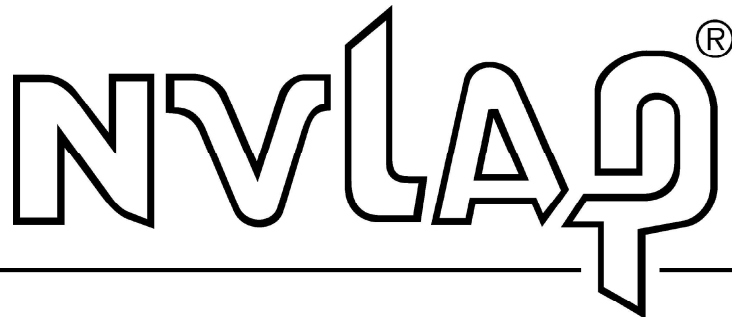


United States Department of Commerce
National Institute of Standards and Technology



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).*

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A handwritten signature in blue ink, reading "Dana S. Laman".

For the National Voluntary Laboratory Accreditation Program

CALIBRATION LABORATORIES

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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: s.marshall@scantekinc.com URL: http://www.scantekinc.com	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)
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CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) Notes 1,2

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

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CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) Notes 1,2

Measured Parameter or Device Calibrated	Range	Frequency Range	Expanded Uncertainty <small>Note 3,5,8</small>	Remarks
LF AC VOLTAGE (20/E09)				
AC Voltage – Generate Sine, Square, two-tone	10 μV_{pp} to 40 V_{pp}	0.001 Hz to 200 kHz	1.1 %	Stanford Research (SR) DS360
Sine or square bursts	10 μV_{pp} to 40 V_{pp}	0.001 Hz to 200 kHz	1.1 %	SR DS360
Broadband noise: white	10 μV_{pp} to 40 V_{pp}	1 Hz to 100 kHz (CF: 11 dB)	1 dB	measured with 1/3 octave analysis
Broadband noise: pink	10 μV_{pp} to 40 V_{pp}	10 Hz – 200 kHz (CF: 12 dB)	2 dB	
AC Voltage Transfer – Measuring equipment: Measure	1 mV to 100 mV	10 Hz to 50 kHz 50 kHz to 200 kHz	0.001 % + 2 μV 0.001 % + 5 μV	Agilent 34401A
	100 mV to 1 V	10 Hz to 50 kHz 50 kHz to 200 kHz	0.001 % + 20 μV 0.001 % + 50 μV	
	1 V 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	
AC Voltage: True RMS	100 V to 750 V	10 Hz to 50 kHz 50 kHz to 200 kHz	0.001 % + 15 mV 0.001 % + 38 mV	N-1504A System
	50 μV to 1 mV	20 Hz to 20 kHz 3 Hz to 100 kHz	0.24 dB 0.40 dB	
	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	

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CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) Notes 1,2

Measured Parameter or Device Calibrated	Range	Frequency Range	Expanded Uncertainty Note 3,5,8	Remarks
	100 mV to 1 V	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	
	1 V to 10 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	
	10 V to 100 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	
	100 V to 750 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	
Self-Generated Noise	1 µV to 10 V > 30 µV	0.1 Hz to 20 kHz	0.85 dB	840 RTA HP 8903A
		20 Hz to 80 kHz	2 dB	

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CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) Notes 1,2

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

FREQUENCY DISSEMINATION (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 μ V _{pp} to 40 V _{pp}	0.001 Hz to 200 kHz	61 μ Hz/Hz + 4 mHz	SR DS360
Time intervals	> 8 s		1 s	Chronometer

OSCILLATOR CHARACTERISTICS (20/F03)

Signal Distortion Signal Level Range: 100 mV to 10 V			(0.07D + 0.03) THD (where D is % THD)	
50 mV to 300 V	> 0.1 % THD > 0.01 % THD	6 Hz to 20 kHz 20 kHz to 100 kHz	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

MECHANICAL

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 and Diffuse Field Response	dB range values are relative to 1 V/Pa dB range values are relative to 1 V/Pa
Frequency Response: Electrostatic Excitation Note 7				

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CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) Notes 1,2

Measured Parameter or Device Calibrated	Range	Frequency Range	Expanded Uncertainty <small>Note 3,5,8</small>	Remarks
(for condenser microphones with removable grid)	-70 dB to 0 dB	31.5 Hz to 100 Hz > 100 Hz to 1.25 kHz > 1.25 kHz to 4 kHz > 4 kHz to 8 kHz > 8 kHz to 10 kHz > 10 kHz to 16 kHz > 16 kHz to 20 kHz > 20 kHz to 50 kHz > 50 kHz to 100 kHz	0.20 dB / 0.20 dB 0.14 dB / 0.18 dB 0.14 dB / 0.23 dB 0.17 dB / 0.45 dB 0.38 dB / 0.57 dB 0.38 dB / 0.77 dB 0.59 dB / 0.89 dB 0.8 dB / 2.1 dB 1.1 dB / 4.2 dB	
Frequency Response:				
Acoustical Method <small>Note 7</small>				
Microphone Sensitivity	-70 dB to 0 dB	31.5 Hz 63 Hz 125 Hz 250 Hz 500 Hz 1 kHz 2 kHz 4 kHz 8 kHz 12.5 kHz 16 kHz	Pressure / Free-field and Diffuse Field Response 0.14 dB / 0.17 dB 0.13 dB / 0.20 dB 0.13 dB / 0.20 dB 0.09 dB / 0.15 dB 0.13 dB / 0.16 dB 0.11 dB / 0.13 dB 0.13 dB / 0.22 dB 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 are relative to 1 V/Pa 4226 Calibrator 1253 Calibrator 4226 Calibrator 1253 Calibrator 4226 Calibrator
Acoustical Calibrators and Pistonphones				
Sound Pressure Level	90 dB to 140 dB	31.5 Hz (± 2 Hz) 63 Hz to 800 Hz 250 Hz (± 10 Hz) 250 Hz (± 10 Hz)	0.11 dB 0.10 dB 0.095 dB 0.092 dB	dB range values relative to 20 μ Pa Direct Method reference conditions

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CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) Notes 1,2

Measured Parameter or Device Calibrated	Range	Frequency Range	Expanded Uncertainty <small>Note 3,5,8</small>	Remarks
Sound Level Stability Sound Level Meters, Dosimeters, Real-time and FFT analyzers, Filter sets <small>Note 7</small> Sound Pressure Level: Fixed points, Tones	90 dB to 140 dB	1 kHz (± 40 Hz)	0.11 dB	reference conditions
		1 kHz (± 40 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	
	94 dB, 104 dB, 114 dB	20 Hz to 20 kHz	0.03 dB	1504A
			Pressure / Free-field and Diffuse Field Response	dB range values relative to 20 μ Pa
		31.5 Hz	0.15 dB / 0.20 dB	4226 Calibrator
		63 Hz	0.14 dB / 0.20 dB	
		125 Hz	0.14 dB / 0.20 dB	
		250 Hz	0.14 dB / 0.15 dB	
		250 Hz	0.09 dB / 0.11 dB	1253 Calibrator
		500 Hz 1 kHz	0.14 dB / 0.15 dB 0.13 dB / 0.13 dB	4226 Calibrator
Tone Burst Sounds	124 dB	1 kHz	0.12 dB / 0.13 dB	1253 Calibrator
	94 dB, 104 dB, 114 dB	2 kHz 4 kHz 8 kHz 12.5 kHz 16 kHz	0.14 dB / 0.20 dB 0.14 dB / 0.25 dB 0.14 dB / 0.45 dB 0.15 dB / 0.70 dB 0.25 dB / 0.75 dB	4226 Calibrator
	80 dB to 100 dB	2 kHz	0.15 dB	dB range values relative to 20 μ Pa 4226 Calibrator

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CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) Notes 1,2

Measured Parameter or Device Calibrated	Range	Frequency Range	Expanded Uncertainty <small>Note 3,5,8</small>	Remarks
Timed Sounds Measuring Equipment – Generate	94 dB 104 dB 114 dB 124 dB	1 kHz 1 kHz 1 kHz 1 kHz	0.01 % dose 0.03 % dose 0.12 % dose 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 > 100 Hz to 160 Hz > 160 Hz to 1 kHz > 1 kHz to 5 kHz > 5 kHz to 10 kHz	1.1 % 1.0 % 1.1 % 1.1 % 1.3 %	
Accelerometers Sensitivity (Volts)	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
Sensitivity (Coulombs)	0.03 pC/(m/s ²) to 1 nC/(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

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CALIBRATION AND MEASUREMENT CAPABILITIES (CMC) Notes 1,2

Measured Parameter or Device Calibrated	Range	Frequency Range	Expanded Uncertainty <small>Note 3,5,8</small>	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				

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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.

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