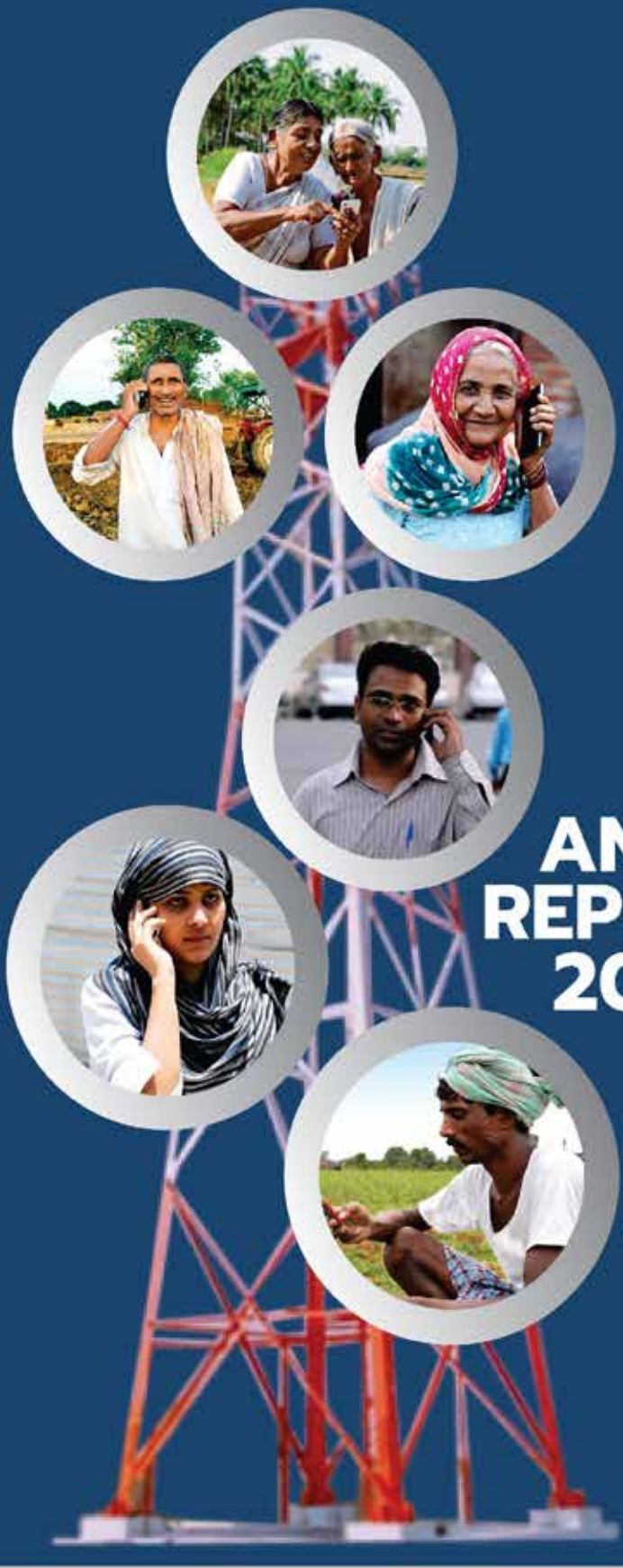
सत्यमेव जयते

DEPARTMENT OF TELECOMMUNICATIONS
MINISTRY OF COMMUNICATIONS
GOVERNMENT OF INDIA
NEW DELHI



ANNUAL REPORT 2018-19

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Department of Telecommunications

Ministry of Communications

Government of India

New Delhi

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CHAPTER 1

DEPARTMENT OF TELECOMMUNICATIONS

The Department of Telecommunications (DoT) is inter-alia responsible for Telecom Policy; Licensing and Coordination matters relating to telegraph, telephones, telecom wireless data; international cooperation in matters connected with telecommunications, promotion of standardization, R&D in telecommunications; and promotion of private investment in the sector. DoT is also responsible for frequency management in the field of radio communication in close coordination with the international bodies. DoT enforces wireless regulatory measures by monitoring wireless transmission of all users in the country.

1.1 FUNCTIONS OF DEPARTMENT

As per Second Schedule to the Government of India (Allocation of Business) Rules, the functions of the Department are as under (Box 1.1).

BOX 1.1

- Policy, Licensing and coordination matters relating to Telegraphs, Telephones, Wireless, Data, Fascimile, Telematic services and other like forms of communications.
- International cooperation in matters connected with telecommunications including matters relating to international bodies dealing with telecommunications such as International Telecommunication Union (ITU), its Radio Regulation Board (RRB), Radio Communication Sector (ITU-R), Telecommunication Standardization Sector (ITU-T), Development Sector (ITU-D), International Telecommunication Satellite Organization (INTELSAT), International Mobile Satellite Organization (INMARSAT), Asia Pacific Telecommunication (APT).
- Promotion of standardization, research and development in telecommunications.
- Promotion of private investment in telecommunications.
- Financial assistance for furtherance of research and study in telecommunications technology and building up adequately trained manpower for telecom program, including assistance to institutions, assistance to scientific institutions and universities for advanced scientific study and research; and
- Grant of scholarships to students in educational institutions and other forms of financial aid to individuals including those going abroad for studies in the field of telecommunications.
- Digital Communications Commission (DCC), Telecom Regulatory Authority of India (TRAI) and Telecom Disputes Settlement and Appellate Tribunal (TDSAT).
- Administration of laws with respect to any of the matters specified in this list, namely:
  - The Indian Telegraph Act, 1885 (13 of 1885);
  - The Indian Wireless Telegraphy Act, 1933 (17 of 1933); and (c) The Telecom Regulatory Authority of India Act, 1997 (24 of 1997).
- Post disinvestment matters relating to M/s Hindustan Teleprinters Limited.
- Matters relating to Indian Telephone Industries (ITI Ltd), Bharat Sanchar Nigam Limited (BSNL), Mahanagar Telephone Nigam Limited (MTNL) and Bharat Broadband Network Limited (BBNL)
- Tata Communications Limited(TCL) and Telecommunications Consultants (India) Limited
- All matters relating to Centre for Development of Telematics (C-DOT).
- Residual work relating to erstwhile Department of Telecom Services and Department of Telecom Operations, including matters relating to-
  - Cadre control functions of Group 'A' and other categories of personnel till their absorption in Bharat Sanchar Nigam Limited;
  - Administration and payment of terminal benefits.
- Execution of works, purchase and acquisition of land debitable to the capital Budget pertaining to telecommunications.

1.1.2 DIGITAL COMMUNICATIONS COMMISSION (DCC)

In order to promote rapid development in all aspects of telecommunications including technology, the Government of India considered it necessary to the set up Telecom Commission(TC) vide Resolution dated April 11, 1989 to deal with various aspects of telecommunications. The Commission is entrusted with responsibility in the entire field of telecommunications. The Government, vide Resolution dated 22nd October, 2018, has re-designated the 'Telecom Commission' as the 'Digital Communications Commission' (DCC). DCC consists of a Chairman and four full time Members, who are ex-officio Secretaries to the Government of India in the DoT and four part time Members who are the Secretaries of the Government of India of the Concerned Departments.

The Secretary to the Government of India in the Department of Telecommunications is the ex-officio Chairperson of the DCC. The full-time Members of the DCC are Member (Finance), Member (Production), Member (Services) & Member (Technology). The part-time Members are Chief Executive Officer, NITI (National Institution for Transforming India) Aayog, Secretary (Department of Economic Affairs), Secretary (Ministry of Electronics & Information Technology) and Secretary (Department for Promotion of Industry and Internal Trade). The Chairperson and the Members of the Commission, at present, are as under: -

Composition of Digital Communication Commission	
Chairperson (Ex-officio)	Secretary (Telecom)
Members (Full time)	Member (Finance)
	Member (Services)
	Member (Technology)
Members (Part time)	CEO, NITI Aayog
	Secretary , Department of Economic Affairs
	Secretary, Ministry of Electronics & Information Technology
	Secretary, Department for Promotion of Industry and Internal Trade

The Chairperson, in his/her capacity as Secretary to the Government of India in the DoT, is responsible for arriving at decisions on technical questions and advising the Government on policy and allied matters of telecommunications.

The Commission is responsible for:

a) Formulating policy of Department of Telecommunications for approval of the Government;

b) Preparing the budget for the Department of Telecommunications for each financial year and getting it approved by the Government; and

c) Implementation of Government's policy in all matters concerning telecommunication.

Some of the major decisions of the Commission during the year 2018-19 related to;

a) Introduction of Internet and Mobile Communication on Aircraft (MCA) as In-Flight Connectivity (IFC) in the Indian airspace where the Satellite System should be an Indian Satellite System or a Satellite System approved by DoS for providing communication services in India with Indian Gateway.

b) Guidelines for regulatory framework for Internet Telephony under the existing licensing regime, to encourage the use of same.

c) 25% disinvestment of Telecommunications Consultants India Ltd. (TCIL)'s equity and subsequent listing of the company, as per existing government policy.

d) 'Ease of Doing Telecom Business' for achieving complete online and paperless processes in according various permissions by WPC, apart from several other initiatives such as easing the process of self-certification by TSPs for EMF compliance, roll out obligations etc.

e) Submarine Optical Fibre Cable Connectivity between Mainland (Chennai) and Andaman & Nicobar Islands with an estimated cost of Rs. 947.283 crore as CAPEX to be funded from USOF and Rs. 276.238 crore as OPEX to be funded by MHA/ANI U.T. Administration for initial five years.

f) Implementation of BharatNet Phase-II through PGCIL and BSNL under CPSU Model for the States of Himachal Pradesh (Rs 640.27 crores), Assam (Rs 293 crores), Madhya Pradesh (Rs 2838.85 crores), Rajasthan (Rs 535.00 crores), Uttar Pradesh (East) (Rs 3459.54 crores), Uttar Pradesh (West) (Rs 523.52 crores), West Bengal (Rs 182.40 crores) and Sikkim (Rs 66.93 crores) (Capex as shown in brackets excluding Opex and Taxes).

g) Net Neutrality

h) Draft National Digital Communications Policy-2018 for placing before the Union Cabinet for consideration/approval.

i) Proposal for addressing the Spectrum, Roaming and QoS related requirements for the Machine-to-Machine Communications;

j) Legal and regulatory framework for Cloud Services, legal framework for data protection and interoperability as well as portability;

k) Augmentation of Satellite Bandwidth from 318 Mbps to 1.71 Gbps by BSNL for Lakshadweep Islands at an estimated cost of Rs. 25.75 crore plus applicable taxes;

l) Proposal for total funding of Rs 2155.26 crore, including additional funding of Rs. 443.03 crore and Rs. 87.47 crore as additional funds towards AE & EC, for the State of Chhattisgarh for implementing Bharat Net Phase-II;

m) Implementation of BharatNet Phase-II: approval of revised DPRs for the States of Odisha, Andhra Pradesh, Telangana, Jharkhand, Gujarat & Maharashtra under the State-led model and approval of proposal for funding to State of Odisha, Andhra Pradesh, Jharkhand, Gujarat and Maharashtra.

n) Pilot Project for Mobile Connectivity in Uncovered Areas of Ladakh & Kargil (J&K Region), Border Areas and other Priority Areas on Technology Neutral Outcome Based Approach.

1.2 ORGANIZATIONAL CHART

The Organization chart of the Department of Telecom is at **Annexure-III**. The chart showing organizational structure of Public Sector undertakings, Regulatory bodies and autonomous body under this Department is at **Annexure-IV**.

1.3 STATUTORY / REGULATORY BODIES IN THE TELECOM SECTOR

The Telecom Regulatory Authority of India (TRAI) is a statutory body. It is the sector regulator and plays a pivotal role in development of the telecom, broadcasting and cable services. It has worked towards providing a fair and transparent environment which encourages competition and level-playing field for service providers and protecting the interest of consumers and enabling technological advancement. The TDSAT performs the role of an appellate body. The details of their functioning are given in Chapter 6.

1.4 ATTACHED, SUBORDINATE AND FIELD OFFICES OF DoT

The Department of Telecommunications has four attached offices: (i) Universal Service Obligation Fund (USOF) (ii) Telecom Engineering Centre (TEC) (iii) Director General (Telecom) Head Quarter and (iv) Controller General of Communication Accounts (CGCA)

The Department has four subordinate offices, namely (i) the Wireless Monitoring Organisation (WMO) (which functions under the Wireless Planning and Coordination wing of DoT), (ii) the National Telecommunications Institute for Policy Research, Innovation & Training (NTIPRIT), (iii) National Centre for Communication Security (NCCS) and (iv) National Institute of Communication Finance (NICF). The Department also performs certain regulatory and enforcement functions in the domain of satellite communications through its Network Operations Control Center (NOCC).

The There are 39 DoT Field Units in all the 22 Licensed Service Areas located across the country which are under the administrative control of Director General Telecom. There are 28 Controller of Communication Accounts (CCA) offices located across the country which are under the control of Controller General of Communication Accounts (CGCA).

The functions of these offices are given in the following paragraphs, in brief [1].

Universal Service Obligation Fund (USOF): Universal Service Obligation Fund (USOF), formed by an Act of Parliament, was established w.e.f. 01.04.2002 under the Indian Telegraph (Amendment) Act 2003 (further amended in 2006), to provide financial support for the provision of telecom services in commercially unviable rural and remote areas of the country. It is an attached office of the Department of Telecom, and is headed by the Administrator, USO Fund, appointed by the Central Government.

The resources for implementation of USO are raised by way of collecting a Universal Service Levy (USL), which is 5% of the Adjusted Gross Revenue (AGR) of Telecom Service Providers. It is a non-lapsable Fund. Levy amount is credited to Consolidated Fund of India. Fund is made available to USOF after due appropriation by the Parliament

The USO Fund was established with the fundamental objective of providing access to 'basic' telecom services to people in the rural and remote areas at affordable and reasonable prices. Subsequently the scope was widened to provide subsidy support for enabling access to all types of telecom services, including mobile services, broadband connectivity and creation of infrastructure like OFC in rural and remote areas

Telecom Engineering Centre (TEC): Telecommunication Engineering Centre (TEC) is the technical wing of the Department of Telecommunications. TEC is committed to develop standards for the telecommunication sector in India, to ensure development of world class telecom network and smooth interconnection of individual networks. It discharges its function as a testing & certification body.

Network Operations Control Center (NOCC): NOCC performs the function of online operational control, coordination regulation of space segment usage and monitoring of all the satellite based services like VSAT (Very Small Aperture Terminal) applications, broadcasting, DTH (Direct-To-Home), HITs (Head-end in the Sky), ISP (Internet service provider) etc. in India on Indian and foreign satellites; resolving the RF (Radio frequency) interference, mandatory performance verification testing of antennae of satellite earth stations and DSNG (Digital Satellite News Gathering). NOCC monitors and controls parameters of carriers uplink from 1378 Satellite Earth Stations/ Teleports/DSNG & more than 2,70,000 VSATs. NOCC has endeavoured to provide interference free environment to various satellite users in country while providing mandatory clearances within three working days to applicant agencies.

NOCC is headed by an HAG level officer who is assisted by one or more SAG level officers. The offices of NOCC are located in Delhi, Gurugram and Sikandrabad. Wireless related work is attributed to the Gurugram office while the Sikandrabad office works as monitoring station for telecom services

[1] *Further details on attached, subordinate and field organisations are in Chapter 4.*

Wireless Monitoring Organisation (WMO): WMO performs various functions related to spectrum management such as resolution of harmful interference; monitoring/identification of frequency sub-bands for introduction of new services and/ or for additional allocation to existing services; monitoring for spectrum recovery – unused/ under-used frequency authorizations; inspection of licensed installations, monitoring of space emissions to protect authorized satellite transmissions, etc.

WMO, a field unit of WPC Wing, carries out wireless monitoring through 22 Wireless Monitoring Stations, 1 International Satellite Monitoring Earth Station (ISMES), 5 International Monitoring Stations (IMSs) strategically located all over India. WMO is also equipped with 5 Radio Noise Survey Units, which undertake detailed and complicated measurements to aid in the spectrum management activity. The Headquarter of WMO is situated in New Delhi. It also has four Regional Headquarters (RHQs) at New Delhi, Mumbai, Kolkata and Chennai. WMO has its own Training Facility at Wireless Monitoring Training & Development Centre (WMTDC), New Delhi, a nodal agency for conducting training courses for officials and staff of Indian Radio Regulatory Service.

Directorate General of Telecommunications (DGT): Office of Directorate General Telecommunications was created with the objective of monitoring and controlling some of the Department's field units in all the 22 Licensed Service Areas (LSAs) located across the country. Headquarters of Director General Telecommunications (DGT-HQ) is located in Delhi. In February 2017, the apex level post of Director General (Telecom) was created. To assist DG(Telecom) one HAG level officer, four SAG level officers & four JAG level officers have also been provided at DG(T) HQ office.

Controller General of Communication Accounts Offices (CGCA): The office of Controller General of Communication Accounts (CGCA) is an attached office of the Department of Telecommunications (DoT) and is headed by an Apex level officer. The post of CGCA was created as a result of the first cadre review of the IP&TAFS. The office of the CGCA presently functions from the NICF Campus at Ghitorni, New Delhi. Controller General of Communication Accounts has been tasked to supervise the functioning of Controller of Communication Accounts (CCAs). There are 28 CCAs offices located across the country.

The Principal CCA/CCA offices play a critical role in providing a professional interface between DoT and its various stakeholders at the ground level on issues such as collection & assessment of license fee and spectrum usage charges, management of USO Fund, review of USO activities etc.

National Telecommunications Institute for Policy Research, Innovation & Training (NTIPRIT): NTIPRIT was established in the year 2010 as National Telecom Academy, the telecom training institute of Department of Telecommunications. Subsequently, in year 2011, the mandate of institute was expanded by bringing into the activities related to Policy Research and Innovations under its ambit and the institute was rechristened as National Telecommunications Institute for

Policy Research. The Institute is now a Central Training Institute (CTI) enlisted with Department of Personal & Training. NTIPRIT is p recently operating from the campus of Advance Level Telecom Training Centre (ALTTC) of BSNL at Ghaziabad.

The National Institute of Communication Finance (NICF): The National Institute of Communication Finance (NICF), established in 2000 (with different name and venue), is a Department of Personnel & Training (DoPT) recognized Central Training Institute (CTI) under the Department of Telecommunications. The NICF has been entrusted with the responsibility of imparting training to Indian Posts & Telecom Accounts and Finance Service (IP&TAFS) Group 'A', 'B' & 'C' cadres, which includes Probationary Training of IP&TAFS Group 'A' officers recruited by the UPSC through Civil Services Examination as well as Induction Training of Group 'B' & 'C' cadres apart from organizing and conducting regular national and international seminars and workshops. The NICF is headed by an HAG level officer, i.e., the Director General, who is assisted by two SAG level officers, i.e. Deputy Director Generals and two JAG level officers i.e. Directors.

1.5 PSUs AND AUTONOMOUS BODIES UNDER DoT

There are 5 PSUs under DoT namely Bharat Sanchar Nigam Limited (BSNL), Mahanagar Telephone Nigam Limited (MTNL), ITI Limited (ITIL), Telecommunications Consultants India Limited (TCIL) and Bharat Broadband Network Limited (BBNL). The Centre for Development of Telematics (C-DOT) is an autonomous body and is also the R&D arm of the Department. Brief functions of these organizations are given below[2].

BSNL, the fully owned by Government of India was formed in October 2000. It provides telecom services across the length and breadth of the country excluding Delhi and Mumbai. BSNL is providing all types of telecom services namely telephone services on landline, WLL and GSM mobile, broadband, internet, leased circuits and long distance telecom services. Rural telephony is one of the focus areas of BSNL which also pays special emphasis on development of telecommunication facilities in North-Eastern region, tribal areas as well as in the LWE-affected areas.

MTNL, set up in 1986, is a Navratna PSU which provides telecommunication facilities in India's key metros - Delhi and Mumbai. MTNL is the principal provider of fixed-line telecommunication service in these two Metropolitan Cities, and for GSM Mobile services in four peripheral towns of Noida, Gurgaon, Faridabad & Ghaziabad along with Delhi city and the areas falling under the Mumbai Municipal Corporation, New Mumbai Corporation and Thane Municipal Corporation along with Mumbai city, also come under the jurisdiction of the company. MTNL is providing triple play services i.e. voice, high speed internet and IPTV on its Broadband network. The company has an authorized capital of Rs. 800 crores and paid up share capital of Rs. 630 crores. At present,

[2]*Further details on the PSUs and autonomous bodies is given in chapter 5.*

56.25% of the equity is held by Government, and the remaining equity is held by FIIs, Financial Institutions, Banks, and Mutual Funds and other including individual investors

ITI Limited (earlier Indian Telephone Industries Ltd) was established in 1948 with the vision of attaining self reliance in the field of telecommunication needs of the country. The company was set up at Bangalore (Karnataka) with Govt. of India holding majority equity stake in the Company. ITI has its Registered & Corporate Office located at Bangalore. The Company is a Schedule 'A' CPSE in Heavy and Medium Engineering Sector under the administrative control of Ministry of Communications.

For manufacture and supply of telecom equipments to the Department, ITI started its operations in Bangalore in 1948, and subsequently manufacturing plants were set up at Srinagar in Jammu and Kashmir; Naini, Rae Bareli and Mankapur in Uttar Pradesh; and Palakkad in Kerala.

TCIL was set-up on 10.03.1978 with the main objective of providing world class technology in all fields of telecommunications and information technology to excel in its operations in overseas and in the domestic markets by developing proper marketing strategies, to acquire state of the art technology on a continuing basis and maintain leadership. It has diversified into Cyber Parks, Intelligent Buildings, Cyber & Smart Cities and upgrading legacy networks by focusing on Broadband Multimedia Convergent Service Networks, entering new areas of IT as systems integrator in Telecom billing customer care value added services; e-governance networks and Telecom fields by utilizing TCIL's expert technical manpower, developing Telecom and IT training infrastructure in countries abroad and aggressively participating in SWAN and IT-education projects in various States.

BBNL, a Special Purpose Vehicle (SPV), namely, Bharat Broadband Network Limited (BBNL) has been incorporated on February 25, 2012 under the Indian Companies Act, 1956 with an authorized share capital of Rs 1000 crore. As per the mandate given by the Government of India, BBNL shall set up, provide (i.e. procure, install, test, commission), operate, maintain and manage OFC under the flagship Bharatnet programme of the Government.

C-DOT: Centre for Development of Telematics (C-DOT) is an autonomous telecom research & development body funded by the Department of Telecommunication. It was established under the Society Registration Act XXI in 1984 to design and develop indigenous switching technology. C-DOT is presently engaged in developing state-of-the-art telecommunication technology to meet the needs of the Indian telecommunication network. It is involved in research and development (R&D) activities as well as in field implementation of technologies developed.

CHAPTER 2

THE TELECOM SECTOR, PROGRAMS AND POLICY INITIATIVES

Telecommunication has been recognized the world-over as a powerful tool of development and poverty reduction through empowerment of masses. It is one of key element of the Sustainable Development Goals (SDGs) of the United Nations Agenda for Sustainable Development for 2030, reflecting its growing reach, better networks and adoption of tools and solutions that enhance digitisation of systems, processes and interactions across key sectors like agriculture, banking and healthcare in developing and middle income countries.

2.1 TELECOM SECTOR GROWTH:

The telecom sector exhibited strong growth over the last few years on the back of strong consumer demand and supportive policies of the Government of India. The government has ensured fair competition among service providers, and a fair and proactive regulatory framework that has resulted in telecom services being available to consumer at affordable prices. Further it has made sustained efforts at encouraging telecom equipment manufacture. The deregulation of Foreign Direct Investment norms has led an increase in FDI in the sector.

India is currently the world's second-largest telecommunications market with a subscriber base of 1.18 billion. India's growing mobile economy now constitutes about 98% of all telephone subscriptions. The mobile industry has witnessed exponential growth over the last few years driven by affordable tariffs, wider availability, roll out of Mobile Number Portability (MNP), expanding 3G and 4G coverage, evolving consumption patterns and supportive policy and regulatory environment. As per a GSMA report[1], the mobile industry supports about 6.5% of India's GDP. The figure accounts for both the direct economic activity generated by mobile operators and an indirect effect on the rest of the economy resulting from increased use of mobile technology by individuals and firms. Telecom industry contribution to GDP is expected to reach 8.2% by 2020.[2]

The Government has placed considerable emphasis on growth of internet and broadband in the country as part its Digital India campaign. Mobile has now emerged as the main platform for internet access in India, bringing connectivity to many previously unconnected populations. Efforts are being made to address the digital divide by extending inclusive internet access to every Indian, as mobile technology looks to empower the masses and become the critical means of accessing a broad range of public services.

[1] *Mobile Economy- India 2017.*
[2] *https://www.investindia.gov.in/sector/telecom*

As per GSMA Reports[3], mobile technologies and services generated 4.6% of GDP globally in 2018, a contribution that amounted to $3.9 trillion of economic value added. By 2023, this contribution will reach $4.8 trillion, or 4.8% of GDP, as countries around the globe increasingly benefit from the improvements in productivity and efficiency brought about by increased take-up of mobile services and M2M/IoT solutions. In 2018, the wider mobile ecosystem also supported a total of 32 million jobs (directly and indirectly) and made a substantial contribution to the funding of the public sector, with almost $510 billion raised through general taxation (before regulatory and spectrum fees). Further ahead, 5G technologies are expected to contribute $2.2 trillion to the global economy over the next 15 years, with key sectors such as manufacturing, utilities and professional/financial services benefiting the most from the new technology.

BOX 2.1 **Snapshot of present status as on March 31, 2019**
• Indian telecom network is 2nd largest in the world in terms of telephone connections
• The country has 1183.41 million telephone connections
• There are 1161.71 million wireless telephone connections
• Overall tele-density in the country is 90.10%
• Urban tele-density is 159.66%
• Rural tele-density is 57.50%.
• Share of wireless telephones in total telephones is 98.17%.
• The share of private sector in total telephones is 88.72%.
• Number of Broadband connections is 561.36 million at the end of March, 2019
Source: DoT

Wire line vs Wireless: India's wireless voice and data services have continued to exhibit phenomenal growth. Landline telephone connections were at 21.70 million while the number of wireless telephone connections stood at 1161.71 million at the end of March'19. Share of wireless telephones stood at 98.17% of all connections. The ever-expanding demand for wireless services has propelled the telecom sector to mobilize considerable resources to create such ecosystem.

Public vs Private: The private sector now firmly dominates the telecom sector with a continuous rise in the number of subscribers. At the end of March'19, the total number of telephone connections provided by the private sector stood at 1049.90 million and number of telephone connections provided by the public sector stood at 133.51million. The share of private sector in the total number of connections was 88.72% at the end of March 2019 (Table 2.1).

[3]*Mobile Economy 2018,and Mobile Economy 2019*

Table 2.1 : Telecom Development Indicators							
Sl. No.	Item		At the end of				
			March'15	March'16	March'17	March'18	March'19
1	Number of Telephones (In million)	Overall	996.13	1059.33	1194.99	1211.80	1183.41
2		Wire line	26.59	25.22	24.40	22.81	21.70
3		Wireless	969.54	1034.11	1170.59	1188.99	1161.71
4		Rural	416.08	447.77	501.81	525.87	514.27
5		Urban	580.05	611.56	693.18	685.93	669.14
6	Tele-density (Telephones per 100 persons)	Overall	79.36	83.40	93.01	93.27	90.10
7		Rural	48.04	51.26	56.98	59.25	57.50
8		Urban	149.04	154.18	171.52	166.64	159.66
9	%age share	Wireless	97.33	97.62	97.96	98.12	98.17
10		Public	10.53	10.26	10.26	10.86	11.28
11		Private	89.47	89.74	89.74	89.14	88.72
12	%age growth of Total Telephones – over previous year		8.04	6.34	12.81	1.41	-2.34

Tele-density: Tele-density, which denotes the number of telephones per 100 populations, is an important indicator of telecom penetration. Overall tele-density in India was 90.10% at the end of March'19. The rural tele-density was 57.50% while that in urban areas it was 159.66%. Amongst the Service Areas, Himachal Pradesh (146.37%) had the highest tele-density followed by Kerala (126.15%), Punjab (125.35%), Tamil Nadu (116.94%) and Karnataka (110.04%). On the other hand, tele-density is comparatively low in service areas such as Bihar (59.95%), Uttar Pradesh (69.63%), Assam (68.81%), Madhya Pradesh (70.11%), West Bengal (71.39%) and Odisha (75.74%). Amongst the metros, Delhi tops in tele-density with 238.57%, followed by Mumbai (165.62%) and Kolkata (165.51%).

Internet and broadband penetration: The Government has placed considerable emphasis on growth of internet and broadband in the country as part its Digital India campaign. The number of Internet subscribers (both broadband and narrowband put together) which was 493.95 million at the end of March, 2018 increased to 636.73 million by the end of March'19. The number of subscribers accessing internet via wireless phones etc. was 615.05 million at the end of March'19 while the number of wireline internet subscribers was 21.68 million. The number of Broadband subscribers was 561.36 million at the end of March 2019. There was a net increase of 132.78 million in the Internet subscribers during the period from March,2018 to March, 2019.

Internet traffic also witnessed phenomenal growth, touching highest ever data usage **of 46.23 million terabytes in 2018**. India is now the global leader in monthly data consumption, with

average consumption per subscriber per month increasing 133 times from 62 MB in 2014 to 8.74 GB in 2018. The cost of data has also reduced substantially, enabling affordable internet access for millions of citizens.

India's leap towards wireless broadband can be the driving force of the economy going forward on the back of rapidly rising data consumption and deployment of necessary technologies by service providers. Rising consumption of data by consumers has also created opportunities for the government to reach out to weaker and marginalised groups and enable social progress by providing services that were previously not feasible. Tapping into these opportunities can unlock the next phase of growth for the Indian economy.

Foreign direct investment: Foreign Direct Investment has played an important role in shaping the progress of the telecom sector over the years, and in financing expansion of telecom infrastructure in the country. The FDI flows in the telecom sector in the last few years have been as follows:

Table 2.2

Year	Rs. crore	US $ Million
2015-16	8,637	1,324
2016-17	37,435	5,564
2017-18	39,748	6,212
2018-19	18337	2668

Source: The Department for Promotion of Industry and Internal Trade (DPIIT)

During 2017-18 FDI equity inflow touched US $ 6.21billion – more than four-fold rise from the level of US$ 1.3 billion witnessed in 2015-16. However, FDI during the year 2018-19 remained at the level of US$ 2.67 billion. The substantial foreign inflows in the telecom sector are indicative of the faith of global community in Government policy, reforms and measures taken towards ease of doing business, as well as in the bright prospects of the telecom sector in the country.

2.2 NATIONAL TELECOM POLICY

In 1994 Government announced the **National Telecom Policy - NTP 1994**. The important objectives envisaged telephone on demand, provision of world class services at reasonable prices, ensuring India's emergence as a major manufacturing/export based on telecom equipment and universal availability of basic telecom services to all villages. It also recognized that funds required would not be available out of Government sources and involvement of private sector was required to bridge the resource gap.

Accordingly, Government invited private sector participation in a phased manner from the early nineties. The **National Telecom Policy 1999 (NTP-1999)** was necessitated inter-alia due to non-fulfillment of certain objectives of NTP 1994 and also due to the fact the far reaching

developments had taken place in the telecom and allied sectors. The main objectives of NTP 1999 included availability of affordable and effective communications for citizens, Telecommunications development in remote, hilly and tribal areas of the country, creation of modern and efficient Telecommunication infrastructure taking into account the convergence of IT, media, Telecom and consumer electronics. It also included transformation in a time bound manner of the Telecommunication sector to a greater competitive environment providing equal opportunities and level playing field for all players, strengthening of Research & Development efforts, providing impetus to build world class manufacturing capabilities, achieving efficiency and transparency in spectrum management etc. Most of the quantified targets for NTP 1999 were achieved. In pursuance of NTP 1999 service provision function of DoT was hived off to a new corporate entity BSNL.

Since the objectives of NTP-1999 were achieved, the National Telecom Policy-2012 (NTP-2012) was issued with a primary objective of maximizing public good by making available affordable, reliable and secure telecommunication and broadband services across the entire country. The main thrust of the Policy was on the multiplier effect and transformational impact of such services in furthering the national development agenda while enhancing equity and inclusiveness.

Keeping in view the modern technological advancements in the telecom sector such as 5G, Internet of Things (IoT), Machine to Machine (M2M) interface etc., a need was felt to introduce a 'customer focused' and 'application driven' policy for the Indian telecom sector which can form the main pillar of Digital India by addressing emerging opportunities for expanding not only the availability of telecom services but also telecom based services. Accordingly, a new National Telecom Policy (re-christened as National Digital Communications Policy – 2018) was announced in the year 2017.

2.3 NATIONAL DIGITAL COMMUNICATIONS POLICY-2018

National Digital Communications Policy – 2018 (NDCP-2018) was formulated after several rounds of stakeholder consultations. As part of the consultative process, National level consultations with all stakeholders were held, including industry and academia. Inputs were also obtained from TRAI. Thereafter, draft NDCP–2018 was prepared and released in public domain for wider consultations and a month's time was given for receiving the public comments.

To obtain inputs from State/UTs a one day interactive session on draft NDCP-2018 was held on 11th May, 2018 under the chairmanship of Hon'ble Minister for Communications. Several inputs/ views/comments were received being this session. A meeting of the Consultative Committee of Parliament on "National Digital Communications Policy, 2018" was held on 30th May, 2018 under the Chairmanship of Hon'ble Minister of State. Several inputs/views were also received in this meeting.

A large number of responses were received from public (through online portal, email, letters) and inputs from were also obtained various Ministries. Based on the analysis of feedbacks received from various stakeholders, the draft NDCP-2018 was finalized and placed before the Telecom Commission. After the Telecom Commission's recommendation of the draft NDCP-2018, it was approved by the Union Cabinet and notified on 22nd October, 2018.

NDCP-2018 envisions fulfilling the information and communication needs of citizens and enterprises through the establishment of a ubiquitous, resilient, secure, accessible and affordable digital communications infrastructure and services; and in the process, supporting India's transition to a digitally empowered economy and society. The key objectives of the policy, to be achieved by 2022, are: 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; and ensuring Digital Sovereignty. For accomplishing these objectives by year 2022, the National Digital Communications Policy, 2018 envisages three Missions as under:

Connect India: Creating Robust Digital Communications Infrastructure to promote Broadband for all as a tool for socio-economic development, while ensuring service quality and environmental sustainability. This mission shall be accomplished by achieving following goals;

a. Provide Universal broadband connectivity at 50Mbps to every citizen

b. Provide 1 Gbps connectivity to all Gram Panchayats of India by 2020 and 10 Gbps by 2022

c. Enable 100 Mbps broadband on demand to all key development institutions including all educational institutions

d. Enable fixed line broadband access to 50% of households

e. Achieve 'unique mobile subscriber density' of 55 by 2020 and 65 by 2022

Propel India: Enabling Next Generation Technologies and Services through Investments, Innovation and IPR generation, to harness the power of emerging digital technologies, including 5G, AI, IoT, Cloud and Big Data to enable provision of future ready products and services; and to catalyse the fourth industrial revolution (Industry 4.0) by promoting Investments, Innovation and IPR. This mission shall be accomplished by achieving following goals;

a. Attract investments of USD 100 Billion in the Digital Communications Sector

b. Increase India's contribution to Global Value Chains

c. Creation of innovation led Start-ups in Digital Communications sector

d. Creation of Globally recognized IPRs in India

e. Development of Standard Essential Patents (SEPs) in the field of digital communication technologies

f. Train/ Re-skill 1 Million manpower for building New Age Skills

g. Expand IoT ecosystem to 5 Billion connected devices

h. Accelerate transition to Industry 4.0

Secure India: Ensuring Sovereignty, Safety and Security of Digital Communications to secure the interests of citizens and safeguard the digital sovereignty of India with a focus on ensuring individual autonomy and choice, data ownership, privacy and security while recognizing data as a crucial economic resource. This mission shall be accomplished by achieving following goals;

a. Establish a comprehensive data protection regime for digital communications that safeguards the privacy, autonomy and choice of individuals and facilitates India's effective participation in the global digital economy

b. Ensure that net neutrality principles are upheld and aligned with service requirements, bandwidth availability and network capabilities including next generation access technologies

c. Develop and deploy robust digital communication network security frameworks

d. Build capacity for security testing and establish appropriate security standards

e. Address security issues relating to encryption and security clearances

f. Enforce accountability through appropriate institutional mechanisms to assure citizens of safe and secure digital communications infrastructure and services

2.4. HARNESSING EMERGING TECHNOLOGIES

(i) Making India 5G ready by 2020

The world is at the cusp of a next generation of wireless technology, 5G. The 5G has been conceived as a foundation for expanding the potential of the Networked Society. A digital transformation brought about through the power of connectivity is taking place in almost every industry. The landscape is expanding to include massive scale of "smart things" to be interconnected. Therefore, the manner in which future networks will cope with massively varied demands and a business landscape will be significantly different from today.

For India, 5G provides an opportunity for industry to reach out to global markets, and consumers to gain with the economies of scale and citizens to reap the benefits of doorstep governance and availability of services, medical support, benefits transfers, education, entertainment and build a digital payment, knowledge and services economy.

Keeping in view the above, the Government has constituted High Level 5G India 2020 Forum with three Secretaries - Telecom, MeiTY and DST, and also comprising of renowned experts in this field like Dr. A. Paulraj, Professor Emeritus, Stanford University, USA, and other prominent persons from academia, and industry in September 2017, to articulate the Vision for 5G in India and to recommend policy initiatives, and action plans to realize this vision. The High Level Forum after due deliberations has submitted its report on "Making India 5GReady" on August 23, 2018. Based on the recommendations of the forum, seven committees have been constituted for action on Spectrum Policy, Regulatory Policy, Education and Awareness Promotion Program, Application & Use Case Labs, Development of Application Layer Standards, Major Trials & Technology Demonstration and Participation in International Standards for 5G.

Indigenous 5G Test Bed:

In order to support furtherance of research and study in 5G through financial assistance to institutions of national importance, DoT has approved financial grant of Rs 224.01 cr for the multi-institute collaborative project to set up 'Indigenous 5G Test Bed' (Building an end to end 5G Test Bed) in India in collaboration with IIT Madras, IIT Delhi, IIT Hyderabad, IIT Bombay, IIT Kanpur, IISc Bangalore, Society for Applied Microwave Electronics Engineering & Research (SAMEER) and Centre of Excellence in Wireless Technology (CEWiT).The project is the first step of a collaborative effort of a pan-Indian multi-institutional team which will enhance national capability in telecom technology, develop indigenous IP and give fillip to Indian telecom manufacturers.

The test Bed will be realised in four stages. Version 3(final version) will be ready by April, 2021. The project has kicked off in right earnest and the stated deliverables/milestones are on track. Many Industry partners and start-ups have got associated with the project.

(ii) Issuance of Policy directives on Net Neutrality

With a view to keep the Internet accessible and available to all without discrimination, Net Neutrality recommendations as received from TRAI were deliberated by the DCC and policy directives on Net Neutrality incorporating the principles of non-discriminatory treatment of content, including amendment of license conditions for enforcement have been issued.

As per the directives, the Internet Access Services are to be governed by a principle that disallows any form of discrimination, restriction or interference in the treatment of content, including practices like blocking, degrading, slowing down or granting preferential speeds or treatment to any content. The monitoring and enforcement functions with respect to Net Neutrality shall rest with DoT.

iii) Development of Online License Management System of DoT (SARALSANCHAR Portal)

To improve ease of doing business, ensure transparency and to make the licensing process more efficient, a web-based portal, "SARAL SANCHAR" (Simplified Application for Registration and Licenses) for issuing of various types of Licenses and Registration Certificates for OSPs (Other Service Providers) was developed by the Department and launched on 15.11.2018.

(iv) Cloud Services

Cloud Computing is expected to become a cornerstone of new architectural paradigms of future communication networks. Accordingly, TRAI was asked to provide its recommendations on Cloud Services and the same were submitted by TRAI. The recommendations were considered by DoT and it was decided that light touch regulatory approach may be adopted to regulate Cloud Services and the recommendation regarding framework for registration of Cloud Service Providers (CSPs) for industry/ bod(y)(ies), which are not for profit, were accepted by the Government in principle. Further, TSDSI (Telecommunications Standards Development Society, India), the National Telecom Standards Development Organization (SDO) have been tasked by DoT with the development of Cloud Services interoperability standards in India.

(v) Transition to IPv6:

The Internet has transformed not only our lifestyles but also the way governance is done. It has been recognized the world over as key enabler of socio- economic development as it serves as an effective medium for delivery of various citizen centric services even in remote and rural areas.

Internet Protocol addresses, or IP addresses, are a core part of how the Internet operates. Every device needs an IP address to connect to the Internet and communicate with other computers, networks and devices. Internet Protocol version 6 (IPv6) is the next generation of the Internet protocol. It was developed to succeed version 4 (IPv4) as IPv4 addresses have almost run out globally.

Therefore, planned transition to Next Generation Internet Protocol i.e. IPv6 assumes significance as it is essential for sustainable growth of Internet, one of the key pillars of Digital India.

Department of Telecommunications (DoT), being the nodal department for IPv6 transition in the country, has been constantly working with all stakeholders including States/UTs/Central Ministries/ Departments for smooth transition to IPv6.

As a result of initiatives undertaken by DoT, significant progress has been made in IPv6 transition. As per Asia Pacific Network Information Centre (APNIC) report, as on 8th May, 2019, India stands at 2nd position with 52.07% IPv6 users. The top position is held by Belgium (57.87% IPv6 traffic) while the US occupies the third position (43.09%) followed by Germany (41.14%).

(vi) Flight and Maritime Connectivity Rules

"Flight and Maritime Connectivity Rules, 2018" has been published in Gazette of India on 14.12.2018, to provide voice or data or both type of services on ships within Indian Territorial waters and on aircraft in Indian airspace. By introduction of these rules Inflight and Maritime connectivity can be provided by IFMC provider so the hitherto unconnected Flights and ships can be provided with Internet and voice facility.

(vii) VNO category B for Access Services

VNO category B for Access Services in district of State have been introduced in the Unified Licences (VNO). Companies that provide telecom services without owning spectrum or network infrastructure - within a licensing framework and allow them to offer voice, data and video services are known as Virtual Operators.

VNOs rely on the network of other telecom companies to provide services to consumers. Typically, a VNO buys bulk talk time and bandwidth from an operator and then sells it to the users. It can provide any or all the services that are being provided by the network operator. VNO Category B for Access Services is for providing wireline access services in the districts.

(viii) Internet Telephony

Telephony networks have in the course of time undergone major evolutionary changes, driven essentially by technological progress in various fields (switching, transmission, access and maintenance).The end purpose of a telephone network was always associated with the provision of a universal communication service with a certain quality. This has several implications for the technologies used and the mode of interconnection between sub- networks.

Internet Telephony in unrestricted sense refers to voice, video call using public internet to any PTSN/ PLMN network. The calling between two internet enabled devices, either smartphone, PC or any other device has been in existence in India for quite some time. However, Internet to PSTN/ PLMN or vice versa, although enabled in Licence agreements, have not been in vogue in India because the interconnection was not enabled by operators as the same would have adversely affected the revenues of them.

Telephony networks have in the course of time undergone major evolutionary changes, driven essentially by technological progress in various fields (switching, transmission, access and maintenance). The end purpose of a telephone network was always associated with the provision of a universal communication service with a certain quality. This has several implications for the technologies used and the mode of interconnection between sub- networks. In this context clarifications with respect to internet telephony have been issued such that the service can be

provided by Access Service provider to the customers using internet of other service providers.

(ix) Amendments in License Agreement

- Amendment in UL (VNO) licences allowing leased line/ bandwidth charges and charges paid by VNO licensees to the TSPs/NSOs treating it as pass through charges have been issued.
- Amendments in licenses for deferred payment liabilities for the spectrum won in auctions held till date and revision of spectrum cap have been issued.
- Amendment in respect of regulatory framework on net neutrality has been issued.
- Norms for network testing before launch of commercial services have been issued thereby streamlining the testing of services before commercial launch.

(x) Implementation of 13-digit M2M (Machine to Machine) Numbering Plan for M2M communication

Machine-to-Machine (M2M) Communications / Internet of Things (IoT) refers to technologies which involve machines or devices communicating among themselves through a network without human intervention The transformational impact of M2M/IoT for the common people will be realized through transformation of the way services are designed and how they utilize information to meet the needs of citizens more efficiently and effectively.

Department of Telecommunications (DoT) has earlier issued 13-digits M2M numbering series for commercial purpose to BSNL, Idea, Vodafone and Reliance Jio on 04.04.2018. Now, DoT has issued another 4 million 13-digits M2M numbering series for commercial purpose to BSNL, Idea, Vodafone and Reliance Jio on 29.08.2018. MTNL was allocated 5 million 13-digits M2M numbering series for commercial purpose on 29.08.2018.

(xi) Allocation of Short Codes

- NITI Aayog has an NGO Darpan Portal to facilitate more than 70,000 NGOs from all over India in getting Govt./FCRA Grants. Any NGO seeking Government grant has to mandatorily/sign-up/register online on NGO Darpan Portal. NITI Aayog at present is offering telephonic and email support to the NGOs. In order to facilitate the grievance redressal of NGOs, DoT has allocated short code '**14414**' to NITI Aayog helpdesk for NGO Darpan Portal.
- Hon'ble Supreme Court of India in its Judgement dated 01-10-18 has directed the setting up of a special help-line to deal with instances of mob violence. For the same, DoT has allocated short code **155270** as Prevention of Mob Violence Helpline.

- Hon'ble Finance Minister in the Financial budget 2019, has announced the Pradhan Mantri Shram Yogi Maan Dhan Scheme (PM-SYM). The PM-SYM, a mega pension scheme will benefit the workers in the unorganized sector, whose monthly income is Rs 15000/- or below. In order to ensure a smooth implementation and effective reach of the scheme, Ministry of Labour and Employment had proposed a call centre to be set up to facilitate inquiries from stakeholders. DoT, has issued short code **14460** for PM-SYM to promote outreach of the scheme.

(xii) Implementation of Restrictive features/KYC Norms in M2M and e-SIMs

On 16.05.2018, the Department of Telecommunications issued instructions for implementing restrictive features for SIMs used only for Machine-to-Machine (M2M) communication services (M2M SIMs) and related Know Your Customer (KYC) instructions for issuing M2M SIMs to entity / organization providing M2M Communication Services under bulk category and instructions for Embedded-SIMs(e-SIMs).

To cater the needs of modern technological developments in M2M/IoT, DoT has also permitted the use of 'Embedded-Subscriber Identity Module (e-SIM)' in Indian Telecom Network, with both Single and Multiple profile configurations with Over the Air (OTA) subscription update facility as per the prevailing global specifications and standards (GSMA).

(xiii) Alternate Digital KYC Process for Issuing Mobile Connections

In compliance to the final judgment and order dated 26.09.2018 of the Hon'ble Supreme Court in W.P. (C) 494/2012 {Justice KS Puttaswamy (Retd) & Anr. V/s UoI & Ors.} and connected matters, the Department of Telecom, on 26.10.2018, has directed all Telecom Service Providers (TSPs) to discontinue the use of 'Aadhaar' e-KYC service of UIDAI for issuing new mobile connections and re-verification of existing subscribers.

The Department has, on 06.11.2018, issued instructions for alternate digital KYC process for issuing new mobile connections to subscribers, in which live photograph of the subscribers and proof of identity/address is to be taken, thereby making the KYC process fully digital and paperless.

2.5 MERGERS & ACQUISITIONS

The following merger cases have been approved by the Department of Telecommunications during the year:

- Merger of M/s Telenor India Communication Private Limited with M/s BhartiAirtel Limited
- Merger of M/s Vodafone Mobile Services Limited and M/s Vodafone India Limited with M/s Idea Cellular Limited.

- The Department has also issued the procedure for testing of rollout obligations in case of merger and acquisition cases.
- Compliance of roll-out of the network as per the rollout obligations mentioned in the License Agreement/ Notice Inviting Application (NIA) for spectrum auction is examined for the spectrum allocated to the access service providers from time to time.
- To promote Ease of Doing Business, the Department has issued guidelines regarding release of Performance Bank Guarantee after fulfilment of rollout obligations.
- Recommendations of the Thirty Eighth Report of the Parliamentary Standing Committee on 'Issues related to quality of services and reported call drops' were dealt in the Department. Further, inputs/Action Taken Note on the recommendations concerning the Department were provided in respect of Fifty-Sixth Report of the Parliamentary Standing Committee on Finance on "Transformation towards a Digital Economy".

2.6 GRANT OF LICENSES

(i) Internet and Broadband Services

As per guidelines for grant of Unified License dated 19.08.2013, the internet services have been included in the Unified License. Accordingly, with effect from 19.08.2013, Unified License with ISP authorization is granted for provision of internet services.

Further, as per guidelines for grant of Unified License (Virtual Network Operators) dated 31.05.2016 and its amendments, the internet services have been included in the Unified License (VNO). Accordingly, with effect from 31.05.2016, Unified License (VNO) with ISP authorization is granted for provision of internet services.

As on 31.03.2019, there are 170 authorized Licences for Internet Services Providers (ISPs) which include 47 Category "A" Licences, 83 Category "B" Licences and 40 Category "C" Licences.

As on 31.03.2019, 1459 Unified Licences have been issued with ISP authorization for various Categories. This includes 52 Category "A" ISP authorization, 518 Category "B" ISP authorization, 889 Category "C" ISP authorization.

As on 31.03.2019, 170 Unified Licences (VNO) have been issued with ISP authorization for various Categories. This includes 23 Category "A" ISP authorization, 131 Category "B" ISP authorization, 16 Category "C" ISP authorization.

(ii) Very Small Aperture Terminal (VSAT) Services

VSAT service Licences are granted on non-exclusive basis for Very Small Aperture Terminal (VSAT)

service using INSAT satellite system within the territorial boundaries of India. Under the VSAT licence, the Licencees provide data connectivity within CUG between various sites scattered throughout India using VSATs and central hub. There are two categories of VSAT licences:

- Captive CUG VSAT Licence wherein the licensee company can set up VSAT network for its internal use only. As on 31st March, 2019, there are 23 captive CUG VSAT networks.
- VSAT CUG service authorization under Unified Licence wherein the licensee company can provide VSAT CUG service to a number of CUGs on commercial basis. As on 31st March, 2019, there are 10 Licences for providing commercial VSAT services.

(iii) Carrier Services

- **Licensing for National Long Distance (NLD) and International Long Distance (ILD) Service:** After announcing opening up of International Long Distance (ILD) Service in April 2002 and National Long Distance (NLD) Service in August 2002 for free competition, the Government has issued 27 ILD Licenses and 34 NLD Licenses (including BSNL). After the introduction of Unified Licensing Regime, the new Licenses to operate NLD & ILD services are being given as authorization under Unified License. Under Unified Licensing (UL) regime, in addition to above-mentioned licenses, seven licensees have been authorized to offer ILD services and thirteen licensees have been authorized to offer NLD services. The minimum networth and minimum equity requirements for obtaining NLD and ILD service authorization under Unified Licensing (UL) regime for the applicant company is Rs.2.50 crore each. Unified License (Virtual Network Operator) [UL (VNO] regime has also been introduced, under which NLD & ILD service authorization can be given.
- **Registration Certificate of Infrastructure Provider Category-I (IP-I):** Under IP-I registration, a company can provide assets such as Dark Fibres, Right of way, Duct Space, Tower for the purpose to grant on lease/ rent/ sale basis to the licensees of Telecom Services licensed under Section 4 of Indian Telegraph Act, 1885 on mutually agreed terms and conditions. As on 31.03.2019, 942 companies have been registered as Infrastructure Provider Category-I.
- **Voicemail/ Audiotex/ Unified Messaging Service (UMS):** 70 Licenses are in existence as on 31.03.2019 for providing Voicemail/ Audiotex/ Unified Messaging Service (UMS). There is no entry fee or license fee for Voicemail/ Audiotex/ UMS.
- **Public Mobile Radio Trunking Service (PMRTS):** 40 licenses are in existence as on 31.03.2019 in 3 metros and 12 circles for providing Public Mobile Radio Trunking Service (PMRTS). One UL (VNO) license has also been issued.
- **Global Mobile Personal Communication by Satellite (GMPCS):** The Licensee shall establish Land Earth Station (Gateway) in India for the purpose of providing Global Mobile Personal

Communication by Satellite (GMPCS) Service. The operation and maintenance centre of the GMPCS Gateway shall also be located in India. The Licensee shall demonstrate the system capabilities with respect to security aspects including monitoring to the Licensor or its authorized representative prior to starting of operations in India.

The Department of Telecommunications (DOT) has granted a license under *sui-genesis* category to BSNL for "Provision & operation of Satellite based services using gateway installed in India". BSNL has installed the Gateway at Ghaziabad and has started giving Global Satellite Phone Service (GSPS) w.e.f. 24.05.2017.

- **Public Awareness Programs on EMF emission issue:** The nation-wide Awareness Programme, on EMF Emissions & Telecom Towers initiated in 2016-17, to build a direct bridge of engagement between different stakeholders and to fill the information gap with scientific evidence, has further been followed up at sub-state level by the LSA field units of DoT so that more and more people are made aware about the scientific facts on health effects of EMF emissions from mobile towers. Pamphlets/ Information Brochures on various topics related to EMF have also been published and distributed in various regional languages. These programs have helped in bringing lot of clarity on this issue and resulted in reduction of new court cases, public grievances and RTI on related matters.

- **Launch of National EMF Portal:** Department of Telecommunications (DoT), Ministry of Communications has launched Tarang Sanchar, a web portal for Information sharing on Mobile Towers and EMF Emission Compliances, with a view to generate confidence and conviction with regard to safety and harmlessness from mobile towers, clearing any myths and misconceptions. The portal can be accessed at www.tarangsanchar.gov.in. The EMF portal provides a public interface where an easy map-based search feature has been provided for viewing the mobile towers in vicinity of any locality. By click of a button, information on EMF compliance of mobile towers can be accessed. Detailed information about any tower site, if requested, are sent on email to the users. Additionally, any person can request for EMF emission measurement at a location by paying a nominal fee of Rs 4000/- online. Filed units of DoT at the Licensed Service Area (LSA) will conduct the test (the requestor can be present, if he so desires) and the test reports will be provided. The portal also has 'EMF Overview' and 'Learn' Sections, which provide numerous articles, booklets and videos, to further educate the citizens about EMF and coverage of telecom services. Public can also access the 'DoT Initiatives section which has information on various leaflets, articles and Frequently Asked Questions. The portal has complete collated technical details of over 20 lakh base stations (BTSs) spread across the country by all technologies (2G, 3G, 4G etc.) for all Telecom Service Providers (TSPs).

2.7 TELECOM INFRASTRUCTURE

(i) BharatNet

Development of broadband highways is the essence of Government's Digital India campaign. Towards achieving this goal**, t**he Government is implementing the flagship BharatNet Programme in a phased manner. The project, financed mainly through the Universal Service Obligation Fund (USOF), would provide Broadband connectivity to all the 2.5 lakh Gram Panchayats (GPs) in the country. The project envisages an optimal mix of optical fibre, radio and satellite media. The broadband infrastructures created under the project would be available to all categories of service providers on non-discriminatory basis.

Box 2.2 BharatNet: Implementation of the project in two Phases

❖ **Phase-I: (1 LacGPs)**

- Phase- I to connect 1 lakh GPs is complete.
- Implementation through CPSUs: BSNL, RailTel ,PGCIL
- BBNL /BSNL to Maintain, Operate &Market the Network; Revenue sharing agreement between BSNL and BBNL
- Existing fibre of BSNL (between Block to GPs) used to lay and connect new OFC under the project.
- Around 32,000 KMs of lossy OF cable of BSNL replaced by new OF cable.

❖ **Phase-II (around 1.3 LacGPs)**

- Implementation primarily through agencies selected by tendering process in EPC mode.
- Life time maintenance of network by implementation agency.
- States/BBNL responsible for operations of Network.
- Services provisioning through Service Providers and States.

Overall Project Status as on19th May,2019

- Length of OFC laid: 3,30,355Kms
- No. of GPs where OFC Laid: 1,27,588GPs
- GPs to which OFC connected & equipment installed: 1,18,919 GPs
- No of GPs Service commissioned on Satellite: 759 GPs

(ii) Public Wi-Fi Access

Utilization of infrastructure projects in rural areas usually go through an initial gestation period

for triggering robust demand. In order to ensure 100% utilization of BharatNet infrastructure, it was decided in May 2018 that five Access Points (APs) would be set up in each GP, of which three APs would be installed at Government institutions (schools, healthcare centres, post offices, police stations) and two APs at public places for ensuring wider access. Under this project 50GB per month of data is to be provided for each Government institutions and 10Mbps of speed is to be provided at Wi-Fi hotspots. In addition to the Wi-Fi hotspots provisioned in the BharatNet, the Government is setting up 25,000 Public Wi-Fi Hotspots infrastructure at BSNL's Telephone Exchanges in rural areas.

(iii) Towers and BTS

The number of Mobile Base Transceiver Stations (BTS) has seen a rise from 7.9 lakh in 2014 to over 21 lakh in June 2019 while Optical Fibre Cable has increased from 7 lakh km to around 14 lakh km during the period. The country also boasts of over 5.4 lakh installed towers as on date.

(iv) Network for Spectrum (NFS) Project

The Cabinet Committee on Infrastructure (CCI) in its meeting held on 3rd December 2009 approved the alternate communication network for Defence services for release of spectrum. This network is being mainly implemented by Bharat Sanchar Nigam Limited (BSNL) and a small part of Delhi and Mumbai Air Force Network by Mahanagar Telephone Nigam Limited (MTNL). The exclusive & dedicated OFC based network was to be set up at a cost of Rs.9175.16 crores. This amount included Rs.1077.16 crores for Air Force and Rs.8098 crores for Army & Navy. As per CCI approval, the Air Force Network was to be completed by 30th June, 2010 and for Army & Navy it was to be completed by 31st December 2012. The Air Force Network was dedicated to the Nation by Indian Air Force on 14th September 2010.

CCI in its meeting held on 3rd July 2012, has given the enhanced financial approval of Rs. 13,334 crore. Further, CCEA in its meeting held on 16th May 2018, has given the enhanced financial approval of Rs. 24,664 crore. The revised timeline of completion of project is May 2020.

NFS has been divided into ten components. These are as follows:

- OFC for Army and Triservices (Around 60,000 km)
- OFC for Navy (Around 3,000 km)
- Dense Wavelength Division Multiplexing (DWDM)
- Geographical Information System based OFC Network Management System (GOFNMS)
- Microwave

- Satellite
- Multi Capacity Encryption Units (MCEU)
- IP-MPLS (Internet Protocol – Multi Protocol Label Switching) (Navy)
- IP-MPLS (Army)
- Unified Network Management system (UNMS)

Purchase Order / Advanced Purchase Order has been placed by BSNL for the first 9 components. Tenders are being finalised by BSNL for the last component. Till date, nearly 94% of OFC has been laid. It is expected that the project would be completed by May 2020.

2.8 ENHANCING CONNECTIVITY

The Department of Telecom executed a project for providing Mobile Services in 2,335 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) with an outlay of Rs 4781 crore. As part of LWE Phase-2, Government has decided to install additional 4,072 mobile towers with an outlay of Rs 7330 crore.

On 10.09.2014, the Union Cabinet approved a proposal to implement a Comprehensive Telecom Development Plan for the North-Eastern Region. The estimated cost of implementation is Rs. 5336.18 crores to be funded from USOF. The plan consists of 4 schemes that include provision of mobile services in uncovered villages in Arunachal Pradesh and Karbi Anglong and Dima Hasao districts of Assam, provision of mobile services in uncovered villages in rest of North Eastern Region (NER), provision of seamless mobile coverage along the National Highways in NER and augmentation of Transmission media in NER. BSNL is looking after the execution of this work.

The Government is also strengthening significantly the connectivity with Andaman and Nicobar Islands by laying 2164.23 km of Submarine Optical Fibre Cable between Mainland (Chennai) and Port Blair and five other islands namely Car Nicobar, Little Andaman, Havelock, Kamorta and Great Nicobar Islands.

The Government has decided to provide, on a pilot basis, voice and data connectivity in 361 identified villages in Ladakh & Kargil Region of J&K, border areas and other priority areas as a technology neutral outcome-based approach. This is being done to achieve the objective of ''Broadband for all" by 2022 as envisaged in the NDCP, 2018.

2.9 TELECOM SPECTRUM

A major achievement in the sector has been bringing in transparency in the allocation of spectrum by adopting an auction process. This has also resulted in the highest ever upfront payment to the Government. There has been a marked thrust on improving efficiency in the use of spectrum by allowing spectrum sharing, trading and harmonisation.

2.10 BUSINESS AND CONSUMER CENTRIC INITIATIVES

(i) Active and passive Infrastructure sharing

The Government has permitted sharing of active and passive infrastructure amongst service providers based on mutual agreements. The infra sharing covers antenna, feeder cable, Node B, Radio Access network (RAN) and transmission systems.

(ii) Single Number Based Integrated Emergency Communication and Response System '112'

Instructions with regard to implementation of Single emergency number '112' along with detailed operational guidelines have been issued. DOT has instructed TSPs to provide necessary telecom connectivity to PSAPs (Public Safety Answering Point) for implementation of Single Emergency Number '112' in all States/UTs. Ministry of Home Affairs has intimated that at present, Single Emergency Number 112 is operational in Uttar Pradesh, Uttarakhand, Punjab, Rajasthan, Madhya Pradesh, Tamil Nadu, Kerala, Andhra Pradesh, Telangana, Gujarat, Puducherry, Lakshwadeep, Andaman, Dadar Nagar Haveli, Daman and Diu, Jammu & Kashmir, Himachal Pradesh and Nagaland. However, other states and UTs are operationalwith mapped on existing emergency number '100' except Delhi. Single Emergency Number '112' is designed to be used to replace the multiplicity of Emergency Numbers operations in India such as 100, 101, 102 and 108 etc. This project is to be made operational by all States/UTs under the supervision of Ministry of Home Affairs through PSAP (Public Safety Answering Point). When an emergency call is received at the PSAP, it would be answered by a specially trained officer/call taker/operator of respective state/UT that will transfer the call on the type of emergency, dispatchers to police, fire medical and other response mechanisms.

(iii) Self-Regulation towards Sustainable Telecom

In order to achieve the objectives of Green Telecom and reduce the carbon footprint, Telecom Regulatory Authority of India (TRAI) had issued recommendations on *Approach towards Sustainable Telecommunications*. Government of India has considered the TRAI recommendations and decided for setting up of procedures for measuring carbon footprints and implement carbon emission reduction targets. Accordingly, directions to all ILD/NLD service providers have been

issued on 07/01/2019. The points included for Self-Regulation towards Sustainable Telecom are as follows:

a) The accuracy level of the Carbon Footprint should be taken as adequate based on the self-certification by the TSP. The Service providers shall submit the Carbon Footprint report to DGT Wing on self certification basis.

b) The TSPs should voluntarily adopt the RET solutions, energy efficient equipments and high capacity fast charging storage solutions etc. to meet the target for reduction of Carbon Footprint.

c) The Service Providers would adopt a Voluntary Code of Practice encompassing energy efficient Network Planning, infra-sharing, deployment of energy efficient technologies and adoption of Renewable Energy Technology (RET). Service providers through their associations should consensually evolve the voluntary code of practice.

d) Service providers should evolve a 'Carbon Credit Policy' in line with carbon credit norms with the objective of achieving the reduction in carbon footprint target. The ultimate objective of achieving a maximum 50% over the carbon footprint levels of the base year in rural areas and achieving a maximum of 66% over the carbon footprint levels of the Base Year in urban area by the year 2020."

2.11 OTHER IMPORTANT INITIATIVES

(i) **SAMPANN (System for Accounting and Management of Pension):** A new software for direct disbursement of Pension to BSNL and DoT retirees has been developed known as SAMPANN-CPMS (comprehensive pension management system). This Comprehensive Pension Management System was inaugurated by Hon'ble Prime Minister on 29th December, 2018 at Varanasi.

SAMPANN integrates the processing, sanctioning, authorization and payment units under a common platform, facilitating direct credit of pension to the accounts of pensioners.

SAMPANN has been rolled out on CPMS at 12 CCAs viz., U.P. (East), UP (West), Gujarat, Kerala, Rajasthan, Bihar, Madhya Pradesh, Andhra Pradesh, Tamilnadu, West Bengal, J&K and Delhi. Rest of the CCA offices are likely to be migrated in due course.

SAMPANN will provide the following benefits to the pensioners-

(i) A single window system for complete pension process, avoiding the complexities.

(ii) Pensioners provided with a login, for tracking the pension status and ongoing related processes.

(iii) Ensures direct disbursement of pension on timely basis without the intervention of 3rd party.

(iv) Effective & Quick process of pension arrears & pension revision cases.

Till now, 2092 pensioners have been benefited and an amount of ₹ 296.51 crores has been disbursed as pension. Bank data migration to CPMS of old pensioners is under process.

(ii) **NTRP (Non-Tax Receipt Portal):** The Electronic Receipt (e-receipt) system for accounting of DoT revenue, has been fully enabled in DoT HQ. All the CCA offices w.e.f. 1st January, 2017 have been operating through NTRP, which is a single window, online portal for payment of revenue of Government of India.

(iii) **SWR (State of Work Report):** The older version of SWR 1.0 is a web based platform developed to ensure accuracy, transparency, accountability and prompt reporting by CCA offices to DoT HQ. Due to some shortcomings in the older version, a new improved version of SWR 2.0 has been developed. A pilot launch has been done in 2 CCAs – Gujarat & Madhya Pradesh. Shortly, the new version of SWR 2.0 will be rolled out in all the CCAs.

(iv) **Digital Payments Mission:** For promotion of Digital Financial Mission in the country, Department of Telecom, being a technology centric sector, was given the target of 250 crore transactions for the FY 2018-19, against which 310 crore transactions has been achieved. For the promotion of Digital Payment in Smart Cities, the Department has organized "Digital Payment Melas" in 81 Smart Cities with a huge success. Direct payment of GPF for BSNL employees has been enabled by the CCAs which reduced the delay in payment of GPF.

(v) **Revenue Management System (SARAS):** The Revenue Division of DoT, consisting of Licensing Finance and Wireless Planning Finance division, has taken up an initiative to ease and automate the current telecom revenue reporting, assessment and payment mechanism.

A Revenue Management Software (RMS) – SARAS System for Assessment of License Fee Revenue and Spectrum Usage Charge (SUC) is accordingly being implemented, which would digitise the assessments, payments and accounting of license fees, spectrum usage charges etc. along with all ancillary processes. It is a web based application, which enables the Licensee to make online payments, digitally file and verify deduction claims, AGR statements, bank guarantee details along with enabling the Department to conduct online assessment of LF and SUC, management of bank guarantees, handle representations etc.The project is being implemented by M/s NSDL E-governance as System Integrator and E&Y LLP as Project Management Unit (PMU).

(vi) **Preference to Make in India (PMI) policy:** Preference to Make in India (PMI) policy is an important tool for leveraging India's large domestic market for strengthening the domestic companies. In line with DIPP's Public Procurement (Preference to Make in India), Order 2017,

DoT has notified the Public Procurement (Preference to Make in India) Order 2017, for telecom products, services and works for telecom sector on 29.08.2018. Manufacturers and suppliers of these notified telecom products, works and services are given preference in procurement by the procuring entities for a specified percentage of the procurement order, subject to the local suppliers satisfying the local content criteria. PMI will ensure reasonable market access for domestic companies thus enabling them to scale up their production and get more competitive.

2.12 ASSESSMENT OF LICENCE FEES:

Assessment of licence fees at the end of the financial year is based on the revenue figures as per the audited accounts of the company. A company is allowed to deduct Public Switched Telecom Network (PSTN) charges, Roaming charges passed on to eligible / entitled service providers and Sales Tax / Service Tax passed on to the State / Central Government from its total revenue. The sum so arrived at after these allowable deductions is called Adjusted Gross Revenue (AGR). A licence fee is levied at 8% of this Adjusted Gross Revenue (AGR).

Licence Fee is payable in four quarterly installments during each financial year. Quarterly installment of licence fee for the first three quarters of a financial year is paid within 15 days of the completion of the relevant quarter. However, in respect of last quarter of the financial year, the licence fee has to be paid by 25th March on the basis of expected revenue for the quarter, subject to a minimum payment equal to the revenue share paid for the previous quarter. Further, balance of amount payable and already paid has to be submitted by April 15th. To avoid penalty total License Fee paid shall not fall short of License Fee payable by more than 10% and this difference can be settled till May 30th of the following year.

For telecom networks licensed for Captive use and Captive Mobile Radio Trunking Service (CMRTS) licences, the license fee is levied at fixed rates depending upon the number of terminals, channels and / or network's capital cost.

2.12.1 TREND OF LICENCE FEE COLLECTIONS:

The trend of licence fee collections for the last five years is given below:

(₹ in crore)

Year wise Licence Fee Collections **					
F. Y	**2014-15**	**2015-16**	**2016-17**	**2017-18**	**2018-19**
Amount	12358	15771	15615	13262	11132 #

*** The above figures are based on e-lekha.*

 # The figure for 2018-19 is not complete as the final figure may be available only after closure of the accounts in the month of September, 2019.

2.12.2 Special Audit: Special Audit has been completed for financial years 2008-09 to 2010-11 for six TSPs in 2016 and revised Demand Notices have been issued.Special Audit for financial years 2011-12 to 2017-18 for eleven TSPs has been allotted via tender to CA firms.

2.12.3 CAG Audit:

CAG Report No. 4 of 2016 for Six TSPs for financial year 2006-07 to 2009-10 has been received and implemented in full. Out of 135 CAG sub paras, 116 sub paras have been settled. Reconciliation of underreporting detected by CAG vs amount raised by DoT in revised Demand Notice is given in the table below:

(₹ in crore)

Particulars	Idea	Airtel	Vodafone	Reliance	Aircel	Tata	Total
Underreporting/Non consideration detected by CAG (As per CAG Report No.4)	3383.60	8748.02	6215.65	14713.00	967.92	12017.36	46045.59
Total Underreporting/Non consideration added back to AGR as per Revised Demand Notice (based on CAG + Special Audit Report)	4933.90	13187.37	9680.28	18021.50	1152.81	14547.46	61523.46

CAG Report No. 11 & 35 of 2017 has been received and implemented. Process for admittance of paras is underway.

2.12.4 'Ease of doing Business' has been promoted by DoT by transferring the work of management, updation and release of Bank Guarantees and record maintenance of new licensees to the office of CGCA (Controller General of Communication Accounts). The Department also gave relief to the Unified License (Virtual Network Operators) from the double incidence of License Fee. An Amendment was issued in UL(VNO) that allows claiming the leaseline/bandwidth charges, minutes, SMS etc paid to the Network Service Operator as pass through charges to arrive at Adjusted Gross Revenue. DoT also streamlined the process of assessment of VNO licenses by clarifying the procedure for assessment of Licensee Fee and Bank Guarantee submission.

2.12.5 The Department has substantially reduced the time period for grant of various categories of service licenses and other clearances/NOCs such as grant of Unified License, grant of NOC, for reselling of global SIM cards, Issuance of No Objection for transfer of License in case of merger/ amalgamation of the companies, etc. The level of transparency in the License Fee Assessment procedure has been improved substantially through issue of many clarifications/circulars to the DoT field offices and TSPs.

2.13 FOREIGN INVESTMENT POLICY & PROMOTION

Foreign Investment Policy & Promotion (FIPP) Wing of the Department of Telecommunications deals with the work of promotion of Foreign Direct Investment in the Telecom Sector and also raises awareness about positive aspects of the foreign investment opportunities available in the Sector. For this purpose, a seminar was also organized by the FIPP wing in the month of September 2018 on the topic of 'FDI in Telecom Sector: A way Ahead'. On the occasion, a compendium 'FDI in Telecom Sector: A way Ahead' was also released.

Approval for foreign investment to the tune of Rs. 74,339,928,134.24/- has been given by the Department of Telecommunication in the Financial Year 2018-19 except the FDI approval to the Vodafone Idea Limited. The FDI proposal of Vodafone Idea Limited for FDI (beyond Rs. 5000 crore and upto Rs. 25000 crore) was approved by the Cabinet Committee on Economic Affairs. Further, a total of 14 (fourteen) proposals was approved in the FY 2018-19 after due consultation with the Ministries/Departments/Offices concerned. The details of the approved proposals are given in the table as under:

Sr. No.	Name of the Applicant	Amount of approved FDI (In Rs.)
1	ATC Telecom Infrastructure Pvt. Ltd.	40000000000/-
2.	Omega Telecom Holding Pvt Ltd (4710)	NIL
3	Idea Cellular Limited	NIL
4	Indus Tower Ltd.	NIL
5	TikonaInfinet Ltd.	4550000000
6	West Unified Communications India Pvt. Ltd.	135221462.24/-
7	Telstra Internet (S) Pte Ltd.	139999989.57/-
8	Intertainment services JSCO	150,000000/-
9	GPX India Services Pvt. Ltd.	500000/-
10	Arkadin SAS	14,13,74,882/-
11	Atria Convergence Technologies Ltd.	NIL
12	Vodafone Idea Limited	Upto 25000 crore
13	ATC Asia Pacific Pte. Ltd.	4553595792/-
14	ATC Asia Pacific Pte. Ltd.	24809235984/-

CHAPTER 3
INTERNATIONAL RELATIONS AND COOPERATION

Telecommunications by definition cuts across borders of different countries. Active participation and cooperation in this area is critical keeping in view the technology intensive nature of this sector. Accordingly, India has been proactively participating in multilateral and bilateral forums. Similarly, India has also been cooperating with different countries and industry and professional bodies in this area.

3.1 INTERNATIONAL RELATION: The year 2018-19 was marked by several important activities and visits in the sphere of International Relations for DoT. There were significant activities in multilateral cooperation with Intergovernmental Organizations such as ITU, APT, and ITSO etc. Indian high level delegations visited foreign countries in strengthening the bilateral relations and technological cooperation and several foreign dignitaries also visited India reflecting the growing prominence of India. The activities on International Relations front have been characterized as below.

i. Activities on Bilateral Cooperation

ii. Activities on Multilateral Cooperation and Conferences of Inter governmental and International Organizations

iii. International Exhibitions and Promotion events

iv. Capacity building programs with ITU/ APT and ITU-T study group meetings

3.1.1 Bilateral Cooperation

- **The 5th India – Japan Joint Working Group Meeting & the ICT Workshop for Disaster Management:** On August 7, 2018, the Fifth Japan-India Joint Working Group Meeting under Japan-India ICT Comprehensive Cooperation Framework was held in New Delhi, jointly by the Ministry of Internal Affairs and Communications of Japan and the Ministry of Communications of India. Both Sides shared the recent progress in ICT Developments in each country, and exchanged their views about current situations, challenges and future initiatives regarding joint projects adopted in the second and fourth meetings.

  It was agreed by both sides to advance efforts by enterprises and organizations of both the countries in the following areas:

  i. Cooperation in the area of the 5th generation mobile communication system.

  ii. Framework for Telecom Security [Sharing of Best Practices]

iii. Testing and Certification of Telecom Equipment in India

iv. A Trilateral Engagement under JWG in capacity building

- **MoU with Korea**: An MoU was signed between Republic of Korea and Republic of India in the field of ICT on 10thSept 2018.

- **MoU with Cambodia**: DDG(IR) visited Cambodia where Memorandum of Understanding (MoU) between India and Cambodia on Cooperation in the field of Communications was signed. The MoU will contribute in strengthening bilateral cooperation and mutual understanding between India and Cambodia in the field of communications. It is in line with the commitment made by Hon'ble Prime Minister during ASEAN-India Commemorative Summit.

- **MoU with Vietnam**: MoU was signed between India and Vietnam for Cooperation in the field of Communications. The MoU will contribute in strengthening bilateral cooperation and mutual understanding in the field of communications. It is in line with the commitment made by Hon'ble Prime Minister during ASEAN-India Commemorative Summit.

- **Visit of Deputy Secretary General ITU to India**: DSG, ITU visited India for 2nd International Conference on "5G India 2018". DSG appreciated the efforts of India for a proposal to establish ITU Local Area office in India.

- **ITU-DSG Visit to India**: ITU-DSG visited India on 12th March 2019. Discussion on long term engagement including establishment of ITU Local Area Office in India were held.

- **Cyber Defence Exercise with recurrence (CYDER) Training**: As part of DoT's effort to develop skilled manpower equipped with relevant skill sets to handle any cyber security breach, a hands-on training program titled 'Cyber Defence Exercise with recurrence (CYDER)' was organised under the ambit of the Joint Working Group on ICT between Department of Telecommunications, Govt. of India and Ministry of Internal Affairs & Communications Govt. of Japan in Telecommunication Engineering Center on 18th&19th March, 2019.

- **WTISD Celebration 17 May 2018**: Department of Telecommunication celebrated 17th May 2018 as the World Telecommunications and Information Society Day (WTISD). The theme of WTISD for the current year 2018 i.e. "Enabling the positive use of Artificial Intelligence for All" focused on the potential of Artificial Intelligence (AI) to accelerate the United Nations' Sustainable Development Goals (SDGs)."

3.1.2. Multilateral Cooperation:

- **Visit of High level DoT delegation, led by Hon'ble MoS (IC), MoC, to participate in the Commonwealth ICT Ministers Forum 2018 at London, U.K. during June 18-20, 2018**: A high level DoT delegation, led by Shri Manoj Sinha, Hon'ble MoS (IC), MoC, accompanied

by Member (Finance), Telecom Commission and DDG (International Relations), participated in the Commonwealth ICT Ministers Forum 2018 at London, U.K. during June 18-20, 2018. Hon'ble MoC delivered keynote address during the Commonwealth ICT Ministers Forum 2018 on June 18, 2018 and on June 19, 2018 on 'ICT Enabled Growth: Leadership Development'. Hon'ble Minister made interventions during various sessions on 'Universal Broadband', 'Over-The-Top (OTT) Services', and 'Cybersecurity: Updates from CHOGM/ Implementation Reports'.

The event showcased major initiatives taken by the Government of India for development of ICTs in the country and progress made towards making India a knowledge society, during various high level sessions. The presence of world leaders from other countries was well used and several bilateral meetings with member states and international organizations such as U.K., CTO, were held on the sidelines of the event. India hosted a lunch during the event to garner the support of member countries of CTO for the candidature of India in ITU Council Elections to be held later this year and for establishment of ITU Local Area Office in India.

On the sidelines of meetings C-DoT signed three MoUs for Cooperation in '5G with 5G Innovation Centre' of University of Surrey UK, Kings College London and University of Bristol UK, in the presence of Shri Manoj Sinha, Hon'ble Minister of Communications, Mr.Y.K.Sinha, High Commissioner of India in UK and Mr. Liam Maxwell, National Technology Advisor UK, on June 20, 2018 in Indian High Commission in London.

- **Visit of DoT delegation, led by Advisor (Finance) to participate in the Thirty-Eighth Meeting of the International Telecommunications Satellite Organization (ITSO) Assembly of Parties (AP-38) in Washington D.C., USA during June 13-15, 2018**: A DoT delegation, led by Shri P.K. Sinha, Advisor (Finance), participated in the Thirty-Eighth Meeting of the International Telecommunications Satellite Organization (ITSO) Assembly of Parties (AP-38) in Washington D.C., USA during June 13-15, 2018. Shri P.K. Sinha, Advisor (Finance) was elected as Deputy Chairman during the Meeting. Further, India was elected in the Advisory Committee of ITSO.

- **TELSOM-ATRC JWG**: (JWG+India) with ASEAN was held on 29 June 2018 in Malaysia. In this meeting India presented ASEAN-India 2019 ICT Work Plan which was adopted by the TELSOM.

- **ITU Telecom World 2018**: Advisor (Finance) led a DoT delegation to ITU Telecom World, Durban, South Africa during 10th - 13th September 2018. Advisor (Finance) also participated as speaker during the Ministerial Round Table: "Government enabling smarter digital development" and for ITU Specialized session – Innovation Power Session: "Monitoring ICT centric innovation policies and programmes" and also highlighted India's latest policy initiatives such as Digital India, Bharat Net, Jandhan Aadhar Mobile (JAM) etc. and showcase India's growth and development in ICT domain.

  India also hosted a networking lunch during the ITU Telecom World 2018 at Durban to highlight and garner support for India's proposal to establish ITU South Asian Area Office

and Technology Innovation Centre in India which is the prime-mover ICT capacity building initiatives. India is also contesting as Council Member in the elections which will take place during ITU PP 2018 to be held in Dubai this year.

- **4th BRICS Communications Ministers' Meeting, 13-15 September 2018, Durban, South Africa:** Minister of State for Communications (Independent Charge), Shri Manoj Sinha led a high level delegation to the 4th BRICS Communications Ministers meeting in Durban, South Africa during September 2018. The theme of this year was 'BRICS in Africa: Collaboration for inclusive growth and shared prosperity in the Fourth Industrial Revolution'.

  The 4th BRICS ICT cooperation platform saw important engagements in the form of Ministers Meeting, Joint Working Group meeting, Business to Business dialogue, and cooperation in Infrastructure development and new technologies. Shri Sinha made a Statement on "Policies towards inclusive growth" and shared dreams and commitments towards the betterment of our people in the spirit of brotherhood. He also addressed the BRICS ICTs Business leaders during the Business Dialogue

  The BRICS Ministers agreed to setup the BRICS Institute of Future Networks (BIFN) with one branch in each of the BRICS member nations to carry out collaborative research in Future Networks in the field of ICTs. It was also resolved to set up a Digital BRICS Task Force (DBTF) for "BRICS Partnership on fourth Industrial Revolution" to formulate Terms of References and Work Plans for ICT sectors with the support of all stakeholders. India also suggested various proposals in agreed areas of cooperation in ICTs among BRICS members with the main objective of bridging the digital divide.

  Secretary General of ITU, Mr Houlin Zhao, made the announcement during BRICS conference for establishment of ITU Local Area Office and Innovation Centre at New Delhi, India.

  Bilateral meetings with Brazil, Russia, China and S. Africa were also held on the sidelines of BRICS Communications Ministers' meeting.

- **India Mobile Congress (IMC) October 25-27, 2018, New Delhi:** Ministerial level bilateral meetings were held with visiting delegation from Nepal, Cambodia and Myanmar. Senior Officers Level Bilateral meetings were held with Vietnam and Taiwan.

- **ITU Council Meeting on 27th October 2018, Dubai, UAE:** The ITU Council meeting was held on 27th October 2018 in Dubai UAE. During the meeting India's proposal for establishment of ITU South Asia Area office and Technology Innovation Centre in India was discussed and greed. This endeavour is the prime mover ICT capacity building initiatives of India.

- **ITU Plenipotentiary Conference 2018 (29th October-16th November 2018), Dubai, UAE:** A delegation of DoT led by Secretary (Telecom) participated in the ITU Plenipotentiary Conference, 2018, Dubai, United Arab Emirates, during 29th October to 1st November.

2018. The Plenipotentiary Conference is the supreme organ of the ITU (International Telecommunication Union) and meets every 4 years to consider broad telecommunication policy issues to ensure that the Union's activities, policies and strategies fully respond to today's dynamic, rapidly changing telecommunications environment. Various elections of ITU (ITU Council and various official positions) are held during this conference. India also has announced its candidature for ITU Council.

Secretary (T) met Secretary General of ITU and Director (TSB) before the ITU Council elections to discuss and strengthen India's commitments towards ITU and its programmes. She invited them to attend inauguration of ITU South Asia Area office and Technology Innovation Centre in India. Secretary (T) also held bilateral meetings with South Korea, Poland (Vice Minister), Mali and Philippines for canvassing Indian Candidature for ITU Council Elections in addition to the discussions on potential areas of cooperation and collaboration in the field of Telecommunications and ICTs.

India has been re-elected as a member of the International Telecommunications Union Council (ITU) for another 4-year term - from 2019 to 2022. The elections to the council were held during the ongoing ITU Plenipotentiary Conference 2018 at Dubai, UAE. India secured 165 votes and ranked third among the 13 countries elected to the council from the Asia-Australasia region, and eighth among the 48 countries elected to the council globally.

3.1.3. Study Group meetings and Conferences:

The ITU study group meetings are aimed to build capacity and contribute for harmonizing standards, share best practices and learning's for ICT growth. The issues discussed in these meetings are important for India as an emerging country to develop the ICT eco system and take challenges and issues to this international discussion forum. The DoT delegation participated in the following ITU study meetings in different sectors.

i. ITU-T Study Group 3 meeting

ii. ITU-T Study Group 13 meeting

iii. ITU-D Study Group 1 Meeting

iv. ITU-T Study Group 12 Meeting

v. ITU-D Study Group 2 Meeting

vi. ETSI Security Week 2018 meeting

vii. ITU-T Study Group 5 Working Party meeting

viii. APT-15th APT Telecommunications/ICT Development Forum and Joint APT NIA Workshop on ICT Broadband

ix. 23rd EMF Project International Advisory Committee meeting and 7th Ultraviolet Radiation meeting.

x. 3GPP SA3 LI meeting

xi. ITU-T Study Group 16 meeting

xii. CTO Commonwealth ICT Roundtable

xiii. ITU-T Study Group 5 Meeting

xiv. SG-1 Rapportuer Meeting

xv. SG-2 Rapporteur Meeting

xvi. ITU T SG 15 Meeting

xvii. 6th Meeting of the Expert Group on ICT Household Indicators and 9th Meeting of Expert Group on Telecommunication

xviii. ICANN 63 Policy Forum

xix. 3 GPP RAN 3#103 meeting

xx. GSMA Mobile World Congress 2019

xxi. 3rd meeting of Focus Group on Technologies for Network 2030 and Workshop

3.1.4 International Training:

NTIPRIT- the telecom training Institute of Department of Telecommunications conducted three international training programmes under ITEC programme. The Advanced Level Telecom Training Centre (ALTTC), BSNL has been selected as one of the Centre of Excellence (CoE) for the Asia & the Pacific region for the Cycle 2019-2022.

DoT officers participated in the capacity building programme abroad organized by the International organisation such as ITU, APT in the following areas:

i. APT Training on Influence of Big Data

ii. APT Training on Utilization of ICT Services

iii. ITU CoE Network on Technical Business and Regulatory aspects of 5 G Network

iv. ITU CoE Training on Competition Analysis

v. ITU CoE Training on Conformity and Interoperability

vi. APT Training on 5G Communications System and Internet of Things

vii. ITU Asia Pacific CoE training on Cybersecurity

viii. ITU Asia Pacific CoE training on Internet and IPv6 Infrastructure

ix. ITU Asia Pacific CoE training on Cybersecurity

3.2 INTERNATIONAL COOPERATION

The International Cooperation Division of the Department of Telecommunications deals with activities of prime importance relating to WTO negotiations, bilateral and multilateral trade and economic agreements relating to telecommunications, Telecom Equipment and Services Export Promotion Council (TEPC), Telecommunications Standards Development Society of India (TSDSI), Telecom Centres of Excellence (TCOE India), Exhibitions/Conferences and seminars relating to telecom.

The year 2018-19 was marked by several important activities in field of International Cooperation, which are broadly categories as under: -

(i) High Level Forum for 5G India 2020

A 5G High Level Forum was set up by the Government in September 2017 to articulate the Vision for 5G in India and to recommend policy initiatives and action plans to realize this vision. Further, a Steering Committee was constituted with Dr. A J Paulraj, Professor Emeritus, Stanford University, USA as the Chair.

The High Level Forum submitted its report titled “Making India 5G Ready” on Aug 23, 2018. Presently, DoT is working on setting up the grounds for the launch of 5G technology in India along with other developed countries. DoT has already incorporated most of the recommendations related to policy aspect in NDCP 2018.

DoT along with MeitY, DST and other stakeholders is working on major recommendations on key areas like:

- Spectrum Policy,
- Regulatory Policy,
- Education and Awareness Promotion Program,
- Application & Use Case Labs,
- Development of Application Layer Standards,
- Major Trials & Technology Demonstration and
- Participation in International Standards.

Unlike the generations of mobile networks that have preceded it, 5G is not just an extension of existing technologies but a "system of systems" that will bring flexibility to mobile, fixed and broadcast networks and support ever larger data requirements. So 5G will not only enable human to human communication but also machine to machine communication.

The 5G demands working with different industry verticals for the development of use cases. It requires ultra-high-speed broadband with extremely low latency which allows a number of use cases like remote surgery, autonomous driving, artificial intelligence, augmented reality and much more.

5G is the game changer technology, which will allow operators to move beyond connectivity and collaborate across sectors such as manufacturing, finance, transport, retail, agriculture and health to deliver new and personalized services. Opportunities related to IoT, M2M, and augmented and virtual reality (AR-VR) will create new revenue streams from business-to-business (B2B) and business-to-government (B2G) segments.

(ii) India Mobile Congress 2018

Department of Telecommunications (DoT), and the Cellular Operators Association of India (COAI) along with other stakeholders organised India Mobile Congress (IMC) 2018, the biggest 'digital technology' event in India. The second edition of the iconic international event, with its theme "New Digital Horizons: Connect, Create, Innovate", was organised at Aerocity, New Delhi from 25th to 27th October, 2018. The IMC 2018 was inaugurated by Shri Manoj Sinha, the then Hon'ble Minister of State (Independent Charge) for Communications and Minister of State for Railways. The inauguration was graced by the presence of Shri Ravi Shankar Prasad, Minister of Electronics and Information Technology and Law & Justice, Shri Suresh Prabhu, the then Minister of Commerce & Industry and Civil Aviation, Shri Hardeep Singh Puri, then Minister of State (Independent Charge) for Housing & Urban Affairs along with Secretary (T) & Chairperson, DCC, Department of Telecommunications. Prominent Industry captains like Shri Mukesh Ambani, Shri Sunil Bharati Mittal, Shri Kumar Mangalam Birla, and other national and international professionals alongwith Government, start-ups, industry and academia also participated in the Congress.

The main thrust area at IMC 2018 was the potential of 5G technology and its use cases. A number of companies presented their roadmaps for their readiness for deployment of 5G technology in India. A number of companies also presented live demos of 5G technology, which was one of the major highlights of the event. The event was attended by more than 56,000 visitors, which comprised of more than 5000 CXO delegates, 300 international speakers, 150 exhibitors, 700 media persons and a number of important policy makers from around the world. Around 20 countries participated in IMC 2018, making it one of the most prestigious platforms for celebrating technology and discussing critical issues, use cases and challenges around it.

IMC also saw representations from States of: Gujarat, Kerala, Karnataka, U.P., Punjab, Rajasthan and Haryana.

With around 40 quality sessions over three days, IMC 2018 had the audiences engaged with current and crucial topics. This resulted in IMC 2018 being awarded the "The Knowledge Hub" award at Exhibition Excellence Awards 2019 held in Expo Center, Greater Noida in March of 2019.

The event also got widespread media coverage with more than 2000 appearances in various news publications. On social media, #IMC2018 generated more than 1 billion impressions making it one of the most popular events on social media in India.

One of the key highlights of IMC2018 was the ASEAN-BIMSTEC conclave that saw the participation of several key policy makers from the ASEAN and BIMSTEC countries. The esteemed panel discussed how to connect the various country specific projects and policies to strengthen the interaction and technological cooperation between the ASEAN and BIMSTEC countries. Focus was also placed on potential roadblocks in terms of regulatory framework, data security, infrastructure as well as access to the requisite technological and financial assistance.

An interesting feature of this edition of the IMC was the focused attention on the critical Start-up ecosystem. More than 200 start-ups marked their presence at the event, with their booths displaying ideas and innovations which seek to leverage the potential of digital communications to create and meet ever-changing consumer needs – in areas such as artificial intelligence, integrated services, healthcare, pharma, security, safety, food, sports, social networking, travel, education, and disaster management, among others. Shri Manoj Sinha also inaugurated the simultaneous release of 250 start-up applications at the IMC 2018.

Inauguration of India Mobile Congress 2018

Inauguration of IMC 2018 Exhibition

(iii) Telecom Centre of Excellence (TCOE):

TCOE has been created as a PPP initiative by the Department of Telecommunications, Government of India in 2007, to strengthen the R&D ecosystem in ICT where Government works as a facilitator, Industry as the ultimate user, and academia as the research unit. Important activities of TCOE during the year 2018-2019 are as under:

- **Innovation in Mobile Application Development Ecosystem (I-MADE):** Innovation in Mobile Application Development Ecosystem (I-MADE) is an initiative to help Indian entrepreneurs build mobile app start-ups some of which can eventually become Indian unicorns. Around 800 institutes have been registered under the I-MADE program since 2016. The main component of the program is encouragement of Entrepreneurship through Hackathons and Industry & Investor connect solving societal and Industry challenges.
- **TCOE India as IMT2020 Evaluator**: TCOE India has signed up as an Independent Evaluation Group (IEG) for the evaluation of the candidate technologies for IMT2020. The evaluation group is made of members from Academia, Research labs and Industry across India. At the TCOE India evaluation group meetings, the contributions for the (S)RIT submissions of 3GPPhave been reviewed by its members, and an interim partial evaluation report was

prepared for the Dense Urban-eMBB Test Environment. This report is submitted with an intent for discussion in the#31 bis meeting in February 2019.

(iii) Telecom Equipment and Services Export Promotion Council (TEPC)

Telecom Equipment and Services Export Promotion Council (TEPC) has been set up by the Government of India to promote and develop exports of telecom equipment and services from India.

TEPC Participation in Events during 2018-19

TEPC organized various structured promotional events so as to create awareness about the capability of Indian telecom exports. The various promotional activities carried out on a regular basis are product & services specific delegation to selected countries, exclusive Indian TEPC Exhibition, country participation in Specialized Trade Fairs, Catalogue Show, Buyer-Seller Meets, Product Specific Seminars and Conferences - both in India and abroad.

During the year 2018-19, TEPC organized/participated in the following events/ exhibitions in India as well as abroad:

- **Indo Africa ICT Expo 2018:** Telecom Equipment & Services Export Promotion Council (TEPC) organized 4th edition of Indo –Africa ICT Expo 2018 in conjunction with IT & Telecom Summit during May 22-23, 2018 at Eko Hotel & Convention Centre, Lagos, Nigeria with support from Department of Commerce, Department of Telecommunications, Government of India, and NASSCOM. Indo Africa Expo 2018 focused on “One World, One Platform: Technologies that Transform” is the largest IT and Telecom Show for convergence of technology and business exchange between Indian and African ICT Companies.

The Nigerian Minister of Communications, H.E. Mr. Abdur-Raheem Adebayo Shittu was the chief guest at the event. In his opening remarks he expressed Nigeria’s readiness to partner with India for streamlining the ICT sector in Nigeria, and enhancing its ability to catalyze and sustain socioeconomic development critical to Nigeria’s vision of becoming a top 20 economy by the year 2020.

TEPC along with NASSCOM took more than 50 ICT companies from India and Nigerian companies also shown good participation. Event witnessed around 1500 visitors. This event provided wider opportunities for African and Indian companies to display with their distinctive products through exhibition and networking activities and a platform to establish strategic partnerships among key players of the ICT ecosystem

Inauguration of Indo Africa ICT Expo 2018 by Hon'ble Minister of Communications, H.E. Mr. Abdur-Raheem Adebayo Shittu, High Commissioner of India in Nigeria

Cultural rendition during Indo-Africa ICT Expo 2018

- **COMMUNICASIA 2018, Singapore:** Indian telecom stakeholders are exploring the telecom markets in different countries and Singapore is one of the major markets for Indian companies to access ASEAN markets. TEPC along with NASSCOM members participated in CommunicAsia 2018, Singapore from 26th to 28th June, 2018.

Inauguration of CommunicAsia 2018,

- **India ASEAN ICT 2018 Expo Hanoi, Vietnam:** TEPC jointly organized India ASEAN ICT 2018 Expo in Hanoi alongside Vietnam ICT Investment Forum organized by Ministry of Information & Communication, Vietnam, creating a bigger platform in support of ICT industries of both the countries. The event was organized with NASSCOM as co-organisor and supported by Department of Telecommunications & Department of Commerce.

India ASEAN ICT 2018 Expo Hanoi, Vietnam

- **GITEX 2018 DUBAI:** TEPC participated in GITEX 2018 scheduled from 14th-18th October 2018 in Dubai. TEPC builded TEPC- India Pavilion in GITEX Technology Week 2018. The event was organized under MAI scheme of Department of Commerce, Ministry of Commerce & Industry. This was a good opportunity for the members to showcase their products and technology solutions in the exhibitions and excellent opportunity for interaction with the foreign buyers. The TEPC pavilion was inaugurated by H.E. Mr. Vipul, The Consul General of India in Dubai.

Inauguration of GITEX 2018

- **INDIA TELECOM 2019, February 11-12:** Telecom Equipment & Services Export Promotion Council (TEPC) organized 11thIndia Telecom 2019- an exclusive International Business Expo

on 11th-12th February 2019 at Shangri La Hotel, New Delhi under MAI scheme of Department of Commerce, Ministry of Commerce & Industry. 145 delegates from 34 countries attended the event. The exhibition of India Telecom 2019 was inaugurated by Shri Suresh Prabhu, then Hon'ble Minister Commerce and Industry & Civil Aviation and the Conference was inaugurated by Shri Manoj Sinha, Hon'ble MoS Communications (I/C) & Railways.

Inauguration of 11thIndia Telecom 2019

- **Mobile World Congress 2019, February 25-28:** TEPC participated in Mobile World Congress 2019, held during 25th February -28th February 2019, in Barcelona, Spain. The event was organized under the subsidy of MAI scheme of Ministry of Commerce.

  TEPC provided Pod Space to to more than 25 Technology Providers companies mostly SMEs. Shri Anshu Prakash, Additional Secretary, Department of Telecom Government of India and Mr. Sanjay Verma Ambassador Embassy of India, Madrid Inaugurated India Pavillion at Mobile World Congress 2019 Barcelona.

(iv) Telecommunications Standards Development Society, India (TSDSI)

TSDSI was established as an autonomous body by Indian industry, Academia, Research entities and the Government of India to drive Telecom Standardization activities in India and project Indian interests in global forums.

TSDSI is a member of Global Standards Collaboration (GSC), a body comprising all global telecom standards development organizations (SDOs), an Organizational partner of third Generation Partnership Project (3GPP), which is driving next generation wireless standards (eg. 5G), Partner Type 1 of oneM2M, an international partnership project working on creation of a standard M2M service layer framework and Members of ITU-R SG5 (Terrestrial Services) and ITU-T SG15 (Transport, Access and Home).

Standardization Activities:

TSDSI has published its first Standard – CPRI Fronthaul Transport Standard and has transposed over 150+ 3GPP Specifications for Indian Telecom Security Assurance Requirements.

Snapshot of Technical Publications as on 31 March 2019:

Group Name	Study Group-Networks	Study Group-Services and Solutions
Total Standards Released	1709 (1414 in FY 18-19)	112 (80 in FY 18-19)
Total Technical Reports Released	-	65 (55 in FY 18-19)

TSDSI members are carrying out studies and standards development in the following areas:

Study Group- Networks	***Study Group-Services and Solutions***
IMT2020 Technologies *Channel characteristics for 60GHz* *Broadcast offload* *FiCAD and FiDAR (Flexible interfaces between Distribution Unit (DU) and Control Unit (CU), FiCAD; as well as DU and Radio Unit (RU), FiDAR)*	*Cloud Interoperability and Portability* *Public Protection and Disaster Relief* *Information Centric Networking* *Unmanned Aerial Vehicles (UAV/Drones)* *Multi-SIM devices* *Indian Language support for Financial transactions*

There were eight formal meetings (including three plenaries) of the technical groups in the reporting period hosted by TSDSI members.

Contributions and Engagement in Global Standards Forums

TSDSI members participate regularly in all meetings of the Working Party 5D of ITU-R SG5, with a cumulative participation of more than 20 Express in 2018-19.

Key accomplishments:

- TSDSI has been recognised as a GCS proponent with its transposition of 1500+ 3GPP Specifications for IMT M.1457 (IMT 2000 technologies) and submission to ITU-R;

- TSDSI has been recognized as an IMT2020 RIT proponent. TSDSI submitted the initial description of the candidate Radio Interface Technology for IMT 2020 at the ITU R SG5 WP5D meeting #29, based on 3GPP release 15 and onwards which may include enhancements based on Indian requirements and technologies.

3rd Generation Partnership Projects (3GPP)

A contribution on pi/2 BPSK with spectrum shaping, championed by TSDSI member, has been accepted as an optional feature for sub 6 GHz and above 6 GHz bands.

TSDSI members have been participating regularly in 3GPP meetings including the PCG/OP meetings. 19 Individual member organizations joined 3GPP through TSDSI in Calendar year 2018. Three meetings of 3GPP were hosted in India.

In 2018, 538 representatives from various TSDSI IMs of 3GPP participated in 88 3GPP meetings across the globe. TSDSI, COAI and IF3 hosted meetings of the 3GPP - SA2+SA3+SA6 groups in Kochi in Jan 2019 and RAN5 Adhoc meeting in Jaipur in Oct 2018.Presence of 3GPP experts was further leveraged to conduct specific topic based meetings with India stakeholders. TSDSI also mobilized the enrolment of Broadband India Forum as a Market Representation Partner (MRP) at 3GPP.

oneM2M

TSDSI had earlier transposed oneM2M Specifications (17 nos.) and Technical Reports (10) corresponding to oneM2M Rel 2. These are currently under consideration by DoT for adoption as National standards for M2M. Four TSDSI members took membership in oneM2M in calendar year 2018 and contributed actively on the issue.

A multicity series of oneM2M tutorial cum hackathons and two workshops have been conducted to promote oneM2M in India, under the aegis of the India EU Cooperation Project on ICT standardization.

oneM2M Centre of Excellence has been setup in IIIT Hyderabad.

Partnerships and Ecosystem

TSDSI has forged multiple partnerships with global and regional standards forums and technology bodies, with the intention of fostering early dialog and experience sharing to promote alignment and harmonization of standards. MoUs were signed with 5GIA, ATSC, BIF, CCICI, TAICS, TTA in the reporting period.

Cooperation Agreements and MoUs	ETSI, 5GIA, ATSC, BIF, CCICI, IEEE-SA, GCF, TTA,TAICS
Letters of Intent to Cooperate	ARIB, ATIS, CCSA, TTC

CHAPTER 4
OFFICES AND FIELD ORGANISATIONS

The functions of offices, including attached, subordinate and field offices of the Department of Telecommunications are given in this chapter.

4.1 WIRELESS PLANNING AND COORDINATION

The Wireless Planning and Coordination Wing of DoT is the nodal wing for planning, regulation, coordination, authorization and management of radio frequency spectrum in the Country. International coordination for spectrum management and associated satellite orbit, including Geo-Stationery Satellite Orbit (GSO)/Non-Geo-Stationery Satellite Orbit (NGSO) are administered under the provisions of Indian Telegraph Act 1885 (13 of 1885) and Indian Wireless Telegraphy Act 1933, for Licensing radio communication systems.

4.1.1 National Frequency Allocation Plan (NFAP) : It provides a broad regulatory framework for identifying frequency bands available for cellular mobile service, Wi-fi, sound and television broadcasting, radio-navigation for aircrafts, ships, defence communications, security communications, disaster relief, emergency communications, satellite communications, satellite-broadcasting, and amateur service, to name just a few. With a view to provide a stable, yet flexible, regulatory framework, NFAP-18 was released on 25.10.2018**.**

4.1.2 Spectrum Management: Radio-communication services and applications are allocated in their specific frequency bonds as par NFAP to ensure interference free network. NFAP is the guiding principle for efficient management of spectrum and its utilization.

4.1.3 Harmonization of Spectrum: To achieve better spectrum efficiency and contiguous spectrum assignment to an operator, harmonization of spectrum continues to be carried out in 900/1800/2100 and 2300 MHZ band. Additional spectrum in various service areas has become available after the harmonization.

4.1.4 Transfer of spectrum due to merger of service provider companies: M/s Telenor merged with Bharti Airtel and spectrum holding of Telenor was transferred to Bharti Airtel. M/s Vodafone and M/s Idea merged to form Vodafone Idea Limited and the spectrum holding of Vodafone was transferred to Idea in all the service areas.

4.1.5 Spectrum audit: Recognizing the importance of potential commercial usage of spectrum by IMT systems, the spectrum in various frequency bands has been re-farmed from time to time and made available for assignment to TSPs through auction. This has helped the department to identify more spectrum for the commercial and captive use.

4.1.6 TRAI recommendations on PMRTS: Earlier, radio frequency assignments for PMRTS networks were made on administrative basis as per the frequency bands available in the National Frequency Allocation Plan (NFAP) to the licensees having valid PMRTS license agreement. For developing a holistic policy of spectrum allocation, a reference was sent to TRAI seeking its recommendations on method of allocation of spectrum for PMRTS. TRAI provided its recommendations on 20.07.2018 after consultation with various stakeholders. The TRAI recommendations for administrative allotment, among others are under consideration of the Department.

4.1.7 SACFA Sitting Clearance: The Standing Advisory Committee on Radio Frequency Allocation (SACFA) grants clearances for fixed wireless stations considering aviation hazard, interference free operations and line of sight obstruction. Site clearances by SACFA are issued without prejudice to applicable bylaws, rules and regulations of local bodies such as Municipal Corporations/Gram Panchayats, etc.

4.1.8 Satellite Coordination:

Satellite Coordination with other Administrations

(i) Operator-level agreement between ISRO, India and National Space Policy Secretariat, Japan for Indian satellite networks i.r.o IRNSS/GAGAN systems and Japanese satellite networks for their QZSS system respectively was ratified.

(ii) Coordination proposal was sent to Administration of Indonesia for IND-SATS series of satellite networks of India and PALAPA series of satellite networks of Indonesia.

4.1.9 Coordination with ITU-

Notification & Due Diligence for Indian Satellite networks (Total:20 Nos.)

(i) Special Section Part I-S published	:	4 Nos
(ii) Special Section Part II-S published	:	8 Nos
(ii) Special Section Part III-S published	:	3 Nos
(iv) Due Diligence submitted	:	5 Nos.

Coordination request Filings for Indian Satellite networks (Total: 36 Nos.):

(i) Special Section CR/C published	:	17 Nos
(ii) Special Section CR/D published	:	3 Nos
(ii) Special Section CR/E published	:	16 Nos

Advance Publication of Information for Indian Satellite networks (Total: 16 Nos.):

(i) Special Section API/A published : 4 Nos

(ii) Special Section API/B published : 6 Nos

(ii) Special Section API/C published : 6 Nos

BSS Plan & FSS Plan (Total: 06 Nos.):

FSS plan band (AP30B) filing in respect of INSAT-EXC(93.5E), INSAT-EXC(68E), INSAT-EXC(71E), INSAT-EXC(90.5E), INSAT-EXC(97.3E), INSAT-EXC(104.4E) satellite network has been published in BRIFIC 2873.

4.1.10 Protection of Indian space and Radio Astronomy Service from the satellite networks of other countries. (Total Objections: 624)

TABLE 4.1

Special Section Published in BRIFIC	Administrations whose satellite networks were objected in view of existing and planned Indian satellite networks.
API/A (105 Objections)	Spain, Estonia, USA, Germany, Canada, China, Cyprus, Poland, France, Russia, United Kingdom, Israel, Japan, Portugal, Colombia, Philippines, Denmark, Bulgaria, Turkey, Iran, Belgium, Luxembourg, Lithuania, Argentina, Norway, Switzerland, UAE and Australia
CR/C (386 Objections)	France, Norway, USA, Saudi Arabia, Brazil, Canada, China, Germany, Spain, Kazakhstan, Oman, Indonesia, Luxembourg, Pakistan, Greece, Russia, UK, Israel, Switzerland, Papua New Guinea, Argentina, Holland, UAE, Ethiopia, Australia, Indonesia, Iran, Cyprus, Vietnam, Nigeria, Azerbaijan, Solomon Islands, Maldives, Italy, Korea, Japan and Cambodia
Part I-S (46 Objections)	France, UK, USA, China, Russia, Finland, Denmark, Spain, Germany, Holland, Korea, UAE, Finland, Singapore, Bulgaria, Norway, Papua New Guinea, Turkey and Cyprus
Part II-S (13 Objections)	Germany, Netherlands, UK, UAE and France
AP30B (39 Objections)	France, Russia, Luxembourg, Iran, Israel and Indonesia
AP30/30A (35 Objections)	Bangladesh, Holland, Monaco, Japan, Kazakhstan, Germany, Qatar, France, UK, UAE, Israel, Iran and Spain

4.1.11 Introduction of Restricted Operators Certificate (ROC)

- **Notification no. G.S.R 1088(E) dated 5th November 2018-** Introduction of Restricted Operator's Certificate (ROC) will help maritime mobile vessels plying within 30 nautical miles from the Coast Station, to facilitate search and rescue (SAR) operations, for safety of life at sea (SOLAS). Further it will also facilitate small fishing boats/ vessels to participate in SAR operation.
- **Notification for exemption from licensing requirements: Notification No. G.S.R. 996 (E) dated 5th October, 2018:** This will facilitate use of Very Low Power Radio Frequency Devices or Equipments for Inductive Applications (Exemption from Licensing Requirement) Amendment Rules, 2018.
- **Notification No. G.S.R. 1046 (E) dated 18th October, 2018:** This relates to use of Very Low Power Ultra-wideband (UWB) devices (Exemption from Licensing Requirements) Rules, 2018.
- **Notification No. G.S.R. 1047 (E) dated 18th October, 2018:** "This relates to use of Low Power and Very Low Power Short Range Radio Frequency Devices (Exemption from Licensing Requirement) Rules, 2018."

4.1.12 Participation of Indian delegation in important International events:

- **Participation of Indian Delegation in 23rd meeting of APT Wireless Group :** Indian delegation participated in 23rd APT meeting during April 9-13, 2018 at Vietnam on spectrum arrangement and harmonization, spectrum monitoring, spectrum sharing studies, future development of IMT, fixed wireless systems; software defined radios, intelligent transport system, wireless power transmission, modern satellite systems, aeronautical and maritime, PPDR and railway radio communication.
- **Participation of Indian Delegation in Working Party- 6A of ITU-R:** Indian delegation participated in Working Party-6A meeting during April 17-25, 2018 and October 16-24, 2018, in Switzerland on the transition from analogue to digital broadcasting, both sound and television.
- **Inspection of working Radio system in Japan:** Indian delegation participated in Inspection of working Radio system in Japan during May 9-11, 2018 for technical knowhow on implementing the project of high speed train corridor between Ahmedabad and Mumbai.
- **Participation of Indian Delegation in Working Party- 5A& 5B of ITU-R:** The Indian delegation participated in the Working Party-5A meeting at ITU, Geneva during 21st May- 1st June 2018, on equitable access to the radio spectrum by the land mobile and the amateur services, providing benefits that are made possible by implementing radio solutions to the communication needs.

- **Participation of Indian Delegation in Working Party- 1A,1B & 1C of ITU-R:** The Indian delegation participated in Working Party-1A, 1B & 1C, related to spectrum engineering techniques, Spectrum management methodologies & economic strategies and Spectrum monitoring respectively, in the meeting while during June 4-12, 2018 in Switzerland.

- **RRS 2018 meeting of Asia-Pacific Telecommunity:** The Indian delegation participated in the seminar related to spectrum management as well as the procedures associated with the recording of frequency assignments in the Master International Frequency Register ("MIFR"), during July 23-28, 2018 at Bhutan. The seminar included discussion on Digital Terrestrial Television ("DTT"), Digital Dividend ("DD"), IMT and New Radio Technologies (HAPS, LTE-U).

- **Participation of Indian delegation in Task Group-5/1 of ITU-R:** The Indian delegation participated in the Task Group (TG 5/1) meeting, during August 20-29, 2018 in TG-5/1 at Switzerland, to deal with complex issue of identification of spectrum for International Mobile Telecommunications (IMT) under WRC-19 agenda item 1.13, *"To consider identification of frequency bands for the future development of International Mobile Telecommunications (IMT), including possible additional allocations to the mobile service on a primary basis".*

- **Participation of Indian Delegation in AWG -24 meeting of APT:** The Indian delegation participated in AWG-24 meeting during September 17-21, 2018 at Thailand, on various aspects of emerging wireless systems including IMT/IMT-Advanced to meet the upcoming digital convergence era in the Asia-Pacific region.

- **Participation of Indian Delegation in Working Party- 5D of ITU-R:** The Indian delegation participated in the Working Party-5D during October 9-16, 2018 at Japan, on issues related to the terrestrial component of IMT, including technical, operational and spectrum-related issues to meet the objectives of future IMT systems.

- **Participation of Indian Delegation in 4th Meeting of the APT Conference Preparatory Group for WRC-19:** The Indian delegation participated in 4th Meeting of the APT Conference Preparatory Group for WRC-19 held from 7–12th January 2019 in Busan, Republic of Korea on updation of *Preliminary Views of APT on WRC-19 Agenda Items/issues, APT Views on proposed modification(s) to draft CPM Report, Mechanism for coordinating APT activities during CPM19-2* ***and*** *Provisional objectives and expected outcomes of APG19-5.*

- **Participation of Indian Delegation in Working Party- 5D of ITU-R:** Indian delegation participated in the Working Party-5D during February 11-15, 2019 at Switzerland, on issues related to the terrestrial component of IMT, including technical, operational and spectrum-related issues to meet the objectives of future IMT systems and works closely with Working Party-4C on issues related to the satellite component of IMT.

- **Participation of Indian delegation in ITU-R Conference Preparatory Meeting (CPM)19-2:** The Indian delegation participated in the ITU-R CPM 19-2 during February 18-28, 2019 at

Switzerland. CPM 19-2 prepares a consolidated report to be used in support of the work of World Radio communication Conference 2019, based on contributions from administrations, the Radio communication Study Groups and other sources concerning the regulatory, technical, operational and procedural matters to be considered by such conferences.

TABLE 4.2
Achievements April 2018 – March 2019

1.	**Radio Frequency Assignment & Related matters.**	
	No of new Frequencies assigned to various users	3356
	No. of interference cases dealt	473
	No. of inter departmental meetings	13
	No. of frequency assignment for VVIP visits	70
2.	**Wireless Licenses.**	
	No of License schedule issued	96771
	No of License schedule renewed	44163
	No. of Import licenses issued	7222
	No. of Import licenses renewed	30
	No. of DPL Licenses issued/renewed	635
	No. of ETA issued	5494
3.	**SACFA**	
	No. of sitting cases cleared by SACFA	732928
4.	**Certificate of Proficiency (COP) Examination Licenses issued.**	
	No. of New Licenses issued	3280
	No. of Licenses renewed	4230
	No. of Candidates admitted in Aeronautical Maritime Mobile Services Examination.	7587
5.	**Radio Amateur Cell**	
	No. of New Licenses Issued	1155
	No. of Renewal of Licenses	172
	Change of Location of Station	101
	No. of Candidates admitted for Examination	1414
	No. of Radio Amateur Examinations conducted	24

4.2 WIRELESS MONITORING ORGANISATION (WMO)

Wireless Monitoring Organisation (WMO) is an integral part of the spectrum management. Radio monitoring service, a regulatory and treaty requirement, is carried out by the Wireless Monitoring

Organisation. It is essentially technical in nature and its broad objectives are derived from the international treaty document — Radio Regulations of the International Telecommunication Union.

WMO, a field unit of WPC Wing, carries out wireless monitoring through 22 Wireless Monitoring Stations, 1 International Satellite Monitoring Earth Station (ISMES), 5 International Monitoring Stations (IMSs) strategically located all over India. WMO is also equipped with 5 Radio Noise Survey Units, which undertake detailed and complicated measurements to aid in the spectrum management activity. The Headquarter of WMO is situated in New Delhi. It also has four Regional Headquarters (RHQs) at New Delhi, Mumbai, Kolkata and Chennai. WMO has its own Training Facility at Wireless Monitoring Training & Development Centre (WMTDC), New Delhi, a nodal agency for conducting training courses for officials and staff of Indian Radio Regulatory Service.

WMO assist in maintenance of the interference-free wireless services in the increasingly crowded radio environment besides providing vital technical data for the introduction of new services such as 5G, BWA etc. to Wireless Planning & Coordination (WPC) Wing.

4.2.1 Radio Monitoring — a regulatory and treaty requirement.

Radio monitoring service, a regulatory and treaty requirement, is carried out by the Wireless Monitoring Organisation of the Wireless Planning & Co-ordination Wing (WPC Wing). It is essentially technical in nature and its broad objectives are derived from the international treaty document — *Radio Regulations* of the *International Telecommunication Union*.

4.2.2 Major functions of Wireless Monitoring Organisation

BOX 4.1

Major functions of the WMO

- Resolution of the harmful interference;
- Monitoring and identification of frequency sub-bands for introduction of new services and/or for additio al allocation to existing services;
- Monitoring for spectrum recovery — unused/ under-used frequency authorizations;
- Monitoring for ensuring adherence to licensing conditions;
- Monitoring / measurements for sharing stdies;
- Assistance to domestic wireless users;
- Assistance to foreign administrations;
- Participation in special monitoring campaigns of the International Telecommunication Union;
- Measurements of radio emissions (intentional & non-intentional) for the possible introduction of new radio communication standards, and also for studying the EMC compatibility of the proposed new installations;
- Inspection of licensed installations; and
- Monitoring of space emissions to protect authorized satellite transmissions.

4.2.3 Challenges before WMO: The increasing dependence of the society on the wireless communications demands WMO to ensure interference free radio communication environment. Therefore, WMO's primary focus, at present, is on public mobile radio communication services, public broadcasting services and safety-of-life services. WMO is earnestly strengthening up its resources, manpower and technolgoies to ensure that these services continue to operate in an interference-free environment. The primary reason for the interference protection to these services lies in their critical importance to the society as a whole.

With regard to public mobile cellular service, WMO has twin objectives (i) to identify and eliminate the sources of interference occurring due to a multitude of reasons and (ii) to find unused spectrum for expansion of 2G, 3G & 4G & LTE services. In so far as public broadcasting is concerned, its transmissions have been found to be affecting aeronautical mobile communications (civil aviation) and also infringing licensing parameters. To address the needs of such crucial services, WMO is in the process of procuring custom-designed radio monitoring products. Besides service-aspect of radio monitoring, WMO has to ensure the quality of the spectrum.

4.2.4 Monitoring Activities:

- **Enforcement Initiative:** The problem of unauthorized use of mobile signal boosters by general public is adversely affecting the quality of service due to interference. Understanding the gravity of this problem, WMO has initiated special Monitoring and Inspection drives in many cities across the country for resolving the interference complaints of Telecom Service Providers. Unauthorized boosters found during the special drives are being removed. General public is also made aware of the implications of deploying such boosters. Some of the initiatives in this regard are as under:

  - Rigorous Monitoring & inspection drives by the Team of WMO officers.
  - Involvement of District Police / Administration.
  - Involvement of stakeholders such as TSP's (the complainant) during the special Monitoring & inspection drives.

  Telecom service providers have also confirmed the improvement in their quality of service after the execution of such special drives in the affected locations / areas. Similar exercises are being planned to resolve interference related problems in often areas also.

- **National level spectrum occupancy vacancy check assignments:** During 2018-19, WMO successfully executed 13061 spectrum occupancy vacancy monitoring assignments pertaining to different licensed users in the frequency band 450-3600 MHz across the country. WMO has achieved this milestone by executing these assignments through 27 field units in 23 states of India. The purpose of these assignments is to identify the actual usage of spectrum so as to get free spectrum for other upcoming services.

- **High Priority Assignments:** A total of 550 high priority interference issues reported by Public Telecom Service Providers have been successfully resolved till December 2018 and 227 new assignments have been issued during January March 2019 in various telecom circles of the country. The details are as under:

TABLE 4.3		
S.No.	**Particulars**	**Actual performance during the period 01.04.2018 to 31.03.2019**
1.	Monitoring assignment handled	**20644**
2.	No. Wireless Transmission monitored	**83763**
3.	Technical Assistance to users to maintain their operations within specified standards	**445**
4.	Infringements communicated to wireless users for remedial actions	**2357**
5.	Channel days utilized for Radio Monitoring	**143547**
6.	No. of Wireless Stations Inspected	**9713**
7.	No. of Radio Noise Measurements	**78562**
8.	No. of High priority / Standard interference complaints resolved	**550**
9.	No. of assignment related to national security	**63**

4.2.5 Satellite Monitoring Activities:

A satellite monitoring station can provide coverage of satellite emissions depending on the satellite footprint, thereby covering at times the territory of several entries. Satellite monitoring facility of WMO protects the Indian Satellite Systems from interference from foreign satellites and detect the beacon signals for satellite identification and measurement of technical parameters on regular basis. To ensure quality of services, satellite spectrum must be used by service providers as per terms and conditions approved by the Government. Regulatory measures must be enforced. Consequent upon the proliferation private players in providing satellite-based services in broadcasting and telecommunication sectors such as DTH, Satellite TV broadcast, DSNG, VSAT etc from the year 2000 onwards, the Satellite Monitoring facility of WMO has taken up initiatives for enforcing the remedial/corrective action for Satellite Service Providers to ensure adherence to licensed technical parameters, infringement in satellite usages, unauthorized up-linking etc.

Satellite Monitoring Facility: International Satellite Monitoring Earth Station (**ISMES**), situated at Jalna, Maharashtra; monitors the satellite occupancy in Geostationary satellite orbit arc over

India ranging from 20 degree east to 140-degree East in S-band, Lower C band, C Band, Extended C band and Ku Band. ISMES Jalna also has capability to analyse the signal in Real Time Mode which is useful in identifying the interfering signal. WMO has also installed and operationalised the small satellite monitoring facility at WMS Trivandrum and at IMS Delhi.

Satellite Monitoring Activities Undertaken:

WMO's International Satellite Monitoring Earth Station, (ISMES) Jalna has been notified and *published in List VIII (List of International Monitoring Stations) of Interna*tional Telecommunication Union (ITU) Geneva during the month of November-2018. Through this notification the ISMES Jalna has been recognised in International forum.

Resolution of reported Interference to DTH operation

- Reported interference at Lake Town Area in Kolkata by M/S Tata Sky to their DTH subscribers has been resolved by the WMO's Technical team of International Monitoring Station (IMS) Kolkata in time bound manner.
- A case harmful interference in satellite frequency band (Ku band) related to DTH service was reported by M/s Independent TV (formerly known as Reliance Big TV) to their DTH service operating on 3 carriers of MEASAT-3 satellite at geolocation 91.10E. During monitoring no interference has been observed. It has been confirmed by M/s Independent TV, that thereafter they didn't experience any further interference, after inspection

Activation check and Inspection of Teleport operation:

- International Satellite Monitoring Earth Station (ISMES), Jalna has carried out Special Satellites monitoring of 48 Teleports Operators on the request of Ministry of I&B (MIB) through WPC Wing. There were 128 teleports Licenses permitted by Ministry of I&B; and 128. Wireless Operating License were issued by WPC. Of these 128 Teleports Licensees,18 were found non-operational. A detailed report of the same has been submitted to the DoT.
- On the request from DoT, physical inspection of 20 teleports operating licenses was carried out by officers of WMO all across the country. Report of physical inspection has been sent to Ministry.

(ii) Commencement & operationalisation of small Satellite Monitoring Facility(SMF) at WMS Trivandrum and Delhi:

Small Satellite Monitoring Facility was created at WMS Trivandrum & Delhi and operationalised for regular monitoring from the month of September-2018 and January-2019 respectively, covering C-Band frequency.

TABLE 4.4 Annual Performance Output of Satellite Monitoring		
S.No.	**Particulars**	**Achievements (April 2018-March 2019)**
1.	No. of satellite Monitoring Assignment undertaken	375
2.	No. of satellite Monitoring assignment cleared	375
3.	No. of satellite monitored	209
4.	No. of satellite transponder/carrier monitored	562
5.	No. of satellite carrier identified	562
6.	No. of high priority satellite interference cases reported & resolve including satellite based public service operators	4
7.	No. of satellite operation/carrier related Infringement communicated	27
8.	No. of Channel hours utilized for satellite monitoring work	1908
9.	No. of satellite Inspection carried out related to satellite operations	22
10.	No. of Infringements issued	11

4.2.6 Training and Development activities: Wireless Monitoring Training & Development Centre (WMTDC), New Delhi is nodal agency for conducting training courses for officials and staff of Indian Radio Regulatory Service. WMTDC is also implementing National Training Policy to improve training both in qualitative and quantitative manner. The nature of training courses conducted during the year 2018-19 covered wide spectrum of areas consisting Orientation Program for Engineers 2018, Inspection of Licenses & Installations, Enforcement and Relevant Acts, Spectrum Monitoring Capacity building program for new batch of JWO's, Spectrum Management Software & Website/IT related topics, Training on Satellite Spectrum Monitoring at ISMES, Jalna. WMTDC has also arranged Technical Visit for probationers/trainee officers of other units like Controller of Communication Accounts (Kerala), Directorate of Coordination Police Wireless (Shillong), Police HQ of Trivandrum Kerala, Cyber Cell (Trivandrum, Kerala), Airport Authority of India & Doordarshan Prasar Bharati.

4.3 TELECOMMUNICATIONS ENGINEERING CENTRE (TEC)

Telecommunication Engineering Centre (TEC) is technical arm of DoT headed by 'Head of TEC', presently being Sr.DDG (TEC), who is assisted by 21 SAG level officers to cover Transmission, Next General Network (NGN), Smart Network, Telecom Security, M2M/IoT, Green Passport and various other aspects of future technology networks with a view to formulate new specifications and update the existing ones in order to keep pace with the global technological developments.

TEC provides technical support to DOT and other government Departments and formulates technical specifications, in consultation with various stakeholders, in the form of Generic Requirements (GR), Interface Requirements (IR), Technical requirements (TRs), Service requirements(SR), Standards, and Essential Requirements (ERs) for telecom equipment, network, systems and services to be deployed in Indian Telecom Network. During formulation of these documents, 'Test Schedule and Test Procedures' (TSTPs) are also prepared to carry out testing and certification of the equipment.

TEC also tests and certifies various telecom products for conformance to respective specifications, standards and their capability to interwork/interoperate in the existing network. Testing and certification activities are carried out region wise by TEC through its four regional centers located at Delhi, Kolkata, Mumbai and Bangalore as well as based on test result reports received from the TEC designated CABs (Conformity Assessment Bodies). As per various test schedules, TEC issues test certificates i.e. Interface Approval Certificate (IAC) against TEC IRs, Type Approval Certificate (TAC) against TEC GRs, Technology Approval Certificate to C-DoT against TEC GRs. Certificate of Approval (CoA) against Applicant's own specifications and Mandatory Conformance Certificate against Essential Requirements, under Mandatory Testing & Certification of Telecom Equipment (MTCTE) Scheme.

The Indian Telegraph (Amendment) Rules, 2017, stipulates that every telecom equipment must undergo prior mandatory testing and certification. The testing is to be carried out by Indian Accredited Test Labs and based upon their test reports, certificate shall be issued by TEC. TEC is the nodal agency for Mandatory Testing & Certification of Telecom Equipment (MTCTE) against respective Essential Requirements.

In addition to the above, TEC is currently performing other major activities as under:

a) Preparation & release of study papers/white papers on the standards, facilities and features of the telecom products and services to keep abreast with the latest technological developments.

b) NGN test Lab has been set up to keep pace with the advancement of technology and to carry out tests, and issue test reports, test certificates, etc., for the network components/ equipment in accordance with international standards.

c) TEC has IPv6 Ready Logo Test Lab for IPv6 testing and IPv6 readiness certification.

d) SAR Lab has been set up in TEC to carry out audit of the SAR (Specific Absorption Rate) values of the mobile equipment (which is a measure of the amount of RF energy absorbed by humans while using a mobile phone). TEC is in the process of establishing new labs like Security Lab, Control lab, Access Lab, CPE&TL (Customer Premises Equipment &Terminals) Lab, Green Passport Lab etc.

e) TEC is the designating agency for designation of domestic Conformance Assessment Bodies (CAB) and Certification Bodies (CB) for testing and certification against various GRs/IRs/SDs of TEC.

f) TEC is also responsible for recognition of foreign CABs for testing and certification of telecom equipment.

g) TEC provides technical support to DoT and other government organizations viz. TRAI, TDSAT, WPC, USOF, etc.

h) TEC participates in the meetings of standards development organizations, viz., ITU, ETSI, APT, WRC, etc.

i) TEC interacts with other international fora, viz., 3GPP, ETSI, IETF, One M2M, etc.

j) TEC proactively interacts with stakeholders and industry associations, viz., COAI, ISPAI, BIF, TEPC, VSAI, TEMA, CMAI, FICCI, CII, etc.

k) TEC is also engaged in validation and Technology approval for C-DoT equipment in order to facilitate indigenous design and development of telecom technologies aimed specifically for local domestic manufacturers.

4.3.1 Achievements during financial year 2018-19:

(i) Conference on M2M/IOT Enabling Smart Infrastructure held in TEC on 8th January 2019: Telecom Engineering Centre organized a one-day conference on ''M2M/ IoT Enabling Smart Infrastructure'' on 8th January 2019 in Delhi. The Hon'ble Minister of State Communications (Independent Charge) Shri Manoj Sinha as chief guest graced the event. Ms. Aruna Sundararajan, Secretary Department of Telecommunications, Shri Ravi Kant, Member(Services) and Shri D. Manna, Director General (Telecom) also graced the event. Senior officers from Department of Telecommunication, CDOT, BSNL, MTNL, National Telecommunication Institute for Policy Research Initiatives and Training (NTIPRIT) Ghaziabad and representatives of Professional associations, academia and Industry associations were among those present on the occasion.

The highlights of the conference included release of two TEC technical reports on *"Design & Planning of Smart Cities by using IOT/ICT"* and **"***Recommendations for IOT/ M2M Security"* by Hon'ble Minister during the inaugural session.

The conference also saw five technical sessions on the following issues:

a. Brief about the M2M/IoT work done in TEC

b. IoT enabling Smart Verticals - use cases & technologies

c. Smart Cities design and planning with IoT & ICT

d. M2M/IoT Standardization & its role in Smart Cities

e. Security Challenges and Testing & Certification of Smart devices/equipment.

All the Technical Reports released on M2M/ IoT issues are available on TEC website and may be accessed using link www.tec.gov.in/technical-reports/

The other activities undertaken during the event included grant of *"Technology Approval"* to CDOT by TEC for their indigenously developed Wi-Fi Access Point. This Wi-Fi Access Point will be manufactured by CDOT's Transfer-of-Technology partners in India thereby giving a boost Make-in-India Programme of Government of India.

During the inaugural session, a Memorandum of Understanding to promote collaboration in the area of Future Telecom & ICT Technologies was signed between TEC and Council for Scientific and Industrial Research -Central Electronics Engineering Research Institute, Pilani (Rajasthan).

conference on M2M/IoT Enabling Smart Infrastructure

(ii) One-day Technical workshop on "Unleashing of 5G potential in Indian perspective" organized in TEC on 19th March 2019

A one-day Technical workshop on *"Unleashing of 5G potential in Indian perspective"* was organized in TEC on 19th March 2019 in New Delhi. The objective of the workshop was to provide a common platform for dialogue between the 5G technologies and the user ministries. Technical subject matter experts from the industry and manufacturing/ R&D organizations shared their knowledge on various topics related to 5G Technology. Officers from DOT, TEC, NTIPRIT, other Ministries, TRAI and PSUs participated in the workshop and interacted with the subject matter experts.

The major highlights of the workshop were the technical sessions on various topics related to 5G Use cases & Relevance for India, IOT Security; 5G Use Cases of Agriculture, 5G X-Haul and Automation etc. The discussions were well received by the audience.

(iii) New Generic Requirements (GRs)/Interface Requirements (IR)s Issued and Revised

The following New Generic Requirements (GRs)/Interface Requirements (IRs)/Essential Requirements (ERs) have been issued during 2018-19:-

BOX 4.2

New GRs, IRs and ERs Issued

- GR on XGS-PON
- GR on Fast access to subscriber terminals (G. fast)
- GR on Multi-Function Portable device for e-KYC and bill payment having biometric scanner, portable thermal Printer.
- GR on PDO Wi-Fi Hotspot.
- GR on 100G Ethernet Traffic Analyser (HH).
- IR on VSAT based mobility service
- ER on DSL family.
- ER on GPON System
- ER on Cordless Telephone.
- ER on Point of Sale (PoS) Devices.
- ER on Modem.
- ER on Router category.
- ER on Switch category.
- ER on Mobile user Equipment.
- ER on Repeater.
- ER on Compact Cellular Network.
- ER on Base Station
- ER for Equipment operating in HF frequency band.
- ER on End Point Device for EPD on Environmental Monitoring (CO2, NO2, Temperature etc. monitoring).
- ERs for Mandatory Testing

The following Generic Requirements (GRs)/Interface Requirements (IRs) have been revised during 2018-19:

Box 4.3
GRs and IRs revised

- GR on 10 Gigabit passive optical network (XG-PON) technology for FTTx based broadband applications (Mar'13).
- GR on uninterrupted power supply UPS system (Dec'13)
- GR on FTTx based broadband access application using GPON technology with Mini-OLT (May'13).
- GR on RF Monitoring System for continuous measurement of electromagnetic radiation No: TEC/TX/GR/RMS-001/01.SEP-11.
- GR on Session Border Controller (TEC/GR/SW/SBC-001/04/ FEB-14).
- GR on Intrusion Prevention System TEC/GR/I/IDS-001/03.MARCH.2011
- GR on Intrusion Detection System for IP Network Security TEC/GR/I/IDS - 001/03.MARCH.2011
- GR on Primary Reference Clock cesieum frequency standards TEC/GR/SW/ SYN-003/03/JAN2011.
- GR on Network Timing Protocol Server TEC/GR/SW/NTS/S01/01/FEB.2011.
- IR on Network- Network Interface for Session Border Controller (TEC/IR/SW/NNI-SBC/02/DEC-13)
- IR on Interface Requirements for SIGTRAN (TEC/IR/SGT-SIG/02/JAN-12
- IR on ISDN Customer Premises Equipment (IR/CPE-02/03.OCT 03).
- IR on ISDN Network Termination (NT1) (IR/NT1-02/03. MAY2005)
- IR of Media Gateway(TEC/IR/SW/MGW-. 001/05.JAN2015).

The following Generic Requirements (GRs) have been amended during 2018-19:-

- GR on Adhesive PVC tape (No. GR/CJM-06/03 FEB 2004).

(iv) The New Test Schedule and Test Procedure (TSTPs) that have been completed during 2018-19:

BOX 4.4
New Test Schedule and Test Procedure (TSTPs)

- TSTP on 10Gigabit passive optical network(XG-PON) technology for FTTx based broadband applications(Mar'13).

- TSTP on XGS-PON.
- TSTP on VDSL equipment.
- TSTP onFTTx based broadband access application using GPON technology with Mini-OLT(May'13).
- TSTP on IP-DSLAM.
- TSTP on Fast access to subscriber terminals (G.fast).
- TSTP on GR for Electronic Telephone Instrument.
- TSTP for priority call routing for voice calls during emergency/disaster in mobile networks for 2G and 3G.
- TSTP for priority call routing for voice calls during emergency/disaster in mobile networks for 4G
- In addition to above TSTP, Calibration process of EMF measuring instruments in the range of 9KHz to 40 GHz were also finalized.

(v) Study Papers/white papers/technical reports released during 2018-19:

BOX 4.5

Study Papers, white papers and Technical reports

Study of PPDR technologies & applications.

- 5G networks: Key capabilities and usage.
- Artificial Intelligence (AI) and Big Data for Telecom.
- Technical reports and actionable points released in IoT division were submitted as a contribution in the workgroup on Application layer standards of HLF-5G (High Level Forum), chaired by CTO TCS. Following two study papers were submitted by IoT division: C- V2X Technology for Intelligent Transport System – Challenges and Way ahead; Machine to Machine Communication (M2M) / Internet of Things (IoT) Enabling Smart Infrastructure: An overview
- Technical Report on Smart Cities.
- Study papers on 'Smart cities',"Smart Village & Agriculture" and "Cellular V2X and road ahead"
- Study paper on IoT for Safety and Surveillance domain.
- Technical Report on M2M Security Group.
- Security aspects of Block chain.
- Annonymising techniques in Internet.
- Darknet/Deepnet Architecture.
- OSINT Tools (Open Source Intelligence) for social networking/OTT.
- Embedded Systems Security.

4.3.2 Project Activity: Following project activities have been carried out by TEC-

- **Establishment of Control Lab:** Financial bid is under evaluation.
- **Establishment of Green Passport Lab Phase-I (Energy Efficiency Testing for IP related equipments in existing NGN Lab):** New Tender have been approved and will be floated shortly
- **Establishment of EMI/EMC Lab :** EMI/EMC and Safety lab are being set up with collaboration with ITI. Work is in progress.
- **Development of MTCE Portal:** Security Audit of MTCTE portal stands completed. Portal is open for trial run.
- **POC (Proof of Concept) of Wi-Fi** : Completed.
- **Security Audit of TEC website & Face-lifting of TEC website** : Second cycle of audit is in progress with STQC Kolkata. TEC website upgradation has been approved in principle. Detailed specifications are under preparation

4.3.3 Essential Requirements (ERs) of M2M/IoT Devices- Internet of Things (IoT):

Internet of Things (IoT) division in TEC has been established with the objective of framing GR / IR on new Telecom Services .At present this unit is working on Machine to Machine (M2M) communications and other new services areas. TEC has prepared ERs of smart devices: Tracking device, Feedback device, Smart security camera, and Smart electricity meter, Smart watch and IoT Gateway, to be connected directly to PSTN/ PLMN (cellular, broadband). These are uploaded on MTCTE portal. ERs of smart devices to be connected via Gateway on communication technologies such as LoRa, Sigfox, ZigBee, PLC, RF Mesh, 6LoWPAN, BLE, Wi-Fi etc. have also been prepared. Decision to include them under MTCTE regime is pending.

4.3.4 Activities related to National Working Groups corresponding to ITU-T Functions:

(i) IoT use case document agreement in ITU-T SG-20: - Based on the technical reports released in TEC, seven revised contributions on IoT use cases were prepared by IOT Division of TEC and submitted in ITU-T SG-20 meetings during 2018-19. The document with five IoT use cases from TEC, has been published as **Recommendation Y Suppl. 53 (12/2018).**

- Vehicle emergency call system for automotive road safety
- Digitization and automation of Vehicle Tracking, Safety, Conformance, Registration and Transfer via the application of e-SIM and Digital Identity
- Remote monitoring the health of a patient

- Connected Smart homes.
- Advanced metering infrastructure (AMI)

These use cases can be used to create smart infrastructure, which will reduce a large no. of issues of the concerned sector and in turn will improve the quality of life.

(ii) Security Testing: TEC had contributed to ITU-T on Security Assessment Techniques which led to finalization of an ITU-T Recommendation "X.1214" on "Security Assessment in Telecommunication/Information and Communication Technologies networks" in ITU-T SG-17 under the editorship of a TEC Officer.

(iii) Transmission: The ITU-T Study Group-15 (2017-2020) meeting on 'Networks, Technologies and Infrastructure for Transport, access and home', took place from 08.10.2018 to 19.10.2018 at Geneva. Three Officers from TEC made contributions and participated in the meeting.

4.3.5 Webinars: TEC has also started the series of webinars which were webcasted. Total 7 Webinars on various technical topics were conducted in the Financial Year 2018-19. All the officers from DoT, TEC, Telecom PSUs, TRAI etc. were invited to join the webinar.

4.3.6 Internship Scheme: TEC, for the first time, has floated TEC Internship Scheme. TEC has engaged 11 interns after observing all the codal formalities. This was done for the first time in TEC.TEC made following efforts for arrangement of staff for smooth implementation of MTCTE:

a) The offer for deputation was made in the grade of SDE/JTO to BSNL/MTNL/KVS officers, for deputation to TEC against existing vacancies of TEC.

b) Hiring of 25 Graduate Engineers through GeM.

c) Diversion of sanctioned strength of Group 'B' posts from other units to TEC.

4.3.7 Testing & Certification by Regional Centres of TEC (RTEC) during 2018-19:

Interface Approval	:	54
Type Approval	:	05
Revenue	:	Rs. 3646625/-

4.4 UNIVERSAL SERVICE OBLIGATION FUND (USOF)

4.4.1 Organizational Structure: The Universal Service Obligation Fund, formed by an Act of Parliament, is headed by the Administrator, appointed by the Central Government, for the administration of the Fund. It is an attached office of the Department of Telecom, Ministry of Communications.

4.4.2 Amendment to Telegraph Act for creation/ administration of USO Fund: The Universal Service Support Policy for provision of telecom facilities in rural and remote areas of the country came into effect from 01.04.2002. The guidelines for universal service support policy were issued by DoT and were placed on the DoT website on 27th March 2002. Subsequently, the Indian Telegraph Act, 1885 was amended in December 2003 vide the Indian Telegraph (Amendment) Act, 2003 thereby creating Universal Service Obligation Fund (USOF). The USO Fund was established with the fundamental objective of providing access to 'Basic' telegraph services to people in the rural and remote areas at affordable and reasonable prices. Subsequently the Indian Telegraph (Amendment) Act 2006 was passed on 29.12.2006 wherein the scope of USO Fund was widened to provide access to telegraph services (including mobile services, broadband connectivity and creation of infrastructure like OFC) in rural and remote areas.

4.4.3 Rules for administration of USOF: The Rules for administration of the Fund known as Indian Telegraph (Amendment) Rules were initially notified on 26.03.2004. The Rules were subsequently amended as Indian Telegraph (Amendment) Rules 2006 in order to enable support for mobile services and broadband connectivity in rural and remote areas of the country and the same were published in gazette on 17.11.2006. Thereafter, the Rules have been amended from time to time.

4.4.4 Functions & objectives: The USO Fund was established with the fundamental objective of providing access to 'basic' telecom services to people in the rural and remote areas at affordable and reasonable prices. Subsequently the scope was widened to provide subsidy support for enabling access to all types of telecom services, including mobile services, broadband connectivity and creation of infrastructure like OFC in rural and remote areas.

The implementation of the USO related activities is carried out by the "eligible operators", i.e. the entities having valid license or registration or authorization from Central Government/ Department of Telecommunication for providing telecom services or infrastructure or any other entities as specified by the Central Government from time to time. The implementation status of the activities, being undertaken by the USO Fund, is available on USOF website (www.usof.gov.in).

As per the Rules, the following shall be supported by the Fund:

(i) Stream-I: Provision of Public Telecom and Information Services

(ii) Stream-II: Provision of household telephones in rural and remote areas as determined by the Central Government from time to time

(iii) Stream-III: Creation of infrastructure for provision of Mobile Services in rural and remote areas

(iv) Stream-IV: Provision of Broadband connectivity to villages in a phased manner

(v) Stream-V: Creation of general infrastructure in rural and remote areas for development of telecommunication facilities

(vi) Stream-VI: Induction of new technological developments in the telecom sector in rural and remote areas

Some of the schemes, being implemented by USOF include BharatNet Project; Provision of mobile services in Left Wing Extremism (LWE) affected areas; Mobile coverage of uncovered villages; Comprehensive Telecom Development Plan (CTDP) for Andaman & Nicobar Islands, including Submarine OFC Connectivity between Mainland India (Chennai) and Andaman & Nicobar Islands; Comprehensive Telecom Development Plan (CTDP) for the North-Eastern Region, etc.

4.4.5 BharatNet: BharatNet, one of the biggest rural telecom projects of the world, is being implemented in a phased manner to provide connectivity at all Gram Panchayats (approx. 2,50,000) with broadband in the country. The Phase-I has been completed in December 2017 with the implementation of over 1 lakh GPs, and the remaining Gram Panchayats are being connected under BharatNet Phase-II. As on 31.03.2019, 3,20,648 km Optical Fibre Cable has been laid, a total of 1,25,722 GPs have been connected by Optical Fibre Cable (OFC) and 1,17,903 GPs are Service Ready.

As part of this flagship project, the Last Mile connectivity, through Wi-Fi or any other suitable broadband technology to access broadband /internet services, is envisaged to be provided at all the GPs in the country. Every GP is being provided with, on an average, 5 Access Points (APs), i.e. 2 APs at Public places and 3 APs at Government Institutions such as school, hospital, post offices, police station, etc. So far, Wi-Fi hotspots have been installed at **39,365** GPs and out of them, services are being provided at **10,815** GPs, catering to more than 11 lakh subscribers with a data usage of over 50 TB per month.

The Cabinet has approved the project at an estimated cost of Rs. 42,068 crore and as of December 2018, Rs. **19,334** crore has been disbursed by the Government.

4.4.6 Comprehensive Telecom Development Plan (CTDP) for the North-Eastern Region : On 10.09.2014, the Union Cabinet approved a proposal to implement a Comprehensive Telecom Development Plan for the North-Eastern Region. The Project envisages to provide 2G mobile coverage to 8621 identified uncovered villages, installation of 321 mobile tower sites along National Highways and strengthening of transmission network in the States of Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim and Tripura.

The initial estimated cost of implementation was Rs. 5336.18 crores. As the two tenders for Meghalaya were not successful therefore on 23.05.2018 cabinet has approved revised proposal for provision of 2G+4G based mobile services in Meghalaya and revised estimated cost for CTDP NER to amount of Rs 8120.81 cr to be funded from Universal Service Obligation Fund (USOF).

USOF has signed an agreement on 16.01.2018 with BSNL, to install 2817 mobile towers for providing mobile coverage in 4119 uncovered villages of Arunachal Pradesh and two districts of Assam for an estimated cost of Rs. 2258 cr. However, Telecom Watchdog has filed a SLP in Hon'ble Supreme Court for staying the implementation of agreement signed between USOF and BSNL on 16.01.2018 for provision of 2G based mobile services in Arunachal Pradesh and 2 Districts of Assam.

On 23.05.2018, Cabinet approved a revised proposal for provision of mobile services on 2G+4G technology for installation of 2173 mobile towers in 2374 uncovered villages and along National Highways for an estimated cost of Rs. 3911 cr. In the meantime, DoT has sent revised list of 2691 No. of uncovered villages in June 2018. Accordingly, DPR is under preparation by TCIL.

Mobile Services in Uncovered Villages of Arunachal Pradesh and 2 Districts of Assam: On 29.09.2017, Telecom Commission approved the project for 2817 mobile tower sites to provide mobile coverage in 4119 identified uncovered villages at a cost of Rs. 2258.18 crore. The agreement has been signed with BSNL on 16.01.2018. Scheme shall be implemented in 18 months from the effective date of agreement. Advance Purchase Order has also been issued by BSNL to L-1 on 21.03.2018 and L-2 on 10.04.2018. The Special Leave Petition has been filed by the Telecom Watchdog before the Hon'ble Supreme Court for staying installation of 2G mobile services.

Mobile Services in Uncovered villages in rest of NER and seamless coverage along National Highway: Under this scheme, a total of 4177 mobile towers are to be setup to provide mobile services in 4502 identified uncovered villages in rest of NER and along National Highways in NER. Out of this, work of setting up 2004 towers in rest of the NER States except Meghalaya is being executed by M/s Bharti Airtel Limited & M/s Bharti Hexacom Limited. Telecom Commission has approved to award the project on 08.09.2017 at a cost of Rs 1656 crore and the Agreement has been signed on 08.12.2017. As of March 2019, installation has been done at 388 sites and out of them, 96 sites are radiating.

Mobile Services in Uncovered villages of Meghalaya and seamless coverage along National Highway: Since the rates of tender were 70%higher, the Telecom Commission had recommended on 21.12.2017, for setting up of 2173 towers on 2G + 4G technology. The project has been approved by the Cabinet on 23.05.2018 at an estimated cost of Rs. 3911 crore. Revised uncovered villages from LSA DoT in June 2018, number of uncovered villages are now 2691. Accordingly, DPR and tender is being finalized. Project will be completed in 18 months after award of work.

OFC Augmentation Scheme under Transmission Media Plan: A USOF scheme, to provide OFC ring connectivity between respective State capitals in NER and also between State capitals & district headquarters to ensure reliability and redundancy in the transmission network has been approved. Estimated amount of Rs. 295.97 crore. (inclusive of all at on applicable taxes except octroi and local taxes) has been approved towards CAPEX for laying of 2122 Km of underground Optical

Fibre cable and 1091 Km of aerial Optical Fibre cable along with associated terminal equipment for augmentation of transmission media in NER. Action has been initiated for implementation of the project.

4.4.7 Implementation of Comprehensive Telecom Development Plan for Islands: Telecom Commission in its meeting held on 07.11.2014 approved, in principle, an Integrated and Comprehensive Telecom Development Plan for Andaman & Nicobar Islands and Lakshadweep in accordance with TRAI recommendations dated 22.07.2014 for 'Improving Telecom Services in Andaman & Nicobar Islands and Lakshadweep'. The plan consists of the following schemes:

Submarine OFC Connectivity between Mainland India (Chennai) and Andaman & Nicobar Islands: On 21.09.2016, Cabinet approved the project provision of Submarine Optical Fibre Cable Connectivity Project between Mainland (Chennai) and Port Blair and Five Other Islands Car Nicobar, Little Andaman, Havelock, Kamorta and Great Nicobar Island. Subsequently it has been decided to connect Rangat Island via Long Island from Havelock Island also on Submarine OFC in addition to six Islands already approved by the Cabinet. As per Cabinet approval, BSNL has been nominated as the Project Execution Agency for implementation of the project while TCIL has been nominated as the Technical Consultant. BSNL floated the Global tender on 07.07.2017 for Design, Engineering, Planning, Supply and Implementation (including management and coordination) of the Submarine Cable System between mainland Chennai and A&N Islands and the tender was opened on 06.02.2018. BSNL observed that a single responsive bid by M/s NEC Technologies India Pvt Ltd. was received in global and transparent tender which was evaluated. The total financial implication of Rs.1224 crore including CAPEX & OPEX for five years has been approved by the Telecom Commission in its 49th meeting held on dated 1st May 2018. Permit-In-Principle (PIP) issued to BSNL on 07.06.2018. Purchase Order(PO) issued by BSNL to NEC on 26.06.2018. Hon. Prime Minister has laid foundation stone of the project on 30.12.2018 at Port Blair. The project is targeted to be completed within 24 months from the date of award of work. i.e. by June, 2020.

Satellite bandwidth Augmentation for Andaman & Nicobar Islands: Under this scheme, satellite bandwidth is to be augmented from 260 Mbps to 1 Gbps. The work has been awarded to BSNL on nomination basis. CAPEX of Rs.80.98 crore is to be funded by USOF while OPEX/transponder charges @ Rs.161.424 Cr per annum, are to be funded by Andaman & Nicobar UT Administration/ MHA. Bandwidth augmentation has been completed by BSNL. Telecom Commission has approved satellite bandwidth augmentation from 1 Gbps to 2 Gbps on 21.12.2017 by BSNL on nomination basis. CAPEX Rs. 42.24 core + applicable taxes would be funded by USOF. The OPEX is to be funded by MHA. The satellite bandwidth is augmented to 2.224 Gbps.

Provision of 2G Mobile coverage with Edge technology in Uncovered Villages and seamless 2G mobile coverage of NH223 in Andaman &Nicobar Islands: Under this scheme, 125 towers are to be set up to provide 2G+4G mobile Coverage in 144 uncovered villages with population >=10 while additional 42 towers are to be set up for seamless mobile coverage of entire 129 km of NH223

including 80km falling within Jarawa Tribal Reserve Belt. The Telecom Commission, on 09.01.2018 has approved CAPEX of Rs.342.40 crore. Work is to be awarded through competitive bidding process. Andaman Nicobar Union Territory Administration conveyed that in place of 2G,4G should be deployed. Department of Telecom, set up a high level committee under Member(Technology) to recommend technology for mobile services. The committee has recommended use of 2G + 4G technology. The tender has been floated on 04.06.2018.

Augmentation of Intra Island OFC Network in Andaman & Nicobar Island: Under this scheme, augmentation of bandwidth is to be carried out by enhancing the capacity of the network and providing OFC in ring configuration for providing redundancy in the terrestrial OFC network by laying about 341 km OFC. The work has been awarded to BSNL on nomination basis and CAPEX of Rs.35.35 crore is to be funded by USO Fund.

Submarine OFC Connectivity between Mainland India (Kochi) and Lakshadweep Islands: Under this scheme, submarine OFC connectivity has been proposed between Mainland(Kochi) and 11 Lakshadweep Islands with 1989Kms of Submarine OF cable as per DPR submitted by TCIL viz Kavaratti, Kalpeni, Agatti, Amini, Androth, Minicoy, Bangaram, Bitra, Chetlat, Kiltan and Kadmath. Future bandwidth requirement of 7.56 Gbps forecasted by TRAI for backhaul shall be met under this project. The estimated expenditure of Rs. 1344 crore has been projected in the DPR submitted by TCIL (CAPEX-Rs. 1030 crore & OPEX- Rs. 314 crore).

Satellite bandwidth Augmentation for Lakshadweep Islands: Under this scheme, the work awarded to BSNL on nomination basis with estimated CAPEX of Rs.46.53 crore to be funded by USO Fund while OPEX/transponder charges are to be funded by Lakshadweep UT Administration/ MHA. The work of satellite bandwidth augmentation from 102 Mbps to 318Mbps has been completed. Further, the work of Satellite bandwidth augmentation from 318Mbps to 1.71Gbps (CAPEX- 25.75 crore and OPEX- to be paid by MHA/UT administration) has been awarded to BSNL on nomination basis. Ground based Equipment is being procured. The project is targeted to be implemented by December 2019.

Augmentation of 2G Mobile Coverage with EDGE Technology in Lakshadweep Islands: Under this scheme, 10 new Towers/BTSs are to be set up to improve the quality of service as per TRAI recommendations. The work has been awarded to BSNL on nomination basis. The CAPEX of Rs.10.1 crore is to be funded by USO Fund. The project has been completed in May, 2018.

4.4.8 Mobile Service in Uncovered Villages: Government has prioritized to reach remote areas of the country such as North-Eastern States, Islands, Himalayan States, Western Border States and more importantly the Left Wing Extremism affected areas in the first phase. Government of India has planned to provide mobile coverage in inhabited and uncovered villages of the Country in a phased manner. For these projects the scope, specification & implementation strategy is being finalized.

4.4.9 Scheme for Mobile Communication Services in Left Wing Extremism (LWE) Affected Areas:-

LWE Phase-I: On 20.08.2014, the Cabinet approved the implementation of a project at a cost of Rs. 3567.58 crores to provide Mobile Services in 2199 locations [1836 new sites & 363 sites already installed by BSNL] in the Left Wing Extremism (LWE) affected areas in the States of Andhra Pradesh, Bihar, Chhattisgarh, Jharkhand, Maharashtra, Madhya Pradesh, Odisha, Telangana, Uttar Pradesh and West Bengal. The project is to be funded by Universal Service Obligation Fund (USOF) and being executed by Bharat Sanchar Nigam Limited (BSNL). The Agreement between USOF and BSNL was signed on 30.09.2014.

In addition to the above, the Ministry of Home Affairs has identified 156 locations for provision of mobile services in LWE affected areas. The Department of Telecommunication has approved provision of mobile services at 156 locations at an estimated cost of Rs 272.40 crore in June 2016.

DoT has approved enhancement of VSAT bandwidth from 512 kbps to 1024 Kbps on 198 sites of LWE Phase I scheme in July 2017. Further, Telecom Commission in its meeting of 21st December 2017 has recommended enhancement of VSAT bandwidth to 2 Mbps at all sites on VSAT under LWE Phase-I at the cost of 89 Crore. As per the information received from BSNL, VSAT bandwidth has been enhanced to 2 Mbps at 375 sites.

State wise status of LWE Phase I schemes is given in the following table.

TABLE 4.5

State wise status of LWE Phase I schemes

S. No.	State	No. of Total Locations identified by MHA	Additional 156 Sites	Total sites Under LWE Phase I	Radiating
1.	Andhra Pradesh	54	8	62	62
2.	Bihar	184	66	250	250
3.	Chhattisgarh	497	35	532	525
4.	Jharkhand	782	34	816	816
5.	Maharashtra	60	5	65	65
6.	Madhya Pradesh	22	0	22	22
7.	Odisha	253	8	261	256
8.	Telangana	173	0	173	173
9.	Uttar Pradesh	78	0	78	78
10.	West Bengal	96	0	96	96
	Total	**2,199**	**156**	**2355**	**2343**

LWE Phase II: On 23.05.2018, the union cabinet approved a proposal to implement Left Wing Extremism (LWE Phase-II) project. The project envisages the provision of mobile connectivity based on 2G(voice) +4G (data) in the 4072 MHA (Ministry of Home Affairs) identified tower locations of 96 districts in Left Wing Extremism affected areas in the states of Andhra Pradesh, Telangana, Chhattisgarh, Bihar, Maharashtra, Uttar Pradesh, Odisha, West Bengal, Jharkhand and Madhya Pradesh. The estimated cost of Implementation approved by union cabinet is Rs7330 crore plus applicable taxes to be funded from Universal Service Obligation Fund(USOF). The project implementation is under process. The details are given in table 4.6.

TABLE 4.6
State wise list of number of mobile towers under LWE Phase II

S No.	State	No of Districts	No. of Mobile Towers
1	Andhra Pradesh	8	429
2	Bihar	8	412
3	Chhattisgarh	16	1028
4	Jharkhand	21	1054
5	Madhya Pradesh	1	26
6	Maharashtra	2	136
7	Odisha	18	483
8	Telangana	14	118
9	Uttar Pradesh	3	179
10	West Bengal	5	207
	Total	**96**	**4072**

4.4.10 Status of USO Fund:

Universal Access Levy (UAL) amounting to Rs. 99590.81 crore has been collected and the total allotment amounting to Rs. 49097.48 crore received through Parliamentary approvals has been utilized to fulfil the object of USO Fund. The balance of UAL amount available as potential fund under USO at the end of March, 2019 is Rs. 50493.33 crore.

The detail of subsidy disbursed under Universal Service Obligation Fund during the FY 2017-18 & current financial year is given in the following table:

(Rs crore)

Table 4.7		
	Amount Disbursed during 2017-18	Amount Disbursed in 2018-19
Amount Disbursed under USOF subsidy	6998.76	4788.22

4.5 NATIONAL CENTRE FOR COMMUNICATION SECURITY (NCCS)

National Centre for Communication Security (NCCS) – a centre under Department of Telecommunications is created, with headquarters at Bengluru, for the purpose of establishing security testing and certification within the country.

In order to make the network more secure and less vulnerable from internal and external threats, Government envisaged a pilot Telecommunication Testing and Security Certification (TTSC) project for testing and validating each network element before its integration with the network. The **Security Assurance Standards Facility (SASF)** of Department of Telecommunication at Bengaluru is an outcome of this pilot project and will be the national facility for coming up with the Security Assurance Requirements for Telecom equipment to be inducted into the Indian telecom networks.

Hon'ble Minister of State (I/c) for communications inaugurating the Security Assurance Standards Facility (SASF) under NCCS

SASF is established in 12000 sq feet space at City Exchange building, Sampangi Rama Nagar, Bangalore at a cost of Rs. 42.06 crores. It is equipped with four test beds for conducting research and development of security standards and framing the security requirements for the communication equipment.

4.5.1 Objective: The objective of NCCS is to establish and operationalise a framework of security testing and certification framework within the country. Presently, there are three verticals under NCCS as follows: -

(i) Security Assurance Standards (SAS) division: The division is assigned the task of developing security standards and requirements for ICT equipment. The division is responsible for developing test processes, test suites, security test standards, recommending test tools and notifying contemporary security features for various network elements of Telecom network. The SAS unit will prepare the security requirements/standards called Indian Telecom Security Assurance Requirement for network elements (or a class of network elements) and notify them.

(ii) Security Lab Recognition (SLR) division: The division is responsible for creating framework for establishing telecom security test labs in India in private and public sector and recognizing the telecom security testing labs, Notifying Telecom Security test lab recognition mechanism, and Conducting infrastructure assessment for recognition of security test labs.

(iii) Security Certification (SC) division: The division is mandated to develop framework of issuing security certificate for the successfully tested products. The work will include evaluation of the test results from Security labs and recommending issuing of Security certification based on the testing performed by recognized labs. SC division shall also be responsible for over-all coordination amongst the three verticals and work of NCCS headquarters.

4.6 NATIONAL OPERATIONS CONTROL CENTRE (NOCC)

NOCC is headed by an HAG level officer who is assisted by one or more SAG level officers. The offices of NOCC are located in Delhi, Gurugram and Sikandrabad. Wireless related work is attributed to the Gurugram office while the Sikandrabad office works as monitoring station for telecom services.

NOCC monitors and controls parameters of carriers uplink from 1534 Satellite Earth Stations/ Teleports/DSNG & more than 2,70,000 VSATs. NOCC has made endeavours to provide the interference free environment to the various satellite users in country and NOCC provides mandatory clearances with in three working days to applicant agencies.

The Network Operations Control Center (NOCC) performs important functions of enforcement and regulatory. Broadly its functions are as follows:

- Online operational control, coordination and monitoring of all the satellite based services (Like VSAT applications, Broadcasting, DTH, ISP etc.) in India on Indian and foreign satellites.
- Handling contingency operations in case of failure of transponders/satellites.
- Providing RF Interference solutions and coordinating with different satellite administration for the resolution of the interference problem(s)
- Mandatory Performance Verifications Testing of all the ground segment satellite earth station antennae for conforming to latest ITU/TEC standards before permitting them to put in operations.
- Testing of ISP satellite Gateways & monitoring of transmissions from these gateways.
- Testing & clearance of Teleports of TV broadcaster(s) and Direct to Home (DTH) service providers
- Testing and clearance of Digital News gathering (DSNG) vans used for live gathering
- Testing of satellite transponder before accepting for operations
- Spot frequency allocations and carrier plan approval to all the INSAT users and foreign satellite users for broadcasting/ DTH/ DSNG, NLD and ILD services (VSAT).
- Verification/ Implementation of license conditions as and when called upon by Licencing cell of DoT.

4.6.1 Regulation of space segment: NOCC has been performing regulatory function for usage of space segment by VSATs, NLD (National long distance services), ILD (International long distance services), Broadcasting, DTH (Direct-To-Home) and HITs (Headend in the Sky) services as per their allocation, presently on 35 Satellites Viz. INSAT- 3A, 3C, 48R, 4A, 4B, 4CR, GSAT-8 GSAT-10,

GSAT-12, GSAT-14, GSAT-15, GSAT-16, GSAT-17, GSAT-18, Measat-3, 3A, 3B, SES-7, SES-8, SES-9, ST2, IS-17, IS-20, IS-902, IS-906, NSS-6, NSS-11, NSS-12, Asisasat-4, 5, 7, Chinasat-12, Thaicom-4, 5 and APSTAR-7. NOCC, in the year 2018-19 issued 179 uplinking permission and 103 frequency plan approvals to various applicant agencies.

NOCC, in year 2018-19, monitored and controlled various transmission parameters of carriers uplink from 1534 Satellite Earth Stations/Teleports/DSNG & more than 2,70,000 VSATs. NOCC also resolved the RF interference namely RF interference due to cross polar carriers, FM (Frequency modulation) Radio pick up, unauthorized pickup, DSNGs operations, other satellites from INSAT and other satellite administrators etc. identifying source of the suspected RF interference.

NOCC carries out the mandatory performance verification testing of antennae of satellite earth stations and DSNG, during year 2018-19, NOCC carried out mandatory performance verification testing tests of 95 antennae of different type of satellite earth stations and DSNG before inducting them into network.

In year 2018-19, NOCC has issued 74 nos. of uplink permissions for live telecast of events of national and international importance and NOCC played important role in interference free telecast.

4.6.2 Financial Achievements: In the year 2018-19, NOCC has billed Rs 52.7 crore for the services rendered by NOCC to the various user agencies and Rs. 21 lakh for uplink permissions for live telecast of events of national and international importance

4.7 NATIONAL TELECOMMUNICATIONS INSTITUTE FOR POLICY RESEARCH, INNOVATION & TRAINING (NTIPRIT)

NTIPRIT was established in the year 2010 as National Telecom Academy, the telecom training institute of Department of Telecommunications. Subsequently, in year 2011, the mandate of institute was expanded by bringing into the activities related to Policy Research and Innovations under its ambit and the institute was rechristened as National Telecommunications Institute for Policy Research, institute is now a Central Training Institute (CTI) enlisted with Department of Personal & Training. NTIPRIT is recently operating from the campus of Advance Level Telecom Training Centre (ALTTC) of BSNL at Ghaziabad.

The institute is being headed by an HAG level officer i.e. Sr. DDG (NTIPRIT) who is being assisted by 6 other SAG level officers to extend training in various telecom and administrative areas.

The institute is the focal point of training activities for technical cadres in Ministry of Communications. It caters training needs of Indian Telecommunications Service (ITS) Group 'A' and Group 'B' officers in Telecom Technologies, Telecom Enforcement & Resource Monitoring, Licensing, and Telecom Network Security are also conducted.

NTIPRIT regularly organizes in-service training, workshop, conference etc. for serving Group 'A' and Group 'B' officers on contemporary needs.

Besides above, NTIPRIT also conducts courses under ITEC Programme of Ministry of External Affairs (MEA) and has offered courses in ICT for APT and ASEAN member States also.

4.8 NATIONAL INSTITUTE OF COMMUNICATION FINANCE

The National Institute of Communication Finance (NICF), established in 2000 (with different name and venue), is a Department of Personnel & Training (DoPT) recognized Central Training Institute (CTI) under the Department of Telecommunications. The NICF has been entrusted with the responsibility of imparting training to Indian Posts & Telecom Accounts and Finance Service (IP&TAFS) Group 'A', 'B' & 'C' cadres, which includes Probationary Training of IP&TAFS Group 'A' officers recruited by the UPSC through Civil Services Examination as well as Induction Training of Group 'B' & 'C' cadres apart from organizing and conducting regular national and international seminars and workshops. The NICF is headed by an HAG level officer, i.e., the Director General, who is assisted by two SAG level officers, i.e. Deputy Director Generals and two JAG level officers i.e. Directors.

The NICF caters to the training needs of officers in the Department of Telecom as well as Department of Post at varying levels of seniority. The IP&TAFS Probationers are imparted rigorous training for two years in order to equip them with thorough professional knowledge of the workings of the Department. The officers at both middle and senior management level are also given Mid-Career Trainings (MCTs) to acquaint them with latest developments in the Telecom and Postal sector. The officers are trained in the areas of their core competencies such as Licensing and regulatory policy of Telecom Sector including the revenue assessment and revenue collection, Spectrum Management, Management of Universal Service Obligation Fund (USOF) including the BharatNet Scheme of the Government of India, Technology Familiarization including regulatory/ policy/financial impact of the prevalent technology, etc., Foreign Investment Promotion in Telecom Sector and FDI Policy, FEMA guidelines, Telecom Policy and other related regulations, Finance Advise including Accounting, Auditing and Budgeting of the Department of Telecommunications and Department of Posts. They are also imparted training in soft skills such as Stress Management, Communication Skills, Leadership, Team Building, Interpersonal Skills, etc. in order to further enhance their effectiveness and efficiency.

As a training institute, the NICF strives to transcend the limitations of classroom training by organizing various workshops, conferences, symposia etc. to encourage participants to exchange best practices and ideas and learn about new trends in the Telecom and Postal Sector in a congenial environment. Of late, the NICF has also ventured into the newer areas in the Telecom Sector and a plethora of training activities have been organized ranging from Digital Payments to Digital

Financial Services and Digital Inclusion. Moreover, the NICF has also emerged as a key training centre for Telecom Policies, Spectrum Management, Planning & Licensing, USO Regulation, and so on. Furthermore, to provide greater fillip to the goal of human capacity development in the field of Information & Communications Technology (ICT), the NICF regularly undertakes training of trainers, which creates a ripple effect in terms of human capacity building in the field units of the Department of Telecom and Department of Post located across different regions/places of the country.

NICF partners with other National Academies and Centre of excellence including, Reserve Bank of India Staff College, National Academy of Direct Taxes, SVP National Police Academy, National Academy of Audit and Accounts, Postal Staff College, Indian Institute of Public Administration, IIT Bombay etc. alongwith other state organizations including Telecom Regulatory Authority of India, National Security Guard and Air India. NICF also collaborates with International Telecommunication Union (ITU), the UN Specialized Agency for the ICT sector and has recently conducted a capacity building workshop on “Bridging the standardization Gap”.

Overall, the NICF seeks to stay abreast of new trends regarding the role of training institutes in a rapidly evolving and changing ICT environment. As the NICF plays a crucial role in the field of Human Resource Training, Training of Policymakers and Trainers’ Training, it has emerged as a nodal institute that is central to human capacity development in the field of ICT in India. At present NICF is developing a multi-functional campus at Ghitorni which will enable it to emerge as true Centre of excellence.

4.9 DIRECTOR GENERAL TELECOM (DGT)

Director General Telecommunications is an apex level officer and is the head of 39 DoT Field Units in all the 22 Licensed Service Areas located across all over the country. Headquarters of Director General Telecommunications (DGT-HQ) is located in Delhi. To assist DG(Telecom) one HAG level officer, four SAG level officers & four JAG level officers have also been provided at DG(T) HQ office.

In Feb 2017, a unified structure of Field units including TERM (Telecom Enforcement and Resource Monitoring), Security, (PG) Public Grievances and NT(Network &Technology) was created in each LSA and headed by Advisor/ Sr.DDG in all the 22 LSA Units spread all over the country.

The Government has structured DGT structure to ensure presence of Telegraph Authority in the field at all the Licence Service Areas (LSA) and Large Telecom Districts of the country, in order to ensure that service providers adhere to the licence conditions and for taking care of telecom network security issues, illegal / clandestine telecom operations. To address these issues, the Government created Vigilance & Telecom Monitoring cells (VTM). In Nov-2004, initially four VTMs at Delhi, Mumbai, Hyderabad and Chennai were formed.

During the year 2006, nine more VTM Cells were set up in the circles of Punjab, Rajasthan, Gujarat, Kerala, Karnataka, Maharashtra, Tamil Nadu, West Bengal and UP (East). Subsequently in Jan-2007, fifteen VTM Cells were added in Andhra Pradesh, Bihar, Madhya Pradesh, Haryana, UP (West), Andaman & Nicobar, Assam, Chhattisgarh, Jammu & Kashmir, Jharkhand, Himachal Pradesh, North East-I, North East-II, Odisha and Uttarakhand. Six more VTM Cells were added in March-2007 for Kolkata, Ahmedabad, Bengaluru, Pune, Jaipur and Lucknow, taking the total number of VTM Cells to 34.

Since formation of Vigilance & Telecom Monitoring (VTM) Cells in DOT, the role and functions of VTM Cells were increased manifold. With a view to reflect the entire gamut of functions assigned to the Cells and to distinguish their role vis-a-vis staff-vigilance activities, the name of VTM Cells were renamed as Telecom Enforcement, Resource and Monitoring (TERM) Cells with effect from 5th August 2008. On further enrichment of the roles and functions, these field units are renamed as LSA Units, DoT under DG(T).

In the present set up of DG(T), there is one Senior DDG and four DDGs at Head Quarter with 22 LSAs. In each LSA, there are five functional verticals namely Compliance, Technology, Security, Rural and Admin. Functions assigned to License Service Areas (LSAs) are:

4.9.1 Compliance Vertical

Monitoring of compliance to prescribed norms regarding acquisition of subscribers: In the year 2007, it was decided to have a continuous monitoring of compliance to prescribed norms regarding acquisition of subscribers for security related concerns. For this, it was decided to verify at least 0.02% of the Customer Acquisition Forms (CAFs) of all the active subscribers on sample basis every month. In the year 2008, the sample size was revised from 0.02% to 0.1% based on the recommendation of National Sample Survey Organization (NSSO). Penalties are also being imposed on Telecom Service Providers (TSPs) for non-compliance to the norms. Apart from above, LSAs are also carrying out following activities and penalties are being imposed for non-compliance:

- Analyses of subscriber databases submitted by TSPs
- Inspections of warehouses and Point of Sale (PoS) of the TSPs for having samples directly from the storage.
- Investigation of complaint related to subscriber verification reported by various sources including Law Enforcement Agencies (LEAs)
- Analysis and verification of bulk customer verification (10 or more than 10 connections to an entity)
- Police verification of franchisee of TSPs in sensitive states (Assam, North East and J&K).

LSAs have audited approx. 11.88 crores CAFs till 31.03.2019 across all TSPs and on non-compliant CAFs a penalty of approx. Rs. 4320 crores has been imposed.

Checking of compliance to Electro Magnetic Field (EMF) radiation norms: With the increasing concerns over harmful effects of Electromagnetic Radiation on human health, LSAs were entrusted in 2010 with the work of cross checking the compliance of EMF radiation norms as prescribed by DoT from time to time. Accordingly, the LSAs have been verifying the prescribed EMF self-certificates submitted by TSPs and also checking the EMF radiation exposure levels of up to 10% of Base Transreceiver Station (BTS) annually on random basis. In case of non-compliance of EMF radiation norms by TSPs, penalty on the concerned TSP(s) is levied by LSAs.

The *Tarang Sanchar Web Portal* has been launched with a view to clear the "myths and misconceptions" surrounding mobile tower & rate of emission and to provide a system to users for checking proper functionality of the tower of a particular zone and to see whether they are compliant to the norms laid by the Government for EMF.

DoT has conducted 162 EMF awareness workshops at various places of the country to spread awareness among people on EMF emission and mobile towers.

LSAs have tested approx. 6.43 lakhs BTS till 31.03.2019 across all TSPs and on non-compliance of EMF radiation norms a penalty of approx. Rs. 8691 crores has been imposed.

Service Testing for checking Roll-out obligations: As per the license agreement all the Access Service Licensees are required to roll out their services within prescribed time periods. For this, they have to offer their services in the districts selected by them for crosschecking the quality/ coverage and other parameters by DoT which is termed as Service Testing. In the year 2007 LSAs were entrusted with the responsibility to carry out the service testing of the cases offered by TSPs and issue Service Test Result Certificates (STRCs) against the cases tested by them. Liquidated Damage (LD) Charges is imposed on the TSPs who are not complying to Roll-out obligation conditions.

LSAs have carried out service testing for checking Roll-out obligations of about 10411 towns covering approximately 77,877 BTSs till 31.03.2019 across all TSPs. A sum of Rs 244.49 crore has been collected as testing fee.

4.9.2 Technology Vertical:

Inspections of TSPs/ Subscribers: LSAs carry out inspections of UASL/CMTS/Basic/UL/NLD/ILD/ ISPs/OSPs/IP-1s/VSAT licensees, for checking compliance to terms and conditions of their license/ registrations. LSAs also carry out inspections of Bulk customers, Heavy users, ILL/IPLC/NPLC customers, V-SAT customers.

During the period 01.04.2018 to 31.03.2019, a total no of 3617 inspections have been carried out by LSAs and the discrepancies have been rectified in coordination with TSPs.

Registration of Other Service Providers (OSPs): LSAs have been entrusted to register Other Service Providers in LSAs like BPO, KPO, Network Operation Centre, Vehicle Tracking System, e-Commerce, Tele-medicine, Tele-education etc. During the period 01.04.2018 to 31.03.2019, as many as 1208 OSPs have been registered by LSAs.

Geo-Intelligent Disaster Early Warning and Resource Management Platform using Common Alerting Protocol (CAP): Pilot testing of Early warning system has been carried out at 10 LSAs. Latest testing was carried out at Bhubaneshwar. Earlier only BSNL and Reliance Jio came on board to show their preparedness in case of disaster, interfacing their network with EWS (Early Warning System). Now, all the TSPs have come on board. EWS worked very well during the disaster that struck Kerala, Andhra Pradesh and Tamil Nadu during this year monsoon. Information about the BTSs (down due to disaster) was also received and shared with DoT. The project is under submission for obtaining approval and expenditure sanction from MHA.

Online License Management System (OLMS)- Saral Sanchar Portal: Saral Sanchar portal consists of two modules: UL and OSP module. All the workflows of OSP module phase 1 were developed and shared with DoT for implementation in Software. Three rounds of Validation Testing were carried out between Aug to Sept 2018 and the observations conveyed accordingly. User acceptance Testing was done end to end after attending validation testing & security audit. Finally, a Web based Portal (https://saralsanchar.gov.in), for issuing of various types of Licenses and Registration certificates for OSPs has been deployed and launched on 15th Nov 2018. All the prospective applicants/stakeholders have started using Saral Sanchar portal for new registration as OSP.

The OSPs registered before the launch of Saral Sanchar have migrated to the new portal and all OSP registrations are now handled on one portal only. As activities of old OSP portal has already been migrated to Saral Sanchar Portal (new portal) and therefore the old OSP Portal has been abandoned.

Implementation of Time Synchronization Pan India Project in Telecom Network: An MOU between CSIR NPL and DOT was signed on 25.04.2018 for implementation of Pan India Time Synchronization Project.

DoT Data Network (DDN)/ renamed as Smart LSA: A committee was constituted to recommend a solution for digitizing various processes for DOT field units and DG(T) HQs. Administrative approval of Secretary(T) on the committee recommendation for smart LSA/DDN has been obtained. Smart LSA solution consists of 10 software modules and business requirement documents of all the modules have been framed. Smart LSA project is based on subscription based cloud solution and is proposed to be carried out in a phased manner. Proposal for obtaining the expenditure sanction for implementation of Smart LSA project is under submission

To monitor inter operator connectivity to ensure optimum Call Completion Ratio (CCR) for inter operator calls. Analysis of call details records/exchange records / subscription/traffic data of various licensees.

4.9.3 Security Vertical:

Lawful Interception and National Security:

- Centralized Monitoring System (CMS) has been implemented with the approval of Committee on Security (CCS) with Government funding of Rs. 400 Crores. The system facilitates Ministry of Home Affairs, Central Law Enforcement Agencies (LEAs) and State Police for automated Lawfull interception and monitoring process. The system has core component CMC (Centralized Monitoring Centre) at C-DOT campus Delhi with a Disaster Recovery unit at Bengaluru. The CMC is regionally connected on MPLS network with 21 Regional Monitoring Centres which in turn are connected to TSP equipment.
- The LSAs act as technical interface between Security Agencies and Telecom Service Providers and assist in matters related to National Security. They also help in providing information related to the Customers, CDRs, exchange records etc.
- LSAs also act on various communications received from LEAs and Security Wing of DoT regarding spillage of mobile signals from neighbouring countries into Indian Territory, deactivation of mobile numbers, checking misuse of ID documents & mobile numbers, etc.
- LSAs conduct monthly coordination meetings for closer interaction and to resolve the issues. An Oversight Committee at DGT Head Quarter level on half yearly basis conducts meeting to resolve the pending issues.

GREY market/Clandestine Operations:

- LSAs carry out investigation to curb illegal operations (not permitted under Indian Telegraph Act) in coordination with Law Enforcement Agencies (LEAs). They also take action for unearthing the illegal telecom setups based on the information received from DoT call centre Haryana and the subsequent analysis of CDRs, IMEIs and probe of suspected premises with the help of local police, before busting the frauds. LSA field units file an FIR against the culprits, pursue the case and issue notices indicating violation of conditions of various Acts.
- LSAs have unearthed around 875 cases of illegal set ups till 31.03.2019.
- The LSAs are coordinating for handling non- genuine IMEI cases and providing support in implementation of CEIR (Central Equipment Identity Register)

Security Audit of TSPs and ISPs: LSAs carry out the Security Audit of TSPs/ISPs for Security compliance of various security norms prescribed in Indian Telegraph Act and License Agreement. LSAs have done 106 Security Audits during the period of Apr 2018 to Mar 2019.

4.9.4 Rural Vertical:

RoW related issues: LSA field Units are pursuing with concerned State/ UT Government for formulation of State RoW Rules aligned with Indian Telegraph Right of Way Rules, 2016. 2016 in 13 States/UTs, the State RoW Policies have been Notified & are aligned with DoT RoW Rules.

For USOF/DoT funded projects: The site survey plan for the Phase-II of the project of mobile connectivity in LWE areas is on going. Further, LSAs have formed committee with State administration for finalisation of the site location under the USOF project

4.9.5 Admin Vertical:

Handling of Public Grievance (PG) cases: LSAs represent the licensor in the field and complaints received through PG portal or from other sources are analyzed and resolved by TERM Cells. Till 31st March, 2019 approximately 26715 PG cases were received through CPGRAMS and approximately 25069 cases were disposed off.

Handling of VIP/PMO references: Disposal of VIP cases/PMO references pertaining to DGTHQ. More than 40 VIP cases were handled during the period of Apr 2018 to Mar 2019.

4.10 CONTROLLER GENERAL OF COMMUNICATION ACCOUNTS (CGCA)

The office of Controller General of Communication Accounts (CGCA) is an attached office of the Department of Telecommunications (DoT) and is headed by an Apex level officer. The post of CGCA was created as a result of the first cadre review of the IP&TAFS. The office of the CGCA presently functions from the NICF Campus at Ghitorni, New Delhi. The CGCA works under the overall supervision and control of Member (Finance), DCC. The mandate of the CGCA are as follows:

a) Monitoring of the work performed by Pr.CsCA/CsCA offices

b) Internal Audit of all field units of DoT

c) Cadre controlling authority of Group 'C' and Group 'B' Non-Gazetted officials

d) Recruitment of Group C (JA/LDC/MTS/Steno) staff for DoT

Monitoring functions of the CGCA to the DOT field offices includes the following:

a) Compliance of the terms and conditions of the license agreements.

b) Revenue Assessment, Revenue Collection and Maintenance of BGs

c) Pension Authorization, Revision & Disbursement

d) Preparation and Maintenance of proper Accounts

e) Promotion of Digital Payments

f) Monitoring of USOF schemes including the verification and disbursement of subsidy as Designated Monitoring Authority (DMA)

g) Imparting the necessary Training

h) Asset Management under D0T including approval of estimates for repair/renovation/ addition/alteration to existing departmental building, repair and additions to rented buildings for civil and electrical work, monitoring of leased accommodations taken from BSNL, etc.

i) Timely handling of Legal Cases and Updation on LIMBS.

j) Supervision and maintenance of Budget.

k) DDO functions of all the field units of DoT.

l) General Administration and any other functions performed etc.

Presently there are five verticals under the CGCA are as follows:

a) Internal Audit,

b) Revenue,

c) Accounts,

d) Coordination and Administration,

e) Manual & Codification.

These verticals are headed by the SAG level officers designated as Joint CGCA and they report to Additional CGCA an HAG+ level officer.

4.10.1 Monitoring of CCA offices: The Office of the CGCA monitors the functions of the DoT field units ie. the O/o the Principal CCAs/CCAs/JtCCAs spread across the country. It carries out the review of the heads of Principal CCA/CCA/Jt.CCA offices through periodical reports and meetings. It also Monitors all legal cases (in LIMBS) arising/pertaining to all Principal CCA/CCA/Jt.CCA offices and Monitoring of PG cases in PG portal. The CGCA is also the Cadre controlling authority of Group "C' and Group "B" Non-Gazetted officials working in these offices.

4.10.2 Asset management: The CGCA has been entrusted with the job of asset management of field units of DoT which includes monitoring and execution of recently signed MOU with BSNL

regarding leasing of BSNL staff quarters for the officials of DoT field units i.e. CCAs, LSAs and WMOs. This office also addresses the issues related to office space and other requirements of CCA offices and sanctions estimates for repair/renovation/addition/alteration to existing departmental building and process cases for hiring office spaces.

4.10.3 Recruitment through SSC: The O/o the CGCA facilitates recruitment through SSC for the vacant post of JA/LDC/MTS/Stenos of all Pr.CCA/CCA offices. This office also periodically conducts departmental exam for promotion to the post of Jr.Acctt and LDC.

4.10.4 Internal Audit: The Internal Audit section of CGCA carries out the internal audit of the offices of the Pr.CCA/CCA/Jt.CCAs/DG(NICF), NTIPRIT, C-DoT, TEC, RLO, WMO, TERM Cell, LSA and also carries out the special Audit of BSNL, LWE project Bharatnet project Phase I & II. The O/o the CGCA is involved in preparation of questionnaires, framing the Internal Audit policy and Internal Audit methodology within its ambit. It carries out Performance & Outcome audit of the Pr.CCA/CCA/Jt.CCAs/DG(NICF), NTIPRIT, C-DoT, TEC,RLO,WMO,TERM Cell, LSA. It coordinates a training plan with the training centres of IA &AS, ICAI, Institute of internal auditors etc. Periodical review of inspection report of all Pr.CCA/CCA is also conducted by this section.

4.10.5 Budget Accounts & IT: Budget Accounts & IT section of O/o the CGCA reviews the budget allocation, expenditure done, monthly state of work report, Pension case on CPGRAM of all Pr.CCA/CCA/Jt.CCAs/DG(NICF) and the implementation and monitoring of SAMPAN. The section also coordinates and conducts investor education, protection fund programme by conducting seminars/workshops. Besides the development & updation of website www.cgca.gov.in, the security audit of all Pr.CCA/CCA/Jt.CCAs/DG(NICF) websites is monitored by this section.

4.10.6 Revenue: The Revenue section monitors the financial bank guarantee and performance bank guarantee of all Licenses i.e access service, ISP, TSP, NLD, ILD and other licensees and updation of basic data of all licenses in the LF software. It also coordinates with the Pr.CCA/CCA/ TERM Cell/WPC/WPF Wing/AS/CS and DS wing of DoT HQ. for issues relating to bank guarantees and monitors assessment of LF in respect of decentralized License and issues clarification to field units for the same. The Revenue section also acts as an appellate authority for assessment of decentralized licensees.

4.10.7 Controller Of Communication Accounts (CCA) Office: Under the overall umbrella of CGCA, there are 5 Pr. Controller of Communication Accounts (Pr. CCA) offices headed by HAG level officers as Zonal head, 23 Controller of Communications Accounts (CCA) offices headed by SAG level officers and 2 by JAG level officers. Apart from that most of the CCA offices have one or two sub offices within their jurisdiction for pension disbursement directly to the account of pensioners according to the “SAMPANN” project recently inaugurated by Hon’ble Prime Minister Sh. Narendra Modi from Varanasi on 29th December 2018.

Restructuring of the department and establishment of CCAs (Erstwhile DOT cell): In the year 2000, after the formation of BSNL, DOT Cell came into existence as independent field offices of DOT for disbursing the pension and performing other residual executive and administrative functions of the Department. These offices are entrusted with the other financial functions like collection of license fee (LF) and spectrum usage charges (SUC) after introduction of revenue share regime in the department in the year 2000.

The work of disbursement of USOF subsidies was delegated to the DOT cell in the year 2003 after the formation of Universal Service Obligation Fund as attached office of the Department for development of rural telephony and infrastructure. Similarly, the of work of assessment and deduction verification were decentralized to the CCA offices and they were declared as HOD in the field for all the practical purposes.

After the journey of more than 18 years of establishment now these are the important functions discharged by the Pr. CCA/CCA offices as eldest field offices of the DOT:

a) Compliance of the terms and conditions of the license agreements.

b) Revenue Assessment, Revenue Collection and Maintenance of BGs

c) Pension Authorization, Revision & Disbursement

d) Preparation and Maintenance of proper Accounts

e) Promotion of Digital Payments

f) Monitoring of USoF schemes including the verification and disbursement of subsidy as Designated Monitoring Authority (DMA)

g) Imparting the necessary Training

h) Asset Management being the Estate officer in the field.

i) Handling of Legal Cases and updation on LIMBS.

j) Supervision and maintenance of Budget

k) DDO functions for Pr. CCA/CCA offices and other DoT field units.

l) Vigilance function as Vigilance officer in the field

m) General Administration and any other functions performed etc.

The Pr. CCA and CCA offices conduct various outreach activities like:

a) Organizing Digital Payment Melas as part of Smart Cities Initiative of the government.

b) Organizing Workshops on Goods & Services Tax (GST):

c) Pension Adalats

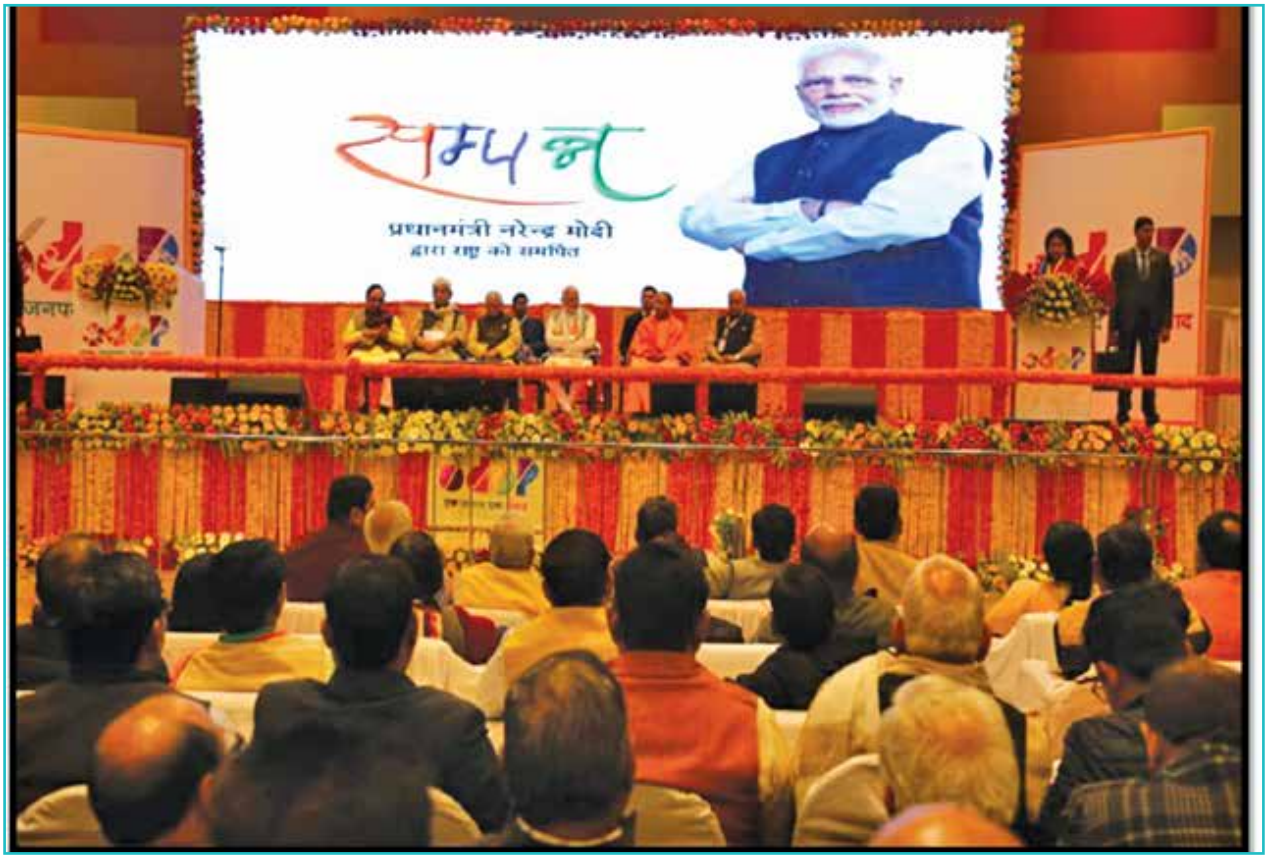
d) Investment Awareness Programs etc.

4.10.8 Important Initiatives Taken:

- **SAMPANN (System for Accounting and Management of Pension):** SAMPANN is the Comprehensive Pension Management System and was inaugurated by Hon'ble Prime Minister on 29th December 2018 at Varanasi and is being rolled out across 28 Pr. CCAs/CCAs.
- SAMPANN integrates the processing, sanctioning, authorization and payment processes under a common platform, facilitates direct credit of pension to the accounts of pensioners and monitoring of pension and pension grievances and provides the following benefits to the pensioners:
- A single window system for complete pension process thus avoiding the complexities.
- Pensioners are provided with a login for tracking the pension status and ongoing related processes.
- Ensures direct disbursement of pension on timely basis without the intervention of 3rd party.
- Introduction of Online Grievance Management to ensures transparency.
- Effective & Quick process of pension arrears & pension revision cases.

A total Rs.394 Crores of pension and pensionary benefits has been disbursed through SAMPANN covering 2636 pensioners as on May 2019.

- **PFMS (Public Financial Management System):** Department of Telecom has implemented PFMS from 1st January, 2017. The Budgeting, accounting, processing and movement of bills and payment through designated banks have been automated in all the CCA offices.
- **E-Payments:** 98.55% Electronic Payment (e-payment) has been implemented in Pr. CCA/CCA offices as per the instructions of Ministry of Finance.
- **NTRP (Non-Tax Receipt Portal):** The Electronic Receipt (e-receipt) system for accounting of DoT revenue, has been fully enabled in DoT HQ and all the CCA offices w.e.f 1st January 2017.
- **SWR (State of Work Report):** Web based platform has been developed to ensure accuracy, transparency, accountability and prompt reporting by CCA offices to DoT HQ/CGCA.
- **Direct payment of GPF:** for BSNL (PSU) employees have been implemented in the CCAs who are maintaining the GPF accounts for the PSU.



Inauguration of SAMPANN at Varanasi by Hon'ble Prime Minister on 29th December, 2018

4.10.9 Digital Payments Mission: Under the Digital Financial Mission in the country, the Department of Telecom with a 1.2 billion strong subscriber base requires to monitor and promote Digital modes of payments not only for the department but also for the entire telecom sector (TSPs, ISPs, Retailers and other stakeholders). For the year 2018-19 the sector has achieved digital transactions for Rs. 310 crores against a target of Rs. 250 crores. In addition to this, the following initiatives have also taken up by the department: -

- Encouraging the TSPs/ISPs to incentivize cashless transactions by providing various offers like cash back, extra data and extra talk time as cashless transactions.
- Promoting Digital Payments in the 100 Smart Cities by hosting "Digital Payment Melas" in 81 Smart Cities in partnership with TSPs and NPCI for telecom retailers where different payments options were demonstrated to the telecom retailers and other stakeholders emphasizing the promotion of Low cost solutions like BHIM app and Bharat QR code.
- Coordinated the on-boarding of all Telecom Service Providers to BBPS (Bharat Bill Payment system).

Digital Payment Melas in Jharkhand, West Bengal, Bihar, Sikkim, Mizoram, Arunachal Pradesh & Assam

4.10.10. Disbursement of Terminal Benefits:

Pension: With the promulgation of Rule 37(A) along with Rule 37 of the CCS Pension Rules, the government plays a critical role in the disbursement of pension to officers and officials of DoT and the erstwhile government servants absorbed in BSNL and MTNL. The CCA Units are responsible for budgeting of pension expenditure, sanction, authorization and disbursement of retirement benefits on CDA and IDA scale to over 3 lakh pensioners. The details are as under:

TABLE 4.7
Disbursement of pension

Financial Year	No. of Pensioners (in lakh)	Pension Disbursed (Rs. In crore)
2017-18 (as on March 31, 2018)	3.24	10804.89
2018-2019 (as on March 31, 2019)	3.58	11820.71

Pension Adalat: A day was earmarked for holding the National level Pension Adalat across all CCA offices on the 18th of September 2018 . Over and above this, Pension Adalats are being organized regularly every quarter by the CCA offices as well as DoT HQ. The details are as under.

TABLE 4.8 Statement of Pension Adalat		
Total Cases taken up during Pension Adalat	No of cases Settled during Adalat	No of cases unresolved/ Pending
459	443	16 (of latest cases)

Regular monitoring and clearance of Pension Grievances under CPENGRAMS: Revision of pre-2016 Pensioners/Family Pensioners under 7th CPC was spearheaded by the CCAs to coordinate the administrative units and to complete revision in a timely manner. The details are as under:

- Total No of Cases for Revision – 95662
- Total No of Cases Revised – 92238
- Total No of Cases Pending – 3424 (due to administrative reasons)

4.10.11 Pension Contribution and leave Salary: The CCA offices carry out the functions of collection, scrutiny and monitoring of the amounts to be received as pension contribution and leave salary by the government.

4.10.12 GPF & Long Term Loans Accounting: The DoT maintains and accounts for the GPF, long term loans and advances and their recovery/accounting for BSNL. The system for direct payment of GPF was implemented in all the circles to replace the reimbursement system to create ease of accounting and cut down delay for the payments for the PSU employees.

4.10.13 Audit Function: Under the restructured Internal Audit system of DoT, the Internal Audit Section of DoT HQ carries out the Internal Audit Inspection of DoT (HQ) Wings and CGCA. In addition, it carries out a periodic review of the operational issues, guidelines, reports / MIS as submitted by the O/o the CGCA to DoT. The DoT IA section also coordinates the corrective action on the pending Part-II B paras with DoT HQ wings, in the audit conducted by O/o DG of Audit.

Pension Voucher Audit Functions: CCA offices carry out post audit of pension and pensionary benefits disbursed by the designated banks (CPPCS) and post offices.

Functioning as CPIOs Under RTI Act, 2005: Officers in the offices of CCA have been designated as Central Public Information Officers (CPIO)/ Appellate Authorities for ensuring smooth provisioning of information under the RTI Act 2005.

4.10.14 Accounts: The Controller of Communications Accounts (CCA) office is the basic unit of departmentalized accounts organization and performs the PAO (Pay and Accounts office) and DDO (Drawing and Disbursing office) functions for field offices like TERM, WMO, RLO etc. Preparation and submission of the accounts has been digitalized through the implementation of PFMS. The work related to preparation of SCT (Statement of Central Transactions), Appropriation Accounts,

Finance Account of DoT, review of monthly accounts, RBI balances reconciliation for DoT field units are being coordinated at the Ministry level in DoT HQ.

4.10.15 Digitization of Accounting functions under DFU (Digital Finance Unit): The DFU (Digital Finance Unit) has been set up under the Accounts Section to carry out the activities for Digitalization of all accounting and budgeting functions, implement the applications and administer the projects to ensure smooth functioning of IT solutions across all DoT Finance units, some of which are listed below: -

- Development of SAMPANN, implementation and maintenance of Helpdesk
- Implementation of PFMS/NTRP (Bharat Kosh) and maintenance of the Helpdesks.
- Implementation of GPF direct payment and maintenance.
- Implementation of SWR (Finance MIS) and maintenance.
- Implementation of EIS and phasing out COMPACT.

4.10.16 Bharat kosh: The Non-Tax Receipt Portal (NTRP), an initiative of the Ministry of Finance to provide one stop services to deposit any fees/fine/other money into the Government Account. It aims to provide 24X7 year round electronic services to deposit the money into Government Account through the web based portal. The Department of Telecom has also integrated its receipts through Bharatkosh portal for LF and is being used as Payment portal for other receipts to achieve the mandate of Government for 100% Digital receipts.

4.11 DOT FIELD OFFICES IN 22 LICENSED SERVICE AREAS (LSA)

All the LSAs are headed by HAG/HAG+ level officer, with following five functional verticals each headed by SAG (DDG) level officers:

a. Service Compliance
b. Security
c. Technology
d. Rural Infrastructure
e. Administration

Broad functions of field units include: Duties and responsibilities of various functional verticals are as given under:

(a) Service Compliance:

- Checking of the service compliance by the licensee in respect of the license conditions and any directions issued by the licensor in public interest.
- Matters related to Electro Magnetic Radiation (EMR) emission from Telecom installations & Tarang Sanchar Portal

- Monitoring of compliance to prescribed norms regarding acquisition of subscribers with the objective to ascertain that the mobile service operators are following the DoT guidelines for Subscriber verification before providing connections
- Service Testing of various Licensed Service Providers for checking roll-out obligation as per license condition.

(b) Security:

- Matters related to Security and Lawful Interception: Act as technical interface between Security Agencies and Telecom Service Providers
- Operation and Maintenance of CMS/ IMS
- Curbing illegal activities/ Control over clandestine / illegal operation of telecom networks
- To file FIR against culprits, pursue the cases and issue notices indicating violation of conditions of various Acts and statute in force
- Analysis of call/subscription/traffic data of various licensees
- Security related Inspection of Internet Lease Line, International/ National Private Leased Circuit
- Detection and Analysis of Non-genuine IMEI cases
- Security Audit of Telecom Network of Service Provider
- Coordination with LEA in various projects like Crime and Criminal Tracking Network & systems (CCTNS), Anchoring of CERTs of state Government etc.
- Implementation of IMEI Registry Project and its maintenance

(c) Technology:

- Inspections of Telecom Service Providers (Access Service, NLD, ILD, ISP, OSP, IP, VSAT, etc.)
- Registration of Other Service Providers (OSPs)
- Telecommunication services in response to Disaster (Disaster Management)
- Matters related to NOC for selling of the global calling cards, international SIMs etc.
- Ensuring Time synchronization of Telecom Networks including the O&M of related equipment if required.
- Secured Dedicated Communication Network, Effective implementation of IPv6

(d) Rural:

- Right of Way (RoW) related issues and coordination with concerned Central and State Government's department and institutions, local bodies.

- Network coverage/connectivity of villages for Direct Benefit Transfer (DBT) mission and of Banks in rural areas under Financial Inclusion Planning (FIP)
- Design, Planning, Implementation of projects funded by DoT & USOF.
- Duties and responsibilities assigned by DoT & USOF generally/specifically
- Implementation of Environmental sustainable Technologies in rural areas

(e) Administration:

- Staff, Establishment and general administration matters
- Disposal of Public Grievances
- Responding RTI queries.
- Training& Skill Development
- Holding of workshops, conferences and presentations
- Building works
- Responding to Parliamentary matters
- Handling Court cases including engagement of legal counsel, Vigilance Cases, Pension etc
- Other regular administrative works

4.12 RAILWAY ELECTRIFICATIONS PROJECT CIRCLE (REPC) – UNDER ADMINISTRATIVE CONTROL OF LSA -DELHI

Prior to the formation of Railway Electrification Project Circle in DoT in 1984, the job of protection work/shifting of alignments was carried out by the four Zonal Telecom Project Circles, as the work of electrification by the Railways was considerably very less. When Railways took up the work of Electrification as a matter of policy, an organisation RAILWAY ELECTRIFICATION PROJECT CIRCLE, was created in DoT for protection/shifting of Telecom Trunk alignments along the Railway Tracks, and issue the 25 KV/AC "DYNAMIC CLEARANCE CERTIFICATE" to Railways. At present this organization is headed by DDG (RE) an officer of SAG level under administrative control of LSA Head, Delhi.

REPC conducts co-ordination meetings with Railways to fix realistic targets, joint inspections and also sort out problems with local Telecom authorities and Railways.

Co-ordination in general is required with the following :

i. BSNL/ New Delhi

ii. Railway Ministry

iii. All CSTEs and CPMs all over India

iv. General Manager Railway/ CORE/ Allahabad

v. All CGMs/ BSNL and GMs/ BSNL of Territorial circles

CHAPTER 5

PUBLIC SECTOR UNDERTAKINGS AND AUTONOMOUS BODIES

5.1 BHARAT SANCHAR NIGAM LIMITED

5.1.1 Role and Functions: Bharat Sanchar Nigam Limited (BSNL) was formed on 1st October 2000 by Corporatisation of the erstwhile Department of Telecom operation & Department Telecom Services. The company has taken over the erstwhile functions of the Department of Telecom in respect of provision of telecom services across the length and breadth of the country excluding Delhi and Mumbai. BSNL has a large work force of around 1.67 lakh as on 31.03.2019. BSNL is a 100% Government of India owned PSU with an authorized capital of Rs. 17,500 crores, paid up capital of Rs. 12,500 crores comprising of Rs. 5,000 crores of Equity and Rs. 7,500 crores of Preference shares capital.

As on 31.03.2019, the market share of company is 51.2% in wired line and 10.5% in wireless segment. The 3G coverage of BSNL is available in 6,068 cities/towns. During the Financial year 2017-18, the Company has made loss of Rs.7992 crore.

BSNL is a technology-oriented company which provides all types of telecom services namely telephone services on wireline, WLL and Mobile, Broadband, Internet, leased circuits and long distance telecom Service. The company has also been in the forefront of technology with 100% digital technology switching network. BSNL's nation-wide telecom network covers all District headquarters, Sub-Divisional headquarters, Tehsil headquarters and almost all the Block Headquarters.

BSNL is actively engaged in the nation building exercise with the Government of India. The following key projects of the Government are under implementation:-

(i) Bharat Net-II:- BSNL is partnering the Government of India in its ambitious programme with the objective of providing broadband connectivity to Gram Panchayats.

(ii) Network for Spectrum (NFS):- This is a Government funded project to be implemented on turn key basis for Defense Tri-services for releasing of spectrum utilized by Defence.

(iii) Left Wing Extremism affected areas (LWE):- BSNL is actively pursuing the government funded project of providing connectivity to the LWE affected areas, to strengthen the communication networks.

(iv) Development of communication networks of NE Region:- BSNL has completed Ashta Mangal Project Phase-I for improving the connectivity in North-East Region.

BSNL has formed a new company namely BSNL Tower Corporation Ltd. which is a wholly owned subsidiary company of BSNL. BSNL Tower Corporation Ltd. was incorporated on 4th January, 2018 in order to take over the Mobile Tower Business.

5.1.2 Highlights: The details of physical and financial targets & achievement for the year 2017-18 & 2018-19, of BSNL are given in the following tables: -

Table 5.1 Achievement during financial year 2017-18

S. No.	Item	Unit	Year 2017-18	
			Target	Achievement
1	Total Telephone Connection	Lakh	-	**90.23**
1 (a)	Wire-line	Lakh	-	**(-) 14.33**
1 (b)	WLL	Lakh	-	**(-) 2.16**
1 (c)	Mobile	Lakh	-	**106.72**
2	Broadband (Wireline + Wireless)	Lakh	-	**(-) 3.48**
3	Total Switching Capacity Mobile	Lakh Lines	-	**43.69**
4	**Rural Telephone**	**Lakh**	**-**	**21.31**

Table 5.2 Achievement during financial year 2018-19

S.No	Item	Unit	Year 2018 - 19			
			Target (2018-19)	Status as on 01.04.2018	Status as on 31.03.2019	Achievement up to 31.03.2019
1	Total Telephone Connection	Lakh	-	1241.11	1268.1	**26.99**
1 (a)	Wire-line	Lakh	-	122.56	111.68	**(-) 10.88**
1 (b)	WLL	Lakh	-	7.45	0	**(-) 7.45**
1 (c)	Mobile	Lakh	-	1111.1	1156.43	**45.33**
2	Total Switching Capacity Mobile	Lakh Lines	-	1030.83	1115.86	**85.03**
3	Broadband Connection (Wireline +Wireless)	Lakh	-	217.41	215.76	**(-) 1.65**
4	**Rural Telephone Connection**	**Lakh**	**-**	**389.8**	**394.81**	**5.01**

5.1.3 Financial Performance:

The details of profit / loss figure for the year, 2015-16, 2016-17, 2017-18 & 2018-19 (up to 31.12.2018) are given as under:

(Figures in Rs. crore)

Table 5.3

Financial Year	2015-16	2016-17	2017-18	**2018-19***
Total income	32,411	31,533	25,071	**12,797**
Total expenditure	37,270	36,327	33,809	**23,678**
Net profit	**(-) 4,859**	**(-) 4,793**	**(-) 7,992**	**(-) 10,881**

Note: - * Financial figures are Provisional & Un-audited as on 31.12.2018.

5.1.4 Rural Telephony:

Village Public Telephones [VPTs]: -

(a) USOF, had assigned a total of 5,93,601 villages to provide VPT facility under various agreements. Total villages having VPT facility were 5, 82,482 out of which 4,086 VPTs were provided by PBSOs. As the subsidy support from USOF, against almost VPTs has been expired, BSNL, after examining the techno-commercial viability against those which were out of ambit of USOF subsidy disconnected 4,48,020 VPTs as on 31.03.2019 from the eligible inhabited villages as per census 2001.

(b) The then Hon'ble MoS for Communications (I/C) on 18.10.2017 had stated that soldiers & officers of various army and paramilitary forces like CRPF, BSF, ITBP etc. working in remote, rural & far-flung areas were only using DSPT services as there was no other means of communications available. Earlier the deployed troops were paying rental charges @ 500/- per month and call charges @ 5/- per minute. Hon'ble MoS (C) (I/C) had announced that no rental charges would be paid by armed forces and call charge should be @ 1/- per minute instead of Rs. 5/- per minute for against utilizing DSPT. Necessary tariff order from BSNL for revision of DSPT rate as per the announcement has already been issued.

5.1.5 Telecom Factories:

Telecom Factories (TF) are in-house manufacturing units of the BSNL located at Kolkata, Gopalpur, Kharagpur, Jabalpur, Bhilai, Richhai and Mumbai. Among these TF Mumbai is 18001:2007 OHSAS certified. Presently, these factories are engaged in production of SIM Card, PLB HDPE Telecom Duct, OFC Accessories, and SS Drop wire, Jointing Kits, LJU cum Splitter, Towers & other conventional

items. During the year 2018-19, all the Telecom Factories together supplied around 58,605 Kms. of PLB HDPE Ducts mainly for the Bharat Net Project.

The Telecom Factories have achieved a turnover of Rs. 408.80 crores during the financial year 2018-19. The details are as under:-

(Figures in Rs. crore)

Table 5.4		
Factory Name	**Target for 2018- 2019**	**Achievement April 2018 to March 2019**
Kolkata	129	159.46
Jabalpur	120	141.43
Mumbai	100	107.93
Total	349	408.82

Amidst constraints posed by declining demand of almost all conventional products, the factories have tried their best to meet the requirement of various telecom goods/ instruments in the BSNL field units during the year 2018-19.

5.1.6 Training

BSNL has 29 Telecom Training Centers countrywide comprising of three APEX level Training Centre's namely:

- Advanced Level Telecom Training Centres (ALTTC), Ghaziabad.
- Bharat Rattan Bhim Rao Ambedkar Institute of Telecom Training (BRBRAITT), Jabalpur
- National Academy of Telecom Finance and Management (NATFM) Hyderabad.

BSNL staff attended various in-service courses / workshops / FTPs / Webinars conducted by various Training Centres during the period April 2018 to March 2019. A total of 24,129 staff was trained (15,290 executives and 8,839 non-executives) during this period through various training centres.

Domestic External Training: Details of staff deputed to attend/participate in training programs / workshops/events etc. areas under:

No. of programs	No. of staff deputed	Fee Paid / to be paid (Rs.)
7	123	9,53,616

Induction Training: BSNL conducted Induction Training for directly recruit / promoted candidates of various cadres i.e. Sr.TOA, TTA (now JE), JTOs, JAOs, during the period April 2018 to March 2019:-

- A total number of 1,881 candidates have undergone induction training courses in various phases at different training centres. This includes 1,272 Junior Telecom Officer 1,291, Junior Accounts Officers & 318 Telecom Technical Assistant (TTA)/Junior Engineer.
- Ongoing process of recruitment of JE, JTO, etc. as well promotions through LICE to JAO, JTO, etc. has generated huge requirement of induction training in BSNL. Accordingly timely conductiing of Induction training of staff and officers at various training centres being given priority to meet the requirements of various circles / business units.

Training Revenue: BSNL training centers provide wide range of training programs to various levels of non-BSNL trainees, viz., students/individuals, Govt. or private. Organizations, etc on payment basis thus ensuring optimum utilization of training resources. During the year 2018-19, revenue of Rs. 37.25 crore was generated by imparting training to non BSNL trainees and by sharing of training infrastructure.

5.1.7 International Training and other events

a) Foreign Deputation : A total of 81 BSNL officers were deputed abroad during the year for various events as under:

- Three officers were deputed as trainers for delivery of international training on different courses under Commonwealth Telecommunication Organization (CTO)/ Diploma in Telecommunication Management Studies (DTMS).
- Seventy eight officers were deputed for attending training/ validation/ Exhibitions/ Meetings/ Conferences/ Business visit such as leadership, Corporate Governance, Cellular Mobile Technology, Broadband Technology etc.

b) International Training Conducted at BSNL Training Centres:

Trainees from Asia Pacific Telecom (APT) member countries were imparted training in the following areas:

- Satellite Communication (ALTTC, Ghaziabad)
- Spectrum Management (RGMTTC, Chennai)
- Licensing in a environment (RTTC, Nagpur)

This apart, trainees from International Telecom Union (ITU) member countries were imparted training in the following areas:

- Mobile Broadband QoS (ALTTC, Ghaziabad)- one course
- IoT Tech & App for Smart City (ALTTC, Ghaziabad)- one course

5.1.8 Development of Telecommunication Facilities in Selected Areas

Table 5.5 Network Status of NE Region States as on 31.3.2019

S. No.	Name of State	Telephone Exchange (Wire-line)	Total Capacity (Wire-line + Wireless) in Lakh Line.	Total DELs (Wire-line+ Wireless) In Lakh.	Broadband Connection (Wire-line) In Nos.	VPTs In Nos.
1	Assam	**553**	**24.726**	**26.724**	**75,813**	**105**
2	**NE-1**	**192**	**18.164**	**10.951**	**40,374**	**575**
2 (a)	Meghalaya	49	6.310	3.483	40,374	270
2 (b)	Mizoram	57	3.327	2.724		83
2 (c)	Tripura	86	8.527	4.744		222
3	**NE-II**	**196**	**13.484**	**6.334**	**23,445**	**1,558**
3 (a)	Arunachal Pradesh	*92*	5.452	3.199	23,445	1,073
3 (b)	Manipur	*43*	3.965	1.732		418
3 (c)	Nagaland	*61*	4.067	1.402		67
4	Sikkim	**48**	**1.599**	**0.465**	**2,854**	**376**
	NE Region	**989**	**57.973**	**44.474**	**1,42,486**	**2,614**

Special Component Plans: Annual Plan of BSNL pays special emphasis on accelerated growth of telecommunication facilities under Special Component Plans in (1) North Eastern Region and (2) Tribal Sub-plan in Tribal Areas.

Table 5.6 Target and achievement during the year 2018-19 for the North East Region

S.No	Items	Target (2018-19)	Status as on 01.04.2018	Status as on 31.03.2019	Achievement up to 31.03.2019
1	Total Switching Capacity (Lakh Line)	-	57.97	57.97	**0**
1 (a)	Wire-line	-	9.9	8.99	**(-) 0.91**
1 (b)	WLL	-	4.64	0	**(-) 4.64**
1 (c)	GSM	-	43.43	48.98	**5.55**

2	Total Telephone Connection(Lakh)	-	39.37	44.47	**5.11**
2 (a)	Wire-line	-	2.56	2.22	**(-) 0.34**
2 (b)	WLL	-	2.4	0	**(-) 2.40**
2 (c)	Mobile	-	34.41	42.25	**7.85**
3	Broadband (Wireline Connection) in Lakh.	-	1.51	1.42	**(-) 0.09**
4	**VPT (Nos.)**	**-**	**11,198**	**2,614**	**(-) 8584**

Tribal Sub Plan: The Tribal Sub Plan (TSP) is a part of the Annual Plan for providing telecom facilities in the tribal areas. For a balance and faster development of telecom facilities in tribal areas, these areas are treated as special focus areas. The main objectives of the Tribal Sub Plan areas are (i) to provide the telephone facility on demand in tribal areas (ii) to provide NSD facility to all exchanges in tribal areas and (iii) to provide public telephone in all tribal villages.

Tribal areas fall in the States of Andaman & Nicobar, Andhra Pradesh, Assam, Chhattisgarh, Gujarat, Himachal Pradesh, Jharkhand, Karnataka, Kerala, Maharashtra, Madhya Pradesh, NE-I, NE-II, Orissa, Rajasthan, Tamil Nadu, Uttaranchal, U.P (East) & West Bengal**.**

Targets and achievements for the year 2018-19 under Tribal-sub-plan (TSP) are as follows:-

Table 5.7

Sl. No.	**Items**	**2018-19**	
		Target	**Achievement during 2018-19 (up to 31.3.2019)**
1.	Wireline Telephone exchanges	-	(-) 28
2.	Switching Capacity (Wireline + Wireless)	-	(-) 6,61,782
3.	DELs (Wireline + Wireless)	-	145086
4.	OFC (RKms)	-	1830
5.	Broad band (Wireline + Wireless) Connection (in nos.)	-	(-) 25,922
6.	Net addition Wi-Fi Hot Spot		667
7.	Net addition Leased Circuit		3737

5.1.9 Welfare Measures/ Facilities/Sports Undertaken By BSNL

BSNL is running various welfare programmes for its employees and their family members. An amount of Rs.10 crores has been allocated for various welfare programmes during the year 2018-19. Some of the salient welfare schemes are as under:-

- Grants of Scholarship / Book Awards to the wards of BSNL Employees.
- Farewell function organised for employees retiring on superannuation/ VRS.
- Financial assistance to the tune of Rs. 25,000/- in case of serious illness or major surgical treatments.
- Immediate financial assistance of Rs.20,000/- to the family of the BSNL employees who die in harness irrespective of basic pay.
- Financial assistance to the tune of Rs. 5,000/- per employee who are the victims of Natural Calamities / Communal riots / terrorist attacks etc.
- Organizing of Cultural Functions, Drawing Competitions and Slogan Writing competitions.
- Transport subsidy to the tune of 75 % for organising the excursion trip.
- Grant in Aid to Recreation Clubs in each Circle /SSA.
- Grant in Aid to Resident Welfare Association (RWA)

a) Grant in Aid to Telecom Women Central Organisation / Telecom Women Welfare Organisation (TWCO /TWWO) for setting up of Crèches for the child care in P&T residential colony and usage of computer facilities of Telecom Training Centre for imparting training to the children and spouses of BSNL employees.

Holiday Homes: There are 38 Holiday Homes all over the country for use by its employees and their family members.

Special Dispensation: Relaxation of 10 % marks is given in respect of students who are wards of SC, ST, OBC & Physically Handicapped employees for grant of Scholarships, Book Awards. In the case of girl students, 15 % relaxation is being given for grant of Book awards.

Bharat Sanchar Seva Padaks: Every year Bharat Sanchar Seva Padaks are given to those BSNL employees who have shown exemplary / meritorious performance. This award is given to six categories of employees (Executive-2 & Non Executive-4). Similarly the best Customer Service Centre and the best Maintained Telephone System awards are given to concerned Customer Service Centres/ SSA respectively.

Sports: BSNL is encouraging its employees to participate in various sports activities by annually organizing 15 Games and one Cultural competition. This year an allocation of Rs. 2.5 crores has been sanctioned for sports.

5.1.10 Staff Strength

Total number of working employees as on 31.03.2019 is 1,66,974. Number of Disabled employees as on 31st March 2019 is 1,045.

Table 5.8

Group	Number of employees	Employees-Scheduled		OBC	Ex-Servicemen	Women Employees
		Scheduled Caste	Scheduled Tribe			
Executive	47,116	8,290	2,757	8,917	202	7,969
Non-Executive	1,19,858	22,380	6,386	11,708	113	18,908
Total	1,66,974	30,670	9,143	20,625	315	26,877

5.1.11 Schemes for the benefit of Women and persons with Disabilities :

- Maternity leave of 180 days is given to all women employees.
- Child Care Leave as per the provisions of DOP&T OM No. 13018/2/2008-Estt.(L) dated 11.09.2008 is available to women employees.
- Special allowance is given for Child Care to Women employees with disabilities @ Rs.1,000/- per month per child maximum for two children till the child attains two years.
- Double the rates of Transport Allowance are allowed for Differently abled employees.
- Rate of transport allowance to blind or orthopedically constrainted employees, is Rs. 1,000/-.
- As far as possible, subject to administrative constraints, persons with disabilities are posted near their native places within the region.
- Grant of Child Adoption leaves of 180 days to female BSNL employees and extension of the facility of Paternity leave to adoptive fathers.

BSNL *announcing its association with Mary Kom as its brand ambassador*

Honble MoSC(I/C) Presenting Sanchar Seva Awards to meritorious employees

5.2 MAHANAGAR TELEPHONE NIGAM LIMITED

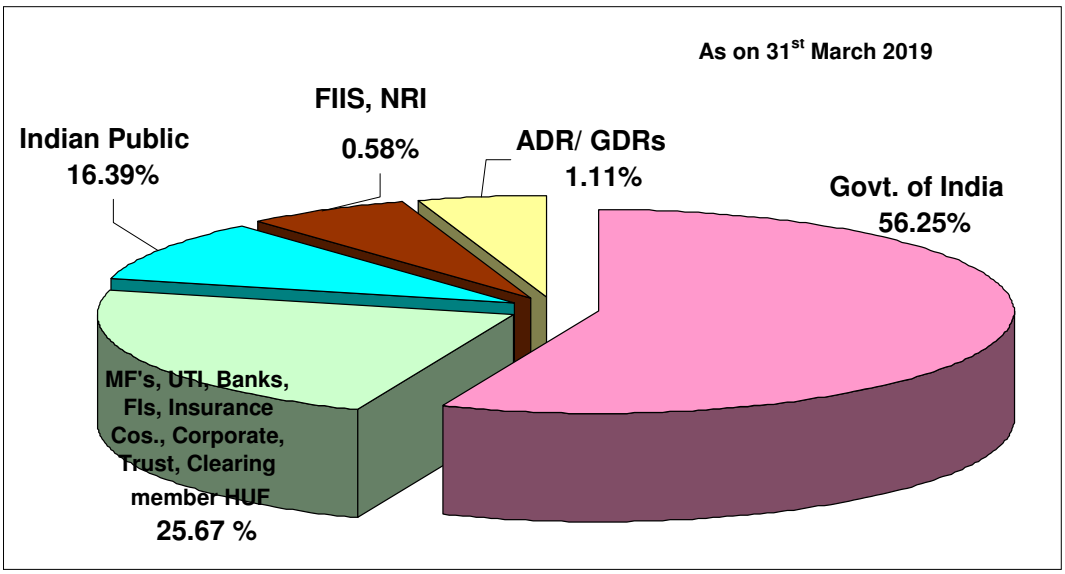
Mahanagar Telephone Nigam Limited (MTNL) was incorporated on February 28, 1986 under the Companies Act as a wholly owned Govt. Company and on 15 April, 1986, assumed responsibility for the control, management, operation of the telecommunications services in the two Metropolitan Cities of Delhi and Mumbai. The jurisdiction of the Company comprises the city of Delhi and the areas falling under the Mumbai Municipal Corporation, New Mumbai Corporation and Thane Municipal Corporation for providing fixed line and WLL based limited mobility services. However, for Cellular services the company has the license to provide services in Delhi including NCR (towns of Ghaziabad, Faridabad, Noida and Gurgaon) and in Mumbai including Navi Mumbai, Kalyan & Dombivili. MTNL is a complete telecom solution provider, providing the following wide range of services to its customers:

- Basic Telephone Service
- Cellular Mobile Service (both 2G / 3G GSM)
- FTTH
- ISDN
- Broadband
- Leased Circuits
- IN Services
- Wi-Fi hot spots
- Data Center Services

In addition, MTNL provides a host of value added services to its wire line & wireless customers. VAS is normally a third party item and is provided on franchise model on revenue share basis as & when available.

The authorized capital of the Company is ₹10,000 crores. The paid up share capital is ₹630 crores divided into Rs 63 crores share of ₹10 each. At present, 56.25% equity shares are held by President of India & his nominees and remaining 43.75% shares are held by FIIs, financial institutions, banks, mutual funds and others including individual investors.

5.2.1 Share Holding Pattern



Physical Performance

During the year 2018-19, a total of 1,12,713 connections (including Fixed line, GSM & Broadband) were added in Delhi and Mumbai. During this period no addition in the Networks installed Capacity was made due to absence of sufficient spare capacity for all type of services as well as financial constraints of the company.

During financial year 2017-18, the company has made loss of Rs. 2973.45 crore. The company launched 3G services in Delhi in December, 2008 and in Mumbai in May, 2009. The company has the market share of 54.50% in wire line and 4.0% in wireless in Delhi and Mumbai. The strength of employee in the company is about 21,679 as on 31.03.2019.

Details of achievements of MTNL Delhi & Mumbai during 2018-2019 are as follows:

5.2.2 Achievements

Table 5.9

S.No.	Items	Achievements 2018-19 (up to Mar'19)	
		Delhi	Mumbai
1	DELs (includes Landline, GSM & Broadband) Gross	35,742	76,971
2	FTTH(Gross)	6434	5615
3	Transmission: SDH System (i) ADM-1/STM-1	04	00

4	Optical fiber Cable(in Route Kms)	383	509
5	Optical fiber Cable(in Fiber Kms)	17885	17684

It is worth mentioning here that, MTNL is operating only in Delhi and Mumbai which are the most fiercely competitive markets characterized by high saturation having more than 150% tele-density. However, to overcome these limitations MTNL has modernized its network by incorporating state of art technologies and adopting customer friendly approach. Status (as on 31st Mar, 2019) of total Network Capacity & subscriber base in respect of Fixed line, GSM, & Broad band services of MTNL are summarized below-

(Figures in Numbers)

Table 5.10

Sl.No.	Services	Network Capacity	Subscriber base
1	Fixed Line	50,02,897	32,18,838
2	GSM	56,00,000	34,53,223
3	Broadband	16,34,644	8,75,881
4	FTTH (in no. of ports)*	2,368	22,775

*each port can provide 32 No. of connections

As can be seen from above, enough network capacity is available and all the services are being provided by MTNL to its' customers promptly.

5.2.3 Financial Performance

The Financial performance of MTNL is tabulated below:

(Figures in ₹ crore)

Table 5.11. Financial performance of MTNL

Items	2015-16	2016-17	2017-18	2018-19 (up to Dec'18)
Income from Services	3196.62	2869.68	2371.91	1450.96
Other Income	316.09	682.78	744.51	470.46
Total Income	3512.71	3552.46	3116.42	1921.42
Expenditure	6351.19	6497.92	6085.87	4556.11
PBT	-2838.48	-2945.46	-2973.45	-2634.69
Net profit	**-2005.74**	**-2970.57**	**-2970.65**	**-2634.69**

Capital Expenditure on Technology

During the year 2018-19 MTNL has spent an amount of ₹325.16 crore (provisional) on Capital Expenditure. This was achieved largely through mobilising other resources and market borrowing.

5.2.4 Different Services and Projects

To improve its network capabilities and provide better quality of service to customers, several initiatives / projects have been taken. The details of some of the salient initiatives and projects are in succeeding paragraphs:

(i) Mobile Network

MTNL has undertaken the task of improving the Wireless Network in Delhi and Mumbai so as to improve the coverage & downlink speed of 21.1 Mbps & uplink speed of 5.76 Mbps which is presently of 3.6 Mbps & 384 Kbps respectively with following major projects:

- **3G expansion & upgradation in Delhi:** Expansion of GSM / 3G RF network by adding 1080 nos. of 3G sites & 800 nos. of hybrid microwave to meet the backhaul capacity and data handling capacity to 10 Gbps and upgradation of 720 existing Node-B of existing 3G-network were planned. A total of 1708 macro and 55 micro node B's have been put on air in this expansion/upgradation project.
- **3G upgradation in Mumbai:** Upgradation of 720 Node-Bs of existing 3G-network and 497 nos. of existing 8Mbps Microwave Hops to Hybrid M/w of 400 Mbps capacity as planned have been upgraded.
- **Convergence of Core Network of Delhi and Mumbai:** MTNL took initiative to have common core of 3G network for Delhi and Mumbai by migrating the core elements of Mumbai Network to Delhi. This resulted into saving of Opex of Rs. 96 crore and will help in reducing Opex on annual basis in terms of AMC cost and staff Cost. The convergence will lead to significant improvement in resource utilisation and reliability of network. With this convergence Mumbai network will also be able to utilise the benefits of upgraded core network of Delhi. All the main Core elements of Mumbai and 2G & 3G BSS of Mumbai have already been migrated. Few other elements like: PCRF, FMCC, OTA & welcome server is being migrated.
- **4G Services:** The rollout of 4G services has been planned in Delhi and Mumbai. DoT has been requested for allocation of spectrum for 4G services in February 2018. MTNL has also submitted the proposal along with Detailed Project Report (DPR) for launching of 4G services in Delhi and Mumbai duly approved by the Board of Directors of MTNL in its 329th Board meeting held on 13.02.2018. Action for rollout of 4G services shall be taken after allotment of 4G spectrum by GoI.

(ii) Wire line Network

- **Upgradation of the MPLS Network on OPEX model:** MTNL is planning to upgrade the entire ageing MPLS network on OPEX model and make it ready to handle the future needs of high data requirements of customers.
- **FTTH Revenue Share Policy:** This unit had worked out, finalized and made operational the new policy to engage partners on revenue share basis to extend its FTTx services. Various partners were roped in to offer the high speed broadband services on fiber. In the year 2018-19 out of total 12,105 FTTH subscribers added by MTNL 9,520 subscribers (approx. 79%) were added by partners.
- **Redeployment of DSLAMs:** Redeployment of DSLAMs of existing Broadband Network near to the subscriber premises in Delhi and Mumbai are being done thereby reducing copper length and enhancing the quality of broadband service. A total of 242 DSLAMs have been redeployed in Delhi and 188 in Mumbai till 31st March 2019. In the year 2017-18, 22 DSLAMs in Delhi and 14 in Mumbai were redeployed. This has improved customer experience and reduced the number of complaints.
- Procurement of pizza box type VDSL DSLAM are underway which are to be deployed near customer premise to offer internet speed up to 50 Mbps over copper.
- It is further planned to upgrade existing DSLAMs to offer high speed internet by providing VDSL cards.
- **Refurbishing of Pillars and DPs**: To improve the QoS parameters, refurbishing of Pillars and DPs has been planned in phased manner. 1283 Pillars and 37844 DP in Delhi & 2862 Pillars and 14702 DPs in Mumbai have been refurbished by MTNL in 2018-19.
- **Replacement of Drop Wire:** To improve copper pair quality, 1,18,096 mtr existing Drop wires have been replaced with twisted drop wires and thermo sleeves have been put at open joints at DPs in 2018-19.
- **Upgradation of Broadband Speed:** To give boost to customer experience, Download Speed of Broadband subscribers is being upgraded to 8 Mbps progressively without any additional cost depending upon feasibility and line parameters. Total of 45,942 connections in Delhi and 53,235 in Mumbai were upgraded to higher speeds in the year 2018-19.

5.2.5 IT SERVICES

- **Constituency Management System for Hon'ble Member of Parliament:** In response to the direction of Lok Sabha House Committee, MTNL submitted a proposal for Constituency

Management System in Lok Sabha Secretariat. A Demo was also conducted to House committee. The benefits of the system includes:

- Bulk Messaging
- Successful Campaigns
- Database
- Tour and Meeting Manager
- Customized Reports
- Compliant Tracking
- Follow up System with Government Officers
- Voice, Text and Email.

- **IPv4 to IPv6 Migration:** MTNL has implemented IPv6 on dual stack for wireline network for both Retail & Enterprise customers. MTNL websites has IPv6 certification logo.

  Both 2G and 3G wireless network of MTNL Delhi is now IPv6 compliant after migration on new 3G packet core on 30.09.2017. The old 3G network is still IPv4 compliant. MTNL Mumbai wireless network will be IPv6 ready after complete migration of Mumbai packet core to new packet core at Delhi which is under final stage of completion.

- **Broadband Billing Up gradation:** Up-gradation of existing Elitecore billing system has been completed in Delhi & is in progress in Mumbai. After its implementation MTNL will be able to offer more attractive plans to BB customers

- **Bharat Wi-Fi Project:** A project for Seamless and Interoperable Internet and Broadband Services has been initiated with other TSPs / ISPs and MTNL has completed some of the integration of its own AAA server with other TSPs i.e. Vodafone, Idea, Airtel, BSNL, and JIO. The process of integration with ISPst is in progress.

- **Security Guidelines:** MTNL is in process of implementing the following activities in this direction:

  - Implementation of Potential Cyber threats & situational awareness project of Cert-In
  - Cert-In Sink hole implementation
  - Cyber Suraksha / ISEA advertisement on websites
  - Procurement of Next Generation Firewall on OPEX model is at PO stage

- **In-browser Messaging Solution:** An agreement was executed with M/s Phozeca for delivering MTNL service messages as well as 3rd Party advertisement once the subscribers access internet services in the browser. Further, now online 3rd Party advertisement module has also been a part of the agreement.

5.2.6 Utilization of Assets

MTNL has been making conscious efforts to maximize revenue by effective utilization of its spare assets. Besides other initiatives, MTNL, during the year 2018-19, has rented out 1.6 lakhs sq. ft. of spare built up spaces in its buildings at Delhi & Mumbai. On consolidation basis, 7.9 lakhs sq. ft. has been rented out so far to various government controlled entities. A revenue of Rs. 299.83 crores (up to Dec.2018-19 of F.Y.2018-19) from rental income of its various spare Infra Assets (including one-time provisional payment on outstanding rent from DoT) has been received by MTNL and for entire financial year 2018-19, the revenue is expected to be approx. Rs.350 crores.

5.2.7 Joint Ventures and Subsidiary Companies

(i) Mahanagar Telephone (Mauritius) Ltd. (MTML)

MTML is a 100% subsidiary of MTNL. The company has license for mobile services, international long distance services and internet services**.** The customer base of MTML as on 31st March 2019 has grown to 318,875 resulting in a market share of around 20%. MTML is offering 2G/3G all over the island and 4G in selected areas. 4G expansion has been completed as targeted and now more than 80% of the island is covered by high speed 4G network.

Though there is slight decrease in revenue of the company mainly due to fierce competition followed by rate reduction, the company could improve its brand image with improved quality of service. Despite reduction in gross revenue, the company maintained a profit after tax of around 4.0% of gross revenue which is almost in the same range as last year**.** 2018-19 has been 10th consecutive year for MTML to be in profit.

MTML has earned Gross revenue of approx.₹944 million during April 2018 to March 2019 period of this financial year as against ₹1003 Million in the corresponding period of last fiscal year, thereby registering a fall of around 6.06%. The fall in the revenue is attributable to change in customer usage pattern with majority of customers using data for ILD calls as well as local calls and using chat applications instead of SMS, intense competition and saturated market (mobile penetration as on date is 188%) etc.

In 2018-19, MTML not only maintained its market share but added to customer base by introducing attractive voice and data plans for existing as well as prospective customers. MTML made inroads in Enterprise Business solutions as well and could get significant number of Enterprise customers in the year.

MTML is well established in Mauritius due to its innovative tariff structure and its state of art technical offerings. The Company is always exploring new business possibilities and is looking to consolidate its position in the market on the basis of a strong 4G network. In the year 2018-19, MTML was successful in getting the order to provide telecom facilities to Agalega Island which is 1000 Kms north of Mauritius Island.

All the expenses of the company are paid from its own internal resources. The CAPEX for procurement of equipment's is totally met from its own internal resources. MTML is operating from its own building, constructed from internal resources, situated at the heart of IT hub in Mauritius. There is no debt liability on the company.

The company is managed by CEO, CTO, CFO and 10 more officers all on deputation from the parent company. Other operations are managed through outsourcing.

(ii) MILLENNIUM TELECOM LTD. (MTL)

Millennium Telecom Ltd (MTL) is a wholly owned subsidiary of MTNL, incorporated in February 2000 under the Companies Act 1956.

Services being offered by MTL include Telecom consultancy & engineering, Project Management, Wi-Fi solution, project on e-governance, Managed services, Turnkey ICT solution, GIS based services, capacity building and skill development etc.

Millennium Telecom Ltd (MTL) is also moving ahead with a very high growth rate. In 2014-15, the company turned into profit making company by System Integration and other ICT related business at pan India level. MTL earned a profit during 2018-19 MTL is in the process of winning over more orders in the upcoming years.

A large number of Govt. Institutions have awarded works on nomination basis, which have been successfully executed by MTL. Customer list include Air India, J & K Government, Central University-(Mahendragarh) Haryana, UP Building and Other Constructions Workers Welfare Board (BOCWWB), Lucknow, Thane Municipal Corporation, CIDCO, Film Division of India, Insurance Institute of India etc. MTL is also expanding its portfolio of service for providing generalized as well customized solutions to suit government and semi government institutions.

MTL has empanelled Business Development Associates (BDAs) for 10 years through Tender in the year 2016-17. MTL has reopened the window for Empanelment of Business Development Associates in MTL through open ended EOI. MTL has around 24 empanelled BDAs.

In 2018-19, MTL has worked on various projects including P2P RF connectivity (50 mbps) for Air India, FMS for campus wide wireless and wired LAN for Central University Haryana, GIS based Survey of District Meerut and Ghaziabad of UP for generating social welfare fund for labour's

CESS, LAN-WAN Project along with email hosting solution of Thane Municipal Corporation(TMC), Communication server project (state of art voice solution) of CIDCO, LAN networking of Films Division of India, enhancing EPABX Solution for Insurance Institute of India.

Further, many new projects are in the pipeline including

- Providing bandwidth connectivity on MPLS-VPN Network (more than 36 locations including DC and DR) and Internet Leased Line for UJVN Limited, Dehradun.
- Establishment of Video Conferencing system between head office and their field offices of UJVNL Ltd, Dehradun Uttarakhand.
- GIS survey of various districts in Chhattisgarh with the help of modern GIS technologies

(iii) MTNL STPI IT Services Ltd (MSITSL)

MTNL STPI IT Services Ltd. (MSITSL) is a 50:50 Joint Venture company of Mahanagar Telephone Nigam Limited (MTNL) and Software Technology Parks of India (STPI). MSITSL was incorporated on 31/03/2006 under the Companies Act, 1956, with authorized Capital of Rs. 50 Crores.

MSITSL has established the physical infrastructure of state of the art Tier III Data Center at Chennai on space taken on lease basis from STPI. The Data Center has server farm area of around 3500 sq. ft. and the total investment made for setting it up was Rs.477 lakhs. This Tier III Data Center is maintaining 99.98% uptime on 24X7.

The commercial operation of the Data Centre commenced in 2009. At present, the following customers have co-located server racks for their projects and operation in the MSITSL Data Centre.

- The Ministry of External Affairs (MEA) has hosted Passport Seva Project at MSITSL Data Center through M/s TCS.
- The Directorate General of Employment & Training (DGE&T) in Ministry of Labour& Employment has hosted National Career Project through STPI at MSITSL Data Centre.
- M/s Repco Bank Ltd has co-located server racks for banking operation.

MSITSL is in the process of expanding the Data Centre server farm area by around 1200 sq. ft. as per Tier-III standard and also MSITS is in the process of setting up the cloud services.

The revenue earned by the Company in FY 2017-18 was Rs 579 lakhs and for FY 2018-19 is Rs.573 lakhs (Provisional) Revenue in FY 2018-19 has experienced slight decline due to decreased interest income from reduced principal and lower interest rate offered by the Banks.

(iv) United Telecom Ltd.(UTL)

This is a joint venture of TCL, TCIL, NVPL (Nepal) & MTNL set up in Oct, 2001 with MTNL stake of 26.68%. The company provides Mobile/ILD/data services in Nepal. The company is making losses and has a total customer base of approx. 5,95,731 as on 31st March, 2019. MTNL, along with TCL and TCIL, is in the process of exiting the Company.

UTL obtained Unified License from Nepal Telecommunications Authority (NTA), regulatory body of telecommunication market in Nepal, on September 5, 2016. This is a Pan-Nepal license to operate any service- GSM, CDMA, ISP, NSP inside the territory of Nepal. Under implementation of the Unified License, UTL is in the process of rolling-out GSM network all over Nepal in different phases in addition to its existing network of almost 200 BTSs covering 44 out of 75 districts of Nepal. UTL is negotiating with vendors for supply and service of GSM systems, infrastructures, Billing, IN/VAS systems to start the services at the earliest.

5.2.8 Human Resource

(i) Manpower

The total employee strength of MTNL, including various employee categories, as on 31.03.2019 is 21708. Employees belonging to Scheduled Castes number 3924, which constitute 18.08% of the total employees. The total number of employees belonging to Scheduled Tribes is 616 which accounts for 2.84% of total employees.

Table 5.12 Staff position in MTNL

Group	Total working strength	SC	ST	Women	Persons with Disabilities
A	810	137	55	94	0
B	2317	347	56	420	16
C	12758	1946	205	4383	85
D	5819	1494	300	774	7
TSM	4	---	---	---	---
Total	21708	3924	616	5671	108

MTNL has endeavoured to fulfil the statutory requirements with regards to implementation of reservation policy for candidates belonging to SC/ST/OBC communities as well as physically challenged candidates.

(ii) Training

At present MTNL has two state of the art training centers- one located in New Delhi and other at Mumbai:

The Institute of Telecom, Technology & Management (ITTM) Shadipur, N Delhi

The Institute of Telecom Technology & Management(ITTM), Saidpur, New Delhi has been imparting induction training, in-service training and short term courses to its officers and employees in the field of Telecom, IT, Management and HR related Topics. With impressive growth of Telecom sector in India, the requirement of telecom trained personnel is growing day by day. Realizing this ever growing demand for telecom personnel, ITTM introduced Industrial training to engineering students in the field of ECE/CS/IT as part of their summer/winter training.

During the year **2018-19**, ITTM has trained **854** Executives and **1034** Non Executives of MTNL. Coaching classes for candidates appearing in Limited Departmental Competitive Exam for TMs was conducted and subsequently the Exam was conducted at Andhra Education Society, New Delhi centre.

Industrial Training and Industrial visits for Engineering / school students were also organized. A total of **278** BE/BTech/Diploma students have undergone Industrial training on paid basis. In addition to this, ITTM also conducted the Industrial visits for 634 students from schools / Technical Institutions. Six employees of TCIL were also imparted training in Computer and Management skill on chargeable basis.

Centre for Excellence in Telecom Technology and Management (CETTM), Mumbai

- The Centre for Excellence in Telecom Technology & Management (CETTM) is situated at Technology Street, Hiranandhani Garden, Powai, and Mumbai. The competition in the field of training is increasing tremendously with each passing day. CETTM's achievements during financial year 2018-19 are as follows.
- CETTM successfully trained 3938 in-house personnel and 3264 external personnel with an achievement of 24414 Trainee days. Total of 318 Programs were conducted.
- 35 Students were trained through various certificate courses under Corporate Social Responsibility (CSR), while 23 students took part in one/two/six months Project Training works. Total 2731 number of Engineering College Students from 30 different Colleges took part in "Industrial Visit Programme" during 2018-19.
- 07 senior officers from the Security Wing from Cabinet Secretariat have been trained in Next Generation Networks.
- Under ITEC program, sponsored by MEA, Govt. of India, CETTM successfully completed 13 programs. Total 306 delegates from 54 different countries participated this FY.
- CETTM conducted 10 weeks Induction Training Program for 02 newly recruited JTO(Electrical) in MTNL & 02 departmental JTOs as well as 16 weeks Induction Training Program for 08 departmental JAOs.

- CETTM conducted Induction training of 50 candidates for TTA promotion of 8 weeks' duration.
- CETTM has conducted various short duration Technical as well as Management related courses for MTNL employees on need basis to improve MTNL services
- "Behavioral & Attitudinal Training" for Line staff and CSC staff completed in all areas & CC operators.
- Onsite & in-house programs conducted on Landline BB, FTTH, OFC splicing, PON wiring & its trouble shooting for all areas.
- 60 Students ofSymbiosis Institute of Telecom Management (SITM) were trained under 4 days Industrial Visit Program.
- 35 Polytechnic faculties from Maharashtra State Board of Technical Education (MSBTE) were trained for 3 days training Course on Information Security.

(iii) Workshops & Events organized in 2018-19

- **SMART** (Stress Management & Right Thinking) workshop organized by Brahmakumaris on 17th Apr 2018.
- CETTM celebrated '**World Telecommunications & Information Society Day'** by conducting one-day workshop on 'Artificial Intelligent' by Dr. Sasikumar Director, CDAC Mumbai and "Legal implications of A.I." by Mr. Chirag Balyan prof. from MNLU on 17th May 2018.
- Yoga sessions & talk by Dr. Sachin Parab were conducted for MTNL employees to celebrate **'International Yoga Day'** at CETTM on 21st June 2017.
- One-day Awareness Program on Blockchain & IoT by SOFOCLE Technologies on 02nd Aug 2018 & 20th Oct 2018.
- Ceragon M/W training for Executives (AM/DM/SM) on 22nd and 25th Oct 2018.
- Two days Advanced LPWA for IoT by M/s Award Solutions on 29th Oct 2019.
- TCIL E-Tendering procedure training (6 batches) arranged for executives on request from IT unit in the month of Jan 2019.
- Workshop on Session Initiation Protocol for FTTH on 19th Feb 2019
- One-day course on "GPS based access network planning" on 22nd Feb 2019.

(iv) Business Development at CETTM in 2018-19

- Total revenue achieved for the year 2018-19 was Rs. 27 crore with an increase of 9% compared to Rs. 24.8 crore revenue in 2017-18.

- CETTM continues to be the first choice for conducting training courses, workshops, seminar etc. by our esteemed clients. Top clients include LIC, BPCL, NPCIL, Department of Sales Tax,
- KEC, IIT Mumbai, Grey Atom, Wipro, National School of Drama etc.
- CETTM has leased additional 50 hostel rooms & 4th floor of academic building (13000sq.ft) to Maharashtra National Law University this F.Y.

The efforts and the results, reiterate the commitment to growth in terms of business, quality and customer satisfaction.

5.3 ITI LIMITED (ITI)

ITI Limited was established in 1948 as the First Government Departmental factory of Independent India. Starting in the earlier era with the vision on attaining self-reliance in the field of telecommunication needs of the Country, the company was set up at Bangalore [Karnataka] and was incorporated on 25-01-1950 under the then Mysore Companies Act, 1938 and later converted as the First PSU. The Government of India holds majority equity stake in the Company. ITI has its Registered & Corporate Office located at Doorvaninagar, Bangalore-560016.

ITI, over a period of time, widened its manufacturing bases in the states of Jammu & Kashmir [one unit at Srinagar], Uttar Pradesh [Three units at Naini, Rae Bareli and Mankapur] and Kerala [at Palakkad], besides providing livelihood to thousands of employees, directly and indirectly, all over the country. All the manufacturing Plants are accredited with ISO 9001-2015 standards.

5.3.1 Revival Plan

ITI has been into continuous losses since 2002-03 mainly due to stiff competition from MNCs. The Company was referred to BIFR in 2004. The Cabinet Committee on Economic Affairs (CCEA), during February 2014 approved the Revival plan of ITI by fund infusion of ₹4156.79Cr. This package consisted of ₹2264Cr in the form of equity for financial assistance in all the plants of ITI for implementation of new projects and ₹1892.79Cr as financial assistance as grant-in-aid. Out of Rs.2264Cr, Government has released ₹664Cr till 31.3.2019. Further ₹105 Cr has been allocated in Budget of 2019-20. The funds has been utilized for upgrading the manufacturing infrastructure at various Units of ITI to cater the need of emerging technologies in Telecom industry after detailed study of the market and demand for Telecom solutions and products prevailing now and expected in the Indian telecom market in future. With the upgraded manufacturing infrastructure, ITI has successfully reverted back to its core strength of manufacturing telecom products & solutions, is now in a position to take up manufacturing of any electronic / telecommunication equipment and in fact ITI is getting benefits from these as ITI is already manufacturing different products for different customers.

Under the Revival Plan the projects implemented are Defense encryption products, HDPE pipe manufacturing, OFC manufacturing, Data Centre, PCB manufacturing upgradation, ERP implementation, Solar panels, SMPS, MLLN, Smart cards, Component screening, EMI/EMC & Safety test labs, Solar panel manufacturing, 3D Printing, Mini PC manufacturing, Smart Energy Meters manufacturing, Antenna manufacturing, CLIP manufacturing, Radio Modem manufacturing, Component screening, Hand held device manufacturing etc.

5.3.2 Highlights of Performance During 2018-19

A. Provisional performance of 2018-19 (Un-Audited)

ITI achieved a Turnover of **₹2051 crore** (Un-audited) in 2018-19, which is highest in the last 8 years, registering 20% growth as compared to turnover of ₹1703 crore in FY 2017-18. ITI posted profits of ₹102 crore (without considering any Government grants) after long gap of 16 years in FY 2017-18.

B. Order book position expected order

The order book of ITI is about ₹6411 crore as on 01.04.2019. In addition to this ITI has an advance purchase order worth ₹7099 crore for Operation and maintenance of GSM BTS for BSNL. The Company has planned a turnover of ₹3898 crore for FY 2019-20. About ₹7500 crore order is in pipeline for ASCON Ph IV project from Defense wherein ITI was L1 and order is expected shortly. ITI has successfully executed ASCON Ph I, II and III projects and the networks are maintained by ITI till date. The projects are to be executed on turnkey basis which involve civil works, telecom infrastructure establishment and supply, installation & commissioning of equipments.

C. Production of OFC & HDPE Pipes

Looking in to requirement of OFC and corresponding HDPE ducts in the country, ITI has established OFC plant at Rae Bareli with the capacity of 30000 km per annum (24F) and four lines of HDPE duct manufacturing with a total capacity of 12000 KM per annum. Three lines have been established at Rae Bareli unit and the one line at Palakkad plant.ITI has established infrastructure for manufactureof OFC(24F to 96 F) including ribbon type cable. Pilot Production ofOFC has been made. Both HDPE duct and OFC has got the required TEC/TSEC approval. ITI has manufactured and supplied 100 KM of HDPE Duct to BSNL. The requirements of OFC and HDPE ducts for BharatNet projects and for Defense projects are being sourced from ITI internally from these plants.

D. BharatNet Phase - I project

ITI is executing turnkey project for manufacture supply & Installation of GPON equipment for

Government of India's flagship project "BharatNet", which is aiming to provide high-speed broadband connectivity to cover 2.5 lacs Village Panchayats in India. In FY 2018-19, ITI has supplied 300 GPON OLT and 7100 ONT. With this ITI has successfully manufactured, supplied & commissioned 1850 GPON OLT and 47400 ONT in Bharat net phase I project.

E. BharatNet Phase - II project

- **Mahanet Project:** ITI is executing a turnkey project for provisioning broadband connectivity across Maharashtra State. The project proposals of laying of OFC (23300 KM underground, 14400 KM Arial cable) and Establishment on network comprising of IP MPLS, microwave radio Wi-Fi hotspots, network operating centre (NOC). The Total Project value is around ₹3800 Cr. In FY 2018-19 ITI has achieved turnover ₹571 Cr from this project.
- **GujaratNet Project:** ITI is executing a turnkey project for provisioning of broadband solution across Gujarat State. The project consists of laying of 14900 KM OFC 300 KM Arial cable and Establishment on network comprising of DWDM, L3 switches, Fiber monitoring system, data center network operating Centre (NOC). The Project value is around ₹1200 Cr.
- ITI manufacturing and supplying the GPON products, OFC, HDPE ducts, Solar panels needed for BharatNet project executed by ITI.

F. Solar panel manufacturing

ITI possesses requisite expertise and experience for addressing opportunities related to Solar power solutions. For catering to the demand for Solar energy in the country ITI has set up 18 MW solar capacity at Naini unit. ITI has already executed solar projects for BSNL as well as UP police. ITI manufactured and supplied 4500, 60 W solar panels for BharatNet project during 2018-19. The requirements of BharatNet Ph. II will be met by this plant.

G. Establishment of Telecom testing labs.

As a part of Mandatory Testing and Certification of Telecom Equipments (MTCTE) guidelines issued by DoT (that says every telecom equipment must undergo mandatory testing and certification prior to sale) ITI in collaboration with DOT and TEC is under process of setting up 4 testing labs like EMI/EMC, Safety, SAR and Security Labs for testing various parameters at its ITI Bangalore plant. The EMI/EMC lab and safety labs are already commissioned. Establishment of other two labs is under process.

H. Establishment of Start-up hub

With a vision to contribute to Startup India mission of Govt of India, ITI is in the process of establishing 1000 seater Startup hub in phased manner at ITI Bangalore plant for encouraging startups in the country. A 50 seater start with amenities like dedicated corporate hub meeting

room, demo room, highly secure Wi-Fi connectivity is already ready. Startup hub customers can also utilize ther manufacturing facilities like PCB, SMT and 3d printing plants to enhance their operations from this facility.

I. IOT & ICT Tech Expo.

ITI organized first edition of **IOT and ICT startup Tech Expo** during Sept 2018 in which around 60 Startups participated to showcase their product and services. ITI in its endeavor to contribute to Make in India initiative of Govt of India entered into agreements with startups and technology partners for manufacturing many next generation telecom products utilizing its state-of-the-art manufacturing facilities. ITI also signed agreements with TEC for establishing telecom testing lab for testing telecom products with collaboration with DoT. The Expo has received huge response from students, professionals and Entrepreneurs. During the Expo ITI signed MOU and teaming agreements with 8 partners for future collaboration with their product and services.

J. Expansion of Data Center

The Company is investing to address the huge growth in the service sector related to Information Technology. ITI has been operating a tier 3 Data Center in its Bangalore plant since 2009. Looking into high demand for data Center business and the expected growth in India, company is in the advance stages of building its own Data Center under the revival plan. Company is already providing IT solutions, like E-Banking, Aadhaar based authentication etc. on SaaS basis from the Data Center. ITI is aiming at expanding its data center operations by building a Tier III Plus (Uptime 99.982%), Data Center with 1000 Rack capacity at its Bangalore Plant. ITI is planning to offer end to end Data Center hosting services including Co-location, Bandwidth, Managed Services, and Secured Cloud based services and solutions. ITI Data Center is one of ITI's endeavors to provide customer-centric services to Government organizations corporates and Start Ups.

K. Production of Smart Energy meter

Smart energy meter allows two-way communications between energy distributers and consumers and has features like remote load connect / disconnect anti-tampering, demand management, gathering real time information, remote firmware upgrade etc. The product conforms to the technical specifications outlined for Advance Metering Infrastructure -AMI and is compatible with Smart Grid Communication technologies and supports distributed generation and can be used in single/three phase connections.

ITI has received contract from M/s EESL for supply 25 L GPRS smart energy meter. Palakkad unit is executing the project. Facilities and infrastructures have been set up in the unit for

bulk manufacturing, testing and supply of smart energy meter as per the requirements. ITI Palakkad has received type approval and BIS certification for Smart Energy meters complying to IS 16444 technical specifications and has started the deliveryof meters to the customers. In order to increase the supplies, manufacturing at Bangalore plant is also being augmented

L. Smart Banking Card Project – Rupay / Mastercard certification

ITI Palakkad unit has the state of the art infrastructure in line with technical specifications for Payment Card Industry (PCI). The infrastructure includes modern manufacturing equipment for Smart Card Assembly and personalization for milling & embedding, personalization etc., having monthly production capacity of approximately 12 Lakhs banking cards (Debit/Credit). The physical security is ensured by installing Security &Surveillance systems as per PCI specifications and logical data security is established through a dedicated network with all security features

ITI got accreditation for Rupay chip card personalization from NPCI and Mastercard certification from Mastercard. VISA certification is also under process

M. ITI entered into TOT for Wi-Fi AP manufacturing in ITI

Looking into the huge demand of Wi Fi hotspots in the country, ITI has entered into Technology Transfer agreement with M/s Z COM for manufacturing of Wi-Fi Access point equipment at Bangalore and Mankapur plants. With this setup ITI will be able to manufacture and supply PPP -MII complaint Wi-Fi equipments for BharatNet Project and to other Government entities. ITI is focusing on becoming Wi Fi Service provider in the country.

N. Contract manufacturing

With its state of art SMT and PCB technology, ITI is executing significant orders under contract manufacturing for C-DOT, CDAC, BEL, ISRO another private Enterprise customers. We have undertaken contract manufacture for NGN products for UT Starcom and Radio products for cambium. ITI is working towards taking up for contract manufacturing of PMA complied products for other customers.

O. Micro PC production

ITI Palakkad has started assembly and marketing of Micro PC branded “SMAASH”, which has unique features such as no-moving parts, low power consumption, sleek design, and high performance computing with built-in features Wi-Fi, Bluetooth, ultra HD 4K graphics, dual display and operating in a silent environment. The product is now registered in GeM portal as “Micro PC”.

Trade mark is registered and BIS, CE, FCC, ROHS, and Energy Star Certifications have been received The product is also customized with add on features such as Smart Power Station with dual power input as grid and solar and 3 hour backup, Smart lock for Physical Security etc.

PoC for the product was successfully demonstrated at LIC, KSEB, E Health, Supplyco, Treasury, IT Mission, Finance dept, NIFT, and other various Kerala Govt. depts. We are also making efforts to sign a MoU with Common Service Centre (CSC) so as to deploy almost 2.5 Lakhs of Smaash PCs in various CSCs across India. The target market is Central / State Govt departments, Universities, Hospitals, Research organizations, Public / Private corporations, Banks, educational institutions etc.

P. Assembly & Testing of various flight packages for VSSC

ITI Palakkad plant has an exclusive Space Electronic Fabrication Centre to manufacture Space and Military grade assemblies. The facility is accredited by VSSC, for all the activities connected with realization of electronic assemblies in launch vehicles (PSLV, GSLV and GSLV Mark III). Stage wise accreditation is for SMD as well as manual soldering, Reflow soldering, Conformal Coating, Card level testing, QC, Integration and Integration testing. Officials engaged in these activities are trained and certified by VSSC solder school. All the required components are being provided by VSSC, as free issue materials (FIMs). As on today, 46 Types of assemblies are already approved for production at ITI Palakkad, against which purchase orders are received and supplies in progress. This includes 3 types of RF assemblies also, for which ITI Palakkad is the first industry partner to VSSC accredited for Assembly & Testing of RF packages of launch vehicles. Developmental works for more assemblies are in progress. More than 1000 assemblies done by ITI Palakkad is used in various launch vehicles.

Q. Component Screening Lab

An exclusive facility with fully air conditioned ESD protected area of 7000 sq. feet with the state of art equipments was established at ITI Palakkad during 2017, for Screening and Burn-in of electronic components used in launch vehicles. The facility is further expanded in 2018 with the inclusion of Screening of assemblies and sub-assemblies known as Test & Evaluation (T&E). Moreover, customized test jigs for functional tests, Burn-in boards and driver circuit, Vibration fixtures, Cable harnesses, Configuration of test equipments etc. are being designed & developed in house at ITI Palakkad,

As on now, this facility is accredited by VSSC, Trivandrum for screening of 20 types of Active and Passive electronic components, 35 types of sub- assemblies and 2 types of stacks. Test setups are being developed for more types of components and assemblies.

R. R&D activities for development of new products

The ITI Bangalore plant has developed high speed IP / Ethernet encryptors to work at 1Gb and 10 Gb. The 10 GB encryptors are supplied to UIDAI. Power aggregators and CCU for Rural Broadband connectivity have been developed and prototype testing in progress. The R&D developed products especially encryption products have generated order worth Rs.90 crore for execution in 2019-20.

S. Encryption Products for Defence

The encryption products for Defense communication networks are being supplied by ITI for long time. ITI has been the leader in this field. The products are evolved in tune with the evolution in the digital communication technology. There are major requirements of encryption products for Defense for their NFS network, ASCON network etc. ITI is executing MCEU (Multi channel Encryption unit) for NFS and is expecting good business in this year in encryption portfolio from ASCON phase IV and other defence projects.

T. NFS OFC cable laying

ITI is executing contract for 13500 KMs OFC cable laying work under NFS (Network For Spectrum) project for the defense forces of India which involves Procurement, Supply, Trenching, Laying, Installation, Testing and Maintenance of Optical Fiber Cable, PLB Duct and accessories for construction of exclusive Optical NLD backbone and Optical access routes on turnkey basis with AMC in the Eastern and North- Eastern region of the country. ITI has successfully completed 84% of the work and will be completing the entire project by this year.

U. AMC services Managed Leased Line Network (MLLN)

ITI has been the leader in supplying MLLN equipment for BSNL and MTNL since 2002-03. The existing MLLN networks of these Telecom Service Providers have been set up and maintained by ITI till date. ITI is offering Repair and maintenances services for the network and in FY 2018-19 AMC works of ₹45 crore has been executed by ITI technology.

V. AMC for ASCON

ITI through its Network System Units department provides Annual Maintenance Contract services to all phases (Ph-I,II,&III) of Army Static Switched Network (ASCON) of Defense forces. ASCON Network is secured using Bulk Encryption.

It uses state-of-the art ATM (Asynchronous Transfer Mode) and ISDN (Integrated Services Digital Network) switches, Satellite media, PAMA (Permanently Assigned Multiple Access)

and DAMA (Demand Assigned Multiple Access), Microwave Radio, PDH,SDH and Optical Fiber communication (OFC) Network PAN India. ITI maintain OFC route of Army defense network for a total length of 5000Km.

W. Major order bagged last Year

Major orders bagged by ITI during 2018-19

- MAHANET : ₹2904.38 cr.
- GUJNET : ₹1417.71 cr.
- RAJNET : ₹334.65 cr.

X. Performance of MSP (Marketing, Service & Projects)

Company's marketing setup has been re organized This year MSP have achieved very good performance with a turnover of ₹434.33 crore. as compared to a turnover of ₹207.75 crore in 2017-18. The MSPs are doing Telecom, IT, IOT and allied business for various State and central Government departments.

Y. Performance of Srinagar plant

The Srinagar plant has started showing its performance with a turnover of ₹3.18 crore this year. It has signed an agreement with Jammu Municipal Corporation for implementation of 'Jammu Surakhsa Yojna' project in the city. Unit is trying to get order on nomination basis from Information and Technology department of J&K government for SWAN project. This project is of value of 50 Cr and its phase-1 value is of 8Cr. The plant is trying to get more projects on digitization of records from social & welfare department and Jammu Municipal Corporation. The Unit has already completed similar project of digitization of records of Jammu and Kashmir worth value of around ₹15 lakh. The Srinagar plant is also going to start skill development center for implementing training programs in Telecom and IT related fields for skill development of local youths of J&K.

Z. ITI employees retirement age enhanced:

The proposal for enhancing the age of superannuation from 58 years to 60 years has been granted by the Government of India and has been implemented by the company w.e.f. July 2018. This will help in better implementation of crucial projects with the availability of experienced people for two more years.

5.3.3 Performance Indicators

Table 5.13 Details Of Achievements For The Last Three Years (Rs crore)				
Sl. No	**Product/Project**	**Performance 2016-17**	**Performance 2017-18**	**Provisional Performance 2018-19 (Un-Audited)**
1	NFS cable laying	700.16	267.11	269.92
2	MSP	190.00	200.11	434.33
3	Defense/ASCON	181.35	127.00	121.51
4	MLLN, MLLN AMC/SSTP	154.85	185.66	72.48
5	GSM-WZ Project/AMC	81.11	34.46	27.61
6	GSM-SZ / AMC	76.25	153.32	46.08
7	NPR/SECC Projects	70.59	122.03	0.00
8	NGN /C5 /Ph2	35.86	3.55	3.54
9	OCB AMC Business	32.86	28.05	20.23
10	G-PON	22.51	391.96	51.61
11	Misc. Services	19.77	7.80	4.22
12	Data Centre	19.13	17.88	17.64
13	Banking / Div. Prod./cont. Mfg.	11.23	7.25	16.64
14	SMPS & Repair	5.73	5.81	11.55
15	SATCOM & PCM MUX,CDOT AN RAX	5.24	15.21	8.01
16	GSM-MTNL	2.44	0.00	0.00
17	NPR Smart Card	1.61	0.00	0.00
18	WLL-CDMA Infra	0.00	0.00	0.00
19	HDPE	0.00	0.48	0.00
20	Solar Panel Mfg.	0.00	0.72	0.00
21	New Project	0.00	134.71	946.22
22	SIM/USIM/Smart cards	0.00	0.00	0.00
	TOTAL	**1610.69**	**1703.11**	**2051.59**

Note: The performance includes Taxes

Financial Performance, revenue and taxes

The Authorised Share Capital of the Company as on December31, 2018 was ₹3500 crore. The paid-up Share Capital as on that date was ₹897 crore. (₹89.7 crore equity shares of ₹10/- each). The percentage share of Central Government in equity as on December 31, 2018 is 89.97%.

Table 5.14 Performance During the Year (₹ in crore)

Particulars	2018-19 (Till December 2018)	FY 2017-18	FY 2016-17
1. Total Revenue & Other income	1358	1812*	2088*
2. Expenditure	1334	1581	1822
3. Net Profit/Loss	**24**	**231**	**266**

*Note: * Turnover & other income include Excise Duty, With Govt. grant of ₹360.71 crore (2016-17) and ₹132.98 crore (2017-18) respectively.*

Table 5.15

Particular	2018-19 (Till December 2018)	2017-18	2016-17
Total Revenue	135808	181162	208872
Add: ST & GST	15865	27283	6376
Total Income (A)	151673	208445	215248
Total Expenditure	133427	158105	182233
Add: ST & GST	15865	27283	6376
Total (B)	149292	185388	188609
Profit C = (A-B)	2381	23056	26639

Note: Due to the implementation of IND AS during finalization of 2017-18 accounts some financial figures got restated.

Table 5.16

SL. No	Particulars	2018-19 (Till December 2018)	2017-18	2016-17
1	Excise duty,Service tax & GST	15865	28185	8377

Breakup of Equity share holding pattern as on 31.12.2018

Table 5.17				
SL. No	**Name of shareholder**	**Number of shares (Face value of ₹10 each)**	**Amount in ₹**	**% of Total number of shares after proposed allotment**
1	President of India	806987500	8069875000	89.97
2	Government of Karnataka	312500	3125000	0.03
3. a	Special National Investment Fund	69480690	694806900	7.75
3. b	General Public	20219310	202193100	2.25
	Total	897000000	8970000000	100

5.3.4 Key Activities and Events

- ITI Limited celebrated 153rd World Telecommunication and Information Society Day on the theme 'Enabling the positive use of Artificial Intelligence for All' on May 17, 2018 at R&D Conference Hall, Bangalore Plant.
- Shri Manoj Sinha, the then Minister of State for Communications (Independent Charge) & Minister for Railways, laid the foundation stone of 'Telecom Testing Center' at ITI Bangalore Plant in the presence of Smt Aruna Sundararajan, Secretary (Telecom) and Shri K Alagesan, CMD, on September 2, 2018

- ITI Limited has announced the expansion of its data center facility by adding 1000 additional racks in the existing setup in Bangalore Plant on May 29, 2018 and setting up of a new Data Centre of 200 racks capacity in Naini Plant. This announcement comes further to the guidelines issued by the Government on setting up of IT infrastructure by government departments using cloud computing technology. The new

infrastructure will enable PSU Banks, Central & State Government undertakings, MNCs, Corporates and large enterprises to have their data located within the country. Shri S. Gopu, CMD inaugurated the Data Center facility expansion May 29, 2018 at Bangalore Plant, ITI Limited, Bengaluru.

- To enable start-ups and technology owners to discuss, discover and collaborate to convert their innovative ideas into marketable products & services in field of ICT & IOT, ITI hosted the first edition of 'ICT & IOT Startup Tech Expo 2018' on 1st and 2nd September 2018 at ITI Bangalore plant. Shri Prabhash Singh, Member (Technical) and Shri Ravi Kant, Member (Services), Department of Telecommunications inaugurated the ICT & IOT Start Up Tech Expo 2018 in the presence of Shri K Alagesan, CMD, and Shri R M Agarwal, Director (Marketing & HR). Shri Manoj Sinha, then Hon'ble Minister of State for Communications and Smt Aruna Sundararajan, Secretary (Telecom) also addressed the Expo.

Other Activities

ITI Limited participated in the Technology Mega Event 'India Mobile Congress 2018' organized by the Department of Telecommunications, Government of India and Cellular Operators Association of India (COAI) at Aerocity, New Delhi from October 25 to 27, 2018. ITI Limited showcased its products and services at the event.

ITI Limited participated in the 4th India Taiwan Electronics Meet (ITEM) hosted by Electronic Industries Association of India (ELCINA) from October 8 to 12, 2018 at Taipei, Taiwan. The 44th Taipei International Electronics Show (Taitronics 2018) was also organized by Taiwan External Trade Development Council (TAITRA) at Nangang Exhibition Hall, Taipei World Trade Center, Taipei from October 9 to 12, 2018. Shri R M Agarwal, Director (Marketing), ITI Ltd and Shri Arun Kumar, EDR (R&D), ITI Ltd participated in ITEM 2018 and made presentation on company's products and services at the meet.

Smt Aruna Sundararajan, Secretary (Telecom) & Chairman, Digital Communications Commission (DCC), visited ITI Limited, Bangalore Plant on January 22, 2019. During her visit she inspected the products showcased by various startups in the presence of Shri K Alagesan, CMD, ITI Limited, Shri R M Agarwal, Director (Marketing), Shri YGSC Kishore Babu, DDG (Policy), DCC and Shri Y Muralidhar, GM-BG & R&D, Unit Head, Bangalore Plant.

ITI Limited has won Digital PSU Award for the year 2018. Shri K Alagesan, CMD, ITI Limited received the award from Chancellor Dr. Priya Ranjan Trivedi, President Confederation of Indian Universities at India Concord Summit, Connecting People to PSUs, Empowering Leadership Vision 2022 presented by ANTHRONIK (Human Technical) Approach to Learning & Development on October 26, 2018 at New Delhi.

ITI Limited has been awarded Best PSU Award in Digital PSU Category by 'Governance Now' at 6th PSU Awards held on January 17, 2019 at The Imperial, New Delhi. Dr Joyti Kaul, GM, Marketing, North Zone, ITI Limited received the award from Shri Manoj Tiwari, Member of Parliament (Lok Sabha), Smt Poonam Dhillon, veteran actress and Shri M. Adhikari, Chairman Sab TV group.

ITI Limited has won 'India's Best Company' Award for the year 2018 by Berkshire Media Private Limited, America's leading multinational brand consulting and market research firm. Shri K Alagesan, CMD, ITI Limited received a trophy and certificate from Shri N Sridhar, IAS, GoI and Shri Hemant Kaushik, CEO, Berkshire Media Private Limited. The IBC Corporate Awards 2019 ceremony was held on March 8, 2019 at The Leela Hotel, Mumbai.

5.3.5 Human Resource

Table 5.18 Manpower strength as on 31st March 2019:

Group	Total Working Strength	SC	ST	Women	Person With Disabilities (PWD)
Officers	2555	401	48	353	30
Non-Officers	965	195	7	140	13
Total	3520	596	55	493	43

The Company employed about 3521 employees (Executives – 2555 & Non-Executives – 965) as on 31st March 2019. About 20.59% of the employees have professional qualification in the field of Engineering, Finance, Human Resource and Medical, around 9.96% are graduates and post graduates, 18.09% are Diploma Holders, 33.37% are Trade Certificate holders and 17.97% others. Around 76 .31 % fall in the age group of 51 and above.

5.3.6 Schemes For SC/ST Employees and Persons with Disabilities

The Facilities provided to SC/ST Employees:

A. Exemption from payment of application / examination fee in recruitment

B. Relaxation in age by 5 years in recruitment

C. Concessions in qualifying marks in recruitment

D. Reservation in recruitment and promotion as per Presidential Directives.

E. Out of Turn allotment of quarters

F. Scholarship to the children of SC/ST employees

Training: ITI endeavours to train its employees in areas of emerging areas of knowledge and skill, to offset technological obsolescence and gain competitive edge in their services.

Accordingly, training programmes and workshops were organized in New Technologies (3D printing technology, Smart grid / smart energy meter, G-PON, PLB HDPE pipes, OFC networks, Smart City, IoT and 5G technologies) besides ISO, leadership development, ERP, etc. Also, customised programmes at premier institutions like IIM's, IIT's and also People Capability Maturity Model(PCMM), Project Management Maturity Model (PMMM) were conducted. Further, Executives and Managers have been trained in special DPE-sponsored programmes. Training programmes were also organized in-house on Technical, Quality, IT, Soft Skills, Stress Management, Safety, awareness programmes on Health, Environment, Energy Management, time management, vigilance awareness etc. were conducted.

Employee Training: In-house and External Nominations:

Table 5.19

No. of Training Programmes	No. Trained			No. of Training Man-days Achieved			Total Expenditure (Rs.)
	Exe.	Non-Exe.	Total	Exe.	Non-Exe.	Total	
101	1336	373	1709	2823	463	3286	64,66,076.00

Skill Development : As a part of 'Skill India' Flagship programme, ITI started imparting Skill Development and Capacity Building training at various plants of ITI. During 2018-19 FY, 2586 students have been trained in telecom skill development training, out of which 110 trained in TSSC/ESSCI Job Roles and 2274 have been trained in ITI modules. The following are some of the Job Roles ITI has imparted skill development training viz. Optical Fibre Technician; Optical Fibre Splicer; Solar Module Assembly Technician; PCB Fabricator; Circuit Image Operator (PCB Manufacturing); Field Technician-Computing & Peripherals; Pick-and-Place Assembly Operator; Through-Hole-Assembly Operator and BSS Support Engineer. Further exploring/ planning for imparting skill development to the youth viz.; SMT Technician and other ESDM Job Roles. Some of the plants of ITI are contemplating to the adopt some of the local Industrial Training Institutes (ITI)

In addition to the above, ITI is also engaging and imparting training to Graduate Engineer, Diploma (Technicians) and Trade Apprentices in various trades under the Apprentices' Act/National Apprentices Promotion Scheme(NAPS). Also as a part of CSR and capacity building, the Company is imparting training to the students of Engineering/ Management to carry out their Internship and Project.

Budget Allocated and Expenditure Incurred: There is no specific budget allocation for expenditure on schemes for SC/ ST employees and Persons with Disabilities. However, as and when expenditure is required to be incurred, specific approval of Competent Authority is obtained.

Industrial Relations: The Industrial Relations scenario in the Company was cordial during the year. Employees' Union and Officers' Association extended their co-operation and support in ensuring smooth workflow to meet the Company's objective.

Official Language: All Units / Offices have established "Check-points" in their departments to make effective implementation of the Official Language Policy. Monitoring is being done by the respective Official Language Implementation Committee constituted in every Unit / Office. The Progress of Implementation of Official Language is being periodically reviewed by the OLIC Committee of Corporate office. In order to enhance the working knowledge of Official Language of our employees, they are sent to various Training Programs organized by the government for imparting training in Hindi awareness, Hindi typing and Hindi Stenography as per requirement. However, the Official Language Cell of the different Units / Offices has also conducted internal training programs. Besides, employees were encouraged to take part in Hindi Prabodh, Praveen & Pragya examination for which financial incentives are given.

"Hindi Fortnight" was celebrated and various Hindi Workshops were organized for encouraging progressive use of Hindi during 2018-19. Bilingual (i.e. English and Hindi) website of company is being regularly updated.

Right to Information: Since introduction of the Right to Information Act, 2005, a mechanism has been drawn to process all requests received by Corporate Office/Units under the Act. The Units and Regional Offices have designated PIOs / APIOs with CPIO, Appellate Authority and Transparency Officer at the Corporate Office.

5.4 TELECOMMUNICATIONS CONSULTANTS INDIA LTD (TCIL)

Telecommunications Consultants India Ltd. (TCIL) is a certified Mini Ratna Category-l, 100% owned Govt. of India Undertaking providing consultancy, implementation services and turnkey project execution services in the field of Telecommunications, IT, Power, and Architecture.

Incepted in 1978, TCIL has introduced new technologies in Telecom software, switching and transmission systems, cellular services, rural telecommunications, optical fiber-based backbone transmission systems, etc.

TCIL has ongoing projects in more than 69 countries across the globe. Most of the projects are large turnkey projects for country governments, ministries, public sector undertakings and private organizations. TCIL today has a global presence with large projects in India, South Asia, Far East, Middle East, Africa, Europe and USA. TCIL has also set up its 100% subsidiary in USA after clearance by the Union Cabinet.

TCIL's core business relate to creating connections through communication with a vision to excel in providing solutions in Information and Communication Technology, Power and Infrastructure Sectors, globally by anticipating opportunities in technology.

Additionally, TCIL offers services from concept to commissioning in setting up Smart cities, Homeland security projects and Integrated Private Security. TCIL is in the process of setting up one of the most comprehensive training programs on cyber security in India. Partnering with some of the best known US universities, TCIL aims to educate and train nearly 1 million cyber security professionals in India over the next three years.

TCIL has been working on ICT in education projects for more than a decade, providing turnkey solutions for Computer Aided Classrooms, Smart Virtual and Digital Classrooms, Cloud and Video Conferencing solutions, impacting more than 2.5 million young students. Under the PAN Africa Network Project, TCIL provided Tele Education and Tele Medicine services to 48 African nations connecting African universities and hospitals with Indian universities and super specialty hospitals. The same is being done in the SAARC countries as well.

Another noteworthy initiative is the TETRA project - Terrestrial Trunked Radio over traditional PMR (Professional Mobile Radio). **TCIL has has worked on the world's largest TETRA project during the** Common Wealth Games 2010 on "Secured Communication Network Terrestrial Trunked Radio.

This was implemented in a record time of nine months. More projects have been undertaken since then with several state governments.

TCIL has been a pioneer in setting up Next Generation Wireless Services like 5G, VOIP, VOLTE and Mobile applications in rural markets and in remote areas with geographically difficult terrain such as Arunachal Pradesh, J&K and others. A profit making PSU (Public Sector Undertaking), TCIL is constantly trying to improve the lives of people in India and in its various operations across the globe.

5.4.1 Industrial/ Business Operations: Under its recent lateral diversification and expansion strategy, TCIL has expanded its service portfolio to provide full scale project consultancy, execution and implementation in the following areas:

- Wired Line Projects - Optical Fiber Network; FTTH, OPGW, Submarine cable.
- Wireless Projects - Tetra, GSM, GSM-R, 3G, 4G, In-Building solutions, QoS Audits, SatCom/ VSAT Networks
- Railway Signaling Projects
- Tele-education and Tele-Medicine Networks- e-VidyaBharati and e-AarogyaBharati
- e-Governance Projects for Government-to-Citizen (G2C), Government-to-Business (G2B), Government-to-Government (G2G)
- ICT for School Projects
- e-Procurement Services through the TCIL's own portal
- Security and Surveillance, Data Centre, Broadband Networks Disaster Management, IPV6, Statewide Area Network (SWAN), Managed Services e-Procurement and Video Conferencing.
- Cyber Parks, Buildings - Intelligent Buildings and Green Building System and Roads
- Solar Power, e-Waste Management and Power Line Projects,
- Internet of Things (IoT), Services on Fibre, Artificial Intelligence (AI)
- Skill Development, Data Security and Cyber Security
- Smart Cities and Experience Centers across India
- Offering value added service through empanelment of Startups, MSEs and Business Associates

5.4.2 Performance Highlights: TCIL achieved total revenue of ₹1260.79 crore during FY 2017-18. The profit after tax was ₹46.08 crore. The company has achieved Provisional turnover of ₹1585.00 crore up to March 2019 for FY 2018-19. Order book for 2018-19 is ₹2714.00 crore and the provisional turnover for period April 19 to June 2019 as ₹350.00 crore.

Order Book : International

- Work awarded in KSA by Ericsson, Nokia Siemens Network and Al Tajheez (Johnson Control) on consultancy basis for the supply of technical manpower for ₹7.18 crore.
- Work awarded in Mauritius by Mauritius Telecom for Access Networks Multi Order Maintenance Contract for ₹1.63 crore.
- Work awarded in KSA for the supply of technical manpower for ₹8.26 crore.
- Work awarded in Mauritius Access network infrastructure maintenance works for ₹1.64 crore.
- Work awarded in KSA by Ericsson, Johnson control & CBRE advisory services for the supply of technical manpower for ₹12.4 crore.
- Work awarded in KSA by Shiba-Al-Jazira for the jobs of shifting & reinstallation of fiber and copper cables for ₹5.06 crore.
- Word awarded in Kuwait by Middle East Telecommunications Company (METCO) for OF and civil works for ₹9.47 crore.
- Implementation of National Broad Band phase II project on turnkey basis for ₹36.30 crore.
- Ericsson for the supply of technical manpower for ₹7.36 Core.
- Work awarded by Mauritius telecom for supply of Anchoring clamps for ₹2.31 crore.
- Work awarded by IMCO engineering and const. co. and misc. clients for civil and OF work for ₹4.85 crore.
- Work awarded by Ericsson, CBRE, Shbakkat & Nokia Al Saudia for supply of technical manpower for ₹7.08 crore.
- Work awarded by Ericson CBRE & Nokia Al Saudia Ltd. for supply of technical manpower project for ₹5.59 crore.
- Work awarded in KSA by Ericsson, Nokia Al Saudia Ltd. and Shabakkat for the supply of Technical Manpower Project on consultancy basis for ₹24.13 crore.
- Work awarded in Kuwait by Kuwait University, Joint Operations Cheveron and Misc Clients for FOC works, Maintenance of Communications Network and OF Cable works for ₹6.74 crore.
- Work awarded by Saudi Telecom Company for the implementation of National Broadband Project Phase-II on turnkey basis in KSA for ₹16.20 crore.
- Work awarded by Mauritius Telecom for Deployment of Fibre to the Enterprise, Mobile Sites and Interexchange Links and Supply of UG Duct Fibre Cable for ₹9.47 crore.
- Work awarded in KSA by Bayanat Etihad Etisalat Company Mobily for managed services and associated service delivery for ₹18.27 crore.

- Work awarded in Kuwait by Kuwait National Petroleum Company for the Communication Network Maintenance for ₹91.58 crore.
- Work awarded in KSA by Integrated Dawiyat Telecom for building passive network under NBB project and last mile project on turnkey basis for ₹83.25 crore.
- Operation and maintenance of SNFN for eastern and central region for ₹19.00 crore.
- FTTH Construction in Al Ansab (Bousher Zone 7) Muscat for ₹4.73 crore.

Order Book: National

- Work awarded by Universal Service Obligation Fund (USOF) for the EIA Study and CRZ clearance for ANI submarine cable Project on consultancy basis for ₹3.58 crore.
- Work Awarded by CIPET Chennai for the implementation of Online Admission Process for the academic year 2018-19 for ₹3.0 crore.
- Work awarded by Bharat Sanchar Nigam Limited for Supply, Installation and Commissioning, Operation and Maintenance of 12050 public Wi-Fi hotspots at BSNL rural telephone Exchanges, Phase –I for ₹85.00 crore.
- Work Awarded by Navodaya Vidyalaya Samiti for the Carrying out special repairworks at JNVs, Faridabad, Sirsa, Chittorgarh, jaisalmer, Jalore, Jhalawar, Jodhpur, Pali, Rajsamand, Sriganganagar-I, Alwar, Udaipur, Churu, Panipat, Baran, Bhiwani, Hisar and Sonepat for ₹54.00 crore.
- Work awarded by Bharat Sanchar Nigam Limited for Supply, Installation and Commissioning, Operation and Maintenance of 12050 public Wi-Fi hotspots at BSNL rural telephone Exchanges, Phase –II for ₹12.98 crore.
- Work Awarded by Chhattisgarh Tourism Board for illumination of central & state owned monuments for ₹40.00 crore.
- Work awarded by Bharat Sanchar Nigam Limited for Supply, Installation and Commissioning, Operation and Maintenance of 12050 public Wi-Fi hotspots at BSNL rural telephone Exchanges, Phase –III for ₹98.80 crore.
- Work awarded by BSNL for selection of PIA for BharatNet Phase II project in MP for ₹783.74 crore.
- Work awarded by BOCW welfare board UK for assessment and facilitation of collection of revenue for BOCW Welfare board, UK for ₹14.17 crore.
- Work awarded by Ministry of Defence New Delhi for Installation of Security and Surveillance System in seven Blocks Building housing offices of Ministry of Defence for ₹76.91 crore.

- Work awarded by AAI for const. of Terminal building, Air Traffic control building & Allied work at Tezu Airport (Balance work) for ₹53.95 crore.
- Work awarded by AAI for const. of New ATC Tower cum Fire station (Balance work) at Barapani Airport, Shillong for ₹8.66 crore.
- Work awarded by Gujarat Fibre Grid N/W ltd. for Third Party Audit Agency (TPA) of package A&B for implementation of BharatNet Phase-II project in Gujarat for ₹40.00 crore.
- Work Awarded by Andhra Pradesh State Fiber net Limited (APSFL), Govt. of Andhra Pradesh, Vijayawada, A.P. for "Appointment Of Project Implementation Agency (PIA) for BHARATNET PHASE-II works for ₹402.54 crore.
- Work awarded by Chhattisgarh Tourism Board for the development of Maa Bamleshwari Temple, Dongargarh according to the guidelines given by the Government of India and development of Kitchen at Sarodha Dadar for ₹36.37 crore.
- Work awarded by Maharashtra Information Technology Corporation Limited for the selection of Third Party Agency (TPA) for implementation of MahaNet-I (BharatNet-II) in Maharashtra for ₹29.67 crore.
- Work Awarded by HQ Eastern Command, Indian Army for Procurement and Installation of CCTV Solutions for various military stations under eastern command cluster 2 for ₹7.39 crore.
- Work awarded by for AP Tribal Welfare Residential Educational Institution Society (APTWREIS), Department of Tribal Welfare, Government of Andhra Pradesh, Vijaywada for Supply and Implementation of Digital Classroom, Virtual Classroom, Math Lab, Science Lab and Language Lab for ₹14.98 crore.
- Work awarded by Department of Higher Education, Odisha for Supply of 135 Virtual Classrooms for ₹7.94 crore.
- Setting-up of Smart Classrooms in Madras and Schools in Minority Areas of Uttar Pradesh for ₹18.00 crore.
- ICT School project on BOOT model in 500 govt. school in UK, awarded by Govt. of Uttarakhand for ₹125.00 crore.
- Construction of Trauma centre at Kokrajhar awarded by BTC for ₹9.70 crore.

5.4.3 Human Resource Management

The enterprise had 818 regular employees as on 31.03.2019. The retirement age in the company is 60 years. Category wise employment status for last 3 years is given in the table.

Table 5.20 TCIL - category wise employment status (Number)			
Particulars Nos	**2018-19**	**2017-18**	**2016-17**
Executives	399	402	400
Non Executives	419	437	454
Total Employees	818	839	854

Sanctioned and working strength

As on 31 March 2019, TCIL has got sanctioned and working strength of personnel comprising of 399 Executives and 419 Non-Executives.

Schemes for Benefit of SC/ST category

- Reservation guidelines are followed for SC/STs for all cadres/posts in direct recruitment which includes relaxation in age and % of marks in educational qualifications. Keeping in view the reservation guidelines, the vacancies are also reserved for SC/ST Candidates in Direct Recruitment.
- TA/DA is also paid to the candidates called for interview.
- For monitoring and implementation of reservation policy, a Liaison Officer has been appointed. Employees can forward their representation/grievances to Liaison Officer as well as to HR Division.
- An SC/ST Representative is included in Interview Selection Board and DPC for recruitment and promotions so that no discrimination on the basis of caste can be done and interests of reserved candidates is protected and they are given due preference where possible.
- The interviews for reserved candidates are conducted separately, if required.
- TCIL has executed various programmes for the Welfare and Socio-Economic Development under CSR Schemes.

Employee welfare measures:

- A number of health management trainings, like Stress Management, Yoga, Meditation, etc. are organized for all employees.
- Young engineers and managers are motivated by sponsoring them for certification programmes like EDPM, PMP, CCNA etc.
- Employees are also sponsored by the company to participate in workshops, seminars, conferences etc. Many in-house training programmes are organized on project management from third party for our middle level and higher management executives.

- Managers are provided with practical guidelines for motivating, retaining, and coaching individual employees. From time to time, TCIL organizes many stress busters and yoga classes to rejuvenate and motivate our employees.
- Various occasions like Hindi pakhwada, Swachhta Pakhwada, and Sadbhavna Diwas are celebrated in TCIL.

5.4.4 Strategic Issues:

In the year of 2018-19 TCIL has taken the following strategic decisions global as well as national expansion:

- 100% subsidiary has been incorporated with the name of TCIL USA Inc. in Seattle USA.
- TCIL has opened an office in Macedonia for ease in operations and expansion.
- TCIL has set up a North East desk in response to the Prime Minister's focus to bring North East Region of India at par with the rest of the country.
- Bi-lateral relationships with Egypt has been strengthened by focusing of global standards, 5G deployment and licenses w.r.t. specific challenges faced by India and Egypt.
- TCIL has taken a decision to work with the CLMV countries. In Myanmar, TCIL completed a project installing 1.5 Gigabit Microwave Radio System on Rihkhawadar – Mindat route for Myanmar Posts and Telecommunication (MPT) for a total value of USD 6.04 Million.
- In Cambodia and Myanmar, TCIL is working on the Digital Village Project announced by the Prime Minister of India with a fund of USD 10 million to be granted to each country.
- TCIL will begin operations in Laos and Vietnam in the near term.

Signing of agreement between TCIL and MEA on e-VBAB (e-VidyaBharati and e-AarogyaBharati) Network Project on 10th September'2018

5.5 BHARAT BROADBAND NETWORK LIMITED (BBNL)

Bharat Broadband Network Limited (BBNL) was set up as a Special Purpose Vehicle (SPV). BBNL was incorporated on 25th February 2012 under Companies Act 1956 as a Public Sector Company with limited liability by shares. However, the company started it business on 09.04.2012. As per the mandate given by the Government of India, BBNL procures, installs, tests, commissions, operates, maintains and manages OFC transport network and associated infrastructure required for achieving at least 100 Mbps bandwidth on sharing basis in all the estimated 2,45,748 Gram Panchayats in India. As per the agreement between the Universal Service Obligation Fund and BBNL, USOF shall provide subsidy to BBNL for the entire Capital Expenditure (Capex) and Net cost of Operating expenditure (Opex) net of revenue for a period of 8 years w.e.f. 25.02.2012 for creation, operation and maintenance of National Optical Fibre Network. Under Ph- II, 1 Gbps bandwidth has been planned at each GP. Dark fibres shall also be available from BHQ to GP for leasing to service providers.

5.5.1 The work execution of connecting the GPs had been planned to be completed in 3 phases.

Phase- I: The target of completing 1,00,000 GPs under Phase- I of BharatNet has been achieved in December 2017.

Phase- II: BharatNet Phase- II is planned to connect remaining approx. 1,50,000 GPs directly to BHQs by optimal mix of underground OFC, Aerial OFC, Radio and Satellite to be completed by 31st March 2019.

Implementation of the project is proposed through three models:

- **States and state agencies:** In 8 States namely AP, Telangana, Chhattisgarh, Tamil Nadu, Jharkhand, Gujarat, Odisha and Maharashtra the project has been implemented through State Model. DPRs of all the States have been approved by DCC. Revised DPR of Telangana is pending for approval.
- **Private Sector Model:** Two States namely Punjab and Bihar have been implemented through private sector model directly by BBNL.
- **CPSU:** In rest of the States, the project shall be implemented by CPSU model by PGCIL (in Uttarakhand and HP) and BSNL (Assam, Bihar, Chhattisgarh, Haryana, J&K, Karnataka, Kerala, MP, Maharashtra, Punjab, Rajasthan, UPE, UPW, Uttarakhand, West Bengal, Sikkim, A&N, Chandigarh)
- The satellite component of the phase- II is being implemented by BBNL & BSNL in 1407 GPs and 4825 GPs respectively.

Phase- III: For network upgradation and meeting future requirement, phase- III will provide ring connectivity between the District Headquarters (DHQs) and the Block Headquarters (BHQs) and between the BHQs and the GPs, The detail will be worked out at a later stage.

5.5.2 Share Holding Pattern:

The authorised share capital of BBNL is 100,00,00,000 equity share of Rs. 10/- each i.e. total authorised capital is Rs. 1000,00,00,000/-. The issued, subscribed and fully paid share capital is 6,00,00,003 equity shares of Rs. 10/- each. Out of total issued subscribed and fully paid share capital, the Government of India holds 6,00,00,000 equity share of Rs. 10/- each valued Rs. 60,00,00,000/-. Apart from that Bharat Sanchar Nigam Limited, a Govt. of India Enterprise under th control of Department of Telecommunications hold one equity of Rs. 10/-. Further, Power Grid Corporation of India Limited (PGCIL) and RailTel Corporation of India Limited (both Govt. of India Enterprise) hold one equity share each of Rs. 10/-.

Physical and Financial Performance of BBNL

Table 5.21 Financials and Turnover

Year	Turn Over		Total Expense	Profit / (Loss) Before Tax	Tax Expense	Profit / (Loss) after tax
	Income from Operation	Other Income				
2012- 13	-	4,01,38,687	1,50,44,208	2,50,94,479	81,83,648	1,69,10,831
2013- 14	41,33,355	7,98,79,064	5,63,31,542	2,76,80,877	99,09,874	1,77,71,003
2014- 15	41,33,354	10,91,35,562	11,46,85,467	(14,16,551)	14,39,721	(28,56,272)
2015- 16	41,33,354	12,89,45,157	18,96,75,666	(5,65,97,155)	2,77,14,733	(8,43,11,888)
2016- 17	32,24,500	1,06,00,61,543	78,21,99,601	28,10,86,442	5,26,05,956	22,84,80,486
2017- 18	35,19,300	3,09,64,72,238	3,03,86,35,606	4,08,99,126	1,31,74,200	2,77,24,926

Note: As per audited annual financial statements.

Table 5.22 Overall Performance of States/ UT upto 13-05-2019

Sr No.	State	Blocks/GPs covered under Ph-I & Ph-II					GPs for which Pipe laid		GPs for which Cable laid		Service Ready GPs	
		Districts	Blocks		GPs							
			Ph- I	Ph- II	Ph- I	Ph- II	Ph- I	Ph- II	Ph- I	Ph- II	Ph- I	Ph- II
1	Assam	27	130	108	1533	1227	1622	0	1622	0	1621	0
2	Bihar	38	354	180	5754	2692	5925	897	5925	554	5889	163
3	Chhattisgarh	27	64	85	4104	5964	4111	206	4104	108	4075	0

[7] *Law Enforcement Monitoring Function*

4	Haryana	21	122	0	6083	0	6188	0	6188	0	6188	0
5	J&K	22	12	304	388	3688	371	0	368	0	311	0
6	Karnataka	30	176	0	6092	0	6221	0	6221	0	6150	0
7	Kerala	14	152	0	977	0	1129	0	1129	0	1129	0
8	Madhya Pradesh	51	173	140	12655	10544	12721	2148	12709	618	12694	2
9	Maharashtra	34	204	171	15301	12740	15197	407	15197	43	15173	0
10	Punjab	22	93	50	8049	4802	7974	1657	7973	911	7973	249
11	Rajasthan	33	220	45	8747	1162	8718	0	8692	0	8586	0
12	UPE	49	275	307	17645	23462	17891	4656	17877	2188	17642	336
13	UPW	24	167	71	10329	4383	10393	1496	10390	1044	10306	0
14	Uttarakhand	13	30	68	1863	5706	1545	0	1541	0	1508	0
15	West Bengal	21	275	66	2637	800	2346	54	2285	15	2150	0
16	Sikkim	4	9	22	52	145	36	0	26	0	17	0
17	A&N	3	7	0	69	0	24	0	19	0	0	0
18	Chandigarh	1	1	0	12	0	12	0	13	0	13	0
19	Lakshadweep	1		9								
20	Arunachal Pradesh	16	68	109	677	0	651	0	564	0	62	0
21	Nagaland	11	48	18	874	0	843	0	639	0	119	0
22	Manipur	9	14	32	650	0	382	0	374	0	322	0
23	Mizoram	8	13	23	262	0	167	0	130	0	41	0
24	Tripura	8	41	8	864	0	841	0	817	0	538	0
25	Meghalaya	7	23	30	948	0	596	0	345	0	122	0
26	Gujarat	33	103	215	6376	7692	6234	56	6112	56	5512	56
27	D&D	1	2	0	15	0	18	0	18	0	18	0
28	D&DH	1	1	0	20	0	21	0	21	0	21	0
29	Puducherry	2	3	0	98	0	98	0	98	0	101	0
30	Andhra Pradesh	13	79	600	1673	11254	1502	0	1480	0	1460	0
31	Telangana	30	104	533	1942	10787	2047	0	2047	0	2047	0

32	Odisha	30	181	144	3860	2945	3895	0	3885	0	3605	0
33	Jharkhand	24	142	117	2711	1684	2680	0	2634	0	2397	0
34	Himachal Pradesh	12	6	67	252	2994	230	0	230	0	230	0
35	Tamil Nadu	31		385	0	12524	0	0	0	0	0	0
TOTAL		671	3292	3907	123512	127195	122629	11577	121673	5537	118020	806

5.6 CENTRE FOR DEVELOPMENT OF TELEMATICS (C-DOT)

The Centre for Development of Telematics (C-DOT) is the Telecom Technology development centre of the Government of India. It was established in August 1984 as an autonomous body. It was vested with full authority and total flexibility to develop state-of-the-art telecommunication technology to meet the needs of the Indian telecommunication network. The key objective was to build a centre for excellence in the area of telecom technology.

C-DOT is engaged in research and development (R&D) activities as well as in field implementation of technologies developed. The progress on major technologies that are being developed, as well as technologies that are being deployed, is briefly summarized below.

5.6.1 Physical Performance

- Significant progress has been made in security related projects: CMS equipment has been rolled out in 21 Licensed Service Areas (LSAs) and operation has started. Secure and Dedicated Communication Network SDCN is ready for commissioning in MTNL in Delhi, and expansion for DRDO is in progress.
- Field trial completion for new variants of GPON ONTs has been completed, next generation PON (Passive Optical Network) i.e. XGS-PON are in advanced stage of development and are likely to get into trial soon.
- 100G DWDM system is under field trial and offered for TEC validation.
- Trials for Routing technology has been completed in MTNL network, and PoC for high capacity router is planned in BSNL network.
- Satellite hub baseband system for DEAL has been developed and delivered to the customer.
- ToT (Transfer of technology) process for High capacity solar power supply system has been initiated for 2KW System.
- M2M network extended lab trial with applications is ongoing. Hybrid DTH STB (Set-Top Box) is ready for trial in the field.

- NGN technology – More than 5 million lines have been migrated in BSNL network.
- ToT (Transfer of technology) completed during year - 14 nos. for various technologies and total ToTs as on date is 96 nos.

5.6.2 Security Related Projects

- A National Roll-out Project for the Centralized Monitoring System (CMS) for lawful interception and monitoring has been put into operations. The CMS project is complete with equipment rolled out in 21 LSAs and operations commenced with 35 LEAs (in LEMF[7] or terminal mode) with onboard CMS. Fifty seven LEAs are in the process of onboarding CMS LEMF
- **Secure and Dedicated Communication Network (SDCN)** is ready for commissioning in MTNL Delhi Network. Commissioning in DRDO is in -progress .
- **The ISP Monitoring System** is under field deployment. During the year, ISP gateway hardware have been installed at 11 additional locations and handed-over to LEAs. Cumulatively, ISP monitoring solution has been deployed and now operational at more than 120 locations across the country.
- **Centre of Excellence for Lawful Interception (CoE)** - Development of advance technologies for social networking and analysis, image processing, quantum safe cryptography, etc. to fulfill the requirements of LEAs are in-progress. Major activities completed during the year include, software development for social networking websites (YouTube, Twitter, Facebook, LinkedIn, etc.), basic framework for social website analysis tool, internal validation for face detection & recognition under control environment and validation ongoing for lattice-based PQC[8] algorithm for phone and IP encryptor.

5.6.3 Optical Technologies

- **OCN**[9]:- DWDM-based 100G Optical Transport Network (OTN) system is under field trial in BSNL at Chennai, and it has been offered for TEC validation.
- Development has also progressed for OTN[10] switch with completion of hardware and software development for cross-connect capacity of 1.6 Tbps[11].
- Development of XGS-PON[12], next generation PON, has been completed and is currently under testing.
- Field trial including TEC certification has been completed for new variant of GPON ONTs, namely, Titli with dying gasp, Ring ONT, and ONT with RF.

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[8] *Post Quantum Cryptography*

[9] *Optical Core Network*

[10] *OTN Optical Transport Network*

[11] *Terabits per second*

[12] *Gpbs PON (TDMA-based)*

- Pilot trial has been completed for 4-port OLT in CSC at Noida, UP and it is in-operation in the field.

5.6.4 Switching and Routing Technology

- Technology trial for routing technology has been completed in MTNL network. Deployment of high capacity routing technology (with capacity upto 6 terabit depending upon field configuration / requirement) in BSNL network, is planned for which technical proposal has been submitted for its PoC.
- **High speed routing system:** Development is in progress with porting of software on 100G Ethernet interface reference board.
- **LAN[13], MAN[14] enterprise and data centre segment:** L3 switch implementation for 24-port has been completed. Development completed for 48 port integrated L2/L3 switch and software porting on new 24-port configuration hardware is ongoing. Development is in-progress for medium capacity ToR[15] switches.
- **Customised router for DRDO-ANURAG[16]:** PCB[17] fabrication and assembly are in progress and software has been integrated on the standard multicore processor reference platform. Software integration is in progress on C-DOT designed hardware.

5.6.5 Satellite-based technologies

- **Satellite hub baseband system for DEAL[18]-** Carrier-grade hub baseband system with redundancy has been developed and delivered to the customer.
- **Digital Video broadcasting (DVB)-S2 Hub Baseband System –** Simulations have been completed for DVB-S2 modulator and MF-TDMA demodulator. Video broadcasting has been successfully implemented in transmit path (downlink from hub to terminal)**.**

5.6.6 Power-efficient and green telecom technologies

- **High capacity solar power supply system** (75W, 125W, and 256W system) is ready for manufacturing. ToT process also initiated for 2KW System. Lab Testing is complete for higher capacity 5KW system.

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[13] *Local Area Network*

[14] *Metropolitan Area Network*

[15] *Top of Rack*

[16] *Advanced Numerical Research and Analysis Group*

[17] *Printed Circuit Board*

[18] *Defence Electronics Applications Laboratory*

5.6.7 Telecom services and applications

- **M2M[19] communication:** Validation of M2M system nodes (comprising of ADN[20], ASN[21], IN[22]and MN[23]) with CSFs[24] are in progress. Extended lab trial for M2M network with applications is ongoing
- **CiSTB[25]:** STB for cable segment is under field trial at Mumbai in IMCL[26] cable network. Validation of DTH[27] hybrid STB[28] has been completed & Identification of site for field trial is in progress.

5.6.8 Field implementation of developed projects

- **C**-DOT MAX technology is under migration to NGN. Till now, migration has been completed at two sites per circles, covering more than 5 million lines which have been migrated in BSNL network.
- **C-DOT Wi-Fi technology -** Field roll-outs are in progress for solar Wi-Fi for 5000 villages of CSC[29]. Wi-Fi systems for Navy and Army are also in the process of being rolled out.
- **LTE enhancements, customization and trial -** LTE system comprising of eNodeB and EPC has been installed in MTNL, Delhi for PoC and trial.
- **Solar RTS-** Roof-top solution using PVDG (Photovoltaic DC generator), SITC (Supply, Installation, Texting & Commissioning), completed for 600 KWp at C-DOT Campus, Delhi and testing of 557 KWp at C-DOT Campus, Bangalore ongoing.

5.6.9 C-DOT Transfer Technology Program

Two Technology transfer licensees were added and eleven ToTs were done during the year, Cumulatively C-DOT ToT licensees stand at 93, which has helped build a manufacturing eco-system for production of indigenous technology in consonance with the Government's Make-in India and Digital Indian programs.

[19] *Machine-to-Machine*
[20] *Application Dedicated Node*
[21] *Application Service Node*
[22] *Infrastructure Node*
[23] *Middle Node*
[24] *Common Service Functions*
[25] *C-DOT interoperable Set-Top Box*
[26] *Indus IND Media and Communications Ltd*
[27] *Direct To Home*
[28] *Set-Top Box*
[29] *Common Service Centre*

5.6.10 Business promotion & Awards

- **World Telecom Day and Information Society Day 2018:** World Telecommunication Day is celebrated annually on 17th May every year since 1969, marking the inception of ITU and the signing of the first International Telegraph Convention in 1865. This year, also, C-DOT celebrated World Telecom Day and Information Society day on 17th May 2018 in Bangalore. This year the theme was "Enabling the positive use of Artificial Intelligence for all" for while Dr. V Sridhar from IIIT Bangalore was invited for a talk.

- **DEFEXPO 2018:** C-DOT participated in the 10th edition of DEFEXPO 2018 - an international land, naval and internal homeland security systems exhibition- held in Chennai from April 11th to 14th 2018. More than 30 countries showcased their defence prowess during the expo.

- **Strategic Electronics Summit 2018:** C-DOT participated in the 9th edition of ''Strategic Electronics Summit (SES 2018) – Defence & Aerospace'' held on 5th & 6th July, 2018 at the Lalit Ashok Hotel, Bengaluru. The last eight editions of SES from 2010 to 2017 successfully brought Industry, Defence Establishment & Government together and this platform is growing year by year.

- C-DOT celebrated its 35th Foundation Day on August 28-29, 2018. This year too, in continuation of its tradition, C-DOT held a technical conference as part of "GB Meemamsi Lecture Series 2018", where several telecom veterans and academicians from around the world including some distinguished professors from universities of UK, USA shared their experiences and

discussed innovative ways to address numerous issues and challenges faced by various stakeholders in the fast-changing telecom Industry. The inaugural session was graced by Smt. Aruna Sundararajan, Secretary, Department of Telecom and other Members of DCC. The event also witnessed the official launch of C-DOT's latest innovations - "DWDM - 80Channel" and "KYM - Know Your Mobile" app as well as the "5G India Website".

- **C-DOT at ITU Durban:** C-DOT participated in **4th BRICS Communication Ministers Meeting** on 13-15th September, 2018 in **Durban, South Africa**. C-DOT, being a pioneer R&D organization of Department of Telecommunication, played an important role in contributing to the delegation and sought possible collaboration with its BRICS counterparts.

C-DOT at India ASEAN ICT Expo 2018, Hanoi, Vietnam : C-DOT participated in India-ASEAN ICT Expo 2018 organized by Ministry of Information & Communication, Vietnam and Telecom Equipment & Services Export Promotion Council (TEPC) held in Hanoi, Vietnam during September 27-28, 2018. The theme of the event was "Digital Connectivity in the Industrial Revolution 4.0". C-DOT demonstrated its indigenous Telecom solutions and also participated in the plenary sessions and B2B meetings with ASEAN counterparts.

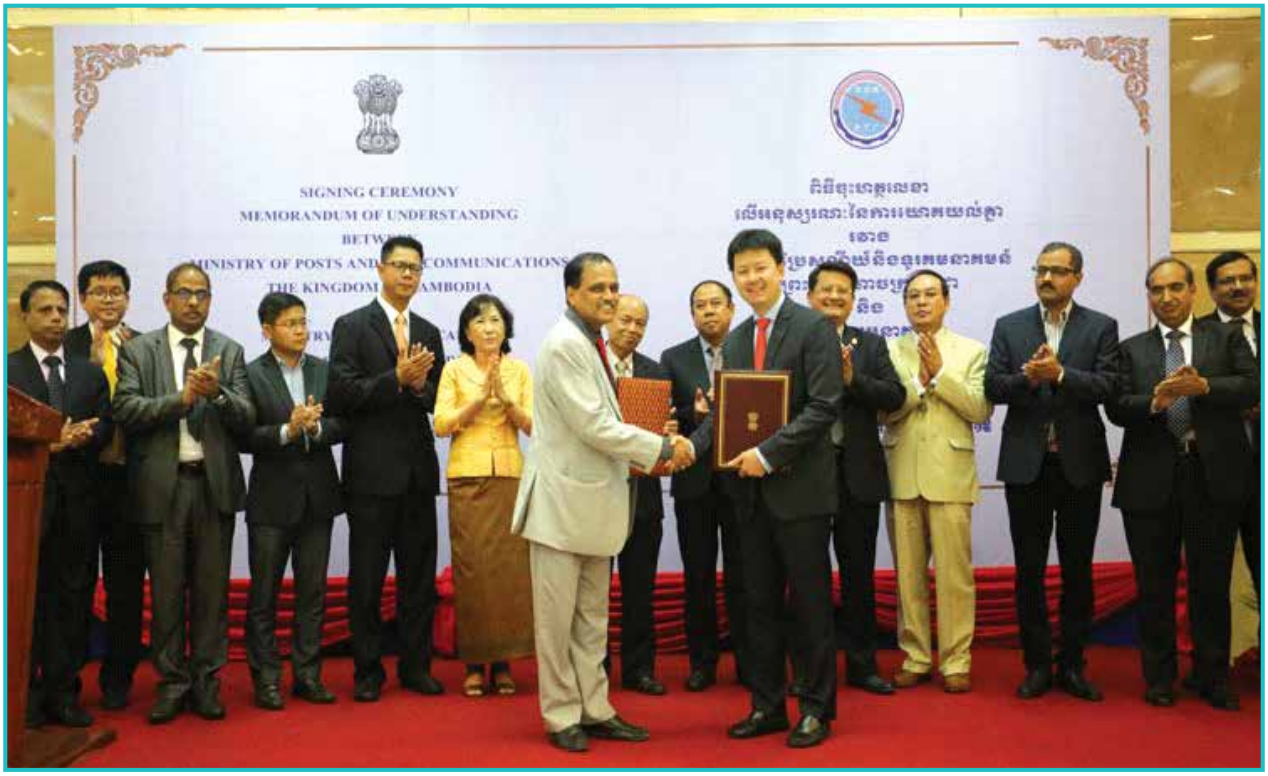
- **India Mobile Congress, Oct, 25–27 2018; New Delhi:** C-DOT participated in India Mobile Congress 2018 organized during 25th – 27th October 2018 at Aerocity, New Delhi. C-DOT exhibited its products during the three-day exhibition and demonstrated indigenous capabilities.

M2M + IoT Forum: Sixth edition of M2M + IoT Forum was held from 14th-15th January 2019 at Indian Habitat Centre, New Delhi. India's policy makers, regulators and the industry leaders were present during the event to chart out a roadmap in the area of machine-to-machine (m2m) and internet of things (IoT). C-DOT demonstrated its capabilities in M2M, Mr. Vipin Tyagi, EDR, C-DOT delivered a special address during the event.

- **India Telecom 2019:** An exclusive International Business Expo, was organized by TEPC (Trade and Export Promotion Centre) New Delhi, from 11th-12th February, 2019 under Market Access Initiative Scheme (MAI) of Department of Commerce, Government of India. The event attracted more than 100 foreign delegates from the Information and communication technology (ICT) industry from over 30 countries, including Ministerial/Official delegations from Afghanistan, Bhutan, Burundi, Cambodia, Indonesia, and Nigeria. C-DOT showcased the products and solutions relating from Wireless, GPON, NMS, Geo Intelligence and Router. Officials from several countries including Cambodia, Afghanistan, Indonesia, Nigeria, Burundi, Sudan etc. showed a great deal of interest in C-DOT technologies.

- **International Colloquium on Ethics and Governance of Autonomous AI Systems:** The first ever 'International Colloquium on Ethics and Governance of Autonomous AI Systems' was held on 18th & 19th February 2019 at India International Centre, New Delhi. Academicians/ Researchers from IITs, IISc, C-DOT, and experts from technology companies presented their thoughts at the interactive thematic sessions.

- A delegation consisting of senior officials of DoT, Executive Director-C-DOT and Head Marketing C-DOT visited Cambodia on 18th March 2019. A MoU and a non-disclosure agreement were inked between the Ministry of Posts and Telecommunications, Cambodia and C-DOT aimed at boosting the ICT and telecommunications sector in Cambodia, including the creation of 'smart villages' in the Kingdom. A separate MoU was signed between C-DOT and Telecom Cambodia, regarding deployment of advanced telecommunications technology and wireless solutions in rural areas.



5.6.11 IPR Asset status

Table 5.23

Intellectual Property Asset	Number	Related Project / Product	Subject invention
Patent Granted	3	GyanSetu	Gesture Based Human Machine Interface Using Marker (USA,UK)
		Interoperable STB	A method and an information appliance device For preventing security breach in information appliance device - Canada
		MLLN	A Communication System for Managing Leased Line Network With Wireless Fallback- India

Patent filed	14 (4 India 8 International)	Interoperable STB	System And Method To Monitor Quality of Service At A Set Top Box (India)
			System For Personalization of A Set Top Box(India)
			Secure Interoperable Set Top Box Through Reverse OTP (USA,UK, Canada and China)
		SGRAN	A RapidIO® network for achieving load balancing (India and PCT)
		GPON	A Learning-Based Method And System For Configuring An Optical Time-Domain Reflectometer In A Gig abit Passive Optical Networks (India)
			System And Method For On-Board Programming Of Configurable Logic Devices-India
		Optical Core Networks	Method For Equipment Selection In Generalized Multiprotocol Label Switching(India)
		Deterministic Ethernet Networks	A Real-Time Distributed Engine Framework of Ethernet Virtual Connections (USA, UP, Japan and China)
		Generic with IIT Delhi (C-DOTian pursuing Ph.D)	Method, System And Apparatus For Multilingual And Multimodal Keyword Search In A Mixlingual Speech Corpus(PCT)
		Geo-Intelligence	GIS Based Centralized Carbon Footprint Monitoring System And Method Thereof (USA, UK, China, South Africa, Nigeria & Kenya)
		Study Project -5G	System And Method For Network Traffic Slicing (USA, China, Korea & Kenya))
		Wi-Fi	Dynamic channel selection in IEEE 802.11 networks (PCT)
		NMS	Event Generation And Management System(PCT)
		Disaster Management	A System for enabling Voice Communication over long-range using Lora Modulation In Indian Disaster Scenario - India
Copyright Granted	10 (India)	GPON	C-DOT GPON EMS Simulator
			G-PON EMS
			Link Management Interface For Communication Between LCT and GPON Equipment
		Wi-Fi (BBWT)	Graphical User Interface For Control, Configure And Monitor
			Multi Radio Based C-DOT BBWT system,
			C-DOT Specific MIBS based SNMP agent for BBWT system PDO APP

			Software For Public Data Office (PDO)
		NOFN NMS	NOFN-SLA
			NOFN-DCNMS
		DWDM	DWDM EMS
Copyright filed	9 (India)	Wi-Fi (BBWT)	Graphical User Interface For Control, Configure And Monitor Multi Radio Based C-Dot BBWT system
			CDOT Specific MIBS based SNMP agent for BBWT system
			PDO APP
			Software For Public Data Office (PDO)
		NOFN NMS	NOFN-SLA
			NOFN-DCNMS
			DASHBOARD Framework
		GPON	Link Management Interface For Communication Between LCT and GPON equipment
		M2M	M2M EMS
Trademark Granted	3 (India)	GPON	Damini
		CGRAN	CGRAN
		Generic	C-DOT Logo
Designs filed	3 (India)	WiFi	WAP WiFi Router
		GPON	4 PORT OFFICE OLT
			X GPON ONT
Papers presented in the national and international conferences and seminars	6	SDCN	Isolating and Reporting Fluctuation Remotely with Preventing Servers from Trap Load, 3rd International Conference for Convergence in Technology (I2CT), Pune, Maharashtra, 6-8th April 2018
		Deal	A RapidIO-Ethernet System Architecture for TDM-based Satellite Receiver, 2018 International Conference on Computer, Information and Telecommunication Systems, Colmer, France July 11-13, 2018
		Optical Networks	Passive Optical Networks: Review and Road Ahead, IEEE TENCON 2018 - 2018 IEEE Region 10 Conference, Jeju Island, Korea, October 28-31, 2018
		Geo Intelligence	C4.5 Decision Tree Machine Learning Algorithm based GIS Route Identification,The 10th International Conference on Ubiquitous and Future Networks, 3rd July'18 to 6th July'18, Prague, Czech Republic
		M2M	oneM2M Compliant Sensor Network for Smart farming & Cellular Radiation Monitoring, IEEE 3rd International Conference For Convergence in Technology I2CT 2018, Pune April 6-8, 2018
		CiSTB	Configurable User Interface - A perspective from Interoperable STB, IC4T-2018, Lucknow, UP, India 25-27 Oct, 2018

5.6.12 HR Initiatives in C-DOT

a) Employees' Welfare:

For addressing hospitalization expenses of staff members, C-DOT has taken a tailor-made group medi-claim insurance from National Insurance Company Ltd. Staff members (and their families) in executive cadre are identified to a coverage of Rs. 5 lakhs with the option of taking a cover of Rs.7.5 lakhs or Rs.10 lakhs. Staff in non-executive cadres have been taking a cover of Rs. 3.5 lakhs with the facility of opting for Rs. 5.0 lakhs. The Group Medi-claim policy has been made effective from 1st April 2006.

C-DOT has a Grievance redressal mechanism for its staff that provide them with an easy & readily accessible machinery for prompt disposal of their day-to-day grievances.

b) Recruitment of SC/ST and persons with disabilities:

For recruitment of persons with disabilities and candidates belonging to SC/ST category, C-DOT follows government rules on reservation in jobs.

A system has been developed to look after the welfare of persons belonging to these categories and address any problems / complaints that may come up.

CHAPTER 6
REGULATORY AND APPELLATE BODIES

6.1 THE TELECOM REGULATORY AUTHORITY OF INDIA (TRAI)

With the entry of private sector in the provision of Telecommunication services a need was felt to have an independent regulatory body. The above requirement was indicated in the guidelines issued for entry of private sector in basic telecom service. Accordingly, Telecom Regulatory Authority of India (TRAI) was established in the year 1997 in pursuance of TRAI (Ordinance) 1997, which was later replaced by an Act of Parliament, to regulate the Telecommunication services.

The Authority consists of a Chairperson, not more than two whole-time members and not more than two part-time members to be appointed by the Central Government. TRAI is currently headed by Dr. R.S. Sharma, the former Secretary in the Department of Electronics & Information Technology, Government of India as Chairperson. Shri Sunil K. Gupta is the present Secretary TRAI who is being assisted by Advisor who report to the Secretary through Principal Advisors. Legal and Administrative Advisors report directly to Secretary TRAI.

During the year, while discharging various recommendatory and regulatory functions, TRAI has tried to address various issues faced by the telecom sector. The Authority made various Recommendations to the Government on key issues concerning telecommunications sector, framed Regulations and issued Consultation Papers, Tariff Order and Directions which are discussed briefly in the following paragraphs

6.1.1 RECOMMENDATIONS

During the year 201819, while discharging various recommendatory and regulatory functions, TRAI has tried to address various issues faced by the telecom sector. The Authority made various recommendations to the Government on key issues concerning telecommunications sector which are indicated below:

1) Recommendations dated 4th June 2018 on ''Next Generation Public Protection and Disaster Relief (PPDR) communication networks''

To have a robust policy framework for the introduction of an advanced, reliable, robust and responsive broadband PPDR communication system in the country, the Authority suo-moto formulated its recommendations after due public consultation and internal analysis and forwarded it the Government on 4th June 2018. The salient features of the recommendations are:

i) Government to set up Pan-India integrated Broadband PPDR (BB-PPDR) Communication Network (to be called "National BB-PPDR Network") based on 3GPP PS-LTE technology.

ii) A hybrid model of BB-PPDR network in India should be put in place in which dedicated network for BB-PPDR communication funded by government be created in metro cities, border districts, disaster prone areas (identified by NDMA) and sensitive areas like J&K and North East by PSU like BSNL/MTNL and existing commercial network can be leveraged in other regions through any TSP.

iii) Stringent SLAs to be put in place and operators should be mandated to provide mobile BTS and backpack devices in case of disaster when terrestrial network gets destroyed in order to make available communication facilities for PPDR agencies.

iv) Setting up a Special Purpose Vehicle (SPV) under Ministry of Home Affairs (MHA) to plan, coordinate and steer the nationwide BB-PPDR communication network implementation and its subsequent operation.

v) An advisory committee should be constituted that includes representatives from all disciplines of public safety, state government, central government and Ministry of Communications to provide domain specific advice to the SPV.

vi) DoT should study the feasibility to do away with CMRTS license for PPDR agencies in a phased manner.

vii) SPV shall be the nodal agency to coordinate with DoT for allocation of spectrum and other issues. The PPDR agencies and details of equipment deployed by them can be registered with DoT through SPV.

viii) DoT should work out timelines to Phase out existing analog networks in PPDR in a phased manner. New spectrum assignments may be done only for deploying digital equipment.

ix) Carrying out pilot testing of BB-PPDR dedicated network (dedicated spectrum and network) to be implemented through BSNL/MTNL, funded by the central government, at five zones identified as disaster prone/sensitive areas to evaluate the efficacy of the proposed network.

x) Testing the efficacy of PPDR trunking service roaming on public telecom networks during pilot testing, and if found feasible, it should be implemented on Pan-India basis.

xi) 2x10 MHz of dedicated spectrum should be allocated nationwide to the SPV on no-cost basis for LTE based broadband PPDR networks.

xii) 814-824/859-869 MHz should be assigned for nationwide BB-PPDR services as per APT Frequency Arrangement Number G 3-1-4.

xiii) 20 MHz of spectrum in the frequency range 440-470 MHz (preferably 450-470 MHz) should be allocated for future evolution of broadband PPDR.

2) Recommendations dated 9th July 2018 on "Making ICT Accessible for Persons with Disabilities"

Telecommunication provides the underlying infrastructure over which several services like banking, education, healthcare and public services are delivered. However, Persons with Disabilities (PwDs) are not able to fully access these ICT services mainly due to lack of necessary accessibility features or unaffordable prices of the equipment or due to unavailability of required services. It is necessary that benefits of ICT technology are passed on to every person in the society including PwDs.

TRAI recommended (i) mandating specific essential accessibility standards identified for mobile phones, landline phones and set top boxes (STBs) (ii) 50% of the channel to be developed in accessible format in next five years (iii) By 2020, all mobile (producing 5 or more models) and STBs manufacturers/importers to make/import at least one mobile handset/STB satisfying accessibility criteria for PwDs (iv) Telecom, DTH service providers and Multi System Operators (MSOs) to have dedicated customer support services for PwDs (v) separate desk at Public Safety Answering Points (PSAPs) to be set up to facilitate accessibility of emergency services by PwDs (vi) Service providers conducting sensitivity training to their staff to deal with PwDs issues (vii) Government mandating accessibility in Government ICT procurement, and (viii) setting up a Steering committee under the aegis of Department of Empowerment of Persons with Disabilities for reviewing accessibility for PwDs from time to time and ensuring its implementation.

3) Recommendations dated 16th July 2018 on "Privacy, Security and Ownership of the Data in the Telecom Sector"

On 16th July 2018 recommendations were issued on "Privacy, Security and Ownership of the Data in the Telecom Sector".

The recommendations are as follows:

- Each user owns his/ her personal information/ data collected by/ stored with the entities in the digital ecosystem. The entities, controlling and processing such data, are mere custodians and do not have primary rights over this data.
- A study should be undertaken to formulate the standards for annonymisation/ de-identification of personal data generated and collected in the digital eco-system.
- All entities in the digital ecosystem, which control or process the data, should be restrained from using Meta-data to identify the individual users.
- The existing framework for protection of the personal information/ data of telecom consumers is not sufficient. To protect telecom consumers against the misuse of their personal data by the broad range of data controllers and processors in the digital ecosystem, all entities in

the digital ecosystem, which control or process their personal data should be brought under a data protection framework.

- Till such time a general data protection law is notified by the Government, the existing Rules/ license conditions applicable to TSPs for protection of users' privacy be made applicable to all the entities in the digital ecosystem. For this purpose, the Government should notify the policy framework for regulation of Devices, Operating Systems, Browsers, and Applications.
- Privacy by design principle coupled with data minimization should be made applicable to all the entities in the digital ecosystem viz, Service providers, Devices, Browsers, Operating Systems, Applications etc.
- The Right to Choice, Notice, Consent, Data Portability, and Right to be forgotten should be conferred upon the telecommunication consumers.
- In order to ensure sufficient choices to the users of digital services, granularities in the consent mechanism should be built-in by the service providers.
- For the benefit of telecommunication users, a framework, on the basis of the Electronic Consent Framework developed by MeitY and the master direction for data fiduciary (account aggregator) issued by Reserve Bank of India, should be notified for telecommunication sector also. It should have provisions for revoking the consent, at a later date, by users.
- The Right to Data Portability and Right to be Forgotten are restricted rights, and the same should be subjected to applicable restrictions due to prevalent laws in this regard.
- Multilingual, easy to understand, unbiased, short templates of agreements/ terms and conditions be made mandatory for all the entities in the digital eco-system for the benefit of consumers.
- Consumer awareness programs be undertaken to spread awareness about data protection and privacy issues so that the users can take well informed decisions about their personal data.
- Data Controllers should be prohibited from using "pre-ticked boxes" to gain users consent. Clauses for data collection and purpose limitation should be incorporated in the agreements.
- Devices should disclose the terms and conditions of use in advance, before sale of the device.
- It should be made mandatory for the devices to incorporate provisions so that user can delete pre-installed applications if he/she so decides. Also, the user should be able to download the certified applications at his/ her own will and the devices should in no manner restrict such actions by the users.
- Department of Telecommunication should re-examine the encryption standards, stipulated in the license conditions for the TSPs, to align them with the requirements of other sector

regulators.

- To ensure the privacy of users, National Policy for encryption of personal data, generated and collected in the digital eco-system, should be notified by the Government at the earliest.
- For ensuring the security of the personal data and privacy of telecommunication consumers, personal data of telecommunication consumers should be encrypted during the motion as well as during the storage in the digital ecosystem. Decryption should be permitted on a need basis by authorized entities in accordance to consent of the consumer or as per requirement of the law.
- All entities in the digital ecosystem including Telecom Service Providers should be encouraged to share the information relating to vulnerabilities, threats etc. in the digital ecosystem/ networks to mitigate the losses and prevent recurrence of such events.
- All entities in the digital ecosystem including Telecom Service Providers should transparently disclose the information about the privacy breaches on their websites along with the actions taken for mitigation and preventing such breaches in future.
- A common platform should be created for sharing of information relating to data security breach incidences by all entities in the digital ecosystem including Telecom service providers. It should be made mandatory for all entities in the digital ecosystem including all such service providers to be a part of this platform.
- Data security breaches may take place in-spite of adoption of best practices/ necessary measures taken by the data controllers and processors. Sharing of information concerning to data security breaches should be encouraged and incentivized to prevent/ mitigate such occurrences in future.

4) Recommendations dated 20th July 2018 on "Method of allocation of spectrum for Public Mobile Radio Trunking Service (PMRTS), including auction, as a transparent mechanism"

After public consultation and internal analysis, on 20th July 2018 TRAI forwarded its recommendations to DoT on "Method of allocation of spectrum for Public Mobile Radio Trunking Service (PMRTS), including auction, as a transparent mechanism".

The salient features of the recommendations are given below:

i) The existing Licensed Service Area (LSA) based authorization criteria for a period of 20 years for PMRTS license should continue.

ii) Taking into consideration factors viz. PMRTS market conditions; spectrum demand and supply; the assignment of spectrum for PMRTS should be made administratively on the basis of demand.

iii) In order to promote efficient use of spectrum, the existing cap on the number of PMRTS handsets per channel that can be imported, should be removed.

iv) Carrier size for assignment to PMRTS licensee (both for analog or digital) shall be 6.25 KHz and multiples of 6.25 KHz.

v) Carriers (frequency pairs) of 25 KHz already assigned to the service providers should be allowed to be retained by the service providers and additional assignment of carriers for the existing analogue system shall continue @ carrier size of 25 KHz (counted as 4 carriers of 6.25 KHz each).

vi) Assignment in new cities / Service Areas shall be made for digital systems only.

vii) Initially for each city, twelve carriers (frequency pairs) of carrier size 6.25 KHz in metro licensed service area and eight carriers (frequency pairs) in non-metro license service area shall be assigned for PMRTS (Digital system) depending on the availability.

viii) The Royalty charges for the PMRTS on a yearly payment option shall be Rs.1200/- per year per 6.25 KHz channel for link distance up to 30 Km and Rs.2400/- per year per 6.25 KHz channel for link distance up to 60 Km.

ix) The PMRTS providers shall also have an option of onetime upfront payment of Royalty charges.

x) The Spectrum Usage Charge (SUC) for the spectrum allocated to PMRTS provider shall be levied @ 1% of AGR and while determining the AGR for the purpose of levy of license fee and SUC, the revenue from sale of handsets (the cost of which is separately identifiable) shall be allowed as deduction from the GR of PMRTS for the purpose of levy of licence fee. The Authority is however not making any specific recommendation on license fee of PMRT Service.

xi) An overall combined spectrum cap of 35% in a LSA on the spectrum identified and available for assignment to PMRT Services, as per provision of NFAP-2011, shall be applicable to PMRT licensee.

xii) In order to make the spectrum available for Broadband-Public Protection Disaster Relief (BB-PPDR) networks, existing PMRTS assignments in the band 814-819/859-864 MHz should be refarmed and further accommodated in the 811-814/856-859 MHz band. The refarming process should be completed within a period of two years.

xiii) The agencies handling PPDR networks who have been operating in the band 806-824 MHz paired with 851-869 MHz should be confined to and accommodated in the proposed PPDR network for which the assignment of spectrum is proposed in 814-824/859-869 MHz sub-band.

xiv) Upon refarming the bands mentioned above, the sub-band 806-811/851-856 MHz should be made available both for PMRTS and CMRTS on need and justification basis.

xv) Allocations of the frequencies in the sub-band 338-340/348-350 MHz shall be predominantly considered for PMRTS. Provisions for allocation in sub-band 351-358/361-368 MHz and 380-389.9/390-399.9 MHz shall remain unchanged.

5) Recommendations dated 1st August 2018 on "Auction of Spectrum in 700 MHz, 800 MHz, 900 MHz, 1800 MHz, 2100 MHz, 2300 MHz, 2500 MHz, 3300-3400 MHz and 3400-3600 MHz Bands"

Department of Telecommunications (DoT) vide its letter No. dated 19th April, 2017 requested TRAI to provide applicable reserve price, quantum of spectrum to be auctioned and associated conditions for auction of spectrum in 700 MHz, 800 MHz, 900 MHz, 1800 MHz, 2100 MHz, 2300 MHz, 2500 MHz, 3300-3400 MHz and 3400-3600 MHz Bands for all the LSAs.

TRAI, vide its letter dated 15th May 2017 sought additional information/clarifications on some of the issues from DoT. However, to speed up the process, based on the available information, TRAI after due consultation process and internal assessment formulated its recommendations on the issue and forwarded to DoT on 1st August 2018.

The salient features of the recommendations are given below:

i) Entire available spectrum should be put to auction in the forthcoming auction.

ii) Barring the specific locations or districts where ISRO is using the 25 MHz (3400 MHz - 3425 MHz) of spectrum, the entire spectrum from 3300 MHz to 3600 MHz should be made available for access services and should be included in the forthcoming auction.

iii) 3300-3600 MHz should be auctioned as a single band and TDD based frequency arrangement should be adopted for this band.

iv) Spectrum in 3300-3600 MHz band should be put to auction in the block size of 20 MHz. To avoid monopolization of this band, there should be limit of 100 MHz per bidder. Since the TSPs are allowed to trade their partial or complete spectrum holding to another TSP, the limit of 100 MHz spectrum in 3300-3600 MHz band, shall also apply for spectrum trading. In case a TSP acquires more than one block, the entire spectrum should be assigned to it in contiguous form.

v) No roll out obligations should be mandated for spectrum in 3300-3600 MHz band. However, to avoid any misuse of not mandating any roll-out obligations, the lock-in period for spectrum in this band for becoming eligible for spectrum trading should be 5 years instead of 2 years.

vi) The revised provisions of spectrum cap (i.e. 35% Overall cap and a Cap of 50% on the combined spectrum holding in the sub-1 GHz bands) should be extended to 3300-3600 MHz band also. Additionally, in 3300-3600 MHz band, there should be a spectrum holding cap of 100 MHz per licensee.

vii) There is an urgent need of audit for all allocated spectrum both commercial as well as spectrum allocated to various PSUs/Government organizations. This should be done by an independent agency on a regular basis.

Recommended reserve price for various spectrum bands is as per table given below:

TABLE 6.1 RECOMMENDED RESERVE PRICE (In Rs. Crore)								
LSA	**700 MHz**	**800 MHz**	**900 MHz**	**1800 MHz**	**2100 MHz**	**2300 MHz**	**2500 MHz**	**3300-3600 MHz**
	Per MHz (Paired)					**Per MHz (Unpaired)**		
Delhi	915	640	NA	457	635	164	164	69
Mumbai	1122	727	NA	561	528	167	167	84
Kolkata	347	160	NA	173	115	38	38	26
Andhra Pradesh	557	390	NA	279	185	78	78	42
Gujarat	546	385	373	273	181	70	45	41
Karnataka	219	192	238	109	91	112	98	16
Maharashtra	729	510	NA	365	391	72	66	55
Tamil Nadu	199	174	235	100	394	151	132	15
Haryana	113	57	102	57	63	8	NA	8
Kerala	190	157	NA	95	203	20	NA	14
Madhya Pradesh	190	143	NA	95	68	9	NA	14
Punjab	177	157	NA	88	104	21	24	13
Rajasthan	211	266	NA	105	NA	6	NA	16
U. P. (East)	305	251	262	153	126	9	NA	23
U.P. (West)	230	161	211	115	76	12	NA	17
West Bengal	105	74	NA	53	35	6	NA	8
Assam	92	NA	NA	46	30	2	NA	7
Bihar	175	136	201	88	99	7	7	13
Himachal Pradesh	37	24	NA	18	12	1	1	3
Jammu & Kashmir	30	NA	NA	15	13	1	1	2
North East	25	NA	NA	13	6	1	NA	2
Orissa	54	47	NA	27	44	5	NA	4

The recommendations have been placed on TRAI's website www.trai.gov.in.

6) Recommendations dated 3rd August 2018 on "Promoting Local Telecom Equipment Manufacturing"

TRAI issued its Recommendations dated 3rd August 2018 on "Promoting Local Telecom Equipment Manufacturing".

The main recommendations made by the Authority are as follows:

i) The progress of indigenous telecommunication equipment manufacturing in the country should be monitored in Department of Telecommunications (DoT) at least at the level of Member, Telecom Commission. A dedicated unit in DoT should be made responsible for facilitation and monitoring of telecommunication equipment design, development, and manufacturing in the country.

ii) India should aim to achieve the objective of 'net zero imports of telecommunication equipments' by 2022. For this purpose, Telecom Equipment Manufacturing Council (TEMC), should identify and recommend specific areas of priorities.

iii) For promoting research, innovation, standardization, design, testing, certification and manufacturing indigenous telecom equipment, Telecom Research and Development Fund (TRDF), with initial corpus of Rs. 1000 Crore, should be created. Subsequently, setting up of Telecom Entrepreneurship Promotion Fund (TEPF) and Telecom Manufacturing Promotion Fund (TMPF) should also be considered.

iv) A Telecommunication Equipment Development Board (TEDB) should be constituted in the DoT, under the Telecom Engineering Centre (TEC), for faster and coordinated decisions relating to funding of and incentives for design, development, and manufacturing of telecommunication equipment in the country. It should be responsible for facilitating innovation, R&D (Research and Development), testing and certification, and manufacturing in the telecom sector in the country.

v) Universities/technical institutes offering specialization in telecommunication technologies and system design should be setup/ identified near the Telecom Products Development clusters.

vi) Telecommunication Technology and Systems Design Labs should be setup in these Universities/ technical institutes in collaboration with Telecom Equipment Manufacturers and Telecom Service Providers.

vii) Participation of indigenous research institutions, telecom service providers, and telecom equipment manufacturing companies in deliberations at international organizations like IEEE, 3GPP, One M2M, ITU, and ETSI etc. should be encouraged.

viii) Permissions for trials of new technologies/ products and running pilot projects should be simplified.

ix) Alternate Dispute Resolution Framework for time bound resolution of patent licensing disputes should be institutionalized in the country.

x) A common portal should be developed for self-declaration of Standard Essential Patents (SEP) by the patent holders in the telecom products. The portal should have the facility for listing of registered telecom product design, manufacturing, marketing, and System Integration (SI) companies along with their designs/ products so that development of the complete ecosystem in the country can be facilitated.

xi) To expand understanding about patent filing policies and procedures, the patent information cells should be created in leading Universities/ technical institutions to be identified for promoting research, innovation, and development of telecom technology and systems designs.

xii) Telecom Engineering Centre should be made responsible for regulation and accreditation of telecom products testing and certification agencies in the country.

xiii) Mandatory testing and certification of the telecom equipments in the country should be started at the earliest.

xiv) To expedite setting up of testing and infrastructure facilities in the country, the Government should incentivize setting up of such facilities by private entities. These facilities should be accredited by the Telecom Engineering Centre.

xv) All telecom products meant for use in the telecommunication network or by consumer and marketed in the country should be classified as either fully finished imported products or Indigenous products. Indigenous products should be further classified into Made in India Products, designed in India Products or Designed and Made in India Products.

xvi) DoT should immediately review its PMA policy, issued in October 2012, so that the products specified under the Policy as well as the norms of the value addition specified in the Policy can be aligned with the present day's local market realities.

xvii) PMA policy should be made applicable for all public telecom networks to address the national security concerns.

xviii) Telecom Service Providers should be incentivized for deploying indigenous telecom products, beyond the quantities to be mandated under the PMA, by giving them graded incentives.

7) Recommendations dated 27th December 2018 on "Methodology for levy of Spectrum Charges for provision of Satellite based Services using Gateway installed in India under 'Sui-generis' category"

Department of Telecommunications (DoT) vide its letter dated 13th August 2018, requested TRAI to provide Recommendations on "Methodology for levy of Spectrum Charges for provision of Satellite based Services using Gateway installed in India under 'sui-generis' category".

In this regard, a Consultation Paper (CP) was issued on 10th October 2018 and TRAI received comments from 9 stakeholders. An Open House Discussion (OHD) was conducted on 26th November 2018 in New Delhi.

Based on the comments/inputs received from the stakeholders and on its own analysis, TRAI finalized its Recommendations on 27th December 2018 on 'Methodology for levy of Spectrum Charges for provision of Satellite based Services using Gateway installed in India under 'sui-generis' category'. The salient features of the recommendations are as follows:

i) The formula based spectrum charges should be replaced with AGR based spectrum charges in respect of provision of services by BSNL under its license for 'Provision and Operation of Satellite based services using Gateway installed in India' under 'sui-generis' category. These charges would cover the entire spectrum charges for handsets as well as for gateway.

ii) The spectrum charges should be levied at 1% of the AGR of BSNL's satellite based under 'sui-generis' category.

iii) While determining the AGR for the purpose of levy of license fee and Spectrum Charges, the cost of handsets (which is separately identifiable) should be allowed as deduction from the Gross revenue of BSNL's Satellite based services under 'sui-generis' category.

iv) There should be a defined time-line not exceeding 30 days within which an Import Licence should be granted and the same should be declared in the portal as well as in the Citizen's Charter.

v) DoT may review whether roaming service can be allowed for GSP service customers in a similar way in which mobile roaming are permitted.

vi) DoT may review the need to restrict the GSP Service in certain (barred) areas, consequent to the establishment of Gateway by BSNL.

The recommendations have been placed on TRAI's website www.trai.gov.in.

6.1.2 REGULATIONS

1). "The Telecommunication Interconnection (Amendment) Regulations, 2018" dated 5th July 2018

The Authority on 5th July 2018 issued "The Telecommunication Interconnection (Amendment) Regulations, 2018" which prescribes amendment in Regulations 6, 8 & 9 of "The Telecommunication Interconnection Regulations, 2018" issued by TRAI on 1st January 2018.

The main amendments in the Regulations are as follows:

i) A service provider may request the other service provider for additional ports at a POI, if the projected utilisation of the capacity of such POI at the end of sixty days from the date of placing the request, is likely to be more than eighty-five percent and such projected utilization of the capacity of POI shall be determined on the basis of the daily traffic for the preceding sixty days at the POI during busy hour: Provided that the service provider shall request for such number of additional ports which is likely to bring the utilization of the capacity of such POI, at the end of sixty days from the date of making request, to less than seventy-five percent.

ii) The time-frame for provisioning of ports for initial interconnection and augmentation of ports at POIs is increased to 42 working days.

iii) Every service provider shall provide to the interconnecting service provider, at interval of every six months, its forecast of busy hour outgoing traffic, for the succeeding six months, at each POI and the first such forecast shall be provided within sixty days of the commencement of the Telecommunication Interconnection (Amendment) Regulations, 2018 and thereafter on the 1st April and 1st October every year.

iv) The port charges and infrastructure charges, for all ports provided before the 1st February, 2018 shall continue to be payable as per the terms and conditions which were applicable to them before the 1st February, 2018.

2). Telecommunication Consumers Education and Protection Fund (fourth Amendment) Regulations 2018 dated 18th July 2018

Telecommunication Consumers Education and Protection Fund (fourth Amendment) Regulations 2018 were notified on 18th July 2018. Through the amendment the name of AUSPI (Association of Unified Telecom Service Provides of India) was removed from the committee for Utilization of Telecommunication Consumers Education and Protection Fund (CUTCEF) and changes in the provisions relating to timelines for submission of annual Budget Estimates to the Authority were effected.

3). Telecom Commercial Communication Customer Preference Regulation, 2018 dated 19th July 2018 and corrigendum dated 21st December 2018

To make the system more effective and efficient, Telecom Commercial Communications Customer Preference Regulations, 2010 have been reviewed after consultation. TRAI on 19th July 2018 notified Telecom Commercial Communication Customer Preference Regulation, 2018that is proposed to curb the problem of Unsolicited Commercial Communication (UCC).

The salient features of the regulation are:

i) Adoption of Distributed Ledger Technology (or blockchain) as the RegTech to ensure regulatory compliance while allowing innovation in the market.

ii) Co-regulation where Telecom Service Providers/ Access Providers establish and arrange the framework, which is legally backed by regulation.

iii) Enabling compliance through innovation in technology solutions that are demonstrated in a regulatory sandbox.

4). The Standards of Quality of Service of Basic Telephone Service (Wireline) and Cellular Mobile Telephone Service (Sixth Amendment) Regulations, 2018 dated 31st July 2018

TRAI on 31st July 2018 notified The Standards of Quality of Service of Basic Telephone Service (Wireline) and Cellular Mobile Telephone Service (Sixth Amendment) Regulations, to specify parameters and benchmarks for packets dropped or lost in cases of Voice over LTE (VoLTE) Calls. The details are as given below:

i) Where service providers have launched LTE networks and are providing Voice over LTE (VoLTE), it was observed that instances of pauses or mute of voice were being experienced by the users during conversation while voice call continued. Such instances of mute were mainly due to drop or loss of voice packets in the networks. It was found that in case of LTE networks, it is appropriate to observe drop or loss of packets in terms of Packet Data Convergence Protocol (PDCP) Service Data Units (SDUs).

ii) Packet drops may be observed on downlink as well as on uplink. It was decided to specify two additional parameters namely QoS Downlink PDCP SDUs Drop Rate (DL-PDR) and Uplink PDCP SDUs Drop Rate (UL-PDR). Less than equal to 2% is set as benchmarks for both the parameters. These parameters are to be reported as part of QoS Periodic Monthly Report from the quarter starting from 1st October 2018.

5). The International Telecommunication Cable Landing Stations Access Facilitation Charges and Co-Location Charges (Amendment) Regulations, 2018 dated 28th November 2018

The Authority on 28th November 2018 issued "The International Telecommunication Cable Landing Stations Access Facilitation Charges and Co-Location Charges (Amendment) Regulations, 2018.

Access Facilitation Charges (AFC) are the charges, which are payable by International Long Distance Operators (ILDO)/ Internet Service Providers (ISP) to the owner of the cable landing station to access the acquired international bandwidth in a submarine cable. Submarine cables provide vital international telecommunication links between countries across the world. Submarine cables terminate in the country through cable landing stations.

TRAI had issued The International Telecommunication Cable Landing Stations Access Facilitation Charges and Co-Location Charges Regulations, 2012 on 21st December 2012. The AFC Charges and Co-Location Charges specified in the Regulations dated 21st December 2012 were to be effective from 1st January 2013. However, it was challenged in the Hon'ble Madras High court by two of the Owners of Cable Landing Station (OCLS). The Single Judge Bench of the Hon'ble Madras High Court on 11th November 2016 had dismissed the writ petitions. But, appeals were filed by these two OCLS before a Division Bench of the Hon'ble Madras High Court. The Hon'ble Division Bench of Madras High Court vide its final Judgment and order dated 2nd July 2018 had quashed the Schedules I, II and III of 'The International Telecommunication Cable Landing Stations Access Facilitation Charges and Co-Location Charges Regulations, 2012 dated 21st December 2012' and has directed that TRAI shall redo and re-enact the aforesaid schedules.

Subsequently, TRAI has filed Special Leave Petition in the Hon'ble Supreme Court against the judgment of the Division Bench of Hon'ble Madras High Court. Similar, Special Leave Petitions were also filed by other stakeholders in the Hon'ble Supreme Court. The Hon'ble Supreme Court vide it Order dated 8th October 2018 had requested the Authority to re-work the figures on both counts within a period of six weeks. The both counts are 'Utilization factor' and 'Conversion factor' which were used for estimation of the Access Facilitation Charges. Accordingly, to seek the views of the stakeholders the Authority issued a Consultation Paper on "Estimation of Access Facilitation Charges and Co-Location Charges at Cable Landing Stations" on 18th October 2018. An Open House Discussion on the same was also held on 5th November 2018.

After taking into consideration the Comments, Counter Comments and Additional Comments received from stakeholders and analysis of other relevant facts, the Authority has decided to take the 'Utilisation Factor' of 70% and 'Conversion Factor' of 2.6, wherever applicable. Accordingly, the Schedules I, II and III of the principal regulations have been re-worked and the charges are being prescribed. The Authority accordingly, notified "The International Telecommunication Cable Landing Stations Access Facilitation Charges and Co-Location Charges (Amendment) Regulations, 2018" on 28th November 2018.

6). Telecommunication Mobile Number Portability (Seventh Amendment) Regulations, 2018 dated 13th December 2018

The Authority on 23rd September 2009 issued the Telecommunication Mobile Number Portability Regulations, 2009 laying down the basic business process framework for implementation of intra-circle Mobile Number Portability (MNP) in the country. Facility of MNP was launched in Haryana service area on 25th November 2010 on pilot basis and the same was extended to the entire country on 20th January 2011. Initially, the MNP facility was available within the licensed service area only. However, in accordance with the provisions contained in the National Telecom Policy-2012 regarding "One Nation – Full Mobile Number Portability", full MNP was implemented w.e.f. 3rd July 2015.

The reports submitted by Mobile Number Portability Service Providers (MNPSPs) are monitored periodically to study the pattern of rejection of porting requests by the Donor Operator (DO). In view of the foregoing, the Authority initiated the consultation process with a vision to review and revamp the existing MNP process and make it more efficient and convenient for the telecom subscribers. Accordingly, a Consultation Paper was issued for the comments of the stakeholders on 6th April, 2018, seeking comments by 3rd May 2018 and counter-comments by 17th May, 2018, on the issues identified and proposed modifications in the MNP process. In response to the consultation paper, thirteen (13) comments and five (05) counter-comments were received. An Open House Discussion was held at TRAI headquarters on 11th June 2018.

The comments on the Draft Seventh amendment received from nine stakeholders were thoroughly analysed. Based on detailed analysis and due deliberations, the seventh Amendment Regulations, 2018 to the Telecommunication Mobile Number Portability regulations, 2009 was issued on 13th December 2018.

7). The Telecom Commercial Communications Customer Preference (Amendment) Regulations, 2018 and Corrigendum dated 21st December 2018

TRAI on 21st December 2018 notified the Telecom Commercial Communication Customer Preference Regulation (Amendment), 2018 to modify the time period for implementation for regulation 23, 24, 26, 27, 29 and sub-regulation 1 to 6 of regulation 25.

6.1.3. Consultation Papers

1). Consultation Paper dated 29th March 2019 on "Review of Terms and Conditions for registration of Other Service Providers (OSPs)"

TRAI on 29th March 2019 issued paper on "Review of terms and conditions for registration of Other Service Providers (OSPs)" for the consultation of stakeholders.

TRAI received a reference from DoT vide letter dated 10th September 2018 seeking recommendations of TRAI on Review of terms and conditions for registration of OSPs. 'Other Service Provider' (OSP) means a company providing Application Services wherein 'Applications Services' means providing services like tele-banking, tele-medicine, tele-education, tele-trading, e-commerce, call centre, network operation center and other IT Enabled Services by using Telecom Resources provided by authorized telecom service providers.

This consultation paper is issued to review the terms and conditions of registration of OSPs issued by DoT on 5th August 2008 and amended subsequently from time to time. In this regard, a reference was received from DoT vide letter dated 10th September 2018 seeking recommendations of TRAI on review of terms and conditions for registration of OSPs.

In pursuance of DoT communication seeking recommendations of TRAI on Review of terms and conditions for registration of OSPs, the Authority initiated this consultation paper to review the terms and conditions for the registration of OSPs. Written comments on the Consultation Paper were invited from the stakeholders by 29th April 2019 and Counter-comments, if any, by 13th May 2019.

2). Consultation Paper dated 22nd February 2019 on "Review of Per Port Transaction Charge and Other Related Charges for Mobile Number Portability"

TRAI on 22nd February 2019 issued paper on "Review of Per Port Transaction Charge and other related charges for Mobile Number Portability" for the consultation of stakeholders. This Consultation Paper was issued to review the per port transaction charge notified vide "The Telecommunication Mobile Number Portability Per Port Transaction Charge and Dipping Charge (Amendment) Regulations, 2018" on 31st January 2018 and to define the actual amount of charges for ancillary services introduced through "Telecommunication Mobile Number Portability (Seventh Amendment) Regulations 2018".

6.1.4. TARIFF ORDER

1). Telecommunication Tariff (Sixty Fourth Amendment) Order, 2018 dated 25th September 2018

TRAI had constituted a Committee to identify infructuous/ redundant regulations which could be purged. The Committee comprised of service providers and their associations as listed below: 1. ACTO 2. Aircel 3. AUSPI 4. Bharti Airtel Ltd. 5. BSNL 6. COAI 7. Idea 8. ISPAI 9. MTNL 10. Rcom 11. RJIL 12. Tata Communication Ltd. 13. Telenor 14. TTSL 15. Vodafone India Ltd.

Three separate sub-committees were also formed from amongst the members of the Committee to identify infructuous/ redundant regulations on (a) licensing, (b) QoS, and (c) tariff related issues. The sub-committee members from the industry had submitted written inputs which were considered, discussed and analysed in the meetings of respective subcommittees. Based on such deliberations, the sub-committees had submitted their recommendations to the Chairperson of the Committee.

The recommendations regarding purging of regulations made by the three subcommittees were circulated to all the members of the Committee. The final meeting of the Committee was held on 28th December 2017.

After due deliberations, the Committee has submitted final recommendations. The recommendations of the Committee, interalia, included proposals to delete, merge, or modify various provisions of the Telecommunication Tariff Order (TTO). The Authority on 25th September 2018 issued the Telecommunication Tariff (Sixty Fourth Amendment) Order, 2018.

6.1.5 DIRECTIONS

1). Direction dated 23rd May 2018 to all Access Service Providers regarding online filling of tariff offers

TRAI, on 23rd May, 2018 issued a direction to all Access Service Providers regarding online filling of tariff offers wherein all Telecom Access Service Providers (TSPs) were directed to report to the Authority all the tariffs offered to the consumers, with effect from 30th June, 2018, through XML API web service, in addition to the existing Tariff Reporting requirements. A corrigendum dated 1st June 2018 was also issued wherein minor correction were in the SML API Document were informed.

2). Direction dated 13th June 2018 issued to all TSPs regarding submission of periodical reports on revenue & usage and tariff plans

On 13th June 2018 direction was issued to all TSPs regarding submission of periodical reports on revenue and usage and tariff plans. TSPs were directed to:

i) submit the report on Revenue & Usage to the Authority on quarter basis within forty-five days from the date of respective quarter ending except fourth quarter of the financial year for which the report shall be submitted within sixty days from the date of quarter ending in prescribed Format-A (for wire-line services), Format-B (for limited mobility services) and Format-C (for full mobility services).

ii) submit the report on Tariff Plans for wireline and wireless services separately to TRAI on quarterly basis within twenty one days from the date of respective quarter ending.

iii) Submit the performance reports for basic services, cellular mobile services, internet services, PMRTS services and VSAT services on quarterly basis within thirty days from the date of respective quarter ending.

iv) Ensure the submission of correct and complete information within the prescribed timeline.

3). Direction dated 31st July 2018 issued to CMTS on Quality of Service (QoS) for Voice Calls for LTE users via Circuit Switched Fall Back (CSFB) option

TRAI on 31st July 2018 issued a direction to CMTS on Quality of Service (QoS) for Voice Calls for LTE users via Circuit Switched Fall Back (CSFB) option. This direction mandates the cellular mobile telephone service providers, to conduct tests, collect data and report to TRAI on regular basis.

The salient features of the directions are:

i) To measure call set up delay for mobile originating and terminating calls on sample basis in the networks where LTE has been launched but Voice over LTE (VoLTE) is yet to be launched.

ii) Measurements are to be taken by the access providers in every quarter of the year and reported to TRAI. Measurements to be made in various locations of the identified cities or districts in the service area.

iii) Service providers are required to conduct such tests on at least 20 locations in each identified cities or districts. At least 5 cities or districts are to be identified for carrying out these tests.

4). Direction dated 7th September 2018 issued to all access service providers and BSNL regarding posting of information pertaining to USO related activities on the website by the service provider

TRAI on 7th September 2018 issued a direction to all access service providers and M/s BSNL regarding posting of information pertaining to USO related activities on the website by the service provider.

TRAI vide its Direction dated 28th October 2005 directed all Universal Access Service Providers (UASPs) and M/s Bharat Sanchar Nigam Ltd. (BSNL) to furnish a report, on a monthly basis, to the administrator, USOF, Department of Telecommunications (DoT) on various activities relating to Village Public Telephones (VDTs), Rural Community Phones (RCPs), Rural Direct Exchange Lines (RDELs) etc. and also post this information/data on the company's website;

A Committee was formed comprising officers of TRAI and representatives of telecom service providers and associations, to identify infructuous / redundant regulations and amendments and it was observed that the Direction dated 28th October 2005 is no longer required, after which the order was withdrawn.

5). Direction dated 7th September 2018 issued to TSPs on certificate of compliance in respect of various directions

TRAI vide its Direction dated 21st August 2006, directed all Telecom Service Providers to furnish a certificate of compliance to the Authority by 31st July of every year in respect of the following:

(i) Direction dated 28th October 2005 to all UASPs and BSNL regarding posting of information pertaining to USO related activities on their website;

(ii) Direction dated 6th January 2005 to all service providers on opening of allotted codes;

(iii) Direction dated 16th June 2004 to all CMSPs on auto roaming services to all Pre-paid subscribers; and

(iv) Direction dated 11th July 2002 to all CMSPs to include standard terms and conditions in all tariff plans for pre-paid cards;

A committee was formed, comprising officers of TRAI and representatives of telecom service

providers and associations, to identify infructuous/redundant regulations and amendments and it was observed that reporting of compliance by the service providers in respect of above cited Directions is no longer required;

TRAI in exercise of powers conferred upon it under the of the TRAI Act, 1997, withdrew Direction No. 101-41/2006-MN dated 21st August 2006 vide its direction dated 7th September 2018.

6). Direction dated 18th October 2018 issued to all service providers holding Unified License, Universal Access Service License, Cellular Mobile Telephone Service License, Basic Service Operators, NLDOs and ILDOs on provision of Interconnection

The Authority had earlier issued Direction No.409-9/2005-FN dated 7th June 2005 and its corrigendum No.409-9/2005-FN dated 28th July 2005, in order to ensure compliance of terms and conditions of license and effective interconnection between service providers and to protect consumer interest. Through this Direction, TRAI directed all service providers to provide interconnection on the request of the interconnection seeker within 90 days of the applicable payments made by the interconnection seeker.

Thereafter, with the issue of "The Telecommunication Interconnection Regulation, 2018" dated 1st January 2018 and "The Telecommunication Interconnection (Amendment) Regulations, 2018" dated 5th July 2018, the framework for provisioning of ports has been revised from 90 days of the applicable payment made by the interconnection seeker to 42 working days, upon receipt of the request of ports from interconnection seekers, to ensure provisioning of ports for initial interconnection and augmentation of ports at POIs.

In view of issue of TRAI's regulations mentioned at para 2 above, the Authority has issued Direction No.6-6/2017-BB&PA dated 18th October 2018, through which it has withdrawn its earlier Direction dated 7th June 2005.

7). Direction dated 3rd December 2018 issued to all Access Service Providers on providing Telephone Bills to Persons with Disabilities as ICT Accessible

Through this order TRAI directed all Access Service Providers to provide telephone, mobile and broadband bills to PwDs in accessible form based on the choice of PwDs.

8). Direction dated 13th December 2018 issued to all Unified Access Service Providers regarding specifying common text of announcement played to subscribers

The Telecom Service Providers (TSPs) were asked to submit inputs regarding present practice adopted by them to play announcement from its networks to the subscribers and based on the inputs provided by TSPs, analysis of announcements played in different networks and different

circles were carried out by the Authority. After analyzing the issues of announcements played by TSPs, TRAI identified 16 events of announcement, in consensus with other TSPs, where common texts for announcement across all Service Providers are needed in order to avoid subscriber inconvenience.

The Authority directed all Access Service Providers to make arrangements to have common text for announcement played by TSP's networks to subscribers for 16 identified events. Vide this direction all Access Service Providers were directed to play common text of announcement to their subscribers for above mentioned 16 identified events, with effect from the 1st day of March 2019.

9). Direction dated 20th December 2018 issued to all Unified Access Service Providers regarding online filing of tariffs

TRAI issued a Direction on 23rd May 2018 regarding online filing of tariff offers directing all Access Service Providers to report to the Authority, all the tariffs offered to the consumers through XML API web-service with effect from 30th June 2018. These tariffs were filed through physical paper filing as well as through online filing.

All Telecom Access Service Providers were asked :

(i) to file tariffs online w.e.f. 1st January 2019;

(ii) to comply with the reporting requirement as per clause 7 of the Telecommunication Tariff Order, 1999 while filing tariffs through online mode;

6.2 TELECOM DISPUTES SETTLEMENT AND APPELLATE TRIBUNAL (TDSAT)

The Telecom Regulatory Authority of India (TRAI) Act, 1997 (as amended) provides for the establishment of the TRAI and the Telecom Disputes Settlement and Appellate Tribunal (TDSAT) to regulate the telecommunication services, adjudicate disputes, dispose off appeals and to protect the interests of service providers and consumers of the Telecom, Broadcasting & Cable sector and to promote and ensure orderly growth of the Telecom, Broadcasting & Cable sectors and for matters connected therewith or incidental thereto.

6.2.1 The TDSAT was created in the year 2000 by the Central Government under the TRAI Act, 1997 (as amended) to settle and adjudicate disputes involving licensor, licensee, and a group of consumers. In January, 2004 the jurisdiction of TDSAT was extended to include broadcasting and cable services besides telecommunication services. In May, 2017 the jurisdiction of TDSAT was further extended to include erstwhile jurisdiction of Airport Economic Regulatory Authority Appellate Tribunal (AERAAT) and Cyber Appellate Tribunal (CyAT).

The jurisdiction of TDSAT is exclusive and an appeal against its order lies to the Hon'ble Supreme

Court of India on points of law only. However, under the provisions of IT Act, appeal against order of TDSAT on cyber matters lies before High Court. Statutory appeal does not lie against the interim order of TDSAT. TDSAT exercises both original as well as appellate jurisdiction. TDSAT is an expert body and comprises of a Chairperson and two Members.

TDSAT is not bound by the provisions of Civil Procedure Code. It has formulated its own Procedure (TDSAT Procedure 2005) which is simple and is based on the principles of natural justice. Court fee for filing a petition, appeal and Misc. application before TDSAT is ₹5,000/-, ₹10,000/- and ₹1,000/- respectively.

World over, the disputes in telecom and broadcasting sectors are resolved by the regulator or normal courts. However, in India, a unique Institution in the form of TDSAT exists for speedy settlement and adjudication of disputes in telecom and broadcasting sectors. As such, dispute resolution in India is outside the purview of the telecom regulator. Indian model for resolution of disputes has been seen with great interest by various telecom regulators across the world.

In telecom sector various types of matters relating to interconnection, inter-operator billing disputes, customer application form (CAF), certain policy and regulatory actions failing to address legitimate expectations of stakeholders, recovery of outstanding dues of stakeholders, licensing disputes including disputes on computation of Adjusted Gross Revenue (AGR) and allocation of spectrum, disputes on access deficit charge (ADC) etc., can be filed in TDSAT.

In broadcasting and Cable sector, cases relating to signal disconnection/ refusal/denial, pricing of channels/ bouquets, non-payment/ recovery of subscription/carriage charges, piracy of signals/ illegal transmission of signals, licensing disputes, disputes arising out of tariff order of the TRAI etc., can be filed before TDSAT.

The number of cases in the Tribunal has been increasing every year since its establishment in May, 2000. The total number of cases filed before TDSAT in the 2001 were 105 (including Petition/ Appeal/ E.A./R.A.), which increased to 766 (Excluding M.A.) in 2017 and in the year 2018, a total of numbers of 948 cases (Excluding M.A.) have been filed. The disposal of cases has kept pace with the filing and all efforts are made to ensure that there is speedy disposal. A statement of cases filed, disposed off and pending since 2001 till 31st March, 2019 is enclosed.

TDSAT has been organizing seminars from time to time, in different parts of the country to bring public awareness amongst various stakeholders including consumers, about the dispute redressal mechanism in the Telecom, Broadcasting and Cable Sectors and to find ways and means to strengthen the grievance redressal system in these sectors. TDSAT has so far organized 50 such seminars. Another seminar is proposed to be held in the month of August, 2019. The distinguished speakers including Hon'ble Judges of the Supreme Court, during various seminars organized by TDSAT, have commended the delivery system of TDSAT.

As sector Member of International Telecommunication Union (ITU), TDSAT has been participating in the international seminars, conferences and events organized by ITU and other international bodies. Officers/ Officials of TDSAT from time to time, are being deputed to participate in Training programmes organized by the National Productivity Council (NPC).

TDSAT maintains its own website with all judgments and other activities of the Tribunal uploaded on it at www.tdsat.gov.in.

TDSAT has also set up a Mediation Centre to help litigants go through a mediation process and arrive at a mutually agreed settlement of disputes with the help of trained mediator. The Mediation Centre has started functioning from 29.07.2013 and has been successful in helping settle large number of cases so far. As on 31.03.2019 a total number of 480 cases have been referred to Mediation Centre. Out of this, a total number of 177 cases have been settled and 292 numbers of cases were referred back to the Tribunal unsettled. The remaining 11 cases are currently under mediation.

6.2.2 The TDSAT has also set up a Registrars' Court which has started functioning w.e.f. 22.7.2013 for completion of pleadings, framing of issues and taking up evidence etc. to speed up the disposal of cases before TDSAT.

Table 6.2 Statistics of Mediation Centre (29.07.2013 to 31.03.2019)

S. No.	Year	No. of cases referred to the Mediation Centre	Cases Settled by Mediation Centre	Referred back to Hon'ble Tribunal	Cases Pending
1	2013-14	233	102	131	Nil
2	2014-15	97	36	61	Nil
3	2015-16	42	10	32	Nil
4	2016-17	52	12	40	Nil
5	2017-18	52	16	28	8
6	2018-19	4	1	0	3
Total		480	177	292	11

STATEMENT OF INSTITUTION, DISPOSAL AND PENDENCY OF CASES AS ON 31ST MARCH, 2019

S. No.	Discription	INSTITUTION																				
		2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Total	
1	Petition	24	20	20	56	155	328	333	271	284	437	523	981	478	545	707	829	717	892	78	**7678**	
2	Review Application	0	1	2	2	3	7	17	5	9	11	14	19	9	11	2	9	22	3	2	**148**	
3	Appeal	12	15	32	5	12	18	15	11	9	11	2	22	19	7	5	3	9	9	2	**218**	
4	AERA Appeal	0	0	0	0	0	0	0	0	0	5	14	12	15	3	0	9	2	8	2	**70**	
5	CYBER Appeal	0	0	0	0	0	0	1	0	8	6	11	4	10	8	34	3	1	23	8	**117**	
6	Received on Transfer from Trai	16	0	0	0	0t	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**16**	
7	Received on Transfer from High Court	0	0	0	0	0	0	0	0	0	0	0	0	13	0	0	0	0	0	0	**13**	
8	On Remand from SC	5	1	1	0	2	3	10	6	7	1	0	0	0	0	0	0	0	0	0	**36**	
9	Executition Applicaton	0	0	0	7	2	18	27	4	10	36	24	46	15	27	12	30	15	13	7	**293**	
10	Total	**57**	**37**	**55**	**70**	**174**	**374**	**403**	**297**	**327**	**507**	**588**	**1084**	**559**	**601**	**760**	**883**	**766**	**948**	**99**	**8589**	
11	M.A.	48	57	48	176	253	148	165	214	179	355	348	718	406	336	508	508	**507**	**521**	**76**	**5571**	
	Grand Total	**105**	**94**	**103**	**246**	**427**	**522**	**568**	**511**	**506**	**862**	**936**	**1802**	**965**	**937**	**1268**	**1391**	**1273**	**1469**	**175**	**14160**	

S. No.	Discription	Disposal																				Pendency
		2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Total	
1	Petition	24	20	20	56	155	328	333	271	283	437	522	948	433	415	444	291	285	374	13	**5652**	2026
2	Review Application	0	1	2	2	3	7	17	5	9	11	14	19	9	11	2	9	22	3	1	**147**	1
3	Appeal	12	15	32	5	12	18	15	11	9	11	2	22	19	6	2	1	9	6	0	**207**	11
4	AERA Appeal	0	0	0	0	0	0	0	0	0	5	14	11	11	1	0	2	0	2	0	**46**	24
5	CYBER Appeal	0	0	0	0	0	0	1	0	8	6	11	2	2	2	5	1	1	4	0	**43**	74
6	Received on Transfer from Trai	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**16**	0
7	Received on Transfer from High Court	0	0	0	0	0	0	0	0	0	0	0	0	13	0	0	0	0	0	0	**13**	0
8	On Remand from SC	5	1	1	0	2	3	10	6	7	1	0	0	0	0	0	0	0	0	0	**36**	0
9	Executition Applicaton	0	0	0	7	2	18	27	4	10	36	24	46	15	23	11	29	5	9	0	**266**	27
10	Total	**57**	**37**	**55**	**70**	**174**	**374**	**403**	**297**	**326**	**507**	**587**	**1048**	**502**	**458**	**464**	**333**	**322**	**398**	**14**	**6426**	2163
11	M.A.	48	57	48	176	253	148	165	214	179	353	346	693	371	296	231	375	308	343	31	**4635**	936
	Grand Total	**105**	**94**	**103**	**246**	**427**	**522**	**568**	**511**	**505**	**860**	**933**	**1741**	**873**	**754**	**695**	**708**	**630**	**741**	**45**	**11061**	**3099**

CHAPTER 7
ADMINISTRATION, TRAINING AND SWACHH BHARAT

7.1 RIGHT INFORMATION ACT

A separate RTI Unit has been established in the Department and is functional since January 1, 2007. RTI Unit of the Department is headed by Section Officer and functioning under the supervision of Deputy Secretary and Nodal Officer (RTI). To facilitate the quick disposal of RTI applications/appeals, 108 CPIOs and 46 First Appellate Authorities are functioning.

RTI Applications Data for the Year 2018-19:

- Total online RTI applications received during the year – 2434
- Total online applications received from other departments – 1214
- Total online RTI appeals received during the year - 299
- Total offline RTI applications received during the year – 822
- Total offline Appeals received during the year – 51
- Total fee received for offline application during the year – ₹ 2605

The facility of receiving and processing RTI applications/appeals online through the RTI Web-Portal of Department of Personnel & Training, has been started in the Department on 23.08.2013. This is strengthening the system of quick disposal and monitoring of RTI applications and appeals. All PSUs under this department i.e. BSNL, MTNL, TRAI, TDSAT, C-DOT, TCIL have been made online on RTI-MIS portal.

7.2 PUBLIC GRIEVANCE

A. Grievance Redressal Mechanism

The responsibility of redressal of grievances in the telecom sector lies with the concerned organizations / subordinate units / PSUs / administrative sections of the Ministry / Service providers (in case of a service grievance). However, Public Grievance (PG) Wing of Department of Telecommunications (DoT), without prejudice to the right of a complainant to approach an appropriate court of law, acts as a facilitator for resolution of grievances so received. A complainant may approach to PG wing of Department of Telecommunications (DoT) after exhausting the channels of redressal of grievance at concerned Organization / Service Provider level. PG wing is coordinating the matter with all the concerned stake holders including Telephone Service Providers

(TSPs), Internet Service Providers (ISPs) etc. for amicably resolving the grievances effectively & in time bound manner to the satisfaction of the complainants.

Grievance can be lodged in PG Wing of DoT through following means:

(a) By Post: Public Grievances Cell, Department of Telecommunications, Room No. 612, Mahanagar Doorsanchar Bhawan, Old Minto Road, J. L. Nehru Marg, New Delhi – 110002.

(b) By hand: Information & Facilitation Counter, Sanchar Bhawan, 20, Ashoka Road, New Delhi- 110001.

(c) Through Fax: FAX No. 011-23232244

(d) Through Phone: Phone No. 011-23221166, 1063 (Toll Free)

(e) By Web Portal: www.pgportal.gov.in

With an object of speedy redressal and effective monitoring of grievances, DoT is using Web based and Centralized Public Grievances Redressal And Monitoring System (CPGRAMS) of Government of India developed by Department of Administrative Reforms & Public Grievance (DARPG) through which a customer can register their grievances for redressal. The system facilitates generation of unique registration number upon the online submission of grievances from aggrieved citizens (to DoT) through internet using any Browser interface.

The system also provides the online facility to a citizen to monitor the progress of redressal process in respect of the grievance lodged by him.

HEAD OF DEPARTMENT	**CONTACT POINTS**
Secretary (Telecom) Department of Telecommunications 210, Sanchar Bhawan New Delhi- 110001. Tel: 011-23719898, FAX No. 23711514 E-mail ID: Secy-dot@nic.in	Shri Arjun Singh Deputy Director General (Public Grievances) Department of Telecommunications 612, Mahanagar Doorsanchar Bhawan, Jawahar Lal Nehru Marg, Old Minto Road, New Delhi–110002. Tel: No. 011-23221231, FAX No. 23222605 E-mail ID: ddgpg-dot@nic.in Our website – www.dot.gov.in

B. Details of Officers in PG Wing.

Table 7.1			
Designation of PG Officer	**Tele. No.**	**FAX. No.**	**Postal address**
Deputy Director General (PG)	011-23221231	011-23222605	Room No. 612, Mahanagar Doorsanchar Bhawan, Old Minto Road, J. L. Nehru Marg, New Delhi 110002
Director (PG - I)	011-23220537	011- 23222350	Room No. 605, Mahanagar Doorsanchar Bhawan, Old Minto Road, J. L. Nehru Marg, New Delhi 110002
Director (PG - II)	011-23222723	011-23212724	Room No. 606, Mahanagar Doorsanchar Bhawan, Old Minto Road, J. L. Nehru Marg, New Delhi 110002
Director (MOC - PG)	011-23222711	011- 23232244	Room No. 602, Mahanagar Doorsanchar Bhawan, Old Minto Road, J. L. Nehru Marg, New Delhi 110002
ADG (PG - I)	011-23222582	011-23222224	Room No. 606, Mahanagar Doorsanchar Bhawan, Old Minto Road, J. L. Nehru Marg, New Delhi 110002.
JTO (MOC - PG)	011-23232657	011- 23232244	Room No. 604, Mahanagar Doorsanchar Bhawan, Old Minto Road, J. L. Nehru Marg, New Delhi 110002
Incharge (MOC-PG Cell)	011-23221166	011-23232244	Room No. 603, Mahanagar Doorsanchar Bhawan, Old Minto Road, J. L. Nehru Marg, New Delhi 110002.

C. Grievances Redressal Status

Department of Telecom receives complaints through the offices of Hon'ble Prime Minister, Minister of Communications, MPs, MLAs, VIPs Chairman's Office, Department of Administrative Reforms and Pubic Grievances (DARPG), Department of Pensions and Pensioners Welfare, Directorate of Public Grievances (DPG), and other Govt. Departments and also directly from citizens in its Public Grievance Wing. Public Grievance Wing of DoT monitors complaints for their early and timely settlements. The details in respect of complaints handled for the year 2018-19 (from 01.04.2018 to 31.03.2019,) are given as under: -

Table 7.2				
Opening Balance as on April 01, 2018	**No. of grievances booked during 1st April, 2018 to 31st March, 2019**	**Total**	**No. of grievances disposed during 1st April, 2018 to 31st March, 2019**	**Pending Balance as on 31st March, 2019**
3132	65273	68405	64666	3739

7.3 CITIZEN CHARTER

The Citizen's / Client's Charter is a written declaration by a Government Department that highlights the standards of service delivery that it subscribes to availability of choice for consumers, avenues for grievance redressal and other related information. In other words, it is a set of commitments made by a department regarding the standards of service which it delivers.

Though not enforceable in a court of law, the Citizen's/Client's Charter is intended to empower citizens and clients so that they can demand committed standards of service and avail remedies in case of non-compliance by service provider organizations. The basic thrust of the Citizen's / Clients Charter is to render citizen-centric public services by making them demand driven rather than supply driven.

DOT has formulated its Citizen's / Client's Charter listing main services being delivered by DoT. All these services have been documented with associated process details which includes details of documents required, applicable fees, if any, along with its mode of payment for availing each of the services. The Charter specifies the standards of services delivery, the contact details of the centre's responsible for delivery of these services, performance evaluation criteria in respect of delivered services, etc.

The details of Citizen's/Client's Charter of Department of Telecom, for the year 2018-19 are under review / consideration.

7.4 TRAINING

The Training & Capacity Building Division is entrusted with the work of deputation of telecom officers for domestic & long term trainings, coordination for training activities with DoPT and coordination for training activities of National Telecommunications Institute for Policy Research, Innovations & Training (NTIPRIT), development of cadre training Plan including Mid-Career Training Program, In-service courses and customized training programs for telecom officers. The Division is also taking steps for several training and knowledge sharing initiatives such as identifying and developing pool of certified trainers on topics of interest from available pool of officers in DoT and knowledge management & sharing through workshops. The Division is also contributing towards building synergy in the field of capacity building among various field units of DoT, PSUs/ departments under DoT such as NTIPRIT, ALTTC, TEC, C-DOT, TCIL etc by encouraging pooling of resources.

With the above objectives in mind and keeping in view the directions provided in the National Training Policy 2012, the Training & Capacity Building Division undertook several important activities in the year 2018-19. In all, 17 officers of the cadre were deputed to 6 long term Training programs at IIM Bangalore, IIPA New Delhi, MDI Gurgaon, TERI New Delhi, ISB Hyderabad and NDC

New Delhi.In addition to above, about 230 officers were deputed for short term trainings during the year in the upcoming technology areas of Mobile Brodband QoS, IoT, 5G, e-Governance, Public Procurement, Cyber Security etc.

The Division contributed significantly to International Relation activities of DoT through capacity building initiatives. It organized a training program on Cyber Defence Exercise with Recurrence (CYDER) under the framework of India Japan Joint Working Group on ICT during 18th- 19th March 2019 in collaboration with Ministry of Internal Affairs and Communications, Govt of Japan. The program was attended by officers of DoT as well as of other Ministries/departments. Similarly, 3 technical training programs were held under the aegis of Indian Technical and Economic Cooperation Programme (ITEC) of Ministry of External Affairs (MEA) for international participants from 20 developing countries at NTIPRIT on topics of Telecom Licensing/Regulations, Mobile and Optical Transmission Technologies.

Under the Synergy initiative, DoT takes steps for capacity building of officers/officials in the PSUs and organisations under it by conducting inter-organisational trainings. Keeping in view the above objective, a training program was conducted by Training Division in coordination with TEC at Bangalore from 6th-7th March 2019 for capacity building of officers of ITI Ltd on the topic 'IoT & 5G'. About 75 officers/officials of Bangalore and Palakkad units of ITI were trained in the program.

With a view to provide exposure to latest technologies to senior officers, four one day seminars were conducted in collaboration with MoU partners/Industry at DoT Headquarter during the year 2018-19 on technical topics such as 5G Technology, Internet of Things (IoT), Advance Spectrum Management as well as on topics of social interest such as role of mobile phones in bridging the Gender Gap.

A. National Telecommunications Institute for Policy Research, Innovations & Training (NTIPRIT)

The Department of Telecommunications established the National Telecommunications Academy (NTA) in the year 2010 as the technical training institute of the Department. Subsequently in year 2011, the mandate of institute was expanded by bringing into the activities related to Policy Research and Innovations under its ambit and the Institute was rechristened as National Telecommunications Institute for Policy Research, Innovations & Training (NTIPRIT). Since then it has grown from strength to strength and NTIPRIT is now a Central Training Institute (CTI) enlisted with Department of Personnel & Training. It is presently operating from the campus of Advanced Level Telecom Training Centre (ALTTC) of BSNL at Ghaziabad.

(i) Interaction of Officer Trainees with Dignitaries

Call on the Hon'ble President of India: Officer trainees (OTs) of 2016 batch of Indian Telecommunication Service and P&T Building Work Service called on the President of India, Shri

Ram Nath Kovind, on 11th July, 2018 at Rashtrapati Bhavan.Smt. Aruna Sundararajan, Secretary & Chairman Telecom Commission; Sh. Deepak Sinha, Member (S); Sh. Debatosh Manna, Advisor (NTIPRIT) and other senior officers were present during the deliberations.

Addressing the OTs, the President said that our country has the world's second largest telecom network based on the total number of users. This sector is a critical component for achieving rapid economic progress and socio-economic development. Indian Telecommunication Service officers have an important role to play as we seek to connect the unconnected especially in our rural and remote areas. This is essential to make our growth inclusive. It is Indian Telecommunication Service and P&T Building Works Service officers' responsibility to ensure that we have in place an enabling policy paradigm and a conducive licensing and regulatory framework.

ITS/ P&T BWS-2016 batch Officer Trainees and other Officers of DoT with Hon'ble President of India

Interaction with Hon'ble Minister of State for Communications: NTIPRIT organized interaction of OTs of 2016 batch of ITS and P&T BWS with Hon'ble Minister of State for Communications Sh. Manoj Sinha at Sanchar Bhawan, New Delhi on 8th May, 2018. Sh. Deepak Sinha, Member (S); Sh. Prabhash Singh, Member (T); Sh. Sunil Kumar, DG (Telecom); Sh. Debatosh Manna, Advisor (NTIPRIT) were present during the deliberations.

In his Address, Hon'ble Minister exhorted the Officer Trainees to develop capabilities to bring

India at par with developed countries in the area of latest telecom technologies, especially in 5G. Shri Sinha suggested to include the topics on emerging technologies in ICT domain in Induction Training curriculum of ITS probationers. He gave 3 Mantras to young Officer Trainees – have clear vision, focus on creativity and display passion to do & deliver the assigned works.

ITS/ P&T BWS-2016 batch Officer Trainees with Hon'ble Minister (Group-1)

ITS/ P&T BWS-2016 batch Officer Trainees with Hon'ble Minister (Group-2)

(ii) Induction Training

ITS Induction Training: NTIPRIT conducted induction training for ITS-2014 batch (15 OTs), ITS-2015 batch (33 OTs) and ITS-2016 batch (34 OTs) during 2018-19.

The OTs were imparted classroom training on the topics of Mobile Communications, Regulations & Dispute Settlement, Lawful Interception & Monitoring, Disaster Management, Ethics, Optical Communication, Satellite Communications, Data Communications, Cyber Security and Mobile Communications etc. They were attached to DoT HQ and field units - License Service Area (LSAs) for exposure to working of these units and learning administrative, financial and technical matters being dealt by them. They were deputed to PSUs and autonomous bodies of the department TEC, TRAI,C-DOT, BBNL, BSNL for understanding their functioning and to get first hand exposure of R&D and implementation of projects of National and Strategic Importance.

OTs of ITS 2015 batch gave presentations to Hon'ble Minister of State for Communications containing recommendations/solutions on various issues being faced in implementation of Govt Schemes for their possible implementation by DoT. They were also deputed to North East to visit and do a survey on the status of the telecom services in urban and rural areas of these states.

OTs of ITS 2016 batch were also sent for study visit to telecom installations in various parts of country. During the visit, they got an opportunity to learn about functioning of Telecom Setups and ecosystem of Telecom sector.

Officer Trainees of ITS-2016 batch at Global Service Centre India, Huawei, Bangalore.

P&T BWS Induction Training: NTIPRIT conducted induction training for7 OTs of P&T BWS-2013, 2015, 2016 and 2017 batches. Various technical modules related to Civil and Electrical Engineering were covered. The OTs were also trained in Public works account.

Foundation Course: NTIPRIT conducted 15 weeks Foundation course for ITS-2014 batch (15 OTs) and P&T BWS-2013/2015 batches (2 OTs) from 17.12.2018 to 29.03.2019.

JTO Induction Training: NTIPRIT conducted Mobile Communications, Data Communications and other technical and administrative modules of 30 weeks training for Junior Telecom Officers (JTO) 2016 batch.

(iii) In-Service Courses:

NTIPRIT has conducted 11 In-Service courses in 2018-19 on various technical and non technical topics like Advance Transmission Technologies, Cyber & Telecom Network Security, Role of Telecommunications in Disaster Management, e-procurement and Vigilance and disciplinary proceedings etc. Total 190 officers of DoT and other central government organizations like Ministry of Home Affairs were benefited by attending these courses.

(iv) ITEC Courses:

Under the aegis of the Indian Technical and Economic Cooperation Programme (ITEC) of Ministry of External Affairs (MEA), professionals and people from developing countries are offered training to empower them with professional skills and to prepare them for an increasingly globalized world. Under ITEC framework,3 training courses were conducted by NTIPRIT in the Academic year 2018-19. Total 43 Participants from 20 member countries, namely Afghanistan, Chad, Cambodia, Colombia, Egypt, Honduras, Jordan, Lebanon, Mauritius, Mongolia, Mozambique, Myanmar, Nigeria, Peru, Palestine, South Sudan, Sri Lanka, Suriname, Tanzania, Tunisia attended these programs. The sessions were handled by the experienced Faculty of NTIPRIT and subject matter experts from DoT HQ, TEC, C-DoT, TRAI and Industry. Visits were also arranged to different labs in ALTTC and C-DOT.

In addition to domain related topics, sessions were held on the topics of 'Incredible India' and 'Current Telecom Scenario in India' to give participants insight about the rich heritage and culture of India as well as positioning of India as one of the leaders in the Global Telecom space. The participants were also taken for local visits to the Heritage sites/ Historical Monuments in Delhi and two days visit to Agra. The participants gave country presentations containing the Cultural and Telecom aspects of their country. The foreign participants were very much appreciative about the course contents, support mechanism and the hospitality.

The following is the summary of the courses.

Table 7.3

S. No	Course name	Period	No of participants	Countries Represented
1	Telecommunication Licensing & Regulation	21st Jan- 1st Feb 2019	11	8
2	Mobile Technologies: GSM, UMTS, LTE	25th Feb- 8th Mar 2019	14	7
3	Optical Transmission Technologies	25thMar-29thMar 2019	18	12

Inauguration of ITEC course on 'Telecommunication Licensing & Regulation'

ITEC Course (Telecommunication Licensing & Regulation) Participants and faculty of NTIPRIT with Member (S), DoT

ITEC Course (Mobile Communication Technologies: GSM, UMTS & LTE) participants with Sr. Dy. Director General, NTIPRIT and other faculty members

ITEC course (Optical Transmission Technologies) participants with Advisor (O), DoT

(v) Summary of Training Courses Conducted by NTIPRIT during 2018-19:

Table 7.4

S. No.	Type of Course	No. of Courses	No. of Trainees	Trainee Days
1	Induction Course for ITS Group - A Officers	23	68	13504
2	Induction Course for P&T BWS Group - A Officers	15	7	1443
3	Induction Course for JTO Group - B Officers	12	4	277
4	In-Service training for DoT officers	11	190	294
5	ITEC Courses for foreign Participants	3	43	376
	Total	64	312	15894

B. NATIONAL INSTITUTE OF COMMUNICATION FINANCE (NICF)

During the year NICF conducted the following training programmes

- MCT-II, I and III for IP&TAFS officers at NIFM Faridabad (with one weak International attachment), at IICA Manesar (with one week outstation attachment) and at IICA Manesar (with one week outstation attachment) respectively.
- "BSG Workshop on Capacity Building for Bridging the standardization Gap" in collaboration with ITU from 18.12.2018 to 20.12.2018 in which IP&TAFS officers from various Pr. CCA/CCA/GM(F)/DA(P) offices as well as DoT Hqrs and O/o CGCA participated.
- Orientation Training of newly appointed AAOs at NICF, Ghitorni, and monitored at other CCA offices also.
- Workshops on PFMS/GEM. Digital Payments, Budget, TDS and Filing of Return, Redefining the Role & Scope of IA in DoT etc
- NICF has also been authorized by NITI Aayog for conducting web-based training on digital payment for ITU.
- Workshop on GST & e-filling for the participants of Department of Posts
- Probationary training was carried out for 2017 Batch IP&TAFS Officer Trainees (OTs) on the Administration and Management Module, Telecom Module and Postal Module. Apart from these, special initiative was taken to give them specialized training with a certification course on 'Advanced Excel Tools and Techniques for analysing Data' for 2 weeks.

- A 5 week training under Orientation module was carried out for IP&TAFS OTs of 2018 batch. Many eminent speakers, experts and senior departmental officers were invited to impart training as also interact with the newly recruited OTs.
- Apart from the above, a workshop was organized in the niche area of 'Legal issues pertaining to License Fee' in which starting from the history of litigation in the licensing regime to many tricky and contentious issues like 'What is AGR', the Industry's inside views as also Regulator (TRAI)'s perspective were covered. The workshop was very well received by the participating Officers.

7.5 STAFF WELFARE AND SPORTS

The Welfare Cell under General Administration Branch undertakes various activities for the welfare of staff which *inter alia* include grant of Scholarship, Book Award and financial incentives to the meritorious school / college going children of the employees. Besides this, conveyance allowance / hostel subsidy is also granted to the differently abled children of the employees. Ex-Gratia financial assistance is also to the employees and their family in distress. In order to encourage the spirit of adventure and foster brotherhood amongst the employees, Welfare Cell also organizes excursion / recreation tours for which subsidy is provided from the Welfare Fund. During April, 2018 to March, 2019, the following activities were undertaken:

(i) Five excursion / trekking trips to Nainital, Chopta – Tungnath, Maclodganj – Triund were organised during the month May & June 2018 for regular employees of Deptt. of Telecom (Hqrs). The main aim to organize these recreation excursion trips is to develop team building spirit amongst the employees. Total no. of 133 employees have participated in these trips in different groups and a total of Rs. 7,86,980/- (Rupees Seven Lakh Eighty-Six Thousand Nine Hundred & Eighty Rupees Only) was spent from welfare fund on organizing these excursion trips.

(ii) An amount of approximately Rs. 35,000/- (Rupees Thirty-Five Thousand Only) was spent for the Inter Ministry Cricket, Badminton & Chess tournaments and purchase of cricket equipment.

(iii) An amount of Rs. 80,000/- (Rupees Eighty Thousand Only) has been disbursed to the family members of 04 (Four) deceased employees @ Rs. 20,000/- each, as immediate financial assistance.

The overall response of all the trips was excellent. This was for the first time that so many trips were undertaken simultaneously. All the participants were apprised of the trips well in advance by their respective group coordinators. All of them were given proper instructions and a list of "Things to carry" for the trips. The trips were 70 % sponsored by the Telecom Staff Welfare Board with the remaining 30% were paid by the employees. The hotel stay was comfortable along with camping at the trekking points. All the buses were air conditioned for comfortable travel for the employees. Overall the excursion/trekking trips were a fine experience for all the employees of the department.

7.6 SWACHHATA MISSION

On completion 4 years of Swachh Bharat Mission, a fortnight long programme 'Swachhta Hi Sewa' was launched by the government to celebrate 4th anniversary of Swachh Bharat Mission w.e.f. 15.09.2018 to 02.10.2018. To celebrate the pakhwara in a befitting manner, the Department drew up an elaborate Action Plan for "Swachhta Hi Sewa" Pakhwara. Various swachhta activities as well as Jagrookta Abhiyaan was organised in the Department and its PSUs/organisation. A 'NukkadNatak' was staged by DoT officials at Patel Chowk Metro Station. Officials of the Department displayed placards carrying swachhta related messages. MTNL/BSNL sent swachhta related SMSs to their subscribers during the campaign. Hon'ble MOSC(I/C) also briefed media on 5.12.2918 about various activities carried out by the Department during Swachhta Pakhwada.

7.7 OFFICIAL LANGUAGE

The Official Language Division is under the overall administrative control of Joint Secretary (Administration) and Deputy Director General (Coordination & Administration). The composition of the Official Language Division comprises one Director/Joint Director, two Deputy Directors, two Assistant Directors, 10 Senior Translators, 06 Junior Translators, one Section Officer, two Assistant Section Officers and other supporting staff.

During the period 2018-19 (January, 2018 to March, 2019), following items of important work relating to the progressive use of Hindi were undertaken by the Official Language Division:-

(i) Implementation of The Official Language Policy And The Annual Programme Of The Govt. Of India

All Sections, attached and subordinate Offices and Public Sector Undertakings under the administrative control of the Department were advised to comply with the provisions of the Official Language Act, Rules and instructions issued thereunder for achieving the targets fixed by the Ministry of Home Affairs, Department of Official Language, in their Annual Programme for the year 2018-19. Various check-points were also devised for the effective implementation of the Official Language Policy of the Union in this regard. Quarterly Progress Reports regarding progressive use of Hindi in the Department, its attached and subordinate units and the Public Sector Undertakings under its administrative control were reviewed and necessary instructions issued for taking corrective measures. Section 3(3) of the Official Languages Act, 1963 was fully complied with during the period under review.

(ii) HINDI SALAHAKAR SAMITI (Hindi Advisory Committee)

In pursuance of the guidelines issued by the Ministry of Home Affairs, Department of Official Language from time to time, a Hindi Salahakar Samiti has been constituted in the Ministry of Communications, Department of Telecommunications. Functions of the Samiti are to render advice to the Government in regard to the implementation of the provisions relating to official language contained in the Constitution, Official Languages Act and Rules framed thereunder, decisions of the Kendriya Hindi Samiti, implementation of the instructions issued by the Department of Official Language to improve and strengthen progressive use of Hindi in the Department of Telecommunications and its attached, subordinate offices and undertakings. During the last tenure of three years of the committee, which expired on 14th September, 2018, its two meetings were held on 27.08.2018 and 29.05.2018 in Banglore and Raipur (Chhattisgarh) respectively under the chairmanship of Shri Manoj Sinha, hon'ble Minister of State of Communications (Independent Charge). Now, reconstitution of the committee is under process.

(iii) Monitoring and Inspection

The Official Language Division acts as a co-ordinator in the event of official language inspections of the various offices/undertakings/organizations under the control of Ministry of Communications, Department of Telecommunications, conducted by the Second Sub Committee of the **Committee of Parliament on Official Language (CPOL).** In these inspections, the Ministry/Department is represented by the Deputy Director General level officer and representative(s) of the Official Language Division. During the period under report, 16 such inspections of various offices under the control of Department of Telecommunications were carried out.

(iv) Official Language Inspections of Offices Located In Delhi and Outside by the Ministry

In order to assess the status of the implementation of the official language policy, it is mandatory for the Ministry/Department to conduct official language inspections of at least 25% of its undertakings/offices/units etc., as per targets prescribed by the Ministry of Home Affairs, Department of Official Language, in their Annual Programme 2018-19. During inspections of this Department and offices under its control, the Second Sub-committee of the Committee of Parliament on Official Language (CPOL), also emphasises the mandatory requirement of official language inspections by the Ministry/Department of the offices/undertakings under its control, as per the targets fixed by the Department of Official Language.

In this context, during the period, January, -2018 to March, -2019, 07 official language inspections in various telecom circle offices of Bharat Sanchar Nigam Limited situated across the country, were carried out by the officials of the Official Language Division of this department. Besides these, 02 official language inspections were carried out in the Delhi-based offices of BSNL during the same period.

(v) Training in Hindi Language, Hindi Typewriting/Hindi Stenography

Official Language Division also processes nominations of officials for various training courses conducted under Hindi Teaching Scheme by the Central Hindi Training Institute, Department of Official Language, Ministry of Home Affairs. During the period under report, 25 officials for training in Hindi typewriting and 10 officials for training in Hindi Stenography were nominated by this division.

(vi) Meetings Of The Official Language Implementation Committee

Quarterly meetings of the Official Language Implementation Committee (OLIC) of the Department are held at regular intervals wherein the progress relating to the use of Hindi in official work in the department is reviewed and based on discussions in them,

effective strategy is worked out for the improvement of progressive use of Hindi and implementation of the official language policy. During this period, five such meetings were held on 09.03.2018, 18.06.2018, 11.09.2018, 28.11.2018 and 27.03.2019 respectively.

(vii) Celebration Of 'Hindi Pakhwara'

In consonance with effective implementation of the Official Language Policy and creating awareness of using Hindi in day-to-day official work, **'Hindi Pakhwara'** was organized from 14.09.2018 to 28.09.2018 in the Department. For the purpose of the promotion of Official Language in the Department, thirteen Hindi competitions were held. 309 officers/officials participated in these competitions, out of which 82 were given cash awards. Besides this, certificates of appreciation were also given to the winners by Joint Secretary (Administration) and Deputy Director General (Coordination & Administration) in a prize distribution function held on 13th November, 2018.

(viii) Hindi Essay Competition Held During Doorsanchar Swachhta Pakhwara

Implementing the Action Plan in respect of '**Swachhta hi Sewa Fortnight'** from 15th September to 02nd October, 2018. A Hindi Essay Competition was held on 25th September, 2018 on the topic, 'स्वच्छ भारत–स्वस्थ भारत'. 27 officers/officials participated in this Hindi Essay Competition, out of which 09 winners were given cash awards.

(ix) Translation Activities

During the period under report, apart from the regular translation of routine material, a number of important and time-bound translation of material relating to Standing Committee on Demand for Grants/Parliamentary Assurances, Action Taken Notes, Cabinet Notes, RTI matters, Parliament Questions, Delay Statements, Monthly Summaries, documents specified in Section 3 (3) of the Official Languages Act, 1963 and other parliamentary activities was carried out.

Notifying offices under rule 10(4) of the Official languages Rules, 1976

Besides above official language activities, the Official Language Division also processes the proposals received from corporate offices of BSNL, MTNL etc. to notify their offices under various telecom circles across the country, under rule 10(4) of the Official Languages (use for official purposes of the Union) Rules, 1976, where 80% and above officials have acquired working knowledge of Hindi.

CHAPTER 8

VIGILANCE WING

8.1 Complaints and Disciplinary Actions

Complaints are received by the Vigilance Wing of DoT from various sources like Prime Minister's Office/ Members of Parliament/ CVC/ CBI/ General Public etc. These Complaints are dealt as per the CVC guidelines.

During the reported period

(i) 443 complaints were handled.

(ii) 49 officers / officials imposed with major & minor penalties, which includes 4 officials dismissed from service, 12 officials imposed with 100% cut in pension.

(iii) 40 cases for imposition of penalty received from BSNL were ratified.

(iv) 43 appeals/ review/ revision against punishment orders were decided.

(v) Prosecution sanction furnished against 02 officers in CBI cases.

Grievance- PG Portal

137 grievance petitions received from various sources viz. through Centralized Public Grievance Redress and Monitoring System (*CPGRAMS*), *Department of Administrative Reforms and Public Grievances,* DPG (Cabinet Secretariat), President's Secretariat, PMO and Department of Pensions etc. were disposed of during the period.

8.2 Training & Workshop

i) One-day training on Vigilance matters was conducted on 10th May, 2018 for 34 Officer Trainees (OTs) of ITS -2016 Batch.

ii) One-day training on Vigilance matters was conducted on 27th July, 2018 for 24 Officer Trainees (OTs) of IP&TAFS -2017 Batch.

iii) Two days' training for Vigilance officers in DoT field units was conducted on 19-20th September, 2018.

iv) A Seminar on Government e-Marketplace (GeM) was organized on 30th October, 2018 during Vigilance Awareness Week-2018 for the officers of DoT.

8.3. Vigilance Clearance (VC)

This is an important activity of the Vigilance Wing as Vigilance clearance is required at the time of promotion, retirement, obtaining passports, visiting abroad, and deputation to other Organizations/Departments etc. During the period, Vigilance clearances were issued to 5122 officers/officials for various purposes.

At present, almost all Vigilance clearance requests are being processed online and vigilance clearances are issued online directly to the concerned requesting authorities. This has greatly reduced the paper work and time, in furnishing Vigilance clearances.

8.4 Consultation with Statutory/Constitutional Bodies

i) **Consultation with Central Vigilance Commission (CVC)**

CVC is the apex vigilance institution having jurisdiction over all Ministries/Departments/PSUs etc. for vigilance related matters. The Vigilance Wing of DoT coordinates with the CVC for vigilance related matters. During the period, 17 cases were referred to CVC for advice.

ii) **Consultation with the Union Public Service Commission (UPSC)**

UPSC is required to be consulted in cases where the Disciplinary Authority is the President of India or disciplinary proceedings under Rule 9 of CCS (Pension) Rules, 1972. In addition, UPSC is required to be consulted where the Appellate Authority is Hon'ble President of India and also in Review cases where modification in penalty is proposed. During the period, 40 cases were referred to UPSC for advice.

iii) **Consultation with the Department of Personnel & Training (DoPT)**

The DoPT is consulted in all disciplinary cases where there is a disagreement between Disciplinary Authority (DA) with the UPSC or the CVC, or where these Commissions direct the DA to consult the DoPT. During the period, 5 cases were referred to DoPT.

8.5 Vigilance Awareness Week

Vigilance Awareness Week was observed in the Department from 29th October, 2018 to 3rd November, 2018. The theme for the week was "Eradicate Corruption –Build a New India". The week started with Pledge taking ceremony. A signature campaign against corruption was also held. Various competitions like essay, quiz, debate, poster making and slogan writing were held to increase the awareness against corruption.

Vigilance Awareness Week - 2018 was also observed in field units of the DoT spread across the country.

The concluding and prize distribution ceremony was held at DoT HQ, Sanchar Bhawan. Certificates, Mementos and Cash Prizes were awarded to the winners of the competitions held during the week.

8.6 Preventive Vigilance

i) The 'Agreed list' and List of 'Officers of Doubtful Integrity' have been prepared.

ii) Various activities were monitored under "Review of mechanism to ensure probity amongst Government Servants" and data uploaded on *Online Probity portal maintained by DoPT*.

iii) Regular meetings were conducted with CVOs of PSUs/Sub-ordinate office/Autonomous body under DoT in order to ensure early disposal of pending complaints and Vigilance matters.

iv) The Vigilance profiles of Board Level Officers of the CPSEs namely BSNL, MTNL, TCIL, ITI, BBNL & C-DoT was updated on monthly basis on SOLVE (System for online Vigilance Enquires) Portal, maintained by the Department of Personal & Training.

v) Vigilance Officers were appointed in various field offices of DoT i.e. in Licensed Service Area (*LSA*), Controller of Communication accounts (*CCA*) & Wireless Planning and Coordination (*WPC*) / Wireless Monitoring Organisation (*WMO*).

vi) Scrutiny of Annual *Immovable Property Return* of officers was done regularly.

8.7. Miscellaneous activities

i) **Court Cases**: Court cases against the Department relating to Vigilance matters are handled by Vigilance wing. 215 cases pending in various courts / tribunals pertaining to Vigilance/ Disciplinary matters were handled by Vigilance Wing, out of which 35 cases were disposed off.

ii) **RTI Applications**: Timely supply of information to public is very important and this aspect is given due importance in Vigilance Wing. During the period, 101 RTI applications have been disposed off by the CPIOs and 25 appeal cases have been disposed of by First Appellate Authority.

CHAPTER 9

WELFARE OF DIFFERENTLY ABLED PERSONS AND WOMEN

9.1 WELFARE OF DIFFERENTLY ABLED PERSONS

Telecom service is a great enabler, it enables people to take many decisions in their daily lives—some of which may be associated with sectors like banking, education, healthcare and public services. It is seen that many times Persons with Disabilities (PwDs) are unable to access such services fully because of lack of accessibility features and high cost of equipment. It is therefore, in the interest of everyone that information access creates opportunities for everyone in the society including for Persons with Disabilities (PwDs).

With a view to make Telecom services accessible to Persons with Disabilities (PwDs), the department is in the process of taking many steps under the flagship program of the Accessible India Campaign (AIC) or Sugamya Bharat Abhiyan. The Department provides reservation to the physically challenged in appointments in accordance with the guidelines issued by the Government of India from time to time for effective implementation of the Persons with Disabilities Act, 1995

The Sanchar Bhawan building, which houses the Department headquarter, is constructed in such a manner that level access to various floors and utilities exists and lifts are provided with Braille car panel buttons for unhindered access for persons with disabilities.

Accessibility is not only about giving equal access to everyone, but also about covering uncovered villages and include digitally deprived segments of society as stated in Digital Communications Policy-2018. As part of initiative under AIC, Persons with Disabilities (PwDs) shall be covered under the "Accessible Digital India" programme. The Department is working towards three main strategies that are as follows: -

(i) Ensuring Inclusion of uncovered areas and digitally deprived segments of society by channelizing the Universal Service Obligation Fund (USOF) for:

- Ensuring connectivity for all uncovered areas in the North Eastern States, Himalayan region, LWE areas, Aspirational Districts, Islands and Border Areas
- Marginalised communities, women and persons with disabilities
- Promoting innovative, effective and scalable alternate technologies for remote areas
- Enabling access provision by any entity capable of fulfilling the Universal Service Obligation

(ii) Reviewing the scope and modalities of USOF:

- Redesigning the USOF and broadening its objectives to enable universal broadband access including for economically and socially weaker sections in urban pockets
- Strengthening institutional capacity of USOF to ensure effective rollout of services in uncovered, remote and rural areas

(iii) Formulation of Accessibility Standards for Communications under Section 40 of RPwD Act 2016: DoT has accepted International standards for achieving universal accessibility for persons with disabilities (PwDs).

(iv) Acceptance of TRAI Recommendations on "Making ICT accessible for Persons with Disabilities":

On basis of Rights of Persons with Disability Act 2016, TRAI has Suo-Moto come up with recommendations on Making ICT accessible for Persons with Disabilities. The recommendations have suggested certain guidelines for adoption of good practices for the welfare of PwDs. The Department is examining these proposals which are under submission to "Digital Communications Commission". Once approved, the same will be notified after which, implementation strategy will be developed in consultation with all stakeholders. The Department is focusing its energy on promoting mobile accessibility for the Persons with Disabilities vigorously in accordance with the notified RPwD Act, 2016 for implementation of the accessibility standards within two years.

DoT Website, developed by NIC, has been recently launched under content Management framework as a part of Early Harvest Scheme (Pillar 9) of Digital India Programme and it is having various accessibility features. Various welfare measures taken by the units of the DoT are as under:

9.1.1 Centre for Development of Telematics (C-DOT)

- C-DOT follows guidelines issued by Government of India with respect to reservations in jobs for persons with disabilities.
- The physical handicapped employees are eligible for double the rates of transport allowance.
- The C-DOT Campus at Delhi has been constructed in such a manner so as to ensure barrier free environment for the persons with disabilities. The main entrance/exit can be approached through a ramp together with stepped entry. Even elevators connecting the various working areas have been installed in way to facilitate persons with disabilities to move around freely from one wing to another.

9.1.2 Bharat Sanchar Nigam Limited (BSNL)

In respect of schemes for the benefit of differently-abled persons, the following schemes are in existence in BSNL:

- Double the rates of Transport Allowance are eligible for Physically Handicapped employees.
- Rate of transport allowance to blind or orthopedically handicapped employees shall in no case be less than ₹1,000/-.
- As far as possible, subject to administrative constraints, persons with disabilities are posted near their native places within the region.
- Grant of Child Adoption leaves of 180 days to female BSNL employees and extension of the facility of Paternity leave to adoptive fathers.

9.1.3 Mahanagar Telephone Nigam Limited (MTNL)

MTNL has always endeavored towards upliftment of social status of physically disabled people by innovating and executing action plans falling under its realm. Several steps have been taken by MTNL in fulfilling its social responsibility and few other innovative schemes are being devised for providing a respected status in the society to these people.

The provisions of reservation for such candidates, as per Government of India Rules have been made in recruitment of officers in various streams. Further, to avoid delay in allotment of PCOs, mobile Booths are being provided to Physically Challenged people based on CDMA/GSM technology.

As on 31.03.2019, 0.50% of total manpower comprises Physically Challenged employees.

9.1.4 ITI Limited

The Facilities being provided to persons with disabilities are detailed below:

- PWD employees who are residing in the township are given special allowance at the rate of 5% of Basic pay subject to maximum of ₹75/- per month
- Those employees who are not residing in Company's township but are utilizing Company's Transport for commuting between residence to factory are given special allowance at the rate of 5% of Basic Pay subject to maximum of ₹100/- per month.
- PWD employees are permitted 10 minutes grace time to Punch In and Out for marking their attendance at the commencement and closure of shift respectively.

- PWD employees are allotted quarters on out of turn basis
- As per the government directive ITI has been maintaining 4% reservation for PWD in recruitment and the reservation in promotion has also been maintained wherever applicable.
- For PWD candidates, the Company has been relaxing 10 years in age in recruitment for Group C and D posts and 5 years in case of Group A & B posts.

9.1.5 Telecommunications Consultants India Limited (TCIL)

- Preference is given to physically handicapped persons in the matter of recruitment.
- Concessions in service conditions are admissible to all Physically Challenged employees as per guidelines. Transport allowance at double the normal rate is given to Physically Challenged employees as per government guidelines.
- No physically disabled employee is posted in remote areas where hardship conditions are involved. Their postings/transfers are considered sympathetically.
- The cases/representations/grievances of disabled persons if any are considered favorably.
- They are treated equally in line with other employees.
- A liberal view is taken while forwarding application of physically disabled candidates outside.
- Special facilities like separate lift for disabled, stair chair at reception is available for their comfort and convenience.

9.2 EMPOWERMENT OF WOMEN

In accordance with the strategic approach of the Government to achieve the goals of gender mainstreaming and gender justice laid down in the National Policy for Empowerment of Women, certain steps have been taken by the Department of Telecommunications and the Public Sector Enterprises under its administrative control.

The Department of Telecommunications is effectively implementing the guidelines/instructions of the Supreme Court on prevention of sexual harassment of women at work place in all its units. In pursuance of the orders of the apex court, it has setup a committee on the sexual harassment of women, headed by a lady officer.

The steps taken for empowerment of women by various functional wings of the Department are given below:

9.2.1 Mahanagar Telephone Nigam Limited (MTNL)

- MTNL has always endeavored towards women participation in the Organization and the Nation Building. This can be assessed from the manpower figures as on 31.03.2019, where 26.12% of total manpower comprises women employees.
- Special care are taken in case of female employee working in night shift and they are provided with rest rooms/ dormitory. Night Shift Allowance is also paid to them. Night Shifts are organized in such a way that the woman employees do not have to travel at late nights.
- For women working in the same positions, same remuneration is paid and there is no discrimination whatsoever in payment of compensation on the basis of Caste, Gender, Religion etc. The service conditions are uniform and there is no gender bias.
- In order to redress the grievance relating to sexual harassment at work place, Sexual Harassment Complaint Committee has been constituted at Unit level as well as in Corporate Office.
- Maternity/Paternity leave is also available to employees. Child Care Leave is provided for a maximum period of two years (i.e. 730 days) with pay up to 3 months and without pay up to 2 years inclusive of 3 months with pay. Creche facility has also been provided for women employees with infants.
- Special Grant is being sanctioned on an annual basis for MTNL Women Welfare Organization, which in turn provides vocational training to kith and kin of working as well as retired/ deceased employees.

9.2.2 Bharat Sanchar Nigam Limited (BSNL)

In BSNL, schemes for the benefit of women, inter-alia, include

- Maternity leave of 180 days is given to all women employees.
- Child Care Leave as per the provisions of DOP&T OM No. 13018/2/2008-Estt. (L) dated 11.09.2008 is available to women employees.
- Special allowance for Child Care for Women employees with disabilities @ ₹1,000/- per month per child maximum for two children till the child attains two years.

9.2.3 Telecommunications Consultants India Limited (TCIL)

- No discrimination on the basis of gender is done and Women employees are treated equally in line with other male employees.

- TCIL, providing a comfortable workplace for our employees and safety & security measures for the employees are strictly enforced ensuring equal opportunities to all our employees. As a welfare measure for Women employees, various benefit schemes are incorporated in TCIL. The positive results of the welfare measures are evident from the increase of women employees in the managerial and supervisory category. Separate rest rooms are available for women on each floor.
- Women employees are today holding some of the higher management/ authoritative posts in TCIL and more and more women are involved in decision making. No discrimination is made on the basis of caste category/weaker sections. All are treated equally. We also have a Sexual Harassment Committee constituted by Women employees for addressing the grievances of women employees regarding harassment and for welfare & security of Women employees.
- Various Leadership Program and gender sensitization sessions were held in 2018-19 in TCIL for Women employee.
- Child Care Leave committee has been formed in TCIL and is in process for implementation for women employee for taking care and rearing to the needs of children for better work life balance.

9.2.4 ITI Limited

The major facilities being provided to women employees are as follows**:**

- Separate lunch room in canteen, rest rooms and crèches have also been provided in the Units.
- The Company has comprehensive health care scheme providing medical treatment / reimbursement to the employees and their dependent families. Hospitals have set up in Bangalore, Naini, Mankapur, and Raebareli Plants which emphasize women and child welfare.
- In the light of Supreme Court Judgment on sexual harassment in the work place, the standing orders applicable to women employees have been amended to incorporate the clause on sexual harassment during the year 2004-2005 and CDA rules also were amended accordingly.
- Complaints Committee formed in each Unit to inquire into complaints of sexual harassment complaint made by any women employees in the Company and also uploaded in Company Website.
- Care is taken to ensure that women employees are nominated for training programmes, which are need based.
- In pursuance of the Amendment, to Section 5(3) of the Maternity Benefit Act, 1961, the maternity leave is enhanced in the Company from Twelve Weeks to Twenty-Six weeks with effect from 01/04/2017.

- Company is celebrating Women's Day every year to encourage women employees.

9.2.5 Centre For Development Of Telematics (C-DoT)

C-DOT's Management has always been sensitive to gender issues and has consistently worked towards creating an organizational culture that reflects gender equality. Presently, about 33% of staff in C-DOT are women.

Existing Policies:

- All female staff members are allowed to avail up to 180 days' maternity leave & up to 90 days leaves subsequent to that (270 days inclusive of 180 days' maternity leave). For miscarriage/ abortion, leave of a total of 45 days in the entire service span is permissible.
- Child Care leave is also granted to eligible female staff on their applying for the same, as per rules.
- C-DOT offers accommodation and transport benefits to all its women employees with different options that may be availed as per individual needs. This ensures the safety and security of all women employees in the company.
- Reimbursement for residential telephone expenses is admissible to 100% of the women staff.
- Career growth opportunities are available to women employees in C-DOT. In the last financial year, of the total employees promoted to higher grades 34% of them were women.
- In management cadres (Team Leaders, Group Leaders, Technical Experts and Sr. Technical Experts) about 27% are women.
- As per the directives of Supreme court, C-DOT has a Complaint Committee for its Centres, at Delhi and Bangalore in case of any complaints relating to Sexual Harassment of women staff at work place for fair and justified view of the complaints, if any, and recommend suitable action on the same to the C-DOT Board,

CHAPTER 10

10.1 AUDIT OBSERVATIONS OF C & AG

Status of C&AG Audit Paras pending as on 31st March 2019

S. No.	Year	Report No.	No. of Paras/ PAC Reports on which ATNs have been submitted to PAC after vetting by Audit (from April 2018 – March 2019)	Details of the CAG Paras* / PAC Report** on which ATNs are pending as on 30/03/2019		
				No. of ATNs not sent by the Ministry even for the first time.	No. of ATNs sent but returned with observation and Audit is awaiting their resubmission by the Ministry	No. of ATNs which have been finally vetted by audit but have not been submitted by the Ministry to PAC
1.	2016-17	4 of 2016	Nil	Nil	30	Nil
2.	2016-17	29 of 2016	Nil	Nil	Nil	Nil
3.	2017-18	11 of 2017	01	Nil	01	Nil
4.	2017-18	35 of 2017	01	Nil	01	Nil
Total			02	Nil	32	Nil

** Total C&AG Audit Paras of DoT pending as on 31/03/2019 = 42 [32 (Under Modification) + 10 (Sent to Audit)]*

** Total paras of 03 PAC Report pending as on 31/03/2019 = 07 [07 (Sent to Audit)]

CAG Report No. 4 of 2016 for Six TSPs for financial year 2006-07 to 2009-10 has been received and implemented in full. Out of 135 CAG sub paras, 116 sub paras have been settled. Reconciliation of the underreporting detected by CAG vs amount raised by DoT in revised Demand Notice is given in the table below:

(₹ in crore)

Particulars	Idea	Airtel	Vodafone	Reliance	Aircel	Tata	Total
Underreporting/Non consideration detected by CAG (As per CAG Report No.4)	3383.60	8748.02	6215.65	14713.00	967.92	12017.36	46045.59
Total Underreporting/ Non consideration added back to AGR as per Revised Demand Notice (based on CAG + Special Audit Report)	4933.90	13187.37	9680.28	18021.50	1152.81	14547.46	61523.46

CAG Report No. 11 & 35 of 2017 has been received and implemented. Process for admittance of paras is underway.

Summary of important audit observations included in Audit Report No.21 of 2018 ((Ministry of Communications and Ministry of Electronics & Information Technology)

S.No	Important Audit observations
Department of Telecommunications	
1	A Performance Audit on **"Spectrum Management in DoT" was conducted which revealed the following** (i) No action/deliberation for re-farming of 900 MHz band was initiated by Wireless Planning & Coordination (WPC) of DoT. The continuing use of spectrum in these bands by Defence results in loss of opportunity cost for the nation as a whole. (ii) DoT had not taken any action for refarming of 900 MHz spectrum assigned to Railways which in turn adversely affected the optimal utilization of spectrum. (iii) A guard band is a narrow frequency range that separates two ranges of wider frequency. During harmonization of 1800 MHz band, DoT made a provision for 0.2 MHz guard band and one additional guard band of 0.2 MHz in between this spectrum band in all 22LSAs. It was also noticed that the location of the additional guard band of 0.2 MHz considered by the DoT was varying from LSA to LSA. Additional guard band of 4.4 MHz spectrum was not considered while putting up spectrum in 1800 MHz band for auction and thus spectrum in 1800 MHz, which is a prime band, remained unutilized. (iv) DoT has not withdrawn the excess spectrum proposed to be surrendered by BSNL till March 2018. Financial impact due to delay in withdrawal of excess spectrum held by BSNL is Rs' 520.79 crore. (v) DoT constituted a committee in December 2012 to look into the allotment/assignment of spectrum in various categories of spectrum users covering different categories of licences and authorizations. The Committee proposed that the spectrum allotment in Microwave band to all the service providers should be allotted through market related process (auction). However, allocation of MW Access spectrum had been done on First Come First Serve (FCFS) basis. Though carriers were available in other bands and propagation characteristics of MW A spectrum in lower bands (say 13/15 GHz) was better compared with higher bands (18/21 GHz and beyond), allotment of MW A to Access Service providers was withheld by DoT since June 2010. Non-allotment of MW A spectrum to Access Service Providers despite availability resulted in loss of revenue to the Government. (vi) The spectrum charges for MW access/backbone Spectrum and satellite Spectrum of National Long Distance (NLD)and International Long Distance (ILD) networks were levied on formula basis instead of revenue share basis (i.e. percentage of AGR), as being done for MW access spectrum of cellular network which indicated non-uniform policy in DoT. (vii) The National Frequency Register (NFR) in Automatic Spectrum Management System (ASMS) was not being updated at the time of assignment of new frequencies and/or surrender/ withdrawal of previously assigned frequencies.

	(viii) Wireless Monitoring Headquarter (MHQ)/Regional Headquarters (RHQs) nor International Monitoring Station (IMS)/Wireless Monitoring Station(WMS)/Inspection units had updated base of wireless licensees and frequency assignments since 2009-10 which is to ensure compliance with regulatory provisions governing radio communications and to intervene with national or foreign stations (ix) Number of equipment/Mobile Monitoring System (MMS) vehicles was supplied around Large 2004-05 under World Bank funded Project to all the wireless monitoring stations for carrying out the various types of monitoring activities. These equipment/MMS vehicles went faulty and remained so for several years.

	Bharat Sanchar Nigam Limited
1	BSNL failed in implementing Comprehensive Telecom Development Plan) CTDP(for North Eastern Region approved by the Cabinet in September 2014 .This was because of failure of the major tenders under CTDP as given below: ➢ Tender relating to Survey, Planning, Supply, Installation, Testing, Commissioning, Integration with existing core network and Operations & Maintenance for five years. of 2G GSM Network along with VSAT, HUB & radio backhaul to provide coverage in uncovered villages at an estimated project cost of Rs 1460 crore in April 2016. ➢ Tender relating to laying of UG cable, cable ducts, etc. issued by COM Telecom Stores, Kolkata in February 2015 and the tender for procurement of DWDM equipment floated by BSNL Corporate office in February 2015. Thus, due to failure of the above two major tenders the objective of CTDP i.e. rollout for 2G coverage in uncovered areas of NER and OFC Ring connectivity along with augmentation of transmission media was yet to be achieved. Regional Trunk Planning Committee (RTPC) approved (April 2008 and June 2014) 116 OFC routes for rehabilitation work in Assam, NE-I and NE-II Circles. The works were to be executed by N01ih East Task Force (NETF), Guwahati. The progress of work was 10 per cent in Assam and nil in NE-I and NE-II as on date and the delays ranged between 3 to 10 years. Due to poor progress of rehabilitation OFC work in the region, BSNL hired media mostly from M/s Oil India Ltd and M/s Power Grid Corporation of India Ltd (PGCIL). Nagaland does not have a single tower within 10 Km range of 215 Km long international border with Myanmar while the tower density was 130 Km/tower in Arunachal Pradesh, 99.5 Km / tower in Manipur and l70 Km/tower in Mizoram. Further, although MHA had proposed to DoT for creation of communication infrastructure in the form of towers in the border areas with the funds available under USOF, DoT stated that DoT/USOF did not propose to fund the provision of mobile services in border and naxal affected areas. Thus, even though MHA initiated the proposal for improving telecom services in border areas of North Eastern Region as early as 2014, there was virtually no progress resulting in spill-over signals from neighboring countries being used by the civilians posing threat to national security/economy. Mean time to Repair)MTTR (is the sum of duration of each repair time in hours for all the fault incidences in a quarter divided by total number of fault incidences in a quarter. MTTR was higher than the bench mark of “less than or equal to eight hours” fixed by Telecom Regulatory Authority of India)TRAI(in Assam, NE-I, ETR Circles and Sikkim SSA during the years from 2014-15 to 2016-17

CHAPTER 11

ANNEXURES

1	**Statistical Supplement**
	• Telephone per 100 Population-Urban/Rural (Tele-density) • Number of Telephones
2	**Acronyms**
3 & 4	**Organisation Chart**

Table 1

Annexure-1a

Telephone per 100 Population-Urban/Rural (Tele-density) as on 31st March 2018 and 2019.

Sl.No.	Service Area	Tele-Density						Telephones						% of Rural Phones to Overall Phones	
		Overall		Urban		Rural		Overall		Urban		Rural			
		March'18	March'19	March'18	March'19	March'18	March'19	March'18	March'19	March'18	March'19	March'18	March'19	March'18	March'19
1	ANDHRA PRADESH	**97.21**	**97.55**	189.30	181.15	61.37	64.96	**87241623**	**88170245**	47592351	45933206	39649272	42237039	**45.45%**	**47.90%**
2	ASSAM	**76.87**	**68.81**	175.45	199.72	57.29	42.36	**25516825**	**23080711**	9649704	11258137	15867121	11822574	**62.18%**	**51.22%**
3	BIHAR[1]	**63.16**	**59.95**	182.52	149.09	43.94	45.55	**88930443**	**85308742**	35644556	29500351	53285887	55808391	**59.92%**	**65.42%**
4	GUJARAT	**112.45**	**107.21**	161.76	155.35	75.95	71.11	**73195847**	**70534207**	44790496	43800674	28405351	26733533	**38.81%**	**37.90%**
5	HARYANA	**84.44**	**97.66**	115.67	142.00	65.96	70.82	**23885096**	**27990960**	12166936	15345935	11718160	12645025	**49.06%**	**45.18%**
6	HIMACHAL PRADESH	**174.46**	**146.37**	656.19	378.46	108.79	114.29	**12578747**	**10630749**	5676008	3338031	6902739	7292718	**54.88%**	**68.60%**
7	JAMMU & KASHMIR	**109.19**	**89.43**	188.09	172.73	78.03	56.19	**13839800**	**11437233**	6748760	6301164	7091040	5136069	**51.24%**	**44.91%**
8	KARNATAKA	**109.05**	**110.04**	181.67	182.15	61.57	62.23	**69221205**	**70398285**	45587968	46457148	23633237	23941137	**34.14%**	**34.01%**
9	KERALA	**121.61**	**126.15**	259.40	272.53	75.10	76.85	**43975326**	**45840356**	23672497	24950530	20302829	20889826	**46.17%**	**45.57%**
10	MADHYA PRADESH[2]	**67.02**	**70.11**	127.26	137.10	43.85	44.12	**71471417**	**75718114**	37694890	41390629	33776527	34327485	**47.26%**	**45.34%**
11	MAHARASHTRA	**95.50**	**92.83**	135.87	133.80	71.74	68.34	**96334317**	**94548392**	50770277	50985112	45564040	43563280	**47.30%**	**46.08%**
12	NORTH-EAST[3]	**98.06**	**84.17**	188.77	198.62	66.81	44.30	**13974925**	**12115134**	6891896	7386541	7083029	4728593	**50.68%**	**39.03%**
13	ORISSA	**80.28**	**75.74**	163.73	144.73	61.81	60.27	**34649966**	**32930410**	12806696	11527968	21843270	21402442	**63.04%**	**64.99%**
14	PUNJAB	**123.45**	**125.35**	174.88	181.51	81.39	78.37	**39002089**	**40014807**	24855130	26391947	14146959	13622860	**36.27%**	**34.04%**
15	RAJASTHAN	**87.83**	**85.34**	174.44	171.59	60.06	57.60	**65840348**	**64774956**	31748218	31691451	34092130	33083505	**51.78%**	**51.07%**
16	TAMIL NADU[4]	**136.36**	**116.94**	154.96	135.30	106.23	85.94	**98012845**	**84480470**	68872295	61390076	29140550	23090394	**29.73%**	**27.33%**
17	UTTAR PRADESH - [East]	**71.36**	**68.63**	153.12	132.63	46.73	49.22	**104613364**	**99449999**	48244353	40797649	56369011	58652350	**53.88%**	**58.98%**
18	UTTAR PRADESH - [West][5]							**63791171**	**64887552**	35405143	33122571	28386028	31764981	**44.50%**	**48.95%**
19	WEST BENGAL[6]	**73.73**	**71.39**	160.28	172.51	59.06	54.19	**59153123**	**57719640**	18633847	20269344	40519276	37450296	**68.50%**	**64.88%**
20	KOLKATTA	**182.97**	**165.51**	#	#	#	#	**29606310**	**27047850**	26322717	24220791	3283593	2827059	**11.09%**	**10.45%**
21	DELHI	**254.49**	**238.57**	#	#	#	#	**57453739**	**55394424**	54492685	53787768	2961054	1606656	**5.15%**	**2.90%**
22	MUMBAI	**163.01**	**165.62**	#	#	#	#	**39507941**	**40934182**	37659986	39294110	1847955	1640072	**4.68%**	**4.01%**
	ALL- INDIA	**93.27**	**90.10**	**166.64**	**159.66**	**59.25**	**57.50**	**1211796467**	**1183407418**	**685927409**	**669141133**	**525869058**	**514266285**	**43.40%**	**43.46%**

Note:Teledensity is calculated for UP(E) & UP(W) jointly due to non availabilty of separate population data for UP(E&W). 1.Includes Jharkhand, 2.Includes Chhattisgarh, 3.Includes North East I&II, 4. includes Chennai, 5.Includes Uttrakhand and 6.Includes A&N Islands. # Rural-urban break up of population for Kolkata, Delhi and Mumbai service areas is not available. **Reliance Jio figures are included from the month of October 2016.**

Source: Population Projections for India & States 2001-2026,O/o the Registrar General of India and subscribers' data from BSNL(PSU), MTNL(PSU), AUSPI (Private-Wireline,WLL & GSM) and COAI (Private-GSM).

Table 2

Annexure-1b

Number of Telephones as on 31st March 2018 and 2019.															
Sl. No.	Service Area	Wireline Phones						Wireless Phones						TOTAL TELEPHONES	
		TOTAL		PSUs' Operators		Private Operators		TOTAL		PSUs		Private Operators			
		March'18	March'19	March'18	March'19	March'18	March'19	March'18	March'19	March'18	March'19	March'18	March'19	March'18	March'19
1	ANDHRA PRADESH	1479737	1439862	1054324	960344	425413	479518	85761886	86730383	10129895	10171599	75631991	76558784	87241623	88170245
2	ASSAM	137250	114368	134580	111518	2670	2850	25379575	22966343	2619338	2560859	22760237	20405484	25516825	23080711
3	BIHAR[1]	278273	228858	258955	215515	19318	13343	88652170	85079884	4430024	4566337	84222146	80513547	88930443	85308742
4	GUJARAT	1268577	1235348	1050516	1009423	218061	225925	71927270	69298859	5814829	5958786	66112441	63340073	73195847	70534207
5	HARYANA	303494	270200	239944	209003	63550	61197	23581602	27720760	4476401	4928753	19105201	22792007	23885096	27990960
6	HIMACHAL PRADESH	126524	114722	120440	110078	6084	4644	12452223	10516027	2570122	2820212	9882101	7695815	12578747	10630749
7	JAMMU & KASHMIR	115678	102447	115678	102447	0	0	13724122	11334786	1595268	1242060	12128854	10092726	13839800	11437233
8	KARNATAKA	2218217	2154582	1104785	1021570	1113432	1133012	67002988	68243703	7223607	7197784	59779381	61045919	69221205	70398285
9	KERALA	1970644	1884036	1868937	1783570	101707	100466	42004682	43956320	10521915	10890618	31482767	33065702	43975326	45840356
10	MADHYA PRADESH[2]	949769	920038	665705	650594	284064	269444	70521648	74798076	6053215	6181330	64468433	68616746	71471417	75718114
11	MAHARASHTRA	1728872	1523328	1258265	1084062	470607	439266	94605445	93025064	7112695	7204097	87492750	85820967	96334317	94548392
12	NORTH-EAST[3]	112134	104151	111924	103881	210	270	13862791	12010983	1636891	1624576	12225900	10386407	13974925	12115134
13	ORISSA	278075	236041	265031	223052	13044	12989	34371891	32694369	5420185	5747860	28951706	26946509	34649966	32930410
14	PUNJAB	863107	773626	467488	394359	395619	379267	38138982	39241181	5346523	5452464	32792459	33788717	39002089	40014807
15	RAJASTHAN	601047	536405	504786	439056	96261	97349	65239301	64238551	5577121	5914348	59662180	58324203	65840348	64774956
16	TAMIL NADU[4]	2315505	2191640	1539528	1423913	775977	767727	95697340	82288830	11115043	12051558	84582297	70237272	98012845	84480470
17	UTTAR PRADESH - [East]	421909	450210	363772	357470	58137	92740	104191455	98999789	11866213	11844571	92325242	87155218	104613364	99449999
18	UTTAR PRADESH - [West][5]	390776	301859	308642	265817	82134	36042	63400395	64585693	5777896	5942389	57622499	58643304	63791171	64887552
19	WEST BENGAL[6]	277267	226595	272150	222417	5117	4178	58875856	57493045	1735709	1770687	57140147	55722358	59153123	57719640
20	KOLKATTA	791519	710482	561941	479590	229578	230892	28814791	26337368	1461353	1571580	27353438	24765788	29606310	27047850
21	DELHI	3191833	3256551	1538377	1481900	1653456	1774651	54261906	52137873	2279634	2213046	51982272	49924827	57453739	55394424
22	MUMBAI	2990509	2920597	1808191	1761740	1182318	1158857	36517432	38013585	1277426	1240177	35240006	36773408	39507941	40934182
ALL- INDIA		22810716	21695946	15613959	14411319	7196757	7284627	1188985751	1161711472	116041303	119095691	1072944448	1042615781	1211796467	1183407418

Note:1.Includes Jharkhand, 2.Includes Chhattisgarh, 3.Includes North East I&II, 4. includes Chennai, 5.Includes Uttrakhand and 6.Includes A&N Islands. **Reliance Jio figures are included from the month of October 2016.**

Source: Population Projections for India & States 2001-2026,O/o the Registrar General of India and subscribers' data from BSNL(PSU), MTNL(PSU), AUSPI (Private-Wireline,WLL & GSM) and COAI (Private-GSM).

Annexure-2

ACRONYMS

2G	Second Generation
3G	Third Generations
ACC	Accounts Calling Card
ADC	Access Deficit Charge
ADSL	Asymmetrical Digital Subscriber Line
AGR	Adjusted Gross Revenue
AI	Artificial Intelligence
AIMS	Advance Intelligent monitoring system
ALTTC	Advanced Level Telecom Training Centre
ANURAG	Advance Numerical Research & Analysis Group
APT	Asia Pacific Telecommunications
ATM	Asynchronous Transfer Mode
ATNs	Action Taken Notes
AWG	Asia-Pacific Tele-community Wireless Group
BBNL	Bharat Broadband Network Limited
BBWT	Broadband Wireless Terminal
BHIM	Bharat Interface for Money
BMCSN	Broadband Multimedia Convergent Service Networks
BPO	Business Process Outsourcing
BRBRAITT	Bharat Ratna Bhim Rao Ambedkar Institute of Telecom Training
BSNL	Bharat Sanchar Nigam Limited
BTRC	Bangladesh Telecommunication Regulatory Commission
BTS	Base Transreceiver Station
BTSs	Base Terminal Stations
BWA	Broadband Wireless Access
C&AG	Comptroller and Auditor General

CACT	Component Approval Centre for Telecom
CAD	Computer Aided Design
CAF	Customer Acquisition Form/ Customer Application Form
CAG	Comptroller and Auditor General
CAGs	Consumer Advocacy Groups
CAIR	Centre for Artificial Intelligence and Robotics
CCA	Controller of Communications Accounts
CCEA	Cabinet Committee on Economic Affairs
CCMS	Customer complaints monitoring system
CCR	Call Completion Ratio
CCS	Cabinet Committee on Security
CDMA	Code Division Multiple Access
CDNs	Content Delivery Networks
C-DoT	Centre for Development of Telematics
CDR	Call Detail Record
CELI	Centre of Excellence for Lawful Interceptor
CERT	Computer Emergency Response Team
CETTM	Centre for excellence in telecom technology and management
CIDA	Canadian International Development Agency
CiSTB	C-DOT Ineteroperable Set-top Box.
CLIP	Callers Line Identification Protocol
CMC	Central Monitoring Centre
CMMI	Capability Maturity Model - Integrated
CMPs	Cellular Mobile Phones
CMRTS	Captive Mobile Radio Trunking Service
CMS	Centralized Monitoring System
CMTS	Cellular Mobile Telephone Service
COMAC	Centralised Operation & Maintenance Centre

CoP	Consumer Outreach Programmes
CPE	Customer Premises Equipment
CPGRAMS	Centralized Public Grievance Redress and Monitoring System
CPGRAMS	Centralized Public Grievance Redressal And Monitoring System
CSC	Community Service Centre
CSMS	Customer Service Management System
DAR&PG	Department of Administrative Reforms and Public Grievances
DCC	Development Coordination Committee
DCME	Digital Circuit Multiplication Equipment
DCN	Data Communication Network
DDG	Deputy Director General
DEAL	Defence Electronics Application Laboratory
DECT	Digital Enhanced Cordless Telephone
DeitY	Department of Electronics and Information Technology
DGT	Director General Telecom
DIAS	Direct Internet Access System
DLC	Digital Loop Carrier
DND	Do Not Disturb
DoE	Department of Expenditure
DoPT	Department of Personnel and Training
DoS	Department of Space
DoT	Department of Telecommunications
DPR	Detailed Project Report
DR	Disaster Recovery
DSPT	Digital Satellite Phone Terminal
DSS	Digital Switching System
DTH	Direct-to-Home
DWDM	Dense Wavelength Division Multiplexing

EFC	Expenditure Finance Committee
E-KYC-	Know Your Customer
ELCINA	Electronic Industries Association of India
EMF	Electro Magnetic Field
EMS	Element Management system
EMTS	Express Money Transfer Service
EPC	Evolved Packet Core
ETSI	European Tele Standards Institute
eUICC	embedded Universal Integrated Circuit Card
FAS	Fibre Access System
FDI	Foreign Direct Investment
FDMA	Frequency Division Multiple Access
FFLS	Fibre Fault Localization System
FIGI	Financial Inclusion Global Initiative
FMCP	Fixed Mobile Converged Platform
FRS	Fault Repair Service
FTII	Indonesian Information Technology Federation
GDP	Gross Domestic Product
GMDSS	Global Maritime Distress and Safety System
GMPCS	Global Mobile Personal Communication by Satellite
GP	Gram Panchayat
G-PON	Gigabit Pasture Optical Network
GPS	Global Positioning System
GPSS	Gateway Packet Switching System
GRs	Generic Requirements
GSMA	Groupe Speciale Mobile Association
GUI	Graphical User Interface
HAG	Higher Administrative Grade

HCSPSS	High Capacity Solar Power Supply System
HECS	High Erlang Capacity Switch
HSCC	Hospital Service Consultancy Corporation
HSDL	High bit rate Digital Subscriberline
I&B	Information and Broadcasting
IAMAI	Internet and Mobile Association of India
IAPs	Innovation Action Plans
IEM	Independent External Monitor
IFRB	International Frequency Regulation Board
ILA	In-line Amplifier
ILD	International Long Distance
ILL	Internet Leased Line
I-MADE	Innovation in Mobile Application Development Ecosystem
IMC	India Mobile Congress
IMEI	International mobile equipment identity
IMRB	Indian Marketing Research Bureau
IMS	IP Multi-media System
IN	Intelligent Network
INMARSAT	International Mobile Satellite Organization
INSAT	Indian National Satellite
INTELSAT	International Telecommunication Satellite Organization
IP and P	Industrial Policy and Promotion
IPDR	IP Detail Record
IP-I	Infrastructure Provider-I
IPLC	International Private Leased Circuit
IPR	Intellectual Property Right
Ipv6	Internet Protocol Version 6
IRR	International Radio Regulations

IRs	Interface Requirements
ISAC	Information Sharing and Analysis Centre
ISDN	Intigrated Services Digital Network
ISMES	International Satellite Monitoring Earth Station
ISP	Internet Service Provider
ITI Ltd	Indian Telephone Industries Limited
ITTM	Institute of telecom, technology & management
ITU	International Telecommunications Union
ITU-D	International Telecommunication Union-Development Sector
ITU-R	International Telecommunication Union- Radiocommunication Sector
ITU-T	International Telecommunication Union-Telecom Sector
IUC	Interconnection Usage Charge
IVRS	Interactive Voice Response System
IWTA	Indian Wireless Telegraphy Act
JAM	Jan Dhan-Aadhar-Mobile
KPO	Knowledge Process Outsourcing
Lab	Laboratory
LD	Liquidity Damages
LEA	Law Enforcement Agency
LMDS	Local Multi-Point Distribution System
LMLC	Low Mobility Large Cell
LOI	Letter of Intent
LSA	Licensed Service Area
LTE-A	Long Term Evolution- Advance
LWE	Left Wing Extremism
M2M	Machine to Machine
MAX-NG	MAX – Next Generation
MCIBS	Microprocessor Controlled Intelligent Building Systems

MCPC	Multi Channel Per Carrier
MHA	Ministry of Home Affairs
MLLN	Managed Leased Line Network
MMS	Multimedia Messaging Service
MNP	Mobile Number Portability
MNRE	Ministry of New and Renewable Energy
MNS	Network Management System
MoF	Ministry of Finance
MoU	Memorandum of understanding
MPLS	Multi Protocol Label Switching
MSC	Mobile Switching Centre
MSITSL	MTNL STPIIT Services Ltd.
MSME	Ministry of Micro Small and Medium Enterprises
MSS	Mobile Satellite System
MTL	Millennium Telecom Limited
MTNL	Mahanagar Telephone Nigam Limited
MUX	Multiplexer
MWC	Mobile World Congress
NCLT	National Company Law Tribunal
NDA	Non-Disclosure Agreement
NFAP	National Frequency Allocation Plan
NFR	National Frequency Register
NFS	Network for Spectrum
NGN	Next Generation Networks
NGN-IN	IN in NGN
NHAI	National Highway Authority of India
NIB	National Internet Backbone
NICF	National Institute of Communication Finance

NITI	National Institution for Transforming India
NLD	National Long Distance
NLDS	National Long Distance Service
NMS	Network Management System
NOC	Network Operation Centre
NOFN	National Optical Fiber Network
NPLC	National Private Leased Circuit
NSSO	National Sample Survey Organization
NTIPRIT	National Telecommunications Institute for Policy Research, Innovation and Training
NTP	National Telecom Policy
NTP	New Telecom Policy
NYSF	New York Stock Exchange
OAM	Operation and administrative Module
OCN	Optical Core Network
OFC	Optical Fiber Cable
OLIC	Official Language Implementation Committee
OLT	Optical Line Termination
OLTE	Optical Line Terminating Equipment
OPAP	Outdoor Public Wi-Fi Access Points
OSINT	Open Source Intelligence
OSP	Other Service Provider
OTN	Optical Transport Network
PAC	Public Accounts Committee
PCB	Printed Circuit Board6Pm
PCI	Prime Custodian Interface
PCI	Prime Custodian of Interception
PCR	Priority Call Routing

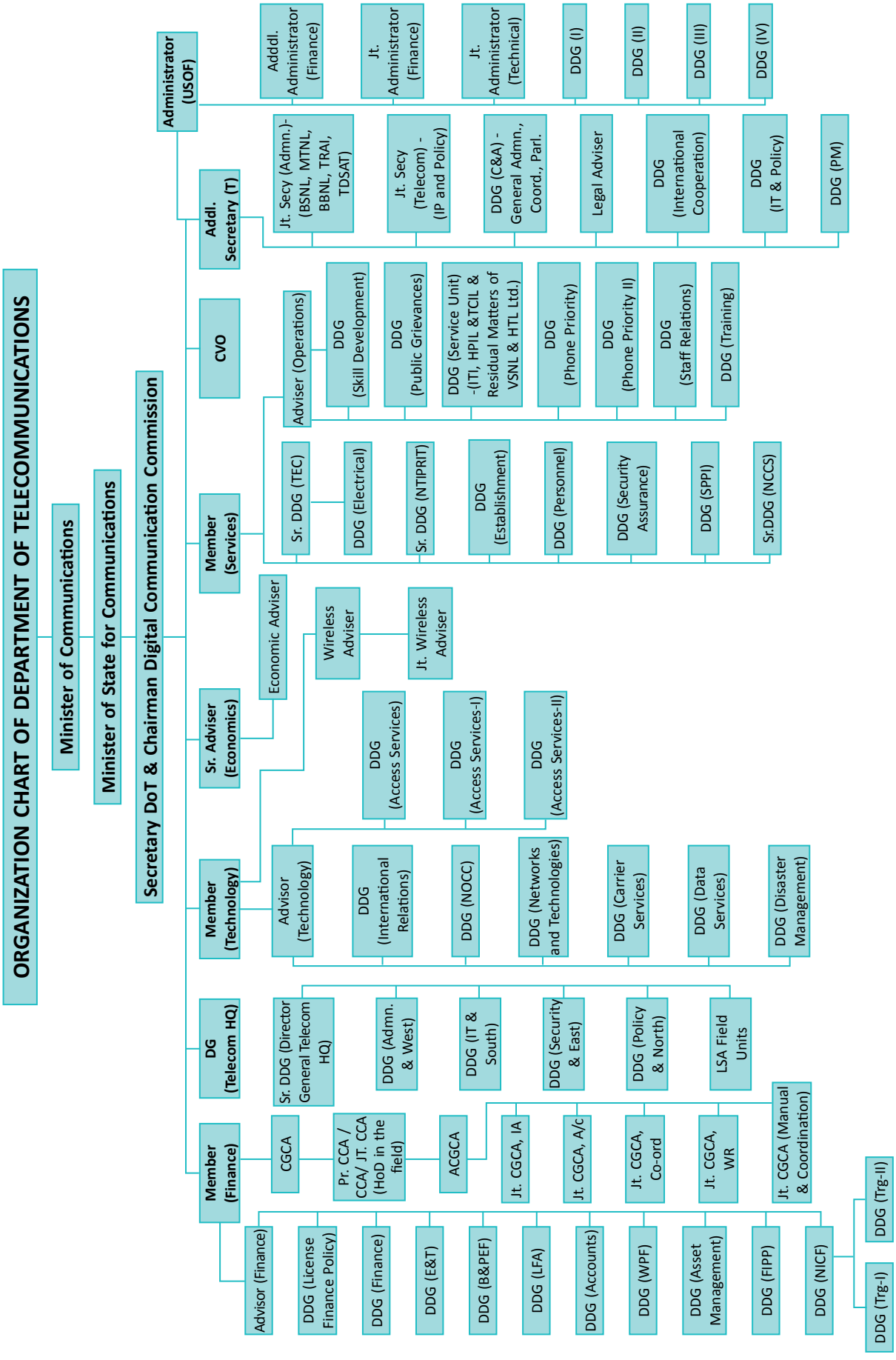
PDO	Public Data Office
PFMS	Public Financial Management System
PG	Public Grievance
PIA	Photo Identity Address
PMA	Preferential Market Access
PMH	Prime Minister House
PMO	Prime Minister Office
PMRTS	Public Mobile Radio Trunk Service
POI	Point of Interconnection
PON	Passive Optical network
PoS	Point of Sale
POT	Plain Old Telephone
POTP	Packet Optical Platform
PRS	Premium Rate Service
PSTN	Public Switching Telecom Network
QOS	Quality of Service
QTS	Quality of Telephone Service
R&D	Research and Development
RABMN	Remote Area Business Message Network
RAN	Radio Access Network
RDSS	Radio Data System
RMC	Regional Monitoring Centre
ROADM	Re-configurable Optical Add / Drop Multiplexer
RoW	Right of Way
RRB	Radio Regulation Board
RRM	Radio Resource Management
RTTC	Regional Telecom Training Centre
SaaS	Software as a Service

SACFA	Standing Advisory Committee on Radio Frequency Allocation
SAG	Senior Administrative Grade
SAR	Specific Absorption Ratio
SAS	System of Accounting Separation
SBM	Signal Base Module
SDCA	Short Distance Charging Area
SDCN	Secure and dedicated communication network
SDG	Sustainable Development Goals
SDH	Synchronous Digital Hierarchy
SDN	Software Defined Network
SIM	Subscriber Identity Module
SOP	System Operating Procedure
SPIC	System Planning & Implementation Centre
SSA	Secondary Switching Area
STM	Synchronous Transport Module
STPI	Software Technology Parks of India
STRC	Service Test Result Certificate
SWAN	State Wide Area Network
TAX	TAX Automatic Exchange
TBR	Terabit Router
TCOE	Telecom Centre of Excellence
TCP	Transmission Connection Protocol
TDM	Time Division Multiplex
TDMA	Time Division Multiple Access
TDSAT	Telecom Dispute Settlement Appellate Tribunal
TEC	Telecommunication Engineering Centre
TEPC	Telecom Equipment and Services Export Promotion Council
TERM	Telecom Enforcement, Resource and Monitoring

TFS	Toll Free Services
ToR	Top – of the Rack
ToT	Transfer of Technology
TPR	Technical Performance Requirements
TRAI	Telecom Regulatory Authority of India
TSERC	Telecom Sectoral Emergency Response Centre
TSP	Tribal Sub Plan
TSPs	Telecom Service Providers
TTL	Telecom Testing Laboratory
TTO	Telecommunications Tariff Order
UAL	Universal Access Levy
UASL	Unified Access Service License
UCC	Unsolicited Commercial Communication
UHF	Ultra High Frequency
UL	Unified License
UMS	Unified Messaging Service
USF	Universal Service Fund
USL	Unified Service Levy
USO	Universal Service Obligation
USOF	Universal Service Obligation Fund
UTL	United Telecom Limited
UTL	United Telecom Ltd.
UTs	Union Territories
VCC	Virtual Calling Cord
VLR	Visitor Location Register
VMS	Voice Mail Service
VNO	Virtual Network Operators
VOIP	Voice-over-IP

VPN	Virtual Private Network
VPT	Village Public Telephone
VRLA	Value Regulated Lead Acid
VSAT	Very Small Aperture Terminal
VTM	Vigilance Telecom Monitoring
WB	Wireless Broadband
WDAN	Wavelength-based Distribution and Aggregation Network System
WiPS	Wireless Phone Secure
WLL	Wireless in Local Loop
WMO	Wireless Monitoring Organisation
WMTDC	Wireless Monitoring and Training Development Centre
WPC	Wireless Planning & Coordination
WPHS	Web Page Hosting Service
WSHS	Web Server Hosting Service
WSIS	World Summit on the Information Society
WTDC	World Telecommunications Development Conference

Annexure-3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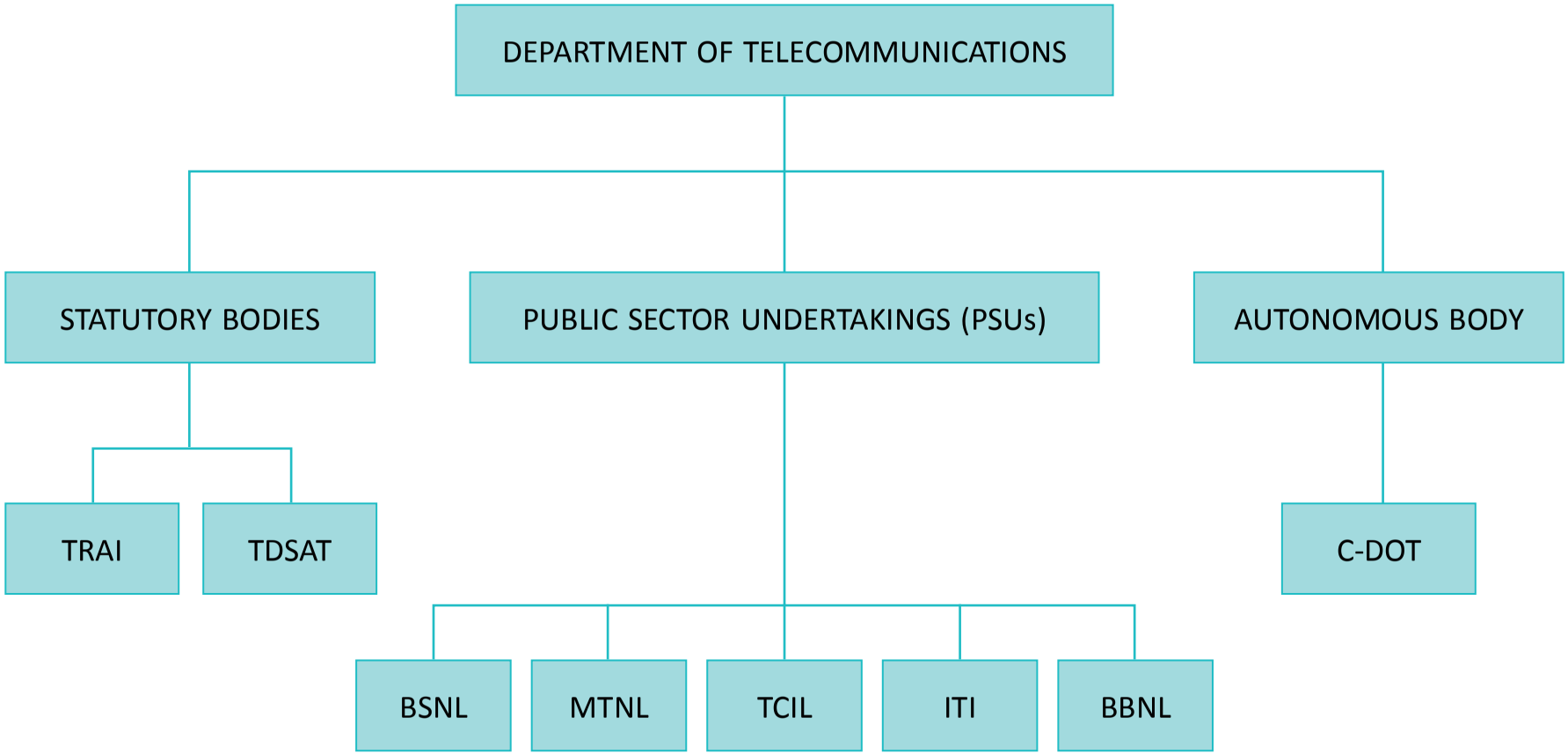
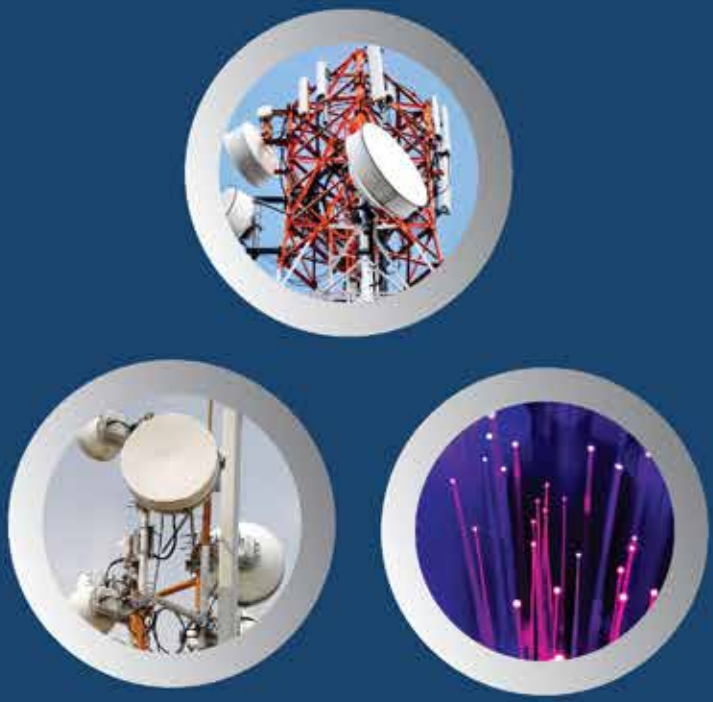
Minister of State for Communications
Secretary DoT & Chairman Digital Communication Commission
Administrator (USOF)
Addl. Secretary (T)
CVO
Member (Services)
Sr. Adviser (Economics)
Member (Technology)
DG (Telecom HQ)
Member (Finance)
Addl. Administrator (Finance)
Jt. Administrator (Finance)
Jt. Administrator (Technical)
DDG (I)
DDG (II)
DDG (III)
DDG (IV)
Jt. Secy (Admn.)- (BSNL, MTNL, BBNL, TRAI, TDSAT)
Jt. Secy (Telecom) - (IP and Policy)
DDG (C&A) - General Admn., Coord., Parl.
Legal Adviser
DDG (International Cooperation)
DDG (IT & Policy)
DDG (PM)
Adviser (Operations)
DDG (Skill Development)
DDG (Public Grievances)
DDG (Service Unit) -(ITI, HPIL &TCIL & Residual Matters of VSNL & HTL Ltd.)
DDG (Phone Priority)
DDG (Phone Priority II)
DDG (Staff Relations)
DDG (Training)
Sr. DDG (TEC)
DDG (Electrical)
Sr. DDG (NTIPRIT)
DDG (Establishment)
DDG (Personnel)
DDG (Security Assurance)
DDG (SPPI)
Sr.DDG (NCCS)
Economic Adviser
Wireless Adviser
Jt. Wireless Adviser
DDG (Access Services)
DDG (Access Services-I)
DDG (Access Services-II)
Advisor (Technology)
DDG (International Relations)
DDG (NOCC)
DDG (Networks and Technologies)
DDG (Carrier Services)
DDG (Data Services)
DDG (Disaster Management)
Sr. DDG (Director General Telecom HQ)
DDG (Admn. & West)
DDG (IT & South)
DDG (Security & East)
DDG (Policy & North)
LSA Field Units
CGCA
Pr. CCA / CCA/ Jt. CCA (HoD in the field)
ACGCA
Jt. CGCA, IA
Jt. CGCA, A/c
Jt. CGCA, Co-ord
Jt. CGCA, WR
Jt. CGCA (Manual & Coordination)
Advisor (Finance)
DDG (License Finance Policy)
DDG (Finance)
DDG (E&T)
DDG (B&PEF)
DDG (LFA)
DDG (Accounts)
DDG (WPF)
DDG (Asset Management)
DDG (FIPP)
DDG (NICF)
DDG (Trg-II)
DDG (Trg-I)

Annexure-4

Public Sector Undertakings, Statutory Bodies and Autonomous Organisations under DoT





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