Consultation Paper No. 2002/3

TELECOM REGULATORY AUTHORITY OF INDIA

CONSULTATION PAPER

ON

TARIFFS
FOR
BASIC SERVICES

23rd September, 2002, New Delhi

PREFACE

1. The rapid technological advance in telecommunications sector has resulted in substantial improvement in availability and accessibility of basic telephony which has significantly helped in the spread of tele-density in the country. A key target of regulatory policy is to promote these objectives of improving access, and tariff policy plays a major role in this regard. Tariff policy aims at protecting consumer interest in a sustainable manner, which involves inter alia, financial viability of the service provider and fostering increased investments for rapid development of the sector. The telecom sector is identified as a high priority area needing swift growth and massive investments. It is felt that competition in the delivery of services can provide the required impetus for a quick growth of this sector.

2. The emerging multi-service multi-operator environment would require a renewed regulatory assessment in the context of both tariff & interconnection issues. All round and sustainable growth in a multi-operator environment would require a streamlined interconnect regime, based on cost based Interconnection Usage Charges (IUC). This becomes all the more critical when competition in the long distance call markets leads to sharp price declines and thus to precipitate larger reduction in the margins available for cross-subsidising the access deficit. The IUC regime provides an important source of revenue to the basic access providers and is a key part of the model Reference Interconnect Offer that has been notified by the TRAI.

3. The last major tariff review was conducted by the Authority in 1998/1999. The present situation has changed substantially and a new review is called for. This consultation paper seeks to explore the tariff framework for basic service, including dial-up access to Internet services, in the context of the competitive trends seen in the telecom market. The outcome expected in the Consultation Paper is two fold. One, the Authority would like to elicit a feedback on the key objectives to be served by this tariff review. Two, to determine the regulatory direction for a medium term scenario. Thus the questions posed are set in the context of trends seen to be emerging in the market for basic services.

4. This consultation paper concentrates on certain key principles relating to regulation of tariff for basic services. Chapter 2 of the Consultation paper examines the evolving structure of the basic service market with an analysis of the degree of competition that is likely to arise in the near future, the changes in tariffs for basic services in the past few years including the substantial changes that have taken place due to the introduction of competition in the NLD and ILD markets. Certain key questions on the regulatory framework for tariffs are raised in this background. Chapter 3 of the Consultation Paper addresses the details regarding basic tariff review with respect to monthly rentals and call charges. Chapter 4 deals with a short exposition on the tariffs for dial up access to internet. The Authority is of the view that it is important to consider these tariffs if a faster spread of internet is to be encouraged. Chapter 5 provides details on the Interconnection Usage Charge (IUC) regime for National Long Distance Calls. This chapter gives estimates prepared by the TRAI for origination, termination and carriage charges for NLD traffic, which is intended to be used as the basis for discussion on this issue.

5. The Authority invites written responses from all stakeholders latest by closing hours of 25th October, 2002. It would be appreciated if the response is accompanied by a Floppy Diskette or Email having the contents of the submission.

6. For further clarifications, Dr.(Mrs) Roopa R.Joshi, Advisor (Economic) – Tel. No. 6160752. Email address: **trai01@bol.net.in** and Shri R.K.Bhatnagar, Advisor (FN) – Tel. No. 6166930 Email address: **trai06@bol.net.in** may be contacted. The Fax no. of TRAI is 6103294.

New Delhi
23 September, 2002

M.S.Verma
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GLOSSARY

ADC	Access Deficit Charge
ARE	Average Recurring Expenditure
ARPU	Average Revenue Per User
BSNL	Bharat Sanchar Nigam Ltd.
BSO	Basic Service Operator
BT	British Telecom
CPE	Customer Premises Equipment
CPI	Consumer Price Index
DEL	Direct Exchange Line
DIAS	Direct Internet Access System
DID	Direct Inward Dialing
DSL	Digital Subscriber Line
FRIACO	Flat Rate Internet Access Call Origination
ILALD	Internet Lease Access Line Doubler
ILD	International Long Distance
ISDN	Integrated Services Digital Network
ISP	Internet Service Provider
ITU	International Telecom Union
IUC	Interconnection Usage Charges
LE	Local Exchange
MOU	Minutes of Use
MTNL	Mahanagar Telephone Nigam Ltd.

NLD	National Long Distance
NTP	National Telecom Policy
OFC	Optical Fiber Cable
OFTEL	Office of Telecommunications (UK)
PABX	Private Automatic Branch Exchange
PCO	Public Call Offices
PLMN	Public Land Mobile Network
POTS	Plain Old Telephone Service
PSTN	Public Switched Telecom Network
RIO	Reference Interconnection Offer
SDCC	Short Distance Charging Centre
STD	Subscriber Trunk Dialing
STP	Standard Tariff Package
TAX	Tandum Automatic Exchange
TDSAT	Telecom Dispute Settlement Appellate Tribunal
TRAI	Telecom Regulatory Authority of India
TTO	Telecommunication Tariff Order
USF	Universal Service Fund
USO	Universal Service Obligation
VPT	Village Public Telephone
WLL(M)	Wireless in Local Loop (with Limited Mobility)

I. INTRODUCTION

1.1 It is well recognized that the availability of affordable basic telephony on demand is essential for meeting the tele-density targets set in NTP 1999 (National Telecom Policy). Given that telecommunications is an important contributor to economic growth, recent developments, particularly that of rapid technological progress have changed the pace of expansion and more importantly made basic services less costly to provide because of falling costs of network elements. On the supply side, traditional models of a monopoly service provider providing telephony is giving way to a multi-operator environment - wherein new entrants also provide the added investment and spur efficiency gains in the provision of services.

1.2 The main objective of this consultation paper is to examine in depth, the nature, content and direction of tariff regulation with respect to basic services. The paper seeks to explore the right framework for basic services tariff regulation in the context of competitive trends seen in the basic telephony market.

1.3 Some of the key principles relating to the regulation of tariff for basic services being focussed in the consultation paper are listed below:-

- Promoting access to basic telecommunication services, particularly in rural and remote areas by making them affordable.
- Creating enabling conditions to promote competition.
- Prevent abuse of market power and anti-competitive behaviour of service providers, who enjoy significant market power.
- Increase tele density to meet the targets of NTP 1999, by making basic services affordable.
- Ensure transparency in regulatory processes.

1.4 The consultation paper is structured as follows:-

1.5 Chapter two examines the structure of the basic service market with an analysis of the degree of competition that is likely to arise in the near future. The Chapter summarises the evolution of the market structure and tariffs for basic services in the past few years, noting the process of tariff re-balancing that was begun by the TRAI with its notification of the Telecommunication Tariff Order (TTO) 1999 and the substantial changes that have taken place due to market competition in the National Long Distance ("NLD") and International Long Distance ("ILD") markets.

1.6 Chapter three addresses the issue of telecom tariffs in greater detail, and raises a number of questions for consultations with respect to monthly rentals, call charge, free calls, etc. The objective of the Chapter is to consider the main issues relating to the regulation of tariffs for basic service, including the methodology and principles applicable to such regulation. Some examples of tariff schemes have been given to help initiation of discussions. The tariff schemes that have been mentioned in the Chapter should not be treated as any indication of the TRAI's thinking on the subject. This Chapter also provides a basis for considering introduction of origination/termination charges applicable to local calls.

1.7 Chapter four is a short exposition on tariffs for dial up access to internet. This is an area which has been the subject of the Authority's concern for some time now. In the recent times there have also been many representations about their being very user unfriendly and actually a deterrent to the growth of internet usage in the country. A Task Force set up by the TRAI to provide inputs for promoting the growth of the internet sector has also identified it as one of the factors responsible for the slow growth of internet in the country.

1.8 Chapter five outlines a framework for introducing the Interconnection Usage Charge (IUC) regime for National Long Distance Calls. The Chapter provides the estimates for origination, termination and carriage charges for NLD traffic, based on a detailed exercise undertaken by the TRAI. The estimates have been arrived at after examining the IUC charges based on different costing methodologies (top down, bottom up, and outside in) and also taking into account some international benchmarks in this regard. These would be relevant for the negotiations in respect of IUC within the framework of the Reference Interconnect Offer that is required to be notified by the dominant operators. In this context, the Authority also raises the issue whether for the IUC there should be a range given by the regulator or voluntarily agreed upon by all the parties concerned. It also invites comments on the estimates that have been given in this paper.

II. COMPETITIVE TRENDS IN BASIC SERVICES- AN ANALYSIS OF EMERGING TRENDS

(a) Tariff Changes since notification of TTO in March 1999

2.1 In this section, we consider the market driven tariff changes for Basic Services that have occurred since the implementation of the Telecommunication Tariff Order (TTO) 1999. The focus is on monthly rentals and local call charges. In this context it is worth emphasising that National Long Distance (NLD) and International Long Distance (ILD) have recently emerged as stand alone services and are offered competitively by independent private operators holding specific licenses for offering these services. When the last exercise was done in 1998/99, the Department of Telecom (DOT) was operating a vertically integrated network offering bundled local and long distance service in a monopolistic market structure.

2.2 The TTO 1999 had begun a process of tariff re-balancing with an increase in monthly rentals and decrease in NLD and ILD tariffs i.e., to bring them near the cost. The change in monthly rentals, and tariffs for NLD and ILD calls were implemented by TTO 1999 in three steps, so as to phase-in the sizeable revisions in these tariffs. However, it is noteworthy that at present the prevailing NLD and ILD tariffs are much below the levels envisaged in TTO 1999; while the NLD tariffs are below the TTO specified levels by up to 62 per cent, the ILD tariffs are lower by up to 50 per cent.

2.3 The large decline in the NLD and ILD tariffs witnessed in recent years has more than achieved the reductions envisaged in TTO, 1999 as part of the tariff rebalancing exercise. However, rebalancing which also envisages a corresponding increase in rentals to bring them near cost has not taken place. The Regulator has maintained the initial levels of rentals specified in TTO 1999 for the non-commercial subscribers, on account of considerations of affordability and increasing teledensity in the country. The Authority did, however, increase the monthly rentals for the commercial subscribers this year as a part of re balancing of tariff, but these higher rentals for commercial subscribers were not made

effective by the service providers partly because of apprehensions that the competitors may not act similarly and partly for fear of encountering consumer resistance and diversion of his business.

2.4 While there is no denying that rebalancing of tariffs prepares the grounds for competition, the adverse impact it is likely to have on affordability by ordinary/general subscribers cannot be overlooked. In the final analysis the tariff structure has to sustain demand and help achieve higher tele density by making basic telephone service affordable. In view of this, TTO 1999 permits Alternative Tariff Packages (ATP) in addition to the mandatory Standard Tariff Package (STP). The mandatory STP protects the interest of subscribers, while ATPs allows operators to compete for the subscriber's differentiated needs, thereby ensuring that the benefits of competition are available to the subscribers, in the form of lower prices and/or better quality.

(b) <u>Number and Nature of Alternative Tariff Packages in Basic Service</u>

2.5 For the period January, 2001 to December, 2001, the number of tariff plans reported were around 282 (including by BSNL and MTNL). Since the beginning of this year until mid July i.e. in 7 months of 2002 for which up to date information is available, the total number of tariff reports received is 283 (private BSO 256, BSNL 20, MTNL 6) for the various services they are providing under the basic service licence. These include PSTN, PCO, ISDN, EPABX service etc. Important features of the ATPs reported by the BSOs for provision of PSTN services are the following:-

i) The BSOs generally offer ATPs that have higher monthly rentals with higher free call allowance or low rental and no free call allowance. In addition, volume discounts are a popular method of offering lower effective prices to subscribers of Basic Services. Promotional packages are also offered by most of the BSOs. Such offers include free Internet access, free calls, Free CLIP, free Voice Mail, rebate in rentals, discount in installation fee and registration fee etc.

ii) A feature worth noting is that between the period March 1999 and January 2001, the number of ATPs reported by BSOs were limited. Since opening up of the NLD and ILD markets, issue of fresh licenses to BSOs and entry of the fourth cellular player in certain service areas has had the effect of increasing the level of competition for Basic Services as manifested in an increase in the number, frequency and variety of alternative tariff plan filings by operators.

(c) Price Changes for Basic Services

2.6 Such alternative tariff packages available along with the STP prescribed by TRAI imply that the effective tariff for subscribers is different from the level specified by TRAI in the STP. In order to calculate the changes in tariffs over the period of operation of TTO 1999 until the present, one will have to look at the usage pattern i.e. break up of calls over local, long distance and International long distance. Such information is not readily available, although based on such figures as are available, some assumptions can be made. In the absence of precise information, and an estimate of demand elasticity, it is possible to make a tentative estimate of price decline of basic services from the changing ARPUs over the period.

2.7 Table 2.1 shows Average Revenue Per User (ARPU) per year for BSOs. The projections are based on the information provided to TRAI by the operators. The trend that emerges from the table is that ARPUs have declined for each BSO and are expected to continue to decline in the medium term. The reason for the decline in ARPUs is a mixture of both fall in tariffs as well as competition for acquiring subscribers who are likely to be the lower users.

Table 2.1 Current and Projected Annual ARPUs of different BSOs (Rs./annum)

Operator	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04
A	8,278	7,061	5,948			
B	40,198	15,691	15,727	17,105	16,553	16,761
C	-	-	17,564	20,168	17,991	16,273
D	-	84,052	52,658	35,813	33,994	31,041
E	-	-			15,994	14,750
F	-	-	22,604	17,730	17,088	12,470
G	-	30,822	30,030	19,575	16,404	16,060

Source: Reports from BSO's

2.8 Tariff reports submitted by service providers were also examined to gauge the extent of tariff changes in the alternative tariff packages. Table 2.2 present data for the period 2000-2001. The methodology used for determining the trends in tariffs for basic service over the period 2000 to 2001 consisted of taking alternate tariff plans offered by the basic operator during the two points of time i.e in the year 2000 and year 2001 from which financial implications (Minimum monthly bill amount) for minutes of use ranging from 100 to 1000 per month were computed. This exercise was repeated for various basic service operators in different circles/cities. As stated above, the intensity of price competition during this period for Basic Services was low and the figures reflect this aspect of the market. For example, while in certain Circles there was no change in tariffs in the last year, in another Circle the average tariffs declined by 3 per cent to 10 per cent depending upon usage. On the other hand, in one Circle, there was an increase in average tariffs, with a higher burden falling on low users. Besides the lack of effective competition in the market during this period, one could also presume a tendency amongst the new private operators to focus, in the first few years of operation, less on market share and more on attracting the high-end users.

Table 2.2 Estimate of Price Changes for different categories of subscribers (2000 – 2001)

Service Providers in Various Circles	No. of Minutes of usage					
	100	**200**	**300**	**400**	**500**	**1000**
A	17%	13%	10%	7%	6%	3%
B	35%	25%	18%	15%	12%	6%
C	0%	0%	0%	0%	0%	0%
D	0%	0%	0%	0%	0%	0%
E	100%	53%	28%	18%	13%	5%
F	-7%	-7%	-5%	-4%	-6%	-3%
G	-7%	-10%	-8%	-7%	-6%	-3%

Source: Computed from Tariff plans reported by service providers

(d) Subscriber base - Market Share of different Service Providers

2.9 The share of BSNL and MTNL in basic services continues to be over 98% of the total market. Private provision of basic services has so far been able to create only a very limited impact accounting for no more than 1.6% of the total market. There could be several reasons for this. The first private operator to begin commercial services was Bharti Telenet in Madhya Pradesh Circle in June 1998 followed by Hughes Telecom in Maharashtra about four months later. In all six private basic operators have started commercial services and it has been only slightly over four years since the start of the first private basic operation. Four years is too small a time to make any serious dent in the market monopolised by a Government owned operator who for several decades has dominated the markets. Table 2.3 shows the extent of subscriber coverage, past and present as well as projections for the future. These are on the basis of inputs received by the TRAI from the Service Providers.

Table 2.3 Market Share of Basic Service Operators

	1998-99	1999-00	2000-01	2001-02
BSNL	82.99%	84.32%	85.95%	86.43%
MTNL	16.92%	15.12%	13.23%	12.05%
A	0.06%	0.35%	0.35%	0.47%
B	0.03%	0.08%	0.21%	0.42%
C		0.10%	0.18%	0.39%
D			0%	0%
E			0.03%	0.07%
F		0.03%	0.04%	0.17%

Source: Based on DEL's reported by BSO's to TRAI.

Table 2.4 Current and Projected Subscriber Base for Basic Services

		1998-99	1999-00	2000-01	2001-02	2002-03 (projected)	2003-04 (projected)
Incumbents							
BSNL	Opg	14,394,956	17,939,773	22,479,721	28,108,976	N.A	N.A
	Clg	17,939,773	22,479,721	28,108,976	33,218,498	N.A	N.A
MTNL	Opg	3,406,740	3,653,913	4,031,624	4,327,158	N.A	N.A
	Clg	3,653,913	4,031,624	4,327,158	4,629,709	N.A	N.A
New Entrants							
A	Opg	-	13,980	91,967	115,212	165,000	210,000
	Clg	13,980	91,967	115,212	165,000	210,000	260,000
B	Opg	-	-	-	13,705	77,333	158,199
	Clg	-	-	13,705	77,333	158,199	246,647
C	Opg	-	5,717	22,913	69,599	150,000	220,665
	Clg	5,717	22,913	69,599	150,000	220,665	300,914
D	Opg	-	-	4	109	140	360,000
	Clg	-	4	109	140	360,000	600,000
E	Opg	-	-	-	9,119	29,575	87,000
	Clg	-	-	9,119	29,575	87,000	180,000
F	Opg	-	285	26,744	58,709	150,797	302,638
	Clg	285	26,744	58,709	150,797	302,638	450,286

Source: Data provided by service providers (Opg : Opening) (Clg : Closing)

2.10 The projections available from the new entrants (i.e. the private sector operators) in Tables 2.4 indicate that BSNL and MTNL will remain the dominant operators in terms of market share in the near future and will continue to be so for some time to come.

2.11 Market trends given in pre-para indicate that as far as basic services are concerned, there is no likelihood of effective competition in the medium term, necessitating regulatory intervention to fix tariff in the absence of market forces. Regulatory intervention is also required to meet the social objective of making basic telephony affordable. This is in line with trends witnessed in most developing countries as well as a large number of developed countries.

2.12 While this conclusion could be valid, an analysis of only the basic services market and the shares of different Basic Services Operators (BSOs) therein could be misleading as it would ignore possible competition from the other access providers i.e. cellular operators. To the extent that these two access services are substitutable, an expansion of the definition of the market to include both basic and cellular services could provide insights into nature and extent of competition that are different from those that can be had by treating the two i.e. basic and cellular markets, as independent.

(e) Level of Competetion in Long Distance Segment of Basic Service

i) NLD Service

2.13 With the opening up of the market for long distance i.e. NLD and ILD (by the entry of players other than the incumbent) the monopolistic nature of the long distance market is likely to evolve towards a multipolistic market structure sooner than later. In this change, cellular mobile services and their fast growth will have an important role as this will affect competition in the telecom market. However, taking note of the fact that at present the private NLD operator has established POPs in only 18 LDCAs out of 321 and is in a position to pick up traffic from less than 10% of the SDCAs, the conclusion that the incumbent will continue to dictate NLD tariff for quite some time, is inescapable.

2.14 The TRAI in its 20th Amendment to TTO 1999 provided for implementation of the third tranche of rebalanced tariff levels for National long distance traffic. However, as already mentioned earlier, current levels of NLD tariffs announced by the NLD operators are up to 62% below the TRAI prescribed, rebalanced levels. Table 2.5 below provides a snapshot of the TRAI determined pulse and call charge per minute and the existing call charges as announced by the incumbent operator.

Table 2.5 Comparison Between NLD Tariff Ceilings Specified By TRAI and the NLD Tariffs Implemented By BSNL

	TRAI (TTO 20th Amendment)		Tariff Given By NLD Operators	
	Existing Pulse (Seconds)	Existing call charge per min. (Rs.)	Existing Pulse (Seconds)	Existing call charge per min. (Rs.)
Local calls	180	0.40	180	0.40
NLD				
0 to 50 Kms	180	0.40	180	0.40
51 to 200 Kms	18	4.80	30	2.40
201 to 500 Kms	6.8	10.80	15	4.80
501 to 1000 Kms	4.6	16.80	8	9.60
Above 1000 Kms	3.5	21.60	8	9.60

Note: A call of 3 minutes duration has been taken for local calls and for the NLD call for distance "0 to 50 kms."

ii) ILD Service

2.15 Competitive trends witnessed in the ILD market is much more pronounced than in the NLD market, because of the recent entry of two new operators in addition to the incumbent VSNL, namely Data Access and Bharti Telesonic. Table 2.6 provides the differentials between the ILD tariffs as set in the third tranche of rebalancing and the competitive rates offered by the operators.

Table 2.6 **Peak Hour Pulse Duration/Ceiling Tariff Specified By TRAI and the Tariffs Offered in The Market By the ILD Operators (tariff calculated at Rs.1.20 per metered call)**

Country Categories	TRAI (20th Amendment) (Third Tranche Ceiling Tariff)		VSNL/Data Access/BTSOL (Reported/ existing)	
	Pulse Rate (Seconds)	Per minute Charge (Rs.)	Pulse Rate (Seconds)	Per minute Charge (Rs.)
SAARC & other Neighboring Countries	3.3	21.60	3.4	21.60 (18.00)
Africa, Europe, Gulf & Oceania	2.3	32.40	3.0	24.00 (21.60)
Countries in American Continent and other places in Western Hemisphere	1.8	40.80	3.0	24.00 (21.60)

Note: The figures in the parentheses show the off peak tariff. TRAI did not specify any off-peak tariff, i.e. it had forborne with respect to those tariffs.

2.16 An important factor which could put downward pressure on ILD tariffs is the emergence of IP telephony. A comparison of IP telephony rates per minute (range) with existing landline ILD tariffs is shown in the Table given as Annex-I. It is observed and interestingly so, that the most competitive tariffs are to the European, Australian and North American continents.

2.17 Evidence from the above sections would suggest that while the market for access is heavily skewed towards the incumbent and is likely to remain so in the near and mid-term, the trends are different in both the NLD and ILD segments. In these segments competition would be more vibrant, and this would need to be factored in for regulatory policy formulations.

(f) TTO 1999, its background and Changes since its introduction

2.18 Tariff regulation is seen as a key regulatory tool to protect consumer interest and to give cost orientation to basic service tariffs when this is not being done through effective market competition. Tariff provisions contained in TTO 1999 need to be seen in the background of the level of competition in basic services then obtaining and growth of competition since then. In the absence of effective competition regulatory intervention in basic services tariff will continue to be important and for some time more remain one of the major functions of the Authority. At the time TTO 1999 was brought into force teledensity was very low and affordability and social objectives of accessibility had to be kept in focus together with the need to encourage investment and efficient roll out of networks. Historically, the local call charges and rentals had been kept below cost in the interest of affordability and were cross subsidized by cost plus long distance charges. It is difficult to alter a tariff structure based on above considerations all of a sudden. However, with such a tariff structure, a small subscriber base provides majority of the revenue, and if competition is allowed the new entrant would initially focus mainly on this small base of subscribers who account for high revenue. This makes it difficult for the incumbent to sustain its revenue surplus and the subscriber base. To mitigate the burden of adjustment on the incumbent and to maintain a level playing field for all service providers, there is a need to re-balance tariffs for the basic services i.e. to increase rental/local call charges and decrease long distance call charges. This need was felt and given effect through TTO 1999. The proposed extent of rebalancing was spread over three years in corresponding three phases which have since been completed.

2.19 Based on extensive consultations in 1998, with the objective of achieving some rebalancing between access and long distance call charges the TRAI notified charges for the following elements of basic service tariff in its TTO 1999: Installation, Deposits, Monthly rentals for rural subscribers, Monthly rentals for urban subscribers, Tariff per metered call for rural subscribers, Free calls for rural

subscribers, Tariff per metered call for urban subscribers, Free calls for urban subscribers, Pulse rate for local calls, Pulse rates for peak hours for domestic long distance calls, Pulse rates for peak hours for international subscriber dialed calls, Peak hour tariff for trunk manual calls, Franchised group PBX or PABX and EPABX with DID facility (for multistory buildings, co-operative housing societies), and Tariffs for ISDN services.

2.20 Since its notification, the TTO, 1999 has been amended with respect to the areas shown in Annex-II. These amendments were made either to correct some anomalies which were observed in the course of implementation of the TTO 1999 or arose from changes in the market situation including changes in the cost structure of service provision.

2.21 In this consultation, we are addressing the tariff categories which are covered under Schedule I of TTO 1999. These include, inter alia, monthly rentals, call charges for local calls, long distance calls, and international calls, charges for end-users of DID exchange, call charges for dial-up for internet, and free calls. In addition, competition issues in other relevant markets, wherever applicable will be addressed.

(g) Tariff Rebalancing in TTO, 1999

2.22 Tables 2.7 to 2.12 show the extent of change in Tariffs that was envisaged in the TTO 1999 in the Standard Tariff Package over the three years of operation of TTO 1999 from May 1999 to March 2002. As is evident from the Tables the proposed extent of tariff rebalancing, in particular the increase in monthly rental, envisaged in TTO 1999 was more than the tariff changes that were actually implemented.

2.23 In contrast, for National Long Distance (NLD) and International Long Distance (ILD), the decrease in tariff envisaged for the third phase lost relevance because apprehensions of loss of market spurred the incumbent to drop these rates substantially below the rebalanced levels proposed in TTO 1999 .

2.24 In order to culminate the process of rebalancing in its targeted penultimate year, the Authority, while taking note of the competitive trends in the NLD and ILD markets decided to notify the third tranche of STD tariffs for NLD and ILD tariffs as ceilings in the 20th Amendment to the TTO 1999. The monthly rentals were kept unchanged for low user category and general user category (which were combined into a single category of non commercial user subscriber). However, for commercial subscribers, the rentals were increased as specified in the third tranche of rebalancing and the number of applicable free calls reduced to 30 and 45 metered calls per month of billing cycle for urban and rural commercial subscriber respectively.

2.25 It would be observed that in respect of monthly rentals the extent of re-balancing achieved in the STP has been less than envisaged, although the extent of tariff decline for NLD and ILD tariffs has been significantly more than that specified under the TTO 1999.

Table 2.7: Monthly Rental for Basic Services for Rural Areas – Low User

Item	Rates before the re-balancing prior to 1.5.1999 (Rs.)	Rates according to Telecom Tariff Order 1999		Cumulative increase envisaged in TTO from 1-5-99 to 31-3-02	% increase not implemented by virtue of 9th Amendment to TTO 1999
		Rates for the final phase of rebalancing	% rise		
Rentals (for exchanges with capacity up to 999 lines)	50	70	40%	**40%**	**0%**
1,000 to 29,999 lines	100	120	20%	**20%**	**0%**
30,000 to 99,000 lines	137.5	180	31%	**31%**	**0%**
1 lakhs to below 3 lakhs lines	180	250	39%	**39%**	**0%**
3 lakhs and above	190	250	32%	**32%**	**0%**

Table 2.8 : Monthly Rental for Basic Services for Rural Areas – General User

Item	Rates before the re-balancing prior to 1.5.1999 (Rs.)	Rates according to Telecom Tariff Order 1999		Cumulative increase envisaged in TTO from 1-5-99 to 31-3-02	% increase not implemented by virtue of 9th Amendment to TTO 1999
		Rates for the final phase of rebalancing	% rise cumula-tive		
1,000 to 29,999 lines	100	160	60%	**60%**	**40%**
30,000 to 99,000 lines	137.5	220	60%	**60%**	**29%**
1 lakhs to below 3 lakhs lines	180	310	72%	**72%**	**33%**
3 lakhs and above	190	310	63%	**63%**	**32%**

Table 2.9 : Monthly Rental for Basic Services for Urban Areas – Low User

Item	Rates before the re-balanc-ing prior to 1.5.1999 (Rs.)	Rates according to Telecom Tariff Order 1999		Cumulative increase envisaged in TTO from 1-5-99 to 31-3-02	% increase not implemented by virtue of 9th Amendment to TTO 1999
		Rates for the final phase of rebalancing	% rise cumula-tive		
Rentals (for exchange with capacity of less than 100 lines)	50	120	140%	**140%**	**0%**
Upto 999 lines	75	120	60%	**60%**	**0%**
1,000 to 29,999 lines	100	120	20%	**20%**	**0%**
30,000 to 99,000 lines	137.5	180	31%	**31%**	**0%**
1 lakhs to below 3 lakhs lines	180	250	39%	**39%**	**0%**
3 lakhs and above	190	250	32%	**32%**	**0%**

Table 2.10 : Monthly Rental for Basic Services for Urban Areas – General User

Item	Rates before the re-balanc-ing prior to 1.5.1999 (Rs.)	Rates according to Telecom Tariff Order 1999		Cumulative increase envisaged in TTO from 1-5-99 to 31-3-02	% increase not implemented by virtue of 9th Amendment to TTO 1999
		Rates for the final phase of rebalancing	% rise cumula-tive		
Rentals (for exchange with capacity of less than 100 lines)	50	160	220%	**220%**	**80%**
Upto 999 lines	75	160	113%	**113%**	**53%**
1,000 to 29,999 lines	100	160	60%	**60%**	**40%**
30,000 to 99,000 lines	137.5	220	60%	**60%**	**29%**
1 lakhs to below 3 lakhs lines	180	310	72%	**72%**	**33%**
3 lakhs and above	190	310	63%	**63%**	**32%**

Note: The monthly rentals for the commercial subscriber category was the level that was the rate in the third year for the general user subscriber category. This rental was implemented only in the third phase of the tariff re-balancing.

Table 2.11 : Peak Charge for Domestic Long Distance Calls

DLD radial distance in kms	Rates before the re-balancing prior to 1.5.1999	Rates according to Telecom Tariff Order 1999 (Rs.; at Rs. 1.20 per pulse)		Cumulative decrease envisaged in TTO from 1-5-99 to 31-3-02	% decrease not implemented by virtue of 9th Amendment to TTO 1999
	Charge per minute in prevailing scheme at Rs. 1.25 per pulse	Rates for the final phase of rebalancing	% fall cumula-tive		
Upto 50	2.08	1.2	**42.3%**	**42%**	**0%**
51-200	9.58	4.8	**49.9%**	**50%**	**13%**
201-500	18.75	10.8	**42.4%**	**42%**	**6%**
501-1000	25	16.8	**32.8%**	**33%**	**5%**
Above 1000	37.5	21.6	**42.4%**	**42%**	**10%**

Table 2.12 : Peak Charge for International Long Distance Calls

ILD Country Categor-ies	**Rates before the re-balancing prior to 1.5.1999**	**Rates according to Telecom Tariff Order 1999 (Rs.; at Rs. 1.20 per pulse**		**Cumulative decrease envisaged in TTO from 1-5-99 to 31-3-02**	**% decrease not implemented by virtue of 9th Amendment to TTO 1999**
	Charge per minute in prevailing scheme at Rs. 1.25 per pulse	Rates for the final phase of rebalancing	% fall cumulative		
Slab 1	37.5	**21.6**	**42.4%**	**42%**	**10%**
Slab II	62.5	**32.4**	**48.2%**	**48%**	**13%**
Slab III	75	**40.8**	**45.6%**	**46%**	**11%**

2.26 It is pertinent to mention here that while re-balancing did allow for a recalibration of commercial users rentals, none of the service providers have raised these rentals. The Service Providers thus have not re-balanced this element although they had an opportunity to do so and thereby foregone some much needed resources which could have been used to cover, at least, a part of the otherwise high access deficit.

(h) Context of Tariff Rebalancing Today

2.27 The ultimate objective of tariff rebalancing would be to make the access deficit zero by raising the rental/local call charges to their cost based levels. However, when we look at the present teledensity and universal service objectives clearly the stage for complete rebalancing has not yet arrived. Once it is conceded that access deficit has to be provided the question of the source from which the deficit can be met assumes importance. Much, therefore, depends on the flexibilities available in the existing set of tariffs, i.e. those relating to NLD and ILD sectors, to allow for rebalancing. The current consultation paper would need to factor in the changed competitive conditions as well as the feasibility and desirability of using IUC as a means to address the issue of access deficit.

(i) Rate of return and price cap regulation

2.28 Regulators have broadly used two types of methodologies to regulate tariffs, namely rate of return regulation and price cap methodology. Under a rate of return methodology, the cost allocated to any specific service/tariff is estimated and the tariff is fixed by providing a reasonable return on the cost base. The objective is thus to address the concerns of both the consumers and the producers. This method also provides for greater certainty of prices, which is important for investment decisions. However, with this methodology, over a period of time, there was an incentive for the service providers to over-estimate their costs or even over-dimension their facilities. Methods were sought to address this problem.

2.29 One method to address this would be to monitor closely the cost developments and have benchmarks for the costs concerned, reviewing periodically the costs and the tariffs. Another would be to alter the incentive for cost over-estimation by allowing the service providers themselves to choose the tariffs for various services, subject to certain overall constraints. Such an incentive structure is attempted through the price cap methodology.

2.30 Under the price cap methodology, a general cap or limit on the overall price increase is put by specifying that the overall average tariffs/prices of the basket of services (e.g. monthly rental, local call, national long distance calls) should not increase by more than the net increase in costs. The proxy for a net increase in costs is usually captured by "CPI minus X", i.e. change in the consumer price index minus a factor which captures the reduction in costs due to improvement in productivity. In addition to the overall cap of CPI minus X, this methodology also allows for specific caps for sub-baskets, e.g. a sub-basket of monthly rental with the cap that this tariff should not increase by more than a specified per cent per annum.

(j) Conclusion : Inferences for Regulatory Policy

2.31 Based on the analyses of basic service market, it would appear that so far the competition in the local service market has remained insignificant with only a duopoly in 6 telecom circles. However, competitive pressure appears to be more pronounced in the NLD and ILD market, where more than two operators have recently entered the market and are likely to offer significant competition to the incumbent. The extent of competition for basic services may change somewhat with the growth of Wireless in Local Loop with limited mobility (hereinafter "WLL(M)"). Nonetheless, the likely trends continue to show a major dominance of the incumbents for the next few years. Moreover, the teledensity of the country is still low, and the objective of affordability will continue to be of great importance in any regulatory policy regarding telecom tariffs. For both these reasons, it appears that there will continue to be a need to regulate Basic Service tariffs for some more time and that complete rebalancing of PSTN tariff i.e. introduction of cost based rates for both local and long distance services can be achieved only in phases. In the interim, the charges payable for long distance origination and termination may have to provide for what may be called 'Access Deficit Charge' (ADC), which in effect will be a means to subsidize the below cost tariffs, i.e. rental/local call charges.

2.32 To the extent that tariff regulation is required, the exact methodology will remain a critical issue i.e. how best to regulate these tariffs. For example, the regulator will have to consider whether to continue with the specification of tariff levels or a price cap or whether any other methodology be used. Issues regarding asymmetric regulation and whether specific services e.g. certain types of calls (domestic/international long distance) could be subject to different regulatory policies would also assume importance with the changing conditions in the market and merit consideration.

2.33 Based on the discussions of the main issues of basic services tariff regulation, the consultation seeks to address the following issues:

1) In view of the existing market structure wherein the incumbent has more than 98% of the market share in the access market and almost the same in the local and long distance services, what would be the immediate objectives of regulations, particularly tariff regulation? Is the need for rebalancing between NLD/ILD tariffs and access tariffs as critical today after introduction of competition in all these areas, as it was when it was first undertaken through TTO 1999? Should efforts to rebalance tariff through regulatory intervention continue?

2) Has market development reached a stage to warrant a different modality of tariff rebalancing namely a shift from a regulator driven regulation? If the answer to the above question is in the positive, what should be the new pattern of tariff regulation:-

(i) An overall price cap, with or without sub-caps for specified services (please indicate the service to be specified); or only a floor price to be specified for all specified services; or a combination of both ceiling and floor prices; or

(ii) Should a system be followed wherein only some specified services such as local services are regulated?

3) With the opening up of NLD and ILD to new players should there be a schedule for these tariffs separate from the basic services tariff schedule?

4) Should we continue with the present method of specifying a mandatory standard tariff package, and allowing the service provider to offer alternative tariff packages?

5) Does a ground exist for applying asymmetric regulation i.e. regulation applying only to the incumbent who enjoys significant market power and has the ability to control prices?

6) Should specific services (e.g. domestic/international long distance) be subject to different regulatory policies, than the local services?

III. FRAMEWORK AND METHODOLOGY FOR BASIC TARIFF REVIEW

3.1 One of the principal objectives of tariff rebalancing exercise for basic services is to promote efficiency in the supply of telecommunication services and at the same time provide basic telephone service (POTS) at affordable prices, to the consumers. While the former is dictated by considerations relating to efficient utilisation of resources utilised and the network infrastructure created, the latter is dictated by social policy objectives. These often appear contradictory goals and cannot be left entirely to market forces. Regulatory intervention for tariff rebalancing, therefore, continues to be relevant. In the Indian context it is evident that enhancing efficiency and investment in telecom needs application of appropriate regulatory mechanisms so that both investment and consumption of telephone services grow in tandem to attain the goal of fast growth in teledensity. An important objective of tariff policy is to provide incentives for competition while aligning prices towards cost particularly in the local network so that competition may be sustained over time. However, in the Indian context, the issue of affordability is an abiding concern, and tariff policy has traditionally subsidized services for low-end users. To encourage the use of telephones in rural areas, the extent of subsidy given to the rural subscriber has been higher than that for the urban subscriber. To the extent that this policy provides a disincentive for the service provider to invest in rural areas, an Universal Service Obligation (USO) Policy becomes an important complement to the tariff policy. In addition to the funding provided through the Universal Services Fund (USF), a cross subsidy is also provided in the interest of making latter affordable to the common man.

3.2 While examining basic services tariffs, one should consider whether the principles applied to both WLL (M) and Fixed Line tariffs should be the same, and if not, what differentiating factors deserve to be noted. This has to be seen in the background of the interaction of basic service market with the market for cellular mobile services, and the competitive overlap existing and/or developing between the two.

3.3 The Authority has recently decided on forbearance with most of the tariffs relating to cellular mobile services, taking note of the existing level of competition and the likely trend of greater competition in future in the cellular mobile market. The Authority has emphasized cost based tariffs for this sector, and expects market forces to provide such a tariff without undue regulatory intervention.

3.4 In the case of WLL (M), the Authority had specified in its Recommendations to the Government that the monthly rental would be fixed on the basis of Fully Allocated Costs, and that the Authority was not in favour of any subsidy being provided in the tariffs of WLL (M). The principle with respect to WLL(M) tariffs, therefore, is to determine them on cost basis.

3.5 For Fixed Line tariffs specifically for the so called Plain Ordinary Telephone Services (POTS), however, the objective of affordability is not easily overlooked. The principle governing these tariffs may, therefore, have to be different from that applicable to WLL (M). Nonetheless, even for Fixed Line, the starting point for determining tariffs is to ascertain the cost based tariffs for monthly rental and call charges, and then to determine whether these would be affordable. If the conclusion is that cost based tariffs are not affordable, the next step in the exercise would be to ascertain the tariff levels that should be put in place keeping in mind the concern of affordability. This would also give an indication of the extent of access cost deficit that would need to be covered from other revenue sources.

3.6 In this Chapter, we begin with a short discussion of the principles for determining cost based tariffs, and then consider the means of addressing the access deficit that arises on account of the rentals being below the cost based estimate. A more detailed discussion on various tariffs follows, beginning with the monthly rentals. This is followed by a consideration of the local call charge regime, and the tariff regime applicable to national (and international) long distance calls, and to the end users DID franchisees. The tariff levels for local calls would also provide the basis of demarcating origination/termination charge for these calls.

(a) The framework for estimating cost based tariffs

3.7 A determination of the cost based tariffs involves identifying the different elements in the access and the long distance networks and their utilisation in conveyance of local and long distance calls. This requires unbundling of the network and allocation of joint and common costs which are incurred in delivering the service for which cost based tariff is to be determined. In addition, we need to decide on the cost principle to be applied for estimating the costs, i.e. whether it should be historical costs, current costs, or forward looking costs, and whether the amount should be based on Fully Allocated Costs or Incremental Costs or any variant thereof.

3.8 The details of the unbundled network elements are given in Annex-III. The data for these network cost elements as well as operational costs have been obtained using the format given in Annex Table-III. The costs have been taken as current costs reported by service providers for the year 2001-2002. The principle of fully allocated costs has been followed to distribute the relevant cost heads based on cost causality which means that costs should be recovered from the source causing the cost to be incurred.

3.9 The joint and common costs in the network have to be duly segregated and attributed. This needs to be done on the basis of cost drivers that allow for the distribution of these costs. In this exercise, the distribution of Minutes of Use between local and long distance has been used for allocating capital costs and operational costs while estimating cost based call charges.

3.10 It is evident that at the current juncture the cost profiles of BSNL on the one hand and the private BSOs are vastly different. The present exercise derives profiles of rentals and call charges both for the new entrant as well as the incumbent. Cost figures have been calculated for a private BSO operating in a license area categorised as 'A' Circle, a private BSO operating in 'B' Circle and the

incumbent (BSNL). The rationale behind the approach is that it provides a comparison of standalone costs of an Access provider with the costs of the incumbent who has an integrated network and is both an access as well as long distance service provider. However it is noteworthy that rentals and local calls have been derived for both stand alone BSOs i.e., who do not provide NLD service bundled with local service, and the incumbent who is in a position to do so. For inter circle long distance calls, transmission costs as reported by the incumbent have been taken into account.

(b) <u>Various means of addressing Access Deficit</u>

3.11 Once the cost based tariffs are derived and a view about the affordable level for local service (rental/local call charges) taken, a detailed exercise will need to be conducted for ensuring that the access deficit i.e., the difference between cost based tariff and the affordable tariff, is recovered from other revenue sources such as IUC which is part of long distance tariff. If this is not done, the very purpose of keeping the rental low viz an increase in teledensity will be defeated. The presence of access deficit without an alternative source covering the cost element would then be a serious disincentive to the service providers and may hold them both from investing in the network or attracting more and more end customers.

3.12 The alternative sources of revenue to meet the access deficit include local call charge, the NLD and ILD calls, an Interconnection Usage Charge (IUC) received by the access provider from the long distance service provider, and the revenue obtained from the USO Fund. There is a complementarity between the revenues provided by the USO Fund and from other sources of revenue in as much as an additional amount of these revenues (including IUC) would imply a lower amount USO funding required to cover a particular revenue deficit. A noteworthy feature in this regard is also that the target of the USO fund is at present limited to remote and rural areas with greater focus on VPTs, while the access deficit arises in the case of DEL's in general i.e. even in urban SDCAs, because of rentals being less than the level computed by cost based methodology. Therefore, sources of revenue other than the USO fund will have to be found to meet the access deficit

for the basic service operator in general. In Chapter 5, this paper provides a calculation of average estimates of IUC including access deficit that have been prepared by the Authority. It must always be kept in view that any change in the tariff structure will have a bearing on the IUC.

(c) Monthly Rentals

3.13 The previous tariff exercise conducted in 1998/99 had allocated all capital costs of the local network up to but not including the tandem exchange towards the cost of rental charges. For determining the monthly rentals for WLL (M), the Authority had taken into account a similar portion of the network, by considering the capital expenditure up to the Short Distance Charging Centre (SDCC). One outcome of this approach is that the local call charge would be lower, which viewed in the context of major sensitivity of most subscribers to call charges is important.

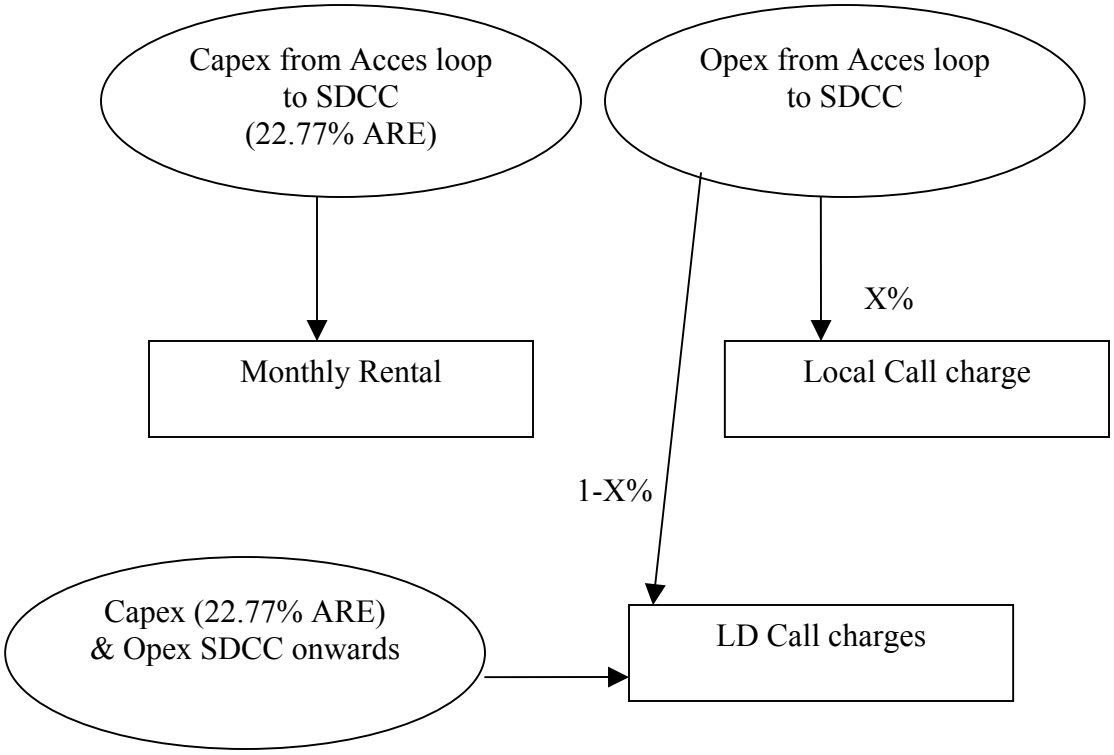
3.14 In the present exercise too, we propose to take the capital costs up to the SDCC (for more details of the network elements and the cost items, please see Annex-III). An important related issue is what portion of the capital stock should be allocated towards rental while determining its cost base. In the previous exercise, the entire capital stock was allocated to monthly rental.

3.15 A possible alternative is that capital costs for this portion of the network be allocated to monthly rental in the ratio of the minutes of use for local calls to the total minutes of use. These two different methods of cost allocation are given in the two scenarios under Chart 1 below. If Scenario I is adopted, then the cost based monthly rental is higher, and the access deficit is likely to be higher too. If the access deficit is allocated to national and international long distance calls in the ratio of their minutes of use as was done in the previous tariff exercise in 1998/99, the effect on the cost based tariffs for these calls would be the same as for Scenario II. However, in Scenario II, we have a lower cost based monthly rental, which would imply a lower extent of tariff re-balancing. However, in both scenarios, the IUC regime would have to ensure that the access provider is able to

recover the amount of access deficit (Scenario I), or the cost based charge relating to the portion of capital stock in the network up to the SDCC (Scenario II).

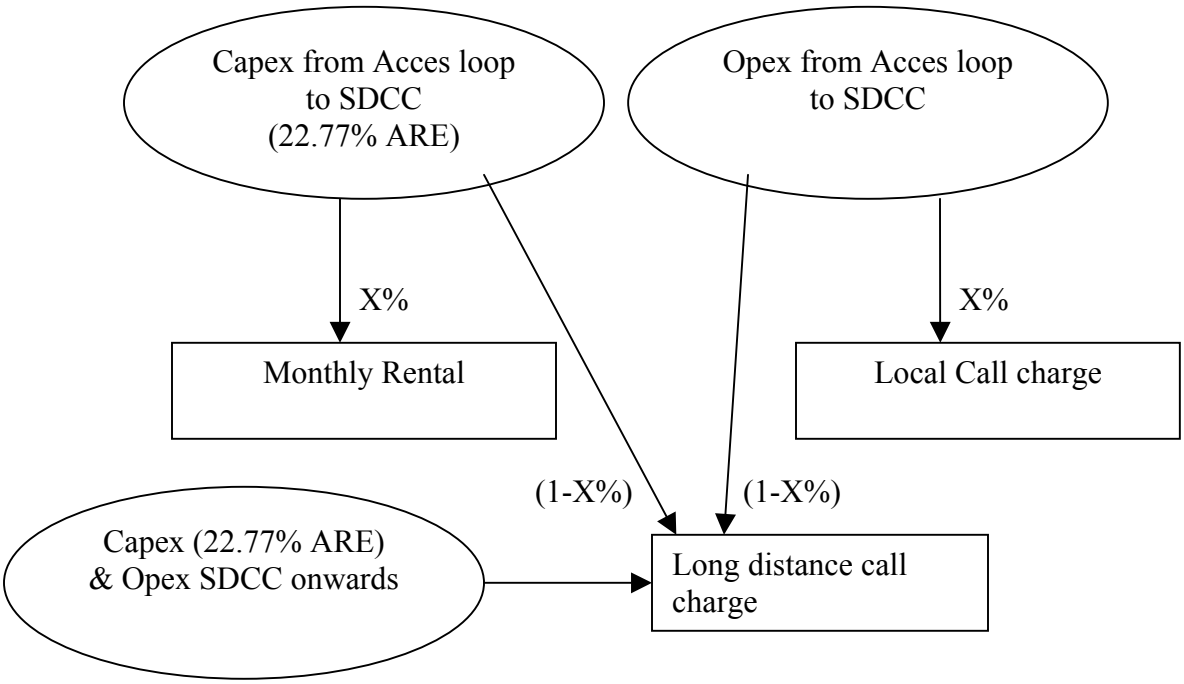
Chart 1. **Allocation of Capital Cost & Operating Cost**

Scenario I



Where X% is the proportion of local minutes in total minutes of use.

Scenario – II



where x% is the proportion of local minutes in total minutes of use.

3.16 In deriving the cost based rentals, an ARE of 22.77% has been used on the basis of the financial analysis carried out for the cost of capital and depreciation rates for basic services. Cost based call charges have been derived from attributable costs for local call charges as per the scenarios described above.

3.17 The issue of affordability will arise if the cost based rental is much higher than what is considered to be an affordable level of rental. While a higher monthly rental could reduce the amount of revenues shortfall which is likely in the case of low-end subscribers, this may also imply a reduction in the number of subscribers particularly low users and thus impact adversely both teledensity as well as the service provider's ability to spread the costs over a larger number of users. For growing networks like ours with a low tele density, a larger number of subscribers would also be desirable to obtain network externalities.

Table 3.1. Estimates of cost based monthly rental (Rs. per month)

	Scenario-I	Scenario-II
Incumbent	455	315
Private Operator "A"	442	296
Private Operator "B"	342	292

3.18 Table 3.1 shows that even with Scenario II, there will be an access deficit for monthly rentals, if we consider the present levels for these tariffs. An important question that arises, therefore, is whether the monthly rentals should be maintained at their current levels or should be increased in order to reduce the deficit and whether for instance this increase be limited by the increase in Consumer Price Index (CPI). A study conducted for TRAI by National Council of Applied Economic Research shows that increase in monthly rentals could adversely affect a rapid growth of subscriber base and the achievement of the teledensity targets. At the same time, there may be some scope to consider an increase, to the extent that average incomes are in general increasing by more than the inflation rate. A policy issue in this regard is whether the monthly rentals may be increased by about the inflation rate, and if so, whether the increase should apply for all monthly rentals or only for specified categories e.g. urban, commercial or any other.

3.19 During the past three years, the cumulative increase in consumer price index for industrial workers has been more than 10 per cent. If we increase the monthly rentals by about 10 per cent, this would imply the following monthly rentals:

- Rs. 250 per month would become Rs. 275 per month;
- Rs. 180 per month would become Rs. 200 per month;
- Rs. 120 per month would become Rs. 130 per month; and,
- Rs. 70 per month would become Rs. 75 per month.

3.20 To the extent that monthly rentals are changed, there will be a decrease in access deficit and this fact should be taken into account in the access deficit that is provided through the IUC payments as part of long distance tariff. A decrease in such access deficit, and hence IUC, would allow the market competition to reduce the tariffs for long distance calls. A noteworthy point to consider when deciding the levels for the monthly rentals for Fixed Line is the interaction that it is likely to have with respect to WLL (M) and cellular mobile, and the monthly rentals for these services so that the changes in monthly rentals are not brought about in a manner which reduces the spread of basic Fixed Line service called 'POTS' which is considered an essential service in developing countries like ours.

3.21 Another policy consideration to bear in mind is that if an overall price cap is decided based on concepts like CPI-X as the appropriate regulatory policy, then whether monthly rentals should be subject to the types of constraints that have been mentioned above or be left to the operators to fix.

(d) Local call charge

3.22 For cost based local calls, the previous Tariff Study had estimated the cost based charges using the operational costs attributable to local calls. This was done by allocating a share of operational costs to local calls, by taking a share that was equal to the minutes of use of local calls in total minutes of use. In effect, this process is similar to the allocation principal used in Scenario II in Chart 1.

3.23 The Authority has calculated the costs attributable to local calls, based on the above methodology. For BSNL, the operational costs taken into account are different from those applicable to Department of Telecom in the previous exercise, because the cost principles applied by BSNL are different, i.e. they are commercial principles. The cost based local charge estimates indicate that if we take call duration of three minutes, then a slight upward revision of call charge may be required.

3.24 The average duration for calls has been estimated at about two minutes in comparison to 2.5 to 3 minutes in the previous exercise undertaken in 1998/99. Taking the local call duration as two minutes, it may be worth considering whether to have a pulse duration of two minutes for the local call i.e., 120 seconds instead of 180 seconds at present. Another point to consider in that event would be whether to reduce the call charge also by some amount for a shorter call duration, and if so how much. Furthermore, would it be appropriate and/or technically feasible to have a fixed call set-up charge for all calls, which may be different from the charge applicable to the metered call units which is based on duration of the call and the applicable pulse rate. Importantly, what should the amount be as the amount in this case becomes a relevant question to address.

3.25 To discuss all the above issues, it is important to have some estimates that could provide a basis for discussion. The estimates of cost per minute for local call have been calculated for two private sector service providers and for BSNL. These estimates (without taking account of revenue share License fee), range from Rs. 0.40 to Rs. 0.51 per minute. The weighted average would be very close to the estimate for BSNL. Taking the License Fee revenue share and a 10% mark up for the BSNL estimate, the cost per minute would come to approx. Rs.0.50. However, if we take a simple average of the estimates shown in Table 3.2 below the corresponding cost per minute would be Rs.0.55. On this basis, if we take a pulse duration of 120 seconds, and a call charge of Re. 1/- to Rs.1.10 per metered call unit, would that be an appropriate charge?

Table 3.2 Per minute cost of local call

	Local call charge per min.
Incumbent	0.40
Private Operator "A"	0.41
Private Operator "B"	0.51

3.26 Alternatively, if a different charge for call set-up can be put in place, then what should that amount be, and how should that affect the charge per metered call unit? For example, would it be appropriate to have a call set-up charge of Rs. 0.20/30 per call and Rs. 0.80 or 0.90 for a pulse duration of 2 minutes.

3.27 Yet another alternative would be a combination of pulse duration and call charge in a situation where a double pulse may be given at the beginning of each call, for instance a double pulse to begin with and a pulse duration of one minute and a charge of Rs. 0.40 or 0.45 per pulse.

3.28 Another point to consider is whether the call charge for WLL (M) should be different from that for Fixed Line, on the grounds that the average minutes of use for WLL (M) may be different from those applicable to Fixed Line service because the latter is likely to be used by a larger number of persons being available at the spot where it has been fixed, and the WLL (M) may be available for a substantial period of time only to the person who carries it out in the area covered by limited mobility. Also, a spectrum charge component needs to be added to the cost base for WLL (M). These and other issues in the form of questions are summarized at the end of the Chapter for consultations.

3.29 If the price cap methodology i.e., CPI – X is adopted as the regulatory regime, then we would need to consider whether any limits should be imposed on the extent of the change in local call charge per se. Also, to the extent that there are changes in the local call regime, the effect of this on the IUC regime would need to be kep in view.

(e) Origination/Termination Charge for Local Calls

3.30 The call charge specified for local call from basic service gives a basis to provide termination charge for the network on which the call terminates. The simplest way to decide the termination charge would be to take it as half of the specified local call charge per minute. In this regard, another aspect to consider would be whether the termination charge should be provided to the cellular mobile network when the calls originating from basic service network terminate in that network, and also whether for calls which originate from the cellular mobile network and terminate in the basic service network the termination charge should be the same as that for termination of calls from one basic service network to another.

3.31 At present for interconnection of two local networks (PSTN) in a local area (SDCA), the originating subscriber pays for the total call i.e., both the local loops and the principle of sender keeps all is followed. However in case of a PSTN to PLMN or PLMN to PSTN call, it can be argued that origination and termination in the PSTN local network involves only one local loop and lesser number of network nodes and that for call termination in a local network the cellular network should pay lesser than the full charge for a local call.

(f) Tariffs for National and International Long Distance Calls

3.32 The prevailing tariffs for both national and international long distance calls are below the ceiling levels specified by TRAI in the third tranche of tariff rebalancing. Market pressure has brought the price nearer the cost of long distance calls thus, substantially achieving one of the objectives of the rebalancing exercise i.e. of lowering long distance charges. However, this would imply another kind of imbalance, given that there is no corresponding increase in rental/local call charges. The present exercise will examine this aspect of tariff rebalancing and try to work out new affordable local tariffs and provide for ADC, to address any imbalance.

3.33 Given that competitive pressures are likely to increase, the following points merit attention. One, there will be considerable pressure on prices on account of the introduction of Voice Over Internet Protocol and Internet Telephony. Two, the Authority has begun a process under which Interconnect Usage Charge will be agreed among the service providers in such a way that the surplus available with either the access provider or the national long distance operator will be more clearly identified than has been possible till now. It is important that some flexibility be retained in this process and that market interplay and competition be allowed to be reflected in the developments regarding these tariffs. It is noteworthy that the access deficit i.e. shortfall in rentals as well as any shortfall in the costs of providing calls are taken into account while determining the IUC to be paid to the access provider.

3.34 Three different policy responses for national/international call charge would appear possible:

i) To let market forces regulate the tariff and bring about the reductions in NLD/ILD charges;

ii) the market be initially left without any constraints, and based on its monitoring of the market price, the Authority intervene if required;

iii) ceiling tariffs be specified for the service, and the market be allowed to operate within the specified ceiling;

- If the third alternative is chosen, some further questions arise, viz. to the extent that the Authority may decide on specific ceiling levels for these tariffs, what should be the basis for determining these ceilings;
- Also, should a ceiling be specified as a one off level, or should there be a transition over a period of time, e.g. 2-4 years, towards a lower level from the existing level of the ceilings.

3.35 If ceilings for call charges have to be specified, then we would need to estimate cost based charges for these calls. In view of the indicative estimates of IUC for national long distance calls that have been calculated by the Authority, we already have a basis to consider the ceilings for these charges. A reasonable mark-up on these costs could, for example, give us the requisite ceilings.

3.36 Likewise, further work on the cost of providing international calls could give us a basis for the ceilings, with the costs calculated for stand alone service provider of these services. However, these ceilings may not be worthwhile if the market develops with Internet telephony, and the market price stays substantially lower than the cost based ceilings calculated for these tariffs. ILD sector is likely to be the most competitive of the three segments of the PSTN (Access/NLD/ILD).

(g) Free calls

3.37 At present, the standard tariff package specified by the Authority provides 60 metered call units (urban) and 75 metered call units (rural) per month as free calls. It is worth noting that if the option of call set up charge is to be implemented for local call charge, then there will be no entirely free calls. For each so called free call, there will be a call set up charge.

3.38 Another approach to free calls may be that a reduction in the number of free calls may be considered, subject to suitable adjustments in regard to rental. Yet another possibility is to consider a reduction in free calls, irrespective of the approach adopted in respect to monthly rentals. In any case, if a lower number of free calls is to be permitted, the issue for discussion would be how to determine the appropriate number of such calls.

3.39 To the extent that there is any reduction in the free call allowance, the implication of this for the IUC regime has also to be kept in mind.

(h) Tariffs for end users of DID Franchisees

3.40 The Authority has emphasised the possibility of cheaper access being available to low users through DID franchisees. That is an important reason for specifying a lower monthly rental and call charge for these end users. Given the emphasis on encouraging access to these services, the Authority would like to maintain a low monthly rental, such as Rs. 100/- per month, per extension for these services. However, with a change in call charge for basic service calls, it would be necessary to take another look at the charges for these calls too. To encourage these services, it would be necessary to provide a suitable discount for call charges for DID end users in comparison to the call charges for regular phone lines. Important policy considerations in this regard would include:

- what should be the extent of discount that should prevail for the call charges for DID franchisees;
- should the Regulator specify such a discount, or should this be left to be specified by the franchiser.
- Should the Regulator specify the call charges on the junction lines connecting the DID PABX to the local network in view of the linkage between retail tariff charged from extension users and wholesale tariff i.e, on junction calls.
- Should DID Franchisee tariffs be totally deregulated and left to market forces.

3.41 In the light of the discussions in pre-paras, the following question are brought up for consultation:

1. Which are the network elements whose costs should be taken into account for fixing cost based rental? Should only the non-traffic sensitive portion of the network such as local loop be taken into account or other elements which are traffic sensitive such as local exchange, junction network etc. should also be accounted for, as done in the previous tariff exercise?

2. What level of rental is considered affordable and such that it will not affect demand adversely?

3. **What cost model should be adopted for determining cost-based rentals? For example, is long run incremental cost an appropriate methodology for determining cost-based prices at this stage of our market development?**

4. **What rate of return of funds employed should be considered reasonable and used for determining a cost based price? How should common or joint costs be allocated to specific services such local, NLD and ILD?**

5. **Should monthly rentals be increased for certain category of subscribers such as commercial? If rentals may be increased, can some objective criterion be developed for deciding the extent of such increase and the consumer segments to whom such increase may be made applicable (e.g., for all subscribers; for certain user-groups such as business subscribers, residential subscribers, rural subscribers, non-rural subscribers)? What criteria should be used for determining subscriber categories whose rentals should increase?**

6. **Does the methodology of determining tariffs for local calls need to be changed e.g., should there be a change in the pulse duration, the number of pulses at the beginning of a call, or a combination of call set up charge and reduced pulse rate? If yes, then what should be the pulse duration and the call charge therefor that should be introduced so as to cover all costs, including license fee. Or may the cost of a local call not be fully covered from local call revenue?**

7. **Should the call charge for WLL (M) be the same as for Fixed Line call charge? If yes, why? If not, why not?**

8. **If a regime of origination/termination charge is introduced for local calls, should the same termination charge as in the case of a basic-to-basic call be applied in the case of an incoming call into basic service network from cellular mobile service?**

9. **Should the current number of free calls continue to be provided, or should the free calls not be provided at all? If free calls were not to be provided, then should a specified number of initial calls be charged a lower/higher price than subsequent calls? What should be the basis of specifying any such number and what should be the link between the price of these initial calls and the subsequent calls? Should there be any link between the monthly rental and the number of free calls?**

10. What is the likely effect of the developments in the NLD market such as entry of new players on the STD tariff? Do we have enough competition in this segment of the PSTN to let market force determine the tariff? In such a scenario how do we meet the access deficit of the local network?

11. If the national STD distance-based tariff system were to be changed to better reflect costs, should the discrete distance-slabs as in the present structure of tariffs be retained, e.g. should there be a single distance slab "Above 500 kms". Is there any view about there being an optimum number of distance slabs for an objective criteria based NLD tariff structure. If so, what would be desirable objective criteria to be used for deciding on number of distance slabs and the distances these should cover?

12. What should be the regime for call charges for end users of DID Franchisees? Should the Authority specify the charge or should this be left to the franchiser? If the call charge has to be fixed, what should it be? Should it have any linkage with the call charges of the junction linking the DID PABX and the local network of the franchiser? Should both be left to market forces?

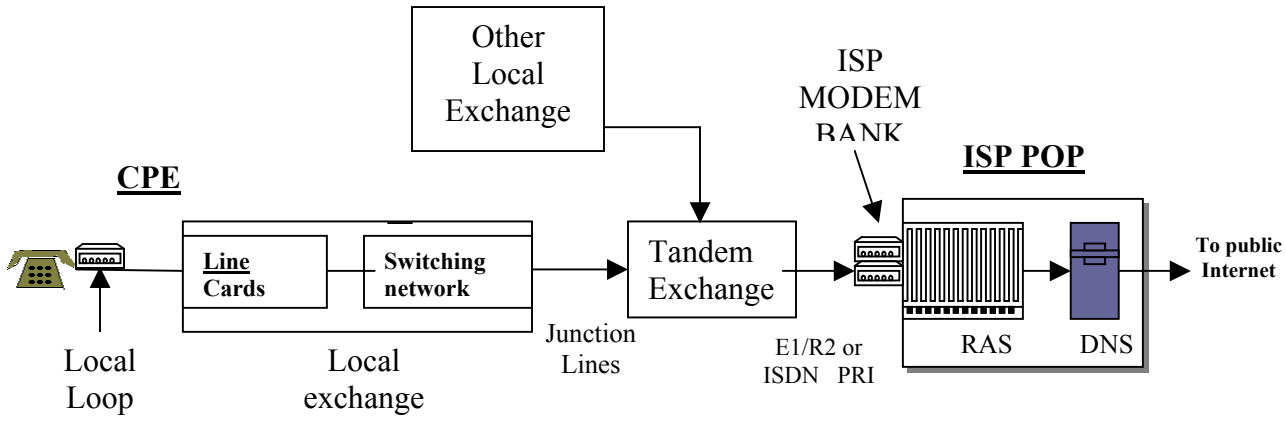
IV CALL CHARGES FOR DIAL UP INTERNET ACCESS OVER PSTN

4.1 Dial up Internet access over PSTN has been the most popular means of accessing the Internet. Market research widely predicts that dial-up access will remain the dominant method of accessing the Internet among residential users and small businesses in the foreseeable future. Notwithstanding the developments in broadband access, dial-up customers will continue to account for a substantial share of the Internet service market.

(a) The issues

The schematic diagram of a dial-up Internet access set up is given below:

Chart 4.1 Schematic Diagram of a Dial Up Internet Access Setup



The various resources required for a dial-up Internet access are the following:

1. Local Loop to customer premises (dedicated to the customer)
2. The line interface card in the local exchange (dedicated to the customer)
3. The switching network part of the local exchange used on the basis of call duration (traffic sensitive part).

The cost of a dial up call for internet access will be a function of the duration for which switching network part of the exchange is utilized.

4.2 A Customer Survey conducted by TRAI showed that a largely held view favoured a reduction in the dial-up call charges since these constitute a major part of expenditure on Internet access and are thus seen as inhibiting the growth of Internet in the country. More recently, a Task Force set up by the TRAI, consisting of eminent experts to provide policy suggestions for accelerating the growth of the Internet services in the country has also emphasised, inter alia, a need to reduce call charges for internet dial up access to stimulate the higher usage of Internet. This is, therefore, an issue which the TRAI wishes to address by seeking ways of implementing lower call charges applicable to dial up Internet access.

4.3 The TRAI has been considering the possibility of implementing a reduced call charge for dial up Internet access in consultation with BSOs. In discussions relating to this issue, several Basic Service Operators (BSOs) felt that a reduction in this call charge would be detrimental to them as it would lead to network congestion and loss of revenue accruing from high value calls (e.g. STD calls). They also mentioned that the resources utilized for Internet access calls are more than those utilized for voice calls because of higher holding time in case of the latter. According to BSOs, the local call charges are below cost and the resources utilised for setting up of a dial-up internet call is the same and thus there is no scope for any further reduction.

4.4 In this regard, it is noteworthy that the cost basis used to determine the cost of a local call charge is operational cost attributable to local call minutes. This cost consists mostly of cost items which are not variable with usage i.e. the costs that are predominantly not linked to usage of the network, e.g. staff salaries, wages and marketing expenses. Thus, the per minute cost for local call could come down over time because the Minutes Of Use (MOU) are likely to increase at a faster rate than operational costs. This trend will be further strengthened due to an increased usage of Internet if the dial-up call charges are reduced.

4.5 Nonetheless, the issue raised by BSOs would still remain relevant, namely the switching network getting congested due to the longer holding time for internet calls, and that in situations of capacity constraints these calls may block-out the more lucrative national/international long distance calls. Some BSOs have also mentioned that cheaper dial up call charges may lead to greater usage of Internet telephony, and thus to a larger fall in the revenues from International Long Distance calls.

(b) <u>International situation</u>

4.6 There is a wide variation in the dial up charges for internet access among different countries. For example, Table 4.1 shows a range for selected countries where the ratio between the highest and lowest costs is about four to one. The charges in India are in the upper end of the estimates shown in Table 4.1. At current tariffs, the average for a 20 hours package in India is about US $ 7.

Table 4.1 Dial-up Call Charges for Indicative 20 hours package of Internet access for Selected Countries (based on ITU data for 2000)

Country	Dial Up call charges for 20 hours package (US$)
Argentina	6.0
Brazil	6.0
Chile	3.45
Indonesia	2.85
Israel	4.39
Malaysia	9.47
Singapore	4.94

Source: ITU

4.7 In some other countries like USA, Canada, France, Hong Kong, Luxemburg, New Zealand, Philippines, Russia, Pakistan, Korea, Mexico and Portugal either free local calls are offered for unlimited Internet usage, or a flat charge is levied together with the line rentals. An example of a country which has recently adopted a flat rate reduced charging scheme for internet access is the United Kingdom.

4.8 The OFTEL (UK Telecom Regulator) reviewed the extent of effective competition in the dial-up Internet access, including the markets for call origination, call termination, wholesale internet call origination and retail Internet service provision. Most residential consumers in UK use the dial-up as the standard facility available. The dial-up access of internet was defined in terms of using bandwidth up to and including 128 kbit/s. Call origination and termination was defined from the perspective of a consumer making the call and as there was no substitutability in the case of dial-up, it was found that some cost investments would need to be incurred by the supplier of origination if a flat reduced rate charging was to be adopted. Regulatory intervention in the UK in the dial-up access market was affected through a direction which required BT (the incumbent Basic Service Operator) to provide an un-metered wholesale service that enabled ISPs to supply un-metered internet access using BT's network for call origination (called Flat Rate Internet Access Call Origination, or FRIACO). It is understood that this arrangement called for substantial additional investments on part of British Telecom (BT), the incumbent, to get over congestion.

(c) <u>Alternative solutions to the issues</u>

4.9 The solutions to the above issues can be sought in the technical and/or the tariff area.

4.10 There are now technical solutions available which may be able to address the concerns of those BSOs who feel that reduced dial up call charges may result into congestion in their network and hence adversely impact their revenues from voice services. In this context it is worth mentioning that now new access technologies like Direct Internet Access System (DIAS), corDECT wireless access, Internet Lease Access Line Doubler (ILALD), DSL etc. are available which enable the simultaneous voice and Internet call over the same access loop and thereafter offloading the Internet traffic to ISPs node without loading the core network such as local exchange, functions, tandems, etc. In addition, these new access technologies can help to provide better data rate to the Internet users and offer the possibility of 'Always-on' Internet. Instead of charging for dial-up access calls, a flat charge on the monthly basis may have to be levied to recover the capital cost of the additional equipment required in the exchange for this purpose.

4.11 Certain tariff options provided by the basic service operators suggest some flexibility in their ability to reduce the dial up call charge. There have been some instances of the established basic service providers giving cheaper Internet services on the assumption that the increased usage of internet would increase their dial up revenues. To the extent that the revenue from dial-up calls presently would cover more than the costs of the dial-up calls, this would provide an opportunity to offer cheaper dial up calls. It may be important to consider such a policy in the national interest of growth of Internet services in the country.

4.12 The issue of an adverse revenue effect would arise if there is a capacity constraint and the system would either carry both the 172xxx and STD ('0' & '00') traffic during the same busy hour. In this regard, it is also worthwhile to consider whether the busy hours of Internet Dial-up access and STD coincide. In case they are different, the Internet dial-up calls i.e., 172xxx may not cause any congestion as far as STD traffic is considered. During off-peak hours i.e. there may be adequate capacity available for both the Internet access dial-up calls and the higher revenue STD calls. Generally, busy hours of Internet usage have been indicated between 7.00 A.M. to 10.00 A.M. and 5.00 P.M. to 11.00 P.M.

4.13 It may also be worth considering as an option that dial-up call charges i.e. on level 172xxx may be suitably reduced for off-peak hours (11.00 P.M to 7.00 A.M.) during which the switching resources of the local exchange may be idle. International best practices specially in developed and developing countries also support this differentiation for making optimum utilisation of resources, at different hours, due to non coincidence of busy hours for different types of traffic streams..

4.14 Another view could be that tariffs for dial up access need to be lower in order to encourage the use of internet in the country, and with such a tariff reduction there will also be a need to increase capacity so that both the local dial up calls and the STD calls may be handled together by the network, without one adversely affecting the other's revenues.

4.15 Based on the above discussion, the following issues are brought out for consultation:

a) Is there a case for reduction of dial-up call charges for Internet usage based on the cost?

b) Based on the lean usage pattern during off-peak hours can the call charges for internet access i.e., on level 172xxx be reduced during off-peak hours as is done in case of STD calls?

c) Whether the reduction in dial-up access charges for Internet will result in increase in usage and hence more revenues for the BSOs?

d) What are the barriers for BSOs to exploit new technologies to provide simultaneous voice and Internet calls and offloading the internet traffic from the core switching network to avoid network congestion, if such a congestion is really apprehended?

e) Do we have any other engineering solutions i.e., based on the technology already deployed to solve the problem of congestion due to excessive holding time of a dial-up Internet calls?

V. INTERCONNECTION USAGE CHARGES (IUC)FOR NATIONAL LONG DISTANCE CALLS

5.1 In terms of the Telecommunication Interconnection (Reference Interconnect Offer) Regulation, 2002 (2 of 2002) issued on the 12th of July 2002, Telecommunication Service Providers holding significant market power are required to publish Reference Interconnect Offer (RIO) based on the model RIO annexed to the Regulation. The RIO will stipulate the concerned Service Provider's terms and conditions on which it will agree to interconnect its network with the network of any other service provider seeking interconnection. The RIO issued by the service provider will prescribe the technical and commercial conditions for interconnection, which will be based on the model RIO and the guidelines annexed to the regulation. The charges for interconnection are expected to be agreed between the seeker and the provider mutually.

5.2 Interconnection Usage Charges (IUC) are required to be paid by one operator to the other(s) involved in carrying a call for originating, terminating and carriage of traffic. The manner of their payment has been indicated in Article 13 and Schedule 6 to the model RIO. The usage charges payable for originating and terminating access will have to be derived taking into account the costs of the network elements from the subscriber station up to the Short Distance Charging Centre (SDCC). For recovering these costs, reliance is placed on the monthly rentals. However, when the rentals are below cost, there will be an access deficit cost i.e. the amount by which the rentals are below cost. This will need to be recovered from other sources.

5.3 An effort has been made in this paper to estimate cost based IUC including a license fee revenue share, taking into account the present regime of monthly rentals. The estimates in this Chapter include the cost of a call, the access deficit reflecting the difference between the cost based rental and the tariff that is charged as monthly rental, and the cost of providing 60 metered call units as free calls. As and when the tariff regime is altered/modified by regulation, there would be a need to amend the estimates of IUC. A comparison of the estimated IUC

with the prevailing tariffs shows that these two are not the same for different distance categories applied for national long distance calls. When the estimated IUC is compared with the prevailing tariffs, the results depend on with whom is the surplus from the tariff retained. In so far as NLD tariff is concerned one view can be that the tariff belongs to the NLD operator who has to be left with the surplus/deficit after paying IUC for origination and termination. It is important that the access providers be given incentives to invest in the capital intensive portion of the network, and to attract as many subscribers as possible. This would also be useful to achieve the objective of rapid tele-density growth.

5.4 This Chapter begins with a summary of the results of the three different methods used to assess the average charges required to cover the cost of long distance calls. This is followed by a discussion of the detailed exercise conducted to estimate the IUC based on cost data from BSNL, using a bottom up approach. The methodology and the average estimates for the IUC are provided, with the IUC estimates being specified in terms of both the Schedule 6 that is given in the model RIO as well as in a framework of the origination, carriage and termination cost based charges for the distance categories for which NLD tariffs are presently offered in the market. The Authority is also seeking the opinion of stakeholders on the issue that if certain IUC are to be specified by the Regulator as Guidelines then whether a range instead of a single estimate would be the appropriate benchmark for each distance category. The Chapter also raises the issue of the method with which to determine the range, so that the Regulator may specify consistent and tenable benchmarks for IUCs.

(a) <u>Three approaches to determine IUC</u>

5.5 For the derivation of IUC, the following three approaches have been applied:

- <u>Top down</u> : Beginning with the actual overall cost of the entire network and then breaking it downwards following the allocative method. Costs are allocated to different services and then downward to the different levels of the network and functions in providing the services.

- Bottom-up : Based on optimal network engineering model, a proxy model, capable of meeting the service requirements of a given subscriber and traffic profile is developed. Since it is a proxy model, while estimating the capital cost of the network is not so difficult, assessment of operational expenses is always a challenge. This problem can be addressed by adopting and working with the ratio of capital to operating expenses, which represents the industry best-practice in this regard.
- Outside-in: "best current international practice" based on benchmarks of other countries with somewhat similar demographic and economic situations. It does not reflect actual costs and operating conditions but certainly provides fair benchmarks and efficient models to compare with. The task of developing these cost figures and benchmarks was assigned by the TRAI to the internationally well known firm 'OVUM' of U.K. who are reputed experts in matters relating to Telecom interconnections and charges in respect thereof.

(b) Summary results of the three approaches

5.6 Tables 5.1 and 5.2 below compare the main results of the IUC estimates from the three approaches. The total estimate for IUC has been calculated under the bottom up and top down approach, taking account of the access deficit as well as the cost of free calls. The top down approach considers the annual data on traffic and its distribution, cost of transmission network as furnished by BSNL and the corresponding cost per line figures. Data on traffic, investment, DELs and TAX lines have been taken from the information provided by BSNL and the Annual Report 2000-2001 of the Department of Telecom. The information on operational costs is from the Annual Report of BSNL for 1999-2000.

5.7 Of the three approaches, those pertaining to the bottom up approach are the most relevant for this exercise, because they are based on a detailed analysis of the cost figures for a range of different operating conditions, and have closely followed the methodology that relates to the framework of the model RIO.

Table 5.1. Comparison of Average IUC estimates for origination/termination obtained by the three approaches for National Long Distance Calls

(Rs./minute)

Type of charge	Bottom-Up Approach			Top-down Approach			Best International practice (OVUM Benchmark study)
Origination / Termination	Cost	ADC	Total	Cost	ADC	Total	
	0.23	1.19	**1.42**	0.55	1.16	**1.71**	**0.93**

Note: "ADC" is the estimate of access deficit charge and includes both the excess of cost based rental over the rental specified and the cost of free calls. The estimate for cost in the bottom up approach includes revenue share License Fee of 12 % but not any mark up.

Table 5.2. Comparison of Average IUC estimates for carriage of National Long Distance calls obtained by the three approaches for National Long Distance Calls

(Rs./minute)

Type of charge	**Bottom-Up Approach**			**Top-down Approach**			**Best International practice (OVUM Benchmark study)**
	Carriage	Termination	Total	Carriage	Termina-tion	Total	
Transit (1 TAX)	0.17	1.42	**1.59**	0.61 (average for all)	1.71 (average for all)	**2.32 (average for all)**	**1.83**
Transit (2 TAXs)	0.32	1.42	**1.74**				**2.35**
Transit (3 TAXs)	0.73	1.42	**2.15**				**2.54 (average for last two categories)**
Transit (4 TAXs)	0.90	1.42	**2.32**				

Note: The cost of termination is the same as the total cost of origination/termination shown in Table 5.1. The amounts for carriage in the bottom up approach include revenue share License Fee of 12 % but not any mark up.

5.8 The IUC figures obtained from the three approaches are broadly consistent for NLD calls that would cover relatively longer distances, e.g. distance slabs above 50 Kms. This is significant in view of the share of calls in the last two distance categories (i.e. above 200 kms.) accounting for a large portion of the total long distance calls. Table 5.2 shows that the benchmark estimates from the OVUM study are somewhat higher than those from the bottom up approach, but this is because while the former are in the nature of tariffs or wholesale prices which include a mark up, the latter are only cost based estimates without mark up. Including a mark up in the bottom up cost estimates would result in reducing the difference.

5.9 For origination/termination (Table 5. 1), the estimates of IUC obtained using the top down and bottom up approach show a variation mainly because of the different data base used. The top down approach used operating expenses for the year 1999-2000 for which audited accounts for the entire year were available from the incumbent. Capital costs were used from the earlier information obtained from the incumbent and used in the Authority's consultation paper on the Universal Service Obligations. The bottom up approach has used more recent data.

5.10 The estimate of IUC for origination/termination from the OVUM study are lower than those obtained from the bottom up and top down approach. A major reason for this is the high access deficit that arises due to the relatively lower Indian tariffs for rentals and the cost incurred in providing free calls, in comparison to the benchmark countries. The lower Indian rentals and the provision of free calls reflect the objective of socially desirable tariffs to promote affordability.

(c) <u>Detailed IUC estimates using the Bottom Up approach</u>

5.11 As mentioned above, the bottom up approach has used detailed estimates of costs from a number of Circles covered by BSNL, and thus represents the type of exercise that would be relevant in the context of the framework that has been

provided in the model RIO. The average estimates have been derived based on the data from seven circles namely, Gujarat, Jharkhand, Kerala, North East–II, Orissa, Punjab and Rajasthan. The capital cost data available from the BSNL for the unbundled network elements have been used, applying a fully allocated cost principle.

5.12 The bottom up approach uses a proxy network model with location and number of lines remaining as at present but employing the optimal contemporary techno-economic switching and transmission technology options based on traffic considerations. The transmission systems between a local exchange and SDCC Tandem have been considered as employing 8/34 Mbps systems or STM 1 OFC systems based on traffic carried on the link. Similarly, between SDCC Tandem and Level II TAX, transmission systems could be 34 Mbps or STM 1 OFC systems. Inter-Circle and Intra-Circle transmission networks between TAXs are designed on STM 4 / STM 16 OFC rings.

5.13 For estimating the IUC, network elements have been sufficiently unbundled so that the IUC relates to the costs relevant to the network elements used. For shared network resources, the relevant costs considered are those that are attributable to each service in proportion to their respective minutes of usage. Cost of software has been included in the equipment cost and not considered separately. The costs that are directly attributable to carriage of a call between a subscriber and the Point of Interconnect (and vice versa) viz. costs of provisioning, maintenance and operation of associated switching and transmission plant, common costs like power plant, and overhead costs that include personnel, finance, administration and IT support costs have been considered. As the Operating expenses are not available individually for the seven Circles considered, the national weighted average has been used in determining IUC figures in each of them. The access deficit and cost of free calls have been allocated in a manner that full costs are recovered but no cost is appropriated more than once.

5.14 As the data on costs are based on the inputs received from the BSNL, the incumbent, the entry fee for award of a license is not included in the capital cost. Costs of unbundled Signalling and Call-related databases have also not been considered since the incumbent's plan for introduction of unbundled signaling links and signal transfer points on stand-alone basis, and providing access to Toll free calling database, Number portability database, Advanced Intelligent Network (AIN) databases, etc., are not yet known. Administration and finance costs for billing have not been added to the originating access charge, as these may be determined by mutual negotiations between the Access Providers and National/International long distance Operators. For the payment of IUC, cascade mode of operation has been assumed.

5.15 The costs have been calculated in the framework that is provided in Schedule 5 of the model RIO (please see Annex IV for this schedule). Since this data is operator specific it is considered commercially sensitive and is not provided in this paper.

5.16 The capital costs per line have been specified in the various categories given in schedule 5. The capital cost for the access loop and building costs were adjusted to reflect an efficiency factor taking account of the costs of efficient private sector operators. For the optical fibre cable (OFC), average costs were calculated to reflect the relatively longer life of the asset and the likely increase in usage over time. For OFC, therefore, an average usage was determined on the basis of the average usage over a ten year period, and the minutes of use were derived on this basis to calculate the per minute costs.

5.17 Operational costs were derived on the basis of the BSNL's balance sheet for the year ending 2001 which contains data for 6.5 months, i.e. mid-September 2000 to March 2001. The operational costs were projected for a twelve month period and divided into two categories, namely bad debt and others. The latter category of operational costs were allocated to the different items in schedule 5 in the same

ratio as for capital costs. The bad debt were allocated over the different revenue categories in the proportion of the total revenues that they account for. Thus, 20 per cent of the bad debt was allocated to rental. Of the residual bad debt costs, local calls account for 44 per cent (i.e. their share in total metered call units) and the rest is allocated to long distance calls.

5.18 An annual recurring expense equivalent of capital expenditure was derived using an ARE of 22.77 per cent. The cost based monthly rental was derived taking the capital costs of the unbundled network elements up to the short distance charging center (SDCC). This includes the access loop, local exchange, SDCC Tandem (except for digital interface for long distance connectivity to long distance charging center TAX), and the LE-SDCC Transmission system and Link/medium. An average cost based rental was derived by taking a weighted average of the costs for the seven circles used as sample.

5.19 An estimate of access deficit was obtained by deducting the prevailing weighted average rental from the cost based rental (including bad debt). The average estimate of the prevailing rentals takes into account the fact that the TRAI has allowed a higher monthly rental for the commercial customers. The estimate of access deficit is Rs. 244/- per month per DEL. Such access deficit in the past was covered by the incumbent from the long distance calls. In the changed multi-operator, multi-service scenario too, for covering this deficit, alternatives are difficult to find and one may have to rely on the same source, i.e. long distance call revenue.

5.20 The per minute cost of origination/termination has been calculated on the basis of the operational costs (including bad debt) allocable to the local calls. The total operational cost was taken for the same network element categories as those applicable to monthly rental. This operational cost was allocated to local calls and long distance calls on the basis of the minutes of use (MOU). The resultant costs were divided by the MOU of local calls to give the per minute local call

cost. Since origination and termination charges were both being considered in the exercise, the MOU used were for both incoming and outgoing calls.

5.21 The following figures of total incoming and outgoing call minutes were used to calculate the per minute charges for origination/termination:

Outgoing Minutes/day	15.00 Minutes
Incoming Minutes/day	15.15 Minutes

Break-up of the above:

Traffic minutes within the Exchange	2.60 Minutes
Total Inter-exchange & Intra_SDCA	18.00 Minutes
Total Inter-SDCA (1 TAX)	1.80 Minutes
Total Inter-SDCA (2 TAXs)	1.80 Minutes
Total Inter_LDCA (3 TAXs)	3.40 Minutes
Total Inter_LDCA (4 TAXs)	2.55 Minutes

5.22 The costs for the various long distance call categories in Schedule 6 were derived taking the unbundled network elements corresponding to the different types of calls covering one or more TAXs. In this case, the cost base includes both the capital cost as well as the operational costs. The per minute costs were derived based on the minutes of use for these different types of calls.

5.23 The cost based estimates derived using the above methodology need to be augmented to take account of the prescribed license fee (revenue share). A revenue share of 12 per cent is used for origination/termination, and 15 per cent for carriage of national long distance calls.

5.24 In addition, the IUC is a wholesale price and would include a margin over the cost. A mark up of 10 per cent was given for this purpose. With these elements, the cost based charges calculated in the framework of Schedule 6 (without

including access deficit) are shown in Annex IV. Corresponding to these cost estimates, the IUC for long distance calls have been considered for four different distance categories, which correspond to the present tariff structure for long distance calls prevailing in the market, which are distance based i.e. up to 50 kms, 50 to 200 kms, 200 to 500 kms, and above 500 kms. These estimates are shown in Table 5.3 below.

Table 5.3 **Average IUCs (including 10 % mark up and revenue share License Fee) For Origination, Carriage, and Termination For National Long Distance Calls (Rs./minute)**

Distance Slab	Originating access	Carriage	Terminating access	Total IUC per minute
1. Upto 50 Kms.	0.25	0.19	0.25	0.69
2. 50 to 200 Kms.	0.25	0.35	0.25	0.85
3. 200 to 500 kms.	0.25	0.81	0.25	1.31
4. Above 500 Kms.	0.25	0.99	0.25	1.49

5.25 To this amount, the estimate of access deficit and cost of free calls have been added. The charge due to access deficit (including revenue share License Fee) has been calculated at Rs. 0.97 per minute on account of rental, and Rs. 0.22 per minute to cover the cost of free calls. The cost of free call was taken on the basis of their being local calls, each local call having an average holding time of two minutes. The average holding time was derived from the traffic data available with the Authority.

5.26 Taking account of the above costs, the average IUC estimates come to those shown in table 5.4 below.

Table 5.4. Average IUCs (including 10 % mark up and revenue share License Fee) For Origination, Carriage, and Termination For National Long Distance Calls, Plus Access Deficit For Origination and Termination (Rs./minute)

Distance Slab	Originating access	Carriage	Terminating access	Total IUC per minute
1. Upto 50 Kms.	1.44	0.19	1.44	3.07
2. 50 to 200 Kms.	1.44	0.35	1.44	3.23
3. 200 to 500 kms.	1.44	0.81	1.44	3.69
4. Above 500 Kms.	1.44	0.99	1.44	3.87

5.27 The effect of Access Deficit on the estimates of IUCs for the two lower distance categories (i.e. up to 200 kms.) is evident since the present tariff for short distance trunk calls would be below cost, especially taking account of the access deficit that is to be obtained from the national long distance call charges. In a multi-operator multi-service scenario for origination, carriage and termination, two or more service providers are likely to be involved in completing a call necessitating a fair sharing of the call revenue. The present tariff structure is, however, such that the call charges for distances up to 200 kms i.e. in the first two of the four categories do not cover the estimated IUC. In the two higher distance categories, however, the charges are much higher. In the single operator scenario these high charges have traditionally covered the cost of lower distance calls, in other words subsidised them. A revenue structure such as this is based on the principle of affordability, it being the assumption that the consumers who make longer distance calls have higher levels of affordability. We may have to continue with this kind of tariff structure for some time more and keep long distance calls priced comparatively higher on considerations of affordability. In this context, it is also noteworthy that national long distance operators are likely to

carry inter-circle calls which would generally fall within the two higher distance categories i.e. above 200 Kms. In a multi-operator, multi-service scenario a methodology for sharing call revenues among the different players would need to be evolved which enables each of the participating service providers to recover its costs incurred in completing the call and also provides it with a reasonable return. The surplus needs to be divided in a manner so that all the operators involved can sustain their services and the telecom network can be extended rapidly over time.

(d) Other issues

5.28 To the extent that certain monthly rentals, e.g. Wireless in Local Loop with limited mobility (WLL (M)), have been fixed on a cost basis, the amount to be provided would not include any access deficit nor would it include the amount calculated for free calls, as no such calls are permitted.

5.29 The estimation of whether or not there is a surplus in the IUC regime would involve calculating a weighted average of the surplus/deficit for different distance categories. This would need information on the distribution of call minutes across these categories and on the peak and off peak call distribution under each of these distance categories. Table 5.5 gives this, based on the data discussed earlier in this Chapter. Information from BSNL indicates that the distribution of peak and off-peak metered call units is in the ratio of about 60:40.

Table 5.5. Distribution of the Minutes Of Use Per day for the Different Categories of Long Distance Calls (incoming and outgoing)

Distance categories	Average Long Distance Minutes of Use Per Day	Percentage share in Total Average Long Distance Minutes of Use
0 to 50 kms.	1.8	18.85%
50 to 200 kms.	1.8	18.85%
200 to 500 kms.	3.4	35.60%
Above 500 kms.*	2.55	26.71%

* Includes 0.25 minutes on account of international traffic.

5.30 Where more than one long distance service provider is involved in carrying the calls, the revenues would need to be shared. This sharing may take place, for example, in the same proportion as the IUC shown in Schedule 6 given in Annex IV. Mutual negotiations will be another alternative but it would always be more desirable to decide upon any sharing pattern based on objective and verifiable data.

5.31 The Regulator may consider providing a range for IUC to facilitate negotiations. So long as the IUC quoted by the interconnection provider is within the given range the seeker may find it acceptable. By giving a range the Regulator could take care of the following concerns.

- a difference in the cost base in different conditions/places.
- the possibility of a change in the pattern of the Minutes of Usage that has been used for the underlying estimates.
- to provide a flexible basis for a negotiating framework since the actual IUCs are expected to be reached through a negotiated solution.
- provide a basis for giving different charges for national long distance call origination/termination in rural areas.
- provide buoyancy for competitive pricing to take place in the market.

5.32 If provisioning of a range for IUC by the Regulator is considered desirable the span of the range and the basis on which the range can be built will be an issue.

5.33 Based on the discussion in this Chapter, the following questions are raised for consultations:

(a) Can the average estimates of IUC given in this Chapter form basis for introduction of a new IUC regime? If some changes are considered desirable what should these be and what should be the basis for effecting those changes in the given estimates?

(b) Is it desirable that the Regulator provides a range for the IUC within which the concerned service providers may conclude their negotiations at a mutually agreed point?

(c) Should the applicable IUC be relatively higher for rural and remote areas?

(d) Should there be linkage between long distance tariff and the IUC?

(e) It is proposed to use element based costing to work out the basic tariffs, i.e. rental and local as well as long distance call charges. What alternative methodologies for both or any of these can be considered as appropriate in the conditions currently prevailing in the Indian Telecom Sector? What, if any, will be the main advantage of such alternative methodology?

Annex Table I Comparative Chart of Internet Telephony Rates by various Service Providers

Sl. No.	Service provider	Rate per minute in Rs. (Range)						
		Calls to SAARC & other neigh-bouring countries	Calls to other Asian countries	Calls to European countries	Calls to Australian continent	Calls to African Countries	Calls to North American countries	Calls to south American countries (central America)
TRAI ISD call rates		**21.60**	**32.40**	**32.40**	**32.40**	**32.40**	**40.80**	**40.80**
Existing ISD tariffs – Peak Off Peak		**21.60 18.00**	**24 21.60**	**24 21.60**	**24 21.60**	**24 21.60**	**24 21.60**	**24 21.60**
1.	A	25 – 77.52	8 – 74.45	5 – 30 U.K.- 5	5 – 8	20 – 53.67	5 – 15 USA – 5 Canada –5	8 – 50.14
2.	B	31.36 – 99.50	7.37 – 229.11	3.05–36.55 U.K.- 5.39 London - 4.3	6.4 – 8.81	23.27 – 146.08	4.95 – 5.86 USA– 4.95 Canada– 5.19	8.02 - 209.48
3.	C	48.20 – 58.70	5 – 90.40	5 – 21.70 U.K. – 5	5	21.70-75.50	5 USA - 5 Canada –5	5- 87.60
4.	D	12 -30	12.00 – 273.24	9.90 – 30.74 U.K. – 8	13.10	16.17– 92.58	8 USA – 8	10.73 – 297.61
5.	E	19.95 – 40.50	3.50 – 78.68	2.50 – 16.50 U.K. – 5	3-15	13.60 – 52.13	2.50 USA - 2. 5 Canada - 2.5	10.58 – 46.50
6.	F	66.92-117.37	7.21 – 227.03	4.38 – 45.04 U.K.– 5.28	9.00 (Australia)	25.23 – 95.24	4.49– 6.44 USA- 4.49 Canada - 4.62	14.41 – 79.28
7.	G	49.60-88.23	9.61-224.61	5.06-37.12 U.K. – 6.24	7.73 - 8.51	22.27-143.77	5.21 – 10.36 USA – 5.21 Canada – 5.79	10.54 – 205.52

Sl. No.	Service provider	Rate per minute in Rs. (Range)						
		Calls to SAARC & other neigh-bouring countries	Calls to other Asian countries	Calls to European countries	Calls to Australian continent	Calls to African Countries	Calls to North American countries	Calls to south American countries (central America)
8.	H	20 18	29 26	29 26	29 26	29 26	37 33	37 33
9.	I	N.A.	4.25-8.00 (China, .Japan, Hongkong,Singapore, Taiwan)	4.25 (Belgium, Denmark, France, Germany, Italy, Sweden, UK)	4.25 (Australia)	N.A.	4.25 (USA and Canada)	N.A.
10.	J	N.A.	5.95 – 19.95	5.95-7.95 U.K.- 5.95	7.95	N.A.	5.95-7.95 USA – 5.95 Canada – 7.95	N.A.
11.	K	18	Asia pacific - 11 Middle East – 18 Others- 25	6	11	25	6	25
12.	L	N.A.	7 - 13	7 – 10 U.K. – 7	7	13 (South Africa and Zimbawe)	7 –10 USA – 7 Canada – 7	7- 16
13	M	20	8 – 22	4.8 – 18 U.K. – 4.8	4.8 – 8	18 – 22	4.8 USA – 4.8 Canada – 4.8	12 - 22

Sl. No.	Service provider	Rate per minute in Rs. (Range)						
		Calls to SAARC & other neigh-bouring countries	Calls to other Asian countries	Calls to European countries	Calls to Australian continent	Calls to African Countries	Calls to North American countries	Calls to south American countries (central America)
14.	N	14 (Dhaka)	4.5 – 19	4.5 – 17 4.5 – U.K.	6	10 – 21	4.5 – 7 4.5 – USA 4.5 – Canada	6 - 20

Source: Tariff Submissions to TRAI

Annex Table II **List of Amendments to TTO, 1999 related to Basic Tariff.**

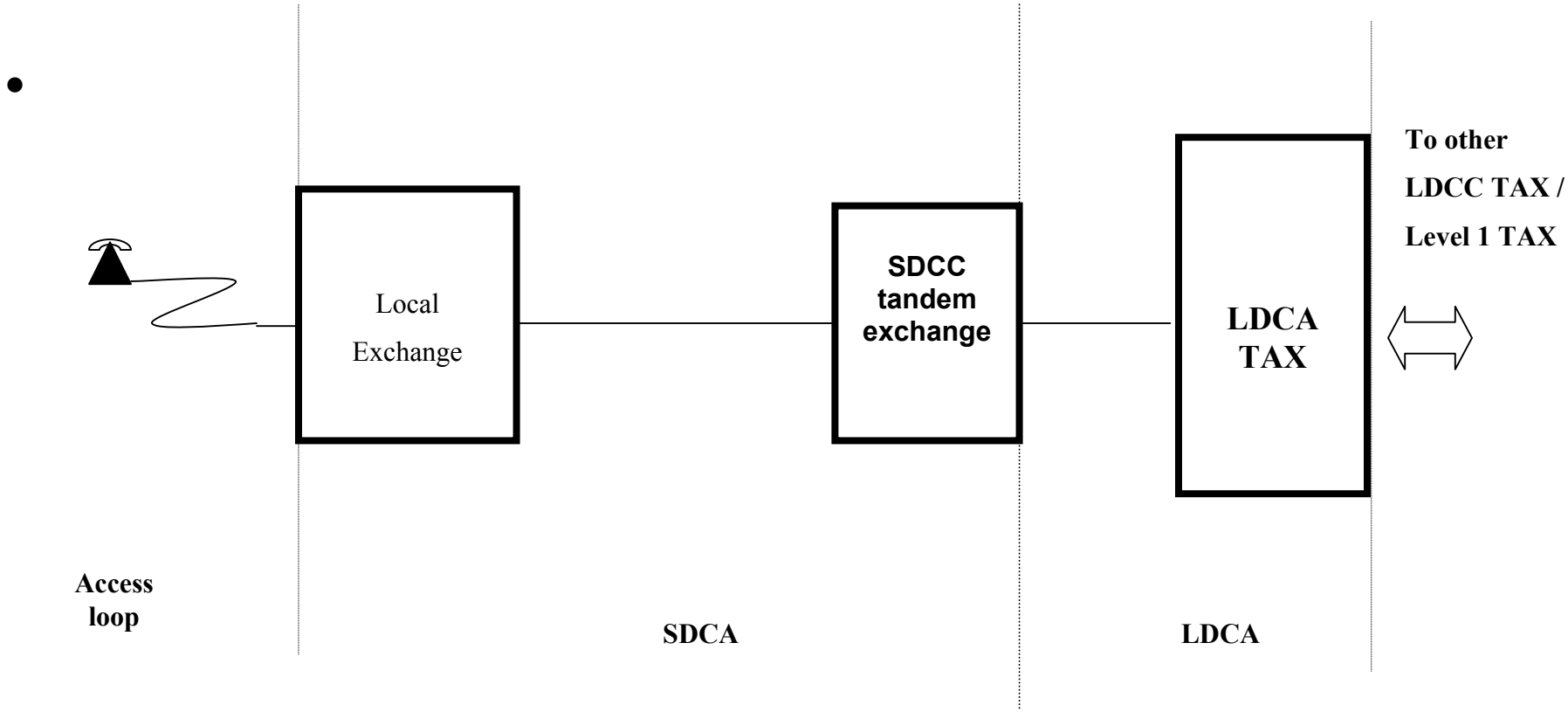
Sl.No.	Name of the Order	Date of Issue	Main Objective
1.	The Telecommunication Tariff (First Amendment) Order , 1999	30.3.1999	To postpone the date of implementation of new tariff in respect of Schedule I, II and IV of TTO, 1999 from 1.4.1999 to 1.5.1999.
2.	The Telecommunication Tariff (Second Amendment) Order, 1999	31.5.1999	To clarify coverage of certain tariff and also to address misprints in TTO,1999.
3.	The Telecommunication Tariff (Third Amendment) Order, 1999	31.5.1999	To allow Basic service Providers the flexibility of providing alternate tariff packages.
4.	The Telecommunication Tariff (Sixth Amendment) Order, 1999	30.9.1999	A new tariff category titled 'Centrex' was added.
5.	The Telecommunication Tariff (Seventh Amendment) Order, 2000	30.3.2000	To postpone the date of implementation of 2nd phase of tariff rebalancing by four months i.e. up to31.7.2000.
6.	The Telecommunication Tariff (Eighth Amendment) Order, 2000	31.7.2000	To post pone the date of implementation of 2nd phase of tariff rebalancing by another one month i.e. up to31.8.2000.
7.	The Telecommunication Tariff (Ninth Amendment) Order, 2000	28.8.2000	To introduce 2nd phase of tariff change w.e.f.1.10.2000.
8.	The Telecommunication Tariff (Tenth Amendment) Order, 2000	9.11.2000	Tariff for extension users of DID Franchisees was revised.
9.	The Telecommunication Tariff (Eleventh Amendment) Order, 2001	25.1.2001	To enlarge the scope of BSNL's revised pulse rates for distance categories 50-200 Kms in respect of inter-network calls also. This has been set aside by TDSAT

10.	The Telecommunication Tariff (Fourteenth Amendment) Order, 2001	24.5.2001	Tariff for Limited Mobility (WLL) Service.
11.	The Telecommunication Tariff (Fifteenth Amendment) Order, 2001	20.7.2001	To enlarge the scope of BSNL's revised pulse rates for distance categories 50-200 Kms in respect of inter-network calls also.
12.	The Telecommunication Tariff (Seventeenth Amendment) Order, 2002.	22.1.2002	Regarding Reporting Requirement for filing of tariff proposals by the service providers.
13.	The Telecommunication Tariff (Twentieth Amendment) Order, 2002	14.3.2002	Implementation of third tranche tariff.
14.	The Telecommunication Tariff (Twenty First Amendment) Order, 2002	13.6.02	To review the reporting requirement for filing of tariff plans by service providers.
15.	The Telecommunication Tariff (Twenty Second Amendment) Order, 2002	4.7.02	Revision of tariff for Limited Mobility (WLL) Service.

Annex-III

Formats
for
Unbundling of Cost of Network Elements

PSTN Network Topology



A. Access Loop from Customer Premises to Local Exchange

1. Customer Premises

Elements of Cost	Upto 200 lines	200 to 1.5 k Lines	1.5k to 10k Lines	10k to 30k Lines	30 k to 1 lakh Lines	More than 1 lakh Lines
Customer Premises Equipment i.e., Telephone set						
Internal wiring						

2. User Network Interface (UNI) to Service Node Interface (SNI)*

Elements of Cost	Upto 200 lines	200 to 1.5 k Lines	1.5k to 10k Lines	10k to 30k Lines	30 k to 1 lakh Lines	More than 1 lakh Lines
Lines & wires						
Distribution Point (DP)						
Pillar / cabinet						
UG Cable						
Cable laying						
Cable Jointing and Termination						
Installation Cost						

3. Local Exchange

Elements of Cost	Upto 200 lines	200 to 1.5 k Lines	1.5k to 10k Lines	10k to 30k Lines	30 k to 1 lakh Lines	More than 1 lakh Lines
MDF						
Line Card						
Land & Building						

Assumptions

1. Average access loop distance from Customer Premises (UNI) to Local Exchange (SNI) to be taken as 4 Km for Urban areas and 6 Kms for Rural areas.
2. For Hilly area, the distance is to be taken as 8 Kms for upto 500 line exchanges.
3. A fill factor for Cable utilization can be taken into account. It could be 80% for Urban Areas and 50% for Rural areas.
4. Mix of New Technology and C-DOT exchanges (20:80 for local area having capacity less than 30 k lines, 50:50 for local area having capacity between 30 k to 1 lakh and 80:20 for local area having more than 1 lakh capacity).
5. In Rural area, exchange upto 1400 lines SBM can be taken. Presently Rural exchange areas below 200 lines can be served by CDOT 256 P exchanges.

B. Local exchange to SDCC tandem link

1. Local Exchange (except line card and MDF)

Elements of Cost	Upto 200 lines	200 to 1.5 k Lines	1.5k to 10k Lines	10k to 30k Lines	30 k to 1 lakh Lines	More than 1 lakh Lines
Local Exchange (except line card, MDF and Digital Trunk Interface for Long Distance)						

2. Transmission Link (Optical Fibre) related cost elements (variable with distance)

Elements of Cost	Upto 2 Mb	2 Mb to 8 Mb	8 Mb to 34 Mb
Optical Fibre cable including ducts, laying, trenching and backfilling			
Route Survey			
Right of way			
Project Management and coordination			

2.A Cost related to Terminal equipment (Fixed cost)

Elements of Cost	Upto 2 Mb	2 Mb to 8 Mb	8 Mb to 34 Mb
Terminal equipment (8 Mbps Optimux including DDF)			
Spares			
Power Plant			
Battery			
Engine Alternator			
Electrical Items			
Test Instruments			
Earthing			
Air-conditioning			
Digital Trunk Interface at Local and SDCC Tandem Exchanges			

Assumptions:

1. Given that LE to SDCC average distance is "X" Kms, it can be assumed that out of “X” Kms, 10 Kms is within municipal limits. Out of the 10 Km within municipal limits, GI pipes can be assumed in 3 Km length and in balance 7 Kms half round RCC pipe can be assumed. This is in addition to the HDPE Pipe normally used for OFC. Beyond the Municipal area, only HDPE Pipe may be assumed for OFC.

2. Rocky: Plan area, ratio varies from circle to circle.

C. SDCC Tandem

	SDCC Tandem requirements for a switching capacity in the SDCA Network of Capacity			
Elements of Cost	Upto 1.5 k Lines	1.5k to 10k Lines	10k to 30k Lines	30 k to 1 lakh Lines
Tandem Exchange (except Digital Trunk Interface) per circuit termination in Tandem.				

D. SDCC to LDCC link (as apportioned on per DEL basis)

1. Transmission Link (Optical Fibre) related cost elements (variable with distance)

Elements of Cost	Upto 8 Mb	Upto 34 Mb	Upto 140 Mb	STM 1
Optical Fibre cable including ducts, laying, trenching and backfilling				
Route Survey				
Right of way				
Project Management and coordination				

2. Cost related to Terminal equipment (Fixed cost)

Elements of Cost	Upto 8 Mb	Upto 34 Mb	Upto 140 Mb	STM 1
Terminal equipment (STM1 or 8/34/140 Mbps Optimux)				
Line Control Terminal (in case of STM1)				
Spares				
Network Manager (in case of STM1)				
Digital Distribution Frame				
Power Plant				
Battery				
Engine Alternator				
Electrical Items				
Test Instruments				
Earthing				
Air-conditioning				
Digital Trunk Interface at Local and SDCC Tandem Exchanges				

Regenerator cost (every 40 Km)

Elements of Cost	Upto 8 Mb	Upto 34 Mb	Upto 140 Mb	STM 1
Regenerator equipment (STM1 or 34 Mbps Optimux)				
Spares				
Power Plant				
Battery				
Engine Alternator				
Electrical Items				
Earthing				
Air-conditioning				

LDCC TAX

Elements of Cost	Upto 1000 lines	> 1k and upto 5 k Lines	> 6 k and upto 20 k Lines	20 k to 50k Lines	Above 50 k Lines
Trunk Automatic Exchange (except Digital Trunk Interface) Cost per line of TAX equipment					

Assumptions

1. Given that SDCC to LDCC average distance is "X" Kms, it can be assumed that out of "X" Kms, 10 Kms is within municipal limits. Out of the 10 Km within municipal limits, GI pipes can be assumed in 3 Km length and in balance 7 Kms half round RCC pipe can be assumed. This is in addition to the HDPE Pipe normally used for OFC. Beyond the Municipal area, only HDPE Pipe may be assumed for OFC.

2. Rocky: Plan area, ratio varies from circle to circle.

E. LDCC to LDCC link

1. Transmission Link (Optical Fibre) related cost elements (variable with distance)

Elements of Cost	565 Mb lines	140 Mb Lines	STM 4 Lines	STM 16 Lines
Optical Fibre cable including ducts, laying, trenching and backfilling				
Route Survey				
Right of way				
Project Management and coordination				

2. Cost related to Terminal equipment (Fixed cost)

Elements of Cost	565 Mb lines	140 Mb Lines	STM 4 Lines	STM 16 Lines
Terminal equipment (STM4/16 or 140/565 Mbps Optimux)				
Line Control Terminal (in case of STM16)				
Spares				
Network Manager (in case of STM16)				
Digital Distribution Frame				
Power Plant				
Battery				
Engine Alternator				
Electrical Items				
Test Instruments				
Earthing				
Air-conditioning				
Digital Trunk Interface at Local and SDCC Tandem Exchanges				

Regenerator cost (every 40 Km)

Elements of Cost	565 Mb lines	140 Mb Lines	STM 4 Lines	STM 16 Lines
Regenerator equipment (STM16 or 140 Mbps Optimux)				
Spares				
Power Plant				
Battery				
Engine Alternator				
Electrical Items				
Earthing				
Air-conditioning				

Assumptions

1. Given that LDCC to LDCC average distance is "X" Kms, it can be assumed that out of "X" Kms, 10 Kms is within municipal limits. Out of the 10 Km within municipal limits, GI pipes can be assumed in 3 Km length and in balance 7 Kms half round RCC pipe can be assumed. This is in addition to the HDPE Pipe normally used for OFC. Beyond the Municipal area, only HDPE Pipe may be assumed for OFC.

3. Rocky: Plan area, ratio varies from circle to circle.

TRAFFIC SENSITIVE INPUTS

BSNL to provide data for all Circles and other BSOs for their licensed Service Area

I. Number of Metered Calls within a representative SDCAfor 1000 DELs (Atleast 2 SDCAs to be covered in each Circle)

Circle	First SDCA	Second SDCA

II. Number of metered calls in the Intra-Circle Network for the following slabs for 1000 DELs (At least one Level I and two Level II TAX stations in each Circle to be covered).

Slab Distance	Metered Calls		
	Level I	Level II	Level II
Upto 50 Kms			
51 to 200 Kms			
201 to 500 Kms			
501 to 1000 Kms			
Above 1000 Kms			

III. Number of metered calls in the Inter-Circle Network for the following slabs for 1000 DELs

Slab Distance	Metered Calls
Upto 50 Kms	
51 to 200 Kms	
201 to 500 Kms	
501 to 1000 Kms	
Above 1000 Kms	

FORMAT FOR DATA REQUIRED FROM BASIC OPERATORS						
Note: Explanations for terms are at the end of the Table						
	Actuals			**Latest Projections**		
	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04
1. NETWORK CAPACITY (DELs)						
Equipped Capacity						
Number of Working DELs						
2.NUMBER OF SUBSCRIBERS						
Opening Subscribers						
Closing Subscribers						
Average Subscribers						
3. CAPACITY UTILISATION (%)						
Subscriber						
4. SOURCES OF FUNDS						
Debt (Rs. Lakhs)						
Equity						
Others (Please specify)						
5. Slab-wise Tariffs						
Peak hours						
0 to 50 Kms						
>50 to 100 Kms						
>100 to 200 Kms						
>200 to 500 Kms						
>500 to 1000 Kms						
> 1000 Kms						
Off-Peak hours						
0 to 50 Kms						
>50 to 100 Kms						
>100 to 200 Kms						
>200 to 500 Kms						
>500 to 1000 Kms						
> 1000 Kms						
6. REVENUE (Rs. Lakhs)						
Rental Revenue						
Call Revenue						
Installation Fee						
STD & ISD Revenue						
Revenue from supplementary and value added services						
Revenue from Pass Thru from Basic						
Revenue from Pass Thru from Cellular						
Anyother Revenue (please specify)						
ARPU (Rs.)						

	Actuals			Latest Projections		
	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04
7. BASIC Service (including WLL)						
No. of subscribers in Standard Package(STP)						
No. of ATPs filed with TRAI						
No. of ATPs on offer.						
Total No. of subscribers.						
Total MCUs (local/long distance/ international calls.						
Average Revenue per user (ARPU)						
Total revenue (Rentals+Call Revenue+Others.)						
8. Wireless in Local Loop (Fixed) [WLL(F)]						
No. of subscribers in Standard Package.						
No. of plans filed with TRAI						
No. of plans on offer.						
Total No. of subscribers.						
No. of MCUs						
Average Revenue per user (ARPU)						
No. of waitlisted subscribers.						
Total revenue (Rentals+Call Revenue+Others.)						
9. Wireless in Local Loop (Mobile) [WLL(M)]						
No. of subscribers.						
Total MCUs						
Average Revenue per user.						
Pass through revenue in the ratio 5:95						
Total revenue (Rentals+Call Revenue+Others.)						
10. Public Call Offices (PCOs)						
No. of ATPs filed for PCOs						
No. of ATPs on offer.						
No. of PCOs installed						
Average Revenue per PCO.						
No. of pending applications for PCOs.						

	Actuals			Latest Projections		
	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04
11. Village Panchayat Telephones (VPTs)						
No. of VPTs installed.						
Average revenue from VPTs						
No. of pending applications for VPTs						
12. Coin Collection Boxes (CCBs).						
No. of CCBs installed.						
Average revenue from CCBs						
No. of pending applications for CCBs						
13. DID/Centrex						
No. of tariff plans filed for DID/Centrex.						
No. of franchisees/subscribers/service providers owned DID EPABXs.						
Average revenue per extension user.						
14. Value Added Service (VAS)						
Total number of VASs offered. Provide details						
Details of tariff plans on offer (to be appended).						
15. CAPITAL EXPENDITURE (Rs.lakhs)						
Network Setup Costs						
Network Expansion Costs						
Preoperative Expenses as Capitalised						
Shared assets if any(% of its utilisation						
attributable to this network)						
License fee capitalised						
Others (Please specify)						
16. REAL ESTATE COSTS (Rs. Lakhs)						
Company Owned Premises-Capital Expen.						
Leased Premises-Annual Lease Rent						
Shared assets if any(% of its utilisation						
Attributable to this network)						
Others (Please specify)						
17. LICENCE FEE (Rs. Lakhs)						
Penalties paid (if any)						
Others (Please specify)						
18. PSTN PASS THROUGH CHARGES (Rs. Lakhs)						

	Actuals			Latest Projections		
	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04
19.OPERATING COST AS PER P&L ACCOUNT (Rs. Lakhs)						
Salary, wages and other allowances #						
Non salary expenses #						
Human Resources development - Recruitment, training etc.						
Network Management/Network Maintenance						
Directory and operator services						
Rent of buildings #						
Insurance #						
Service Tax						
Electricity and Fuel charges #						
- Office #						
- Network Equipment						
Repair and Maintenance						
- Plant and Machinery						
- Office premises #						
- Vehicles #						
- Others (please specify) #						
Spare inventory						
Telephone charges						
Printing and stationery #						
Postage #						
Travel Expenses #						
Freight #						
Billing and customer care						
Business promotion and marketing, exhibitions #						
Bad debts						
Licence Fee						
Interconnection charges						
- Port charges						
- Leased line charges						
- other interconnection charges						
Meetings/Entertainment #						
Other operating Expenses (Please specify)						
20. PREPAID OVER THE COUNTER						
VCC / ITC CARDS						
Number sold						
Value (Rs. Lakhs)						
Other Income (please specify sub heads)						
21. INTEREST # (Rs. Lakhs)						

	Actuals			Latest Projections		
	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04
22. DEPRECIATION # (Rs. Lakhs)						
23. PROFIT BEFORE TAX						
24. PROFIT AFTER TAX						
NET PROFIT(Rs. Lakhs)						
25. MARKET SHARE						
(% in area of operation)						

Explanatory Notes:

1. Closing capacity refers to the capacity at the end of the accounting period
2. ARPU is the average revenue per user per year. Please specify the elements of revenue included in the calculation of ARPU.

Annex Table -IV **Framework of Schedule 5 and the cost based average estimates for IUC (without access deficit) as per Schedule 6 of the model Reference interconnect offer**

SCHEDULE 5

Interconnect Usage charges (IUC) for use of Unbundled Network Elements (UNEs) involved in carriage of various types of calls

No.	Network Elements	Total OPEX per DEL	Mean Capital Employed per DEL	Cost of Capital (%)	Annual CAPEX	Annual CAPEX+OPEX per DEL	Minutes of Usage	Av. Cost per minute
1.	Wireline/ Wireless Access Loop							
2.	Local Exchange							
3.	SDCC Tandem							
4.	TAX Switch							
5.	Local Exchange – SDCC transmission Link							
6.	Local Exchange – SDCC transmission Length in steps of 1 km each.							
7.	SDCC – TAX transmission Link							
8.	SDCC – TAX transmission Length in steps of 10 km each.							
9.	Inter-TAX transmission Link (Intra-Circle)							
10.	Inter-TAX Transmission Length (Intra-Circle) in steps of 50 km each.							
11.	Inter-TAX transmission Link (Inter-Circle)							
12.	Inter-TAX Transmission Length (Inter-Circle) in steps of 50 km each.							

NOTES:

1. **Based on the above average cost per minute/per unit indicated in the table, it should be possible to calculate carriage/ access charges involving various types of switching and transmission elements such as Double TAX call for transit, Single TAX/ILT call for originating and termination.**

2. The element costs may be different for different network sizes/ configurations.

3. This Schedule shall be submitted by both the Parties to the Authority and will be treated as confidential.

SCHEDULE 6
Interconnect Usage Charges Derived From Schedule 5

(Rs.; includes a 10 per cent mark up and revenue share License Fee)

Type of Access / Carriage	**Network Elements involved**	**Charge / Minute**
Originating	Local Loop-Local Exchange-Tandem Exchange plus Transmission Link & Length	0.25
Transit	Single TAX-Transmission Link & Length (Intra-Circle)	0.19
Transit	Two TAXs-Transmission Link & Length (Intra-Circle and Inter-Circle)	0.35
Transit	Three TAXs-Transmission Link & Length (Intra-Circle and Inter-Circle)	0.81
Transit	Four TAXs – Transmission Link & Length (Inter-Circle)	0.99
Terminating	Tandem exchange plus Transmission Link & Length – Local Exchange – Local Loop	0.25