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Calibration Laboratory.

Accreditation Scope of Precision Measuring Equipment Laboratory (PMEL)
 KARF, PAC, Kamra, Pakistan

Permanent laboratory premises

Field of measurement:			
Measured quantity	Range	Best Measurement capability expressed as an uncertainty (\pm)	Brief description of measurement and equipment used
AC Voltages	2 mV – 1000 V (10 Hz – 1 MHz) 2 mV - 200 mV 5 V – 750 V	0.016 mV 0.077 V	Fluke 5700A Multifunction Calibrator (Source)
DC Voltages	10 mV – 1000 V 10 mV – 220 mV 0.5 V – 10 V	0.08 mV 0.0004 mV 0.0029 V	Fluke 5700A Multifunction Calibrator (Source)
AC Current	200 mA- 2.2A (10Hz -10kHz) 0.010 mA - 0.99 A 1 A -2.2 A	0.045 mA 0.900 mA	Fluke 5700A Multifunction Calibrator (Source)
DC Current	15 mA-2.2 A 15 mA- 300 mA 0.500 A - 2.2 A	0.0035 mA 0.2300 mA	Fluke 5700A Multifunction Calibrator (Source)
Resistance	0.01 m Ω - 100 m Ω 0.010 Ω - 0.99 Ω 1 Ω - 190 Ω 1k Ω -190k Ω 1M Ω - 100 M Ω	0.00097 Ω 0.00102 Ω 0.00052 K Ω 0.000514 M Ω	Fluke 5700A Multifunction Calibrator (Source)
AC Voltages	300 mV-1000 V (10 Hz – 100 KHz) 300 mV – 2.99 V 3 V – 29.9 V 30 V – 99.9 V 100 V – 1000 V	95 mV 130 V 190 V 110 V	Model 9100A Calibration System (Source)
DC Voltages	\pm 300 mV \pm 4500 mV \pm 1.5 V \pm 3 V \pm 4.5 V \pm 30 V \pm 45 V \pm 300 V \pm 330 V \pm 1k V	8.9 mV 38.4 mV 13.8 V 8.5 V 40 V 10.2 V 40 V 10.2 V 9.7 V 3.4 kV	Model 9100A Calibration System (Source)

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Measured quantity	Range	Best Measurement capability expressed as an uncertainty (\pm)	Brief description of measurement and equipment used
AC Current	0 V -20 V(10 Hz-30 kHz) (Upto 1000 A Via Tum Coil) 3 mA 3 mA 30 mA 3 A 3 A 10 A 30 A 100 A 150 A 500 A	520 mA 520 mA 520 mA 480 A 460 A 590 A 210 A 180 A 210 A 180 A	Model 9100A Calibration System (Source)
DC Current	300 μ A – 20 A 300 μ A 450 μ A 3 mA 30 mA 3 A 10 A	70 μ A 180 μ A 71 μ A 72 mA 84 mA 120 A 89 A	Model 9100A Calibration System (Source)
Resistance	0.1 Ω 10 Ω 38 Ω 45 Ω 100 Ω 380 Ω 450 Ω 1 k Ω 3.8 k Ω 10 k Ω 38 k Ω 45 k Ω 100 k Ω (High Current) 1 Ω 30 Ω 45 Ω 100 Ω 380 Ω 450 Ω 1 k Ω	34 Ω 110 Ω 34 Ω 210 Ω 97 Ω 30 Ω 29 Ω 17 k Ω 9 k Ω 130 k Ω 45 k Ω 180 k Ω 96 k Ω 40 Ω 25 Ω 30 Ω 17 Ω 9 Ω 9 Ω 8 Ω	Model 9100A Calibration System (Source)

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Measured quantity	Range	Best Measurement capability expressed as an uncertainty (\pm)	Brief description of measurement and equipment used
	1.95 k Ω 4.5 k Ω 10 k Ω 38 k Ω 45 k Ω 100 k Ω 380 k Ω 450 k Ω 1 M Ω 3.8 M Ω 4.5 M Ω 10 M Ω 38 M Ω 45 M Ω 80 M Ω 100 M Ω (Super Current) 1 Ω 30 Ω 45 Ω 190 Ω 450 Ω 1.9 k Ω 4.5 k Ω 19 k Ω 60 k Ω 300 k Ω 600 k Ω 3 M Ω 6 M Ω 30 M Ω	7 k Ω 32 k Ω 19 k Ω 12 k Ω 40 k Ω 27 k Ω 18 k Ω 41 k Ω 33 M Ω 28 M Ω 240 M Ω 180 M Ω 140 M Ω 130 M Ω 130 M Ω 40 Ω 12 Ω 11 Ω 9 Ω 9 Ω 8 k Ω 9 k Ω 8 k Ω 21 k Ω 19 k Ω 31 k Ω 30 M Ω 210 M Ω 140 M Ω	
Frequency	0.5 Hz- 10 MHz 1 MHz	1 Hz	Model 9100A Calibration System (Source)
Capacitance	0.5 nF - 40mF (Low Current) 0.75 nF 3 nF 1.5 nF 6 nF 15 nF 60 nF 150.0 nF 300.0 nF 600.0 nF 3 μ F 1.5 μ F 6 μ F	0.05 % + 3 PF 0.05 % + 3 PF 0.05 % + 3 PF 0.05 % + 3 PF 0.05 % + 3 PF 0.059 % 0.059 % 0.059 % 0.059 % 0.059 % 0.059 % 0.059 % 0.059 % 0.059 % 0.059 %	Model 9100A Calibration System (Source)

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Measured quantity	Range	Best Measurement capability expressed as an uncertainty (\pm)	Brief description of measurement and equipment used
	15 μ F 30 μ F 60 μ F 150 μ F 300 μ F 600 μ F 1.5 mF 3 mF 6 mF 15 mF 30 mF (Super Current) 300 μ F 3.0 mF 30 mF	0.059 % 0.059 % 0.059 % 0.059 % 0.059 % 0.059 % 0.059 % 0.01 % 0.01 % 0.01 % 0.01 % 0.05 % 0.05 % 0.01 %	
Temperature	-250 °C + 1370° C 24.91 °C	0.01 ⁰ %	Model 9100A Calibration System (Source)
Frequency RF Power	10 Hz - 20 GHz 13 dBm to -110 dBm 3 μ W - 100 mW	2.9 x 10 ⁻¹⁰ GHz 0.033 dBm 0.25 %	HP 5350 Freq Counter (Measurement) HP 5334 Freq Counter (Measurement) HP 437B Power Meter (Measurement) HP 8481 Power Sensor (Measurement) HP 8656B Signal Generator (Source) HP83732B Synth Signal Generator (Source) HP58503A GPS Receiver (Source) HP33120A Arbitrary Waveform Generator (Source)
Frequency	10.0 MHz to 18.0 GHz 0 dBm (1 mW)	2.9 E - 10 GHz 1.3 % 0.1mW	HP 437B Power Meter (Measurement) HP83732B Synth Signal Generator (Source) Tegam F1109 Thermistor Mount (Source) Tegam 1805B RF Control Unit (Source) HP8720C Vector Network Analyzer (Source)

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Measured quantity	Range	Best Measurement capability expressed as an uncertainty (\pm)	Brief description of measurement and equipment used
Pulse	Frequency 50 MHz Amplitude -8 V - 8 V	0.01 V	TDS 410A Digital Oscilloscope (Measurement) HP 5334B Freq Counter (Measurement) DMM 34401A (Measurement)
AC Power	1 mW Ref Output of Power Meter 3 μ W 10 μ W 30 μ W 100 μ W 300 μ W 1 mW 3 mW 10 mW 30 mW 100 mW 1 mW Ref	0.007 mW 0.0001 mW	Tegam M 1110 Standard Thermistor Mount (Source) HP168A Range Calibrator (Source) Fluke8508A Reference Multimeter (Measurement) Tegam Model 1806 Dual Type IV Mater
Pressure	1 psi -10000 psi	1.19 psi	Automatic Pressure Calibration System Model 3666-C (Source/Measurement)

Note:

The laboratory is accredited for calibration on the points mentioned above. The range contain other points are not under accredited scope.

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