CERTIFICATE OF ACCREDITATION

ANSI National Accreditation Board

11617 Coldwater Road, Fort Wayne, IN 46845 USA

This is to certify that

Teledyne LeCroy
700 Chestnut Ridge Road
Chestnut Ridge, NY 10977

has been assessed by ANAB and meets the requirements of international standard

ISO/IEC 17025:2017

and national standard

ANSI/NCSL Z540-1-1994 (R2002)

while demonstrating technical competence in the field of

CALIBRATION

Refer to the accompanying Scope of Accreditation for information regarding the types of activities to which this accreditation applies

AC-2555
Certificate Number

ANAB Approval

Certificate Valid Through: 02/14/2022
Version No. 003 Issued: 02/04/2020

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communiqué dated April 2017).

ANSI National Accreditation Board

SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017 AND ANSI/NCSL Z540-1-1994 (R2002)

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CALIBRATION

Valid to: **February 14, 2022** Certificate Number: **AC-2555**

Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
DC Voltage – Source	(0 to 330) mV (0.33 to 3.3) V (3.3 to 33) V (33 to 330) V (330 to 1 000) V	47 µV/V + 3.3 µV 40 µV/V + 4.5 µV 40 µV/V + 39 µV 43 µV/V + 0.39 mV 43 µV/V + 1.2 mV	Fluke 5500A Multi Product Calibrator
DC Voltage – Measure[1]	(10 to 100) mV 100 mV to 1 V (1 to 10) V (10 to 100) V (100 to 1 000) V	9 µV/V + 1.2 µV 5.5 µV/V + 1.2 µV 5.4 µV/V + 1.9 µV 8.1 µV/V + 0.041 mV 9.7 µV/V + 0.31 mV	HP 3485A w/ option 002 Multimeter
DC Current – Source	(0 to 3.2) mA (3.2 to 32) mA (32 to 320) mA 320 mA to 2.1 A (2.1 to 11) A	0.1 mA/A + 0.04 µA 80 µA/A + 0.22 µA 82 µA/A + 2.8 µA 0.24 mA/A + 34 µA 0.47 mA/A + 0.26 mA	Fluke 5500A Multi Product Calibrator
DC Current – Measure	(10 to 100) µA (0.1 to 1) mA (1 to 10) mA (10 to 100) mA (0.1 to 1) A	28 µA/A + 0.81 nA 26 µA/A + 5.6 nA 26 µA/A + 60 nA 42 µA/A + 0.52 µA 0.12 mA/A +10 µA	HP 3485A w/ option 002 Multimeter

Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Resistance – Source	(0 to 11) Ω	0.012 % of reading + 6.2 mΩ	Fluke 5500A Multi Product Calibrator (2-wire mode from 110 kΩ to 330 MΩ)
	(11 to 33) Ω	0.010 % of reading + 0.012 Ω	
	(33 to 330) Ω	0.007 % of reading + 0.012 Ω	
	(0.33 to 3.3) kΩ	0.007 % of reading + 0.05 Ω	
	(3.3 to 33) kΩ	0.007 % of reading + 0.47 Ω	
	(33 to 110) kΩ	0.009 % of reading + 4.7 Ω	
	(110 to 330) kΩ	0.01 % of reading + 4.7 Ω	
	(0.33 to 3.3) MΩ	0.012 % of reading + 43 Ω	
	(3.3 to 11) MΩ	0.047 % of reading + 0.43 kΩ	
	(11 to 33) MΩ	0.1 % of reading + 0.43 kΩ	
	(33 to 110) MΩ	0.4 % of reading + 4.3 kΩ	
	(110 to 330) MΩ	0.4 % of reading + 13 kΩ	
Resistance – Measure[1]	0 to 10 Ω	18 μΩ/Ω + 51 μΩ	HP 3458A w/ option 002 Multimeter
	(10 to 100) Ω	18 μΩ/Ω + 0.5 mΩ	
	(0.1 to 1) kΩ	13 μΩ/Ω + 0.5 mΩ	
	(1 to 10) kΩ	13 μΩ/Ω + 5.2 mΩ	
	(10 to 100) kΩ	13 μΩ/Ω + 0.05Ω	
	(0.1 to 1) MΩ	17 μΩ/Ω + 2.0 Ω	
	(1 to 10) MΩ	53 μΩ/Ω + 100 Ω	
	(10 to 100) MΩ	0.055 % of reading + 1 kΩ	
AC Voltage – Source	(1 to 33) mV		Fluke 5500A Multi Product Calibrator
	(10 to 45) Hz	0.3 % of reading + 20 μV	
	45 Hz to 10 kHz	0.12 % of reading + 16 μV	
	(10 to 20) kHz	0.16 % of reading + 16 μV	
	(20 to 50) kHz	0.19 % of reading + 16 μV	
	(50 to 100) kHz	0.27 % of reading + 26 μV	
	(100 to 500) kHz	0.79 % of reading + 47 μV	
	(33 to 330) mV		
	(10 to 45) Hz	0.22 % of reading + 39 μV	
	45 Hz to 10 kHz	0.04 % of reading + 16 μV	
	(10 to 20) kHz	0.08 % of reading + 16 μV	
	(20 to 50) kHz	0.12 % of reading + 38 μV	
	(50 to 100) kHz	0.19 % of reading + 0.13 mV	
	(100 to 500) kHz	0.54 % of reading + 0.26 mV	

Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Voltage – Source	(0.33 to 3.3) V		Fluke 5500A Multi Product Calibrator
	(10 to 45) Hz	0.15 % of reading + 0.2 mV	
	45 Hz to 10 kHz	0.02 % of reading + 47 µV	
	(10 to 20) kHz	0.06 % of reading + 47 µV	
	(20 to 50) kHz	0.06 % of reading + 47 µV	
	(50 to 100) kHz	0.19 % of reading + 1.3 mV	
	(100 to 500) kHz	0.39 % of reading + 2.6 mV	
	(3.3 to 33) V		
	(10 to 45) Hz	0.12 % of reading + 2 mV	
	45 Hz to 10 kHz	0.03 % of reading + 0.47 mV	
	(10 to 20) kHz	0.062 % of reading + 2.0 mV	
	(20 to 50) kHz	0.15 % of reading + 4.0 mV	
	(50 to 100) kHz	0.19 % of reading + 13 mV	
	(33 to 330) V		
	45 Hz to 1 kHz	0.04 % of reading + 5 mV	
	(1 to 10) kHz	0.06 % of reading + 12 mV	
	(10 to 20) kHz	0.07 % of reading + 26 mV	
	(330 to 1 020) V		
	45 Hz to 1 kHz	0.04 % of reading + 62 mV	
	(1 to 5) kHz	0.16 % of reading + 77 mV	
	(5 to 10) kHz	0.16 % of reading + 0.39 V	
AC Voltage – Measure[1]	(10 to 100) mV		HP 3458A w/ option 002 Multimeter
	40 Hz to 1 kHz	0.34 mV/V +1.1 µV	
	(1 to 20) kHz	0.41 mV/V +1.1 µV	
	(20 to 50) kHz	1.3 mV/V + 1.1 µV	
	(50 to 100) kHz	5 mV/V + 1.1 µV	
	100 mV to 1 V		
	40 Hz to 1 kHz	90 µV/V + 20 µV	
	(1 to 20) kHz	0.16 mV/V + 20 µV	
	(20 to 50) kHz	0.32 mV/V + 20 µV	
	(50 to 100) kHz	0.82 mV/V +29 µV	
	(1 to 10) V		
	40 Hz to 1 kHz	85 µV/V + 0.2 mV	
	(1 to 10) kHz	0.15 mV/V +0.2 mV	
	(10 to 20) kHz	0.15 mV/V +0.2 mV	
	(20 to 50) kHz	0.33 mV/V + 0.6 mV	
	(50 to 100) kHz	0.81 mV/V +2.3 mV	

Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Voltage – Measure[1]	(10 to 100) V 40 Hz to 1 kHz (1 to 10) kHz (10 to 20) kHz (100 to 700) V 40 Hz to 1 kHz (1 to 5) kHz (10 to 20) kHz	 0.22 mV/V + 2 mV 0.23 mV/V + 2 mV 0.23 mV/V + 2 mV 0.41 mV/V + 20 mV 0.6 mV/V + 20 mV 0.61 mV/V + 66 mV	HP 3458A w/ option 002 Multimeter
Oscilloscopes[1] – Frequency Ref - Lo BW	10 MHz	0.25 µHz/Hz	HP 8648C w/option 1E5 Signal Generator R&S SMB100A w/option SMB-B1
Oscilloscopes[1] – Frequency Ref – Hi BW	10 MHz	50 nHz/Hz	Anritsu Generator phase locked to Stanford Research Systems Rb Frequency Standard PSR10
Oscilloscopes[1] – Bandwidth	(-20 to +20) dBm 10 kHz to 2 GHz (2 to 4) GHz	 0.28 dB 0.34 dB	HP 8648C w/option 1EA, R&S SMB100A Signal Generators
	(-20 to +20) dBm 25 MHz to 50 GHz 25 MHz to 65 GHz	 0.64 dB + M 0.9 dB + M	Anritsu MG369X Signal Generator

Electrical – RF/Microwave

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
RF Power – Measure[2]	(-60 to +20) dBm 9 kHz to 2 GHz (2 to 4) GHz	 0.28 dB 0.34 dB	Agilent 4418B Power Meter w/E9304 H18 Power Sensor
	(-35 to +20) dBm DC to 50 GHz (50 to 65) GHz	 0.45 dB+ M 0.61 dB + M	R&S NRPZ57 Power Sensor

Time and Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Frequency – Measure	1 kHz to 300 MHz	0.6 nHz/Hz + 0.58 µHz	Stanford Research Systems - SR620 Counter, phase locked to Rb Frequency Standard PSR10
Frequency – Generate	10 MHz	0.6 nHz/Hz yearly	Stanford Research Systems Rb Frequency Standard - PSR10

Calibration and Measurement Capability (CMC) is expressed in terms of the measurement parameter, measurement range, expanded uncertainty of measurement and reference standard, method, and/or equipment. The expanded uncertainty of measurement is expressed as the standard uncertainty of the measurement multiplied by a coverage factor of 2 (k=2), corresponding to a confidence level of approximately 95%.

Notes:

1. On-site calibration service is available for this parameter, since on-site conditions are typically more variable than those in the laboratory, larger measurement uncertainties are expected on-site than what is reported on the accredited scope.
2. M = mismatch error.
3. This scope is formatted as part of a single document including Certificate of Accreditation No. AC-2555.