

Calibration Certificate

Certificate Number 2020003515

Customer:

The Modal Shop
3149 East Kemper Road
Cincinnati, OH 45241, United States

Model Number 831C
Serial Number 10743
Test Results **Pass**

Initial Condition AS RECEIVED same as shipped

Description Larson Davis Model 831C
Class 1 Sound Level Meter
Firmware Revision: 04.0.8R0

Procedure Number D0001.8378
Technician Ron Harris
Calibration Date 16 Mar 2020

Calibration Due
Temperature 23.6 °C ± 0.25 °C
Humidity 52.5 %RH ± 2.0 %RH
Static Pressure 86.03 kPa ± 0.13 kPa

Evaluation Method Tested electrically using Larson Davis PRM831 S/N 036756 and a 12.0 pF capacitor to simulate microphone capacitance. Data reported in dB re 20 µPa assuming a microphone sensitivity of 50.0 mV/Pa.

Compliance Standards Compliant to Manufacturer Specifications and the following standards when combined with Calibration Certificate from procedure D0001.8384:

IEC 60651:2001 Type 1	ANSI S1.4-2014 Class 1
IEC 60804:2000 Type 1	ANSI S1.4 (R2006) Type 1
IEC 61672:2013 Class 1	ANSI S1.43 (R2007) Type 1
IEC 61260:2014 Class 1	ANSI S1.11-2014 Class 1

Issuing lab certifies that the instrument described above meets or exceeds all specifications as stated in the referenced procedure (unless otherwise noted). It has been calibrated using measurement standards traceable to the International System of Units (SI) through the National Institute of Standards and Technology (NIST), or other national measurement institutes, and meets the requirements of ISO/IEC 17025:2005. **Test points marked with a ‡ in the uncertainties column do not fall within this laboratory's scope of accreditation.**

The quality system is registered to ISO 9001:2015.

This calibration is a direct comparison of the unit under test to the listed reference standards and did not involve any sampling plans to complete. No allowance has been made for the instability of the test device due to use, time, etc. Such allowances would be made by the customer as needed.

The uncertainties were computed in accordance with the ISO Guide to the Expression of Uncertainty in Measurement (GUM). A coverage factor of approximately 2 sigma (k=2) has been applied to the standard uncertainty to express the expanded uncertainty at approximately 95% confidence level.

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Correction data from Larson Davis SoundAdvisor Model 831C Reference Manual, I831C.01 Rev M, 2019-09-10

Calibration Check Frequency: 1000 Hz; Reference Sound Pressure Level: 114 dB re 20 µPa; Reference Range: 0 dB gain

Periodic tests were performed in accordance with procedures from IEC 61672-3:2013 / ANSI/ASA S1.4-2014/Part3.

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No Pattern approval for IEC 61672-1:2013 / ANSI/ASA S1.4-2014/Part 1 available.

The sound level meter submitted for testing successfully completed the periodic tests of IEC 61672-3:2013 / ANSI/ASA S1.4-2014/Part 3, for the environmental conditions under which the tests were performed. However, no general statement or conclusion can be made about conformance of the sound level meter to the full specifications of IEC 61672-1:2013 / ANSI/ASA S1.4-2014/Part 1 because (a) evidence was not publicly available, from an independent testing organization responsible for pattern approvals, to demonstrate that the model of sound level meter fully conformed to the class 1 specifications in IEC 61672-1:2013 / ANSI/ASA S1.4-2014/Part 1 or correction data for acoustical test of frequency weighting were not provided in the Instruction Manual and (b) because the periodic tests of IEC 61672-3:2013 / ANSI/ASA S1.4-2014/Part 3 cover only a limited subset of the specifications in IEC 61672-1:2013 / ANSI/ASA S1.4-2014/Part 1.

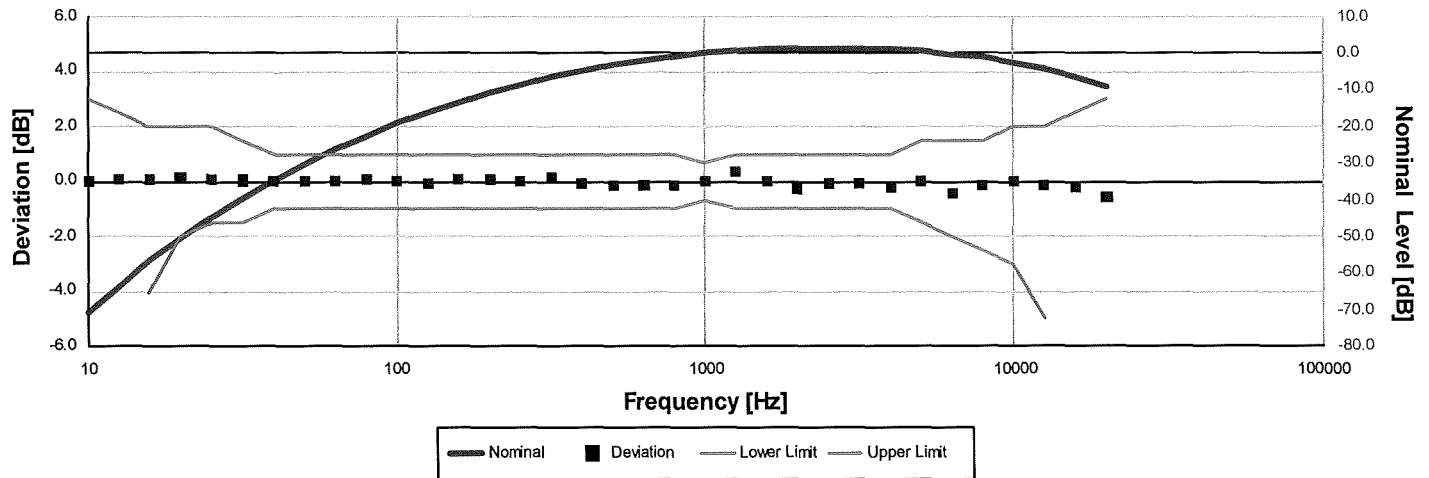
Periodic tests were performed in accordance with procedures from IEC 61260-3:2016 Part 3 and ANSI/ASA S1.11-2016 Part 3.

No Pattern approval for IEC 61260-1:2014 Part 1 and ANSI/ASA S1.11-2014 Part 1 available.

The filter submitted for testing successfully completed the periodic tests of IEC 61260-3:2016 Part 3 and ANSI/ASA S1.11-2016 Part 3, for the environmental conditions under which the tests were performed. However, no general statement or conclusion can be made about conformance of the filter to the full specifications of IEC 61260-1:2014 Part 1 and ANSI/ASA S1.11-2014 Part 1 because (a) evidence was not publicly available, from an independent testing organization responsible for pattern approvals, to demonstrate that the model of filter fully conformed to the class 1 specifications in IEC 61260-1:2014 Part 1 and ANSI/ASA S1.11-2014 Part 1 and (b) because the periodic tests of IEC 61260-3:2016 Part 3 and ANSI/ASA S1.11-2016 Part 3 cover only a limited subset of the specifications in IEC 61260-1:2014 Part 1 and ANSI/ASA S1.11-2014 Part 1.

Standards Used			
Description	Cal Date	Cal Due	Cal Standard
SRS DS360 Ultra Low Distortion Generator	2019-06-14	2020-06-14	006311
Hart Scientific 2626-S Humidity/Temperature Sensor	2019-07-18	2020-07-18	006946

A-weight Filter Response



Electrical signal test of frequency weighting performed according to IEC 61672-3:2013 13 and ANSI S1.4-2014 Part 3: 13 for compliance to IEC 61672-1:2013 5.5; IEC 60651:2001 6.1 and 9.2.2; IEC 60804:2000 5; ANSI S1.4:1983 (R2006) 5.1 and 8.2.1; ANSI S1.4-2014 Part 1: 5.5

Frequency [Hz]	Test Result [dB]	Deviation [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
10.00	-70.39	0.01	-inf	3.00	0.25	Pass
12.59	-63.30	0.10	-inf	2.50	0.25	Pass
15.85	-56.63	0.07	-4.00	2.00	0.25	Pass
19.95	-50.33	0.17	-2.00	2.00	0.25	Pass
25.12	-44.62	0.08	-1.50	2.00	0.25	Pass
31.62	-39.36	0.04	-1.50	1.50	0.25	Pass
39.81	-34.57	0.03	-1.00	1.00	0.25	Pass
50.12	-30.18	0.02	-1.00	1.00	0.25	Pass
63.10	-26.16	0.04	-1.00	1.00	0.25	Pass
79.43	-22.43	0.07	-1.00	1.00	0.25	Pass
100.00	-19.12	-0.02	-1.00	1.00	0.25	Pass
125.89	-16.14	-0.04	-1.00	1.00	0.25	Pass
158.49	-13.31	0.09	-1.00	1.00	0.25	Pass
199.53	-10.84	0.06	-1.00	1.00	0.25	Pass
251.19	-8.60	0.00	-1.00	1.00	0.25	Pass
316.23	-6.47	0.13	-1.00	1.00	0.25	Pass
398.11	-4.89	-0.09	-1.00	1.00	0.25	Pass
501.19	-3.34	-0.14	-1.00	1.00	0.25	Pass
630.96	-2.06	-0.16	-1.00	1.00	0.25	Pass
794.33	-0.95	-0.15	-1.00	1.00	0.25	Pass
1,000.00	0.00	0.00	-0.70	0.70	0.25	Pass
1,258.93	0.95	0.35	-1.00	1.00	0.25	Pass
1,584.89	1.01	0.01	-1.00	1.00	0.25	Pass
1,995.26	0.95	-0.25	-1.00	1.00	0.25	Pass
2,511.89	1.21	-0.09	-1.00	1.00	0.25	Pass
3,162.28	1.16	-0.04	-1.00	1.00	0.25	Pass
3,981.07	0.77	-0.23	-1.00	1.00	0.25	Pass
5,011.87	0.48	-0.02	-1.50	1.50	0.25	Pass
6,309.57	-0.53	-0.43	-2.00	1.50	0.25	Pass
7,943.28	-1.26	-0.16	-2.50	1.50	0.25	Pass
10,000.00	-2.48	0.02	-3.00	2.00	0.25	Pass
12,589.25	-4.42	-0.12	-5.00	2.00	0.25	Pass
15,848.93	-6.82	-0.22	-16.00	2.50	0.25	Pass
19,952.62	-9.85	-0.55	-inf	3.00	0.25	Pass

-- End of measurement results--

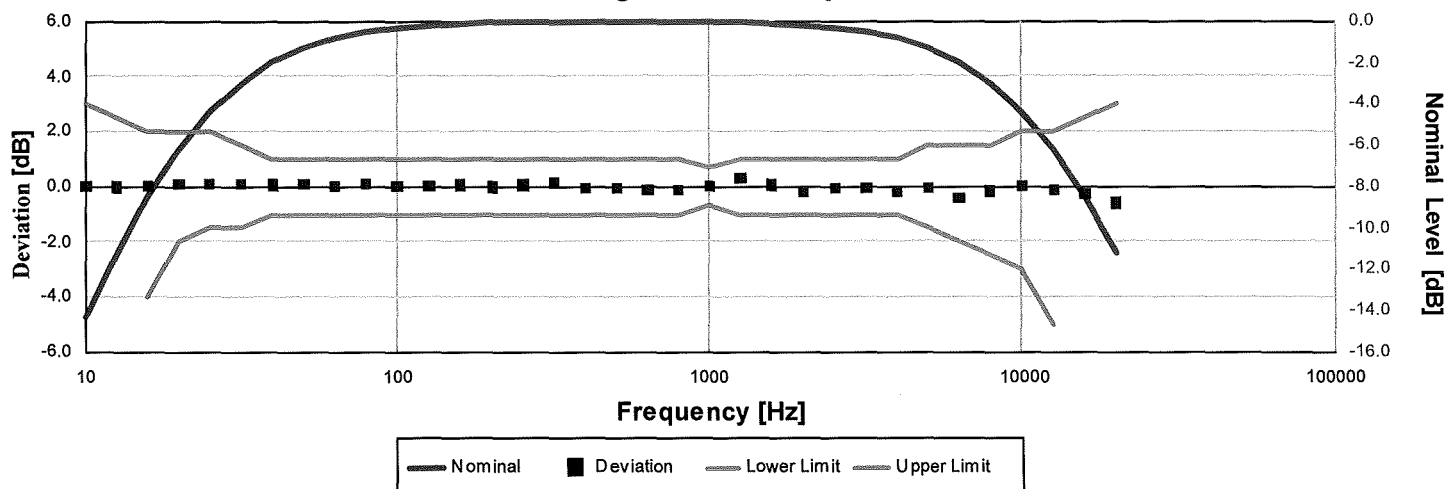
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C-weight Filter Response

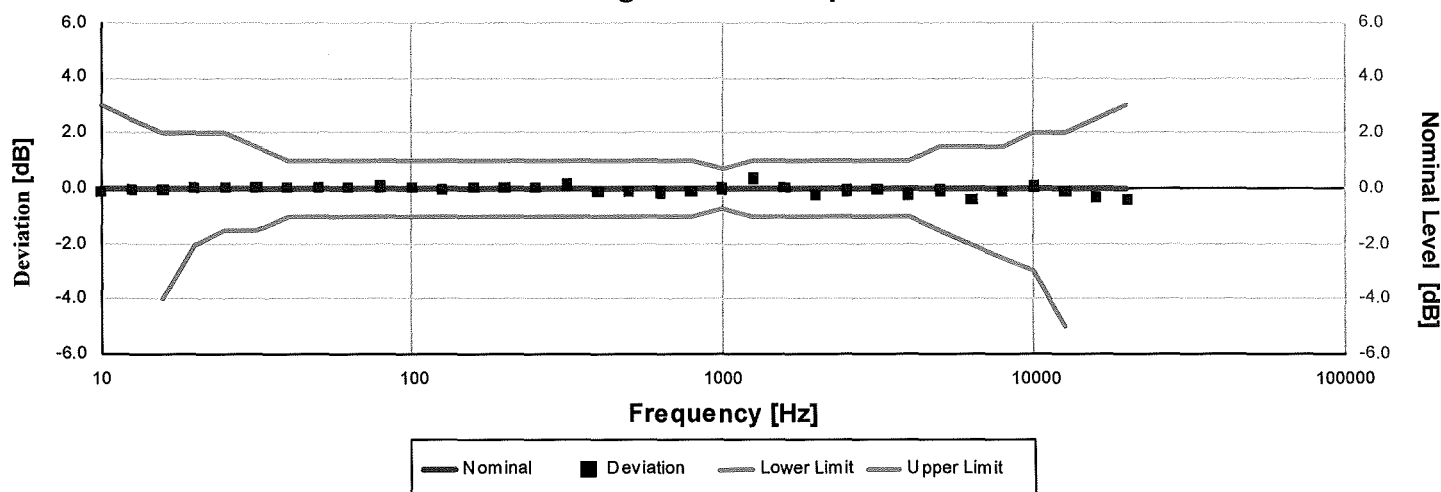


Electrical signal test of frequency weighting performed according to IEC 61672-3:2013 13 and ANSI S1.4-2014 Part 3: 13 for compliance to IEC 61672-1:2013 5.5; IEC 60651:2001 6.1 and 9.2.2; IEC 60804:2000 5; ANSI S1.4:1983 (R2006) 5.1 and 8.2.1; ANSI S1.4-2014 Part 1: 5.5

Frequency [Hz]	Test Result [dB]	Deviation [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
10.00	-14.30	0.00	-inf	3.00	0.25	Pass
12.59	-11.23	-0.03	-inf	2.50	0.25	Pass
15.85	-8.47	0.03	-4.00	2.00	0.25	Pass
19.95	-6.12	0.08	-2.00	2.00	0.25	Pass
25.12	-4.32	0.08	-1.50	2.00	0.25	Pass
31.62	-2.92	0.08	-1.50	1.50	0.25	Pass
39.81	-1.94	0.06	-1.00	1.00	0.25	Pass
50.12	-1.21	0.09	-1.00	1.00	0.25	Pass
63.10	-0.79	0.01	-1.00	1.00	0.25	Pass
79.43	-0.43	0.07	-1.00	1.00	0.25	Pass
100.00	-0.30	0.00	-1.00	1.00	0.25	Pass
125.89	-0.21	-0.01	-1.00	1.00	0.25	Pass
158.49	-0.05	0.05	-1.00	1.00	0.25	Pass
199.53	-0.01	-0.01	-1.00	1.00	0.25	Pass
251.19	0.04	0.05	-1.00	1.00	0.25	Pass
316.23	0.16	0.16	-1.00	1.00	0.25	Pass
398.11	-0.07	-0.07	-1.00	1.00	0.25	Pass
501.19	-0.08	-0.08	-1.00	1.00	0.25	Pass
630.96	-0.13	-0.13	-1.00	1.00	0.25	Pass
794.33	-0.11	-0.11	-1.00	1.00	0.25	Pass
1,000.00	0.00	0.00	-0.70	0.70	0.25	Pass
1,258.93	0.32	0.33	-1.00	1.00	0.25	Pass
1,584.89	-0.05	0.05	-1.00	1.00	0.25	Pass
1,995.26	-0.42	-0.22	-1.00	1.00	0.25	Pass
2,511.89	-0.37	-0.07	-1.00	1.00	0.25	Pass
3,162.28	-0.54	-0.04	-1.00	1.00	0.25	Pass
3,981.07	-1.02	-0.22	-1.00	1.00	0.25	Pass
5,011.87	-1.36	-0.06	-1.50	1.50	0.25	Pass
6,309.57	-2.41	-0.41	-2.00	1.50	0.25	Pass
7,943.28	-3.16	-0.16	-2.50	1.50	0.25	Pass
10,000.00	-4.39	0.01	-3.00	2.00	0.25	Pass
12,589.25	-6.34	-0.14	-5.00	2.00	0.25	Pass
15,848.93	-8.75	-0.25	-16.00	2.50	0.25	Pass
19,952.62	-11.80	-0.60	-inf	3.00	0.25	Pass

-- End of measurement results--

Z-weight Filter Response



Electrical signal test of frequency weighting performed according to IEC 61672-3:2013 13 and ANSI S1.4-2014 Part 3: 13 for compliance to IEC 61672-1:2013 5.5; IEC 60651:2001 6.1 and 9.2.2; IEC 60804:2000 5; ANSI S1.4:1983 (R2006) 5.1 and 8.2.1; ANSI S1.4-2014 Part 1: 5.5

Frequency [Hz]	Test Result [dB]	Deviation [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
10.00	-0.09	-0.09	-inf	3.00	0.25	Pass
12.59	-0.06	-0.06	-inf	2.50	0.25	Pass
15.85	-0.03	-0.03	-4.00	2.00	0.25	Pass
19.95	0.04	0.04	-2.00	2.00	0.25	Pass
25.12	0.03	0.03	-1.50	2.00	0.25	Pass
31.62	0.04	0.04	-1.50	1.50	0.25	Pass
39.81	0.03	0.03	-1.00	1.00	0.25	Pass
50.12	0.03	0.03	-1.00	1.00	0.25	Pass
63.10	0.02	0.02	-1.00	1.00	0.25	Pass
79.43	0.07	0.07	-1.00	1.00	0.25	Pass
100.00	0.04	0.04	-1.00	1.00	0.25	Pass
125.89	-0.04	-0.04	-1.00	1.00	0.25	Pass
158.49	0.03	0.03	-1.00	1.00	0.25	Pass
199.53	0.02	0.02	-1.00	1.00	0.25	Pass
251.19	0.04	0.04	-1.00	1.00	0.25	Pass
316.23	0.14	0.14	-1.00	1.00	0.25	Pass
398.11	-0.10	-0.10	-1.00	1.00	0.25	Pass
501.19	-0.11	-0.11	-1.00	1.00	0.25	Pass
630.96	-0.16	-0.16	-1.00	1.00	0.25	Pass
794.33	-0.13	-0.13	-1.00	1.00	0.25	Pass
1,000.00	0.00	0.00	-0.70	0.70	0.25	Pass
1,258.93	0.36	0.36	-1.00	1.00	0.25	Pass
1,584.89	0.03	0.03	-1.00	1.00	0.25	Pass
1,995.26	-0.26	-0.26	-1.00	1.00	0.25	Pass
2,511.89	-0.07	-0.07	-1.00	1.00	0.25	Pass
3,162.28	-0.05	-0.05	-1.00	1.00	0.25	Pass
3,981.07	-0.21	-0.21	-1.00	1.00	0.25	Pass
5,011.87	-0.08	-0.08	-1.50	1.50	0.25	Pass
6,309.57	-0.41	-0.41	-2.00	1.50	0.25	Pass
7,943.28	-0.12	-0.12	-2.50	1.50	0.25	Pass
10,000.00	0.07	0.07	-3.00	2.00	0.25	Pass
12,589.25	-0.09	-0.09	-5.00	2.00	0.25	Pass
15,848.93	-0.34	-0.34	-16.00	2.50	0.25	Pass
19,952.62	-0.43	-0.43	-inf	3.00	0.25	Pass

-- End of measurement results--

High Level Stability

Electrical signal test of high level stability performed according to IEC 61672-3:2013 21 and ANSI S1.4-2014 Part 3: 21 for compliance to IEC 61672-1:2013 5.15 and ANSI S1.4-2014 Part 1: 5.15

Measurement	Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
High Level Stability	0.00	-0.10	0.10	0.01 ‡	Pass

-- End of measurement results--

Long-Term Stability

Electrical signal test of long term stability performed according to IEC 61672-3:2013 15 and ANSI S1.4-2014 Part 3: 15 for compliance to IEC 61672-1:2013 5.14 and ANSI S1.4-2014 Part 1: 5.14

Test Duration [min]	Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
40	0.00	-0.10	0.10	0.02 ‡	Pass

-- End of measurement results--

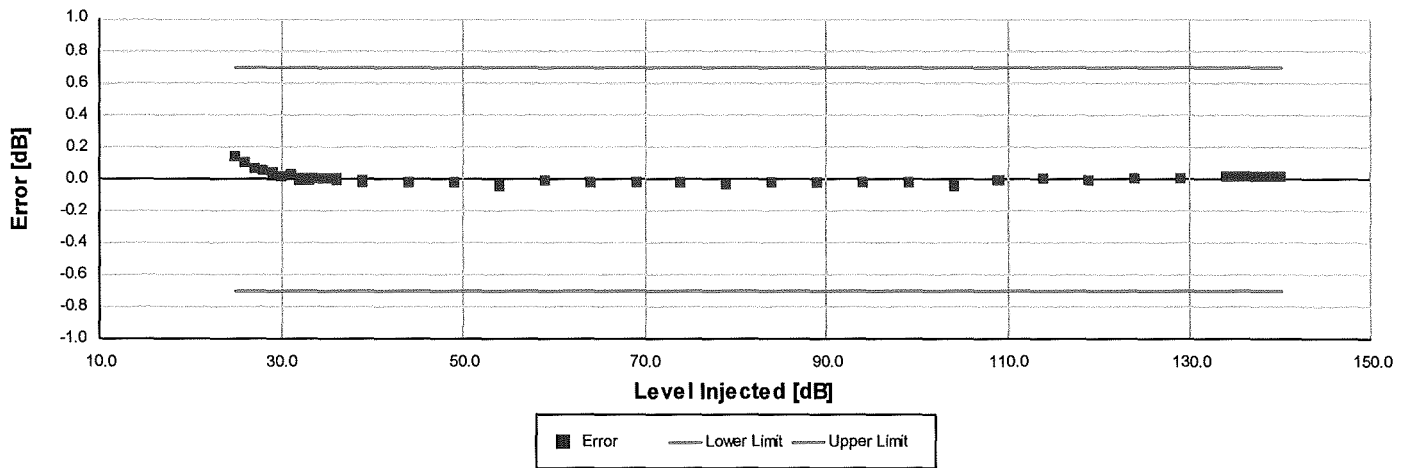
1 kHz Reference Levels

Frequency weightings and time weightings at 1 kHz (reference is A weighted Fast) performed according to IEC 61672-3:2013 14 and ANSI S1.4-2014 Part 3: 14 for compliance to IEC 61672-1:2013 5.5.9 and 5.8.3 and ANSI S1.4-2014 Part 1: 5.5.9 and 5.8.3

Measurement	Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
C weight	114.00	113.80	114.20	0.15	Pass
Z weight	113.99	113.80	114.20	0.15	Pass
Slow	114.00	113.90	114.10	0.15	Pass
Impulse	114.00	113.90	114.10	0.15	Pass

-- End of measurement results--

A-weighted 0 dB Gain Broadband Log Linearity: 8,000.00 Hz

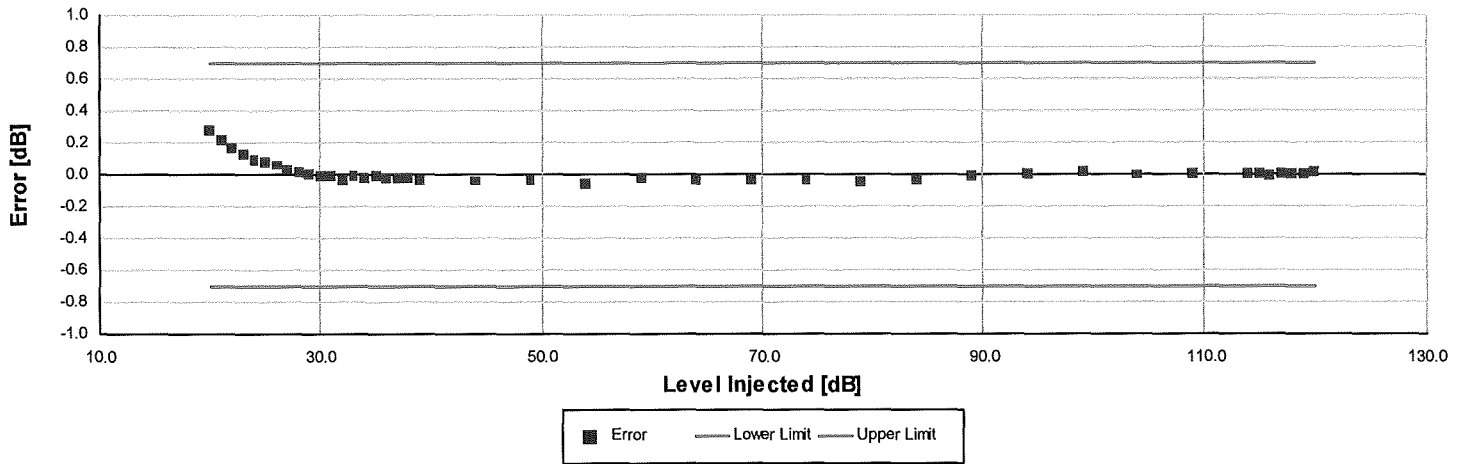


Broadband level linearity performed according to IEC 61672-3:2013 16 and ANSI S1.4-2014 Part 3: 16 for compliance to IEC 61672-1:2013 5.6, IEC 60804:2000 6.2, IEC 61252:2002 8, ANSI S1.4 (R2006) 6.9, ANSI S1.4-2014 Part 1: 5.6, ANSI S1.43 (R2007) 6.2

Level [dB]	Error [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
25.00	0.14	-0.70	0.70	0.16	Pass
26.00	0.10	-0.70	0.70	0.16	Pass
27.00	0.06	-0.70	0.70	0.16	Pass
28.00	0.06	-0.70	0.70	0.16	Pass
29.00	0.04	-0.70	0.70	0.18	Pass
30.00	0.02	-0.70	0.70	0.17	Pass
31.00	0.03	-0.70	0.70	0.17	Pass
32.00	0.00	-0.70	0.70	0.17	Pass
33.00	0.00	-0.70	0.70	0.16	Pass
34.00	0.00	-0.70	0.70	0.16	Pass
35.00	0.00	-0.70	0.70	0.16	Pass
36.00	0.00	-0.70	0.70	0.16	Pass
39.00	-0.01	-0.70	0.70	0.16	Pass
44.00	-0.03	-0.70	0.70	0.16	Pass
49.00	-0.02	-0.70	0.70	0.16	Pass
54.00	-0.04	-0.70	0.70	0.16	Pass
59.00	-0.01	-0.70	0.70	0.16	Pass
64.00	-0.02	-0.70	0.70	0.16	Pass
69.00	-0.02	-0.70	0.70	0.16	Pass
74.00	-0.02	-0.70	0.70	0.16	Pass
79.00	-0.03	-0.70	0.70	0.16	Pass
84.00	-0.02	-0.70	0.70	0.16	Pass
89.00	-0.02	-0.70	0.70	0.16	Pass
94.00	-0.02	-0.70	0.70	0.16	Pass
99.00	-0.02	-0.70	0.70	0.16	Pass
104.00	-0.04	-0.70	0.70	0.15	Pass
109.00	-0.01	-0.70	0.70	0.15	Pass
114.00	0.00	-0.70	0.70	0.15	Pass
119.00	0.00	-0.70	0.70	0.15	Pass
124.00	0.01	-0.70	0.70	0.15	Pass
129.00	0.01	-0.70	0.70	0.15	Pass
134.00	0.02	-0.70	0.70	0.15	Pass
135.00	0.02	-0.70	0.70	0.15	Pass
136.00	0.02	-0.70	0.70	0.15	Pass
137.00	0.02	-0.70	0.70	0.15	Pass
138.00	0.02	-0.70	0.70	0.15	Pass

Level [dB]	Error [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
139.00	0.02	-0.70	0.70	0.15	Pass
140.00	0.02	-0.70	0.70	0.15	Pass
-- End of measurement results--					

A-weighted 20 dB Gain Broadband Log Linearity: 8,000.00 Hz



Broadband level linearity performed according to IEC 61672-3:2013 16 and ANSI S1.4-2014 Part 3: 16 for compliance to IEC 61672-1:2013 5.6, IEC 60804:2000 6.2, IEC 61252:2002 8, ANSI S1.4 (R2006) 6.9, ANSI S1.4-2014 Part 1: 5.6, ANSI S1.43 (R2007) 6.2

Level [dB]	Error [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
20.00	0.28	-0.70	0.70	0.17	Pass
21.00	0.22	-0.70	0.70	0.16	Pass
22.00	0.16	-0.70	0.70	0.16	Pass
23.00	0.13	-0.70	0.70	0.16	Pass
24.00	0.09	-0.70	0.70	0.16	Pass
25.00	0.08	-0.70	0.70	0.16	Pass
26.00	0.06	-0.70	0.70	0.19	Pass
27.00	0.03	-0.70	0.70	0.18	Pass
28.00	0.01	-0.70	0.70	0.19	Pass
29.00	0.00	-0.70	0.70	0.18	Pass
30.00	-0.01	-0.70	0.70	0.17	Pass
31.00	-0.01	-0.70	0.70	0.17	Pass
32.00	-0.03	-0.70	0.70	0.17	Pass
33.00	-0.01	-0.70	0.70	0.16	Pass
34.00	-0.02	-0.70	0.70	0.16	Pass
35.00	-0.01	-0.70	0.70	0.16	Pass
36.00	-0.02	-0.70	0.70	0.16	Pass
37.00	-0.02	-0.70	0.70	0.16	Pass
38.00	-0.03	-0.70	0.70	0.16	Pass
39.00	-0.03	-0.70	0.70	0.16	Pass
44.00	-0.04	-0.70	0.70	0.16	Pass
49.00	-0.04	-0.70	0.70	0.16	Pass
54.00	-0.05	-0.70	0.70	0.16	Pass
59.00	-0.03	-0.70	0.70	0.16	Pass
64.00	-0.04	-0.70	0.70	0.16	Pass
69.00	-0.04	-0.70	0.70	0.16	Pass
74.00	-0.04	-0.70	0.70	0.16	Pass
79.00	-0.04	-0.70	0.70	0.16	Pass
84.00	-0.04	-0.70	0.70	0.16	Pass
89.00	-0.01	-0.70	0.70	0.16	Pass
94.00	0.01	-0.70	0.70	0.16	Pass
99.00	0.01	-0.70	0.70	0.16	Pass
104.00	0.00	-0.70	0.70	0.15	Pass
109.00	0.00	-0.70	0.70	0.15	Pass
114.00	0.00	-0.70	0.70	0.15	Pass
115.00	0.00	-0.70	0.70	0.15	Pass

Level [dB]	Error [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
116.00	0.00	-0.70	0.70	0.15	Pass
117.00	0.00	-0.70	0.70	0.15	Pass
118.00	0.00	-0.70	0.70	0.15	Pass
119.00	0.00	-0.70	0.70	0.15	Pass
120.00	0.02	-0.70	0.70	0.15	Pass

-- End of measurement results--

Slow Detector

Toneburst response performed according to IEC 61672-3:2013 18 and ANSI S1.4-2014 Part 3: 18 for compliance to IEC 61672-1:2013 5.9, IEC 60651:2001 9.4.2, ANSI S1.4:1983 (R2006) 8.4.2 and ANSI S1.4-2014 Part 1: 5.9

Amplitude [dB]	Duration [ms]	Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
137.00	200	-7.58	-7.92	-6.92	0.15	Pass
	2	-27.20	-29.99	-25.99	0.15	Pass

-- End of measurement results--

Fast Detector

Toneburst response performed according to IEC 61672-3:2013 18 and ANSI S1.4-2014 Part 3: 18 for compliance to IEC 61672-1:2013 5.9, IEC 60651:2001 9.4.2, ANSI S1.4:1983 (R2006) 8.4.2 and ANSI S1.4-2014 Part 1: 5.9

Amplitude [dB]	Duration [ms]	Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
137.00	200.00	-1.13	-1.48	-0.48	0.15	Pass
	2.00	-18.42	-19.49	-16.99	0.16	Pass
	0.25	-27.35	-29.99	-25.99	0.15	Pass

-- End of measurement results--

Sound Exposure Level

Toneburst response performed according to IEC 61672-3:2013 18 and ANSI S1.4-2014 Part 3: 18 for compliance to IEC 61672-1:2013 5.9, IEC 60651:2001 9.4.2, ANSI S1.4:1983 (R2006) 8.4.2 and ANSI S1.4-2014 Part 1: 5.9

Amplitude [dB]	Duration [ms]	Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
137.00	200.00	-7.05	-7.49	-6.49	0.15	Pass
	2.00	-27.09	-28.49	-25.99	0.15	Pass
	0.25	-36.20	-39.02	-35.02	0.15	Pass

-- End of measurement results--

Peak C-weight

C-weighted peak sound level performed according to IEC 61672-3:2013 19 and ANSI S1.4-2014 Part 3: 19 for compliance to IEC 61672-1:2013 5.13 and ANSI S1.4-2014 Part 1: 5.13

Level [dB]	Frequency [Hz]	Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
135.00	31.50	138.04	135.50	139.50	0.15	Pass
135.00	500.00	138.50	137.50	139.50	0.15	Pass
135.00	8,000.00	137.67	136.40	140.40	0.15	Pass
135.00, Negative	500.00	137.16	136.40	138.40	0.15	Pass
135.00, Positive	500.00	137.17	136.40	138.40	0.15	Pass

-- End of measurement results--

Peak Z-weight

Z-weighted peak sound level performed according to IEC 60651:2001 9.4.4 and ANSI S1.4:1983 (R2006) 8.4.4

Amplitude [dB]	Duration[μs]	Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result	
136.00	100	Negative Pulse	136.08	134.01	138.01	0.15	Pass
	100	Positive Pulse	136.08	134.01	138.01	0.15	Pass
126.00	100	Negative Pulse	126.08	124.00	128.00	0.15	Pass
	100	Positive Pulse	126.08	124.00	128.00	0.15	Pass
116.00	100	Negative Pulse	116.08	114.00	118.00	0.15	Pass
	100	Positive Pulse	116.08	114.00	118.00	0.15	Pass
106.00	100	Negative Pulse	106.09	104.01	108.01	0.15	Pass
	100	Positive Pulse	106.08	104.01	108.01	0.15	Pass

-- End of measurement results--

Overload Detector

Overload indication performed according to IEC 61672-3:2013 20 and ANSI S1.4-2014 Part 3: 20 for compliance to IEC 61672-1:2013 5.11, IEC 60804:2000 9.3.5, IEC 61252:2002 11, ANSI S1.4 (R2006) 5.8, and ANSI S1.4-2014 Part 1: 5.11, ANSI S1.25 (R2007) 7.6, ANSI S1.43 (R2007) 7

Measurement	Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
Positive	140.70	140.00	142.00	0.16	Pass
Negative	140.60	140.00	142.00	0.16	Pass
Difference	0.10	-1.50	1.50	0.15	Pass

-- End of measurement results--

Peak Rise Time

Peak rise time performed according to IEC 60651:2001 9.4.4 and ANSI S1.4:1983 (R2006) 8.4.4

Amplitude [dB]	Duration [μs]		Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
139.00	40	Negative Pulse	135.94	134.62	136.62	0.15	Pass
		Positive Pulse	135.93	134.61	136.61	0.15	Pass
	30	Negative Pulse	135.12	134.62	136.62	0.15	Pass
		Positive Pulse	135.13	134.61	136.61	0.15	Pass

-- End of measurement results--

Positive Pulse Crest Factor**200 μ s pulse tests at 2.0, 12.0, 22.0, 32.0 dB below Overload Limit**

Crest Factor measured according to IEC 60651:2001 9.4.2 and ANSI S1.4:1983 (R2006) 8.4.2

Amplitude [dB]	Crest Factor	Test Result [dB]	Limits [dB]	Expanded Uncertainty [dB]	Result
138.00	3	OVLD	± 0.50	0.15 $\pm$	Pass
	5	OVLD	± 1.00	0.15 $\pm$	Pass
	10	OVLD	± 1.50	0.15 $\pm$	Pass
128.00	3	-0.11	± 0.50	0.15 $\pm$	Pass
	5	-0.12	± 1.00	0.15 $\pm$	Pass
	10	OVLD	± 1.50	0.15 $\pm$	Pass
118.00	3	-0.11	± 0.50	0.15 $\pm$	Pass
	5	-0.13	± 1.00	0.15 $\pm$	Pass
	10	0.00	± 1.50	0.15 $\pm$	Pass
108.00	3	-0.12	± 0.50	0.15 $\pm$	Pass
	5	-0.13	± 1.00	0.15 $\pm$	Pass
	10	-0.24	± 1.50	0.15 $\pm$	Pass

-- End of measurement results--

Negative Pulse Crest Factor**200 μ s pulse tests at 2.0, 12.0, 22.0, 32.0 dB below Overload Limit**

Crest Factor measured according to IEC 60651:2001 9.4.2 and ANSI S1.4:1983 (R2006) 8.4.2

Amplitude [dB]	Crest Factor	Test Result [dB]	Limits [dB]	Expanded Uncertainty [dB]	Result
138.00	3	OVLD	± 0.50	0.15 $\pm$	Pass
	5	OVLD	± 1.00	0.15 $\pm$	Pass
	10	OVLD	± 1.50	0.15 $\pm$	Pass
128.00	3	-0.11	± 0.50	0.15 $\pm$	Pass
	5	-0.10	± 1.00	0.15 $\pm$	Pass
	10	OVLD	± 1.50	0.15 $\pm$	Pass
118.00	3	-0.11	± 0.50	0.15 $\pm$	Pass
	5	-0.12	± 1.00	0.15 $\pm$	Pass
	10	-0.23	± 1.50	0.15 $\pm$	Pass
108.00	3	-0.12	± 0.50	0.15 $\pm$	Pass
	5	-0.12	± 1.00	0.15 $\pm$	Pass
	10	-0.15	± 1.50	0.16 $\pm$	Pass

-- End of measurement results--

Tone Burst**2kHz tone burst tests at 2.0, 12.0, 22.0, 32.0 dB below Overload Limit**

Tone burst response measured according to IEC 60651:2001 9.4.2 and ANSI S1.4:1983 (R2006) 8.4.2

Amplitude [dB]	Crest Factor	Test Result [dB]	Limits [dB]	Expanded Uncertainty [dB]	Result
138.00	3	OVLD	± 0.50	0.15	Pass
	5	OVLD	± 1.00	0.15	Pass
128.00	3	-0.10	± 0.50	0.15	Pass
	5	-0.02	± 1.00	0.15	Pass
118.00	3	-0.09	± 0.50	0.15	Pass
	5	-0.01	± 1.00	0.15	Pass
108.00	3	-0.08	± 0.50	0.15	Pass
	5	-0.01	± 1.00	0.15	Pass

-- End of measurement results--

Impulse Detector - Repeat

Impulse Detector measured according to IEC 60651:2001 9.4.3 and ANSI S1.4:1983 (R2006) 8.4.3

Amplitude [dB]	Repetition Rate [Hz]	Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
140	100.00	-2.90	-3.71	-1.71	0.15	Pass
	20.00	-7.68	-9.57	-5.57	0.20	Pass
	2.00	-8.86	-10.76	-6.76	0.16	Pass
Step	2.00	5.13	4.00	6.00	0.16	Pass

-- End of measurement results--

Impulse Detector - Single

Impulse Detector measured according to IEC 60651:2001 9.4.3 and ANSI S1.4:1983 (R2006) 8.4.3

Amplitude [dB]	Duration [ms]	Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
140	20.00	-3.70	-5.11	-2.11	0.15	Pass
	5.00	-8.84	-10.76	-6.76	0.15	Pass
	2.00	-12.77	-14.55	-10.55	0.16	Pass
Step	2.00	9.85	9.00	11.00	0.16	Pass

-- End of measurement results--

Gain

Gain measured according to IEC 61672-3:2013 17.3 and 17.4 and ANSI S1.4-2014 Part 3: 17.3 and 17.4

Measurement	Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
0 dB Gain	94.00	93.90	94.10	0.15	Pass
0 dB Gain, Linearity	28.12	27.30	28.70	0.16	Pass
20 dB Gain	94.03	93.90	94.10	0.15	Pass
20 dB Gain, Linearity	23.13	22.30	23.70	0.16	Pass
OBA High Range	94.00	93.20	94.80	0.15	Pass
OBA Normal Range	94.00	93.90	94.10	0.15	Pass

-- End of measurement results--

Broadband Noise Floor

Self-generated noise measured according to IEC 61672-3:2013 11.2 and ANSI S1.4-2014 Part 3: 11.2

Measurement	Test Result [dB]	Upper limit [dB]	Result
A-weight Noise Floor	5.92	9.00	Pass
C-weight Noise Floor	12.20	15.00	Pass
Z-weight Noise Floor	22.65	25.00	Pass

-- End of measurement results--

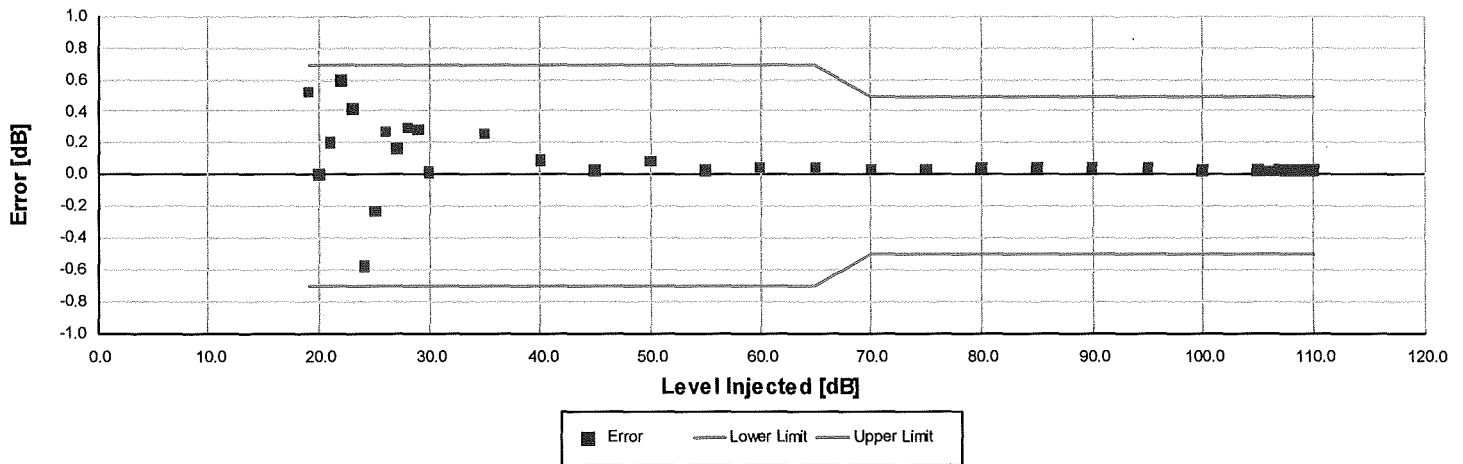
Total Harmonic Distortion

Measured using 1/3-Octave filters

Measurement	Test Result [dB]	Lower Limit [dB]	Upper Limit [dB]	Expanded Uncertainty [dB]	Result
10 Hz Signal	137.54	137.20	138.80	0.15	Pass
THD	-75.68		-60.00	1.30 ‡	Pass
THD+N	-74.77		-60.00	1.30 ‡	Pass

-- End of measurement results--

1/1 Octave Log Linearity: 31.50 Hz

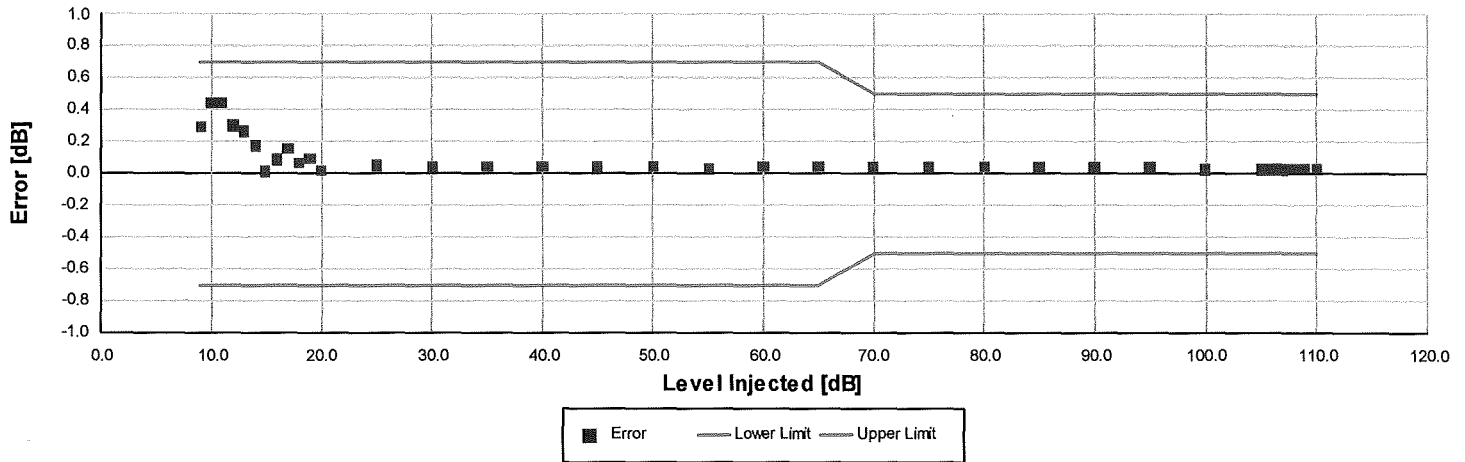


1/1 octave level linearity at normal range with 0 dB gain performed according to IEC 61260-3:2016 11 and ANSI S1.11-2016 Part 3 11 for compliance to IEC 61260-1:2014 5.13 and ANSI S1.11-2014 Part 1 5.13

Level [dB]	Error [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
19.00	0.52	-0.70	0.70	0.17	Pass
20.00	0.00	-0.70	0.70	0.17	Pass
21.00	0.21	-0.70	0.70	0.16	Pass
22.00	0.59	-0.70	0.70	0.16	Pass
23.00	0.42	-0.70	0.70	0.16	Pass
24.00	-0.58	-0.70	0.70	0.16	Pass
25.00	-0.23	-0.70	0.70	0.16	Pass
26.00	0.28	-0.70	0.70	0.16	Pass
27.00	0.17	-0.70	0.70	0.16	Pass
28.00	0.30	-0.70	0.70	0.16	Pass
29.00	0.28	-0.70	0.70	0.16	Pass
30.00	0.02	-0.70	0.70	0.16	Pass
35.00	0.26	-0.70	0.70	0.16	Pass
40.00	0.09	-0.70	0.70	0.16	Pass
45.00	0.03	-0.70	0.70	0.16	Pass
50.00	0.09	-0.70	0.70	0.16	Pass
55.00	0.03	-0.70	0.70	0.16	Pass
60.00	0.05	-0.70	0.70	0.16	Pass
65.00	0.05	-0.70	0.70	0.16	Pass
70.00	0.04	-0.50	0.50	0.16	Pass
75.00	0.04	-0.50	0.50	0.16	Pass
80.00	0.05	-0.50	0.50	0.16	Pass
85.00	0.04	-0.50	0.50	0.16	Pass
90.00	0.04	-0.50	0.50	0.16	Pass
95.00	0.04	-0.50	0.50	0.16	Pass
100.00	0.03	-0.50	0.50	0.15	Pass
105.00	0.03	-0.50	0.50	0.15	Pass
106.00	0.02	-0.50	0.50	0.15	Pass
107.00	0.03	-0.50	0.50	0.15	Pass
108.00	0.03	-0.50	0.50	0.15	Pass
109.00	0.03	-0.50	0.50	0.15	Pass
110.00	0.03	-0.50	0.50	0.15	Pass

-- End of measurement results--

1/1 Octave Log Linearity: 1,000.00 Hz

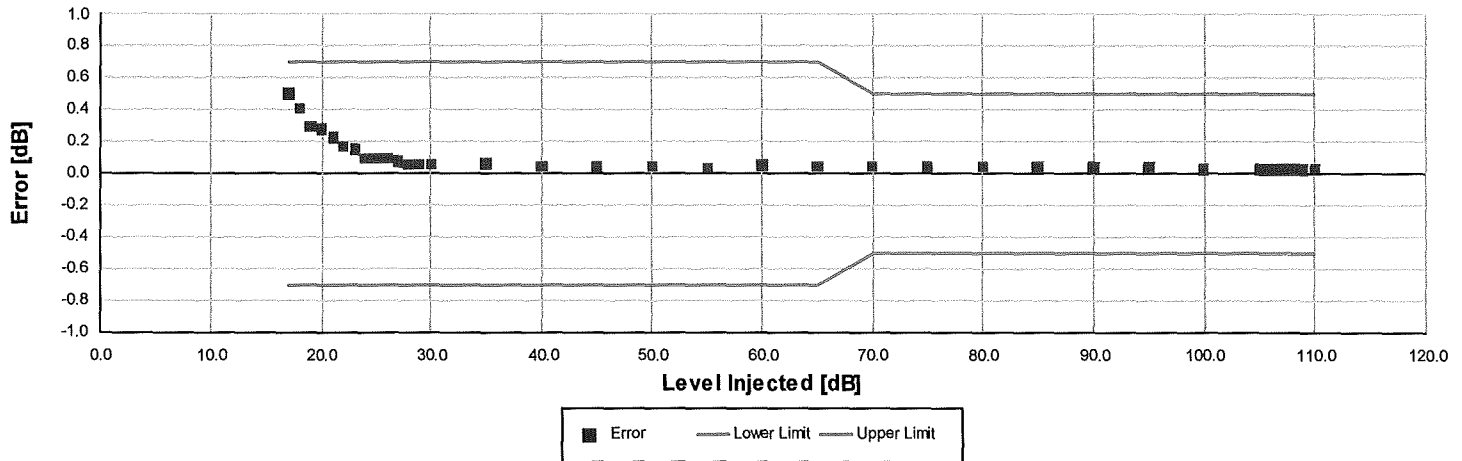


1/1 octave level linearity at normal range with 0 dB gain performed according to IEC 61260-3:2016 11 and ANSI S1.11-2016 Part 3 11 for compliance to IEC 61260-1:2014 5.13 and ANSI S1.11-2014 Part 1 5.13

Level [dB]	Error [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
9.00	0.30	-0.70	0.70	0.19	Pass
10.00	0.44	-0.70	0.70	0.19	Pass
11.00	0.45	-0.70	0.70	0.18	Pass
12.00	0.30	-0.70	0.70	0.18	Pass
13.00	0.26	-0.70	0.70	0.18	Pass
14.00	0.17	-0.70	0.70	0.18	Pass
15.00	0.01	-0.70	0.70	0.17	Pass
16.00	0.09	-0.70	0.70	0.17	Pass
17.00	0.16	-0.70	0.70	0.17	Pass
18.00	0.07	-0.70	0.70	0.17	Pass
19.00	0.09	-0.70	0.70	0.17	Pass
20.00	0.02	-0.70	0.70	0.17	Pass
25.00	0.05	-0.70	0.70	0.16	Pass
30.00	0.04	-0.70	0.70	0.16	Pass
35.00	0.04	-0.70	0.70	0.16	Pass
40.00	0.04	-0.70	0.70	0.16	Pass
45.00	0.04	-0.70	0.70	0.16	Pass
50.00	0.04	-0.70	0.70	0.16	Pass
55.00	0.03	-0.70	0.70	0.16	Pass
60.00	0.05	-0.70	0.70	0.16	Pass
65.00	0.04	-0.70	0.70	0.16	Pass
70.00	0.04	-0.50	0.50	0.16	Pass
75.00	0.04	-0.50	0.50	0.16	Pass
80.00	0.04	-0.50	0.50	0.16	Pass
85.00	0.04	-0.50	0.50	0.16	Pass
90.00	0.04	-0.50	0.50	0.16	Pass
95.00	0.04	-0.50	0.50	0.16	Pass
100.00	0.03	-0.50	0.50	0.15	Pass
105.00	0.03	-0.50	0.50	0.15	Pass
106.00	0.02	-0.50	0.50	0.15	Pass
107.00	0.03	-0.50	0.50	0.15	Pass
108.00	0.03	-0.50	0.50	0.15	Pass
109.00	0.03	-0.50	0.50	0.15	Pass
110.00	0.03	-0.50	0.50	0.15	Pass

-- End of measurement results--

1/1 Octave Log Linearity: 16,000.00 Hz



1/1 octave level linearity at normal range with 0 dB gain performed according to IEC 61260-3:2016 11 and ANSI S1.11-2016 Part 3 11 for compliance to IEC 61260-1:2014 5.13 and ANSI S1.11-2014 Part 1 5.13

Level [dB]	Error [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
17.00	0.50	-0.70	0.70	0.17	Pass
18.00	0.41	-0.70	0.70	0.17	Pass
19.00	0.29	-0.70	0.70	0.17	Pass
20.00	0.27	-0.70	0.70	0.17	Pass
21.00	0.23	-0.70	0.70	0.16	Pass
22.00	0.17	-0.70	0.70	0.16	Pass
23.00	0.15	-0.70	0.70	0.16	Pass
24.00	0.09	-0.70	0.70	0.16	Pass
25.00	0.09	-0.70	0.70	0.16	Pass
26.00	0.10	-0.70	0.70	0.16	Pass
27.00	0.07	-0.70	0.70	0.16	Pass
28.00	0.06	-0.70	0.70	0.16	Pass
29.00	0.05	-0.70	0.70	0.16	Pass
30.00	0.05	-0.70	0.70	0.16	Pass
35.00	0.06	-0.70	0.70	0.16	Pass
40.00	0.05	-0.70	0.70	0.16	Pass
45.00	0.04	-0.70	0.70	0.16	Pass
50.00	0.04	-0.70	0.70	0.16	Pass
55.00	0.03	-0.70	0.70	0.16	Pass
60.00	0.05	-0.70	0.70	0.16	Pass
65.00	0.05	-0.70	0.70	0.16	Pass
70.00	0.04	-0.50	0.50	0.16	Pass
75.00	0.04	-0.50	0.50	0.16	Pass
80.00	0.05	-0.50	0.50	0.16	Pass
85.00	0.04	-0.50	0.50	0.16	Pass
90.00	0.04	-0.50	0.50	0.16	Pass
95.00	0.04	-0.50	0.50	0.16	Pass
100.00	0.03	-0.50	0.50	0.15	Pass
105.00	0.03	-0.50	0.50	0.15	Pass
106.00	0.02	-0.50	0.50	0.15	Pass
107.00	0.03	-0.50	0.50	0.15	Pass
108.00	0.03	-0.50	0.50	0.15	Pass
109.00	0.03	-0.50	0.50	0.15	Pass
110.00	0.03	-0.50	0.50	0.15	Pass

Certificate Number 2020003515

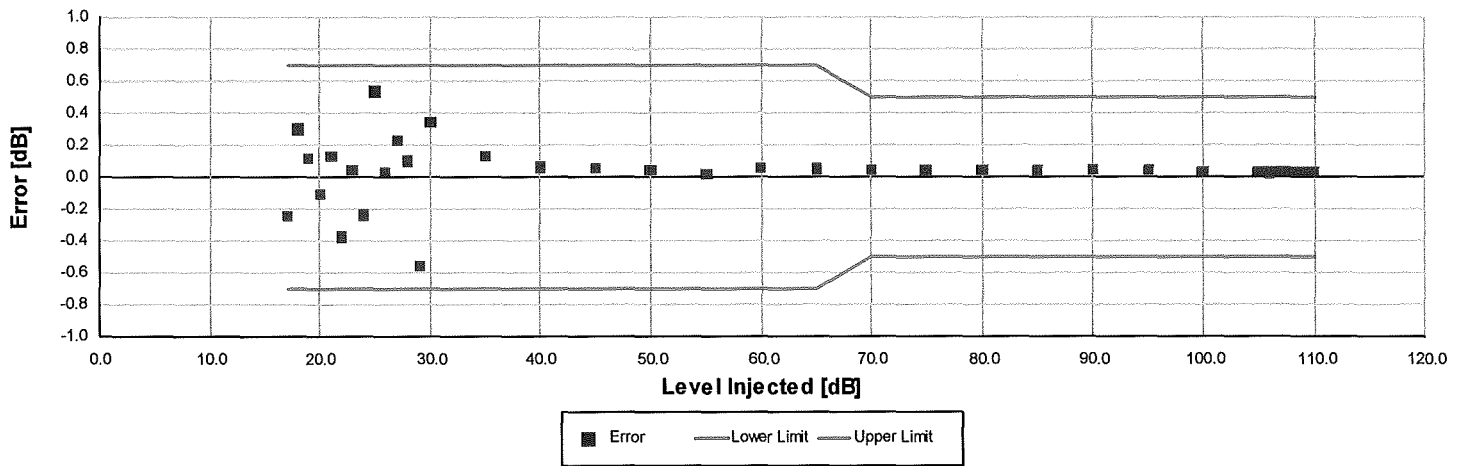
-- End of measurement results--

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1681 West 820 North
Provo, UT 84601, United States
716-684-0001



 **LARSON DAVIS**
A PCB PIEZOTRONICS DIV.

1/3 Octave Log Linearity: 31.50 Hz

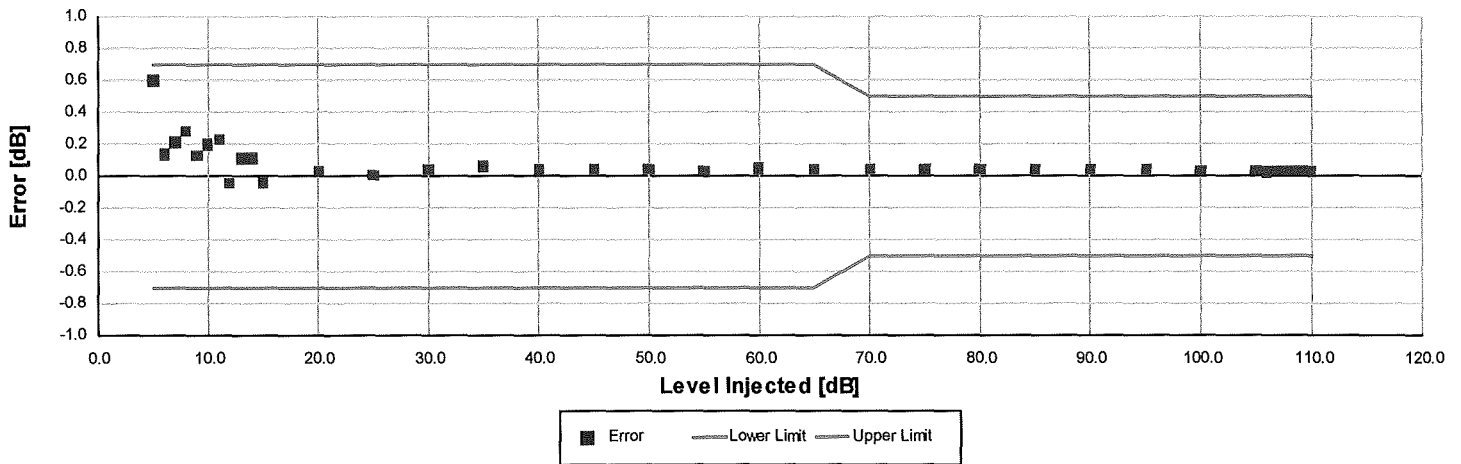


1/3 octave level linearity at normal range with 0 dB gain performed according to IEC 61260-3:2016 11 and ANSI S1.11-2016 Part 3 11 for compliance to IEC 61260-1:2014 5.13 and ANSI S1.11-2014 Part 1 5.13

Level [dB]	Error [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
17.00	-0.25	-0.70	0.70	0.17	Pass
18.00	0.30	-0.70	0.70	0.17	Pass
19.00	0.12	-0.70	0.70	0.17	Pass
20.00	-0.11	-0.70	0.70	0.17	Pass
21.00	0.13	-0.70	0.70	0.16	Pass
22.00	-0.38	-0.70	0.70	0.16	Pass
23.00	0.04	-0.70	0.70	0.16	Pass
24.00	-0.24	-0.70	0.70	0.16	Pass
25.00	0.54	-0.70	0.70	0.16	Pass
26.00	0.03	-0.70	0.70	0.16	Pass
27.00	0.23	-0.70	0.70	0.16	Pass
28.00	0.10	-0.70	0.70	0.16	Pass
29.00	-0.56	-0.70	0.70	0.16	Pass
30.00	0.34	-0.70	0.70	0.16	Pass
35.00	0.13	-0.70	0.70	0.16	Pass
40.00	0.06	-0.70	0.70	0.16	Pass
45.00	0.06	-0.70	0.70	0.16	Pass
50.00	0.04	-0.70	0.70	0.16	Pass
55.00	0.01	-0.70	0.70	0.16	Pass
60.00	0.05	-0.70	0.70	0.16	Pass
65.00	0.05	-0.70	0.70	0.16	Pass
70.00	0.04	-0.50	0.50	0.16	Pass
75.00	0.04	-0.50	0.50	0.16	Pass
80.00	0.04	-0.50	0.50	0.16	Pass
85.00	0.04	-0.50	0.50	0.16	Pass
90.00	0.04	-0.50	0.50	0.16	Pass
95.00	0.04	-0.50	0.50	0.16	Pass
100.00	0.03	-0.50	0.50	0.15	Pass
105.00	0.03	-0.50	0.50	0.15	Pass
106.00	0.02	-0.50	0.50	0.15	Pass
107.00	0.03	-0.50	0.50	0.15	Pass
108.00	0.03	-0.50	0.50	0.15	Pass
109.00	0.03	-0.50	0.50	0.15	Pass
110.00	0.03	-0.50	0.50	0.15	Pass

-- End of measurement results--

1/3 Octave Log Linearity: 1,000.00 Hz



1/3 octave level linearity at normal range with 0 dB gain performed according to IEC 61260-3:2016 11 and ANSI S1.11-2016 Part 3 11 for compliance to IEC 61260-1:2014 5.13 and ANSI S1.11-2014 Part 1 5.13

Level [dB]	Error [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
5.00	0.60	-0.70	0.70	0.21	Pass
6.00	0.13	-0.70	0.70	0.21	Pass
7.00	0.21	-0.70	0.70	0.20	Pass
8.00	0.28	-0.70	0.70	0.19	Pass
9.00	0.13	-0.70	0.70	0.19	Pass
10.00	0.20	-0.70	0.70	0.19	Pass
11.00	0.23	-0.70	0.70	0.18	Pass
12.00	-0.05	-0.70	0.70	0.18	Pass
13.00	0.11	-0.70	0.70	0.18	Pass
14.00	0.11	-0.70	0.70	0.18	Pass
15.00	-0.04	-0.70	0.70	0.17	Pass
20.00	0.03	-0.70	0.70	0.17	Pass
25.00	0.00	-0.70	0.70	0.16	Pass
30.00	0.04	-0.70	0.70	0.16	Pass
35.00	0.06	-0.70	0.70	0.16	Pass
40.00	0.03	-0.70	0.70	0.16	Pass
45.00	0.04	-0.70	0.70	0.16	Pass
50.00	0.04	-0.70	0.70	0.16	Pass
55.00	0.03	-0.70	0.70	0.16	Pass
60.00	0.05	-0.70	0.70	0.16	Pass
65.00	0.04	-0.70	0.70	0.16	Pass
70.00	0.04	-0.50	0.50	0.16	Pass
75.00	0.04	-0.50	0.50	0.16	Pass
80.00	0.04	-0.50	0.50	0.16	Pass
85.00	0.04	-0.50	0.50	0.16	Pass
90.00	0.04	-0.50	0.50	0.16	Pass
95.00	0.04	-0.50	0.50	0.16	Pass
100.00	0.03	-0.50	0.50	0.15	Pass
105.00	0.03	-0.50	0.50	0.15	Pass
106.00	0.02	-0.50	0.50	0.15	Pass
107.00	0.03	-0.50	0.50	0.15	Pass
108.00	0.03	-0.50	0.50	0.15	Pass
109.00	0.03	-0.50	0.50	0.15	Pass
110.00	0.03	-0.50	0.50	0.15	Pass

-- End of measurement results--

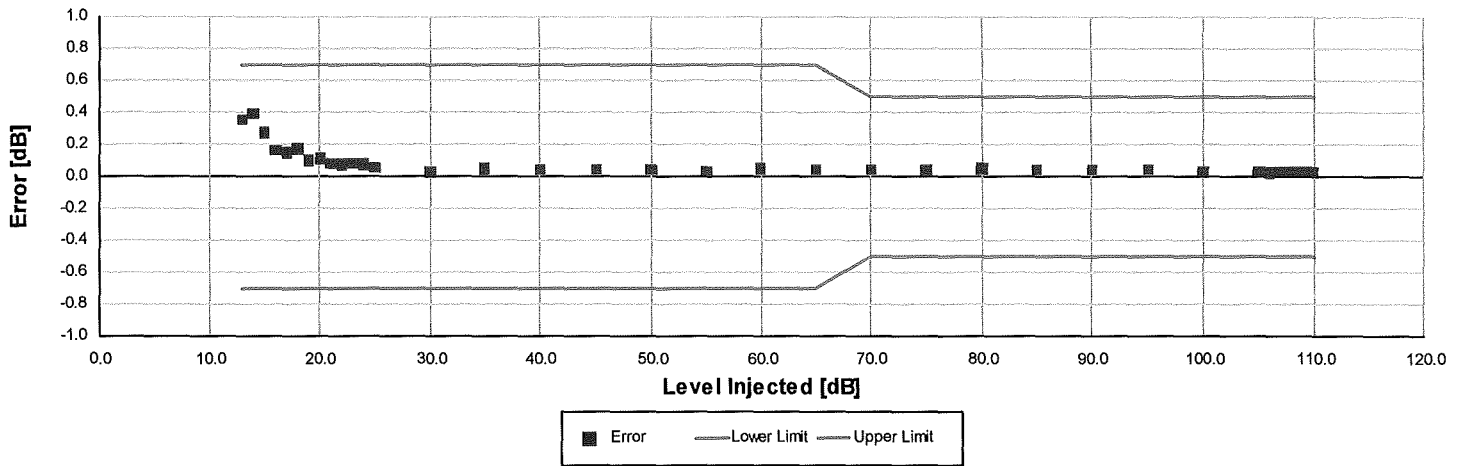
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1681 West 820 North
Provo, UT 84601, United States
716-684-0001



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1/3 Octave Log Linearity: 16,000.00 Hz



1/3 octave level linearity at normal range with 0 dB gain performed according to IEC 61260-3:2016 11 and ANSI S1.11-2016 Part 3 11 for compliance to IEC 61260-1:2014 5.13 and ANSI S1.11-2014 Part 1 5.13

Level [dB]	Error [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
13.00	0.35	-0.70	0.70	0.18	Pass
14.00	0.39	-0.70	0.70	0.18	Pass
15.00	0.27	-0.70	0.70	0.17	Pass
16.00	0.17	-0.70	0.70	0.17	Pass
17.00	0.15	-0.70	0.70	0.17	Pass
18.00	0.17	-0.70	0.70	0.17	Pass
19.00	0.10	-0.70	0.70	0.17	Pass
20.00	0.11	-0.70	0.70	0.17	Pass
21.00	0.08	-0.70	0.70	0.16	Pass
22.00	0.07	-0.70	0.70	0.16	Pass
23.00	0.08	-0.70	0.70	0.16	Pass
24.00	0.07	-0.70	0.70	0.16	Pass
25.00	0.05	-0.70	0.70	0.16	Pass
30.00	0.03	-0.70	0.70	0.16	Pass
35.00	0.05	-0.70	0.70	0.16	Pass
40.00	0.04	-0.70	0.70	0.16	Pass
45.00	0.04	-0.70	0.70	0.16	Pass
50.00	0.04	-0.70	0.70	0.16	Pass
55.00	0.03	-0.70	0.70	0.16	Pass
60.00	0.05	-0.70	0.70	0.16	Pass
65.00	0.04	-0.70	0.70	0.16	Pass
70.00	0.04	-0.50	0.50	0.16	Pass
75.00	0.04	-0.50	0.50	0.16	Pass
80.00	0.05	-0.50	0.50	0.16	Pass
85.00	0.04	-0.50	0.50	0.16	Pass
90.00	0.04	-0.50	0.50	0.16	Pass
95.00	0.04	-0.50	0.50	0.16	Pass
100.00	0.03	-0.50	0.50	0.15	Pass
105.00	0.03	-0.50	0.50	0.15	Pass
106.00	0.02	-0.50	0.50	0.15	Pass
107.00	0.03	-0.50	0.50	0.15	Pass
108.00	0.03	-0.50	0.50	0.15	Pass
109.00	0.03	-0.50	0.50	0.15	Pass
110.00	0.03	-0.50	0.50	0.15	Pass

-- End of measurement results--

1/1 Octave Log Linearity

1/1 octave level linearity measured according to IEC 61260-3:2016 11.9 and ANSI S1.11-2016 Part 3: 11.9

Measurement	Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
0 dB, Normal Range, 31.5 Hz	79.57	79.06	80.06	0.16	Pass
0 dB, Normal Range, 1000.0 Hz	79.57	79.07	80.07	0.16	Pass
0 dB, Normal Range, 16000.0 Hz	79.55	79.04	80.04	0.16	Pass
0 dB, High Range, 31.5 Hz	109.55	109.06	110.06	0.15	Pass
0 dB, High Range, 1000.0 Hz	109.56	109.07	110.07	0.15	Pass
0 dB, High Range, 16000.0 Hz	109.53	109.04	110.04	0.15	Pass
20 dB, Normal Range, 31.5 Hz	59.55	59.05	60.05	0.16	Pass
20 dB, Normal Range, 1000.0 Hz	59.56	59.05	60.05	0.16	Pass
20 dB, Normal Range, 16000.0 Hz	59.53	59.03	60.03	0.16	Pass
20 dB, High Range, 31.5 Hz	89.56	89.06	90.06	0.16	Pass
20 dB, High Range, 1000.0 Hz	89.56	89.06	90.06	0.16	Pass
20 dB, High Range, 16000.0 Hz	89.53	89.04	90.04	0.16	Pass

-- End of measurement results--

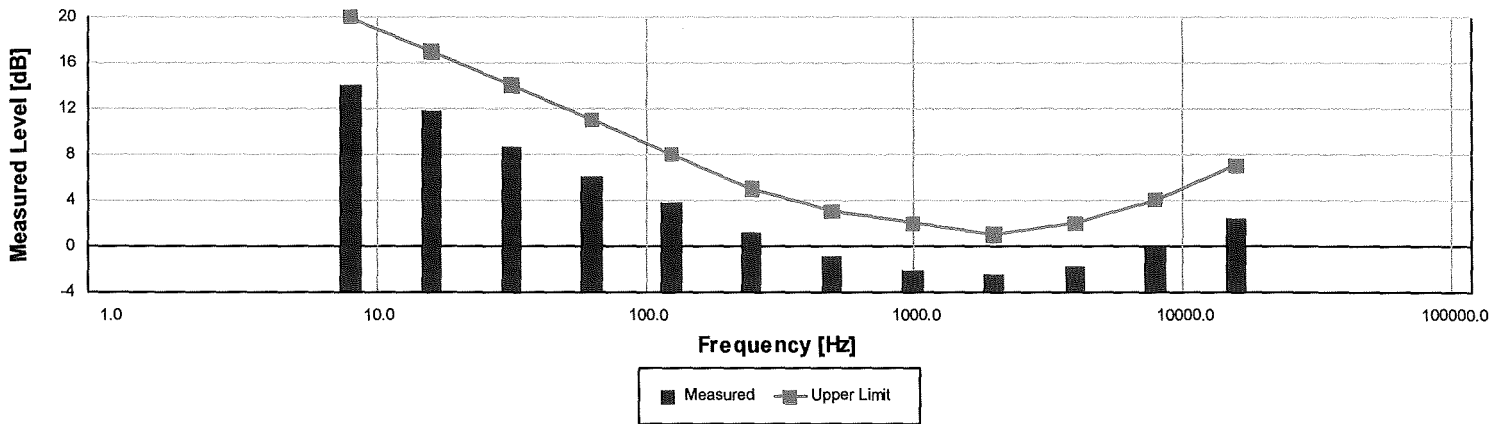
1/3 Octave Log Linearity

1/3 octave level linearity measured according to IEC 61260-3:2016 11.9 and ANSI S1.11-2016 Part 3: 11.9

Measurement	Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
0 dB, Normal Range, 31.5 Hz	79.57	79.06	80.06	0.16	Pass
0 dB, Normal Range, 1000.0 Hz	79.57	79.07	80.07	0.16	Pass
0 dB, Normal Range, 16000.0 Hz	79.54	79.04	80.04	0.16	Pass
0 dB, High Range, 31.5 Hz	109.55	109.06	110.06	0.15	Pass
0 dB, High Range, 1000.0 Hz	109.56	109.06	110.06	0.15	Pass
0 dB, High Range, 16000.0 Hz	109.53	109.04	110.04	0.15	Pass
20 dB, Normal Range, 31.5 Hz	59.55	59.05	60.05	0.16	Pass
20 dB, Normal Range, 1000.0 Hz	59.56	59.05	60.05	0.16	Pass
20 dB, Normal Range, 16000.0 Hz	59.53	59.02	60.02	0.16	Pass
20 dB, High Range, 31.5 Hz	89.55	89.06	90.06	0.16	Pass
20 dB, High Range, 1000.0 Hz	89.56	89.06	90.06	0.16	Pass
20 dB, High Range, 16000.0 Hz	89.53	89.04	90.04	0.16	Pass

-- End of measurement results--

1/1-Octave Self-Generated Noise

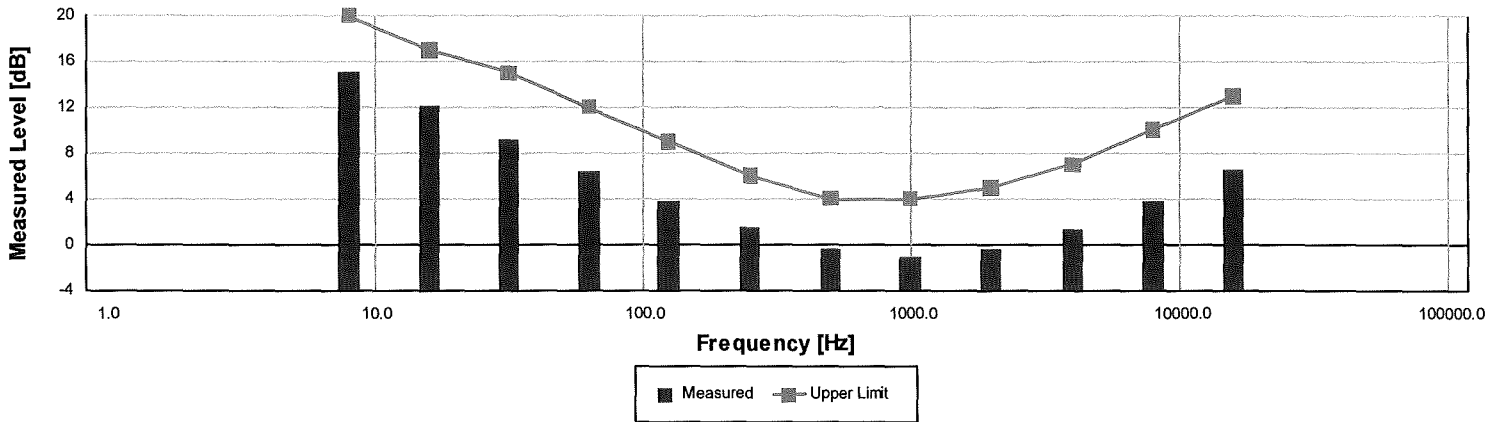


The SLM is set to normal range and 20 dB gain. Performed according to IEC 61260-3:2016 12 and ANSI S1.11-2016 Part 3 12.

Frequency [Hz]	Test Result [dB]	Upper limit [dB]	Result
8.00	14.06	20.00	Pass
16.00	11.77	17.00	Pass
31.50	8.56	14.00	Pass
63.00	6.08	11.00	Pass
125.00	3.72	8.00	Pass
250.00	1.17	5.00	Pass
500.00	-0.86	3.00	Pass
1,000.00	-2.18	2.00	Pass
2,000.00	-2.52	1.00	Pass
4,000.00	-1.73	2.00	Pass
8,000.00	0.01	4.00	Pass
16,000.00	2.40	7.00	Pass

-- End of measurement results--

1/1-Octave Self-Generated Noise

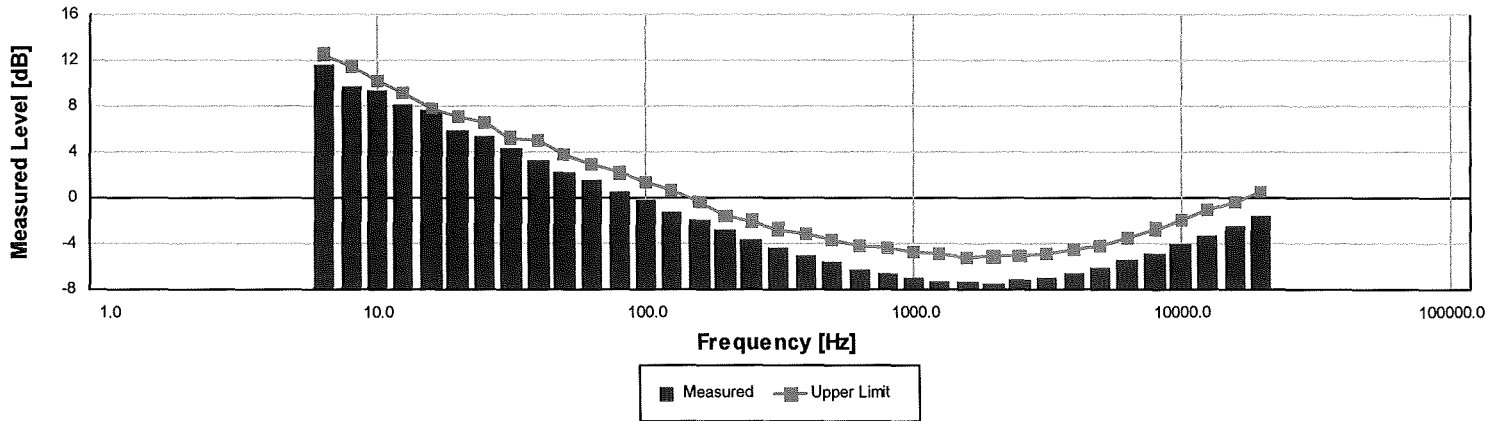


The SLM is set to normal range and 0 dB gain. Performed according to IEC 61260-3:2016 12 and ANSI S1.11-2016 Part 3 12.

Frequency [Hz]	Test Result [dB]	Upper limit [dB]	Result
8.00	15.12	20.00	Pass
16.00	12.15	17.00	Pass
31.50	9.10	15.00	Pass
63.00	6.31	12.00	Pass
125.00	3.79	9.00	Pass
250.00	1.44	6.00	Pass
500.00	-0.40	4.00	Pass
1,000.00	-1.11	4.00	Pass
2,000.00	-0.47	5.00	Pass
4,000.00	1.33	7.00	Pass
8,000.00	3.75	10.00	Pass
16,000.00	6.55	13.00	Pass

-- End of measurement results--

1/3-Octave Self-Generated Noise

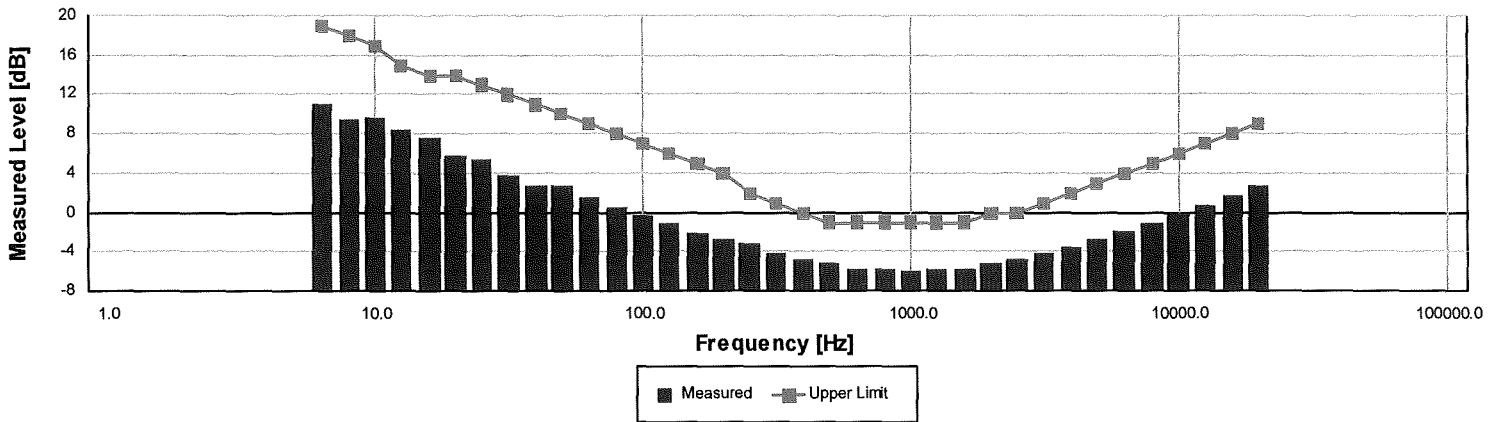


The SLM is set to normal range and 20 dB gain. Performed according to IEC 61260-3:2016 12 and ANSI S1.11-2016 Part 3 12.

Frequency [Hz]	Test Result [dB]	Upper limit [dB]	Result
6.30	11.59	12.60	Pass
8.00	9.67	11.50	Pass
10.00	9.38	10.20	Pass
12.50	8.15	9.20	Pass
16.00	7.61	7.90	Pass
20.00	5.86	7.20	Pass
25.00	5.39	6.60	Pass
31.50	4.37	5.30	Pass
40.00	3.26	5.00	Pass
50.00	2.31	3.80	Pass
63.00	1.59	3.00	Pass
80.00	0.49	2.20	Pass
100.00	-0.08	1.40	Pass
125.00	-1.16	0.70	Pass
160.00	-1.83	-0.40	Pass
200.00	-2.76	-1.50	Pass
250.00	-3.71	-2.00	Pass
315.00	-4.31	-2.70	Pass
400.00	-4.96	-3.10	Pass
500.00	-5.63	-3.70	Pass
630.00	-6.29	-4.10	Pass
800.00	-6.57	-4.30	Pass
1,000.00	-7.02	-4.70	Pass
1,250.00	-7.24	-4.80	Pass
1,600.00	-7.36	-5.20	Pass
2,000.00	-7.38	-5.10	Pass
2,500.00	-7.19	-5.00	Pass
3,150.00	-6.91	-4.80	Pass
4,000.00	-6.58	-4.50	Pass
5,000.00	-6.04	-4.10	Pass
6,300.00	-5.47	-3.40	Pass
8,000.00	-4.80	-2.70	Pass
10,000.00	-4.05	-1.90	Pass
12,500.00	-3.27	-1.10	Pass
16,000.00	-2.43	-0.30	Pass
20,000.00	-1.53	0.60	Pass

-- End of measurement results--

1/3-Octave Self-Generated Noise

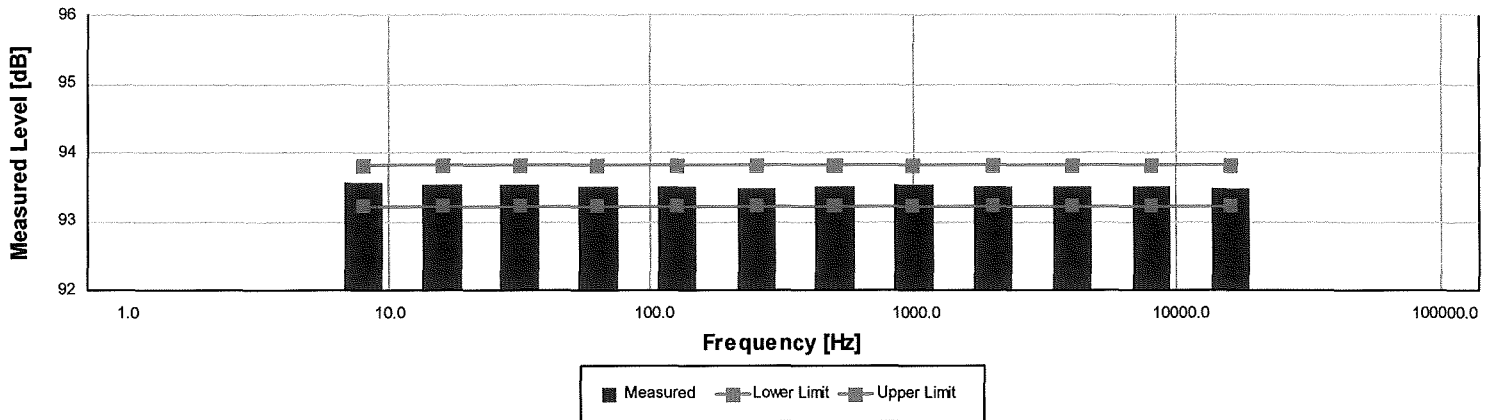


The SLM is set to normal range and 0 dB gain. Performed according to IEC 61260-3:2016 12 and ANSI S1.11-2016 Part 3 12.

Frequency [Hz]	Test Result [dB]	Upper limit [dB]	Result
6.30	11.05	19.00	Pass
8.00	9.36	18.00	Pass
10.00	9.61	17.00	Pass
12.50	8.48	15.00	Pass
16.00	7.66	14.00	Pass
20.00	5.79	14.00	Pass
25.00	5.33	13.00	Pass
31.50	3.84	12.00	Pass
40.00	2.66	11.00	Pass
50.00	2.75	10.00	Pass
63.00	1.56	9.00	Pass
80.00	0.48	8.00	Pass
100.00	-0.34	7.00	Pass
125.00	-1.00	6.00	Pass
160.00	-2.03	5.00	Pass
200.00	-2.79	4.00	Pass
250.00	-3.22	2.00	Pass
315.00	-4.17	1.00	Pass
400.00	-4.64	0.00	Pass
500.00	-5.16	-1.00	Pass
630.00	-5.69	-1.00	Pass
800.00	-5.84	-1.00	Pass
1,000.00	-5.95	-1.00	Pass
1,250.00	-5.85	-1.00	Pass
1,600.00	-5.65	-1.00	Pass
2,000.00	-5.22	0.00	Pass
2,500.00	-4.76	0.00	Pass
3,150.00	-4.14	1.00	Pass
4,000.00	-3.46	2.00	Pass
5,000.00	-2.71	3.00	Pass
6,300.00	-1.87	4.00	Pass
8,000.00	-1.03	5.00	Pass
10,000.00	-0.14	6.00	Pass
12,500.00	0.77	7.00	Pass
16,000.00	1.72	8.00	Pass
20,000.00	2.70	9.00	Pass

-- End of measurement results--

1/1-Octave Relative Attenuation

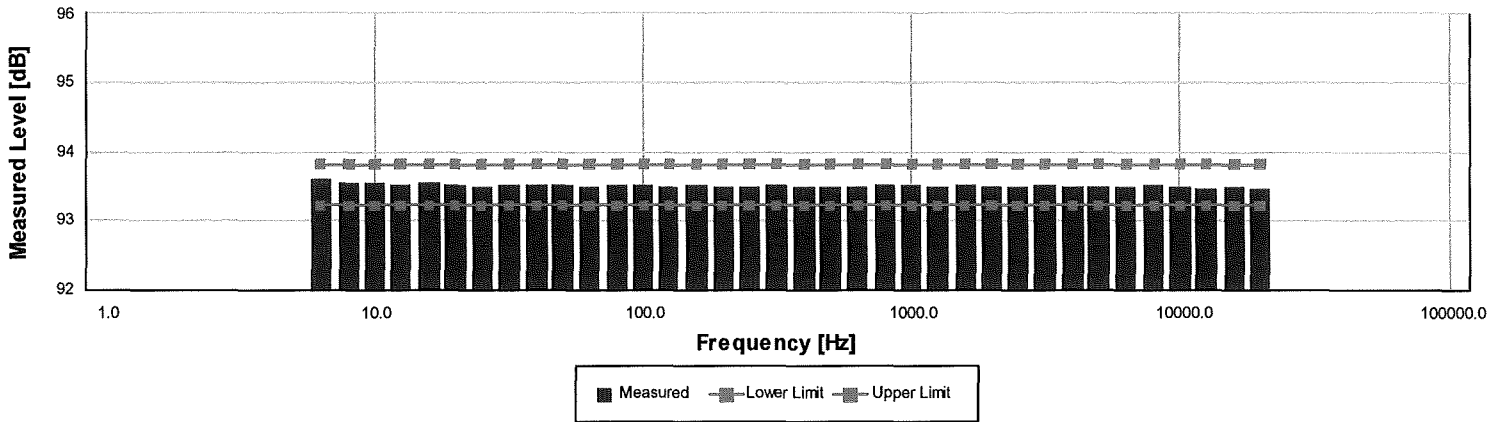


The SLM is set to normal range and 0 dB gain. Performed according to IEC 61260-3:2016 10.2 and ANSI S1.11-2016 Part 3 10.2 for compliance to IEC 61260-1:2014 5.10 and ANSI S1.11-2014 Part 1 5.10.

Frequency [Hz]	Measured Level [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
8.00	93.57	93.23	93.83	0.15	Pass
16.00	93.55	93.23	93.83	0.15	Pass
31.50	93.53	93.23	93.83	0.15	Pass
63.00	93.51	93.23	93.83	0.15	Pass
125.00	93.50	93.23	93.83	0.15	Pass
250.00	93.49	93.23	93.83	0.15	Pass
500.00	93.51	93.23	93.83	0.15	Pass
1,000.00	93.53	93.23	93.83	0.15	Pass
2,000.00	93.50	93.23	93.83	0.15	Pass
4,000.00	93.51	93.23	93.83	0.15	Pass
8,000.00	93.51	93.23	93.83	0.15	Pass
16,000.00	93.48	93.23	93.83	0.15	Pass

-- End of measurement results--

1/3-Octave Relative Attenuation



The SLM is set to normal range and 0 dB gain. Performed according to IEC 61260-3:2016 10.2 and ANSI S1.11-2016 Part 3 10.2 for compliance to IEC 61260-1:2014 5.10 and ANSI S1.11-2014 Part 1 5.10.

Frequency [Hz]	Measured Level [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
6.30	93.60	93.23	93.83	0.15	Pass
8.00	93.56	93.23	93.83	0.15	Pass
10.00	93.56	93.23	93.83	0.15	Pass
12.50	93.54	93.23	93.83	0.15	Pass
16.00	93.55	93.23	93.83	0.15	Pass
20.00	93.52	93.23	93.83	0.15	Pass
25.00	93.50	93.23	93.83	0.15	Pass
31.50	93.53	93.23	93.83	0.15	Pass
40.00	93.52	93.23	93.83	0.15	Pass
50.00	93.51	93.23	93.83	0.15	Pass
63.00	93.51	93.23	93.83	0.15	Pass
80.00	93.54	93.23	93.83	0.15	Pass
100.00	93.54	93.23	93.83	0.15	Pass
125.00	93.50	93.23	93.83	0.15	Pass
160.00	93.52	93.23	93.83	0.15	Pass
200.00	93.50	93.23	93.83	0.15	Pass
250.00	93.49	93.23	93.83	0.15	Pass
315.00	93.52	93.23	93.83	0.15	Pass
400.00	93.51	93.23	93.83	0.15	Pass
500.00	93.51	93.23	93.83	0.15	Pass
630.00	93.50	93.23	93.83	0.15	Pass
800.00	93.53	93.23	93.83	0.15	Pass
1,000.00	93.53	93.23	93.83	0.15	Pass
1,250.00	93.50	93.23	93.83	0.15	Pass
1,600.00	93.52	93.23	93.83	0.15	Pass
2,000.00	93.50	93.23	93.83	0.15	Pass
2,500.00	93.50	93.23	93.83	0.15	Pass
3,150.00	93.52	93.23	93.83	0.15	Pass
4,000.00	93.50	93.23	93.83	0.15	Pass
5,000.00	93.50	93.23	93.83	0.15	Pass
6,300.00	93.49	93.23	93.83	0.15	Pass
8,000.00	93.51	93.23	93.83	0.15	Pass
10,000.00	93.50	93.23	93.83	0.15	Pass
12,500.00	93.46	93.23	93.83	0.15	Pass
16,000.00	93.50	93.23	93.83	0.15	Pass
20,000.00	93.47	93.23	93.83	0.15	Pass

-- End of measurement results--

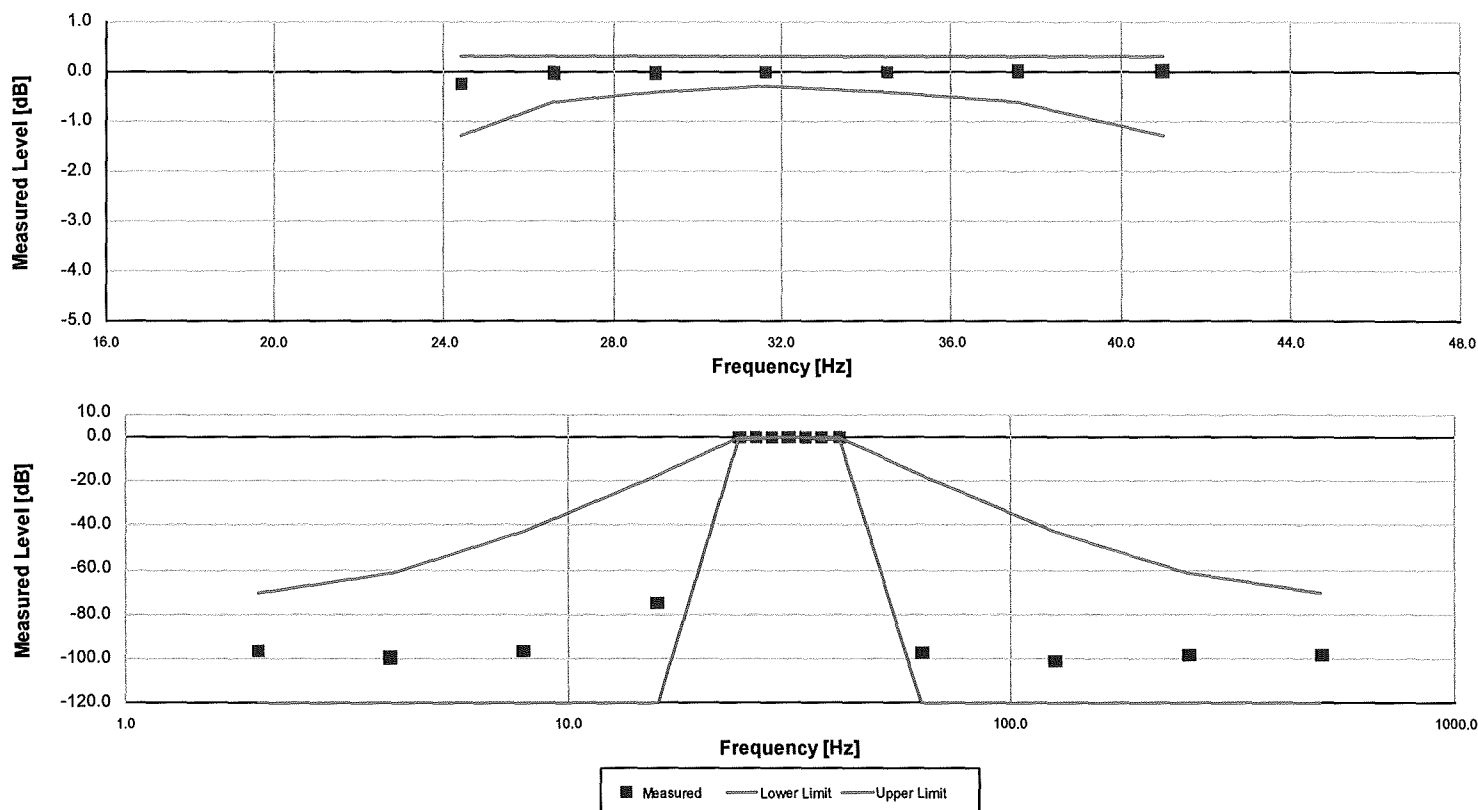
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Provo, UT 84601, United States
716-684-0001



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A PCB PIEZOTRONICS DIV.

1/1 Octave Filter: 31.5 Hz

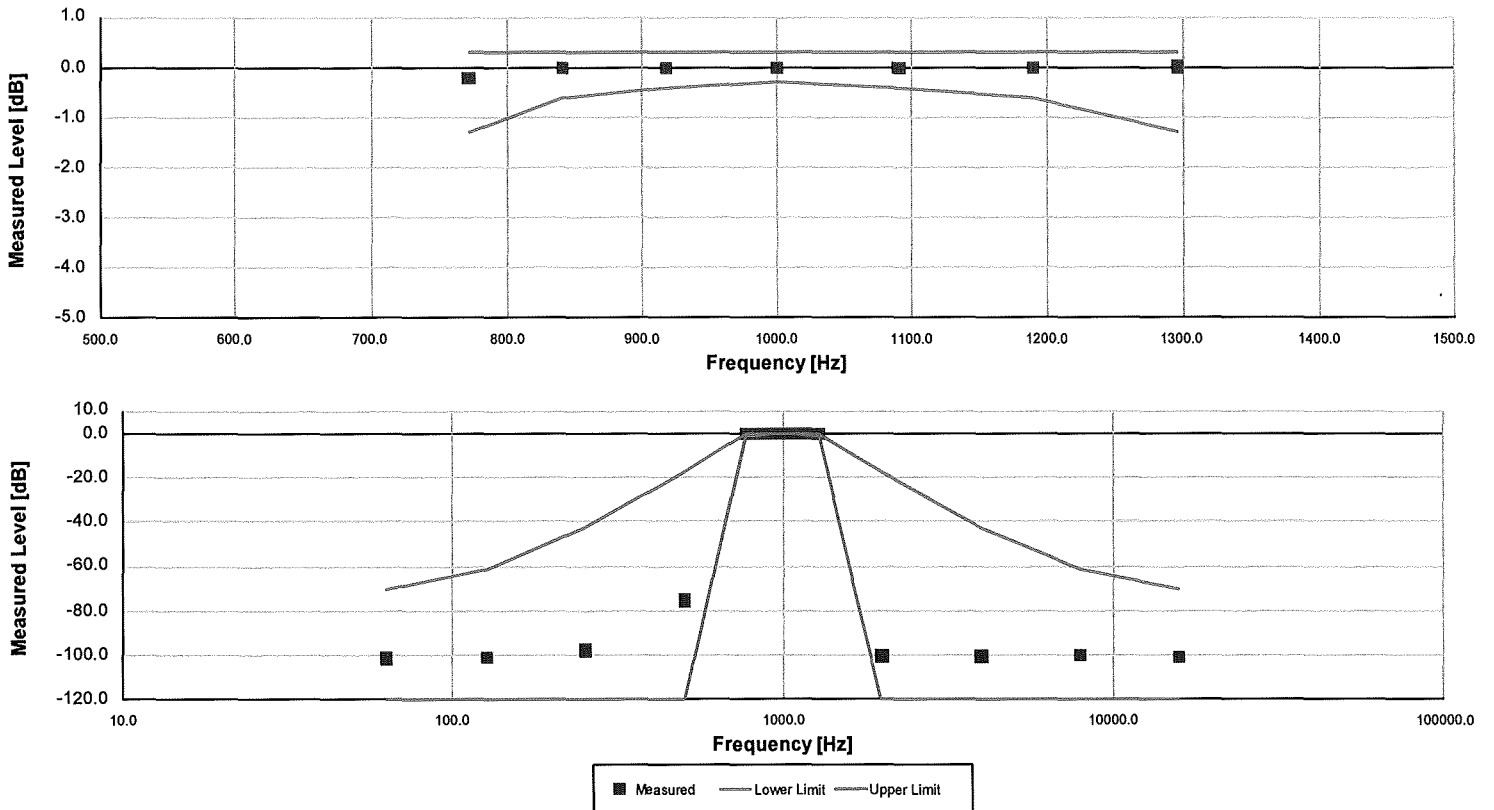


The SLM is set to normal range and 0 dB gain. Filter shape measured according to IEC 61260-3:2016 13 and ANSI S1.11-2016 Part 3 13 for compliance to IEC 61260-1:2014 5.10 and ANSI S1.11-2014 Part 1 5.10

Frequency [Hz]	Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
2.00	-96.33	-inf	-70.00	4.70	Pass
3.98	-99.53	-inf	-61.00	3.70	Pass
7.94	-96.58	-inf	-42.00	4.80	Pass
15.85	-74.97	-inf	-17.50	1.30	Pass
24.41	-0.25	-1.30	0.30	0.15	Pass
26.61	-0.03	-0.60	0.30	0.15	Pass
29.01	-0.03	-0.40	0.30	0.15	Pass
31.62	0.00	-0.30	0.30	0.15	Pass
34.47	0.00	-0.40	0.30	0.15	Pass
37.58	0.01	-0.60	0.30	0.15	Pass
40.97	0.01	-1.30	0.30	0.15	Pass
63.10	-97.51	-inf	-17.50	1.50	Pass
125.89	-101.08	-inf	-42.00	2.00	Pass
251.19	-97.95	-inf	-61.00	1.60	Pass
501.19	-98.41	-inf	-70.00	1.00	Pass

-- End of measurement results--

1/1 Octave Filter: 1 kHz

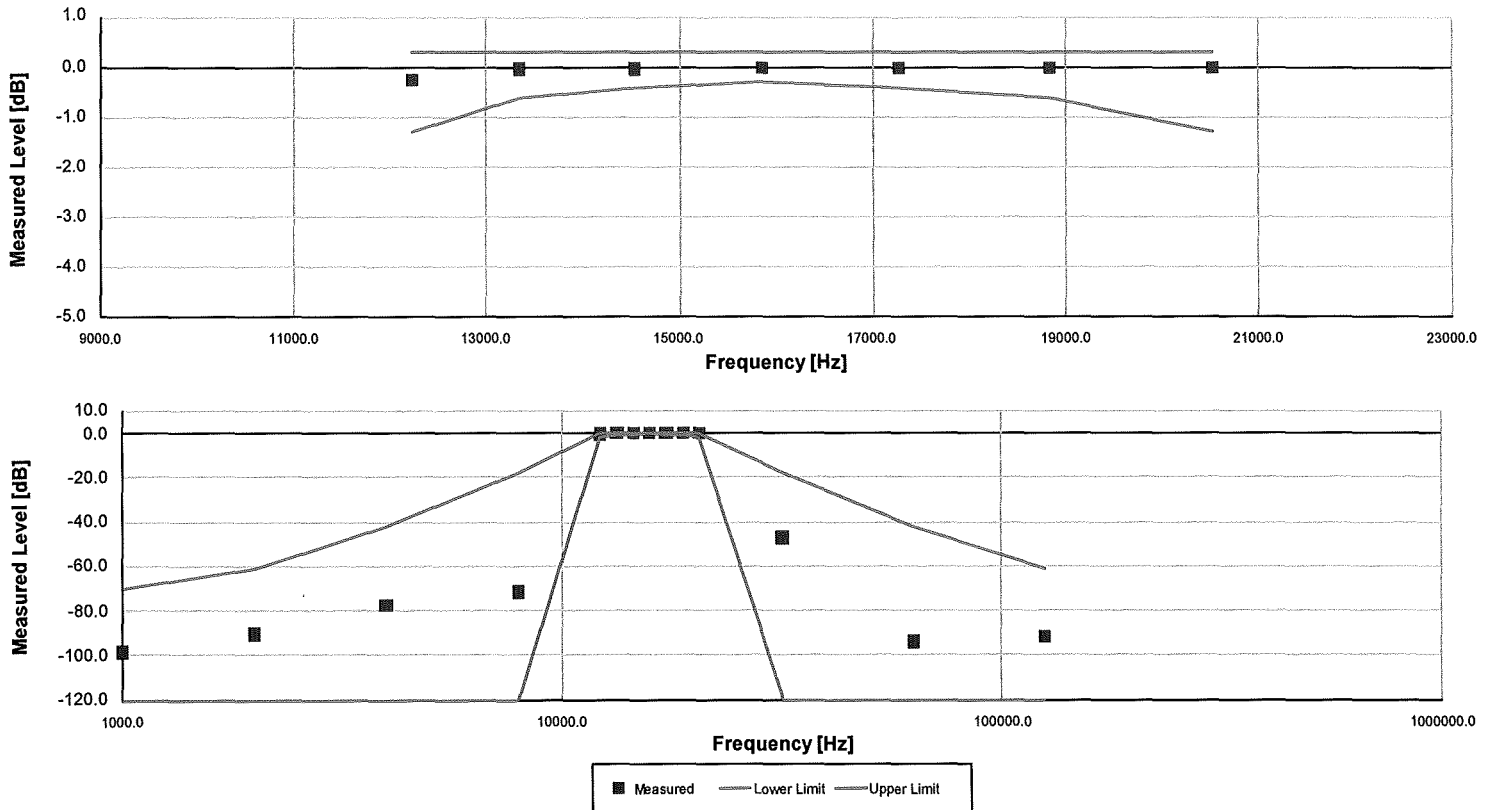


The SLM is set to normal range and 0 dB gain. Filter shape measured according to IEC 61260-3:2016 13 and ANSI S1.11-2016 Part 3 13 for compliance to IEC 61260-1:2014 5.10 and ANSI S1.11-2014 Part 1 5.10

Frequency [Hz]	Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
63.10	-101.28	-inf	-70.00	1.10	Pass
125.89	-101.11	-inf	-61.00	1.60	Pass
251.19	-97.58	-inf	-42.00	1.50	Pass
501.19	-75.25	-inf	-17.50	0.15	Pass
771.79	-0.22	-1.30	0.30	0.15	Pass
841.40	-0.02	-0.60	0.30	0.15	Pass
917.28	-0.01	-0.40	0.30	0.15	Pass
1,000.00	0.00	-0.30	0.30	0.15	Pass
1,090.18	-0.02	-0.40	0.30	0.15	Pass
1,188.50	-0.01	-0.60	0.30	0.15	Pass
1,295.69	0.01	-1.30	0.30	0.15	Pass
1,995.26	-100.37	-inf	-17.50	0.35	Pass
3,981.07	-100.29	-inf	-42.00	0.40	Pass
7,943.28	-100.15	-inf	-61.00	0.54	Pass
15,848.93	-100.60	-inf	-70.00	0.53	Pass

-- End of measurement results--

1/1 Octave Filter: 16 kHz

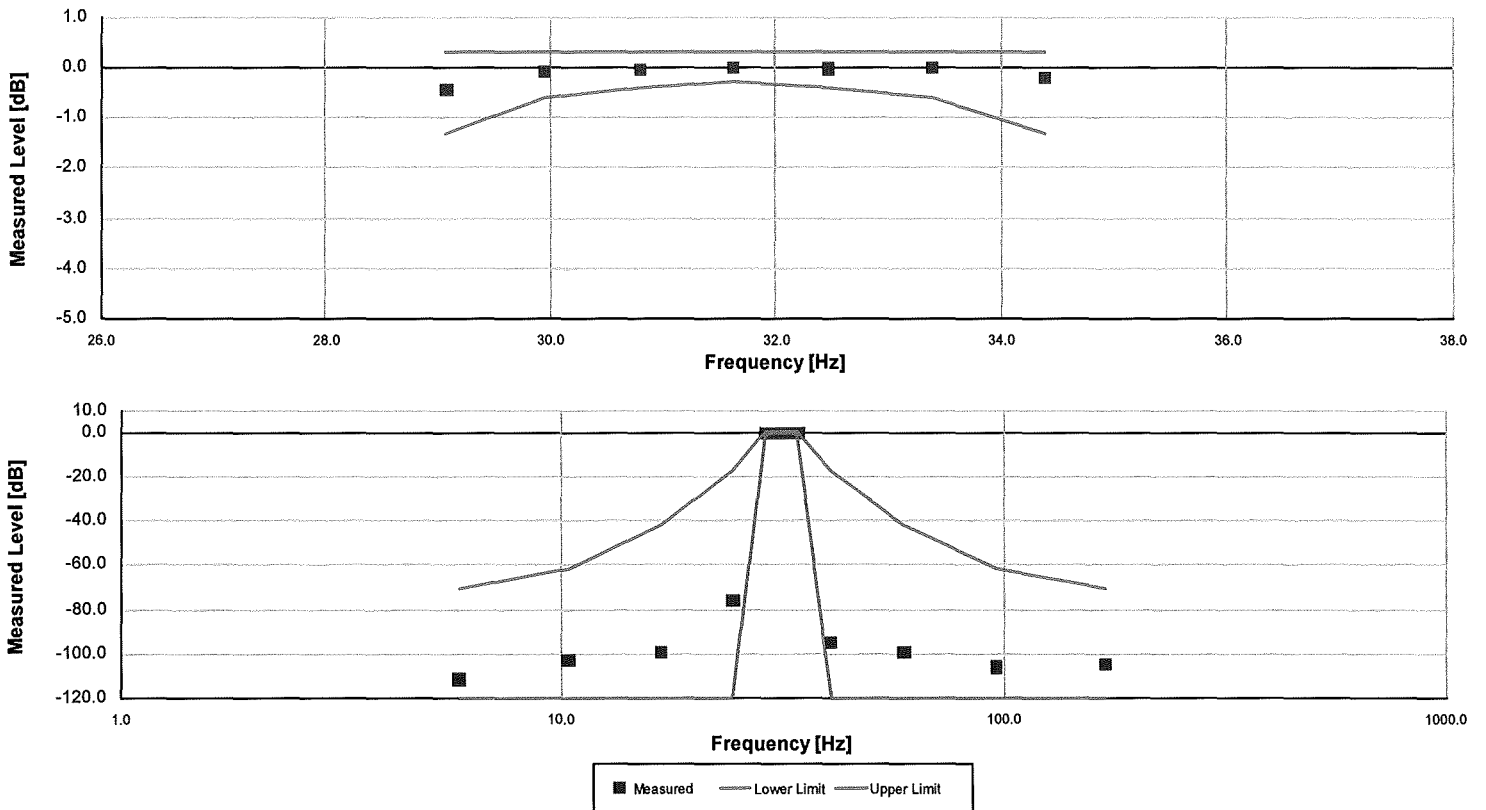


The SLM is set to normal range and 0 dB gain. Filter shape measured according to IEC 61260-3:2016 13 and ANSI S1.11-2016 Part 3 13 for compliance to IEC 61260-1:2014 5.10 and ANSI S1.11-2014 Part 1 5.10

Frequency [Hz]	Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
1,000.00	-98.38	-inf	-70.00	1.80	Pass
1,995.26	-90.21	-inf	-61.00	0.87	Pass
3,981.07	-77.32	-inf	-42.00	1.40	Pass
7,943.28	-71.48	-inf	-17.50	0.16	Pass
12,232.07	-0.25	-1.30	0.30	0.15	Pass
13,335.21	-0.03	-0.60	0.30	0.15	Pass
14,537.84	-0.03	-0.40	0.30	0.15	Pass
15,848.93	-0.03	-0.30	0.30	0.15	Pass
17,278.26	-0.03	-0.40	0.30	0.15	Pass
18,836.49	-0.02	-0.60	0.30	0.15	Pass
20,535.25	-0.02	-1.30	0.30	0.15	Pass
31,622.78	-47.25	-inf	-17.50	0.16	Pass
63,095.73	-93.86	-inf	-42.00	0.26	Pass
125,892.54	-91.60	-inf	-61.00	0.51	Pass

-- End of measurement results--

1/3 Octave Filter: 31.5 Hz

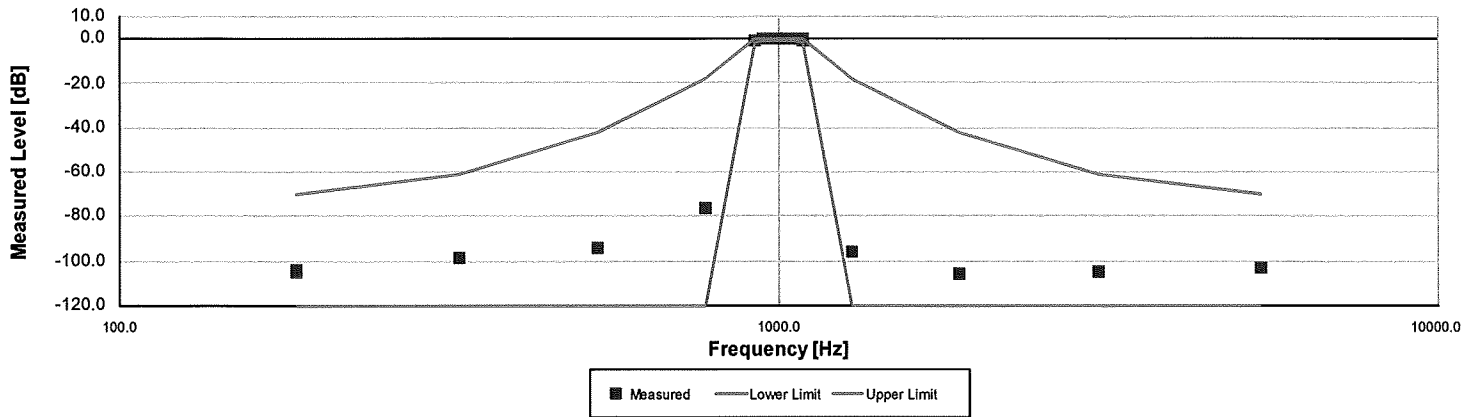
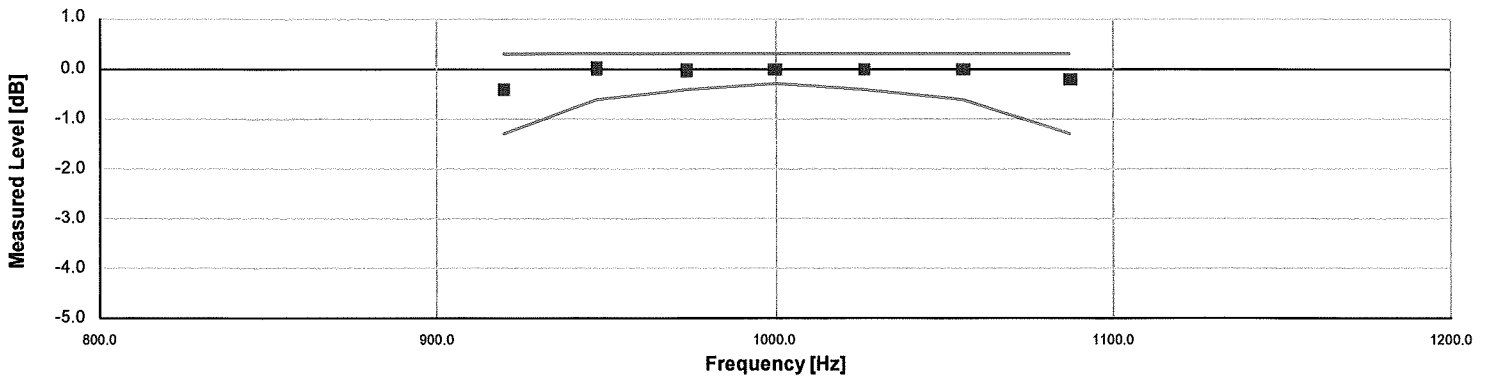


The SLM is set to normal range and 0 dB gain. Filter shape measured according to IEC 61260-3:2016 13 and ANSI S1.11-2016 Part 3 13 for compliance to IEC 61260-1:2014 5.10 and ANSI S1.11-2014 Part 1 5.10

Frequency [Hz]	Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
5.86	-111.44	-inf	-70.00	4.90	Pass
10.36	-103.07	-inf	-61.00	4.70	Pass
16.81	-99.24	-inf	-42.00	2.90	Pass
24.43	-75.81	-inf	-17.50	0.23	Pass
29.08	-0.44	-1.30	0.30	0.15	Pass
29.95	-0.07	-0.60	0.30	0.15	Pass
30.80	-0.04	-0.40	0.30	0.15	Pass
31.62	-0.01	-0.30	0.30	0.15	Pass
32.47	-0.02	-0.40	0.30	0.15	Pass
33.39	-0.01	-0.60	0.30	0.15	Pass
34.39	-0.20	-1.30	0.30	0.15	Pass
40.93	-94.85	-inf	-17.50	0.31	Pass
59.51	-99.45	-inf	-42.00	2.10	Pass
96.56	-105.89	-inf	-61.00	1.70	Pass
170.51	-104.41	-inf	-70.00	2.20	Pass

-- End of measurement results--

1/3 Octave Filter: 1 kHz

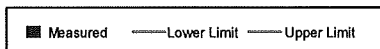
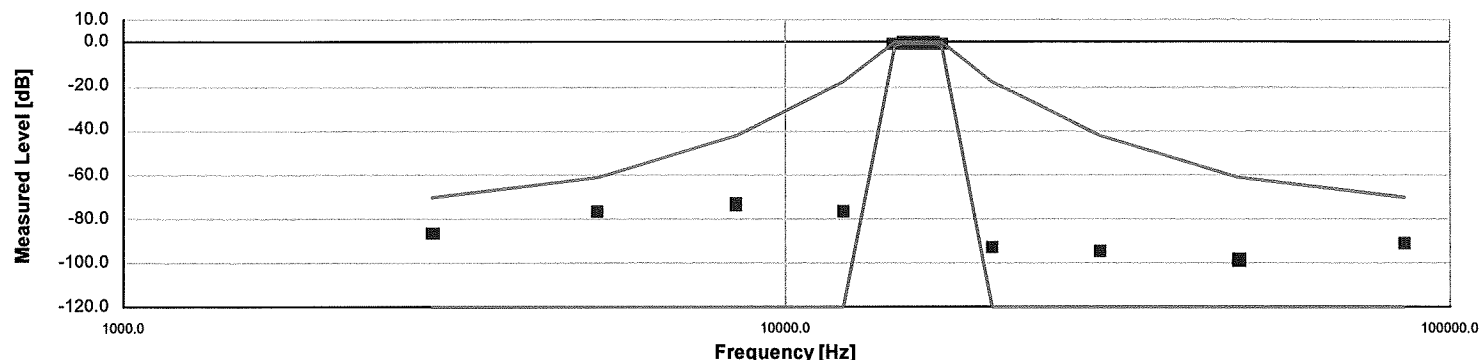
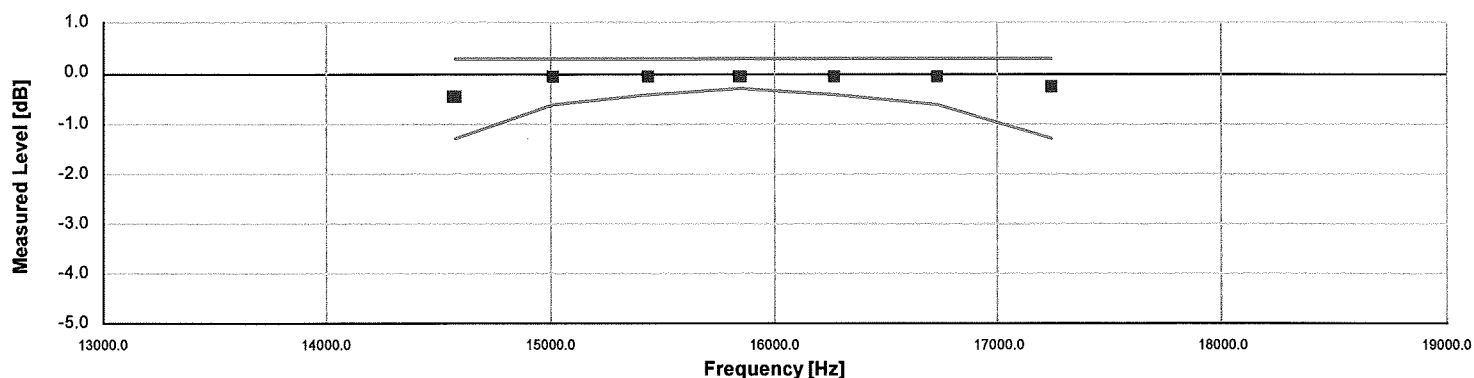


The SLM is set to normal range and 0 dB gain. Filter shape measured according to IEC 61260-3:2016 13 and ANSI S1.11-2016 Part 3 13 for compliance to IEC 61260-1:2014 5.10 and ANSI S1.11-2014 Part 1 5.10

Frequency [Hz]	Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
185.46	-104.39	-inf	-70.00	2.30	Pass
327.48	-98.67	-inf	-61.00	1.50	Pass
531.43	-94.38	-inf	-42.00	1.00	Pass
772.57	-76.25	-inf	-17.50	0.16	Pass
919.58	-0.40	-1.30	0.30	0.15	Pass
947.19	0.00	-0.60	0.30	0.15	Pass
974.02	-0.04	-0.40	0.30	0.15	Pass
1,000.00	0.00	-0.30	0.30	0.15	Pass
1,026.67	0.00	-0.40	0.30	0.15	Pass
1,055.75	-0.02	-0.60	0.30	0.15	Pass
1,087.46	-0.22	-1.30	0.30	0.15	Pass
1,294.37	-96.17	-inf	-17.50	0.22	Pass
1,881.73	-105.65	-inf	-42.00	0.41	Pass
3,053.65	-104.87	-inf	-61.00	0.38	Pass
5,391.95	-102.77	-inf	-70.00	0.43	Pass

-- End of measurement results--

1/3 Octave Filter: 16 kHz



The SLM is set to normal range and 0 dB gain. Filter shape measured according to IEC 61260-3:2016 13 and ANSI S1.11-2016 Part 3 13 for compliance to IEC 61260-1:2014 5.10 and ANSI S1.11-2014 Part 1 5.10

Frequency [Hz]	Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
2,939.37	-85.96	-inf	-70.00	2.10	Pass
5,190.16	-76.28	-inf	-61.00	1.30	Pass
8,422.54	-73.12	-inf	-42.00	2.10	Pass
12,244.48	-75.94	-inf	-17.50	0.16	Pass
14,574.31	-0.45	-1.30	0.30	0.15	Pass
15,011.95	-0.07	-0.60	0.30	0.15	Pass
15,437.16	-0.06	-0.40	0.30	0.15	Pass
15,848.93	-0.05	-0.30	0.30	0.15	Pass
16,271.69	-0.07	-0.40	0.30	0.15	Pass
16,732.58	-0.05	-0.60	0.30	0.15	Pass
17,235.03	-0.25	-1.30	0.30	0.15	Pass
20,514.45	-92.51	-inf	-17.50	0.32	Pass
29,823.37	-94.38	-inf	-42.00	0.69	Pass
48,397.12	-98.31	-inf	-61.00	0.36	Pass
85,456.63	-90.74	-inf	-70.00	0.35	Pass

-- End of measurement results--

-- End of Report--

Signatory: Ron Harris

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