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TEC

टी ई सी संचारिका
NEWSLETTER

दूरसंचार अभियांत्रिकी केन्द्र

TELECOMMUNICATION ENGINEERING CENTRE

Interaction of DoT officers with Hon'ble Minister

On 8th Nov, 2019, Shri Ravi Shankar Prasad, Hon'ble Minister of Communications held an interactive session with officers of DoT at Vigyan Bhavan in New Delhi. He launched an on-line DoT Dashboard & released one newsletter during the event. He addressed the young probationary officers of Indian Telecom Service as well as other officers of DoT & urged them to become the change agents in digital transformation of India. Shri Anshu Prakash, Secretary(T) was also present on this occasion. During event, presentations on six technical topics were given by six groups comprising DoT/TEC officers. *One presentation was given by Smt. Preetika Singh, ADG (TS), TEC on 'safeguarding the digital frontiers' in interactive session.*



Inauguration of event by Hon'ble Minister



Hon'ble Minister addressing DoT/TEC officers during interactive session

Telecom News: At a Glance

1. India Mobile Congress (14-16, OCT 2019)

Shri Ravi Shankar Prasad, Hon'ble Minister of Communications inaugurated 3rd edition of India Mobile Congress (14-16, OCT 2019) at Aerocity, New Delhi on 14th Oct, 2019 in presence of Shri Anshu Prakash, Secretary(T). MoC chaired the session on "Leaders for the Next Generation". Foreign delegates and eminent persons from Telecom industry were present during the occasion. On 1st day of IMC-2019, various sessions were held on 5G, IOT, AI, Smart City, Cloud and other important topics. Leadership/CEO's Conclave event was held on 2nd day of IMC-2019. Shri Anshu Prakash, Secretary(T) also addressed during an event on Make in India held on 15th Oct, 2019. On last day (16th Oct, 2019), Secretary(T)



Hon'ble Minister during inaugural session of IMC-2019



Inaugural session of IMC-2019

released a White Paper during CIO Conclave, and Grand Innovation Challenge Award Ceremony was also held in IMC-2019.

2. On 23 Oct, 2019, Government approved the proposal for revival of BSNL and MTNL by administrative allotment of spectrum for 4G services, debt restructuring by raising of bonds with sovereign guarantee, reducing employee costs, monetisation of assets and in-principle approval of merger of BSNL & MTNL.

3. National Broadband Mission (NBM)

On 17 DEC 2019, Shri Ravi Shankar Prasad, Hon'ble Minister of Communications launched the National Broadband Mission (NBM) at an event held at National Media Centre, New Delhi in the presence of Shri Sanjay Dhotre, Hon'ble Minister of State for Communications. On this occasion, Hon'ble MOC released the logo and mission document of NBM. Secretary (T), Industry representatives, officials from various Central Ministries, State Governments, DoT and media persons were also present in the event. NBM Mission is to provide affordable and universal access broadband to all; all villages to have access to Broadband by 2022.



Hon'ble Minister inaugurating National Broadband Mission

4. Central Equipment Identity Register(CEIR)

On 30 DEC, 2019, Shri Ravi Shankar Prasad, Hon'ble Minister of Communications launched Central Equipment Identity Register(CEIR) System to facilitate blocking & tracing of stolen/lost mobile phones in Delhi in august present of Shri Anil Baijal, Hon'ble Lt. Governor of NCT of Delhi. Same system was

launched earlier in Sept, 2019 in Mumbai on pilot basis. On this occasion, Shri Anshu Prakash, Secretary(T), Shri Amulya Patnaik, Commissioner of Delhi Police, Officers from Delhi Police & DoT, Representatives of Telecom industry and Media persons were also present.



Hon'ble Minister launching CEIR system in Delhi

5. On 18 Oct, 2019, Shri Ravi Shankar Prasad, Hon'ble Minister of Communications met with Mr. Malcolm Johnson, Deputy Secretary General, ITU in New Delhi in presence of Shri Anshu Prakash, Secretary(T).

Mandatory Testing and Certification of Telecom Equipment (MTCTE)

Mandatory Testing and Certification of Telecom Equipment (MTCTE) for 13 telecom equipment, covered under Phase-I was made mandatory w.e.f. 1st Oct'19. 57 companies/firms have registered on MTCTE portal till now for certification of their telecom equipment. Total 69 applications have been registered, so far, for certification of telecom equipment covered under Phase-I. Out of these 69 registered applications, 55 certificates (26 certificates under General Certification Scheme and 29 Certificates under Simplified Certification Scheme) have been issued. While remaining applications are under process at different stages. All cases are being completed in time bound manner by TEC.

04 labs were designated as CAB (Conformity Assessment Bodies) during OCT-DEC, 2019 and so far, total 53 nos labs have been designated by TEC for testing purpose under MTCTE. List of all designated labs is available at TEC website "<http://www.tec.gov.in/list-of-cabs-designated-by-india/>".



Dr. R. M. Chaturvedi, Advisor & Head TEC



Dr. R. M. Chaturvedi, an ITS officer of 1982 batch & electronics engineer from Shri Govindram Seksaria Institute of Technology and Science, Indore joined as Sr. DDG, in TEC on 31st Dec, 2019 and stands promoted to Advisor, TEC on 1st Jan, 2020.



During his career, he has acquired the degree of LLB from Law College Sayaji University Vadodara, PG Diploma in Investment & Market Studies from K. C. College Mumbai, MBA in Finance from JBIMS (Jamnalal Bajaj Institute of Management Studies) Mumbai and PhD in Management Studies from SVKM's NMIMS (Narsee Monjee Institute of Management Studies) Mumbai. His numerous publications include the book 'BUSINESS MODEL FOR TELECOM INDUSTRY IN COMPETITIVE ENVIRONMENT'.

He joined Department of Telecommunications in July, 1984 and till now he has served in the telecom sector for more than 35 years in different capacities dealing with projects, planning, development, maintenance and optimization of telecom systems which include Switching, Transmission, Internet, Data Networks, Broadband, Optical Fiber Network, Computerization etc. He has served in MTNL, Mumbai as DGM & area GM in the areas of Enterprise Networks, Business Development, Corporate Account Management, Operations, Access Networks, Cable Constructions & Materials Management.

Since 2012 onwards, he worked in DoT HQ as Deputy Director General (Carrier Services) in Telecom Licencing Wing of DoT in the areas covering Telecommunication Policy formulation, Licensing, National Digital Communications Policy-2018, Strategic Management, Management Training and Education, Technology selection and implementation till Dec, 2019. His multi-domain education & expertise enables him to provide holistic & pragmatic leadership in all situations.

He has been associated with NMIMS, JBIMS, AIAIMS and other leading Management Institutions at Mumbai and other places in various capacities including Governance, Management, Advisory, Teaching and Judging assignments.

TEC family welcomes Dr. R. M. Chaturvedi on his joining as Head of Organization.

Technical Paper on 'M2M/ IoT Enabling Smart Infrastructure'

Abstract: Global projections vary from 24 Billion to 50 Billion connected devices in the world by 2020. These devices may be in various sectors such as Safety & Surveillance, Automotive, Power, Health care, Smart homes, Intelligent buildings, Environment monitoring and pollution control, Water management, Waste management, Agriculture etc. As per National Digital Communication Policy (NDCP) released by DoT, an ecosystem is to be developed for connecting 5 billion by 2022.

1.0 M2M Communication / Internet of things (IOT)

1.1 M2M Communication

M2M refers to the technologies that allow wired / wireless system to communicate with devices of same ability. M2M uses a device (sensor, meter etc.) to capture an 'event' (motion, meter reading, temperature etc.), which is relayed through a network (wireless, wired or hybrid) to an application (software program), that translates the captured event into meaningful information.

The enabling technologies for M2M communication are sensor networks, RFID, mobile Internet, wired & wireless communication network, IPv4 / IPv6, etc.

1.2 Internet of Things

ITU-T in its Recommendation ITU-T Y.2060 (06/2012) has defined Internet of Things (IoT), as a global infrastructure for the information society, enabling advanced services by interconnecting (physical and virtual) things based on existing and evolving interoperable information and communication technologies.

IoT will be having a heterogeneous network, having IP and non-IP devices connected through IP Gateways. Gateways will be connected to IoT Platform. Communication technology is an important segment of the IoT domain as the data is required to be transmitted and received in time. A typical network having various communication technologies and Gateways has been shown in Figure – 1.

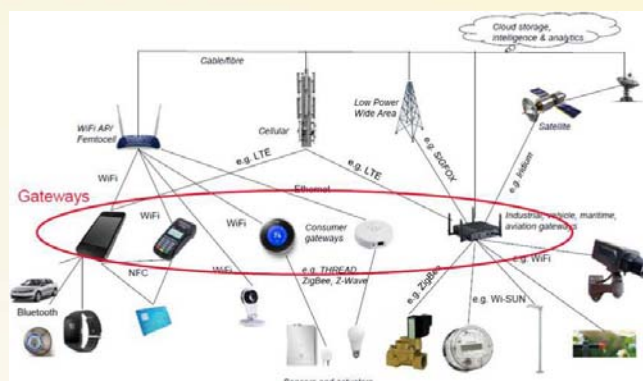


Figure – 1

M2M is a subset of IoT. IoT is a more encompassing phenomenon because it also includes Human-to-Machine communication (H2M).

2.0 M2M / IoT applications

M2M / IoT technology may make any vertical smart. Some of the verticals and related applications have been mentioned in the table below;

S.No.	Vertical	Vertical related applications
1	Smart City	Intelligent transport System, Waste management, Street Light control system, Water distribution, Smart Parking, Intelligent buildings, Safety & Security
2	Automotive / Intelligent Transport System	Vehicle tracking, e-call, V2V and V2I applications, traffic control, Navigation, Infotainment, Fleet management, asset tracking, manufacturing and logistics
3	Utilities / Energy	Smart metering, smart grid, Electric line monitoring, gas / oil / water pipeline monitoring
4	Health Care	Remote monitoring of patient after surgery (e-health), remote diagnostics, medication reminders, Tele-medicine, wearable health devices
5	Safety & Surveillance	Commercial and home security monitoring, Surveillance applications, Video analytics and sending alerts, Fire alarm, Police / medical alert
6	Smart Home	Security & alarm, Connected appliances, Smart lighting system
7	Agriculture	Remotely controlled irrigation pump, Crop Management, Soil analysis
8	Smart Manufacturing	Proactive maintenance of machines, Shop floor monitoring, Industry automation

3.0 Enabling technologies for M2M / IoT domain

The enabling technologies for M2M / IoT are sensor networks, RFID, mobile Internet, Location Based Services (LBS), Augmented Reality (AR), Artificial intelligence, wired & wireless communication network, IPv4 / IPv6 etc.

3.1 Communication technologies in M2M/ IoT domain

Communication technologies will play a very important role in the IoT domain as timely transmission of data is required. Data may be from few bytes (meter reading, fire alerts, temperature etc) to several MBs (video from a camera). Data may be in the form of bursts. There may be different types of communication technologies covering few centimeters to several kilometers and will be decided depending upon the use case requirement. Communication technologies have been shown in figure-2.

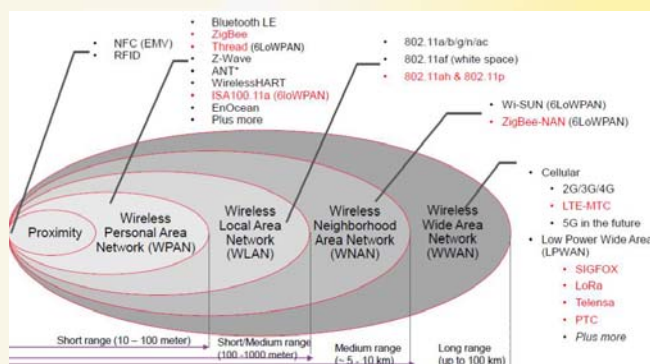


Figure – 2, Source: [Keysight Technologies]

In Personal area network (PAN)/ Home area network (HAN) / Local area network (LAN)/ Field area network (FAN), low power wireless communication technologies such as Wi-Fi, ZigBee, 6LoWPAN, Bluetooth Low Energy (BLE), Z-wave etc. may be used to connect the devices with the M2M gateway. GSM 3G/ 4G or fixed line broadband / FTTH may be used for connecting M2M gateway to the server.

3.1.1 Low Power wide area network (LPWAN) technologies

LPWAN technologies have been developed to carry a very small data to a large distance and consumes very

low power. It covers 2-3 Km in city (dense) areas and 12-15 Km in rural (open) areas. Expected battery life is around 10 years.

3.1.2 Use cases

Smart metering, Smart farming (transmitting Soil testing data), Smart bin, transmitting pollution sensor data etc.

In non-cellular domain, LPWAN technologies such as LoRa and Sigfox are being deployed across the globe. LoRa and Sigfox networks are deployed in delicensed sub GHz frequency band and in India it is 865-867 MHz.

In cellular domain, 3GPP has already released specifications in its Release 13 onwards for LPWAN services, which may co-exist with the existing cellular network deployment. Three variants in LPWAN technologies in cellular domain are EC-GSM, NB-IoT and LTE MTC. Cellular operators can enable LPWAN services in the existing GSM / LTE networks by upgrading the software. Trials have been done and the commercial offerings are also available in a number of countries namely South Korea, Europe, USA etc.

TEC had released a Technical Report on Communication technologies in M2M/ IoT domain (available on www.tec.gov.in/technical-reports/).

3.1.3 M2M SIM

The normal SIM card is not suitable for harsh conditions of vehicles like vibrations, temperature, and humidity. GSMA has created specifications for embedded M2M SIM, with Over-the-Air (OTA) provisioning. Temperature variation range is from -40 degree to +125 degree Celsius. Embedded SIM technology offers big opportunities for auto manufacturers as the lifecycle of an eSIM is, around 10-12 years. Embedded SIM will be the game changer in the IoT domain.

4.0 Challenges in the IoT domain

Emerging challenges mentioned in the figure-3 are required to be resolved, for proliferation of the IoT domain.



Figure – 3

5.0 Standardization at Global level

A number of international organizations are working on the standardization in IoT domain namely ITU, ISO/IEC JTC1, OneM2M, 3GPP, ETSI, IEEE etc.

5.1 International Telecommunication Union (ITU)

In June 2015, ITU-T created a new Study Group (SG)-20 to work on IoT and its applications including Smart Cities and communities. ITU-T SG-20 has approved / consented a number of standards in the form of technical documents. Accordingly, **National working Group-20 [NWG-20]** was created in TEC in September 2015, to submit contributions from India, in ITU-T SG-20.

5.2 OneM2M

A partnership project 'OneM2M', comprising ETSI (Europe), TTC (Japan), ARIB (Japan), ATIS, TIA (USA), TTA (Korea), CCSA (China) and TSDSI (India), are working to create standards for the common service layer.

OneM2M has published first set of specifications Rel 1 in Jan 2015, Rel 2 in March 2016, Rel 3 in December 2018. New releases are having some additional specifications on various features and functionalities and are backward compatible. Most of the specifications of OneM2M Rel 2 have been adopted by ITU-T SG-20.

6.0 Standardization work in Telecommunication Engineering Center (TEC), DoT, India

TEC formed eleven multi-stake holders working groups in the last 2- 3 years to work in M2M and IoT domain. Total eleven technical reports have been released so far and available on TEC website (www.tec.gov.in/technical-reports/). These reports are as given below;

- i. M2M Enablement in Power Sector
- ii. M2M Enablement in Intelligent Transport System
- iii. M2M Enablement in Remote Health Management
- iv. M2M Enablement in Safety & Surveillance Systems
- v. M2M Gateway & Architecture.
- vi. M2M Number resource requirement and options
- vii. V2V / V2I Radio Communication and Embedded SIM
- viii. Spectrum requirements for PLC and Low Power RF Communications.
- ix. ICT Deployments and strategies for India's smart cities: A curtain raiser
- x. M2M/ IoT Enablement in Smart Homes
- xi. Communication Technologies in M2M / IoT domain
- xii. Design and planning Smart cities with IoT/ ICT

These technical reports will be quite useful in developing eco system for the IoT domain and also for Smart Cities.

6.1 Actionable points emerged from the technical reports (TRs)

A number of actionable points emerged from these technical reports. Some are as given below;

- i. Based on TEC technical report, 13 digit M2M Numbering plan for SIM based devices/ Gateways, which will co-exist with the existing 10-digit numbering scheme was prepared and recommended by TEC.

- DoT has approved the scheme and issued orders for its implementation.
 - Five codes of 3 digit each (559, 575, 576, 579 and 597) have been allotted as a M2M identifier.
- ii. M2M SIM/ Embedded SIM and remote subscription management: In view of technical report released on this subject, Interface Requirement (IR) was prepared in TEC.
- DoT has approved the use of Embedded SIM with OTA provisioning.
 - Ministry of Road Transport and Highways in India has issued a Standard [AIS-140] which mandates the use of Embedded SIM for Commercial Passenger Vehicle Tracking.
 - The Bureau of Indian Standards (BIS) has released a new Standard for Automotive Tracking Device and Integrated Systems (IS 16833: 2018) which mandates the use of the embedded SIM as per the Standards/ Specifications of TEC, DoT.
- iii. Any device / Gateway having direct connectivity with PSTN / PLMN will be required to have static IP. As IPv4 are going to exhaust, adoption of IPv6 at device, network and application level will be necessary. Therefore, such devices/ Gateways should have IPv6 or dual stack.
- BIS has mandated IPv6 for Smart meters (IS16444).
- iv. Multi-protocol gateways: Essential requirement has already been prepared under MTCTE.
- v. Common service layer at the platform for sharing of data across verticals and between platforms: Adoption of oneM2M Rel2 standards transposed by TSDSI is in progress and expected to be completed by March 2020.

7.0 Conclusion

A lot of work is already in progress to resolve the issues mentioned in para-5 (figure-3). For large

proliferation of the M2M/ IoT domain, standards based solutions are required to be implemented. Interoperability at device, network and application levels is required to achieve the economies of scale. Platforms should have common service layer to share the data among the various verticals and also in between the platforms. Sharing of data will bring the real smartness. Standards based solutions to be implemented in Smart cities will create the smart solutions not only for the present but will be sustainable for the future.

References

1. Technical Report on Communication technologies in IoT domain (www.tec.gov.in/technical-reports).
2. Harnessing the Internet of Things for Global development by CISCO and ITU.
3. Technical Report on (a). V2V/ V2I Radio Spectrum and Embedded SIM, (b). M2M Enablement in Remote health management. (www.tec.gov.in/technical-reports)

[Contributed by IoT division, TEC]

Essential Requirements (ERs) of M2M/ IoT Devices

ER on Feedback device with cellular and LoRa connectivity has been issued and available on MTCTE portal.

ERs on Smart electricity meter, Tracking device, Feedback device, IoT Gateway, Smart watch and Security Camera with connectivity as PSTN/ PLMN (cellular, broadband) have been prepared and approved by competent authority.

ERs on smart devices to be connected via Gateway on communication technologies such as LoRa, Sigfox, ZigBee, PLC, RF Mesh, 6LoWPAN, BLE, Wi-Fi etc. are being formulated and may likely be approved after following due process.

TEC Contributions submitted to ITU-T & other Standardization bodies

1. **Y.SCC- use cases “Use cases on Smart cities and communities” converted into ITU Standards in SG-20 meeting, Geneva, Dec 2019**

This document is having total nine Smart city use cases from Japan, Korea, UK and India. It has been approved / accepted in the ITU-T SG-20 closing plenary meeting, 6th Dec 2019. Contributions were submitted in all SG-20 meetings and presented remotely. Mr. Sushil Kumar, DDG(IoT), TEC worked as an editor in both the documents mentioned above, jointly with experts from other countries. This document is being published by as ITU-T as Recommendation Y Suppl. 56 (12/ 2019).

2. One contribution in collaboration with the industry was submitted by Officers of IoT division participated in ITU-T Focus Group meeting on ‘**Artificial Intelligence for Health**’ (AI4H) held in NICF (National Institute of Communication Finance), Delhi in Nov 2019. Two demos on AI4H from the industries, working in IoT domain with TEC namely Calligio Technologies and STMicroelectronics, were facilitated for this meeting in NICF, Delhi. DDG(IoT), TEC was also the member of organising committee of this event.
3. A contribution on ‘**Open Bootstrap framework enabling trustworthy networking and services for distributed diverse ecosystem**’ was presented remotely in the meeting of ITU-T Study Group-13 held in Geneva in OCT-2019.
4. A contribution on ‘**End to End Product life cycle management of IoT devices**’ was presented by Dir(FN), TEC in the meeting of ITU-T FG-AI4EE held in Vienna, Austria in DEC-2019.

Workshops conducted in TEC

1. A Workshop was conducted on 11th December 2019 in TEC with association with OEM Rohde and Schwarz. The workshop provided the exposure of conformance testing of Base Station and WLAN and testing solution of RF, RRM, PCT, LBS for user equipment (2G, 3G, 4G and 5G).

The workshop was well attended and helped TEC officials in better understanding of the testing solutions. It was the second in a series of workshops. Access Lab (AL) Division is planning few more workshops in coming months.



TEC officers participating in the workshop

2. Workshop on ‘**ML in future networks and role of standardisation**’ organised by TSDSI in IIT Delhi on 29th Nov 2019 was attended by a no. of officers from TEC. Ms. Deepa Tyagi, DDG(FN) participated in the panel discussion on ‘**ML Technology-Maturity in communication**’ and presented her views. Mr. Sushil Kumar, DDG (IoT) also expressed his thoughts on ‘**Bridging the Skill and Standardization gap**’ in the panel discussion in this event.

Adoption of oneM2M Rel 2 specifications, transposed by TSDSI, as National Standard

A two layered Committee was constituted by Sr. DDG, TEC in Feb 2019 for this work. Consultative Committee chaired by Mr. Sushil Kumar, DDG (IoT) TEC is having members from industries, Government and standardisation bodies, including C-DOT and TSDSI. After a no. of meetings and training programmes, Consultative Committee has finalized its report and submitted to Telecom Standards Advisory Committee in Dec 2019 for further necessary action.

Various Presentations by TEC officers

1. A Presentation was delivered on '**Application Segments for 5G in India - Opportunities, Requirements and Challenges**' by Mr. Sushil Kumar, DDG(IoT), TEC in a panel discussion with other industry speakers, arranged by TSDSI on 16th Oct 2019 in India Mobile Congress-2019, Delhi.
2. Presentations on the topics 'Next Generation Microwave', 'Technical framework for Lawful interception (LI) in India', 'Legal framework for Lawful interception in India and International scenario of LI', 'NGN Interconnection and security issues' in NTIPRIT Ghaziabad were given by TEC officers.
3. A presentation on 'Ethical issues in AI for Health' submitted to ITU-T FG-AI4H in Delhi in NICF.
4. A presentation on "Testing and Certification of LoRa based devices and Gateway (BTS)" by M/s LoRa Alliance, was arranged by IoT division in TEC in Oct-19.
5. A presentation on "IoT technology, applications and security aspects", in ITU CoE programme in ALTTC Ghaziabad was given by DDG (IoT) in Oct & Dec-19.
6. DDG (IoT) delivered his views on Importance of Standardisation in a conference on LoRaWAN Live, organised by LoRa Alliance in Delhi in Oct-19.

हिंदी कार्यशाला

दूरसंचार अभियांत्रिकी केंद्र, नई दिल्ली में दिनांक 18.12.2019 को एक हिंदी कार्यशाला का आयोजन किया गया। इस कार्यशाला में कुल 25 अधिकारियों / कर्मचारियों ने भाग लिया। इस कार्यशाला में अतिथि वक्ता के रूप में श्री राजेश कुमार श्रीवास्तव, उप निदेशक (राजभाषा), सूचना एवं प्रसारण मंत्रालय ने भाग लिया। उन्होंने कार्यालय कार्यों में हिंदी का ज्यादा से ज्यादा प्रयोग करने हेतु यूनिकोड इन्स्टाल करने एवं यूनिकोड की सहायता से हिंदी में कार्य करने का अभ्यास करवाया गया तथा हिंदी के बारे में ज्ञानवर्धक जानकारी दी गई।



(अतिथि वक्ता श्री राजेश कुमार श्रीवास्तव, उप निदेशक (राजभाषा), जानकारी देते हुए)



(हिन्दी कार्यशाला में उपस्थित अधिकारी – कर्मचारी गण)

Activities in 'National Telecommunications Institute for Policy Research, Innovations & Training Institute'

1. Valedictory Module of ITS-2016 batch and P&T BWS 2016 batch

As part of induction training, ITS officers of 2016 batch attended 15 weeks Foundation course at HIPA, Gurugram. After this, Officers of ITS-2016 batch and P&T BWS 2016 batch attended the valedictory module at NTIPRIT. Ms. Deepa Tyagi, Sr. DDG, NTIPRIT graced the occasion and blessed the Officers for future endeavors.



ITS-2016 and P&T BWS 2016 batch with faculties of NTIPRIT on the occasion of Valedictory Programme

2. In-Service Course on 'RET (Renewable Energy Technology) in Telecom (Solar Power Plant)' (10.10.2019 to 11.10.2019)

Two days In-Service course on 'RET in Telecom (Solar Power Plant)' was conducted by NTIPRIT at Ghaziabad. During the course the experts from government organizations were invited to deliver the lectures and share the experiences. 10 Officers from various LSAs and Public Sector Units had attended the course.

3. ITEC (Indian Technical and Economic Cooperation) Course on '5G & IoT' (30.09.2019 to 04.10.2019)

One-week course on '5G & IoT' was conducted at CDTI, Ghaziabad. Total 25 participants from 14 countries attended the course. The objective of the Course was to familiarize and develop an understanding of 5G and IoT/M2M and their various related aspects. The course



Group photo of participants of ITEC course

covered the concepts of LTE & LTE Advanced (4G), 5G New Radio, 5G Core Network and different usage scenario of 5G as well as on IoT/M2M. It also covered Regulatory & Spectrum aspects of 5G & IoT/M2M. The participants also visited Delhi as part of cultural / heritage Visit.



Glimpse of Valedictory programme of the course

4. ITEC on 'Telecommunications Licensing and Regulation' (16.12.2019 to 20.12.2019)

NTIPRIT conducted 3rd ITEC course in the month of December, 2019. Total 14 participants from 9 countries participated in the course.

The objective of the Course was to familiarize the participants with the concepts, evolution and current trends of Licensing & Regulation in Telecom, Universal and affordable access of Telecom services, Spectrum management, Standardization and interoperability of Telecom Networks and Dispute resolution framework. They also visited Historical monuments in Delhi as part of Cultural Visit during the course.



Group photo of participants of "Telecommunications Licensing and Regulation" course

5. Induction Training

Following batches of Officer Trainees of ITS/ BWS probationers was conducted during the period:

- i. ITS-2016 batch (34 officers)
- ii. BWS-2016 batch (3 Officers)
- iii. BWS-2017 batch (2 Officers)
- iv. ITS-2018 batch (15 Officers)
- v. JTO-2016 batch (1 Officer)
- vi. JTO-2018 batch (10 Officers)

Various training programs like technical modules, BSNL/MTNL attachment, were conducted during this period as per respective training calendar.

6. In-Service training courses for DoT Officers were conducted at NTIPRIT on the following topics:

- i. In-Service course on "RET in Telecom (Solar Power Plant)" (10-11 October, 2019) [10 Participants]
- ii. In-Service course on "4G & 5G Technologies" from 04.12.2019 to 06.12.2019 [11 Participants]

Approval Certificate Issued by TEC

Sl. No.	Name of the Manufacturer/Trader & Name of Product & Model No.
A	<i>M/s Aspect Contact Centre Software India Pvt. Ltd.</i>
1	Systems Employing Computer Telephony Integration, DCP-00
2	Systems Employing Computer Telephony Integration, Aspect Call Centre Enterprise
3	Systems Employing Computer Telephony Integration, TMS-00
B	<i>M/s ECI Telecom India Pvt. Ltd.</i>
4	Interchange of Digital Signals at 2Mbit/s, 8Mbit/s, 34Mbit/s, 140 Mbit/s and 45 Mbit/s Ports, Digital Multiplexer E1, NPT-1200
5	Interchange of STM-1, STM-4, STM-16 and STM-64 signals between different networks, Digital Multiplexer STM1, NPT-1200
6	Interface Requirements for Interchange of ETHERNET Signals between Different Networks, Digital Multiplexer 1G, NPT-1022
7	Interface Requirements for Interchange of ETHERNET Signals between Different Networks, Digital Multiplexer 1G, NPT-1300
8	Interface Requirements for Interchange of ETHERNET Signals between Different Networks, Digital Multiplexer 1G, NPT-1800

Important Activities of TEC during OCT 19 to DEC 19

Brief About TEC

Telecommunication Engineering Centre (TEC) functions under Department of Telecommunications (DOT), Government of India. Its activities include:

- Issue of Generic Requirements (GR), Interface Requirements (IR), Essential Requirements (ER), Service Requirements (SR) and Standards for Telecom Products and Services
- Field evaluation of products and Systems
- National Fundamental Plans
- Support to DOT on technology issues
- Testing & Certification of Telecom products

For the purpose of testing, four Regional Telecom Engineering Centers (RTECs) have been established which are located at New Delhi, Bangalore, Mumbai, and Kolkata.

For more information visit TEC website
www.tec.gov.in

Meeting/Seminar/Workshop attended by TEC officials:

- World Radio Communication Conference 2019 (WRC-19), Sharm el-Sheikh, Egypt
- ITU-T meeting of Focus Group on Environment Efficiency for AI and other emerging technologies (FG-AI4EE) in Vienna, Austria
- India Mobile Congress-2019, Aerocity, New Delhi
- Meeting on POLNET system in DCPW, New Delhi
- TSAC meeting regarding adoption of 3GPP standards
- Conference on National IPR Policy in IIT Delhi
- Workshop on ML and Standardization in IIT Delhi
- Workshop on 5G organised by GSMA in DoT HQ, New Delhi
- Digital Infrastructure Summit organised by CII in Delhi

GRs/IRs/SDs/ERs issued

- GR on Media Server
- GR on Signalling Gateway
- GR on E-PON

DCC/Sub DCC meeting conducted for

- IR on PoS devices with wireless/wireline interfaces
- GR on Power system based on renewable energy for telecom equipment
- GR on NGPON2, GR on Micro duct
- SD on SAR limits for wireless communication devices used in close proximity to human body

Other Important Activities in TEC

- Meetings of NWG-13 & NWG-15 were held in TEC
- Guideline on "Voluntary code of Practice(VCP)" for sustainable telecom is under finalization in TEC. It envisaged to consist of energy efficient network planning, infra-sharing, deployment of energy efficient technologies and adoption of renewable energy technology.
- Internal Audit of 22 Divisions of TEC was carried out and completed in Dec 2019 in accordance with Quality System Procedures framed to meet the requirement of ISO 9001:2015.

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Suggestions/feedback are welcome, if any, for further improvement.

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