



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

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CALIBRATION

Valid To: November 30, 2023

Certificate Number: 5546.01

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory to perform the following calibrations^{1,4}:

I. Electrical DC/Low Frequency

Parameter/Equipment	Range	CMC ^{2,3} (±)	Comments
DC Voltage – Generate	(0 to 330) mV (0 to 3.3) V (0 to 33) V (33 to 330) V (100 to 1020) V	16 µV/V + 1 µV 9 µV/V + 2 µV 9.8 µV/V + 20 µV 14 µV/V + 150 µV 14 µV/V + 1500 µV	Fluke 5522A
DC Current – Generate	(0 to 330) mA (0 to 3.3) mA (0 to 33) mA (0 to 330) mA (0 to 1.1) A (1.1 to 2.9) A (0 to 11) A (11 to 20.5) A	0.12 mA/A + 0.02 µA 78 µA/A + 0.05 µA 78 µA/A + 0.25 µA 80 µA/A + 2.5 µA 160 µA/A + 40 µA 300 µA/A + 40 µA 390 µA/A + 500 µA 780 µA/A + 750 µA	Fluke 5522A

Parameter/Equipment	Range	CMC ^{2,3} (±)	Comments
Electrical Calibration of Thermocouple Indicators			
Type J	(-210 to -100) °C (-100 to -30) °C (-30 to 150) °C (150 to 760) °C (760 to 1200) °C	0.27 °C 0.17 °C 0.16 °C 0.18 °C 0.27 °C	Fluke 5522A
Type K	(-200 to -100) °C (-100 to -25) °C (-25 to 120) °C (120 to 1000) °C (1000 to 1372) °C	0.35 °C 0.22 °C 0.2 °C 0.27 °C 0.42 °C	
Type T	(-250 to -150) °C (-150 to 0) °C (0 to 120) °C (120 to 400) °C	0.64 °C 0.27 °C 0.2 °C 0.19 °C	
Resistance – Generate	(0 to 11) W (11 to 33) W (33 to 110) W 110 W to 1.1 kW (1.1 to 11) kW (11 to 110) kW 110 kW to 1.1 MW (1.1 to 3.3) MW (3.3 to 11) MW (11 to 33) MW (33 to 110) MW (110 to 330) MW (330 to 1100) MW	33 μΩ/Ω + 1 mΩ 25 μΩ/Ω + 1.5 mΩ 23 μΩ/Ω + 1.4 mΩ 23 μΩ/Ω + 2 mΩ 23 μΩ/Ω + 20 mΩ 23 μΩ/Ω + 0.2 mΩ 26 μΩ/Ω + 2 Ω 49 μΩ/Ω + 30 Ω 100 μΩ/Ω + 50 Ω 210 μΩ/Ω + 2.5 kΩ 400 μΩ/Ω + 3 kΩ 2300 μΩ/Ω + 100 kΩ 12 000 μΩ/Ω + 500 kΩ	Fluke 5522A

Parameter/Range	Frequency	CMC ^{2,3} (±)	Comments
AC Voltage – Measure			
(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	660 μV/V + 6 μV 160 μV/V + 6 μV 190 μV/V + 6 μV 800 μV/V + 6 μV 2700 μV/V + 12 μV 6300 μV/V + 50 μV	Fluke 5522A
(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	240 μV/V + 8 μV 120 μV/V + 8 μV 130 μV/V + 8 μV 280 μV/V + 8 μV 630 μV/V + 32 μV 1600 μV/V + 70 μV	
(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	240 μV/V + 50 μV 120 μV/V + 60 μV 150 μV/V + 60 μV 240 μV/V + 50 μV 550 μV/V + 130 μV 1900 μV/V + 0.6 mV	
(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	240 μV/V + 650 μV 120 μV/V + 600 μV 190 μV/V + 600 μV 280 μV/V + 600 μV 700 μV/V + 1.6 μV	
(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	160 μV/V + 2 mV 160 μV/V + 6 mV 200 μV/V + 6 mV 260 μV/V + 6 mV 1600 μV/V + 50 mV	
(330 to 1020) V	45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	240 μV/V + 10 mV 200 μV/V + 10 mV 240 μV/V + 10 mV	

Parameter/Range	Frequency	CMC ^{2,3} (±)	Comments
AC Current – Generate			
(0.03 to 0.33) 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	1600 µA/A + 0.1 µA 1200 µA/A + 0.1 µA 970 µA/A + 0.1 µA 2300 µA/A + 0.15 µA 6200 µA/A + 0.2 µA 12 mA/A + 0.4 µA	Fluke 5522A
(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	1600 µA/A + 0.15 µA 970 µA/A + 0.15 µA 780 µA/A + 0.15 µA 1600 µA/A + 0.2 µA 3900 µA/A + 0.3 µA 7800 µA/A + 0.6 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	1400 µA/A + 2 µA 700 µA/A + 2 µA 310 µA/A + 2 µA 620 µA/A + 2 µA 1600 µA/A + 3 µA 3100 µA/A + 4 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	1400 µA/A + 20 µA 700 µA/A + 20 µA 310 µA/A + 20 µA 780 µA/A + 50 µA 1600 µA/A + 100 µA 3100 µA/A + 200 µA	
(0.33 to 1.1) A	(10 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	1400 µA/A + 100 µA 410 µA/A + 100 µA 4700 µA/A + 1000 µA 19 mA/A + 5000 µA	
(1.1 to 3) A	(10 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	1400 µA/A + 100 µA 550 µA/A + 100 µA 0.47 mA/A + 0.1 mA 19 mA/A + 0.5 mA	
(3 to 11) A	(45 to 100) Hz 100 Hz to 1 kHz (1 to 5) kHz	0.53 mA/A + 0.2 mA 0.81 mA/A + 0.2 mA 23 mA/A + 0.2 mA	
(11 to 20.5) A	(45 to 100) Hz 100 Hz to 1 kHz (1 to 5) kHz	0.11 mA/A + 0.5 mA 0.13 mA/A + 0.5 mA 23 mA/A + 0.5 mA	

Parameter/Range	Frequency	CMC ^{2,3} (±)	Comments
<p>Capacitance – Generate</p> <p>(0.19 to 1.1) nF (1.1 to 3.3) nF (3.3 to 11) nF (11 to 110) nF (110 to 330) nF (0.33 to 1.1) μF (1.1 to 3.3) μF (3.3 to 11) μF (11 to 33) μF (33 to 110) μF (110 to 330) μF (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</p>	<p>10 Hz to 10 kHz 10 Hz to 3 kHz 10 Hz to 1 kHz 10 Hz to 1 kHz 10 Hz to 1 kHz (10 to 600) Hz (10 to 300) Hz (10 to 150) Hz (10 to 120) Hz (10 to 80) Hz (0 to 50) Hz (0 to 20) Hz (0 to 6) Hz (0 to 2) Hz (0 to 0.6) Hz (0 to 0.2) Hz</p>	<p>4400 μF/F + 0.01 nF 4100 μF/F + 0.01 nF 2100 μF/F + 0.01 nF 2000 μF/F + 0.1 nF 2100 μF/F + 0.3 nF 2100 μF/F + 1 nF 2000 μF/F + 3 nF 2100 μF/F + 10 nF 3200 μF/F + 30 nF 3700 μF/F + 100 nF 3700 μF/F + 300 nF 3800 μF/F + 1 μF 3500 μF/F + 3 μF 3700 μF/F + 10 μF 5900 μF/F + 30 μF 8900 μF/F + 100 μF</p>	Fluke 5522A
<p>Oscilloscopes</p> <p>Amplitude – DC 50 Ω 1 MΩ</p> <p>Amplitude – Square Wave 50 Ω @ 1kHz 1 MΩ @ 1kHz</p> <p>Leveled Sine Wave (ref 50 kHz)</p> <p>Amplitude (Absolute)</p> <p>Flatness (Relative to 50 kHz)</p> <p>Time Marker into 50Ω</p> <p>Rise Time – Generate</p>	<p>(0 to 6.6) V (0 to 130) V</p> <p>1 mV to 6.6 V (p-p) 1 mV to 130 V (p-p)</p> <p>50 kHz reference</p> <p>50 kHz to 100 MHz (100 to 300) MHz (300 to 600) MHz (600 to 1100) MHz</p> <p>50 kHz to 100 MHz (100 to 300) MHz (300 to 600) MHz (600 to 1100) MHz</p> <p>2 ns to 20 ms 50 ms to 5 s</p> <p>1 kHz to 2 MHz; (200 to 300) ps</p>	<p>0.32 % + 40 μV 0.33 % + 40 μV</p> <p>0.27 % + 40 μV 0.13 % + 40 μV</p> <p>2 % + 300 μV</p> <p>3.6 % + 300 μV 4.0 % + 300 μV 6.0 % + 300 μV 7.0 % + 300 μV</p> <p>1.9 % + 100 μV 2.2 % + 100 μV 3.5 % + 100 μV 4.2 % + 100 μV</p> <p>2.5 μs/s (1000t + 79) μs/s</p> <p>75 ps</p>	<p>Fluke 5522A</p> <p>t = time in seconds</p>

Parameter/Equipment	Range	CMC ^{2,3} (±)	Comments
DC Voltage – Measure (Opt. 002)	(0 to 100) mV 100 mV to 1 V (1 to 10) V (10 to 100) V 100 V to 1 kV	9.3 μV/V + 300 nV 6.6 μV/V + 300 nV 5.4 μV/V + 500 nV 7.5 μV/V + 30 μV 9.3 μV/V + 100 μV	HP 3458A OPT 002
DC Current – Measure	(0 to 100) nA 100 nA to 1 μA (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	280 μA/A + 40 pA 140 μA/A + 40 pA 24 μA/A + 100 pA 24 μA/A + 800 pA 25 μA/A + 5 nA 27 μA/A + 50 nA 47 μA/A + 500 nA 140 μA/A + 10 μA	HP 3458A OPT 002

Parameter/Range	Frequency	CMC ^{2,3} (±)	Comments
AC Voltage – Measure (1 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 (4 to 8) MHz	370 μV/V + 3 μV 260 μV/V + 1.1 μV 380 μV/V + 1.1 μV 1200 μV/V + 1.1 μV 5800 μV/V + 1.1 μV 47 000 μV/V + 2 μV 14 000 μV/V + 5 μV 82 000 μV/V + 7 μV 230 000 μV/V + 8 μV	HP 3458A OPT 002
(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 4) MHz (4 to 8) MHz (8 to 10) MHz	140 μV/V + 4 μV 93 μV/V + 2 μV 170 μV/V + 2 μV 350 μV/V + 2 μV 990 μV/V + 2 μV 3500 μV/V + 10 μV 12 000 μV/V + 10 μV 47 000 μV/V + 70 μV 47 000 μV/V + 80 μV 170 000 μV/V + 100 μV	

Parameter/Range	Frequency	CMC ^{2,3} (±)	Comments
AC Voltage – Measure (cont)			
100 mV to 1 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 300 kHz to 1 MHz (1 to 4) MHz (4 to 8) MHz (8 to 10) MHz	83 µV/V + 40 µV 92 µV/V + 20 µV 170 µV/V + 20 µV 370 µV/V + 20 µV 950 µV/V + 20 µV 3.5 mV/V + 0.1 mV 12 mV/V + 0.1 mV 46 mV/V + 0.7 mV 47 mV/V + 0.8 mV 180 mV/V + 1 mV	HP 3458A OPT 002
(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 300 kHz to 1 MHz (1 to 4) MHz (4 to 8) MHz (8 to 10) MHz	99 µV/V + 400 µV 91 µV/V + 200 µV 170 µV/V + 200 µV 370 µV/V + 200 µV 940 µV/V + 200 µV 3.5 mV/V + 1 mV 12 mV/V + 1 mV 46 mV/V + 7 mV 46 mV/V + 8 mV 170 mV/V + 10 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 300 kHz to 1 MHz	0.23 mV/V + 4 mV 0.23 mV/V + 2 mV 0.24 mV/V + 2 mV 0.41 mV/V + 2 mV 1.4 mV/V + 2 mV 4.6 mV/V + 10 mV 17 mV/V + 10 mV	
(100 to 700) V	(1 to 40) Hz 40 Hz to 1 kHz (1 to 20) kHz (20 to 50) kHz (50 to 100) kHz	0.46 mV/V + 40 mV 0.47 mV/V + 20 mV 0.69 mV/V + 20 mV 1.4 mV/V + 20 mV 3.4 mV/V + 20 mV	

Parameter/Range	Frequency	CMC ^{2,3} (±)	Comments
AC Current – Measure			
(5 to 100) μA	(10 to 20) Hz (20 to 45) Hz (45 to 100) Hz 100 Hz to 5 kHz	4700 μA/A + 30 nA 1900 μA/A + 30 nA 1000 μA/A + 30 nA 1000 μA/A + 30 nA	HP 3458A OPT 002
100 μA to 1.0 mA	(10 to 20) Hz (20 to 45) Hz (45 to 100) Hz 100 Hz to 5 kHz (5 to 20) kHz (20 to 50) kHz (50 to 100) kHz	4600 μA/A + 200 nA 1700 μA/A + 200 nA 710 μA/A + 200 nA 390 μA/A + 200 nA 690 μA/A + 200 nA 4600 μA/A + 400 nA 6400 μA/A + 1.5 μA	
(1 to 10) mA	(10 to 20) Hz (20 to 45) Hz (45 to 100) Hz 100 Hz to 5 kHz (5 to 20) kHz (20 to 50) kHz (50 to 100) kHz	4600 μA/A + 2 μA 1700 μA/A + 2 μA 700 μA/A + 2 μA 370 μA/A + 2 μA 690 μA/A + 2 μA 4600 μA/A + 4 μA 6400 μA/A + 15 μA	
(10 to 100) mA	(10 to 20) Hz (20 to 45) Hz (45 to 100) Hz 100 Hz to 5 kHz (5 to 20) kHz (20 to 50) kHz (50 to 100) kHz	4600 μA/A + 20 μA 1700 μA/A + 20 μA 700 μA/A + 20 μA 370 μA/A + 20 μA 690 μA/A + 20 μA 4600 μA/A + 40 μA 6400 μA/A + 150 μA	
100 mA to 1.0 A	(10 to 20) Hz (20 to 45) Hz (45 to 100) Hz 100 Hz to 5 kHz (5 to 20) kHz (20 to 50) kHz	4600 μA/A + 200 μA 1860 μA/A + 200 μA 950 μA/A + 200 μA 1200 μA/A + 200 μA 3500 μA/A + 200 μA 12 000 μA/A + 400 μA	

Parameter/Equipment	Range	CMC ^{2,3} (±)	Comments
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	21 μΩ/Ω + 50 μΩ 18 μΩ/Ω + 500 μΩ 14 μΩ/Ω + 500 μΩ 14 μΩ/Ω + 5 mΩ 14 μΩ/Ω + 50 mΩ 19 μΩ/Ω + 2 Ω 62 μΩ/Ω + 100 Ω 610 μΩ/Ω + 1 kΩ 5800 μΩ/Ω + 10 kΩ	HP 3458A OPT 002

II. Electrical – RF/Microwave

Parameter/Range	Frequency	CMC ^{2,3} (±)	Comments
RF Power – Generate			
>10 dBm (10 to -10) dBm (-10 to -60) dBm <-60 dBm	< 2 GHz	1.6 dB 0.5 dB 0.7 dB 1.1 dB	HP 86350B
>10 dBm (10 to -10) dBm (-10 to -60) dBm <-60 dBm	(2 to 2) GHz	1.7 dB 0.6 dB 0.8 dB 1.4 dB	
(10 to -10) dBm (-10 to -60) dBm <-60 dBm	(>20 to 40) GHz	0.8 dB 1.0 dB 1.4 dB	
(10 to -10) dBm (-10 to -60) dBm <-60 dBm	(40 to 50) GHz	1.4 dB 1.6 dB	
Power Flatness	15 MHz to 2 GHz (2.05 to 20) GHz (20.05 to 40) GHz (40.05 to 50) GHz	0.4 dB 0.5 dB 0.7 dB 1.3 dB	
AM Source Rate: 10 MHz to 50 GHz (0 to 100) %	DC to 100 kHz	5.0 %	

Parameter/Range	Frequency	CMC ^{2,3} (±)	Comments
RF Power – Generate (cont) FM Source Rate: 1 MHz External Modulation Rate 10 MHz/B Sensitivity	40 MHz to 50 GHz	8.0 %	HP 86350B
RF Power – Measure (- 60 to -30) dBm (-30 to -20) dBm (-20 to -10) dBm (-10 to 0) dBm (0 to 10) dBm (10 to 20) dBm (- 60 to -30) dBm (-30 to -20) dBm (-20 to -10) dBm (-10 to 0) dBm (0 to 10) dBm (10 to 20) dBm (- 60 to -30) dBm (-30 to -20) dBm (-20 to -10) dBm (-10 to 0) dBm (0 to 10) dBm (10 to 20) dBm (- 60 to -30) dBm (-30 to -20) dBm (-20 to -10) dBm (-10 to 0) dBm (0 to 10) dBm (10 to 20) dBm	(9 to 100) kHz 100 kHz to 500 MHz 500 MHz to 1.2 GHz (1.2 to 6) GHz (6 to 14) GHz	2.1 dB 0.16 dB 0.14 dB 0.13 dB 0.13 dB 0.13 dB 2.1 dB 0.15 dB 0.15 dB 0.15 dB 0.13 dB 0.13 dB 2.1 dB 0.16 dB 0.14 dB 0.13 dB 0.13 dB 0.13 dB 2.1 dB 0.14 dB 0.14 dB 0.13 dB 0.13 dB 0.13 dB	E4419B & E9304-H18

Parameter/Range	Frequency	CMC ^{2,3} (±)	Comments
RF Power – Measure (cont)			
(- 60 to -30) dBm	(14 to 18) GHz	2.1 dB	E4419B & E9304-H18
(-30 to -20) dBm		0.14 dB	
(-20 to -10) dBm		0.14 dB	
(-10 to 0) dBm		0.13 dB	
(0 to 10) dBm		0.13 dB	
(10 to 20) dBm		0.13 dB	
(-20 to -10) dBm	<2 GHz	0.29 dB	E4419B & 84787 ^a
(-10 to 0) dBm		0.08 dB	
(0 to 10) dBm		0.16 dB	
(10 to 20) dBm		0.13 dB	
(-20 to -10) dBm	(2 to 18) GHz	0.16 dB	
(-10 to 0) dBm		0.1 dB	
(0 to 10) dBm		0.11 dB	
(10 to 20) dBm		0.18 dB	
(-20 to -10) dBm	(26.5 to 33) GHz	0.14 dB	
(-10 to 0) dBm		0.13 dB	
(0 to 10) dBm		0.19 dB	
(10 to 20) dBm		0.19 dB	
(-20 to -10) dBm	(33 to 40) GHz	0.18 dB	
(-10 to 0) dBm		0.18 dB	
(0 to 10) dBm		0.22 dB	
(10 to 20) dBm		0.22 dB	
(-20 to -10) dBm	(40 to 45) GHz	0.21 dB	
(-10 to 0) dBm		0.21 dB	
(0 to 10) dBm		0.25 dB	
(10 to 20) dBm		0.25 dB	
(-20 to -10) dBm	(45 to 50) GHz	0.21 dB	
(-10 to 0) dBm		0.21 dB	
(0 to 10) dBm		0.25 dB	
(10 to 20) dBm		0.25 dB	

Parameter/Range	Frequency	CMC ^{2,3} (±)	Comments
Phase Modulation – Measure Rate: 200 Hz to 10 kHz (w/11722A)	150 kHz to 10 MHz	5.0 %	8902B w/ 11722A & 11792A
Rate: 200 Hz to 20 kHz (w/11722A)	10 MHz to 1.3 GHz	3.8 %	
Rate: 200 Hz to 20 kHz (w/11792A)	(1.3 to 26.5) GHz	3.8 %	
RF Power – Measure (30 to -20) dBm w/11722A w/11792A	100 kHz to 2.6 GHz (2 to 26.5) GHz	0.072 dBm 0.077 dBm	8902B w/ 11722A & 11792A
RF Attenuation/ Insertion Loss – (0 to -10) dBm w/11722A w/11792A	2.5 MHz to 1.3 GHz (1.3 to 26.5) GHz	0.0027 dB 0.0027 dB	8902B w/ 11722A & 11792A
(-10 to -40) dBm w/11722A w/11792A	2.5 MHz to 1.3 GHz (1.3 to 26.5) GHz	0.088 dB 0.088 dB	
(-40 to -50) dBm w/11722A w/11792A	2.5 MHz to 1.3 GHz (1.3 to 26.5) GHz	0.18 dB 0.18 dB	
(-50 to -80) dBm w/11722A w/11792A	2.5 MHz to 1.3 GHz (1.3 to 26.5) GHz	0.18 dB 0.18 dB	
(-80 to -90) dBm w/11722A w/11792A	2.5 MHz to 1.3 GHz (1.3 to 26.5) GHz	0.29 dB 0.29 dB	
(-90 to -110) dBm w/11722A w/11792A	2.5 MHz to 1.3 GHz (1.3 to 26.5) GHz	0.32 dB 0.32 dB	
(-110 to -127) dBm w/11722A w/11792A	2.5 MHz to 1.3 GHz (1.3 to 26.5) GHz	0.49 dB 0.49 dB	

Parameter/Range	Frequency	CMC ^{2,3} (±)	Comments
Amplitude Modulation – Measure			
Depths (5 to 99) %			
Rate: 50 Hz to 10 kHz (w/11722A)	150 kHz to 10 MHz	2.5 %	8902B w/ 11722A & 11792A
Rate: 20 Hz to 10 kHz (w/11722A)	150 kHz to 10 MHz	3.7 %	
Rate: 50 Hz to 50 kHz (w/11722A)	10 MHz to 1.3 GHz	1.3 %	
Rate: 20 Hz to 100 kHz (w/11722A)	10 MHz to 1.3 GHz	3.7 %	
Rate: 50 Hz to 50 kHz (w/11792A)	(1.3 to 26.5) GHz	1.3 %	
Rate: 20 Hz to 100 kHz (w/11792A)	(1.3 to 26.5) GHz	3.7 %	
Frequency Modulation – Measure			
Deviation: ≤ 40 kHz Peak			8902B w/ 11722A & 11792A
Rate: 20 Hz to 10 kHz (w/11722A)	150 kHz to 10 MHz	2.5 %	
Deviation: ≤ 400 kHz Peak			
Rate: 50 Hz to 100 kHz (w/11722A)	10 MHz to 1.3 GHz	1.3 %	
Rate: 20 Hz to 200 kHz (w/11722A)	10 MHz to 1.3 GHz	6.2 %	
Rate: 50 Hz to 100 kHz (w/11792A)	(1.3 to 26.5) GHz	1.3 %	
Rate: 20 Hz to 200 kHz (w/11792A)	(1.3 to 26.5) GHz	6.2 %	

III. Time & Frequency

Parameter/Equipment	Range	CMC ^{2,3} (±)	Comments
Frequency – Generate	0.01 Hz to 2 MHz	4 µHz/Hz + 5 µHz	Fluke 5522A
Frequency – Measure	(1 to 40) Hz 40 Hz to 10 MHz	0.05 % 120 µHz /Hz	HP 3458A OPT 002

¹ This laboratory offers commercial calibration service 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 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.

⁴ This scope meets A2LA's *PI12 Flexible Scope Policy*.



Accredited Laboratory

A2LA has accredited

TEST AND MEASUREMENT PARTS, DBA TOP DOG TEST

Hayward, CA

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 29th day of November 2021.

A blue ink signature of the Vice President of Accreditation Services.

Vice President, Accreditation Services
For the Accreditation Council
Certificate 5546.01
Valid to November 30, 2023

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