Government Policy on Mandatory Testing and Certification of Telecom Equipment (MTCTE) in India: A Study

A Dissertation submitted for Master's Diploma in Public Administration in Partial Fulfilment of the requirement for the Advanced Professional Programme in Public Administration (APPPA)

by

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CERTIFICATE

I have the pleasure to certify that Shri Rajkumar of Indian Telecom Services has pursued his research work and prepared the present dissertation entitled **'Government Policy on Mandatory Testing and Certification of Telecom Equipment (MTCTE) in India: A Study'**, under my guidance and supervision. The dissertation is the result of his own research and to the best of my knowledge, no part of it has earlier compromised any other monograph, dissertation or book. This is being submitted to Indian Institute of Public Administration (IIPA) for the purpose of Master's Diploma in Public Administration in partial fulfilment of the requirement for the Advanced Professional Programme in Public Administration (APPPA) of IIPA, New Delhi.

I recommend that the dissertation of **Shri Rajkumar** is worthy of the award of Master's Diploma in Public Administration.

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List of Abbreviations

ACMA	Australian Communications and Media Authority
APT	Asia-Pacific Telecommunity
ASSOCHM	Associated Chambers of Commerce and Industry
CAB	Conformity Assessment Bodies
CCC	China Compulsory Certification
COAI	Cellular Operators Association of India
DoT	Department of Telecommunication
EAEU	Eurasian Economic Union
EESS	Electrical Equipment Safety System
EMC	Electromagnetic Compatibility
EMF	Electro Magnetic Frequency
EMI	Electromagnetic Interference
EMR	Electromagnetic Field Radiation
ERAC	Electrical Regulatory Authorities Council
EU	European Union
FCC	Federal Communications Commission
FICCI	Federation of Indian Chambers of Commerce & Industry
GDP	Gross domestic production
GEMS	Greenhouse and Energy Minimum Standards
GSMA	Global System for Mobile Communications Association
ICASA	Independent Communication Authority of South Africa
ICNIRP	International Commission on Non-Ionizing Radiation Protection
ITSAR	Indian Telecom Security Assurance Requirements
IEEE	Institute of Electrical and Electronics Engineers.

IoT	Internet of Things
ITU	International Telecommunication Union
JATE	Japan approvals institute for telecommunications equipment
LoA	Letter of Authority
LSA	Licence Service Area
LVD	Low Voltage Directive
M2M	Machine to machine
MEPS	Minimum energy performance standards
MIC	Ministry of Information and Communications
MRA	Mutual recognition agreement
MTCTE	Mandatory Testing and Certification of Telecommunication Equipment
NAL	Network Access License
NDCP	National Digital Communication Policy
NTP	Network Time Protocol
NTRA	National Telecommunication Regulatory Authority
RCM	Regulatory Compliance Mark
RED	Radio equipment directive
RF	Radio Frequency
ROI	Return of Investment
SAR/IPV6	Specific Absorption Rate / Internet Protocol version 6
TBT	Technical Barriers to Trade
TEC	Telecommunication Engineering Center
TLTE	Telecommunication line terminal equipment
USA	United States of America
VNTA	Viet Nam Telecommunications Authority
WTO	World Trade Organization

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Executive Summary

Telecom Industry is considered as an essential tool for developing countries on the whole by contributing towards immense growth, quick expansion and up gradation of different sectors of the countries. The Indian telecom industry has grown greatly during the past one and half decade owing to the unprecedented growth of wireless technology, Digital India program and infrastructure not only is beneficial for the industry but also has positive effects on entire economy and as well to country GDP. Today, India is one of the largest and one of the fastest growing telecom markets in the world.

The task for policy makers is to ensure the advantages of new technologies to be leveraged equally and affordably, while securing them against existing and emerging threats. India needs to ensure particularly, its safe and secure communications infrastructure supports the entire population, whose demographic profiles vary widely across various indices such as literacy, economic conditions, and urbanisation. Therefore, it is essential for country like India to be sensitive to the above-mentioned factors and come forward with comprehensive strategic policies that embark the increased opportunities for social and economic development.

One of the strategies to achieve the objectives of The National Telecom Policy 2012 is to focus on mandatory testing and certification of all telecom products for conformance, performance, interoperability, health, safety, security, EMF/ EMI/ EMC etc. to ensure safe-to-connect and seamless functioning of existing and future networks. Another strategy is to create suitable testing infrastructure for carrying out conformance testing, certification and to aid in development of new products and services. This is further strengthened by National Digital Communication policy -2018 (NDCP-2018).

Accordingly, Department of Telecommunications has notified Indian Telegraph (Amendment) Rules in Gazette of India vide G.S.R. 1131(E) PART XI on September 05, 2017 that prescribes for Mandatory Testing and Certification of Telecommunication Equipment (MTCTE). As per this policy, every telecom equipment must undergo mandatory testing and certification before its use, sale or import in India.

Conformity assessment of telecom product due to user safety, network and nation security is a cause of concern globally. Many other countries like USA, Australia and European Union etc. had also come out with their conformity assessment procedure and regulation. Therefore, it has become necessary to conduct a study on Indian regulations with regards to the global perspective/best practices. Conformance testing of the facilities is a challenge as it requires huge investment and trained technical manpower to test stipulated requirement of technical regulations for setting up all state of art testing facilities under one roof. Further, there are other various issues and challenges like regulatory overlap, enforcement & market surveillance (including financial and infrastructure support), capacity building of the staff including stakeholders (viz. CABs, manufacturers, OEMs etc.), awareness on MTCTE along with its related rules and regulations to the stakeholders & end-users etc.

In view of the above, a need has been emanated to study the Mandatory Testing and Certification of Telecommunication Equipment (MTCTE) with objectives to study Indian telecom testing and certification regulation in global perspective, adequacy of conformity testing infrastructure with regards to present and potential demand and MTCTE policy implementation issues and challenges.

With this objective, the research is organized into various parts: An overview of TEC, its function and certification activity, objective and technical regulation of MTCTE, focussing further on the statement of problem, literature review & research methodology and global regulations. Finally based on research findings and observations; conclusion and recommendation were drawn.

To study the global perspective, there is a need to understand the different testing & certification policies being adopted worldwide and in India. Accordingly, the qualitative approach of study has been adopted during research to study the perspective of different countries' regulations. In order to understand the requirement of conformity infrastructure and MTCTE implementation issues; there is a need to study the various related policy documents, acts and available website data again with qualitative approach. Further, to understand the views of stakeholder with regards to the objective and research questions of this study, a quantitative approach of study also was considered by taking their opinion by survey via questionnaire. Similarly, opinion of telecom users was also taken in respect of MTCTE policy and its importance using separate structured questionnaire. Due to time constraints, 58 and 202 stakeholders and users, respectively could respond.

The outcome of the study reveals that Indian regulation is at par (towards better side) in terms of technical regulations i.e. Essential Requirements, testing infrastructure, process of designation of CABs with regards to the global perspective / best practices. Comprehensive analysis of comments of stakeholders manifested that, there are some concerns regarding more stringent Essential Requirements. Infrastructure adequacy was another gray area. It has been observed that present infrastructure is not adequate to test all the technical regulations for all products. However, Implementation of

MTCTE policy in phased manner with present infrastructure is a ponderable step. There is an immediate need to focus on various issues and challenges including financial and infrastructure support, capacity building of the staff working for implementation of policy including stakeholders, awareness on MTCTE and its related rules and regulations for the end-users & stakeholders. Insistence is on need of well-defined ecosystem for Enforcement & Market surveillance supported with legal framework.

The study proposes various recommendations; use of PPP model that can bridge the gap between requirement of testing infrastructure and fulfilment of MTCTE policy objective and MOUs between different departments, ministries, and PSUs for sharing of knowledge by means of training, technical capabilities, and testing infrastructure. To address the regulatory overlap efficiently and effectively there should be interagency working groups (coordination committee) and lead regulator be designated to achieve better coordination among regulatory agencies. It is also recommended that there should be independent agency under DoT for implementation of market surveillance and enforcement framework. The government needs to conduct short term capacity building / skill upgrade programs /technical sessions for better understanding of scheme, online portal operations, technical knowhow for implementation of scheme for all stakeholders including enforcement agencies. Technology in telecommunication evolving very rapidly, in order to align with changing technology MTCTE policy covering all dimensions need to be reviewed at regular in defined intervals. Open house sessions may be conducted to create awareness among the public to help them understand the benefits & advantages of certified products for end-users. Logo of TEC should be universalized and popularized among the people like ISO and ISI etc. Accordingly, it is in best interest of everyone that one should understand such

government initiatives for their benefit and help the government to counter unfair practices.

Chapter 1

1. Introduction

1.1 Background

Telecom Industry is considered as an essential tool for developing countries on the whole by contributing towards immense growth, quick expansion and up gradation of different sectors of the countries. The Indian telecom industry has grown immensely past one and half decade owing to the unprecedented growth of wireless technology. Digital India program and infrastructure not only is beneficial for the industry but also has positive effects on entire economy and country GDP. Today, India is one of the largest and fastest growing telecom markets in the world. India is ranked second in terms of number of subscriptions, internet subscribers and app downloads globally.

The task for policy makers is to ensure the advantages of new technologies to be leveraged equally and affordably, while securing them against existing and emerging threats. India needs to ensure particularly, its safe and secure communications infrastructure supports the entire population, whose demographic profiles vary widely across various indices such as literacy, economic conditions, and urbanisation. Therefore, it is essential for country like India to be sensitive to the above-mentioned factors and come forward with comprehensive strategic policies that embark the increased opportunities for social and economic development.

One of the mission of National Digital Communication policy - 2018 (NDCP-2018)[1] is to secure India for Ensuring Sovereignty, Safety and Security of Digital Communications and objective is to secure the interests of citizens and safeguard the digital sovereignty of country with a focus on ensuring individual autonomy and choice, data ownership, privacy and security; while recognising data as a crucial economic resource.

Department of Telecommunications, Ministry of Communications is playing an important role in formulation of public policies for emerging technologies in Telecommunication and related ICT sector to transform India into a safe, secure and inclusive digital society in accordance with the objectives of National Telecom Policy-2012[2] and further strengthened by NDCP-2018. Accordingly, Department of Telecommunications has notified Indian Telegraph (Amendment) Rules in Gazette of India vide G.S.R. 1131(E) PART XI on September 05, 2017[3] that prescribes for Mandatory Testing and Certification of Telecommunication Equipment (MTCTE). As per this policy, every telecom equipment must undergo mandatory testing and certification before its use, sale or import in India.

Telecommunication Engineering Centre (TEC), New Delhi, under Department of Telecommunications (DoT), that, inter alia, is the Telegraph Authority for the purpose

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[1] 'National Digital Communication Policy -2018'. Available at: http// www.dot.gov.in, Accessed 08 September 2020

[2] 'NTP-2012'. Available at: http// www.dot.gov.in, Accessed 08 September 2020

[3] Indian Telegraph Act (Amendment) Rules-2017: Available at: https://dot.gov.in/act-rules-content/2442, Also Annexed as Annexure IV

of Testing and Certification. TEC is an authority responsible for implementation of MTCTE[4].

This research study is an attempt to study MTCTE in global perspective along with its implementation challenges and issues. With this objective, the research is organized into various parts: An overview of TEC, its function and certification activity, objective and technical regulation of MTCTE, focussing further on the statement of problem, literature review & research methodology and global regulations. Finally based on research findings and observations; conclusion and recommendation were drawn.

1.2   An Overview of TEC

Telecommunication Engineering Centre (TEC)[5] is a technical body representing the interest of Department of Telecommunication (DoT), Ministry of Communications, Government of India. TEC deals with visualization and strategic positioning of future telecom sector in India, technological forecasting, assessment, and specifications of next generation network elements.

TEC is committed to develop Standards and Specifications for cutting-edge technologies in Telecommunication and related ICT systems to be deployed in India and to promote development/ upgradation of ubiquitous, resilient, and state-of-the-art quality infrastructure by testing and certification.

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[4] https://www.tec.gov.in/mandatory-testing-and-certification-of-*telecom-equipments-mtcte/,*
[5] TEC overview' Available at: https://www.tec.gov.in/about-us/,

TEC is also committed to facilitate Department of Telecommunications in formulation of public policies for emerging technologies in Telecommunication and related ICT sector to transform India into a safe, secure and inclusive digital society in accordance with the objectives of National Digital Communication Policy (NDCP) 2018. Tec fulfil its commitments through proactive approach, stakeholders' consultations, knowledge sharing, skill development as well as collaboration with national and international standardisation and certification bodies.

1.2.1 Functions of TEC

- Prepare specification of common standards with regards to the Telecom network equipment, services and interoperability. Published specifications of TEC are of three types namely Generic Requirements (GRs), Interface Requirements (IRs) and Service Requirements (SR).

- Formulation of Standards and Fundamental Technical Plans.

- Interact with multilateral agencies like APT, ETSI and ITU etc. for standardisation.

- Develop expertise to imbibe the latest technologies and results of R&D.

- Provide technical support to DoT and technical advice to TRAI & TDSAT.

- Co-ordinate with C-DOT in the technological developments of the Telecom Sector for policy planning by DoT.

- Establishment of state-of-art telecom laboratories.

1.2.2 Certification Activities of TEC

TEC provides services for issuing Interface Approvals, Certificate of Approvals, Service & Type Approvals and Testing facilities for evaluation of telecom equipment

against mandatory requirements to the Indian as well as overseas telecom industries. 'Certification' means that model of telecom equipment has undergone specified testing and complies with relevant Essential Requirements; such equipment model will be called 'Certified Equipment', and the document conveying the certification will be called the 'Certificate'.

Certification under MTCTE needs to be obtained only once for an equipment model, and is applicable for any quantity of the certified model of the equipment. A different model of the equipment needs separate certification.

1.2.3   Conformity Assessment

Conformity assessment system is applied extensively; its object may be products and processes, as well as people, systems, etc. Thus, nowadays conformity assessment has become a prerequisite and guarantee for using safe products, receiving appropriate services, successful operation of the processes, competences of qualified persons etc. Conformity assessment involves a set of processes that shows product, service or system meets the requirements of a standard. TEC has been appointed as the Designating Authority (DA) on behalf of DoT for Telecom Equipment.

TEC as DA is designating Conformity Assessment Bodies (CABs) / Certification Bodies (CBs) located in India to perform conformance testing and certification of telecom products. The role of TEC as DA is also to recognizing Foreign CABs/ CBs located in the territory of Mutual Recognition Agreement (MRA) partner to perform conformance testing and certification of telecom products to India requirements.

1.2.4 Conformity Assessment Bodies (CABs) / Certification Bodies (CBs)

Conformity Assessment Body (CAB) is a body that conduct conformity assessment activities with regards to determine whether products, manufacturers or processes meet relevant standards and specifications. Certification Body (CB) is a body that issues conformance certificate and may also conduct conformance assessment activities.

1.2.5 Mutual Recognition Agreement/Arrangement (MRA)

Mutual Recognition Agreement/Arrangement (MRA) means an agreement through which two countries give recognition to Certifying Bodies and CABs in respective countries. MRAs eliminate the cost of retesting, re-certification and shorten the time-to-market for partner countries' manufacturers and exporters of telecommunication equipment.

1.3 Objective of Mandatory Testing and Certification of Telecommunication Equipment[6]

- Any telecom equipment does not degrade the performance of existing network to which it is connected.

- Safety of end–users.

- Protection of users and general public by ensuring that radio frequency emissions from equipment do not exceed prescribed standards.

- Telecom equipment complies with the relevant national and international regulatory standards and requirements.

- Telecom network elements meet security assurance requirements.

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[6] 'MTCTE procedure'' Available at, https://tec.gov.in/pdf/MTCTE/FinalMTCTEProcedure.pdf, Also annexed at Annexure V.

1.4 Technical Regulations

With the MTCTE notification and above objective, technical regulations have been introduced in telecom sector with a view to ensure safety of users, security of telecom networks as well as interoperability of the equipment. These regulations have come in force with effect from October 01, 2019 with a limited number of telecom products under its ambit. The testing is to be carried out for conformance of the equipment, by Indian Accredited Labs, designated by TEC/DoT and based upon their test reports, certificate shall be issued by DoT. The Technical regulations (Essential Requirements, ERs) are provided below.

- EMI/EMC, Safety and Technical requirements: As prescribed by regulator.
- Other requirements such as SAR/IPV6 Etc.: As notified by Regulator/any government Agency from time to time.
- Security Requirements: As per notification issued by Regulator i.e DoT.

1.5 Statement of Problem

1. Conformity assessment of telecommunication product is a global concern due to user safety and nation security. Many other countries like USA, Australia and EU countries etc. had also come out with their conformity assessment procedure and regulations. Therefore, need is also to have a study of Indian regulations keeping in view the global perspective/best practices.

2. Conformance testing facilities is a challenge as it requires huge investment for setting up the labs and trained technical manpower to test stipulated requirement of technical regulations. Also, all state of art testing facilities under one roof is a

requirement of manufactures but it is a major challenge for test Labs considering the Return of Investment (ROI).

3. Conformity assessment procedures are one of the key aspect for global trade. The World Trade Organisation (WTO) Technical Barriers to Trade (TBT) Agreement having obligations regarding conformity assessment procedures. The TBT Agreement requires, among other things, that conformity assessment procedures not be "prepared, adopted or applied with a view to or with the effect of creating unnecessary obstacles to international trade".

4. Precise estimation of the impact on international trade for compliance with various foreign technical regulations and standards, is utmost difficult. This would certainly involve significant costs for producers and exporters.

5. Existence of very a smaller number of MRAs with foreign countries is again a problem. Most of the equipments are imported in India and MRA eliminates the cost of re-testing, re-certification, and shorten the time-to-market for partner countries' manufacturers and exporters of telecommunication equipment.

6. Multiple regulating agencies are responsible for overseeing a given market activity, creating the potential for inefficiency. Such regulatory overlap poses significant issues & challenges to business/market and can dampen economic activity. Regulatory overlap can inflict real costs on businesses through repetitive testing/inspections, data collection efforts and is particularly more burdensome

when agencies issue conflicting rules with inconsistent standards. There is a need to reduce unnecessary regulatory overlap.

7. Surveillance and enforcement are another key aspect for successful implementation of the MTCTE regulatory regime and for achievement of desired policy objectives.

1.6   Objective of the Study

The study has been taken up considering the below objectives.

1. To study the Indian telecom testing and certification regulations in global perspective.

2. To assess the adequacy of conformity testing infrastructure with regards to present and potential demand.

3. To identify the challenges and issues in implementing the policy of Mandatory testing.

1.7   Rationale of Mandatory Testing and Certification of Telecommunication Equipment

1. As per digital India program in accordance with NDCP policy 2018, Government services are being made available electronically to citizens by building the telecom infrastructure and most of the network equipment are procured through liberal market. Hence security is a main concern for users as well as nation.

2. As per NDCP-2018, If India's economic, social and political interests in the emerging data economy are to be effectively secured, its 'digital sovereignty'

encompassing the data privacy, choice and security of its citizens must be on priority while participating in the global digital economy.

3. Online records such as citizens demographic/biometric data (Aadhar), financial & revenue records and digital locker need storage i.e. server etc. The data transacted through telecom network elements is susceptible to unauthorized access.

4. In recent years, with the progress of broadbandization of services, etc., the dependence of socio-economic activities on information and communication networks has expanded rapidly. The new threats such as unauthorized intrusion into networks have become apparent. The importance of ensuring the safety and security of information and communication networks is becoming more and more socially recognized.

5. Radio communications are a part of everyday life today. All radio communication systems utilize EMF in the radiofrequency (RF) part of the electromagnetic spectrum. Typical background EMF levels from radio communication systems are generally extremely low and much below the safety guidelines. There is also a public concern over possible health effects from Electromagnetic Field Radiation (EMR) exposure from diverse EMR sources especially Mobile BTS antennas and mobiles.

6. Department of Telecommunication (DoT) has been monitoring global developments since 2008. It has already taken necessary steps and adopted stricter

norms for safety from EMF radiation that are emitted from mobile towers and mobile handsets. Regulator has been taking due precautions and necessary actions in respect of EMF radiation emitted from mobile towers and mobile handsets by issuing various guidelines and norms taking into account the international norms/ standards described by International Commission on Non Ionizing Radiation Protection (ICNIRP) as recommended by World Health Organisation.

7. India is looking for developing markets for IoT (Internet of Things)/ M2M connectivity services in sectors including agriculture, smart cities, intelligent transport networks, multimodal logistics, smart electricity meter, consumer durables etc. incorporating international best practices. The Goal is to expand IoT ecosystem to 5 Billion connected devices by 2022. The Indian Government is planning to develop 100 smart city projects where IoT will play a vital role in development of those cities.

8. The (IoT) is a network of connected devices for different applications such as consumer, business and governmental applications etc., each with a unique identifier that automatically collects and exchanges data over a network. Their increased presence in our daily lives has led to an increased scrutiny of their inherent security issues.

9. Wireless subscription has flourished over the past few years and subscription was 1168.66 million at the end of December 2020[7] and hence the uses of mobile

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[7] https://www.statista.com/statistics/328003/wireless-subscribers-in-india/.

handsets. Lithium-ion battery is a critical part of mobile handsets. Mobile phones explosion incidents have become ubiquitous these days. Several phones explosion incidents due to mobile battery have been reported in the past couple of months[8]. The Lithium-ion battery that powers the mobile handset needs to be thoroughly tested and certified before its shipment. A wrong component or a fault in the assembly line may lead to malfunctioning of the battery in turn, explosion. The conformance testing of battery and its critical aspects have become more essential when the whole world is now online for commercial activities including education amid COVID-19.

10. Conformity assessment of products alone increases the probability of interoperability. Interoperability can only be guaranteed through practical testing of interconnected equipments and services from different vendors. Hence one of the objective of the conformance testing of product is to give reasonable assurance that different implementations of vendors are interoperable.

1.8 Research Questions

1. What are the best practices globally with regards to mandatory telecom testing and certification?

2. Whether conformity testing facilities in India are adequate?

3. What are the challenges and gaps in implementing the policy of Mandatory testing?

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[8]https://www.indiatoday.in/technology/news/story/smartphone-battery-explodes-while-charging-in-madhya-pradesh-kills-12-year-old-1543784-2019-06-06.

1.9   Chapterisation Scheme

The broad chapter scheme for this research report is provided below.

Chapter 1   Introduction

Chapter 2   Literature Review

Chapter 3   Strategies, Methodology and Research Design

Chapter 4   Conformity Assessment and Interoperability

Chapter 5   Mandatory Testing and certification of Telecom
                        Equipment policy of India: Analysis and comparison
                        with policy of other countries

Chapter 6   Data Analysis and Findings

Chapter 7   Conclusion and Recommendations.

Bibliography/ References

Annexures

Chapter 2

2. Literature Review

This study is primarily focused on the included provisions and implementation aspects of Government Policy on Mandatory Testing and Certification of Telecom Equipment in India. A limited literature is available on the subject and not much research has been done on this aspect. Majority of the literature/research work available cover the technical aspects of telecom product. The study is a god venture to critically examine some papers, articles, and reports available on user health concern due to EMF/ RF radiation and about their testing in the subsequent paragraphs to present the knowledge together.

This attempt is related to regulation in conformity of telecom product. A brief study of global initiative and best practices has been included in subsequent chapter 5.

2.1 WHO, (2006)[9]. 'Electromagnetic fields and public health, Base stations and wireless technologies'

This review is related to the scientific evidence on the health effects from continuous low-level human exposure to base stations and other local wireless networks. A common concern about mobile base station and local wireless network antennas relates to the possible long-term health effects that whole-body exposure to the Radio Frequency signals may have. To date, the only health effect from Radio Frequency fields identified in

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[9] WHO, (2006). *Electromagnetic fields and public health, Base stations and wireless technologies*: Available at: https://www.who.int/peh-emf/publications/facts/fs304 /en/#:~:text=The%20levels%20of%20RF%20exposure,and%20diminishes%20quickly%20with%20distance,

scientific reviews has been related to an increase in body temperature (> 1 °C) from exposure at very high field intensity found only in certain industrial facilities, such as Radio Frequency heaters/elements. Although, the levels of radio frequency exposure from base stations and wireless networks are so low that the temperature increases are insignificant and do not affect human health.

However, this article also describe International exposure guidelines developed to provide protection against established effects from RF fields by the International Commission on Non-Ionizing Radiation Protection (ICNIRP, 1998) and the Institute of Electrical and Electronic Engineers (IEEE, 2005).

National regulators should align their standards to international standards to protect their citizens against adverse levels of RF fields.

This Article covers the health concerns due to RF exposure and adoption of international standards to protect citizens against adverse levels of RF fields without any suggestions regarding their conformity enforcement.

2.2   FCC, USA. (2019)[10]. 'Wireless Devices and Health Concerns'

This article issued by Federal Communications Commission (FCC) describes about RF exposure as specific absorption rate (SAR) of Handheld device such as mobile phone.

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[10]   FCC, USA. (2019). *Wireless Devices and Health Concerns*: Available at: https://www.fcc.gov/sites/default/files/wireless_devices_and_health_concerns.pdf,

This article describes technical value of SAR and regulatory measures also to restrict it in prescribed value.

The FCC's guidelines and rules regarding Radio Frequency exposure are based upon standards developed by IEEE and NCRP and input from other Regulator. These guidelines specify limit of exposure for hand-held wireless devices in terms of the Specific Absorption Rate (SAR). The SAR is a measure of the rate that Radio Frequency energy is absorbed by the body. For exposure to RF energy from wireless devices, the allowable USA SAR limit is 1.6 watts per kilogram (W/kg), as averaged over one gram of tissue.

All wireless devices sold or import in the USA go through a formal FCC approval process to ensure that they do not exceed the maximum allowable SAR level when operating at the device's highest possible power level. In case device does not confirm with the test report basis which FCC approval is provided - in essence, if the device in market is not the device that FCC has approved – the FCC can withdraw its approval and pursue appropriate enforcement action against the appropriate party.

2.3 Niyazi, Ari. (2003)[11]. 'Running and Auditing EMC Labs for Europe (Part l)'. IEEE publications

In this article Author describes the planning, building, staffing, marketing, running and accrediting EMC Telecom Labs for Europe, according to EU-MRA rules, basically anywhere in the world, calls for many detailed considerations. Beside highly

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[11] Ari, N. (2003). *Running and Auditing EMC labs (Part1). Europe*: IEEE Publications

specialized technical expertise, financial resources, managerial and marketing skills and in particular efficient in depth training (EMC Education) is a continuing requirement to meet the quality technical aspects spelt out in the latest Norm ISO EN 17025 (General requirements for the competence of testing and calibration laboratories).

Author, further, mentioned that calibration according to ISO 17025 has to consider the whole chain of test instrumentation within a test stand. It is exactly this point, where most of the labs presently have their biggest problems. Following the EMC standards word by word does not present a solution, because some of the standards are not clearly and explicitly written. Their interpretation is sometimes quite difficult and may change over time. This requires deep technical understanding of the topic and permanent training as well as lifelong learning. It takes a lot of practical experience and even a scientific approach like electromagnetic code simulation.

2.4 Nektarios, Moraitis. (2020)[12]. 'Frequency Selective EMF Measurements and Exposure Assessment in Indoor Office Environments'. IEEE Publications

In this work presents an extensive RF-EMF measurement campaign in indoor office locations and aims to assess the exposure levels. In this article spot measurements have been carried out in various corporate buildings using a portable frequency selective radio meter. Multiple emission sources have been recorded in the frequency range

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[12] Moraitis, N. (2020). *Frequency Selective EMF Measurements and Exposure Assessment in Indoor Office Environments*: IEEE Publications.

between 75 and 3000 MHz. Based on the measurements, the related exposure parameters are computed and compared with the legislated limits and concluded.

2.5 Research Gaps

Above all articles mention about parameter of technical regulations but do not mention about Countries Mandatory testing and certification Regulations of Telecom Products and its implementation.

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Chapter 3

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3. Strategies, Methodology and Research Design

3.1 Research Strategy

The selection of the method to be adopted for any study is dependent both on the nature of the study (Noor, 2008)[13] as well as on the nature of the social phenomena to be probed (Morgan & Smirch, 1980)[14]. Based on the review of the related literature (Chapter 2), an effort has been made in the present study to bring together all the issues specified in statement of problem and objective. The manifold methods adopted for any study is dependent on the objectives of the study and so the present methods. Thus, the research objectives and the research questions of the present study (Chapter 1) are the crucial elements to be referred. Starting from historical background and chronological evolution of the telecommunications in India, this study discusses the philosophy and thought process behind the MTCTE policies.

The different aspects of this research are based on the study and analysis of the various inputs from different sources. Objective of this study are a) to study Indian telecom testing and certification regulation in global perspective, b) adequacy of conformity testing infrastructure with regards to the present and potential demand and c) MTCTE policy implementation issues and challenges. To study the global perspective, it is needed to understand the different testing & certification policy being adopted

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[13] Noor, K. (2008). 'Case study. A strategic research methodology'. *American Journal of Applied Sciences*, 5(11), 1602-1604

[14] Morgan, G. and Smircich, L. (1980). 'The Case for Qualitative Research '. *Academy of Management Review* 5(4): 491-500.

worldwide including India. Therefore, this requires a detailed study of documents, policies, and regulations of countries. Accordingly, the qualitative approach of study has been adopted during research to study the perspective of regulations pertaining to different countries.

To identify the requirement of conformity infrastructure and MTCTE implementation issues, there is a need to study the various related policy documents, acts and available website data with qualitative approach.

To identify the views of stakeholder with regards to the objective and research questions of this study, a quantitative approach of study was considered by taking their opinion by survey. Similarly, opinion of telecom end-users also has been taken with regards to the MTCTE policy and its importance.

Accordingly, this research is based on both i.e., employ a mixed research strategy – qualitative approach has been adopted based on the study of literature and countries regulations mainly via secondary data and quantitative approach has been done based on the analysis of data received from response of questionnaire.

3.2   Research Design

The research design is 'Explanatory and Descriptive' primarily based on study of Government policies/Regulation and National /International technical reports/publications and data received through questionnaire.

3.3 Research Methods/ Data Sources

To get responsive feedback on the objectives, relevant information was garnered using both primary and secondary sources. Since most of the part of study is technical, the target population for survey was discrete, depending on the issue. The data collection has been done from different segments via online mode only due to paucity of time and amid Covid-19.

3.3.1 Secondary Source of Data

Secondary source of data was from Government Policies/regulations document, national and international books and articles published in journals. Some of these sources are as below-

- The Indian Telegraph (Amendment) Rules, 2017
- National Digital Communication policy -2018
- National Telecom Policy-2012
- Countries Policies/Regulations document
- Report released by GOI and various organisations
- MTCTE policy documents
- MTCTE portal
- TEC/DoT website
- Trai Website
- Published articles in newspapers & magazines, internet sites, etc.
- ITU, APT, IEEE articles and recommendations from websites

3.3.2 Primary Data Collection

Primary data has been collected from different sources as given below.

- Primary data has been collected directly by survey of telecom users, all stake holders like testing Labs, manufactures and importers, different service provider association etc. including subject experts by preparing questionnaire.

- The questions were prepared keeping in view the objective and research question of our study i.e. to study Indian telecom testing and certification regulation considering global perspective, adequacy of conformity testing infrastructure with regards to present and potential demand, including MTCTE policy implementation issues and challenges. Accordingly, there are two sets of questionnaires targeting different populations.

Questionnaire Set I

The set I was for general public. These were based on fundamental aspects and terms specific to MTCTE policy. Questions were related to awareness about safety of the end users and protection of users from radio frequency emissions from equipment in case radiated beyond prescribed limits. The response with regards to an awareness of MTCTE policy had also been requested (**Annexure II**).

Questionnaire Set II:

The set II was specific, focused on technical and implementation aspects of MTCTE policy. The questions being specific, the response for this set was collected from TEC/DoT officials, and telecom testing labs, manufactures/importers and their associations to assess their opinion (**Annexure III**).

3.3.3 Scope/ Limitations/ Delimitations

The secondary data used in the study is based on the data and qualitative information collected from existing documents and websites. Since the sources of these are established ones like government websites and publications, the data and information have not been verified. In a way, mostly existing documents have been analysed in this

study. Further, the secondary data collected from published reports and articles may bear the biases of the author or organization publishing them.

With regards to primary data regarding the MTCTE policy and its implementation issues and challenges, the opinion of serving officers i.e regulators from concerned department and ministries may also have organizational affinity and bias. Similarly, stakeholder views may also bias in view of their interests. Further, primary data collected from end users through online mode i.e. email and WhatsApp due to Covid-19, many of them were government/private sector employee at different positions who were otherwise well educated, affluent and have well access to communication network and on social media. Their opinion may not actually reflect the perception of society at large and may be skewed to the extent.

Further, Interviews of various stakeholders and manufacturer association could not be taken amid Covid-19, though their comments and suggestion have been taken via questionnaire set -2.

Chapter 4

4.   Conformity Assessment and Interoperability

In ICT, some countries and business environments (such as telecommunication companies) require that a telecom product should meet certain requirements before they could be sold. Standards for telecommunication products written by standard organizations such as ANSI, the FCC, IEC and TEC in India have certain criteria that a product must meet some standards before compliance is recognized. In countries such as Japan, China, Korea, and some parts of Europe etc., there is a restriction on the sale of the product unless they are known to meet those requirements specified in the standards. Usually, manufacturers set their own requirements to ensure product quality, sometimes with levels much higher than that the governing bodies require. Compliance is realized after a product passes a series of tests without facing some specified mode of failure.

Conformity assessment is the process by which the conformity assessment procedures are carried out to evaluate the object (product, process, etc.) compliance with the requirements. Conformity assessment guarantees that an ICT equipment implements a technical specification or standards. Compliance helps vendors and users of the equipment to evaluate the performance of an equipment in the network where it will integrate with other network devices to provide an offered network service. Interoperability testing measures the implementation of the technical specifications necessary to ensure successful integration supporting particular communication protocols by two or more products correctly.

Conformity assessment can be ensured by knowing its processes and activities, understanding its elements and other aspects involved, recognizing them as a whole (a uniform system). To assess whether the product meets the requirements, conformity assessment is performed according to a specific conformity assessment process. Conformity assessment procedure is one of the important stages in conformity assessment. The concepts of 'conformity assessment process' and 'conformity assessment procedure' are widely used in conformity assessment field, but there are no precise definitions for them. The definitions for these terms are provided below.

Conformity assessment process is a set of actions within the framework of which the object (product, process, etc.) conformity assessment is performed.

Conformity assessment procedure is a way (action or module) in which the object (product, process, etc.) conformity assessment is performed, and decision is made about issuing a certificate of conformity and/or marking.

Conformity Assessment				
Product		Define Assess Prove Measure Demonstrate	Conform Comply Prove Verify State quality	Placing on the market, Putting into use, Usage
Legal documents Standards Requirements Specifications Complaints				
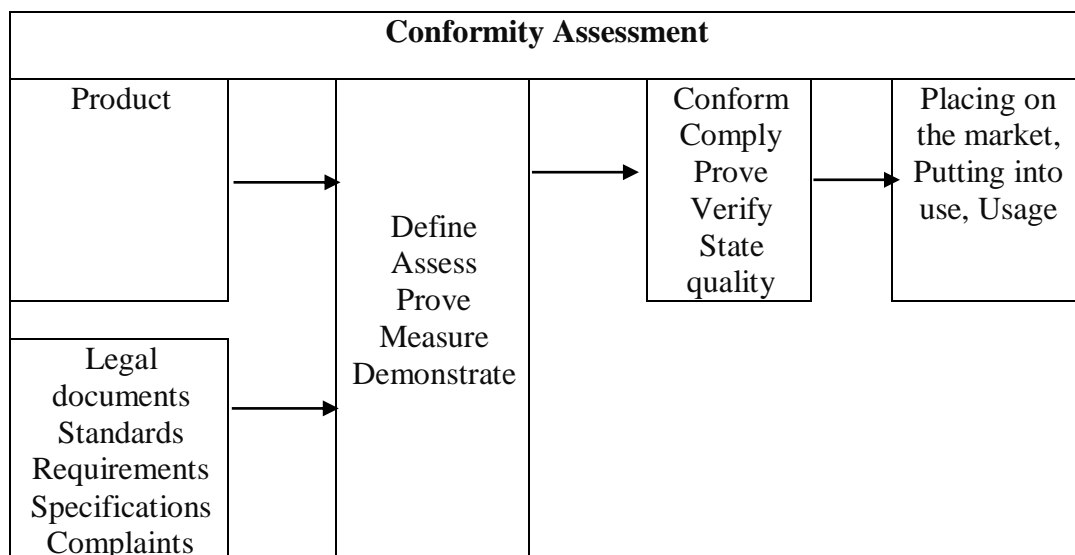
Figure 1: Interrelations of the Terminology Related to the Concept of Conformity Assessment (Created by author)

Conformance and interoperability testing in ICT is important to identify the possible non-compliance aspects of an equipment to be part of ICT network, as defined by accepted standards in the industry, that may interfere in the quality of the network service being provided. High quality performing products available for commercial use contribute to the widespread deployment of the network technologies and their associated network services.

4.1   Conformance Testing

Conformance testing an element of conformity assessment, and also known as compliance testing, or type testing is testing or other activities that determine whether a process, product, or service complies with the requirements of a specification, technical standard, contract, or regulation. Testing is often either logical testing or physical testing. The test procedures may involve other criteria from mathematical testing or chemical testing. Beyond simple conformance, other requirements for efficiency, interoperability or compliance may apply. Conformance testing may be undertaken by the producer of the product or service being assessed, by a user, or by an accredited independent organization, which can sometimes be the author of the standard being used. When testing is accompanied by certification, the products or services may then be advertised as being certified in compliance with the referred technical standard. Manufacturers and suppliers of products and services rely on such certification including listing on the certification body's website, to assure quality to the end user and that competing suppliers are on the same level.

There are three forms of testing or assessment:

- 1st party assessment (self-assessment)

- 2nd party assessment (assessment by a purchaser or user of a product or service)

- 3rd party assessment (undertaken by an independent organisation)

MTCTE scheme follows 3rd Part assessment and it is done by Conformance assessment body (CAB) and the procedure of appointment(designation) of CAB by TEC is described in subsequent paragraph in details.

Compliance testing for Telecom Equipment in MTCTE include emissions tests, immunity tests i.e EMI/EMC, safety tests and other tests as technical regulation. Emissions tests ensure that a product will not emit harmful electromagnetic interference in communication and power lines. Immunity tests ensure that a product is immune to common electrical signals and electromagnetic interference (EMI) that will be found in its operating environment, such as electromagnetic radiation from a local radio station or interference from nearby products. Safety tests ensure that a product will not create a safety risk from situations such as a failed or shorted power supply, blocked cooling vent, and power line voltage spikes and dips etc.

Testing conformance to a specification can give confidence that an implementation supports the functions defined in the specification and will also, if the tests are well defined, interoperate with other implementations. If a specification has no optional features, then conformance testing alone will give reasonable assurance that different implementations will interoperate.

4.2 Interoperability Testing

Many communication protocols have characteristics that are conditional upon support of optional features and it is possible that different implementations support different sets of features or similar features in different ways and so may not interoperate. It is therefore useful to demonstrate the interoperability of equipment. Interoperability testing also, by its very nature, tests a complete protocol stack rather than testing each component in isolation, as may be the case with conformance testing.

Interoperability testing is usually performed in the development phases of a technology and can be very useful in both testing the equipment and the standard specifications that are being implemented, whereas conformance testing and certification is usually performed on products that are being introduced to the market.

4.3 Conformity Assessment Bodies (CABs) Designation Process for Conformance Testing[15]

TEC has been appointed as the Designating Authority (DA) on behalf of DoT for Telecom Equipment by Govt. TEC as DA is designating Conformity Assessment Bodies (CABs) / Certification Bodies (CBs) located in India to perform conformance testing and certification of telecom products. The role of TEC as DA is also to recognize Foreign CABs/ CBs located in the territory of Mutual Recognition Agreement (MRA) partner to perform conformance testing and certification of telecom products to India requirements. For this purpose, TEC has formulated two schemes named as:

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[15] 'CAB Process' Available at https://www.tec.gov.in/conformity-assessment/,

1. Scheme for Designating Domestic Testing and Certification Bodies for Conformity Assessment of Telecommunication Equipment (Issue 2- December 2017[16]

2. Scheme for Recognizing Foreign Testing and Certification Bodies for Conformity Assessment of Telecommunication Equipment (Issue 2- December 2017[17]

To qualify for designation/ recognition, the CABs/ CBs must fulfil the criteria as given in the above schemes and some of main points of schemes are given below.

4.3.1 Scope of Designation

Application for designation is open to any conformity assessment body (test labs) and/or certification body which conducts its business of conformity assessment and certification in India. CABs and CBs duly accredited by any recognised Indian accreditation body like NABL and NABCB respectively, may apply for designation. The scope of designation by DA is limited to the scope for which accreditation is granted against TEC's/ other Party's technical standards and/or specifications.

4.3.2 Scope of Accreditation

CABs shall be accredited by any recognised Indian accreditation body like NABL, in accordance with ISO/IEC 17025:2005 or its latest version, to carry out tests for verifying conformance to one or more stipulated requirements for telecom equipment.

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[16] Scheme for Designating Domestic Testing and Certification Bodies for Conformity Assessment of Telecommunication Equipment, Available at https://tec.gov.in/pdf/MRA/Domestic.pdf,

[17] Scheme for Recognising Foreign Testing and Certification Bodies for Conformity Assessment of Telecommunication Equipment, Available at https://tec.gov.in/pdf/MRA/Foreign.pdf,

4.3.3 Eligibility

To be eligible for designation as CAB, the applicant shall

1.   be an entity legally identifiable and located in India;

2.   be accredited by any recognised Indian accreditation body like NABL in accordance with ISO/IEC 17025:2005 or its latest version for CAB, in the relevant areas of stipulated requirements for telecom equipment.

3.   have expert knowledge of all the applicable technical, administrative, and regulatory requirements for the equipment.

4.   have sufficient capital and financial resources to maintain viable operations as a CAB.

5.   have the knowledge, capability, technical competence and equipment to perform the tests for conformity to stipulated requirements for the equipment.

6.   have no interest whatsoever in any business to test any product or carry on testing in an unfair or biased manner, for which it seeking designation

7.   satisfy all criteria required for its recognition under the relevant MRA, if any.

8.   provide all desired information or documents as required by DA.

It is worth mentioning that Conformance testing facilities is a challenge as it requires huge investment for setting up labs and technical manpower to test stipulated requirement of technical regulation. Further all state of art testing facilities under one roof is requirement of Manufactures but it is major challenge for test Labs in term of Return of Investment (ROI). As per data available on TEC website till February' 2021 no of CAB's are 59 and details are attached with their scope as Annexure I and summary of CABs designated is shown below in Table 1.

Table 1:   Brief of the CABs Designated by TEC[18]

Technical Regulations parameter as per Essential Requirements	No of CABs
Safety of IT products	47
EMI/EMC	27
Environment (QM-333)	19
Mobile Handset Language Testing	2
Other requirements such as SAR	3
PABX	2
POS	1
Terminal for PSTN	1
V.90 Modem	1
Group 3 Fax Machine	1
Interface requirement for PDH	2
Interface requirement for SDH	2
Technical (Radio Devices in unlicensed band 2.4 Ghz.)	3
Router TEC ER No. TEC 37681911	1
IP Security Equipment – TEC ER No. TEC 34731911	1
PON Family of Broadband Equipment – TEC ER No. TEC 14761911	1
LAN Switch as per TEC GR and IR	1
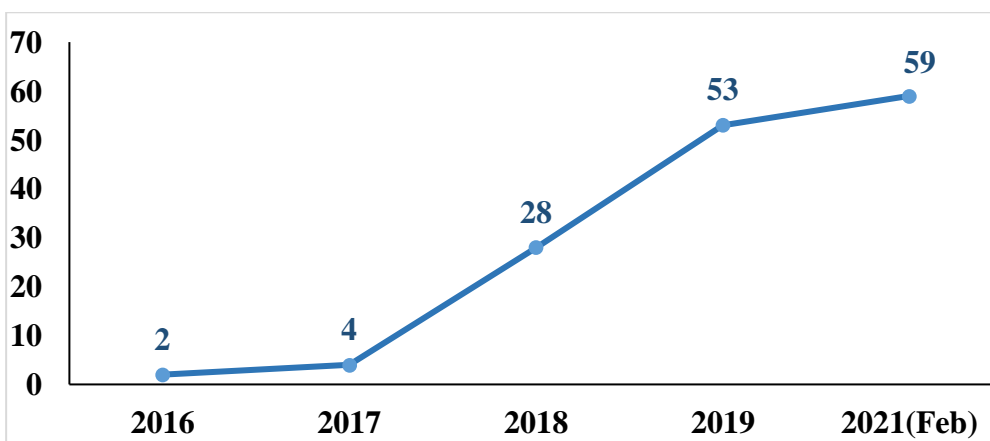
Figure 2: Created by Author, showing No of Designated CABs vs Year[19]

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[18] Data taken from TEC website, Available at https://www.tec.gov.in/list-of-cabs-designated-by-india/,
[19] Data taken from TEC website, Available at https://www.tec.gov.in/list-of-cabs-designated-by-india/

Above Graph shows a rapid increase in number of CABs designation after notification of Telegraph act for mandatory testing i.e September 05, 2017. The table 1 shows that majority of the CABs are designated against the parameter EMI/EMC and safety of IT products, whereas CABs required for other parameter such as SAR /IPV6 and technical parameter of few products like PABX, POS, Modems and Fax etc. are very less. Accordingly, scheme has been implemented in phased manner with some relaxations, only six telecommunication products had made mandatory with effect from October 1, 2019 and subsequently three more product added in phase-2 mandatory with effect from October 1, 2020. Detailed list of product mentioned in MTCTE procedure annexed as Annexure-V.

As per MTCTE requirement testing also can be done by foreign recognized CABs as per the scheme mentioned in above para 4.3 at s.no.2 but there is only one MRA with Singapore. Existence of very less MRA with foreign country is again concern as most of Equipment is imported in India and MRA eliminate the cost of re-testing and re-certification and shorten time-to-market for partner countries' manufacturers and exporters of telecommunication equipment.

Chapter 5

5. Mandatory Testing and certification of Telecom Equipment Policy of India: Analysis and Comparison with Policy of Other Countries

In order to have a comparative analysis of MTCTE policy with similar policy or regulation of other countries, the salient feature of such policies/regulation of a few developed and developing countries summarised in the following paras.

5.1 USA[20]

Federal communication commission (FCC), Regulatory Authority, USA has certain rules for product mandatory testing and certification:

(i) **FCC Certification** is the most rigorous approval process in USA for RF Devices with the greatest potential to cause harmful interference to radio services. It is an equipment authorization issued by an FCC-recognized Telecommunication Certification Body (TCB) based on an evaluation of the supporting documentation and test data submitted by the responsible party (e.g., the manufacturer or importer) to the TCB. Testing is performed by an FCC-recognized accredited testing laboratory. Information including the technical parameters and descriptive information for all certified equipment is posted on a Commission-maintained public database. In addition, equipment subject to approval using the Supplier's Declaration of Conformity (SDoC) procedure can optionally use the Certification procedure.

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[20] *USA'S Equipment Authorization procedure:* Available at: https://www.fcc.gov/engineering-technology/laboratory-division/general/equipment-authorization,

(ii)   Also**,** Supplier's Declaration of Conformity (SDoC) is another procedure that requires the party responsible for compliance ensure that the equipment complies with the appropriate technical standards. The responsible party, who must be located in the United States, is not required to file an equipment authorization application with the Commission or a TCB. Equipment authorized under the SDoC procedure is not listed in a Commission database. However, the responsible party or any other party marketing the equipment must provide a test report and other information demonstrating compliance with the rules upon request by the Commission. The responsible party has the option to use the certification procedure in place of the SDoC procedure.

(iii)   Further, the FCC regulates radio frequency (RF) devices contained in electronic-electrical products that are capable of emitting radio frequency energy by radiation, conduction, or other means. These products have the potential to cause interference to radio services operating in the radio frequency range of 9 kHz to 3000 GHz.

(iv)   Almost all electronic-electrical products (devices) are capable of emitting radio frequency energy. Most, but not all, of these products must be tested to demonstrate compliance to the FCC rules for each type of electrical function that is contained in the product. As a general rule, products that, by design, contain circuitry that operates in the radio frequency spectrum need to demonstrate compliance using the applicable FCC equipment authorization procedure (i.e., Supplier's Declaration of Conformity (SDoC) or Certification) as specified in the FCC rules depending on the type of device. A product may

contain one device or multiple devices with the possibility that one or both of the equipment authorization procedures apply. An RF device must be approved using the appropriate equipment authorization procedure before it can be marketed, imported, or used in the United States.

(v)   FCC CFR 47, Unintentional Emission – FCC Part 15 B for almost all electronic-electrical products (devices) are capable of emitting radio frequency energy. Most, but not all, of these telecom products must be tested to demonstrate compliance to the rules for each type of electrical function that is contained in the product. As a general rule, telecom products operates in the radio frequency spectrum need to demonstrate compliance using the applicable FCC equipment authorization procedure (i.e., Supplier's Declaration of Conformity (SDoC) or Certification) as specified in the rules depending on the type of device/products. A product may contain one device or multiple devices with the possibility that one or both of the equipment authorization procedures applicable. An Radio Frequency device must be approved using the appropriate equipment authorization procedure before it can be marketed, imported, or sell/used in the United States.

(vi)   FCC CFR 47, Intentional Frequency – FCC Part 15 C An intentional radiator (defined in Section 15.3 (o)) is a device that intentionally generates and emits RF energy by radiation/ induction that may be operated without an individual license. For examples wireless garage gate openers, wireless microphones, RF universal remote control devices, cordless telephones, wireless alarm systems, Wi-Fi transmitters, and Bluetooth devices.

(vii)   Part 68 of the FCC rules (47 C.F.R. Part 68) describes the direct connection of Terminal Equipment (TE) to the Public Switched Telephone Network (PSTN). Also covered by Part 68 are telecommunication equipment that are connected to wireline facilities owned by wireline telecommunications providers and used to provide private line services.

5.2   European Union (EU)[21]

EU legislation for certification in the Electrical & Electronic Engineering Industry (EEI) sector is important to ensure European-wide harmonisation of a set of essential health and safety and other public interest requirements for products placed on the market. It is Comprehensive regulatory framework as per Regulation (EC) No 765/2008 and Decision No 768/2008/EC to operate effectively for the safety and compliance of industrial products with the requirements adopted to protect the various public interests (health, safety, environment, consumers) and for the proper functioning of the single market. EU policies affecting electrical and electronic engineering industries (EEI) cover 3 major areas.

1. Electromagnetic compatibility: regulated by the electromagnetic compatibility (EMC) Directive 2014/30/EU ensures that electrical and electronic equipment does not generate, or is not affected by, electromagnetic disturbance. The EMC directive limits electromagnetic emissions from equipment in order to ensure that, when used as intended, such equipment does not disturb radio and telecommunication, as well as other equipment. The directive also governs the

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[21] EU's Legislation contents: Available at: https://ec.europa.eu/growth/sectors/electrical-engineering_en,

immunity of such equipment to interference and seeks to ensure that this equipment is not disturbed by radio emissions, when used as intended.

2. Low voltage electrical equipment: regulated by the low voltage directive (LVD) (2014/35/EU) ensures that electrical equipment within certain voltage limits provides a high level of protection for European citizens, and benefits fully from the single market. It has been applicable since 20 April 2016. The new LVD does not require notified bodies to assess if products to be placed on the market comply with the applicable EU legislation. The manufacturer alone is responsible for determining this by carrying out conformity assessment procedures.

3. Radio and telecommunication terminal equipment: regulated by the radio equipment directive (RED). It applies to all products using the radio frequency spectrum. The Radio equipment directive 2014/53/EU (RED) establishes a regulatory framework for placing radio equipment on the market. It ensures a single market for radio equipment by setting essential requirements for safety and health, electromagnetic compatibility (EMC), and the efficient use of the radio spectrum. It also provides the basis for further regulation governing some additional points. These rule include technical features for the protection of privacy, personal data and against fraud. Additionally, cover interoperability, access to emergency services, and compliance regarding the combination of radio equipment and software.

In EU, Notification is an act whereby a Member State informs the Commission and the other Member States that a body, which fulfils the relevant requirements, has been

designated as Notified Bodies to carry out conformity assessment according to a directive. Notification of Notified Bodies and their withdrawal are the responsibility of the notifying Member State.

Improving the enforcement of EU legislation (market surveillance) is also a priority, in order to ensure fair competition, the protection of the health and safety of consumers and workers, and improved efficiency in the use of radio spectrum.

5.3   China[22]

Ministry of Information and Information Technology (MIIT) is Regulatory authority in china and Network Access License (NAL) is mandatory for telecom equipment that is exported to or sold in China. This license applies to telecom equipment that is connected to the public telecommunication network. For receiving the such License, an application has to be submitted at the Ministry of Industry and Information Technology (MIIT) in Beijing. The process requires extensive conformity testing and support and may include network trials and review of the product by a local panel of experts, in addition to laboratory testing against China's national standards. These laboratories are all accredited by the "Certification and Accreditation Administration" (CNCA) and specialized in testing a certain product group.

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[22] *China's Regulation*: Available at: https://www.china-certification.com/en/network-access-license-nal-for-telecommunication-equipment-2/,

The all basic and the high-end equipment need to obtain the NAL necessarily before being imported into China. In order to obtain the Network Access License, the following steps are needed:

1. Submission of the application document by the applicant must be a juristic person with a registered residence in China.

2. Product tests to pass NAL certification, a product needs to pass several tests. Apart from the NAL-License, certain telecommunication equipment also needs a CCC-certification. But before applying for CCC, the applicant needs to apply for the Network Access License. Some testing results of the NAL approval process is also relevant for CCC-Certification, so that these tests do not have to be undertaken twice.

3. License issue, once all tests have been passed, MIIT will issue the license. Then, the device can be legally exported to China and be sold there.

The China Compulsory Certification (CCC) scheme is also required for a list of product categories that includes many types of Information technology equipment (ITE). In 2009, with revisions to the list of product categories, some categories of telecommunications equipment now also must have the CCC mark in order to pass customs for import into China. The certification process includes laboratory testing against prescribed national standards and inspection of the product's manufacturing facility.

Further, all RF devices in China also require Radio Type Approval (RTA) issued by the State Radio Regulation Center (SRRC). The approval process includes domestic testing and a certification application process.

5.4 Egypt- National Telecommunication Regulatory Authority (NTRA)[23]

Telecommunications equipment must be type approved by the National Telecommunication Regulatory Authority (NTRA). Approval is generally granted based on review of foreign standard (FCC/ETSI etc.) test reports. NTRA issues approval to foreign manufacturers.

Type Approval is a compulsory step applied when importing or manufacturing or assembly of any equipment having a communication element. Through this step, compliance of the product to the global Radio Frequency (RF), Electromagnetic Compatibility (EMC), Safety and Health standards approved in Egypt is ensured. It's prohibited to import or manufacture or assemble a communication equipment not complying with such approved standards according to Communication Law No. 10/2003 due to their possible harms and interferences with the networks of licensed communication services providers and harmful effects on electrical equipment located around them and on the health of communication equipment end user.

5.5 Vietnam[24]

Vietnam's Ministry of Information and Communications is announced the formation of a new regulatory body, the Viet Nam Telecommunications Authority (VNTA). This new body is responsible for regulation as well as policy-making.

VNTA is responsible for issuing type approval for wireline telecommunications equipment and radio equipment. test reports issued by an in-country testing laboratory

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[23] EGYPT's Type Approval Process: Available at: https://tra.gov.eg/en/regulation/type-approval/Pages/Procedures.aspx,

[24] VIETNAM's Regulation: Available at: https://english.mic.gov.vn/mra/Pages/TinTuc/114318/List-of-technical-regulations.html

designed by MIC Vietnam or issued by oversea testing laboratory recognized by MIC Vietnam under MRA to demonstrate compliance with Vietnam national standards.

5.6   Japan[25]

The Japan approvals institute for telecommunications equipment (JATE) was established and licensed to provide technical conditions, regulatory compliance and certifications for telecommunications terminal equipment in March 1984. In April 1985, with the enforcement of the Telecommunications Business Law, JATE was designated as a Technical conditions certification body, and began its certification activities. On April 1st, 2017, the conformity certification services of radio equipment based on the Radio Act is started.

Telecom terminal equipment requires certification for connection to public network services in Japan. Certification is not only issued by the government affiliated JATE, but also by private certification bodies. Testing to Japan's technical requirements may be conducted by many recognised laboratories around the world.

The Japanese Telecommunication Business Law is an additional requirement for the approval of technical equipment in Japan and it is separate from an approval according to the Radio Act. The Business Law requirement relates primarily to products that can be connected to the state communications network in Japan. It is irrelevant whether this connection is wired or wireless:

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[25] *JAPAN's A system to ensure the safety and reliability of commercial telecommunications equipment*: Available at: https://www.soumu.go.jp/menu_seisaku/ictseisaku/net_anzen/ jigyoyo/index.html

5.7 Australia - Australian Communications and Media Authority (ACMA) Regulatory Compliance (RCM)[26]

Equipment in Australia must be labelled with the regulatory compliance mark (RCM) to demonstrate compliance with technical standards for telecommunications customer equipment, radio communications devices, electromagnetic radiation, and electromagnetic compatibility mandated by the Australian Communications and Media Authority (ACMA).

Further, Labelling must be backed up by compliance records, which include Declarations of Conformity made by an Australian legal entity. The compliance records are held by a supplier or agent and are subject to audit by the ACMA and Electrical Regulatory Authorities Council (ERAC).

In addition to ACMA mandates, for equipment also in scope of Australian electrical safety regulations, suppliers have additional obligations under the Electrical Regulatory Authorities Council (ERAC), Electrical Equipment Safety System (EESS) and must comply in accordance with the Equipment Safety Rules of the EESS. Before any equipment is sold, a supplier must be registered with the EESS. Certain higher-risk end equipment such as external power supplies, must receive safety certification and be registered to the supplier. Conformance records and declarations of conformity must be prepared and RCM labelling affixed.

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[26] Australia's Equipment Labelling Rule: Available at: https://www.acma.gov.au/electrical-products-and-devices)/

Green Concept: Moreover, Compliance with minimum energy performance standards (MEPS) is mandatory for a range of products in Australia, including the external power supplies often supplied with telecommunications, radio and information technology equipment. Such equipment/products must be registered/enrolled with the Greenhouse and Energy Minimum Standards (GEMS) regulator on the basis of acceptable test reports.

5.8 Russia – Telecommunication Approval[27]

Telecommunications equipment in Russia requires certification or registration of declaration of conformity with the Federal Communications Agency (Rossvyaz) if it is to be supplied/commissioned in connection with a common carrier network in Russia.

The **EAC** Mark was introduced in 2013 to harmonize and replace national requirements in the region. The Eurasian Conformity mark (**EAC**, Russian: Евразийское соответствие (EAC)) is a certification mark to **indicate products** that conform to all technical regulations of the Eurasian Customs Union (CU) and once attained, it must appear on all products entering the Eurasian Economic Union (EAEU).

All products WiFi, Satellite (unless a private network), BT, cellular, PSTN, Lithium Ion batteries, etc. require some kind of approval. This could be a Technical Regulation (TR) Custom Union LVE, EMC, MD, etc. or Certificate, Declaration.

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[27] http://www.eurasiancommission.org/en/Pages/default.aspx

Also, An EAC Certificate is an official certification that the products comply with the harmonized technical requirements of the EAEU. Certificates can only be issued by an independent certification body accredited by a member state of the customs union after a quality assessment. The certification takes place on the basis of technical documents and corporate test reports or test reports provided by accredited production laboratories, as well as if necessary an on-site manufacturing audit.

An EAC Declaration is a declaration by the manufacturer, importer or an authorized representative on the conformity with the minimum requirements of the technical regulations of the Eurasian Economic Union. In contrast to the EAC Certificate, the EAC Declaration is made by the manufacturer or importer. All tests and analyses required are carried out by the manufacturer himself. The EAC Declaration has to be recorded in the unified register of the EAEU by an accredited certification body of a member state of the customs union. Declarations are supported by EMC test reports.

5.9   South Africa -ICASA Telecom Equipment Type Approval[28]

The Independent Communications Authority of South Africa is an independent regulatory body of the South African government, established in 2000 by the ICASA Act to regulate both the telecommunications and broadcasting sectors in the public interest.

In terms of section 35 (1) of the Electronic Communications Act, "No person may use, supply, sell, offer for sale or lease or hire any type of electronic communications

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[28] South Africa's regulation: Available at: https://www.nrcs.org.za/content.asp?subID=4140#

equipment or electronic communications facility, including radio apparatus, used or to be used in connection with the provision of electronic communications, unless such equipment, electronic communications facility or radio apparatus has, subject to subsection (2), been approved by the Authority."

In South Africa "Type Approval" means a process by which Equipment or a device or system is authorized by the Authority to be used in South Africa or imported into South Africa and involves verification of the Equipment's compliance with the applicable standards and other regulatory requirements; The Authority determines and publishes in the Government Gazette the recognized technical standards with which equipment must conform in order to be eligible for Type Approval. These standards are based on the standards prepared by recognized international, regional and national standards-making bodies and include minimum requirements for meeting the Type Approval. The applicable technical standards are found in the Technical Regulations as defined in the Type Approval Regulations. ICASA is accepts test reports of the relevant European standards, provided the testing has been performed at an accredited test facility.

Further, South Africa's The National Regulator for Compulsory Specifications (NRCS) requires a Letter of Authority (LoA) for product safety and Certificate of Conformity (CoC) for EMC for some telecommunications equipment, some radio equipment, and information technology equipment. Type approval for RF equipment does not expire and the equipment can be used again in future without the need for another application for type approval. However, type approval for fixed line equipment is valid for a period of a year and is renewable before or on 31 March every year.

Chapter 6

6.   Data Analysis and Findings

6.1   Finding of Perception Based User Survey

For understanding the perception and awareness of the users about Mandatory Testing and Certification of Telecommunication Equipment (MTCTE) and this Govt. initiative for Safety & protection of the end-users and general public by ensuring that radio frequency emissions from equipment do not exceed prescribed standards, a structured questionnaire (**Annexure II**) based survey was conducted online by way of mainly email and WhatsApp messenger amid Covid-19. In all **202 users** responded to the questionnaire and shared their opinion. The data of respondents, their response and the analysis of responses are summarized below.

Question 1

Are you aware that telecommunication products like mobile phones, Wi-Fi modem, mobile batteries and smart watches etc. may not be safe to use and may interfere with functioning of other electronic devices if these telecommunication products do not comply to the specified standards?
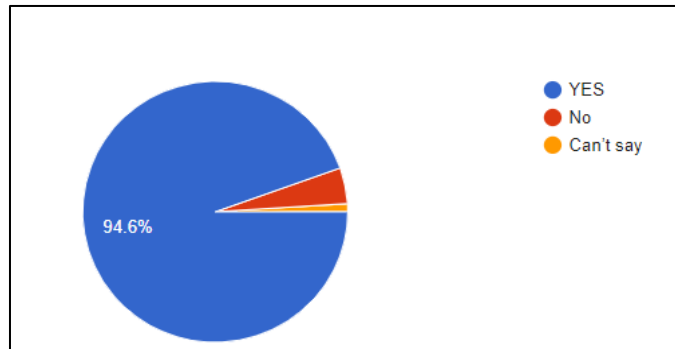
Figure 3: Awareness about Safety of Telecommunication Products and Interference with Functioning of Other Electronic Devices

A great deal of people (94.6%) is aware about Safety of Telecommunication Products and Interference with Functioning of Other Electronic Devices. Only 1% are not aware.

Question 2

Do you know that that telecommunication products like mobile phones, Wi-Fi modem, mobile batteries and smart watches etc. emit electromagnetic radiations which may be harmful to humans if such radiations from these devices are not within the permissible limits?
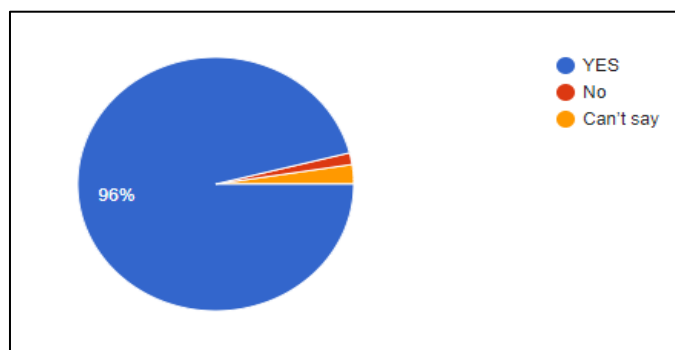
Figure 4: Awareness about Harmful Electromagnetic Radiations Emission from of Telecommunication Products

People in abundance (96%) are aware that these telecommunication devices emit electromagnetic radiations that may be harmful to humans if such radiations from these devices are not within the permissible limits.

The above responses indicates that people are vigilant about use of these electronic gadgets and cautious about their health from harmful radiations radiated by devices operating beyond permissible limit.

Question 3

Are you aware that there are Govt. norms which prescribe the permissible limit of electromagnetic radiations from such telecom and communication products?
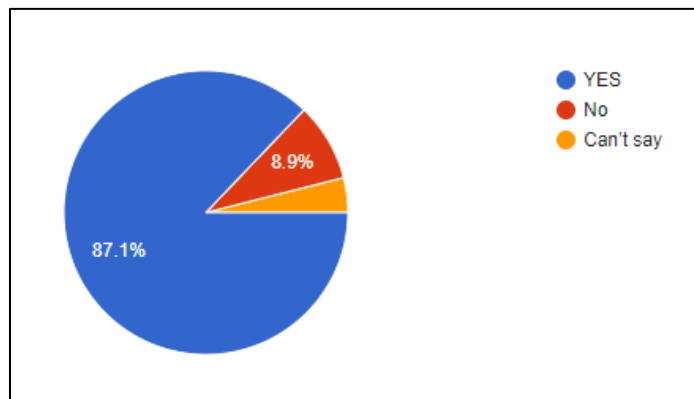
Figure 5: Perception about Govt. Norms which Prescribe the Permissible Limit of Electromagnetic Radiations from such Telecom Products

A plenitude people (87.1%) are aware about the Govt. norms that prescribe the permissible limit of electromagnetic radiations from such telecom and communication products, only 8.9% are not aware and 4% have no opinion.

Question 4

Have you heard the names Specific Absorption Rate (SAR), Electromagnetic Frequencies (EMF) radiation limits for the telecom products?
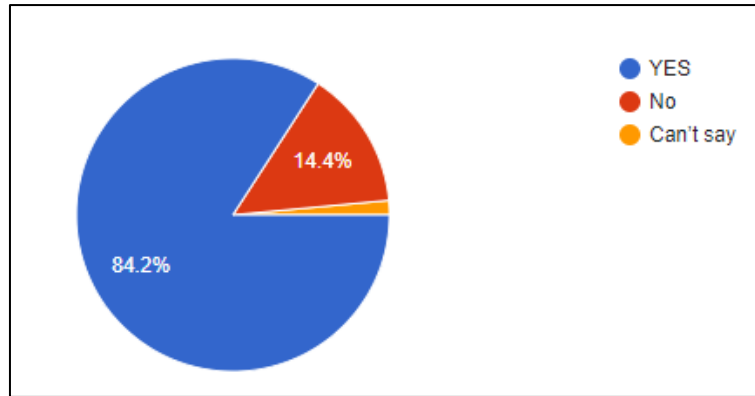
Figure 6: Awareness about Specific Absorption Rate (SAR), Electromagnetic Frequencies (EMF) Radiation Limits for Telecom Products

The terms Specific Absorption Rate (SAR), Electromagnetic Frequencies (EMF) radiation limits for the telecom products have been heard by an appreciable number of respondents (84,2%), only 14.4% have not come across them.

Question 5

Do you think that there should be a comprehensive regulation for all telecom products to comply to norms of EMF radiation, safety, security as well as technical aspects of the device ensuring proper functionality of these devices?
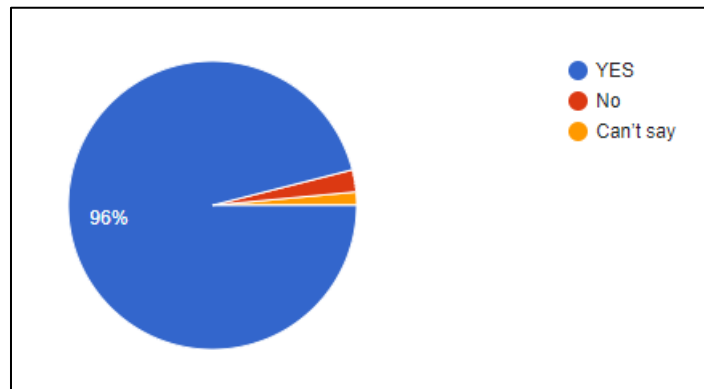
Figure 7: Response on Comprehensive Regulation for all Telecom Products

Almost all (96%) think that there should be a comprehensive regulation for all telecom products to comply to norms of EMF radiation, safety, security as well as technical aspects of the device ensuring proper functionality of these devices.

Question 6

Have you heard about the organization named 'TEC' Telecommunication Engineering Centre a unit of Department of Telecommunications under Ministry of Communication, Govt. of India?
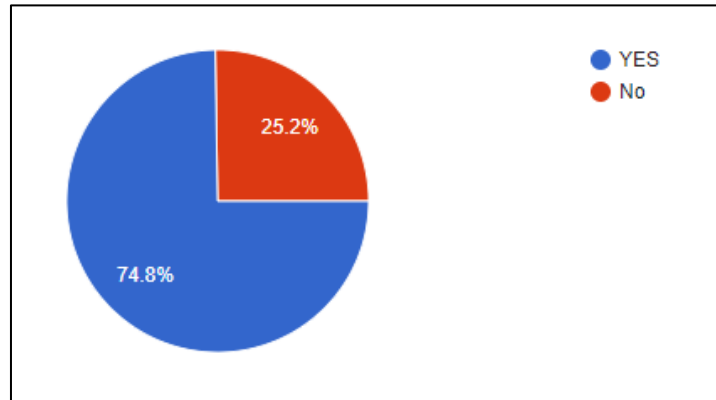
Figure 8: Awareness about TEC

An ample group (74.8%) has heard the name organization named 'TEC' Telecommunication Engineering Centre a unit of Department of Telecommunications under Ministry of Communication, Govt. of India.

Question 7

Have you come across the term 'MTCTE' Mandatory Testing and Certification of Telecommunication Equipment policy? As per this policy, each telecom equipment must undergo mandatory testing and certification before its use, sale or import in India.
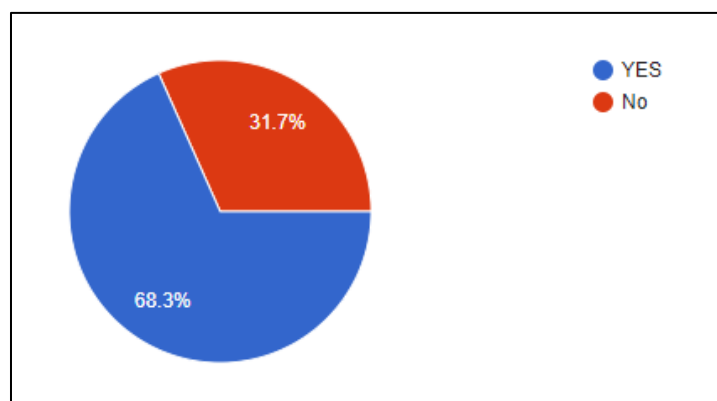
Figure 9: Awareness about MTCTE Policy

A similar number (68.3%) have come across the term 'MTCTE' Mandatory Testing and Certification of Telecommunication Equipment policy, 30% have not heard this term. These responses show that awareness of this schemes among people is much needed.

Question 8

Have you heard term 'Accreditation', Accreditation is third party attestation of the competency of the labs to carry out specific conformity assessment tasks of products w.r.t. prescribed Standards/Specifications?
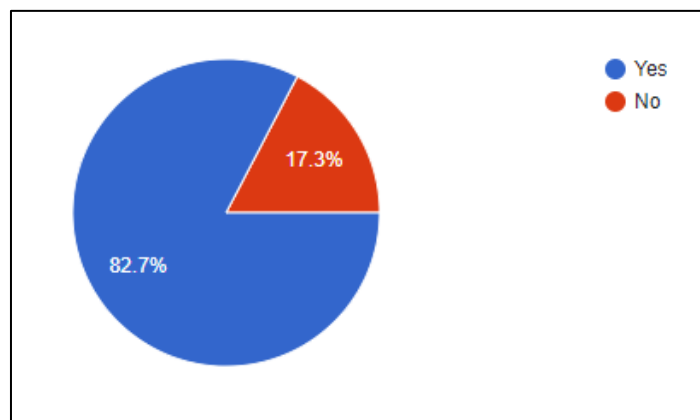
Figure 10: Awareness about Accreditation

Question 9

Have you heard about the organization 'NABL' National accreditation board for testing and calibration laboratory that is responsible for accreditation of testing Laboratories in India?
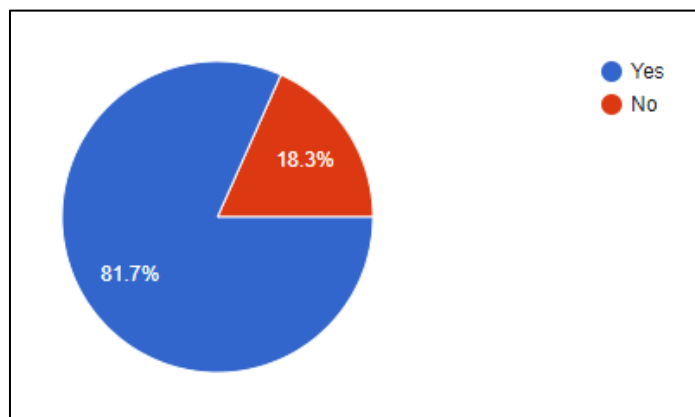
Figure 11: Awareness about NABL

Respondents (82%) have come across the term Accreditation and organization name 'NABL'; about 18 % have not heard. This indicates that people need to be educated about accreditation as accreditation is third party attestation of the competency of the labs to carry out specific conformity assessment tasks of products w.r.t. prescribed standards/specifications. The responsible organization for this activity in India is NABL.

Question 10

Authorized certification conforms that product is safe to use viz. Hallmark for purity of gold, FSSAI mark on food products and BIS certification on electrical & electronics appliances. Similarly, TEC logo will be put on certified telecommunication products. Are you in agreement with this government initiative to provide mark of conformity (certified Product) on telecom products?
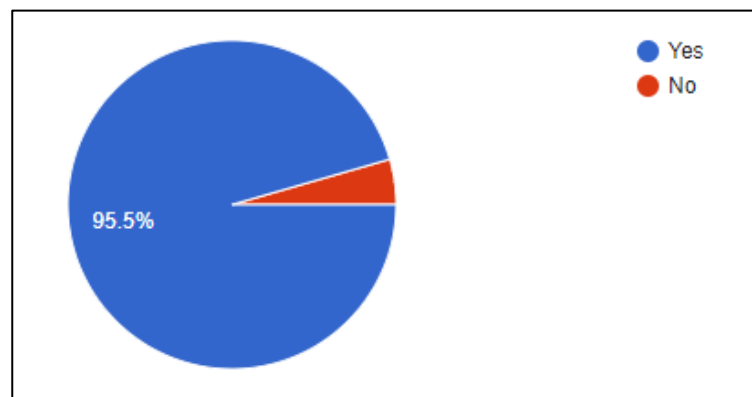
Figure 12: Awareness about TEC logo on Certified Products

An overwhelming response (95.5%) has been received in favor of agreement that there should be 'TEC' logo on certified telecommunication products and government initiative to provide mark of conformity (certified Product) on telecom products.

Question 11

As per your opinion, whether MTCTE policy of Govt. of India for TEC mark on products could sufficiently address the safety and security etc. of users especially in view of exponential rise in Digital devices in Digital India era.
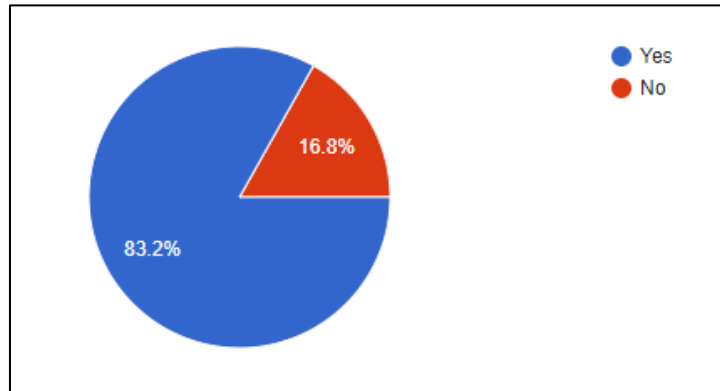
Figure 13: Opinion whether MTCTE Policy of Govt. of India for TEC mark on Products Could Sufficiently Address the Safety and Security

Only 83.2% people are in agreement that MTCTE policy of Govt. of India for TEC mark on products could sufficiently address the safety and security etc. of users especially in view of exponential rise in Digital devices in Digital India era.

Question 12

Our telecom products and telecom network are some or the other way safe & secure as compared to developed countries like USA, Australia and European countries etc. What is your opinion about our products with regards to this comparison?
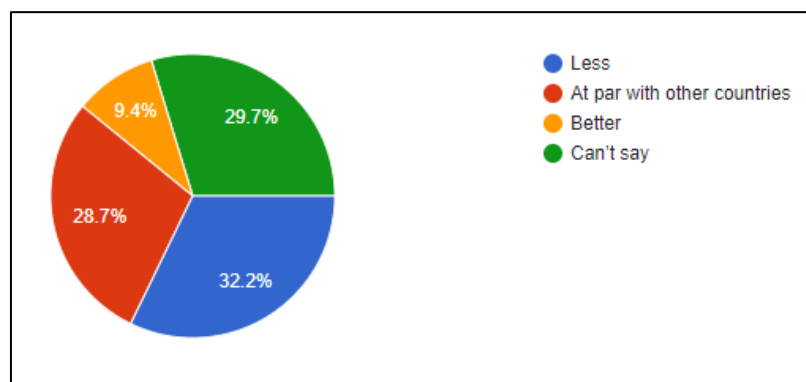
Figure 14:Comparison of Safety and Security of Our Telecom Products and Telecom Network USA, Australia and European Countries

Almost equal number of people believe that our telecom products are at par and better with other countries (38%) and less safe & secure (32.2 %). 29.7 % have no opinion about this.

Question 13

How will you rate Govt initiative of MTCTE for telecommunication products?

(please rate between 1 to 5, whereas 1 is less appreciable and 5 is highly appreciable)
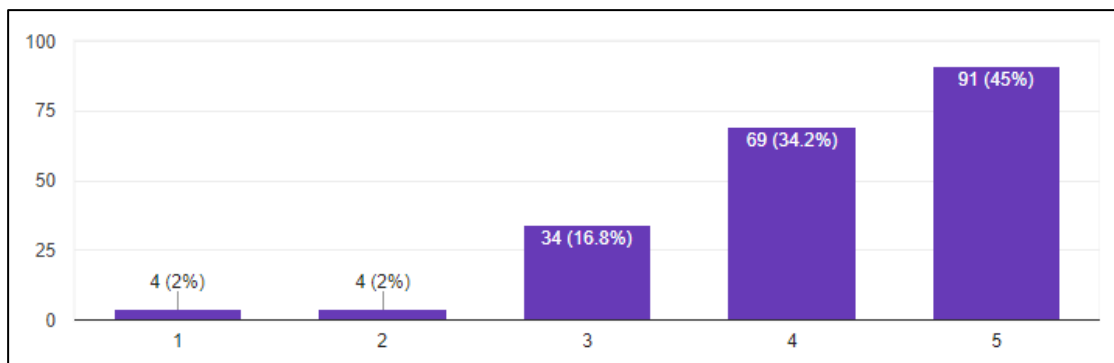
Figure 15:Rating of Government Initiative of MTCTE for Telecommunication Products

Scads (80%) have rated Govt. initiative of MTCTE for telecommunication products towards highly appreciable. A moderate response (16.8%) has been received on appreciable rating as compared to less appreciable (4%). It clearly indicates that majority of people appreciate this initiative of MTCTE policy of Govt. of India.

Question 14

Comments, if any (optional)

6.1.1 Users' Response Conclusion

Exhaustive analysis of the comments reveals that MTCTE policy should be implemented for all Telecom Products inducted / to be inducted in the Telecom Network, on priority so that the QoS of the products is as per Approved Telecom Standards and the Telecom Product is safe for the Telecom Users. Also, majority of

the users have emphasized that there should be more awareness in public domain regarding the policy. The users have also suggested inclusion of TEC logo on certified products on priority. TEC certification for each electronic gadgets is the right approach to remove the apprehension for use of it by common citizens.

Some more comments from users have been reproduced below.

1.   MTCTE can play major role in the field of telecommunications.

2.   Indian technical requirements need to be at par with countries worldwide. In case Indian manufacturing units need to grow and compete globally, the primary focus should be on quality along with and zero compromise on safety, leading product compliance to performance and Technical standards.

3.   The major accomplishment from MTCTE is the growth of Quality Test labs in India. Once this has been achieved, many foreign manufacturers will be allured to get their products tested in India for Global Certification. Mandatory requirement for testing will not only help in enhancement of knowledge, growth of skill set, but also the development of local Industries, labs and processes, once the rules are implemented.

4.   TEC to usher developing Certification Bodies in India. CBs are experts that are accredited to review, advise, and certify on behalf of the Regulators. Most of the countries worldwide such the Unites States, European Union, Australia have this arrangement. However, as far as India is concerned, CBs must be under strict vigilance.

5.   Dual certification (manufacturer and CBs) will culminate an additional burden on the manufacturer, ensuing a surge in the cost of the product, a

direct hit on the buyer's pocket. Single certification would be the best way to go (either BIS or TEC).

6. In India, MTCTE is the seed for High-quality Telecommunication. This is an incredibly good initiative by Government of India to safeguard the General public. Testing should be imperative for each equipment of Electronics.

6.2 Finding of Stakeholders' Survey

The data on MTCTE policy provisions and its implementation aspects has been collected through another set of predesigned mostly structured questionnaire with comments/recommendations from selected stakeholders i.e., the government department/ministry officials concerned associated with formulation of the policy and its implementation. Also, data has been collected from other stakeholders mainly involved in implementation part i.e., persons concerned to testing infrastructure facility and manufacture/importers and their associations.

The questionnaire (**Annexure III**) was designed by the researcher under the supervision of the guide. The purpose of this questionnaire mainly related to objective and research question of our study. Survey was conducted online by way of mainly email and WhatsApp messenger and personal meetings and interviews were avoided amid covid-19. Only **58 stakeholders** responded to the questionnaire and shared their opinion as even after repeated persuasion there was reluctant in sharing the information. Though it was clarified beforehand that the responses will be kept confidential and will be used only for academic purpose. Accordingly, analysis based on available responses are deliberated as under:

Question 1

Have you ever been directly or indirectly associated with the preparation of Essential Requirements (ERs) against which telecom product testing and certification is being / to be done?
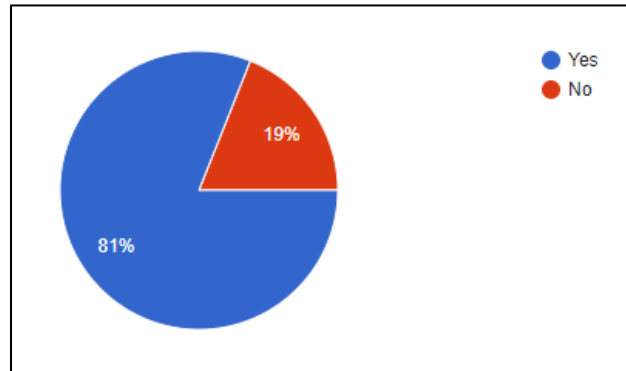
Figure 16: Involvement in Preparation of Essential Requirements (ERs)

Paramount (81%) have directly or indirectly been associated with the preparation of Essential Requirements (ERs) against which telecom product testing and certification is being / to be done. The number of stakeholders (19%) who are not involved is not very significant.

Question 2

Do you agree that Essential Requirements have been made after wide consultation and participation of stakeholders?
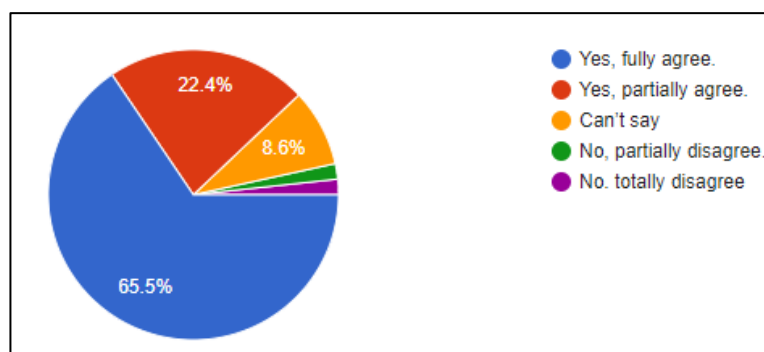
Figure 17: Agreement that Essential Requirements have been made after Wide Consultation and Participation of Stakeholders

Preponderance have vetted (65.5%) that Essential Requirements have been made after wide consultation and participation of stakeholders. 22.4% stakeholders have agreed partially. Only 8.6% are muddled and they could not put their opinion.

Question 3

Do you think that ERs meet the objective of MTCTE policy?
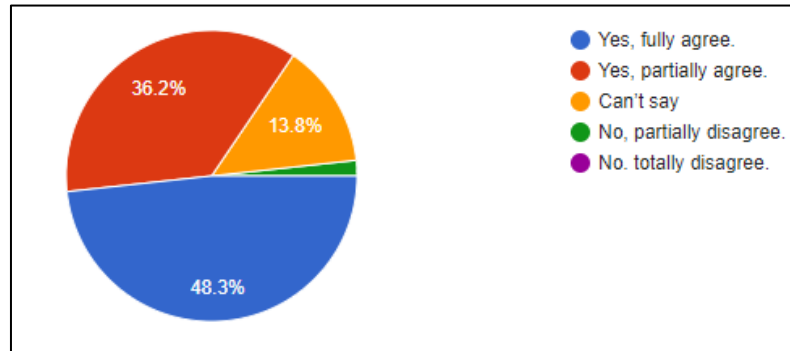
Figure 18: Response on ERs Meeting the Objective of MTCTE Policy

Majority 84.5% agreed (48.3% fully and 36.2% partially) that these ERs meet the objective of MTCTE policy. Whereas 13.8% have no idea about it.

Question 4

How do you compare ERs of MTCTE regulation with ERs as part of technical regulations in other advanced economies (EU, USA, Japan etc.)-?
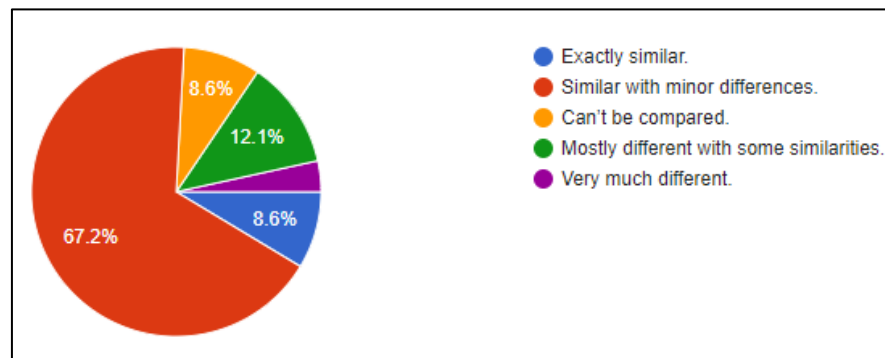
Figure 19: Comparison of ERs of MTCTE Regulation with ERs as Part of Technical Regulations in Other Advanced Economies

Approximately 67.2% believe that in comparisons to ERs of MTCTE regulation with ERs as part of technical regulations in other advanced economies (EU, USA, Japan etc.) are similar with minor differences means almost similar. Out of rest approx. 8.6% opinion that exactly similar and only approx. 12.1% opinion that mostly different with some similarities.

Question 5

In terms of regulatory compliance requirement imposed on OEM's/importers of telecom products through MTCTE ERs, how do you rate MTCTE ERs with ERs as part of technical regulations in other advanced economies (EU, USA, Japan etc.)-?
(please rate between 1 to 5, where 1 is lenient and easy to comply and 5 being stringent and difficult to comply)
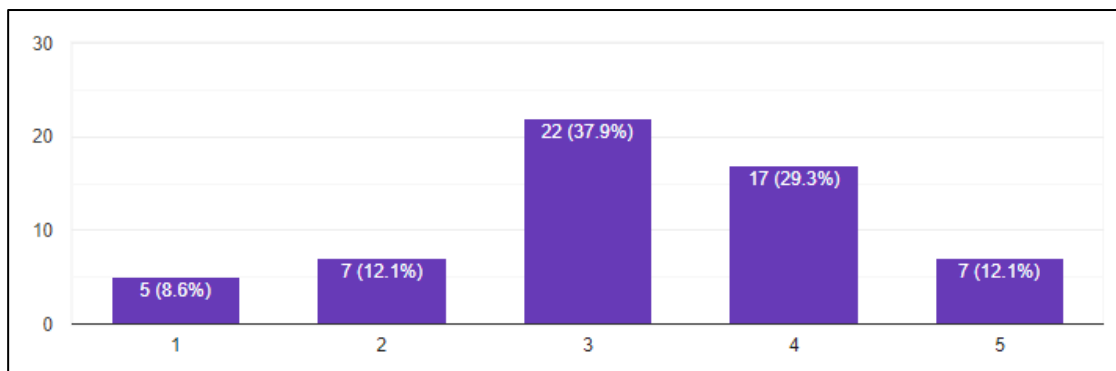
Figure 20: Comparison of Rate of MTCTE ERs with ERs as Part of technical Regulations in other Advanced Economies (EU, USA, Japan etc.)

About 41.4% respondents rated the MTCTE ERs as compared to the technical regulations of other advanced economies (EU, USA, Japan etc.) stringent and difficult to comply and only 20.7% think that these are lenient and easy to comply. But 22% think and rated midway about this opinion.

Question 6

What do you think about the present testing infrastructure /facilities with regards to MTCTE policy?
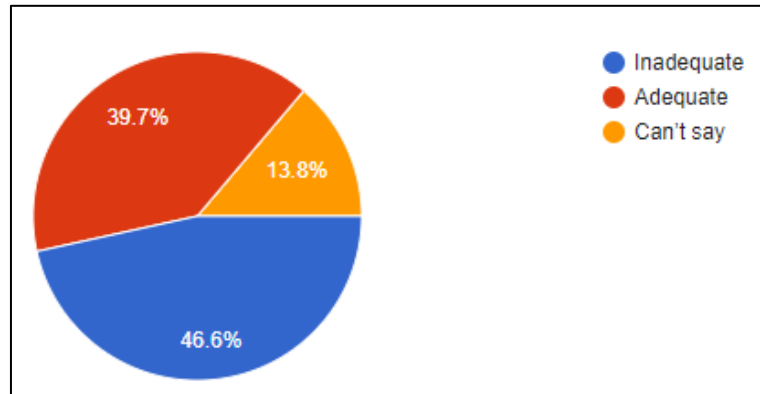
Figure 21: Adequacy of Testing Infrastructure /Facilities for MTCTE Policy

About 46.6% the respondent thinks that the present testing infrastructure /facilities with regards to MTCTE policy are adequate. whereas 39.7% think required more infrastructure and 13.8% having no assessment on this.

Question 7

To create all state art of telecom testing facilities in India which of the below mentioned factors are more important.
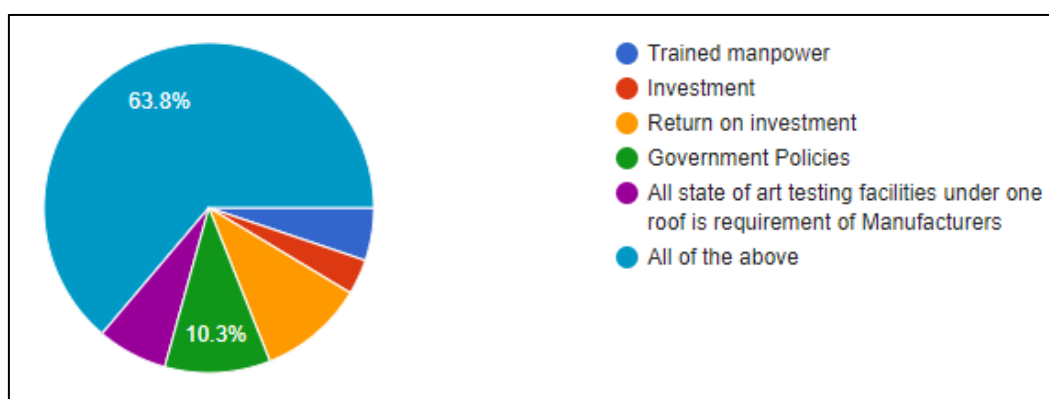
Figure 22: Important Factors to create All State Art of Telecom Testing Facilities in India

Mentioned all factors in question felt important by 63.8 % respondent to create the all state art of telecom testing facilities in India. Next to it 10.3% believe that Government Policies are responsible for it. Each 6 % respondent opinion that Return on investment and trained manpower is also one of the main factors.

Question 8

Do you agree that PPP (public–private partnership or 3P) model should be promoted to create state of art testing facilities under one roof in India.
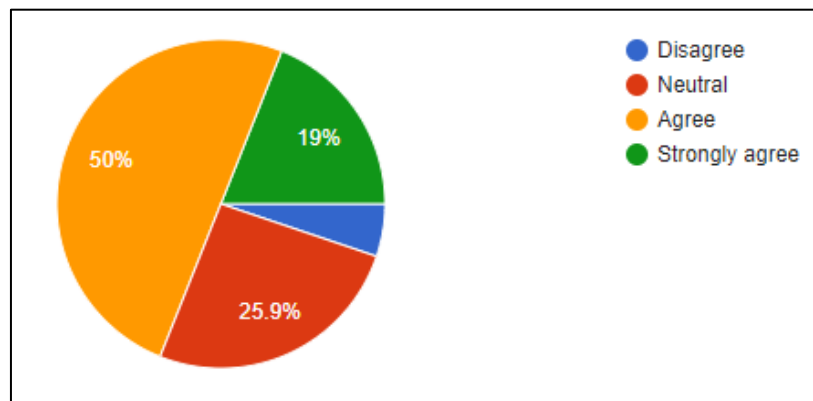
Figure 23: Agreement on promotion of PPP (public–private partnership or 3P)

Exactly Half (50%) respondents agree and 19% strongly agree that PPP (public–private partnership or 3P) model should be promoted to create state of art testing facilities under one roof in India, only 5.2% do not think so and 25.9% respondent's neutral on this opinion.

Question 9

Rate the process of TEC Conformity Assessment Body(CAB) Designation as compared to other developed countries.

(please rate 1 to 5, where is 1 is need improvement and 5 is well defined and transparent)
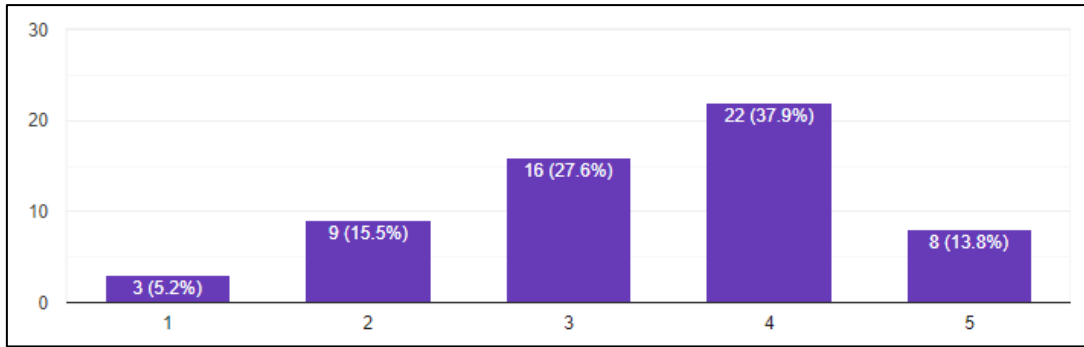
Figure 24: Comparison of process of TEC Conformity Assessment Body (CAB) Designation with Other Developed Countries

It is observed that approx. 51.7% (37.9 % and 13.8%) respondents rated the process of TEC Conformity Assessment Body (CAB) Designation well defined and transparent as compared to the other developed countries. Only 20.7% (5.2% and 15.5%) thinks that there is need of improvement. However, 27.6% opinions are moderate.

Question 10

India is one of the major telecom equipment importers in the world. MRA (Mutual recognition agreement) eliminates the cost of re-testing, re-certification, and shorten the time-to-market for partner countries' manufacturers and exporters. Presently only one MRA with Singapore is there. In view of this, do you agree there should be more and more MRA with foreign countries.
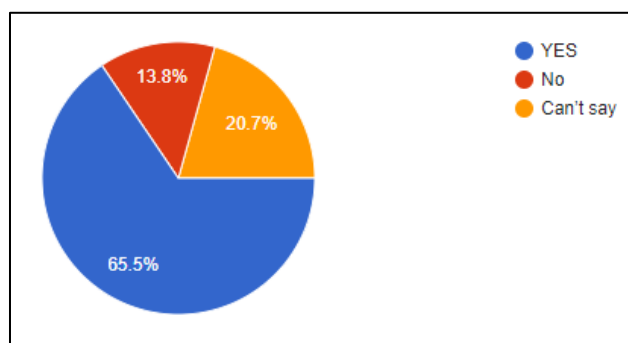
Figure 25: Agreement on More MRAs

One of the most important opinion that more than 66.5 % respondents think there should be more and more MRA with foreign countries. Only 13.8% do not agree this and 20.7% having no opinion.

Question 11

Do you agree that there should be more Govt owned testing Labs for Audit purpose/market surveillance and to control market testing price?
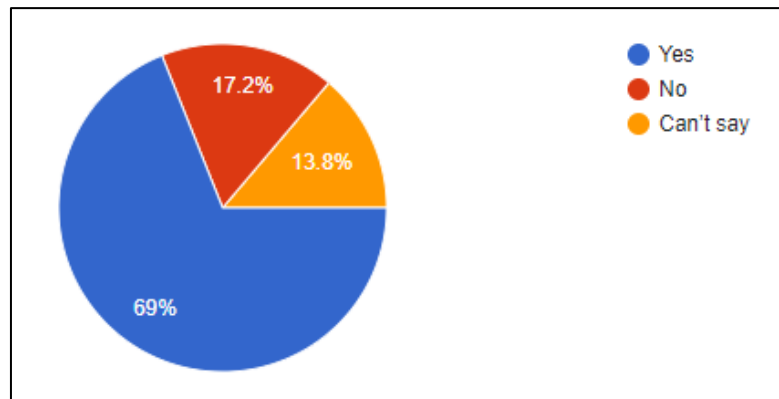
Figure 26: Opinion on Government Testing Labs

More than 69% respondent agreed that there should be more Govt. owned testing Labs for Audit purpose/market surveillance and to control market testing price. Out of rest 17.2% not agreed and 13.8% having no opinion.

Question 12

How will you rate Indian testing facility as compared to the developed countries testing facilities?

(please rate between 1 to 5, whereas 1 is needs improvement and 5 is Adequate)
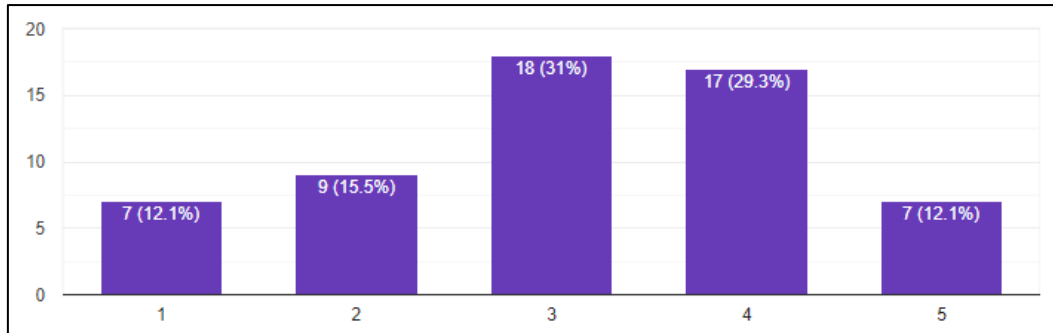
Figure 27: Rating of Indian Testing Facility as Compared to the Developed Countries Testing Facilities

The Indian testing facilities are adequate as compared to the developed countries testing facilities as rating received from 41.3% respondents (29.3% and 12.1%). Lesser number of respondents (15.5% and 12.2%) are under the impression that Indian facilities needs improvement. Maximum number (31%) of people postulate that our facilities are at par with other countries.

Question 13

How will you rate MTCTE scheme Govt. of India as compared to developed countries such schemes for telecom products?

(please rate between 1 to 5, whereas 1 is less appreciable and 5 is highly appreciable)
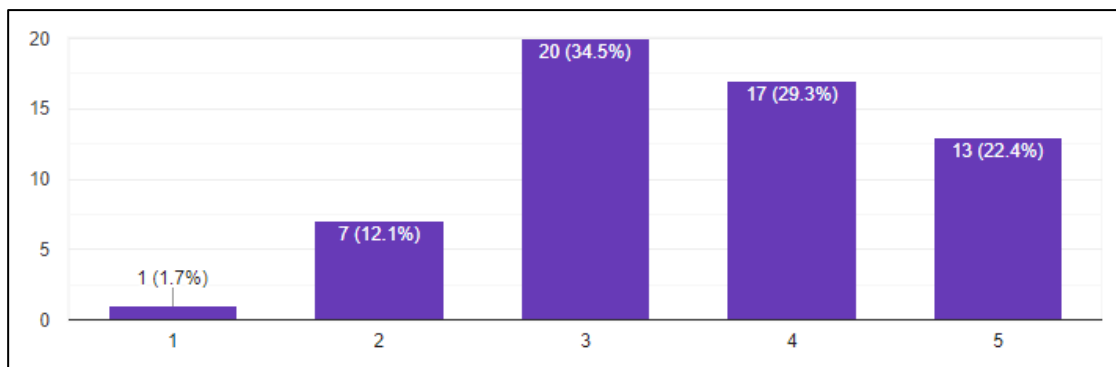
Figure 28: Rating of MTCTE Scheme as compared to Developed Countries

MTCTE scheme of Govt. of India is highly appreciable as compared to the schemes of developed countries as appraised by maximum number of respondents (51.7%) whereas only 13.8% has placed them relatively needing improvement. A good number of people (34.5%) has rated the schemes equal to those of developed countries.

Question 14

Regulatory overlap in same country can inflict real costs on businesses through repetitive testing/inspections and data collection efforts and is particularly more burdensome when agencies issue conflicting rules with inconsistent standards. Do you think there should be coordination committee and nodal agency to resolve this issue?
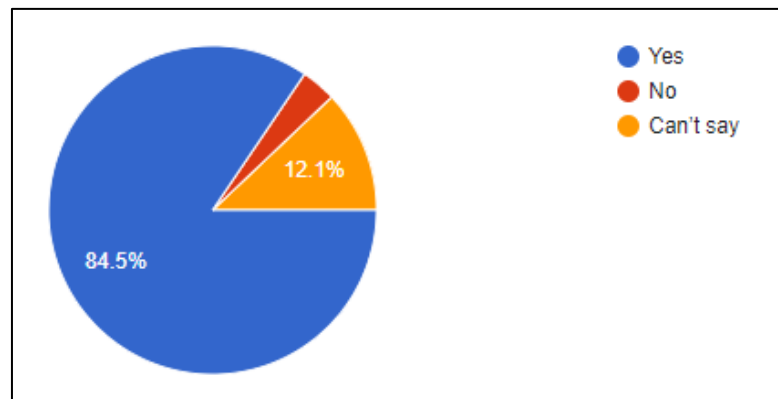
Figure 29: Opinion on Regulatory Overlap Issues

Multitude (84.5%) witness there should be a coordination committee and nodal agency to resolve the issues arising due to regulatory overlap in same country. On the edge of 12.1% are in dilemma and could not think whether it is required or not. Negligible (only 3.4 %) beholders believe non-requirement of such committee.

Question 15

Surveillance and enforcement is another key aspect for successful implementation of the MTCTE regulatory regime and for achievement of desired policy objectives. What do you think about the role of Surveillance and Enforcement in achieving desired policy objectives?
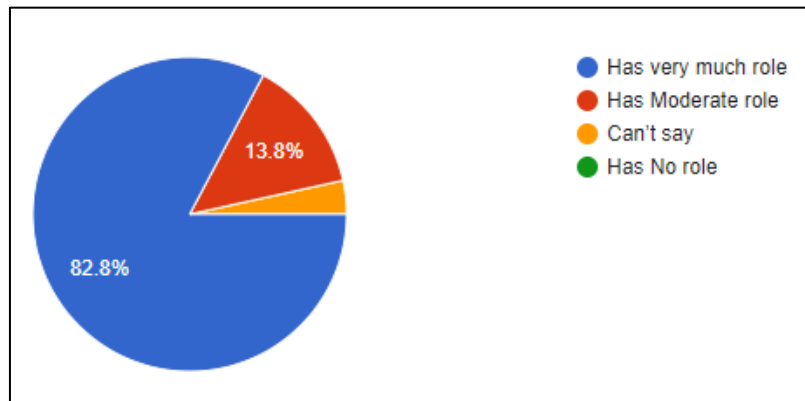
Figure 30: Role of Surveillance and Enforcement in Achieving Desired Policy Objectives

The role of Surveillance and Enforcement is rated is at the highest decent end (82.8%) for successful implementation of the MTCTE regulatory regime and for achievement of desired policy objectives. Only 3.4% are at the edge of the path to decide anything. A defined number of respondents (13.8%) expounded the moderate role.

Question 16

Conformity assessment procedures are one of the key aspect for global trade. Do you think it is creating unnecessary obstacles to international trade?
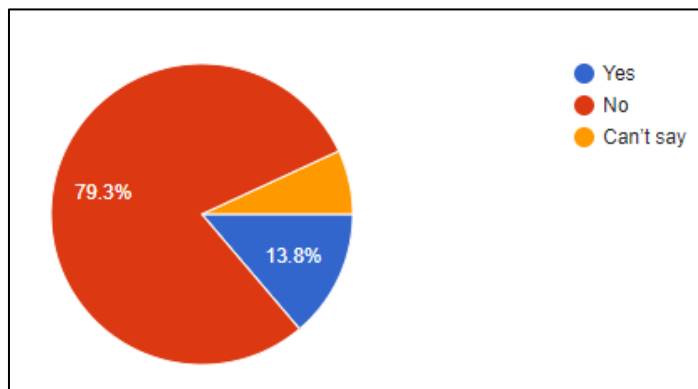
Figure 31: Opinion on Conformity assessment procedures, an Obstacle on Global Trade

Conformity assessment procedures are one of the key aspect for global trade. A shedload (79.3%) thinks that it is not creating unnecessary obstacles to international trade however 13.8% are on opposition. Scanty (6.9%) seems betwixt and between.

Question 17

Compliance with international technical regulations and standards involves significant costs for testing and certification for producers and exporters. What you think about it?
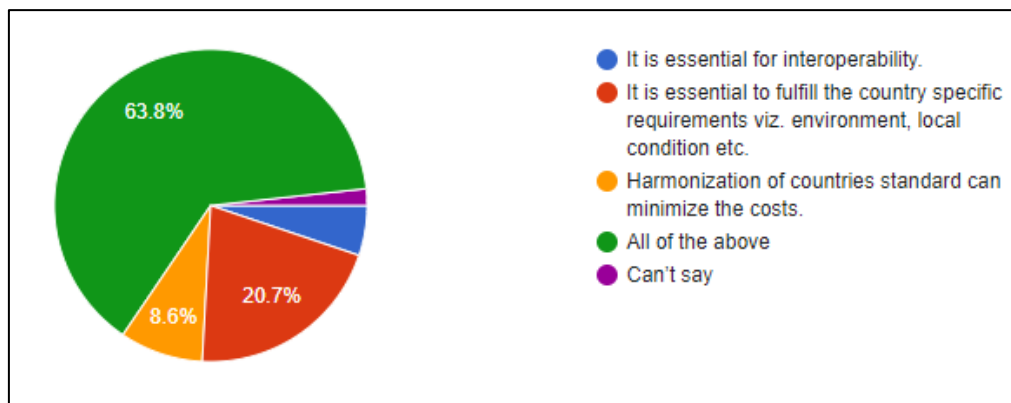
Figure 32: Factor Affecting Compliance with International Technical Regulations and Standards

Compliance with international technical regulations and standards involves significant costs for testing and certification for producers and exporters as it is essential for interoperability, to fulfil the country specific requirements viz. environment, local condition etc. Also, harmonization of countries standard can minimize the costs. Plethora of respondents (63.8%) believe that all these factors play the role. Still, there are respondents (1.7%) who are not able to decide the factor that could be responsible. There are people (20.7%) who believe that it is essential for interoperability, to fulfil the country specific requirements viz. environment, local condition etc. There are people (8.6%) who vet harmonization of countries standard can minimize the costs. Interoperability is one of the factor that is voted by 5.2% respondents.

Question 18

Launch of MTCTE scheme in a phased manner addresses most of the issues viz. manpower requirement, testing infrastructure availability / testing turnaround time and trade requirement etc. Do you agree that this step is one of the appreciable initiatives for successful implementation of MTCTE?
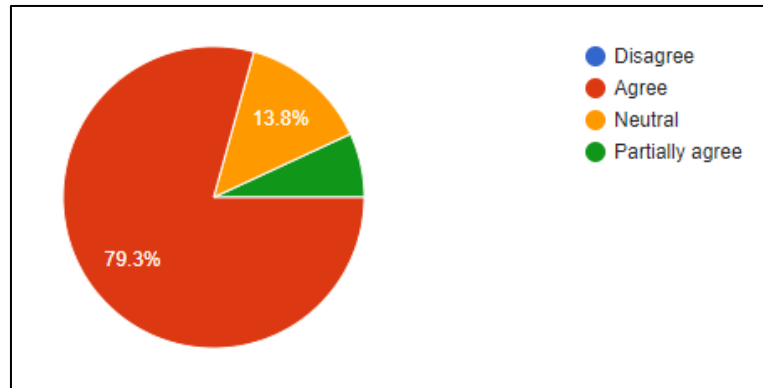
Figure 33: Launch of MTCTE scheme in Phased manner, an Appreciable Initiative for Successful Implementation of MTCTE

A remarkable figure (79%) has been received who agree that Launch of MTCTE scheme in Phased manner is one of the appreciable initiatives for successful implementation of MTCTE. Non-committal response received from 13.8%. In spite of people who have provided either of the response there are a very few (6.9%) minds who are unprejudiced.

Question 19

Please tick one of the following w.r.t challenges and issues in implementing the policy of Mandatory testing in India? (if relevant to you)

A. Manpower requirement for handling MTCTE implementation
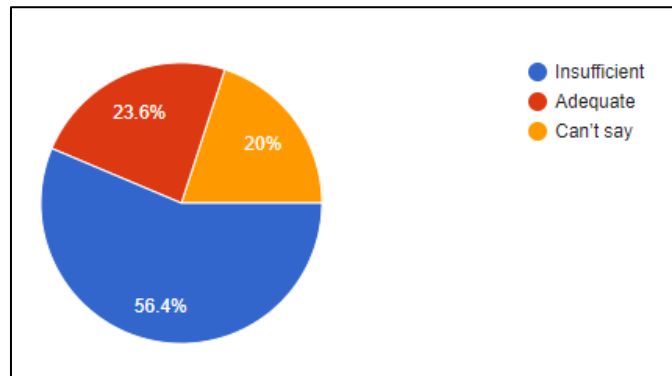
Figure 34: Manpower Requirement for Handling MTCTE Implementation

B. Technical knowhow for dealing MTCTE
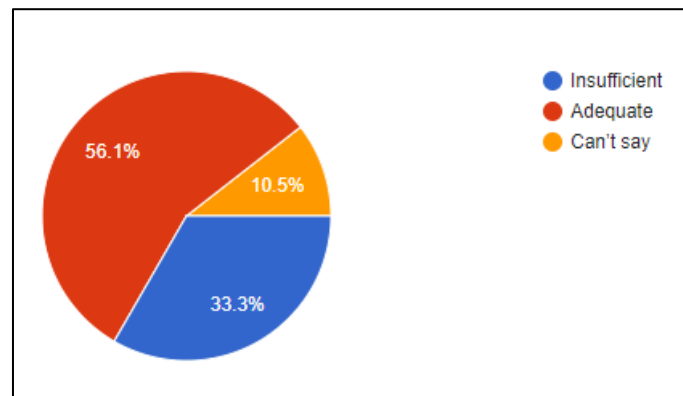
Figure 35: Technical Knowhow for Dealing MTCTE

C. Online portal readiness
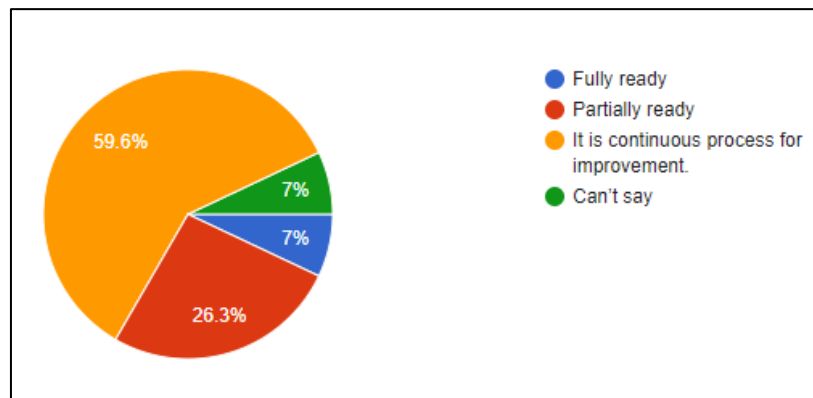
Figure 36: Online Portal Readiness

D. Manpower requirement for market surveillance via DOT field units
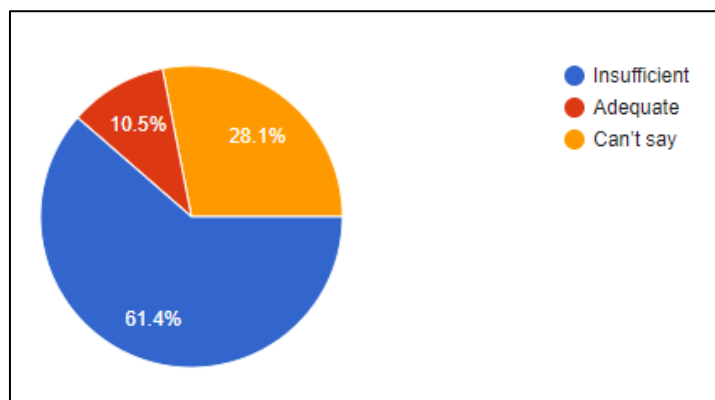
Figure 37: Manpower Requirement for Market Surveillance via DOT Field Units

E. Finance requirement for implementation of MTCTE.
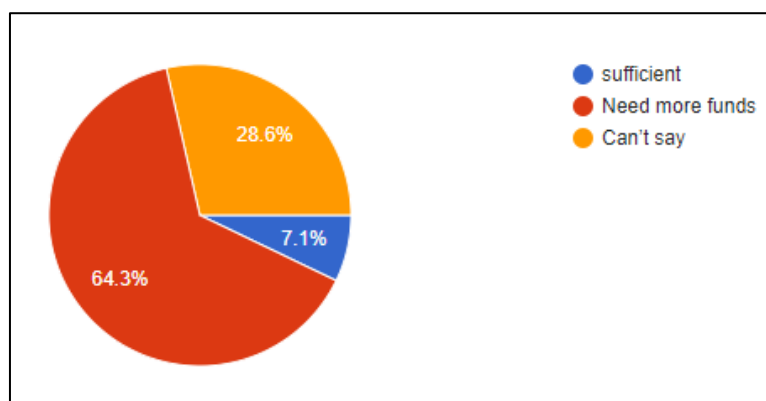
Figure 38: Finance Requirement for Implementation of MTCTE

Policy of Mandatory testing in India needs to be implemented. However, there are certain issues being faced. The opinion of the stakeholders have been summarized below.

- Paramount (56.4%) thinks that manpower is insufficient and 23.6% admit the sufficiency of manpower.

- Technical knowhow for dealing MTCTE is adequate. This is vetted by 56.1% people. Count on insufficient availability of Technical knowhow was 33.3%.

- Online portal readiness for implementing the policy of Mandatory testing in India is a continuous process for improvement as perceived by 59.6% people

where as some optimistic people (7%) feel that this online portal is ready. 26.3% have in their mind that online portal is partially ready.

- There is insufficient manpower for market surveillance via DOT field units ('LSA' Licensed Service Area) as per 61.4% of respondents. Many respondents (10.5%) are confident about the adequacy.

- Finance requirement for implementation of MTCTE is never being sufficient, more finds are required and this has been vouched by 64.3% respondents. Some people can manage the things with the available funds but this number is only 7.1%.

However, always there is a group of people who have no opinion of their own weather it is related to manpower availability (20%), technical know-how (10.5%), online portal readiness (7%), manpower for market surveillance via DOT field units (28.1%), finance requirement for implementation of MTCTE (28.6%).

Question 20

Do you think the provision in Indian Telegraph act and its amendments can adequately take care of legal framework required for MTCTE.
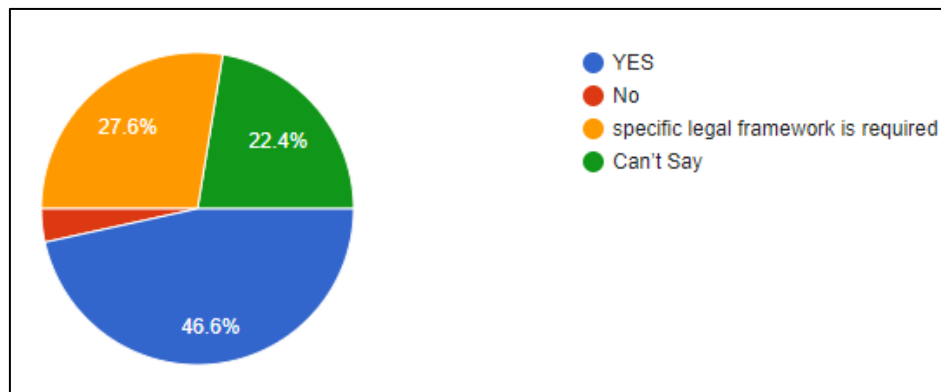
Figure 39: Opinion on Legal framework Required for MTCTE

The provision in Indian Telegraph act and its amendments can adequately take care of legal framework required for MTCTE. Almost half (46.6%) of the respondents are of this stance. There are persons (27.6%) who further believe that specific legal

framework is required. Irrespective of any clear cut answer, 22.4% have no opinion of their own. Not plentiful respondents (3.4%) think about inadequacy.

Question 21

Recommendation / comments for better implementation of MTCTE policy.

6.2.1 Stakeholders' Response Conclusion

In addition to the above, stakeholders viz. CABs, manufacturers, OEMs and regulator etc. have also been asked for suggestions on MTCTE policy implementation. Some of their views are summarized below.

6.2.1.1 Comments from experts and officers (n = 21) from Telecommunication Engineering Center (TEC)/ Department of Telecommunications (DoT)

1. Few are of the opinion; Essential Requirements may be reviewed in consultation with stakeholders to make it at par with other countries. MTCTE should be implemented for all Telecom Products in a phased manner on priority basis so that the Designated CABs have sufficient business in order to sustain their existence and also ensure smooth implementation of MTCTE. Close coordination with all Departments concerned should be ensured to avoid duplication of works and involvement of multiple agencies. Close coordination with stakeholders viz. CABs, manufacturers, OEMs etc. to ensure smooth and seamless implementation of MTCTE, Development of MTCTE Portal and provision of sufficient manpower/ infrastructure for

implementation/ surveillance of MTCTE. More number of Domestic CABs should be designated to ensure Atmanirbhar Bharat.

2. Web portal needs improvement, professional agencies to complete the automation including security module. Efficient organisation is required for design & development of web portal, automation testing, reports to be there on portal, structured ER leading to quality assurance for easy evaluation and reliability. Also, CAB designation process of TEC may be made online completely.

3. MRAs with other countries are not going through in our country. If it is bilateral, the test reports from other partner countries would be acceptable and vice versa. Therefore, a trust in Indian testing infrastructure needs to be built globally. Security requirements being an objective of MTCTE should be included on priority. In view of this, at least for the products whose ERs have been made, stress should be on developing Indian Telecom Security Assurance Requirements (ITSAR).

4. There should be emphasis on development of government labs on priority, with all facilities including deployment of sufficient skilled staff / manpower for MTCTE that need to be trained regularly. More funds for better infrastructure to be arranged. Better & adequate testing infrastructure can further accelerate the process of MTCTE.

5. In addition to the above feedback, there is a need for active involvement of DoT field units i.e Licensed Service Area (LSA) mainly for Surveillance and Enforcement. Legal frame work to support the policy should be prepared similar to licensing etc.

6.2.1.2 Comments from Testing Labs (CABs) and associated persons (n = 26)

1. They are of the view that India is equipped with the testing infrastructure. Therefore, major concern is the inclusion of more products and smooth designation of labs. Enforcement of Policy should be done with immediate effect in phased manner. Exemption in Interface protocol should be granted with Self declaration/Undertaking. Suggestions have been received to have a feedback from similar schemes of Government of India like Compulsory Registration Scheme (CRS) of BIS that is running successfully.

2. Some have emphasized on the formation of coordinating committee under the chairmanship of Government of India Senior Officer including Laboratory Association of India as Member. Also, they need Common mailing list via email aliases where all stakeholders from OEMs/Labs/TEC are subscribed to discuss real time testing issues.

3. Enforcement agency for effectiveness of MTCTE is needed to check the compliance of the products made in India and sold in India, in addition to imported products. Overlapping regulations with other ministries need

necessary action. Private labs need to be linked with Government Technical Nodal Agencies to ensure quality of test results.

4. ER's must define the test condition (test configuration of EUT) detail with clarity. ERs should be such that turnaround Time (TAT) for an applicant is < 15 days.

5. Government support is much needed in terms of different policies that would succour in surviving the testing agency and ROI. Emphasis should be on PPP model wherein government bodies could collaborate with private bodies to create infrastructure and take part in both testing and interest of ODM \OEM \assembler factory so that win-win condition for all and role model could be developed.

6. Majority need phases of MTCTE with more products launch on priority to sustain their business and in the benefit of nation.

7. There is a suggestion, more and more technical sessions may be organized for stake holders on regular interval for smooth implementation.

6.2.1.3 Comments from Manufacturer/importers/OEM representatives (n = 6):

1. Their Perspective is that every Indian state should have a MTCTE help desk along with Government scheme help desk as all these initiatives are there to

achieve common goal. These all should be under one roof so that manufacture can get help rather than contacting external agencies.

2. Accentuation is on acceptation of International Certification and testing. ER should be harmonized with International standards. Also, government need to revisit and review the MTCTE policy.

3. These stakeholders perceive that technical knowhow should be there for those implementing the policy. They have also concern regarding some products included in MTCTE like networking products etc. Transparency in whole process is the need of an hour.

6.2.1.4 Comments from OEM representative/Lab Representative/Association (n = 5)

1. In their opinion, there should be sufficient manpower to review the documents and reduce an overall time in issuance of the final TEC certificate and also to release all the important products under MTCTE that are being imported regularly from other countries like mobile phones, switches, gateways etc. This could also improve and increase the revenue for the Indian government.

2. More MTCTE labs, in particular Technical (interface, protocols, interoperability, RF) and Security Testing should be built. Also, decision

making process and implementation should be much faster else the industry and labs may loose interest and momentum.

3. Outlook is that every country faces backlash from industry when regulations are introduced whether it is GST or CE marking or MTCTE. Here government should come forward and need to do the right for its people and the country. Eventually, the lobbyists would disappear, and Industry would be busy adhering to the rules. These stakeholders are of the belief that MRA is needed as it is great when it is bilateral, and the standards are harmonised between the two countries. Retesting and certification is not only a huge cost burden on the manufacturer/reseller but also a tedious process that can cause delay in market launch. For such products that already have FCC/CE/RCM approvals and are identical to those exported to India, they must be verified for compliance by CBs (nominated experts) or regulator by review of existing test reports. Retesting in India should be avoided. However, for new products, testing in India for Global market should be encouraged.

4. It is also mentioned by them that government labs for surveillance is a good idea as it not only develops skills, understanding of their standards and regulations but also helps their designation team for CAB auditing.

5. The need of an hour is that MTCTE policy awareness should be there.

Chapter 7

7.   Conclusion and Recommendations

The outcome of the study reveals that Indian regulation is at par (towards better side) in terms of technical regulations i.e. Essential Requirements, testing infrastructure, process of designation of CABs with regards to the global perspective / best practices. Comprehensive analysis of comments of stakeholders manifested that, there are some concerns regarding more stringent Essential Requirements. Infrastructure adequacy was another gray area. It has been observed that present infrastructure is not adequate to test all the technical regulations for all products. However, Implementation of MTCTE policy in phased manner with present infrastructure is a ponderable step. There is an immediate need to focus on various issues and challenges including financial and infrastructure support, capacity building of the staff working for implementation of policy including stakeholders, awareness on MTCTE and its related rules and regulations for the end-users & stakeholders. Insistence is on need of well-defined ecosystem for Enforcement & Market surveillance supported with legal framework. The recommendations of research work are summed up below.

1. Mandatory Testing and Certification of Telecommunication Equipment (MTCTE) provides a framework of testing and certification to ensure safety of end-users, security of telecom networks as well as interoperability of the equipment. For such certification, model of telecom equipment has to undergo specified testing and compliances with relevant Essential Requirements (ERs). Plurality commented that these ERs met the objective of MTCTE policy and have been made after wide consultation and participation of stakeholders and are also similar to other countries

with minor differences. At the same time some respondents believe that these ERs as compared to the technical regulations of other advanced economies (EU, USA, Japan etc.) are stringent and difficult to comply. However, these ERs have been made through Mandatory Testing Consultation Forum (MATCOF) with wider participation and consultation of Stakeholders. Advocation is, to rule out stakeholders' concern, streamlining and easy understanding of the test parameters of Essential Requirement; a review committee should be there, to reconsider such ERs case basis in MATCOF again. ERs must be reviewed periodically considering rapid changes in technology and frequent consultation with market players deploying telecom products.

2. Exponential rise in testing infrastructure could be seen since launch of MTCTE i.e from 2017. Growth of quality test labs in India is a major win from MTCTE policy. This will attract many foreign manufactures to get their products tested in India for global certification too. However, creation of all state art of telecom testing facilities in India under one roof is a major concern for successful implementation of MTCTE policy. Establishment of Technical test labs require huge investment; return of investment and government policies are the main concerns. Reflection from preponderance is there in survey. To attract the private sector, it is recommended that such apprehension of test labs should be addressed frequently and periodically in consultation with high level committee, and the test labs should be the member to build confidence and trust in government policy. Further, government should come with a publication schedule of the telecom products to be covered in phases of MTCTE policy in advance and such timeline should be adhered strictly to invigorate test labs.

3. Use of PPP model can also bridge the gap between requirement of testing infrastructure and fulfilment of MTCTE policy objective. This would only be possible, in case both the sectors agree to come together and establish joint world class testing facilities under single roof. As an outcome of the survey, it has been perceived, majority (66%) of respondents are in agreement that PPP (public–private partnership or 3P) model should be promoted to create state of art testing facilities under one roof in India. It is possible in principle, however, it is a big challenge. The issue behind this is the lack of trust in government, essentially a regulator and the private companies would not like any control over their operations. Therefore, building trust and joint mechanism should be accentuated and PPP model should be promoted. Further, government need to explore all possibilities for MOUs between different departments, ministries and PSUs for sharing of knowledge by means of training, technical capabilities and testing infrastructure.

4. One of the most important opinion received during survey by more than 63 % respondents that there should be increase in MRA with foreign countries. At present, only one MRA with Singapore exists. India being one of the major telecom equipment importers in the world, MRA would eliminate the cost of re-testing and re-certification, and shorten time-to-market for partner countries' manufacturers and exporters of telecommunication equipment. Government needs to consider more MRA with foreign countries if it is bilateral and the telecom product standards are harmonised between the countries. Accordingly, if test reports of MRA partner country is acceptable in India, vice versa shall also be true. Therefore, a trust in

Indian testing infrastructure will be built globally and testing in India will be encouraged.

5. Conformity Assessment Body (CAB) Designation process in India as compared to other developed countries has been rated well defined and transparent as per survey. Two phases of MTCTE with some products has already been launched for certification and more are expected once testing infrastructure for remaining products are ready. Process of CAB designation to be made online to save more time, more transparency and to be integrated with existing MTCTE portal for efficient and effective use.

6. The main deciding factor to bring more telecom products in purview of MTCTE scheme is the testing infrastructure in view of present & potential demand and trained manpower. Launch of MTCTE scheme in a phased manner addresses most of the issues viz. manpower requirement, testing infrastructure availability / testing turnaround time and trade requirement etc. A remarkable number (85.4%) in survey has been received who agree that this step is one of the appreciable initiatives for successful implementation of MTCTE. However, slight sedation in such launches is also the main concern by test labs as they would not have sufficient business in order to sustain their existence. Therefore, this aspect needs an attention.

7. Regulatory overlap in some countries can inflict real cost on businesses through repetitive testing/inspections, and data collection efforts. In particular, this will be an additional load when agencies issue incongruent rules with inconsistent standards, agreed by most of the respondents. Countless studies show that excessive

regulation can reduce economic activity and discourage business investment. In view of this, there is a need to adopt a policy of evaluating all such instances of regulatory overlap framework, either identified by an agency or outside stakeholders. Interagency working groups (coordination committee) should be established and lead regulator be designated to achieve better coordination among regulatory agencies and to address that overlap efficiently and effectively.

8. The existence of non-compliant products exposes the citizens to potential dangerous products, place the environment at risk and distort the competition. The root cause is the limited knowledge of rules, low deterrence, and major inefficiencies in the enforcement systems. The problem is expected to increase due to growing e-commerce and imports from other countries. As per the sequel of survey, the role of market surveillance and enforcement is rated at the highest decent end (85.4%) for successful implementation of the MTCTE regulatory regime and for achievement of desired policy objectives. It has also been vetted in abundance during survey that there should be defined ecosystem with sufficient manpower with authorities for market surveillance and enforcement. It is recommended that there should be independent agency under DoT for more effectiveness and transparency for implementation of market surveillance and enforcement framework. This will work in coordination with MTCTE policy framing and certification unit, supported by custom and empowered by DoT field units (i.e. LSA). Reinforcing procedures and framework should be well defined, transparent and at par with global best practices. Coordination of activities is necessary to ensure consistent enforcement across the Nation and management of non-compliance efficiently.

9. The National Telecom Policy 2012 also provides creation of suitable testing infrastructure for carrying out conformance testing, certification and to aid in development of new products and services for MTCTE. Accordingly, TEC is establishing Government test-beds by setting up test and certification infrastructure, intended to primarily serve telecom equipment manufacturers, telecom operators, application & content providers, independent software developers and other stakeholders. After reviewing the response from survey it is suggested that government should come forward in fast manner for establishment of such more and more test-beds and should align with changing technology. These government labs shall be used for setting up test processes, procedures for standardizing the mandatory tests and developing the skills & understanding of standards and regulations. Further, government testing facilities not only supports Surveillance and Audit process but also help CAB Designation team in supervising private labs and hence their transparent & good quality test reports and results.

10. The provision in Indian Telegraph act and its amendments can adequately take care of legal framework required for above. This has been vetted by about half of the respondents during survey. However, market surveillance and enforcement is a major issue that is complex in the domain as far as internet domain is concerned. Therefore, it has become arduous to ensure fair competition, protection of health and safety of consumers and against businesses from unfair competition by those who ignore the rules. In addition to provision in Indian Telegraph act, provision of specific legal framework for stringent compliance may also be explored. This will also set the seal on the protection of other public interests such as the environment, security and fairness in trade. It includes actions such as the product withdrawals,

recalls and the application of sanctions to barricade the circulation of non-compliant products and/or bring them into compliance.

11. TEC is the authority responsible for implementation of MTCTE. At present, TEC is under the purview of DoT with limited powers for decision making. Since any policy decisions from the DoT will have to undergo a huge process that takes time, it is suggested that TEC should be reorganized and revamped with wide range of functions for specific concrete powers. It is of paramount importance that TEC administrator be empowered effectively in terms of administrative, financial powers along with decision making. Provision should be there for a) sufficient trained manpower for implementation of scheme and b) more funds for setting up government labs and digitization of scheme. The government also needs to conduct short term capacity building / skill up gradation   programs /technical sessions for better understanding of scheme, online portal operations, technical knowhow for implementation of scheme for all stakeholders including enforcement agencies.

12. Another big challenge is to disseminate the awareness about MTCTE policy of Government of India and hence, TEC mark on certified telecommunication products. As an outcome of the survey it has been observed that end-users, in general, are not aware about this. Open house sessions may be conducted to create awareness among the public to help them understand the benefits & advantages of certified products for end-users. Logo of TEC should be universalized and popularized among the people like ISO and ISI etc. With digital India project being implemented extravagantly, there will be an exponential an increase in the number of users of e-governance and e- commerce. Accordingly, it is in best interest of everyone that one

should understand such government initiatives for their benefit and help the government to counter unfair practices. The success of digital India would also depend upon on trusted and certified telecommunication products as emphasised in national telecom policies. Self-reliance in telecom products will ensure end-users safety and security of telecom networks.

Way forward

There is still a long way to go. The below studies may be taken up further on MTCTE.

✓ Public private partnership (PPP) model for MTCTE Ecosystem development.

✓ Market surveillance & enforcement policy and its implementation strategies.

✓ Return on investment (ROI)/ cost benefit approach for various activities undertaken by MTCTE.

✓ Study of policy need to be adopted for evaluation of regulatory overlap framework so that excessive regulation could be addressed effectively to increase economic activity and encourage business investment products.

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Detailed status of CABs designated by TEC[29]

S. No.	Lab Name	Testing Capability Details	ER Testing Type
1	AA Electro Magnetic Test Laboratory Pvt. Ltd. Gurugram	1. EMI/EMC Testing of Telecommunication Equipment	EMI/EMC
		2. Information Technology Equipment - Safety Requirement	Safety
		3. Uninterruptible Power System (UPS) - Safety Requirement	
		4. Audio/video, information and Communication Technology Equipment - Safety Requirement	
		5. Radio Conformance Testing for Equipment Operating in Frequency Band of 2.4 GHz, 5 Ghz and 5.8 GHz	Technical
2	AB MSAI Research Labs Private Limited New Delhi	1. Information Technology Equipment - Safety Requirement	Safety
		2. Secondary Cells and Batteries containing Alkaline or other Non-Acid Electrolytes (Lithium System) - Safety Requirement	
		3. Safety Testing for instruments	
		4. Mobile Phone Handsets	Technical
		5. Environmental Testing of Telecom Equipment	Other (Env)
3	Accurate Test Solutions Noida	1. Information Technology Equipment - Safety Requirement	Safety
		2. Uninterruptible Power System (UPS) - Safety Requirement	
		3. Indian Language Support for Mobile Phone Handsets - Safety Requirement	Technical
4	Aforeserve Labs Pvt. Ltd. Noida	1. Information Technology Equipment - Safety Requirement	Safety
		2. Uninterruptible Power System (UPS) - Safety Requirement	
		3. Environmental Testing of Telecom Equipment	Other (Env)
5	Alpha Test House New Delhi (Unit-4)	1. Information Technology Equipment - Safety Requirement	Safety

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[29] Data taken from TEC website, Available at https://www.tec.gov.in/list-of-cabs-designated-by-india/ (As per TEC website dated 23-02-2021)

S. No.	Lab Name	Testing Capability Details	ER Testing Type
		2. Uninterruptible Power System (UPS) - Safety Requirement	
6	Amit Test and Calibration Centre Delhi (Unit-2)	1. Information Technology Equipment - Safety Requirement	Safety
		2. Uninterruptible Power System (UPS) - Safety Requirement	
7	Bharat Electronics Limited (BEL) EMC Test Centre Quality Assurance Division Bengaluru	EMI/EMC Testing of Telecommunication Equipment	EMI/EMC
8	Bharti Automation Pvt. Ltd. Gurugram	1. Information Technology Equipment - Safety Requirement	Safety
		2. Environmental Testing of Telecom Equipment	Other (Env)
9	BNNSPEAG Test & Calibration Laboratory (I) India Pvt. Ltd. Ghaziabad	SAR (Specific Absorption Rate) Testing Requirement: Used in Close Proximity to Head	Other (SAR)
10	Classic Instrumentation Pvt. Ltd. Noida	Information Technology Equipment - Safety Requirement	Safety
11	Compliance International Telecom Laboratories Delhi	1. PABX for Network Connectivity	Technical
		2. Interface Requirement for Interchange of Digital Signals at 2, 8, 34, 45 & 140 Mbps Ports	Technical
		3. Interface Requirement for Interchange of STM-1, STM-4, STM-16, STM-64 and STM-256 Signals between different networks	Technical
12	Conformity Testing Labs Pvt. Ltd. New Delhi (Unit-1)	1. Information Technology Equipment - Safety Requirement	Safety
		2. Uninterruptible Power System (UPS) - Safety Requirement	
		3. Secondary Cells and Batteries containing Alkaline or other Non-Acid Electrolytes - Safety Requirement	
		4. Environmental Testing of Telecom Equipment	Other (Env)
13	Conformity Testing Labs Pvt. Ltd. New Delhi (Unit-2)	1. EMI/EMC Testing of Telecommunication Equipment	EMI/EMC
		2. Information Technology Equipment - Safety Requirement	Safety

S. No.	Lab Name	Testing Capability Details	ER Testing Type
		3. Uninterruptible Power System (UPS) - Safety Requirement	
		4. Secondary Cells and Batteries containing Alkaline or other Non-Acid Electrolytes - Safety Requirement	
		5. Environmental Testing of Telecom Equipment	Other (Env)
14	CSA India Private Limited Bengaluru	Information Technology Equipment - Safety Requirement	Safety
15	M/s Criterion Network Labs, Bengaluru	1. Router (IPv4, IPv6, MPLS, BNG/BRAS Router)	Technical
		2. IP Security Equipment (UTM, IPS, IDS, Firewall Equipment)	
		3. PON Family of Broadband Equipment (ONT, ONU, OLT)	
		4. LAN Switch	
16	Delhi Test House Delhi	1. Information Technology Equipment - Safety Requirement	Safety
		2. Uninterruptible Power System (UPS) - Safety Requirement	
		3. Environmental Testing of Telecom Equipment	Other (Env)
17	ECIL EMI EMC Test Facility Hyderabad	1. EMI/EMC Testing of Telecommunication Equipment	EMI/EMC
18	Electrical Research and Development Association (ERDA) Vadodara	1. EMI/EMC Testing of Telecommunication Equipment	EMI/EMC
		2. Information Technology Equipment - Safety Requirement	Safety
		3. Environmental Testing of Telecom Equipment	Other (Env)
19	Electronics Regional Test Laboratory ([ERTL (E)] Kolkata	1. EMI/EMC Testing of Telecommunication Equipment	EMI/EMC
		2. Information Technology Equipment - Safety Requirement	Safety
		3. Environmental Testing of Telecom Equipment	Other (Env)
20	Electronics Regional Test Laboratory (North) [ERTL (N)] New Delhi	1. EMI/EMC Testing of Telecommunication Equipment	EMI/EMC

S. No.	Lab Name	Testing Capability Details	ER Testing Type
		2. Information Technology Equipment - Safety Requirement	Safety
		3. Uninterruptible Power System (UPS) - Safety Requirement	
		4. Environmental Testing of Telecom Equipment	Other (Env)
21	Electronics Regional Test Laboratory (West) [ERTL (W)] Mumbai	1. EMI/EMC Testing of Telecommunication Equipment	EMI/EMC
		2. Information Technology Equipment - Safety Requirement	Safety
		3. Environmental Testing of Telecom Equipment	Other (Env)
22	Electronics Test And Development Centre (ETDC) Bengaluru	1. EMI/EMC Testing of Telecommunication Equipment	EMI/EMC
		2. Information Technology Equipment - Safety Requirement	Safety
		3. Environmental Testing of Telecom Equipment	Other (Env)
23	Electronics Test And Development Centre (ETDC) Mohali	1. EMI/EMC Testing of Telecommunication Equipment	EMI/EMC
		2. Information Technology Equipment - Safety Requirement	Safety
		3. Uninterruptible Power System (UPS) - Safety Requirement	
		4. Environmental Testing of Telecom Equipment	Other (Env)
24	EMC Testing and Compliance LLP Gurugram	1. Information Technology Equipment - Safety Requirement	Safety
		2. EMI/EMC Testing of Telecommunication Equipment	EMI/EMC
		3. Uninterruptible Power System (UPS) - Safety Requirement	Safety
		4. Secondary Cells and Batteries containing Alkaline or other Non-Acid Electrolytes - Safety Requirement	
25	EMTAC Laboratories Pvt. Ltd. Hyderabad	Information Technology Equipment - Safety Requirement	Safety
26	M/s Electronics Test and Development Centre (ETDC), Pune	1. EMI/EMC Testing of Telecom Equipment	EMI/EMC
		2. Environmental Testing for Telecom Equipment	Other (Env)

S. No.	Lab Name	Testing Capability Details	ER Testing Type
27	Hi Physix Laboratory India Pvt. Ltd. Pune	1. Information Technology Equipment - Safety Requirement	Safety
		2. Secondary Cells and Batteries containing Alkaline or other Non-Acid Electrolytes (Lithium System) - Safety Requirement	
		3. Tubular Valve Regulated Lead Acid (VRLA) Batteries based on Gel Technology	
		4. Valve Regulated Lead Acid Batteries (VRLA)	
28	IIT Madras Central Electronics Centre Chennai	Information Technology Equipment - Safety Requirement	Safety
29	Institute for Design of Electrical Measuring Instruments (IDEMI) Mumbai	1. EMI/EMC Testing of Telecommunication Equipment	EMI/EMC
		2. Information Technology Equipment - Safety Requirement	Safety
		3. Electrical Equipment of Measurement, Control and Laboratory Use - Safety Requirement	
30	Institute of Testing and Certification India Pvt. Ltd. Mohali	1. Information Technology Equipment - Safety Requirement	Safety
		2. Uninterruptible Power System (UPS) - Safety Requirement	
31	International Centre for Automotive Technology (ICAT) Sector 3 Manesar (Centre-1)	1. Information Technology Equipment - Safety Requirement	Safety
		2. Uninterruptible Power System (UPS) - Safety Requirement	
		3. Secondary Cells and Batteries containing Alkaline or other Non-Acid Electrolytes (Lithium System) - Safety Requirement	
		4. Environmental Testing of Telecom Equipment	Other (Env)
32	International Centre for Automotive Technology (ICAT) Manesar (Centre-2)	1. EMI/EMC Testing of Telecommunication Equipment	EMI/EMC
33	Intertek India Pvt. Ltd. New Delhi	Information Technology Equipment - Safety Requirement	Safety
34	K C India Test laboratories LLP Ghaziabad	Information Technology Equipment - Safety Requirement	Safety

S. No.	Lab Name	Testing Capability Details	ER Testing Type
35	Kailtech Test and Research Centre Pvt. Ltd. Indore	1. Information Technology Equipment - Safety Requirement	Safety
		2. Uninterruptible Power System (UPS) - Safety Requirement	
		3. Secondary Cells and Batteries containing Alkaline or other Non-Acid Electrolytes (Lithium System) - Safety Requirement	
36	Matrix Test Labs Delhi	1. Information Technology Equipment - Safety Requirement	Safety
		2. Uninterruptible Power System (UPS) - Safety Requirement	Other (Env)
		3. Secondary Cells and Batteries containing Alkaline or other Non-Acid Electrolytes - Safety Requirement	
		4. Environmental Testing of Telecom Equipment	
37	M/s National Research & Technology Consortium, HPCED Building, Deptt of Industries Complex, Sector-1, Parwanoo-173220 (HP)	1. Information Technology Equipment – Safety Requirements	Safety
		2. Uninterruptible Power Systems (UPS) part 1 General and Safety requirements for UPS	
38	Nemko India Test Lab Pvt. Ltd. Faridabad	Information Technology Equipment - Safety Requirement	Safety
39	React Laboratories Bengaluru	Information Technology Equipment - Safety Requirement	Safety
40	Reliable Analytical Laboratories Pvt. Ltd. Thane	Information Technology Equipment - Safety Requirement	Safety
41	SAMEER - Centre for Electromagnetics Chennai	EMI/EMC Testing of Telecommunication Equipment	EMI/EMC
42	SAMEER Kolkata Centre, Ministry of Electronics and Information Technology, Government of India	EMI/EMC Testing of Telecommunication Equipment	EMI/EMC
43	SAMEER - Centre for Microwave Research, EMC Division, Mumbai	1. EMI/EMC Testing of Telecommunication Equipment	EMI/EMC
		2. Information Technology Equipment - Safety Requirement	Safety
44	SGS India Pvt. Ltd. Bengaluru	Information Technology Equipment - Safety Requirement	Safety

S. No.	Lab Name	Testing Capability Details	ER Testing Type
45	SPECTRO Analytical Labs Limited Greater Noida	1. Information Technology Equipment - Safety Requirement	Safety
		2. Uninterruptible Power System (UPS) - Safety Requirement	
		3. Secondary Cells and Batteries containing Alkaline or other Non-Acid Electrolytes (Lithium Cell) - Safety Requirement	
46	Sunren Telecom Laboratory Mumbai	1. PABX for Network Connectivity	Technical
		2. Interface Requirement for Interchange of Digital Signals at 2, 8, 34 & 140 Mbps Ports	Technical
		3. Interface Requirement for Interchange of STM-1, STM-4, STM-16, STM-64 and STM-256 Signals between different networks	Technical
		4. Point of Sales (POS) Terminal with PSTN/ CDMA/ GSM/ GPRS (only against PSTN interface)	Technical
		5. V.90 Modem	Technical
		6. Terminals for Connecting to PSTN	Technical
		7. Group 3 FAX Machine/Card	Technical
47	Tarang Lab (Wipro) Bengaluru	1. EMI/EMC Testing of Telecommunication Equipment	EMI/EMC
		2. Information Technology Equipment - Safety Requirement	Safety
48	The Tata Power Company Limited Strategic Engineering Division Bengaluru	EMI/EMC Testing of Telecommunication Equipment	EMI/EMC
49	The Automotive Research Association of India (ARAI) Pune	EMI/EMC Testing of Telecommunication Equipment	EMI/EMC
50	TUV India Pvt. Ltd. Pune	1. EMI/EMC Testing of Telecommunication Equipment	EMI/EMC
		2. Information Technology Equipment - Safety Requirement	Safety
		3. Uninterruptible Power System (UPS) - Safety Requirement	
51	TUV Rheinland (India) Pvt. Ltd. Bengaluru (Unit-1)	1. Information Technology Equipment - Safety Requirement	Safety
		2. New Standard on Radio Devices in Unlicensed Band (2.4 GHz)	Technical
		3. SAR (Specific Absorption Rate) Measurement System	Other (SAR)

S. No.	Lab Name	Testing Capability Details	ER Testing Type
		4. Environmental Testing of Telecom Equipment	Other (Env)
52	TUV Rheinland (India) Pvt. Ltd. Bengaluru (Unit-2)	1. EMI/EMC Testing of Telecommunication Equipment	EMI/EMC
		2. Radio Conformance Testing for Equipment Operating in Frequency Band of 2.4 GHz and 5 GHz	Technical
53	TUV Rheinland (India) Pvt. Ltd. Gurugram	1. Information Technology Equipment - Safety Requirement	Safety
		2. Environmental Testing of Telecom Equipment	Other (Env)
54	TUV SUD South Asia Pvt. Ltd. Bengaluru	1. EMI/EMC Testing of Telecommunication Equipment	EMI/EMC
		2. Information Technology Equipment - Safety Requirement	Safety
55	U L India Pvt. Ltd. Bengaluru (Unit-1)	1. EMI/EMC Testing of Telecommunication Equipment	EMI/EMC
		2. Information Technology Equipment - Safety Requirement	Safety
56	U L India Pvt. Ltd. Bengaluru (Unit-2)	1. SAR Testing Requirement - Used in Close Proximity to Head	Other (SAR)
		2. SAR Testing Requirement - Used in Close Proximity to Body	
		3. EMI/EMC Testing of Telecommunication Equipment	EMI/EMC
		4. Radio Conformance Testing for Equipment Operating in Frequency Band of 2.4 GHz, 5 GHz and 5.8 GHz	Technical
57	U L India Pvt. Ltd. Gurugram	Information Technology Equipment - Safety Requirement	Safety
58	U R S Products and Testing Pvt. Ltd. Noida	1. Information Technology Equipment - Safety Requirement	Safety
		2. Secondary Cells and Batteries containing Alkaline or other Non-Acid Electrolytes (Lithium System) - Safety Requirement	
59	Yadav Measurements Pvt. Ltd. Udaipur	1. EMI/EMC Testing of Telecommunication Equipment	EMI/EMC
		2. Information Technology Equipment - Safety Requirement	Safety

Questionnaire on MTCTE (Users' views)

<u>Name (optional)</u>

Question 1

Are you aware that telecommunication products like mobile phones, Wi-Fi modem, mobile batteries and smart watches etc. may not be safe to use and may interfere with functioning of other electronic devices if these telecommunication products do not comply to the specified standards?

    O Yes   O No   O Can't say

Question 2

Do you know that that telecommunication products like mobile phones, Wi-Fi modem, mobile batteries and smart watches etc. emit electromagnetic radiations which may be harmful to humans if such radiations from these devices are not within the permissible limits?

    O Yes   O No   O Can't say

Question 3

Are you aware that there are Govt. norms which prescribe the permissible limit of electromagnetic radiations from such telecom and communication products?

    O Yes   O No   O Can't say

Question 4

Have you heard the names Specific Absorption Rate (SAR), Electromagnetic Frequencies (EMF) radiation limits for the telecom products?

O Yes   O No   O Can't say

Question 5

Do you think that there should be a comprehensive regulation for all telecom products to comply to norms of EMF radiation, safety, security as well as technical aspects of the device ensuring proper functionality of these devices?

O Yes   O No   O Can't say

Question 6

Have you heard about the organization named 'TEC' Telecommunication Engineering Centre a unit of Department of Telecommunications under Ministry of Communication, Govt. of India?

O Yes   O No

Question 7

Have you come across the term 'MTCTE' Mandatory Testing and Certification of Telecommunication Equipment policy? As per this policy, each telecom equipment must undergo mandatory testing and certification before its use, sale or import in India.

O Yes   O No

Question 8

Have you heard term 'Accreditation', Accreditation is third party attestation of the competency of the labs to carry out specific conformity assessment tasks of products w.r.t. prescribed Standards/Specifications?

O   Yes   O   No

Question 9

Have you heard about the organization 'NABL' National accreditation board for testing and calibration laboratory that is responsible for accreditation of testing Laboratories in India?

O   Yes   O   No

Question 10

Authorized certification conforms that product is safe to use viz. Hallmark for purity of gold, FSSAI mark on food products and BIS certification on electrical & electronics appliances. Similarly, TEC logo will be put on certified telecommunication products. Are you in agreement with this government initiative to provide mark of conformity (certified Product) on telecom products.

O   Yes   O   No

Question 11

As per your opinion, whether MTCTE policy of Govt. of India for TEC mark on products could sufficiently address the safety and security etc. of users especially in view of exponential rise in Digital devices in Digital India era.

   O Yes   O No

Question 12

Our telecom products and telecom network are some or the other way safe & secure as compared to developed countries like USA, Australia and European countries etc. What is your opinion about our products with regards to this comparison?

  O Less   O At par with other countries   O Better   O Can't say

Question 13

How will you rate Govt initiative of MTCTE for telecommunication products?

    (please rate between 1 to 5, whereas 1 is less appreciable and 5 is highly appreciable)

  O 1   O 2   O 3   O 4   O 5

Question 14

Comments, if any (optional)

Questionnaire on MTCTE policy (Stakeholders' views)

Name (optional):

Organization:

Designation:

Question 1

Have you ever been directly or indirectly associated with the preparation of Essential

Requirements (ERs) against which telecom product testing and certification is being /

to be done?

O   Yes   O   No

Question 2

Do you agree that Essential Requirements have been made after wide consultation and

participation of stakeholders?

O   Yes, fully agree   O   Yes, partially agree   O   Can't say

O   No, partially disagree   O   No, totally disagree

Question 3

Do you think that ERs meet the objective of MTCTE policy?

O   Yes, fully agree   O   Yes, partially agree   O   Can't say

O   No, partially disagree   O   No. totally disagree

Question 4

How do you compare ERs of MTCTE regulation with ERs as part of technical regulations in other advanced economies (EU, USA, Japan etc.)-?

O Exactly similar   O Similar with minor differences   O Can't be compared

O Mostly different with some   O Very much different
    similarities

Question 5

In terms of regulatory compliance requirement imposed on OEM's/importers of telecom products through MTCTE ERs, how do you rate MTCTE ERs with ERs as part of technical regulations in other advanced economies (EU, USA, Japan etc.)-?

(please rate between 1 to 5, where 1 is lenient and easy to comply and 5 being stringent and difficult to comply)

O 1   O 2   O 3   O 4   O 5

Question 6

What do you think about the present testing infrastructure /facilities with regards to MTCTE policy?

O Inadequate   O Adequate   O Can't say

Question 7

To create all state art of telecom testing facilities in India which of the below mentioned factors are more important.

O Trained manpower   O Investment   O Return on investment

O All state of art testing facilities under one roof is requirement of Manufacturers

O   Government Policies   O   All of the above

Question 8

Do you agree that PPP (public–private partnership or 3P) model should be promoted to create state of art testing facilities under one roof in India.

O Disagree   O Neutral   O Agree   O Strongly agree

Question 9

Rate the process of TEC Conformity Assessment Body(CAB) Designation as compared to other developed countries.

(please rate 1 to 5, where is 1 is need improvement and 5 is well defined and transparent)

O 1   O 2   O 3   O 4   O 5

Question 10

India is one of the major telecom equipment importers in the world. MRA (Mutual recognition agreement) eliminates the cost of re-testing, re-certification, and shorten the time-to-market for partner countries' manufacturers and exporters. Presently only one MRA with Singapore is there. In view of this, do you agree there should be more and more MRA with foreign countries.

O   Yes   O   No   O   Can't say

Question 11

Do you agree that there should be more Govt owned testing Labs for Audit purpose/market surveillance and to control market testing price?

O Yes   O No   O Can't say

Question 12

How will you rate Indian testing facility as compared to the developed countries testing facilities?

(please rate between 1 to 5, whereas 1 is needs improvement and 5 is Adequate)

O 1   O 2   O 3   O 4   O 5

Question 13

How will you rate MTCTE scheme Govt. of India as compared to developed countries such schemes for telecom products?

(please rate between 1 to 5, whereas 1 is less appreciable and 5 is highly appreciable)

O 1   O 2   O 3   O 4   O 5

Question 14

Regulatory overlap in same country can inflict real costs on businesses through repetitive testing/inspections and data collection efforts and is particularly more burdensome when agencies issue conflicting rules with inconsistent standards. Do you think there should be coordination committee and nodal agency to resolve this issue?

O Yes   O No   O Can't say

Question 15

Surveillance and enforcement is another key aspect for successful implementation of the MTCTE regulatory regime and for achievement of desired policy objectives. What do you think about the role of Surveillance and Enforcement in achieving desired policy objectives?

O   Has very much role   O   Has Moderate role   O   Can't say   O   Has No role

Question 16

Conformity assessment procedures are one of the key aspect for global trade. Do you think it is creating unnecessary obstacles to international trade?

O   Yes   O   No   O   Can't say

Question 17

Compliance with international technical regulations and standards involves significant costs for testing and certification for producers and exporters. What you think about it?

O   It is essential for interoperability
O   It is essential to fulfill the country specific requirements viz. environment, local condition etc.
O   Harmonization of countries standard can minimize the costs.
O   All of the above   O   Can't say

Question 18

Launch of MTCTE scheme in a phased manner addresses most of the issues viz. manpower requirement, testing infrastructure availability / testing turnaround time and trade requirement etc. Do you agree that this step is one of the appreciable initiatives for successful implementation of MTCTE?

O Disagree   O Neutral   O Agree   O Strongly agree

Question 19

Please tick one of the following w.r.t challenges and issues in implementing the policy of Mandatory testing in India? (if relevant to you)

A. Manpower requirement for handling MTCTE implementation

   O Insufficient   O Adequate   O Can't say

B. Technical knowhow for dealing MTCTE

   O Insufficient   O Adequate   O Can't say

C. Online portal readiness

   O Fully ready   O Partially ready   O Can't say
   O It is continuous process for improvement

D. Manpower requirement for market surveillance via DOT field units

   O Insufficient   O Adequate   O Can't say

E. Finance requirement for implementation of MTCTE

   O Sufficient   O Need more funds   O Can't say

Question 20

Do you think the provision in Indian Telegraph act and its amendments can adequately take care of legal framework required for MTCTE.

O   Yes   O   No   O   Can't say

O   specific legal framework is required

Question 21

Recommendation / comments for better implementation of MTCTE policy.

The Indian Telegraph (Amendment) Rules, 2017

GOVERNMENT OF INDIA

MINISTRY OF COMMUNICATIONS

(Department of Telecommunications)
NOTIFICATION

New Delhi, Wednesday, September 5, 2017

G.S.R. 1131(E). In exercise of the powers conferred by section 7 of the Indian Telegraph Act, 1885(13 of 1885), the Central Government hereby makes the following rules further to amend the Indian Telegraph Rules, 1951, namely: -

1. (1) These rules may be called the Indian Telegraph (Amendment) Rules, 2017.
    (2) They shall come into force on 1st October, 2018.

2. In the Indian Telegraph Rules, 1951, after PART X and the entities relating there to, the following shall be inserted, namely :-

PART XI

TESTING AND CERTIFICATION OF TELEGRAPH

528. Definitions:-

 Testing and certification of telegraph - in this part, unless the context otherwise requires, -

"Original Equipment Manufacturer" means a manufacturer of telegraph under whose brand the telegraph is sold or proposed to be sold.

529. Mandatory Testing- Any telegraph which is used or capable of being used with any telegraph established, maintained or worked under the licence granted by the Central

Government in accordance with the provisions of section 4 of the Indian telegraph Act, 1885 (hereinafter referred to as the said Act), shall have to undergo prior mandatory testing and certification in respect of parameters as determined by the telegraph authority from time to time:

Provided that the telegraph imported for the purpose of research and development or demonstration in India or as sample for mandatory testing or personally accompanied on inward foreign travel to India which is for personal use in India and not prohibited to be imported or used under the said Act or any other law for the time being in force, may be exempted by an order issued in this regard by the telegraph authority from time to time, from the requirement of mandatory testing:

Provided further that the telegraph authority may by notification in the Official Gazette exempt certain category or categories of telegraph except those specified in the proviso from such mandatory testing.

530. Authority for testing- (1) The testing shall be carried out by the telegraph authority or any other agency designated by the telegraph authority.

(2) The fee charged for testing carried out by the telegraph authority from the person who offers the telegraph for testing shall not exceed rupees fifty lakhs as specified by notification and the telegraph authority after compliance of the parameters set forth both for testing and certification shall issue a test certificate for the telegraph, as per the procedures prescribed by the telegraph authority.

(3) The validity of the test certificate shall be as specified in the certificate and the certificate may be renewed   on payment of prescribed fee, after following the prescribed procedures.

531. Responsibility for mandatory testing :- It shall be the responsibility of the Original Equipment Manufacturer in India for getting the mandatory testing and certification done before sale of equipment in India and to print the details of telegraph as prescribed by the telegraph authority such as specification, warning and certificate number and its validity on the outside body of the telegraph.

532. Responsibility of importer for testing:- It shall be the responsibility of the person importing telegraph for sale in India or the foreign Original Equipment Manufacturer to offer the telegraph for testing and certification by the telegraph authority or its designated body before sale.

533. Responsibility of foreign original equipment manufacturer:- The foreign Original Equipment Manufacturer shall not dispatch any quantity of the telegraph for sale in India after expiry of the validity of the test certificate.

534. Recertification: - When a telegraph has been certified, the dealer or distributor or agency of the Indian or foreign Original Equipment Manufacturer shall not be required to get the telegraph certified again provided that the model or brand of such

telegraph is not different in any manner from the one which has been certified and shall carry details of certification on the body of the telegraph as prescribed by the telegraph authority.

535. Bar on sale of uncertified telegraph:- No person shall sell any telegraph in respect of which mandatory certification is required by the telegraph authority or any designated agency, referred to in rule 530, unless it is certified by such authority or agency.

536. Removal of uncertified telegraph: - (1) Any person licensed or permitted to establish, maintain or work a telegraph under the said Act shall, on detection of use of uncertified telegraph by a user, ensure its removal by the user or, in case of his failure in such removal, withdrawal of service or connectivity to network within seven days of its detection and all such cases shall be brought to the notice of the telegraph authority in each week.

(2) No telegraph in respect of which mandatory certification is required, shall be used by the licensee in its network unless it is certified.

537.(1) Contravention and notices: - If any person contravenes the provisions of this Part, in respect of any telegraph, the telegraph authority may,

(i) issue notice to the person who contravenes the provisions of law pertaining to conditions of license or permission granted under section 4 of the Act,

(ii) take action in accordance with the terms and conditions of the licence or permission, if uncertified telegraph is used by the person so licensed or permitted, or if such person fails to get uncertified telegraph removed from the users of his network or service;

(iii) take custody of such telegraph and order to destroy the telegraph whether imported or of Indian origin, if the person i.e. the importer or the Original Equipment Manufacturer in case of indigenous item is unable to get the mandatory certification done within one hundred and eighty days from the date of issue of notice of violation;

(2) The person referred to in sub-rule(1) may be permitted to apply for Certification to the telegraph authority for such telegraph on payment of ten times of prescribed fee and the telegraph authority after observing the procedures as specified may issue the Certificate.

[F.No.3-1/2011-PHP(Pt.)]

(Amit Yadav)
Joint Secretary (A)

Procedure for Mandatory Testing & Certification of

Telecommunication Equipment

परीक्षण और प्रमाणन प्रक्रिया

सं0: टीईसी/एमपी/डीडी/टीसीपी-711/02/अक्तूबर18

TESTING & CERTIFICATION PROCEDURE

No.: TEC/MP/DD/TCP-711/02.Oct18

दूरसंचार उपकरणों का अनिवार्य परीक्षण और प्रमाणन प्रक्रिया

संस्करण-2.0

PROCEDURE FOR MANDATORY TESTING & CERTIFICATION OF TELECOMMUNICATION EQUIPMENT

VERSION-2.0

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भारत सरकार

दूरसंचार अभियांत्रिकी केंद्र

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GOVERNMENT OF INDIA

TELECOMMUNICATION ENGINEERING CENTRE

KHURSHID LAL BHAWAN, JANPATH, NEW DELHI – 110001

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FOREWORD

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

- Issue of Generic Requirements (GR), Interface Requirements (IR), 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 Centres (RTECs) have been established which are located at New Delhi, Bangalore, Mumbai, and Kolkata.

With the notification of Indian Telegraph (Amendment) Rules 2017 enabling mandatory testing and certification of telecom equipment (MTCTE), TEC has been designated as the Telegraph Authority for the purpose of administration of MTCTE procedure and Surveillance Procedure, and for formulation of Essential Requirements under MTCTE.

This document prescribes the procedure for mandatory testing and certification of telecom equipment.

CONTENTS

HISTORY SHEET

S. No.	Document No.	Description	Remarks
1.	-	Draft MTCTE Procedure	Withdrawn
2.	TEC/MP/DD/TCP-711/02/Oct18	MTCTE Procedure V2.0	Current

SECTION – I
MTCTE SCHEME

1.0   SHORT TITLE AND COMMENCEMENT

1.1   This document may be called the 'Procedure for Mandatory Testing and Certification of Telecommunication Equipment (MTCTE)'.

1.2   These procedures would be applicable for all telecommunication equipment and shall come into force on the 1st of October, 2018.

1.3   The Indian Telegraph Rules, 1951, PART XI, Testing & Certification of Telegraph, (Rule 528 to 537) provide that every telecom equipment must undergo prior mandatory testing and certification. This document describes the procedure and related framework for implementation of mandatory testing and certification.

2.0   DEFINITIONS

2.1   In this document, unless there is something repugnant in the subject or context, -

i.   'Act' means Indian Telegraph Act 1885.

ii.   'Applicant' means a company or firm incorporated in India, which may be indigenous Original Equipment Manufacturer (OEM) or a brand owner, or, in case of imported equipment, an importer or an Indian representative of foreign OEM, duly authorized by Foreign OEM.

iii.   'Appropriate Authority' means an officer not below the rank of Assistant Director General of Department of Telecommunications or its subordinate or attached offices authorized by the Telegraph Authority.

iv. 'Associated model' means model of a telecom equipment formed by using chassis/ motherboard and cards/ access ports of another tested and certified model, using the same chassis/ motherboard and a larger superset of cards/ access ports.

v. 'Authorized Indian representative (AIR) means a company or firm incorporated in India, which, in case of imported equipment, has been duly authorized by Foreign OEM to carry out all obligations required under MTCTE in respect of the imported equipment.

vi. 'BoM' means Bill of Material, and is a file containing details of all major modules/ components of the model being offered for testing. In case of application for certification of multiple models, the BoM shall include such details of all models.

vii. 'Certification' means that model of telecom equipment has undergone specified testing and complies with relevant Essential Requirements; such equipment model will be called 'Certified Equipment', and the document conveying the certification will be called the 'Certificate'.

viii. 'Certification Label' means a mark/ label to be put by manufacturer, after the model of the equipment is certified by TEC.

ix. 'Designated Conformance Assessment Body' or 'Conformance Assessment Body (CAB)' means a test laboratory designated by TEC for testing of telecom equipment against specified Essential Requirements.

x. 'Essential Requirements' means set of parameters/ standards/ requirements/ specifications etc. specified by TEC which are to be complied for seeking certification.

xi. 'Family' means collection of all modules and chases which can be used interchangeably in different combinations to achieve different hardware

configurations meeting different site requirements, which are certified as a whole under MTCTE.

xii. 'HSE' means Highly Specialized Equipment, and refers to those telecom equipment, which have specialized power, cooling, storage or handling requirements, and limited import/ sale.

xiii. 'Mandatory Testing & Certification' means testing and certification of telecom equipment as per the procedure described in this document.

x. 'Model' means a particular hardware design or version of a product/ equipment bearing a unique model number assigned to the equipment. An equipment, which is different in either of hardware / design / model / version, shall be treated as a different model.

xi. 'Mutual Recognition Agreement/Arrangement (MRA)' means an agreement through which two countries give recognition to Certifying Bodies and CABs in respective countries.

xii. 'Prescribed Fee' is the fee charged for granting certification and may include Administrative Fee, Test Result Evaluation Fee, Certification Fee, Certificate Modification Fee etc.

xiii. 'Provisional Certification' means that model of telecom equipment has undergone specified testing but does not comply with some parts of relevant Essential Requirements; such equipment model will be called 'Provisionally Certified Equipment', and the document conveying the certification will be called the 'Provisional Certificate'.

xiv. 'RTEC' means Regional offices of TEC, which shall also carry out testing as designated CABs. RTEC, as a designated CAB, may also test the telecom equipment at a location other than itself, if the test facilities are not available in RTEC.

xv. 'Rule' means The Indian Telegraph Rules 1951 and its amendments.

xvi. 'Security Wing' means the unit of Department of Telecommunications handling matters related to testing and certification relating to security aspects of telecom equipment/ networks.

xvii. 'TEC' means the Telecommunication Engineering Centre, New Delhi, under Department of Telecommunications (DoT), which, inter alia, is the Telegraph Authority for the purpose of Testing and Certification.

xviii. 'Technical Regulations' means product characteristics or their related processes and production methods, including the applicable administrative provisions, with which compliance is mandatory.

xix. 'Telecommunication equipment' also referred to as 'telecom equipment' or 'equipment' is synonymous with 'Telegraph', as defined in Section 3 of Indian Telegraph Act, 1885, and the terms are interchangeable.

2.2 Words and expressions used but not defined in this document shall have the meaning respectively assigned to them in the Act or the Rules made thereunder.

3.0 CERTIFICATION OBJECTIVES

3.1.1 Certification process endeavors to encourage:

i. that any telecom equipment does not degrade performance of existing network to which it is connected;

ii. safety of the end–users;

iii. protection of users and general public by ensuring that radio frequency emissions from equipment do not exceed prescribed standards;

iv. that telecom equipment complies with the relevant national and international regulatory standards and requirements.

3.2 The testing and certification envisaged in this procedure ensures that the equipment meets all TEC prescribed Essential Requirements. The quality and reliability of equipment is not part of this procedure, hence, the same is not guaranteed through this certification. OEMs/ importers/ dealers themselves will be responsible for necessary quality and reliability criteria claimed by them.

3.3 Any equipment to be used in Licensed Telecom Service Providers network may have to undergo additional tests as specified in License.

4.0 SCOPE OF CERTIFICATION

4.1 The scope of certification would cover all types of telecom equipment to be sold in India for being connected or capable of being connected to Indian telecom network. The effective dates for certification becoming mandatory for different products is notified by the Government separately. For the purpose of clarity, Table-2 under Annexure-I indicates types of equipment not covered by mandatory testing. Further, list of equipment presently exempted from the requirement of mandatory testing under proviso to Rule 529 is given in Table-3 under Annexure-I. Highly Specialized equipment, as notified by Government from time to time are not covered by MTCTE.

4.2 The use of certified equipment, unless specifically exempted, shall be governed by extant guidelines, rules/ conditions of license of telecom service provider.

4.3 If the equipment is being imported for Research and Development or for demonstration purpose in India or as a sample for mandatory testing, prior TEC certification is exempted.

4.4 Any uncertified equipment, which is not prohibited in India by any law, personally accompanied on inward foreign travel to India for personal use, is exempted from mandatory testing and certification on self-declaration.

4.5 Equipment that are manufactured/ imported in India but exclusively meant for export are excluded from MTCTE, provided model number/ country variant should be distinct from the model sold in India. Supporting document issued from the state/ central government are required.

5.0 GENERAL

5.1 Any Original Equipment Manufacturer (OEM)/ importer/ dealer who wishes to sell or import any telecom equipment in India, shall have to obtain Certificate from Telecommunication Engineering Centre (TEC) and mark or affix the equipment with appropriate Certification label.

5.2 Certification needs to be obtained only once for a model of equipment, and is applicable for any quantity of the certified model of the equipment. A different model of the equipment needs separate certification.

5.3 However, associated models of the main model/ certified model of the telecom equipment shall be certified without testing. Further, if an equipment is tested and certified under family definition, any hardware configuration of the equipment formed by using a subset of modules/ chases from the family shall be treated as certified. Broad criterion for qualifying a model as associated model and definition of family is given in Annexure-II.

5.4 Only complete-in-itself, standalone, independent equipment are tested and certified under MTCTE. Equipment modules/ components are not covered by MTCTE. Further, combination of independent equipment made to form systems are not certified under MTCTE; instead, each independent equipment should be certified separately.

5.5   The equipment needs to be tested only in a designated CAB, or recognized CAB of MRA partner country. The test results/ test reports shall not be older than one year on the date of submission.

5.6   As a relaxation, test reports/ results from any lab accredited by accreditation bodies under ILAC shall be accepted until 31 March 2019. The test results/ test reports submitted during this period shall not be older than five years on the date of submission.

5.7   The issued certificate shall be valid for five years from the date of issue.

5.8   TEC may amend/ suspend/ cancel the certificate, if it comes to the knowledge of TEC that any violation of the Rules has taken place.

5.9   TEC may issue such directions to OEMs/ importers/ dealers/ users, consistent with the Act, Rule or this procedure, as may be necessary, for carrying out purpose of this Procedure.

5.10   The certification procedures, which are detailed in this document, are subject to revision from time to time.

6.0   CERTIFICATION SCHEMES

6.1   General Certification Scheme (GCS)

6.1.1 This scheme is applicable for all telecom equipment listed in Table-1 of the Annexure-I, against which GCS is indicated. This list is updated from time to time and updated version of this list available on MTCTE portal is always to be referred to.

6.1.2 Under this scheme, applicant shall be required to submit test wise compliance along with test reports, in respect of parameters included in ERs, from any designated CAB or recognized CAB of MRA partner country. The test results shall be evaluated for compliance against respective ERs.

6.1.3 If equipment is found compliant with all applicable Essential Requirement parameters, a Certificate shall be issued to the applicant along with labelling details, for the specific model of equipment.

6.1.4 In case where valid Type/ Interface Approval Certificate (TAC/ IAC) issued by TEC, or TSEC issued by BSNL based upon TEC GR/ IR is in vogue for any particular equipment, only incremental testing and result evaluation is required for issue of certificate. The validity of this certificate shall be for the remaining period of TAC/ IAC/ TSEC.

6.1.5 In case, for any equipment, variant or interface, Essential Requirements are not listed on the MTCTE portal, the applicant may submit the requisite details on the portal. TEC will examine the details and will specify provisional ERs against which the equipment can be tested and complied. On evaluation of test results, a provisional certificate with one-year validity shall be issued.

6.1.6 A regular ER shall be issued by TEC for the equipment for which provisional ER was issued earlier. The equipment should be got certified against regular ER before expiry of validity of provisional certificate.

6.2 Simplified Certification Scheme (SCS)

6.2.1 This scheme is applicable for all equipment listed in Table-1 of the Annexure-I against which SCS is indicated.

6.2.2 Under this scheme, applicant has to submit a test wise compliance sheet, along with a Self-Declaration of Conformity (SDoC), in respect of parameters included in ERs.

6.3.3 All other rules/ procedures applicable in case of GCS shall apply in case of SCS, except that test reports are not required to be submitted by applicant or evaluated by TEC. TEC, however, reserves the right to ask the applicant to submit copy of report in case of SCS also.

7.0   TECHNICAL REGULATIONS

7.1   The technical regulations prescribed under this framework are in the form of Essential Requirements. The Essential Requirements (ER) to be complied for the purpose of certification under this procedure will include following:

i.   EMI/ EMC : As prescribed by TEC

ii.   Safety : As prescribed by TEC

iii.   Technical requirements: As prescribed by TEC

iv.   Other requirements: As notified by TEC/ DoT/ any Government Agency from time to time

v.   Security Requirements: As per notification issued by DoT.

7.2   The current ER available on the online portal needs to be complied.

7.3   If ER is not available, a Provisional ER will be prescribed on the request of applicant.

7.4   If ER is amended, it will be applicable from a prospective date indicated in the ER. Until that time, existing ER will be applicable.

8.0   FEES PAYABLE

8.1   The Fees charged under MTCTE consist of Administrative Fee (for SCS and GCS both) and additionally Test Report Evaluation Fee (for GCS).

8.2   Equipment covered by MTCTE are grouped according to the time and complexity involved in testing the equipment or evaluating test reports. The Schedule of Fees applicable for different groups is given in Annexure-III.

8.3   In case applicant opts for testing in one of the TEC/ RTEC labs, applicable test fee shall be charged separately.

8.4   All fees are non-refundable.

8.5 The fees are to be deposited during the application process on MTCTE portal. During processing, the MTCTE portal will lead the user to the Non-Tax Revenue Portal (NTRP) for online payment.

9.0 EQUIPMENT LABELLING

9.1 OEM/ Importers/ Dealers shall ensure that equipment offered for sale/ use in India is clearly marked or affixed with the following:

    i.   the OEM's/ Brand's name;

    ii.   the equipment's trade name, model name and serial number;

    iii.   relevant certification label

9.2 The detailed labelling guidelines are given in Annexure-IV.

10.0 CERTIFICATE MODIFICATION

10.1 Certificate modification without re-testing:

10.1.1 Change in ownership of equipment/ brand or modifications performed on the certified equipment that do not affect compliance with approved Essential Requirements will require certificate modification without going through the process of testing. In such cases, certificate holders should apply online for certification of the modified equipment/ modified ownership. After examination of the application, a new certificate will be issued reflecting the changes. Certificate holders may continue to sell such modified equipment after recertification by TEC. Examples of such modifications are:

    i.   Change in model number/ name arisen due to change in size, shape, color or enclosure of equipment;

    ii.   Change in model number without affecting the hardware design.

iii. Change in ownership/ structure/ address of company holding the certificate for the equipment.

iv. Inclusion of name of a new Associated Model not originally available on the existing certificate, but covered by BoM already submitted.

10.1.2 TEC may call for re-testing/ re-evaluation of certified telecom equipment and charge the relevant fee, should the need arise to check on the compliance of the equipment to the ERs.

10.2 Certificate Modification with re-testing:

10.2.1 Any other modifications performed on the certified equipment that affects its conformance with approved Essential Requirements will warrant fresh certification. Some examples (not limited to following) of such modifications are:

i. Addition of new network interface card;

ii. Change in the existing network interface card;

iii. Inclusion of a new Associated Model neither originally mentioned on the existing certificate, nor covered by BoM of certified model.

iv. Inclusion of a new chasses, interface module or unit in the family of already certified equipment.

10.3 In case of modifications affecting ER conformance, certificate holders should apply online and the equipment shall have to undergo incremental testing, as applicable. The modified equipment shall be sold or used only after fresh certificate is issued by TEC.

10.4 Any modification in the certified product without obtaining certificate modification shall amount to use of uncertified equipment and shall be dealt accordingly.

10.4   Modifications that cannot be differentiated as incremental change shall be treated as fresh application.

10.5   The validity of modified certificate shall be for balance period of five years.

10.6   A change in software, by way of major revision/ minor revision/ patch/ bug fix/ update does not necessarily call for certificate modification, unless the change has resulted in non-conformity or non-compliance to ERs, to which the equipment was earlier compliant. The OEM himself is responsible for ascertaining the same and applying for certificate modification, should the need arise.

11.0   RENEWAL

11.1   For renewal, a Certificate holder must apply online and pay the renewal fee, at least one month prior to expiry of the current certificate's validity period.

11.2   A certificate shall be renewed only if there is no change in the Essential Requirements applicable to the equipment, and there is no change in the equipment model.

11.3   After evaluation of the renewal application, a fresh certificate valid for another five years shall be issued, indicating the previous certificate number thereon.

11.4   TEC may call for re-testing/ re-evaluation of certified telecom equipment and charge the relevant fee, should the need arise to check on the compliance of the equipment to the ERs.

12.0   REVISION OF ESSENTIAL REQUIREMENT

12.1   Technological developments, changes in international standards or other regulatory requirements may entail revision of Essential Requirement.

12.2 Essential Requirements will generally be issued along with a prospective date of effect indicated thereon.

12.2 The revision of Essential Requirement shall not generally affect the validity of certificate of already certified Telecom Equipment. Equipment for which applications are received after the notified date of effect of amended ER shall be required to be certified against amended ER.

13.0   RESPONSIBILITIES OF OEMs/ IMPORTERS/ AIRs/ DEALERS/ USERS

13.1 An OEM/ dealer shall not sell the equipment and an importer/ AIR shall not import a telecom equipment until it has been certified by TEC and the Certification Label is applied, affixed or embossed on the equipment.

13.2 The equipment to be sold/ used must be of the same model that has been certified.

13.3 If need arises, OEM/ Importer/ AIR should offer the certified equipment for further tests and evaluation, as and when directed by TEC.

13.4 An OEM/ importer/ AIR/ dealer must cease to sell the uncertified telecom equipment if so directed by TEC and dispose of such equipment, at his own expense in the manner directed by TEC.

13.5 Telecom licensees should use certified telecom equipment only in their network.

13.6 As the certification issued under this procedure ensures that the certified equipment has been tested for conformance to Safety, EMIC/ EMC, Security and other technical requirements including SAR, public is advised to buy/ use certified telecom equipment only, in their own interest of safety and security.

SECTION - II

14.0 SURVEILLANCE

14.1 Telegraph Authority/ Appropriate Authority(AA) reserves the right to inspect and/ or test any telegraph, which requires mandatory certification at any time and at any premises including sites where it is in use or at the place of manufacturing to ensure that the telegraph used/ sold has required certifications and/ or conforms to the Essential Requirements of existing certifications. Such inspection and/ or testing may be carried out periodically, or at the discretion of Telegraph Authority/ Appropriate Authority or due to any complaint.

14.2 Detailed procedure for surveillance shall be notified separately.

SECTION - III

15.0 NON CONFORMITY & CONTRAVENTIONS

15.1 If it comes into the notice of the Telegraph Authority/Appropriate Authority (AA) that

(i) an uncertified equipment or certified equipment with unauthorized modifications or equipment whose certification has expired is being sold/ used or intended to be sold/ used, or

(ii) a certified equipment is not conforming to the Essential Requirements for which the certification has been issued; then

a) AA will issue a notice of violation inter-alia ordering to stop the sale/ use of the uncertified equipment with immediate effect.

b) Such telegraph will be required to undergo the mandatory certification within one hundred and eighty days from the date of issue of notice of violation. For the same, the telegraph authority will charge ten times of the prescribed fee and after observing the procedures as specified may issue the Certificate.

c) In case certification is not obtained for such telegraph within stipulated timeframe, AA may order to take custody of all such telegraph and may order to destroy the telegraph.

15.2 If it comes into the notice of the Telegraph Authority/ Appropriate Authority (AA) that any entity/ entities that are licensed under the Act, are using any uncertified equipment or failing in taking action against use of uncertified equipment by user, as prescribed in Rule 536 then;

a) AA will issue a notice of violation inter-alia ordering it to stop the use of the uncertified equipment with immediate effect and will take actions as per the provisions of their license conditions.

b) However, AA may allow getting the mandatory certification done within one hundred and eighty days from the date of issue of notice of violation. For the same, the telegraph authority will charge ten times of the prescribed fee and after observing the procedures as specified may issue the Certificate.

15.3 Prescribed fee as indicated in previous clause shall mean the applicable fees as given in para 8.0.

15.4 Unlawful/ unauthorized/ fraudulent/ forged use of certification label by anyone shall be a criminal offence and relevant penal provisions of Indian Penal Code shall apply.

SECTION – IV

16.0 APPEAL

16.1 This section describes the procedure for dealing with appeals received from the Appellant (i.e. OEM/ Importer/ AIR) against any adverse decisions taken by TEC/ AA with respect to their certification application, e.g. refusal to accept an application, refusal to accept test results/ reports, refusal to proceed with evaluations, refusal to grant certification, decisions to close the application or deny certification or any adverse action imposed/ taken. Appellant may also appeal against AA's decision to put the certification under abeyance, suspend, or forced withdrawal of certification, or any other action that impedes the attainment of certification.

16.2 Appeal shall be made to Appeals Officer, TEC in writing, within 30 days from the date of adverse decisions.

16.3 Initially the appeals shall be examined by Appeals Officer for its validity and if prima-facie they appear to be valid and having some substance, they will be taken up for further actions or otherwise the appellant will be informed appropriately. Appeals Officer shall acknowledge the receipt of appeals.

16.4 Admitted appeals shall be placed before the designated Appeals Committee. Designated appeals committee may consist of three members nominated by AA.

16.5 While nominating members for the Committee, Appropriate Authority shall ensure that the nominated members are not directly involved in the decision-making process for the appellant.

16.6 Designated Appeal Committee is responsible for considering the appeal. An opportunity will be given to the appellant to present the appeal in person(s)

during the process of hearing of appeal. The appellant may depute his/ her representative for hearing; however, the deputed representative(s) should be from its staff only. The dealing officer involved in the adverse decision may also provide technical inputs but shall not be involved in the decision making of the Appeal Committee.

16.7   After examination of the appeal, the committee may seek clarifications and information from all appropriate sources. If considered necessary, the Committee shall ask TEC to depute its staff or expert to investigate the matter.

16.8   Based on the data gathered through any of the above stated means, the Appeal Committee shall make the final decision within a reasonable time and the Appellant shall be informed accordingly by Appeal Officer. Appeal Officer shall also inform the dealing officer of that particular case regarding the outcome of appeal.

16.9   At any time during the review, the appellant may withdraw the appeal in writing. However, if for any reason, an appeal is withdrawn, a future appeal on the same grounds shall not be considered.

16.10 The Appeal Officer shall maintain record pertaining to all appeals including important details like date of receipt, name and address of the Appellant, details of appeal, outcome and final disposal. No further appeal in this regards will be considered.

16.11 This procedure of Appeal will not be applicable for adverse action(s) taken by Telegraph Authority under provisions of license conditions.

16.12 The names of Appeals Officer and members of Appeals Committee shall be notified by TEC separately.

SECTION-V

17.0 APPLICATION PROCEDURE

17.1 The application process shall be online through MTCTE Portal www.mtcte.tec.gov.in.

17.2 The applicant may register online and upload relevant documents in support of (i) Company Registration (ii) Letter issued by company authorizing him for MTCTE related responsibilities. Additionally, in case of foreign OEMs, the applicant from Indian company shall upload documents in support of (iii) MoU between foreign OEM and Indian representative (AIR) for sale and support of the product in India, and (iv) authorizing the AIR for MTCTE related responsibilities.

17.3 The documents shall be scrutinized by TEC. Any shortcoming in documents shall be intimated to the applicant. After rectification of shortcomings, applicants registration shall be approved, after which he may submit applications for testing/ certification.

17.4 Applicant shall select product to be certified, its variant details, available interfaces and associated models information, if applicable, and shall upload BoM file on the portal. After submission of his application, applicant will be shown the applicable certification scheme, ER and fee.

17.5 After payment of fee, applicant shall be asked to submit test results/ reports.

17.6 In case the applicant select the option of "reports not available", he is directed to testing section of MTCTE portal, wherein he can select CAB(s) of his choice for testing. After testing and uploading of test results/ reports by CAB(s), applicant can resume the application by selecting "All reports available".

17.7   If it is case of SCS, applicant shall submit test results, and accept the online self-declaration of conformity (SDoC). The submitted test results will be examined and if the equipment is found to be compliant, certificate will be issued.

17.8   If it is case of GCS, applicant shall submit test results, shall upload test reports, and shall accept online undertaking regarding correctness of uploaded documents/ reports. The test results/ reports will be examined and if the equipment is found to be compliant, certificate will be issued.

17.9   Telecom Equipment shall be tested in Designated CAB or recognized CAB of MRA partner country. However, Telegraph authority may allow acceptance of test results/ test reports for some or all tests from any other source for some limited period as a relaxation to this procedure.

17.10 All the submitted documents and communication with TEC should be in Hindi or English language only. If any submitted document is in any other language, then its certified English translation should also be submitted simultaneously.

17.11 Application for testing by RTECs can be submitted through concerned section of MTCTE portal. The contact details and jurisdiction of RTECs are given in Annexure-V.

Table-1

List of Equipment Covered by MTCTE

S. No.	Name of Equipment	Certification Scheme	Product Fee Group
1.	Executive Telephone System	SCS	A
2.	NSD/ISD Payphone	SCS	A
3.	Electronic Telephone Instrument	SCS	A
4.	Key Telephone Systems	SCS	A
5.	2-Line Feature Phone	SCS	A
6.	Coin Box Telephone	SCS	A
7.	Terminals for connecting to PSTN	SCS	A
8.	CLIP Phone	SCS	A
9.	Audio Conferencing Facility Device	SCS	A
10.	Multi Line Telephone System	SCS	A
11.	Group 3 FAX Machine	SCS	A
12.	Modem	SCS	A
13.	Cordless Phone	GCS	A
14.	Point of Sales (POS) Terminal	GCS	A
15.	GPON Equipment	GCS	B
16.	DSL Equipment	GCS	B
17.	IoT Gateway	GCS	B

18.	Tracking Devices	GCS	B
19.	Smart Electricity meter	GCS	B
20.	Smart Watch	GCS	B
21.	Smart Security Camera	GCS	B
22.	Router	GCS	C
23.	LAN Switch	GCS	C
24.	Mobile Handsets and Dongles	GCS	C
25.	Mobile BTS	GCS	C
26.	Compact Cellular Network	GCS	C
27.	Mobile Repeater	GCS	C
28.	Microwave Communication Equipment	GCS	C
29.	UHF/ VHF Communication Equipment	GCS	C
30.	Mobile Radio Trunking System Equipment	GCS	C
31.	Equipment Operating in 2.4 GHz and 5 GHz Frequency Bands	GCS	B
32.	Satellite System equipment	GCS	C
33.	IP Terminal	GCS	B
34.	Media Gateway	GCS	C
35.	Signalling Gateway	GCS	C
36.	Session Border Controller	GCS	C
37.	Soft Switch	GCS	C

38.	ISDN CPE	SCS	A
39.	PABX	GCS	B
40.	Telephony Application Server	GCS	C
41.	Telephony Media Server	GCS	C
42.	Multiplexing Equipment	GCS	C
43.	SDH Equipment	GCS	C
44.	DWDM Equipment	GCS	C
45.	Digital cross Connect	GCS	C

Note: The list of equipment covered by MTCTE is updated from time to time. The updated list can be downloaded from www.mtcte.tec.gov.in/.

Table-2

Items Not Covered by MTCTE

S. No.	Name of Equipment	Examples
1.	Modules/ Spares/ Components/ SKD/ CKD	Spare cards, return repair, WiFi modules
2.	Test Instruments	RF Tester, Power Meter
3.	Hobby Assembling	Self-assembled Amateur Radio
4.	Passive Telecom Components	Tower, Antenna, Waveguide, smart cards
5.	Integrated systems and networks consisting of more than one telecom equipment, each of which are individually covered by MTCTE.	GPON is not certified. OLT, ONT and ONU are independent components of GPON and each are certified independently.
6.	Power supply/ UPS/ Solar equipment/ Batteries	
7.	Equipment that are manufactured/ imported in India but exclusively meant for export	

Table-3

Items Presently Not Covered by MTCTE

S. No.	Name of Equipment	Examples/ Remarks
1.	IoT sensors and inter-sectoral devices with propriety communication interfaces only.	Temperature sensor, Agricultural Sensor
2.	Primarily non-telecom electrical and electronic products with Wi-Fi/ NFC/ BT etc.	AC or Fridge with WiFi, Lights with BLE remote control
3.	Multi-functional devices with Wi-Fi/ Ethernet ports primarily meant for trans-receiving images.	Multi-functional Printer/ Scanner/ Fax
4.	Equipment with communication module specifically covered by mandatory scheme of any other Government agency.	Laptop with WiFi.
5.	Set Top Box (presently under CRS)	ERs/ certification procedure for these products shall be notified later.
6.	Enterprise Digital Assistant	
7.	Laptops with Cellular connectivity	

Associated Models and Family Definition

A2.1 Each model of a telecom product needs to tested and certified under MTCTE once. However, in the following cases, more than one models can be covered by a single certificate:

A2.1.1 Pizza Box Models: In such equipment, generally a single PCB or motherboard is used for creating number of different models. These hardware models are created by providing different combination or configuration of access ports. In this case, if one pizza box model built around a particular motherboard having largest configuration of ports is tested and certified, all other models built around the same motherboard with a different lower configuration of interfaces/ access ports shall be covered by the same certificate.

A2.1.2 Chases based Models: Such equipment generally consist of a single chassis with the same backplane, and common function cards like processor or logic card, power supply card and other common control cards are present in the chassis. Different hardware variant models are formed by inserting different combination of functional cards (like frequency filter cards or interface cards) in the chassis. In this case, if one model built on one chassis populated with largest variety of interface cards is tested and certified, all other models built around the same chassis by inserting another combination of the same or lower number of interfaces shall be covered by the same certificate.

A2.1.3 Family based Models: Such equipment families generally consist of a number of chases with varying capacities, and a large number of cards, all of which can be inserted in any of the chases in the family

interchangeably. Depending upon customer requirement, different combination of chases from the family and different combination of cards are used at one site, which can be closely called one model. In this case, if all chases of the family are tested and certified separately or collectively, and all cards in the family are tested and certified by inserting them in whatsoever chassis, then all other models built by selecting some of the chases and some of the cards from the pool of tested chases and cards shall be covered by the same certificate.

A2.1.4   Split Unit Type Models: Such equipment generally consist of two functionally independent units, like an indoor unit and an outdoor unit, or a baseband unit and a radio unit. Safety and EMI/EMC testing of individual unit is possible in isolation, but technical parameter testing can be carried out only when the two units are connected. Each of the two units are often in different varieties; mostly the outdoor or radio unit variety is based upon frequency of operation and power capability, and the indoor or baseband unit variety is based upon chassis size, interface cards etc. In such cases, if all the outdoor or radio units have been individually tested with any (one or more) of the indoor or baseband units, and all the indoor or baseband units have been individually tested with any (one or more) of outdoor or radio units, the collection of all such indoor or baseband units and all outdoor or radio units will be treated as a family and will be certified accordingly. Further, the concept of associated model may be applied to indoor or baseband units, if these meet the criteria.

A2.2   In case of Pizza box models and chases based models, the model with largest configuration is called the tested model. The other models built around the same motherboard are called Associated Models.

A2.3   Where plug-in type of interface modules are used, if module with highest port density is tested, module with lower port density need not be tested. However, a module with two different types of ports will be treated as different from a module with either type of ports, and needs to be tested.

A2.4   Maximum 10 number of associated models can be included in one certificate, the tested model being one of the 10.

A2.5   Model numbers of all associated models need to be indicated in the online application in the corresponding BoM file.

A2.6   In case of radiating equipment, the model with highest radio power level is tested. The model of radio equipment with lower power will be covered by the same certificate under family based models.

A2.7   In case of radiating equipment with different frequency band, tests are required to be carried out on all frequency band.

Schedule of Fees

A3.1   Administrative Fee: Applicable for all products, as per respective product group indicated in Table 1 of Annexure-I.

A3.2   Test Report Evaluation Fee: Applicable in addition to Administrative Fee, only for products under GCS, as per respective product group indicated in Table 1 of Annexure-I.

A3.3   Certificate Modification Fee: Applicable if application for certificate modification is made, and no testing or report evaluation is involved. The amount of this fee is same as Administrative fee, for the respective product group. In case testing and test report evaluation is involved, respective fees will be charged in addition.

A3.4   Renewal Fee: Applicable if application for renewal of certificate is made, and no testing or report evaluation is involved. The amount of this fee is same as Administrative fee, for the respective product group.

A3.5   Testing Fee: In case of testing by CABs, fees as charged by CABs shall be payable directly to the CAB, without involvement of MTCTE portal. In case of testing in RTEC Labs, testing fee as notified by TEC separately, shall be payable through MTCTE portal.

A3.6   Fees for Contravention: In case of contraventions of requirements of mandatory testing, the fee as required under para 15.2 shall be ten time of the applicable fee as per para A3.1 and A3.2.

A3.7   The fees as indicated in para A3.1, A3.2, A3.3 and A3.4 are as follows:

| Group of Equipment	Administrative Fee/ Certificate Modification Fee/ Renewal Fee ₹	Test Report Evaluation Fee ₹
A.	10,000	50,000
B.	20,000	1,00,000
C.	30,000	2,00,000
D.	50,000	4,00,000

ANNEXURE-IV

Labelling Guidelines

A4.1 The certification label required under clause 9.1 (iii) of MTCTE includes the TEC Logo, and the certification number as given by TEC in the issued certificate.

A4.2 The TEC labelling requirements consists of:

i. TEC Logo on body of equipment.

ii. Indication of equipment conforming to Essential Requirements in its technical document.

iii. TEC Certification e-label, only in case of mobile handset and tablets

A4.3 The TEC Logo on body of equipment needs to conform to following guidelines:

A4.3.1 The 'TEC certification label' consists of the pictorial representation of TEC logo, drawn in the exact style as indicated in the following. If the size of TEC logo is reduced or enlarged, the aspect ratio given in the figure must be maintained.

Red = 0
Green = 108
Blue = 156

W = 6X
U = 3.2X
Y = 3X
Z = 5.2X

A = 8.2X
B = 2.3X
C = X
θ = 68.54°

V = 7.5X
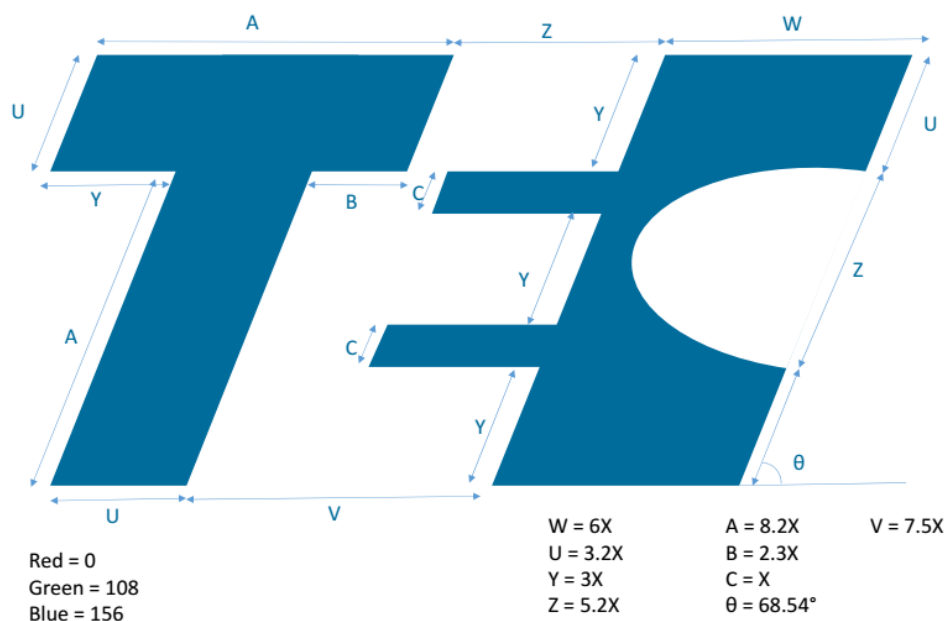
A4.3.2   The height of TEC logo shall be 1/4th of the size of the brand name, subject to a minimum height of 6 mm and maximum height of 12 mm.

A4.3.3   The TEC logo can be engraved, raised, embossed or debossed or printed label affixed.

A4.3.4   In case of engraving or debossing of TEC Certification label, Figure 1 given in the guidelines may be referred. The TEC logo (in color) has to be engraved/ debossed while the other portion of the label (in white) is to be flush with product body surface.

A4.3.5   If the logo is raised or embossed, then the TEC logo shown in Figure 2 (in white) has to be raised while the other portion (in color) is to be engraved.

A4.3.6   If the TEC logo is color printed and affixed, then the color composition given in the attached figure (RGB=0,108,156) must be maintained with no significant variation in color. However, black and white label is also permitted (colored=black, white=white).

A4.3.7   The 'TEC certification label' shall be legible, indelible, non-removable and should be easily discernable under normal lighting conditions.

A4.3.8   The 'TEC certification label' shall be put on the product at a prominent location so that it is clearly visible to the user. However, in case of removable or user replaceable outer cover (e.g. back cover in case of few mobile models) it can be placed below removable cover.

A4.3.9   The durability of label shall be tested as per the ISO 28219:2009.

A4.4.   The technical manual of the product should contain the information that this product conforms to the relevant Essential Requirements of TEC.

A4.5.1   The 'TEC certification e-label' consists of the Name of Country "INDIA", Certificate Number of the certificate issued for the device under MTCTE, the device's model number, and TEC Logo, as given in following figure.

A4.5.2   The device shall not require any special accessory/ tool or supplemental plug-in (e.g., the installation of a SIM/ USIM card) to access the e-label.

A4.5.3   The compliance related information shall be programmed by the manufacturer and the information shall be secured in such a manner that third party cannot modify it.

A4.5.4   The information can be in the firmware or software menu provided it is easily accessible and cannot be modified.

A4.5.5   The compliance related information should be placed in the section containing regulatory information about the device.

A4.5.6   Users shall be able to access the information without requiring special access codes or permissions and, in all cases; the information shall be accessible in no more than four steps in a device's menu.

A4.5.7   Instructions on how to access e-label shall be included in the user's manual, operating instructions, or as an insert in the package of the product, or other similar means.

A4.5.8   Alternately, the instructions to access the information may be available on the product related website. The instructions on how to access the website shall be provided in the user's manual or package of the product.

A4.6   Manufacturers may initiate advance action for labelling the equipment before issue of certificate by TEC, after ascertaining at their own level that the equipment conforms to relevant ER, and the product would conform to relevant ER when tested in the designated CAB under MTCTE.

Regional TECs

All enquiries regarding testing of equipment should be addressed to Regional Telecommunication Engineering Centre (RTEC). The contact detail along with jurisdiction of present RTEC are as under:

Concerned officer	Jurisdiction	e-mail
Deputy Director General (N), RTEC New Delhi	Chandigarh, Delhi, Haryana, Himachal Pradesh, Jammu & Kashmir, Punjab, Rajasthan, Uttarakhand and Uttar Pradesh.	ddgnr.tec@gov.in
Deputy Director General (W) RTEC Mumbai	Chhattisgarh, Daman & Diu, Dadara & Nagar Haveli, Goa, Gujarat, Madhya Pradesh and Maharashtra.	ddgwr.tec@gov.in
Deputy Director General (E) RTEC Kolkata	Assam, Arunachal Pradesh, Andaman & Nicobar, Bihar, Jharkhand, Meghalaya, Manipur, Mizoram, Nagaland, Odisha, Sikkim, Tripura and West Bengal.	ddger.tec@gov.in
Deputy Director General (S) RTEC Bengaluru	Andhra Pradesh, Karnataka, Kerala, Lakshadweep, Tamil Nadu, Telangana, Puducherry	ddgsr.tec@gov.in