Moyvannan Electricity Substation

Environmental Impact Assessment Report

Annex 11.2: Noise Meter Calibration Certificates

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AcSoft
Noise, Vibration & Air Quality

CALIBRATION CERTIFICATE

Date of issue: 04-01-2023 **Certificate No:** 1503700-5 **Page:** 1/8

INSTRUMENT DETAILS	Manufacturer:	**SVANTEK**	
	Model:	**SVAN 977**	
	Serial No.:	46436	
	Description:	Sound Level Meter	
SENSOR DETAILS	Manufacturer:	**ACO**	**SVANTEK**
	Model:	**7052E**	**SV12L**
	Serial No.:	63961	58574
	Description:	Microphone	Preamplifier
CUSTOMER	Galetech Energy Services		
	Tullyco, Co Cavan, Ireland		
ENVIRONMENTAL CONDITIONS	Temperature:	22.8 – 23.2	°C
	Humidity:	44 – 46	%rh
	Pressure:	100.8 – 100.9	kPa
DATE OF CALIBRATION	04-01-2023		
APPROVED BY	A. Pullinger		

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CALIBRATION METHOD

Method described in instruction IN-02 "Calibration of the sound level meter", issue number 11 date 27.01.2016, written on the basis of international standard EN IEC 61672-3:2013 Electroacoustics. Part 3: Periodic tests.

CALIBRATION RESULTS

The sound level meter submitted for testing has successfully completed the Class 1 periodic tests of IEC 61672-3:2013 (BS EN 61672-3:2013), for the environmental conditions under which the tests were performed.

The results are presented on pages 3 to 8 of this certificate (including measurement uncertainty).

REPORTED RESULTS

The results contained in this Certificate refer only to the measurements made at the time of test for the instrument detailed above. These results do not reflect the instrument's ability to maintain calibration.

CONFORMITY WITH REQUIREMENTS

On the basis of the calibration results, it has been found that, the sound level meter meets metrological requirements specified in the standard IEC 61672-1:2013 Electroacoustics – Sound level meters. Part 1: Specifications, for class 1.

UNCERTAINTY OF MEASUREMENTS

Uncertainty of measurement has been evaluated in compliance with EA-4/02:2013. The expanded uncertainty assigned corresponds to a coverage probability of 95 % and the coverage factor $k = 2$.

NOTES

1. *The information appearing on this certificate has been compiled specifically for this instrument. This calibration certificate is produced with traceable and advanced equipment which permit comprehensive quality assurance verification of all data supplied herein.*
2. *The measurements in this document are traceable to GUM (Central Office of Measures), Poland*
3. *This calibration certificate shall not be reproduced except in full, without written permission from AcSoft Ltd.*

MEASUREMENT TRACEABILITY

The instrument under test was calibrated using the following equipment

Description	Manufacturer	Model	Serial Number
Signal Generator	Svantek	SV401	124
Sound & Vibration Analyser	Svantek	SV912AE	15909
Thermo-Barometer	LAB-EL	LB-706B	912
Acoustical Calibrator	Svantek	SV30A	83782

CALIBRATION RESULTS Calibration results are as follows:

1. Indication at the calibration check frequency

The sound level meter was calibrated in compliance with the instruction manual. During this process, the indication of this SLM was adjusted to the sound pressure level of the sound level calibrator type SV 30A, No 83782, from SVANTEK. The sound pressure level was corrected by the free-field factor.

Deviation of the acoustic pressure measurement of the A-weighted sound level using the sound calibrator type SV 30A, No 83782, from SVANTEK, was made according to the standard reference conditions: for static pressure 1003 hPa, for temperature 24 °C and for relative humidity 60 %, results:

0.0 ± 0.2 dB

The deviation was determined as a difference between the measured sound level and the sound level corrected by the free-field factor appropriate to mentioned sound calibrator.

2. Self-generated noise with microphone installed

Frequency weighting	A
The highest level of self-generated noise stated in the instruction manual [dB]	____
Indication [dB]	n/a

3. Self-generated noise with microphone replaced by the electrical input signal device

Frequency weighting	A	C	Z
The highest expected level of self-generated noise stated in the instruction manual [dB]	14.0	13.0	21.0
Level of self-generated noise [dB]	8.1	8.1	11.6

4. Acoustical signal tests of a frequency weighting C

Frequency	Relative frequency-weighted free-field response	Design-goal frequency weighting	The deviation of frequency weighting	Expanded uncertainty	Acceptable limits
Hz	dB	dB	dB	dB	dB
125.0	-0.29	-0,2	-0.1	0.3	±1.5
1000.0	0.00	0,0	0.0	0.3	±1.1
4000.0	0.36	-0,8	1.2	0.4	±1.6
8000.0	-0.50	-3,0	2.5	0.4	-3.1; +2.5

5. Electrical signal tests of frequency weightings

Frequency	Design-goal frequency weighting			The deviation of frequency weighting			Expanded uncertainty	Acceptable limits
	A	C	Z	A	C	Z		
Hz	dB	dB	dB	dB	dB	dB	dB	dB
63	-26,2	-0,8	0,0	0.1	0.0	0.0	0,3	±1,5
125	-16,1	-0,2	0,0	0.1	0.0	0.0	0,3	±1,5
250	-8,6	0,0	0,0	0.1	0.1	0.1	0,3	±1,4
500	-3,2	0,0	0,0	0.2	0.3	0.3	0,3	±1,4
1000	0,0	0,0	0,0	0.0	0.0	0.0	0,3	±1,1
2000	1,2	-0,2	0,0	0.6	0.6	0.6	0,3	±1,6
4000	1,0	-0,8	0,0	0.5	0.5	0.4	0,3	±1,6
8000	-1,1	-3,0	0,0	0.1	0.1	0.0	0,4	-3,1; +2,1
16000	-6,6	-8,5	0,0	-3.2	-3.2	-3.0	0,6	-17,0; +3,5

6. Frequency and time weightings at 1 kHz

	Sound level				Time-averaged sound level
Frequency weighting	A	A	C	Z	A
Time weighting	Fast	Slow	Fast	Fast	-
Indication [dB]	114.0	114.0	114.0	114.0	114.0
The deviation of indication from the indication of A-weighted sound level with Fast time weighting [dB]		0.0	0.0	0.0	0.0
Expanded uncertainty [dB]		0.1			
Acceptable limits[dB]		±0.3	±0.4	±0.4	±0.3

7. Level linearity

Reference level range: 130 dB

Expected sound level	Indication	Level linearity error	Expanded uncertainty	Acceptable limits
dB	dB	dB	dB	dB
136.0	136.0	0.0		
135.0	135.0	0.0		
134.0	134.0	-0.1		
133.0	133.0	-0.1		
132.0	132.0	-0.1		
131.0	131.0	-0.1		
130.0	130.0	-0.1		
129.0	129.0	-0.1		
124.0	123.9	-0.1		
119.0	118.9	-0.1		
114.0	114.0	0.0		
109.0	109.0	0.0		
104.0	104.0	0.0		
99.0	99.0	0.0		
94.0	94.0	0.0	0.2	±1.1
89.0	89.0	0.0		
84.0	83.9	-0.1		
79.0	78.9	-0.1		
74.0	73.9	-0.1		
69.0	68.9	-0.1		
64.0	63.9	-0.1		
59.0	58.9	-0.1		
54.0	53.9	-0.1		
49.0	49.0	0.0		
48.0	48.0	0.0		
47.0	47.0	0.0		
46.0	46.0	0.0		
45.0	45.0	0.0		
44.0	44.0	0.0		

Level range: 105 dB

Expected sound level	Indication	Level linearity error	Expanded uncertainty	Acceptable limits
dB	dB	dB	dB	dB
115.0	115.1	0.1	0.2	±1.1
114.0	114.1	0.1		
113.0	113.1	0.1		
112.0	112.1	0.1		
111.0	111.1	0.1		
110.0	110.1	0.1		
109.0	109.1	0.1		
104.0	104.1	0.1		
99.0	99.1	0.1		
94.0	94.1	0.1		
89.0	89.1	0.1		
84.0	84.1	0.1		
79.0	79.1	0.1		
74.0	74.1	0.1		
69.0	69.1	0.1		
64.0	64.1	0.1		
59.0	59.1	0.1		
54.0	54.0	0.0		
49.0	49.1	0.1		
44.0	44.1	0.1		
39.0	39.3	0.3		
34.0	34.3	0.3		
29.0	29.3	0.3	0.3	
28.0	28.4	0.4		
27.0	27.6	0.6		
26.0	26.6	0.6		
25.0	25.7	0.7		
24.0	24.8	0.8		

8. Level linearity including the level range control

Level range	130 dB	105 dB
Indication for the reference sound pressure level [dB]	113.9	113.9
The deviation of indication [dB]		0.0
Anticipated level that is 5 dB less than the upper limit specified in the instruction manual for level range at 1 kHz [dB]	132.0	110.0
Indication [dB]	131.9	109.9
The deviation of indication [dB]	-0.1	-0.1
Expanded uncertainty [dB]	0.2	
Acceptable limits[dB]	±1.1	

9. Toneburst response

Measurement quantity	Time weighting	Toneburst duration	The indications in response to toneburst relative to steady sound level	Reference toneburst response relative to steady sound level	Deviation of measured toneburst response from reference toneburst	Expanded uncertainty	Acceptable limits
		ms	dB	dB	dB	dB	dB
Time-weighted sound level	Fast	200	-1.0	-1.0	0.0	0.2	±0.8
		2	-18.0	-18.0	0.0		-1.8; +1.3
		0.25	-27.1	-27.0	-0.1		-3.3; +1.3
Time-weighted sound level	Slow	200	-7.4	-7.4	0.0		±0.8
		2	-27.0	-27.0	0.0		-1.8; +1.3
Sound exposure level	-	200	-7.0	-7.0	0.0		±0.8
		2	-27.0	-27.0	0.0		-1.8; +1.3
		0.25	-36.1	-36.0	-0.1		-3.3; +1.3

10. Peak C sound level

Numbers of cycles in test signal	Frequency of test signal	The deviation of indication	Expanded uncertainty	Acceptable limits
	Hz	dB	dB	dB
One	8000	-0.5	0.2	±2.4
Positive half-cycle	500	-0.1		±1.4
Negative half-cycle	500	-0.1		

11. Overload indication

Frequency weighting A

The difference between the levels of the positive and negative one-half-cycles input signals that first cause the displays of overload indication	Expanded uncertainty	Maximum value of the difference
dB	dB	dB
0.1	0.3	1.8

CERTIFICATE OF CALIBRATION

0653

Date of Issue: 02 September 2022 **Certificate Number: UCRT22/2053**

Calibrated at & Certificate issued by:
ANV Measurement Systems
Beaufort Court
17 Roebuck Way
Milton Keynes MK5 8HL
Telephone 01908 642846 Fax 01908 642814
E-Mail: info@noise-and-vibration.co.uk
Web: www.noise-and-vibration.co.uk
Acoustics Noise and Vibration Ltd trading as ANV Measurement Systems

Approved Signatory

K. Mistry

Customer	AWN Consulting Limited The Tecpro Building IDA Business and Technology Park Clonshaugh Dublin, D17 XD90 Ireland			
Order No.	2243			
Description	Sound Level Meter / Pre-amp / Microphone / Associated Calibrator			
Identification	*Manufacturer*	*Instrument*	*Type*	*Serial No. / Version*
	Rion	Sound Level Meter	NL-52	00976162
	Rion	Firmware		2.0
	Rion	Pre Amplifier	NH-25	76279
	Rion	Microphone	UC-59	12055
	Rion	Calibrator	NC-75	34313057
		Calibrator adaptor type if applicable		NC-75-022
Performance Class	1			
Test Procedure	TP 10. SLM 61672-3:2013 *Procedures from IEC 61672-3:2013 were used to perform the periodic tests.*			
Type Approved to IEC 61672-1:2013	Yes *If YES above there is public evidence that the SLM has successfully completed the applicable pattern evaluation tests of IEC 61672-2:2013*			
Date Received	01 September 2022	ANV Job No.	UKAS22/09555	
Date Calibrated	02 September 2022			

The sound level meter submitted for testing has successfully completed the periodic tests of IEC 61672-3:2013, for the environmental conditions under which the tests were performed. As evidence was publicly available, from an independent testing organisation responsible for approving the results of pattern-evaluation tests performed in accordance with IEC 61672-2:2013, to demonstrate that the model of sound level meter fully conformed to the class 1 specifications in IEC 61672-1:2013, the sound level meter submitted for testing conforms to the class 1 specifications of IEC 61672-1:2013.

Previous Certificate	*Dated*	*Certificate No.*	*Laboratory*
	17 July 2020	UCRT20/1661	0653

CERTIFICATE OF CALIBRATION

0653

Date of Issue: 25 October 2023

Certificate Number: UCRT23/2400

Calibrated at & Certificate issued by:
ANV Measurement Systems
Beaufort Court
17 Roebuck Way
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Telephone 01908 642846 Fax 01908 642814
E-Mail: info@noise-and-vibration.co.uk
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Acoustics Noise and Vibration Ltd trading as ANV Measurement Systems

Approved Signatory

K. Mistry

Customer	AWN Consulting The Tecpro Building IDA Business and Technology Park Clonshaugh Dublin 17 Ireland			
Order No.	2338			
Test Procedure	Procedure TP 14 Calibration of Sound Calibrators (60942:2017)			
Description	Acoustic Calibrator			
Identification	*Manufacturer*	*Instrument*	*Model*	*Serial No.*
	Rion	Calibrator	NC-75	34313057
	Public evidence of Type Approval	Yes	Approved by PTB	

The calibrator has been tested as specified in Annex B of IEC 60942:2017. As public evidence was available, from a testing organisation responsible for approving the results of pattern evaluation tests, to demonstrate that the model of sound calibrator fully conformed to the requirements for pattern evaluation described in Annex A of IEC 60942:2017, the sound calibrator tested is considered to conform to all the class 1 requirements of IEC 60942:2017.

ANV Job No.	UKAS23/10731	
Date Received	25 October 2023	
Date Calibrated	25 October 2023	
Previous Certificate	*Dated*	01 September 2022
	Certificate No.	UCRT22/2051
	Laboratory	0653