

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. : C173120

證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC17-1220)

Date of Receipt / 收件日期 : 1 June 2017

Description / 儀器名稱 : Sound Level Meter

Manufacturer / 製造商 : Rion

Model No. / 型號 : NL-52

Serial No. / 編號 : 00643049

Supplied By / 委託者 : Envirotech Services Co.

Room 113, 1/F, My Loft, 9 Hoi Wing Road, Tuen Mun,
New Territories, Hong Kong

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 : 8 June 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.

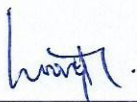
The results are detailed in the subsequent page(s).

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


H T Wong
Technical Officer

Certified By

核證


K C Lee
Engineer

Date of Issue

簽發日期

8 June 2017

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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所書面批准。

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

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Certificate of Calibration

校正證書

Certificate No. : C173120

證書編號

1. 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.
2. Self-calibration was performed before the test.
3. The results presented are the mean of 3 measurements at each calibration point.
4. Test equipment :

| <u>Equipment ID</u> | <u>Description</u> | <u>Certificate No.</u> |
|---------------------|-------------------------------------|------------------------|
| 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

| UUT Setting | | | | Applied Value | | UUT Reading (dB) | IEC 61672 Class 1 Spec. (dB) |
|-------------|----------------|---------------------|----------------|---------------|-------------|------------------|------------------------------|
| Range (dB) | Function | Frequency Weighting | Time Weighting | Level (dB) | Freq. (kHz) | | |
| 30 - 130 | L _A | A | Fast | 94.00 | 1 | 93.9 | ± 1.1 |

- 6.1.2 Linearity

| UUT Setting | | | | Applied Value | | UUT Reading (dB) |
|-------------|----------------|---------------------|----------------|---------------|-------------|------------------|
| Range (dB) | Function | Frequency Weighting | Time Weighting | Level (dB) | Freq. (kHz) | |
| 30 - 130 | L _A | A | Fast | 94.00 | 1 | 93.9 (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.

- 6.2 Time Weighting

| UUT Setting | | | | Applied Value | | UUT Reading (dB) | IEC 61672 Class 1 Spec. (dB) |
|-------------|----------------|---------------------|----------------|---------------|-------------|------------------|------------------------------|
| Range (dB) | Function | Frequency Weighting | Time Weighting | Level (dB) | Freq. (kHz) | | |
| 30 - 130 | L _A | A | Fast | 94.00 | 1 | 93.9 | Ref. |
| | | | Slow | | | | |

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Certificate of Calibration

校正證書

Certificate No. : C173120

證書編號

6.3 Frequency Weighting

6.3.1 A-Weighting

| UUT Setting | | | | Applied Value | | UUT Reading (dB) | IEC 61672 Class 1 Spec. (dB) |
|-------------|----------------|---------------------|----------------|---------------|----------|------------------|------------------------------|
| Range (dB) | Function | Frequency Weighting | Time Weighting | Level (dB) | Freq. | | |
| 30 - 130 | L _A | A | Fast | 94.00 | 63 Hz | 67.6 | -26.2 ± 1.5 |
| | | | | | 125 Hz | 77.7 | -16.1 ± 1.5 |
| | | | | | 250 Hz | 85.2 | -8.6 ± 1.4 |
| | | | | | 500 Hz | 90.6 | -3.2 ± 1.4 |
| | | | | | 1 kHz | 93.9 | Ref. |
| | | | | | 2 kHz | 95.1 | +1.2 ± 1.6 |
| | | | | | 4 kHz | 94.9 | +1.0 ± 1.6 |
| | | | | | 8 kHz | 92.8 | -1.1 (+2.1 ; -3.1) |
| | | | | | 12.5 kHz | 89.4 | -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) | Function | Frequency Weighting | Time Weighting | Level (dB) | Freq. | | |
| 30 - 130 | L _C | C | Fast | 94.00 | 63 Hz | 93.0 | -0.8 ± 1.5 |
| | | | | | 125 Hz | 93.7 | -0.2 ± 1.5 |
| | | | | | 250 Hz | 93.9 | 0.0 ± 1.4 |
| | | | | | 500 Hz | 93.9 | 0.0 ± 1.4 |
| | | | | | 1 kHz | 93.9 | Ref. |
| | | | | | 2 kHz | 93.7 | -0.2 ± 1.6 |
| | | | | | 4 kHz | 93.1 | -0.8 ± 1.6 |
| | | | | | 8 kHz | 90.9 | -3.0 (+2.1 ; -3.1) |
| | | | | | 12.5 kHz | 87.5 | -6.2 (+3.0 ; -6.0) |

Remarks : - UUT Microphone Model No. : UC-59 & S/N : 06829

- Mfr's Spec. : IEC 61672 Class 1

- 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) |

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

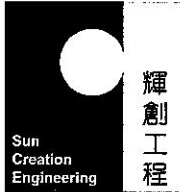
Note :

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.

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輝創工程

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. : C175522

證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC17-2161) Date of Receipt / 收件日期 : 18 September 2017

Description / 儀器名稱 : Precision Acoustic Calibrator

Manufacturer / 製造商 : LARSON DAVIS

Model No. / 型號 : CAL200

Serial No. / 編號 : 11334

Supplied By / 委託者 : Envirotech Services Co.

Room 113, 1/F, My Loft, 9 Hoi Wing Road, Tuen Mun,
New Territories, Hong Kong

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 : 2 October 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


H T Wong
Technical Officer

Certified By
核證


K C Lee
Engineer

Date of Issue
簽發日期

3 October 2017

This certificate is valid only if used in accordance with the National Standard specified in the certificate. This certificate shall not be reproduced, except in full, with out the prior written consent of the issuer.

此證書只適用於按照證書內所列之國家標準進行校準。此證書不得被複製，除非事先獲得發行人之書面同意。

Sun Creation Engineering Limited, Calibration and Testing Laboratory

Co. 11, My Loft, 9 Hoi Wing Road, Tuen Mun, New Territories, Hong Kong

輝創工程有限公司, 校準及測試實驗室

Co. 11, My Loft, 9 Hoi Wing Road, Tuen Mun, New Territories, Hong Kong

Tel: 3439 2222 Fax: 3439 2222 E-mail: info@suncreation.com Web site: www.suncreation.com



輝創工程

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. : C175522

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 :

| Equipment ID | Description | Certificate No. |
|--------------|-----------------------------------|-----------------|
| CL130 | Universal Counter | C173864 |
| CL281 | Multifunction Acoustic Calibrator | PA160023 |
| TST150A | Measuring Amplifier | C161175 |

- Test procedure : MA100N.

- Results :

5.1 Sound Level Accuracy

| UUT Nominal Value | Measured Value (dB) | Mfr's Spec. (dB) | Uncertainty of Measured Value (dB) |
|----------------------|------------------------|---------------------|---------------------------------------|
| 94 dB, 1 kHz | 93.9 | ± 0.2 | ± 0.2 |
| 114 dB, 1 kHz | 113.9 | | |

5.2 Frequency Accuracy

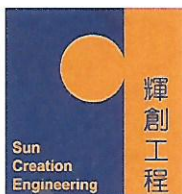
| UUT Nominal Value (kHz) | Measured Value (kHz) | Mfr's Spec. (Hz) | Uncertainty of Measured Value (Hz) |
|----------------------------|-------------------------|---------------------|---------------------------------------|
| 1 | 1.000 | 1 kHz ± 1 % | ± 1 |

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.

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Certificate of Calibration 校正證書

Certificate No. : C165934
證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC16-2438) Date of Receipt / 收件日期 : 26 October 2016

Description / 儀器名稱 : Anemometer
Manufacturer / 製造商 : Lutron
Model No. / 型號 : AM-4201
Serial No. / 編號 : AF.27513
Supplied By / 委託者 : Envirotech Services Co.
Room 113, 1/F, My Loft, 9 Hoi Wing Road, Tuen Mun,
New Territories, Hong Kong

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

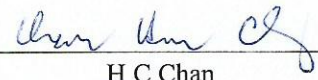
DATE OF TEST / 測試日期 : 27 October 2016

TEST RESULTS / 測試結果

The results apply to the particular unit-under-test only.
The results are detailed in the subsequent page(s).

The test equipment used for calibration are traceable to National Standards via :
- Testo Industrial Services GmbH, Germany

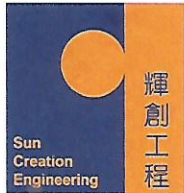
Tested By : 
測試 : _____
T L Shek
Assistant Engineer

Certified By : 
核證 : _____
H C Chan
Engineer

Date of Issue : 28 October 2016
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.

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Certificate of Calibration 校正證書

Certificate No. : C165934
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 10 measurements at each calibration point.
- Test equipment :

| <u>Equipment ID</u> | <u>Description</u> | <u>Certificate No.</u> |
|---------------------|-------------------------------------|------------------------|
| CL386 | Multi-function Measuring Instrument | S12109 |

- Test procedure : MA130N.
- Results :

Air Velocity

| Applied Value (m/s) | UUT Reading (m/s) | Measured Correction | | |
|---------------------|-------------------|---------------------|----------------------------|-----------------|
| | | Value (m/s) | Measurement Uncertainty | |
| | | | Expanded Uncertainty (m/s) | Coverage Factor |
| 2.0 | 1.8 | +0.2 | 0.2 | 2.0 |
| 4.0 | 3.8 | +0.2 | 0.2 | 2.0 |
| 6.0 | 5.8 | +0.2 | 0.3 | 2.0 |
| 8.1 | 8.0 | +0.1 | 0.3 | 2.0 |
| 10.0 | 10.0 | 0.0 | 0.4 | 2.0 |

Remarks : - The Measured Corrections are defined as :
Value = Applied Value - UUT Reading

- The expanded uncertainties are for a level of confidence of 95 %.

Note :

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