



SCOPE OF ACCREDITATION TO ISO 17025:2005

GEFEN ELECTRONIC SERVICES  
Metrology Laboratory  
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CALIBRATION

Valid To: June 30, 2014

Certificate Number: 1881.03

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory to perform the following calibrations<sup>1</sup>:

I. Electrical – DC/Low Frequency

Parameter/Equipment	Range	CMC <sup>2</sup> (±)	Comments
DC Voltage – Generate	2.2 $\mu$ V 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	12 $\mu$ V/V + 0.9 $\mu$ V 8.7 $\mu$ V/V + 1.5 $\mu$ V 8.6 $\mu$ V/V + 5.2 $\mu$ V 8.6 $\mu$ V/V + 8.2 $\mu$ V 11 $\mu$ V/V + 110 $\mu$ V 12 $\mu$ V/V + 580 $\mu$ V	Fluke 5700A; CMCs stated as a portion of the setting plus a portion of the range.
DC Current – Generate	(0.02 to 220) $\mu$ A 220 $\mu$ A to 2.2 mA (2.2 to 22) mA (22 to 220) mA 220 mA to 2.2 A  (2 to 10) A	0.17 % + 9.3 nA 75 $\mu$ A/A + 9.3 nA 75 $\mu$ A/A + 93 nA 85 $\mu$ A/A + 0.92 $\mu$ A 0.014 % + 29 $\mu$ A  0.024 % + 58 $\mu$ A/A	Fluke 5700A; CMCs stated as a portion or percent of the setting plus a portion of the range.  Datron 4800 w/ Datron 4600 transconductance amplifier



Parameter/Range	Frequency	CMC <sup>2</sup> (±)	Comments
AC Voltage – Generate (cont)			
(22 to 220) V	(20 to 40) Hz 40 Hz to 20 kHz (20 to 100) kHz	0.02 % + 2.9 mV 0.013 % + 0.9 mV 0.1 % + 9.2 mV	Fluke 5700A; CMC's stated as a portion or percent of setting plus the floor specification.
(220 to 1100) V	(15 to 50) Hz 50 Hz to 1 kHz	0.05 % + 19 mV 0.014 % + 4 mV	
AC Current – Generate			
(0.1 to 220) µA	40 Hz to 1 kHz (1 to 10) kHz	0.039 % + 19 nA 0.19 % + 92 nA	Fluke 5700A; CMC's stated as a percent of setting plus the floor specification.
220 µA to 2.2 mA	40 Hz to 1 kHz (1 to 10) kHz	0.029 % + 40 nA 0.19 % + 1 µA	
(2.2 to 22) mA	40 Hz to 1 kHz (1 to 10) kHz	0.029 % + 0.4 µA 0.19 % + 9.3 µA	
(22 to 220) mA	40 Hz to 1 kHz (1 to 10) kHz	0.029 % + 4 µA 0.19 % + 9.2 µA	
220 mA to 2.2 A	40 Hz to 1 kHz (1 to 10) kHz	0.089 % + 92 µA 1 % + 190 µA	
(2 to 10) A	10 Hz to 1 kHz (1 to 5) kHz (5 to 10) kHz (10 to 20) kHz	0.045 % + 1.4 mA 0.1 % + 1.8 mA 0.25 % + 6.9 mA 0.86 % + 39 mA	Datron 4800 w/ Datron 4600 transconductance amplifier; CMC's stated as a percentage of setting.

Parameter/Range	Frequency	CMC <sup>2</sup> (±)	Comments
Oscilloscope –			
DC Voltage Amplitude	± 1 mV to 190 V	0.029 % rdg + 29 µV	Wavetek 9500; The percentages are related to the reference level.
Leveled Sine Wave	50 kHz to 10 MHz	1.8 % rdg	
Flatness	(50 to 550) MHz (relative to 50 kHz to 10 MHz)	2.3 % rdg	
	(550.01 to 1000) MHz (relative to 50 kHz to 10 MHz)	4.9 % rdg	
Time Marker			
Sine Wave	550.01 ps to 2 ns	10 parts in 10 <sup>6</sup>	SR FS 725 Rubidium frequency standard, HP 33120, 83712A
Square Wave	10 ns to 10 ms	10 parts in 10 <sup>6</sup>	
Time Interval	50 ps to 100 µs	3 parts in 10 <sup>4</sup>	

## II. Optical Quantities

Parameter/Equipment	Range	CMC <sup>2</sup> (±)	Comments
Optical Attenuation – Measure, (1310 to 1550) nm	(0 to 50) dB	0.7 % rdg (0.03 dB)	ANDO AQ2735
Optical Time Domain Reflectometer – (OTDR): Distance	Up to 200 km Back reflection -50 dB	1.3 m/10 km range	OPCOM BX-C-9B1-4-3-2-1-C-33A

Parameter/Equipment	Range	CMC <sup>2</sup> (±)	Comments
Optical Spectrum Analyzer –			
Power	(+0 to -50) dBm	4 % of rdg	ANDO AQ2735
Wavelength	(1480 to 1570) nm	0.9 parts in 10 <sup>6</sup>	Burleigh WA-7600
Optical Power – Absolute Power Measure, (1309, 1550) nm	(1 to 2000) µW	4 % of rdg (0.17 dB)	ANDO AQ2735
Wavelength – Measure	(1270 to 1680) nm	0.9 parts in 10 <sup>6</sup>	Burleigh WA-7600

### III. Thermodynamics

Parameter/Equipment	Range	CMC <sup>2</sup> (±)	Comments
Temperature – Measure, Ovens	-50 °C to 125 °C	1.3 °C	Fluke Hydra 2625 w/ PT-100
	(30 to 95) % RH	3 % RH	Omega RH5100

### IV. Time and Frequency

Parameter/Equipment	Range	CMC <sup>2</sup> (±)	Comments
Frequency – Measure			
Time Base	10 MHz	5.4 parts in 10 <sup>10</sup>	SR FS 725 Rubidium frequency standard
Frequency	(0.001 to 100) Hz	10 parts in 10 <sup>6</sup>	HP 53131A
	100 Hz to 3 GHz	5.4 parts in 10 <sup>10</sup>	
	500 MHz to 26.5 GHz	5.4 parts in 10 <sup>10</sup>	HP 5351A

*Peter Meyer*

Parameter/Equipment	Range	CMC <sup>2</sup> (±)	Comments
Frequency – Measuring Equipment	(0.001 to 100) Hz 100 Hz to 15 MHz 10 MHz to 20 GHz (1 to 26.5) GHz	10 parts in 10 <sup>6</sup> 5.4 parts in 10 <sup>10</sup> 5.4 parts in 10 <sup>10</sup> 5.4 parts in 10 <sup>10</sup>	HP 33120 HP 83712A HP 8340B
Jitter – Measure and Measuring Equipment	(0.05 to 20) UI	2 % rdg for null point of Bessel Function  4 % rdg for other points	HP 8562E

<sup>1</sup> This laboratory offers commercial calibration service.

<sup>2</sup> Calibration and Measurement Capability (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. Calibration and Measurement Capabilities 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.



American Association for Laboratory Accreditation

# *Accredited Laboratory*

A2LA has accredited

## **GEFEN ELECTRONIC SERVICES**

*Petah-Tikva, 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 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 13<sup>th</sup> day of August 2012.



  
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President & CEO

For the Accreditation Council

Certificate Number 1881.03

Valid to June 30, 2014

Revised: December 06, 2012

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