



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

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CALIBRATION

Valid To: September 30, 2025

Certificate Number: 1395.22

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory to perform the following calibrations^{1, 6}:

I. Dimensional

Parameter/Equipment	Range	CMC ^{2, 4} ($\pm$)	Comments
Micrometers ³	Up to 1 in (1 to 12) in (12 to 20) in (20 to 48) in	33 μ in 67 μ in 130 μ in 240 μ in	Gage blocks
Height Gages ³	Up to 40 in	140 μ in	Gage blocks, surface plate
Depth Gages ³	Up to 12 in	290 μ in	Gage blocks, surface plate
Calipers ³	Up to 5 in (5 to 48) in	(200 + 10L) μ in (550 + 6.4L) μ in	Gage blocks
Indicators ³	Up to 1 in	62 μ in	Gage blocks
Thread Plug Gages – Diameter ³	Up to 4 in	(85 + 1.8L) μ in	Pratt & Whitney Supermicrometer™ Model C, thread wire set

Parameter/Equipment	Range	CMC ^{2, 4} ($\pm$)	Comments
Pin Gages, Plugs & Master Disks – Diameter ³	Up to 10 in	$(30 + 1.8L) \mu\text{in}$	Pratt & Whitney Supermicrometer™ Model C, master gage blocks
Length – Rulers ³	Up to 120 in	$(300 + 110L) \mu\text{in}$	Scherr Tumico 20-3500 optical comparator

II. Electrical – DC / Low Frequency

Parameter/Equipment	Range	CMC ^{2, 5} ($\pm$)	Comments
DC Voltage – Generate ³	Up to 330 mV 330 mV to 3.3 V (3.3 to 33) V (33 to 330) V (330 to 1000) V	17 $\mu\text{V/V} + 1 \mu\text{V}$ 10 $\mu\text{V/V} + 1.6 \mu\text{V}$ 10 $\mu\text{V/V} + 16 \mu\text{V}$ 15 $\mu\text{V/V} + 120 \mu\text{V}$ 15 $\mu\text{V/V} + 1.2 \text{ mV}$	Fluke 5520A
DC Voltage – Measure ³	(0 to 200) mV (0.2 to 2) V (2 to 20) V (20 to 200) V (200 to 1000) V	6.5 $\mu\text{V/V} + 0.1 \mu\text{V}$ 4.1 $\mu\text{V/V} + 0.4 \mu\text{V}$ 4.0 $\mu\text{V/V} + 4 \mu\text{V}$ 5.8 $\mu\text{V/V} + 40 \mu\text{V}$ 5.9 $\mu\text{V/V} + 0.5 \text{ mV}$	Fluke 8508A

Parameter/Equipment	Range	CMC ^{2, 5} (±)	Comments
DC Current – Generate ³	(0 to 330) μ A 330 μ A to 3.3 mA (3.3 to 33) mA (33 to 330) mA 330 mA to 1.1 A (1.1 to 3) A (3 to 11) A	0.012 % + 20 nA 80 μ A/A + 40 nA 80 μ A/A + 0.19 μ A 80 μ A/A + 2 μ A 0.016 % + 32 μ A 0.030 % + 32 μ A 0.040 % + 0.39 mA	Fluke 5520A
Clamp Meters	(11 to 20) A (0 to 1000) A	0.078 % + 0.59 mA 0.82 % + 0.029 A	Fluke 5520A/SC1100 Fluke 5500A/coil & 5520A/SC1100
DC Current – Measure ³	(0 to 200) μ A (0.2 to 20) mA (20 to 200) mA (0.2 to 2) A (2 to 20) A (20 to 100) A	13 μ A/A + 0.4 nA 15 μ A/A + 40 nA 49 μ A/A + 0.8 μ A 0.019 % + 16 μ A 0.042 % + 0.4 mA 0.058 % + 10 μ A	Fluke 8508A Valhalla 2575A w/ 8508A
Resistance – Generate ³	Up 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 3.3) M Ω (3.3 to 11) M Ω (11 to 33) M Ω (33 to 110) M Ω (110 to 330) M Ω (0.33 to 1.1) G Ω	33 $\mu\Omega/\Omega$ + 7.8 m Ω 26 $\mu\Omega/\Omega$ + 12 m Ω 27 $\mu\Omega/\Omega$ + 12 m Ω 30 $\mu\Omega/\Omega$ + 16 m Ω 27 $\mu\Omega/\Omega$ + 16 m Ω 30 $\mu\Omega/\Omega$ + 0.16 Ω 34 $\mu\Omega/\Omega$ + 78 m Ω 27 $\mu\Omega/\Omega$ + 0.78 Ω 25 $\mu\Omega/\Omega$ + 0.78 Ω 27 $\mu\Omega/\Omega$ + 7.8 Ω 30 $\mu\Omega/\Omega$ + 7.8 Ω 48 $\mu\Omega/\Omega$ + 0.12 k Ω 0.011 % + 0.2 k Ω 0.020 % + 1.9 k Ω 0.039 % + 2.3 k Ω 0.24 % + 78 k Ω 1.2 % + 0.4 M Ω	Fluke 5520A/SC1100

Parameter/Equipment	Range	CMC ^{2, 5} ($\pm$)	Comments
Resistance – Measure ³	Up to 2 Ω (2 to 20) Ω (20 to 200) Ω (0.2 to 2) k Ω (2 to 20) k Ω (20 to 200) k Ω (0.2 to 2) M Ω (2 to 20) M Ω (20 to 200) M Ω (0.2 to 2) G Ω	20 $\mu\Omega/\Omega$ + 4 $\mu\Omega$ 11 $\mu\Omega/\Omega$ + 14 $\mu\Omega$ 8.7 $\mu\Omega/\Omega$ + 50 $\mu\Omega$ 8.6 $\mu\Omega/\Omega$ + 500 $\mu\Omega$ 8.6 $\mu\Omega/\Omega$ + 5 m Ω 8.8 $\mu\Omega/\Omega$ + 50 m Ω 11 $\mu\Omega/\Omega$ + 1 Ω 24 $\mu\Omega/\Omega$ + 0.1 k Ω 80 $\mu\Omega/\Omega$ + 1 k Ω 0.022 % + 0.1 M Ω	Fluke 8508A High voltage
Electrical Simulation of Thermocouples Indicating Devices – Generate & Measure ³			
Type E	(-250 to -100) $^{\circ}\text{C}$ (-100 to -25) $^{\circ}\text{C}$ (-25 to 350) $^{\circ}\text{C}$ (350 to 650) $^{\circ}\text{C}$ (650 to 1000) $^{\circ}\text{C}$	0.42 $^{\circ}\text{C}$ 0.18 $^{\circ}\text{C}$ 0.17 $^{\circ}\text{C}$ 0.18 $^{\circ}\text{C}$ 0.21 $^{\circ}\text{C}$	Fluke 5520A/SC1100
Type J	(-210 to -100) $^{\circ}\text{C}$ (-100 to -30) $^{\circ}\text{C}$ (-30 to 150) $^{\circ}\text{C}$ (150 to 760) $^{\circ}\text{C}$ (760 to 1200) $^{\circ}\text{C}$	0.24 $^{\circ}\text{C}$ 0.18 $^{\circ}\text{C}$ 0.17 $^{\circ}\text{C}$ 0.18 $^{\circ}\text{C}$ 0.22 $^{\circ}\text{C}$	
Type K	(-200 to -100) $^{\circ}\text{C}$ (-100 to -25) $^{\circ}\text{C}$ (-25 to 120) $^{\circ}\text{C}$ (120 to 1000) $^{\circ}\text{C}$ (1000 to 1372) $^{\circ}\text{C}$	0.28 $^{\circ}\text{C}$ 0.19 $^{\circ}\text{C}$ 0.18 $^{\circ}\text{C}$ 0.24 $^{\circ}\text{C}$ 0.33 $^{\circ}\text{C}$	
Type T	(-250 to -150) $^{\circ}\text{C}$ (-150 to 0) $^{\circ}\text{C}$ (0 to 120) $^{\circ}\text{C}$ (120 to 400) $^{\circ}\text{C}$	0.50 $^{\circ}\text{C}$ 0.22 $^{\circ}\text{C}$ 0.18 $^{\circ}\text{C}$ 0.17 $^{\circ}\text{C}$	

Parameter/Equipment	Range	CMC ^{2, 5} ($\pm$)	Comments
Oscilloscopes ³ –			
Amplitude – DC Signal:			
50 Ω Load	1 mV to 6.6 V	0.2 % + 40 μ V	Fluke 5520A/SC1100
1 M Ω Load	1 mV to 130 V	0.05 % + 40 μ V	
Amplitude – Square Wave:			
50 Ω Load	1 mV _{p-p} to 6.6 V _{p-p} , 10 Hz to 100 kHz	0.23 % + 31 μ V	
1 M Ω Load	1 mV _{p-p} to 130 V _{p-p} , 10 Hz to 100 kHz	0.16 % + 31 μ V	
Bandwidth	5 mV to 5.5 V:		
	50 kHz	1.8 % + 0.23 mV	
	50 kHz to 100 MHz	2.8 % + 0.23 mV	
	(100 to 300) MHz	3.2 % + 0.23 mV	
	(300 to 600) MHz	4.7 % + 0.23 mV	
	4 mV to 3.5 V:		
	(600 to 1100) MHz	5.5 % + 0.23 mV	
	5 s to 50 ms	60 μ s/s	
	1 ns to 20 ms	2.1 μ s/s	
Time Marker	1 kHz to 2 MHz:		
	(200 to 300) ps	68 ps	
	(2 to 10) MHz:		
	(200 to 350) ps	68 ps	

Parameter/Range	Frequency	CMC ^{2, 5} ($\pm$)	Comments
AC Voltage – Generate ³			
(1 to 33) mV	(10 to 45) Hz 45 Hz to 10 kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 500) kHz	0.064 % + 4.7 μ V 0.019 % + 4.7 μ V 0.023 % + 4.7 μ V 0.082 % + 4.7 μ V 0.28 % + 9.3 μ V 0.63 % + 39 μ V	Fluke 5520A
(33 to 330) mV	(10 to 45) Hz 45 Hz to 10 kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 500) kHz	0.024 % + 6.2 μ V 0.013 % + 6.2 μ V 0.014 % + 6.2 μ V 0.029 % + 6.2 μ V 0.063 % + 25 μ V 0.16 % + 55 μ V	
(0.33 to 3.3) V	(10 to 45) Hz 45 Hz to 10 kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 500) kHz	0.024 % + 39 μ V 0.014 % + 47 μ V 0.017 % + 47 μ V 0.025 % + 39 μ V 0.056 % + 97 μ V 0.2 % + 470 μ V	
(3.3 to 33) V	(10 to 45) Hz 45 Hz to 10 kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz	0.025 % + 510 μ V 0.014 % + 470 μ V 0.02 % + 470 μ V 0.03 % + 470 μ V 0.072 % + 1.3 mV	
(33 to 330) V	45 Hz to 1 kHz (1 to 10) kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz	0.017 % + 1.6 mV 0.017 % + 4.7 mV 0.022 % + 4.7 mV 0.03 % + 4.7 mV 0.17 % + 39 mV	
(330 to 1020) V	45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	0.025 % + 7.8 mV 0.021 % + 7.8 mV 0.025 % + 7.8 mV	

Parameter/Range	Frequency	CMC ^{2, 5} (±)	Comments
AC Voltage – Measure ³			
Up to 200 mV	(10 to 40) Hz (40 to 100) Hz (0.1 to 2) kHz (2 to 10) kHz (10 to 30) kHz (30 to 100) kHz	0.016 % + 4 µV 0.013 % + 4 µV 0.013 % + 2 µV 0.016 % + 4 µV 0.035 % + 8 µV 0.078 % + 20 µV	Fluke 8508A
(0.2 to 2) V	(10 to 40) Hz (40 to 100) Hz (0.1 to 2) kHz (2 to 10) kHz (10 to 30) kHz (30 to 100) kHz (100 to 300) kHz (0.3 to 1) MHz	0.013 % + 20 µV 0.011 % + 20 µV 0.08 % + 20 µV 0.013 % + 20 µV 0.023 % + 40 µV 0.059 % + 200 µV 0.31 % + 2.0 mV 1.1 % + 20 mV	
(2 to 20) V	(10 to 40) Hz (40 to 100) Hz (0.1 to 2) kHz (2 to 10) kHz (10 to 30) kHz (30 to 100) kHz (100 to 300) kHz (0.3 to 1) MHz	0.013 % + 200 µV 96 µV/V + 200 µV 85 µV/V + 200 µV 0.013 % + 200 µV 0.023 % + 400 µV 0.059 % + 2.0 mV 0.31 % + 20 mV 1.1 % + 200 mV	
(20 to 200) V	(10 to 40) Hz (40 to 100) Hz (0.1 to 2) kHz (2 to 10) kHz (10 to 30) kHz (30 to 100) kHz (100 to 300) kHz	0.013 % + 2 mV 99 µV/V + 2 mV 85 µV/V + 2 mV 0.013 % + 2 mV 0.023 % + 4 mV 0.059 % + 20 mV 0.31 % + 200 mV	
(0.2 to 1000) V	(10 to 40) Hz (40 to 100) Hz (0.1 to 2) kHz (2 to 10) kHz (10 to 30) kHz (30 to 100) kHz (100 to 300) kHz	0.013 % + 2 mV 99 µV/V + 2 mV 85 µV/V + 2 mV 0.013 % + 2 mV 0.023 % + 4 mV 0.059 % + 20 mV 0.31 % + 200 mV	
(100 to 1000) V	(40 to 100) Hz (0.1 to 2) kHz (2 to 10) kHz (10 to 30) kHz (30 to 100) kHz	0.013 % + 20 mV 0.015 % + 20 mV 0.014 % + 20 mV 0.025 % + 40 mV 0.068 % + 0.20 V	

Parameter/Range	Frequency	CMC ^{2, 5} (±)	Comments
AC Current – Generate ³			
(29 to 330) µA	(10 to 20) Hz (20 to 45) Hz 45 Hz to 1.0 kHz (1 to 5) kHz (5 to 10) kHz (10 to 30) kHz	0.16 % + 80 nA 0.12 % + 80 nA 0.1 % + 80 nA 0.23 % + 0.12 µA 0.62 % + 0.16 µA 1.3 % + 0.32 µA	Fluke 5520A
(0.33 to 3.3) mA	(10 to 20) Hz (20 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz (10 to 30) kHz	0.16 % + 0.12 µA 0.1 % + 0.12 µA 0.08 % + 0.12 µA 0.16 % + 0.16 µA 0.41 % + 0.24 µA 0.8 % + 0.48 µA	
(3.3 to 33) mA	(10 to 20) Hz (20 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz (10 to 30) kHz	0.14 % + 1.6 µA 0.071 % + 1.6 µA 0.034 % + 1.6 µA 0.064 % + 1.6 µA 0.17 % + 2.4 µA 0.32 % + 3.2 µA	
(33 to 330) mA	(10 to 20) Hz (20 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz (10 to 30) kHz	0.14 % + 16 µA 0.071 % + 16 µA 0.034 % + 16 µA 0.079 % + 40 µA 0.16 % + 78 µA 0.32 % + 0.16 mA	
(0.33 to 1.1) A	(10 to 20) Hz (20 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	0.14 % + 78 µA 0.039 % + 78 µA 0.039 % + 78 µA 0.47 % + 0.78 mA 2.0 % + 4 mA	
(1.1 to 3) A	(10 to 20) Hz (20 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	0.14 % + 78 µA 0.15 % + 78 µA 0.055 % + 78 µA 0.47 % + 0.78 mA 2.0 % + 4 mA	
(3 to 11) A	45 Hz to 1 kHz (1 to 5) kHz	0.083 % + 1.6 mA 2.4 % + 1.6 mA	
(11 to 20.5) A	45 Hz to 1 kHz (1 to 5) kHz	0.12 % + 4 mA 2.4 % + 4 mA	

Parameter/Range	Frequency	CMC ^{2, 5} ($\pm$)	Comments
Capacitance – Generate ³ (cont)			
(0.33 to 1.1) μ F	(10 to 600) Hz	0.24 % + 0.8 nF	Fluke 5520A
(1.1 to 3.3) μ F	(10 to 300) Hz	0.23 % + 2.3 nF	
(3.3 to 11) μ F	(10 to 150) Hz	0.24 % + 7.8 nF	
(11 to 33) μ F	(10 to 120) Hz	0.34 % + 24 nF	
(33 to 110) μ F	(10 to 80) Hz	0.39 % + 78 nF	
(110 to 330) μ F	(0 to 50) Hz	0.39 % + 0.24 μ F	
(0.33 to 1.1) mF	(0 to 20) Hz	0.37 % + 0.8 μ F	
(1.1 to 3.3) mF	(0 to 6) Hz	0.37 % + 2.3 μ F	
(3.3 to 11) mF	(0 to 2) Hz	0.37 % + 8 μ F	
(11 to 33) mF	(0 to 0.6) Hz	0.59 % + 24 μ F	
(33 to 110) mF	(0 to 0.2) Hz	0.86 % + 78 μ F	

Parameter/Equipment	Range	CMC ^{2, 5} ($\pm$)	Comments
Safety Test –			
Earth Bond (Rpe)	(0 to 19.99) Ω	1.2 Ω	Megger PAT 320
Insulation Resistance (Riso)	(0 to 99.9) M Ω	2.9 M Ω	
Leakage Current (Isubstitute)	(0 to 19.9) mA (dc)	1.7 mA (dc)	

III. Electrical – RF / Microwave

Parameter/Range	Frequency	CMC ^{2, 4, 5} ($\pm$)	Comments
RF Power – Generate ³			
(13 to -5) dB (-20 to -58) dB (-50 to -80) dB	200 Hz to 80 MHz	0.09 dB 0.13 dB 0.19 dB	HP 3335A
(+20 to -100) dBm	2.5 MHz to 26.5 GHz	0.6 dB	HP 83630B synthesizer w/8902; 11722A, 11792A sensors, 11793A converter
RF Power – Measure ³			
0 dBm	50 MHz	0.39 %	HP 432A, 478A-H76, 8508A
(-20 to +30) dBm	100 kHz to 1.3 GHz (0.05 to 26.5) GHz	0.063 dB + 1 digit 0.13 dB + 1 digit	Agilent 8902A receiver w/11793A converter, Agilent 11722A / 11792A
Attenuation – Generate ³			
(-1 to -10) dB (-10 to -20) dB (-20 to -30) dB (-30 to -40) dB (-40 to -50) dB (-50 to -60) dB (-60 to -70) dB (-70 to -80) dB (-80 to -90) dB (-90 to -100) dB	50 MHz	0.0046 dB + 0.0005 dB/dB 0.017 dB + 0.0015 dB/dB 0.029 dB + 0.0013 dB/dB 0.029 dB + 0.000 73 dB/dB 0.031 dB + 0.000 62 dB/dB 0.031 dB + 0.000 53 dB/dB 0.03 dB + 0.000 43 dB/dB 0.033 dB + 0.000 41 dB/dB 0.032 dB + 0.000 37 dB/dB 0.036 dB + 0.000 36 dB/dB	HP 8496H/8494H
(-1 to -10) dB (-10 to -20) dB (-20 to -30) dB (-30 to -40) dB (-40 to -50) dB (-50 to -60) dB (-60 to -70) dB (-70 to -80) dB (-80 to -89) dB	10 MHz	0.043 dB + 0.88 dB/dB 0.18 dB + 0.058 dB/dB 0.35 dB + 0.033 dB/dB 0.45 dB + 0.011 dB/dB 0.45 dB + 0.008 dB/dB 0.64 dB + 0.006 dB/dB 0.70 dB + 0.006 dB/dB 1.2 dB + 0.017 dB/dB 1.2 dB + 0.015 dB/dB	HP 8496H/8494H

Parameter/Range	Frequency	CMC ^{2, 5} (±)	Comments
Phase Noise – Measure ³ (cont)			
1 kHz Offset	(0.1 to 18.0) GHz	3.5 dB	HP E8254A w/3048A system
10 kHz Offset	(7 to -170) dBc/Hz	3.5 dB	
100 kHz Offset		3.5 dB	
Amplitude Modulation – Measure ³			
Rate: 50 Hz to 10 kHz Depth: (5 to 99) %	150 kHz to 10 MHz	2.4 % + 1 digit	Agilent 8902A receiver w/ 11722A
Rate: 20 Hz to 10 kHz Depth: Up to 99 %	150 kHz to 10 MHz	3.5 % + 1 digit	
Rate: 50 Hz to 10 kHz Depth: (5 to 99) %	(10 to 1300) MHz	1.4 % + 1 digit	
Rate: 20 Hz to 10 kHz Depth: Up to 99 %	(10 to 1300) MHz	3.6 % + 1 digit	
Frequency Modulation – Measure ³			
Rate: 20 Hz to 10 kHz Dev.: ≤ 40 kHz Peak	250 kHz to 10 MHz	2.3 % + 1 digit	Agilent 8902A measuring receiver w/ 11715A
Rate: 50 Hz to 100 kHz Dev.: ≤ 400 kHz Peak	(10 to 1300) MHz	1.2 % + 1 digit	
Rate: 20 Hz to 200 kHz Dev.: ≤ 400 kHz Peak	(10 to 1300) MHz	5.8 % + 1 digit	

Parameter/Range	Frequency	CMC ^{2, 5} ($\pm$)	Comments
Phase Modulation – Measure ³ Rate: 200 Hz to 10 kHz Rate: 20 Hz to 200 kHz	150 kHz to 10 MHz 10 MHz to 26.5 GHz	4 % + 0.015 rad 5 % + 0.019 rad	HP 8902A measuring receiver w/ HP 11792A sensor
Distortion – Measure ³	(-80 to 0) dB; 20 Hz to 20 kHz (-65 to 0) dB; (20 to 100) kHz	1.2 dB 2.3 dB	HP 8903B
Reflection S ₁₁ /S ₂₂ – Measure ³ (0.6 to 1) lin (0.2 to 0.5) lin (0.0 to 0.1) lin (0.6 to 1) lin (0.2 to 0.5) lin (0.0 to 0.1) lin (0.6 to 1) lin (0.2 to 0.5) lin (0.0 to 0.1) lin	100 kHz to 500 MHz 45 MHz to 18 GHz 45 MHz to 26.5 GHz	0.004 lin 2.3 deg 0.004 lin 2.3 deg 0.008 lin 0.83 deg 0.01 lin 0.69 deg 0.007 lin 0.88 deg 0.006 lin 3.5 deg 0.01 lin 0.93 deg 0.009 lin 0.99 deg 0.008 lin 4.8 deg	HP 8751A, HP 87511A, HP 85054B type-N cal kit HP 8510C, 8515A, 85054B type-N (sliding load cal) HP 8510C, 8515A, 85052B 3.5 mm (sliding load cal)

Parameter/Range	Frequency	CMC ^{2, 5} ($\pm$)	Comments
Transmission S_{12}/S_{21} – Measure			
0 dB	100 kHz to 500 MHz	0.05 dB 0.36 deg	HP 8751A, 87511A, 85054 B type-N cal kit
-10 dB		0.08 dB 0.53 deg	
-20 dB		0.21 dB 1.4 deg	
-30 dB		0.66 dB 4.2 deg	
-40 dB		2.2 dB 13 deg	
-50 dB		5.5 dB 42 deg	
10 dB	45 MHz to 18 GHz	0.05 dB 0.31 deg	HP 8510C, 8515A, 85054B type-N (sliding load cal)
0 dB		0.01 dB 0.04 deg	
-10 dB		0.05 dB 0.31 deg	
-20 dB		0.06 dB 0.4 deg	
-30 dB		0.19 dB 1.3 deg	

Parameter/Range	Frequency	CMC ^{2,5} ($\pm$)	Comments
Transmission S_{12}/S_{21} – Measure (cont)			
-40 dB	45 MHz to 18 GHz	0.17 dB 1.1 deg	HP 8510C, 8515A, 85052B 3.5 mm (sliding load cal)
-50 dB		0.48 dB 3.3 deg	
-60 dB		1.4 dB 10 deg	
0 dB	45 MHz to 26.5 GHz	0.02 dB 0.13 deg	
-10 dB		0.02 dB 0.13 deg	
-20 dB		0.02 dB 0.15 deg	
-30 dB		0.04 dB 0.25 deg	
-40 dB		0.11 dB 0.69 deg	
-50 dB		0.33 dB 2.1 deg	
-60 dB		1.1 dB 6.8 deg	

Parameter/Range	Frequency	CMC ^{2, 4, 5} (±)	Comments
RF Power Sensors – Calibration Factor ³			
Coaxial TC/Diode Power Sensors @ 1 mW: Reference to 50 MHz @ 1 mW	0.1 MHz	0.97 %	Bolometers Weinschel 1806, F1119C, Fluke 8508A
	0.3 MHz to 2.5 GHz	0.92 %	
	3.0 GHz	0.93 %	
	3.5 GHz	0.92 %	
	4.0 GHz	0.95 %	
	4.2 GHz	1.0 %	
	10 MHz	0.93 %	Bolometers Weinschel 1806, F1807A, Fluke 8508A
	(0.03 to 1.0) GHz	0.92 %	
	(2.0 to 4.0) GHz	0.96 %	
	5 GHz	0.99 %	
	(6 to 12.4) GHz	1.0 %	
	(13 to 18) GHz	1.1 %	
	(0.05 to 2.0) GHz	1.2 %	Agilent E4419B, 8485A-H84, 11667B
	(4.0 to 19) GHz	1.3 %	
	(11 to 13) GHz	1.6 %	
	(14 to 17) GHz	1.8 %	
	18 GHz	2.3 %	
	19 GHz	2.1 %	
	20 GHz	2.0 %	
	21 GHz	1.8 %	
	22 GHz	2.0 %	
	23 GHz	1.9 %	
	24 GHz	2.3 %	
	25 GHz	1.9 %	
	26 GHz	2.2 %	
	26.5 GHz	2.1 %	

IV. Mechanical

Parameter/Equipment	Range	CMC ² (±)	Comments
Torque – Wrenches & Drivers ³	(5 to 50) ozf·in (10 to 100) ozf·in (5 to 50) lbf·in (40 to 500) lbf·in (25 to 250) lbf·ft	0.77 % Indicated Value 0.77 % Indicated Value 0.77 % Indicated Value 0.77 % Indicated Value 0.77 % Indicated Value	Check-line ITI & ITF-System

Parameter/Equipment	Range	CMC ^{2, 4, 7} ($\pm$)	Comments
Pressure – Measuring Equipment ³	(0 to 1) inH ₂ O (0 to 2) inH ₂ O (0 to 60) psia (0 to 100) psia (0 to 300) psig (0 to 3000) psig	0.07 % FS 0.07 % FS 0.06 % FS 0.06 % FS 0.06 % FS 0.3 % FS	Ashcroft ATE-100, AQS-1 & AQS-2 system
Scales & Balances ³	(1 to 500) mg 1 g 2 g 5 g 10 g 20 g 50 g 100 g 200 g 500 g 1 kg 2 kg 5 kg 10 kg 20 kg 30 kg (0 to 500) lb	6.2 μ g + 0.58R 23 μ g + 0.58R 24 μ g + 0.58R 24 μ g + 0.58R 29 μ g + 0.58R 57 μ g + 0.58R 0.15 mg + 0.58R 0.23 mg + 0.58R 0.43 mg + 0.58R 0.99 mg + 0.58R 2.1 mg + 0.58R 4.2 mg + 0.58R 10 mg + 0.58R 21 mg + 0.58R 42 mg + 0.58R 63 mg + 0.58R 0.012 % + 0.58R	Troemner Ultra- Class & Class 1 weight set

V. Time & Frequency

Parameter/Equipment	Frequency	CMC ^{2, 4, 7} ($\pm$)	Comments
Frequency – Measuring Equipment ³			
Rubidium Standard	10 MHz	0.52 nHz/Hz + 0.58R	Stanford Research FS725
	Up to 80 MHz Up to 26.5 GHz	0.52 nHz/Hz + 1 μ Hz 0.81 nHz/Hz + 0.58R	Rubidium, Agilent 33250A & 83630B
Frequency – Measure ³	Up to 12.4 GHz	0.52 nHz/Hz	Rubidium, Agilent 53132A

Parameter/Equipment	Frequency	CMC ^{2, 4} ($\pm$)	Comments
Stopwatches ³	Up to 19.99 s/day	0.039 s/day	Timometer
Non-Contact Tachometers ³	Up to 200 000 rpm	0.0002 % + 0.58R	Rubidium, Agilent 53132A, 33250A

¹ This laboratory offers commercial calibration and field calibration service.

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 measuring equipment. 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. 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.

⁴ In the statement of CMC, L is the numerical value of the nominal length of the device measured in inches or millimeters. In the statement of CMC, R is the numerical value of the resolution of the device. In the statement of CMC, percent is the percentage in reading, unless otherwise noted. In the statement of CMC, FS represents "Full Scale".

⁵ The stated measured values are determined using the indicated instrument (see Comments). This capability is suitable for the calibration of the devices intended to measure or generate the measured value in the ranges indicated. CMC's are expressed as either a specific value that covers the full range or as a percent or fraction of the reading plus a fixed floor specification.

⁶ This scope meets A2LA's *P112 Flexible Scope Policy*.

⁷ 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

SIMCO ELECTRONICS

Scottsdale, AZ

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/NCCL 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 15th day of August 2023.

A blue ink signature of Mr. Trace McInturff, written over a horizontal line.

Mr. Trace McInturff, Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 1395.22
Valid to September 30, 2025

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