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

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CALIBRATION

Valid To: February 28, 2026 Certificate Number: 2626.01

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory to perform the following calibrations[1, 7]:

I. Electrical – DC/Low Frequency

Parameter/Range	Range	CMC[2, 3, 4, 5, 6] (±)	Comments
DC Voltage – Generate	(0 to 220) mV 220 mV to 2.2 V (2.2 to 11) V (11 to 22) V (22 to 220) V (220 to 1100) V	11 µV/V + 0.40 µV 5.1 µV/V + 0.70 µV 3.7 µV/V + 2.5 µV 4.9 µV/V + 4.0 µV 6.0 µV/V + 40 µV 7.3 µV/V + 0.40 mV	Fluke 5720A
DC Voltage – Measure	(0 to 100) mV 100 mV to 1 V (1 to 10) V (10 to 100) V (100 to 1000) V	14 µV/V + 0.70 µV 12 µV/V + 0.70 µV 12 µV/V + 0.90 µV 13 µV/V + 70 µV 13 µV/V + 0.14 mV	Agilent 3458A, opt 002 (2-year specifications)
DC Resistance – Generate, Fixed Points	(1, 1.9) Ω (10, 19) Ω (100, 190) Ω (1, 1.9) kΩ (10, 19) kΩ (100, 190) kΩ (1, 1.9) MΩ (10, 19) MΩ 100 MΩ	98 µΩ/Ω 27 µΩ/Ω 12 µΩ/Ω 9.8 µΩ/Ω 9.3 µΩ/Ω 12 µΩ/Ω 31 µΩ/Ω 72 µΩ/Ω 0.16 mΩ/Ω	Fluke 5720A

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Parameter/Range	Frequency	CMC[2, 3, 4, 5, 6] (±)	Comments
DC Resistance – Measure	(0 to 10) Ω (10 to 100) Ω 100 Ω to 1 kΩ (1 to 10) kΩ (10 to 100) kΩ 100 kΩ to 1 MΩ (1 to 10) MΩ (10 to 100) MΩ 100 MΩ to 1 GΩ	30 µΩ/Ω + 0.14 mΩ 29 µΩ/Ω + 1.4 mΩ 22 µΩ/Ω + 1.4 mΩ 22 µΩ/Ω + 14 mΩ 22 µΩ/Ω + 0.14 Ω 28 µΩ/Ω + 8.0 Ω 0.012 % + 0.18 kΩ 0.024 % + 1.8 kΩ 1.3 % + 18 kΩ	Agilent 3458A, opt 002 (2-year specifications)
DC Current – Generate	(0 to 220) µA 220 µA to 2.2 mA (2.2 to 22) mA (22 to 220) mA 220 mA to 2.2 A (2.2 to 11) A	41 µA/A + 6.0 nA 37 µA/A + 7.0 nA 39 µA/A + 40 nA 49 µA/A + 0.70 µA 86 µA/A + 12 µA 0.37 mA/A + 0.48 mA	Fluke 5720A & Fluke 5725A
DC Current – Measure	(1 to 10) µA (10 to 100) µA 100 µA to 1 mA (1 to 10) mA (10 to 100) mA 100 mA to 1 A	39 µA/A + 0.14 nA 38 µA/A + 1.2 nA 38 µA/A + 9.0 nA 42 µA/A + 90 nA 57 µA/A + 0.90 µA 0.14 mA/A + 18 µA	Agilent 3458A, opt 002 (2-year specifications)
AC Voltage – Generate			
(0 to 2.2) mV (0 to 2.2) mV (0 to 2.2) mV (0 to 2.2) mV (0 to 2.2) mV (0 to 2.2) mV (0 to 2.2) mV (0 to 2.2) mV (2.2 to 22) mV (2.2 to 22) mV (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 500 kHz to 1 MHz (10 to 20) Hz (20 to 40) Hz 40 Hz to 20 kHz	0.072 % + 4.0 µV 0.12 % + 4.0 µV 0.051 % + 4.0 µV 0.12 % + 4.0 µV 0.095 % + 5.0 µV 0.16 % + 10 µV 0.24 % + 20 µV 0.39 % + 20 µV 0.029 % + 20 µV 0.019 % + 20 µV 0.011 % + 20 µV	Fluke 5720A

Parameter/Range	Frequency	CMC[2, 3, 4, 5, 6] (±)	Comments
AC Voltage – Generate (cont)			
(2.2 to 22) mV	(20 to 50) kHz	0.031 % + 20 µV	Fluke 5720A
(2.2 to 22) mV	(50 to 100) kHz	0.079 % + 20 µV	
(2.2 to 22) mV	(100 to 300) kHz	0.11 % + 20 µV	
(2.2 to 22) mV	(300 to 500) kHz	0.14 % + 20 µV	
(2.2 to 22) mV	500 kHz to 1 MHz	0.31 % + 20 µV	
(22 to 220) mV	(10 to 20) Hz	0.024 % + 20 µV	
(22 to 220) mV	(20 to 40) Hz	0.0099 % + 20 µV	
(22 to 220) mV	40 Hz to 20 kHz	0.0083 % + 20 µV	
(22 to 220) mV	(20 to 50) kHz	0.022 % + 20 µV	
(22 to 220) mV	(50 to 100) kHz	0.047 % + 20 µV	
(22 to 220) mV	(100 to 300) kHz	0.091 % + 20 µV	
(22 to 220) mV	(300 to 500) kHz	0.14 % + 20 µV	
(22 to 220) mV	500 kHz to 1 MHz	0.29 % + 20 µV	
220 mV to 2.2 V	(10 to 20) Hz	0.024 % + 20 µV	
220 mV to 2.2 V	(20 to 40) Hz	0.0092 % + 20 µV	
220 mV to 2.2 V	40 Hz to 20 kHz	0.0047 % + 20 µV	
220 mV to 2.2 V	(20 to 50) kHz	0.0077 % + 20 µV	
220 mV to 2.2 V	(50 to 100) kHz	0.011 % + 20 µV	
220 mV to 2.2 V	(100 to 300) kHz	0.026 % + 20 µV	
220 mV to 2.2 V	(300 to 500) kHz	0.10 % + 20 µV	
220 mV to 2.2 V	500 kHz to 1 MHz	0.18 % + 20 µV	
(2.2 to 22) V	(10 to 20) Hz	0.024 % + 20 µV	
(2.2 to 22) V	(20 to 40) Hz	0.0093 % + 20 µV	
(2.2 to 22) V	40 Hz to 20 kHz	0.0048 % + 20 µV	
(2.2 to 22) V	(20 to 50) kHz	0.0077 % + 20 µV	
(2.2 to 22) V	(50 to 100) kHz	0.010 % + 20 µV	
(2.2 to 22) V	(100 to 300) kHz	0.029 % + 20 µV	
(2.2 to 22) V	(300 to 500) kHz	0.10 % + 20 µV	
(2.2 to 22) V	500 kHz to 1 MHz	0.17 % + 20 µV	
(22 to 220) V	(10 to 20) Hz	0.024 % + 20 µV	
(22 to 220) V	(20 to 40) Hz	0.0096 % + 20 µV	
(22 to 220) V	40 Hz to 20 kHz	0.0064 % + 20 µV	
(22 to 220) V	(20 to 50) kHz	0.0092 % + 20 µV	
(22 to 220) V	(50 to 100) kHz	0.017 % + 20 µV	
(22 to 220) V	(100 to 300) kHz	0.093 % + 20 µV	Where $V*F \leq 2.2*10^7$ V*Hz
(22 to 220) V	(300 to 500) kHz	0.44 % + 20 µV	Where $V*F \leq 2.2*10^7$ V*Hz
(22 to 220) V	500 kHz to 1 MHz	0.83 % + 20 µV	Where $V*F \leq 2.2*10^7$ V*Hz
(220 to 1100) V	(15 to 50) Hz	0.030 % + 20 µV	
(220 to 1100) V	50 Hz to 1 kHz	0.0078 % + 20 µV	
(220 to 1100) V	40 Hz to 1 kHz	0.012 % + 20 µV	
(220 to 1100) V	(1 to 20) kHz	0.018 % + 20 µV	
(220 to 1100) V	(20 to 30) kHz	0.061 % + 20 µV	
(220 to 750) V	(30 to 50) kHz	0.063 % + 20 µV	
(220 to 750) V	(50 to 100) kHz	0.23 % + 20 µV	

Parameter/Range	Frequency	CMC[2, 3, 4, 5, 6] (±)	Comments
AC Voltage – Generate (cont)			
(15 to 17) V	(45 to 65) Hz	0.0051 %	Fluke 6105A
(28 to 32) V	(45 to 65) Hz	0.0052 %	
(56 to 64) V	(45 to 65) Hz	0.0059 %	
(110 to 128) V	(45 to 65) Hz	0.0056 %	
(13 to 180) V	(45 to 65) Hz	0.0053 % + 1.6 mV	
(25 to 360) V	(45 to 65) Hz	0.0067 % + 3.2 mV	
(75 to 1008) V	(45 to 65) Hz	0.007 % + 10 mV	
AC Voltage – Measure			
(0 to 10) mV	(1 to 40) Hz	0.056 % + 13 µV	Agilent 3458A, opt 002 (2-year specifications)
(0 to 10) mV	40 Hz to 1 kHz	0.037 % + 11 µV	
(0 to 10) mV	(1 to 20) kHz	0.056 % + 11 µV	
(0 to 10) mV	(20 to 50) kHz	0.16 % + 11 µV	
(0 to 10) mV	(50 to 100) kHz	0.59 % + 11 µV	
(0 to 10) mV	(100 to 300) kHz	4.6 % + 12 µV	
(10 to 100) mV	(1 to 40) Hz	0.013 % + 5.1 µV	
(10 to 100) mV	40 Hz to 1 kHz	0.013 % + 2.8 µV	
(10 to 100) mV	(1 to 20) kHz	0.021 % + 2.8 µV	
(10 to 100) mV	(20 to 50) kHz	0.040 % + 2.8 µV	
(10 to 100) mV	(50 to 100) kHz	0.097 % + 2.8 µV	
(10 to 100) mV	(100 to 300) kHz	0.35 % + 12 µV	
(10 to 100) mV	300 kHz to 1 MHz	1.2 % + 12 µV	
(10 to 100) mV	(1 to 2) MHz	1.7 % + 12 µV	
100 mV to 1 V	(1 to 40) Hz	0.013 % + 51 µV	
100 mV to 1 V	40 Hz to 1 kHz	0.013 % + 28 µV	
100 mV to 1 V	(1 to 20) kHz	0.021 % + 28 µV	
100 mV to 1 V	(20 to 50) kHz	0.039 % + 28 µV	
100 mV to 1 V	(50 to 100) kHz	0.097 % + 28 µV	
100 mV to 1 V	(100 to 300) kHz	0.35 % + 0.12 mV	
100 mV to 1 V	300 kHz to 1 MHz	1.2 % + 0.12 mV	
100 mV to 1 V	(1 to 2) MHz	1.7 % + 0.12 mV	
(1 to 10) V	(1 to 40) Hz	0.013 % + 0.51 mV	
(1 to 10) V	40 Hz to 1 kHz	0.013 % + 0.28 mV	
(1 to 10) V	(1 to 20) kHz	0.021 % + 0.28 mV	
(1 to 10) V	(20 to 50) kHz	0.039 % + 0.28 mV	
(1 to 10) V	(50 to 100) kHz	0.097 % + 0.28 mV	
(1 to 10) V	(100 to 300) kHz	0.35 % + 1.2 mV	
(1 to 10) V	300 kHz to 1 MHz	1.2 % + 1.2 mV	

Parameter/Range	Frequency	CMC[2, 3, 4, 5, 6] (±)	Comments
AC Voltage – Measure (cont)			
(1 to 10) V	(1 to 2) MHz	1.7 % + 1.2 mV	Agilent 3458A, opt 002 (2-year specifications)
(10 to 100) V	(1 to 40) Hz	0.028 % + 5.1 mV	
(10 to 100) V	40 Hz to 1 kHz	0.028 % + 2.8 mV	
(10 to 100) V	(1 to 20) kHz	0.028 % + 2.8 mV	
(10 to 100) V	(20 to 50) kHz	0.045 % + 2.8 mV	
(10 to 100) V	(50 to 100) kHz	0.14 % + 2.8 mV	
(10 to 100) V	(100 to 300) kHz	0.47 % + 12 mV	
(10 to 100) V	300 kHz to 1 MHz	1.7 % + 12 mV	
(100 to 1000) V	(1 to 40) Hz	0.051 % + 51 mV	
(100 to 1000) V	40 Hz to 1 kHz	0.051 % + 28 mV	
(100 to 1000) V	(1 to 20) kHz	0.074 % + 28 mV	
(100 to 1000) V	(20 to 50) kHz	0.14 % + 28 mV	
(100 to 1000) V	(50 to 100) kHz	0.35 % + 28 mV	
AC Current – Generate			
(0 to 220) µA	(10 to 20) Hz	0.026 % + 16 nA	Fluke 5720A & Fluke 5725A
(0 to 220) µA	(20 to 40) Hz	0.017 % + 10 nA	
(0 to 220) µA	40 Hz to 1 kHz	0.014 % + 8.0 nA	
(0 to 220) µA	(1 to 5) kHz	0.033 % + 12 nA	
(0 to 220) µA	(5 to 10) kHz	0.11 % + 65 nA	
220 µA to 2.2 mA	(10 to 20) Hz	0.026 % + 40 nA	
220 µA to 2.2 mA	(20 to 40) Hz	0.017 % + 35 nA	
220 µA to 2.2 mA	40 Hz to 1 kHz	0.013 % + 35 nA	
220 µA to 2.2 mA	(1 to 5) kHz	0.022 % + 0.11 µA	
220 µA to 2.2 mA	(5 to 10) kHz	0.11 % + 0.65 µA	
(2.2 to 22) mA	(10 to 20) Hz	0.026 % + 0.4 µA	
(2.2 to 22) mA	(20 to 40) Hz	0.017 % + 0.35 µA	
(2.2 to 22) mA	40 Hz to 1 kHz	0.013 % + 0.35 µA	
(2.2 to 22) mA	(1 to 5) kHz	0.021 % + 0.55 µA	
(2.2 to 22) mA	(5 to 10) kHz	0.11 % + 5.0 µA	
(22 to 220) mA	(10 to 20) Hz	0.026 % + 4.0 µA	
(22 to 220) mA	(20 to 40) Hz	0.017 % + 3.5 µA	
(22 to 220) mA	40 Hz to 1 kHz	0.014 % + 2.5 µA	
(22 to 220) mA	(1 to 5) kHz	0.022 % + 3.5 µA	
(22 to 220) mA	(5 to 10) kHz	0.11 % + 10 µA	
220 mA to 2.2 A	20 Hz to 1 kHz	0.027 % + 35 µA	
220 mA to 2.2 A	(1 to 5) kHz	0.048 % + 80 µA	
220 mA to 2.2 A	(5 to 10) kHz	0.71 % + 0.16 mA	
(2.2 to 11) A	40 Hz to 1 kHz	0.049 % + 0.17 mA	
(2.2 to 11) A	(1 to 5) kHz	0.097 % + 0.38 mA	
(2.2 to 11) A	(5 to 10) kHz	0.36 % + 0.75 mA	

Parameter/Range	Frequency	CMC[2, 3, 4, 5, 6] (±)	Comments
AC Current – Generate (cont)			
(0.2 to 0.5) A	(45 to 65) Hz	0.0093 % + 3.0 µA	Fluke 6105A
(0.4 to 1) A	(45 to 65) Hz	0.012 % + 6.0 µA	
(0.8 to 2) A	(45 to 65) Hz	0.015 % + 12 µA	
(2 to 5) A	(45 to 65) Hz	0.018 % + 30 µA	
(4 to 10) A	(45 to 65) Hz	0.022 % + 60 µA	
AC Current – Measure			
(0 to 100) µA	(10 to 20) Hz	0.47 % + 35 nA	Agilent 3458A, opt 002 (2-year specifications)
(0 to 100) µA	(20 to 45) Hz	0.18 % + 35 nA	
(0 to 100) µA	(45 to 100) Hz	0.079 % + 35 nA	
(0 to 100) µA	100 Hz to 5 kHz	0.079 % + 35 nA	
100 µA to 1 mA	(10 to 20) Hz	0.47 % + 0.23 µA	
100 µA to 1 mA	(20 to 45) Hz	0.18 % + 0.23 µA	
100 µA to 1 mA	(45 to 100) Hz	0.079 % + 0.23 µA	
100 µA to 1 mA	100 Hz to 5 kHz	0.044 % + 0.23 µA	
100 µA to 1 mA	(5 to 20) kHz	0.079 % + 0.23 µA	
100 µA to 1 mA	(20 to 50) kHz	0.47 % + 0.46 µA	
100 µA to 1 mA	(50 to 100) kHz	0.64 % + 1.7 µA	
(1 to 10) mA	(10 to 20) Hz	0.47 % + 2.3 µA	
(1 to 10) mA	(20 to 45) Hz	0.18 % + 2.3 µA	
(1 to 10) mA	(45 to 100) Hz	0.079 % + 2.3 µA	
(1 to 10) mA	100 Hz to 5 kHz	0.044 % + 2.3 µA	
(1 to 10) mA	(5 to 20) kHz	0.079 % + 2.3 µA	
(1 to 10) mA	(20 to 50) kHz	0.47 % + 4.6 µA	
(1 to 10) mA	(50 to 100) kHz	0.64 % + 17 µA	
(10 to 100) mA	(10 to 20) Hz	0.47 % + 23 µA	
(10 to 100) mA	(20 to 45) Hz	0.18 % + 23 µA	
(10 to 100) mA	(45 to 100) Hz	0.079 % + 23 µA	
(10 to 100) mA	100 Hz to 5 kHz	0.044 % + 23 µA	
(10 to 100) mA	(5 to 20) kHz	0.079 % + 23 µA	
(10 to 100) mA	(20 to 50) kHz	0.47 % + 46 µA	
(10 to 100) mA	(50 to 100) kHz	0.64 % + 0.17 mA	
100 mA to 1 A	(10 to 20) Hz	0.47 % + 0.23 mA	
100 mA to 1 A	(20 to 45) Hz	0.19 % + 0.23 mA	
100 mA to 1 A	(45 to 100) Hz	0.10 % + 0.23 mA	
100 mA to 1 A	100 Hz to 5 kHz	0.13 % + 0.23 mA	
100 mA to 1 A	(5 to 20) kHz	0.36 % + 0.23 mA	
100 mA to 1 A	(20 to 50) kHz	1.2 % + 0.46 mA	

Parameter/Range	Frequency	CMC[2, 5, 6] (±)	Comments
AC Power – Generate PF = 1 (1 to 300) W (>300 to 1000) W (>1000 to 3000) W	 45 to 65 Hz 45 to 65 Hz 45 to 65 Hz	 77 µW/W 91 µW/W 0.10 mW/W	Fluke 6105A
AC Power – Measure PF = 1 (1 to 60) W (60 to 200) W (200 to 750) W (750 to 3000) W	 (45 to 66) Hz (45 to 66) Hz (45 to 66) Hz (45 to 66) Hz	 0.055 % 0.051 % 0.049 % 0.050 %	Yokogawa WT3000E precision power analyzer

II. Electrical – RF/Microwave

Parameter/Range	Frequency	CMC[2, 5, 6] (±)	Comments
RF Power – 1 mW Calibration Factor	100 kHz to 50 MHz 50 MHz to 1 GHz (1 to 2) GHz (2 to 4) GHz (4 to 6) GHz (6 to 12) GHz (12 to 18) GHz	0.60 % 0.59 % 0.60 % 0.62 % 0.63 % 0.81 % 1.7 %	Tegam F1130 transfer standard
RF Power – Generate & Measure 1 mW	100 kHz to 50 MHz 50 MHz 50 MHz to 1 GHz (1 to 2) GHz (2 to 4) GHz (4 to 6) GHz (6 to 12) GHz (12 to 18) GHz	0.60 % 0.59 % 0.59 % 0.60 % 0.62 % 0.63 % 0.81 % 1.7 %	Tegam F1130 transfer standard

Parameter/Range	Frequency	CMC[2, 5, 6] (±)	Comments
RF Power – Generate & Measure (cont)			
(0.1 to 10) W	100 kHz to 100 MHz	1.5 %	Directional coupler & N8482A
(0.1 to 10) W	100 MHz to 1 GHz	1.7 %	
(0.1 to 10) W	(1 to 6) GHz	1.7 %	
(10 to 100) W	100 kHz to 100 MHz	1.6 %	
(10 to 100) W	100 MHz to 1 GHz	1.8 %	
(10 to 100) W	(1 to 6) GHz	1.8 %	
(100 to 1000) W	100 kHz to 100 MHz	1.7 %	Directional Coupler & N8482H
(100 to 1000) W	100 MHz to 1 GHz	1.8 %	
(100 to 1000) W	(1 to 6) GHz	1.8 %	
1700 W	250 kHz to 5 MHz	0.41 %	Bird 6080 calorimeter, Yokogawa WT3000 power analyzer
	(10 to 15) MHz	0.41 %	
	(25 to 30) MHz	0.41 %	
	(35 to 65) MHz	0.41 %	
	(95 to 105) MHz	0.41 %	
	(150 to 170) MHz	0.41 %	
700 W	250 kHz to 5 MHz	0.42 %	Bird 6080 calorimeter, Yokogawa WT3000 power analyzer
	(10 to 15) MHz	0.42 %	
	(25 to 30) MHz	0.42 %	
	(35 to 65) MHz	0.42 %	
	(95 to 105) MHz	0.42 %	
	(150 to 170) MHz	0.42 %	
1700 Watts	0.33 to 0.5 MHz	0.21 %	Bird 6085b calorimeter, Yokogawa WT3000 power analyzer
	0.82 to 1.3 MHz	0.21 %	
	1.8 to 2.8 MHz	0.21 %	
	10 to 15 MHz	0.21 %	
	23 to 30 MHz	0.21 %	
	30 to 45 MHz	0.21 %	
	45 to 72 MHz	0.21 %	

Parameter/Range	Frequency	CMC[2, 6] (±)	Comments
RF Attenuation – Measure			
Magnitude:			
(0 to 10) dB	100 kHz to 100 MHz	0.023 dB	Rohde & Schwarz ZNB8, Keysight 85032F
(0 to 10) dB	100 MHz to 1 GHz	0.040 dB	
(0 to 10) dB	(1 to 8.5) GHz	0.031 dB	
(11 to 20) dB	100 kHz to 100 MHz	0.026 dB	
(11 to 20) dB	100 MHz to 1 GHz	0.039 dB	
(11 to 20) dB	(1 to 8.5) GHz	0.033 dB	
(21 to 30) dB	100 kHz to 100 MHz	0.029 dB	
(21 to 30) dB	100 MHz to 1 GHz	0.038 dB	
(21 to 30) dB	(1 to 8.5) GHz	0.037 dB	
(31 to 40) dB	100 kHz to 100 MHz	0.034 dB	
(31 to 40) dB	100 MHz to 1 GHz	0.043 dB	
(31 to 40) dB	(1 to 8.5) GHz	0.041 dB	
(41 to 50) dB	100 kHz to 100 MHz	0.040 dB	
(41 to 50) dB	100 MHz to 1 GHz	0.047 dB	
(41 to 50) dB	(1 to 8.5) GHz	0.047 dB	
(51 to 60) dB	100 kHz to 100 MHz	0.064 dB	
(51 to 60) dB	100 MHz to 1 GHz	0.067 dB	
(51 to 60) dB	(1 to 8.5) GHz	0.064 dB	
Phase:			
0 to 180°	0.1 kHz to 8.5 GHz	180°	If $U_{Mag} \geq \lvert\Gamma\rvert$,
0 to 180°	0.1 kHz to 8.5 GHz	$U_{Ph} = \arcsin(U_{Mag}/\lvert\Gamma\rvert) \times 180°/\pi$	If $U_{Mag} < \lvert\Gamma\rvert$, where: Γ: reflection magnitude U_{Mag}: magnitude uncertainty in linear units U_{Ph}: phase uncertainty in degrees

Parameter/Range	Frequency	CMC[2, 6] (±)	Comments
RF Reflection Coefficient – Measure			
Magnitude, Linear:			
0.0 to 0.2	100 kHz to 2 GHz (2 to 3) GHz (3 to 6) GHz (6 to 8.5) GHz	0.0042 0.0058 0.010 0.013	Rohde & Schwarz ZNB8, Keysight 85032F
>0.2 to 1	100 kHz to 2 GHz (2 to 3) GHz (3 to 6) GHz (6 to 8.5) GHz	0.0044 0.0062 0.0095 0.012	
Phase:			
0 to 180°	0.1 kHz to 8.5 GHz	180°	If $U_{Mag} \geq \|\Gamma\|$,
0 to 180°	0.1 kHz to 8.5 GHz	$U_{Ph} = \arcsin(U_{Mag}/\|\Gamma\|) \times 180°/\pi$	If $U_{Mag} < \|\Gamma\|$, where: Γ: reflection magnitude U_{Mag}: magnitude uncertainty in linear units U_{Ph}: phase uncertainty in degrees

III. Time & Frequency

Parameter/Range	Frequency	CMC[2, 6] (±)	Comments
Frequency – Measure & Measuring Equipment	10 Hz to 15 GHz	0.13 nHz/Hz + 74 µHz	Agilent 53230A counter, 910R GPS receiver, RF / function generator
Frequency – Time Base	10 MHz	3.5×10^{-12} Hz/Hz	Wavetek 910R GPS receiver

[1] This laboratory offers commercial 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] The measurands stated are generated with the Fluke 5720A series of instruments. This capability is suitable for the calibration of the devices intended to measure the stated measurand in the ranges indicated. CMC are expressed as either a specific value that covers the full range or as a fraction of the reading plus a fixed floor specification.

[4] The measurands stated are measured with the Agilent 3458A. This capability is suitable for the calibration of the devices intended to generate the measurand in the ranges indicated. CMC's 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.

[5] In the statement of CMC, uncertainties expressed as a percent are to be read as percent of reading unless otherwise indicated.

[6] 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.

[7] This scope meets A2LA's *P112 Flexible Scope Policy*.

Accredited Laboratory

A2LA has accredited

BIRD SERVICE CENTER

Solon, OH

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 7th day of February 2024.

Mr. Trace McInturff Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 2626.01
Valid to February 28, 2026

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