

	ACCREDITATION DOCUMENT	F-06/02 Issue Date: 18/08/2020 Rev. No: 09 LAB 018
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Accreditation No: LAB 018

Awarded to

Precision Measuring Equipment Laboratory APF, PAC Kamra Attock, Pakistan.

The scope of accreditation is in accordance with the standard specifications outlined in the following page(s) of this document. The accredited scope shall be visible and legible in areas such as customer service, sample-receiving section etc and shall not mislead its users.

The accreditation was first time granted on **28-10-2005** by Pakistan National Accreditation Council.

The laboratory complies with the requirements of **ISO/IEC 17025:2017**.

The accreditation requires regular surveillance, and is valid until **01-01-2021**.

The decision of accreditation made by Pakistan National Accreditation Council implies that the organization has been found to fulfill the requirements for accreditation within the scope.

The organization however, itself is responsible for the results of performed measurements/tests.

PAKISTAN NATIONAL ACCREDITATION COUNCIL

18-08-2020
Date

Sd.
Director General



Calibration Laboratory

**Accreditation Scope of Precision Measuring Equipment Laboratory
APF, PAC Kamra, Attock, Pakistan**

Permanent laboratory premises

FIELD OF MEASUREMENT: -

Calibration Area	Range	*Expanded Uncertainty (±)	Technique, Reference Standard, Equipment
DC VOLTAGE (SOURCE)	100 mV at 100 mV Range	0.0020 mV	CP No. PM-01 1. REFERENCE STANDARD: FLUKE 5520A MULTIFUNCTION CALIBRATOR (SOURCE) 2. UNIT UNDER TEST: HP 34401A DIGITAL MULTIMETER (MEASURE)
	1 V at 1 V Range	0.000201 V	
	10 V at 10 V Range	0.00015 V	
	-10 V at 10 V Range	0.00074 V	
	50 V at 50 V Range	0.00080 V	
	100 V at 100 V Range	0.0010 V	
	500 V at 1000 V Range	0.0050 V	
	800 V at 1000 V Range	0.0090 V	
1000 V at 1000 V Range	0.010 V		
AC VOLTAGE (SOURCE)	100 mV @ 10 Hz at 100 mV Range	0.0029 mV	CP No. PM-01 1. REFERENCE STANDARD: FLUKE 5520A MULTIFUNCTION CALIBRATOR (SOURCE) 2. UNIT UNDER TEST: HP 34401A DIGITAL MULTIMETER (MEASURE)
	100 mV @ 50 Hz at 100 mV Range	0.0029 mV	
	100 mV @ 1 KHz at 100 mV Range	0.0019 mV	
	100 mV @ 50 KHz at 100 mV Range	0.0023 mV	
	1 V @ 50 Hz at 1 V Range	0.003224 V	
	10 V @ 50 Hz at 10 V Range	0.00318 V	
	100 V @ 50 Hz at 100 V Range	0.0027 V	
	300 V @ 50 Hz at 750 V Range	0.0040 V	
	500 V @ 50 Hz at 750 V Range	0.055 V	
	750 V @ 50 Hz at 750 V Range	0.053 V	
	1 V @ 1 KHz at 1 V Range	0.003275 V	
	10 V @ 1 KHz at 10 V Range	0.00327 V	
	100 V @ 1 KHz at 100 V Range	0.0031 V	
	300 V @ 1 kHz at 750 V Range	0.0040 V	
	500 V @ 1 kHz at 750 V Range	0.0050 V	
	750 V @ 1 kHz at 750 V Range	0.054 V	
1 V @ 10 KHz at 1 V Range	0.0000070 V		
10 V @ 10 KHz at 10 V Range	0.000070 V		
100 V @ 10 KHz at 100 V Range	0.00070 V		

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FIELD OF MEASUREMENT: -

Calibration Area	Range	*Expanded Uncertainty (\pm)	Technique, Reference Standard, Equipment
AC VOLTAGE (SOURCE)	300 V @ 10 KHz at 750 V Range	0.058 V	CP No. PM-01 1. REFERENCE STANDARD: FLUKE 5520A MULTIFUNCTION CALIBRATOR (SOURCE) 2. UNIT UNDER TEST: HP 34401A DIGITAL MULTIMETER (MEASURE)
	500 V @ 10 KHz at 750 V Range	0.0040 V	
	750 V @ 10 KHz at 750 V Range	0.054 V	
	1 V @ 50 KHz at 1 V Range	0.0000080 V	
	10 V @ 50 KHz at 10 V Range	0.000080 V	
	100 V @ 50 KHz at 100 V Range	0.00070 V	
	300 V @ 50 KHz at 750 V Range	0.0040 V	
DC CURRENT (SOURCE)	10 mA at 10 mA Range	0.00025 mA	CP No. PM-01 1. REFERENCE STANDARD: FLUKE 5520A MULTIFUNCTION CALIBRATOR (SOURCE) 2. UNIT UNDER TEST: HP 34401A DIGITAL MULTIMETER (MEASURE)
	100 mA at 100mA Range	0.0023 mA	
	1 A at 1 A Range	0.002992 A	
	3 A at 3 A Range	0.00298 A	
AC CURRENT (SOURCE)	1 A @ 50 Hz at 1 A Range	0.00104 A	CP No. PM-01 1. REFERENCE STANDARD: FLUKE 5520A MULTIFUNCTION CALIBRATOR (SOURCE) 2. UNIT UNDER TEST: HP 34401A DIGITAL MULTIMETER (MEASURE)
	3 A @ 50 Hz at 3 A Range	0.00104 A	
	1 A @ 1 kHz at 1 A Range	0.00104 A	
	3 A @ 1 kHz at 3 A Range	0.00104 A	
	1 A @ 5 kHz at 1 A Range	0.00103A	
	3 A @ 5 kHz at 3 A Range	0.00104 A	
RESISTANCE (SOURCE)	100 Ω at 1 k Ω Range	0.0020 Ω	CP No. PM-01 1. REFERENCE STANDARD: FLUKE 5520A MULTIFUNCTION CALIBRATOR (SOURCE) 2. UNIT UNDER TEST: HP 34401A DIGITAL MULTIMETER (MEASURE)
	1 k Ω at 1 k Ω Range	0.000083 k Ω	
	10 k Ω at 10 k Ω Range	0.00012 k Ω	
	100 k Ω at 100 k Ω Range	0.0011 k Ω	
	1 M Ω at 10 M Ω Range	0.00070 M Ω	
	10 M Ω at 10 M Ω Range	0.00061 M Ω	
	100 M Ω at 100 M Ω Range	0.0026 M Ω	
FREQUENCY (SOURCE)	9 Hz at 110 mV Range	0.00020 Hz	CP No. PM-01 1. REFERENCE STANDARD: FLUKE 5520A MULTIFUNCTION CALIBRATOR (SOURCE) 2. UNIT UNDER TEST: HP 34401A DIGITAL MULTIMETER (MEASURE)
	30 Hz at 110 mV Range	0.00020 Hz	
	300 kHz at 110 mV Range	0.0030 kHz	

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CAPACITANCE (SOURCE)	1 nF	0.28 nF	CP No. PM-42 1. REFERENCE STANDARD: FLUKE 5520A MULTIFUNCTION CALIBRATOR (SOURCE) 2. UNIT UNDER TEST: U1242B DIGITAL MULTIMETER (MEASURE)
	10 nF	0.080 nF	
	100 nF	0.080 nF	
	1 µF	0.0014 µF	
	10 µF	0.0050 µF	
	100 µF	0.020 µF	
	1 mF	0.0014 mF	
DC VOLTAGE (MEASURE)	10 V	0.00017 V	CP No. PM-27 1. REFERENCE STANDARDS: (A) HP 34401A DIGITAL MULTIMETER (MEASURE) (B) HP 6051A SYSTEM DC ELECTRONIC LOAD (MEASURE) 2. UNIT UNDER TEST: N5772A DC POWER SUPPLY (SOURCE)
	20 V	0.0010 V	
	30 V	0.0010 V	
	40 V	0.0010 V	
	50 V	0.0010 V	
	60 V	0.0010 V	
DC CURRENT (MEASURE)	0.5 A	0.00067 A	CP No. PM-27 1. REFERENCE STANDARDS: (A) HP 34401A DIGITAL MULTIMETER (MEASURE) (B) HP 6051A SYSTEM DC ELECTRONIC LOAD (MEASURE) (C) RC80/3 STANDARD RESISTOR (MEASURE) 2. UNIT UNDER TEST: HP6541A DC POWER SUPPLY (SOURCE)
	1 A	0.00067 A	
	5 A	0.00068 A	
	10 A	0.00068 A	
	15 A	0.00070 A	
	20 A	0.00070 A	
TEMPERATURE (SOURCE)	-20 °C	0.080 °C	P-399 1. REFERENCE STANDARDS: (A) FLUKE 9103 DRY WELL CALIBRATOR (SOURCE) 2. UNIT UNDER TEST: 6685PK0001541 DIGITAL THERMOMETER (MEASURE)
	-10 °C	0.080 °C	
	0.0 °C	0.080 °C	
	20 °C	0.080 °C	
	40 °C	0.080 °C	
	60 °C	0.080 °C	
	80 °C	0.13 °C	
	100 °C	0.21 °C	

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Calibration Area	Range	*Expanded Uncertainty (±)	Technique, Reference Standard, Equipment
TEMPERATURE (SOURCE)	-190 °C	0.080 °C	CP No. PM-42 1. REFERENCE STANDARD: FLUKE 5520A MULTIFUNCTION CALIBRATOR (SOURCE) 2. UNIT UNDER TEST: FLUKE 51 II THERMOMETER WITH THERMOCOUPLE (MEASURE)
	-150 °C	0.080 °C	
	-100 °C	0.080 °C	
	-50 °C	0.080 °C	
	0.0 °C	0.080 °C	
	50 °C	0.080 °C	
	100 °C	0.080 °C	
	150 °C	0.080 °C	
	200 °C	0.080 °C	
	250 °C	0.080 °C	
	300 °C	0.080 °C	
	350 °C	0.080 °C	
	400 °C	0.080 °C	
	450 °C	0.080 °C	
	500 °C	0.080 °C	
	550 °C	0.080 °C	
	600 °C	0.080 °C	
	650 °C	0.080 °C	
	700 °C	0.080 °C	
	750 °C	0.080 °C	
	800 °C	0.080 °C	
	850 °C	0.080 °C	
	900 °C	0.080 °C	
	950 °C	0.080 °C	
	1000 °C	0.080 °C	
	1050 °C	0.080 °C	
1100 °C	0.080 °C		
1150 °C	0.080 °C		
1200 °C	0.080 °C		
1250 °C	0.080 °C		
1300 °C	0.080 °C		
1350 °C	0.080 °C		

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FIELD OF MEASUREMENT: -

Calibration Area	Range	*Expanded Uncertainty (\pm)	Technique, Reference Standard, Equipment
RF AMPLITUDE (MEASURE)	-20 dBm @ 10 MHz	0.020 dBm	P-637 1. REFERENCE STANDARDS: (A) HP437B POWER METER (MEASURE) (B) HP8482A POWER SENSOR (MEASURE) (C) HP8485A POWER SENSOR (MEASURE) 2. UNIT UNDER TEST: GIGA-TRONICS 2440B SIGNAL GENERATOR (SOURCE)
	-10 dBm @ 10 MHz	0.10 dBm	
	0.0 dBm @ 10 MHz	0.010 dBm	
	10 dBm @ 10 MHz	0.020 dBm	
	-20 dBm @ 100 MHz	0.020 dBm	
	-10 dBm @ 100 MHz	0.10 dBm	
	0.0 dBm @ 100 MHz	0.010 dBm	
	10 dBm @ 100 MHz	0.020 dBm	
	-20 dBm @ 200 MHz	0.020 dBm	
	-10 dBm @ 200 MHz	0.10 dBm	
	0.0 dBm @ 200 MHz	0.010 dBm	
	10 dBm @ 200 MHz	0.020 dBm	
	-20 dBm @ 400 MHz	0.020 dBm	
	-10 dBm @ 400 MHz	0.10 dBm	
	0.0 dBm @ 400 MHz	0.010 dBm	
	10 dBm @ 400 MHz	0.020 dBm	
	-20 dBm @ 750 MHz	0.020 dBm	
	-10 dBm @ 750 MHz	0.10 dBm	
	0.0 dBm @ 750 MHz	0.010 dBm	
	10 dBm @ 750 MHz	0.020 dBm	
	-20 dBm @ 1.5GHz	0.020 dBm	
	-10 dBm @ 1.5GHz	0.10 dBm	
	0.0 dBm @ 1.5GHz	0.010 dBm	
	10 dBm @ 1.5GHz	0.020 dBm	
	-20 dBm @ 3GHz	0.020 dBm	
	-10 dBm @ 3GHz	0.10 dBm	
	0.0 dBm @ 3GHz	0.010 dBm	
	10 dBm @ 3GHz	0.020 dBm	
	-20 dBm @ 6GHz	0.020 dBm	
	-10 dBm @ 6GHz	0.10 dBm	
0.0 dBm @ 6GHz	0.010 dBm		
10 dBm @ 6GHz	0.020 dBm		
-20 dBm @ 12GHz	0.020 dBm		
-10 dBm @ 12GHz	0.10 dBm		
0.0 dBm @ 12GHz	0.010 dBm		
10 dBm @ 12GHz	0.020 dBm		
-20 dBm @ 20GHz	0.020 dBm		
-10 dBm @ 20GHz	0.10 dBm		
0.0 dBm @ 20GHz	0.010 dBm		
10 dBm @ 20GHz	0.020 dBm		

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Calibration Area	Range	*Expanded Uncertainty (±)	Technique, Reference Standard, Equipment
RF FREQUENCY (MEASURE)	10 MHz @ 0.0 dBm	0.002064 MHz	P-637 1. REFERENCE STANDARDS: 5350B M/W FREQUENCY COUNTER(MEASURE) 2. UNIT UNDER TEST: GIGA-TRONICS 2440B SIGNAL GENERATOR (SOURCE)
	100 MHz @ 0.0 dBm	0.002103 MHz	
	200 MHz @ 0.0 dBm	0.002870 MHz	
	400 MHz @ 0.0 dBm	0.006466 MHz	
	750 MHz @ 0.0 dBm	0.014079 MHz	
	1.5 GHz @ 0.0 dBm	0.000027565 GHz	
	3 GHz @ 0.0 dBm	0.000058731 GHz	
	6 GHz @ 0.0 dBm	0.000117446 GHz	
	12 GHz @ 0.0 dBm	0.000256051 GHz	
	20 GHz @ 0.0 dBm	0.000287610 GHz	
AC POWER (SOURCE)	3 μW	0.010 μW	CP No. PM-02 1. REFERENCE STANDARD: HP11683A RANGE CALIBRATOR (SOURCE) 2. UNIT UNDER TEST: HP 437B POWER METER (MEASURE)
	10 μW	0.010 μW	
	30 μW	0.10 μW	
	100 μW	0.10 μW	
	0.3 mW	0.0010 mW	
	1 mW	0.0010 mW	
	3 mW	0.010 mW	
	10 mW	0.010 mW	
	30 mW	0.10 mW	
	100 mW	0.10 mW	

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FIELD OF MEASUREMENT: -			
Calibration Area	Range	*Expanded Uncertainty (±)	Technique, Reference Standard, Equipment
OUTPUT OFFSET (MEASURE)	4.995 VDC @ 1 kHz	0.00146 V	CP No. PM-64 1. REFERENCE STANDARD: HP34401A DMM (MEASURE) 2. UNIT UNDER TEST: AGILENT 33250A FUNCTION / ARBITRARY WAVEFORM GENERATOR (SOURCE)
	4.0 VDC @ 1 kHz	0.00146 V	
	3.0 VDC @ 1 kHz	0.00146 V	
	2.0 VDC @ 1 kHz	0.0015 V	
	1.0 VDC @ 1 kHz	0.00146 V	
	0.0 VDC @ 1 kHz	0.00225 V	
	-1.0 VDC @ 1 kHz	0.00058 V	
	-2.0 VDC @ 1 kHz	0.0006 V	
	-3.0 VDC @ 1 kHz	0.00058 V	
	-4.0 VDC @ 1 kHz	0.00058 V	
-4.995 VDC @ 1 kHz	0.00058 V		
PRESSURE (SOURCE)	500 psi	7.2 psi	CP No. PM-25 1. REFERENCE STANDARD: KNC 3666-C AUTOMATIC PRESSURE CALIBRATION SYSTEM (SOURCE) 2. UNIT UNDER TEST: PRESSURE GAUGE 0-6000 psi (MEASURE)
	1000 psi	7.2 psi	
	1500 psi	7.2 psi	
	2000 psi	7.2 psi	
	2500 psi	7.2 psi	
	3000 psi	7.3 psi	
	3500 psi	7.2 psi	
	4000 psi	7.3 psi	
	4500 psi	7.2 psi	
	5000 psi	7.3 psi	
	5500 psi	7.3 psi	

*** Expanded Uncertainty:**

Expanded Uncertainty is the measurement uncertainty at a coverage probability of 95 %, which usually requires the use of a coverage factor of $k = 2$. This measurement uncertainty is a value for which the laboratory has been accredited using the procedure that was the subject of assessment. In certificates issued under its accreditation scope an accredited laboratory is not permitted to quote an uncertainty that is smaller than the published uncertainty for respective ranges as given above.

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