

TELECOMMUNICATION ENGINEERING CENTRE (TEC)

Department of Telecommunications



About TEC



Technical arm/ attached office of DoT

Standards Setting Organization (SSO) for telecom & related ICT sector

Defacto sector specific National Standards Body (NSB)

Responsibility to implement Mandatory Testing & Certification of Telecom Equipment (MTCTE)

Voluntary testing and certification of telecom equipment and interfaces

Designated National Enquiry point for WTO -TBT (Technical Barrier to Trade) for telecom sector

Complaint resolution under PPP-MII for Telecom products and services

An ISO 9001:2015 certified organization



TEC: Standardisation related activities



Formulation of Standards for telecom, broadcasting, and related ICT sector.

Ratification/ Adoption of international standards as National Standards.

Formulation of Technical Regulations i.e. Essential Requirements (ERs).

Contributes in the standardization process of international organizations - ITU, APT, IEEE,...

Nodal organisation for ITU-T.

Leads National Working Groups (NWGs) corresponding to the ITU-T Study Groups

TRAI designated agency for testing and certification of Conditional Access System and Subscriber Management System for Broadcasting sector

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Major Functions

- Formulation of Standards (GR/IR/SR) and Test Guides(e.g., 4G RAN,4G Core,5G trial, Quantum Key Distribution System (QKD), EMF assessment.)
- Formulation of Essential Requirement (ERs) and test guide for MTCTE Certification
- Designation of Conformity Assessment Body (Labs)for testing of Telecom & networking Products.
- Contribution in the Standardization process of international organisations, viz. ITU-T ,ITU-R Study Groups, APT, WRC etc., Various activities assigned to TEC for the WTSA-24.
- PLI & TTDF evaluation, Local Content (LC) complaints under PPP-MII and WTO-TBT enquiry point for telecom sector.
- Technical Inputs to DoT & other concerned departments (Customs, TRAI, DCPW etc.),

TEC Standards/Technical Reports

- ✓ Standards issued/revised since 2014 covering cutting edge & emerging telecom technologies:

Type of Standard /Specifications	No.
Essential Requirement (ER)	60
Standards(GR/IR/SR)	239

- ✓ TEC issues technical reports, study papers, Test guides, Guidelines etc. as per Industry requirements etc. (Total Technical reports published=22, Study papers=98)
- ✓ TEC publishes quarterly newsletter regularly

TEC Reforms for “Ease of Doing Business”: A continuous process for improvement of the existing process/system

- ✓ Enhancement of Validity period of MTCTE Certificates: Validity of Regular MTCTE Certificate enhanced from 5 years to 10 years.
- ✓ Promotion of Self certification scheme: **Seven Telecom products were converted from GCS to SCS** w.e.f. 01.01.2023. Further, **37** more products shifted into SCS category w.e.f. 01.01.2024.
- ✓ Fee revision: **Only administrative fee** is charged for all ER based applications w.e.f. 01.01.2024.
- ✓ Wider Acceptance of Test reports:
 - **Acceptance of test reports from reputed government institutes/ Labs such as IITs, IISc, CDOT, CDAC etc. & BIS recognized lab(s).**
 - **Acceptance of test report from (i) NABL accredited lab, (ii) Government organisation/PSUs such as RDSO/BSNL/MTNL/ITI etc. (iii) witness testing for registered MSME, for OF/OFC.**

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Voluntary Certification Scheme (VCS)

- ❖ Total Exemption of evaluation & certification fee for DPIIT registered Start-ups & MSMEs for a period of 5 years up to March 2027.
- ❖ Reduction in renewal fee (only administrative fee charged).
- ❖ All the Voluntary Certification modules have been made online by TEC (Type approval /Interface approval/ Certificate of Approval (CoA)/ Technology Approval).

Waiver of Fee for TEC standard download: TEC Standards uploaded online and available free of cost.

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CAB Designation Scheme

- ❖ Reduction in CAB Designation application fees by 50% for registered Start-ups & MSMEs
- ❖ No fee for Government Labs to apply for CAB designation.
- ❖ Reduction in renewal fee by 50%.

Portal developed for making processes online:

- ✓ CAB Lab designation process
- ✓ Standard Coordination Portal (SCP) for NWG activities.
- ✓ PPP-MII Local Content complaint's registration.

Major Achievements

A glance on few new Standards on Emerging Technologies (GR/IR/ER etc.)

- ✓ Standard(GR) and Test Guide on Quantum Key Distribution System (QKD).
Standard (GR) for Quantum-Safe and Classical Cryptographic System.
- ✓ Standard(IR) for Non-Geostationary Satellite(LEO, MEO) Orbit (NGSO) Communication
Standard (ER) for NGSO satellite communication equipment
Standard(ER) on E-Band Fixed radio & V-Band Fixed Radio Systems
Standard(IR) of Embedded SIM(ESIM)
Standard(GR) for Small Size gNodeB
- ✓ Standard for Fairness assessment and rating in AI
- ✓ Time synchronisation standard for Indian communication network i.e. National Plan prepared for distribution of IST to all Licensed Service Providers of DoT.
- ✓ Design and Standard for Common Duct and Post infrastructure along Highways and public pathways.
Report on Traffic Management practices & Network slicing effects on Net Neutrality, submitted to DoT.
Formulation of Test Guide for 5G core.

A Glance on Other Achievements

- **ITU 6G Framework:** India successfully contributed for incorporation of India's 6G Vision-Ubiquitous Connectivity as usage scenario and, Coverage, Sustainability, Interoperability as capabilities
- Study on Planning & deployment of 5G technology base stations and EMF exposure with CEWiT, IIT Madras
- Report on Rollout of Small Cells for 5G Networks by **leveraging Street Furniture**
- Technical Report on "Television Broadcasting to Mobile handheld devices - Direct to Mobile (D2M) broadcasting
- MoU between **TEC & IIT Delhi** for collaboration in the area of trustworthy & responsible **AI systems** (on 03.11.2023) for development of test tools for TEC standards. MoU also signed with Amrita University
- Based on WG recommendation for **Interoperability** requirement between **OLT and ONT** deployed in a Multivendor Environment, the ER of PON family has been revised.
- Test Guide of Conditional Access System (**CAS**) & Subscriber Management System (**SMS**) for Broadcasting and designation of two labs as per TRAI mandate

- GR and Test Guide for Metal Free Double HDPE underground Optical Fibre cable (used in Bharat Net)
- GR & Test Guide for 50G PON system for FTTx broadband applications.
- GR and Test Guide on Band Pass Filter for C-Band Satellite Earth Receivers in 3700-4200 MHz
- Technology Approval issued for C-DoT: WiFi Access Point / 4G RAN / XGS Mini OLT / 100G DWDM / QKD System
- Seven proposals submitted by academia and industry to MeitY with TEC as Knowledge Partner for developing frameworks. And tools for Responsible AI – Feb 2024 (DIAT, IITD, IIITD (2), Bosch (2), Amrita).
- Four ITU Standards/ Reports published in 2023-24 driven fully by contributions by C&B Division TEC:
 - ITU Recommendation J.1036: Factual subscriber-base reporting and protected content delivery in conditional access system – Requirements published – May 2023
 - ITU Supplement J Suppl. 13: ITU-T J.1036 – Factual subscriber-base reporting and protected content delivery in conditional access system – Test methods published – Nov 2023
 - ITU Technical Report TR.FSR - Factual subscriber-base reporting and protected content delivery in a conditional access system (CAS) published – May 2023
 - ITU Technical Report on Common User Profile published – Nov 2023

Ongoing Activities

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A	<u>MANDATORY TESTING & CERTIFICATION (MTCTE) & CAB Designation</u>
1	Integrated MTCTE portal with security (ITSAR) testing has been inaugurated on 22.12.2023 to facilitate OEMs for end to end online testing. -Completed
2	Based on the analysis of 44 notified products under Phase-III & IV, only 10 products granted extension by 4 months i.e. till 01.08.2024. – Notified
3	Roll out of 6 products under Phase-V w.e.f. 01.07.2024. – Notified
4	Extension of security requirements for WiFi CPE & IP Router by three months i.e. till 01.07.2024. – Notified

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5	Accreditation Scheme for designation of TCBs for Proposal of Rs 26.7 lacs approved by Secretary (T). NABCB has submitted initial scheme draft along with Proforma invoice; same is under process
6	Proposal for reimbursement of testing fees to startups and MSEs as a measure of reduction in compliance burden – submitted to DOT-HQ, under consideration
7	Provisional Designation of Labs for emerging technologies - 02 Lab designated (CN Lab, Bengaluru for hypervisor and AAEMT, Gurgaon for 5G BTS)
8	MoU with IIT-Madras & IIT-M Pravartak for using their testing lab infrastructure for Conformity Assessment requirement for 5G Core & 5G RAN (to start with) is under process of approval;

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B (a)	New Standards/Specs. on Emerging Technologies (GR/IR/ER etc.)
1	Standard for Anti Drone Systems - (In progress)
2	GR for Open RAN product (RU, CU+DU) - (In process)
3	Standard for Mobile Satellite Service (MSS) with low bit rate IoT/M2M based applications - (In process)
4	Standard for Assessing and Rating Robustness of Artificial Intelligence Systems in Telecom Networks and Digital Infrastructure. - (In process)

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5	GR for Radio over Fiber (RoF) system
6	GR on Li-Fi indoor Access point - (In process)
7	Quantum Random Number Generator - (In process)
8	Standard on Radio Altimeter to be prepared for mitigation of interference from 5G Base Stations operating in C- Band - (In process)
9	Formulation of Policy Paper & Action Plan on Circular Economy in Telecom Sector - (Report under Finalization)

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B (b)	Other New Standards (GR/ER etc.)	
1	Metal free Optical Fibre Cable with Double HDPE Sheath for underground duct application (ribbon and non ribbon)	
2	GR for Small Size 5G Core	- (In progress)
3	GR on Armoured Ribbon Optical fibre Cable	- (In progress)
B (c)	Revision of Existing Standards Revision of ER on SIM (for addition of 5G SIM)	(Total = 26 documents)
B (d)	New Test Guides for inclusion of SIM Swap criteria for MNP Rejection for CNAP Service	- In Process - In process

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c	TESTING & CERTIFICATION
	TECHNOLOGY APPROVAL/ CERTIFICATION to indigenous OEMs
1	Type Approval Certificate to M/s Lekha Wireless for eNodeB (issued on 09.02.2024)
2	Testing of 4G LTE RAN eNodeB to Indian OEMs namely M/s. Resonous Technologies (139 tests out of 242 completed) & M/s Signaltron Systems (101 tests out of 242 completed) –(Testing underway)
3	Type Approval Certificate to M/s Astrome's E-Band Radio Equipment (Issued on 31.01.2024)
4	Certificate of Approval (CoA) for Virtual Network Expert (VNE) to M/s Aprecomm, Bengaluru - (Issued on 30.10.2023)
5	Certificate of Approval (CoA) for VCS, VWE & SNAP to M/s Aprecomm, Bengaluru - (Issued on 05.02.2024)
6	Type Approval Certification of the QKD system developed by M/s QNu Labs - (Testing underway)
7	CoA for FSOC product- (M/s NAV Wireless , Gujarat) - (issued on 10-2-2024)
8	CoA of SDWAN to M/s Infinity Labs , Pune - (Issued on 11.09.2023)

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9	TECHNOLOGY APPROVAL/ CERTIFICATION to C-DOT	
(i)	RAN Technology eNodeB	(Issued on 27.07.2023)
(ii)	Quantum Key Distribution system & PoC trials between Sanchar Bhawan (DoT) & CGO Complex (NIC) encrypting the traffic	(Issued on 30.08.2023)
(iii)	GPON mini-OLT (office OLT-2) system	-(issued on 21.07.2023)
(iv)	GPON mini-OLT (office OLT-3) system	-(issued on 01.09.2023)
(iv)	Dual Band Wi-Fi Access Point CPE	(Issued on 05.07.2023)
10	Two Conditional Access Systems (CAS) certificates to C-DoT against TRAI requirement -(issued on 05-07-2023 & 27-03-2024)	
11	Subscriber Management System (SMS) certificate to C-DoT against TRAI requirement - (issued on 19-02-2024)	
12	Proof of Concept (POC) testing of indigenous 4G technology solution developed by C-DOT: - Indigenous 4G technology solution to be utilized by BSNL has been tested using TEC Control lab . The lab has generated subscriber load of 10 million subscribers for testing the indigenous solution subsequent to which the solution has been approved by DoT for commercial deployment.	

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13	Review of Electromagnetic Field Norms: Addendum for 5G EMF measurement procedure finalized, issued & circulated to TSPs (Licensees) by AS wing, DoT HQ.
14	Evaluation of proposals of Telecom Technology Development Fund (TTDF) for funding R&D projects: TEC is a member of the Evaluation Committee.
15	Evaluation of products in Trusted Telecom Portal of NSCS - (Evaluation of around 1800 Telecom products completed since 1 st June 2021.)
16	Adoption of SDOs (TSDSI) specification as National Standards: -(Completed) <ul style="list-style-type: none">➤ 3GPP Release 10 to 17 standards (total 428 documents)➤ Rev 6 of ITU-R M.2012 and Rev 2 of ITU-R M.2150 reg. IMT Advanced (5G)

IoT/M2M related Activities

- TEC created framework for development of National Trust Centre (NTC) being implemented by C-DoT for addressing vulnerability issues in IoT devices.
- 1st NTC stakeholders workshop was held on 12th Jan 2024 ; 2nd Workshop being planned in May 2024
- Sectoral ministries have been apprised of IoT related M2M standards and guidelines.
- TEC has adopted oneM2M Release 2 in 2020 and oneM2M Release 3 in 2022 as National standards. Initiated dialogue with GCF for strengthening oneM2M testing and certification ecosystem in India.
- Revised all existing ERs for inclusion of testing parameters related to NB-IoT, 5G Interface.
- In 2023-24, Released Technical Report on:
 - Revolutionizing Agriculture: The Digital Transformation of Farming
 - Technologies and Standards for Intelligent Transport System
 - EMF Radiation from IoT/ M2M devices
 - Security by design for IoT device manufacturers

Major Events/Conferences/ Workshops

- ✓ **1st International Quantum Communication** Conclave, 2023 conducted on **27th – 28th March 2023** at Vigyan Bhawan, New Delhi.
- ✓ **2nd International Quantum Communication Conclave** held on 15-16 February 2024 at New Delhi.
- ✓ TEC conducted an awareness program at ITI complex, Bengaluru on 02 Feb 2024 for start-up /industry about TEC certification.
- ✓ Workshop on “**Drones Use-cases in Communications**” conducted in Dec, 2023.
- ✓ **2nd International 6G Standardization workshop @IMC-2023 on 28th - 29th October, 2023.**
- ✓ A TEC stall was put-up to create awareness about TEC standardization, Certification activities in @ IMC-2023 on **28th - 29th October, 2023**
- ✓ The first meeting of ITU-T SG 20 Regional Group for Asia-Pacific successfully organized under Indian chairmanship on 25-26 July 2023. It witnessed active participation of around 120 delegates from 15 countries of Asia Pacific region.

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- ✓ **DO letters** dated 17.10.2023 & 23.01.2024 from **Secretary(T)** to all Chief Secretaries of States/UTs, Secretary, Power, Higher Education etc. regarding awareness about MTCTE regulatory regime and TEC voluntary certification
 - ✓ **Workshop** on “ Facilitation of Telecom Startups & MSMEs for Atmanirbhar Bharat” conducted in TEC on 15-03-2024
 - ✓ **Workshop** on Advances in Optical Communication was held successfully in IIT Madras on 22-23rd July 2023
 - ✓ Hosted **ITU Workshop** on “Future of TV in South Asia, Arab and Africa” on 11.05.2023
 - ✓ TEC successfully hosted **ITU-T SG-9 meeting** along with IISc, Bangalore in India from 9th to 18th May 2023
 - ✓ TEC successfully hosted **ITU/ FAO Workshop and 9th Meeting of ITU/ FAO Focus Group** on ‘Artificial Intelligence (AI) and Internet of Things (IoT) for Digital Agriculture’ (FG-AI4A) in New Delhi jointly with ICAR on **18-19 March 2024**, with participation of more than 250 delegates globally.

World Telecommunication Standardization Assembly (WTSA)

- Various activities assigned by DoT-HQ in view of hosting of WTSA-2024 in India from 15th-24th October, 2024 ;
- **Shortlisting Indian candidates for leadership positions for Study Groups/ TSAG etc. of ITU-T;**
 - TEC solicited nominations from telecom/ICT experts for various leadership roles, scrutinized, categorized and forwarded to DoT HQ.
- **Preparation for contribution on ITU-T Resolutions and other content part;**
 - Coordination meeting with IAFI, TSDSI, CDOT etc. to synchronize contributions for WTSA-24 on 21.10.2023. A National Preparatory workshop was organized on 10.01.2024.
 - Total 30 Indian Contributions (27 on existing ITU-T Resolutions + 03 on New Resolutions) have been submitted in APT in view of 2nd APT preparatory meeting for WTSA-24.
- **Run up events for creating awareness and active participation of stakeholders;**
 - Instructions to DoT/NTIPRIT/NCCS/LSA/TEC to reserve a session/slot in all their forthcoming seminars, workshops, webinars for WTSA-24 awareness.
 - Open Workshops/Webinar for all stakeholders (Started from DEC, 2023), 1st workshop held on 27.12.2023 at Rajasthan LSA and Special Session held on 31.01.2024 in IIT Roorkee
- **Participation in DoT's Committees for WTSA management related activities**

ITU-T : National Working Groups (NWGs)

- ✓ TEC is the nodal agency for interacting with ITU-T.
- ✓ Constituted 11 National Working Group(NWG) corresponds to each ITU-T Study Groups (SGs).
- ✓ In addition, a 'National Working Group on Quantum Technology (NWG-QT)' has also been created in TEC to have more focussed approach on Quantum Technology.
- ✓ Members from all the stakeholders including Industry, service providers, domain experts, academia, other ministries/ organizations etc.
- ✓ Contributions are presented, deliberated, debated in ITU meetings and finalized.
- ✓ ITU documents are released in the form of Recommendations/ Guidelines
- ✓ Contributions to ITU-T Study Groups & ITU-R SG5
 - Work items – already contributing: 50
 - Work items – contributions proposed: 18
 - Work items – identified for future work: 198



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