



# PERRY JOHNSON LABORATORY ACCREDITATION, INC.

## Certificate of Accreditation

*Perry Johnson Laboratory Accreditation, Inc. has assessed the Laboratory of:*

### **Agile Calibration**

**252 West Swamp Road, Suite 7, Doylestown, PA 18901**

*(Hereinafter called the Organization) and hereby declares that Organization is accredited in accordance with the recognized International Standard:*

### **ISO/IEC 17025:2017 & Meets the Requirements of ANSI/NCSL Z540.1-1994**

This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (as outlined by the joint ISO-ILAC-IAF Communiqué dated April 2017):

### **Electrical Calibration** *(As detailed in the supplement)*

Accreditation claims for such testing and/or calibration services shall only be made from addresses referenced within this certificate. This Accreditation is granted subject to the system rules governing the Accreditation referred to above, and the Organization hereby covenants with the Accreditation body's duty to observe and comply with the said rules.

For PJLA:

Tracy Szerszen  
President

Perry Johnson Laboratory  
Accreditation, Inc. (PJLA)  
755 W. Big Beaver, Suite 1325  
Troy, Michigan 48084

*Initial Accreditation Date:*

January 20, 2018

*Issue Date:*

February 7, 2022

*Expiration Date:*

March 31, 2024

*Accreditation No.:*

95241

*Certificate No.:*

L22-119

*The validity of this certificate is maintained through ongoing assessments based on a continuous accreditation cycle. The validity of this certificate should be confirmed through the PJLA website: [www.pjlab.com](http://www.pjlab.com)*



# Certificate of Accreditation: Supplement

## Agile Calibration

252 West Swamp Road, Suite 7, Doylestown, PA 18901  
 Contact Name: Bill Albert Phone: 215-340-0123

Accreditation is granted to the facility to perform the following calibrations:

### Electrical

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE OR NOMINAL DEVICE SIZE AS APPROPRIATE	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY ( $\pm$ )	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Equipment to Measure DC Voltage <sup>FO</sup>	0 mV to 329.999 mV	20 $\mu$ V/V + 1 $\mu$ V	Fluke 5522A WI: OEM/Agile P/Z540.1
	0.33 V to 3.299 999 V	11 $\mu$ V/V + 2 $\mu$ V	
	3.3 V to 32.999 99 V	12 $\mu$ V/V + 20 $\mu$ V	
	33 V to 339.999 9 V	18 $\mu$ V/V + 0.15 mV	
	340 V to 1 020 V	18 $\mu$ V/V + 1.5 mV	
Equipment to Measure DC Current <sup>FO</sup>	0 $\mu$ A to 329.99 $\mu$ V	0.15 mA/A + 20 nA	
	330 $\mu$ V to 3.299 99 mA	0.1 mA/A + 50 nA	
	3.3 mA to 32.999 9 mA	0.1 mA/A + 0.25 $\mu$ A	
	33 mA to 329.999 mA	0.1 mA/A + 2.5 $\mu$ A	
	0.33 A to 1.099 99 A	0.2 mA/A + 40 $\mu$ A	
	1.1 A to 2.999 99 A	0.38 mA/A + 40 $\mu$ A	
	3 A to 10.999 9 A	0.5 mA/A + 0.5 mA	
	11 A to 20.5 A	1 mA/A + 0.75 mA	
Equipment to Measure Resistance <sup>FO</sup>	0 $\Omega$ to 10.999 9 $\Omega$	40 $\mu\Omega/\Omega$ + 1 m $\Omega$	
	11 to 32.999 9 $\Omega$	30 $\mu\Omega/\Omega$ + 1.5 m $\Omega$	
	33 $\Omega$ to 109.999 9 $\Omega$	28 $\mu\Omega/\Omega$ + 1.4 m $\Omega$	
	110 $\Omega$ to 329.999 9 $\Omega$	28 $\mu\Omega/\Omega$ + 2 m $\Omega$	
	330 $\Omega$ to 1 099.999 $\Omega$	28 $\mu\Omega/\Omega$ + 2 m $\Omega$	
	1.1 k $\Omega$ to 3.299 999 k $\Omega$	28 $\mu\Omega/\Omega$ + 20 m $\Omega$	
	3.3 k $\Omega$ to 10.999 99 k $\Omega$	28 $\mu\Omega/\Omega$ + 20 m $\Omega$	
	11 k $\Omega$ to 32.999 99 k $\Omega$	28 $\mu\Omega/\Omega$ + 0.2 $\Omega$	
	33 k $\Omega$ to 109.999 9 k $\Omega$	28 $\mu\Omega/\Omega$ + 0.2 $\Omega$	
	110 k $\Omega$ to 329.999 9 k $\Omega$	32 $\mu\Omega/\Omega$ + 2 $\Omega$	
	330 k $\Omega$ to 1 099.99 k $\Omega$	32 $\mu\Omega/\Omega$ + 2 $\Omega$	
	1.1 M $\Omega$ to 3.299 999 M $\Omega$	60 $\mu\Omega/\Omega$ + 30 $\Omega$	
	3.3 M $\Omega$ to 10.999 99 M $\Omega$	0.13 m $\Omega/\Omega$ + 50 $\Omega$	
	11 M $\Omega$ to 32.999 99 M $\Omega$	0.25 m $\Omega/\Omega$ + 2.5 k $\Omega$	
	33 M $\Omega$ to 109.999 9 M $\Omega$	0.5 m $\Omega/\Omega$ + 3 k $\Omega$	
110 M $\Omega$ to 329.999 9 M $\Omega$	3 m $\Omega/\Omega$ + 0.1 M $\Omega$		
330 M $\Omega$ to 1 100 M $\Omega$	15 m $\Omega/\Omega$ + 0.5 M $\Omega$		



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Equipment to Source RF Power (at the listed frequencies) <sup>FO</sup>			E4419B/8482A/ U8487A GIDEP/OEM
50MHz	1 mW	0.002 6 mW	
Equipment to Source RF Power (at the listed frequencies) <sup>FO</sup>			
9 kHz up to 1 GHz	1 uW to 10 mW	1.0% of reading + 0.01 uW	
1 GHz up to 9 GHz	1 uW to 10 mW	1.1% of reading + 0.01 uW	
9 GHz up to 19 GHz	1 uW to 10 mW	1.4% of reading + 0.01 uW	
19 GHz up to 21 GHz	1 uW to 10 mW	1.7% of reading + 0.01 uW	
21 GHz up to 33 GHz	1 uW to 10 mW	2.3% of reading + 0.01 uW	
33 GHz up to 38 GHz	1 uW to 10 mW	2.6% of reading + 0.01 uW	
38 GHz up to 42 GHz	1 uW to 10 mW	2.9% of reading + 0.01 uW	
42 GHz up to 46 GHz	1 uW to 10 mW	3.0% of reading + 0.01 uW	
46 GHz up to 48 GHz	1 uW to 10 mW	3.2% of reading + 0.01 uW	
48 GHz up to 50 GHz	1 uW to 10 mW	3.4% of reading + 0.01 uW	
Equipment to Source Relative Power from (at the listed frequencies) <sup>FO</sup>			U8487A N9030B GIDEP/OEM
10 MHz to 50 GHz	-20 dBm to -70 dBm	0.02 dB	
	-70 dBm to -130 dBm	0.10 dB	
Equipment to Measure RF Power (at the listed frequencies) <sup>FO</sup>			GPSDO/5522A/ N5371B/ADA-2052/ E4419B/8482A GIDEP/OEM
50 MHz	1 mW	0.002 6 mW	
Equipment to Measure RF Power (at the listed frequencies) <sup>FO</sup>			E4419B/8482 GIDEP/OEM
9 kHz to 1 GHz	1 uW up to 10 mW	1.0% of reading + 0.01 uW	
1 GHz to 9 GHz	1 uW up to 10 mW	1.1% of reading + 0.01 uW	U8487A GIDEP/OEM
9 GHz to 19 GHz	1 uW up to 10 mW	1.4% of reading + 0.01 uW	
19 GHz to 21 GHz	1 uW up to 10 mW	1.7% of reading + 0.01 uW	
21 GHz to 33 GHz	1 uW up to 10 mW	2.3% of reading + 0.01 uW	
33 GHz to 38 GHz	1 uW up to 10 mW	2.6% of reading + 0.01 uW	



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Equipment to Measure RF Power (at the listed frequencies) <sup>FO</sup>			U8487A GIDEP/OEM
38 GHz to 42 GHz	1 uW up to 10 mW	2.9% of reading + 0.01 uW	
42 GHz to 46 GHz	1 uW up to 10 mW	3.0% of reading + 0.01 uW	
46 GHz to 48 GHz	1 uW up to 10 mW	3.2% of reading + 0.01 uW	
48 GHz to 50 GHz	1 uW up to 10 mW	3.4% of reading + 0.01 uW	
Equipment to Measure S-Parameter Phase Angle (S21/S12) (at the listed frequencies) <sup>FO</sup>			85057B GIDEP/OEM
45 MHz up to 2.5 GHz	0 to +/- 180°	1.1°	
2.5 GHz up to 7.5 GHz	0 to +/- 180°	1.8°	
7.5 GHz up to 12.5 GHz	0 to +/- 180°	3.0°	
12.5 GHz up to 20 GHz	0 to +/- 180°	4.0°	
20 GHz up to 26.25 GHz	0 to +/- 180°	6.4°	
32.5 GHz up to 40 GHz	0 to +/- 180°	8.0°	
	0 to +/- 180°	9.0°	
40 GHz up to 45 GHz	0 to +/- 180°	11°	
45 GHz up to 50 GHz	0 to +/- 180°	12°	
Equipment to Measure S-Parameter Reflection (S11/S22) (at the listed frequencies) <sup>FO</sup>			
45 MHz to 1.25 GHz	0 to (Linear Units)	0.023 U	
1.25 GHz to 7.55 GHz	0 to 1 U (Linear Units)	0.014 U	
7.5 GHz to 20 GHz	0 to 1 U (Linear Units)	0.026 U	
20 GHz to 50 GHz	0 to 1 U (Linear Units)	0.06 U	
Equipment to Measure S-Parameter Insertion Loss (S21/S12) <sup>FO</sup>	45 MHz up to 1.25 GHz	0.36 dB	
	1.25 GHz to 7.5 GHz	0.11 dB	
	7.5 GHz up to 10 GHz	0.19 dB	
	10 GHz up to 20 GHz	0.22 dB	
	20 GHz up to 26.25 GHz	0.26 dB	
	26.25 up to 40 GHz	0.59 dB	
	40 up to 50 GHz	0.8 dB	



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Equipment to Measure Thermocouple Type B <sup>FO</sup>	600 °C to 800 °C	0.44 °C	Fluke 5522A WI: OEM/Agile P/Z540.1
	800 °C to 1 000 °C	0.34 °C	
	1 000 °C to 1 550 °C	0.3 °C	
	1 550 °C to 1 820 °C	0.33 °C	
Equipment to Measure Thermocouple Type C <sup>FO</sup>	0 °C to 150 °C	0.3 °C	
	150 °C to 650 °C	0.26 °C	
	650 °C to 1 000 °C	0.31 °C	
	1 000 °C to 1 800 °C	0.5 °C	
	1 800 °C to 2 316 °C	0.84 °C	
Equipment to Measure Thermocouple Type E <sup>FO</sup>	-240 °C to -100 °C	0.5 °C	
	-100 °C to -25 °C	0.16 °C	
	-25 °C to 350 °C	0.14 °C	
	350 °C to 650 °C	0.16 °C	
	650 °C to 1 000 °C	0.21 °C	
Equipment to Measure Thermocouple Type J <sup>FO</sup>	-210 °C to -100 °C	0.27 °C	
	-100 °C to -30 °C	0.16 °C	
	-30 °C to 150 °C	0.14 °C	
	150 °C to 760 °C	0.17 °C	
	760 °C to 1 200 °C	0.23 °C	
Equipment to Measure Thermocouple Type K <sup>FO</sup>	-200 °C to -100 °C	0.33 °C	
	-100 °C to -25 °C	0.18 °C	
	-25 °C to 120 °C	0.16 °C	
	120 °C to 1 000 °C	0.26 °C	
	1 000 °C to 1 372 °C	0.4 °C	
Equipment to Measure Thermocouple Type L <sup>FO</sup>	-200 °C to -100 °C	0.37 °C	
	-100 °C to 800 °C	0.26 °C	
	800 °C to 900 °C	0.17 °C	
Equipment to Measure Thermocouple Type N <sup>FO</sup>	-200 °C to -100 °C	0.4 °C	
	-100 °C to -25 °C	0.22 °C	
	-25 °C to 120 °C	0.19 °C	
	120 °C to 410 °C	0.18 °C	
	410 °C to 1 300 °C	0.27 °C	



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Equipment to Measure Thermocouple Type R <sup>FO</sup>	0 °C to 250 °C	0.57 °C	Fluke 5522A WI: OEM/Agile P/Z540.1
	250 °C to 400 °C	0.35 °C	
	400 °C to 1 000 °C	0.33 °C	
	1 000 °C to 1 767 °C	0.4 °C	
Equipment to Measure Thermocouple Type S <sup>FO</sup>	0 °C to 250 °C	0.47 °C	
	250 °C to 1 000 °C	0.36 °C	
	1 000 °C to 1 400 °C	0.37 °C	
	1 400 °C to 1 767 °C	0.46 °C	
Equipment to Measure Thermocouple Type T <sup>FO</sup>	-250 °C to -150 °C	0.63 °C	
	-150 °C to 0 °C	0.24 °C	
	0 °C to 120 °C	0.16 °C	
	120 °C to 400 °C	0.14 °C	
Equipment to Measure Thermocouple Type U <sup>FO</sup>	-200 °C to 0 °C	0.56 °C	
	0 °C to 600 °C	0.27 °C	
Equipment to Measure AC Voltage (Sine Wave) (at the listed frequencies) <sup>FO</sup>			
10 Hz to 45 Hz	1 mV to 32.999 mV	0.8 mV/V + 6 $\mu$ V	
45 Hz to 10 kHz	1 mV to 32.999 mV	0.15 mV/V + 6 $\mu$ V	
10 kHz to 20 kHz	1 mV to 32.999 mV	0.2 mV/V + 6 $\mu$ V	
20 kHz to 50 kHz	1 mV to 32.999 mV	1 mV/V + 6 $\mu$ V	
50 kHz to 100 kHz	1 mV to 32.999 mV	3.5 mV/V + 12 $\mu$ V	
100 kHz to 500 kHz	1 mV to 32.999 mV	8 mV/V + 50 $\mu$ V	
Equipment to Measure AC Voltage (Sine Wave) (at the listed frequencies) <sup>FO</sup>			
10 Hz to 45 Hz	33 mV to 329.999 mV	0.3 mV/V + 8 $\mu$ V	
45 Hz to 10 kHz	33 mV to 329.999 mV	0.15 mV/V + 8 $\mu$ V	
10 kHz to 20 kHz	33 mV to 329.999 mV	0.16 mV/V + 8 $\mu$ V	
20 kHz to 50 kHz	33 mV to 329.999 mV	0.35 mV/V + 8 $\mu$ V	
50 kHz to 100 kHz	33 mV to 329.999 mV	0.8 mV/V + 32 $\mu$ V	
100 kHz to 500 kHz	33 mV to 329.999 mV	2 mV/V + 70 $\mu$ V	



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Equipment to Measure AC Voltage (Sine Wave) (at the listed frequencies) <sup>FO</sup>			Fluke 5522A WI: OEM/Agile P/Z540.1
10 Hz to 45 Hz	0.3 V to 3.299 99 V	0.3 mV/V + 50 $\mu$ V	
45 Hz to 10 kHz	0.3 V to 3.299 99 V	0.15 mV/V + 60 $\mu$ V	
10 kHz to 20 kHz	0.3 V to 3.299 99 V	0.19 mV/V + 60 $\mu$ V	
20 kHz to 50 kHz	0.3 V to 3.299 99 V	0.3 mV/V + 50 $\mu$ V	
50 kHz to 100 kHz	0.3 V to 3.299 99 V	0.7 mV/V + 0.13 mV	
100 kHz to 500 kHz	0.3 V to 3.299 99 V	2.4 mV/V + 0.6 mV	
Equipment to Measure AC Voltage (Sine Wave) (at the listed frequencies) <sup>FO</sup>			
10 Hz to 45 Hz	3.3 V to 32.999 9 V	0.3 mV/V + 0.65 mV	
45 Hz to 10 kHz	3.3 V to 32.999 9 V	0.15 mV/V + 0.6 mV	
10 kHz to 20 kHz	3.3 V to 32.999 9 V	0.24 mV/V + 0.6 mV	
20 kHz to 50 kHz	3.3 V to 32.999 9 V	0.35 mV/V + 0.6 V	
50 kHz to 100 kHz	3.3 V to 32.999 9 V	0.9 mV/V + 1.6 mV	
Equipment to Measure AC Voltage (Sine Wave) (at the listed frequencies) <sup>FO</sup>			
45 Hz to 1 kHz	33 V to 329.999 V	0.19 mV/V + 2 mV	
1 kHz to 10 kHz	33 V to 329.999 V	0.2 mV/V + 6 mV	
10 kHz to 20 kHz	33 V to 329.999 V	0.25 mV/V + 6 mV	
20 kHz to 50 kHz	33 V to 329.999 V	0.3 mV/V + 6 mV	
50 kHz to 100 kHz	33 V to 329.999 V	2 mV/V + 50 mV	
Equipment to Measure AC Voltage (Sine Wave) (at the listed frequencies) <sup>FO</sup>			
45 Hz to 1 kHz	330 V to 1 020 V	0.3 mV/V + 10 mV	
1 kHz to 5 kHz	330 V to 1 020 V	0.25 mV/V + 10 mV	
5 kHz to 10 kHz	330 V to 1 020 V	0.3 mV/V + 10 mV	
Equipment to Measure AC Current (Sine Wave) (at the listed frequencies) <sup>FO</sup>			
10 Hz to 20 Hz	29 $\mu$ A to 329.99 $\mu$ A	2 mA/A + 0.1 $\mu$ A	
20 Hz to 45 Hz	29 $\mu$ A to 329.99 $\mu$ A	1.5 mA/A + 0.1 $\mu$ A	
45 Hz to 1 kHz	29 $\mu$ A to 329.99 $\mu$ A	1.3 mA/A + 0.1 $\mu$ A	
1 kHz to 5 kHz	29 $\mu$ A to 329.99 $\mu$ A	3 mA/A + 0.15 $\mu$ A	
5 kHz to 10 kHz	29 $\mu$ A to 329.99 $\mu$ A	8 mA/A + 0.2 $\mu$ A	
10 kHz to 30 kHz	29 $\mu$ A to 329.99 $\mu$ A	16 mA/A + 0.4 $\mu$ A	



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Equipment to Measure AC Current (Sine Wave) (at the listed frequencies) <sup>FO</sup>			Fluke 5522A WI: OEM/Agile P/Z540.1
10 Hz to 20 Hz	0.33 mA to 3.299 99 mA	2 mA/A + 0.15 $\mu$ A	
20 Hz to 45 Hz	0.33 mA to 3.299 99 mA	1.3 mA/A + 0.15 $\mu$ A	
45 Hz to 1 kHz	0.33 mA to 3.299 99 mA	1 mA/A + 0.15 $\mu$ A	
1 kHz to 5 kHz	0.33 mA to 3.299 99 mA	2 mA/A + 0.2 $\mu$ A	
5 kHz to 10 kHz	0.33 mA to 3.299 99 mA	5 mA/A + 0.3 $\mu$ A	
10 kHz to 30 kHz	0.33 mA to 3.299 99 mA	10 mA/A + 0.6 $\mu$ A	
Equipment to Measure AC Current (Sine Wave) (at the listed frequencies) <sup>FO</sup>			
10 Hz to 20 Hz	3.3 mA to 32.999 9 mA	1.8 mA/A + 2 $\mu$ A	
20 Hz to 45 Hz	3.3 mA to 32.999 9 mA	0.9 mA/A + 2 $\mu$ A	
45 Hz to 1 kHz	3.3 mA to 32.999 9 mA	0.4 mA/A + 2 $\mu$ A	
1 kHz to 5 kHz	3.3 mA to 32.999 9 mA	0.8 mA/A + 2 $\mu$ A	
5 kHz to 10 kHz	3.3 mA to 32.999 9 mA	2 mA/A + 3 $\mu$ A	
10 kHz to 30 kHz	3.3 mA to 32.999 9 mA	4 mA/A + 4 $\mu$ A	
Equipment to Measure AC Current (Sine Wave) (at the listed frequencies) <sup>FO</sup>			
10 Hz to 20 Hz	33 mA to 329.999 mA	1.8 mA/A + 20 $\mu$ A	
20 Hz to 45 Hz	33 mA to 329.999 mA	0.9 mA/A + 20 $\mu$ A	
45 Hz to 1 kHz	33 mA to 329.999 mA	0.4 mA/A + 20 $\mu$ A	
1 kHz to 5 kHz	33 mA to 329.999 mA	1 mA/A + 50 $\mu$ A	
5 kHz to 10 kHz	33 mA to 329.999 mA	2 mA/A + 0.1 mA	
10 kHz to 30 kHz	33 mA to 329.999 mA	4 mA/A + 0.2 mA	
Equipment to Measure AC Current (Sine Wave) (at the listed frequencies) <sup>FO</sup>			
10 Hz to 45 Hz	0.33 A to 1.099 99 A	1.8 mA/A + 0.1 mA	
45 Hz to 1 kHz	0.33 A to 1.099 99 A	0.5 mA/A + 0.1 mA	
1 kHz to 5 kHz	0.33 A to 1.099 99 A	6 mA/A + 1 mA	
5 kHz to 10 kHz	0.33 A to 1.099 99 A	25 mA/A + 5 mA	
Equipment to Measure AC Current (Sine Wave) (at the listed frequencies) <sup>FO</sup>			
10 Hz to 45 Hz	1.1 A to 2.999 99 A	1.8 mA/A + 0.1 mA	
45 Hz to 1 kHz	1.1 A to 2.999 99 A	0.6 mA/A + 0.1 mA	
1kHz to 5 kHz	1.1 A to 2.999 99 A	6 mA/A + 1 mA	
5 kHz to 10 kHz	1.1 A to 2.999 99 A	25 mA/A + 5 mA	





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Equipment to Measure AC Current (Sine Wave) (at the listed frequencies) <sup>FO</sup>			Fluke 5522A WI: OEM/Agile P/Z540.1
45 Hz to 100 Hz	3 A to 10.999 9 A	0.6 mA/A + 2 mA	
100 Hz to 1 kHz	3 A to 10.999 9 A	1 mA/A + 2 mA	
1 kHz to 5 kHz	3 A to 10.999 9 A	30 mA/A + 2 mA	
Equipment to Measure AC Current (Sine Wave) (at the listed frequencies) <sup>FO</sup>			
45 Hz to 100 Hz	11 A to 20.5 A	1.2 mA/A + 5 mA	
100 Hz to 1 kHz	11 A to 20.5 A	1.5 mA/A + 5 mA	
1 kHz to 5 kHz	11 A to 20.5 A	30 mA/A + 5 mA	
Equipment to Measure Capacitance <sup>FO</sup>			
	220 pF to 399.9 pF	5 mF/F + 10 pF	
	0.4 nF to 1.099 9 nF	5 mF/F + 10 pF	
	1.1 nF to 3.299 9 nF	5 mF/F + 10 pF	
	3.3 nF to 10.999 9 nF	2.5 mF/F + 10 pF	
	11 nF to 32.999 9 nF	2.5 mF/F + 10 pF	
	33 nF to 109.999 nF	2.5 mF/F + 10 pF	
	110 nF to 329.999 nF	2.5 mF/F + 30 pF	
	0.33 $\mu$ F to 1.099 99 $\mu$ F	2.5 mF/F + 1 nF	
	1.1 $\mu$ F to 3.299 99 $\mu$ F	2.5 mF/F + 3 nF	
	3.3 $\mu$ F to 10.999 9 $\mu$ F	2.5 mF/F + 10 nF	
	11 $\mu$ F to 32.999 9 $\mu$ F	4 mF/F + 30 nF	
	33 $\mu$ F to 109.999 $\mu$ F	4.5 mF/F + 0.1 $\mu$ F	
	110 $\mu$ F to 329.999 $\mu$ F	4.5 mF/F + 0.3 $\mu$ F	
	0.33 mF to 1.099 99 mF	4.5 mF/F + 1 $\mu$ F	
	1.1 mF to 3.299 99 mF	4.5 mF/F + 3 $\mu$ F	
	3.3 mF to 10.999 9 mF	4.5 mF/F + 10 $\mu$ F	
	11 mF to 32.999 9 mF	7.5 mF/F + 30 $\mu$ F	
	33 mF to 110 mF	11 mF/F + 0.1 mF	
Temperature Calibration, Indication, Control Equipment used with Thermocouple Type B <sup>FO</sup>			
	600 °C to 800 °C	0.44 °C	
	800 °C to 1 000 °C	0.34 °C	
	1 000 °C to 1 550 °C	0.3 °C	
	1 550 °C to 1 820 °C	0.33 °C	



# Certificate of Accreditation: Supplement

## Agile Calibration

252 West Swamp Road, Suite 7, Doylestown, PA 18901  
 Contact Name: Bill Albert Phone: 215-340-0123

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### Electrical

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE OR NOMINAL DEVICE SIZE AS APPROPRIATE	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY ( $\pm$ )	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Temperature Calibration, Indication, Control Equipment used with Thermocouple Type C <sup>FO</sup>	0 °C to 150 °C	0.3 °C	Fluke 5522A WI: OEM/Agile P/Z540.1
	150 °C to 650 °C	0.26 °C	
	650 °C to 1 000 °C	0.31 °C	
	1 000 °C to 1 800 °C	0.5 °C	
	1 800 °C to 2 316 °C	0.84 °C	
Temperature Calibration, Indication, Control Equipment used with Thermocouple Type E <sup>FO</sup>	-240 °C to -100 °C	0.5 °C	
	-100 °C to -25 °C	0.16 °C	
	-25 °C to 350 °C	0.14 °C	
	350 °C to 650 °C	0.16 °C	
	650 °C to 1 000 °C	0.21 °C	
Temperature Calibration, Indication, Control Equipment used with Thermocouple Type J <sup>FO</sup>	-210 °C to -100 °C	0.27 °C	
	-100 °C to -30 °C	0.16 °C	
	-30 °C to 150 °C	0.14 °C	
	150 °C to 760 °C	0.17 °C	
	760 °C to 1 200 °C	0.23 °C	
Temperature Calibration, Indication, Control Equipment used with Thermocouple Type K <sup>FO</sup>	-200 °C to -100 °C	0.33 °C	
	-100 °C to -25 °C	0.18 °C	
	-25 °C to 120 °C	0.16 °C	
	120 °C to 1 000 °C	0.26 °C	
	1 000 °C to 1 372 °C	0.4 °C	
Temperature Calibration, Indication, Control Equipment used with Thermocouple Type L <sup>FO</sup>	-200 °C to -100 °C	0.37 °C	
	-100 °C to 800 °C	0.26 °C	
	800 °C to 900 °C	0.17 °C	
Temperature Calibration, Indication, Control Equipment used with Thermocouple Type N <sup>FO</sup>	-200 °C to -100 °C	0.4 °C	
	-100 °C to -25 °C	0.22 °C	
	-25 °C to 120 °C	0.19 °C	
	120 °C to 410 °C	0.18 °C	
	410 °C to 1 300 °C	0.27 °C	
Temperature Calibration, Indication, Control Equipment used with Thermocouple Type R <sup>FO</sup>	0 °C to 250 °C	0.57 °C	
	250 °C to 400 °C	0.35 °C	
	400 °C to 1 000 °C	0.33 °C	
	1 000 °C to 1 767 °C	0.4 °C	



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### Electrical

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Temperature Calibration, Indication, Control Equipment used with Thermocouple Type S <sup>FO</sup>	0 °C to 250 °C	0.47 °C	Fluke 5522A WI: OEM/Agile P/Z540.1
	250 °C to 1 000 °C	0.36 °C	
	1 000 °C to 1 400 °C	0.37 °C	
	1 400 °C to 1 767 °C	0.46 °C	
Temperature Calibration, Indication, Control Equipment used with Thermocouple Type T <sup>FO</sup>	-250 °C to -150 °C	0.63 °C	
	-150 °C to 0 °C	0.24 °C	
	0 °C to 120 °C	0.16 °C	
	120 °C to 400 °C	0.14 °C	
Temperature Calibration, Indication, Control Equipment used with Thermocouple Type U <sup>FO</sup>	-200 °C to 0 °C	0.56 °C	
	0 °C to 600 °C	0.27 °C	
Temperature Calibration Indication and Control Equipment used with RTD Pt 385 100 $\Omega$ <sup>FO</sup>	-200 °C to -80 °C	0.05 °C	
	-80 °C to 0 °C	0.05 °C	
	0 °C to 100 °C	0.07 °C	
	100 °C to 300 °C	0.09 °C	
	300 °C to 400 °C	0.1 °C	
	400 °C to 630 °C	0.12 °C	
	630 °C to 800 °C	0.23 °C	
Temperature Calibration Indication and Control Equipment used with RTD Pt 3926 100 $\Omega$ <sup>FO</sup>	-200 °C to -80 °C	0.05 °C	
	-80 °C to 0 °C	0.05 °C	
	0 °C to 100 °C	0.07 °C	
	100 °C to 300 °C	0.09 °C	
	300 °C to 400 °C	0.1 °C	
	400 °C to 630 °C	0.12 °C	
Temperature Calibration Indication and Control Equipment used with RTD Pt 3916 100 $\Omega$ <sup>FO</sup>	-200 °C to -190 °C	0.25 °C	
	-190 °C to -80 °C	0.04 °C	
	-80 °C to 0 °C	0.05 °C	
	0 °C to 100 °C	0.06 °C	
	100 °C to 260 °C	0.07 °C	
	260 °C to 300 °C	0.08 °C	
	300 °C to 400 °C	0.09 °C	
	400 °C to 600 °C	0.1 °C	
	600 °C to 630 °C	0.23 °C	



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## Agile Calibration

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Temperature Calibration Indication and Control Equipment used with RTD Pt 385 200 $\Omega$ <sup>FO</sup>	-200 °C to -80 °C	0.04 °C	Fluke 5522A WI: OEM/Agile P/Z540.1
	-80 °C to 0 °C	0.04 °C	
	0 °C to 100 °C	0.04 °C	
	100 °C to 260 °C	0.05 °C	
	260 °C to 300 °C	0.12 °C	
	300 °C to 400 °C	0.13 °C	
	400 °C to 600 °C	0.14 °C	
	600 °C to 630 °C	0.16 °C	
Temperature Calibration Indication and Control Equipment used with RTD Pt 385 500 $\Omega$ <sup>FO</sup>	-200 °C to -80 °C	0.04 °C	
	-80 °C to 0 °C	0.05 °C	
	0 °C to 100 °C	0.05 °C	
	100 °C to 260 °C	0.06 °C	
	260 °C to 300 °C	0.08 °C	
	300 °C to 400 °C	0.08 °C	
	400 °C to 600 °C	0.09 °C	
	600 °C to 630 °C	0.11 °C	
Temperature Calibration Indication and Control Equipment used with RTD Pt 385 1 000 $\Omega$ <sup>FO</sup>	-200 °C to -80 °C	0.03 °C	
	-80 °C to 0 °C	0.03 °C	
	0 °C to 100 °C	0.04 °C	
	100 °C to 260 °C	0.05 °C	
	260 °C to 300 °C	0.06 °C	
	300 °C to 400 °C	0.07 °C	
	400 °C to 600 °C	0.07 °C	
	600 °C to 630 °C	0.23 °C	
Temperature Calibration Indication and Control Equipment used with RTD Pt 385 1 000 $\Omega$ <sup>FO</sup>	-80 °C to 0 °C	0.08 °C	
	0 °C to 100 °C	0.08 °C	
	100 °C to 260 °C	0.14 °C	
Temperature Calibration Indication and Control Equipment used with RTD Cu 427 10 $\Omega$ <sup>FO</sup>	-100 °C to 260 °C	0.3 °C	
Equipment to Measure DC Power <sup>FO</sup>	0.1 W to 300 W	0.23 mW/W	
	300 W to 3 000 W	0.22 mW/W	
	3 kW to 20 kW	0.7 W/kW	



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Equipment to Measure DC Power <sup>FO</sup>	0.1 W to 300 W	0.23 mW/W	Fluke 5522A WI: OEM/Agile P/Z540.1
	300 W to 3 000 W	0.22 mW/W	
	3 kW to 20 kW	0.7 W/kW	
Equipment to Measure AC Power (45 to 65 Hz) <sup>FO</sup>	11 $\mu$ W to 3 000 $\mu$ W	1.4 mW/W	
	3 mW to 33 W	0.8 mW/W	
	33 W to 90 W	1.2 mW/W	
	90 W to 300 W	0.8 mW/W	
	300 W to 900 W	1.1 mW/W	
	900 W to 2 200 W	0.9 mW/W	
	2 200 W to 4 500 W	1.2 mW/W	
4.5 kW to 20 kW	1 mW/W		
Equipment to Measure Relative Phase Angle (at the listed frequencies) <sup>FO</sup>			
10 Hz to 65 Hz	0 ° to 180 °	0.1 °	
65 Hz to 500 Hz	0 ° to 180 °	0.25 °	
500 Hz to 1 kHz	0 ° to 180 °	0.5 °	
1 kHz to 5 kHz	0 ° to 180 °	2.5 °	
5 kHz to 10 kHz	0 ° to 180 °	5 °	
10 kHz to 30 kHz	0 ° to 180 °	10 °	
Equipment to Measure Square Wave (10 Hz to 10 kHz) (into specified Load) <sup>FO</sup>			
Into 50 $\Omega$	1 mVpp to 6.6 Vpp	2.5 mV/V + 40 $\mu$ V	
Into 1 M $\Omega$	1 mVpp to 130 Vpp	1 mV/V + 40 $\mu$ V	
Equipment to Measure Fast Edge (into 50 $\Omega$ ) <sup>FO</sup>			
Into 50 $\Omega$	300 pS	0 pS to -100 pS	
Equipment to Measure Leveled Sine Wave (into 50 $\Omega$ ) (at the listed frequencies) <sup>FO</sup>			
50 kHz to 100 MHz	5 mV to 3.5 Vpp	15 mV/V + 0.1 mV	
100 MHz to 300 MHz	5 mV to 3.5 Vpp	20 mV/V + 0.1 mV	
300 MHz to 600 MHz	5 mV to 3.5 Vpp	40 mV/V + 0.1 mV	
600 MHz to 1 100 MHz	5 mV to 3.5 Vpp	50 mV/V + 0.1 mV	



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Equipment to Measure Timing Marks (into 50 $\Omega$ ) <sup>FO</sup>	5 S	5 mS/S	Fluke 5522A WI: OEM/Agile P/Z540.1
	2 S	2 mS/S	
	1 S	1 mS/S	
	500 mS	0.5 mS/S	
	200 mS	0.2 S/S	
	100 mS	0.1 mS/S	
	50 mS	53 $\mu$ S/S	
	20 mS to 2 nS	2.5 $\mu$ S/S	
Equipment to Output DC Voltage <sup>FO</sup>	0 to 100 mV	7 $\mu$ V/V + 0.3 $\mu$ V	Keysight 3458A OPT002 WI: OEM/Agile P/Z540.1
	100 mV to 1V	6 $\mu$ V/V + 0.3 $\mu$ V	
	1V to 10 V	6 $\mu$ V/V + 0.5 $\mu$ V	
	10 V to 100 V	8 $\mu$ V/V + 3 $\mu$ V	
	100 to 1 000 V	8 $\mu$ V/V + 10 $\mu$ V + (12 $\mu$ V/V) * (Vin/1 000) <sup>2</sup>	
Equipment to Output DC Current <sup>FO</sup>	10 $\mu$ A to 100 $\mu$ A	20 $\mu$ A/A + 8 pA	
	100 $\mu$ A to 1 mA	20 $\mu$ A/A + 50 pA	
	1 mA to 10 mA	20 $\mu$ A/A + 0.5 nA	
	10 mA to 100 mA	35 $\mu$ A/A + 5 nA	
	100 mA to 1 A	0.11 mA/A + 0.1 mA	
Equipment to Output AC Voltage (at the listed frequencies) <sup>FO</sup>			
1 Hz to 40 Hz	0 mV to 10 mV	0.3 mV/V + 3 $\mu$ V	
40 Hz to 1 kHz	0 mV to 10 mV	0.2 mV/V + 1.1 $\mu$ V	
1 kHz to 20 kHz	0 mV to 10 mV	0.3 mV/V + 1.1 $\mu$ V	
20 kHz to 50 kHz	0 mV to 10 mV	1 mV/V + 1.1 $\mu$ V	
50 kHz to 100 kHz	0 mV to 10 mV	5 mV/V + 1.1 $\mu$ V	
100 kHz to 300 kHz	0 mV to 10 mV	40 mV/V + 2 $\mu$ V	
2 MHz to 4 MHz	0 mV to 10 mV	70 mV/V + 7 $\mu$ V	
4 MHz to 8 MHz	0 mV to 10 mV	0.2 V/V + 8 $\mu$ V	



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Equipment to Output AC Voltage (at the listed frequencies) <sup>FO</sup>			Keysight 3458A OPT002 WI: OEM/Agile P/Z540.1
1 Hz to 40 Hz	10 mV to 100 mV	70 $\mu$ V/V + 4 $\mu$ V	
40 Hz to 1 kHz	10 mV to 100 mV	70 $\mu$ V/V + 2 $\mu$ V	
1 kHz to 20 kHz	10 mV to 100 mV	0.14 mV/V + 2 $\mu$ V	
20 kHz to 50 kHz	10 mV to 100 mV	0.3 mV/V + 2 $\mu$ V	
50 kHz to 100 kHz	10 mV to 100 mV	0.8 mV/V + 2 $\mu$ V	
100 kHz to 300 kHz	10 mV to 100 mV	3 mV/V + 10 $\mu$ V	
300 kHz to 1 MHz	10 mV to 100 mV	10 mV/V + 10 $\mu$ V	
1 MHz to 2 MHz	10 mV to 100 mV	15 mV/V + 10 $\mu$ V	
2 MHz to 4 MHz	10 mV to 100 mV	40 mV/V + 70 $\mu$ V	
4 MHz to 8 MHz	10 mV to 100 mV	40 mV/V + 80 $\mu$ V	
8 MHz to 10 MHz	10 mV to 100 mV	0.15 V/V + 0.1 mV	
Equipment to Output AC Voltage (at the listed frequencies) <sup>FO</sup>			
1 Hz to 40 Hz	100 mV to 1 V	70 $\mu$ V/V + 40 $\mu$ V	
40 Hz to 1 kHz	100 mV to 1 V	70 $\mu$ V/V + 20 $\mu$ V	
1 kHz to 20 kHz	100 mV to 1 V	0.14 mV/V + 20 $\mu$ V	
20 kHz to 50 kHz	100 mV to 1 V	0.3 mV/V + 20 $\mu$ V	
50 kHz to 100 kHz	100 mV to 1 V	0.8 mV/V + 20 $\mu$ V	
100 kHz to 300 kHz	100 mV to 1 V	3 mV/V + 0.1 mV	
300 kHz to 1 MHz	100 mV to 1 V	10 mV/V + 0.1 mV	
1 MHz to 2 MHz	100 mV to 1 V	15 mV/V + 0.1 mV	
2 MHz to 4 MHz	100 mV to 1 V	40 mV/V + 0.7 mV	
4 MHz to 8 MHz	100 mV to 1 V	40 mV/V + 0.8 mV	
8 MHz to 10 MHz	100 mV to 1 V	0.15 V/V + 1 mV	



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Equipment to Output AC Voltage (at the listed frequencies) <sup>FO</sup>			Keysight 3458A OPT002 WI: OEM/Agile P/Z540.1
1 Hz to 40 Hz	1 V to 10 V	70 $\mu$ V/V + 0.4 mV	
40 Hz to 1 kHz	1 V to 10 V	70 $\mu$ V/V + 0.2 mV	
1 kHz to 20 kHz	1 V to 10 V	0.14 mV/V + 0.2 mV	
20 kHz to 50 kHz	1 V to 10 V	0.3 mV/V + 0.2 mV	
50 kHz to 100 kHz	1 V to 10 V	0.8 mV/V + 0.2 mV	
100 kHz to 300 kHz	1 V to 10 V	3 mV/V + 1 mV	
300 kHz to 1 MHz	1 V to 10 V	10 mV/V + 1 mV	
1 MHz to 2 MHz	1 V to 10 V	15 mV/V + 1 mV	
2 MHz to 4 MHz	1 V to 10 V	40 mV/V + 7 mV	
4 MHz to 8 MHz	1 V to 10 V	40 mV/V + 8 mV	
8 MHz to 10 MHz	1 V to 10 V	0.15 mV/V + 10 mV	
Equipment to Output AC Voltage (at the listed frequencies) <sup>FO</sup>			
1 Hz to 40 Hz	10 V to 100 V	0.2 mV/V + 4 mV	
40 Hz to 1 kHz	10 V to 100 V	0.2 mV/V + 2 mV	
1 kHz to 20 kHz	10 V to 100 V	0.2 mV/V + 2 mV	
20 kHz to 50 kHz	10 V to 100 V	0.35 mV/V + 2 mV	
50 kHz to 100 kHz	10 V to 100 V	1.2 mV/V + 2 mV	
100 kHz to 300 kHz	10 V to 100 V	1.2 mV/V + 10 mV	
300 kHz to 1 MHz	10 V to 100 V	15 mV/V + 10 mV	
Equipment to Output AC Voltage (at the listed frequencies) <sup>FO</sup>			
1 Hz to 40 Hz	100 V to 1 000 V	0.4 mV/V + 40 mV	
40 Hz to 1 kHz	100 V to 1 000 V	0.4 mV/V + 20 mV	
1 kHz to 20 kHz	100 V to 1 000 V	0.6 mV/V + 20 mV	
20 kHz to 50 kHz	100 V to 1 000 V	1.2 mV/V + 20 mV	
50 kHz to 100 kHz	100 V to 1 000 V	3 mV/V + 20 mV	





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Equipment to Output Resistance <sup>FO</sup>	0 $\Omega$ to 10 $\Omega$	18 $\mu\Omega/\Omega$ + 50 $\mu\Omega$	Keysight 3458A OPT002 WI: OEM/Agile P/Z540.1
	10 $\Omega$ to 100 $\Omega$	15 $\mu\Omega/\Omega$ + 0.5 m $\Omega$	
	100 $\Omega$ to 1 000 $\Omega$	13 $\mu\Omega/\Omega$ + 0.5 m $\Omega$	
	1 k $\Omega$ to 10 k $\Omega$	13 $\mu\Omega/\Omega$ + 5 m $\Omega$	
	10 k $\Omega$ to 100 k $\Omega$	13 $\mu\Omega/\Omega$ + 50 m $\Omega$	
	100 k $\Omega$ to 1 000 k $\Omega$	18 $\mu\Omega/\Omega$ + 0.2 $\Omega$	
	1 M $\Omega$ to 10 M $\Omega$	53 $\mu\Omega/\Omega$ + 1 $\Omega$	
	10 M $\Omega$ to 100 M $\Omega$	0.5 $\Omega/\Omega$ + 10 $\Omega$	
	100 M $\Omega$ to 1 000 M $\Omega$	5 m $\Omega/\Omega$ + 0.1 k $\Omega$	

### Time and Frequency

MEASURED INSTRUMENT, QUANTITY OR GAUGE	RANGE OR NOMINAL DEVICE SIZE AS APPROPRIATE	CALIBRATION AND MEASUREMENT CAPABILITY EXPRESSED AS AN UNCERTAINTY ( $\pm$ )	CALIBRATION EQUIPMENT AND REFERENCE STANDARDS USED
Equipment to Source Frequency <sup>FO</sup>	0.01 Hz to 10 MHz	6.32 x 10 <sup>-12</sup> Hz/Hz	GPSDO/ FA-2/N9030B GIDEP/OEM
	10 MHz to 50 GHz	2.81 x 10 <sup>-12</sup> Hz/Hz	
Equipment to Measure Frequency <sup>FO</sup>	0.01 Hz to 50 GHz	2.10 x 10 <sup>-12</sup> Hz/Hz	GPSDO/5522A/ N5371B/ADA-2052 GIDEP/OEM

- The CMC (Calibration and Measurement Capability) stated for calibrations included on this scope of accreditation represents the smallest measurement uncertainty attainable by the laboratory when performing a more or less routine calibration of a nearly ideal device under nearly ideal conditions. It is typically expressed at a confidence level of 95 % using a coverage factor  $k$  (usually equal to 2). The actual measurement uncertainty associated with a specific calibration performed by the laboratory will typically be larger than the CMC for the same calibration since capability and performance of the device being calibrated and the conditions related to the calibration may reasonably be expected to deviate from ideal to some degree.
- The laboratories range of calibration capability for all disciplines for which they are accredited is the interval from the smallest calibrated standard to the largest calibrated standard used in performing the calibration. The low end of this range must be an attainable value for which the laboratory has or has access to the standard referenced. Verification of an indicated value of zero in the absence of a standard is common practice in the procedure for many calibrations but by its definition it does not constitute calibration of zero capacity.
- The presence of a superscript FO means that the laboratory performs calibration of the indicated parameter both at its fixed location and onsite at customer locations. Example: Outside Micrometer<sup>FO</sup> would mean that the laboratory performs this calibration at its fixed location and onsite at customer locations.



## *Certificate of Accreditation: Supplement*

### **Agile Calibration**

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4. Measurement uncertainties obtained for calibrations performed at customer sites can be expected to be larger than the measurement uncertainties obtained at the laboratories fixed location for similar calibrations. This is due to the effects of transportation of the standards and equipment and upon environmental conditions at the customer site which are typically not controlled as closely as at the laboratories fixed location.

