輝創工程有限公司
Sun Creation Engineering Limited Calibration and Testing Laboratory

Certificate No. : C045685

# Certificate of Calibration

This is to certify that the equipment

Description : Precision Integrating Sound Level Meter

Manufacturer : ONO SOKKI

Model No. : LA-5110

Serial No. : 72700154

has been calibrated for the specific items and ranges.
The results are shown in the Calibration Report No. C045685.

The equipment is supplied by

Co. Name : Atkins China Limited

Address : 15/F, Miramar Tower, 132 Nathan Road, Tsim Sha Tsui, Kowloon

Date of Issue : 30 December 2004

Certified by : C F Leung



Calibration and Testing Laboratory of Sun Creation Engineering Limited
c/o G/F, LCK Telephone Exchange Building, 2 Yuet Lun Street, Lai Chi Kok, Kowloon, Hong Kong.
Tel: 2927 2606 Fax: 2744 8986 E-mail: callab@suncreation.com Website: www.suncreation.com

輝創工程有限公司
Sun Creation Engineering Limited Calibration and Testing Laboratory

Report No. : C045685

# *Calibration Report*

***ITEM TESTED***

DESCRIPTION : Precision Integrating Sound Level Meter
MANUFACTURER : ONO SOKKI
MODEL NO. : LA-5110
SERIAL NO. : 72700154

***TEST CONDITIONS***

AMBIENT TEMPERATURE : (23 ± 2)°C RELATIVE HUMIDITY : (55 ± 15)%
LINE VOLTAGE : ---

***TEST SPECIFICATIONS***

Calibration check

***DATE OF TEST*** : 29 December 2004 ***JOB NO.*** : IC04-3635

***TEST RESULTS***

The results apply to the particular unit-under-test only.
All calibration points are within 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 Brüel & Kjær Calibration Laboratory, Denmark

*Tested by* : *H S Yuen* *Date* : *30 December 2004*



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Report No. : C045685

# Calibration Report

1. 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.

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 :

| Equipment ID | Description | Certificate No. |
|---|---|---|
| CL281 | Multifunction Acoustic Calibrator | 12909 |

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 651 Type 1 Spec. (dB) |
|---|---|---|---|---|---|---|---|
| Range (dB) | Mode | Weighting | Response | Level (dB) | Freq. (kHz) | | |
| 40 - 100 | Lp | A | Fast | 94.00 | 1 | 94.0 | ± 0.7 |

6.1.2 Linearity

| UUT Setting | | | | Applied Value | | UUT Reading (dB) |
|---|---|---|---|---|---|---|
| Range (dB) | Mode | Weighting | Response | Level (dB) | Freq. (kHz) | |
| 60 - 120 | Lp | A | Fast | 94.00 | 1 | 94.0 (Ref.) |
| | | | | 104.00 | | 104.0 |
| | | | | 114.00 | | 114.0 |

IEC 651 Type 1 Spec. : ±0.4 dB per 10 dB step and ±0.7 dB for overall different.

6.2 Time Weighting

| UUT Setting | | | | Applied Value | | UUT Reading (dB) | IEC 651 Type 1 Spec. (dB) |
|---|---|---|---|---|---|---|---|
| Range (dB) | Mode | Weighting | Response | Level (dB) | Freq. (kHz) | | |
| 40 - 100 | Lp | A | Fast | 94.00 | 1 | 94.0 | Ref. |
| | | | Slow | | | 94.0 | ± 0.1 |
| | | | Imp | | | 94.0 | ± 0.1 |

Report No. : C045685

# Calibration Report

6.3 Frequency Weighting

6.3.1 A-Weighting

| UUT Setting | | | | Applied Value | | UUT Reading (dB) | IEC 651 Type 1 Spec. (dB) |
|---|---|---|---|---|---|---|---|
| Range (dB) | Mode | Weighting | Response | Level (dB) | Freq. (Hz) | | |
| 40 - 100 | Lp | A | Fast | 94.00 | 31.5 | 55.0 | -39.4 ± 1.5 |
| | | | | | 63 | 67.7 | -26.2 ± 1.5 |
| | | | | | 125 | 77.8 | -16.1 ± 1.0 |
| | | | | | 500 | 90.7 | -3.2 ± 1.0 |
| | | | | | 1 k | 94.0 | Ref. |
| | | | | | 2 k | 95.2 | +1.2 ± 1.0 |

6.3.2 C-Weighting

| UUT Setting | | | | Applied Value | | UUT Reading (dB) | IEC 651 Type 1 Spec. (dB) |
|---|---|---|---|---|---|---|---|
| Range (dB) | Mode | Weighting | Response | Level (dB) | Freq. (Hz) | | |
| 40 - 100 | Lp | C | Fast | 94.00 | 31.5 | 90.8 | -3.0 ± 1.5 |
| | | | | | 63 | 93.1 | -0.8 ± 1.5 |
| | | | | | 125 | 93.9 | -0.2 ± 1.0 |
| | | | | | 500 | 94.0 | 0.0 ± 1.0 |
| | | | | | 1 k | 94.0 | Ref. |
| | | | | | 2 k | 93.8 | -0.2 ± 1.0 |

Remarks : - Mfr's Spec. : IEC651 Type 1

- Uncertainties of Applied Value : 94 dB : 31.5 Hz - 125 Hz : ± 0.35 dB
  500 Hz : ± 0.30 dB
  1 kHz : ± 0.20 dB
  2 kHz : ± 0.35 dB
  104 dB : 1 kHz : ± 0.30 dB
  114 dB : 1 kHz : ± 0.30 dB

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

Note :
The values given in this Calibration Report 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.

輝創工程有限公司
Sun Creation Engineering Limited Calibration and Testing Laboratory

*Certificate No. : C045684*

# *Certificate of Calibration*

*This is to certify that the equipment*

*Description : Sound Calibrator (P022X0077701)*

*Manufacturer : ONO SOKKI*

*Model No. : SC-2110*

*Serial No. : 00461*

*has been calibrated for the specific items and ranges.*
*The results are shown in the Calibration Report No. C045684.*

*The equipment is supplied by*

*Co. Name : Atkins China Limited*

*Address : 15/F, Miramar Tower, 132 Nathan Road, Tsim Sha Tsui, Kowloon*

*Date of Issue : 30 December 2004*

*Certified by :* C F Leung



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輝創工程有限公司
Sun Creation Engineering Limited Calibration and Testing Laboratory

Report No. : C045684

# *Calibration Report*

***ITEM TESTED***

DESCRIPTION : Sound Calibrator (P022X0077701)
MANUFACTURER : ONO SOKKI
MODEL NO. : SC-2110
SERIAL NO. : 00461

***TEST CONDITIONS***

AMBIENT TEMPERATURE : (23 ± 2)°C RELATIVE HUMIDITY : (55 ± 15)%
LINE VOLTAGE : ---

***TEST SPECIFICATIONS***

Calibration check

***DATE OF TEST*** : 29 December 2004 ***JOB NO.*** : IC04-3641

***TEST RESULTS***

The results apply to the particular unit-under-test only.
All calibration points are within user'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
- The Brüel & Kjær Calibration Laboratory, Denmark

*Tested by :* *H S Yuen* *Date : 30 December 2004*

Report No. : C045684

# *Calibration Report*

1. The unit-under-test (UUT) was allowed to stabilize in the laboratory for over 24 hours before the commencement of the test.

2. The results presented are the mean of 3 measurements at each calibration point.

3. Test equipment :

| Equipment ID | Description | Certificate No. |
|---|---|---|
| CL126 | Sound Level Meter | C043496 |
| CL130 | Universal Counter | C042857 |
| CL281 | Multifunction Acoustic Calibrator | 12909 |

4. Test procedure : MA100N.

5. Results :

5.1 Sound Level Accuracy

| UUT Nominal Value | Measured Value (dB) | User's Spec. (dB) | Uncertainty of Measured Value (dB) |
|---|---|---|---|
| 94 dB, 1 kHz | 94.0 | ± 0.5 | ± 0.2 |

5.2 Frequency Accuracy

| UUT Nominal Value (kHz) | Measured Value (Hz) | User's Spec. | Uncertainty of Measured Value (Hz) |
|---|---|---|---|
| 1 | 999.2 | 1 kHz ± 1 % | ± 0.1 |

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

Note :
The values given in this Calibration Report 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.