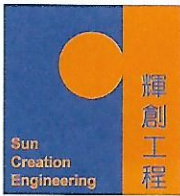


Annex F1

# Calibration Certificates for Noise



# Certificate of Calibration

## 校正證書

Certificate No. : C183084  
證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC18-1101)

Date of Receipt / 收件日期 : 30 May 2018

Description / 儀器名稱 : Precision Acoustic Calibrator

Manufacturer / 製造商 : LARSON DAVIS

Model No. / 型號 : CAL200

Serial No. / 編號 : 11333

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 :  $(23 \pm 2)^{\circ}\text{C}$

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 : 9 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).

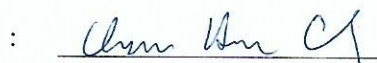
The test equipment used for calibration are traceable to National Standards via :

- 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

  
K C Lee  
Engineer

Certified By  
核證

  
H C Chan  
Engineer

Date of Issue  
簽發日期

14 June 2018

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。

# Certificate of Calibration

## 校正證書

Certificate No. : C183084

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> |
|---------------------|-----------------------------------|------------------------|
| CL130               | Universal Counter                 | C173864                |
| CL281               | Multifunction Acoustic Calibrator | PA160023               |
| TST150A             | Measuring Amplifier               | C181288                |

- Test procedure : MA100N.

- Results :

### 5.1 Sound Level Accuracy

| UUT<br>Nominal Value | Measured Value<br>(dB) | Mfr's Spec.<br>(dB) | Uncertainty of Measured Value<br>(dB) |
|----------------------|------------------------|---------------------|---------------------------------------|
| 94 dB, 1 kHz         | 93.8                   | ± 0.2               | ± 0.2                                 |
| 114 dB, 1 kHz        | 113.8                  |                     |                                       |

### 5.2 Frequency Accuracy

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

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

#### Note :

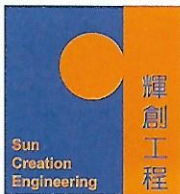
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The values given in this Certificate only relate to the values measured at the time of the test and any uncertainties quoted will not include allowance for the equipment long term drift, variations with environment changes, vibration and shock during 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.

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# Certificate of Calibration

## 校正證書

Certificate No. : C183089  
證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC18-1132)      Date of Receipt / 收件日期 : 31 May 2018  
Description / 儀器名稱 : Sound Level Meter  
Manufacturer / 製造商 : Rion  
Model No. / 型號 : NL-52  
Serial No. / 編號 : 00331805  
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 : (50 ± 25)%  
Line Voltage / 電壓 : ---

### TEST SPECIFICATIONS / 測試規範

Calibration check

DATE OF TEST / 測試日期 : 10 June 2018

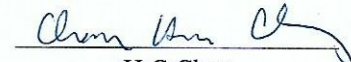
### TEST RESULTS / 測試結果

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 : K C Lee  
Engineer

Certified By :   
核證 : H C Chan  
Engineer

Date of Issue : 14 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.

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# Certificate of Calibration

## 校正證書

Certificate No. : C183089

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 | C180024                |
| 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 <sub>A</sub> | A                   | Fast           | 94.00         | 1           | 94.2             | ± 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 <sub>A</sub> | A                   | Fast           | 94.00         | 1           | 94.2 (Ref.)      |
|             |                |                     |                | 104.00        |             | 104.2            |
|             |                |                     |                | 114.00        |             | 114.2            |

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 <sub>A</sub> | A                   | Fast           | 94.00         | 1           | 94.2             | Ref.                         |
|             |                |                     | Slow           |               |             | 94.2             | ± 0.3                        |

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# Certificate of Calibration

## 校正證書

Certificate No. : C183089

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 <sub>A</sub> | A                   | Fast           | 94.00         | 63 Hz    | 67.9             | -26.2 ± 1.5                  |
|             |                |                     |                |               | 125 Hz   | 78.0             | -16.1 ± 1.5                  |
|             |                |                     |                |               | 250 Hz   | 85.5             | -8.6 ± 1.4                   |
|             |                |                     |                |               | 500 Hz   | 91.0             | -3.2 ± 1.4                   |
|             |                |                     |                |               | 1 kHz    | 94.2             | Ref.                         |
|             |                |                     |                |               | 2 kHz    | 95.4             | +1.2 ± 1.6                   |
|             |                |                     |                |               | 4 kHz    | 95.2             | +1.0 ± 1.6                   |
|             |                |                     |                |               | 8 kHz    | 93.2             | -1.1 (+2.1 ; -3.1)           |
|             |                |                     |                |               | 12.5 kHz | 89.8             | -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 <sub>C</sub> | C                   | Fast           | 94.00         | 63 Hz    | 93.3             | -0.8 ± 1.5                   |
|             |                |                     |                |               | 125 Hz   | 94.0             | -0.2 ± 1.5                   |
|             |                |                     |                |               | 250 Hz   | 94.2             | 0.0 ± 1.4                    |
|             |                |                     |                |               | 500 Hz   | 94.2             | 0.0 ± 1.4                    |
|             |                |                     |                |               | 1 kHz    | 94.2             | Ref.                         |
|             |                |                     |                |               | 2 kHz    | 94.1             | -0.2 ± 1.6                   |
|             |                |                     |                |               | 4 kHz    | 93.4             | -0.8 ± 1.6                   |
|             |                |                     |                |               | 8 kHz    | 91.3             | -3.0 (+2.1 ; -3.1)           |
|             |                |                     |                |               | 12.5 kHz | 87.9             | -6.2 (+3.0 ; -6.0)           |

Remarks : - UUT Microphone Model No. : UC-59 & S/N : 04870

- 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 :

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