India

Country Profile	
Regulator	Telecom Regulatory Authority of India
Acronym	(TRAI)
Website	https://trai.gov.in/
Twitter	https://twitter.com/TRAI
Contact	ap@trai.gov.in
Ministry	Department of Telecommunications, Ministry of Communications
Acronym	(DoT)
Website	http://dot.gov.in/
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National Policy

The policy and regulatory framework governing telecommunications in India comprises various acts, guidelines, rules, etc.

<callout type="tip" icon="true"> List of primary statutes which regulates telecommunications sector in India:

1. The Indian Telegraph Act, 1885
2. The Indian Wireless Telegraphy Act, 1933
3. Telecom Regulatory Authority of India (TRAI) Act, 1997
4. Telecom Policies formulated by the Government from time to time. Example:
    - National Broadband Policy, 2004
    - National Telecom Policy, 2012
    - National Digital Communications Policy, 2018

</callout>

The Indian Telegraph Act, 1885 is the primary legislation underlying the regulatory framework for telecommunications in India. It prescribes various powers of the government to operate and regulate telecommunication services in India. [1)] The main objective of the Telegraph Act, when enacted in 1885, was to give power to the Government to install telegraph lines on private as well as public property. [2)] Since then, this act has undergone multiple amendments to accommodate new technologies in communication.

<callout type="default" icon="true"> Definition of Telegraph according to the Telegraph Act : *"telegraph" means any appliance, instrument, material or apparatus used or capable of use for transmission or reception of signs, signals, writing, images and sounds or intelligence of any nature by wire, visual or other electro-magnetic emissions, Radio waves or Hertzian waves, galvanic, electric or magnetic means.* </callout> The Telegraph Act gives the Central Government the exclusive privilege in respect of telegraphs and the power to grant licenses. [3)] At present, the Department of Telecommunications (DoT) under the Ministry of Communications grants licenses and approvals to telecom service providers (TSPs) in India.

The main objective of the Indian Wireless Telegraphy Act, 1933 is *to regulate the possession of*

wireless telegraphy apparatus. This Act prohibits the possession of wireless telegraphy apparatus, unless a license has been given in that regard by the telegraph authority constituted under the telegraph act. [4)] At present, DoT issues the license to possess wireless telegraphy apparatus.

With the liberalisation of the telecom sector and entry of private players in the 90s, the need for independent regulation became inevitable. Thus, The Telecom Regulatory Authority of India (TRAI) was established w.e.f. 20th February 1997 by an Act of Parliament, called the Telecom Regulatory Authority of India Act, 1997, to regulate telecom services, including fixation/revision of tariffs for telecom services which were earlier vested in the Central Government. [5)]The TRAI Act also provides for a Telecom Disputes Settlement and Appellate Tribunal (TDSAT) to adjudicate any dispute between licensors (i.e. DoT) and licensee, between two service providers, and between service providers and a group of consumers .[6)]

Telecommunication services play an important role in socio-economic development, and thus the DoT also formulates developmental policies for the accelerated growth of the telecommunication services in India, apart from the grant of licenses . [7)]

<callout type="tip" icon="true"> DoT has been coming up with telecommunications policy statements at a regular interval. List of Telecom Policies (in chronological order):

1. National Telecommunications Policy, 1994
2. New Telecom Policy, 1999
3. Broadband Policy, 2004
4. National Telecom Policy, 2012
5. National Digital Communications Policy, 2018

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The most recent telecom policy is National Digital Communications Policy (NDCP), 2018 . Unveiled by the Government in 2018, the Policy attempts to outline a set of goals, initiatives, strategies and intended policy outcomes. The Policy aims to accomplish the following Strategic Objectives by 2022: [8)]

- Provisioning of Broadband for All
- Creating 4 Million additional jobs in the Digital Communications sector
- Enhancing the contribution of the Digital Communications sector to 8% of India's GDP from 6% in 2017
- Propelling India to the Top 50 Nations in the ICT Development Index of ITU from 134 in 2017
- Enhancing India's contribution to Global Value Chains
- Ensuring Digital Sovereignty

It is also important to re-look at the statutes discussed above with regard to explicit provisions for connectivity in rural and remote areas, community networks, etc.

To begin with, the mission of DoT as listed on its website has a special emphasis to connectivity in rural areas: [9)]

<callout type="success" icon="true"> DoT's Mission: *To develop a robust and secure state-of-the-art telecommunication network providing seamless coverage* ***with special focus on rural and remote areas*** *for bridging the digital divide and thereby facilitate socio- economic development* </callout>

The NDCP 2018 mentions specific initiatives for broadband connectivity in rural areas. Although the term "Community Networks" does not explicitly appear in the NDCP document, the term "Public Wi-

Fi" finds a mention. One of the goals of the "Connect India" Mission in NDCP 2018 is to *"enable deployment of public Wi-Fi Hotspots; to reach 5 million by 2020 and 10 million by 2022"* [10] NDCP mentions the promotion of Open Public Wi-Fi Access through W-Fi/ Public Data Office Aggregators and Public Data Offices as a strategy to catalyze investments in the Digital Communications Sector. [11] Prime Minister Wi-Fi Access Network Interface (PM-WANI) initiative of DoT was launched in 2020 to take forward the NDCP's goal of creating a robust digital communication infrastructure through deployment of Public Wi-Fi Hotspot. [12]

NDCP 2018 also strives to ensure inclusion of uncovered areas and digitally deprived segments of society by channelizing the Universal Service Obligation Fund (USOF) and by reviewing the scope and modalities of USOF. [13]

With regard to rights of indigenous people over the use of natural resources such as spectrum, the NDCP 2018 doesn't mention this explicitly; though it recognizes spectrum as a key natural resource for public benefit. [14]

In the mission of "Connect India", NDCP provides for the establishment of the National Broadband Mission (NBM) as a strategy. In the NBM various initiatives have been suggested to increase connectivity in rural and remote areas. Under the Bharat Net initiative (a flagship project of the Government of India which aims to connect 2.5 lakh gram panchayats across India with Optical Fibre Cables), NDCP targets provision of 1 Gbps (upgradeable to 10 Gbps) to every gram panchayat. The GramNet initiative aims to connect all rural development institutions with 10 Mbps (upgradeable to 100 Mbps). To increase last-mile connectivity, Jan Wi-Fi initiative aims to establish 2 Million Wi-Fi Hotspots. [15]

<callout type="success" icon="true">

Apart from the large programs, some smaller initiatives have also been taken by the Government *to connect the unconnected*. Examples of such initiatives include:

- The Department of Telecom executed a project for providing Mobile Services in 2199 locations in Andhra Pradesh, Bihar, Chhattisgarh, Jharkhand, Maharashtra, Madhya Pradesh, Odisha, Telangana, Uttar Pradesh and West Bengal, which are affected by Left Wing Extremism (LWE). [16]
- The Comprehensive Telecom Development Program for the North East region aimed to connect 8261 villages through installation of 6000 mobile tower sites.[17]

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Operator Licensing

The operator licensing framework in India dates back to The Indian Telegraph Act, 1885. Section 4 of the Telegraph Act gives the Central Government the power to grant license *to any person to establish, maintain or work a telegraph within any part of India.* [18]

Although the provision for licensing was always present in the Telegraph Act, the Government had complete monopoly in telecommunications until the early 1990s. It was only in 1992 that the government first allowed licensing in the telecom sector. Listed below in the table are the major landmarks in the history of telecom licensing in India.

Table: Major Landmarks in the History of Telecom Licensing in India [19)]

Year	Event in the History of Telecom Licensing
1991	The government allowed private telecom companies to manufacture telecom switches for telephone exchange.
1992	The Department of Telecommunication (DoT) invited bids for licences for cellular service across the four metros. The DoT offered two licences per metro city.
1994	The Government brought National Telecom Policy which laid out the criteria for entry of private operators.
1995	DoT allowed bidding for cellular licences and wireline licences. Spectrum was bundled with the telecom service provider licence. For the implementation of the licensing scheme, the country was divided into 21 circles (excluding four metros) and it was categorized into circles namely A, B and C on the basis of the potential of the circle to generate revenue.
1998	Internet services were rolled out in 1995 by Videsh Sanchar Nigam Limited (VSNL). In November, 1998, the government opened it up to the private sectors.
1999	The New Telecom Policy, 1999 allowed the migration of the licensees from a Fixed Licence Fee Regime to a Revenue Arrangement Scheme. Under the new scheme a licence fee was collected as proportional tax on the service provider's revenue. Previously, there were two operators in each circle and the 1999 Policy allowed the government to open it up to the private sectors.
2000	The government issued a licence for national long distance telephony (NLDO). There was no restriction on the number of operators to whom the licence was granted. The licence was issued for a period of 20 years on a non-exclusive basis and could be extended upto a period of 10 years once government as the third operator in the circle.
2001	Licence for basic telephone services using wireless in local loop (WLL). This was the first time that the first-come-first-serve scheme was implemented for issuing licences.
2002	DoT issued licenses to private operators for International Long Distance Telephony (ILD) services.
2003	
2007	DoT allowed issuing of licences for operating on dual technologies that are CDMA and GSM. DoT also allowed a single licence for Internet Service Providers (ISPs), but restrictions were put on VoIP.
2012	National Telecom Policy, 2012 introduced Unified Licensing Regime. Under the regime, service operators can provide converged services. The spectrum has been delinked from the licence.

<callout type="success" icon="true"> NTP 2012 listed down as one of its objectives to *simplify the licensing framework to further extend converged high quality services across the nation including rural and remote areas.* </callout>

Telecom licensing in India underwent a major transformation with the implementation of the "Unified License (UL)" regime in 2013. This regime was implemented to achieve one of the objectives envisaged in NTP 2012: *One Nation - One License across services and service areas.* [20)]

In NTP 2012, it was recognized that the evolution from analog to digital technology has facilitated the conversion of voice, data and video to the digital form, and these are now increasingly being rendered through single networks bringing about a convergence in networks, services and also devices. [21)]

<callout type="default" icon="true"> The preamble of NTP 2012 states: *"it is now imperative to move towards convergence between various services, networks, platforms, technologies and overcome the existing segregation of licensing, registration and regulatory mechanisms in these areas to enhance affordability, increase access, delivery of multiple services and reduce cost.* [22)]
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The UL regime replaced the earlier regime in which there were separate licenses for different telecommunication services. In this regime, telco players can offer all telecommunication services under one license; service authorisation for different telecom services will have to be done separately under UL, however.

Listed below are the basic features of Unified Licenses [23] :

1. The allocation of spectrum is delinked from the licenses and has to be obtained separately as per prescribed procedure. At present, spectrum in 800/900/1800/2100/2300/2500 MHz band is allocated through bidding process. For all other services and usages like Public Mobile Radio Trunking Service (PMRTS), the allocation of spectrum and charges thereof shall be as prescribed by Wireless and Planning and Coordination wing of Department of Telecommunications from time to time.
2. Authorisation under Unified License comprises for any one or more services listed below:
    1. Unified License (All Services)*
    2. Access Service (Service Area-wise)
    3. Internet Service (Category-A with All India jurisdiction)
    4. Internet Service (Category-B with jurisdiction in a Service Area)
    5. Internet Service (Category-C with jurisdiction in a Secondary Switching Area)
    6. National Long Distance (NLD) Service
    7. International Long Distance (ILD) Service
    8. Global Mobile Personal Communication by Satellite (GMPCS) Service
    9. Public Mobile Radio Trunking Service (PMRTS) Service
    10. Very Small Aperture Terminal (VSAT) Closed User Group (CUG) Service
    11. INSAT MSS-Reporting (MSS-R) Service
    12. Resale of International private Leased Circuit (IPLC) Service

(* Authorization for All Services UL covers all services listed in 2(b) in all service areas, 2©, 2(f) to 2(l) above)

While introducing the UL regime, DoT decided to implement it in two phases. In the first phase, spectrum was delinked from license. In the second phase, the concept of “Virtual Network Operators (VNO)” was introduced to facilitate delinking of licensing of networks from the delivery of services. [24] VNO allows Telecom Service Providers (TSPs) to utilize their networks and spectrum in an efficient manner by sharing active and passive infrastructure, and also facilitates resale at service level.

UL (VNO) is a regime parallel to UL. It offers all authorisations as available in the UL. In addition, it offers an authorisation for the ‘Access Services Category B’ wherein the service area is a District of a State/Union Territory. [25]

Listed below are the basic features of UL (VNO):

1. VNOs are treated as extension of Network Service Operators (NSOs) or TSPs. They will not be allowed to install equipment interconnecting with network of other NSOs.
2. Applicant can apply for UL (VNO) along with VNO authorisation for any one or more services below:
    - Unified License VNO (All Services)
    - Access Services Category B* (This is additional in case of UL (VNO), Other authorization categories are same as UL, thus not listed here)

<callout type=“success” icon=“true”> Licensing framework for internet services allows three options (options= authorization options available under UL/ UL(VNO) regime): Category-“A” (All India/

National), Category-“B” (Telecom Circle/ Licensed Service Area), Category- “C”. Thus, there is flexibility of area of operations through three different authorizations (Secondary switching Area) </callout>

<callout type=“question” icon=“true”> Is centralised procedure for granting ISP licenses suitable for local level entrepreneurs, or does it require decentralisation at the Licensed Service Area (LSA) level? [26)]

</callout>

Technical and Administrative Requirements

UL and UL(VNO) can be applied by Indian companies except for Access Service Category B authorisation under UL(VNO) which can be applied for by Indian companies, partnership firms, proprietorship firms, Shops and establishment and legal persons. One company can have only one UL/ UL(VNO). However, the applicant company/applicant can apply for authorisation for more than one service and service area subject to fulfillment of all the conditions of entry.

<callout type=“tip” icon=“true”> Some important resources for UL and UL (VNO)

- DoT’s Guidelines for Grant of Unified License
- DoT’s Guidelines for Grant of Unified License (Virtual Network Operators)
- List of documents required for grant of UL/ authorization for additional services under UL can be found here: See (3) in UL FAQ.

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Licensing Fees

According to DoT’s Guidelines for Grant of Unified License , a licensee has to pay a one-time non-refundable Entry Fee of each service and service area before license agreement is signed. The licensee will need to pay the fees for each subsequent authorisation. In addition to entry fees, the licensee has to pay an Annual License Fees for each authorized service separately. [27)] The license fee is calculated as a percentage of Adjusted Gross Revenue (AGR). At present, the license fee is 8 percent of the AGR: It is inclusive of Universal Service Obligation Levy which is 5 percent of the AGR. [28)]

The table below summarizes processing fees, entry fees, Bank Guarantees, Minimum Paid Up Capital, networth requirements etc.for UL:

Table: Unified Licence: Details of Minimum required Equity, Minimum Net Worth, Entry Fee, PBG, FBG, and Application Processing Fee for various service authorizations [29)]

Sl No.	Service	Minimum Equity in INR(USD)	Minimum Net Worthin INR(USD)	Entry Feein INR(USD)	PBG in INR(USD)	FBG in INR(USD)	Application Processing Fee in INR(USD)
1	UL(All services)	2,50,000k(USD 33,31,092)	1,50,000k (USD 33,31,092)	1,50,000k(USD 19,98,655)	4,40,000k(USD 58,62,722)	88,000k (USD 11,72,544)	100k (USD 1,332)

Sl No.	Service	Minimum Equity in INR(USD)	Minimum Net Worthin INR(USD)	Entry Feein INR(USD)	PBG in INR(USD)	FBG in INR(USD)	Application Processing Fee in INR(USD)
Service Authorisation-wise Requirements							
1	Access Service (Telecom Circle /Metro Area)	25,000k (USD 3,33,109)	25,000k (USD 3,33,109)	10,000 k(USD 1,33,244)(5,000 for NE & J&K)	20,000k (USD 2,66,487)	4,000k (USD 53,297)	50k (USD 666)
2	NLD (National Area)	25,000k (USD 3,33,109)	25,000k (USD 3,33,109)	25,000k (USD 3,33,109)	5,000k (USD 66,622)	10,000k (USD 1,33,244)	50k (USD 666)
3	ILD (National Area)	25,000k (USD 3,33,109)	25,000k (USD 3,33,109)	25,000k (USD 3,33,109)	5,000k (USD 66,622)	10,000k (USD 1,33,244)	50k (USD 666)
4	VSAT (National Area)	Nil	Nil	3,000k (USD 39,973)	1,000k (USD 13,324)	600k (USD 7,995) 50k (USD 666)	
5	PMRTS (Telecom circle/Metro Area)	Nil	Nil	50k (USD 666)	20k (USD 266)	20k (USD 266)	15k (USD 200)
6	GMPCS (National Area)	25,000k (USD 3,33,109)	25,000k (USD 3,33,109)	10,000k (USD 1,33,244)	5,000k (USD 66,622)	2,000k (USD 26,649)	50k (USD 666)
7	INSAT MSS-R (National Area)	Nil	Nil	3,000k (USD 39,973)	40k (USD 533)	40k (USD 533)	50k (USD 666)
8	ISP-A (National Area)	Nil	Nil	3,000k (USD 39,973)	4,000k (USD 53,297)	200k (USD 2,665)	50k (USD 666)
9	ISP “B” (Telecom circle/Metro Area)	Nil	Nil	200k (USD 2,665)	200k (USD 2,665)	20k (USD 266)	15k (USD 200)
10	ISP “C” (SSA)	Nil	Nil	20k (USD 266)	10k (USD 133)	2k (USD 27)	10k (USD 133)
11	Resale IPLC(National Area)	25,000k (USD 3,33,109)	25,000k (USD 3,33,109)	10,000k (USD 1,33,244)	20,000k (USD 2,66,487)	10,000k (USD 1,33,244)	50k (USD 666)

The table below summarizes processing fees, entry fees, Bank Guarantees, Minimum Paid Up Capital, networth requirements etc.for UL-VNO:

Table: Unified Licence (VNO) : Details of Minimum required Equity, Minimum Net Worth, Entry Fee, and Application Processing Fee for various service authorizations

Sl. No.	Service Authorization(s)(VNO)	Minimum Equity in INR(USD)	Minimum Net Worth in INR(USD)	Entry Fee in INR(USD)	FBG in INR(USD)	Application Processing Fee in INR(USD)

Sl. No.	Service Authorization(s)(VNO)	Minimum Equity in INR(USD)	Minimum Net Worth in INR(USD)	Entry Fee in INR(USD)	FBG in INR(USD)	Application Processing Fee in INR(USD)
1	UL (VNO- All Services)	1,00,000k (USD 13,32,437)	1,00,000k (USD 13,32,437)	75,000k (USD 9,99,328)	44,000k (USD 5,86,272)	100k (USD 1,332)
2	Access Service (Telecom Circle/ Metro Area)	10,000k (USD 1,33,244)	10,000k (USD 1,33,244)	5000k (USD 66,622), 2500k (USD 33,311) for NE & J&K)	2,000k (USD 26,649)	50k (USD 666
3	NLD (National Area)	10,000k (USD 1,33,244)	10,000k (USD 1,33,244)	12,500k (USD 1,66,555)	5,000k (USD 66,622)	50k (USD 666)
4	ILD (National Area)	10,000k (USD 1,33,244)	10,000k (USD 1,33,244)	12,500k (USD 1,66,555)	5,000k (USD 66,622)	50k (USD 666)
5	VSAT (National Area)	Nil	Nil	1,500k (USD 19,987)	300k (USD 3,997)	50k (USD 666)
6	PMRTS (Telecom Circle / Metro)	Nil	Nil	25k (USD 333)	10k (USD 133)	15k (USD 200)
7	GMPCS (National Area)	Nil	Nil	25k (USD 333)	10k (USD 133)	15k (USD 200)
8	INSAT MSS-R (National Area)	Nil	Nil	1,500k (USD 19,987)	20k (USD 266)	50k (USD 666)
9	ISP “A” (National Area)	Nil	Nil	1,500k (USD 19,987)	100k (USD 1,332)	50k (USD 666)
10	ISP “B” (Telecom Circle/ Metro Area)	Nil	Nil	100k (USD 1,332)	10k (USD 133)	15k (USD 200)
11	ISP “C” (SSA)	Nil	Nil	10k (USD 133)	1k (USD 13)	10k (USD 133)
12	Resale of IPLC (National Area)	12,500k (USD 1,66,555)	12,500k (USD 1,66,555)	5,000k (USD 66,622)	1,000k (USD 13,324)	50k (USD 666)
13	Access Services Category B (Districts)	-	500k (USD 6,662)	165k (USD 2,199)	20k (USD 266)	10k (USD 133)

Access to Spectrum

Created in 1952, Wireless Planning and Coordination Wing (WPC) of the Ministry of Communications serves as the National Radio Regulatory Authority of India. It is responsible for frequency spectrum management in India. [30)] There are different divisions/ departments which have been assigned distinct functions under the WPC Wing: Licensing and Regulation (LR), New Technology Group (NTG) and Standing Advisory Committee on Radio Frequency Allocation (SACFA). Of the three listed divisions, SACFA is responsible for making recommendations on major frequency allocation issues, formulation of the frequency action plan, making recommendations related to ITU, etc.[31)]

Technical and Administrative Requirements

National Digital Communication Policy (NDCP) 2018 recognizes spectrum as a key natural resource for public benefit to achieve India's socio economic goals; it strives to ensure transparency in allocation and optimise availability and utilisation of spectrum. [32)] Accordingly, a National Frequency Action Plan (NFAP) 2018 has been formulated which aims to provide a roadmap for the availability and allocation of wireless spectrum to facilitate the development and deployment of next generation wireless services in the country. [33)]

Providing a broad regulatory framework, NFAP 2018 identifies which frequency bands are available for different radiocommunication services including cellular mobile service, Wi-fi, sound and television broadcasting, radionavigation for aircrafts and ships, defence and security communications, disaster relief and emergency communications, satellite communications and satellite-broadcasting, and amateur service. [34)] Simply put, allocation of radio-frequency spectrum to different radiocommunication services is the central theme of NFAP 2018. [35)] Notably, NFAP-18 doesn't attempt to list the various applications (uses) of the individual radiocommunication services that are currently authorised or may be authorised in future in India, thus providing a stable yet flexible regulatory framework. [36)]

<callout type="tip" icon="true"> The latest frequency allocation table of India can be found in National Frequency Allocation Table (NFAP) 2018. Follow link. </callout>

Licensed

The year 2010 represented a watershed in spectrum management policies in India. [37)] Pre-2010, spectrum was administratively allocated and was linked to granting of license by DoT. [38)] The first auction for spectrum was held in the year 2010: spectrum in the 2100 MHz band (3G) and 2300 MHz (BWA) was assigned through an online auction. Subsequently, in its February 2012 judgement, Supreme Court (SC) of India quashed spectrum allocation done based on advertisement released in 2008, and ruled that all natural resources , including spectrum should be granted through a market-related process only, such as auction. [39)] As contemplated in National Telecom Policy (NTP) , 2012 the UL regime delinked spectrum from license. [40)].

From 2012 to 2016, DoT conducted multiple rounds of spectrum auctions through Simultaneous Multiple Round Ascending (SMRA) method. The outcome of each round is summarised in below table:

Table: Outcome of Spectrum Auctions from 2010- 16 [41)]

Sl.No	Year of auction	Bands auctioned	Total Spectrum Sold(MHz)	Percentage of Spectrum Sold	Outcome
1	2010	2100 MHz (3G), 2300 MHz	465, 1320	100, 100	Both bands were completely sold.
2	2012	1800 MHz and 800 MHz	127.5	32.69	Only 1800 MHz was (partially)sold.
3	2013	800 MHz,900 MHz and 1800 MHz	30	15.38	Only 800 MHz was (partially)sold.
4	2014	900 MHz and 1800 MHz	353.2	81.91	Both bands were (moderately)sold.

Sl.No	Year of auction	Bands auctioned	Total Spectrum Sold(MHz)	Percentage of Spectrum Sold	Outcome
5	2015	800 MHz, 900 MHz, 1800 MHz and 2100 MHz	418.25	88.85	All bands were (moderately) sold.
6	2016	700 MHz,800 MHz, 900 MHz, 1800 MHz, 2100 MHz, 2300 MHz, and 2500 MHz	964.8	40.97	All bands, except 700 MHz and 900 MHz, were (partially)sold.

<callout type="tip" icon="true"> Spectrum Holding of TSPs as on 25.02.21 can be found here. Spectrum holding data sheet in this article represents the current spectrum holdings across all 22 telecom circles along with their liberalisation status and expiry dates. </callout>

License Exempt

While Section 3 of the Wireless Telegraphy Act prohibits possession of wireless telegraph apparatus unless a license has been issued in that regard, Section 4 of the said Act also provides Central Government the power to exempt persons from certain provisions of this act.

As discussed earlier, NFAP provides a broad regulatory framework and identifies which frequency bands are available for different radiocommunication services. NFAP 2018, which is the most recent NFAP of India, provides for certain license exempt bands as well which have been approved by the Central Government through various rules and notifications.

<callout type="tip" icon="true"> The complete list of wireless equipments exempted from licensing can be found in Annex of NFAP 2018 </callout>

Different telecom policies brought out by the government have also stressed on the need for expanding share of license-exempt bands. Broadband Policy 2004, in order to accelerate growth of broadband and internet initiated the process of delicensing 2.40-2.48 GHz, 2.40- 2.4835 GHz, 5.15-5.35 GHz, 5.25-5.35 GHz, 5.15-5.25 GHz. It also talked about exploring and identifying alternative spectrum bands which are not in high usage and could be deployed for Broadband Services. [42)]

NTP 2012 lists *de-licensing additional frequency bands for public use* as one of the objectives. [43)] NDCP 2018 recognizes spectrum as a key natural resource for public benefit and lists *enabling light touch licensing/ de-licensing of spectrum for broadband proliferations* as a strategy. [44)]

Table: Wireless Equipments exempted from Licensing

S.No	Frequency Range(MHz)	Title of the Rule	GSR No
1	Use of Low Power Equipment in the frequency band 2.4 GHz to 2.4835 GHz (Exemption from Licensing Requirement) Rules, 2005	Use of Low Power Equipment in the frequency band 2.4 GHz to 2.4835 GHz (Exemption from Licensing Requirement) Rules, 2005	

S.No	Frequency Range(MHz)	Title of the Rule	GSR No
2	5150 - 5250 MHz, 5250 - 5350 MHz, 5470-5725 MHz, 5725 - 5875 MHz	Use of Wireless Access Systems (WAS) including Radio Local Area Network (RLAN) in 5GHz (Exemption from Licensing Requirement) Rules, 2018	GSR No. 1048(E) dated 18- Oct.2018 and subsequent amendments, if any.

Secondary

Amongst the telecom policies brought out by the Central Government, only NTP 2012 explicitly mentions White Spaces in management of spectrum. One of the strategies listed in NTP 2012 is *to promote use of white spaces with low power devices, without causing harmful interference to the licensed applications in specific frequency bands by deployment of Software Defined Radios (SDRs), Cognitive Radios (CRs), etc.* [45)]

<callout type="default" icon="true"> "It is observed that unlike developed countries, a major portion of the TV band spectrum is unutilized in India. The results show that even while using conservative parameters, in at least 56.27% areas in the country, all the 15 channels (100% of the TV band spectrum) are free!" [46)] </callout> It is often argued that unused bands in TV UHF (TV White Spaces) can help to boost broadband connectivity in rural and remote areas, if deployed effectively. [47)] TVWS offers unique advantages such as non- line of sight propagation and ease of deployment [48)] TVWS spectrum can be used for rural connectivity in multiple ways: as an affordable backhaul option to connect Wi-Fi clusters eventually terminating into urban-sub-urban or village gram panchayat NOFN nodes; as an alternative to optical fibre in the regions with difficult terrain; or as backhaul to unlicensed Wi-Fi operations in villages or panchayats. [49)] [50)]

However, despite the advantages which TVWS offers, it hasn't seen any widespread deployment yet. This is partially because of the lack of regulation surrounding usage of TVWS in India. India lies in Region 3 of International Telecommunication Union's (ITU) Radio Regulations. According to this regulation fixed, mobile, and broadcasting services in TV UHF Band (470- 585 MHz) are permitted in India. [51)] As per Remark IND 16 in NFAP 2018, "part of the band 470-698 MHz would be made available for International Mobile Telecommunications (IMT) once the current and future usage of the band 470-698 MHz by the broadcasting service is finalized." The Government has also assigned this spectrum band in some cases, but it is solely for the purpose of carrying out experiments in TVWS technology. For example, eight licenses were issued by DoT in March 2016 to ERNET (an autonomous body under the Telecom Ministry), power equipment maker BHEL, IIT Bombay, IIT Delhi, IIT Hyderabad, IIIT Bangalore, Tata Advanced Systems and Amrawati District Administration for the purpose of carrying out experiments in TVWS technology. [52)] However, on the question of allocating 470-582 MHz spectrum band for commercial deployment of TVWS technology, DoT is of the view that this spectrum band will not be de-licensed and will be rather auctioned when the ecosystem is developed for this band. [53)]

<callout type="tip" icon="true">

Some of the projects in India are using TVWS to provide rural broadband connectivity.

- After being granted an experimental license to conduct experiments in the TV UHF band, the TV White Space group, IIT Bombay was the first in India to set up a pilot test-bed using TVWS technology for rural broadband access. [54)] To scale this up, 'Gram Marg' , a rural broadband initiative was started by the Department of Electrical Engineering which uses a combination of TVWS and wireless solutions including those in 5.8 GHz point to point WiFi. [55)]. To know more about Gram Marg initiative, see this .

- In 2015, Microsoft conducted pilots in Harisal village in Maharashtra, Srikakulam in Andhra Pradesh, and Varanasi under its White-Fi initiative which uses TVWS. However, in 2017 Microsoft had to put this project on hold as it was not granted the license to continue operating the pilot project in Harisal. [56)]

</callout>

Spectrum Applications, Fees, Costs, etc.

Central Government prescribes the spectrum usage charges for Telecom Service Providers having License/ Authorization to provide Access Services in exercise of the powers conferred under Section 4 of the Indian Telegraph Act 1885. In the present scenario, companies pay spectrum usage charges (SUC) somewhere in between 3-5 percent of Adjusted Gross Revenue. [57)] In the case where an operator shares spectrum with another operator, they have to pay an additional 0.5 per cent of AGR for that band as SUC. [58)]

<callout type="tip" icon="true"> Links for different type of applications for wireless spectrum:

- Application for a licence to possess Wireless Receiving and or Transmitting Apparatus in India
- Application Form to Operate Wireless Link/ Network under Indian Telegraph Act 1885
- Application for an Experimental Wireless License
- Application for License to establish, maintain, and work Radio Paging Systems
- Application Form for Licence to Establish, Maintain And Operate Wireless Telegraph Stations In India For Short Range Uhf Handheld Radios
- Application Form for a licence to Demonstrate a Wireless Transmitter or a Receiver set

</callout>

Backhaul

'Bharat Net' project, earlier known as National Optical Fibre Network (NOFN), is a flagship project of Government of India which aims to connect 2.5 lakh Gram Panchayats of India through optical fibre network. Viewed as the first pillar of 'Digital India' Programme [59)] BharatNet project aims to provide connectivity for 'middle-mile' : laying of incremental fibre from Block HQs to Gram Panchayats to fill the connectivity gap.

<callout type="default" icon="true">

The Bharat Net fibre can be utilized by service providers in two ways: [60)]

1. **Bandwidth Utilization**: Any service provider/ government agency that intends to provide its services at Gram Panchayat level may connect to BharatNet at block optical line termination (OLT) location from where its traffic is carried to Gram Panchayat (GP) level on BharatNet. At the GP, the service provider has to extend its services to the end-customers using its own last mile.
2. **Dark Fibre Utilization** : Service providers may also utilize the dark fiber on the new cable laid by BBNL between block and GPs, called incremental cable, for extending its services to GPs. The dark fiber is available from Fiber Point of Interconnect (with the existing fiber) to the GPs.

</callout>

<callout type="tip" icon="true"> **Important Resources for Service Providers who plan to utilize NOFN/ BharatNet**

- The tariff for Bharat Net bandwidth and dark fibre can be found here.
- The detailed procedure for Bharat Net connectivity can be found here: Requirements, * Application Form for Bandwidth on Bharat Net , Application form for taking on Lease Dark Fibre on Incremental Cable of Bharatnet, Payment Procedure, etc.
- Block-wise Line Diagram for Bharat Net and BBNL Dark Fibre, Lat-Long of GPs, FPOIs and OLTs for GPs under BharatNet Phase-I

</callout>

The Government of India, from time to time, has come up with various policies and regulations to strengthen and improve access to backhaul.

NDCP 2018 emphasizes on enhancing the backhaul capacity to support the development of next generation networks like 5G. [61)] Specifically, NDCP 2018 mentions promotion of effective utilisation of high capacity backhaul E-band 71-76/ 81-86 GHz) and V-band (57-64 MHz) spectrum, and rationalization of annual royalty charges for microwave links for backhaul connectivity as some of the strategies to improve backhaul connectivity. [62)] With the aim to establish a National Digital Grid, NDCP 2018 mentions facilitating development of Open Access Next Generation Network as a sub-strategy. [63)] In the said notification, active sharing was limited to antenna, feeder cable, Node B, Radio Access network (RAN) and transmission systems. [64)] However, DoT through a notification dated 06.04.2021 widened the scope of active infrastructure sharing further to give a boost to Public Wi-Fi services and drive broadband penetration [65)] : *Sharing of infrastructure related to Wi-Fi equipment such as Wi-Fi router, Access point etc. allowed. Sharing of backhaul also permitted.* [66)]

With regard to internet exchange points (IXPs), the following table provides the list of IXPs operating in India.

Table: Internet Exchange Points in India [67)]

Name of IXP	Website	Locations
NIXI	http://nixi.in	Noida, Mumbai, Chennai, Kolkata, Bangalore, Hyderabad, Ahmedabad and Guwahati
Mumbai IX	https://www.mumbai-ix.net	Delhi, Mumbai, Chennai, and Kolkata
Extreme IX	https://extreme-ix.org	Mumbai, Delhi, Hyderabad, Chennai and Kolkata
AMS-IX India	https://www.ams-ix.net /in	Mumbai
IIFON	http://iifon.org	Kolkata
BharatIX	https://www.bharatix.net	Mumbai

Of the IXPs listed above, National Internet Exchange of India (NIXI) was set up by the government. It was set up in 2003 *for peering of ISPs among themselves for the purpose of routing the domestic traffic within the country, instead of taking it all the way to US/Abroad, thereby resulting in better quality of service (reduced latency) and reduced bandwidth charges for ISPs by saving on International Bandwidth.* [68)]

Gender

India has a stark gender divide when it comes to accessing the internet. According to Kantar ICUBE 2020 Report on Internet Adoption in India , there are overall 622 million active internet users (AIU) in India. Out of which 58 per cent are male and remaining 42 per cent are females. The divide is almost the same in rural and urban India: In rural India, the ratio between male to female internet users is 57:43, whereas for urban areas this ratio is 58:42.

Some of the policies brought out by the Government have tried to address this issue of digital gender divide. The National Digital Communication Policy (NDCP) 2018 lists down a 'Connect India' strategy which provides for inclusion of uncovered areas and digitally deprived segments of society by channelizing the Universal Service Obligation Fund (USOF) for marginalized communities, **women** and persons with disabilities.

The Draft National Policy for Women (NPW) 2016 acknowledges that the global growth in technology and information systems can have an impact on the general populace, and women in particular, in unique and different ways. [69)] NPW also suggests that the growth in Information Technology (IT) has also resulted in new forms of sexual abuse against women including cyber crimes, harassment through mobile and internet, and that the regulatory frameworks are not yet in pace with technological growth happening currently. [70)] NPW 2016 strives to encourage women's participation in new and upcoming industries such as information based industries, telecommunications, etc. [71)] NPW strategizes to collect gender-based data through mobile phones in order to inform policy prescriptions. [72)] In order to encourage girl students/ women to enter into areas of ICT, NPW envisions institutionalization of enabling mechanisms. [73)]

<callout type="tip" icon="true"> Resources for understanding policy environment around gender in India:

1. Policies related to gender and women can be found here
2. All gender related legislations of India can be accessed from here
3. Guidelines with regard to gender, and women in particular can be found here

</callout>

Universal Service

The New Telecom Policy (NTP) 1994 , the first telecom policy statement of India, mentioned universal availability of basic telecom services to all villages as one of its objectives. [74)] However, a more concrete and clearer framework for Universal Service was seen in the New Telecommunication Policy (NTP), 1999 : NTP 1999 had a section dedicated to the Universal Service Obligations (USO) . [75)]

<callout type="default" icon="true"> NTP 1999 explicitly mentioned Universal Service as an important objective: *...Strive to provide a balance between the provision of universal service to all uncovered areas, including the rural areas, and the provision of high-level services capable of meeting the needs of the country's economy; Encourage development of telecommunication facilities in remote, hilly and tribal areas of the country* [76)] </callout>

NTP 1999 provided that a 'Universal Access Levy (UAL)' be raised from all operators under various licences to meet the resource requirement for Universal Service Obligation (USO). [77)]. This levy is

calculated as a percentage of the revenue earned by the operators, and this percentage is decided by the Government in consultation with TRAI. [78] At present, USO Levy is 5 percent of the AGR. [79]

To further the objective enshrined in NTP 1999, DoT issued the guidelines for 'Universal Service Support Policy' in 2002 [80], and a Universal Service Obligation Fund (USOF) was constituted. USOF was accorded statutory status through The Indian Telegraph (Amendment) Act 2003, and subsequently the rules for administration of USOF known as Indian Telegraph (Amendment) Rules, 2004 were notified on 26.03.2004. [81]

<callout type="default" icon="true"> Definition of Universal Service Obligations as per Indian Telegraph Act: *"Universal Service Obligation" means the obligation to provide access to telegraph services to people in the rural and remote areas at affordable and reasonable prices.* </callout>

NTP 2012 laid the foundation for National Optical Fibre Network (NOFN), which is considered to be the most prominent service supported by USO. NTP 2012 provided that the optical fibre network will be laid up to the Village Panchayat by funding from the USOF. [82] Accordingly, Indian Telegraph Rules 1951 was amended to insert a section on NOFN. [83]

NOFN is one example of a service supported by USOF. As per Indian Telegraph (Amendment) Rules 2004 (amended further in 2006 and 2008) , USOF supports a range of services segregated in six different streams.

Table: Services Supported by USOF [84]

Stream of Service	**Sub-Streams/ Explanations**	**Key Projects under each stream and Link to the Project**
Stream-I: Provision of Public Access Service	(a) Operation and Maintenance of Village Public Telephones (VPT) in the revenue villages identified as per Census 1991 and Installation of VPTs in the additional revenue villages as per Census 2001; (b) Provision of Rural Community Phones (RCPs) after achieving the target of one VPT in every revenue village where in a village the population is more than 2000 and no public call office (PCO) exists, a second public phone shall be installed; © Replacement of Multi Access Radio Relay Technology (MARR) VPTs installed before the 1st day of April 2002	O&M of VPTs, New VPTs Phase 1, New VPTs Phase 2; Rural Community Phones (RCPs)
Stream-II: Provision of Household Telephones in Rural and Remote Areas as may be Determined by the Central Government from Time to Time	(a) For rural household Direct Exchange Lines (RDELs) installed prior to 1st day of April, 2002, support towards the difference in rental actually charged from rural subscribers and rent prescribed by Telecom Regulatory Authority of India (TRAI) for such subscribers shall be reimbursed until such time the ADC prescribed by TRAI from time to time takes into account this difference. Also following the phasing out of the ADC Regime, support for a limited duration of three years for rural wire line RDELs installed prior to 01.04.02; (b) Support for RDELs installed after the 1st day of April, 2002	RDELs prior to 1.04.02 ; RDELs 1.04.03 to 31.03.05; RDELs w.e.f. 31.03.05

Stream of Service	Sub-Streams/ Explanations	Key Projects under each stream and Link to the Project
Stream-III: Creation of Infrastructure for provision of Mobile Services in Rural and Remote Areas.	The assets constituting the infrastructure for provision of mobile services shall be determined by the Central Government from time to time.	Mobile Infrastructure Phase 1 ; Left Wing Extremism (LWE) Areas ; AmarNath
Stream-IV: Provision of Broadband Connectivity to rural & remote areas in a phased manner.	-	Wireline Broadband
Stream-V: Creation of General Infrastructure in Rural and Remote Areas for Development of Telecommunication facilities.	The items of general infrastructure to be taken up for development shall be determined by the Central Government from time to time.	CSC Wi-Fi Choupal ; OFC for Assam ; OFC for NE I ; OFC for NE II ; National Optical Fibre Network with BBNL
Stream-VI: Induction of new technological developments in the telecom sector in Rural and Remote Areas	Pilot projects to establish new technological developments in the telecom sector, which can be deployed in the Rural and Remote Areas, may be supported with the approval of the Central Government.	

<callout type="danger" icon="true"> About 49 per cent of the USOF still remains unused. Based on the latest figures (As on 31.07.2021) total accretion is Rs. 119121.34 cr, total disbursement is Rs. 60840.80 cr. , Potentially available fund Rs. 58280.54 cr. [85)] </callout>

Cooperatives

Cooperatives in India are not a new phenomenon: even though the formal cooperative structures came into existence post the passing of a law on cooperatives in 1904, the concept of cooperation and cooperative activities were already practiced in different regions of India. [86)] Cooperatives in India originally evolved in agriculture and allied sectors as a mechanism for pooling meager resources of people so that benefits of economies of scale could be availed. [87)]. The legislative history of cooperatives in India can be divided into two parts: pre- Independence and post- Independence. The first attempt to institutionalize cooperatives was taken by the British-India Government through enacting the Cooperatives Credit Societies Act of 1904. The promulgation of this act is considered to be the formal introduction of the Cooperative Movement in India. [88)] The Cooperative Credit Societies Act of 1904 was replaced by a more comprehensive Cooperative Societies Act of 1912 which also expanded the scope of cooperatives. Till today, this act remains the primary legislation for cooperative societies in India.

<callout type="tip" icon="true"> At present, in India a cooperative society can be formed under the provisions of Cooperative Societies Act, 1912 </callout>

The subject of cooperation was transferred to the (then) provinces under Government of India Act of 1919, and cooperatives remained a provincial subject in the subsequent Government of India Act of 1935. [89)]

<callout type="default" icon="true"> In the present legal framework, the item "Cooperative Societies" appears under entry 32 of the State List of the Constitution of India. </callout>

To administer cooperative societies having membership in more than one province, the British-India Government enacted the Multi-Unit Cooperative Societies Act, 1942. Post-Independence this act was replaced by the Multi-State Cooperative Societies Act of 1984 under entry 44 of the Union List, and further by the Multi State Cooperative Societies Act, 2002. In the same year, a National Policy on Cooperatives was also brought out by the government for promotion and development of cooperatives.

<callout type="default" icon="true">India's National Policy on Cooperatives follows the International Cooperative Alliance's (ICA) definition of cooperatives: *"Cooperative is an autonomous association of persons united voluntarily to meet their common economic, social and cultural needs and aspirations through a jointly-owned and democratically-controlled enterprise"* </callout>

With regard to constitutional provisions related to cooperatives, Part IX B of the Constitution of India contains provisions regarding the cooperatives working in India. Part IX- B was inserted through the Constitution (97th Amendment) Act, 2011. This amendment also added the word "cooperatives" after "unions and associations" in Article 19(1)(c) under Part III of the Constitution. This means, the right to form cooperatives has the status of fundamental right in India. Further, a new article 43B was added through the said amendment in the Directive Principle of State Policy (DPSP): *"promotion of cooperative societies"*

As cooperatives fall under the state list, each state in India has their own cooperative laws for governing cooperatives operating within the state. In the current legal framework, national cooperatives and cooperatives having multi-state operation are governed by the Central Act, whereas the cooperatives having the area of operation within the state are governed by the cooperative societies Act of the respective states. [90)] Thus, to put simply, there are two different sets of legislations which establish the legal framework of cooperatives in India. They are:

1. Central Act: Multi-State Cooperative Societies Act, 2002
2. State laws for each of the 29 states. Example: Maharashtra has enacted 'The Maharashtra Co-Operative Societies Act I960'

For state cooperatives, a Cooperation Commissioner and the Registrar of Societies serves as the governing office of cooperatives, whereas for Multi-state cooperative societies (MSCS), the Central Registrar of Societies is the controlling authority. However, in most cases on the ground the state registrar takes action on his behalf. [91)]

<callout type="default" icon="true"> Notably, India doesn't have sector specific law for cooperatives.. This means that all types of cooperatives including agriculture, consumer credit, etc. are governed by a single law. [92)] </callout>

In the most recent development around cooperatives in India, the ruling dispensation led by Narendra Modi has announced the creation of a separate ' Ministry of Cooperation' for realizing the vision of "Sahkar se Samriddhi" i.e. prosperity through cooperation. [93)] According to the press release, this ministry will provide a separate administrative, legal and policy framework for strengthening the cooperative movement in the country, and streamline processes for 'Ease of doing business' for co-operatives and enable development of Multi-State Co-operatives (MSCS)[94)]

<callout type="danger" icon="true"> UL and UL(VNO) can be applied by Indian companies except for Access Service Cat B authorisation under UL(VNO) which can be applied for by Indian companies, partnership firm, proprietorship firm, Shops and establishment and legal person. [95)] Thus, in the current unified telecom licensing regime in India, only a company registered under the Companies Act, 2013 can apply for an ISP- A, ISP-B, or ISP-C authorization. </callout>

Resources / References

Coding examples

This could be used to frame specific questions that should be asked

<callout type="tip" icon="true">This could be for hints / tips / tricks on finding information, what to look for etc.</callout> <callout type="question" icon="true">A question</callout> <callout type="success" icon="true">A good practice example might look like this</callout> <callout type="danger" icon="true">A bad practice to be aware of might look like this</callout>

1) Seth Dua & Associates, In brief: telecoms regulation in India
2) https://cis-india.org/telecom/resources/indian-telegraph-act
3) See Section 4 of The Indian Telegraph Act, 1885
4) Section 3 and Section 5 of the The Indian Wireless Telegraphy Act, 1933
5) Adapted from https://trai.gov.in/about-us/history
6) Section 14 of the TRAI Act, 1997
7) https://dot.gov.in/profile
8) Reproduced from Section 1, p. 15 of 24 of National Digital Communications Policy 2018
9) https://dot.gov.in/vision-mission
10) See 2022 Goals in Section 1 of | NDCP 2018
11) See (b) (vi) in Section 2.1 on p.9 of 24 of | | NDCP 2018
12) https://dot.gov.in/sites/default/files/202-_12_11%20Brief%20PM%20WANI_0.pdf?download=1
13) Section 1.4, | NDCP 2018
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15) See Section 1.1 on p. 15 of 24 in | NDCP 2018
16) DoT, Telecom at a Glance
17) DoT, Telecom at a Glance
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19) Adapted from https://cis-india.org/telecom/resources/licensing-framework-for-telecom
20) See (12) of Section (III) on p. 6 of 20 in NTP 2012
21) https://dot.gov.in/unified-licnse ; NTP 2012

22)

p.2 of 20, NTP 2012

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Reproduced from DoT's website

24)

DoT Guidelines for Grant of Unified License (Virtual Network Operators) dt. 31 August 2018

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TRAI Consultation Paper on Enabling Unbundling of Different Layers Through Differential Licensing

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27)

Section (3)(i) DoT Guidelines on UL 20-281/2010-AS-I (Vol VI) dated 28.03.2016

28) , 79)

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29)

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https://dot.gov.in/spectrum-management/2457?page=10

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See Section 1.2 on p.16 of 24 in NDCP 2018

33)

Reproduced from Foreword, NFAP 2018

34)

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35)

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36)

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40)

See para 3.5 in Section (IV) on p. 12 of 20 in NTP 2012

41)

Adapted from A Short Analysis of Spectrum Auction in India

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Section (3.1)(e), Broadband Policy, 2004

43)

para 22 in Section III of NTP 2012

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See (b)(vii) of Section (1.2), NDCP, 2018

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See 4.9 in Section (IV) , NTP 2012

46)

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61)

See (d)(ii) in Section 2.2 , p.20 of 24 NDCP 2018

62)

See (d)(iii), Section 1.2 , p.17 of 24 NDCP 2018 ((Section 1.2 (d)(iv) , p.17 of 24 NDCP 2018

63)

Section 1.1 ©(iv) , p.16 of 24 NDCP 2018) In order to facilitate sharing of telecom infrastructure, DoT issued a notification in February 2016 which permits sharing of active infrastructure amongst service providers based on mutual agreements. ((DoT, Telecom at a Glance

64)

Section 33.2, Amended vide DOT's letter no 20-443/2014-AS-I Pt dated 11.02.2016 UL version dated 29.03.2016

65)

https://economictimes.indiatimes.com/industry/telecom/telecom-news/dot-widens-scope-of-active-infra-sharing-to-boost-broadband-penetration/articleshow/81935288.cms?from=mdr

66)

Amendment in Unified License relating to infrastructure sharing and Public Wi-Fi services

67)

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68)

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para 1.4 in Section 1. Introduction, National Policy for Women, 2016

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Section 5 (III) (Service Sector) (i) on p.10 National Policy for Women, 2016

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