



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

LARSON DAVIS A PCB DIVISION
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CALIBRATION

Valid To: August 31, 2024

Certificate Number: 3622.01

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory to perform the following calibrations^{1,5}:

I. Acoustical

| Parameter/Range | Frequency | CMC ^{2,4} (±) | Comments |
|--|-----------------|------------------------|--|
| Acoustic Calibrator – Fixed Points 114 dB, 94 dB, Re 20 µPA | 250 Hz, 1 kHz | 0.14 dB | Reference microphone (LD 2559) |
| Comparison to Coupler – (25 to 124) dB, Re 20 µPA | 125 Hz to 8 kHz | 0.21 dB | LD CAL291 with reference microphone |
| Microphone Sensitivity – (0.1 to 0.5) mV/Pa (0.5 to 100) mV/Pa | 250 Hz | 0.24 dB 0.16 dB | Acoustic calibrator (LD CAL250) |

II. Electrical – DC/Low Frequency

| Parameter/Equipment | Range | CMC ^{2,3} (±) | Comments |
|----------------------|-----------------|------------------------|----------------------------------|
| DC Voltage – Measure | (10 to 120) mV | 7.5 μV/V + 0.36 μV | Agilent 3458A digital multimeter |
| | 100 mV to 1.2 V | 9.2 μV/V + 0.32 μV | |
| | (1 to 12) V | 9.4 μV/V + 0.87 μV | |
| | (10 to 120) V | 12 μV/V + 32 μV | |

| Parameter/Range | Frequency | CMC ^{2,3,4} (±) | Comments | |
|--|---------------------|------------------------------------|--|--------------------------------------|
| AC Voltage – Measure | 100 mV to 14 V | 0.12 dB | LD model 831 Agilent 3458A digital multimeter | |
| | (10 to 120) mV | 3 Hz to 50 kHz (50 to 300) kHz | | 0.031 % + 2.1 μV 0.31 % + 11 μV |
| | 100 mV to 1.2 V | 3 Hz to 50 kHz (50 to 300) kHz | | 0.031 % + 21 μV 0.31 % + 0.11 mV |
| | (1 to 12) V | 3 Hz to 50 kHz (50 to 300) kHz | | 0.031 % + 0.21 mV 0.31 % + 1.1 mV |
| | (10 to 120) V | 3 Hz to 50 kHz (50 to 300) kHz | | 0.036 % + 2.1 mV 0.41 % + 11 mV |
| Attenuation – Measure, Fixed Points | | | Agilent 34401A digital multimeter | |
| | 40 dB 60 dB Gain | 10 Hz to 20 kHz 10 Hz to 20 kHz | | 0.02 dB 0.05 dB |

| Parameter/Range | Frequency | CMC ^{2,3,4} (\pm) | Comments |
|--|---|--|---------------------------------|
| AC Voltage – Generate Sinewave: | | | |
| 10 mV to 14 V | 0.01 Hz to 200 kHz | 1.3 % + 1.2 μ V | Signal generator (SRS DS360) |
| 30 mV to 3 V | (3 to 5) Hz (5 to 10) Hz 10 Hz to 20 kHz (20 to 50) kHz (50 to 100) kHz (100 to 126) kHz | 0.12 dB 0.06 dB 0.04 dB 0.04 dB 0.09 dB 0.50 dB | Signal generator (LD 2900) |
| (0.1 to 30) mV | 10 Hz to 20 kHz | 0.04 dB | |
| 16 μ V to 0.1 mV | 10 Hz to 20 kHz | 0.04 dB | |
| Preamplifier & Sound Level Meter – | | | |
| (103 to 142) dB μ V 141 mV to 12.6 V | 3 Hz to 20 kHz | 0.12 dB | Signal generator (SRS DS360) |
| (24 to 103) dB μ V 15.9 μ V to 141 mV | 3 Hz to 20 kHz | 0.14 dB | |
| (103 to 142) dB μ V 141 mV to 12.6 V | (2.5 to 5) Hz | 0.093 dB | 1/3 octave intervals |
| | (5 to 10) Hz | 0.039 dB | |
| | 10 Hz to 1 kHz | 0.019 dB | |
| | (1 to 20) kHz | 0.019 dB | 1/12 octave intervals |
| | (20 to 50) kHz | 0.022 dB | |
| | (50 to 100) kHz | 0.062 dB | |
| | (100 to 200) kHz | 0.39 dB | |

| Parameter/Range | Frequency | CMC ^{2,4} (±) | Comments |
|---|------------------|------------------------|-----------------------|
| Preamplifier & Sound Level Meter – (cont) (24 to 103) dB μ V 15.9 μ V to 141 mV | (2.5 to 5) Hz | 0.13 dB | 1/3 octave intervals |
| | (5 to 10) Hz | 0.070 dB | |
| | 10 Hz to 1 kHz | 0.053 dB | |
| | (1 to 20) kHz | 0.053 dB | 1/12 octave intervals |
| | (20 to 50) kHz | 0.055 dB | |
| | (50 to 100) kHz | 0.091 dB | |
| | (100 to 200) kHz | 0.39 dB | |

III. Mechanical

| Parameter/Equipment | Frequency | CMC ^{2,3} (±) | Comments |
|--|---------------------|------------------------|--|
| Accelerometers – vs. Primary Standard | (5 to 9) Hz | 2.0 % | Data acquisition card w/ 396C10/C11 air bearing shaker |
| | (10 to 99) Hz | 1.5 % | |
| | 100 Hz | 1.2 % | |
| | (101 to 920) Hz | 1.4 % | |
| | (921 to 5000) Hz | 1.7 % | |
| | (5001 to 10 000) Hz | 2.2 % | |
| Low Frequency Accelerometer Calibration | (10 to 15) kHz | 2.5 % | Data acquisition card w/ low frequency long stroke shaker w/ optical reference |
| | (15 to 20) kHz | 3.5 % | |

IV. Time & Frequency

| Parameter/Range | Frequency | CMC ^{2,6} (±) | Comments |
|--|----------------------------------|--|-----------------------------------|
| Frequency – Measure 100 mV to 120 V | (3 to 40) Hz 40 Hz to 200 kHz | 36 µHz/Hz + 13 mHz 33 µHz/Hz + 13 mHz | Agilent 34401A digital multimeter |
| Frequency – Measuring Equipment 10 µVpp to 40 Vpp | 0.01 Hz to 200 kHz | 12 µHz/Hz + 12 mHz | Signal generator (SRS DS360) |

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 The measurands stated are generated using the indicated instrument (see Comments). This capability is suitable for the calibration of the devices intended to measure the 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.

⁴ All references to dB are given in dB Volts.

⁵ This scope meets A2LA's *P112 Flexible Scope Policy*.

⁶ The type of instrument or material being calibrated is defined by the parameter. This indicates the laboratory is capable of calibrating instruments that measure or generate the values in the ranges indicated for the listed measurement parameter.



Accredited Laboratory

A2LA has accredited

LARSON DAVIS A PCB DIVISION

Provo, UT

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 13th day of July 2022.

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

Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 3622.01
Valid to August 31, 2024

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