

Appendix 7-B

Noise Survey Equipment Details

Equipment details

Details of the equipment used for the noise surveys are provided in Table 1—1 below. All sound levels meters had been laboratory calibrated within two years of the end of the noise survey (24th May 2023), and the acoustic calibrator within one year.

Table 1–1 Details of equipment used for noise survey

Monitoring Details		Equipment Details				
Position	Type	Type	Model	Class	Serial no.	Date of lab calibration ¹
L3	Unattended	Sound Level Meter	Larson Davis 831	1	4096	27/03/2023
L5	Unattended	Sound Level Meter	Larson Davis SoundExpert LxT	1	3318	27/03/2023
All	All	Acoustic Calibrator	Larson Davis CAL200	1	16906	10/02/2023
¹ Date of last lab calibration at time of survey; equipment may have been lab calibrated since stated date.						

Copies of the relevant laboratory calibration certificates for the equipment can be found on the following pages.



Certificate of Calibration and Conformance

Certificate number: **43809**

Test Object: **Sound Level Meter, BS EN IEC 61672-1:2003 Class 1**
Associated Frequency Analyser to BS EN IEC 61260:1996 Class 1

Producer: **Larson Davis**

Type: **831**

Serial number: **0004096**

Customer: **Vanguardia Ltd**

Address: **21 Station Road West,**
Oxted, Surrey. RH8 9EE.

Contact Person: **Ian Fortune**

Order No: **Contract: 22087**

Introduction:

Calibration has been performed as set out in CA Technical Procedures which are based on the procedures for periodic verification of sound level meters as per the **Test Object** listed above. Results and conformance statement are overleaf and detailed results, where appropriate, are provided in the attached Measurement Report.

Tested:	<i>Producer</i>	<i>Type</i>	<i>Serial No</i>	<i>Certificate No</i>
Microphone	PCB Piezotronics	377B02	317802	43808
Calibrator*	Norsonic	1251	30873	U43256
Preamplifier	PCB	PRM831	036955	Included

* The calibrator was complete with any required coupler for the microphone specified.

Additional items that have also been submitted for verification:

Wind shield N/A

Attenuator N/A

Extension cable N/A

These items have been taken into account wherever appropriate.

Instruction Manual: I831.01 Rev Q Manual Firmware Version: v2.403 The test object is a single channel instrument.

Conditions	<i>Pressure kPa</i>	<i>Temperature °C</i>	<i>Humidity %RH</i>
Reference conditions	101.325	23	50
Measurement conditions	101.99 ±0.03	22.55 ±0.15	33.98 ±0.25

Calibration Dates:

Received date: 20/03/2023 Reviewed date: 28/03/2023

Calibration date: 27/03/2023 Issued date: 28/03/2023

Technicians: (Electronic certificate)

Calibrated by: *Palanivel Marappan B.Eng (Hons), M.Sc*

Reviewed by: *Jenny Crawford*

This certificate is issued in accordance with the CA Quality Management system. It provides traceability of measurement to recognized national standards, and to the units of measurement realized at the National Physical Laboratory or other recognized national standards laboratories. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.

Certificate of Calibration and Conformance

Continuation of Certificate number: 43809

The statements of conformance and observation notes detailed in this certificate are made with reference to the following standards in respect of the calibration of the test object.

Manufactured:	BS EN IEC 61672-1:2003
Periodic Tests:	BS EN IEC 61672-3:2006
Pattern Evaluation:	BS EN IEC 61672-2:2003
Filter Evaluation:	BS EN IEC 61260:1996 Class 1

Conformance:

From markings on the sound level meter or by reference to the manufacturer's published literature it has been determined that the instrument submitted for verification was originally manufactured to the listed standard and similarly that the associated sound calibrator conforms to the BS EN IEC 60942 standard.

Measurement Summary:

Indication at the calibration check frequency - IEC61672-3 Ed.1 #9	Passed
Self-generated noise - IEC 61672-3 Ed.1 #10.2	Passed
Acoustical signal tests of a frequency weighting - IEC 61672-3 Ed.1 #11	Passed
Electrical signal tests of frequency weightings - IEC 61672-3 Ed.1 #12	Passed
Frequency weightings: A Network - IEC 61672-3 Ed.1 #12.3	Passed
Frequency weightings: C Network - IEC 61672-3 Ed.1 #12.3	Passed
Frequency weightings: Z Network - IEC 61672-3 Ed.1 #12.3	Passed
Frequency and time weightings at 1 kHz IEC 61672-3 Ed.1 #13	Passed
Level linearity on the reference level range - IEC 61672-3 Ed.1 #14	Passed
Level linearity including the level range control - IEC 61672-3 Ed.1 #15	Passed
Toneburst response - IEC 61672-3 Ed.1 #16	Passed
Peak C sound level - IEC 61672-3 Ed.1 #17	Passed
Overload indication - IEC 61672-3 Ed.1 #18	Passed
1/1octave: Relative attenuation - IEC 61260, #4.4 & #5.3	Passed
1/3octave: Relative attenuation - IEC 61260, #4.4 & #5.3	Passed

Comments

Correct level with associated calibrator is 114.0dB(A).

Statement of Conformance

The sound level meter submitted has successfully completed the periodic tests of the standard listed for the environmental conditions under which the tests were performed. As public evidence(1) was available, from an independent testing organisation responsible for approving the results of pattern evaluation tests performed in accordance with the manufacturer's standard to demonstrate that the model of sound level meter fully conformed to the requirements of the said standard, the sound level meter submitted for testing conforms to the relevant class of the said standard.

(1 - evidence is held on file at the calibration laboratory)

Filter Calibration

The filter functions have been found to conform, by electrical testing, to the relative attenuation requirement of the standard noted over the range of frequencies shown in the attached test report.

Observations

No information on the uncertainty of measurement, required by the listed standard, for the correction data was made available in the instruction manual / data sheets from the equipment manufacturer / supplier for the test object. The uncertainty of measurement of the adjustment data has therefore been assumed to be numerically zero for the purpose of this periodic test. If these uncertainties are not actually zero, there is a possibility that the frequency response of the test object may not conform to the requirements of the listed standards.

Continuation of Certificate number: 43809

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor $k = 2$, providing a coverage probability of approximately 95 %. The uncertainty evaluation has been carried out in accordance with EA publication EA-4/02. Details of the uncertainty for each measurement are available from the Calibration Laboratory upon request. Details of the sources of corrections and their associated uncertainties that relate to this verification are contained within the test report accompanying this certificate.

This certificate relates only to the items tested above.

**** End of Certificate ****

Measurement Results:

Indication at the calibration check frequency - IEC61672-3 Ed.1 Clause 9

Reference level: 114.0 dB
Reference Range: 140 dB FS
Reference Frequency: 1000 Hz
Reference Calibrator: WSC5 - Nor1251-31824
Reference calibrator level: 114.02
Before calibration:
Environmental corrections: 0.00
Other corrections: -0.15
Notional level: 113.87
Calibrator level before adjustment: 113.9
After calibration:
Environmental corrections: 0.00
Other corrections: -0.15
Notional level: 113.87
Reference calibrator level after calibration: 113.9
Associated Calibrator: Norsonic - 1251 - 30873
Associated calibrator level: 114.10
Initial level check:
Environmental corrections: 0.00
Other corrections: -0.15
Notional level: 113.95
Indicated level: 114.0
Final level statement:
Environmental corrections after calibration: 0.00
Other corrections: -0.15
Notional level: 113.95
Calibrator level after adjustment: 114.0
This value shall be used for adjusting the sound level meter in the future.
Test Passed

Self-generated noise - IEC 61672-3 Ed.1 Clause 10.2

Network	Level (dB)	Comment
A	17.7	Microphone installed
A	12.7	Equivalent capacity
C	13.1	Equivalent capacity
Z	22.9	Equivalent capacity

Test Passed

Acoustical signal tests of a frequency weighting - IEC 61672-3 Ed.1 Clause 11

C-Weighted results

Frequency	SLM		Microphone		Case	Refl.	Wind	Screen	Uncert	Lim	Result
	Meas	U	Corr	U	Corr	U	Corr	U	(dB)	(dB)	(dB)
	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)
125 Hz	0.1	0.2	0.0	0.0	0.0	0.0			0.2	+/-1.5	0.2 P
1 kHz	0.0	0.2	0.1	0.0	-0.2	0.0			0.2	+/-1.1	0.0 P
4 kHz	-0.9	0.3	1.0	0.0	0.2	0.0			0.3	+/-1.6	0.3 P
8 kHz	-3.3	0.2	3.4	0.0	0.1	0.0			0.2	+2.1/-3.1	0.3 P

The level obtained at 1 kHz was used as reference for the calculations.

This level was: 92.77 dB.

The overall frequency response of the sound level meter, nominal case reflections and microphone response has shown to conform with the requirements in IEC 61672-3 for a class 1 sound level meter.

Frequency response test using electrostatic actuator.

Sources for correction data:

Microphone field corrections and uncertainty: None

Case reflections and uncertainty:

Wind screen corrections and uncertainty:

Test Passed

Electrical signal tests of frequency weightings - IEC 61672-3 Ed.1 Clause 12

A-Weighted results:

Frequency	SLM		Microphone		Case	Refl.	Wind	Screen	Uncert	Lim	Result
	Meas	U	Corr	U	Corr	U	Corr	U	(dB)	(dB)	(dB)
	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)
63 Hz	0.0	0.1	0.0	0.0	0.0	0.0			0.12	+/-1.5	0.0 P
125 Hz	-0.1	0.1	0.0	0.0	0.0	0.0			0.12	+/-1.5	-0.1 P
250 Hz	-0.1	0.1	0.0	0.0	0.0	0.0			0.12	+/-1.4	-0.1 P
500 Hz	-0.1	0.1	0.0	0.0	0.2	0.0			0.12	+/-1.4	0.1 P
1 kHz	0.0	0.1	0.1	0.0	-0.2	0.0			0.12	+/-1.1	-0.1 P
2 kHz	-0.1	0.1	0.1	0.0	0.3	0.0			0.12	+/-1.6	0.3 P
4 kHz	-0.1	0.1	0.0	0.0	0.2	0.0			0.12	+/-1.6	0.1 P
8 kHz	0.0	0.1	0.0	0.0	0.1	0.0			0.12	2.1/3.1	0.1 P
16 kHz	0.1	0.1	1.4	0.0	0.5	0.0			0.12	3.5/17	2.0 P

C-Weighted results:

Frequency	SLM		Microphone		Case	Refl.	Wind	Screen	Uncert	Lim	Result
	Meas	U	Corr	U	Corr	U	Corr	U	(dB)	(dB)	(dB)
	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)
63 Hz	-0.1	0.1	0.0	0.0	0.0	0.0			0.12	+/-1.5	-0.1 P
125 Hz	0.0	0.1	0.0	0.0	0.0	0.0			0.12	+/-1.5	0.0 P
250 Hz	-0.1	0.1	0.0	0.0	0.0	0.0			0.12	+/-1.4	-0.1 P
500 Hz	0.0	0.1	0.0	0.0	0.2	0.0			0.12	+/-1.4	0.2 P
1 kHz	0.0	0.1	0.1	0.0	-0.2	0.0			0.12	+/-1.1	-0.1 P
2 kHz	0.0	0.1	0.1	0.0	0.3	0.0			0.12	+/-1.6	0.4 P
4 kHz	0.0	0.1	0.0	0.0	0.2	0.0			0.12	+/-1.6	0.2 P
8 kHz	0.0	0.1	0.0	0.0	0.1	0.0			0.12	2.1/3.1	0.1 P
16 kHz	0.0	0.1	1.4	0.0	0.5	0.0			0.12	3.5/17	1.9 P

Z-Weighted results:

Frequency	SLM		Microphone		Case	Refl.	Wind	Screen	Uncert	Lim	Result
	Meas	U	Corr	U	Corr	U	Corr	U	(dB)	(dB)	(dB)
	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	(dB)

Electrical signal tests of frequency weightings - IEC 61672-3 Ed.1 Clause 12

63 Hz	0.0	0.1	0.0	0.0	0.0	0.0	0.12	+1.5	0.0	P
125 Hz	0.0	0.1	0.0	0.0	0.0	0.0	0.12	+1.5	0.0	P
250 Hz	0.0	0.1	0.0	0.0	0.0	0.0	0.12	+1.4	0.0	P
500 Hz	0.0	0.1	0.0	0.0	0.2	0.0	0.12	+1.4	0.2	P
1 kHz	0.0	0.1	0.1	0.0	-0.2	0.0	0.12	+1.1	-0.1	P
2 kHz	0.0	0.1	0.1	0.0	0.3	0.0	0.12	+1.6	0.4	P
4 kHz	0.1	0.1	0.0	0.0	0.2	0.0	0.12	+1.6	0.3	P
8 kHz	0.1	0.1	0.0	0.0	0.1	0.0	0.12	2.1/3.1	0.2	P
16 kHz	0.0	0.1	1.4	0.0	0.5	0.0	0.12	3.5/17	1.9	P

The actual frequency response of PCB Piezotronics / 377B02 317802 has been used for the calculations.

The overall frequency response of the sound level meter, nominal case reflections and microphone response has shown to conform with the requirements in IEC 61672-3 for a class 1 sound level meter.

The calculated uncertainties are checked against the requirements in the standard.

Sources for correction data:

Microphone response and uncertainty: Measured response / Settings file
Test Passed

Frequency weightings: A Network - IEC 61672-3 Ed.1 Clause 12.3

Frequency (Hz)	Ref. (dB)	Meas. (dB)	Uncert. (dB)	Dev. (dB)
63.1	95.0	95.0	0.12	0.0
125.9	95.0	94.9	0.12	-0.1
251.2	95.0	94.9	0.12	-0.1
501.2	95.0	94.9	0.12	-0.1
1000.0	95.0	95.0	0.12	0.0
1995.3	95.0	94.9	0.12	-0.1
3981.1	95.0	94.9	0.12	-0.1
7943.3	95.0	95.0	0.12	0.0
15848.9	95.0	95.1	0.12	0.1

Test Passed

Frequency weightings: C Network - IEC 61672-3 Ed.1 Clause 12.3

Frequency (Hz)	Ref. (dB)	Meas. (dB)	Uncert. (dB)	Dev. (dB)
63.1	95.0	94.9	0.12	-0.1
125.9	95.0	95.0	0.12	0.0
251.2	95.0	94.9	0.12	-0.1
501.2	95.0	95.0	0.12	0.0
1000.0	95.0	95.0	0.12	0.0
1995.3	95.0	95.0	0.12	0.0
3981.1	95.0	95.0	0.12	0.0
7943.3	95.0	95.0	0.12	0.0
15848.9	95.0	95.0	0.12	0.0

Test Passed

Frequency weightings: Z Network - IEC 61672-3 Ed.1 Clause 12.3

Frequency (Hz)	Ref. (dB)	Meas. (dB)	Uncert. (dB)	Dev. (dB)
63.1	95.0	95.0	0.12	0.0
125.9	95.0	95.0	0.12	0.0
251.2	95.0	95.0	0.12	0.0
501.2	95.0	95.0	0.12	0.0
1000.0	95.0	95.0	0.12	0.0
1995.3	95.0	95.0	0.12	0.0
3981.1	95.0	95.1	0.12	0.1
7943.3	95.0	95.1	0.12	0.1
15848.9	95.0	95.0	0.12	0.0

Test Passed

Frequency and time weightings at 1 kHz IEC 61672-3 Ed.1 Clause 13

Weightings Time	Netw	Ref. (dB)	Measured (dB)	Lim. (dB)	Uncert. (dB)	Dev. (dB)	Result
Fast	A	114.0	114.0	0.4 -0.4	0.12	0.0	P
Fast	C	114.0	114.0	0.4 -0.4	0.12	0.0	P
Fast	Z	114.0	114.0	0.4 -0.4	0.12	0.0	P
Slow	A	114.0	114.0	0.3 -0.3	0.12	0.0	P
Leq	A	114.0	114.0	0.3 -0.3	0.12	0.0	P
SEL	A	134.0	134.0	0.3 -0.3	0.12	0.0	P

Test Passed

Level linearity on the reference level range - IEC 61672-3 Ed.1 Clause 14

	Ref. (dB)	Measured (dB)	Lim. (dB)	Uncert. (dB)	Dev. (dB)	Result	
Measured at 8 kHz							
	114.0	114.0	1.1	-1.1	0.12	0.0	P
	119.0	119.0	1.1	-1.1	0.12	0.0	P
	124.0	124.0	1.1	-1.1	0.12	0.0	P
	129.0	129.0	1.1	-1.1	0.12	0.0	P
	134.0	134.0	1.1	-1.1	0.12	0.0	P
	135.0	135.0	1.1	-1.1	0.12	0.0	P
	136.0	136.0	1.1	-1.1	0.12	0.0	P
	137.0	137.0	1.1	-1.1	0.12	0.0	P
	138.0	138.0	1.1	-1.1	0.12	0.0	P
	139.0	139.0	1.1	-1.1	0.12	0.0	P
	114.0	114.0	1.1	-1.1	0.12	0.0	P
	109.0	109.0	1.1	-1.1	0.12	0.0	P
	104.0	104.0	1.1	-1.1	0.12	0.0	P
	99.0	99.0	1.1	-1.1	0.12	0.0	P
	94.0	94.0	1.1	-1.1	0.12	0.0	P
	89.0	89.0	1.1	-1.1	0.12	0.0	P
	84.0	84.0	1.1	-1.1	0.12	0.0	P
	79.0	78.9	1.1	-1.1	0.12	-0.1	P
	74.0	73.9	1.1	-1.1	0.12	-0.1	P
	69.0	68.9	1.1	-1.1	0.12	-0.1	P
	64.0	64.0	1.1	-1.1	0.12	0.0	P

Level linearity on the reference level range - IEC 61672-3 Ed.1 Clause 14

Level Linearity and Reference Level Range						
Ref.	Measured	Lim.		Uncert.	Dev.	Result
(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	
59.0	59.0	1.1	-1.1	0.12	0.0	P
54.0	53.9	1.1	-1.1	0.12	-0.1	P
49.0	48.9	1.1	-1.1	0.12	-0.1	P
44.0	43.9	1.1	-1.1	0.12	-0.1	P
39.0	38.9	1.1	-1.1	0.12	-0.1	P
34.0	33.9	1.1	-1.1	0.12	-0.1	P
32.0	32.0	1.1	-1.1	0.12	0.0	P
31.0	31.0	1.1	-1.1	0.12	0.0	P
30.0	30.0	1.1	-1.1	0.12	0.0	P
29.0	29.0	1.1	-1.1	0.12	0.0	P
28.0	28.0	1.1	-1.1	0.12	0.0	P
27.0	27.1	1.1	-1.1	0.12	0.1	P
26.0	26.2	1.1	-1.1	0.12	0.2	P

Test Passed

Level linearity including the level range control - IEC 61672-3 Ed.1 Clause 15

Full Scale (dB)	Ref. Value (dB)	Measured Value (dB)	Lim. Value (±dB)	Uncert. (dB)	Dev. (dB)	Result
Measured at 1 kHz						
The following measurements are SPL measurements						
Measuring the reference level on the available ranges						
140	114.0	114.0	1.1	0.12	0.0	P
120	114.0	114.0	1.1	0.12	0.0	P
Measuring 5 dB below full scale on all available ranges						
140	135.0	135.0	1.1	0.12	0.0	P
120	115.0	114.9	1.1	0.12	-0.1	P
Measuring 5 dB above bottom of scale or 16 dB above self-noise						
140	30.0	29.9	1.1	0.12	-0.1	P
120	29.0	29.0	1.1	0.12	0.0	P

Test Passed

Toneburst response - IEC 61672-3 Ed.1 Clause 16

Burst type		Ref.	Measured	Lim.		Uncert.	Dev.	Result
		(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	
Fast	200 mSec	137.0	136.9	0.8	-0.8	0.16	-0.1	P
Fast	2.0 mSec	120.0	119.5	1.3	-1.8	0.16	-0.5	P
Fast	0.25 mSec	111.0	110.7	1.3	-3.3	0.16	-0.3	P
Slow	200 mSec	130.6	130.4	0.8	-0.8	0.16	-0.2	P
Slow	2.0 mSec	111.0	110.8	1.3	-3.3	0.16	-0.2	P
SEL	200 mSec	131.0	130.9	0.8	-0.8	0.16	-0.1	P
SEL	2.0 mSec	111.0	110.9	1.3	-1.8	0.16	-0.1	P
SEL	0.25 mSec	102.0	101.8	1.3	-3.3	0.16	-0.2	P

Test Passed

Peak C sound level - IEC 61672-3 Ed.1 Clause 17

Pulse Type	Pulse Freq. (Hz)	Ref. RMS (dB)	Ref. Peak (dB)	Measured Value (dB)	Lim. (+/-dB)	Uncert. (dB)	Dev. (dB)	Result
1 cycle	8k	129.0	132.4	131.7	2.4	0.2	-0.7	P
Pos 1/2 cycle	500	132.0	134.4	134.2	1.4	0.2	-0.2	P
Neg 1/2 cycle	500	132.0	134.4	134.1	1.4	0.2	-0.3	P
Test Passed								

Overload indication - IEC 61672-3 Ed.1 Clause 18

	Measured (dB)	Lim. (+/-dB)	Uncert. (dB)	Result
Level difference of positive and negative pulses:	0.2	1.8	0.16	P
Positive 1/2 cycle 4 kHz. Overload occurred at:	142.4			
Negative 1/2 cycle 4 kHz. Overload occurred at:	142.6			
Test Passed				

1/1octave: Relative attenuation - IEC 61260, Clause 4.4 & #5.3

Test 1/1 octave filter X=-4 fexact=63.096Hz class 1

Nominal f[Hz]	Measured L[dB]	LoLim [dB]	HiLim [dB]	Result [P/F]
3.981	53.5	0.0	68.0	P
7.943	53.2	0.0	77.0	P
15.849	52.8	0.0	96.0	P
31.623	63.6	0.0	120.5	P
44.668	134.8	133.0	136.0	P
48.697	137.7	136.7	138.3	P
53.088	138.0	137.4	138.3	P
57.876	138.0	137.6	138.3	P
63.096	137.9	137.7	138.3	P
68.786	138.0	137.6	138.3	P
74.989	138.0	137.4	138.3	P
81.752	137.9	136.7	138.3	P
89.125	134.8	133.0	136.0	P
125.893	53.9	0.0	120.5	P
251.189	53.6	0.0	96.0	P
501.187	53.4	0.0	77.0	P
1000.00	53.6	0.0	68.0	P

Test 1/1 octave filter X=-3 fexact=125.893Hz class 1

Nominal f[Hz]	Measured L[dB]	LoLim [dB]	HiLim [dB]	Result [P/F]
7.943	52.3	0.0	68.0	P
15.849	52.9	0.0	77.0	P
31.623	53.4	0.0	96.0	P
63.096	63.2	0.0	120.5	P
89.125	134.8	133.0	136.0	P
97.163	137.7	136.7	138.3	P
105.925	137.9	137.4	138.3	P
115.478	137.9	137.6	138.3	P
125.893	137.9	137.7	138.3	P

1/octave: Relative attenuation - IEC 61260, Clause 4.4 & #5.3

137.246	137.9	137.6	138.3	P
149.624	137.9	137.4	138.3	P
163.117	137.9	136.7	138.3	P
177.828	134.8	133.0	136.0	P
251.189	52.3	0.0	120.5	P
501.187	51.8	0.0	96.0	P
1000.00	52.3	0.0	77.0	P
1995.26	51.9	0.0	68.0	P
Test 1/1 octave filter X=-2 fexact=251.189Hz class 1				
Nominal	Measured	LoLim	HiLim	Result
f[Hz]	L[dB]	[dB]	[dB]	[P/F]
15.849	45.9	0.0	68.0	P
31.623	45.9	0.0	77.0	P
63.096	47.3	0.0	96.0	P
125.893	63.1	0.0	120.5	P
177.828	134.8	133.0	136.0	P
193.865	137.7	136.7	138.3	P
211.349	137.9	137.4	138.3	P
230.409	137.9	137.6	138.3	P
251.189	137.9	137.7	138.3	P
273.842	137.9	137.6	138.3	P
298.538	137.9	137.4	138.3	P
325.462	137.9	136.7	138.3	P
354.813	134.8	133.0	136.0	P
501.187	45.6	0.0	120.5	P
1000.00	45.6	0.0	96.0	P
1995.26	45.8	0.0	77.0	P
3981.07	45.6	0.0	68.0	P
Test 1/1 octave filter X=-1 fexact=501.187Hz class 1				
Nominal	Measured	LoLim	HiLim	Result
f[Hz]	L[dB]	[dB]	[dB]	[P/F]
31.623	50.3	0.0	68.0	P
63.096	50.0	0.0	77.0	P
125.893	50.9	0.0	96.0	P
251.189	63.1	0.0	120.5	P
354.813	134.8	133.0	136.0	P
386.812	137.7	136.7	138.3	P
421.697	137.9	137.4	138.3	P
459.727	137.9	137.6	138.3	P
501.187	137.9	137.7	138.3	P
546.387	137.9	137.6	138.3	P
595.662	137.9	137.4	138.3	P
649.382	137.9	136.7	138.3	P
707.946	134.8	133.0	136.0	P
1000.00	50.3	0.0	120.5	P
1995.26	50.2	0.0	96.0	P
3981.07	50.4	0.0	77.0	P
7943.28	50.3	0.0	68.0	P
Test 1/1 octave filter X= 0 fexact=1000.000Hz class 1				
Nominal	Measured	LoLim	HiLim	Result
f[Hz]	L[dB]	[dB]	[dB]	[P/F]
63.096	48.2	0.0	68.0	P
125.893	48.5	0.0	77.0	P
251.189	48.6	0.0	96.0	P
501.187	63.2	0.0	120.5	P
707.946	134.8	133.0	136.0	P
771.792	137.7	136.7	138.3	P
841.395	137.9	137.4	138.3	P
917.276	137.9	137.6	138.3	P

1/octave: Relative attenuation - IEC 61260, Clause 4.4 & #5.3

1000.00	138.0	137.7	138.3	P
1090.18	137.9	137.6	138.3	P
1188.50	137.9	137.4	138.3	P
1295.69	138.0	136.7	138.3	P
1412.54	134.8	133.0	136.0	P
1995.26	48.3	0.0	120.5	P
3981.07	48.3	0.0	96.0	P
7943.28	48.7	0.0	77.0	P
15848.9	49.5	0.0	68.0	P

Test 1/1 octave filter X= 1 fexact=1995.262Hz class 1

Nominal	Measured	LoLim	HiLim	Result
f[Hz]	L[dB]	[dB]	[dB]	[P/F]
125.893	48.4	0.0	68.0	P
251.189	48.7	0.0	77.0	P
501.187	49.3	0.0	96.0	P
1000.00	63.2	0.0	120.5	P
1412.54	134.8	133.0	136.0	P
1539.93	137.7	136.7	138.3	P
1678.80	137.9	137.4	138.3	P
1830.21	137.9	137.6	138.3	P
1995.26	137.9	137.7	138.3	P
2175.20	137.9	137.6	138.3	P
2371.37	137.9	137.4	138.3	P
2585.24	137.9	136.7	138.3	P
2818.38	134.8	133.0	136.0	P
3981.07	48.7	0.0	120.5	P
7943.28	49.0	0.0	96.0	P
15848.9	50.6	0.0	77.0	P
31622.8	48.3	0.0	68.0	P

Test 1/1 octave filter X= 2 fexact=3981.072Hz class 1

Nominal	Measured	LoLim	HiLim	Result
f[Hz]	L[dB]	[dB]	[dB]	[P/F]
251.189	50.3	0.0	68.0	P
501.187	50.3	0.0	77.0	P
1000.00	51.0	0.0	96.0	P
1995.26	63.2	0.0	120.5	P
2818.38	134.8	133.0	136.0	P
3072.56	137.7	136.7	138.3	P
3349.65	137.9	137.4	138.3	P
3651.74	138.0	137.6	138.3	P
3981.07	137.9	137.7	138.3	P
4340.10	137.9	137.6	138.3	P
4731.51	138.0	137.4	138.3	P
5158.22	138.0	136.7	138.3	P
5623.41	134.8	133.0	136.0	P
7943.28	50.8	0.0	120.5	P
15848.9	52.9	0.0	96.0	P
31622.8	50.2	0.0	77.0	P
63095.7	66.8	0.0	68.0	P

Test Passed

1/3octave: Relative attenuation - IEC 61260, Clause 4.4 & #5.3

Test 1/3 octave filter X=-13 fexact=50.119Hz class 1

Nominal	Measured	LoLim	HiLim	Result
f[Hz]	L[dB]	[dB]	[dB]	[P/F]
9.295	52.1	0.0	68.0	P
16.413	52.9	0.0	77.0	P
26.634	55.7	0.0	96.0	P
38.720	62.1	0.0	120.5	P
44.668	135.0	133.0	136.0	P
46.088	137.5	136.7	138.3	P
47.472	138.0	137.4	138.3	P
48.817	137.9	137.6	138.3	P
50.119	137.9	137.7	138.3	P
51.456	138.0	137.6	138.3	P
52.913	138.0	137.4	138.3	P
54.502	137.7	136.7	138.3	P
56.234	135.0	133.0	136.0	P
64.872	50.8	0.0	120.5	P
94.310	50.8	0.0	96.0	P
153.045	51.2	0.0	77.0	P
270.238	51.0	0.0	68.0	P

Test 1/3 octave filter X=-12 fexact=63.096Hz class 1

Nominal	Measured	LoLim	HiLim	Result
f[Hz]	L[dB]	[dB]	[dB]	[P/F]
11.702	39.9	0.0	68.0	P
20.662	46.3	0.0	77.0	P
33.531	53.0	0.0	96.0	P
48.746	61.5	0.0	120.5	P
56.234	135.0	133.0	136.0	P
58.021	137.6	136.7	138.3	P
59.764	138.0	137.4	138.3	P
61.456	138.0	137.6	138.3	P
63.096	137.9	137.7	138.3	P
64.779	138.0	137.6	138.3	P
66.614	138.0	137.4	138.3	P
68.614	137.8	136.7	138.3	P
70.795	135.0	133.0	136.0	P
81.669	42.5	0.0	120.5	P
118.729	35.6	0.0	96.0	P
192.672	32.2	0.0	77.0	P
340.209	34.2	0.0	68.0	P

Test 1/3 octave filter X=-11 fexact=79.433Hz class 1

Nominal	Measured	LoLim	HiLim	Result
f[Hz]	L[dB]	[dB]	[dB]	[P/F]
14.732	39.5	0.0	68.0	P
26.012	42.2	0.0	77.0	P
42.213	53.4	0.0	96.0	P
61.368	62.0	0.0	120.5	P
70.795	135.0	133.0	136.0	P
73.045	137.6	136.7	138.3	P
75.238	137.9	137.4	138.3	P
77.369	137.9	137.6	138.3	P
79.433	138.0	137.7	138.3	P
81.552	137.9	137.6	138.3	P
83.862	138.0	137.4	138.3	P
86.380	137.8	136.7	138.3	P
89.125	135.0	133.0	136.0	P
102.816	41.5	0.0	120.5	P

1/3octave: Relative attenuation - IEC 61260, Clause 4.4 & #5.3

149.471	34.1	0.0	96.0	P
242.560	32.0	0.0	77.0	P
428.298	33.5	0.0	68.0	P
Test 1/3 octave filter X=-10 fexact=100.000Hz class 1				
Nominal	Measured	LoLim	HiLim	Result
f[Hz]	L[dB]	[dB]	[dB]	[P/F]
18.546	40.6	0.0	68.0	P
32.748	43.2	0.0	77.0	P
53.143	53.4	0.0	96.0	P
77.257	61.4	0.0	120.5	P
89.125	135.0	133.0	136.0	P
91.958	137.6	136.7	138.3	P
94.719	138.0	137.4	138.3	P
97.402	137.9	137.6	138.3	P
100.000	138.0	137.7	138.3	P
102.667	138.0	137.6	138.3	P
105.575	137.9	137.4	138.3	P
108.746	137.7	136.7	138.3	P
112.202	135.0	133.0	136.0	P
129.437	43.9	0.0	120.5	P
188.173	35.0	0.0	96.0	P
305.365	37.5	0.0	77.0	P
539.195	37.7	0.0	68.0	P
Test 1/3 octave filter X=-9 fexact=125.893Hz class 1				
Nominal	Measured	LoLim	HiLim	Result
f[Hz]	L[dB]	[dB]	[dB]	[P/F]
23.348	50.7	0.0	68.0	P
41.227	51.6	0.0	77.0	P
66.903	54.3	0.0	96.0	P
97.261	62.0	0.0	120.5	P
112.202	135.0	133.0	136.0	P
115.768	137.5	136.7	138.3	P
119.244	137.9	137.4	138.3	P
122.622	137.9	137.6	138.3	P
125.893	137.9	137.7	138.3	P
129.251	137.9	137.6	138.3	P
132.912	138.0	137.4	138.3	P
136.903	137.7	136.7	138.3	P
141.254	135.0	133.0	136.0	P
162.952	51.0	0.0	120.5	P
236.895	50.5	0.0	96.0	P
384.432	50.4	0.0	77.0	P
678.806	50.3	0.0	68.0	P
Test 1/3 octave filter X=-8 fexact=158.489Hz class 1				
Nominal	Measured	LoLim	HiLim	Result
f[Hz]	L[dB]	[dB]	[dB]	[P/F]
29.394	46.7	0.0	68.0	P
51.902	47.5	0.0	77.0	P
84.225	54.2	0.0	96.0	P
122.445	62.3	0.0	120.5	P
141.254	135.0	133.0	136.0	P
145.743	137.6	136.7	138.3	P
150.120	137.9	137.4	138.3	P
154.372	137.9	137.6	138.3	P
158.489	138.0	137.7	138.3	P
162.717	137.9	137.6	138.3	P
167.326	138.0	137.4	138.3	P
172.350	137.8	136.7	138.3	P
177.828	135.0	133.0	136.0	P

1/3octave: Relative attenuation - IEC 61260, Clause 4.4 & #5.3

205.144	46.5	0.0	120.5	P
298.234	46.2	0.0	96.0	P
483.971	45.3	0.0	77.0	P
854.566	46.5	0.0	68.0	P
Test 1/3 octave filter X=-7 fexact=199.526Hz class 1				
Nominal	Measured	LoLim	HiLim	Result
f[Hz]	L[dB]	[dB]	[dB]	[P/F]
37.004	41.4	0.0	68.0	P
65.340	42.3	0.0	77.0	P
106.034	52.3	0.0	96.0	P
154.149	61.5	0.0	120.5	P
177.828	135.0	133.0	136.0	P
183.480	137.5	136.7	138.3	P
188.989	138.0	137.4	138.3	P
194.342	137.9	137.6	138.3	P
199.526	137.9	137.7	138.3	P
204.848	138.0	137.6	138.3	P
210.651	137.9	137.4	138.3	P
216.976	137.7	136.7	138.3	P
223.872	135.0	133.0	136.0	P
258.262	42.7	0.0	120.5	P
375.454	35.8	0.0	96.0	P
609.284	36.2	0.0	77.0	P
1075.84	35.1	0.0	68.0	P
Test 1/3 octave filter X=-6 fexact=251.189Hz class 1				
Nominal	Measured	LoLim	HiLim	Result
f[Hz]	L[dB]	[dB]	[dB]	[P/F]
46.586	41.9	0.0	68.0	P
82.258	43.2	0.0	77.0	P
133.488	53.4	0.0	96.0	P
194.062	62.2	0.0	120.5	P
223.872	135.0	133.0	136.0	P
230.987	137.5	136.7	138.3	P
237.923	137.9	137.4	138.3	P
244.662	137.9	137.6	138.3	P
251.189	137.9	137.7	138.3	P
257.889	137.9	137.6	138.3	P
265.193	137.9	137.4	138.3	P
273.157	137.7	136.7	138.3	P
281.838	134.9	133.0	136.0	P
325.132	43.4	0.0	120.5	P
472.669	40.6	0.0	96.0	P
767.043	42.3	0.0	77.0	P
1354.40	40.3	0.0	68.0	P
Test 1/3 octave filter X=-5 fexact=316.228Hz class 1				
Nominal	Measured	LoLim	HiLim	Result
f[Hz]	L[dB]	[dB]	[dB]	[P/F]
58.648	45.3	0.0	68.0	P
103.557	45.3	0.0	77.0	P
168.052	53.0	0.0	96.0	P
244.309	62.2	0.0	120.5	P
281.838	134.9	133.0	136.0	P
290.796	137.5	136.7	138.3	P
299.528	137.9	137.4	138.3	P
308.012	137.9	137.6	138.3	P
316.228	137.9	137.7	138.3	P
324.663	137.9	137.6	138.3	P
333.859	137.9	137.4	138.3	P
343.884	137.9	136.7	138.3	P

1/3octave: Relative attenuation - IEC 61260, Clause 4.4 & #5.3

354.813	135.0	133.0	136.0	P
409.317	46.7	0.0	120.5	P
595.055	44.5	0.0	96.0	P
965.650	42.9	0.0	77.0	P
1705.08	43.0	0.0	68.0	P
Test 1/3 octave filter X=-4 fexact=398.107Hz class 1				
Nominal	Measured	LoLim	HiLim	Result
f[Hz]	L[dB]	[dB]	[dB]	[P/F]
73.834	48.9	0.0	68.0	P
130.371	49.6	0.0	77.0	P
211.565	53.2	0.0	96.0	P
307.567	61.9	0.0	120.5	P
354.813	134.9	133.0	136.0	P
366.090	137.6	136.7	138.3	P
377.083	137.9	137.4	138.3	P
387.764	137.9	137.6	138.3	P
398.107	137.9	137.7	138.3	P
408.726	138.0	137.6	138.3	P
420.303	137.9	137.4	138.3	P
432.924	137.9	136.7	138.3	P
446.684	135.0	133.0	136.0	P
515.300	48.8	0.0	120.5	P
749.129	48.1	0.0	96.0	P
1215.68	48.0	0.0	77.0	P
2146.57	47.3	0.0	68.0	P
Test 1/3 octave filter X=-3 fexact=501.187Hz class 1				
Nominal	Measured	LoLim	HiLim	Result
f[Hz]	L[dB]	[dB]	[dB]	[P/F]
92.951	42.5	0.0	68.0	P
164.127	43.4	0.0	77.0	P
266.344	52.3	0.0	96.0	P
387.204	61.6	0.0	120.5	P
446.684	135.0	133.0	136.0	P
460.880	137.5	136.7	138.3	P
474.720	138.0	137.4	138.3	P
488.166	137.9	137.6	138.3	P
501.187	137.9	137.7	138.3	P
514.556	137.9	137.6	138.3	P
529.131	137.9	137.4	138.3	P
545.019	137.7	136.7	138.3	P
562.341	135.0	133.0	136.0	P
648.724	42.9	0.0	120.5	P
943.098	39.1	0.0	96.0	P
1530.45	39.8	0.0	77.0	P
2702.38	39.4	0.0	68.0	P
Test 1/3 octave filter X=-2 fexact=630.957Hz class 1				
Nominal	Measured	LoLim	HiLim	Result
f[Hz]	L[dB]	[dB]	[dB]	[P/F]
117.018	47.9	0.0	68.0	P
206.624	47.8	0.0	77.0	P
335.307	53.0	0.0	96.0	P
487.461	61.7	0.0	120.5	P
562.341	135.0	133.0	136.0	P
580.214	137.5	136.7	138.3	P
597.637	137.9	137.4	138.3	P
614.564	137.9	137.6	138.3	P
630.957	137.9	137.7	138.3	P
647.788	137.9	137.6	138.3	P
666.136	137.9	137.4	138.3	P

1/3octave: Relative attenuation - IEC 61260, Clause 4.4 & #5.3

686.139	137.7	136.7	138.3	P
707.946	135.0	133.0	136.0	P
816.695	47.7	0.0	120.5	P
1187.29	46.6	0.0	96.0	P
1926.72	46.3	0.0	77.0	P
3402.09	46.0	0.0	68.0	P
Test 1/3 octave filter X=-1 fexact=794.328Hz class 1				
Nominal	Measured	LoLim	HiLim	Result
f[Hz]	L[dB]	[dB]	[dB]	[P/F]
147.317	46.0	0.0	68.0	P
260.124	46.3	0.0	77.0	P
422.127	53.3	0.0	96.0	P
613.677	62.2	0.0	120.5	P
707.946	134.9	133.0	136.0	P
730.446	137.6	136.7	138.3	P
752.380	137.9	137.4	138.3	P
773.691	137.9	137.6	138.3	P
794.328	138.0	137.7	138.3	P
815.516	137.9	137.6	138.3	P
838.615	138.0	137.4	138.3	P
863.798	137.7	136.7	138.3	P
891.251	135.0	133.0	136.0	P
1028.16	46.7	0.0	120.5	P
1494.71	45.8	0.0	96.0	P
2425.60	45.3	0.0	77.0	P
4282.98	44.6	0.0	68.0	P
Test 1/3 octave filter X= 0 fexact=1000.000Hz class 1				
Nominal	Measured	LoLim	HiLim	Result
f[Hz]	L[dB]	[dB]	[dB]	[P/F]
185.462	44.9	0.0	68.0	P
327.477	45.3	0.0	77.0	P
531.427	52.4	0.0	96.0	P
772.574	61.8	0.0	120.5	P
891.251	135.0	133.0	136.0	P
919.577	137.6	136.7	138.3	P
947.190	138.0	137.4	138.3	P
974.019	137.9	137.6	138.3	P
1000.00	138.0	137.7	138.3	P
1026.67	137.9	137.6	138.3	P
1055.75	137.9	137.4	138.3	P
1087.46	137.7	136.7	138.3	P
1122.02	135.0	133.0	136.0	P
1294.37	45.5	0.0	120.5	P
1881.73	43.4	0.0	96.0	P
3053.65	43.4	0.0	77.0	P
5391.95	43.9	0.0	68.0	P
Test 1/3 octave filter X= 1 fexact=1258.925Hz class 1				
Nominal	Measured	LoLim	HiLim	Result
f[Hz]	L[dB]	[dB]	[dB]	[P/F]
233.482	44.1	0.0	68.0	P
412.269	45.3	0.0	77.0	P
669.026	52.7	0.0	96.0	P
972.613	61.8	0.0	120.5	P
1122.02	135.0	133.0	136.0	P
1157.68	137.5	136.7	138.3	P
1192.44	137.9	137.4	138.3	P
1226.22	137.9	137.6	138.3	P
1258.93	137.9	137.7	138.3	P
1292.51	137.9	137.6	138.3	P

1/3octave: Relative attenuation - IEC 61260, Clause 4.4 & #5.3

1329.12	137.9	137.4	138.3	P
1369.03	137.7	136.7	138.3	P
1412.54	135.0	133.0	136.0	P
1629.52	45.7	0.0	120.5	P
2368.96	43.4	0.0	96.0	P
3844.32	43.9	0.0	77.0	P
6788.06	43.7	0.0	68.0	P
Test 1/3 octave filter X= 2 fexact=1584.893Hz class 1				
Nominal	Measured	LoLim	HiLim	Result
f[Hz]	L[dB]	[dB]	[dB]	[P/F]
293.937	44.7	0.0	68.0	P
519.016	45.5	0.0	77.0	P
842.254	53.8	0.0	96.0	P
1224.45	62.1	0.0	120.5	P
1412.54	134.9	133.0	136.0	P
1457.43	137.5	136.7	138.3	P
1501.20	137.9	137.4	138.3	P
1543.72	137.9	137.6	138.3	P
1584.89	137.9	137.7	138.3	P
1627.17	137.9	137.6	138.3	P
1673.26	137.9	137.4	138.3	P
1723.50	137.7	136.7	138.3	P
1778.28	135.0	133.0	136.0	P
2051.45	45.7	0.0	120.5	P
2982.34	43.8	0.0	96.0	P
4839.71	43.6	0.0	77.0	P
8545.66	44.1	0.0	68.0	P
Test 1/3 octave filter X= 3 fexact=1995.262Hz class 1				
Nominal	Measured	LoLim	HiLim	Result
f[Hz]	L[dB]	[dB]	[dB]	[P/F]
370.045	44.6	0.0	68.0	P
653.402	45.6	0.0	77.0	P
1060.34	53.3	0.0	96.0	P
1541.49	61.8	0.0	120.5	P
1778.28	135.0	133.0	136.0	P
1834.80	137.5	136.7	138.3	P
1889.89	137.9	137.4	138.3	P
1943.42	137.9	137.6	138.3	P
1995.26	137.9	137.7	138.3	P
2048.49	137.9	137.6	138.3	P
2106.51	137.9	137.4	138.3	P
2169.76	137.7	136.7	138.3	P
2238.72	135.0	133.0	136.0	P
2582.62	45.8	0.0	120.5	P
3754.54	43.7	0.0	96.0	P
6092.84	44.0	0.0	77.0	P
10758.4	44.4	0.0	68.0	P
Test 1/3 octave filter X= 4 fexact=2511.886Hz class 1				
Nominal	Measured	LoLim	HiLim	Result
f[Hz]	L[dB]	[dB]	[dB]	[P/F]
465.859	45.6	0.0	68.0	P
822.584	46.5	0.0	77.0	P
1334.88	53.3	0.0	96.0	P
1940.62	62.0	0.0	120.5	P
2238.72	135.0	133.0	136.0	P
2309.87	137.5	136.7	138.3	P
2379.23	137.9	137.4	138.3	P
2446.62	137.9	137.6	138.3	P
2511.89	137.9	137.7	138.3	P

1/3octave: Relative attenuation - IEC 61260, Clause 4.4 & #5.3

2578.89	137.9	137.6	138.3	P
2651.94	137.9	137.4	138.3	P
2731.57	137.7	136.7	138.3	P
2818.38	134.9	133.0	136.0	P
3251.32	46.4	0.0	120.5	P
4726.69	44.5	0.0	96.0	P
7670.43	45.2	0.0	77.0	P
13544.0	45.3	0.0	68.0	P

Test 1/3 octave filter X= 5 fexact=3162.278Hz class 1

Nominal f[Hz]	Measured L[dB]	LoLim [dB]	HiLim [dB]	Result [P/F]
586.481	45.5	0.0	68.0	P
1035.57	47.3	0.0	77.0	P
1680.52	53.7	0.0	96.0	P
2443.09	62.2	0.0	120.5	P
2818.38	134.9	133.0	136.0	P
2907.96	137.5	136.7	138.3	P
2995.28	137.9	137.4	138.3	P
3080.12	137.9	137.6	138.3	P
3162.28	137.9	137.7	138.3	P
3246.63	137.9	137.6	138.3	P
3338.59	137.9	137.4	138.3	P
3438.84	137.7	136.7	138.3	P
3548.13	135.0	133.0	136.0	P
4093.17	47.3	0.0	120.5	P
5950.55	44.6	0.0	96.0	P
9656.50	45.6	0.0	77.0	P
17050.8	47.3	0.0	68.0	P

Test 1/3 octave filter X= 6 fexact=3981.072Hz class 1

Nominal f[Hz]	Measured L[dB]	LoLim [dB]	HiLim [dB]	Result [P/F]
738.336	45.6	0.0	68.0	P
1303.71	49.0	0.0	77.0	P
2115.65	53.7	0.0	96.0	P
3075.67	61.8	0.0	120.5	P
3548.13	134.9	133.0	136.0	P
3660.90	137.5	136.7	138.3	P
3770.83	137.9	137.4	138.3	P
3877.64	137.9	137.6	138.3	P
3981.07	137.9	137.7	138.3	P
4087.26	137.9	137.6	138.3	P
4203.03	137.9	137.4	138.3	P
4329.24	137.7	136.7	138.3	P
4466.84	135.0	133.0	136.0	P
5153.00	46.9	0.0	120.5	P
7491.29	45.9	0.0	96.0	P
12156.8	46.7	0.0	77.0	P
21465.7	47.0	0.0	68.0	P

Test 1/3 octave filter X= 7 fexact=5011.872Hz class 1

Nominal f[Hz]	Measured L[dB]	LoLim [dB]	HiLim [dB]	Result [P/F]
929.510	46.3	0.0	68.0	P
1641.27	50.7	0.0	77.0	P
2663.44	53.6	0.0	96.0	P
3872.04	61.6	0.0	120.5	P
4466.84	135.0	133.0	136.0	P
4608.80	137.5	136.7	138.3	P
4747.20	137.9	137.4	138.3	P
4881.66	137.9	137.6	138.3	P

1/3octave: Relative attenuation - IEC 61260, Clause 4.4 & #5.3

5011.87	137.9	137.7	138.3	P
5145.56	137.9	137.6	138.3	P
5291.31	137.9	137.4	138.3	P
5450.20	137.7	136.7	138.3	P
5623.41	135.0	133.0	136.0	P
6487.24	47.6	0.0	120.5	P
9430.98	47.1	0.0	96.0	P
15304.5	48.7	0.0	77.0	P
27023.8	48.3	0.0	68.0	P

Test Passed

*** End of results ***



Certificate of Calibration and Conformance

Certificate number: **43807**

Test Object: **Sound Level Meter, BS EN IEC 61672-1:2003 Class 1**
Associated Frequency Analyser to BS EN IEC 61260:1996 Class 1

Producer: **Larson Davis**

Type: **LXT1**

Serial number: **0003318**

Customer: **Vanguardia Ltd**

Address: **21 Station Road West,**
Oxted, Surrey. RH8 9EE.

Contact Person: **Ian Fortune**

Order No: **Contract: 22087**

Introduction:

Calibration has been performed as set out in CA Technical Procedures which are based on the procedures for periodic verification of sound level meters as per the **Test Object** listed above. Results and conformance statement are overleaf and detailed results, where appropriate, are provided in the attached Measurement Report.

Tested:	<i>Producer</i>	<i>Type</i>	<i>Serial No</i>	<i>Certificate No</i>
Microphone	PCB Piezotronics	377B02	314541	43806
Calibrator*	Norsonic	1251	30873	U43256
Preamplifier	PCB	PRMLxT1L	070086	Included

* The calibrator was complete with any required coupler for the microphone specified.

Additional items that have also been submitted for verification:

Wind shield N/A

Attenuator N/A

Extension cable N/A

These items have been taken into account wherever appropriate.

Instruction Manual: LxT Manual I770.01 Rev M Firmware Version: v2.404 The test object is a single channel instrument.

Conditions	<i>Pressure kPa</i>	<i>Temperature °C</i>	<i>Humidity %RH</i>
Reference conditions	101.325	23	50
Measurement conditions	101.96 ±0.01	22.25 ±0.35	35.35 ±1.45

Calibration Dates:

Received date: 20/03/2023 Reviewed date: 28/03/2023

Calibration date: 27/03/2023 Issued date: 28/03/2023

Technicians: (Electronic certificate)

Calibrated by: *Palanivel Marappan B.Eng (Hons), M.Sc*

Reviewed by: *Jenny Crawford*

This certificate is issued in accordance with the CA Quality Management system. It provides traceability of measurement to recognized national standards, and to the units of measurement realized at the National Physical Laboratory or other recognized national standards laboratories. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.

Certificate of Calibration and Conformance

Continuation of Certificate number: 43807

The statements of conformance and observation notes detailed in this certificate are made with reference to the following standards in respect of the calibration of the test object.

Manufactured:	BS EN IEC 61672-1:2003
Periodic Tests:	BS EN IEC 61672-3:2006
Pattern Evaluation:	BS EN IEC 61672-2:2003
Filter Evaluation:	BS EN IEC 61260:1996 Class 1

Conformance:

From markings on the sound level meter or by reference to the manufacturer's published literature it has been determined that the instrument submitted for verification was originally manufactured to the listed standard and similarly that the associated sound calibrator conforms to the BS EN IEC 60942 standard.

Measurement Summary:

Indication at the calibration check frequency - IEC61672-3 Ed.1 #9	Passed
Self-generated noise - IEC 61672-3 Ed.1 #10.2	Passed
Acoustical signal tests of a frequency weighting - IEC 61672-3 Ed.1 #11	Passed
Electrical signal tests of frequency weightings - IEC 61672-3 Ed.1 #12	Passed
Frequency weightings: A Network - IEC 61672-3 Ed.1 #12.3	Passed
Frequency weightings: C Network - IEC 61672-3 Ed.1 #12.3	Passed
Frequency weightings: Z Network - IEC 61672-3 Ed.1 #12.3	Passed
Frequency and time weightings at 1 kHz IEC 61672-3 Ed.1 #13	Passed
Level linearity on the reference level range - IEC 61672-3 Ed.1 #14	Passed
Toneburst response - IEC 61672-3 Ed.1 #16	Passed
Peak C sound level - IEC 61672-3 Ed.1 #17	Passed
Overload indication - IEC 61672-3 Ed.1 #18	Passed
1/1octave: Relative attenuation - IEC 61260, #4.4 & #5.3	Passed
1/3octave: Relative attenuation - IEC 61260, #4.4 & #5.3	Passed

Comments

Correct level with associated calibrator is 114.0dB(A).

Statement of Conformance

The sound level meter submitted has successfully completed the periodic tests of the standard listed for the environmental conditions under which the tests were performed. As public evidence(1) was available, from an independent testing organisation responsible for approving the results of pattern evaluation tests performed in accordance with the manufacturer's standard to demonstrate that the model of sound level meter fully conformed to the requirements of the said standard, the sound level meter submitted for testing conforms to the relevant class of the said standard.

(1 - evidence is held on file at the calibration laboratory)

Filter Calibration

The filter functions have been found to conform, by electrical testing, to the relative attenuation requirement of the standard noted over the range of frequencies shown in the attached test report.

Observations

No information on the uncertainty of measurement, required by the listed standard, for the correction data was made available in the instruction manual / data sheets from the equipment manufacturer / supplier for the test object. The uncertainty of measurement of the adjustment data has therefore been assumed to be numerically zero for the purpose of this periodic test. If these uncertainties are not actually zero, there is a possibility that the frequency response of the test object may not conform to the requirements of the listed standards.

Continuation of Certificate number: 43807

No adjustment data have been published in the instruction manual or made available by the manufacturer or supplier of the sound level meter to account for the average effects of reflections from the case of the sound level meter and diffraction of sound around the microphone as required by sub-clause 11.4 and 12.6 of BS EN IEC 61672-3:2006. The average effects of reflections from the case of the sound level meter and diffraction of sound around the microphone have therefore been assumed to be numerically zero for the purposes of this periodic test. If these adjustment data are not actually zero, there is a possibility that the frequency response of the sound level meter may not meet the requirements of BS EN IEC 61672-1:2003.

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor $k = 2$, providing a coverage probability of approximately 95 %. The uncertainty evaluation has been carried out in accordance with EA publication EA-4/02. Details of the uncertainty for each measurement are available from the Calibration Laboratory upon request. Details of the sources of corrections and their associated uncertainties that relate to this verification are contained within the test report accompanying this certificate.

This certificate relates only to the items tested above.

**** End of Certificate ****

Measurement Results:

Indication at the calibration check frequency - IEC61672-3 Ed.1 Clause 9

Reference level: 114.0 dB
Reference Range: 120 dB FS
Reference Frequency: 1000 Hz
Reference Calibrator: WSC5 - Nor1251-31824
Reference calibrator level: 114.02
Before calibration:
Environmental corrections: 0.00
Other corrections: -0.15
Notional level: 113.87
Calibrator level before adjustment: 113.9
After calibration:
Environmental corrections: 0.00
Other corrections: -0.15
Notional level: 113.87
Reference calibrator level after calibration: 113.9
Associated Calibrator: Norsonic - 1251 - 30873
Associated calibrator level: 114.10
Initial level check:
Environmental corrections: 0.00
Other corrections: -0.15
Notional level: 113.95
Indicated level: 114.0
Final level statement:
Environmental corrections after calibration: 0.00
Other corrections: -0.15
Notional level: 113.95
Calibrator level after adjustment: 114.0
This value shall be used for adjusting the sound level meter in the future.
Test Passed

Self-generated noise - IEC 61672-3 Ed.1 Clause 10.2

Network	Level (dB)	Comment
A	16.4	Microphone installed
A	8.9	Equivalent capacity
C	11.8	Equivalent capacity
Z	18.9	Equivalent capacity

Test Passed

Acoustical signal tests of a frequency weighting - IEC 61672-3 Ed.1 Clause 11

C-Weighted results

Frequency	SLM		Microphone		Case	Refl.	Wind	Screen	Uncert	Lim	Result
	Meas (dB)	U (dB)	Corr (dB)	U (dB)							
125 Hz	0.1	0.2	0.0	0.0	0.0	0.0			0.2	+/-1.5	0.0 P
1 kHz	0.0	0.2	0.1	0.0	0.0	0.0			0.2	+/-1.1	0.0 P
4 kHz	-0.9	0.2	1.0	0.0	0.0	0.0			0.2	+/-1.6	0.0 P
8 kHz	-3.4	0.2	3.4	0.0	0.0	0.0			0.2	+2.1/-3.1	-0.1 P

The level obtained at 1 kHz was used as reference for the calculations.

This level was: 93.80 dB.

The overall frequency response of the sound level meter, nominal case reflections and microphone response has shown to conform with the requirements in IEC 61672-3 for a class 1 sound level meter.

Frequency response test using electrostatic actuator.

Sources for correction data:

Microphone field corrections and uncertainty: PCB

Case reflections and uncertainty:

Wind screen corrections and uncertainty:

Test Passed

Electrical signal tests of frequency weightings - IEC 61672-3 Ed.1 Clause 12

A-Weighted results:

Frequency	SLM		Microphone		Case	Refl.	Wind	Screen	Uncert	Lim	Result
	Meas (dB)	U (dB)	Corr (dB)	U (dB)							
63 Hz	0.1	0.1	0.0	0.0	0.0	0.0			0.12	+/-1.5	0.1 P
125 Hz	0.1	0.1	0.0	0.0	0.0	0.0			0.12	+/-1.5	0.1 P
250 Hz	0.1	0.1	0.0	0.0	0.0	0.0			0.12	+/-1.4	0.1 P
500 Hz	0.0	0.1	0.0	0.0	0.0	0.0			0.12	+/-1.4	0.0 P
1 kHz	0.0	0.1	0.0	0.0	0.0	0.0			0.12	+/-1.1	0.0 P
2 kHz	0.0	0.1	0.0	0.0	0.0	0.0			0.12	+/-1.6	0.0 P
4 kHz	0.0	0.1	0.0	0.0	0.0	0.0			0.12	+/-1.6	0.0 P
8 kHz	0.0	0.1	0.0	0.0	0.0	0.0			0.12	2.1/3.1	0.0 P
16 kHz	0.2	0.1	1.4	0.0	0.0	0.0			0.12	3.5/17	1.6 P

C-Weighted results:

Frequency	SLM		Microphone		Case	Refl.	Wind	Screen	Uncert	Lim	Result
	Meas (dB)	U (dB)	Corr (dB)	U (dB)							
63 Hz	0.0	0.1	0.0	0.0	0.0	0.0			0.12	+/-1.5	0.0 P
125 Hz	0.0	0.1	0.0	0.0	0.0	0.0			0.12	+/-1.5	0.0 P
250 Hz	0.0	0.1	0.0	0.0	0.0	0.0			0.12	+/-1.4	0.0 P
500 Hz	0.0	0.1	0.0	0.0	0.0	0.0			0.12	+/-1.4	0.0 P
1 kHz	0.0	0.1	0.0	0.0	0.0	0.0			0.12	+/-1.1	0.0 P
2 kHz	0.1	0.1	0.0	0.0	0.0	0.0			0.12	+/-1.6	0.1 P
4 kHz	0.1	0.1	0.0	0.0	0.0	0.0			0.12	+/-1.6	0.1 P
8 kHz	0.0	0.1	0.0	0.0	0.0	0.0			0.12	2.1/3.1	0.0 P
16 kHz	0.0	0.1	1.4	0.0	0.0	0.0			0.12	3.5/17	1.4 P

Z-Weighted results:

Frequency	SLM		Microphone		Case	Refl.	Wind	Screen	Uncert	Lim	Result
	Meas (dB)	U (dB)	Corr (dB)	U (dB)							

Electrical signal tests of frequency weightings - IEC 61672-3 Ed.1 Clause 12

63 Hz	0.0	0.1	0.0	0.0	0.0	0.0	0.12	+1.5	0.0	P
125 Hz	0.0	0.1	0.0	0.0	0.0	0.0	0.12	+1.5	0.0	P
250 Hz	0.0	0.1	0.0	0.0	0.0	0.0	0.12	+1.4	0.0	P
500 Hz	0.0	0.1	0.0	0.0	0.0	0.0	0.12	+1.4	0.0	P
1 kHz	0.0	0.1	0.0	0.0	0.0	0.0	0.12	+1.1	0.0	P
2 kHz	0.0	0.1	0.0	0.0	0.0	0.0	0.12	+1.6	0.0	P
4 kHz	0.0	0.1	0.0	0.0	0.0	0.0	0.12	+1.6	0.0	P
8 kHz	0.1	0.1	0.0	0.0	0.0	0.0	0.12	2.1/3.1	0.1	P
16 kHz	0.0	0.1	1.4	0.0	0.0	0.0	0.12	3.5/17	1.4	P

The actual frequency response of PCB Piezotronics / 377B02 314541 has been used for the calculations.

The overall frequency response of the sound level meter, nominal case reflections and microphone response has shown to conform with the requirements in IEC 61672-3 for a class 1 sound level meter.

The calculated uncertainties are checked against the requirements in the standard.

Sources for correction data:

Microphone response and uncertainty: Measured response / Settings file
Test Passed

Frequency weightings: A Network - IEC 61672-3 Ed.1 Clause 12.3

Frequency (Hz)	Ref. (dB)	Meas. (dB)	Uncert. (dB)	Dev. (dB)
63.1	73.0	73.1	0.12	0.1
125.9	73.0	73.1	0.12	0.1
251.2	73.0	73.1	0.12	0.1
501.2	73.0	73.0	0.12	0.0
1000.0	73.0	73.0	0.12	0.0
1995.3	73.0	73.0	0.12	0.0
3981.1	73.0	73.0	0.12	0.0
7943.3	73.0	73.0	0.12	0.0
15848.9	73.0	73.2	0.12	0.2

Test Passed

Frequency weightings: C Network - IEC 61672-3 Ed.1 Clause 12.3

Frequency (Hz)	Ref. (dB)	Meas. (dB)	Uncert. (dB)	Dev. (dB)
63.1	73.0	73.0	0.12	0.0
125.9	73.0	73.0	0.12	0.0
251.2	73.0	73.0	0.12	0.0
501.2	73.0	73.0	0.12	0.0
1000.0	73.0	73.0	0.12	0.0
1995.3	73.0	73.1	0.12	0.1
3981.1	73.0	73.1	0.12	0.1
7943.3	73.0			Not Measured
15848.9	73.0			Not Measured

Test Passed

Frequency weightings: Z Network - IEC 61672-3 Ed.1 Clause 12.3

Frequency (Hz)	Ref. (dB)	Meas. (dB)	Uncert. (dB)	Dev. (dB)
63.1	73.0	73.0	0.12	0.0
125.9	73.0	73.0	0.12	0.0
251.2	73.0	73.0	0.12	0.0
501.2	73.0	73.0	0.12	0.0
1000.0	73.0	73.0	0.12	0.0
1995.3	73.0	73.0	0.12	0.0
3981.1	73.0	73.0	0.12	0.0
7943.3	73.0	73.1	0.12	0.1
15848.9	73.0	73.0	0.12	0.0

Test Passed

Frequency and time weightings at 1 kHz IEC 61672-3 Ed.1 Clause 13

Weightings	Ref. (dB)	Measured (dB)	Lim. (dB)	Uncert. (dB)	Dev. (dB)	Result
Time Netw						
Fast A	114.0	114.0	0.4 -0.4	0.12	0.0	P
Fast C	114.0	114.0	0.4 -0.4	0.12	0.0	P
Fast Z	114.0	114.0	0.4 -0.4	0.12	0.0	P
Slow A	114.0	114.0	0.3 -0.3	0.12	0.0	P
Leq A	114.0	114.0	0.3 -0.3	0.12	0.0	P
SEL A	134.0	134.1	0.3 -0.3	0.12	0.1	P

Test Passed

Level linearity on the reference level range - IEC 61672-3 Ed.1 Clause 14

Ref. (dB)	Measured (dB)	Lim. (dB)	Uncert. (dB)	Dev. (dB)	Result
Measured at 8 kHz					
114.0	114.0	1.1 -1.1	0.12	0.0	P
115.0	115.0	1.1 -1.1	0.12	0.0	P
116.0	116.0	1.1 -1.1	0.12	0.0	P
117.0	117.1	1.1 -1.1	0.12	0.1	P
118.0	118.0	1.1 -1.1	0.12	0.0	P
114.0	114.0	1.1 -1.1	0.12	0.0	P
109.0	109.1	1.1 -1.1	0.12	0.1	P
104.0	104.1	1.1 -1.1	0.12	0.1	P
99.0	99.0	1.1 -1.1	0.12	0.0	P
94.0	94.1	1.1 -1.1	0.12	0.1	P
89.0	89.1	1.1 -1.1	0.12	0.1	P
84.0	84.1	1.1 -1.1	0.12	0.1	P
79.0	79.0	1.1 -1.1	0.12	0.0	P
74.0	73.9	1.1 -1.1	0.12	-0.1	P
69.0	69.0	1.1 -1.1	0.12	0.0	P
64.0	64.0	1.1 -1.1	0.12	0.0	P
59.0	59.0	1.1 -1.1	0.12	0.0	P
54.0	54.1	1.1 -1.1	0.12	0.1	P
49.0	48.9	1.1 -1.1	0.12	-0.1	P
44.0	44.0	1.1 -1.1	0.12	0.0	P
39.0	39.0	1.1 -1.1	0.12	0.0	P

Level linearity on the reference level range - IEC 61672-3 Ed.1 Clause 14

Ref. (dB)	Measured (dB)	Lim. (dB)	Uncert. (dB)	Dev. (dB)	Result	
34.0	34.0	1.1	-1.1	0.12	0.0	P
29.0	29.0	1.1	-1.1	0.12	0.0	P
27.0	27.0	1.1	-1.1	0.12	0.0	P
26.0	26.0	1.1	-1.1	0.12	0.0	P
25.0	25.0	1.1	-1.1	0.12	0.0	P
24.0	24.1	1.1	-1.1	0.12	0.1	P
23.0	23.1	1.1	-1.1	0.12	0.1	P
22.0	22.2	1.1	-1.1	0.12	0.2	P
21.0	21.2	1.1	-1.1	0.12	0.2	P

Test Passed

Toneburst response - IEC 61672-3 Ed.1 Clause 16

Burst type		Ref.	Measured	Lim.		Uncert.	Dev.	Result
		(dB)	(dB)	(dB)	(dB)	(dB)	(dB)	
Fast	200 mSec	115.0	115.0	0.8	-0.8	0.16	0.0	P
Fast	2.0 mSec	98.0	97.8	1.3	-1.8	0.16	-0.2	P
Fast	0.25 mSec	89.0	88.8	1.3	-3.3	0.16	-0.2	P
Slow	200 mSec	108.6	108.5	0.8	-0.8	0.16	-0.1	P
Slow	2.0 mSec	89.0	88.9	1.3	-3.3	0.16	-0.1	P
SEL	200 mSec	109.0	109.0	0.8	-0.8	0.16	0.0	P
SEL	2.0 mSec	89.0	89.0	1.3	-1.8	0.16	0.0	P
SEL	0.25 mSec	80.0	80.1	1.3	-3.3	0.16	0.1	P

Test Passed

Peak C sound level - IEC 61672-3 Ed.1 Clause 17

Pulse Type	Pulse Freq. (Hz)	Ref. RMS (dB)	Ref. Peak (dB)	Measured Value (dB)	Lim. (+/-dB)	Uncert. (dB)	Dev. (dB)	Result
1 cycle	8k	107.0	110.4	109.6	2.4	0.2	-0.8	P
Pos 1/2 cycle	500	110.0	112.4	112.1	1.4	0.2	-0.3	P
Neg 1/2 cycle	500	110.0	112.4	112.1	1.4	0.2	-0.3	P

Test Passed

Overload indication - IEC 61672-3 Ed.1 Clause 18

	Measured (dB)	Lim. (+/-dB)	Uncert. (dB)	Result
Level difference of positive and negative pulses:	0.1	1.8	0.16	P
Positive 1/2 cycle 4 kHz. Overload occurred at:	119.7			
Negative 1/2 cycle 4 kHz. Overload occurred at:	119.6			

Test Passed

1/1octave: Relative attenuation - IEC 61260, Clause 4.4 & #5.3

Test 1/1 octave filter X=-4 fexact=63.096Hz class 1

Nominal	Measured	LoLim	HiLim	Result
f[Hz]	L[dB]	[dB]	[dB]	[P/F]
3.981	35.7	0.0	47.0	P
7.943	35.3	0.0	56.0	P
15.849	40.2	0.0	75.0	P
31.623	58.2	0.0	99.5	P
44.668	113.9	112.0	115.0	P
48.697	116.8	115.7	117.3	P
53.088	117.0	116.4	117.3	P
57.876	117.0	116.6	117.3	P
63.096	117.0	116.7	117.3	P
68.786	117.0	116.6	117.3	P
74.989	117.0	116.4	117.3	P
81.752	117.0	115.7	117.3	P
89.125	113.9	112.0	115.0	P
125.893	16.8	0.0	99.5	P
251.189	17.5	0.0	75.0	P
501.187	17.6	0.0	56.0	P
1000.00	14.9	0.0	47.0	P

Test 1/1 octave filter X=-3 fexact=125.893Hz class 1

Nominal	Measured	LoLim	HiLim	Result
f[Hz]	L[dB]	[dB]	[dB]	[P/F]
7.943	16.4	0.0	47.0	P
15.849	19.0	0.0	56.0	P
31.623	37.0	0.0	75.0	P
63.096	58.2	0.0	99.5	P
89.125	113.8	112.0	115.0	P
97.163	116.8	115.7	117.3	P
105.925	117.0	116.4	117.3	P
115.478	117.0	116.6	117.3	P
125.893	117.0	116.7	117.3	P
137.246	117.0	116.6	117.3	P
149.624	117.0	116.4	117.3	P
163.117	117.0	115.7	117.3	P
177.828	113.9	112.0	115.0	P
251.189	17.3	0.0	99.5	P
501.187	17.6	0.0	75.0	P
1000.00	23.2	0.0	56.0	P
1995.26	18.2	0.0	47.0	P

Test 1/1 octave filter X=-2 fexact=251.189Hz class 1

Nominal	Measured	LoLim	HiLim	Result
f[Hz]	L[dB]	[dB]	[dB]	[P/F]
15.849	17.4	0.0	47.0	P
31.623	18.0	0.0	56.0	P
63.096	36.6	0.0	75.0	P
125.893	58.2	0.0	99.5	P
177.828	113.9	112.0	115.0	P
193.865	116.8	115.7	117.3	P
211.349	117.0	116.4	117.3	P
230.409	117.0	116.6	117.3	P
251.189	117.0	116.7	117.3	P
273.842	117.0	116.6	117.3	P
298.538	117.0	116.4	117.3	P
325.462	117.0	115.7	117.3	P
354.813	113.9	112.0	115.0	P
501.187	17.6	0.0	99.5	P

1/octave: Relative attenuation - IEC 61260, Clause 4.4 & #5.3

1000.00	17.8	0.0	75.0	P
1995.26	19.1	0.0	56.0	P
3981.07	18.3	0.0	47.0	P
Test 1/1 octave filter X=-1 fexact=501.187Hz class 1				
Nominal	Measured	LoLim	HiLim	Result
f[Hz]	L[dB]	[dB]	[dB]	[P/F]
31.623	18.9	0.0	47.0	P
63.096	18.9	0.0	56.0	P
125.893	36.4	0.0	75.0	P
251.189	58.2	0.0	99.5	P
354.813	113.9	112.0	115.0	P
386.812	116.8	115.7	117.3	P
421.697	117.0	116.4	117.3	P
459.727	117.0	116.6	117.3	P
501.187	117.0	116.7	117.3	P
546.387	117.0	116.6	117.3	P
595.662	117.0	116.4	117.3	P
649.382	117.0	115.7	117.3	P
707.946	113.9	112.0	115.0	P
1000.00	18.3	0.0	99.5	P
1995.26	18.1	0.0	75.0	P
3981.07	18.3	0.0	56.0	P
7943.28	18.2	0.0	47.0	P
Test 1/1 octave filter X= 0 fexact=1000.000Hz class 1				
Nominal	Measured	LoLim	HiLim	Result
f[Hz]	L[dB]	[dB]	[dB]	[P/F]
63.096	20.5	0.0	47.0	P
125.893	21.0	0.0	56.0	P
251.189	36.6	0.0	75.0	P
501.187	58.3	0.0	99.5	P
707.946	113.9	112.0	115.0	P
771.792	116.8	115.7	117.3	P
841.395	117.0	116.4	117.3	P
917.276	117.0	116.6	117.3	P
1000.00	117.0	116.7	117.3	P
1090.18	117.0	116.6	117.3	P
1188.50	117.0	116.4	117.3	P
1295.69	117.0	115.7	117.3	P
1412.54	113.9	112.0	115.0	P
1995.26	20.5	0.0	99.5	P
3981.07	20.7	0.0	75.0	P
7943.28	20.5	0.0	56.0	P
15848.9	24.6	0.0	47.0	P
Test 1/1 octave filter X= 1 fexact=1995.262Hz class 1				
Nominal	Measured	LoLim	HiLim	Result
f[Hz]	L[dB]	[dB]	[dB]	[P/F]
125.893	22.9	0.0	47.0	P
251.189	23.2	0.0	56.0	P
501.187	36.7	0.0	75.0	P
1000.00	58.3	0.0	99.5	P
1412.54	113.9	112.0	115.0	P
1539.93	116.8	115.7	117.3	P
1678.80	117.0	116.4	117.3	P
1830.21	117.0	116.6	117.3	P
1995.26	117.0	116.7	117.3	P
2175.20	117.0	116.6	117.3	P
2371.37	117.0	116.4	117.3	P
2585.24	117.0	115.7	117.3	P
2818.38	113.9	112.0	115.0	P

1/octave: Relative attenuation - IEC 61260, Clause 4.4 & #5.3

3981.07	23.6	0.0	99.5	P
7943.28	24.5	0.0	75.0	P
15848.9	26.7	0.0	56.0	P
31622.8	22.9	0.0	47.0	P
Test 1/1 octave filter X= 2 fexact=3981.072Hz class 1				
Nominal	Measured	LoLim	HiLim	Result
f[Hz]	L[dB]	[dB]	[dB]	[P/F]
251.189	26.7	0.0	47.0	P
501.187	26.6	0.0	56.0	P
1000.00	36.4	0.0	75.0	P
1995.26	58.3	0.0	99.5	P
2818.38	113.9	112.0	115.0	P
3072.56	116.8	115.7	117.3	P
3349.65	117.0	116.4	117.3	P
3651.74	117.0	116.6	117.3	P
3981.07	117.0	116.7	117.3	P
4340.10	117.0	116.6	117.3	P
4731.51	117.0	116.4	117.3	P
5158.22	117.0	115.7	117.3	P
5623.41	113.9	112.0	115.0	P
7943.28	27.4	0.0	99.5	P
15848.9	30.2	0.0	75.0	P
31622.8	27.0	0.0	56.0	P
63095.7	18.3	0.0	47.0	P
Test Passed				

1/3octave: Relative attenuation - IEC 61260, Clause 4.4 & #5.3

Test 1/3 octave filter X=-13 fexact=50.119Hz class 1				
Nominal	Measured	LoLim	HiLim	Result
f[Hz]	L[dB]	[dB]	[dB]	[P/F]
9.295	13.5	0.0	47.0	P
16.413	37.2	0.0	56.0	P
26.634	58.1	0.0	75.0	P
38.720	40.7	0.0	99.5	P
44.668	114.0	112.0	115.0	P
46.088	116.6	115.7	117.3	P
47.472	117.0	116.4	117.3	P
48.817	117.0	116.6	117.3	P
50.119	117.0	116.7	117.3	P
51.456	117.0	116.6	117.3	P
52.913	117.0	116.4	117.3	P
54.502	116.8	115.7	117.3	P
56.234	114.1	112.0	115.0	P
64.872	21.2	0.0	99.5	P
94.310	13.5	0.0	75.0	P
153.045	19.9	0.0	56.0	P
270.238	15.2	0.0	47.0	P
Test 1/3 octave filter X=-12 fexact=63.096Hz class 1				
Nominal	Measured	LoLim	HiLim	Result
f[Hz]	L[dB]	[dB]	[dB]	[P/F]
11.702	11.3	0.0	47.0	P
20.662	37.2	0.0	56.0	P
33.531	58.1	0.0	75.0	P
48.746	40.8	0.0	99.5	P
56.234	114.0	112.0	115.0	P

1/3octave: Relative attenuation - IEC 61260, Clause 4.4 & #5.3

58.021	116.6	115.7	117.3	P
59.764	117.0	116.4	117.3	P
61.456	117.0	116.6	117.3	P
63.096	117.0	116.7	117.3	P
64.779	117.0	116.6	117.3	P
66.614	117.0	116.4	117.3	P
68.614	116.8	115.7	117.3	P
70.795	114.0	112.0	115.0	P
81.669	20.6	0.0	99.5	P
118.729	12.3	0.0	75.0	P
192.672	16.3	0.0	56.0	P
340.209	10.2	0.0	47.0	P

Test 1/3 octave filter X=-11 fexact=79.433Hz class 1

Nominal	Measured	LoLim	HiLim	Result
f[Hz]	L[dB]	[dB]	[dB]	[P/F]
14.732	11.6	0.0	47.0	P
26.012	37.1	0.0	56.0	P
42.213	58.1	0.0	75.0	P
61.368	41.1	0.0	99.5	P
70.795	114.0	112.0	115.0	P
73.045	116.6	115.7	117.3	P
75.238	117.0	116.4	117.3	P
77.369	117.0	116.6	117.3	P
79.433	117.0	116.7	117.3	P
81.552	117.0	116.6	117.3	P
83.862	117.0	116.4	117.3	P
86.380	116.8	115.7	117.3	P
89.125	114.0	112.0	115.0	P
102.816	20.8	0.0	99.5	P
149.471	12.2	0.0	75.0	P
242.560	8.2	0.0	56.0	P
428.298	10.3	0.0	47.0	P

Test 1/3 octave filter X=-10 fexact=100.000Hz class 1

Nominal	Measured	LoLim	HiLim	Result
f[Hz]	L[dB]	[dB]	[dB]	[P/F]
18.546	14.7	0.0	47.0	P
32.748	35.7	0.0	56.0	P
53.143	58.1	0.0	75.0	P
77.257	48.6	0.0	99.5	P
89.125	114.0	112.0	115.0	P
91.958	116.6	115.7	117.3	P
94.719	117.0	116.4	117.3	P
97.402	117.0	116.6	117.3	P
100.000	117.0	116.7	117.3	P
102.667	117.0	116.6	117.3	P
105.575	117.0	116.4	117.3	P
108.746	116.8	115.7	117.3	P
112.202	114.1	112.0	115.0	P
129.437	20.5	0.0	99.5	P
188.173	16.8	0.0	75.0	P
305.365	12.3	0.0	56.0	P
539.195	13.8	0.0	47.0	P

Test 1/3 octave filter X=-9 fexact=125.893Hz class 1

Nominal	Measured	LoLim	HiLim	Result
f[Hz]	L[dB]	[dB]	[dB]	[P/F]
23.348	13.7	0.0	47.0	P
41.227	37.2	0.0	56.0	P
66.903	58.2	0.0	75.0	P
97.261	40.8	0.0	99.5	P

1/3octave: Relative attenuation - IEC 61260, Clause 4.4 & #5.3

112.202	114.0	112.0	115.0	P
115.768	116.6	115.7	117.3	P
119.244	117.0	116.4	117.3	P
122.622	117.0	116.6	117.3	P
125.893	117.0	116.7	117.3	P
129.251	117.0	116.6	117.3	P
132.912	117.0	116.4	117.3	P
136.903	116.8	115.7	117.3	P
141.254	114.1	112.0	115.0	P
162.952	20.8	0.0	99.5	P
236.895	7.6	0.0	75.0	P
384.432	11.2	0.0	56.0	P
678.806	12.3	0.0	47.0	P
Test 1/3 octave filter X=-8 fexact=158.489Hz class 1				
Nominal	Measured	LoLim	HiLim	Result
f[Hz]	L[dB]	[dB]	[dB]	[P/F]
29.394	15.2	0.0	47.0	P
51.902	37.3	0.0	56.0	P
84.225	58.2	0.0	75.0	P
122.445	41.0	0.0	99.5	P
141.254	114.0	112.0	115.0	P
145.743	116.6	115.7	117.3	P
150.120	117.0	116.4	117.3	P
154.372	117.0	116.6	117.3	P
158.489	117.0	116.7	117.3	P
162.717	117.0	116.6	117.3	P
167.326	117.0	116.4	117.3	P
172.350	116.8	115.7	117.3	P
177.828	114.0	112.0	115.0	P
205.144	21.9	0.0	99.5	P
298.234	16.3	0.0	75.0	P
483.971	13.3	0.0	56.0	P
854.566	15.0	0.0	47.0	P
Test 1/3 octave filter X=-7 fexact=199.526Hz class 1				
Nominal	Measured	LoLim	HiLim	Result
f[Hz]	L[dB]	[dB]	[dB]	[P/F]
37.004	17.6	0.0	47.0	P
65.340	37.2	0.0	56.0	P
106.034	58.2	0.0	75.0	P
154.149	41.3	0.0	99.5	P
177.828	114.0	112.0	115.0	P
183.480	116.6	115.7	117.3	P
188.989	117.0	116.4	117.3	P
194.342	117.0	116.6	117.3	P
199.526	117.0	116.7	117.3	P
204.848	117.0	116.6	117.3	P
210.651	117.0	116.4	117.3	P
216.976	116.8	115.7	117.3	P
223.872	114.1	112.0	115.0	P
258.262	21.6	0.0	99.5	P
375.454	13.3	0.0	75.0	P
609.284	16.2	0.0	56.0	P
1075.84	15.3	0.0	47.0	P
Test 1/3 octave filter X=-6 fexact=251.189Hz class 1				
Nominal	Measured	LoLim	HiLim	Result
f[Hz]	L[dB]	[dB]	[dB]	[P/F]
46.586	15.3	0.0	47.0	P
82.258	37.0	0.0	56.0	P
133.488	58.2	0.0	75.0	P

1/3octave: Relative attenuation - IEC 61260, Clause 4.4 & #5.3

194.062	41.1	0.0	99.5	P
223.872	114.0	112.0	115.0	P
230.987	116.6	115.7	117.3	P
237.923	117.0	116.4	117.3	P
244.662	117.0	116.6	117.3	P
251.189	117.0	116.7	117.3	P
257.889	117.0	116.6	117.3	P
265.193	117.0	116.4	117.3	P
273.157	116.8	115.7	117.3	P
281.838	114.0	112.0	115.0	P
325.132	21.0	0.0	99.5	P
472.669	12.2	0.0	75.0	P
767.043	12.2	0.0	56.0	P
1354.40	11.3	0.0	47.0	P

Test 1/3 octave filter X=-5 fexact=316.228Hz class 1

Nominal	Measured	LoLim	HiLim	Result
f[Hz]	L[dB]	[dB]	[dB]	[P/F]
58.648	16.3	0.0	47.0	P
103.557	37.2	0.0	56.0	P
168.052	58.2	0.0	75.0	P
244.309	41.2	0.0	99.5	P
281.838	114.0	112.0	115.0	P
290.796	116.6	115.7	117.3	P
299.528	117.0	116.4	117.3	P
308.012	117.0	116.6	117.3	P
316.228	117.0	116.7	117.3	P
324.663	117.0	116.6	117.3	P
333.859	117.0	116.4	117.3	P
343.884	116.8	115.7	117.3	P
354.813	114.0	112.0	115.0	P
409.317	21.5	0.0	99.5	P
595.055	12.8	0.0	75.0	P
965.650	12.3	0.0	56.0	P
1705.08	13.5	0.0	47.0	P

Test 1/3 octave filter X=-4 fexact=398.107Hz class 1

Nominal	Measured	LoLim	HiLim	Result
f[Hz]	L[dB]	[dB]	[dB]	[P/F]
73.834	15.6	0.0	47.0	P
130.371	37.3	0.0	56.0	P
211.565	58.2	0.0	75.0	P
307.567	40.7	0.0	99.5	P
354.813	114.0	112.0	115.0	P
366.090	116.6	115.7	117.3	P
377.083	117.0	116.4	117.3	P
387.764	117.0	116.6	117.3	P
398.107	117.0	116.7	117.3	P
408.726	117.0	116.6	117.3	P
420.303	117.0	116.4	117.3	P
432.924	116.8	115.7	117.3	P
446.684	114.1	112.0	115.0	P
515.300	20.9	0.0	99.5	P
749.129	11.4	0.0	75.0	P
1215.68	15.3	0.0	56.0	P
2146.57	13.7	0.0	47.0	P

Test 1/3 octave filter X=-3 fexact=501.187Hz class 1

Nominal	Measured	LoLim	HiLim	Result
f[Hz]	L[dB]	[dB]	[dB]	[P/F]
92.951	15.3	0.0	47.0	P
164.127	37.0	0.0	56.0	P

1/3octave: Relative attenuation - IEC 61260, Clause 4.4 & #5.3

266.344	58.2	0.0	75.0	P
387.204	40.5	0.0	99.5	P
446.684	114.1	112.0	115.0	P
460.880	116.6	115.7	117.3	P
474.720	117.0	116.4	117.3	P
488.166	117.0	116.6	117.3	P
501.187	117.0	116.7	117.3	P
514.556	117.0	116.6	117.3	P
529.131	117.0	116.4	117.3	P
545.019	116.8	115.7	117.3	P
562.341	114.1	112.0	115.0	P
648.724	21.3	0.0	99.5	P
943.098	14.2	0.0	75.0	P
1530.45	12.3	0.0	56.0	P
2702.38	13.3	0.0	47.0	P

Test 1/3 octave filter X=-2 fexact=630.957Hz class 1

Nominal	Measured	LoLim	HiLim	Result
f[Hz]	L[dB]	[dB]	[dB]	[P/F]
117.018	17.3	0.0	47.0	P
206.624	37.3	0.0	56.0	P
335.307	58.2	0.0	75.0	P
487.461	40.7	0.0	99.5	P
562.341	114.1	112.0	115.0	P
580.214	116.6	115.7	117.3	P
597.637	117.0	116.4	117.3	P
614.564	117.0	116.6	117.3	P
630.957	117.0	116.7	117.3	P
647.788	117.0	116.6	117.3	P
666.136	117.0	116.4	117.3	P
686.139	116.8	115.7	117.3	P
707.946	114.1	112.0	115.0	P
816.695	21.5	0.0	99.5	P
1187.29	14.4	0.0	75.0	P
1926.72	14.0	0.0	56.0	P
3402.09	14.5	0.0	47.0	P

Test 1/3 octave filter X=-1 fexact=794.328Hz class 1

Nominal	Measured	LoLim	HiLim	Result
f[Hz]	L[dB]	[dB]	[dB]	[P/F]
147.317	12.0	0.0	47.0	P
260.124	37.1	0.0	56.0	P
422.127	58.2	0.0	75.0	P
613.677	41.0	0.0	99.5	P
707.946	114.0	112.0	115.0	P
730.446	116.6	115.7	117.3	P
752.380	117.0	116.4	117.3	P
773.691	117.0	116.6	117.3	P
794.328	117.0	116.7	117.3	P
815.516	117.0	116.6	117.3	P
838.615	117.0	116.4	117.3	P
863.798	116.8	115.7	117.3	P
891.251	114.1	112.0	115.0	P
1028.16	21.5	0.0	99.5	P
1494.71	14.9	0.0	75.0	P
2425.60	14.3	0.0	56.0	P
4282.98	15.3	0.0	47.0	P

Test 1/3 octave filter X= 0 fexact=1000.000Hz class 1

Nominal	Measured	LoLim	HiLim	Result
f[Hz]	L[dB]	[dB]	[dB]	[P/F]
185.462	16.2	0.0	47.0	P

1/3octave: Relative attenuation - IEC 61260, Clause 4.4 & #5.3

327.477	37.1	0.0	56.0	P
531.427	58.2	0.0	75.0	P
772.574	44.3	0.0	99.5	P
891.251	114.0	112.0	115.0	P
919.577	116.6	115.7	117.3	P
947.190	117.0	116.4	117.3	P
974.019	117.0	116.6	117.3	P
1000.00	117.0	116.7	117.3	P
1026.67	117.0	116.6	117.3	P
1055.75	117.0	116.4	117.3	P
1087.46	116.8	115.7	117.3	P
1122.02	114.1	112.0	115.0	P
1294.37	21.5	0.0	99.5	P
1881.73	15.6	0.0	75.0	P
3053.65	15.6	0.0	56.0	P
5391.95	15.3	0.0	47.0	P

Test 1/3 octave filter X= 1 fexact=1258.925Hz class 1

Nominal	Measured	LoLim	HiLim	Result
f[Hz]	L[dB]	[dB]	[dB]	[P/F]
233.482	16.9	0.0	47.0	P
412.269	37.0	0.0	56.0	P
669.026	58.2	0.0	75.0	P
972.613	40.8	0.0	99.5	P
1122.02	114.1	112.0	115.0	P
1157.68	116.6	115.7	117.3	P
1192.44	117.0	116.4	117.3	P
1226.22	117.0	116.6	117.3	P
1258.93	117.0	116.7	117.3	P
1292.51	117.0	116.6	117.3	P
1329.12	117.0	116.4	117.3	P
1369.03	116.8	115.7	117.3	P
1412.54	114.1	112.0	115.0	P
1629.52	21.9	0.0	99.5	P
2368.96	17.1	0.0	75.0	P
3844.32	17.6	0.0	56.0	P
6788.06	17.9	0.0	47.0	P

Test 1/3 octave filter X= 2 fexact=1584.893Hz class 1

Nominal	Measured	LoLim	HiLim	Result
f[Hz]	L[dB]	[dB]	[dB]	[P/F]
293.937	18.6	0.0	47.0	P
519.016	37.0	0.0	56.0	P
842.254	58.2	0.0	75.0	P
1224.45	41.2	0.0	99.5	P
1412.54	114.0	112.0	115.0	P
1457.43	116.6	115.7	117.3	P
1501.20	117.0	116.4	117.3	P
1543.72	117.0	116.6	117.3	P
1584.89	117.0	116.7	117.3	P
1627.17	117.0	116.6	117.3	P
1673.26	117.0	116.4	117.3	P
1723.50	116.8	115.7	117.3	P
1778.28	114.1	112.0	115.0	P
2051.45	23.0	0.0	99.5	P
2982.34	17.3	0.0	75.0	P
4839.71	17.8	0.0	56.0	P
8545.66	18.3	0.0	47.0	P

Test 1/3 octave filter X= 3 fexact=1995.262Hz class 1

Nominal	Measured	LoLim	HiLim	Result
f[Hz]	L[dB]	[dB]	[dB]	[P/F]

1/3octave: Relative attenuation - IEC 61260, Clause 4.4 & #5.3

370.045	19.3	0.0	47.0	P
653.402	36.6	0.0	56.0	P
1060.34	58.1	0.0	75.0	P
1541.49	40.7	0.0	99.5	P
1778.28	114.0	112.0	115.0	P
1834.80	116.6	115.7	117.3	P
1889.89	117.0	116.4	117.3	P
1943.42	117.0	116.6	117.3	P
1995.26	117.0	116.7	117.3	P
2048.49	117.0	116.6	117.3	P
2106.51	117.0	116.4	117.3	P
2169.76	116.8	115.7	117.3	P
2238.72	114.1	112.0	115.0	P
2582.62	22.5	0.0	99.5	P
3754.54	18.0	0.0	75.0	P
6092.84	18.8	0.0	56.0	P
10758.4	19.9	0.0	47.0	P

Test 1/3 octave filter X= 4 fexact=2511.886Hz class 1

Nominal f[Hz]	Measured L[dB]	LoLim [dB]	HiLim [dB]	Result [P/F]
465.859	19.8	0.0	47.0	P
822.584	36.6	0.0	56.0	P
1334.88	58.2	0.0	75.0	P
1940.62	41.2	0.0	99.5	P
2238.72	114.1	112.0	115.0	P
2309.87	116.6	115.7	117.3	P
2379.23	117.0	116.4	117.3	P
2446.62	117.0	116.6	117.3	P
2511.89	117.0	116.7	117.3	P
2578.89	117.0	116.6	117.3	P
2651.94	117.0	116.4	117.3	P
2731.57	116.8	115.7	117.3	P
2818.38	114.0	112.0	115.0	P
3251.32	22.9	0.0	99.5	P
4726.69	20.4	0.0	75.0	P
7670.43	21.3	0.0	56.0	P
13544.0	22.3	0.0	47.0	P

Test 1/3 octave filter X= 5 fexact=3162.278Hz class 1

Nominal f[Hz]	Measured L[dB]	LoLim [dB]	HiLim [dB]	Result [P/F]
586.481	20.6	0.0	47.0	P
1035.57	36.3	0.0	56.0	P
1680.52	58.2	0.0	75.0	P
2443.09	41.2	0.0	99.5	P
2818.38	114.0	112.0	115.0	P
2907.96	116.6	115.7	117.3	P
2995.28	117.0	116.4	117.3	P
3080.12	117.0	116.6	117.3	P
3162.28	117.0	116.7	117.3	P
3246.63	117.0	116.6	117.3	P
3338.59	117.0	116.4	117.3	P
3438.84	116.8	115.7	117.3	P
3548.13	114.1	112.0	115.0	P
4093.17	24.5	0.0	99.5	P
5950.55	21.6	0.0	75.0	P
9656.50	21.8	0.0	56.0	P
17050.8	24.7	0.0	47.0	P

Test 1/3 octave filter X= 6 fexact=3981.072Hz class 1

Nominal	Measured	LoLim	HiLim	Result
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1/3octave: Relative attenuation - IEC 61260, Clause 4.4 & #5.3

f[Hz]	L[dB]	[dB]	[dB]	[P/F]
738.336	21.9	0.0	47.0	P
1303.71	36.0	0.0	56.0	P
2115.65	58.2	0.0	75.0	P
3075.67	40.9	0.0	99.5	P
3548.13	114.0	112.0	115.0	P
3660.90	116.6	115.7	117.3	P
3770.83	117.0	116.4	117.3	P
3877.64	117.0	116.6	117.3	P
3981.07	117.0	116.7	117.3	P
4087.26	117.0	116.6	117.3	P
4203.03	117.0	116.4	117.3	P
4329.24	116.8	115.7	117.3	P
4466.84	114.1	112.0	115.0	P
5153.00	24.5	0.0	99.5	P
7491.29	23.0	0.0	75.0	P
12156.8	24.2	0.0	56.0	P
21465.7	25.3	0.0	47.0	P
Test 1/3 octave filter X= 7 fexact=5011.872Hz class 1				
Nominal	Measured	LoLim	HiLim	Result
f[Hz]	L[dB]	[dB]	[dB]	[P/F]
929.510	23.1	0.0	47.0	P
1641.27	35.6	0.0	56.0	P
2663.44	58.2	0.0	75.0	P
3872.04	40.9	0.0	99.5	P
4466.84	114.1	112.0	115.0	P
4608.80	116.6	115.7	117.3	P
4747.20	117.0	116.4	117.3	P
4881.66	117.0	116.6	117.3	P
5011.87	117.0	116.7	117.3	P
5145.56	117.0	116.6	117.3	P
5291.31	117.0	116.4	117.3	P
5450.20	116.8	115.7	117.3	P
5623.41	114.1	112.0	115.0	P
6487.24	25.3	0.0	99.5	P
9430.98	24.3	0.0	75.0	P
15304.5	26.0	0.0	56.0	P
27023.8	25.8	0.0	47.0	P

Test Passed

*** End of results ***



Certificate of Calibration and Conformance

Certificate number: U43278

Test Object: Sound Calibrator

Producer: Larson Davis

Type: CAL200

Serial number: 16906

Customer: Vanguardia Ltd

Address: 21 Station Road West,
Oxted, Surrey. RH8 9EE.

Contact Person: Ian Fortune

Order No: Contract: 22087

Measurement Results	Level dB	Level Stability dB	Frequency Hz	Distortion %
Measurement 1	114.05	0.01	1000.21	0.47
Measurement 2	114.05	0.01	1000.21	0.47
Measurement 3	114.04	0.01	1000.22	0.47
Result (Average):	114.05	0.01	1000.21	0.47
Expanded Uncertainty:	0.1	0.02	1	0.1
Degree of Freedom:	>100	>100	>100	>100
Coverage Factor:	2	2	2	2

The stated level is relative to 20 μ Pa. The level is traceable to National Standards. The stated level is valid at reference conditions. The following correction factors have been applied during the measurement

Pres:0 dB/kPa Temp:0 dB/°C Humi:0 dB/%RH Load volume: 0 dB/mm³

Conditions	Pressure kPa	Temperature °C	Humidity %RH
Reference conditions	101.325	23	50
Measurement conditions	103.008 $\pm$ 0.040	21.6 $\pm$ 0.1	35.3 $\pm$ 1.2

The reported expanded uncertainty of measurements is based on a standard uncertainty multiplied by the coverage factor of $k=2$, providing a level of confidence of approximately 95%. Where the degrees of freedom are insufficient to maintain this confidence level, the coverage factor is increased to maintain this confidence level. The uncertainty has been determined in accordance with UKAS requirements.

Records: K:\C A\Calibration\Nor-1504\Nor-1018 CalCal\Current Year\LDL200_16906_M1.nmf

Preconditioning

The equipment was preconditioned for more than 4 hours in the specified calibration environment.

Method

Calibration has been performed as set out in the current version of CA Technical procedure TP01

Calibration Dates:

Received date:	02/02/2023	Reviewed date:	14/02/2023
Calibration date:	10/02/2023	Issued date:	14/02/2023

Technicians: (Electronic certificate)

Calibrated by: *Palanivel Marappan B.Eng(Hons), M.Sc*

Reviewed by: *Jenny Crawford*

This certificate is issued in accordance with the laboratory accreditation requirements of the United Kingdom Accreditation Service. It provides traceability of measurement to the SI system of units and/or to units of measurement realised at the National Physical Laboratory or other recognised national metrology institutes. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.

Certificate of Calibration and Conformance

Continuation of Certificate number: U43278

Reference Microphone: WSM10 (D)- GRAS40AG-282243

Measurements

The calibrator has been tested as described in the following annexes to BS EN IEC60942:2003 Sound Calibrators; B3.4 for sound pressure level, B3.5 for frequency, B3.6 for total distortion and A4.4 for short term stability of the pressure level.

Instruments and Program

A complete list of instruments, hardware and software that have been used for this calibration is available from the calibration laboratory

Comments

94dB spot check = 94.02dB. Note this is not UKAS data.

Statement of Conformance and Calibration

As public evidence was available*, from a testing organisation responsible for approving the results of pattern evaluation tests, to demonstrate that the model of sound calibrator fully conformed to the requirements for pattern evaluation described in annex A of BS EN IEC 60942:2003, the sound calibrator tested is considered to conform to all the class 1 requirements of that BS EN IEC 60942:2003.

*This evidence is held on file at the calibration laboratory.

Notes:

The sound pressure level generated by the calibrator in its ½ inch configuration was measured five times and averaged by a WS2P working standard microphone for class 1 or 2 devices or a LS2P reference microphone for class 0 or LS devices as specified in the International Standard BS EN 61094-4. The results of three replications and the mean of the measurements obtained are given in the measurement results table of this certificate. The frequency and distortion were measured in a similar manner. The figures in BOLD are the final results; a small correction factor may need to be added to the sound pressure level quoted here if the device is used to calibrate a sound level meter that is fitted with a free field response microphone. See manufacturer's handbooks for full details of this and other corrections that may be applicable.

Observations:

Decision Rule:

The decision rules have been applied in accordance with the procedure as described in BS EN 60942:2003

This certificate relates only to the items tested above.

** End of Certificate **