

## Appendix H Noise Monitoring Equipment Calibration Certificate

# *Certificate of Calibration*

*for*

**Description:** *Sound Level Meter*  
**Manufacturer:** *NTi Audio*  
**Type No.:** *XL2 (Serial No.: A2A-13661-E0)*  
**Microphone:** *ACO 7052 (Serial No.:70537)*  
**Preamplifier:** *NTi Audio MA220 (Serial No.:6282)*

**Submitted by:**

**Customer:** *Acuity Sustainability Consulting Limited*  
**Company Address:** *Unit 1908, iPlace, Nos. 301-305 Castle Peak Road,  
Kwai Chung, New Territories*

Upon receipt for calibration, the instrument was found to be:

- Within**  
 **Outside**

the allowable tolerance.




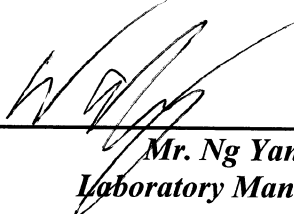
The test equipment used for calibration are traceable to National Standards via:

- The Government of The Hong Kong Special Administrative Region Standard & Calibration Laboratory

**Date of receipt:** 7 September 2018

**Date of calibration:** 10 September 2018

**Calibrated by:**   
*Calibration Technician*

**Certified by:**   
*Mr. Ng Yan Wa*  
*Laboratory Manager*

**Date of issue:** 10 September 2018

**Certificate No.:** APJ18-086-CC001

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**1. Calibration Precaution:**

- The unit-under-test (UUT) was allowed to stabilize in the laboratory for over 24 hours, and switched on to warm up for over 10 minutes before the commencement of the test.
- The results presented are the mean of 3 measurements at each calibration point.

**2. Calibration Conditions:**

Air Temperature: 26.0 °C  
 Air Pressure: 1008 hPa  
 Relative Humidity: 64.8 %

**3. Calibration Equipment:**

	Type	Serial No.	Calibration Report Number	Traceable to
Multifunction Calibrator	B&K 4226	2288467	AV180064	HOKLAS

**4. Calibration Results**

Sound Pressure Level

Reference Sound Pressure Level



Setting of Unit-under-test (UUT)				Applied value		UUT Reading,	IEC 61672 Class 1
Range, dB	Freq. Weighting	Time Weighting	Level, dB	Frequency, Hz	dB	Specification, dB	
30-130	dBA SPL	Fast	94	1000	94.0	±0.4	

Linearity

Setting of Unit-under-test (UUT)				Applied value		UUT Reading,	IEC 61672 Class 1
Range, dB	Freq. Weighting	Time Weighting	Level, dB	Frequency, Hz	dB	Specification, dB	
30-130	dBA SPL	Fast	94	1000	94.0	Ref	
			104		104.0	±0.3	
			114		114.0	±0.3	

Time Weighting

Setting of Unit-under-test (UUT)				Applied value		UUT Reading,	IEC 61672 Class 1
Range, dB	Freq. Weighting	Time Weighting	Level, dB	Frequency, Hz	dB	Specification, dB	
30-130	dBA SPL	Fast	94	1000	94.0	Ref	
		Slow			94.0	±0.3	

Frequency Response

Linear Response

Setting of Unit-under-test (UUT)			Applied value		UUT Reading, dB	IEC 61672 Class 1 Specification, dB	
Range, dB	Freq. Weighting	Time Weighting	Level, dB	Frequency, Hz			
30-130	dB	SPL	Fast	94	31.5	93.9	±2.0
					63	94.0	±1.5
					125	94.0	±1.5
					250	94.0	±1.4
					500	94.0	±1.4
					1000	94.0	Ref
					2000	93.8	±1.6
					4000	93.9	±1.6

A-weighting

Setting of Unit-under-test (UUT)			Applied value		UUT Reading, dB	IEC 61672 Class 1 Specification, dB	
Range, dB	Freq. Weighting	Time Weighting	Level, dB	Frequency, Hz			
30-130	dBA	SPL	Fast	94	31.5	54.8	-39.4±2.0
					63	67.8	-26.2±1.5
					125	77.9	-16.1±1.5
					250	85.4	-8.6±1.4
					500	90.8	-3.2±1.4
					1000	94.0	Ref
					2000	95.0	+1.2±1.6
					4000	94.9	+1.0±1.6

C-weighting

Setting of Unit-under-test (UUT)			Applied value		UUT Reading, dB	IEC 61672 Class 1 Specification, dB	
Range, dB	Freq. Weighting	Time Weighting	Level, dB	Frequency, Hz			
30-130	dBC	SPL	Fast	94	31.5	90.9	-3.0±2.0
					63	93.2	-0.8±1.5
					125	93.8	-0.2±1.5
					250	94.0	-0.0±1.4
					500	94.0	-0.0±1.4
					1000	94.0	Ref
					2000	93.7	-0.2±1.6
					4000	93.1	-0.8±1.6



**5. Calibration Results Applied**

The results apply to the particular unit-under-test only. All calibration points are within manufacture's specification as IEC 61672 Class 1.

Uncertainties of Applied Value:

94 dB	31.5 Hz	± 0.15
	63 Hz	± 0.05
	125 Hz	± 0.05
	250 Hz	± 0.05
	500 Hz	± 0.10
	1000 Hz	± 0.05
	2000 Hz	± 0.05
	4000 Hz	± 0.10
104 dB	1000 Hz	± 0.05
114 dB	1000 Hz	± 0.05

The uncertainties are evaluated for a 95% confidence level.



**Note:**

The values given in this certification only related to the values measured at the time of the calibration and any uncertainties quoted will not allow for the equipment long-term drift, variations with environmental changes, vibration and shock during transportation, overloading, mis-handling, or the capability of any other laboratory to repeat the calibration. (A+A)\*L shall not be liable for any loss or damage resulting from the use of the equipment.



# MAXLAB

## CALIBRATION CERTIFICATE

### Certificate Information

Date of Issue 22-Oct-2018

Certificate Number MLCN182538S

### Customer Information

Company Name Acuity Sustainability Consulting Limited  
Address Unit 1908, Nos. 301-305 Castle Peak Road,  
Kwai Chung, N.T.

### Equipment-under-Test (EUT)

Description Sound & Vibration Analyser  
Manufacturer Svantek  
Model Number SVAN 958A  
Serial Number 36691  
Equipment Number --

### Calibration Particular

Date of Calibration 22-Oct-2018  
Calibration Equipment 4231(MLTE008) / / 0-Jan-1900  
CE-7144(MLTE120) / SSD201606579 / 27-Oct-2019

Calibration Procedure MLCG00, MLCG15

Calibration Conditions	Laboratory	Temperature	23 °C ± 5 °C
		Relative Humidity	55% ± 25%
EUT		Stabilizing Time	Over 3 hours
		Warm-up Time	10 minutes
		Power Supply	Internal battery

Calibration Results Svantek Vibration Accelerometer PNR: SV84, SNR : D6013.  
Calibration data were detailed in the continuation pages.  
EUT reading in Vibration Mode of Z-Axis was found to be very low.

### Approved By & Date

K.O. Lo

22-Oct-2018

### Statements

- \* Calibration equipment used for this calibration are traceable to national / international standards.
- \* The results on this Calibration Certificate only relate to the values measured at the time of the calibration and the uncertainties quoted will not include allowance for the EUT long term drift, variation with environmental changes, vibration and shock during transportation, overloading, mishandling, misuse, and the capacity of any other laboratory to repeat the measurement.
- \* MaxLab Calibration Centre Limited shall not be liable for any loss or damage resulting from the use of the EUT.
- \* The copy of this Certificate is owned by MaxLab Calibration Centre Limited. No part of this Certificate may be reproduced without the prior written approval of MaxLab Calibration Centre Limited.



# MAXLAB

Certificate No. MLCN182538S

<b>Calibration Data</b>						
Channel / Mode	Test Frequency (Hz)	Direction	EUT Reading	Standard Reading	EUT Error (% of Rdg)	Calibration Uncertainty (% of Rdg)
CH1 / Vibration (peak)	Test Frequency 56 Hz Range 316 m/s <sup>2</sup>	X-Axis	7.94 m/s <sup>2</sup>	9.00 m/s <sup>2</sup>	-11.8%	3%
			13.2 m/s <sup>2</sup>	15.00 m/s <sup>2</sup>	-12.0%	3%
			17.8 m/s <sup>2</sup>	20.0 m/s <sup>2</sup>	-11.0%	3%
			35.4 m/s <sup>2</sup>	40.0 m/s <sup>2</sup>	-11.5%	3%
CH2 / Vibration (peak)	Test Frequency 56 Hz Range 316 m/s <sup>2</sup>	Y-Axis	8.99 m/s <sup>2</sup>	9.00 m/s <sup>2</sup>	-0.1%	3%
			14.9 m/s <sup>2</sup>	15.00 m/s <sup>2</sup>	-0.7%	3%
			20.0 m/s <sup>2</sup>	20.0 m/s <sup>2</sup>	0.0%	3%
			40.0 m/s <sup>2</sup>	40.0 m/s <sup>2</sup>	0.0%	3%
CH3 / Vibration (peak)	Test Frequency 56 Hz Range 316 m/s <sup>2</sup>	Z-Axis	0.76 m/s <sup>2</sup>	9.00 m/s <sup>2</sup>	-91.6%	3%
			0.9 m/s <sup>2</sup>	15.00 m/s <sup>2</sup>	-94.0%	3%
			0.9 m/s <sup>2</sup>	20.0 m/s <sup>2</sup>	-95.5%	3%
			0.9 m/s <sup>2</sup>	40.0 m/s <sup>2</sup>	-97.8%	3%

Channel / Mode	Filter / Detector	Range	EUT Reading	Standard Reading	EUT Error	Calibration Uncertainty
CH4 / Sound	A / FAST (1 kHz Input)	105 dB	94.0 dB	94.0 dB	0.0 dB	0.2 dB
		130 dB	94.1 dB	94.0 dB	0.1 dB	0.2 dB
			114.1 dB	114.0 dB	0.1 dB	0.2 dB
	C / FAST (1 kHz Input)	105 dB	94.0 dB	94.0 dB	0.0 dB	0.2 dB
		130 dB	94.1 dB	94.0 dB	0.1 dB	0.2 dB
			114.1 dB	114.0 dB	0.1 dB	0.2 dB
	LIN / FAST (1 kHz Input)	105 dB	94.0 dB	94.0 dB	0.0 dB	0.2 dB
		130 dB	94.1 dB	94.0 dB	0.1 dB	0.2 dB
			114.1 dB	114.0 dB	0.1 dB	0.2 dB
	A / SLOW (1 kHz Input)	105 dB	94.0 dB	94.0 dB	0.0 dB	0.2 dB
		130 dB	114.1 dB	114.0 dB	0.1 dB	0.2 dB
	C / SLOW (1 kHz Input)	105 dB	94.0 dB	94.0 dB	0.0 dB	0.2 dB
		130 dB	114.1 dB	114.0 dB	0.1 dB	0.2 dB
	LIN / SLOW (1 kHz Input)	105 dB	94.0 dB	94.0 dB	0.0 dB	0.2 dB
		130 dB	114.1 dB	114.0 dB	0.1 dB	0.2 dB
	A / IMPULSE (1 kHz Input)	105 dB	94.0 dB	94.0 dB	0.0 dB	0.2 dB
		130 dB	114.1 dB	114.0 dB	0.1 dB	0.2 dB
	C / IMPULSE (1 kHz Input)	105 dB	94.0 dB	94.0 dB	0.0 dB	0.2 dB
		130 dB	114.1 dB	114.0 dB	0.1 dB	0.2 dB
	LIN / IMPULSE (1 kHz Input)	105 dB	94.0 dB	94.0 dB	0.0 dB	0.2 dB
		130 dB	114.1 dB	114.0 dB	0.1 dB	0.2 dB

- END -

Calibrated By :  
Date :

Dan  
22-Oct-2018

Checked By :  
Date :

K.O. Lo  
22-Oct-2018

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萬儀校正中心有限公司  
MaxLab Calibration Centre Limited

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Unit B2, 9/F., Boldwin Industrial Bldg., 16-18 Wah Sing Street, Kwai Chung, N.T., Hong Kong Tel: (852) 2116 1380 Fax: (852) 2264 6480 Email: info@maxlab.com.hk

# *Certificate of Calibration*

*for*

*Description:*                    *Sound Level Meter*  
*Manufacturer:*                *NTi Audio*  
*Type No.:*                        *XL2 (Serial No.: A2A-13548-E0)*  
*Microphone:*                  *ACO 7052 (Serial No.:60997)*  
*Preamplifier:*                 *NTi Audio MA220 (Serial No.:5287)*

***Submitted by:***

*Customer:*                    *Acuity Sustainability Consulting Limited*  
*Address:*                      *Unit 1908, iPlace, Nos. 301-305 Castle Peak Road,*  
*Kwai Chung, New Territories*

**Upon receipt for calibration, the instrument was found to be:**

- Within**  
 **Outside**

**the allowable tolerance.**

The test equipment used for calibration are traceable to National Standards via:

- The Government of The Hong Kong Special Administrative Region Standard & Calibration Laboratory

**Date of receipt: 8 January 2019**

**Date of calibration: 10 January 2019**

*Calibrated by:* \_\_\_\_\_  
*Calibration Technician*

*Certified by:* \_\_\_\_\_  
*Mr. Ng Yan Wa*  
*Laboratory Manager*

**Date of issue: 10 January 2019**

*Certificate No.: APJ18-157-CC001*



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**1. Calibration Precaution:**

- The unit-under-test (UUT) was allowed to stabilize in the laboratory for over 24 hours, and switched on to warm up for over 10 minutes before the commencement of the test.
- The results presented are the mean of 3 measurements at each calibration point.

**2. Calibration Conditions:**

Air Temperature: 22.3 °C  
 Air Pressure: 1006 hPa  
 Relative Humidity: 71.3 %

**3. Calibration Equipment:**

	Type	Serial No.	Calibration Report Number	Traceable to
Multifunction Calibrator	B&K 4226	2288467	AV180064	HOKLAS

**4. Calibration Results**

Sound Pressure Level

Reference Sound Pressure Level

Setting of Unit-under-test (UUT)			Applied value		UUT Reading, dB	IEC 61672 Class 1 Specification, dB
Range, dB	Freq. Weighting	Time Weighting	Level, dB	Frequency, Hz		
30-130	dBA SPL	Fast	94	1000	94.0	±0.4

Linearity

Setting of Unit-under-test (UUT)			Applied value		UUT Reading, dB	IEC 61672 Class 1 Specification, dB
Range, dB	Freq. Weighting	Time Weighting	Level, dB	Frequency, Hz		
30-130	dBA SPL	Fast	94	1000	94.0	Ref
			104		104.0	±0.3
			114		114.0	±0.3

Time Weighting

Setting of Unit-under-test (UUT)			Applied value		UUT Reading, dB	IEC 61672 Class 1 Specification, dB
Range, dB	Freq. Weighting	Time Weighting	Level, dB	Frequency, Hz		
30-130	dBA SPL	Fast	94	1000	94.0	Ref
		Slow			94.0	±0.3

Frequency Response

Linear Response

Setting of Unit-under-test (UUT)			Applied value		UUT Reading, dB	IEC 61672 Class 1 Specification, dB	
Range, dB	Freq. Weighting	Time Weighting	Level, dB	Frequency, Hz			
30-130	dB	SPL	Fast	94	31.5	94.0	±2.0
					63	94.1	±1.5
					125	94.1	±1.5
					250	94.0	±1.4
					500	94.0	±1.4
					1000	94.0	Ref
					2000	93.8	±1.6
					4000	93.8	±1.6
					8000	92.7	+2.1; -3.1

A-weighting

Setting of Unit-under-test (UUT)			Applied value		UUT Reading, dB	IEC 61672 Class 1 Specification, dB	
Range, dB	Freq. Weighting	Time Weighting	Level, dB	Frequency, Hz			
30-130	dBA	SPL	Fast	94	31.5	54.8	-39.4±2.0
					63	67.9	-26.2±1.5
					125	78.0	-16.1±1.5
					250	85.4	-8.6±1.4
					500	90.8	-3.2±1.4
					1000	94.0	Ref
					2000	95.1	+1.2±1.6
					4000	94.8	+1.0±1.6
					8000	91.6	-1.1+2.1; -3.1

C-weighting

Setting of Unit-under-test (UUT)			Applied value		UUT Reading, dB	IEC 61672 Class 1 Specification, dB	
Range, dB	Freq. Weighting	Time Weighting	Level, dB	Frequency, Hz			
30-130	dBC	SPL	Fast	94	31.5	91.0	-3.0±2.0
					63	93.2	-0.8±1.5
					125	93.9	-0.2±1.5
					250	94.0	-0.0±1.4
					500	94.0	-0.0±1.4
					1000	94.0	Ref
					2000	93.7	-0.2±1.6
					4000	93.0	-0.8±1.6
					8000	89.7	-3.0 +2.1; -3.1

### 5. Calibration Results Applied

The results apply to the particular unit-under-test only. All calibration points are within manufacture's specification as IEC 61672 Class 1.

Uncertainties of Applied Value:

94 dB	31.5 Hz	± 0.05
	63 Hz	± 0.05
	125 Hz	± 0.10
	250 Hz	± 0.10
	500 Hz	± 0.10
	1000 Hz	± 0.05
	2000 Hz	± 0.05
	4000 Hz	± 0.10
	8000 Hz	± 0.10
104 dB	1000 Hz	± 0.05
114 dB	1000 Hz	± 0.05

The uncertainties are evaluated for a 95% confidence level.

Note:

The values given in this certification only related to the values measured at the time of the calibration and any uncertainties quoted will not allow for the equipment long-term drift, variations with environmental changes, vibration and shock during transportation, overloading, mis-handling, or the capability of any other laboratory to repeat the calibration. (A+A)\*L shall not be liable for any loss or damage resulting from the use of the equipment.





# MAXLAB

## CALIBRATION CERTIFICATE

### Certificate Information

<b>Date of Issue</b>	23-Nov-2018	<b>Certificate Number</b>	MLCN182934S
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### Customer Information

<b>Company Name</b>	Acuity Sustainability Consulting Limited
<b>Address</b>	Unit 1908, Nos. 301-305 Castle Peak Road, Kwai Chung, N.T.

### Equipment-under-Test (EUT)

<b>Description</b>	Sound Level Calibrator
<b>Manufacturer</b>	Rion
<b>Model Number</b>	NC-74
<b>Serial Number</b>	34504770
<b>Equipment Number</b>	--

### Calibration Particular

<b>Date of Calibration</b>	23-Nov-2018		
<b>Calibration Equipment</b>	4231(MLTE008) / AV180068 / 13-May-20 1357(MLTE190) / MLEC18/05/02 / 25-May-19		
<b>Calibration Procedure</b>	MLCG00, MLCG15		
<b>Calibration Conditions</b>	Laboratory	Temperature	23 °C ± 5 °C
		Relative Humidity	55% ± 25%
	EUT	Stabilizing Time	Over 3 hours
		Warm-up Time	Not applicable
		Power Supply	Internal battery
<b>Calibration Results</b>	Calibration data were detailed in the continuation pages. Calibration result was out of EUT specification.		

### Approved By & Date

K.O. Lo

23-Nov-2018

### Statements

- \* Calibration equipment used for this calibration are traceable to national / international standards.
- \* The results on this Calibration Certificate only relate to the values measured at the time of the calibration and the uncertainties quoted will not include allowance for the EUT long term drift, variation with environmental changes, vibration and shock during transportation, overloading, mishandling, misuse, and the capacity of any other laboratory to repeat the measurement.
- \* MaxLab Calibration Centre Limited shall not be liable for any loss or damage resulting from the use of the EUT.
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# MAXLAB

Certificate No. MLCN182934S

## Calibration Data

EUT Setting	Standard Reading	EUT Error from Setting	Calibration Uncertainty	EUT Specification
94 dB	94.0 dB	0.0 dB	0.20 dB	± 0.3 dB

- END -

Calibrated By :  
Date :

Dan  
23-Nov-18

Checked By :  
Date :

K.O. Lo  
23-Nov-18

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萬儀校正中心有限公司  
MaxLab Calibration Centre Limited

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