REPORT ON BOUNDARY NOISE MONITORING

Client	:	**Fyno Precision Pte Ltd** Block 20 #02-25 Woodlands Link Singapore 738733
Contact Person	:	Mr. Pang Wee Chin
Survey Address	:	Same as above
Report No	:	EHS/10421784/17
Date Surveyed	:	06 April 2017
Date Reported	:	13 April 2017

ENCLOSED

SUPPORTING DOCUMENTS

NEA's PERMITTED BOUNDARY NOISE LEVEL
LOCATION MAP
CALIBRATION CERTIFICATE
CERTIFICATE OF COMPETENCE FOR NOISE MONITORING OFFICER

Reviewed by:-

Yen Chee Choy
Manager

Surveyed and reported by:-

Don Chin
Engineer

1.0 SUBJECT

Boundary Noise Monitoring was performed by SGS Testing & Control Services Singapore Pte Ltd on 06 April 2017 for Fyno Precision Pte Ltd.

2.0 OBJECTIVE

The objective of the boundary noise monitoring was to determine whether the noise levels at Fyno Precision Pte Ltd's premises are in compliance with the National Environment Agency's Environmental Protection and Management Act 2008 Environmental Protection and Management (Boundary Noise Limits for Factory Premises) Regulations 2008.

3.0 METHODOLOGY

1 portable 3M Quest SoundPro DL-1 Datalogging Sound Level Meter (Class 1) approved by the National Environment Agency (NEA) was used to measure noise levels along the perimeter at the clients premises. A five (5)-minute sampling period was used at each point along the boundary at three different periods.

During the course of this monitoring, the 3M Quest SoundPro DL-1 Datalogging Sound Level Meter (Class 1) was set up as follows:

PARAMETER	SETTING
Frequency weighting for RMS	A
Frequency weighting for peak	Linear
Time weighting	Fast
Measurement range	30.0 - 120.0
Exchange Rate (Q)	3

The 3M Quest SoundPro DL-1 Datalogging Sound Level Meter (Class 1) was calibrated prior to each monitoring using the Svantek's SV 33 (Class 1) Acoustical Calibrator. The Calibration Certificate is presented in Appendix C.

4.0 TEST RESULTS

The locations of the sampling points are illustrated in Appendix B.
The results tabulated in the following table reflect our findings on 06 April 2017:

Location	*Sound Pressure Level, dB (A)*			
	7am - 7pm	*7pm - 11pm*	*11pm - 7am*	*Suspected Noise Contributor*
# 1	68.1	61.8	58.8	Carrier Air-Con Compressors Outside Unit #02-24
# 2	69.3	60.8	59.0	
# 3	69.8	61.0	61.0	
# 4	71.6	63.5	63.0	
# 5	72.6	65.5	61.9	
# 6	62.7	57.7	54.7	-
# 7	60.7	57.3	57.2	-
# 8	61.1	58.0	56.2	-
** Factory Premises*	*75 dB(A)*	*70 dB(A)*	*65 dB(A)*	-

Note:

Result readings in Leq,A over 5 minutes
* Max,A Maximum permissible noise level (reckoned as an equivalent continuous noise level over 5 minutes) in decibels (A)
Ventilation fan and air-con compressors were not in used (turned off) during evening and night period.

5.0 CONCLUSION

During the monitoring, all of the noise readings were within the noise level permitted as stipulated under the National Environment Agency's Environmental Protection and Management.

It should be noted that this study is based upon the limited information gathered during the execution of this project and reflects our findings at the time and place inspected.

6.0 RECOMMENDATIONS

Good engineering control and a regular maintenance program will assist in reducing or controlling the noise from any machinery, equipment, or process. The most effective and permanent means of noise control is to use an engineering approach. Engineering control involve application of physical measures to reduce the noise causing exposure. It includes the following:

- replace noisy equipment or process
- isolate noise cause
- construct acoustic enclosure
- erect noise barrier
- acoustically treat environment
- reduce machinery vibration
- install silencers at exhaust outlet that emit noise

7.0 ABBREVIATION GUIDE

NEA	-	National Environment Agency, Singapore
dB (A)	-	A-Weighted sound pressure level
Max,A	-	Maximum A - weighted sound pressure level
Leq,A	-	Equivalent continuous A - weighted sound pressure level

APPENDICES

Appendix A	-	NEA's Permitted Boundary Noise Level
Appendix B	-	Location of Boundary Noise Monitoring Sampling Locations
Appendix C	-	Calibration Certification of 3M Quest SoundPro DL-1 Sound level Meter and SV 33 Acoustical Calibrator
Appendix D	-	Certificate of Competence for Noise Monitoring Officer

APPENDIX A

NEA's Permitted Boundary Noise Level

FIRST SCHEDULE

PERMITTED BOUNDARY NOISE LEVEL

TABLE 1

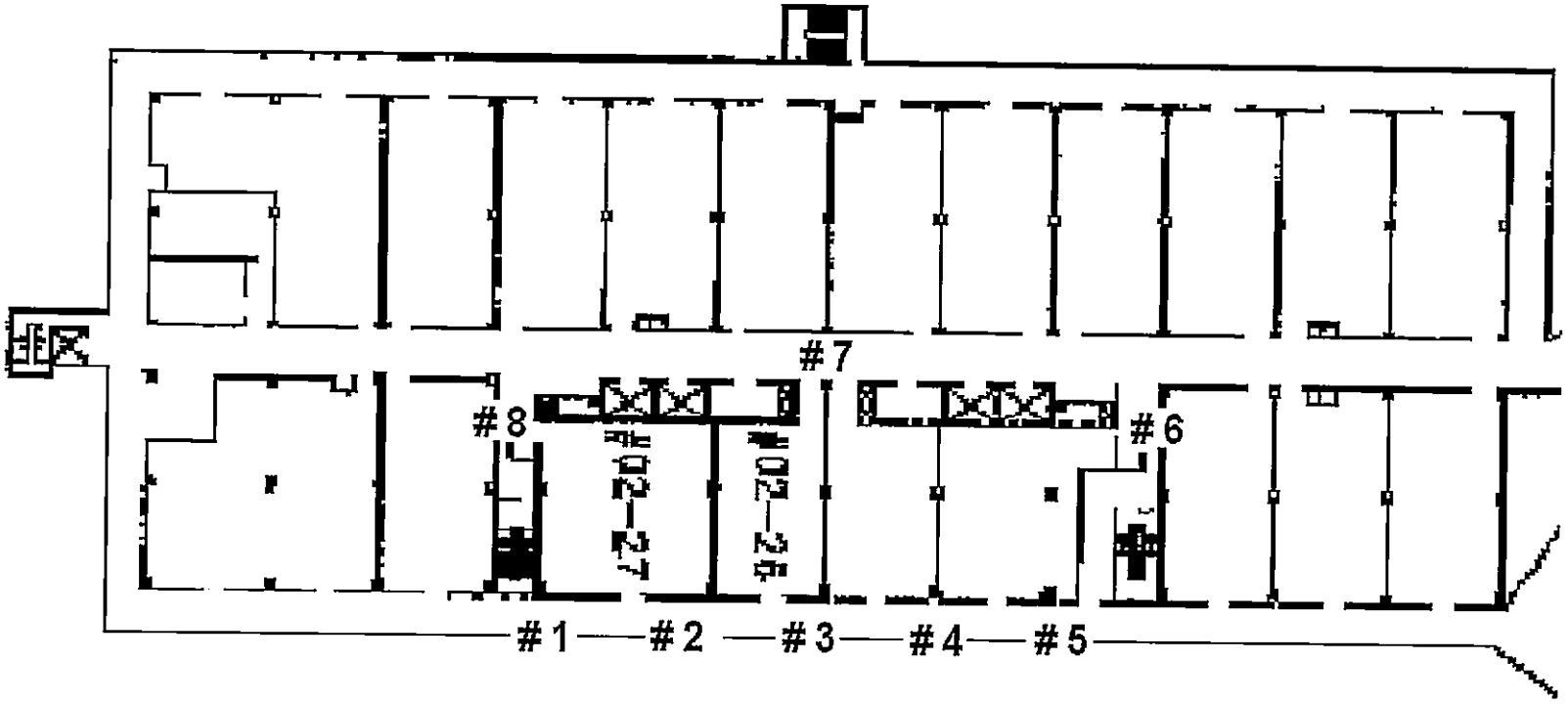
Type of affected premises	Maximum permitted noise level (reckoned as equivalent continuous noise level over the specified period)		
	Day 7am - 7pm	Evening 7pm - 11pm	Night 11pm - 7am
Noise sensitive premises	60	55	50
Residential premises	65	60	55
Commercial premises	70	65	60

TABLE 2

Type of affected premises	Maximum permitted noise level (reckoned as equivalent continuous noise level over 5 minutes) in decibels (A)		
	Day 7am - 7pm	Evening 7pm - 11pm	Night 11pm - 7am
Noise sensitive premises	65	60	55
Residential premises	70	65	60
Commercial premises	75	70	65
Factory premises	75	70	65

APPENDIX B

Location of Sampling Points



FYNO PRECISION PTE LTD

APPENDIX C

Calibration Certification of 3M Quest SoundPro DL-1 Sound Level Meter & Svantek's SV 33 Acoustical Calibrator

LEE HUNG TEST SERVICES PTE LTD

(Sister company of Lee Hung Scientific Pte Ltd)

Business Reg. No. 200207853M

Certificate of Calibration

Certificate No. : 16/11/179
Submitted by : SGS TESTING AND CONTROL SERVICES (S) PTE LTD
3 TOH TUCK LINK
#01-02/03
SINGAPORE 5962288

Date Submitted : 28 Nov 2016
Date of Calibration : 05 Dec 2016

Description of Equipment :

Subject : SOUND LEVEL METER TYPE 1
Brand : QUEST
Model No. : SOUNDPRO DL-1
Serial No. : BJP060024
Sub-Assemblies : B & K 4936 2910935

Ambient conditions :

Ambient Temp. : (23 ± 3) °C
Relative Humidity : (50 ± 10) %R.H.
Pressure : (1006.0 ± 4.0) hPa

The above-mentioned product/equipment has been calibrated at LHTS Lab under the ambient conditions stated above for conformity with certain specifications as laid down in the calibration procedure.

Method of Calibration

The method of calibration is Calibration Procedure : LHT-WI-CAL-S11 REV 7, generally as recommended by manufacturer. The calibration was carried out with reference to the following calibration and measurement standards which are traceable to the following below:

	Instrument	Serial Number	Cal. Report	Due Date
1	IET SOUND-LEVEL CALIBRATOR	01780	AL000920	17-Jul-17
2	9004 GLOBAL MULTI TESTER	229007	RL001327	15-May-17
3	HEWLETT PACKARD ATTENUATOR	1250J01894	RL001325	12-May-17

Results of Calibration

The results of the calibration are given on the Calibration Report as per attached.
The expanded uncertainties of measurement stated in this report are estimated at a level of confidence of approximately 95% with a coverage factor k=2.

The results of the above-mentioned instrument shown in the Calibration Report does not cover the full parameters of the Sound Level Meter. The user should determine the suitability of this instrument for its intended use.

* Recommended Next Calibration Date: 04 Dec 2017
* This is only a suggested date, the recalibration interval should be determined based on the user's requirements.

Calibrated By,

Md Shahril bin Buang
Calibration Officer

Reviewed By,

Gavino delos Reyes
Technical Manager

Report of Calibration

Report No 16/11/179
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EQUIPMENT : Quest Sound Level Meter Type 1
MODEL : SOUNDPRO DL-1
SERIAL NUMBER : BJP060024
SUB-ASSEMBLIES : B & K 4936 2810935
RESULT OF CALIBRATION :

1. MICROPHONE CALIBRATION

Sound-Level Calibrator Setting	UUT Reading		Actual Value	Tolerance (IEC 61672-1, Table 2)	Expanded Uncertainty
	Before Adjustment	After Adjustment			
94 dB @ 1 kHz	94.1 dB	94.2 dB	94.2 dB	±1.1 dB	0.4 dB
114 dB @ 1 kHz	114.1 dB	114.2 dB	114.2 dB	±1.1 dB	0.4 dB
114 dB @ 1 kHz (PEAK)	117.1 dB	117.2 dB	117.2 dB	±1.1 dB	0.4 dB

2. RANGE TRACKING

UUT dB Range	Sound-Level Calibrator Setting	UUT Reading	Actual Value	Tolerance (IEC 61672-1, Clause 5.5.6)	Expanded Uncertainty
30 – 120	114 dB	114.2 dB	114.2 dB	±0.6 dB	0.4 dB
20 – 110	104 dB	104.2 dB	104.2 dB	±0.6 dB	0.4 dB
10 – 100	94 dB	94.1 dB	94.2 dB	±0.6 dB	0.4 dB

3. "A" WEIGHTING TEST

Sound-Level Calibrator Setting	Actual Frequency Weighted Value	Tolerance (IEC 61672-1, Table 2)	UUT Reading	Expanded Uncertainty
125.0 Hz	97.8 dB	±1.5 dB	98.0 dB	0.4 dB
250.0 Hz	105.4 dB	±1.4 dB	105.7 dB	0.4 dB
500.0 Hz	111.0 dB	±1.4 dB	111.2 dB	0.4 dB
1000.0 Hz	114.2 dB	±1.1 dB	114.2 dB	0.4 dB
2000.0 Hz	115.2 dB	±1.6 dB	115.2 dB	0.4 dB

4. "C" WEIGHTING TEST

Sound-Level Calibrator Setting	Actual Frequency Weighted Value	Tolerance (IEC 61672-1, Table 2)	UUT Reading	Expanded Uncertainty
125.0 Hz	113.7 dB	±1.5 dB	113.9 dB	0.4 dB
250.0 Hz	114.0 dB	±1.4 dB	114.2 dB	0.4 dB
500.0 Hz	114.2 dB	±1.4 dB	114.4 dB	0.4 dB
1000.0 Hz	114.2 dB	±1.1 dB	114.1 dB	0.4 dB
2000.0 Hz	113.8 dB	±1.6 dB	113.7 dB	0.4 dB

5. "Z" WEIGHTING TEST

Sound-Level Calibrator Setting	Actual Frequency Weighted Value	Tolerance (IEC 61672-1, Table 2)	UUT Reading	Expanded Uncertainty
125.0 Hz	113.9 dB	±1.5 dB	114.1 dB	0.4 dB
250.0 Hz	114.0 dB	±1.4 dB	114.3 dB	0.4 dB
500.0 Hz	114.2 dB	±1.4 dB	114.4 dB	0.4 dB
1000.0 Hz	114.2 dB	±1.1 dB	114.2 dB	0.4 dB
2000.0 Hz	114.0 dB	±1.6 dB	113.9 dB	0.4 dB

CALIBRATION OFFICER

6. LINEARITY TEST

Function Generator = 8kHz, Attenuator = 0dB, Output reading = 120dB, WGHT-A

Attenuator Setting	Actual Attenuation Value	Tolerance (IEC 61672-1, Clause 5.5.6)	UUT Reading	Expanded Uncertainty
- 60.0 dB	60.1 dB	±0.6 dB	60.2 dB	0.4 dB
- 50.0 dB	70.1 dB	±0.6 dB	70.2 dB	0.4 dB
- 40.0 dB	80.1 dB	±0.6 dB	80.2 dB	0.4 dB
- 30.0 dB	90.0 dB	±0.6 dB	90.1 dB	0.4 dB
- 20.0 dB	100.0 dB	±0.6 dB	100.1 dB	0.4 dB
- 10.0 dB	110.0 dB	±0.6 dB	110.1 dB	0.4 dB
0.0 dB	120.0 dB	±0.6 dB	120.0 dB	0.4 dB

7. OVERLOAD TEST

Meter Display	Meter OL Indicator Light
116 dB	ON
117 dB	ON

CALIBRATION OFFICER

Calibration Certificate

Calibration Number: 170301670552

Customer Name	: SGS Testing & Control Services Singapore Pte Ltd	**Job Reference No:**	17030167
Customer Address	: 3 Toh Tuck Link #01-02/03 Singapore 596228	**Certificate Issue Date:**	28/03/2017
Manufacturer	: Svantek	**Calibration Date:**	23/03/2017
Item Description	: Acoustic Calibrator	**Test Conditions:**	
Model Number	: SV 33	Ambient Temperature:	25 °C
Serial Number	: 43011	Relative Humidity:	62 %R.H.
Sub-Assemblies S/N	: N.A.	Pressure:	101.1 kPa

Absolute Laboratories Pte. Ltd. certifies that the above product listed was calibrated in compliance with a quality management system using the applicable and approved Absolute Laboratories Pte. Ltd. calibration procedures as specified.

The equipments used in the test and calibration of this instrument are traceable to the National Metrology Centre (NMC) Singapore and National Institute of Standards and Technology (NIST) U.S.

Calibration Method:

The instrument was calibrated following AL calibration procedure WI- 11-Rev-2

Calibration Equipment(s) Used			
Apparatus	**Serial Number**	**Cal Due Date**	**Certificate Number**
Digital Multimeter	MY45034436	22/09/2017	1-8155870818-1
Reference microphone	15930/ 13389/ 73479	24/08/2017	443/02/2016

Ambient Condition Range:
Temperature: (20-26)°C , Humidity: (25-70)%RH, Pressure: (80-105)kPa

Calibration By :

Rodrigo Manansala
Calibration Officer

Reviewed/Approved By :

Joseph Cruz
Approving Officer

Absolute Laboratories Pte. Ltd. is an affiliated company of Absolute Instrument Systems (Pte.) Ltd.

Absolute Laboratories Pte. Ltd.
11 Kallang Place #06-02 Singapore 339155
Tel: 65 6296 8012 Fax: 65 6296 3242

Calibration Report

Item Description	: **Acoustic Calibrator**	Job Reference No.:	**17030167**
Brand	: **Svantek**	Temperature:	**25 °C**
Model	: **SV 33**	Humidity:	**62 % RH**
Serial Number	: **43011**	Pressure:	**101.1 kPa**
Sub-assembly	: **N.A.**	WI No.:	**11-Rev-2**
Calibration Date	: **23-Mar-17**		

No.	Type of Test	Measured Value				Tolerance Range		Expanded Uncertainty	
		Before Adjustment		After Adjustment					
1	Low Battery	OFF		Pass		NA		NA	
2	AC Output	NA mVAC		NA mVAC		1000mVAC ± 10mVAC		NA mVAC	
3	Acoustical Output :								
	94dB @ 1KHz	NA dB	NA Hz	NA dB	NA Hz	± 0.4 dB	± 10 Hz	NA dB	NA Hz
	114dB @ 1KHz	114.05 dB	1000.0 Hz	114.00 dB	1000.0 Hz	± 0.4 dB	± 10 Hz	0.38 dB	5.8 Hz
	94db @ 250Hz	NA dB	NA Hz	NA dB	NA Hz	± 0.4 dB	± 2.5 Hz	NA dB	NA Hz
	114dB @ 250Hz	NA dB	NA Hz	NA dB	NA Hz	± 0.4 dB	± 2.5 Hz	NA dB	NA Hz
4	Electrical Output Frequency :								
	1000Hz	1000.0 Hz		1000.0 Hz		1000 Hz ± 10 Hz		5.8 Hz	
	250Hz	NA Hz		NA Hz		250 Hz ± 2.5 Hz		NA Hz	

CALIBRATION OFFICER
WI-11-CR-2-Rev-2

Absolute Laboratories Pte. Ltd.
11 Kallang Place #06-02 Singapore 339155 I TEL: 6296 8012, FAX: 6296 3242 I www.aisys.com.sg

APPENDIX D

Certificate of Competence for Noise Monitoring Officer

NO: 0073

SHAMA • Vibration • Noise • Environmental Engineering • Machine Condition Monitoring
• Computer Aided Engineering • Consultant & Training • Repair & Calibration

Certificate of Competence

This is to certify that

CHIN WEE KUAN, DON

has attended and passed an examination for a course on

Noise Monitoring

held between 9th October 2000 to 11th October 2000

SHAMA Technologies (S) Pte Ltd is approved by the Ministry of Manpower as a Training Centre for the Noise Monitoring Course

Stephen Soon

STEPHEN SOON
Course Director