E. Calibration Certificates

Appendix E

Calibration Record

(Air Quality Monitoring)

CERTIFICATE OF CALIBRATION AND TESTING

TSI Incorporated, 500 Cardigan Road, Shoreview, MN 55126 USA
Tel: 1-800-874-2811 1-651-490-2811 Fax: 1-651-490-3824 http://www.tsi.com

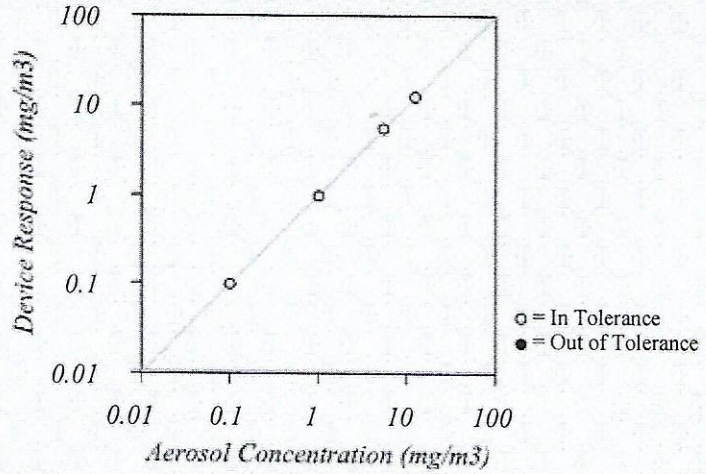
Environment Conditions		
Temperature	75.79 (24.3)	°F (°C)
Relative Humidity	17.0	%RH
Barometric Pressure	29.01 (982.4)	inHg (hPa)

Model	**AM510**
Serial Number	**10406054**

☒ As Left ☐ As Found

☒ In Tolerance ☐ Out of Tolerance

Concentration Linearity Plot



System ID: DTII01-02

CONCENTRATION *Unit: mg/m3*

#	STANDARD	MEASURED	ALLOWABLE RANGE	#	STANDARD	MEASURED	ALLOWABLE RANGE
1	5.480	5.445	4.932~6.028	3	1.000	0.973	0.700~1.300
2	0.099	0.097	0.084~0.114	4	12.447	12.322	11.202~13.692

TSI Incorporated does hereby certify that all materials, components, and workmanship used in the manufacture of this equipment are in strict accordance with the applicable specifications agreed upon by TSI and the customer and with all published specifications. All performance and acceptance tests required under this contract were successfully conducted according to required specifications. There is no NIST standard for optical mass measurements. Calibration of this instrument performed by TSI has been done using emery oil and has been nominally adjusted to respirable mass per standard ISO 12103-1, A1 test dust (Arizona dust). Our calibration ratio is greater than 4:1

Measurement Variable	System ID	Last Cal.	Cal. Due
Temp/Humidity	E005656	03-07-17	03-31-18
DC Voltage	E003314	05-03-17	05-31-18
Photometer	E003319	07-27-17	01-31-18
Pressure	E003511	10-02-17	10-31-18

Measurement Variable	System ID	Last Cal.	Cal. Due
Temp/Humidity	E005657	03-06-17	03-31-18
DC Voltage	E003315	05-03-17	05-31-18
Microbalance	M001324	11-02-16	11-30-18
Flowmeter	E002471	04-20-17	04-30-18

Bailey Fazzone
Calibrated

November 28, 2017
Date

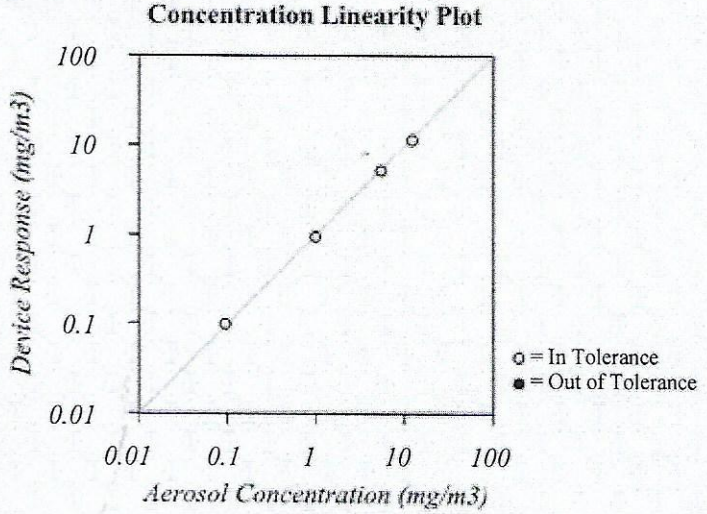
CERTIFICATE OF CALIBRATION AND TESTING

TSI Incorporated, 500 Cardigan Road, Shoreview, MN 55126 USA
Tel: 1-800-874-2811 1-651-490-2811 Fax: 1-651-490-3824 http://www.tsi.com

Environment Conditions		
Temperature	75.71 (24.3)	°F (°C)
Relative Humidity	21.4	%RH
Barometric Pressure	28.98 (981.4)	inHg (hPa)

Model	**AM510**
Serial Number	**11603043**

☐ As Left
☒ As Found
☒ In Tolerance
☐ Out of Tolerance



System ID: DTII01-02

CONCENTRATION *Unit: mg/m3*

#	STANDARD	MEASURED	ALLOWABLE RANGE	#	STANDARD	MEASURED	ALLOWABLE RANGE
1	5.447	5.159	4.902~5.992	3	0.977	0.937	0.684~1.270
2	0.096	0.098	0.082~0.110	4	12.238	11.550	11.014~13.462

TSI Incorporated does hereby certify that all materials, components, and workmanship used in the manufacture of this equipment are in strict accordance with the applicable specifications agreed upon by TSI and the customer and with all published specifications. All performance and acceptance tests required under this contract were successfully conducted according to required specifications. There is no NIST standard for optical mass measurements. Calibration of this instrument performed by TSI has been done using emery oil and has been nominally adjusted to respirable mass per standard ISO 12103-1, A1 test dust (Arizona dust). Our calibration ratio is greater than 4:1

Measurement Variable	System ID	Last Cal.	Cal. Due
Temp/Humidity	E005656	03-07-17	03-31-18
DC Voltage	E003314	05-03-17	05-31-18
Photometer	E003319	07-27-17	01-31-18
Pressure	E003511	10-02-17	10-31-18

Measurement Variable	System ID	Last Cal.	Cal. Due
Temp/Humidity	E005657	03-06-17	03-31-18
DC Voltage	E003315	05-03-17	05-31-18
Microbalance	M001324	11-02-16	11-30-18
Flowmeter	E002471	04-20-17	04-30-18

Bailey Parsons
Verified

November 28, 2017
Date

High-Volume TSP Sampler
5-Point Calibration Record

Location	:	ASR1
Calibrated by	:	T.K.Wong
Date	:	05/11/2017

Sampler

Model	:	GMWS-2310 ACCU-VOL
Serial Number	:	S/N 1806

Calibration Orifice and Standard Calibration Relationship

Serial Number	:	2454
Service Date	:	20 March 2017
Slope (m)	:	2.08464
Intercept (b)	:	-0.036840
Correlation Coefficient(r)	:	0.99994

Standard Condition

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

Calibration Condition

Pa (hpa)	:	1016
Ta(K)	:	298

Resistance Plate		dH [green liquid] (inch water)	Z	X=Qstd (cubic meter/min)	IC	Y
1	18 holes	12.7	3.569	1.730	57	57.08
2	13 holes	10.3	3.214	1.559	50	50.07
3	10 holes	7.9	2.815	1.368	43	43.06
4	7 holes	5.7	2.391	1.165	32	32.05
5	5 holes	3.8	1.952	0.954	26	26.04

Sampler Calibration Relationship

Slope(m):41.155 Intercept(b):14.111 Correlation Coefficient(r): 0.9964

Checked by: Magnum Fan Date: 09/11/2017

High-Volume TSP Sampler
5-Point Calibration Record

Location : ASR2A
Calibrated by : T.K.Wong
Date : 05/11/2017

Sampler
Model : GMWS-2310 ACCU-VOL
Serial Number : S/N 1061

Calibration Orifice and Standard Calibration Relationship
Serial Number : 2454
Service Date : 20 March 2017
Slope (m) : 2.08464
Intercept (b) : -0.036840
Correlation Coefficient(r) : 0.99994

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

Calibration Condition
Pa (hpa) : 1016
Ta(K) : 303

Resistance Plate		dH [green liquid] (inch water)	Z	X=Qstd (cubic meter/min)	IC	Y
1	18 holes	11.5	3.396	1.647	58	58.09
2	13 holes	9.1	3.021	1.467	50	50.07
3	10 holes	6.8	2.612	1.270	45	45.07
4	7 holes	4.6	2.148	1.048	34	34.05
5	5 holes	2.8	1.676	0.822	25	25.04

Sampler Calibration Relationship

Slope(m):39.761 Intercept(b):-7.268 Correlation Coefficient(r): 0.9966

Checked by: Magnum Fan Date: 09/11/2017

High-Volume TSP Sampler
5-Point Calibration Record

Location : ASR3
Calibrated by : T.K.Wong
Date : 05/11/2017

Sampler
Model : GMWS-2310 ACCU-VOL
Serial Number : S/N 7577

Calibration Orifice and Standard Calibration Relationship
Serial Number : 2454
Service Date : 20 March 2017
Slope (m) : 2.08464
Intercept (b) : -0.036840
Correlation Coefficient(r) : 0.99994

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

Calibration Condition
Pa (hpa) : 1016
Ta(K) : 298

Resistance Plate		dH [green liquid] (inch water)	Z	X=Qstd (cubic meter/min)	IC	Y
1	18 holes	12.50	3.541	1.716	64	64.09
2	13 holes	9.80	3.135	1.522	56	56.08
3	10 holes	7.60	2.761	1.342	48	48.07
4	7 holes	4.90	2.217	1.081	41	41.06
5	5 holes	2.90	1.705	0.836	30	30.04

Sampler Calibration Relationship

Slope(m):37.634 Intercept(b):-1.029 Correlation Coefficient(r): 0.9968

Checked by: Magnum Fan Date: 09/11/2017

High-Volume TSP Sampler
5-Point Calibration Record

Location	:	ASR4
Calibrated by	:	T.K.Wong
Date	:	05/11/2017

Sampler

Model	:	GMWS-2310 ACCU-VOL
Serial Number	:	S/N 1273

Calibration Orifice and Standard Calibration Relationship

Serial Number	:	2454
Service Date	:	20 March 2017
Slope (m)	:	2.08464
Intercept (b)	:	-0.036840
Correlation Coefficient(r)	:	0.99994

Standard Condition

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

Calibration Condition

Pa (hpa)	:	1016
Ta(K)	:	298

Resistance Plate		dH [green liquid] (inch water)	Z	X=Qstd (cubic meter/min)	IC	Y
1	18 holes	11.8	3.440	1.668	59	59.09
2	13 holes	9.4	3.070	1.491	52	52.08
3	10 holes	7.4	2.724	1.325	42	42.06
4	7 holes	4.7	2.171	1.059	32	32.05
5	5 holes	3.2	1.792	0.877	26	26.04

Sampler Calibration Relationship

Slope(m):42.606 Intercept(b):-12.438 Correlation Coefficient(r): 0.9956

Checked by: Magnum Fan Date: 09/11/2017

High-Volume TSP Sampler
5-Point Calibration Record

Location	:	ASR1
Calibrated by	:	T.K.Wong
Date	:	05/01/2018

Sampler

Model	:	GMWS-2310 ACCU-VOL
Serial Number	:	S/N 1806

Calibration Orifice and Standard Calibration Relationship

Serial Number	:	2454
Service Date	:	20 March 2017
Slope (m)	:	2.08464
Intercept (b)	:	-0.036840
Correlation Coefficient(r)	:	0.99994

Standard Condition

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

Calibration Condition

Pa (hpa)	:	1016
Ta(K)	:	293

Resistance Plate		dH [green liquid] (inch water)	Z	X=Qstd (cubic meter/min)	IC	Y
1	18 holes	12.6	3.585	1.737	55	55.55
2	13 holes	9.4	3.097	1.503	47	47.47
3	10 holes	6	2.474	1.204	40	40.40
4	7 holes	4.2	2.070	1.011	35	35.35
5	5 holes	2.8	1.690	0.828	28	28.28

Sampler Calibration Relationship

Slope(m):28.702 Intercept(b):5.337 Correlation Coefficient(r): 0.9965

Checked by: Magnum Fan Date: 10/01/2018

High-Volume TSP Sampler
5-Point Calibration Record

Location : ASR2A
Calibrated by : T.K.Wong
Date : 05/01/2018

Sampler
Model : GMWS-2310 ACCU-VOL
Serial Number : S/N 1061

Calibration Orifice and Standard Calibration Relationship
Serial Number : 2454
Service Date : 20 March 2017
Slope (m) : 2.08464
Intercept (b) : -0.036840
Correlation Coefficient(r) : 0.99994

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

Calibration Condition
Pa (hpa) : 1016
Ta(K) : 293

Resistance Plate		dH [green liquid] (inch water)	Z	X=Qstd (cubic meter/min)	IC	Y
1	18 holes	13.2	3.669	1.778	60	60.60
2	13 holes	9.4	3.097	1.503	54	54.54
3	10 holes	7.5	2.766	1.345	47	47.47
4	7 holes	4.5	2.143	1.045	40	40.40
5	5 holes	2.8	1.690	0.828	32	32.32

Sampler Calibration Relationship

Slope(m):29.802 Intercept(b):8.327 Correlation Coefficient(r): 0.9953

Checked by: Magnum Fan Date: 10/01/2018

High-Volume TSP Sampler
5-Point Calibration Record

Location	:	ASR3
Calibrated by	:	T.K.Wong
Date	:	05/01/2018

Sampler

Model	:	GMWS-2310 ACCU-VOL
Serial Number	:	S/N 7577

Calibration Orifice and Standard Calibration Relationship

Serial Number	:	2454
Service Date	:	20 March 2017
Slope (m)	:	2.08464
Intercept (b)	:	-0.036840
Correlation Coefficient(r)	:	0.99994

Standard Condition

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

Calibration Condition

Pa (hpa)	:	1016
Ta(K)	:	293

Resistance Plate		dH [green liquid] (inch water)	Z	X=Qstd (cubic meter/min)	IC	Y
1	18 holes	12.80	3.613	1.751	62	62.62
2	13 holes	9.80	3.162	1.534	53	53.53
3	10 holes	7.30	2.729	1.327	47	47.47
4	7 holes	4.70	2.190	1.068	41	41.41
5	5 holes	2.90	1.720	0.843	32	32.32

Sampler Calibration Relationship

Slope(m):31.783 Intercept(b):6.001 Correlation Coefficient(r): 0.9950

Checked by: Magnum Fan Date: 10/01/2018

High-Volume TSP Sampler
5-Point Calibration Record

Location	:	ASR4
Calibrated by	:	T.K.Wong
Date	:	05/01/2018

Sampler

Model	:	GMWS-2310 ACCU-VOL
Serial Number	:	S/N 1273

Calibration Orifice and Standard Calibration Relationship

Serial Number	:	2454
Service Date	:	20 March 2017
Slope (m)	:	2.08464
Intercept (b)	:	-0.036840
Correlation Coefficient(r)	:	0.99994

Standard Condition

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

Calibration Condition

Pa (hpa)	:	1016
Ta(K)	:	293

Resistance Plate		dH [green liquid] (inch water)	Z	X=Qstd (cubic meter/min)	IC	Y
1	18 holes	12.8	3.613	1.751	58	58.58
2	13 holes	9.3	3.080	1.495	50	50.50
3	10 holes	7.2	2.710	1.318	45	45.45
4	7 holes	4.6	2.166	1.057	38	38.38
5	5 holes	3.1	1.778	0.871	30	30.30

Sampler Calibration Relationship

Slope(m):31.166 Intercept(b):4.179 Correlation Coefficient(r): 0.9971

Checked by: Magnum Fan Date: 10/01/2018

Appendix E

Calibration Record

(Noise Monitoring)

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. : C173477
證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC17-1398) Date of Receipt / 收件日期 : 21 June 2017

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 ± 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 : 28 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 : 30 June 2017

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 – 校正及檢測實驗所
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 and Testing Laboratory

Certificate of Calibration
校正證書

Certificate No. : C173477
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 :

Equipment ID	Description	Certificate No.
CL130	Universal Counter	C163709
CL281	Multifunction Acoustic Calibrator	PA160023
TST150A	Measuring Amplifier	C161175

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	94.0	± 0.2	± 0.2
114 dB, 1 kHz	114.0		

5.2 Frequency Accuracy

UUT Nominal Value (kHz)	Measured Value (kHz)	Mfr's Spec.	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.

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.

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 – 校正及檢測實驗所
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 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

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 :

Equipment ID	Description	Certificate No.
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			93.9	± 0.3

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

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.

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 – 校正及檢測實驗所
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

Appendix E

Calibration Record

(Water Quality Monitoring)

專業化驗有限公司
QUALITY PRO TEST-CONSULT LIMITED
Unit 10, 14/F, Wah Wai Centre, 38-40 Au Pui Wan St., Fotan, Hong Kong
Email: info@qualityprotest.com; Website: www.qualityprotest.com
Tel: (852) 3956 8717; Fax: (852) 3956 3928

REPORT OF EQUIPMENT PERFORMANCE CHECK/ CALIBRATION

Report No. : AG110096
Date of Issue : 16 November 2017

PART A – CUSTOMER INFORMATION

Enovative Environmental Service Ltd.
Rm 811, Hin Pui House,
Hin Keng Estate, Tai Wai
New Territories, Hong Kong
Attn: Mr. Thomas WONG

PART B – DESCRIPTION

Name of Equipment	:	YSI ProDSS (Multi-Parameters)
Manufacturer	:	YSI (a xylem brand)
Serial Number	:	16J101715
Date of Received	:	Nov 15, 2017
Date of Calibration	:	Nov 15, 2017 to Nov 15, 2017
Date of Next Calibration[a]	:	Feb 15, 2018

PART C – REFERENCE METHODS/ DOCUMENTS FOR THE CALIBRATION

Parameter	Reference Method
pH at 25°C	APHA 21e 4500-H^+ B
Dissolved Oxygen	APHA 21e 4500-O G
Conductivity at 25°C	APHA 21e 2510 B
Salinity	APHA 21e 2520 B
Turbidity	APHA 21e 2130 B
Temperature	Section 6 of international Accreditation New Zealand Technical Guide no. 3 Second edition March 2008: Working Thermometer Calibration Procedure.

PART D – CALIBRATION RESULTS[b,c]

(1) pH at 25°C

Target (pH unit)	Displayed Reading[d] (pH Unit)	Tolerance[e](pH Unit)	Results
4.00	4.03	+0.03	Satisfactory
7.42	7.44	+0.02	Satisfactory
10.01	10.03	+0.02	Satisfactory

Tolerance of pH should be less than ±0.10 (pH unit)

(2) Temperature

Reading of Ref. thermometer (°C)	Displayed Reading (°C)	Tolerance (°C)	Results
14.3	14.4	0.1	Satisfactory
23.4	23.4	0	Satisfactory
33.5	33.3	-0.2	Satisfactory

Tolerance limit of temperature should be less than ±2.0 (°C)

~ CONTINUED ON NEXT PAGE ~

Remark(s): -

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

APPROVED SIGNATORY : _____
FUNG Yuen-ching Aries
Laboratory Manager

專業化驗有限公司
QUALITY PRO TEST-CONSULT LIMITED
Unit 10, 14/F, Wah Wai Centre, 38-40 Au Pui Wan St., Fotan, Hong Kong
Email: info@qualityprotest.com; Website: www.qualityprotest.com
Tel: (852) 3956 8717; Fax: (852) 3956 3928

REPORT OF EQUIPMENT PERFORMANCE CHECK/ CALIBRATION

Report No. : AG110096
Date of Issue : 16 November 2017

PART D – CALIBRATION RESULTS (Cont'd)

(3) Dissolved Oxygen

Expected Reading (mg/L)	Displayed Reading (mg/L)	Tolerance (mg/L)	Results
0	0.05	0.05	Satisfactory
3.54	3.60	0.06	Satisfactory
8.20	8.18	-0.02	Satisfactory

Tolerance limit of dissolved oxygen should be less than ±0.20 (mg/L)

(4) Conductivity at 25°C

Conc. of KCl (M)	Expected Reading (µS/cm)	Displayed Reading (µS/cm)	Tolerance (%)	Results
0.001	146.9	148.2	+0.9	Satisfactory
0.01	1412	1450	+2.7	Satisfactory
0.1	12890	13185	+2.3	Satisfactory
0.5	58670	59600	+1.6	Satisfactory
1.0	111900	111072	-0.7	Satisfactory

Tolerance limit of conductivity should be less than ±10.0 (%)

(5) Salinity

Expected Reading (g/L)	Displayed Reading (g/L)	Tolerance (%)	Results
10	9.8	-2.0	Satisfactory
20	19.73	-1.4	Satisfactory
30	30.31	+1.0	Satisfactory

Tolerance limit of salinity should be less than ±10.0 (%)

(6) Turbidity

Expected Reading (NTU)	Displayed Reading[f] (NTU)	Tolerance[g] (%)	Results
0	0.01	--	
4	4	0.0	Satisfactory
20	20.5	+2.5	Satisfactory
100	106.2	+6.2	Satisfactory
800	834	+4.3	Satisfactory

Tolerance limit of turbidity should be less than ±10.0 (%)

~ END OF REPORT ~

Remark(s): -

(f) "Displayed Reading" presents the figures shown on item under calibration/ checking regardless of equipment precision or significant figures.

(g) The "Tolerance Limit" mentioned is the acceptance criteria applicable for similar equipment used by Quality Pro Test-Consult Ltd. or quoted form relevant international standards.