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REPORT ID**: 15427.00.T02.RP3**

East Durham Wind Energy Centre – Turbine T02
IEC 61400-11 Edition 3.0 Measurement Report

Prepared for:

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02 July 2019 – Revision # 3

Revision History

Revision Number	Description	Date
1	Issued test report	25/04/2017
2	Report revised for additional collected data	16/02/2018
3	Correction to Table 2 Rotor Diameter	02/07/2019

This report in its entirety, including appendices contains 114 pages.

Statement Qualifications and Limitations

This report was prepared by Aercoustics Engineering Limited in accordance with International Standard IEC 61400-11 (Edition 3.0, released 2012-11), "Wind turbine generator systems – Part 11: Acoustic noise measurement techniques". This report is specific only to the Wind Turbine identified in this report.

Aercoustics Engineering Limited shall not be responsible for any events or circumstances that may have occurred since the date on which the Wind Turbine was tested and/or this report was prepared, or for any inaccuracies contained in information that was provided to Aercoustics Engineering Limited. Further, Aercoustics Engineering Limited agrees that this report represents test data analysed as per the above described standard for the specific Wind Turbine described in this report, but Aercoustics Engineering Limited makes no other representations with respect to this report or any part thereof.

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Any use of this report is subject to this Statement of Qualifications and Limitations. Any damages arising from improper use of this report or parts thereof shall be borne by the party making such use.

This Statement of Qualifications and Limitations is attached to and forms part of this report.

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1 Introduction

Aercoustics Engineering Limited (Aercoustics) was retained by East Durham Wind LP ("East Durham") to conduct an acoustic measurement of turbine T02 at the East Durham Wind Energy Centre. The purpose of the measurement was to provide verification of the maximum noise emission of the turbine. The measurement was carried out in accordance with International Standard IEC 61400-11 (Edition 3.0, released 2012-11), "Wind turbine generator systems – Part 11: Acoustic noise measurement techniques". This report is specific only to Turbine T02.

2 Wind Turbine Information

2.1 Wind turbine equipment specific information

Wind turbine specific equipment information for turbine T02 was provided by East Durham and is summarized in Tables 1 – 5.

Table 1 - Wind Turbine Details

Wind Turbine Details	
Manufacturer	GE
Model Number	1.6 ESS
Turbine ID	16133860

Table 2 - Operating Details

Operating Details	
Vertical or Horizontal axis wind turbine	Horizontal
Upwind or downwind rotor	Upwind rotor
Hub height	80 m
Horizontal distance from rotor centre to tower axis	4.1 m
Diameter of rotor	100 m
Tower type (lattice or tube)	Tubular
Passive stall, active stall, or pitch controlled turbine	Pitch controlled turbine
Constant or variable speed	Variable speed
Power curve	Implied
Rotational speed at each integer standardised wind speed	NA
Rated power output	1.39 MW
Control software version	ToolboxST V04.07

Table 3 - Rotor Details

Rotor Details	
Rotor control devices	Rotor Details
Presence of vortex generators, stall strips, serrated trailing edges	ADVANCED LOAD CONTROL
Blade type	NO VORTEX STRIPS, DOES HAVE SERRATED TRAILING EDGES
Serial number	TPI IOWA LLC
Number of blades	20427, 50386, 60370

Table 4 - Gearbox Details

Gearbox Details	
Manufacturer	NANJING H.S. GEAR MANUFACTURING CC
Model number	FDMD
Serial number	FDMD-2315

Table 5 - Generator Details

Generator Details	
Manufacturer	GE Vietnam Co.
Model number	109W3457P001
Serial number	WTG-1308-048

2.2 Wind Turbine Location

Turbine T02 is in the municipality of West Grey, Ontario and is located approximately 590m East of Grey Road 23 and 1400m North of Grey Road 4. The area surrounding T02 consists of undulating farmland and tree lots. There is a tree line 40m West, 60m south, 169m East and 140m North of turbine T02.

A general layout of the area in which the turbine is located is provided in the site plan (Figure A.01).

3 Measurement Details

3.1 Measurement Equipment

3.1.1 Acoustic Measurement Equipment

A summary of acoustic equipment utilized by Aercoustics for the measurement of turbine T02 is summarized in Table 6.

Table 6 - Acoustic Measurement Equipment

Equipment	Manufacturer Name & Model	Serial Number
Acoustic Data acquisition system	LMS SCADA Mobile	22143211
Microphone	B&K 4189	2625197
Pre-amplifier	B&K 2671	2614901
Acoustic calibrator	B&K 4231	2513183

Calibration of the measurement setup was carried out before and after Aercoustics set of measurements.

3.1.2 Meteorological Equipment

Wind speed for Turbine ON was derived from the power curve (as per procedures outlined in IEC 61400-11). Wind direction for turbine ON measurements was utilized from the nacelle anemometer located at hub height (100m high) from turbine T02. Data for background measurements was obtained from a 10m high anemometer, which was placed as per guidelines outlined in IEC-61400-11The meteorological equipment is summarized in Table 7

Table 7 – Meteorological Measurement Equipment

Equipment	Manufacturer Name & Model	Serial Number
Anemometer	VAISALA WXT520	G4420002
Serial to Analog Converter	NOKEVAL 7470	A159784

3.2 Measurement Setup

3.2.1 Microphone Placement

The measurement microphone was setup 104m from the base of the turbine in 'Position 1', (i.e. downwind of the turbine, as per IEC 61400-11) at an elevation of 0m relative to the base of T02. The slant distance (R_1) from microphone location to rotor centre includes the distance from rotor center (hub) to tower axis (R_1 = 134.5m). The microphone was placed in the centre of a circular, acoustically reflective board.

During the measurement period only data points for which the microphone was within 15 degrees of downwind from the turbine were used. The microphone position relative to

downwind of the turbine was monitoring via the yaw angle output provided from the turbine system (discussed further in Section 3.5). During placement of the microphone the turbine was parked and the reference yaw angle for that measurement logged.

When measurements of T02 were taken, the surrounding land was bare farm land with light snow. There were no nearby reflecting surfaces (houses, barns etc.); as such the influence from reflecting surfaces was considered to be negligible.

Photos of the measurement setup are provided in Figure A.02, Appendix A.

3.2.2 Double Windscreen Setup

A double windscreen setup was not utilized.

3.3 Measurement Schedule

Table 8 provides a summary of the test date and times. Data was logged in 10 second intervals for post-processing (as per the measurement standard).

Table 8 - Measurement Schedule Summary

Date	Test Type	Start Time	Finish time
November 23, 2017	Turbine ON	11:34am	11:54am
	Turbine ON	11:54am	12:10pm
	Turbine ON	12:11pm	12:30pm
	Background	12:32pm	1:17pm
	Turbine ON	1:27pm	2:31pm
	Background	2:47pm	3:00pm
November 28, 2017	Turbine ON	11:13am	11:48am
	Turbine ON	12:00pm	12:35pm
	Background	3:13pm	3:46pm
	Turbine ON	3:51pm	4:11pm

3.4 Meteorological Conditions

Detailed meteorological data relevant to the measurement is provided in Appendix E.

As previously mentioned, wind speed for Turbine ON was derived from T02's power curve (as per the standard), while wind direction was provided by T02's nacelle anemometer (located at hub height). Background data was obtained from an anemometer located 10m above ground level near T02.

Temperature and pressure readings during the measurement period were provided by the 10m anemometer, located near turbine T02 for the duration of Aercoustics measurements.

3.5 Turbine operational information

Output data from the turbine (Power, yaw, RPM, pitch angle, and nacelle wind speed) were obtained as analog output signals that were simultaneously acquired with the acoustic and anemometer measurement data using Aercoustics data acquisition system.

4 Measurement Results

4.1 Deviations from IEC-61400-11 Edition 3.0

No deviations.

4.2 Special Notes & Considerations

There were no other turbines in the immediate vicinity of T02.

Data available from different measurement series with differing environmental conditions were encountered during testing at T02. As can be seen in Figure C.03 there is a significant difference between the background data on the two separate test days, therefore it is inappropriate to combine both data sets by pooling them together into one dataset. Data available from different measurement series with differing environmental conditions have been combined by analysing the periods separately and combining the results. When there are overlapping results then the method of weighted means, defined in Annex H of the amendment to Edition 3.0 of the IEC 61400-11 standard, has been used to combine these into a single result. Annex H is provided in Appendix F.

The tonal analysis is based on pooling all available data as per recommendations made by the IEC technical committee.

4.3 Analysis Details

The following section outlines analysis of the measurement data acquired for T02. The data presented is exclusive of transient events such as vehicle traffic, wildlife, air traffic etc. The site has been assessed to have a roughness length of 0.05m, representative of farmland with some vegetation.

4.3.1 Double Windscreen Adjustment

As previously mentioned, no double wind screen was used, as such the measurement data did not require adjustment.

4.3.2 Wind Speed Correction

The wind speed for each measurement data point for Turbine ON was derived through the power curve (as per Section 8.2.1.1 of IEC-61400-11). For data points during Turbine ON that were outside the allowed range of the power curve, the wind speed was derived from the nacelle anemometer wind speed (as specified in Section 8.2.1.2 of IEC-61400-11).

Background wind speed was derived utilizing data acquired with the 10m anemometer and normalizing the wind speed (as per Section 8.2.2 of IEC-61400-11).

Table 9 - Calculated nacelle anemometer (k_nac) and 10m (k_Z) wind speed k-factor

Test Day	k_nac	k_Z
Test Day 1	1.01	1.84
Test Day 2	1.06	1.64

4.4 Type B uncertainties

Type B uncertainties were obtained through interpretation of information provided in Annex C of IEC-61400-11, and instrument uncertainties obtained from the calibration certificate. A summary of Type B uncertainties is provided in Table 10, while detailed information (including data in 1/3 octave) is provided in Appendix C.

Table 10 - Summary of Type B uncertainties

Component	Typical (dB)	Used (dB)
Calibration	0.2	0.2
Board	0.3	0.3
Distance & direction	0.1	0.1
Air absorption	0	0
Weather conditions	0.5	0.5
Wind speed measured	0.7	0.7
Wind speed derived	0.2	0.2
Wind speed from power curve	0.2	0.2

4.5 Sound Pressure Level Measurements

Sound pressure level measurements are summarized in Table 11 and Table 12. Detailed 1/3 Octave band spectrum data, respective uncertainties, and analysis plots are provided in Appendix C. A copy of the measurement data used for analysis is provided in Appendix E and includes meteorological and turbine operational data.

Table 11 - Summary of Sound Pressure Level Measurements – Test Day 1

Wind Speed (m/s)	Turbine ON		Background		Turbine ON, Background adjusted L_{eq}, (dBA)
	L_{eq}, (dBA)	# of data pts	L_{eq}, (dBA)	# of data pts	
6.5	52.4	92	40.5	28	52.1
7	53.3	105	40.9	29	53.0
7.5	53.6	51	40.9	31	53.3
8	53.9	32	39.9	28	53.7
8.5	53.9	11	40.5	22	53.7
9	53.9	14	40.0	10	53.8
9.5	53.5	9	41.0	22	53.2
10	53.6	3	40.7	21	53.4
10.5	53.6	1	40.0	4	53.4

Table 12 - Summary of Sound Pressure Level Measurements – Test Day 2

Wind Speed (m/s)	Turbine ON		Background		Turbine ON, Background adjusted L_{eq}, (dBA)
	L_{eq}, (dBA)	# of data pts	L_{eq}, (dBA)	# of data pts	
6.5	52.2	2	50.4	14	**
7	54.0	5	51.0	16	51.9*
7.5	54.2	7	50.0	15	52.5*
8	55.1	9	49.9	24	53.6*
8.5	55.5	9	50.4	23	54.1*
9	54.9	7	50.3	20	53.4*
9.5	55.2	15	50.6	18	53.6*
10	54.8	14	49.9	27	53.2*
10.5	55.2	24	49.8	28	53.8*

Values marked with an asterisk * denote 3 to 6 dB difference between Turbine ON and Background
Values marked with two asterisk ** denote less than 3 dB difference between Turbine ON and Background and are not reported

4.6 Sound Power Level of Turbine

The calculated sound power level of the turbine T02 (as per IEC 61400-11) is summarized in Table 13 (hub height) and Table 14 (10m height). Detailed 1/3 Octave band spectrum data and respective uncertainties are provided in Appendix C.

Table 13 - $L_{WA,\,K}$ at each integer wind speed

Wind Speed (m/s)	Apparent L_{WA}, (dBA)	Uncertainty (dB)
6.5	99.6	0.8
7	100.6	0.7
7.5	100.9	0.7
8	101.3	0.7
8.5	101.2	0.7
9	101.3	0.8
9.5	101.1*	1.1
10	100.8*	1.1
10.5	101.4*	1.0

Values marked with an asterisk * denote 3 to 6 dB difference between Turbine ON and Background

Table 14 - $L_{WA\ 10m,\,K}$ at each integer wind speed

Wind Speed (m/s)	Apparent L_{WA}, (dBA)	Uncertainty (dB)
4	97.8	1.1
5	100.1**	1.7
6	101.2**	1.9
7	101.0**	1.6
8	101.5*	1.0

Values marked with an asterisk * denote 3 to 6 dB difference between Turbine ON and Background
Values marked with two asterisks ** denote Sound Power Level determined by combination of data from two test days by method of weighted means

4.7 Tonality Analysis

The tonality analysis for Turbine T02 is summarized in Table 15, while plots of narrow band spectra at each wind speed are provided in Appendix D. The ΔL_{tn} and ΔL_a values reported represent the energy average of all data points with an identified tone that falls within the same frequency origin (as specified in Section 9.5.8 in IEC-61400-11).

The narrow band spectra provided in the plots represents an energy average of all data points in the given wind speed bin for both Turbine ON and Background.

Table 15 - Tonality Assessment Summary

Wind Speed (m/s)	Frequency (Hz)	Tonality, ΔL_{tn} (dB)	Tonal audibility, ΔL_a (dB)	FFT's with tones	Total # of FFT's	Presence (%)
6.5	532	-0.4	2.0	36	94	38%
7	528	-1.9	0.5	49	110	45%
	565	-3.8	-1.5	39	110	35%
	1140	-2.7	0.2	25	110	23%
7.5	135	-3.5	-1.5	50	58	86%
	1142	-2.4	0.6	14	58	24%
8	137	-2.0	0.0	40	41	98%
8.5	135	-1.5	0.5	20	20	100%
9	135	0.5	2.5	16	21	76%
	1161	-2.3	0.6	8	21	38%
9.5	137	0.1	2.1	24	24	100%
	1120	-3.9	-1.0	9	24	38%
10	137	-0.6	1.4	17	17	100%
10.5	137	0.0	2.0	24	25	96%

5 Closure

Measurements and analysis were carried on Turbine T02 of the East Durham Wind Energy Centre, located in the municipality of West Grey, Ontario as per International IEC 61400-11 (Edition 3.0, released 2012-11), "Wind turbine generator systems – Part 11: Acoustic noise measurement techniques".

Should you have any questions or comments please do not hesitate to contact the authors of this report.

6 References

1. International Standard IEC 61400-11 (Edition 3.0, released 2012-11), "Wind turbine generator systems – Part 11: Acoustic noise measurement techniques".

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Appendix A
Site Details

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15427.00.T02.RP3	**Project Name**
Scale: NTS Drawn by: AM Reviewed by: PA Date: April 18, 2017 Revision: 1	East Durham Wind Energy Centre - Turbine T02 - IEC61400-11 Edition 3.0
	Figure Title Site Plan

Figure A.01

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15427.00.T02.RP3

Scale: NTS
Drawn by: AM
Reviewed by: PA
Date: Feb 15, 2018
Revision: 1

Project Name

East Durham Wind Energy Centre - Turbine T02 - IEC61400-11 Edition 3.0

Figure Title

Site Photos

Figure A.02

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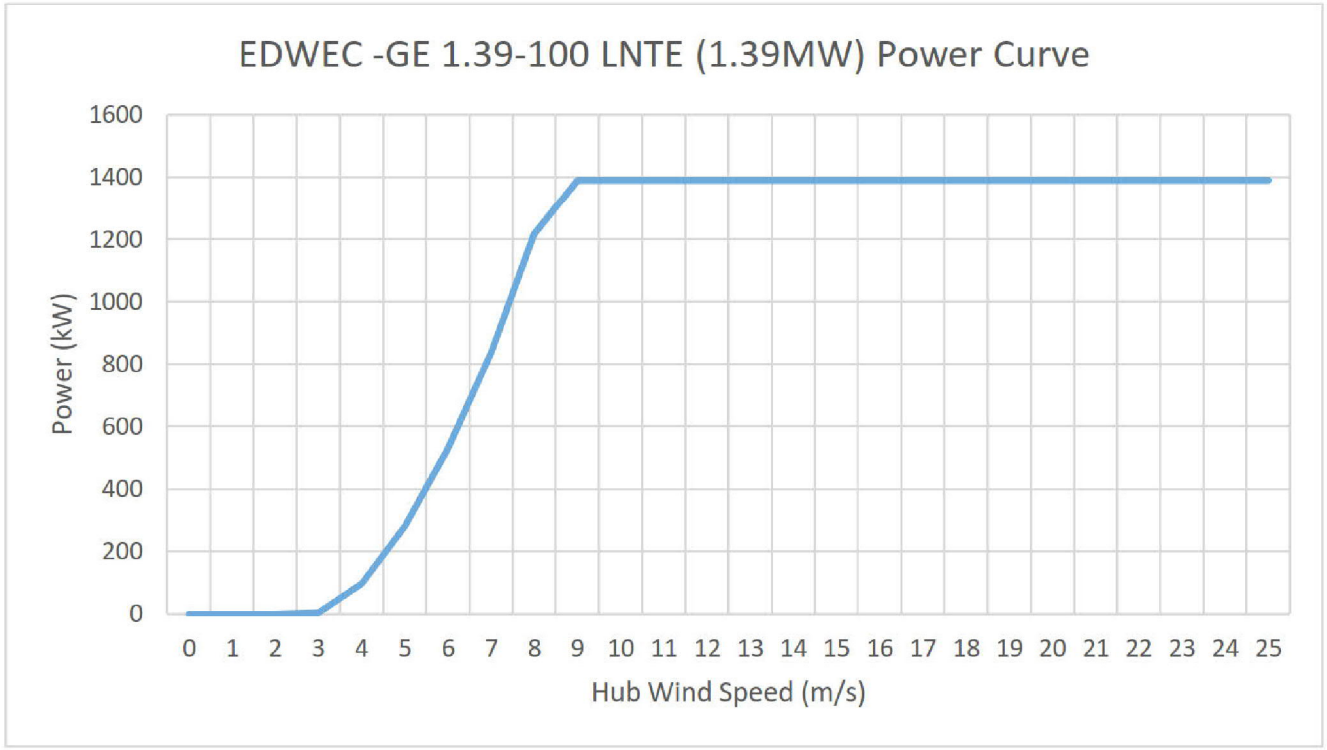
Appendix B
Turbine Information



Power Curve	
Hub Wind Speed (m/s)	Power [kW]
0	0
1	0
2	0
3	4
4	97
5	280
6	526
7	835
8	1216
9	1390
10	1390
11	1390
12	1390
13	1390
14	1390
15	1390
16	1390
17	1390
18	1390
19	1390
20	1390
21	1390
22	1390
23	1390
24	1390
25	1390

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15427.00.T02.RP3

Scale: NTS
Drawn by: AM
Reviewed by: PA
Date: Feb 15, 2018
Revision: 1

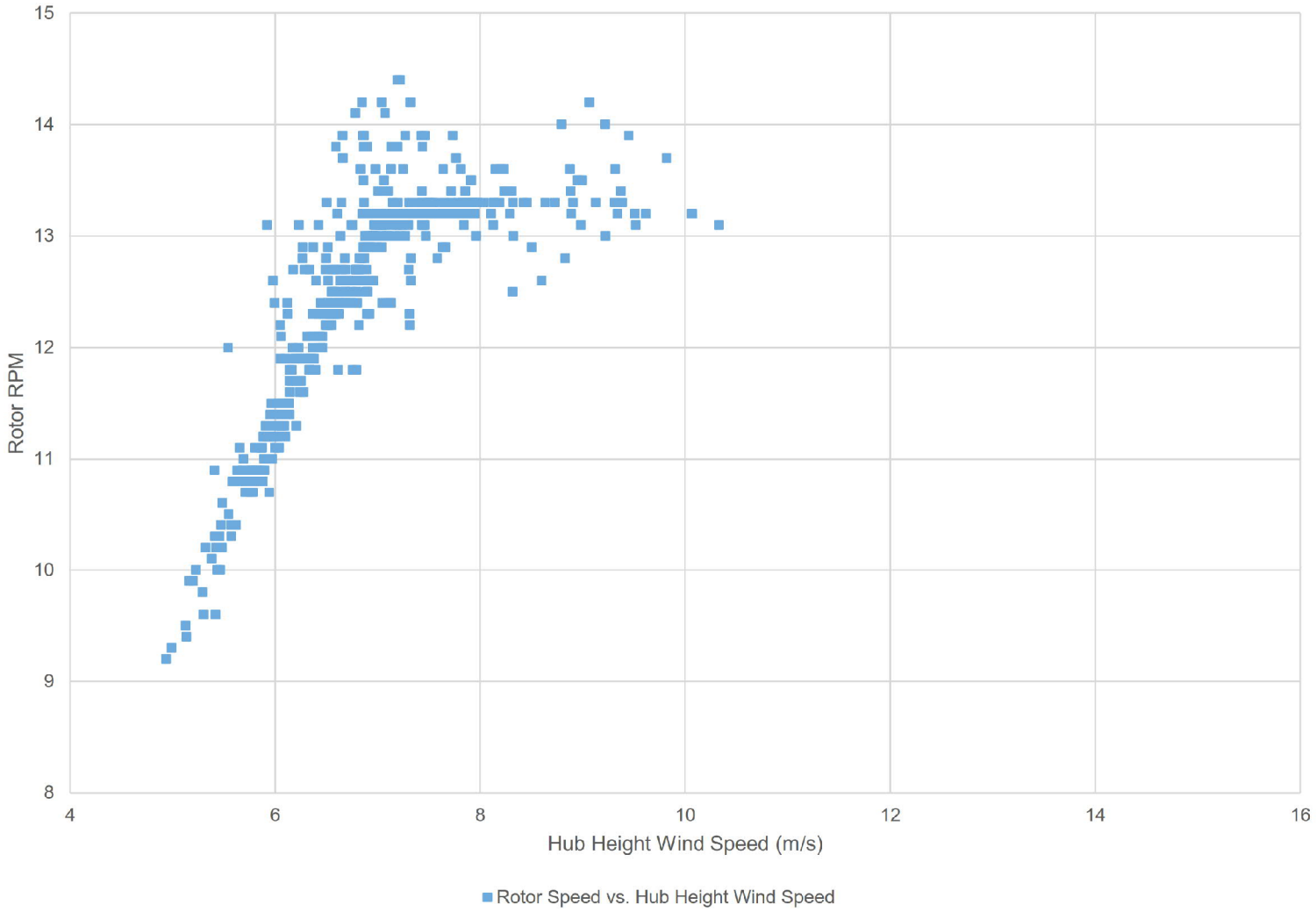
Project Name

East Durham Wind Energy Centre - Turbine T02 - IEC61400-11 Edition 3.0

Figure Title

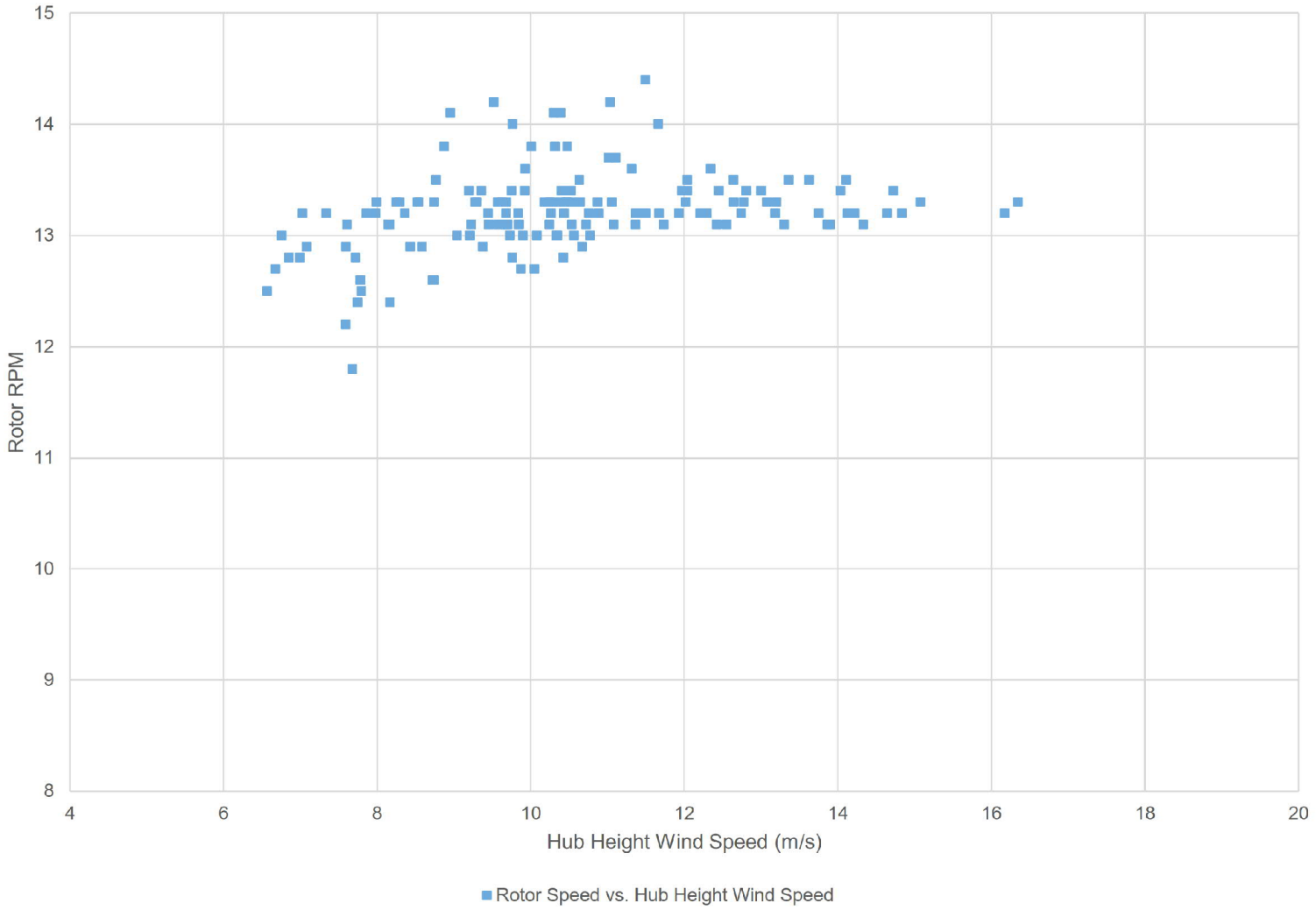
Power Curve

Figure B.01



aercoustics	15427.00.T02.RP3 Scale: NTS Drawn by: AM Reviewed by: PA Date: Feb 15, 2018 Revision: 1	**Project Name** East Durham Wind Energy Centre - Turbine T02 - IEC61400-11 Edition 3.0 **Figure Title** Rotor RPM vs. wind speed – Data Series 1

Figure B.02



aercoustics	15427.00.T02.RP3 Scale: NTS Drawn by: AM Reviewed by: PA Date: Feb 15, 2018 Revision: 1	**Project Name** East Durham Wind Energy Centre - Turbine T02 - IEC61400-11 Edition 3.0 **Figure Title** Rotor RPM vs. wind speed – Data Series 2

Figure B.03

Table B.01 allowed range of power curve and required wind speeds

Project: East Durham Wind Energy Centre - Turbine T02 - IEC 61400-11 Measurement

Report ID: 15427.00.T02.RP3

Created on: 2/16/2018

Power Curve & Required Wind Speeds		
Power Curve Tolerance	1%	
Acceptable range min	3	m/s
Acceptable range max	8	m/s
Min allowable range	2.5	m/s
Max allowable range	8.5	m/s
Power Output	1390	kW
85% Power	1181.5	kW
Corresponding wind speed	7.91	m/s
Minimum bin	6.5	m/s
Maximum bin	10.5	m/s

Power Curve Hub Wind Speed (m/s)	Power [kW]	+ value = acceptable slope of power curve
0	**0**	-27.8
1	0	-27.8
2	0	-23.8
3	4	65.2
4	97	155.2
5	280	218.2
6	526	281.2
7	835	353.2
8	1216	146.2
9	1390	-27.8
10	1390	-27.8
11	1390	-27.8
12	1390	-27.8
13	1390	-27.8
14	1390	-27.8
15	1390	-27.8
16	1390	-27.8
17	1390	-27.8
18	1390	-27.8
19	1390	-27.8
20	1390	-27.8
21	1390	-27.8
22	1390	-27.8
23	1390	-27.8
24	1390	-27.8
25	1390	

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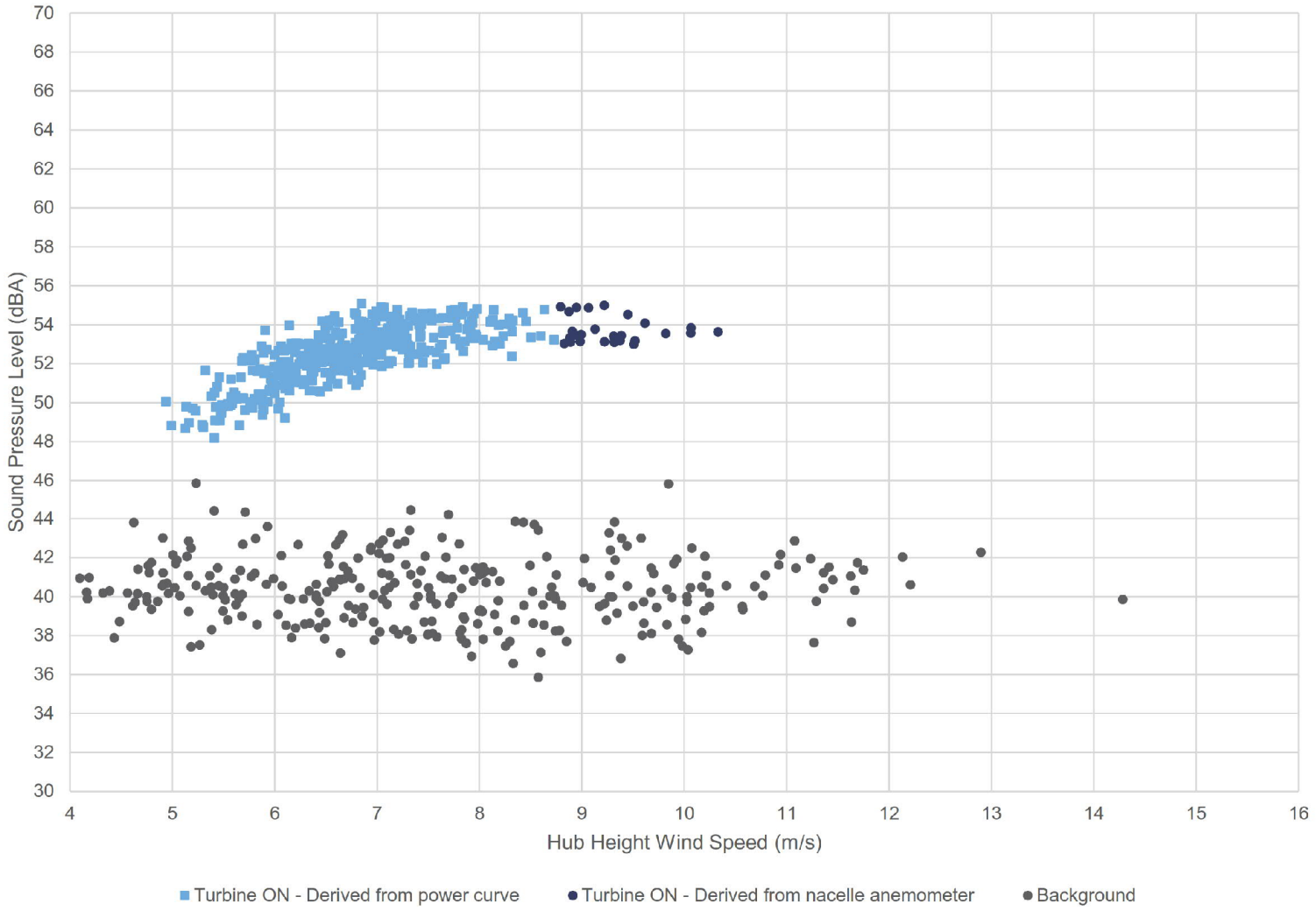
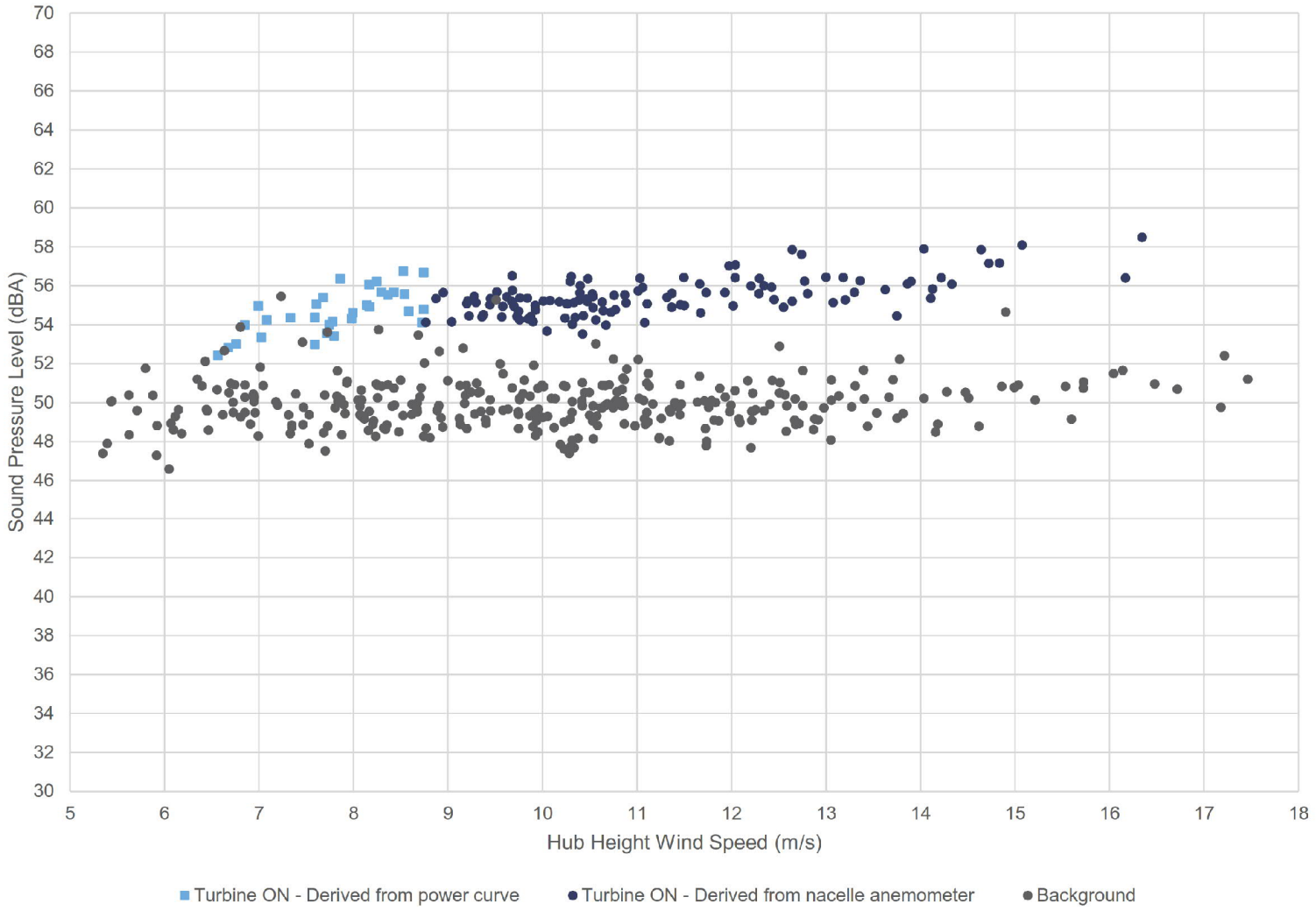
Appendix C
Apparent Sound Power Level



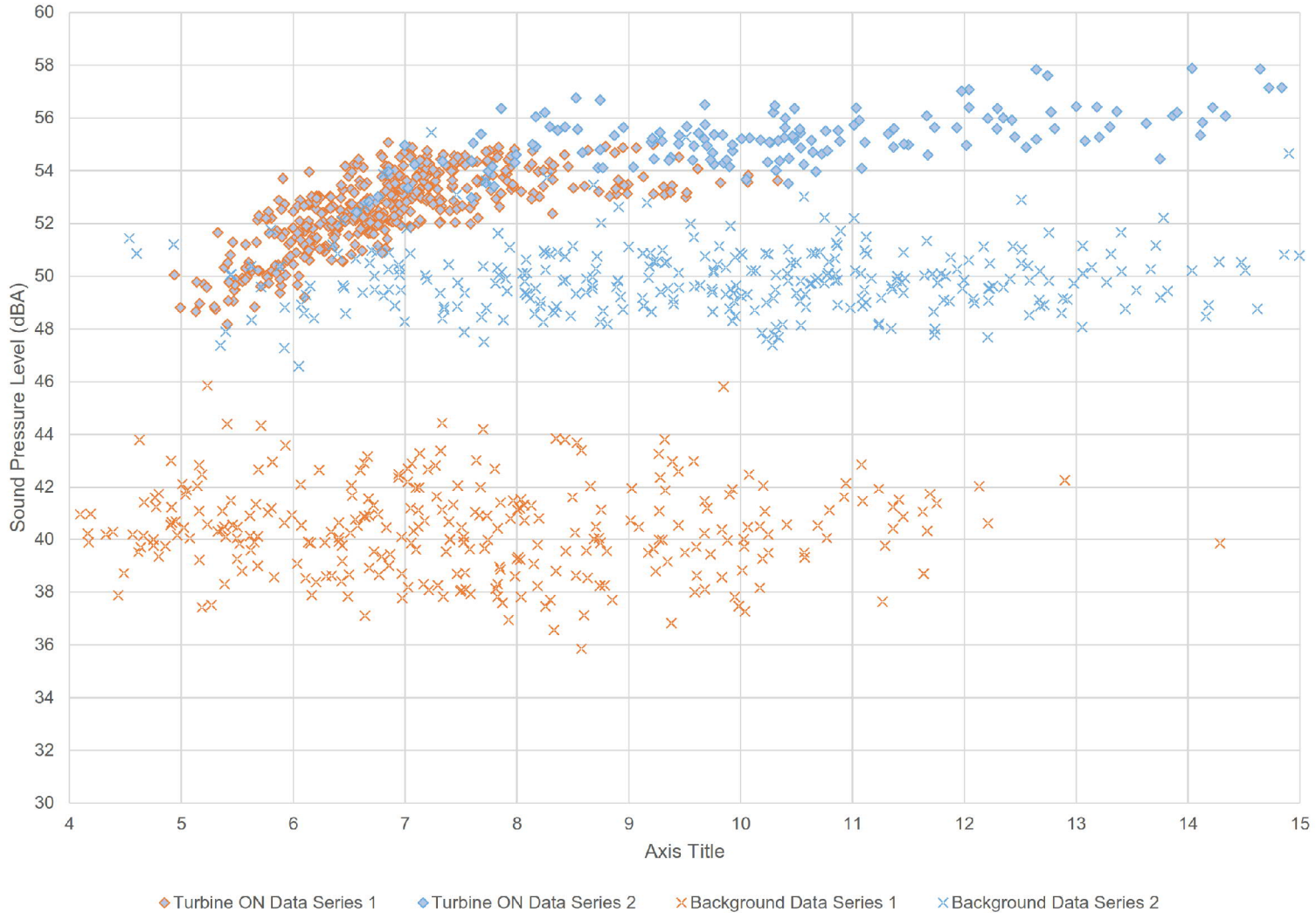
aercoustics	15427.00.T02.RP3 Scale: NTS Drawn by: AM Reviewed by: PA Date: Feb 15, 2018 Revision: 1	**Project Name** East Durham Wind Energy Centre - Turbine T02 - IEC61400-11 Edition 3.0 **Figure Title** Plot of overall measurement data pairs at Position 1 (Turbine ON &Background) – Data Series 1

Figure C.01



aercoustics	15427.00.T02.RP3 Scale: NTS Drawn by: AM Reviewed by: PA Date: Feb 15, 2018 Revision: 1	**Project Name** East Durham Wind Energy Centre - Turbine T02 - IEC61400-11 Edition 3.0 **Figure Title** Plot of overall measurement data pairs at Position 1 (Turbine ON &Background) – Data Series 2

Figure C.02



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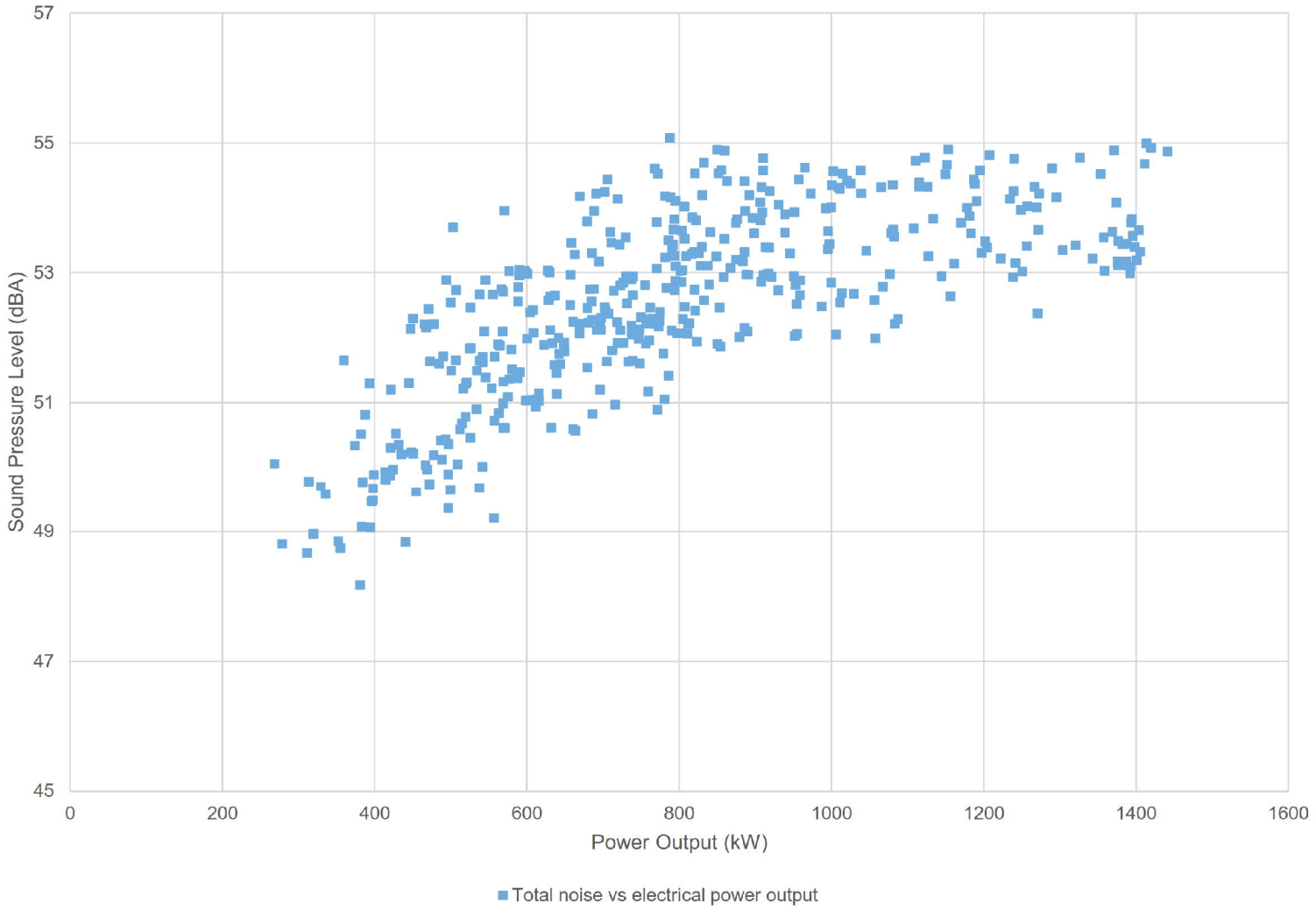
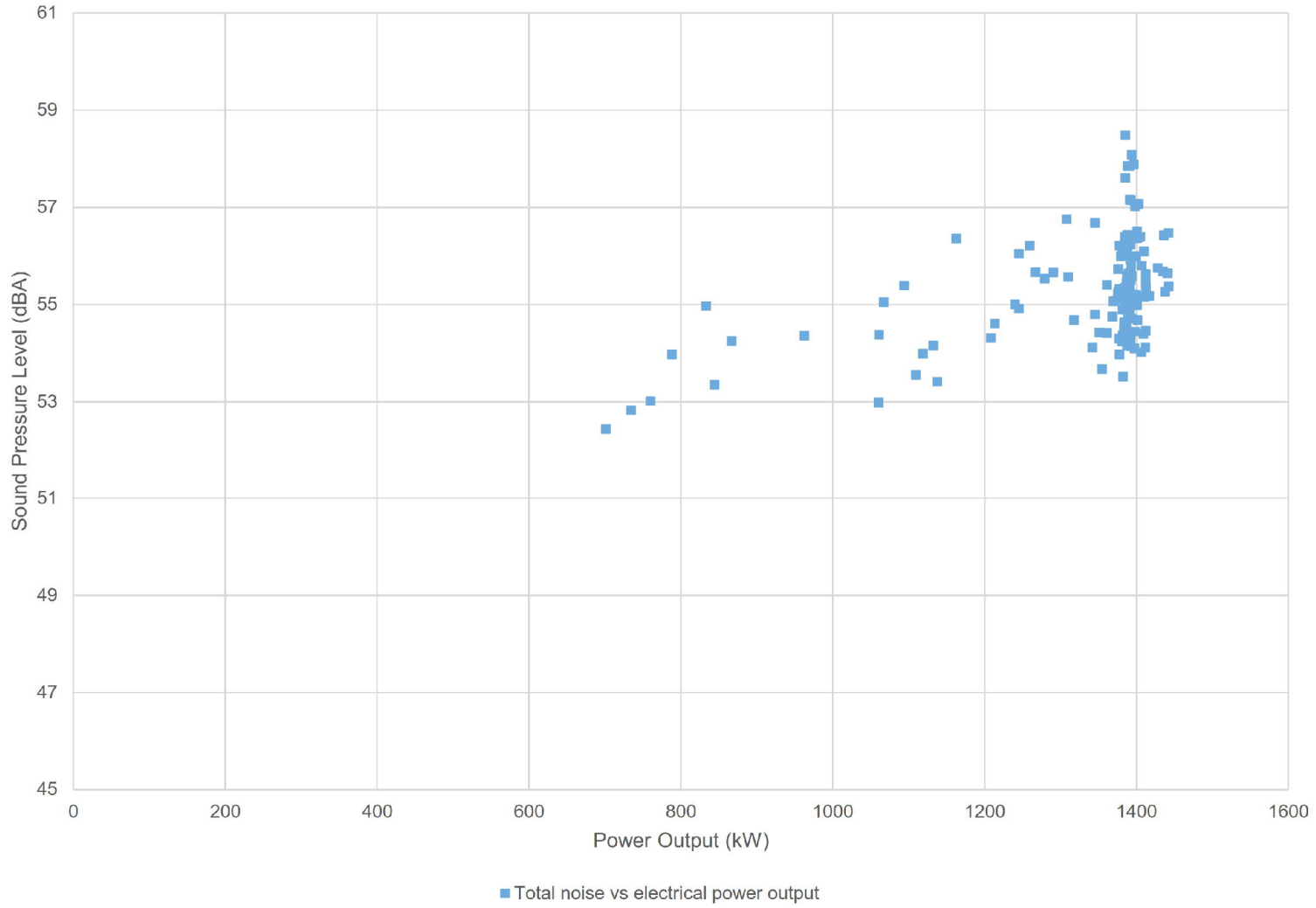
15427.00.T02.RP3	**Project Name**
Scale: NTS Drawn by: AM Reviewed by: PA Date: Feb 15, 2018 Revision: 1	East Durham Wind Energy Centre - Turbine T02 - IEC61400-11 Edition 3.0
	Figure Title Plot of overall measurement data pairs at Position 1 (Turbine ON &Background) – Data Series 1 and 2

Figure C.03



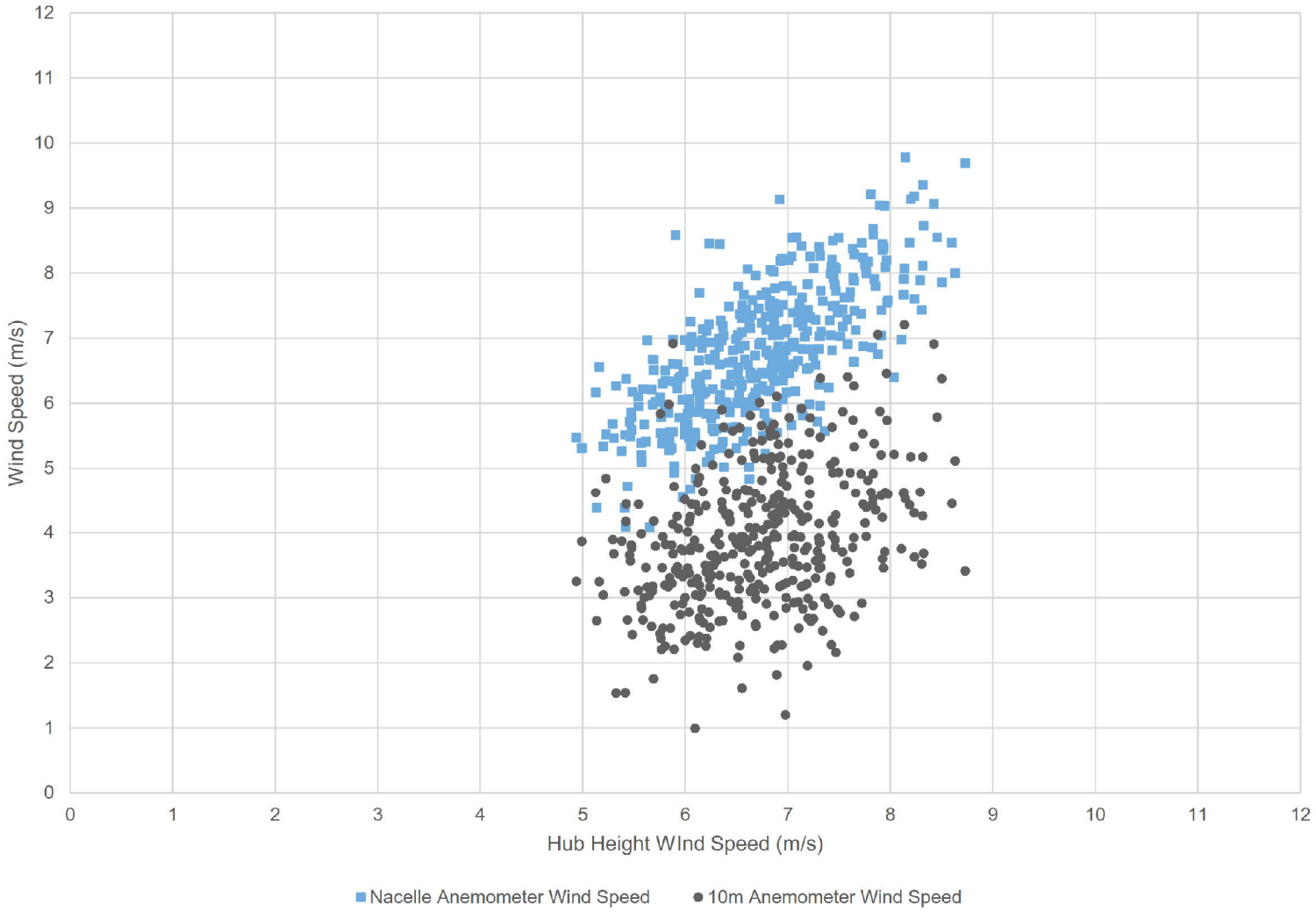
aercoustics	15427.00.T02.RP3 Scale: NTS Drawn by: AM Reviewed by: PA Date: Feb 15, 2018 Revision: 1	**Project Name** East Durham Wind Energy Centre - Turbine T02 - IEC61400-11 Edition 3.0 **Figure Title** Plot of measured total noise vs electrical power output – Data Series 1

Figure C.04



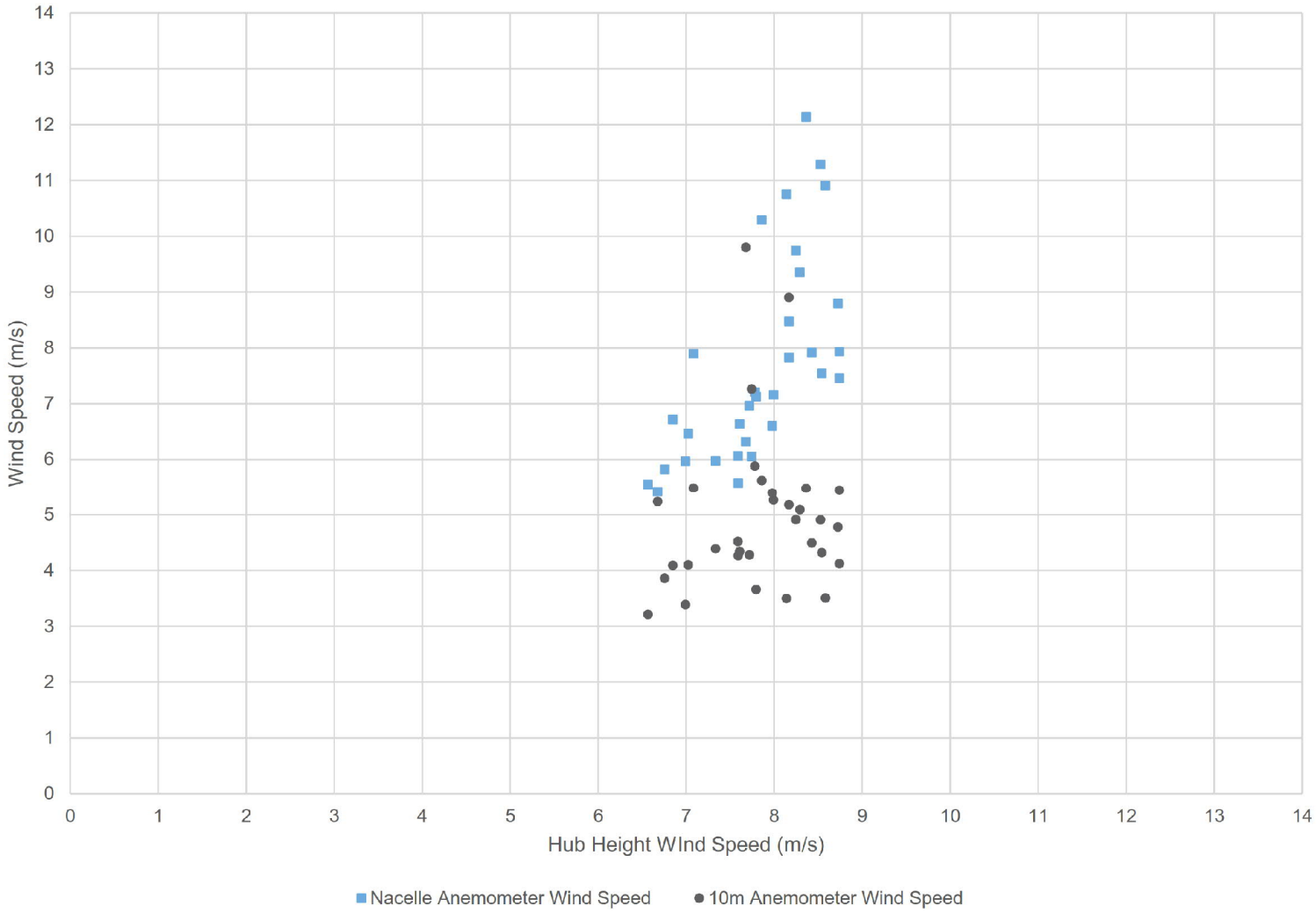
aercoustics	15427.00.T02.RP3 Scale: NTS Drawn by: AM Reviewed by: PA Date: Feb 15, 2018 Revision: 1	**Project Name** East Durham Wind Energy Centre - Turbine T02 - IEC61400-11 Edition 3.0 **Figure Title** Plot of measured total noise vs electrical power output – Data Series 2

Figure C.05



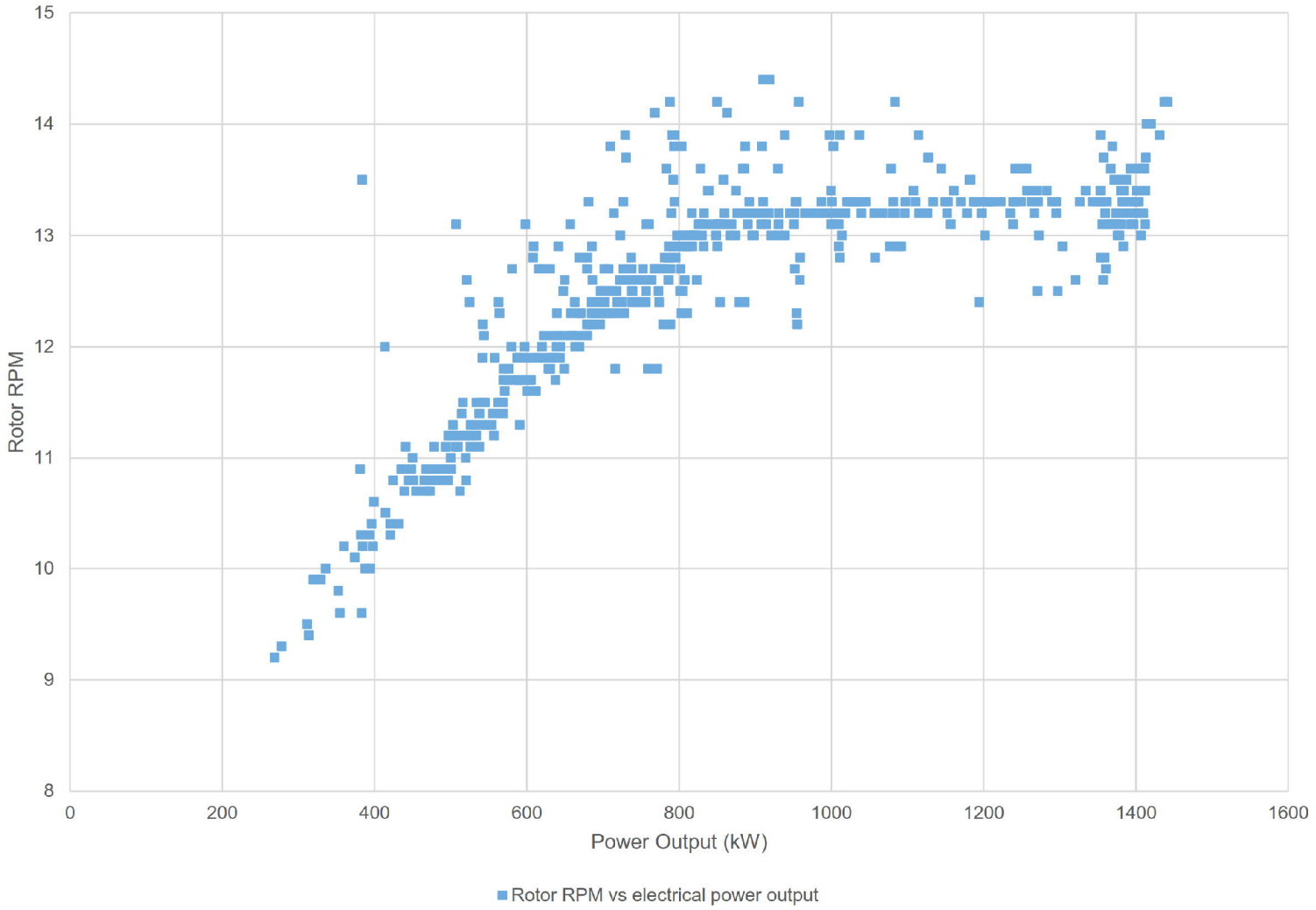
aercoustics	15427.00.T02.RP3 Scale: NTS Drawn by: AM Reviewed by: PA Date: Feb 15, 2018 Revision: 1	**Project Name** East Durham Wind Energy Centre - Turbine T02 - IEC61400-11 Edition 3.0 **Figure Title** Plot of power curve relative to nacelle anemometer and 10m anemometer – Data Series 1

Figure C.06



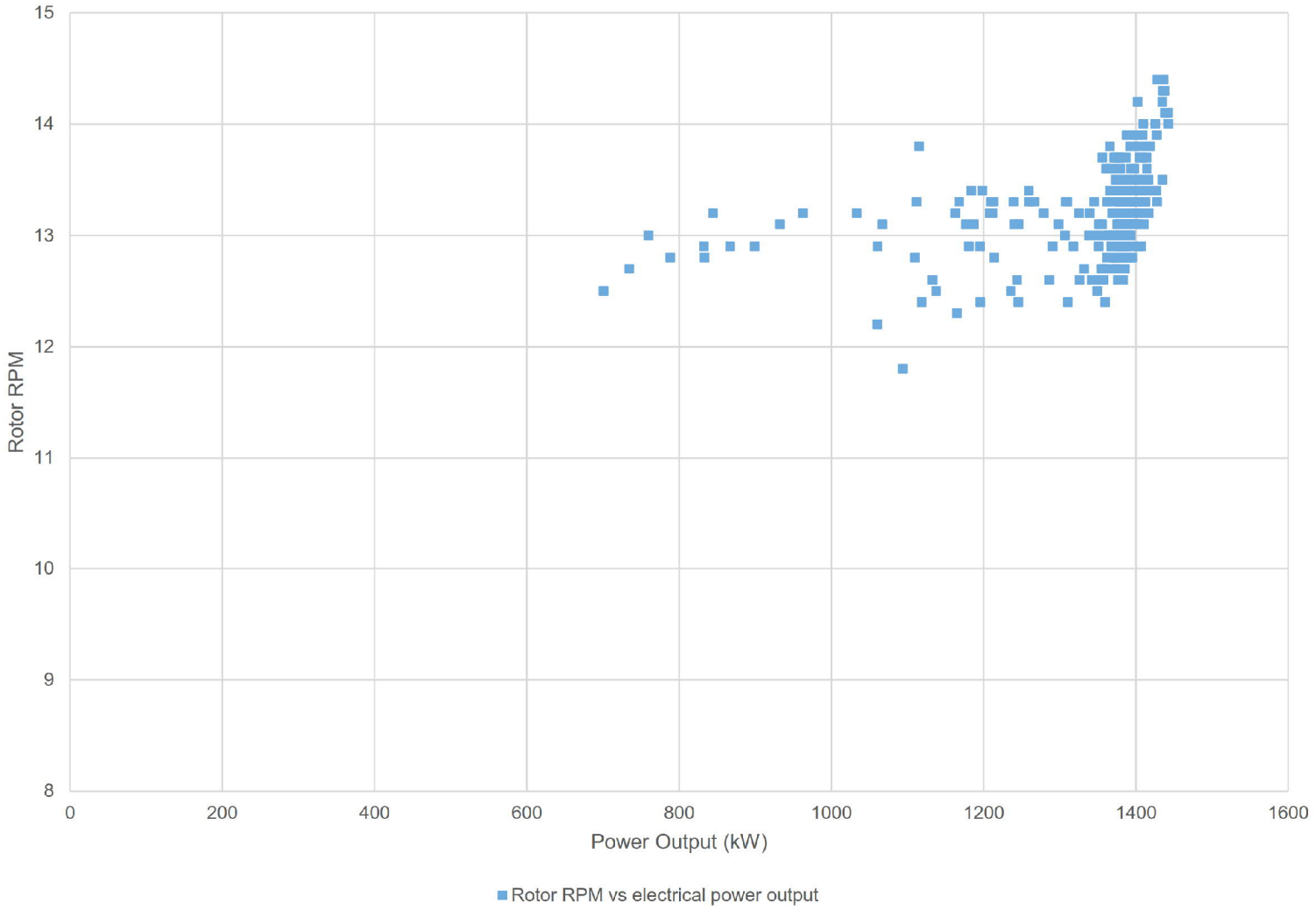
aercoustics	15427.00.T02.RP3 Scale: NTS Drawn by: AM Reviewed by: PA Date: Feb 15, 2018 Revision: 1	**Project Name** East Durham Wind Energy Centre - Turbine T02 - IEC61400-11 Edition 3.0 **Figure Title** Plot of power curve relative to nacelle anemometer and 10m anemometer – Data Series 2

Figure C.07



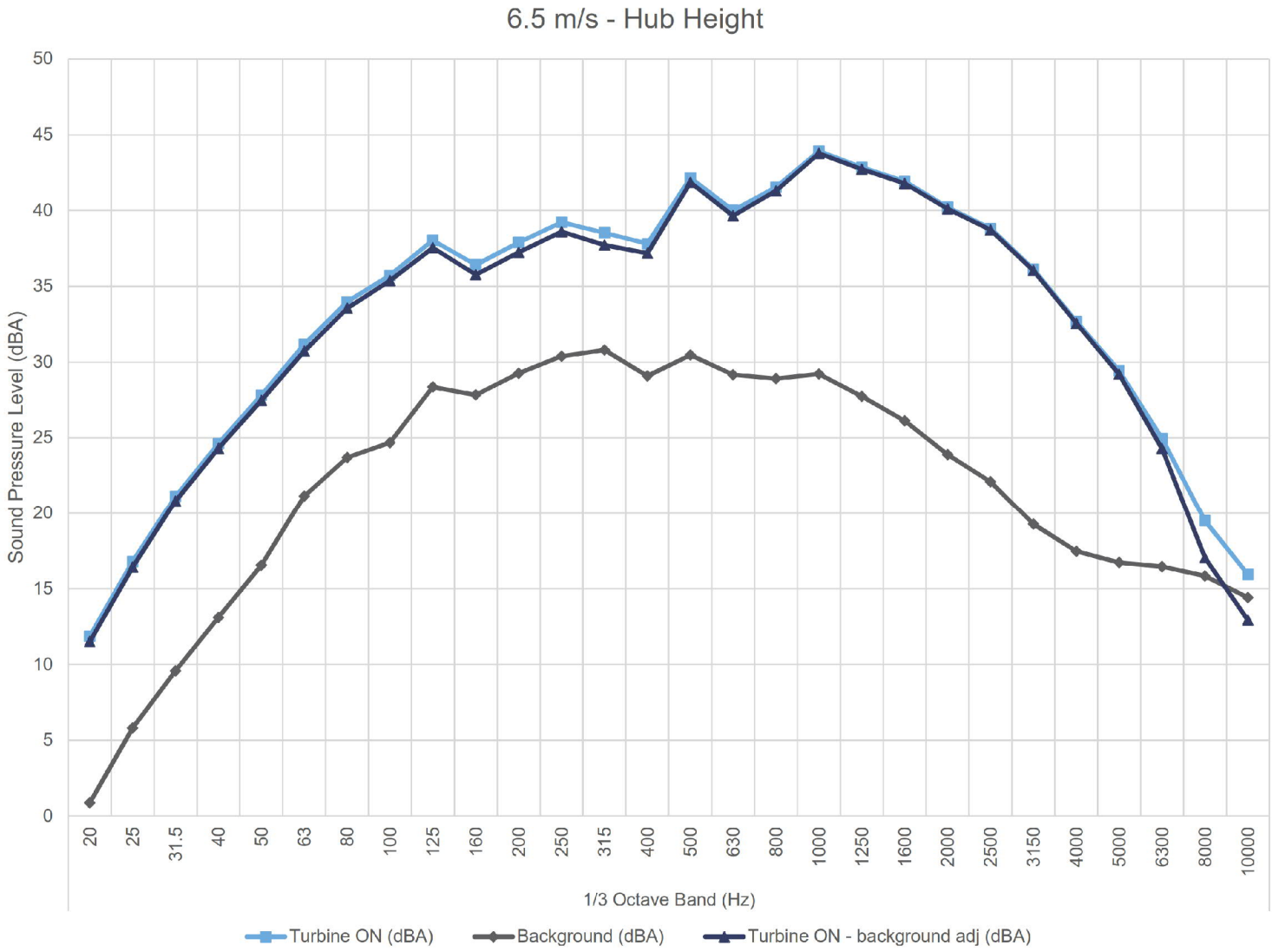
aercoustics	15427.00.T02.RP3 Scale: NTS Drawn by: AM Reviewed by: PA Date: Feb 15, 2018 Revision: 1	**Project Name** East Durham Wind Energy Centre - Turbine T02 - IEC61400-11 Edition 3.0 **Figure Title** Plot of rotor RPM vs. electrical power output – Data Series 1

Figure C.08



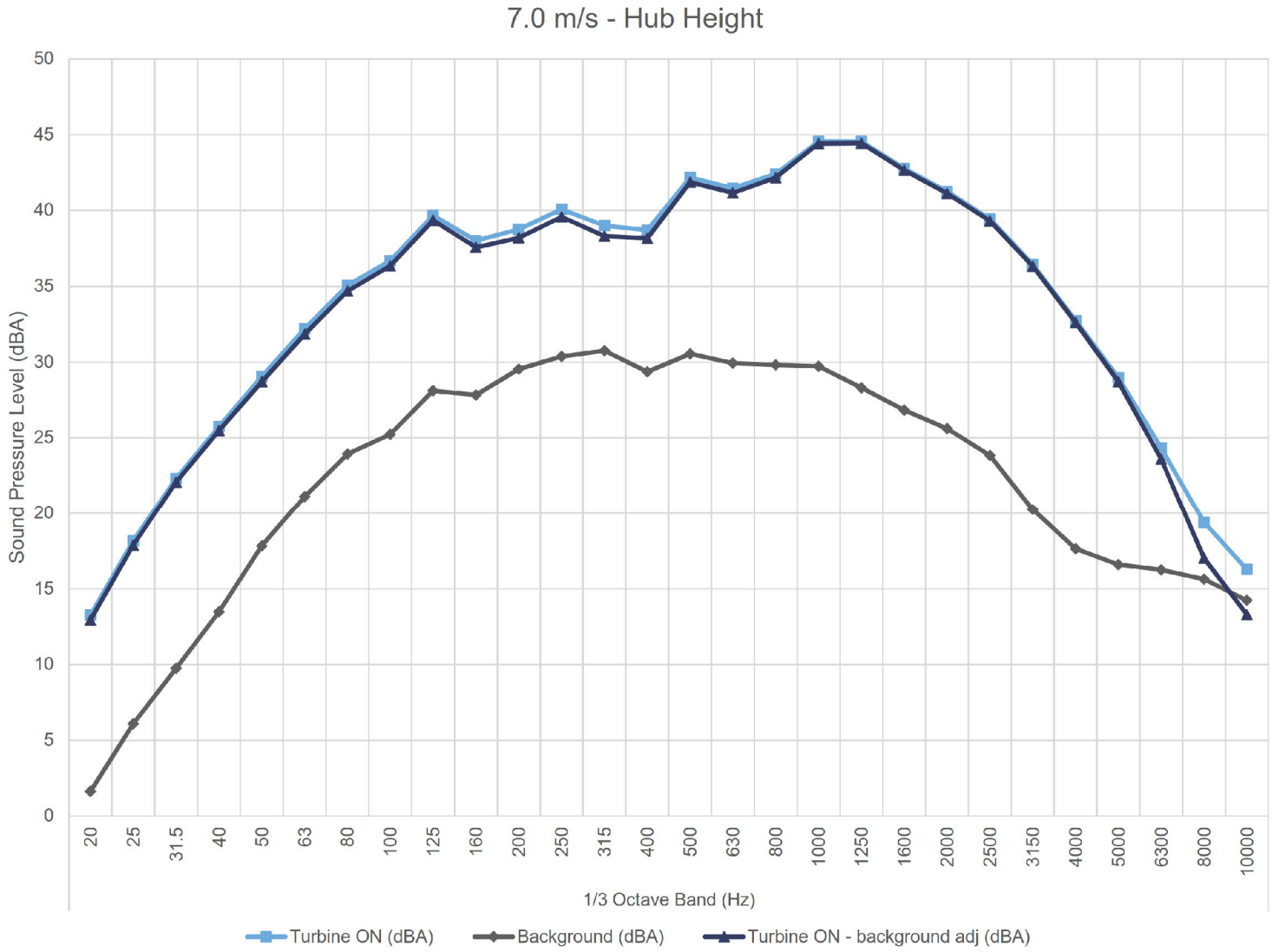
aercoustics	15427.00.T02.RP3 Scale: NTS Drawn by: AM Reviewed by: PA Date: Feb 15, 2018 Revision: 1	**Project Name** East Durham Wind Energy Centre - Turbine T02 - IEC61400-11 Edition 3.0 **Figure Title** Plot of rotor RPM vs. electrical power output – Data Series 2

Figure C.09



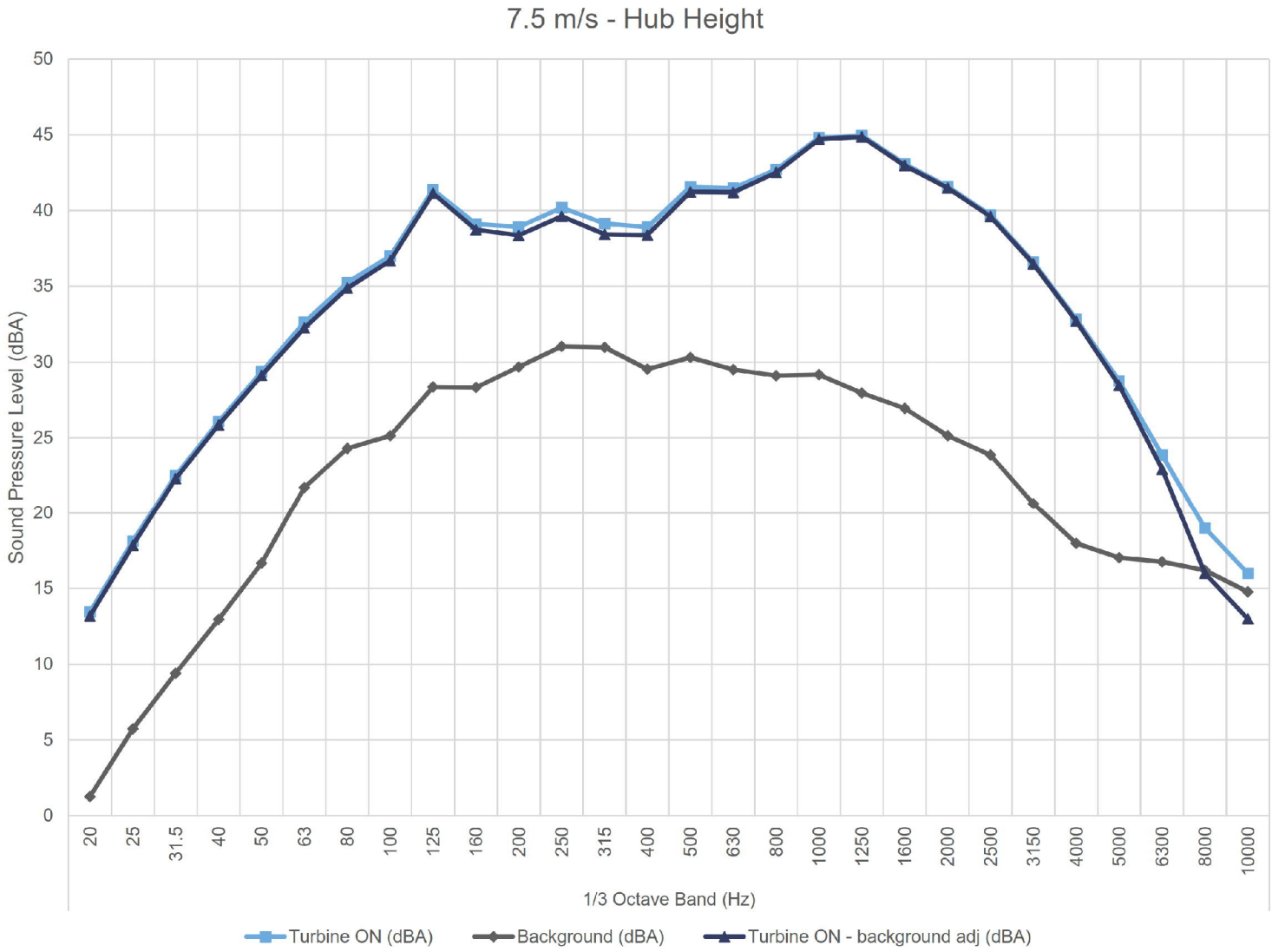
aercoustics	15427.00.T02.RP3 Scale: NTS Drawn by: AM Reviewed by: PA Date: Feb 15, 2018 Revision: 1	**Project Name** East Durham Wind Energy Centre - Turbine T02 - IEC61400-11 Edition 3.0 **Figure Title** Plot of sound pressure spectrum in 1/3 Octave at 6.5 m/s – Data Series 1

Figure C.10



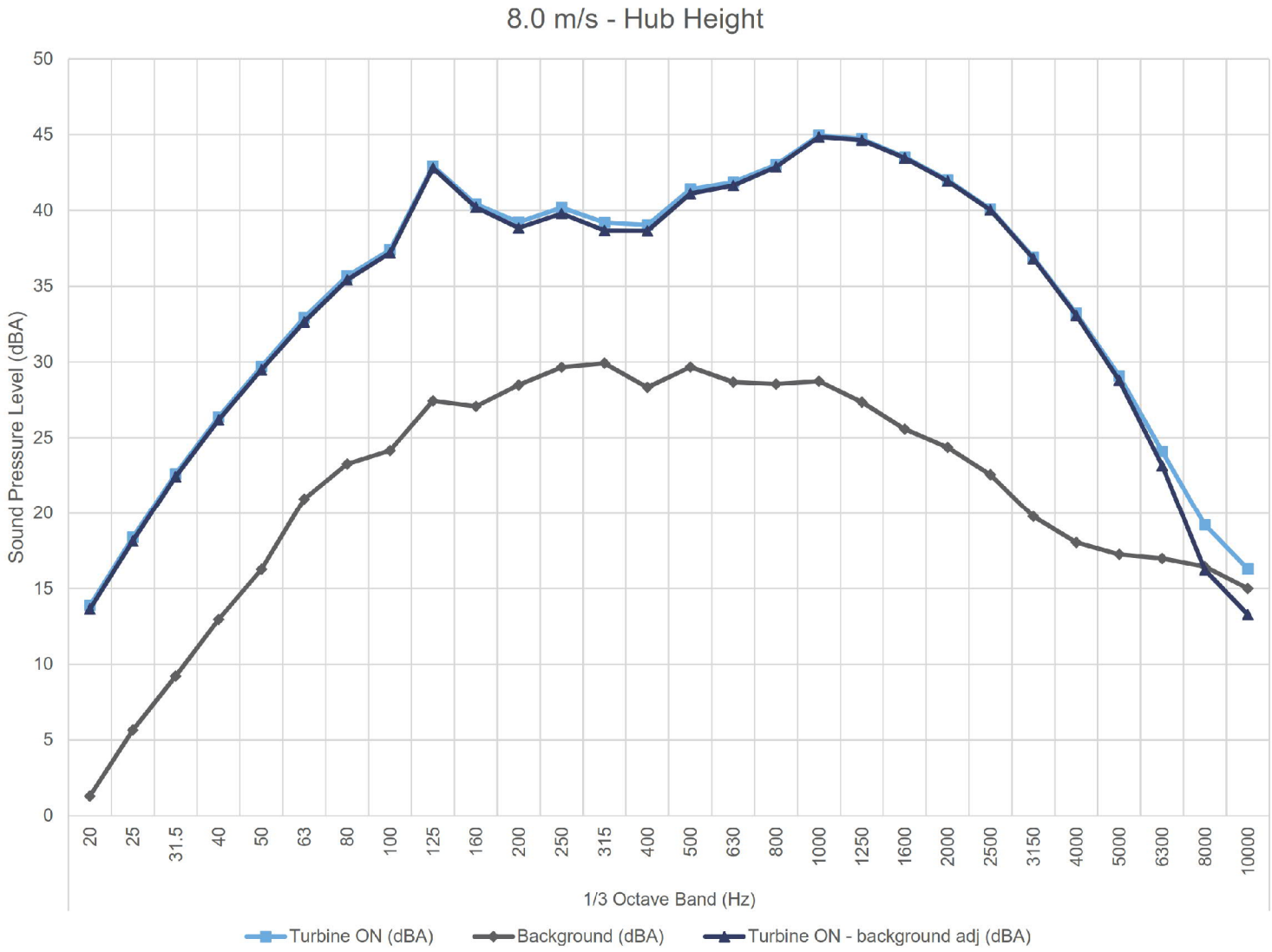
aercoustics	15427.00.T02.RP3 Scale: NTS Drawn by: AM Reviewed by: PA Date: Feb 15, 2018 Revision: 1	**Project Name** East Durham Wind Energy Centre - Turbine T02 - IEC61400-11 Edition 3.0 **Figure Title** Plot of sound pressure spectrum in 1/3 Octave at 7.0 m/s – Data Series 1

Figure C.11



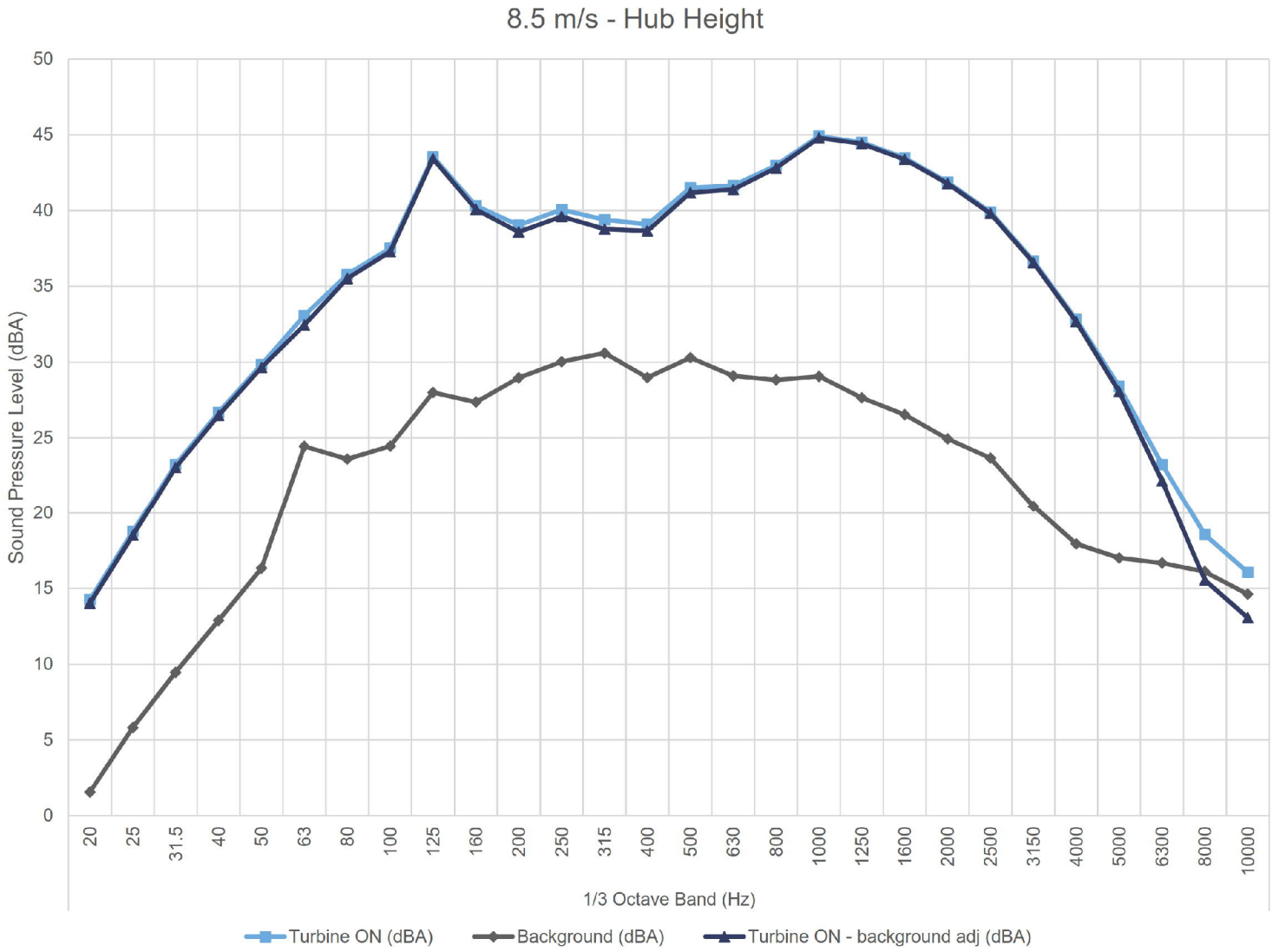
aercoustics	15427.00.T02.RP3 Scale: NTS Drawn by: AM Reviewed by: PA Date: Feb 15, 2018 Revision: 1	**Project Name** East Durham Wind Energy Centre - Turbine T02 - IEC61400-11 Edition 3.0 **Figure Title** Plot of sound pressure spectrum in 1/3 Octave at 7.5 m/s – Data Series 1

Figure C.12



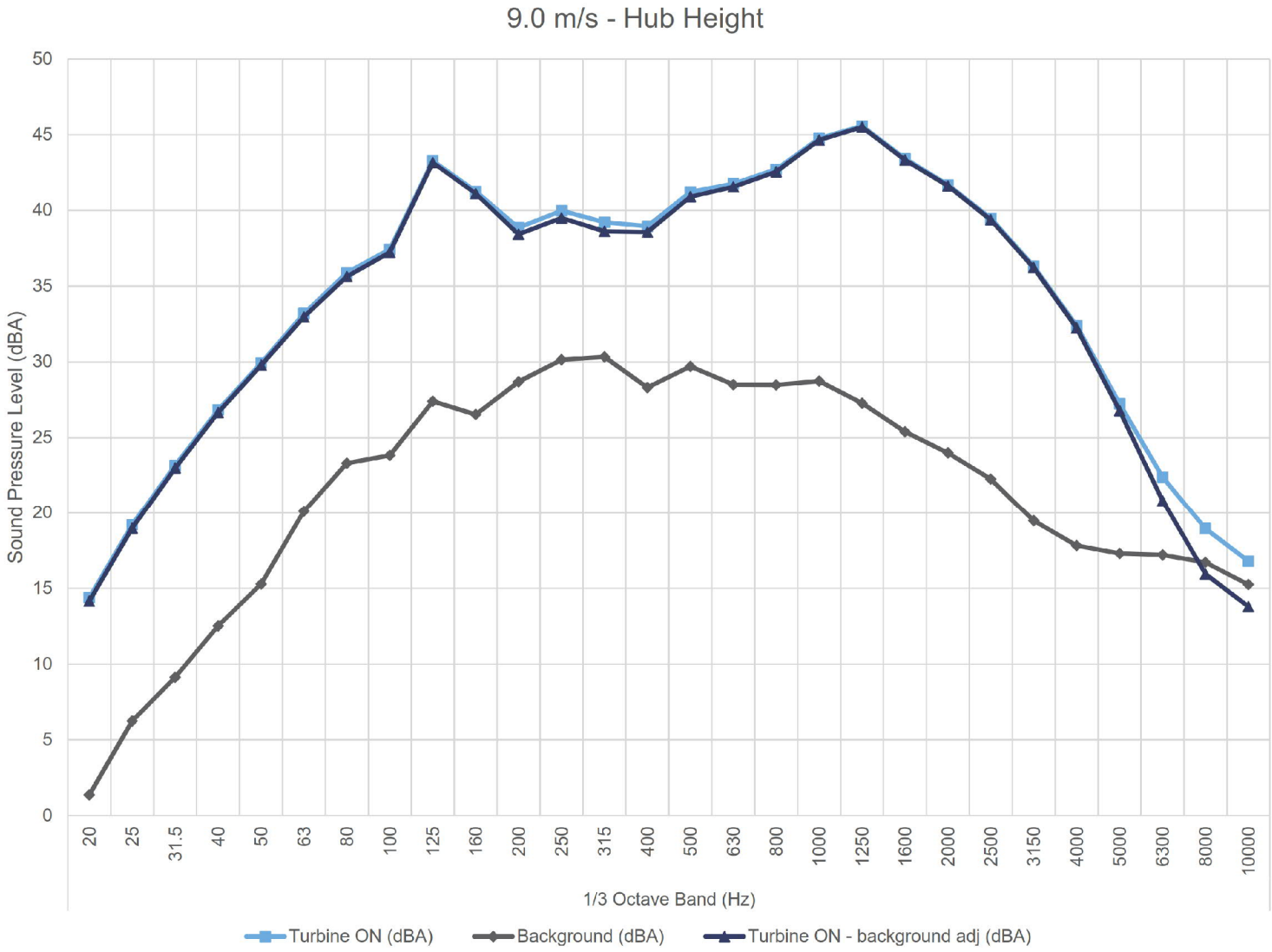
aercoustics	15427.00.T02.RP3 Scale: NTS Drawn by: AM Reviewed by: PA Date: Feb 15, 2018 Revision: 1	**Project Name** East Durham Wind Energy Centre - Turbine T02 - IEC61400-11 Edition 3.0 **Figure Title** Plot of sound pressure spectrum in 1/3 Octave at 8.0 m/s – Data Series 1

Figure C.13



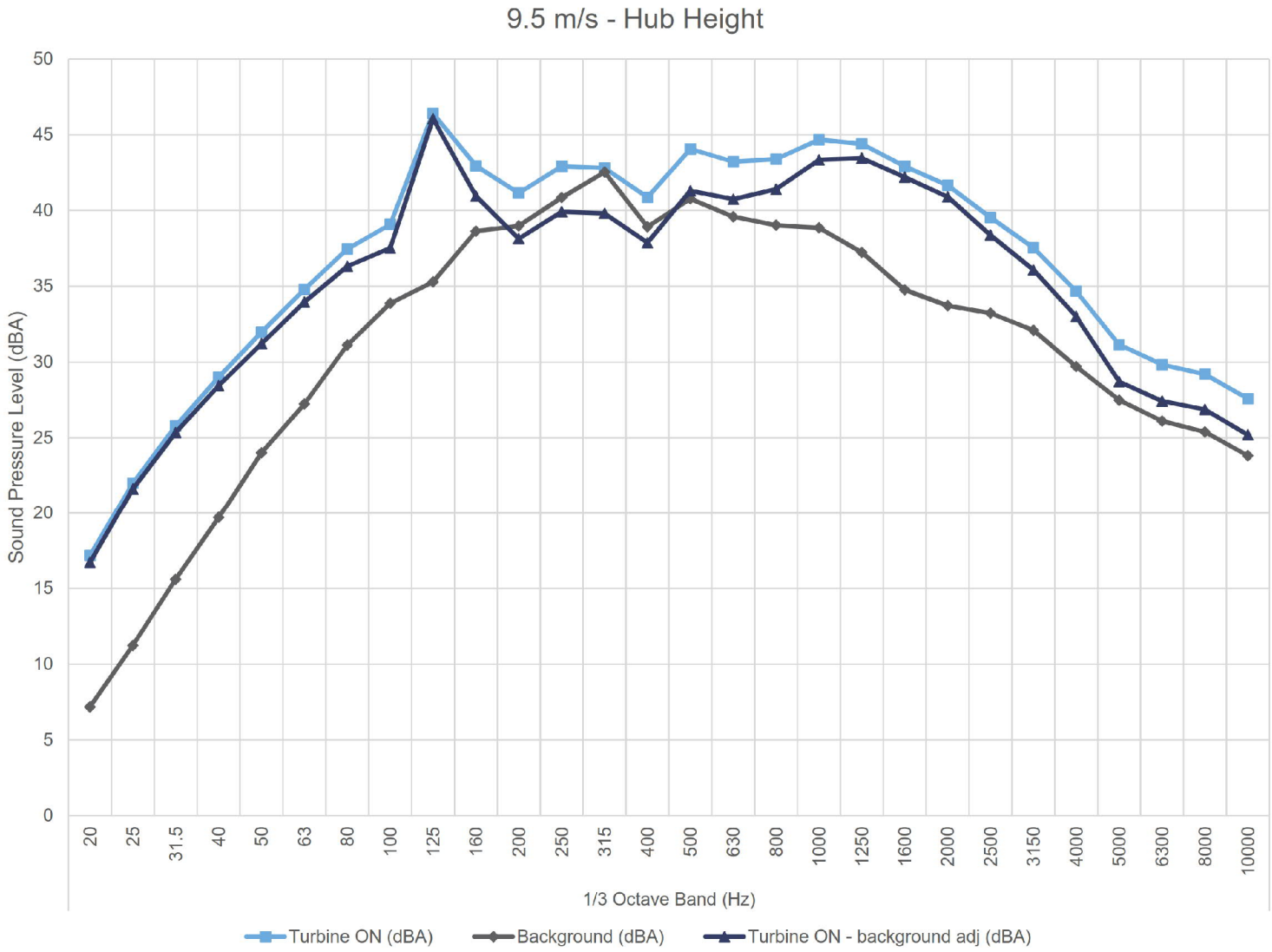
aercoustics	15427.00.T02.RP3 Scale: NTS Drawn by: AM Reviewed by: PA Date: Feb 15, 2018 Revision: 1	**Project Name** East Durham Wind Energy Centre - Turbine T02 - IEC61400-11 Edition 3.0 **Figure Title** Plot of sound pressure spectrum in 1/3 Octave at 8.5 m/s – Data Series 1

Figure C.14



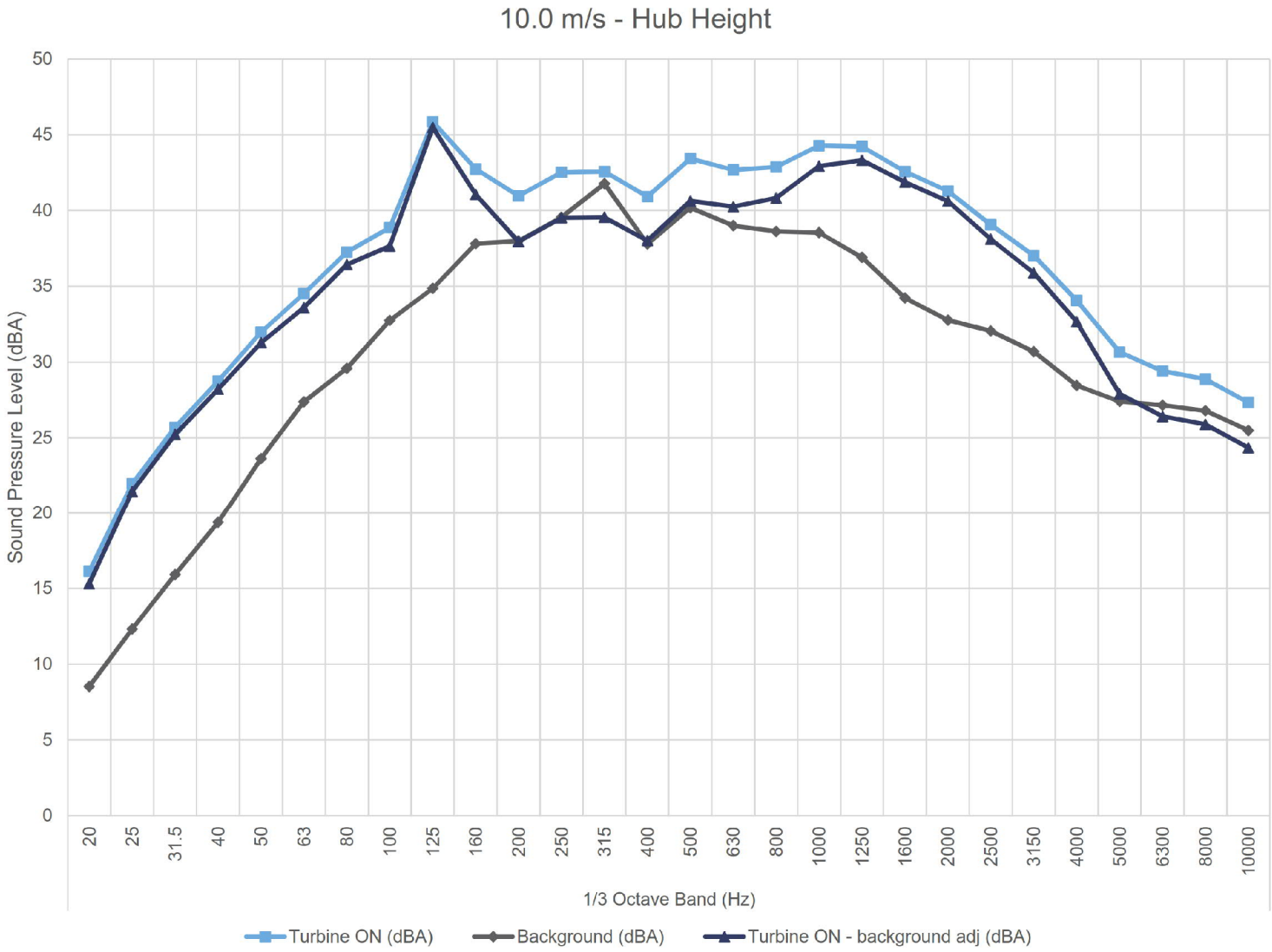
aercoustics	15427.00.T02.RP3 Scale: NTS Drawn by: AM Reviewed by: PA Date: Feb 15, 2018 Revision: 1	**Project Name** East Durham Wind Energy Centre - Turbine T02 - IEC61400-11 Edition 3.0 **Figure Title** Plot of sound pressure spectrum in 1/3 Octave at 9.0 m/s – Data Series 1

Figure C.15



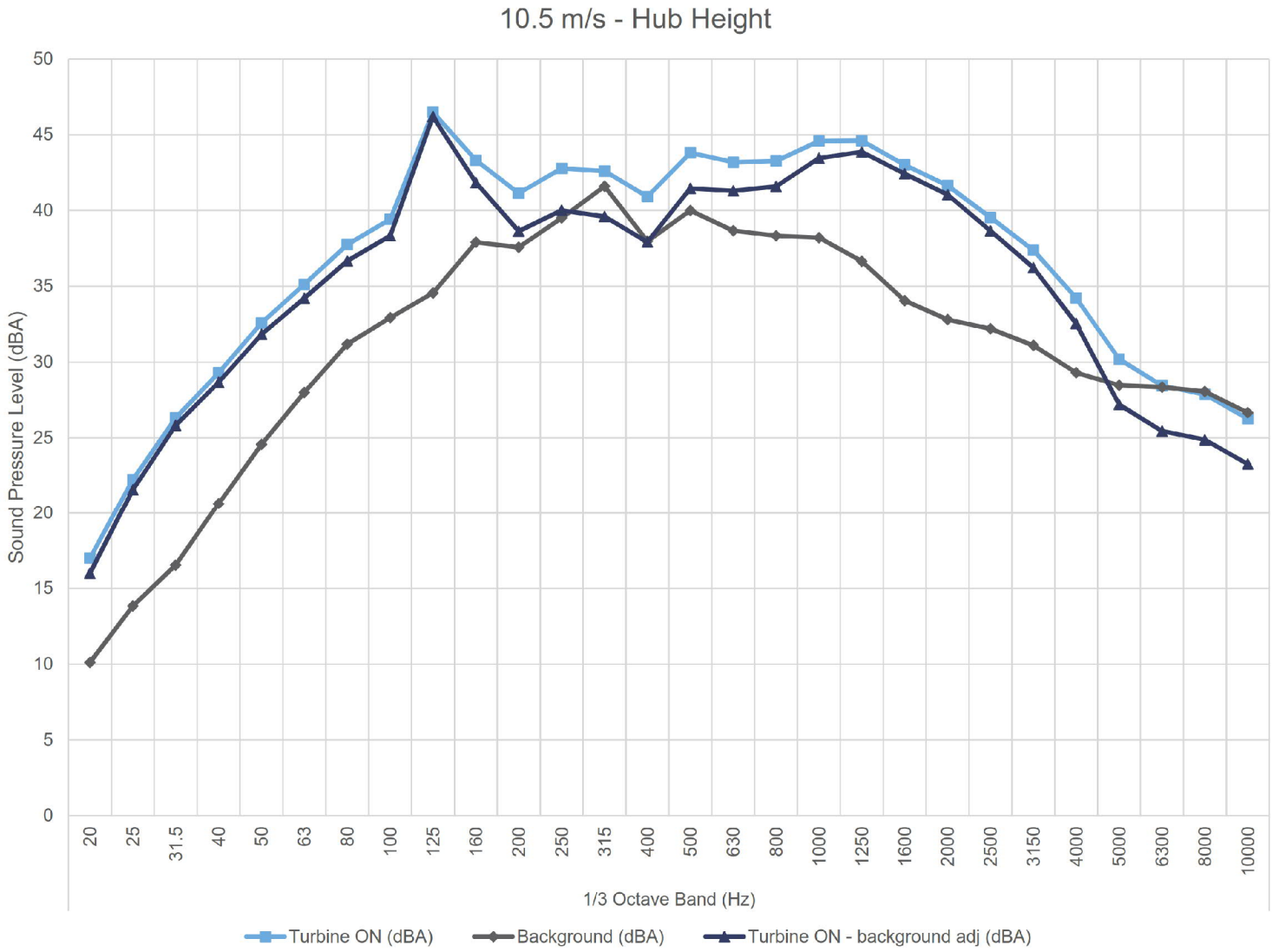
aercoustics	15427.00.T02.RP3 Scale: NTS Drawn by: AM Reviewed by: PA Date: Feb 15, 2018 Revision: 1	**Project Name** East Durham Wind Energy Centre - Turbine T02 - IEC61400-11 Edition 3.0 **Figure Title** Plot of sound pressure spectrum in 1/3 Octave at 9.5 m/s – Data Series 2

Figure C.16



aercoustics	15427.00.T02.RP3 Scale: NTS Drawn by: AM Reviewed by: PA Date: Feb 15, 2018 Revision: 1	**Project Name** East Durham Wind Energy Centre - Turbine T02 - IEC61400-11 Edition 3.0 **Figure Title** Plot of sound pressure spectrum in 1/3 Octave at 10.0 m/s – Data Series 2

Figure C.17



aercoustics	15427.00.T02.RP2 Scale: NTS Drawn by: AM Reviewed by: PA Date: Feb 15, 2018 Revision: 1	**Project Name** East Durham Wind Energy Centre - Turbine T02 - IEC61400-11 Edition 3.0 **Figure Title** Plot of sound pressure spectrum in 1/3 Octave at 10.5 m/s – Data Series 2

Figure C.18

Table C.01 Detailed apparent sound power level data at hub height - Data Series 1

Project: East Durham Wind Energy Centre - Turbine T02 - IEC 61400-11 Measurement

Report ID: 15427.00.T02.RP3

Created on: 2/15/2018

1/3 Octave values marked with brackets [ ] denote less than 3 dB difference between Turbine ON and Background

Overall levels marked with an asterisk * denote 3 to 6 dB difference between Turbine ON and Background, while Overall values with less than 3 dB difference between Turbine ON and Background are not reported

Wind Bin (m/s)	Parameter	1/3 Octave Band (Hz)																													Overall
		20	25	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	10000	
6.5	Turbine ON (dBA)	11.9	16.8	21.1	24.6	27.8	31.2	34.0	35.7	38.0	36.4	37.9	39.2	38.5	37.8	42.2	40.0	41.5	43.9	42.9	41.9	40.2	38.8	36.1	32.7	29.4	25.0	19.5	15.9	52.4
	Background (dBA)	0.9	5.8	9.6	13.1	16.5	21.2	23.7	24.7	28.4	27.8	29.3	30.4	30.8	29.1	30.5	29.2	28.9	29.2	27.7	26.1	23.9	22.1	19.3	17.5	16.7	16.5	15.8	14.4	40.5
	Turbine ON - background adj (dBA)	11.5	16.4	20.8	24.3	27.5	30.7	33.6	35.4	37.6	35.8	37.3	38.6	37.7	37.2	41.9	39.7	41.3	43.8	42.7	41.8	40.1	38.7	36.0	32.6	29.2	24.3	17.0	[12.9]	52.1
	Signal to noise (dB)	11.0	11.0	11.6	11.5	11.3	10.0	10.3	11.0	9.7	8.6	8.6	8.8	7.7	8.7	11.7	10.9	12.6	14.7	15.1	15.8	16.3	16.7	16.9	15.2	12.7	8.5	3.7	1.5	11.9
	Uncertainty (dB)	1.2	1.2	0.9	0.9	0.9	0.9	0.9	0.9	0.9	1.0	0.8	0.8	0.9	0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.8	0.9	0.9	0.9	1.0	1.1	1.7	3.3	0.8
	PWL (dBA)	59.1	64.0	68.4	71.9	75.0	78.3	81.1	82.9	85.1	83.3	84.8	86.2	85.3	84.8	89.4	87.2	88.9	91.3	90.3	89.4	87.7	86.3	83.6	80.1	76.8	71.9	64.6	[60.5]	99.6
7.0	Turbine ON (dBA)	13.3	18.2	22.3	25.8	29.1	32.2	35.1	36.7	39.7	38.0	38.8	40.1	39.0	38.7	42.2	41.5	42.4	44.6	44.6	42.8	41.3	39.4	36.4	32.7	29.0	24.3	19.4	16.3	53.3
	Background (dBA)	1.6	6.1	9.7	13.5	17.8	21.1	24.0	25.2	28.1	27.8	29.5	30.4	30.8	29.4	30.6	29.9	29.8	29.7	28.3	26.8	25.6	23.9	20.2	17.6	16.6	16.2	15.6	14.2	40.9
	Turbine ON - background adj (dBA)	12.9	17.9	22.1	25.5	28.7	31.8	34.7	36.4	39.4	37.6	38.2	39.6	38.3	38.2	41.9	41.2	42.2	44.4	44.4	42.7	41.1	39.3	36.3	32.6	28.7	23.6	17.0	[13.3]	53.0
	Signal to noise (dB)	11.6	12.1	12.6	12.3	11.2	11.1	11.1	11.4	11.6	10.2	9.2	9.7	8.3	9.3	11.6	11.6	12.6	14.8	16.2	15.9	15.6	15.6	16.2	15.1	12.4	8.1	3.8	2.0	12.4
	Uncertainty (dB)	1.1	1.1	0.8	0.8	0.9	0.9	0.9	0.8	0.8	0.9	0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.8	0.9	1.0	1.5	3.2	0.7
	PWL (dBA)	60.5	65.4	69.6	73.1	76.3	79.4	82.3	83.9	86.9	85.1	85.8	87.1	85.9	85.7	89.4	88.7	89.7	92.0	92.0	90.2	88.7	86.9	83.9	80.2	76.3	71.2	64.6	[60.8]	100.6
7.5	Turbine ON (dBA)	13.5	18.1	22.5	26.1	29.4	32.6	35.2	37.0	41.4	39.1	38.9	40.2	39.1	38.9	41.6	41.5	42.7	44.8	45.0	43.1	41.6	39.7	36.6	32.9	28.8	23.9	19.0	16.0	53.6
	Background (dBA)	1.3	5.7	9.4	13.0	16.7	21.7	24.3	25.1	28.4	28.3	29.7	31.0	31.0	29.5	30.3	29.5	29.1	29.2	28.0	26.9	25.1	23.9	20.6	18.0	17.0	16.8	16.2	14.8	40.9
	Turbine ON - background adj (dBA)	13.2	17.9	22.3	25.9	29.1	32.3	34.9	36.7	41.1	38.7	38.4	39.6	38.4	38.4	41.2	41.2	42.5	44.7	44.9	43.0	41.5	39.6	36.5	32.7	28.5	22.9	[16]	[13]	53.3
	Signal to noise (dB)	12.2	12.4	13.1	13.1	12.7	10.9	10.9	11.9	13.0	10.8	9.2	9.2	8.2	9.4	11.3	12.0	13.6	15.7	17.0	16.1	16.5	15.9	16.0	14.9	11.7	7.1	2.8	1.2	12.7
	Uncertainty (dB)	1.1	1.1	0.8	0.8	0.8	0.9	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.8	0.9	1.1	1.8	3.1	0.7
	PWL (dBA)	60.7	65.4	69.9	73.4	76.7	79.8	82.4	84.3	88.7	86.3	85.9	87.2	86.0	85.9	88.8	88.8	90.1	92.3	92.4	90.5	89.1	87.2	84.0	80.3	76.0	70.5	[63.6]	[60.6]	100.9
8.0	Turbine ON (dBA)	13.9	18.4	22.6	26.4	29.7	32.9	35.7	37.4	42.9	40.4	39.2	40.2	39.2	39.0	41.4	41.9	43.0	45.0	44.7	43.5	42.0	40.1	36.9	33.2	29.1	24.1	19.2	16.3	53.9
	Background (dBA)	1.3	5.7	9.2	13.0	16.3	20.9	23.3	24.2	27.4	27.1	28.5	29.7	29.9	28.3	29.7	28.7	28.6	28.7	27.4	25.6	24.4	22.6	19.8	18.0	17.2	17.0	16.4	15.0	39.9
	Turbine ON - background adj (dBA)	13.6	18.1	22.4	26.2	29.5	32.6	35.4	37.2	42.8	40.2	38.8	39.8	38.7	38.6	41.1	41.7	42.9	44.9	44.6	43.5	41.9	40.0	36.8	33.1	28.8	23.2	[16.2]	[13.3]	53.7
	Signal to noise (dB)	12.6	12.7	13.4	13.4	13.4	12.0	12.4	13.2	15.5	13.3	10.8	10.5	9.3	10.7	11.7	13.2	14.5	16.2	17.4	18.0	17.7	17.5	17.1	15.2	11.8	7.1	2.8	1.3	14.0
	Uncertainty (dB)	1.0	1.0	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.8	0.9	1.1	1.8	3.1	0.7
	PWL (dBA)	61.2	65.7	70.0	73.7	77.1	80.2	83.0	84.8	90.4	87.8	86.4	87.4	86.2	86.2	88.7	89.2	90.4	92.4	92.2	91.0	89.5	87.6	84.4	80.6	76.3	70.7	[63.8]	[60.9]	101.3
8.5	Turbine ON (dBA)	14.3	18.8	23.2	26.7	29.8	33.1	35.8	37.5	43.5	40.3	39.0	40.1	39.4	39.1	41.5	41.6	43.0	44.9	44.5	43.5	41.9	39.9	36.7	32.8	28.4	23.2	18.6	16.1	53.9
	Background (dBA)	1.6	5.8	9.5	12.9	16.3	24.4	23.6	24.4	28.0	27.4	29.0	30.0	30.6	29.0	30.3	29.1	28.8	29.1	27.6	26.5	24.9	23.7	20.5	17.9	17.0	16.7	16.1	14.6	40.5
	Turbine ON - background adj (dBA)	14.0	18.5	23.0	26.5	29.6	32.4	35.5	37.3	43.4	40.1	38.6	39.6	38.8	38.6	41.2	41.4	42.8	44.8	44.4	43.4	41.8	39.8	36.6	32.7	28.1	22.1	[15.6]	[13.1]	53.7
	Signal to noise (dB)	12.7	12.9	13.8	13.8	13.5	8.6	12.2	13.1	15.6	13.0	10.1	10.0	8.8	10.1	11.2	12.6	14.2	15.9	16.9	16.9	16.9	16.2	16.2	14.9	11.4	6.5	2.4	1.4	13.4
	Uncertainty (dB)	1.0	1.0	0.9	0.8	0.9	0.9	0.8	0.8	0.8	0.9	0.7	0.7	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.8	1.0	1.1	1.8	3.0	0.7
	PWL (dBA)	61.6	66.1	70.6	74.1	77.2	80.0	83.1	84.9	91.0	87.7	86.2	87.2	86.3	86.2	88.7	89.0	90.4	92.4	92.0	91.0	89.3	87.4	84.1	80.2	75.6	69.7	[63.1]	[60.6]	101.2
9.0	Turbine ON (dBA)	14.4	19.2	23.2	26.8	29.9	33.2	35.9	37.4	43.3	41.3	38.9	40.0	39.2	39.0	41.2	41.8	42.7	44.8	45.6	43.4	41.7	39.5	36.3	32.4	27.3	22.4	19.0	16.8	53.9
	Background (dBA)	1.4	6.2	9.1	12.5	15.3	20.1	23.3	23.8	27.4	26.5	28.7	30.1	30.3	28.3	29.7	28.5	28.5	28.7	27.3	25.4	24.0	22.3	19.5	17.8	17.3	17.2	16.7	15.3	40.0
	Turbine ON - background adj (dBA)	14.2	19.0	23.0	26.7	29.8	33.0	35.6	37.2	43.2	41.1	38.4	39.5	38.6	38.6	40.9	41.6	42.6	44.7	45.5	43.3	41.6	39.4	36.2	32.2	26.8	20.8	[16]	[13.8]	53.8
	Signal to noise (dB)	13.0	13.0	14.0	14.3	14.6	13.1	12.6	13.6	15.9	14.7	10.2	9.8	8.9	10.7	11.5	13.3	14.2	16.0	18.3	18.0	17.7	17.2	16.8	14.6	10.0	5.2	2.2	1.5	14.0
	Uncertainty (dB)	1.1	1.1	0.9	0.8	0.8	0.8	0.8	0.8	1.0	0.9	0.8	0.8	0.8	0.8	0.7	0.8	0.7	0.7	0.9	0.7	0.7	0.8	0.8	0.9	1.0	1.3	2.0	3.3	0.8
	PWL (dBA)	61.7	66.5	70.6	74.2	77.3	80.5	83.2	84.8	90.7	88.7	86.0	87.1	86.2	86.1	88.5	89.1	90.1	92.2	93.1	90.9	89.2	87.0	83.8	79.8	74.4	68.4	[63.5]	[61.4]	101.3

Table C.02 Detailed apparent sound power level data at hub height - Data Series 2

Project: East Durham Wind Energy Centre - Turbine T02 - IEC 61400-11 Measurement

Report ID: 15427.00.T02.RP3

Created on: 2/15/2018

1/3 Octave values marked with brackets [ ] denote less than 3 dB difference between Turbine ON and Background

Overall levels marked with an asterisk * denote 3 to 6 dB difference between Turbine ON and Background, while Overall values with less than 3 dB difference between Turbine ON and Background are not reported

Wind Bin (m/s)	Parameter	1/3 Octave Band (Hz)																													Overall
		20	25	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	10000	
9.5	Turbine ON (dBA)	17.2	22.0	25.8	29.0	32.0	34.8	37.5	39.1	46.4	43.0	41.2	42.9	42.8	40.9	44.1	43.2	43.4	44.7	44.4	42.9	41.7	39.5	37.6	34.7	31.2	29.8	29.2	27.6		55.2
	Background (dBA)	7.2	11.2	15.6	19.7	24.0	27.2	31.1	33.9	35.3	38.6	39.0	40.9	42.5	38.9	40.8	39.6	39.0	38.9	37.2	34.8	33.7	33.2	32.1	29.7	27.5	26.1	25.4	23.8		50.6
	Turbine ON - background adj (dBA)	16.7	21.6	25.3	28.4	31.2	34.0	36.3	37.5	46.1	41.0	[38.2]	[39.9]	[39.8]	[37.9]	41.3	40.8	41.4	43.4	43.5	42.2	40.9	38.4	36.1	33.0	28.7	27.4	26.9	25.2		53.6*
	Signal to noise (dB)	10.0	10.8	10.2	9.3	8.0	7.6	6.4	5.2	11.1	4.3	2.2	2.1	0.3	1.9	3.3	3.6	4.4	5.8	7.2	8.2	7.9	6.3	5.4	5.0	3.7	3.7	3.8	3.8		4.6
	Uncertainty (dB)	1.2	1.1	0.9	0.9	1.0	1.0	1.1	1.2	1.0	1.3	1.6	1.6	1.6	1.6	1.5	1.4	1.2	0.9	0.9	0.8	0.8	1.1	1.2	1.3	2.0	2.6	2.9	3.8		1.1
	PWL (dBA)	64.3	69.2	72.9	76.0	78.8	81.5	83.9	85.1	93.6	88.5	[85.7]	[87.5]	[87.4]	[85.4]	88.9	88.3	89.0	90.9	91.0	89.8	88.5	86.0	83.7	80.6	76.3	75.0	74.4	72.8		101.1*
10.0	Turbine ON (dBA)	16.1	22.0	25.7	28.7	32.0	34.5	37.3	38.9	45.9	42.8	41.0	42.5	42.6	40.9	43.4	42.7	42.9	44.3	44.2	42.6	41.3	39.1	37.0	34.1	30.7	29.4	28.9	27.3		54.8
	Background (dBA)	8.5	12.3	15.9	19.4	23.6	27.4	29.6	32.8	34.9	37.8	38.0	39.6	41.8	37.8	40.2	39.0	38.6	38.5	36.9	34.2	32.8	32.1	30.7	28.5	27.4	27.2	26.8	25.5		49.9
	Turbine ON - background adj (dBA)	15.3	21.5	25.2	28.2	31.3	33.6	36.4	37.7	45.5	41.1	[38]	[39.5]	[39.6]	38.0	40.6	40.3	40.8	42.9	43.3	41.9	40.6	38.1	35.9	32.7	27.9	[26.4]	[25.9]	[24.3]		53.2*
	Signal to noise (dB)	7.6	9.6	9.8	9.4	8.3	7.1	7.7	6.1	11.0	4.9	3.0	3.0	0.8	3.1	3.2	3.7	4.3	5.7	7.3	8.3	8.5	7.0	6.3	5.6	3.3	2.2	2.1	1.9		4.9
	Uncertainty (dB)	1.2	1.1	0.8	0.9	0.9	0.9	0.9	1.0	0.9	1.2	1.5	1.5	1.5	1.5	1.4	1.3	1.1	0.9	0.9	0.8	0.8	1.0	1.0	1.1	1.9	2.6	2.9	3.9		1.1
	PWL (dBA)	62.9	69.0	72.8	75.8	78.8	81.2	84.0	85.2	93.1	88.6	[85.5]	[87.1]	[87.1]	85.6	88.2	87.8	88.4	90.5	90.9	89.4	88.2	85.7	83.5	80.2	75.5	[74]	[73.4]	[71.9]		100.8*
10.5	Turbine ON (dBA)	17.0	22.2	26.3	29.3	32.6	35.1	37.8	39.4	46.5	43.3	41.1	42.8	42.6	40.9	43.8	43.2	43.3	44.6	44.6	43.0	41.7	39.5	37.4	34.2	30.2	28.4	27.9	26.3		55.2
	Background (dBA)	10.1	13.8	16.5	20.6	24.6	28.0	31.2	32.9	34.6	37.9	37.6	39.5	41.6	38.0	40.0	38.7	38.3	38.2	36.6	34.1	32.8	32.2	31.1	29.3	28.5	28.3	28.1	26.7		49.8
	Turbine ON - background adj (dBA)	16.0	21.6	25.8	28.7	31.8	34.2	36.7	38.3	46.2	41.8	38.6	40.0	[39.6]	[37.9]	41.5	41.3	41.6	43.5	43.9	42.4	41.0	38.6	36.2	32.5	[27.2]	[25.4]	[24.9]	[23.3]		53.8*
	Signal to noise (dB)	6.9	8.4	9.8	8.7	8.0	7.1	6.6	6.5	11.9	5.4	3.6	3.3	1.0	3.0	3.8	4.5	4.9	6.4	8.0	9.0	8.9	7.3	6.3	4.9	1.7	0.1	-0.2	-0.4		5.4
	Uncertainty (dB)	1.3	1.2	0.9	0.9	0.9	1.0	1.0	1.0	0.9	1.1	1.3	1.4	1.5	1.6	1.2	1.1	1.0	0.9	0.8	0.8	0.8	1.0	1.0	1.3	2.2	2.7	3.1	4.1		1.0
	PWL (dBA)	63.6	69.1	73.4	76.2	79.4	81.8	84.2	85.9	93.8	89.4	86.2	87.6	[87.2]	[85.5]	89.0	88.9	89.2	91.0	91.4	90.0	88.6	86.2	83.8	80.1	[74.8]	[73]	[72.4]	[70.8]		101.4*

Table C.03 Detailed apparent sound power level data at 10m height - Data Series 1

Project: East Durham Wind Energy Centre - Turbine T02 - IEC 61400-11 Measurement

Report ID: 15427.00.T02.RP3

Created on: 2/15/2018

1/3 Octave values marked with brackets [ ] denote less than 3 dB difference between Turbine ON and Background

Overall levels marked with an asterisk * denote 3 to 6 dB difference between Turbine ON and Background, while Overall values with less than 3 dB difference between Turbine ON and Background are not reported

Wind Bin (m/s)	Parameter	1/3 Octave Band (Hz)																													Overall
		20	25	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	10000	
4.0	Turbine ON (dBA)	8.5	13.7	18.1	21.4	24.7	28.3	31.7	34.1	34.2	34.1	36.5	36.7	36.2	37.5	39.5	37.8	40.1	41.8	42.2	40.8	38.7	37.9	35.6	32.6	30.0	25.6	19.6	15.6		50.8
	Background (dBA)	2.1	6.1	9.7	13.1	18.1	24.9	24.0	25.0	29.0	28.1	29.8	30.7	30.9	29.3	30.7	29.8	29.7	29.8	28.4	27.1	25.5	24.1	20.8	18.3	17.2	16.8	16.2	14.7		41.1
	Turbine ON - background adj (dBA)	7.4	12.9	17.4	20.7	23.6	25.7	30.9	33.6	32.7	32.8	35.5	35.5	34.7	36.7	38.9	37.1	39.7	41.5	42.1	40.6	38.4	37.7	35.5	32.4	29.8	25.0	16.9	[12.6]		50.3
	Signal to noise (dB)	6.5	7.6	8.3	8.3	6.6	3.4	7.8	9.1	5.2	6.0	6.7	6.1	5.4	8.1	8.8	8.0	10.5	12.0	13.8	13.8	13.2	13.8	14.8	14.3	12.9	8.8	3.4	0.8		9.7
	Uncertainty (dB)	1.7	1.6	1.2	1.2	1.3	2.0	1.3	1.2	1.5	1.4	1.2	1.2	1.3	1.1	1.1	1.1	1.0	1.0	0.9	0.9	1.0	1.1	1.1	1.2	1.3	1.4	2.1	4.0		1.1
	PWL (dBA)	55.0	60.5	64.9	68.3	71.2	73.2	78.5	81.1	80.2	80.4	83.0	83.1	82.3	84.3	86.5	84.6	87.3	89.1	89.6	88.2	86.0	85.2	83.1	80.0	77.4	72.6	64.5	[60.1]		97.8
5.0	Turbine ON (dBA)	12.9	17.8	22.0	25.5	28.8	32.0	34.8	36.5	39.7	37.9	38.5	39.8	38.9	38.5	42.0	41.0	42.2	44.4	44.1	42.6	41.0	39.3	36.4	32.7	29.1	24.4	19.3	16.1		53.1
	Background (dBA)	1.3	6.0	9.7	13.2	17.1	21.2	24.0	25.0	28.2	27.9	29.5	30.4	30.7	29.2	30.4	29.5	29.3	29.4	28.1	26.7	25.0	23.4	20.0	17.6	16.7	16.4	15.7	14.3		40.7
	Turbine ON - background adj (dBA)	12.6	17.5	21.8	25.2	28.5	31.6	34.4	36.2	39.4	37.4	37.9	39.3	38.2	37.9	41.7	40.7	42.0	44.3	44.0	42.5	40.9	39.2	36.3	32.6	28.8	23.7	16.8	[13.1]		52.8
	Signal to noise (dB)	11.6	11.8	12.4	12.3	11.7	10.8	10.8	11.5	11.5	9.9	9.1	9.4	8.2	9.3	11.7	11.5	12.9	15.0	16.0	15.9	16.0	15.9	16.3	15.1	12.4	8.1	3.6	1.8		12.4
	Uncertainty (dB)	1.0	1.0	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.9	0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.8	0.8	1.0	1.5	3.1		0.7
	PWL (dBA)	60.2	65.0	69.3	72.8	76.0	79.2	82.0	83.7	86.9	85.0	85.5	86.9	85.7	85.5	89.3	88.3	89.5	91.8	91.6	90.0	88.5	86.8	83.8	80.2	76.4	71.3	64.4	[60.7]		100.4
6.0	Turbine ON (dBA)	13.9	18.5	22.7	26.4	29.7	32.9	35.6	37.4	43.1	40.5	39.1	40.1	39.2	39.0	41.4	41.7	42.9	44.9	44.9	43.4	41.9	39.9	36.7	32.9	28.5	23.5	19.1	16.4		53.9
	Background (dBA)	1.4	5.7	9.2	12.9	16.2	22.7	23.6	24.4	27.8	27.4	28.9	30.3	30.6	28.9	30.1	29.0	28.7	28.9	27.5	26.0	24.5	23.1	20.1	18.1	17.3	17.1	16.5	15.0		40.3
	Turbine ON - background adj (dBA)	13.7	18.3	22.6	26.2	29.5	32.5	35.4	37.1	43.0	40.3	38.6	39.6	38.6	38.5	41.1	41.5	42.7	44.8	44.8	43.4	41.8	39.8	36.6	32.7	28.1	22.4	[16.1]	[13.4]		53.7
	Signal to noise (dB)	12.5	12.8	13.5	13.5	13.5	10.2	12.1	13.0	15.3	13.1	10.2	9.8	8.6	10.1	11.3	12.8	14.2	16.0	17.4	17.4	17.3	16.8	16.5	14.8	11.2	6.5	2.5	1.3		13.5
	Uncertainty (dB)	1.0	1.0	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.6	0.6	0.6	0.6	0.6	0.7	0.7	0.8	0.8	1.0	1.7	2.9		0.7
	PWL (dBA)	61.2	65.8	70.1	73.8	77.0	80.0	82.9	84.7	90.5	87.9	86.2	87.2	86.1	86.1	88.6	89.1	90.3	92.3	92.4	90.9	89.3	87.3	84.2	80.3	75.7	70.0	[63.6]	[60.9]		101.2
7.0	Turbine ON (dBA)	14.6	19.5	23.4	27.1	30.1	33.1	35.8	37.4	43.5	40.7	38.6	39.9	39.2	39.0	41.3	41.4	42.3	44.4	45.4	43.0	41.2	38.8	35.5	31.3	25.7	21.3	19.1	17.2		53.7
	Background (dBA)	0.9	5.6	9.2	12.9	16.7	27.9	25.5	24.6	28.0	27.3	28.9	30.2	30.4	28.7	29.9	29.1	29.2	29.3	28.0	26.8	26.0	25.1	21.9	18.6	17.0	16.5	15.9	14.4		40.7
	Turbine ON - background adj (dBA)	14.4	19.4	23.2	26.9	29.9	31.5	35.4	37.2	43.3	40.5	38.1	39.5	38.6	38.6	41.0	41.1	42.0	44.3	45.3	42.9	41.1	38.6	35.3	31.0	25.0	19.6	16.3	[14.2]		53.5
	Signal to noise (dB)	13.7	14.0	14.1	14.2	13.4	5.1	10.3	12.8	15.4	13.4	9.7	9.8	8.8	10.3	11.4	12.3	13.1	15.1	17.4	16.2	15.2	13.7	13.6	12.7	8.7	4.9	3.2	2.8		12.9
	Uncertainty (dB)	1.3	1.3	1.0	1.0	1.0	1.5	1.1	1.0	1.2	1.0	0.9	0.9	1.0	1.0	0.9	0.9	0.9	0.9	1.0	0.9	0.9	1.0	1.0	1.1	1.2	1.5	2.2	3.9		1.0
	PWL (dBA)	62.0	66.9	70.8	74.5	77.5	79.1	83.0	84.7	90.9	88.1	85.7	87.0	86.2	86.1	88.5	88.7	89.6	91.9	92.9	90.5	88.7	86.2	82.9	78.6	72.6	67.2	63.8	[61.8]		101.0

Table C.04 Detailed apparent sound power level data at 10m height - Data Series 2

Project: East Durham Wind Energy Centre - Turbine T02 - IEC 61400-11 Measurement

Report ID: 15427.00.T02.RP3

Created on: 2/15/2018

1/3 Octave values marked with brackets [ ] denote less than 3 dB difference between Turbine ON and Background

Overall levels marked with an asterisk * denote 3 to 6 dB difference between Turbine ON and Background, while Overall values with less than 3 dB difference between Turbine ON and Background are not reported

Wind Bin (m/s)	Parameter	1/3 Octave Band (Hz)																													Overall
		20	25	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	10000	
5.0	Turbine ON (dBA)	14.3	19.8	24.3	27.6	31.6	33.8	36.2	37.8	42.9	40.3	40.1	42.0	41.6	39.4	43.8	41.3	42.1	43.9	42.9	41.8	40.8	39.0	36.6	33.2	28.4	24.5	22.4	20.6	53.7
	Background (dBA)	9.9	12.8	16.2	19.8	23.6	26.8	30.0	32.2	34.9	38.3	38.4	40.4	42.4	39.1	40.8	39.7	39.2	39.0	37.5	35.3	34.2	33.8	32.8	30.7	29.1	28.4	27.9	26.4	50.6
	Turbine ON - background adj (dBA)	12.4	18.8	23.5	26.8	30.8	32.8	35.0	36.5	42.2	[37.3]	[37.1]	[39]	[38.6]	[36.4]	40.8	[38.3]	[39.1]	42.3	41.4	40.7	39.7	37.4	34.3	[30.2]	[25.4]	[21.5]	[19.4]	[17.6]	51.7*
	Signal to noise (dB)	4.4	7.0	8.0	7.8	8.0	7.0	6.2	5.7	8.0	2.0	1.7	1.6	-0.9	0.3	3.0	1.6	2.9	5.0	5.4	6.5	6.6	5.2	3.9	2.5	-0.7	-3.9	-5.5	-5.8	3.1
	Uncertainty (dB)	2.0	1.6	1.2	1.2	1.1	1.2	1.3	1.3	1.4	2.2	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.2	1.2	1.1	1.1	1.5	1.8	2.3	2.4	2.8	3.2	4.5	1.5
	PWL (dBA)	59.9	66.4	71.1	74.4	78.4	80.4	82.5	84.0	89.7	[84.9]	[84.7]	[86.5]	[86.2]	[84]	88.4	[85.9]	[86.6]	89.8	89.0	88.3	87.2	84.9	81.9	[77.7]	[73]	[69]	[66.9]	[65.2]	99.2*
6.0	Turbine ON (dBA)	17.1	22.0	25.9	28.8	32.6	35.2	37.6	39.3	45.4	42.8	41.3	43.1	43.0	41.1	43.9	43.1	43.4	44.9	44.4	43.2	42.0	40.3	38.2	35.2	31.5	29.6	28.7	27.2	55.2
	Background (dBA)	7.6	11.6	15.6	19.4	23.6	27.0	30.7	33.1	35.5	37.9	38.6	40.1	42.0	38.4	40.4	39.2	38.8	38.6	37.0	34.5	33.2	32.5	31.2	28.9	27.3	26.6	26.2	24.7	50.2
	Turbine ON - background adj (dBA)	16.6	21.6	25.5	28.3	32.0	34.5	36.6	38.1	45.0	41.0	[38.3]	[40.1]	[40]	[38.1]	41.3	40.9	41.6	43.8	43.5	42.6	41.4	39.5	37.3	34.0	29.4	[26.6]	[25.7]	[24.2]	53.6*
	Signal to noise (dB)	9.6	10.5	10.3	9.4	8.9	8.3	6.9	6.2	10.0	4.8	2.8	3.0	0.9	2.7	3.5	3.9	4.7	6.3	7.4	8.6	8.8	7.8	7.0	6.2	4.2	2.9	2.5	2.5	5.0
	Uncertainty (dB)	1.2	1.1	0.9	0.9	0.9	1.0	1.0	1.1	1.0	1.3	1.6	1.6	1.6	1.6	1.4	1.3	1.1	0.9	0.9	0.8	0.8	1.0	1.0	1.1	1.6	2.5	2.8	3.9	1.1
	PWL (dBA)	64.2	69.2	73.0	75.9	79.5	82.1	84.2	85.7	92.5	88.6	[85.9]	[87.7]	[87.5]	[85.6]	88.9	88.4	89.2	91.4	91.1	90.1	88.9	87.1	84.8	81.6	77.0	[74.1]	[73.3]	[71.7]	101.2*
7.0	Turbine ON (dBA)	16.8	22.1	25.9	29.0	32.2	34.9	37.5	39.1	46.1	42.9	41.1	42.8	42.7	40.9	43.8	43.0	43.2	44.5	44.4	42.9	41.6	39.5	37.5	34.5	30.8	29.3	28.6	27.0	55.0
	Background (dBA)	8.7	11.9	15.9	19.6	24.1	27.2	30.0	32.8	34.8	38.0	38.1	39.9	42.0	38.2	40.4	39.2	38.7	38.6	36.9	34.4	33.2	32.6	31.5	29.3	27.9	27.4	26.9	25.5	50.1
	Turbine ON - background adj (dBA)	16.0	21.6	25.4	28.5	31.5	34.1	36.7	38.0	45.8	41.2	[38.1]	[39.8]	[39.7]	[37.9]	41.2	40.7	41.3	43.3	43.5	42.2	40.9	38.5	36.2	32.9	[27.8]	[26.3]	[25.6]	[24]	53.5*
	Signal to noise (dB)	8.1	10.1	10.0	9.4	8.1	7.7	7.5	6.4	11.3	4.9	3.0	2.9	0.8	2.7	3.4	3.9	4.5	6.0	7.5	8.5	8.4	6.9	6.0	5.2	2.9	1.9	1.7	1.5	5.0
	Uncertainty (dB)	1.2	1.1	0.9	0.9	0.9	0.9	0.9	1.0	0.9	1.2	1.5	1.5	1.5	1.5	1.3	1.2	1.1	0.9	0.8	0.8	0.8	1.0	1.0	1.2	1.9	2.2	2.4	3.5	1.0
	PWL (dBA)	63.6	69.2	73.0	76.1	79.0	81.7	84.3	85.6	93.3	88.8	[85.7]	[87.4]	[87.3]	[85.5]	88.7	88.3	88.9	90.8	91.1	89.8	88.5	86.1	83.8	80.5	[75.4]	[73.9]	[73.2]	[71.6]	101.1*
8.0	Turbine ON (dBA)	17.0	22.3	26.3	29.1	32.5	35.0	37.6	39.5	47.1	43.4	41.2	42.9	42.7	41.1	43.9	43.4	43.4	44.8	44.8	43.1	41.8	39.6	37.4	34.2	30.2	28.3	27.6	26.0	55.4
	Background (dBA)	10.8	13.6	17.4	20.2	24.0	27.5	30.6	32.5	34.7	38.0	38.0	39.9	41.9	38.4	40.2	39.0	38.6	38.5	37.0	34.5	33.3	32.8	31.7	29.7	28.4	28.1	27.7	26.4	50.1
	Turbine ON - background adj (dBA)	15.8	21.7	25.7	28.5	31.8	34.2	36.7	38.6	46.8	41.9	38.4	39.9	[39.7]	[38.1]	41.5	41.4	41.7	43.6	44.0	42.5	41.1	38.7	36.0	32.3	[27.2]	[25.3]	[24.6]	[23]	54*
	Signal to noise (dB)	6.1	8.7	8.9	8.9	8.4	7.6	7.0	7.0	12.4	5.4	3.2	3.0	0.7	2.7	3.7	4.3	4.8	6.3	7.8	8.6	8.5	6.9	5.7	4.5	1.7	0.3	-0.1	-0.3	5.3
	Uncertainty (dB)	1.3	1.1	0.9	0.9	0.9	0.9	0.9	0.9	0.8	1.1	1.3	1.4	1.4	1.4	1.2	1.1	1.0	0.8	0.8	0.7	0.7	0.9	1.0	1.2	1.9	2.2	2.4	3.5	1.0
	PWL (dBA)	63.3	69.2	73.3	76.0	79.3	81.8	84.2	86.1	94.4	89.5	86.0	87.5	[87.2]	[85.7]	89.1	88.9	89.3	91.2	91.6	90.0	88.7	86.2	83.6	79.9	[74.8]	[72.9]	[72.2]	[70.6]	101.5*

Table C.05 Detailed apparent sound power level data at 10m height - Combined Data

Project: East Durham Wind Energy Centre - Turbine T02 - IEC 61400-11 Measurement

Report ID: 15427.00.T02.RP3

Wind Bin (m/s)	Parameter	1/3 Octave Band (Hz)																													Overall
		20	25	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	10000	
5.0	Uncertainty (dB)	1.2	1.3	1.6	1.6	1.6	1.6	1.6	1.6	1.5	1.4	1.5	1.6	1.5	1.6	1.6	1.6	1.7	1.8	1.8	1.9	1.8	1.6	1.5	1.5	1.4	1.3	1.0	0.7	1.7	
	PWL (dBA)	60.1	65.4	69.9	73.3	76.9	79.6	82.1	83.8	87.7	84.9	85.4	86.8	85.8	85.3	89.2	88.0	89.2	91.4	90.9	89.5	88.1	86.4	83.5	79.9	76.0	71.0	64.9	62.2	100.1	
6.0	Uncertainty (dB)	1.5	1.5	1.8	1.8	1.8	1.7	1.7	1.7	1.8	1.6	1.7	1.7	1.6	1.7	1.8	1.8	1.9	2.0	2.0	2.1	2.1	1.8	1.8	1.7	1.5	1.2	0.9	0.8	1.9	
	PWL (dBA)	62.4	67.2	71.3	74.6	78.0	80.9	83.4	85.0	91.3	88.1	86.1	87.3	86.4	86.0	88.7	88.9	90.0	92.0	92.0	90.6	89.2	87.2	84.4	80.7	76.0	70.6	66.1	64.8	101.2	
7.0	Uncertainty (dB)	1.3	1.4	1.6	1.6	1.6	1.4	1.5	1.5	1.6	1.4	1.4	1.4	1.4	1.4	1.5	1.5	1.6	1.7	1.7	1.8	1.8	1.6	1.5	1.4	1.2	1.0	0.9	0.7	1.6	
	PWL (dBA)	62.9	68.3	72.1	75.4	78.4	80.9	83.7	85.2	92.5	88.4	85.7	87.1	86.5	85.9	88.6	88.6	89.3	91.4	91.8	90.1	88.6	86.1	83.3	79.5	73.4	69.4	68.1	67.2	101.0	

Table C.06 Type B measurement uncertainty summary

Overall Equipment Uncertainties		
	Typical values	Used values
Calibration	0.2 dB	0.2 dB
Board	0.3 dB	0.3 dB
Distance	0.1 dB	0.1 dB
Air absorption	0 dB	0 dB
Weather	0.5 dB	0.5 dB

1/3 Octave Band Uncertainties		
Frequency (Hz)	Microphone Uncertainty	Overall (including overall equipment Uncertainties)
20	0.8 dB	1 dB
25	0.8 dB	1 dB
31.5	0.5 dB	0.8 dB
40	0.5 dB	0.8 dB
50	0.5 dB	0.8 dB
63	0.5 dB	0.8 dB
80	0.5 dB	0.8 dB
100	0.5 dB	0.8 dB
125	0.5 dB	0.8 dB
160	0.5 dB	0.8 dB
200	0.3 dB	0.7 dB
250	0.3 dB	0.7 dB
315	0.3 dB	0.7 dB
400	0.3 dB	0.7 dB
500	0.3 dB	0.7 dB
630	0.3 dB	0.7 dB
800	0.3 dB	0.7 dB
1000	0.3 dB	0.7 dB
1250	0.3 dB	0.7 dB
1600	0.3 dB	0.7 dB
2000	0.3 dB	0.7 dB
2500	0.5 dB	0.8 dB
3150	0.5 dB	0.8 dB
4000	0.5 dB	0.8 dB
5000	0.5 dB	0.8 dB
6300	0.5 dB	0.8 dB
8000	0.5 dB	0.8 dB
10000	1.3 dB	1.4 dB

Table C.07 Detailed measurement uncertainty at hub height - Data Series 1

Project: East Durham Wind Energy Centre - Turbine T02 - IEC 61400-11 Measurement

Report ID: 15427.00.T02.RP3

Created on: 2/15/2018

Wind Bin (m/s)	Parameter	Average Wind Speed (m/s)	# of data points	Parameter	1/3 Octave Band (Hz)																													Overall
					20	25	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	10000	
6.5	Turbine ON	6.52	92	Average (dBA)	11.9	16.8	21.2	24.7	27.9	31.2	34.0	35.8	38.1	36.5	37.9	39.2	38.5	37.8	42.2	40.1	41.6	43.9	42.9	41.9	40.3	38.8	36.1	32.7	29.4	24.9	19.5	16.0	52.4
				Uncertainty A (dB)	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.3	0.3	0.5	0.5	0.3	0.1		
				Uncertainty B (dB)	1.0	1.0	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.8	0.8	0.8	0.8	1.4		
				Combined Uncertainty (dB)	1.0	1.0	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.9	0.9	0.9	0.8	1.4		
	Background	6.53	28	Average (dBA)	0.8	5.8	9.6	13.1	16.5	21.1	23.7	24.7	28.3	27.8	29.3	30.4	30.8	29.1	30.5	29.2	28.9	29.2	27.7	26.1	23.8	22.0	19.2	17.4	16.7	16.4	15.8	14.4	40.5
				Uncertainty A (dB)	0.2	0.3	0.2	0.2	0.2	0.3	0.2	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.3	0.4	0.5	0.6	0.5	0.3	0.2	0.2	0.2	0.2		
				Uncertainty B (dB)	1.0	1.0	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.8	0.8	0.8	0.8	1.4		
				Combined Uncertainty (dB)	1.0	1.0	0.8	0.8	0.8	0.9	0.8	0.8	0.9	0.9	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	1.0	0.9	0.8	0.8	0.8	0.8	1.5		
7.0	Turbine ON	6.98	105	Average (dBA)	13.3	18.2	22.3	25.7	29.0	32.2	35.0	36.7	39.6	38.0	38.7	40.1	39.0	38.7	42.2	41.5	42.4	44.5	44.5	42.8	41.2	39.4	36.4	32.7	29.0	24.4	19.4	16.3	53.3
				Uncertainty A (dB)	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.2	0.2	0.3	0.4	0.4	0.2	0.2		
				Uncertainty B (dB)	1.0	1.0	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.8	0.8	0.8	0.8	1.4		
				Combined Uncertainty (dB)	1.0	1.0	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.8	0.9	0.9	0.8	1.5		
	Background	7.01	29	Average (dBA)	1.6	6.1	9.7	13.5	17.9	21.1	24.0	25.3	28.1	27.8	29.5	30.4	30.8	29.4	30.6	29.9	29.8	29.7	28.3	26.8	25.6	23.9	20.3	17.6	16.6	16.2	15.6	14.2	40.9
				Uncertainty A (dB)	0.4	0.3	0.3	0.2	0.5	0.3	0.3	0.3	0.2	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.3	0.6	0.7	0.6	0.3	0.2	0.2	0.2	0.2		
				Uncertainty B (dB)	1.0	1.0	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.8	0.8	0.8	0.8	1.4		
				Combined Uncertainty (dB)	1.1	1.1	0.8	0.8	0.9	0.9	0.8	0.9	0.8	0.9	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.9	1.1	1.0	0.9	0.8	0.8	0.8	1.5		
7.5	Turbine ON	7.47	51	Average (dBA)	13.4	18.1	22.5	26.1	29.3	32.6	35.2	37.0	41.3	39.0	38.9	40.2	39.1	38.9	41.6	41.5	42.7	44.8	45.0	43.1	41.6	39.7	36.6	32.8	28.7	23.8	19.0	16.0	53.6
				Uncertainty A (dB)	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.2	0.2	0.2	0.3	0.4	0.4	0.2	0.1		
				Uncertainty B (dB)	1.0	1.0	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.8	0.8	0.8	0.8	1.4		
				Combined Uncertainty (dB)	1.0	1.0	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.9	0.9	0.9	0.8	1.4		
	Background	7.50	31	Average (dBA)	1.3	5.7	9.4	13.0	16.7	21.7	24.3	25.2	28.4	28.3	29.7	31.0	31.0	29.5	30.3	29.5	29.1	29.2	28.0	27.0	25.1	23.9	20.6	18.0	17.0	16.8	16.2	14.8	40.9
				Uncertainty A (dB)	0.3	0.2	0.2	0.2	0.2	0.3	0.3	0.2	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.4	0.5	0.6	0.7	0.6	0.3	0.3	0.3	0.3	0.3		
				Uncertainty B (dB)	1.0	1.0	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.8	0.8	0.8	0.8	1.4		
				Combined Uncertainty (dB)	1.1	1.0	0.8	0.8	0.8	0.9	0.9	0.8	0.8	0.9	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.9	1.1	1.0	0.9	0.8	0.8	0.8	1.5		
8.0	Turbine ON	7.96	32	Average (dBA)	13.9	18.3	22.6	26.4	29.7	32.9	35.7	37.4	42.9	40.4	39.2	40.2	39.2	39.0	41.4	41.9	43.0	45.0	44.7	43.5	42.0	40.1	36.9	33.2	29.1	24.2	19.3	16.3	53.9
				Uncertainty A (dB)	0.2	0.2	0.3	0.2	0.2	0.2	0.1	0.1	0.3	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.3	0.3	0.5	0.5	0.3	0.3		
				Uncertainty B (dB)	1.0	1.0	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.8	0.8	0.8	0.8	1.4		
				Combined Uncertainty (dB)	1.0	1.0	0.8	0.8	0.8	0.8	0.8	0.8	0.9	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.9	0.9	0.9	0.9	1.5		
	Background	7.98	28	Average (dBA)	1.3	5.7	9.2	13.0	16.3	20.8	23.3	24.1	27.4	27.1	28.5	29.6	29.9	28.3	29.6	28.7	28.5	28.7	27.3	25.5	24.3	22.5	19.7	18.1	17.3	17.0	16.5	15.0	39.9
				Uncertainty A (dB)	0.4	0.3	0.2	0.2	0.3	0.3	0.2	0.2	0.2	0.3	0.3	0.4	0.4	0.4	0.4	0.3	0.4	0.4	0.4	0.4	0.5	0.6	0.5	0.4	0.3	0.3	0.3	0.3		
				Uncertainty B (dB)	1.0	1.0	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.8	0.8	0.8	0.8	1.4		
				Combined Uncertainty (dB)	1.1	1.1	0.8	0.8	0.8	0.9	0.8	0.8	0.8	0.9	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.9	1.0	0.9	0.9	0.9	0.9	0.9	1.5		
8.5	Turbine ON	8.45	11	Average (dBA)	14.2	18.7	23.2	26.7	29.8	33.1	35.8	37.5	43.6	40.2	39.1	40.1	39.4	39.1	41.5	41.6	43.0	44.9	44.4	43.5	41.9	40.0	36.7	32.9	28.5	23.3	18.5	16.0	53.9
				Uncertainty A (dB)	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.2	0.4	0.5	0.1	0.2	0.2	0.2	0.2	0.3	0.2	0.2	0.3	0.2	0.3	0.3	0.4	0.4	0.6	0.5	0.3	0.3		
				Uncertainty B (dB)	1.0	1.0	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.8	0.8	0.8	0.8	1.4		
				Combined Uncertainty (dB)	1.1	1.1	0.9	0.9	0.9	0.9	0.8	0.8	0.9	0.9	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.9	0.9	0.9	1.0	1.0	0.9	1.5		
	Background	8.54	22	Average (dBA)	1.6	5.8	9.5	12.9	16.4	24.7	23.6	24.5	28.0	27.4	29.0	30.0	30.6	29.0	30.3	29.1	28.8	29.1	27.7	26.6	25.0	23.7	20.5	17.9	17.0	16.7	16.1	14.6	40.5
				Uncertainty A (dB)	0.6	0.4	0.3	0.3	0.3	1.2	0.4	0.4	0.5	0.5	0.5	0.6	0.7	0.6	0.6	0.6	0.6	0.5	0.5	0.6	0.7	0.9	0.7	0.4	0.3	0.3	0.3	0.2		
				Uncertainty B (dB)	1.0	1.0	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.8	0.8	0.8	0.8	1.4		
				Combined Uncertainty (dB)	1.2	1.1	0.9	0.8	0.9	1.4	0.9	0.9	0.9	0.9	0.9	0.9	1.0	0.9	0.9	0.9	0.9	0.9	0.8	0.9	1.0	1.2	1.1	0.9	0.8	0.8	0.8	1.5		
9.0	Turbine ON	8.98	14	Average (dBA)	14.4	19.2	23.2	26.9	30.0	33.2	35.9	37.5	43.3	41.3	38.9	40.0	39.3	39.0	41.2	41.8	42.8	44.8	45.6	43.4	41.7	39.5	36.4	32.4	27.3	22.5	19.0	16.8	54.0
				Uncertainty A (dB)	0.4	0.4	0.3	0.2	0.2	0.2	0.2	0.2	0.6	0.3	0.2	0.2	0.2	0.2	0.1	0.3	0.2	0.2	0.6	0.3	0.3	0.3	0.3	0.4	0.5	0.5	0.4	0.5		
				Uncertainty B (dB)	1.0	1.0	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.8	0.8	0.8	0.8	1.4		
				Combined Uncertainty (dB)	1.1	1.1	0.9	0.8	0.8	0.8	0.8	0.8	1.0	0.9	0.7	0.7	0.7	0.7	0.7	0.8	0.7	0.7	0.9	0.7	0.7	0.9	0.9	0.9	1.0	0.9	0.9	1.5		
	Background	9.00	10	Average (dBA)	1.4	6.2	9.1	12.5	15.3	20.1	23.3	23.8	27.4	26.5	28.7	30.1	30.3	28.3	29.7	28.5	28.5	28.7	27.3	25.4	24.0	22.2	19.4	17.8	17.3	17.2	16.7	15.3	39.9
				Uncertainty A (dB)	0.8	0.8	0.5	0.5	0.3	0.2	0.4	0.4	0.4	0.4	0.5	0.5	0.6	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.7	0.9	0.8	0.6	0.6	0.6	0.7	0.6		
				Uncertainty B (dB)	1.0	1.0	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.8	0.8	0.8	0.8	1.4		
				Combined Uncertainty (dB)	1.3	1.3	1.0	0.9	0.9	0.8	0.9	0.9	0.9	0.9	0.9	0.8	0.9	0.8	0.8	0.8	0.9	0.8	0.9	0.9	1.0	1.2	1.2	1.0	1.0	1.0	1.0	1.6		

Table C.08 Detailed measurement uncertainty at hub height - Data Series 2

Project: East Durham Wind Energy Centre - Turbine T02 - IEC 61400-11 Measurement

Report ID: 15427.00.T02.RP3

Created on: 2/15/2018

Wind Bin (m/s)	Parameter	Average Wind Speed (m/s)	# of data points	Parameter	1/3 Octave Band (Hz)																													Overall
					20	25	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	10000	
9.5	Turbine ON	9.53	15	Average (dBA)	17.2	22.0	25.8	29.0	32.0	34.8	37.5	39.1	46.5	43.0	41.2	42.9	42.9	40.9	44.1	43.2	43.4	44.7	44.4	42.9	41.7	39.5	37.5	34.7	31.2	29.9	29.3	27.7	55.2
				Uncertainty A (dB)	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.5	0.2	0.2	0.3	0.3	0.2	0.2	0.3	0.2	0.2	0.3	0.2	0.2	0.3	0.2	0.3	0.7	1.2	1.5	1.6		
				Uncertainty B (dB)	1.0	1.0	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.8	0.8	0.8	0.8	1.4		
				Combined Uncertainty (dB)	1.1	1.1	0.9	0.9	0.9	0.8	0.8	0.8	1.0	0.8	0.7	0.7	0.7	0.7	0.7	0.8	0.7	0.7	0.8	0.7	0.7	0.8	0.8	0.9	1.0	1.4	1.7	2.2		
	Background	9.50	18	Average (dBA)	7.2	11.2	15.6	19.7	24.0	27.2	31.1	33.9	35.3	38.7	39.0	40.9	42.5	38.9	40.8	39.6	39.0	38.9	37.2	34.8	33.7	33.2	32.1	29.7	27.5	26.1	25.4	23.8	50.6
				Uncertainty A (dB)	0.4	0.2	0.2	0.3	0.4	0.4	0.5	0.6	0.4	0.3	0.4	0.5	0.4	0.5	0.4	0.4	0.3	0.3	0.3	0.4	0.6	0.7	0.9	1.0	1.1	1.2	1.2	1.2		
				Uncertainty B (dB)	1.0	1.0	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.8	0.8	0.8	0.8	1.4		
				Combined Uncertainty (dB)	1.1	1.0	0.8	0.8	0.9	0.9	1.0	1.0	0.9	0.9	0.8	0.8	0.8	0.9	0.8	0.8	0.8	0.8	0.8	0.8	0.9	1.1	1.2	1.3	1.4	1.4	1.4	1.9		
10.0	Turbine ON	9.94	14	Average (dBA)	16.0	21.9	25.6	28.7	31.9	34.4	37.2	38.8	45.8	42.7	40.9	42.5	42.6	40.9	43.4	42.6	42.8	44.3	44.2	42.5	41.2	39.0	37.0	34.0	30.7	29.5	29.0	27.5	54.7
				Uncertainty A (dB)	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.5	0.3	0.2	0.1	0.2	0.3	0.2	0.3	0.2	0.2	0.4	0.2	0.2	0.2	0.2	0.3	0.6	1.0	1.2	1.3		
				Uncertainty B (dB)	1.0	1.0	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.8	0.8	0.8	0.8	1.4		
				Combined Uncertainty (dB)	1.1	1.1	0.8	0.8	0.9	0.8	0.8	0.8	0.9	0.9	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.7	0.7	0.8	0.8	0.8	1.0	1.3	1.5	1.9		
	Background	9.99	27	Average (dBA)	8.5	12.3	15.9	19.4	23.6	27.4	29.6	32.7	34.9	37.8	38.0	39.6	41.8	37.8	40.2	39.0	38.6	38.6	36.9	34.2	32.8	32.1	30.7	28.4	27.4	27.1	26.8	25.5	49.9
				Uncertainty A (dB)	0.6	0.4	0.3	0.2	0.2	0.2	0.3	0.4	0.3	0.2	0.3	0.3	0.2	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.4	0.5	0.7	0.9	1.0	1.1	1.1		
				Uncertainty B (dB)	1.0	1.0	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.8	0.8	0.8	0.8	1.4		
				Combined Uncertainty (dB)	1.2	1.1	0.8	0.8	0.8	0.8	0.8	0.9	0.9	0.8	0.8	0.7	0.7	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.9	1.0	1.1	1.2	1.3	1.3	1.8		
10.5	Turbine ON	10.45	24	Average (dBA)	17.0	22.3	26.3	29.3	32.6	35.2	37.8	39.4	46.5	43.3	41.1	42.8	42.6	40.9	43.8	43.1	43.3	44.6	44.5	43.0	41.6	39.5	37.4	34.2	30.2	28.5	27.9	26.3	55.1
				Uncertainty A (dB)	0.4	0.3	0.3	0.2	0.2	0.3	0.3	0.2	0.4	0.3	0.2	0.2	0.2	0.2	0.2	0.3	0.2	0.1	0.3	0.2	0.2	0.2	0.2	0.3	0.5	0.9	1.2	1.3		
				Uncertainty B (dB)	1.0	1.0	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.8	0.8	0.8	0.8	1.4		
				Combined Uncertainty (dB)	1.1	1.1	0.8	0.8	0.8	0.8	0.8	0.8	0.9	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.8	1.0	1.2	1.4	1.9		
	Background	10.50	28	Average (dBA)	10.1	13.8	16.5	20.6	24.6	28.0	31.2	32.9	34.6	37.9	37.6	39.5	41.6	38.0	40.0	38.7	38.3	38.2	36.6	34.0	32.8	32.2	31.1	29.3	28.5	28.3	28.1	26.7	49.8
				Uncertainty A (dB)	0.9	0.7	0.4	0.4	0.4	0.5	0.5	0.5	0.3	0.3	0.3	0.3	0.3	0.4	0.2	0.2	0.2	0.2	0.2	0.3	0.4	0.5	0.7	0.9	1.1	1.3	1.4	1.4		
				Uncertainty B (dB)	1.0	1.0	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.8	0.8	0.8	0.8	1.4		
				Combined Uncertainty (dB)	1.3	1.2	0.9	0.9	0.9	0.9	0.9	0.9	0.8	0.8	0.7	0.8	0.7	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.8	1.0	1.1	1.2	1.3	1.5	1.6	2.0		

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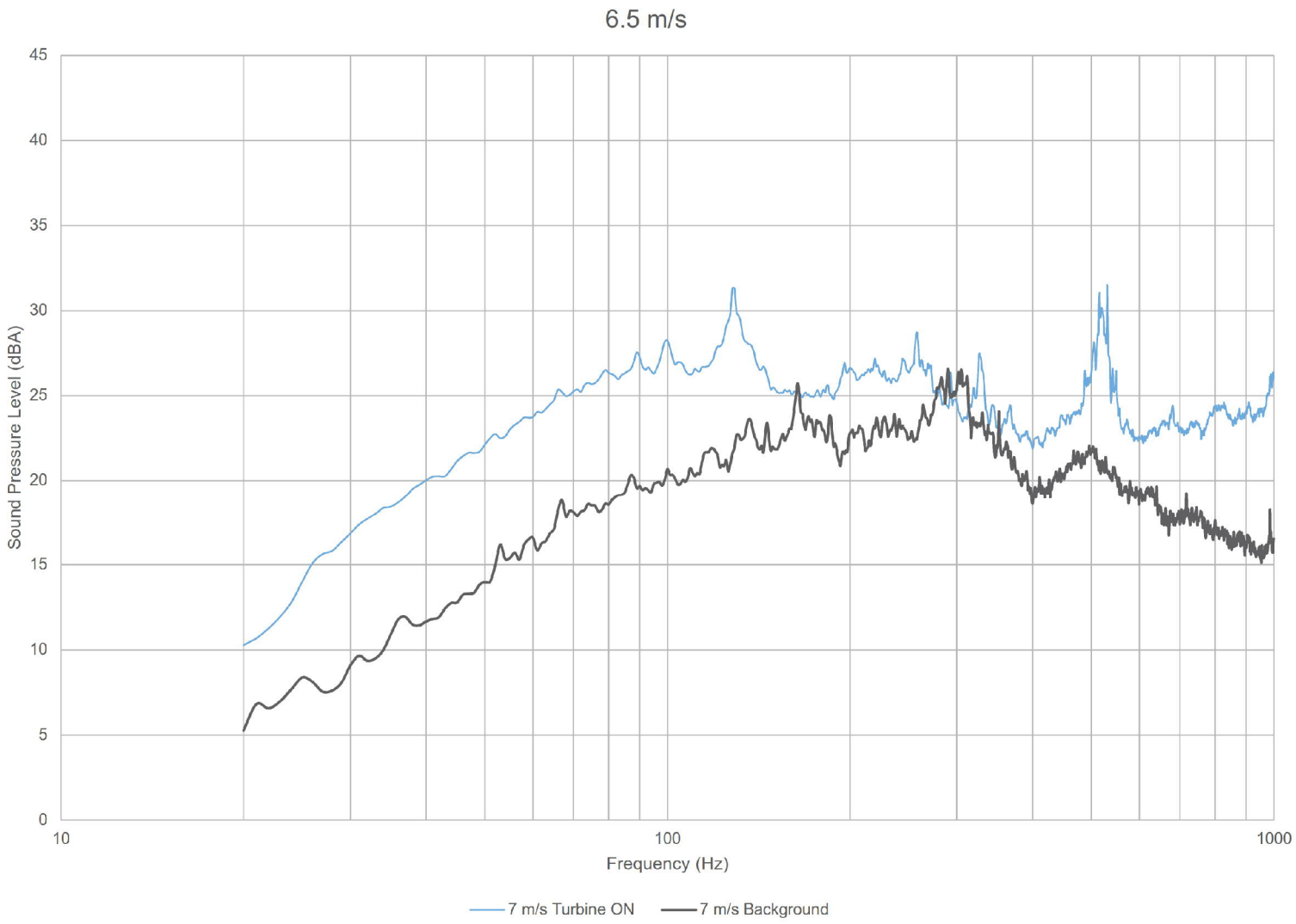
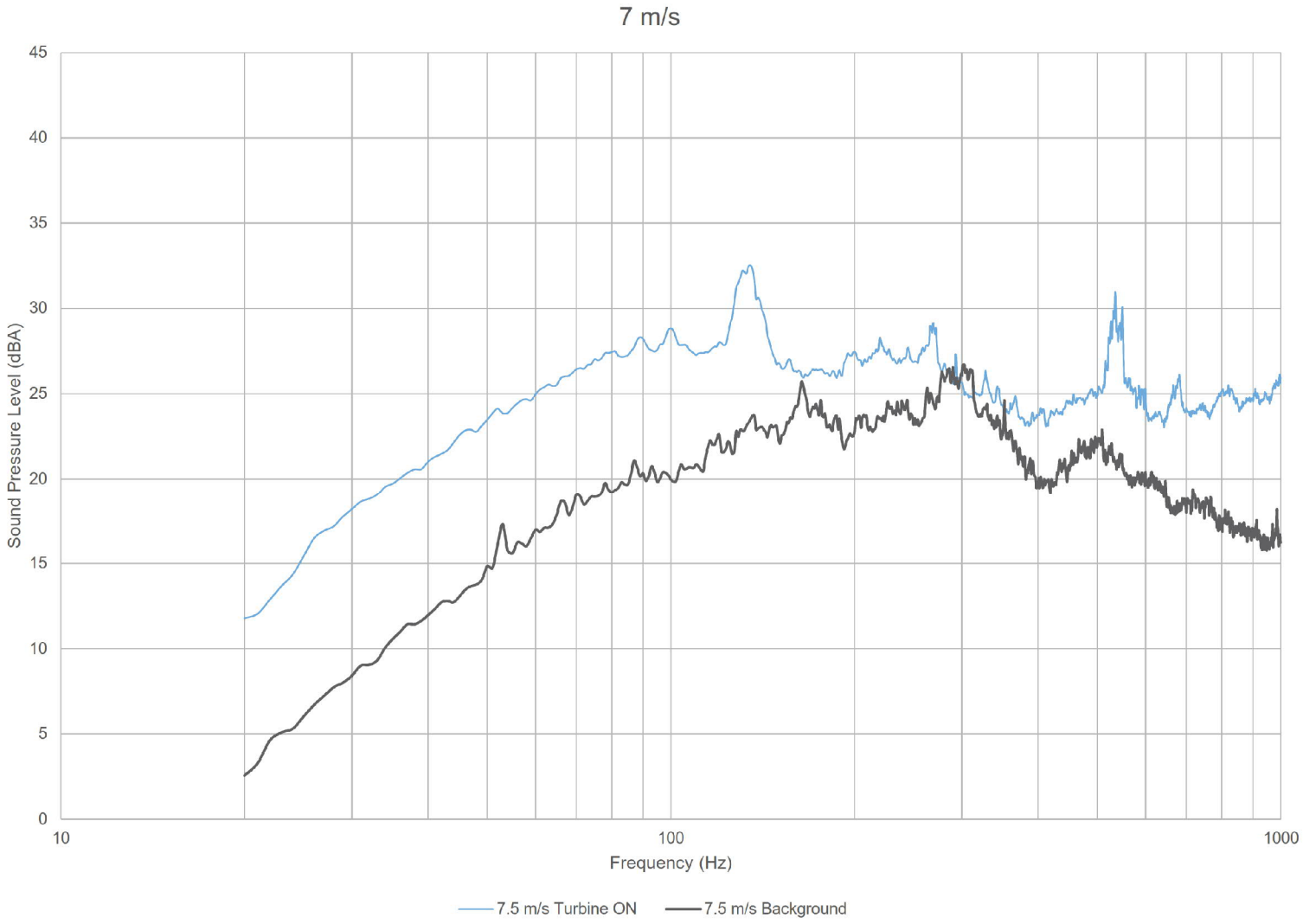
Appendix D
Tonality Assessment



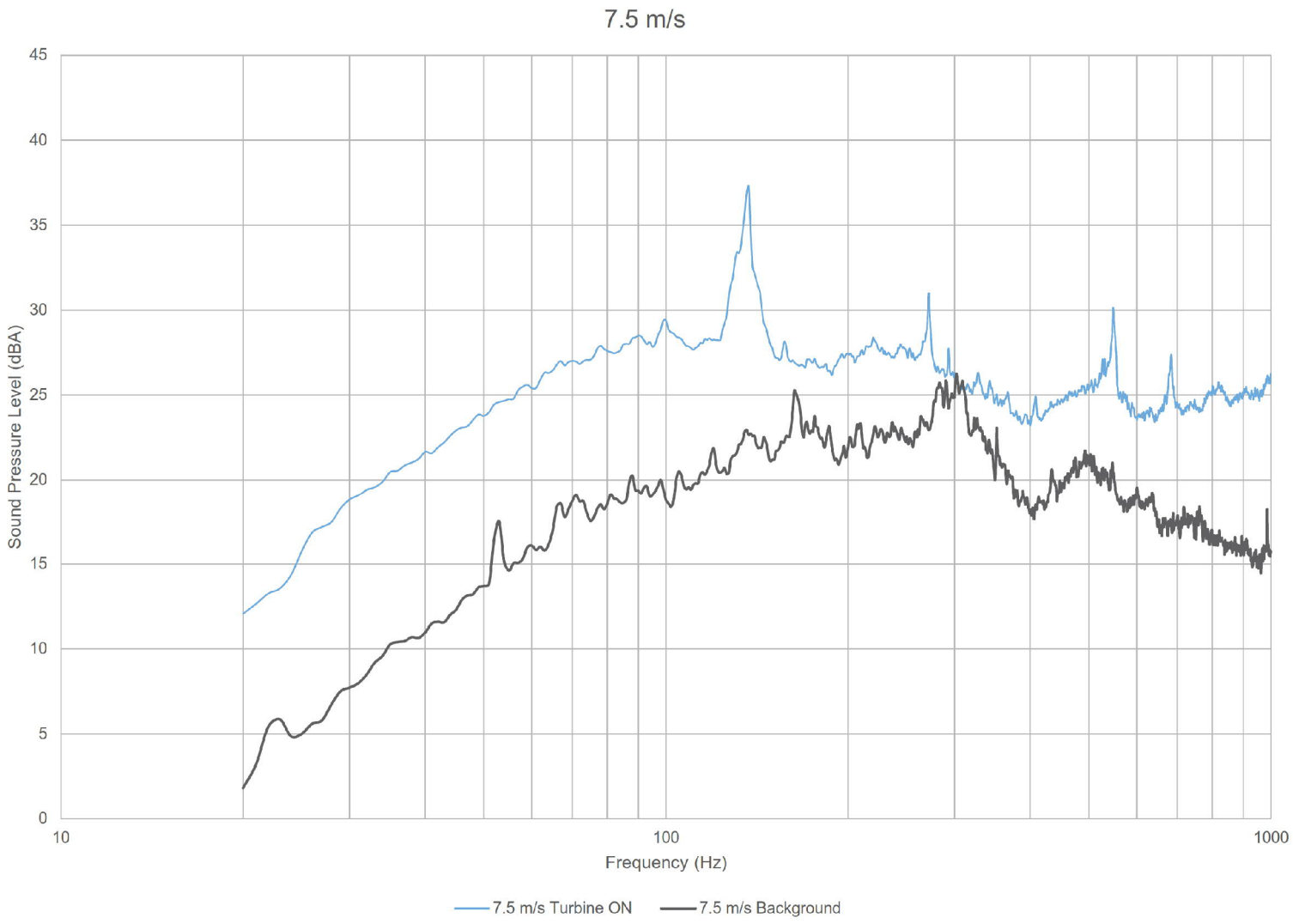
aercoustics	15427.00.T02.RP3 Scale: NTS Drawn by: AM Reviewed by: PA Date: Feb 15, 2018 Revision: 1	**Project Name** East Durham Wind Energy Centre - Turbine T02 - IEC61400-11 Edition 3.0 **Figure Title** Plot of narrow band spectra – Turbine ON vs. Background at 6.5 m/s

Figure D.01



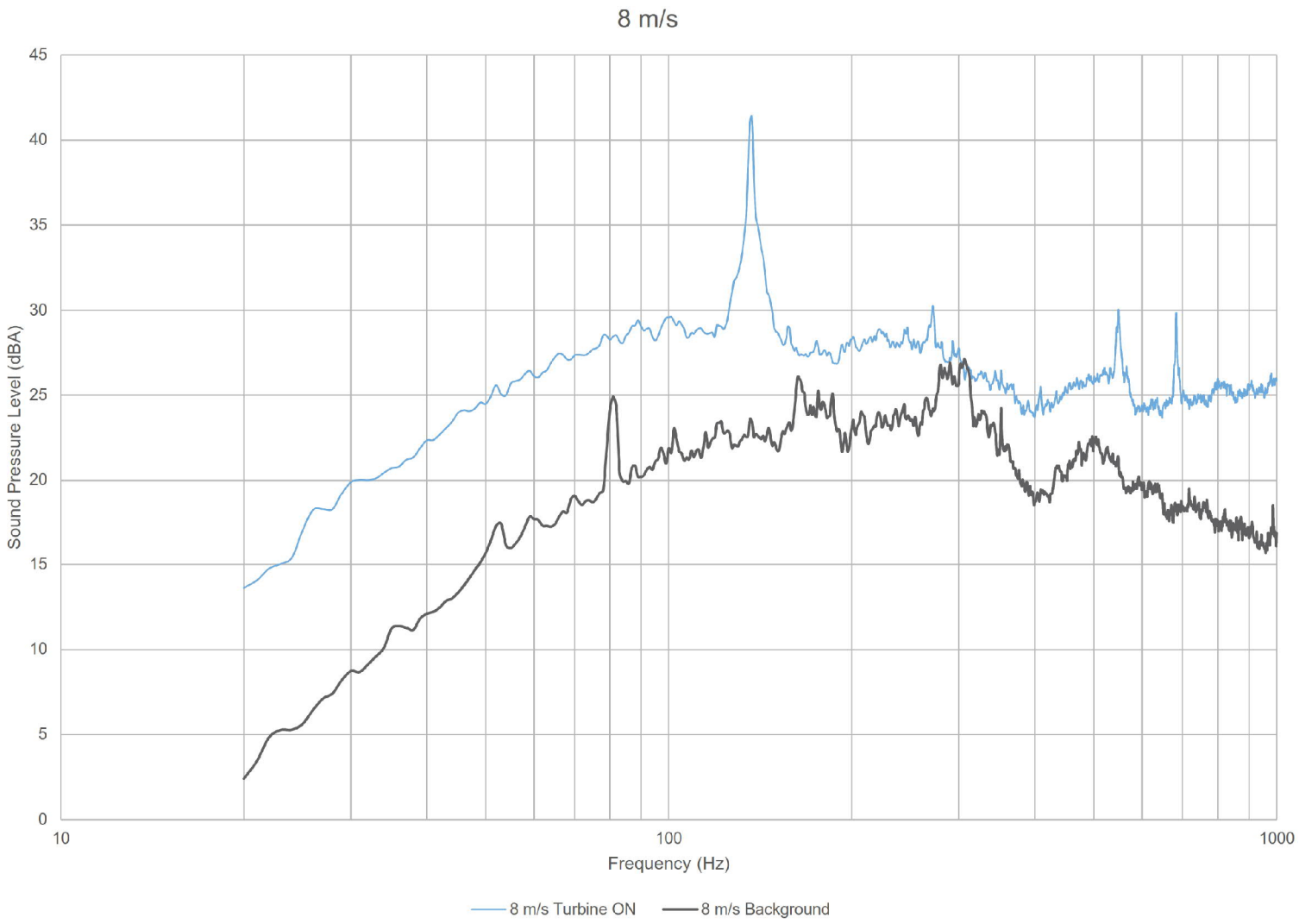
aercoustics	15427.00.T02.RP3 Scale: NTS Drawn by: AM Reviewed by: PA Date: Feb 15, 2018 Revision: 1	**Project Name** East Durham Wind Energy Centre - Turbine T02 - IEC61400-11 Edition 3.0 **Figure Title** Plot of narrow band spectra – Turbine ON vs. Background at 7 m/s

Figure D.02



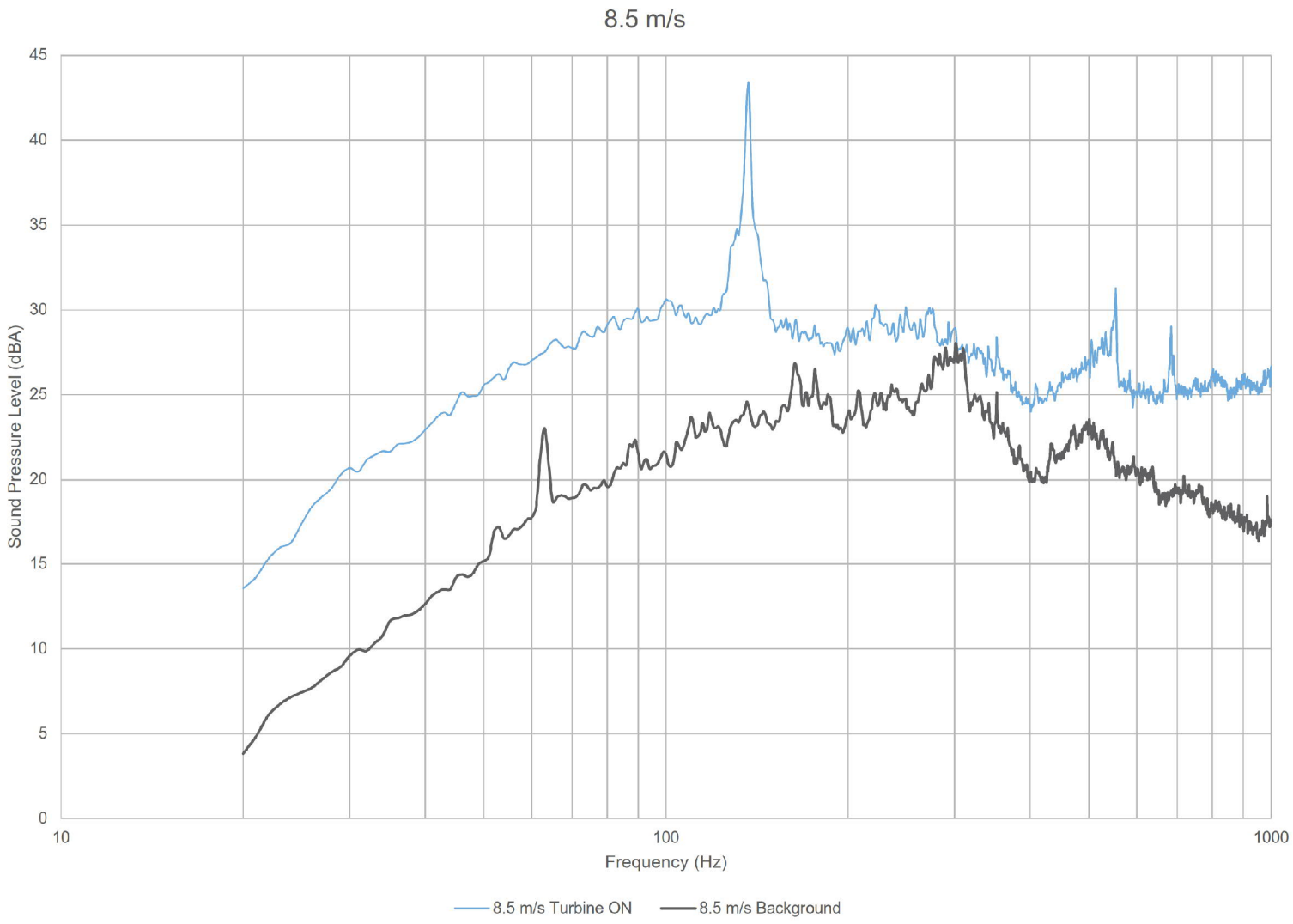
aercoustics	15427.00.T02.RP3 Scale: NTS Drawn by: AM Reviewed by: PA Date: Feb 15, 2018 Revision: 1	**Project Name** East Durham Wind Energy Centre - Turbine T02 - IEC61400-11 Edition 3.0 **Figure Title** Plot of narrow band spectra – Turbine ON vs. Background at 7.5 m/s

Figure D.03



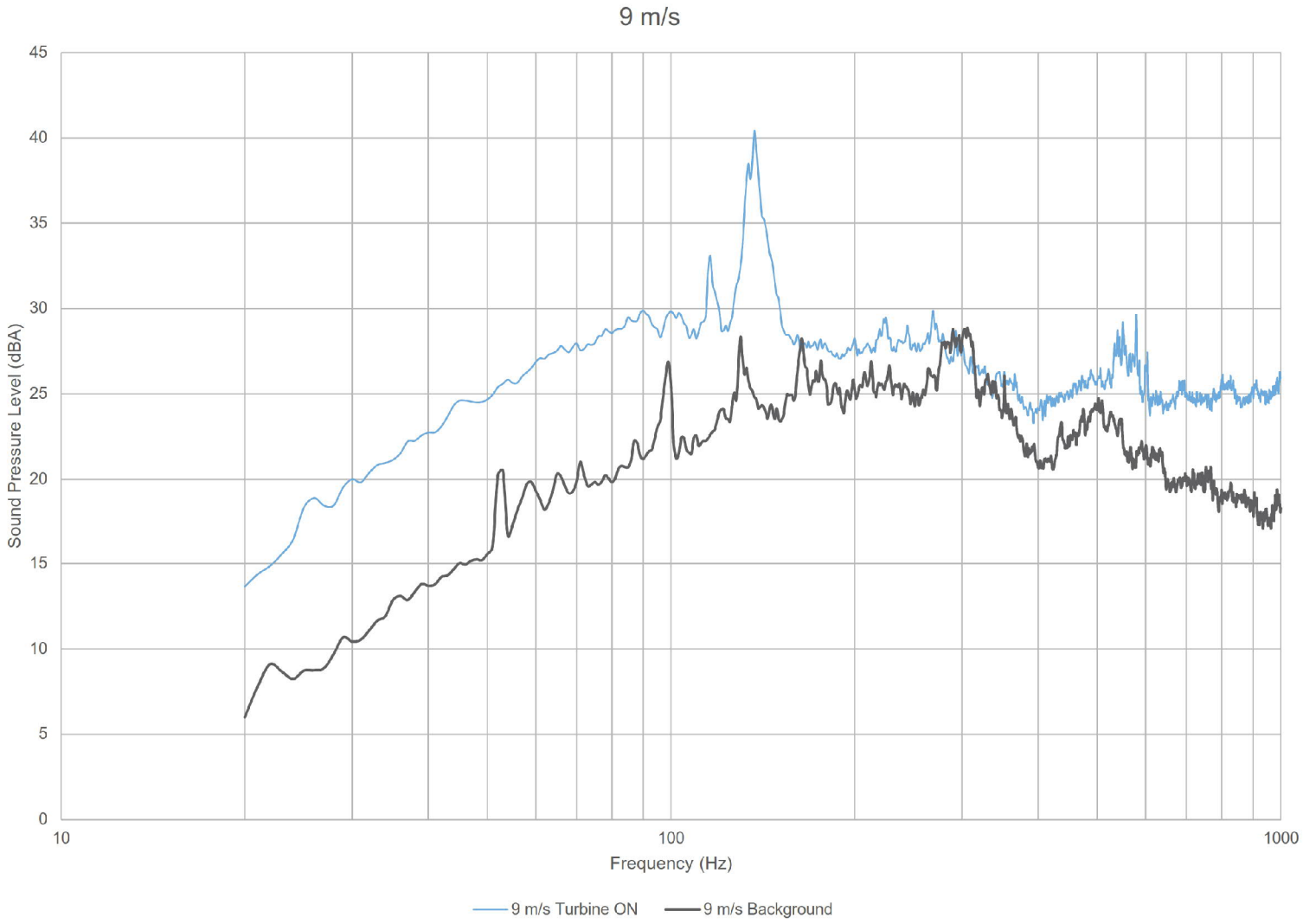
aercoustics	15427.00.T02.RP3 Scale: NTS Drawn by: AM Reviewed by: PA Date: Feb 15, 2018 Revision: 1	**Project Name** East Durham Wind Energy Centre - Turbine T02 - IEC61400-11 Edition 3.0 **Figure Title** Plot of narrow band spectra – Turbine ON vs. Background at 8 m/s

Figure D.04



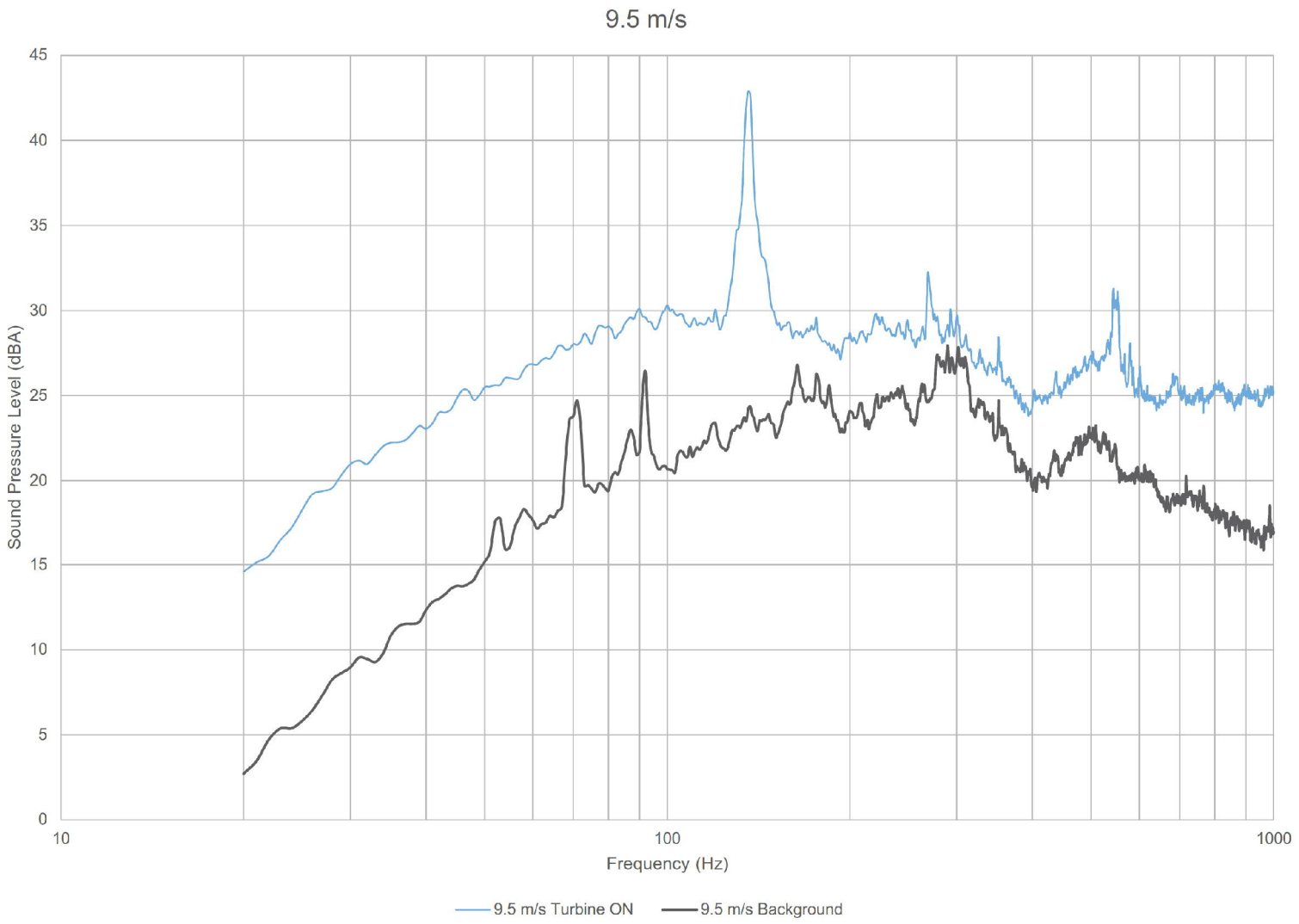
aercoustics	15427.00.T02.RP3 Scale: NTS Drawn by: AM Reviewed by: PA Date: Feb 15, 2018 Revision: 1	**Project Name** East Durham Wind Energy Centre - Turbine T02 - IEC61400-11 Edition 3.0 **Figure Title** Plot of narrow band spectra – Turbine ON vs. Background at 8.5 m/s

Figure D.05



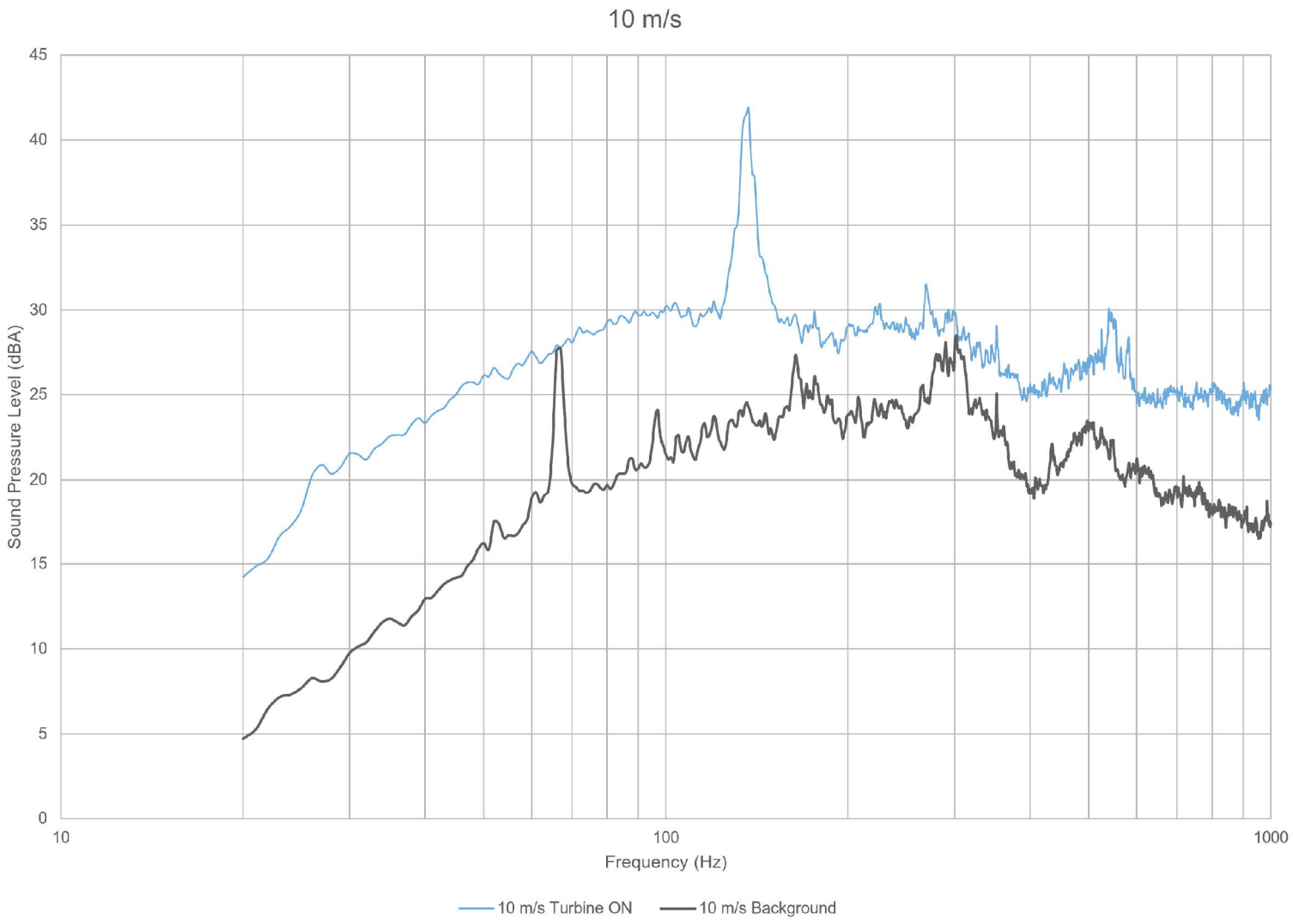
aercoustics	15427.00.T02.RP3 Scale: NTS Drawn by: AM Reviewed by: PA Date: Feb 15, 2018 Revision: 1	**Project Name** East Durham Wind Energy Centre - Turbine T02 - IEC61400-11 Edition 3.0 **Figure Title** Plot of narrow band spectra – Turbine ON vs. Background at 9 m/s

Figure D.06

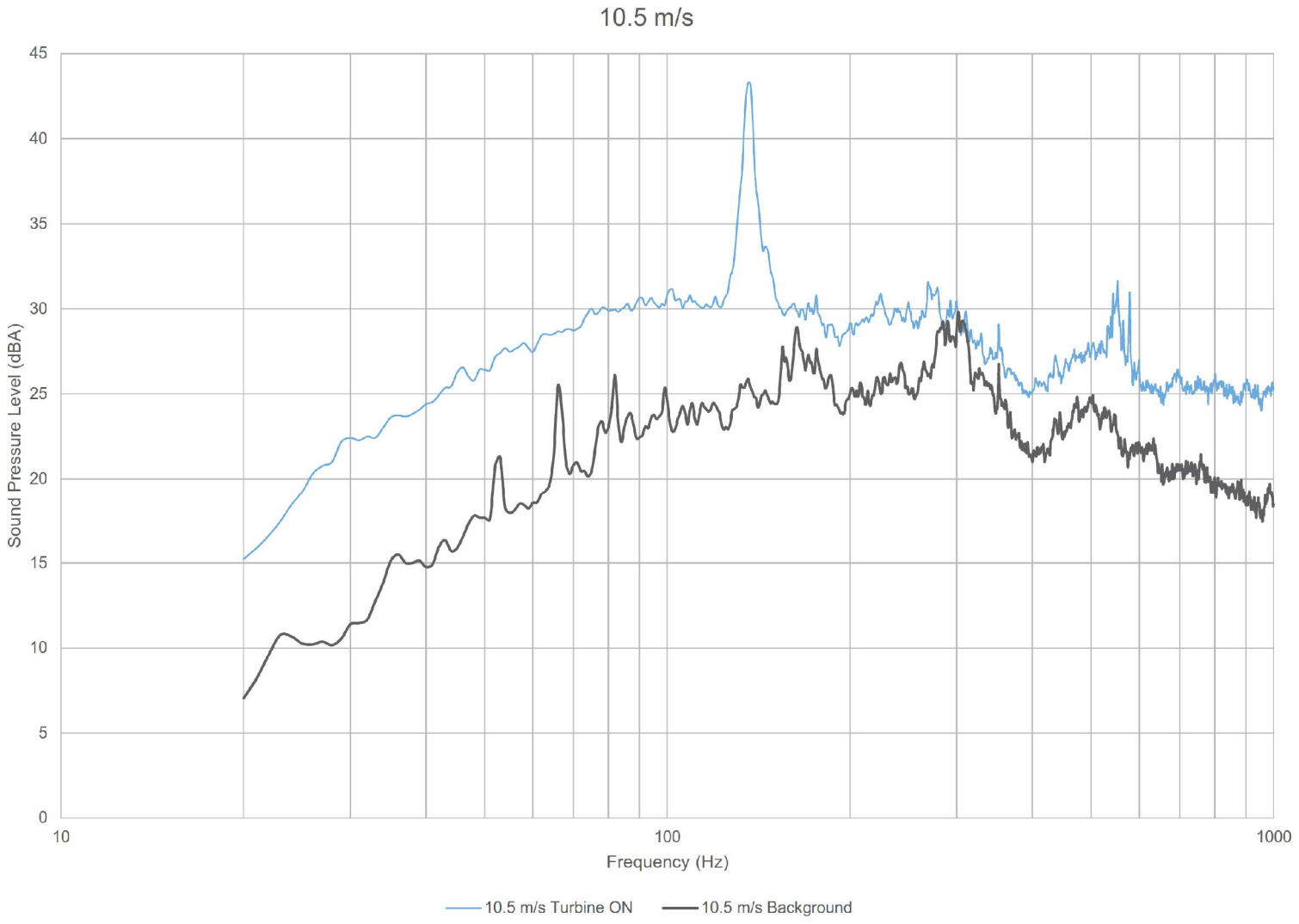


aercoustics	15427.00.T02.RP3 Scale: NTS Drawn by: AM Reviewed by: PA Date: Feb 15, 2018 Revision: 1	**Project Name** East Durham Wind Energy Centre - Turbine T02 - IEC61400-11 Edition 3.0 **Figure Title** Plot of narrow band spectra – Turbine ON vs. Background at 9.5 m/s

Figure D.07



aercoustics	15427.00.T02.RP3	**Project Name**
	Scale: NTS Drawn by: AM Reviewed by: PA Date: Feb 15, 2018 Revision: 1	East Durham Wind Energy Centre - Turbine T02 - IEC61400-11 Edition 3.0
		Figure Title Plot of narrow band spectra – Turbine ON vs. Background at 10 m/s
		Figure D.08



aercoustics	15427.00.T02.RP3 Scale: NTS Drawn by: AM Reviewed by: PA Date: Feb 15, 2018 Revision: 1	**Project Name** East Durham Wind Energy Centre - Turbine T02 - IEC61400-11 Edition 3.0 **Figure Title** Plot of narrow band spectra – Turbine ON vs. Background at 10.5 m/s

Figure D.09

Table D.01 Tonality Assessment Table - 6.5 m/s

Project: East Durham Wind Energy Centre - Turbine T02 - IEC 61400-11 Measurement

Report ID: 15427.00.T02.RP3

Created on: 2/15/2018

Measurement #	Centre frequency (Hz)	Energy average of all masking lines (dB)	Background (dB)	Background adjusted criterion level (dB)	Masking level (dB)	Tone level (dB)	Determination of tonality (dB)	Frequency dependent audibility criterion (dB)	Tonal Audibility (dB)
299	520			25.0	44.0	40.8	-3.1	-2.3	-0.8
76	520			23.5	42.5	42.2	-0.3	-2.3	2.1
75	521			23.6	42.6	43.7	1.1	-2.3	3.4
43	521			23.9	42.9	43.2	0.4	-2.3	2.7
45	521			23.4	42.4	43.8	1.4	-2.3	3.7
405	522			25.8	44.8	36.2	-8.6	-2.3	-6.2
245	522			24.5	43.5	35.6	-7.9	-2.3	-5.5
46	523			24.5	43.5	44.5	1.0	-2.3	3.3
198	523			22.9	41.9	41.9	0.0	-2.3	2.3
401	524			25.0	44.0	39.5	-4.4	-2.3	-2.1
74	524			23.3	42.2	40.4	-1.9	-2.3	0.5
281	524			24.4	43.4	39.7	-3.7	-2.3	-1.4
331	524			24.5	43.5	42.5	-1.0	-2.3	1.4
330	526			24.9	43.9	42.3	-1.5	-2.3	0.8
432	527			24.5	43.5	41.8	-1.7	-2.3	0.7
201	528			22.8	41.8	41.4	-0.4	-2.3	1.9
44	531			23.1	42.1	44.6	2.5	-2.3	4.8
210	531			23.5	42.5	43.8	1.3	-2.3	3.7
328	531			25.0	44.0	41.8	-2.1	-2.3	0.2
180	531			23.5	42.5	43.7	1.1	-2.3	3.5
144	531			23.9	42.9	44.8	1.9	-2.3	4.2
40	531			25.2	44.2	43.2	-1.0	-2.3	1.3
183	531			23.8	42.8	45.2	2.5	-2.3	4.8
263	531			24.6	43.6	38.2	-5.4	-2.3	-3.0
244	531			24.1	43.1	42.7	-0.4	-2.3	2.0
145	531			23.9	42.9	46.0	3.1	-2.3	5.4
146	531			23.5	42.6	44.9	2.4	-2.3	4.7
209	535			24.5	43.5	44.4	0.9	-2.3	3.3
1232	536			25.1	44.2	42.9	-1.2	-2.3	1.1
185	542			25.0	44.1	39.3	-4.8	-2.3	-2.5
184	542			24.3	43.3	44.4	1.1	-2.3	3.4
147	548			24.4	43.5	42.4	-1.1	-2.4	1.2
165	550			24.1	43.1	42.4	-0.7	-2.4	1.6
140	550			23.8	42.9	43.8	0.9	-2.4	3.3
39	569			24.9	44.0	33.1	-10.9	-2.4	-8.6
47	574			26.1	45.2	35.6	-9.5	-2.4	-7.2
Average	532						-0.4	-2.3	2.0

Table D.02 Tonality Assessment Table - 7 m/s

Project: East Durham Wind Energy Centre - Turbine T02 - IEC 61400-11 Measurement

Report ID: 15427.00.T02.RP3

Created on: 2/15/2018

Measurement #	Centre frequency (Hz)	Energy average of all masking lines (dB)	Background (dB)	Background adjusted criterion level (dB)	Masking level (dB)	Tone level (dB)	Determination of tonality (dB)	Frequency dependent audibility criterion (dB)	Tonal Audibility (dB)
214	496			22.6	41.5	38.1	-3.4	-2.3	-1.1
280	502			23.1	42.1	38.6	-3.5	-2.3	-1.2
279	510			25.1	44.0	37.6	-6.4	-2.3	-4.1
173	515			23.8	42.7	39.4	-3.4	-2.3	-1.1
150	515			24.5	43.4	40.8	-2.7	-2.3	-0.3
170	516			23.1	42.1	42.5	0.5	-2.3	2.8
53	521			24.3	43.3	39.1	-4.2	-2.3	-1.9
23	522			24.5	43.5	40.0	-3.5	-2.3	-1.2
172	522			23.1	42.0	41.7	-0.3	-2.3	2.0
265	523			24.2	43.2	37.5	-5.7	-2.3	-3.3
451	523			25.0	44.0	45.8	1.8	-2.3	4.1
381	523			25.1	44.1	41.0	-3.1	-2.3	-0.8
157	523			25.2	44.1	31.5	-12.6	-2.3	-10.3
191	526			24.1	43.1	42.6	-0.5	-2.3	1.8
427	526			24.9	43.9	37.9	-6.0	-2.3	-3.7
73	526			23.5	42.5	35.5	-7.0	-2.3	-4.7
329	526			24.8	43.8	43.7	-0.1	-2.3	2.2
268	527			24.5	43.5	39.7	-3.8	-2.3	-1.5
34	527			23.7	42.7	44.4	1.6	-2.3	3.9
197	527			22.5	41.5	40.5	-1.0	-2.3	1.3
1096	528			27.6	46.6	40.2	-6.4	-2.3	-4.1
431	528			25.4	44.4	42.8	-1.6	-2.3	0.8
166	528			23.4	42.4	42.9	0.5	-2.3	2.9
426	531			25.2	44.2	39.8	-4.4	-2.3	-2.0
152	531			26.8	45.8	32.8	-13.0	-2.3	-10.7
61	531			24.2	43.2	42.5	-0.7	-2.3	1.6
64	532			23.6	42.6	45.2	2.6	-2.3	5.0
241	532			25.2	44.2	43.1	-1.1	-2.3	1.3
167	533			23.8	42.9	40.9	-1.9	-2.3	0.4
1234	533			26.0	45.0	41.0	-4.1	-2.3	-1.7
78	534			23.6	42.6	41.9	-0.7	-2.3	1.7
77	534			24.0	43.0	39.3	-3.7	-2.3	-1.4
1153	534			26.0	45.0	43.8	-1.2	-2.3	1.1
356	535			24.6	43.7	43.6	-0.1	-2.3	2.3
407	535			25.1	44.2	44.8	0.6	-2.3	3.0
419	535			26.6	45.6	40.1	-5.5	-2.3	-3.2
338	535			25.6	44.6	42.4	-2.2	-2.3	0.2
190	535			25.7	44.7	38.3	-6.5	-2.3	-4.1
1231	535			26.0	45.0	46.1	1.0	-2.3	3.4
240	536			25.0	44.0	41.6	-2.5	-2.3	-0.1
142	536			23.5	42.5	42.0	-0.6	-2.3	1.8
357	536			25.1	44.1	37.5	-6.6	-2.3	-4.3
27	536			24.8	43.8	42.6	-1.2	-2.3	1.1
79	536			24.4	43.4	44.5	1.1	-2.3	3.5
376	537			25.4	44.5	42.5	-1.9	-2.3	0.4
406	538			24.9	44.0	41.7	-2.2	-2.3	0.1
450	538			25.3	44.4	36.4	-8.0	-2.3	-5.7
63	539			23.8	42.8	37.9	-4.9	-2.3	-2.6
351	539			25.2	44.2	41.4	-2.8	-2.3	-0.5
Average	528						-1.9	-2.3	0.5

Table D.02 Tonality Assessment Table - 7 m/s

Project: East Durham Wind Energy Centre - Turbine T02 - IEC 61400-11 Measurement

Report ID: 15427.00.T02.RP3

Created on: 2/15/2018

Measurement #	Centre frequency (Hz)	Energy average of all masking lines (dB)	Background (dB)	Background adjusted criterion level (dB)	Masking level (dB)	Tone level (dB)	Determination of tonality (dB)	Frequency dependent audibility criterion (dB)	Tonal Audibility (dB)
428	547			25.9	44.9	34.6	-10.3	-2.4	-7.9
60	547			24.1	43.1	40.4	-2.7	-2.4	-0.4
347	548			25.1	44.2	38.7	-5.5	-2.4	-3.1
424	549			26.0	45.0	38.7	-6.4	-2.4	-4.0
425	549			25.7	44.7	43.0	-1.7	-2.4	0.7
94	549			24.4	43.5	39.4	-4.0	-2.4	-1.7
371	550			25.2	44.3	39.5	-4.8	-2.4	-2.4
350	550			25.9	44.9	39.4	-5.5	-2.4	-3.2
143	550			24.3	43.3	37.8	-5.6	-2.4	-3.2
380	550			25.9	44.9	43.7	-1.2	-2.4	1.1
266	550			24.7	43.8	39.9	-3.9	-2.4	-1.6
1235	550			25.4	44.4	42.3	-2.2	-2.4	0.2
348	550			25.3	44.3	42.8	-1.5	-2.4	0.8
267	551			25.3	44.3	42.3	-2.0	-2.4	0.4
349	551			25.9	44.9	42.8	-2.1	-2.4	0.2
377	551			25.5	44.5	40.1	-4.4	-2.4	-2.1
141	551			23.5	42.5	40.8	-1.7	-2.4	0.7
181	554			24.7	43.7	39.2	-4.5	-2.4	-2.2
51	558			25.0	44.1	37.3	-6.7	-2.4	-4.4
81	559			25.3	44.4	38.4	-6.0	-2.4	-3.7
212	560			25.5	44.6	36.2	-8.4	-2.4	-6.0
193	564			24.3	43.4	36.5	-6.9	-2.4	-4.6
37	564			25.9	45.0	38.0	-7.0	-2.4	-4.6
189	564			24.3	43.4	42.2	-1.1	-2.4	1.3
211	566			24.4	43.5	41.1	-2.3	-2.4	0.0
50	568			24.7	43.8	41.6	-2.2	-2.4	0.2
192	569			25.0	44.1	35.3	-8.8	-2.4	-6.5
160	573			25.5	44.6	41.6	-3.0	-2.4	-0.7
49	576			25.5	44.7	39.6	-5.1	-2.4	-2.7
38	577			24.6	43.8	41.5	-2.3	-2.4	0.1
188	583			24.9	44.0	37.6	-6.4	-2.4	-4.0
3	585			25.3	44.5	36.2	-8.2	-2.4	-5.8
187	585			25.4	44.5	42.2	-2.4	-2.4	0.0
4	591			25.9	45.1	42.5	-2.6	-2.4	-0.2
82	594			25.8	45.0	35.4	-9.6	-2.4	-7.2
48	594			26.2	45.4	42.6	-2.8	-2.4	-0.4
152	597			26.0	45.2	33.4	-11.7	-2.4	-9.3
153	599			25.4	44.6	40.6	-4.0	-2.4	-1.6
83	599			24.9	44.1	42.8	-1.3	-2.4	1.1
Average	565						-3.8	-2.4	-1.5

Table D.02 Tonality Assessment Table - 7 m/s

Project: East Durham Wind Energy Centre - Turbine T02 - IEC 61400-11 Measurement

Report ID: 15427.00.T02.RP3

Created on: 2/15/2018

Measurement #	Centre frequency (Hz)	Energy average of all masking lines (dB)	Background (dB)	Background adjusted criterion level (dB)	Masking level (dB)	Tone level (dB)	Determination of tonality (dB)	Frequency dependent audibility criterion (dB)	Tonal Audibility (dB)
380	1094			27.0	47.6	33.2	-14.5	-2.9	-11.6
60	1095			25.0	45.6	33.5	-12.1	-2.9	-9.2
347	1095			26.2	46.8	34.6	-12.2	-2.9	-9.3
424	1098			26.5	47.1	34.3	-12.8	-2.9	-9.9
1235	1100			25.1	45.7	33.4	-12.3	-2.9	-9.4
143	1104			25.4	46.1	33.2	-12.8	-2.9	-9.9
193	1124			25.3	46.0	40.5	-5.5	-2.9	-2.5
189	1124			25.0	45.7	35.1	-10.6	-2.9	-7.7
211	1133			25.5	46.2	39.5	-6.7	-2.9	-3.7
51	1136			25.5	46.3	36.6	-9.6	-2.9	-6.7
50	1136			26.3	47.1	37.5	-9.6	-2.9	-6.6
278	1138			26.1	46.8	34.3	-12.5	-2.9	-9.6
160	1146			26.8	47.5	45.7	-1.9	-2.9	1.1
49	1151			26.8	47.6	44.7	-2.9	-3.0	0.1
277	1151			26.6	47.4	41.3	-6.0	-3.0	-3.1
37	1153			26.1	46.9	34.1	-12.8	-3.0	-9.8
38	1156			25.3	46.1	43.8	-2.3	-3.0	0.6
215	1162			25.5	46.4	43.1	-3.2	-3.0	-0.3
188	1167			26.2	47.0	46.8	-0.2	-3.0	2.8
48	1169			26.7	47.5	49.0	1.4	-3.0	4.4
152	1169			26.3	47.1	42.8	-4.4	-3.0	-1.4
187	1169			25.9	46.8	51.3	4.5	-3.0	7.5
3	1170			25.9	46.8	44.5	-2.3	-3.0	0.7
82	1178			26.6	47.5	48.9	1.4	-3.0	4.4
4	1182			26.6	47.4	50.6	3.2	-3.0	6.2
Average	1140						-2.7	-2.9	0.2

Table D.03 Tonality Assessment Table - 7.5 m/s

Project: East Durham Wind Energy Centre - Turbine T02 - IEC 61400-11 Measurement

Report ID: 15427.00.T02.RP3

Created on: 2/15/2018

Measurement #	Centre frequency (Hz)	Energy average of all masking lines (dB)	Background (dB)	Background adjusted criterion level (dB)	Masking level (dB)	Tone level (dB)	Determination of tonality (dB)	Frequency dependent audibility criterion (dB)	Tonal Audibility (dB)
135	125			26.5	44.8	32.5	-12.3	-2.0	-10.3
1212	130			28.8	47.1	34.8	-12.3	-2.0	-10.3
1151	131			30.2	48.5	38.1	-10.4	-2.0	-8.4
21	131			29.1	47.4	43.7	-3.8	-2.0	-1.8
196	131			25.9	44.2	45.7	1.5	-2.0	3.6
91	131			27.2	45.5	42.5	-3.0	-2.0	-1.0
86	132			25.7	44.0	45.7	1.7	-2.0	3.7
52	133			27.9	46.2	43.6	-2.6	-2.0	-0.6
169	133			25.5	43.8	44.8	1.1	-2.0	3.1
149	133			28.6	46.9	42.2	-4.7	-2.0	-2.7
1186	134			29.8	48.1	48.6	0.5	-2.0	2.5
168	134			25.0	43.3	43.3	0.0	-2.0	2.0
227	135			30.0	48.3	40.4	-7.9	-2.0	-5.9
59	135			28.5	46.8	43.3	-3.5	-2.0	-1.4
85	135			27.6	45.9	38.3	-7.6	-2.0	-5.6
72	135			28.4	46.7	39.7	-7.0	-2.0	-5.0
163	136			26.1	44.4	44.0	-0.5	-2.0	1.5
234	136			29.0	47.3	43.2	-4.1	-2.0	-2.1
22	136			29.2	47.5	44.5	-2.9	-2.0	-0.9
237	136			28.6	46.9	40.1	-6.9	-2.0	-4.8
162	136			24.8	43.1	45.0	1.9	-2.0	3.9
388	136			28.8	47.1	39.8	-7.3	-2.0	-5.3
346	136			27.9	46.2	39.8	-6.4	-2.0	-4.4
389	136			28.5	46.8	39.0	-7.9	-2.0	-5.8
370	136			28.4	46.7	42.7	-4.0	-2.0	-2.0
374	136			28.4	46.7	40.8	-5.8	-2.0	-3.8
364	136			28.5	46.8	40.5	-6.3	-2.0	-4.3
337	136			28.8	47.1	41.0	-6.1	-2.0	-4.1
56	137			29.1	47.4	44.5	-2.8	-2.0	-0.8
358	137			28.8	47.1	42.2	-4.8	-2.0	-2.8
1097	137			30.4	48.7	42.9	-5.7	-2.0	-3.7
228	137			29.5	47.8	40.8	-7.0	-2.0	-5.0
29	137			28.8	47.1	38.1	-9.0	-2.0	-7.0
378	137			28.4	46.7	42.7	-4.0	-2.0	-2.0
93	137			27.6	45.9	33.9	-11.9	-2.0	-9.9
365	137			28.2	46.5	40.8	-5.7	-2.0	-3.7
1204	137			30.6	48.9	46.3	-2.6	-2.0	-0.6
6	137			27.2	45.5	40.1	-5.3	-2.0	-3.3
355	137			28.4	46.7	43.3	-3.4	-2.0	-1.4
30	137			27.9	46.2	44.5	-1.7	-2.0	0.3
238	137			28.0	46.3	41.9	-4.4	-2.0	-2.4
379	137			28.2	46.5	40.2	-6.2	-2.0	-4.2
66	137			27.1	45.4	42.3	-3.1	-2.0	-1.1
1084	137			29.1	47.4	46.1	-1.3	-2.0	0.7
342	137			27.7	46.0	41.5	-4.5	-2.0	-2.5
373	137			28.2	46.5	44.9	-1.6	-2.0	0.4
372	137			28.6	46.9	42.3	-4.5	-2.0	-2.5
7	138			28.0	46.3	34.8	-11.5	-2.0	-9.5
218	139			27.3	45.6	36.7	-8.9	-2.0	-6.9
154	141			27.4	45.7	34.8	-10.9	-2.0	-8.9
Average	135						-3.5	-2.0	-1.5

Table D.03 Tonality Assessment Table - 7.5 m/s

Project: East Durham Wind Energy Centre - Turbine T02 - IEC 61400-11 Measurement

Report ID: 15427.00.T02.RP3

Created on: 2/15/2018

Measurement #	Centre frequency (Hz)	Energy average of all masking lines (dB)	Background (dB)	Background adjusted criterion level (dB)	Masking level (dB)	Tone level (dB)	Determination of tonality (dB)	Frequency dependent audibility criterion (dB)	Tonal Audibility (dB)
29	1103			25.3	45.9	32.3	-13.7	-2.9	-10.8
373	1106			26.8	47.5	36.8	-10.7	-2.9	-7.8
372	1106			26.7	47.3	35.8	-11.6	-2.9	-8.7
66	1109			25.0	45.7	34.8	-10.9	-2.9	-8.0
30	1109			26.0	46.6	37.4	-9.2	-2.9	-6.3
218	1134			26.8	47.5	37.0	-10.5	-2.9	-7.5
195	1144			25.0	45.8	40.0	-5.7	-2.9	-2.8
168	1146			23.8	44.6	39.2	-5.4	-2.9	-2.4
194	1157			26.0	46.8	43.1	-3.7	-3.0	-0.7
217	1164			26.6	47.4	51.2	3.7	-3.0	6.7
5	1167			26.2	47.1	43.2	-3.9	-3.0	-0.9
84	1177			27.1	48.0	49.1	1.2	-3.0	4.1
154	1180			26.7	47.6	49.3	1.7	-3.0	4.7
216	1182			26.8	47.7	48.0	0.4	-3.0	3.3
Average	1142						-2.4	-2.9	0.6

Table D.04 Tonality Assessment Table - 8 m/s

Project: East Durham Wind Energy Centre - Turbine T02 - IEC 61400-11 Measurement

Report ID: 15427.00.T02.RP3

Created on: 2/15/2018

Measurement #	Centre frequency (Hz)	Energy average of all masking lines (dB)	Background (dB)	Background adjusted criterion level (dB)	Masking level (dB)	Tone level (dB)	Determination of tonality (dB)	Frequency dependent audibility criterion (dB)	Tonal Audibility (dB)
1230	130			29.0	47.3	43.5	-3.8	-2.0	-1.8
568	134			30.8	49.1	43.2	-5.9	-2.0	-3.9
1203	134			29.8	48.1	44.5	-3.6	-2.0	-1.6
1152	135			32.0	50.3	49.1	-1.2	-2.0	0.8
368	136			29.1	47.4	42.3	-5.1	-2.0	-3.1
87	136			26.5	44.8	45.8	1.0	-2.0	3.0
104	136			27.6	45.9	43.0	-2.9	-2.0	-0.9
1218	136			31.9	50.2	50.2	-0.1	-2.0	2.0
233	136			28.6	46.9	43.7	-3.3	-2.0	-1.3
230	136			28.2	46.5	46.1	-0.4	-2.0	1.6
225	136			28.2	46.5	45.9	-0.6	-2.0	1.5
1213	136			30.3	48.6	48.1	-0.5	-2.0	1.5
362	136			29.4	47.7	42.4	-5.3	-2.0	-3.3
345	136			28.1	46.4	42.9	-3.5	-2.0	-1.5
1187	136			30.2	48.5	47.0	-1.5	-2.0	0.5
71	137			27.8	46.1	44.1	-2.0	-2.0	0.0
366	137			28.6	46.9	46.0	-0.8	-2.0	1.2
58	137			27.3	45.6	45.8	0.1	-2.0	2.1
70	137			28.9	47.2	46.9	-0.3	-2.0	1.7
32	137			28.3	46.6	46.1	-0.5	-2.0	1.6
363	137			29.0	47.3	44.4	-2.9	-2.0	-0.8
155	137			27.0	45.3	44.3	-1.0	-2.0	1.0
231	137			28.6	46.9	45.4	-1.5	-2.0	0.5
352	137			28.3	46.6	43.7	-2.9	-2.0	-0.9
360	137			28.8	47.1	46.2	-0.9	-2.0	1.1
57	137			28.1	46.4	46.8	0.4	-2.0	2.4
25	137			28.7	47.0	46.6	-0.4	-2.0	1.6
229	137			28.2	46.5	46.6	0.1	-2.0	2.1
367	137			28.4	46.7	45.1	-1.6	-2.0	0.4
236	137			29.3	47.6	45.3	-2.3	-2.0	-0.3
1219	137			31.4	49.7	49.5	-0.2	-2.0	1.8
235	137			28.9	47.2	42.4	-4.8	-2.0	-2.8
369	137			28.3	46.6	42.4	-4.2	-2.0	-2.2
219	138			28.4	46.7	43.3	-3.4	-2.0	-1.4
106	139			28.0	46.3	41.3	-5.0	-2.0	-3.0
95	139			28.7	47.0	42.4	-4.7	-2.0	-2.6
9	140			27.8	46.1	41.9	-4.2	-2.0	-2.2
88	140			28.5	46.8	42.6	-4.3	-2.0	-2.2
105	140			28.3	46.6	38.4	-8.3	-2.0	-6.3
8	142			27.6	45.9	36.9	-9.0	-2.0	-7.0
Average	137						-2.0	-2.0	0.0

Table D.05 Tonality Assessment Table - 8.5 m/s

Project: East Durahm Wind Energy Centre- Turbine T02 - IEC 61400-11 Measurement

Report ID: 15427.00.T02.RP3

Created on: 2/15/2018

Measurement #	Centre frequency (Hz)	Energy average of all masking lines (dB)	Background (dB)	Background adjusted criterion level (dB)	Masking level (dB)	Tone level (dB)	Determination of tonality (dB)	Frequency dependent audibility criterion (dB)	Tonal Audibility (dB)
20	128			27.2	45.5	40.4	-5.1	-2.0	-3.1
222	129			27.5	45.8	40.8	-5.0	-2.0	-2.9
562	131			31.1	49.4	40.6	-8.8	-2.0	-6.8
1128	134			30.0	48.3	42.7	-5.6	-2.0	-3.5
223	135			27.9	46.1	46.5	0.3	-2.0	2.4
134	135			27.7	45.9	46.1	0.2	-2.0	2.2
1217	136			31.7	50.0	52.8	2.8	-2.0	4.8
89	136			28.7	47.0	47.0	0.0	-2.0	2.0
561	136			31.0	49.3	48.0	-1.3	-2.0	0.7
68	137			28.7	47.0	46.0	-1.0	-2.0	1.0
1207	137			31.6	49.9	38.4	-11.5	-2.0	-9.5
1111	137			31.0	49.3	50.0	0.7	-2.0	2.8
361	137			28.5	46.8	45.9	-1.0	-2.0	1.1
220	137			28.4	46.7	45.5	-1.2	-2.0	0.8
232	137			28.3	46.6	47.1	0.4	-2.0	2.4
158	137			28.9	47.2	45.7	-1.5	-2.0	0.5
1112	137			32.1	50.4	47.2	-3.2	-2.0	-1.1
1228	137			30.7	49.0	42.6	-6.4	-2.0	-4.4
1109	137			32.1	50.3	48.5	-1.9	-2.0	0.2
226	137			29.5	47.8	45.5	-2.2	-2.0	-0.2
Average	135						-1.5	-2.0	0.5

Table D.06 Tonality Assessment Table - 9 m/s

Project: East Durham Wind Energy Centre - Turbine T02 - IEC 61400-11 Measurement

Report ID: 15427.00.T02.RP3

Created on: 2/15/2018

Measurement #	Centre frequency (Hz)	Energy average of all masking lines (dB)	Background (dB)	Background adjusted criterion level (dB)	Masking level (dB)	Tone level (dB)	Determination of tonality (dB)	Frequency dependent audibility criterion (dB)	Tonal Audibility (dB)
1137	116			30.9	49.2	50.0	0.8	-2.0	2.9
90	132			27.8	46.1	45.3	-0.7	-2.0	1.3
1172	133			29.7	48.0	49.3	1.4	-2.0	3.4
1191	134			31.4	49.7	48.6	-1.0	-2.0	1.0
1079	134			29.6	47.9	48.3	0.4	-2.0	2.4
109	134			27.5	45.8	47.1	1.3	-2.0	3.3
123	137			27.6	45.9	45.8	-0.1	-2.0	1.9
12	137			28.2	46.5	46.6	0.1	-2.0	2.1
133	137			27.7	46.0	48.2	2.2	-2.0	4.2
19	137			27.3	45.6	46.6	1.0	-2.0	3.0
127	137			27.3	45.6	48.8	3.2	-2.0	5.2
10	138			28.8	47.1	45.7	-1.4	-2.0	0.6
343	138			28.5	46.8	47.1	0.4	-2.0	2.4
224	138			28.4	46.7	45.7	-1.0	-2.0	1.0
1163	139			29.7	48.0	46.3	-1.8	-2.0	0.3
117	140			28.0	46.3	46.1	-0.1	-2.0	1.9
Average	135						0.5	-2.0	2.5

Table D.06 Tonality Assessment Table - 9 m/s

Project: East Durham Wind Energy Centre - Turbine T02 - IEC 61400-11 Measurement

Report ID: 15427.00.T02.RP3

Created on: 2/15/2018

Measurement #	Centre frequency (Hz)	Energy average of all masking lines (dB)	Background (dB)	Background adjusted criterion level (dB)	Masking level (dB)	Tone level (dB)	Determination of tonality (dB)	Frequency dependent audibility criterion (dB)	Tonal Audibility (dB)
10	1125			25.5	46.2	31.9	-14.3	-2.9	-11.4
343	1127			27.0	47.7	33.7	-14.1	-2.9	-11.1
224	1147			27.2	48.0	40.1	-7.9	-2.9	-5.0
1214	1154			25.8	46.6	44.9	-1.7	-3.0	1.3
99	1169			27.0	47.8	49.4	1.6	-3.0	4.5
96	1170			26.9	47.7	50.3	2.6	-3.0	5.5
1113	1194			26.7	47.6	39.8	-7.8	-3.0	-4.8
67	1200			27.7	48.6	44.3	-4.3	-3.0	-1.3
Average	1161						-2.3	-3.0	0.6

Table D.07 Tonality Assessment Table - 9.5 m/s

Project: East Durham Wind Energy Centre - Turbine T02 - IEC 61400-11 Measurement

Report ID: 15427.00.T02.RP3

Created on: 2/15/2018

Measurement #	Centre frequency (Hz)	Energy average of all masking lines (dB)	Background (dB)	Background adjusted criterion level (dB)	Masking level (dB)	Tone level (dB)	Determination of tonality (dB)	Frequency dependent audibility criterion (dB)	Tonal Audibility (dB)
1168	132			31.0	49.3	47.2	-2.1	-2.0	-0.1
1147	135			30.2	48.5	49.7	1.2	-2.0	3.2
535	135			31.5	49.8	44.6	-5.2	-2.0	-3.1
112	135			27.6	45.8	46.5	0.6	-2.0	2.6
550	135			30.9	49.2	44.8	-4.4	-2.0	-2.3
564	135			31.8	50.1	45.5	-4.6	-2.0	-2.6
1161	135			29.6	47.9	50.6	2.8	-2.0	4.8
1080	135			29.7	48.0	50.3	2.3	-2.0	4.3
1195	136			30.9	49.2	48.9	-0.3	-2.0	1.7
1162	136			30.0	48.3	48.4	0.1	-2.0	2.2
108	136			27.1	45.4	45.5	0.1	-2.0	2.1
1135	136			29.5	47.8	51.1	3.3	-2.0	5.4
111	137			28.3	46.6	45.9	-0.7	-2.0	1.3
15	137			28.3	46.6	45.7	-0.9	-2.0	1.1
542	137			31.8	50.1	48.9	-1.3	-2.0	0.7
11	137			28.4	46.7	47.4	0.7	-2.0	2.7
16	137			27.4	45.7	46.9	1.2	-2.0	3.2
221	137			27.8	46.1	47.5	1.5	-2.0	3.5
1090	137			30.3	48.6	51.4	2.9	-2.0	4.9
101	138			27.9	46.2	44.8	-1.4	-2.0	0.6
1164	138			29.0	47.3	49.3	2.0	-2.0	4.0
1134	140			30.3	48.6	46.2	-2.4	-2.0	-0.4
159	143			27.7	46.0	41.9	-4.1	-2.0	-2.1
1188	145			30.9	49.2	39.4	-9.8	-2.0	-7.7
Average	137						0.1	-2.0	2.1

Table D.07 Tonality Assessment Table - 9.5 m/s

Project: East Durham Wind Energy Centre - Turbine T02 - IEC 61400-11 Measurement

Report ID: 15427.00.T02.RP3

Created on: 2/15/2018

Measurement #	Centre frequency (Hz)	Energy average of all masking lines (dB)	Background (dB)	Background adjusted criterion level (dB)	Masking level (dB)	Tone level (dB)	Determination of tonality (dB)	Frequency dependent audibility criterion (dB)	Tonal Audibility (dB)
1147	1092			25.3	45.9	37.0	-8.9	-2.9	-6.0
1080	1093			24.8	45.4	31.4	-14.0	-2.9	-11.1
1090	1097			26.2	46.8	32.3	-14.5	-2.9	-11.6
1135	1104			25.4	46.1	31.7	-14.4	-2.9	-11.5
16	1110			25.0	45.7	32.6	-13.1	-2.9	-10.1
1164	1112			25.0	45.6	36.9	-8.8	-2.9	-5.8
101	1135			25.2	45.9	31.2	-14.7	-2.9	-11.7
1188	1165			26.9	47.7	47.0	-0.7	-3.0	2.3
159	1169			26.5	47.3	51.0	3.7	-3.0	6.6
Average	1120						-3.9	-2.9	-1.0

Table D.08 Tonality Assessment Table - 10 m/s

Project: East Durham Wind Energy Centre - Turbine T02 - IEC 61400-11 Measurement

Report ID: 15427.00.T02.RP3

Created on: 2/15/2018

Measurement #	Centre frequency (Hz)	Energy average of all masking lines (dB)	Background (dB)	Background adjusted criterion level (dB)	Masking level (dB)	Tone level (dB)	Determination of tonality (dB)	Frequency dependent audibility criterion (dB)	Tonal Audibility (dB)
1094	133			29.8	48.0	46.0	-2.0	-2.0	0.0
1067	134			29.3	47.6	48.9	1.2	-2.0	3.2
1089	134			29.9	48.2	49.0	0.8	-2.0	2.8
1078	134			29.4	47.7	47.7	0.0	-2.0	2.0
1227	135			29.4	47.7	46.5	-1.2	-2.0	0.8
1193	135			31.3	49.6	50.0	0.5	-2.0	2.5
1070	135			29.3	47.6	48.8	1.1	-2.0	3.1
558	136			31.0	49.3	45.4	-3.8	-2.0	-1.8
1222	137			30.7	49.0	48.5	-0.5	-2.0	1.5
122	137			28.0	46.3	45.6	-0.7	-2.0	1.3
14	137			29.4	47.7	47.8	0.2	-2.0	2.2
1069	137			30.9	49.2	50.6	1.4	-2.0	3.4
1126	139			32.1	50.4	40.0	-10.4	-2.0	-8.4
1077	139			29.6	47.9	49.0	1.1	-2.0	3.1
1075	140			30.2	48.5	48.2	-0.3	-2.0	1.7
102	141			28.5	46.8	42.6	-4.3	-2.0	-2.2
1102	144			30.7	49.0	39.9	-9.1	-2.0	-7.1
Average	137						-0.6	-2.0	1.4

Table D.09 Tonality Assessment Table - 10.5 m/s

Project: East Durham Wind Energy Centre - Turbine T02 - IEC 61400-11 Measurement

Report ID: 15427.00.T02.RP3

Created on: 2/15/2018

Measurement #	Centre frequency (Hz)	Energy average of all masking lines (dB)	Background (dB)	Background adjusted criterion level (dB)	Masking level (dB)	Tone level (dB)	Determination of tonality (dB)	Frequency dependent audibility criterion (dB)	Tonal Audibility (dB)
1053	132			29.1	47.4	46.2	-1.1	-2.0	0.9
1211	134			28.8	47.1	48.2	1.1	-2.0	3.1
1093	134			29.6	47.9	48.8	0.9	-2.0	3.0
1171	135			29.6	47.9	50.2	2.3	-2.0	4.3
1132	135			30.9	49.2	51.2	2.0	-2.0	4.0
1052	135			29.1	47.4	49.4	2.0	-2.0	4.1
1105	135			31.3	49.6	50.9	1.3	-2.0	3.3
1123	135			30.8	49.1	48.9	-0.3	-2.0	1.7
103	135			29.1	47.3	46.5	-0.9	-2.0	1.1
1202	136			29.9	48.2	49.3	1.1	-2.0	3.1
560	136			31.6	49.9	47.7	-2.2	-2.0	-0.1
563	137			31.8	50.1	46.3	-3.8	-2.0	-1.8
1066	137			30.5	48.8	49.7	0.9	-2.0	2.9
1196	137			30.3	48.6	48.9	0.3	-2.0	2.3
1127	137			30.8	49.1	49.7	0.6	-2.0	2.6
1087	137			30.3	48.6	50.1	1.5	-2.0	3.5
1115	137			30.7	49.0	50.8	1.9	-2.0	3.9
565	138			32.0	50.3	45.8	-4.5	-2.0	-2.5
1179	138			32.0	50.3	52.4	2.1	-2.0	4.1
1118	138			30.7	49.0	48.7	-0.3	-2.0	1.7
1056	139			30.4	48.7	44.9	-3.9	-2.0	-1.9
1160	141			29.9	48.2	43.3	-5.0	-2.0	-2.9
1085	141			30.5	48.8	40.2	-8.6	-2.0	-6.6
559	141			32.3	50.6	43.6	-6.9	-2.0	-4.9
Average	137						0.0	-2.0	2.0

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Appendix E
Measurement Data

Table E.01 Measurement data - Turbine ON - Data Series 1

Project: East Durham Wind Energy Centre - Turbine T02 - IEC 61400-11 Measurement

Report ID: 15427.00.T02.RP3

Created on: 2/15/2018

***Blank data denotes values that were omitted in the analysis due to an extraneous event during recording

Data Point #	Standardized Wind Speed	LAeq	Turbine Power Output (kW)	Reference Yaw Angle (°)	Yaw Angle (°)	Pitch Angle (°)	Rotor RPM	Nacelle Anemometer Wind Speed (m/s)	10m Anemometer Wind Speed (m/s)	Air Temperature (-C)	Pressure (kPa)	Relative Humidity (%)
1	6.4	51.6	636	185.8	189.7	1.0	11.9	5.3	5.9	-1.1	95969.1	73
2	6.7	51.9	727	185.8	189.7	1.0	12.7	6.4	4.5	-1.1	95969.1	73
3	6.9	53.6	804	185.8	189.7	3.3	13.8	5.5	3.9	-1.1	95978.9	73
4	6.8	55.1	788	185.8	189.7	5.7	14.2	7.4	4.3	-1.1	95982.5	74
5	7.3	53.6	939	185.8	189.7	5.8	13.9	6.6	3.3	-1.1	95982.5	74
6	7.4	52.5	987	185.8	189.7	5.0	13.3	6.2	2.9	-1.1	95982.4	74
7	7.4	52.8	1000	185.8	189.7	5.1	13.4	8.2	4.2	-1.1	95982.5	74
8	7.8	53.3	1127	185.8	189.7	6.4	13.7	8.0	4.4	-1.1	95982.4	74
9	8.2	53.0	1251	185.8	189.7	7.2	13.6	9.1	5.2	-1.1	95982.5	74
10	9.0	53.5	1377	185.8	189.7	7.4	13.5	8.9	5.4	-1.1	95982.5	74
11	9.4	53.4	1382	185.8	189.7	7.4	13.3	9.3	4.5	-1.1	95982.6	74
12	9.0	53.1	1381	185.8	189.7	6.5	13.1	8.9	4.7	-1.1	95982.5	74
13			1396	185.8	189.7	5.7	13.2	7.8	4.7	-1.1	95982.6	74
14	10.1	53.8	1395	185.8	189.7	6.0	13.2	10.0	3.4	-1.1	95982.9	74
15	9.3	53.4	1398	185.8	189.7	6.0	13.3	9.3	3.7	-1.1	95973.2	74
16	9.3	53.2	1388	185.8	189.7	6.4	13.2	9.3	3.1	-1.1	95969.4	74
17			1361	185.8	189.7	3.5	12.7	7.6	3.2	-1.1	95969.6	74
18			1407	185.8	189.7	2.1	13.0	8.0	2.3	-1.1	95969.3	74
19	8.9	53.1	1385	185.8	189.7	3.8	13.2	8.8	3.2	-1.1	95969.6	74
20	8.3	52.4	1271	185.8	189.7	1.4	12.5	8.1	4.3	-1.1	95969.2	74
21	7.6	53.0	1077	185.8	189.7	0.3	12.9	8.4	3.8	-1.1	95969.7	74
22	7.6	53.6	1082	185.8	189.7	0.5	13.2	8.3	5.3	-1.1	95969.7	74
23	6.8	52.5	762	185.8	189.7	1.2	12.6	6.4	5.2	-1.1	95969.7	74
24	6.9	52.5	807	185.8	189.7	0.9	12.6	7.4	5.4	-1.1	95969.6	74
25	8.2	54.0	1249	185.8	189.7	-0.1	13.3	8.5	4.4	-1.1	95969.6	74
26	7.2	53.6	899	185.8	189.7	0.7	13.0	7.0	3.7	-1.1	95969.7	74
27	6.9	53.3	809	185.8	189.7	1.0	12.9	7.1	4.6	-1.1	95969.7	74
28	7.2	53.4	918	185.8	189.7	0.8	13.2	7.3	4.6	-1.1	95969.9	74
29	7.3	53.3	946	185.8	189.7	0.8	13.2	5.7	3.7	-1.1	95969.9	74
30	7.7	53.7	1108	185.8	189.7	0.7	13.4	7.4	4.9	-1.1	95969.8	74
31			1380	185.8	189.7	0.1	13.4	7.9	5.3	-1.1	95969.8	74
32	8.0	53.3	1197	185.8	189.7	0.6	13.2	8.1	4.6	-1.1	95969.8	74
33	7.2	53.0	914	185.8	189.7	0.7	13.1	7.3	4.8	-1.1	95969.9	73
34	6.8	52.4	775	185.8	189.7	1.2	12.7	6.2	4.1	-1.1	95969.8	73
35	6.7	52.1	748	185.8	189.7	1.0	12.6	7.5	3.8	-1.1	95969.9	73
36	7.0	52.5	853	185.8	189.7	1.0	13.1	6.9	3.6	-1.1	95970.0	73
37	7.1	53.3	886	185.8	189.7	2.4	13.6	7.2	5.0	-1.1	95969.9	73
38	6.9	53.4	791	185.8	189.7	4.3	13.9	6.4	4.5	-1.1	95969.9	73
39	6.7	52.9	730	185.8	189.7	5.0	13.7	6.1	5.4	-1.1	95970.0	74
40	6.4	52.5	657	185.8	189.7	5.0	13.1	5.6	4.3	-1.1	95970.1	74
41	6.3	50.6	632	185.8	189.7	3.7	11.9	6.1	3.0	-1.1	95970.4	74
42	6.4	50.6	664	185.8	189.7	3.0	12.0	6.4	2.9	-1.1	95970.1	74
43	6.6	52.1	697	185.8	189.7	2.8	12.5	6.3	1.6	-1.1	95970.1	74
44	6.5	51.5	679	185.8	189.7	3.1	12.7	5.6	2.8	-1.1	95970.1	74
45	6.4	51.8	650	185.8	189.7	3.5	12.6	6.0	4.7	-1.1	95970.0	74
46	6.5	52.5	680	185.8	189.7	4.0	12.8	5.3	4.6	-1.1	95970.2	74
47	6.6	53.6	710	185.8	189.7	6.2	13.8	7.4	4.4	-1.1	95970.1	74
48	7.0	54.9	850	185.8	189.7	8.4	14.2	8.3	4.5	-1.1	95970.1	74
49	7.2	53.9	909	185.8	189.7	7.6	13.8	7.4	4.2	-1.1	95970.2	74
50	7.1	53.2	884	185.8	189.7	6.6	13.6	7.4	3.9	-1.1	95970.3	74
51	7.1	53.0	888	185.8	189.7	5.0	13.2	7.6	4.2	-1.1	95970.4	74
52	7.3	52.9	959	185.8	189.7	3.2	12.8	7.1	3.6	-1.1	95970.5	74
53	6.9	52.9	803	185.8	189.7	0.7	12.3	6.8	4.3	-1.1	95970.5	74
54	6.7	51.6	734	185.8	189.7	1.1	12.6	6.1	5.2	-1.1	95970.3	74
55	6.7	52.3	750	185.8	189.7	1.0	12.6	6.2	6.0	-1.1	95970.6	74
56	7.3	53.7	1081	185.8	189.7	0.5	13.3	6.6	6.3	-1.1	95963.3	74
57	7.9	53.8	1170	185.8	189.7	0.6	13.3	6.8	7.1	-1.1	95957.3	74
58	8.0	53.4	1204	185.8	189.7	0.5	13.3	7.5	5.7	-1.1	95957.2	74
59	7.4	53.4	995	185.8	189.7	0.5	13.2	7.0	5.1	-1.1	95957.1	74
60	7.1	53.0	891	185.8	189.7	0.8	13.2	5.8	5.0	-1.1	95957.2	74
61	7.0	52.7	820	185.8	189.7	1.1	13.0	6.3	5.0	-1.1	95957.3	74
62	6.7	52.2	757	185.8	189.7	1.2	12.5	6.5	4.8	-1.1	95957.3	74
63	6.9	52.2	814	185.8	189.7	0.8	13.0	8.2	5.2	-1.1	95957.2	74
64	6.8	52.2	768	185.8	189.7	1.0	12.7	5.2	3.8	-1.1	95957.2	74
65	6.7	51.6	739	185.8	189.7	1.0	12.5	6.1	2.6	-1.1	95957.4	74
66	7.6	52.6	1057	185.8	189.7	0.6	13.2	7.3	3.6	-1.1	95957.5	74
67	9.1	54.9	1442	185.8	189.7	3.8	14.2	9.0	4.3	-1.1	95957.4	74
68	8.3	54.3	1267	185.8	189.7	0.2	13.2	7.9	4.6	-1.1	95971.1	74
69			1385	185.8	189.7	0.8	13.4	8.6	3.1	-1.1	95971.1	74
70	8.1	54.1	1235	185.8	189.7	0.4	13.2	7.0	3.7	-1.1	95970.9	74
71	8.0	53.2	1223	185.8	189.7	0.0	13.3	6.4	5.2	-1.1	95971.1	74
72	7.3	52.9	951	185.8	189.7	0.6	13.1	6.8	3.9	-1.1	95971.0	74
73	7.1	52.0	879	185.8	189.7	1.9	12.4	7.5	4.3	-1.0	95971.0	74
74	6.6	51.6	705	185.8	189.7	0.8	12.5	6.9	3.5	-1.0	95971.4	74
75	6.7	52.1	738	185.8	189.7	1.1	12.5	6.0	5.2	-1.0	95971.2	74
76	6.7	52.0	747	185.8	189.7	1.0	12.6	6.2	3.2	-1.0	95971.3	74
77	7.0	52.4	821	185.8	189.7	0.9	13.0	6.4	3.2	-1.0	95971.2	74
78	6.9	52.2	812	185.8	189.7	1.1	12.9	6.6	4.4	-1.0	95971.3	74
79	6.9	52.9	796	185.8	189.7	1.0	12.9	6.8	3.5	-1.0	95971.3	74
80	7.0	53.3	849	185.8	189.7	1.0	13.0	5.7	5.1	-1.0	95963.3	74
81	7.0	53.1	838	185.8	189.7	1.5	13.4	6.9	5.4	-1.0	95958.0	74
82	7.1	54.4	863	185.8	189.7	3.8	14.1	6.2	4.3	-1.0	95958.1	74
83	7.2	54.6	910	185.8	189.7	6.3	14.4	7.8	4.4	-1.0	95958.3	74
84	7.5	54.3	1011	185.8	189.7	6.7	13.9	8.1	3.8	-1.0	95958.3	74
85	7.6	52.8	1068	185.8	189.7	5.3	13.2	7.7	4.9	-1.0	95958.5	74
86	7.7	52.3	1088	185.8	189.7	3.8	12.9	7.1	4.6	-1.0	95958.2	74
87	7.8	52.6	1157	185.8	189.7	3.6	13.1	7.9	5.4	-1.0	95958.1	74
88	8.2	53.4	1257	185.8	189.7	5.3	13.6	9.2	4.3	-1.0	95958.3	74

***Blank data denotes values that were omitted in the analysis due to an extraneous event during recording

Data Point #	Standardized Wind Speed	LAeq	Turbine Power Output (kW)	Reference Yaw Angle (°)	Yaw Angle (°)	Pitch Angle (°)	Rotor RPM	Nacelle Anemometer Wind Speed (m/s)	10m Anemometer Wind Speed (m/s)	Air Temperature (-C)	Pressure (kPa)	Relative Humidity (%)
89	8.7	53.2	1343	185.8	189.7	4.6	13.3	9.7	3.4	-1.0	95958.4	74
90	8.8	53.0	1359	185.8	189.7	1.4	12.8	8.8	2.5	-1.0	95958.4	74
91	7.3	52.7	959	185.8	189.7	0.3	12.6	7.7	3.5	-1.0	95958.5	74
92	7.2	52.9	908	185.8	189.7	0.6	13.1	7.1	3.8	-1.0	95958.4	74
93	7.3	52.8	953	185.8	189.7	0.8	13.3	7.0	3.8	-1.0	95958.4	74
94	7.2	53.0	917	185.8	189.7	0.8	13.2	6.0	5.5	-1.0	95958.4	74
95	7.9	53.9	1182	185.8	189.7	0.5	13.5	7.0	5.2	-1.0	95958.2	74
96	9.2	55.0	1414	185.8	189.7	2.5	14.0	9.2	5.9	-1.0	95958.4	74
97			1351	185.8	189.7	2.6	13.3	8.0	5.4	-1.0	95958.4	74
98			1407	185.8	189.7	0.8	13.6	8.7	3.4	-1.0	95946.6	74
99	8.8	54.9	1420	185.8	189.7	4.0	14.0	8.7	3.9	-1.0	95946.4	74
100			1402	185.8	189.7	2.1	13.6	6.5	6.0	-1.0	95946.3	74
101	9.3	53.1	1393	185.8	189.7	2.7	13.6	9.3	7.0	-1.0	95946.6	74
102	9.8	53.5	1358	185.8	189.7	8.0	13.7	9.8	3.9	-1.0	95946.8	74
103	10.3	53.6	1369	185.8	189.7	6.5	13.1	10.3	4.2	-1.0	95946.8	74
104	7.9	53.1	1161	185.8	189.7	5.1	13.4	7.8	4.3	-1.0	95946.9	74
105	7.8	52.9	1145	185.8	189.7	6.8	13.6	9.2	4.6	-1.0	95947.1	74
106	8.1	53.1	1242	185.8	189.7	7.3	13.6	9.8	4.5	-1.0	95947.2	74
107			1360	185.8	189.7	6.9	13.2	8.3	3.6	-1.0	95947.0	74
108	9.5	53.0	1392	185.8	189.7	6.4	13.2	9.5	3.5	-1.0	95947.0	74
109	9.2	53.1	1376	185.8	189.7	5.1	13.0	9.2	5.6	-1.0	95947.0	74
110			1405	185.8	189.7	4.5	13.2	8.5	5.0	-1.0	95947.0	74
111	9.4	53.2	1402	185.8	189.7	6.5	13.4	9.3	5.8	-1.0	95947.0	74
112	9.5	53.2	1376	185.8	189.7	4.8	13.1	9.5	5.1	-1.0	95947.5	74
113			1397	185.8	189.7	3.5	13.1	8.7	3.7	-1.0	95941.6	74
114			1394	185.8	189.7	3.7	13.1	7.8	5.7	-1.0	95934.0	74
115			1413	185.8	189.7	3.7	13.4	8.6	6.4	-1.0	95934.4	74
116			1411	185.8	189.7	6.1	13.6	8.2	6.4	-1.0	95934.1	74
117	9.0	53.4	1388	185.8	189.7	7.1	13.5	8.9	5.1	-1.0	95934.1	74
118			1373	185.8	189.7	5.4	13.1	8.0	5.6	-1.0	95933.8	74
119			1402	185.8	189.7	5.6	13.3	8.1	4.3	-1.0	95934.0	74
120			1385	185.8	189.7	5.9	13.2	7.9	5.6	-1.0	95933.9	74
121			1392	185.8	189.7	5.5	13.2	8.5	6.1	-1.0	95933.6	74
122	10.1	53.6	1396	185.8	189.7	5.0	13.2	10.0	4.8	-1.0	95933.5	74
123	9.1	53.8	1394	185.8	189.7	5.5	13.3	9.1	3.3	-1.0	95933.6	74
124			1379	185.8	189.7	5.2	13.0	8.5	3.7	-1.0	95933.6	74
125			1383	185.8	189.7	3.5	12.9	7.3	5.3	-1.0	95927.8	74
126			1410	185.8	189.7	3.3	13.2	8.2	5.1	-1.0	95918.7	74
127	8.9	53.3	1406	185.8	189.7	4.2	13.4	8.8	4.4	-1.0	95918.7	74
128			1410	185.8	189.7	5.5	13.6	8.5	5.8	-1.0	95920.4	74
129			1365	185.8	189.7	4.9	13.1	8.5	6.2	-1.0	95920.7	74
130			1357	185.8	189.7	1.1	12.6	8.4	5.0	-1.0	95920.9	74
131			1412	185.8	189.7	1.2	13.1	8.6	4.8	-1.0	95920.7	74
132			1400	185.8	189.7	2.5	13.2	8.4	4.5	-1.0	95920.9	74
133	8.9	53.7	1404	185.8	189.7	2.5	13.3	8.9	6.3	-1.0	95921.1	74
134	8.5	53.4	1304	185.8	189.7	1.5	12.9	7.9	6.4	-1.0	95921.0	74
135	7.3	52.1	955	185.8	189.7	0.4	12.2	6.0	5.5	-1.0	95921.2	74
136			671	185.8	189.7	1.9	12.3	6.5	4.4	-1.0	95921.2	74
137			648	185.8	189.7	2.9	12.5	5.7	4.4	-1.0	95915.6	74
138			620	185.8	189.7	3.7	12.7	6.8	4.5	-1.0	95908.5	74
139			669	185.8	189.7	4.2	12.8	6.2	4.2	-1.0	95908.6	74
140	6.6	52.7	714	185.8	189.7	4.7	13.2	8.1	3.4	-1.0	95908.5	74
141	6.9	52.1	790	185.8	189.7	4.2	13.2	7.0	4.3	-1.0	95908.6	74
142	6.9	52.1	797	185.8	189.7	3.7	13.0	7.8	5.5	-1.0	95908.5	74
143	7.0	52.6	833	185.8	189.7	4.0	13.2	7.1	4.7	-1.0	95914.2	74
144	6.6	52.5	702	185.8	189.7	1.8	12.7	5.4	4.4	-1.0	95921.9	74
145	6.3	52.4	608	185.8	189.7	3.2	12.8	5.6	3.5	-0.9	95921.7	74
146	6.3	52.1	609	185.8	189.7	4.5	12.9	6.2	5.0	-0.9	95922.0	74
147	6.7	52.8	727	185.8	189.7	4.9	13.3	7.4	3.7	-0.9	95921.6	74
148	7.2	53.0	911	185.8	189.7	4.5	13.3	7.4	3.0	-0.9	95921.8	74
149	7.5	52.7	1014	185.8	189.7	2.9	13.0	7.7	4.3	-0.9	95921.9	74
150	6.9	53.0	802	185.8	189.7	0.8	12.5	5.9	6.1	-0.9	95921.9	74
151	6.6	51.9	720	185.8	189.7	1.3	12.3	4.8	4.1	-1.0	95921.7	74
152	6.9	53.7	793	185.8	189.7	3.1	13.5	7.3	5.7	-1.0	95921.9	74
153	7.2	54.3	919	185.8	189.7	6.4	14.4	8.3	5.8	-1.0	95921.8	74
154	7.7	54.3	1115	185.8	189.7	6.3	13.9	8.2	5.5	-1.0	95921.8	74
155	8.1	52.9	1239	185.8	189.7	3.7	13.1	7.7	4.6	-1.0	95921.8	74
156	7.3	52.5	955	185.8	189.7	0.4	12.3	7.0	3.8	-1.0	95921.6	74
157	7.2	52.9	921	185.8	189.7	0.6	13.0	6.8	2.6	-0.9	95921.5	74
158	8.3	54.0	1269	185.8	189.7	0.6	13.4	7.4	3.5	-0.9	95921.5	74
159	9.4	54.5	1354	185.8	189.7	4.1	13.9	9.4	3.2	-0.9	95921.6	74
160	7.1	53.9	887	185.8	189.7	9.4	13.8	8.4	3.2	-0.9	95921.5	74
161			384	185.8	189.7	12.9	13.5	10.3	3.3	-0.9	95921.7	74
162	7.7	52.2	1083	185.8	189.7	6.6	13.2	7.4	2.7	-0.8	95885.7	75
163	7.5	52.5	1011	185.8	189.7	6.7	13.2	7.5	3.9	-0.8	95886.0	75
164	7.1	52.1	890	185.8	189.7	6.8	13.1	6.8	5.2	-0.8	95885.7	75
165	6.7	52.3	757	185.8	189.7	7.6	13.1	7.2	5.4	-0.8	95886.1	75
166	6.8	51.4	786	185.8	189.7	5.7	12.6	6.5	5.2	-0.8	95885.9	75
167	7.0	51.9	850	185.8	189.7	5.2	12.9	8.5	3.9	-0.8	95885.9	75
168	7.4	52.0	1006	185.8	189.7	4.6	13.1	7.9	4.2	-0.8	95886.0	75
169	7.6	52.0	1058	185.8	189.7	3.0	12.8	6.9	6.4	-0.8	95885.9	75
170	7.1	52.1	886	185.8	189.7	2.6	12.4	5.9	5.9	-0.8	95885.9	75
171	6.7	51.9	756	185.8	189.7	2.6	12.4	7.7	5.7	-0.8	95875.3	75
172	7.0	51.9	823	185.8	189.7	2.3	12.6	6.7	4.9	-0.8	95872.7	75
173	6.8	52.2	773	185.8	189.7	1.1	12.5	5.7	3.9	-0.8	95872.6	75
174	6.4	50.6	661	185.8	189.7	1.2	12.1	5.9	4.2	-0.8	95872.8	75
175	6.1	49.2	557	185.8	189.7	1.5	11.2	5.4	4.4	-0.8	95872.7	75
176	5.9	49.4	497	185.8	189.7	1.0	11.2	6.6	4.1	-0.8	95872.6	75

Table E.01 Measurement data - Turbine ON - Data Series 1

Project: East Durham Wind Energy Centre - Turbine T02 - IEC 61400-11 Measurement

Report ID: 15427.00.T02.RP3

Created on: 2/15/2018

***Blank data denotes values that were omitted in the analysis due to an extraneous event during recording

Data Point #	Standardized Wind Speed	LAeq	Turbine Power Output (kW)	Reference Yaw Angle (°)	Yaw Angle (°)	Pitch Angle (°)	Rotor RPM	Nacelle Anemometer Wind Speed (m/s)	10m Anemometer Wind Speed (m/s)	Air Temperature (-C)	Pressure (kPa)	Relative Humidity (%)
177	6.0	49.7	538	185.8	189.7	1.0	11.4	6.0	3.4	-0.8	95884.8	75
178	6.1	50.6	571	185.8	189.7	1.0	11.6	6.4	3.0	-0.8	95885.8	75
179	6.4	51.1	640	185.8	189.7	0.8	12.3	7.2	2.6	-0.8	95885.9	75
180	6.7	52.2	737	185.8	189.7	1.2	12.8	6.7	3.1	-0.8	95886.0	75
181	6.9	52.7	794	185.8	189.7	1.8	13.3	6.3	4.0	-0.8	95886.1	75
182	6.8	52.0	761	185.8	189.7	2.2	13.1	5.5	4.0	-0.8	95886.1	75
183	6.6	52.4	708	185.8	189.7	2.5	12.7	5.9	3.9	-0.8	95885.9	75
184	6.5	52.3	686	185.8	189.7	3.3	12.9	6.6	2.9	-0.8	95885.9	75
185	6.5	52.2	681	185.8	189.7	4.5	13.3	6.0	2.9	-0.8	95885.9	75
186	6.7	53.5	730	185.8	189.7	6.5	13.9	7.6	3.1	-0.8	95885.9	75
187	6.8	54.6	768	185.8	189.7	7.7	14.1	7.3	3.6	-0.8	95886.0	75
188	6.9	53.3	794	185.8	189.7	7.1	13.9	7.2	2.2	-0.8	95885.9	75
189	7.0	53.1	828	185.8	189.7	6.1	13.6	7.1	1.2	-0.8	95875.0	76
190	6.9	53.0	804	185.8	189.7	4.7	13.0	6.8	2.3	-0.8	95872.7	76
191	6.9	52.1	802	185.8	189.7	3.5	12.7	6.6	1.8	-0.8	95872.9	76
192	7.1	52.9	858	185.8	189.7	5.0	13.5	6.6	2.9	-0.8	95873.0	76
193	7.2	52.7	930	185.8	189.7	5.7	13.6	6.7	2.9	-0.8	95873.0	76
194	7.4	53.4	998	185.8	189.7	7.2	13.9	8.1	2.3	-0.8	95872.9	76
195	7.5	52.7	1029	185.8	189.7	6.8	13.3	7.0	2.8	-0.8	95872.9	76
196	7.3	52.0	952	185.8	189.7	5.3	12.7	6.3	3.4	-0.8	95873.0	76
197	6.8	51.0	781	185.8	189.7	5.9	12.7	7.5	3.4	-0.8	95873.1	76
198	6.5	50.8	686	185.8	189.7	6.1	12.6	7.8	2.9	-0.8	95873.0	76
199	6.7	51.6	748	185.8	189.7	4.7	12.4	6.9	3.5	-0.8	95873.1	76
200	6.6	51.8	712	185.8	189.7	3.8	12.5	5.6	3.9	-0.8	95873.0	76
201	6.3	51.1	616	185.8	189.7	4.1	12.7	6.7	3.7	-0.8	95872.9	76
202	6.1	50.8	563	185.8	189.7	4.6	12.4	6.2	2.3	-0.8	95872.7	76
203	6.2	51.5	581	185.8	189.7	5.0	12.7	6.1	2.6	-0.8	95873.2	76
204	6.1	50.0	542	185.8	189.7	4.5	11.9	4.7	2.4	-0.8	95873.0	76
205	5.7	48.8	441	185.8	189.7	4.2	11.1	4.1	3.0	-0.8	95873.0	76
206	5.4	48.2	381	185.8	189.7	4.8	10.9	4.4	3.1	-0.8	95873.1	76
207	5.5	49.9	414	185.8	189.7	5.9	12.0	6.1	3.1	-0.8	95873.1	76
208	6.0	51.3	521	185.8	189.7	6.1	12.6	6.5	3.7	-0.8	95873.2	76
209	6.4	52.0	642	185.8	189.7	5.5	12.9	7.0	5.6	-0.8	95873.2	76
210	6.6	52.1	723	185.8	189.7	5.1	13.0	7.1	5.8	-0.8	95873.1	76
211	6.8	52.8	784	185.8	189.7	6.5	13.6	8.0	5.5	-0.8	95873.4	76
212	7.0	52.8	840	185.8	189.7	6.2	13.4	8.2	4.4	-0.8	95873.3	76
213	7.1	51.9	854	185.8	189.7	3.5	12.4	6.6	3.3	-0.8	95873.2	76
214	6.8	51.2	759	185.8	189.7	1.0	11.8	6.3	3.4	-0.8	95873.6	76
215	6.9	53.3	817	185.8	189.7	2.0	13.2	8.2	4.8	-0.8	95873.4	76
216	7.3	54.4	957	185.8	189.7	4.9	14.2	8.3	6.4	-0.8	95873.4	76
217	7.4	54.6	1003	185.8	189.7	5.3	13.8	8.5	4.9	-0.8	95873.2	76
218	7.6	53.6	1079	185.8	189.7	5.4	13.6	7.9	5.7	-0.8	95873.4	76
219	7.9	53.6	1183	185.8	189.7	5.1	13.5	7.4	4.6	-0.8	95873.4	76
220	8.3	53.7	1272	185.8	189.7	4.9	13.3	9.4	5.2	-0.8	95873.6	76
221	9.6	54.1	1374	185.8	189.7	4.3	13.2	9.6	4.9	-0.8	95873.5	76
222	8.6	53.4	1321	185.8	189.7	1.7	12.6	8.5	4.4	-0.8	95873.4	76
223	8.3	54.2	1273	185.8	189.7	0.5	13.0	8.7	3.7	-0.8	95873.5	76
224	8.9	54.7	1411	185.8	189.7	2.0	13.6	8.8	4.4	-0.9	95873.6	76
225	8.0	53.5	1202	185.8	189.7	1.1	13.0	8.2	6.5	-0.9	95873.8	76
226	8.5	54.2	1296	185.8	189.7	0.1	13.3	8.5	5.8	-0.9	95873.5	76
227	7.4	54.0	1000	185.8	189.7	0.4	13.1	6.8	5.6	-0.9	95873.6	76
228	7.4	54.2	973	185.8	189.7	0.8	13.2	5.6	3.0	-0.9	95873.3	76
229	8.2	54.0	1257	185.8	189.7	0.2	13.4	7.6	3.6	-0.9	95873.7	76
230	7.9	54.1	1191	185.8	189.7	0.6	13.3	8.4	3.5	-0.9	95873.7	77
231	8.1	54.3	1239	185.8	189.7	0.3	13.3	7.9	4.6	-0.9	95873.8	77
232	8.6	54.8	1327	185.8	189.7	0.3	13.3	8.0	5.1	-0.9	95873.7	77
233	7.9	54.0	1178	185.8	189.7	0.5	13.2	9.0	5.9	-0.9	95873.6	77
234	7.6	54.3	1081	185.8	189.7	0.4	13.2	7.9	3.9	-0.9	95873.5	77
235	7.8	53.8	1134	185.8	189.7	0.5	13.3	8.2	4.8	-0.9	95873.7	77
236	7.9	54.4	1188	185.8	189.7	0.3	13.3	8.4	3.6	-0.9	95873.5	77
237	7.4	53.6	996	185.8	189.7	0.5	13.2	8.0	3.3	-0.9	95873.6	77
238	7.6	53.3	1046	185.8	189.7	0.6	13.3	7.6	4.7	-0.9	95873.6	77
239	7.2	53.4	914	185.8	189.7	0.7	13.2	6.5	5.2	-0.9	95873.6	77
240	7.0	53.3	820	185.8	189.7	1.0	13.0	6.1	4.4	-0.9	95873.7	77
241	6.8	53.5	786	185.8	189.7	1.0	12.8	6.5	5.0	-0.9	95873.6	77
242	6.6	52.2	719	185.8	189.7	1.0	12.4	5.0	4.6	-0.9	95860.5	77
243	6.7	52.5	732	185.8	189.7	1.0	12.6	6.0	3.9	-0.9	95860.3	77
244	6.7	52.9	738	185.8	189.7	1.1	12.7	6.2	4.6	-0.9	95860.3	77
245	6.3	51.9	623	185.8	189.7	1.7	12.1	5.6	3.6	-0.9	95860.4	77
246	5.9	50.6	512	185.8	189.7	1.6	10.7	5.8	3.4	-0.9	95860.3	77
247	5.3	48.7	355	185.8	189.7	1.4	9.6	5.5	3.7	-0.9	95869.6	78
248	5.2	49.7	330	185.8	189.7	0.8	9.9	5.3	3.0	-0.9	95873.6	78
249	5.6	50.0	424	185.8	189.7	0.7	10.8	6.2	2.7	-0.9	95873.5	78
250	5.9	50.4	494	185.8	189.7	0.9	11.1	5.3	3.8	-0.9	95873.5	78
251	5.8	50.4	487	185.8	189.7	1.0	10.9	5.3	6.0	-0.9	95873.6	78
252	5.9	50.4	497	185.8	189.7	1.0	11.2	7.0	6.9	-0.9	95873.8	78
253	6.2	51.1	575	185.8	189.7	0.9	11.7	6.2	5.4	-1.0	95865.3	78
254	6.3	51.0	612	185.8	189.7	1.0	11.9	5.6	3.5	-1.0	95860.6	78
255	6.1	50.6	569	185.8	189.7	1.2	11.4	6.1	3.8	-1.0	95860.7	78
256	5.8	50.2	478	185.8	189.7	1.2	10.8	6.0	3.2	-1.0	95860.7	78
257	5.5	49.1	395	185.8	189.7	1.3	10.0	5.5	3.6	-1.0	95860.6	78
258	5.5	49.9	399	185.8	189.7	0.7	10.6	6.2	2.4	-1.0	95860.9	78
259	6.0	51.5	534	185.8	189.7	0.8	11.5	5.7	3.5	-1.0	95861.0	78
260	6.1	52.1	544	185.8	189.7	2.5	12.1	5.3	3.8	-1.0	95861.0	79
261	5.9	52.7	507	185.8	189.7	6.3	13.1	6.6	3.5	-1.0	95860.8	79
262	6.2	53.0	598	185.8	189.7	7.8	13.1	8.5	3.4	-1.0	95860.8	79
263	6.7	52.0	738	185.8	189.7	6.0	12.4	8.0	2.6	-1.0	95861.0	79
264	6.8	50.9	772	185.8	189.7	3.3	11.8	7.7	2.9	-1.0	95860.8	79

***Blank data denotes values that were omitted in the analysis due to an extraneous event during recording

Data Point #	Standardized Wind Speed	LAeq	Turbine Power Output (kW)	Reference Yaw Angle (°)	Yaw Angle (°)	Pitch Angle (°)	Rotor RPM	Nacelle Anemometer Wind Speed (m/s)	10m Anemometer Wind Speed (m/s)	Air Temperature (-C)	Pressure (kPa)	Relative Humidity (%)
265	6.9	52.1	811	185.8	189.7	2.3	12.3	9.1	3.2	-1.0	95870.2	79
266	7.1	53.1	868	185.8	189.7	2.8	13.0	8.6	3.9	-1.0	95874.3	79
267	7.1	53.5	860	185.8	189.7	2.9	13.1	6.9	4.0	-1.0	95874.3	79
268	6.8	52.2	774	185.8	189.7	1.6	12.4	5.5	3.6	-1.0	95874.2	79
269	6.3	51.0	616	185.8	189.7	1.1	11.9	5.8	3.9	-1.0	95874.0	79
270	6.1	51.7	558	185.8	189.7	1.6	11.9	6.3	5.0	-1.0	95874.3	79
271	6.1	51.0	569	185.8	189.7	1.4	11.4	5.9	4.9	-1.0	95874.2	79
272	5.8	50.0	467	185.8	189.7	1.2	10.7	5.5	5.8	-1.0	95874.4	79
273	5.7	50.2	451	185.8	189.7	1.0	10.8	6.5	4.2	-1.0	95874.0	79
274	6.0	51.2	516	185.8	189.7	0.9	11.5	6.4	3.7	-1.0	95874.1	79
275	6.2	51.4	588	185.8	189.7	1.3	11.9	6.2	3.5	-1.0	95874.0	79
276	6.3	52.6	631	185.8	189.7	2.8	12.7	8.4	3.3	-1.0	95874.3	79
277	6.9	53.8	794	185.8	189.7	5.0	13.8	7.5	2.7	-1.0	95874.0	79
278	7.1	53.2	875	185.8	189.7	4.5	13.4	6.6	2.9	-1.0	95874.2	79
279	6.9	52.3	805	185.8	189.7	2.8	12.5	6.5	4.3	-1.0	95873.9	79
280	6.8	51.8	779	185.8	189.7	1.4	12.2	6.7	3.7	-1.0	95874.1	79
281	6.6	52.3	698	185.8	189.7	0.7	12.5	7.5	2.7	-1.0	95874.0	79
282	7.0	53.3	826	185.8	189.7	0.9	13.1	6.6	4.3	-1.0	95874.2	79
283	7.0	53.4	830	185.8	189.7	1.0	13.1	6.2	3.0	-1.0	95874.1	80
284	6.8	52.3	764	185.8	189.7	1.3	12.6	5.8	3.1	-1.0	95874.3	80
285	6.3	50.9	612	185.8	189.7	1.3	11.6	5.3	3.6	-1.0	95874.3	80
286	5.9	49.6	500	185.8	189.7	1.3	10.9	4.9	4.7	-1.0	95874.2	80
287	5.4	49.1	383	185.8	189.7	1.6	9.6	4.1	4.2	-1.0	95874.0	80
288	5.0	48.8	278	185.8	189.7	1.0	9.3	5.3	3.9	-1.0	95874.1	80
289	5.2	49.0	320	185.8	189.7	0.7	9.9	6.6	3.2	-1.0	95874.1	80
290	5.5	49.8	415	185.8	189.7	0.8	10.5	6.0	4.4	-1.0	95874.3	80
291	6.2	51.8	580	185.8	189.7	0.6	12.0	7.1	4.6	-1.0	95874.1	80
292	6.5	52.1	692	185.8	189.7	1.1	12.4	6.3	5.6	-1.0	95874.4	80
293	6.4	51.8	642	185.8	189.7	1.3	12.1	5.0	4.8	-1.0	95874.3	80
294	6.1	51.9	564	185.8	189.7	2.5	12.3	5.9	4.8	-1.0	95874.3	80
295	6.0	51.8	525	185.8	189.7	3.8	12.4	5.5	4.5	-1.0	95874.2	80
296	6.1	51.6	542	185.8	189.7	4.5	12.2	6.9	4.2	-1.0	95874.0	80
297	6.6	51.2	696	185.8	189.7	3.7	12.2	7.3	5.1	-1.0	95874.3	80
298	6.6	51.0	716	185.8	189.7	0.9	11.8	6.6	4.3	-1.0	95874.7	80
299	6.5	52.6	685	185.8	189.7	0.8	12.4	7.0	3.8	-1.0	95874.4	80
300	6.6	52.2	696	185.8	189.7	1.1	12.3	7.1	3.8	-1.0	95879.8	80
301	6.3	51.0	605	185.8	189.7	1.2	11.7	5.8	3.3	-1.0	95887.5	80
302	5.9	49.9	497	185.8	189.7	1.5	10.8	5.6	3.7	-1.0	95887.6	80
303	5.5	49.5	398	185.8	189.7	1.2	10.2	5.8	3.8	-1.0	95887.6	80
304	5.3	48.8	352	185.8	189.7	1.2	9.8	5.7	3.9	-1.0	95887.9	80
305	5.1	48.7	312	185.8	189.7	1.1	9.5	6.2	4.6	-1.0	95887.8	80
306	5.2	49.6	336	185.8	189.7	0.7	10.0	5.5	4.8	-1.0	95876.0	80
307	5.5	49.5	396	185.8	189.7	0.9	10.4	5.9	3.8	-1.0	95860.8	80
308	5.5	49.7	398	185.8	189.7	1.1	10.2	5.6	3.8	-1.0	95860.7	80
309	5.6	50.2	435	185.8	189.7	0.8	10.9	7.0	3.2	-1.0	95860.7	80
310	5.9	50.0	510	185.8	189.7	1.0	11.2	6.4	4.1	-1.0	95860.7	80
311	5.8	50.1	489	185.8	189.7	1.1	10.9	5.4	3.3	-1.0	95860.7	80
312	5.8	50.0	469	185.8	189.7	1.0	10.9	5.8	2.2	-1.0	95867.4	80
313	6.0	50.7	515	185.8	189.7	0.9	11.4	6.4	2.7	-1.0	95873.7	80
314	6.0	50.5	526	185.8	189.7	1.2	11.1	5.6	3.4	-1.0	95873.7	80
315	5.8	49.7	472	185.8	189.7	1.2	10.9	6.3	3.9	-1.0	95873.6	80
316	5.7	49.6	455	185.8	189.7	1.1	10.7	6.0	3.8	-1.0	95873.7	80
317	5.6	49.9	421	185.8	189.7	1.2	10.4	5.4	4.0	-1.0	95873.7	80
318	5.4	49.8	385	185.8	189.7	1.0	10.2	6.4	4.4	-1.0	95873.9	80
319	5.7	50.2	448	185.8	189.7	0.7	10.9	6.0	3.2	-1.0	95873.9	80
320	6.2	51.4	577	185.8	189.7	0.7	11.8	6.8	2.8	-1.0	95874.0	80
321	6.4	51.9	649	185.8	189.7	0.9	12.1	6.3	3.0	-1.0	95873.9	80
322	6.2	51.0	599	185.8	189.7	1.0	11.7	6.7	3.3	-1.0	95873.8	80
323	6.3	51.9	633	185.8	189.7	1.0	12.1	7.3	2.6	-1.0	95873.7	81
324	6.4	51.6	644	185.8	189.7	1.1	11.9	6.0	3.6	-1.0	95873.6	81
325	6.1	50.7	558	185.8	189.7	1.2	11.4	4.8	3.0	-1.0	95873.7	81
326	6.0	51.3	520	185.8	189.7	1.1	11.2	4.5	3.3	-1.0	95873.6	81
327	6.1	51.3	569	185.8	189.7	0.8	11.7	7.7	3.2	-1.0	95873.5	81
328	6.6	52.8	723	185.8	189.7	0.8	12.6	6.5	3.1	-1.0	95873.7	81
329	6.8	53.1	770	185.8	189.7	1.0	12.7	7.1	4.4	-1.0	95873.6	81
330	6.7	52.8	755	185.8	189.7	1.0	12.6	6.9	4.5	-1.0	95873.6	81
331	6.7	52.7	739	185.8	189.7	1.0	12.6	6.4	4.1	-1.0	95873.5	81
332	6.6	52.4	703	185.8	189.7	1.0	12.3	7.7	3.9	-1.0	95873.2	81
333	6.5	52.1	669	185.8	189.7	1.0	12.1	6.4	5.6	-1.0	95872.9	81
334	6.4	51.5	639	185.8	189.7	1.0	12.0	5.4	4.4	-1.0	95873.0	81
335	6.4	52.2	661	185.8	189.7	1.0	12.1	5.9	4.2	-1.0	95875.6	81
336	6.9	53.4	792	185.8	189.7	0.9	12.9	8.0	3.9	-1.0	95886.0	81
337	7.3	53.9	952	185.8	189.7	0.7	13.2	8.4	4.1	-1.0	95885.9	81
338	6.9	53.1	796	185.8	189.7	1.2	12.8	7.2	4.1	-1.0	95886.0	81
339	6.4	51.9	649	185.8	189.7	1.3	11.8	6.0	4.3	-1.0	95885.8	81
340	6.0	50.9	534	185.8	189.7	1.2	11.2	5.8	4.0	-1.0	95885.7	81
341	6.2	52.0	601	185.8	189.7	0.7	11.9	6.9	3.2	-1.0	95884.0	81
342	7.3	53.9	939	185.8	189.7	0.7	13.0	7.3	3.6	-1.1	95872.2	81
343	8.9	54.9	1372	185.8	189.7	0.4	13.5	8.9	3.8	-1.1	95872.0	81
344			1354	185.8	189.7	1.0	13.4	8.4	3.5	-1.1	95871.9	81
345	7.8	54.3	1127	185.8	189.7	0.5	13.2	8.1	3.9	-1.1	95871.7	81
346	7.4	54.0	992	185.8	189.7	0.6	13.2	7.3	3.3	-1.1	95871.5	81
347	7.2	53.8	907	185.8	189.7	0.8	13.2	6.5	3.5	-1.1	95870.9	81
348	7.1	53.8	877	185.8	189.7	0.9	13.2	7.4	2.5	-1.1	95870.3	81
349	7.1	54.2	892	185.8	189.7	0.9	13.3	7.2	2.8	-1.1	95869.5	81
350	7.2	53.8	897	185.8	189.7	0.9	13.2	7.4	3.2	-1.1	95868.2	81
351	7.1	53.8	874	185.8	189.7	1.1	13.0	7.2	3.5	-1.1	95866.1	81
352	7.9	54.4	1187	185.8	189.7	0.4	13.3	8.4	4.2	-1.1	95862.4	81

Table E.01 Measurement data - Turbine ON - Data Series 1

Project: East Durham Wind Energy Centre - Turbine T02 - IEC 61400-11 Measurement

Report ID: 15427.00.T02.RP3

Created on: 2/15/2018

***Blank data denotes values that were omitted in the analysis due to an extraneous event during recording

Data Point #	Standardized Wind Speed	LAeq	Turbine Power Output (kW)	Reference Yaw Angle (°)	Yaw Angle (°)	Pitch Angle (°)	Rotor RPM	Nacelle Anemometer Wind Speed (m/s)	10m Anemometer Wind Speed (m/s)	Air Temperature (-C)	Pressure (kPa)	Relative Humidity (%)
353			1334	185.8	189.7	0.3	13.4	8.8	2.9	-1.1	95856.1	81
354			1384	185.8	189.7	0.7	13.4	8.6	3.7	-1.1	95842.2	82
355	7.5	54.3	1010	185.8	189.7	0.6	13.1	7.8	5.1	-1.1	95790.2	82
356	6.9	53.5	807	185.8	189.7	1.0	12.9	6.9	5.2	-1.1	95613.7	82
357	7.0	53.6	841	185.8	189.7	0.9	13.1	6.5	5.8	-1.1	95405.1	82
358	7.5	54.4	1025	185.8	189.7	0.9	13.3	8.5	4.9	-1.1	95066.2	82
359			1283	185.8	189.7	0.4	13.4	8.7	5.7	-1.1	94687.0	82
360	8.1	54.8	1240	185.8	189.7	0.5	13.3	8.1	7.2	-1.1	95203.2	82
361	8.4	54.6	1290	185.8	189.7	0.4	13.3	9.1	6.9	-1.1	95542.6	82
362	7.8	54.7	1152	185.8	189.7	0.4	13.2	8.7	4.5	-1.1	95103.0	82
363	7.9	54.6	1195	185.8	189.7	0.4	13.3	9.0	3.7	-1.1	94701.8	82
364	7.7	54.4	1115	185.8	189.7	0.5	13.2	6.9	4.4	-1.1	94701.2	82
365	7.5	54.2	1039	185.8	189.7	0.6	13.2	7.2	5.9	-1.1	94721.3	82
366	7.8	54.9	1154	185.8	189.7	0.5	13.3	8.6	4.9	-1.1	94623.8	82
367	8.0	54.8	1208	185.8	189.7	0.5	13.3	7.6	4.6	-1.1	94620.5	82
368	7.8	54.8	1123	185.8	189.7	0.4	13.2	8.1	4.1	-1.1	94673.3	82
369	7.8	54.5	1150	185.8	189.7	0.5	13.3	6.9	4.4	-1.1	94709.8	82
370	7.6	54.3	1066	185.8	189.7	0.5	13.2	7.6	3.4	-1.1	94742.8	82
371	7.2	54.1	907	185.8	189.7	0.8	13.2	7.4	3.2	-1.1	94732.6	82
372	7.5	54.6	1039	185.8	189.7	0.8	13.3	7.4	3.7	-1.1	94775.0	82
373	7.7	54.7	1111	185.8	189.7	0.6	13.3	8.5	2.9	-1.1	94785.4	82
374	7.3	54.0	931	185.8	189.7	0.7	13.1	8.1	2.7	-1.1	94771.2	82
375	7.0	53.8	822	185.8	189.7	1.0	13.0	7.8	3.5	-1.1	94789.2	82
376	6.9	53.9	818	185.8	189.7	1.0	12.9	7.1	2.3	-1.1	94780.3	82
377	7.2	54.3	908	185.8	189.7	1.0	13.2	7.8	2.0	-1.1	94725.9	82
378	7.5	54.4	1021	185.8	189.7	0.8	13.3	7.4	2.8	-1.1	94732.4	82
379	7.4	54.3	1001	185.8	189.7	0.7	13.3	7.5	4.0	-1.1	94737.3	82
380	7.1	54.4	886	185.8	189.7	0.9	13.2	7.3	5.0	-1.1	94736.9	82
381	6.8	53.2	782	185.8	189.7	1.2	12.7	7.6	5.6	-1.1	94814.3	82
382	6.5	52.2	670	185.8	189.7	1.4	12.0	6.8	3.9	-1.1	94773.0	82
383	6.1	51.2	554	185.8	189.7	1.3	11.3	5.6	3.9	-1.1	94802.1	82
384	6.1	51.7	542	185.8	189.7	1.0	11.5	7.3	3.7	-1.1	94782.1	82
385	6.1	51.4	546	185.8	189.7	1.2	11.3	5.9	3.2	-1.1	94749.6	82
386	6.0	51.8	526	185.8	189.7	1.0	11.3	5.8	2.3	-1.1	94703.0	82
387	6.5	53.3	686	185.8	189.7	0.7	12.3	6.5	2.1	-1.1	94692.1	82
388	7.5	54.5	1015	185.8	189.7	0.6	13.2	8.1	2.2	-1.1	94643.0	82
389	7.3	54.6	965	185.8	189.7	0.6	13.2	7.6	2.5	-1.1	94696.0	83
390	7.0	54.2	830	185.8	189.7	1.1	13.0	6.8	2.8	-1.1	94735.0	83
391	6.7	52.9	739	185.8	189.7	1.3	12.4	6.4	3.0	-1.1	94714.7	83
392	6.5	53.2	695	185.8	189.7	1.1	12.3	6.3	3.9	-1.1	94694.1	83
393	6.5	52.7	683	185.8	189.7	1.1	12.2	6.0	4.6	-1.1	94700.3	83
394	6.3	52.1	631	185.8	189.7	1.1	11.8	6.6	3.8	-1.1	94707.7	83
395	6.1	52.1	568	185.8	189.7	1.1	11.5	6.7	2.4	-1.1	94674.5	83
396	6.0	50.8	520	185.8	189.7	1.3	11.0	6.1	2.9	-1.1	94693.6	83
397	5.6	50.5	428	185.8	189.7	1.3	10.4	5.7	3.0	-1.1	94733.8	83
398	5.4	50.3	374	185.8	189.7	1.1	10.1	5.3	3.9	-1.1	94715.2	83
399	5.5	51.3	393	185.8	189.7	0.9	10.3	5.7	3.7	-1.1	94718.5	83
400	5.8	52.2	479	185.8	189.7	0.7	11.1	6.3	3.8	-1.1	94730.9	83
401	6.4	53.3	663	185.8	189.7	0.7	12.4	6.3	3.3	-1.1	94684.5	83
402	6.5	52.7	688	185.8	189.7	1.2	12.3	6.1	3.1	-1.1	94684.7	83
403	6.2	51.5	591	185.8	189.7	1.4	11.3	5.1	3.4	-1.1	94691.6	83
404	5.9	51.6	507	185.8	189.7	1.0	11.2	6.2	4.2	-1.1	94680.5	83
405	6.4	53.5	658	185.8	189.7	0.7	12.3	7.5	4.3	-1.1	94668.6	83
406	6.9	54.1	795	185.8	189.7	0.9	12.9	7.1	4.5	-1.1	94648.4	83
407	6.8	54.2	782	185.8	189.7	1.1	12.8	6.2	5.1	-1.1	94674.4	83
408	6.6	53.5	711	185.8	189.7	1.2	12.3	6.0	4.6	-1.1	94710.0	83
409	6.4	53.0	658	185.8	189.7	1.2	12.1	6.6	5.2	-1.1	94696.9	83
410	6.4	52.6	637	185.8	189.7	1.2	11.9	7.0	4.5	-1.1	94698.8	83
411	6.3	52.4	604	185.8	189.7	1.2	11.7	6.7	3.6	-1.1	94667.7	83
412	6.2	52.6	588	185.8	189.7	1.1	11.7	5.8	4.4	-1.1	94702.0	83
413	6.1	51.9	562	185.8	189.7	1.1	11.5	5.9	3.3	-1.1	94701.6	83
414	5.9	51.5	501	185.8	189.7	1.2	10.9	6.3	2.9	-1.1	94648.3	83
415	5.6	50.3	421	185.8	189.7	1.2	10.3	5.2	2.9	-1.1	94660.4	83
416	5.4	50.5	382	185.8	189.7	1.0	10.3	5.5	1.5	-1.1	94638.6	83
417	5.7	51.3	445	185.8	189.7	0.9	10.8	6.2	2.6	-1.1	94645.0	83
418	6.2	52.8	589	185.8	189.7	0.6	11.9	6.9	2.3	-1.1	94699.9	83
419	7.0	54.7	832	185.8	189.7	0.6	12.9	7.8	3.2	-1.1	94662.1	83
420			1031	185.8	189.7	0.6	13.3	7.8	3.4	-1.1	94662.6	83
421			1097	185.8	189.7	0.5	13.3	8.2	2.7	-1.1	94640.0	83
422			1018	185.8	189.7	0.6	13.2	7.7	2.5	-1.1	94663.3	83
423			988	185.8	189.7	0.7	13.2	8.3	2.5	-1.1	94672.5	83
424	7.2	54.8	910	185.8	189.7	0.8	13.2	7.4	2.7	-1.1	94701.3	83
425	7.1	54.9	860	185.8	189.7	0.9	13.2	6.9	3.8	-1.1	94673.0	83
426	6.9	54.0	807	185.8	189.7	1.1	12.9	6.7	4.2	-1.1	94695.1	83
427	6.8	53.8	771	185.8	189.7	1.1	12.7	6.8	3.6	-1.1	94702.6	83
428	7.1	54.6	856	185.8	189.7	1.0	13.1	7.4	3.5	-1.1	94732.8	83
429			1036	185.8	189.7	0.8	13.3	8.2	4.7	-1.1	94739.2	83
430	7.0	54.5	852	185.8	189.7	1.0	13.1	7.7	4.4	-1.1	94746.0	83
431	6.9	54.2	789	185.8	189.7	1.1	12.8	6.6	4.4	-1.1	94759.9	83
432	6.6	53.4	722	185.8	189.7	1.2	12.4	6.5	3.3	-1.1	94801.3	83
433	6.3	52.6	629	185.8	189.7	1.2	11.8	6.9	2.6	-1.1	94796.3	83
434	6.0	51.6	538	185.8	189.7	1.4	11.1	5.5	2.8	-1.1	94802.6	83
435	5.6	50.4	432	185.8	189.7	1.3	10.4	5.4	3.5	-1.1	94794.4	83
436	5.7	52.1	448	185.8	189.7	0.8	10.9	6.7	3.1	-1.1	94797.6	83
437	6.2	53.0	597	185.8	189.7	0.7	12.0	7.2	2.8	-1.1	94768.4	83
438			693	185.8	189.7	0.8	12.4	7.0	2.6	-1.1	94800.0	83
439	6.5	54.2	691	185.8	189.7	1.0	12.3	7.4	2.3	-1.1	94792.5	83
440	6.2	53.0	601	185.8	189.7	1.4	11.6	5.2	2.5	-1.1	94832.4	83

***Blank data denotes values that were omitted in the analysis due to an extraneous event during recording

Data Point #	Standardized Wind Speed	LAeq	Turbine Power Output (kW)	Reference Yaw Angle (°)	Yaw Angle (°)	Pitch Angle (°)	Rotor RPM	Nacelle Anemometer Wind Speed (m/s)	10m Anemometer Wind Speed (m/s)	Air Temperature (-C)	Pressure (kPa)	Relative Humidity (%)
441	5.9	51.7	491	185.8	189.7	1.3	10.8	5.6	2.5	-1.1	94804.1	83
442	5.8	51.6	485	185.8	189.7	1.2	10.9	5.9	3.2	-1.1	94789.3	84
443	5.6	51.2	421	185.8	189.7	1.3	10.3	5.1	2.8	-1.1	94789.1	84
444	5.1	49.8	314	185.8	189.7	1.6	9.4	4.4	2.6	-1.1	95337.4	84
445	4.9	50.1	269	185.8	189.7	1.2	9.2	5.5	3.2	-1.1	95860.7	84
446	5.9	53.7	503	185.8	189.7	0.4	11.3	8.6	3.4	-1.1	95860.4	84
447			931	185.8	189.7	0.5	13.0	7.9	3.4	-1.1	95860.3	84
448			976	185.8	189.7	0.6	13.2	7.8	3.2	-1.1	95860.6	84
449			869	185.8	189.7	0.9	13.1	6.6	3.6	-1.1	95860.4	84
450	7.0	54.5	821	185.8	189.7	1.1	13.0	7.5	4.5	-1.1	95860.3	84
451	6.8	54.5	772	185.8	189.7	1.2	12.7	6.8	3.8	-1.1	95860.3	84
452	6.6	54.1	720	185.8	189.7	1.2	12.4	7.2	3.7	-1.1	95860.5	84
453	6.5	53.8	679	185.8	189.7	1.2	12.2	7.0	3.8	-1.1	95860.3	84
454	6.3	53.0	628	185.8	189.7	1.2	11.9	7.0	4.0	-1.1	95860.5	84
455	6.1	52.7	569	185.8	189.7	1.2	11.5	6.4	2.7	-1.1	95860.3	84
456	6.0	52.5	526	185.8	189.7	1.2	11.2	7.0	3.0	-1.1	95860.5	84
457	6.1	52.9	545	185.8	189.7	0.8	11.5	7.0	4.4	-1.1	95860.5	84
458	6.2	53.0	590	185.8	189.7	1.0	11.7	7.1	3.4	-1.1	95860.5	84
459	6.1	52.7	567	185.8	189.7	1.1	11.5	6.7	4.3	-1.1	95860.7	84
460	6.0	52.7	538	185.8	189.7	1.1	11.4	6.1	4.2	-1.1	95860.7	84
461	6.2	53.0	577	185.8	189.7	0.9	11.7	7.0	3.1	-1.1	95860.5	84
462	6.5	54.2	670	185.8	189.7	0.8	12.3	6.6	3.7	-1.1	95860.7	84
463	6.5	53.9	688	185.8	189.7	1.1	12.2	6.8	3.3	-1.1	95860.6	84
464	6.3	53.0	630	185.8	189.7	1.2	11.8	6.1	3.1	-1.1	95860.7	84
465	6.2	53.0	590	185.8	189.7	1.2	11.7	6.4	2.4	-1.1	95860.4	84
466	6.1	52.7	556	185.8	189.7	1.2	11.4	5.5	1.0	-1.1	95860.7	84
467	5.9	52.5	500	185.8	189.7	1.2	11.0	5.0	2.2	-1.1	95860.7	84
468	5.9	52.9	494	185.8	189.7	1.0	11.1	5.6	3.2	-1.1	95860.6	84
469	5.8	51.6	473	185.8	189.7	1.3	10.7	5.5	2.5	-1.1	95860.4	84
470	5.4	50.8	388	185.8	189.7	1.3	10.0	4.7	2.7	-1.1	95860.7	84
471	5.3	51.6	360	185.8	189.7	0.8	10.2	6.3	1.5	-1.1	95860.5	84
472	5.7	52.3	450	185.8	189.7	0.8	11.0	6.7	1.8	-1.1	95860.6	84
473	5.8	52.2	478	185.8	189.7	1.2	10.9	6.5	2.3	-1.1	95860.7	84
474	5.8	52.2	468	185.8	189.7	1.1	10.9	5.8	2.4	-1.1	95860.5	84
475	5.8	52.4	471	185.8	189.7	1.1	10.9	5.4	3.5	-1.1	95860.8	84
476	5.8	52.2	466	185.8	189.7	1.1	10.8	6.1	2.4	-1.1	95860.5	84
477	6.1	54.0	570	185.8	189.7	0.7	11.8	6.9	2.6	-1.1	95860.4	84
478	6.6	54.2	702	185.8	189.7	1.0	12.4	6.0	3.9	-1.1	95860.6	84
479	6.6	54.4	706	185.8	189.7	1.1	12.3	6.7	4.7	-1.1	95860.5	84
480			753	185.8	189.7	0.9	12.7	8.0	5.0	-1.1	95860.4	84
481			828	185.8	189.7	0.9	13.1	7.8	4.8	-1.1	95860.4	84
482			679	185.8	189.7	1.2	12.1	7.3	3.3	-1.1	95860.2	84
483			718	185.8	189.7	0.8	12.5	7.8	2.9	-1.1	95860.2	84
484			810	185.8	189.7	0.9	13.0	8.1	3.4	-1.1	95860.3	84
485			931	185.8	189.7	0.9	13.2	9.9	5.3	-1.1	95860.3	84
486			789	185.8	189.7	1.2	12.7	6.9	4.6	-1.1	95860.2	84
487			638	185.8	189.7	1.4	11.7	6.9	4.0	-1.1	95859.9	84
488			534	185.8	189.7	1.2	11.3	6.1	4.1	-1.1	95860.0	84
489			510	185.8	189.7	1.1	11.1	7.1	4.1	-1.1	95859.9	84
490			507	185.8	190.3	1.0	11.1	7.1	4.0	-1.1	95859.7	84
491			590	185.8	195.8	0.8	11.9	9.2	3.5	-1.1	95859.6	84
492			699	185.8	201.1	0.8	12.4	6.8	3.2	-1.1	95859.3	84
493			725	185.8	201.4	1.1	12.4	6.0	3.4	-1.1	95859.3	84
494			787	185.8	201.4	0.8	12.9	7.6	4.0	-1.1	95859.0	84
495			816	185.8	201.4	1.1	13.0	7.5	4.3	-1.1	95858.5	84
496			786	185.8	201.4	1.0	12.8	7.3	3.4	-1.1	95858.6	84
497			768	185.8	201.4	1.2	12.7	6.8	3.9	-1.1	95858.5	84
498			679	185.8	201.4	1.2	12.1	7.0	3.8	-1.1	95858.4	84
499			644	185.8	201.4	1.2	12.0	6.1	3.7	-1.1	95857.9	84
500			688	185.8	201.4	0.9	12.3	7.1	3.0	-1.1	95866.3	84
501			851	185.8	201.4	0.8	13.1	6.8	2.8	-1.1	95869.0	84
502			728	185.8	201.4	1.5	12.3	5.9	3.4	-1.1	95868.5	84
503			521	185.8	201.4	1.6	10.8	4.6	3.8	-1.1	95868.8	84
504			439	185.8	201.4	1.0	10.7	5.0	5.2	-1.1	95869.5	84
505			620	185.8	201.4	0.6	12.0	6.6	5.1	-1.1	95870.0	84
506			1210	185.8	201.4	0.4	13.3	9.3	5.2	-1.1	95862.2	84
507			1438	185.8	201.4	4.5	14.2	9.4	4.6	-1.1	95857.6	84
508			1369	185.8	201.4	6.6	13.8	8.1	5.4	-1.1	95857.9	84
509			1362	185.8	201.4	4.4	13.3	9.2	4.5	-1.1	95858.1	84
510			1386	185.8	201.4	6.1	13.5	8.6	4.8	-1.1	95858.4	84
511			1354	185.8	201.4	4.2	12.8	8.3	4.5	-1.1	95858.4	84
512			1298	185.8	201.4	0.7	12.5	8.0	5.6	-1.1	95858.6	84
513			1092	185.8	201.4	0.3	12.9	8.4	3.7	-1.1	95858.7	84
514			1263	185.8	201.4	0.4	13.3	7.4	5.3	-1.1	95858.9	84
515			1413	185.8	201.4	1.7	13.7	8.7	5.3	-1.1	95859.0	84
516			1372	185.8	201.4	2.7	13.5	7.7	4.7	-1.1	95859.1	84
517			1011	185.8	201.4	0.6	12.8	6.3	4.3	-1.1	95859.0	84
518			1356	185.8	201.4	-0.4	13.3	8.6	4.2	-1.1	95859.1	84
519			1383	185.8	201.4	0.6	13.3	8.9	3.3	-1.1	95859.2	84
520			1296	185.8	201.4	0.6	13.2	7.8	3.8	-1.1	95859.3	84
521			1431	185.8	201.4	2.3	13.9	9.3	4.4	-1.1	95859.3	84
522			1367	185.8	201.4	6.1	13.6	8.5	4.0	-1.1	95859.7	84
523			1356	185.8	201.4	4.1	13.1	8.2	2.6	-1.1	95859.9	84
524			1194	185.8	201.4	0.8	12.4	7.7	2.4	-1.1	95859.6	84
525			1010	185.8	201.4	0.4	12.9	7.6	2.8	-1.1	95859.7	84
526			1179	185.8	201.4	0.4	13.2	8.3	2.5	-1.1	95859.6	84
527			1000	185.8	201.4	0.9	13.2	8.2	2.5	-1.1	95860.0	84
528			955	185.8	201.4	1.4	13.3	8.0	3.4	-1.1	95859.8	84

Table E.01 Measurement data - Turbine ON - Data Series 1

Project: East Durham Wind Energy Centre - Turbine T02 - IEC 61400-11 Measurement

Report ID: 15427.00.T02.RP3

Created on: 2/15/2018

***Blank data denotes values that were omitted in the analysis due to an extraneous event during recording

Data Point #	Standardized Wind Speed	LAeq	Turbine Power Output (kW)	Reference Yaw Angle (°)	Yaw Angle (°)	Pitch Angle (°)	Rotor RPM	Nacelle Anemometer Wind Speed (m/s)	10m Anemometer Wind Speed (m/s)	Air Temperature (-C)	Pressure (kPa)	Relative Humidity (%)
529			1037	185.8	201.4	3.2	13.9	7.7	5.6	-1.1	95860.0	84
530			1084	185.8	201.4	5.7	14.2	7.2	5.2	-1.1	95860.3	85
531			1097	185.8	201.4	4.2	13.2	7.4	4.4	-1.1	95859.9	85
532			789	185.8	201.4	0.8	12.2	6.5	4.5	-1.1	95859.9	85
533			896	185.8	201.4	0.9	13.0	6.0	5.5	-1.1	95860.1	85
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***Blank data denotes values that were omitted in the analysis due to an extraneous event during recording

Data Point #	Standardized Wind Speed	LAeq	Turbine Power Output (kW)	Reference Yaw Angle (°)	Yaw Angle (°)	Pitch Angle (°)	Rotor RPM	Nacelle Anemometer Wind Speed (m/s)	10m Anemometer Wind Speed (m/s)	Air Temperature (-C)	Pressure (kPa)	Relative Humidity (%)
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Table E.02 Measurement data - Turbine ON - Data Series 2

Project: East Durham Wind Energy Centre - Turbine T02 - IEC 61400-11 Measurement

Report ID: 15427.00.T02.RP3

Created on: 2/15/2018

***Blank data denotes values that were omitted in the analysis due to an extraneous event during recording

Data Point #	Standardized Wind Speed	LAeq	Turbine Power Output (kW)	Reference Yaw Angle (°)	Yaw Angle (°)	Pitch Angle (°)	Rotor RPM	Nacelle Anemometer Wind Speed (m/s)	10m Anemometer Wind Speed (m/s)	Air Temperature (-C)	Pressure (kPa)	Relative Humidity (%)
534			1395	179.0	179.9	11.0	13.2	10.9	4.1	10.7	960165.4	49
535	9.5	55.3	1391	179.0	179.9	8.6	13.1	8.9	4.1	10.7	960165.2	49
536	12.0	56.4	1405	179.0	179.9	12.3	13.5	11.4	3.5	10.7	960065.5	49
537	12.6	57.8	1391	179.0	179.9	16.4	13.5	12.0	4.3	10.7	960027.3	49
538	16.2	56.4	1387	179.0	179.9	15.6	13.2	15.3	2.1	10.7	960026.9	49
539	14.1	55.8	1393	179.0	179.9	13.4	13.2	13.4	2.7	10.7	960027.4	49
540	15.1	58.1	1394	179.0	179.9	14.4	13.3	14.3	5.7	10.7	960031.6	49
541	13.9	56.1	1388	179.0	179.9	12.5	13.1	13.1	8.4	10.7	960031.3	49
542	9.7	56.5	1401	179.0	179.9	10.9	13.2	9.2	11.0	10.7	960033.6	48
543	14.0	57.9	1397	179.0	179.9	13.8	13.4	13.3	6.5	10.8	960030.8	48
544	12.7	57.6	1385	179.0	179.9	13.6	13.2	12.1	6.5	10.8	960029.6	48
545	12.3	56.4	1400	179.0	179.9	13.2	13.2	11.6	6.7	10.8	960030.9	48
546	14.6	57.9	1388	179.0	179.9	14.0	13.2	13.9	5.2	10.8	960028.4	48
547	13.2	56.4	1395	179.0	179.9	12.0	13.2	12.5	6.3	10.8	960026.4	48
548	12.3	55.6	1394	179.0	179.9	11.4	13.2	11.6	6.4	10.8	960029.3	48
549			1388	179.0	179.9	8.8	13.1	11.0	5.6	10.8	960029.1	48
550	9.7	55.2	1399	179.0	179.9	7.0	13.1	9.2	4.2	10.8	960029.7	48
551			1402	179.0	179.9	8.9	13.4	10.6	6.2	10.8	960027.7	48
552	14.7	57.1	1393	179.0	179.9	12.3	13.4	13.9	6.4	10.8	960028.5	48
553			1389	179.0	179.9	9.5	13.1	7.5	4.8	10.8	960029.6	48
554	12.0	57.1	1402	179.0	179.9	12.0	13.4	11.4	4.6	10.8	959933.8	49
555	16.3	58.5	1386	179.0	179.9	14.5	13.3	15.5	5.3	10.8	959894.5	49
556	14.8	57.2	1391	179.0	179.9	12.3	13.2	14.0	7.0	10.8	959895.6	49
557	13.3	55.7	1393	179.0	179.9	11.1	13.1	12.6	6.7	10.8	959895.7	49
558	10.1	55.2	1387	179.0	179.9	8.6	13.0	9.5	5.2	10.8	959896.6	49
559	10.5	55.4	1412	179.0	179.9	7.8	13.3	10.0	5.1	10.8	959897.2	49
560	10.3	56.2	1378	179.0	179.9	11.1	13.3	9.7	4.8	10.8	959897.2	48
561	8.4	55.5	1279	179.0	179.9	10.5	13.2	12.1	5.5	10.8	959895.2	48
562	8.6	54.7	1318	179.0	179.9	6.9	12.9	10.9	3.5	10.8	959897.5	48
563	10.4	55.6	1413	179.0	179.9	6.6	13.3	9.8	4.1	10.8	959897.3	48
564	9.4	55.0	1385	179.0	179.9	7.5	13.2	8.9	6.4	10.8	959897.4	48
565	10.4	56.0	1400	179.0	179.9	9.1	13.4	9.8	6.5	10.8	959898.8	48
566	8.2	54.9	1246	179.0	179.9	5.6	12.4	7.8	8.9	10.8	959905.1	48
567	7.7	55.4	1094	179.0	179.9	2.8	11.8	6.3	9.8	10.9	959908.1	48
568	8.1	55.0	1240	179.0	179.9	9.1	13.1	10.8	-	-	-	-
569			1393	179.0	179.9	9.6	13.0	11.2	-	-	-	-
570			1397	179.0	179.9	8.3	13.1	9.9	-	-	-	-
571			1382	179.0	179.9	6.8	13.0	10.7	-	-	-	-
572			1400	179.0	179.9	5.9	13.2	9.0	-	-	-	-
573			1382	179.0	179.9	5.8	13.1	7.2	-	-	-	-
574			1395	179.0	179.9	3.2	13.1	6.9	-	-	-	-
575			1332	179.0	179.9	0.9	12.7	7.4	-	-	-	-
576			1416	179.0	179.9	1.8	13.4	10.3	-	-	-	-
577			1390	179.0	179.9	2.8	13.3	8.2	-	-	-	-
578			1400	179.0	179.9	11.3	13.9	10.8	-	-	-	-
579			1364	179.0	179.9	7.7	13.0	9.2	-	-	-	-
580			1403	179.0	179.9	3.6	12.9	9.6	-	-	-	-
581			1404	179.0	179.9	8.0	13.5	12.1	-	-	-	-
582			1391	179.0	179.9	7.7	13.3	12.9	-	-	-	-
583			1381	179.0	179.9	6.6	13.1	10.4	-	-	-	-
584			1382	179.0	179.9	4.4	12.9	7.8	-	-	-	-
585			1396	179.0	179.9	2.4	12.9	7.8	-	-	-	-
586			1427	179.0	179.9	4.4	13.4	8.3	-	-	-	-
587			1373	179.0	179.9	5.4	13.2	7.8	-	-	-	-
588			1388	179.0	179.9	4.4	13.2	8.5	-	-	-	-
589			1380	179.0	179.9	5.4	13.2	9.1	-	-	-	-
590			1378	179.0	179.9	2.8	12.9	7.1	-	-	-	-
591			1417	179.0	179.9	5.2	13.5	6.9	-	-	-	-
592			1395	179.0	179.9	8.2	13.5	11.1	-	-	-	-
593			1389	179.0	179.9	10.8	13.5	12.3	-	-	-	-
594			1391	179.0	179.9	11.9	13.4	12.4	-	-	-	-
595			1390	179.0	179.9	11.6	13.2	11.5	-	-	-	-
596			1388	179.0	179.9	10.0	13.1	11.1	-	-	-	-
597			1392	179.0	179.9	7.4	13.1	10.3	-	-	-	-
598			1392	179.0	179.9	6.4	13.1	9.1	-	-	-	-
599			1399	179.0	179.9	7.3	13.3	10.3	-	-	-	-
600			1392	179.0	179.9	7.0	13.3	8.8	-	-	-	-
601			1390	179.0	179.9	9.4	13.4	10.1	-	-	-	-
602			1388	179.0	179.9	10.6	13.3	11.7	-	-	-	-
603			1393	179.0	179.9	10.8	13.3	11.4	-	-	-	-
604			1392	179.0	179.9	10.3	13.2	11.4	-	-	-	-
605			1396	179.0	179.9	10.5	13.3	9.9	-	-	-	-
606			1398	179.0	179.9	12.4	13.4	14.7	-	-	-	-
607			1386	179.0	179.9	12.6	13.2	15.6	-	-	-	-
608			1391	179.0	179.9	12.2	13.2	11.0	-	-	-	-
609			1398	179.0	179.9	12.1	13.3	12.7	-	-	-	-
610			1394	179.0	179.9	12.4	13.3	14.5	-	-	-	-
611			1392	179.0	179.9	12.7	13.2	13.5	-	-	-	-
612			1392	179.0	179.9	11.8	13.2	10.5	-	-	-	-
613			1397	179.0	179.9	12.1	13.3	11.2	-	-	-	-
614			1396	179.0	179.9	8.5	13.1	11.9	-	-	-	-
615			1395	179.0	179.9	7.4	13.1	10.9	-	-	-	-
616			1378	179.0	179.9	7.9	13.1	9.6	-	-	-	-
617			1386	179.0	179.9	4.5	12.9	8.4	-	-	-	-
618			1196	179.0	179.9	0.9	12.4	7.6	-	-	-	-
619			1379	179.0	179.9	0.1	13.3	8.2	-	-	-	-
620			1408	179.0	179.9	3.5	13.7	7.5	-	-	-	-
621			1391	179.0	179.9	3.9	13.5	7.9	-	-	-	0

***Blank data denotes values that were omitted in the analysis due to an extraneous event during recording

Data Point #	Standardized Wind Speed	LAeq	Turbine Power Output (kW)	Reference Yaw Angle (°)	Yaw Angle (°)	Pitch Angle (°)	Rotor RPM	Nacelle Anemometer Wind Speed (m/s)	10m Anemometer Wind Speed (m/s)	Air Temperature (-C)	Pressure (kPa)	Relative Humidity (%)
622			1404	179.0	179.9	6.8	13.8	10.9	-	-	-	-
623			1364	179.0	179.9	6.4	13.3	11.8	-	-	-	-
624			1390	179.0	179.9	5.6	13.3	9.0	-	-	-	-
625			1398	179.0	179.9	8.0	13.4	8.7	-	-	-	-
626			1379	179.0	179.9	8.3	13.2	10.7	-	-	-	-
627			1406	179.0	179.9	8.4	13.4	8.6	-	-	-	-
628			1389	179.0	179.9	13.5	13.5	13.9	-	-	-	-
629			1391	179.0	179.9	15.6	13.4	14.6	-	-	-	-
630			1392	179.0	179.9	16.6	13.3	17.2	-	-	-	-
631			1385	179.0	179.9	14.1	13.1	16.2	-	-	-	-
632			1396	179.0	179.9	13.2	13.2	12.3	-	-	-	-
633			1393	179.0	179.9	11.6	13.1	12.8	-	-	-	-
634			1395	179.0	179.9	12.2	13.3	12.9	-	-	-	-
635			1389	179.0	179.9	12.3	13.2	12.4	-	-	-	-
636			1402	179.0	179.9	8.9	13.2	8.9	-	-	-	-
637			1394	179.0	179.9	13.0	13.4	10.6	-	-	-	-
638			1391	179.0	179.9	13.6	13.3	12.3	-	-	-	-
639			1389	179.0	179.9	11.6	13.1	12.0	-	-	-	-
640			1393	179.0	179.9	10.7	13.2	10.2	-	-	-	-
641			1393	179.0	179.9	8.9	13.2	9.5	-	-	-	-
642			1384	179.0	179.9	5.3	12.9	10.1	-	-	-	-
643			1415	179.0	179.9	10.7	13.6	13.8	-	-	-	-
644			1376	179.0	179.9	9.6	13.1	10.9	-	-	-	-
645			1399	179.0	179.9	8.4	13.2	12.5	-	-	-	-
646			1399	179.0	179.9	10.0	13.3	8.0	-	-	-	-
647			1395	179.0	179.9	10.7	13.4	11.6	-	-	-	-
648			1393	179.0	179.9	11.3	13.3	13.2	-	-	-	-
649			1394	179.0	179.9	14.9	13.5	16.6	-	-	-	-
650			1389	179.0	179.9	15.9	13.3	15.9	-	-	-	-
651			1389	179.0	179.9	14.9	13.2	15.1	-	-	-	-
652			1393	179.0	179.9	14.0	13.2	12.8	-	-	-	-
653			1402	179.0	179.9	15.4	13.4	12.8	-	-	-	-
654			1387	179.0	179.9	13.6	13.0	11.1	-	-	-	-
655			1395	179.0	179.9	11.6	13.1	12.7	-	-	-	-
656			1395	179.0	179.9	9.7	13.1	10.6	-	-	-	-
657			1396	179.0	179.9	11.7	13.4	11.4	-	-	-	-
658			1393	179.0	179.9	11.2	13.2	12.8	-	-	-	-
659			1401	179.0	179.9	11.9	13.4	12.3	-	-	-	-
660			1384	179.0	179.9	12.9	13.3	14.8	-	-	-	-
661			1382	179.0	179.9	8.5	13.0	11.1	-	-	-	-
662			1386	179.0	179.9	4.2	12.7	7.0	-	-	-	-
663			1417	179.0	179.9	4.9	13.2	9.5	-	-	-	-
664			1399	179.0	179.9	6.7	13.3	10.6	-	-	-	-
665			1374	179.0	179.9	4.6	13.0	7.6	-	-	-	-
666			1405	179.0	179.9	4.4	13.3	7.9	-	-	-	-
667			1397	179.0	179.9	6.0	13.3	7.3	-	-	-	-
668			1394	179.0	179.9	7.1	13.4	9.3	-	-	-	-
669			1386	179.0	179.9	5.9	13.2	9.0	-	-	-	-
670			1398	179.0	179.9	7.8	13.4	9.7	-	-	-	-
671			1379	179.0	179.9	6.7	13.1	9.3	-	-	-	-
672			1400	179.0	179.9	9.6	13.4	10.0	-	-	-	-
673			1369	179.0	179.9	6.6	12.9	10.4	-	-	-	-
674			1165	179.0	179.9	1.0	12.3	6.5	-	-	-	-
675			899	179.0	179.9	0.5	12.9	6.5	-	-	-	-
676			1436	179.0	179.9	5.0	14.3	9.1	-	-	-	-
677			1326	179.0	179.9	6.9	13.2	9.4	-	-	-	-
678			1326	179.0	179.9	1.4	12.6	8.3	-	-	-	-
679			1181	179.0	179.9	0.3	12.9	7.2	-	-	-	-
680			1188	179.0	179.9	0.3	13.1	8.4	-	-	-	-
681			833	179.0	179.9	0.8	12.9	5.5	-	-	-	-
682			1112	179.0	179.9	0.8	13.3	6.9	-	-	-	-
683			1428	179.0	179.9	7.0	14.4	9.0	-	-	-	-
684			1374	179.0	179.9	10.3	13.7	9.3	-	-	-	-
685			1376	179.0	179.9	9.7	13.3	9.4	-	-	-	-
686			1404	179.0	179.9	8.8	13.3	10.1	-	-	-	-
687			1381	179.0	179.9	13.3	13.3	11.6	-	-	-	-
688			1391	179.0	179.9	12.4	13.2	12.6	-	-	-	-
689			1307	179.0	179.9	5.2	13.0	10.7	-	-	-	-
690			1371	179.0	179.9	1.9	13.0	9.4	-	-	-	-
691			1339	179.0	179.9	1.5	13.0	7.4	-	-	-	-
692			1428	179.0	179.9	5.4	13.9	5.9	-	-	-	-
693			1387	179.0	179.9	8.1	13.7	6.8	-	-	-	-
694			1379	179.0	179.9	10.3	13.4	12.4	-	-	-	-
695			1388	179.0	179.9	7.7	13.1	9.7	-	-	-	-
696			1392	179.0	179.9	7.9	13.2	9.4	-	-	-	-
697			1358	179.0	179.9	4.8	12.7	8.1	-	-	-	-
698			1414	179.0	179.9	4.6	13.2	8.6	-	-	-	-
699			1394	179.0	179.9	12.9	13.6	12.4	-	-	-	-
700			1395	179.0	179.9	13.4	13.4	12.9	-	-	-	-
701			1402	179.0	179.9	15.5	13.5	13.7	-	-	-	-
702			1378	179.0	179.9	16.8	13.2	15.2	-	-	-	-
703			1398	179.0	179.9	17.8	13.3	16.6	-	-	-	-
704			1394	179.0	179.9	19.2	13.4	16.0	-	-	-	-
705			1384	179.0	179.9	18.7	13.2	18.5	-	-	-	-
706			1389	179.0	179.9	16.6	13.0	16.0	-	-	-	-
707			1397	179.0	179.9	14.7	13.1	16.5	-	-	-	-
708			1391	179.0	179.9	11.0	13.0	13.1	-	-	-	-
709			1401	179.0	179.9	10.8	13.3	12.7	-	-	-	-

Table E.02 Measurement data - Turbine ON - Data Series 2

Project: East Durham Wind Energy Centre - Turbine T02 - IEC 61400-11 Measurement

Report ID: 15427.00.T02.RP3

Created on: 2/15/2018

***Blank data denotes values that were omitted in the analysis due to an extraneous event during recording

Data Point #	Standardized Wind Speed	LAeq	Turbine Power Output (kW)	Reference Yaw Angle (°)	Yaw Angle (°)	Pitch Angle (°)	Rotor RPM	Nacelle Anemometer Wind Speed (m/s)	10m Anemometer Wind Speed (m/s)	Air Temperature (-C)	Pressure (kPa)	Relative Humidity (%)
710			1387	179.0	179.9	9.8	13.1	12.0	-	-	-	0
711			1392	179.0	183.0	7.7	13.1	10.5	-	-	-	0
712			1399	179.0	185.7	7.0	13.1	7.6	-	-	-	0
713			1384	179.0	185.7	11.3	13.4	11.2	-	-	-	0
714			1385	179.0	185.7	7.9	13.1	9.2	-	-	-	0
715			1405	179.0	185.7	6.5	13.2	8.7	-	-	-	0
716			1393	179.0	185.7	8.8	13.3	8.8	-	-	-	0
717			1368	179.0	185.7	5.5	12.9	6.7	-	-	-	0
718			1383	179.0	185.7	1.4	12.6	8.6	-	-	-	0
719			1239	179.0	185.7	4.6	13.3	6.7	-	-	-	0
720			1116	179.0	185.7	11.6	13.8	10.3	-	-	-	0
721			1340	179.0	185.7	9.4	13.2	10.3	-	-	-	0
722			1395	179.0	185.7	8.1	13.2	7.9	-	-	-	0
723			1378	179.0	185.7	6.9	13.0	7.6	-	-	-	0
724			1311	179.0	185.7	2.3	12.4	7.0	-	-	-	0
725			1195	179.0	185.7	0.6	12.9	6.5	-	-	-	0
726			1438	179.0	185.7	11.2	14.3	10.9	-	-	-	0
727			1375	179.0	185.7	14.5	13.4	15.5	-	-	-	0
728			1380	179.0	185.7	11.3	13.1	12.2	-	-	-	0
729			1388	179.0	185.7	5.8	12.9	8.2	-	-	-	0
730			1416	179.0	185.7	5.9	13.2	9.1	-	-	-	0
731			1397	179.0	185.7	10.7	13.4	11.5	-	-	-	0
732			1390	179.0	185.7	10.3	13.3	10.1	-	-	-	0
733			1390	179.0	185.7	9.0	13.2	11.3	-	-	-	0
734			1411	179.0	182.8	7.2	13.3	8.6	-	-	-	0
735			1372	179.0	182.8	7.1	13.0	7.6	-	-	-	0
736			1371	179.0	182.8	4.4	12.8	6.8	-	-	-	0
737			100	179.0	5.0	-5.0	0.0	0.0	6.8	13.5	957586.6	41
738			100	179.0	5.0	-5.0	0.0	0.0	3.7	13.5	957585.8	41
739			100	179.0	5.0	-5.0	0.0	0.0	3.4	13.5	957589.5	41
740			100	179.0	5.0	-5.0	0.0	0.0	3.7	13.5	957590.4	41
741			100	179.0	5.0	-5.0	0.0	0.0	3.2	13.5	957588.1	41
742			100	179.0	5.0	-5.0	0.0	0.0	5.4	13.5	957587.2	41
743			100	179.0	5.0	-5.0	0.0	0.0	7.5	13.5	957588.5	41
744			100	179.0	5.0	-5.0	0.0	0.0	6.1	13.5	957588.6	41
745			100	179.0	5.0	-5.0	0.0	0.0	5.0	13.5	957588.7	41
746			100	179.0	5.0	-5.0	0.0	0.0	5.4	13.5	957590.0	41
747			100	179.0	5.0	-5.0	0.0	0.0	5.0	13.5	957591.8	41
748			100	179.0	5.0	-5.0	0.0	0.0	4.5	13.5	957591.9	41
749			100	179.0	5.0	-5.0	0.0	0.0	5.9	13.5	957594.6	41
750			100	179.0	5.0	-5.0	0.0	0.0	4.5	13.5	957594.4	41
751			100	179.0	5.0	-5.0	0.0	0.0	6.3	13.5	957594.0	41
752			100	179.0	5.0	-5.0	0.0	0.0	3.5	13.5	957594.5	41
753			100	179.0	5.0	-5.0	0.0	0.0	3.6	13.5	957610.9	41
754			100	179.0	5.0	-5.0	0.0	0.0	4.4	13.5	957728.6	41
755			100	179.0	5.0	-5.0	0.0	0.0	6.0	13.5	957730.1	41
756			100	179.0	5.0	-5.0	0.0	0.0	8.4	13.5	957727.7	41
757			100	179.0	5.0	-5.0	0.0	0.0	6.4	13.5	957728.2	41
758			100	179.0	5.0	-5.0	0.0	0.0	7.2	13.5	957728.2	41
759			100	179.0	5.0	-5.0	0.0	0.0	8.0	13.5	957728.7	41
760			100	179.0	5.0	-5.0	0.0	0.0	6.9	13.5	957729.1	41
761			100	179.0	5.0	-5.0	0.0	0.0	5.7	13.5	957730.5	41
762			100	179.0	5.0	-5.0	0.0	0.0	7.2	13.5	957731.4	41
763			100	179.0	5.0	-5.0	0.0	0.0	6.1	13.5	957730.7	41
764			100	179.0	5.0	-5.0	0.0	0.0	5.4	13.5	957731.0	41
765			100	179.0	5.0	-5.0	0.0	0.0	7.5	13.5	957714.0	41
766			100	179.0	5.0	-5.0	0.0	0.0	7.4	13.5	957597.3	40
767			100	179.0	5.0	-5.0	0.0	0.0	8.0	13.5	957598.2	40
768			100	179.0	5.0	-5.0	0.0	0.0	9.0	13.5	957596.3	40
769			100	179.0	5.0	-5.0	0.0	0.0	9.8	13.5	957598.5	40
770			100	179.0	5.0	-5.0	0.0	0.0	7.8	13.5	957597.5	40
771			100	179.0	5.0	-5.0	0.0	0.0	7.7	13.5	957594.4	40
772			100	179.0	5.0	-5.0	0.0	0.0	7.2	13.4	957598.3	41
773			100	179.0	5.0	-5.0	0.0	0.0	6.2	13.4	957598.5	41
774			100	179.0	5.0	-5.0	0.0	0.0	10.1	13.4	957599.2	41
775			100	179.0	5.0	-5.0	0.0	0.0	6.9	13.4	957601.7	41
776			100	179.0	5.0	-5.0	0.0	0.0	4.2	13.4	957598.0	41
777			100	179.0	5.0	-5.0	0.0	0.0	2.9	13.4	957636.5	41
778			100	179.0	5.0	-5.0	0.0	0.0	3.6	13.4	957684.5	41
779			100	179.0	5.0	-5.0	0.0	0.0	4.1	13.4	957693.4	41
780			100	179.0	5.0	-5.0	0.0	0.0	4.6	13.4	957695.1	41
781			100	179.0	5.0	-5.0	0.0	0.0	6.7	13.4	957698.5	41
782			100	179.0	5.0	-5.0	0.0	0.0	5.6	13.4	957698.7	41
783			100	179.0	5.0	-5.0	0.0	0.0	5.9	13.4	957733.9	41
784			100	179.0	5.0	-5.0	0.0	0.0	6.5	13.4	957837.7	41
785			100	179.0	5.0	-5.0	0.0	0.0	9.0	13.4	957839.0	41
786			100	179.0	5.0	-5.0	0.0	0.0	7.1	13.4	957840.1	41
787			100	179.0	5.0	-5.0	0.0	0.0	5.4	13.4	957841.2	41
788			100	179.0	5.0	-5.0	0.0	0.0	6.5	13.4	957842.1	41
789			100	179.0	5.0	-5.0	0.0	0.0	6.0	13.4	957843.2	41
790			100	179.0	5.0	-5.0	0.0	0.0	4.9	13.4	957842.5	41
791			100	179.0	5.0	-5.0	0.0	0.0	4.2	13.4	957843.7	41
792			100	179.0	5.0	-5.0	0.0	0.0	4.2	13.4	957844.7	41
793			100	179.0	5.0	-5.0	0.0	0.0	6.2	13.4	957845.4	41
794			100	179.0	5.0	-5.0	0.0	0.0	3.9	13.4	957845.9	41
795			100	179.0	5.0	-5.0	0.0	0.0	4.3	13.4	957846.0	41
796			100	179.0	5.0	-5.0	0.0	0.0	3.6	13.4	957846.7	41
797			100	179.0	5.0	-5.0	0.0	0.0	4.2	13.4	957847.4	41

***Blank data denotes values that were omitted in the analysis due to an extraneous event during recording

Data Point #	Standardized Wind Speed	LAeq	Turbine Power Output (kW)	Reference Yaw Angle (°)	Yaw Angle (°)	Pitch Angle (°)	Rotor RPM	Nacelle Anemometer Wind Speed (m/s)	10m Anemometer Wind Speed (m/s)	Air Temperature (-C)	Pressure (kPa)	Relative Humidity (%)
798			100	179.0	5.0	-5.0	0.0	0.0	4.1	13.4	957848.5	41
799			100	179.0	5.0	-5.0	0.0	0.0	2.9	13.4	957845.1	41
800			100	179.0	5.0	-5.0	0.0	0.0	2.0	13.4	957845.0	41
801			100	179.0	5.0	-5.0	0.0	0.0	3.9	13.4	957845.0	41
802			100	179.0	5.0	-5.0	0.0	0.0	5.8	13.4	957845.2	41
803			100	179.0	5.0	-5.0	0.0	0.0	6.9	13.4	957845.6	41
804			100	179.0	5.0	-5.0	0.0	0.0	7.4	13.4	957845.7	41
805			100	179.0	5.0	-5.0	0.0	0.0	7.4	13.4	957845.2	41
806			100	179.0	5.0	-5.0	0.0	0.0	5.8	13.4	957845.0	41
807			100	179.0	5.0	-5.0	0.0	0.0	7.2	13.4	957844.4	41
808			100	179.0	5.0	-5.0	0.0	0.0	6.2	13.4	957845.0	41
809			100	179.0	5.0	-5.0	0.0	0.0	4.7	13.4	957845.4	41
810			100	179.0	5.0	-5.0	0.0	0.0	7.3	13.4	957846.0	41
811			100	179.0	5.0	-5.0	0.0	0.0	6.6	13.4	957846.0	41
812			100	179.0	5.0	-5.0	0.0	0.0	4.3	13.4	957844.3	41
813			100	179.0	5.0	-5.0	0.0	0.0	3.9	13.4	957843.1	41
814			100	179.0	5.0	-5.0	0.0	0.0	4.6	13.4	957843.3	41
815			100	179.0	5.0	-5.0	0.0	0.0	5.4	13.4	957844.0	41
816			100	179.0	5.0	-5.0	0.0	0.0	6.7	13.4	957843.9	41
817			100	179.0	5.0	-5.0	0.0	0.0	5.2	13.4	957843.6	41
818			100	179.0	5.0	-5.0	0.0	0.0	4.6	13.4	957844.0	41
819			100	179.0	5.0	-5.0	0.0	0.0	7.2	13.4	957846.1	41
820			100	179.0	5.0	-5.0	0.0	0.0	6.0	13.4	957843.3	41
821			100	179.0	5.0	-5.0	0.0	0.0	5.6	13.4	957843.8	41
822			100	179.0	5.0	-5.0	0.0	0.0	4.4	13.4	957843.3	41
823			100	179.0	5.0	-5.0	0.0	0.0	3.5	13.4	957845.2	41
824			100	179.0	5.0	-5.0	0.0	0.0	4.7	13.4	957843.8	41
825			100	179.0	5.0	-5.0	0.0	0.0	2.1	13.4	957859.8	41
826			100	179.0	5.0	-5.0	0.0	0.0	4.7	13.4	957977.1	41
827			100	179.0	5.0	-5.0	0.0	0.0	5.7	13.4	957976.2	41
828			100	179.0	5.0	-5.0	0.0	0.0	3.9	13.4	957976.1	41
829			100	179.0	5.0	-5.0	0.0	0.0	4.2	13.4	957975.7	41
830			100	179.0	5.0	-5.0	0.0	0.0	6.0	13.4	957976.3	41
831			100	179.0	5.0	-5.0	0.0	0.0	4.0	13.4	957976.1	41
832			100	179.0	5.0	-5.0	0.0	0.0	4.2	13.4	957976.1	41
833			100	179.0	5.0	-5.0	0.0	0.0	4.6	13.4	957976.7	41
834			100	179.0	5.0	-5.0	0.0	0.0	3.6	13.4	957976.6	41
835			100	179.0	5.0	-5.0	0.0	0.0	4.1	13.4	957976.4	41
836			100	179.0	5.0	-5.0	0.0	0.0	7.0	13.4	957977.5	41
837			100	179.0	5.0	-5.0	0.0	0.0	5.5	13.4	957976.4	41
838			100	179.0	5.0	-5.0	0.0	0.0	7.7	13.4	957976.2	41
839			100	179.0	5.0	-5.0	0.0	0.0	9.2	13.4	957977.3	41
840			100	179.0	5.0	-5.0	0.0	0.0	8.5	13.4	957976.7	41
841			100	179.0	5.0	-5.0	0.0	0.0	7.7	13.4	957977.2	41
842			100	179.0	5.0	-5.0	0.0	0.0	6.7	13.4	957977.9	41
843			100	179.0	5.0	-5.0	0.0	0.0	6.5	13.4	957978.1	41
844			100	179.0	5.0	-5.0	0.0	0.0	5.5	13.4	957978.4	41
845			100	179.0	5.0	-5.0	0.0	0.0	5.2	13.4	957977.6	41
846			100	179.0	5.0	-5.0	0.0	0.0	6.0	13.4	957978.9	41
847			100	179.0	5.0	-5.0	0.0	0.0	6.2	13.4	957978.3	41
848			100	179.0	5.0	-5.0	0.0	0.0	5.6	13.4	957978.3	41
849			100	179.0	5.0	-5.0	0.0	0.0	4.2	13.3	957977.5	41
850			100	179.0	5.0	-5.0	0.0	0.0	3.2	13.3	957976.8	41
851			100	179.0	5.0	-5.0	0.0	0.0	8.2	13.3	957977.4	41
852			100	179.0	5.0	-5.0	0.0	0.0	8.8	13.3	957977.0	41
853			100	179.0	5.0	-5.0	0.0	0.0	9.3	13.3	957976.5	41
854			100	179.0	5.0	-5.0	0.0	0.0	8.1	13.3	957977.1	41
855			100	179.0	5.0	-5.0	0.0	0.0	8.9	13.3	957976.6	41
856			100	179.0	5.0	-5.0	0.0	0.0	10.4	13.3	957977.5	41
857			100	179.0	5.0	-5.0	0.0	0.0	9.6	13.3	957977.7	41
858			100	179.0	5.0	-5.0	0.0	0.0	8.2	13.3	957978.0	41
859			100	179.0	5.0	-5.0	0.0	0.0	7.1	13.3	957977.9	41
860			100	179.0	5.0	-5.0	0.0	0.0	9.0	13.3	957978.3	41
861			100	179.0	5.0	-5.0	0.0	0.0	8.4	13.3	957961.4	41
862			100	179.0	5.0	-5.0	0.0	0.0	7.5	13.3	957846.0	41
863			100	179.0	5.0	-5.0	0.0	0.0	6.2	13.3	957845.9	41
864			100	179.0	5.0	-5.0	0.0	0.0	6.4	13.3	957846.4	41
865			100	179.0	5.0	-5.0	0.0	0.0	7.4	13.3	957846.5	41
866			100	179.0	5.0	-5.0	0.0	0.0	5.6	13.3	957846.5	41
867			100	179.0	5.0	-5.0	0.0	0.0	5.3	13.3	957876.7	41
868			100	179.0	5.0	-5.0	0.0	0.0	6.6	13.3	957977.8	41
869			100	179.0	5.0	-5.0	0.0	0.0	4.3	13.3	957977.1	41
870			100	179.0	5.0	-5.0	0.0	0.0	6.0	13.3	957977.4	41
871			100	179.0	5.0	-5.0	0.0	0.0	6.6	13.3	957977.7	41
872			100	179.0	5.0	-5.0	0.0	0.0	7.0	13.3	957977.2	41
873			100	179.0	5.0	-5.0	0.0	0.0	6.4	13.3	957942.9	41
874			100	179.0	5.0	-5.0	0.0	0.0	9.1	13.3	957711.2	41
875			100	179.0	5.0	-5.0	0.0	0.0	6.4	13.3	957709.6	41
876			100	179.0	5.0	-5.0	0.0	0.0	6.4	13.3	957710.6	41
877			100	179.0	5.0	-5.0	0.0	0.0	5.0	13.3	957711.5	41
878			100	179.0	5.0	-5.0	0.0	0.0	5.7	13.3	957711.5	41
879			100	179.0	5.0	-5.0	0.0	0.0	7.9	13.3	957759.5	41
880			100	179.0	5.0	-5.0	0.0	0.0	8.8	13.3	957978.5	41
881			100	179.0	5.0	-5.0	0.0	0.0	6.6	13.3	957978.0	41
882			100	179.0	5.0	-5.0	0.0	0.0	5.1	13.3	957977.4	41
883			100	179.0	5.0	-5.0	0.0	0.0	5.3	13.3	957977.4	41
884			100	179.0	5.0	-5.0	0.0	0.0	4.4	13.3	957976.8	41
885			100	179.0	5.0	-5.0	0.0	0.0	5.8	13.3	957978.3	41

Table E.02 Measurement data - Turbine ON - Data Series 2

Project: East Durham Wind Energy Centre - Turbine T02 - IEC 61400-11 Measurement

Report ID: 15427.00.T02.RP3

Created on: 2/15/2018

***Blank data denotes values that were omitted in the analysis due to an extraneous event during recording

Data Point #	Standardized Wind Speed	LAeq	Turbine Power Output (kW)	Reference Yaw Angle (°)	Yaw Angle (°)	Pitch Angle (°)	Rotor RPM	Nacelle Anemometer Wind Speed (m/s)	10m Anemometer Wind Speed (m/s)	Air Temperature (-C)	Pressure (kPa)	Relative Humidity (%)
886			100	179.0	5.0	-5.0	0.0	0.0	5.1	13.3	957976.7	41
887			100	179.0	5.0	-5.0	0.0	0.0	2.7	13.3	957978.7	41
888			100	179.0	5.0	-5.0	0.0	0.0	2.9	13.3	957978.8	41
889			100	179.0	5.0	-5.0	0.0	0.0	6.0	13.3	957978.2	41
890			100	179.0	5.0	-5.0	0.0	0.0	6.8	13.3	957978.5	41
891			100	179.0	5.0	-5.0	0.0	0.0	7.5	13.3	957978.1	41
892			100	179.0	5.0	-5.0	0.0	0.0	6.2	13.3	957977.4	41
893			100	179.0	5.0	-5.0	0.0	0.0	4.8	13.3	957977.2	41
894			100	179.0	5.0	-5.0	0.0	0.0	5.1	13.3	957977.2	41
895			100	179.0	5.0	-5.0	0.0	0.0	4.4	13.3	957976.7	41
896			100	179.0	5.0	-5.0	0.0	0.0	4.9	13.3	957977.3	41
897			100	179.0	5.0	-5.0	0.0	0.0	4.3	13.3	957977.2	41
898			100	179.0	5.0	-5.0	0.0	0.0	4.8	13.3	957978.1	41
899			100	179.0	5.0	-5.0	0.0	0.0	5.3	13.3	957978.3	41
900			100	179.0	5.0	-5.0	0.0	0.0	5.8	13.3	957977.9	41
901			100	179.0	5.0	-5.0	0.0	0.0	5.6	13.3	957978.2	41
902			100	179.0	5.0	-5.0	0.0	0.0	3.9	13.3	957978.0	41
903			100	179.0	5.0	-5.0	0.0	0.0	3.2	13.3	957977.9	41
904			100	179.0	5.0	-5.0	0.0	0.0	3.5	13.3	957978.0	41
905			100	179.0	5.0	-5.0	0.0	0.0	5.7	13.3	957978.6	41
906			100	179.0	5.0	-5.0	0.0	0.0	4.4	13.3	957978.4	41
907			100	179.0	5.0	-5.0	0.0	0.0	2.1	13.3	957978.6	41
908			100	179.0	5.0	-5.0	0.0	0.0	3.3	13.3	957978.6	41
909			100	179.0	5.0	-5.0	0.0	0.0	4.1	13.3	957995.1	41
910			100	179.0	5.0	-5.0	0.0	0.0	2.9	13.3	958115.0	42
911			100	179.0	5.0	-5.0	0.0	0.0	4.6	13.3	958115.1	42
912			100	179.0	5.0	-5.0	0.0	0.0	5.4	13.3	958113.7	42
913			100	179.0	5.0	-5.0	0.0	0.0	4.3	13.3	958114.7	42
914			100	179.0	5.0	-5.0	0.0	0.0	5.1	13.3	958114.8	42
915			100	179.0	5.0	-5.0	0.0	0.0	7.0	13.3	958097.6	42
916			100	179.0	5.0	-5.0	0.0	0.0	7.4	13.3	957977.0	41
917			100	179.0	5.0	-5.0	0.0	0.0	7.5	13.3	957978.0	41
918			100	179.0	5.0	-5.0	0.0	0.0	6.4	13.3	957977.5	41
919			100	179.0	5.0	-5.0	0.0	0.0	6.4	13.3	957978.0	41
920			100	179.0	5.0	-5.0	0.0	0.0	4.7	13.3	957977.7	41
921			100	179.0	5.0	-5.0	0.0	0.0	4.3	13.3	957994.7	41
922			100	179.0	5.0	-5.0	0.0	0.0	3.3	13.3	958114.6	41
923			100	179.0	5.0	-5.0	0.0	0.0	3.4	13.3	958114.6	41
924			100	179.0	5.0	-5.0	0.0	0.0	3.4	13.3	958113.8	41
925			100	179.0	5.0	-5.0	0.0	0.0	3.7	13.3	958112.2	41
926			100	179.0	5.0	-5.0	0.0	0.0	4.3	13.3	958115.4	41
927			100	179.0	5.0	-5.0	0.0	0.0	4.2	13.3	958114.4	41
928			100	179.0	5.0	-5.0	0.0	0.0	3.8	13.3	958115.1	42
929			100	179.0	5.0	-5.0	0.0	0.0	5.6	13.3	958115.3	42
930			100	179.0	5.0	-5.0	0.0	0.0	4.4	13.3	958113.1	42
931			100	179.0	5.0	-5.0	0.0	0.0	3.1	13.3	958113.2	42
932			100	179.0	5.0	-5.0	0.0	0.0	4.9	13.3	958113.8	42
933			100	179.0	5.0	-5.0	0.0	0.0	3.2	13.3	958114.9	42
934			100	179.0	5.0	-5.0	0.0	0.0	1.9	13.3	958114.7	42
935			100	179.0	5.0	-5.0	0.0	0.0	3.0	13.3	958114.9	42
936			100	179.0	5.0	-5.0	0.0	0.0	3.1	13.3	958114.9	42
937			100	179.0	5.0	-5.0	0.0	0.0	3.6	13.3	958114.9	42
938			100	179.0	5.0	-5.0	0.0	0.0	2.0	13.3	958115.0	42
939			100	179.0	5.0	-5.0	0.0	0.0	5.7	13.3	958115.4	42
940			100	179.0	5.0	-5.0	0.0	0.0	5.7	13.3	958113.7	42
941			100	179.0	5.0	-5.0	0.0	0.0	5.5	13.3	958115.2	42
942			100	179.0	5.0	-5.0	0.0	0.0	7.1	13.3	958114.9	42
943			100	179.0	5.0	-5.0	0.0	0.0	8.1	13.3	958115.4	42
944			100	179.0	5.0	-5.0	0.0	0.0	7.7	13.3	958114.7	42
945			100	179.0	5.0	-5.0	0.0	0.0	5.5	13.3	958132.3	42
946			100	179.0	5.0	-5.0	0.0	0.0	3.6	13.3	958254.6	42
947			100	179.0	5.0	-5.0	0.0	0.0	5.2	13.3	958254.9	42
948			100	179.0	5.0	-5.0	0.0	0.0	4.4	13.3	958255.6	42
949			100	179.0	5.0	-5.0	0.0	0.0	4.4	13.3	958256.2	42
950			100	179.0	5.0	-5.0	0.0	0.0	7.3	13.3	958256.2	42
951			100	179.0	5.0	-5.0	0.0	0.0	8.2	13.3	958238.1	42
952			100	179.0	5.0	-5.0	0.0	0.0	6.0	13.3	958114.0	41
953			100	179.0	5.0	-5.0	0.0	0.0	5.7	13.3	958116.1	41
954			100	179.0	5.0	-5.0	0.0	0.0	6.3	13.3	958116.2	41
955			100	179.0	5.0	-5.0	0.0	0.0	5.4	13.3	958116.5	41
956			100	179.0	5.0	-5.0	0.0	0.0	4.8	13.3	958116.2	41
957			100	179.0	5.0	-5.0	0.0	0.0	5.4	13.3	958115.8	41
958			100	179.0	5.0	-5.0	0.0	0.0	5.6	13.3	958116.3	42
959			100	179.0	5.0	-5.0	0.0	0.0	7.4	13.3	958113.6	42
960			100	179.0	5.0	-5.0	0.0	0.0	5.0	13.3	958114.5	42
961			100	179.0	5.0	-5.0	0.0	0.0	6.4	13.3	958116.7	42
962			100	179.0	5.0	-5.0	0.0	0.0	6.3	13.3	958116.0	42
963			100	179.0	5.0	-5.0	0.0	0.0	5.6	13.3	958113.5	42
964			100	179.0	5.0	-5.0	0.0	0.0	4.6	13.3	958115.1	42
965			100	179.0	5.0	-5.0	0.0	0.0	4.8	13.3	958113.5	42
966			100	179.0	5.0	-5.0	0.0	0.0	6.6	13.3	958115.7	42
967			100	179.0	5.0	-5.0	0.0	0.0	6.1	13.3	958115.4	42
968			100	179.0	5.0	-5.0	0.0	0.0	4.5	13.3	958112.7	42
969			100	179.0	5.0	-5.0	0.0	0.0	4.0	13.3	958129.6	42
970			100	179.0	5.0	-5.0	0.0	0.0	4.7	13.3	958255.0	42
971			100	179.0	5.0	-5.0	0.0	0.0	3.7	13.3	958256.4	42
972			100	179.0	5.0	-5.0	0.0	0.0	3.3	13.3	958254.7	42
973			100	179.0	5.0	-5.0	0.0	0.0	4.9	13.3	958256.1	42

***Blank data denotes values that were omitted in the analysis due to an extraneous event during recording

Data Point #	Standardized Wind Speed	LAeq	Turbine Power Output (kW)	Reference Yaw Angle (°)	Yaw Angle (°)	Pitch Angle (°)	Rotor RPM	Nacelle Anemometer Wind Speed (m/s)	10m Anemometer Wind Speed (m/s)	Air Temperature (-C)	Pressure (kPa)	Relative Humidity (%)
974			100	179.0	5.0	-5.0	0.0	0.0	7.4	13.3	958256.3	42
975			100	179.0	5.0	-5.0	0.0	0.0	3.8	13.3	958255.5	42
976			100	179.0	5.0	-5.0	0.0	0.0	4.2	13.3	958254.6	42
977			100	179.0	5.0	-5.0	0.0	0.0	6.2	13.3	958255.3	42
978			100	179.0	5.0	-5.0	0.0	0.0	6.2	13.3	958255.6	42
979			100	179.0	5.0	-5.0	0.0	0.0	6.5	13.3	958255.7	42
980			100	179.0	5.0	-5.0	0.0	0.0	4.4	13.3	958256.8	42
981			100	179.0	5.0	-5.0	0.0	0.0	4.0	13.3	958251.3	42
982			100	179.0	5.0	-5.0	0.0	0.0	5.8	13.4	958115.8	42
983			100	179.0	5.0	-5.0	0.0	0.0	6.4	13.4	958116.4	42
984			100	179.0	5.0	-5.0	0.0	0.0	6.6	13.4	958115.7	42
985			100	179.0	5.0	-5.0	0.0	0.0	6.0	13.4	958115.6	42
986			100	179.0	5.0	-5.0	0.0	0.0	5.3	13.4	958115.4	42
987			100	179.0	5.0	-5.0	0.0	0.0	5.2	13.4	958115.6	42
988			100	179.0	5.0	-5.0	0.0	0.0	4.1	13.4	958116.3	42
989			100	179.0	5.0	-5.0	0.0	0.0	4.3	13.4	958116.7	42
990			100	179.0	5.0	-5.0	0.0	0.0	7.4	13.4	958117.2	42
991			100	179.0	5.0	-5.0	0.0	0.0	5.2	13.4	958013.1	42
992			100	179.0	5.0	-4.9	0.0	0.0	4.8	13.4	957976.7	42
993			580	179.0	71.0	0.2	0.0	3.3	3.8	13.4	957976.7	42
994			100	179.0	5.0	-5.0	0.0	0.0	3.7	13.4	957977.1	42
995			100	179.0	5.0	-5.0	0.0	0.0	3.7	13.4	957977.1	42
996			100	179.0	5.0	-5.0	0.0	0.0	4.9	13.4	957977.3	42
997			100	179.0	5.0	-5.0	0.0	0.0	4.9	13.4	957977.1	42
998			100	179.0	5.0	-5.0	0.0	0.0	4.9	13.4	957977.9	42
999			513	179.0	64.4	1.4	4.4	4.5	5.5	13.4	957979.7	42
1000			1384	179.0	189.5	16.0	13.5	13.6	4.4	13.4	957978.3	42
1001			1382	179.0	189.5	15.3	13.1	14.5	4.1	13.4	957977.2	42
1002			1389	179.0	189.5	11.8	13.0	11.3	3.2	13.4	957976.7	42
1003			1403	179.0	189.5	12.5	13.3	12.3	3.3	13.4	957881.4	42
1004			1392	179.0	189.6	14.0	13.3	12.0	2.4	13.4	957844.3	42
1005			1390	179.0	189.6	10.5	13.1	10.4	2.9	13.4	957844.4	42
1006			1392	179.0	189.6	11.5	13.3	12.5	5.6	13.4	957844.7	42
1007			1393	179.0	189.6	9.9	13.2	10.2	6.7	13.4	957844.7	42
1008			1386	179.0	189.6	8.6	13.1	9.8	7.1	13.4	957843.8	42
1009			1381	179.0	189.6	4.4	12.8	8.4	6.2	13.4	957968.0	41
1010			1394	179.0	189.6	2.1	12.8	10.0	5.6	13.4	957977.9	41
1011			1435	179.0	189.6	5.6	13.5	8.7	6.3	13.4	957977.4	41
1012			1385	179.0	189.6	7.6	13.4	8.9	5.7	13.4	957977.2	41
1013			1384	179.0	189.6	7.0	13.3	9.1	5.2	13.4	957977.3	41
1014			1388	179.0	189.6	5.9	13.1	8.2	4.0	13.4	957977.1	41
1015			1395	179.0	189.6	6.9	13.3	9.0	4.3	13.4	958089.7	42
1016			1398	179.0	189.6	8.0	13.4	10.2	4.1	13.4	958115.3	42
1017			1389	179.0	189.6	10.6	13.4	9.8	4.6	13.4	958115.4	42
1018			1392	179.0	189.6	8.2	13.2	9.6	2.7	13.4	958114.7	42
1019			1389	179.0	189.6	7.2	13.1	7.4	2.3	13.4	958114.4	42
1020			1400	179.0	189.6	8.1	13.3	8.5	3.0	13.4	958114.9	42
1021			1383	179.0	189.6	7.2	13.1	9.0	2.4	13.4	958114.5	42
1022			1389	179.0	189.6	4.8	13.0	9.0	2.2	13.4	958114.2	42
1023			1391	179.0	189.6	7.9	13.3	9.9	2.5	13.4	958114.5	42
1024			1390	179.0	189.6	6.8	13.2	7.1	2.8	13.4	958112.6	42
1025			1399	179.0	189.6	7.9	13.4	9.0	1.6	13.4	958113.5	42
1026			1379	179.0	189.6	7.3	13.1	7.9	2.6	13.4	958114.0	42
1027			1388	179.0	189.6	4.2	12.9	6.1	2.2	13.4	958112.8	42
1028			1379	179.0	189.6	3.7	12.9	6.6	2.7	13.4	958113.4	42
1029			1391	179.0	189.6	1.5	12.8	6.4	4.4	13.4	958113.2	42
1030			1387	179.0	189.6	1.0	13.0	7.7	2.2	13.4	958113.9	42
1031			1246	179.0	189.6	0.6	13.1	7.1	2.8	13.4	958114.0	42
1032			1212	179.0	189.6	0.4	13.2	7.4	2.7	13.4	958114.1	42
1033			933	179.0	189.6	0.5	13.1	7.2	7.0	13.4	958113.5	42
1034			1184	179.0	189.6	0.4	13.4	7.2	8.3	13.4	958114.0	42
1035			1033	179.0	189.6	0.4	13.2	6.7	6.8	13.4	958112.6	42
1036			1259	179.0	189.6	0.4	13.4	8.2	5.1	13.4	958113.4	42
1037			1263	179.0	189.6	0.3	13.3	7.4	4.7	13.4	958112.4	42
1038			1209	179.0	189.6	0.2	13.3	7.3	4.3	13.4	958112.6	42
1039			1426	179.0	189.6	2.0	14.0	6.9	3.7	13.4	958112.8	42
1040			1373	179.0	189.6	8.0	13.5	10.0	10.0	13.4	957746.5	42
1041			1377	179.0	189.6	7.0	13.2	8.3	8.5	13.4	957719.8	41
1042			1372	179.0	189.6	3.8	12.8	7.6	6.2	13.4	957720.8	41
1043			1395	179.0	189.6	2.1	12.8	7.6	4.9	13.4	957957.6	41
1044			1419	179.0	189.6	11.6	13.8	13.2	5.3	13.4	957993.3	41
1045			1388	179.0	189.6	13.7	13.4	12.3	5.8	13.4	957992.0	41
1046			1389	179.0	189.6	14.1	13.3	12.9	6.1	13.4	957994.4	41
1047			1374	179.0	189.6	4.3	12.8	9.1	3.6	13.4	957996.7	42
1048			1412	179.0	189.6	3.9	13.2	8.5	4.5	13.4	957998.2	42
1049			1382	179.0	189.6	5.5	13.2	9.4	6.2	13.4	957996.8	42
1050			1403	179.0	189.6	7.2	13.5	9.4	5.2	13.4	957996.5	42
1051			1375	179.0	189.6	6.9	13.2	9.2	3.3	13.4	957999.0	42
1052	10.6	54.2	1382	179.0	189.6	5.4	13.0	10.0	6.2	13.4	957911.2	42
1053	10.4	53.5	1382	179.0	189.6	3.0	12.8	9.9	5.8	13.4	957862.5	42
1054			1362	179.0	189.6	1.6	12.8	8.2	5.5	13.4	957863.8	42
1055			1299	179.0	189.6	0.8	13.1	6.2	5.7	13.4	957863.0	42
1056	10.5	55.2	1417	179.0	189.6	2.8	13.8	9.9	6.9	13.4	957863.1	42
1057			1356	179.0	189.6	3.0	13.1	8.0	6.1	13.4	957864.3	42
1058			1414	179.0	189.6	4.4	13.7	7.8	4.6	13.4	957863.2	42
1059			1396	179.0	189.6	12.9	13.9	10.4	4.8	13.4	957862.4	42
1060	13.4	56.2	1386	179.0	189.6	15.0	13.5	12.6	4.3	13.4	957863.5	42
1061	14.3	56.1	1381	179.0	189.6	13.9	13.1	13.6	4.2	13.4	957863.5	42

Table E.02 Measurement data - Turbine ON - Data Series 2

Project: East Durham Wind Energy Centre - Turbine T02 - IEC 61400-11 Measurement

Report ID: 15427.00.T02.RP3

Created on: 2/15/2018

***Blank data denotes values that were omitted in the analysis due to an extraneous event during recording

Data Point #	Standardized Wind Speed	LAeq	Turbine Power Output (kW)	Reference Yaw Angle (°)	Yaw Angle (°)	Pitch Angle (°)	Rotor RPM	Nacelle Anemometer Wind Speed (m/s)	10m Anemometer Wind Speed (m/s)	Air Temperature (-C)	Pressure (kPa)	Relative Humidity (%)
1062	12.4	55.9	1392	179.0	189.6	12.1	13.1	11.8	5.0	13.4	957862.6	42
1063			1393	179.0	189.6	10.8	13.2	10.7	8.2	13.4	957863.8	42
1064			1390	179.0	189.6	7.7	13.0	9.6	8.4	13.4	957794.6	41
1065			1406	179.0	189.6	8.8	13.3	10.2	6.6	13.4	957731.5	41
1066	10.5	55.3	1388	179.0	189.6	9.7	13.3	9.9	3.1	13.4	957731.7	41
1067	9.9	54.2	1388	179.0	189.6	6.8	13.0	9.4	2.2	13.4	957732.0	41
1068	11.1	54.1	1398	179.0	189.6	6.0	13.1	10.5	2.7	13.4	957731.0	41
1069	10.2	55.2	1400	179.0	189.6	7.1	13.3	9.6	4.4	13.4	957731.1	41
1070	10.0	53.7	1355	179.0	189.6	4.6	12.7	9.5	4.1	13.4	957827.2	42
1071			1236	179.0	189.6	0.4	12.5	9.7	5.3	13.4	957863.7	42
1072			1177	179.0	189.6	0.4	13.1	8.8	4.3	13.4	957863.3	42
1073			1380	179.0	189.6	1.7	13.7	7.5	6.4	13.4	957865.4	42
1074	11.0	56.4	1402	179.0	189.6	8.1	14.2	10.4	5.9	13.4	957863.5	42
1075	9.9	54.8	1368	179.0	189.6	8.2	13.6	9.4	6.5	13.4	957867.6	42
1076			1363	179.0	189.6	6.3	13.0	7.8	4.6	13.4	957880.7	42
1077	9.8	54.7	1402	179.0	189.6	8.1	13.4	9.2	3.9	13.3	957866.5	42
1078	9.8	54.3	1377	179.0	189.6	7.5	13.1	9.3	4.4	13.3	957863.9	42
1079	9.2	54.4	1398	179.0	189.6	5.3	13.1	8.7	3.2	13.3	957866.2	42
1080	9.7	54.9	1388	179.0	189.6	5.2	13.1	9.2	1.9	13.3	957865.9	42
1081	10.9	55.1	1401	179.0	189.6	5.5	13.2	10.3	3.7	13.3	957865.8	42
1082			1387	179.0	189.6	5.3	13.2	8.2	4.8	13.4	957878.3	42
1083			1343	179.0	189.6	2.2	12.6	7.2	3.4	13.4	957863.4	42
1084	7.7	53.5	1110	179.0	189.6	0.6	12.8	7.0	4.3	13.4	957862.5	42
1085	10.4	55.3	1438	179.0	189.6	4.5	14.1	9.8	3.2	13.4	957862.2	42
1086	11.1	55.1	1371	179.0	189.6	8.0	13.7	10.5	3.4	13.4	957861.5	42
1087	10.6	54.7	1394	179.0	189.6	7.6	13.3	10.1	3.9	13.4	958086.7	42
1088	13.7	54.4	1387	179.0	189.6	8.5	13.2	13.0	3.3	13.4	958090.6	42
1089	10.2	54.3	1392	179.0	189.6	7.3	13.1	9.7	4.6	13.4	958092.2	42
1090	9.6	55.4	1391	179.0	189.6	8.3	13.3	9.1	3.1	13.4	958092.9	42
1091			1395	179.0	189.6	10.6	13.4	10.6	3.2	13.4	958093.5	42
1092			1391	179.0	189.6	9.4	13.2	11.4	5.4	13.4	958095.0	42
1093	10.3	54.4	1382	179.0	189.6	7.1	13.0	9.8	4.4	13.4	958095.8	42
1094	9.8	54.2	1380	179.0	189.6	4.1	12.8	9.2	3.1	13.4	958095.8	42
1095			1287	179.0	189.6	0.8	12.6	7.0	2.7	13.4	958096.8	42
1096	7.0	55.0	834	179.0	189.6	0.5	12.8	6.0	3.4	13.4	958097.6	42
1097	7.3	54.4	963	179.0	189.6	0.6	13.2	6.0	4.4	13.4	958098.6	42
1098			1199	179.0	189.6	0.4	13.4	7.3	3.8	13.4	958100.1	42
1099			1409	179.0	189.6	2.6	13.9	7.4	4.5	13.4	958101.3	42
1100			1366	179.0	189.6	3.1	13.4	6.8	4.8	13.4	958102.2	42
1101			1398	179.0	189.6	3.3	13.6	7.7	4.7	13.4	958102.6	42
1102	10.0	55.2	1393	179.0	189.6	8.8	13.8	9.5	4.5	13.4	958104.2	42
1103	12.5	55.3	1377	179.0	189.6	8.4	13.4	11.8	4.2	13.4	958104.5	42
1104	13.2	55.3	1386	179.0	189.6	8.3	13.3	12.5	3.2	13.4	958107.9	42
1105	10.3	55.1	1377	179.0	189.6	6.7	13.0	9.8	3.4	13.4	958244.8	42
1106			1360	179.0	189.6	1.8	12.4	6.5	3.3	13.4	958245.3	42
1107			1214	179.0	189.6	0.4	12.8	7.4	4.0	13.4	958250.4	42
1108			1382	179.0	189.6	0.6	13.3	7.5	4.3	13.4	958253.1	42
1109	8.3	55.7	1267	179.0	189.6	0.6	13.3	9.4	5.1	13.4	958252.3	42
1110			1168	179.0	189.6	0.5	13.3	7.6	5.2	13.4	958248.7	42
1111	8.5	55.6	1310	179.0	189.6	-0.1	13.3	7.5	4.3	13.4	958112.9	42
1112	8.7	56.7	1345	179.0	189.6	0.1	13.3	7.5	5.4	13.4	958112.1	42
1113	9.0	55.6	1441	179.0	189.6	5.2	14.1	8.5	4.0	13.4	958112.4	42
1114			1388	179.0	189.6	9.6	13.9	11.0	5.6	13.4	958112.9	42
1115	10.3	55.1	1369	179.0	189.6	8.4	13.2	9.7	5.4	13.4	958112.9	42
1116			1375	179.0	189.6	4.1	12.8	7.4	5.9	13.4	958116.6	42
1117			1411	179.0	189.6	4.1	13.1	8.0	3.6	13.4	958252.6	42
1118	10.6	55.2	1411	179.0	189.6	7.5	13.5	10.1	4.4	13.4	958253.5	42
1119	12.8	55.6	1388	179.0	189.6	8.2	13.4	12.1	7.1	13.4	958254.5	42
1120	10.9	55.5	1393	179.0	189.6	7.8	13.3	10.3	7.8	13.4	958253.7	42
1121			1393	179.0	189.6	9.9	13.4	11.0	7.1	13.4	958251.6	42
1122			1389	179.0	189.6	9.2	13.2	10.7	5.8	13.4	958249.7	42
1123	10.5	54.9	1391	179.0	189.6	7.1	13.1	10.0	4.6	13.4	958112.4	42
1124			1357	179.0	189.6	4.1	12.6	7.6	3.7	13.4	958111.2	42
1125			1244	179.0	189.6	0.1	12.6	8.5	5.4	13.4	958110.4	42
1126	9.8	55.4	1443	179.0	189.6	5.5	14.0	9.2	7.4	13.4	958114.0	42
1127	10.3	55.1	1386	179.0	189.6	5.9	13.3	9.7	6.0	13.4	958066.8	42
1128	8.7	54.1	1342	179.0	189.6	3.3	12.6	8.8	4.8	13.4	957976.0	42
1129			1133	179.0	189.6	0.3	12.6	6.0	6.2	13.4	957976.7	42
1130	10.3	56.5	1442	179.0	189.6	5.6	14.1	9.8	5.9	13.4	957975.2	42
1131	11.0	55.7	1376	179.0	189.6	9.5	13.7	10.4	8.3	13.4	957974.8	42
1132	10.5	55.3	1377	179.0	189.6	8.3	13.3	9.9	7.8	13.4	957975.2	42
1133			1349	179.0	189.6	3.9	12.5	7.9	6.8	13.4	958019.5	41
1134	9.6	54.4	1409	179.0	189.6	6.4	13.3	9.1	6.6	13.4	958112.5	41
1135	9.3	55.1	1383	179.0	189.6	8.8	13.3	8.8	4.0	13.4	958111.6	41
1136			1387	179.0	189.6	5.8	13.0	8.0	3.6	13.4	958112.0	41
1137	9.2	55.1	1398	179.0	189.6	9.2	13.4	8.7	5.5	13.4	958111.9	41
1138	11.1	55.9	1392	179.0	189.6	9.6	13.3	10.5	6.8	13.4	958115.2	41
1139			1394	179.0	189.6	10.6	13.3	11.7	6.6	13.4	958112.4	41
1140			1386	179.0	189.6	10.0	13.1	10.9	5.4	13.4	958112.1	41
1141			1399	179.0	189.6	12.5	13.4	10.8	5.2	13.4	958113.6	41
1142			1389	179.0	189.6	13.7	13.2	13.9	4.7	13.4	958112.6	41
1143			1397	179.0	189.6	11.9	13.2	10.9	5.0	13.4	958112.2	41
1144			1394	179.0	189.6	13.0	13.3	10.4	3.6	13.4	958112.6	41
1145			1390	179.0	189.6	13.3	13.2	13.0	4.6	13.4	958112.7	42
1146			1391	179.0	189.6	11.4	13.1	12.0	4.5	13.4	958112.9	42
1147	9.6	54.9	1387	179.0	189.6	9.0	13.1	9.1	5.3	13.4	958113.2	42
1148			1402	179.0	189.6	7.0	13.1	6.6	6.6	13.4	958112.9	42
1149	11.7	54.6	1387	179.0	189.6	7.9	13.2	11.1	5.3	13.4	958112.9	42

***Blank data denotes values that were omitted in the analysis due to an extraneous event during recording

Data Point #	Standardized Wind Speed	LAeq	Turbine Power Output (kW)	Reference Yaw Angle (°)	Yaw Angle (°)	Pitch Angle (°)	Rotor RPM	Nacelle Anemometer Wind Speed (m/s)	10m Anemometer Wind Speed (m/s)	Air Temperature (-C)	Pressure (kPa)	Relative Humidity (%)
1150			1373	179.0	189.6	4.6	12.8	7.4	5.1	13.4	958112.1	42
1151	7.7	54.0	1119	179.0	189.6	0.8	12.4	6.0	7.3	13.4	958067.0	42
1152	8.2	56.0	1245	179.0	189.6	0.4	13.1	8.5	5.2	13.4	957974.4	42
1153	7.1	54.2	867	179.0	189.6	0.6	12.9	7.9	5.5	13.4	957974.2	42
1154			1366	179.0	189.6	1.8	13.8	7.1	7.1	13.4	957973.9	42
1155			1378	179.0	189.6	4.6	13.7	7.4	7.7	13.4	957974.2	42
1156			1352	179.0	189.6	2.3	13.1	6.6	7.9	13.4	957974.8	42
1157			1388	179.0	189.6	2.5	13.2	7.5	5.4	13.4	957974.1	42
1158			1393	179.0	189.6	2.8	13.3	7.8	6.8	13.4	957974.5	42
1159			1407	179.0	189.6	4.1	13.5	7.9	8.0	13.4	957974.8	42
1160	10.3	54.0	1406	179.0	189.6	7.3	13.8	9.8	7.9	13.4	957975.3	42
1161	9.7	54.4	1351	179.0	189.6	5.5	13.0	9.2	5.4	13.4	957975.6	42
1162	9.4	54.5	1384	179.0	189.6	2.5	12.9	8.9	4.4	13.4	957975.5	42
1163	8.8	54.1	1412	179.0	189.6	6.7	13.5	8.3	5.9	13.4	958034.5	42
1164	9.4	54.4	1393	179.0	189.6	7.9	13.4	8.9	5.6	13.4	958112.5	42
1165			1383	179.0	189.6	7.5	13.2	8.1	4.8	13.4	958112.1	42
1166	11.5	55.0	1389	179.0	189.6	6.7	13.2	10.9	5.1	13.4	958111.8	42
1167			1373	179.0	189.6	2.9	12.7	6.1	4.3	13.4	958112.1	42
1168	9.7	55.8	1428	179.0	189.6	3.7	13.3	9.2	3.6	13.4	958054.2	42
1169			1405	179.0	189.6	10.3	13.7	10.6	2.9	13.4	957973.9	42
1170	13.1	55.1	1385	179.0	189.6	9.5	13.3	12.4	5.4	13.4	957975.0	42
1171	10.7	54.6	1384	179.0	189.6	7.4	13.1	10.2	4.9	13.4	957975.3	42
1172	9.0	54.1	1393	179.0	189.6	5.0	13.0	8.6	3.7	13.4	957976.3	42
1173	13.6	55.8	1407	179.0	189.6	10.5	13.5	12.9	2.1	13.4	957978.7	42
1174	11.4	55.6	1391	179.0	189.6	9.3	13.2	10.8	3.7	13.4	958031.8	42
1175	12.0	57.0	1398	179.0	189.6	12.3	13.4	11.3	5.1	13.4	958111.4	42
1176	14.2	56.4	1385	179.0	189.6	12.5	13.2	13.5	3.0	13.4	958111.0	42
1177	11.7	55.6	1390	179.0	189.6	9.6	13.1	11.1	3.6	13.4	958110.9	42
1178			1398	179.0	189.6	8.2	13.2	8.1	5.0	13.4	958109.9	42
1179	10.5	56.4	1401	179.0	189.6	11.0	13.4	9.9	4.0	13.4	958110.5	42
1180	12.8	56.2	1392	179.0	189.6	12.0	13.3	12.1	5.0	13.4	958065.8	42
1181	11.4	54.9	1382	179.0	189.6	9.9	13.1	10.8	7.6	13.4	957974.3	42
1182			1388	179.0	189.6	6.7	13.0	7.9	4.8	13.4	957973.9	42
1183			1377	179.0	189.6	3.3	12.6	6.2	4.8	13.4	957974.2	42
1184			1407	179.0	189.6	1.9	12.9	7.1	3.7	13.4	957974.3	42
1185			1351	179.0	189.6	1.7	12.9	7.3	3.5	13.4	957974.6	42
1186	7.6	54.4	1061	179.0	189.6	0.4	12.9	5.6	4.3	13.4	957987.9	42
1187	8.0	54.6	1214	179.0	189.6	0.4	13.3	7.2	5.3	13.4	957975.5	42
1188	9.5	55.7	1435	179.0	189.6	4.4	14.2	9.0	6.2	13.4	957973.8	42
1189			1356	179.0	189.6	8.5	13.7	7.4	4.6	13.4	957975.7	42
1190			1362	179.0	189.6	6.9	13.3	7.5	5.2	13.4	957975.2	42
1191	9.2	55.2	1376	179.0	189.6	5.4	13.0	8.7	8.6	13.4	957976.0	42
1192	11.5	55.0	1398	179.0	189.6	6.1	13.2	10.8	6.9	13.4	957989.5	42
1193	9.8	55.4	1389	179.0	189.6	5.7	13.2	9.3	7.5	13.4	957976.1	41
1194			1407	179.0	189.6	6.6	13.4	7.2	7.3	13.4	957975.9	41
1195	9.3	55.5	1387	179.0	189.6	8.8	13.3	8.8	6.0	13.4	957975.7	41
1196	10.5	55.6	1392	179.0	189.6	11.4	13.4	10.0	6.8	13.4	957974.0	41
1197	12.0	55.0	1390	179.0	189.6	11.8	13.3	11.4	5.8	13.4	957975.3	41
1198	12.6	54.9	1387	179.0	189.6	8.6	13.1	11.9	4.6	13.4	958048.5	41
1199	10.8	54.8	1389	179.0	189.6	6.1	13.0	10.2	2.4	13.4	958113.9	42
1200			1392	179.0	189.6	5.7	13.1	8.0	6.6	13.4	958114.6	42
1201			1373	179.0	189.6	2.6	12.7	7.4	7.7	13.4	958115.0	42
1202	10.4	54.5	1413	179.0	189.6	2.7	13.2	9.9	7.0	13.4	958114.4	42
1203	7.8	54.2	1132	179.0	189.6	1.2	12.6	7.2	5.9	13.4	958114.2	42
1204	7.6	55.0	1067	179.0	189.6	0.3	13.1	6.6	4.3	13.4	958054.9	42
1205			1436	179.0	189.6	6.7	14.4	10.9	4.6	13.4	957976.6	42
1206	11.3	55.4	1361	179.0	189.6	9.7	13.6	10.7	4.2	13.4	957977.1	42
1207	8.4	55.7	1291	179.0	189.6	1.6	12.9	7.9	4.5	13.4	957975.8	42
1208			1385	179.0	189.6	8.9	13.5	7.8	4.4	13.4	957972.9	42
1209	14.1	55.3	1385	179.0	189.6	10.8	13.5	13.4	5.0	13.4	957976.4	42
1210	12.6	55.2	1391	179.0	189.6	9.9	13.3	12.0	5.6	13.4	957976.5	42
1211	10.7	54.0	1378	179.0	189.6	7.9	12.9	10.1	4.5	13.4	957975.3	42
1212	7.6	53.0	1060	179.0	189.6	2.1	12.2	6.1	4.5	13.4	957974.3	42
1213	8.0	54.3	1208	179.0	189.6	0.8	13.2	6.6	5.4	13.4	957975.4	42
1214	8.9	55.3	1413	179.0	189.6	4.2	13.8	8.4	7.2	13.4	957976.2	42
1215	11.7	56.1	1410	179.0	189.6	8.0	14.0	11.0	7.3	13.4	958022.0	42
1216	12.3	56.0	1380	179.0	189.6	9.9	13.6	11.7	4.5	13.4	958114.2	42
1217	8.5	56.8	1308	179.0	189.6	9.8	13.3	11.3	4.9	13.4	958114.0	42
1218	7.9	56.4	1163	179.0	189.6	9.8	13.2	10.3	5.6	13.4	958114.5	42
1219	8.2	56.2	1259	179.0	189.6	10.0	13.3	9.7	4.9	13.4	958115.0	42
1220			1387	179.0	189.6	9.4	13.2	8.3	4.8	13.4	958114.5	42
1221	10.8	55.5	1393	179.0	189.6	9.6	13.2	10.2	3.9	13.4	958114.0	42
1222	9.9	55.0	1401	179.0	189.6	10.5	13.4	9.4	4.7	13.4	958114.8	42
1223	13.0	56.4	1388	179.0	189.6	13.4	13.4	12.3	3.9	13.4	958114.2	42
1224	13.9	56.2	1389	179.0	189.6	11.2	13.1	13.2	4.7	13.4	958114.7	42
1225	12.2	56.0	1395	179.0	189.6	10.6	13.2	11.6	4.2	13.4	958113.5	42
1226	11.9	55.6	1392	179.0	189.6	10.2	13.2	11.3	3.4	13.4	958114.6	42
1227	9.9	54.4	1361	179.0	189.6	5.6	12.7	9.3	3.5	13.4	958082.1	42
1228	8.7	54.8	1345	179.0	189.6	0.6	12.6	7.9	4.1	13.4	957974.9	42
1229			1407	179.0	189.6	4.2	13.5	8.0	4.0	13.4	957975.7	42
1230	7.8	53.4	1138	179.0	189.6	1.6	12.5	7.1	3.7	13.4	957976.9	42
1231	6.8	54.0	789	179.0	189.6	0.6	12.8	6.7	4.1	13.4	957977.4	42
1232	6.7	52.8	735	179.0	189.6	1.1	12.7	5.4	5.2	13.4	957977.1	42
1233	6.6	52.4	701	179.0	189.6	1.1	12.5	5.5	3.2	13.4	958003.9	42
1234	6.8	53.0	760	179.0	189.6	0.8	13.0	5.8	3.9	13.4	957976.3	42
1235	7.0	53.3	845	179.0	189.6	0.9	13.2	6.5	4.1	13.4	957976.0	42
1236												
1237												

Table E.03 Measurement data - Background - Data Series 1

Project: East Durham Wind Energy Centre - Turbine T02 - IEC 61400-11 Measurement

Report ID: 15427.00.T02.RP3

Created on: 2/15/2018

***Blank data denotes values that were omitted in the analysis due to an extraneous event during recording

Data Point #	Standardized Wind Speed	LAeq	Rotor RPM	10m Anemometer Wind Speed (m/s)	Air Temperature (°C)	Pressure (kPa)	Relative Humidity (%)
1	2.8	40.8	0.0	1.5	-1	95909.3	74
2	4.6	43.8	0.0	2.5	-1	95908.5	74
3	9.3	43.8	0.0	5.1	-1	95908.2	74
4	9.8	45.8	0.0	5.4	-1	95908.2	74
5	8.5	43.7	0.0	4.6	-1	95908.2	74
6	5.4	44.4	0.0	2.9	-1	95909.3	74
7	4.9	43.0	0.0	2.7	-1	95908.0	74
8	5.0	41.9	0.0	2.7	-1	95907.4	74
9	6.6	40.8	0.0	3.6	-1	95907.2	74
10	6.9	42.4	0.0	3.8	-1	95908.1	74
11	9.3	41.9	0.0	5.1	-1	95908.3	74
12	11.4	41.2	0.0	6.2	-1	95908.6	74
13	11.6	41.0	0.0	6.3	-1	95908.8	74
14	9.9	41.9	0.0	5.4	-1	95909.2	74
15	10.9	41.6	0.0	5.9	-1	95909.3	74
16	10.1	40.5	0.0	5.5	-1	95909.4	74
17	10.2	39.5	0.0	5.6	-1	95909.4	74
18	8.1	41.3	0.0	4.4	-1	95909.4	74
19	6.6	40.9	0.0	3.6	-1	95909.5	74
20	6.1	40.5	0.0	3.3	-1	95909.6	74
21	5.2	41.1	0.0	2.8	-1	95909.5	74
22	4.9	41.2	0.0	2.7	-1	95909.8	74
23	6.5	42.1	0.0	3.5	-1	95909.6	74
24	6.7	40.9	0.0	3.6	-1	95909.8	75
25	4.5	38.7	0.0	2.4	-1	95909.6	75
26	4.9	40.7	0.0	2.7	-1	95909.9	75
27	4.2	41.0	0.0	2.3	-1	95909.6	75
28	4.6	40.2	0.0	2.5	-1	95909.7	75
29	5.4	40.5	0.0	2.9	-1	95910.1	75
30	5.4	40.4	0.0	2.9	-1	95910.1	75
31	6.3	39.9	0.0	3.4	-1	95909.9	75
32	4.4	40.3	0.0	2.4	-1	95910.1	75
33	5.5	40.5	0.0	3.0	-1	95910.3	74
34	11.8	41.4	0.0	6.4	-1	95897.7	74
35	11.4	40.4	0.0	6.2	-1	95896.4	74
36	8.1	40.7	0.0	4.4	-1	95896.2	74
37	7.4	40.7	0.0	4.0	-1	95896.2	74
38	5.1	42.1	0.0	2.8	-1	95896.3	74
39	7.3	43.4	0.0	4.0	-1	95896.2	74
40	6.6	42.9	0.0	3.6	-1	95896.3	74
41	5.8	43.0	0.0	3.2	-1	95896.3	74
42			0.0	2.2	-1	95896.3	74
43			0.0	2.5	-1	95896.3	74
44			0.0	2.9	-1	95896.3	74
45			0.0	4.9	-1	95896.2	74
46			0.0	4.0	-1	95896.4	74
47			0.0	3.0	-1	95896.2	74
48			0.0	2.6	-1	95896.1	74
49	4.8	41.2	0.0	2.6	-1	95895.9	74
50	4.8	41.6	0.0	2.6	-1	95895.6	74
51	4.8	41.7	0.0	2.6	-1	95895.5	74
52	5.0	41.7	0.0	2.7	-1	95907.5	75
53	6.1	42.1	0.0	3.3	-1	95904.3	75
54	7.0	42.2	0.0	3.8	-1	95901.4	75
55	8.0	41.5	0.0	4.3	-1	95899.0	75
56	9.4	40.5	0.0	5.1	-1	95896.9	75
57	9.0	42.0	0.0	4.9	-1	95894.5	75
58	8.0	41.2	0.0	4.4	-1	95878.0	74
59	5.8	41.0	0.0	3.1	-1	95874.9	74
60	5.4	40.1	0.0	2.9	-1	95875.2	74
61	7.7	40.0	0.0	4.2	-1	95873.8	74
62	10.2	39.3	0.0	5.5	-1	95873.4	74
63	8.5	40.3	0.0	4.6	-1	95867.2	74
64	8.0	39.2	0.0	4.4	-1	95591.3	74
65	6.7	39.5	0.0	3.7	-1	95249.4	74
66	4.8	40.0	0.0	2.6	-1	95153.1	74
67	4.3	40.2	0.0	2.4	-1	95056.9	74
68	5.1	40.0	0.0	2.8	-1	94936.8	74
69	7.4	41.3	0.0	4.0	-1	94914.7	74
70	9.3	40.0	0.0	5.0	-1	94887.5	74
71	11.7	40.3	0.0	6.3	-1	94907.9	74
72	9.9	41.7	0.0	5.4	-1	94801.9	74
73	6.5	41.7	0.0	3.5	-1	94824.9	74
74	9.8	40.4	0.0	5.3	-1	94763.4	74
75	9.7	40.2	0.0	5.3	-1	94623.5	74
76	6.4	40.1	0.0	3.5	-1	94681.3	74
77	4.8	39.3	0.0	2.6	-1	94716.2	74
78	6.4	39.9	0.0	3.5	-1	94742.4	74
79	5.6	40.1	0.0	3.1	-1	94697.5	74
80	10.4	40.6	0.0	5.7	-1	94510.8	74
81	11.1	42.9	0.0	6.0	-1	94390.8	74
82	11.1	41.4	0.0	6.0	-1	94380.7	74
83	9.2	39.6	0.0	5.0	-1	94303.0	74

***Blank data denotes values that were omitted in the analysis due to an extraneous event during recording

Data Point #	Standardized Wind Speed	LAeq	Rotor RPM	10m Anemometer Wind Speed (m/s)	Air Temperature (°C)	Pressure (kPa)	Relative Humidity (%)
84	10.0	39.7	0.0	5.5	-1	94318.1	74
85	8.6	39.6	0.0	4.7	-1	94336.1	74
86	6.8	42.0	0.0	3.7	-1	94207.8	74
87	8.7	40.0	0.0	4.7	-1	94279.3	74
88	7.1	42.0	0.0	3.9	-1	94436.0	74
89	9.7	41.2	0.0	5.3	-1	94367.2	74
90	6.6	40.5	0.0	3.6	-1	94379.2	74
91	7.4	40.0	0.0	4.0	-1	94505.1	74
92	5.0	40.2	0.0	2.7	-1	94579.7	74
93	4.6	39.7	0.0	2.5	-1	94537.2	74
94	8.0	39.3	0.0	4.3	-1	94522.5	74
95	9.9	40.0	0.0	5.4	-1	94507.8	74
96	10.8	40.0	0.0	5.9	-1	94549.0	74
97	9.3	40.0	0.0	5.1	-1	94558.9	74
98	8.2	38.2	0.0	4.4	-1	94492.9	74
99	8.7	39.9	0.0	4.8	-1	95453.6	74
100	6.5	40.2	0.0	3.5	-1	95897.5	74
101	7.5	39.9	0.0	4.1	-1	95897.2	74
102	7.0	40.1	0.0	3.8	-1	95897.5	74
103	5.5	40.0	0.0	3.0	-1	95897.2	74
104	5.4	41.1	0.0	2.9	-1	95897.4	74
105	5.2	40.6	0.0	2.8	-1	95897.4	74
106	6.3	40.3	0.0	3.4	-1	95897.5	74
107	8.0	41.1	0.0	4.4	-1	95897.5	74
108	5.7	39.9	0.0	3.1	-1	95897.5	74
109	4.9	40.5	0.0	2.7	-1	95897.7	74
110	6.2	39.9	0.0	3.3	-1	95897.6	74
111	6.8	39.3	0.0	3.7	-1	95897.7	74
112	10.2	40.5	0.0	5.5	-1	95897.6	74
113	9.6	39.7	0.0	5.2	-1	95897.8	74
114	10.8	41.1	0.0	5.9	-1	95897.6	74
115	8.8	39.5	0.0	4.8	-1	95897.7	74
116	8.0	38.6	0.0	4.3	-1	95897.7	74
117	14.3	39.8	0.0	7.8	-1	95897.9	74
118	10.9	42.1	0.0	5.9	-1	95897.7	74
119	8.6	43.4	0.0	4.7	-1	95897.6	74
120	9.0	40.7	0.0	4.9	-1	95897.8	74
121	7.5	40.4	0.0	4.1	-1	95897.5	74
122	6.4	39.8	0.0	3.5	-1	95898.0	74
123	6.0	40.9	0.0	3.3	-1	95897.8	74
124	8.8	41.1	0.0	4.8	-1	95897.7	74
125	7.8	42.7	0.0	4.2	-1	95898.0	74
126	5.7	42.7	0.0	3.1	-1	95897.9	74
127	9.3	41.1	0.0	5.0	-1	95897.8	74
128	9.1	40.5	0.0	4.9	-1	95897.8	74
129	5.8	41.2	0.0	3.2	-1	95897.9	74
130	7.2	40.7	0.0	3.9	-1	95897.7	74
131	7.1	39.6	0.0	3.9	-1	95897.9	74
132	7.0	38.7	0.0	3.8	-1	95898.0	74
133	6.2	37.9	0.0	3.4	-1	95897.9	74
134	7.5	38.1	0.0	4.1	-1	95897.9	74
135	9.2	38.8	0.0	5.0	-1	95898.1	74
136	9.9	37.8	0.0	5.4	-1	95898.2	74
137	9.8	38.6	0.0	5.3	-1	95888.2	74
138	7.0	38.2	0.0	3.8	-1	95884.5	74
139	7.8	38.1	0.0	4.2	-1	95884.6	74
140	7.8	37.8	0.0	4.3	-1	95884.4	74
141	7.2	38.3	0.0	3.9	-1	95884.4	74
142	7.3	37.8	0.0	4.0	-1	95884.6	74
143	8.6	35.9	0.0	4.7	-1	95884.8	74
144	8.6	37.1	0.0	4.7	-1	95877.7	74
145	7.8	38.3	0.0	4.3	-1	95871.2	74
146	7.5	40.1	0.0	4.1	-1	95871.3	74
147	5.3	37.5	0.0	2.9	-1	95871.3	74
148	9.2	39.5	0.0	5.0	-1	95871.6	74
149	10.2	38.2	0.0	5.5	-1	95871.5	74
150	8.0	39.3	0.0	4.4	-1	95871.6	74
151	11.6	38.7	0.0	6.3	-1	95871.5	74
152	10.6	39.3	0.0	5.7	-1	95875.8	74
153	8.7	38.2	0.0	4.8	-1	95885.2	74
154	6.6	37.1	0.0	3.6	-1	95884.8	74
155	9.4	36.8	0.0	5.1	-1	95885.1	74
156	8.3	37.5	0.0	4.5	-1	95885.2	74
157	6.4	38.4	0.0	3.5	-1	95884.9	74
158	7.9	37.6	0.0	4.3	-1	95884.8	74
159	7.1	39.9	0.0	3.8	-1	95884.7	74
160	6.8	38.7	0.0	3.7	-1	95885.0	74
161	8.3	36.6	0.0	4.5	-1	95885.2	74
162	6.5	37.8	0.0	3.5	-1	95885.0	74
163	7.5	38.0	0.0	4.1	-1	95885.1	74
164	7.7	42.0	0.0	4.2	-1	95885.1	74
165	7.7	40.9	0.0	4.2	-1	95884.9	74
166	6.4	40.6	0.0	3.5	-1	95885.2	74

***Blank data denotes values that were omitted in the analysis due to an extraneous event during recording

Data Point #	Standardized Wind Speed	LAeq	Rotor RPM	10m Anemometer Wind Speed (m/s)	Air Temperature (°C)	Pressure (kPa)	Relative Humidity (%)
167	5.5	38.8	0.0	3.0	-1	95884.9	74
168	4.4	37.9	0.0	2.4	-1	95885.1	74
169	5.5	39.8	0.0	3.0	-1	95885.1	74
170	6.7	41.5	0.0	3.6	-1	95885.1	74
171	8.7	40.5	0.0	4.7	-1	95885.0	74
172	8.4	39.5	0.0	4.6	-1	95885.3	74
173	9.7	38.1	0.0	5.3	-1	95884.9	74
174	11.3	37.6	0.0	6.1	-1	95885.2	74
175	7.9	40.8	0.0	4.3	-1	95885.1	74
176	7.1	43.3	0.0	3.9	-1	95885.4	74
177	7.7	44.2	0.0	4.2	-1	95885.3	74
178	6.6	42.6	0.0	3.6	-1	95884.9	74
179	7.7	40.9	0.0	4.2	-1	95885.0	74
180	7.8	39.0	0.0	4.3	-1	95885.1	74
181	6.4	39.2	0.0	3.5	-1	95885.1	74
182	7.4	39.5	0.0	4.0	-1	95885.1	74
183	8.2	39.8	0.0	4.5	-1	95885.0	74
184	9.3	39.2	0.0	5.1	-1	95885.4	74
185	8.6	38.5	0.0	4.7	-1	95885.1	74
186	9.5	39.5	0.0	5.2	-1	95885.2	74
187	9.6	38.6	0.0	5.2	-1	95885.1	74
188	7.9	38.9	0.0	4.3	-1	95885.1	74
189	6.1	39.9	0.0	3.3	-1	95885.1	74
190	9.7	39.4	0.0	5.3	-1	95885.0	74
191	7.5	38.7	0.0	4.1	-1	95885.2	74
192	5.2	39.2	0.0	2.8	-1	95884.9	74
193	6.5	38.7	0.0	3.5	-1	95885.0	74
194	8.2	40.8	0.0	4.5	-1	95881.7	74
195	8.7	40.0	0.0	4.7	-1	95871.9	74
196	10.0	40.0	0.0	5.5	-1	95871.6	74
197	10.0	37.3	0.0	5.5	-1	95871.9	74
198	8.9	37.7	0.0	4.8	-1	95871.6	74
199	8.0	37.8	0.0	4.4	-1	95871.5	74
200	8.8	38.3	0.0	4.8	-1	95877.6	74
201	8.5	38.6	0.0	4.6	-1	95898.4	74
202	6.3	38.6	0.0	3.4	-1	95898.4	74
203	6.1	38.5	0.0	3.3	-1	95898.7	74
204	5.2	37.4	0.0	2.8	-1	95898.8	74
205	5.4	38.3	0.0	2.9	-1	95898.5	74
206	7.9	37.6	0.0	4.3	-1	95898.6	74
207	5.8	38.6	0.0	3.2	-1	95898.8	75
208	4.9	40.6	0.0	2.7	-1	95898.9	75
209	7.8	40.4	0.0	4.3	-1	95898.8	75
210	6.7	38.9	0.0	3.6	-1	95898.8	75
211	5.5	39.3	0.0	3.0	-1	95898.9	75
212	8.3	38.8	0.0	4.5	-1	95895.5	75
213	10.0	38.8	0.0	5.4	-1	95885.1	74
214	9.6	38.0	0.0	5.2	-1	95885.1	74
215	7.5	38.7	0.0	4.1	-1	95885.0	74
216	6.9	39.4	0.0	3.7	-1	95885.0	74
217	7.6	39.6	0.0	4.1	-1	95885.2	74
218	7.4	40.0	0.0	4.0	-1	95889.8	74
219	7.2	38.1	0.0	3.9	-1	95898.9	74
220	10.0	37.5	0.0	5.4	-1	95899.1	74
221	7.0	37.8	0.0	3.8	-1	95899.0	74
222	5.7	40.1	0.0	3.1	-1	95899.2	74
223	8.3	37.7	0.0	4.5	-1	95898.9	74
224	7.9	36.9	0.0	4.3	-1	95899.0	74
225	6.2	38.4	0.0	3.4	-1	95899.2	74
226	7.5	38.1	0.0	4.1	-1	95899.2	74
227	6.3	38.6	0.0	3.4	-1	95899.0	74
228	7.3	38.3	0.0	4.0	-1	95899.1	74
229	10.2	40.2	0.0	5.6	-1	95899.1	74
230	10.6	39.5	0.0	5.7	-1	95899.2	74
231	8.5	41.6	0.0	4.6	-1	95899.1	74
232	10.2	42.1	0.0	5.5	-1	95899.2	74
233	8.4	43.8	0.0	4.6	-1	95899.3	74
234	5.9	43.6	0.0	3.2	-1	95899.3	74
235	6.9	39.0	0.0	3.7	-1	95899.2	74
236	7.6	37.9	0.0	4.1	-1	95899.2	74
237	6.2	42.7	0.0	3.4	-1	95812.7	85
238	5.2	42.5	0.0	2.8	-1	95812.5	85
239	5.0	42.1	0.0	2.7	-1	95812.6	85
240	6.9	42.5	0.0	3.8	-1	95812.7	85
241	7.2	42.7	0.0	3.9	-1	95812.5	85
242	7.1	42.9	0.0	3.8	-1	95812.5	86
243			0.0	4.1	-1	95812.3	86
244	10.1	42.5	0.0	5.5	-1	95812.2	86
245	12.1	42.0	0.0	6.6	-1	95812.5	86
246	11.5	40.9	0.0	6.2	-1	95812.6	86
247	9.7	41.5	0.0	5.3	-1	95812.3	85
248	8.3	43.8	0.0	4.5	-1	95812.2	85
249	9.4	43.0	0.0	5.1	-1	95812.1	85

Table E.03 Measurement data - Background - Data Series 1

Project: East Durham Wind Energy Centre - Turbine T02 - IEC 61400-11 Measurement

Report ID: 15427.00.T02.RP3

Created on: 2/15/2018

***Blank data denotes values that were omitted in the analysis due to an extraneous event during recording

Data Point #	Standardized Wind Speed	LAeq	Rotor RPM	10m Anemometer Wind Speed (m/s)	Air Temperature (°C)	Pressure (kPa)	Relative Humidity (%)
250	7.1	42.0	0.0	3.9	-1	95812.1	85
251	8.7	42.0	0.0	4.7	-1	95812.2	85
252	8.1	41.3	0.0	4.4	-1	95812.3	85
253	8.0	41.5	0.0	4.4	-1	95812.4	85
254	7.3	41.6	0.0	4.0	-1	95812.5	85
255	7.3	42.8	0.0	4.0	-1	95812.2	85
256	9.3	43.3	0.0	5.0	-1	95812.5	85
257	9.6	43.0	0.0	5.2	-1	95812.6	85
258	9.4	42.6	0.0	5.1	-1	95812.6	85
259	9.3	42.4	0.0	5.0	-1	95812.6	85
260	6.8	40.4	0.0	3.7	-1	95812.6	85
261	6.0	39.1	0.0	3.3	-1	95812.6	85
262	7.1	41.1	0.0	3.9	-1	95812.9	85
263	6.7	43.2	0.0	3.6	-1	95812.9	85
264	10.2	41.1	0.0	5.6	-1	95813.0	85
265	12.2	40.6	0.0	6.6	-1	95813.2	85
266	12.9	42.3	0.0	7.0	-1	95813.2	85
267	11.2	41.9	0.0	6.1	-1	95813.1	85
268	10.7	40.5	0.0	5.8	-1	95813.4	85
269	7.7	39.6	0.0	4.2	-1	95813.2	85
270	8.1	39.1	0.0	4.4	-1	95813.2	85
271	7.0	41.2	0.0	3.8	-1	95813.2	85
272	5.2	45.9	0.0	2.8	-1	95813.3	85
273	6.7	41.3	0.0	3.7	-1	95813.2	85
274	6.8	40.9	0.0	3.7	-1	95812.9	85
275	6.6	40.9	0.0	3.6	-1	95813.0	85
276	5.4	41.5	0.0	3.0	-1	95813.0	85
277	4.0	42.8	0.0	2.2	-1	95820.7	86
278	3.9	43.3	0.0	2.1	-1	95825.6	86
279	5.7	44.3	0.0	3.1	-1	95825.6	86
280	7.3	44.4	0.0	4.0	-1	95825.8	86
281	7.6	43.0	0.0	4.2	-1	95825.8	86
282	7.6	41.0	0.0	4.1	-1	95825.8	86
283	7.9	41.4	0.0	4.3	-1	95819.3	86
284	7.1	40.5	0.0	3.9	-1	95813.2	86
285	5.5	40.5	0.0	3.0	-1	95813.1	86
286	4.7	41.4	0.0	2.5	-1	95813.1	86
287	4.2	39.9	0.0	2.3	-1	95813.0	86
288	5.0	40.4	0.0	2.7	-1	95813.0	86
289	4.7	40.1	0.0	2.5	-1	95813.0	86
290	5.3	40.3	0.0	2.9	-1	95813.0	86
291	5.6	39.6	0.0	3.1	-1	95813.1	86
292	5.7	39.0	0.0	3.1	-1	95813.1	86
293	4.6	39.5	0.0	2.5	-1	95813.0	86
294	4.9	39.7	0.0	2.6	-1	95813.1	86
295	5.9	40.6	0.0	3.2	-1	95813.1	86
296	7.3	41.1	0.0	4.0	-1	95812.9	86
297	5.6	40.9	0.0	3.1	-1	95813.1	86
298	7.5	42.1	0.0	4.1	-1	95813.1	86
299	5.7	41.3	0.0	3.1	-1	95813.1	86
300	4.8	39.8	0.0	2.6	-1	95812.9	86
301	3.8	40.2	0.0	2.1	-1	95813.0	86
302	4.2	40.2	0.0	2.3	-1	95813.0	86
303	4.1	40.9	0.0	2.2	-1	95812.9	86
304	2.8	41.0	0.0	1.5	-1	95813.0	86
305	3.9	41.7	0.0	2.1	-1	95812.9	86
306	5.2	42.8	0.0	2.8	-1	95813.0	86
307	7.0	42.7	0.0	3.8	-1	95813.1	86
308	11.7	41.7	0.0	6.4	-1	95813.1	86
309	11.3	39.8	0.0	6.1	-1	95813.1	86
310	7.1	40.3	0.0	3.8	-1	95813.1	86
311	4.0	40.6	0.0	2.2	-1	95813.4	86
312	11.4	41.5	0.0	6.2	-1	95813.2	86
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***Blank data denotes values that were omitted in the analysis due to an extraneous event during recording

Data Point #	Standardized Wind Speed	LAeq	Rotor RPM	10m Anemometer Wind Speed (m/s)	Air Temperature (°C)	Pressure (kPa)	Relative Humidity (%)
333							
334							
335							
336							
337							
338							
339							
340							
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***Blank data denotes values that were omitted in the analysis due to an extraneous event during recording

Data Point #	Standardized Wind Speed	LAeq	Rotor RPM	10m Anemometer Wind Speed (m/s)	Air Temperature (°C)	Pressure (kPa)	Relative Humidity (%)
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Table E.04 Measurement data - Background - Data Series 2

Project: East Durham Wind Energy Centre - Turbine T02 - IEC 61400-11 Measurement

Report ID: 15427.00.T02.RP3

Created on: 2/15/2018

***Blank data denotes values that were omitted in the analysis due to an extraneous event during recording

Data Point #	Standardized Wind Speed	LAeq	Rotor RPM	10m Anemometer Wind Speed (m/s)	Air Temperature (°C)	Pressure (kPa)	Relative Humidity (%)
313	11.5	50.9	0.0	6.9	12	959112.8	47
314	16.7	50.7	0.0	10.0	12	959112.3	47
315	14.5	50.5	0.0	8.7	12	959115.0	47
316	9.3	51.0	0.0	5.6	12	959114.4	47
317	8.3	53.7	0.0	4.9	12	959111.7	47
318	7.7	53.6	0.0	4.6	12	959112.0	47
319	6.8	53.9	0.0	4.1	12	959113.3	47
320	7.2	55.4	0.0	4.3	12	959114.5	47
321	7.5	53.1	0.0	4.5	12	959114.7	47
322	3.8	53.3	0.0	2.3	12	959114.4	47
323	11.0	52.2	0.0	6.6	12	959113.7	47
324	12.5	52.9	0.0	7.5	12	959117.2	47
325	8.2	51.0	0.0	4.9	12	959115.7	47
326	9.0	51.1	0.0	5.4	12	959117.2	47
327	6.7	51.0	0.0	4.0	12	959116.4	47
328	6.7	50.0	0.0	4.0	12	959116.4	47
329	11.2	48.2	0.0	6.7	12	959116.6	47
330	11.5	49.4	0.0	6.9	12	959117.4	47
331	5.4	50.1	0.0	3.3	12	959117.0	47
332	6.4	50.9	0.0	3.8	12	959117.5	47
333	6.9	50.3	0.0	4.1	12	959117.7	47
334	9.3	49.4	0.0	5.6	12	959118.4	47
335	11.8	49.8	0.0	7.0	12	959117.0	47
336	8.7	50.3	0.0	5.2	12	959116.8	47
337	13.5	49.5	0.0	8.1	12	959118.4	47
338	11.7	50.1	0.0	7.0	12	959119.0	47
339	14.5	50.2	0.0	8.7	12	959120.2	47
340	9.9	50.3	0.0	5.9	12	959119.3	47
341	9.4	49.5	0.0	5.6	12	959120.9	47
342	12.4	49.9	0.0	7.4	12	959119.8	47
343	6.6	49.4	0.0	4.0	12	959119.8	47
344	7.5	49.4	0.0	4.5	12	959118.4	47
345	9.7	49.5	0.0	5.8	12	959120.0	47
346	8.1	49.3	0.0	4.8	12	959120.5	47
347	10.5	49.1	0.0	6.3	12	959120.1	47
348	13.8	49.2	0.0	8.2	12	959120.3	47
349	14.0	50.2	0.0	8.4	12	959120.3	47
350	9.6	49.7	0.0	5.8	12	959118.2	47
351	6.4	49.6	0.0	3.9	12	959119.7	47
352	4.6	50.9	0.0	2.8	12	959120.2	47
353	6.4	52.1	0.0	3.8	12	959120.6	47
354	9.9	51.9	0.0	5.9	12	959121.2	47
355	8.4	50.9	0.0	5.0	12	959121.8	47
356	7.8	51.6	0.0	4.7	12	959122.7	47
357	15.7	51.1	0.0	9.4	12	959121.7	47
358	13.3	50.8	0.0	8.0	12	959123.2	47
359	12.2	50.5	0.0	7.3	12	959122.4	47
360	10.7	49.9	0.0	6.4	12	959050.5	47
361	11.9	49.1	0.0	7.1	12	958984.4	46
362	11.7	48.7	0.0	7.0	12	958985.1	46
363	8.9	49.2	0.0	5.3	12	958983.4	46
364	8.6	49.9	0.0	5.2	12	958985.1	46
365	8.2	49.1	0.0	4.9	12	958985.2	46
366	6.9	48.9	0.0	4.1	12	958985.4	47
367	10.9	49.9	0.0	6.5	12	958984.5	47
368	12.0	50.6	0.0	7.2	12	958985.5	47
369	11.4	50.0	0.0	6.8	12	958985.0	47
370	10.0	50.9	0.0	6.0	12	958984.9	47
371	6.7	50.5	0.0	4.0	12	958985.1	47
372	5.8	51.8	0.0	3.5	12	958985.0	47
373	8.8	52.0	0.0	5.2	12	958986.1	47
374	11.9	50.7	0.0	7.1	12	958987.0	47
375	10.8	50.1	0.0	6.5	12	958987.3	47
376	10.3	50.0	0.0	6.2	12	958986.6	47
377	10.6	53.0	0.0	6.3	12	958986.5	47
378	9.8	51.1	0.0	5.9	12	958916.0	47
379	14.9	50.8	0.0	8.9	12	958854.4	47
380	23.4	51.3	0.0	14.0	12	958855.6	47
381	15.5	50.8	0.0	9.3	12	958854.8	47
382	16.1	51.7	0.0	9.7	12	958854.9	47
383	11.1	51.0	0.0	6.6	12	958854.5	47
384	7.0	50.3	0.0	4.2	12	958937.0	46
385	5.6	50.4	0.0	3.4	12	958987.8	46
386	9.2	50.6	0.0	5.5	12	958987.8	46
387	7.5	49.8	0.0	4.5	12	958987.8	46
388	8.9	49.8	0.0	5.3	12	958988.8	46
389	7.2	49.9	0.0	4.3	12	958987.8	46
390	11.1	51.5	0.0	6.7	12	959001.6	46
391	15.0	50.9	0.0	9.0	12	958987.1	47
392	13.7	50.3	0.0	8.2	12	958985.7	47
393	12.7	49.1	0.0	7.6	12	958987.1	47
394	12.7	48.9	0.0	7.6	12	958988.1	47
395	12.9	49.1	0.0	7.7	12	958987.9	47

***Blank data denotes values that were omitted in the analysis due to an extraneous event during recording

Data Point #	Standardized Wind Speed	LAeq	Rotor RPM	10m Anemometer Wind Speed (m/s)	Air Temperature (°C)	Pressure (kPa)	Relative Humidity (%)
396	13.4	48.8	0.0	8.0	12	958988.1	46
397	10.0	49.2	0.0	6.0	12	958986.1	46
398	7.9	51.0	0.0	4.7	12	958987.7	46
399	9.8	50.5	0.0	5.9	12	958988.5	46
400	12.5	50.5	0.0	7.5	12	958989.0	46
401	10.8	50.1	0.0	6.5	12	958988.6	46
402	17.2	52.4	0.0	10.3	12	958848.8	46
403	12.5	51.0	0.0	7.5	12	958723.2	46
404	13.1	50.1	0.0	7.8	12	958722.5	46
405	8.7	49.7	0.0	5.2	12	958722.5	46
406	11.1	49.5	0.0	6.6	12	958722.7	46
407	12.2	49.5	0.0	7.3	12	958722.6	46
408	13.4	50.2	0.0	8.0	12	958795.7	46
409	17.5	51.2	0.0	10.4	12	958857.2	46
410	13.1	51.2	0.0	7.8	12	958857.2	46
411	12.3	49.6	0.0	7.3	12	958855.1	46
412	9.4	50.1	0.0	5.7	12	958857.2	46
413	11.3	49.2	0.0	6.7	12	958857.1	46
414	9.1	48.9	0.0	5.5	12	958857.2	46
415	12.2	49.1	0.0	7.3	12	958857.9	46
416	11.8	49.1	0.0	7.1	12	958857.7	46
417	11.1	49.2	0.0	6.6	12	958858.9	46
418	12.7	48.9	0.0	7.6	12	958860.8	46
419	9.9	48.3	0.0	5.9	12	958860.9	46
420	7.7	48.8	0.0	4.6	12	958874.2	46
421	8.2	48.6	0.0	4.9	12	958862.0	46
422	9.6	49.6	0.0	5.7	12	958862.1	46
423	8.1	49.4	0.0	4.8	12	958862.0	46
424	14.6	48.8	0.0	8.7	12	958862.6	46
425	12.6	48.5	0.0	7.5	12	958862.0	46
426	8.8	48.7	0.0	5.2	12	958862.6	46
427	12.1	49.2	0.0	7.2	12	958862.5	46
428	12.9	49.2	0.0	7.7	12	958862.7	46
429	10.5	48.1	0.0	6.3	12	958862.6	46
430	7.9	49.4	0.0	4.7	12	958861.5	46
431	10.7	49.9	0.0	6.4	12	958861.3	46
432	15.6	49.1	0.0	9.3	12	958792.5	46
433	15.7	50.7	0.0	9.4	12	958729.7	46
434	15.0	50.8	0.0	9.0	12	958729.7	46
435	10.8	50.0	0.0	6.4	12	958729.4	46
436	8.7	50.8	0.0	5.2	12	958729.1	46
437	8.4	50.7	0.0	5.0	12	958729.7	46
438	9.6	51.5	0.0	5.7	12	958800.3	46
439	10.4	51.0	0.0	6.2	12	958863.4	46
440	7.9	51.1	0.0	4.7	12	958862.4	46
441	10.7	50.9	0.0	6.4	12	958863.2	46
442	11.3	49.6	0.0	6.8	12	958862.6	46
443	11.8	50.1	0.0	7.1	12	958862.6	46
444	11.1	50.1	0.0	6.6	12	958805.8	46
445	11.0	50.2	0.0	6.6	12	958728.1	46
446	8.6	49.4	0.0	5.2	12	958727.9	46
447	6.9	49.5	0.0	4.1	12	958727.0	46
448	5.9	50.4	0.0	3.5	12	958726.9	46
449	10.9	51.7	0.0	6.5	12	958727.0	46
450	9.5	55.3	0.0	5.7	12	958810.5	46
451	8.7	53.5	0.0	5.2	12	958860.2	46
452	9.2	52.8	0.0	5.5	12	958860.0	46
453	14.9	54.7	0.0	8.9	12	958859.8	46
454	9.6	52.0	0.0	5.7	12	958859.6	46
455	7.0	50.9	0.0	4.2	12	958859.2	46
456	8.4	49.9	0.0	5.0	12	958789.6	46
457	8.4	49.8	0.0	5.0	12	958726.8	47
458	8.5	51.1	0.0	5.1	12	958726.9	47
459	10.8	52.2	0.0	6.4	12	958726.6	47
460	10.7	50.9	0.0	6.4	12	958726.0	47
461	9.1	50.9	0.0	5.5	12	958725.1	47
462	9.3	50.5	0.0	5.6	12	958808.0	47
463	12.2	49.5	0.0	7.3	12	958857.2	46
464	9.8	50.1	0.0	5.8	12	958856.8	46
465	6.5	49.6	0.0	3.9	12	958855.7	46
466	10.2	50.9	0.0	6.1	12	958856.2	46
467	7.0	51.8	0.0	4.2	12	958826.4	46
468	10.5	49.4	0.0	6.3	12	958646.7	47
469	12.0	49.9	0.0	7.2	12	958590.2	47
470	8.5	49.3	0.0	5.1	12	958592.4	47
471	8.7	49.5	0.0	5.2	12	958593.0	47
472	6.8	49.3	0.0	4.1	12	958594.0	47
473	6.9	50.4	0.0	4.2	12	958594.2	47
474	4.5	51.4	0.0	2.7	12	958593.0	47
475	9.3	50.5	0.0	5.6	12	958595.4	47
476	11.7	51.3	0.0	7.0	12	958596.7	47
477	10.2	50.8	0.0	6.1	12	958596.8	47
478	11.1	50.8	0.0	6.7	12	958596.3	47

***Blank data denotes values that were omitted in the analysis due to an extraneous event during recording

Data Point #	Standardized Wind Speed	LAeq	Rotor RPM	10m Anemometer Wind Speed (m/s)	Air Temperature (°C)	Pressure (kPa)	Relative Humidity (%)
479	9.8	50.2	0.0	5.8	12	958596.7	47
480	13.0	49.7	0.0	7.8	12	958596.8	46
481	12.6	50.4	0.0	7.5	12	958595.4	46
482	16.0	51.5	0.0	9.6	12	958595.9	46
483	16.5	51.0	0.0	9.9	12	958596.6	46
484	10.8	50.7	0.0	6.5	12	958596.5	46
485	11.9	50.3	0.0	7.1	12	958597.3	46
486	11.4	49.8	0.0	6.8	12	958596.9	46
487	5.9	48.8	0.0	3.5	12	958598.2	46
488	10.4	49.8	0.0	6.2	12	958596.5	46
489	13.4	51.7	0.0	8.0	12	958598.7	46
490	14.3	50.5	0.0	8.5	12	958597.2	46
491	12.8	51.6	0.0	7.6	12	958599.2	46
492	12.8	49.8	0.0	7.6	12	958670.1	46
493	10.6	50.9	0.0	6.4	12	958732.6	45
494	7.4	50.4	0.0	4.4	12	958733.0	45
495	8.1	49.2	0.0	4.9	12	958733.6	45
496	10.8	49.8	0.0	6.5	12	958734.0	45
497	12.1	49.0	0.0	7.2	12	958733.5	45
498	8.3	50.8	0.0	5.0	12	958664.6	46
499	7.7	50.4	0.0	4.6	12	958600.6	46
500	6.6	50.7	0.0	3.9	12	958599.6	46
501	6.9	50.9	0.0	4.1	12	958599.1	46
502	10.1	50.2	0.0	6.0	12	958598.6	46
503	13.7	51.2	0.0	8.2	12	958600.9	46
504	10.4	50.5	0.0	6.3	12	958601.8	46
505	7.9	49.9	0.0	4.7	12	958601.2	46
506	10.0	50.8	0.0	6.0	12	958600.6	46
507	9.2	50.5	0.0	5.5	12	958599.9	46
508	6.2	49.6	0.0	3.7	12	958600.0	46
509	9.7	49.4	0.0	5.8	12	958599.4	46
510	12.3	49.6	0.0	7.4	12	958598.8	46
511	13.3	49.8	0.0	7.9	12	958598.2	46
512	18.6	49.1	0.0	11.1	12	958598.2	46
513	17.2	49.8	0.0	10.3	12	958599.8	46
514	11.1	49.0	0.0	6.7	12	958601.3	46
515	12.0	49.5	0.0	7.2	12	958601.3	46
516	9.9	49.3	0.0	5.9	12	958716.0	46
517	11.4	49.8	0.0	6.8	12	958830.6	46
518	10.1	50.2	0.0	6.1	12	958844.5	46
519	11.3	48.0	0.0	6.8	13	957974.3	42
520	11.0	48.8	0.0	6.6	13	957973.3	42
521	7.8	50.1	0.0	4.7	13	957972.4	42
522	8.1	50.6	0.0	4.8	13	957972.1	42
523	6.4	51.2	0.0	3.8	13	957973.1	42
524	7.0	50.0	0.0	4.2	13	957973.4	42
525	5.7	49.6	0.0	3.4	13	957972.3	42
526	5.4	50.1	0.0	3.3	13	957972.3	43
527	4.9	51.2	0.0	3.0	13	957972.5	43
528	8.1	49.8	0.0	4.8	13	957972.4	43
529	12.4	51.1	0.0	7.4	13	957972.0	43
530	11.4	49.5	0.0	6.8	13	957972.5	43
531	11.1	48.9	0.0	6.6	13	957956.1	43
532	8.5	48.5	0.0	5.1	13	957839.4	42
533	5.9	47.3	0.0	3.5	13	957839.3	42
534	5.4	47.9	0.0	3.2	13	957839.5	42
535	6.1	48.6	0.0	3.6	13	957839.5	42
536	7.5	47.9	0.0	4.5	13	957838.6	42
537	7.7	47.5	0.0	4.6	13	957838.1	42
538	12.2	47.7	0.0	7.3	13	957838.6	43
539	9.9	49.5	0.0	5.9	13	957838.4	43
540	10.3	47.8	0.0	6.2	13	957837.5	43
541	10.3	47.7	0.0	6.2	13	957838.5	43
542	10.3	47.4	0.0	6.2	13	957839.0	43
543	8.3	48.7	0.0	5.0	13	957838.1	43
544	8.8	48.2	0.0	5.3	13	957838.8	43
545	8.2	48.3	0.0	4.9	13	957838.4	43
546	6.0	46.6	0.0	3.6	13	957836.4	43
547	10.2	47.6	0.0	6.1	13	957839.9	43
548	14.2	48.5	0.0	8.5	13	957840.2	43
549	10.3	48.1	0.0	6.2	13	957839.7	43
550	13.1	48.1	0.0	7.8	13	957839.2	43
551	11.7	48.0	0.0	7.0	13	957838.9	43
552	11.7	47.8	0.0	7.0	13	957838.5	43
553	10.2	47.8	0.0	6.1	13	957838.7	43
554	7.3	48.4	0.0	4.4	13	957839.1	43
555	7.3	49.4	0.0	4.4	13	957839.3	43
556	7.9	48.3	0.0	4.7	13	957839.2	43
557	9.9	49.4	0.0	5.9	13	957838.9	43
558	7.5	48.9	0.0	4.5	13	957838.3	43
559	7.8	49.7	0.0	4.7	13	957837.5	43
560	6.7	49.5	0.0	4.0	13	957838.7	43
561	7.7	48.4	0.0	4.6	13	957838.8	43

Table E.04 Measurement data - Background - Data Series 2

Project: East Durham Wind Energy Centre - Turbine T02 - IEC 61400-11 Measurement

Report ID: 15427.00.T02.RP3

Created on: 2/15/2018

***Blank data denotes values that were omitted in the analysis due to an extraneous event during recording

Data Point #	Standardized Wind Speed	LAeq	Rotor RPM	10m Anemometer Wind Speed (m/s)	Air Temperature (-C)	Pressure (kPa)	Relative Humidity (%)
562	3.8	48.8	0.0	2.3	13	957839.3	43
563	7.0	49.5	0.0	4.2	13	957839.9	43
564	10.5	50.5	0.0	6.3	13	957840.3	43
565	10.3	49.5	0.0	6.2	13	957838.7	43
566	7.3	48.7	0.0	4.4	13	957837.9	43
567	9.4	49.6	0.0	5.7	13	957839.6	43
568	8.7	48.3	0.0	5.2	13	957839.8	43
569	11.2	49.9	0.0	6.7	13	957839.4	43
570	10.1	48.7	0.0	6.1	13	957837.7	43
571	10.0	48.5	0.0	6.0	13	957837.7	43
572	9.9	48.8	0.0	5.9	13	957839.4	43
573	8.9	48.7	0.0	5.4	13	957839.3	43
574	5.3	47.4	0.0	3.2	13	957838.3	43
575	5.6	48.3	0.0	3.4	13	957837.3	43
576	7.0	48.3	0.0	4.2	13	957837.5	43
577	6.1	49.3	0.0	3.7	13	957837.9	43
578	3.3	48.6	0.0	2.0	13	957837.9	43
579	6.2	48.4	0.0	3.7	13	957838.1	43
580	8.1	49.3	0.0	4.8	13	957836.1	43
581	8.2	48.9	0.0	4.9	13	957838.2	43
582	11.5	49.9	0.0	6.9	13	957838.2	43
583	9.9	49.1	0.0	5.9	13	957838.4	43
584	9.2	50.9	0.0	5.5	13	957838.1	43
585	10.9	51.2	0.0	6.5	13	957839.5	43
586	9.2	50.4	0.0	5.5	13	957837.5	43
587	9.4	48.9	0.0	5.6	13	957838.5	43
588	14.2	48.9	0.0	8.5	13	957838.9	43
589	10.6	48.8	0.0	6.3	13	957837.7	43
590	6.1	48.9	0.0	3.6	13	957837.5	43
591	7.3	48.8	0.0	4.4	13	957835.7	43
592	10.4	48.2	0.0	6.2	13	957837.1	43
593	10.3	49.2	0.0	6.2	13	957837.8	43
594	10.7	49.7	0.0	6.4	13	957837.1	43
595	12.9	48.6	0.0	7.7	13	957837.7	43
596	13.1	50.3	0.0	7.9	13	957838.7	43
597	9.2	49.9	0.0	5.5	13	957838.4	43
598	12.2	51.1	0.0	7.3	13	957838.0	43
599	8.3	50.2	0.0	4.9	13	957837.5	43
600	12.7	50.2	0.0	7.6	13	957837.3	43
601	6.5	48.6	0.0	3.9	13	957837.1	43
602	8.3	50.9	0.0	4.9	13	957838.0	43
603	10.1	49.3	0.0	6.0	13	957783.8	43
604	10.0	49.6	0.0	6.0	13	957713.2	43
605	7.8	50.3	0.0	4.7	13	957717.3	43
606	8.0	50.1	0.0	4.8	13	957715.8	43
607	8.9	52.6	0.0	5.3	13	957713.3	43
608	10.0	50.7	0.0	6.0	13	957716.6	43
609	10.6	49.7	0.0	6.4	13	957717.2	43
610	11.2	48.1	0.0	6.7	13	957715.7	43
611	9.4	49.1	0.0	5.6	13	957716.9	43
612	8.7	50.0	0.0	5.2	13	957718.0	43
613	9.7	50.8	0.0	5.8	13	957715.0	43
614	10.6	49.7	0.0	6.4	13	957719.2	43
615	10.5	49.8	0.0	6.3	13	957721.7	43
616	8.2	49.5	0.0	4.9	13	957719.1	43
617	10.6	49.3	0.0	6.3	13	957721.3	43
618	8.9	49.8	0.0	5.3	13	957720.7	43
619	8.1	50.1	0.0	4.8	13	957721.3	43
620	8.3	48.6	0.0	5.0	13	957719.7	43
621	6.6	52.7	0.0	4.0	13	957721.0	43
622	6.7	50.9	0.0	4.0	13	957720.5	43
623	15.2	50.1	0.0	9.1	13	957721.1	43
624	10.4	50.1	0.0	6.2	13	957721.1	43
625	7.2	50.0	0.0	4.3	13	957721.3	43
626	7.9	50.2	0.0	4.7	13	957721.5	43
627	12.6	49.8	0.0	7.5	13	957723.2	43
628	11.8	50.0	0.0	7.1	13	957723.9	43
629	13.8	52.2	0.0	8.2	13	957734.1	43
630	10.9	51.3	0.0	6.5	13	957735.7	43
631	8.9	49.6	0.0	5.3	13	957734.6	43
632	10.2	49.0	0.0	6.1	13	957736.1	43
633	8.4	48.9	0.0	5.0	13	957734.6	43
634	9.1	49.2	0.0	5.5	13	957734.4	43
635	9.2	48.7	0.0	5.5	13	957733.4	43
636	11.6	50.0	0.0	7.0	13	957735.2	43
637	10.9	48.9	0.0	6.5	13	957737.4	43
638	10.8	50.5	0.0	6.5	13	957737.2	43
639	9.7	48.7	0.0	5.8	13	957738.3	43
640	13.8	49.4	0.0	8.3	13	957743.9	43
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***Blank data denotes values that were omitted in the analysis due to an extraneous event during recording

Data Point #	Standardized Wind Speed	LAeq	Rotor RPM	10m Anemometer Wind Speed (m/s)	Air Temperature (-C)	Pressure (kPa)	Relative Humidity (%)
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***Blank data denotes values that were omitted in the analysis due to an extraneous event during recording

Data Point #	Standardized Wind Speed	LAeq	Rotor RPM	10m Anemometer Wind Speed (m/s)	Air Temperature (-C)	Pressure (kPa)	Relative Humidity (%)
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Aercoustics Engineering Ltd.
1004 Middlegate Road, Suite 1100
Mississauga, ON L4Y 1M4
Tel: 416-249-3361
Fax 416-249-3613
aercoustics.com

Appendix F – Annex H: IEC 61400-11:2012 AMD 1

Data treatment for measurement series on different Days or with substantially different conditions

ANNEX H
(Normative)
Data treatment for measurements series on different days or with substantially different conditions.

When measuring different measurement series over several days with different conditions or with changing measurement position with different conditions and overlapping wind speeds there is a need for a procedure to reduce the measurements series to one set of data. In this annex a procedure is laid out.

The results of several measurement series are the Apparent Sound Power spectra at a given wind bin including the uncertainty. The resulting Apparent Sound Power spectrum at the wind speed bin is calculated as the weighted average with the uncertainty as the weight. This is described in equation H1

$$L_{WA,i} = \frac{\sum L_{WA,i,l} \cdot u_{i,l}^{-2}}{\sum u_{i,l}^{-2}} \qquad \text{H1}$$

Where i is the 1/3 octave and l is the measurement series number

The corresponding uncertainty is calculated as

$$u_i = \sqrt{b + \frac{1}{\sum u_{i,l}^{-2}}} \qquad \text{H2}$$

Since the type B uncertainties are eliminated in this calculation the uncertainty can be less than the uncertainty from instruments and similar. To compensate for this a fixed number b[1] is introduced in the equation.

[1] The uncertainties from table C1 adds up to 0,6. This means the number b should be 0,4 or the squareroot of 0,6 in the formula.

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Appendix G
Calibration Certificates

TRANSCAT® CANADA
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CERTIFICATE OF CALIBRATION

Customer: AEROCOUSTICS ENGINEERING LTD
50 RONSON DRIVE
SUITE 165
TORONTO, ON M9W 1B3
PO Number: Stasiewicz-CC

NVLAP
NVLAP LAB CODE
200905-0

Certificate/SO Number: 33-Q0D1V-20-1 Revision 0

Manufacturer: Nokeval
Model Number: 7470
Description: Serial to Analog Converter
Serial Number: A159784
ID: NONE

As-Found: In Tolerance
As-Left: In Tolerance

Calibration Date: February 19, 2016
Due Date: February 19, 2017

Calibrated To: Manufacturer Specification
Calibration Procedure: 1-AC58014-0

Transcat Calibration Laboratories have been audited and found in compliance with ISO/IEC 17025:2005. Accredited calibrations performed within the Lab's Scope of Accreditation are indicated by the presence of the Accrediting Body's Logo and Certificate Number on this Certificate of Calibration. Any measurements on an accredited calibration not covered by that Lab's Scope of Accreditation are listed in the notes section of the certificate. This report must not be used to claim product certification, approval, or endorsement by NVLAP, NIST, SCC, NRC, CLAS, ANAB or any agency of the Federal Government. NVLAP, NIST, SCC, NRC, CLAS or ANAB do not guarantee the accuracy of an individual calibration by accredited laboratories.

Transcat calibrations, as applicable, are performed in compliance with the requirements of the Transcat Quality Manual Revision H, ISO 9001:2008, ANSI/NCSL Z540.1-1994 (R2002), and ISO 10012:2003. When specified contractually, the requirements of ISO TS16949:2009, 10CFR21, 10CFR50 App. B and ASME NQA-1:2012 are also covered. Complete records of work performed are maintained by Transcat and are available for inspection. Laboratory standards used in the performance of this calibration are shown on the Supplemental Report.

Transcat documents the traceability of measurements to the SI units through the National Institute of Standards and Technology (NIST), or the National Research Council of Canada (NRC), or other recognized national measurement institutes (NMI) that are signatories to the CIPM Mutual Recognition Arrangement, or accepted fundamental and/or natural physical constants, or by the use of specified methods, consensus standards or ratio type measurements. Documentation supporting traceability information is available for review at a Transcat facility. The measured quantity and the measurement uncertainty are required for further dissemination of traceability.

Uncertainties are reported with a coverage factor k=2, providing a level of confidence of approximately 95%. All calibrations have been performed using processes having a TUR of 4:1 or better (3:1 for mass calibrations), unless otherwise noted on the Supplemental Report. The Test Uncertainty Ratio (TUR) is calculated in accordance with NCSL International RP-18. For mass calibrations: Conventional mass referenced to 8.0 g/cm³.

The results in this report relate only to the item calibrated or tested, and the determination of in or out of tolerance is specific to the model/serial no. referenced above based on the tolerances shown on the supplemental report; these tolerances are either the original equipment manufacturer's (OEM's) warranted specifications or the client's requested specifications. Any number of factors can cause a unit to drift out of tolerance at any time following its calibration. Limitations on the uses of this instrument are detailed in the OEM's operating instructions. This certificate may not be reproduced except in full, without the written approval of Transcat. Additional information, if applicable may be included on separate report(s).

Notes:

Calibrated At:
4043 Carling Avenue
Ottawa, ON K2K 2A4

Facility Responsible:
4043 Carling Avenue
Ottawa, ON K2K 2A4
800-826-1470

Calibrated By:
Digitally Signed By
Shabeba Bucknor
Date: February 19, 2016

Shabeba Bucknor
Calibration Technician

Reviewed By:
Digitally Signed By
Keith Powell for
Date: February 19, 2016

Robert Whittaker
Lab Manager

Unit Barcode: 901B01501
901B0150195

Date Received: February 10, 2016

Customer Number: 9-322110-000

F0013R28 8/3/15

TRANSCAT CANADA
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SUPPLEMENTAL REPORT

CALIBRATION LAB DATA AS FOUND / AS LEFT

Customer: AEROCOUSTICS ENGINEERING LTD
PO Number: Stasiewicz-CC

Certificate/SO Number: 33-Q0D1V-20-1

Manufacturer: Nokeval
Model Number: 7470
Description: Serial to Analog Converter
Serial Number: A159784
ID: NONE

Service Type: R9

Calibration Date: Feb 19, 2016
Date Due: Feb 19, 2017

Calibration Procedure: 1-AC58014-0

Description	Setpoints	Accuracy	Low Limit	High Limit	As Found / As Left	OOT	Cal Process Uncertainty (k=2; ±)	Measurement Uncertainty (k=2; ±)	Units	TUR
DC Current % Source - 4-20mA Ch #1										
4 - 20mA	0%	±(0.1% Span)	3.984	4.016	3.997 mA		1.6e-004	1.9e-003	mA	100.0 : 1
	25%	±(0.1% Span)	7.984	8.016	7.995 mA		2.7e-004	1.9e-003	mA	59.3 : 1
	50%	±(0.1% Span)	11.984	12.016	12.000 mA		1.1e-003	2.2e-003	mA	14.5 : 1
	75%	±(0.1% Span)	15.984	16.016	15.999 mA		1.3e-003	2.3e-003	mA	12.3 : 1
	100%	±(0.1% Span)	19.984	20.016	19.998 mA		1.4e-003	2.3e-003	mA	11.4 : 1
DC Current % Source - 4-20mA Ch #2										
4 - 20mA	0%	±(0.1% Span)	3.984	4.016	3.996 mA		1.6e-004	1.9e-003	mA	100.0 : 1
	25%	±(0.1% Span)	7.984	8.016	7.999 mA		2.7e-004	1.9e-003	mA	59.3 : 1
	50%	±(0.1% Span)	11.984	12.016	11.997 mA		1.1e-003	2.2e-003	mA	14.5 : 1
	75%	±(0.1% Span)	15.984	16.016	16.001 mA		1.3e-003	2.3e-003	mA	12.3 : 1
	100%	±(0.1% Span)	19.984	20.016	19.999 mA		1.4e-003	2.3e-003	mA	11.4 : 1

The column labeled Cal Process Uncertainty (CPU) does not include the short term component of the UUT. The column labeled Measurement Uncertainty includes both CPU and the short term component of the UUT. TUR is calculated using CPU
Note: Reported resolution of the UUT does not represent calibration uncertainty or accuracy of the UUT.

TRANSCAT CANADA
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SUPPLEMENTAL REPORT

CALIBRATION LAB DATA AS FOUND / AS LEFT

Customer: AEROCOUSTICS ENGINEERING LTD

PO Number: Stasiewicz-CC

Certificate/SO Number: 33-Q0D1V-20-1

Description	Setpoints	Accuracy	Low Limit	High Limit	As Found / As Left	OOT	Cal Process Uncertainty (k=2; ±)	Measurement Uncertainty (k=2; ±)	Units	TUR
DC Current % Source - 4-20mA Ch #3										
4 - 20mA	0%	±(0.1% Span)	3.984	4.016	3.999 mA		1.6e-004	1.9e-003	mA	100.0 : 1
	25%	±(0.1% Span)	7.984	8.016	7.996 mA		2.7e-004	1.9e-003	mA	59.3 : 1
	50%	±(0.1% Span)	11.984	12.016	11.996 mA		1.1e-003	2.2e-003	mA	14.5 : 1
	75%	±(0.1% Span)	15.984	16.016	16.002 mA		1.3e-003	2.3e-003	mA	12.3 : 1
	100%	±(0.1% Span)	19.984	20.016	20.002 mA		1.4e-003	2.3e-003	mA	11.4 : 1
DC Current % Source - 4-20mA Ch #4										
4 - 20mA	0%	±(0.1% Span)	3.984	4.016	3.998 mA		1.6e-004	1.9e-003	mA	100.0 : 1
	25%	±(0.1% Span)	7.984	8.016	7.995 mA		2.7e-004	1.9e-003	mA	59.3 : 1
	50%	±(0.1% Span)	11.984	12.016	11.999 mA		1.1e-003	2.2e-003	mA	14.5 : 1
	75%	±(0.1% Span)	15.984	16.016	15.998 mA		1.3e-003	2.3e-003	mA	12.3 : 1
	100%	±(0.1% Span)	19.984	20.016	20.001 mA		1.4e-003	2.3e-003	mA	11.4 : 1
DC Current % Source - 0-20mA Ch #1										
0 - 20mA	0%	±(0.1% Span)	-0.020	0.020	0.000 mA		9.2e-007	2.3e-003	mA	100.0 : 1
	25%	±(0.1% Span)	4.980	5.020	4.997 mA		1.9e-004	2.3e-003	mA	100.0 : 1
	50%	±(0.1% Span)	9.980	10.020	9.998 mA		3.2e-004	2.3e-003	mA	62.5 : 1
	75%	±(0.1% Span)	14.980	15.020	14.998 mA		1.2e-003	2.6e-003	mA	16.7 : 1
	100%	±(0.1% Span)	19.980	20.020	19.998 mA		1.4e-003	2.7e-003	mA	14.3 : 1

The column labeled Cal Process Uncertainty (CPU) does not include the short term component of the UUT. The column labeled Measurement Uncertainty includes both CPU and the short term component of the UUT. TUR is calculated using CPU.

Note: Reported resolution of the UUT does not represent calibration uncertainty or accuracy of the UUT.

TRANSCAT CANADA
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SUPPLEMENTAL REPORT

CALIBRATION LAB DATA AS FOUND / AS LEFT

Customer: AEROCOUSTICS ENGINEERING LTD

PO Number: Stasiewicz-CC

Certificate/SO Number: 33-Q0D1V-20-1

Description	Setpoints	Accuracy	Low Limit	High Limit	As Found / As Left	OOT	Cal Process Uncertainty (k=2; ±)	Measurement Uncertainty (k=2; ±)	Units	TUR
DC Current % Source - 0-20mA Ch #2										
0 - 20mA	0%	±(0.1% Span)	-0.020	0.020	0.000 mA		9.2e-007	2.3e-003	mA	100.0 : 1
	25%	±(0.1% Span)	4.980	5.020	4.996 mA		1.9e-004	2.3e-003	mA	100.0 : 1
	50%	±(0.1% Span)	9.980	10.020	10.001 mA		3.2e-004	2.3e-003	mA	62.5 : 1
	75%	±(0.1% Span)	14.980	15.020	15.000 mA		1.2e-003	2.6e-003	mA	16.7 : 1
	100%	±(0.1% Span)	19.980	20.020	19.999 mA		1.4e-003	2.7e-003	mA	14.3 : 1
DC Current % Source - 0-20mA Ch #3										
0 - 20mA	0%	±(0.1% Span)	-0.020	0.020	0.000 mA		9.2e-007	2.3e-003	mA	100.0 : 1
	25%	±(0.1% Span)	4.980	5.020	4.995 mA		1.9e-004	2.3e-003	mA	100.0 : 1
	50%	±(0.1% Span)	9.980	10.020	9.996 mA		3.2e-004	2.3e-003	mA	62.5 : 1
	75%	±(0.1% Span)	14.980	15.020	14.996 mA		1.2e-003	2.6e-003	mA	16.7 : 1
	100%	±(0.1% Span)	19.980	20.020	20.001 mA		1.4e-003	2.7e-003	mA	14.3 : 1
DC Current % Source - 0-20mA Ch #4										
0 - 20mA	0%	±(0.1% Span)	-0.020	0.020	0.000 mA		9.2e-007	2.3e-003	mA	100.0 : 1
	25%	±(0.1% Span)	4.980	5.020	4.993 mA		1.9e-004	2.3e-003	mA	100.0 : 1
	50%	±(0.1% Span)	9.980	10.020	9.997 mA		3.2e-004	2.3e-003	mA	62.5 : 1
	75%	±(0.1% Span)	14.980	15.020	14.997 mA		1.2e-003	2.6e-003	mA	16.7 : 1
	100%	±(0.1% Span)	19.980	20.020	20.002 mA		1.4e-003	2.7e-003	mA	14.3 : 1

The column labeled Cal Process Uncertainty (CPU) does not include the short term component of the UUT. The column labeled Measurement Uncertainty includes both CPU and the short term component of the UUT. TUR is calculated using CPU.

Note: Reported resolution of the UUT does not represent calibration uncertainty or accuracy of the UUT.

TRANSCAT CANADA
Trust in every measure

SUPPLEMENTAL REPORT

CALIBRATION LAB DATA AS FOUND / AS LEFT

Customer: AEROCOUSTICS ENGINEERING LTD

PO Number: Stasiewicz-CC

Certificate/SO Number: 33-Q0D1V-20-1

Description	Setpoints	Accuracy	Low Limit	High Limit	As Found / As Left	OOT	Cal Process Uncertainty (k=2; ±)	Measurement Uncertainty (k=2; ±)	Units	TUR
DC Voltage % Source - 0-5V Ch#1										
0 -5V	0%	±(0.1% Span)	-0.0050	0.0050	0.0010 V		5.0e-007	5.8e-004	V	100.0 : 1
	20%	±(0.1% Span)	0.9950	1.0050	1.0014 V		5.5e-006	5.8e-004	V	100.0 : 1
	40%	±(0.1% Span)	1.9950	2.0050	2.0003 V		1.1e-005	5.8e-004	V	100.0 : 1
	60%	±(0.1% Span)	2.9950	3.0050	2.9986 V		1.6e-005	5.8e-004	V	100.0 : 1
	80%	±(0.1% Span)	3.9950	4.0050	4.0003 V		2.1e-005	5.8e-004	V	100.0 : 1
	100%	±(0.1% Span)	4.9950	5.0050	4.9991 V		2.6e-005	5.8e-004	V	100.0 : 1
DC Voltage % Source - 0-5V Ch#2										
0 -5V	0%	±(0.1% Span)	-0.0050	0.0050	0.0020 V		5.0e-007	5.8e-004	V	100.0 : 1
	20%	±(0.1% Span)	0.9950	1.0050	1.0001 V		5.5e-006	5.8e-004	V	100.0 : 1
	40%	±(0.1% Span)	1.9950	2.0050	2.0011 V		1.1e-005	5.8e-004	V	100.0 : 1
	60%	±(0.1% Span)	2.9950	3.0050	2.9996 V		1.6e-005	5.8e-004	V	100.0 : 1
	80%	±(0.1% Span)	3.9950	4.0050	3.9984 V		2.1e-005	5.8e-004	V	100.0 : 1
	100%	±(0.1% Span)	4.9950	5.0050	5.0000 V		2.6e-005	5.8e-004	V	100.0 : 1
DC Voltage % Source - 0-5V Ch#3										
0 -5V	0%	±(0.1% Span)	-0.0050	0.0050	0.0010 V		5.0e-007	5.8e-004	V	100.0 : 1
	20%	±(0.1% Span)	0.9950	1.0050	0.9997 V		5.5e-006	5.8e-004	V	100.0 : 1
	40%	±(0.1% Span)	1.9950	2.0050	1.9993 V		1.1e-005	5.8e-004	V	100.0 : 1
	60%	±(0.1% Span)	2.9950	3.0050	2.9984 V		1.6e-005	5.8e-004	V	100.0 : 1
	80%	±(0.1% Span)	3.9950	4.0050	4.0009 V		2.1e-005	5.8e-004	V	100.0 : 1
	100%	±(0.1% Span)	4.9950	5.0050	5.0004 V		2.6e-005	5.8e-004	V	100.0 : 1

The column labeled Cal Process Uncertainty (CPU) does not include the short term component of the UUT. The column labeled Measurement Uncertainty includes both CPU and the short term component of the UUT. TUR is calculated using CPU.
Note: Reported resolution of the UUT does not represent calibration uncertainty or accuracy of the UUT.

TRANSCAT CANADA
Trust in every measure

SUPPLEMENTAL REPORT

CALIBRATION LAB DATA AS FOUND / AS LEFT

Customer: AEROCOUSTICS ENGINEERING LTD

PO Number: Stasiewicz-CC

Certificate/SO Number: 33-Q0D1V-20-1

Description	Setpoints	Accuracy	Low Limit	High Limit	As Found / As Left	OOT	Cal Process Uncertainty (k=2; ±)	Measurement Uncertainty (k=2; ±)	Units	TUR
DC Voltage % Source - 0-5V Ch#4										
0 -5V	0%	±(0.1% Span)	-0.0050	0.0050	0.0009 V		5.0e-007	5.8e-004	V	100.0 : 1
	20%	±(0.1% Span)	0.9950	1.0050	1.0009 V		5.5e-006	5.8e-004	V	100.0 : 1
	40%	±(0.1% Span)	1.9950	2.0050	1.9993 V		1.1e-005	5.8e-004	V	100.0 : 1
	60%	±(0.1% Span)	2.9950	3.0050	3.0001 V		1.6e-005	5.8e-004	V	100.0 : 1
	80%	±(0.1% Span)	3.9950	4.0050	3.9987 V		2.1e-005	5.8e-004	V	100.0 : 1
	100%	±(0.1% Span)	4.9950	5.0050	4.9999 V		2.6e-005	5.8e-004	V	100.0 : 1
DC Voltage % Source - 0-10V Ch#1										
0 - 10V	0%	±(0.1% Span)	-0.010	0.010	0.001 V		5.0e-007	1.2e-003	V	100.0 : 1
	20%	±(0.1% Span)	1.990	2.010	2.000 V		1.1e-005	1.2e-003	V	100.0 : 1
	40%	±(0.1% Span)	3.990	4.010	4.000 V		2.1e-005	1.2e-003	V	100.0 : 1
	60%	±(0.1% Span)	5.990	6.010	6.000 V		3.1e-005	1.2e-003	V	100.0 : 1
	80%	±(0.1% Span)	7.990	8.010	7.998 V		4.1e-005	1.2e-003	V	100.0 : 1
	100%	±(0.1% Span)	9.990	10.010	9.997 V		5.2e-005	1.2e-003	V	100.0 : 1
DC Voltage % Source - 0-10V Ch#2										
0 - 10V	0%	±(0.1% Span)	-0.010	0.010	0.002 V		5.0e-007	1.2e-003	V	100.0 : 1
	20%	±(0.1% Span)	1.990	2.010	2.001 V		1.1e-005	1.2e-003	V	100.0 : 1
	40%	±(0.1% Span)	3.990	4.010	3.998 V		2.1e-005	1.2e-003	V	100.0 : 1
	60%	±(0.1% Span)	5.990	6.010	5.999 V		3.1e-005	1.2e-003	V	100.0 : 1
	80%	±(0.1% Span)	7.990	8.010	7.998 V		4.1e-005	1.2e-003	V	100.0 : 1
	100%	±(0.1% Span)	9.990	10.010	9.998 V		5.2e-005	1.2e-003	V	100.0 : 1

The column labeled Cal Process Uncertainty (CPU) does not include the short term component of the UUT. The column labeled Measurement Uncertainty includes both CPU and the short term component of the UUT. TUR is calculated using CPU.

Note: Reported resolution of the UUT does not represent calibration uncertainty or accuracy of the UUT.

TRANSCAT CANADA
Trust in every measure

SUPPLEMENTAL REPORT

CALIBRATION LAB DATA AS FOUND / AS LEFT

Customer: AEROCOUSTICS ENGINEERING LTD

PO Number: Stasiewicz-CC

Certificate/SO Number: 33-Q0D1V-20-1

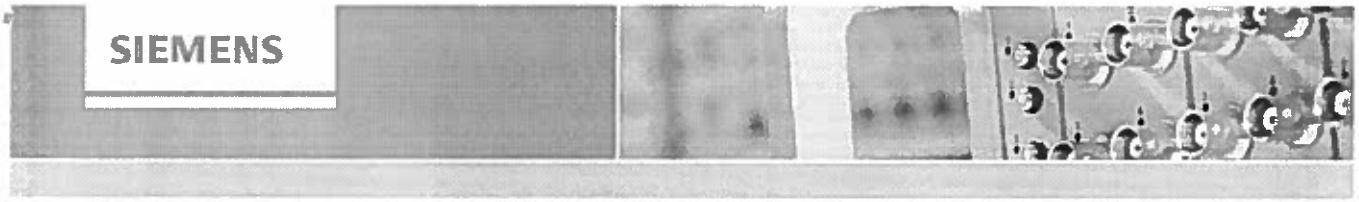
Description	Setpoints	Accuracy	Low Limit	High Limit	As Found / As Left	OOT	Cal Process Uncertainty (k=2; ±)	Measurement Uncertainty (k=2; ±)	Units	TUR
DC Voltage % Source - 0-10V Ch#3										
0 - 10V	0%	±(0.1% Span)	-0.010	0.010	0.001 V		5.0e-007	1.2e-003	V	100.0 : 1
	20%	±(0.1% Span)	1.990	2.010	1.999 V		1.1e-005	1.2e-003	V	100.0 : 1
	40%	±(0.1% Span)	3.990	4.010	4.001 V		2.1e-005	1.2e-003	V	100.0 : 1
	60%	±(0.1% Span)	5.990	6.010	6.000 V		3.1e-005	1.2e-003	V	100.0 : 1
	80%	±(0.1% Span)	7.990	8.010	7.999 V		4.1e-005	1.2e-003	V	100.0 : 1
	100%	±(0.1% Span)	9.990	10.010	9.997 V		5.2e-005	1.2e-003	V	100.0 : 1
DC Voltage % Source - 0-10V Ch#4										
0 - 10V	0%	±(0.1% Span)	-0.010	0.010	0.001 V		5.0e-007	1.2e-003	V	100.0 : 1
	20%	±(0.1% Span)	1.990	2.010	1.999 V		1.1e-005	1.2e-003	V	100.0 : 1
	40%	±(0.1% Span)	3.990	4.010	3.999 V		2.1e-005	1.2e-003	V	100.0 : 1
	60%	±(0.1% Span)	5.990	6.010	6.001 V		3.1e-005	1.2e-003	V	100.0 : 1
	80%	±(0.1% Span)	7.990	8.010	8.000 V		4.1e-005	1.2e-003	V	100.0 : 1
	100%	±(0.1% Span)	9.990	10.010	9.999 V		5.2e-005	1.2e-003	V	100.0 : 1

As Found and As Left Data recorded on February 19, 2016

Temperature 69.9°F / 21.0°C Relative Humidity 32% Temp/RH Asset N0438A

Asset	Manufacturer	Model	Description	Cal Date	Due Date	Traceability Numbers
N0118	Agilent/HP	3458A Opt 002	Multimeter, 8.5 Digit	Oct 12, 2015	Oct 31, 2016	5-&N0118-725-1

The column labeled Cal Process Uncertainty (CPU) does not include the short term component of the UUT. The column labeled Measurement Uncertainty includes both CPU and the short term component of the UUT. TUR is calculated using CPU.
Note: Reported resolution of the UUT does not represent calibration uncertainty or accuracy of the UUT.



ISO17025

As Left RECALIBRATION CERTIFICATE

Sales Region:	AMERICAS
Account:	Aercoustics engineering Limited
Instrument:	LMS SCADAS
Manufacturer:	Siemens Industry Software B.V.
Type:	SCR202
Serial number(s):	22143211
Calibration method:	Two calibrated external standards (DC voltage and frequency) are used to calibrate the internal LMS SCADAS references: time/frequency accuracy of the internal system clock and amplitude accuracy of the internal signal sources. All input channels are calibrated against the internal references.
Ambient conditions:	The calibrations have been carried out in a controlled environment, at an ambient temperature of 22,8°C and a relative humidity of 50,2%.
Calibration date:	August 17, 2016
Results:	The calibration results, together with their associated uncertainties, are included in this calibration certificate. *Calibration results within specification.*
Uncertainty:	The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k =2, which for a normal distribution corresponds to a coverage probability of approximately 95%. The standard uncertainty of measurement has been determined in accordance with publication EA-4/02.
Traceability:	The measurements have been executed using methods for which the traceability to international standards has been demonstrated towards the Raad voor Accreditatie.

Breda, August 17, 2016

Calibration performed by:

H. Dam

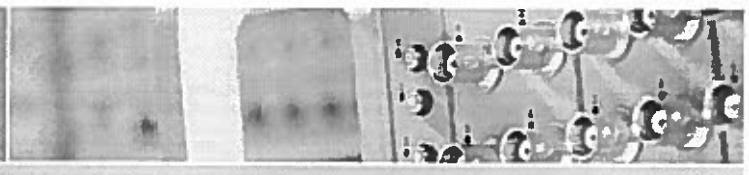
Certificate approved by:

M.C.A.G. Damen

The Raad voor Accreditatie is one of the signatories of the Multilateral Agreement of the European Cooperation for Accreditation (EA) for the mutual recognition of calibration certificates.

Siemens Industry Software B.V.
Druivenstraat 47
4816 KB Breda
The Netherlands
Phone: +31 76 573 6363

SIEMENS



ISO17025

As Found RECALIBRATION CERTIFICATE

Sales Region:	AMERICAS
Account:	Aercoustics engineering Limited
Instrument:	LMS SCADAS
Manufacturer:	Siemens Industry Software B.V.
Type:	SCR202
Serial number(s):	22143211
Calibration method:	Two calibrated external standards (DC voltage and frequency) are used to calibrate the internal LMS SCADAS references: time/frequency accuracy of the internal system clock and amplitude accuracy of the internal signal sources. All input channels are calibrated against the internal references.
Ambient conditions:	The calibrations have been carried out in a controlled environment, at an ambient temperature of 22.7°C and a relative humidity of 50.8%.
Calibration date:	August 17, 2016
Results:	The calibration results, together with their associated uncertainties, are included in this calibration certificate. *One or more channels failed to meet their specifications.*
Uncertainty:	The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k =2, which for a normal distribution corresponds to a coverage probability of approximately 95%. The standard uncertainty of measurement has been determined in accordance with publication EA-4/02.
Traceability:	The measurements have been executed using methods for which the traceability to international standards has been demonstrated towards the Raad voor Accreditatie.

Breda, August 17, 2016

Calibration performed by:

H. Dam

Certificate approved by:

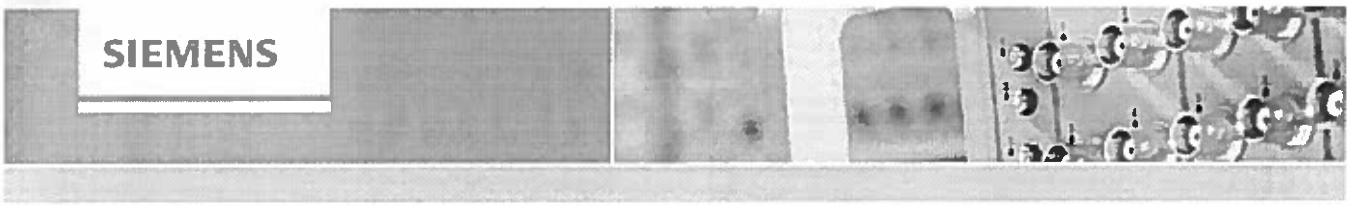
M.C.A.G. Damen

The Raad voor Accreditatie is one of the signatories of the Multilateral Agreement of the European Cooperation for Accreditation (EA) for the mutual recognition of calibration certificates.

Siemens Industry Software B.V.
Druivenstraat 47
4816 KB Breda
The Netherlands
Phone: +31 76 573 6363

CALIBRATION
RvA K 159

ilac-MRA



Certificate number: **2016-22143211**

Adjustment report

Product type: LMS SCADAS

Calibration Suite: **Calibration Software**
Calibration Suite Version: **2.10.0001**

Customer:

Company name	: Aercoustics Enigneering Limited
Location (city / country)	: Toronto/Canada
Contact person	: Tim Preager

System:

System type(s)	: SCR202
Serial number(s)	: 22143211

Adjustment conditions:

TAC reference number	: 7508254
Location (factory, office or on-site)	: Office
Date	: 17 August, 2016
Ambient temperature	: 22,8 °C
Previous adjustment / calibration date	: August 2014

Adjustment results (refer to page 2 for details) :

Adjustment successful	: YES
Within published specification	: YES
Within test specification	: NO

Report approved by:

Name : Mr. H. Dam

(Signature)..... .....

.....

Siemens Industry Software
Druivenstraat 47
4816 KB Breda
The Netherlands
Phone: +31 76 573 6363

Siemens Industry Software
222-0033 Kanagawa
Shin-Yokohama, Kohoku-ku
Japan
Phone: + +81 454 784 800

Siemens Industry Software
13 avenue Morane Saulnier
78140 Vélizy Villacoublay
France
Phone :+33 1 3452 1740

Siemens PLM Software
5755 New King Street
Troy, MI 48098
USA
Phone: +1 248 952 5664

West Caldwell Calibration Laboratories Inc.

Certificate of Calibration

for

ACOUSTICAL CALIBRATOR

Manufactured by:	BRUEL & KJAER
Model No:	4231
Serial No:	2513183
Calibration Recall No:	28017

Submitted By:

Customer:

Company: Aercoustics Engineering LTD

Address:

The subject instrument was calibrated to the indicated specification using standards traceable to the National Institute of Standards and Technology or to accepted values of natural physical constants. This document certifies that the instrument met the following specification upon its return to the submitter.

West Caldwell Calibration Laboratories Procedure No. 4231 BRUE

Upon receipt for Calibration, the instrument was found to be:

Within (X)

tolerance of the indicated specification. See attached Report of Calibration.

West Caldwell Calibration Laboratories' calibration control system meets the requirements, ISO 10012-1 MIL-STD-45662A, ANSI/NCSL Z540-1, IEC Guide 25, ISO 9001:2008 and ISO 17025.

Note: With this Certificate, Report of Calibration is included.

Approved by: FC

Felix Christopher (QA Mgr.)

Calibration Date: 11-Sep-17

Certificate No: 28017 - 1

ISO/IEC 17025:2005

ACCREDITED

Calibration Lab. Cert. # 1533.01

West Caldwell Calibration Laboratories, Inc.
uncompromised calibration
1575 State Route 96, Victor, NY 14564, U.S.A.

West Caldwell Calibration Laboratories, Inc.
uncompromised calibration
1575 State Route 96, Victor NY 14564

ISO/IEC 17025: 2005
ACCREDITED
Calibration Lab. Cert. # 1533.01

REPORT OF CALIBRATION

for

Brüel & Kjær Sound Calibrator **Model No.: 4231** **Serial No.: 2513183**
Company: Aercoustics Engineering LTD **ID No.: XXXX**

Calibration results:

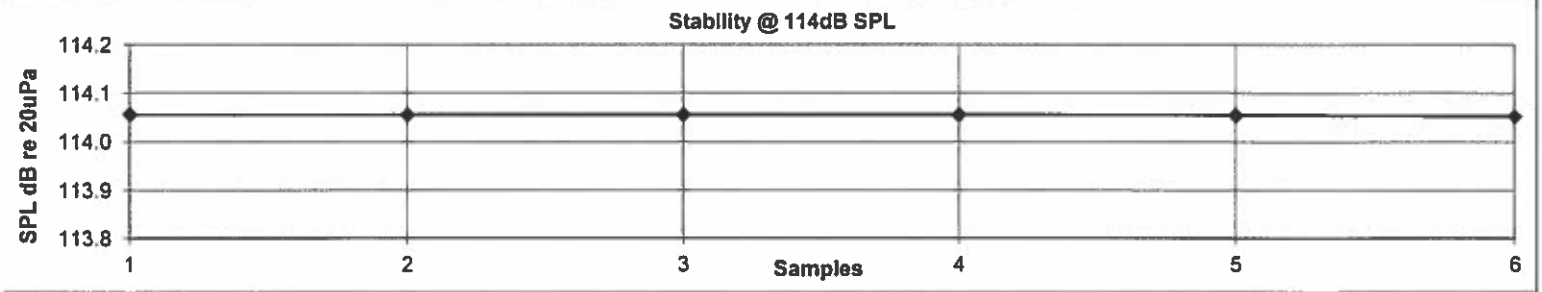
Before data: ..... After data: .....
Before & after data same: ...X...
Sound Pressure Level at 1000.0 Hz and pressure of 1013 hPa (mbar)
was 114.06 dB re 20µPa
(Calibrator tested with ½" adaptor UC 0210)
IEC 1094-4 Type WS 2 P Microphone was used for measurement.

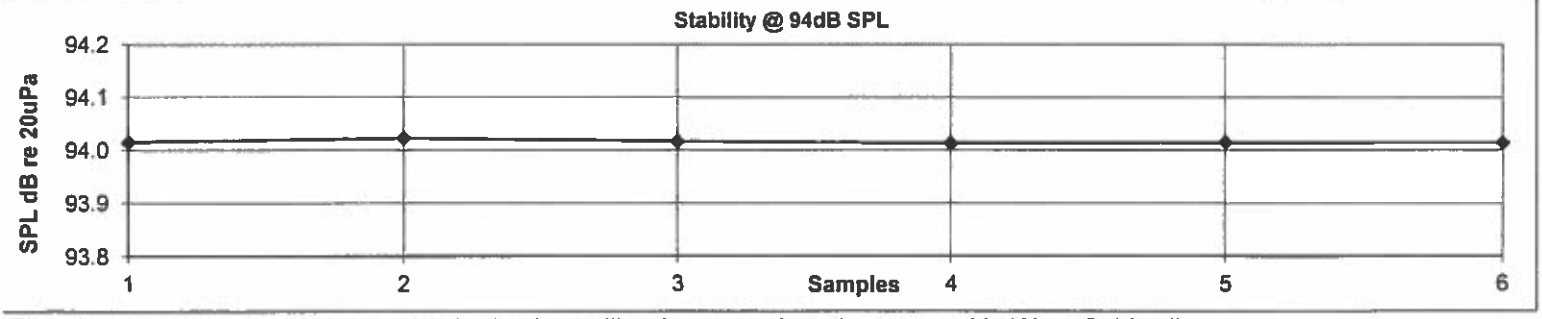
	114dB	94dB
Sound Pressure Level:	Pass	Pass
Frequency:	Pass	Pass
Distortion:	Pass	Pass
Stability:	Pass	Pass
All tested parameters:		Pass

Laboratory Environment:		
Ambient Temperature:	20.7	°C
Ambient Humidity:	53.0	% RH
Ambient Pressure:	100.558	kPa
Calibration Date:	11-Sep-2017	
Calibration Due:	11-Sep-2018	
Report Number:	28017 -1	
Control Number:	28017	

The above listed instrument meets or exceeds the tested manufacturer's specifications
The IEC 60942:2003 Class 1 specifications, passed.
The ANSI S1.4-1984 specifications, passed.
This Calibration is traceable through NIST test numbers: 683/284413-14
The expanded uncertainty of calibration: 0.09dB at 95% confidence level with a coverage factor of k=2.

Graph represents six samples of Sound Pressure Level measured at 5sec. interval.





The above listed instrument was checked using calibration procedure documented in West Caldwell Calibration Laboratories Inc. procedure : **Rev. 7.0 Jan. 24, 2014 Doc. # 1038 4231B&K**

Calibration was performed by West Caldwell Calibration Laboratories Inc. under Operating Procedures intended to implement the requirements of ISO10012-1, IEC Guide 25, ANSI/NCSL Z540-1, (MIL-STD-45662A) and ISO 9001:2008, ISO 17025

Cal. Date: 11-Sep-2017 Measurements performed by: .....
Calibrated on WCCL system type 9700 James Zhu

West Caldwell Calibration Laboratories Inc.
1575 State Route 96, Victor NY 14564
Tel. (585) 586-3900 FAX (585) 586-4327

Calibration Data Record

for

Brüel & Kjær Sound Calibrator **Model No.: 4231** **Serial No.: 2513183**
Company: Aercoustics Engineering LTD

All tested parameters: Pass

Measured Sound Pressure Level (Six samples measured at 5 sec. interval)

Sample	1	114.06 dB re 20µPa		94.02 dB re 20µPa	
	2	114.06		94.02	
	3	114.06		94.02	
	4	114.06		94.01	
	5	114.06		94.01	
	6	114.05		94.01	
	Average	**114.06**	Spec. 114dB ± 0.2dB	**94.02**	Spec. 94dB ± 0.2dB

Frequency measured (Three samples at 30 sec. Interval)

Sample	1	999.96 Hz		999.97 Hz	
	2	999.96		999.95	
	3	999.96		999.96	
	Average	**999.96**		**999.96**	Spec. 1000Hz ±0.1%

The Frequency expanded uncertainty of calibration:45µHz/Hz at 95% confidence level with a coverage factor of k=2.

Distortion measured	-49.1 dB		-45.9 dB	Spec. ≤-40dB

Instruments used for calibration:			Date of Cal.	Traceability No.	Re-cal. Due Date
Brüel & Kjær	4231	S/N 2205492	1-Nov-2016	683/284413-14	1-Nov-2017
Brüel & Kjær	4134	S/N 173494	1-Nov-2016	683/284413-14	1-Nov-2017
Brüel & Kjær	2669	S/N 1835080	1-Nov-2016	683/284413-14	1-Nov-2017
HP	34401A	S/N MY440029	1-Nov-2016	,287708	1-Nov-2017
Brüel & Kjær	2636	S/N 1487493	1-Nov-2016	683/284413-14	1-Nov-2017
HP	33120A	S/N SG400116	1-Nov-2016	,287708	1-Nov-2017

Cal. Date: 11-Sep-2017 **Tested by: James Zhu**

Calibrated on WCCL system type 9700

West Caldwell Calibration Laboratories Inc.

Certificate of Calibration

for

MICROPHONE UNIT

Manufactured by:	BRUEL & KJAER
Model No:	4189-A-021
Serial No:	2622170
Calibration Recall No:	28047

Submitted By:

Customer:

Company: Aercoustics Engineering LTD

Address:

The subject instrument was calibrated to the indicated specification using standards traceable to the National Institute of Standards and Technology or to accepted values of natural physical constants. This document certifies that the instrument met the following specification upon its return to the submitter.

West Caldwell Calibration Laboratories Procedure No. 4189-A-021 BRUE

Upon receipt for Calibration, the instrument was found to be:

Within (X)

tolerance of the indicated specification. See attached Report of Calibration.

West Caldwell Calibration Laboratories' calibration control system meets the requirements, ISO 10012-1 MIL-STD-45662A, ANSI/NCSL Z540-1, IEC Guide 25, ISO 9001:2008 and ISO 17025.

Note: With this Certificate, Report of Calibration is included.

Approved by: FC

Calibration Date: 20-Sep-17

Felix Christopher (QA Mgr.)

Certificate No: 28047 - 1

ISO/IEC 17025:2005

ACCREDITED

Calibration Lab. Cert. # 1533.01

West Caldwell Calibration Laboratories, Inc.
uncompromised calibration
1575 State Route 96, Victor, NY 14564, U.S.A.

West Caldwell Calibration Laboratories, Inc.
uncompromised calibration
1575 State Route 96, Victor NY 14564

ISO/IEC 17025: 2005
ACCREDITED
Calibration Lab. Cert. # 1533.01

REPORT OF CALIBRATION

for

Brüel & Kjær Microphone Unit

Model No.: 4189-A-021 — **Serial No.: 2622170**
Mic. Model No.: 4189 — **Serial No.: 2625197**
Preamp. Model No.: 2671 — **Serial No.: 2614901**
Company: Aercoustics Engineering LTD — **I. D. No.: XXXX**

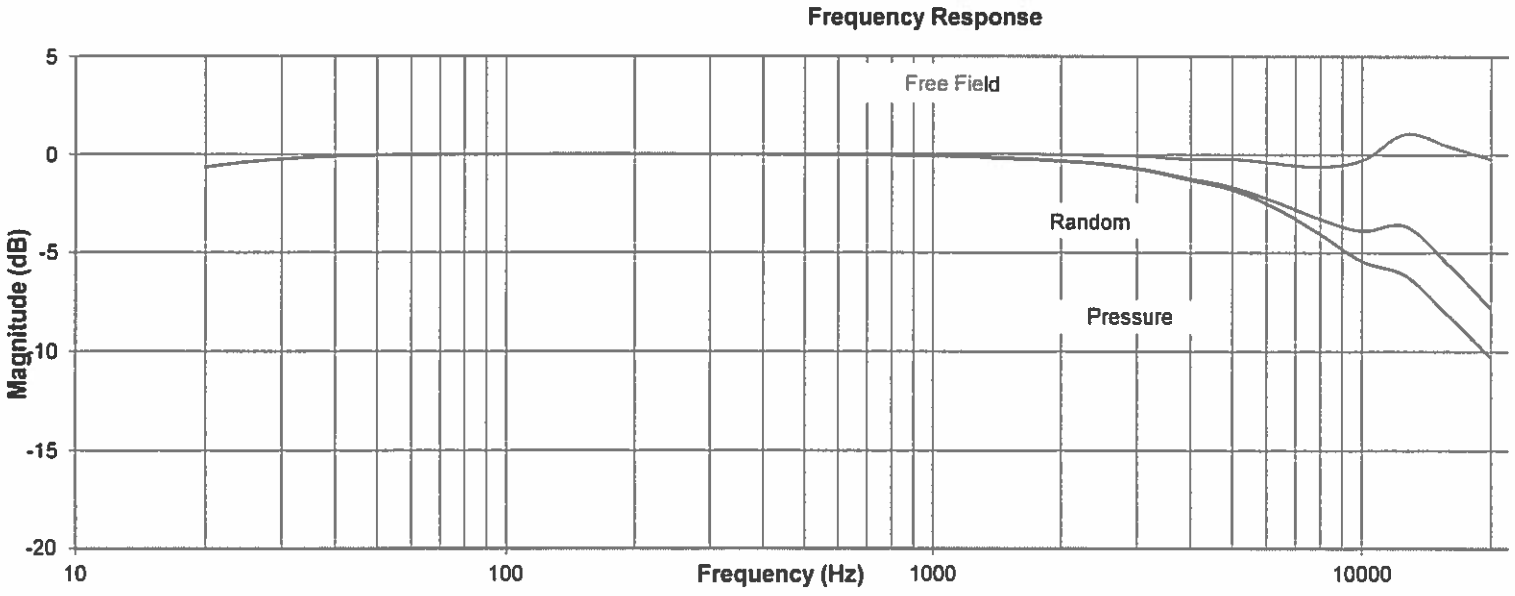
Calibration results:

Before & after data same: ...X...

Combined Sensitivity @ **250** **Hz** **and pressure of** **99.456** **kPa**
(Sens. with mic. and preamp.) **0** Volts Polarization voltage (External):
-26.69 dB re.1V/Pascal
46.31 mV/Pascal
0.69 Ko (- dB re 50 mV/Pascal)
Sensitivity: **Pass**
Freq. Response: **Pass**
All tests: **Pass**

Ambient Temperature:	21.6	°C
Ambient Humidity:	53.6	% RH
Ambient Pressure:	99.456	kPa
Calibration Date:	20-Sep-2017	
Calibration Due:	20-Sep-2018	
Report Number:	28047	-1
Control Number:	28047	

The above listed instrument meets or exceeds the tested manufacturer's specifications.
The IEC 651:1979 & 1993 Type 1 specification passed.
This Calibration is traceable through NIST test numbers: 683/284413-14
The expanded uncertainty of calibration: 0.079dB at 95% confidence level with a coverage factor of k=2.
The pressure response recorded with electroacoustic method.



The above listed instrument was checked using calibration procedure documented in West Caldwell Calibration Laboratories Inc. procedure : **Rev. 7.0 Jan. 24, 2014 Doc. # 1038 P4189A021B&K**
Calibration was performed by West Caldwell Calibration Laboratories Inc. under Operating Procedures intended to implement the requirements of ISO10012-1, IEC Guide 25, ANSI/NCSL Z540-1, (MIL-STD-45662A) and ISO 9001:2008, ISO 17025

Measurements performed by: .....
James Zhu

Calibrated on WCCL system type 9700

West Caldwell Calibration Laboratories Inc.
1575 State Route 96, Victor NY 14564
Tel. (585) 586-3900 FAX (585) 586-4327

Calibration Data Record

for

Brüel & Kjær Microphone Unit **Model No.: 4189-A-021** **Serial No.: 2622170**
Company: Aercoustics Engineering LTD **I. D. No.: XXXX**

Frequency Response (Reference = 0 dB @ 250Hz)

Frequency [Hz]	Pressure [dB]	Free Field (dB)	Random (dB)
19.95	-0.65	-0.65	-0.65
25.12	-0.38	-0.38	-0.38
31.62	-0.21	-0.21	-0.21
39.81	-0.10	-0.10	-0.10
50.12	-0.04	-0.04	-0.04
63.10	-0.01	-0.01	-0.01
79.43	0.00	0.00	0.00
100.00	0.00	0.00	0.00
125.89	0.00	0.00	0.00
158.49	0.01	0.01	0.01
199.53	0.00	0.00	0.00
251.19	0.00	0.00	0.00
316.23	0.00	0.00	0.00
398.11	-0.01	0.00	-0.01
501.19	-0.01	0.01	-0.01
630.96	-0.02	0.02	-0.02
794.33	-0.04	0.03	-0.04
1000.00	-0.07	0.02	-0.09
1258.93	-0.11	0.04	-0.14
1584.89	-0.20	0.02	-0.25
1995.26	-0.33	-0.01	-0.34
2511.89	-0.51	-0.03	-0.47
3162.28	-0.81	-0.10	-0.77
3981.07	-1.30	-0.23	-1.21
5011.87	-1.80	-0.22	-1.66
6309.57	-2.72	-0.44	-2.41
7943.28	-4.00	-0.62	-3.25
10000.00	-5.41	-0.28	-3.87
12589.25	-6.14	1.05	-3.63
15848.93	-8.16	0.43	-5.57
19952.62	-10.27	-0.22	-7.79

Freq. response: Expanded Uncertainty (dB) with coverage factor K = 2
20 to 63Hz 0.1dB, 63 to 12.5kHz 0.094dB, 12.5k to 16kHz 0.10dB, 16k to 20kHz 0.5dB.

Instruments used for calibration:			Date of Cal.	Traceability No.	Re-cal. Due Date
Brüel & Kjær	4226	S/N 1445428	3-Nov-2016	683/284413-14	3-Nov-2017
Brüel & Kjær	3560	S/N 2202374	3-Nov-2016	683/284413-14	3-Nov-2017
HP	33120A	S/N 36043716	1-Oct-2016	,287708	1-Oct-2017
HP	34401A	S/N 36064102	1-Oct-2016	,287708	1-Oct-2017

Cal. Date: 20-Sep-2017 **Tested by: James Zhu**

Calibrated on WCCL system type 9700

Rev. 7.0 Jan. 24, 2014 Doc. # 1038 P4189A021B&K

SOH Wind Engineering LLC
141 Leroy Road · Williston, VT 05495 · USA
Tel 802.316.4368 · Fax 802.735.9106 · www.sohwind.com

CERTIFICATE FOR CALIBRATION OF SONIC ANEMOMETER

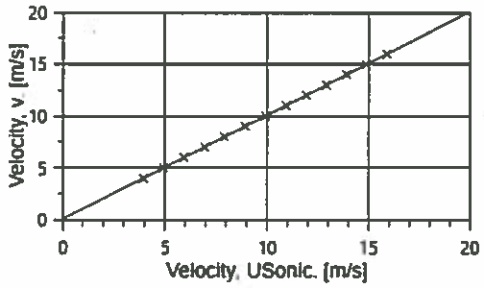
Certificate number: 17.US1.10370 **Date of issue:** November 16, 2017
Type: Vaisala Weather Transmitter, WXT520 **Serial number:** G4420002
Manufacturer: Vaisala, Oyj, Pl 26, FIN-00421 Helsinki, Finland
Client: Aercoustics Engineering Ltd., 1004 Middlegate RD, Suite 1100, S.Tower, Mississauga, ON L4Y 1M4, Canada

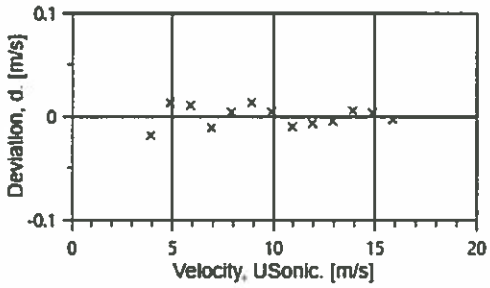
Anemometer received: November 15, 2017 **Anemometer calibrated:** November 15, 2017
Calibrated by: MEJ **Procedure:** MEASNET, IEC 61400-12-1:2017 Annex F
Certificate prepared by: EJF **Approved by:** Calibration engineer, EJF

Calibration equation obtained: $v\,[m/s] = 1.00118 \cdot f\,[m/s] + 0.06286$

Standard uncertainty, slope: 0.00077 **Standard uncertainty, offset:** 0.13048
Covariance: -0.0000059 $(m/s)^2/m/s$ **Coefficient of correlation:** $\rho = 0.999997$
Absolute maximum deviation: -0.019 m/s at 3.969 m/s
Barometric pressure: 1011.5 hPa **Relative humidity:** 21.9%

Succession	Velocity pressure, q. [Pa]	Temperature in wind tunnel [°C]	Temperature in d.p. box [°C]	Wind velocity, v. [m/s]	Anemometer Output, f. [m/s]	Deviation, d. [m/s]	Uncertainty u_c (k=2) [m/s]
2	9.39	22.0	26.0	3.969	3.9200	-0.019	0.024
4	14.85	22.0	26.0	4.992	4.9103	0.013	0.025
6	21.38	22.0	26.0	5.990	5.9100	0.011	0.027
8	29.13	22.1	26.0	6.993	6.9333	-0.011	0.029
10	38.09	22.1	26.0	7.996	7.9200	0.004	0.032
12	48.35	22.1	26.0	9.010	8.9233	0.013	0.035
13-last	59.50	22.1	26.0	9.996	9.9172	0.004	0.038
11	72.14	22.0	26.0	11.006	10.9400	-0.010	0.041
9	85.76	22.0	26.0	12.000	11.9300	-0.007	0.044
7	100.55	22.0	26.0	12.993	12.9200	-0.005	0.047
5	116.73	22.0	26.0	14.000	13.9150	0.006	0.050
3	133.56	22.0	26.0	14.974	14.8900	0.004	0.053
1-first	152.12	21.9	26.0	15.979	15.9000	-0.003	0.057





AC-1746

EQUIPMENT USED

Serial Number	Description
Njord1	Wind tunnel, blockage factor = 1.0035
2254	Control cup anemometer
-	Mounting tube, D = 19 mm
TT003	Summit Electronics, 1XPT100, 0-10V Output, wind tunnel temp.
TP001	PR Electronics 5102, 0-10V Output, differential pressure box temp.
DP004	Setra Model 239, 0-1inWC, differential pressure transducer
HY002	Dwyer RHP-2D20, 0-10V Output, humidity transmitter
BP001	Setra Model 278, barometer
PL8	Pitot tube
XB002	Computer Board. 16 bit A/D data acquisition board
9PRZRW1	PC dedicated to data acquisition

Traceable calibrations of the equipment are carried out by external accredited institutions: Atlantic Scale, Essco Calibration Labs & Furness Controls. A real-time analysis module within the data acquisition software detects pulse frequency.

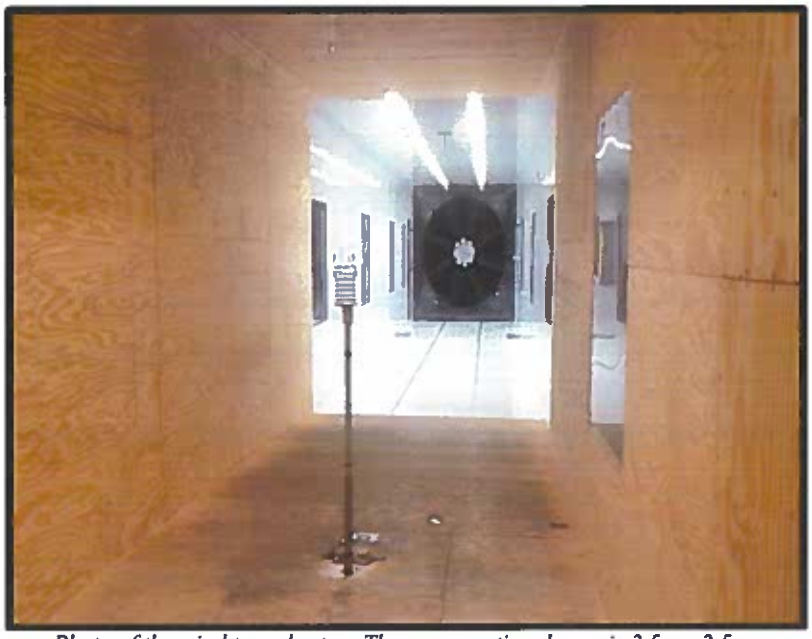


Photo of the wind tunnel setup. The cross-sectional area is 2.5m x 2.5m.

UNCERTAINTIES

The documented uncertainty is the total combined uncertainty at 95% confidence level (k=2) in accordance with EA-4/02. The uncertainty at 10 m/s comply with the requirements in the IEC 61400-12-1:2005 procedure. See Document US.12.01.004 for further details.

COMMENTS

This sensor was calibrated at 0° for this certificate.

Certificate number: 17.US1.10370

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Tel 802.316.4368 · Fax 802.735.9106 · www.sohwind.com

CERTIFICATE FOR CALIBRATION OF SONIC ANEMOMETER

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Type: Vaisala Weather Transmitter, WXT520 **Serial number:** G4420002
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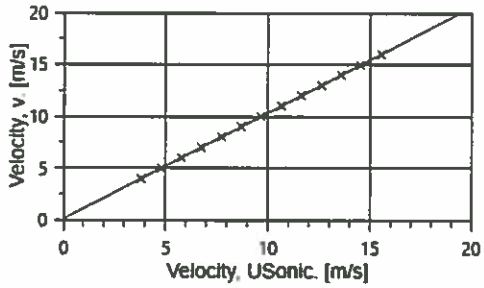
Client: Aercoustics Engineering Ltd., 1004 Middlegate RD, Suite 1100, S.Tower, Mississauga, ON L4Y 1M4, Canada

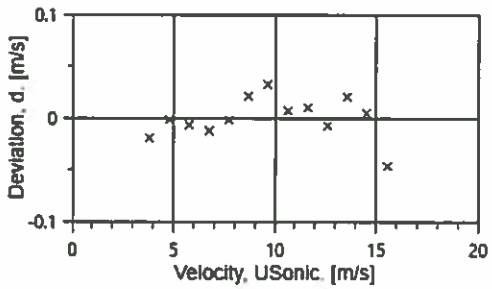
Anemometer received: November 15, 2017 **Anemometer calibrated:** November 15, 2017
Calibrated by: MEJ **Procedure:** MEASNET, IEC 61400-12-1:2017 Annex F
Certificate prepared by: EJF **Approved by:** Calibration engineer, EJF

Calibration equation obtained: v [m/s] = 1.02399 · f [m/s] + 0.09265

Standard uncertainty, slope: 0.00156 **Standard uncertainty, offset:** 0.17838
Covariance: -0.0000247 (m/s)²/m/s **Coefficient of correlation:** ρ = 0.999987
Absolute maximum deviation: -0.046 m/s at 15.979 m/s
Barometric pressure: 1011.1 hPa **Relative humidity:** 22.0%

Succession	Velocity pressure, q. [Pa]	Temperature in wind tunnel [°C]	d.p. box [°C]	Wind velocity, v. [m/s]	Anemometer Output, f. [m/s]	Deviation, d. [m/s]	Uncertainty u_c (k=2) [m/s]
2	9.41	22.0	26.0	3.975	3.8100	-0.019	0.024
4	14.86	22.0	26.0	4.996	4.7897	-0.002	0.025
6	21.40	22.1	26.0	5.994	5.7700	-0.007	0.027
8	29.14	22.1	26.0	6.996	6.7533	-0.012	0.029
10	38.16	22.1	26.0	8.006	7.7300	-0.002	0.032
12	48.35	22.1	26.0	9.012	8.6900	0.021	0.035
13-last	59.54	22.1	26.0	10.001	9.6448	0.032	0.038
11	72.13	22.1	26.0	11.009	10.6533	0.007	0.041
9	85.87	22.1	26.0	12.012	11.6300	0.010	0.044
7	100.56	22.1	26.0	12.998	12.6100	-0.008	0.047
5	116.94	22.0	26.0	14.015	13.5767	0.020	0.050
3	133.53	22.0	26.0	14.976	14.5300	0.005	0.053
1-first	152.03	22.0	26.0	15.979	15.5600	-0.046	0.057





AC-1746

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PL8	Pitot tube
XB002	Computer Board. 16 bit A/D data acquisition board
9PRZRW1	PC dedicated to data acquisition

Traceable calibrations of the equipment are carried out by external accredited institutions: Atlantic Scale, Essco Calibration Labs & Furness Controls. A real-time analysis module within the data acquisition software detects pulse frequency.

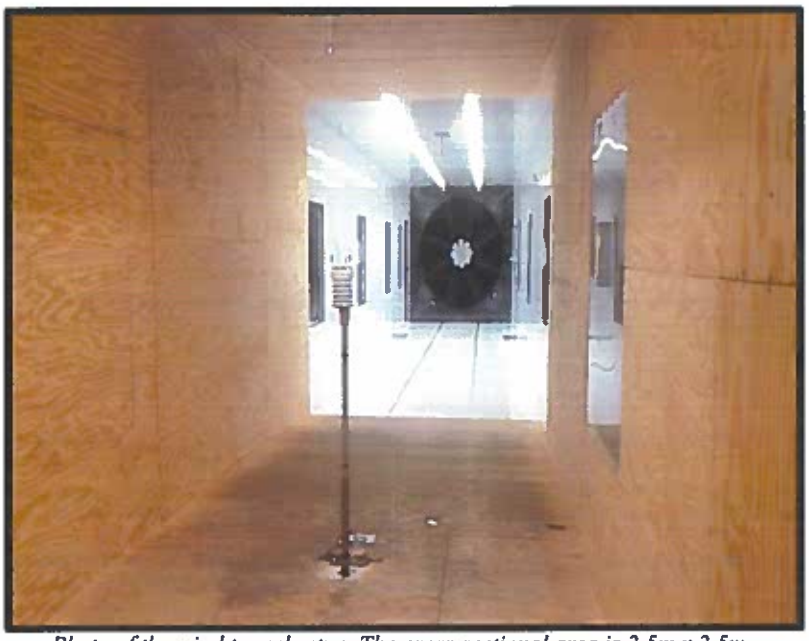

Photo of the wind tunnel setup. The cross-sectional area is 2.5m x 2.5m.

UNCERTAINTIES

The documented uncertainty is the total combined uncertainty at 95% confidence level (k=2) in accordance with EA-4/02. The uncertainty at 10 m/s comply with the requirements in the IEC 61400-12-1:2005 procedure. See Document US.12.01.004 for further details.

COMMENTS

This sensor was calibrated at 90° for this certificate.

Certificate number: 17.US1.10369

aercoustics

Aercoustics Engineering Ltd.
1004 Middlegate Road, Suite 1100
Mississauga, ON L4Y 0G1

Tel: 416-249-3361
Fax 416-249-3613
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Appendix H
E-Audit Checklist

Appendix H - (2017 Compliance Protocol AF5): E-Audit checklist

Wind Energy Project – Screening Document – Acoustic Audit Report – Emmission IEC61400-11 Standard

Information Required in the Acoustic Audit Report – Immission

Item #	Description	Complete?	Comment
1	Characterization of the wind turbine Items 1 to 26; IEC61400-11:2013, Section 10.2	✓	
2	Physical environment Items 27 to 33; IEC61400-11:2013, Section 10.3, Physical Environment	✓	
3	Measurement instrumentation Items 34 to 39; IEC61400-11:2013, Section 10.4, Instrumentation	✓	
4	Acoustic data Items 40 to 52; IEC61400-11:2013, Section 10.5, Acoustic Data	✓	
5	Non-acoustic data Items 50 to 53, and 56; IEC61400-11:2003 Section 10.6, Non-Acoustic Data Items 59 and 60; NPC-233, Section 12.3, Acoustic Audit – Acoustical Data, bullet point number 8, All necessary and supporting calculations	✓	
6	Uncertainty the apparent sound power level at integer wind speeds one-third octave band spectrum of the noise at the reference position at each integer wind speed the Tonality of the sound emissions of the wind turbine measured at the reference position	✓	
7	Additional information Item 60; NPC-233, Section 10, Report Format, bullet point number 4, Conclusions and Recommendations Item 61; NPC-233, Section 12.3, Acoustic Audit – Acoustical Data, bullet point number 8, All necessary and supporting calculations Item 62; NPC-233, Section 12.3, Acoustic Audit – Acoustical Data, bullet point number 3, Details of measurement procedure	✓	All data Excel sheet to be provided separately
8	Items 68 to 72; IEC61400-11:2013, Section 10.5, Acoustic Data	⊘	Items 68 to 72 acoustic data as per IEC 61400-11 standard are optional; low frequency noise, infrasound, impulsivity, amplitude modulation not reported
9	Non-acoustic data Items 73 to 74 are from IEC61400-11:2013, Section 10.6, Non-Acoustic Data	⊘	Items 73 to 74 non-acoustic data as per IEC 64100-11 standard are optional; turbulence intensity during acoustic meeasurements not reported

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End of Report