



SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005
ANSI/NCSL Z540-1-1994 & ANSI/NCSL Z540.3-2006

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CALIBRATION

Valid To: March 31, 2017

Certificate Number: 2516.02

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

I. Chemical

Parameter/Equipment	Range	CMC ² (±)	Comments
pH – Measuring Equipment ³	(4, 7, 10) units	0.016 units	Buffer solutions
Electrolytic Conductivity – Measuring Equipment ^{3, 8}	≈10 μS/cm ≈100 μS/cm ≈1000 μS/cm ≈10 000 μS/cm	0.53 μS/cm 2.4 μS/cm 23 μS/cm 0.23 mS/cm	Conductivity solutions

II. Dimensional

Parameter/Equipment	Range	CMC ^{2, 4} (±)	Comments
Angle – Measuring Equipment ⁸	Up to 60°	2.5”	Gage blocks & sine bar
Bore Gages, Bore Micrometers & Holtests ³	(0.075 to 6) in	19 μin/in + 0.6R	Master rings

Parameter/Equipment	Range	CMC ^{2,4} (±)	Comments
Coordinate Measuring Machines ³ –			ASME B89.4.10360.2-2008
Repeatability	Sphere	23 μin	Sphere
Linear Accuracy	Up to 24 in	1.4 μin/in + 71 μin	Step gage
Squareness	Up to 24 in	31 μin	Ball bar
Volumetric Performance	24 in	140 μin	Ball bar
Diameter, External - Plain	Up to 8 in	5.9 μin/in + 9.1 μin	ULM
Diameter, Internal – Plain Ring Gages	(0.5 to 8) in	5.9 μin/in + 16 μin	ULM, rings
Hand Tools ^{3,8} – Indicators, Micrometers, Depth Gages, Height Gages, Calipers	Up to 1 in (1 to 6) in (1 to 20) in (1 to 20) in (1 to 20) in (1 to 20) in	2.9 μin/in + 8.1 μin	Gage blocks
Flatness ⁸	3”	6.8 μin	Optical flat
Height Master ³ – Micrometer Head Block Pitch	Up to 1 in Up to 24 in	2.4 μin/in + 15 μin 14 μin + 0.6R	Gage blocks
Length Standards	Up to 20 in	5.9 μin/in + 8.1 μin	ULM/gage blocks
Optical Comparators ³ –			
Linear Travel	Up to 30 in	130 μin	Glass scales and balls
Magnification	10x to 100x	0.12 %	
Steel Rules	(6 to 24) in	0.0011 in	Gage blocks, loupe

Parameter/Equipment	Range	CMC ^{2,4} (±)	Comments
Steel Tapes ³	Up to 30 ft	0.11 in	Master tapes
Surface Plates ³	Up to 170 in diagonal	1.5D μin	Laser
Thread Gauging, External –			ULM w/
Plug Gages, Discs Major Diameter	Up to 1 in (>1 to 8) in	5.9 μin/in + 9.1 μin	Gage blocks
Pitch Diameter Up to 8 in	29° 55° 60°	6.1 μin/in + 72 μin 6.1 μin/in + 81 μin 6 μin/in + 120 μin	Master wires
National Pipe (NPT) Pitch Diameter	Up to 3 in	14 μin/in + 72 μin	Measuring wires
Step	Up to 4 in	41 μin	Gage blocks
Thread Gauging, Internal –			
Pitch Diameter (0.1 to 12) in fixed	7/45°, 55°, 60°	2.2 μin/in + 70 μin	T-ball measurements ULM

III. Electrical – DC/Low Frequency

Parameter/Equipment	Range	CMC ^{2,5} (±)	Comments
DC Voltage ³ – Generate	Up 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	7.1 μV/V + 0.40 μV 3.7 μV/V + 0.80 μV 4.9 μV/V + 3.0 μV 4.9 μV/V + 4.3 μV 3.7 μV/V + 48 μV 4.7 μV/V + 0.48 mV	Fluke 5720A

Parameter/Equipment	Range	CMC ² (±)	Comments
DC Voltage – Measure	Up to 100 mV (0.1 to 1) V (1 to 10) V (10 to 100) V (100 to 1000) V	9.5 μV/V + 0.37 μV 6.1 μV/V + 0.37 μV 5.8 μV/V + 0.60 μV 8.7 μV/V + 37 μV 8.7 μV/V + 0.12 mV	Agilent 3458A
DC Voltage ^{3,8} – Generate, Fixed Points	1 V 10 V	1.2 μV/V 0.77 μV/V	Fluke 732B w/ Agilent 3458A
DC High Voltage ³ – Measure	(1 to 6) kV (6 to 20) kV (20 to 35) kV (35 to 40) kV	1.1 % 2.1 % 1.1 % 2.1 %	Fluke 80K series probe & DMM
DC Current ³ – Generate	Up to 200 pA (0.2 to 200) nA Up to 220 μA (0.22 to 2.2) mA (2.2 to 22) mA (22 to 220) mA (0.22 to 2.2) A (2.2 to 11) A (11 to 20.5) A (20.5 to 150) A (150 to 1000) A (2 to 20) A (20 to 120) A 120 A to 5 kA	1.9 % + 13 fA 0.35 % + 13 fA 35 μA/A + 6.0 nA 31 μA/A + 7.0 nA 30 μA/A + 41 nA 41 μA/A + 0.71 μA 77 μA/A + 12 μA 0.034 % + 0.48 mA 0.10 % + 0.91 A 0.58 % + 0.16 A 0.60 % + 0.58 A 0.04 % 0.06 % 0.9 %	Keithley 617 & voltage source Fluke 5720A Fluke 5520A Fluke 5520A w/ coil Fluke 5522A w/ 52120A w/ coil

Parameter/Equipment	Range	CMC ² (±)	Comments
DC Current ³ – Measure	Up to 200 pA (0.2 to 200) nA	1.9 % + 13 fA 0.35 % + 13 fA	Keithley 617
	Up to 100 µA (0.1 to 1) mA (1 to 10) mA (10 to 100) mA (0.1 to 1) A	17 µA/A + 0.80 nA 17 µA/A + 5.0 nA 17 µA/A + 50 nA 31 µA/A + 0.50 µA 0.010 % + 10 µA	Agilent 3458A
	(1 to 10) A (10 to 100) A (30 to 300) A (300 to 1200) A	0.31 mA 33 µA/A 0.010 % 0.05 %	w/ L&N 4222 w/ L&N 4361 w/ L&N 4363 w/ RAM shunt
Resistance ³ – Generate	Up 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 32.99999) kΩ (33 to 109.999) kΩ (110 to 329.999) kΩ	40 µΩ/Ω + 1.0 mΩ 30 µΩ/Ω + 2.0 mΩ 28 µΩ/Ω + 2.0 mΩ 28 µΩ/Ω + 4.0 mΩ 28 µΩ/Ω + 13 mΩ 28 µΩ/Ω + 13 mΩ 28 µΩ/Ω + 30 mΩ 28 µΩ/Ω + 0.30 Ω 28 µΩ/Ω + 0.30 Ω 32 µΩ/Ω + 2.0 Ω	Fluke 5520A, 4-wire
	(0.33 to 1.09999) MΩ (1.1 to 3.29900) MΩ (3.3 to 10.9999) MΩ (11 to 32.9999) MΩ (33 to 109.9999) MΩ (110 to 329.9999) MΩ (330 to 1100) MΩ	32 µΩ/Ω + 2.2 Ω 60 µΩ/Ω + 39 Ω 0.013 % + 63 Ω 0.025 % + 2.5 kΩ 0.050 % + 3.0 kΩ 0.30 % + 0.10 MΩ 1.5 % + 0.50 MΩ	Fluke 5520A, 2-wire
Fixed Points	0 Ω 1 Ω 1.9 Ω 10, 19 Ω 100, 190 Ω 1, 1.9 kΩ 10, 19 kΩ 100, 190 kΩ 1 MΩ 1.9 MΩ 10 MΩ 19 MΩ 100 MΩ	41 µΩ 81 µΩ/Ω 82 µΩ/Ω 23 µΩ/Ω 9.5 µΩ/Ω 8.5 µΩ/Ω 8.5 µΩ/Ω 11 µΩ/Ω 20 µΩ/Ω 30 µΩ/Ω 35 µΩ/Ω 45 µΩ/Ω 0.010 %	Fluke 5720A

Parameter/Equipment	Range	CMC ^{2,7} (\pm)	Comments	
Resistance ³ – Generate, Fixed Points (cont)	0.05 m Ω	0.30 %	Shunt	
	0.1 m Ω	0.29 %		
	1 m Ω	90 $\mu\Omega/\Omega$	Standard resistors	
	10 m Ω	94 $\mu\Omega/\Omega$		
	100 m Ω	85 $\mu\Omega/\Omega$		
	1.0 Ω	2.5 $\mu\Omega/\Omega$		
	(1.9, 10, 100) Ω	2.3 $\mu\Omega/\Omega$		
	1 k Ω	3.2 $\mu\Omega/\Omega$		
	10 k Ω	2.4 $\mu\Omega/\Omega$		
	19 k Ω	5.0 $\mu\Omega/\Omega$		
	100 k Ω	5.6 $\mu\Omega/\Omega$		
	1 M Ω	11 $\mu\Omega/\Omega$		
	10 M Ω	31 $\mu\Omega/\Omega$		
	19 M Ω	41 $\mu\Omega/\Omega$		
Resistance ³ – Measure	Up to 10 Ω	18 $\mu\Omega/\Omega$ + 58 $\mu\Omega$	Agilent 3458A	
	(10 to 100) Ω	12 $\mu\Omega/\Omega$ + 0.58 m Ω		
	(100 to 1000) Ω	9.5 $\mu\Omega/\Omega$ + 5.8 m Ω		
	(1 to 10) k Ω	9.5 $\mu\Omega/\Omega$ + 58 m Ω		
	(10 to 100) k Ω	9.7 $\mu\Omega/\Omega$ + 0.58 Ω		
	(100 to 1000) k Ω	15 $\mu\Omega/\Omega$ + 2.3 Ω		
	(1 to 10) M Ω	58 $\mu\Omega/\Omega$ + 0.12 k Ω		
	(10 to 100) M Ω	0.058 % + 1.2 k Ω		
	(0.1 to 1) G Ω	0.59 % + 12 k Ω		
	(0.1 to 1) Ω	61 $\mu\Omega/\Omega$		Current source: Fluke 5720A calibrator DMM, Agilent 3458A
	(1 to 1.9) Ω	17 $\mu\Omega/\Omega$		
	(1.9 to 10) Ω	13 $\mu\Omega/\Omega$		
	(10 to 100) Ω	14 $\mu\Omega/\Omega$		
	(0.1 to 1) k Ω	14 $\mu\Omega/\Omega$		
	(1 to 10) k Ω	4.9 $\mu\Omega/\Omega$		
	(10 to 19) k Ω	4.9 $\mu\Omega/\Omega$		
	(19 to 100) k Ω	4.9 $\mu\Omega/\Omega$		
	(0.1 to 1) M Ω	7.5 $\mu\Omega/\Omega$		
	(1 to 10) M Ω	10 $\mu\Omega/\Omega$		
	(10 to 19) M Ω	13 $\mu\Omega/\Omega$		
	(19 to 100) M Ω	22 $\mu\Omega/\Omega$		

Parameter/Equipment	Range	CMC ² (±)	Comments
Thermocouple ³ – Indicating Systems & Measure			
Type B	(600 to 800) °C (800 to 1550) °C (1550 to 1820) °C	0.35 °C 0.28 °C 0.22 °C	Fluke 7526A
Type C	(0 to 1000) °C (1000 to 1800) °C (1800 to 2000) °C (2000 to 2316) °C	0.16 °C 0.23 °C 0.26 °C 0.35 °C	
Type E	(-250 to -200) °C (-200 to -100) °C (-100 to 0) °C (0 to 600) °C (600 to 1000) °C	0.25 °C 0.12 °C 0.09 °C 0.08 °C 0.1 °C	
Type J	(-210 to -100) °C (-100 to 800) °C (800 to 1200) °C	0.14 °C 0.09 °C 0.1 °C	
Type K	(-250 to -200) °C (-200 to -100) °C (-100 to 500) °C (500 to 800) °C (800 to 1372) °C	0.46 °C 0.16 °C 0.1 °C 0.1 °C 0.13 °C	
Type L	(-200 to -100) °C (-100 to 900) °C	0.1 °C 0.09 °C	
Type N	(-250 to -200) °C (-200 to -100) °C (-100 to 0) °C (0 to 100) °C (100 to 800) °C (800 to 1300) °C	0.73 °C 0.23 °C 0.12 °C 0.11 °C 0.1 °C 0.12 °C	

Parameter/Equipment	Range	CMC ² (±)	Comments
Thermocouple ³ – Indicating Systems & Measure (cont)			
Type R	(-50 to -25) °C (-25 to 0) °C (0 to 100) °C (100 to 400) °C (400 to 600) °C (600 to 1000) °C (1000 to 1600) °C (1600 to 1767) °C	0.55 °C 0.45 °C 0.39 °C 0.28 °C 0.22 °C 0.21 °C 0.19 °C 0.23 °C	Fluke 7526A
Type S	(-50 to -25) °C (-25 to 0) °C (0 to 100) °C (100 to 400) °C (400 to 600) °C (600 to 1000) °C (1000 to 1600) °C (1600 to 1767) °C	0.51 °C 0.43 °C 0.38 °C 0.29 °C 0.23 °C 0.22 °C 0.22 °C 0.26 °C	
Type T	(-250 to -200) °C (-200 to -100) °C (-100 to 0) °C (0 to 200) °C (200 to 400) °C	0.35 °C 0.16 °C 0.11 °C 0.09 °C 0.09 °C	
Type U	(-200 to 0) °C (0 to 200) °C (200 to 600) °C	0.16 °C 0.1 °C 0.1 °C	

Parameter/Equipment	Range	CMC ² (±)	Comments
Electrical Calibration of RTDs ³ – Generate			
Pt 385, 100 Ω	(-200 to -80) °C (-80 to 100) °C (100 to 300) °C (300 to 400) °C (400 to 600) °C (600 to 800) °C	0.013 °C 0.02 °C 0.024 °C 0.026 °C 0.033 °C 0.038 °C	Fluke 7526A
Pt 3926, 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	0.013 °C 0.015 °C 0.017 °C 0.022 °C 0.026 °C 0.032 °C	
Pt 3916, 100 Ω	(-200 to -190) °C (-190 to -80) °C (-80 to 0) °C (0 to 100) °C (100 to 300) °C (300 to 400) °C (400 to 600) °C (600 to 630) °C	0.01 °C 0.013 °C 0.015 °C 0.017 °C 0.022 °C 0.026 °C 0.031 °C 0.033 °C	
Pt 385, 200 Ω	(-200 to -80) °C (-80 to 0) °C (0 to 100) °C (100 to 260) °C (260 to 300) °C (300 to 400) °C (400 to 630) °C	0.053 °C 0.056 °C 0.06 °C 0.06 °C 0.069 °C 0.071 °C 0.088 °C	
Pt 385, 500 Ω	(-200 to 0) °C (0 to 100) °C (100 to 300) °C (300 to 400) °C (400 to 630) °C	0.026 °C 0.028 °C 0.034 °C 0.038 °C 0.045 °C	
Pt 385, 1000 Ω	(-200 to 0) °C (0 to 100) °C (100 to 300) °C (300 to 400) °C (400 to 630) °C	0.015 °C 0.018 °C 0.024 °C 0.026 °C 0.033 °C	

Parameter/Equipment	Range	CMC ² (±)	Comments
Electrical Calibration of RTDs ³ – Generate (cont)			
Ni 385, 120 Ω	(-80 to 260) °C	0.009 °C	Fluke 7526A
Cu 427, 10 Ω	(-100 to 260) °C	0.11 °C	
SPRT	(-200 to 660) °C	0.06 °C	
Electrical Calibration of RTDs – Generate & Measure	(-200 to 850) °C	0.13 % + 0.6R	Agilent 3458A

Parameter/Range	Frequency	CMC ^{2,5} (±)	Comments
AC Voltage ³ – Generate			
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 500 kHz to 1 MHz	0.022 % + 4.0 μV 85 μV/V + 4.0 μV 75 μV/V + 4.0 μV 0.018 % + 4.0 μV 0.046 % + 5.0 μV 0.090 % + 10 μV 0.12 % + 20 μV 0.25 % + 20 μV	Fluke 5720A
(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	0.022 % + 4.0 μV 85 μV/V + 4.0 μV 75 μV/V + 4.0 μV 0.018 % + 4.0 μV 0.046 % + 5.0 μV 0.090 % + 10 μV 0.12 % + 20 μV 0.25 % + 20 μV	

Parameter/Range	Frequency	CMC ^{2,5} (±)	Comments
AC Voltage ³ – Generate (cont)			
(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 500 kHz to 1 MHz	0.022 % + 12 μV 85 μV/V + 7.0 μV 75 μV/V + 7.0 μV 0.018 % + 7.0 μV 0.042 % + 17 μV 0.075 % + 20 μV 0.12 % + 25 μV 0.25 % + 45 μV	Fluke 5720A
220 mV 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 500 kHz to 1 MHz	0.022 % + 40 μV 85 μV/V + 15 μV 40 μV/V + 8.0 μV 70 μV/V + 10 μV 0.011 % + 30 μV 0.034 % + 80 μV 0.090 % + 0.20 mV 0.15 % + 0.30 mV	
(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 500 kHz to 1 MHz	0.022 % + 0.40 mV 80 μV/V + 0.15 mV 40 μV/V + 50 μV 70 μV/V + 0.10 mV 95 μV/V + 0.20 mV 0.026 % + 0.60 mV 0.090 % + 2.0 mV 0.13 % + 3.2 mV	

Parameter/Range	Frequency	CMC ^{2,5} (±)	Comments
AC Voltage ³ – Generate (cont)			
(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 500 kHz to 1 MHz	0.022 % + 4.0 mV 80 μV/V + 1.5 mV 47 μV/V + 0.60 mV 75 μV/V + 1.0 mV 0.013 % + 2.5 mV 0.080 % + 16 mV 0.42 % + 40 mV 0.70 % + 80 mV	Fluke 5720A
(220 to 250) V	(15 to 50) Hz 50 Hz to 1 kHz	0.035 % + 30 mV 90 μV/V + 6 mV	
(220 to 1100) V	40 Hz to 1 kHz (1 to 20) kHz (20 to 30) kHz	80 μV/V + 4.0 mV 0.013 % + 6.0 mV 0.036 % + 11 mV	w/ 5725A amplifier
(220 to 750) V	(30 to 50) kHz (50 to 100) kHz	0.036 % + 11 mV 0.13 % + 45 mV	
AC Voltage – Measure			
(0.7 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	0.15 % 0.066 % 0.038 % 0.073 % 0.14 % 0.27 % 0.30 % 0.50 %	Fluke 5790A
(2.2 to 7) 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	0.061 % 0.018 % 0.013 % 0.025 % 0.052 % 0.10 % 0.15 % 0.29 %	

Parameter/Range	Frequency	CMC ^{2,5} (±)	Comments
AC Voltage – Measure (cont)			Fluke 5790A
(7 to 22) mV	(10 to 20) Hz	0.032 %	
	(20 to 40) Hz	0.018 %	
	40 Hz to 20 kHz	0.016 %	
	(20 to 50) kHz	0.022 %	
	(50 to 100) kHz	0.049 %	
	(100 to 300) kHz	0.099 %	
	(300 to 500) kHz	0.14 %	
	(0.5 to 1) MHz	0.29 %	
(22 to 70) mV	(9.5 to 10) Hz	0.26 %	
	(10 to 20) Hz	0.027 %	
	(20 to 40) Hz	0.013 %	
	40 Hz to 20 kHz	0.012 %	
	(20 to 50) kHz	0.019 %	
	(50 to 100) kHz	0.044 %	
	(100 to 300) kHz	0.078 %	
	(300 to 500) kHz	0.12 %	
(70 to 220) mV	(9.5 to 10) Hz	0.26 %	
	(10 to 20) Hz	0.025 %	
	(20 to 40) Hz	0.010 %	
	40 Hz to 20 kHz	0.008 %	
	(20 to 50) kHz	0.018 %	
	(50 to 100) kHz	0.043 %	
	(100 to 300) kHz	0.076 %	
	(300 to 500) kHz	0.12 %	
(220 to 700) mV	(9.5 to 10) Hz	0.55 %	
	(10 to 20) Hz	0.025 %	
	(20 to 40) Hz	0.009 %	
	40 Hz to 20 kHz	0.005 %	
	(20 to 50) kHz	0.008 %	
	(50 to 100) kHz	0.011 %	
	(100 to 300) kHz	0.035 %	
	(300 to 500) kHz	0.091 %	
(0.5 to 1) MHz	0.55 %		

Parameter/Range	Frequency	CMC ^{2,5} (±)	Comments
AC Voltage – Measure (cont)			
700 mV to 2.2 V	(9.5 to 10) Hz	0.55 %	Fluke 5790A
	(10 to 20) Hz	0.024 %	
	(20 to 40) Hz	0.009 %	
	40 Hz to 20 kHz	0.005 %	
	(20 to 50) kHz	0.008 %	
	(50 to 100) kHz	0.012 %	
	(100 to 300) kHz	0.036 %	
	(300 to 500) kHz	0.092 %	
(0.5 to 1) MHz	0.55 %		
(2.2 to 7) V	(9.5 to 10) Hz	0.14 %	
	(10 to 20) Hz	0.024 %	
	(20 to 40) Hz	0.009 %	
	40 Hz to 20 kHz	0.004 %	
	(20 to 50) kHz	0.008 %	
	(50 to 100) kHz	0.011 %	
	(100 to 300) kHz	0.033 %	
	(300 to 500) kHz	0.095 %	
(0.5 to 1) MHz	0.14 %		
(7 to 22) V	(9.5 to 10) Hz	0.15 %	
	(10 to 20) Hz	0.024 %	
	(20 to 40) Hz	0.009 %	
	40 Hz to 20 kHz	0.004 %	
	(20 to 50) kHz	0.008 %	
	(50 to 100) kHz	0.012 %	
	(100 to 300) kHz	0.034 %	
	(300 to 500) kHz	0.095 %	
(0.5 to 1) MHz	0.16 %		
(22 to 70) V	(10 to 20) Hz	0.024 %	
	(20 to 40) Hz	0.009 %	
	40 Hz to 20 kHz	0.005 %	
	(20 to 50) kHz	0.008 %	
	(50 to 100) kHz	0.015 %	
	(100 to 300) kHz	0.081 %	
	(300 to 500) kHz	0.42 %	
	(0.5 to 1) MHz	0.70 %	

Parameter/Range	Frequency	CMC ^{2,5} (±)	Comments	
AC Voltage – Measure (cont)				
(70 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	0.029 % 0.010 % 0.005 % 0.009 % 0.016 % 0.082 % 0.42 %	Fluke 5790A	
(220 to 700) V	(20 to 40) Hz 40 Hz to 20 kHz (20 to 50) kHz (50 to 100) kHz	0.027 % 0.013 % 0.041 % 0.14 %		
(700 to 1000) V	(20 to 40) Hz 40 Hz to 20 kHz (20 to 50) kHz	0.028 % 0.013 % 0.039 %		
AC Flatness ³ – @ 50 Ω				
(0.5 to 1.77) mV _{RMS}	10 Hz to 50 kHz 50 kHz to 1 MHz (1 to 10) MHz (10 to 30) MHz	0.092 % 0.21 % 0.27 % 0.27 %		Fluke 5790A
(1.77 to 2.655) mV _{RMS}	10 Hz to 50 kHz 50 kHz to 1 MHz (1 to 10) MHz (10 to 30) MHz	0.092 % 0.21 % 0.27 % 0.27 %		
(2.655 to 3.54) mV _{RMS}	10 Hz to 50 kHz 50 kHz to 1 MHz (1 to 10) MHz (10 to 30) MHz	0.095 % 0.21 % 0.28 % 0.27 %		
(3.54 to 8.85) mV _{RMS}	10 Hz to 50 kHz 50 kHz to 1 MHz (1 to 10) MHz (10 to 30) MHz	0.092 % 0.21 % 0.27 % 0.27 %		

Parameter/Range	Frequency	CMC ^{2,5} (±)	Comments
AC Flatness ³ (cont) –			
(8.85 to 14.16) mV _{RMS}	10 Hz to 50 kHz 50 kHz to 1 MHz (1 to 10) MHz (10 to 30) MHz	0.092 % 0.21 % 0.26 % 0.26 %	Fluke 5790A
(14.16 to 24.78) mV _{RMS}	10 Hz to 50 kHz 50 kHz to 1 MHz (1 to 10) MHz (10 to 30) MHz	0.092 % 0.21 % 0.26 % 0.26 %	
(24.78 to 35.4) mV _{RMS}	10 Hz to 50 kHz 50 kHz to 1 MHz (1 to 10) MHz (10 to 30) MHz	0.095 % 0.21 % 0.26 % 0.26 %	
(35.4 to 88.5) mV _{RMS}	10 Hz to 50 kHz 50 kHz to 1 MHz (1 to 10) MHz (10 to 30) MHz	0.092 % 0.21 % 0.26 % 0.26 %	
(88.5 to 141.6) mV _{RMS}	10 Hz to 50 kHz 50 kHz to 1 MHz (1 to 10) MHz (10 to 30) MHz	0.093 % 0.21 % 0.23 % 0.23 %	
(141.6 to 283.2) mV _{RMS}	10 Hz to 50 kHz 50 kHz to 1 MHz (1 to 10) MHz (10 to 30) MHz	0.092 % 0.19 % 0.23 % 0.23 %	
(283.2 to 424.8) mV _{RMS}	10 Hz to 50 kHz 50 kHz to 1 MHz (1 to 10) MHz (10 to 30) MHz	0.092 % 0.19 % 0.23 % 0.23 %	
(0.4248 to 1.204 V _{RMS}	10 Hz to 50 kHz 50 kHz to 1 MHz (1 to 10) MHz (10 to 30) MHz	0.092 % 0.19 % 0.22 % 0.22 %	
(1.204 to 1.947) V _{RMS}	10 Hz to 50 kHz 50 kHz to 1 MHz (1 to 10) MHz (10 to 30) MHz	0.092 % 0.19 % 0.22 % 0.22 %	

Parameter/Range	Frequency	CMC ^{2,5} (±)	Comments
AC High Voltage ³ – Measure			
(1 to 4.2) kV	60 Hz (0 to 500) Hz (500 to 1000) Hz	1.7 % 3.1 % 3.7 %	Fluke 80K series probe & DMM
(4.2 to 28) kV	60 Hz	5.9 %	
AC Current ³ – Generate			
Up to 220 µA	(10 to 20) Hz (20 to 40) Hz 40 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz (10 to 30) kHz	0.023 % + 16 nA 0.014 % + 10 nA 0.011 % + 8.0 nA 0.025 % + 12 nA 0.090 % + 65 nA 2.0 % + 0.64 µA	Fluke 5720A Fluke 5520A
220 µA 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 (10 to 30) kHz	0.023 % + 40 nA 0.033 % + 35 nA 0.013 % + 35 nA 0.051 % + 0.11 µA 0.15 % + 0.65 µA 1.6 % + 0.78 µA	Fluke 5720A Fluke 5520A
(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 (10 to 30) kHz	0.023 % + 0.40 µA 0.033 % + 0.35 µA 0.013 % + 0.35 µA 0.051 % + 0.55 µA 0.15 % + 5.0 µA 1.1 % + 4.0 µA	Fluke 5720A Fluke 5520A

Parameter/Range	Frequency	CMC ^{2,5} (±)	Comments
AC Current ³ – Generate (cont)			
(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 (10 to 30) kHz	0.023 % + 4.0 µA 0.033 % + 3.5 µA 0.013 % + 2.5 µA 0.018 % + 3.5 µA 0.15 % + 10 µA 0.72 % + 210 µA	Fluke 5720A Fluke 5520A
220 mA to 2.2 A	20 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	0.024 % + 35 µA 0.039 % + 88 µA 0.60 % + 0.16 mA	Fluke 5720A
(2.2 to 11) A	40 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz	0.040 % + 0.17 mA 0.085 % + 0.38 mA 0.33 % + 0.75 mA	
(11 to 20.5) A	(45 to 100) Hz 100 Hz to 1 kHz (1 to 5) kHz	0.12 % + 5.1 mA 0.15 % + 5.1 mA 3.0 % + 5.1 mA	Fluke 5520A
(20.5 to 150) A (150 to 1025) A	(45 to 65) Hz (45 to 65) Hz	0.38 % + 0.029 A 1.0 % + 0.031 A	Fluke 5520A w/ coil
(20.5 to 150) A (150 to 1025) A	(65 to 440) Hz (65 to 440) Hz	1.0 % + 0.031 A 1.0 % + 0.12 A	
Up to 20 A	(10 to 65) Hz (65 to 300) Hz 300 Hz to 1 kHz	0.62 % 0.49 % 0.38 %	Fluke 5522A w/ 52120A
(20 to 120) A	(10 to 65) Hz (65 to 300) Hz 300 Hz to 1 kHz	0.29 % 0.29 % 0.29 %	
120 A to 6 kA	(10 to 65) Hz (65 to 300) Hz 300 Hz to 1 kHz	0.97 % 0.95 % 0.94 %	w/ coil

Parameter/Range	Frequency	CMC ^{2,5} (±)	Comments
AC Current ³ – Measure			
10 µA to 20A	10 Hz to 10 kHz	0.015 %	5790A w/ A40s
(5 to 100) µA	(10 to 20) Hz (20 to 45) Hz 45 Hz to 5 kHz	0.46 % + 35 nA 0.15 % + 35 nA 0.060 % + 35 nA	Agilent 3458A
(0.1 to 1) 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	0.40 % + 0.20 µA 0.15 % + 0.20 µA 0.06 % + 0.20 µA 0.030 % + 0.20 µA 0.60 % + 0.20 µA 0.40 % + 0.40 µA 0.55 % + 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	0.40 % + 2.0 µA 0.16 % + 2.0 µA 0.060 % + 2.0 µA 0.030 % + 2.0 µA 0.060 % + 2.0 µA 0.40 % + 4.0 µA 0.55 % + 15 µA	
AC Current ³ – Measure (cont)			
(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	0.40 % + 0.20 µA 0.15 % + 0.20 µA 0.06 % + 0.20 µA 0.03 % + 0.20 µA 0.06 % + 0.20 µA 0.40 % + 0.40 µA 0.55 % + 20 µA	Agilent 3458A
(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	0.40 % + 0.2 mA 0.16 % + 0.2 mA 0.080 % + 0.2 mA 0.10 % + 0.2 mA 0.30 % + 0.2 mA 1.0 % + 0.4 mA	

Parameter/Range	Frequency	CMC ^{2,5} (\pm)	Comments
AC Resistance ³ – Generate 0.1 Ω 1 Ω 10 Ω (0.1, 1) k Ω 10 k Ω , 100 k Ω	DC to 13 MHz DC to 13 MHz DC to 13 MHz DC to 13 MHz DC to 1 MHz	1.2 % + 0.6R 0.12 % + 0.6R 0.11 % + 0.6R 0.032 % + 0.6R 0.032 % + 0.6R	Agilent 16074A AC resistance standards
Capacitance ³ – Measure (1 to 10) pF (10 to 100) pF (100 to 1000) pF (1 to 10) nF (10 to 100) nF (100 to 1000) nF (1 to 10) μ F (10 to 100) μ F (100 to 1000) μ F	(0.1, 0.12, 1 and 10) kHz	0.16 % 0.24 % 0.15 % 0.14 % 0.14 % 0.13 % 0.21 % 0.21 % 0.21 %	QuadTech 1689M

Parameter/Range	Frequency	CMC ^{2,5} (\pm)	Comments
<p>Capacitance³ – Generate</p> <p>(0.19 to 1.0999) nF (1.1 to 3.299) nF (0.33 to 10.999) nF (11 to 109.999) nF (110 to 329.99) nF (0.33 to 1.0999) μF (1.1 to 3.2999) μF (3.3 to 10.999) μF (11 to 32.999) μF (33 to 109.99) μF (110 to 329.99) μF (0.33 to 1.0999) mF (1.1 to 3.2999) mF (3.3 to 10.999) mF (11 to 32.999) mF (33 to 110) mF</p> <p>Fixed Points</p> <p>1 pF 10 pF 100 pF 1000 pF (10, 100, 1000) nF</p>	<p>10 Hz to 10 kHz 10 Hz to 3 kHz (10 to 1000) Hz (10 to 1000) Hz (10 to 1000) Hz (10 to 600) Hz (10 to 300) Hz (10 to 150) Hz (10 to 120) Hz (10 to 80) Hz Up to 50 Hz Up to 20 Hz Up to 6 Hz Up to 2 Hz Up to 0.6 Hz Up to 0.2 Hz</p>	<p>0.51 % + 12 pF 0.51 % + 12 pF 0.26 % + 12 pF 0.26 % + 0.12 nF 0.26 % + 0.31 nF 0.26 % + 1.2 nF 0.26 % + 3.1 nF 0.26 % + 12 nF 0.42 % + 31 nF 0.46 % + 0.12 μF 0.46 % + 0.31 μF 0.46 % + 1.2 μF 0.46 % + 3.1 μF 0.46 % + 12 μF 0.78 % + 31 μF 1.2 % + 0.12 mF</p>	<p>Fluke 5520A</p> <p>Agilent 16381A Agilent 16382A Agilent 16383A Agilent 16384A Agilent 16380C series air capacitors</p>
<p>Inductance³ – Generate, 1 mH to 1 H</p> <p>Fixed Points 100 μH 1 mH 10 mH 100 mH 1 H</p>	<p>@ 1 kHz 400 Hz & 1 kHz</p>	<p>0.13 % + 0.6R 1.2 % + 0.6R 0.13 % + 0.6R 0.083 % + 0.6R 0.083 % + 0.6R 0.083 % + 0.6R</p>	<p>GenRad 1490A GenRad 1482 series</p>
<p>Inductance – Measure, 1 μH to 100 H</p>	<p>@ 1 kHz</p>	<p>0.13 %</p>	<p>QuadTech 1689M</p>

Parameter/Range	Frequency	CMC ^{2,5} (±)	Comments
Phase Angle ³ – Generate (0.0 to 360)°	(1 to 1000) Hz (1.01 to 6.25) kHz (6.26 to 50) kHz (50.01 to 100) kHz	6.2 m° 12 m° 29 m° 58 m°	Clarke-Hess 5500 m° = millidegrees
Phase Angle ³ – Measure	20 Hz to 10 kHz (10 to 40) kHz (40 to 100) kHz	81 m° 0.29 ° 0.98 °	Krohn-Hite 6500
Audio Distortion (THD) ³	(0.02 to 20) kHz (20 to 100) kHz	1.0 dB 2.0 dB	Agilent 8903
Oscilloscopes ³ – Risetime – Generate Risetime – Measure Bandwidth (Flatness)	>15 ps >7 ps 50 kHz to 300 MHz (300 to 550) MHz (0.55 to 1.1) GHz (0.11 to 3.2) GHz (3.2 to 6.0) GHz 100 kHz to 4.2 GHz (4.2 to 18) GHz (18 to 26.5) GHz	10 ps 4.3 ps 3.4 % 3.5 % 4.4 % 5.3 % 5.6 % 0.24 dB 0.24 dB 0.30 dB	Step generator Tektronix 80E01 Fluke 9500A Signal generator w/ power sensor

IV. Electrical – RF/Microwave

Parameter/Range	Frequency	CMC ^{2,7} (±)	Comments
Power Meter ^{3,8} – Power Reference, @ 1 mW	50 MHz	1.9 %	Agilent 432A power meter w/ 478A thermistor sensor
Relative Power (Tuned RF Level) ^{3,8} – Measure (0 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 (-100 to -110) dB (-110 to -120) dB (-120 to -130) dB	100 kHz to 26.5 GHz	0.018 dB 0.019 dB 0.019 dB 0.056 dB 0.056 dB 0.057 dB 0.057 dB 0.094 dB 0.094 dB 0.095 dB 0.096 dB 0.096 dB 0.097 dB	Agilent E4440A
RF Absolute Power ^{3,8} – Measure (-30 to -50) dBm (-50 to -60) dBm (-60 to -68) dBm (-30 to +10) dBm (+10 to +20) dBm	10 MHz to 18 GHz 100 kHz to 4.2 GHz (4.2 to 18) GHz (18 to 26.5) GHz 100 kHz to 4.2 GHz (4.2 to 18) GHz (18 to 26.5) GHz	1.6 % 2.6 % 15 % 5.9 % 6.0 % 6.5 % 3.3 % 3.5 % 4.2 %	Agilent N5530S Power sensor, N Type w/ power meter 3.5 mm 3.5 mm

Parameter/Range	Frequency	CMC ^{2,7} (\pm)	Comments
Frequency Modulation ^{3,8} – Measure Mod Rate: 20 Hz to 10 kHz Dev.: 200 Hz to 40 kHz ($\beta > 0.2$) Mod Rate: 50 Hz to 200 kHz Dev.: 250 Hz to 400 kHz ($\beta > 0.2$)	250 kHz to 10 MHz 10 MHz to 6.6 GHz (6.6 to 13.2) GHz (13.2 to 26.5) GHz	1.0 % 1.0 % 1.0 %	Agilent E4440A β is the ratio of the frequency deviation to the modulation rate
Amplitude Modulation ^{3,8} – Measure Depth: (5 to 99) % (5 to 20) % (20 to 99) % (5 to 20) % (20 to 99) %	100 kHz to 10 MHz 10 MHz to 3 GHz 10 MHz to 3 GHz (3 to 26.5) GHz (3 to 26.5) GHz	0.75 % 2.5 % 0.50 % 4.5 % 1.5 %	Agilent E4440A
Phase Modulation ^{3,8} – Mod Rate: (0.2 to 20) kHz 0.3 rad < Dev \leq 0.7 rad Dev > 0.7 rad 0.6 rad < Dev \leq 2.0 rad Dev > 2.0 rad 1.2 rad < Dev \leq 4.0 rad Dev > 4.0 rad	100 kHz to 6.6 GHz (6.6 to 13.2) GHz (13.2 to 26.5) GHz	3.0 % 1.0 % 3.0 % 1.0 % 3.0 % 1.0 %	Agilent E4440A
VSWR ^{3,8}	5 MHz to 2 GHz (2 to 12.5) GHz (12.5 to 18) GHz	0.10 dB 0.49 dB 0.83 dB	Agilent E4440A w/ Wiltron SWR bridges

Parameter/Range	Frequency	CMC ^{2,7} (±)	Comments
Single Side-Band Phase Noise ^{3,8} – Measure	Carrier: 50 kHz to 26.5 GHz		
Noise Floor :	Offset Freq:		Agilent E4440A
-110 dB	10 Hz	1.5 dB	
-110 dB	100 Hz	1.5 dB	
-130 dB	1 kHz	1.5 dB	
-140 dB	10 kHz	1.5 dB	
-150 dB	100 kHz	1.5 dB	
-155 dB	1 MHz	1.5 dB	
-155 dB	10 MHz	1.5 dB	
-155 dB	100 MHz	1.5 dB	

V. Mechanical

Parameter/Equipment	Range	CMC ^{2,4,7} (±)	Comments
Weighing Devices – Balances ^{3,8}	1 mg to 2 kg (2 to 100) kg	0.00038 % 0.0015 %	Class 1 weights Class 3 weights
Scales ³	(0.002 to 1000) lb	0.015 %	Class F weights
Force Gauges	(0.002 to 1000) lbf	0.023 %	Class F weights
Torque Tools ³	(0.5 to 215) in·ozf 5 in·lbf to 200 ft·lbf (200 to 1000) ft·lbf	0.51 % + 0.6R 0.26 % + 0.6R 0.25 % + 0.6R	Torque watch calibrator, torque tester

Parameter/Equipment	Range	CMC ^{2,4,7} (±)	Comments
Pressure Measuring Equipment ³	(0 to 1) psid (-15 to 30) psig (30 to 100) psig (100 to 500) psig (500 to 1000) psig (1000 to 3000) psig (3000 to 10000) psig (1000 to 3000) psig (3000 to 6000) psig (6000 to 10 000) psig (10 000 to 30 000) psig	0.01 % + 0.0015 psid 0.01 % + 0.023 psig 0.01 % + 0.05 psig 0.01 % + 0.25 psig 0.01 % + 0.50 psig 0.035 % + 2.5 psig 0.035 % + 8.3 psig 0.62 psi 1.3 psi 2.1 psi 25 psi	Fluke 7526 w/ 700P series High pressure calibrator
Durometer Calibration ³ – Spring Force	A, B, O, D, C, DO scales	0.60 pts	Shore durocalibrator w/ calibrated weights
Indirect Verification of Brinell Hardness Testers at Test Conditions ³ – HBW 10/3000/15	Repeatability: ≤ 263 HBW > 263 to 591 HBW Error: ≤ 263 HBW > 263 to 591 HBW	0.028 <i>d</i> 0.011 <i>d</i> 1.0 % 1.2 %	ASTM E10-07a with hardness test blocks and Brinell scope <i>d</i> is the mean of the <i>n</i> diameters in millimeters CMC is stated as a percentage of the standardized test block hardness value

Parameter/Equipment	Range	CMC ^{2,4,7} (±)	Comments
Indirect Verification of Rockwell Hardness Testers ³	HRBW: (40 to 59) (60 to 79) (80 to 100) HRC: (20 to 90) (35 to 55) (60 to 65) HREW: (70 to 90) (84 to 90) (93 to 100) HR30N: (42 to 50) (55 to 73) (77 to 82) HR30TW: (43 to 56) (57 to 69) (70 to 83)	0.050 HRBW 0.030 HRBW 0.10 HRBW 0.43 HRC 0.54 HRC 0.53 HRC 0.20 HREW 0.20 HREW 0.20 HREW 0.20 HR30N 0.50 HR30N 0.30 HR30N 1.2 HR30TW 0.60 HR30TW 0.20 HR30TW	ASTM E18-14 using traceable blocks through NIST

VI. Thermodynamics

Parameter/Equipment	Range	CMC ^{2,7} (±)	Comments
Temperature – Measuring Equipment ³	(-25 to 600) °C	0.0038 % + 0.068 °C	Hart 5627, 1522, 9105 & 9123
Temperature – Measure ³	(-197 to 425) °C	0.0038 % + 0.068 °C	Hart Scientific 5627 & 1522
Infrared Thermometers ³	(-30 to 150) °C (150 to 500) °C	0.51 °C 0.35 % + 0.5 °C	Hart 9133 Hart 4181
Relative Humidity ^{3,8} – Measure	(10 to 95) % RH	1.4 %	Kaymont 2000

VII. Time & Frequency

Parameter/Equipment	Frequency	CMC ^{2,4} (\pm)	Comments
Frequency – Measuring Equipment ³	0.001 Hz to 26.5 GHz	4.4 E-12 + 0.1 mHz + 0.6R	GPS receiver w/ generator
Frequency – Measure ³	0.001 Hz to 26.5 GHz	4.4 E-12 + 0.1 mHz + 0.6R	Counter locked to 10 MHz reference

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 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, L is the numerical value of the nominal length of the device measured in inches; R is the value of the resolution of the device under test; D is the length of the diagonal in inches.

⁵ The measurands stated are generated with the Fluke 5700A or 5520A series of instruments. This capability is suitable for the calibration of the devices intended to measure the stated measurand in the ranges indicated. 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.

⁶ 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. 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.

⁷ In the statement of CMC, percentages are percentage of reading, unless otherwise indicated.

⁸ Uncertainty components that can be reasonably attributed to the Unit Under Test have not been utilized in the calculation of the CMC value for this measurement parameter.



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This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005 *General requirements for the competence of testing and calibration laboratories*. This laboratory also meets the requirements of ANSI/NCSLI Z540-1-1994 and the requirements of ANSI/NCSLI Z540.3-2006 and any additional program requirements in the field of calibration. 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 8 January 2009*).



Presented this 9th day of July 2015.

A handwritten signature in black ink, reading "Peter Abney".

President & CEO
For the Accreditation Council
Certificate Number 2516.02
Valid to March 31, 2017

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