



Telecom Regulatory Authority of India



Recommendations
on
In-Building Access by Telecom Service Providers

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Contents

CHAPTER-I: BACKGROUND.....	1
CHAPTER-II: IN-BUILDING TELECOM INFRASTRUCTURE - ISSUES INVOLVED	5
CHAPTER-III: SUMMARY OF RECOMMENDATIONS.....	21
ABBREVIATIONS	23

CHAPTER-I: BACKGROUND

Need of In-building Telecom Infrastructure

- 1.1 Telecommunications infrastructure is an essential component of any building for its connectivity to the outside world. Telecommunications services such as voice, data and wideband multimedia services are indispensable in the modern society. In today's fast-paced environment, with rapid evolution of technologies, exponential growth in data and broadband traffic, and increasing demand for e-services, large organizations, big buildings & complexes, malls etc. require continuous high speed data connection(s) in order to function effectively.
- 1.2 As the number of mobile phone users is growing at a fast pace, there is a demand for high quality data and voice services. People rely on mobile phones to communicate even when they are inside building. As per one estimate, around 70% of all mobile calls originate from indoors. Therefore, having better in-building coverage is very important for good quality mobile/wireless services. Theoretically, wireless services can be provided from outside the building. However, there are appreciable losses in signal strength when it penetrates building walls. While all wireless services can suffer from poor in-building coverage, this problem is particularly pronounced for the high-data rate services. These services require a much better signal quality than their voice counterpart. Therefore, in order to improve in-building coverage and to offer better quality high data rate services, there is a definite need to install in-building solutions (IBS) for wireless services. This is equally true for installing Wi-Fi hotspots.
- 1.3 Provisioning of telecom services inside buildings are not confined to wireless medium only. Wireline services through cables such as copper cables, optical fibre cables (OFC), LAN cables etc are also equally important for having uninterrupted connectivity. Also, for services such as Cable TV and DTH, suitable cabling inside the building is a pre-requisite.

Issues involved in access to building/premises

- 1.4 To lay cables or install telecom infrastructure inside the building or premises, Telecom Service Providers (TSP¹)/Infrastructure Providers (IP-I) would require permission of the owner of the building/premise. However, it is seen that generally restrictive practices are adopted by building/premise owners while giving access to the building due to commercial interests. In many cases, these owners enter into exclusive agreement with one of the TSPs/IP-Is for providing telecom services to the consumers living or doing business from a particular location/building/society/commercial complex etc and deny access to their building(s) to other TSPs, thus creating an artificial entry barrier for such TSPs. Such practices not only limit competition, it also leaves no choice to consumers except to avail services from the TSP with whom the contract is entered into, taking away choice and flexibility from the consumers which they would have had in terms of quality of service (QoS), tariff, redundancy etc.
- 1.5 In some cases, building owners allow TSPs to access their premises at exorbitant rates. For instance, Airport or mall owners may charge high price from TSPs for accessing their premises. As TSPs cannot leave such places uncovered from their telecom network, they are compelled to enter into agreement at the terms and conditions set by such owners.
- 1.6 In cases of leased line connectivity, many organizations take secondary leased lines from other TSP(s) to have redundancy. However, places where building owners allow access to a TSP on an exclusive basis, do not allow these dwellers to have redundancy provision.

Earlier Initiatives by the Authority

- 1.7 The issue of encouraging deployment of In-building solution (IBS) /Distributed Antenna System (DAS) for better in-building coverage, better QoS and reduction in level of radiated power from Macro cell sites

¹ The term TSP used in this paper includes Access Service provider and Internet Service Provider

and sharing of IBS/DAS amongst TSPs, was examined by the Authority earlier too. In its recommendations on “Telecommunications Infrastructure Policy” dated 12th April 2011, the Authority had recommended the following:

“1.94 The Authority recommends that IP-I and telecom service providers should be mandated to share IBS/DAS system deployed in the buildings, complexes or streets.

1.95 DoT should advise all ministries to provide, within next one year IBS/DAS solutions in all Central Government buildings including central PSU buildings, Airports and buildings falling under their jurisdiction & control.

1.96 All State Governments should be similarly advised to provide/mandate, within next one year, IBS/DAS solutions in all buildings including hospitals having more than 100 beds and shopping malls of more than 25000 square feet super built area.”

- 1.8 To promote the roll-out of broadband services in the country, the Authority made its recommendations on ‘Delivering Broadband Quickly: What do we need to do?’ on 17th April 2015. In one of the recommendations, the Authority recommended that:

“4.17There is a need to mandate city developers and builders to have properly demarcated sections within buildings and on rooftops for housing BB infrastructure and antenna. These areas should have uninterrupted power supply for reliable, always-on services.....”

- 1.9 Steps taken by DoT on these recommendations are not known. However, it is important to ensure that all TSPs are able to provide mobile and wireline services to all the subscribers without any artificial restrictions or hindrance. The choice of TSPs for using these services should be made by subscribers; not by the building owners. The subscriber is entitled to the quality telecom services at the best available prices in the market.
- 1.10 In this backdrop, the Authority, under section 11(1)(a) of TRAI Act 1997, issued a Consultation Paper on ‘In-Building Access by Telecom Service

Providers' on 6th June 2016 seeking comments of the stakeholders. Written Comments on the Consultation Paper were invited from the stakeholders by 21st July 2016 and counter-comments by 28th July 2016. The Authority received comments from 28 stakeholders and counter comments were received from one stakeholder. These are available on TRAI's web-site www.trai.gov.in. An Open House Discussion (OHD) was conducted on 30th September 2016. Based on the inputs received from the stakeholders and its own analysis, the Authority has formulated its recommendations. This Chapter is for the purpose of giving background of the subject. In Chapter-II, all the relevant issues concerning in-building telecom infrastructure have been analyzed. Chapter-III summarizes the recommendations made by the Authority.

CHAPTER-II: IN-BUILDING TELECOM INFRASTRUCTURE - ISSUES INVOLVED

A. Need for regulatory intervention

- 2.1 The right type and amount of telecom infrastructure is necessary for providing a variety of telecommunication services with desired Quality of Service. Besides timely availability of telecom services, one of the most important factors is that the choice of TSP should remain with the consumers. The entry of TSPs in premises is dependent upon the wish of the builder/developer/RWA. The speed of deployment is often hindered by building owners/building developers due to delay in negotiations or demand for exorbitant rents. At times, in-building telecom infrastructure is setup by a TSP or an IP-I through exclusive commercial agreement with the builder/developer /Resident Welfare Associations (RWA). Due to restricted access to the premises, the residents of the building are not able to avail the telecom services of the TSP of their choice; their choice is limited to the TSP(s), who could get the access to the building after entering into a commercial settlement with the builder. Thus, the residents get deprived of the benefits of competition.
- 2.2 In light of above, in the Consultation Paper, the stakeholders were asked to comment whether there is a need of regulatory intervention/guidelines or the market is capable of taking care of these issues.

Comments of the stakeholders

- 2.3 In response, a number of stakeholders submitted that there is a need for a framework to ensure that access to residential/commercial complexes is made available to TSPs in a timely manner on fair, reasonable, transparent and non-discriminatory terms. Some stakeholders are of the view that since in-building solutions complement the outdoor coverage, there is a need to make policies that will facilitate the installation of

indoor telecom infrastructure. Some stakeholders submitted that uniform guidelines, applicable on a pan-India basis, shall be an excellent initiative towards bringing about improvements in indoor network coverage and QoS.

- 2.4 Some stakeholders are of the view that regulatory intervention is required for the existing as well as in new multi-tenant private buildings, while a few stakeholders have suggested that for the existing private residential and commercial buildings, regulatory intervention is not required and commercial arrangements in such cases should be left to market forces and mutual agreements, as TSPs have invested sufficient CAPEX/OPEX based on their business viability.
- 2.5 Some stakeholders are of the view that though there is a need to address the issues discussed in the consultation paper, there are various issues requiring coordination with local municipal authorities and prevailing building byelaws etc., which do not fall within TRAI ambit.

Analysis

- 2.6 The Authority has carefully examined the comments of the stakeholders. In general, stakeholders have supported the idea of framing policy for facilitating the installation of the in-building telecom infrastructure and related issues. It is important to provide indoor building solutions in important public/commercial complexes, offices, hospitals, malls, educational institutions, airports, metro stations/routes, railway stations and other such places having large footfalls. Therefore, the Authority, concurs with the views of the stakeholders that there is a requirement to evolve a framework applicable to in-building facilities to enable the TSPs to obtain access on reasonable terms and conditions. Failure to share infrastructure would unreasonably restrict competition.

B. Mandatory Sharing of In-Building Telecom Infrastructure

- 2.7 It is important for all TSPs to provide mobile coverage/network presence inside large public places/residential complexes/commercial complexes to improve QoS of their networks. However, it is not practical to install individual in-building infrastructure by all TSPs as this will result in multiplication of network, thereby entailing huge avoidable cost. Sometimes, it may not be feasible/advisable to lay cables again and again by different TSPs. Such situation cause inconvenience to the residents, particularly after the completion of the building construction. It will be desirable if one or a few TSPs/IP-I providers put in place the required telecom infrastructure inside the buildings and others share this infrastructure. In this context, the stakeholders were asked to suggest how sharing of telecom infrastructure inside a residential or commercial complex/airport/hotels/multiplexes etc. be encouraged among service providers. The stakeholders were also requested to comment upon whether the sharing of such telecom infrastructure be made mandatory.

Comments of the stakeholders

- 2.8 Many stakeholders submitted that access to public buildings, including transit hubs like Airports, Metro Stations, railways stations, commercial-complex, Private Residential building, hotels etc should be on non-discriminatory basis. Some of them have suggested that all TSPs should get access in all Government buildings/Government properties to install telecom infrastructure including in-building solution. Some stakeholders recommended that it should be made mandatory upon building owners/societies/RWAs etc to allow the access of TSPs (Access Service Providers/ISPs/IP-Is) without any charge. A few stakeholders submitted that TSP or IP-I should be dissuaded from entering into contracts/arrangements with the owner of the building which put a condition of exclusivity. One stakeholder suggested that if a TSP wants to provide the coverage in a building where telecom infrastructure is

already deployed by some other TSP/IP-I but the sharing of existing infrastructure is not possible due to any reason, then that TSP should also be allowed to install its infrastructure in the building.

2.9 On the issue of mandating sharing of in-building telecom infrastructure, some stakeholders submitted that sharing of the telecom infrastructure in large public places like Airports, Commercial complexes, hotels, multiplexes, large residential complexes etc. needs to be mandated. This will ensure availability of services from all TSPs and will also lead to avoidance of duplicate infrastructure and cost reduction. However, these stakeholders were of the view that for sharing the infrastructure, the commercial terms and conditions should be left to mutual agreement as there are various complexities involved in installation of in-building infrastructure which can only be dealt on a case-to-case basis. As an example, they submitted that the cost of installing antennas which support multiple bands/ multiple operators using different technologies/ equipments is more than the cost of those equipments that do not support such features. Further, equipment such as these might not be of use for every service provider as operators might use different solutions/technology depending on their individual requirements and business case. One of them suggested that in the first phase, the commercial aspect should be left to market forces and a review can be carried out once in two years for evaluating the effectiveness of such mandatory sharing.

2.10 Some of the stakeholders were not in favour of mandating the sharing of in-building telecom infrastructure, stating that there are various technical complexities involved in the installation of In-building infrastructure and sharing of IBS/DAS depends on several factors such as coverage, capacity, QoS requirement, technical feasibility, type of IBS etc. Mandating the sharing will infuse inefficiency in the current system and will hamper healthy competition as well as disincentivize creation of infrastructure. It is suggested that the sharing can be improved with creation of standardized guidelines for architectural planning and

mandating the developers to provide basic infrastructure like Telecom Room, Cable Trays, Ducts etc.

Analysis

- 2.11 Traditionally, 2G mobile services have been provided mainly by installing macro sites mounted on mobile towers infrastructure. However, with increase in usage for voice and data services, such macro cells, at times, do not prove adequate to provide seamless and good quality service inside the buildings.
- 2.12 IBS Solutions help in improving coverage and capacity inside the building. By offloading traffic from macro cell networks, in-building solutions ensure a higher quality of service with fewer dropped calls. By using small cells or DAS, it becomes possible to provide good coverage inside the building(s); it also minimizes the impact and interference from outside the building and helps in allaying the perceived risk from the relatively higher radiated power levels from macro sites. Therefore, for providing coverage and capacity particularly in large public/ commercial places like malls, airports, hotels, hospitals and enterprise offices, etc., installation of IBS/DAS at various locations may be required. In DAS, a number of TSPs can utilize the same antenna system, eliminating the need of installing multiple antennas distributed across a building. DAS solutions are transparent from a radio frequency (RF) perspective and radio access network (RAN) vendor-agnostic. A single passive DAS solution can be shared by multiple TSPs using different technologies and frequency bands. Service providers can simply “plug-in” and services are available.
- 2.13 IBS sharing reduces the total cost of ownership, since both the investment cost and the maintenance expenses are shared among several TSPs. With only one set of antennas and feeder, it offers significant benefits to the TSPs, without compromising the aesthetics of the building. One such example is the shared telecom network in Delhi Metro Network, where same “leaky cables” are being used by a number

of TSPs for providing mobile coverage inside the Delhi Metro stations and tunnels.

2.14 It may not be practically feasible that each and every TSP installs its own IBS along with associated telecom infrastructure for signal distribution inside those buildings. It won't be good from aesthetics point of view of the building. Further, it is not an economically prudent measure. To make best use of resources and to comply with building owner requirements, TSPs may need to share one or more in-building antenna systems. Therefore, the Authority is of the opinion that it is essential to promote the sharing of IBS. In some of the buildings, there are other telecom facilities which are required to be provided. It includes fixed connections, Internet/broadband connections/leased lines etc and the associated cabling (Copper cables, Optical Fibre Cables, LAN cables etc) and telecom nodes (DSLAM, PABX etc). Therefore, in addition to sharing of IBS, there is a need to promote sharing of other in-building telecom infrastructure.

2.15 As discussed earlier, the incumbent TSP, who has installed its telecom infrastructure inside the building, is generally either not keen to enter into infrastructure sharing agreement with other TSPs or the commercial arrangement sought by it may not be fair and just. Other TSPs are not allowed to create their own infrastructure as permission is not given by the building owners. Access restrictions are caused when RWA/ builder of a residential/commercial complex, Airport etc get into exclusive contracts with one of the TSPs. In such circumstances, usually virtual monopoly is exercised by that TSP.

2.16 The primary objectives of National Telecom Policy (NTP-2012) are maximizing public good by making available affordable, reliable and secure telecommunication and broadband services across the entire country. NTP-2012 targets at providing affordable and reliable broadband-on-demand, to achieve 175 million broadband connections by the year 2017 and 600 million by the year 2020 at minimum 2 Mbps

download speed and making available higher speeds of at least 100 Mbps on demand. The objective of high speed broadband at affordable rates would require all measures to prevent avoidable cost in the network roll-outs. Building telecom infrastructure such as cables, fibres, IBS / Micro BTS / HetNet (Heterogeneous Network) etc inside the building and sharing it with other TSPs at reasonable terms and conditions will not only help in provisioning of telecom services including high speed broadband but also facilitate in reduction of the cost of these services.

2.17 In view of the foregoing discussion, the Authority is of the view that considering the requirement of ubiquitous voice and data network inside the large public places/commercial complexes/residential complexes and considering the fact that it is not practical for each TSP to put its IBS and other telecom infrastructure inside such complexes, the requirement of sharing the in-building telecom infrastructure including IBS has become inevitable. Therefore, TSP/IP-I should be mandated to share the in-building infrastructure with other TSPs, in large public places like Airports, hotels, multiplexes, etc., commercial complexes and residential complexes. Further, the TSPs/IP-Is should be categorically disallowed to enter into any kind of agreement or contract, which results in exclusive access or lessening of competition. Indulgence into such a practice, through either formal or informal arrangement, may be treated as violation of the license agreement/registration.

2.18 For sharing of in-building telecom infrastructure to be effective, the Authority is of the view that a time-bound system should be developed, which may, *inter-alia*, mandate that a seeker-TSP i.e. TSP who wish to access the Cables/IBS system of an existing TSP/IP-Is (provider-TSP) to place its requirement in writing to provider-TSP and the provider-TSP may be mandated to respond in writing within 30 days time. In case of denial to the access to its infrastructure, provider-TSP to give reasons and justification in writing to seeker-TSP. Regarding commercial terms

and conditions of such an arrangement, the Authority is also of the view that the same may be decided by the provider-TSP. However, the same should be done in transparent, fair and non-discriminatory manner.

2.19 In view of the above, **the Authority recommends that**

- (i) Considering the requirement of ubiquitous voice and data network inside the large public places/commercial complexes/residential complexes and considering the fact that it is not practical for each TSP to put its IBS and other telecom infrastructure inside such complexes, the requirement of sharing the In-building telecom infrastructure including IBS has become inevitable. Therefore, TSPs/IP-Is should be mandated to share the in-building infrastructure (IBS, OFC and other cables, ducts etc) with other TSPs, in large public places like Airports, hotels, multiplexes, etc., commercial complexes and residential complexes.**
- (ii) The TSPs/IP-Is may be categorically disallowed to enter into any kind of agreement or contract, which results in exclusive access or lessening of competition. Indulgence into such a practice, through either formal or informal arrangement, may be treated as violation of the license agreement/registration.**
- (iii) To make it more effective, the Authority recommends that a system (time bound) may be developed, which may, *inter-alia*, include:**
 - a. The seeker-TSP i.e. who wish to access the Cables/IBS installed by an existing TSP/IP-I (provider-TSP), should place its requirement in writing to such provider-TSP.**
 - b. The provider-TSP shall respond in writing within 30 days time. In case of denial of request to access the infrastructure, the provider-TSP shall give reasons and justification for denial.**

(iv) Commercial terms for sharing of the in-building telecom infrastructure system, may be decided by the provider-TSP. However, the same shall be done in transparent, fair and non-discriminatory manner.

C. Provisions to be included in the National Building Code of India to facilitate Telecom Installation inside a building

2.20 Robust telecom infrastructure, being the bedrock for reliable telecom services, should be developed in a planned manner so as to cater to the existing and future demand in an efficient manner. One possible option could be that the local administration makes it mandatory to have adequate provision for ducts/optical fibre and IBS while approving/clearing the construction of new facilities, such as multiplexes, malls, hotels. The provisions should be such that it should facilitate access to all the TSPs to provide telecom services to the residents/tenants of the society/building. The Authority, in its recommendations on “Delivering Broadband Quickly: What do we need to do?” dated April 17, 2015, examined the issue of ensuring access mechanism for the telecom services in the residential/commercial complexes and stated that:

“There is a need to change building by-laws which currently deem only electricity, water and fire safety as necessary infrastructure for the issue of a completion certificate. Including mandatory inclusion of either ducts/optical fibre with well defined access mechanisms in all upcoming office complexes, commercial spaces and residential complexes would have a significant and measurable net positive impact on BB penetration.”

2.21 It is understood that Bureau of Indian Standards (BIS) is in the process of framing ‘National Building Code of India’ under which some provision of Common Telecom Infrastructure (CTI) housed inside the buildings for convenient provision of telecom services are being envisaged. It is essential that suitable enabling provisions may be kept in the National Building Code.

2.22 As discussed in the consultation paper on the subject, similar initiatives have already been taken in other countries. In Singapore, the Code of Practice for Infocomm Facilities in buildings (COPIF) which is issued by Infocomm Development Authority of Singapore (IDA), the regulator, provides for mandatory provisions for info-communication facilities inside the building. The COPIF lays down the detailed specifications of the space and facilities which developers or owners of buildings are to provide under this Code in order to enhance the range and/or quality of info-communication services that may be provided to their buildings by telecommunication system licensees. It is used by Facility Based Operators (FBOs) providing services to the tenants. Developers or owners are required to submit their building plans for IDA's approval prior to the construction of building.

2.23 In Hong Kong, the Communication Authority (CA) has granted authorization to the Network Operators under section 14 of the Telecommunications Ordinance (Cap 106) to enable these licensees to have legal rights to install and provide in-building telecommunications systems (IBTS), for the conveyance of telecommunications and broadcasting services to the occupiers of the building. In April 2012, CA issued "Code of Practice (COP) for the provision of access facilities in Buildings for the supply of Telecommunication and Broadcasting services.

2.24 In the 2014 Broadband Cost Reduction Directive², the European Commission set out specific infrastructure requirements aimed at increasing broadband speeds and provision across the European Union. In addition to a number of measures to reduce cost of providing broadband, the Directive requires that new buildings and major renovations must include a minimum standard of in-building physical infrastructure and providers of high-speed networks must have certain rights to access this infrastructure.

² DIRECTIVE 2014/61/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 15th May 2014 on measures to reduce the cost of deploying high-speed electronic communications networks

“Article 8: In-building physical infrastructure: Member States shall ensure that all newly constructed buildings at the end-user's location, including elements thereof under joint ownership, for which applications for building permits have been submitted after 31 December 2016, are equipped with a high-speed-ready in-building physical infrastructure, up to the network termination points. The same obligation applies in the event of major renovation works for which applications for building permits have been submitted after 31 December 2016.”

2.25 In this backdrop, the stakeholders were requested to provide their comments on what provisions should be included in the National Building Code of India to facilitate unhindered access for all TSPs.

Comments of the stakeholders

2.26 There is almost a consensus that mandating creation of Common Telecom Infrastructure (CTI) with defined access mechanism in all new buildings and buildings undergoing rehabilitation is necessary. It should be made mandatory in the National Building Code that buildings are constructed in such a way that they are ‘Telecom Infrastructure deployment’ ready. A number of stakeholders submitted that International best practices should be incorporated in to the National Building Code.

2.27 Some of the stakeholders have submitted that the builder/owners/developers of the new buildings (commercial or residential) should be mandated to create a standardized telecom infrastructure through the National Building Code. Such standards should include creation of a Telecom Room, horizontal and vertical dedicated trays for cable/HDPE ducts laying, planned underground concrete ducts/pathways for cable/ducts, power and backup generator arrangements. The TSPs and other infrastructure providers should be able to connect their fiber in their telecom rooms.

2.28 Some stakeholders were of the view that new buildings and the building undergoing major renovation should be given Completion Certificate only after they submit compliance on provision of Common Telecom

Infrastructure. As per some stakeholders, the respective circle Telecom Enforcement Resource and Monitoring (TERM) cells can be made responsible for approving the common telecom infrastructure facilities to be created within the building and to provide the 'Telecom Infrastructure Completion Certificate' to the building. One stakeholder has opined that Expert committee / focus group should be formed under TEC to lay down the standards/guidelines for installation of common telecom infrastructure, which should be followed by building owners.

2.29 Some stakeholders commented that TSPs should be given legal rights to use the common telecom infrastructure within a building and its premises free of charge just like other essential services like water and electricity. Many stakeholders have opined for mandating the availability of power at the Government regulated industrial rates to avoid any arbitrariness and indulgence in anti-competitive practices by the building owners.

2.30 Some of the stakeholders have opined that there should be a cap on the rental to be charged by property owner like Mall/ Hotel/ Airport Commercial Complex etc. The rent of IBS space in such buildings may be regulated based on circle rate of the area/ locality with yearly escalation. Some have also suggested that for the space needed to install the equipments, the rent should not be more than 25% of general rent with upper cap of Rs. 50 per sq feet per month. One of the stakeholders has submitted that TRAI should address the issue of exorbitant rent by recommending rental ceiling which can be referred as a benchmark for determination of realistic price/ rental to be paid by the TSP to avail common telecom infrastructure.

Analysis

2.31 Installing physical telecom infrastructure for telecom services is cost effective and less disturbing for residents, if it is done at the time of construction of building. When buildings are equipped with the necessary infrastructure in a planned manner, TSPs can install cables

or other active equipment quicker and at significantly lower costs, allowing them to offer their services faster and to more citizens. Therefore, there is an urgent need to change the way infrastructure is created in the country i.e. the infrastructure developed should be telecom ready - not only considering the present requirement but also future demand and changes. The infrastructure should be created in such a manner that it provides equitable and easy access, which does not restrict competition.

2.32 With increasing digitization, telecommunication services have become basic necessity for the people. Telecommunication services should not be seen a source of revenue generation for building owners as ultimately all the costs incurred by TSPs are passed on to the end consumer in form of tariff for telecom services.

2.33 Building Bye-Laws are legal tools used to regulate coverage, height, building bulk, and architectural design and construction aspects of buildings so as to achieve orderly development of an area. Recently, Town and Country Planning Organization (TCPO), Ministry of Urban Development has issued “Model Building Bye-Laws- 2016 (MBBL-2016)” for the guidance of the State Governments, Urban Local Bodies, Urban Development Authorities, etc which is an improvement over the previous Model Building Bye Laws brought out in 2004. MBBL-2016 covers Structural Safety, fire protection and fire safety requirements and other provisions for all types of buildings including High-rise Building regulations, disaster management, green buildings and sustainability provisions, rainwater harvesting, wastewater reuse and recycle and installation of Solar Roof Top PV norms. It also includes the mandatory provision of services duct for sanitation, electric & telecommunication purpose in the High-rise Buildings; however, the subject of Common Telecom Infrastructure has not been comprehensively covered.

2.34 The Authority is of the view that suitable provisions for the creation of Common Telecom Infrastructure (CTI) inside the newly constructed large

public places should form part of the Model Building Bye-Laws. There should be provision of telecom ducts to reach to the accessible parts of the buildings. The telecom ducts to access buildings from outside should invariably be part of the CTI, which could be used by TSPs for laying/putting cables. No building plan should be approved without having a plan for creation of CTI including the duct to access the telecom room inside the building. Completion certificate to a building to be granted only after ensuring that the CTI as per the prescribed standards is in place.

2.35 Denial of access or exclusive permission leads to artificial monopoly or lack of competition. Therefore, access inside the building should be available to TSPs/IP-Is. This will also encourage sharing of infrastructure because the incumbent TSP will have no incentive in not sharing the infrastructure. Therefore, the Authority is of the view that as part of Building Bye-Laws, the builder/RWA should be mandated to ensure that:

- (i) Access to building as well as CTI facilities inside the building should be available on a fair, transparent and non-discriminatory manner and minimum three TSPs/IP-Is should have presence in the building.
- (ii) Public Sector TSP (BSNL / MTNL) should be given access to Government and commercial building.
- (iii) The TSPs/IP-Is should have unrestricted access for maintenance work.
- (iv) The permission to in-building access and/or CTI facilities inside the building should not be seen as a source of revenue generation for builder(s)/RWA(s).
- (v) Charges (rentals/power rates etc.) levied to the TSPs should be fair, transparent and non-discriminatory.

2.36 MBBL-2016 mandates the use of National Building Code of India (NBC) for various construction activities such as provision of structure safety,

construction of gas pipeline, lighting and ventilation, electrical installation, installation of lifts and escalators etc. The National Building Code of India (NBC) is a comprehensive building Code prepared by Bureau of Indian Standards (BIS), formulated to lay down a set of minimum provisions for buildings designed to protect the safety of public with regard to structural sufficiency, fire hazards, health aspects, life safety requirements etc including environmental concerns. The Code was first formulated in the year 1970 at the request of the Planning Commission and was subsequently revised in 1983 and 2005. It serves as a Model Code for adoption by all agencies involved in building construction works.

2.37 Keeping in mind, lot of developments in the techno-legal regime, techno-financial regime, and in respect of changing requirements of cityscapes and life style, BIS has decided to take up a comprehensive revision of NBC. Common Telecom Infrastructure (CTI) housed inside the buildings for convenient provision of telecom services is being envisaged as part of NBC. The Authority is of the view that DoT should ensure that the essential requirement for telecom installations and the associated cabling is met.

2.38 **In view of the above, the Authority recommends that**

- (i) DoT should take up the matter with the Ministry of Urban Development to ensure that Suitable provision for the creation of Common Telecom Infrastructure (CTI) inside the newly constructed public places like Airports, commercial complexes and residential complexes, should form part of the Model Building Bye-Laws.**
- (ii) Government should ensure that the essential requirement for telecom installations and the associated cabling is formed part of National Building Code of India (NBC), being amended by Bureau of Indian Standards (BIS).**

- (iii) The telecom ducts to access the buildings from outside should invariably be part of the CTI, which could be used by TSPs/IP-Is for putting cables; which would ensure unhindered access to TSPs/IP-Is.**
- (iv) No building plan should be approved without having a plan for creation of CTI including the duct to reach to the telecom room inside the building.**
- (v) Completion certificate to a building to be granted only after ensuring that the CTI as per the prescribed standards is in place.**
- (vi) As part of Building Bye-Laws, the builder/RWA should be mandated to ensure that:**
 - a. Access to building as well as CTI facilities inside the building should be available on a fair, transparent and non-discriminatory manner and minimum three TSPs/IP-Is should have presence in the building.**
 - b. Public Sector TSP (BSNL / MTNL) should be given access to Government and commercial buildings.**
 - c. The TSPs/IP-Is should have unrestricted access for maintenance work.**
 - d. The permission to in-building access and/or use of CTI facilities inside the building should not be seen as a source of revenue generation for builder(s)/RWA(s).**
 - e. Charges (rentals/power rates etc.) levied to the TSPs should be fair, transparent and non-discriminatory.**

CHAPTER-III: SUMMARY OF RECOMMENDATIONS

1. The Authority recommends that

- (i) Considering the requirement of ubiquitous voice and data network inside the large public places/commercial complexes/residential complexes and considering the fact that it is not practical for each TSP to put its IBS and other telecom infrastructure inside such complexes, the requirement of sharing the In-building telecom infrastructure including IBS has become inevitable. Therefore, TSPs/IP-Is should be mandated to share the in-building infrastructure (IBS, OFC and other cables, ducts etc) with other TSPs, in large public places like Airports, hotels, multiplexes, etc., commercial complexes and residential complexes.**
- (ii) The TSPs/IP-Is may be categorically disallowed to enter into any kind of agreement or contract, which results in exclusive access or lessening of competition. Indulgence into such a practice, through either formal or informal arrangement, may be treated as violation of the license agreement/registration.**
- (iii) A system (time bound) may be developed, which may, *inter-alia*, include:
 - a. The seeker-TSP i.e. who wish to access the Cables/IBS installed by an existing TSP/IP-I (provider-TSP), should place its requirement in writing to such provider-TSP.**
 - b. The provider-TSP shall respond in writing within 30 days time. In case of denial of request to access the infrastructure, the provider-TSP shall give reasons and justification for denial.****
- (iv) Commercial terms for sharing of the in-building telecom infrastructure system, may be decided by the provider-TSP. However, the same shall be done in transparent, fair and non-discriminatory manner.**

(Para 2.19)

2. The Authority recommends that

- (i) DoT should take up the matter with the Ministry of Urban Development to ensure that Suitable provision for the creation of Common Telecom Infrastructure (CTI) inside the newly constructed public places like Airports, commercial complexes and residential complexes, should form part of the Model Building Bye-Laws.**
- (ii) Government should ensure that the essential requirement for telecom installations and the associated cabling is formed part of National Building Code of India (NBC), being amended by Bureau of Indian Standards (BIS).**
- (iii) The telecom ducts to access the buildings from outside should invariably be part of the CTI, which could be used by TSPs/IP-Is for putting cables; which would ensure unhindered access to TSPs/IP-Is.**
- (iv) No building plan should be approved without having a plan for creation of CTI including the duct to reach to the telecom room inside the building.**
- (v) Completion certificate to a building to be granted only after ensuring that the CTI as per the prescribed standards is in place.**
- (vi) As part of Building Bye-Laws, the builder/RWA should be mandated to ensure that:**
 - a. Access to building as well as CTI facilities inside the building should be available on a fair, transparent and non-discriminatory manner and minimum three TSPs/IP-Is should have presence in the building.**
 - b. Public Sector TSP (BSNL / MTNL) should be given access to Government and commercial buildings.**
 - c. The TSPs/IP-Is should have unrestricted access for maintenance work.**
 - d. The permission to in-building access and/or use of CTI facilities inside the building should not be seen as a source of revenue generation for builder(s)/RWA(s).**
 - e. Charges (rentals/power rates etc.) levied to the TSPs should be fair, transparent and non-discriminatory.**

(Para 2.38)

ABBREVIATIONS

S.No.	Abbreviation	Expansion
1.	BIS	Bureau of Indian Standards
2.	BTS	Base Transceiver Station
3.	CTI	Common Telecom Infrastructure
4.	DAS	Distributed Antenna System
5.	DoT	Department of Telecommunications
6.	DTH	Direct To Home
7.	HDPE	High Density Polyethylene Pipes
8.	HetNet	Heterogeneous Networks
9.	IBS	In-Building Solution
10.	IP-I	Infrastructure Provider Category I
11.	ISP	Internet Service Provider
12.	LAN	Local Area Network
13.	NBC	National Building Code of India
14.	NTP	National Telecom Policy
15.	OFC	Optical Fibre Cable
16.	OHD	Open House Discussion
17.	PSU	Public Sector Undertaking
18.	QoS	Quality of Service
19.	RERA	Real Estate Regulatory Agency
20.	RWA	Resident Welfare Association
21.	TEC	Telecommunication Engineering Centre
22.	TERM Cell	Telecom Enforcement, Resource and Monitoring Cell
23.	TRAI	Telecom Regulatory Authority of India
24.	TSP	Telecom Service Provider
25.	UASL	Unified Access Service Licence
26.	Wi-Fi	Wireless Fidelity