CERTIFICATE OF ACCREDITATION

The ANSI National Accreditation Board

Hereby attests that

QRS Calibrations, LLC dba QRS Solutions
4501 Waldemar Street
Haltom City, TX 76177

Fulfills the requirements of

ISO/IEC 17025:2017

and national standard

ANSI/NCSL Z540-1-1994 (R2002)

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.

Jason Stine, Vice President

Expiry Date: 08 December 2028

Certificate Number: AC-2931

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

AND

ANSI/NCSL Z540-1-1994 (R2002)

QRS Calibrations, LLC dba QRS Solutions

4501 Waldemar Street
Haltom City, TX 76117
Karie Heiselt 877-254-7086

CALIBRATION

ISO/IEC 17025 Accreditation Granted: **07 May 2026**

Certificate Number: **AC-2931** Certificate Expiry Date: **08 December 2028**

Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Capacitance – Source [1] (Fixed Points)	1 kHz 1 nF 2 nF 5 nF 10 nF 100 nF 1 µF 10 µF	 2.6 pF 5.3 pF 15 pF 64 pF 0.64 nF 7.1 nF 85 nF	Comparison to Transmille Multiproduct Calibrator
Capacitance – Source [1] (Simulation)	1 kHz (0.95 to 9.5) µF (9.5 to 95) µF 95 µF to 0.95 mF (0.95 to 9.5) mF (9.5 to 100) mF	 9.4 nF/µF + 0.11 nF 23 pF/µF + 89 nF 7.9 µF/mF 7.2 µF/mF 7.1 µF/mF + 0.6 µF	Comparison to Transmille Multiproduct Calibrator
Capacitance – Measure [1]	1 kHz (1 to 100) nF (1 to 10) µF	 5.3 % of reading + 0.53 nF 0.47 % of reading + 5.3 nF	Comparison to LCR Meter

1899 L Street NW, Suite 1100-A, Washington, DC 20036
414-501-5494
www.anab.org

Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Current – Source [1]	(20 to 202) µA		Comparison to Transmille Multiproduct Calibrator
	(10 to 45) Hz	2 mA/A + 0.25 µA	
	45 Hz to 1 kHz	0.7 mA/A + 0.15 µA	
	(1 to 10) kHz	8 mA/A + 0.25 µA	
	(10 to 30) kHz	16 mA/A + 0.4 µA	
	(0.2 to 2.02) mA		
	(10 to 45) Hz	2 mA/A + 0.25 µA	
	45 Hz to 1 kHz	0.6 µA + 0.2 µA	
	(1 to 10) kHz	5 mA/A + 0.3 µA	
	(10 to 30) kHz	10 mA/A + 0.6 µA	
	(2 to 20.2) mA		
	(10 to 45) Hz	2 mA/A + 0.25 µA	
	45 Hz to 1 kHz	0.7 mA/A + 0.15 µA	
	(1 to 10) kHz	8 mA/A + 0.25 µA	
	(10 to 30) kHz	16 mA/A + 0.4 µA	
	(20 to 202) mA		
	(10 to 45) Hz	2 mA/A + 0.25 µA	
	45 Hz to 1 kHz	0.6 mA/A + 0.2 µA	
	(1 to 10) kHz	5 mA/A + 0.3 µA	
	(10 to 30) kHz	10 mA/A + 0.6 µA	
	(0.2 to 2.02) A		
	(10 to 45) Hz	2 mA/A + 0.3 mA	
	45 Hz to 1 kHz	0.6 mA/A + 0.2 mA	
	(1 to 5) kHz	5 mA/A + 0.4 mA	
	(5 to 10) kHz	6 mA/A + 1 mA	
	(10 to 30) kHz	25 mA/A + 5 mA	
	(2 to 30) A		
	(10 to 45) Hz	2 mA/A + 3 mA	
	(45 to 100) Hz	0.8 mA/A + 2 mA	
	100 Hz to 1 kHz	3 mA/A + 4 mA	
	(1 to 5) kHz	6 mA/A + 4 mA	
	(5 to 10) kHz	30 mA/A + 5 mA	
AC Current – Source [1] (Clamp-on Meters)			Comparison to Transmille Multiproduct Calibrator w/ Clamp Coil Adaptor
2-turn Coil Wound Clamps	(30 to 60) Hz		
	Up to 60 A	3.7 mA/A + 10 mA	
Hall-effect Clamps	(30 to 60) Hz		
	Up to 60 A	4.9 mA/A + 72 mA	

1899 L Street NW, Suite 1100-A, Washington, DC 20036
414-501-5494
www.anab.org

Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Current – Source [1] (Clamp-on Meters) 10-turn Coil Wound Clamps Hall-effect Clamps	 (30 to 60) Hz Up to 300 A (30 to 60) Hz Up to 300 A	 4.2 mA/A + 12 mA 6 mA/A + 0.11 A	Comparison to Transmille Multiproduct Calibrator w/ Clamp Coil Adaptor
AC Current – Source [1] (Clamp-on Meters) 50-turn Coil Wound Clamps Hall-effect Clamps	 (30 to 60) Hz Up to 1 500 A (30 to 60) Hz Up to 1 500 A	 2.6 mA/A + 42 mA 4.6 mA + 0.42 A	Comparison to Transmille Multiproduct Calibrator w/ Clamp Coil Adaptor
AC Current – Measure [1]	Up to 100 µA (10 to 40) Hz 40 Hz to 1 kHz (1 to 10) kHz (0.1 to 1) mA (10 to 40) Hz 40 Hz to 1 kHz (1 to 10) kHz (1 to 10) mA (10 to 40) Hz 40 Hz to 1 kHz (1 to 10) kHz (10 to 100) mA (10 to 40) Hz 40 Hz to 1 kHz (1 to 10) kHz (0.1 to 1) A (10 to 40) Hz 40 Hz to 1 kHz (1 to 10) kHz (1 to 10) A (10 to 40) Hz 40 Hz to 1 kHz (10 to 30) A (10 to 40) Hz 40 Hz to 1 kHz	 0.9 mA/A + 15 nA 0.5 mA/A + 12 nA 1.2 mA/A + 30 nA 0.9 mA/A + 0.15 µA 0.5 mA/A + 0.12 µA 1.2 mA/A + 0.3 µA 0.9 mA/A + 1.5 µA 0.5 mA/A + 1.2 µA 1.2 mA/A + 3 µA 0.9 mA/A + 15 µA 0.5 mA/A + 12 µA 1.2 mA/A + 30 µA 1.1 mA/A + 0.2 mA 0.7 mA/A + 0.15 mA 1.3 mA/A + 0.5 mA 1.6 mA/A + 4 mA 1.2 mA/A + 3 mA 1.6 mA/A + 12 mA 1.2 mA/A + 9 mA	Comparison to Transmille 8.5 Digit Multimeter

1899 L Street NW, Suite 1100-A, Washington, DC 20036
414-501-5494
www.anab.org

Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
DC Current – Source [1]	(0 to 202) µA (0.2 to 2.02) mA (2 to 20.2) mA (20 to 202) mA (0.2 to 2.02) A (2 to 20.2) A (20 to 30) A	0.1 mA/A + 10 nA 50 µA/A + 30 nA 50 µA/A + 0.2 µA 50 µA/A + 2 µA 0.13 mA/A + 30 µA 0.3 mA/A + 0.3 mA 0.5 mA/A + 0.45 mA	Comparison to Transmille Multiproduct Calibrator
DC Current – Source [1] (Clamp-on Meters) 2-turn Coil Hall-effect Clamps	(0 to 60) A	4.9 mA/A + 72 mA	Comparison to Transmille Multiproduct Calibrator w/ Clamp Coil Adaptor
DC Current – Source [1] (Clamp-on Meters) 10-turn Coil Hall-effect Clamps	(0 to 300) A	6 mA/A + 0.11 A	Comparison to Transmille Multiproduct Calibrator w/ Clamp Coil Adaptor
DC Current – Source [1] (Clamp-on Meters) 50-turn Coil Hall-effect Clamps	(0 to 1 500) A	4.6 mA/A + 0.42 A	Comparison to Transmille Multiproduct Calibrator w/ Clamp Coil Adaptor
DC Current – Measure [1]	(0 to 10) nA (10 to 100) nA (0.1 to 1) µA (1 to 10) µA (10 to 100) µA (0.1 to 1) mA (1 to 1) mA (10 to 100) mA (0.1 to 1) A (1 to 10) A (10 to 30) A	0.86 nA 0.6 mA/A + 0.85 nA 24 µA/A + 0.91 nA 18 µA/A + 0.92 nA 13 µA/A + 0.97 nA 22 µA/A + 0.14 nA 1.8 mA/A – 1.8 µA 16 µA 0.31 mA/A – 25 µA 0.73 mA/A – 0.45 mA 1.3 mA/A – 5.7 mA	Comparison to Transmille 8.5 Digit Multimeter
Inductance – Source [1] (Simulation)	1 kHz (1 to 100) mH (1 to 10) H	28 µH/H + 56 µH 1 mH/H – 0.3 mH	Comparison to Transmille Multiproduct Calibrator
Inductance – Measure [1]	1 kHz (1 to 100) mH (1 to 10) H	0.059 % of reading + 5.3 µH 0.81 % of reading	Comparison to LCR Meter

1899 L Street NW, Suite 1100-A, Washington, DC 20036
414-501-5494
www.anab.org

Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Resistance – Source [1] (Fixed Points) 4-wire Configuration	0.1 Ω 1 Ω 10 Ω 100 Ω 1 kΩ 10 kΩ 100 kΩ	7.1 mΩ 7.1 mΩ 7.3 mΩ 9.3 mΩ 32 mΩ 0.21 Ω 7.4 Ω	Comparison to Transmille Multiproduct Calibrator
Resistance – Source [1] (Fixed Points) 2-wire Configuration	1 MΩ 10 MΩ 100 MΩ 1 GΩ	40 Ω 1.3 kΩ 230 kΩ 13 MΩ	Comparison to Transmille Multiproduct Calibrator
Resistance – Source [1] (Simulated)	(0 to 100) Ω (100 to 330) Ω (0.33 to 1) kΩ (1 to 3.3) kΩ (3.3 to 10) kΩ (10 to 33) kΩ (33 to 100) kΩ (100 to 330) kΩ (0.33 to 1) MΩ (1 to 3.3) MΩ (3.3 to 10) MΩ (10 to 33) MΩ (33 to 100) MΩ (100 to 330) MΩ (0.33 to 1) GΩ	0.1 mΩ/Ω + 5 mΩ 0.1 mΩ/Ω + 52 mΩ 0.2 mΩ/Ω + 30 mΩ 0.1 mΩ/Ω + 89 mΩ 0.2 mΩ/Ω - 44 mΩ 0.1 mΩ/Ω + 0.37 Ω 0.2 mΩ/Ω – 0.9 Ω 0.1 mΩ/Ω + 3.2 Ω 0.2 mΩ/Ω – 9.2 Ω 0.1 mΩ/Ω + 19 Ω 0.2 mΩ/Ω – 79 Ω 0.5 mΩ/Ω – 3.7 kΩ 2.1 mΩ/Ω – 51 kΩ 16 mΩ/Ω – 1.4 MΩ 27 mΩ/Ω – 48 MΩ	Comparison to Transmille Multiproduct Calibrator
Resistance – Measure [1]	(0 to 1) Ω (1 to 10) Ω (10 to 100) Ω (0.1 to 1) kΩ (1 to 10) kΩ (10 to 100) kΩ (0.1 to 1) MΩ (1 to 10) MΩ	38 µΩ/Ω + 10 µΩ 21.3 µΩ/Ω + 27 µΩ 17.3 µΩ/Ω + 67 µΩ 14.3 µΩ/Ω + 1.7 mΩ 18.7 µΩ/Ω + 3.3 mΩ 33 µΩ/Ω + 11 mΩ 24 µΩ/Ω + 0.9 Ω 46 µΩ/Ω – 21 Ω	Comparison to Transmille 8.5 Digit Multimeter

1899 L Street NW, Suite 1100-A, Washington, DC 20036
414-501-5494
www.anab.org

Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Resistance – Measure [1]			Comparison to Transmille 8.5 Digit Multimeter
(Electrometer Function)			
2-wire Configuration	50 V		
	(5 to 10) MΩ	2 kΩ	
	(10 to 100) MΩ	0.7 mΩ/Ω – 4.9 kΩ	
	(0.1 to 1) GΩ	2.8 mΩ/Ω – 218 kΩ	
	1 GΩ to 1 TΩ	33 mΩ/Ω – 30.4 kΩ	
	100 V		
	(8 to 10) MΩ	2 kΩ	
	(10 to 100) MΩ	0.63 mΩ/Ω – 4.3 kΩ	
	(0.1 to 1) GΩ	2.8 mΩ/Ω – 223 kΩ	
	1 GΩ to 1 TΩ	6 mΩ/Ω – 3.4 MΩ	
	150 V		
	(12 to 100) MΩ	19 kΩ	
	(0.1 to 1) GΩ	0.7 mΩ/Ω – 51 kΩ	
	(1 to 10) GΩ	3 mΩ/Ω – 2.9 MΩ	
	10 GΩ to 1 TΩ	25.2 mΩ – 225 MΩ	
	200 V		
	(20 to 100) MΩ	19 kΩ	
	(0.1 to 1) GΩ	0.7 mΩ/Ω – 47 kΩ	
	(1 to 10) GΩ	2.8 mΩ/Ω – 2.2 MΩ	
	10 GΩ to 1 TΩ	21.2 mΩ/Ω – 186 MΩ	
	250 V		
	(25 to 100) MΩ	19 kΩ	
	(0.1 to 1) GΩ	0.7 mΩ/Ω – 47 kΩ	
	(1 to 10) GΩ	2.8 mΩ/Ω – 2.2 MΩ	
	10 GΩ to 1 TΩ	19.2 mΩ/Ω – 166 MΩ	
	300 V		
	(30 to 100) MΩ	19 kΩ	
	(0.1 to 1) GΩ	0.7 mΩ/Ω – 44.4 kΩ	
	(1 to 10) GΩ	3 mΩ/Ω – 2.2 MΩ	
	10 GΩ to 1 TΩ	17 mΩ/Ω – 16.5 MΩ	

1899 L Street NW, Suite 1100-A, Washington, DC 20036
414-501-5494
www.anab.org

Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Electrical Simulation of RTD Indicating Devices – Source (Passive) [1]			
2-wire Configuration	Pt 100		Comparison to Transmille Multiproduct Calibrator
	-100 °C	0.007 °C	
	0 °C	0.011 °C	
	30 °C	0.014 °C	
	60 °C	0.015 °C	
	100 °C	0.016 °C	
	200 °C	0.02 °C	
	300 °C	0.027 °C	
	800 °C	0.074 °C	
Electrical Simulation of RTD Indicating Devices – Measure [1]			
4-wire Configuration, Normal Current Mode	Pt 100		Comparison to Transmille Multiproduct Calibrator
	(-100 to 0) °C	0.002 % of reading + 0.003 °C	
	(0 to 800) °C	0.005 % of reading + 0.003 °C	
Low Current Mode	(-100 to 0) °C	0.005 % of reading + 0.007 °C	
	(0 to 800) °C	0.006 % of reading + 0.007 °C	
AC Voltage – Source [1]	Up to 202 mV		Comparison to Transmille Multiproduct Calibrator
	(10 to 45) Hz	0.8 mV/V + 15 µV	
	45 Hz to 1 kHz	0.16 mV/V + 15 µV	
	(1 to 20) kHz	200 µV/V + 28 µV	
	(20 to 100) kHz	1 mV/V + 40 µV	
	(100 to 500) kHz	4 mV/V + 0.1 mV	
	200 mV to 2.02 V		
	(10 to 45) Hz	0.5 mV/V + 0.18 mV	
	45 Hz to 1 kHz	0.16 m V/V + 0.12 mV	
	(1 to 20) kHz	0.21 mV/V + 0.18 mV	
	(20 to 100) kHz	0.65 mV/V + 0.3 mV	
	(0.1 to 1) MHz	3 mV/V + 0.45 mV	
	(2 to 20.2) V		
	(10 to 45) Hz	0.5 mV/V + 1.6 mV	
	45 Hz to 1 kHz	0.16 mV/V + 1 mV	
	(1 to 20) kHz	0.21 mV/V + 1.6 mV	
	(20 to 100) kHz	0.6 mV/V + 3 mV	

1899 L Street NW, Suite 1100-A, Washington, DC 20036
414-501-5494
www.anab.org

Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Voltage – Source [1]	(20 to 202) V		Comparison to Transmille Multiproduct Calibrator
	(10 to 45) Hz	0.5 mV/V + 20 mV	
	45 Hz to 1 kHz	0.15 mV/V + 12 mV	
	(1 to 10) kHz	0.2 mV/V + 16 mV	
	(10 to 40) kHz	0.3 mV/V + 30 mV	
	(40 to 100) kHz	2 mV/V + 50 mV	
	(200 to 1 020) V		
	(10 to 45) Hz	0.55 mV/V + 0.2 V	
	45 Hz to 1 kHz	0.2 mV/V + 60 mV	
	(1 to 20) kHz	0.25 mV/V + 0.12 V	
	(20 to 100) kHz	0.3 mV/V + 0.2 V	
AC Voltage – Measure [1]	900 Hz		Comparison to Fluke True RMS Voltmeter
	0.159 V	0.56 mV	
	0.318 V	1.1 mV	
	0.955 V	3 mV	
	1.909 V	5.9 mV	
	3.359 V	12 mV	
	250 kHz		
	0.159 V	0.72 mV	
	0.2 V	0.87 mV	
	400 kHz		
	0.159 V	0.72 mV	
	0.318 V	1.4 mV	
	0.955 V	4 mV	
	1.909 V	8 mV	
	3.359 V	15 mV	
	1 MHz		
	0.159 V	0.72 nV	
	0.318 V	1.4 mV	
	0.955 V	4 mV	
	1.909 V	8 mV	
	3.359 V	15 mV	
	3 MHz		
	0.159 V	2.8 mV	
	0.2 V	3.5 mV	

1899 L Street NW, Suite 1100-A, Washington, DC 20036
414-501-5494
www.anab.org

Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Voltage – Measure [1]	5 MHz 0.159 V 0.318 V 0.955 V 1.909 V 3.359 V 8 MHz 0.159 V 0.2 V	 2.8 mV 5.6 mV 17 mV 33 mV 59 mV 2.8 mV 3.5 mV	Comparison to Fluke True RMS Voltmeter
AC Voltage – Measure [1]	Up to 105 mV (10 to 40) Hz (40 to 200) Hz 200 Hz to 1 kHz (1 to 2) kHz (2 to 20) kHz (20 to 100) kHz 105 mV to 1.05 V (10 to 40) Hz (40 to 200) Hz 200 Hz to 1 kHz (1 to 2) kHz (2 to 20) kHz (20 to 100) kHz 100 kHz to 1 MHz (1.05 to 10.5) V (10 to 40) Hz (40 to 200) Hz 200 Hz to 1 kHz (1 to 2) kHz (2 to 20) kHz (20 to 100) kHz (100 to 500) kHz (10.5 to 105) V (10 to 40) Hz (40 to 200) Hz 200 Hz to 1 kHz (1 to 2) kHz (2 to 20) kHz (20 to 50) kHz	 0.8 mV/V + 0.15 mV 0.3 mV/V + 9 µV 0.3 mV/V + 8 µV 0.3 mV/V + 8 µV 0.4 mV/V + 10 µV 0.9 mV/V + 50 µV 0.6 mV/V + 0.15 mV 0.3 mV/V + 60 µV 0.2 mV/V + 60 µV 0.2 mV/V + 60 µV 0.4 mV/V + 0.1 mV 0.9 mV/V + 0.5 mV 15.6 mV/V + 25 mV 0.6 mV/V + 1.5 mV 0.3 mV/V + 0.6 mV 0.2 mV/V + 0.6 mV 0.2 mV/V + 0.6 mV 0.4 mV/V + 1 mV 0.9 mV/V + 5 mV 15.6 mV/V + 0.25 V 0.8 mV/V + 15 mV 0.3 mV/V + 9 mV 0.3 mV/V + 7 mV 0.3 mV/V + 7 mV 0.5 mV/V + 10 mV 1.2 mV/V + 50 mV	Comparison to Transmille 8.5 Digit Multimeter

1899 L Street NW, Suite 1100-A, Washington, DC 20036
414-501-5494
www.anab.org

Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Voltage – Measure [1]	(105 to 1 050) V (10 to 40) Hz (40 to 200) Hz 200 Hz to 1 kHz (1 to 2) kHz (2 to 10) kHz	 0.8 mV/V + 0.15 V 0.3 mV/V + 90 mV 0.3 mV/V + 70 mV 0.3 mV/V + 70 mV 0.5 mV/V + 0.1 V	Comparison to Transmille 8.5 Digit Multimeter
DC Voltage – Source [1]	(0 to 202) mV (0.2 to 2.02) V (2 to 20.2) V (20 to 202) V (200 to 1 025) V	15 µV/V + 2 µV 9 µV/V + 2.5 µV 8 µV/V + 24 µV 12 µV/V + 0.24 mV 12 µV/V + 2.4 mV	Comparison to Transmille Multiproduct Calibrator
DC Voltage – Measure [1]	(0 to 120) mV (0.12 to 1.2) V (1.2 to 12) V (12 to 120) V (120 to 1 050) V	9 µV/V + 0.17 µV 6.4 µV/V + 0.6 µV 6.8 µV/V + 6 µV 9.5 µV/V + 80 µV 9.5 µV/V + 1.2 mV	Comparison to Transmille 8.5 Digit Multimeter
Electrical Simulation of Thermocouple Indicators – Source [1]	Type B (600 to 800) °C (800 to 1 000) °C (1 000 to 1 550) °C (1 550 to 1 820) °C Type C (0 to 150) °C (150 to 650) °C (650 to 1 000) °C (1 000 to 1 800) °C Type E -250 to -100°C -100 to -25°C (-25 to 350) °C (350 to 650) °C (650 to 1 000) °C Type J (-210 to -100) °C (-100 to -30) °C (-30 to 150) °C (150 to 760) °C (760 to 1 200) °C	 0.89 °C 0.78 °C 0.65 °C 0.66 °C 0.38 °C 0.33 °C 0.39 °C 0.56 °C 0.59 °C 0.13 °C 0.12 °C 0.15 °C 0.18 °C 0.28 °C 0.14 °C 0.12 °C 0.17 °C 0.23 °C	Comparison to Transmille Multiproduct Calibrator w/ Thermocouple Adapter

1899 L Street NW, Suite 1100-A, Washington, DC 20036
414-501-5494
www.anab.org

Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Electrical Simulation of Thermocouple Indicators – Source [1]	Type K		Comparison to Transmille Multiproduct Calibrator w/ Thermocouple Adapter
	(-200 to -100) °C	0.33 °C	
	(-100 to -25) °C	0.19 °C	
	(-25 to 120) °C	0.14 °C	
	(120 to 1 000) °C	0.24 °C	
	(1 000 to 1 370) °C	0.31 °C	
	Type L		
	(-200 to -100) °C	0.41 °C	
	(-100 to 800) °C	0.39 °C	
	(800 to 900) °C	0.4 °C	
	Type N		
	(-200 to -100) °C	0.51 °C	
	(-100 to -25) °C	0.25 °C	
	(-25 to 120) °C	0.2 °C	
	(120 to 410) °C	0.19 °C	
	(410 to 1 300) °C	0.19 °C	
	Type R		
	(0 to 250) °C	0.98 °C	
	(250 to 1 000) °C	0.53 °C	
	(1 000 to 1 760) °C	0.62 °C	
	Type S		
	(0 to 250) °C	0.98 °C	
	(250 to 1 000) °C	0.53 °C	
	(1 000 to 1 760) °C	0.62 °C	
	Type T		
	(-250 to -150) °C	0.72 °C	
	(-150 to 0) °C	0.13 °C	
	(0 to 120) °C	0.12 °C	
	(120 to 400) °C	0.14 °C	
	Type U		
	(-200 to 0) °C	0.5 °C	
	(0 to 600) °C	0.36 °C	

1899 L Street NW, Suite 1100-A, Washington, DC 20036
414-501-5494
www.anab.org

Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Electrical Simulation of Thermocouple Indicators – Measure [1]	Type B (300 to 500) °C (500 to 1 820) °C Type E (0 to 800) °C Type J (-210 to 1 200) °C Type K (-140 to 1 340) °C Type N (-200 to 1 300) °C Type R (-50 to 600) °C (600 to 1 760) °C Type S (0 to 1 760) °C Type T (-200 to 400) °C	 0.3 °C 0.18 °C 0.07 °C 0.11 °C 0.11 °C 0.11 °C 0.59 °C 0.22 °C 0.18 °C 0.11 °C	Comparison to Transmille 8.5 Digit Multimeter
Oscilloscopes [1] Amplitude – DC 1 MΩ load	2 mV to 50 V	0.58 % of reading + 0.18 mV	Comparison to Transmille Multiproduct Calibrator w/ Scope Pak
Amplitude – Square Wave 1 MΩ load	1 kHz 2 mVp-p to 50 mVp-p	 0.013 % of reading + 34 µV	
Time Markers 1 MΩ load	(20 to 500) ns 500 ns to 50 µs 50 µs to 5 ms (5 to 100) ms 100 ms to 1 s	0.000 3 % of reading + 1.3 ps 0.002 % of reading – 11 ps 0.15 % of reading 3.3 % of reading 36 % of reading	
Bandwidth Sinewave (50 kHz Reference) 50 Ω load	600 mVp-p (5 to 350) MHz	 4.6 mV	
Rise Time 50 Ω load	≤ 1 ns	1.5 ns	

1899 L Street NW, Suite 1100-A, Washington, DC 20036
414-501-5494
www.anab.org

Mass and Mass Related

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Mass Determination [2]	(10 to 120) g	7.5 µg/g + 0.2 mg	Direct measure using Analytical Balances and Scales.
Pressure Devices	(-12 to -0.7) psig (0.7 to 15) psig (10 to 400) psig	0.024 % of reading + 0.000 5 psi 0.025 % of reading + 0.000 4 psi 0.033 % of reading + 0.000 4 psi	Comparison to DH-Budenberg Deadweight Tester

Thermodynamic

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Temperature – Source/Measure [1]	(-75 to -38) °C (-37 to 0) °C (0 to 250) °C	0.033 °C 0.029 °C 0.03 °C	Comparison to Isotech Precision Thermometer w/ PRT Probe

Time and Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Frequency – Source	10 MHz	8.2 nHz	Comparison to Transmille GPS Frequency Standard
Frequency – Source/Measure [1]	1 Hz to 1 GHz	0.24 µHz/Hz	Comparison to Transmille GPS Frequency Standard
Non-contact Tachometers [1,3] (Photo)	(60 to 30 000) rpm	0.005 % of reading	Comparison to Transmille Multiproduct Calibrator w/ Optical Tachometer Adaptor
Timers and Stopwatches [1]	1 ms to 86 000 s	0.58 µs/s + 4 ms	Comparison to Agilent Universal Counter, Transmille GPS Frequency Standard

1899 L Street NW, Suite 1100-A, Washington, DC 20036
414-501-5494
www.anab.org

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. The Laboratory is only capable of determining the mass of a weight for OIML Class M1 and below.
3. rpm = revolutions per minute.
4. Unless otherwise specified in the far-right column, the calibration procedure utilized by the laboratory was developed internally.

Jason Stine, Vice President

1899 L Street NW, Suite 1100-A, Washington, DC 20036
414-501-5494
www.anab.org