



CERTIFICATE OF ACCREDITATION

The ANSI National Accreditation Board

Hereby attests that

**Spectrum Technologies,
a Transcat Company
1228 State Route 487
Paxinos, PA 17860**

Fulfills the requirements of

ISO/IEC 17025:2017

and national standards

**ANSI/NCSL Z540-1-1994 (R2002) AND
ANSI/NCSL Z540.3-2006 (R2013)**

In the field of

CALIBRATION

This certificate is valid only when accompanied by a current scope of accreditation document.
The current scope of accreditation can be verified at www.anab.org.

A handwritten signature in black ink, appearing to read 'R. Douglas Leonard Jr.', is positioned above a horizontal line.

R. Douglas Leonard Jr., VP, PILR SBU

Expiry Date: 07 September 2023
Certificate Number: AC-2489.19



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).

**SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017,
ANSI/NCSL Z540-1-1994 (R2002) AND ANSI/NCSL Z540.3-2006 (R2013)**

**Spectrum Technologies,
A Transcat Company**

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CALIBRATION

Valid to: **September 7, 2023**

Certificate Number: **AC-2489.19**

Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Current – Source ¹	(30 to 330) μ A	0.25 % of reading + 0.12 μ A	Fluke 5500A Multiproduct Calibrator
	(10 to 20) Hz	0.098 % of reading + 0.12 μ A	
	(20 to 45) Hz	0.097 % of reading + 0.12 μ A	
	45 Hz to 1 kHz	0.31 % of reading + 0.12 μ A	
	(1 to 5) kHz		
	(0.33 to 3.3) mA	0.16 % of reading + 0.23 μ A	
	(10 to 20) Hz	0.16 % of reading + 0.23 μ A	
	(20 to 45) Hz	0.078 % of reading + 0.23 μ A	
	45 Hz to 1 kHz	0.16 % of reading + 0.23 μ A	
	(1 to 5) kHz	0.47 % of reading + 0.23 μ A	
	(5 to 10) kHz		
	(3.3 to 33) mA	0.16 % of reading + 2.3 μ A	
	(10 to 20) Hz	0.079 % of reading + 2.3 μ A	
	(20 to 45) Hz	0.07 % of reading + 2.3 μ A	
	45 Hz to 1 kHz	0.16 % of reading + 2.3 μ A	
(1 to 5) kHz	0.47 % of reading + 2.3 μ A		
(5 to 10) kHz			
(33 to 330) mA	0.16 % of reading + 23 μ A		
(10 to 20) Hz	0.078 % of reading + 23 μ A		
(20 to 45) Hz	0.07 % of reading + 23 μ A		
45 Hz to 1 kHz	0.16 % of reading + 23 μ A		
(1 to 5) kHz	0.47 % of reading + 23 μ A		
(5 to 10) kHz			

Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Current – Source ¹	(0.33 to 2.2) A (10 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (2.2 to 10) A (10 to 65) Hz (65 to 500) Hz 500 Hz to 1 kHz	0.16 % of reading + 0.23 mA 0.078 % of reading + 0.23 mA 0.58 % of reading + 0.23 mA 0.047 % of reading + 1.6 mA 0.078 % of reading + 1.6 mA 0.26 % of reading + 1.6 mA	Fluke 5500A Multiproduct Calibrator
DC Current – Source ¹	Up to 3.3 mA (3.3 to 33) mA (33 to 330) mA (0.33 to 2.2) A (2.2 to 11) A	0.01 % of reading + 40 nA 0.01 % of reading + 0.19 μA 0.008 % of reading + 2.5 μA 0.025 % of reading + 34 μA 0.047 % of reading + 0.26 mA	Fluke 5500A Multiproduct Calibrator
Capacitance – Source ¹	(0.33 to 11) nF (50 to 1 000) Hz (11 to 110) nF (50 to 1 000) Hz (110 to 330) nF (50 to 1 000) Hz (0.33 to 1.1) μf (50 to 1 000) Hz (1.1 to 3.3) μf (50 to 1 000) Hz (3.3 to 11) μf (50 to 400) Hz (11 to 33) μf (50 to 400) Hz (33 to 110) μf (50 to 200) Hz (110 to 330) μf (50 to 100) Hz (0.33 to 1.1) mf (50 to 100) Hz	0.41 % of reading + 7.8 pF 0.22 % of reading + 7.8 pF 0.22 % of reading + 0.23 nF 0.22 % of reading + 0.77 nF 0.22 % of reading + 2.3 nF 0.22 % of reading + 7.8 nF 0.33 % of reading + 23 nF 0.45 % of reading + 78 nF 0.59 % of reading + 0.23 μF 0.85 % of reading + 0.23 μF	Fluke 5500A Multiproduct Calibrator
Resistance – Source ¹	Up to 11 Ω (11 to 33) Ω (33 to 110) Ω (110 to 330) Ω (0.33 to 1.1) kΩ (1.1 to 3.3) kΩ (3.3 to 11) kΩ (11 to 33) kΩ	0.009 % of reading + 4.6 mΩ 0.009 % of reading + 7.7 mΩ 0.007 % of reading + 7.7 mΩ 0.007 % of reading + 7.7 mΩ 0.007 % of reading + 47 mΩ 0.007 % of reading + 47 mΩ 0.007 % of reading + 0.47 Ω 0.007 % of reading + 0.47 Ω	Fluke 5500A Multiproduct Calibrator



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Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Resistance – Source ¹	(33 to 110) kΩ (110 to 330) kΩ (0.33 to 1.1) MΩ (1.1 to 3.3) MΩ (3.3 to 11) MΩ (11 to 33) MΩ (33 to 110) MΩ (110 to 330) MΩ	0.009 % of reading + 4.7 Ω 0.009 % of reading + 4.7 Ω 0.012 % of reading + 43 Ω 0.013 % of reading + 43 Ω 0.047 % of reading + 0.43 kΩ 0.086 % of reading + 0.43 kΩ 0.4 % of reading + 4.3 kΩ 0.54 % of reading + 4.3 kΩ	Fluke 5500A Multiproduct Calibrator
AC Voltage – Source ¹	(1 to 33) mV (10 to 45) Hz 45 Hz to 10 kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 500) kHz (33 to 330) mV (10 to 45) Hz 45 Hz to 10 kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 500) kHz (0.33 to 3.3) V (10 to 45) Hz 45 Hz to 10 kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 500) kHz (3.3 to 33) V (10 to 45) Hz 45 Hz to 10 kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz (33 to 330) V 45 Hz to 1 kHz (1 to 10) kHz (10 to 20) kHz	0.27 % of reading + 16 μV 0.12 % of reading + 16 μV 0.16 % of reading + 16 μV 0.19 % of reading + 16 μV 0.27 % of reading + 26 μV 0.78 % of reading + 47 μV 0.19 % of reading + 39 μV 0.039 % of reading + 16 μV 0.078 % of reading + 16 μV 0.12 % of reading + 31 μV 0.19 % of reading + 0.13 mV 0.54 % of reading + 0.26 mV 0.12 % of reading + 0.19 mV 0.023 % of reading + 46 μV 0.062 % of reading + 47 μV 0.11 % of reading + 0.23 mV 0.19 % of reading + 1.3 mV 0.39 % of reading + 2.6 mV 0.12 % of reading + 1.9 mV 0.031 % of reading + 0.47 mV 0.062 % of reading + 2 mV 0.15 % of reading + 3.9 mV 0.19 % of reading + 13 mV 0.039 % of reading + 5.1 mV 0.062 % of reading + 12 mV 0.07 % of reading + 26 mV	Fluke 5500A Multiproduct Calibrator

Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Voltage – Source ¹	(330 to 1020) V 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	0.039 % of reading + 62 mV 0.16 % of reading + 78 mV 0.16 % of reading + 0.39 V	Fluke 5500A Multiproduct Calibrator
DC Voltage – Source ¹	Up to 330 mV (0.33 to 3.3) V (3.3 to 33) V (33 to 330) V (330 to 1 000) V	0.005 % of reading + 2.3 μV 0.004 % of reading + 3.9 μV 0.004 % of reading + 39 μV 0.004 % of reading + 0.39 mV 0.004 % of reading + 1.2 mV	Fluke 5500A Multiproduct Calibrator

Time and Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Frequency – Source ¹	10 mHz to 2 MHz	19 μHz/Hz + 0.78 mHz	Fluke 5500A Multiproduct Calibrator

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. CMC is for a controlled laboratory environment of 18 °C to 28 °C (65 °F to 82 °F), when outside of this environment, larger measurement uncertainties are expected than what is reported on the accredited scope.
2. This scope is formatted as part of a single document including Certificate of Accreditation No. AC-2489.19.



R. Douglas Leonard Jr., VP, PILR SBU