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

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CALIBRATION

Valid To: January 31, 2026 Certificate Number: 1533.01

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

I. Acoustical Quantities

Parameter/Range	Frequency	CMC[2] (±)	Comments
Acoustic Level (Sound Pressure Level) – Measure			
124 dB re 2 x 10^{-5} Pa	250 Hz	0.13 dB	B&K 4228
(114 & 94) dB re 2 x 10^{-5} Pa	1 kHz	0.14 dB	B&K 4231
Acoustic Level (Sound Pressure Level)[3] – Measure			
124 dB re 2 x 10^{-5} Pa	250 Hz	0.18 dB	B&K 4228
(114 & 94) dB re 2 x 10^{-5} Pa	1 kHz	0.19 dB	B&K 4231
Microphones – Measuring Equipment			
Sensitivity (mV/Pa)	250 Hz	0.16 dB	Comparison to B&K 4134 & B&K 4144
Actuator Response	20 Hz to 20 kHz 20 Hz to 50 kHz 20 Hz to 200 kHz	0.16 dB 0.26 dB 0.36 dB	Signal generator, multimeter & actuators

Parameter/Range	Frequency	CMC[2, 8] (±)	Comments
Microphones – Measuring Equipment[3]			
Sensitivity (mV/Pa)	250 Hz	0.21 dB	Comparison to B&K 4134
Actuator Response	20 Hz to 20 kHz 20 Hz to 50 kHz	0.21 dB 0.31 dB	Signal generator, multimeter & actuators
Acoustic Measuring Equipment – Sound Pressure Level			
114 dB re 2 x 10^{-5} Pa	1000 Hz	0.17 dB	B&K 4231 & 4134
(94 to 114) dB re 2 x 10^{-5} Pa	31.5 Hz (63, 125, 250, 500) Hz (1, 2, 4, 8) kHz (12.5, 16) kHz	0.18 dB 0.17 dB 0.17 dB 0.18 dB	B&K 4226 & 4180
Acoustic Measuring Equipment – Sound Level Pressure[3]			
114 dB re 2 x 10^{-5} Pa	1000 Hz	0.22 dB	B&K 4231 & 4134
(94 to 114) dB re 2 x 10^{-5} Pa	31.5 Hz (63, 125, 250, 500) Hz (1, 2, 4, 8) kHz (12.5, 16) kHz	0.23 dB 0.22 dB 0.22 dB 0.23 dB	B&K 4226 & 4180
Pistonphones – Sound Pressure Level			
(114 to 134) dB re 2 x 10^{-5} Pa	250 Hz	0.13 dB	B&K 4228 & attenuator
Pistonphone – Sound Pressure Level[3]			
(114 to 134) dB re 2 x 10^{-5} Pa	250 Hz	0.18 dB	B&K 4228 & attenuator

Parameter/Equipment	Frequency	CMC[2, 4] (±)	Comments
Sound Level Meters – Sound Pressure Level Measuring Equipment (94 to 114) dB re 2 x 10^{-5} Pa	31.5 Hz (63, 125, 250, 500) Hz (1, 2, 4, 8, 12.5) kHz 16 kHz	0.18 dB 0.17 dB 0.17 dB 0.18 dB	B&K 4226
Sound Level Meters – Sound Pressure Level Measuring Equipment[3] (94 to 114) dB re 2 x 10^{-5} Pa	31.5 Hz (63, 125, 250, 500) Hz (1, 2, 4, 8, 12.5) kHz 16 kHz	0.23 dB 0.22 dB 0.22 dB 0.23 dB	B&K 4226
Electrical Simulation of Sound Level Meters, Preamplifiers, Measuring Amplifiers, Analyzers & Filters	10 Hz to 20 kHz (20 to 50) kHz (50 to 100) kHz (100 to 250) kHz	0.010 dB 0.010 dB 0.010 dB 0.021 dB	Function generator, Agilent 33120A & 3458A
Electrical Simulation of Sound Level Meters, Preamplifiers, Measuring Amplifiers, Analyzers & Filters[3]	10 Hz to 20 kHz (20 to 50) kHz (50 to 100) kHz (100 to 250) kHz	0.060 dB 0.060 dB 0.060 dB 0.071 dB	Function generator, Agilent 33120A & 3458A
Electrical Simulation of Sound Level Meters, Preamplifiers, Measuring Amplifiers, Analyzers & Filters	10 Hz to 20 kHz (20 to 50) kHz (50 to 100) kHz (100 to 250) kHz	0.010 dB 0.010 dB 0.010 dB 0.010 dB	Function generator, Agilent 33120A & 34401A
Electrical Simulation of Sound Level Meters, Preamplifiers, Measuring Amplifiers, Analyzers & Filters[3]	10 Hz to 20 kHz (20 to 50) kHz (50 to 100) kHz (100 to 250) kHz	0.060 dB 0.060 dB 0.060 dB 0.060 dB	Function generator, Agilent 33120A & 34401A

Parameter/Equipment	Frequency	CMC[2] (±)	Comments
Electrical Simulation of Sound & Vibration Analyzers	1 kHz 10 Hz to 1 kHz (1 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz	0.090 dB 0.095 dB 0.10 dB 0.10 dB 0.11 dB 0.52 dB	Function generator, Agilent 33120A & 34401A
Electrical Simulation of Sound & Vibration Analyzers[3]	1 kHz 10 Hz to 1 kHz (1 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz	0.14 dB 0.15 dB 0.15 dB 0.15 dB 0.16 dB 0.57 dB	Function generator, Agilent 33120A & 34401A
Dosimeters – (94, 104 & 114) dB	2 Hz to 20 kHz	0.23 dB	B&K 4226
Dosimeters[3] – (94, 104 & 114) dB	2 Hz to 20 kHz	0.28 dB	B&K 4226

II. Electrical – DC/Low Frequency

Parameter/Equipment	Range	CMC[2, 4, 6] (±)	Comments
DC Voltage – Generate	Up to 320 mV (0.32 to 3.2) V (3.2 to 32) V (32 to 320) V (320 to 1050) V	0.044 % + 0.4 µV 0.044 % + 0.4 µV 0.045 % + 0.6 µV 0.046 % + 40 µV 0.049 % + 13 mV	Wavetek 9100
DC Voltage – Measure	Up to 100 mV (0.1 to 1) V (1 to 10) V (10 to 100) V (100 to 1000) V	0.044 % + 0.4 µV 0.044 % + 0.4 µV 0.047 % + 0.6 µV 0.047 % + 40 µV 0.045 % + 13 mV	Keysight 3458A

Parameter/Equipment	Range	CMC[2, 4, 6] (±)	Comments
DC Voltage – Measure[3]	1 mV to 1000 V	0.046 % + 5 mV	Agilent 34401A
DC Current – Generate	Up to 320 µA (0.32 to 3.2) mA (3.2 to 32) mA (32 to 320) mA (0.32 to 3.2) A	0.054 % + 0.1 µA 0.049 % + 0.2 µA 0.047 % + 3.0 µA 0.083 % + 40 µA 0.16 % + 0.6 mA	Wavetek 9100
DC Current – Measure	Up to 100 nA (0.1 to 10) µA (10 to 100) µA (0.1 to 100) mA (0.1 to 1) A	0.045 % + 10 µA 0.044 % + 100 µA 0.044 % + 1 nA 0.044 % + 10 nA 0.046 % + 100 nA	Keysight 3458A
Resistance – Generate	(40 to 400) Ω (0.4 to 40) kΩ (4 to 40) kΩ (40 to 400) kΩ (0.4 to 4) MΩ (4 to 40) MΩ	0.18 % + 20 mΩ 0.11 % + 80 mΩ 0.08 % + 0.8 Ω 0.58 % + 8 Ω 0.14 % + 0.1 Ω 2.4 % + 2.0 kΩ	Wavetek 9100
Resistance – Measure	(1 to 10) Ω (10 to 100) Ω (0.1 to 1) kΩ (1 to 10) kΩ (10 to 100) kΩ (0.1 to 1) MΩ (1 to 10) MΩ	0.03 % + 10 µΩ 0.03 % + 10 µΩ 0.03 % + 100 µΩ 0.03 % + 1 mΩ 0.03 % + 10 mΩ 0.03 % + 100 mΩ 0.03 % + 1 Ω	Keysight 3458A

Parameter/Range	Frequency	CMC[2, 6] (±)	Comments
AC Voltage – Generate			
Up to 320 mV (0.32 to 3.2) V (3.2 to 32) V (32 to 320) V	10 Hz to 100 kHz	0.24 % + 0.4 mV 0.26 % + 0.4 mV 0.43 % + 7 mV 0.42 % + 90 mV	Wavetek 9100
(320 to 1050) V	40 Hz to 1 kHz	0.16 % + 130 mV	

Parameter/Range	Frequency	CMC[2, 4, 6] (±)	Comments
AC Voltage – Measure Up to 10 V (10 to 100) V (100 to 1 000) V	 20 Hz to 300 kHz 1 kHz 1 kHz	 0.028 % + 40 µV 0.029 % + 4 mV 0.17 % + 20 mV	 Keysight 3458A
AC Voltage – Measure[3] Up to 100 mV (1 to 750) V	 1 kHz to 50 kHz 10 Hz to 50 kHz	 0.011 % + 7 µV 0.15 % + 0.7 mV	 Agilent 34401A

III. Electrical – RF/Microwave

Parameter/Range	Frequency	CMC[2, 6] (±)	Comments
Attenuation – Generate (0 to -60) dB (0 to -100) dB	 1 kHz 10 Hz to 200 kHz	 0.17 dB 0.16 dB	 WB 0785
Attenuation – Generate[3] (0 to -60) dB (0 to -100) dB	 1 kHz 10 Hz to 200 kHz	 0.22 dB 0.21 dB	 WB 0785
Attenuation – Measure (0 to -60) dB (0 to -100) dB	 1 kHz 10 Hz to 200 kHz	 0.05 dB 0.15 dB	 Agilent 34401A
Attenuation –Measure[3] (0 to -60) dB (0 to -100) dB	 1 kHz 10 Hz to 200 kHz	 0.10 dB 0.2 dB	 Agilent 34401A

IV. Mechanical

Parameter/Equipment	Range	CMC[2, 5, 8] (±)	Comments
Calibration Exciters – Acceleration Level (m/s^2, "g")	(100 to 160) Hz 10 Hz to 10 kHz	1.3 % 2.5 %	B&K 8305/2635
Calibration Exciters[3] – Acceleration Level (m/s^2, "g")	(100 to 160) Hz 10 Hz to 10 kHz	1.3 % 2.5 %	B&K 8305/2635
Random Noise – Measure	100 Hz to 20 kHz 20 kHz to 200 kHz 100 Hz to 10 kHz 20 Hz to 20 kHz	0.30 dB 0.50 dB 0.30 dB 0.50 dB	B&K 1617/2636 B&K 2133 B&K 3560
Random Noise[3] – Measure	100 Hz to 20 kHz 20 Hz to 20 kHz	0.30 dB 0.50 dB	B&K 3560
Dynamic Pressure Sensors	250 Hz 20 Hz to 200 kHz	0.18 dB 1.0 dB	B&K 4228 WB 0736 & UA0033 stepped sine response
Accelerometers –			
Charge Sensitivity (0.02 to 5000) pC/g	100 Hz & 160 Hz (5 to 10) Hz (10 to 40) Hz 40 Hz to 2 kHz (2 to 4) kHz (4 to 7) kHz (7 to 10) kHz	1.3 % 1.4 % 1.4 % 1.4 % 1.8 % 2.2 % 2.5 %	B & K 9610, B&K 4808, 4809
Voltage Sensitivity (0.02 to 5000) mV/g	100 Hz & 160 Hz (5 to 10) Hz (10 to 40) Hz 40 Hz to 2 kHz (2 to 4) kHz (4 to 7) kHz (7 to 10) kHz	1.3 % 2.0 % 1.6 % 1.4 % 1.8 % 2.2 % 2.5 %	B & K 9610, B&K 4808, 4809

Parameter/Equipment	Range	CMC[2, 5] (±)	Comments
Accelerometers – (cont)			
Voltage & Charge Sensitivities (0.02 to 10 000) mV/g (0.02 to 10 000) pC/g	(10, 80, 100, & 160) Hz (0.5 to 10) Hz (10 to 40) Hz 40 Hz to 2 kHz (2 to 4) kHz (4 to 7) kHz (7 to 20) kHz	1.3 % 2.5 % 2.0 % 1.4 % 1.8 % 2.2 % 2.5 %	Sensitivity frequency response plot using B&K 3560, 4808, 4809

V. Time & Frequency

Parameter/Equipment	Range	CMC[2, 8] (±)	Comments
Frequency – Measure	1 Hz to 10 MHz	6.0×10^{-8} Hz/Hz	HP 3458A

[1] This laboratory offers commercial calibration services and field calibration services.

[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 CMCs 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 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] Based on using the standard at the temperature the Agilent 3458A was calibrated (tcal ± 5 °C) and an auto-calibration (ACAL) was performed within the previous 24 hours (± 1 °C of ambient temperature).

[5] In the statement of CMC, percentages are to be read as percent of reading.

[6] The stated measured values are determined using the indicated instrument (see Comments). This capability is suitable for the calibration of the devices intended to measure or generate the measured value in the ranges indicated. CMC's are expressed as either a specific value that covers the full range or as a percent or fraction of the reading plus a fixed floor specification.