



SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017
& ANSI/NCSL Z540-1-1994

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CALIBRATION

Valid To: November 30, 2020

Certificate Number: 1995.02

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory to perform the following calibrations^{1,9}:

I. Electrical – DC/Low Frequency

Parameter/Equipment	Range	CMC ^{2, 4, 5, 6, 10} (\pm)	Comments
DC Voltage – Generate ^{3, 8}	(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 1100) V	13 μ V/V + 0.6 μ V 8.6 μ V/V + 1.0 μ V 8.2 μ V/V + 3.5 μ V 8.2 μ V/V + 6.5 μ V 9.8 μ V/V + 80 μ V 11 μ V/V + 500 μ V	Fluke 5700A
DC Voltage – Measure ^{3, 8}	(0 to 100) mV (0.1 to 1) V (1 to 10) V (10 to 100) V (100 to 1000) V (1 to 40) kV	32 μ V/V + 0.3 μ V 21 μ V/V + 0.3 μ V 21 μ V/V + 0.5 μ V 32 μ V/V + 30 μ V 33 μ V/V + 100 μ V 0.23 %	Agilent 3458A Fluke 80E10, DMM

Parameter/Equipment	Range	CMC ^{2, 4, 5, 6, 10} (\pm)	Comments
DC Current – Generate ^{3, 8}	(0 to 220) μ A (0.22 to 22) mA (2.2 to 22) mA (22 to 220) mA (0.22 to 2.2) A	60 μ A/A + 8 nA 59 μ A/A + 8 nA 61 μ A/A + 80 nA 73 μ A/A + 0.8 μ A 110 μ A/A + 2.5 μ A	Fluke 5700A
Current Clamps ^{3, 8}	(1.1 to 3) A (3 to 11) A (11 to 20.5) A (10 to 16.5) A (16.5 to 150) A (150 to 1025) A	0.044 % + 40 μ A 0.058 % + 0.5 mA 0.12 % + 0.75 mA 0.25 % + 0.002 A 0.26 % + 0.015 A 0.28 % + 0.05 A	Fluke 5520A Fluke 5520A + 50 turn coil
DC Current – Measure ^{3, 8}	(10 to 100) μ A (0.10 to 1.0) mA (1.0 to 10) mA (10 to 100) mA (0.10 to 1) A (1 to 1000) A	49 μ A/A + 0.8 nA 48 μ A/A + 5 nA 66 μ A/A + 50 nA 77 μ A/A + 0.5 μ A 0.02 % + 10 μ A 0.12 %	Agilent 3458A Empro shunts & Agilent 3458A
DC Power – Generate ^{3, 8}	Up to 109 μ W (0.109 to 1.09) mW (1.09 to 10.9) mW (10.9 to 109) mW (0.109 to 1.09) W (1.09 to 10.9) W (10.9 to 109) W (109 to 337) W (337 to 990) W (0.99 to 3.06) kW (3.06 to 11.2) kW (11.2 to 20.9) kW	0.023 % 0.014 % 0.013 % 0.013 % 0.013 % 0.013 % 0.013 % 0.013 % 0.013 % 0.028 % 0.045 % 0.063 % 0.12 %	Fluke 5520A

Parameter/Equipment	Range	CMC ^{2, 4, 6, 10} (\pm)	Comments
Resistance – Generate ^{3, 8} Fixed Points	0 Ω 1 Ω 1.9 Ω 10 Ω 19 Ω 100 Ω 190 Ω 1 k Ω 1.9 k Ω 10 k Ω 19 k Ω 100 k Ω 190 k Ω 1 M Ω 1.9 M Ω 10 M Ω 19 M Ω 100 M Ω	41 $\mu\Omega$ 0.013 % 0.019 % 34 $\mu\Omega/\Omega$ 35 $\mu\Omega/\Omega$ 20 $\mu\Omega/\Omega$ 21 $\mu\Omega/\Omega$ 15 $\mu\Omega/\Omega$ 15 $\mu\Omega/\Omega$ 14 $\mu\Omega/\Omega$ 14 $\mu\Omega/\Omega$ 17 $\mu\Omega/\Omega$ 17 $\mu\Omega/\Omega$ 26 $\mu\Omega/\Omega$ 29 $\mu\Omega/\Omega$ 54 $\mu\Omega/\Omega$ 63 $\mu\Omega/\Omega$ 0.016 %	Fluke 5700A
Resistance – Generate ^{3, 8}	(0 to 11) Ω (11 to 33) Ω (33 to 110) Ω (110 to 330) Ω (0.33 to 1.1) k Ω (1.1 to 3.3) k Ω (3.3 to 11) k Ω (11 to 33) k Ω (33 to 110) k Ω (110 to 330) k Ω (0.33 to 1.1) M Ω (1.1 to 33) M Ω (3.3 to 11) M Ω (11 to 33) M Ω (33 to 110) M Ω (110 to 330) M Ω (330 to 1100) M Ω	48 $\mu\Omega/\Omega + 0.001 \Omega$ 36 $\mu\Omega/\Omega + 0.0015 \Omega$ 33 $\mu\Omega/\Omega + 0.0014 \Omega$ 33 $\mu\Omega/\Omega + 0.002 \Omega$ 33 $\mu\Omega/\Omega + 0.002 \Omega$ 33 $\mu\Omega/\Omega + 0.02 \Omega$ 33 $\mu\Omega/\Omega + 0.02 \Omega$ 33 $\mu\Omega/\Omega + 0.2 \Omega$ 33 $\mu\Omega/\Omega + 0.2 \Omega$ 38 $\mu\Omega/\Omega + 2 \Omega$ 38 $\mu\Omega/\Omega + 2 \Omega$ 71 $\mu\Omega/\Omega + 30 \Omega$ 0.015 % + 50 Ω 0.03 % + 2.5 k Ω 0.058 % + 3 k Ω 0.35 % + 0.1 M Ω 1.7 % + 0.5 M Ω	Fluke 5520A

Parameter/Equipment	Range	CMC ^{2, 3, 4, 5, 10} (\pm)	Comments
Resistance – Measure ^{3, 8}	(0 to 10) Ω (10 to 100) Ω (0.1 to 1) k Ω (1 to 10) k Ω (10 to 100) k Ω (0.1 to 1) M Ω (1 to 10) M Ω (0 to 100) M Ω	65 $\mu\Omega/\Omega$ + 50 $\mu\Omega$ 48 $\mu\Omega/\Omega$ + 0.5 m Ω 35 $\mu\Omega/\Omega$ + 0.5 m Ω 35 $\mu\Omega/\Omega$ + 5 m Ω 36 $\mu\Omega/\Omega$ + 50 m Ω 39 $\mu\Omega/\Omega$ + 2 Ω 0.013 % + 100 Ω 0.063 % + 1 k Ω	Agilent 3458A
Capacitance – Generate ^{3, 8}	(220 to 400) pF (0.4 to 1.1) nF (1.1 to 3.3) nF (3.3 to 11) nF (11 to 33) nF (33 to 110) nF (110 to 330) nF (0.33 to 1.1) μ F (1.1 to 3.3) μ F (3.3 to 11) μ F (11 to 33) μ F (33 to 110) μ F (110 to 330) μ F (0.33 to 1.1) mF (1.1 to 3.3) mF (3.3 to 11) mF (11 to 33) mF (33 to 110) mF	0.58 % + 0.01 nF 0.58 % + 0.01 nF 0.58 % + 0.01 nF 0.29 % + 0.01 nF 0.29 % + 0.1 nF 0.29 % + 0.1 nF 0.29 % + 0.3 nF 0.3 % + 1 nF 0.3 % + 3 nF 0.3 % + 10 nF 0.47 % + 30 nF 0.52 % + 0.1 μ F 0.52 % + 0.3 μ F 0.62 % + 1 μ F 0.73 % + 3 μ F 0.55 % + 10 μ F 0.99 % + 30 μ F 1.2 % + 100 μ F	Fluke 5520A

Parameter/Equipment	Range	CMC ² (±)	Comments
Electrical Calibration of Thermocouple Indicators – Generate & Measure ^{3, 8}			
Type E	(-250 to -100) °C (-100 to -25) °C (-25 to 350) °C (350 to 650) °C (650 to 1000) °C	0.59 °C 0.23 °C 0.21 °C 0.23 °C 0.28 °C	Fluke 5520A
Type J	(-210 to -100) °C (-100 to -30) °C (-30 to 150) °C (150 to 760) °C (760 to 1200) °C	0.34 °C 0.23 °C 0.21 °C 0.24 °C 0.3 °C	
Type K	(-200 to -100) °C (-100 to -25) °C (-25 to 120) °C (120 to 1000) °C (1000 to 1372) °C	0.4 °C 0.25 °C 0.23 °C 0.33 °C 0.48 °C	
Type R	0 to 250) °C (250 to 400) °C (400 to 1000) °C (1000 to 1767) °C	0.67 °C 0.43 °C 0.4 °C 0.48 °C	
Type S	(0 to 250) °C (250 to 400) °C (400 to 1000) °C (1000 to 1767) °C	0.56 °C 0.44 °C 0.45 °C 0.55 °C	
Type T	(-250 to -150) °C (-150 to 0) °C (0 to 120) °C (120 to 400) °C	0.74 °C 0.31 °C 0.23 °C 0.21 °C	

Parameter/Equipment	Range	CMC ² (±)	Comments
Electrical Calibration of RTD Indicators – Generate ^{3,8}			
Pt 385, 100 Ω	(-200 to -80) °C (-80 to 0) °C (0 to 100) °C (100 to 300) °C (300 to 400) °C (400 to 630) °C (630 to 800) °C	0.06 °C 0.06 °C 0.08 °C 0.11 °C 0.12 °C 0.14 °C 0.27 °C	Fluke 5520A

Parameter/Range	Frequency	CMC ^{2,6,10} (±)	Comments
AC Voltage – Generate ^{3,8}			
Up to 2.2 mV	(10 to 20) Hz (20 to 40) Hz 40 Hz to 20 kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz (300 to 500) kHz (0.5 to 1) MHz	0.21 % + 4.5 μV 0.13 % + 4.5 μV 0.11 % + 4.5 μV 0.16 % + 4.5 μV 0.22 % + 7 μV 0.59 % + 13 μV 0.56 % + 25 μV 1.5 % + 25 μV	Fluke 5700A
(2.2 to 22) mV	(10 to 20) Hz (20 to 40) Hz 40 Hz to 20 kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz (300 to 500) kHz (0.5 to 1) MHz	0.069 % + 5 μV 0.030 % + 5 μV 0.022 % + 5 μV 0.048 % + 5 μV 0.11 % + 7 μV 0.16 % + 12 μV 0.22 % + 25 μV 0.43 % + 25 μV	
(22 to 220) mV	(10 to 20) Hz (20 to 40) Hz 40 Hz to 20 kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz (300 to 500) kHz (0.5 to 1) MHz	0.070 % + 13 μV 0.025 % + 8 μV 0.013 % + 8 μV 0.044 % + 8 μV 0.10 % + 25 μV 0.13 % + 25 μV 0.20 % + 35 μV 0.41 % + 80 μV	

Parameter/Range	Frequency	CMC ^{2, 6, 10} (\pm)	Comments
AC Voltage – Generate ^{3, 8} (cont)			
(0.22 to 2.2) V	(10 to 20) Hz (20 to 40) Hz 40 Hz to 20 kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz (300 to 500) kHz (0.5 to 1) MHz	0.060 % + 80 μ V 0.020 % + 25 μ V 0.011 % + 6 μ V 0.015 % + 16 μ V 0.030 % + 70 μ V 0.054 % + 130 μ V 0.13 % + 350 μ V 0.33 % + 850 μ V	Fluke 5700A
(2.2 to 22) V	(10 to 20) Hz (20 to 40) Hz 40 Hz to 20 kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz (300 to 500) kHz (0.5 to 1) MHz	0.058 % + 800 μ V 0.019 % + 250 μ V 90 μ V/V + 60 μ V 0.015 % + 160 μ V 0.030 % + 350 μ V 0.065 % + 1.5 mV 0.16 % + 4.3 mV 0.38 % + 8.5 mV	
(22 to 220) V	(10 to 20) Hz (20 to 40) Hz 40 Hz to 20 kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz (300 to 500) kHz	0.062 % + 8 mV 0.031 % + 2.5 mV 0.028 % + 0.8 mV 0.034 % + 3.5 mV 0.077 % + 8 mV 0.23 % + 90 mV 0.59 % + 90 mV	
(220 to 250) V	(15 to 50) Hz	0.045 % + 16 mV	
(220 to 1100) V	50 Hz to 1 kHz (1 to 20) kHz (20 to 30) kHz	97 μ V/V + 3.5 mV 0.020 % + 6 mV 0.070 % + 11 mV	Fluke 5700A Fluke 5725A amplifier
(220 to 750) V	(30 to 50) kHz (50 to 100) kHz	0.070 % + 11 mV 0.27 % + 45 mV	Fluke 5725A amplifier

Parameter/Range	Frequency	CMC ^{2, 4, 5, 6, 10} (\pm)	Comments
AC Voltage – Measure ^{3, 8}			
(0 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	0.08 % + 3 μ V 0.06 % + 1.1 μ V 0.09 % + 1.1 μ V 0.46 % + 1.1 μ V 0.78 % + 1.1 μ V 4.7 % + 2 μ V	Agilent 3458A
(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 (0.3 to 1) MHz	0.011 % + 4 μ V 0.015 % + 2 μ V 0.03 % + 2 μ V 0.013 % + 2 μ V 0.024 % + 2 μ V 0.41 % + 10 μ V 1.2 % + 10 μ V	
(0.10 to 1.0) V	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 (0.3 to 1) MHz	0.011 % + 40 μ V 0.016 % + 20 μ V 0.03 % + 20 μ V 0.05 % + 20 μ V 0.011 % + 20 μ V 0.36 % + 100 μ V 1.2 % + 100 μ V	
(1 to 10) V	(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 (0.3 to 1) MHz	0.01 % + 0.4 mV 0.012 % + 0.2 mV 0.02 % + 0.2 mV 0.04 % + 0.2 mV 0.1 % + 0.2 mV 0.37 % + 1 mV 1.2 % + 1 mV	
(10 to 100) V	(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 (0.3 to 1) MHz	0.025 % + 4 mV 0.025 % + 2 mV 0.03 % + 2 mV 0.05 % + 2 mV 0.16 % + 2 mV 0.47 % + 10 mV 1.8 % + 10 mV	
(100 to 750) V	(1 to 40) Hz 40 Hz to 1 kHz (1 to 20) kHz (20 to 50) kHz (50 to 100) kHz	0.048 % + 40 mV 0.048 % + 20 mV 0.08 % + 20 mV 0.14 % + 20 mV 0.35 % + 20 mV	
(0.75 to 10) kV	(60 Hz)	0.23 %	Fluke 80E10, DMM

Parameter/Range	Frequency	CMC ^{2, 4, 10} (\pm)	Comments
AC Current – Generate ^{3, 8}			
(10 to 200) μ A	(10 to 20) Hz (20 to 40) Hz 40 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	0.082 % + 25 nA 0.042 % + 20 nA 0.018 % + 16 nA 0.74 % + 40 nA 0.2 % + 80 nA	Fluke 5700A
220 μ A to 2.2 mA	(10 to 20) Hz (20 to 40) Hz 40 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	0.082 % + 40 nA 0.042 % + 35 nA 0.017 % + 35 nA 0.07 % + 0.4 μ A 0.19 % + 0.8 μ A	
(2.2 to 22) mA	(10 to 20) Hz (20 to 40) Hz 40 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	0.082 % + 0.4 μ A 0.041 % + 0.35 μ A 0.017 % + 0.35 μ A 0.07 % + 4 μ A 0.19 % + 8 μ A	
(22 to 220) mA	(10 to 20) Hz (20 to 40) Hz 40 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	0.083 % + 4 μ A 0.042 % + 3.5 μ A 0.017 % + 3.5 μ A 0.07 % + 40 μ A 0.19 % + 80 μ A	
220 mA to 2.2 A	20 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	0.077 % + 35 μ A 0.12 % + 80 μ A 1 % + 0.16 mA	
(1.1 to 3) A	(10 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	0.21 % + 0.1 mA 0.072 % + 0.1 mA 0.69 % + 1 mA 2.9 % + 5 mA	
(3 to 11) A	(45 to 100) Hz 100 Hz to 1 kHz (1 to 5) kHz	0.072 % + 2 mA 0.12 % + 2 mA 3.5 % + 2 mA	
(11 to 20.5) A	(45 to 100) Hz 100 Hz to 1 kHz (1 to 5) kHz	0.14 % + 5 mA 0.17 % + 5 mA 3.5 % + 5 mA	

Parameter/Range	Frequency	CMC ^{2, 4, 6, 10} (±)	Comments
AC Current – Generate ^{3, 8} (cont)			
(LCOMP On) Up to 330 µA	(10 to 100) Hz 100 Hz to 1 kHz	0.29 % + 0.2 µA 0.69 % + 0.5 µA	Fluke 5520A
(0.33 to 3.3) mA	(10 to 100) Hz 100 Hz to 1 kHz	0.29 % + 0.3 µA 0.69 % + 0.8 µA	
(3.3 to 33) mA	(10 to 100) Hz 100 Hz to 1 kHz	0.092 % + 4 µA 0.23 % + 10 µA	
(33 to 330) mA	(10 to 100) Hz 100 Hz to 1 kHz	0.092 % + 40 µA 0.23 % + 0.1 mA	
(0.33 to 3) A	(10 to 100) Hz (100 to 440) Hz	0.14 % + 0.2 mA 0.35 % + 1 mA	
(3 to 20.5) A	(10 to 100) Hz (100 to 440) Hz	0.14 % + 2 mA 1.2 % + 5 mA	
Current Clamps ^{3, 8} (10 to 16.5) A	(45 to 65) Hz (65 to 440) Hz	0.29 % + 0.003 A 0.83 % + 0.003 A	Fluke 5520A + 50 turn coil
(16.5 to 150) A	(45 to 65) Hz (65 to 440) Hz	0.32 % + 0.025 A 0.87 % + 0.027 A	
(150 to 1025) A	(45 to 65) Hz (65 to 440) Hz	0.32 % + 0.09 A 1.5 % + 0.1 A	
Electrical Calibration of Phase Indicators – Generate Only ^{3, 8}	(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	0.12° phase 0.3° phase 0.6° phase 2.9° phase 6° phase 12° phase	Fluke 5520A

Parameter/Range	Frequency	CMC ^{2, 5, 6, 10} (±)	Comments
AC Current – Measure ^{3, 8}			
(10 to 100) μA	(10 to 20) Hz (20 to 40) Hz (40 to 100) Hz (0.1 to 5) kHz	0.47 % + 0.03 μA 0.18 % + 0.03 μA 0.07 % + 0.03 μA 0.07 % + 0.03 μA	Agilent 3458A
(0.1 to 1) mA	(10 to 20) Hz (20 to 40) Hz (40 to 100) Hz (0.1 to 5) kHz (5 to 10) kHz	0.47 % + 0.2 μA 0.18 % + 0.2 μA 0.08 % + 0.2 μA 0.04 % + 0.2 μA 0.08 % + 0.2 μA	
(1 to 10) mA	(10 to 20) Hz (20 to 40) Hz (40 to 100) Hz (0.1 to 5) kHz (5 to 10) kHz	0.47 % + 2 μA 0.18 % + 2 μA 0.08 % + 2 μA 0.04 % + 2 μA 0.08 % + 2 μA	
(10 to 100) mA	(10 to 20) Hz (20 to 40) Hz (40 to 100) Hz (0.1 to 5) kHz (5 to 10) kHz	0.47 % + 20 μA 0.18 % + 20 μA 0.08 % + 20 μA 0.04 % + 20 μA 0.08 % + 20 μA	
(0.1 to 1) A	(10 to 20) Hz (20 to 40) Hz (40 to 100) Hz (0.1 to 5) kHz (5 to 10) kHz	0.47 % + 200 μA 0.2 % + 200 μA 0.11 % + 200 μA 0.13 % + 200 μA 0.36 % + 200 μA	
(1 to 1000) A	(45 to 65) Hz	0.15 %	

Parameter/Range	Frequency	CMC ^{2, 6, 10} (±)	Comments
AC Power – Generate (45 to 65 Hz, PF=1) ^{3, 8}	Up to 10.9 μW	0.18 %	Fluke 5520A
	(10.9 to 109) μW	0.13 %	
	(0.109 to 1.09) mW	0.07 %	
	(1.09 to 10.9) mW	0.059 %	
	(10.9 to 109) mW	0.059 %	
	(0.109 to 1.09) W	0.059 %	
	(1.09 to 10.9) W	0.059 %	
	(10.9 to 37) W	0.061 %	
	(37 to 337) W	0.067 %	
	(0.337 to 1.12) kW	0.079 %	
	(1.12 to 3.06) kW	0.083 %	
	(3.06 to 11.2) kW	0.10 %	
	(11.2 to 20.9) kW	0.17 %	

II. Mechanical

Parameter/Equipment	Range	CMC ^{2, 6} (±)	Comments
Torque Testers	(0 to 2000) ft·lbf	0.026 %	Torque arms, weights
Torque Wrenches ^{3, 8}	(2.5 to 750) in·lbf (12.5 to 2000) ft·lbf	0.6 % 0.6 %	CDI 2000 torque calibrator
Force Gages	(5 to 62) lbf (62 to 2000) lbf	0.24 % 0.23 %	CDI 2000 torque/force calibrator
	(1 to 500) lbf	0.29 %	Class “T” weights

III. Time & Frequency

Parameter/Equipment	Range	CMC ^{2, 10} (±)	Comments
Frequency – Measuring Equipment	10.000 000 0 MHz	4.0 parts 10 ¹¹ Hz/Hz	GPS reference, rubidium standard

Parameter/Equipment	Range	CMC ^{2, 10} (\pm)	Comments
Frequency – Measure ^{3, 8}	10 mHz to 100 MHz	4.0 parts in 10 ¹¹ Hz/Hz + counter resolution of 0.02 Hz at 100 MHz frequency input	HP 5335A counter slaved to time base – GPS steered Rubidium OCXO
	10 MHz to 18 GHz	4.0 parts in 10 ¹¹ Hz/Hz + counter resolution (resolution = 2 Hz)	EIP 575 counter slaved to time base – GPS steered Rubidium OCXO
Time Interval – Timers Stop Watches ^{3, 8}			NIST SP 960-12
Time Base ⁷	(0 to 24) hour	0.0016 s/day	Fluke PM6681
Totalize method	(0 to 24) hour	0.039 s	Fluke PM 6681, function generator

¹ This laboratory offers commercial calibration service and field calibration services.

² Calibration and Measurement Capability Uncertainty (CMC) is the smallest uncertainty of measurement that a laboratory can achieve within its scope of accreditation when performing more or less routine calibrations of nearly ideal measurement standards or nearly ideal Generate. CMCs represent expanded uncertainties expressed at approximately the 95 % level of confidence, usually using a coverage factor of $k = 2$. The actual measurement uncertainty of a specific calibration performed by the laboratory may be greater than the CMC due to the behavior of the customer's device and to influences from the circumstances of the specific calibration.

³ Field calibration service is available for this calibration and this laboratory meets A2LA R104 – *General Requirements: Accreditation of Field Testing and Field Calibration Laboratories* for these calibrations. Please note the actual measurement uncertainties achievable on a customer's site can normally be expected to be larger than the CMC found on the A2LA Scope. Allowance must be made for aspects such as the environment at the place of calibration and for other possible adverse effects such as those caused by transportation of the calibration equipment. The usual allowance for the actual uncertainty introduced by the item being calibrated, (e.g. resolution) must also be considered and this, on its own, could result in the actual measurement uncertainty achievable on a customer's site being larger than the CMC. Field environmental conditions are limited to 15 °C to 30 °C and <80% relative humidity to 30 °C.

⁴ Fluke 5700A and 5500A CMCs are based upon the temperature the standard was calibrated ($t_{cal} \pm 5$ °C) and assuming the instrument is zeroed at least every seven days or when the ambient temperature changes more than 5 °C. For Resistance, a zero calibration is performed at least every 12 hours within ± 1 °C of use. For AC Current, CMCs are determined with the LCOMP off. CMCs are also based upon 1-year floor specifications. CMCs are expressed as either a specific value that covers the full range or as a fraction of the reading plus a fixed floor specification.

⁵ Agilent 3458A CMCs are based upon the temperature the standard was calibrated ($t_{cal} \pm 5$ °C) and an

auto calibration (ACAL) was performed within the previous 24 hours (± 1 °C of ambient temperature.) CMCs are also based upon 1-year floor specifications. CMCs are expressed as either a specific value that covers the full range or as a combination of the fraction of the reading/output plus a range specification.

- ⁶ In the statement of CMC, percentages are percentages of reading, unless otherwise indicated.
- ⁷ Applicable when the internal time base (oscillator) of the device under test is/can be measured directly by the frequency counter.
- ⁸ This Laboratory meets A2LA R104 – General Requirements for Field testing and Field Calibration Laboratories for their Mobile Laboratory to perform the noted calibrations.
- ⁹ This laboratory meets A2LA's P112 *Flexible Scope Policy*.
- ¹⁰ The type of instrument or material being calibrated is defined by the parameter. This indicates the laboratory is capable of calibrating instruments that measure or generate the values in the ranges indicated for the listed measurement parameter.



Accredited Laboratory

A2LA has accredited

JM TEST SYSTEMS, INC.

Alexandria, LA

for technical competence in the field of

Calibration

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017 *General requirements for the competence of testing and calibration laboratories*. This laboratory also meets the requirements of ANSI/NCSL Z540-1-1994 and R205 – Specific Requirements: Calibration Laboratory Accreditation Program. 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).



Presented this 30th day of November 2018.

A handwritten signature in black ink, written over a horizontal line.

President and CEO
For the Accreditation Council
Certificate Number 1995.02
Valid to November 30, 2020

For the calibrations to which this accreditation applies, please refer to the laboratory's Calibration Scope of Accreditation.