



Certificate of Accreditation to ISO/IEC 17025:2017

NVLAP LAB CODE: 200625-0

Scantek, Inc. Calibration Laboratory

Columbia, MD

is accredited by the National Voluntary Laboratory Accreditation Program for specific services, listed on the Scope of Accreditation, for:

Calibration Laboratories

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communique dated January 2009).

2021-03-25 through 2022-03-31

Effective Dates





NVLAP LAB CODE 200625-0

SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017

Scantek, Inc. Calibration Laboratory 6430 Dobbin Road, Suite C Columbia, MD 21045 Steve Marshall Phone: 410-290-7726 Fax: 410-290-9167 E-mail: <u>s.marshall@scantekinc.com</u> URL: <u>http://www.scantekinc.com</u> Fields of Calibration Electromagnetics – DC/Low Frequency Time and Frequency Mechanical

This laboratory is compliant to ANSI/NCSL Z540-1-1994; Part 1. (20/A01)

CALIBRATION AND MEASUREMENT CAPABILITIES (CMC)^{Notes 1,2}

Measured Parameter or		Expanded	
Device Calibrated	Range	Uncertainty Note 3,5,8	Remarks
	ELECTROMAGNETICS	- DC/LOW FREQUENCY	
DC RESISTANCE AND CU	RRENT (20/E05)		
DC Current	1 mA to 10 mA	0.11 % + 0.002 mA	Agilent 34401A
	10 mA to 100 mA	0.12 % + 0.005 mA	_
	100 mA to 1 A	0.25 % + 0.1 mA	
	1 A to 3 A	0.2 % + 0.6 mA	
DC Resistance (4-wire)	1Ω to 100Ω	$0.1~\% + 0.006~\Omega$	Agilent 34401A
	100 Ω to 1 k Ω	$0.1~\% + 0.04~\Omega$	
	1 k Ω to 10 k Ω	$0.1 \ \% + 0.4 \ \Omega$	
	10 k Ω to 100 k Ω	$0.1 \% + 4 \Omega$	
	$100 \text{ k}\Omega$ to $1 \text{ M}\Omega$	$0.1 \ \% + 40 \ \Omega$	
DC VOLTAGE (20/E06)			
DC Voltage	1 mV to 100 mV	$0.0055 \ \% + 0.0036 \ mV$	Agilent 34401A
	100 mV to 1 V	$0.0055 \ \% + 0.007 \ mV$	
	1 V to 10 V	$0.0055 \ \% + 0.05 \ mV$	
	10 V to 100 V	$0.0055 \ \% + 0.6 \ mV$	
	100 V to 1000 V	0.0055 % + 0.01 V	

2021-03-25 through 2022-03-31 Effective dates



NVLAP LAB CODE 200625-0

Measured Parameter or			Expanded	
Device Calibrated	Range	Frequency Range	Uncertainty Note 3,5,8	Remarks
LF AC VOLTAGE (20/E0)	9)		• •	
AC Voltage – Generate				Stanford Research
Sine, Square, two-tone	10 μV_{pp} to 40 V_{pp}	0.001 Hz to 200 kHz	1.1 %	(SR) DS360
Sine or square bursts	$10~\mu V_{pp}$ to $40~V_{pp}$	0.001 Hz to 200 kHz	1.1 %	SR DS360
Broadband noise: white	$10~\mu V_{pp}$ to $40~V_{pp}$	1 Hz to 100 kHz (CF: 11 dB)	1 dB	
Broadband noise: pink	$10~\mu V_{pp}$ to $40~V_{pp}$	10 Hz – 200 kHz (CF: 12 dB)	2 dB	measured with 1/3 octave analysis
AC Voltage Transfer – Measuring equipment:				
Measure	1 mV to 100 mV	10 Hz to 50 kHz 50 kHz to 200 kHz	$\begin{array}{c} 0.001 \ \% + 2 \ \mu V \\ 0.001 \ \% + 5 \ \mu V \end{array}$	Agilent 34401A
	100 mV to 1 V	10 Hz to 50 kHz 50 kHz to 200 kHz	$\begin{array}{c} 0.001 \ \% + 20 \ \mu V \\ 0.001 \ \% + 50 \ \mu V \end{array}$	
	1V to 10 V	10 Hz to 50 kHz 50 kHz to 200 kHz	0.001 % + 0.2 mV 0.001 % + 0.5 mV	
	10 V to 100 V	10 Hz to 50 kHz 50 kHz to 200 kHz	0.001 % + 2 mV 0.001 % + 5 mV	
	100 V to 750 V	10 Hz to 50 kHz 50 kHz to 200 kHz	0.001 % + 15 mV 0.001 % + 38 mV	
AC Voltage: True RMS	50 μ V to 1 mV	20 Hz to 20 kHz 3 Hz to 100 kHz	0.24 dB 0.40 dB	N-1504A System
	1 mV to 100 mV	3 Hz to 5 Hz 5 Hz to 10 Hz	1.0 % + 0.04 mV 0.36 % + 0.04 mV	Agilent 34401A

CALIBRATION AND MEASUREMENT CAPABILITIES (CMC)^{Notes 1,2}

2021-03-25 through 2022-03-31 Effective dates



NVLAP LAB CODE 200625-0

Measured Parameter or	TATION AND MEAS	SUREMENT CAPABIL]
	Danas	European ary Damas	Expanded Uncertainty ^{Note 3,5,8}	Domonius
Device Calibrated	Range	Frequency Range		Remarks
		10 Hz to 20 kHz	0.06% + 0.04 mV	
		20 kHz to 50 kHz	0.16% + 0.05 mV	
		50 kHz to 100 kHz	0.62 % + 0.08 mV	
		100 kHz to 300 kHz	4.0 % + 0.50 mV	
	100 mV to 1 V	3 Hz to 5 Hz	1.0 % + 0.2 mV	
		5 Hz to 10 Hz	0.36 % + 0.3 mV	
		10 Hz to 20 kHz	0.06 % + 0.3 mV	
		20 kHz to 50 kHz	0.16 % + 0.5 mV	
		50 kHz to 100 kHz	0.62 % + 0.8 mV	
		100 kHz to 300 kHz	4.0 % + 5.0 mV	
	1 V to 10 V	3 Hz to 5 Hz	1.0 % + 3.0 mV	
		5 Hz to 10 Hz	0.36% + 3.0 mV	
		10 Hz to 20 kHz	0.06 % + 3.0 mV	
		20 kHz to 50 kHz	0.16 % + 5.0 mV	
		50 kHz to 100 kHz	0.62 % + 8.0 mV	
		100 kHz to 300 kHz	4.0% + 50 mV	
	10 V to 100 V	3 Hz to 5 Hz	1.0% + 30 mV	
		5 Hz to 10 Hz	0.36% + 30 mV	
		10 Hz to 20 kHz	0.06 % + 30 mV	
		20 kHz to 50 kHz	0.16 % + 50 mV	
		50 kHz to 100 kHz	0.62 % + 80 mV	
		100 kHz to 300 kHz	4.0% + 0.5 V	
	100 V to 750 V	3 Hz to 5 Hz	1.0 % + 0.225 V	
	100 V 10 / 30 V	5 Hz to 10 Hz	1.0% + 0.225 V 0.36% + 0.225 V	
		10 Hz to 20 kHz	0.36% + 0.225 V 0.12% + 0.225 V	
		20 kHz to 50 kHz	0.12% + 0.225 V 0.16% + 0.375 V	
		50 kHz to 100 kHz	0.16% + 0.373 V 0.62% + 0.6 V	
		100 kHz to 300 kHz	4.0 % + 3.75 V	
Self-Generated Noise	1 µV to 10 V	0.1 Hz to 20 kHz	0.85 dB	840 RTA
	$>30 \mu\text{V}$	20 Hz to 80 kHz	2 dB	HP 8903A

CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) Notes 1,2

2021-03-25 through 2022-03-31 Effective dates



NVLAP LAB CODE 200625-0

CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) Notes 1,2

Measured Parameter or			Expanded	
Device Calibrated	Range	Frequency Range	Uncertainty Note 3,5,8	Remarks

	TIME AND FREQUENCY					
FREQUENCY DISSEMIN	ATION (20/F01)					
Frequency Measure	100 mV to 750 V	3 Hz to 5 Hz 5 Hz to 10 Hz 10 Hz to 40 Hz 40 Hz to 300 kHz	0.1 % 0.05 % 0.03 % 0.01 %	Agilent 34401A		
Frequency Generate	10 μV_{pp} to 40 V_{pp}	0.001 Hz to 200 kHz	$61 \ \mu Hz/Hz + 4 \ mHz$	SR DS360		
Time intervals	> 8 s		1 s	Chronometer		
OSCILLATOR CHARACI	HTERISTICS (20/F03))				
Signal Distortion Signal Level Range: 100 mV to 10 V 50 mV to 300 V	> 0.1 % THD > 0.01 % THD	6 Hz to 20 kHz 20 kHz to 100 kHz	(0.07D + 0.03) THD (where D is % THD) 2.3 dB	840 Analyzer HP 8903A		
Signal to noise ratio < 80 dB	50 Hz to 100 kHz	50 mV to 300 V	1.5 dB	HP 8903A		
	N	IECHANICAL				
ACOUSTIC (20/M01)						
Sensitivity or Open Circuit Sensitivity: Direct and Comparison Methods	-70 dB to < -50 dB -50 dB to 0 dB -70 dB to < -50 dB -50 dB to 0 dB	250 Hz 250 Hz 1 kHz 1 kHz	0.12 dB 0.092 dB 0.13 dB 0.094 dB Actuator / Free-field	dB range values are relative to 1 V/Pa dB range values are relative to 1		
Frequency Response: Electrostatic Excitation Note 7			and Diffuse Field Response	V/Pa		

2021-03-25 through 2022-03-31 Effective dates

For the National Voluntary Laboratory Accreditation Program



NVLAP LAB CODE 200625-0

Device Calibrated Range Frequency Range Uncertainty Note 3.5.8 Remarks (for condenser microphones with removable grid) -70 dB to 0 dB 31.5 Hz to 100 Hz > 1.05 kHz 0.20 dB / 0.20 dB 0.14 dB / 0.13 dB -70 dB to 0 dB 31.5 Hz to 100 Hz > 1.25 kHz to 4 kHz 0.14 dB / 0.23 dB 0.14 dB / 0.23 dB > 4 kHz to 8 kHz 0.17 dB / 0.45 dB 0.38 dB / 0.77 dB 0.44 dB / 0.23 dB > 10 kHz to 16 kHz 0.38 dB / 0.77 dB 0.84 dB / 0.77 dB 0.42 dB > 10 kHz to 16 kHz 0.38 dB / 0.77 dB 0.84 dB / 0.17 dB 0.42 dB > 10 kHz to 16 kHz 0.38 dB / 0.77 dB 0.84 dB / 0.17 dB 0.42 dB > 00 kHz to 16 kHz 0.38 dB / 0.77 dB 0.84 dB / 0.17 dB 0.42 dB > 00 kHz to 10 kHz 0.84 dB / 0.17 dB 0.42 dB 0.14 dB / 0.17 dB 4226 Calibrator Microphone Sensitivity -70 dB to 0 dB 31.5 Hz 0.13 dB / 0.20 dB 4226 Calibrator 125 Hz 0.13 dB / 0.16 dB 1253 Calibrator 1 kHz 0.13 dB / 0.16 dB 4226 Calibrator 1 kHz 0.13 dB / 0.22 dB 4226 Calibrator 1 kHz <td< th=""><th>Measured Parameter or</th><th></th><th></th><th>Expanded</th><th></th></td<>	Measured Parameter or			Expanded	
		Range	Frequency Range		Remarks
with removable grid) -70 dB to 0 dB 31.5 Hz to 100 Hz 0.20 dB / 0.20 dB 0.14 dB / 0.18 dB -70 dB to 0 dB > 100 Hz to 1.25 kHz 0.14 dB / 0.18 dB 0.14 dB / 0.23 dB 0.14 dB / 0.23 dB -8 kHz to 10 kHz 0.38 dB / 0.57 dB 0.38 dB / 0.57 dB 0.38 dB / 0.77 dB 0.38 dB / 0.77 dB -8 kHz to 10 kHz 0.38 dB / 0.77 dB 0.38 dB / 0.77 dB 0.38 dB / 0.27 dB 0.8 dB / 2.1 dB -9 to kHz to 20 kHz 0.59 dB / 0.89 dB 0.59 dB / 0.20 dB 0.8 dB / 2.1 dB 0.13 dB / 2.2 dB -70 dB to 0 dB 31.5 Hz 0.14 dB / 0.17 dB 0.42 dB 0.13 dB / 0.20 dB -70 dB to 0 dB 31.5 Hz 0.14 dB / 0.17 dB dB range values are relative to 1 -70 dB to 0 dB 31.5 Hz 0.14 dB / 0.17 dB 0.13 dB / 0.20 dB -70 dB to 0 dB 31.5 Hz 0.13 dB / 0.20 dB 1253 Calibrator 250 Hz 0.09 dB / 0.15 dB 1253 Calibrator 1 kHz 1.1 dB / 0.13 dB 226 Calibrator 1 kHz 0.11 dB / 0.13 dB 1253 Calibrator 1 kHz 0.13 dB / 0.22 dB 426 Calibrator 1 kHz 0.13 dB / 0.23 dB 0.14 dB / 0.70 dB 1253 Calibrator 14 dB / 0.70 dB </td <td></td> <td></td> <td></td> <td></td> <td></td>					
Acoustical Calibrators and Pistonphones -70 dB to 10 dB -100 Hz to 1.25 kHz > 1.25 kHz to 4 kHz > 4 kHz to 8 kHz > 1.25 kHz to 10 kHz 0.17 dB / 0.45 dB > 8 kHz to 10 kHz 0.38 dB / 0.77 dB 0.38 dB / 0.77 dB 0.38 dB / 0.77 dB 0.8 dB / 2.1 dB 1.1 dB / 4.2 dB dB range values are relative to 1 V/Pa 420 kHz 50 kHz to 100 kHz -70 dB to 0 dB 31.5 Hz 0.31 st 2 0 kHz 0.9 dB / 0.15 dB 0.13 dB / 0.20 dB 0.13 dB / 0.20 dB dB range values are relative to 1 V/Pa 4226 Calibrator -70 dB to 0 dB 31.5 Hz 0.13 dB / 0.20 dB 0.13 dB / 0.20 dB 1253 Calibrator -70 dB to 0 dB 31.5 Hz 0.13 dB / 0.20 dB 1253 Calibrator -70 dB to 0 dB 31.5 Hz 0.13 dB / 0.20 dB 1253 Calibrator -70 dB to 0 dB 31.5 Hz 0.13 dB / 0.20 dB 1253 Calibrator -70 dB to 0 dB 31.5 Hz 0.13 dB / 0.20 dB 1253 Calibrator -70 dB to 0 dB 31.5 Hz 0.13 dB / 0.20 dB 1253 Calibrator -70 dB to 0 dB 31.5 Hz 0.11 dB / 0.13 dB 1253 Calibrator -70 dB to 0 dB 31.5 Hz 0.09 dB / 0.15 dB 1253 Calibrator -70 dB to 0 dB 31.5 Hz 0.11 dB / 0.13 dB 1253 Calibrator -70 dB to 0 dB -70 dB to 14 dB 0.11 dB / 0.13 dB 1253 Calibrator -70 dB to 0 dB -70 dB to 14 dB -70					
Frequency Response: Acoustical Method Microphone Sensitivity> 1.25 kHz to 4 kHz > 4 kHz to 8 kHz > 10 kHz to 16 kHz > 10 kHz to 16 kHz $20.38 dB / 0.57 dB$ $20 kHz to 20 kHz50 kHz to 20 kHz50 kHz to 10 kHz20 kHz to 50 kHz50 kHz to 10 kHz1.1 dB / 4.2 dBdB range valuesare relative to 1V/a4226 CalibratorFrequency Response:Microphone Sensitivity-70 dB to 0 dB31.5 Hz63 Hz125 Hz0.13 dB / 0.20 dB0.13 dB / 0.20 dBdB range valuesare relative to 1V/a4226 Calibrator250 Hz0.09 dB / 0.15 dB1253 Calibrator500 Hz0.13 dB / 0.16 dB4226 Calibrator2 kHz4 kHz0.13 dB / 0.20 dB1253 Calibrator1 kHz0.11 dB / 0.13 dB1253 Calibrator2 kHz4 kHz0.13 dB / 0.22 dB4226 Calibrator1 kHz0.13 dB / 0.23 dB4226 Calibrator90 dB to 140 dB31.5 Hz (\pm 2 Hz)63 Hz to 800 Hz250 Hz0.11 dB / 0.13 dBAcoustical Calibrators andPistonphonesSound Pressure Level90 dB to 140 dB31.5 Hz (\pm 2 Hz)63 Hz to 800 Hz250 Hz (\pm 10 Hz)0.11 dB90 dB to 140 dB31.5 Hz (\pm 2 Hz)63 Hz to 800 Hz250 Hz (\pm 10 Hz)0.11 dB0.11 dB0.11 dB0.13 dB / 0.29 dB11 dB / 0.29 dBdB range valuesrelative to 20 µPaDirect Method$		-70 dB to 0 dB	31.5 Hz to 100 Hz	0.20 dB / 0.20 dB	
$Acoustical Calibrators andPistonphonesSound Pressure Level90 \text{ dB to 140 dB}31.5 \text{ Hz} (4 2 \text{ Hz}) = 250 \text{ Hz}0.17 \text{ dB} / 0.45 \text{ dB} = 0.38 \text{ dB} / 0.57 \text{ dB} = 0.38 \text{ dB} / 0.77 \text{ dB} = 0.59 \text{ dB} / 0.89 \text{ dB} / 0.89 \text{ dB} / 0.89 \text{ dB} = 20 \text{ kHz to 20 \text{ kHz}} = 20 \text{ kHz to 20 \text{ kHz}} = 0.59 \text{ dB} / 0.89 \text{ dB} / 2.1 \text{ dB} = 20 \text{ kHz to 100 \text{ kHz}} = 1.1 \text{ dB} / 4.2 \text{ dB} = 20 \text{ kHz to 100 \text{ kHz}} = 1.1 \text{ dB} / 4.2 \text{ dB} = 20 \text{ kHz to 100 \text{ kHz}} = 0.14 \text{ dB} / 0.17 \text{ dB} = 0.14 \text{ dB} / 0.17 \text{ dB} = 0.13 \text{ dB} / 0.17 \text{ dB} = 0.13 \text{ dB} / 0.20 \text{ dB} = 0.13 \text{ dB} / 0.13 \text{ dB} = 0.22 \text{ dB} = 0.13 \text{ dB} / 0.13 \text{ dB} = 0.22 \text{ dB} = 0.13 \text{ dB} / 0.13 \text{ dB} = 0.23 \text{ dB} = 0.13 \text{ dB} / 0.13 \text{ dB} = 0.22 \text{ dB} = 0.13 \text{ dB} / 0.13 \text{ dB} = 0.23 \text{ dB} = 0.13 \text{ dB} / 0.22 \text{ dB} = 0.13 \text{ dB} / 0.23 \text{ dB} = 0.23 \text{ dB} / 0.75 \text{ dB} = 0.13 \text{ dB} / 0.75 \text{ dB} = 0.13 \text{ dB} / 0.75 \text{ dB} = 0.10 \text{ dB} / 0.75 \text{ dB} = 0.0$			> 100 Hz to 1.25 kHz	0.14 dB / 0.18 dB	
> 8 kHz to 10 kHz > 10 kHz to 16 kHz > 10 kHz to 20 kHz 0.59 dB /0.89 dB 0.59 dB /0.1 dB 1.1 dB /4.2 dBdB range values are relative to 1 V/Pa 4226 Calibrator 4226 CalibratorAcoustical Method Note 7 Microphone Sensitivity-70 dB to 0 dB31.5 Hz 63 Hz 125 Hz0.14 dB /0.17 dB 0.13 dB /0.20 dB 0.13 dB /0.20 dBdB range values are relative to 1 			> 1.25 kHz to 4 kHz	0.14 dB / 0.23 dB	
Frequency Response: Acoustical Method Note 7 Microphone Sensitivity> 10 kHz to 16 kHz > 16 kHz to 20 kHz > 50 kHz to 50 kHz 50 kHz to 100 kHz0.38 dB / 0.77 dB 0.59 dB / 0.89 dB 0.8 dB / 2.1 dB 1.1 dB / 4.2 dBdB range values are relative to 1 V/Pa 4226 Calibrator-70 dB to 0 dB $31.5 Hz$ $63 Hz$ $125 Hz$ Pressure / Free-field 0.13 dB / 0.20 dBdB range values are relative to 1 V/Pa 4226 Calibrator250 Hz0.09 dB / 0.15 dB1253 Calibrator500 Hz0.13 dB / 0.20 dB1253 Calibrator250 Hz0.13 dB / 0.16 dB4226 Calibrator1 kHz0.11 dB / 0.13 dB1253 Calibrator2 kHz 8 kHz0.13 dB / 0.22 dB4226 Calibrator2 kHz 9 0 dB to 140 dB31.5 Hz (\pm 2 Hz) 63 Hz to 800 Hz0.14 dB / 0.70 dB 0.14 dB / 0.70 dB 0.14 dB / 0.70 dB 0.14 dB / 0.70 dBAcoustical Calibrators and Pistonphones Sound Pressure Level90 dB to 140 dB31.5 Hz (\pm 2 Hz) 63 Hz to 800 Hz 250 Hz (\pm 10 Hz)0.11 dB 0.095 dBdB range values reference conditions			> 4 kHz to 8 kHz	0.17 dB / 0.45 dB	
Frequency Response: Acoustical Method Note 7 Microphone Sensitivity> 16 kHz to 20 kHz > 20 kHz to 50 kHz > 50 kHz to 100 kHz0.59 dB / 0.89 dB 0.8 dB / 2.1 dB 1.1 dB / 4.2 dBdB range values are relative to 1 V/Pa 4226 Calibrator-70 dB to 0 dB31.5 Hz 63 Hz 125 Hz0.09 dB / 0.17 dB 0.13 dB / 0.20 dB 0.13 dB / 0.20 dBdB range values are relative to 1 V/Pa 4226 Calibrator500 Hz0.09 dB / 0.15 dB1253 Calibrator500 Hz0.11 dB / 0.13 dB1253 Calibrator1 kHz0.11 dB / 0.13 dB1253 Calibrator2 kHz 4 kHz0.13 dB / 0.22 dB 0.13 dB / 0.23 dB4226 Calibrator2 kHz 4 kHz0.13 dB / 0.13 dB1253 Calibrator2 kHz 4 kHz0.13 dB / 0.13 dB4226 Calibrator0.3 dB / 0.23 dB 0.13 dB / 0.23 dB0.13 dB / 0.23 dB 0.13 dB / 0.23 dB4226 Calibrator90 dB to 140 dB31.5 Hz (± 2 Hz) 63 Hz to 800 Hz 250 Hz (± 10 Hz)0.11 dB 0.095 dBdB range values relative to 20 µPa Direct Method reference conditions			> 8 kHz to 10 kHz	0.38 dB / 0.57 dB	
Frequency Response: Acoustical Method Note 7 Microphone Sensitivity-70 dB to 0 dB $20 \text{ kHz to 50 kHz} > 50 \text{ kHz to 100 kHz} > 1.1 dB / 4.2 dBdB range values are relative to 1V/Pa4226 Calibrator-70 dB to 0 dB31.5 Hz63 Hz125 Hz0.09 dB / 0.17 dB0.13 dB / 0.20 dB1253 Calibrator250 Hz0.09 dB / 0.15 dB1253 Calibrator500 Hz0.13 dB / 0.20 dB1253 Calibrator1 kHz0.11 dB / 0.13 dB1253 Calibrator2 kHz4 kHz0.13 dB / 0.22 dB0.14 dB / 0.17 dB4226 Calibrator2 kHz4 kHz0.13 dB / 0.23 dB4226 Calibrator1 kHz0.11 dB / 0.13 dB1253 Calibrator90 dB to 140 dB31.5 Hz (± 2 Hz)63 Hz to 800 Hz250 Hz (± 10 Hz)0.11 dB0.10 dB0.095 dB0.11 dB0.10 dB0.095 dB$			> 10 kHz to 16 kHz	0.38 dB / 0.77 dB	
Frequency Response: Acoustical Method Note 7 Microphone Sensitivity> 50 kHz to 100 kHz1.1 dB / 4.2 dBB range values are relative to 1 V/Pa 4226 Calibrator-70 dB to 0 dB31.5 Hz 63 Hz 125 Hz0.13 dB / 0.20 dBB range values are relative to 1 V/Pa 4226 Calibrator250 Hz0.09 dB / 0.15 dB1253 Calibrator500 Hz0.13 dB / 0.20 dB4226 Calibrator500 Hz0.13 dB / 0.16 dB4226 Calibrator1 kHz0.11 dB / 0.13 dB1253 Calibrator2 kHz 4 kHz 12.5 kHz0.13 dB / 0.22 dB 0.13 dB / 0.22 dB 0.14 dB / 0.75 dB4266 Calibrator90 dB to 140 dB31.5 Hz (± 2 Hz) 63 Hz to 800 Hz 250 Hz (± 10 Hz)0.11 dB611 dB 0.10 dB 0.10 dB			> 16 kHz to 20 kHz	0.59 dB / 0.89 dB	
Frequency Response: Acoustical Method Note 7 Microphone Sensitivity-70 dB to 0 dB31.5 Hz 63 Hz 125 HzPressure / Free-field and Diffuse Field 0.14 dB / 0.17 dB 0.13 dB / 0.20 dBB range values are relative to 1 V/Pa 4226 Calibrator-70 dB to 0 dB31.5 Hz 63 Hz 125 Hz0.09 dB / 0.15 dB1253 Calibrator250 Hz0.09 dB / 0.15 dB1253 Calibrator500 Hz0.13 dB / 0.16 dB4226 Calibrator1 kHz0.11 dB / 0.13 dB1253 Calibrator2 kHz 4 kHz0.13 dB / 0.22 dB 0.13 dB / 0.22 dB426 Calibrator2 kHz 4 kHz0.13 dB / 0.22 dB 0.14 dB / 0.13 dB426 Calibrator90 dB to 140 dB31.5 Hz (± 2 Hz) 63 Hz to 800 Hz 250 Hz (± 10 Hz)0.11 dB 0.095 dBB range values relative to 20 µPa Direct Method reference conditions					
Acoustical Method Note 7 Microphone Sensitivity-70 dB to 0 dB31.5 Hz 63 Hz 125 HzPressure / Free-field and Diffuse Field Response 0.13 dB / 0.20 dBdB range values are relative to 1 V/Pa 4226 Calibrator-70 dB to 0 dB31.5 Hz 63 Hz 125 Hz0.09 dB / 0.17 dB 0.13 dB / 0.20 dB1253 Calibrator250 Hz0.09 dB / 0.15 dB1253 Calibrator500 Hz0.13 dB / 0.16 dB4226 Calibrator1 kHz0.11 dB / 0.13 dB1253 Calibrator2 kHz 4 kHz Sound Pressure Level0.13 dB / 0.22 dB 0.14 dB / 0.75 dB4226 Calibrator90 dB to 140 dB31.5 Hz (± 2 Hz) 63 Hz to 800 Hz 250 Hz (± 10 Hz)0.11 dB 0.10 dB 0.10 dB 0.095 dBdB range values reference conditions			> 50 kHz to 100 kHz	1.1 dB / 4.2 dB	
Acoustical Method Microphone Sensitivity-70 dB to 0 dB31.5 Hz 63 Hz 125 Hzand Diffuse Field Response 0.14 dB / 0.17 dB 0.13 dB / 0.20 dBare relative to 1 V/Pa 4226 Calibrator-70 dB to 0 dB31.5 Hz 63 Hz 125 Hz0.09 dB / 0.17 dB 0.13 dB / 0.20 dBare relative to 1 V/Pa 4226 Calibrator250 Hz0.09 dB / 0.15 dB1253 Calibrator500 Hz0.13 dB / 0.16 dB4226 Calibrator1 kHz0.11 dB / 0.13 dB1253 Calibrator2 kHz 4 kHz0.13 dB / 0.22 dB 0.13 dB / 0.22 dB4226 Calibrator2 kHz 4 kHz0.13 dB / 0.22 dB 0.13 dB / 0.32 dB 0.23 dB / 0.75 dB4226 CalibratorPistonphones Sound Pressure Level90 dB to 140 dB31.5 Hz (± 2 Hz) 63 Hz to 800 Hz 250 Hz (± 10 Hz)0.11 dB 0.095 dBdB range values reference conditions	Frequency Response:				
Microphone Sensitivity Microphone Sensitivity-70 dB to 0 dB31.5 Hz 63 Hz 125 HzResponse 0.14 dB / 0.17 dB 0.13 dB / 0.20 dB 0.13 dB / 0.20 dBV/Pa 4226 Calibrator250 Hz0.09 dB / 0.15 dB1253 Calibrator500 Hz0.13 dB / 0.16 dB4226 Calibrator1 kHz0.11 dB / 0.13 dB1253 Calibrator2 kHz 4 kHz0.11 dB / 0.13 dB1253 Calibrator2 kHz 4 kHz0.13 dB / 0.22 dB 0.13 dB / 0.23 dB4226 Calibrator2 kHz 4 kHz0.13 dB / 0.22 dB 0.14 dB / 0.32 dB 0.14 dB / 0.70 dB 0.23 dB / 0.75 dB4226 Calibrator90 dB to 140 dB31.5 Hz (± 2 Hz) 63 Hz to 800 Hz 250 Hz (± 10 Hz)0.11 dB 0.095 dBdB range values reference conditions					
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$				and Diffuse Field	
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	Microphone Sensitivity				
Acoustical Calibrators and Pistonphones 90 dB to 140 dB 125 Hz 0.13 dB / 0.20 dB 1253 Calibrator 90 dB to 140 dB 31.5 Hz (± 2 Hz) 63 Hz to 800 Hz 0.11 dB 0.13 dB / 0.12 dB 4226 Calibrator 11 dB / 0.13 dB 1253 Calibrator 1 kHz 0.11 dB / 0.13 dB 1253 Calibrator 1 kHz 0.11 dB / 0.13 dB 1253 Calibrator 1253 Calibrator 1 kHz 0.11 dB / 0.13 dB 1253 Calibrator 1 kHz 0.13 dB / 0.22 dB 0.13 dB / 0.32 dB 0.14 dB / 0.70 dB 0.10 dB 0.10 dB 4226 Calibrator		-70 dB to 0 dB			4226 Calibrator
Acoustical Calibrators and Pistonphones Sound Pressure Level90 dB to 140 dB250 Hz0.09 dB / 0.15 dB1253 Calibrator90 dB to 140 dB31.5 Hz (± 2 Hz) 63 Hz to 800 Hz 250 Hz (± 10 Hz)0.11 dB0.13 dB / 0.22 dB 0.13 dB / 0.22 dB 0.13 dB / 0.23 dB 0.14 dB / 0.75 dB4226 CalibratorAcoustical Calibrators and Pistonphones Sound Pressure Level90 dB to 140 dB31.5 Hz (± 2 Hz) 63 Hz to 800 Hz 250 Hz (± 10 Hz)0.11 dB 0.095 dB0.11 dB 0.095 dBdB range values reference conditions					
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$			125 Hz	0.13 dB / 0.20 dB	
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$					
$\begin{array}{cccc} Acoustical Calibrators and Pistonphones \\ Sound Pressure Level \end{array} \begin{array}{c} 90 \ dB \ to \ 140 \ dB \end{array} \begin{array}{c} 1 \ kHz \\ 2 \ kHz \\ 4 \ kHz \\ 50 \ Hz \ to \ 800 \ Hz \\ 250 \ Hz \ (\pm 10 \ Hz) \end{array} \begin{array}{c} 0.11 \ dB \ / \ 0.13 \ dB \ / \ 0.22 \ dB \\ 0.13 \ dB \ / \ 0.22 \ dB \\ 0.13 \ dB \ / \ 0.22 \ dB \\ 0.13 \ dB \ / \ 0.22 \ dB \\ 0.14 \ dB \ / \ 0.23 \ dB \ / \ 0.23 \ dB \ / \ 0.75 \ dB \end{array} \begin{array}{c} 4226 \ Calibrator \\ 4 \ kHz \\ 0.13 \ dB \ / \ 0.70 \ dB \\ 0.23 \ dB \ / \ 0.75 \ dB \end{array} \begin{array}{c} dB \ range \ values \\ relative \ to \ 20 \ \muPa \\ Direct \ Method \\ 0.10 \ dB \\ reference \ conditions \end{array}$			250 Hz	0.09 dB / 0.15 dB	1253 Calibrator
$\begin{array}{c} \mbox{Acoustical Calibrators and} \\ \mbox{Pistonphones} \\ \mbox{Sound Pressure Level} \end{array} \begin{array}{c} \mbox{90 dB to 140 dB} & 11 \mbox{ km mmodel} \\ \mbox{90 dB to 140 dB} & 1253 \mbox{ calibrator} \\ \mbox{31.5 Hz (\pm 2 \mbox{ Hz} \\ 250 \mbox{ Hz (}\pm 10 \mbox{ Hz}) \end{array} \end{array} \begin{array}{c} \mbox{0.11 dB / 0.13 dB} & 0.22 \mbox{ dB} \\ \mbox{0.13 dB / 0.22 dB} \\ \mbox{0.13 dB / 0.23 dB} & 0.14 \mbox{ dB / 0.23 dB} \\ \mbox{0.14 dB / 0.70 dB} \\ \mbox{0.14 dB / 0.70 dB} \\ \mbox{0.13 dB / 0.75 dB} \end{array} \begin{array}{c} \mbox{4226 Calibrator} \\ \mbox{4 kHz} \\ \mbox{16 kHz} \end{array} \end{array}$			500 Hz	0.13 dB / 0.16 dB	4226 Calibrator
$\begin{array}{c} 2 \text{ kHz} \\ 4 \text{ kHz} \\ 6 \text{ kHz} \\ 12.5 \text{ kHz} \\ 12.5 \text{ kHz} \\ 16 \text{ kHz} \end{array} \begin{array}{c} 0.13 \text{ dB} / 0.22 \text{ dB} \\ 0.13 \text{ dB} / 0.32 \text{ dB} \\ 0.14 \text{ dB} / 0.70 \text{ dB} \\ 0.14 \text{ dB} / 0.70 \text{ dB} \\ 0.23 \text{ dB} / 0.75 \text{ dB} \end{array} \begin{array}{c} 4226 \text{ Calibrator} \\ 48 \text{ kHz} \\ 12.5 \text{ kHz} \\ 16 \text{ kHz} \end{array} \begin{array}{c} 0.13 \text{ dB} / 0.32 \text{ dB} \\ 0.14 \text{ dB} / 0.70 \text{ dB} \\ 0.23 \text{ dB} / 0.75 \text{ dB} \end{array} \begin{array}{c} 48 \text{ c} \text{ and } and$					
Acoustical Calibrators and Pistonphones Sound Pressure Level90 dB to 140 dB $31.5 Hz (\pm 2 Hz) \\ 63 Hz to 800 Hz \\ 250 Hz (\pm 10 Hz)0.13 dB / 0.32 dB \\ 0.14 dB / 0.44 dB \\ 0.14 dB / 0.70 dB \\ 0.23 dB / 0.75 dBdB range values relative to 20 \muPaMathematical Calibrators andPistonphonesSound Pressure Level90 dB to 140 dB31.5 Hz (\pm 2 Hz) \\ 63 Hz to 800 Hz \\ 250 Hz (\pm 10 Hz)0.11 dB \\ 0.10 dBDirect Method$			1 kHz	0.11 dB / 0.13 dB	1253 Calibrator
Acoustical Calibrators and Pistonphones Sound Pressure Level90 dB to 140 dB $31.5 Hz (\pm 2 Hz) \\ 63 Hz to 800 Hz \\ 250 Hz (\pm 10 Hz)$ $0.13 dB / 0.32 dB \\ 0.14 dB / 0.44 dB \\ 0.14 dB / 0.70 dB \\ 0.23 dB / 0.75 dB$ dB range values relative to 20 μ PaMathematical Calibrators and Pistonphones Sound Pressure Level90 dB to 140 dB $31.5 Hz (\pm 2 Hz) \\ 63 Hz to 800 Hz \\ 250 Hz (\pm 10 Hz)$ $0.10 dB \\ 0.095 dB$ The ference conditions			2 kHz	0.13 dB / 0.22 dB	4226 Calibrator
Acoustical Calibrators and Pistonphones Sound Pressure Level90 dB to 140 dB31.5 Hz (± 2 Hz) (± 10 Hz)0.14 dB / 0.44 dB (0.14 dB / 0.70 dB) (0.14 dB / 0.70 dB) (0.23 dB / 0.75 dB)dB range values relative to 20 μPa Direct Method490 dB to 140 dB31.5 Hz (± 2 Hz) (± 10 Hz)0.11 dB (0.10 dB) (0.095 dB)Direct Method					0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
Acoustical Calibrators and Pistonphones Sound Pressure Level90 dB to 140 dB12.5 kHz 16 kHz0.14 dB / 0.70 dB 0.23 dB / 0.75 dBdB range values relative to 20 μPa90 dB to 140 dB31.5 Hz (± 2 Hz) 63 Hz to 800 Hz 250 Hz (± 10 Hz)0.11 dB 0.10 dB 0.095 dBDirect Method					
Acoustical Calibrators and Pistonphones Sound Pressure Level16 kHz0.23 dB / 0.75 dBdB range values relative to 20 μPa90 dB to 140 dB31.5 Hz (± 2 Hz) 63 Hz to 800 Hz 250 Hz (± 10 Hz)0.11 dB 0.10 dB 0.095 dBDirect Method					
Acoustical Calibrators and Pistonphones90 dB to 140 dB31.5 Hz (± 2 Hz)0.11 dB 0.10 dBdB range values relative to 20 μPaSound Pressure Level90 dB to 140 dB31.5 Hz (± 2 Hz)0.10 dBDirect Method63 Hz to 800 Hz0.10 dB0.10 dBreference conditions					
Pistonphones Sound Pressure Level90 dB to 140 dB31.5 Hz (± 2 Hz) 63 Hz to 800 Hz 250 Hz (± 10 Hz)0.11 dB 0.10 dB 0.095 dBrelative to 20 μPa Direct Method	Acoustical Calibrators and				dB range values
Sound Pressure Level90 dB to 140 dB $31.5 \text{ Hz} (\pm 2 \text{ Hz})$ 0.11 dB Direct Method $63 \text{ Hz} to 800 \text{ Hz}$ 0.10 dB 0.10 dB reference conditions					
63 Hz to 800 Hz 0.10 dB 250 Hz (± 10 Hz) 0.095 dB		90 dB to 140 dB	31.5 Hz (± 2 Hz)	0.11 dB	
				0.10 dB	
			250 Hz (± 10 Hz)	0.095 dB	reference conditions
			250 Hz (± 10 Hz)	0.092 dB	

CALIBRATION AND MEASUREMENT CAPABILITIES (CMC)^{Notes 1,2}

2021-03-25 through 2022-03-31 Effective dates



NVLAP LAB CODE 200625-0

		Expanded	
Range	Frequency Range	Uncertainty Note 3,5,8	Remarks
	1 kHz (± 40 Hz)	0.11 dB	reference conditions
	$1 \text{ kHz} (\pm 40 \text{ Hz})$	0.10 dB	
	1250 Hz to 5 kHz	0.11 dB	
	6.3 kHz to 8 kHz	0.14 dB	
	10 kHz to 12.5 kHz	0.16 dB	
	16 kHz	0.21 dB	
90 dB to 140 dB	20 Hz to 20 kHz	0.03 dB	1504A
		Pressure / Free-field	
		and Diffuse Field	dB range values
		Response	relative to 20 µPa
114 dB			4226 Calibrator
	250 Hz	0.14 dB / 0.15 dB	
124 dB	250 Hz	0.09 dB / 0.11 dB	1253 Calibrator
94 dB, 104 dB,			
114 dB	500 Hz	0.14 dB / 0.15 dB	4226 Calibrator
	1 kHz	0.13 dB / 0.13 dB	
124 dB	1 kHz	0.12 dB / 0.13 dB	1253 Calibrator
94 dB, 104 dB,			
	2 kHz	0.14 dB / 0.20 dB	4226 Calibrator
	16 kHz		
			dB range values
			relative to 20μ Pa
80 dB to 100 dB	2 kHz	0.15 dB	4226 Calibrator
	90 dB to 140 dB 94 dB, 104 dB, 114 dB 124 dB 94 dB, 104 dB, 114 dB 124 dB 94 dB, 104 dB, 114 dB	1 kHz (± 40 Hz) 1 kHz (± 40 Hz) 1250 Hz to 5 kHz 6.3 kHz to 8 kHz 10 kHz to 12.5 kHz 16 kHz 90 dB to 140 dB 20 Hz to 20 kHz 94 dB, 104 dB, 31.5 Hz 114 dB 31.5 Hz 125 Hz 250 Hz 124 dB 250 Hz 94 dB, 104 dB, 1 114 dB 500 Hz 1 kHz 1 kHz 124 dB 1 kHz 94 dB, 104 dB, 1 kHz 114 dB 2 kHz 1 kHz 1 kHz 124 dB 1 kHz 14 dB 2 kHz 14 dB 1 kHz 14 dB 1 kHz 16 kHz 1 kHz	$\begin{array}{cccccccccccccccccccccccccccccccccccc$

2021-03-25 through 2022-03-31 Effective dates



NVLAP LAB CODE 200625-0

Measured Parameter or			Expanded	
Device Calibrated	Range	Frequency Range	Uncertainty Note 3,5,8	Remarks
Timed Sounds				
Measuring Equipment –				
Generate	94 dB	1 kHz	0.01 % dose	
	104 dB	1 kHz	0.03 % dose	
	114 dB	1 kHz	0.12 % dose	
	124 dB	1 kHz	0.26 % dose	
PIR Intensity Probe	0 dB to 60 dB	40 Hz to 10 kHz	2.5 dB	Broadband Noise
VIBRATION (20/M11)				
Exciters and Vibration				
Calibrators				
Acceleration – Measure	0.1 m/s^2 to 110 m/s^2	10 Hz to 100 Hz	1.1 %	
		> 100 Hz to 160 Hz	1.0 %	
		> 160 Hz to 1 kHz	1.1 %	
		> 1 kHz to 5 kHz	1.1 %	
		> 5 kHz to 10 kHz	1.3 %	
Accelerometers				
	$0.03 \text{ mV}/(\text{m/s}^2)$ to			Comparison
Sensitivity (Volts)	$5 V/(m/s^2)$	10 Hz to 20 Hz	1.4 %	Method
		21 Hz to 99 Hz	1.3 %	
		100 Hz to 160 Hz	1.0 %	
		161 Hz to 1 kHz	1.2 %	
		> 1 kHz to < 5 kHz	1.9 %	
		5 kHz to $<$ 8 kHz	2.7 %	
		8 kHz to 10 kHz	3.1 %	
	$0.03 \text{ pC}/(\text{m/s}^2)$ to			Comparison
Sensitivity (Coulombs)	1 nC/(m/s^2)	10 Hz to 20 Hz	1.4%	Method
•	, ,	21 Hz to 99 Hz	1.3 %	
		100 Hz to 160 Hz	1.0 %	
		161 Hz to 1 kHz	1.2 %	
		> 1 kHz to < 5 kHz	1.9 %	
		5 kHz to < 8 kHz	2.7 %	
		8 kHz to 10 kHz	3.1 %	

CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) Notes 1,2

Atta & Laman

2021-03-25 through 2022-03-31 Effective dates



NVLAP LAB CODE 200625-0

Measured Parameter or Device Calibrated	Range	Frequency Range	Expanded Uncertainty Note 3,5,8	Remarks
Velocity Sensors	0.03 mV/(m/s ²) to 5 V/(m/s ²)	10 Hz to 20 Hz 21 Hz to 99 Hz 100 Hz to 160 Hz 161 Hz to 1 kHz > 1 kHz to < 5 kHz 5 kHz to < 8 kHz 8 kHz to 10 kHz	1.4 % 1.3 % 1.0 % 1.2 % 1.9 % 2.7 % 3.1 %	Comparison Method
		END		

CALIBRATION AND MEASUREMENT CAPABILITIES (CMC)^{Notes 1,2}

2021-03-25 through 2022-03-31 Effective dates



NVLAP LAB CODE 200625-0

Notes

Note 1: A Calibration and Measurement Capability (CMC) is a description of the best result of a calibration or measurement (result with the smallest uncertainty of measurement) that is available to the laboratory's customers under normal conditions, when performing more or less routine calibrations of nearly ideal measurement standards or instruments. The CMC is described in the laboratory's scope of accreditation by: the measurement parameter/device being calibrated, the measurement range, the uncertainty associated with that range (see note 3), and remarks on additional parameters, if applicable.

Note 2: Calibration and Measurement Capabilities are traceable to the national measurement standards of the U.S. or to the national measurement standards of other countries and are thus traceable to the internationally accepted representation of the appropriate SI (Système International) unit.

Note 3: The uncertainty associated with a measurement in a CMC is an expanded uncertainty with a level of confidence of approximately 95 %, typically using a coverage factor of k = 2. However, laboratories may report a coverage factor different than k = 2 to achieve the 95 % level of confidence. Units for the measurand and its uncertainty are to match. Exceptions to this occur when marketplace practice employs mixed units, such as when the artifact to be measured is labeled in non-SI units and the uncertainty is given in SI units (Example: 5 lb weight with uncertainty given in mg).

Note 3a: The uncertainty of a specific calibration by the laboratory may be greater than the uncertainty in the CMC due to the condition and behavior of the customer's device and specific circumstances of the calibration. The uncertainties quoted do not include possible effects on the calibrated device of transportation, long term stability, or intended use.

Note 3b: As the CMC represents the best measurement results achievable under normal conditions, the accredited calibration laboratory shall not report smaller uncertainty of measurement than that given in a CMC for calibrations or measurements covered by that CMC.

Note 3c: As described in Note 1, CMCs cover calibrations and measurements that are available to the laboratory's customers under *normal conditions*. However, the laboratory may have the capability to offer special tests, employing special conditions, which yield calibration or measurement results with lower uncertainties. Such special tests are not covered by the CMCs and are outside the laboratory's scope of accreditation. In this case, NVLAP requirements for the labeling, on calibration reports, of results outside the laboratory's scope of accreditation apply. These requirements are set out in Annex A.5 of NIST Handbook 150, Procedures and General Requirements.

Note 4: Uncertainties associated with field service calibration may be greater as they incorporate on-site environmental contributions, transportation effects, or other factors that affect the measurements. (This note applies only if marked in the body of the scope.)

Note 5: Values listed with percent (%) are percent of reading or generated value unless otherwise noted.

Note 6: NVLAP accreditation is the formal recognition of specific calibration capabilities. Neither NVLAP nor NIST guarantee the accuracy of individual calibrations made by accredited laboratories.

Note 7: The Free-field and Diffuse Field Responses characteristics are calculated using the measured actuator/pressure response and the correction coefficients provided by the manufacturer of the tested device.

Note 8: Unless otherwise specified, uncertainties are given at actual conditions.

2021-03-25 through 2022-03-31 Effective dates