



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

AUDIO PRECISION CALIBRATION SERVICES  
5750 S.W. Arctic Drive  
Beaverton, OR 97005  
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CALIBRATION

Valid To: January 31, 2021

Certificate Number: 2527.01

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory to perform the following calibrations<sup>1,4</sup>:

I. Electrical – DC/Low Frequency

Parameter/Equipment	Range	CMC <sup>2,3</sup> (±)	Comments
DC Voltage – Measure	(0 to 32.999) mV	2.6 µV	Agilent 3458A 100 mV range
	(33.000 to 77.999) mV	78 µV/V	
	(78.000 to 119.999) mV	38 µV/V	
	(120.00 to 329.99) mV	24 µV/V	1 V range
	(0.330 00 to 1.199 99) V	14 µV/V	
	(1.2000 to 11.9999) V	12 µV/V	10 V range
(12.000 to 119.999) V	17 µV/V	100 V range	
(120.00 to 329.99) V	18 µV/V	1000 V range	

Parameter/Equipment	Range	CMC <sup>2,3</sup> (±)	Comments
DC Voltage – Generate	(0 to 32.9999) mV	2.8 μV	Fluke 5520A/5522A  Rsource ≈ 50 Ω  Rsource ≈ 50 Ω Rsource ≈ 50 Ω Rsource ≈ 50 Ω
	(33.000 to 77.999) mV	84 μV/V	
	(78.000 to 119.999) mV	40 μV/V	
	(120.000 to 329.999) mV	30 μV/V	
	(330.00 to 779.99) mV (0.780 00 to 3.299 99) V	15 μV/V 11 μV/V	
	(3.3000 to 7.7999) V (7.8000 to 32.9999) V	14 μV/V 11 μV/V	
(33.000 to 77.999) V (78.000 to 329.999) V	18 μV/V 16 μV/V		
Resistance – Measure	(0 to 11.9999) Ω	0.30 mΩ	Agilent 3458A  10 Ω range  100 Ω range  1 kΩ range 10 kΩ range 100 kΩ range 1 MΩ range
	(12.000 to 32.9999) Ω	88 μΩ/Ω	
	(33.000 to 119.999) Ω	40 μΩ/Ω	
	(120.00 to 1199.99) Ω	21 μΩ/Ω	
	(1.2000 to 11.9999) kΩ	21 μΩ/Ω	
	(12.000 to 119.999) kΩ	21 μΩ/Ω	
(120.00 to 1100.00) kΩ	43 μΩ/Ω		

Parameter/Range	Frequency	CMC <sup>2,3</sup> (±)	Comments
AC Voltage – Measure			Agilent 3458A
(12.000 to 32.999) mV	1 kHz	0.032 %	100 mV range, SSM mode
(33.000 to 119.999) mV	1 kHz	0.023 %	
(120.00 to 329.99) mV	1 kHz	0.030 %	1 V range, SSM mode
(0.330 00 to 1.199 99) V	1 kHz	0.019 %	
(1.2000 to 3.2999) V	1 kHz	0.030 %	10 V range, SSM mode
(3.3000 to 11.9999) V	1 kHz	0.019 %	
(12.000 to 32.999) V	1 kHz	0.045 %	100 V range, SSM mode
(33.000 to 119.999) V	1 kHz	0.035 %	
(120.00 to 329.99) V	1 kHz	0.059 %	1000 V range, SSM mode
(0.600 00 to 1.199 99) V	100 Hz to 20 kHz	0.053 %	1 V range, ANA mode 10 V range, ANA mode
(1.2000 to 3.2000) V	100 Hz to 20 kHz	0.13 %	
AC Voltage – Generate			Fluke 5520A/5522A
(1.650 to 47.999) mV	1 kHz	0.035 %	Test sources <48 mV are obtained using a 200:1 custom attenuator driven by Fluke 5520A/5522A set for 200x the desired voltage, R <sub>source</sub> ≈ 50 Ω
(48.000 to 77.999) mV	1 kHz	0.028 %	R <sub>source</sub> ≈ 50 Ω R <sub>source</sub> ≈ 50 Ω
(78.000 to 329.999) mV	1 kHz	0.020 %	
(330.00 to 779.99) mV	1 kHz	0.027 %	
(0.780 00 to 3.2999) V	1 kHz	0.019 %	
(3.300 0 to 7.7999) V	1 kHz	0.027 %	
(7.800 0 to 32.9999) V	1 kHz	0.019 %	
(33.000 to 329.999) V	1 kHz	0.021 %	

Parameter/Range	Frequency	CMC <sup>2,3</sup> (±)	Comments
AC Flatness – Measure (1 kHz reference)			Agilent 3458A
(100 to 115) mV	(5 to 40) Hz 40 Hz to 1 kHz (1 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz	0.0017 dB 0.0014 dB 0.0019 dB 0.0035 dB 0.0070 dB 0.026 dB	100 mV range, SSM mode
(1.00 to 1.15) V	(5 to 40) Hz 40 Hz to 1 kHz (1 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz	0.0015 dB 0.0013 dB 0.0019 dB 0.0035 dB 0.0070 dB 0.026 dB	1 V range, SSM mode
AC Flatness – Generate (1 kHz reference)			Fluke 5520A/5522A
(100 to 320) mV	(10 to 45) Hz 45 Hz to 1 kHz (1 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz	0.0043 dB 0.0022 dB 0.0023 dB 0.0034 dB 0.0078 dB 0.020 dB	Rsource ≈ 50 Ω Rsource ≈ 50 Ω Rsource ≈ 50 Ω Rsource ≈ 50 Ω Rsource ≈ 50 Ω Rsource ≈ 50 Ω
(1.00 to 3.20) V	(10 to 45) Hz 45 Hz to 1 kHz (1 to 20) kHz (20 to 50) kHz (50 to 100) kHz (100 to 300) kHz	0.0028 dB 0.0020 dB 0.0022 dB 0.0029 dB 0.0058 dB 0.020 dB	

## II. Time & Frequency

Parameter/Equipment	Range	CMC <sup>2,5</sup> (±)	Comments
Frequency – Measure	1 Hz to 10 MHz	0.18 μHz/Hz	Agilent 53131 w/ opt 010 timebase

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<sup>1</sup> This laboratory offers commercial calibration service for selected Audio Precision products only.

<sup>2</sup> 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 Statistical analysis is in accordance with the Guide to the Expression of Uncertainty in Measurement (GUM). 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.

<sup>3</sup> 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. CMCs 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.

<sup>4</sup> This scope meets A2LA's *P112 Flexible Scope Policy*.

<sup>5</sup> 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

# AUDIO PRECISION CALIBRATION SERVICES

*Beaverton, OR*

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/NCCL 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 19<sup>th</sup> day of February 2019.

A handwritten signature in blue ink, written over a horizontal line.

Vice President, Accreditation Services  
For the Accreditation Council  
Certificate Number 2527.01  
Valid to January 31, 2021

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