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**Essential Requirements under**  
**the**  
**MTCTE**  
**Framework for**  
**Radio Broadcast receivers**

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 Radio Broadcast receivers	August-2020	1

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### **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 32	Electromagnetic compatibility of multimedia equipment - Emission requirements
3.	IEC 61000-4-2	Testing and measurement techniques of Electrostatic discharge immunity test
4.	IEC 61000-4-3	Radiated RF Electromagnetic Field Immunity test
5.	IEC 61000-4-4	Testing and measurement techniques of electrical fasttransients/burst immunity test
6.	IEC 61000-4-5	Test & Measurement techniques for Surge immunity tests
7.	IEC 61000-4-6	Immunity to conducted disturbances, induced by radio frequencyfields
8.	IEC 61000-4-11	Voltage dips, shot interruptions and voltage variations immunity tests
9.	IEC 61000-4-29	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.	IS616:2017/IEC 60065:2014	Audio, video and similar electronic apparatus - Safety requirements

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11.	IEC 62368-1: 2018	Audio/video, information and communication technology equipment - Part 1: Safety requirements
12.	IS 16046(Part 2): 2018/ IEC 62133-2 : 2017	Secondary cells and batteries containing alkaline or other non-acid electrolytes - Safety requirements for portable sealed secondary lithium cells, and for batteries made from them, for use in portable applications - Part 2: Lithium
13.	ETSI EN 303 345	Broadcast Sound Receivers; Harmonised Standard covering the essential requirements of article 3.2 of Directive 2014/53/EU
14.	ETSI EN 303 413	Satellite Earth Stations and Systems (SES); Global Navigation Satellite System (GNSS) receivers; Radio equipment operating in the 1 164 MHz to 1 300 MHz and 1 559 MHz to 1 610 MHz frequency

**Note :** *All the above mentioned standards are subject to updations/revisions and conformance to this ER shall be as per latest in force valid versions of corresponding standards.*

## Scope

This document lays down the essential requirements for Radio Broadcasting receivers which are primarily used in sound/audio broadcasting. The present document applies to radio-broadcast receivers with or without the capability of operating with an external source of power and combined/not combined with sound recording or reproducing apparatus. Different technologies for Radio broadcast services that are referred in this document currently include FM, AM, and Digital radio Mondiale (DRM). Along with the radio broadcasting receiver functionality, the equipment under the scope of this document may also include additional functionalities for services such as Global Navigation satellite systems(GNSS), Wi-Fi, Bluetooth etc. The requirements for such services are applicable on the equipment only if the functionality is supported by the 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:

Equipment Type/Variant	EMC Requirements	Safety Requirements	Technical Requirements	Other Requirements	Security Requirements
All type of motor vehicle Radio broadcast receivers (comprising of interfaces not limited to Wi-Fi, Bluetooth), not capable of operating without an external source of power.	A	A	A	A	Applicable as and when prescribed by Department of Telecommunications, Ministry of Communications, Government of India.
All type of Radio Broadcast receivers driven with in -built power source.  Example includes devices like pocket –size radio cassette players, music players with	A	A	A	A	

radio broadcast receiver/Bluetooth /Wi-Fi interfaces, portable radio broadcast receiver etc.					
All type of other devices having radio broadcast receivers interfaces. Example includes IOT devices such as Mobile phones, smart watches, smart TV, personal assistant service devices etc	NA	NA	A	A	

## SECTION I:

### Electromagnetic Compatibility (EMC) Requirements

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

Sr. No	Technical Parameters	Testing requirements
i.	<p><b>Name of EMC Standard:</b> “CISPR 32 - Electromagnetic compatibility of multimedia equipment - Emission requirements”</p> <ul style="list-style-type: none"><li>i. To comply with Class B for all type of radio broadcast receiver 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>	Test results from Designated CAB of TEC to be submitted for compliance.
ii.	<p><b>Immunity to Electrostatic discharge:</b> <b>Name of EMC Standard:</b> IEC 61000-4-2 "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 "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</li></ul>	Test results from Designated CAB of TEC to be submitted for compliance.



	<p>frequency range 80 MHz to 1000 MHz and</p> <p>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> <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 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> Name of EMC Standard: IEC 61000- 4- 4 "Testing and measurement techniques of electrical fast transients/burst immunity test"</p> <p>Limits:- 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>	Test results from Designated CAB of TEC to be submitted for compliance.
<b>v.</b>	<p><b>Immunity to surges:</b> <b>Name of EMC Standard:</b> IEC 61000-4-5 "Testing &amp; Measurement techniques for Surge immunity test" <b>Limits:-</b> i. For mains power input ports: (a)2 kV</p>	Test results from Designated CAB of TEC to be submitted for compliance.

	<p>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 No. TEC/SD/DD/EMC-221/05/OCT-16</p>	
vi.	<p><b>Immunity to conducted disturbance induced by Radio frequency fields:</b>  <b>Name of EMC Standard:</b> IEC 61000-4-6 "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.
vii.	<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 "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</li> </ol>	Test results from Designated CAB of TEC to be submitted for compliance.

	<p>200ms)</p> <p>iii. a voltage interruption corresponding to a reduction of supply voltage of &gt; 95% for 5s.</p> <p>iv. a voltage interruption corresponding to a reduction of supply voltage of &gt;95% for 10ms.</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-1</p>	
<p><b>viii.</b></p>	<p><b>*Immunity to voltage dips &amp; short interruptions (applicable to only DC power input ports, if any):</b></p> <p><b>Name of EMC Standard:</b>IEC 61000-4- 29: 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> <p>i. Voltage Interruption with 0% of supply for 10ms. Applicable Performance Criteria shall be B.</p> <p>ii. Voltage Interruption with 0% of supply for 30ms, 100ms, 300ms and 1000ms. Applicable Performance Criteria shall be C.</p> <p>iii. Voltage dip corresponding to 40% &amp; 70% of supply for 10ms, 30 ms. Applicable Performance Criteria shall be B.</p> <p>iv. Voltage dip corresponding to 40% &amp; 70% of supply for 100ms, 300 ms and 1000 ms. Applicable Performance Criteria shall be C.</p> <p>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.</p>	<p>Test results from Designated CAB of TEC to be submitted for compliance.</p>

## SECTION II:

### Safety Requirements

The safety requirements shall be as below:

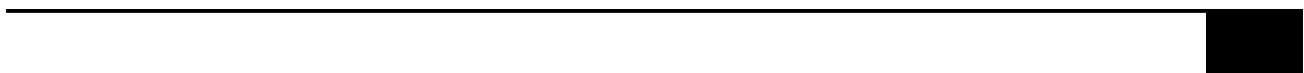
<b>Sr. No</b>	<b>Technical Parameters</b>	<b>Testing requirements</b>
<b>i.</b>	<p>a) The equipment shall conform to IS 616:2017/IEC 60065:2014 -‘Audio, Video and similar electronic apparatus-Safety requirements’.</p> <p style="text-align: center;">OR</p> <p>The equipment shall conform to IEC 62368-1: 2018 “Audio/video, information and communication technology equipment - Part 1: Safety requirements”.</p> <p>b) In case of secondary cells and batteries used in portable equipments, conformance to standard IS 16046(Part2): 2018/ IEC 62133-2: 2017) “Secondary cells and batteries containing alkaline or other non-acid electrolytes - Safety requirements for portable sealed secondary cells, and for batteries made from them, for use in portable applications”: Lithium systems.</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><b>Frequency of operation</b></p> <p><b>As per Table 1 in Annexure I</b></p> <p>The equipment shall operate in the permitted radio frequency bands as per latest regulations and guidelines issued by Government of India.</p>	<p>i. Test set up as prescribed in Annexure II</p> <p>ii. Test report from TEC Designated CAB as per testing requirements.</p>						
ii.	<p>If the equipment has inbuilt geolocation navigation receiver then it shall support the following GNSS systems</p> <ol style="list-style-type: none"> <li>1. GPS</li> <li>2. NavIC (Regional GNSS system of India)</li> </ol>	<p>i. As per Test Setup II in Annexure II</p> <p>ii. Test report from TEC Designated CAB as per testing requirements.</p>						
iii.	<p><b>Conformance to the following latest in force/valid versions of standards as applicable:</b></p> <table border="1" data-bbox="300 1267 957 2009"> <thead> <tr> <th data-bbox="300 1267 421 1339">Sr. No.</th> <th data-bbox="421 1267 683 1339">Standard</th> <th data-bbox="683 1267 957 1339">Applicability</th> </tr> </thead> <tbody> <tr> <td data-bbox="300 1339 421 2009">1.</td> <td data-bbox="421 1339 683 2009">ETSI EN 303 345</td> <td data-bbox="683 1339 957 2009"> <p>Applicable to Radio broadcast receivers, intended to support analog AM/FM or DRM digital modulation only.</p> <p><b>Note:</b> Conformance shall only be required for each of the frequency bands co-located as per Sr. no. I under section III of this document</p> </td> </tr> </tbody> </table>	Sr. No.	Standard	Applicability	1.	ETSI EN 303 345	<p>Applicable to Radio broadcast receivers, intended to support analog AM/FM or DRM digital modulation only.</p> <p><b>Note:</b> Conformance shall only be required for each of the frequency bands co-located as per Sr. no. I under section III of this document</p>	<p>Test results and certificate from TEC Designated CAB shall be submitted for compliance.</p>
Sr. No.	Standard	Applicability						
1.	ETSI EN 303 345	<p>Applicable to Radio broadcast receivers, intended to support analog AM/FM or DRM digital modulation only.</p> <p><b>Note:</b> Conformance shall only be required for each of the frequency bands co-located as per Sr. no. I under section III of this document</p>						

			and ETSI EN 303 345-1.	
	2.	ETSI EN 303 413	Applicable to Radio broadcast receivers intended for reception of GNSS signals	
<b>iv.</b>	Any additional interface in Radio broadcast receiver equipment like Wi-Fi, Bluetooth etc shall be in conformance to the applicable requirements covered under relevant ERs of TEC. The same is described below:			Test results and certificate from TEC Designated CAB shall be submitted for compliance.
	<b>Sr.No</b>	<b>Standard</b>	<b>Applicability</b>	
	1.	Annexure to TEC ERs Clause No: G 1.4, G2.11, G 2.12, G. 2.13, G 3.12, G 3.13, G 3.14 and G 3.15	For Bluetooth interface	
	2.	Annexure to TEC ERs Clause No: G. 1.7, G 2.16, G. 2.17, G 3.18, G 3.19.	Wi-Fi interface	
	Note: Annexure to ERs as mentioned above can be found on MTCTE website ( <a href="https://mtcte.tec.gov.in">https://mtcte.tec.gov.in</a> )			



## **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.



**Table 1**

<b>Frequency bands</b>		<b>Applications</b>
Medium Frequency (MF)	526, 5 kHz to 1 606, 5 kHz.	Radio Broadcasting
High Frequency (HF):	3 950 kHz to 4 000 kHz, 5 900 kHz to 6 200 kHz, 7 200 kHz to 7 450 kHz, 9 400 kHz to 9 900 kHz, 11 600 kHz to 12 100 kHz, 13 570 kHz to 13 870 kHz, 15 100 kHz to 15 800 kHz, 17 480 kHz to 17 900 kHz, 18 900 kHz to 19 020 kHz, 21 450 kHz to 21 850 kHz and 25 670 kHz to 26 100 kHz	
VHF band I:	47 MHz to 68 MHz.	
VHF band II:	87,5 MHz to 108 MHz.	
VHF band III:	174 MHz to 230 MHz.	
L band I	1 164 MHz to 1 300 MHz	
L band II	1 559 MHz to 1 610 MHz	
S band	2483.5 MHz to 2500 MHz	

**Note:**

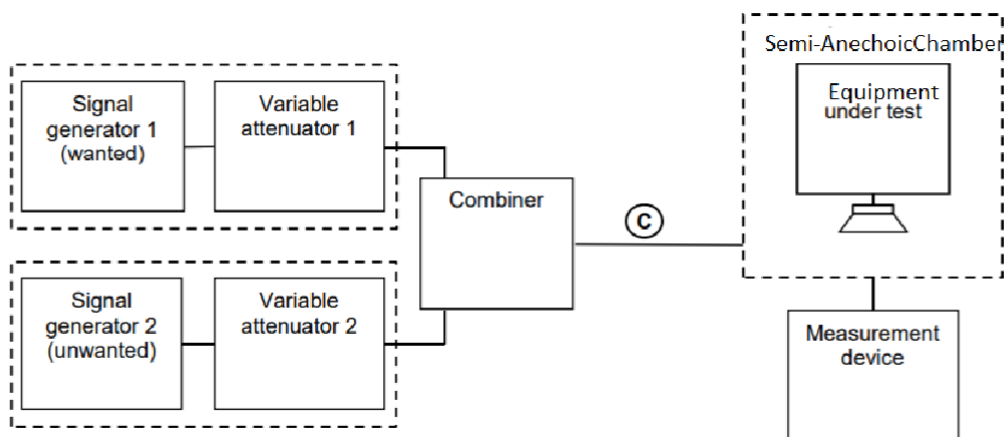
- i. The equipment may operate in part of the bands or cover the full bands listed in Table 1 above.
- ii. The above mentioned frequencies are for the purpose of prescribing technical specifications and don't specify the actual allocation of above mentioned services in India. The actual allocation w.r.t to any services will be as per license conditions/regulations of Government of India.
- iii. All the frequency bands mentioned in the table above, may be revised as per the "National Frequency Allocation Plan (NFAP)" in force.

## Annexure II

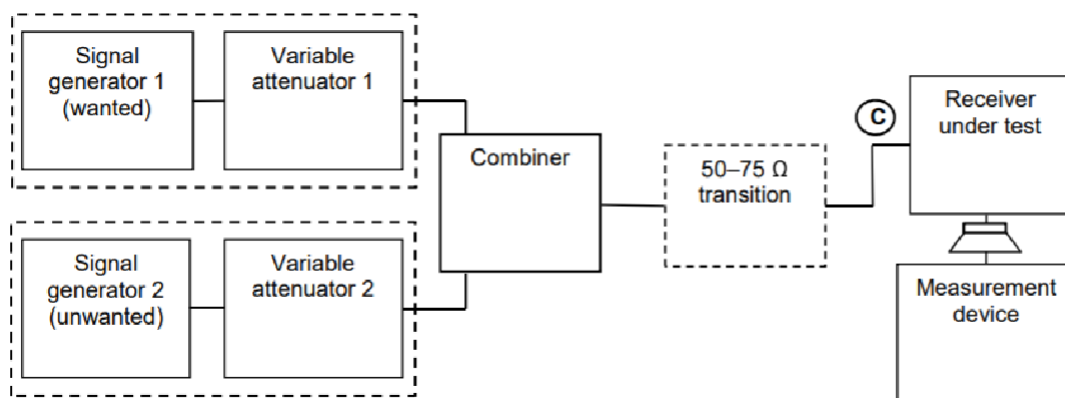
### Test Setup I: To verify the frequency of operation of the EUT (as per applicability defined in standard ETSI EN 303 345-1)

The setups are representative and may vary depending on the equipment under test and specific test methodology.

#### General Test requirement – Radiated Measurements



#### General Test requirement – Conducted Measurements



## **Test Setup II : To verify support for GNSS**

a) To verify support for GPS/NaVIC

Parameter Name	Support for geolocation through GPS/NaVIC
Test Details	Test for facility of identifying the location through satellite-based GPS/NaVIC
Test instruments required	None
Test Setup	Powered on EUT (Equipment Under Test)
Test Procedure	<ol style="list-style-type: none"><li>i. Power on the EUT.</li><li>ii. If the EUT is SIM enabled then deactivate the SIM.</li><li>iii. Go to Settings through appropriate menu in the device to enable GPS/NaVIC functionality.</li><li>iv. Locate the settings to turn Location 'ON'.</li></ol>
Expected Result	<ol style="list-style-type: none"><li>i. Verify that the device is able to display location using satellite based GPS/NaVIC, when SIM(if present) is deactivated.</li></ol>

## ABBREVIATIONS

<To be updated>

CAB	Conformance Assessment Body
	Comité International Spécial des Perturbations
CISPR	Radioélectriques
EMC	Electromagnetic Compatibility
ER	Essential Requirements
ETSI	<i>European Telecommunications Standards Institute</i>
EUT	Equipment Under Test
GHz	Giga Hertz
GPS	Global Positioning System
GSR	General Statutory Rules
IEC	International Electrotechnical Commission
IRNSS	Indian Regional Navigation Satellite System
MHz	Mega Hertz
MTCTE	Mandatory Testing & Certification of Telecom Equipment
NavIC	Navigation with Indian Constellation
NFAP	National Frequency Allocation Plan
TEC	Telecommunication Engineering Center
WPC	Wireless Planning & Coordination

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