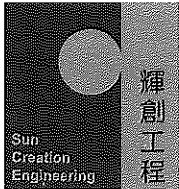


Appendix H Noise Monitoring Equipment Calibration Certificate



輝創工程有限公司

Sun Creation Engineering Limited
Calibration and Testing Laboratory

Certificate of Calibration

校正證書

Certificate No. : C176148
證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC17-1542) Date of Receipt / 收件日期 : 26 October 2017

Description / 儀器名稱 : Audio Analyzer
Manufacturer / 製造商 : NTi
Model No. / 型號 : XL2
Serial No. / 編號 : A2A-09696-E0
Supplied By / 委託者 : Acumen Environmental Engineering and Technologies Co., Ltd.
Lot 11, Tam Kon Shan Road, North Tsing Yi, N.T.

TEST CONDITIONS / 測試條件

Temperature / 溫度 : (23 ± 2)°C Relative Humidity / 相對濕度 : (55 ± 20)%
Line Voltage / 電壓 : ---

TEST SPECIFICATIONS / 測試規範

Calibration check


DATE OF TEST / 測試日期 : 3 November 2017

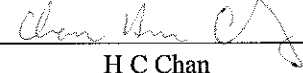
TEST RESULTS / 測試結果

The results apply to the particular unit-under-test only.
The results do not exceed manufacturer's specification.
The results are detailed in the subsequent page(s).

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

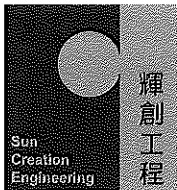
- The Government of The Hong Kong Special Administrative Region Standard & Calibration Laboratory
- Agilent Technologies / Keysight Technologies
- Rohde & Schwarz Laboratory, Germany
- Fluke Everett Service Center, USA

Tested By : 
測試 : K C Lee
Engineer

Certified By : 
核證 : H C Chan
Engineer

Date of Issue : 7 November 2017
簽發日期

The test equipment used for calibration are traceable to the Nation Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.
本證書所載校正用之測試器材均可溯源至國際標準。局部複印本證書需先獲本實驗室書面批准。



Certificate of Calibration 校正證書

Certificate No. : C176148
證書編號

- The unit-under-test (UUT) was allowed to stabilize in the laboratory for over 12 hours, and switched on to warm up for over 10 minutes before the commencement of the test.
- Self-calibration using the laboratory acoustic calibrator was performed before the test from 6.1.1.2 to 6.3.2.
- The results presented are the mean of 3 measurements at each calibration point.
- Test equipment :

Equipment ID	Description	Certificate No.
CL280	40 MHz Arbitrary Waveform Generator	C170048
CL281	Multifunction Acoustic Calibrator	PA160023

5. Test procedure : MA101N.

6. Results :

6.1 Sound Pressure Level

6.1.1 Reference Sound Pressure Level

6.1.1.1 Before Self-calibration

UUT Setting			Applied Value		UUT Reading (dB)
Range (dB)	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)	
30 - 130	A	FAST	94.00	1	93.9

6.1.1.2 After Self-calibration

UUT Setting			Applied Value		UUT Reading (dB)	IEC 61672 Class 1 (dB)
Range (dB)	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)		
30 - 130	A	FAST	94.00	1	94.0	± 1.1

6.1.2 Linearity

UUT Setting			Applied Value		UUT Reading (dB)
Range (dB)	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)	
30 - 130	A	FAST	94.00	1	94.0 (Ref.)
			104.00		104.0
			114.00		114.0

IEC 61672 Class 1 Spec. : ± 0.6 dB per 10 dB step and ± 1.1 dB for overall different.

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Certificate of Calibration

校正證書

Certificate No. : C176148

證書編號

6.2 Time Weighting

UUT Setting			Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)		
30 - 130	A	FAST	94.00	1	94.0	Ref.
		SLOW			94.0	

6.3 Frequency Weighting

6.3.1 A-Weighting

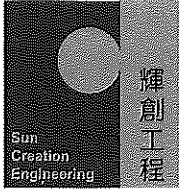
UUT Setting			Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Frequency Weighting	Time Weighting	Level (dB)	Freq.		
30 - 130	A	FAST	94.00	63 Hz	67.7	-26.2 ± 1.5
				125 Hz	77.8	-16.1 ± 1.5
				250 Hz	85.3	-8.6 ± 1.4
				500 Hz	90.7	-3.2 ± 1.4
				1 kHz	94.0	Ref.
				2 kHz	95.2	+1.2 ± 1.6
				4 kHz	95.0	+1.0 ± 1.6
				8 kHz	92.9	-1.1 (+2.1; -3.1)
				12.5 kHz	89.7	-4.3 (+3.0; -6.0)

6.3.2 C-Weighting

UUT Setting			Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Frequency Weighting	Time Weighting	Level (dB)	Freq.		
30 - 130	C	FAST	94.00	63 Hz	93.1	-0.8 ± 1.5
				125 Hz	93.8	-0.2 ± 1.5
				250 Hz	94.0	0.0 ± 1.4
				500 Hz	94.0	0.0 ± 1.4
				1 kHz	94.0	Ref.
				2 kHz	93.8	-0.2 ± 1.6
				4 kHz	93.2	-0.8 ± 1.6
				8 kHz	91.0	-3.0 (+2.1; -3.1)
				12.5 kHz	87.7	-6.2 (+3.0; -6.0)

The test equipment used for calibration are traceable to the Nation Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.

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輝創工程有限公司

Sun Creation Engineering Limited

Calibration and Testing Laboratory

Certificate of Calibration

校正證書

Certificate No. : C176148

證書編號

Remarks : - Mfr's Spec. : IEC 61672 Class 2

- Uncertainties of Applied Value : 94 dB : 63 Hz - 125 Hz : ± 0.35 dB
250 Hz - 500 Hz : ± 0.30 dB
1 kHz : ± 0.20 dB
2 kHz - 4 kHz : ± 0.35 dB
8 kHz : ± 0.45 dB
12.5 kHz : ± 0.70 dB
104 dB : 1 kHz : ± 0.10 dB (Ref. 94 dB)
114 dB : 1 kHz : ± 0.10 dB (Ref. 94 dB)

- UUT Microphone Model No. : MA220 (ACO7052) & S/N : 62324

- The uncertainties are for a confidence probability of not less than 95 %.

Note :

Only the original copy or the laboratory's certified true copy is valid.

The values given in this Certificate only relate to the values measured at the time of the test and any uncertainties quoted will not include allowance for the equipment long term drift, variations with environment changes, vibration and shock during transportation, overloading, mis-handling, or the capability of any other laboratory to repeat the measurement. Sun Creation Engineering Limited shall not be liable for any loss or damage resulting from the use of the equipment.

The test equipment used for calibration are traceable to the Nation Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.

本證書所載校正用之測試器材均可溯源至國際標準。局部複印本證書需先獲本實驗室書面批准。

Sun Creation Engineering Limited Calibration & Testing Laboratory

c/o 4/F, Tsing Shan Wan Exchange Building, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong

輝創工程有限公司 校正及檢測實驗室

c/o 香港新界屯門興安里一號青山灣機樓四樓

Tel/電話: 2927 2606

Fax/傳真: 2744 8986

E-mail/電郵: calab@suncreation.com

Website/網址: www.suncreation.com



輝創工程有限公司

Sun Creation Engineering Limited

Calibration & Testing Laboratory

Certificate of Calibration

校正證書

Certificate No. : C183253
證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC18-1199) Date of Receipt / 收件日期 : 11 June 2018

Description / 儀器名稱 : Acoustic Calibrator
Manufacturer / 製造商 : Pulsar
Model No. / 型號 : 105
Serial No. / 編號 : 70396
Supplied By / 委託者 : Acumen Environmental Engineering and Technologies Co., Ltd.
Lot 11, Tam Kon Shan Road, North Tsing Yi, N.T.

TEST CONDITIONS / 測試條件

Temperature / 溫度 : $(23 \pm 2)^{\circ}\text{C}$ Relative Humidity / 相對濕度 : $(50 \pm 25)\%$
Line Voltage / 電壓 : ---

TEST SPECIFICATIONS / 測試規範

Calibration check


DATE OF TEST / 測試日期 : 18 June 2018

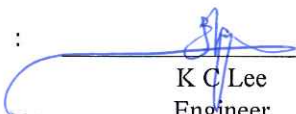
TEST RESULTS / 測試結果

The results apply to the particular unit-under-test only.
The results do not exceed manufacturer's specification.
The results are detailed in the subsequent page(s).

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

- The Government of The Hong Kong Special Administrative Region Standard & Calibration Laboratory
- Agilent Technologies / Keysight Technologies
- Rohde & Schwarz Laboratory, Germany
- Fluke Everett Service Center, USA

Tested By : 
測試 : _____
H T Wong
Technical Officer

Certified By : 
核證 : _____
K C Lee
Engineer

Date of Issue : 20 June 2018
簽發日期

The test equipment used for calibration are traceable to the Nation Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.

本證書所載校正用之測試器材均可溯源至國際標準。局部複印本證書需先獲本實驗所書面批准。

Sun Creation Engineering Limited – Calibration & Testing Laboratory

c/o 4/F, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong

輝創工程有限公司 – 校正及檢測實驗室

c/o 香港新界屯門興安里一號四樓

Tel/電話: (852) 2927 2606

Fax/傳真: (852) 2744 8986

E-mail/電郵: callab@suncreation.com

Website/網址: www.suncreation.com



Certificate of Calibration 校正證書

Certificate No. : C183253

證書編號

- The unit-under-test (UUT) was allowed to stabilize in the laboratory for over 12 hours before the commencement of the test.
- The results presented are the mean of 3 measurements at each calibration point.
- Test equipment :

<u>Equipment ID</u>	<u>Description</u>	<u>Certificate No.</u>
TST150A	Measuring Amplifier	C181288
CL130	Universal Counter	C173864
CL281	Multifunction Acoustic Calibrator	PA160023

4. Test procedure : MA100N.

5. Results :

5.1 Sound Level Accuracy

UUT Nominal Value	Measured Value (dB)	IEC60942:2003 Class 1 Spec.	Uncertainty of Measured Value (dB)
94 dB, 1 kHz	93.8	± 0.4 dB	± 0.2

Mfr's Spec. : IEC60942:2003 Class 1

5.2 Frequency Accuracy

UUT Nominal Value (kHz)	Measured Value (kHz)	Mfr's Spec.	Uncertainty of Measured Value (Hz)
1	1.000	1 kHz ± 1 %	± 1

Remark : - The uncertainties are for a confidence probability of not less than 95 %.

Note :

Only the original copy or the laboratory's certified true copy is valid.

The values given in this Certificate only relate to the values measured at the time of the test and any uncertainties quoted will not include allowance for the equipment long term drift, variations with environment changes, vibration and shock during transportation, overloading, mis-handling, or the capability of any other laboratory to repeat the measurement. Sun Creation Engineering Limited shall not be liable for any loss or damage resulting from the use of the equipment.

The test equipment used for calibration are traceable to the Nation Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.

本證書所載校正用之測試器材均可溯源至國際標準。局部複印本證書需先獲本實驗室書面批准。

Certificate of Calibration

for

Description: Sound Level Meter
Manufacturer: NTi Audio
Type No.: XL2 (Serial No.: A2A-13663-E0)
Microphone: NTi Audio M2211 (Serial No.:60989)
Preamplifier: NTi Audio MA220 (Serial No.:5735)

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: 22 January 2018

Date of calibration: 23 January 2018

Calibrated by: 
Calibration Technician

Certified by: 
Mr. Ng Yan Wa
Laboratory Manager

Date of issue: 23 January 2018



Certificate No.: APJ17-179-CC001

Page 1 of 4

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: 20.5 °C
 Air Pressure: 1008 hPa
 Relative Humidity: 67.2 %

3. Calibration Equipment:

	Type	Serial No.	Calibration Report Number	Traceable to
Multifunction Calibrator	B&K 4226	2288467	PA160056	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	94.1	±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	94.1	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	94.1	Ref
		Slow			94.0	±0.3

Certificate No.: APJ17-179-CC001



Page 2 of 4

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	94	Fast	31.5	94.0	±2.0
					63	94.1	±1.5
					125	94.0	±1.5
					250	94.0	±1.4
					500	94.1	±1.4
					1000	94.1	Ref
					2000	94.5	±1.6
					4000	95.6	±1.6
				8000	94.6	+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	94	Fast	31.5	54.5	-39.4±2.0
					63	67.8	-26.2±1.5
					125	78.0	-16.1±1.5
					250	85.4	-8.6±1.4
					500	90.9	-3.2±1.4
					1000	94.1	Ref
					2000	95.7	+1.2±1.6
					4000	96.6	+1.0±1.6
				8000	93.5	-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	94	Fast	31.5	91.0	-3.0±2.0
					63	93.2	-0.8±1.5
					125	94.0	-0.2±1.5
					250	94.1	-0.0±1.4
					500	94.1	-0.0±1.4
					1000	94.1	Ref
					2000	93.8	-0.2±1.6
					4000	93.3	-0.8±1.6
				8000	87.4	-3.0+2.1; -3.1	



Certificate No.: APJ17-179-CC001

Page 3 of 4

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	± 0.10
	125 Hz	± 0.10
	250 Hz	± 0.05
	500 Hz	± 0.05
	1000 Hz	± 0.05
	2000 Hz	± 0.05
	4000 Hz	± 0.05
	8000 Hz	± 0.15
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.

