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 17025:2005.**

The accreditation requires regular surveillance, and is valid until **01-01-2018.**

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

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Date Director General

Calibration Laboratory.

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

Permanent laboratory premises X

FIELD OF MEASUREMENT :				
MEASURED QUANTITY	RANGE	CALIBRATION & MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY (±)	BRIEF DESCRIPTION OF MEASUREMENT AND EQUIPMENT USED	
			EQUIPMENT USED	METHOD USED
DC VOLTAGE (SOURCE)	100mV at 100mV Range	0.0004mV	1. REFERENCE STANDARD: (A) FLUKE 5520A MULTIFUNCTION CALIBRATOR (SOURCE) 2. UNIT UNDER TEST: (A) HP 34401A DIGITAL MULTIMETER (MEASURE)	CP No.: PM-01
	1V at 1V Range	0.000010V		
	10V at 10V Range	0.00007V		
	-10V at 10V Range	0.0001V		
	100V at 100V Range	0.0007V		
	1000V at 1000V Range	0.008V		
DC CURRENT (SOURCE)	10mA at 10mA Range	0.0003mA	1. REFERENCE STANDARD: (A) FLUKE 5520A MULTIFUNCTION CALIBRATOR (SOURCE) 2. UNIT UNDER TEST: (A) HP 34401A DIGITAL MULTIMETER (MEASURE)	CP No.: PM-01
	100mA at 100mA Range	0.003mA		
	1A at 1A Range	0.00008A		
	2A at 3A Range	0.00008A		
AC CURRENT (SOURCE)	10mA @ 1kHz at 1A Range	0.0004mA	1. REFERENCE STANDARD: (A) FLUKE 5520A MULTIFUNCTION CALIBRATOR (SOURCE) 2. UNIT UNDER TEST: (A) HP 34401A DIGITAL MULTIMETER (MEASURE)	CP No.: PM-01
	1A @ 1kHz at 1A Range	0.00040A		
	2A @ 1kHz at 3A Range	0.00040A		

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			EQUIPMENT USED	METHOD USED
AC VOLTAGE (SOURCE)	10mV@1KHz at 100mV Range	0.0022mV	1. REFERENCE STANDARD: (A) FLUKE 5520A MULTIFUNCTION CALIBRATOR (SOURCE) 2. UNIT UNDER TEST: (A) HP 34401A DIGITAL MULTIMETER (MEASURE)	CP No.: PM-01
	100mV@1KHz at 100mV Range	0.003mV		
	100mV@50KHz at 100mV Range	0.003mV		
	1V @ 20Hz at 1V Range	0.00030V		
	1V @ 1kHz at 1V Range	0.00016V		
	1V @ 20kHz at 1V Range	0.00016V		
	1V @ 50kHz at 1V Range	0.00011V		
	1V @ 100kHz at 1V Range	0.00016V		
	1V @ 300kHz at 1V Range	0.00208V		
	100mV @ 1kHz at 10V Range	0.003mV		
	1V @ 1kHz at 10V Range	0.00011V		
	10V @ 10Hz at 10V Range	0.0004V		
	10V @ 1kHz at 10V Range	0.0003V		
	10V @ 50kHz at 10V Range	0.0003V		
	100V @ 1kHz at 100V Range	0.003V		
	100V @ 50kHz at 100V Range	0.003V		
	700V @ 1kHz at 750V Range	0.007V		
	700V @ 50kHz at 750V Range	0.007V		
	700V @ 45Hz at 750V Range	0.007V		

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RESISTANCE (SOURCE)	100Ω at 100Ω Range	0.003Ω	1. REFERENCE STANDARD: (A) FLUKE 5520A MULTIFUNCTION CALIBRATOR (SOURCE) 2. UNIT UNDER TEST: (A) HP 34401A DIGITAL MULTIMETER (MEASURE)	CP No.: PM-01
	1kΩ at 1kΩ Range	0.00004kΩ		
	10kΩ at 10kΩ Range	0.0003kΩ		
	100kΩ at 100kΩ Range	0.003kΩ		
	1MΩ at 1MΩ Range	0.00012MΩ		
	10MΩ at 10MΩ Range	0.0003MΩ		
	100MΩ at 100MΩ Range	0.001MΩ		
FREQUENCY (SOURCE)	100Hz @10mV at 100mV Range	0.003Hz	1. REFERENCE STANDARD: (A) FLUKE 5520A MULTIFUNCTION CALIBRATOR (SOURCE) 2. UNIT UNDER TEST: (A) HP 34401A DIGITAL MULTIMETER (MEASURE)	CP No.: PM-01
	100kHz @1V at 1V Range	0.003kHz		
CAPACITANCE (SOURCE)	1nF	0.03nF	1. REFERENCE STANDARD: (A) FLUKE 5520A MULTIFUNCTION CALIBRATOR (SOURCE) 2. UNIT UNDER TEST: (B) FLUKE 289 DIGITAL MULTIMETER (MEASURE)	CP No.: PM-42
	10nF	0.20nF		
	100nF	0.3nF		
	1µF	0.197µF		
	10µF	0.20µF		
	100µF	0.3µF		
	1mF	0.20mF		
	10mF	0.20mF		
	100mF	0.3mF		
	110mF	0.3mF		
DC VOLTAGE (MEASURE)	10V	0.06260V	1. REFERENCE STANDARDS: (A) HP 34401A DIGITAL MULTIMETER (MEASURE) (B) HP 6051A SYSTEM DC ELECTRONIC LOAD (MEASURE) 2. UNIT UNDER TEST: HP6673A DC POWER SUPPLY (SOURCE)	P-74
	20V	0.1283V		
	30V	0.1283V		
DC CURRENT (MEASURE)	2A	0.0019280A	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: (A) HP6673A DC POWER SUPPLY (SOURCE)	P-74
	5A	0.0019280A		

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			EQUIPMENT USED	METHOD USED
TEMPERATURE (SOURCE)	-20°C	0.3°C	1. REFERENCE STANDARDS: (A) FLUKE 9103 DRY WELL CALIBRATOR (SOURCE) (B) FLUKE 9103 DRY WELL CALIBRATOR (SOURCE) 2. UNIT UNDER TEST: FLUKE 51 II DIGITAL THERMOMETER (MEASURE)	P-398 & P-399
	-10°C	0.3°C		
	0°C	0.3°C		
	10°C	0.3°C		
	20°C	0.3°C		
	50°C	0.3°C		
	100°C	0.4°C		
	150°C	0.4°C		
	200°C	0.5°C		
	250°C	0.4°C		
	300°C	0.4°C		
	350°C	0.4°C		
	400°C	0.4°C		
	450°C	0.4°C		
	500°C	0.4°C		
RF AMPLITUDE (MEASURE)	-20dBm @(100kHz)	0.04dBm	1. REFERENCE STANDARDS: (A) HP437B POWER METER (MEASURE) (B) HP8482A POWER SENSOR (MEASURE) (C) HP8485A POWER SENSOR (MEASURE) 2. UNIT UNDER TEST: R&S SMF100A SIGNAL GENERATOR (SOURCE)	P-432
	-10dBm @(100kHz)	0.10dBm		
	0dBm @(100kHz)	0.03dBm		
	10dBm @(100kHz)	0.04dBm		
	18dBm @(100kHz)	0.40dBm		
	-20dBm @(1MHz)	0.04dBm		
	-10dBm @(1MHz)	0.10dBm		
	0dBm @(1MHz)	0.03dBm		
	10dBm @(1MHz)	0.04dBm		
	18dBm @(1MHz)	0.40dBm		
	-20dBm @(10MHz)	0.04dBm		
	-10dBm @(10MHz)	0.10dBm		
	0dBm @(10MHz)	0.03dBm		
	10dBm @(10MHz)	0.04dBm		
	18dBm @(10MHz)	0.40dBm		
	-20dBm @(100MHz)	0.04dBm		
	-10dBm @(100MHz)	0.10dBm		
	0dBm @(100MHz)	0.03dBm		
	10dBm @(100MHz)	0.04dBm		
	18dBm @(100MHz)	0.40dBm		
	-20dBm @(1GHz)	0.04dBm		
	-10dBm @(1GHz)	0.10dBm		
	0dBm @(1GHz)	0.03dBm		
	10dBm @(1GHz)	0.04dBm		
	18dBm @(1GHz)	0.40dBm		
	-20dBm @(10GHz)	0.04dBm		
	-10dBm @(10GHz)	0.10dBm		
	0dBm @(10GHz)	0.03dBm		
	10dBm @(10GHz)	0.04dBm		
	18dBm @(10GHz)	0.40dBm		
	-20dBm @(18GHz)	0.04dBm		
	-10dBm @(18GHz)	0.11dBm		
	0dBm @(18GHz)	0.03dBm		
	10dBm @(18GHz)	0.04dBm		
	18dBm @(18GHz)	0.40dBm		

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			EQUIPMENT USED	METHOD USED
RF FREQUENCY (MEASURE)	100kHz @ 0 dBm	0.0007kHz	REFERENCE STANDARDS: (A) FLUKE 910R GPS CONTROLLED FREQUENCY STANDARD (SOURCE) (B) AGILIENT 53151A MICROWAVE FREQUENCY COUNTER (MEASURE) 2. UNIT UNDER TEST: R&S SMF100A SIGNAL GENERATOR (SOURCE)	P-432
	1MHz @ 0 dBm	0.00001MHz		
	5MHz @ 0 dBm	0.00003MHz		
	10MHz @ 0 dBm	0.00007MHz		
	100MHz @ 0 dBm	0.00069MHz		
	1000MHz @ 0 dBm	0.00693MHz		
	5GHz @ 0 dBm	0.00003GHz		
	10GHz @ 0 dBm	0.00007GHz		
	15GHz @ 0 dBm	0.00010GHz		
	20GHz @ 0 dBm	0.00014GHz		
	26GHz @ 0 dBm	0.00018GHz		
AC POWER (SOURCE)	3µW	0.03µW	1. REFERENCE STANDARD: HP11683A RANGE CALIBRATOR (SOURCE) 2. UNIT UNDER TEST: HP 437B POWER METER (MEASURE)	CP No.: PM-02
	10µW	0.02µW		
	30µW	0.3µW		
	100µW	0.3µW		
	0.3mW	0.003mW		
	1mW	0.003mW		
	3mW	0.03mW		
	10mW	0.03mW		
	30mW	0.4mW		
	100mW	0.4mW		
PULSE (MEASURE)	0.5V @ 15MHz	0.03V	1. REFERENCE STANDARD: TDS410 OSCILLOSCOPE (MEASURE) 2. UNIT UNDER TEST: HP81134A PULSE PATTERN GENERATOR (SOURCE)	P-444
	1V @ 15MHz	0.04V		
	2V @ 15MHz	0.05V		
	0.5V @ 50MHz	0.03V		
	1V @ 50MHz	0.05V		
	2V @ 50MHz	0.05V		
	0.5V @ 100MHz	0.03V		
	1V @ 100MHz	0.05V		
	2V @ 100MHz	0.05V		
	0.5V @ 150MHz	0.03V		
	1V @ 150MHz	0.04V		
	2V @ 150MHz	0.05V		
	0.5V @ 200MHz	0.032V		
	1V @ 200MHz	0.05V		
	2V @ 200MHz	0.05V		

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PRESSURE (SOURCE)	10 inHg (UP SCALE)	0.6 inHg	1. REFERENCE STANDARD KNC 3688-A AIR DATA CALIBRATOR (SOURCE) 2. UNIT UNDER TEST: FLUKE 717 50009 PRESSURE CALIBRATOR (MEASURE)	CP No.: PM-422
	20 inHg (UP SCALE)	0.8 inHg		
	30 inHg (UP SCALE)	0.8 inHg		
	40 inHg (UP SCALE)	1.0 inHg		
	50 inHg (UP SCALE)	1.3 inHg		
	60 inHg (UP SCALE)	1.3 inHg		
	70 inHg (UP SCALE)	1.3 inHg		
	60 inHg (DOWN SCALE)	1.3 inHg		
	50 inHg (DOWN SCALE)	1.3 inHg		
	40 inHg (DOWN SCALE)	1.0 inHg		
	30 inHg (DOWN SCALE)	0.8 inHg		
	20 inHg (DOWN SCALE)	0.8 inHg		
	10 inHg (DOWN SCALE)	0.8 inHg		

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