

## Amendment-01

### Tender Reference Number: IITK/EE/MJA/2020/01

An Open Tender Enquiry was floated on 14-08-2020 on [www.eprocure.gov.in](http://www.eprocure.gov.in) (**Tender Reference Number: IITK/EE/MJA/2020/01**) to carry out the work of Establishment of EMI/EMC Test Facility including Semi-Anechoic Chamber (SAC), Related Equipment and Accessories for Testing of Medical, Electrical, and Electronic Devices.

A pre bid meeting was held through video conferencing on 25<sup>th</sup> and 26<sup>th</sup> August, 2020 at 4 PM. After the prebid meeting, few amendments are now suggested by the purchase committee in the original bid document. The bid submission date including EMD Fees submission deadline is accordingly extended to 08.10.2020 (16:00 hrs). The technical bid opening date is now extended to 09.10.2020 (16:00 hrs).

Item Number	Existing Provisions of bidding document	Amendments to Bidding Document
	<p><b>SECTION-IV 4. a.</b> The currency of all quoted rates shall be Indian Rupees or an equivalent amount in other currency (US Dollar, Euro etc).</p> <p><b>SECTION-IV 4. b.</b> In case the bidder quotes the prices in different currencies, all such quoted prices will be converted to a single currency viz., Indian Rupees for the purpose of equitable comparison and evaluation, as per the exchange rates established by the Reserve Bank of India for similar transactions, as on the date of 'Price Bid' opening.</p>	<p><b>SECTION-IV 4. a.</b> The currency of all quoted rates shall be Indian Rupees only.</p> <p><b>SECTION-IV 4. b.</b> The bidder will quote the rates in Indian Rupees only. All comparison and evaluation of financial bids will also take place in Indian Rupees.</p>

	<p><b>SECTION-IV 4. e.</b></p> <p>The final tender will however be awarded to the bidder quoting the lowest total price, which is the sum of prices of all the items listed in the BOQ excel file. The item wise price will be used for audit and bookkeeping purposes.</p>	<p><b>SECTION-IV 4. e.</b></p> <p>The final tender will however be awarded to the bidder quoting the lowest total price, taking into account prices of all the items listed in the BOQ excel file and any other prices / Educational discount mentioned in the Additional sheet. The item wise price will be used for audit and bookkeeping purposes.</p> <p>Please note that the latest GFR2017 Amendment dated 4th June (Preference to Make in India) ( P-45021/2/2017-PP(BE-II) will be followed while deciding the bidder to whom the final tender will be awarded. For more details about (P-45021/2/2017-PP(BE-II )</p> <p>Please refer link below:  <a href="#">link.</a></p>
	<p><b>SECTION-IV 10.</b></p> <p><b>Page No.13</b></p> <p>Delivery must be completed within the period mentioned in the tender document from the date of receipt of the order. Penalty @ 1% per week or part thereof subject to a maximum of 10% of the delivery price will be deducted from the balance payment if supply is not completed within stipulated period.</p>	<p><b>SECTION-IV 10.</b></p> <p><b>Page No.13</b></p> <p>Delivery must be completed within the period mentioned in the tender document from the date of receipt of the order. Penalty @ 0.5% per week or part thereof subject to a maximum of 10% of the delivery price will be deducted from the balance payment if supply is not completed within stipulated period.</p>
A: 1.1.5	<p><b>SECTION-V Part A</b></p> <p><b>Page No.15</b></p> <p><b>Quiet zone:</b> 2m X 2m X 2m (L X W X H)</p>	<p><b>SECTION-V Part A</b></p> <p><b>Page No.15</b></p> <p><b>Quiet zone</b></p>

		<p>For radiated immunity as per standard IEC 61000-4-3, CUBICAL: 1.5m X 1.5m X 1.5m</p> <p>For radiated emission as per CISPR 16-1-4, CYLINDRICAL: D=2 m, H=2 m</p>
A: 1.1.7	<p><b>SECTION-V Part A</b> <b>Page No.15</b></p> <p><b>Power and utilities for the Equipment Under Test (EUT):</b></p> <p>Maximum power supply rating EUT: AC: 230 V, 20 A, 50 Hz, 1 Ø and 440 V, 50 A, 50 Hz, 3 Ø.</p> <p>Gas supply should provide the provision for medical gas (e.g. O2, N2, N2O, and Air) inside the chamber. Four pipes of 12 mm diameter.</p> <p>Provision for taking in and bringing out liquid.</p>	<p><b>SECTION-V Part A</b> <b>Page No.15</b></p> <p><b>Power and utilities for the Equipment Under Test (EUT):</b></p> <p>Maximum power supply rating EUT: AC: 230 V, 20 A, 50 Hz, 1 Ø and 440 V, 50 A, 50 Hz, 3 Ø.</p> <p>Gas supply should provide the provision for medical gas (e.g. O2, N2, N2O, and Air) inside the chamber. Four pipes of 12 mm diameter. Provision for taking in and bringing out liquid. The liquid will pass through a tube which passes through the specified pipe of diameter 12mm.</p> <p>Connection panel is required.</p>
A: 1.1.8	<p><b>SECTION-V Part A</b> <b>Page No.16</b></p> <p><b>Chamber Performance Criteria:</b></p>	<p><b>SECTION-V Part A</b> <b>Page No.16</b></p> <p><b>Chamber Performance Criteria:</b></p>

	<p><b>Shielding Effectiveness (SE):</b></p> <p>Magnetic Field : 1 MHz: <math>\geq 80</math> dB  Electric Field: 200 KHz - 50 MHz: <math>\geq 100</math> dB  Plane wave field: 50 MHz – 1 GHz: <math>\geq 100</math> dB  Microwave Field: 1 GHz – 40 GHz: <math>\geq 100</math> As per EN 50147-1</p>	<p><b>Shielding Effectiveness(SE):</b></p> <p>Magnetic Field :  10kHz -100kHz: <math>\geq 60 -80</math> dB  100 kHz -1 MHz <math>\geq 80 -100</math> dB  1 MHz-30MHz : <math>\geq 100</math> dB</p> <p>Electric Field: -  10 kHz -100 kHz : 50 -70 dB  1 MHz- 5MHz: <math>\geq 90 -100</math>dB  5 MHz -100 MHz: <math>\geq 100</math> dB</p> <p>Plane wave field:  10 MHz -1GHz <math>\geq 100</math> dB</p> <p>Microwave Field:  1 GHz – 40GHz: <math>\geq 100</math> dB  As per EN 50147-1 and IEEE 299</p>
	<p><b>Normalized Site Attenuation (NSA):</b>  <math>\pm 4.3</math> dB from 30 MHz – 1 GHz at 3 m distance in the above defined Quiet zone(QZ), as per ANSI C63.4, CISPR 16-1-4</p>	<p><b>Normalized Site Attenuation (NSA):</b>  NSA= <math>\pm 4.0</math> dB  It should be applied for the full span as per standard CISPR 16-1-4 and as per ANSI C63.4.</p>
	<p><b>Site Voltage Standing Wave Ratio (SVSWR) :</b> <math>&lt; 6</math> dB for 1 GHz – 18 GHz, As per CISPR 16-1-4, ANSI C 63.4</p>	<p><b>Site Voltage Standing Wave Ratio (SVSWR) :</b> <math>&lt; 6</math> dB for 1 GHz – 18 GHz, as per CISPR 16-1-4, ANSI C 63.4</p>

	<p><b>Field Uniformity (FU):</b></p> <p>0 to +6 dB at 80 MHz – 6 GHz (75% points in 16 points) as per IEC 61000-4-3 As per IEC 61000-4-3, the analytical result should be provided confirming to given standards EN 50147-1, 2, IEEE 299, ANSI 63.4, CISPR 16-1-4, IEC 61000-4-3.</p> <p>The chamber shall be validated by third party or independent laboratory which is accredited as per ISO 17025: 2005.</p> <p>The bidder shall attach the sample certificate along with technical bid.</p>	<p><b>Field uniformity (FU):</b></p> <p><b>Radiated Susceptibility Test:</b></p> <p>Field uniformity as per IEC 61000-4-3 as per Table -2</p> <p><b>Frequency Range 80 MHz to 1GHz</b></p> <p>Test Level: 30V/m (54 V/m CW) , Test Distance: 3m ,</p> <p>Window Size: 1.5m x 1.5m , 16 Points</p> <p><b>Frequency Range: 1GHz to 6GHz</b></p> <p>Test Level: 30V/m (54V/m CW), Test Distance: 1m ,</p> <p>Window Size: 0.5m x 0.5m, 4 Points</p> <p>0 to +6 dB at 80 MHz – 6 GHz (75% points in 16 points) as per IEC 61000-4-3 As per IEC 61000-4-3, the analytical result should be provided confirming to given standards EN 50147-1, 2, IEEE 299, ANSI 63.4, CISPR 16-1-4, IEC 61000-4-3.</p> <p>The chamber shall be validated by third party or independent laboratory which is accredited as per ISO 17025: 2005. The bidder shall attach the sample certificate along with technical bid.</p>
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**Table 2 – Requirements for uniform field area for application of full illumination, partial illumination and independent windows method**

Frequency range	Requirements of UFA size and calibration when the EUT fits completely within UFA (Full Illumination, the preferred method)	Requirements of UFA size and calibration when the EUT does not fit completely within UFA (Partial Illumination and Independent Windows, the alternative methods)
<b>Less than 1 GHz</b>	<p>Minimum UFA size 0,5 m × 0,5 m</p> <p>UFA size in 0,5 m grid size steps (e.g., 0,5 m × 0,5 m; 0,5 m × 1,0 m; 1,0 m × 1,0 m; etc)</p> <p>Calibration in 0,5 m × 0,5 m grid steps</p> <p>75 % of calibration points within specifications if UFA is larger than 0,5 m × 0,5 m. 100 % (all 4 points) must be in specifications for 0,5 m × 0,5 m UFA.</p>	<p><b>PARTIAL ILLUMINATION</b></p> <p>Minimum UFA size 1,5 m × 1,5 m</p> <p>UFA size in 0,5 m grid size steps (e.g., 1,5 m × 1,5 m; 1,5 m × 2,0 m; 2,0 m × 2,0 m; etc)</p> <p>Calibration in 0,5 m × 0,5 m grid steps</p> <p>75 % of calibration points within specifications</p>

Frequency range	Requirements of UFA size and calibration when the EUT fits completely within UFA (Full Illumination, the preferred method)	Requirements of UFA size and calibration when the EUT does not fit completely within UFA (Partial Illumination and Independent Windows, the alternative methods)
<b>Greater than 1 GHz</b>	<p>Minimum UFA size 0,5 m × 0,5 m</p> <p>UFA size in 0,5 m grid size steps (e.g., 0,5 m × 0,5 m; 0,5 m × 1,0 m; 1,0 m × 1,0 m; etc)</p> <p>Calibration in 0,5 m × 0,5 m grid steps</p> <p>75 % of calibration points within specifications if UFA is larger than 0,5 m × 0,5 m. 100 % (all 4 points) must be in specifications for 0,5 m × 0,5 m UFA.</p>	<p><b>INDEPENDENT WINDOWS METHOD</b></p> <p>0,5 m × 0,5 m window (See Annex H)</p> <p><b>PARTIAL ILLUMINATION</b></p> <p>1,5 m × 1,5 m and larger size windows in 0,5 m increments (e.g., 1,5 m × 2,0 m; 2,0 m × 2,0 m; etc)</p> <p>Calibration in 0,5 m × 0,5 m grid steps</p> <p>75 % of calibration points within specifications if UFA is larger than 0,5 m × 0,5 m. 100 % (all 4 points) must be in specifications for 0,5 m × 0,5 m UFA.</p>

<p>A:1.2.1</p>	<p><b>SECTION-V Part A</b> <b>Page No.17</b></p> <p><b>Dimensions:</b> Minimum External Dimension: 9 m x 6 m x 6 m approx. Building site is an existing laboratory. Floor plan is given in Annexure IV. Suggested modifications to the building for optimum placement of the chamber should be mentioned by the bidder. The suggested modifications to the building will be carried out by IIT Kanpur.</p>	<p><b>SECTION-V Part A</b> <b>Page No.17</b></p> <p><b>Dimensions:</b> Minimum internal dimension: 8m x 5m x 5.5m (L X W X H)  (Remaining specification of S.No.A: 1.2.1 is same as existing tender )</p>
<p>A:1..2.3</p>	<p><b>SECTION-V Part A</b> <b>Page No.18</b></p> <p><b>Hybrid pyramidal absorbers</b></p> <p>Full coverage non-drooping with polyurethane foam or latest thin film technology absorbers</p> <ul style="list-style-type: none"> <li>● High Field withstand capacity (at least 200 V/m)</li> <li>● Fire retardant as per UL/DIN/IEC as per DIN 4102</li> <li>● Removable and replaceable</li> <li>● Clean room compatible absorbers according to ISO 14644-1 class 5 / class 100000</li> </ul> <p>- RF testing as per IEEE1128</p>	<p><b>SECTION-V Part A</b> <b>Page No.18</b></p> <p><b>Hybrid pyramidal absorbers</b></p> <p>Full coverage non-drooping with polystyrene/polyurethane foam/latest thin film technology absorbers</p> <ul style="list-style-type: none"> <li>● High Field withstand capacity (at least 200 V/m)</li> <li>● Fire retardant as per UL/DIN/IEC as per DIN 4102</li> <li>● Removable and replaceable</li> <li>● Clean room compatible absorbers according to ISO 14644-1 class 5 / class 100000</li> <li>● RF Testing as per EN 13501-1 and IEEE1128</li> </ul>
<p>A:1.2.5</p>	<p><b>SECTION-V Part A</b></p> <p><b>Page No. 18</b> <b>Floor and ground plane</b></p>	<p><b>SECTION-V Part A</b></p> <p><b>Page No. 18</b> <b>Floor and ground plane</b></p>



	<p>Raised floor of required height with load bearing capacity of at least 1500 kg/m<sup>2</sup> with floor entry panels included.</p> <p>Anti-moisture mat should also be included under the shielded floor.</p> <p>Multi sheeted mat located inside the main door and it has the same width as that of the shielded door.</p> <p>Suitable below floor clearance for turntable installation</p>	<p>Raised floor of required height with load bearing capacity of at least 1500 kg/m<sup>2</sup> with floor entry panels included.</p> <p>Anti-moisture mat should also be included under the shielded floor.</p> <p><b>Clean-Walk Mat:</b> Multi sheeted mat and it has the same width as that of the shielded door.</p> <p>Suitable below floor clearance for turntable installation</p>
A: 1.2.7	<p><b>SECTION-V Part A</b></p> <p><b>Page No. 19</b></p> <p><b>RF Shielded Door (Main)</b> 2.0m x 2.1m Double leaf knife edge swing door, electrically and pneumatically operated (1500 kg load capacity).</p> <ul style="list-style-type: none"> <li>● Test in progress” Display with Interlock Switch.</li> <li>● Easy to operate, light weight with standard sealing.</li> <li>● Should be able to shut off the RF in the event of door being opened during Immunity Testing</li> <li>● Should provide door maintenance kit</li> </ul>	<p><b>SECTION-V Part A</b></p> <p><b>Page No. 19</b></p> <p><b>RF Shielded Door (Main)</b> 2.1 m x 2.1 m , Fully automatic, electrically operated sliding door. (1500 kg load capacity).</p> <ul style="list-style-type: none"> <li>● Test in progress” Display with Interlock Switch.</li> <li>● Easy to operate, light weight with standard sealing.</li> <li>● Should be able to shut off the RF in the event of door being opened during Immunity Testing</li> <li>● Should provide moving ramp</li> </ul>

	<ul style="list-style-type: none"> <li>● Provide compressor in case of pneumatic door</li> </ul> <p>Provide the separate price for all types of doors.</p>	<ul style="list-style-type: none"> <li>● Should provide door maintenance kit</li> </ul>
A: 1.2.8	<p><b>SECTION-V Part A</b> <b>Page No. 19</b></p> <p>Semi-automatic Single leaf swing door of size 1.2m x 2.1m</p> <ul style="list-style-type: none"> <li>● RF shielded swing door and limit switch to accommodate immunity interlock</li> </ul> <p>Test in progress” Display with Interlock Switch.</p>	<p><b>SECTION-V Part A</b> <b>Page No. 19</b></p> <p>Semi-automatic, single leaf Pneumatically operated door of size 1.2m x 2.1m</p> <ul style="list-style-type: none"> <li>● RF shielded swing door and limit switch to accommodate immunity interlock.</li> <li>● Provide compressor for pneumatic door</li> <li>● Test in progress” Display with Interlock Switch.</li> </ul>
A:1.2.10	<p><b>SECTION-V Part A</b> <b>Page No. 20</b></p> <p><b>Lighting</b></p> <p>EMI-Free LED lights (minimum 5 in number) of (60W-100W) and (with electrical distribution and filtering. Capable of withstanding the produced field strength.</p> <p>Test in Progress Lights over SAC door and CR door;</p> <p>EMI Free Emergency lighting system with</p>	<p><b>SECTION-V Part A</b> <b>Page No. 20</b></p> <p><b>Lighting</b></p> <p>Sign board can be fluorescent illumination</p> <p>EMI-Free LED lights (minimum 5 in number) of (60W-100W) and with electrical distribution and filtering.</p> <p>Capable of withstanding the produced field strength.</p> <p>Test in Progress Lights over SAC door and CR door; EMI Free Emergency lighting system with rechargeable battery</p>

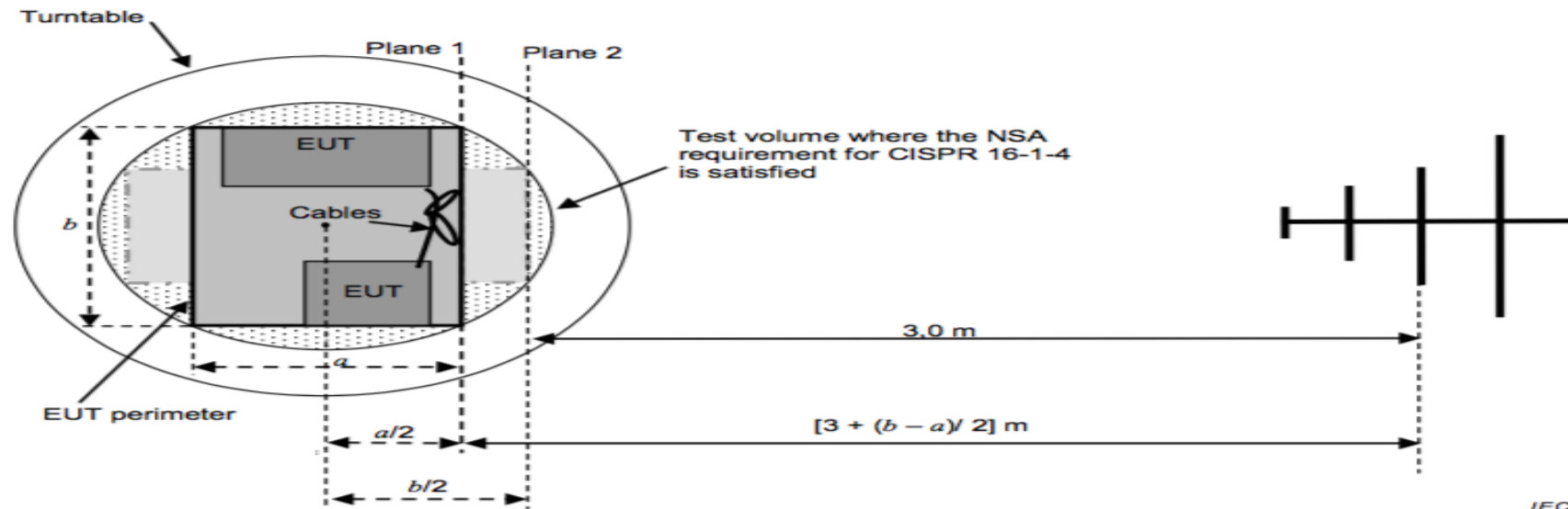
	<p>rechargeable battery backup to be provided above the exit door.</p> <p>Signal lights over SAC, CR and AR doors.</p> <p>Ladder provided for lighting maintenance.</p>	<p>backup to be provided above the exit door.</p> <p>Signal lights over SAC, CR and AR doors.</p> <p>Ladder provided for lighting maintenance.</p> <p>All lighting, Indicator lights and Safety Signs compliant as per standard IEC 60601-1</p>
A:1.2.12	<p><b>SECTION-V Part A</b> <b>Page No.21</b></p> <p><b>Reference radiator</b> To evaluate chamber and test instrument performance</p>	<p><b>SECTION-V Part A</b> <b>Page No.21</b></p> <p><b>Reference radiator</b> only one reference generator is required. A:1.2.12 and B:4.2.3 are the same and quantity is one number.</p>
A:1.2.13	<p><b>SECTION-V Part A</b> <b>Page No.21</b></p> <p><b>RF Filters</b> Power line Filters with more than 100 dB insertion loss from 9 kHz to 40 GHz as per CISPR17</p> <p>For EUT</p> <p>- 1 Ø, 230V AC, 50 Hz,20 A, 2 lines (1 Ø + neutral) - 2 number</p>	<p><b>SECTION-V Part A</b> <b>Page No.21</b></p> <p><b>RF Filters</b> Power line Filters as per CISPR17</p> <p>Frequency: 9kHz -40 GHz,</p> <p>Loss: 9 kHz-14kHz ( 60 dB insertion loss or more) :14kHz-40 GHz ( 100 dB insertion loss )</p>

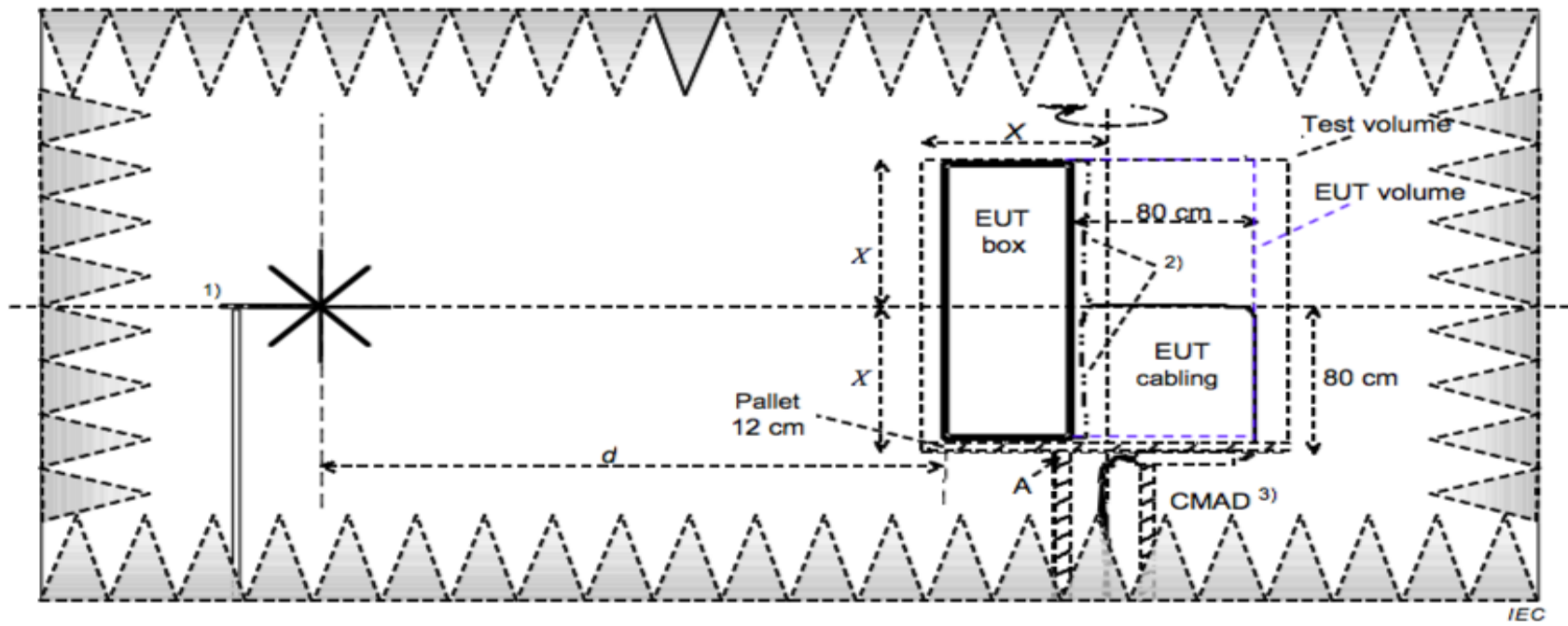
	<ul style="list-style-type: none"> <li>- 3 Ø, 4 Line, 440 V, 50 Hz, 50 A – 2 number</li> <li>- DC, 2 line, 300 V, 25A – 2 number</li> </ul> <p>Filters are to be provided as per requirement of Lighting, Antenna mast, Turntable, Fire detection system, CCTV, Intercom, VOIP phone and Ethernet.</p>	<p>For EUT</p> <ul style="list-style-type: none"> <li>- 1 Ø, 230V AC, 50 Hz, 20 A, 2 lines (1 Ø + neutral) - 2 number</li> <li>- 3 Ø, 4 Line, 440 V, 50 Hz, 50 A – 2 number</li> <li>- DC, 2 line, 300 V, 25A – 2 number</li> </ul> <p>Filters are to be provided as per requirement of Lighting, Antenna mast, Turntable, Fire detection system, CCTV, Intercom, VOIP phone and Ethernet.</p>
A: 1.2.14	<p><b>SECTION-V Part A</b> <b>Page No.21</b></p> <p><b>Device controller:</b> The device controller, being operated using software from the control room, shall control various devices such as RF source, external receivers, amplifiers, power meters, antenna mast, turntable, and other equipment in the test loop etc. Provision should be there to control the devices manually. This should facilitate all the testing being carried out in the chamber, including radiated emission and immunity.</p>	<p><b>SECTION-V Part A</b> <b>Page No.21</b></p> <p><b>Device controller:</b> The device controller, being operated using software from the control room, shall control various devices such as RF source, external receivers, amplifiers, power meters, and other equipment in the test loop etc. Provision should be there to control the devices manually. This should facilitate all the testing being carried out in the chamber, including radiated emission and immunity.</p>

<p>A: 1.2.16</p>	<p><b>SECTION-V Part A</b> <b>Page No.22</b></p> <p>Antenna Mast</p> <p>Scanning range from 1m to 4m with accuracy of <math>\pm 2</math> cm or better</p> <ul style="list-style-type: none"> <li>● Remotely controllable with fiber optic control lines</li> <li>● Centerline Polarization for better accuracy</li> <li>● Variable Speed Drive</li> <li>● Electrically operated</li> </ul> <p>All the fittings, wiring is to be carried out by the bidder.</p>	<p><b>SECTION-V Part A</b> <b>Page No.22</b></p> <p>Boresight Antenna Mast</p> <ul style="list-style-type: none"> <li>● The mast should have the capability to orient the antenna boresight towards EUT during vertical movement of the antenna.</li> <li>● Provision to control a Tilt angle automatically (compliant as per CISPR 16-1-4 Boresight)</li> <li>● Scanning range from 1m to 4m with accuracy of <math>\pm 2</math> cm or better</li> <li>● Remotely controllable with fiber optic control lines</li> <li>● Centerline Polarization for better accuracy</li> <li>● Variable Speed Drive</li> <li>● Electrically operated / Pneumatic operated</li> <li>● All the fittings, wiring is to be carried out by the bidder.</li> </ul>
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<p>A: 1.2.17</p>	<p><b>SECTION-V Part A</b>  <b>Page No.22</b></p> <p><b>Turntable</b></p> <p>One optimum size duty turntable with standard diameter 2m, payload 1500 kg and variable drive speed.  Fiber optic controllable and terminal box with access cover plate  More information is required on specification, drive, hold, positioning accuracy, etc.</p>	<p><b>SECTION-V Part A</b>  <b>Page No.22</b></p> <p><b>Turntable</b></p> <p>Turntable should be placed at the centre of the front wall as per standard CISPR 16-1-4 and CISPR 16-2-3. Refer below Figure 1.</p> <p>One optimum size duty turntable with standard diameter 2m, payload 1500 kg and variable drive speed.</p> <p>Fiber optic controllable and terminal box with access cover plate</p>
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Figure 1





<p>A: 1.2.21</p>	<p><b>SECTION-V Part A</b> <b>Page No.23</b></p> <p><b>Electrical Distribution panel</b> Power distribution box with ELCB, MCB/MCCB and RCCB – 1 Number</p> <ul style="list-style-type: none"> <li>● Light ON/OFF switches as per requirement.</li> <li>● ON/OFF control switches for turntable and antenna mast</li> </ul> <p>EUT outlets 32 A - 3 phase with neutral and single phase</p>	<p><b>SECTION-V Part A</b> <b>Page No.23</b></p> <p><b>Electrical Distribution panel</b></p> <p>Power distribution box with MCB/MCCB and RCCB – 1 Number or as per requirement</p> <ul style="list-style-type: none"> <li>● Light ON/OFF switches as per requirement.</li> <li>● ON/OFF control switches for turntable and antenna mast</li> </ul> <p>EUT outlets 32 A - 3 phase with neutral and single phase</p>
<p>A: 2.2</p>	<p><b>SECTION-V Part A</b> <b>Page No.24</b></p> <p><b>RF shielded Door between Outside and CR:</b></p> <p>Semi-automatic RF shielded swing door. Should have “Test in progress” Display</p>	<p><b>SECTION-V Part A</b> <b>Page No.24</b></p> <p><b>RF shielded Door between Outside and CR:</b></p> <p>Size :1.2m (W) x 2.1m (H)</p> <p>Semi-automatic, single leaf, Pneumatically operated door .</p> <p>“Test in progress” Display with Interlock Switch</p>
<p>A: 2.7</p>	<p><b>SECTION-V Part A</b> <b>Page No.25</b></p> <p><b>Power line filters</b></p>	<p><b>SECTION-V Part A</b> <b>Page No.25</b></p> <p><b>Power line filters</b></p>



	<p>RF Power line Filters with 100dB insertion loss from 9 kHz to 40 GHz</p> <ul style="list-style-type: none"> <li>● For Instrumentation, Lighting and other accessories: 3 Ø, 4Line, 440 V, 50 Hz, 25 A – 1 Number.</li> </ul> <p>Shielded optical converter for Ethernet - 1 each</p>	<p>RF Power line Filters with</p> <p>:9 kHz to 14 kHz ( 60 dB insertion loss or more)</p> <p>:14kHz to 40 GHz ( 100 dB insertion loss )</p> <ul style="list-style-type: none"> <li>● For Instrumentation, Lighting and other accessories: 3 Ø, 4Line, 440 V, 50 Hz, 25 A – 1 Number.</li> <li>● Shielded optical converter for Ethernet - 1 each</li> </ul>
<p>A: 2.8</p>	<p><b>SECTION-V Part A</b> <b>Page No.25</b></p> <p><b>Electrical Distribution panel for CR</b></p> <p>Power distribution box with ELCB, MCB/MCCB or RCCB – 1 Number</p> <ul style="list-style-type: none"> <li>● Light ON/OFF switches as per requirement.</li> <li>● Power points (1 Ø, 230V - 5/15A) with switch along the wall of the CR.</li> <li>● 3 Ø outlets at specific locations</li> </ul>	<p><b>SECTION-V Part A</b> <b>Page No.25</b></p> <p><b>Electrical Distribution panel for CR</b></p> <p>Power distribution box with MCB/MCCB or RCCB – 1 Number or as per requirement.</p> <p>Power points (1 Ø, 230V -5/15A) with switch - as decided by the bidder for the instruments supplied by the bidder.</p> <ul style="list-style-type: none"> <li>● Light ON/OFF switches as per requirement.</li> <li>● Power points (1 Ø, 230V - 5/15A) switch along the wall of the CR.</li> </ul> <p>Power points (1 Ø, 230V -5/15A) with switch - as decided by the bidder for the instruments supplied by the bidder.</p>

		<p>Quantity: Total Number (approx.) for SAC,CR,AR,NSR</p> <p>1 Ø, 230V -5/15A with switch - 40 Number (approx.) as per standard IEC 60601-1</p> <p>● 3 Ø outlets at specific locations</p>
<p>A: 2.9</p>	<p><b>SECTION-V Part A</b> <b>Page No.25</b></p> <p><b>Test environment</b> Must provide a user-friendly system with a required number of tables, racks, trolleys and furniture.</p>	<p><b>SECTION-V Part A</b> <b>Page No.25</b></p> <p><b>Test environment</b> Must provide a ergonomically designed with a required number of tables, racks, trolleys and furniture</p> <p><b>Table:</b></p> <p><b>EUT Table :</b> Size: L(2m) x W(1m) x H(0.8m) Styrofoam /PVC Table as per standard IEC 61000-4-3 and CISPR 11</p> <p><b>Controller/PC Table: 5 Number</b> Size: L(2m) x W(1mm) x H(0.8m) (approx dimension)</p> <p><b>Conducted Emission Table - 1 Number</b> Wooden table with appropriate ground plane sheets as per standard CISPR 11 requirement. 2m x 1m x 0.8 m (L X B X H) with 100 kg load bearing capacity.</p>

		<p><b>Conducted susceptibility Table - 1 Number</b> Wooden table as per standard IEC 61000-4-6 requirement. Size: 2m x 1m x 0.8 m (L X B XH) with 100 kg load bearing capacity</p> <p><b>Printer Table – 1 Number</b> Suitable for printer placement.</p> <p><b>Racks: 4 Number</b> RE System – Min. 32 U, 19” Rack RS System – Min 32 U, 19” Rack CS System – Min 24 U, 19” Rack Additional rack - Min. 32 U, 19” Rack</p> <p><b>Trolleys: 3</b> 500 kg load capacity -1 Number ( Hand Pallet, Hydraulic trolley,) 500 kg Load capacity -1 Number ( Metal type, Moving trolley, ) 250 kg Load capacity -1 Number ( Metal type, Hydraulic Scissor lifting Trolley, Lifting height 0.9m Minimum ) Trolley dimension should be such that it could easily move inside EMI /EMC Test facility and does not damage flooring.</p> <p><b>Chair (Revolving chair) :8 Number</b> Dimensions: W x H x D (cm) (76 x 99.5-108.8 x 76) approx Seat Height adjustable (cm) (44.5-53.8) approx Primary Material: Glass-filled poly-amide</p>
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		Upholstery Material: Knitted Fabric
A: 3.7	<b>SECTION-V Part A</b> <b>Page No.26</b>  <b>Resolution bandwidth:</b> 10 Hz-10 MHz	<b>SECTION-V Part A</b> <b>Page No.26</b>  <b>Resolution bandwidth:</b> 10 Hz-8 MHz
A: 3.16	<b>SECTION-V Part A</b> <b>Page No.27</b>  <b>Total measurement uncertainty</b> $\leq 1$ dB	<b>SECTION-V Part A</b> <b>Page No.27</b>  <b>Total measurement uncertainty</b> $\leq 1.0$ dB or better for frequencies $< 1$ GHz  $\leq 1.5$ dB or better for frequencies $> 1$ GHz
A: 3.17	<b>SECTION-V Part A</b> <b>Page No.27</b>  <b>Tracking generator:</b> Needed	<b>SECTION-V Part A</b> <b>Page No.27</b>  <b>Tracking generator:</b> Not Required
A: 3.20	<b>SECTION-V Part A</b> <b>Page No.27</b>  <b>Average Noise level:</b> Average Detector On , RF Atten- 0dB Pre-amp OFF, $\leq 19$ dB $\mu$ V Pre-amp ON, $\leq 8$ dB $\mu$ V	<b>SECTION-V Part A</b> <b>Page No.27</b>  <b>Average Noise level:</b> Pre-amp OFF, $\leq 27$ dB $\mu$ V Pre-amp ON, $\leq 14$ dB $\mu$ V @ measurement bandwidths as per CISPR 16-1-1

		<p>Above 1GHz: Resolution bandwidth: 1MHz</p> <p>Below 1GHz: Resolution bandwidth: 120 kHz</p>
A:4.1	<p><b>SECTION-V Part A</b> <b>Page No.31</b></p> <p><b>Type of Chamber and Dimension</b></p> <p>Modular Pan Type Shielded Amplifier Room.</p> <ul style="list-style-type: none"> <li>● Hot galvanised sheet steel / conductive material</li> <li>● Zinc galvanisation on every side of the shielding to resist corrosion.</li> <li>● Corners of the shielded room should be secured properly</li> </ul> <p>Aesthetically pleasing floor tiles applied with adhesive over the exposed steel surface</p>	<p><b>SECTION-V Part A</b> <b>Page No.31</b></p> <p><b>Type of Chamber and Dimension</b></p> <p>Size: 4.0m (L) x 2.0m (W) x 3.0 m (H) minimum</p> <p>Modular Pan Type Shielded Amplifier Room.</p> <ul style="list-style-type: none"> <li>● Hot galvanised sheet steel / conductive material</li> <li>● Zinc galvanisation on every side of the shielding to resist corrosion.</li> <li>● Corners of the shielded room should be secured properly</li> <li>● Aesthetically pleasing floor tiles applied with adhesive over the exposed steel surface</li> </ul>
A:4.2	<p><b>SECTION-V Part A</b> <b>Page No.31</b></p> <p><b>RF shielded Door between Outside and AR</b></p> <p>Single leaf swing door of size - 1.2m(W) x 2.1m(H) Should have “Test in progress” Display and automatic lock facility</p>	<p><b>SECTION-V Part A</b> <b>Page No.31</b></p> <p><b>RF shielded Door between Outside and AR</b></p> <p>Semi-automatic, single leaf, Pneumatically operated door.</p> <p>Size -: 1.2m(W) x 2.1m(H) Should have “Test in progress” Display and automatic lock facility</p>
A:4.5	<b>SECTION-V Part A</b>	<b>SECTION-V Part A</b>

	<p><b>Page No.32</b></p> <p><b>Power line filters</b></p> <p>RF Power line Filters with 100dB insertion loss from 9 kHz to 40 GHz For Instrumentation / Lighting and Others: 3 Ø - 4 Line, 440 V, 50 Hz, 50 A – 1 number</p>	<p><b>Page No.32</b></p> <p><b>Power line filters</b></p> <p>9kHz-14kHz ( 60 dB insertion loss or more) 14kHz-40GHz ( 100 dB insertion loss )</p> <ul style="list-style-type: none"> <li>• For Instrumentation / Lighting and Others: 3 Ø - 4 Line, 440 V, 50 Hz, 50 A – 1 number</li> </ul>
A:4.6	<p><b>SECTION-V Part A</b> <b>Page No.32</b></p> <p><b>Electrical Distribution panel for AR</b> Power distribution box with ELCB, MCCB, and RCCB – 1 Number.</p> <ul style="list-style-type: none"> <li>• Light ON/OFF switches as per requirement. ON/OFF switches for instruments with at least 3 extra for future.</li> </ul>	<p><b>SECTION-V Part A</b> <b>Page No.32</b></p> <p><b>Electrical Distribution panel for AR</b> Power distribution box with MCCB, and RCCB – 1 Number.</p> <ul style="list-style-type: none"> <li>• Light ON/OFF switches as per requirement.</li> <li>• ON/OFF switches for instruments with at least 3 extra for future.</li> </ul>
A:4.7	<p><b>SECTION-V Part A</b> <b>Page No.32</b></p> <p><b>Connector panels and penetration on amplifier room</b> Appropriate size panels containing the following connectors with RF shielded connector caps.</p> <ul style="list-style-type: none"> <li>• BNC (F), SMA (F), 7/16 DIN (F) (Quantity- 4 each)</li> </ul>	<p><b>SECTION-V Part A</b> <b>Page No.32</b></p> <p><b>Connector panels and penetration on amplifier room</b> Appropriate size panels containing the following connectors with RF shielded connector caps.</p>

	<ul style="list-style-type: none"> <li>● N type(F)- Quantity 6</li> <li>● Fiber optic (FO) cables, connectors, adaptors: as per requirement</li> <li>● 1½” diameter pipe penetration with cap</li> <li>● 6-way Fiber optic feed through – 1 Number</li> <li>● RS232, RS485</li> </ul>	<ul style="list-style-type: none"> <li>● BNC (F), SMA (F), 7/16 DIN (F) (Quantity- 4 each)</li> <li>● N type(F)- Quantity 6</li> <li>● 1½” diameter pipe penetration with cap</li> <li>● 6-way Fiber optic feed through – 1 Number</li> <li>● Fiber optic (FO) cables, ST penetration for FO cables – 4 Number FSMA penetration for FO cables – 4 Number</li> <li>Adaptors : 6 Number (Approx) bidder can decide as per requirement</li> <li>● RS232-1 Number</li> <li>● RS485-1 Number</li> <li>● Connector panel: Required FO shielded</li> </ul>
A: 5.3	<p><b>SECTION-V Part A</b> <b>Page No.33</b></p> <p>Civil Works</p> <p>Epoxy flooring (Electrostatic) as per standard has to be carried out by the bidder.</p>	<p><b>SECTION-V Part A</b> <b>Page No.33</b></p> <p>Civil Works</p> <p>Epoxy flooring (Electrostatic) as per standard has to be carried out by the bidder.</p>

	<p>False ceiling – Bidder to provide false ceiling along with all necessary supporting structures.</p> <p>Painting – Epoxy Wall Painting as per standard has to be carried out by the bidder.</p>	<p>False ceiling – Bidder to provide false ceiling along with all necessary supporting structures.</p> <p><b>For NSR floor :Epoxy on floor</b></p> <p>Painting – Wall Painting as per standard has to be carried out by the bidder.</p>
A:6.7	<p><b>SECTION-V Part A</b> <b>Page No.35</b></p> <p><b>Air conditioning system (SAC, CR, AR and NSR)</b> Air conditioning system to be installed as per the latest international environment guidelines.</p> <p>Temperature: <math>22 \pm 2</math> °C Humidity: <math>50\% \pm 5\%</math> or as per the requirement of the instrument and chamber, whichever is more stringent. The system shall take into account the heat load inside the various rooms considering rating of RF power amplifiers, filter rating, lighting system, typical EUT requirement and all measurement systems, etc.</p> <p>Ductable packaged A/C unit from reputed brands to be used.</p> <p>Bidders should advise the recommended tonnage for AC by considering the temperature and humidity factors.</p>	<p><b>SECTION-V Part A</b> <b>Page No.35</b></p> <p><b>Air conditioning system (SAC, CR, AR and NSR)</b> EUT (max load): Maximum 4 kVA</p> <p>Air conditioning system to be installed as per the latest international environment guidelines.</p> <p>Temperature: <math>24 \pm 2</math> °C Humidity: <math>50\% \pm 5\%</math> or as per the requirement of the instrument and chamber, whichever is more stringent. The system shall take into account the heat load inside the various rooms considering rating of RF power amplifiers, filter rating, lighting system, typical EUT requirement and all measurement systems, etc.</p> <p>Ductable packaged A/C unit from reputed brands to be used.</p> <p>Bidders should advise the recommended tonnage for AC by considering the temperature and humidity factors.</p>



	<p>System shall provide effective humidity control</p> <p>Duct noise should be within the required safe level. The duct should have adequate internal acoustic lining and thermal insulation. Return duct to package A/C unit should be provided.</p> <p>Adequate arrangement for treated fresh air inside the chamber to be considered in the design of air conditioning systems.</p>	<p>System shall provide effective humidity control</p> <p>Duct noise should be within the required safe level. The duct should have adequate internal acoustic lining and thermal insulation. Return duct to package A/C unit should be provided.</p> <p>Adequate arrangement for treated fresh air inside the chamber to be considered in the design of air conditioning systems.</p>
A: 7	<p><b>SECTION-V Part A</b> <b>Page No. 39</b></p> <p><b>INTEGRATED SYSTEM SOFTWARE</b></p> <p><b>Radiated Emission / Conducted Emission:</b></p> <p>It should Pre-Scan routine to find peaks and final scan routines.</p> <p>Option to compare 2 different scans.</p> <p>Able to make uncertainty measurements.</p>	<p><b>SECTION-V Part A</b> <b>Page No. 39</b></p> <p><b>INTEGRATED SYSTEM SOFTWARE</b></p> <p><b>Radiated Emission / Conducted Emission:</b></p> <p>It should Pre-Scan routine to find peaks and final scan routines.</p> <p>Option to compare 2 different scans.</p>

B:1	<p><b>SECTION-V Part B</b> <b>Page No.43</b></p> <p><b>Radiated Susceptibility Test System</b></p> <p><b>Frequency</b> :80 MHz – 6 GHz minimum Test : 30 V/m (54 V/m CW) As per IEC 60601-1-2 with reference to IEC 61000-4-3.</p>	<p><b>SECTION-V Part B</b> <b>Page No.43</b></p> <p><b>Radiated Susceptibility Test System</b></p> <p><b>Frequency</b> :80 MHz – 6 GHz minimum Test level: 30 V/m (54 V/m CW) As per IEC 60601-1-2 with reference to IEC 61000-4-3.</p> <p><b>Frequency Range 80 MHz to 1GHz</b> Test Level: 30V/m (54 V/m CW) , Test Distance: 3m , Window Size: 1.5m x 1.5m , 16 Points</p> <p><b>Frequency Range: 1GHz to 6GHz</b> Test Level: 30V/m (54V/m CW), Test Distance: 1m , Window Size: 0.5m x 0.5m, 4 Points</p> <p>As specified in Table 2 of IEC 61000-4-3 given in A:1.1.8</p>
B: 1.1.8	<p><b>SECTION-V Part B</b> <b>Page No.43</b></p> <p><b>Phase noise</b> &lt; -125 dBc/Hz</p>	<p><b>SECTION-V Part B</b> <b>Page No.43</b></p> <p><b>Phase noise</b> &lt; -120 dBc/Hz @ 1 GHz, 20 kHz offset</p>
B: 1.2.5	<p><b>SECTION-V Part B</b> <b>Page No.46</b></p> <p><b>VSWR</b> ≤ 1.5</p>	<p><b>SECTION-V Part B</b> <b>Page No.46</b></p> <p><b>VSWR</b> ≤ 2</p>
B: 1.2.6	<p><b>SECTION-V Part B</b> <b>Page No.46</b></p>	<p><b>SECTION-V Part B</b> <b>Page No.46</b></p>

	<p><b>Rated output power</b> 1000 W (typical) The amplifier should be able to generate typically 30 V/m at a distance of 3m from the transmitting antenna while working in the linear region</p>	<p><b>Rated output power Range</b> :500 W to 1200 W</p> <p>The amplifier should be able to generate typically 30 V/m at a distance of 3m from the transmitting antenna while working in the linear region</p> <p>30 V/m at a distance of 3m over window of size: 1.5m x1.5 m</p>
B: 1.2.7	<p><b>SECTION-V Part B</b> <b>Page No.46</b></p> <p><b>Power output at 1dB compression</b></p> <p>1000 Watts (typical)</p>	<p><b>SECTION-V Part B</b> <b>Page No.46</b></p> <p><b>Power output at 1dB compression</b></p> <p>minimum 1000 Watts &lt; 400 MHz</p> <p>minimum 850 Watts &gt; 400MHz</p>
B:1.2.10	<p><b>SECTION-V Part B</b> <b>Page No.47</b></p> <p><b>Harmonic distortion</b></p> <p>≤ - 20 dBc at 1 dB compression point</p>	<p><b>SECTION-V Part B</b> <b>Page No.47</b></p> <p><b>Harmonic distortion</b></p> <p>-15 dBc to - 20 dBc at 1 dB compression point</p>
B: 1.2.15	<p><b>SECTION-V Part B</b> <b>Page No.47</b></p> <p><b>Directional coupler:</b> Directional Coupler should have –</p> <ul style="list-style-type: none"> <li>● Low Transmission loss(0.2 dB)</li> </ul>	<p><b>SECTION-V Part B</b> <b>Page No.47</b></p> <p><b>Directional coupler:</b> Directional Coupler should have –</p> <ul style="list-style-type: none"> <li>● Low Transmission loss (0.2 dB)</li> </ul>

	<ul style="list-style-type: none"> <li>● VSWR - 1.5</li> <li>● Better Power Handling capacity (1000 W Typical)</li> <li>● Better coupling factor atleast 50 dB.</li> <li>● Directional Coupler should be calibrated.</li> <li>● Frequency: 80 MHz – 1 GHz.</li> <li>● Power : 1000W</li> </ul>	<ul style="list-style-type: none"> <li>● VSWR - 1.5</li> <li>● Better Power Handling</li> <li>● Capacity (1000 W Typical)</li> <li>● Better coupling factor at least 50 dB.</li> <li>● Directional Coupler should be calibrated.</li> <li>● Frequency: 80 MHz – 1 GHz.</li> <li>● Power : 1000W</li> <li>● Inbuilt/ external directional coupler</li> </ul>
B: 1.3.6	<p><b>SECTION-V Part B</b> <b>Page No.48</b></p> <p><b>Rated output power:</b> 200 watts min</p>	<p><b>SECTION-V Part B</b> <b>Page No.48</b></p> <p><b>Rated output power:</b> 100 Watts to 300 Watts</p> <p>30 V/m at a distance of 1m over window of size: 0.5m x0.5 m</p>
B: 1.3.7	<p><b>SECTION-V Part B</b> <b>Page No.48</b></p> <p><b>Power output at 1dB compression</b> 200 watts min.</p>	<p><b>SECTION-V Part B</b> <b>Page No.48</b></p> <p><b>Power output at 1dB compression</b></p> <p>&lt; 4.5 GHz min. 200 W ≥ 4.5 GHz min. 180 W</p>
B: 1.3.14	<p><b>SECTION-V Part B</b> <b>Page No.48</b></p> <p><b>Directional Coupler</b> Dual Directional Coupler should have</p>	<p><b>SECTION-V Part B</b> <b>Page No.48</b></p> <p><b>Directional Coupler</b> Dual Directional Coupler should have</p>

	<ul style="list-style-type: none"> <li>● Low Transmission loss (0.2 dB)</li> <li>● VSWR - 1.5</li> <li>● Better Power Handling capacity</li> <li>● Better coupling factor at least 40dB.</li> <li>● Directional Coupler should be calibrated.</li> <li>● Coupler Directivity - 20 dB.</li> <li>● Frequency: 1 GHz – 6 GHz ,</li> <li>● Power : 300W</li> </ul>	<ul style="list-style-type: none"> <li>● Low Transmission loss (0.2 dB)</li> <li>● VSWR - 1.5</li> <li>● Better Power Handling capacity</li> <li>● Better coupling factor at least 40dB.</li> <li>● Directional Coupler should be calibrated.</li> <li>● Coupler Directivity - 20 dB.</li> <li>● Frequency: 1 GHz – 6 GHz ,</li> <li>● Power : 300W</li> <li>● Inbuilt/ external directional coupler</li> </ul>
B: 1.4.4	<p><b>SECTION-V Part B</b> <b>Page No.49</b></p> <p><b>Measurement speed:</b> 500 readings/sec</p>	<p><b>SECTION-V Part B</b> <b>Page No.49</b></p> <p><b>Measurement speed:</b> 400 reading /sec</p>
B: 1.5.5	<p><b>SECTION-V Part B</b> <b>Page No.49</b></p> <p><b>Interface :</b>USB/GPIB</p>	<p><b>SECTION-V Part B</b> <b>Page No.49</b></p> <p><b>Interface :</b>USB/GPIB This requirement has been moved to B: 1.4.8</p>
B:1.6	<p><b>SECTION-V Part B</b> <b>Page No.49</b></p> <p><b>ANTENNA-1: Bi-conical Antenna or Any Other Suitable Type</b></p> <p>Frequency 30 MHz – 300 MHz Impedance 50 Ω</p>	<p><b>SECTION-V Part B</b> <b>Page No.49</b></p> <p><b>ANTENNA-1: Bi-conical</b> Frequency 30 MHz – 300 MHz Impedance 50 Ω VSWR ≤ 2:1 Gain 2 dBi (Typical)</p>

	<p>VSWR <math>\leq</math> 2:1  Gain 2 dBi (Typical)  Polarisation Vertical and horizontal  Connectors Type</p>	<p>Polarisation Vertical and horizontal  Connectors Type</p>
B:1.7	<p><b>SECTION-V Part B</b>  <b>Page No.50</b></p> <p><b>Antenna 2: Log Periodic Antenna</b>  Frequency: 200 MHz – 1 GHz  Impedance: 50 <math>\Omega</math>  VSWR: <math>\leq</math> 2:1  Gain : 10 dBi  Power handling capacity :1 kW  Polarisation : Horizontal and vertical  Connector : Type N female</p>	<p><b>SECTION-V Part B</b>  <b>Page No.50</b></p> <p><b>Antenna 2: Log Periodic Antenna</b>  Frequency: 200 MHz – 1 GHz  Impedance: 50 <math>\Omega</math>  VSWR: <math>\leq</math> 2:1  Gain : 8.5 dBi (Typical)  Power handling capacity :1 kW  Polarisation : Horizontal and vertical  Connector : Type N female</p>
B:1.8	<p><b>SECTION-V Part B</b>  <b>Page No.50</b></p> <p><b>Antena 3-Standard Gain Horn Antenna</b>  Frequency: 1 GHz – 18 GHz  VSWR: <math>\leq</math> 2:1  Power handling capacity: <math>\geq</math> 200 W  Polarisation: Horizontal and vertical  Gain: 10-18 dBi (Typical)</p>	<p><b>SECTION-V Part B</b>  <b>Page No.50</b></p> <p><b>Antena 3-Standard Gain Horn Antenna</b>  Frequency: 1 GHz – 18 GHz  (Can be split in two bands only, 1GHz to 6 GHz and 6 GHz to 18 GHz. )  VSWR: <math>\leq</math> 2:1  Power handling capacity: <math>\geq</math> 200 W</p>

	Impedance: 50 $\Omega$ Connector: Type N female	Polarisation: Horizontal and vertical Gain: 10-18 dBi (Typical) Impedance: 50 $\Omega$ Connector: Type N female
B: 1.9.1.3	<b>SECTION-V Part B</b> <b>Page No.51</b>  <b>Field strength range-</b> 0.1 - 100 V/m	<b>SECTION-V Part</b> <b>Page No.51</b>  <b>Field strength range -</b> 2V/m -800 V/m
B:2.4.1	<b>SECTION-V Part B</b> <b>Page No.53</b>  <b>DUAL DIRECTIONAL COUPLER</b>  Frequency : 4 KHz - 400 MHz Power handling : According to RF power amplifier Input Impedance : 50 Ohms Output Impedance : 50 Ohms VSWR : $\leq 1.5$ Insertion Loss : $\leq 0.7$ dB "Coupling factor" : $\geq 40$ dB for forward and reverse power ports.	<b>SECTION-V Part B</b> <b>Page No.53</b>  <b>DUAL DIRECTIONAL COUPLER</b>  <b>Required External directional coupler .</b>  Frequency : 4 KHz - 400 MHz Power handling : According to RF power amplifier Input Impedance : 50 Ohms Output Impedance : 50 Ohms VSWR : $\leq 1.5$ Insertion Loss : $\leq 0.7$ dB "Coupling factor" : $\geq 40$ dB for forward and reverse power ports.
B:2.4.2.7	<b>SECTION-V Part B</b>	<b>SECTION-V Part B</b>

	<p><b>Page No.55</b></p> <p><b>Attenuators</b></p> <ul style="list-style-type: none"> <li>● 3 dB, 100 watts –1 number</li> <li>● 6 dB, 80 watts - 1 number</li> <li>● 20 dB, 15 watts - 2 number</li> </ul> <p>Connectors should be Compatible with impedance matching units or else adaptors to be included</p>	<p><b>Page No.55</b></p> <p><b>Attenuator :</b></p> <p>T1(Variable attenuator): 3dB to 40dB,125 Watts Quantity: 1 number</p> <p>T2(Fixed attenuator): 6dB, 125 watts Quantity: 1 number</p> <p>T3: 20 dB, 125 watts Quantity: 1 number</p> <p>Connectors should be Compatible with impedance matching units or else adaptors to be included</p>
<p>B:2.4.5</p>	<p><b>SECTION-V Part B</b> <b>Page No.56</b></p> <p><b>BULK CURRENT INJECTION (BCI) PROBE</b></p> <ul style="list-style-type: none"> <li>● Frequency 150 kHz - 230 MHz</li> <li>● Insertion Loss <math>\leq</math> 8 dB</li> <li>● Power Handling 100 watts</li> <li>● Cable diameter 40 mm</li> <li>● Suitable calibration accessories for calibrating the injection probe.</li> </ul>	<p><b>SECTION-V Part B</b> <b>Page No.56</b></p> <p><b>BULK CURRENT INJECTION (BCI) PROBE</b></p> <p><b>Compliant as per IEC 62132-3</b></p> <ul style="list-style-type: none"> <li>● Frequency 150 kHz - 230 MHz</li> <li>● Insertion Loss <math>\leq</math> 8 dB</li> <li>● Power Handling 100 watts</li> <li>● Cable diameter 40 mm</li> </ul>



		<ul style="list-style-type: none"> <li>• Suitable calibration accessories for calibrating the injection probe.</li> </ul>
B:2.4.6.2	<p><b>SECTION-V Part B</b></p> <p><b>Page No.56</b></p> <p><b>CURRENT MONITORING PROBE</b></p> <p><b>Transfer Impedance:</b> 1 <math>\Omega</math> from 150 kHz –230MHz</p>	<p><b>SECTION-V Part B</b></p> <p><b>Page No.56</b></p> <p><b>CURRENT MONITORING PROBE</b></p> <p><b>Transfer Impedance:</b> Compliant as per CISPR 16-1-2</p>
B: 3.1	<p><b>SECTION-V Part B</b></p> <p><b>Page No. 57</b></p> <p><b>ANTENNA-4: BI-CONICAL OR ANY OTHER SUITABLE TYPE ANTENNA</b></p>	<p><b>SECTION-V Part B</b></p> <p><b>Page No. 57</b></p> <p>Refer to amendment B: 1.6</p>
B: 3.2	<p><b>SECTION-V Part B</b></p> <p><b>Page No. 57</b></p> <p><b>ANTENNA-5: LOG PERIODIC OR ANY OTHER SUITABLE TYPE ANTENNA</b></p>	<p><b>SECTION-V Part B</b></p> <p><b>Page No. 57</b></p> <p>Refer to amendment B: 1.7</p>
B: 3.3	<p><b>SECTION-V Part B</b></p> <p><b>Page No. 58</b></p>	<p><b>SECTION-V Part B</b></p> <p><b>Page No. 58</b></p>

	<b>Antenna 6 - Standard Gain Horn Antenna or Any Other suitable Antenna:</b>	Refer to amendment B: 1.8
B: 3.4.1	<p><b>SECTION-V Part B</b> <b>Page No.58</b></p> <p><b>Pre-Amplifier</b> Frequency: 10 MHz -18 GHz Noise Figure &lt; 4 Gain <math>\geq 30</math> dB Package: Shielded, It should be either placed below the antenna mast or the ground plane Power AC: 230 V</p>	<p><b>SECTION-V Part B</b> <b>Page No.58</b></p> <p><b>Pre-Amplifier</b> Frequency: 10 MHz -18 GHz ( Frequency range preamplifier should be aligned with antenna frequency) Noise Figure: &lt; 4 Gain: <math>\geq 30</math> dB Power AC: 230 V Package: Shielded :It should be either placed below the antenna mast or the ground plane</p>
B: 3.5.1.2	<p><b>SECTION-V PART B</b> <b>Page No.58</b></p> <p><b>Active Loop Antenna</b></p> <p>Diameter: 2 m Input impedance :50 <math>\Omega</math> Polarization :Vertical and Horizontal VSWR :<math>\leq 2:1</math> Antenna factor :Antenna factors data in the specified</p>	<p><b>SECTION-V PART B</b> <b>Page No.58</b></p> <p><b>Active Loop Antenna</b></p> <p>Diameter: 0.5 m Input impedance :50 <math>\Omega</math> Polarization :Vertical and Horizontal VSWR :<math>\leq 2:1</math> Antenna factor :Antenna factors data in the specified</p>

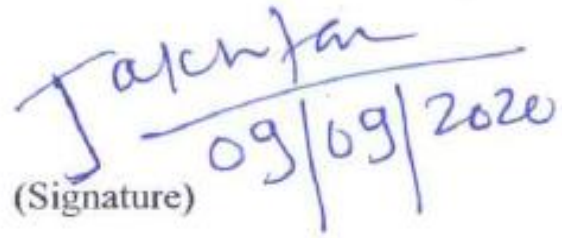
	frequency range to be provided. Connector : BNC female	frequency range to be provided. Connector : BNC female : Compliant as per standard <b>CISPR 16-1-4</b>
B: 4.1.1	<b>SECTION-V PART B, Page No.59</b>  Frequency range: 10 Hz – 3.5 GHz	<b>SECTION-V PART B, Page No.59</b>  Frequency range: 10 Hz – 3.0 GHz
B: 4.1.7	<b>SECTION-V PART B, Page No.60</b>  <b>Resolution bandwidth:</b> 10 Hz-10 MHz	<b>SECTION-V PART B, Page No.60</b>  <b>Resolution bandwidth :</b> 10 Hz - 8 MHz
B: 4.1.16	<b>SECTION-V PART B Page No.61</b>  <b>Total measurement uncertainty</b> ≤ 1 dB	<b>SECTION-V PART B Page No.61</b>  <b>Total measurement uncertainty</b> ≤1.0 dB or better for frequencies < 1 GHz  ≤1.5 dB or better for frequencies > 1 GHz
B:4.1.20	<b>SECTION-V PART B Page No.61</b>  <b>Average Noise level:</b> Average Detector On , RF Atten- 0dB Pre-amp OFF, ≤ 19 dBμV	<b>SECTION-V PART B Page No.61</b>  <b>Average Noise level:</b> Pre-amp OFF, ≤ 27 dBμV Pre-amp ON, ≤ 14 dBμV @ measurement bandwidths as per CISPR 16-1-1

	Pre-amp ON, $\leq 8 \text{ dB}\mu\text{V}$	Above 1GHz: Resolution bandwidth: 1MHz Below 1GHz: Resolution bandwidth: 120 kHz
B:4.1.17	<b>SECTION-V PART B</b> <b>Page No.61</b>  <b>Tracking generator:</b> Needed	<b>SECTION-V PART B</b> <b>Page No.61</b>  <b>Tracking generator :</b> Not required.
B:4.2.2.3	<b>SECTION-V PART B</b> <b>Page No.65</b>  <b>Current Probe</b>  <b>Transfer Impedance :</b> 0.1 $\Omega$ to 5 $\Omega$ in the flat linear range; 0.001 $\Omega$ to 0.1 $\Omega$ below the flat linear range (current probe terminated into 50 $\Omega$ load)	<b>SECTION-V PART B</b> <b>Page No.65</b>  <b>Current Probe</b>  <b>Transfer Impedance :</b> Compliant as per standard IEC CISPR 16-1-2
B: 4.2.3.2	<b>SECTION-V PART B</b> <b>Page No.66</b>  <b>Frequency spacing:</b> 1 MHz, 5 MHz, 10 MHz	<b>SECTION-V PART B</b> <b>Page No.66</b>  <b>Frequency spacing:</b>  Below 1GHz: 1-10 MHz  Above 1GHz: 100MHz / 200 MHz

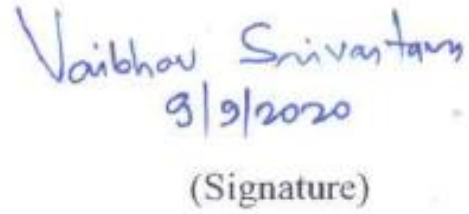
B: 4.2	<b>SECTION-V PART B</b> <b>Page No.65</b>  <b>ACCESSORIES FOR CONDUCTED EMISSION TEST</b>	<b>SECTION-V PART B</b> <b>Page No.65</b>  <b>ACCESSORIES FOR CONDUCTED EMISSION TEST</b> <b>Additional Accessories included:</b>
B:4.2.4		Impedance stabilization Network as compliant to standard CISPR 32
B:4.2.5		Absorption clamp, Guide rail (can be manual/automatic), as compliant to standard CISPR 14
B:4.2.6		Triple loop antenna as compliant to standard <b>CISPR 15</b> same as <b>Large Loop Antenna System (LLAS)</b> The LLAS consists of three mutually perpendicular large-loop antennas (Triple loop). Diameter: 2m compliant as per standard <b>CISPR 16-1-4, Annex C</b> Quantity: 1 Number
B:4.2.7		Common mode absorption device (CMAD) as compliant to standard CISPR 11
B:4.2.8		<b>Other Accessories</b>
	<b>SECTION-VI Terms and Conditions 20.b.</b>	<b>SECTION-VI Terms and Conditions 20.b.</b>

	<p><b>Page No. 71</b> On site calibration, comprehensive service, and maintenance should be for a minimum period of three years.</p>	<p><b>Page No. 71</b> On site calibration or calibration in OEM labs, comprehensive service, and maintenance should be for a minimum period of three years.</p>
	<p><b>SECTION-VI Terms and Conditions 15.</b> <b>Page No. 71</b>  The final tender will however be awarded to the bidder quoting the lowest price, which is the sum of overall prices quoted in Part A and Part B. The item wise price will be used for audit and bookkeeping purposes.</p>	<p><b>SECTION-VI Terms and Conditions 15</b> The final tender will however be awarded to the bidder quoting the lowest total price, taking into account prices of all the items listed in the BOQ excel file and any other prices / Educational discount mentioned in the Additional sheet. The item wise price will be used for audit and bookkeeping purposes. Please note that the latest GFR2017 Amendment dated 4th June (Preference to Make in India) ( P-45021/2/2017-PP(BE-II) ) will be followed while deciding the bidder to whom the final tender will be awarded. For more details about (P-45021/2/2017-PP(BE-II ) Please refer link below <a href="#">Link</a></p>
	<p><b>SECTION-VI Terms and Conditions</b> <b>New clause 23.</b></p>	<p><b>SECTION-VI Terms and Conditions 23.</b> Compliance document in support of Office Memorandum dated 23 July ( Rule 144 of GFR 20 17) needs to be uploaded along with the technical compliance document. For more details please refer link given below: <a href="#">Link</a></p>
	<p><b>SECTION-VI Terms and Conditions</b> <b>New clause 24.</b></p>	<p><b>SECTION-VI Terms and Conditions 24.</b> Compliance document declaring Class I or Class II local supplier</p>

		<p>status as per GFR2017 Amendment dated 4th June (Preference to Make in India) (P-45021/2/2017-PP(BE-II)) needs to be uploaded along with the technical compliance document.</p> <p>For more details please refer link given below:</p> <p><a href="#">Link</a></p>
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(Signature)

Prof. M. Jaleel Akhtar (PI/Indentor)

  
(Signature)

Prof. K.V. Srivastava (EE)

  
(Signature)

Prof. N. Gupta (EE)

  
(Signature)

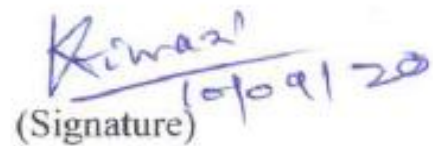
Prof. Nishchal K. Verma (EE)

  
(Signature)

Prof. Kamal K. Kar (ME)

  
(Signature)

Tarun Gautam ( SE IWD)

  
(Signature)

V K Tiwari (EE) (IWD)

  
(Signature)

Raghvendra Singh (EE) (IWD)