Consultation Paper No. 2001/5

Telecom Regulatory Authority of India

Consultation Paper

On

Issues Relating to Interconnection between Access Providers and National Long Distance Operators

14th December 2001, New Delhi

PREFACE

1. Following the announcement of the New Telecom Policy (NTP) 1999 by the Government, Open Competition has already been introduced in the Basic, National Long Distance (NLD) and Cellular Mobile Services. TRAI has recently issued its recommendations for Open Competition in the International Long Distance (ILD) Service and Government's guidelines on ILD Services are also expected shortly.

2. As result of introduction of Open Competition in various service sectors, the Indian Telecommunication sector is now headed towards a Multi-operator Multi-service scenario. Interconnection in such a scenario is going to be rather complex and a number of issues are required to be adequately addressed so that fruits of the competition are available to the telecom users in the form of high quality services at competitive prices. Interconnection is the key to the success of Open Competition. TRAI through this Consultation Paper is attempting to address various issues relating to Interconnection between Access Providers and National Long Distance Operators.

3. The objective of this public consultation is:

(a) to develop a General Framework for Interconnection (GFI) in the context of private NLD Operators' entry into the Telecom service market;

(b) to evolve a methodology for charging carriage of a Long Distance call in a Multi-operator environment i.e., when more than two operators are involved, in the light of the best International practice.

(c) to discuss issues relating to Equal Ease of Access by subscribers to the NLD Networks particularly relating to Carrier Access Code (CAC), Pre-selection and Default Carrier.

(d) to present the outline of an Interconnect Billing System for proper reconciliation and settlement of Access Charges between Access Providers i.e., BSOs / CMSOs and National Long Distance Operators, and to discuss various issues relating to the same.

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4 This paper also seeks to generate discussion / views on the framework of a typical Interconnection Agreement as published in ITU's Publication on Interconnection Regulation. The objective would be to get the different stakeholders views on its applicability in the Indian conditions, in parts or as a whole. The paper also reproduces for ready reference, extracts relating to Interconnection and Interconnect Billing from Licensing Agreements of Access Providers and NLDOs. Extracts from Interconnection Agreements, TRAI's Recommendations on Carrier

Selection of National Long Distance Calls have also been made available. International practices on various Interconnection issues find a place in the paper and where considered helpful, references to certain relevant important documents, especially from other International Telecom Regulators have also been made.

5. The Authority intends to issues its Regulations on Interconnection issues relating to the Multi-operator scenario in a time-bound manner and would therefore like to have the comments and views on any or all issues raised in this paper on or before 14th January, 2002. TRAI would be conducting a few Open House Sessions for all stakeholders including consumers / consumer organisations. A separate Open House discussion with the Access Providers and the NLDOs is also proposed, to discuss various technical issues, in more detail.

6. For further clarifications, Adviser (Fixed Network Division), TRAI may be contacted on telephone number: 6166930. The Fax number is 6103294 and E-Mail is: trai06@bol.net.in. Written submissions accompanied by floppy diskette having the contents of the submission would be appreciated.

Sd/-
M. S. Verma
Chairman

New Delhi
13th December, 2001

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Note: Annexures marked with ** (asterisk) below are not included in the printed document but will be available on TRAI's Web Site

I.** ITU-T E-164 Recommendation Supplement 1 "Alternatives for Carrier Selection and Network Identification"

II** EU's Directive 97/33 on Interconnection in Telecommunication practices on Interconnection Agreements and Charging

1. BACKGROUND INFORMATION

1.1 In 1999, the Government announced a New Telecom Policy (NTP'99). Subsequent to the announcement of NTP 99, the Government sought TRAI's recommendation on opening up of the National Long Distance (NLD) segment of the PSTN. Based on the Authority's recommendation, the DOT (Licensor) has recently issued detailed terms & conditions for operating the NLD Service in the country. Extracts of the terms and conditions as far as they relate to the Interconnection are placed in Annexure D. This includes other Interconnection references as appearing in other Licence and Interconnect Agreements.

1.2 The Authority in its recommendation on NLD had recommended setting up of a High Level Technical Committee to sort out various technical issues relating to the Interconnection of Access Provider's (BSOs'/ CMSOs') Network to that of the NLDs. Accordingly, the Authority, in consultation with the DOT, set up a High Level Committee under the Chairmanship of the Secretary TRAI to address various issues on Interconnection. Representatives of the DOT, MTNL, BSNL, VSNL, TEC, Associations of Basic and Cellular Mobile Operators and TRAI are members of the Committee. The Committee has given a number of recommendations to the TRAI, which have helped the Authority in its decision making process.

1.3 The Authority had issued the Telecommunications Interconnection Charges and Revenue Sharing Regulation'99 (Annexure C) specifying Interconnection Charge i.e. for 'Port' & 'Leased Lines' required to terminate Interconnection links between the Network of the Interconnection seekers and that of the Interconnection givers. The Interconnection Regulation issued by the Authority defines the following three types of Costs/ Charges:

i) **Set-up Costs** i.e. all costs required for initially linking up two Networks and making that link operational (including inputs such as fibre links, ports, building space and any up-gradation of equipment, as well as software required to make the Interconnection operational)

ii) **Interconnection Charges** are the (recurring) amounts payable for the link, ports and other resources as indicated at i) above;

iii) **Usage Charges** are payments for use of the Network for transmission of telecommunications messages by the subscriber of the Interconnection seeker. The mode of payment of such charges includes, *inter-alia,* revenue sharing arrangements.

1.4 Although Interconnection regulation of May'99 specifies Port charges, Leased line charges as well as usage charges for all types of calls including domestic long distance and International calls, it needs to be reviewed because it was issued before the NLD licensing regime, keeping in view only two Networks involved in conveyance of a long distance call i.e. that of basic

service operator providing the originating carriage service, and that of the DOT (now BSNL) providing both transit and terminating carriage services. The Authority, therefore considers it necessary to develop a general framework for Interconnection in the context of NLD operator's entry in to the telecom service market so as to provide a basis for Interconnection between Access Provider's Network and that of the new entrant NLD operator.

1.5 The objective of the public consultation is:-

(e) to develop a General Framework for Interconnection (GFI) in the context of private NLD Operators' entry into the Telecom service market;

(f) to evolve a methodology for charging of Origination, Transit and Termination carriage of a Long Distance call in a Multi-operator environment i.e., when more than two operators are involved, in the light of the best international practice.

(c) to discuss issues relating to Equal Ease of Access by subscribers to the NLD Networks particularly relating to Carrier Access Code (CAC), Pre-selection and Default Carrier.

(d) to present the outline of an Interconnect Billing System for proper reconciliation and settlement of Access Charges between Access Providers i.e., BSOs/ CMSOs and NLDOs.

2. GENERAL FRAMEWORK OF INTERCONNECTION

2.1 Inputs from other countries / ITU Guidelines

2.1.1 The global practices suggest that the structure and level of Interconnection charges often determine whether competitors will be financially viable. Efficient technical arrangements for Interconnection are considered as one of the most important pre-requisite for sustainable competition. These arrangements should specify gateway functions to be performed at Network-Network Interfaces such as those relating to Signalling, generation of Call Data Records (CDRs) by Transit Switches for Interconnection Billing as well as Points of handing over traffic by one operator to another, in conformance with Fundamental Technical Plans.

2.1.2 International experience shows that the Incumbent operators generally have little incentive to make Interconnection easy for their new competitors, as it may be contrary to their immediate corporate interests to provide full, open and low cost Interconnection on a timely basis. When negotiations do occur, the incumbent operators usually retain most of the bargaining power. Regulators in such a scenario are expected to play a central role in ensuring that the National Interconnection Framework becomes more competitive.

2.1.3 The latest ITU publication on Interconnection indicates that more than 101 countries have established Interconnection Regulatory Framework in some form or the other relying upon a host of measures such as legislation, license provisions, executive orders, directives, guidelines and determinations.

2.1.4 In addition to National Regulatory Frameworks, a number of Regional groups have begun developing common approaches to Interconnection. European Union (EU) has Interconnection directive to be incorporated into the national laws of its 15 member states. Asia Pacific Economic Cooperation (APEC), Inter-American Telecommunication Commission (CITEL) and Telecommunications Regulators Association of Southern Africa (TRASA) are also working towards global harmonisation approach for Interconnection. The Malaysian Regulator has recently issued a General Framework of Interconnection, to facilitate detailed negotiations between Operators.

2.1.5 Many countries have favoured a policy of industry negotiation on Interconnection Agreements and are allowing operators to seek Regulatory intervention for dispute resolution if negotiations fail. However, there appears to be a growing consensus that advance regulatory guidelines – or even specific Interconnection rules – may be necessary to establish the proper environment to facilitate Interconnection.

2.1.6 It is becoming clear that the lack of advance Regulatory Guidelines may have some serious drawbacks. Without Guidelines, Interconnection negotiations are frequently protracted, delaying the introduction of competition. This leads to regulatory uncertainty and discourages investment.

Interconnection arrangements that are negotiated in such an environment often reflect the unequal bargaining power of the incumbent operator and may not be optimal for developing an efficient competitive market place.

2.1.7 The issue, of whether to establish binding Rules or Regulatory Guidelines, is often described in terms of ex-ante versus ex-post regulation. An ex-ante framework involves setting in advance, clear and possibly detailed, sector-specific rules for all market players to follow. An ex-post model, by contrast, gives market players substantial freedom and flexibility to act in the market, punishing any transgressions of telecommunication or general competition law only after they occur.

2.1.8 Many countries have adopted ex-post model but actually practice ex-ante, sector-specific regulation. That is to say that policy-makers generally agree that in truly competitive market, Interconnection Agreements should be left to market forces and commercial negotiation. But in viewing their own markets, very few policy-makers have concluded that Interconnection markets are sufficiently competitive to warrant pure ex-post regulation.

2.2. Making the Dominant Operator responsible for offering Interconnection on Cost based Principles to new entrants.

2.2.1. Some countries seeking to introduce competition, require “Dominant” Carriers i.e, the former monopoly operators of the Public Switched Telephone Network who are also the dominant NLDO, to Interconnect with the other Carriers such as Access Providers (BSOs / CMSOs), based on a regulator approved Reference Interconnection Offer (RIO). One such example is Singapore, where the Regulator i.e., the Info-Communications Development Authority (IDA) has mandated that the Dominant Carrier i.e. SingTel to prepare a RIO, based on which, the new entrants can seek Interconnection.

2.2.2 The Singapore RIO is in two Parts. The first outlines the procedures necessary to accept the RIO and enter into a RIO Agreement with SingTel; the second includes the minimum terms and conditions on which SingTel will enter into such an Agreement with Telecommunications Licensees. A Requesting Licensee, that has notified SingTel that it wishes to negotiate an Individualised Agreement, may obtain Services on the prices, terms and conditions specified in this RIO on an interim basis pending the adoption of the Individualised Agreement, either as a result of voluntary agreement or the dispute resolution procedure.

2.2.3 Basically, the Dominant Operator is required to publish the cost of unbundled network elements and services, based on which the new entrants can avail his Network Carriage services, such as Origination, Transit and Termination. Similar approach has been adopted in the UK, where the Regulator (OFTEL) has mandated the Dominant Carrier i.e. British Telecom (BT), to publish Accounting Statements showing the cost of unbundled network elements involved in call conveyance from the Point of Entry to the Point of Exit

on the BT network, to determine the charges of using the BT Network i.e, per mile-minutes (MM) of use of various elements. The format used by BT to show the unbundled network elements involved in call conveyance, as well for Interconnection of links, is placed at Annexure L.

2.3 Key Items in an Interconnect Agreement

An orderly Interconnection regime is extremely important for the healthy growth of the telecommunications sector. There are many complex aspects and settlement of these issues is an ongoing activity. The Authority is of the view that the following key items should be elaborated in full details in an Interconnection Agreement to be signed between Access Providers and National Long Distance Operators:

a) Scope and definition of services;
b) Interconnection and POI requirements and principles;
c) Provision of all relevant technical information;
d) Interconnection provisioning procedures;
e) Network and transmission capacity requirements;
f) Technical service level commitments;
g) Technical specifications and standards;
h) Transmission and performance standards;
i) Fault reporting and resolution procedures;
j) Network management, maintenance and measurement procedures;
k) Network integrity, safety, protection and related matters;
l) Call routing, handling and operations procedures;
m) Access to Interconnection gateway facilities and sharing of infrastructure;
n) Charging mechanisms, billing and settlement procedures;
o) Transmission of calling line identification (CLI) information;
p) Operator assisted services, directory information and assistance;
q) Commercial terms and conditions;
r) Provision for contribution to the cost of local access;
s) Fundamental Technical Plans;
t) Confidentiality of information;
u) Liability and indemnities;
v) Provision for an Interconnection Agreement liaison and co-ordination Committee; and
w) Review periods and terms for review
x) Quality of Service

2.4 Provisions of the Licence Agreements issued to NLD / BSOs relating to Interconnection:

2.4.1 Since the Interconnection Agreement will have to be finalised within the framework of the existing Licence regime, the relevant clauses from

agreements between Licensor and Licensee (BSOs/NLD) are brought out in the following sub-sections for ready reference and also to provide the general framework of Interconnection. Clauses 2.4, 2.5 and 17.5 of the Licence Agreement for provision of Basic Service (new players) and the DOT, stipulates that:

> *"Clause 2.4 It shall be mandatory for the LICENSEE to provide Interconnection with National Long Distance (NLD) Service Providers, through suitable mutual arrangements / agreements, where by the subscribers could have a free choice to make Inter-Circle / International Long Distance Calls through any NLD Service Provider. For International Long Distance Calls, the LICENSEE shall access International Long Distance OPERATOR through National Long Distance Operator only. Similarly, inter-circle leased lines are to be provided by suitable mutual agreements / arrangements with NLD Service Providers.*
>
> *Clause 2.5 Direct Interconnectivity among all Telecom Service Providers in the licensed SERVICE AREA is permitted. LICENSEE shall Interconnect with Cellular Mobile Telephone SERVICE PROVIDER at the station Gateway Mobile Switching Centre (GMSC) or Mobile Switching Centre (MSC), unless mutually agreed otherwise, subject to compliance of prevailing regulations, directions or determinations issued by TRAI under TRAI Act, 1997"*
>
> Clause 17.5 "The LICENSEE may enter into suitable arrangements with other Service providers to negotiate Interconnection Agreements whereby the Interconnected Networks will provide the following:
>
> a) To connect, and keep connected, to their applicable systems,
> b) To establish and maintain such one or more Points of Interconnect as are reasonably required and are of sufficient capacity and in sufficient numbers to enable transmission and reception of the messages by means of the applicable systems,
> c) To meet all reasonable demands for the transmission and reception of messages between the Interconnected systems.

2.4.2 The TRAI had issued a detailed Regulation on Interconnection in May 99, which gives certain general principles of Interconnection. These mainly relate to - non-discrimination, timeliness, unbundling and payment only for elements which are required and costs based price based on Directly Attributable Incremental Costs.

The Telecommunication Interconnection (Charges and Revenue Sharing) Regulation 1999 (1 of 1999) lays down the following general framework for Interconnection:

- Interconnection charges shall be cost based, unless as may be specified otherwise.
- For determining cost based Interconnection charges, the main basis shall be "incremental or additional" costs directly attributable to the provision of Interconnection by the Interconnection provider.
- No service provider shall discriminate between service providers in the matter of providing Interconnection and levying of charges thereof.

Provided that a different charge may be levied if justified on the basis of a substantial difference in costs incurred for providing that particular Interconnection.

2.5 ITU's Typical Interconnection Agreement

Contents of a Typical Interconnection Agreement contained in the ITU's publication "**Trends in 2000-2001 : Telecommunication Reform : INTERCONNECTION REGULATION**" which will hopefully provide a framework for negotiations between APs and NLDs for entering into an Interconnection Agreement, are placed at Annexure A for ready reference and soliciting the comments of the stakeholders.

2.6 In many countries, time frames are set for Interconnection provision. There are provisions for penalties in the event of delays in Interconnections. Annexure 'B' is having one such set of details covering the provisions made by some of the courtiers in the American Region.

2.7 Technical Interfaces between Access Providers' Network and National Long Distance Operators' Network

2.7.1 Best International practice mandates each of the Interconnecting parties provide, Interconnection of comparable technical and operational quality as is applicable between their own structurally separate NLD/ BSO/ CMSO Networks.

2.7.2 Some of the relevant considerations applicable to technical interfaces between APs' Network and NLD Network are as follows:

a) Compliance with National standards. Where such standards for Interconnection interfaces do not exist, ITU standards may be used as long as the arrangements do not restrict Interconnection by other licensees;

b) the offering of technical and operational Interconnection facilities should be on the basis of unbundled Network elements (UNE);

c) Network operators should plan for adequate switching and transmission capacities to Interconnect with other Networks without undue delay;

d) need for a reasonable lead times for provisioning of Network resources to the other party;

e) the need for the Network to Network Interface (NNI) to conform to the Fundamental Technical Plans such as Numbering, Signalling, Synchronisation and Charging;

f) the timely and efficient deployment of sufficient resources such as number of time slots in E1 links connecting the two Networks to meet the specified Grade of Service (GOS) on the NNI;

2.8 Questions

A number of questions arise in the context of the points brought out in this Section. These are listed below:

2a) In the event that the Interconnection Provider and Interconnection seeker are not able to reach an Agreement, whether the Regulator should step in suo-moto or should his intervention be only at the request of one or both the parties?

2b) Does the TRAI's Telecommunication Interconnection Regulation of May 99 need any amendment(s) in the light of the latest ITU publication "Trends in Telecommunication Reform 2000-2001 Interconnection Regulation"/ the licenses issued by the DOT to BSOs/ NLDOs? If the answer is yes, what are the suggested modification(s) to the Regulation.

2c) What should be a reasonable time for the Interconnection provider to give the requested resources such as leased line/ ports etc to the Interconnection seeker? In case of an Interconnection Provider's failure to adhere to the given time-frame, what corrective or remedial measures should be stipulated?

2d) Should the Regulator in India mandate the dominant Operator i.e., BSNL to publish a Reference Interconnect Offer (RIO) document containing Un-bundled Network Element (UNE) costs so that the Interconnection charges are settled without any undue delay, based on principles enunciated in the May 99 Regulation of TRAI?

3. Methodology for calculating Origination, Transit and Termination Carriage Charges in a Multi-Operator Environment

3.1 Revenue Sharing on the basis of Origination/ Transit/ Termination carriage charges:

3.1.1 The current sharing of call revenues between private BSOs/CMSOs and the incumbent i.e., BSNL, who presently is the only long distance service provider in the country, is based on "The Telecommunication Interconnection (Charges and Revenue Sharing) Regulation issued by TRAI in May 99. The Explanatory Memorandum annexed to this Regulation contains the following explanation: "To begin with, it must be re-iterated that the revenue sharing arrangements specified in this Regulation are interim, and are not based on detailed cost analysis. Application of an access/carriage charge regime will provide more logically tenable usage charges. That requires a detailed assessment of the underlying costs".

3.1.2 It will be seen from the above explanation contained in the Interconnect Regulation issued by TRAI in May 99, that the existing call by call access charges, i.e., of 48 p multiplied by MCUs registered on the bulk meters at the POI, paid by BSOs to the Transit and Terminating Carrier i.e., BSNL (erstwhile DOT) and Rs. 1.20 multiplied by MCUs paid by CMSOs to the Transit and Terminating Carrier, will need revision based on 'detailed cost analysis'. Moreover, the Authority's Regulation of May 99 was applicable, when the carriage of a long distance call involved only two Networks i.e., one of the APs (BSOs/ CMSOs) and the other of the incumbent. With the induction of the NLDOs, who will provide long distance carriage service between two telecom circles, the total carriage charges from the point of origination to the point of termination, may need to be shared, between at least three operators based on detailed cost analysis of origination, transit and termination, as detailed in the following sub-section.

3.1.3 Figure 3.1 gives the Network elements involved in carrying a call from a PSTN Network in an SDCA (A) situated in Telecom Circle 'X' to another SDCA (B) situated in Telecom Circle 'Y'. Figure 3.2 gives the Network elements in carrying a call from a PLMN Network situated in a Telecom Circle 'X' to a PSTN subscriber located in an SDCA 'B' of the Telecom Circle 'Y'.

Figure 3.1

Typical Carriage on the PSTN

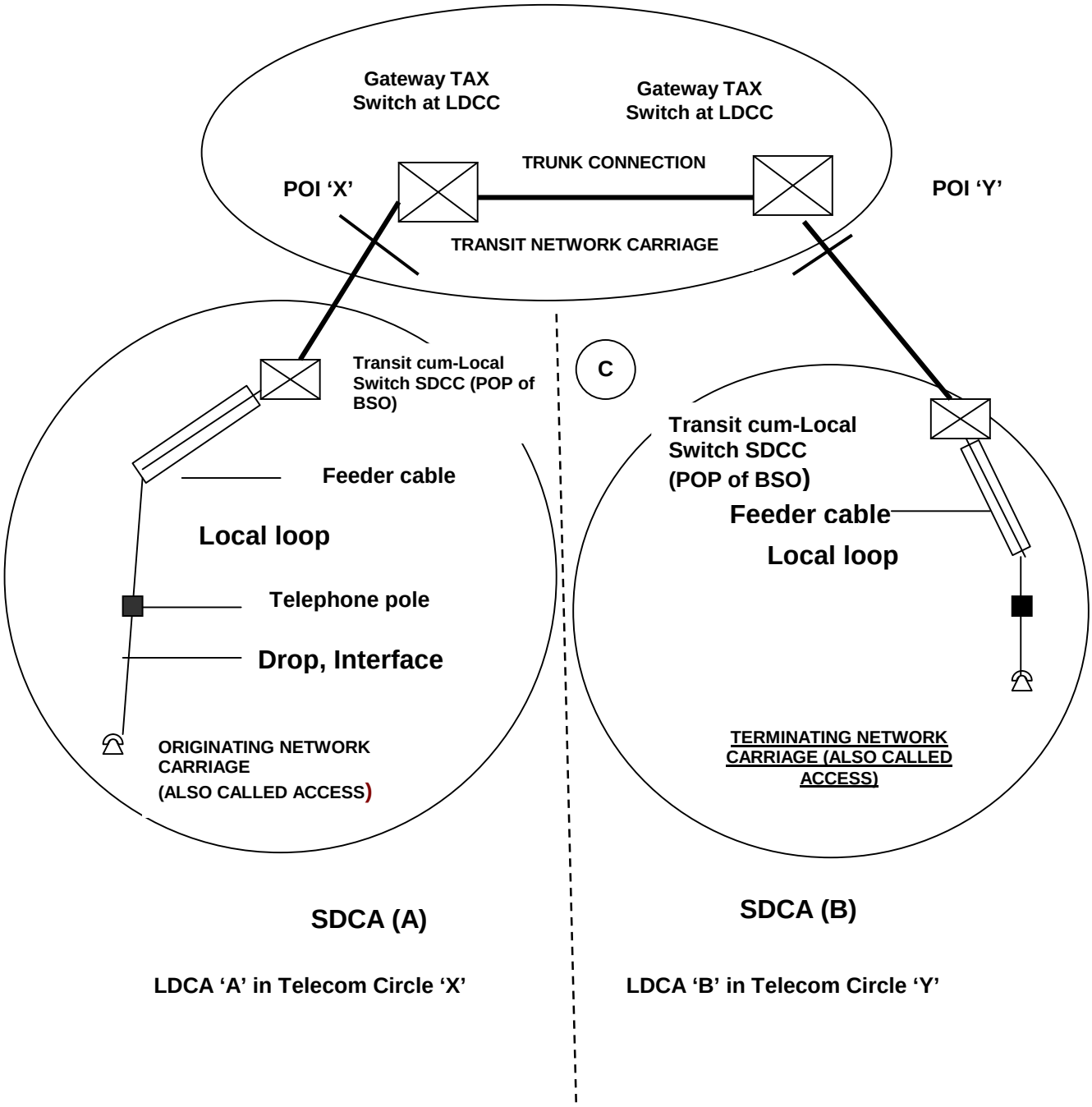
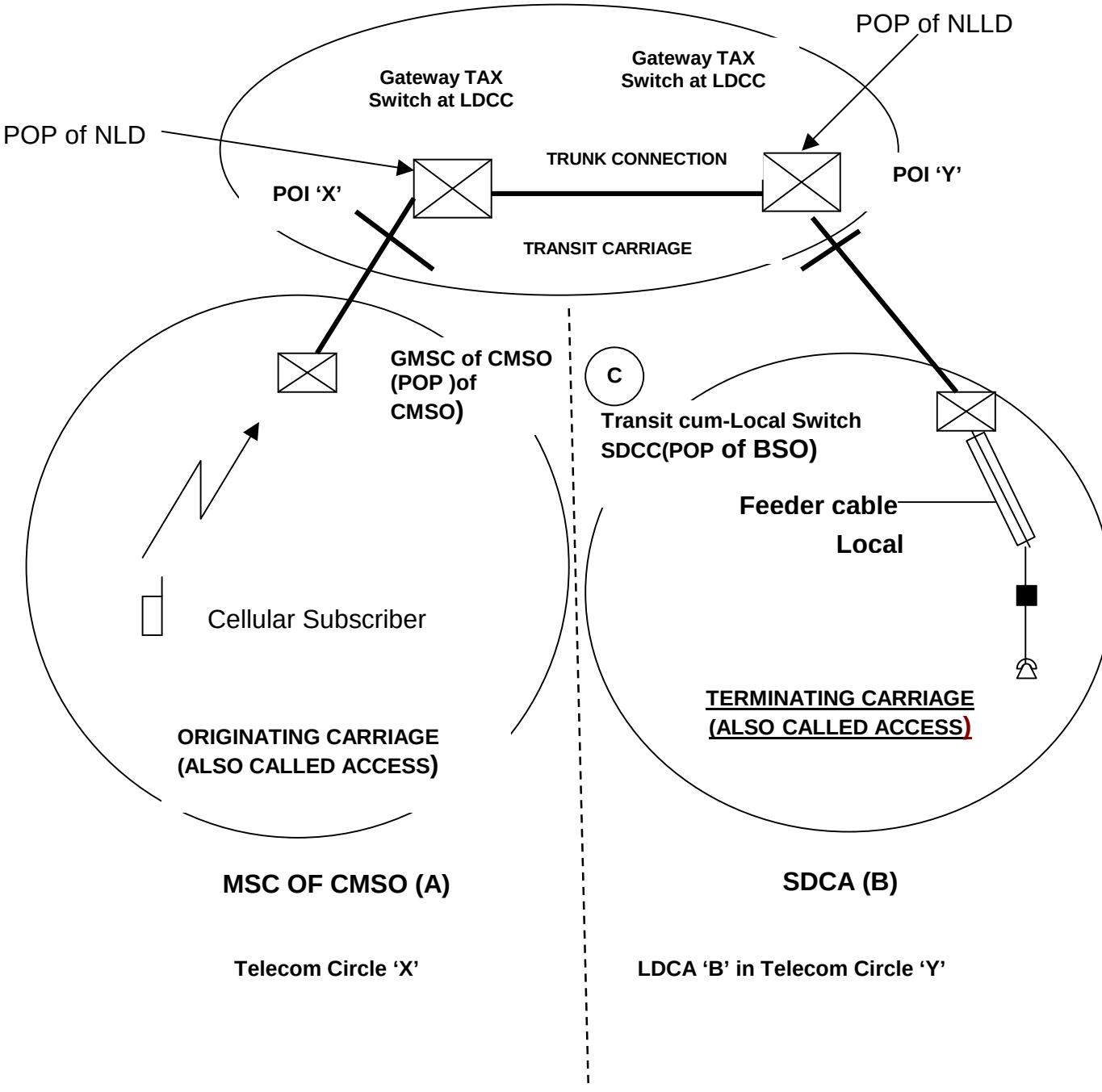


Figure 3.2

Typical Carriage of a Call originating in a PLMN and transited / terminated in a PSTN



3.1.4 Two alternative methodologies for assessing cost based carriage charges in the three Network clouds shown in the Figure 3.1 can be adopted. The first one is based on capturing the distance element between POIs 'X' and 'Y' i.e., on the NLD Network cloud, in real time, in an off line billing system (also called Interconnect Billing System) and categorizing the same in three or four distance slabs and based on the same, deciding the quantum of resources in terms of Network elements used in the three Networks. The cost of the carriage to be determined based on the resources used for the carriage of the call in the three Network clouds. Such a comparative costing of Network elements on the three clouds can hopefully provide a basis for sharing of the collection charges. In general, the Network elements (both switching and transmission) involved in the originating and terminating Networks will not differ significantly, that is to say that the revenue percentage for origination and termination, may be almost equal. However, the revenue percentage for transit carriage provided by the NLD cloud, based on the distance between originating LDCC and terminating LDCC i.e., X – Y will vary call by call, due to dramatic variation in the distance element of each carriage. It may be in the range of 200 Kms in case of neighbouring Circles such as Haryana and Punjab, but in case of J & K and Karnataka, could be greater than 1500 Kms.

3.1.5 Thus, the carriage on the NLD cloud may have to be categorized as suggested below:

- Short haul (upto 200 Kms),
- Medium haul (upto 500 Kms),
- Long haul (upto 1000 Kms),
- Very long (above 1000 Kms):

3.1.6 The average costs of the Network elements involved in the long distance carriage of the above four or five categories will have to be determined either by mutual discussions or regulatory analysis, based on the cost data furnished by the operators involved. Similar cost analysis will have to be done for other types of Network combinations such as PLMN (Originating) – PSTN (Transit) – PLMN (Terminating) or PLMN (Originating) – PSTN (Transit) – PLMN (Terminating) as shown in Figure 3.2.

3.1.7 In so far as revenue sharing on domestic long distance calls originated in cellular mobile Network (PLMN) and terminating in a basic service provider's Network (PSTN) are concerned, the schedule II of the Telecom Interconnection Regulation of May'99 stipulates that the payment to the basic service providers for the long distance carriage will be made at a rate applicable to domestic long distance calls from the point of Interconnect. The number of metered call unit (MCU) shall be measured at the pulse rate applicable to long distance calls from the point of Interconnection to ultimate destination. The cellular mobile operators is permitted to retain airtime charge, which is distance insensitive, for the resources consumed on the PLMN cloud. Subsequently, the Authority has permitted them to retain 5 % of the STD charges collected from the subscribers

as a compensation for billing and bad debt charge vide its determination of 8th January 2001. After the induction of private NLD operators, the PSTN carriage may involve the facilities of two PSTN operators, namely as far as transit is concerned, the NLD operator's cloud, and as far as termination is concerned that of the terminating BSOs. The sharing of the STD collection charges between the two operators namely the NLDO and terminating BSO, may have to be done on the same basis as in those cases in which the call is entirely conveyed on the PSTN. In this case also, the cost of carriage on the NLD cloud may have to be determined on the basis of the distance travelled on the NLD clouds i.e. from the point of entry to the point of exit and the distance of carriage involved from the point of entry in the terminating BSOs' Network to its destination. It could perhaps be shared on the same ratio as distance travelled on the two clouds, namely NLD cloud and the terminating BSOs cloud.

3.1.8 It will be seen from the methodology of determining the revenue shares or usage charges on per call basis presented in pre-paras, that a detailed cost analysis of the Network elements involved in the carriage of call from its origin to destination is an essential pre-requisite to determine either the revenue share percentage for the call volumes i.e., minutes of use (MOU) or usage charges on per call basis. The same could vary on call by call basis based on the distance element involved in the three clouds or could be worked out as a percentage of all call revenues (for call volumes) based on average distance of carriage in the respective clouds. The fundamental concepts relating to costing of Network facilities are given below.

3.2 Fundamental concepts relating to costing of Network facilities

3.2.1 Fixed and Variable Costs:

a) In principle, all telecommunication costs can be classified either as fixed or variable. Fixed costs remain constant over time, regardless of how much the Network is used. There are two main types of fixed costs: One-time investment costs, also known as 'Capital Expenditures', and recurring 'Operating Expenses'.

b) Capital Expenditures are generally large purchases of plant and equipment that have a planned useful life of at least four to five years. Such equipment typically includes all major Network switching and transmission facilities. Standard accounting practice calls for converting capital expenditures to recurring expenses as either annual depreciation or amortization charges.

c) Operating expenses are the costs that the operator incurs on a regular basis – monthly or annually, for example. These expenses generally are constant; they do not vary in amount according to the level of Network usage. Operating expenses can be divided into two major categories; fixed operating expenses (including materials and services), and labour expenses such as salaries and employee benefits.

d) Variable costs are directly related to the level of Network usage.

In telecommunication Networks, variable and fixed costs are categorised "Traffic-Sensitive" and "Non-Traffic-Sensitive" costs, respectively.

3.3 Cost Study Approaches recommended by ITU:

a) Cost studies should be as thorough as possible, given the available data. Examination of the costs needs to be made from more than one point of view, to reinforce the accuracy of the results. Three general approaches to cost studies can be pursued, either separately or in combination:

- Top-Down,
- Bottom-Up, and
- Outside-In.

b) Each approach could, in principle, yield meaningful cost results by itself. But in reality, there are likely to be too many data gaps and methodological variances to rely on a single approach. Including all three methods in a single study can yield a range of results that will serve as basis for meaningful conclusions on costs and Interconnection rates.

3.4 The Bottom-Up Approach:

a) According to ITU, this method is arguably the most "accurate" means of measuring unit costs, assuming sufficient data are available. It is based on the idea that service costs can be identified from the facilities and other inputs needed to provide the services. The costs of the inputs are combined in proportion to their utilisation in providing each service, then divided by the number of total units of service, resulting in per-unit facility costs.

b) This approach depends on the availability of complete, disaggregated data on input costs and the relative use of facilities in the provision of different services. This can be analysed on a historical-cost basis or a forward-looking incremental cost basis, but any result expressed as pure, incremental facility-based unit costs must be reconciled with joint and common costs and administrative overheads.

c) Figure 3.3 explains the Bottom-Up Approach.

3.5 The Top-Down Approach:

a) As per ITU recommendation, the Top-Down approach begins with aggregate, company-wide cost data such as total annual expenditures, capital investments and operating costs. Ideally, such costs will be tracked according to some general categories, such as whether they are capital or operating costs. The goal of a top-down study is to take these aggregate costs and

allocate them among all services provided by the carrier. The advantage is that this method assures that all of the carrier's costs are accounted for. The difficulty, on the other hand, is determining an economically justifiable allocation formula.

b) The most appropriate use of top-down analysis is as a check and comparison against a comprehensive bottom-up, incremental cost analysis. Unfortunately, such a complete bottom-up analysis is rarely possible because of a lack of adequate data. Aggregate company costs, by contrast, are usually available. As a result, the top-down analysis often becomes an integral part of the cost study and is used to estimate capital and operating costs where exact facility input data are unavailable

c) The Australian Competition and Consumer Commission (ACCC) uses a form of top-down analysis – dubbed a "full-cost approach" – as an option for settling Interconnection disputes. The analysis is used to arrive at Total Service Long Range Incremental Cost (TSLRIC) results, which depend upon extensive carrier record data.

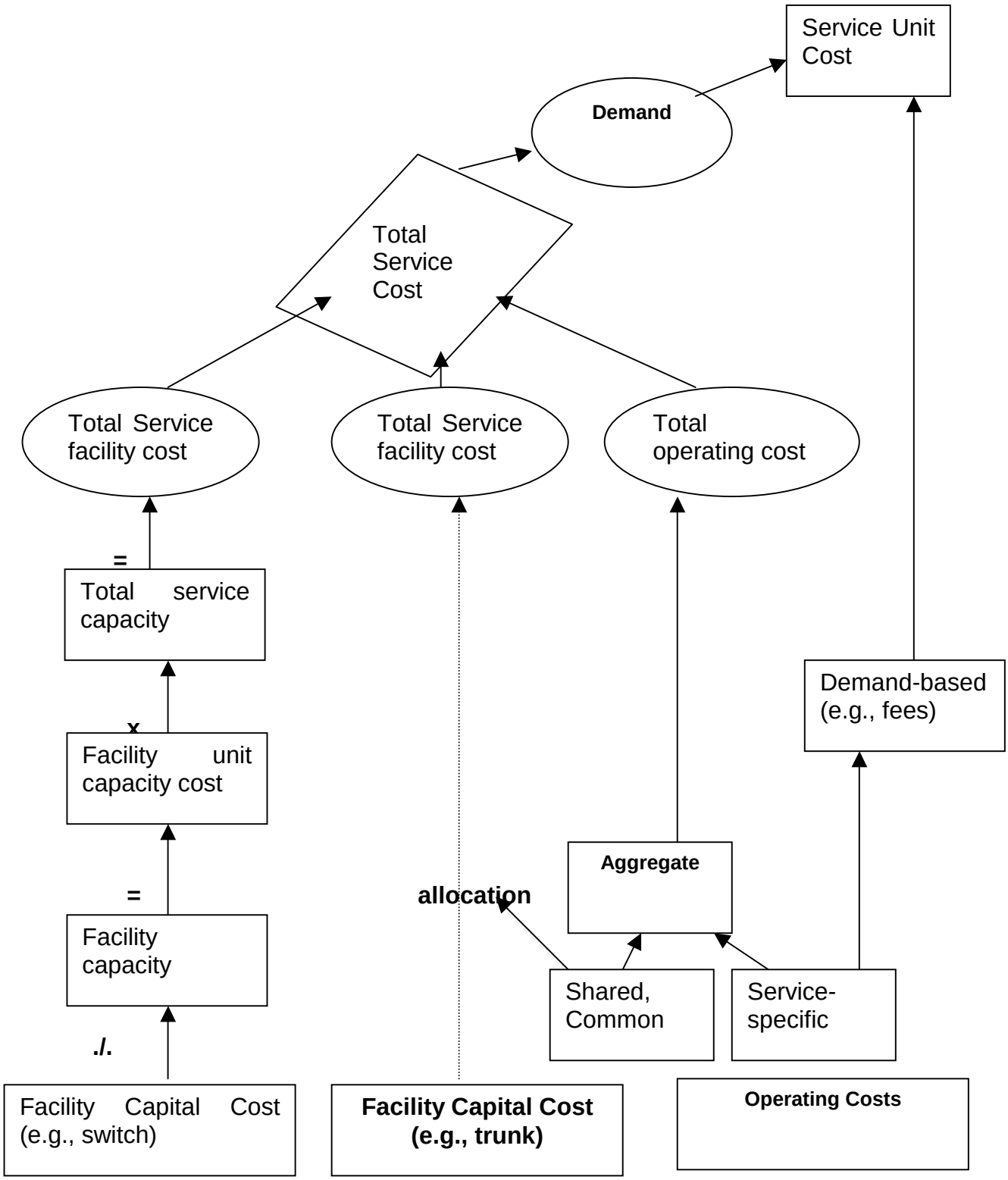
Figure 3.4 explains the Top-down Approach.

3.6 The Outside-In Approach:

a) The third approach is to use "proxy" estimates from outside sources, establishing cost "benchmarks", or ranges of costs, for services or facilities. This involves two steps. First, the regulators must define the appropriate cost elements and the scope of cost comparisons – whether they will be comparisons of specific facility costs, operating unit costs or service-wide costs. Second, the results have to be adjusted to account for differing conditions between the subject country and the benchmark country.

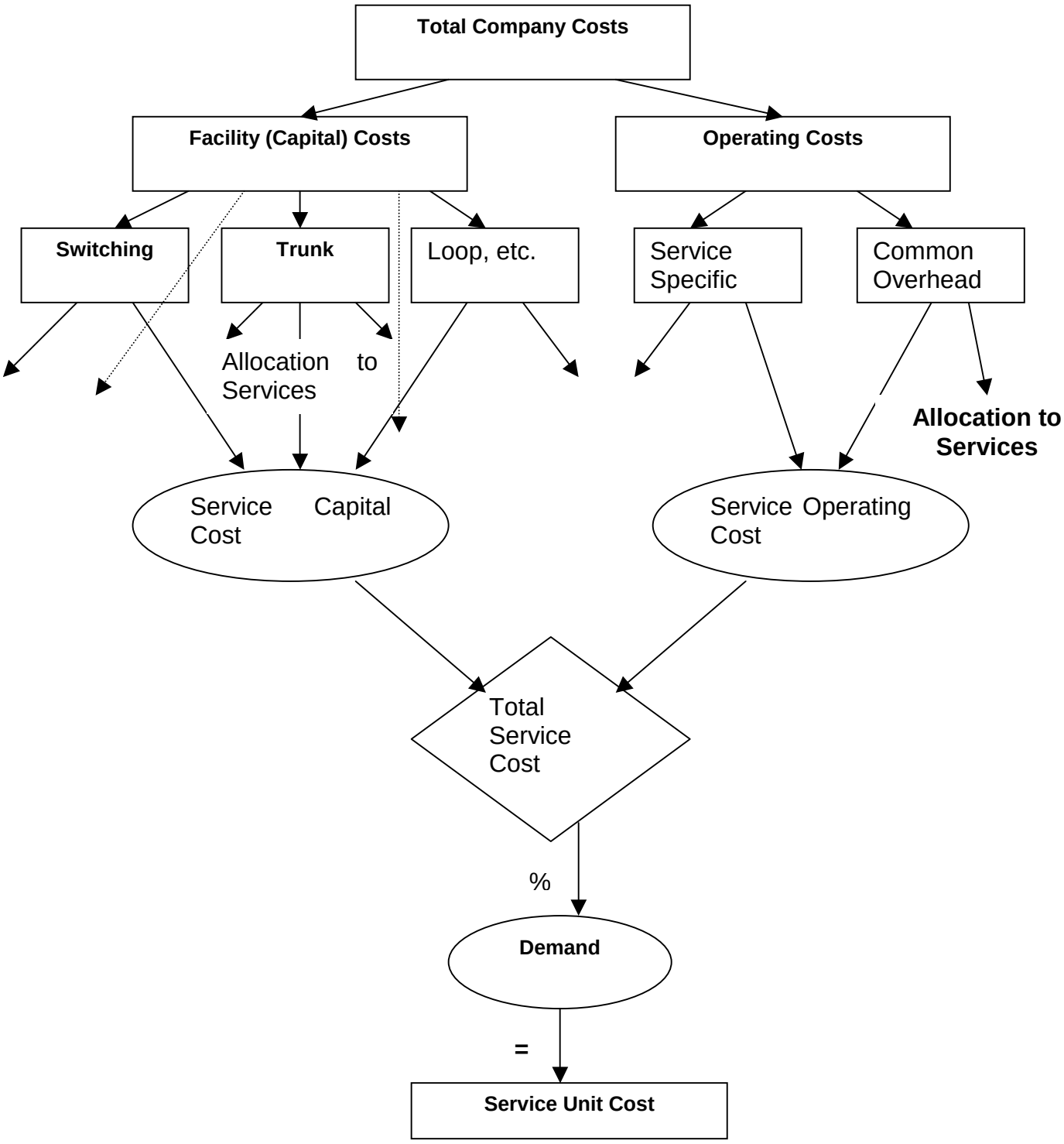
b) Figure 3.5 explains the Outside-In Approach.

Figure 3.3 Bottom-Up Analysis:



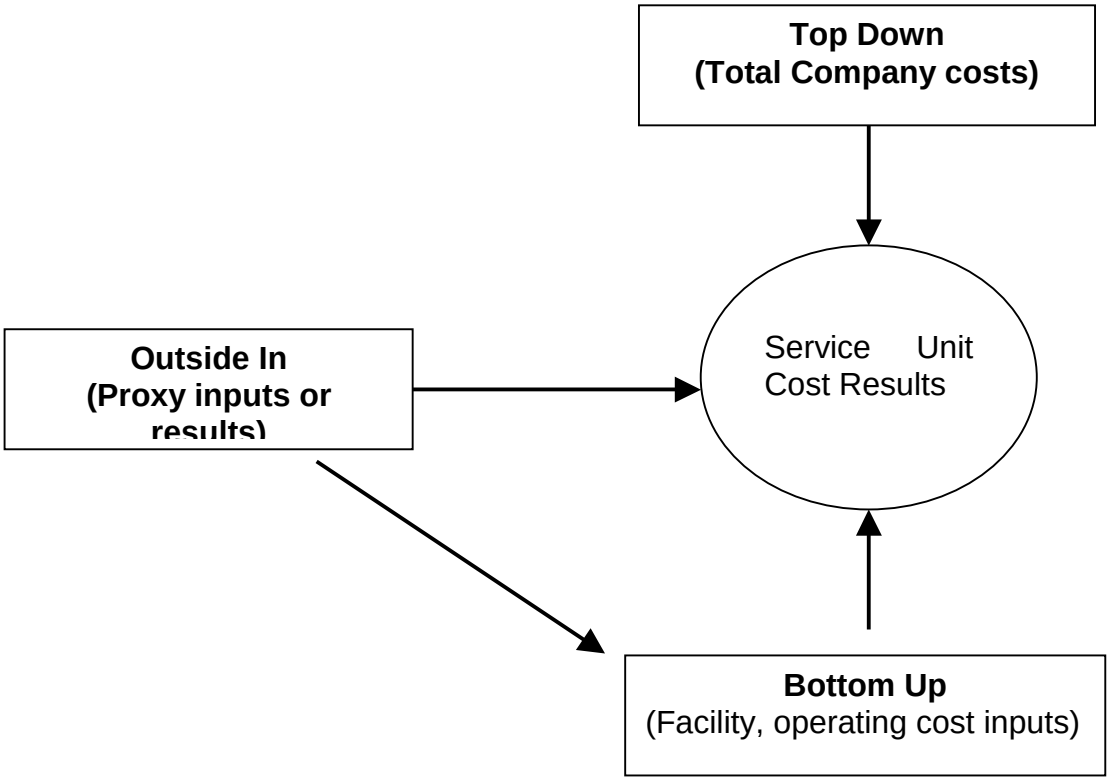
Source: ITU – Trends in Telecommunication Reform 2000-2001

Figure 3.4 Top-Down Analysis:



Source: ITU – Trends in Telecommunication Reform 2000-2001

FIGURE 3.5 OUTSIDE-IN APPROACH:



Source: ITU Trends in Telecommunication Reform 2000-2001 (Interconnection Regulation)

3.7 **Questions:** Views of the stakeholders are solicited on the following issues, based on the discussions in this section.

3. a) Which of the three costing Approaches referred in Section 3.4 to 3.6 above would be appropriate for adoption in our present Indian Telecom environment?

3 b) Whether the Revenue Sharing methodology for Long Distance calls should be based on call by call assessment of cost of Originating, Transit and Terminating Carriage? Would it be correct to assume that the distance elements involved in the Originating and Terminating carriages are on an average, almost equal? Can we fix equal percentage say 'X' for origination and Termination and 'Y' for Transit. Both 'X' and 'Y' to vary based on the Cost of Carriage incurred on the three Network segments i.e. Originating, Transit and Terminating?

3 c) What would be the most acceptable way to work out Revenue Share percentages, when there are more than one NLDOs involved in Carriage of a Long Distance call between two Telecom Circles?

3 d) What Revenue Sharing methodology should be adopted in case of International Long Distance Calls for scenarios when ILD traffic is

- Delivered through NLDOs
- Delivered directly to ILDO by Access Providers

4. DISCUSSION ON ISSUES RELATING TO EQUAL EASE OF ACCESS

4.1.1 Dialling Parity

a) If conditions for healthy competition are to be established, telecommunications end users should be able to access the services of new market entrants as easily as they can access those of the incumbent operators. Without equal – or at least comparable – ease of access, new entrants will find it difficult to attract customers. For example, in the early days of long distance competition in Canada and the United States, many customers found it inconvenient to use competitive operator's services because of the need to dial more digits than what would be required if the STD call is dialled through the incumbent's network.

b) US policy-makers addressed that problem by requiring dominant local exchange carriers to offer equal access for long distance carriers to reach potential customers. That regulatory solution also included the information of 'Pre-subscription' for Long distance services, allowing US customers' calls to be routed automatically to their chosen carriers.

c) Today, many incumbent operators and telecommunications equipment manufacturers have redesigned their switches and related software, making them very easily adaptable to the requirements of multi-operator environment. Dialling parity is thus fairly painless to achieve with the right software package. Nevertheless, implementing dialling parity usually requires incumbent carriers to alter their operating procedures and reprogram their equipment. There are basically two approaches to providing equal access:

4.1.2 Call-by-Call Carrier selection:-

a) Customers select the operator of their choice for each call by dialling a short code or prefix unique to their selected operator. For example, in Colombia, customers dial "09" to route national calls through the incumbent operator TELCOM's Network, and other two-digit prefixes to route them through competitive operator's Networks. The main requirements to provide this type of equal access efficiently are:

- A Numbering Plan that allocates available numbers on equitable basis among all NLD Operators including the incumbent.

- Rules requiring incumbent operators to gives new entrants access to basic signalling services, including Calling Line Identification (CLI), Databases, answer and disconnect supervision functions.

- Appropriate billing and auditing arrangements, allowing each carrier to bill customers directly or to procure billing services from another carrier or third-party billing agent.

4.1.3 Operator Pre-selection

a) Under this approach, customers pre-select an operator for some or all of their calls. For example, a customer may select a preferred carrier for all long distance and international calling. Pre-selection allows all such calls to be routed automatically to the chosen carrier. The main requirements for this type of equal access are:

- Switch software features needed to identify each customer's pre-selected carrier and to route and bill all calls accordingly.

- Appropriate billing and audit arrangements to permit direct billing by each pre-selected carrier or consolidated billing by a single carrier (usually the local access provider, which may bill the end user and then remit payments for long distance calls to the pre-selected long distanced carrier).

b) The implementation of equal access has been uneven around the world. It is available in many countries – including Argentina, Australia, Canada, Chile, Germany, Hong Kong SAR, Switzerland and the United States, among others – but it remains unknown in many parts of the globe. Equal access is more common for international services. In some countries, equal access is delayed due to delays in implementing a Numbering Plan that allows equivalent allocation of numbers to competitors.

c) A combination of the two methods is also possible.

4.1.4 In the European Union, dynamic carrier selection and pre-selection has been implemented in most of the countries. Annexure H is an extract from a EU document on Carrier Selection options in Europe and some other countries. Annexure I contains a release dated 8th January 2001 by OFTEL on finalisation of Carrier Pre-Selection Charges. Annexure J indicates the status of Carrier Selection in the European Union.

4.2 Carrier Selection Status in India

4.2.1 Given below is an extract from NLD Licence Agreement on Equal Ease of Access.

> Clause 17.1 It shall be mandatory for fixed service providers, cellular mobile service providers, cable service providers, to provide Interconnection to NLD service providers whereby the subscribers could have a free choice to make inter-circle/ international long distance calls through NLD service provider.

4.2.2 The new Basic Service Licence Agreement has the following main provisions on Equal Ease of Access:

> 2.2 Licensee shall be free to carry Intra-Circle long distance traffic. However subject to technical feasibility, the subscriber of the Intra-Circle long distance calls, shall be given the choice to use the Network of another Basic Service Provider in the same service area. The Licensee can also make mutual agreements with National Long Distance Operators for carrying intra-Circle Long Distance traffic.
>
> 2.4: It shall be mandatory for the LICENSEE to provide Interconnection with National Long Distance (NLD) Service Providers, through suitable mutual arrangements / agreements, whereby the subscribers could have a free choice to make Inter-Circle / International Long Distance Calls through any NLD Service Provider. For international Long Distance Calls, the LICENSEE shall access International Long Distance OPERATOR through National Long Distance Operator only. Similarly, inter-circle leased lines are to be provided by suitable mutual agreements / arrangements with NLD Service Providers.
>
> 16.1: The Licensee shall ensure adherence to the National Fundamental Plan (describing Numbering and Routing Plan as well as Transmission Plan) issued by Department of Telecom and technical standards as prescribed by the Licensor or TRAI from time to time. In the case of providing choice of Long Distance Operator, the equipment shall support the selection facilities such as dynamic selection or pre-selection as per prevailing regulation, direction, order or determination issued by Licensor or TRAI on the subject.
>
> 17.3: Licensee shall Interconnect with National Long Distance (NLD) Service Providers through suitable arrangements/ Agreements whereby the subscribers could have a free choice to make Inter-circle/ International Long Distance calls through any NLD Service Provider. For international long distance call, the Licensee shall access International Long Distance Operator through National Long Distance Operator only. Similarly, inter circle leased lines are to be provided by suitable mutual agreements / arrangements with NLD Service Providers. Licensee can enter into mutual agreement/ arrangement with NLD Service Providers for carriage and delivery of inter-circle traffic for the leg between LDCC and SDCC.
>
> 17.4 Licensee shall be free to carry Intra-Circle Long Distance traffic. However, subject to technical feasibility, for these Intra-Circle Long Distance calls, subscriber shall also have the choice to use the Network of the Basic Service Providers in the same service area. The Licensee can enter into mutual agreement with NLDO for carriage of Intra-Circle Long Distance calls.
>
> 17.11: The Network resources including the cost of upgrading/ modifying Interconnecting Networks to meet the service requirements of service will be provided by service provider seeking Interconnection. However mutually negotiated sharing arrangements for cost of upgrading/ modifying Interconnecting Networks between the Service Providers shall be permitted.

4.2.3 The issues relating to Carrier Selection were examined by a High Level Technical Committee under the aegis of TRAI as referred earlier in para 1.3 also. This was subsequent to TRAI Recommendations on National Long Distance Services. Based on the same, TRAI issued Recommendations to the Licensor on the Allotment of Codes for introduction of Dynamic Call by Call Selection of NLD Carriers. These are available at Annexure F. Letter to the Licensor for incorporating suitable clauses in the License Agreement of BSOs

to reflect the Recommendations of TRAI on NLD operations relating to Equal Ease of Access was also issued and the same is available as Annexure G.

4.2.4 Extracts from TRAI's Recommendation on Carrier Selection Code are reproduced below:

> For Dynamic Call by Call selection, the subscriber should dial the STD prefix i.e. "0" followed by a NLD Service Code (NLDSC, a Carrier Access Code (CAC), and thereafter the National Significant Number (NSN) of the called subscriber. Thus dialling sequence will be : 0 + NLDSC + CAC + NSN.

For example, for dialling Mumbai from Delhi, the subscriber will dial :

' 0'	+	'10'	+	'55'	+	22	+	3451234
		(NLDSC)		(CAC)		(Area Code)		(Local Number)

> The Authority recommends adoption of "10" as the NLD Service Code. This code will be required to be dialled for all NLD Calls involving carriage over NLLD Network operators facilities.
>
> In regard to Carrier Access Code, which will identify the NLD Operator chosen by the subscriber, the Authority recommends a two digit Code beginning 40 and ending at 59, thus giving 20 codes to be allotted to all NLD Carriers, including BSNL. The Authority feels that number of NLD operators would be less than '20' for the planning period of five years. The position would be reviewed after that period.
>
> Regarding charging for Interconnection link between NLD Operator's POP at LDCC, and that of the BSO at the SDCC, the charges specified for such links in the Telecommunication Interconnection (Charges and Revenue Sharing) Regulation of May 1999 are applicable. Please note that this Interconnection Regulation also emphasizes mutual negotiations between Interconnection seeker and provider. Further, for estimating cost of origination, termination and transit on the NLD Network, cost of unbundled Network elements are required by the Authority to issue a determination, in case operators do not come to a mutual agreement on the modalities of inter Carrier settlements. The work of Accounting Separation and has just begun, and is likely to take about 6 to 8 months. The operators may be asked to expedite the Accounting Separation in accordance with Authority's recommendations.

4.2.5 TRAI has not yet issued any Recommendations on dialling procedures for ILD Carrier Selection or code allotment, though the High Power Technical Committee had recommended 00+10+XY+ International Significant Number. There is an alternate option to use 00 +91 + XY+ International Significant Number. As recent TRAI Recommendations permit normal Toll Quality and below normal Toll Quality ILD Services, each ILD Operator would need two 'XY' codes if the ILDO deploys two type of ILD Services.

4.2.6 At present, it is not technically feasible to provide a dynamic choice for International calls since the digit storage capacity is inadequate. Service Providers will have to take steps to upgrade their switches to handle 23 digits.

4.2.7 In the Pre-Selection procedure, the subscriber registers in advance, the identity of his preferred National/ International Carrier with his Basic/ Cellular Service provider. When a pre-selection registered subscriber dials '0' or '00',

the specified operator will be automatically selected by the system. This requires identification of the subscriber's class by introducing certain procedures in the exchanges and requires significant Network up-gradation. The local exchange would have to use this information, to determine the outgoing trunk route. It would be possible for the user to override the Pre-Selection process by dialling the Dynamic Selection Code.

4.2.8 TRAI's Recommendation on International Long Distance Services envisages direct routing from an access provider to an ILDO in some cases. This would be possible after a minimum storage capacity of 21 digits is available.

4.3 Schedule for Introduction of Pre-Selection

In the context of NLD competition, a subscriber is likely to find it difficult to change his / her pre-selected choice from the incumbent's (BSNL's) Long Distance Network to another Network, until the alternative NLDO has established a Network that can be reached for most destinations. Dynamic Carrier selection, by which the subscriber selects the NLDO only for selected destinations, may be a more acceptable option at the starting stage of the NLD liberalisation process. By the time NLDOs achieve substantial Roll-out (say 2/ 3 years), Pre-Selection also will become more practicable option. There would, however, be another major consideration for an early introduction of Pre-Selection, that is the issue of 'Default Carrier' which is discussed in the next Section.

4.4. DEFAULT CARRIER

4.4.1 Background

If the Carrier Selection Code is not dialled, either the call will not be completed or it will have to be routed to a default Carrier. This is in the interest of the subscriber who should not be forced to dial 4 extra digits on every trunk call. If default Carrier procedure is not followed, users will be forced to dial 14 digits instead of 10 digits on all NLD calls. This may lead to adverse public reaction, increased dialling errors and other problems. **Default Carrier is significant only in the interim phase before Pre-Selection is introduced.** This procedure puts a new NLDO at a disadvantage with respect to the BSNL which functions as both NLDO and Access Provider. This matter requires to be considered and addressed.

4.4.2 TRAI's NLD Recommendation

4.4.2.1 TRAI NLD Recommendations of 13th Dec.1999 on Carrier Selection made following points.

> 47. Suitable access arrangements shall be made available to NLD service providers by Access Providers. Carrier Access Codes (CAC) should be notified having

dialing parity with Access Providers in conformity with the National Numbering Plan. It should be used to identify a long distance carrier by a customer of any AP in order to promote free choice and equal ease of access (EEA).

48. The technical arrangements for choosing an NLD service provider by dialing a CAC or pre-selection shall be made by all Access Providers (AP). Such arrangements should be made by APs in consultation with NLD service provider before commissioning NLD service and should form part of an Interconnect agreement. In case the facility of carrier pre-selection needs extended time, the APs must ensure its provision preferably within a **period of three years.**

49. It would be desirable that a technical group consisting of representatives of DOT, DTS and other APs, under the aegis of TRAI, is assigned the task of devising a scheme for dialing- access to different NLDOs and APs. The objective should be to formulate a suitable scheme of access codes of uniform number of digits for the NLD service providers and APs with adequate provision for additional players at a later date. The group may also supervise arrangements for introduction of pre-selection and for an inter-carrier charge billing system.

4.4.2.2 In response to DOT's reference for reconsideration, Revised TRAI Recommendation on the subject is as follows:

47 All NLD/ AP operators including DTS will be allotted a carrier access code (CAC) in the interest of dialling parity as already recommended. In case of default i.e. absence of CAC, in the digits dialled by the subscriber, the call should be routed to a recorded announcement requesting the subscriber to prefix his destination code with the CAC of the chosen operator. In due course pre-selection will be introduced to achieve equal ease of access as already recommended.

4.5 Considerations

a) The available options for selection of the default Carrier is to specify it by policy or allow it to be selected at the discretion of the BSO. The BSO may also choose to distribute such traffic amongst available NLDOs. No changes are required in the current Network in case the option of default Carrier Selection is left to the discretion of the Access Provider. If the Carrier Selection Code is not dialled, feeding a recorded announcement asking the subscriber to consult the directory or a special service operator to find out the 'CAC' of a NLD of his choice, is technically feasible. However, this could cause some annoyance to the customers and also increase the total processing time for such calls, with some adverse affect throughput of the switches.

b) Access Providers (BSOs/ CMSOs) have in their interaction with High Level Technical Committee strongly recommended that the system of default carrier be introduced. Because if no default mode is prescribed, the average number of digits dialled would increase, and the requirement of providing announcements for incomplete dialled calls could lead to avoidable congestion in their Network in the initial stages of the introduction of the NLD competition.

c) NLDOs have expressed a contrary view. According to them, compulsory dialling of the CAC is an important aspect of the 'Level Playing Field' and they would be handicapped in their effort to collect traffic particularly in the period

before Pre-Selection is available. One possible solution could be to ask the Access Providers (APs) including BSNL/ MTNL to pass an agreed share of default traffic to the NLDOs who have established Points of Presence (PoPs) in the area of operation of concerned Access Providers (APs) until the Pre-selection procedure is established and subscriber's choices ascertained.

4.6 UPGRADATION COSTS

4.6.1 Dynamic (Call by call) Selection

a) The existing BSNL switches have the capacity for handling the extra digits for selection of National Carriers, but not for International calls. In principle, the additional capacity for analysis exists in most exchanges, but in a few of the older exchanges, modifications or replacements may be necessary. NLDOs and the Access providers will have to co-ordinate their programmes and changes may have to be carried out over a year or so in a phased manner. CMSP operators have generally indicated that their systems already provide for such selection procedures.

b) The traffic related up-gradations, require a much more detailed analysis on the part of all operators and a clearer picture will emerge on the basis of the inputs provided by the operators, much of which is not yet available. Additional Network Costs may be involved in one or more of the following cases:

i) Software upgrades to accommodate the Carrier Selection Code
ii) Changes in software, and in some cases in hardware of local exchanges, for extra analysis and processing
iii) Increase in storage capacity for International Carrier Selection

c) The costs of I) & ii) above are not likely to be very high and Call by Call selection by dialling Carrier Access Code (CAC), can be introduced at an early date i.e., as soon as NLD Operators commission their Networks.

4.6.2 Preselection

a) In the UK, the costs for introduction of Pre-Selection appears to have been distributed between the subscribers and operators. If the subscriber has to pay additional costs to register his pre-selected choice, he may be reluctant and the NLDOs, who do not have any captive subscriber base, may end up having to pay the charges on the subscriber's behalf. Another way of addressing this issue may be to obtain mandatory payment from all subscribers for implementation of the overall pre-selection regime, in the form of small additional payments in their bills. This seems feasible but could prove to be unpopular.

b) In India the principle is that the operator seeking changes should pay for them, however, the methodology for estimating costs, collection and distribution of funds may be complex. There is a strong need to collectively work out the principles relating to verification of costs and sharing amongst various operators. Without a mutually agreed sharing regime system, changes may not be affected smoothly and in time.

4.6.3 General Issues regarding Network Up-gradation Costs

a) The question of compensation to be provided by Operators who seek up-gradations in the Network of other Operator needs careful consideration. Up-gradations in the Operator's Network may be of two types:

- ❖ Those that are required to be made to meet National Standards, for example QOS.
- ❖ Those that are required to meet the Service needs of other operators

b) It could safely be assumed that the first type of up-gradation i.e. to meet the QOS norms, should be met by each Operator for his Network.

c) It is likely that the second type of improvement may not be carried out until the operator, who has to upgrade, has received payment. This may delay matters unless principles for such payments are agreed to in advance.

d) In this connection two major issues will arise. How should costs be estimated, and how should funds be collected and distributed for implementing the changes.

e) For estimating costs of up-gradation, a statutory mechanism may be necessary since operators have been reluctant to provide any information to the High Level Committee. It may be necessary for the Licensor to mandate these up-gradations subject to a post facto settlement of dues. Also, since the up-gradations can be phased over a period, it is necessary to have a coordinated approach on this issue between APs and NLDOs. This could perhaps be initiated through the High Level Committee (HLC). Once the cost per line of up-gradation are determined, the requesting operators should start making payments based on the areas covered in their roll-out plan.

f) Where an up-gradation would benefit a number of operators, the collection of funds will have to be distributed amongst them. However, when new operators join they may have to reimburse their share to the existing operators.

g) Another practical alternative would be to create a fund, possibly out of the Licence fees recovered from the Access Providers and NLDOs and to advance amounts out of this fund to the incumbent in whose Network most of the up-gradations may have to be done. The amount may be recovered from the concerned Operators, through the license payment regime as a temporary

surcharge and credited back to the fund. A rolling fund like that could take care of the funding problems relating to the up-gradation of the incumbent's Network and could avoid quite a few roadblocks to the growth of a satisfactory Interconnection regime.

4.7 Questions : In the light of the above discussion, the following issues need to be discussed with the stakeholders:

4a) What should be a reasonable time frame to introduce Carrier Pre-selection, after the NLD Service is started based on Carrier Access Code (CAC) as already recommended by TRAI?

4b) Introduction of Pre-Selection and increase of storage capacity to 23 digits, may involve significant up-gradation costs. These costs are future costs. What should be the mechanism for determination of these costs? Who should bear the cost of up-gradation of the incumbent's Network to introduce pre-selection?

4c) In case NLDOs are to bear the costs, how to apportion share of the cost recovered between various Access Providers?

4d) In an open competition scenario, when a new operator comes in at a later date, to what extent should he contribute towards meeting the costs incurred in the past?

4e) Pre-selection would involve additional storage capacity and other hardware and software-upgrades. What would be the best way to coordinate the efforts / actions of the different BSOs and NLDOs towards technical/ Network up-gradation or modification to facilitate Carrier Selection? Can an industry level agreement to which all operators will subscribe, achieve this objective? Such an arrangement will also be an important step towards industry self-regulation.

4f) What would be a techno-economically feasible and an acceptable Carrier Pre-Selection Procedure for International Long Distance Calls and Intra-Circle Long Distance Calls?

4g) What would be a reasonable time frame for introduction of Carrier Pre-selection facilities in respect of International calls?

4h) In the interim period before Pre-Selection is made available, all calls where no Carrier Access Code is dialled, the following options would be available:

- Routing call to an announcement machine so that the caller dials again.
- Routing automatically to Default Carrier as selected by BSO.

- Specifying a Routing policy so that Default traffic is distributed amongst the NLDOs in an agreed proportion.

Which of the above or any other option would you recommend and why?

4i) In case calls are routed through a default Carrier, those operators who own both Access and National Long Distance Networks will have an advantage over those NLDOs who have no direct access to subscribers. How can this issue be addressed for maintaining a level playing field?

5. ISSUES RELATING TO AN INTERCONNECT BILLING SYSTEM

5.1 BACKGROUND

The Interconnect Agreement between the Department of Telecom (now BSNL) and six Basic Service Operators to whom licenses were issued in the second half of 1997, at Chapter VII gives the details of an Interconnect Billing System. The latest License Agreement issued to the new Basic Service Operators also provides for Interconnect Billing so that proper Inter-carrier settlements and reconciliation take place in respect of Carriage Charges.

5.2 Outline of an Interconnect Billing System

The existing digital Switching Systems are designed to generate only detailed charging information for billing the subscribers for calls made by them. Subscriber charging is based on an analysis of the destination code. Detailed information for billing the subscribers like Calling Number, Called Number, Duration of the call etc are generated in a local exchange. In a single operator environment, there was no need to provide for Bulk Billing at the Points of Interconnections for Inter-carrier settlements based on actual usage of each other's Network resources. In a multi-operator environment, there is need for a different kind of Billing System to be connected to Gateway Transit exchanges for settlement of Carriage Charges. Such Interconnect Billing Systems also called Inter-carrier Charge Billing Systems in some countries, are based on Call Data Records (CDRs) generated by Gateway Transit or Trunk Automatic Exchanges (TAX). An Interconnect Billing System is connected to the TAX or Tandem Switches by data communication links. The latter generates Call Data Records which is inputted to the Billing Systems in real time for each call transited through the Transit Network indicating typically the following information:

a) Carrier Related Information
   i) Identity of Originating Carrier
   ii) Identity of Terminating Carrier
   iii) Identity of Transit Carrier.

b) Geographical Information
   i) Originating Charging Area
   ii) Terminating Charging Area
   iii) Charging areas of POIs located at Entry and Exit of the Transit Network.

Based on the above information, the Interconnect Billing System generates a bill for the Network resources used in transiting the call from Point X to Point Y (Ref Fig. 3.1). Interconnect Billing System determines the Cost of Carriage of the call from Point of Entry to Point of Exit in a Network cloud using a distance element based Cost Matrix, which is part of the Billing Software. The Billing Process essentially characterizes the calls in types such as Short

Haul, Medium Haul and Long Haul, to account for the differences in the Transmission length as well Switching stages.

5.3 **Need to upgrade the existing Signalling System**

It will be seen from the pre-paras that one of the essential requirements to implement a sophisticated Inter-carriage Charge Billing System (also called Interconnect Billing System) is to generate Call Data Records in the Transit Switches (TAX) to capture various types of Carrier related information, as well as information relating to the Originating, Terminating and Transit Point Charging Areas. Such information flows is only possible if CCS7 Signalling System is available end to end. The existing CCS7 Signalling System i.e. ISDN User Part specified by TEC for the country, does not have provision for conveying these Charging information from one Network to another. Therefore, the National Specifications for CCS7 Signalling will also need modifications. The Switching Software in the existing TAX as well as local exchange will also need modifications. These may involve considerable expenditure in terms of monetary resources as well as time.

5.4 Whether the existing System can be adapted for Multi-operator environment

Considering the Techno-economic problems of implementing the state of the art Inter-carrier Charge Billing System outlined above, it is worthwhile examining whether the existing System between Access Providers and BSNL which is based on Bulk meters provided on incoming junctions could be adapted for the Multi-operator environment involving more than two Operators. These Bulk meters are incremented by the periodic pulse received from down the stream Gateway TAXs. The Gateway TAXs generate pulses at the rates applicable for the distance from the POI to the Destination. The existing System although easier to be implemented, may cause problems relating to reconciliation of the Carriage Charge in case the two Gateway Switches of the two Networks are separated by a distance slab . It does not bill for the distance carriage on a pure Transit Network such as that of a NLD.

5.5 Questions

In the light of the above discussions, the following issues need to be discussed with the stakeholders:

5a) What type of Inter-Carrier Charge Billing System should be adopted for proper settlement and reconciliation between two operators? Whether the Inter-Carrier Charge Billing should be based on the concept of call by call detailed records or on Bulk basis as at present?

5b) In case the first option is chosen, what modifications would be necessary in the Signalling procedure to introduce new messages and new parameters in

the National CCS7 Specification, to accommodate the capability of Charging for Inter-Operator Billing in Multi-Operator Scenario?

5c) How the technical / Network up-gradation or modifications to facilitate Inter Carrier Billing System for Multi-Operator Scenario could be coordinated? How should the cost of such up-gradations in the incumbent's Network be met?

5d) For capturing varying distance elements on the Transit cloud, sophisticated Signalling and Charging Systems may have to be employed. This may involve up-gradation of existing Switching elements in the incumbent's Network. What would be the most appropriate and acceptable method to meet the cost of such up-gradation?

ANNEXURE A

CONTENTS OF A TYPICAL INTERCONNECTION AGREEMENT

Contents	Detail and Comments
Interpretation	
Recitals	'Whereas' clauses add historical and legal context to assist understanding by future readers of agreements.
Definitions of key terms	Terminology varies significantly among different countries and operators. It is important to ensure compatibility of terminology with the local environment when adapting Interconnection agreements from other countries. Definitions in other documents may be referenced, e.g. definitions in law or regulations, regulatory guidelines, ITU definitions
Scope of Interconnection	
Description of scope and purpose of Interconnection	Different types of Interconnection agreements have different purposes; (e.g. between local Networks, local to long distance/ international, fixed to mobile, mobile to mobile, local ISP to ISP backbone). The purpose of some Interconnection agreements is to provide termination services or transit services; other involve provision of unbundled *facilities*, etc. Interconnection architecture (annotated diagrams).
Points of Interconnection and Interconnection Facilities	
Points of Interconnection (POI) and related facility specifications	POI locations (e.g exchanges, meet points) usually listed in an appendix; may be modified from time to time; typically includes exchange types and street addresses. Specific POI facility locations (e.g. digital distribution frame; manhole splice box). Description of Network facilities to be Interconnected (e.g. large-capacity fibre optic terminals with Interconnecting single-mode optical fibres). Specify capacity and/or traffic volume requirements. Indicate which party is to provide which facilities (include diagram of POIs and Interconnected facilities). Technical specifications, for example: Calling Line Identification (CLI) specifications. Other advanced digital feature specifications, e.g. call forwarding, caller name ID, etc. Basic and ISDN call control interface specifications. Local number portability (LNP) query-response Network specifications.
Signalling Interconnection	Specify type of signaling Networks/standards (e.g. CCS7). Signalling POI locations to be specified (i.e. Signal Transfer Points or STPs). Point codes to be specified. Technical interface specifications (e.g. signaling links to be dedicated E-1 or DS-1 transmission facilities; operating at 56 kbps). Diagram of signaling Interconnection architecture.
Network and Facility Changes	
Planning and forecasts	Requirement for mutual notification of Network changes and capacity forecasts, for example: traffic forecasts for each POI;

	local number and portability requirements; area code saturation and changes to increased digit phone numbers; default and redundant routing arrangements; Periodic Network planning reports may be specified.
Facility ordering procedures	Specify rights and obligations of each party with respect to ordering and provisioning of Interconnection facilities (including unbundled Network elements – see below). Confidentiality requirements and procedures. Ensure no anti-competitive use of order information (e.g. no contacts with end users; competitive service divisions of operator receiving orders). Specify point of contact (e.g. Interconnection Service Groups; E-mail addresses, etc.). Specify order format and procedures (e.g. standard order forms may be utilized in paper or electronic (EDI) format). Procedures to expedite specific orders. Co-ordination process for migration of customers between operators (e.g. coordination of cutovers to prevent or minimize service interruptions to end-users). Procedures for ordering operator to arrange for all equipment installations and changes at end user premises. Order confirmation and order rejection procedures; timely notification, notification of additional charges, etc. Order completion notification and reporting requirements.
Traffic Measurement and Routing	
Traffic measurement responsibilities and procedures	Describe party responsible; measurement and reporting procedures (see billing procedures (below). Rules for routing of different types of traffic, if any; e.g. local traffic that is to be terminated reciprocally without charge may be carried on “bill-and keep” trunks; traffic for which termination charges apply may be carried on other trunks (e.g. transit trunks, national traffic trunks, etc.).
Infrastructure Sharing and Collocation	
Sharing of infrastructure, procedures and costs.	Availability of poles, conduits, towers, right of way, etc. Procedures, if any, for determining available capacity; procedures for allocating capacity among requesting operators (e.g. first come/ first served). Prices and/or costing method. Provision and pricing of supplementary services (electrical power, security systems, maintenance and repairs, etc.). Sub-licences on property of third parties (e.g. right of way owners, municipal and other public and private property owners, where infrastructure is located), insurance and indemnification for damages.
Collocation	Availability of poles, actual or virtual collocation (e.g. for transmission facilities on exchange premises); list of addresses where collocation is available; procedures for determining available space; reservation of expansion space. Prices and/or costing method for collocated space. Provision and pricing of supplementary services (e.g. electrical power and emergency backup power, lighting, heating and air conditioning, security and alarm systems, maintenance and janitorial services, etc.). Procedures for ensuring access to and security of collocated facilities (notification; supervised repair and provisioning work and/or separated premises, etc.).

	Negotiation of other lease and/or licence arrangements, including issues of sub-licences on property of third parties (e.g. building owners, right of way owners, municipal and other public property owners), insurance and indemnification for damages.
Billing	
Scope of billing arrangements and responsibilities	May include different arrangements, for example: Operators billing each other for Interconnection services (e.g. termination) and facilities (e.g. unbundled loops and other Network elements). Performance of billing functions by some operators for others (e.g. local operators billing end-users for long distance or international operators., ISPs, etc.).
Billing procedures	Interconnection billing media – discs, tapes, paper and/or electronic (EDI) transfers; format and software specifications. Guidelines for production of Interconnection billing outputs, including: Applicable industry standards or systems for metering and billing. Billing data format and data elements. Standardized codes and phrases. Billing schedules. Customer Service Record (CSR) provision, including: Details to be supplied by provisioning local operator (e.g. record of Interconnection elements used, including circuit and other (e.g. DSLAM) equipment identification numbers). Media (e.g. tape, paper, etc.) and schedule for delivery. Other requirements to facilitate efficient verification and billing of end-user by non-provisioning operator. Retention periods for billing data.
Payment terms and conditions	Billing fees and related charges. Payment terms and conditions (including late payment penalties, service disruption credits, etc.).
Billing disputes and reconciliation procedures	Contact details for reconciliation and billing queries. Responsibilities to provide any back-up records. Notification of billing disputes. Initial resolution procedures (e.g. escalation to more senior management). Final resolution (referral to arbitration, regulator or courts).
Quality of Service/Performance and Trouble Reports	
Quality of Service	Service performance standards may be specified in appendix, for example: Average time for provisioning Interconnection circuits. Percentage of Interconnection cut-overs made on scheduled dates. Switching and transmission quality measures on Interconnected circuits (e.g. probability of blockage at peak hours, transmission delay and loss).
Testing and Maintenance	Right to make reasonable tests, and to schedule service interruptions; procedures to minimize disruption.
Trouble Reports	Procedure for trouble reports; notice periods; response time standards. Duty to investigate own Network before reporting faults to Interconnecting operator. Responsibility for costs incurred to second operator in investigating faults subsequently found to exist in first operator's Network. Calculation of charges (labour, etc.) for

	investigating trouble reports.
System protection and safety measures.	Responsibilities of parties to take necessary precautions to prevent interference with or interruptions of other party's Networks or customers.
Interchange and Treatment of Information	
Data Interchange Format	Method and format of data interchange between carriers, including data interfaces, software, forms, etc.
Data to be exchanged	Specify all data types and systems for which data is to be interchanged, for example: New facilities and service orders, Network changes and forecasts, billing, etc. Number allocations and other data required for call routing and local number portability (where applicable, e.g. where LNP system is operated by incumbent operator rather than an independent party). Customer listings in directories and databases. Access to other Network databases, for provision of advanced services.
Access to and use of customer information	Confidentiality procedures for customer information, including: Establishment of separate Interconnection services group with secure data (password protection for electronic files; locks for data rooms and filing cabinets, etc.). Confidentiality forms to be completed by all relevant employees (penalties and bonding optional). Procedures to ensure protection of customer privacy.
Access to and use of operator information	Confidentiality procedures (see customer information procedures, above). Intellectual property rights.
Equal Access and Customer Transfer	
Equal access procedures	Procedures depend on equal access approach, e.g. carrier pre-selection, casual selection. Detailed procedures normally incumbent for carrier pre-selection, including: Customer authorization requirements (signature on prescribed form, clear choice requirements). Authentication and measures to prevent unauthorized customer transfers (slamming). Penalties for unauthorized customer transfers. Methods of reporting customer transfers (contact points and data to be provided). Order confirmation procedure (format, medium, etc.). Schedule to implement transfers. Procedures to implement transfers. Dispute resolution process (e.g. escalation through senior management, arbitrator and regulator); information to be provided in dispute resolution process. Procedures for dealing with disputed customers (which operator may contact customer, information to be provided to and/or obtained from disputed customers.
Ancillary Services	
Operator-assistance	Types of operator assistance services to be provided, including directory assistance, translation services, fault report routing, etc. Call handling and operations procedures. Fees and billing procedures.
Other Ancillary Services	Subscriber listings in telephone directories. Information and billing inserts. Repair and maintenance services.

	Other services provided by one or other operator to increase mutual operating efficiencies.
Termination	
Grounds for termination and restrictions	Termination may only be permitted subject to certain restrictions (e.g. regulatory approval for termination of Interconnection by incumbent operator). Grounds for termination by incumbent operator may include: regulatory or court orders; bankruptcy, insolvency, receivership, etc.; cessation of business; fewer, if any, termination restrictions in competitive markets, and by non-dominant operators.
Termination procedures	Advance notice requirements. Payment of non-recoverable Interconnection costs incurred by disconnected operator. Computation and payment schedule for disconnection costs. Dealings with end-users, communication restrictions, etc. Disconnection cutover procedures.
Other Provisions	
Force majeure	List of conditions for which non-performance of Interconnection agreement obligations will be excused.
Assignment	Rights of assignment and restrictions on same (e.g. consent or regulatory approval requirements).
Applicable laws	Identifying jurisdiction whose laws will govern the agreement.
Regulatory Approvals	Specify regulatory approvals required for effectiveness and/or renewal, amendment, termination, etc. of agreement.
Breach of Agreement	Remedies and penalties. Liabilities, indemnification and limitation of liabilities.
Legal interpretation	Standard provisions for legal interpretation and enforcement of agreement (e.g. entire agreement clause, effect of unenforceable terms, cumulative rights and remedies, etc.).
Dispute resolution	Procedures for resolution of disputes under agreement that are not specifically dealt with elsewhere; for example: good faith negotiations, time schedule for same, escalation through management levels; referral to regulator, arbitrator or court (e.g. of different types of issues). Selection of and procedures for arbitration
Term	Duration of term. Renewal rights and procedures.
Amendment	Review and re-negotiation procedures. Impact of regulatory changes.

ANNNEXURE 'B'
Interconnection time frames, delays, and penalties in the American region, selected countries.

Country	Period to reach agreement	Entity in charge of dispute resolution	Penalty for not Interconnecting
Bolivia	3 months from the request for Interconnection	Superintendencia de Telecommunicaciones	Fines from 2.45 million BS (Bolvianos) to 36.75 million Bs, (roughly between 400,000 USD and 6 million USD), the confiscation of equipment and materials, or one year prohibition from providing services.
Dominican Republic	3 months from the request for Interconnection	Instituto Dominicano de Telecommunicaciones	n.a.
El Salvador	n.a.	Superintendencia General de Electricidad y Telecom	Fines from 5,000 to 5000,000 colones (570 USD to 57,000 UKSD), and 500 to 5,000 colones per day if the infraction continues.
Guatemala	40 working days from the request for Interconnection	Superintendencia de Telecommunicaciones	Fines up to 100,000 USD per day
Mexico	2 months from the request for Interconnection	Comision Federal de Telecommunicaciones	Fines and/or revocation of concession.
Peru	2 months from the request for Interconnection	Organismo Supervisor de Inversion Privada en Telecom	Fines established by OSIPTSEL; repeated infractions lead to revocation of licence
United States	135 days from the request for Interconnection	State Commission	Fines from 110,000 USD for a single violation, up to 1 million USD for a continuing violation
Venezuela	2 months from the request for Interconnection	Comision Nacional de Telecommunicaciones	Monetary penalties of various types

Source: ITU- Trends in Telecommunication Reform Interconnection Regulation

ANNEXURE C

Extracts from THE TELECOMMUNICATION INTERCONNECTION (CHARGES AND REVENUE SHARING) REGULATION 1999 (1 of 1999)

Section III

3. Interconnection Charges

i. Interconnection charges shall be cost based, unless as may be specified otherwise.

ii. For determining cost based Interconnection charges, the main basis shall be "incremental or additional" costs directly attributable to the provision of Interconnection by the Interconnection provider.

iii. No service provider shall discriminate between service providers in the matter of levying of charges for Interconnection.

Provided that a different charge may be levied if justified on the basis of a substantial difference in costs incurred for providing that particular Interconnection.

iv. No service provider shall be charged for any Interconnection facility it does not seek or require.

Provided that if Interconnection facility cannot be provided in the form that is sought or required by the Interconnection seeker, the issue may be decided mutually between the seeker and provider of Interconnection. In case such mutual agreement is not possible, the matter may be reported to the Authority for a decision. The Interconnection provider shall inform the Interconnection seeker within 45 days of the request for Interconnection facilities whether the facilities can be provided in the form sought or required by the Interconnection seeker.

v. Charges for certain elements of the Network used to provide Interconnection are specified in the Schedules to this Regulation. Interconnection charges in respect of leased circuits and internet port charges shall be the same as the tariffs for these services specified, respectively, in Schedules IV and VI of the Telecommunication Tariff Order 1999.

vi. Unless specifically so provided, the Authority has forborne with respect to Interconnection charges.

vii. Where the Authority has, for the time being, forborne from specifying Interconnection charges, Interconnection seekers and providers shall mutually decide on such charges.

viii. Interconnection charges mutually agreed among Interconnection seeker and provider shall be based on the principles enunciated in this Section.

ix. Where mutual agreement for Interconnection charge cannot be reached within three months of initiating such a process for charges with respect to which the Authority has forborne, the Authority may intervene to settle the matter *suo moto* or on the application of either party.

Section IV

4. Revenue Sharing Arrangements

i. Any revenue sharing among Interconnection seeker and Interconnection provider shall take place out of the proceeds of the amount payable by the subscriber for obtaining the service which involves the usage of the Network of the Interconnection provider.

ii. Unless specifically provided in the Schedules to this Regulation, the Authority forebears with respect to revenue sharing arrangements.

iii. Where the Authority has, for the time being, forborne from specifying revenue sharing arrangements for any telecommunication service or part thereof, service providers shall mutually decide on such arrangements.

Where mutual agreement for revenue sharing cannot be reached within three months of initiating such a process for revenue sharing with respect to which the Authority has forborne, the Authority may intervene to settle the matter *suo moto* or on the application of either party.

For Basic Services:

(3) Local calls	Bill and keep for each service provider.
(4) Domestic long distance calls (STD calls)	The originating/transit service provider to pay Rs. 0.48 per unit of measured call for traffic delivered from its Network to the Network of the transit/terminating service provider for the call units measured at the point of Interconnection for its further carriage from the point of Interconnection to destination, based on the STD pulse rate. Provided no such charge shall be payable if the point of Interconnection is at the destination Short Distance Charging Area (SDCA) and also provided that no such charge will be payable if the terminating service provider requests that the call be handed over by the originating/transit service provider at an SDCA other than the destination SDCA.
(5) International calls	The originating service provider to pay Rs. 0.66 per unit measured call to the transit service provider (at present the Department of Telecommunications), for the call units to be measured at the point of Interconnection.

For Cellular Mobile:

(3) Local calls from cellular mobile to basic service subscriber	Payment to basic service provider at the rate of Rs. 1.20 per metered call, with number of metered calls measured at the pulse rate applicable to a basic service local call.
(4) Domestic Long distance calls from cellular mobile to basic service subscriber	Payment to basic service provider at a rate applicable to domestic long distance calls. The charge shall be Rs. 1.20 per metered call, with the number of metered calls measured at the pulse rate applicable to basic service long distance calls, with the chargeable distance equal to the distance of the call carried by the basic service provider for an equivalent STD from point of Interconnection to destination.
(5) International calls from cellular mobile	Payment to basic service provider at a rate applicable to international calls. The charge shall be Rs. 1.20 per metered call, with the number of metered calls measured at the point of Interconnection at a pulse rate applicable to an equivalent international call made by a basic service subscriber.

Explanatory Memorandum:

6. The Authority is preparing a consultation paper on access/carriage charge regime. Access/carriage charges will provide for an efficient Interconnection regime in a situation with multiple service providers Interconnecting with each other, i.e. the telecom environment envisaged in the National Telecom Policy 1999.

7. Work is also underway in the Authority for preparing a consultation paper on accounting separation for telecommunication service providers. Implementation of accounting separation is very important for determining cost based Interconnection charges and revenue sharing arrangements, but this is a time consuming process. The Authority's consultation paper on access/carriage charges will take into account certain aspects of accounting separation in order to determine an access/carriage charge regime in the near future. Any further refinements will be made, if required, when the accounting separation exercise provides more detailed information.

8. The payment by any service provider for connection and use of the Network of another service provider is conceptually divided as under:

- **set-up costs**, i.e. all costs required for initially linking up two Networks and making that link operational (including inputs such as fibre links, ports, building space and any up-gradation of equipment, as well as software required to make the Interconnection operational).
- **Interconnection charges** are the (recurring) amounts payable for the set-up costs;
- **usage charges** are payments for use of the Network for transmission of telecommunications messages by the subscriber of the Interconnection seeker. The mode of payment of such charges includes, *inter alia*, revenue sharing arrangements

In the second consultation paper, the nature of the change in the prevailing system of revenue sharing for basic telecom was summarized as follows:

> "*In view of the fact that proposed prices for various services are in the form of price caps, revenue shares are suggested, inter alia, for basic telecom operators. This alters the present system of revenue sharing. For example, in the basic services sector where the current condition requires a payment of specific amounts per pulse (Rs. 0.50 for long distance, and Rs. 0.70 for international), revenue shares of 60:40 and 45:55, respectively, for long distance and international call revenue are proposed for new entrant and DOT [for a call originating from the Network of the new entrant and carried by DOT]*." (Chapter I, page xiii)

The second consultation paper had proposed no revenue sharing for the terminating service provider because of the technical difficulty in implementing the proposed arrangement, and the premise that there would likely be similar number of calls originating and terminating for each new service provider.

To begin with, it must be re-iterated that the revenue sharing arrangements specified in this Regulation are interim, and are not based on detailed cost analysis. Application of an access/carriage charge regime will provide more logically tenable usage charges. That requires a detailed assessment of the underlying costs. It would, moreover, imply major changes to the existing revenue sharing arrangements, and hence an analysis is required also of the revenue implications for service providers. This is so also for suggestions made by ABTO regarding revenue sharing principles. Till any access/carriage charge regime is implemented, a system of revenue sharing must be in place to give effect to the commercial relationships arising through Interconnection.

E. **CERTAIN OTHER FEATURES**

1. The Regulation includes, similar to the Telecommunication Tariff Order 1999, a reporting requirement and the possibility for the Authority to review and alter any Interconnection charge or revenue sharing arrangement, whether specified by the Authority or those agreed mutually among Interconnection seeker and provider.

2. Similarly, as with the Telecommunication Tariff Order 1999, the Regulation states that in matters addressed by it, the Regulation's provisions over-ride those of the license or Interconnection charges and revenue sharing arrangements specified by originating, transit or terminating service providers.

3. As mentioned above, the Regulation addresses on Interconnection charges and revenue sharing arrangements with regard to Interconnection. Other rules and regulations pertaining to Interconnection have either been specified elsewhere by the Authority, or will be addressed by other Regulations/Orders of the Authority. These include aspects such as agreement on points of Interconnection, technical feasibility of providing Interconnection, and the quality of Interconnection services.

Annexure D

PROVISIONS RELATING TO INTERCONNECTION IN

(i) LICENSE AGREEMENTS OF BASIC SERVICE, CMTS & NATIONAL LONG DISTANCE SERVICE;

(ii) INTERCONNECTION AGREEMENTS BETWEEN BSNL & BSOs;

(iii) TRAI DETERMINATION ON POINTS OF INTERCONNECTION BETWEEN CMTS OPERATORS AND BSOs

i a) Old Basic Service License Agreement:

4: Unless otherwise mentioned or appearing from context, all the schedules annexed hereto including the tender document with clarifications thereto and the *Interconnect Agreement (omitted in the License Agreement for new licenses)*, entered into between the two operators i.e. Government of India and the Licensee, with subsequent amendments made thereto will form part and parcel of this agreement. Provided, however, in case of conflict or variance on an issue relating to this agreement, the terms set out in the main body of this agreement read with all the Schedules annexed hereto shall prevail.

12: The Licensor reserves the right to, in case of a default of any of the terms and conditions stipulated in the License Agreement or the Interconnect Agreement, impose any penalty as it may deem fit under the provisions of these agreements.

Part-B

1.7.3.1: The Licensee may develop its own independent Network, with its own transmission links within each Circle in its service area. However, National/Inter-Circle links would be provided exclusively by DOT, through its long distance Network.

1.7.3.2: The Licensee's Network can have Interconnectivity with DOT's Network at the equivalent level at a local/ tandem exchange and at the LDCC TAX.

1.7.3.3: The Licensee shall be responsible for providing the required transmission links from/to his Network to/from DOT's Network interface points at local/tandem and TAX levels, during the currency of Licence.

1.7.3.4: Interconnectivity between Licensee's Network as specified in the licence and the Network of any other Licensee of Service shall be only through DOT's Network. The Licensee shall not, directly or otherwise, extend any type of service to DOT subscribers through the DELs provided by DOT.

1.7.3.5: Interconnectivity between Licensee's Network as specified in the licence and the overseas communication Network operated by VSNL shall only be through the TAXs of DOT.

1.7.3.6: All planning activities of the Licensee for providing Intra Circle connectivity will be coordinated with the planning activities of DOT. Any circuits leased by the Licensee from DOT shall not be resold as leased circuits to a third party.

1.7.3.7: Demands of either party, i.e., DOT and the Licensee, on the other for the following shall be firmed up at least 12 months (provided that this time frame shall be six months for demand

made for the first occasion in the first year of Licence Period) before the date on which the required connectivity or circuits is/are required:

- number of ports (2048 kbps digital trunks) and type of signaling in the telephone exchanges, location-wise.
- Addition to traffic capacity of exchanges in Erlangs and call handling capacity in BHCA.
- Number of exchanges and signaling capacity to be connected over CCS 7 signalling.
- Number of 2048 kbps circuits or higher order circuits over transmission facilities.
- Analogue connectivity and ports required in exceptional cases.

1.7.3.9: If any change in DOT's/Licensee's Network/ system is introduced to comply with international and national standards or for any other reason mutually agreed to, costs associated with such changes that either party has to make in its Network/ system to maintain the SERVICE and to maintain inter-connectivity with other's Network, shall be borne by the respective parties.

1.7.3.10: Normally, the altering party shall notify in writing atleast 12 months in advance setting out details of the nature, effect, technical details and potential impact on the other party's system of such alteration. A notice period shorter than 12 months can be considered in exceptional circumstances by mutual agreement.

Either party requiring enhancement of features in switching and transmission systems to meet new or unforeseen situations and demands, shall notify the other party at least 12 months in advance.

1.7.3.11: Irrespective of who owns a transmission system of the link Interconnecting one party's exchange to the exchange of the other party, each party will provide accommodation for and operate the terminals of the other party located in its premises. Each party will permit mounting of antennae owned by the other party on its transmission towers subject to feasibility for this purpose. Rental for such lease of space and mounting shall be arrived at on a mutually agreed basis.

1.7.3.15: Licensee shall also comply with the terms and conditions of the Interconnect Agreement along with this licence Agreement.

1.7.6.3: The Licensee may install TAX in the LDCC in which it wants to operate. This could be an Integrated Local cum Tandem exchange. This will be known as Licensee's LD TAX.

1.7.6.4(i): If Licensee has only one exchange in an SDCA, connectivity from that exchange to DOT's Network in the SDCA shall be through a direct link between that exchange and the DOT's local exchange/ SDCC tandem. If Licensee has two or more terminal exchanges in an SDCA, connectivity between Licensee's exchanges in the SDCA and DOT's Network in the SDCA shall be through a link between Licensee's SDCC tandem and DOT's local exchange/ SDCC tandem.

1.7.6.4(ii): In a multi-exchange area such as Metro and Major telephone districts, wherever the originating and terminating traffic to and from an exchange of DOT justifies more than two PCMs, the Licensee shall provide direct junctions for the said exchange.

1.7.6.5: Interconnectivity for STD/ISD calls shall be ordinarily only between DOT's LDCC TAX and Licensee's LDCC TAX. In case Licensee does not have his own TAX in the LDCC, STD/ISD calls from Licensee's SDCC Tandem/ local exchange in an SDCA in the LDCA shall be routed to DOT's LDCC TAX. This requires the Licensee to connect to the nearest DOT TAX even for Intra Circle calls that may be between two LDCCs. However, the Licensee is free to have his Network for carrying the traffic entirely over his own Network within the Circle/ Service Area.

1.7.6.6: Calls from DOT subscriber or DOT Network to Licensee's Network will be routed in the DOT Network upto the farthest point i.e. upto DOT's SDCC Tandem/local exchange in the terminating SDCA and then will be delivered to the Licensee's SDCC Tandem/Terminal exchange. National numbering plan, which is revised periodically from time to time, shall have to be adhered to/complied with.

1.7.6.7: If the Licensee serves multiple SDCs through one large exchange, DOT shall deliver the traffic directly into Licensee's large exchange from its TAX except for local and intra SDCA calls. For calls delivered from DOT's TAX to Licensee's Main exchange, the latter shall be treated as terminal exchange and no access charges shall be payable by the DOT to the Licensee.

The above situation of one main exchange serving multiple SDCs does not exist in DOT at present. However, if a similar situation arises at a later date, the same facility shall be extended to the Licensee as well, provided it is not technically feasible to accept the calls directly by the remote DOT exchange in the SDC.

i b) New Basic Service License Agreement:

2.3 Licensee shall be free to carry Intra-Circle long distance traffic. However subject to technical feasibility, the subscriber of the Intra-Circle long distance calls, shall be given the choice to use the Network of another Basic Service Provider in the same service area. The Licensee can also make mutual agreements with National Long Distance Operators for carrying intra-Circle Long Distance traffic.

2.4: It shall be mandatory for the LICENSEE to provide Interconnection with National Long Distance (NLD) Service Providers, through suitable mutual arrangements / agreements, whereby the subscribers could have a free choice to make Inter-Circle / International Long Distance Calls through any NLD Service Provider. For international Long Distance Calls, the LICENSEE shall access International Long Distance OPERATOR through National Long Distance Operator only. Similarly, inter-circle leased lines are to be provided by suitable mutual agreements / arrangements with NLD Service Providers.

2.5: Direct Interconnectivity among all Telecom Service Providers in the licensed SERVICE AREA is permitted. LICENSEE shall Interconnect with Cellular Mobile Telephone SERVICE PROVIDER at the station of Gateway Mobile Switching Centre (GMSC) or Mobile Switching Centre (MSC), unless mutually agreed otherwise, subject to compliance of prevailing regulations, directions or determinations issued by TRAI under TRAI Act, 1997.

9.2: The LICENSEE shall intimate the LICENSOR one month prior to his intention of commencement of service by establishing a POINT OF PRESENCE (POP). However, the exact date of commencement of the service shall be required to be intimated to the LICENSOR within one week from the date of such commencement along with the proof of completion of INTERCONNECTION tests as stipulated in Clause 25 of this AGREEMENT.

16.1: The Licensee shall ensure adherence to the National Fundamental Plan (describing Numbering and Routing Plan as well as Transmission Plan) issued by Department of Telecom and technical standards as prescribed by the Licensor or TRAI from time to time. In the case of providing choice of Long Distance Operator, the equipment shall support the sselection facilities such as dynamic selection or pre-selection as per prevailing regulation, direction, order or determination issued by LICENSOR or TRAI on the subject.

17.1: Direct Interconnectivity among all Telecom SERVICE PROVIDERs in a SERVICE AREA is permitted. Interconnect between the Networks of different SERVICE PROVIDERs shall be

as per national standards of CCS No.7 issued from time to time by Telecom Engineering Centre (TEC). However, if situation so arises, INTERCONNECTION with R2MF signaling may be permitted by LICENSOR upon mutual agreement of LICENSEES.

17.2: The number of points of INTERCONNECTION (POIs) of Cellular Mobile Service Providers with Basic Service Providers shall be as per mutual agreement subject to compliance of prevailing determination, regulation or direction issued by TRAI under the TRAI Act 1997.

17.3: LICENSEE shall Interconnect with National Long Distance (NLD) SERVICE PROVIDERs through suitable arrangements/ Agreements whereby the subscribers could have a free choice to make inter-circle/international long distance calls through any NLD SERVICE PROVIDER. For international long distance call, the LICENSEE shall access International Long Distance Operator through National Long Distance Operator only. Similarly, inter circle leased lines are to be provided by suitable mutual agreements / arrangements with NLD SERVICE PROVIDERs. LICENSEE can enter into mutual agreement/ arrangement with NLD SERVICE PROVIDERs for carriage and delivery of inter-circle traffic for the leg between LDCC and SDCC.

17.4 LICENSEE shall be free to carry intra circle Long Distance traffic. However, subject to technical feasibility, for these intra circle long distance calls, subscriber shall also have the choice to use the Network of the Basic Service Providers in the same service area. The LICENSEE can enter into mutual agreement with NLDO for carriage of intra-circle long distance calls.

17.5: The LICENSEE may enter into suitable arrangements with other service providers to negotiate Interconnection Agreements whereby the Interconnected Networks will provide the following :

a) To connect, and keep connected, to their applicable systems,
To establish and maintain such one or more Points of Interconnect as are reasonably required and are of sufficient capacity and in sufficient numbers to enable transmission and reception of the messages by means of the applicable systems,
c) To meet all reasonable demand for the transmission and reception of messages between the Interconnected systems.

17.6: The terms and conditions of Interconnection including standard interfaces, points of Interconnection and technical aspects will be as mutually agreed between the service providers subject to compliance of prevailing regulations, directions and determinations issued by TRAI under TRAI Act 1997.

17.7: The LICENSEE shall, for the purpose of providing the SERVICE, install own equipment so as to be compatible with other service/ access providers' equipment to which the LICENSEE 's applicable systems are intended for Interconnection.

17.8: The LICENSEE shall comply with any order, direction, determination or regulation issued by TRAI under TRAI Act, 1997 as amended from time to time.

17.9: The LICENSEE shall operate and maintain the licensed Network conforming to QUALITY OF SERVICE standards to be mutually agreed between the service providers in respect of Network-Network Interface subject to such other directions as LICENSOR or TRAI may give from time to time. Failure on part of LICENSEE or his franchisee to adhere to the QUALITY OF SERVICE stipulations by TRAI and Network to Network interface standards of TEC, shall adversely affect the LICENCE of the LICENSEE.

17.10: The charges for access or Interconnection with other Networks shall be based on mutual Agreements between the service providers subject to compliance of any determination,

orders, directions, restrictions and regulations issued from time to time by TRAI under TRAI Act, 1997.

17.11: The Network resources including the cost of upgrading / modifying Interconnecting Networks to meet the service requirements of service will be provided by service provider seeking Interconnection. However mutually negotiated sharing arrangements for cost of upgrading/ modifying Interconnecting Networks between the service providers shall be permitted.

25: The Interconnection Tests for each and every interface with any service provider may be carried out by mutual arrangement between the LICENSEE and the other party involved. The Interconnection Tests schedule shall be mutually agreed. Adequate time, not less than 30 days, will be given by the LICENSEE for these tests. On successful completion of Interconnection tests or on mutual agreement between service providers for rectification of deficiencies / deviations, if any, the LICENSEE can commence the SERVICE. In case of disagreement for rectification of deficiencies / deviations in conducted Interconnection tests, prior approval of LICENSOR shall be required.

i c) CMTS License Agreement:

4: The resources required for operation of the services, for extending them over the Network of the DOT and MTNL and any other service provider licensed by the Authority will be mutually agreed between the parties and shall be listed. The resources may refer to include but not limited to – physical junctions, PCM derived channels, private wires, leased lines, data circuits, other communication elements. The Licensee shall apply for and obtain from the DOT the determined resources. The operation and charge of the traffic passed through these resources shall be treated on the basis of the prevailing rules and guidelines of the DOT on the subject.

Necessary interface specification and requirements with full details with DOT/MTNL equipment for Interconnecting the Cellular Mobile Telephone Equipment should be furnished within one month from the effective date by the Licensee to the Authority. The Authority will have the right to decide the extent of the equipment required based on genuine needs of the Licensee.

The acceptance testing for every interface with the DOT and MTNL Network shall be carried out by the Acceptance Testing party of the DOT/MTNL. The Acceptance Testing schedule shall be mutually agreed to.

All long distance connectivity outside the service area will be through PSTN Network of DOT.

i d) National Long Distance Service License Agreement:

Schedule-I

Definition of Point of Presence (POP): Setting up of switching center and transmission center of appropriate capacity by NLDO at the LDCC level to provide on demand inter-circle long distance services of prescribed quality and grade of service in a non-discriminatory manner.

16.3 Interconnection between the Networks of different service providers shall be as per national standards of CCS No.7 issued from time to time by Telecom Engineering Center (TEC).

17.1 It shall be mandatory for fixed service providers, cellular mobile service providers, cable service providers, to provide Interconnection to NLD service providers whereby the subscribers

could have a free choice to make inter-circle/international long distance calls through NLD service provider.

17.2 NLDO shall be required to make own suitable arrangements / agreements for leased lines with the Access Providers for last mile

17.3 The NLDO Licensee may enter into suitable arrangements with other service providers to negotiate Interconnection Agreements whereby the Interconnected Networks will provide the following :

a) To connect, and keep connected, to their Applicable Systems,

b) To establish and maintain such one or more Points of Interconnect as are reasonably required and are of sufficient capacity and of sufficient numbers to enable transmission and reception of the messages by means of the Applicable Systems,

c) To meet all reasonable demand for the transmission and reception of messages between the Interconnected systems.

17.4 The terms and conditions of Interconnection including standard interfaces, points of Interconnection and technical aspects will be such as mutually agreed between the service providers.

17.5 The LICENSEE shall for the purpose of providing the SERVICE install own equipment so as to be compatible with other service/ Access providers' equipment to which the LICENSEE's Applicable Systems are intended for Interconnection.

17.6 The LICENSEE shall promptly comply with any order or direction or regulation on Interconnection issued by the TRAI under TRAI Act, 1997.

17.7 The LICENSEE shall operate and maintain the licensed Network conforming to Quality of Service standards to be mutually agreed between the service providers in respect of Network-Network Interface.

17.8 The charges for access or Interconnection with other Networks for origination, termination and carriage of calls shall be based on mutual agreements between the service providers subject to the restrictions issued from time to time by TRAI under TRAI Act, 1997.

17.9 The Network resources including the cost of upgrading / modifying Interconnecting Networks to meet the service requirements of National Long Distance service will be as per mutually negotiated sharing arrangements between the service providers.

25.1 The Interconnection Tests for each and every interface with the DTO / MTNL / VSNL / or any other Service Provider may be carried out by mutual arrangement between the Licensee and the other party involved. The Interconnection Tests schedule shall be mutually agreed. Adequate time, not less than 30 days, will be given by the Licensee for these tests.

25.2 Service will be commissioned after obtaining clearance from licensor after successful completion of Interconnection tests as mentioned in para 25.1 above.

ii) Interconnect Agreement between BSNL & BSOs

(Main Provisions)

2.1: Interconnectivity to DOT Network:

2.1.1: The Licensee may develop its own independent Network, with its own transmission links within each Circle in its service area. However, National/Inter-Circle links shall be provided exclusively by DOT, through its long distance Network.

2.1.2: The Licensee's Network shall have Interconnectivity with DOT's Network at the equivalent level at a local/ tandem exchange and at the LDCC TAX.

2.1.3: The Licensee shall be responsible for providing the required transmission links from/to his Network to/from DOT's Network at interface points under Clause 2.1.2, at local/ tandem and TAX levels, initially as well as for augmentation from time to time.

2.1.4: Interconnectivity between Licensee's Network as specified in the licence and the Network of any other Licensee of Service shall be only through DOT's Network. The Licensee shall not, directly or otherwise, extend any type of service to DOT subscribers through the DELs provided by DOT.

2.1.5: Interconnectivity between Licensee's Network as specified in the licence and the overseas communication Network operated by VSNL, shall only be through the TAXs of DOT.

2.1.6: The Basic Service Operator will not be permitted to route the traffic originated from GSM Network for inter-circle and international calls, which shall be routed through DOT Network. As regards GSM Network originated calls, which are intra-circle in nature, these may be routed by the Basic Service operator through his own Network but for delivery of such GSM originated calls into DOT Network, the Basic Service Operator will provide a separate group of junctions purely for this purpose which would be distinct from the normal junctions on which Basic Service Licensee's Network originated calls are carried. Provided, this facility will not be available in respect of GSM originated calls within the Metro cities as the licence conditions stipulate that calls going out of Metro Cellular Network will necessarily be routed only through DOT Network.

2.1.7: Notwithstanding anything contained in the above stated clause, the terms and conditions provided in the Licence Agreements including any modifications made thereto, for provision of Cellular Mobile Telephone Service as well as for the provision of Basic Telephone Service, shall have overriding effect.

2.1.9: Licensee is not authorized to provide 'Call Back Services' to its subscribers. Any unauthorized provision and use of such services by any person or firm shall be liable to attract penal provisions of Indian Telegraph Act 1885 and the Indian Telegraph Rules made there under.

2.1.10: Any circuit leased by the Licensee from DOT shall not be resold as leased circuit to a third party.

2.1.11: Irrespective of who owns a transmission system of the link Interconnecting one party's exchange to the exchange of the other party, each party subject to availability and feasibility may provide accommodation for the terminals of such equipment of the other party located in its premises. Each party may permit mounting of antennae for Interconnect link owned by the party on its transmission towers subject to feasibility. Rental for use of such space and mounting shall be arrived at on a mutually agreed basis. Arrangements for installation, operation and maintenance of such equipment will be arrived at by mutual agreement at respective locations.

2.3.0: Network Interconnectivity:

2.3.1: Interconnectivity between the Licensee's Network and the DOT's Network shall be as in Clause 2.1.2 of this agreement. Interface points referred to in clause 2.1.2 are described below:

-A tandem switch/ group dialing center of DOT at SDCC will be known as DOT SDCC tandem. Corresponding switch of the Licensee will be called Licensee's SDCC tandem, which can be local cum tandem.

-Tax at the LDCC will be known as DOT's LDCC TAX.

-The Licensee may install TAX in the LDCC in which it wants to operate. This may be an Integrated Local cum TAX and will be known as Licensee's LDCC TAX.

2.3.2.1: If Licensee has only one exchange in an SDCA, connectivity from that exchange to DOT's Network in the SDCA shall be through a direct link between that exchange and the DOT's local exchange/ SDCC tandem. If Licensee has two or more terminal exchanges in an SDCA, connectivity between Licensee's exchanges in the SDCA and DOT's Network in the SDCA shall be through a link between Licensee's SDCC tandem and DOT's local exchange/SDCC tandem.

2.3.2.2: In a multi-exchange area such as Metro and Major Telephone Districts, wherever the originating and terminating traffic to and from an exchange of DOT justifies more than 2 PCMs, the Licensee shall provide junctions for the said exchange.

2.3.3: Interconnectivity for STD/ ISD Calls:

2.3.3.1: Interconnectivity for STD/ISD calls shall be between DOT's LDCC TAAX and the Licensee's LDCC TAX. In case Licensee does not have his own TAX in the LDCC, STD/ISD calls from Licensee's SDCC Tandem/ local exchange in an SDCA in the LDCA shall be routed to DOT's LDCC TAX.

2.3.4: Calls from DOT Network/Subscriber to Licensee's Network:

2.3.4.1: Calls from DOT subscriber or DOT Network to Licensee's Network will be routed in the DOT Network upto the farthest point i.e. upto DOT's SDCC Tandem/ local exchange in the terminating SDCA and then will be delivered to the Licensee's SDCC Tandem/ Terminal exchange.

If the Licensee serves multiple SDCs through one large exchange, DOT shall deliver the traffic directly into Licensee's large exchange from its TAX except for local and intra SDCA calls. For calls delivered from DOT's TAX to Licensee's main exchange, the latter shall be treated as terminal exchange and no access charges shall be payable by DOT to the Licensee.

The above situation of one main exchange serving multiple SDCs does not exist in DOT at present. However, if a similar situation arises at a later date, the same facility shall be extended to the Licensee as well, provided it is not technically feasible to accept the calls directly by the remote DOT exchange in the SDC. The numbering and charging plans shall always be adhered to by both DOT as well as Licensee.

3.1: Capacity Ordering:

3.1.1: Demand/Forecasts of either party i.e. DOT and the Licensee, on the other for the following shall be firmed up at least 12 months (provided that this time-frame shall be six

months for demand made for the first occasion in the first year of Licence period) before the date on which the required connectivity or circuits is/are required:

- number of ports (2048 kb/sec digital trunks) and type of signaling in the telephone exchanges, location-wise.
- Addition to the traffic capacity of the exchanges in Erlangs and call handling capacity in BHCA.
- Number of exchanges and signaling capacity to be connected over CCS7 signalling .
- Number of 2048 kb/sec circuits or higher order circuits over transmission facilities.
- Analogue connectivity and ports required in exceptional cases.

The requirements mentioned above shall be furnished in the prescribed proforma.

3.1.3: Licensee is responsible for providing the required transmission links to and from DOT's Network at permitted interface points at local/ tandem and TAX levels initially as well as for augmentation from time to time. However, in case Licensee requests DOT in writing to provide for such links against payment of prescribed charges, to Interconnect Licensee's Network to DOT's Network, then DOT, subject to technical feasibility, may accept such request in normal circumstances.

3.1.4: The party receiving the Interconnect capacity demand shall intimate, within a period of 15 days from the date of receipt of appropriate demand, either the acceptance or otherwise an alternative proposal for meeting this demand. In case an alternative proposal is not made within such 15 days, the Interconnect capacity demand shall be deemed to have been accepted.

3.1.5: In case an alternative proposal as referred to in para 3.1.4 is made, both parties will meet to firm up the mutually agreed proposal within next 15 days.

3.1.6: After the acceptance of Interconnect capacity demand, DOT will issue a bill based on the Interconnect capacity demand, calculated as per clause 6.3.1, within 15 days to the Licensee for the advance charges for the first year's use of connection. The Licensee shall pay such bill within 15 days of its issue date.

3.1.7: The above stated Interconnect capacity demand will be treated as firm demand from the date of receipt of the first year's advance payment of connection charges. The advance payment thus received by the DOT from the Licensee will be adjusted against the first year's (reckoned from date of actual provision of connection to the Licensee) connection charges for the connections, calculated as per para 6.3.1. In subsequent years, the annual connection charges for the link connections will be paid each year in advance by the Licensee.

3.2.1: The time scale for the provision of capacity ready for testing shall be 12 months following the date of receipt of the firm demand. However, in exceptional cases, a longer or a shorter time frame can be mutually agreed.

3.3: Liquidated Damages:

3.3.1: After placement of the firm demand to provide the Interconnect capacity, if the DOT fails (otherwise than through an act of omission of the Licensee) to make available connection on the ready for test date i.e. 12 months (or mutually agreed time frame) from the date of receipt of advance payment as in para 3.1.6 and 3.1.7 above, then the DOT shall pay, on demand, to the Licensee, liquidated damages for such delays calculated as follows:

(i) 0.5% of annual connection charge calculated for each PCM link/port as per clause 6.3.1. (a) & (b)/(c) of chapter 6 for the number of connections not made available on the ready for test date as per the relevant firm demand multiplied by number of days following the ready for test date till the required connections are made available for ready for test.

(ii) For the purpose of calculation of liquidated damages, the said quantum of delay in provision of connections, shall be reckoned from the date of expiry of 12 months period from the date of receipt of advance/firm demand upto the actual date of issue of notification certifying that such capacity is ready for testing.

The maximum number of days for which the liquidated damages are payable is limited to 30 days.

The payment of liquidated damages shall not release the DOT from the obligation to deliver the ordered connections to the Licensee. In exceptional cases where the delay is beyond 30 days, DOT shall be liable to explain the reasons to Licensee and also to indicate the revised ready for test date.

3.3.2: In those cases where Interconnection links are being provided by Licensee and Licensee fails (otherwise than through an act of omission of the DOT) to make available connections on the ready for test date i.e 12 months (or mutually agreed time frame) from the date of advance payment of port charges to DOT, then the Licensee shall pay, on demand, to DOT the liquidated damages for such delays calculated as follows:

0.5% of annual port charges calculated for each port as per Clause 6.3.1. of Chapter 6 for the number of connections not made available on the ready for test date as per relevant firm demand multiplied by the number of days following the ready for test date till the required connections are made available for ready for test.

The maximum number of days for which the liquidated damages are payable is limited to 30 days.

The payment of liquidated damages shall not release the licensee from the obligation to deliver the requisite connections/links.

3.4: Cancellation of Firm Demand:

3.4.1: The Licensee may cancel a firm demand made for Interconnections required by him at any time prior to ready for test date, by written notice to DOT. In the event of cancellation of an order for Interconnection more than 30 days after its placement, the Licensee shall pay cancellation charges to the DOT.

The amount deposited by the Licensee in accordance with paragraph 3.1.6 above for provision of connections for the relevant capacity firm demand shall be refunded to the Licensee after deducting appropriate cancellation charges.

3.5: Removal and Cessation of Interconnect Capacity:

3.5.1: Subject to the provision of licensing conditions, either party may place a written order on the other for the removal and cessation of Interconnect capacity.

3.5.2: If Licensee requires the removal of, in part or in full, Interconnect capacity already provided under this agreement then an order (in short “removal order” shall be placed on the DOT to that effect. DOT will in turn verify the requirement and remove the capacity within 30 days (or mutually agreed time from) from the date of receipt of the removal order.

If DOT after receiving the request disagrees with the proposed removal, then the capacity will not be removed until joint agreement is reached in accordance with the dispute resolution procedure.

3.5.3: A removal certificate will be issued by DOT to the Licensee for the removed capacity within one month of the completion of the removal work.

3.5.4: The cost of removal of such capacity, thus agreed upon, as payable by the Licensee to DOT shall be the one year's connection charge as defined in Clause 6.3.1. (B) & (c) in respect of such capacity. In case of links provided on Rent & Guarantee basis, the prevalent terms and conditions of DOT for Rent & Guarantee cases, will apply.

3.5.5: Where DOT suggests removal of some Interconnect capacity e.g. due to underutilization of already provided Interconnect capacity etc., the similar procedure as laid down in clause 3.5.1 to 3.5.3 above shall be followed. No removal charge shall be payable by DOT in such cases. However, suitable adjustment for the connection charges already paid shall be made from the date of such removal.

3.6: Traffic Forecast:

3.6.1: The content of the traffic forecast shall be as follows:

traffic from licensee's Network to DOT (For each TAX/SDCC tandem/ local exchange of DOT)

traffic from DOT to Licensee's Network (From each TAX/SDCC tandem/ local exchange of DOT)

3.6.2: Each traffic forecast shall contain

- BHCA of each TAX/SDCC tandem/ local exchange.
- Busy hour Traffic in Erlangs.

3.6.3: Busy hour may vary for various exchanges and it shall be determined from actual traffic figures in the Network.

3.6.4: The traffic figures indicated in the forecast shall be reviewed after the implementation of the Licensee's Network on monthly basis. Both parties shall provide traffic report on all trunk groups used for Interconnection.

3.7: Enhancement of Standards and Features:

3.7.1: If any change in DOT's/Licensee's Network/system is introduced to comply with international standards and national standards or for any other reason mutually agreed to, costs associated with such changes that either party has to make in its Network/system to maintain Interconnectivity with other's Network shall be borne by the respective parties.

3.7.2: Normally the altering party shall notify in writing at least 12 months in advance setting out details of the nature, effect, technical details and potential impact on the other party's system of such alteration. A notice period shorter than 12 months can also be considered in exceptional circumstances by mutual agreement.

3.7.3: Either party requiring enhancement of features in switching and transmission systems to meet new or unforeseen situations and demands shall notify the other party at least 12 months in advance.

Fault Identification and Reporting:

5.1.(i) Each party shall be responsible for running its own system and ensuring the safety of such system.

5.1(ii): Fault reporting mechanism for Interconnect operational problems will be initially worked out jointly by both the parties and this mechanism shall be upgraded from time to time.

6.1 Interconnectivity to DOT Network:

6.1.1: Provision of links to Interconnect Licensee's Network with DOT's Network will be the responsibility of the Licensee as provided under Clause 2.1.2 and 2.1.3.

6.1.2: DOT may, subject to availability, lease lines to Interconnect Licensee's exchange to DOT's exchange in the SDCA/LDCA on payment of charges prescribed by DOT.

6.1.3: The cost of terminating equipment including measurement devices in the DOT LDCC TAX shall be payable by Licensee.

6.1.4: STD/ISD calls will be always delivered to DOT's LDCC TAX and not at the SDCC as provided under Clause 2.3.3. On answering by the called party, periodic pulses will be sent by the LDCC TAX to the Licensee's exchange on R2 signalling and for CCS7 signalling a Charge Band message will be sent, if required.

6.3: Connection Charges:

6.3.1: DOT may, subject to availability, lease PCM links to Interconnect Licensee's exchange to DOT's exchange either at SDCA level or at LDCA TAX level. In both the cases, the connection charge will consist of the following components:

Annual rent and guarantee for the PCM links between the Licensee's exchange to the nearest DOT exchange building will be calculated as per standard DOT terms. The Licensee will also have the option of having the 'end link' or 'last mile' on R&G systems or on contribution work basis as per the standard DOT terms.

In case, DOT's inter-working exchange (point of Interconnection to Licensee's Network) is located in a building other than the nearest DOT exchange building mentioned in para (a) above, annual inter exchange junction charge shall be levied.

For the initial period of three years, the charges for terminating the Interconnecting PCM links (port charges of DOT) shall be payable after opting by the Licensee for either of the two formulae given hereunder and the choice of the Licensee once made on the first occasion shall be treated as final for the total period and for entire Service Area:

The graded scale given below (excluding cost of infrastructure) of Interconnect port charges applicable separately for each exchange of the Circle/ Service Area for various demand situations:-

Sl.No.	Demand for No. of PCMs given by the Licensee to DOT in each exchange	Annual Interconnect port charge per PCM termination (excluding the cost of infrastructure viz land, building, air-conditioning etc.) (in Rs.)
1	2 PCM	2,16,200
2	4 PCM	1,08,100
3	8 PCM	54,100
4	16 PCM	30,600
5	32 PCM	20,400
6	64 PCM	15,400
7	PCM	12,900

(i) A fixed amount, irrespective of the number of terminations in each exchange for the Circle/ Service Area, of Rs.54,100/- per PCM termination per annum.

After expiry of the said period of three years, the aforesaid arrangements shall stand terminated where after DOT will provide the facility of Interconnect on payment of the charges based on full cost including the cost of incremental infrastructure like land, building, air-conditioning etc.

Notwithstanding anything contained hereinabove, the directions or decisions on the subject by the Telecom Regulatory Authority of India shall be binding on either party and such decision or direction shall be implemented in good faith by both the parties.

Provided always that for a 64 Kbps Analogue port, the said charges shall be Rs.3,200/- per annum per port.

6.3.2: The rates indicated in Annexure 5 for the aforesaid components are based on present costs and are subject to change in the intervening period till the date on which the Interconnect Agreement comes into effect (Effective date). Once, the Interconnect agreement comes into effect, the rates in respect of the aforesaid components at (b) and (c) as applicable on the effective date may remain fixed for the capacity orders placed within 24 months from the effective date. However, as regards the aforesaid component at (a) above, the rates as per DOT terms prevalent at the time of charging shall be applicable.

6.3.3: Even in cases where the link is provided by the Licensee, port charges as at 6.3.1(c) shall be payable by the Licensee to the DOT.

6.4: Access Charges (*now as per TRAI REGULATIONS*)

iii) TRAI Determination on Interconnection between BSNL & CMTS Operators:

For metro cellular operators who provide service in the metro cities of Delhi, Mumbai, Chennai and Kolkata and its adjoining areas, the lowest level where Interconnection (at the request of Interconnection seeker) should mandatorily be provided by the BSNL/BSO is up to the level of tandem exchanges, for Cellular Telecom Circle operators covering a large geographical area, it should be with the long distance Network of the circle i.e., at the TAX level. The CMTS providers Network may have Interconnectivity with FSP's Network at the level of a Gateway TAX.

In accordance with the stipulation contained in pre para, the incumbent i.e. BSNL will provide the Interconnection requested by the cellular operator within three months at the TAXs of both the levels i.e., I & II. If the incumbent is unable to provide the sought Interconnection within three months, the matter should be referred to the expert committee working under the aegis of TRAI, which will look into the reasons for the delay and attempt a resolution thereof. This Committee has representatives of ABTO, COAI, BSNL, MTNL and VSNL and is chaired by Secretary, TRAI. The Committee will try to resolve all disputes relating to Interconnection arrangements amongst service providers.

In accordance with the Government guidelines relating to NLD services, the NLD operators will be asked to have matching capability of CCS-7 signalling in their gateway TAXs from day one. The Interconnection arrangement should be in accordance with the National Fundamental Plans relating to switching, routing, traffic, charging etc.

Network Interconnectivity will be provided based on technical feasibility from TAX as well as TANDEM in the city where MSC is located. However, connectivity to TAX will be only for outstation calls and connectivity to TANDEM will be only for local calls. Multiple POIs in a service area will be given subject to technical feasibility and integrity of Network. The connectivity of two Networks shall be at the level of Gateway TAX/ Gateway MSC.

Annexure E

PROVISIONS RELATING TO BILLING IN

i) LICENSE AGREEMENTS OF BASIC SERVICE, NATIONAL LONG DISTANCE SERVICE, CMTS;

ii) INTERCONNECTION AGREEMENTS BETWEEN BSNL & BSOs;

i a) Old Basic Service License Agreement:

2.1.4: Telephone billing:

Issue of bills at least once in two months to Licensee's subscribers a) for local, national and international calls (dialled and operator assisted) made by the subscriber and b) for service rentals installation etc.

Provision of itemized billing for all STD/ISD calls made by a subscriber.

1.7.8.1: DOT and the Licensee will collect and retain the billed amount for calls originating from their respective Networks which terminate within the same SDCA or the contiguous telephone exchange of the adjacent SDCA (Group Dialed Calls). No access charges is payable for local call traffic. Access charges are payable by Licensee for STD and ISD calls.

1.7.8.2: The traffic delivered on any DOT LDCC TAX from Licensee's LDCC TAX/SDCC tandem/ local exchange will be measured on the incoming junctions of the DOT's LDCC TAX at the destination wise pulse rates applicable to the calls generated locally at the same station, where the DOT's LDCC TAX is located.

11.9: Message Measurement:

The Licensee shall equip itself with the means to measure the originating traffic in respect of each subscriber. It shall be able to generate the billing information in enough detail, to convince the subscribers satisfactorily. The billing disputes or difference, between the Licensee and its subscribers, unless settled amongst themselves within six months can be subjected to arbitration by the Telecom Authority or its nominee.

Condition 6: Issue of Bills to subscribers.

6.1: It shall be the responsibility of the Licensee, to cause regular issue of the bills to its subscribers.

6.2: Billing

The Licensee shall not charge, for Service provided to its subscribers, more than DOT's tariff fixed from time to time. The Licensee may, however, charge lower rate of tariff without prior approval from Licensor, provided such changes are intimated to Licensor prior to their implementation.

6.3: The billing system shall be subject to scrutiny by the Licensor.

6.4: Suitable arrangements shall be provided by the Licensee to enable to the Licensor to monitor the billing software and billing data, of its Network.

6.5: The billing period may be decided by the Licensee, but it should be at least once in two months.

i b) New Basic Service License Agreement:

8.3(b): The LICENSEE shall invariably preserve all billing and all other accounting records (electronic as well as hard copy) for a period of one year from the date of publishing of duly audited & approved Accounts of the company and any dereliction thereof shall be treated as a material breach independent of any other breach, sufficient to give a cause for cancellation of the LICENCE.

19.4 The LICENSEE's contractual obligations towards the CUSTOMER will include terms and conditions under which the SERVICES shall be provided or terminated. The LICENSEE shall notify to customers all the arrangements or everything with respect to billing, repair, fault rectification, compensation or refunds etc. All complaints in this regard will be addressed/ handled as per the guidelines, orders or regulations or directives issued by the LICENSOR.

20. BILLING

20.1 The LICENSEE shall offer a regular itemised billing service (for long distance calls) to its customers without demanding any extra charge. In every case the LICENSEE shall be responsible to its customers and shall ensure fulfillment of the obligations in this regard. The LICENSEE shall also maintain necessary records for the billing cycles as specified by the LICENSOR or TRAI from time to time.

20.2. LICENSEE will work out suitable regular Interconnect billing arrangements with other licensed service providers in the respective Interconnect Agreements with them.

20.3 All complaints of customers in this regard will be addressed/ handled as per the guidelines, orders or regulations or directives issued by the LICENSOR or TRAI from time to time.

20.4 Any dispute, with regard to the provision of SERVICE shall be a matter only between the aggrieved party and the LICENSEE, who shall duly notify this to all before providing the SERVICE. And in no case the LICENSOR shall have any liability or responsibility in the matter towards the aggrieved party and shall be kept indemnified from all costs, charges, claims or damages.

i c) National Long Distance Service License Agreement:

8.3 (b): The licensee shall preserve all billing and all other accounting records (electronic as well as hard copy) for a period of three years from the date of publishing of duly audited & approved concerned Accounts of the company and any dereliction thereof shall be treated as a material breach independent of any other breach sufficient to give a cause for cancellation of the licence.

20. BILLING
20.1 The LICENSEE shall offer either itself directly or through access providers itemised billing services to its customer. In every case the LICENSEE shall be responsible to its customers and shall ensure fulfillment of the obligations in this regard. The Licensee shall also maintain necessary records for the billing cycle as specified by the Licensor or TRAI from time to time.

20.2. The Licensee will provide itemised billing to its customer without demanding any extra charge either directly or through Access Provider. A billing handling charge as mutually agreed

with NLDO may be payable to Access Provider, coinciding with the billing schedule of access providers.

20.3 All complaints of customers in this regard will be addressed / handled as per the guidelines, orders or regulations or directives issued by the Licensor or TRAI from time to time.

20.4 Any dispute, with regard to the provision of SERVICE shall be a matter only between the aggrieved party and the LICENSEE, who shall duly notify this to all before providing the SERVICE. And in no case the LICENSOR shall have any liability or responsibility in the matter towards the aggrieved party.

i d) CMTS License Agreement:

Schedule "C" Part-III – Terms & Conditions:

1.6: The Licensee is responsible for the measurement of the messages, in units, in segments of kilobytes or as the case may be and shall keep a record of the same for purposes of billing in so far as his equipment and the Services are concerned. The Licensee shall maintain all commercial records with regard to the communications exchanged on the Network till the Authority clears for destruction. Such records should be archived for atleast one year for scrutiny by the Authority for security reasons.

6.3: The metering being essence of the amount to be charged from the subscriber should be suitably secured so that it is not accessible to all staff members of licensee but only to a specified few and authorized representative of 'Authority'.

6.4: The record of metering shall be maintained on fortnightly basis by the Licensee. The billing schedule may be longer, if required, than that of metering.

Condition 7: Issue of Bills to Subscribers:

7.1: It shall be the responsibility of the Licensee, to cause issue of the bills to his subscribers. The Licensee can issue bills only to the extent of those messages and for the duration, where applicable, carried on the Cellular System at rates prescribed by the Authority.

7.2: The billing shall be subject to audit by the Authority. Billing and/ or collection may be done by EDOT, if so requested, on mutually agreed terms and conditions.

7.3: The operator should provide detailed itemized billing information to those subscribers who may like to have it.

7.4: The billing cycle may not be less that one month or more than three months for any connection provided under this License.

13.1(b): In the interest of security, billing records will be preserved for a period of one year and made available to the Authority or it's representative as and when required.

ii) Interconnect Agreement between BSNL & BSOs:

Chapter 1 – Definitions:

Bill Issue Date means the 10th of every calendar month.

Billing Period: The period of one calendar month commencing on the first day of every month.

Billing Information: Information, as in Chapter 6 and 7, necessary to ascertain the charges payable by either party under this agreement.

6.2: Detailed Billing:

6.2.1: For every STD/ISD call originating from the Licensee's Network and accepted by DOT, a detailed billing and/or bulk billing record will be generated in the LDCC TAX. For this purpose calling subscriber's identity shall be supplied by the Licensee for detailed billing purpose.

6.4.2: DOT and the Licensee will collect and retain the billed amount for calls originating from their respective Networks which terminate within the same SDCA or the contiguous telephone exchange of the adjacent SDCA (Group Dialled Calls).

6.4.4: For STD calls, originating in the Licensee's Network and accepted by DOT (ref. Para 6.2.1), DOT will bill the Licensee on monthly basis as STD-access charge at a rate of Rs.0.50 per unit measured call at the point of Interconnection.

6.4.5: For international calls originating in the Licensee's Network and accepted by DOT (ref. Para 6.2.1), DOT will bill the Licensee on monthly basis as ISD Access charge at a rate of Rs.0.70 per unit measured call at the point of Interconnection. The responsibility of paying to the international carrier (presently Videsh Sanchar Nigam Limited) will lie with the DOT.

6.6.2: Licensee will be billed by DOT on monthly basis for trunk call charges and phonogram charges at the prevalent notified DOT tariffs.

6.6.3: Duration of the call will be counted from the time when the Licensee's operator is informed by the DOT Trunk operator that:

in the case of particular person call, the specified person is one the line.
In the case of call other than a particular person call, the called number or called extension, when the call is booked to an extension is connected.

Chapter 7 – Interconnect Billing System:

7.1: Bill Information:

7.1.1: Each party shall provide to the other party information relating to detailed billing/ trunk group bulk billing as may be reasonably required for ascertaining the charges payable by each party under this agreement on monthly basis.

7.1.2: The DOT or the Licensee shall have the right in case of dispute, having given the other not less than ten clear and working days advance written notice to such effect, to inspect the books and records of the other relating to a period not exceeding two years prior to the date of inspection, for the purpose of verifying the Billing information provided by the other in respect of such period.

7.1.3: Each Party shall keep all books and records relating to Billing Information provided by it to the other, in respect of access charges (clause 6.4) and charges for special services (clause 6.6), for a period of two years from the end of the Billing Period in respect of which such Billing Information was delivered to the other. If a request has been made as per provisions in 7.1.2 such records will have to be preserved till final settlement of the case.

7.1.4: In the event that any time during the continuance of this Agreement the Billing System of either Party malfunctions and is unable to provide all or part of the Billing Information necessary for such Party to prepare a bill to the other, the other Party shall at the request and expense of the first mentioned Party use its reasonable endeavours to supply the necessary

Billing Information to the first mentioned Party without any legal liability to the first mentioned party for the contents of such Billing Information.

7.1.5: Licensee shall be responsible to cover its liability for payment of taxes imposed by the Central or State Government, as the case may be.

7.2: Issue of Bills:

7.2.1: Bills for access charges and charges for special services including trunk calls will be issued on monthly basis by the designated unit of DOT to the Licensee and such bills shall be payable within 15 days from the date of issue. Similar bills may also be issued by the Licensee for the access charges, if any, due to it.

7.2.2: Bills for telecom resources and other support facilities, such as connection charges, charges for leased facilities and charges for enhancement of features, if availed by the Licensee will be issued by DOT and paid by the Licensee at the intervals specified in this agreement.

7.3: terms of payment:

7.3.1: DOT and the Licensee agree that the payment of bills will be made by the Licensee within the time specified in clause 7.2 above.

The mode of payment will be through cheque/Demand draft in favour of the designated authority of DOT, drawn at the local branch of any scheduled bank at the place where such designated authority of DOT is located.

All payments due to DOT will be paid without set off (netting) or counter claim and shall be free and clear of any withholding or deductions.

If the bill issuing authority subsequently finds that some charges have been omitted from the bills issued, he will include the omitted charges in the subsequent bills at any time, but within 6 months from the date of issue of the relevant bill except in cases where additional billing becomes necessary due to the tariffs/rates changes notified subsequently with retrospective effect by the appropriate authority.

7.3.2(i): If due payment is not received within specified period outlined in the bill, the DOT shall have a right to obtain payment through the use of Letter of Credit which shall be opened by the Licensee in favour of DOT as provided herein below after the concurrence of Licensee's first and single failure of making said payments in specified time.

7.3.2(ii): The opening of the aforesaid Letter of Credit in favour of DOT or use thereof to receive payments shall not detract in any manner the DOT from discontinuing the use of its facilities by the Licensee after failure in making due payment. Provided, before disconnecting the said facilities, 30 day's notice shall be given to the Licensee but such notice will be construed to have any link or connection with the use of Letter of Credit.

7.4: Opening of Letter of Credit:

7.4.1: The Licensee, immediately on the occurrence of first and singular failure in making due payment of DOT's bills, shall open an irrevocable and confirmed Letter of Credit in favour of DOT at the point of access in a scheduled bank with one year period of validity extendable from time to time such that the extension shall be requested for a period of one year from the last default, if the default occurred during the validity period of the Letter of Credit for an amount equal to 10% of the access charges and trunk call charges in respect of each Service Area, payable/paid by the Licensee to the DOT during the preceding 12 calendar months.

7.5: In the event of delayed payment by the Licensee, interest will be charged on the due amount at the following rates:

	Period Delay	Interest Rate
A.	For the first two occasions of delay: (i) Delay of 15 days beyond the due date	18%
	(ii) Delay beyond 15 days but up to the next 15 days	21%
B.	For the third & subsequent occasions of delayed payment: (i) Delay of 15 days beyond the due date	21%*
	(ii) Delay beyond 15 days but up to next 15 days	24%*

*Note: This stipulated interest rate or the prevailing prime lending rate of State Bank of India plus 5% (five percent) per annum (compounded monthly), which ever is higher, shall be applicable.

Explanation: The interest referred above will also be applicable in case the bill is disputed but subsequently it is found to be in order by the appropriate authority.

7.6: Settlement of Disputes regarding wrong/excess Billing:

7.6.1: In the event the Licensee disputes the accuracy of a bill delivered by the DOT pursuant to this Agreement it will, as soon as practicable, but in any case before the pay-by-date notify the billing liaison contact of the DOT of the nature and extent of the dispute along with all details reasonably necessary to substantiate its claim, which shall be reasonably capable of being verified by the DOT.

7.6.2: In case of calculation or clerical error in the bill, the bill issuing authority after verifying the bill, if it finds the error genuine, will correct the relevant bill accordingly within three days of the receipt of the complaint.

7.6.3: In cases other than those referred in clause 7.6.2, the Licensee shall immediately obtain a provisional bill from DOT before the pay by date of the original bill on the basis of the number of call units of the previous month. The provisional bill shall be paid by the Licensee before the pay by date indicated in the provisional bill. Thereafter, within 7 days of the issue of the provisional bill, the Licensee shall approach the designated authority of DOT along with all his relevant records based on which the Licensee disputes the bill issued by DOT. The Licensee shall, in consultation with the designated authority of DOT, settle the dispute within 15 days of the issue of the provisional bill referred in this clause. In this consultation, the records made by the measurement devices located at the DOT interface point shall have precedence over the records of the Licensee. If after consultation, it is found that the bill issued by DOT is correct, the balance amount of the bill, which was kept under dispute (after the issue of the provisional bill), will also have to be paid by the Licensee within 7 days of the settlement of such dispute.

7.6.4: After the settlement of the dispute, if balance of the due payment is not made within the period referred to in clause 7.6.3., the DOT shall discontinue the use of its facilities by the Licensee immediately on occurance of this default. Restoration of the facility will be made only on clearance of the due payments by the Licensee. The Licensee shall also take action to open irrevocable Letter of Credit in favour of DOT as per clause 7.4.1 of the Inter Connect Agreement in the event of such a default.

7.6.5(i): Not withstanding provided herein above, if the dispute over the accuracy of the bill fails to be resolved, in the manner already provided, one party, after calling upon the other so to

agree, refer the dispute to the Telecom Authority, as an expert and not as an arbitrator, for resolution of the dispute. The decision of the Telecom Authority shall be final and binding.

7.6.5(ii): The cost of reference to Telecom Authority as an expert shall be borne equally by the parties unless such expert shall decide that one party has acted unreasonably in which case, he may have discretion as to awarding of costs.

7.6.5(iii): This clause may not be construed to preclude the right of a party under the Telecom Regulatory Authority Ordinance 1996 or any other law in force to seek TRAI's involvement in the resolution of a dispute where such involvement is within TRAI's functions and powers under the said Ordinance.

7.6.5(iv): Each party shall continue to fulfill its obligations under the Interconnect Agreement during the pendency of dispute and which dispute resolution process invoked under sub para (i) above.

7.6.5(v): Any party shall not use any information obtained from other party during the course of dispute resolution process under this clause for any purpose other than to resolve the dispute and such information shall not be in a litigation before Civil Court.

ANNEXURE F

Telecom Regulatory Authority of India

No.404-1/2000-FN Dated the 19th June 2001

To

The Dy. Director General (Basic Services),
Department of Telecommunications,
Sanchar Bhawan,
New Delhi

Sub: Allotment of Codes to NLD Operators, for introduction of Dynamic Call by Call Selection of NLD Carriers by subscribers
Ref: DOT letter No. 10-5/99-BS.I/Vol.II dated 24th Aug 2000

Dear Sir,

Kindly refer to your letter on the above subject. A high level Committee was set up by the TRAI to examine all the relevant issues relating to the implementation of NLD guidelines referred to in your letter. The Committee has representatives of DOT, BSNL, MTNL, ABTO, COAI, C-DOT, TEC and is chaired by Secretary, TRAI. The subject matter has been deliberated at length in the committee and in its Working Group. Based on the inputs provided by the Committee, the Authority would like to recommend as follows:

For Dynamic Call by Call selection, the subscriber should dial the STD prefix i.e. "0" followed by a NLD Service Code (NLDSC)/a Carrier Access Code (CAC), and thereafter the National Significant Number (NSN) of the called subscriber. Thus dialing sequence will be : 0 + NLDSC + CAC + NSN.

For example, for dialing Mumbai from Delhi, the subscriber will dial :

'0' + '10' + '55' + 22 + 3451234
(NLDSC) (CAC) (Area Code) (Local Number)

b) The Authority recommends adoption of "10" as the NLD Service Code. This code will be required to be dialed for all NLD Calls involving carriage over NLLD Network operators facilities.

c) In regard to Carrier Access Code, which will identify the NLD Operator chosen by the subscriber, the Authority recommends a two digit Code beginning 40 and ending at 59, thus giving 20 codes to be allotted to all NLD Carriers, including BSNL. The Authority feels that number of NLD operators would be less than '20' for the planning period of five years. The position would be reviewed after that period.

2. Regarding charging for Interconnection link between NLD Operator's POP at LDCC, and that of the BSO at the SDCC, the charges specified for such links in the Telecommunication Interconnection (Charges and Revenue Sharing) Regulation of May 1999 are applicable. Please note that this Interconnection Regulation also emphasizes mutual negotiations between Interconnection seeker and provider. Further, for estimating cost of origination, termination and transit on the NLD Network , cost of unbundled Network elements are required by the Authority to issue a determination, in case operators do not come to a mutual agreement on the modalities of inter Carrier settlements. The work of Accounting Separation and has just begun, and is likely to take about 6 to 8 months. The operators may be asked to expedite the Accounting Separation in accordance with Authority's recommendations.

Yours faithfully,
(Harsha Vardhana Singh),Secretary

ANNEXURE G

Telecom Regulatory Authority of India
A-2/14, Safdarjung Enclave,
New Delhi-110 029

No. 404-1/2000-FN Dated the 20th July 2001

To

DDG (Basic Services)
Department of Telecommunications,
Sanchar Bhawan,
New Delhi-110 001.

SUB : Incorporation of suitable clauses in the License Agreement of BSOs to reflect the recommendations of TRAI on NLD operations relating to Equal Ease of Access through Pre-selection.

Ref : DOT's letter No.10-5/99-BS-I/Vol.II dated 24th Aug'2000 & TRAI's letter No.404-1/2000-FN dated 19th June, 2001.

Dear Sir,

Your attention is invited to the recommendations (para 48 of the NLD recommendation) of the Authority on the above subject matter. The same is quoted below for ready reference :

"The technical arrangements for choosing an NLD service provider by dialing a CAC or pre-selection shall be made by all Access Providers (AP). Such arrangements should be made by APs in consultation with NLD service provider before commissioning NLD service and should form part of an Interconnect agreement. In case the facility of Carrier pre-selection needs extended time, the APs must ensure its provision preferably within a period of three years".

2. A High Level technical committee working under the aegis of TRAI with representations of DOT/ BSOs/ BSNL/ MSOs has finalized Carrier Access Codes for NLD operators, for introduction of Dynamic Call by Call selection immediately after commissioning of NLD Network s. The same was communicated to you vide our letter of even number dated 19th June.

3. The Committee has done considerable work regarding the introduction of pre-selection for Equal Ease of Access (EEA), so as to introduce pre-selection at an early date. A tentative time plan has been drawn up by the committee to introduce pre-selection within 2 ½ years of issue of the first licence. A copy of a tentative plan drawn up by the committee for upgradation of switches of the Access Providers and for making other technical arrangements to implement Carrier pre-selection is enclosed.

4. It is requested that suitable clauses may be incorporated in the license agreement of the BSOs/ CMSPs to reflect the Authority's recommendations relating to Equal Ease of Access (EEA), through pre-selection. A copy of the License Agreement after incorporating suitable clauses as suggested, may please be sent to this office for information of the Authority.

Yours faithfully,

(Harsha Vardhana Singh)
Secretary-cum-Principal Advisor

TENTATIVE TIME SCHEDULE FOR IMPLEMENTATION OF PRE-SELECTION

Assuming that the first NLD License is issued at time **D,** the following schedule is proposed:

i. **D+1 months** NLDO supplies the first year roll-out plan to Access Providers within 1 month of issue of the licence.

ii. **D+1 months** TRAI to lay down principles and procedures of compensation for directly attributable incremental costs of Access Providers for carrier selection.

iii. **D+6 months** All Access Providers who are ready, to provide Dynamic Carrier Selection to the subscribers requesting for the same in LDCAs covered in the first year's Roll-out Plan.

iv. **D+6 months** All Access Providers who can provide pre-selection may start to do the same.

v. **D+9 months** NLDOs to supply Roll-out plans for years 2 and 3 to Access Providers.

vi. **D+12 months** Access Providers to arrange for introduction of Dynamic Carrier selection in accordance with the roll-out plan provided the NLDO is ready for the same.

vii. **D+12 months** All Access Providers start action for introduction trials of pre-selection in accordance with an agreed programme.

viii. **D+21 months** All Access Providers to upgrade switches for handling of 23 digits in support of International Carrier Selection.

ix. **D+30 months** All Access Providers to complete pre-selection in the network covering all LDCAs covered in the NLDO's request and Roll-out Plan.

ANNEXURE H
CARIER SELECTION OPTIONS : EUROPEAN UNION

One possibility for Carrier selection is through the use of prefixes (short codes) to be dialed in front of the subscriber number in a single stage dialing procedure Identification of the calling party is done through the Calling Line Identification (CLI).

Another possibility is by calling a special service access codes to Carrier services after which the dialed number is entered together with a special code for authentication of the subscriber. This latter possibility is a two stage dialing procedure which is more prone to fraud and resembles calling card services in use today.

The main options for Carrier selection in a single stage dialing procedure are:

A: default Carrier determined by access Network operator (local operator) with possibility of override by user on call by call basis. This options is sometimes referred to as easy access;

B: pre-selection of Carrier by the customer plus possibility of override on call by call basis. There are some variants on this method e.g. change default Carrier through instant DTMF dialing (change pre-selected Carrier on-line) or pre-selected Carrier determined by regulator on the basis of market share. This option is referred to as equal access;

C: the use of Carrier Selection Codes for all calls. Clearly, this option is in contradiction with the Council Decision on the introduction of a standard telephone access code.

The commission believes that the requirement for a harmonized access code should prevail as, with the implementation of Option B, it does not form a barrier to the development of effective competition. Option C is therefore not considered further.

With the implementation of easy access (Option A), operators will not loose market share in long-distance and International traffic as quickly and substantially as with the implementation of equal access (Option B) because they will normally elect to route their long-distance and International traffic via their own channels. Option A could therefore be an intermediate step in a phased approach with Option B as the medium to long-term goal and cause a more gradual transition towards an open competitive market then with the implementation of Option B right from the start.

Cost/benefit of Carrier selection

Studies carried out for the Commission and ETO concluded that Carrier selection mechanisms are mandatory to foster competition in main telecommunications markets. Users must be able to easily select a Carrier wherever they are in Europe for their National and International long-distance telephony services.

The experience with Carrier selection is strongest in the US where, after the divestiture of AT&T and the introduction of inter-exchange long-distance competition, the long-distance rates have been slashed by approximately 40 %. Another example is Finland. Since the introduction of long-distance competition between Telecom Finland and the long-distance Carrier of the independent local operators in 1993, long distance tariffs fell by more than 50 %. Remarkably, the total revenue did fall but not as substantial because of increased telephone usage.

The total revenues of the telecommunications market in the European Union in 2000 is estimated at 110-120 Billion ECU. Some 50 % of the traffic is business traffic with some 20% International traffic. By introducing Carrier selection throughout the EU, it works out that between 40-50 Billion ECU of revenues is at stake. Extrapolating the effects on long-distance tariffs which were seen in the US and Finland to the European Union, the introduction of Carrier

selection could save the European customer as much as 20-25 Billion ECU per year. Obviously, the reductions of tariffs would change telephone calling patterns and thus offset somewhat the loss of revenues for operators.

The lower prices of telephone traffic would make the diffusion of information cheaper and thus form an immediate stimulus to the European economy. These direct effects are difficult to quantify in financial terms but are believed to be huge. Besides that, the introduction of Carrier selection would assist in the migration of users from one operator to the other. It would make customers more aware of competitive alternatives, customers would not have to invest so much time and money (including any necessary CPE alterations) in changing to a new operator, customers could try out new operators on a call-by-call basis with no long term commitment, and customers would avoid having to dial additional digits in order to access an other operator's Network .

The cost of introducing Carrier selection cover local Network implementation cost for the incumbent operator and any other local operator required to provide equal access; costs for long distance operators, any extra costs of Network capacity or operations that result from increased customer churn; and end user equipment costs.

An analysis of the cost of implementation of equal access to long-distance Carrier was carried out in the UK. The total direct cost to BT over the period 1995-2004 was estimated between 136.6 and 261.2 [sterling]M. This included cost for Network changes, cost for information system changes, and cost for data build maintenance and staff, training and organization. The cost for other operators for the same period was estimated at 68.6 [sterling]M.

Extrapolating this to the European Union market and assuming similar degrees of Network digitisation and efficiency, the introduction of Carrier selection at the European level would cost about 2 Billion ECU over the ten year period considered.

It is obvious from this very rudimentary analysis that the benefits of introducing Carrier selection by far outweigh its costs. Even if the drop in long-distance tariffs would be much less than assumed, benefits of equal access to Carrier will exceed costs.

Pre-selection equal access was introduced in the US and Australia using slightly different methods.

Move to equal access in the US

Pre-selection was introduced in the US from September 1, 1984 as local exchanges were given equal access capabilities in rolling conversion programmes. To begin with, once an exchange had been converted to equal access, their was no immediate requirement for all customers to be balloted on their preferred long-distance Carrier. By early 1985, it became apparent that only around 30 % of customers connected to equal access exchanges were pre-selecting a long-distance Carrier (either AT&T or one of the other long-distance Carriers) whilst the remaining 70% were staying with AT&T default.

In May 1985 the FCC released an Order specifying a balloting and allocation plan to be used by local exchange Carrier (LECs) on the introduction of equal access into their exchanges and a retroactive balloting process in cases where equal access had already been introduced. This process required a re-ballot of customers who failed to respond to the first ballot, after which customers who did not respond to either ballot had to be assigned a long-distance Carrier in proportion to those who did respond in the first ballot. Under this system, LECs found that between 60 % and 75 % of their customers now pre-selected a long-distance Carrier, whilst the remaining 24 % to 40% were assigned a Carrier. This increase in pre-selection has been argued to have been a major factor behind AT&T's loss of market during the late 1980s. In particular, its share of inter-state switched traffic fell from 82 % in 1985 (when it had already

faced eight years of competition from MCI without equal access), to 63 % in 1991 when equal access had been rolled out to over 90% of access lines in the US.

Move to equal access in Australia

Australia licensed a second Carrier, Optus, in December 1991. The new Carrier's Network was operational in major cities by November 1992, and was available to 65 % of the population by the end of 1993. Within 18 months of launch it had captured about 15 % of National and International traffic. Originally access to the Optus Network was through a simple dialing code prefix – 1". If this prefix was omitted calls would be routed over the Telstra (incumbent) Network . However, it was always intended to move to an equal access system of pre-sel;ection with call-by-call override.

Pre-selection balloting began in Australia in July 1993, and will continue on a sequential city-by-city basis until 1997. The process takes the form of a first ballot, with the option for Optus to call for a second ballot in cities where the response rate is less than 60 %. Non-respondents remain with the existing Carrier (in contrast to the US system where they were assigned). It is likely that the share of traffic captured by Optus exceeds its share of lines since it will have tended to have captured customers with higher than average calling rates.

On the basis of the experience of the US and Australia, it appears that effective pre-selection would require the balloting of all customers; and an option of a second ballot if response rates are low. There are however other possibilities than ballots to let users make their pre-selection for instance through marketing campaigns. Unlike the ballot, this latter method allows a better control quality and quantity of customers by the new entrant and allows new entrants with less marketing resources to compete fairly.

Source: EU Website

ANNEXURE I
OFTEL FINALISATION OF CARRIER PRE-SELECTION CHARGES

Ref: 03/01
Date: 08 January 2001

Oftel has today set the charges that BT will make to operators for the setting up and running of permanent carrier pre-selection services.

The charges are contained in a Determination published today.

Launched in December, carrier pre-selection allows consumers with a BT line to choose between different telephone companies for different types of call without changing their existing phone line, and without dialling extra numbers.

Consumers have the option to use BT for their telephone line and local calls, a different supplier for national calls and another supplier again for international calls.

Oftel has made the determination because telecoms companies were unable to agree the charges themselves.

David Edmonds, Director General of Telecommunications said today:

"Carrier pre-selection means far greater choice for consumers. They will be able to shop around for the best deal from several different telephone companies, without having to change their phone line or dialling extra digits.

"This determination gives operators certainty about the charges that will apply to carrier pre-selection so that they can continue in confidence with their roll-out of carrier pre-selection services to customers.

"Consumers are already signing up to the service and with at least 15 companies planning to launch services in the coming year, I expect to see many more consumers benefiting from the greater choice and savings that carrier pre-selection can offer."

Notes to editors

1. *Determination under Condition 50A of the Licence of British Telecommunications plc relating to 'permanent' carrier pre-selection* is available from Oftel's website at

www.oftel.gov.uk/publications/carrier/pcps0101.htm. Copies are also available to the media from Oftel's Press Office on 020 7634 8991 and to the public from Oftel's Research and Intelligence Unit on 020 7634 8761.

2. There are several different types and levels of charge in the Determination. Two important examples are:

- The charge to an alternative operator for setting up CPS on a simple residential line will be £4.46
- The once-off charge for an alternative operator wishing to offer CPS is approximately £22,700.

3. The determination has been made following public consultation on a draft determination that was made on 7 December 2000.

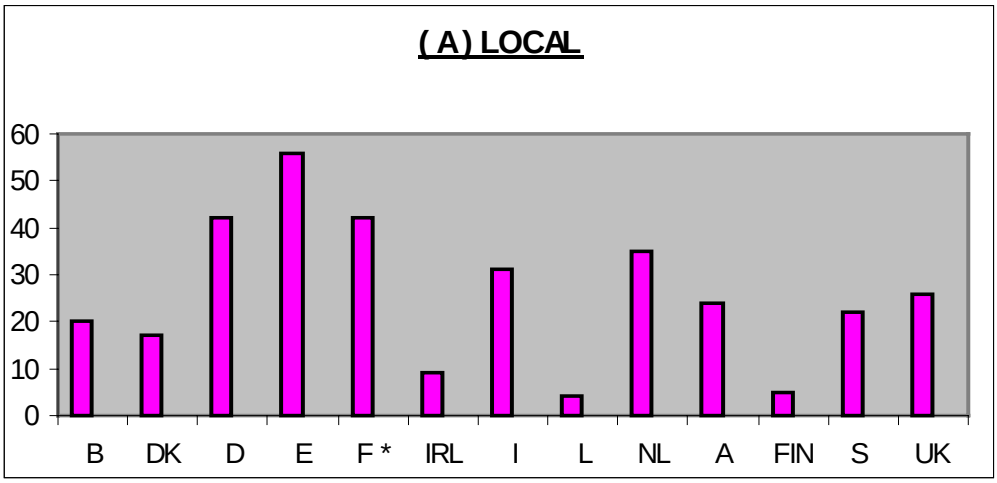
Source: OFTEL

ANNEXURE J

CARRIER SELECTION in European Union [Source: EU]

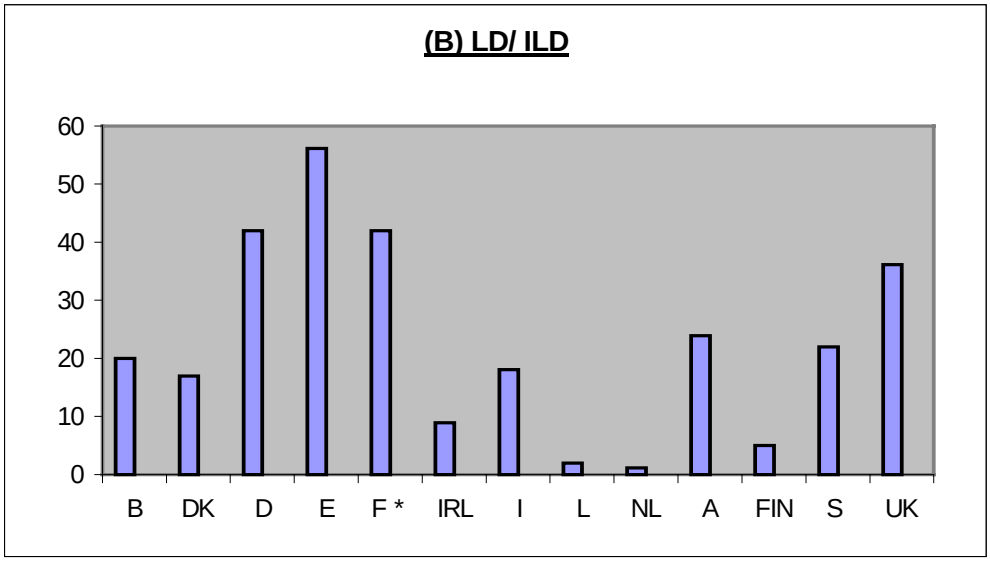
New operators using **Carrier Selection** in European Union for providing fixed voice telephony to residential users for Local, National/ International Long Distance Services is shown in following figures 1 and 2 respectively.

Figure1



Note : Countries are : Belgium (B), Denmark (DK), Germany (D), Spain (E), France(F), Ireland (IRL), Italy (Italy), Luxemburg (L), Netherland (NL), Austria(A), Finland (FIN), England (UK).

Figure 2



New operators using **Carrier Pre-Selection** in European Union for providing fixed voice telephony to residential users for Local, National/ International Long Distance Services is shown in following figures 3 and 4 respectively.

Figure 3

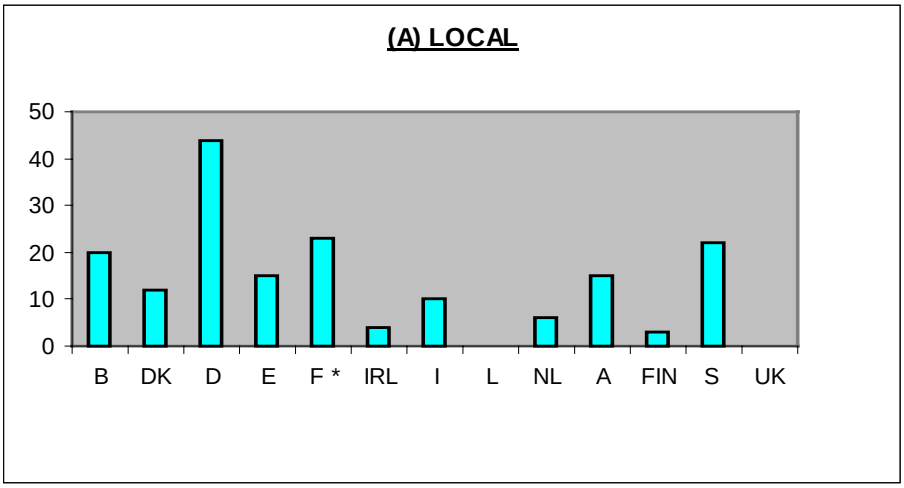
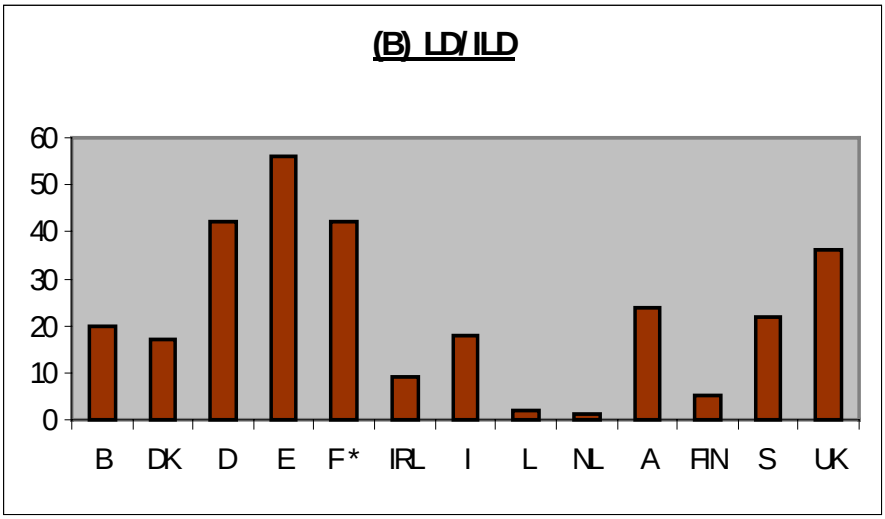


Figure 4



ANNEXURE K

INTERCONNECT BILLING IN BT

There are two main billing systems in BT: CSS which is used to provide retail billing for end (retail) customers and INCA which is used to bill for Interconnected calls from other operators. The two systems are completely separate. In general long distance calls are handed over at a BT Tandem switch and can be routed through the BT Network to either the same operator or a second operator i.e. OLOI-BT-OLOI or OLOI-BT-OL02. Interconnected calls handed over at a local switch must terminate on that local switch, BT will not provide long distance conveyance for Interconnected calls handed over at a BT local switch. To provide long distance transit for calls handed over at a local exchange would require additional local to tandem exchange capacity, modifications to local exchange and modifications to the billing systems.

The retail billing system uses only the BT local switches to determine call charges for retail billing. Billing information collected from tandem switches, when collected, is used only for Interconnect billing. Until the need arose to perform Interconnect billing (early 90s) there was generally no need for billing at the tandem switches. The Interconnect billing system has grown substantially and handles more calls than a regional retail billing system. This is a reflection of the number of the number of other operators in the UK market who Interconnect with BT.

The call information recorded at the tandem switch where the calls enters is used in conjunction with an Element Based Cost EBC matrix to compute the cost of the calls. This concept is increasingly being used in Europe. The process essentially characterises the calls as types for example single tandem or double tandem depending on the number of switching stages used. The UK also uses a further splitting of the double tandem in to double tandem long and double tandem short to accommodate the transmission length.

For BT the call charges are regulated and BT is required by Oftel to demonstrate that the charges are cost oriented. As a quick and crude example of how this works, a double tandem call would require the use of two tandem switches and some length of transmission. The total call cost would be calculated by summing the call costs of the components used: switching and transmission. The cost of the transmission would be calculated from the unit cost (p/km/min) of inter-tandem transmission and the average distance a double transit call would be carried. Historical traffic data is used to determine the average distances. Thus the call charges calculated are averaged over the appropriate distance. We can provide more about the method of calculating charges if required.

It is possible that between two points there are many alternative routes. The Network routing system therefore employs a least cost routing algorithm. Essentially the algorithm determines several routes and then looks at the number of switches on each route. The route with the lowest number of switches is selected as the quickest route. The key point is that although the routing of the call through the Network may vary the call charge depends only on the point where the call enters the Network and where it leaves, not the actual route taken.

Source : Inputs received from British Telecomm Regulatory Division in response to a query from TRAI

ANNEXURE L

BT format showing the unbundled network elements involved in call conveyance, as well for interconnection of links.

Statement of costs For the year ended 31st March 1999	Total Operating costs £m	Mean capital employed £m	Applicable rate of return on capital %	Capital costs £m	Total of operating and capital cost £m	Volume min/unit (b)	Average Cost per min/unit
Network components							
Local exchange concentrator	184	661	12.5	82	266	287,197 mm	**0.093p**
Local exchange processor	353	1,112	12.5	139	492	280,551 mm	**0.176p**
Main and digital junction switching	104	255	12.5	32	136	192,421 mm	**0.070p**
Local to remote transmission link	58	154	12.5	19	77	217,407 mm	**0.035p**
Local to remote transmission length (c)	74	378	12.5	47	121	343,059 mm	**0.035p**
Local to tandem transmission link	48	101	12.5	13	61	151,192 mm	**0.040p**
Local to tandem transmission length (c)	37	203	12.5	25	62	435,459 mm	**0.014p**
Tandem to tandem transmission link	17	51	12.5	6	23	59,411 mm	**0.039p**
Tandem to tandem transmission length (c)	28	186	12.5	23	51	824,917 mm	**0.006p**
Digital derived services network-switch	45	113	12.5	14	59	4,912 mm	**1.204p**
Digital derived services network-link	5	26	12.5	3	8	4,076 mm	**0.197p**
Inland directory enquiry	138	40	12.5	5	143	19,997 ms	**0.718p**
International directory enquiry	15	3	12.5	-	15	936 ms	**1.601p**
National operator assistance	67	21	12.5	3	70	6,678 ms	**1.045p**
International operator assistance	12	4	12.5	-	12	1,065 ms	**1.159p**
Emergency operator assistance (999)	13	2	12.5	-	13	1,306 ms	**1.012p**
Product management, policy and planning	36	7	12.5	1	37	86,826 mm	**0.042p**
Numbering information system (DAS)	1	-	12.5	-	1	298 t	**£3,464**
Public payphone line	12	42	12.5	5	17	140,527 L	**£119**
Public payphone operations	152	209	12.5	26	178	n/a	(a)
Interconnect connections and rentals	35	81	12.5	10	45	n/a	(a)

Numbering information system (other)	3	1	12.5	-	3	n/a	(a)
Inland private circuits	669	1,999	12.5	250	919	n/a	(a)
BT only other	149	377	12.5	48	197	n/a	(a)
Multifunction platform	59	200	12.5	25	84	n/a	(a)
International network	332	819	12.5	103	435	n/a	(a)
All out-payments	1,970	(511)	12.5	(62)	1,908	n/a	(a)
Total	**4,616**	**6,534**		**817**	**5,433**		

(a) These components include a number of different elements which are used in different proportions for the delivery of services within this heading. As a result no single volume of usage can be applied and so no unit cost is derived.

(b) mm = million minutes; ms = million seconds; t = terminals; L = lines.

(c) Unit of length is 10 km.