

**Essential Requirements**  
**under the**  
**MTCTE Framework**  
**for**  
**Equipment used for Point to Point, Point**  
**to Multipoint Microwave Links in Fixed**  
**Radio Systems**

This document defines the technical parameters for the telecommunication equipment mentioned in the scope of this document against which Testing & Certification has to be carried as prescribed by G.S.R No. 1131(E) dated 5<sup>th</sup> September, 2017 (Amendment (2017) to Indian Telegraph Rules, 1951).

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## HISTORY SHEET

<b>Sr. No.</b>	<b>Document name/No.</b>	<b>Issued on</b>	<b>Version</b>
1.	Essential Requirements under the MTCTE Framework for Equipment used for Point to Point, Point to Multipoint Microwave Links in Fixed Radio Systems (No: .....)	XXXX-2018	1

## REFERENCES

<b>Sr No.</b>	<b>Document No.</b>	<b>Document Title</b>
1.	TEC/SD/DD/EMC-221/05/OCT-16	Electromagnetic compatibility standard for Telecommunication Equipment
2.	CISPR 22 (2008)	Limits and methods of measurement of radio disturbance characteristics of Information Technology equipment
3.	IEC 61000-4-2 (2008)	Testing and measurement techniques of Electrostatic discharge immunity test
4.	IEC 61000-4-3 (2010)	Radiated RF Electromagnetic Field Immunity test
5.	IEC 61000-4-4 (2012)	Testing and measurement techniques of electrical fasttransients/burst immunity test
6.	IEC 61000-4-5(2014)	Test & Measurement techniques for Surge immunity tests
7.	IEC 61000-4-6(2013)	Immunity to conducted disturbances, induced by radio frequencyfields
8.	IEC 61000-4-11(2004)	Voltage dips, shot interruptions and voltage variations immunity tests
9.	IEC 61000-4-29(2000)	Electromagnetic compatibility (EMC) - Part 4-29: Testing and measurement techniques - Voltage dips, short interruptions and voltage variations on d.c. input power port immunity tests
10.	IS 13252 part 1: 2010 Amd 2013 &Amd 2015	Information Technology Equipment –Safety- Part 1: General Requirements
11.	IEC 60950-1:2005+A1:2009+A2:2013	Information Technology Equipment –Safety- Part 1: General Requirements

12.	IEC 62368: 2014	Audio/video, information and communication technology equipment - Part 1: Safety requirements
13.	IEC 60215: 2016	Safety requirements for radio transmitting equipment - General requirements and terminology
14.	ETSI EN 302 217-2	Fixed Radio Systems; Characteristics and requirements for point-to-point equipment and antennas; Part 2: Digital systems operating in frequency bands from 1 GHz to 86 GHz; Harmonised Standard covering the essential requirements of article 3.2 of Directive 2014/53/EU of article 3.2 of Directive 2014/53/EU
15.	ETSI EN 302 326-2	Fixed Radio Systems; Multipoint Equipment and Antennas; Part 2: Harmonized EN covering the essential requirements of Article 3.2 of the R&TTE Directive for Digital Multipoint Radio Equipment

### **Scope**

This document lays down the essential requirements for equipment which is used in fixed radio systems typically for point to point (PTP), point to multipoint (PMP) microwave links. Such equipment shall operate in the frequency bands as prescribed in Section III of this document. The document shall cover both full outdoor (IDU+ODU) and split type equipment.

The document also defines the necessary testing requirements for certification under the MTCTE framework.

### **Applicability Matrix**

The applicability of tests under different sections of this ER as per the category of equipment is as below:

<b>Equipment Type/Variant</b>	<b>EMC Requirements</b>	<b>Safety Requirements</b>	<b>Technical Requirements</b>	<b>Other Requirements</b>	<b>Security Requirements</b>
Point to Point, Point to Multipoint Equipment (Full outdoor type)	A	A	A	A	Applicable as prescribed by DoT
Point to Point, Point to Multipoint Equipment (Split type-Outdoor Unit)	A	A	A	A	
Point to Point, Point to Multipoint Equipment (Split type-Indoor Unit)	A	A	NA	A	

A- Applicable

NA- Not Applicable

## SECTION I

### Electromagnetic Compatibility (EMC) Requirements

The equipment shall conform to the EMC requirements as per the following standards and limits indicated therein.

Sr. No	Technical Parameters	Testing requirements
i.	<p><b>Conducted and radiated emission (applicable to telecom equipment):</b>  <b>Name of EMC Standard:</b> "CISPR 22 (2008) - Limits and methods of measurement of radio disturbance characteristics of Information Technology Equipment".  <b>Limits:-</b></p> <ul style="list-style-type: none"> <li>i. To comply with Class B for indoor equipment and Class A of CISPR 22 (2008) for outdoor equipment.</li> <li>ii. The values of limits shall be as per TEC Standard No. TEC/SD/DD/EMC-221/05/OCT-16.</li> <li>iii. For Radiated Emission tests, limits below 1 GHz shall be as per Table 4 (a1) (for Class B) or 5 (a1) (for Class A) for measuring distance of 3m.</li> </ul> <p style="text-align: center;">OR</p> <p><b>Name of EMC Standard:</b> "CISPR 32 (2015) - Electromagnetic compatibility of multimedia equipment - Emission requirements"</p> <ul style="list-style-type: none"> <li>i. To comply with Class B for indoor equipment and Class A of CISPR 32 (2015) for outdoor equipment and the limits specified therein.</li> <li>ii. For Radiated Emission tests, limits below 1 GHz shall be for measuring distance of 3m.</li> </ul> <p><i>Note: Test Reports as per limits of CISPR 22 (2008) mentioned above shall be acceptable only upto March 31, 2019.</i></p>	<p>Test results from Designated CAB of TEC to be submitted for compliance.</p>

ii.	<p><b>Immunity to Electrostatic discharge:</b>  <b>Name of EMC Standard:</b> IEC 61000-4-2 {2008} "Testing and measurement techniques of Electrostatic discharge immunity test".  <b>Limits: -</b></p> <ul style="list-style-type: none"> <li>i. Contact discharge level 2 {± 4 kV} or higher voltage;</li> <li>ii. Air discharge level 3 {± 8 kV} or higher voltage;</li> </ul> <p>Performance Criteria shall be as per Table 1 under Clause 6 of TEC Standard No. TEC/SD/DD/EMC-221/05/OCT-16.</p> <p>Applicable Performance Criteria shall be as per Table 3 under Clause 7.2 of TEC Standard No. TEC/SD/DD/EMC-221/05/OCT-16</p>	Test results from Designated CAB of TEC to be submitted for compliance.
iii.	<p><b>Immunity to radiated RF:</b>  <b>Name of EMC Standard:</b> IEC 61000-4-3 (2010) "Testing and measurement techniques-Radiated RF Electromagnetic Field Immunity test" <b>Limits:-</b>  <b>For Telecom Equipment and Telecom Terminal Equipment with Voice interface (s)</b></p> <ul style="list-style-type: none"> <li>i. Under Test level 2 {Test field strength of 3 V/m} for general purposes in frequency range 80 MHz to 1000 MHz and</li> <li>ii. Under test level 3 (10 V/m) for protection against digital radio telephones and other RF devices in frequency ranges 800 MHz to 960 MHz and 1.4 GHz to 6.0 GHz.</li> </ul> <p><b>For Telecom Terminal Equipment without Voice interface (s)</b>  Under Test level 2 {Test field strength of 3 V/m} for general purposes in frequency</p>	Test results from Designated CAB of TEC to be submitted for compliance.



	<p>range 80 MHz to 1000 MHz and for protection against digital radio telephones and other RF devices in frequency ranges 800 MHz to 960 MHz and 1.4 GHz to 6.0 GHz.</p> <p>Performance Criteria shall be as per Table 1 under Clause 6 of TEC Standard No. TEC/SD/DD/EMC-221/05/OCT-16.</p> <p>Applicable Performance Criteria shall be as per Table 3 under Clause 7.2 of TEC Standard No. TEC/SD/DD/EMC-221/05/OCT-16</p>	
<b>iv.</b>	<p><b>Immunity to fast transients (burst):</b></p> <p>Name of EMC Standard: IEC 61000- 4- 4 {2012} "Testing and measurement techniques of electrical fast transients/burst immunity test"</p> <p>Limits:-</p> <p>Test Level 2 i.e. a) 1 kV for AC/DC power lines; b) 0.5 kV for signal / control / data / telecom lines;</p> <p>Performance Criteria shall be as per Table 1 under Clause 6 of TEC Standard No. TEC/SD/DD/EMC-221/05/OCT-16.</p> <p>Applicable Performance Criteria shall be as per Table 3 under Clause 7.2 of TEC Standard No. TEC/SD/DD/EMC-221/05/OCT-16</p>	<p>Test results from Designated CAB of TEC to be submitted for compliance.</p>
<b>v.</b>	<p><b>Immunity to surges:</b></p> <p><b>Name of EMC Standard:</b> IEC 61000-4-5 (2014) "Testing &amp; Measurement techniques for Surge immunity test"</p> <p><b>Limits:-</b></p> <ul style="list-style-type: none"> <li>i. For mains power input ports: (a) 2 kV peak open circuit voltage for line to ground coupling (b) 1 kV peak open circuit voltage for line to line coupling</li> <li>ii. For telecom ports: (a) 2 kV for common mode.</li> </ul> <p>Performance Criteria shall be as per Table 1 under Clause 6 of TEC Standard No. TEC/SD/DD/EMC-221/05/OCT-16.</p> <p>Applicable Performance Criteria shall be as per Table 3 under Clause 7.2 of TEC Standard</p>	<p>Test results from Designated CAB of TEC to be submitted for compliance.</p>

	No. TEC/SD/DD/EMC-221/05/OCT-16	
<b>vi.</b>	<p><b>Immunity to conducted disturbance induced by Radio frequency fields:</b>  <b>Name of EMC Standard:</b> IEC 61000-4-6 (2013) "Testing &amp; measurement techniques-Immunity to conducted disturbances induced by radio- frequency fields"  <b>Limits:-</b>  Under the test level 2 {3 V r.m.s.}in the frequency range 150 kHz-80 MHz for AC / DC lines and Signal /Control/telecom lines.</p> <p>Performance Criteria shall be as per Table 1 under Clause 6 of TEC Standard No. TEC/SD/DD/EMC-221/05/OCT-16.</p> <p>Applicable Performance Criteria shall be as per Table 3 under Clause 7.2 of TEC Standard No. TEC/SD/DD/EMC-221/05/OCT-16</p>	Test results from Designated CAB of TEC to be submitted for compliance.
<b>vii.</b>	<p><b>Immunity to voltage dips &amp; short interruptions (applicable to only ac mains power input ports, if any):</b>  <b>Name of EMC Standard:</b> IEC 61000-4-11 (2004) "Testing &amp; measurement techniques- voltage dips, short interruptions and voltage variations immunity tests"  <b>Limits:-</b></p> <ol style="list-style-type: none"> <li>i. a voltage dip corresponding to a reduction of the supply voltage of 30% for 500ms (i.e. 70 % supply voltage for 500ms)</li> <li>ii. a voltage dip corresponding to a reduction of the supply voltage of 60% for 200ms; (i.e. 40% supply voltage for 200ms)</li> <li>iii. a voltage interruption corresponding to a reduction of supply voltage of &gt; 95% for 5s.</li> <li>iv. a voltage interruption corresponding to a reduction of supply voltage of &gt;95% for 10ms.</li> </ol> <p>Performance Criteria shall be as per Table 1 under Clause 6 of TEC Standard No. TEC/SD/DD/EMC-221/05/OCT-16.</p>	Test results from Designated CAB of TEC to be submitted for compliance.

	Applicable Performance Criteria shall be as per Table 3 under Clause 7.2 of TEC Standard No. TEC/SD/DD/EMC-221/05/OCT-16	
<b>viii.</b>	<p><b>Immunity to voltage dips &amp; short interruptions (applicable to only DC power input ports, if any):</b>  <b>Name of EMC Standard:</b>IEC 61000-4-29:2000: Electromagnetic compatibility (EMC) - Part 4-29: Testing and measurement techniques - Voltage dips, short interruptions and voltage variations on d.c. input power port immunity tests</p> <p>Limits:</p> <ul style="list-style-type: none"> <li>i. Voltage Interruption with 0% of supply for 10ms. Applicable Performance Criteria shall be B.</li> <li>ii. Voltage Interruption with 0% of supply for 30ms, 100ms, 300ms and 1000ms. Applicable Performance Criteria shall be C.</li> <li>iii. Voltage dip corresponding to 40% &amp; 70% of supply for 10ms, 30 ms. Applicable Performance Criteria shall be B.</li> <li>iv. Voltage dip corresponding to 40% &amp; 70% of supply for 100ms, 300 ms and 1000 ms. Applicable Performance Criteria shall be C.</li> <li>v. Voltage variations corresponding to 80% and 120%of supply for 100 ms to 10s as per Table 1c of IEC 61000-4-29. Applicable Performance Criteria shall be B.</li> </ul>	Test results from Designated CAB of TEC to be submitted for compliance.

## SECTION II

### Safety Requirements

### Safety Requirements

The safety requirements shall be as below:

<b>Sr. No</b>	<b>Technical Parameters</b>	<b>Testing requirements</b>
<b>i.</b>	<p>a) The equipment shall conform to IS 13252 part 1: 2010 Amd 2013 &amp; Amd 2015 "Information Technology Equipment –Safety- Part 1: General Requirements" [equivalent to IEC 60950-1:2005+A1:2009+A2:2013 "Information Technology Equipment – Safety- Part 1: General Requirements"]</p> <p style="text-align: center;">OR</p> <p>The equipment shall conform to IEC 62368-1: 2014 "Audio/video, information and communication technology equipment - Part 1: Safety requirements".</p> <p>b) In case of radio transmitting equipment, it shall conform to IEC 60215: 2016 "Safety requirements for radio transmitting equipment - General requirements and terminology"].</p> <p><i>Note: Test reports as per IEC 60215:1987 shall be acceptable only till March 31, 2019.</i></p>	Test results from Designated CAB of TEC to be submitted for compliance.

### SECTION III

#### Technical Requirements

<b>Sr. No</b>	<b>Requirements</b>	<b>Testing requirements</b>
<b>i.</b>	Frequency of operation  1. 6/7/13/15/18/23GHz for Point to Point (PTP) operation 2. 10.5/26/28 GHz bands for Point to Multipoint (PMP) operation  <i>Note: Frequency of operation and channelling plan requirements are as per the latest NFAP issued by DoT and the requirements in NFAP supersede the requirements listed here.</i>	<ul style="list-style-type: none"><li>• Testing as per Clause 5.2.7 of ETSI EN 302 217-2 in case of PTP equipment.</li><li>• Testing as per Clause 6.3.3 of ETSI EN 302 326-2 in case of PMP equipment.</li></ul>
<b>ii.</b>	Transmit Power  Transmit power requirements/EIRP requirements shall be as per DoT prescribed limits.	a) Test setup shall be as per Clause A of Annexure I.  Or <ul style="list-style-type: none"><li>• Testing as per Clause 5.2.1 of ETSI EN 302 217-2 in case of PTP equipment.</li><li>• Testing as per Clause 6.3.2 of ETSI EN 302 326-2 in case of PMP equipment.</li></ul> b) Test results and certificate from TEC Designated CAB.
<b>iii.</b>	Compliance to ETSI EN 302 217-2 for PTP systems.	Test results and certificate from TEC Designated CAB.
<b>iv.</b>	Compliance to ETSI EN 302 326-2 for PMP systems.	Test results and certificate from TEC Designated CAB.

## **SECTION IV:**

### **Other Requirements**

**1. ROHS**

Applicable when prescribed. Deferred at present.

**2. IPv6**

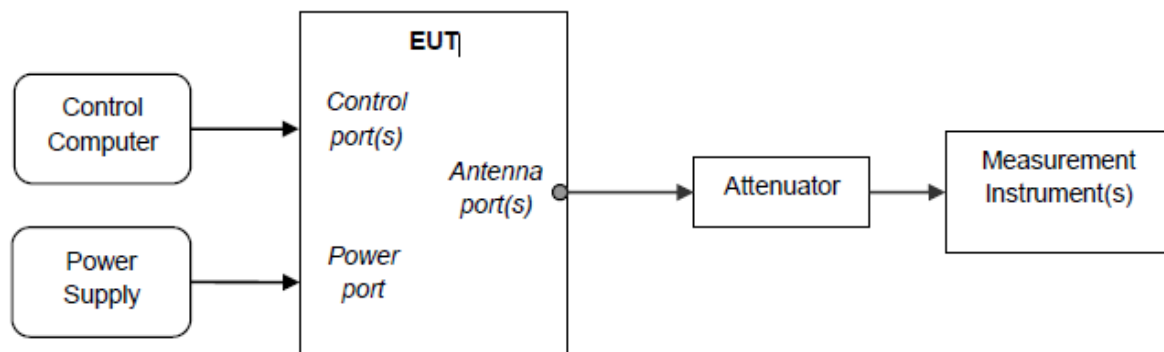
As per applicable order of Department of Telecommunications, Ministry of Communications, Government of India.

## **SECTION V:**

### **Security Requirements**

As and when prescribed by Department of Telecommunications, Ministry of Communications, Government of India.

**Clause A: Typical setup of Transmit Power measurement**





## ABBREVIATIONS

CAB	Conformance Assessment Body
	Comité International Spécial des Perturbations
CISPR	Radioélectriques
CPE	Customer Premise Equipment
	Department of Telecommunication, Ministry of
DoT	Communications, Government of India
EIRP	Effective Isotropic Radiated Power
EMC	Electromagnetic Compatibility
ER	Essential Requirements
ETSI	European Telecommunications Standards Institute
EUT	Equipment Under Test
GHz	Giga Hertz
IDU	Indoor Unit
IEC	International Electrotechnical Commission
IPv6	Internet Protocol version 6
MHz	Mega Hertz
ms	Millisecond
MTCTE	Mandatory Testing & Certification of Telecom Equipment
NFAP	National Frequency Allocation Plan
ODU	Outdoor Unit
PMP	Point to Multipoint
PTP	Point to Point
TEC	Telecommunication Engineering Center
WPC	Wireless Planning & Coordination