



**ACCREDITATION
DOCUMENT**

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

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 **01-01-2024**.

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

28-10-2021
Date

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Director General



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Calibration Laboratory.

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

Permanent laboratory premises

Field of Measurement: -			
Measured Quantity	Range	*Expanded Uncertainty (±)	Technique, Reference Standard, Equipment
DC VOLTAGE (SOURCE)	100mV at 100 mV Range	0.0003mV	CP No. PM/CP-01 1. REFERENCE STANDARD: FLUKE 5520A MULTIFUNCTION CALIBRATOR (SOURCE) 2. UNIT UNDER TEST: HP 34401A DIGITAL MULTIMETER (MEASURE)
	1V at 1V Range	0.000116V	
	10V at 10V Range	0.000106V	
	-10V at 10V Range	0.000106V	
	50V at 50V Range	0.0004V	
	100V at 100V Range	0.0007V	
	500V at 1000V Range	0.004V	
	800V at 1000V Range	0.006V	
1000V at 1000V Range	0.008V		
AC VOLTAGE (SOURCE)	100mV @ 10Hz at 100mV Range	0.0049mV	CP No. PM/CP-01 1. REFERENCE STANDARD: FLUKE 5520A MULTIFUNCTION CALIBRATOR (SOURCE) 2. UNIT UNDER TEST: HP 34401A DIGITAL MULTIMETER (MEASURE)
	100mV @ 50Hz at 100mV Range	0.0058mV	
	100mV @ 1KHz at 100mV Range	0.0047mV	
	100mV @ 50KHz at 100mV Range	0.0068mV	
	1V @ 50Hz at 1V Range	0.000047V	
	10V @ 50Hz at 10V Range	0.00046V	
	100V @ 50Hz at 100V Range	0.0048V	
	300V @ 50Hz at 750V Range	0.045V	
	500V @ 50Hz at 750V Range	0.048V	
	750V @ 50Hz at 750V Range	0.138V	
	1V @ 1KHz at 1V Range	0.000047V	
	10V @ 1KHz at 10V Range	0.00036V	
	100V @ 1KHz at 100V Range	0.0064V	
	300V @ 1kHz at 750V Range	0.046V	
	500V @ 1kHz at 750V Range	0.047V	
	750V @ 1kHz at 750V Range	0.048V	
	1V @ 10KHz at 1V Range	0.000528V	
10V @ 10KHz at 10V Range	0.00046V		
100V @ 10KHz at 100V Range	0.0063V		

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Field of Measurement: -

Measured Quantity	Range	*Expanded Uncertainty (±)	Technique, Reference Standard, Equipment
AC VOLTAGE (SOURCE)	300V @ 10KHz at 750V Range	0.046V	CP No. PM/CP-01
	500V @ 10KHz at 750V Range	0.047V	1. REFERENCE STANDARD: FLUKE 5520A MULTIFUNCTION CALIBRATOR (SOURCE) 2. UNIT UNDER TEST: HP 34401A DIGITAL MULTIMETER (MEASURE)
	750V @ 10KHz at 750V Range	0.048V	
	1V @ 50KHz at 1V Range	0.000043V	
	10V @ 50KHz at 10V Range	0.01179V	
	100V @ 50KHz at 100V Range	0.0468V	
	300V @ 50KHz at 750V Range	0.047V	
DC CURRENT (SOURCE)	10mA at 10mA Range	0.00016mA	
	100mA at 100mA Range	0.0015mA	1. REFERENCE STANDARD: FLUKE 5520A MULTIFUNCTION CALIBRATOR (SOURCE) 2. UNIT UNDER TEST: HP 34401A DIGITAL MULTIMETER (MEASURE)
	1A at 1A Range	0.001000A	
	3A at 3A Range	0.00100A	
1A @ 50Hz at 1A Range	0.001009A	CP No. PM/CP-01	
AC CURRENT (SOURCE)	3A @ 50Hz at 3A Range	0.03320A	1. REFERENCE STANDARD: FLUKE 5520A MULTIFUNCTION CALIBRATOR (SOURCE) 2. UNIT UNDER TEST: HP 34401A DIGITAL MULTIMETER (MEASURE)
	1A @ 1kHz at 1A Range	0.001008A	
	3A @ 1kHz at 3A Range	0.00101A	
	1A @ 5kHz at 1A Range	0.001008A	
	3A @ 5kHz at 3A Range	0.00102A	
	100Ω at 1kΩ Range	0.0012Ω	
RESISTANCE (SOURCE)	1kΩ at 1kΩ Range	0.000018kΩ	1. REFERENCE STANDARD: FLUKE 5520A MULTIFUNCTION CALIBRATOR (SOURCE) 2. UNIT UNDER TEST: HP 34401A DIGITAL MULTIMETER (MEASURE)
	10kΩ at 10kΩ Range	0.00011kΩ	
	100kΩ at 100kΩ Range	0.0015kΩ	
	1MΩ at 10MΩ Range	0.000039MΩ	
	10MΩ at 10MΩ Range	0.00031MΩ	
	100MΩ at 100MΩ Range	0.0256MΩ	
	FREQUENCY (SOURCE)	9Hz at 110mV Range	
30Hz at 110mV Range		0.00028Hz	1. REFERENCE STANDARD: FLUKE 5520A MULTIFUNCTION

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	300kHz at 110mV Range	0.0022kHz	CALIBRATOR (SOURCE) 2. UNIT UNDER TEST: HP 34401A DIGITAL MULTIMETER (MEASURE)
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Field of Measurement: -

Measured Quantity	Range	*Expanded Uncertainty (±)	Technique, Reference Standard, Equipment
CAPACITANCE (SOURCE)	1nF	0.08nF	CP No. PM/CP-42 1. REFERENCE STANDARD: FLUKE 5520A MULTIFUNCTION CALIBRATOR (SOURCE) 2. UNIT UNDER TEST: U1242B DIGITAL MULTIMETER (MEASURE)
	10nF	0.08nF	
	100nF	0.10nF	
	1µF	0.0010µF	
	10µF	0.002µF	
	100µF	0.12µF	
	1mF	0.0010mF	
	10mF	0.007mF	
DC VOLTAGE (MEASURE)	10V	0.00023V	CP No. PM/CP-27 & PM/CP-16 1. REFERENCE STANDARDS: (A) HP 34401A DIGITAL MULTIMETER (MEASURE) (B) HP 6051A SYSTEM DC ELECTRONIC LOAD (MEASURE) 2. UNIT UNDER TEST: 6543A DC POWER SUPPLY (SOURCE)
	20V	0.0014V	
	30V	0.0015V	
DC CURRENT (MEASURE)	1A	0.00003A	CP No. PM/CP-27 & PM/CP-16 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)
	5A	0.00022A	
	10A	0.00009A	
	15A	0.0003A	
	20A	0.0003A	
TEMPERATURE (SOURCE)	-20°C	0.2°C	P-008 1. REFERENCE STANDARDS: (A) FLUKE 9103 DRY WELL CALIBRATOR (SOURCE)
	-10°C	0.2°C	
	0°C	0.2°C	

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	20°C	0.2°C	2. UNIT UNDER TEST: 6685PK0001541 DIGITAL THERMOMETER (MEASURE)
	40°C	0.2°C	
	60°C	0.2°C	
	80°C	0.2°C	
	100°C	0.2°C	

Field of Measurement: -

Measured Quantity	Range	*Expanded Uncertainty (±)	Technique, Reference Standard, Equipment
TEMPERATURE (SOURCE)	-190°C	0.08°C	P-015 & P-008 1. REFERENCE STANDARD: FLUKE 5520A MULTIFUNCTION CALIBRATOR (SOURCE) 2. UNIT UNDER TEST: FLUKE 51 II THERMOMETER WITH THERMOCOUPLE (MEASURE)
	-150°C	0.08°C	
	-100°C	0.08°C	
	-50°C	0.08°C	
	0°C	0.08°C	
	50°C	0.08°C	
	100°C	0.08°C	
	150°C	0.08°C	
	200°C	0.08°C	
	250°C	0.08°C	
	300°C	0.08°C	
	350°C	0.08°C	
	400°C	0.08°C	
	450°C	0.08°C	
	500°C	0.08°C	
	550°C	0.08°C	
	600°C	0.08°C	
	650°C	0.08°C	
	700°C	0.08°C	
	750°C	0.08°C	
	800°C	0.08°C	
850°C	0.08°C		
900°C	0.08°C		
950°C	0.08°C		
1000°C	0.58°C		
1050°C	0.58°C		
1100°C	0.58°C		
1150°C	0.58°C		

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	1200°C	0.58°C	
	1250°C	0.58°C	
	1300°C	0.58°C	
	1350°C	0.58°C	

Field of Measurement: -

Measured Quantity	Range	*Expanded Uncertainty (±)	Technique, Reference Standard, Equipment
RF AMPLITUDE (MEASURE)	-20dBm @ 10.1MHz	0.11dBm	CP No. PM/CP-45 1. REFERENCE STANDARDS: (A) HP437B POWER METER (MEASURE) (B) HP8482A POWER SENSOR (MEASURE) (C) HP8485A POWER SENSOR (MEASURE) 2. UNIT UNDER TEST: E8247C PSG CW SIGNAL GENERATOR (SOURCE)
	-10dBm @ 10.1MHz	0.15dBm	
	0dBm @ 10.1MHz	0.11dBm	
	10dBm @ 10.1MHz	0.11dBm	
	-20dBm @ 1GHz	0.04dBm	
	-10dBm @ 1GHz	0.11dBm	
	0dBm @ 1GHz	0.04dBm	
	10dBm @ 1GHz	0.04dBm	
	-20dBm @ 1.9GHz	0.03dBm	
	-10dBm @ 1.9GHz	0.10dBm	
	0dBm @ 1.9GHz	0.02dBm	
	10dBm @ 1.9GHz	0.02dBm	
	-20dBm @ 2.1GHz	0.17dBm	
	-10dBm @ 2.1GHz	0.20dBm	
	0dBm @ 2.1GHz	0.20dBm	
	10dBm @ 2.1GHz	0.17dBm	
	-20dBm @ 10GHz	0.17dBm	
	-10dBm @ 10GHz	0.20dBm	
	0dBm @ 10GHz	0.17dBm	
	10dBm @ 10GHz	0.17dBm	
-20dBm @ 20GHz	0.17dBm		
-10dBm @ 20GHz	0.20dBm		

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	0dBm @ 20GHz	0.17dBm	
	10dBm @ 20GHz	0.17dBm	

Field of Measurement: -

Measured Quantity	Range	*Expanded Uncertainty (±)	Technique, Reference Standard, Equipment
RF FREQUENCY (MEASURE)	10MHz @ 0 dBm	0.0000098MHz	CP No. PM/CP-45 & P-294 1. REFERENCE STANDARDS: (A) M/W FREQUENCY COUNTER 53151A(MEASURE) (B) GPS CONTROLLED FREQ STANDARD 2. UNIT UNDER TEST: (A) E8247C PSG CW SIGNAL GENERATOR (SOURCE) (B) GIGA-TRONICS 2440B SIGNAL GENERATOR (SOURCE)
	100MHz @ 0 dBm	0.000693MHz	
	200MHz @ 0 dBm	0.001386MHz	
	400MHz @ 0 dBm	0.002771MHz	
	750MHz @ 0 dBm	0.005196MHz	
	1.111111111GHz @ 0 dBm	0.000007698GHz	
	2.222222222GHz @ 0 dBm	0.000015396GHz	
	3.333333333GHz @ 0 dBm	0.000023095GHz	
	4.444444444GHz @ 0 dBm	0.000030793GHz	
	5.555555555GHz @ 0 dBm	0.000038491GHz	
	6.666666666GHz @ 0 dBm	0.000046189GHz	
	7.777777777GHz @ 0 dBm	0.000053888GHz	
	8.888888888GHz @ 0 dBm	0.000061586GHz	
	9.999999999GHz @ 0 dBm	0.000069284GHz	
10GHz @ 0 dBm	0.000069284GHz		
20GHz @ 0 dBm	0.000138568GHz		
AC POWER (SOURCE)	3μW	0.01μW	CP No. PM/CP-02 1. REFERENCE STANDARD: HP11683A RANGE CALIBRATOR (SOURCE) 2. UNIT UNDER TEST: HP 437B POWER METER (MEASURE)
	10μW	0.01μW	
	30μW	0.1μW	
	100μW	0.1μW	
	0.3mW	0.001mW	
	1mW	0.001mW	
	3mW	0.01mW	

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	10mW	0.01mW	
	30mW	0.1mW	
	100mW	0.1mW	

Field of Measurement: -

Measured Quantity	Range	*Expanded Uncertainty (±)	Technique, Reference Standard, Equipment
OUTPUT OFFSET (MEASURE)	4.995 VDC @ 1kHz	0.00015V	CP No. PM/CP-64 1. REFERENCE STANDARD: HP34401A DMM (MEASURE) 2. UNIT UNDER TEST: AGILENT 33250A FUNCTION / ARBITRARY WAVEFORM GENERATOR (SOURCE)
	4.0 VDC @ 1kHz	0.00015V	
	3.0 VDC @ 1kHz	0.00012V	
	2.0 VDC @ 1kHz	0.00015V	
	1.0 VDC @ 1kHz	0.000117V	
	0.0 VDC @ 1kHz	0.000001V	
	-1.0 VDC @ 1kHz	0.000168V	
	-2.0 VDC @ 1kHz	0.00018V	
	-3.0 VDC @ 1kHz	0.00018V	
	-4.0 VDC @ 1kHz	0.00018V	
	-4.995 VDC @ 1kHz	0.00018V	
PRESSURE (SOURCE)	500 psi	7 psi	CP No. PM/CP-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 psi	
	1500 psi	7 psi	
	2000 psi	7 psi	
	2500 psi	7 psi	
	3000 psi	7 psi	
	3500 psi	8 psi	
	4000 psi	7 psi	
	4500 psi	7 psi	
	5000 psi	8 psi	
	5500 psi	7 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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