



SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005
& ANSI/NCSL Z540-1-1994

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CALIBRATION

Valid until: March 31, 2018

Certificate Number: 3270.01

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory to perform the following calibrations¹:

I. Electrical – DC/Low Frequency

Parameter/Equipment	Range	CMC ^{2,4} (±)	Comments
DC Voltage ³ – Generate	(0 to 329.999) mV (0.33 to 3.299999) V (3.3 to 32.99999) V (33 to 329.9999) V (0.1 to 1) kV	16 µV/V + 0.81 µV 8.6 µV/V + 2.8 µV 7.6 µV/V + 0.10 mV 14 µV/V + 0.33 mV 12 µV/V + 4.3 mV	Fluke 5520A
DC Voltage ³ – Measure	(0 to 100) mV (0.1 to 1) V (1 to 10) V (10 to 100) V (0.1 to 1) kV	6.9 µV/V + 0.55 µV 6.8 µV/V + 0.49 µV 6.9 µV/V + 0.7 µV 9.1 µV/V + 49 µV 24 µV/V + 0.85 mV	Agilent 3458A/002
DC High Voltage ³ – Measure	(1 to 4) kV (4 to 30) kV	0.12 % + 1.1 V 0.13 % + 6.5 V	Ross Eng. VD30-8.3- A-K-AAA & Fluke 87 III

Parameter/Equipment	Range	CMC ^{2,4} (±)	Comments
DC Current ³ – Measure	(0 to 100) nA (0.1 to 1) μA (1 to 10) μA (10 to 100) μA (0.1 to 1) mA (1 to 10) mA (10 to 100) mA (0.1 to 1) A	21 μA/A + 0.093 nA 17 μA/A + 0.10 nA 27 μA/A + 0.15 nA 28 μA/A + 1.0 nA 30 μA/A + 6.5 nA 29 μA/A + 64 nA 43 μA/A + 1.0 μA 0.014 % + 12 μA	Agilent 3458A/002
DC Current ³ – Generate	(0 to 329.999) μA (0.33 to 3.29999) mA (3.3 to 32.9999) mA (33 to 329.999) mA (0.33 to 1.09999) A (1.1 to 2.99999) A (3 to 10.99999) A (11 to 20.5) A	0.017 % + 17 nA 65 μA/A + 95 nA 70 μA/A + 0.51 μA 78 μA/A + 2.5 μA 0.015 % + 33 μA 0.011 mA/A + 1.2 mA 0.39 mA/A + 0.43 mA 0.78 mA/A + 0.63 mA	Fluke 5520A
DC High Current ³ – Measure	(0 to 15) A (1 to 100) A	0.20 μA/A + 16 mA 0.68 mA/A + 0.26 A	Agilent 3458A/002 w/ L&N 15A Shunt w/ Weston 100A Shunt
DC Power ³ – Generate (33 mV to 1020 V) 329.99 mA range 2.9999 A range 20.5 A range	(0.01 to 330) W 330 W to 3 kW (3 to 20.9) kW	0.023 % + 0.58 mW 0.046 % + 0.077 W 0.092 % + 0.50 W	Fluke 5520A
Resistance ³ – Generate Fixed Point (Four-Terminal Pair)	0.1 Ω 1 Ω 10 Ω 100 Ω 1 kΩ 10 kΩ 100 kΩ	0.57 mΩ 1.2 mΩ 4.2 mΩ 35 mΩ 0.35 Ω 3.5 Ω 35 Ω	Hewlett Packard 16074A

Parameter/Equipment	Range	CMC ^{2,4} (±)	Comments
DC Resistance ³ – Generate	(0 to 10.9999) Ω (11 to 32.9999) Ω (33 to 109.9999) Ω (110 to 329.9999) Ω (0.33 to 1.099999) kΩ (1.1 to 3.299999) kΩ (3.3 to 10.99999) kΩ (11 to 32.9999) kΩ (33 to 109.9999) kΩ (110 to 329.9999) kΩ (0.33 to 1.099999) MΩ (1.1 to 3.299999) MΩ (3.3 to 10.99999) MΩ (11 to 32.9999) MΩ (33 to 109.9999) MΩ (110 to 329.9999) MΩ (330 to 1100) MΩ	32 μΩ/Ω + 0.78 mΩ 23 μΩ/Ω + 0.12 mΩ 23 μΩ/Ω + 0.77 mΩ 23 μΩ/Ω + 2.5 mΩ 23 μΩ/Ω + 8.0 mΩ 24 μΩ/Ω + 26 mΩ 24 μΩ/Ω + 77 mΩ 25 μΩ/Ω + 0.28 Ω 24 μΩ/Ω + 0.78 Ω 26 μΩ/Ω + 3.0 Ω 26 μΩ/Ω + 0.90 Ω 49 μΩ/Ω + 52 Ω 0.011 % + 0.34 kΩ 0.021 % + 2.3 kΩ 0.040 % + 14 kΩ 0.24 % + 0.26 MΩ 1.2 % + 4.7 MΩ	Fluke 5520A
DC Resistance ³ – Measure	(0 to 10) Ω (10 to 100) Ω (100 to 1000) Ω (1 to 10) kΩ (10 to 100) kΩ (0.1 to 1) MΩ (1 to 10) MΩ (10 to 100) MΩ (100 to 1) GΩ	21 μΩ/Ω + 62 μΩ 17 μΩ/Ω + 0.61 mΩ 15 μΩ/Ω + 0.64 mΩ 15 μΩ/Ω + 6.7 mΩ 15 μΩ/Ω + 0.10 Ω 20 μΩ/Ω + 3.3 Ω 59 μΩ/Ω + 0.15 kΩ 0.06 % + 3.5 kΩ 0.57 % + 0.045 MΩ	Agilent 3458A/002
Capacitance ³ – Generate	(0.19 to 0.3999) nF (0.4 to 1.0999) nF (1.1 to 3.2999) nF (3.3 to 10.9999) nF (11 to 32.9999) nF (33 to 109.999) nF (110 to 329.999) nF (0.33 to 1.09999) μF (1.1 to 3.29999) μF (3.3 to 10.9999) μF (11 to 32.9999) μF (33 to 109.999) μF (110 to 329.999) μF (0.33 to 1.09999) mF (1.1 to 3.29999) mF (3.3 to 10.9999) mF (11 to 32.9999) mF (33 to 109.999) mF	0.57 % + 0.010 nF 0.57 % + 0.010 nF 0.58 % + 0.010 nF 0.29 % + 0.010 nF 0.29 % + 0.12 nF 0.29 % + 0.12 nF 0.30 % + 0.33 nF 0.32 % + 1.0 nF 0.29 % + 3.5 nF 0.39 % + 5.3 nF 0.47 % + 35 nF 0.57 % + 84 nF 0.53 % + 0.34 μF 0.49 % + 1.5 μF 0.52 % + 3.6 μF 0.53 % + 11 μF 0.87 % + 35 μF 1.3 % + 0.12 mF	Fluke 5520A

Parameter/Equipment	Range	CMC ² (±)	Comments
Electrical Simulation of Thermocouples ³ – Generate			
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 0.19 °C 0.17 °C 0.19 °C 0.29 °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	0.32 °C 0.19 °C 0.17 °C 0.20 °C 0.29 °C	
Type K	(-200 to -100) °C (-100 to -25) °C (-25 to 120) °C (120 to 1000) °C (1000 to 1372) °C	0.39 °C 0.21 °C 0.19 °C 0.33 °C 0.49 °C	
Type T	(-250 to -150) °C (-150 to 0) °C (0 to 120) °C (120 to 400) °C	0.74 °C 0.28 °C 0.19 °C 0.17 °C	
Type B	(600 to 800) °C (800 to 1000) °C (1000 to 1550) °C (1550 to 1820) °C	0.52 °C 0.43 °C 0.41 °C 0.46 °C	
Type C	(0 to 150) °C (150 to 650) °C (650 to 1000) °C (1000 to 1800) °C (1800 to 2316) °C	0.36 °C 0.31 °C 0.40 °C 0.59 °C 0.99 °C	
Type R	(0 to 250) °C (250 to 400) °C (400 to 1000) °C (1000 to 1767) °C	0.67 °C 0.41 °C 0.43 °C 0.49 °C	
Type S	(0 to 250) °C (250 to 1000) °C (1000 to 1400) °C (1400 to 1767) °C	0.56 °C 0.44 °C 0.46 °C 0.55 °C	

Parameter/Equipment	Range	CMC ^{2,4} (±)	Comments
Electrical Simulation of Thermocouples ³ – Generate (cont)			
Type L	(-200 to -100) °C (-100 to 800) °C (800 to 900) °C	0.44 °C 0.31 °C 0.20 °C	Fluke 5520A
Type N	(-200 to -100) °C (-100 to -25) °C (-25 to 120) °C (120 to 410) °C (410 to 1300) °C	0.47 °C 0.26 °C 0.22 °C 0.21 °C 0.32 °C	
AC Voltage ³ – Generate			
(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	0.081 % + 5.6 μV 0.029 % + 5.1 μV 0.033 % + 5.8 μV 0.096 % + 8.2 μV 0.31 % + 15 μV 0.75 % + 50 μV	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	0.031 % + 15 μV 0.014 % + 11 μV 0.015 % + 14 μV 0.030 % + 22 μV 0.071 % + 52 μV 0.18 % + 0.13 mV	
(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	0.030 % + 0.12 mV 0.017 % + 0.09 mV 0.025 % + 0.14 mV 0.058 % + 0.16 mV 0.21 % + 0.34 mV 0.21 % + 1.5 mV	
(3.3 to 33) V	(10 to 45) Hz (0.045 to 10) kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz	0.030 % + 1.3 mV 0.014 % + 0.87 mV 0.021 % + 1.4 mV 0.029 % + 1.8 mV 0.075 % + 4.8 mV	

Parameter/Range	Frequency	CMC ^{2,4} (±)	Comments
AC Voltage ³ – Generate (cont)			
(33 to 330) V	(0.045 to 1) kHz (1 to 10) kHz (10 to 20) kHz (20 to 50) kHz (50 to 100) kHz	0.016 % + 6.6 mV 0.018 % + 9.9 mV 0.022 % + 17 mV 0.27 % + 18 mV 0.17 % + 93 mV	Fluke 5520A
(330 to 1020) V	(0.045 to 1) kHz (1 to 5) kHz (5 to 10) kHz	0.026 % + 86 mV 0.022 % + 79 mV 0.026 % + 86 mV	
AC Voltage ³ – 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	0.035 % + 3.6 μV 0.023 % + 1.3 μV 0.040 % + 1.5 μV 0.12 % + 1.4 μV 0.60 % + 1.4 μV 4.7 % + 2.4 μV	Agilent 3458A/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 (0.3 to 1) MHz (1 to 2) MHz	88 μV/V + 5.1 μV 74 μV/V + 3.3 μV 0.015 % + 3.4 μV 0.039 % + 2.6 μV 0.090 % + 4.3 μV 0.34 % + 13 μV 1.1 % + 23 μV 1.8 % + 0.020 mV	
(0.1 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 (0.3 to 1) MHz (1 to 2) MHz (2 to 4) MHz (4 to 8) MHz (8 to 10) MHz	90 μV/V + .050 mV 78 μV/V + 27 μV 0.020 % + 27 μV 0.030 % + 27 μV 0.090 % + 25 μV 0.30 % + 0.12 mV 1.2 % + 0.1 mV 1.8 % + 0.13 mV 4.6 % + 0.90 mV 0.17 μV/V + 0.12 mV 0.17 μV/V + 0.12 mV	

Parameter/Range	Frequency	CMC ^{2,4} (±)	Comments
AC Voltage ³ – Measure (cont)			
(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 (1 to 2) MHz (2 to 4) MHz (4 to 8) MHz (8 to 10) MHz	60 μV/V + 0.90 mV 76 μV/V + 0.30 mV 0.016 % + 0.30 mV 0.034 % + 0.34 mV 0.092 % + 0.28 mV 0.34 % + 1.3 mV 1.1 % + 1.2 mV 4.6 % + 8.4 mV 4.6 % + 8.4 mV 4.7 % + 10 mV 0.18 μV/V + 12 mV	Agilent 3458A/002
(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	0.024 % + 4.8 mV 0.015 % + 16 mV 0.014 % + 17 mV 0.036 % + 8.2 mV 0.14 % + 2.6 mV 0.47 % + 12 mV 1.8 % + 12 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	0.047 % + 48 mV 0.046 % + 25 mV 0.069 % + 25 mV 0.15 % + 24 mV 0.35 % + 24 mV	
AC High Voltage ³ – Measure			
(1 to 4) kV	60 Hz	0.010 kV/kV + 2.1 V	Ross Eng. VD30-8.3- A-K-AAA & Fluke 87 III
(4 to 30) kV	60 Hz	1.1 % + 0.64 V	

Parameter/Range	Frequency	CMC ^{2,4} (±)	Comments
AC Current ³ – Generate			
(29 to 330) µA	(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	0.19 % + 0.13 µA 0.15 % + 0.12 µA 0.13 % + 0.11 µA 0.28 % + 0.19 µA 0.67 % + 0.35 µA 1.3 % + 0.68 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 % + 0.70 µA 0.10 % + 0.60 µA 0.083 % + 0.55 µA 0.17 % + 3.1 µA 0.40 % + 1.6 µA 0.80 % + 3.2 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	0.15 % + 7.5 µA 0.077 % + 5.7 µA 0.039 % + 4.8 µA 0.070 % + 5.9 µA 0.17 % + 8.8 µA 0.33 % + 16 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	0.15 % + 76 µA 0.077 % + 57 µA 0.039 % + 47 µA 0.091 % + 81 µA 0.19 % + 0.16 mA 0.38 % + 0.38 mA	
(.33 to 1.09999)A	(10 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	0.15 % + 0.55 mA 0.048 % + 0.23 mA 0.55 % + 2.4 mA 2.4 % + 11 mA	
(1.1 to 2.99999)A	(10 to 45) Hz 45 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	0.15 % + 1.9 mA 0.050 % + 1.1 mA 0.50 % + 6.0 mA 2.1 % + 26 mA	
(3 to 10.99999) A	(45 to 100) Hz (0.1 to 1) kHz (1 to 5) kHz	0.070 % + 3.2 mA 0.12 % + 3 mA 3.5 % + 2.4 mA	
(11 to 20.5) A	(45 to 100) Hz (0.1 to 1) kHz (1 to 5) kHz	0.14 % + 6.6 mA 0.2 % + 6.5 mA 3.5 % + 6.0 mA	

Parameter/Range	Frequency	CMC ^{2,4} (±)	Comments
AC Current ³ – Measure			
(10 to 100) µA	(10 to 20) Hz (20 to 45) Hz (45 to 100) Hz 100 Hz to 1 kHz	0.46 % + 36 nA 0.18 % + 35 nA 0.074 % + 35 nA 0.074 % + 35nA	Agilent 3458A/002
(0.1 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	0.49 % + 0.31 µA 0.20 % + 1.7 µA 0.093 % + 1.4 µA 0.056 % + 2.7 µA 0.093 % + 1.8 µA 0.50 % + 0.4 µA 0.83 % + 0.33 µA	
(0.1 to 1) 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	0.46 % + 0.30 mA 0.19 % + 0.24 mA 0.10 % + 0.24 mA 0.11 % + 0.25 mA 0.35 % + 0.25 mA 1.2 % + 0.50 mA	
AC Power ³ – Generate			
(45 to 65) Hz PF = 1			Fluke 5520A
330 mV range (to 20.5 A)	0.01 W to 6.5 kW	0.18 %	
1020 V range (to 20.5 A)	0.01 W to 20.9 kW	0.16 %	
Phase ³ – Generate			
(-179.99 to 179.99) (ΔΦ°)			Fluke 5520A
V vs. V	(1 to 65) Hz (65 to 500) Hz 500 Hz to 1 kHz (1 to 5) kHz	0.13° 0.29° 0.58° 2.9°	
V vs. I	(1 to 65) Hz (65 to 500) Hz 500 Hz to 1 kHz (1 to 5) kHz	0.13° 0.31° 0.58° 2.9°	

Parameter/Equipment	Range	CMC ^{2,4} (±)	Comments
Oscilloscopes ³ –			
Level Sine Amp. 50 kHz Ref.	5 mV to 5.5 V	2.6 % + 0.30 μV	Fluke 5520A/ SC1100
Level Sine Amp. 5 mV to 5.5 V (Relative to 50 kHz Reference)	50 kHz to 100 MHz (100 to 300) MHz (300 to 600) MHz (600 to 1100) MHz	1.9 % + 0.11 mV 2.5 % + 0.12 mV 4.7 % + 0.12 mV 5.8 % + 0.12 mV	
Square Wave Amp. Into 1 MΩ Load Into 50 Ω Load	1 mV to 130 V 1 mV to 6.6 V	0.14 % + 48 μV 0.38 % + 47 μV	
DC Level	Up to 130 V Up to 6.6 V	0.067 % + 47 μV 0.32 % + 46 μV	
Time Marker Output into 50 Ω	1 ns to 20 ms 50 ms to 5 s	0.10 % + 2.1 ps 0.59 %	
Edge Transition Time	1 kHz to 10 MHz	120 ps	

II. Electrical – RF/Microwave

Parameter/Equipment	Range	CMC ^{2,4} (±)	Comments
Power Meter ³ – Power Reference @ 50 MHz	1 mW	3.6 μW	HP 432A, 478A H75 & 3458A DMM
Power Meter ³ – Range Calibration	3 μW 10 μW 30 μW 100 μW 300 μW 1 mW 3 mW 10 mW 30 mW 100 mW	21 nW 19 nW 21 nW 77 nW 0.11 μW 0.29 μW 0.64 μW 6.4 μW 13 μW 0.10 mW	HP 11683A/H01 & Fluke 5520A Calibrator

Parameter/Range	Frequency	CMC ^{2,4} (±)	Comments
RF Power ³ – Generate			
(-36 to 0) dBm (0 to 10) dBm (10 to 20) dBm	At 1 kHz	7.9 mV _{rms} 22 mV _{rms} 73 mV _{rms}	Agilent 33250A
(-36 to 0) dBm (0 to 10) dBm (10 to 20) dBm	1 kHz to 10 MHz (relative to 1 kHz)	0.11 dB 0.17 dB 0.17 dB	
(-36 to 0) dBm (0 to 10) dBm (10 to 20) dBm	(10 to 50) MHz (relative to 1 kHz)	0.21 dB 0.25 dB 0.25 dB	
(-36 to 0) dBm (0 to 10) dBm (10 to 20) dBm	(50 to 80) MHz (relative to 1 kHz)	0.49 dB 0.51 dB 0.51 dB	
(-20 to -10) dBm (-10 to 10) dBm	<2 GHz	1.0 dB 0.74 dB	Agilent 83650B
(-20 to -10) dBm (-10 to 10) dBm	(2 to 18) GHz	1.2 dB 0.83 dB	
RF Absolute Power ³ – Measure			
(-50 to -20) dBm (-20 to -10) dBm (-10 to 0) dBm (0 to 10) dBm (10 to 20) dBm	9 kHz to 6 GHz	3.6 % 3.1 % 2.2 % 2.2 % 2.2 %	Agilent E9304A w/ Power Meter
(-20 to -10) dBm (-10 to 0) dBm (0 to 10) dBm (10 to 20) dBm	100 kHz to 4.2 GHz	1.1 % 1.1 % 3.2 % 3.2 %	Agilent 8482A w/ Power Meter
(-20 to -10) dBm (-10 to 0) dBm (0 to 10) dBm (10 to 20) dBm	10 MHz to 18 GHz	1.1 % 1.1 % 3.2 % 3.2 %	Agilent 8481A w/ Power Meter

Parameter/Range	Frequency	CMC ^{2,4} (±)	Comments
Power Sensor Calibration Factor – Measure 10 μW to 10 mW	100 kHz 300 kHz 500 kHz 1 MHz (3 to 5) MHz (10 to 50) MHz 100 MHz 300 MHz 500 MHz 1 GHz (1.5 to 2.5) GHz (3.5 to 4.2) GHz	2.0 % CF 1.1 % CF 0.96 % CF 0.91 % CF 0.89 % CF 0.87 % CF 0.88% CF 0.93 % CF 0.94 % CF 0.96 % CF 1.0 % CF 1.1 % CF	Direct Comparison Transfer Method Agilent 8482A/H84
Power Sensor Calibration Factor – Measure (cont'd)	10 MHz 30 MHz 50 MHz 100 MHz (300 to 800) MHz 1 GHz (1.2 to 1.5) GHz 2 GHz 3 GHz 4 GHz 5 GHz 6 GHz 7 GHz 8 GHz 9 GHz 10 GHz 11 GHz 12 GHz 12.4 GHz 13 GHz 14 GHz 15 GHz 16 GHz 17 GHz 18 GHz	1.2 % CF 0.91 % CF 0.89 % CF 0.87 % CF 0.93 % CF 0.94 % CF 0.93 % CF 0.94 % CF 0.95 % CF 0.97 % CF 1.0 % CF 1.1 % CF 1.2 % CF 1.3 % CF 1.7 % CF 1.8 % CF 1.5 % CF 1.4 % CF 1.6 % CF 2.0 % CF 2.3 % CF 1.6 % CF 1.6 % CF 2.6 % CF 2.5 % CF	Agilent 8481A/H84

III. Mechanical

Parameter/Equipment	Range	CMC ^{2,4} (±)	Comments
Pressure ³	(0 to 600) psi (>600 to 3000) psi	0.0060 % + 0.70 psi 0.12 % + 0.022 psi	Ametek 3KPSIXP2I w/ Ashcroft 1327D
	(0 to 2000) psi (>2000 to 10 000) psi	0.0076 % + 2.3 psi 0.13 % + 3.1 psi	Ametek 10KPSIXP2I w/ Ashcroft 1327D
Torque	(25 to 250) lbf·in.	0.58 % + 0.17 lbf·in.	Mountz BMX250i w/ FTA100

IV. Thermodynamics

Parameter/Equipment	Range	CMC ^{2,4} (±)	Comments
Temperature – Measuring Equipment	(-15 to 0) °C (>0 to 95) °C	0.019 °C 0.0049 % + 0.27 °C	Burns Eng. 12005 SSPRT w/ Agilent 3458A DMM & temperature bath
Temperature ³ – Measure	(-196 to 0) °C (>0 to 420) °C	0.0052 % + 0.018 °C 0.27 °C	Burns Eng. 12005 SSPRT w/ Agilent 3458A DMM
Relative Humidity – Measuring Equipment	11 % RH	1.2 % RH (absolute)	Humidity Calibrator w/ Vaisala MI70/HMP77B
	75 % RH	1.4 % RH (absolute)	
	90 % RH	2.2 % RH (absolute)	
	97 % RH	1.7 % RH (absolute)	Vaisala HMK Salt System
(30 to 70) % RH	0.0023 % RH / % RH + 1.2 % RH (absolute)	Chamber w/ Vaisala MI70/HMP77B	
(70 to 90) % RH	0.0069 % RH / % RH + 1.4 % RH (absolute)		

Parameter/Equipment	Range	CMC ² (±)	Comments
Relative Humidity ³ – Measure	(11 to 90) %RH	0.0022 % RH / % RH + 1.2 % RH (absolute)	Vaisala MI70/HMP77B

V. Time & Frequency

Parameter/Equipment	Range	CMC ^{2,4} (±)	Comments
Frequency Reference	10 MHz	5 parts in 10 ¹² Hz	Datum GPS
Frequency ³ – Measuring Equipment	1 mHz to 80 MHz	0.0072 μHz/Hz + 4.7 μHz	Agilent 33250A w/GPS
	10 MHz to 50 GHz	0.58 Hz	Agilent 83650B w/GPS
Frequency ³ – Measure	0.1 Hz to 225 MHz	0.00032 μHz/Hz + 5.4 μHz	Agilent 53132A w/GPS
	100 MHz to 3 GHz	74 mHz	
	(10 to 525) MHz 500 MHz to 26.5 GHz	0.58 Hz 0.86 Hz	Agilent 5351B w/GPS
Time Interval ³	50 ns to 999 s	5 parts in 10 ¹² + 1 ns	Agilent 53132A w/GPS
Period ³	4.44 ns to 10 s	14 μs/s + 0.70 μs	Agilent 53132A w/GPS

Parameter/Equipment	Range	CMC ^{2,4} (±)	Comments
Rise/Fall Time ³ – Measure	> 2 ns	0.93 ns	Tektronix TDS744A
Pulse Width ³ – Measure	> 5 ns	1.9 ns	Agilent 53132A
Stop Watches ³ – Totalize Method	1s to 24 hrs	0.13 s	Agilent 53132A, 33250A w/GPS

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 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.

⁴ In the statement of CMC, percentages are to be read as percent of reading unless otherwise noted.