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

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CALIBRATION

Valid To: June 30, 2019 Certificate Number: 0839.03

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

I. Electrical – DC/Low Frequency

Parameter/Equipment	Range	CMC [2, 4] (±)	Comments [5]
DC Voltage – Generate	0.01 mV to 1 V (1.0 to 10) V (10.0 to 100) V (100.0 to 1000) V	16 µV/V + 0.64 µV 16 µV/V + 2.7 µV 16 µV/V + 50 µV 16 µV/V + 15 mV	Wavetek 9000 calibrator & Agilent 3458A
DC Voltage – Measure	0.01 mV to 1 V (1.0 to 10) V (10.0 to 100) V (100.0 to 1000) V	16 µV/V + 0.37 µV 16 µV/V + 0.90 µV 16 µV/V + 38 µV 16 µV/V + 14 mV	Agilent 3458A
DC Current – Generate	(0.01 to 1.0) µA (1.0 to 10.0) µA (10.0 to 100) µA 100.0 µA to 1.0 mA (1.0 to 10.0) mA (10.0 to 100.0) mA 100 mA to 1.0 A	29 µA/A + 0.7 nA 29 µA/A + 0.7 nA 29 µA/A + 1.2 nA 29 µA/A + 0.0086 µA 29 µA/A + 0.078 µA 46 µA/A + 0.58 µA 0.013 % + 13 µA	Wavetek 9000 calibrator & Agilent 3458A

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Parameter/Equipment	Range	CMC [2, 4] (±)	Comments [5]
DC Current – Measure	(1 to 100) nA 100 nA to 1.0 µA (1.0 to 10.0) µA (10.0 to 100.0) µA 100.0 µA to 1.0 mA (1.0 to 10.0) mA (10.0 to 100.0) mA 100.0 mA to 1.0 A	40 µA/A + 0.05 nA 29 µA/A + 0.05 nA 29 µA/A + 0.12 nA 29 µA/A + 0.92 nA 29 µA/A + 0.006 µA 29 µA/A + 0.06 µA 46 µA/A + 0.6 µA 0.013 % + 13 µA	Agilent 3458A
Resistance – Generate	(0.1 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	23 µΩ/Ω + 0.14 mΩ 23 µΩ/Ω + 1.3 mΩ 18 µΩ/Ω + 1.3 mΩ 18 µΩ/Ω + 13 mΩ 18 µΩ/Ω + 0.13 Ω 23 µΩ/Ω + 7.2 Ω 85 µΩ/Ω + 0.19 kΩ 0.12 % + 2.6 kΩ 1.2 % + 51 kΩ	JJ Instruments R702 Resistor box (up to 1 MΩ), time electronics 8000-decade resistance (up to 90 MΩ), HL 4084 resistor set (up to 1 GΩ) & Agilent 3458A
Resistance – Measure	(0.001 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	23 µΩ/Ω + 0.14 mΩ 23 µΩ/Ω + 1.3 mΩ 18 µΩ/Ω + 1.3 mΩ 18 µΩ/Ω + 13 mΩ 18 µΩ/Ω + 0.13 Ω 23 µΩ/Ω + 7.2 Ω 85 µΩ/Ω + 0.19 kΩ 0.12 % + 2.6 kΩ 1.2 % + 51 kΩ	Agilent 3458A 4-wire method
AC Voltage – Generate			
(1 to 10) mV (10 to 100) mV (0.1 to 1) V (1 to 10) V (10 to 100) V	(1 to 40) Hz	0.034 % + 0.004 mV 0.008 % + 0.006 mV 0.008 % + 0.05 mV 0.008 % + 0.46 mV 0.023 % + 4.6 mV	Wavetek 9000 calibrator & Agilent 3458A
(1 to 10) mV (10 to 100) mV	40 Hz to 1 kHz	0.023 % + 1.3 µV 0.008 % + 2.8 µV	

Parameter/Range	Frequency	CMC [2, 4] (±)	Comments [5]
AC Voltage – Generate (cont)			
(0.1 to 1) V	40 Hz to 1 kHz	0.008 % + 31 µV	Wavetek 9000 calibrator & Agilent 3458A
(1 to 10) V		0.008 % + 0.28 mV	
(10 to 100) V		0.023 % + 2.7 mV	
(100 to 700) V		0.045 % + 19 mV	
(1 to 10) mV	(1 to 20) kHz	0.034 % + 1.3 µV	
(10 to 100) mV		0.016 % + 2.8 µV	
(0.1 to 1) V		0.016 % + 3.1 µV	
(1 to 10) V		0.016 % + 0.28 mV	
(10 to 100) V		0.023 % + 2.7 mV	
(100 to 700) V		0.068 % + 19 mV	
(1 to 10) mV	(20 to 50) kHz	0.12 % + 1.4 µV	
(10 to 100) mV		0.034 % + 3.3 µV	
(0.1 to 1) V		0.034 % + 23 µV	
(1 to 10) V		0.034 % + 0.23 mV	
(10 to 100) V		0.040 % + 2.4 mV	
(1 to10) mV	(50 to 100) kHz	0.57 % + 1.5 µV	
(10 to 100) mV		0.092 % + 3.4 µV	
(0.1 to 1) V		0.092 % + 24 µV	
(1 to 10) V		0.092 % + 0.25 mV	
(10 to 100) V		0.14 % + 2.9 mV	
AC Voltage – Measure			
(1 to10) mV	(1 to 40) Hz	0.034 % + 0.003 mV	Agilent 3458A
(10 to 100) mV		0.008 % + 0.005 mV	
(0.1 to 1) V		0.008 % + 0.046 mV	
(1 to 10) V		0.008 % + 0.45 mV	
(10 to 100) V		0.023 % + 4.5 mV	
(100 to 700) V		0.045 % + 45 mV	
(1 to10) mV	40 Hz to 1 kHz	0.023 % + 2.0 µV	
(10 to 100) mV		0.008 % + 2.8 µV	
(0.1 to 1) V		0.008 % + 23 µV	
(1 to 10) V		0.008 % + 0.23 mV	
(10 to 100) V		0.023 % + 2.3 mV	
(100 to 700) V		0.045 % + 16 mV	

Parameter/Range	Frequency	CMC [2, 4] (±)	Comments [5]
AC Voltage – Measure (cont)			
(1 to 10) mV	(1 to 20) kHz	0.034 % + 2.0 µV	Agilent 3458A
(10 to 100) mV		0.016 % + 2.8 µV	
(0.1 to 1) V		0.016 % + 23 µV	
(1 to 10) V		0.016 % + 0.23 mV	
(10 to 100) V		0.023 % + 2.3 mV	
(100 to 700) V		0.068 % + 16 mV	
(1 to 10) mV	(20 to 50) kHz	0.12 % + 1.3 µV	
(10 to 100) mV		0.034 % + 2.6 µV	
(0.1 to 1) V		0.034 % + 23 µV	
(1 to 10) V		0.034 % + 0.23 mV	
(10 to 100) V		0.040 % + 2.3 mV	
(100 to 700) V		0.14 % + 16 mV	
(1 to 10) mV	(50 to 100) kHz	0.57 % + 1.5 µV	
(10 to 100) mV		0.091 % + 2.9 µV	
(0.1 to 1) V		0.091 % + 24 µV	
(1 to 10) V		0.091 % + 0.24 mV	
(10 to 100) V		0.14 % + 2.4 mV	
(100 to 700) V		0.34 % + 17 mV	
AC Current – Generate			
(10 to 100) µA	(10 to 20) Hz	0.46 % + 0.034 µA	Wavetek 9000 Calibrator, Wavetek 174 & Agilent 3458A
(0.1 to 1) mA		0.46 % + 0.23 µA	
(1 to 10) mA		0.46 % + 2.3 µA	
(10 to 100) mA		0.46 % + 23 µA	
(0.1 to 1) A		0.46 % + 0.23 mA	
(10 to 100) µA	(20 to 45) Hz	0.17 % + 0.034 µA	
(0.1 to 1) mA		0.17 % + 0.23 µA	
(1 to 10) mA		0.17 % + 2.3 µA	
(10 to 100) mA		0.17 % + 23 µA	
(0.1 to 1) A		0.18 % + 0.23 mA	
(10 to 100) µA	(45 to 100) Hz	0.068 % + 0.034 µA	
(0.1 to 1) mA		0.068 % + 0.23 µA	
(1 to 10) mA		0.068 % + 2.3 µA	
(10 to 100) mA		0.068 % + 23 µA	
(0.1 to 1) A		0.091 % + 0.23 mA	
(10 to 100) µA	100 Hz to 5 kHz	0.068 % + 0.034 µA	
(0.1 to 1) mA		0.035 % + 0.23 µA	

Parameter/Range	Frequency	CMC [2, 4] (±)	Comments [5]
AC Current – Generate (cont)			
(1 to 10) mA (10 to 100) mA (0.1 to 1) A	100 Hz to 5 kHz	0.035 % + 2.3 µA 0.035 % + 23 µA 0.12 % + 0.23 mA	Wavetek 9000 calibrator & Agilent 3458A
(0.1 to 1) mA (1 to 10) mA (10 to 100) mA (0.1 to 1) A	(5 to 20) kHz (5 to 10) kHz	0.068 % + 0.23 µA 0.068 % + 2.3 µA 0.068 % + 23 µA 0.34 % + 0.23 mA	
(0.1 to 1) mA (1 to 10) mA (10 to 100) mA	(20 to 50) kHz	0.46 % + 0.45 µA 0.46 % + 4.5 µA 0.46 % + 45 µA	
(0.1 to 1) mA (1 to 10) mA (10 to 100) mA	(50 to 100) kHz	0.63 % + 1.7 µA 0.63 % + 17 µA 0.63 % + 0.17 mA	
AC Current – Measure			
(10 to 100) µA (0.1 to 1) mA (1 to 10) mA (10 to 100) mA (0.1 to 1) A	(10 to 20) Hz	0.46 % + 0.034 µA 0.46 % + 0.23 µA 0.46 % + 2.3 µA 0.46 % + 23 µA 0.46 % + 0.23 mA	Agilent 3458A
(10 to 100) µA (0.1 to 1) mA (1 to 10) mA (10 to 100) mA (0.1 to 1) A	(20 to 45) Hz	0.17 % + 0.034 µA 0.17 % + 0.23 µA 0.17 % + 2.3 µA 0.17 % + 23 µA 0.18 % + 0.23 mA	
(10 to 100) µA (0.1 to 1) mA (1 to 10) mA (10 to 100) mA (0.1 to 1) A	(45 to 100) Hz	0.068 % + 0.034 µA 0.068 % + 0.23 µA 0.068 % + 2.3 µA 0.068 % + 23 µA 0.091 % + 0.23 mA	
(10 to 100) µA (0.1 to 1) mA (1 to 10) mA (10 to 100) mA (0.1 to 1) A	100 Hz to 5 kHz	0.068 % + 0.034 µA 0.035 % + 0.23 µA 0.035 % + 2.3 µA 0.035 % + 23 µA 0.12 % + 0.23 mA	

Parameter/ Range	Frequency	CMC [2, 4] (±)	Comments [5]
AC Current – Measure (cont)			
(0.1 to 1) mA	(5 to 20) kHz	0.068 % + 0.23 µA	Agilent 3458A
(1 to 10) mA		0.068 % + 2.3 µA	
(10 to 100) mA		0.068 % + 23 µA	
(0.1 to 1) A		0.34 % + 0.23 mA	
(0.1 to 1) mA	(20 to 50) kHz	0.46 % + 0.45 µA	
(1 to 10) mA		0.46 % + 4.5 µA	
(10 to 100) mA		0.46 % + 45 µA	
(0.1 to 1) A		1.2 % + 0.45 mA	
(0.1 to 1) mA	(50 to 100) kHz	0.63 % + 1.7 µA	
(1 to 10) mA		0.63 % + 17 µA	
(10 to 100) mA		0.63 % + 0.17 mA	
AC High Voltage – Measure			
(0.7 to 10) kV	50/60 Hz	(0.25 to 0.29) %	Tektronix P6015A, Agilent 3458A, Wavetek 9000, Associated Research 3670
DC High Voltage – Measure			
(0.7 to 10) kV	DC	(0.042 to 0.19) %	Tektronix P6015A, Agilent 3458A, Wavetek 9000, Associated Research 3670

II. Electrical – RF/Microwave

Parameter/Equipment	Frequency	CMC [2] (±)	Comments [5]
Biconical Antenna –			
3 m	(30 to 300) MHz	1.5 dB	ANSI C63.5-1998 (SSM)
10 m	(30 to 300) MHz	1.5 dB	ANSI C63.5-1998 (SSM) ANSI C63.5-2006, excluding Appendix H (RAM)
Log Periodic Antenna –			
3 m	(200 to 3000) MHz	1.5 dB	ANSI C63.5-1998 (SSM)
10 m	(200 to 1000) MHz	1.5 dB	ANSI C63.5-1998 (SSM) ANSI C63.5-2006, excluding Appendix H (RAM)
Dipole Antenna –			
3 m	(30 to 1000) MHz	1.5 dB	ANSI C63.5-1998 (SSM)
10 m	(30 to 1000) MHz	1.5 dB	ANSI C63.5-1998 (SSM) ANSI C63.5-2006 (RAM)
Hybrid Broadband Antenna –			
3 m	(30 to 3000) MHz	1.5 dB	ANSI C63.5-1998 (SSM)
10 m	(30 to 1000) MHz	1.5 dB	ANSI C63.5-1998 (SSM) ANSI C63.5-2006, excluding Appendix H (RAM)

Parameter/Equipment	Frequency	CMC [2] (±)	Comments [5]
Horn Antennas – 1 m, 3 m	(1 to 18) GHz (18 to 40) GHz	0.7 dB 1.3 dB	SAE ARP 958D, Appendix C, ANSI C63.5-2017(SSM) Agilent E4407B, E4446A, Rohde & Schwarz NRP-Z91, NRP-Z31, NRP-Z56
Linear Polarized Broadband Antennas – 1 m	(20 to 2000) MHz (1 to 18) GHz (18 to 40) GHz	1.2 dB 1.1 dB 1.7 dB	SAE ARP958D Agilent E4407B, E4446A and R&S SMB100A
Log Spiral Antennas – 1 m	(0.2 to 10) GHz	1.3 dB	SAE ARP958D Agilent E4407B, E4446A and R&S SMB100A
Magnetic Field Probes & Antennas – 0.5 mG to 3 G	10 Hz to 500 kHz	2.4 %	IEEE 1309, IEEE 291-1992 Helmholtz Coil
ELF Electric Field Probes – 50 V/m to 5 kV/m	(16 to 300) Hz	1.5 %	IEEE 1308-1994 Parallel Plates

Parameter/Equipment	Frequency	CMC [2, 4] (±)	Comments [5]
Line Impedance Stabilization Network (LISN) –			
Impedance Magnitude	(0.009 to 300) kHz (0.3 to 400) MHz	(0.35 to 1.7) % 1.9 %	CISPR 16-1-2 CISPR 25 (2008) ANSI C63.4-2014,
Impedance Phase	(0.009 to 300) kHz (0.3 to 108) MHz	(0.24 to 0.7) ° 1.1°	Annex E, MIL-STD 461 RTCA/DO-160
Voltage Division Factor	(0.009 to 400) MHz	0.08 dB	HIOKI 3532-50 LCR HiTESTER, HP 4195A, & HP41951A
Rod (Monopole) Antennas	9 kHz to 30 MHz	0.75 dB	IEEE Std 291-1991, SAE ARP958D, ANSI C63.5- 2017 (ECSM), HP 4195A
Bulk Current Injection Probes –			MIL STD-461 IEC 61000-4-6 CISPR 16-1-2
Insertion loss	10 Hz to 500 MHz	0.3 dB + *M*	Agilent 3458A, HP 4195
Current Probes –			IEC 61000-4-6 CISPR 16-1-2
Transfer Impedance	10 Hz to 500 MHz 500 MHz to 1 GHz	0.3 dB + *M* 0.75 dB + *M*	Agilent 3458A, HP 4195, Rhode & Schwarz NRP –Z91

Parameter/Equipment	Frequency	CMC [2, 3, 4] (±)	Comments [5]
Electromagnetic Field Sensors & Probes – Frequency response, Linearity	10 kHz to 200 MHz 250 to 400 MHz 400 MHz to 18 GHz (18 to 40) GHz	0.75 dB 1.8 dB 1.4 dB 1.8 dB	IEEE 1309 TEM-cell CC-103SEX, Anechoic chamber with double ridged wave guide & standard gain horn antennas
Electrical Pulse – Measure Amplitude Transition time, duration	Up to 4 kV 2 ns to 500 ms	2.7 % 3 %	LeCroy LC584AL
RF Power – Measure (-25 to 20) dBm (-55 to 20) dBm	10 Hz to 100 MHz (0.1 to 8) GHz (8 to 12.4) GHz (12.4 to 26.5) (26.5 to 40) GHz 9 kHz to 4 GHz (4 to 26.5) GHz (26.5 to 33) GHz	0.93 % + *M* 1.3 % + *M* 1.5 % + *M* 2 % + *M* 2.4 % + *M* 1.5 % + *M* 2.1 % + *M* 2.8 % + *M*	Rohde & Schwarz NRP-Z56 Rohde & Schwarz NRP-Z91 & NRP-Z31
RF Power – Measure (0.01 to 1000) W (0.1 to 500) W (0.1 to 50) W (0.1 to 50) W (0.1 to 2) W (0.1 to 2) W	10 kHz to 100 MHz (0.1 to 2.4) GHz (2.4 to 8) GHz (8 to 18) GHz (26.5 to 40) GHz (26.5 to 40) GHz	1.4 % + *M* 1.9 % + *M* 2.1 % + *M* 3 % + *M* 4.6 % + *M* 5.2 % + *M*	Rohde & Schwarz NRP-Z56, NRP-Z91, & NRP-Z31, directional couplers, attenuators

Parameter/Equipment	Frequency	CMC[2, 3, 4] (±)	Comments [5]
RF Power – Linearity			Tabor Electronics WW5062, Rohde & Schwarz SML03, SMB100A, & NRP-Z56 HP 355D, HP 355C
(0 to 30) dB	10 Hz to 40 GHz	0.011 dB	
(0 to 60) dB	10 Hz to 40 GHz	0.016 dB	
(60 to 70) dB	10 Hz to 500 MHz	0.08 dB	
(70 to 120) dB	10 Hz to 500 MHz	0.13 dB	
Harmonics - Measure (generators and spectrum analyzers)	10 Hz to 1500 MHz	0.45 dB	Agilent E4446A
	(1.5 to 3.3) GHz	0.64 dB	
	(3.3 to 11) GHz	0.94 dB	
	(11 to 18) GHz	1.11 dB	
Resolution bandwidth accuracy and selectivity		0.9 %	Rohde & Schwarz SMB-100A, NRP-Z56, Hewlett Packard 355D, HP355C
RF Power – Generate			
(-25 to 20) dBm	10 Hz to 100 MHz	0.97 % + *M*	Tabor Electronics WW5062, Rohde & Schwarz SML03, SMB100A, & NRP-Z56
	(0.1 to 2.4) GHz	1.3 % + *M*	
	(2.4 to 8) GHz	2 % + *M*	
	(8 to 12) GHz	2.9 % + *M*	
	(12 to 18) GHz	3.7 % + *M*	
	(18 to 26.5) GHz	4.6 % + *M*	
	(26.5 to 40) GHz	7.3 % + *M*	
(-55 to 20) dBm	9 kHz to 2.4 GHz	1.7 % + *M*	Rohde & Schwarz SML03, SMB100A, NRP-Z91, & NRP-Z31
	(2.4 to 4) GHz	2 % + *M*	
	(4 to 8) GHz	3.8 % + *M*	
	(8 to 26.5) GHz	5.5 % + *M*	
	(26.5 to 33) GHz	8.4 % + *M*	
(0.01 to 500) W	10 kHz to 100 MHz	1.5 % + *M*	Rohde & Schwarz SML03, SMB100A, & NRP-Z56, power amplifiers & directional couplers
(0.1 to 50) W	(0.1 to 2.4) GHz	2.1 % + *M*	
(0.1 to 50) W	(2.4 to 4) GHz	2.7 % + *M*	
(0.1 to 25) W	(4 to 12) GHz	4.1 % + *M*	
(0.1 to 25) W	(12 to 18) GHz	5.5 % + *M*	

Parameter/Equipment	Range	CMC[2, 3, 4] (±)	Comments[5]
Transmission – Magnitude (Attenuation / Gain)			
DC to 10 kHz	(0 to 45) dB (45 to 65) dB (65 to 80) dB	0.01 dB + *M* 0.17 dB + *M* 0.17 dB + *M*	Rohde & Schwarz NRP-Z56, Agilent E4446A, 3458A, HP4195A
9 kHz to 100 MHz	(0 to 30) dB (30 to 65) dB (65 to 95) dB	0.02 dB + *M* 0.07 dB + *M* 0.17 dB + *M*	Rohde & Schwarz NRP-Z56, NRP-Z91, & NRP-Z31, Agilent E4446A, HP4195A
100 MHz to 2.4 GHz	(0 to 30) dB (30 to 65) dB (65 to 95) dB	0.02 dB + *M* 0.07 dB + *M* 0.18 dB + *M*	Rohde & Schwarz NRP-Z56, Agilent E4446A, 3458A, HP4195A
(2.4 to 8) GHz	(0 to 30) dB (30 to 65) dB (65 to 95) dB	0.05 dB + *M* 0.09 dB + *M* 0.19 dB + *M*	Rohde & Schwarz NRP-Z56, NRP-Z91, NRP-Z31, Agilent E4446A, HP4195A
(8 to 18) GHz	(0 to 30) dB (30 to 65) dB (65 to 95) dB	0.04 dB + *M* 0.1 dB + *M* 0.27 dB + *M*	
(18 to 26.5) GHz	(0 to 30) dB (40 to 65) dB (65 to 95) dB	0.1 dB + *M* 0.19 dB + *M* 0.35dB + *M*	
(26.5 to 40) GHz	(0 to 30) dB (30 to 65) dB (65 to 90) dB	0.2 dB + *M* 0.2 dB + *M* 0.39 dB + *M*	

Parameter/Equipment	Range	CMC [2, 3, 4] (±)	Comments [5]
Reflection Magnitude –			
(0.3 to 500) MHz	(0 to 1) lin	(0.005 to 0.1) lin	HP 4195, Agilent 86205A, Mini-Circuits ZFDC-10-6, ZFDC-20-5, Agilent 85032E
(0.5 to 2) GHz (2 to 3) GHz (3 to 5) GHz (5 to 6) GHz	(0 to 1) lin (0 to 1) lin (0 to 1) lin (0 to 1) lin	(0.014 to 0.12) lin (0.044 to 0.16) lin (0.14 to 0.23) lin (0.22 to 0.32) lin	HP 4407B, Agilent 86205A, Narda 3020A, 3022, 3024, Agilent 85032E
Impedance – Measure, Magnitude			
(0.1 to 1) Ω (1 to 10) Ω (0.01 to 10) kΩ (0.01 to 1.0) MΩ, (1 to 10) MΩ	100 Hz to 10 kHz	(0.48 to 3.26) % (0.24 to 0.41) % (0.10 to 0.24) % (0.18 to 0.57) % (0.47 to 2.3) %	HIOKI 3532-50 LCR HiTESTER
(0.001 to 10) kΩ (10 to 100) kΩ (0.1 to 1.0) MΩ	(10.01 to 100) kHz	(0.24 to 0.41) % (0.30 to 0.54) % (0.35 to 0.95) %	
(1 to 10) Ω (0.01 to 10) kΩ (10 to100) kΩ	100.1 kHz to 1 MHz	(0.47 to 1.2) % (0.35 to 0.5) % (0.47 to 3.3) %	
(5 to 2000) Ω	100 kHz to 300 kHz	(3.5 to 5.7) %	
(5 to 2000) Ω	(0.3 to 30) MHz	(1.9 to 2.9) %	HP 4195A, HP 41951, Agilent 85032E
(5 to 2000) Ω	(30 to 250) MHz	(1.9 to 5.1) %	HIOKI 3532-50 LCR HiTESTER
(5 to 2000) Ω	(250 to 500) MHz	(1.9 to 8.5) %	

Parameter/Equipment	Range	CMC [2, 3, 4] (±)	Comments [5]
Impedance – Measure, Phase			
(0.1 to 1) Ω	100 Hz to 10 kHz	(0.30 to 2.2) °	HIOKI 3532-50 LCR HiTESTER
(1 to 10) Ω		(0.18 to 0.29) °	
(0.01 to 10) kΩ		(0.06 to 0.13) °	
(10 to 100) kΩ		(0.09 to 0.15) °	
(0.1 to 1.0) MΩ		(0.18 to 0.29) °	
(1 to 10) MΩ		(0.30 to 1.2) °	
(1 to 10) Ω	(10.01 to 100) kHz	(0.18 to 0.41) °	
(0.01 to 10) kΩ		(0.10 to 0.24) °	
(10 to 100) kΩ		(0.18 to 0.29) °	
(0.1 to 1.0) MΩ		(0.35 to 0.95) °	
(1 to 10) Ω	100.1 kHz to 1 MHz	(0.35 to 0.66) °	
(0.01 to 10) kΩ		(0.18 to 0.29) °	
(10 to 100) kΩ		(0.35 to 3.23) °	
(5 to 2000) Ω	(100 to 300) kHz	(2.0 to 3.3) °	HP4195A, HP41951, Agilent 85032E
(5 to 2000) Ω	(0.3 to 30) MHz	(1.1 to 1.7) °	
(5 to 2000) Ω	(30 to 250) MHz	(1.1 to 2.9) °	
(5 to 2000) Ω	(250 to 500) MHz	(1.1 to 4.9) °	

III. Thermodynamics

Parameter/Equipment	Range	CMC [2] (±)	Comments [5]
Relative Humidity, Fixed Points	10 % RH 50 % RH 95 % RH	0.44 % RH 0.85 % RH 1.2 % RH	Calibration kit EM-15, EDM 15/15 Rotronic & Rotronic EA10, EA50 & EA95 humidity standard
Relative Humidity – Measure	(10 to 95) % RH	2.1 % RH	Rotronic HC2-S & HL-NT2-Dp
Temperature – Measure	(-80 to 100) °C (100 to 200) °C	0.036 °C 0.04 °C	Hart Scientific 5615-6, 1524
Temperature – Measuring Equipment	(-80 to 100) °C	0.04 °C	Hart Scientific 5615-6, 1524, 7380
Temperature Uniformity – Measure	(-80 to 100) °C	0.7 °C	Fluke 2625A/2625A w/ thermocouple probes

IV. Time & Frequency

Parameter/Equipment	Range	CMC [2, 4] (±)	Comments [5]
Frequency – Measure & Measuring Equipment	10 MHz (1 to 10) Hz (10 to 100) Hz (100 to 1000) Hz (1 to 10) kHz (10 to 100) kHz (0.1 to 10) MHz (10 to 100) MHz (0.1 to 12.8) GHz (12.8 to 40) GHz	4.8 mHz 0.034 % 0.0034 % 3.4 µHz/Hz 0.36 µHz/Hz 0.12 µHz/Hz 0.12 µHz/Hz 0.011 µHz/Hz 0.002 µHz/Hz 0.004 µHz/Hz	Arbiter System Satellite-controlled Clock 1084B, LeCroy LC584AL, HP5327C, Agilent 4446A, Tabor WW5062, R&S SMB100A

[1] This laboratory offers commercial calibration service only.

[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] In the statement of CMC, *M* is the Mismatch error due to connections of calibrated device to calibration set up in actual use.

[4] In the statement of CMC the percentage is defined as percent of reading.

[5] Laboratory calibrations are to the current revision/configuration of the applicable standard. Calibration to earlier version or revision of the standard can be provided on request.

Accredited Laboratory

A2LA has accredited

HERMON LABORATORIES

Binyamina, Israel

for technical competence in the field of

Calibration

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 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 8 January 2009*).

Presented this 10th day of October 2017.

President and CEO
For the Accreditation Council
Certificate Number 0839.03
Valid to June 30, 2019
Revised May 1, 2019

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