



# National Accreditation Board for Testing and Calibration Laboratories

## SCOPE OF ACCREDITATION

**Laboratory Name :**

CENTRE OF EXCELLENCE FOR ELECTRONIC PRODUCTS, 638, GIDC MAKARPURA,  
VADODARA, GUJARAT, INDIA

**Accreditation Standard**

ISO/IEC 17025:2017

**Certificate Number**

CC-2952

**Page No**

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**Validity**

18/03/2022 to 17/03/2024

**Last Amended on**

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S.No	Discipline / Group	Measurand or Reference Material/Type of instrument or material to be calibrated or measured / Quantity Measured /Instrument	Calibration or Measurement Method or procedure	Measurement range and additional parameters where applicable(Range and Frequency)	* Calibration and Measurement Capability(CMC)(±)
Permanent Facility					
1	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Measure)	AC Current @ 50Hz - 500Hz	Using 6.1/2 Digital Multimeter by Direct Method	1 A to 10 A	0.17 % to 0.54 %
2	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Measure)	AC Current @ 50Hz - 500Hz	Using 6.1/2 Digital Multimeter with Three Phase Power Calibrator by Comparison Method	1 A to 10 A	0.18 % to 0.54 %
3	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Measure)	AC Current @ 50Hz - 500Hz	Using 6.1/2 Digital Multimeter by Direct Method	10 µA to 50 µA	1.007 % to 0.38 %
4	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Measure)	AC Current @ 50Hz - 500Hz	Using 6.1/2 Digital Multimeter with Three Phase Power Calibrator & Resistance Box by Comparison Method	10 µA to 50 µA	1.01 % to 0.38 %



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5	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Measure)	AC Current @ 50Hz - 500Hz	Using 6.1/2 Digital Multimeter by Direct Method	50 $\mu$ A to 1 A	0.38 % to 0.17 %
6	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Measure)	AC Current @ 50Hz - 500Hz	Using 6.1/2 Digital Multimeter with Three Phase Power Calibrator & Resistance Box by Comparison Method	50 $\mu$ A to 1 A	0.38 % to 0.18 %
7	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Measure)	AC Current @45Hz-65Hz	Using Three Phase Reference Standard by Direct Method and with Three Phase Power Calibrator by Comparison Method	1 mA to 120 A	0.084 % to 0.032 %
8	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Measure)	AC Power/Energy (Single Phase, Three Phase), Active and Reactive, (45Hz to 65Hz, 30V(P-N) to 300V(P-N), 120A to 0.01A, 0.25 Lag/Lead to 0.1Lag/Lead) 30mW/30mVAr to 27kW/27kVAr	Using Three Phase Reference Standard by Direct Method and with Three Phase Power Calibrator by Comparison Method	30 V(P-N) to 300 V(P-N)	0.058 % to 0.47 %



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9	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Measure)	AC Power/Energy (Single Phase, Three Phase), Active and Reactive, (45Hz to 65Hz, 30V(P-N) to 300V(P-N), 120A to 0.01A, 0.25Lag to UPF to 0.25 Lead) 75mW/75mVAr/300 mVA to 108kW/108kVAr/108 kVA	Using Three Phase Reference Standard by Direct Method and with Three Phase Power Calibrator by Comparison Method	30 V(P-N) to 300 V(P-N)	0.019 % to 0.18 %
10	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Measure)	AC Voltage @ 50Hz	Using 6.1/2 Digital Multimeter by Direct Method	560 V to 750 V	0.12%
11	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Measure)	AC Voltage @ 50Hz	Using 6.1/2 Digital Multimeter with Three Phase Power Calibrator & Potential Transformer by Comparison Method	560 V to 750 V	0.12%
12	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Measure)	AC Voltage @ 50Hz - 500Hz	Using 6.1/2 Digital Multimeter by Direct Method	10 mV to 100 mV	0.46 % to 0.074 %





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13	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Measure)	AC Voltage @ 50Hz - 500Hz	Using 6.1/2 Digital Multimeter with Signal Generator by Comparison Method	10 mV to 100 mV	0.53 % to 0.094 %
14	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Measure)	AC Voltage @ 50Hz - 500Hz	Using 6.1/2 Digital Multimeter by Direct Method	100 mV to 560 V	0.074 % to 0.13 %
15	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Measure)	AC Voltage @ 50Hz - 500Hz	Using 6.1/2 Digital Multimeter with Three Phase Power Calibrator & Signal Generator by Comparison Method	100 mV to 560 V	0.094 % to 0.13 %
16	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Measure)	AC Voltage @45Hz-65Hz	Using Three Phase Reference Standard by Direct Method and with Three Phase Power Calibrator & Potential Transformer by Comparison Method	30 V to 625 V	0.013 % to 0.042 %



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17	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Measure)	Capacitance at 1 kHz	Using 6.1/2 Digital Multimeter digit with Capacitance Box by Comparison Method	1 nF to 100 $\mu$ F	1.51 % to 0.58 %
18	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Measure)	Capacitance at 1kHz	Using 6.1/2 Digital Multimeter by Direct Method	1 nF to 100 $\mu$ F	1.51 % to 0.60 %
19	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Measure)	Harmonics (1st to 41th order) in Current	Using Three Phase Reference Standard by Direct Method and with Three Phase Power Calibrator by Comparison Method	1 A to 10 A	0.31 % to 0.64 %
20	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Measure)	Harmonics (1st to 41th order) in Voltage	Using Three Phase Reference Standard by Direct Method and with Three Phase Power Calibrator by Comparison Method	100 V to 480 V	0.31 % to 0.64 %



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21	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Measure)	Power Factor (-1 to 1)PF, 45Hz to 65Hz	Using Three Phase Reference Standard by Direct Method with Three Phase Power Calibrator by Comparison Method	+1 PF to -1 PF	0.0002 PF to 0.0007 PF
22	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Source)	AC Current @ 45Hz - 65Hz	Using Three Phase Portable Meter Test System by Direct Method	1 mA to 120 A	0.082 % to 0.059 %
23	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Source)	AC Current @ 45Hz - 65Hz	Using Three Phase Power Calibrator by Direct Method	1 mA to 120 A	0.086 % to 0.026 %
24	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Source)	AC Power /Energy (Single Phase, Three Phase), Active and Reactive, (45Hz to 60Hz, 40V(P-N) to 300V(P-N), 0.02A to 0.005A,0.25Lag to UPF to 0.25Lead) 50mW/50mVAr/200 mVA to 18W/18VAr/18VA	Using Three Phase Power Calibrator by Direct Method	40 V(P-N) to 300 V(P-N)	0.033 % to 0.14 %





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25	ELECTRO-TECHNICAL- Alternating Current (< 1 GHz) (Source)	AC Power /Energy (Single Phase, Three Phase), Active and Reactive, (45Hz to 60Hz, 40V(P-N) to 300V(P-N), 0.02A to 0.005A,0.25Lag to UPF to 0.25Lead) 50mW/50mVAr/200 mVA to 18W/18VAr/18VA	Using Three Phase Portable Meter Test System by Direct Method	40 V(P-N) to 300 V(P-N)	0.06 % to 0.25 %
26	ELECTRO-TECHNICAL- Alternating Current (< 1 GHz) (Source)	AC Power/ Energy (Single Phase, Three Phase), Active and Reactive, (45Hz to 60Hz, 40V(P-N) to 300V(P-N), 0.05A to 0.02A,0.25Lag to UPF to 0.25Lead) 200mW/200mVAr/80 0mVA to 45W/45VAr/45VA	Using Three Phase Power Calibrator by Direct Method	40 V(P-N) to 300 V(P-N)	0.028 % to 0.13 %



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27	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Source)	AC Power/ Energy (Single Phase, Three Phase), Active and Reactive, (45Hz to 60Hz, 40V(P-N) to 300V(P-N), 0.05A to 0.02A,0.25Lag to UPF to 0.25Lead) 200mW/200mVAR/800mVA to 45W/45VAR/45VA	Using Three Phase Portable Meter Test System by Direct Method	40 V(P-N) to 300 V(P-N)	0.060 % to 0.25 %
28	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Source)	AC Power/Energy (Single Phase, Three Phase), Active and Reactive, (45Hz to 60Hz, 40V(P-N) to 300V(P-N), 120A to 0.05A, 0.25Lag to UPF to 0.25Lead) 500mW/500mVAR/2000mVA to 108kW/108kVAR/108 kVA	Using Three Phase Power Calibrator by Direct Method	40 V(P-N) to 300 V(P-N)	0.028 % to 0.13 %





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29	ELECTRO-TECHNICAL- Alternating Current (< 1 GHz) (Source)	AC Power/Energy (Single Phase, Three Phase), Active and Reactive, (45Hz to 60Hz, 40V(P-N) to 300V(P-N), 120A to 0.05A, 0.25Lag to UPF to 0.25Lead) 500mW/500mVAr/2000mVA to 108kW/108kVAr/108 kVA	Using Three Phase Portable Meter Test System by Direct Method	40 V(P-N) to 300 V(P-N)	0.060 % to 0.25 %
30	ELECTRO-TECHNICAL- Alternating Current (< 1 GHz) (Source)	AC Voltage @ 45Hz - 65Hz	Using Three Phase Portable Meter Test System by Direct Method	30 V to 456 V	0.063 % to 0.070 %
31	ELECTRO-TECHNICAL- Alternating Current (< 1 GHz) (Source)	AC Voltage @ 45Hz - 65Hz	Using Three Phase Power Calibrator by Direct Method	30 V to 560 V	0.034 % to 0.045 %
32	ELECTRO-TECHNICAL- Alternating Current (< 1 GHz) (Source)	Harmonics (1% to 40% of 1st to 40th order) in Current	Using Three Phase Power Calibrator by Direct Method	0.05 A to 24 A	0.96 % to 0.88 %



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33	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Source)	Harmonics (1% to 40% of 1st to 40th order) in Voltage	Using Three Phase Power Calibrator by Direct Method	110 V to 240 V	0.87 % to 0.64 %
34	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Source)	Phase Angle 0 to 360 °(40V to 320V, 0.02A to 120A , 0 to UPF)	Using Three Phase Power Calibrator by Direct Method	0 ° to 360 °	0.071 ° to 0.093 °
35	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Source)	Phase Angle 0 to 360 °(40V to 320V, 0.02A to 120A , 0 to UPF)	Using Three Phase Portable Meter Test System by Direct Method	0 ° to 360 °	0.085 ° to 0.11 °
36	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Source)	Power Factor (-1 to 1),45Hz - 65Hz	Using Three Phase Portable Meter Test System by Direct Method	+1 PF to -1 PF	0.0019 PF to 0.0021 PF
37	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Source)	Power Factor (-1 to 1),45Hz - 65Hz	Using Three Phase Power Calibrator by Direct Method	+1 PF to -1 PF	0.0019 PF to 0.0021 PF
38	ELECTRO-TECHNICAL-DIRECT CURRENT (Measure)	DC Current	Using 6.1/2 Digital Multimeter by Direct Method	10 µA to 50 µA	0.66 % to 0.22 %



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39	ELECTRO-TECHNICAL-DIRECT CURRENT (Measure)	DC Current	Using 6.1/2 Digital Multimeter with DC Current Source by Comparison Method	10 $\mu$ A to 50 $\mu$ A	0.66 % to 0.20 %
40	ELECTRO-TECHNICAL-DIRECT CURRENT (Measure)	DC Current	Using 6.1/2 Digital Multimeter with DC Current Source by Comparison Method	3 A to 10 A	0.17 % to 0.5 %
41	ELECTRO-TECHNICAL-DIRECT CURRENT (Measure)	DC Current	Using 6.1/2 Digital Multimeter by Direct Method	3 A to 10 A	0.28 % to 0.38 %
42	ELECTRO-TECHNICAL-DIRECT CURRENT (Measure)	DC Current	Using 6.1/2 Digital Multimeter with DC Current Source by Comparison Method	50 $\mu$ A to 3 A	0.20 % to 0.13 %
43	ELECTRO-TECHNICAL-DIRECT CURRENT (Measure)	DC Current	Using 6.1/2 Digital Multimeter by Direct Method	50 $\mu$ A to 3 A	0.22 % to 0.20 %
44	ELECTRO-TECHNICAL-DIRECT CURRENT (Measure)	DC Voltage	Using 6.1/2 Digital Multimeter by Direct Method	1 mV to 100 mV	0.46 % to 0.009 %





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45	ELECTRO-TECHNICAL-DIRECT CURRENT (Measure)	DC Voltage	Using 6.1/2 Digital Multimeter with Rectifier by Comparison Method	1 mV to 100 mV	1.7 % to 0.058 %
46	ELECTRO-TECHNICAL-DIRECT CURRENT (Measure)	DC Voltage	Using 6.1/2 Digital Multimeter by Direct Method	100 mV to 1000 V	0.009 % to 0.007 %
47	ELECTRO-TECHNICAL-DIRECT CURRENT (Measure)	DC Voltage	Using 6.1/2 Digital Multimeter with Rectifier by Comparison Method	100 mV to 1000 V	0.031 % to 0.046 %
48	ELECTRO-TECHNICAL-DIRECT CURRENT (Measure)	Resistance	Using 6.1/2 Digital Multimeter by Direct Method	1 Ohm to 1 Mohm	0.034 % to 0.013 %
49	ELECTRO-TECHNICAL-DIRECT CURRENT (Measure)	Resistance	Using 6.1/2 Digital Multimeter by Direct Method	1 Mohm to 10 Mohm	0.013 % to 0.047 %
50	ELECTRO-TECHNICAL-DIRECT CURRENT (Measure)	Resistance	Using 6.1/2 Digital Multimeter with Resistance Box by Comparison Method	1 Mohm to 10 Mohm	0.013 % to 0.047 %



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51	ELECTRO-TECHNICAL-DIRECT CURRENT (Measure)	Resistance	Using 6.1/2 Digital Multimeter with Resistance Box by Comparison Method	1 Ohm to 1 Mohm	0.067 % to 0.013 %
52	ELECTRO-TECHNICAL-DIRECT CURRENT (Measure)	Resistance	Using 6.1/2 Digital Multimeter by Direct Method	10 Mohm to 100 Mohm	0.047 % to 0.25 %
53	ELECTRO-TECHNICAL-DIRECT CURRENT (Measure)	Resistance	Using 6.1/2 Digital Multimeter with Resistance Box by Comparison Method	10 Mohm to 100 Mohm	0.047 % to 0.264 %
54	ELECTRO-TECHNICAL-ELECTRICAL EQUIPMENT (Measure)	PD Calibrator/ Pulse Generator	Using Resistance Box with Digital Oscilloscope by Direct Method as per IS/IEC 60270	5 pC to 10000 pC	3.2%
55	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	Amplitude Modulation @ 9kHz to 15 GHz	Using Vector Network Analyzer with Spectrum by direct method	10 % to 95 %	2.5 % to 4.2 %
56	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	Amplitude Modulation @ 9kHz to 3.2 GHz	Using Oscilloscope by direct method	10 % to 90 %	3.3%



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57	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	Antenna Factor (Antenna) 2M Loop Antenna, Monopole/ ROD Antenna @9 kHz to 30MHz	Using Signal Generator, Power sensor, Vector Network Analyzer with Spectrum as per CISPR 16-1-4:2019 AMD1:2020 by Direct Method	-87 dB to 15 dB	1dB
58	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	Combination Wave Surge Test System-Open circuit Voltage Amplitude	Using Oscilloscope and HV Differential Probe as per IEC 61000-4-5 Ed 3.0 2017-08 by Direct Method	+/-0.45 kV to +/-8.0 kV	3.10%
59	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	Combination Wave Surge Test System-Open circuit Voltage Front Time	Using Oscilloscope and HV Differential Probe as per IEC 61000-4-5 Ed 3.0 2017-08 by direct method	0.84 µs to 1.56 µs	7.8%
60	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	Combination Wave Surge Test System-Open circuit Voltage Pulse Duration	Using Oscilloscope and HV Differential Probe as per IEC 61000-4-5 Ed 3.0 2017-08 by direct method	40 µs to 60 µs	3.1%





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61	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	Combination Wave Surge Test System-Short circuit current front time @ CDN Output	Using Oscilloscope and Current Clamp as per IEC 61000-4-5 Ed 3.0 2017-08 by direct method	0.91 $\mu$ s to 10.4 $\mu$ s	3.48%
62	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	Combination Wave Surge Test System-Short circuit Fronttime	Using Oscilloscope and Current Clamp as per IEC 61000-4-5 Ed 3.0 2017-08 by direct method	6.4 $\mu$ s to 9.6 $\mu$ s	3.12%
63	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	Combination Wave Surge Test System-Short circuit pulse duration	Using Oscilloscope and Current Clamp as per IEC 61000-4-5 Ed 3.0 2017-08 by direct method	16 $\mu$ s to 24 $\mu$ s	3.41%
64	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	Combination Wave Surge Test System-Open Circuit Voltage @ CDN Output	Using Oscilloscope and HV Differential Probe as per IEC 61000-4-5 Ed 3.0 2017-08 by direct method	+/-0.45 kV to +/-8.0 kV	3.10%
65	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	Combination Wave Surge Test System-Open circuit Voltage front time @CDN Output	Using Oscilloscope and HV Differential Probe as per IEC 61000-4-5 Ed 3.0 2017-08 by direct method	0.84 $\mu$ s to 10.4 $\mu$ s	3.10%



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66	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	Combination Wave Surge Test System-Open circuit Voltage Pulse Duration @ CDN Output	Using Oscilloscope and HV Differential Probe as per IEC 61000-4-5 Ed 3.0 2017-08 by direct method	5 $\mu$ s to 325 $\mu$ s	3.10%
67	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	Combination Wave Surge Test System-Short circuit current @ CDN Output	Using Oscilloscope and Current Clamp as per IEC 61000-4-5 Ed 3.0 2017-08 by direct method	+/-37.5 A to +/-4400 A	3.10%
68	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	Combination Wave Surge Test System-Short circuit Current Amplitude	Using Oscilloscope and Current Clamp as per IEC 61000-4-5 Ed 3.0 2017-08 by direct method	+/-0.225 kA to +/-4.4 kA	3.10%
69	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	Combination Wave Surge Test System-Short circuit current Pulse Duration @ CDN Output	Using Oscilloscope and Current Clamp as per IEC 61000-4-5 Ed 3.0 2017-08 by direct method	9.10 $\mu$ s to 325 $\mu$ s	1 % to 3.10 %
70	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	Combination Wave Surge Test System-Telecom/CDN Short circuit Front time	Using Oscilloscope and Current Clamp as per IEC 61000-4-5 Ed 3.0 2017-08 by direct method	2.52 $\mu$ s to 6 $\mu$ s	3.48%



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71	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	Combination Wave Surge Test System/CDN-Telecom Open circuit Voltage Front Time	Using Oscilloscope and HV Differential Probe as per IEC 61000-4-5 Ed 3.0 2017-08 by direct method	7 $\mu$ s to 13 $\mu$ s	2.28%
72	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	Combination Wave Surge Test System/CDN-Telecom Open circuit Voltage Pulse Duration	Using Oscilloscope and HV Differential Probe as per IEC 61000-4-5 Ed 3.0 2017-08 by direct method	560 $\mu$ s to 840 $\mu$ s	1.10%
73	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	Combination Wave Surge Test System/CDN-Telecom Short circuit Current Amplitude	Using Oscilloscope and Current Clamp as per IEC 61000-4-5 Ed 3.0 2017-08 by direct method	+/-11.25 A to +/-220 A	3.10%
74	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	Combination Wave Surge Test System/CDN-Telecom Short circuit pulse duration	Using Oscilloscope and Current Clamp as per IEC 61000-4-5 Ed 3.0 2017-08 by direct method	256 $\mu$ s to 384 $\mu$ s	1.0%
75	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	Combination Wave Surge Test-Phase Shifting	Using Oscilloscope and HV Differential Probe as per IEC 61000-4-5 Ed 3.0 2017-08 by direct method	0 ° to 360 °	1.0 ° to 0.5 °





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76	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	Electrical Fast Transient Test System - Generator/CDN/Capacitive coupling clamp Pulse amplitude	Using Oscilloscope & Dividers (50 Ohm & 1000 Ohm) as per IEC 61000-4-4 Ed 3.0 2012-04 by direct method	+/-113 V to +/-5.714 kV	3.29%
77	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	Electrical Fast Transient Test System- Generator/ CDN/Capacitive coupling clamp : Burst Duration	Using Oscilloscope & Dividers (50 Ohm & 1000 Ohm) as per IEC 61000-4-4 Ed 3.0 2012-04 by direct method	0.06 ms to 900 ms	1%
78	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	Electrical Fast Transient Test System- Generator/ CDN/Capacitive coupling clamp : Burst Period	Using Oscilloscope & Dividers (50 Ohm & 1000 Ohm) as per IEC 61000-4-4 Ed 3.0 2012-04 by direct method	5 ms to 360 ms	1%
79	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	Electrical Fast Transient Test System- Generator/CDN/Capacitive coupling clamp Pulse Rise Time	Using Oscilloscope & Dividers (50 OHM & 1000 OHM) as per IEC 61000-4-4 Ed 3.0 2012-04 by direct method	3.5 ns to 7 ns	3.93%



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80	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	Electrical Fast Transient Test System- Generator/CDN/Capacitive coupling clamp: Pulse Width	Using Oscilloscope & Dividers (50 Ohm & 1000 Ohm) as per IEC 61000-4-4 Ed 3.0 2012-04 by direct method	30 ns to 150 ns	2.44%
81	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	Electrical Fast Transient Test System- Generator/ CDN/Capacitive coupling clamp : Repetition Frequency	Using Oscilloscope & Dividers (50 Ohm & 1000 Ohm) as per IEC 61000-4-4 Ed 3.0 2012-04 by direct method	0.08 kHz to 1200 kHz	1.0%
82	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	Electrostatic Discharge Generator : Air Discharge $\pm 2$ kV to $\pm 30$ kV Generator DC output voltage	Using Digital multimeter with Divider as per IEC 61000-4-2 Ed 2.0 2008-12, SAE J1113-13 2015-02, ISO 10605 2008-07 by direct method	$\pm 1.9$ kV to $\pm 31.5$ kV	2.4%
83	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	Electrostatic Discharge Generator :Contact Discharge $\pm 2$ kV to $\pm 30$ kV Current 30 ns to 800 ns	Using Oscilloscope & ESD Target Attenuator Cable Chain as per IEC 61000-4-2 Ed 2.0 2008-12, SAE J1113-13 2015-02, ISO 10605 2008-07 by direct method	$\pm 0.15$ A to $\pm 78$ A	3.79%



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84	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	Electrostatic Discharge Generator :Contact Discharge ±2kV to ±30kV Rise time	Using Oscilloscope & ESD Target Attenuator Cable Chain as per IEC 61000-4-2 Ed 2.0 2008-12, SAE J1113-13 2015-02, ISO 10605 2008-07 by direct method	0.6 ns to 1 ns	8.21%
85	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	Electrostatic Discharge Generator :Contact Discharge ±2kV to ±30kV First Peak Current	Using Oscilloscope & ESD Target Attenuator Cable Chain as per IEC 61000-4-2 Ed 2.0 2008-12, SAE J1113-13 2015-02, ISO 10605 2008-07 by direct method	±6.375 A to ±129.375 A	3.78%
86	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	Impedance-AMN, ISN, EM CLAMP, Coupling & Decoupling-CDN, CDNE @ 9kHz-1000MHz	Using Vector Network Analyzer as per CISPR 16-1-2: Ed. 2.0 2017-11, MIL-STD-461G: 2017-07, IEC 61000-4-6: 2013 by direct method	1 Ohm to 300 Ohm	10.1 % to 5 %





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87	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	Impulse Magnetic Field - Phase Shifting	Using CRO Oscilloscope & Current clamp As per IEC 61000-4-9 Ed. 2.0 2016-07 by direct method	0 ° to 360 °	1.0 ° to 0.5 °
88	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	Impulse Magnetic Field (100A/m to 1000A/m ) Field Immunity Test system;Standard Coil:1 m x 1m, 1m x 2.6m : Peak current	Using CRO Oscilloscope & Current clamp As per IEC 61000-4-9 Ed. 2.0 2016-07 by direct method	±99.9 A to ±1667 A	2.38%
89	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	Impulse Magnetic Field : Current Front Time	Using CRO Oscilloscope & Current clamp As per IEC 61000-4-9 Ed. 2.0 2016-07 by direct method	6.4 µs to 11.2 µs	2.02%
90	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	Impulse Magnetic Field : Duration	Using CRO Oscilloscope & Current clamp As per IEC 61000-4-9 Ed. 2.0 2016-07 by direct method	16 µs to 28 µs	1%



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91	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	Phase Angle AMN, ISN, EM CLAMP, Coupling & Decoupling-CDN, CDNE :@ 9kHz-1000 MHz	Using Vector Network Analyzer as per CISPR 16-1-2, Ed 2.0 2017:11, MIL-STD-461G: 2017-07, IEC 61000-4-6: 2013 by Direct Method	-90 ° to +90 °	3.1°
92	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	Power Frequency Magnetic Field Immunity: Current Continuous & Short Duration- 1s to 3s, Standard Coil:1 m x 1m, 1m x 2.6m	Using Digital Multimeter with Current clamp and Clamp on Meter As per IEC 61000-4-8 Ed 2.0 2009:09 by direct method	1 A/m to 1000 A/m	2%
93	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	Return Loss (VSWR) Attenuator, Antenna, Amplifier, Termination, RF Load, Directional Coupler, adapter line or Similar Equipment @ 9 kHz to 15GHz	Using Vector Network Analyzer By Direct Method	1 dB to 46 dB	0.35 dB to 0.4 dB
94	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	Return Loss (VSWR) Attenuator, Antenna, Amplifier, Termination, RF Load, Directional Coupler, adapter line or Similar Equipment @ 9 kHz to 3.2GHz	Using Vector Network Analyzer With Spectrum / Signal Generator , Power meter & Directional Coupler by direct method	1 dB to 46 dB	0.35dB



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95	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	RF Amplifier :Gain @ 9kHz to 15 GHz	Using Vector Network Analyzer With Spectrum / Power Sensor, Signal Generator and Attenuator by Direct Method	5 dB to 65 dB	0.4 dB to 0.56 dB
96	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	RF Amplifier, Generator : Harmonics Level @ 9kHz to 15GHz	Using Vector Network Analyzer With Spectrum / Power Sensor, Signal Generator, and Attenuator by Direct Method	5 dBc to 80 dBc	0.52 dB to 0.7 dB
97	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	RF & Microwave Power Loss: Attenuation, VDF , Coupling Decoupling Factor, Isolation, Insertion loss for BCI, DC, Attenuator, Adapter AMN, ISN,ESD Target, HV Divider, EM Clamp, CDNE, cable (9kHz-15GHz)	Using Vector Network Analyzer with Spectrum by Direct Method	0.1 dB to 70 dB	0.35 dB to 0.4 dB





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98	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	RF & Microwave Power Loss: Attenuation, VDF , Coupling Decoupling Factor, Isolation, Insertion loss for BCI, DC, Attenuator, Adapter AMN, ISN,ESD Target, HV Divider, EM Clamp, CDNE, cable (9kHz-3.2GHz	Using Power meter and Signal Generator by Direct Method	0.1 dB to 70 dB	0.25dB
99	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	RF Amplifier, Generator :Power Measurement @ 9 kHz to 15 GHz	Network Analyzer With Spectrum /Power Sensor and Attenuator by Direct Method	-60 dBm to 60 dBm	0.56dB
100	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	RF Amplifier, Generator :Power Measurement @ 9 kHz to 6 GHz	Using Power Sensor by Direct Method	-60 dBm to 15 dBm	0.56 dB to 0.25 dB
101	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	Ring Wave Generator -Phase Shifting	Using Oscilloscope and HV Differential Probe as per IEC 61000-4-12 Ed 3.0 2017-07 by direct method	0 ° to 360 °	1.0 ° to 0.5 °



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102	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	Ring Wave Immunity Test System Repetition rate	Using Oscilloscope and HV Differential Probe as per IEC 61000-4-12 Ed 3.0 2017-07 by direct method	0.1 min to 1 min	2.0%
103	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	Ring Wave Immunity Test System -Open Circuit Voltage	Using Oscilloscope and HV Differential Probe as per IEC 61000-4-12 Ed 3.0 2017-07 by direct method	+/-225 Volts to +/-6600 Volts	3.05%
104	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	Ring Wave Immunity Test System Current Rise Time (Short Circuit)	Using Oscilloscope and Current clamp as per IEC 61000-4-12 Ed 3.0 2017-07 by direct method	0.2 $\mu$ s to 1 $\mu$ s	1.0%
105	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	Ring Wave Immunity Test System decay in voltage 0.4 = ratio of Pk2 to Pk1 = 1.1	Using Oscilloscope and HV Differential Probe as per IEC 61000-4-12 Ed 3.0 2017-07 by direct method	0.4 V/V to 1.1 V/V	4.42%
106	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	Ring Wave Immunity Test System decay in voltage 0.4 = ratio of Pk3 to Pk2 = 0.8	Using Oscilloscope and HV Differential Probe as per IEC 61000-4-12 Ed 3.0 2017-07 by direct method	0.4 V/V to 0.8 V/V	4.42%



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107	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	Ring Wave Immunity Test System decay in voltage 0.4 = ratio of Pk4 to Pk3 = 0.8	Using Oscilloscope and HV Differential Probe as per IEC 61000-4-12 Ed 3.0 2017-07 by direct method	0.4 V/V to 0.8 V/V	4.42%
108	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	Ring Wave Immunity Test System Frequency	Using Oscilloscope and HV Differential Probe as per IEC 61000-4-12 Ed 3.0 2017-07 by direct method	90 kHz to 110 kHz	2.11%
109	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	Ring Wave Immunity Test System Voltage Rise Time (Open Circuit)	Using Oscilloscope and HV Differential Probe as per IEC 61000-4-12 Ed 3.0 2017-07 by direct method	0.35 $\mu$ s to 0.65 $\mu$ s	1.0%
110	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	Ring Wave Immunity Test System-Short Circuit Current :12 OHM	Using Oscilloscope and Current Probe clamp as per IEC 61000-4-12 Ed 3.0 2017-07 by direct method	+/-15.6 A to +/-550 A	2.58%
111	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	Ring Wave Immunity Test System-Short Circuit Current :30 OHM	Using Oscilloscope and Current Probe clamp as per IEC 61000-4-12 Ed 3.0 2017-07 by direct method	+/-6.225 A to +/-220 A	2.58%





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112	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	Target – Attenuator Cable Chain :DC Resistance	Using Digital multimeter as per IEC 61000-4-2 Ed 2.0 2008-12 by direct method	1 Ohm to 2.1 Ohm	0.25%
113	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	Target – Attenuator Cable Chain :Low Frequency Transfer Impedance	Using Digital Multimeter /Vector Network Analyzer as per IEC 61000-4-2 Ed 2.0 2008-12 by direct method	±0.0198 Ohm to ±0.202 Ohm	0.5 % to 0.25 %
114	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	Transfer Impedance –RF Current Clamp 20Hz to 500MHz	Using Vector Network Analyzer With Spectrum and Generator with Oscilloscope by Direct Method	39 dBOhm to -36 dBOhm	0.4dB
115	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	Voltage Dips & interruption Generator Output Voltage at NO Load	Using Oscilloscope with HV probe and Digital multimeter as per IEC 61000-4-11 Ed. 3.0 2020-01 and IEC 61000-4-29:2000 by direct method	0 % to 100 %	2.60%
116	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	Voltage Dips & interruption- Dips/ interruption Time	Using Oscilloscope with HV probe as per IEC 61000-4-11 Ed. 3.0 2020-01 and IEC 61000-4-29:2000 by direct method	0.005 s to 10 s	3.0%



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117	ELECTRO-TECHNICAL-EMI/ EMC (Source)	Power Measurement @9kHz to 6GHz	Using Power Sensor with Signal Generator by Comparison method	-60 dBm to 15 dBm	0.25 dB to 0.35 dB
118	ELECTRO-TECHNICAL-TIME & FREQUENCY (Measure)	Frequency	Using Vector Network Analyzer with Spectrum by Direct Method	0.009 MHz to 15000 MHz	0.00012%
119	ELECTRO-TECHNICAL-TIME & FREQUENCY (Measure)	Frequency	Using 6.1/2 Digital Multimeter with Three Phase Power Calibrator & Signal Generator by Comparison Method	20 Hz to 500 Hz	0.040 % to 0.017 %
120	ELECTRO-TECHNICAL-TIME & FREQUENCY (Measure)	Frequency	Using 6.1/2 Digital Multimeter by Direct Method	3 Hz to 300 KHz	0.13 % to 0.015 %
121	ELECTRO-TECHNICAL-TIME & FREQUENCY (Measure)	Frequency	Using Three Phase Reference Standard with Three Phase Power Calibrator by Comparison Method and by Direct Method	45 Hz to 65 Hz	0.022%



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122	ELECTRO-TECHNICAL-TIME & FREQUENCY (Source)	Frequency	Using Signal Generator by Direct Method	2.00E-05 MHz to 3200 MHz	0.00012 % to 0.00031 %
123	ELECTRO-TECHNICAL-TIME & FREQUENCY (Source)	Frequency	Using Three Phase Portable Meter Test System by Direct Method	45 Hz to 60 Hz	0.032 % to 0.033 %
124	ELECTRO-TECHNICAL-TIME & FREQUENCY (Source)	Frequency	Using Three Phase Power Calibrator by Direct Method	45 Hz to 60 Hz	0.033 % to 0.034 %





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Site Facility					
1	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Measure)	AC Current @ 50Hz - 500Hz	Using 6.1/2 Digital Multimeter by Direct Method	1 A to 10 A	0.17 % to 0.54 %
2	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Measure)	AC Current @ 50Hz - 500Hz	Using 6.1/2 Digital Multimeter with Three Phase Power Calibrator by Comparison Method	1 A to 10 A	0.18 % to 0.54 %
3	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Measure)	AC Current @ 50Hz - 500Hz	Using 6.1/2 Digital Multimeter by Direct Method	10 µA to 50 µA	1.007 % to 0.38 %
4	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Measure)	AC Current @ 50Hz - 500Hz	Using 6.1/2 Digital Multimeter with Three Phase Power Calibrator & Resistance Box by Comparison Method	10 µA to 50 µA	1.01 % to 0.38 %



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5	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Measure)	AC Current @ 50Hz - 500Hz	Using 6.1/2 Digital Multimeter by Direct Method	50 $\mu$ A to 1 A	0.38 % to 0.17 %
6	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Measure)	AC Current @ 50Hz - 500Hz	Using 6.1/2 Digital Multimeter with Three Phase Power Calibrator & Resistance Box by Comparison Method	50 $\mu$ A to 1 A	0.38 % to 0.18 %
7	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Measure)	AC Current @45Hz-65Hz	Using Three Phase Reference Standard by Direct Method and with Three Phase Power Calibrator by Comparison Method	1 mA to 120 A	0.084 % to 0.032 %
8	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Measure)	AC Power/Energy (Single Phase, Three Phase), Active and Reactive, (45Hz to 65Hz, 30V(P-N) to 300V(P-N), 120A to 0.01A, 0.25 Lag/Lead to 0.1Lag/Lead) 30mW/30mVAr to 27kW/27kVAr	Using Three Phase Reference Standard by Direct Method and with Three Phase Power Calibrator by Comparison Method	30 V(P-N) to 300 V(P-N)	0.058 % to 0.47 %



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9	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Measure)	AC Power/Energy (Single Phase, Three Phase), Active and Reactive, (45Hz to 65Hz, 30V(P-N) to 300V(P-N), 120A to 0.01A, 0.25Lag to UPF to 0.25 Lead) 75mW/75mVAr/300 mVA to 108kW/108kVAr/108 kVA	Using Three Phase Reference Standard by Direct Method and with Three Phase Power Calibrator by Comparison Method	30 V(P-N) to 300 V(P-N)	0.019 % to 0.18 %
10	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Measure)	AC Voltage @ 50Hz	Using 6.1/2 Digital Multimeter by Direct Method	560 V to 750 V	0.12%
11	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Measure)	AC Voltage @ 50Hz	Using 6.1/2 Digital Multimeter with Three Phase Power Calibrator & Potential Transformer by Comparison Method	560 V to 750 V	0.12%
12	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Measure)	AC Voltage @ 50Hz - 500Hz	Using 6.1/2 Digital Multimeter by Direct Method	10 mV to 100 mV	0.46 % to 0.074 %





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13	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Measure)	AC Voltage @ 50Hz - 500Hz	Using 6.1/2 Digital Multimeter with Signal Generator by Comparison Method	10 mV to 100 mV	0.53 % to 0.094 %
14	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Measure)	AC Voltage @ 50Hz - 500Hz	Using 6.1/2 Digital Multimeter by Direct Method	100 mV to 560 V	0.074 % to 0.13 %
15	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Measure)	AC Voltage @ 50Hz - 500Hz	Using 6.1/2 Digital Multimeter with Three Phase Power Calibrator & Signal Generator by Comparison Method	100 mV to 560 V	0.094 % to 0.13 %
16	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Measure)	AC Voltage @45Hz-65Hz	Using Three Phase Reference Standard by Direct Method and with Three Phase Power Calibrator & Potential Transformer by Comparison Method	30 V to 625 V	0.013 % to 0.042 %



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17	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Measure)	Capacitance at 1 kHz	Using 6.1/2 Digital Multimeter digit with Capacitance Box by Comparison Method	1 nF to 100 $\mu$ F	1.51 % to 0.58 %
18	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Measure)	Capacitance at 1kHz	Using 6.1/2 Digital Multimeter by Direct Method	1 nF to 100 $\mu$ F	1.51 % to 0.60 %
19	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Measure)	Harmonics (1st to 41th order) in Current	Using Three Phase Reference Standard by Direct Method and with Three Phase Power Calibrator by Comparison Method	1 A to 10 A	0.31 % to 0.64 %
20	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Measure)	Harmonics (1st to 41th order) in Voltage	Using Three Phase Reference Standard by Direct Method and with Three Phase Power Calibrator by Comparison Method	100 V to 480 V	0.31 % to 0.64 %



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21	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Measure)	Power Factor (-1 to 1)PF, 45Hz to 65Hz	Using Three Phase Reference Standard by Direct Method with Three Phase Power Calibrator by Comparison Method	+1 PF to -1 PF	0.0002 PF to 0.0007 PF
22	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Source)	AC Current @ 45Hz - 65Hz	Using Three Phase Portable Meter Test System by Direct Method	1 mA to 120 A	0.082 % to 0.059 %
23	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Source)	AC Current @ 45Hz - 65Hz	Using Three Phase Power Calibrator by Direct Method	1 mA to 120 A	0.086 % to 0.026 %
24	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Source)	AC Power /Energy (Single Phase, Three Phase), Active and Reactive, (45Hz to 60Hz, 40V(P-N) to 300V(P-N), 0.02A to 0.005A,0.25Lag to UPF to 0.25Lead) 50mW/50mVAr/200 mVA to 18W/18VAr/18VA	Using Three Phase Power Calibrator by Direct Method	40 V(P-N) to 300 V(P-N)	0.033 % to 0.14 %





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25	ELECTRO-TECHNICAL- Alternating Current (< 1 GHz) (Source)	AC Power /Energy (Single Phase, Three Phase), Active and Reactive, (45Hz to 60Hz, 40V(P-N) to 300V(P-N), 0.02A to 0.005A,0.25Lag to UPF to 0.25Lead) 50mW/50mVAr/200 mVA to 18W/18VAr/18VA	Using Three Phase Portable Meter Test System by Direct Method	40 V(P-N) to 300 V(P-N)	0.06 % to 0.25 %
26	ELECTRO-TECHNICAL- Alternating Current (< 1 GHz) (Source)	AC Power/ Energy (Single Phase, Three Phase), Active and Reactive, (45Hz to 60Hz, 40V(P-N) to 300V(P-N), 0.05A to 0.02A,0.25Lag to UPF to 0.25Lead) 200mW/200mVAr/80 0mVA to 45W/45VAr/45VA	Using Three Phase Power Calibrator by Direct Method	40 V(P-N) to 300 V(P-N)	0.028 % to 0.13 %



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27	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Source)	AC Power/ Energy (Single Phase, Three Phase), Active and Reactive, (45Hz to 60Hz, 40V(P-N) to 300V(P-N), 0.05A to 0.02A,0.25Lag to UPF to 0.25Lead) 200mW/200mVAR/800mVA to 45W/45VAR/45VA	Using Three Phase Portable Meter Test System by Direct Method	40 V(P-N) to 300 V(P-N)	0.060 % to 0.25 %
28	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Source)	AC Power/Energy (Single Phase, Three Phase), Active and Reactive, (45Hz to 60Hz, 40V(P-N) to 300V(P-N), 120A to 0.05A, 0.25Lag to UPF to 0.25Lead) 500mW/500mVAR/2000mVA to 108kW/108kVAR/108 kVA	Using Three Phase Power Calibrator by Direct Method	40 V(P-N) to 300 V(P-N)	0.028 % to 0.13 %



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29	ELECTRO-TECHNICAL- Alternating Current (< 1 GHz) (Source)	AC Power/Energy (Single Phase, Three Phase), Active and Reactive, (45Hz to 60Hz, 40V(P-N) to 300V(P-N), 120A to 0.05A, 0.25Lag to UPF to 0.25Lead) 500mW/500mVA/20 00mVA to 108kW/108kVA/108 kVA	Using Three Phase Portable Meter Test System by Direct Method	40 V(P-N) to 300 V(P-N)	0.060 % to 0.25 %
30	ELECTRO-TECHNICAL- Alternating Current (< 1 GHz) (Source)	AC Voltage @ 45Hz - 65Hz	Using Three Phase Portable Meter Test System by Direct Method	30 V to 456 V	0.063 % to 0.070 %
31	ELECTRO-TECHNICAL- Alternating Current (< 1 GHz) (Source)	AC Voltage @ 45Hz - 65Hz	Using Three Phase Power Calibrator by Direct Method	30 V to 560 V	0.034 % to 0.045 %
32	ELECTRO-TECHNICAL- Alternating Current (< 1 GHz) (Source)	Harmonics (1% to 40% of 1st to 40th order) in Current	Using Three Phase Power Calibrator by Direct Method	0.05 A to 24 A	0.96 % to 0.88 %





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33	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Source)	Harmonics (1% to 40% of 1st to 40th order) in Voltage	Using Three Phase Power Calibrator by Direct Method	110 V to 240 V	0.87 % to 0.64 %
34	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Source)	Phase Angle 0 to 360 °(40V to 320V, 0.02A to 120A , 0 to UPF)	Using Three Phase Power Calibrator by Direct Method	0 ° to 360 °	0.071 ° to 0.093 °
35	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Source)	Phase Angle 0 to 360 °(40V to 320V, 0.02A to 120A , 0 to UPF)	Using Three Phase Portable Meter Test System by Direct Method	0 ° to 360 °	0.085 ° to 0.11 °
36	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Source)	Power Factor (-1 to 1),45Hz - 65Hz	Using Three Phase Portable Meter Test System by Direct Method	+1 PF to -1 PF	0.0019 PF to 0.0021 PF
37	ELECTRO-TECHNICAL-Alternating Current (< 1 GHz) (Source)	Power Factor (-1 to 1),45Hz - 65Hz	Using Three Phase Power Calibrator by Direct Method	+1 PF to -1 PF	0.0019 PF to 0.0021 PF
38	ELECTRO-TECHNICAL-DIRECT CURRENT (Measure)	DC Current	Using 6.1/2 Digital Multimeter by Direct Method	10 µA to 50 µA	0.66 % to 0.22 %



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39	ELECTRO-TECHNICAL-DIRECT CURRENT (Measure)	DC Current	Using 6.1/2 Digital Multimeter with DC Current Source by Comparison Method	10 $\mu$ A to 50 $\mu$ A	0.66 % to 0.20 %
40	ELECTRO-TECHNICAL-DIRECT CURRENT (Measure)	DC Current	Using 6.1/2 Digital Multimeter with DC Current Source by Comparison Method	3 A to 10 A	0.17 % to 0.5 %
41	ELECTRO-TECHNICAL-DIRECT CURRENT (Measure)	DC Current	Using 6.1/2 Digital Multimeter by Direct Method	3 A to 10 A	0.28 % to 0.38 %
42	ELECTRO-TECHNICAL-DIRECT CURRENT (Measure)	DC Current	Using 6.1/2 Digital Multimeter with DC Current Source by Comparison Method	50 $\mu$ A to 3 A	0.20 % to 0.13 %
43	ELECTRO-TECHNICAL-DIRECT CURRENT (Measure)	DC Current	Using 6.1/2 Digital Multimeter by Direct Method	50 $\mu$ A to 3 A	0.22 % to 0.20 %
44	ELECTRO-TECHNICAL-DIRECT CURRENT (Measure)	DC Voltage	Using 6.1/2 Digital Multimeter by Direct Method	1 mV to 100 mV	0.46 % to 0.009 %



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45	ELECTRO-TECHNICAL-DIRECT CURRENT (Measure)	DC Voltage	Using 6.1/2 Digital Multimeter with Rectifier by Comparison Method	1 mV to 100 mV	1.7 % to 0.058 %
46	ELECTRO-TECHNICAL-DIRECT CURRENT (Measure)	DC Voltage	Using 6.1/2 Digital Multimeter by Direct Method	100 mV to 1000 V	0.009 % to 0.007 %
47	ELECTRO-TECHNICAL-DIRECT CURRENT (Measure)	DC Voltage	Using 6.1/2 Digital Multimeter with Rectifier by Comparison Method	100 mV to 1000 V	0.031 % to 0.046 %
48	ELECTRO-TECHNICAL-DIRECT CURRENT (Measure)	Resistance	Using 6.1/2 Digital Multimeter by Direct Method	1 Ohm to 1 Mohm	0.034 % to 0.013 %
49	ELECTRO-TECHNICAL-DIRECT CURRENT (Measure)	Resistance	Using 6.1/2 Digital Multimeter by Direct Method	1 Mohm to 10 Mohm	0.013 % to 0.047 %
50	ELECTRO-TECHNICAL-DIRECT CURRENT (Measure)	Resistance	Using 6.1/2 Digital Multimeter with Resistance Box by Comparison Method	1 Mohm to 10 Mohm	0.013 % to 0.047 %





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51	ELECTRO-TECHNICAL-DIRECT CURRENT (Measure)	Resistance	Using 6.1/2 Digital Multimeter with Resistance Box by Comparison Method	1 Ohm to 1 Mohm	0.067 % to 0.013 %
52	ELECTRO-TECHNICAL-DIRECT CURRENT (Measure)	Resistance	Using 6.1/2 Digital Multimeter by Direct Method	10 Mohm to 100 Mohm	0.047 % to 0.25 %
53	ELECTRO-TECHNICAL-DIRECT CURRENT (Measure)	Resistance	Using 6.1/2 Digital Multimeter with Resistance Box by Comparison Method	10 Mohm to 100 Mohm	0.047 % to 0.264 %
54	ELECTRO-TECHNICAL-ELECTRICAL EQUIPMENT (Measure)	PD Calibrator/ Pulse Generator	Using Resistance Box with Digital Oscilloscope by Direct Method as per IS/IEC 60270	5 pC to 10000 pC	3.2%
55	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	Amplitude Modulation @ 9kHz to 15 GHz	Using Vector Network Analyzer with Spectrum by direct method	10 % to 95 %	2.5 % to 4.2 %
56	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	Amplitude Modulation @ 9kHz to 3.2 GHz	Using Oscilloscope by direct method	10 % to 90 %	3.3%



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57	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	Antenna Factor (Antenna) 2M Loop Antenna, Monopole/ ROD Antenna @9 kHz to 30MHz	Using Signal Generator, Power sensor, Vector Network Analyzer with Spectrum as per CISPR 16-1-4:2019 AMD1:2020 by Direct Method	-87 dB to 15 dB	1dB
58	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	Combination Wave Surge Test System-Open circuit Voltage Amplitude	Using Oscilloscope and HV Differential Probe as per IEC 61000-4-5 Ed 3.0 2017-08 by Direct Method	+/-0.45 kV to +/-8.0 kV	3.10%
59	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	Combination Wave Surge Test System-Open circuit Voltage Front Time	Using Oscilloscope and HV Differential Probe as per IEC 61000-4-5 Ed 3.0 2017-08 by direct method	0.84 µs to 1.56 µs	7.8%
60	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	Combination Wave Surge Test System-Open circuit Voltage Pulse Duration	Using Oscilloscope and HV Differential Probe as per IEC 61000-4-5 Ed 3.0 2017-08 by direct method	40 µs to 60 µs	3.1%



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61	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	Combination Wave Surge Test System-Short circuit current front time @ CDN Output	Using Oscilloscope and Current Clamp as per IEC 61000-4-5 Ed 3.0 2017-08 by direct method	0.91 $\mu$ s to 10.4 $\mu$ s	3.48%
62	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	Combination Wave Surge Test System-Short circuit Fronttime	Using Oscilloscope and Current Clamp as per IEC 61000-4-5 Ed 3.0 2017-08 by direct method	6.4 $\mu$ s to 9.6 $\mu$ s	3.12%
63	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	Combination Wave Surge Test System-Short circuit pulse duration	Using Oscilloscope and Current Clamp as per IEC 61000-4-5 Ed 3.0 2017-08 by direct method	16 $\mu$ s to 24 $\mu$ s	3.41%
64	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	Combination Wave Surge Test System-Open Circuit Voltage @ CDN Output	Using Oscilloscope and HV Differential Probe as per IEC 61000-4-5 Ed 3.0 2017-08 by direct method	+/-0.45 kV to +/-8.0 kV	3.10%
65	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	Combination Wave Surge Test System-Open circuit Voltage front time @CDN Output	Using Oscilloscope and HV Differential Probe as per IEC 61000-4-5 Ed 3.0 2017-08 by direct method	0.84 $\mu$ s to 10.4 $\mu$ s	3.10%





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66	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	Combination Wave Surge Test System-Open circuit Voltage Pulse Duration @ CDN Output	Using Oscilloscope and HV Differential Probe as per IEC 61000-4-5 Ed 3.0 2017-08 by direct method	5 $\mu$ s to 325 $\mu$ s	3.10%
67	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	Combination Wave Surge Test System-Short circuit current @ CDN Output	Using Oscilloscope and Current Clamp as per IEC 61000-4-5 Ed 3.0 2017-08 by direct method	+/-37.5 A to +/-4400 A	3.10%
68	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	Combination Wave Surge Test System-Short circuit Current Amplitude	Using Oscilloscope and Current Clamp as per IEC 61000-4-5 Ed 3.0 2017-08 by direct method	+/-0.225 kA to +/-4.4 kA	3.10%
69	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	Combination Wave Surge Test System-Short circuit current Pulse Duration @ CDN Output	Using Oscilloscope and Current Clamp as per IEC 61000-4-5 Ed 3.0 2017-08 by direct method	9.10 $\mu$ s to 325 $\mu$ s	1 % to 3.10 %
70	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	Combination Wave Surge Test System-Telecom/CDN Short circuit Front time	Using Oscilloscope and Current Clamp as per IEC 61000-4-5 Ed 3.0 2017-08 by direct method	2.52 $\mu$ s to 6 $\mu$ s	3.48%



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71	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	Combination Wave Surge Test System/CDN-Telecom Open circuit Voltage Front Time	Using Oscilloscope and HV Differential Probe as per IEC 61000-4-5 Ed 3.0 2017-08 by direct method	7 $\mu$ s to 13 $\mu$ s	2.28%
72	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	Combination Wave Surge Test System/CDN-Telecom Open circuit Voltage Pulse Duration	Using Oscilloscope and HV Differential Probe as per IEC 61000-4-5 Ed 3.0 2017-08 by direct method	560 $\mu$ s to 840 $\mu$ s	1.10%
73	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	Combination Wave Surge Test System/CDN-Telecom Short circuit Current Amplitude	Using Oscilloscope and Current Clamp as per IEC 61000-4-5 Ed 3.0 2017-08 by direct method	+/-11.25 A to +/-220 A	3.10%
74	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	Combination Wave Surge Test System/CDN-Telecom Short circuit pulse duration	Using Oscilloscope and Current Clamp as per IEC 61000-4-5 Ed 3.0 2017-08 by direct method	256 $\mu$ s to 384 $\mu$ s	1.0%
75	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	Combination Wave Surge Test-Phase Shifting	Using Oscilloscope and HV Differential Probe as per IEC 61000-4-5 Ed 3.0 2017-08 by direct method	0 ° to 360 °	1.0 ° to 0.5 °



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76	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	Electrical Fast Transient Test System - Generator/CDN/Capacitive coupling clamp Pulse amplitude	Using Oscilloscope & Dividers (50 Ohm & 1000 Ohm) as per IEC 61000-4-4 Ed 3.0 2012-04 by direct method	+/-113 V to +/-5.714 kV	3.29%
77	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	Electrical Fast Transient Test System- Generator/ CDN/Capacitive coupling clamp : Burst Duration	Using Oscilloscope & Dividers (50 Ohm & 1000 Ohm) as per IEC 61000-4-4 Ed 3.0 2012-04 by direct method	0.06 ms to 900 ms	1%
78	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	Electrical Fast Transient Test System- Generator/ CDN/Capacitive coupling clamp : Burst Period	Using Oscilloscope & Dividers (50 Ohm & 1000 Ohm) as per IEC 61000-4-4 Ed 3.0 2012-04 by direct method	5 ms to 360 ms	1%
79	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	Electrical Fast Transient Test System- Generator/CDN/Capacitive coupling clamp Pulse Rise Time	Using Oscilloscope & Dividers (50 OHM & 1000 OHM) as per IEC 61000-4-4 Ed 3.0 2012-04 by direct method	3.5 ns to 7 ns	3.93%





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80	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	Electrical Fast Transient Test System-Generator/CDN/Capacitive coupling clamp: Pulse Width	Using Oscilloscope & Dividers (50 Ohm & 1000 Ohm) as per IEC 61000-4-4 Ed 3.0 2012-04 by direct method	30 ns to 150 ns	2.44%
81	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	Electrical Fast Transient Test System- Generator/ CDN/Capacitive coupling clamp : Repetition Frequency	Using Oscilloscope & Dividers (50 Ohm & 1000 Ohm) as per IEC 61000-4-4 Ed 3.0 2012-04 by direct method	0.08 kHz to 1200 kHz	1.0%
82	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	Electrostatic Discharge Generator : Air Discharge $\pm 2$ kV to $\pm 30$ kV Generator DC output voltage	Using Digital multimeter with Divider as per IEC 61000-4-2 Ed 2.0 2008-12, SAE J1113-13 2015-02, ISO 10605 2008-07 by direct method	$\pm 1.9$ kV to $\pm 31.5$ kV	2.4%
83	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	Electrostatic Discharge Generator :Contact Discharge $\pm 2$ kV to $\pm 30$ kV Current 30 ns to 800 ns	Using Oscilloscope & ESD Target Attenuator Cable Chain as per IEC 61000-4-2 Ed 2.0 2008-12, SAE J1113-13 2015-02, ISO 10605 2008-07 by direct method	$\pm 0.15$ A to $\pm 78$ A	3.79%



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84	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	Electrostatic Discharge Generator :Contact Discharge ±2kV to ±30kV Rise time	Using Oscilloscope & ESD Target Attenuator Cable Chain as per IEC 61000-4-2 Ed 2.0 2008-12, SAE J1113-13 2015-02, ISO 10605 2008-07 by direct method	0.6 ns to 1 ns	8.21%
85	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	Electrostatic Discharge Generator :Contact Discharge ±2kV to ±30kV First Peak Current	Using Oscilloscope & ESD Target Attenuator Cable Chain as per IEC 61000-4-2 Ed 2.0 2008-12, SAE J1113-13 2015-02, ISO 10605 2008-07 by direct method	±6.375 A to ±129.375 A	3.78%
86	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	Impedance-AMN, ISN, EM CLAMP, Coupling & Decoupling-CDN, CDNE @ 9kHz-1000MHz	Using Vector Network Analyzer as per CISPR 16-1-2: Ed. 2.0 2017-11, MIL-STD-461G: 2017-07, IEC 61000-4-6: 2013 by direct method	1 Ohm to 300 Ohm	10.1 % to 5 %



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87	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	Impulse Magnetic Field - Phase Shifting	Using CRO Oscilloscope & Current clamp As per IEC 61000-4-9 Ed. 2.0 2016-07 by direct method	0 ° to 360 °	1.0 ° to 0.5 °
88	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	Impulse Magnetic Field (100A/m to 1000A/m ) Field Immunity Test system;Standard Coil:1 m x 1m, 1m x 2.6m : Peak current	Using CRO Oscilloscope & Current clamp As per IEC 61000-4-9 Ed. 2.0 2016-07 by direct method	±99.9 A to ±1667 A	2.38%
89	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	Impulse Magnetic Field : Current Front Time	Using CRO Oscilloscope & Current clamp As per IEC 61000-4-9 Ed. 2.0 2016-07 by direct method	6.4 µs to 11.2 µs	2.02%
90	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	Impulse Magnetic Field : Duration	Using CRO Oscilloscope & Current clamp As per IEC 61000-4-9 Ed. 2.0 2016-07 by direct method	16 µs to 28 µs	1%





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91	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	Phase Angle AMN, ISN, EM CLAMP, Coupling & Decoupling-CDN, CDNE :@ 9kHz-1000 MHz	Using Vector Network Analyzer as per CISPR 16-1-2, Ed 2.0 2017:11, MIL-STD-461G: 2017-07, IEC 61000-4-6: 2013 by Direct Method	-90 ° to +90 °	3.1°
92	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	Power Frequency Magnetic Field Immunity: Current Continuous & Short Duration- 1s to 3s, Standard Coil:1 m x 1m, 1m x 2.6m	Using Digital Multimeter with Current clamp and Clamp on Meter As per IEC 61000-4-8 Ed 2.0 2009:09 by direct method	1 A/m to 1000 A/m	2%
93	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	Return Loss (VSWR) Attenuator, Antenna, Amplifier, Termination, RF Load, Directional Coupler, adapter line or Similar Equipment @ 9 kHz to 15GHz	Using Vector Network Analyzer By Direct Method	1 dB to 46 dB	0.35 dB to 0.4 dB
94	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	Return Loss (VSWR) Attenuator, Antenna, Amplifier, Termination, RF Load, Directional Coupler, adapter line or Similar Equipment @ 9 kHz to 3.2GHz	Using Vector Network Analyzer With Spectrum / Signal Generator , Power meter & Directional Coupler by direct method	1 dB to 46 dB	0.35dB



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95	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	RF Amplifier :Gain @ 9kHz to 15 GHz	Using Vector Network Analyzer With Spectrum / Power Sensor, Signal Generator and Attenuator by Direct Method	5 dB to 65 dB	0.4 dB to 0.56 dB
96	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	RF Amplifier, Generator : Harmonics Level @ 9kHz to 15GHz	Using Vector Network Analyzer With Spectrum / Power Sensor, Signal Generator, and Attenuator by Direct Method	5 dBc to 80 dBc	0.52 dB to 0.7 dB
97	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	RF & Microwave Power Loss: Attenuation, VDF , Coupling Decoupling Factor, Isolation, Insertion loss for BCI, DC, Attenuator, Adapter AMN, ISN,ESD Target, HV Divider, EM Clamp, CDNE, cable (9kHz-15GHz)	Using Vector Network Analyzer with Spectrum by Direct Method	0.1 dB to 70 dB	0.35 dB to 0.4 dB



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98	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	RF & Microwave Power Loss: Attenuation, VDF , Coupling Decoupling Factor, Isolation, Insertion loss for BCI, DC, Attenuator, Adapter AMN, ISN,ESD Target, HV Divider, EM Clamp, CDNE, cable (9kHz-3.2GHz	Using Power meter and Signal Generator by Direct Method	0.1 dB to 70 dB	0.25dB
99	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	RF Amplifier, Generator :Power Measurement @ 9 kHz to 15 GHz	Network Analyzer With Spectrum /Power Sensor and Attenuator by Direct Method	-60 dBm to 60 dBm	0.56dB
100	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	RF Amplifier, Generator :Power Measurement @ 9 kHz to 6 GHz	Using Power Sensor by Direct Method	-60 dBm to 15 dBm	0.56 dB to 0.25 dB
101	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	Ring Wave Generator -Phase Shifting	Using Oscilloscope and HV Differential Probe as per IEC 61000-4-12 Ed 3.0 2017-07 by direct method	0 ° to 360 °	1.0 ° to 0.5 °





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102	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	Ring Wave Immunity Test System Repetition rate	Using Oscilloscope and HV Differential Probe as per IEC 61000-4-12 Ed 3.0 2017-07 by direct method	0.1 min to 1 min	2.0%
103	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	Ring Wave Immunity Test System -Open Circuit Voltage	Using Oscilloscope and HV Differential Probe as per IEC 61000-4-12 Ed 3.0 2017-07 by direct method	+/-225 Volts to +/-6600 Volts	3.05%
104	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	Ring Wave Immunity Test System Current Rise Time (Short Circuit)	Using Oscilloscope and Current clamp as per IEC 61000-4-12 Ed 3.0 2017-07 by direct method	0.2 $\mu$ s to 1 $\mu$ s	1.0%
105	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	Ring Wave Immunity Test System decay in voltage 0.4 = ratio of Pk2 to Pk1 = 1.1	Using Oscilloscope and HV Differential Probe as per IEC 61000-4-12 Ed 3.0 2017-07 by direct method	0.4 V/V to 1.1 V/V	4.42%
106	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	Ring Wave Immunity Test System decay in voltage 0.4 = ratio of Pk3 to Pk2 = 0.8	Using Oscilloscope and HV Differential Probe as per IEC 61000-4-12 Ed 3.0 2017-07 by direct method	0.4 V/V to 0.8 V/V	4.42%



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107	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	Ring Wave Immunity Test System decay in voltage 0.4 = ratio of Pk4 to Pk3 = 0.8	Using Oscilloscope and HV Differential Probe as per IEC 61000-4-12 Ed 3.0 2017-07 by direct method	0.4 V/V to 0.8 V/V	4.42%
108	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	Ring Wave Immunity Test System Frequency	Using Oscilloscope and HV Differential Probe as per IEC 61000-4-12 Ed 3.0 2017-07 by direct method	90 kHz to 110 kHz	2.11%
109	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	Ring Wave Immunity Test System Voltage Rise Time (Open Circuit)	Using Oscilloscope and HV Differential Probe as per IEC 61000-4-12 Ed 3.0 2017-07 by direct method	0.35 $\mu$ s to 0.65 $\mu$ s	1.0%
110	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	Ring Wave Immunity Test System-Short Circuit Current :12 OHM	Using Oscilloscope and Current Probe clamp as per IEC 61000-4-12 Ed 3.0 2017-07 by direct method	+/-15.6 A to +/-550 A	2.58%
111	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	Ring Wave Immunity Test System-Short Circuit Current :30 OHM	Using Oscilloscope and Current Probe clamp as per IEC 61000-4-12 Ed 3.0 2017-07 by direct method	+/-6.225 A to +/-220 A	2.58%



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112	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	Target - Attenuator Cable Chain :DC Resistance	Using Digital multimeter as per IEC 61000-4-2 Ed 2.0 2008-12 by direct method	1 Ohm to 2.1 Ohm	0.25%
113	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	Target - Attenuator Cable Chain :Low Frequency Transfer Impedance	Using Digital Multimeter /Vector Network Analyzer as per IEC 61000-4-2 Ed 2.0 2008-12 by direct method	$\pm 0.0198$ Ohm to $\pm 0.202$ Ohm	0.5 % to 0.25 %
114	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	Transfer Impedance -RF Current Clamp 20Hz to 500MHz	Using Vector Network Analyzer With Spectrum and Generator with Oscilloscope by Direct Method	39 dBOhm to -36 dBOhm	0.4dB
115	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	Voltage Dips & interruption Generator Output Voltage at NO Load	Using Oscilloscope with HV probe and Digital multimeter as per IEC 61000-4-11 Ed. 3.0 2020-01 and IEC 61000-4-29:2000 by direct method	0 % to 100 %	2.60%
116	ELECTRO-TECHNICAL-EMI/ EMC (Measure)	Voltage Dips & interruption- Dips/ interruption Time	Using Oscilloscope with HV probe as per IEC 61000-4-11 Ed. 3.0 2020-01 and IEC 61000-4-29:2000 by direct method	0.005 s to 10 s	3.0%





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117	ELECTRO-TECHNICAL-EMI/ EMC (Source)	Power Measurement @9kHz to 6GHz	Using Power Sensor with Signal Generator by Comparison method	-60 dBm to 15 dBm	0.25 dB to 0.35 dB
118	ELECTRO-TECHNICAL-TIME & FREQUENCY (Measure)	Frequency	Using Vector Network Analyzer with Spectrum by Direct Method	0.009 MHz to 15000 MHz	0.00012%
119	ELECTRO-TECHNICAL-TIME & FREQUENCY (Measure)	Frequency	Using 6.1/2 Digital Multimeter with Three Phase Power Calibrator & Signal Generator by Comparison Method	20 Hz to 500 Hz	0.040 % to 0.017 %
120	ELECTRO-TECHNICAL-TIME & FREQUENCY (Measure)	Frequency	Using 6.1/2 Digital Multimeter by Direct Method	3 Hz to 300 KHz	0.13 % to 0.015 %
121	ELECTRO-TECHNICAL-TIME & FREQUENCY (Measure)	Frequency	Using Three Phase Reference Standard with Three Phase Power Calibrator by Comparison Method and by Direct Method	45 Hz to 65 Hz	0.022%



# National Accreditation Board for Testing and Calibration Laboratories

## SCOPE OF ACCREDITATION

**Laboratory Name :** CENTRE OF EXCELLENCE FOR ELECTRONIC PRODUCTS, 638, GIDC MAKARPURA, VADODARA, GUJARAT, INDIA

**Accreditation Standard** ISO/IEC 17025:2017

**Certificate Number** CC-2952 **Page No** 58 of 58

**Validity** 18/03/2022 to 17/03/2024 **Last Amended on** -

S.No	Discipline / Group	Measurand or Reference Material/Type of instrument or material to be calibrated or measured / Quantity Measured /Instrument	Calibration or Measurement Method or procedure	Measurement range and additional parameters where applicable(Range and Frequency)	* Calibration and Measurement Capability(CMC)(±)
122	ELECTRO-TECHNICAL-TIME & FREQUENCY (Source)	Frequency	Using Signal Generator by Direct Method	2.00E-05 MHz to 3200 MHz	0.00012 % to 0.00031 %
123	ELECTRO-TECHNICAL-TIME & FREQUENCY (Source)	Frequency	Using Three Phase Portable Meter Test System by Direct Method	45 Hz to 60 Hz	0.032 % to 0.033 %
124	ELECTRO-TECHNICAL-TIME & FREQUENCY (Source)	Frequency	Using Three Phase Power Calibrator by Direct Method	45 Hz to 60 Hz	0.033 % to 0.034 %

\* CMCs represent expanded uncertainties expressed at approximately the 95% level of confidence, using a coverage factor of k = 2.