codling wind park

Environmental Impact Assessment Report

Volume 4

Appendix 24.8 Calibration certificates


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APPENDIX 24.8 CALIBRATION CERTIFICATES

1 Introduction

1. Codling Wind Park Limited (hereafter 'the Applicant') is proposing to develop the Codling Wind Park (CWP) Project, which is located in the Irish sea approximately 13 - 22 km off the east coast of Ireland, at County Wicklow.

2. This appendix forms part of **Chapter 24 Noise and Vibration** of the Environmental Impact Assessment Report (EIAR) for the CWP Project.

3. The calibration certificates for the noise survey equipment, summarised in **Table 1**, are presented in the following section.

Table 1 Instrumentation Details

Equipment	Type	Serial Number	Calibration Date
Sound Level Meter	RION NL – 52	00764925	09/09/2021
Sound Level Meter	RION NL – 52	575782	12/07/2021
Sound Calibrator	Bruel and Kjaer 4231	2460007	03/05/2022

1.1 Rion NL-52 – Serial number 00764925

MEASUREMENT SYSTEMS

CERTIFICATE OF CALIBRATION

0653

Date of Issue: 09 September 2021 **Certificate Number: UCRT21/2107**

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

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Approved Signatory

K. Mistry

Customer	AWN Consulting Limited The Tecpro Building IDA Business and Technology Park Clonshaugh Dublin D17 XD90
Order No.	2157
Description	Sound Level Meter / Pre-amp / Microphone / Associated Calibrator

Identification

Manufacturer	*Instrument*	*Type*	*Serial No. / Version*
Rion	Sound Level Meter	NL-52	00764925
Rion	Firmware		2.0
Rion	Pre Amplifier	NH-25	65051
Rion	Microphone	UC-59	09853
Brüel & Kjær	Calibrator	4231	3010488
	Calibrator adaptor type if applicable		UC 0210

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	03 September 2021 ANV Job No. UKAS21/09586
Date Calibrated	09 September 2021

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*
	10 June 2021	UCRT21/1719	0653

CERTIFICATE OF CALIBRATION	Certificate Number UCRT21/2107
UKAS Accredited Calibration Laboratory No. 0653	Page 2 of 2 Pages

Sound Level Meter Instruction manual and data used to adjust the sound levels indicated.

SLM instruction manual title	NL-52/NL-42 Description for IEC 61672-1		
SLM instruction manual ref / issue	No. 56034 21-03	Source	Rion
Date provided or internet download date	19 March 2021		

	Case Corrections	Wind Shield Corrections	Mic Pressure to Free Field Corrections
Uncertainties provided	Yes	Yes	Yes

Total expanded uncertainties within the requirements of IEC 61672-1:2013	YES		
Specified or equivalent Calibrator	Equivalent		
Customer or Lab Calibrator	Customers Calibrator		
Calibrator adaptor type if applicable	UC 0210		
Calibrator cal. date	08 September 2021		
Calibrator cert. number	UCRT21/2094		
Calibrator cal cert issued by Lab	0653		
Calibrator SPL @ STP	94.00	dB	Calibration reference sound pressure level
Calibrator frequency	999.96	Hz	Calibration check frequency
Reference level range	Single	dB	

Accessories used or corrected for during calibration - Extension Cable & Wind Shield WS-15
Note - The Extension Cable was used between the SLM and the pre-amp for this calibration.

Environmental conditions during tests	Start	End	
Temperature	24.08	24.30	± 0.30 °C
Humidity	45.2	48.9	± 3.00 %RH
Ambient Pressure	99.70	99.67	± 0.03 kPa

Indication at the Calibration Check Frequency			
Initial indicated level	94.0 dB	Adjusted indicated level	94.0 dB
Uncertainty of calibrator used for Indication at the Calibration Check Frequency ±			0.10 dB

Self Generated Noise								
Microphone installed -	Less Than	16.9	dB	A Weighting				
Microphone replaced with electrical input device -				UR = Under Range indicated				

Weighting	A			C			Z		
	12.2	dB	UR	16.3	dB	UR	23.2	dB	UR

Self Generated Noise reported for information only and not used to assess conformance to a requirement

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor $k=2$, providing a coverage probability of approximately 95%. The uncertainty evaluation has been carried out in accordance with UKAS requirements.

Additional Comments The results on this certificate only relate to the items calibrated as identified above.

Prior to calibration the instrument's main PCB was replaced and the meter was re-aligned.

..... END .....

Calibrated by: B. Bogdan R 2

1.2 Rion NL-52 – Serial number 575782

ANV MEASUREMENT SYSTEMS

CERTIFICATE OF CALIBRATION

ilac-MRA UKAS CALIBRATION 0653

Date of Issue: 12 July 2021 **Certificate Number: UCRT21/1841**

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

B. Giles

Customer	AWN Consulting Ltd The Tecpro Building IDA Business and Technology Park Clonshaugh Dublin D17			
Order No.	DOD/21/Cal034			
Description	Sound Level Meter / Pre-amp / Microphone / Associated Calibrator			
Identification	*Manufacturer*	*Instrument*	*Type*	*Serial No. / Version*
	Rion	Sound Level Meter	NL-52	00575782
	Rion	Firmware		2.0
	Rion	Pre Amplifier	NH-25	65810
	Rion	Microphone	UC-59	19108
	Rion	Calibrator	NC-74	34536109
		Calibrator adaptor type if applicable		NC-74-002
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	08 July 2021	ANV Job No.	UKAS21/07450	
Date Calibrated	12 July 2021			

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*
	26 November 2020	UCRT20/2149	0653

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CERTIFICATE OF CALIBRATION

UKAS Accredited Calibration Laboratory No. 0653

Certificate Number UCRT21/1841

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Sound Level Meter Instruction manual and data used to adjust the sound levels indicated.

SLM instruction manual title	NL-52/NL-42 Description for IEC 61672-1			
SLM instruction manual ref / issue	No. 56034 21-03	Source	Rion	
Date provided or internet download date	19 March 2021			

	Case Corrections	Wind Shield Corrections	Mic Pressure to Free Field Corrections
Uncertainties provided	Yes	Yes	Yes

Total expanded uncertainties within the requirements of IEC 61672-1:2013	YES		
Specified or equivalent Calibrator	Specified		
Customer or Lab Calibrator	Lab Calibrator		
Calibrator adaptor type if applicable	NC-74-002		
Calibrator cal. date	28 June 2021		
Calibrator cert. number	UCRT21/1792		
Calibrator cal cert issued by Lab	0653		
Calibrator SPL @ STP	94.02	dB	Calibration reference sound pressure level
Calibrator frequency	1002.00	Hz	Calibration check frequency
Reference level range	Single	dB	

Accessories used or corrected for during calibration - Extension Cable & Wind Shield WS-15
Note - The Extension Cable was used between the SLM and the pre-amp for this calibration.

Environmental conditions during tests	Start	End	
Temperature	21.60	23.23	± 0.30 °C
Humidity	62.3	46.8	± 3.00 %RH
Ambient Pressure	100.10	100.07	± 0.03 kPa

Indication at the Calibration Check Frequency					
Initial indicated level	94.0	dB	Adjusted indicated level	94.0	dB
Uncertainty of calibrator used for Indication at the Calibration Check Frequency ±				0.10	dB

Self Generated Noise

Microphone installed - Less Than 16.6 dB A Weighting

Microphone replaced with electrical input device - UR = Under Range indicated

Weighting	A			C			Z		
	11.5	dB	UR	15.8	dB	UR	21.1	dB	UR

Self Generated Noise reported for information only and not used to assess conformance to a requirement

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor $k=2$, providing a coverage probability of approximately 95%. The uncertainty evaluation has been carried out in accordance with UKAS requirements.

Additional Comments The results on this certificate only relate to the items calibrated as identified above.

Prior to calibration, the instrument's microphone was replaced and the meter was realigned.

END

Calibrated by: C. Hirlav R 3

1.3 Bruel and Kjaer 4231 – Serial number 2460007

ANV MEASUREMENT SYSTEMS

CERTIFICATE OF CALIBRATION

ilac-MRA UKAS CALIBRATION 0653

Date of Issue: 03 May 2022

Certificate Number: UCRT22/1593

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

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Approved Signatory

K. Mistry

Customer	AWN Consulting Limited The Tecpro Building IDA Business and Technology Park Clonshaugh Dublin, D17 XD90 Ireland
Order No.	DOD/22/Cal040
Test Procedure	Procedure TP 1 Calibration of Sound Calibrators
Description	Acoustic Calibrator

Identification	*Manufacturer*	*Instrument*	*Model*	*Serial No.*
	Brüel & Kjær	Calibrator	4231	2460007

The calibrator has been tested as specified in Annex B of IEC 60942:2003. As public evidence was available from a testing organisation (PTB) 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 60942:2003, the sound calibrator tested is considered to conform to all the class 1 requirements of IEC 60942:2003.

ANV Job No.	UKAS22/04300	
Date Received	29 April 2022	
Date Calibrated	03 May 2022	
Previous Certificate	*Dated*	23 March 2021
	Certificate No.	211005
	Laboratory	NSAI

CERTIFICATE OF CALIBRATION	Certificate Number UCRT22/1593
UKAS Accredited Calibration Laboratory No. 0653	Page 2 of 2 Pages

Measurements

The sound pressure level generated by the calibrator in its WS2 configuration was measured five times by the Insert Voltage Method using a microphone as detailed below. The mean of the results obtained is shown below. It is corrected to the standard atmospheric pressure of 101.3 kPa (1013 mBar) using original manufacturers information.

Test Microphone	*Manufacturer*	*Type*
	Brüel & Kjær	4134

Results

The level of the calibrator output under the conditions outlined above was

93.97 ± 0.10 dB rel 20 µPa

Functional Tests and Observations

The frequency of the sound produced was	999.96 ±	0.12 Hz
The total distortion was	0.43 ±	0.04 % Distortion

During the measurements environmental conditions were

Temperature	22	to	23	°C
Relative Humidity	36	to	42	%
Barometric Pressure	101.1	to	101.2	kPa

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a coverage probability of approximately 95%. The uncertainty evaluation has been carried out in accordance with UKAS requirements.

The uncertainties refer to the measured values only with no account being taken of the ability of the instrument to maintain its calibration.

A small correction factor may need to be applied to the sound pressure level quoted above if the device is used to calibrate a sound level meter which is fitted with a free-field response microphone. See manufacturers handbook for details.

..... END .....

Note:

Calibrator adjusted prior to calibration?	NO	
Initial Level	N/A	dB
Initial Frequency	N/A	Hz

Additional Comments The results on this certificate only relate to the items calibrated as identified above.

None

Calibrated by: B. Bogdan R 2