



CERTIFICATE OF ACCREDITATION

ANSI-ASQ National Accreditation Board

500 Montgomery Street, Suite 625, Alexandria, VA 22314, 877-344-3044

This is to certify that

Transcat Spectrum
1228 State Route 487
Paxinos, PA 17860

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

ISO/IEC 17025:2005

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 calibrations to which this accreditation applies.

AC-2489.19

Certificate Number


ANAB Approval

Certificate Valid: 08/09/18-09/07/2019

Version No. 001 Issued: 08/09/18



This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005. 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 17025:2005 AND
ANSI/NCSL Z540-1-1994 (R2002)**

**Spectrum Technologies,
a Transcat Company**

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CALIBRATION

Valid to: **September 07, 2019**

Certificate Number: **AC-2489.19**

Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
DC Voltage - Source	(0 to 330) mV	0.004 7 % + 2.3 μ V	Fluke 5500A
	(0.33 to 3.3) V	0.003 9 % + 3.9 μ V	
	(3.3 to 33) V	0.004 % + 39 μ V	
	(33 to 330) V	0.004 3 % + 0.39 mV	
	(330 to 1 000) V	0.004 3 % + 1.2 mV	
DC Current - Source	(0 to 3.3) mA	0.01 % + 0.04 μ A	Fluke 5500A
	(3.3 to 33) mA	0.009 6 % + 0.19 μ A	
	(33 to 330) mA	0.007 8 % + 2.5 μ A	
	(0.33 to 2.2) A	0.024 % + 34 μ A	
	(2.2 to 11) A	0.048 % + 0.26 mA	
AC Voltage - Source	(1 to 33) mV (10 to 45) Hz	0.27 % + 16 μ V	Fluke 5500A



Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Voltage - Source	(0.045 to 10) kHz	0.12 % + 16 μ V	Fluke 5500A
	(10 to 20) kHz	0.16 % + 16 μ V	
	(20 to 50) kHz	0.19 % + 16 μ V	
	(50 to 100) kHz	0.27 % + 26 μ V	
	(100 to 500) kHz	0.78 % + 47 μ V	
	(33 to 330) mV		
	(10 to 45) Hz	0.19 % + 39 μ V	
	(0.045 to 10) kHz	0.039 % + 16 μ V	
	(10 to 20) kHz	0.078 % + 16 μ V	
	(20 to 50) kHz	0.12 % + 31 μ V	
	(50 to 100) kHz	0.19 % + 0.13 mV	
	(100 to 500) kHz	0.54 % + 0.25 mV	
	(0.33 to 3.3) V		
	(10 to 45) Hz	0.12 % + 0.19 mV	
	(0.045 to 10) kHz	0.023 % + 47 μ V	
	(10 to 20) kHz	0.062 % + 47 μ V	
	(20 to 50) kHz	0.1 % + 0.23 mV	
	(50 to 100) kHz	0.19 % + 1.3 mV	
	(100 to 500) kHz	0.39 % + 2.6 mV	
	(3.3 to 33) V		
	(10 to 45) Hz	0.12 % + 1.9 mV	
(0.045 to 10) kHz	0.034 % + 0.47 mV		

Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Voltage - Source	(10 to 20) kHz	0.062 % + 2 mV	Fluke 5500A
	(20 to 50) kHz	0.15 % + 3.9 mV	
	(50 to 100) kHz	0.19 % + 13 mV	
	(33 to 330) V		
	45 Hz to 1 kHz	0.039 % + 5.1 mV	
	(1 to 10) kHz	0.062 % + 12 mV	
	(10 to 20) kHz	0.07 % + 26 mV	
	(330 to 1020) V		
	45 Hz to 1 kHz	0.039 % + 62 mV	
	(1 to 5) kHz	0.16 % + 78 mV	
	(5 to 10) kHz	0.16 % + 390 mV	
	AC Current - Source	(30 to 330) μ A	
(10 to 20) Hz		0.25 % + 0.12 μ A	
(20 to 45) Hz		0.098 % + 0.12 μ A	
45 Hz to 1 kHz		0.097 % + 0.12 μ A	
(1 to 5) kHz		0.31 % + 0.12 μ A	
(0.33 to 3.3) mA			
(10 to 20) Hz		0.16 % + 0.23 μ A	
(20 to 45) Hz		0.16 % + 0.23 μ A	
45 Hz to 1 kHz		0.078 % + 0.23 μ A	
(1 to 5) kHz		0.16 % + 0.23 μ A	
(5 to 10) kHz		0.47 % + 0.23 μ A	



Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Current - Source	(3.3 to 33) mA		Fluke 5500A
	(10 to 20) Hz	0.16 % + 2.3 μA	
	(20 to 45) Hz	0.079 % + 2.3 μA	
	45 Hz to 1 kHz	0.072 % + 2.3 μA	
	(1 to 5) kHz	0.16 % + 2.3 μA	
	(5 to 10) kHz	0.47 % + 2.3 μA	
	(33 to 330) mA		
	(10 to 20) Hz	0.16 % + 23 μA	
	(20 to 45) Hz	0.08 % + 23 μA	
	45 Hz to 1 kHz	0.071 % + 23 μA	
	(1 to 5) kHz	0.19 % + 23 μA	
	(5 to 10) kHz	0.47 % + 23 μA	
	(0.330 to 2.2) A		
	(10 to 45) Hz	0.16 % + 0.23 mA	
	45 Hz to 1 kHz	0.078 % + 0.23 mA	
	(1 to 5) kHz	0.58 % + 0.23 mA	
(2.2 to 10) A			
(10 to 65) Hz	0.048 % + 1.6 mA		
(65 to 500) Hz	0.078 % + 1.6 mA		
500 Hz to 1 kHz	0.26 % + 1.6 mA		
Resistance - Source	(0 to 11) Ω	0.009 4 % + 0.004 6 Ω	Fluke 5500A
	(11 to 33) Ω	0.009 4 % + 0.007 7 Ω	

Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Resistance - Source	(33 to 110) Ω	0.007 % + 0.007 7 Ω	Fluke 5500A
	(110 to 330) Ω	0.007 % + 0.007 7 Ω	
	(0.33 to 1.1) kΩ	0.007 % + 0.047 Ω	
	(1.1 to 3.3) kΩ	0.007 % + 0.047 Ω	
	(3.3 to 11) kΩ	0.007 % + 0.47 Ω	
	(11 to 33) kΩ	0.007 % + 0.47 Ω	
	(33 to 110) kΩ	0.008 6 % + 4.7 Ω	
	(110 to 330) kΩ	0.009 4 % + 4.7 Ω	
	(0.33 to 1.1) MΩ	0.012 % + 43 Ω	
	(1.1 to 3.3) MΩ	0.013 % + 43 Ω	
	(3.3 to 11) MΩ	0.047 % + 0.43 kΩ	
	(11 to 33) MΩ	0.087 % + 0.43 kΩ	
	(33 to 110) MΩ	0.39 % + 4.3 kΩ	
	(110 to 330) MΩ	0.54 % + 4.3 kΩ	
Capacitance - Source	(0.33 to 11) nf (50 to 1 000) Hz	0.4 % + 7.8 pF	Fluke 5500A
	(11 to 110) nf (50 to 1 000) Hz	0.2 % + 7.8 pF	
	(110 to 330) nf (50 to 1 000) Hz	0.2 % + 0.23 nF	
	(0.33 to 1.1) μf (50 to 1 000) Hz	0.20 % + 0.77 nF	

Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Capacitance - Source	(1.1 to 3.3) μ f (50 to 1 000) Hz	0.2 % + 2.3 nF	Fluke 5500A
	(3.3 to 11) μ f (50 to 400) Hz	0.2 % + 7.8 nF	
	(11 to 33) μ f (50 to 400) Hz	0.32 % + 23 nF	
	(33 to 110) μ f (50 to 200) Hz	0.39 % + 77 nF	
	(110 to 330) μ f (50 to 100) Hz	0.55 % + 0.23 μ F	
	(0.33 to 1.1) mf (50 to 100) Hz	0.79 % + 0.23 μ F	

Time and Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Frequency - Source	0.01 Hz to 2 MHz	20 μ Hz/Hz + 0.78 mHz	Fluke 5500A

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. Values listed with percent (%) are percent of reading unless otherwise noted
3. 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.
4. This scope is formatted as part of a single document including Certificate of Accreditation No. AC-2489.19.



Vice President