



THAILAND INSTITUTE OF SCIENTIFIC AND TECHNOLOGICAL RESEARCH (TISTR)

Request No. 21-61/0559

MTC No. EEL. BP. 62/0561

CALIBRATION CERTIFICATE

Submitted by : S.P.S. Consulting Service Co., Ltd.

Address : 7 Soi Phaholyothin 24, Phaholyothin Rd., Jompol, Chatuchak, Bangkok 10900.

Calibrated at : Electrical and Electronic Standards Laboratory, Industrial Metrology and Testing Service Center.
: Soi 1, Bangpoo Industrial Estate, Sukhumvit Rd., Muang, Samutprakan 10280.

Instrument Calibrated :

Description : Sound Level Calibrator

Manufacturer : Rion

Model : NC-73

Serial No. : 10727909

Ambient Environment

Temperature : $(23 \pm 3) ^\circ\text{C}$

Relative Humidity : $(50 \pm 15) \%$

Ambient Pressure : $(101.325 \pm 1.500) \text{ kPa}$

Standards used : 1. Digital Function Synthesizer NF Electronic DF-193A S/N 122037.

2. Measuring Amplifier Bruel&Kjaer 2636 S/N 1537484.

3. Programmable Attenuator Tamagawa 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 Panasonic VP-7722A S/N 041477D122.

7. Condenser Microphone B&K 4180 S/N 2633526.

Calibration Procedure : CP.SC.02 based on IEC 60942-2003; The sound pressure level generated by sound calibrator under test shall be 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

- 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 : 21 May 2018

Date of Calibration : 23 May 2018

1 / 2

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The results relate only to the items tested or calibrated.

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

FM.BL.MTC.002 Rev.3

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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 = 94 dB re 20 μ Pa at 1000 Hz

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

1. Sound Pressure Level

Standard Microphone Type	Sound Pressure Level			
	Measured Sound Pressure Level (dB)	Deviated value (dB)	Uncertainty (dB)	Tolerance limit IEC60942:2003 Class 2
1/2 inch B&K 4180	94.34	0.34	± 0.15	± 0.75 dB

2. Frequency

Standard Microphone Type	Frequency			
	Measured Frequency (Hz)	Deviated value (Hz)	Uncertainty (Hz)	Tolerance limit IEC60942:2003 Class 2
1/2 inch B&K 4180	983.9	-16.1	± 1.5	$\pm 2.0\%$

3. Total distortion*

Standard Microphone Type	Total distortion*		
	Measured Total distortion (%)	Uncertainty (%)	Tolerance limit IEC60942:2003 Class 2
1/2 inch B&K 4180	1.28	± 0.50	$\pm 4.0\%$

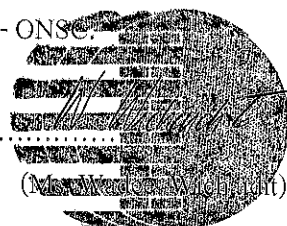
- Note :
1. No adjustment.
 2. The calibration results exclude the calibrator pressure correction.
 3. The calibration results exclude the microphone volume correction.
 4. Results marked " * " in this Certificate are not accredited by NSC - ONSC.

Calibrated by :

Tawikiat Iamsamran

(Mr. Tawikiat Iamsamran)

Approved by :



Director

TISTR

Electrical and Electronic Standards Laboratory

Industrial Metrology and Testing Service Center

Date of Calibration : 23 May 2018

Date of Issue : 24 May 2018

Ref: 2011261052101926002

2 / 2

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บริษัท เอส.พี.เอส. คอนซัลติ้ง เซอร์วิส จำกัด

S.P.S. CONSULTING SERVICE CO., LTD.

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Tel: (662) 939-4370 (Automatic 5 Lines) Fax: (662) 513-4221 E-mail: sale@spscon.com

Noise 477/18

Sound Level Meter Calibration Report


Acoustic Calibrator Data

Brand	RION	Number	AC 01/40
Model	NC-73	Serial No.	10576192
Calibration Range	94 dB, 1000 Hz	Last Calibration	21 August 2017
		Due Date	21 August 2018

Calibration Data

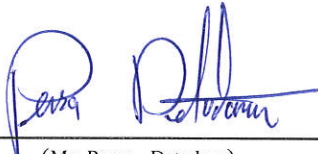
Sound Level Meter Data				Calibration Data		
SLM No.	Brand	Model	Serial No.	Date	Actual Reading [dB]	
					Before Adjustment	After Adjustment
NL 21-14	RION	NL-21	00932855	13 July 2018	94.0	94.0
NL 21-21	RION	NL-21	00554239	13 July 2018	94.0	94.0
Acoustic Certified Value : Thailand Institute of Scientific and Technological Research (TISTR)					94.18 ± 0.15 dB	

Calibrated by :



(Mr. Anun Nuttanu)

Approved by :



(Mr. Peera Detudom)



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Noise 521/18

Sound Level Meter Calibration Report

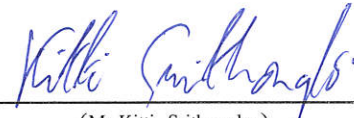
Acoustic Calibrator Data

Brand	ACO	Number	AC 03/56
Model	2127	Serial No.	130006
Calibration Range	94 dB, 1000 Hz	Last Calibration	23 May 2018
		Due Date	23 May 2019

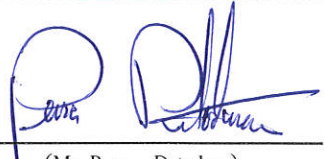
Calibration Data

Sound Level Meter Data				Calibration Data		
SLM No.	Brand	Model	Serial No.	Date	Actual Reading [dB]	
					Before Adjustment	After Adjustment
NL 21-10	RION	NL-21	00932857	03 August 2018	94.0	94.0
NL 21-16	RION	NL-21	00554234	03 August 2018	94.0	94.0
Acoustic Certified Value : Thailand Institute of Scientific and Technological Research (TISTR)					93.94 ± 0.15 dB	

Calibrated by :


(Mr.Kitti Srithonglo)

Approved by :


(Mr. Peera Detudom)



บริษัท เอส.พี.เอส. คอนซัลติ้ง เซอร์วิส จำกัด

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Noise 570/18

Sound Level Meter Calibration Report

Acoustic Calibrator Data

Brand	ACO	Number	AC 03/56
Model	2127	Serial No.	130006
Calibration Range	94 dB, 1000 Hz	Last Calibration	23 May 2018
		Due Date	23 May 2019

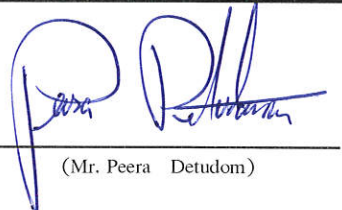
Calibration Data

Sound Level Meter Data				Calibration Data		
SLM No.	Brand	Model	Serial No.	Date	Actual Reading [dB]	
					Before Adjustment	After Adjustment
NL 21-13	RION	NL-21	00932860	31 August 2018	94.0	94.0
NL 21-14	RION	NL-21	00932855	31 August 2018	94.0	94.0
Acoustic Certified Value : Thailand Institute of Scientific and Technological Research (TISTR)					93.94 ± 0.15 dB	

Calibrated by :


(Mr.Kitti Srithonglo)

Approved by :


(Mr. Peera Detudom)