

Appendix D. Calibration Certificates



Certificate of Calibration 校正證書

Certificate No. : C236127
證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC23-2041)

Date of Receipt / 收件日期 : 4 October 2023

Description / 儀器名稱 : Sound Level Meter
Manufacturer / 製造商 : Rion
Model No. / 型號 : NL-52
Serial No. / 編號 : 01287679
Supplied By / 委託者 : Mott MacDonald Hong Kong Limited
3/F., Manulife Place, 348 Kwun Tong Road, Kwun Tong,
Kowloon, Hong Kong

TEST CONDITIONS / 測試條件

Temperature / 溫度 : $(23 \pm 2)^{\circ}\text{C}$
Line Voltage / 電壓 : ---

Relative Humidity / 相對濕度 : $(50 \pm 25)\%$

TEST SPECIFICATIONS / 測試規範

Calibration

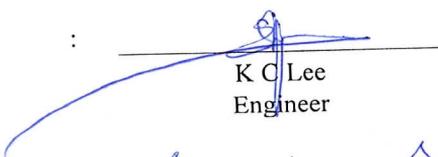
DATE OF TEST / 測試日期 : 22 October 2023

TEST RESULTS / 測試結果

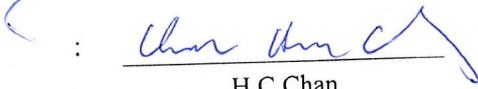
The results apply to the particular unit-under-test only.
The results do not exceed specified limits. (after adjustment)
These limits refer to manufacturer's published tolerances as requested by the customer.
The results are detailed in the subsequent page(s).

The test equipment used for calibration are traceable to National Standards via :
- The Government of The Hong Kong Special Administrative Region Standard & Calibration Laboratory
- Hottinger Brüel & Kjær Calibration Laboratory, Denmark
- Agilent Technologies / Keysight Technologies
- 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

25 October 2023

The test equipment used for calibration is traceable to the National 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所書面批准。

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- 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 internal standard (After Adjustment) 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	C230306
CL281	Multifunction Acoustic Calibrator	CDK2302738

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 61672 Class 1 Limit (dB)
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)		
30 - 130	L _A	A	Fast	94.00	1	* 92.4	± 1.1

* Out of IEC 61672 Class 1 Limit

6.1.1.2 After Adjustment

UUT Setting				Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Limit (dB)
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)		
30 - 130	L _A	A	Fast	94.00	1	94.0	± 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	94.0 (Ref.)
				104.00		104.0
				114.00		114.0

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

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6.2 Time Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Limit (dB)
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)		
30 - 130	L _A	A	Fast	94.00	1	94.0	Ref.
			Slow			94.0	± 0.3

6.3 Frequency Weighting

6.3.1 A-Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Limit (dB)
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq.		
30 - 130	L _A	A	Fast	94.00	63 Hz	67.8	-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	93.0	-1.1 (+2.1 ; -3.1)
					16 kHz	86.0	-6.6 (+3.5 ; -17.0)

6.3.2 C-Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Limit (dB)
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq.		
30 - 130	L _C	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	91.1	-3.0 (+2.1 ; -3.1)

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輝創工程有限公司

Sun Creation Engineering Limited

Calibration & Testing Laboratory

Certificate of Calibration

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Certificate No. : C236127

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Remarks : - UUT Microphone Model No. : UC-59 & S/N : 22018

- Mfr's Limit : 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
	16 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.

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Sun Creation Engineering Limited - Calibration & Testing Laboratory
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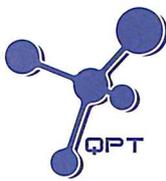
輝創工程有限公司 - 校正及檢測實驗室
c/o 香港新界屯門興安里一號四樓

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QUALITY PRO TEST-CONSULT LIMITED

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REPORT OF EQUIPMENT PERFORMANCE CHECK/ CALIBRATION

Test Report No. : R-BC110024
Date of Issue : 09 November 2023
Page No. : 1 of 2

PART A - CUSTOMER INFORMATION

Enovative Environmental Service Ltd.
Flat 2207, Yu Fun House Yu Chui Court, Shatin
New Territories (HK) Hong Kong

PART B - SAMPLE INFORMATION

Name of Equipment : Titrette® bottle-top burette, 50mL
Manufacturer : Brand
Serial Number : 10N60623
Date of Received : 06 November 2023
Date of Calibration : 07 November 2023
Date of Next Calibration : 07 February 2024
Request No. : D-BC110024

PART C - REFERENCE METHODS/ DOCUMENTS FOR THE CALIBRATION

Test Parameter	Reference Method
Accuracy Test	In-house Method (Gravimetric Method)

PART D - CALIBRATION RESULT

(1) Accuracy Test

Trial	Tested Volume (interval)	Range (1-4)	Tested Volume (interval)	Range (16-19)	Tested Volume (interval)	Range (23-26)	Tested Volume (interval)	Range 34-37	Tested Volume (interval)	Range (42-45)
No	Weight of Water(g)	Volume, V (mL)								
1	2.9600	2.9707	2.9701	2.9808	2.9688	2.9795	2.9623	2.9730	2.9642	2.9749
2	2.9551	2.9657	2.9652	2.9759	2.9655	2.9762	2.9575	2.9681	2.9601	2.9708
3	2.9612	2.9719	2.9655	2.9762	2.9714	2.9821	2.9611	2.9718	2.9878	2.9986
4	2.9641	2.9748	2.9766	2.9873	2.9601	2.9708	2.9655	2.9762	2.9674	2.9781
5	2.9612	2.9719	2.9585	2.9692	2.9767	2.9874	2.9661	2.9768	2.9712	2.9819
6	2.9563	2.9669	2.9645	2.9752	2.9600	2.9707	2.9717	2.9824	2.9688	2.9795
7	2.9734	2.9841	2.9612	2.9719	2.9596	2.9703	2.9748	2.9855	2.9615	2.9722
8	2.9656	2.9763	2.9565	2.9671	2.9612	2.9719	2.9684	2.9791	2.9601	2.9708
9	2.9701	2.9808	2.9764	2.9871	2.9734	2.9841	2.9621	2.9728	2.9600	2.9707
10	2.9612	2.9719	2.9496	2.9602	2.9697	2.9804	2.9714	2.9821	2.9720	2.9827
Average	2.9628	2.9735	2.9644	2.9751	2.9666	2.9773	2.9661	2.9768	2.9673	2.9780
SD	0.0057	-	0.0085	-	0.0062	-	0.0055	-	0.0086	-
Error	-0.8838	-	-0.8306	-	-0.7560	-	-0.7744	-	-0.7336	-
RSD%	0.1916	-	0.2865	-	0.2097	-	0.1841	-	0.2876	-

Tolerance of Accuracy Test should be less than ± 1.0 (%)

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AUTHORIZED
SIGNATORY:


LEE Chun-ning
Assistant Manager



專業化驗有限公司

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Test Report No. : R-BC110024
Date of Issue : 09 November 2023
Page No. : 2 of 2

Acceptance Criteria:

Accuracy: $\leq \pm 1\%$

Precision (RSD): $< 1\%$

Environmental conditions of the calibration:

Water temperature: 23.5°C

Relative humidity: 65%

Z-Factor: 1.0036

Nominal volume: 3.0ml

Remark(s)

- The "Date of Next Calibration" is recommended according to best practice principals as practiced by QPT or quoted from relevant international standards.
- The results relate only to the calibrated equipment as received
- The performance of the equipment stated in this report is checked with independent reference material and results compared against a calibrated secondary source.
- "Displayed Reading" denotes the figure shown on item under calibration/ checking regardless of equipment precision or significant figures.
- The "Tolerance Limit" mentioned is the acceptance criteria applicable for similar equipment used by Quality Pro Test-Consult Ltd. or quoted from relevant international standards.

--- END OF REPORT ---