

High-Volume TSP Sampler
5-Point Calibration Record

Location : AM1(ICC)
 Calibrated by : K.T.Ho
 Date : 12/04/2018

Sampler

Model : TE-5170
 Serial Number : S/N 0767

Calibration Orifice and Standard Calibration Relationship

Serial Number : 2454
 Service Date : 19 Mar 2018
 Slope (m) : 2.05242
 Intercept (b) : -0.01383
 Correlation Coefficient(r) : 0.99994

Standard Condition

Pstd (hpa) : 1013
 Tstd (K) : 298.18

Calibration Condition

Pa (hpa) : 1012
 Ta(K) : 299

| Resistance Plate | dH [green liquid] (inch water) | Z | X=Qstd (cubic meter/min) | IC (chart) | Y (corrected) |
|------------------|-----------------------------------|-------|-----------------------------|---------------|------------------|
| 1 18 holes | 10.2 | 3.187 | 1.559 | 58 | 57.87 |
| 2 13 holes | 7.5 | 2.733 | 1.338 | 50 | 49.89 |
| 3 10 holes | 5.6 | 2.361 | 1.157 | 42 | 41.91 |
| 4 7 holes | 3.8 | 1.945 | 0.954 | 34 | 33.93 |
| 5 5 holes | 2.6 | 1.609 | 0.791 | 24 | 23.95 |

Notes: $Z = \sqrt{dH(Pa/Pstd)(Tstd/Ta)}$, $X = Z/m - b$, $Y(\text{Corrected Flow}) = IC * \{\sqrt{Pa/Pstd}(Tstd/Ta)\}$

Sampler Calibration Relationship

Slope(m): 43.447 Intercept(b): -8.889 Correlation Coefficient(r): 0.9959

Checked by: 
 Magnum Fan

Date: 14/04/2018

High-Volume TSP Sampler
5-Point Calibration Record

Location : AM2A (Harbourside)
 Calibrated by : K.T.Ho
 Date : 12/04/2018

Sampler

Model : TE-5170
 Serial Number : S/N 8919

Calibration Orifice and Standard Calibration Relationship

Serial Number : 2454
 Service Date : 19 Mar 2018
 Slope (m) : 2.05242
 Intercept (b) : -0.01383
 Correlation Coefficient(r) : 0.99994

Standard Condition

Pstd (hpa) : 1013
 Tstd (K) : 298.18

Calibration Condition


Pa (hpa) : 1012
 Ta(K) : 299

| Resistance Plate | | dH [green liquid] (inch water) | Z | X=Qstd (cubic meter/min) | IC (chart) | Y (corrected) |
|------------------|----------|-----------------------------------|-------|-----------------------------|---------------|------------------|
| 1 | 18 holes | 12.0 | 3.457 | 1.691 | 60 | 59.87 |
| 2 | 13 holes | 8.2 | 2.857 | 1.399 | 52 | 51.89 |
| 3 | 10 holes | 6.2 | 2.485 | 1.217 | 44 | 43.90 |
| 4 | 7 holes | 4.0 | 1.996 | 0.979 | 34 | 33.93 |
| 5 | 5 holes | 2.4 | 1.546 | 0.760 | 24 | 23.95 |

Notes: $Z = \sqrt{dH(Pa/Pstd)(Tstd/Ta)}$, $X = Z/m - b$, $Y(\text{Corrected Flow}) = IC * \{\sqrt{Pa/Pstd}(Tstd/Ta)\}$

Sampler Calibration Relationship

Slope(m): 39.142 Intercept(b): -4.264 Correlation Coefficient(r): 0.9949

Checked by: 
 Magnum Fan

Date: 14/04/2018



Certificate of Calibration

| Calibration Certification Information | | | |
|---------------------------------------|-----------------------------|-----------|-------|
| Cal. Date: March 19, 2018 | Rootsmeter S/N: 438320 | Ta: 294 | °K |
| Operator: Jim Tisch | | Pa: 746.8 | mm Hg |
| Calibration Model #: TE-5025A | Calibrator S/N: 2454 | | |

| Run | Vol. Init (m3) | Vol. Final (m3) | ΔVol. (m3) | ΔTime (min) | ΔP (mm Hg) | ΔH (in H2O) |
|-----|----------------|-----------------|------------|-------------|------------|-------------|
| 1 | 1 | 2 | 1 | 1.4300 | 3.2 | 2.00 |
| 2 | 3 | 4 | 1 | 1.0040 | 6.4 | 4.00 |
| 3 | 5 | 6 | 1 | 0.9030 | 7.9 | 5.00 |
| 4 | 7 | 8 | 1 | 0.8590 | 8.7 | 5.50 |
| 5 | 9 | 10 | 1 | 0.7080 | 12.8 | 8.00 |

| Data Tabulation | | | | | |
|-----------------|---------------|--|-----------|-------------|---|
| Vstd (m3) | Qstd (x-axis) | $\sqrt{\Delta H \left(\frac{Pa}{Pstd} \right) \left(\frac{Tstd}{Ta} \right)}$ (y-axis) | Va | Qa (x-axis) | $\sqrt{\Delta H \left(\frac{Ta}{Pa} \right)}$ (y-axis) |
| 0.9917 | 0.6935 | 1.4113 | 0.9957 | 0.6963 | 0.8874 |
| 0.9874 | 0.9835 | 1.9959 | 0.9914 | 0.9875 | 1.2549 |
| 0.9854 | 1.0913 | 2.2315 | 0.9894 | 1.0957 | 1.4030 |
| 0.9843 | 1.1459 | 2.3405 | 0.9883 | 1.1506 | 1.4715 |
| 0.9789 | 1.3826 | 2.8227 | 0.9829 | 1.3882 | 1.7747 |
| QSTD | m= | 2.05242 | QA | m= | 1.28519 |
| | b= | -0.01383 | | b= | -0.00869 |
| | r= | 0.99994 | | r= | 0.99994 |

| Calculations | |
|---|--|
| Vstd= $\Delta Vol \left(\frac{Pa - \Delta P}{Pstd} \right) \left(\frac{Tstd}{Ta} \right)$ | Va= $\Delta Vol \left(\frac{Pa - \Delta P}{Pa} \right)$ |
| Qstd= Vstd/ΔTime | Qa= Va/ΔTime |
| For subsequent flow rate calculations: | |
| Qstd= $1/m \left(\left(\sqrt{\Delta H \left(\frac{Pa}{Pstd} \right) \left(\frac{Tstd}{Ta} \right)} \right) - b \right)$ | Qa= $1/m \left(\left(\sqrt{\Delta H \left(\frac{Ta}{Pa} \right)} \right) - b \right)$ |

| Standard Conditions | |
|---|-----------|
| Tstd: | 298.15 °K |
| Pstd: | 760 mm Hg |
| Key | |
| ΔH: calibrator manometer reading (in H2O) | |
| ΔP: rootsmeter manometer reading (mm Hg) | |
| Ta: actual absolute temperature (°K) | |
| Pa: actual barometric pressure (mm Hg) | |
| b: intercept | |
| m: slope | |

| RECALIBRATION |
|--|
| US EPA recommends annual recalibration per 1998 40 Code of Federal Regulations Part 50 to 51, Appendix B to Part 50, Reference Method for the Determination of Suspended Particulate Matter in the Atmosphere, 9.2.17, page 30 |

CALIBRATION CERTIFICATE

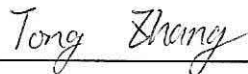
Date: July 27, 2017

| | | |
|------------------------|---|-------------------------------------|
| Equipment Name | : | Digital Dust Indicator, Model LD-3B |
| Code No. | : | 080000-42 |
| Quantity | : | 1 unit |
| Serial No. | : | 245833 |
| Sensitivity | : | 0.001 mg/m ³ |
| Sensitivity Adjustment | : | 711CPM |
| Scale Setting | : | Jul 25, 2017 |

We hereby certify that the above mentioned instrument has been calibrated satisfactory.

Sincerely

SIBATA SCIENTIFIC TECHNOLOGY LTD.



Tong Zhang

Overseas Sales Division


REPORT OF EQUIPMENT PERFORMANCE CHECK / CALIBRATION

REPORT NO. : HK1710682
PROJECT NAME : PERFORMANCE CHECK / CALIBRATION OF DUST METER
DATE OF ISSUE : 21/8/2017
CUSTOMER : Envirotech Services Company
ADDRESS : Rm. 113, 1/F., MY LOFT, 9 HOI WING ROAD, TUEN MUN, N.T.


REPORT NO. : HK1710682
PROJECT ITEM NO. : HK1710682-01
PERFORMANCE CHECK / CALIBRATED EQUIPMENT
TYPE : Digital Dust Indicator
MANUFACTURER : SIBATA
MODEL NO. : LD-3B
SERIAL NO. : 245833
EQUIPMENT NO. : ---
RECEIPT DATE : 18/8/2017
PERFORMANCE CHECK / CALIBRATION DATE : 18/8/2017

PERFORMANCE CHECK / CALIBRATION Information

| CODE | Calibration Parameter | Method Procedure | Reference Method |
|----------------|---|------------------|--|
| Dust PC/CAL | Performance Check / Calibration of Dust Meter | CAL003 | General Technical Requirements of Environmental Monitoring, Environmental Monitoring & Audit Guidelines for Development Projects in HK |

- Notes : 1. This report shall not be reproduced, except in full, without prior approval from Pilot Testing Limited.
 2. Performance Check / Calibration result relates to performance check / calibration item(s) as received.

Approved Signatory



 Wong Po Yan Pauline
 (Assistant Laboratory Manager)

Issue Date: 21/8/2017


REPORT OF PERFORMANCE CHECK / CALIBRATION

PROJECT NAME : PERFORMANCE CHECK / CALIBRATION OF DUST METER
 DATE OF ISSUE : 21/8/2017
 REPORT NO. : HK1710682

PERFORMANCE CHECK / CALIBRATED EQUIPMENT

TYPE : Digital Dust Indicator
 MANUFACTURER : SIBATA
 MODEL NO. : LD-3B
 SERIAL NO. : 245833
 EQUIPMENT NO. : ---
 SENSITIVITY ADJUSTMENT : ---
 PERFORMANCE CHECK / CALIBRATION DATE : 18/8/2017

STANDARD EQUIPMENT

TYPE : HIGH VOLUME AIR SAMPLER
 MANUFACTURER : TISCH
 MODEL NO. : TE-5170
 EQUIPMENT REF NO. : PTL_HV002
 LAST CALIBRATION DATE : 31/7/2017

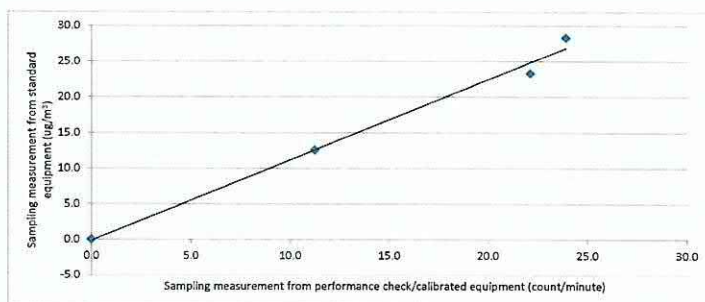
EQUIPMENT PERFORMANCE CHECK / CALIBRATION RESULTS:

Sensitivity Adjustment Scale Setting (Before Performance check / Calibration): $\frac{712}{712}$ CPM
 Sensitivity Adjustment Scale Setting (After Performance check / Calibration): $\frac{712}{712}$ CPM

| Trial no. in 1-hr period | Time | Mean Temp (°C) | Mean Pressure (hPa) | Concentration in $\mu\text{g}/\text{m}^3$ (Standard equipment) (Y - Axis) | Total Count ² (Performance Check / Calibrated equipment) | Concentration in Count/Minute ³ (Performance Check / Calibrated equipment) (X - Axis) |
|--------------------------|-----------------------|----------------|---------------------|---|--|--|
| Zero Check ¹ | 18/8/2017, 1:15:00 PM | 30.4 | 1010 | 0 | 0 | 0 |
| 1 | 18/8/2017, 2:19:00 PM | 30.4 | 1010 | 23 | 1327 | 22 |
| 2 | 18/8/2017, 3:24:00 PM | 30.4 | 1010 | 28 | 1434 | 24 |
| 3 | 18/8/2017, 4:29:00 PM | 30.4 | 1010 | 13 | 674 | 11 |

Linear Regression of Y on X

Slope (K- factor) : $\frac{1.1}{0.9953}$
 Correlation Coefficient : $\frac{0.9953}{18/8/2018}$
 Validity of Performance Check / Calibration Record : 18/8/2018



- Notes : 1. Zero check conducted as per CAL003 SOP and manufacturer's manual as appropriate.
 2. Total Count was measured by Digital Dust Indicator.
 3. Count/minute was calculated by (Total Count/60)
 4. This report shall not be reproduced, except in full, without prior approval from Pilot Testing Limited.
 5. Performance Check / Calibration result relates to performance check / calibration item(s) as received.

Operator: Lau, Natalie Signature: *Natalie* Date: 18/8/2017

Checked by: Wong Po Yan, Pauline Signature: *Wong Po Yan* Date: 21/8/2017

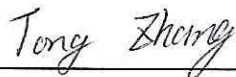
CALIBRATION CERTIFICATE

Date: July 27, 2017

| | | |
|------------------------|---|-------------------------------------|
| Equipment Name | : | Digital Dust Indicator, Model LD-3B |
| Code No. | : | 080000-42 |
| Quantity | : | 1 unit |
| Serial No. | : | 276015 |
| Sensitivity | : | 0.001 mg/m ³ |
| Sensitivity Adjustment | : | 721CPM |
| Scale Setting | : | Jul 6, 2017 |

We hereby certify that the above mentioned instrument has been calibrated satisfactorily.

Sincerely

SIBATA SCIENTIFIC TECHNOLOGY LTD.

Tong Zhang

Overseas Sales Division



REPORT OF EQUIPMENT PERFORMANCE CHECK / CALIBRATION

REPORT NO. : HK1710683
 PROJECT NAME : PERFORMANCE CHECK / CALIBRATION OF DUST METER
 DATE OF ISSUE : 21/8/2017

CUSTOMER : Envirotech Services Company
 ADDRESS : Rm. 113, 1/F., MY LOFT, 9 HOI WING ROAD, TUEN MUN, N.T.

REPORT NO. : HK1710683
 PROJECT ITEM NO. : HK1710683-01

PERFORMANCE CHECK / CALIBRATED EQUIPMENT

TYPE : Digital Dust Indicator
 MANUFACTURER : SIBATA
 MODEL NO. : LD-3B
 SERIAL NO. : 276015
 EQUIPMENT NO. : ---
 RECEIPT DATE : 18/8/2017
 PERFORMANCE CHECK / CALIBRATION DATE : 18/8/2017

PERFORMANCE CHECK / CALIBRATION Information

| CODE | Calibration Parameter | Method Procedure | Reference Method |
|----------------|---|------------------|--|
| Dust PC/CAL | Performance Check / Calibration of Dust Meter | CAL003 | General Technical Requirements of Environmental Monitoring, Environmental Monitoring & Audit Guidelines for Development Projects in HK |

- Notes : 1. This report shall not be reproduced, except in full, without prior approval from Pilot Testing Limited.
 2. Performance Check / Calibration result relates to performance check / calibration item(s) as received.

Approved Signatory



Wong Po Yan Pauline
 (Assistant Laboratory Manager)

Issue Date:

21/8/2017


REPORT OF PERFORMANCE CHECK / CALIBRATION

PROJECT NAME : PERFORMANCE CHECK / CALIBRATION OF DUST METER
 DATE OF ISSUE : 21/8/2017
 REPORT NO. : HK1710683

PERFORMANCE CHECK / CALIBRATED EQUIPMENT

TYPE : Digital Dust Indicator
 MANUFACTURER : SIBATA
 MODEL NO. : LD-3B
 SERIAL NO. : 276015
 EQUIPMENT NO. : ---
 SENSITIVITY ADJUSTMENT : ---
 PERFORMANCE CHECK / CALIBRATION DATE : 18/8/2017

STANDARD EQUIPMENT

TYPE : HIGH VOLUME AIR SAMPLER
 MANUFACTURER : TISCH
 MODEL NO. : TE-5170
 EQUIPMENT REF NO. : PTL_HV002
 LAST CALIBRATION DATE : 31/7/2017

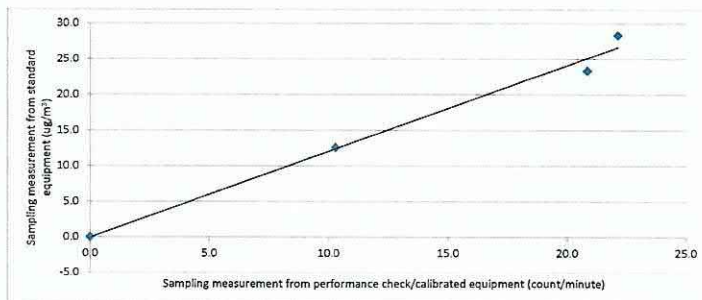
EQUIPMENT PERFORMANCE CHECK / CALIBRATION RESULTS:

Sensitivity Adjustment Scale Setting (Before Performance check / Calibration): 721 CPM
 Sensitivity Adjustment Scale Setting (After Performance check / Calibration): 721 CPM

| Trial no. in 1-hr period | Time | Mean Temp (C) | Mean Pressure (hPa) | Concentration in ug/m ³ (Standard equipment) (Y - Axis) | Total Count ² (Performance Check / Calibrated equipment) | Concentration in Count/Minute ³ (Performance Check / Calibrated equipment) (X - Axis) |
|--------------------------|----------------------|---------------|---------------------|--|--|--|
| Zero Check ¹ | 18/8/2017,1:15:00 PM | 30.4 | 1010 | 0 | 0 | 0 |
| 1 | 18/8/2017,2:19:00 PM | 30.4 | 1010 | 23 | 1252 | 21 |
| 2 | 18/8/2017,3:24:00 PM | 30.4 | 1010 | 28 | 1329 | 22 |
| 3 | 18/8/2017,4:29:00 PM | 30.4 | 1010 | 13 | 618 | 10 |

Linear Regression of Y on X

Slope (K- factor) : 1.2
 Correlation Coefficient : 0.9937
 Validity of Performance Check / Calibration Record : 18/8/2018



- Notes : 1. Zero check conducted as per CAL003 SOP and manufacturer's manual as appropriate.
 2. Total Count was measured by Digital Dust Indicator.
 3. Count/minute was calculated by (Total Count/60)
 4. This report shall not be reproduced, except in full, without prior approval from Pilot Testing Limited.
 5. Performance Check / Calibration result relates to performance check / calibration item(s) as received.

Operator: Lau, Natalie Signature: Natalie Date: 18/8/2017

Checked by: Wong Po Yan, Pauline Signature: Pauline Date: 21/8/2017



Certificate of Calibration

校正證書

Certificate No. : C174093
證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC17-1613) Date of Receipt / 收件日期 : 11 July 2017
Description / 儀器名稱 : Precision Integrating Sound Level Meter
Manufacturer / 製造商 : Rion
Model No. / 型號 : NL-18
Serial No. / 編號 : 00360030
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 : $(55 \pm 20)\%$
Line Voltage / 電壓 : ---

TEST SPECIFICATIONS / 測試規範

Calibration


DATE OF TEST / 測試日期 : 22 July 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. (after adjustment)
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 : 24 July 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. : C174093

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 using the internal standard (After Adjustment) was performed before the test from 6.1.1.2 to 6.4.
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

6.1.1.1 Before Adjustment

| UUT Setting | | | | Applied Value | | UUT Reading (dB) | IEC 60651 Type 1 Spec. (dB) |
|-------------|------|---------------------|----------------|---------------|-------------|------------------|-----------------------------|
| Range (dB) | Mode | Frequency Weighting | Time Weighting | Level (dB) | Freq. (kHz) | | |
| 50 - 110 | LA | A | Fast | 94.00 | 1 | * 92.9 | ± 0.7 |

* Out of IEC 60651 Type 1 Spec.

6.1.1.2 After Adjustment

| UUT Setting | | | | Applied Value | | UUT Reading (dB) | IEC 60651 Type 1 Spec. (dB) |
|-------------|------|---------------------|----------------|---------------|-------------|------------------|-----------------------------|
| Range (dB) | Mode | Frequency Weighting | Time Weighting | Level (dB) | Freq. (kHz) | | |
| 50 - 110 | LA | A | Fast | 94.00 | 1 | 94.1 | ± 0.7 |

6.1.2 Linearity

| UUT Setting | | | | Applied Value | | UUT Reading (dB) |
|-------------|------|---------------------|----------------|---------------|-------------|------------------|
| Range (dB) | Mode | Frequency Weighting | Time Weighting | Level (dB) | Freq. (kHz) | |
| 60 - 120 | LA | A | Fast | 94.00 | 1 | 94.1 (Ref.) |
| | | | | 104.00 | | 104.1 |
| | | | | 114.00 | | 114.1 |

IEC 60651 Type 1 Spec. : ± 0.4 dB per 10 dB step and ± 0.7 dB for overall different.

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Certificate of Calibration

校正證書

Certificate No. : C174093

證書編號

6.2 Time Weighting

6.2.1 Continuous Signal

| UUT Setting | | | | Applied Value | | UUT Reading (dB) | IEC 60651 Type 1 Spec. (dB) |
|-------------|------|---------------------|----------------|---------------|-------------|------------------|-----------------------------|
| Range (dB) | Mode | Frequency Weighting | Time Weighting | Level (dB) | Freq. (kHz) | | |
| 50 - 110 | LA | A | Fast | 94.00 | 1 | 94.1 | Ref. |
| | | | Slow | | | 94.0 | ± 0.1 |

6.2.2 Tone Burst Signal (2 kHz)

| UUT Setting | | | | Applied Value | | UUT Reading (dB) | IEC 60651 Type 1 Spec. (dB) |
|-------------|------|---------------------|----------------|---------------|----------------|------------------|-----------------------------|
| Range (dB) | Mode | Frequency Weighting | Time Weighting | Level (dB) | Burst Duration | | |
| 50 - 110 | LA | A | Fast | 106.00 | Continuous | 106.0 | Ref. |
| | LAmx | | | | 200 ms | 105.1 | -1.0 ± 1.0 |
| | LA | Slow | Continuous | | 106.0 | Ref. | |
| | LAmx | | 500 ms | | 102.4 | -4.1 ± 1.0 | |

6.3 Frequency Weighting

6.3.1 A-Weighting

| UUT Setting | | | | Applied Value | | UUT Reading (dB) | IEC 60651 Type 1 Spec. (dB) |
|-------------|------|----------------------|----------------|---------------|---------|------------------|-----------------------------|
| Range (dB) | Mode | Frequency Weighting | Time Weighting | Level (dB) | Freq. | | |
| 50 - 110 | LA | A | Fast | 94.00 | 31.5 Hz | 54.5 | -39.4 ± 1.5 |
| | | | | | 63 Hz | 67.7 | -26.2 ± 1.5 |
| | | | | | 125 Hz | 77.7 | -16.1 ± 1.0 |
| | | | | | 250 Hz | 85.3 | -8.6 ± 1.0 |
| | | | | | 500 Hz | 90.7 | -3.2 ± 1.0 |
| | | | | | 1 kHz | 94.1 | Ref. |
| | | | | | 2 kHz | 95.4 | $+1.2 \pm 1.0$ |
| | | | | | 4 kHz | 95.1 | $+1.0 \pm 1.0$ |
| | | | | | 8 kHz | 93.0 | $-1.1 (+1.5 ; -3.0)$ |
| 12.5 kHz | 89.8 | $-4.3 (+3.0 ; -6.0)$ | | | | | |

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Certificate of Calibration

校正證書

Certificate No. : C174093
證書編號

6.3.2 C-Weighting

| UUT Setting | | | | Applied Value | | UUT Reading (dB) | IEC 60651 Type 1 Spec. (dB) |
|-------------|------|---------------------|----------------|---------------|---------|------------------|-----------------------------|
| Range (dB) | Mode | Frequency Weighting | Time Weighting | Level (dB) | Freq. | | |
| 50 - 110 | LC | C | Fast | 94.00 | 31.5 Hz | 90.9 | -3.0 ± 1.5 |
| | | | | | 63 Hz | 93.2 | -0.8 ± 1.5 |
| | | | | | 125 Hz | 93.9 | -0.2 ± 1.0 |
| | | | | | 250 Hz | 94.1 | 0.0 ± 1.0 |
| | | | | | 500 Hz | 94.2 | 0.0 ± 1.0 |
| | | | | | 1 kHz | 94.1 | Ref. |
| | | | | | 2 kHz | 94.0 | -0.2 ± 1.0 |
| | | | | | 4 kHz | 93.3 | -0.8 ± 1.0 |
| | | | | | 8 kHz | 91.1 | -3.0 (+1.5 ; -3.0) |
| 12.5 kHz | 87.8 | -6.2 (+3.0 ; -6.0) | | | | | |

6.4 Time Averaging

| UUT Setting | | | | Applied Value | | | | | UUT Reading (dB) | IEC 60804 Type 1 Spec. (dB) |
|-------------|------|---------------------|------------------|---------------|---------------------|-------------------|------------------|-----------------------|------------------|-----------------------------|
| Range (dB) | Mode | Frequency Weighting | Integrating Time | Freq. (kHz) | Burst Duration (ms) | Burst Duty Factor | Burst Level (dB) | Equivalent Level (dB) | | |
| 50 - 110 | LAeq | A | 10 sec. | 4 | 1 | 1/10 | 110 | 100 | 100.1 | ± 0.5 |
| | | | | | | | | 90 | 90.1 | ± 0.5 |
| | | | 60 sec. | | | | | 80 | 79.5 | ± 1.0 |
| | | | 5 min. | | | | | 70 | 69.8 | ± 1.0 |

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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書面批准。



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. : C174093

證書編號

Remarks : - UUT Microphone Model No. : UC-53A & S/N : 307435

- Mfr's Spec. : IEC 60651 Type 1 & IEC 60804 Type 1

- Uncertainties of Applied Value :

| | | |
|------------------------|--------------------|---|
| 94 dB | : 31.5 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) |
| Burst equivalent level | | : ± 0.2 dB (Ref. 110 dB continuous sound level) |

- 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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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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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: callab@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. : C181755

證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC18-0616)

Date of Receipt / 收件日期 : 20 March 2018

Description / 儀器名稱 : Sound Level Calibrator

Manufacturer / 製造商 : Rion

Model No. / 型號 : NC-73

Serial No. / 編號 : 10486660

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 : 5 April 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.

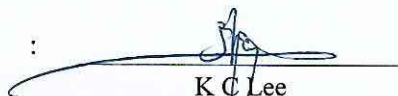
The results are detailed in the subsequent page(s).

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

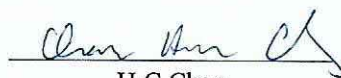
Tested By

測試


K C Lee
Engineer

Certified By

核證


H C Chan
Engineer

Date of Issue

簽發日期

11 April 2018

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c/o 香港新界屯門興安里一號四樓

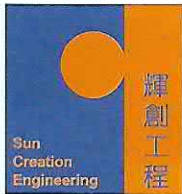
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Page 1 of 2



輝創工程有限公司

Sun Creation Engineering Limited

Calibration & Testing Laboratory

Certificate of Calibration 校正證書

Certificate No. : C181755

證書編號

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

4. Test procedure : MA100N.

5. 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 | 93.7 | ± 0.5 | ± 0.2 |

- 5.2 Frequency Accuracy

| UUT Nominal Value (kHz) | Measured Value (kHz) | Mfr's Spec. | Uncertainty of Measured Value (Hz) |
|----------------------------|-------------------------|----------------|---------------------------------------|
| 1 | 0.988 | 1 kHz ± 2 % | ± 1 |

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

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