

Essential Requirements
under the
MTCTE Framework
for
Equipment operating in 2.4 GHz and 5
GHz frequency bands

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 5th September, 2017 (Amendment (2017) to Indian Telegraph Rules, 1951).

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HISTORY SHEET

Sr. No.	Document name/No.	Issued on	Version
1.	Essential Requirements under the MTCTE Framework for Equipment operating in 2.4 GHz and 5 GHz frequency bands (No:	XXXX-2018	1

REFERENCES

Sr No.	Document No.	Document Title
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 300 328	Wideband transmission systems;Data transmission equipment operating in the 2,4 GHz ISM band and using wide band modulation techniques; Harmonised Standard covering the essential requirements
15.	ETSI EN 301 893	5 GHz RLAN;Harmonised Standard covering the essential requirements of article 3.2 of Directive 2014/53/EU
16.	ETSI EN 302 502	Wireless Access Systems (WAS);5,8 GHz fixed broadband data transmitting systems; Harmonised Standard covering the essential requirements of article 3.2 of Directive 2014/53/EU

Scope

This document lays down the essential requirements for 2.4 and 5 GHz wireless access systems including RLAN/WLAN equipment which is used in wireless local area networks(WLAN).The present document also applies to point to point and point to multipoint equipment in these bands and ad-hoc networking where these devices communicate directly with each other, without the use of a wireless infrastructure. The specific requirements related to IoT devices operating in these bands are dealt in ERs related to IoT equipment, which may or may not refer this ER. 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:

Equipment Type/Variant	EMC Requirements	Safety Requirements	Technical Requirements	Other Requirements	Security Requirements
Wi-Fi enabled Data Card/Dongle, Wi-Fi Access Points, CPE, Wi-Fi Modems etc.	A	A	A	A	Applicable as and when prescribed by Department of Telecommunications, Ministry of Communications, Government of India.
Wi-Fi Access/WLAN Controller Equipment	A	A	NA (Applicable, if the equipment has radio interface in 2.4 GHz and/or 5 GHz bands)	A	
Point to Point, Point to Multipoint, Fixed Radio Equipment	A	A	A	A	
Any equipment with Wi-Fi/RLAN air interface *	NA	NA	A	NA	

A-Applicable NA- Not Applicable

* For any equipment with Wi-Fi/RLAN air interface, this will be specified in the ERs of the respective equipment. The Technical Requirements covered under Section III of this ER will be applicable to the Wi-Fi/RLAN air interface of the equipment, in this case.

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>Conducted and radiated emission (applicable to telecom equipment): Name of EMC Standard: "CISPR 22 (2008) - Limits and methods of measurement of radio disturbance characteristics of Information Technology Equipment". Limits:-</p> <ul style="list-style-type: none"> i. To comply with Class B for indoor equipment and Class A of CISPR 22 (2008) for outdoor equipment. ii. The values of limits shall be as per TEC Standard No. TEC/SD/DD/EMC-221/05/OCT-16. 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. <p style="text-align: center;">OR</p> <p>Name of EMC Standard: "CISPR 32 (2015) - Electromagnetic compatibility of multimedia equipment - Emission requirements"</p> <ul style="list-style-type: none"> i. To comply with Class B for indoor equipment and Class A of CISPR 32 (2015) for outdoor equipment and the limits specified therein. ii. For Radiated Emission tests, limits below 1 GHz shall be for measuring distance of 3m. <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>Immunity to Electrostatic discharge: Name of EMC Standard: IEC 61000-4-2 {2008} "Testing and measurement techniques of Electrostatic discharge immunity test". Limits: -</p> <ul style="list-style-type: none"> i. Contact discharge level 2 {\pm 4 kV} or higher voltage; ii. Air discharge level 3 {\pm 8 kV} or higher voltage; <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>Immunity to radiated RF: Name of EMC Standard: IEC 61000-4-3 (2010) "Testing and measurement techniques-Radiated RF Electromagnetic Field Immunity test" Limits:- For Telecom Equipment and Telecom Terminal Equipment with Voice interface (s)</p> <ul style="list-style-type: none"> i. Under Test level 2 {Test field strength of 3 V/m} for general purposes in frequency range 80 MHz to 1000 MHz and 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. <p>For Telecom Terminal Equipment without Voice interface (s) 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>	
iv.	<p>Immunity to fast transients (burst):</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>
v.	<p>Immunity to surges:</p> <p>Name of EMC Standard: IEC 61000-4-5 (2014) "Testing & Measurement techniques for Surge immunity test"</p> <p>Limits:-</p> <p>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</p> <p>ii. For telecom ports: (a) 2 kV for common mode.</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</p>	<p>Test results from Designated CAB of TEC to be submitted for compliance.</p>

	No. TEC/SD/DD/EMC-221/05/OCT-16	
vi.	<p>Immunity to conducted disturbance induced by Radio frequency fields: Name of EMC Standard: IEC 61000-4-6 (2013) "Testing & measurement techniques-Immunity to conducted disturbances induced by radio- frequency fields" Limits:- 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.
vii.	<p>Immunity to voltage dips & short interruptions (applicable to only ac mains power input ports, if any): Name of EMC Standard: IEC 61000-4-11 (2004) "Testing & measurement techniques- voltage dips, short interruptions and voltage variations immunity tests" Limits:-</p> <ol style="list-style-type: none"> i. a voltage dip corresponding to a reduction of the supply voltage of 30% for 500ms (i.e. 70 % supply voltage for 500ms) ii. a voltage dip corresponding to a reduction of the supply voltage of 60% for 200ms; (i.e. 40% supply voltage for 200ms) iii. a voltage interruption corresponding to a reduction of supply voltage of > 95% for 5s. iv. a voltage interruption corresponding to a reduction of supply voltage of >95% for 10ms. <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	
viii.	<p>Immunity to voltage dips & short interruptions (applicable to only DC power input ports, if any): Name of EMC Standard: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> <ol style="list-style-type: none"> i. Voltage Interruption with 0% of supply for 10ms. Applicable Performance Criteria shall be B. ii. Voltage Interruption with 0% of supply for 30ms, 100ms, 300ms and 1000ms. Applicable Performance Criteria shall be C. iii. Voltage dip corresponding to 40% & 70% of supply for 10ms, 30 ms. Applicable Performance Criteria shall be B. iv. Voltage dip corresponding to 40% & 70% of supply for 100ms, 300 ms and 1000 ms. Applicable Performance Criteria shall be C. 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. 	Test results from Designated CAB of TEC to be submitted for compliance.

SECTION II:**Safety Requirements**

The safety requirements shall be as below:

Sr. No	Technical Parameters	Testing requirements
i.	<p>a) The equipment shall conform to IS 13252 part 1: 2010Amd 2013 &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>	<p>Test results from Designated CAB of TEC to be submitted for compliance.</p>

SECTION III :**Technical Requirements**

Sr. No	Technical Parameters	Testing requirements
i.	<p>Frequency of operation</p> <p>A. 2.4 GHz band: 2.4- 2.4835 GHz as per latest NFAP provisions WPC GSR No. 45(E)).</p> <p>B. 5 GHz:</p> <p>a. 5.150- 5.350 GHz (Indoor Usage defined as per WPC GSR 46(E)).</p> <p>b. 5.725-5.875 GHz (Indoor usage defined as per WPC GSR 46(E))</p> <p>c. 5.825-5.875 GHz(Usage with maximum EIRP of 4W defined as per WPC GSR 38(E))</p> <p><i>Note:</i></p> <p>i. Frequency of operation requirements are as per the latest NFAP and GSRs issued by WPC and the requirements in NFAP and GSRs supersede the requirements listed here.</p>	<p>Test report from TEC Designated CAB as per testing requirements defined in Annexure I (Clause A) to be submitted for compliance.</p>
ii.	<p>EIRP</p> <p>A. Maximum of 4 Watts for outdoor usage.</p> <p>B. Maximum of 200 mW for indoor usage.</p> <p><i>Note: EIRP requirements are as per the latest NFAP and GSRs issued by WPC and the requirements in NFAP and GSRs supersede the requirements listed here.</i></p>	<p>Test report from TEC Designated CAB shall be submitted for compliance as per the test procedure prescribed for RF Output Power in respective standards as below:</p> <ul style="list-style-type: none"> • ETSI EN 300 328 for equipment in 2.4 GHz band. • ETSI EN 301 893 for RLAN/WLAN equipment in 5GHz band. • ETSI EN 302 502 for Point to Point, Point to Multipoint, Fixed Radio Systems in 5.825-5.875 GHz band
iii.	Conformance to latest version of ETSI	Test results and certificate from

	<p>EN 300 328 for equipment in 2.4 GHz band.</p> <p>OR</p> <p>Conformance to FCC CFR47 Part 15.247 or FCC CFR47 Part 15.249.</p>	<p>TEC Designated CAB shall be submitted for compliance.</p>
iv.	<p>Conformance to latest version of ETSI EN 301 893 for RLAN/WLAN equipment in 5GHz band.</p> <p>Or</p> <p>Conformance to</p> <ul style="list-style-type: none"> i) FCC CFR47 15.407 for 5.150-5.350 GHz ii) FCC CFR47 Part 15.249 for 5.725-5.875 GHz 	<p>Test results and certificate from TEC Designated CAB shall be submitted for compliance.</p>
v.	<p>Conformance to latest version of ETSI EN 302 502 (excluding clauses 4.2.4, 4.2.6 & 4.2.8) for Point to Point, Point to Multipoint, Fixed Radio Systems in 5.825-5.875 GHz band.</p> <p>Or</p> <p>Conformance to FCC CFR47 Part 15.249 for 5.725-5.875 GHz.</p>	<p>Test results and certificate from TEC Designated CAB shall be submitted for compliance.</p>

SECTIONIV:

Other Requirements

1. ROHS

Applicable when prescribed. Deferred at present.

2. SAR

Applicable when prescribed. Deferred at present.

3. IPv6

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

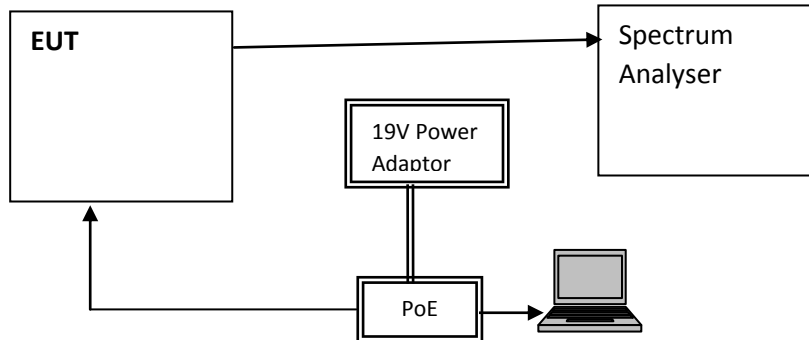
SECTION V:

Security Requirements

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

ANNEXURE I**A: Frequency of Operation- Test Setup**

Typical representation of test setup is as below:

**Test Procedure**

1. Make the setup as shown above.
2. Configure the Spectrum Analyzer for
 - a) Center Frequency as required.
 - b) SPAN of 20MHz
 - c) RBW of 3KHz
3. Configure EUT in different modes of operation.
4. Measure peak power shown in Spectrum analyser.

Note: This is a representative setup and may be adapted as per the requirement of testing for the equipment.

ABBREVIATIONS

CAB	Conformance Assessment Body Comité International Spécial des Perturbations Radioélectriques
CISPR	Radioélectriques
CPE	Customer Premise Equipment
EIRP	Effective Isotropic Radiated Power
EMC	Electromagnetic Compatibility
ER	Essential Requirements
ETSI	<i>European Telecommunications Standards Institute</i>
EUT	Equipment Under Test
GHz	Giga Hertz
GSR	General Statutory Rules
IEC	International Electrotechnical Commission
IOT	Internet of Things
IPv6	Internet Protocol version 6
MHz	Mega Hertz
ms	Millisecond
MTCTE	Mandatory Testing & Certification of Telecom Equipment
NFAP	National Frequency Allocation Plan
RLAN	Radio Local Area Network
TEC	Telecommunication Engineering Center
WLAN	Wireless Local Area Network
WPC	Wireless Planning & Coordination

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