



APPENDIX 12-3

Background Noise Summary



Trinity
Consultants

 **awnconsulting**

Background Noise Survey

Project Title: Cunlaghfadda Green Energy Project, Co. Mayo

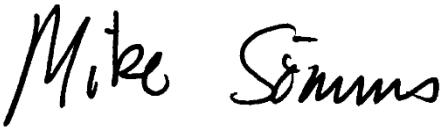
CLIENT
MKO

DOCUMENT REFERENCE
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3 December
2025

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Signature		
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Title	Acoustic Consultant	Principal Acoustic Consultant
Date	3 December 2025	

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TABLE OF CONTENTS

1. INTRODUCTION	2-2
2. BACKGROUND NOISE SURVEY	3-3
2.1 Measurement Locations	3-3
2.2 Measurement Periods	3-4
2.3 Measurement Procedure	3-4
2.4 Instrumentation.....	3-5
2.5 Rainfall Data	3-5
2.6 Wind Data	3-5
2.6.1 Wind Shear	3-5
2.7 Selection of Measurement Locations and Methodology.....	3-7
2.8 Data Analysis	3-7
2.8.1 Assessment Periods.....	3-7
2.8.2 Atypical Noise Data	3-8
2.9 Derived Background Noise Levels	3-8
APPENDIX A. GLOSSARY OF ACOUSTIC TERMS	A-9
APPENDIX B. INSTALLATION PHOTOGRAPHS	B-10
APPENDIX C. REGRESSION ANALYSIS ON DATA SETS	C-13
APPENDIX D. CALIBRATION CERTIFICATES	D-18

LIST OF TABLES

Table 2-1. Coordinates of Noise Monitoring Equipment	3-3
Table 2-2. Measurement periods of Noise Monitoring Equipment	3-4
Table 2-3. Details of Noise Measurement Instrumentation	3-5
Table 2-4. Wind Measurement Location	3-5
Table 2-5. Daytime and Night Periods	3-7
Table 2-6. Derived Background Noise Levels at Assessment Hub Height - Daytime	3-8
Table 2-7. Derived Background Noise Levels at Assessment Hub Height – Night-time	3-8

LIST OF FIGURES

Figure 2-1 - Noise Monitoring Location Selection	3-4
Figure 2-2. Distributions of Wind Speeds and Directions Over the Survey Period	3-6

2. INTRODUCTION

AWN has completed a background noise survey that will support a wind turbine environmental noise impact assessment for the proposed Cunlaghfadda Green Energy Project at Co. Mayo (Proposed Project). This note has been prepared to provide a preliminary indication of the background noise levels derived at the relevant Noise Monitoring Locations (NMLs). A brief description of the assessment methodology is outlined in the note.

3. BACKGROUND NOISE SURVEY

The noise survey and subsequent data analysis was carried out in accordance with best practice following the guidance contained in the Institute of Acoustics publication *A Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise* (May 2013), (IOA GPG).

3.1 Measurement Locations

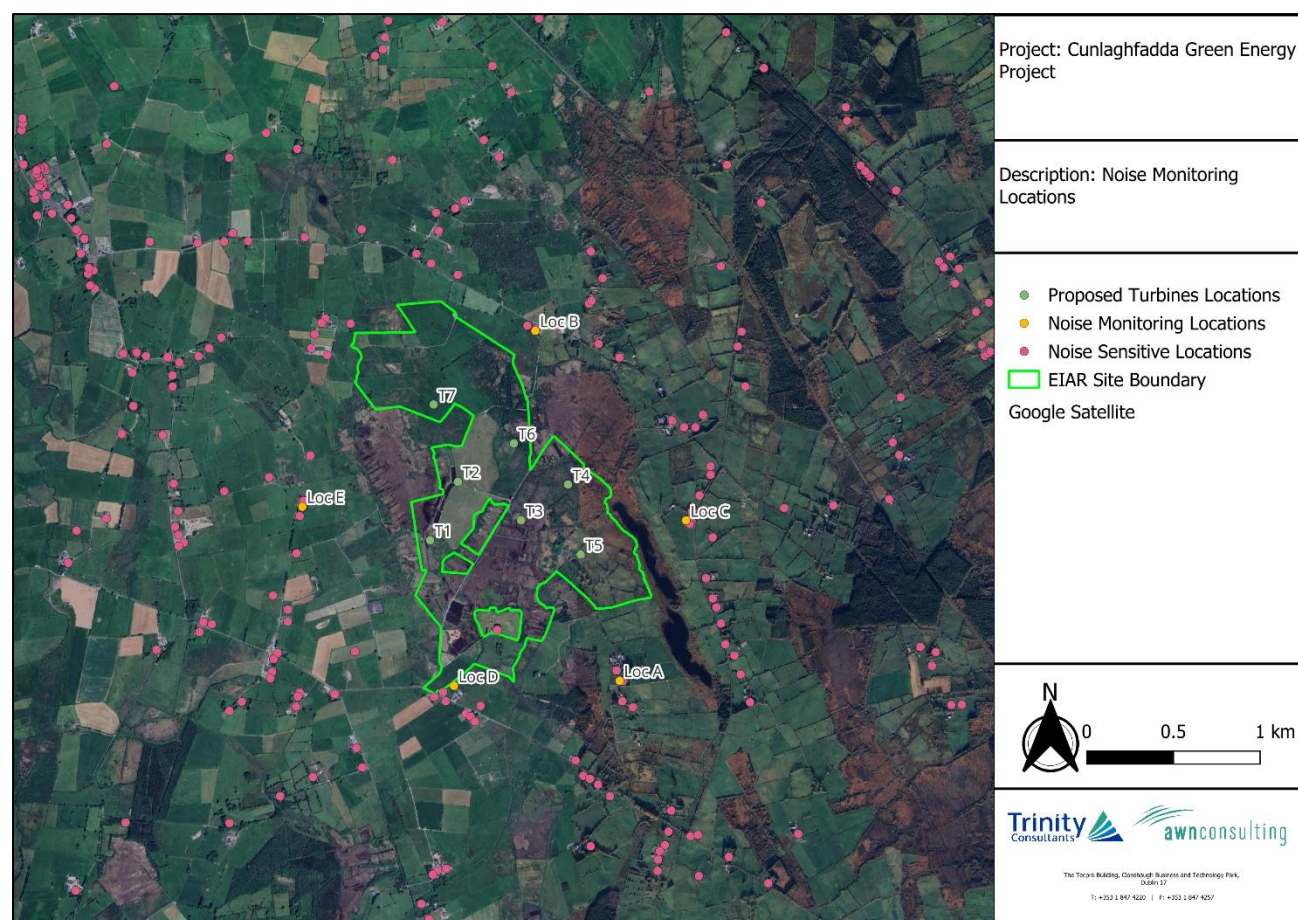
The background noise survey was conducted through installing unattended sound level meters at 5 no. representative locations in the surrounding area. The co-ordinates for selected locations for the noise monitoring locations are outlined in Table 3-1 and identified on a map in Figure 3-1.

Table 3-1. Coordinates of Noise Monitoring Equipment

Location	Coordinates (ITM)	
	Easting	Northing
Loc A	529,399	777,050
Loc B	528,913	779,067
Loc C	529,782	777,974
Loc D	528,444	777,021
Loc E	527,570	778,053

Site visits by survey personnel were carried out during morning and afternoon periods; during these visits, primary noise sources contributing to noise environment were noted as being occasional local traffic noise and farming activity, birdsongs and distant agricultural activity. In respect of night-time periods, when noise due to traffic on local roads, agricultural activities and other sources tend to reduce, there was no indication of any significant local night-time sources of noise at any location.

Figure 3-1 - Noise Monitoring Location Selection



3.2 Measurement Periods

The periods of noise measurements used in the background noise monitoring assessment are outlined in Table 3-2. The survey was deemed completed when an adequate number of datasets had been measured as recommended in the IOA GPG to determine a suitable representation of the typical background noise.

Table 3-2. Measurement periods of Noise Monitoring Equipment

Location Reference	Survey Period	
	Start Date	End Date
Loc A	22 June 2023	01 August 2023
Loc B	22 June 2023	01 August 2023
Loc C	22 June 2023	01 August 2023
Loc D	22 June 2023	01 August 2023
Loc E	22 June 2023	01 August 2023

3.3 Measurement Procedure

Measurements were conducted at all locations over the survey periods outlined in Table 3-2. Data samples for all measurements (noise, rainfall, and wind) were logged continuously at 10-minute interval periods for the duration of the survey. The $L_{Aeq,10min}$ and $L_{A90,10min}$ noise parameters were measured in this instance and the results were saved to the instrument memory for later analysis.

Survey personnel noted potential primary noise sources contributing to noise build-up during the installation and removal of the sound level meters from site.

3.4 Instrumentation

Table 3-3 confirms the details of the noise monitoring instrumentation installed at each location.

Table 3-3. Details of Noise Measurement Instrumentation

Location Reference	Equipment Make and Model	Serial Number
Loc A	Rion NL-52	998411
Loc B	Rion NL-52	186671
Loc C	Rion NL-52	186670
Loc D	Rion NL-52	564808
Loc E	Rion NL-52	564809

Before and after the survey the measurement apparatus was check calibrated using a Brüel & Kjær type 4231 Sound Level Calibrator where appropriate. Instruments were calibrated on each interim visit and any drift noted. All calibration drifts were less than ± 0.3 dB and within acceptable tolerances outlined in the IOA GPG.

3.5 Rainfall Data

Rainfall was monitored and logged using one Rain Gauge data logger that was installed at Locations A and E over the duration of the survey.

3.6 Wind Data

Average wind speed and direction was measured in 10-minute intervals at an on-site LIDAR unit and provided to AWN. The coordinates of the LiDAR are provided in Table 3-4. A copy of the LiDAR installation report is included in Appendix 12-6 of the EIAR Chapter.

Table 3-4. Wind Measurement Location

Co-ordinates (ITM)	
Easting	Northing
528,651	777,338

3.6.1 Wind Shear

Wind speed collected at 99 m and 54 m were used to correct the wind speed up to an assessment hub height (HH) at 92 m, as per the methodology outlined in the IOA GPG.

The calculated HH wind speeds were then corrected to the 'standardised' 10 m height wind speed in accordance with the IOA GPG. The 'standardised' wind speed is the industry standard for referencing wind speeds with respect to wind turbines.

The calculated hub height wind speeds have been corrected standardised to 10 m height using a fixed correction. The standardised is a wind speed measured at a height different than 10 m (generally measured at the turbine hub height) which is expressed to a reference height of 10 m using a roughness length of 0.05 for standardisation purpose in accordance with the IEC 61400-11 standard:

Roughness Length Shear Profile: $U_1 = U_2 \times [(\ln(H_1/z))/ (\ln(H_2/z))]$

Where:

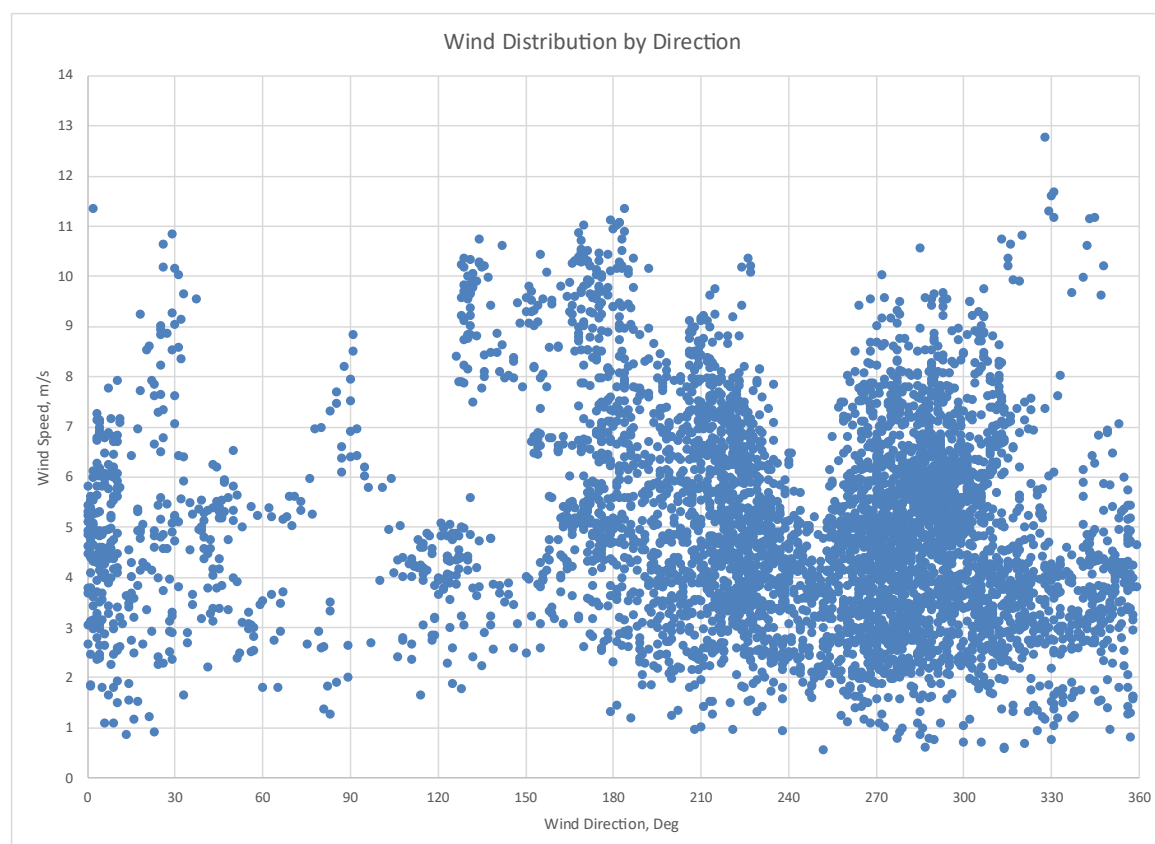
H_1	The height of the wind speed to be calculated (10m)
H_2	The height of the measured or calculated HH wind speed.
U_1	The wind speed to be calculated.
U_2	The measured or calculated HH wind speed.
Z	The roughness length.

Note: A roughness length of 0.05m is used to standardise hub height wind speeds to 10m height in the IEC 61400-11:2003 standard, regardless of what the actual roughness length seen on a site may have been. This 'normalisation' procedure was adopted for comparability between test results for different turbines.

Any reference to wind speed in this chapter should be understood to be the standardised 10 m height wind speed unless otherwise stated.

Figure 3-2 presents the distributions of the measured wind speed and wind direction over the survey period.

Figure 3-2. Distributions of Wind Speeds and Directions Over the Survey Period



3.7 Selection of Measurement Locations and Methodology

The purpose of the noise survey is to determine the background noise at representative noise sensitive locations (NSLs) within the receiving environment surrounding the Site.

The survey locations were identified with consideration of the potential turbine noise contribution from the Proposed Project assessed using noise prediction modelling and supported by reviewing aerial images and street side images where available on website e.g., Google Earth and Bing Maps.

The assessment methodology in the EIAR is in accordance with the Institute of Acoustics document A Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise (2013) hereafter referred to as the IOA GPG.

The following text summaries the guidance from the IOA GPG for the selection of background noise survey locations:

- ▶ The selection of suitable noise monitoring locations for background noise surveys is not straightforward, and only general guidance can be given as it is not possible to be prescriptive.
- ▶ Often there are practical constraints on where equipment can be placed, and a considerable degree of experience-based judgement is required when selecting these positions.
- ▶ Any contribution to background noise levels of noise from an existing wind farm must be excluded when assigning background noise and setting noise limits for a new development.
- ▶ No general guidance can therefore be given on the number of measurement locations as this will be site-specific.

A robust assessment of the noise impacts of the wind farm necessitates a detailed survey of the background noise at houses in the vicinity of the Proposed Wind Farm.

3.8 Data Analysis

The following sections present a summary of the statistical analysis carried out on the noise monitoring data to derive the background noise curves at each NML. Background noise data sets can be re-analysed for various scenarios should this be required, for instance, if the proposed HH changes or alternative hub heights are considered.

3.8.1 Assessment Periods

The results presented in the following sections refer to the noise data collated during 'quiet periods' of the day and night as defined in the IOA GPG. These periods are defined in Table 3-5.

Table 3-5. Daytime and Night Periods

Period Description	Period Definition
Daytime (Amenity Hours)	ETSU-R-97 defines the amenity hours as: 18.00 to 23.00 Monday to Friday. 13.00 to 23.00 on Saturdays; and, 07.00 to 23.00 on Sundays.
Night	ETSU-R-97 defines the night-time hours as 23.00 to 07.00 every day

The data sets have been assessed separately for both daytime and night-time periods as outlined in Table 3 and analysed with respect to the methods outlined in the IOA GPG.

3.8.2 Atypical Noise Data

The data sets have been filtered to remove issues such as the dawn chorus and the influence of other atypical noise sources. An example of atypical sources would be short, isolated periods of raised noise levels attributable to local sources, vehicles, agricultural activity, boiler flues, operation of gardening equipment etc. In addition, sample periods affected by rainfall or when rainfall resulted in prolonged periods of atypical noise levels have also been removed from the data sets. This approach is in line with the guidance contained in the IOA GPG.

3.9 Derived Background Noise Levels

The derived background noise levels dB LA90,10min for daytime and nighttime are presented in Table 3-6 and Table 3-7 respectively. These levels have been derived using regression analysis carried out on the data sets measured in line with best practice guidance contained in the IOA GPG and its SGN No. 2 Data Collection; Background noise levels are calculated based on a hub height of 92 m, this being the hub height of the candidate turbine.

Appendix C presents the regression analysis charts for daytime and night-time periods from each NML.

These background noise levels will be used to determine the appropriate turbine noise limits in accordance with the adopted turbine noise criteria as set out in the EIAR Chapter.

Table 3-6. Derived Background Noise Levels at Assessment Hub Height - Daytime

Locations	Period	Background Noise Levels dB LA90 at standardised 10m height wind speed m/s for 92 m Hub Height							
		3	4	5	6	7	8	9	10
Loc A	Day	25.7	27.7	30.5	33.6	36.6	39.2	41	41.6
Loc B	Day	24.7	27.1	29.9	32.9	35.8	38.3	40.1	41
Loc C	Day	22.9	25	27.7	30.6	33.4	35.7	37.4	38.1
Loc D	Day	25	26.9	28.9	31	33	35	37	38.8
Loc E	Day	24.2	26.5	29.3	32.4	35.4	38.2	40.4	41.8

Table 3-7. Derived Background Noise Levels at Assessment Hub Height – Night-time

Locations	Period	Background Noise Levels dB LA90 at standardised 10m height wind speed m/s for 92 m Hub Height							
		3	4	5	6	7	8	9	10
A	Night	16	18	21.2	25.4	30.2	35.2	40	44.2
B	Night	16.8	18.5	21.3	25	29.3	34	38.8	43.4
C	Night	16.2	17.5	19.8	23	26.8	31.1	35.6	40.1
D	Night	16.7	17.9	20.1	23.2	26.9	30.9	35	39.1
E	Night	15.8	17.6	20.6	24.7	29.5	34.7	39.9	44.9

APPENDIX A. GLOSSARY OF ACOUSTIC TERMS

Background noise	The noise level rarely fallen below in any given location over any given time period, often classed according to daytime, evening or night-time periods.
dB	Abbreviation for 'decibel'.
dB(A)	Abbreviation for the decibel level of a sound that has been A-weighted.
Dawn Chorus	Noise due to birds which can occur at sunrise.
Decibel	The unit normally employed to measure the magnitude of sound.
Directivity	The property of a sound source that causes more sound to be radiated in one direction than another.
L_{A90}	The noise level exceeded 90% of the time during a measurement period, often used for the measurement of background noise.
Level	The general term used to describe a sound once it has been converted into decibels.
Sound level meter	An instrument for measuring sound pressure level.

APPENDIX B. INSTALLATION PHOTOGRAPHS

Appendix Figure B-1. Location A Installation



Appendix Figure B-2. Location B Installation



Appendix Figure B-3. Location C Installation



Appendix Figure B-4. Location D Installation



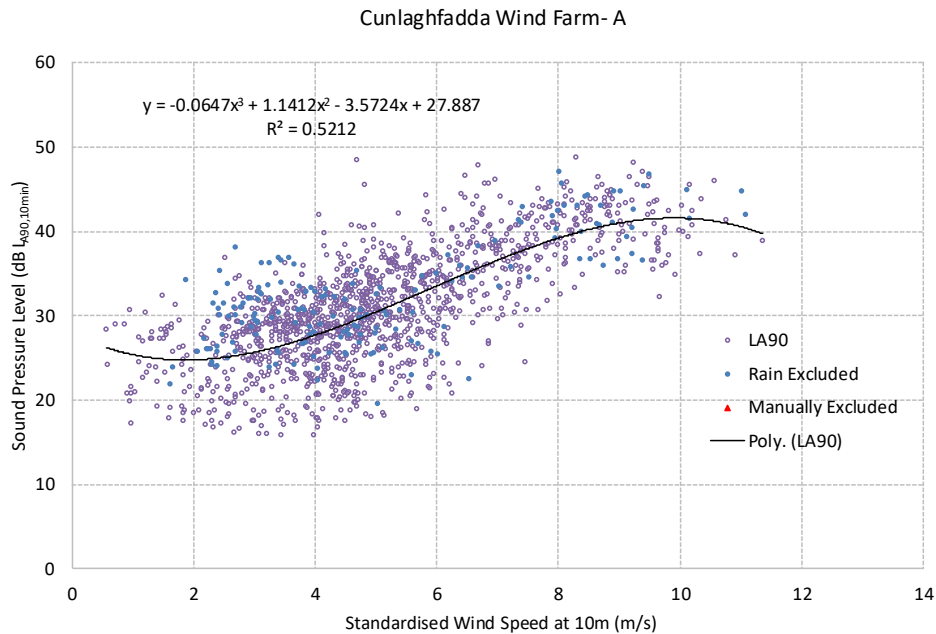
Appendix Figure B-5. Location E Installation



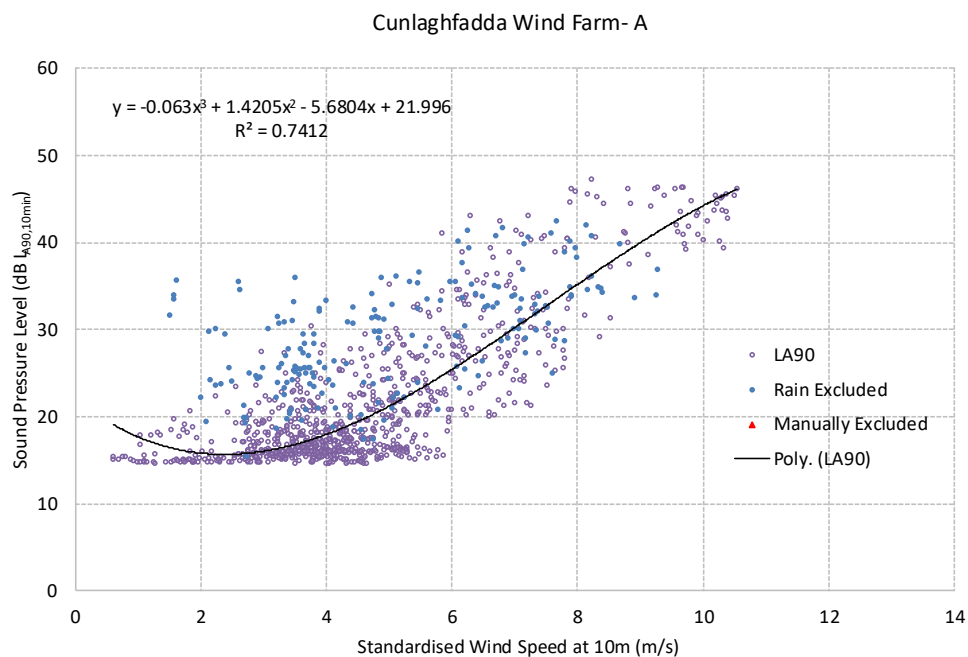
APPENDIX C. REGRESSION ANALYSIS ON DATA SETS

The following graphs present the data sets for each location. In each case, the daytime data is presented first and the night-time data below.

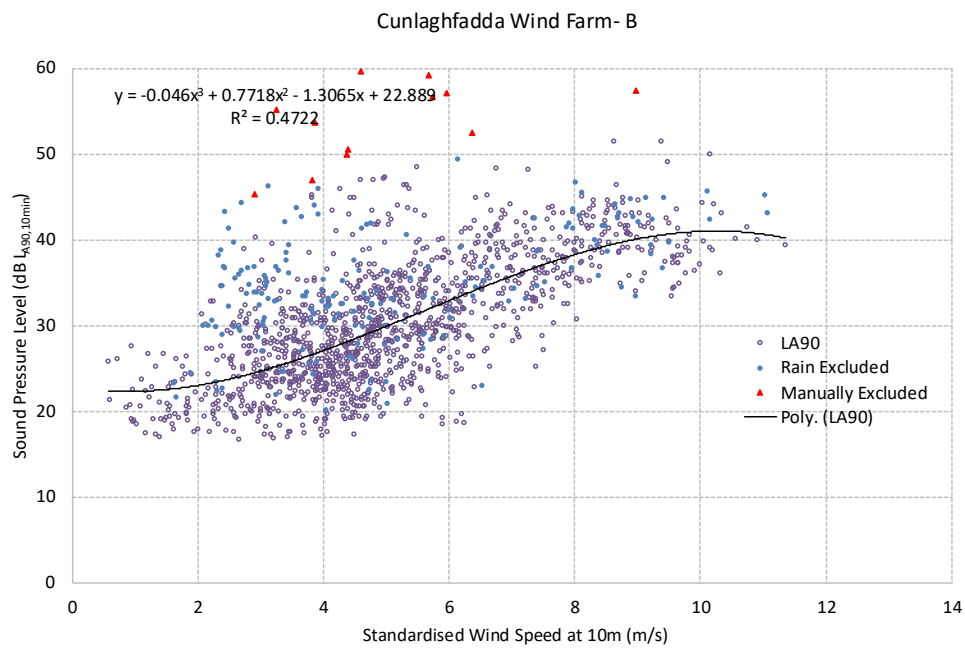
Appendix Figure C-1. Location A Daytime noise levels



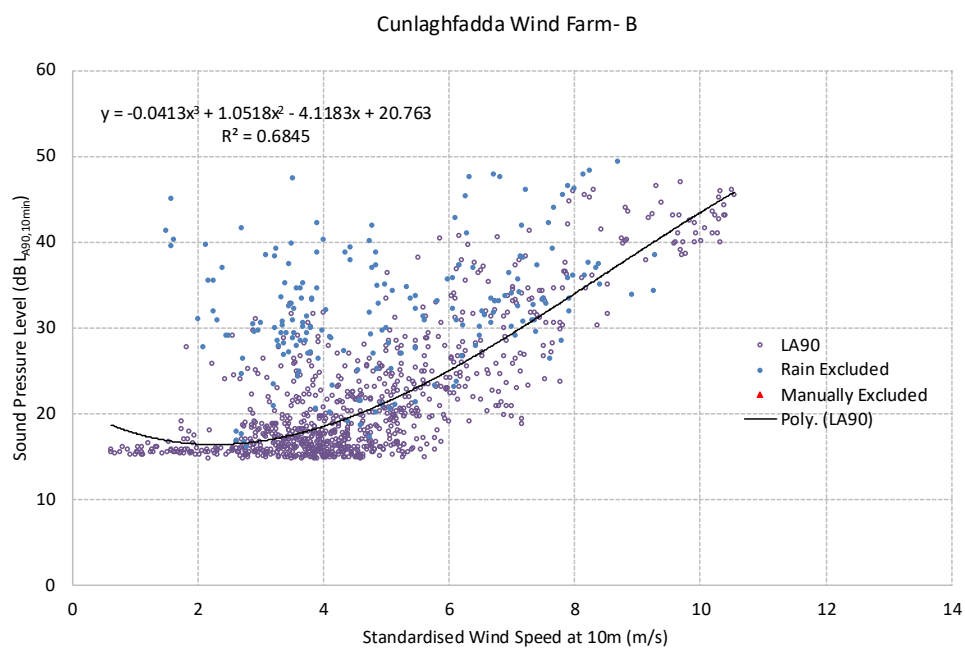
Appendix Figure C-2. Location A Night-time noise levels



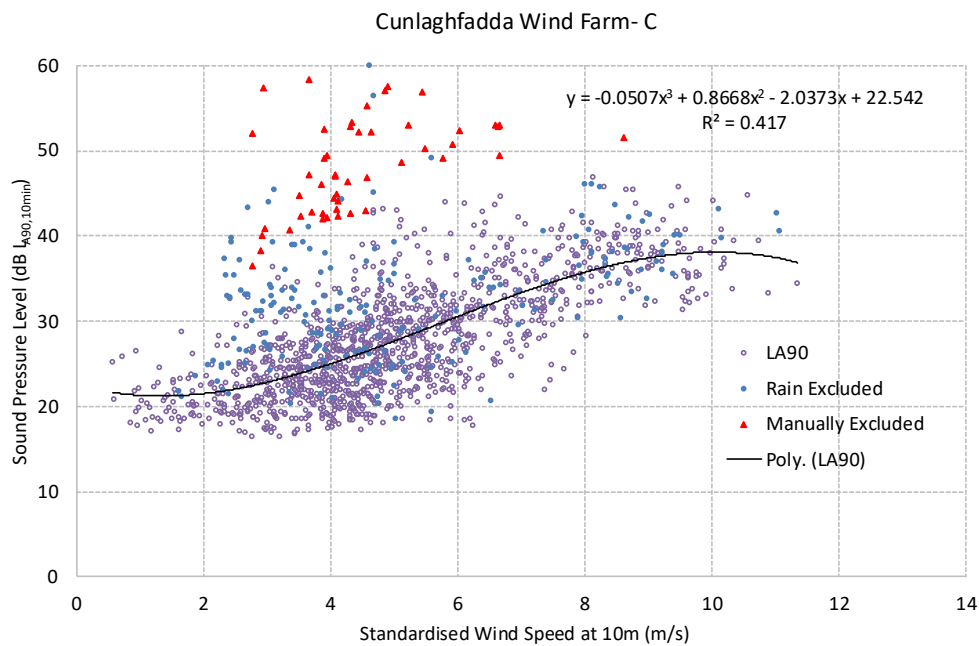
Appendix Figure C-3. Location B Daytime noise levels



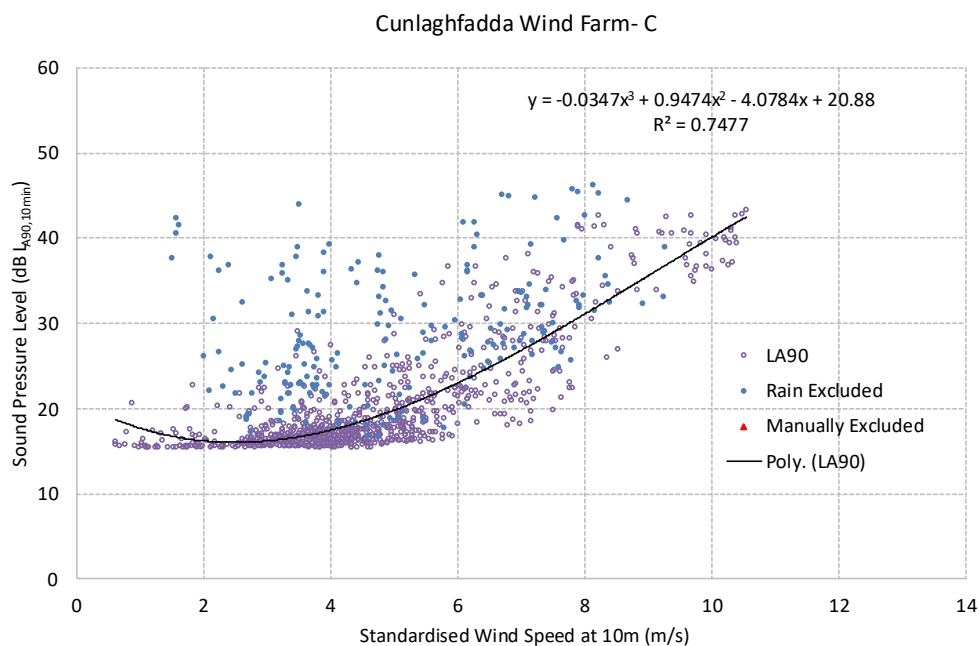
Appendix Figure C-4. Location B Night-time noise levels



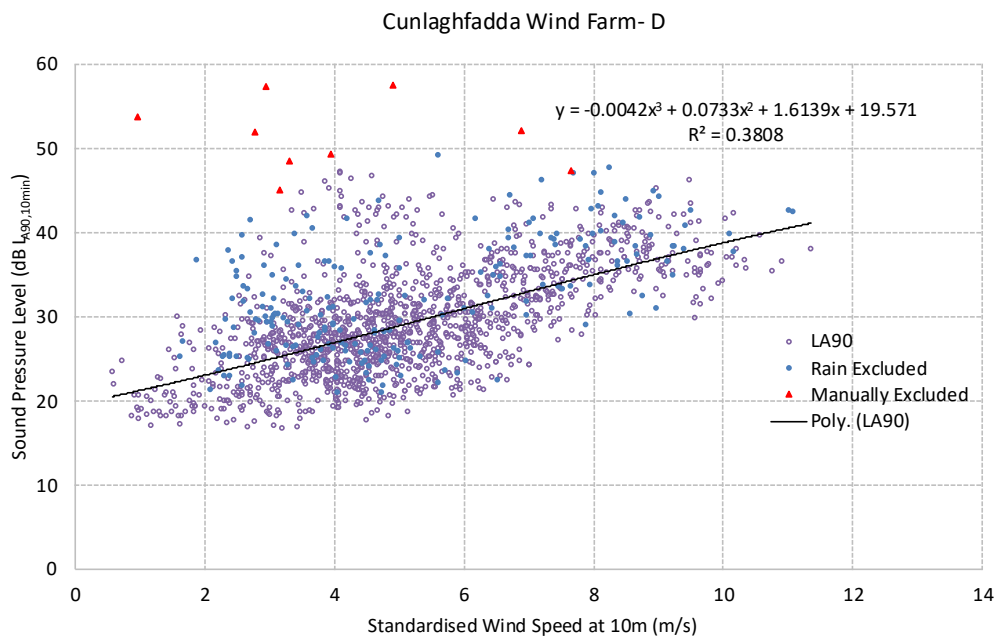
Appendix Figure C-5. Location C Daytime noise levels



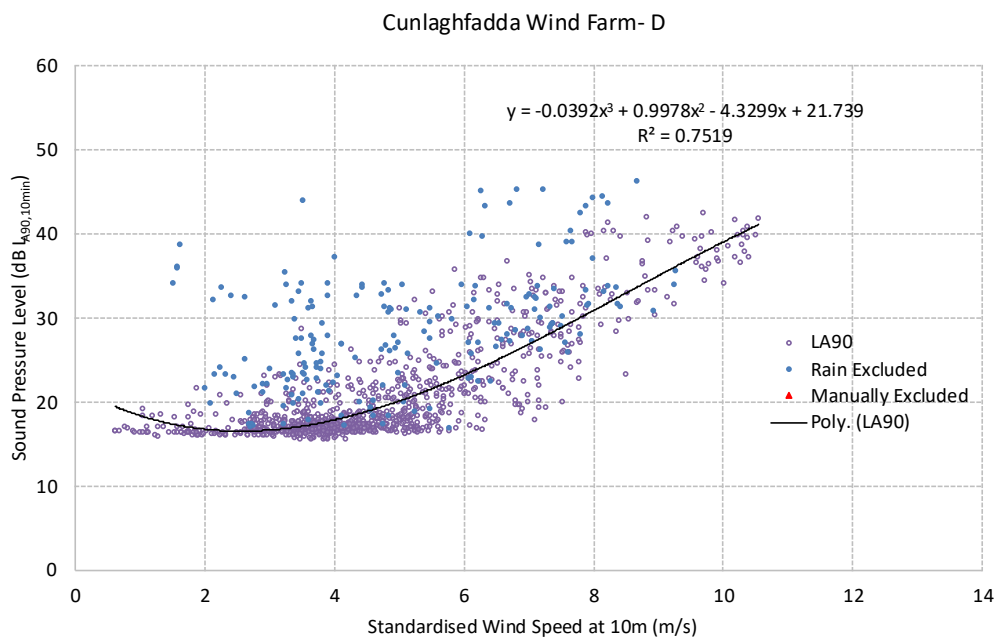
Appendix Figure C-6. Location C Night-time noise levels



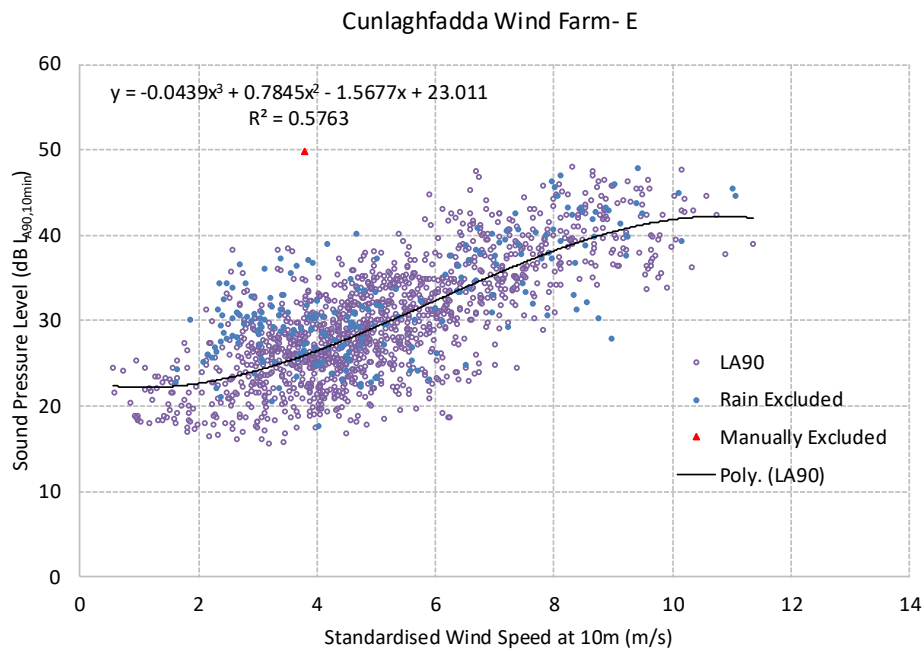
Appendix Figure C-7. Location D Daytime noise levels



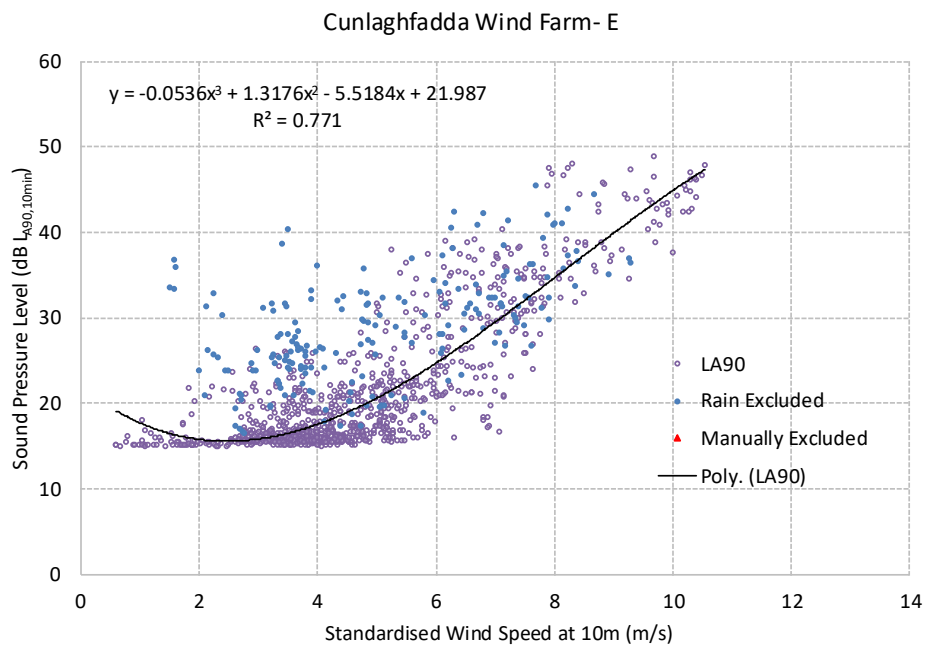
Appendix Figure C-8. Location D Night-time noise levels



Appendix Figure C-9. Location E Daytime noise levels



Appendix Figure C-10. Location E Night-time noise levels



APPENDIX D. CALIBRATION CERTIFICATES

Location A



CERTIFICATE OF CALIBRATION



0653

Date of Issue: 01 February 2022

Certificate Number: UCRT22/1140

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
Clonsaugh
Dublin
D17 XD90

Order No. DOD/22/Cal/038

Description Sound Level Meter / Pre-amp / Microphone / Associated Calibrator

Identification	Manufacturer	Instrument	Type	Serial No. / Version
	Rion	Sound Level Meter	NL-52	00998411
	Rion	Firmware		2.0
	Rion	Pre Amplifier	NH-25	98625
	Rion	Microphone	UC-59	17215
	Brüel & Kjær	Calibrator	4231	2022651
		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 26 January 2022

ANV Job No. UKAS22/01059

Date Calibrated 01 February 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
	16 September 2020	UCRT20/1875	0653

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Location B



CERTIFICATE OF CALIBRATION



0653

Date of Issue: 16 May 2022

Certificate Number: UCRT22/1656

Calibrated at & Certificate issued by:

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Dublin
D17 XD90

Order No. DOD/22/Cal041

Description Sound Level Meter / Pre-amp / Microphone / Associated Calibrator

Identification	Manufacturer	Instrument	Type	Serial No. / Version
	Rion	Sound Level Meter	NL-52	00186671
	Rion	Firmware		2.0
	Rion	Pre Amplifier	NH-25	76821
	Rion	Microphone	UC-59	16877
	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 10 May 2022

ANV Job No. UKAS22/05320

Date Calibrated 16 May 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
	12 May 2020	UCRT20/1415	0653

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Location C



CERTIFICATE OF CALIBRATION



0653

Date of Issue: 03 May 2022

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Dublin, D17 XD90
Ireland

Order No. DOD/22/Cal040
Description Sound Level Meter / Pre-amp / Microphone / Associated Calibrator
Identification

Manufacturer	Instrument	Type	Serial No. / Version
Rion	Sound Level Meter	NL-52	00186670
Rion	Firmware		2.0
Rion	Pre Amplifier	NH-25	76820
Rion	Microphone	UC-59	12816
Brüel & Kjær	Calibrator	4231	2394086
	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 29 April 2022

ANV Job No. UKAS22/04300

Date Calibrated 03 May 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
	05 May 2020	UCRT20/1392	0653

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Location D



CERTIFICATE OF CALIBRATION



0653

Date of Issue: 05 September 2022

Certificate Number: UCRT22/2064

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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
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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	00564808
	Rion	Firmware		2.0
	Rion	Pre Amplifier	NH-25	64933
	Rion	Microphone	UC-59	21306
	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 05 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
	15 September 2020	UCRT20/1867	0653

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Location E



CERTIFICATE OF CALIBRATION



Date of Issue: 15 September 2020

Certificate Number: UCRT20/1868

Calibrated at & Certificate issued by:

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K. Mistry

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The Tecpro Building
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Clonsaugh
Dublin 17
Ireland

Order No. 2074

Description Sound Level Meter / Pre-amp / Microphone / Associated Calibrator

Identification	Manufacturer	Instrument	Type	Serial No. / Version
	Rion	Sound Level Meter	NL-52	00564809
	Rion	Firmware		2.0
	Rion	Pre Amplifier	NH-25	64934
	Rion	Microphone	UC-59	09447
	Rion	Calibrator	NC-74	34536109
		Calibrator adaptor type if applicable		NC-74-002

Performance Class 1

Test Procedure TP 2.SLM 61672-3 TPS-49

Procedures from IEC 61672-3:2006 were used to perform the periodic tests.

Type Approved to IEC 61672-1:2002 YES Approval Number 21.21 / 13.02

If YES above there is public evidence that the SLM has successfully completed the applicable pattern evaluation tests of IEC 61672-2:2003

Date Received 14 September 2020

ANV Job No. UKAS20/09501

Date Calibrated 15 September 2020

The sound level meter submitted for testing has successfully completed the class 1 periodic tests of IEC 61672-3:2006, for the environmental conditions under which the tests were performed. As public evidence was available, from an independent testing organisation responsible for approving the results of pattern evaluation tests performed in accordance with IEC 61672-2:2003, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2002, the sound level meter submitted for testing conforms to the class 1 requirements of IEC 61672-1:2002.

Previous Certificate	Dated	Certificate No.	Laboratory
	22 August 2018	UCRT18/1866	0653

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