



กรมวิทยาศาสตร์
TISTR

NSC-754787-1703
CALIBRATION 0037

THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-66/0225

MTC No. EEL. BP. 163/0166

CALIBRATION CERTIFICATE

Submitted by : HEALTH & ENVITECH CO., LTD.
Address : 6 Nganwongwan Rd., Soi 5, T. Bangkhen, A. Muang, Nontaburi 11000.
Calibrated at : Electrical and Electronic Standards Laboratory, Industrial Metrology and Testing Service Centre,
: Soi 1C, Bangpoo Industrial Estate, Sukhumvit Rd., Muang, Samutprakan 10280.

Instrument Calibrated :
Description : Sound Calibrator Ambient Environment
Temperature : (23 ± 3) °C
Relative Humidity : (50 ± 15) %
Manufacturer : Quest Electronics
Model : QC-10
Serial No. : QE3060101 (ID. NO : SC-001)
Ambient Pressure : (101.325 ± 1.500) kPa

Standards used : 1. Digital Function Synthesizer NF Electronic DF-193A S/N 122037.
2. Measuring Amplifier Brüel&Kjaer 2636 S/N 1537484.
3. Programmable Attenuator Tanigawa TPA-303A S/N OF 2214.
4. Digital Multimeter Agilent 34401A S/N MY44005560.
5. Pressure Transmitter Vaisala PTB202AD S/N T0650001.
6. Audio Analyzer Keithley 2015-P S/N 4106495.
7. Condenser Microphone Brüel&Kjaer 4180 S/N 2889871.

Calibration Procedure: CP-102-04 based on IEC 60942-2003. The sound pressure level of instrument was measured by standard microphone using an insert voltage technique.

This instrument has been calibrated against standards maintained at Electrical and Electronic Standards Laboratory (EEL), which are traceable to the International System of Units through the National Institute of Metrology (Thailand).

The information on actual reading is attached herewith and the uncertainty limits quoted refer to the measured values only.

Date of Receipt : 16 Jan. 2023

Date of Calibration : 24 Jan. 2023

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The results relate only to the items tested/calibrated or value assigned.
Advertising the Report/Certificate and publicity of the results except in full are prohibited unless written permission is obtained from the governor of TISTR.

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Office/Laboratory : Soi 1C, Bangpoo Industrial Estate, Sukhumvit Road, Amphoe Muang, Changwat Samutprakan 10280, Thailand
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Office : 196 Phayothin Road, Chatuchak Bangkok 10902, Thailand
Tel. (66) 0 2579 1121-30 ext. 5219, 5225, 5217
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FMBL/MTC.002 Rev.4



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www.accl-cal.com
www.accl2008@yahoo.co.th



ANAB
ASAC Mutual Accreditation Board
ACCREDITED
CALIBRATION LABORATORY

CALIBRATION LABORATORY

Certificate No. RA-2212018-2

Job No. RA-2212018

Certificate of Calibration

FOR

Equipment Name : Sound Level Meter

Manufacturer : Larson Davis

Model : 820

Serial Number : 1797

Customer Code : N/A

Location of Calibration : In Lab

Customer Name : Health and Envitech Co., Ltd

6 Ngamwongwan Road, Soi 5, Bang Khen, Muang Nonthaburi, Nonthaburi 11000

Calibration Procedure : CPE-04-01

Received Date : Nov 1, 2022

Calibration Date : Nov 1, 2022

Recommended Due Date : N/A

CONDITION AS RECEIVED : Normal

Environmental Conditions

Ambient Temperature : (25 ± 2) °C

Result : No Adjustment (See data attached in page 3 to the end of certificate)

Relative Humidity : (50 ± 15) %RH

1. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor $k = 2$, providing a level of confidence of approximately 95%.

2. The Unit Under Calibration (UUC) has been calibrated by using the working standard which is traceable to SI-Units. The calibration procedure documented is intended to implement the requirements of ISO/IEC 17025 : 2017

3. The working standard is indicated in page 2 of this certificate.

4. This report applies to the item calibrated and shall not be reproduced except in full, without written approval by Calibration Laboratory, Advantage Center Co., Ltd.

Calibrated by : B. Pradit

Approved by :

(Pomsak Suksawaeng)

Laboratory Management

Date of Issue : Nov 2, 2022

Page 1 of 3

This Equipment Calibration is traceable to International Standards (ISO 9000) : 14000 Certification, Statistical Quality Control, Statistical Process Control, New Product Sourcing, Troubleshooting, Safety Engineering, Applications to world wide Approvals and Certifications.



THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-66/0225

MTC No. EEL BP. 163/0166

The reported expanded uncertainty is based upon a standard uncertainty multiplied by a coverage factor $k = 2$, providing a level of confidence of approximately 95%.

Nominal Output of Unit Under Test = 114 dB re 20 µPa at 1000 Hz

Acoustic Output in dB re 20 µPa, Corrected to Reference Conditions: 101.325 kPa, 23.0 °C and 50 %RH.

1. Sound Pressure Level

Standard Microphone Type	Measured Sound Pressure Level (dB)	Deviated value (dB)	Uncertainty (dB)	Tolerance limit IEC60942:2003 Class 1
1/2 inch Brüel&Kjaer 4180	113.06	-0.94	± 0.10	± 0.40 dB

2. Frequency

Standard Microphone Type	Measured Frequency (Hz)	Deviated value (Hz)	Uncertainty (Hz)	Tolerance limit IEC60942:2003 Class 1
1/2 inch Brüel&Kjaer 4180	998.3	-1.7	± 1.5	± 1.0 %

3. Total Distortion

Standard Microphone Type	Measured Total Distortion (%)	Uncertainty (%)	Tolerance limit IEC60942:2003 Class 1
1/2 inch Brüel&Kjaer 4180	0.53	± 0.50	± 3.0 %

Note : 1. No adjustment.

2. The calibrator pressure correction was not included.

3. The microphone volume correction was not included.

Calibrated by :

(Mr. Nuttapong Nitjrusvanit)

Approved by :

Electrical and Standards Laboratory

Industrial Metrology and Testing Service Centre

Ref : 201266011600175001

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End of Certificate

Advertising the Report/Certificate and publicity of the results except in full are prohibited unless written permission is obtained from the governor of TISTR.

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FMBL/MTC.002 Rev



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pomsak2008@yahoo.co.th

Certificate No.: RA-2212018-2

Result of Calibration

Calibration Range : 94 dB, 114 dB

Function : Measurement @ 1 kHz

Select A

STD Setting	UUC Reading		Error		Uncertainty of Measurement (± dB)
	Fast	Slow	Fast	Slow	
94 dB	93.9	93.9	-0.1	-0.1	0.88
114 dB	113.8	113.8	-0.2	-0.2	0.88

Select C

STD Setting	UUC Reading		Error		Uncertainty of Measurement (± dB)
	Fast	Slow	Fast	Slow	
94 dB	93.9	93.9	-0.1	-0.1	0.88
114 dB	113.9	113.9	-0.1	-0.1	0.88

Select Z

STD Setting	UUC Reading		Error		Uncertainty of Measurement (± dB)
	Fast	Slow	Fast	Slow	
94 dB	93.9	93.9	-0.1	-0.1	0.88
114 dB	113.9	113.9	-0.1	-0.1	0.88

STD = Standard

UUC = Unit Under Calibration

- End of Certificate -



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Test Equipment Calibration, In-house Calibration Preparations, Source Inspection (ISO 9000 / 14000 Consultation, Statistical Quality Control, Statistical Process Control, New Product Source, Troubleshooting, Safety Engineering consultation) Applications for world wide Approvals and Certifications.

Certificate No.: RA-2212018-2

Reference Standards

Equipment Name	Serial No.	Certificate No.	Due Date	Traceability to
Sound Calibrator	170603302	EELBP.14/1165	Nov 4, 2023	TISTR

Traceability

This calibration is traceable to the International System of Unit via :

- TISTR : Thailand Institute of Scientific and Technological Research



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Test Equipment Calibration, In-house Calibration Preparations, Source Inspection (ISO 9000 / 14000 Consultation, Statistical Quality Control, Statistical Process Control, New Product Source, Troubleshooting, Safety Engineering consultation) Applications for world wide Approvals and Certifications.



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pomsak2008@yahoo.co.th

Certificate No.: RA-2212018-1

Reference Standards

Equipment Name	Serial No.	Certificate No.	Due Date	Traceability to
Sound Calibrator	170603302	EEL.BP.14/1165	Nov 4, 2023	TISTR

Traceability

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- TISTR : Thailand Institute of Scientific and Technological Research



Page 2 of 3

Test Equipment Calibration, In-house Calibration Preparations, Source Inspection ISO 9000 / 14000 Consultation, Statistical Quality Control, Statistical Production Control, New Product Sourcing, Troubleshooting, Safety Engineering consultations / Applications for world wide Approvals and Certifications.



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pomsak2008@yahoo.co.th



CALIBRATION LABORATORY

Certificate No. RA-2212018-1

Certificate of Calibration

FOR

Equipment Name : Sound Level Meter

Manufacturer : Larson davis

Model : 820

Serial Number : 1251

Customer Code : N/A

Location of Calibration : In Lab

Customer Name : Health and Envitech Co., Ltd

6 Ngamwongwan Road, Soi 5, Bang Khen, Mueang Nonthaburi, Nonthaburi 11000

Calibration Procedure : CPE-04-01

Received Date : Nov 1, 2022

Calibration Date : Nov 1, 2022

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CONDITION AS RECEIVED : Normal

Environmental Conditions

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Result

Relative Humidity : (50 ± 15) %RH

1. The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k = 2,

providing a level of confidence of approximately 95%.

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Calibration Laboratory, Advantage Center Co., Ltd.

Calibrated by : B. Pudit

Approved by :



(Pomsak Sulcawacng)

Laboratory Management

Date of Issue : Nov 2, 2022

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Certificate No. : RA-2212018-1

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STD Setting	UUC Reading		Error		Uncertainty of Measurement (± dB)
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94 dB	93.9	93.9	-0.1	-0.1	0.88
114 dB	113.9	113.9	-0.1	-0.1	0.88

Select Z

STD Setting	UUC Reading		Error		Uncertainty of Measurement (± dB)
	Fast	Slow	Fast	Slow	
94 dB	93.9	93.9	-0.1	-0.1	0.88
114 dB	113.9	113.9	-0.1	-0.1	0.88

STD = Standard

UUC = Unit Under Calibration

- End of Certificate -



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Test Equipment Calibration, In-house Calibration Preparations, Source Inspection ISO 9000 - 14000 Consultation, Statistical Quality Control, Statistical Production Control, New Product Sourcing, Troubleshooting, Safety Engineering consultations / Applications for world wide Approvals and Certifications.

ใบอนุญาตขึ้นทะเบียนห้องปฏิบัติการวิเคราะห์เอกชน ว-152
CERTIFICATION OF LABORATORY ว-152