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Hereby attests that

Transcat-Phoenix
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Tempe, AZ 85284

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and the 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.
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Jason Stine, Vice President

Expiry Date: 07 September 2027
Certificate Number: AC-2489.11

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)
ANSI/NCSL Z540.3-2006 (R2013)

Transcat – Phoenix
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CALIBRATION

ISO/IEC 17025 Accreditation Granted: **07 September 2025**

Certificate Number: **AC-2489.11** Certificate Expiry Date: **07 September 2027**

Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Sine Wave Flatness [1] (into 50 Ω load)	(0.3 to 1) V 10 Hz to 1 MHz (1 to 10) MHz (10 to 30) MHz (30 to 50) MHz (50 to 80) MHz (80 to 100) MHz	 0.073 % of reading 0.11 % of reading 0.3 % of reading 0.66 % of reading 1.5 % of reading 2.4 % of reading	Comparison to Agilent 11050A Thermal Convertor
Sine Wave Flatness [1] (into 50 Ω load)	(1 to 3) V 10 Hz to 1 MHz (1 to 10) MHz (10 to 30) MHz (30 to 50) MHz (50 to 80) MHz (80 to 100) MHz	 0.071 % of reading 0.086 % of reading 0.17 % of reading 0.35 % of reading 0.85 % of reading 1.3 % of reading	Comparison to Agilent 11049A Thermal Convertor
AC Current – Source [1]	Up to 220 µA (10 to 20) Hz (20 to 40) Hz 40 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	 0.025 % of reading + 16 nA 0.016 % of reading + 10 nA 0.011 % of reading + 8 nA 0.028 % of reading + 12 nA 0.11 % of reading + 65 nA	Comparison to Fluke 5730A Multiproduct Calibrator

Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Current – Source [1]	(0.22 to 2.2) mA		Comparison to Fluke 5730A Multiproduct Calibrator
	(10 to 20) Hz	0.025 % of reading + 40 nA	
	(20 to 40) Hz	0.016 % of reading + 35 nA	
	40 Hz to 1 kHz	0.011 % of reading + 35 nA	
	(1 to 5) kHz	0.028 % of reading + 0.11 µA	
	(5 to 10) kHz	0.11 % of reading + 0.65 µA	
	(2.2 to 22) mA		
	(10 to 20) Hz	0.025 % of reading + 0.4 µA	
	(20 to 40) Hz	0.016 % of reading + 0.35 µA	
	40 Hz to 1 kHz	0.011 % of reading + 0.35 µA	
	(1 to 5) kHz	0.02 % of reading + 0.55 µA	
	(5 to 10) kHz	0.11 % of reading + 5 µA	
	(22 to 220) mA		
	(10 to 20) Hz	0.025 % of reading + 4 µA	
	(20 to 40) Hz	0.016 % of reading + 3.5 µA	
	40 Hz to 1 kHz	0.011 % of reading + 2.5 µA	
	(1 to 5) kHz	0.02 % of reading + 3.5 µA	
	(5 to 10) kHz	0.11 % of reading + 10 µA	
	(0.22 to 2.2) A		
	20 Hz to 1 kHz	0.025 % of reading + 35 µA	
	(1 to 5) kHz	0.045 % of reading + 80 µA	
	(5 to 10) kHz	0.7 % of reading + 0.16 mA	
AC Current – Source [1]	(2.2 to 11) A		Comparison to Fluke 5730A Multiproduct Calibrator, Fluke 5725A Amplifier
	40 Hz to 1 kHz	0.046 % of reading + 0.17 mA	
	(1 to 5) kHz	0.095 % of reading + 0.38 mA	
	(5 to 10) kHz	0.36 % of reading + 0.75 mA	
AC Current – Source [1]	(11 to 20.5) A		Comparison to Fluke 5520A Multiproduct Calibrator
	(45 to 100) Hz	0.095 % of reading + 4 mA	
	100 Hz to 1 kHz	0.12 % of reading + 4 mA	
	(1 to 5) kHz	2.3 % of reading + 4 mA	
AC Current – Source [1] (Extended Frequency Ranges)	(29 to 330) µA		Comparison to Fluke 5520A Multiproduct Calibrator
	(10 to 30) kHz	1.2 % of reading + 0.31 µA	
	(0.33 to 3.3) mA		
	(10 to 30) kHz	0.78 % of reading + 0.47 µA	
	(3.3 to 33) mA		
	10 kHz to 30 kHz	0.31 % of reading + 3.1 µA	
	(33 to 330) mA		
	(10 to 30) kHz	0.31 % of reading + 0.16 mA	

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Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Clamp-on Ammeters [1] (Toroidal Type) Transformer Type Sensor	(20 to 150) A (45 to 65) Hz (65 to 440) Hz (150 to 1 000) A (45 to 65) Hz (65 to 440) Hz	 0.35 % of reading + 30 mA 0.94 % of reading + 50 mA 0.34 % of reading + 0.13 A 1.2 % of reading + 0.23 A	Comparison to Fluke 5520A Multiproduct Calibrator, Fluke 5500A/COIL 50-turn Coil
AC Clamp-on Ammeters [1] (Non-Toroidal Type) Hall Effect Sensor	(20 to 150) A (45 to 65) Hz (65 to 440) Hz (150 to 1 000) A (45 to 65) Hz (65 to 440) Hz	 0.68 % of reading + 0.29 A 1.2 % of reading + 0.29 A 0.66 % of reading + 1 A 1.4 % of reading + 1.1 A	Comparison to Fluke 5520A Multiproduct Calibrator, Fluke 5500A/COIL 50-turn Coil
AC Current – Measure [1]	Up to 100 µA (10 to 20) Hz (20 to 45) Hz (45 to 100) Hz 100 Hz to 1 kHz (0.1 to 1) mA (10 to 20) Hz (20 to 45) Hz (45 to 100) Hz 100 Hz to 5 kHz (1 to 10) mA (10 to 20) Hz (20 to 45) Hz (45 to 100) Hz 100 Hz to 5 kHz (10 to 100) mA (10 to 20) Hz (20 to 45) Hz (45 to 100) Hz 100 Hz to 5 kHz 100 mA to 1 A (10 to 20) Hz (20 to 45) Hz (45 to 100) Hz 100 Hz to 5 kHz	 0.4 % of reading + 30 nA 0.17 % of reading + 30 nA 0.072 % of reading + 30 nA 0.072 % of reading + 30 nA 0.4 % of reading + 0.2 µA 0.15 % of reading + 0.2 µA 0.062 % of reading + 0.2 µA 0.034 % of reading + 0.2 µA 0.4 % of reading + 2 µA 0.15 % of reading + 2 µA 0.062 % of reading + 2 µA 0.034 % of reading + 2 µA 0.4 % of reading + 20 µA 0.15 % of reading + 20 µA 0.062 % of reading + 20 µA 0.034 % of reading + 20 µA 0.4 % of reading + 0.2 mA 0.16 % of reading + 0.2 mA 0.087 % of reading + 0.2 mA 0.14 % of reading + 0.2 mA	Comparison to Agilent 3458A opt 002 8.5 Digit Multimeter

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Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Current – Measure [1]	(1 to 30) A (50 to 100) Hz (100 to 300) Hz 300 Hz to 1 kHz (1 to 3) kHz (3 to 4) kHz (4 to 5) kHz	0.065 % of reading + 0.23 mA 0.065 % of reading + 0.23 mA 0.065 % of reading + 0.23 mA 0.37 % of reading + 0.23 mA 0.37 % of reading + 0.23 mA 0.37 % of reading + 0.23 mA	Comparison to Agilent 34330A Current Shunt, Agilent 3458A opt 002 8.5 Digit Multimeter
DC Current – Source [1]	(0.2 to 220) µA (0.2 to 2.2) mA (2.2 to 22) mA (22 to 220) mA (0.22 to 2.2) A	40 µA/A + 6 nA 35 µA/A + 7 nA 35 µA/A + 40 nA 45 µA/A + 0.7 µA 80 µA/A + 12 µA	Comparison to Fluke 5730A Multiproduct Calibrator
DC Current – Source [1]	(2.2 to 11) A	0.036 % of reading + 0.48 mA	Comparison to Fluke 5730A Multiproduct Calibrator, Fluke 5725A Amplifier
DC Current – Source/Measure [1]	Up to 100 µA (0.1 to 1) mA (1 to 10) mA (10 to 100) mA (0.1 to 1) A	33 µA/A + 0.92 nA 29 µA/A + 5.8 nA 29 µA/A + 58 nA 46 µA/A + 0.58 µA 0.013 % of reading + 12 µA	Comparison to Agilent 3458A opt 002 8.5 Digit Multimeter, Current Source
DC Current – Source/Measure [1]	(1 to 20) A	0.45 mA/A	Comparison to Agilent 34330A Current Shunt, Agilent 3458A opt 002 8.5 Digit Multimeter, DC Current Source
DC Clamp-on Ammeters [1] (Non-Toroidal Type) Hall Effect Sensor	(20 to 150) A (150 to 1 000) A	0.53 % of reading + 0.17 A 0.52 % of reading + 0.58 A	Comparison to Fluke 5520A Multiproduct Calibrator, Fluke 5500A/COIL 50-turn Coil
DC Current – Measure [1]	(20 to 100) A	0.046 % of reading	Comparison to L&N 4361 Current Shunt, Agilent 3458A opt 002 8.5 Digit Multimeter

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Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
DC Resistance – Measure [1]	Up 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 (10 to 100) MΩ (0.1 to 1) GΩ	16 µΩ/Ω + 50 µΩ 14 µΩ/Ω + 0.5 mΩ 12 µΩ/Ω + 0.5 mΩ 13 µΩ/Ω + 5 mΩ 13 µΩ/Ω + 50 mΩ 17 µΩ/Ω + 2 Ω 58 µΩ/Ω + 0.1 kΩ 0.052 % of reading + 1 kΩ 0.5 % of reading + 10 kΩ	Comparison to Agilent 3458A opt 002 8.5 Digit Multimeter
DC Resistance – Source/Measure [1]	Up 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 (10 to 100) MΩ (0.1 to 1) GΩ	18 µΩ/Ω + 58 µΩ 15 µΩ/Ω + 0.58 mΩ 13 µΩ/Ω + 0.58 mΩ 12 µΩ/Ω + 5.8 mΩ 13 µΩ/Ω + 58 mΩ 21 µΩ/Ω + 2.3 Ω 62 µΩ/Ω + 0.12 kΩ 0.059 % of reading + 1.2 kΩ 0.82 % of reading + 12 kΩ	Comparison to Agilent 3458A opt 002 8.5 Digit Multimeter, characterized with Decade Resistor
DC Resistance – Source/Measure [1]	(10 to 100) MΩ (0.1 to 1) GΩ (1 to 10) GΩ (10 to 100) GΩ (100 to 300) GΩ (300 to 700) GΩ (0.7 to 1) TΩ	0.012 % of reading + 0.28 kΩ 0.012 % of reading + 9.7 kΩ 0.012 % of reading + 0.42 MΩ 0.012 % of reading + 45 MΩ 0.016 % of reading + 45 MΩ 0.016 % of reading + 0.11 GΩ 0.016 % of reading + 0.49 GΩ	Comparison to Extended Arm Bridge
DC Resistance – Source [1] (Fixed Artifacts)	10 µΩ 100 µΩ 1 mΩ 10 mΩ 100 mΩ	0.4 % of reading 0.046 % of reading 0.046 % of reading 35 µΩ/Ω 67 µΩ/Ω	Comparison to Standard Resistors

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DC Resistance – Source [1,6] (Simulation)	0 Ω 1 Ω 1.9 Ω 10 Ω 19 Ω 100 Ω 190 Ω 1 kΩ 1.9 kΩ 10 kΩ 19 kΩ 100 kΩ 190 kΩ 1 MΩ 1.9 MΩ 10 MΩ 19 MΩ 100 MΩ	40 µΩ 95 µΩ/Ω 95 µΩ/Ω 23 µΩ/Ω 23 µΩ/Ω 10 µΩ/Ω 10 µΩ/Ω 6.5 µΩ/Ω 6.5 µΩ/Ω 6.5 µΩ/Ω 6.5 µΩ/Ω 8.5 µΩ/Ω 8.5 µΩ/Ω 13 µΩ/Ω 18 µΩ/Ω 40 µΩ/Ω 47 µΩ/Ω 0.11 mΩ/Ω	Comparison to Fluke 5730A Multiproduct Calibrator
AC Voltage – Source [1]	Up to 2.2 mV (10 to 20) Hz (20 to 40) Hz 40 Hz to 20 kHz (20 o 50) kHz (50 to 100) kHz (100 to 300) kHz (300 to 500) kHz 500 kHz to 1 MHz (2.2 to 22) mV (10 to 20) Hz (20 to 40) Hz 40 Hz to 20 kHz (20 o 50) kHz (50 to 100) kHz (100 to 300) kHz (300 to 500) kHz 500 kHz to 1 MHz	 0.024 % of reading + 4 µV 0.009 % of reading + 4 µV 0.008 % of reading + 4 µV 0.02 % of reading + 4 µV 0.05 % of reading + 5 µV 0.11 % of reading + 10 µV 0.14 % of reading + 20 µV 0.27 % of reading + 20 µV 0.024 % of reading + 4 µV 0.009 % of reading + 4 µV 0.008 % of reading + 4 µV 0.02 % of reading + 4 µV 0.05 % of reading + 5 µV 0.11 % of reading + 10 µV 0.14 % of reading + 20 µV 0.27 % of reading + 20 µV	Comparison to Fluke 5730A Multiproduct Calibrator

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Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Voltage – Source [1]	(22 to 220) mV		Comparison to Fluke 5730A Multiproduct Calibrator
	(10 to 20) Hz	0.024 % of reading + 12 µV	
	(20 to 40) Hz	0.009 % of reading + 7 µV	
	40 Hz to 20 kHz	0.005 7 % of reading + 7 µV	
	(20 o 50) kHz	0.012 % of reading + 7 µV	
	(50 to 100) kHz	0.031 % of reading + 17 µV	
	(100 to 300) kHz	0.066 % of reading + 20 µV	
	(300 to 500) kHz	0.14 % of reading + 25 µV	
	500 kHz to 1 MHz	0.27 % of reading + 45 µV	
	(0.22 to 2.2) V		
	(10 to 20) Hz	0.024 % of reading + 40 µV	
	(20 to 40) Hz	0.009 % of reading + 15 µV	
	40 Hz to 20 kHz	0.004 2 % of reading + 8 µV	
	(20 o 50) kHz	0.006 7 % of reading + 10 µV	
	(50 to 100) kHz	0.008 5 % of reading + 30 µV	
	(100 to 300) kHz	0.034 % of reading + 80 µV	
	(300 to 500) kHz	0.1 % of reading + 0.2 mV	
	500 kHz to 1 MHz	0.17 % of reading + 0.3 mV	
	(2.2 to 22) V		
	(10 to 20) Hz	0.024 % of reading + 0.4 mV	
	(20 to 40) Hz	0.009 % of reading + 0.15 mV	
	40 Hz to 20 kHz	0.004 2 % of reading + 50 µV	
	(20 o 50) kHz	0.006 7 % of reading + 0.1 mV	
	(50 to 100) kHz	0.008 3 % of reading + 0.2 mV	
	(100 to 300) kHz	0.26 % of reading + 0.6 mV	
	(300 to 500) kHz	0.1 % of reading + 2 mV	
	500 kHz to 1 MHz	0.15 % of reading + 3.2 mV	
	(22 to 220) V		
	(10 to 20) Hz	0.024 % of reading + 4 mV	
	(20 to 40) Hz	0.009 % of reading + 1.5 mV	
	40 Hz to 20 kHz	0.005 2 % of reading + 0.6 mV	
	(20 o 50) kHz	0.008 % of reading + 1 mV	
	(50 to 100) kHz	0.015 % of reading + 2.5 mV	
	(100 to 300) kHz	0.09 % of reading + 16 mV	
	(300 to 500) kHz	0.44 % of reading + 40 mV	
	500 kHz to 1 MHz	0.8 % of reading + 80 mV	
	(220 to 250) V		
	(15 to 50) Hz	0.03 % of reading + 16 mV	
	(250 to 1 100) V		
	50 Hz to 1 kHz	0.007 % of reading + 3.5 mV	

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Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Voltage – Source [1]	(220 to 750) V (30 to 50) kHz (50 to 100) kHz (220 to 1 100) V 40 Hz to 1 kHz (1 to 20) kHz	 0.06 % of reading + 11 mV 0.23 % of reading + 45 mV 0.009 % of reading + 4 mV 0.017 % of reading + 6 mV	Comparison to Fluke 5730A Multiproduct Calibrator, Fluke 5725A Amplifier
AC Voltage – Source [1] Wideband Flatness (into 50 Ω load) (1 kHz Reference)	(0.33 to 1.1) mV (10 to 30) Hz (30 to 119.99) Hz 120 Hz to 1.199 9 kHz (1.2 to 11.999) kHz (12 to 119.99) kHz 120 kHz to 1.199 9 MHz (1.2 to 2) MHz (2 to 11.9) MHz (12 to 20) MHz (20 to 30) MHz (1.1 to 3.3) mV (10 to 30) Hz (30 to 119.99) Hz 120 Hz to 1.199 9 kHz (1.2 to 11.999) kHz (12 to 119.99) kHz 120 kHz to 1.199 9 MHz (1.2 to 2) MHz (2 to 11.9) MHz (12 to 20) MHz (20 to 30) MHz (3.3 to 11) mV (10 to 30) Hz (30 to 119.99) Hz 120 Hz to 1.199 9 kHz (1.2 to 11.999) kHz (12 to 119.99) kHz 120 kHz to 1.199 9 MHz (1.2 to 2) MHz (2 to 11.9) MHz (12 to 20) MHz (20 to 30) MHz	 0.23 % of reading 0.078 % of reading 0.078 % of reading 0.078 % of reading 0.078 % of reading 0.16 % of reading + 1.2 µV 0.16 % of reading + 1.2 µV 0.31 % of reading + 1.2 µV 0.47 % of reading + 1.2 µV 2.1 % of reading + 5.8 µV 0.23 % of reading 0.078 % of reading 0.078 % of reading 0.078 % of reading 0.078 % of reading 0.078 % of reading + 1.2 µV 0.078 % of reading +1.2 µV 0.23 % of reading + 1.2 µV 0.39 % of reading + 1.2 µV 1.2 % of reading + 1.2 µV 0.23 % of reading 0.078 % of reading 0.078 % of reading 0.078 % of reading 0.078 % of reading 0.078 % of reading + 1.2 µV 0.078 % of reading + 1.2 µV 0.16 % of reading + 1.2 µV 0.31 % of reading + 1.2 µV 0.78 % of reading + 1.2 µV	Comparison to Fluke 5730A/03 Multiproduct Calibrator

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Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Voltage – Source [1] Wideband Flatness (into 50 Ω load) (1 kHz Reference)	(11 to 33) mV		Comparison to Fluke 5730A/03 Multiproduct Calibrator
	(10 to 30) Hz	0.23 % of reading	
	(30 to 119.99) Hz	0.078 % of reading	
	120 Hz to 1.199 9 kHz	0.078 % of reading	
	(1.2 to 11.999) kHz	0.078 % of reading	
	(12 to 119.99) kHz	0.078 % of reading	
	120 kHz to 1.199 9 MHz	0.078 % of reading + 1.2 µV	
	(11 to 16.5) mV		
	(1.2 to 2) MHz	0.16 % of reading + 1.2 µV	
	(2 to 11.9) MHz	0.23 % of reading + 1.2 µV	
	(12 to 20) MHz	0.39 % of reading + 1.2 µV	
	(20 to 30) MHz	0.85 % of reading + 1.2 µV	
	(16.5 to 33) mV		
	(1.2 to 2) MHz	0.078 % of reading + 1.2 µV	
	(2 to 11.9) MHz	0.16 % of reading + 1.2 µV	
	(12 to 20) MHz	0.31 % of reading + 1.2 µV	
	(20 to 30) MHz	0.78 % of reading + 1.2 µV	
	(33 to 110) mV		
	(10 to 30) Hz	0.23 % of reading	
	(30 to 119.99) Hz	0.078 % of reading	
	120 Hz to 1.199 9 kHz	0.078 % of reading	
	(1.2 to 11.999) kHz	0.078 % of reading	
	(12 to 119.99) kHz	0.078 % of reading	
	120 kHz to 1.199 9 MHz	0.078 % of reading + 1.2 µV	
	(110 to 330) mV		
	(10 to 30) Hz	0.23 % of reading	
	(30 to 119.99) Hz	0.078 % of reading	
	120 Hz to 1.199 9 kHz	0.078 % of reading	
	(1.2 to 11.999) kHz	0.078 % of reading	
	(12 to 119.99) kHz	0.078 % of reading	
	120 kHz to 1.199 9 MHz	0.078 % of reading + 1.2 µV	

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Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Voltage – Source [1] Wideband Flatness (into 50 Ω load) (1 kHz Reference)	(0.33 to 1.1) V (10 to 30) Hz (30 to 119.99) Hz 120 Hz to 1.199 9 kHz (1.2 to 11.999) kHz (12 to 119.99) kHz 120 Hz to 1.199 9 MHz (1.1 to 3.5) V (10 to 30) Hz (30 to 119.99) Hz 120 Hz to 1.199 9 kHz (1.2 to 11.999) kHz (12 to 119.99) kHz 120 kHz to 1.199 9 MHz	 0.23 % of reading 0.078 % of reading 0.078 % of reading 0.078 % of reading 0.078 % of reading 0.078 % of reading + 1.2 µV 0.23 % of reading 0.078 % of reading 0.078 % of reading 0.078 % of reading 0.078 % of reading 0.078 % of reading + 1.2 µV	Comparison to Fluke 5730A/03 Multiproduct Calibrator
AC Voltage – Measure [1]	Up to 10 mV (1 to 40) Hz 40 Hz to 1 kHz (1 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz 300 kHz to 1 MHz (1 to 4) MHz (10 to 100) mV (1 to 40) Hz 40 Hz to 1 kHz (1 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz 300 kHz to 1 MHz (1 to 2) MHz (2 to 4) MHz (4 to 8) MHz (8 to 10) MHz	 0.04 % of reading + 3.5 µV 0.03 % of reading + 1.3 µV 0.04 % of reading + 1.3 µV 0.15 % of reading + 1.3 µV 0.59 % of reading + 1.3 µV 4.6 % of reading + 2.3 µV 1.5 % of reading + 5.8 µV 8.1 % of reading + 8.1 µV 0.013 % of reading + 4.6 µV 0.009 7 % of reading + 2.3 µV 0.017 % of reading + 2.3 µV 0.038 % of reading + 2.3 µV 0.093 % of reading + 2.3 µV 0.36 % of reading + 12 µV 1.2 % of reading + 12 µV 1.8 % of reading + 12 µV 4.7 % of reading + 81 µV 4.7 % of reading + 92 µV 17 % of reading + 0.1 mV	Comparison to Agilent 3458A opt 002 8.5 Digit Multimeter

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Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Voltage – Measure [1]	(0.1 to 1) V		Comparison to Agilent 3458A opt 002 8.5 Digit Multimeter
	(1 to 40) Hz	0.008 8 % of reading + 46 µV	
	40 Hz to 1 kHz	0.008 3 % of reading + 23 µV	
	(1 to 20) kHz	0.017 % of reading + 23 µV	
	(20 to 50) kHz	0.036 % of reading + 23 µV	
	(50 to 100) kHz	0.093 % of reading + 23 µV	
	(100 to 300) kHz	0.35 % of reading + 0.12 mV	
	300 kHz to 1 MHz	1.2 % of reading + 0.12 mV	
	(1 to 2) MHz	1.8 % of reading + 0.12 mV	
	(2 to 4) MHz	4.6 % of reading + 0.81 mV	
	(4 to 8) MHz	4.6 % of reading + 0.92 mV	
	(8 to 10) MHz	17 % of reading + 1.2 mV	
	(1 to 10) V		
	(1 to 40) Hz	0.009 5 % of reading + 0.46 mV	
	40 Hz to 1 kHz	0.023 % of reading + 0.23 mV	
	(1 to 20) kHz	0.017 % of reading + 0.23 mV	
	(20 to 50) kHz	0.036 % of reading + 0.23 mV	
	(50 to 100) kHz	0.093 % of reading + 0.23 mV	
	(100 to 300) kHz	0.35 % of reading + 1.2 mV	
	300 kHz to 1 MHz	1.2 % of reading + 1.2 mV	
	(1 to 2) MHz	1.8 % of reading + 1.2 mV	
	(2 to 4) MHz	4.6 % of reading + 8.1 mV	
	(4 to 8) MHz	4.6 % of reading + 9.2 mV	
	(8 to 10) MHz	17 % of reading + 12 mV	
	(10 to 100) V		
	(1 to 40) Hz	0.024 % of reading + 4.6 mV	
	40 Hz to 1 kHz	0.024 % of reading + 2.3 mV	
	(1 to 20) kHz	0.024 % of reading + 2.3 mV	
	(20 to 50) kHz	0.041 % of reading + 2.3 mV	
	(50 to 100) kHz	0.14 % of reading + 2.3 mV	
	(100 to 300) kHz	0.46 % of reading + 12 mV	
	300 kHz to 1 MHz	1.7 % of reading + 12 mV	
	(100 to 700) V		
	(1 to 40) Hz	0.048 % of reading + 46 mV	
	40 Hz to 1 kHz	0.048 % of reading + 23 mV	
	(1 to 20) kHz	0.071 % of reading + 23 mV	
	(20 to 50) kHz	0.19 % of reading + 23 mV	
	(50 to 100) kHz	0.35 % of reading + 23 mV	

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Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Voltage – Measure [1]	Up to 1 mV		Comparison to Rohde & Schwarz URE3 RMS Voltmeter
	100 kHz to 1 MHz	2 % of reading + 2.4 µV	
	(1 to 3) MHz	3.5 % of reading + 2.4 µV	
	(3 to 10) MHz	9.3 % of reading + 2.4 µV	
	(10 to 20) MHz	23 % of reading + 2.4 µV	
	(1 to 3) mV		
	100 kHz to 1 MHz	0.97 % of reading + 2 µV	
	(1 to 3) MHz	3.5 % of reading + 2 µV	
	(3 to 10) MHz	9.3 % of reading + 2 µV	
	(10 to 20) MHz	23 % of reading + 2 µV	
	(3 to 100) mV		
	100 kHz to 1 MHz	0.91 % of reading + 3 µV	
	(1 to 3) MHz	1.8 % of reading + 3 µV	
	(3 to 10) MHz	2.9 % of reading + 3 µV	
	(10 to 20) MHz	6.9 % of reading + 3 µV	
	(20 to 30) MHz	14 % of reading + 3 µV	
AC High Voltage – Measure [1]	(0.7 to 5) kV		Comparison to Vitrek 4700 Digital HV Meter, Vitrek HVL Series Probes
	10 mHz to 10 Hz	0.15 % of reading + 0.17 V	
	(10 to 30) Hz	0.13 % of reading + 0.29 V	
	(30 to 200) Hz	0.11 % of reading + 0.37 V	
	(200 to 450) Hz	0.48 % of reading + 0.17 V	
	(450 to 600) Hz	0.88 % of reading + 0.17 V	
	(5 to 30) kV		
	10 mHz to 10 Hz	0.2 % of reading + 2.4 V	
	(10 to 30) Hz	0.15 % of reading + 2.4 V	
	(30 to 200) Hz	0.12 % of reading + 2.4 V	
	(200 to 450) Hz	0.71 % of reading + 2.4 V	
	(450 to 600) Hz	1.4 % of reading + 2.4 V	
	(30 to 50) kV		
	10 mHz to 10 Hz	0.25 % of reading + 2.5 V	
	(10 to 30) Hz	0.19 % of reading + 2.5 V	
	(30 to 70) Hz	0.14 % of reading + 2.5 V	
	(70 to 200) Hz	0.7 % of reading + 2.5 V	
	(200 to 450) Hz	2.9 % of reading + 2.5 V	
	(50 to 70) kV		
	10 mHz to 10 Hz	0.37 % of reading + 2.6 V	
	(10 to 30) Hz	0.27 % of reading + 2.6 V	
	(30 to 70) Hz	0.18 % of reading + 2.6 V	
	(70 to 200) Hz	1.2 % of reading + 2.6 V	
	(200 to 450) Hz	1.7 % of reading + 2.6 V	

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DC Voltage – Source [1]	(0 to 220) mV (0.22 to 2.2) V (2.2 to 11) V (11 to 22) V (22 to 220) V (220 to 1 100) V	7.5 µV/V + 0.4 µV 5 µV/V + 0.7 µV 3.5 µV/V + 2.5 µV 3.5 µV/V + 4 µV 5 µV/V + 40 µV 6.5 µV/V + 0.4 mV	Comparison to Fluke 5730A Multiproduct Calibrator
DC Voltage – Measure [1]	Up to 100 mV (0.1 to 10) V (10 to 100) V (100 to 500) V (500 to 700) V (700 to 1 000) V	8.3 µV/V + 0.35 µV 5.3 µV/V + 0.35 µV 7.6 µV/V + 35 µV 11 µV/V + 0.12 mV 14 µV/V + 0.12 mV 21 µV/V + 0.12 mV	Comparison to Agilent 3458A opt 002 8.5 Digit Multimeter
DC High Voltage – Measure [1]	(1 to 10) kV (10 to 35) kV (35 to 50) kV (50 to 70) kV (70 to 100) kV	0.042 % of reading + 92 mV 0.047 % of reading + 2.4 V 0.056 % of reading + 2.4 V 0.088 % of reading + 2.4 V 0.17 % of reading + 2.5 V	Comparison to Vitrek 4700 Digital HV Meter, Vitrek HVL Series Probes
Capacitance – Source [1] (Simulation)	10 Hz to 10 kHz (0.19 to < 1.1) nF 10 Hz to 3 kHz (1.1 to < 3.3) nF 10 Hz to 1 kHz (3.3 to < 11) nF (11 to < 110) nF (110 to < 330) nF (10 to 600) Hz (0.33 to < 1.1) µF (10 to 300) Hz (1.1 to < 3.3) µF (10 to 150) Hz (3.3 to < 11) µF (10 to 120) Hz (11 to < 33) µF (10 to 80) Hz (33 to < 110) µF DC to 50 Hz (110 to < 330) µF	0.39 % of reading + 7.8 pF 0.39 % of reading + 7.8 pF 0.21 % of reading + 7.8 pF 0.21 % of reading + 78 pF 0.21 % of reading + 0.23 nF 0.21 % of reading + 0.78 nF 0.21 % of reading + 2.3 nF 0.21 % of reading + 7.8 nF 0.32 % of reading + 23 nF 0.36 % of reading + 78 nF 0.36 % of reading + 0.23 µF	Comparison to Fluke 5520A Multiproduct Calibrator

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Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Capacitance – Source [1] (Simulation)	DC to 20 Hz (0.33 to < 1.1) mF DC to 6 Hz (1.1 to < 3.3) mF DC to 2 Hz (3.3 to < 11) mF DC to 0.6 Hz (11 to < 33) mF DC to 0.2 Hz (33 to < 110) mF	0.35 % of reading + 0.78 µF 0.35 % of reading + 2.3 µF 0.35 % of reading + 7.8 µF 0.58 % of reading + 23 µF 0.85 % of reading + 78 µF	Comparison to Fluke 5520A Multiproduct Calibrator
Electrical Simulation of Thermocouple Indicating Devices – Measure/Source [1]	Type B (250 to 350) °C (350 to 445) °C (445 to 580) °C (580 to 750) °C (750 to 1 000) °C (1 000 to 1 820) °C Type C (0 to 250) °C (250 to 1 000) °C (1 000 to 1 500) °C (1 500 to 1 800) °C (1 800 to 2 000) °C (2 000 to 2 250) °C (2 250 to 2 315) °C Type E (-270 to -245) °C (-245 to -195) °C (-195 to -155) °C (-155 to -90) °C (-90 to 0) °C (0 to 15) °C (15 to 890) °C (890 to 1 000) °C Type J (-210 to -180) °C (-180 to -120) °C (-120 to -50) °C (-50 to 990) °C (990 to 1 200) °C	 1.2 °C 0.9 °C 0.71 °C 0.55 °C 0.45 °C 0.35 °C 0.24 °C 0.19 °C 0.21 °C 0.24 °C 0.27 °C 0.33 °C 0.37 °C 1.6 °C 0.24 °C 0.12 °C 0.095 °C 0.08 °C 0.076 °C 0.064 °C 0.074 °C 0.15 °C 0.12 °C 0.093 °C 0.08 °C 0.094 °C	Comparison to Ectron 1140A Thermocouple Calibrator/Simulator

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Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Electrical Simulation of Thermocouple Indicating Devices – Measure/Source [1]	Type K		Comparison to Ectron 1140A Thermocouple Calibrator/Simulator
	(-270 to -255) °C	2.5 °C	
	(-255 to -195) °C	0.85 °C	
	(-195 to -115) °C	0.16 °C	
	(-115 to -55) °C	0.12 °C	
	(-55 to 1 000) °C	0.087 °C	
	(1 000 to 1 372) °C	0.096 °C	
	Type N		
	(-270 to -260) °C	5.4 °C	
	(-260 to -200) °C	1.5 °C	
	(-200 to -140) °C	0.29 °C	
	(-140 to -70) °C	0.18 °C	
	(-70 to 25) °C	0.14 °C	
	(-25 to 160) °C	0.12 °C	
	(160 to 1 300) °C	0.11 °C	
	Type R		
	(-50 to -30) °C	0.8 °C	
	(-30 to 45) °C	0.69 °C	
	(45 to 160) °C	0.49 °C	
	(160 to 380) °C	0.35 °C	
	(380 to 775) °C	0.3 °C	
	(775 to 1 768) °C	0.26 °C	
	Type S		
	(-50 to -30) °C	0.76 °C	
	(-30 to 45) °C	0.68 °C	
	(45 to 105) °C	0.49 °C	
	(105 to 310) °C	0.41 °C	
	(310 to 615) °C	0.35 °C	
	(615 to 1 768) °C	0.31 °C	
	Type T		
	(-270 to -255) °C	1.9 °C	
	(-255 to -240) °C	0.6 °C	
	(-240 to -210) °C	0.36 °C	
	(-210 to -150) °C	0.22 °C	
	(-150 to -40) °C	0.15 °C	
	(-40 to 100) °C	0.095 °C	
	(100 to 400) °C	0.08 °C	

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Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
DC Power – Source [1]			
(0.33 to 330) mA	11 µW to 1.1 mW	0.024 % of reading	
	1.1 mW to 0.11 W	0.027 % of reading	
	(0.11 to 110) W	0.024 % of reading	
	(110 to 330) W	0.018 % of reading	
(0.33 to 3) A	11 µW to 110 mW	0.044 % of reading	Comparison to Fluke 5520A Multiproduct Calibrator
	(0.11 to 990) W	0.053 % of reading	
	(0.99 to 3) kW	0.009 6 % of reading	
(3 to 20.5) A	99 mW to 0.99 W	0.088 % of reading	
	0.99 W to 6.8 kW	0.07 % of reading	
	(6.8 to 20.5) kW	0.04 % of reading	
AC Power – Source [1,2]	(10 to 65) Hz		
PF = 1	(0.11 mW to 3) mW	0.13 % of reading	
(3.3 to 9) mA	3 mW to 9 W	0.077 % of reading	Comparison to Fluke 5520A Multiproduct Calibrator
	(10 to 65) W		
	(0.3 to 10) mW	0.089 % of reading	
(9 to 33) mA	10 mW to 33 W	0.077 % of reading	
AC Power – Source [1,2]			
PF = 1			
(33 to 90) mA	(10 to 65) Hz		
	(1 to 30) mW	0.071 % of reading	
	30 mW to 90 W	0.057 % of reading	
(90 to 330) mA	(10 to 65) Hz		
	(3 to 100) mW	0.089 % of reading	
	100 mW to 300 W	0.078 % of reading	
(0.33 to 0.9) A	(10 to 65) Hz		Comparison to Fluke 5520A Multiproduct Calibrator
	(11 to 300) mW	0.071 % of reading	
	(0.3 to 900) W	0.081 % of reading	
(0.9 to 2.2) A	(10 to 65) Hz		
	(30 to 720) mW	0.089 % of reading	
	0.72 W to 2 kW	0.079 % of reading	
(2.2 to 4.5) A	(10 to 65) Hz		
	80 mW to 1.4 W	0.088 % of reading	
	1.4 W to 4.5 kW	0.18 % of reading	
(4.5 to 20.5) A	(10 to 65) Hz		
	150 mW to 230 kW	0.17 % of reading	

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Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
LF Phase – Source [1]	(0 to 90)° (10 to 65) Hz (65 to 500) Hz 500 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz (10 to 30) kHz	 0.11° 0.2° 0.39° 1.9° 3.9° 7.8°	Comparison to Fluke 5520A Multiproduct Calibrator
Oscilloscopes [1]			Comparison to Fluke 5520A/SC1100 Multiproduct Calibrator
Amplitude DC – Source			
into 50 Ω load	(-6 to 6) V	0.22 % of reading + 31 µV	
into 1 MΩ load	(-130 to 130) V	0.12 % of reading + 31 µV	
Square Wave – Source			
into 50 Ω load	10 Hz to 100 kHz 1 mV p-p to 6.6 Vp-p	0.22 % of reading + 31 µV	
into 1 MΩ load	10 Hz to 1 kHz 1 mV p-p to 6.6 Vp-p	0.14 % of reading + 31 µV	
	(1 kHz to 10) kHz 1 mV p-p to 6.6 Vp-p	0.22 % of reading + 31 µV	
Time Markers – Source			
into 50 Ω load	1 ns to 20 ms	0.000 22 % of reading	
	50 ms	0.005 9 % of reading	
	0.1 s	0.009 8 % of reading	
	0.2 s	0.018 % of reading	
	0.5 s	0.041 % of reading	
	1 s	0.08 % of reading	
	2 s	0.16 % of reading	
	5 s	0.39 % of reading	
Rise Time – Source [1]			
into 50 Ω load			
Rate: 1 kHz to 2 MHz	5 mVp-p to 2.5 Vp-p		
Rate: 2 MHz to 10 MHz	(200 to 300) ps	50 ps	
	(250 to 350) ps	50 ps	

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Electrical – DC/Low Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Oscilloscopes [1,3]			
Leveled Sine Wave – Source			
into 50 Ω load	5 mVp-p to 5 Vp-p		
	50 kHz	1.8 % of reading + 0.23 mV	
	50 kHz to 100 MHz	2.8 % of reading + 0.23 mV	
	(100 to 300) MHz	3.2 % of reading + 0.23 mV	
	(300 to 600) MHz	4 % of reading + 0.23 mV	
	5 mVp-p to 3.5 Vp-p		
	600 MHz to 1.1 GHz	5 % of reading + 0.23 mV	
Bandwidth/Flatness – Source (50 kHz Reference)			
into 50 Ω load	5 mVp-p to 5.5 Vp-p		
	50 kHz to 100 MHz	1.4 % of reading + 78 µV	
	(100 to 300) MHz	1.8 % of reading + 78 µV	
	(300 to 600) MHz	3.2 % of reading + 78 µV	Comparison to Fluke 5520A/SC1100 Multiproduct Calibrator
	5 mVp-p to 3.5 Vp-p		
	600 MHz to 1.1 GHz	3.9 % of reading + 78 µV	
Input Impedance – Measure	(40 to 60) Ω	0.082 % of reading	
	(0.5 to 1.5) MΩ	0.081 % of reading	
Input Capacitance – Measure	(5 to 50) pF	3.9 % of reading + 0.39 pF	
Waveform Generator – Source			
Amplitude (Sine, Square, Triangle)	10 Hz to 10 kHz		
into 50 Ω load	1.8 mVp-p to 2.5 Vp-p	2.3 % of reading + 78 µV	
into 1 MΩ load	1.8 mVp-p to 55 Vp-p	2.3 % of reading + 78 µV	
Frequency (Sine, Square, Triangle)	10 Hz to 10 kHz	0.001 9 % of reading + 12 mHz	

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Electrical – RF/Microwave

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Total Harmonic Distortion	20 Hz to 100 kHz	0.7 dB	Comparison to HP 8903B Audio Analyzer
Total Harmonic Distortion	100 kHz to 2.9 GHz	1 dB	Comparison to HP 8563E Spectrum Analyzer
Distortion – Measure	20 Hz to 20 kHz (20 to 100) kHz	1.2 dB 2.3 dB	Comparison to HP 8903B Audio Analyzer
RF Power – Power Meter Reference	50 MHz 1 mW Reference	0.43 % of reading	Comparison to Thermistor Mount, Analog Power Meter, 8.5 Digit Multimeter
RF Power – Measure	9 kHz to 10 MHz (-60 to < -50) dBm (-50 to < -40) dBm (-40 to < -20) dBm (-20 to < 10) dBm (10 to 20) dBm (20 to 30) dBm 10 MHz to 6 GHz (-70 to < -60) dBm (-60 to < -50) dBm (-50 to < -20) dBm (-20 to < 10) dBm (10 to 20) dBm (20 to 30) dBm (6 to 18) GHz (-70 to < -60) dBm (-60 to < -50) dBm (-50 to < -20) dBm (-20 to < 10) dBm (10 to 20) dBm (20 to 30) dBm (18 to 26.5) GHz (-30 to < -20) dBm (-20 to < 10) dBm (10 to 20) dBm (20 to 30) dBm	 3.3 dB 0.29 dB 0.16 dB 0.1 dB 0.13 dB 0.23 dB 1.1 dB 0.16 dB 0.13 dB 0.11 dB 0.13 dB 0.27 dB 1.1 dB 0.16 dB 0.13 dB 0.11 dB 0.17 dB 0.27 dB 0.3 dB 0.18 dB 0.22 dB 0.27 dB	Comparison to Power Sensor, Power Meter, Sensor Module, Measuring Receiver

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Electrical – RF/Microwave

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Amplitude Modulation – Measure			Comparison to HP 8902A Measuring Receiver
Rate: 50 Hz to 10 kHz	(5 to 99) % Depth 150 kHz to 10 MHz	2.4 % Depth	
Rate: 20 Hz to 10 kHz	(> 0 to 99) % Depth 150 kHz to 10 MHz	3.5 % Depth	
Rate: 50 Hz to 50 kHz	(5 to 99) % Depth 10 MHz to 1.3 GHz	1.4 % Depth	
Amplitude Modulation – Measure			Comparison to HP 8902A Measuring Receiver
Rate: 20 Hz to 100 kHz	(> 0 to 99) % Depth 10 MHz to 1.3 GHz	3.5 % Depth	
Rate: 50 Hz to 50 kHz	(5 to 99) % Depth (1.3 to 26.5) GHz	1.9 % Depth	
Rate: 20 Hz to 100 kHz	(> 0 to 99) % Depth (1.3 to 26.5) GHz	3.5 % Depth	
Frequency Modulation – Measure			Comparison to HP 8902A Measuring Receiver
Rate 50 Hz to 10 kHz	≤ 40 kHz peak 250 kHz to 10 MHz	2.4 % Deviation	
Rate: 50 Hz to 100 kHz	≤ 400 kHz peak 10 MHz to 26.5 GHz	1.4 % Deviation	
Rate: 20 Hz to 200 kHz	≤ 400 kHz peak 10 MHz to 26.5 GHz	5.8 % Deviation	
Phase Modulation – Measure			Comparison to HP 8902A Measuring Receiver
Rate: 200 Hz to 10 kHz	< 40 rad Deviation 150 kHz to 10 MHz	4.9 % Deviation	
Rate: 200 Hz to 20 kHz	< 40 rad Deviation 10 MHz to 26.5 GHz	3.8 % Deviation	

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Electrical – RF/Microwave

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Tuned RF Absolute Power – Measure	2.5 MHz to 26.5 GHz (-127 to -120) dBm (-120 to -110) dBm (-110 to -100) dBm (-100 to -90) dBm (-90 to -80) dBm (-80 to -70) dBm (-70 to -60) dBm (-60 to -50) dBm (-50 to -40) dBm (-40 to -30) dBm (-30 to -20) dBm (-20 to -10) dBm (-10 to 0) dBm	 0.26 dB 0.26 dB 0.26 dB 0.26 dB 0.26 dB 0.25 dB 0.25 dB 0.25 dB 0.25 dB 0.14 dB 0.14 dB 0.14 dB 0.14 dB	Comparison to HP 8902A OPT 050 Measuring Receiver, HP 11722A Power Sensor; or HP 11792A, HP 11793A Power Sensors
Tuned RF Relative Power – Measure	2.5 MHz to 26.5 GHz (-127 to -120) dBm (-120 to -110) dBm (-110 to -100) dBm (-100 to -90) dBm (-90 to -80) dBm (-80 to -70) dBm (-70 to -60) dBm (-60 to -50) dBm (-50 to -40) dBm (-40 to -30) dBm (-30 to -20) dBm (-20 to -10) dBm (-10 to 0) dBm	 0.23 dB 0.23 dB 0.23 dB 0.23 dB 0.22 dB 0.084 dB 0.081 dB 0.074 dB 0.071 dB 0.068 dB 0.064 dB 0.06 dB 0.056 dB	Comparison to HP 8902A OPT 050 Measuring Receiver, HP 11722A Power Sensor; or HP 11792A, HP 11793A Power Sensors

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Electrical – RF/Microwave

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Amplitude Modulation – Measure			Comparison to Agilent E4440A PSA Spectrum Analyzer
Rate 50 Hz to 10 kHz	(5 to 99) % Depth 10 kHz to 10 MHz	1 % Depth	
Rate: 50 Hz to 100 kHz	(20 to 99) % Depth 10 MHz to 3 GHz	0.9 % Depth	
Rate: 50 Hz to 100 kHz	(5 to 20) % Depth 10 MHz to 3 GHz	3 % Depth	
Rate: 20 Hz to 100 kHz	(20 to 99) % Depth (3 to 26.5) GHz	1.9 % Depth	
Rate: 50 Hz to 100 kHz	(5 to 20) % Depth (3 to 26.5) GHz	5.2 % Depth	
Rate 20 Hz to 1 kHz	> 1 % Depth 100 kHz to 10 MHz	15 % of reading	
Rate 20 Hz to 1 kHz	> 1 % Depth 10 MHz to 26.5 GHz	16 % of reading	
Frequency Modulation – Measure			Comparison to Agilent E4440A PSA Spectrum Analyzer
Rate 20 Hz to 10 kHz	Deviation/Rate > 0.2 250 kHz to 10 MHz	1.8 % Deviation	
Rate 20 Hz to 10 kHz	Deviation/Rate > 1.2 250 kHz to 10 MHz	1.3 % Deviation	
Rate 50 Hz to 200 kHz	Deviation/Rate > 0.2 10 MHz to 6.6 GHz	1.8 % Deviation	
Rate 50 Hz to 200 kHz	Deviation/Rate > 0.45 10 MHz to 6.6 GHz	1.3 % Deviation	
Rate 50 Hz to 200 kHz	Deviation/Rate > 0.2 (6.6 to 13.2) GHz	3 % Deviation	
Frequency Modulation – Measure			Comparison to Agilent E4440A PSA Spectrum Analyzer
Rate 50 Hz to 200 kHz	Deviation/Rate > 8 (6.6 to 13.2) GHz	1.3 % Deviation	
Rate 50 Hz to 200 kHz	Deviation/Rate > 0.2 (13.2 to 26.5) GHz	4.8 % Deviation	
Rate 50 Hz to 200 kHz	Deviation/Rate > 16 (13.2 to 26.5) G	1.3 % Deviation	

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Electrical – RF/Microwave

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Frequency Modulation Distortion – Measure			Comparison to Agilent E4440A PSA Spectrum Analyzer
Rate 20 Hz to 1 kHz	Deviation > 500 Hz 1 MHz to 6.6 GHz	14 % of reading	
Rate 20 Hz to 1 kHz	Deviation > 2.3 kHz (6.6 to 13.2) GHz	14 % of reading	
Rate 20 Hz to 1 kHz	Deviation > 2.7 kHz (13.2 to 26.5) GHz	14 % of reading	
Phase Modulation – Measure	> 0.7 rad 100 kHz to 6.6 GHz	1.3 % of reading	Comparison to Agilent E4440A PSA Spectrum Analyzer
	> 0.3 rad 100 kHz to 6.6 GHz	3.5 % of reading	
	> 2 rad (6.6 to 13.2) GHz	1.3 % of reading	
	> 0.6 rad (6.6 to 13.2) GHz	3.5 % of reading	
	> 4 rad (13.2 to 26.5) GHz	1.3 % of reading	
	> 1.2 rad (13.2 to 26.5) GHz	3.5 % of reading	
Phase Modulation Distortion – Measure			Comparison to Agilent E4440A PSA Spectrum Analyzer
Rate 20 Hz to 500 Hz	> 0.8 rad 1 MHz to 6.6 GHz	16 % of reading	
Rate 500 Hz to 1 kHz	> 0.4 rad 1 MHz to 6.6 GHz	15 % of reading	
Rate 20 Hz to 500 Hz	> 1.8 rad (6.6 to 13.2) GHz	17 % of reading	
Rate 500 Hz to 1 kHz	> 0.8 rad (6.6 to 13.2) GHz	14 % of reading	
Rate 20 Hz to 500 Hz	> 3.5 rad (13.2 to 26.5) GHz	15 % of reading	
Rate 500 Hz to 1 kHz	> 1.2 rad (13.2 to 26.5) GHz	14 % of reading	

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Electrical – RF/Microwave

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Tuned RF Relative Power – Measure	100 kHz to 2 MHz (-127 to -120) dB (-120 to -110) dB (-110 to -100) dB (-100 to -90) dB (-90 to -80) dB (-80 to -70) dB (-70 to -60) dB (-60 to -50) dB (-50 to -40) dB (-40 to -30) dB (-30 to -20) dB (-20 to -10) dB (-10 to 0) dB (2 to 10) MHz (-127 to -120) dB (-120 to -110) dB (-110 to -100) dB (-100 to -90) dB (-90 to -80) dB (-80 to -70) dB (-70 to -60) dB (-60 to -50) dB (-50 to -40) dB (-40 to -30) dB (-30 to -20) dB (-20 to -10) dB (-10 to 0) dB	 1.1 dB 0.61 dB 0.19 dB 0.092 dB 0.08 dB 0.076 dB 0.058 dB 0.052 dB 0.051 dB 0.042 dB 0.036 dB 0.03 dB 0.024 dB 0.73 dB 0.37 dB 0.11 dB 0.085 dB 0.08 dB 0.068 dB 0.06 dB 0.055 dB 0.054 dB 0.045 dB 0.039 dB 0.034 dB 0.029 dB	Comparison to Agilent E4440A PSA Spectrum Analyzer

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Electrical – RF/Microwave

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Tuned RF Relative Power – Measure	10 MHz to 6.6 GHz (-127 to -120) dB (-120 to -110) dB (-110 to -100) dB (-100 to -90) dB (-90 to -80) dB (-80 to -70) dB (-70 to -60) dB (-60 to -50) dB (-50 to -40) dB (-40 to -30) dB (-30 to -20) dB (-20 to -10) dB (-10 to 0) dB (6.6 to 13.2) GHz (-127 to -120) dB (-120 to -110) dB (-110 to -100) dB (-100 to -90) dB (-90 to -80) dB (-80 to -70) dB (-70 to -60) dB (-60 to -50) dB (-50 to -40) dB (-40 to -30) dB (-30 to -20) dB (-20 to -10) dB (-10 to 0) dB	 0.41 dB 0.17 dB 0.1 dB 0.085 dB 0.072 dB 0.068 dB 0.06 dB 0.055 dB 0.054 dB 0.045 dB 0.039 dB 0.034 dB 0.029 dB 0.67 dB 0.33 dB 0.11 dB 0.085 dB 0.08 dB 0.068 dB 0.06 dB 0.055 dB 0.054 dB 0.045 dB 0.039 dB 0.034 dB 0.029 dB	Comparison to Agilent E4440A PSA Spectrum Analyzer

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Electrical – RF/Microwave

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Tuned RF Relative Power – Measure	(13.2 to 18) GHz (-127 to -120) dB (-120 to -110) dB (-110 to -100) dB (-100 to -90) dB (-90 to -80) dB (-80 to -70) dB (-70 to -60) dB (-60 to -50) dB (-50 to -40) dB (-40 to -30) dB (-30 to -20) dB (-20 to -10) dB (-10 to 0) dB (18 to 26.5) GHz (-127 to -120) dB (-120 to -110) dB (-110 to -100) dB (-100 to -90) dB (-90 to -80) dB (-80 to -70) dB (-70 to -60) dB (-60 to -50) dB (-50 to -40) dB (-40 to -30) dB (-30 to -20) dB (-20 to -10) dB (-10 to 0) dB	 1.1 dB 0.61 dB 0.19 dB 0.092 dB 0.08 dB 0.076 dB 0.06 dB 0.055 dB 0.054 dB 0.045 dB 0.039 dB 0.034 dB 0.029 dB 1.8 dB 1.2 dB 0.51 dB 0.14 dB 0.08 dB 0.076 dB 0.06 dB 0.055 dB 0.054 dB 0.045 dB 0.039 dB 0.034 dB 0.029 dB	Comparison to Agilent E4440A PSA Spectrum Analyzer

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Electrical – RF/Microwave

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Tuned RF Absolute Power – Measure	100 kHz to 2 MHz (-127 to -120) dB (-120 to -110) dB (-110 to -100) dB (-100 to -90) dB (-90 to -80) dB (-80 to -70) dB (-70 to -60) dB (-60 to -50) dB (-50 to -40) dB (-40 to -30) dB (-30 to -20) dB (-20 to -10) dB (-10 to 0) dB (2 to 10) MHz (-127 to -120) dB (-120 to -110) dB (-110 to -100) dB (-100 to -90) dB (-90 to -80) dB (-80 to -70) dB (-70 to -60) dB (-60 to -50) dB (-50 to -40) dB (-40 to -30) dB (-30 to -20) dB (-20 to -10) dB (-10 to 0) dB	 1.1 dB 0.62 dB 0.21 dB 0.13 dB 0.12 dB 0.12 dB 0.11 dB 0.1 dB 0.1 dB 0.1 dB 0.097 dB 0.095 dB 0.094 dB 0.42 dB 0.19 dB 0.13 dB 0.12 dB 0.12 dB 0.11 dB 0.11 dB 0.11 dB 0.1 dB 0.1 dB 0.099 dB 0.097 dB 0.095 dB	Comparison to Agilent E4440A PSA Spectrum Analyzer

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Electrical – RF/Microwave

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Tuned RF Absolute Power – Measure	10 MHz to 3.05 GHz (-127 to -120) dB (-120 to -110) dB (-110 to -100) dB (-100 to -90) dB (-90 to -80) dB (-80 to -70) dB (-70 to -60) dB (-60 to -50) dB (-50 to -40) dB (-40 to -30) dB (-30 to -20) dB (-20 to -10) dB (-10 to 0) dB (3.05 to 6.6) GHz (-127 to -120) dB (-120 to -110) dB (-110 to -100) dB (-100 to -90) dB (-90 to -80) dB (-80 to -70) dB (-70 to -60) dB (-60 to -50) dB (-50 to -40) dB (-40 to -30) dB (-30 to -20) dB (-20 to -10) dB (-10 to 0) dB	 0.42 dB 0.19 dB 0.13 dB 0.12 dB 0.12 dB 0.11 dB 0.11 dB 0.11 dB 0.1 dB 0.1 dB 0.099 dB 0.097 dB 0.095 dB 0.42 dB 0.2 dB 0.14 dB 0.13 dB 0.13 dB 0.12 dB 0.12 dB 0.12 dB 0.12 dB 0.11 dB 0.11 dB 0.11 dB 0.11 dB	Comparison to Agilent E4440A PSA Spectrum Analyzer

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Electrical – RF/Microwave

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Tuned RF Absolute Power – Measure	(6.6 to 13.2) GHz (-127 to -120) dB (-120 to -110) dB (-110 to -100) dB (-100 to -90) dB (-90 to -80) dB (-80 to -70) dB (-70 to -60) dB (-60 to -50) dB (-50 to -40) dB (-40 to -30) dB (-30 to -20) dB (-20 to -10) dB (-10 to 0) dB (13.2 to 18) GHz (-127 to -120) dB (-120 to -110) dB (-110 to -100) dB (-100 to -90) dB (-90 to -80) dB (-80 to -70) dB (-70 to -60) dB (-60 to -50) dB (-50 to -40) dB (-40 to -30) dB (-30 to -20) dB (-20 to -10) dB (-10 to 0) dB	 0.68 dB 0.34 dB 0.15 dB 0.13 dB 0.13 dB 0.12 dB 0.12 dB 0.12 dB 0.12 dB 0.11 dB 0.11 dB 0.11 dB 0.11 dB 1.1 dB 0.62 dB 0.22 dB 0.14 dB 0.13 dB 0.13 dB 0.12 dB 0.12 dB 0.12 dB 0.11 dB 0.11 dB 0.11 dB 0.11 dB	Comparison to Agilent E4440A PSA Spectrum Analyzer

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Electrical – RF/Microwave

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Tuned RF Absolute Power – Measure	(18 to 26.5) GHz (-127 to -120) dB (-120 to -110) dB (-110 to -100) dB (-100 to -90) dB (-90 to -80) dB (-80 to -70) dB (-70 to -60) dB (-60 to -50) dB (-50 to -40) dB (-40 to -30) dB (-30 to -20) dB (-20 to -10) dB (-10 to 0) dB	 1.8 dB 1.2 dB 0.53 dB 0.22 dB 0.19 dB 0.19 dB 0.18 dB 0.18 dB 0.18 dB 0.18 dB 0.18 dB 0.18 dB 0.17 dB	Comparison to Agilent E4440A PSA Spectrum Analyzer
Phase Noise – Measure	1 MHz to 3 GHz (3 to 6.6) GHz (6.6 to 22) GHz (22 to 26.5) GHz	3.9 dB 4.2 dB 4.4 dB 4.7 dB	Comparison to Agilent E4440A PSA Spectrum Analyzer
Spectral Analysis – Measure	3 Hz to 3 GHz (3 to 6.6) GHz (6.6 to 13.2) GHz (13.2 to 22) GHz (22 to 26.5) GHz	0.93 dB 1.9 dB 3 dB 3.1 dB 3.4 dB	Comparison to Agilent E4440A PSA Spectrum Analyzer
Sine-wave Flatness	9 kHz to 6 GHz	1.7 % of reading	Comparison to Agilent E4418B Power Meter, Agilent E9304A Power Sensor

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Length – Dimensional Metrology

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Micrometers, Calipers [1,4] Length – Outside/Inside/Depth/Step	(0.05 to 1) in (1 to 9) in (9 to 15) in (15 to 40) in	13 µin (9 + 4*L*) µin (11 + 4*L*) µin (16 + 4*L*) µin	Comparisons to Gage Blocks, Long Gage Blocks
Anvil Flatness	Up to 1 in Diameter	4.4 µin	Optical Flats
Test Indicators [1,4]	Up to 0.4 in (0.45 to 3) in	7 µin (17 + 5.3*L*) µin	Comparison to Gage Blocks, Surface Plate
Height Measuring Equipment [4]	(0.01 to 8) in (8 to 40) in	(17 + 3.4*L*) µin (15 + 4.3*L*) µin	Comparison to Gage Blocks, Long Gage Blocks, Surface Plate
Pin Gages – Outside Diameter	(0.004 to 1) in	36 µin	Direct Measure using Laser Micrometer
Steel Rules, Steel Tapes	Up to 40 in	0.005 5 in	Comparison to ME-HZ1000 Ruler Calibrator
Crimp Height – Measure	Up to 0.8 in	180 µin	Direct measure with Micrometer

Mass and Mass Related

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Force Measuring Equipment (Tension and Compression)	(1 to 250) lbf	0.017 % of reading	Comparison to Deadweights
Torque Measuring Instruments [1]	20 ozf·in to 600 lbf·ft	1 % of reading	Comparison to Torque Calibrator
Torque Angle [1]	45° 90° 135° 180° 360°	0.35° 0.35° 0.35° 0.35° 0.35°	Comparison to Torque Angle Fixture

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Mass and Mass Related

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Balances [1,5]			Class S Weights and internal calibration procedure utilized in the calibration of the weighing device.
Avoirdupois	(0.07 to 0.18) oz	0.13 mg	
	(0.18 to 1.8) oz	0.001 7 % of reading	
	1.8 oz to 58 lb	0.000 6 % of reading	
SI (metric)	(2 to 5) g	0.13 mg	
	(5 to 50) g	0.001 7 % of reading	
	50 g to 26 kg	0.000 6 % of reading	
Balances [1,5]			ASTM E617 Class 1 Weights and internal calibration procedure utilized in the calibration of the weighing device.
Avoirdupois	Up to 0.018 oz	12 µg	
	(0.018 to 0.2) oz	40 µg	
	(0.2 to 0.4) oz	60 µg	
	(0.4 to 0.7) oz	90 µg	
	0.7 oz to 13 lb	0.000 3% of reading	
SI (metric)	Up to 500 mg	12 µg	
	500 mg to 5 g	40 µg	
	(5 to 10) g	60 µg	
	(10 to 20) g	90 µg	
	20 g to 6 kg	0.000 3% of reading	
Scales [1,5]			NIST Class F Weights and internal calibration procedure utilized in the calibration of the weighing device.
Avoirdupois	(50 to 600) lb	0.012 % of reading	
SI (metric)	(22 to 272) kg	0.012 % of reading	
Absolute Pressure – Source (Pneumatic)	Up to 25 psia	0.001 9 psi	Comparison to Ruska 7250xi Pressure Controller/Calibrator
	(25 to 500) psia	0.007 % of reading + 0.001 psi	
Absolute and Gauge Pressure – Source (Pneumatic)	Up to 125 psia	0.13 psia	Comparison to Mensor CPC6050 Pressure Controller with Modules
	(125 to 250) psia	0.25 psia	
	(250 to 500) psia	0.5 psia	
	(500 to 1 015) psia	1 psia	
	Up to 110 psig	0.13 psig	
	(110 to 235) psig	0.25 psig	
	(235 to 485) psig	0.5 psig	
	(485 to 1 000) psig	1 psig	

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Mass and Mass Related

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Gauge Pressure – Source (Pneumatic)	(-15 to 25) psig (25 to 500) psig	0.001 7 psi 0.007 % of reading	Comparison to Ruska 7250xi Pressure Controller/Calibrator
Gauge Pressure – Source (Hydraulic)	Up to 1 500 psig (1 500 to 15 000) psig	0.36 psi 0.023 % of reading	Comparison to Fluke RPM4-E-DWT Electronic Deadweight Tester
Gas Flow	(0.1 to 10) slpm (10 to 680) slpm	0.23 % of reading 0.15 % of reading	Comparison to Bell Prover
Liquid Flow	(0.001 to 47) gpm (0.004 to 178) lpm (0.4 to 23 500) pph	0.1 % of reading 0.1 % of reading 0.1 % of reading	Comparison to Liquid Ballistic Prover

Thermodynamic

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Temperature Measuring Instruments [1] (Probes, Thermometers, etc.)	(0 to 100) °C	0.038 °C	Comparison to Hart 5609A PRT, Digital Readout, Drywell
Temperature – Measure [1]	(-195 to 0) °C (0 to 420) °C (420 to 600) °C	0.012 °C 0.025 °C 0.036 °C	Comparison to Hart 56A PRT, Digital Readout
Infrared Temperature Measuring Equipment	(-15 to 0) °C (0 to 50) °C (50 to 100) °C	0.79 °C 0.53 °C 0.67 °C	Comparison to Blackbody Source (flat plate) ε = (0.9 to 1), λ = (8 to 14) µm
Infrared Temperature Measuring Equipment	(100 to 120) °C (120 to 200) °C (200 to 350) °C (350 to 500) °C	0.75 °C 0.97 °C 1.7 °C 2.2 °C	Comparison to Blackbody Source (flat plate) ε = (0.9 to 1), λ = (8 to 14) µm

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Thermodynamic

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Relative Humidity – Measure [1]	(10 to 30) °C (20 to 90) %RH	1.3 %RH	Comparison to Vaisala HMI41/HMP46 Temperature/Humidity Indicator/Probe

Time and Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
AC Duty Cycle – Source [1] Square Wave: < 3.3 Vp-p Freq: 0.01 Hz to 100 kHz	(1 to 10) % Duty Cycle 10 µS to 100 s (10 to 49) % Duty Cycle 10 µS to 100 s 50 % Duty Cycle 10 µS to 100 s	0.62 % of reading + 78 ns 0.4 % of reading + 78 ns 0.02 % of reading + 78 ns	Comparison to Fluke 5522A Multiproduct Calibrator
AC Duty Cycle – Source [1] Square Wave: < 3.3 Vp-p Freq: 0.01 Hz to 100 kHz	(51 to 90) % Duty Cycle 10 µS to 100 s (90 to 99) % Duty Cycle 10 µS to 100 s	0.04 % of reading + 78 ns 0.62 % of reading + 78 ns	Comparison to Fluke 5522A Multiproduct Calibrator
Frequency – Reference	10 MHz	3.7 pHz/Hz	Comparison to Pendulum GPS-89 GPS Frequency Standard
Frequency – Measure [1]	1 Hz to 10 kHz 10 kHz to 10 MHz (10 to 225) MHz 225 MHz to 26.5 GHz	19 pHz/Hz + 4.5 µHz 19 pHz/Hz + 18 µHz 19 pHz/Hz + 0.64 mHz 0.21 µHz/Hz + 0.12 Hz	Comparison to Agilent 53132A Universal Counter, Pendulum GPS-89 GPS Frequency Standard, Keysight PSA E4440A Spectrum Analyzer
Period – Measure	(1 to 100) s	45 µs	Comparison to Agilent 53132A Universal Counter, Pendulum GPS-89 GPS Frequency Standard
Rise Time – Source	350 ps	64 ps	Comparison to Tektronix PG509 Rise Time Pulse Generator

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Time and Frequency

Parameter/Equipment	Range	Expanded Uncertainty of Measurement (+/-)	Reference Standard, Method, and/or Equipment
Rise Time – Measure	17.5 ps 20 GHz	12 ps	Comparison to Agilent 86100A Wide-bandwidth Oscilloscope, Agilent 83478A Plug-in
Stopwatches, Timers [1,4]	Up to 86 400 s (1 d)	59 ms/d	Comparison to Helmut Klein TM-4500 Timometer
Non-contact Tachometers [1,4]	Up to 60 000 rpm	0.000 23% of reading + 0.001 2 rpm	Comparison to Keysight 33250A Waveform Generator

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 uncertainties shown are for the most favorable conditions. There is an increase in uncertainty that corresponds to the laboratory's AC voltage and current uncertainties at frequencies other than the ones shown. Power factors (PF) other than the one shown contribute to the power uncertainty. PF is related to the cosine of phase. Therefore, uncertainties track the laboratory's phase uncertainty closely at PF near one but are magnified heavily as PF approaches zero. The lab may also report reactive power, apparent power, and power factor under this accreditation. If needed, contact the laboratory for more information regarding uncertainties at frequency and power factor combinations other than the ones shown.
3. The stated uncertainty is the laboratory's ability to source a fast rise pulse that is approximately 250 ps. In the typical application of measuring rise time of an oscilloscope, this value is one of the contributing factors, but other factors are derived from the DUT.
4. L = length in inches; rpm = revolutions per minute; d = day.
5. The CMC for scales and balances is highly dependent upon the resolution of the unit under test. The CMC presented here does not include the resolution of the unit under test. The resolution will be included in the reported measurement uncertainty at the time of calibration.
6. The fixed value stated on the Scope is an approximate value.
7. Unless otherwise specified in the far-right column, the calibration procedure utilized by the laboratory was developed internally.
8. This location is part of a Multi-site Organization whose legal entity name is Transcat, Inc.

Jason Stine, Vice President

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