

Consultation Paper No. 2000/5-FN

TELECOM REGULATORY AUTHORITY OF INDIA

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Consultation Paper on
Policy issues relating to
Limited Mobility
by use of
Wireless in Local Loop
Techniques in the Access Network by
Basic Service Providers

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November 3, 2000

PREFACE

For expansion of Telecom Network in the country last mile connectivity i.e. connection

between Exchange and Customer's Premises equipment (CPE) called 'Local Loop' is very important. Local Loop has thus far been provided mostly by laying underground cables or by construction of overhead alignment. The typical length of this wire based Local Loop is about 8/ 10 Kms.

The laying of underground copper cable specially in congested areas is not only cumbersome but also time consuming. This comes in the way of quick roll out of Telecom Networks. To overcome this problem, one of the solutions is the deployment of Wireless in Local Loop (WLL) systems in the last mile. WLL systems are application of Cellular technologies such as CDMA, DECT, PHS, GSM etc. As the Basic Service Operators in India have begun providing the last mile connectivity through WLL Systems, there is a demand from them to offer Limited Mobility also to subscribers as part of the Basic Service package. However, once Mobility features are added to WLL, the differentiation in Service between Fixed and Mobile is no more significant. It can also be argued by some that this may affect the market available to the Cellular Operators. The matter to be considered, therefore, is whether mobility should be provided to WLL subscribers and if so, what should be the extent of this mobility and what will be its impact on various Licensing and Regulatory issues.

Another matter to be considered is the Frequency Spectrum. National Frequency Allocation Plan 2000 (NFAP 2000) and Basic License Agreement have provided various specified frequency bands for WLL systems. Efficient utilization of Frequency Spectrum for Cellular and WLL systems and their proper allocation is another issue for consideration.

Department of Telecommunications has sought TRAI's recommendations on the above issues in the context of permitting WLL Limited Mobility Services to be offered by Basic Service Operators to customers. As per established practice TRAI will conduct a public consultation to ensure transparency and due consultation in its decision making process. This paper attempts to analyse various issues connected with WLL, particularly in the context of DOT's reference to TRAI and brings out questions on which inputs from stakeholders are solicited.

I hope this Consultation Paper would generate useful inputs from all stakeholders viz. Service Providers, consumers and Consumer's Organisations, Financial Institutions, Policy Makers and various Research Institutions. I request that written comments on the Consultation Paper may please be furnished to Secretary, TRAI by 20th November 2000. For any further clarification of the matter, Advisor (Fixed Network) or Deputy Advisor (Fixed Network) TRAI may be contacted at Phone Nos.3316782 and 3356523 respectively. (Fax No.3738708, 3356083) (E-mail-trai@del2.vsnl.net.in).

(M.S. VERMA)
Chairperson.

New Delhi
3rd November, 2000

I. BACKGROUND

1. Access to the National Telecommunication Network is being recognised as one of the Basic needs of the citizens of a country. Local Loop, the last link of the Telecom Network, is also called a bottleneck facility in regulatory jargon. The Local Loop i.e., the 'last mile' of the Telecom Network, provides the vital link between the customer and the Local exchange. This vital link has traditionally been a pair of copper wire connecting the Customer Premises Equipment (CPE) to the Main Distribution Frame (MDF) of the Local exchange. The deployment of Access Network based on copper requires long roll out period and huge initial investments. The Local Loop is the most capital intensive element of the Telecom Network. Therefore telecom engineers and planners have been searching for an alternative to copper based Local Loop since decades, to find a more cost-effective alternative, preferably based on Wireless technology, to cut down the Network Roll out time as well as cost.

2. A number of alternatives to copper based Local Loop have emerged under the generic name of 'Wireless in Local Loop (WLL)'. WLL Systems are applications of Cellular technology (either Micro or Macro) to connect a Fixed telephone set to the exchange through an open interface (V 5.2) as indicated in the diagram at Annexure 'A'. Such Systems employing different Access technologies (CDMA/ GSM/ DECT /PHS etc.) & operating in different frequency bands are increasingly becoming available and are likely to play an important role in increasing the level of coverage and competition in the last mile. Details of such systems are indicated at Annexure 'B'. NTP-99 has recognized the role of WLL in relation to Fixed Service Providers. It also stipulates separate frequency bands for WLL. ITU has defined WLL as indicated below:

"The proper terms to use for WLL, which has received wide acceptance is Wireless Access which is defined as "End User Radio Access Connection(s) to Core Networks.

Core Networks include for example, PSTN, ISDN, PLMN, PSDN, Internet, WAN/LAN, CATV, etc. Wireless Access may be considered from a number of perspectives, such as: -

- (i) Fixed Wireless Access: Wireless Access application in which location of the end-user termination and the Network Access point to be connected to the end-user are Fixed.
- (ii) Mobile Wireless Access: Wireless Access System in which the location of end-user termination is Mobile.
- (iii) Nomadic Wireless Access: Wireless Access Application in which the location of end user termination may be in different places but it must be stationary while in use”.

3. The Basic Service License issued by the DOT stipulates WLL as the preferred method for providing Basic Service. All the Licensees of Basic Services have deployed WLL Systems as Fixed Wireless Access. Although the BSOs have deployed WLL Systems as Fixed Wireless Access (FWA) Systems in conformance with the stipulation in their License Agreement, the incumbent i.e. MTNL/ BSNL have either introduced or plan to introduce the WLL with Limited Mobility in the near future.

4. MTNL has introduced Wireless in Local Loop (WLL) with Limited Mobility based on CDMA (IS-95) technology last year. The Mobile handset offered by MTNL to the subscribers is identical to a Cellular handset. BSNL has also drawn up plans for induction of WLL Systems in the customer Access Network in a number of major cities as per newspaper reports. These Systems are likely to be commissioned in the near future.

5. MTNL had approached TRAI through their letter dated 23rd August 1999 for approval of tariff package for providing “Cellular Mobile Telecom Service using CDMA WLL technology with Limited Mobility. The name of the Service was later changed by MTNL to “Cellular Mobile Telecom Service using CDMA technology” in a letter dated 1st September 1999. The tariff stipulated a low call charge i.e. of Rupees 1.40 per three minute. It was not clear whether the relevant Access charges paid to Fixed Network were part of this tariff or would be charged separately. The erstwhile TRAI had raised a number of queries relating to the tariff report of MTNL, including those pertaining to costing detail, issue of cross-subsidisation from Fixed Services, whether separate accounts would be maintained for Fixed and Cellular Services to be provided by MTNL. Also the tele-bearer and supplementary Services to be

provided and whether they were at par with GSM based technology, the quality of Services provided, proposed Area of coverage, and Access charge payments. These concerns reflected among others, a need to address cross-subsidisation and appropriate Access charge payments in the background of TRAI's methodology of cost based tariffs. A consultation paper was also prepared on the basis of the information provided by MTNL highlighting the relevant policy issues.

6. Based on a survey of the scenario in a number of countries, it is seen that generally, WLL Systems have been given a separate frequency band i.e. different than 800/ 900 MHz. In most of the countries, it is either the 1800/ 1900 PCS band or in the 2.34 GHz band. The latter band has been allotted in North and South America. WLL is also called FWA (Fixed Wireless Application) in North America, South America and UK etc. Such Systems using different Access methods and operating in different frequency bands are available meeting various International standards.

7. WLL Systems generally use a Micro Cellular architecture and provide a very Limited Mobility, i.e., Limited to the neighbourhood. Cellular Mobile and CDMA WLL Systems, however, use Macro Cellular architecture. The speed of Mobility is Limited in WLL Systems to pedestrian speeds and not that of fast moving cars. WLL Systems based on Micro Cellular architecture do not permit handover from one cell to another.

8. The condition of Basic Service License stipulates use of WLL/ Optical fibre in the Access Network except in the last 500 meters where copper can be employed. The condition of Copper cable in last 500 meters was also relaxed by the Licensor (DOT) recently. There is no provision in the License Agreement for the Basic Service Operator to provide Mobility using WLL technology.

9. In their letter dated 9TH October 2000, the Department of Telecommunications has informed the TRAI that the Telecom Commission has recommended the use of hand held terminal in Local Area (SDCA) by the subscribers of Basic Service Operators (BSOs). This will use Wireless Local Loop platform, which means that Numbering Plan of Local Area is to be followed and Inter Base Station Controller/ Manager authentication is not permitted. No Basic Service Operator is to be allocated frequency from GSM band. The DOT letter under reference is placed at Annexure 'C'. The DOT has also intimated that the Government has felt that Hand Held terminals in Wireless Access technology with Full Mobility within the Service Area may be permitted to the Basic Service Operator also, to ensure competition and deregulation of the Cellular sector keeping pace with the trends in National Long Distance, International Long Distance, Basic Service sector of Telecommunications. The Government

has clarified that the frequency in GSM band in of 890-915 MHz paired with 935-960 MHz and 1710-1785 paired with 1805-1880 MHz will not be allocated under any circumstances to the Basic Service Operators in order to avoid any conflict of interest with present Cellular Operator.

10. It needs to be recognised that when Hand Held terminals in Wireless Access technology with Full Mobility within the Service Area is permitted to the Basic Service Operator also, the Service distinction between them and the Cellular Mobile Service Operator will be largely obliterated.

11. With the above background, the Government has requested TRAI to consider its suggestions for making suitable recommendations in respect of:

- (a) Scope of Area of Hand Held subscriber terminals under Wireless Access System operations,
- (b) Basis for assigning WLL frequency,
- (c) Amount of Entry Fee and spectrum charges as a percentage of revenue to be charged from the Basic Service Operator for extending the above facility in respect of existing as well as future Basic Service Licensees, so as to ensure a level playing field with the Cellular Operators.

12. This paper provides a background and framework for TRAI's discussions with the stakeholders on these issues, in order to obtain various inputs that need to be considered for reaching a decision on this matter.

II. EXTENT OF MOBILITY OF WIRELESS IN LOCAL LOOP SYSTEMS

1. WLL Systems are engineered based on the concept of Cells. Each Cell has a coverage Area with radio interface connecting a number of subscribers to the base station through Wireless links. The coverage Area of a Cell varies, depending upon technology and engineering i.e. from 100 meters to 30-40 Kms. At the subscriber end, all the technologies provide an option for either a Fixed terminal or a portable terminal which could be identical to a handset used by the subscribers of Mobile telephone Service.

2. In case of a Macro Cellular architecture with several Kms. cell radius, a Mobile WLL terminal enables the subscriber to make calls from almost anywhere in the entire city. It adds value to the standard telephony Service by providing Cellular type Service at a lower tariff. It

is thus likely that WLL Access with Limited Mobility in Basic Service may considerably fulfill the Mobility requirements of many subscribers at a much cheaper cost and subscribers may not find it cost effective to go for a Full fledged Cellular Mobile Service with hand over and roaming facility. This chapter discusses the issue of Mobility of WLL terminals vis-à-vis the policy guidelines, the standards laid and the existing License conditions. It also raises various issues on which comments are solicited through this Consultation.

3. A number of issues, pertaining to the extent of Mobility need to be discussed. For example, what should be the limiting condition of Mobility : whether it should be 500 metres or 8/ 10 Kms i.e. exchange Area Mobility or the SDCA which is generally a tehsil in a State. Another issue which needs to be discussed relates to the policing function so that the specified limits are actually adhered to by the Operators. We need to define not only the extent of Mobility but also the type i.e., neighbourhood pedestrian or high speed vehicular Mobility. These issues are listed at the end of the Chapter for discussion.

4. The following table indicates the practice followed in some of the developing countries :

Name of the country	Frequency Allocated for WLL	Tecnology used	Extent of Mobility
Brazil		NA	No Mobility
Cook Islands	800 – 900	AMPS	No Mobility
Indonesia	1800 MHz	DECT / PHS	No Mobility
Korea	2.3 Ghz [26 Ghz for Broadband WLL]	CDMA	Limited to a cell of about 1.5 Km
SriLanka		PROXIMITY/ DECT	300 Mtr radius
China	1800-1900 MHz and 450 MHz	CDMA/ PHS	Covering Rural areas and small cities

South Africa		DECT/ CT2	Technology deployed supports Limited Mobility but not provided at present
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New Telecom Policy 1999

5. NTP 1999 explicitly mentions WLL in the section relating to Fixed Service Providers, which reads as follows:

“The Fixed Service Providers (FSP) shall be freely permitted to establish 'last mile' linkages to provide Fixed Services and carry long distance traffic within their Service Area without seeking an additional licence.

The FSP shall be free to provide, in his Service Area of operation, all types of Fixed Services including voice and non-voice messages and data Services, utilizing any type of Network equipment, including circuit and/ or packet switches, that meet the relevant International Telecommunication Union (ITU) / Telecommunication Engineering Center (TEC) standards.”

For Cellular Mobile Service Providers, the stipulation in the NTP 1999 is as follows:

“The Cellular Mobile Service Providers (CMSP) shall be permitted to provide Mobile telephony Services including permission to carry its own long distance traffic within their Service Area without seeking an additional License. ... The CMSP shall be free to provide, in its Service Area of operation, all types of Mobile Services including voice and non-voice messages, data Services and PCOs utilizing any types of Network equipment, including circuit and/or packet switches, that meet the relevant International International Telecommunications Union (ITU)/ Telecommunications Engineering Centre (TEC) standards.”

6. According to a press release of the Telecom Commission, dated 13 September, 1999 which was also communicated to the Regulator, the following new guidelines were laid in regard to technology.

- *all new Cellular Mobile Service Providers will be technology wise neutral. However, the technology must be Digital. The existing Licensees of Cellular Services on their migration to the NTP 1999 regime in terms of migration package already offered to them, will also be permitted to expand their Networks using any other technology or the GSM technology to which they have been bound so far as per the existing Licenses;*

The above guidelines issued by the policy maker implies that technologies other than GSM, such as CDMA which falls in same category of Macro Cellular architecture could be used to provide Mobile Services in future. It was under this change of policy that the DOT gave MTNL an amended License on September 15, 1999 for providing Cellular Mobile Service with technology neutrality. It was under this amended License that MTNL introduced its Mobile Services using CDMA technology. At that time too, the issue of "Limited Mobility" had arisen when MTNL mentioned this term in its tariff report of 23rd August, 1999 to TRAI. TRAI had sought a clarification on this matter from DOT, which had responded in its letter dated 17th September, 1999 as indicated below:

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

7. Based on the above discussion on the extent of Mobility, the following specific issues need to be discussed in the public consultation:

- i. Whether a definite limit should be specified on Mobility provided by WLL Systems deployed by BSOs?**
- ii If so, should it be Limited to coverage of the Local exchange Area, SDCA, or the jurisdiction of an Area Manager in a Metropolitan telephoneSystems such as Delhi, Mumbai, Chennai and Calcutta?**
- iii. WLL's main advantage to the BSOs being faster and cheaper coverage of the last mile, particularly in areas with difficult terrains and in areas where tele-density is low, such as Rural areas, should they be permitted to use WLL freely only in Rural and Remote areas?**
- iv. To what extent, Limited Mobility would affect the market for the Cellular Mobile industry?**

- v. **Should there be a distinction between WLL terminal Portability and Full handset Mobility?**

III. FREQUENCY RELATED ISSUES

1. Frequency Spectrum is a scarce National Resource and is to be shared optimally by all type of Telecommunication Services. The frequency band allotted to WLL can indirectly specify the extent of Mobility permissible. The present day technologies operating in the 800 / 900 MHz band are capable of delivering voice at vehicular speeds within a larger cell while those operating in the 1800 MHz – 1900 MHz band are mainly derivatives of cordless technologies with maximum cell radius of 5 KMs depending upon the topology and pedestrian speed Mobility. Countries like USA have used even higher frequency bands of 2.34 GHz for purely Fixed Wireless Access (FWA) applications.

2. The picture that emerges from a survey of a large number of countries is that the majority of the countries have used 1800 MHz and higher bands in GHz for their WLL / FWA applications. The 800 MHz / 900 MHz have been deployed for Mobile applications only. In India, currently WLL Systems are operating in 800 MHz (CDMA based) & 1800 MHz (CorDECT based) band. The issue is, whether Limited Mobility be permitted in 800 MHz band for WLL, or should it be permitted only in the 1800 MHz, and 800 MHz band reserved for Full Mobility in Cellular telephone Service. Following is also relevant in this regard:

- The 800 MHz band, which is a premium band with higher revenue potential, could be utilized in a more effective manner for pure Cellular Mobile Operator. In fact, the latest policy directive i.e. of 15th Sept. 1999 permits the Cellular Operators to employ CDMA technology for Full Mobility Cellular Services. If the same band is also given to the WLL Limited Mobility Services, it could create conflict of interest and frequency co-ordination problem.

3. License Agreement for Basic Service Providers has specified the following bands subject to satisfactory coordination for use of WLL Systems to be deployed by Basic Service Operators:

- (i) 864 to 868 MHz

- (ii) 824 to 844 MHz
- (iii) 869 to 889 MHz
- (iv) 1.8 to 1.9 GHz

4. From the above, it will be seen that Systems in the categories of both Macro Cellular and Micro Cellular can be deployed by the Basic Service Operators for their WLL Systems. However, a majority of Operators have preferred to use Macro Cellular Systems based on CDMA techniques in the 800 to 900 MHz frequency band. A few Operators have also been given the 1.8 to 1.9 GHz frequency band, presumably for Micro Cellular Systems such as CorDECT. In addition to the above frequency bands, the License Agreement stipulates the following frequency bands for Rural Radio Telephone Systems by the Basic Service Operators:

- a) 367 to 399.9 MHz
- b) 3.4 to 3.8 GHz
- c) 10.5 to 10.68GHz

5. The License Agreement requires the Basic Service Operators to obtain a separate License from Wireless Planning and Coordination Wing of the Ministry of Communications and pay separate License Fee and Royalty for use of the Frequency Spectrum. However, the National Frequency Allocation Plan 2000, issued by the Ministry of Communication (WPC Wing), has the following remarks in the National Frequency Allocation Table relating to WLL:

- i) Frequency band 824 to 844 MHz paired with 869-889 MHz has been earmarked for Wireless Local Loop (WLL) Services. Requirement of EPABX using Wireless extension may also be considered in the frequency band 864-868 MHz.
- ii) Requirement of Cellular and WLL in the frequency band 1700 to 2000 MHz may be coordinated on case by case basis, initially (10 + 10) MHz in the frequency band 1710 to 1785 MHz paired with 1805 to 1880 MHz. Additional (10 + 10) MHz may also be coordinated on case by case basis, subsequently in the frequency band 1710 to 1785 MHz paired with 1805 to 1880 MHz. These allocations may not be contiguous and may be in smaller chunks of 1.25 MHz and may not be same in all cases, while efforts would be made to make available in larger chunks to the extent feasible.

6. NTP'99 has following reference with respect of WLL spectrum fees.

As In the case for Cellular, for WLL also, availability of appropriate Frequency Spectrum Spectrum as required is essential not only for providing optimal bandwidth to every Operator but also for entry of additional Operators. It is proposed to review the spectrum utilisation from time to time keeping in view the emerging scenario of spectrum availability, optimal use of spectrum, requirements of market, competition and other interest of public.

The WLL frequency shall be awarded to the FSPs requiring the same, based on the payment of an additional one time fee over and above the FSP entry fee. The basis for determining the entry fee and the basis for assigning WLL frequency shall be recommended by the TRAI. All FSP Operators utilising WLL shall pay a licence fee in the form of a revenue share for spectrum utilization. This percentage of revenue share shall be over and above the percentage payable for the FSP licence. It is proposed that that the appropriate level of entry fee and percentage of revenue share for WLL for different Service Areas of operation will be recommended by TRAI in a time-bound manner, keeping in view the objectives of the New Telecom Policy.”

Based on the issues highlighted in pre-paras, the following questions arise which need to be discussed during the Consultation process.

- i. The existing Frequency Spectrum for WLL is both in 800/ 900 MHz and 1800/ 1900 MHz bands. The former is being used by Cellular Operators for GSM Systems. They have also the option to use CDMA based Full Mobile Systems which also fall in the 800/ 900 MHz band. In view of the latest policy relating to technology neutrality which gives the flexibility to Cellular Operators, to use either the GSM or CDMA technology, would it be preferable to reserve this entire band (800/ 900 MHz) for CMTS operators and higher frequency bands such as 1800/ 1900 MHz and 3.4 to 3.8 GHz, 10.5 to 10.68 GHz etc. for Basic Service Operators?**
- ii. Should we specify the frequency spot within 1800/ 1900 MHz band reserved for DECT System for Basic Service Operators as a means of promoting indigenous technology? This will, however limit Mobility to the neighbourhood.**
- iii. What should be the basis for assigning WLL frequency, amount of entry**

fee and spectrum charges as a percentage of revenue to be charged from the Basic Service Operator for extending the above facility in respect of existing as well as future Basic Service Licensees, so as to ensure a level playing field with the Cellular Operators?

IV. ISSUES RELATING TO LEVEL PLAYING FIELD AND CONVERGENCE OF FIXED AND MOBILE SERVICES

1. The DOT letter under discussion placed at Annexure II, contains a suggestion from the Government that keeping in view the need of the Telecom Policy for free competition, the objective of NTP 99, the subscriber's convenience, available fruits of technology, the Government felt that handheld terminals in access technology with Full Mobility within the Service Area may be permitted to the Basic Service Operators also. This will also ensure a competition in the deregulation of the Cellular Sector keeping pace with the trends in National Long Distance, International Long Distance and Basic Service sectors of Telecommunications. However in case the Government's suggestion of Full Mobility within the Service Area of Basic Service Operators is implemented, there will be practically no differentiation in the Mobile Service offered by the Basic Service Operators and those offered by CMTS in a Circle which is the Service Area of both operators. As discussed in Chapter I, both GSM and CDMA technologies belong to the same category of 'Macro Cellular' architecture, and provide almost identical bearer and tele-Services to the subscribers. In fact, these two technologies are competing internationally in the same market i.e. for the Cellular Mobile Services. Since the financial terms and conditions of licensing of the BSOs and CMTSOs are quite different, such as the amount of License Fee i.e. Revenue Share/ Entry Fee, Interconnection/ Access charges, spectrum charges, tariff etc., it will open up a larger number of issues relating to the level playing field as well as policy issues relating to convergence.

2. In case BSOs are allowed to offer WLL based Mobility in the whole Service Area, it is worthwhile considering whether Cellular Operators be permitted to offer Fixed Service using their infrastructure in the interest of level playing field. This will raise a whole gamut of issues relating to an omnibus License for Fixed/ Mobile based on a converged Network. Before such a policy change is implemented, the Regulators and Policy Makers will need to address a whole range of issues relating to the converged platform. The present reference is limited to the provision of Limited Mobility WLL Services by the Basic Service Operators within the framework of NTP99, which defines the scope of Fixed and Mobile Access Services differently. However in the context of whole Service Area wide Mobility which will mean practically State wide Mobility in case of Circles, **the following Licensing issues need to be discussed:**

- i. **Is there a case for allowing the Cellular Operators to offer Fixed Services, in case Full Circle wise WLL Mobility facility is given to the Basic Service Operators as proposed by DOT, in the interest of level playing field?**
- ii. **Since the scope of Limited Mobility is proposed to be extended to the whole Circle Area which is co-terminus with that of State boundaries, will it be appropriate to classify such a Service as Wireless in Local Loop Service, as Local Loop generally extends to 8/ 10 Kms? Will it not be more appropriate to call it a Fully Cellular Mobile Service being offered by the Basic Service Operators?**
- iii. **Telecom Commission has recommended that the Wireless Local Loop platform should follow the 'Local Area Numbering Scheme', of Short Distance Charging Area. In case Govt's recommendation is accepted, there will be a conflict with the recommendation of Telecom Commission to allocate the Number Plan of a Local Area. Could the Govt's recommendation of Full Circle wide Mobility be implemented along with the Telecom Commission recommendation to allot a Local Number to the WLL phone?**
- iv. **Since the Basic Service Operators will be entitled for Universal Service Fund based on the location of the telephones provided in Rural/ Remote Areas, how will the eligibility of a phone with WLL based Circle-wide Mobility, for USO be determined?**
- v. **What should be the basis of fixing the additional amount of Revenue Sharing with the BSO? Should it be a top up over the Revenue Sharing recommended already for their License?**

V. SPECIFIC ISSUES FOR OPEN HOUSE DISCUSSION AND PUBLIC CONSULTATION AT A GLANCE

Various issues as discussed in previous Chapters are summarised below for Open House Discussion and Public Consultation.

A. EXTENT OF MOBILITY OF WIRELESS IN LOCAL LOOP SYSTEMS

- 1. Whether a definite limit should be specified on Mobility provided by WLL Systems deployed by BSOs?**
- 2. If so, should it be Limited to coverage of the Local exchange Area, SDCA, or the jurisdiction of an Area Manager in a Metropolitan telephone Systems such as Delhi, Mumbai, Chennai and Calcutta?**
- 3. WLL's main advantage to the BSOs being faster and cheaper coverage of the last mile, particularly in areas with difficult terrains and in areas where tele-density is low, such as Rural areas, should they be permitted to use WLL freely only in Rural and Remote areas?**
- 4. To what extent, Limited Mobility would affect the market for the Cellular Mobile industry?**
- 5. Should there be a distinction between WLL terminal Portability and Full handset Mobility?**

VI. FREQUENCY RELATED ISSUES

- 6. The existing Frequency Spectrum for WLL is both in 800/ 900 MHz and 1800/ 1900 MHz bands. The former is being used by Cellular Operators for GSM Systems. They have also the option to use CDMA based Full Mobile Systems which also fall in the 800/ 900 MHz band. In view of the latest policy relating to technology neutrality which gives the flexibility to Cellular Operators, to use either the GSM or CDMA technology, would it be preferable to reserve this entire band (800/ 900 MHz) for CMTS operators and higher frequency bands such as 1800/ 1900 MHz and 3.4 to 3.8 GHz, 10.5 to 10.68 GHz etc. for Basic Service Operators?**
- 7. Should we specify the frequency spot within 1800/ 1900 MHz band reserved for DECT System for Basic Service Operators as a means of promoting indigenous technology? This will however limit Mobility to the**

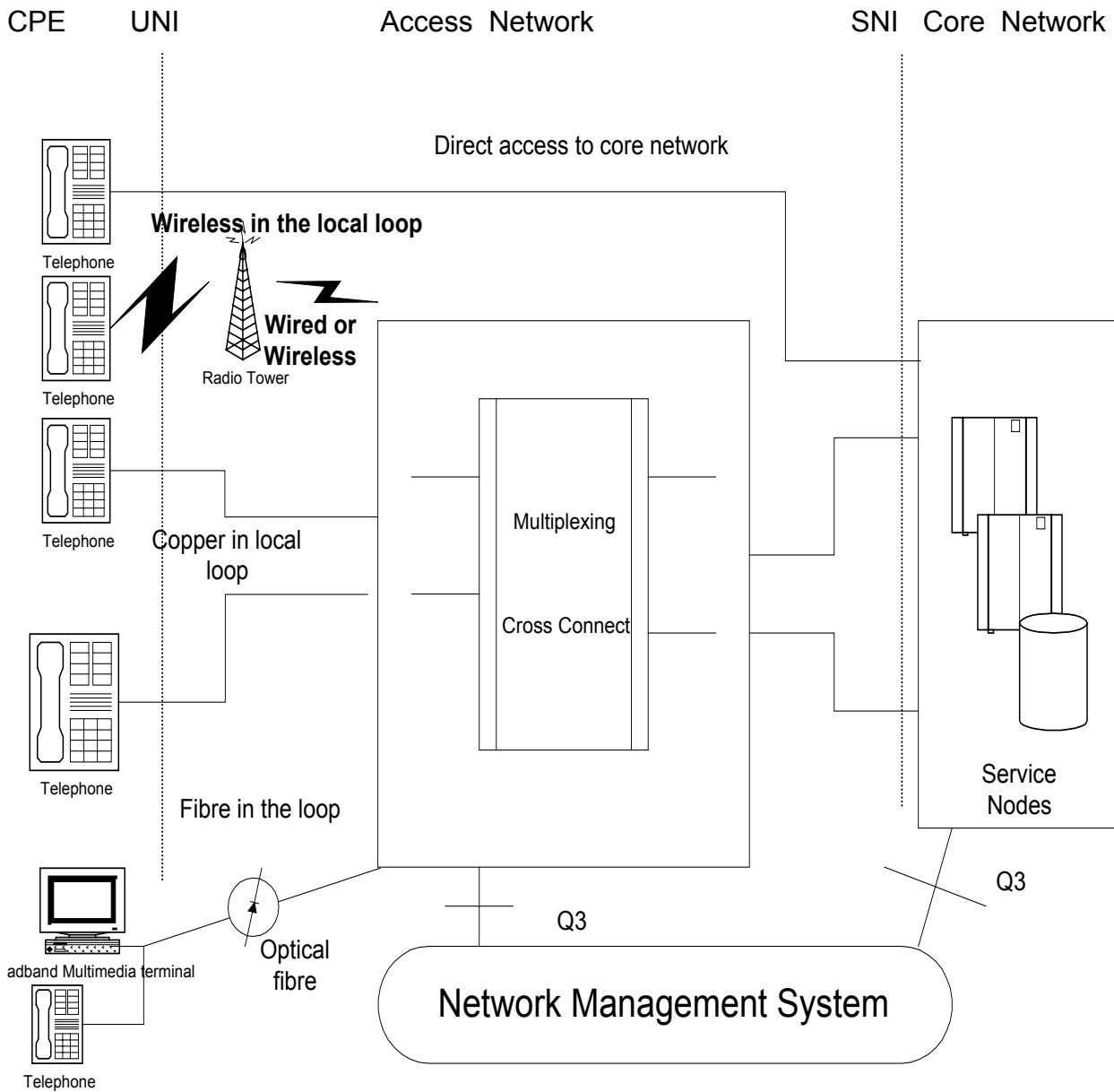
neighbourhood.

8. What should be the basis for assigning WLL frequency, amount of Entry Fee and spectrum charges as a percentage of revenue to be charged from the Basic Service Operator for extending the above facility in respect of existing as well as future Basic Service Licensees, so as to ensure a level playing field with the Cellular Operators?

C. ISSUES RELATING TO LEVEL PLAYING FIELD AND CONVERGENCE OF FIXED FIXED AND MOBILE SERVICES

9. Is there a case for allowing the Cellular Operators to offer Fixed Services, in case Full Circle wise WLL Mobility facility is given to the Basic Service Operators as proposed by DOT, in the interest of level playing field?
10. Since the scope of Limited Mobility is proposed to be extended to the whole Circle Area which is co-terminus with that of State boundaries, will it be appropriate to classify such a Service as Wireless in Local Loop Service, as Local Loop generally extends to 8/ 10 Kms? Will it not be more appropriate to call it a Fully Cellular Mobile Service being offered by the Basic Service Operators?
11. Telecom Commission has recommended that the Wireless Local Loop platform should follow the 'Local Area Numbering Scheme', of Short Distance Charging Area. In case Govt's recommendation is accepted, there will be a conflict with the recommendation of Telecom Commission to allocate the Number Plan of a Local Area. Could the Govt's recommendation of Full Circle wide Mobility be implemented along with the recommendation of Telecom Commission to allot a Local Number to the WLL phone?
12. Since the Basic Service Operators will be entitled for Universal Service Fund based on the location of the telephones provided in Rural/ Remote Areas, how will the eligibility of a phone with WLL based Circle wide Mobility, for USO be determined?
13. What should be the basis of fixing the additional amount of Revenue Sharing with the BSO? Should it be a top up over the Revenue Sharing recommended already for their License?

ANNEXUTE 'A' A Typical Telecom Access Network



CPE Customer premises equipment

- UNI User Network Interface
SNI Service Network interface
Q 3 Network management System interface

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ANNEXURE 'B'

The Choice of WLL Technology

The various technologies that have been used for Wireless in Local Loop deployment are based on

- Frequency Division Multiple Access
- Time Division Multiple Access
- Code Division Multiple Access

A comprehensive table indicating the developments in the first and second generation of such technologies is given below:

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On the basis of coverage, these technologies can be broadly classified as

- Macro Cellular Systems
- Micro Cellular Systems
- Digital Point to Multi point Systems

MacroCellular Systems:

Such deployments are often used for covering a large Area and provide umbrella coverage enabling a quick initial rollout. The Area covered by a single Cell is large i.e., in excess of 5 Km. The major technologies competing under the following class include D-AMPS, GSM and CDMA.

Global System For Mobile (GSM)

GSM is a standard that evolved in Europe in order to universalise the usage of the handset. This System is based on TDMA / FDD and was adopted as the Indian National standard for all Cellular Mobile licences.

Code Division Multiple Access (CDMA)

CDMA is another Access technology that uses codes and not time slot or frequency slot to distinguish between signals. It uses spread spectrum technique i.e., the signal is spread over a band of frequency rather than a slot. Entire band is available to all the users and they are distinguished based on the code.

MicroCellular Systems:

These Systems also known as the cordless Systems are more suited for coverage of Area with very high density and have Cell size typically of the order of 100 m. to 300 m. The major technologies that have undergone field trial in India include

Digital Enhanced Cordless Telephony (DECT)

This is based on ETSI standard and operates in the range of 1880 – 1900 MHz. It is more effective in Areas with high packing density as the small Cell size and low power enhances the subscriber per unit Area factor. This factor can be as high as 100,000 users per square

Km.

CorDect

CorDect WLL System is based on DECT standards (1880 -1900 MHz band) and is an indigenous technology developed at IIT Madras (Chennai). The System has features like high quality voice, fax, modem, payphone, high traffic handling capacity. Different deployment models have been suggested to suit to various situations of applications in terms of traffic and customer density.

Cordless Telephone (CT2)

Cordless Telephone (CT2) technology is based on FDMA/ Time Division Duplex. The total no. of channels supported is 40. CT2 does not support handover feature and thus is not a success in the market.

Personal Handyphone System (PHS)

It is a Japanese standard for transmission in the 1895 ~ 1918 MHz. The technology used is FDMA/ TDMA.

Point to Multi point Systems

Such Systems, which also include what is known as MARR, have both analogue and Digital versions in use. Analogue MARR Systems have been used in rural and remote Areas for providing public telephones. The popular versions include 2/15, 4/36 etc. which are indigenously manufactured. It may be recalled that the licence conditions encourage use of Digital WLL Systems and analog Systems are to be used, if necessary within rural telephone Systems only.

Digital point to multi point Systems was being deployed to provide Telecommunication facilities in the rural and remote subscribers much before the inception of the Cellular derivatives. A common pair of radio channel is shared by a group of subscriber using Time division Multiplexing. Another System in this category (developed indigenously by C-DOT) is TDMA-PMP (time division multiple Access - Point to Multi-point). Such Systems deployed for WLL applications have been found attractive in mountainous Areas, isolated islands or sparsely distributed subscribers. However, the choice of the majority of Operators the world over have been the derivatives of Cellular technologies.

ANNEXURE 'C'
EXTRACTS FROM DOT's REFERENCE ON
'WLL & MOBILITY'

Suggestion from Government for New Recommendation

(a) TRAI in their recommendation A(ii) [for Fixed Service Providers] has noted that the existing licence for Basic Service stipulates Wireless as the preferred technology for subscriber loop (Local Loop). It has further noted that employment of this technology i.e. Wireless would appear to be inescapable if quick roll out and connection on demand in congested Areas is to be given as per TRAI's quality of Service guidelines. The experience has shown that Right of Way is also a Limited resource as Highway/Environmental authorities do not permit repeated diggings along the highways and vacant land with forestation. It has further noted that a factor which could inhibit the entry of large number of players is the paucity of Frequency Spectrum which is a scarce national resource and this will be required by the Basic Service Operator to provide the last mile connectivity if they employ WLL technology.

(b) Para 1.3 of NTP 99, the need for a new telecom policy states that convergence of both markets and technologies is a reality that is forcing re-alignment of the industry. It also mentioned that this convergence now allows Operators to use their facilities to deliver some Services reserved for other Operators, necessitating a re look into the existing policy framework.

(c) The objective of NTP-99 (para 2) states that Access to telecommunications is of utmost importance for achievement of the country's social and economic goals. Availability of affordable and effective communication for the citizens is at the core of the vision and goal of the telecom policy. Another objective of NTP-99 (para 2 of NTP 99) stipulate to transform in a time bound manner, the telecom sector to a greater competitive environment in both urban and rural Areas providing equal opportunities of level playing field for all the players.

(d) The tender for Basic Service operation and the licence Agreement based on that specifies that for subscriber loop, optical fibre and Wireless are the preferred technologies. The Agreement does not bar specifically deployment of the hand held subscriber sets. Later on in a clarification, the permission for use of subscriber hand held sets was not granted. It was felt that this may amount to a Mobile Service for which separate licence is required &

frequency band was different. However, it may be worthwhile to mention that today's subscriber does not want to be tied down by Fixed cord of telephone instrument. A Wireless subscriber terminal cannot be Fixed as a wire line terminal and at the most it can be portable instead of hand held.

(e) At present the following frequency bands have been stipulated for allocation in respect of WLL operations by existing Basic Telephone Service Providers:

- (i) 864 to 868 MHz
- (ii) 824 to 849 MHz paired with 869 to 889 MHz
- (iii) 1.8 to 1.9 GHz.

The Cellular Mobile Service was permitted with only Digital GSM technology and not even with analogue technology. The band allocated to Cellular Mobile Operator, as per GSM technology is in Frequency band of 890-915 MHz paired with 935-960 MHz and 1710-1785 MHz paired with 1805-1818 MHz, which do not fall within the bands indicated above. The above bands are for Basic and Mobile Services operation as per NFAP-2000 and does not use GSM technology. However, the band between 1.8 to 1.9 GHz is to be coordinated with Defence on case to case basis. As per foot note, frequency band paired with 869 to 889 MHz has been earmarked for WLL Services. 864 – 868 MHz for requirement of EPABX for Wireless extension, requirement of Cellular and WLL frequency in 1.7 to 2 GHz is to be coordinated on case to case basis initially for 10 + 10 MHz in frequency band 1710 to 1785 MHz paired with 1805 to 1880 MHz. 1880 to 1900 MHz for DECT is to be coordinated with Defence on case to case basis. With duopoly regime, it was decided that 40% spectrum will be allocated from the above band to each of the Operator and balance 20% will be allotted on first request. However, this requires a re-look with free entry. With free entry, three or four Basic Service Operators can be expected and spectrum can be considered for sharing with about 4 MHz for each.

(f) The technologies available for the frequency bands are also different and it is not possible for a subscriber of one technology to roam into another technology. Thus, a subscriber of Basic Service Operator having a hand held set has a disadvantage of not being able to roam across the board in various Networks in the country. The Agreement for Basic Service provides for cordless telephones and WLL technology, but there is no mention of TEC specification for WLL System, including terminals, as there was no such specification of TEC at that time for the same. The intention and thrust of private Service was to infuse new technology to provide affordable world class communication to subscribers.

(g) As already pointed out above, the cost of hand held instrument is around Rs. 6,000/- against the cost of about Rs. 15,000/- for Fixed Wireless instrument. Thus, it amounts to saying that in order to ensure inconvenience to the subscriber, the Operator has been asked to invest more in the Network which is against the Basic principles of rapid roll out, affordable communication to the subscribers at reasonable cost.

(h) ABTO, CII and ASSOCHAM has proposed Full Mobility for FSPs within the Service Area while COAI has opposed it indicating that this will be against the level playing field as the Cellular Operator has paid large amount of entry fee and are paying spectrum charges.

(i) It is worthwhile to mention that spectrum charges for use of frequencies are based on same formula which is applicable for Basic Service Operator as well as Cellular Mobile Service Operators.

(j) NTP 99 stipulates protection for existing Basic Service Operators for a period of five years and four Operators in Cellular Service. It is worthwhile to mention that initially GSM digital technology was envisaged for Mobile Service which may have been a reason for restricting the number of Operators so as to provide spectrum to all the Operators with reasonableness in 800 MHz band of GSM but as per the migration package offered after NTP 99, both Cellular and Basic Service Operators have agreed to operate in multipoly regime. Thus, any contention for protection of Service sector for any of the Operators is not in line with the unconditional acceptance given by them to the migration package.

(k) Further, Basic Service Operators have pointed out that with the present low amount of entry fees it will be possible very easily for a Cellular Operator to become a Basic Service Operator while vice-versa, it will not be possible.

(l) NTP 99 as per para 3.1.2 envisaged that WLL frequency shall be awarded to the FSPs requiring the same, based on the payment of an additional one time fee over and above the FSP entry fee. The basis for determining the entry fee and the basis for assigning WLL frequency shall be recommended by the TRAI. All FSP Operators utilizing WLL shall pay a licence fee in the form of a revenue share for spectrum utilization. This percentage of revenue shall be over and above the percentage payable for the FSP licence. NTP 99 further proposed that the appropriate level of entry fee and percentage of revenue share for WLL for different Service Areas of operation will be recommended by TRAI in a time bound manner, keeping in view the objectives of the New Telecom Policy.

(m) Telecom Commission has recommended the use of hand held terminal in Local Area i.e. Short Distance Charging Area (SDCA). This is to be on Wireless Local Loop Platform which means that Numbering Plan of Local Area is to be followed and Inter Base Station Controller/ Manager authentication is not permitted. No Basic Service Operator is to be allocated frequency from GSM band.

(n) However, while considering the recommendations of Telecom Commission, keeping in view the need of telecom policy for free competition, the objectives of NTP 99, the subscriber convenience, available fruits of technology and above facts, Government felt that hand held terminals in Wireless Access technology with Full Mobility within the Service may be permitted to the Basic Service Operator also. This will also ensure a competition and deregulation of the Cellular sector keeping pace with the trends in National Long Distance, International Long Distance, Basic Service sector of telecommunications.

It is worthwhile to make clear that the frequency in GSM band in of 890-915 MHz paired with 935-960 MHz and 1710-1785 paired with 1805-1880 MHz will not be allocated under any circumstances to the Basic Service Operators in order to avoid any conflict of interest with present Cellular Operator.

TRAI is requested to consider the above suggestions for making suitable recommendations in respect of scope of Area of hand held subscriber terminals under Wireless Access System operations, the basis for assigning WLL frequency & the amount of entry fee and spectrum charges as a percentage of revenue to be charged from the Basic Service Operator for extending the above facility in respect of existing as well as future Basic Service Licensees, so as to ensure a level playing field with the Cellular Operators.