Telecom Regulatory Authority of India

(TRAI)

Recommendations on Infrastructure Sharing

April 11th, 2007

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PREFACE

1. The growth in telecom sector, particularly of wireless subscribers has been impressive. India has crossed 200 million subscribers; it had already joined the elite class of countries having more than 100 million wireless telephones in May 2006. The Authority's policy to encourage competition, ensure level playing field and maintain technology neutral stance had a significant contribution to the success story of telecom sector.

2. Maintaining such exponential growth calls for creation of huge infrastructure requiring significant investment. The challenge is to optimally utilize available resources while ensuring competition and availability of services at affordable prices. The infrastructure sharing therefore is the crying need of the hour.

3. Department of telecommunication (DOT) has recognized the need for infrastructure sharing and sought the views of the Authority regarding bringing in appropriate legislation or amendment in the licensing conditions to encourage infrastructure sharing.

4. The Authority feels that infrastructure sharing can be effectively leveraged to roll-out services at faster speed and at affordable cost. Regulatory interventions should not be the first option at this stage while other modes of policy initiatives including financial incentives could produce positive results.

5. The changing technological scenario and strongly felt need for sharing of active infrastructure by the operators were both convincing and persuasive in putting forward the recommendations. The incentive schemes have been carefully expanded to further encourage infrastructure sharing.

6. It is expected that advantage of such infrastructure sharing will be passed on to subscribers in terms of faster roll-out of services and greater affordability of services.

7. The recommendations by TRAI, it is hoped, will receive serious consideration in department of telecommunications.

(Nripendra Misra)
Chairman

CHAPTER 1

INTRODUCTION

1. Background

1.1 **Department of Telecommunications (DOT) vide letter number 10-5/2006/AS-III/825 dated 8th November 2006 (refer Annexure 'A') sought the recommendations of Telecom Regulatory Authority of India (TRAI, hence forth called The Authority) regarding bringing in appropriate legislation, amendment in the license agreement for ensuring effective sharing of new passive infrastructure (Towers). DOT has also mentioned that while considering any legislation, amendment in licensing conditions, it should be ensured that same should not come in the way of growth of mobile telephony.**

1.2 Infrastructure sharing in telecom is an important measure to reduce costs. It is useful in start up phase to build coverage quickly and in the longer term scenario to build more cost effective coverage in un-serviced area. In the Indian context both in urban and rural areas infrastructure sharing should be adopted as an imperative for sustained telecom growth.

1.3 DoT has set the target to provide 250 million telephones by December 2007 and 500 million telephones by 2010. The total number of telephone subscribers is 200 Millions by the end of February 2007, which includes 160 Million wireless subscribers. Approximately 6 million wireless subscribers are getting added per month. Such an exponential growth requires significant investment and efforts to optimise the Capex and Opex.

1.4 Passive infrastructure sharing to some extent is taking place based on the industry initiative. As per the report about 25% sites are being shared among the operators. The task is to accelerate the pace of sharing and adoption of this pattern as the key strategy.

1.5 The Authority welcomes the initiatives taken by universal service obligation (USO) fund administrator to encourage infrastructure sharing in rural areas. The framework is to provide financial incentives determined on the basis of revenue deficit (Net negative after adjusting for Capex, Opex against usage charges). The

Authority has therefore focused on various derivates of the existing framework of incentivisation to accelerate infrastructure sharing in rural areas while ensuring level playing field for telecom service providers.

1.6 The Department of Telecommunications, as stated in para 1.1, has sought the recommendations to ensure effective sharing of passive infrastructure. The Authority noted that the existing licensing conditions enable passive infrastructure sharing. The international practice as well as the technological necessity in the Telecom sector is to expand the scope of infrastructure sharing to active and backhaul domain. It is for this reason that the Authority suo motu has extended the scope to active infrastructure sharing including backhaul in wireless networks and the recommendations have been made to DOT as per Section 11.1(a) of TRAI Act, 1997.

1.7 The Restricted permission to setup sites in places like cantonment area, and other earmarked special areas demand further analysis. The key issue is to determine the nature of regulatory intervention for infrastructure sharing including identification of sites/ location.

1.8 The Authority issued a consultation paper on 29th November 2006 and sought the comments of the stakeholders. An open house discussion was held on 9th January 2007 at Delhi. The gist of comments received from stakeholders was also put on the website of TRAI.

1.9 Based on the written submissions of the stakeholders, the discussions in open house and prevailing international practices relevant to our country, the issues have been examined in depth and appropriate recommendations given.

1.10 The issues have been addressed in three parts - Passive infrastructure sharing, Active infrastructure sharing and Financial and economic measures for infrastructure sharing.

1.11 The chapter on “Passive infrastructure sharing” examines the need and scope of policy intervention to promote passive infrastructure sharing. The definition and methodology to handle passive infrastructure sharing in identified critical infrastructure areas is also discussed.

1.12 The chapter on “Active infrastructure sharing” deals with the feasibility and advantages in permitting sharing of the active infrastructure and possible extent of such sharing. It also explores

whether sharing of active infrastructure is advisable if services like "Mobile Virtual Network Operators (MVNO)" are likely to emerge in future.

1.13 Non-availability of backhaul especially in rural areas has been a major concern. As the traffic in such areas is likely to be low in the initial stages; there is an obvious advantage of sharing such backhaul to carry traffic from Base Trans receiver Station (BTS) to Base station controller (BSC). Such backhaul sharing can also help to reduce the load of the backhaul antennae on the tower reducing the cost to setup such towers and increase the possibility of sharing same tower by more operators.

1.14 The chapter on "Financial and Economic Measures for Infrastructure Sharing" deals with a range of incentives to encourage passive and active infrastructure sharing. The issues of likely impact on competition and maintaining level paying fields have also been addressed.

CHAPTER 2

PASSIVE INFRASTRUCTURE SHARING

2. Introduction

2.1 Passive infrastructure sharing means sharing of physical sites, buildings, shelters, towers/masts, power supply and battery backup, etc. Figure 1 illustrates the sharable network elements.

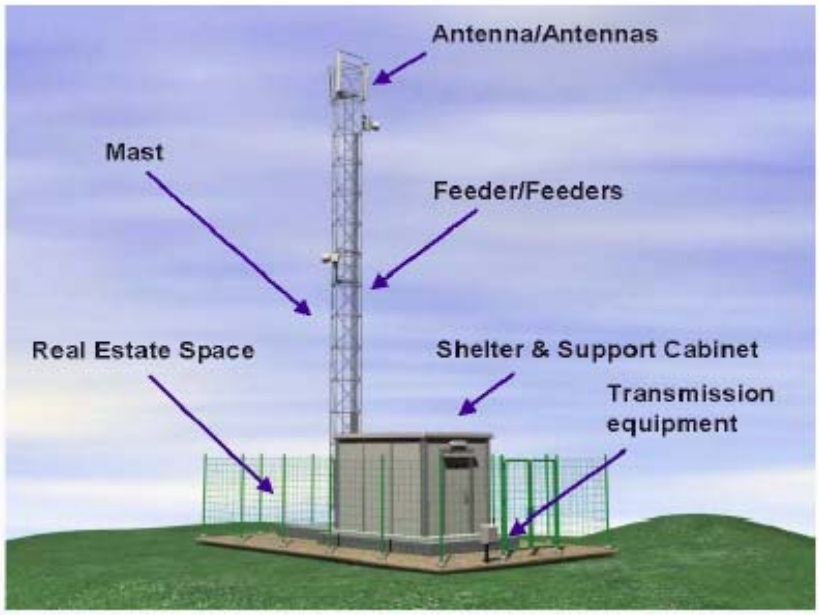

Fig 1: Site sharing among service providers

2.2 While service providers agree on the need to share the passive infrastructure and admit that such sharing is already taking place on a mutual basis but felt that in order to promote large scale sharing there is a need to identify other measures including regulatory interventions to promote passive infrastructure sharing. Presently there are large number of Infrastructure Providers Category I (IP-I). The option to have an inclusive framework involving infrastructure providers in addition to service providers in this task has been addressed.

2.3 As per feedback there are areas like Lutyens zone, Cantonments where the availability of the sites is limited due to certain imposed restrictions. As a result the quality of wireless service is affected. To overcome this situation, one of the solutions could be to identify such areas and term them as Critical Infrastructure sites (CIS) and mandate sharing. Thereafter the sharing can be mutually decided on agreed commercial terms.

2.4 Against the above arrangement there may be a counter argument that if intra circle roaming is mandated, there will not be any need to identify critical infrastructure sharing. Roaming if mandated in contingency of weak / no signal would solve the problem by riding over other networks. However accepting this alternative would need evaluating implications on overall network coverage.

2.5 While acknowledging the need for sharing of infrastructure, the Authority has ensured that such initiatives do not impact the competition in the market and in no way reduce the growth of wireless services in the country.

2.6 These issues were highlighted in the consultation paper and the stakeholders in their written submission as well as discussion during open house have commented on following aspects:

i) Amendments in Licensing Provisions and Need for Policy Intervention/ Legislation
ii) Identification of Critical Sites
iii) *Infrastructure Sharing - Effects on competition*
iv) *Cost Benefits in Infrastructure Sharing & their percolation to subscribers*

2.7 The issue wise comments of the stakeholders, analysis, and recommendations on Passive infrastructure Sharing are as follows.

2.8 Amendments in Licensing Provisions and Need for policy Intervention/Legislation to encourage infrastructure sharing

2.8.1 Stakeholders Comments

2.8.1.1 Passive Infrastructure Sharing is already permitted as per existing licensing conditions of Unified Access Service Licence (UASL) and Cellular Mobile Telecom Service (CMTS) license.

2.8.1.2 The infrastructure sharing is already happening and as such it may be left to service providers based on mutual agreement. The sharing arrangement should be made on the basis of access-seeker arrangement but a time limit should be fixed for the sharing of infrastructure.

2.8.1.3 The present infrastructure was created for utilization by the service providers themselves. All such towers, which were erected in the initial stages by service providers, have not been designed considering possibility of sharing with other operators. Therefore policy intervention in such cases may not yield the desired results.

2.8.1.4 The earnings from infrastructure sharing should be excluded from AGR estimation. It was also mentioned that such revenues earned by Infrastructure provider category I are not subjected to any taxes and levies and therefore the issue of level playing field needed to be addressed.

2.8.1.5 The regulator should propose amendments in License condition of infrastructure provider to ensure Infrastructure Providers (IP-I) Category-I service providers sign Service Level Agreements (SLAs) in respect of infrastructure setup by them to ensure quality of service for wireless subscribers.

2.8.1.6 There is a need to formulate standard terms and conditions to facilitate infrastructure sharing.

2.8.1.7 No uniform policy guidelines have been issued by civic authorities for installation of cell sites across the country. Various Civic authorities across India have varied policies/ guidelines for installation of cell sites. The Government/Regulator should ensure that detailed uniform policy guidelines are issued to encourage infrastructure sharing.

2.8.1.8 Infrastructure Providers Category-I (IP-I) highlighted the difficulty in acquiring and commissioning a site, due to SACFA clearance being one of the mandatory requirements. The procedure for the SACFA clearance requires site coordinates, allocated frequency spectrum and carrier frequency allocation for backhaul link. It is serious bottleneck since SACFA clearance is given only to CMSP/UASL and Infrastructure Providers Category-I (IP-I) cannot apply for SACFA clearance.

Infrastructure Providers Category-I (IP-I) may be allowed SACFA clearance for site so that they can start the erection of towers and offer facilities to CMSP/UASL for sharing.

2.8.2 Analysis

2.8.2.1 The infrastructure sharing if mandated would raise issues like fixing the commercial tariff, terms and condition of the sharing, monitoring of SLAs for the shared sites and allocation of specific sites for erection of the towers. The implementation will pose a major challenge and will be seen as highly interventionist in nature. Therefore, incentivisation of infrastructure sharing perhaps may be considered more effective and useful. Another alternative could be to only identify critical infrastructure sites without any need of mandation or policy intervention. Perhaps there may be no need to mandate or initiate policy intervention except in cases of identified critical infrastructure sites.

2.8.2.2 Leaving infrastructure sharing to service providers in seeker – Provider mode would certainly require well defined timeframe and can not be left open ended. Moreover the mutually agreed sharing should be both transparent and non discriminatory in order to plan for future and also to firm up investments. Service providers must announce the program of passive infrastructure sharing on the existing infrastructure whereever feasible and future investment while setting up the towers. It should be offered to other service providers on first come first serve basis subject to commercial agreements.

2.8.2.3 Another impediment for faster growth of wireless services is SACFA clearance procedures. The clearance sought for must be accorded at the earliest and preferably in a time bound manner. Non approval within a time limit should be taken as deemed approval. DoT will do well if they initiate steps to computerize SACFA clearance procedures. Beside service providers, Infrastructure provider category I (IP-I) may also be eligible to apply for SACFA clearance if they have entered in atleast one agreement with the wireless service provider for leasing out infrastructure.

2.8.3 Recommendations:

The Authority recommends

(i) **There is an urgency for passive infrastructure sharing. The existing provisions in the licenses of BSOs, CMSP, and UASL permit passive infrastructure sharing. The Authority is of the view that mandating passive infrastructure sharing at this stage is not required. Accordingly the Authority does not recommend any legislation/ amendment in the license conditions.**

(ii) **SACFA clearance needs to be given in a stipulated time frame. If no communication is received in the prescribed time frame, the request may be deemed to be approved. Infrastructure Providers (IP) Category-I may also be allowed to seek SACFA clearance if they have at least one agreement with existing wireless service providers for leasing infrastructure.**

(iii) **The process of sharing infrastructure should be transparent and non discriminatory. All licensees must announce on their web site the details regarding the existing and future infrastructure installations available for sharing with other service providers. A time limit of 30 days for negotiation between access seeker and provider should be the normal practice. This criterion should be specifically provided in the license conditions. At this stage, the mode of commercial agreement is being left to telecom service providers however the Authority could consider standard commercial format in future if process of infrastructure sharing does not pickup.**

2.9 Identification of Critical Sites for Wireless Services

The problem of non-availability of sites in congested areas reducing the coverage and signal strength is common. It has been observed that non- availability of the sites to erect mast in congested areas and busy markets is resulting in network congestion & call drop, thus impairing QoS. Similar situations have also been experienced by other countries. Some countries have defined places where acquiring sites and resources are difficult as critical infrastructure sites (CIS).

2.9.1 Stakeholders Comments on Critical sites

2.9.1.1 There was a general consensus that areas where getting sites is difficult, may be classified as Critical Infrastructure Sites (CIS).

2.9.1.2 There was unanimous suggestion to mandate infrastructure sharing in areas where acquisition of site is either restricted by the competent authorities or any other factor inhibiting infrastructure installation.

2.9.1.3 It was also proposed that a Joint Working Group (JWG) having representatives from Service Providers (COAI and AUSPI), BSNL, IP-I, Municipal Committees/Corporation, and Local Bodies etc be constituted to identify such CIS.

2.9.1.4 It was also opined that regulator should frame guidelines to facilitate the acquisition of sites in such critical areas.

2.9.2 Analysis

2.9.2.1 Since permission to setup mobile towers in critical areas are restricted, the only option is to mandate sharing to all service providers to make best use of available sites and classify sites in such areas as critical infrastructure sites (CIS).

2.9.2.2 Identification procedures for Critical infrastructure sites should be transparent and predictable. A committee having representatives of Mobile operator, Government, local bodies at state level as suggested by stack holders may not be very functional to support fast mobile customer growth. Instead, it will be better if a committee is formed at a district level under chairmanship of the District Magistrate of the district having representative from all mobile service provider licensees in that area, representatives of the municipal corporation/ Body, and a representative of Military land and cantonment wing in case area under consideration also covers cantonment areas. The committee may hold its meeting when requested by any licensee in that area and finalize a decision in a time bound manner preferably within three months time. The committee will also examine whether a particular site is critical for the purpose of erecting a mobile tower. Such identified sites once approved by the committee will be notified as Critical infrastructure site by the office of Chairman, Joint working committee (JWC). Any mobile tower being setup at such sites in future shall be considered as critical infrastructure site. Municipal bodies/ Corporations/ Cantonment authorities shall grant permission to any service provider to set up tower at such sites only when service provider have sharing agreements with at least two other mobile telecom service providers for that tower.

2.9.3 Recommendations

The Authority recommends:

(i) **It is necessary to identify and notify critical infrastructure sites to facilitate sharing of passive infrastructure in an expeditious manner. In order to identify and notify critical infrastructure sites, it is recommended that a Joint Working Groups (JWG) should be constituted with District Magistrate of that district as the Chairman and having representatives from all mobile service providers present in that service area, representatives of municipal corporation/ Body, and a representative of Military land and cantonment wing if area under consideration also covers cantonment areas. The committee shall hold its meeting when requested by any of the licensed service providers in that area and decision shall be taken in a time bound manner but preferably within three months time. All identified sites once approved by the committee will be notified as Critical infrastructure sites by the office of Chairman, Joint working committee (JWC).**

(ii) **Municipal bodies/ Corporations/ Cantonment authorities shall grant permission to any service provider/ Infrastructure provider category I (IP I) to set up tower in such notified sites only when the service provider gives a commitment that the site would be shared by at least three service providers.**

(iii) **In case of any disagreement among the service providers for sharing of critical site, the same will be first referred to the Joint Working Groups (JWG) to settle the issue before taking any other remedial action.**

2.10 Infrastructure Sharing- Effects on Competition

Infrastructure sharing increases interdependence of the service providers. The overlapping service area, almost similar quality of service is likely to compromise with competitive independence of the service providers. A concern was flagged whether infrastructure sharing will reduce competition in market place. This issue was posed to stake holders for comments.

2.10.1 **Stakeholders Comments**

2.10.1.1 The overwhelming view was that passive infrastructure sharing will not affect the competition in telecom market. In fact service providers felt that reduction in Capex and Opex will reduce the rental to offer the services hence will increase the competition. It was felt that sharing of passive infrastructure would help to roll out telecom services in rural and far-flung areas resulting in more opportunities to service providers, thus further increasing competition.

2.10.2 Analysis

2.10.2.1 The sharing of passive infrastructure is likely to increase presence of all the operators and hence more competition.

2.10.2.2 The Identification of critical infrastructure and mandating sharing of towers in critical infrastructure area where limited operators are present will ensure availability of site space to all operators. This will increase the competitive edge of the service providers boosting the competition.

2.10.2.3 Reduction in Capex and Opex are other important factors which will help service providers to reduce the cost of services, and help to introduce new packages and services thus further increasing competition.

2.10.2.4 Hence Passive infrastructure sharing is not likely to compromise the competition or reduce the growth of mobile in the country.

2.11 Cost- Benefits in Infrastructure Sharing & their percolation to subscribers

Infrastructure sharing will reduce costs i.e. Capex and Opex. The issue is whether such savings shall be passed on to subscribers and if so, is there any measurable yardstick.

The comments of the stakeholders were invited and are compiled in following paragraphs.

2.11.1 Comments of stakeholders

2.11.1.1 Most of the service providers felt that presence of about six mobile operators, combination of Private and PSU operators, and different technologies have introduced stiff competition. Service providers are making all out efforts to attract subscribers. Hence any reduction in the cost will pass to subscribers.

2.11.1.2 Service providers also expressed that different packages are being registered with the Authority. The changes in tariff are notified to the Authority. Therefore impact of infrastructure sharing will be clearly visible in terms of likely reduction in tariff and more ingenuous schemes.

2.11.2 Analysis

2.11.2.1 It is evident that there will be cost savings to the service providers on account of passive infrastructure sharing.

2.11.2.2 The Authority expects that financial benefits accruing to service providers on account of passive infrastructure sharing will be beneficial to the subscribers both in terms of affordable services as well as better quality of service (QoS).

CHAPTER 3

ACTIVE INFRASTRUCTURE INCLUDING BACKHAUL SHARING

3. Introduction

3.1.1 The present licensing regime does not provide for Active infrastructure sharing as per clause 33 of UASL and clause 34 of CMTS license. As per the license conditions, resale or sharing of bandwidth is not permitted.

The respective clauses of licensing conditions read as: -

(a) Clause 33 of UASL License:

(i) Sharing of "passive" infrastructure viz. building, tower, dark fiber etc. is permitted,

(ii) Provision of point to point bandwidth from their own infrastructure within their Service Area to other licensed telecom service providers for their own use (resale not to be permitted) is also permitted.

(iii) Sharing of switch by the LICENSEE for providing other licensed services is permitted.

***(b) Clause 34 of CMTS License**:*

(ii) Sharing of "passive" infrastructure viz., building, tower, dark fiber etc. is permitted.

(iii) Provision of point to point bandwidth from their own infrastructure within their Service Area to other licensed telecom service providers for their own use (resale not to be permitted) is also permitted.

3.1.2 Active Infrastructure sharing means sharing of active equipments such as antenna systems, cables, filters, node B, allocated frequency spectrum, transmission system etc by more than one operator. The active infrastructure sharing is a complex mode of sharing and needs thorough technical skills with the operators opting for it. Service providers will be interdependent while sharing such infrastructure. The exit path

from active infrastructure sharing is difficult in case of dispute between service providers. However the advantages overweigh the interdependence factor as it reduces roll out cost and roll out time.

3.2 Licensing/ Policy issues

3.2.1 As stated in 3.1.1 the existing licensing provision, active infrastructure sharing is not permitted for UASL, CMTS and BSOs. This policy at initial stage was justified to promote creation of infrastructure by various new service providers. This also contributed to creation of wide spread and a robust telecom backbone.

3.2.2 Now the country has fairly widespread telecom infrastructure. The market is also competitive. Therefore active infrastructure sharing for mobile networks needs a re-look in the existing scenario. The proposal under discussion is sharing of Antenna, feeder cable from antenna to transmission equipment, Radio access network etc. Sharing of main switching center (MSC) and related equipment etc are not in the scope of discussion.

3.2.3 **Stakeholders' Comments**

3.2.3.1 It was a unanimous expression that active infrastructure sharing be introduced by modifying the licensing conditions. Such sharing should be left to mutual agreements and should not be mandated.

3.2.3.2 It was pointed out that in order to give coverage to the remaining 60% of the geographical area active infrastructure sharing must be given a boost.

3.2.3.3 The regulator must ensure that sharing policies are transparent, non-discriminatory and must be in accordance with a given framework.

3.2.3.4 Any part of network i.e antenna, feeder cable, Node B, backhaul etc should be permitted for sharing based on commercial terms.

3.2.4 Analysis

3.2.4.1 The scope of active Infrastructure sharing will involve sharing of active equipments such as antenna systems, cables, filters,

node B, allocated frequency spectrum, transmission system etc by more than one operator.

3.2.4.2 Active infrastructure sharing was not permitted earlier mainly to ensure development of widespread infrastructure for mobile services. Moreover such sharing was not found feasible in past due to technological limitations. Now, the scenario has changed and large scale technological up gradations had taken place, which are both cost effective and technologically advanced.

3.2.4.3 Since active infrastructure sharing is not permitted as per the present licensing conditions, all the wireless service providers have to put their separate antenna, the feeder cable, including power amplifiers and associated equipment in case of 2G services. For roll out of 3G services all the operators have to put separate node B equipment.

3.2.4.4 It is now possible to share antenna, feeder cable from antenna to transmission equipment and other transmission equipments by for various mobile service providers maintaining separate allocated spectrum. The quality of service and other parameters can be maintained.

3.2.4.5 If this infrastructure sharing is permitted, it will reduce Capex and Opex to very great extent still permitting service providers to maintain their own spectrum and service quality. The fast growth in telecom field and likely launch of 3G services will be greatly encouraged. This will enable the operators to provide more capacity at the same cost and hence cheaper services to customers and greater margins to operators.

3.2.4.6 The increasing competition in the market and the need to ensure availability of affordable telecom services will require that all possibilities to cut on cost of provision of services be looked into and supportive regulatory frame work is created.

3.2.4.7 Since the methodology and commercial terms of agreement for such sharing are service provider specific, therefore mutual agreements appears to be a preferred option rather than active regulatory interventions. Initiative for such sharing will be driven by service providers, based on their business model hence light regulatory approach is advisable.

3.2.4.8 Sharing of the allocated spectrum can also be considered as one form of active infrastructure sharing but it is not being considered at present. At present spectrum allocation policy is based on total number of subscribers and traffic. This is being allocated with due diligence and care. As such, sharing of the spectrum is not being envisaged at present.

3.2.5 Recommendations:

The Authority recommends

(i) The licence conditions of UASL/CMSP should be suitably amended to allow active infrastructure sharing limited to antenna, feeder cable, Node B, Radio Access network (RAN) and transmission system only. Sharing of the allocated spectrum is not permitted.

(ii) The active infrastructure sharing arrangements may be left to service providers based on mutual agreements.

(iii) The service provider should indicate the intention of active infrastructure sharing in transparent and predictable manner. All licensees must announce on their web site the details regarding the existing and future infrastructure installations available for sharing with other service providers. A time limit of 30 days for negotiation between access seeker and provider should be the normal practice. This criterion should be specifically provided in the license conditions. At this stage, the mode of commercial agreement is being left to telecom service providers however the Authority could consider standard commercial format in future if process of infrastructure sharing does not pickup.

3.3 Backhaul Sharing

3.3.1 Optical fiber cable (OFC) network in urban area is mostly available but it is not being optimally utilized. It can be effectively shared with significant reduction in cost. In rural areas where traffic from Base Transreceiver Station (BTS) to Base Station Controller (BSC) is low, backhaul sharing will be both cost effective and boost coverage. A common Radio Frequency (RF) or Optical fiber medium can be utilized for backhaul. This will not only reduce cost but also reduce maintenance efforts.

3.3.2 As per the license conditions, resale or sharing of bandwidth is not permitted; hence sharing of backhaul cannot be done unless license conditions are suitably modified.

3.3.3 Stakeholders' Comments

3.3.3.1 BTS is connected to BSC either through optical fiber or Microware/ UHF. This connectivity is commonly known as backhaul. There was a strong view in favour of backhaul sharing through suitable amendments in existing license conditions. Stake holders also desired to aggressively encourage backhaul sharing among service providers.

3.3.3.2 It was felt that in rural areas there would not be much traffic in the initial stages; hence it may not be economically viable for a service provider to have its independent backhaul leased circuits from BTS to BSC. The service providers should be permitted to share this bandwidth by permitting backhaul sharing.

3.3.3.3 There was also a suggestion that regulator may fix the terms for such backhaul sharing arrangement between service providers.

3.3.4 Analysis

3.3.4.1 The mobile traffic is low when mobile services are initially rolled out or when such services are provided in rural and far flung areas. Hence full capacity of backhaul is not utilized to carry traffic.

3.3.4.2 The cost of backhaul contributes significantly on the operational cost especially when traffic is low. The technical up gradation and availability of optical fiber has created sufficient capacity to support higher volume of traffic even when mobile services pick up. When towers are shared, perhaps laying of individual backhaul network is avoidable. The network laid by one service providers can be easily shared by all others. As such, sharing of backhaul as a strategy is being advocated to reduce cost and to effectively utilize available infrastructure.

3.3.4.3 Backhaul sharing becomes necessary corollary when antenna and feeder cable is being shared. Service providers sharing antenna, feeder cable, and transmission equipment will prefer sharing of backhaul also to deploy cost effective technology.

3.3.4.4 Backhaul can be either on optical fiber media or on Microwave/ UHF media.

3.3.4.5 When the optical fiber media for the purpose of backhaul is contemplated, Infrastructure provider category I can provide dark optical fiber from BTS to BSC. Each of the service providers can lease separate dark fiber from infrastructure provider category I and lit it for the purpose of backhaul. This is permitted as per the existing licensing conditions. The route is inefficient as it require each service provider to put up their own optical fiber equipment to lit the dark optical fiber provided by IP I. In order to efficiently utilize dark optical fiber, one of the service providers may be permitted to lease dark optical fiber, lit it and share with other service providers only for the purpose to carry mobile traffic from BTS to BSC. It will reduce the cost as it will avoid the necessity of each service provider to put their own optical fiber network.

3.3.4.6 Other alternative could be that one of the service providers sharing active infrastructure has its own optical fiber connectivity from BTS to BSC. He can use the network for his own backhaul purpose as well as provide required capacity to other service providers from BTS to BSC. This is also permitted as per the present licensing conditions.

3.3.4.7 Any access provider can also provide backhaul connectivity to each service providers sharing active infrastructure from BTS to BSC. This is also permitted as per the present licensing conditions. The only limitation as per present license condition is that a service provider who takes backhaul connectivity on lease from any access provider can not resell it to other service providers.

3.3.4.8 From the above discussions, it is clear that the present provisions regarding use of optical fiber in backhaul except in case of Infrastructure provider category I broadly meet the objective; however availability of optical fiber backhaul in rural areas is limited. Most of the BTS in rural and far flung remote areas use radio link as backhaul. Sharing of radio backhaul as per present licensing conditions is not permitted. Therefore each service provider needs separate antennae to have radio backhaul. This increases the weight of the antennae on the tower and requires stronger foundation and robust tower design. As a result height of the tower and consequent cost of

construction of tower increases. Therefore to limit the height of the tower, it is desirable to have common radio network/ Microwave network per tower as backhaul facility.

3.3.4.9 Sharing of capacity of microwave systems like the sharing of OFC capacity is therefore viable option. Since it is not specifically stated in licensing condition, the Authority is of the view that such a sharing be permitted through amendment in licensing condition. It is further clarified that it is not radio channel spectrum sharing.

3.3.4.10 The relevance of backhaul sharing has emerged because the Authority now favours active infrastructure sharing.

3.3.4.11 There is no technological issue to have active infrastructure sharing and carry combined traffic from BTS to BSC using common backhaul while still maintaining individually allocated spectrums for access purpose separately.

3.3.4.12 There could be a point of view that sharing of radio backhaul amount to sharing of spectrum allocated by Wireless Planning and Co-Ordination (WPC) wing. It is clarified that only capacity of transmission system is shared and not the spectrum.

3.3.4.13 WPC allocates RF carrier channels for radio backhaul and permit use of total allocated capacity. In case such backhaul is shared, it is basically sharing of the capacity of the allocated RF carrier channel. Therefore, it will boost efficient RF channel utilization.

3.3.4.14 A purist interpretation could be that such arrangements amount to backdoor sharing of the spectrum. Our analysis and consequent recommendation is restricted to backhaul using microwave/ UHF links from BTS to BSC only and it is not envisaged that the scope or permission would be extended to any other situation.

3.3.4.15 DOT has come out with new charging mechanism in Nov 2006 for charging of the radio spectrum for the purpose of backhaul. Different charging slabs based on percentage of adjusted gross revenue (AGR) have been prescribed for using number of carrier (0.15 % of AGR for one carrier to 1.45 % of AGR for using 6 carriers). The charging is not dependent on number of hops for which one carrier is used i.e if one service provider takes a carrier for the purpose of backhaul between his BTS to BSC in

his licensed area of operation, he can use the same any number of times. Moreover charges taken from other service provider to share the capacity of Radio backhaul will be added to AGR of such service provider having RF carrier allocation. This will result in enhanced payment to WPC since such payments are based on percentage of AGR.

3.3.4.16 The service provider who has taken RF carrier allocation for operation of Backhaul will wholly be responsible for any misuse of such backhaul even when it is shared with other service providers. There should be no reservations for permitting sharing of such backhaul.

3.3.5 Recommendations

The Authority Recommends

(i) Considering the importance of backhaul sharing for provision of mobile services in rural and far flung areas, licensing conditions of UASL clause no 33 (ii) and CMTS clause no 34 (ii) should be amended to allow service providers to share their backhaul from BTS to BSC only. Such sharing is permitted on optical fiber as well as Radio medium at port size E1 and multiple there of (nxE1). No sharing of spectrum at access network side is permitted.

3.4 Intra-circle and Inter circle Roaming

3.4.1 Another mode of common active infrastructure sharing is to permit roaming between the operational networks. Considering the large area of service providers and dark spots, one may advocate full roaming between service providers.

3.4.2 The comments of the stake holders are compiled.

3.4.3 Stakeholders' Comments

3.4.3.1 There is a need to mandate roaming between various service providers. Some stake holders were of the view that it may be left to mutual agreements between service providers.

3.4.3.2 A view was expressed that mandated intra circle roaming will encourage other operators to move to villages and give incentive to those who are operating in the villages/ rural areas by way of

more subscribers roaming on their network. They felt that most of the service providers are operating only in urban areas, and are not providing any coverage in rural areas. Non availability of Intra-circle roaming deprive subscribers to roam on those operators who are providing services on rural/ remote areas.

3.4.4 Analysis

3.4.4.1 Intra-circle roaming is not permitted at present. The rationale has been to encourage creation of more infrastructures and well spread network capacities.

3.4.4.2 There are six to eight operators in the circle. Roll out obligations have been well defined to ensure that sufficient infrastructure is developed and mobile services are provided by all service providers. This is envisaged to increase competition in the sector.

3.4.4.3 While intra-circle roaming can be helpful to provide service to subscribers through other service providers network but may reduce service providers effort to cover whole area. In other words, it can seriously hamper the pace of development and creation of infrastructure. The subscriber base will also not increase if such infrastructure is not well spread.

3.4.4.4 In case intra-circle roaming is permitted its impact may not be predominant in metro areas as robust infrastructure is available, but it would adversely impact large circles and rural areas particularly when mobile geographical coverage is around 40%.

3.4.4.5 Intra-circle roaming may even decrease the possibility of sharing of the infrastructure and increase the possibility to ride on other service providers' network.

3.4.4.6 The number of floating subscribers shall be high in case intra-circle roaming is permitted and it may create serious difficulties in planning of the network, which may affect quality of service.

3.4.4.7 The intra-circle roaming may work as de-motivating factor to setup network across difficult service area. Some service providers may prefer not to setup further BTS and like to piggy back on other service providers. This may reduce the developmental efforts to setup infrastructure in rural and other priority areas.

3.4.4.8 Implementation of the home plan tariff and handling of incoming calls without any extra charges in case of intra circle roaming may be difficult and may result in complicated billing scenario. Similarly issues related to QoS and security monitoring will require in-depth consideration.

3.4.4.9 Hence intra circle roaming may not be conducive at this stage.

3.5 Mobile Virtual Network Operators (MVNO)

3.5.1 Mobile Virtual Network Operators (MVNOs) are companies who do not own any cellular infrastructure but buy airtime from operators and then market and sell it using their own brand. MVNO concept is useful in relation to increasing competitions, improving spectrum and capacity utilization of cellular networks and broadening the range of service options available to the costumers.

3.5.2 As MVNO does not have their own spectrum, it may require sharing of spectrum with mobile operators. This raises the issue whether active infrastructure sharing is pre-requisite for introduction of MVNO in Indian market?

3.5.3 Stakeholders' Comments

3.5.3.1 Majority of stakeholders felt that active infrastructure sharing is not pre-requisite for launch of MVNO.

3.5.3.2 There was general consensus that MVNO should be addressed separately.

3.5.3.3 It was felt that MVNOs should be allowed to access the core network of the cellular operators which will result in CAPEX and OPEX saving and optimal utilization of resources. MVNOs can go with the customer services development whereas the network operator can concentrate into the development of core network.

3.5.3.4 A view was also expressed that Indian market is not ripe for introduction of Mobile Virtual Network Operator (MNVO).

The Authority came to the conclusion that MVNO is not within the reference made by DoT and also needed to be dealt separately as it has major licensing implications.

CHAPTER 4

FINANCIAL AND ECONOMIC MEASURES FOR INFRASTRUCTURE SHARING

4. Introduction

4.1 DoT has set the target to provide 250 million telephones by December 2007 and 500 million telephones by 2010. To meet this demand, it is expected that about 1,35,000 towers will be required by 2007 and 3,30,000 towers by 2010, as against appx. 1, 00,000 existing towers. Thus, both efficient utilization of existing infrastructure and significant investment to create infrastructure within the overall strategy of infrastructure sharing is considered essential to sustain the growth rate in telecom services.

4.2 Department of Telecommunications (DoT) has already initiated a process to promote the growth of Telecommunication Services, especially in rural and remote areas using USO fund support to create passive infrastructure.

4.3 The Authority has not opted for any strong regulations for infrastructure sharing and has preferred a market based instrument to incentivise infrastructure sharing.

4.4 Stakeholders Comments on Incentives for infrastructure sharing in urban areas

4.4.1 The income earned by Cellular Mobile Service Providers/Unified Access Service Providers from sharing of infrastructure is included in the Adjusted Gross Revenue (AGR) and hence licence fee is levied on it. They also emphasized that in case of IP-1 Service Providers, who set up and offer passive infrastructure to wireless operators, no license fee is paid on the income earned by these companies from offering their infrastructure to other service providers. Sale/Lease of passive infrastructure is a non-licensed activity for CMSP/UASL. Hence such earnings should be exempted from inclusion in AGR for the purpose of calculating taxes and levies. Stake holders felt

that this will act as an incentive and sharing of infrastructure will get a fillip.

4.4.2 The stakeholders were of the view that various Civic authorities levy very high charges while permitting the installation of new tower sites. They wanted that charges levied by civic authorities, if any, be limited to recover cost of administration and should not be driven with the objective to finance their budget deficits. They also desired that civic authorities should give incentive by way of reduction in taxes and levies when a site is shared by service providers.

4.4.3 Stakeholders also requested to consider incentives like Government subsidy, reduction in License fee charges, speedy SACFA clearances, more spectrums to operators sharing infrastructure in promoting infrastructure sharing.

4.4.4 The stakeholders also stated that a fixed amount per tower could be considered as an incentive and the same could be adjusted against the license fee. The fixed amount can be arrived at through mutual consultation with all telecom operators as well as IP-I Service Providers. This fixed amount should be provided even when a tower/Cell Site is shared between two service providers. This will act as an incentive for service providers to offer passive infrastructure for sharing.

4.4.5 Stakeholders also stated that Mobile Sector requires huge investment of approx. 10 billion USD per annum. Based on above it is amply clear that financial incentives are needed in order to increase the mobile penetration and push the telecom growth to higher trajectory.

4.4.6 The stakeholders also proposed that a cash subsidy by way of service tax reduction be given to those service providers who are sharing the infrastructure.

4.4.7 Some of the stakeholders were of the opinion that there is no need for any monetary incentive for infrastructure sharing. The very fact that the infrastructure sharing would result in reduction of Capex and Opex for all the concerned parties will encourage infrastructure sharing.

4.4.8 One of Stakeholder also suggested that the Licensor may devise a “point based policy”, where each telecom operator sharing the infrastructure, depending upon the sites, may be given points (on monthly/ quarterly/ yearly basis). Each point may be allocated a Rupee value. The operator may then be allowed to use/ redeem such points to procure/ bid for new licenses, renew existing licenses etc.

4.4.9 A view was expressed that major relief in income tax would boost infrastructure sharing.

4.5 Analysis

4.5.1 The Authority has considered the submission of service providers for relief in AGR. The Authority in its recommendations on components of Adjusted Gross Revenue (AGR) to Hon'ble TDSAT in Sep 2006 had stated that such deductions from AGR be not allowed to service providers. It is observed that licensees have special privileges, like right of way which facilitates laying down of ducts and fiber, which are not available to independent companies. Therefore, renting/leasing of passive infrastructure by a service provider has to be considered as part of normal telecom activity.

4.5.2 While evaluating the broad principles for AGR calculation, the Authority examined the views of service providers, views expressed by consultant of DOT, the views of Comptroller and Auditor General of India (CAG), accounting principles and the concern of DOT on the necessity of a system of assessment which was easily verifiable and transparent and did not lend itself to reducing the AGR by means of accounting jugglery.

4.5.3 Passive infrastructure sharing in most of the urban areas is happening by mutual agreements. Barter system is the most common mode of infrastructure sharing in urban areas. The prevalent lease rentals are not well defined as it is based on outcome of mutual agreements. Monitoring of such rentals and exemption from AGR will be difficult. Moreover possibilities of misuse of such provision to pass through tower rentals by way of accounting jugglery can not be ruled out.

4.5.4 The service providers handle their infrastructure activities as one of the segment of their telecom business. In the absence of separation of the infrastructure activity of the service provider as having legal entity, it may be difficult to segregate revenue arising out of infrastructure activity from the total revenue for providing exemption.

4.5.5 The lease rentals for tower sharing are decided based on the mutual agreements. No specific rates are fixed for leasing a tower as it depends on location of sites, number of towers being shared and market forces. Passive infrastructure is being

created by Infrastructure provider category I as well as service providers. Even if it is assumed for sake of discussion that certain financial incentives are given to the service providers to setup the towers, it will not be possible to monitor that these incentives have suitably been passed on to the service providers while fixing lease rents for sharing passive infrastructure.

4.5.6 The taxes and levies imposed by civic authorities to give permission to set up site need to be rationalized on account of the fact that these levies add to the cost of provision of services apart from the fact that the amount levied have no relation to the services performed by local bodies. The total taxes and levies applicable to setup a site can be considered for reduction in case the site is shared. This will help to minimize the required number of towers and thus goes a long way in improving the aesthetics of the city.

4.5.7 Service providers mentioned that some civic authorities are charging similar taxes and levies from service providers even if they are sharing one single tower. In order to encourage service providers to share the tower, it is felt that civic authorities be requested through DOT to charge such amounts from all service providers sharing infrastructure so that total amount charged per tower should not be more than 1.2 times of the amount being charged from individual service providers when tower is not shared.

4.5.8 Sharing of infrastructure will directly result in reduction of Capital expenditure and operational expenditure to a large extent and thus it will incentivise operators to resort to sharing of infrastructure. Stream lining of existing procedures to obtain permission from civic bodies apart from identification of critical infrastructure sites would be adequate incentive in urban areas. Therefore a separate scheme of financial subvention has not been recommended.

4.6 Recommendations

The Authority recommends

(i) Civic bodies may be requested through DOT to charge such amounts from all service providers sharing infrastructure so that total amount charged per tower should not be more than 1.2 times of the amount being charged from individual service providers when tower is not shared, instead of

charging same amount of processing fee and other charges from all the operators sharing a site. Incentives in the form of processing fee and other charges will encourage passive infrastructure sharing.

4.7 Stakeholders Comments on Incentives for Infrastructure Sharing in Rural Areas

4.7.1 Stakeholders felt that financial incentive for rural area is extremely critical for development of infrastructure and growth of rural telecom. A suitable incentive scheme should be evolved to expend the infrastructure sharing.

4.7.2 USO Fund Administrator has already embarked upon an infrastructure sharing tender which seeks to provide subsidy to be shared among three operators for development of infrastructure. This will enable mobile operators to provide services in rural areas. In order to incentivise the operators further, some concessions in form of reduced tax, free spectrum for a limited period, availability of land at concessional rates, subsidized electricity etc should also be provided.

4.7.3 Some service providers felt that restricting the number of service providers to a maximum of three under USO scheme for subsidy for infrastructure sharing in rural areas is anti-competitive and therefore discriminatory.

4.7.4 Some Stakeholders opined that all passive infrastructure set up after a cut-off date should be made mandatory for sharing among at least three service providers in rural area. Further incentives should be built-in to encourage sharing of infrastructure by more than three service providers. Necessary funds for this incentive may flow from the USO fund for sharing infrastructure. TRAI may suggest ceiling on cost of sharing and stipulate a time frame to promote increased infrastructure sharing among the service providers.

4.7.5 One of the stakeholders mentioned that the concerned service provider should get deduction of the revenue earned from wireless subscribers for the infrastructure deployed in rural areas from the gross revenue for the purpose of calculating Access Deficit Charge (ADC) as a percentage of AGR, over and above USO subsidy. Presently only wire line rural revenue is allowed as a deduction from ADC.

4.7.6 Some of the stakeholders felt that mandating infrastructure sharing is not a solution for covering vast rural areas. The infrastructure sharing is already taking place in urban areas without any mandating or regulatory initiatives. As and when the infrastructure is created in rural areas, service providers will themselves come forward for sharing this infrastructure.

4.8 Analysis

4.8.1 The Authority has kept in view the developments in regards to rural telephony since the period of its recommendation made in 2005.

4.8.2 Rural area of India comprises of 638499 villages out of which about 44856 villages are uninhabited as per census 2001. The remaining 594000 villages account for 72.22% of total population of India. The current rural tele-density is about 5.0% compared to urban tele-density of 49.53%. There is an urgent need to bridge this gap.

4.8.3 The Authority welcomes the initiative taken by universal services obligation fund (USOF) administrator to support creation of passive infrastructure in identified rural and far flung areas.

4.8.4 The proposed project of USO fund administrator envisages covering only those rural and remote areas where fixed wireless and mobile services are not being provided currently.

(i) For this purpose, information in respect of existing towers has been plotted on a geographical information service (GIS) map and the same is being utilized for this project to enable identification of rural and remote areas not covered by mobile services.

(ii) It is contemplated to provide financial support for setting up infrastructure. The scheme is proposed to be implemented in two concomitant parts – Part A sharable component and part B non sharable components. Part A relates to setting up of passive infrastructure sites comprising of land, tower, Power connection, power backup and associated civil and electrical works. Part B relates to provisioning of mobile services by access service providers by installation of BTS equipment with associated antenna and backhaul. While initially the infrastructure created will be used primarily for voice telephony,

the same infrastructure can also be used subsequently to provide broadband services.

(iii) The USO fund administrator intends to provide subsidy support for part A of the scheme to the infrastructure provider Category I (IP – I) short listed, existing Basic Service Providers (BSOs), Cellular Mobile telephone Service (CMTS) providers, Unified Access Service Licensees (UASLs) for creation of passive infrastructure in specified rural and remote areas. Passive infrastructure so created shall be shared by three service providers selected by USOF administrator as per part B of the scheme.

(iv) USOF administrator also intends to provide subsidy support for part B of the scheme to existing Basic Service Providers (BSOs), Cellular Mobile telephone Service (CMTS) providers, Unified Access Service Licensees (UASLs) for provision of mobile services in specified rural and remote areas by sharing the infrastructure created as per part A of the scheme.

(v) Total 81 clusters of towers have been identified in the above project both for part 'A' and part 'B' of scheme.

(vi) One of the bidders for part A (Short listed Infrastructure provider category I or Service provider) seeking least subsidy shall be selected per cluster basis to set up the passive infrastructure. The subsidy sought shall be provided for five years from USOF. After five years no subsidy will be provided by USO fund. Service providers using the infrastructure shall pay rental to the infrastructure provider. For this purpose the passive infrastructure provider before end of five years, shall execute commercial agreements with selected service providers for sharing of the site on mutual basis starting from sixth year onward.

(vii) The passive infrastructure provider have to setup 50 % of the sites in eight months time counted from the date of signing the agreement and all sites have to be completed in 12 month time. If the project is not completed as per prescribed schedule, provision of penalty in the form of Liquidated Damage (LD) maximum up to 10% of annual subsidy for infrastructure providers have been made. However it is to be seen whether such passive infrastructures shall be available in time.

(viii) Three service providers shall be short listed to share the tower (set up in part A) by USOF administrator per cluster on the basis of minimum subsidy sought to provide mobile services in rural area. These service providers shall roll out mobile services with in two month from the date of passive infrastructure made available to them. All active equipment including backhaul has to be arranged by these service providers to roll out mobile services.

4.8.5 The Scheme being implemented through Universal Service Obligation Fund has been examined and evaluated in detail. Perhaps there is a scope to further strengthen the framework. Some of the salient points which need to be revisited are :-

(i) It is envisaged that infrastructure providers shall not charge any rental for 5 years. However, provision to recover operational expenses from service providers have been made but detailed terms and conditions have not been specified. This seems to be open ended and may result in litigation between infrastructure provider and service provider.

(ii) The successful bidder in the tender for passive infrastructure has full control over the implementation of the scheme. If the works are not executed in a prescribed duration the entire scheme could be delayed. Though Provision for Penalties have been made but it may not be an effective deterrent. It will be safer to provide for a parallel incentive scheme for other telecom service provider for creation of passive infrastructure with compulsory sharing among the service providers.

(iii) The available trend from the bidding process indicates that the passive infrastructure providers have bid for subsidy of approx. 12 lakhs in 5 years whereas telecom service providers in as many as 74 telecom circles have not asked for any subsidy for creation of active infrastructure and for roll out of mobile services. It seems that the main bottleneck facility is installation of passive infrastructure and therefore deserve financial support for enhancing penetration of mobile services in rural areas. The telecom service providers are not looking for any support in rolling out mobile services after the passive infrastructure is available.

(iv) The tender process for part 'A' i.e., shareable passive infrastructure and part 'B' i.e., non-sharable components (mainly active) have been structured separately. This could lead to a coordination problem both in terms of timing and activisation of the facility particularly where detailed modalities for sharing of the towers with telecom service providers is an open ended agenda depending on negotiated terms and conditions of sharing.

(v) Even if USOF scheme shall get implemented as per the schedule and mobile services are rolled out in rural and far flung villages as per the envisaged plan by three selected service providers, it will be asymmetric treatment for the remaining/left-out service providers (who are not the beneficiary of USOF support) to provide competitive services in those areas considering that they have to develop their own passive infrastructure. Stakeholders have raised the issue of non level playing field as one set of service providers will get almost free passive infrastructure for five years with USOF support and other set of service providers will require huge expenditure to set up and maintain passive infrastructure without any financial support. Financial incentive in some form will also be required by service providers not beneficiary of USOF support to set up passive infrastructure. This will ensure fair play, generate competition and discourage any form of cartelization. This will also be effective to counter any move to delay roll out of mobile services in these identified areas either by manipulative tactics or procedural delays in creation of passive infrastructure using USOF support. Maintaining level playing field is necessary for creation of passive infrastructure to develop robust structure in rural areas. Hence financial incentives are necessary to service providers not beneficiary of USO Fund support.

(vi) A major hurdle faced by the service providers in expanding their network in rural and remote areas is absence of backhaul connectivity. Setting up of backhaul connectivity from the towers (BTSs) to the BSCs apart from being a time consuming process is a high cost exercise, as the returns on the capital are initially quite low. The proposed scheme of USOF Administrator has taken into consideration only part of the backhaul (as per the information available from USOF, only a single wireless hop is being considered in the proposed scheme). Since the cost of installing backbone infrastructure in semi-urban and rural areas for a service provider can be substantial, this may act as a deterrent to the service providers to go into remote rural

areas. Currently, there are around 29000 rural exchanges in the country and most of these exchanges are connected through optical fibre cable. Being used for connecting the rural exchanges, it can be safely presumed that this fibre is heavily underutilized and by investing some incremental amount this national resource can be gainfully used for providing the backhaul connectivity from the BTSs to BSCs in the proposed scheme. This, apart from being cost effective measure will also save unnecessary duplication of infrastructure by the service providers. The service provider owning the optical fibre (in most of the cases, it is BSNL) can be provided an incentive to lease the fibre and also to charge a discounted price from the service providers seeking the connectivity. The expenditure incurred on providing this incentive to the optical fibre owner can be funded from the USOF.

4.8.6 TRAI in its recommendation in October, 2005, on "Growth of Telecom Services in Rural India" had stated that the operator who install BTS in rural/remote areas should be given a support of Rs.12 lakhs per BTS from USO Fund provided its is shared with one other operator. It had also recommended that the operators who share the infrastructure of already existing operator will also be given a support of Rs.12 lakhs from USO Fund. However, there is a need to review this recommendation in the background of recent bids opened by USOF Administrator. It is evident that the passive infrastructure is the main bottleneck. Telecom Service Providers are keen to enter the rural areas on the peaking of demands in urban markets. Thus the element of subsidy can be restricted to passive infrastructure in rural areas only.

4.8.7 While considering subsidy for creation of the passive infrastructure, the Authority is conscious that such subsidy is to be provided only to those service providers / Infrastructure providers Category I who are not the beneficiary of USOF scheme. A well spelt out criteria would be required to bring transparency. Short distance charging Area (SDCA) is the lowest recognized unit in present system. Therefore, any service provider/ Infrastructure provider category I who is beneficiary of USOF scheme in a particular SDCA will not be considered under this new scheme any where within that SDCA.

4.8.8 Having recognized the need to provide subsidy to support creation of passive infrastructure from USO Fund and to

maintain level playing field, following aspects of proposed framework of incentive of infrastructure sharing can be considered :-

(a) The subsidy shall be provided only to those service providers/ Infrastructure providers' category I who are not the beneficiary of USOF scheme within that particular SDCA.

(b) The mobile tower design should have capacity to accommodate at least three service providers to be eligible for availing subsidy under the proposed license.

(c) The service provider/infrastructure provider Category I who is not beneficiary under USOF scheme, erects the tower and share it with three service providers (Not beneficiary of USOF scheme in that SDCA) to roll out mobile services shall also be entitled to subsidy equal to 80% of the amount decided under USOF scheme based on the bidding process, from USO Fund from the date of roll-out of mobile service using this tower. This reduced subsidy is proposed to give due importance to bidding process as all service providers were permitted to participate in bidding process.

(d) If only two service providers not being beneficiary in USOF scheme, share newly erected tower and roll out mobile service, then amount of subsidy payable from USO Fund to service provider/infrastructure provider Category I who erects the tower shall be proportionally reduced compared with amount where tower would be shared between three service providers.

(e) No subsidy shall be paid if newly erected tower is not shared. This is to encourage concept of infrastructure sharing in rural and remote areas.

4.8.9 This support in rural areas not covered under USOF will ensure level playing field. This will enhance competition and extend better mobile services in rural areas.

4.8.10 The burden of having mutual agreement for sharing passive infrastructure must be left to the infrastructure provider category I/ service provider who is setting up passive infrastructure. This will also redress likely problem in having mutual agreement by infrastructure providers with service providers after five years as envisaged by USOF scheme. The

need is not only to encourage creation of such towers but it has to be achieved within a specified time frame. An infrastructure provider Category I or service provider who is not beneficiary of USOF scheme has to register with USO fund administrator along with commitment letters from other service providers (Not beneficiary of USOF scheme in that SDCA) who wish to share the tower. The passive infrastructure has to be created within one year from the date of such registration to make him eligible for subsidy. No subsidy shall be paid if such infrastructure is not setup to roll out mobile services within one year.

4.9 Recommendations

The Authority recommends

(i) Subsidy for erecting the tower should also be made available to service providers not beneficiary under USOF scheme to maintain level playing field. The subsidy should be provided from USO Fund to service provider/ Infrastructure category I to erect tower and share it with service providers as per the following scheme: -

(a) The subsidy shall be provided only to those service providers/ Infrastructure providers' category I who are not the beneficiary of USOF scheme within that particular SDCA.

(b) The mobile tower design should have capacity to accommodate at least three service providers to be eligible for availing subsidy under the proposed license. The passive infrastructure has to be created within one year from the date of registration with USOF administrator to make him eligible for subsidy. No subsidy shall be paid if such infrastructure is not setup to roll out mobile services within one year.

(c) The service provider/infrastructure provider Category I who is not beneficiary under USOF scheme, erects the tower and share it with three service providers (Not beneficiary of USOF scheme in that SDCA) to roll out mobile services shall also be entitled to subsidy from USO Fund equal to 80% of the amount decided under USOF scheme based on the bidding process, from the date of roll-out of mobile service using this tower.

(d) If only two service providers not being beneficiary in USOF scheme, share newly erected tower and roll out mobile service, then amount of subsidy payable from USO Fund to service provider/infrastructure provider Category I who erects the tower shall be proportionally reduced compared with amount when tower would be shared between three service providers.

(e) No subsidy shall be paid if newly erected tower is not shared. This is to encourage concept of infrastructure sharing in rural and remote areas.

(ii) The burden of having mutual agreement for sharing passive infrastructure would be left to the infrastructure provider category I/ service provider who is setting up passive infrastructure. The need is not only to encourage creation of such towers but it has to be achieved within a specified time frame. To ensure this, an infrastructure provider Category I or service provider who is not beneficiary of USOF scheme has to register with USO fund administrator along with commitment letters from other service providers (Not beneficiary of USOF scheme in that SDCA) who wish to share the tower. The passive infrastructure has to be created within one year from the date of such registration to make him eligible for subsidy.

(iii) A scheme based on the framework envisaged above would be needed to support erection of towers in rural areas not covered under USOF scheme. This will provide level playing field, enhance competition and extend better mobile services in rural areas.

4.10 Incentives for using Non-Conventional energy sources

4.10.1 Stakeholders Comments

4.10.1.1 Department of Non-conventional Energy Resources (Called department here after) can be requested to devise a policy to promote the use of solar power and alternative fuel sources specifically for use by the Telecom sector. The Department can

provide Telecom specific inputs on available equipments, costs, sources for procurement etc. Since schemes and subsidies already exist in some form or the other, the Department can consider maximum possible subsidies for use by Telecom and infrastructure service providers, considering that the consumption of such alternatives in the Telecom sector will be extremely high.

4.10.1.2 The stakeholders stated that the Government as well as the Regulator should aggressively encourage the use of non-conventional energy sources, especially in rural areas where stable and reliable power supply is not available. The Department of Non Conventional Energy sources have already initiated a number of schemes under which incentives are available for use of non conventional sources of energy like solar cells etc. The use of bio fuels should also be examined. The above is important in light of the fact that, the telecom network in India is spreading out in the rural areas and there is scarcity of power supply.

4.10.1.3 The cost of operating BTS to provide mobile services through Gen set will increase the cost of operation and therefore, it will further necessitate the need for the sharing to bring down the cost of provisioning telecom services in rural areas.

4.10.1.4 It was also mentioned by the stakeholders that the Capital expenditure involved in setting up of non-conventional energy infrastructure should be fully subsidised by the appropriate authorities. The operations and maintenance expenses may be born by the service providers.

4.10.1.5 Renewable energy can be very helpful in rural areas where there is erratic power supply and can be a viable alternative to diesel generators. Because, by renewable energy consumption we are not only becoming environment-friendly, but also engaging and providing business opportunities for clean energy companies (i.e. these energy providers). Thus, the capital expenditure involved in setting up of non-conventional energy infrastructure should be fully subsidized by the appropriate authorities.

4.9.2 Analysis

4.10.2.1 The use of non-conventional energy sources is presently not popular in telecom sector because of its prohibitive costs and large space requirements. The stakeholders were inclined to use these sources but at the same time wanted support from government in various forms like capital expenditure subsidy, concessional rates for various Government levies/taxes etc.

4.10.2.2 The use of non-conventional energy sources in India for spread of telecom services would be beneficial since power situation is not satisfactory in many rural/remote areas. However the non conventional source of energy for telecom operation in rural area has practical problems. Reliable power supply is a critical input for providing services that are electronics/ electrical based. The BTS sites require huge power (App 25KW). The solar power generated per panel is limited (App 60 watts). Hence it requires lot of space. Moreover sufficient sun light through out the day is another requirement therefore proper orientation of solar panels is necessary. The security of solar panels and their regular cleaning is another issue of concern. Cost of the battery backup and their routine maintenance is prohibitive. So, the alternatives have to be evaluated before accepting solar energy source as one of the option.

4.10.2.3 The possibility of Bio-gas energy generation or similar other options need to be examined by concerned agencies as power supply in rural areas in some states is poor and it puts huge additional burden on service providers to use generators to meet the power requirement.

4.9.3 Recommendations

The Authority recommends

(i) Department of Non-conventional Energy Resources may be approached by DoT to evolve a pro-active policy framework to encourage use of environment friendly non conventional energy sources. Some of the specific measures in this regard are given below :-

a) To device a policy to promote the use of solar power and alternative fuel specifically for Telecom sector.

b) To provide Telecom specific Advisories on available equipments, costs, sources for procurement etc to service providers.

c) To maximize subsidies for Telecom operators considering potential of high use of such devices in telecom sector.

d) To examine possibilities of use of other non-conventional environment friendly energy sources.

(ii) DOT may evolve a scheme of subsidy per site to service providers using non conventional energy sources.

CHAPTER 5

RECOMMENDATIONS

5.1 Passive infrastructure sharing

5.1.1 Amendments in Licensing Provisions and Need for policy Intervention/Legislation to encourage infrastructure sharing

5.1.1.1 The Authority recommends

(i) **There is an urgency for passive infrastructure sharing. The existing provisions in the licenses of BSOs, CMSP, and UASL permit passive infrastructure sharing. The Authority is of the view that mandating passive infrastructure sharing at this stage is not required. Accordingly the Authority does not recommend any legislation/ amendment in the license conditions.**

(ii) **SACFA clearance needs to be given in a stipulated time frame. If no communication is received in the prescribed time frame, the request may be deemed to be approved. Infrastructure Providers (IP) Category-I may also be allowed to seek SACFA clearance if they have at least one agreement with existing wireless service providers for leasing infrastructure.**

(iii) **The process of sharing infrastructure should be transparent and non discriminatory. All licensees must announce on their web site the details regarding the existing and future infrastructure installations available for sharing with other service providers. A time limit of 30 days for negotiation between access seeker and provider should be the normal practice. This criterion should be specifically provided in the license conditions. At this stage, the mode of commercial agreement is being left to telecom service providers however the Authority could consider standard commercial format in future if process of infrastructure sharing does not pickup.**

5.1.2 Identification of Critical Sites for Wireless Services

5.1.2.1 The Authority recommends:

(i) It is necessary to identify and notify critical infrastructure sites to facilitate sharing of passive infrastructure in an expeditious manner. In order to identify and notify critical infrastructure sites, it is recommended that a Joint Working Groups (JWG) should be constituted with District Magistrate of that district as the Chairman and having representatives from all mobile service providers present in that service area, representatives of municipal corporation/ Body, and a representative of Military land and Cantonment wing if area under consideration also covers cantonment areas. The committee shall hold its meeting when requested by any of the licensed service providers in that area and decision shall be taken in a time bound manner but preferably within three months time. All identified sites once approved by the committee will be notified as Critical infrastructure sites by the office of Chairman, Joint working committee (JWC).

(ii) Municipal bodies/ Corporations/ Cantonment authorities shall grant permission to any service provider/ Infrastructure provider category I (IP I) to set up tower in such notified sites only when the service provider gives a commitment that the site would be shared by at least three service providers.

(iii) In case of any disagreement among the service providers for sharing of critical site, the same will be first referred to the Joint Working Groups (JWG) to settle the issue before taking any other remedial action.

5.2 Active infrastructure sharing

5.2.1 Licensing/ Policy issues

5.2.1.1 Authority recommends that

(i) The licence conditions of UASL/CMSP should be suitably amended to allow active infrastructure sharing limited to antenna, feeder cable, Node B, Radio Access network (RAN) and transmission system only. Sharing of the allocated spectrum is not permitted.

(ii) The active infrastructure sharing arrangements may be left to service providers based on mutual agreements.

(iii) The service provider should indicate the intention of active infrastructure sharing in transparent and predictable manner. All licensees must announce on their web site the details regarding the existing and future infrastructure installations available for sharing with other service providers. A time limit of 30 days for negotiation between access seeker and provider should be the normal practice. This criterion should be specifically provided in the license conditions. At this stage, the mode of commercial agreement is being left to telecom service providers however the Authority could consider standard commercial format in future if process of infrastructure sharing does not pickup.

5.2.2 Backhaul Sharing

5.2.2.1 The Authority Recommends

(i) Considering the importance of backhaul sharing for provision of mobile services in rural and far flung areas, licensing conditions of UASL clause no 33 (ii) and CMTS clause no 34 (ii) should be amended to allow service providers to share their backhaul from BTS to BSC only. Such sharing is permitted on optical fiber as well as Radio medium at port size E1 and multiple there of (nxE1). No sharing of spectrum at access network side is permitted.

5.3 Financial and economic measures for infrastructure sharing

5.3.1 Incentives for infrastructure sharing in urban areas

5.3.1.1 The Authority recommends

(i) Civic bodies may be requested through DOT to charge such amounts from all service providers sharing infrastructure so that total amount charged per tower should not be more than 1.2 times of the amount being charged from individual service providers when tower is not shared instead of charging same amount of processing fee and other charges from all the operators sharing a site. Incentives in the form

of processing fee and other charges will encourage passive infrastructure sharing.

5.3.2 Incentives for Infrastructure Sharing in Rural Areas

5.3.2.1 The Authority recommends

(j) Subsidy for erecting the tower should also be made available to service providers not beneficiary under USOF scheme to maintain level playing field. The subsidy should be provided from USO Fund to service provider/ Infrastructure category I to erect tower and share it with service providers as per the following scheme: -

(a) The subsidy shall be provided only to those service providers/ Infrastructure providers' category I who are not the beneficiary of USOF scheme within that particular SDCA.

(b) The mobile tower design should have capacity to accommodate at least three service providers to be eligible for availing subsidy under the proposed license. The passive infrastructure has to be created within one year from the date of registration with USOF administrator to make him eligible for subsidy. No subsidy shall be paid if such infrastructure is not setup to roll out mobile services within one year.

(c) The service provider/infrastructure provider Category I who is not beneficiary under USOF scheme, erects the tower and share it with three service providers (Not beneficiary of USOF scheme in that SDCA) to roll out mobile services shall also be entitled to subsidy from USO Fund equal to 80% of the amount decided under USOF scheme based on the bidding process, from the date of roll-out of mobile service using this tower.

(d) If only two service providers not being beneficiary in USOF scheme, share newly erected tower and roll out mobile service, then amount of subsidy payable from USO Fund to service provider/infrastructure provider Category I who erects the tower shall be proportionally reduced

compared with amount when tower would be shared between three service providers.

(e) No subsidy shall be paid if newly erected tower is not shared. This is to encourage concept of infrastructure sharing in rural and remote areas.

(ii) The burden of having mutual agreement for sharing passive infrastructure would be left to the infrastructure provider category I/ service provider who is setting up passive infrastructure. The need is not only to encourage creation of such towers but it has to be achieved within a specified time frame. To ensure this, an infrastructure provider Category I or service provider who is not beneficiary of USOF scheme has to register with USO fund administrator along with commitment letters from other service providers (Not beneficiary of USOF scheme in that SDCA) who wish to share the tower. The passive infrastructure has to be created within one year from the date of such registration to make him eligible for subsidy.

(iii) A scheme based on the framework envisaged above would be needed to support erection of towers in rural areas not covered under USOF scheme. This will provide level playing field, enhance competition and extend better mobile services in rural areas.

5.3.3 Incentives for using Non-Conventional energy sources

5.3.3.1 The Authority recommends

(i) Department of Non-conventional Energy Resources may be approached by DoT to evolve a pro-active policy framework to encourage use of environment friendly non conventional energy sources. Some of the specific measures in this regard are given below :-

a) To device a policy to promote the use of solar power and alternative fuel specifically for Telecom sector.

b) To provide Telecom specific Advisories on available equipments, costs, sources for procurement etc to service providers.

c) To maximize subsidies for Telecom operators considering potential of high use of such devices in telecom sector.

d) To examine possibilities of use of other non-conventional environment friendly energy sources.

(ii) DOT may evolve a scheme of subsidy per site to service providers using non conventional energy sources.

Annexure 'A'

Most Immediate

Annexure - I

No.10-5/2006/AS-III /825
Government of India
Ministry of Communications
Department of Telecommunications
Sanchar Bhawan, 20, Ashoka Road, New Delhi

Dated 8th November 2006

To

The Secretary,
Telecom Regulatory Authority of India,
A-2/14, Africa Avenue,
Safdarjung Enclave, New Delhi-28

Sub : Sharing of new passive infrastructure by mobile service providers.

Sir,

With the exponential growth of mobile services in the country, it is felt that the mobile service providers should be sharing the new passive infrastructure, especially towers, while expanding the networks. This would not only bring down the cost of providing the service but also would help in preventing the deterioration of the skyline. One of the ways of ensuring this is to bring in a proper legislation (amendment in the license agreement) so that the new passive infrastructure like towers are effectively shared by the mobile service providers. While bringing in such a legislation, it is to be ensured that the same should not come in the way of growth of mobile services in the country.

Undersigned is directed to seek the views of TRAI regarding bringing in an appropriate legislation/amendment in the license agreement for ensuring effective sharing of new passive infrastructure(towers) by the mobile service providers. In case the view is for bringing in appropriate legislation/amendment in the license agreement, the comments on the nature of such a legislation/amendment in the license agreement may also be provided.

8/11/06

(Sukhbir Singh)
Director(AS-III)
Tel: 23711909

Annexure 'B'

INTERNATIONAL EXPERIENCE

1 USA:

Telecommunications in the USA is regulated by the Telecommunications Act 1996, which contains requirements for both co-location and infrastructure sharing. These requirements are imposed by section 251 on Interconnection. There is a separate section 259 on Infrastructure Sharing, but section 259 applies only where the service provider who is sharing another service provider's facilities uses them only for services that do not compete with the provider of the infrastructure. Since all the issues are discussed in the context of section 251, there is no need to consider section 259 further.

Section 251 includes requirements for

1. All carriers to provide access to poles, ducts, conduits and rights-of-way to competing carriers;
2. Incumbent local exchange carriers (LEC) to:

- Negotiate in good faith.
- Provide to any requesting carrier non-discriminatory access to network elements on an unbundled basis at any technically feasible point on terms that are non-discriminatory.
- The access must be provided in a way that enables the requesting carrier to combine such elements to provide a service.
- Provide on reasonable and non-discriminatory terms for the physical collocation of equipment necessary for interconnection or unbundled access at the premises of the LEC, except that virtual collocation may be provided if collocation is not practicable for technical or space reasons.

Rural telephone companies may gain exemption or modification from the requirements.

The FCC issued a Notice of Proposed Rule Making (Docket 96-98) followed by the First Report and Order (FCC-96-325) in August 1996. The First Report and Order contains an extensive discussion of the issues and the new Rules.

The FCC Rules require:

- Utilities to provide a carrier with non-discriminatory access to any pole, duct, conduit or right-of-way. Access may be denied if there is insufficient capacity or for safety, reliability or engineering reasons.
- Requests to be in writing and to be fulfilled within 45 days otherwise written reasons must be given why the request is being denied.
- 60 days notice must be given of removal or modification to facilities, apart from emergencies.
- A carrier may file a petition against the removal or modification of a facility within15 days of receiving notice, and the respondent may file a reply within 7 days.

Although the US regulator has not issued regulations specifically addressed to 3G infrastructures sharing, in recent years, the regulator has been called upon to scrutinize on a case-by-case basis several infrastructure sharing joint ventures between various mobile service providers. Based on this experience, the US approach generally has been not to intervene in infrastructure sharing issues, but the regulator has the authority to do so if issues of competitive harm are raised. The same general approach would be applicable to 3G infrastructure sharing should the issue arise. There is also a proposal by the FCC, which examines whether infrastructure sharing is promoted or not as a means of bringing competition to rural areas.

2. France

ART (Autorité de Régulation des Télécommunications) also favoured sharing of 3G infrastructure between service providers, as long as they don't share frequencies. It added that it did not want the sharing agreement to prevent the development of effective competition in the 3G market, which must be beneficial for subscribers.

ART defined following five levels of sharing and their compliance with conditions for issuing 3G authorizations:

a) Level 1: Sharing of sites and passive elements

This form of sharing consists of common use by multiple service providers of all or part of the passive elements of the infrastructure. This would include sites, civil engineering, technical premises and easements, pylons, electrical supply, air conditioning, etc.

This type of sharing is not only permitted, but encouraged.

This "level 1" sharing also includes the pooling of transmission elements that are not part of the UMTS architecture, such as connections between base station controllers (BSC) and network nodes (MSC and SGSN) or connections between base stations (node B) and base station controllers (BSC). Such pooling is possible if these elements are not directly from the UMTS network.

b) Level 2: Antenna sharing

This level is defined as pooling of an antenna and all related connections (coupler, feeder cable), in addition to passive radio site elements. Since an antenna can be considered a passive element, antenna sharing can be included in the more general issue of passive infrastructure sharing mentioned above and therefore complies with the telecommunications act.

c) Level 3: Base station sharing (Node B)

Base station sharing is possible as long as each service provider:

- maintains control over logical Node B so that it will be able to operate the frequencies assigned to the carrier, fully independent from the partner service provider.
- retains control over active base station equipment such as the TRXs that control reception/transmission over radio channels.

d) Level 4: Base station controller (RNC)

RNC sharing is possible since it represents maintaining logical control over the RNC of each service provider independently.

e) Level 5: Sharing of backbone elements

This consists of sharing switches (MSC) and routers (SGSN) on the service provider's fixed network. The frequency usage authorizations issued by the Authority are assigned intuitu personae and cannot be transferred. Accordingly, the Authority must exclude infrastructure sharing solutions that lead to a pooling of frequencies between service providers.

The sharing of backbone elements does not comply with the French regulatory framework if it leads to such pooling of frequencies. This is the case when backbone elements are shared along with the radio portion.

3. Germany

In Germany, the regulator RegTP (Regulierungsbehörde für Post und Telekommunikation) stated that each 3G license holder would be required to build its own network, each of which needed to ensure its 'competitive independence' during the lifetime of the license. This means that service providers would not be allowed to share backbone facilities such as switching centers even though they could share network elements such as masts and antennae.

The regulator ruled that infrastructure sharing of wireless sites, masts, antennae, cables, combiners and cabinets was permissible – provided that full legal control of the networks and competitive independence remains intact. There is expectation that this will allow UMTS license holders (particularly new market entrants) to achieve meaningful economies in the build-out of their UMTS networks. Infrastructure sharing could also lead to an extension of 3G coverage, particularly outside urban areas.

4. Brazil

National Telecommunications Agency (ANATEL) laid the rules on infrastructure sharing among telecommunications service providers.

The rules set out the conditions and standards for sharing of ducts, conduits, poles, towers and utility easements in the telecommunications sector. Instead of a price list, ANATEL has prescribed a calculation methodology for actual infrastructure costs.

The major points in the Resolution are:

- Only infrastructure over-capacity may be shared with other telecommunications companies;
- Acts or omissions aimed at protracting an agreement between telecommunications companies will be treated as unfair competition under antitrust laws; and
- Caps on the amount payable by the telecommunications service providers applying for use of another service provider's infrastructure were adopted.

5. Jordan

Telecommunications Regulatory Commission of Jordan issued a statement is in regard to the implementation of Infrastructure Sharing and National Roaming for mobile telecommunications service providers.

In this statement, the TRC has concluded, "it is impractical to publish an exhaustive set of rules with respect to collocation and infrastructure sharing matters. Instead, the TRC will address any issues related to capacity, availability or other situations that may arise on a case by case basis. In instances where the requesting service provider and the other service provider fail to reach agreement in these matters, the TRC will conduct an investigation. Upon completion of its investigation, if the TRC has determined that infrastructure sharing or collocation is indeed feasible, it will then issue a decision regarding the terms, conditions and time frames under which infrastructure sharing or collocation (or both) will be provided."

6. Netherlands

In the Netherlands, NMA (Netherlands Competition Authority), OPTA (Independent Post and Telecommunications Authority), and the V&W (Ministry of Transport, Public Networks and Water management) issued a joint memorandum that provided comprehensive clarification on collaboration in the deployment of 3G networks in September 2001. They agreed to allow 3G service providers to collaborate in the construction of 3G network components on the condition that competition between service providers continued to exist and that service providers

compete against one another in providing 3G services. While they shared the opinion that collaboration in 3G network deployment could contribute to a more rapid 3G rollout, they clarified that collaboration must be limited to the joint construction and use of the 3G network infrastructures such as masts, aerials and network operation. On this basis, they did not permit the joint use of frequencies and core networks.

7. Sweden

In Sweden, network infrastructure sharing is allowed under the present 3G licensing regime as long as each service provider has 30% of the population covered with its own infrastructure, the 70% remaining being sharable. The radio infrastructure includes antennae, transmission equipment and other intelligent parts of the network, while leaving aside masts, power supply, sites and so forth

8. Norway

The different networks in Norway can share most of the infrastructure. Masts, antennae, power supplies, housing, transmission routes etc. can be shared. Node B and Radio Network Controllers can be shared except from the intelligent control of the frequency resources. The core network cannot be shared. The frequencies cannot be shared.

The licensing process specifically required the networks to meet the coverage requirements by using the licensee's own frequencies. This requirement could have been relaxed by allowing frequency sharing in parts of the country, especially in rural areas.

9. UK

Most such agreements are governed by UK Chapter I competition prohibitions (EC Treaty Article 81), which prohibit agreements which have the object or effect of preventing, restricting, or distorting competition and that may affect trade within the UK. Some agreements, depending on how they are structured, could fall to the European Commission under the EC Merger Regulation.

Service providers would need to satisfy themselves that any infrastructure agreements do not fall foul of general competition

law; general guidelines have been published by both OFT and Oftel. However, service providers may ask Oftel for guidance or a decision under the Competition Act as to the compatibility of the agreement with competition rules. They may apply for an exemption if they apply for a decision. Oftel cannot give legal advice in advance of any agreement being notified to it for guidance, a decision or an exemption. It is up to the parties concerned to ensure that any agreements do not fall foul of the law. An exemption may be granted if the agreement satisfies the criteria set out in the Competition Act, and it may be subject to conditions if the Director General sees fit and with the agreement of OFT. The Commission can similarly grant an exemption if the conditions in Article 81(3) are met.

Any infrastructure sharing arrangements would need to ensure that consumers get a fair share of the benefits of such a deal, and that the terms of the deal only cover what is required to deliver those benefits.

10. **Trinidad and Tobago**

TATT has attempted to prevent the proliferation of cellular towers throughout the country by mandating collocation (tower sharing) in the concession granted to cellular providers. The operators who availed concessions are required to share where the same is technically feasible. As per the guidelines issued by Ministry of Planning and Development, any operators who wish to construct a tower, has to get the clearance/no objection from TATT.

TATT is not involved in fixing of price for collocation but TATT intervenes only when there is dispute between the parties.

No incentive is offered for collocation, however by way of ensuring fairness, maintaining control TATT has stipulated that concessionaires may only put their antennae on towers that are owned and controlled by another concessionaire.

11. **St. Vincent and the Grenadines**

Infrastructure sharing is done by a mutual agreement between operators. It is not mandated by a Regulation.

12. Hong Kong

In Hong Kong the network operators are encouraged to share facilities on a fair commercial and technical terms & conditions in order to avoid uneconomic duplication on network resources. The Telecom Authority is empowered under the Telecommunication Ordinance in Hong Kong to direct the cooperation and coordination among the licensees in the public interest to share the use of network facility after considering the factors such as bottleneck facility, duplication on network resources. The Telecom Authority may also make any determination in terms and conditions of the shared use of facility should the operators have failed to reach an agreement.

13. Nigeria

Infrastructure sharing is encouraged in Nigeria by the Regulator and it is being done by mutual agreement between the operators. The operator, who wishes to make use of the facility of other operator, should request in writing for availing the facility. The regulator steps in when there is a dispute or a refusal from an operator to share its infrastructure. It is not mandated by a regulation.

The Regulator encourage and promote the sharing of Right of Way, Masts, Poles, Antenna mast and tower-structure, Ducts, Trenches, Space in buildings, Electric Power etc.

14. Switzerland

According to the license, Swiss operators are obliged to use jointly the operations building and the antenna mast in so far as sufficient capacity exists and technical, legal and economic reasons do not prevent co-use of sites.

15. Malaysia

Applicant Information Package (AIP) of 2002 was issued by Malaysian Communications and Multimedia Commission (MCMC). In this they have identified Infrastructure Sharing as

one of the criteria for evaluation. Among the criteria that were outlines in the AIP on infrastructure sharing are as follows:

i) Sharing or allowing access to the use of airtime and network facilities with other licensees and

ii) Maximizing the use of existing network facilities including existing network capacity and capabilities, existing base station sites, backbone, radio links etc to enhance sharing and reduce duplication of network facilities.

16. Saudi Arabia

The Communications & Information Technology Commission (CITC) the regulator in Saudi Arabia, considers that the sharing of network infrastructure and facilities between Data telecommunications service providers can provide an efficient and cost-effective approach to the provisioning of Data telecommunication networks. The sharing of towers, poles, conduit, central office space and other facilities can benefit both the own and shared user of such facilities.

Bylaws mandate collocation to be provided where economically feasible and no major additional construction work is required. The service providers shall agree on the amount to be compensated for co-location provided.

CITC would be involved in case of any dispute.

ABBREVIATIONS

1.	BSC	Base Station Controller
2.	BSO	Basic Service Operator
3.	BTS	Base Trans receiver Station
4.	Capex	Capital Expenditure
5.	CI	Critical Infrastructure
6.	CMSP	Cellular Mobile Service Providers
7.	DOT	Department of Telecommunications
8.	MVNO	Mobile Virtual Network Operator
9.	MW	Microwave
10.	Opex	Operational Expenditure
11.	QoS	Quality of Service
12.	SACFA	Standing Advisory Committee on Radio Frequency Allocation
13	SLA	Service Level Agreement
14.	UASL	Unified Access Service License
15.	UHF	Ultra high Frequency
16.	WPC	Wireless Planning and Co-ordination