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REPORT ID**: 14284.00.T10.RP4**

Grand Renewable Wind Farm – Turbine T10
IEC 61400-11 Edition 3.0 Measurement Report

Prepared for:

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March 2, 2018 – Revision #4

SCC Accredited CB-P/S
OCPS Accrédité CCN

Revision History

Revision Number	Description	Date
1	Issued Edition 2.1 test report	November 13, 2015
2	Issued Edition 2.1 test report with minor changes to report body	November 18, 2015
3	Minor Corrections to Table 2 (Edition 2.1)	February 4, 2016
4	Issued Edition 3.0 test report	March 02, 2018

This report in its entirety, including appendices contains 77 pages.

Statement of 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.

Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. Aercoustics Engineering Limited accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

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 Grand Renewable Wind Farm ("GRWLP") to conduct an acoustic measurement of turbine T10 at the Grand Renewable Wind Farm. 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 T10.

2 Wind Turbine Information

2.1 Wind turbine equipment specific information

Wind turbine specific equipment information for turbine T10 was provided by GRWLP and is summarized in Tables 1 – 5.

Table 1 - Wind Turbine Details

Wind Turbine Details	
Manufacturer	Siemens
Model Number	SWT2.3-101
Turbine ID	T10

Table 2 - Operating Details

Operating Details	
Vertical or Horizontal axis wind turbine	Horizontal
Upwind or downwind rotor	Upwind
Hub height	99.5 m
Horizontal distance from rotor centre to tower axis	3.5 m
Diameter of rotor	101 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	Rev 4
Rotational speed at each integer standardised wind speed	14.8 rpm
Rated power output	2.126 MW
Control software version	14.04.30

Table 3 - Rotor Details

Rotor Details	
Rotor control devices	Pitch control
Presence of vortex generators, stall strips, serrated trailing edges	Vortex generators, Dino Tails, Winglet
Blade type	B49
Serial number	Blade A – 4902111201
Number of blades	Blade B – 4902110601

Table 4 - Gearbox Details

Gearbox Details	
Manufacturer	Winergy
Model number	PEAB4456.8 cold climate 2.3MW
Serial number	4854355-0110-1

Table 5 - Generator Details

Generator Details	
Manufacturer	Loher
Model number	Generator Loher C3, SG V2
Serial number	5839498

2.2 Wind Turbine Location

Turbine T10 is located approximately 720 meters east of Kohler Road and approximately 575 meters north of Concession 3 near the town of Cayuga in Haldimand County. The specific UTM coordinates for turbine T10 are 593994 mE, 4748442 mN, zone 17T. A patch of trees is situated roughly 100m west of T10.

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 T10 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	2625416
Pre-amplifier	B&K 2671	2369794
Acoustic calibrator	B&K 4231	3012380

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 acquired from the angular position of T10's nacelle yaw motor at a hub height of 99.5 meters. Data for background measurements was obtained from a 10m high anemometer, which was placed as per guidelines outlined in IEC-61400-11.

The meteorological equipment is summarized in Table 7

Table 7 – Meteorological Measurement Equipment

Equipment	Manufacturer Name & Model	Serial Number
Anemometer	VAISALA WXT520	K4250007
Serial to Analog Converter	NOKEVAL 7470	A165164

3.2 Measurement Setup

3.2.1 Microphone Placement

The measurement microphone was setup 150 meters 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 T10. 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 T10 were taken, the surrounding land was planted with a matured soy bean crop. The crop was short and as such the influence on the measurement was considered negligible. 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
October 13, 2015	Background	11:11am	11:15am
	Turbine ON	11:18am	11:49am
	Background	11:54am	12:18pm
	Background	12:22pm	12:51pm
	Turbine ON	12:58pm	1:41pm
	Turbine ON	1:45pm	1:56pm
	Background	1:57pm	2:15pm
	Background	2:21pm	2:33pm

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 T10's power curve (as per the standard), while wind direction was taken from the angular position of the turbines nacelle at a hub height of 99.5m. Background data was obtained from an anemometer located 10m above ground level near T10.

Temperature and pressure readings during the measurement period were provided by the 10m anemometer, located near turbine T10 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 T10.

4.3 Analysis Details

The following section outlines analysis of the measurement data acquired for T10. 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).

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 9, while detailed information (including data in 1/3 octave) is provided in Appendix C.

Table 9 - 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 10. 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 10 - Summary of Sound Pressure Level Measurements

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	
7.5	51.8	19	38.4	11	51.6
8	53.8	32	40.2	19	53.6
8.5	54.3	35	39.6	20	54.2
9	54.3	41	39.3	16	54.2
9.5	54.3	77	39.2	25	54.2
10	54.3	37	39.7	19	54.1
10.5	54.6	34	42.4	43	54.3
11	54.5	58	41.4	41	54.3
11.5	54.5	46	41.7	31	54.3
12	54.4	24	41.7	41	54.1
12.5	54.4	20	40.1	30	54.2

4.6 Sound Power Level of Turbine

The calculated sound power level of the turbine T10 (as per IEC 61400-11) is summarized in Table 11 (hub height) and Table 12 (10m height). Detailed 1/3 Octave band spectrum data and respective uncertainties are provided in Appendix C.

Table 11 - $L_{WA,K}$ at each integer wind speed

Wind Speed (m/s)	Apparent L_{WA}, (dBA)	Uncertainty (dB)
7.5	101.8	0.7
8	103.8	0.7
8.5	104.4	0.7
9	104.4	0.7
9.5	104.4	0.7
10	104.4	0.7
10.5	104.5	0.8
11	104.5	0.8
11.5	104.5	0.8
12	104.4	0.7
12.5	104.5	0.7

Table 12 - $L_{WA\ 10m,\ K}$ at each integer wind speed

Wind Speed (m/s)	Apparent L_{WA}, (dBA)	Uncertainty (dB)
5	101.1	0.6
6	104.2	0.7
7	104.4	0.7
8	104.5	0.7
9	104.4	0.7

4.7 Tonality Analysis

The tonality analysis for Turbine T10 is summarized in Table 13, 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 13 - 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 (%)
7.5	420	-5.2	-3.0	14	19	74%
8	428	-3.1	-0.9	7	32	22%
8.5	474	-2.4	-0.2	35	35	100%
9	473	-1.0	1.2	41	41	100%
9.5	476	-0.1	2.1	77	77	100%
10	115	-4.4	-2.4	36	37	97%
	475	0.6	2.9	37	37	100%
10.5	117	-4.1	-2.1	28	34	82%
	485	0.9	3.1	33	34	97%
11	484	1.0	3.3	43	58	74%
11.5	118	-4.2	-2.2	40	46	87%
	488	0.3	2.6	41	46	89%
12	493	0.3	2.6	24	24	100%
12.5	492	1.6	3.8	19	20	95%

5 Closure

Measurements and analysis were carried on Turbine T10 of the Grand Renewable Wind Farm, located near the town of Cayuga 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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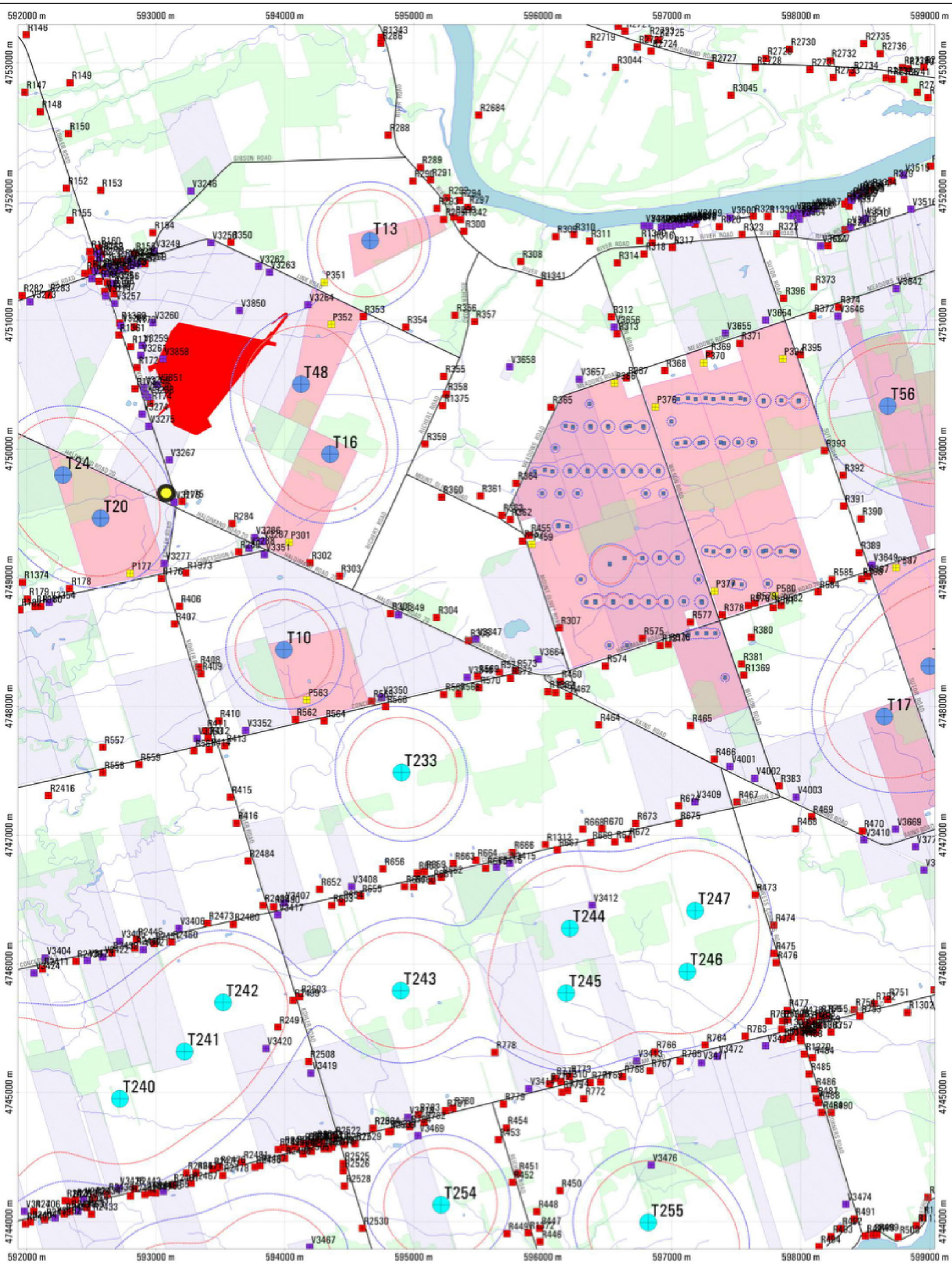
Appendix A
Site Details



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	Scale: NTS Drawn by: KC Reviewed by: PA Date: January 2018 Revision: 4	Grand Renewable Wind Farm - T10 - IEC 61400-11 Edition 3.0
		Figure Title Site Photos
		Figure A.01

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Figure Title

Site Photos

Figure A.02

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Appendix B
Turbine Information

Power Curve

Hub Wind Speed (m/s)	Electrical Power (kW)
0	0
1	0
2	0
3	27
4	116
5	264
6	486
7	792
8	1196
9	1654
10	1979
11	2096
12	2121
13	2125
14	2125
15	2126
16	2126
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21	2126
22	2126
23	2126
24	2126
25	2126

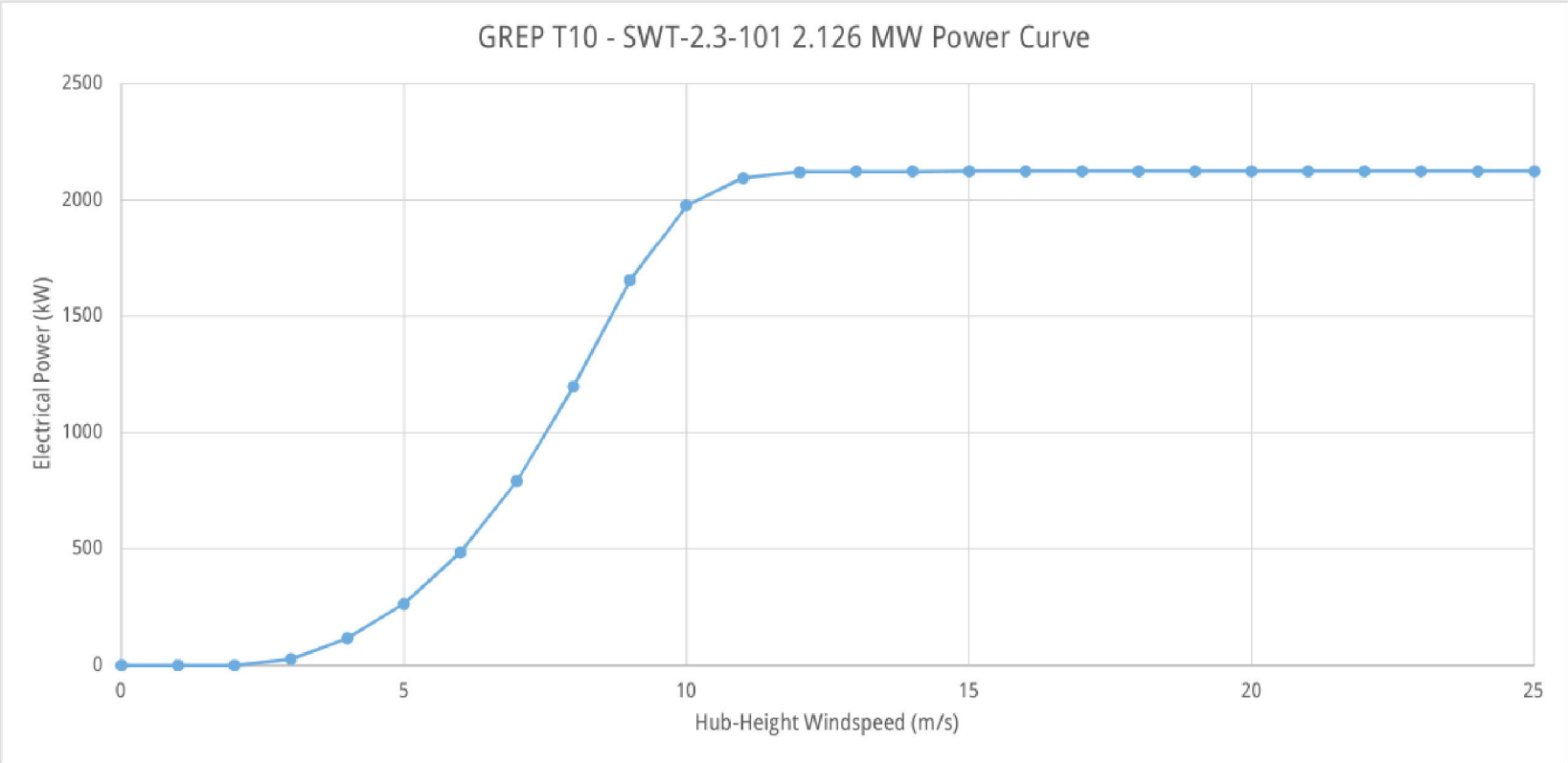

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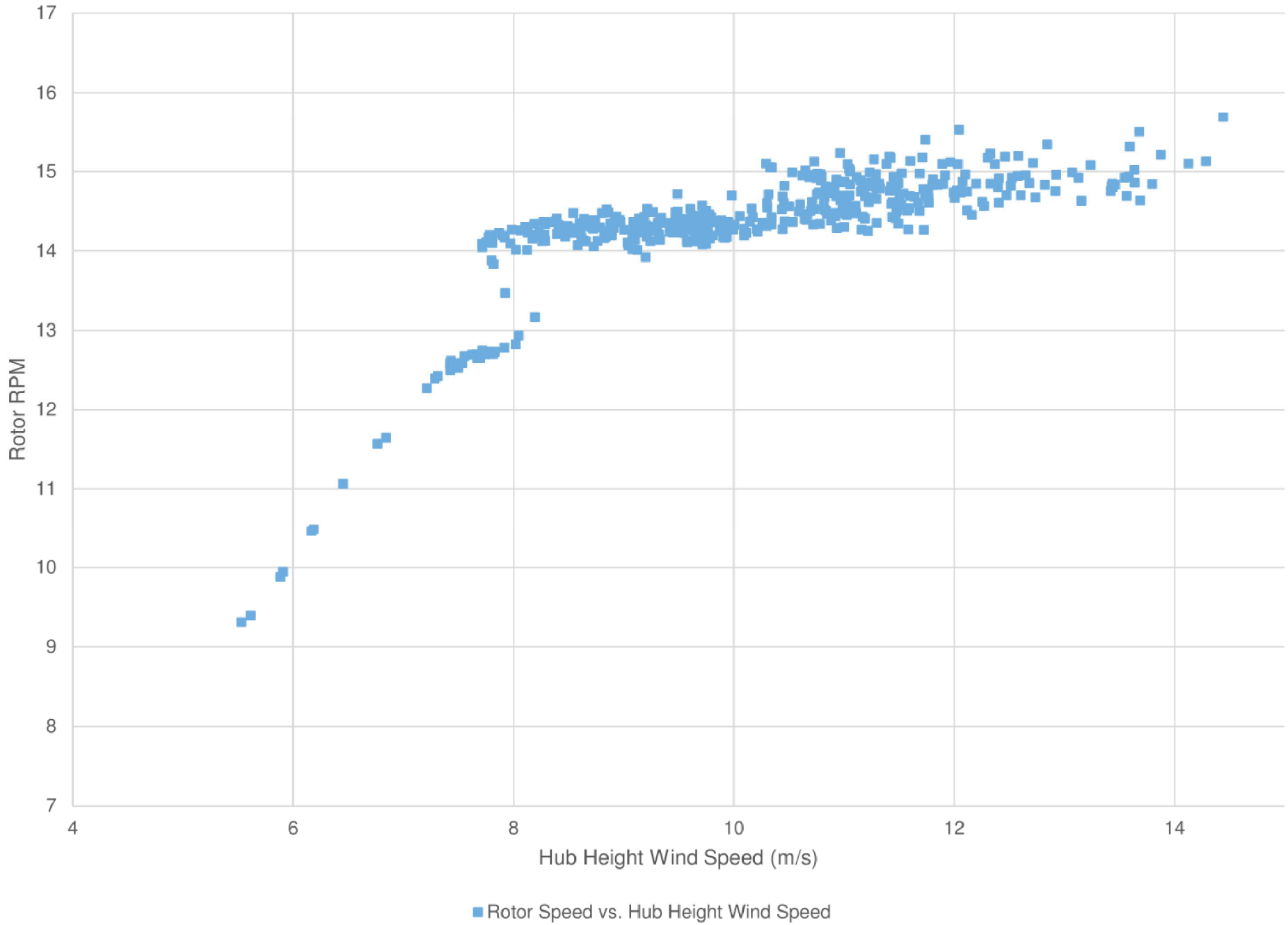
Figure Title

Power Curve

Figure B.01



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Appendix C
Apparent Sound Power Level

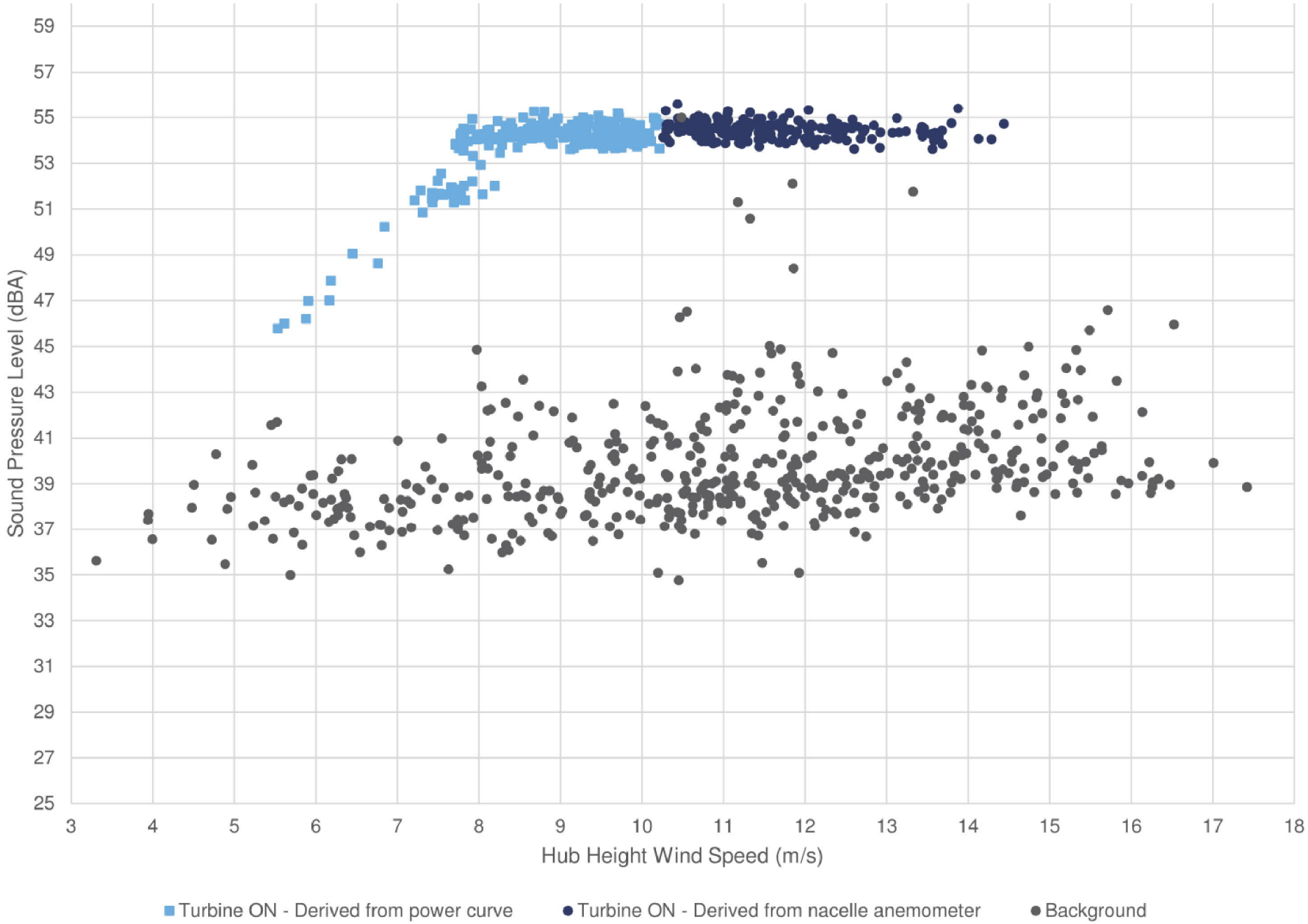

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		Figure Title Plot of overall measurement data pairs at Position 1 (Turbine ON & Background)	**Figure C.01**

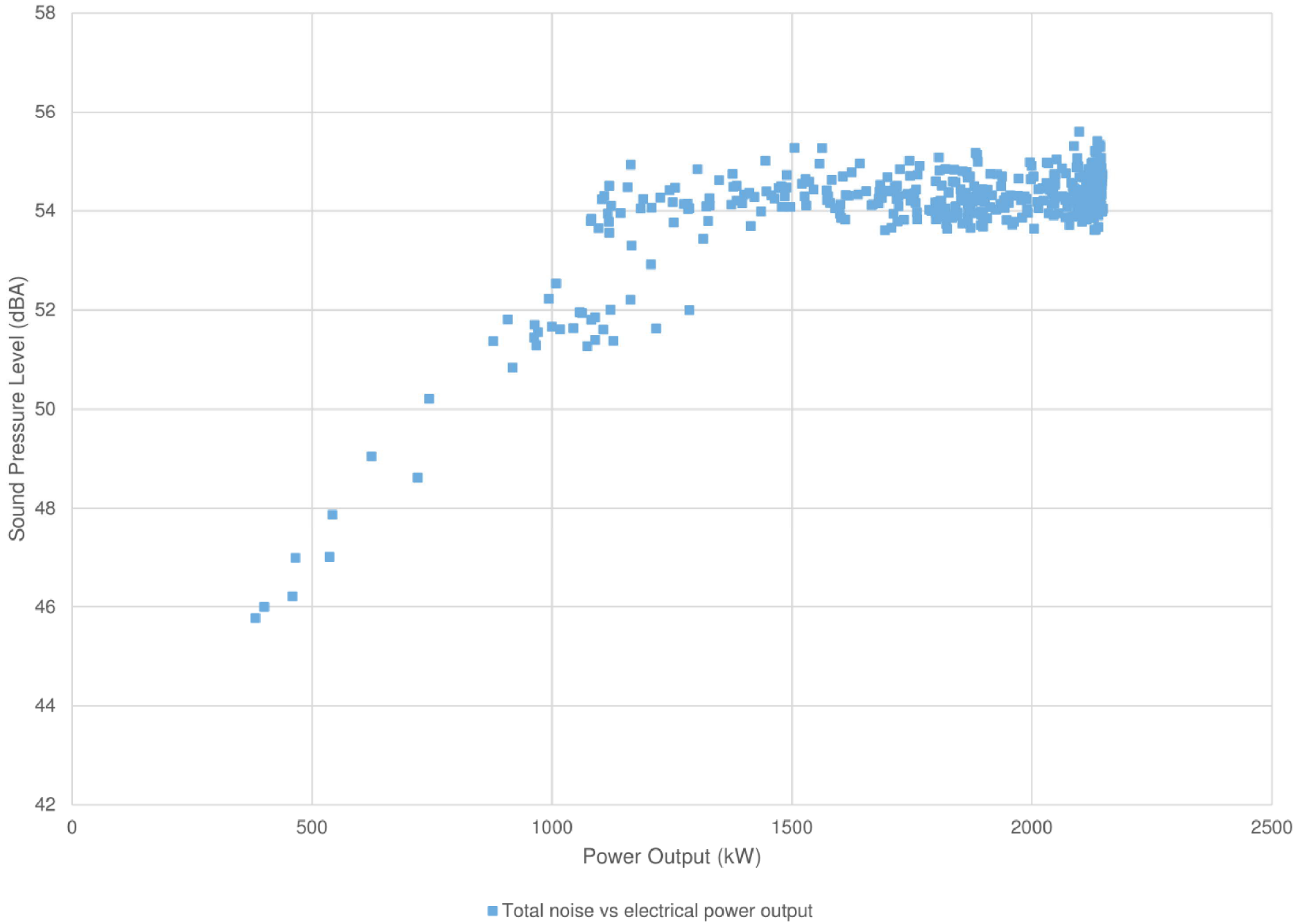

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Figure C.02

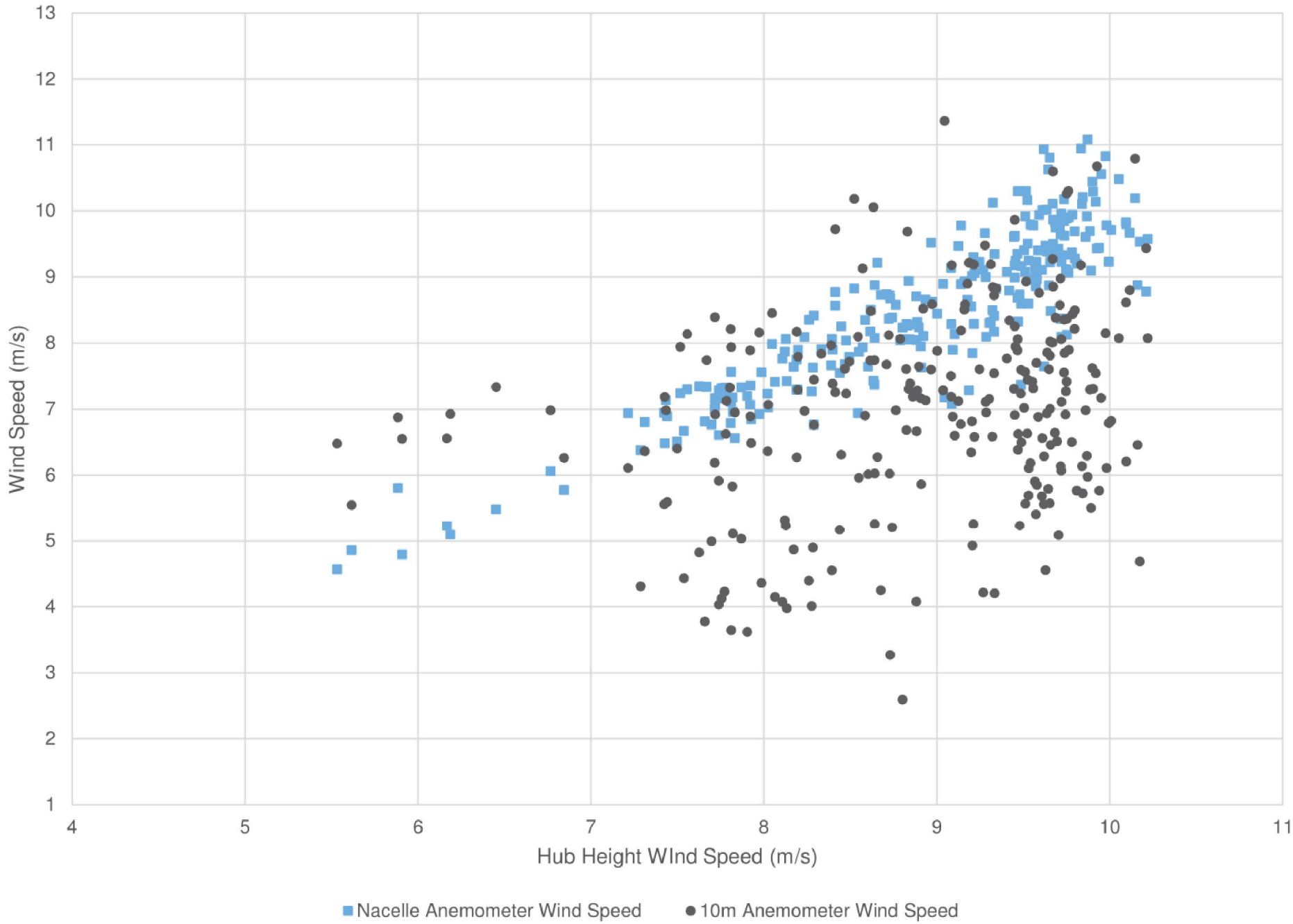

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Figure Title

Plot of power curve relative to nacelle anemometer and 10m anemometer

Figure C.03

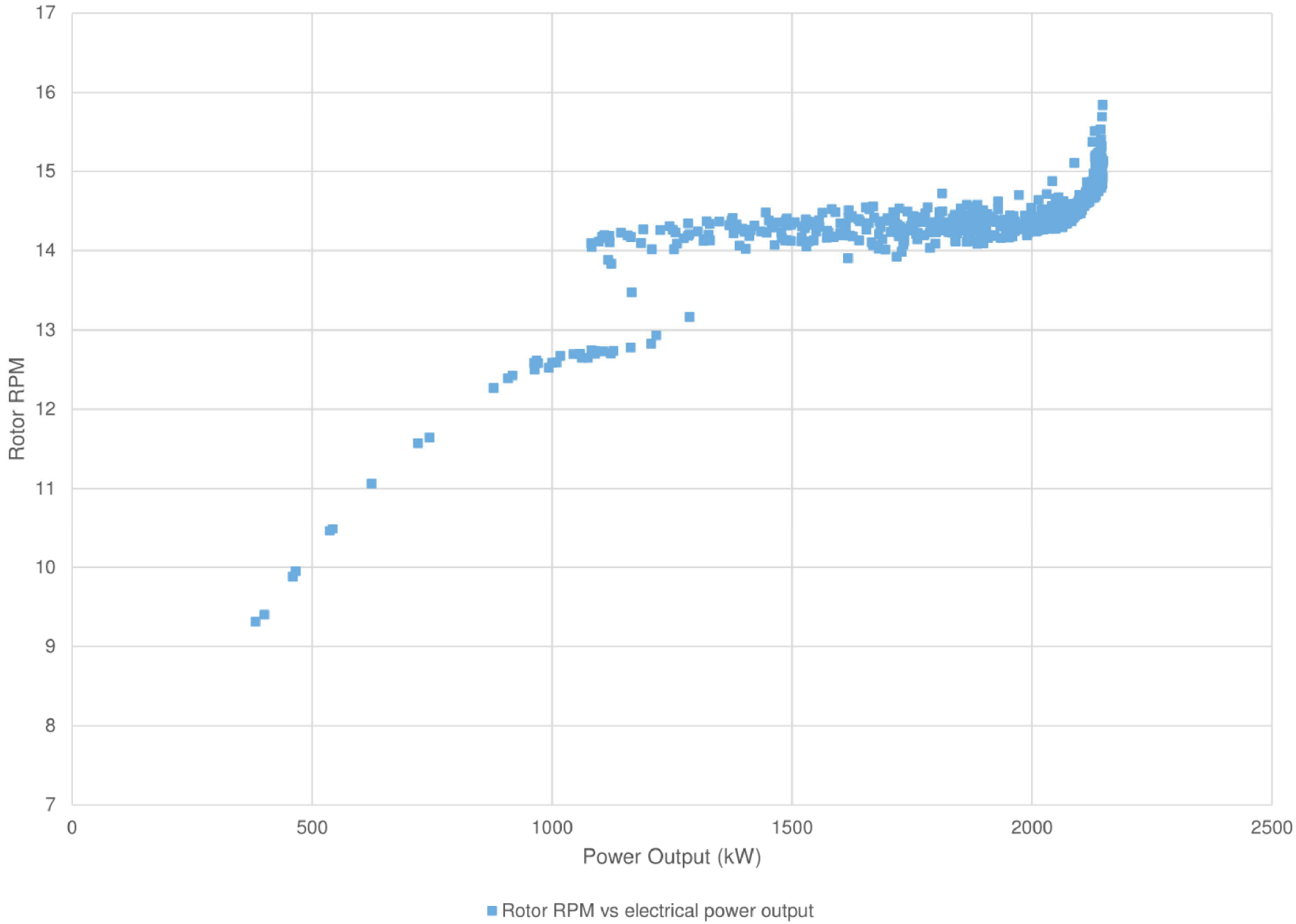

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Figure C.04

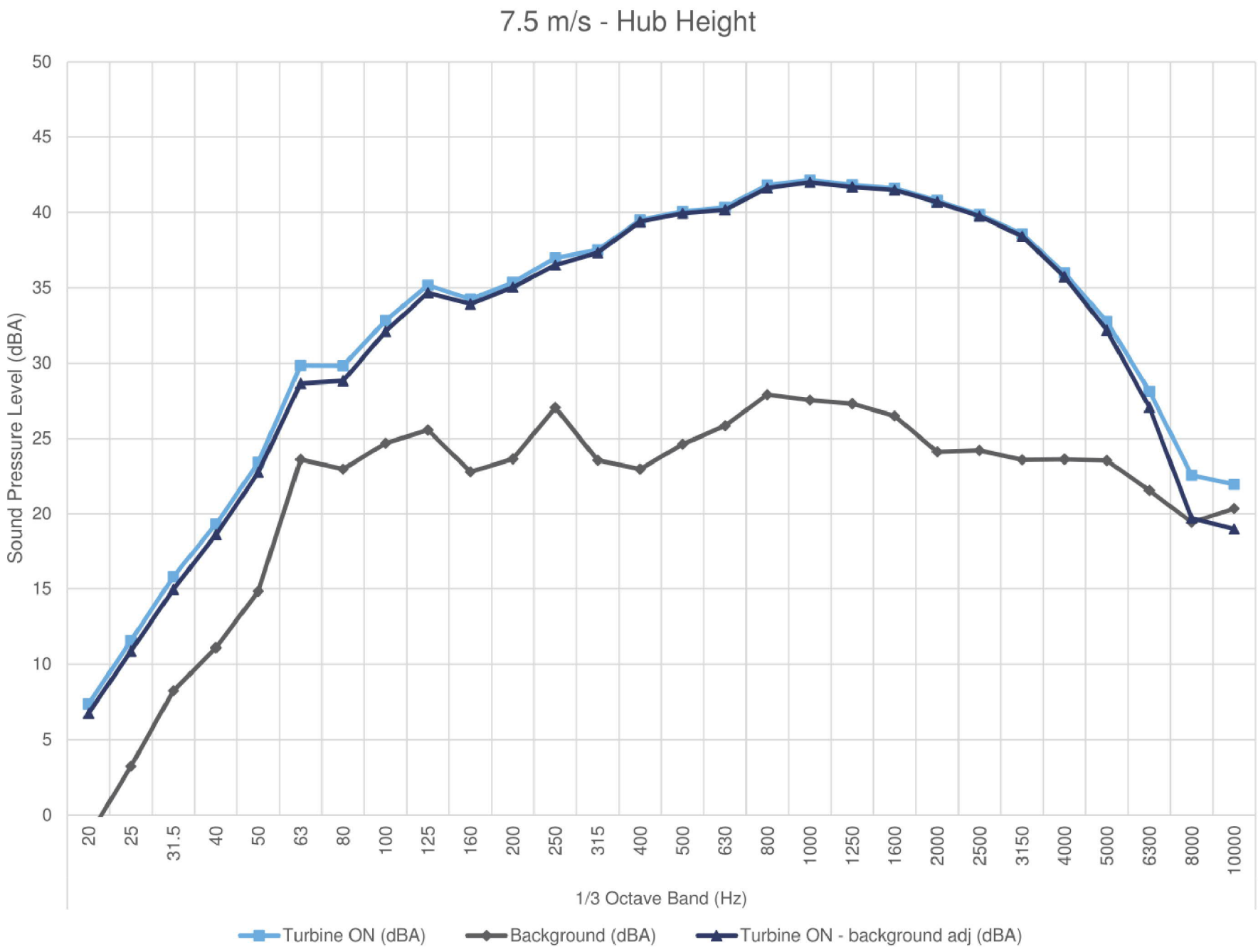

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		Figure Title Plot of sound pressure spectrum in 1/3 Octave at 7.5 m/s	**Figure C.04**

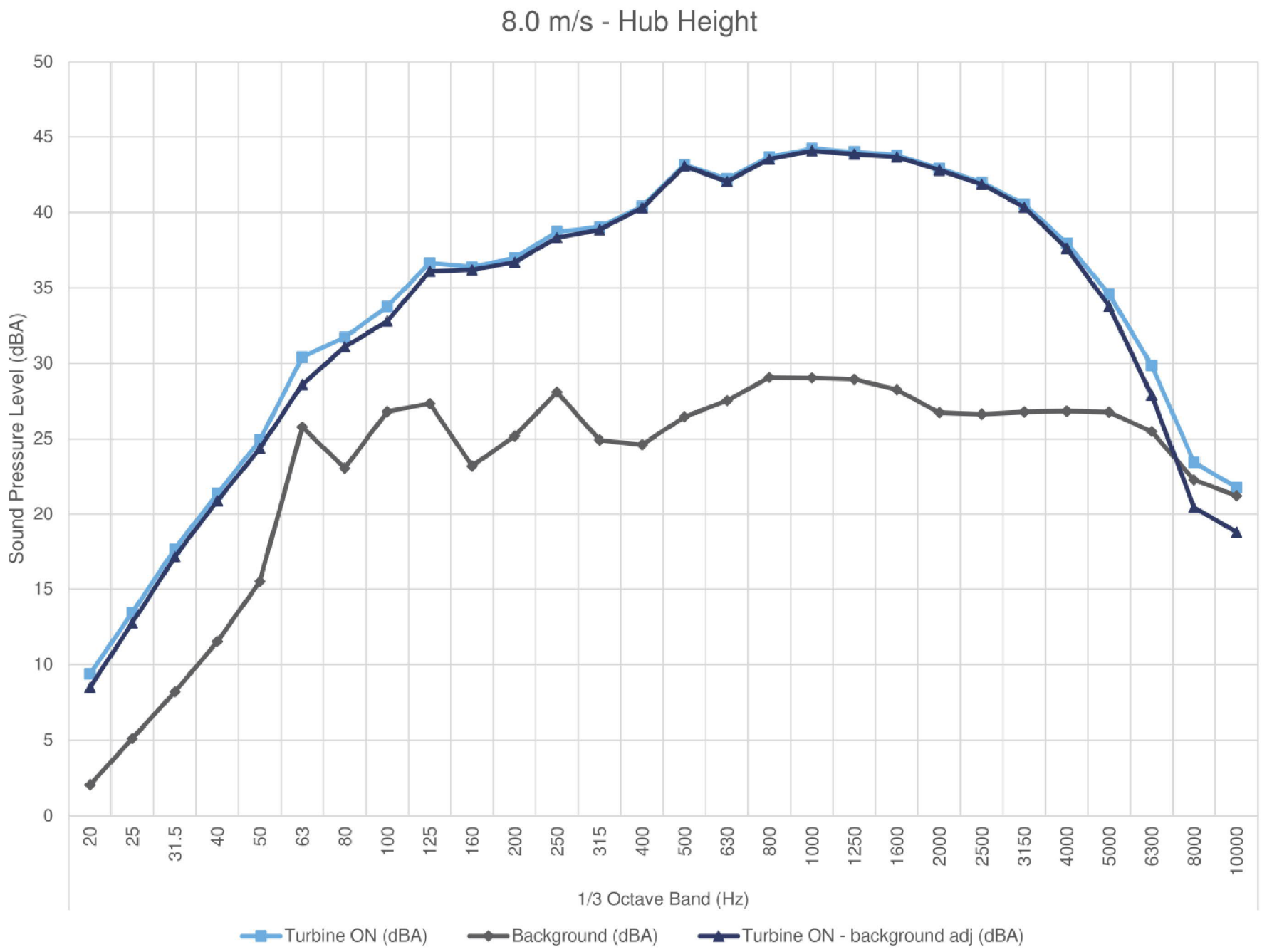

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		Figure Title Plot of sound pressure spectrum in 1/3 Octave at 8 m/s	**Figure C.05**

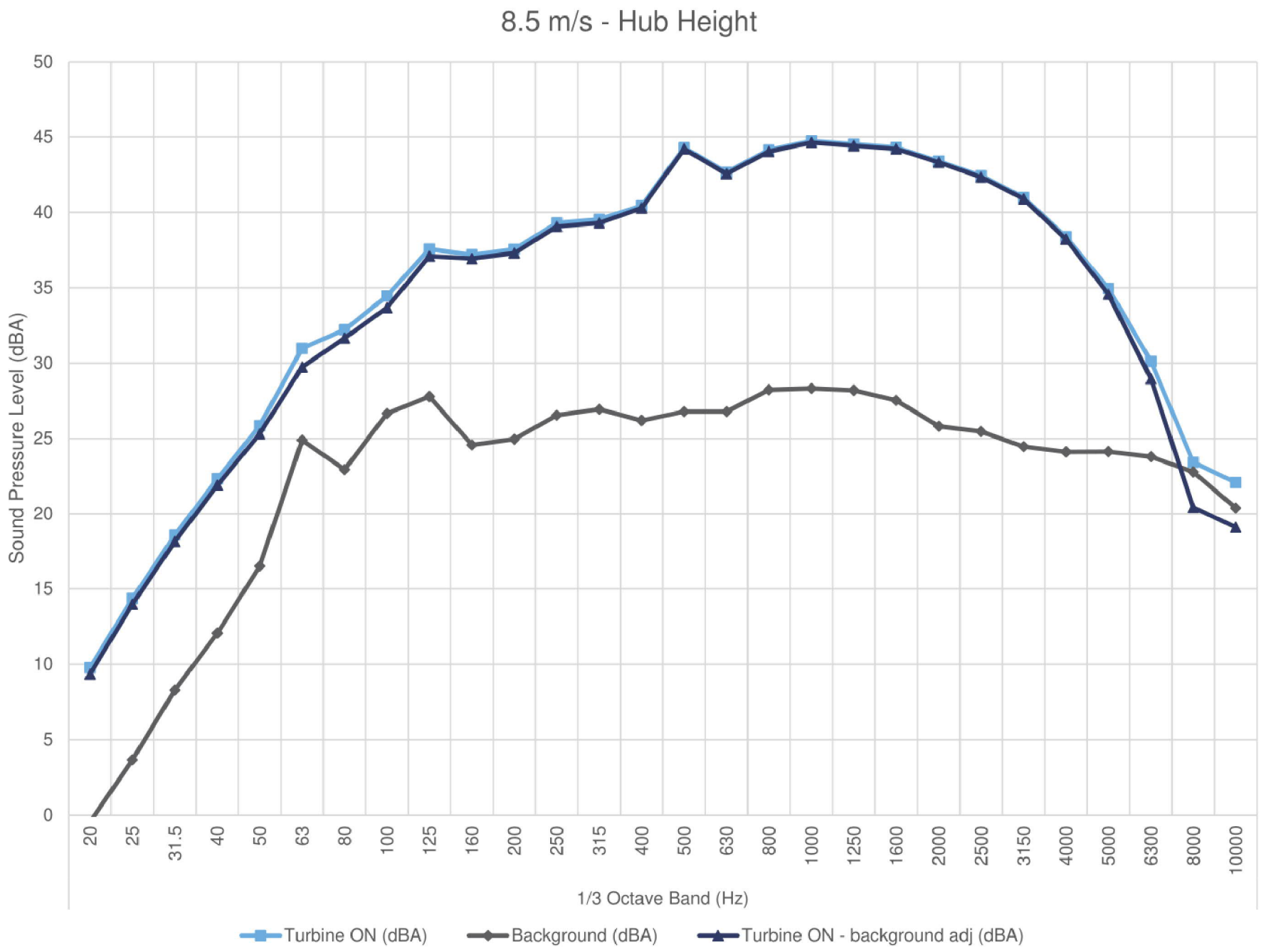

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		Figure Title Plot of sound pressure spectrum in 1/3 Octave at 8.5 m/s	**Figure C.07**

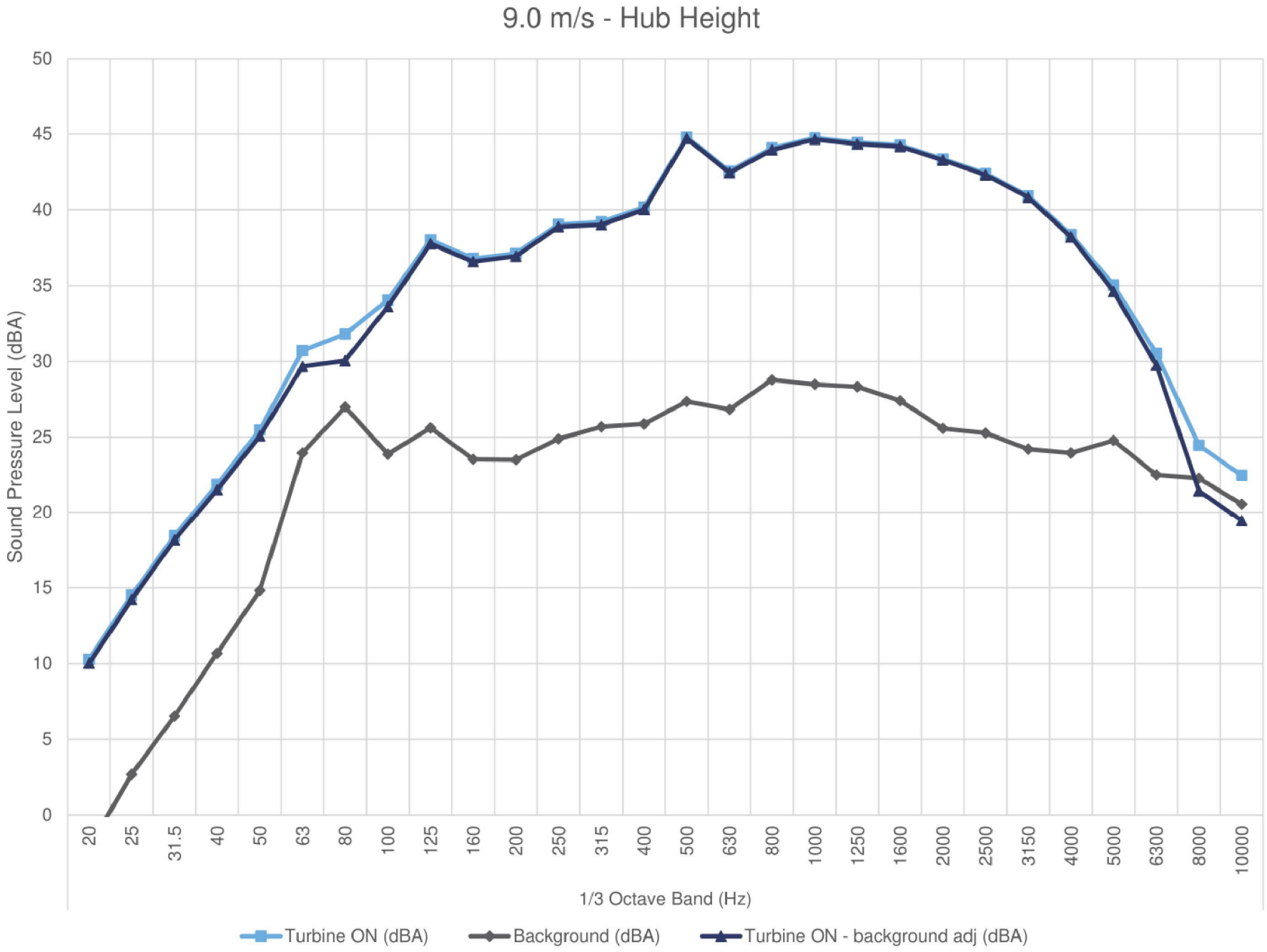

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		Figure Title Plot of sound pressure spectrum in 1/3 Octave at 9 m/s	**Figure C.08**

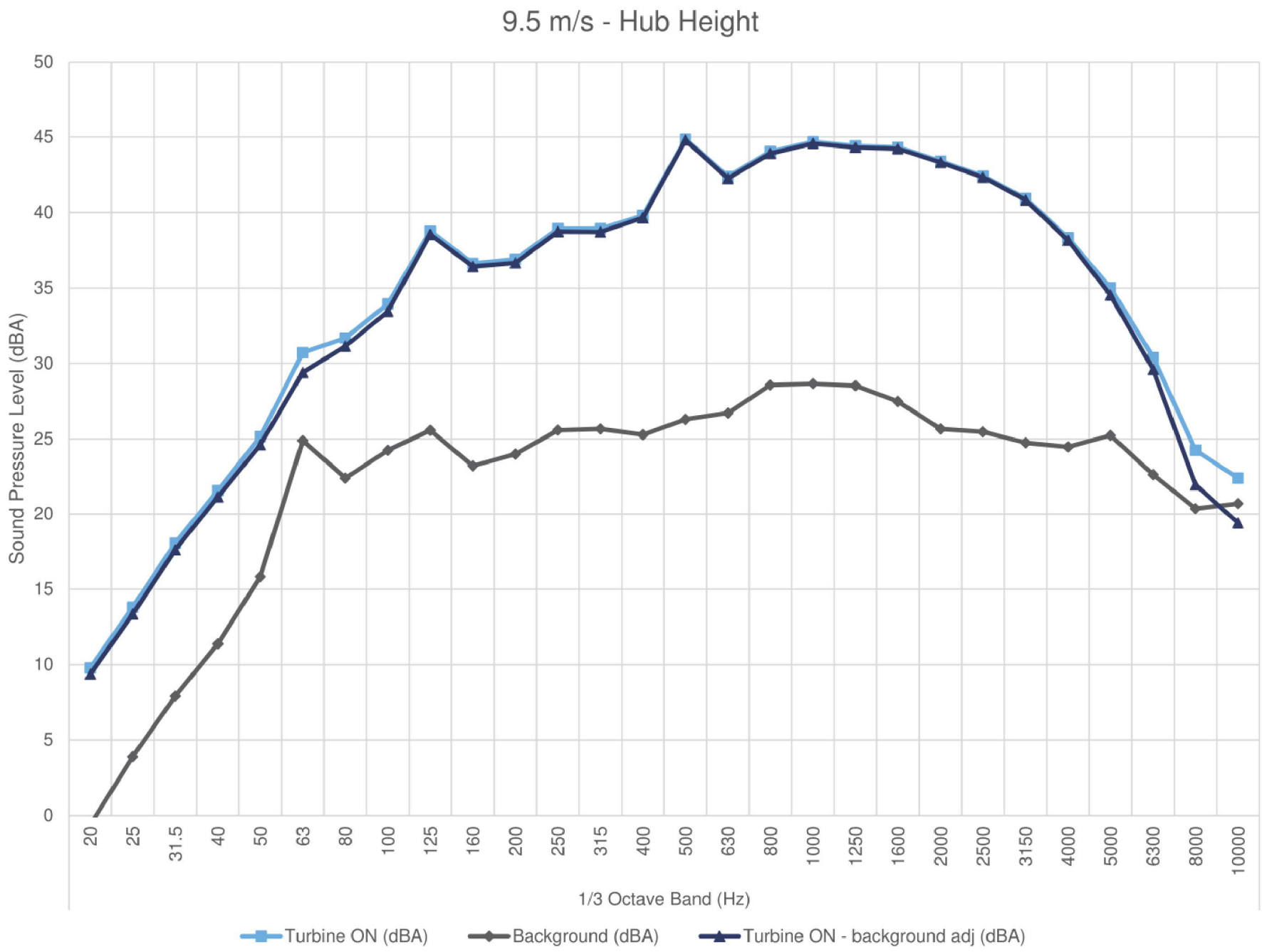

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		Figure Title Plot of sound pressure spectrum in 1/3 Octave at 9.5 m/s	**Figure C.09**

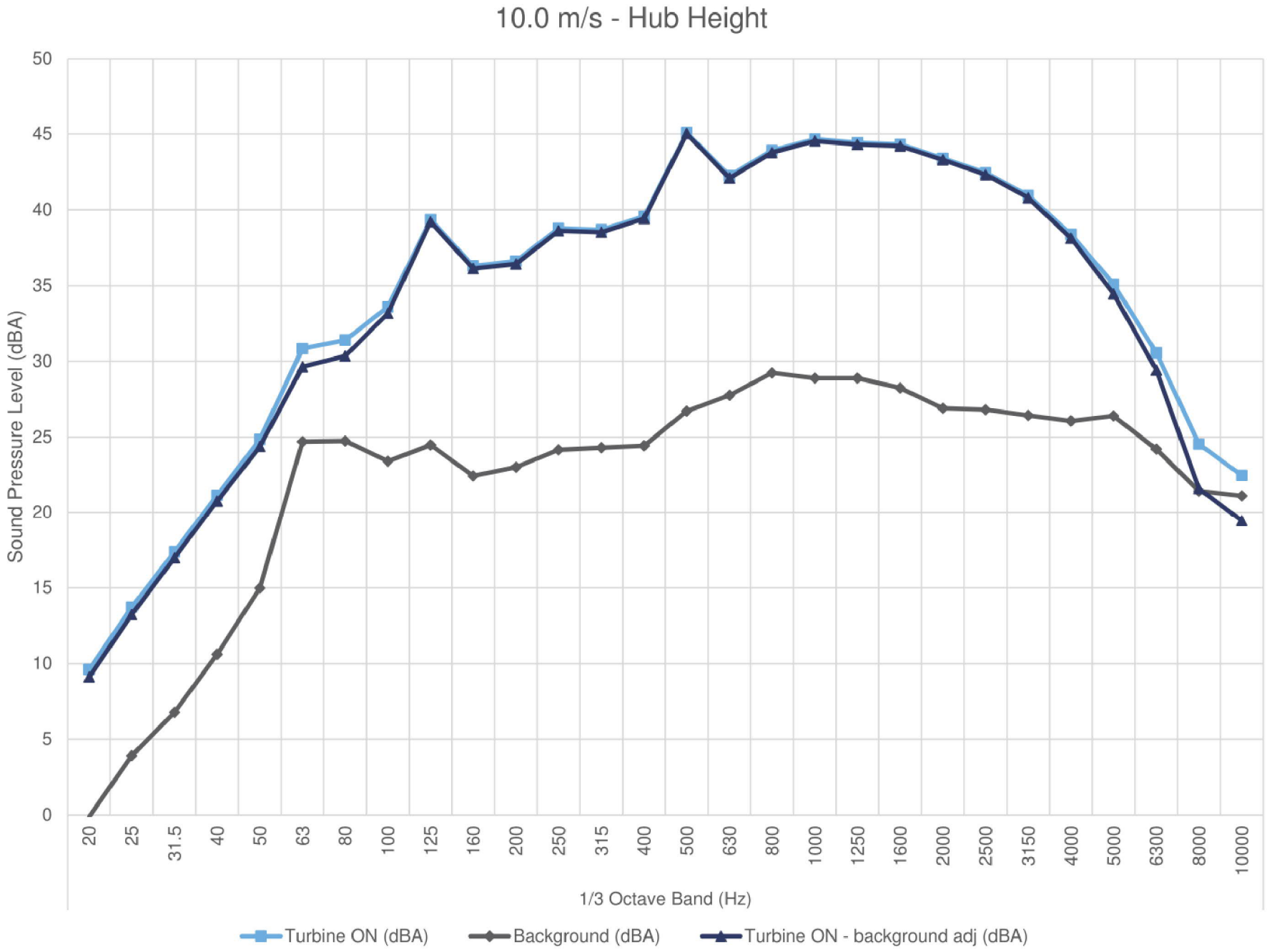

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		Figure Title Plot of sound pressure spectrum in 1/3 Octave at 10 m/s	**Figure C.10**

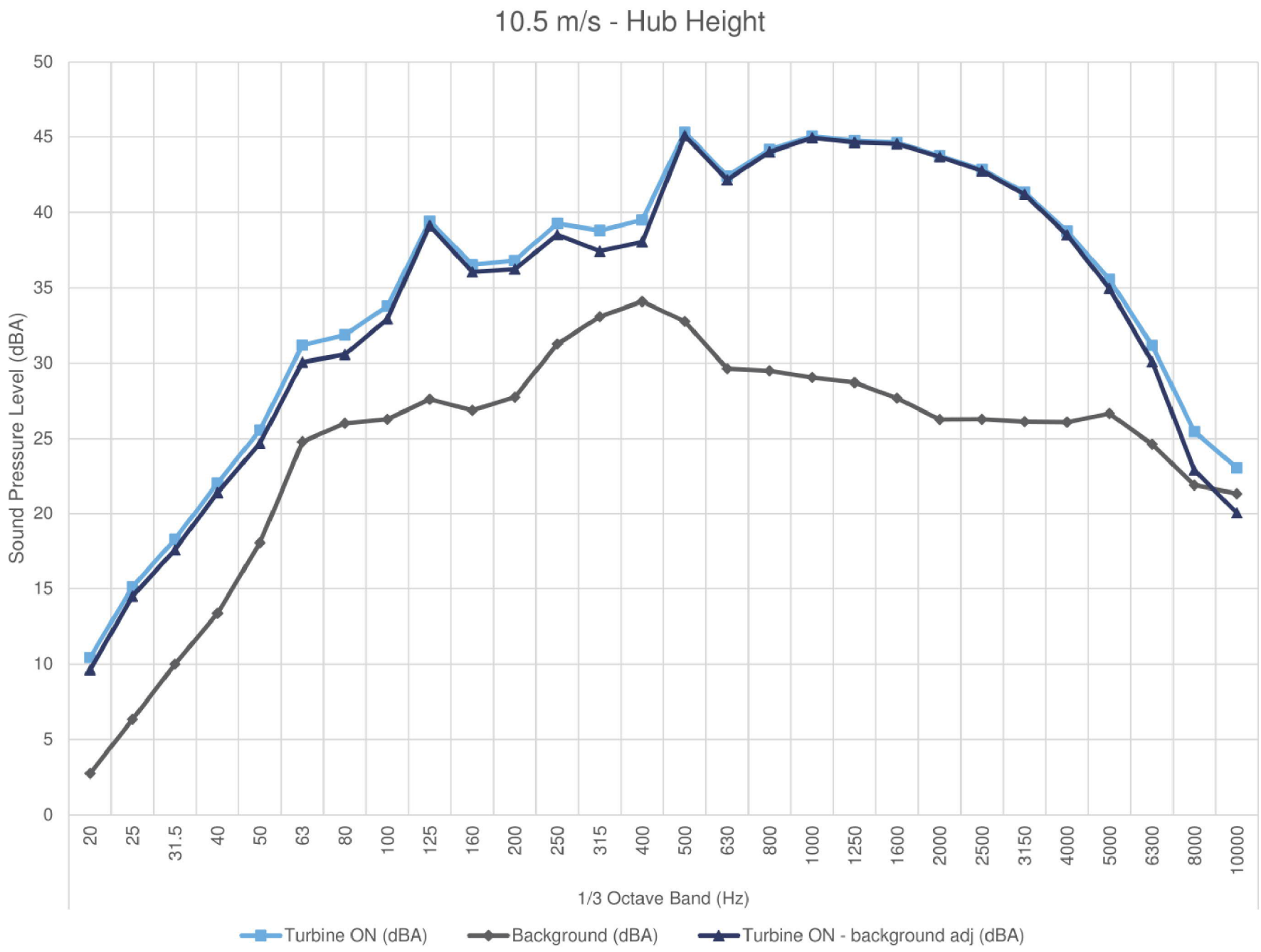

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		Figure Title Plot of sound pressure spectrum in 1/3 Octave at 10.5 m/s	**Figure C.11**

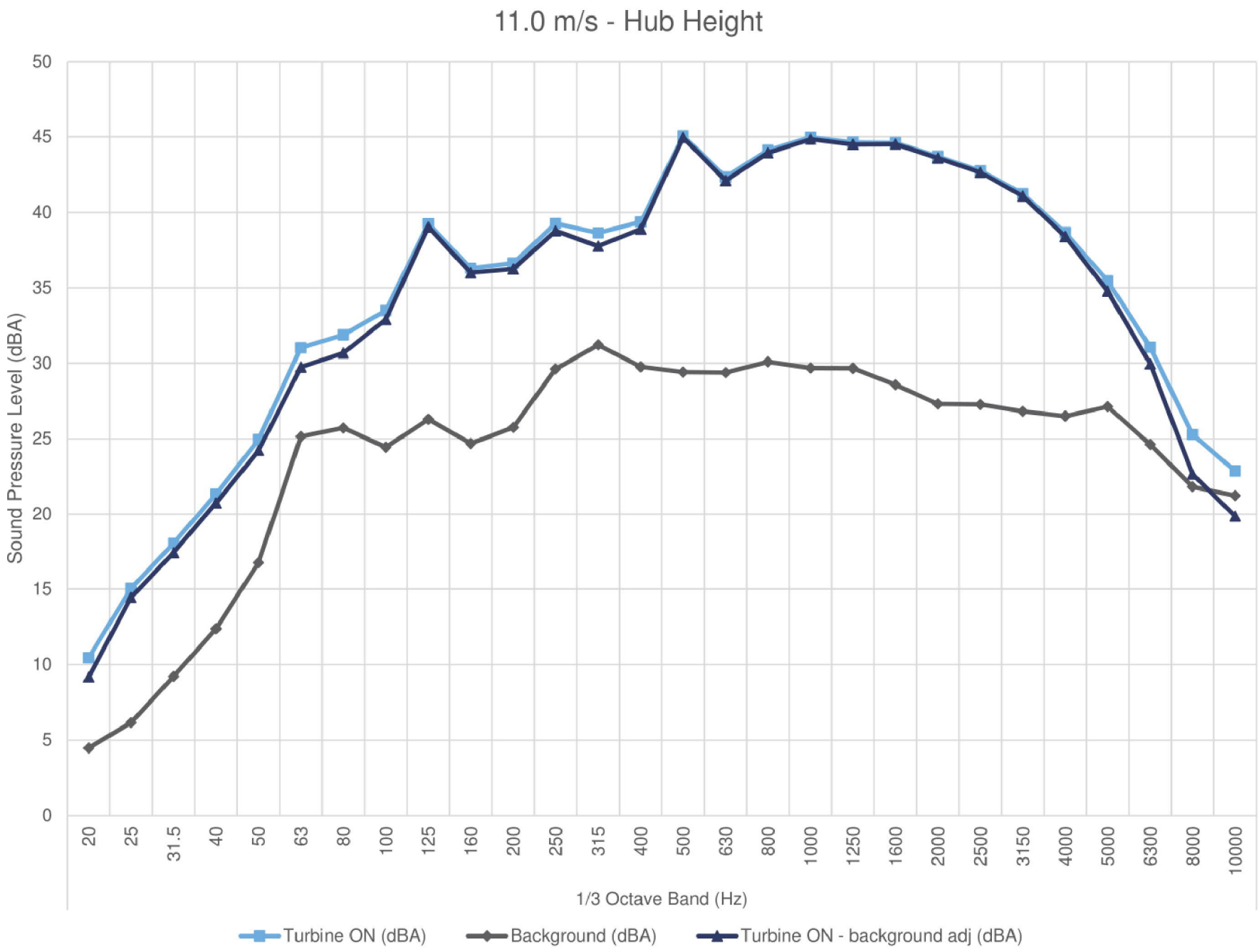

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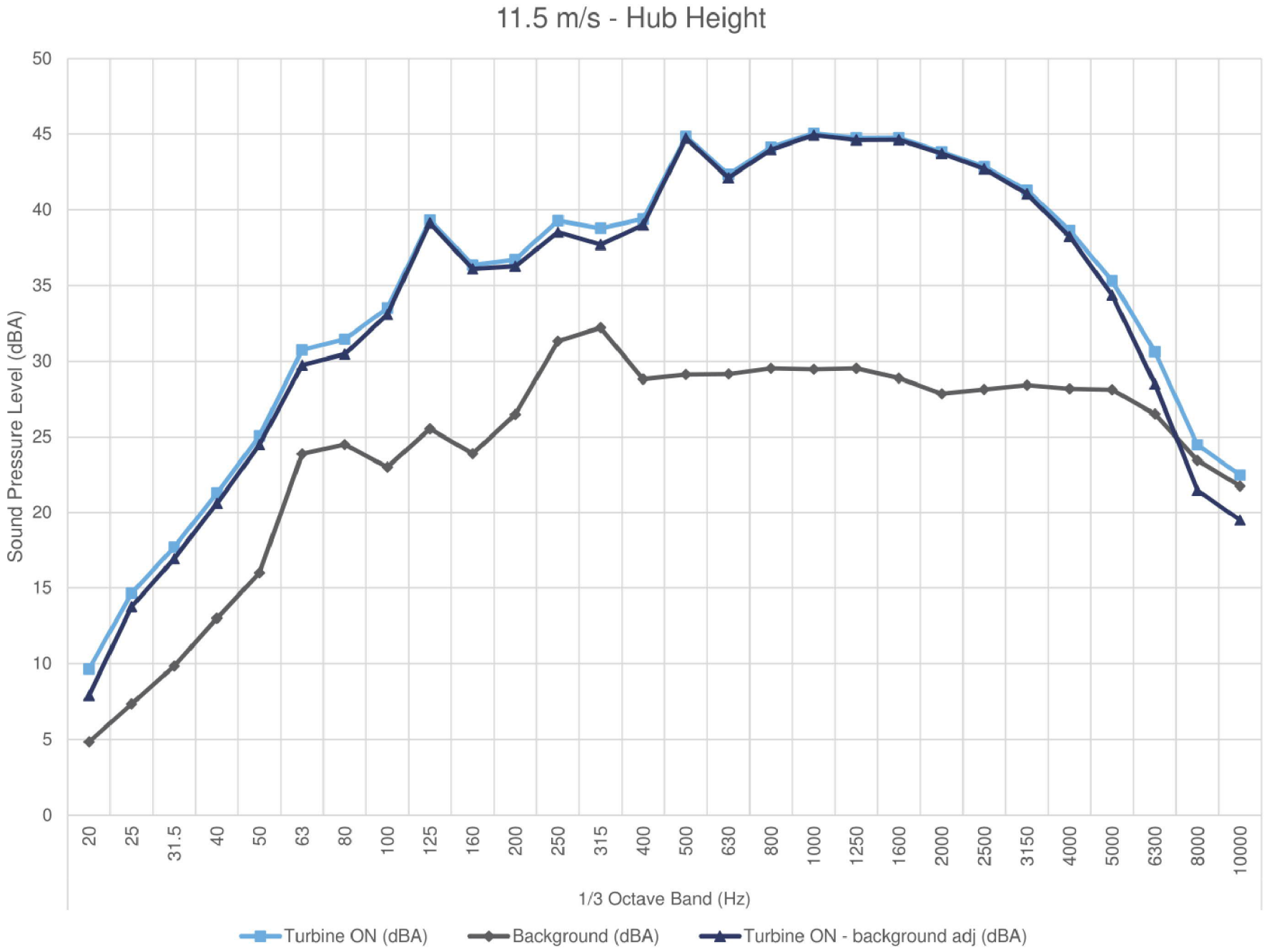
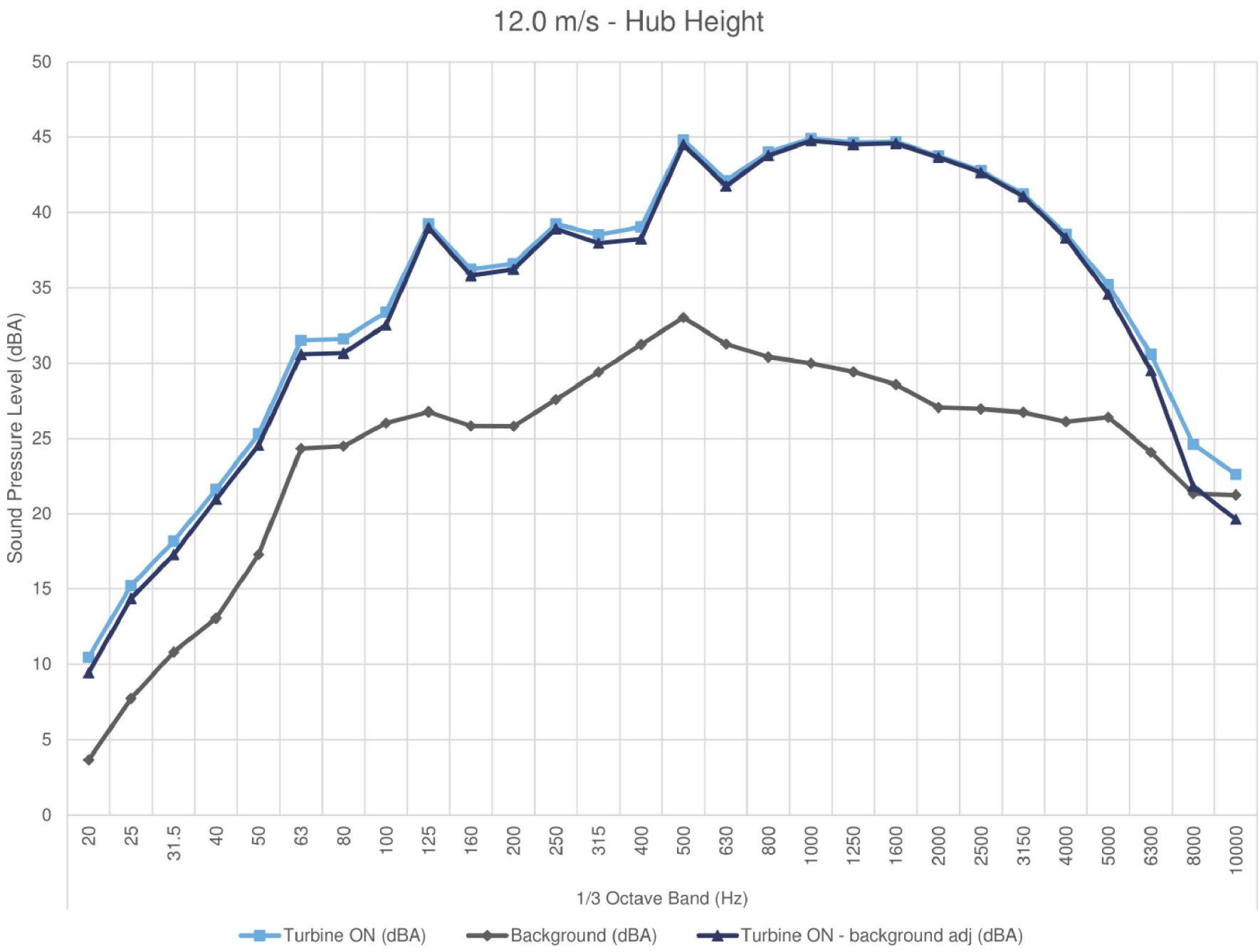
		Figure Title Plot of sound pressure spectrum in 1/3 Octave at 11 m/s	**Figure C.12**



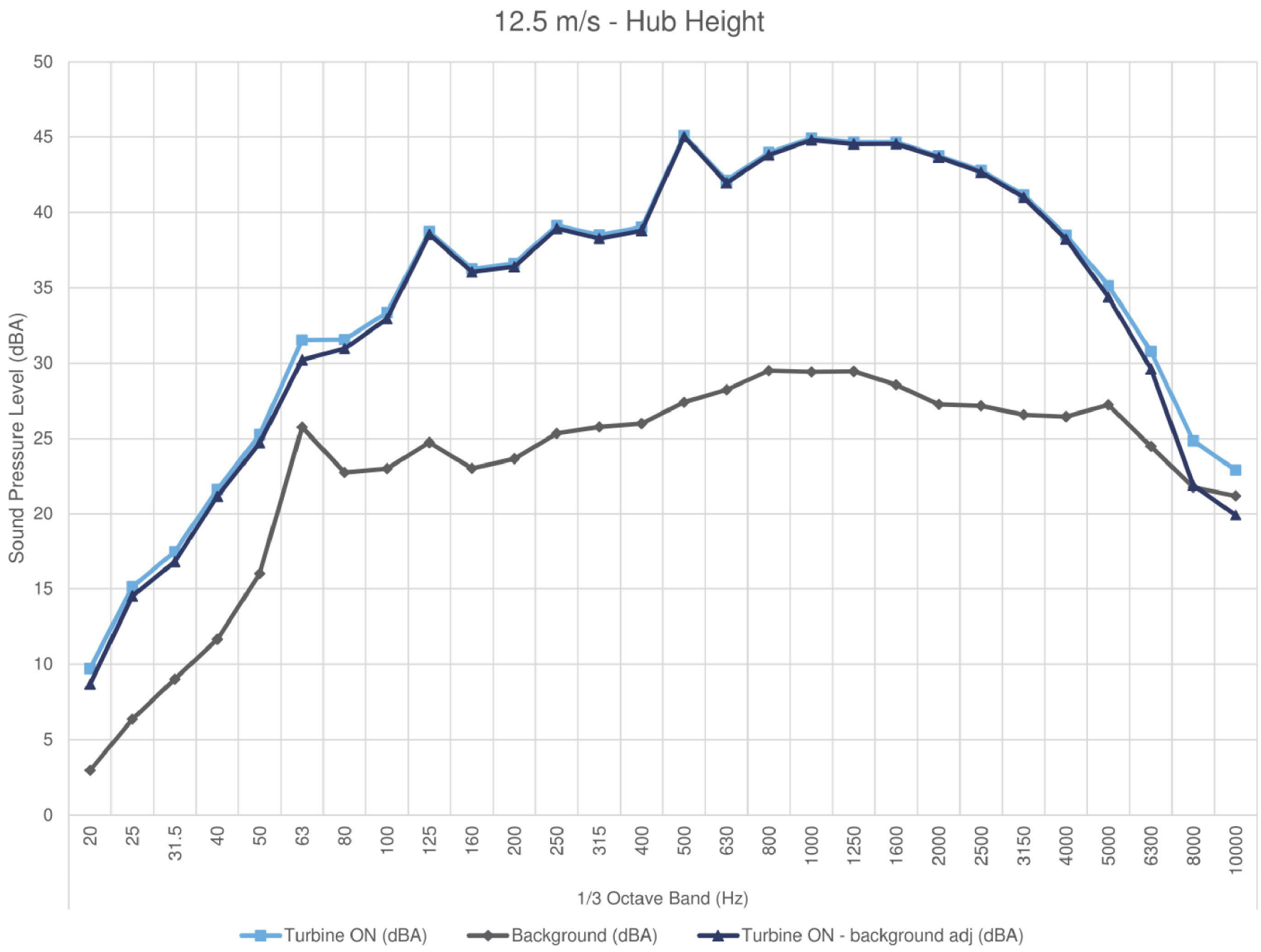
aercoustics	Project ID: 14284.00.T10.RP4	**Project Name**	
	Scale: NTS Drawn by: KC Reviewed by: PA Date: January 2018 Revision: 1	Grand Renewable Wind Farm - T10 - IEC 61400-11 Edition 3.0	
		Figure Title Plot of sound pressure spectrum in 1/3 Octave at 11.5 m/s	**Figure C.13**



aercoustics

Project ID: 14284.00.T10.RP4	**Project Name**
Scale: NTS Drawn by: KC Reviewed by: PA Date: January 2018 Revision: 1	Grand Renewable Wind Farm - T10 - IEC 61400-11 Edition 3.0
	Figure Title Plot of sound pressure spectrum in 1/3 Octave at 12 m/s

Figure C.14



aercoustics	Project ID: 14284.00.T10.RP4	**Project Name**	
	Scale: NTS Drawn by: KC Reviewed by: PA Date: January 2018 Revision: 1	Grand Renewable Wind Farm - T10 - IEC 61400-11 Edition 3.0	
		Figure Title Plot of sound pressure spectrum in 1/3 Octave at 12.5 m/s	**Figure C.15**

Table C.01 Detailed apparent sound power level data at hub height

Project: Grand Renewables Wind Farm - Turbine T10 - IEC 61400-11 Measurement

Report ID: 14284.00.T10.RP4

Created on: 1/23/2018

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		
7.5	Turbine ON (dBA)	7.4	11.6	15.8	19.3	23.4	29.9	29.8	32.8	35.2	34.2	35.3	37.0	37.5	39.5	40.1	40.3	41.8	42.1	41.8	41.6	40.8	39.9	38.6	36.0	32.8	28.1	22.6	22.0		51.8
	Background (dBA)	-1.4	3.2	8.2	11.1	14.8	23.6	23.0	24.7	25.6	22.8	23.6	27.1	23.6	23.0	24.6	25.9	27.9	27.6	27.3	26.5	24.1	24.2	23.6	23.6	23.6	21.6	19.4	20.4		38.4
	Turbine ON - background adj (dBA)	6.7	10.9	15.0	18.6	22.8	28.7	28.8	32.1	34.7	33.9	35.0	36.5	37.3	39.4	39.9	40.2	41.6	42.0	41.7	41.5	40.7	39.7	38.4	35.7	32.2	27.1	19.7	[19]		51.6
	Signal to noise (dB)	8.8	8.3	7.6	8.2	8.6	6.2	6.9	8.1	9.6	11.4	11.7	9.9	13.9	16.5	15.4	14.5	13.9	14.6	14.5	15.1	16.6	15.6	15.0	12.3	9.2	6.6	3.2	1.6		13.4
	Uncertainty (dB)	1.2	1.2	1.0	0.9	0.9	1.1	1.0	0.9	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	0.9	1.0	1.8	3.0		0.7
	PWL (dBA)	57.0	61.1	65.2	68.8	73.0	78.9	79.1	82.3	84.9	84.2	85.3	86.8	87.6	89.6	90.2	90.4	91.9	92.2	91.9	91.7	90.9	90.0	88.7	86.0	82.4	77.3	69.9	[69.2]		101.8
8.0	Turbine ON (dBA)	9.4	13.5	17.7	21.4	24.9	30.4	31.7	33.8	36.6	36.4	37.0	38.7	39.0	40.4	43.1	42.2	43.7	44.2	44.0	43.8	42.9	42.0	40.5	38.0	34.6	29.9	23.5	21.8		53.8
	Background (dBA)	2.0	5.1	8.2	11.5	15.5	25.8	23.1	26.8	27.3	23.2	25.2	28.1	24.9	24.6	26.5	27.5	29.1	29.0	28.9	28.3	26.7	26.6	26.8	26.8	26.8	25.5	22.3	21.2		40.2
	Turbine ON - background adj (dBA)	8.5	12.8	17.1	20.9	24.4	28.6	31.1	32.8	36.1	36.2	36.7	38.3	38.8	40.3	43.0	42.1	43.5	44.1	43.9	43.7	42.8	41.9	40.3	37.6	33.8	27.9	[20.5]	[18.8]		53.6
	Signal to noise (dB)	7.3	8.3	9.5	9.9	9.4	4.6	8.7	7.0	9.3	13.2	11.8	10.6	14.1	15.8	16.7	14.7	14.6	15.2	15.1	15.5	16.2	15.4	13.7	11.1	7.8	4.4	1.2	0.5		13.6
	Uncertainty (dB)	1.3	1.2	0.9	0.9	0.9	1.5	0.9	1.0	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	1.0	1.5	2.1	3.1		0.7
	PWL (dBA)	58.7	63.0	67.4	71.1	74.6	78.8	81.3	83.0	86.3	86.4	86.9	88.6	89.1	90.5	93.3	92.3	93.8	94.3	94.1	93.9	93.0	92.1	90.6	87.9	84.0	78.1	[70.7]	[69]		103.8
8.5	Turbine ON (dBA)	9.8	14.4	18.6	22.3	25.9	31.0	32.2	34.5	37.6	37.2	37.6	39.3	39.5	40.4	44.3	42.7	44.1	44.7	44.5	44.3	43.4	42.4	41.0	38.4	34.9	30.1	23.4	22.1		54.3
	Background (dBA)	-0.5	3.7	8.3	12.1	16.5	24.9	23.0	26.7	27.8	24.6	25.0	26.6	26.9	26.2	26.8	26.8	28.2	28.3	28.2	27.5	25.8	25.5	24.5	24.1	24.1	23.8	22.8	20.4		39.6
	Turbine ON - background adj (dBA)	9.3	14.0	18.1	21.9	25.3	29.7	31.7	33.7	37.1	36.9	37.3	39.1	39.3	40.3	44.2	42.6	44.0	44.6	44.4	44.2	43.3	42.3	40.9	38.2	34.6	29.0	[20.4]	[19.1]		54.2
	Signal to noise (dB)	10.2	10.7	10.3	10.3	9.4	6.1	9.3	7.8	9.8	12.6	12.6	12.7	12.6	14.3	17.5	15.9	15.9	16.4	16.3	16.8	17.6	17.0	16.5	14.3	10.8	6.3	0.6	1.7		14.7
	Uncertainty (dB)	1.2	1.1	0.9	0.9	1.0	1.2	0.9	1.0	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	0.9	1.1	2.0	3.2		0.7
	PWL (dBA)	59.6	64.2	68.4	72.2	75.6	80.0	81.9	83.9	87.3	87.2	87.5	89.3	89.5	90.5	94.4	92.8	94.3	94.9	94.7	94.4	93.6	92.6	91.1	88.5	84.8	79.2	[70.7]	[69.3]		104.4
9.0	Turbine ON (dBA)	10.3	14.5	18.5	21.9	25.5	30.7	31.8	34.0	38.0	36.8	37.1	39.1	39.2	40.2	44.8	42.6	44.1	44.8	44.4	44.3	43.4	42.4	40.9	38.4	35.0	30.5	24.5	22.5		54.3
	Background (dBA)	-2.1	2.7	6.5	10.7	14.8	23.9	27.0	23.9	25.6	23.5	23.5	24.9	25.7	25.9	27.4	26.8	28.8	28.5	28.3	27.4	25.6	25.3	24.2	24.0	24.8	22.5	22.3	20.6		39.3
	Turbine ON - background adj (dBA)	10.0	14.2	18.2	21.5	25.1	29.7	30.1	33.6	37.8	36.6	36.9	38.9	39.0	40.0	44.7	42.4	44.0	44.7	44.3	44.2	43.3	42.3	40.8	38.2	34.6	29.8	[21.5]	[19.5]		54.2
	Signal to noise (dB)	12.4	11.8	11.9	11.2	10.7	6.8	4.8	10.2	12.4	13.3	13.6	14.2	13.5	14.3	17.4	15.7	15.3	16.3	16.1	16.9	17.8	17.1	16.7	14.4	10.3	8.0	2.2	1.9		15.0
	Uncertainty (dB)	1.1	1.1	0.9	0.9	0.9	1.1	1.5	0.9	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	1.0	2.1	3.1		0.7
	PWL (dBA)	60.3	64.5	68.4	71.8	75.3	79.9	80.3	83.8	88.0	86.8	87.2	89.1	89.3	90.2	95.0	92.7	94.2	94.9	94.6	94.4	93.5	92.5	91.1	88.4	84.9	80.0	[71.7]	[69.7]		104.4
9.5	Turbine ON (dBA)	9.8	13.8	18.1	21.6	25.1	30.7	31.7	33.9	38.8	36.6	36.9	38.9	38.9	39.8	44.9	42.4	44.0	44.7	44.4	44.3	43.4	42.4	40.9	38.3	35.0	30.4	24.3	22.4		54.3
	Background (dBA)	-0.6	3.9	7.9	11.4	15.8	24.9	22.4	24.3	25.6	23.2	24.0	25.6	25.7	25.3	26.3	26.7	28.6	28.7	28.5	27.5	25.7	25.5	24.7	24.5	25.2	22.6	20.4	20.7		39.2
	Turbine ON - background adj (dBA)	9.4	13.3	17.6	21.1	24.6	29.4	31.1	33.5	38.5	36.4	36.7	38.7	38.7	39.6	44.8	42.3	43.9	44.6	44.3	44.2	43.3	42.3	40.8	38.2	34.5	29.6	22.0	[19.4]		54.2
	Signal to noise (dB)	10.4	9.9	10.1	10.2	9.3	5.8	9.3	9.7	13.2	13.4	12.9	13.4	13.3	14.5	18.6	15.7	15.5	16.0	15.9	16.8	17.7	16.9	16.2	13.9	9.8	7.8	3.9	1.7		15.1
	Uncertainty (dB)	1.1	1.1	0.9	0.9	0.9	1.1	0.9	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.6	0.7	0.6	0.6	0.7	0.7	0.8	0.8	0.9	1.4	3.0		0.7
	PWL (dBA)	59.6	63.6	67.8	71.4	74.8	79.6	81.4	83.7	88.8	86.7	86.9	89.0	89.0	89.9	95.0	92.5	94.1	94.8	94.5	94.5	93.6	92.6	91.1	88.4	84.8	79.8	72.2	[69.6]		104.4
10.0	Turbine ON (dBA)	9.6	13.7	17.4	21.2	24.8	30.8	31.4	33.6	39.3	36.3	36.6	38.8	38.7	39.6	45.1	42.3	43.9	44.7	44.4	44.3	43.4	42.4	41.0	38.4	35.1	30.6	24.5	22.5		54.3
	Background (dBA)	-0.1	3.9	6.8	10.6	15.0	24.7	24.7	23.4	24.5	22.4	23.0	24.2	24.3	24.4	26.7	27.8	29.2	28.9	28.9	28.2	26.9	26.8	26.4	26.1	26.4	24.2	21.4	21.1		39.7
	Turbine ON - background adj (dBA)	9.1	13.2	17.0	20.8	24.4	29.6	30.4	33.2	39.2	36.1	36.4	38.6	38.5	39.4	45.0	42.1	43.8	44.6	44.3	44.2	43.3	42.3	40.8	38.1	34.4	29.4	21.6	[19.5]		54.1
	Signal to noise (dB)	9.7	9.8	10.6	10.6	9.9	6.2	6.7	10.2	14.9	13.9	13.6	14.6	14.4	15.1	18.4	14.5	14.7	15.8	15.5	16.1	16.5	15.6	14.5	12.3	8.7	6.4	3.1	1.3		14.6
	Uncertainty (dB)	1.1	1.1	0.8	0.9	0.9	1.1	1.0	0.8	0.8	0.8	0.7	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.7	0.7	0.8	0.8	1.0	1.8	3.0		0.7
	PWL (dBA)	59.4	63.5	67.2	71.0	74.6	79.9	80.6	83.4	89.4	86.4	86.7	88.9	88.8	89.7	95.3	92.3	94.0	94.8	94.5	94.5	93.5	92.6	91.0	88.4	84.7	79.7	71.8	[69.7]		104.4
10.5	Turbine ON (dBA)	10.4	15.1	18.3	22.1	25.5	31.2	31.9	33.8	39.4	36.5	36.8	39.3	38.8	39.5	45.3	42.4	44.2	45.1	44.8	44.6	43.8	42.8	41.3	38.7	35.6	31.2	25.5	23.1		54.6
	Background (dBA)	2.7	6.3	10.0	13.4	18.1	24.8	26.0	26.3	27.6	26.9	27.8	31.3	33.1	34.1	32.8	29.6	29.5	29.0	28.7	27.7	26.3	26.3	26.1	26.1	26.7	24.6	21.9	21.3		42.4
	Turbine ON - background adj (dBA)	9.6	14.5	17.6	21.4	24.7	30.1	30.6	32.9	39.1	36.0	36.2	38.5	37.4	38.0	45.1	42.2	44.0	44.9	44.6	44.5	43.7	42.8	41.2	38.5	35.0	30.1	22.9	[20.1]		54.3
	Signal to noise (dB)	7.7	8.8	8.3	8.7	7.5	6.4	5.9	7.5	11.8	9.7	9.1	8.0	5.7	5.4	12.6	12.8	14.7	16.0	16.0	17.0	17.5	16.6	15.2	12.6	8.9	6.5	3.5	1.7		12.2
	Uncertainty (dB)	1.3	1.2	1.0	1.0	1.0	1.1	1.2	1.0	0.9	0.9	0.8	0.9	1.1	1.2	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.8	0.9	1.1	1.7	3.2		0.8
	PWL (dBA)	59.9	64.7	67.8	71.7	74.9	80.3	80.8	83.2	89.4	86.3	86.5	88.8	87.7	88.3	95.3	92.4	94.2	95.2	94.9	94.8	93.9	93.0	91.4	88.7	85.2	80.3	73.2	[70.3]		104.5
11.0	Turbine ON (dBA)	10.4	15.0	18.0	21.3	25.0	31.0	31.9	33.5	39.2	36.3	36.6	39.3	38.6	39.4	45.1	42.3	44.1	45.0	44.6	44.6	43.7	42.8	41.2	38.7	35.5	31.1	25.3	22.9		54.5
	Background (dBA)	4.5	6.2	9.2	12.4	16.7	25.2	25.7	24.4	26.3	24.7	25.8	29.6	31.2	29.8	29.4	29.4	30.1	29.7	29.7	28.6	27.3	27.3	26.8	26.5	27.1	24.6	21.8	21.2		41.4
	Turbine ON - background adj (dBA)	9.2	14.4	17.4	20.7	24.2	29.7	30.7	32.9	39.0	36.0	36.3	38.8	37.8	38.9	45.0	42.1	43.9	44.8	44.5	44.5	43.6	42.6	41.1	38.4	34.8	30.0	22.7	[19.9]		54.3
	Signal to noise (dB)	6.0	8.9	8.8	9.0	8.2	5.9	6.2	9.0	13.0	11.6	10.9	9.6	7.4	9.6	15.7	12.9	14.0	15.3	15.0	16.0	16.4	15.5	14.4	12.2	8.3	6.4	3.4	1.6		13.1
	Uncertainty (dB)	1.5	1.2	1.0	1.0	1.0	1.2	1.2	0.9	0.8	0.9	0.8	0.8	0.9	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.8	1.0	1.1	1.7	3.2		0.8
	PWL (dBA)	59.4	64.7	67.7	71.0	74.5	80.0	80.9	83.1	89.3	86.2	86.5	89.0	88.0	89.1	95.2	92.3	94.2	95.1	94.7	94.7	93.8	92.9	91.3	88.6	85.0	80.2	72.9	[70.1]		104.5

Table C.01 Detailed apparent sound power level data at hub height

Project: Grand Renewables Wind Farm - Turbine T10 - IEC 61400-11 Measurement

Report ID: 14284.00.T10.RP4

Created on: 1/23/2018

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		
11.5	Turbine ON (dBA)	9.6	14.7	17.7	21.3	25.1	30.7	31.5	33.5	39.3	36.4	36.7	39.3	38.8	39.4	44.8	42.3	44.1	45.0	44.7	44.7	43.8	42.8	41.3	38.7	35.3	30.6	24.5	22.5		54.5
	Background (dBA)	4.8	7.3	9.8	13.0	16.0	23.9	24.5	23.0	25.5	23.9	26.5	31.3	32.2	28.8	29.1	29.2	29.5	29.5	29.5	28.9	27.8	28.1	28.4	28.2	28.1	26.5	23.5	21.8		41.7
	Turbine ON - background adj (dBA)	7.9	13.8	16.9	20.6	24.5	29.7	30.5	33.1	39.1	36.1	36.3	38.5	37.7	39.0	44.7	42.1	44.0	44.9	44.6	44.6	43.7	42.7	41.1	38.2	34.4	28.5	[21.5]	[19.5]		54.3
	Signal to noise (dB)	4.8	7.3	7.9	8.3	9.1	6.9	7.0	10.5	13.8	12.4	10.2	8.0	6.6	10.6	15.7	13.2	14.6	15.6	15.2	15.8	16.0	14.7	12.9	10.5	7.2	4.1	1.0	0.7		12.8
	Uncertainty (dB)	1.8	1.3	1.0	1.0	1.0	1.1	1.0	0.9	0.8	0.8	0.8	0.9	1.0	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.9	1.0	1.5	2.0	3.2		0.8
	PWL (dBA)	58.1	64.0	67.2	70.9	74.7	80.0	80.7	83.3	89.4	86.3	86.5	88.8	87.9	89.2	95.0	92.4	94.2	95.2	94.8	94.9	94.0	92.9	91.3	88.5	84.6	78.7	[71.7]	[69.7]		104.5
12.0	Turbine ON (dBA)	10.5	15.2	18.2	21.6	25.3	31.5	31.6	33.4	39.2	36.2	36.6	39.2	38.5	39.0	44.8	42.1	44.0	44.9	44.6	44.7	43.7	42.8	41.2	38.6	35.2	30.6	24.6	22.6		54.4
	Background (dBA)	3.7	7.7	10.8	13.0	17.3	24.3	24.5	26.0	26.8	25.8	25.8	27.6	29.4	31.2	33.0	31.3	30.4	30.0	29.4	28.6	27.1	27.0	26.7	26.1	26.4	24.1	21.4	21.3		41.7
	Turbine ON - background adj (dBA)	9.4	14.4	17.3	21.0	24.6	30.6	30.7	32.5	39.0	35.8	36.2	38.9	38.0	38.2	44.5	41.7	43.8	44.7	44.5	44.6	43.6	42.6	41.0	38.3	34.6	29.5	21.9	[19.6]		54.1
	Signal to noise (dB)	6.8	7.5	7.3	8.6	8.0	7.2	7.1	7.4	12.4	10.4	10.8	11.6	9.1	7.8	11.8	10.8	13.6	14.9	15.2	16.1	16.7	15.8	14.5	12.4	8.8	6.5	3.3	1.4		12.6
	Uncertainty (dB)	1.4	1.3	1.0	0.9	1.0	1.0	1.0	1.0	0.8	0.9	0.7	0.7	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	1.8	3.1		0.7
	PWL (dBA)	59.7	64.6	67.5	71.2	74.8	80.8	80.9	82.8	89.2	86.0	86.5	89.1	88.2	88.5	94.7	92.0	94.0	95.0	94.7	94.8	93.9	92.9	91.3	88.5	84.8	79.7	72.1	[69.9]		104.4
12.5	Turbine ON (dBA)	9.7	15.1	17.5	21.6	25.3	31.5	31.6	33.4	38.7	36.3	36.6	39.1	38.5	39.0	45.1	42.1	44.0	44.9	44.6	44.6	43.7	42.8	41.2	38.5	35.2	30.8	24.9	22.9		54.4
	Background (dBA)	3.0	6.4	9.0	11.6	16.0	25.8	22.8	23.0	24.7	23.0	23.7	25.4	25.8	26.0	27.4	28.2	29.5	29.4	29.5	28.6	27.3	27.2	26.6	26.5	27.2	24.5	21.8	21.2		40.1
	Turbine ON - background adj (dBA)	8.7	14.5	16.8	21.2	24.7	30.2	31.0	32.9	38.5	36.0	36.4	38.9	38.3	38.8	45.0	41.9	43.8	44.8	44.5	44.5	43.6	42.7	41.0	38.2	34.4	29.6	21.9	[19.9]		54.2
	Signal to noise (dB)	6.7	8.8	8.4	10.0	9.3	5.8	8.8	10.3	14.0	13.2	13.0	13.8	12.7	13.0	17.7	13.9	14.5	15.5	15.2	16.1	16.5	15.6	14.6	12.0	7.9	6.3	3.1	1.7		14.3
	Uncertainty (dB)	1.4	1.2	1.0	0.9	1.0	1.2	0.9	0.9	0.8	0.8	0.7	0.7	0.7	0.7	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.8	0.9	1.1	1.9	3.2		0.7
	PWL (dBA)	58.9	64.8	67.0	71.4	75.0	80.4	81.2	83.2	88.8	86.3	86.6	89.2	88.5	89.0	95.3	92.2	94.0	95.0	94.8	94.8	93.9	92.9	91.2	88.5	84.6	79.9	72.2	[70.2]		104.5

Table C.02 Detailed apparent sound power level data at 10m height

Project: Grand Renewables Wind Farm - Turbine T10 - IEC 61400-11 Measurement

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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)	6.4	11.1	15.5	18.9	23.2	30.1	30.0	32.5	35.0	33.9	34.7	36.5	36.8	38.1	39.4	39.6	41.1	41.5	41.0	40.8	40.0	39.0	37.7	35.1	31.8	27.3	21.9	21.7		51.0
	Background (dBA)	-3.1	1.8	6.5	10.4	14.5	23.7	23.0	23.9	24.7	22.4	23.1	25.8	23.1	22.8	24.7	25.5	27.8	27.6	27.3	26.4	24.1	24.1	23.1	22.9	22.7	20.8	18.8	20.1		38.0
	Turbine ON - background adj (dBA)	5.9	10.5	14.9	18.2	22.6	29.0	29.0	31.9	34.6	33.6	34.4	36.1	36.6	38.0	39.3	39.4	40.9	41.3	40.8	40.6	39.8	38.9	37.5	34.8	31.3	26.1	19.0	[18.7]		50.8
	Signal to noise (dB)	9.6	9.3	9.0	8.5	8.7	6.5	6.9	8.6	10.3	11.5	11.6	10.7	13.8	15.3	14.8	14.1	13.3	13.8	13.8	14.4	15.9	14.9	14.6	12.2	9.1	6.5	3.1	1.6		13.0
	Uncertainty (dB)	1.0	1.0	0.8	0.8	0.8	0.9	0.9	0.8	0.7	0.7	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.7	0.7	0.7	0.8	0.9	1.5	2.7		0.6
	PWL (dBA)	56.2	60.8	65.2	68.5	72.8	79.2	79.2	82.1	84.9	83.8	84.7	86.3	86.9	88.2	89.5	89.6	91.1	91.5	91.1	90.8	90.1	89.1	87.8	85.1	81.5	76.4	69.2	[69]		101.1
6.0	Turbine ON (dBA)	9.9	14.2	18.3	22.0	25.5	30.7	31.9	34.1	37.6	36.8	37.2	39.0	39.2	40.3	44.2	42.4	43.9	44.5	44.3	44.1	43.2	42.2	40.8	38.2	34.8	30.2	23.9	22.2		54.1
	Background (dBA)	0.5	4.2	8.0	11.7	15.8	25.0	24.9	26.3	27.3	23.9	24.8	27.0	26.1	25.8	27.0	27.2	28.8	28.7	28.6	27.9	26.2	26.0	25.6	25.4	25.6	24.4	22.8	20.8		39.9
	Turbine ON - background adj (dBA)	9.4	13.8	17.9	21.5	25.0	29.4	31.0	33.4	37.2	36.6	36.9	38.7	39.0	40.1	44.1	42.3	43.8	44.4	44.2	44.0	43.1	42.1	40.7	38.0	34.3	28.8	[20.9]	[19.2]		54.0
	Signal to noise (dB)	9.4	10.1	10.4	10.3	9.7	5.7	7.1	7.9	10.4	12.9	12.4	12.0	13.1	14.5	17.1	15.2	15.1	15.8	15.7	16.2	17.0	16.2	15.2	12.8	9.3	5.7	1.1	1.4		14.2
	Uncertainty (dB)	1.1	1.1	0.8	0.9	0.9	1.1	1.0	0.9	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)	59.6	64.0	68.2	71.8	75.2	79.6	81.2	83.6	87.5	86.8	87.2	89.0	89.2	90.4	94.3	92.5	94.0	94.7	94.4	94.2	93.4	92.4	90.9	88.2	84.5	79.1	[71.1]	[69.4]		104.2
7.0	Turbine ON (dBA)	9.8	14.1	17.8	21.4	25.1	30.8	31.6	33.7	39.1	36.5	36.7	39.0	38.8	39.6	45.0	42.3	44.0	44.8	44.5	44.4	43.5	42.5	41.0	38.5	35.2	30.6	24.6	22.6		54.4
	Background (dBA)	1.5	5.4	9.0	12.4	17.0	24.8	25.0	25.3	26.6	25.4	26.3	29.4	30.9	31.8	30.8	28.6	29.2	28.9	28.7	27.8	26.3	26.2	25.9	25.7	26.3	24.1	21.4	21.1		41.3
	Turbine ON - background adj (dBA)	9.1	13.5	17.2	20.8	24.3	29.6	30.5	33.0	38.8	36.1	36.3	38.5	38.0	38.8	44.9	42.1	43.9	44.7	44.4	44.3	43.4	42.4	40.9	38.2	34.6	29.6	21.8	[19.6]		54.1
	Signal to noise (dB)	8.3	8.7	8.8	9.0	8.0	6.0	6.6	8.4	12.5	11.0	10.5	9.6	7.9	7.8	14.2	13.7	14.8	15.9	15.8	16.6	17.2	16.3	15.2	12.7	8.9	6.5	3.2	1.4		13.1
	Uncertainty (dB)	1.1	1.1	0.9	0.9	0.9	1.0	1.0	0.9	0.8	0.8	0.7	0.7	0.8	0.8	0.7	0.7	0.7	0.6	0.6	0.6	0.6	0.7	0.8	0.8	0.8	1.0	1.6	3.0		0.7
	PWL (dBA)	59.4	63.7	67.4	71.1	74.6	79.8	80.7	83.3	89.1	86.3	86.6	88.7	88.2	89.1	95.1	92.4	94.1	94.9	94.6	94.6	93.7	92.7	91.1	88.5	84.8	79.8	72.0	[69.8]		104.4
8.0	Turbine ON (dBA)	10.2	15.0	17.9	21.4	25.1	31.1	31.7	33.5	39.2	36.3	36.6	39.2	38.6	39.3	44.9	42.3	44.1	45.0	44.7	44.7	43.7	42.8	41.2	38.6	35.4	30.9	24.9	22.7		54.5
	Background (dBA)	4.5	7.3	10.1	12.9	16.9	24.7	25.2	24.9	26.5	25.1	26.2	29.8	31.2	30.4	31.3	30.3	30.1	29.8	29.6	28.7	27.4	27.5	27.4	27.0	27.3	25.2	22.3	21.4		41.7
	Turbine ON - background adj (dBA)	8.9	14.2	17.2	20.8	24.4	30.0	30.6	32.8	39.0	36.0	36.2	38.7	37.8	38.7	44.7	42.0	43.9	44.8	44.5	44.6	43.6	42.7	41.1	38.3	34.6	29.5	[21.9]	[19.7]		54.2
	Signal to noise (dB)	5.7	7.7	7.8	8.5	8.2	6.4	6.5	8.6	12.8	11.2	10.5	9.4	7.4	8.9	13.7	12.0	13.9	15.2	15.1	16.0	16.3	15.3	13.8	11.6	8.1	5.7	2.6	1.3		12.7
	Uncertainty (dB)	1.4	1.2	0.9	0.9	0.9	1.0	1.0	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	0.7	0.8	0.8	0.8	0.9	1.1	1.8	3.1		0.7
	PWL (dBA)	59.1	64.5	67.4	71.0	74.6	80.2	80.8	83.1	89.2	86.2	86.5	89.0	88.0	88.9	95.0	92.2	94.1	95.1	94.8	94.8	93.9	92.9	91.3	88.6	84.9	79.7	[72.2]	[70]		104.5
9.0	Turbine ON (dBA)	10.3	15.8	17.9	21.7	25.4	31.9	31.6	33.4	38.7	36.2	36.6	39.0	38.4	38.9	44.9	42.1	43.9	44.9	44.6	44.6	43.7	42.8	41.2	38.6	35.3	31.0	25.4	23.2		54.4
	Background (dBA)	4.4	7.1	9.7	12.2	16.4	25.9	23.3	24.2	26.0	24.6	25.0	26.8	27.5	28.0	30.0	29.9	30.1	30.0	29.7	28.9	27.6	27.6	27.1	26.7	27.0	24.7	21.9	21.2		41.0
	Turbine ON - background adj (dBA)	9.0	15.2	17.2	21.1	24.8	30.6	31.0	32.9	38.5	35.9	36.3	38.7	38.1	38.5	44.8	41.8	43.7	44.8	44.5	44.5	43.6	42.6	41.0	38.3	34.6	29.9	22.7	[20.2]		54.2
	Signal to noise (dB)	5.9	8.8	8.3	9.4	9.0	5.9	8.4	9.2	12.7	11.5	11.5	12.1	10.9	10.9	15.0	12.1	13.8	15.0	14.9	15.7	16.1	15.2	14.1	11.8	8.3	6.3	3.4	2.0		13.4
	Uncertainty (dB)	1.4	1.2	0.9	0.9	0.9	1.1	0.9	0.9	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	1.0	1.7	3.1		0.7
	PWL (dBA)	59.2	65.5	67.5	71.4	75.0	80.8	81.2	83.1	88.7	86.1	86.5	89.0	88.3	88.8	95.0	92.0	93.9	95.0	94.7	94.7	93.9	92.9	91.2	88.5	84.9	80.1	73.0	[70.4]		104.4

Table C.03 Type B measurement uncertainty summary

Project: Grand Renewables Wind Farm - Turbine T10 - IEC 61400-11 Measurement
Report ID: 14284.00.T10.RP4

Created on: 1/23/2018

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.04 Detailed measruement uncertainty at hub height

Project: Grand Renewables Wind Farm - Turbine T10 - IEC 61400-11 Measurement

Report ID: 14284.00.T10.RP4

Created on: 1/23/2018

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	
7.5	Turbine ON	7.53	19	Average (dBA)	7.5	11.7	15.9	19.4	23.5	29.7	29.8	32.7	35.2	34.4	35.5	37.1	37.7	39.7	40.3	40.5	42.0	42.3	42.0	41.8	41.0	40.1	38.8	36.2	33.0	28.4	22.8	22.0	52.0
				Uncertainty A (dB)	0.5	0.4	0.3	0.2	0.2	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.4	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.4	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	0.8	0.8	0.9	0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.8	0.8	0.8	0.9	1.5	
	Background	7.54	11	Average (dBA)	-1.2	3.5	8.5	11.2	14.9	23.6	22.9	24.8	25.7	22.9	23.7	27.2	23.6	23.0	24.6	25.9	27.9	27.5	27.3	26.5	24.1	24.2	23.6	23.7	23.6	21.6	19.5	20.4	38.4
				Uncertainty A (dB)	1.0	1.0	1.3	0.6	0.5	1.5	1.1	1.3	1.0	0.8	1.0	1.6	0.8	0.5	0.3	0.5	0.5	0.6	0.3	0.3	0.4	0.3	0.5	0.6	0.8	0.6	0.5	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)	1.5	1.4	1.5	1.0	1.0	1.7	1.3	1.5	1.3	1.2	1.2	1.7	1.1	0.9	0.8	0.8	0.9	0.9	0.8	0.8	0.8	0.9	0.9	1.0	1.2	1.0	0.9	1.5	
8.0	Turbine ON	7.99	32	Average (dBA)	9.4	13.4	17.6	21.3	24.9	30.4	31.7	33.7	36.6	36.4	37.0	38.7	39.0	40.4	43.1	42.2	43.7	44.2	44.0	43.8	42.9	42.0	40.5	37.9	34.6	29.9	23.5	21.8	53.8
				Uncertainty A (dB)	0.4	0.3	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	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	0.8	0.8	0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.8	0.8	0.8	0.8	1.5	
	Background	8.01	19	Average (dBA)	2.1	5.1	8.2	11.5	15.5	25.8	23.1	26.8	27.3	23.2	25.2	28.1	24.9	24.6	26.5	27.6	29.1	29.1	29.0	28.3	26.8	26.7	26.8	26.9	26.8	25.6	22.3	21.3	40.3
				Uncertainty A (dB)	1.5	1.0	0.8	0.6	0.4	1.4	0.6	1.1	1.0	0.5	0.9	1.2	0.5	0.4	0.5	0.6	0.5	0.5	0.5	0.4	0.6	0.7	1.0	1.2	1.3	1.3	1.0	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)	1.8	1.5	1.2	1.0	0.9	1.6	1.0	1.4	1.3	0.9	1.1	1.3	0.9	0.8	0.8	0.9	0.8	0.8	0.8	0.8	0.9	1.1	1.3	1.4	1.5	1.6	1.3	1.5	
8.5	Turbine ON	8.51	35	Average (dBA)	9.8	14.4	18.6	22.4	25.9	31.0	32.2	34.5	37.6	37.2	37.6	39.3	39.6	40.4	44.3	42.7	44.2	44.8	44.5	44.3	43.4	42.4	41.0	38.4	35.0	30.1	23.4	22.1	54.4
				Uncertainty A (dB)	0.4	0.4	0.3	0.3	0.3	0.3	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	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	0.2	
				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	0.9	0.9	0.9	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	1.5	
	Background	8.48	20	Average (dBA)	-0.4	3.7	8.4	12.1	16.6	24.9	22.8	26.8	27.9	24.6	25.0	26.6	27.0	26.2	26.8	26.8	28.2	28.3	28.2	27.5	25.8	25.5	24.5	24.1	24.1	23.9	22.8	20.4	39.7
				Uncertainty A (dB)	1.0	0.8	0.8	0.9	0.7	1.2	0.8	1.2	1.2	0.9	1.0	1.0	1.1	0.9	0.6	0.5	0.4	0.5	0.4	0.4	0.6	0.5	0.6	0.6	0.6	0.9	1.0	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)	1.4	1.3	1.1	1.2	1.1	1.4	1.2	1.4	1.4	1.2	1.2	1.2	1.3	1.1	0.9	0.8	0.8	0.9	0.8	0.8	0.9	1.0	1.0	1.0	1.0	1.2	1.3	1.5	
9.0	Turbine ON	8.99	41	Average (dBA)	10.3	14.5	18.4	21.8	25.5	30.7	31.8	34.0	38.0	36.8	37.1	39.0	39.2	40.2	44.8	42.6	44.1	44.8	44.4	44.3	43.4	42.4	40.9	38.4	35.0	30.5	24.5	22.5	54.3
				Uncertainty A (dB)	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.3	0.2	
				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	0.8	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	1.5	
	Background	8.96	16	Average (dBA)	-2.3	2.6	6.4	10.6	14.7	23.9	27.4	23.8	25.6	23.6	23.5	24.8	25.7	25.9	27.4	26.8	28.8	28.5	28.3	27.4	25.6	25.2	24.2	23.9	24.7	22.5	22.4	20.5	39.4
				Uncertainty A (dB)	0.6	0.4	0.4	0.5	0.4	1.4	1.8	0.7	0.8	0.7	0.6	0.8	1.1	1.0	0.7	0.4	0.5	0.5	0.4	0.5	0.6	0.6	0.6	0.6	0.8	0.8	1.1	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)	1.2	1.1	0.9	0.9	0.9	1.6	1.9	1.1	1.1	1.1	0.9	1.0	1.3	1.2	1.0	0.8	0.9	0.9	0.8	0.8	0.9	1.0	1.0	1.0	1.2	1.1	1.4	1.5	
9.5	Turbine ON	9.48	77	Average (dBA)	9.7	13.7	18.0	21.6	25.1	30.7	31.7	33.9	38.8	36.6	36.9	38.9	38.9	39.8	44.9	42.4	44.0	44.7	44.4	44.3	43.4	42.4	40.9	38.3	35.0	30.4	24.2	22.4	54.3
				Uncertainty A (dB)	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	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)	1.1	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	
	Background	9.52	25	Average (dBA)	-0.5	4.0	8.0	11.4	15.9	24.9	22.2	24.3	25.6	23.2	24.0	25.6	25.7	25.3	26.2	26.7	28.6	28.7	28.5	27.5	25.7	25.5	24.8	24.5	25.3	22.6	20.3	20.7	39.2
				Uncertainty A (dB)	0.7	0.6	0.5	0.5	0.5	1.3	0.5	0.6	0.6	0.5	0.6	0.7	0.7	0.6	0.4	0.4	0.4	0.4	0.4	0.3	0.4	0.4	0.5	0.5	0.6	0.5	0.5	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)	1.2	1.2	1.0	0.9	0.9	1.6	0.9	1.0	1.0	0.9	0.9	1.0	1.0	0.9	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.9	0.9	0.9	1.0	1.0	0.9	1.5	
10.0	Turbine ON	9.97	37	Average (dBA)	9.5	13.5	17.3	21.1	24.8	30.8	31.3	33.6	39.3	36.3	36.6	38.7	38.7	39.6	45.1	42.2	43.9	44.6	44.4	44.3	43.3	42.4	40.9	38.3	35.0	30.5	24.4	22.4	54.2
				Uncertainty A (dB)	0.4	0.4	0.3	0.4	0.3	0.3	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.3	0.2	
				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	0.9	0.9	0.9	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	1.5	
	Background	10.02	19	Average (dBA)	-0.1	3.9	6.7	10.6	14.9	24.7	24.9	23.4	24.4	22.4	23.0	24.1	24.2	24.4	26.7	27.8	29.3	28.9	28.9	28.3	27.0	26.9	26.5	26.1	26.5	24.3	21.5	21.1	39.7
				Uncertainty A (dB)	0.8	0.6	0.4	0.3	0.3	1.3	1.0	0.6	0.5	0.4	0.5	0.5	0.6	0.5	0.5	0.5	0.6	0.6	0.5	0.4	0.6	0.6	0.8	0.8	0.8	0.8	0.7	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)	1.3	1.2	0.9	0.9	0.9	1.5	1.3	1.0	1.0	0.9	0.9	0.9	0.9	0.8	0.8	0.9	0.9	0.9	0.8	0.8	0.9	1.0	1.1	1.1	1.1	1.1	1.0	1.5	
10.5	Turbine ON	10.46	34	Average (dBA)	10.5	15.2	18.3	22.1	25.6	31.2	31.9	33.8	39.4	36.5	36.8	39.3	38.8	39.5	45.3	42.4	44.2	45.1	44.8	44.6	43.8	42.9	41.3	38.8	35.6	31.2	25.5	23.1	54.6
				Uncertainty A (dB)	0.4	0.4	0.4	0.3	0.3	0.3	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.3	0.2	
				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	0.9	0.9	0.9	0.9	0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.8	0.8	0.8	0.9	1.5	
	Background	10.51	43	Average (dBA)	2.8	6.4	10.1	13.4	18.1	24.8	26.1	26.4	27.7	27.0	27.9	31.5	33.3	34.3	32.9	29.7	29.5	29.1	28.7	27.7	26.3	26.3	26.1	26.1	26.7	24.6	21.9	21.4	42.5
				Uncertainty A (dB)	0.8	0.7	0.6	0.6	0.6	1.0	0.8	0.8	0.7	0.9	1.0	1.3	1.6	1.7	1.1	0.6	0.4	0.4	0.3	0.3	0.4	0.4	0.5	0.5	0.6	0.6	0.5	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)	1.3	1.2	1.0	1.0	1.0	1.3	1.1	1.1	1.1	1.2	1.2	1.5	1.7	1.8	1.3	0.9	0.8	0.8	0.8	0.8	0.8	0.9	1.0	1.0	1.0	1.0	1.0	1.5	

Table C.04 Detailed measruement uncertainty at hub height

Project: Grand Renewables Wind Farm - Turbine T10 - IEC 61400-11 Measurement

Report ID: 14284.00.T10.RP4

Created on: 1/23/2018

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		
11.0	Turbine ON	10.99	58	Average (dBA)	10.5	15.1	18.0	21.3	25.0	31.0	31.9	33.5	39.2	36.3	36.6	39.3	38.6	39.4	45.1	42.3	44.1	45.0	44.6	44.6	43.7	42.8	41.2	38.7	35.5	31.1	25.3	22.9		54.5
				Uncertainty A (dB)	0.4	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.1	0.1	0.2	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)	1.1	1.1	0.9	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	1.5		
	Background	11.01	41	Average (dBA)	4.5	6.1	9.2	12.4	16.7	25.2	25.7	24.4	26.3	24.7	25.7	29.6	31.2	29.7	29.4	29.4	30.1	29.7	29.7	28.6	27.3	27.3	26.8	26.5	27.1	24.6	21.8	21.2		41.4
				Uncertainty A (dB)	1.1	0.7	0.6	0.5	0.5	1.1	0.9	0.6	0.6	0.6	0.7	1.0	1.2	0.9	0.6	0.5	0.4	0.3	0.3	0.3	0.3	0.4	0.5	0.5	0.5	0.6	0.5	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)	1.5	1.2	1.0	0.9	0.9	1.4	1.2	1.0	1.0	1.0	1.0	1.2	1.4	1.2	0.9	0.8	0.8	0.7	0.7	0.7	0.8	0.9	0.9	1.0	1.0	1.0	0.9	1.5		
11.5	Turbine ON	11.46	46	Average (dBA)	9.6	14.6	17.7	21.3	25.1	30.7	31.4	33.5	39.3	36.4	36.7	39.3	38.8	39.4	44.8	42.3	44.1	45.0	44.7	44.7	43.8	42.8	41.3	38.7	35.3	30.6	24.5	22.5		54.5
				Uncertainty A (dB)	0.4	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.3	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)	1.1	1.1	0.9	0.9	0.9	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	1.5		
	Background	11.52	31	Average (dBA)	4.8	7.4	9.9	13.0	16.0	23.8	24.5	23.0	25.5	23.9	26.5	31.4	32.2	28.8	29.1	29.1	29.5	29.5	29.5	28.9	27.9	28.2	28.5	28.3	28.2	26.6	23.5	21.8		41.7
				Uncertainty A (dB)	1.3	0.9	0.7	0.6	0.5	1.0	0.8	0.4	0.6	0.5	0.9	1.4	1.6	1.0	0.7	0.6	0.5	0.5	0.4	0.5	0.6	0.7	0.8	0.9	0.9	1.0	0.8	0.4		
				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)	1.6	1.4	1.0	1.0	0.9	1.3	1.1	0.9	1.0	1.0	1.1	1.6	1.7	1.2	1.0	0.9	0.9	0.8	0.8	0.8	0.9	1.1	1.2	1.2	1.2	1.3	1.1	1.5		
12.0	Turbine ON	11.94	24	Average (dBA)	10.5	15.2	18.2	21.6	25.3	31.5	31.6	33.4	39.3	36.2	36.6	39.2	38.5	39.0	44.8	42.1	44.0	44.9	44.6	44.7	43.7	42.8	41.2	38.6	35.2	30.6	24.6	22.6		54.4
				Uncertainty A (dB)	0.4	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.4	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	0.8	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	0.9	1.5		
	Background	11.98	41	Average (dBA)	3.7	7.8	10.9	13.1	17.3	24.3	24.6	26.1	26.8	25.9	25.9	27.7	29.5	31.4	33.2	31.4	30.4	30.0	29.4	28.6	27.0	27.0	26.7	26.1	26.4	24.1	21.4	21.3		41.8
				Uncertainty A (dB)	0.9	0.8	0.7	0.5	0.5	1.0	0.7	0.7	0.7	0.8	0.7	0.8	1.1	1.2	1.1	0.7	0.4	0.3	0.2	0.3	0.4	0.4	0.5	0.5	0.6	0.6	0.5	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)	1.4	1.3	1.0	0.9	1.0	1.3	1.0	1.0	1.1	1.1	1.0	1.0	1.3	1.4	1.3	1.0	0.8	0.8	0.7	0.7	0.8	0.9	0.9	1.0	1.0	1.0	0.9	1.5		
12.5	Turbine ON	12.45	20	Average (dBA)	9.6	15.1	17.4	21.6	25.3	31.5	31.6	33.4	38.7	36.3	36.6	39.1	38.5	39.0	45.1	42.1	44.0	44.9	44.7	44.6	43.7	42.8	41.1	38.5	35.1	30.7	24.8	22.9		54.4
				Uncertainty A (dB)	0.4	0.4	0.3	0.4	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.3	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.3	0.4	0.4		
				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)	1.1	1.1	0.9	0.9	0.9	0.8	0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.8	0.8	0.8	0.9	1.5		
	Background	12.50	30	Average (dBA)	3.0	6.4	9.0	11.6	16.0	25.8	22.8	23.0	24.7	23.0	23.6	25.3	25.8	26.0	27.4	28.2	29.5	29.4	29.5	28.6	27.3	27.2	26.6	26.5	27.2	24.5	21.8	21.2		40.1
				Uncertainty A (dB)	1.1	0.8	0.6	0.4	0.4	1.4	0.6	0.4	0.5	0.4	0.5	0.5	0.6	0.5	0.4	0.4	0.4	0.4	0.3	0.3	0.4	0.4	0.5	0.6	0.7	0.7	0.6	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)	1.5	1.3	1.0	0.9	0.9	1.6	1.0	0.9	0.9	0.9	0.8	0.9	0.9	0.9	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.9	1.0	1.0	1.0	1.0	1.0	1.5		

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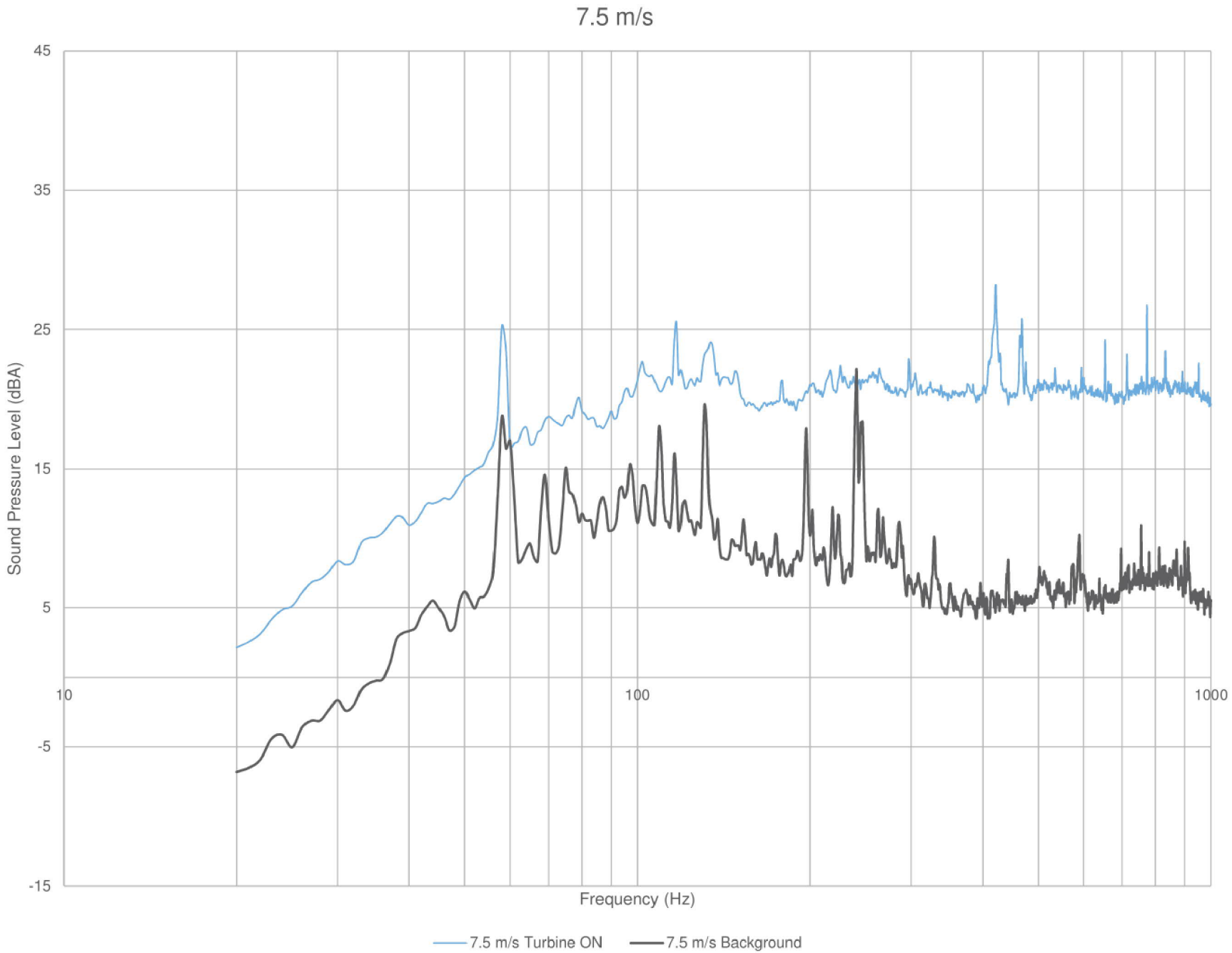
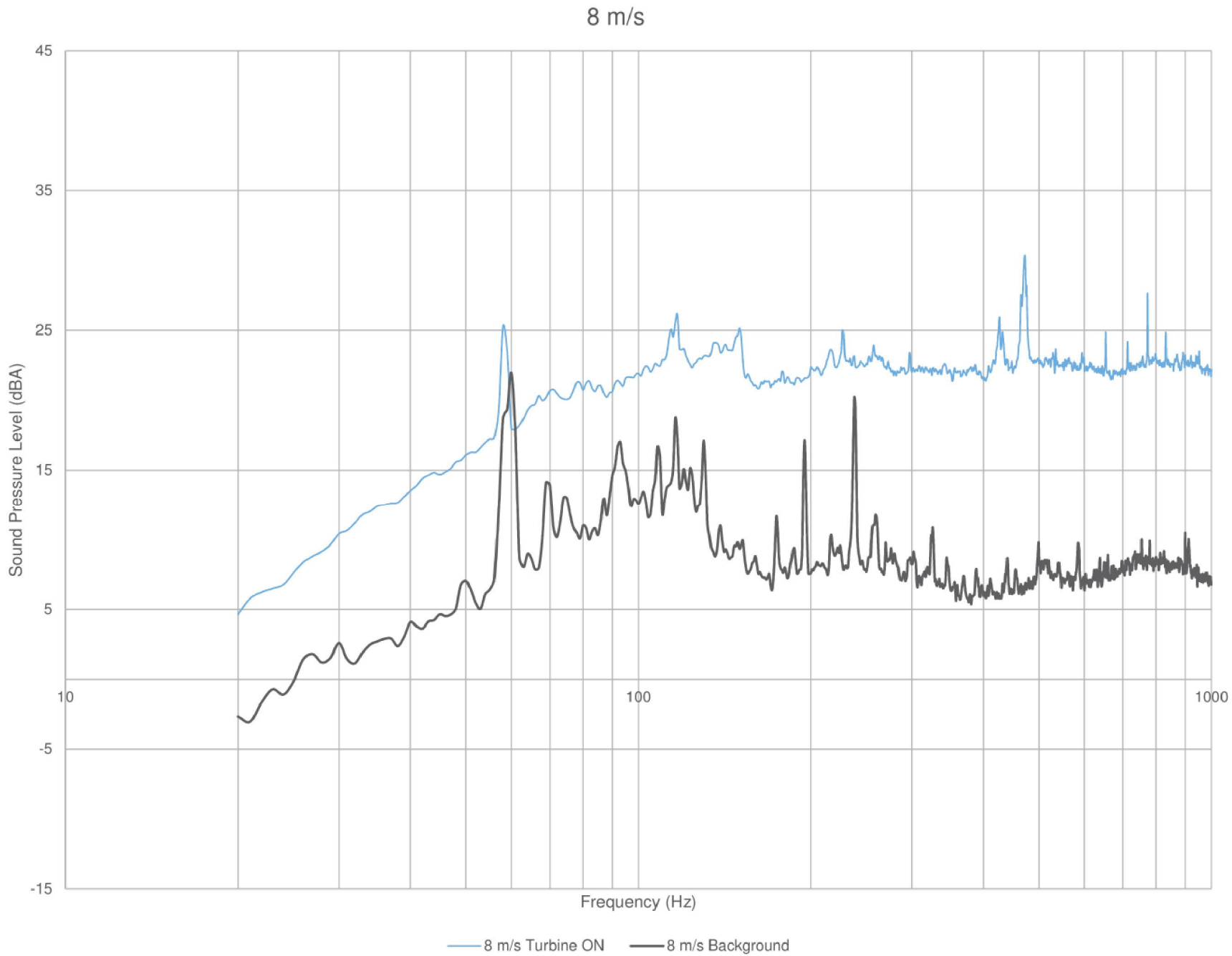
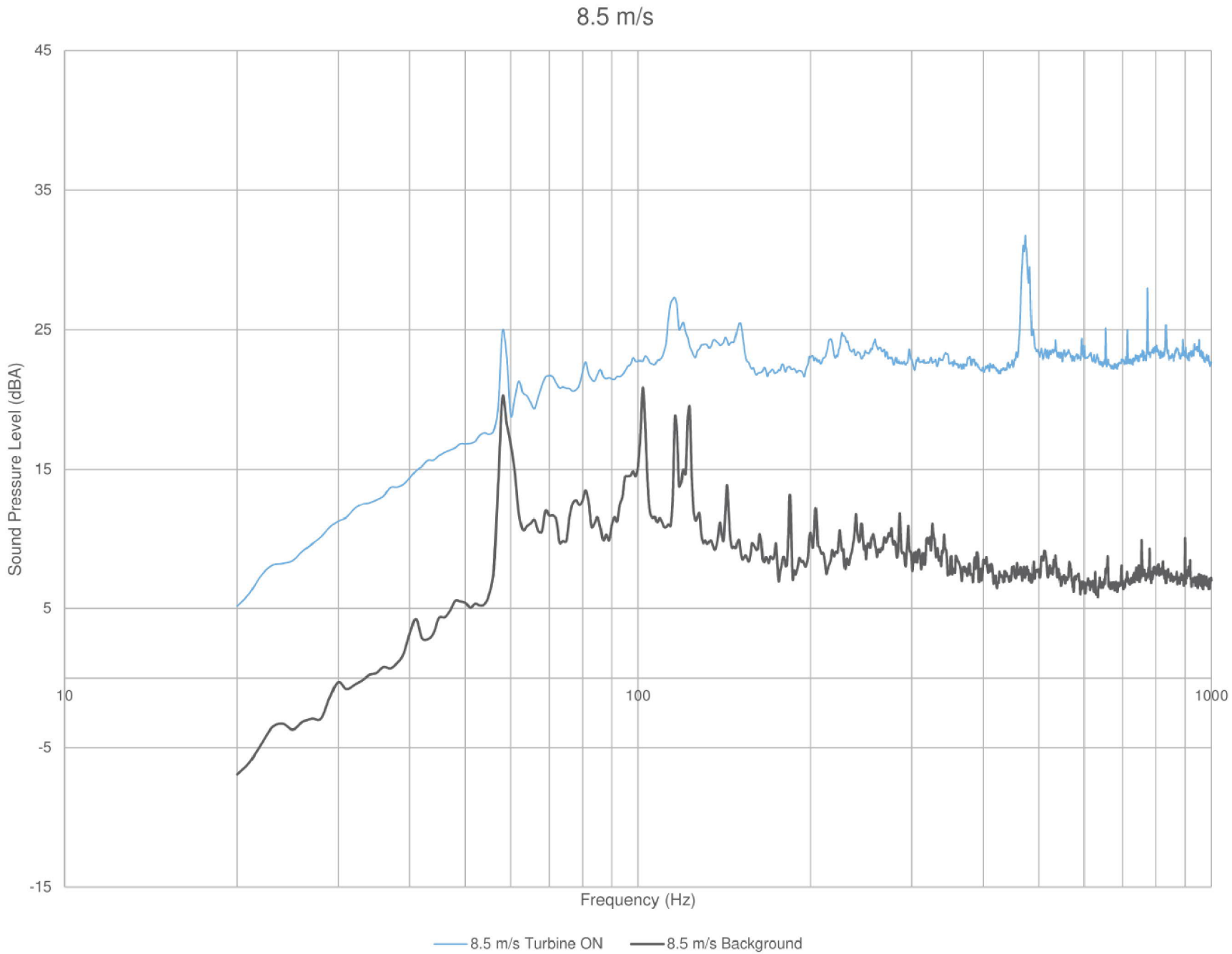
Appendix D
Tonality Assessment



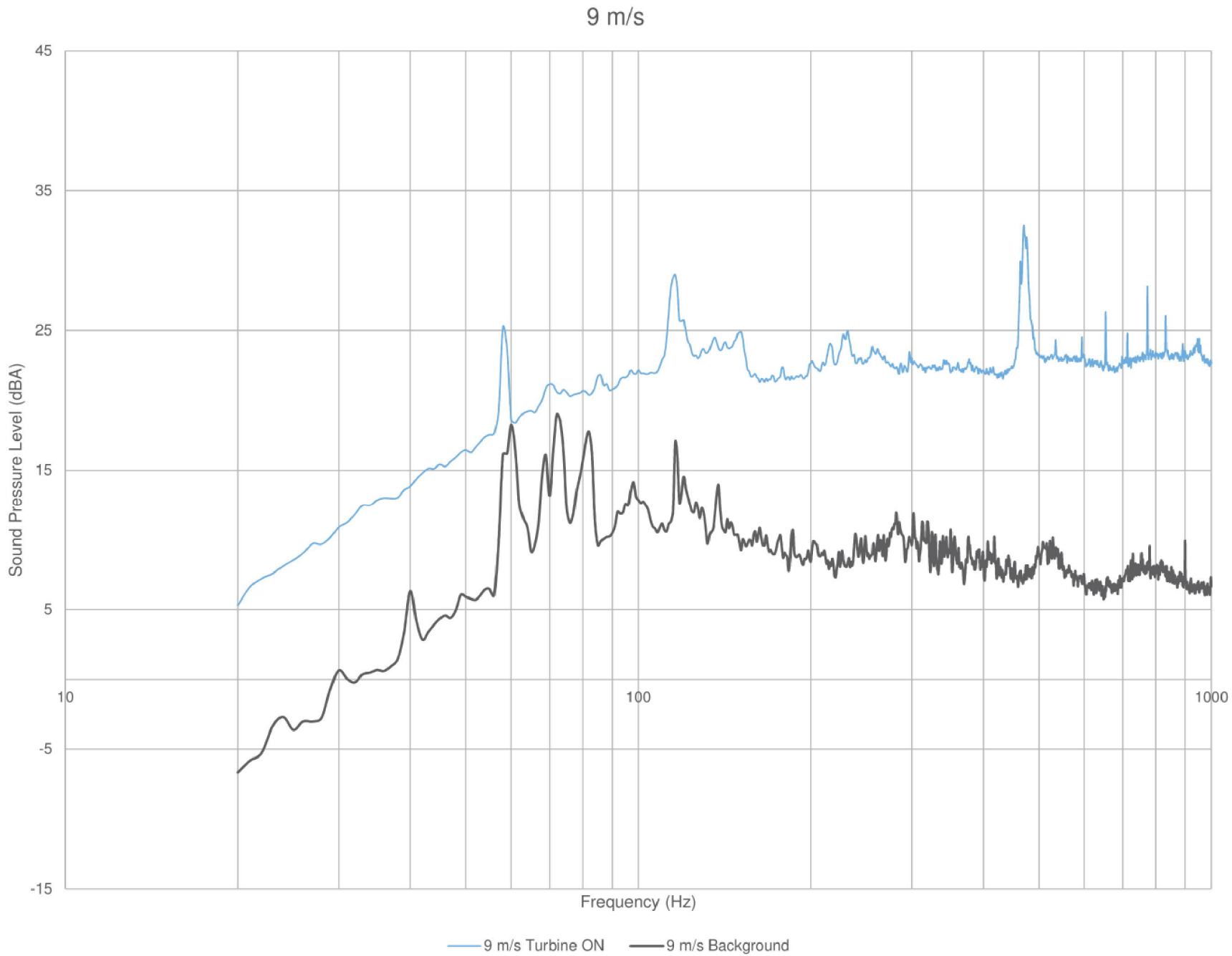
aercoustics	Project ID: 14284.00.T10.RP4	**Project Name**
	Scale: NTS Drawn by: KC Reviewed by: PA Date: January 2018 Revision: 1	Grand Renewable Wind Farm - T10 - IEC 61400-11 Edition 3.0
		Figure Title Plot of narrow band spectra - Turbine ON vs. Background at 7.5 m/s
		Figure D.01



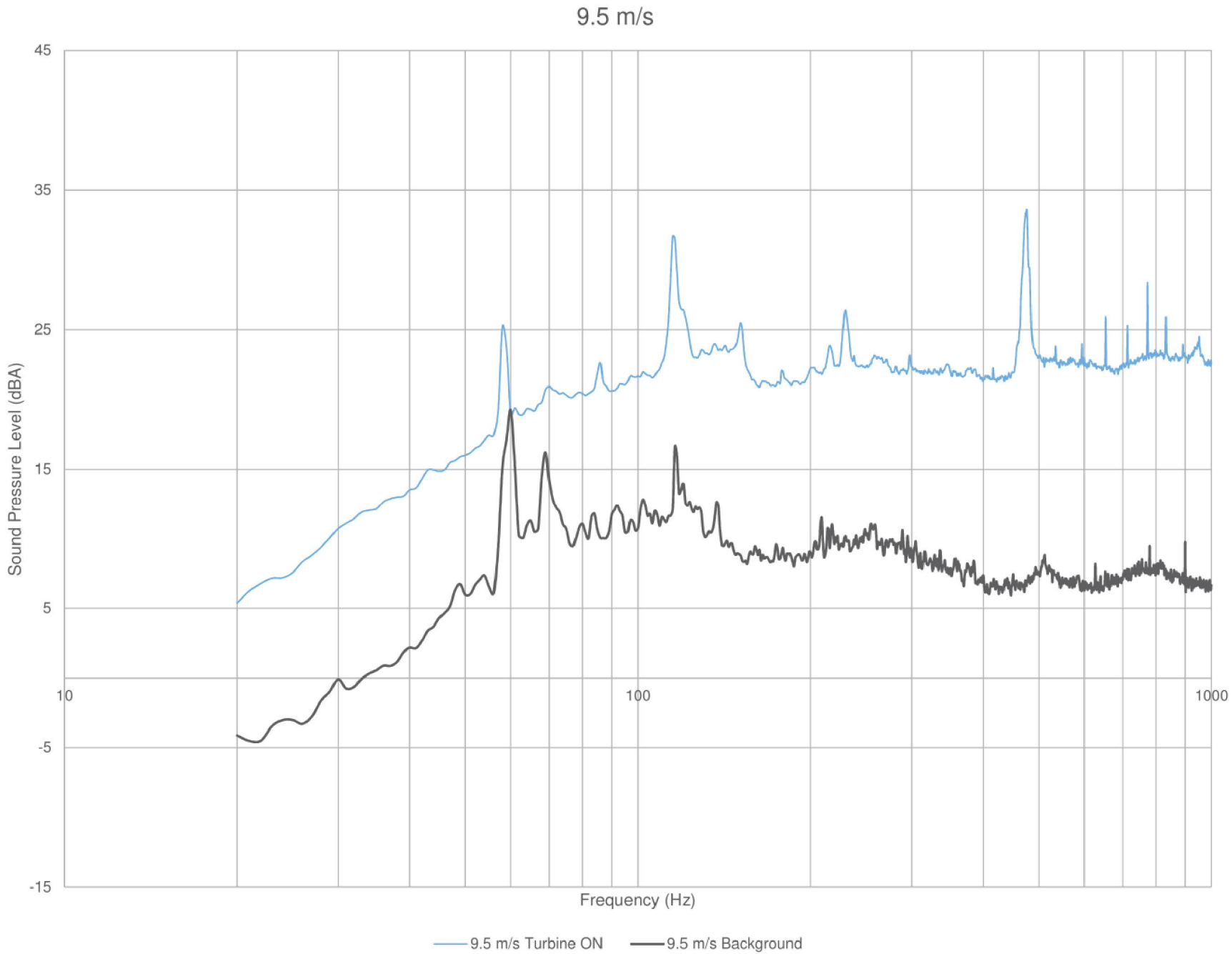
aercoustics	Project ID: 14284.00.T10.RP4	**Project Name**
	Scale: NTS Drawn by: KC Reviewed by: PA Date: January 2018 Revision: 1	Grand Renewable Wind Farm - T10 - IEC 61400-11 Edition 3.0
		Figure Title Plot of narrow band spectra - Turbine ON vs. Background at 8 m/s
		Figure D.02



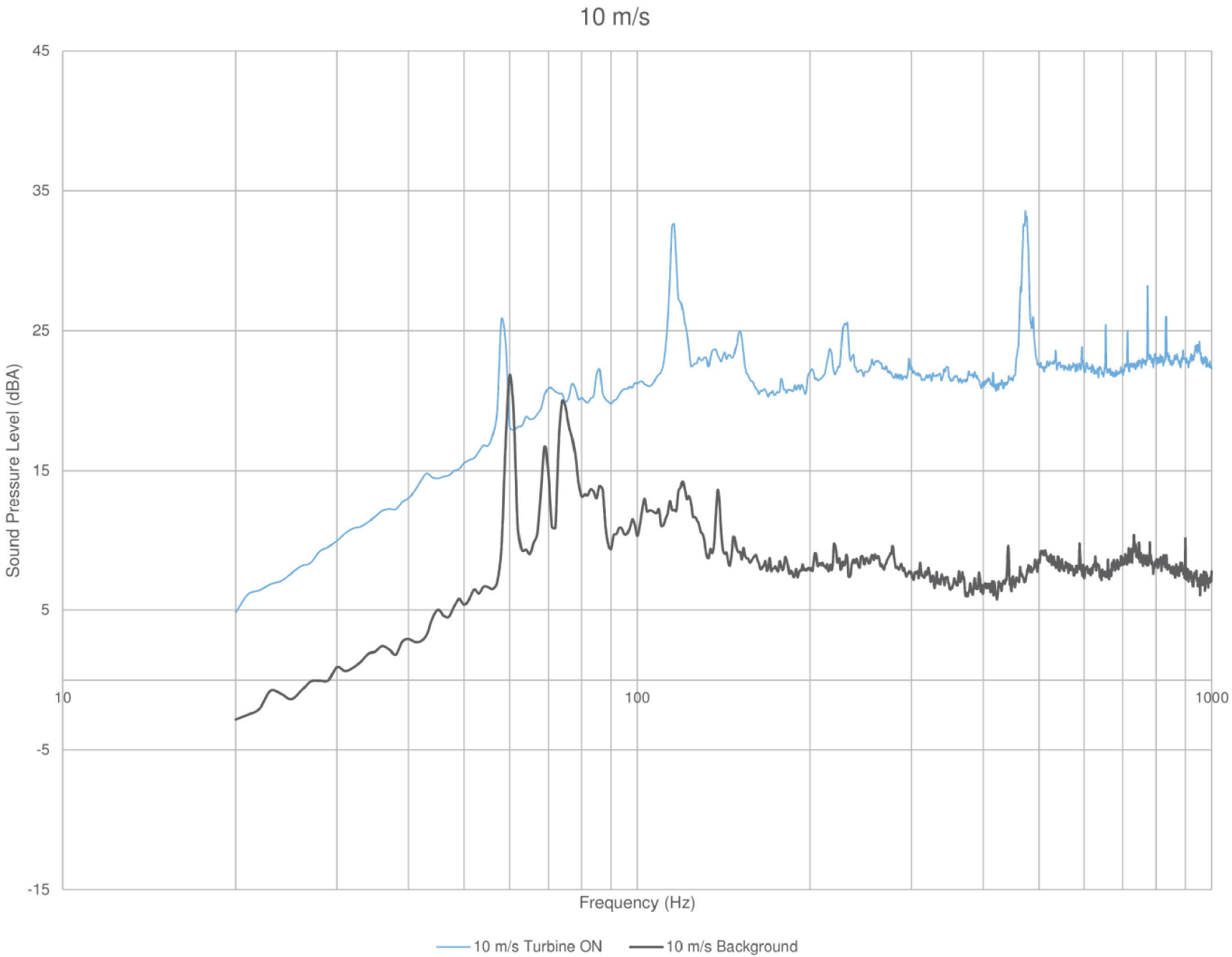
aercoustics	Project ID: 14284.00.T10.RP4	**Project Name**
	Scale: NTS Drawn by: KC Reviewed by: PA Date: January 2018 Revision: 1	Grand Renewable Wind Farm - T10 - IEC 61400-11 Edition 3.0
		Figure Title Plot of narrow band spectra - Turbine ON vs. Background at 8.5 m/s
		Figure D.03



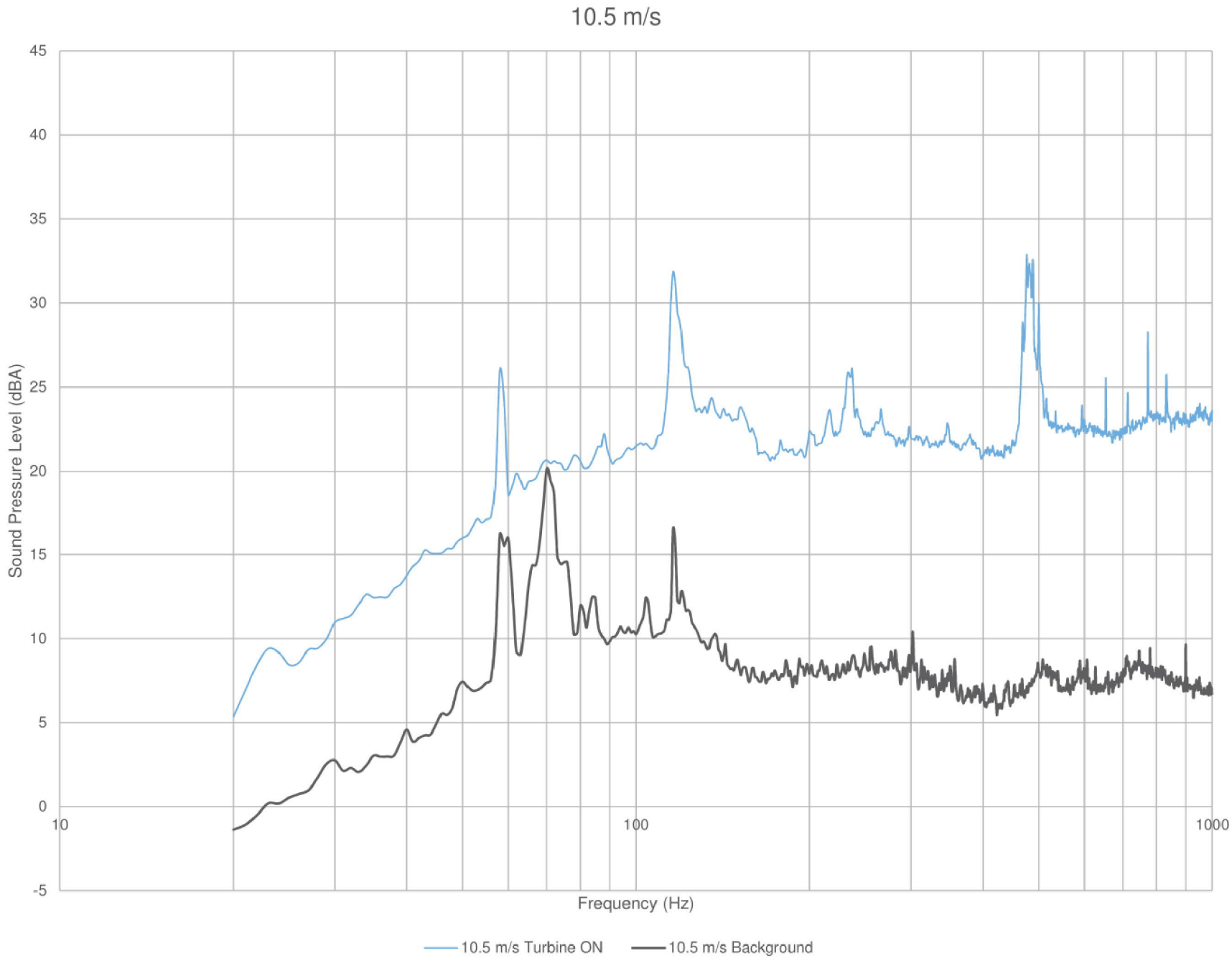
aercoustics	Project ID: 14284.00.T10.RP4	**Project Name**
	Scale: NTS Drawn by: KC Reviewed by: PA Date: January 2018 Revision: 1	Grand Renewable Wind Farm - T10 - IEC 61400-11 Edition 3.0
		Figure Title Plot of narrow band spectra - Turbine ON vs. Background at 9.0 m/s
		Figure D.04



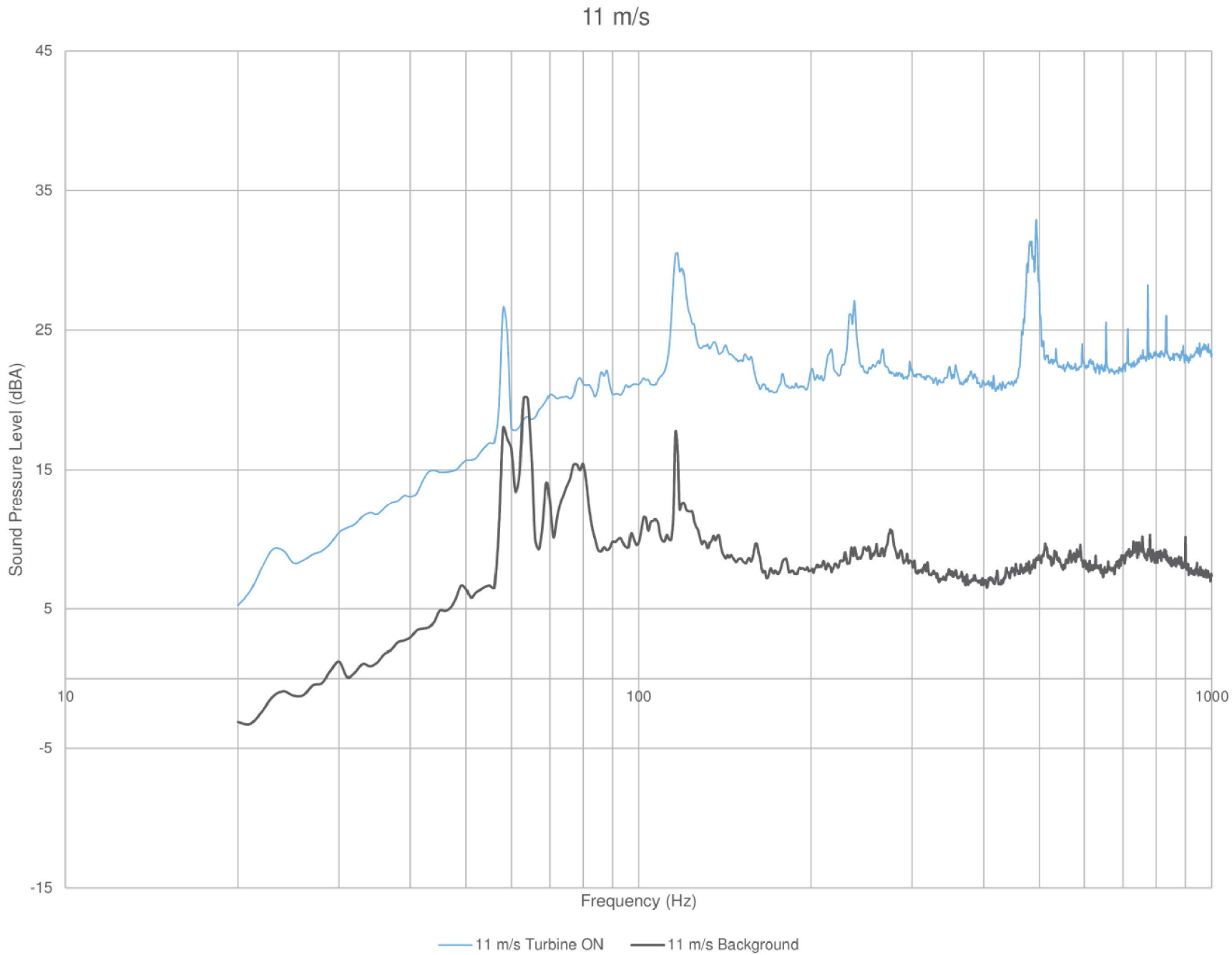
aercoustics	Project ID: 14284.00.T10.RP4	**Project Name**
	Scale: NTS Drawn by: KC Reviewed by: PA Date: January 2018 Revision: 1	Grand Renewable Wind Farm - T10 - IEC 61400-11 Edition 3.0
		Figure Title Plot of narrow band spectra - Turbine ON vs. Background at 9.5 m/s
		Figure D.05



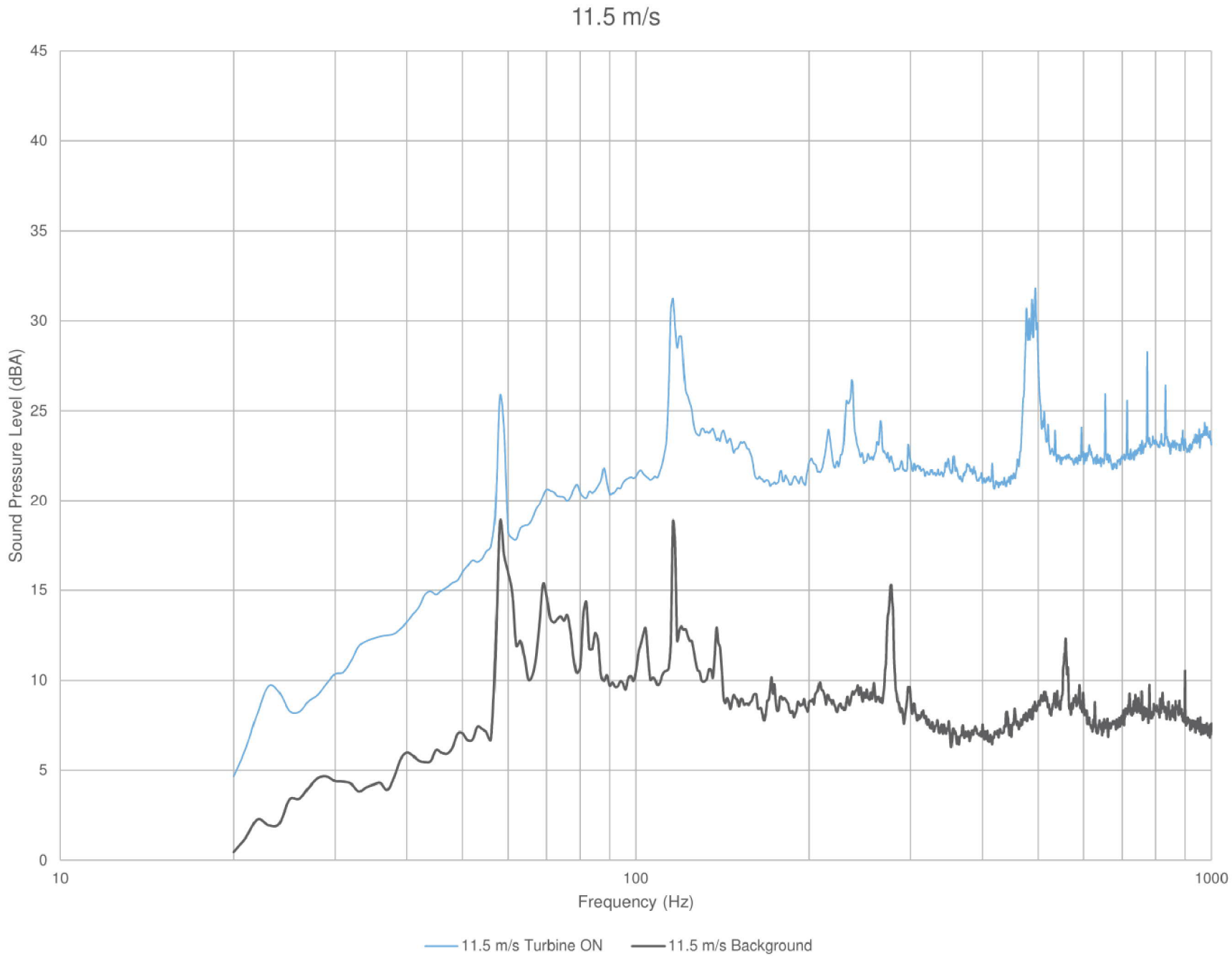
aercoustics	Project ID: 14284.00.T10.RP4	**Project Name**
	Scale: NTS Drawn by: KC Reviewed by: PA Date: January 2018 Revision: 1	Grand Renewable Wind Farm - T10 - IEC 61400-11 Edition 3.0
		Figure Title Plot of narrow band spectra - Turbine ON vs. Background at 10 m/s
		Figure D.06



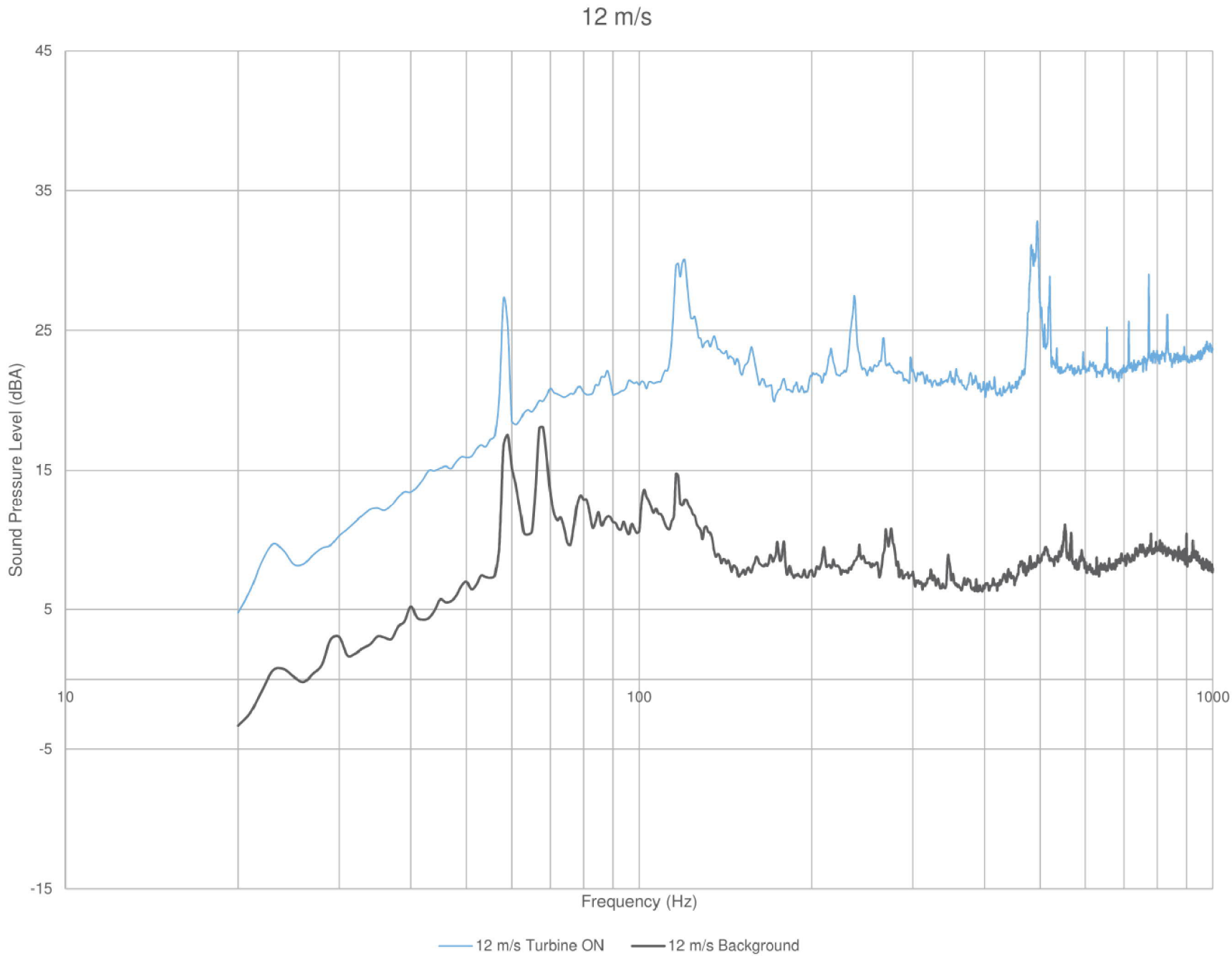
aercoustics	Project ID: 14284.00.T10.RP4	**Project Name**
	Scale: NTS Drawn by: KC Reviewed by: PA Date: January 2018 Revision: 1	Grand Renewable Wind Farm - T10 - IEC 61400-11 Edition 3.0
		Figure Title Plot of narrow band spectra - Turbine ON vs. Background at 10.5 m/s
		Figure D.07



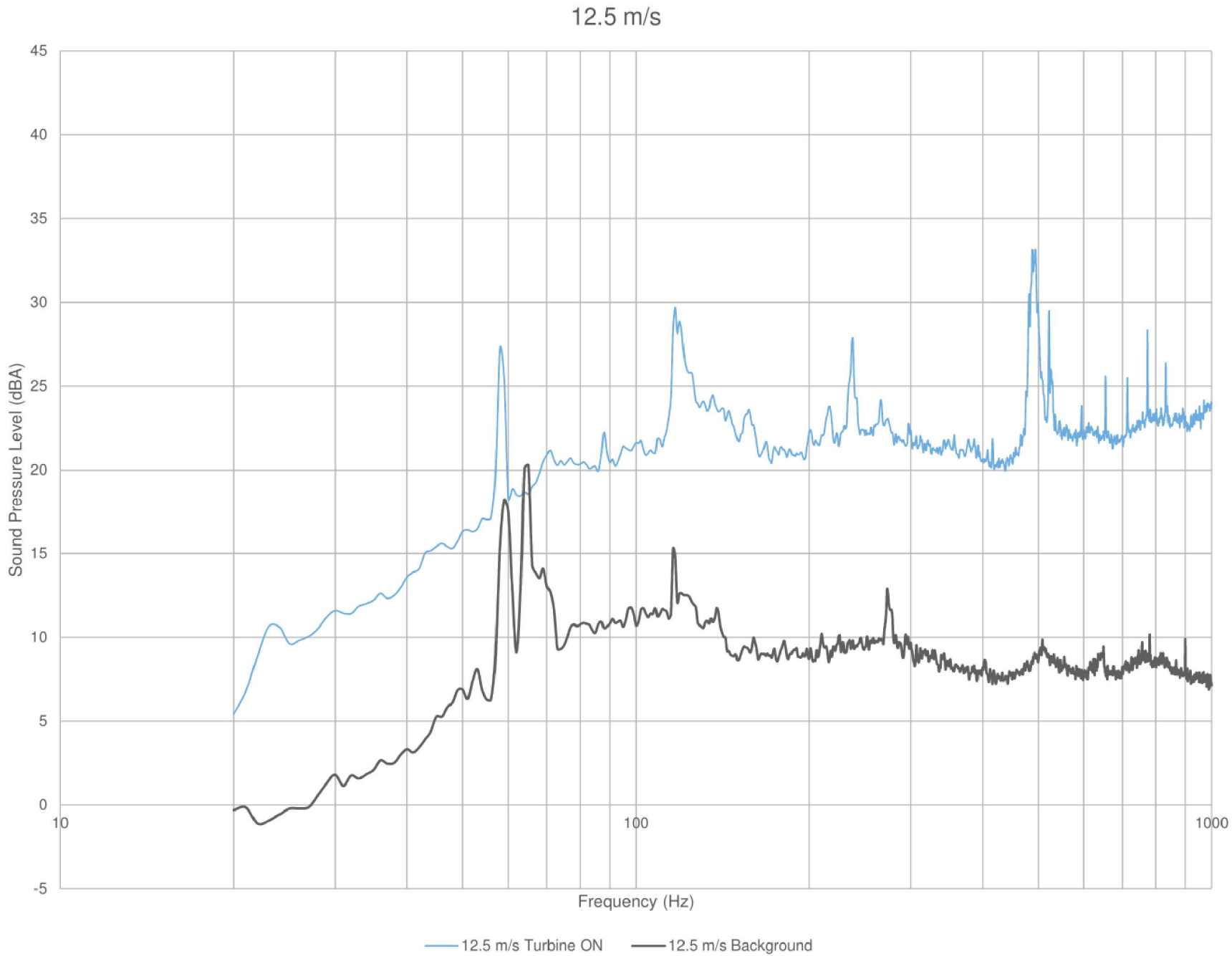
aercoustics	Project ID: 14284.00.T10.RP4	**Project Name**
	Scale: NTS Drawn by: KC Reviewed by: PA Date: January 2018 Revision: 1	Grand Renewable Wind Farm - T10 - IEC 61400-11 Edition 3.0
		Figure Title Plot of narrow band spectra - Turbine ON vs. Background at 11 m/s
		Figure D.08



aercoustics	Project ID: 14284.00.T10.RP4	**Project Name**	
	Scale: NTS Drawn by: KC Reviewed by: PA Date: January 2018 Revision: 1	Grand Renewable Wind Farm - T10 - IEC 61400-11 Edition 3.0	
		Figure Title Plot of narrow band spectra - Turbine ON vs. Background at 11.5 m/s	**Figure D.09**



aercoustics	Project ID: 14284.00.T10.RP4	**Project Name**
	Scale: NTS Drawn by: KC Reviewed by: PA Date: January 2018 Revision: 1	Grand Renewable Wind Farm - T10 - IEC 61400-11 Edition 3.0
		Figure Title Plot of narrow band spectra - Turbine ON vs. Background at 12 m/s
		Figure D.10



aercoustics	Project ID: 14284.00.T10.RP4	**Project Name**
	Scale: NTS Drawn by: KC Reviewed by: PA Date: January 2018 Revision: 1	Grand Renewable Wind Farm - T10 - IEC 61400-11 Edition 3.0
		Figure Title Plot of narrow band spectra - Turbine ON vs. Background at 12.5 m/s
		Figure D.11

Table D.01 Tonality Assessment Table - 7.5m/s

Project: Grand Renewables Wind Farm - T10 - IEC 61400-11 Measurement

Report ID: 14284.00.T10.RP4

Created on: 1/23/2018

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)
505	410			20.6	39.3	27.7	-11.6	-2.2	-9.4
304	412			19.7	38.5	29.1	-9.4	-2.2	-7.2
71	416			20.5	39.2	33.9	-5.3	-2.2	-3.1
504	418			21.2	39.9	33.3	-6.6	-2.2	-4.4
305	420			20.4	39.1	33.4	-5.8	-2.2	-3.6
307	421			21.2	39.9	37.3	-2.6	-2.2	-0.4
69	421			20.8	39.5	35.2	-4.3	-2.2	-2.1
68	421			21.0	39.7	35.2	-4.5	-2.2	-2.3
67	421			20.4	39.2	33.1	-6.1	-2.2	-3.8
306	421			20.3	39.1	32.2	-6.9	-2.2	-4.7
507	422			20.6	39.3	37.6	-1.7	-2.2	0.5
70	423			20.7	39.4	32.6	-6.9	-2.2	-4.7
508	424			20.8	39.6	37.1	-2.5	-2.2	-0.3
503	430			20.5	39.3	30.0	-9.2	-2.2	-7.0
Average	420						-5.2	-2.2	-3.0

Table D.02 Tonality Assessment Table - 8.0 m/s

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)
72	421			21.0	39.7	37.3	-2.5	-2.2	-0.2
86	424			20.4	39.2	37.0	-2.2	-2.2	0.1
85	427			21.4	40.2	38.9	-1.3	-2.2	0.9
84	427			22.0	40.8	36.4	-4.4	-2.2	-2.2
308	431			22.8	41.5	38.4	-3.2	-2.2	-0.9
73	432			21.4	40.1	31.0	-9.2	-2.2	-7.0
87	432			22.1	40.8	38.3	-2.6	-2.2	-0.3
Average	428						-3.1	-2.2	-0.9

Table D.03 Tonality Assessment Table - 8.5 m/s

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)
298	465			23.2	42.1	36.6	-5.4	-2.3	-3.2
321	467			22.5	41.4	39.9	-1.5	-2.3	0.7
215	467			23.0	41.8	42.5	0.6	-2.3	2.9
310	468			23.4	42.2	35.3	-6.9	-2.3	-4.7
90	468			23.2	42.0	40.7	-1.3	-2.3	1.0
499	469			22.4	41.2	37.7	-3.5	-2.3	-1.3
206	469			23.6	42.5	41.9	-0.6	-2.3	1.7
498	469			22.3	41.2	38.5	-2.7	-2.3	-0.4
60	470			23.3	42.1	43.6	1.5	-2.3	3.8
474	470			23.1	42.0	37.8	-4.1	-2.3	-1.9
481	470			23.7	42.6	38.0	-4.6	-2.3	-2.4
364	471			23.8	42.6	39.3	-3.4	-2.3	-1.1
484	472			22.9	41.7	38.4	-3.4	-2.3	-1.1
475	472			23.2	42.1	39.3	-2.8	-2.3	-0.5
208	473			23.8	42.7	36.6	-6.1	-2.3	-3.8
207	473			23.1	41.9	39.4	-2.6	-2.3	-0.3
322	474			22.8	41.7	36.7	-5.0	-2.3	-2.7
218	474			23.2	42.0	41.7	-0.3	-2.3	2.0
357	474			23.6	42.5	39.9	-2.6	-2.3	-0.3
483	474			22.9	41.7	39.9	-1.8	-2.3	0.5
365	475			23.6	42.5	42.4	-0.1	-2.3	2.2
216	475			22.5	41.3	43.4	2.0	-2.3	4.3
476	475			23.3	42.2	37.5	-4.7	-2.3	-2.4
221	476			24.2	43.1	39.2	-3.9	-2.3	-1.6
89	476			23.7	42.6	38.9	-3.7	-2.3	-1.5
482	478			23.8	42.6	40.5	-2.1	-2.3	0.2
480	478			23.2	42.1	35.8	-6.3	-2.3	-4.0
217	481			23.7	42.6	39.1	-3.5	-2.3	-1.3
309	482			24.0	42.9	35.3	-7.5	-2.3	-5.3
488	482			23.8	42.6	42.1	-0.6	-2.3	1.7
198	482			23.7	42.6	39.4	-3.2	-2.3	-0.9
487	482			23.9	42.8	41.6	-1.1	-2.3	1.1
91	482			24.4	43.3	40.4	-2.9	-2.3	-0.6
88	484			24.3	43.2	37.8	-5.4	-2.3	-3.1
324	488			24.7	43.6	32.4	-11.2	-2.3	-8.9
Average	474						-2.4	-2.3	-0.2

Table D.04 Tonality Assessment Table - 9.0 m/s

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)
288	463			24.0	42.9	32.9	-10.0	-2.3	-7.7
245	464			22.4	41.2	40.3	-0.9	-2.3	1.3
287	464			22.4	41.2	41.2	0.0	-2.3	2.2
355	464			22.7	41.5	45.1	3.5	-2.3	5.8
274	465			23.1	41.9	40.8	-1.1	-2.3	1.1
257	465			23.2	42.0	41.6	-0.5	-2.3	1.8
315	469			22.5	41.3	40.3	-1.0	-2.3	1.2
194	469			23.8	42.7	33.9	-8.8	-2.3	-6.5
414	470			22.9	41.8	41.5	-0.3	-2.3	2.0
63	470			22.7	41.6	39.2	-2.4	-2.3	-0.1
59	470			22.7	41.5	39.6	-1.9	-2.3	0.4
58	470			22.6	41.5	45.7	4.2	-2.3	6.5
356	471			23.2	42.1	39.4	-2.6	-2.3	-0.3
30	471			23.1	42.0	42.0	0.0	-2.3	2.3
417	471			23.4	42.3	41.6	-0.7	-2.3	1.6
362	472			23.0	41.8	38.8	-3.1	-2.3	-0.8
31	472			23.6	42.5	41.4	-1.0	-2.3	1.2
363	472			22.7	41.6	39.8	-1.7	-2.3	0.6
442	472			23.2	42.1	39.5	-2.6	-2.3	-0.3
205	473			23.1	42.0	41.2	-0.8	-2.3	1.5
212	473			23.1	42.0	44.1	2.1	-2.3	4.3
416	474			22.8	41.6	43.5	1.8	-2.3	4.1
358	474			23.5	42.3	37.5	-4.8	-2.3	-2.6
472	474			23.3	42.1	40.9	-1.3	-2.3	1.0
360	475			23.1	42.0	39.3	-2.7	-2.3	-0.4
473	476			23.1	42.0	41.1	-0.9	-2.3	1.4
226	476			23.1	42.0	39.6	-2.3	-2.3	-0.1
227	476			22.9	41.8	37.4	-4.4	-2.3	-2.1
62	476			23.0	41.9	39.4	-2.5	-2.3	-0.2
32	477			23.4	42.3	40.2	-2.1	-2.3	0.2
359	477			23.2	42.0	39.9	-2.2	-2.3	0.1
210	477			23.1	42.0	41.1	-0.8	-2.3	1.5
195	477			23.2	42.1	39.5	-2.5	-2.3	-0.3
61	478			23.3	42.1	39.3	-2.9	-2.3	-0.6
213	478			23.4	42.3	44.2	1.9	-2.3	4.2
211	479			22.8	41.7	41.2	-0.5	-2.3	1.8
493	479			23.9	42.8	39.3	-3.4	-2.3	-1.2
225	481			22.9	41.8	38.7	-3.1	-2.3	-0.8
246	482			25.2	44.0	32.5	-11.6	-2.3	-9.3
209	485			23.3	42.2	41.7	-0.6	-2.3	1.7
311	487			24.1	43.0	40.4	-2.6	-2.3	-0.3
Average	473						-1.0	-2.3	1.2

Table D.05 Tonality Assessment Table - 9.5 m/s

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)
191	465			22.7	41.6	42.2	0.6	-2.3	2.9
23	467			22.7	41.6	42.0	0.5	-2.3	2.8
204	467			22.9	41.8	42.9	1.2	-2.3	3.4
255	469			23.0	41.8	45.2	3.4	-2.3	5.7
201	470			22.8	41.7	39.3	-2.4	-2.3	-0.1
428	470			23.0	41.8	41.8	0.0	-2.3	2.2
1	470			22.9	41.8	40.8	-0.9	-2.3	1.3
26	471			22.6	41.4	38.9	-2.6	-2.3	-0.3
377	471			22.1	41.0	40.1	-0.9	-2.3	1.3
297	471			23.4	42.3	39.2	-3.1	-2.3	-0.8
317	472			22.6	41.4	42.5	1.1	-2.3	3.4
14	472			22.8	41.7	41.0	-0.7	-2.3	1.6
43	472			22.6	41.5	46.7	5.2	-2.3	7.5
331	472			22.7	41.6	38.9	-2.7	-2.3	-0.4
320	472			23.0	41.9	37.6	-4.3	-2.3	-2.0
29	472			22.6	41.4	42.0	0.6	-2.3	2.8
4	473			22.2	41.1	38.5	-2.6	-2.3	-0.3
376	473			22.2	41.1	38.6	-2.5	-2.3	-0.3
47	473			22.8	41.7	42.9	1.3	-2.3	3.5
413	473			22.7	41.5	42.3	0.8	-2.3	3.1
340	473			22.9	41.7	38.0	-3.7	-2.3	-1.4
24	473			23.3	42.1	39.4	-2.7	-2.3	-0.4
45	473			22.6	41.5	44.2	2.7	-2.3	5.0
33	474			22.4	41.2	40.0	-1.3	-2.3	1.0
44	474			22.8	41.7	43.4	1.7	-2.3	4.0
411	474			22.6	41.5	44.3	2.8	-2.3	5.1
338	474			23.1	42.0	41.6	-0.4	-2.3	1.9
34	474			24.4	43.3	43.2	0.0	-2.3	2.2
438	474			22.6	41.5	41.6	0.1	-2.3	2.3
293	474			22.5	41.4	40.7	-0.6	-2.3	1.6
295	474			23.2	42.0	41.2	-0.8	-2.3	1.5
381	474			22.7	41.6	38.6	-3.0	-2.3	-0.8

392	474			23.0	41.8	41.8	0.0	-2.3	2.3
385	475			22.9	41.7	39.9	-1.8	-2.3	0.4
380	475			22.8	41.7	36.9	-4.7	-2.3	-2.5
470	475			23.0	41.9	42.3	0.5	-2.3	2.7
437	475			22.8	41.7	41.5	-0.2	-2.3	2.1
48	476			22.6	41.4	44.6	3.2	-2.3	5.5
294	476			22.7	41.6	40.1	-1.6	-2.3	0.7
471	476			22.5	41.4	40.1	-1.3	-2.3	0.9
467	476			23.2	42.0	45.4	3.3	-2.3	5.6
379	476			22.6	41.5	40.7	-0.8	-2.3	1.5
296	476			23.4	42.2	40.4	-1.9	-2.3	0.4
318	476			22.8	41.6	41.3	-0.3	-2.3	2.0
337	476			22.7	41.6	41.3	-0.3	-2.3	2.0
292	477			22.7	41.6	40.4	-1.2	-2.3	1.1
25	477			22.9	41.8	40.3	-1.5	-2.3	0.8
192	477			23.0	41.9	45.3	3.3	-2.3	5.6
497	477			22.9	41.8	41.0	-0.7	-2.3	1.5
341	477			22.6	41.5	40.7	-0.7	-2.3	1.5
275	477			23.1	42.0	40.5	-1.4	-2.3	0.8
28	477			23.4	42.3	43.6	1.3	-2.3	3.6
27	477			23.4	42.3	42.1	-0.1	-2.3	2.1
2	477			22.6	41.5	41.2	-0.3	-2.3	2.0
415	477			23.1	42.0	40.2	-1.8	-2.3	0.5
383	477			22.3	41.2	40.2	-1.0	-2.3	1.2
382	477			22.6	41.5	40.1	-1.4	-2.3	0.9
312	478			22.9	41.8	43.6	1.8	-2.3	4.1
193	478			23.0	41.8	41.5	-0.3	-2.3	2.0
214	478			22.9	41.8	44.1	2.3	-2.3	4.6
384	478			22.4	41.3	39.9	-1.3	-2.3	0.9
378	478			22.4	41.2	39.7	-1.6	-2.3	0.7
202	478			23.0	41.9	43.4	1.5	-2.3	3.8
92	479			23.8	42.7	42.0	-0.7	-2.3	1.6
319	479			23.5	42.4	38.6	-3.8	-2.3	-1.6
496	479			22.9	41.8	43.5	1.8	-2.3	4.1
314	480			23.1	42.0	40.1	-1.9	-2.3	0.4
289	480			22.9	41.8	39.2	-2.6	-2.3	-0.3
494	481			23.5	42.4	41.1	-1.3	-2.3	1.0
361	481			22.3	41.2	39.8	-1.5	-2.3	0.8
228	482			23.0	41.9	41.5	-0.4	-2.3	1.9
495	482			23.6	42.4	43.2	0.7	-2.3	3.0
325	482			23.3	42.1	40.2	-2.0	-2.3	0.3
418	482			23.4	42.3	38.8	-3.5	-2.3	-1.2
313	483			23.7	42.6	41.1	-1.6	-2.3	0.7
199	483			24.0	42.9	35.1	-7.8	-2.3	-5.5
316	487			23.2	42.1	36.0	-6.0	-2.3	-3.7
Average	476						-0.1	-2.3	2.1

Table D.06 Tonality Assessment Table - 10.0 m/s

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)
278	114			20.5	38.7	30.9	-7.8	-2.0	-5.8
165	114			21.5	39.8	36.7	-3.1	-2.0	-1.1
410	114			21.1	39.3	33.5	-5.8	-2.0	-3.8
57	114			20.6	38.9	35.4	-3.5	-2.0	-1.5
427	114			21.1	39.3	33.9	-5.4	-2.0	-3.4
342	115			20.9	39.2	36.0	-3.1	-2.0	-1.1
339	115			21.2	39.5	36.9	-2.6	-2.0	-0.6
332	115			20.8	39.0	36.1	-3.0	-2.0	-1.0
469	115			22.3	40.5	33.2	-7.3	-2.0	-5.3
412	115			21.2	39.5	35.4	-4.1	-2.0	-2.0
391	115			20.7	39.0	34.4	-4.6	-2.0	-2.6
273	115			21.0	39.3	37.1	-2.2	-2.0	-0.2
104	115			24.0	42.3	36.5	-5.8	-2.0	-3.8
6	115			21.3	39.5	36.5	-3.0	-2.0	-1.0
419	115			22.9	41.2	32.9	-8.3	-2.0	-6.3
291	115			23.1	41.3	37.2	-4.1	-2.0	-2.1
37	115			24.2	42.5	34.3	-8.1	-2.0	-6.1
238	115			22.8	41.1	30.2	-10.9	-2.0	-8.9
406	115			21.2	39.5	37.2	-2.3	-2.0	-0.2
441	115			23.1	41.4	34.8	-6.6	-2.0	-4.5
5	116			22.2	40.5	38.4	-2.1	-2.0	-0.1
279	116			20.7	39.0	35.3	-3.6	-2.0	-1.6
3	116			21.3	39.6	39.0	-0.5	-2.0	1.5
7	116			23.2	41.4	34.8	-6.6	-2.0	-4.6
336	116			21.4	39.7	32.2	-7.5	-2.0	-5.5
46	116			21.7	40.0	37.6	-2.4	-2.0	-0.4
256	116			23.0	41.3	38.9	-2.3	-2.0	-0.3
439	116			23.2	41.5	35.9	-5.6	-2.0	-3.6
103	116			23.8	42.0	34.2	-7.8	-2.0	-5.8
333	116			20.4	38.7	36.5	-2.2	-2.0	-0.2
258	116			23.1	41.4	31.5	-9.8	-2.0	-7.8
203	116			23.7	42.0	37.0	-4.9	-2.0	-2.9
343	116			21.2	39.5	34.0	-5.5	-2.0	-3.5
17	117			21.7	40.0	35.3	-4.7	-2.0	-2.6
429	117			22.5	40.8	36.1	-4.7	-2.0	-2.7
366	119			22.5	40.8	29.2	-11.5	-2.0	-9.5
Average	115						-4.4	-2.0	-2.4

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)
238	463			22.5	41.3	43.2	1.9	-2.3	4.2
273	465			22.0	40.8	45.1	4.2	-2.3	6.5
336	467			21.8	40.6	41.1	0.5	-2.3	2.7
441	468			22.7	41.6	41.1	-0.5	-2.3	1.8
427	470			21.9	40.8	42.8	2.0	-2.3	4.3
410	470			22.2	41.0	43.3	2.3	-2.3	4.6
104	470			23.0	41.8	42.3	0.5	-2.3	2.7
291	471			22.6	41.5	39.3	-2.2	-2.3	0.1
165	471			22.0	40.8	39.5	-1.3	-2.3	1.0
278	471			22.0	40.8	39.4	-1.4	-2.3	0.8
57	471			22.3	41.1	45.7	4.6	-2.3	6.9
391	473			22.9	41.7	41.3	-0.5	-2.3	1.8
37	474			23.4	42.3	42.8	0.5	-2.3	2.8
103	474			22.8	41.6	45.4	3.8	-2.3	6.1
406	474			22.5	41.3	43.4	2.1	-2.3	4.4
186	474			22.3	41.1	42.2	1.0	-2.3	3.3
46	474			22.9	41.8	43.2	1.4	-2.3	3.6
469	474			22.6	41.4	43.8	2.3	-2.3	4.6
412	475			22.4	41.3	40.4	-0.9	-2.3	1.4
17	475			22.0	40.9	40.4	-0.5	-2.3	1.8
279	476			22.3	41.2	38.7	-2.4	-2.3	-0.1
333	476			22.0	40.8	42.1	1.3	-2.3	3.6
332	476			22.5	41.3	40.4	-0.9	-2.3	1.4
342	477			22.5	41.3	41.2	-0.1	-2.3	2.2
6	477			22.4	41.3	39.3	-2.0	-2.3	0.3
339	477			22.5	41.3	41.6	0.2	-2.3	2.5
429	477			23.0	41.9	41.2	-0.7	-2.3	1.6
5	478			23.1	41.9	39.4	-2.5	-2.3	-0.2
256	478			22.6	41.5	45.0	3.5	-2.3	5.8
7	479			23.1	42.0	39.6	-2.4	-2.3	-0.1
419	479			22.8	41.7	40.4	-1.3	-2.3	1.0

203	479			23.0	41.9	43.2	1.3	-2.3	3.6
3	480			22.4	41.3	38.6	-2.8	-2.3	-0.5
439	480			23.2	42.1	40.9	-1.1	-2.3	1.1
343	481			22.9	41.8	40.9	-1.0	-2.3	1.3
258	485			23.2	42.1	42.2	0.1	-2.3	2.4
366	488			23.3	42.2	37.9	-4.2	-2.3	-2.0
Average	475						0.6	-2.3	2.9

Table D.07 Tonality Assessment Table - 10.5 m/s

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)
426	115			21.3	39.6	35.9	-3.7	-2.0	-1.7
395	115			22.0	40.2	35.8	-4.4	-2.0	-2.4
284	115			21.5	39.8	39.5	-0.2	-2.0	1.8
405	115			20.7	39.0	36.4	-2.5	-2.0	-0.5
354	116			21.8	40.1	34.5	-5.6	-2.0	-3.6
389	116			20.6	38.9	35.4	-3.5	-2.0	-1.5
253	116			22.0	40.3	36.3	-4.0	-2.0	-2.0
468	116			22.6	40.9	36.2	-4.7	-2.0	-2.7
99	116			23.3	41.6	36.1	-5.5	-2.0	-3.5
100	116			23.9	42.2	39.5	-2.7	-2.0	-0.7
440	116			22.2	40.5	34.2	-6.3	-2.0	-4.3
117	116			23.1	41.4	35.3	-6.0	-2.0	-4.0
280	116			22.3	40.6	36.4	-4.2	-2.0	-2.2
15	116			22.7	41.0	37.2	-3.8	-2.0	-1.8
133	117			22.7	41.0	31.1	-9.9	-2.0	-7.9
56	117			21.9	40.2	35.4	-4.8	-2.0	-2.8
95	117			22.6	40.9	33.2	-7.7	-2.0	-5.7
170	117			22.7	41.0	36.7	-4.3	-2.0	-2.3
425	117			22.1	40.4	36.0	-4.4	-2.0	-2.3
42	117			21.8	40.1	38.5	-1.7	-2.0	0.3
53	117			22.1	40.4	39.1	-1.2	-2.0	0.8
346	118			22.6	40.9	30.2	-10.7	-2.0	-8.7
375	119			22.0	40.3	35.8	-4.5	-2.0	-2.5
435	119			21.2	39.5	33.6	-5.9	-2.0	-3.9
96	119			22.2	40.5	38.1	-2.4	-2.0	-0.4
98	119			22.5	40.8	37.0	-3.8	-2.0	-1.8
250	124			22.7	41.0	32.2	-8.8	-2.0	-6.8
Average	117						-4.1	-2.0	-2.1

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)
395	469			22.1	41.0	43.7	2.7	-2.3	4.9
426	474			22.7	41.6	41.6	0.1	-2.3	2.4
405	476			22.6	41.5	44.7	3.3	-2.3	5.5
100	477			23.2	42.1	45.5	3.5	-2.3	5.7
354	477			22.2	41.1	42.3	1.1	-2.3	3.4
284	477			22.7	41.6	40.8	-0.8	-2.3	1.4
440	477			23.1	42.0	39.8	-2.2	-2.3	0.1
117	477			22.7	41.6	42.1	0.5	-2.3	2.8
468	481			23.1	42.0	46.7	4.7	-2.3	7.0
280	481			22.4	41.3	41.7	0.4	-2.3	2.6
95	482			22.7	41.6	41.9	0.3	-2.3	2.6
99	482			23.0	41.9	42.7	0.8	-2.3	3.1
253	482			22.8	41.7	42.7	1.0	-2.3	3.3
170	483			23.2	42.1	41.2	-0.9	-2.3	1.4
425	484			23.2	42.0	44.7	2.6	-2.3	4.9
53	484			22.7	41.6	41.9	0.3	-2.3	2.6
98	485			23.0	41.9	42.6	0.7	-2.3	3.0
346	485			22.6	41.5	40.6	-0.9	-2.3	1.4
15	486			23.0	41.9	39.1	-2.8	-2.3	-0.5
326	487			23.0	41.9	41.4	-0.5	-2.3	1.8
389	487			22.9	41.8	40.9	-0.8	-2.3	1.4
42	488			23.5	42.4	46.0	3.7	-2.3	5.9
351	488			23.7	42.6	39.7	-3.0	-2.3	-0.7
56	488			23.4	42.3	45.5	3.3	-2.3	5.5
96	489			22.7	41.6	42.9	1.3	-2.3	3.6
435	489			22.4	41.3	41.0	-0.3	-2.3	2.0
375	489			22.8	41.8	44.2	2.5	-2.3	4.8
436	489			22.8	41.7	42.6	0.9	-2.3	3.2
234	493			23.0	42.0	35.7	-6.2	-2.3	-3.9
250	494			24.5	43.4	32.5	-10.8	-2.3	-8.5
259	494			23.7	42.6	37.8	-4.8	-2.3	-2.5
430	500			23.0	41.9	44.0	2.1	-2.3	4.4
133	500			22.9	41.8	42.3	0.5	-2.3	2.8
Average	485						0.9	-2.3	3.1

Table D.08 Tonality Assessment Table - 11.0 m/s

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)
330	466			22.3	41.2	41.7	0.5	-2.3	2.8
244	470			22.1	41.0	41.5	0.5	-2.3	2.8
390	473			22.4	41.3	42.6	1.3	-2.3	3.6
403	475			23.0	41.8	42.8	0.9	-2.3	3.2
187	476			22.8	41.7	43.7	2.0	-2.3	4.2
254	476			21.7	40.5	44.9	4.3	-2.3	6.6
166	477			22.7	41.6	42.1	0.5	-2.3	2.7
16	477			22.6	41.4	42.2	0.8	-2.3	3.0
38	477			23.0	41.9	44.5	2.6	-2.3	4.9
160	477			23.6	42.5	38.9	-3.6	-2.3	-1.3
131	477			24.0	42.9	40.3	-2.5	-2.3	-0.3
420	479			23.1	42.0	44.3	2.3	-2.3	4.5
397	480			22.9	41.8	41.4	-0.3	-2.3	1.9
404	481			22.8	41.7	43.9	2.2	-2.3	4.5
167	481			22.5	41.4	42.3	0.9	-2.3	3.2
159	482			22.7	41.6	43.0	1.4	-2.3	3.6
368	482			22.7	41.6	44.7	3.1	-2.3	5.4
424	483			22.4	41.3	41.7	0.4	-2.3	2.7
249	483			22.3	41.2	43.4	2.2	-2.3	4.5
386	483			22.8	41.7	41.5	-0.2	-2.3	2.1
402	483			22.5	41.4	44.9	3.5	-2.3	5.7
335	484			22.9	41.8	40.7	-1.1	-2.3	1.2
353	484			22.8	41.7	43.2	1.5	-2.3	3.8
252	484			22.8	41.7	43.2	1.5	-2.3	3.8
157	485			22.4	41.3	43.4	2.1	-2.3	4.4
268	485			22.4	41.3	42.2	0.9	-2.3	3.2
328	487			22.6	41.5	39.3	-2.2	-2.3	0.1
423	487			22.7	41.6	42.1	0.5	-2.3	2.8
188	487			24.1	43.0	37.9	-5.2	-2.3	-2.9
22	488			22.8	41.7	39.0	-2.7	-2.3	-0.4
115	488			23.4	42.3	38.5	-3.9	-2.3	-1.6
55	488			23.3	42.2	43.7	1.5	-2.3	3.7
432	489			23.1	42.0	40.6	-1.4	-2.3	0.9
163	489			21.9	40.8	43.3	2.5	-2.3	4.8
282	489			22.4	41.3	40.7	-0.6	-2.3	1.7
276	490			23.4	42.4	37.1	-5.2	-2.3	-3.0
11	491			22.7	41.7	37.2	-4.5	-2.3	-2.2
401	492			22.7	41.6	42.6	1.1	-2.3	3.4
40	493			22.7	41.6	45.3	3.7	-2.3	6.0
41	494			23.2	42.2	46.5	4.4	-2.3	6.7
229	494			22.9	41.8	41.1	-0.7	-2.3	1.6
270	494			22.9	41.8	41.6	-0.2	-2.3	2.1
39	494			22.7	41.6	44.7	3.0	-2.3	5.3
Average	484						1.0	-2.3	3.3

Table D.09 Tonality Assessment Table - 11.5m/s

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)
407	115			19.7	38.0	40.2	2.1	-2.0	4.2
283	115			22.0	40.3	35.6	-4.7	-2.0	-2.7
54	115			22.4	40.7	35.9	-4.8	-2.0	-2.8
272	115			21.4	39.6	40.0	0.4	-2.0	2.4
408	115			20.6	38.9	39.9	1.0	-2.0	3.0
190	115			22.2	40.4	36.8	-3.6	-2.0	-1.6
387	116			20.9	39.2	35.1	-4.1	-2.0	-2.1
277	116			20.4	38.7	35.0	-3.7	-2.0	-1.7
393	116			21.5	39.7	37.3	-2.5	-2.0	-0.5
237	116			23.3	41.6	35.7	-5.9	-2.0	-3.9
344	116			21.2	39.5	35.7	-3.8	-2.0	-1.8
155	116			23.2	41.5	38.5	-3.0	-2.0	-1.0
409	116			20.6	38.9	37.4	-1.5	-2.0	0.5
334	116			21.1	39.4	37.4	-1.9	-2.0	0.1
290	116			22.6	40.9	37.5	-3.4	-2.0	-1.4
175	117			23.8	42.0	33.1	-8.9	-2.0	-6.9
132	117			22.9	41.2	29.8	-11.4	-2.0	-9.4
182	117			24.0	42.3	31.4	-10.9	-2.0	-8.9
271	117			21.5	39.7	34.4	-5.3	-2.0	-3.3
421	117			22.3	40.6	31.6	-9.0	-2.0	-7.0
367	117			23.5	41.8	35.2	-6.6	-2.0	-4.6
172	117			24.0	42.3	35.2	-7.2	-2.0	-5.2
394	119			22.6	40.9	32.2	-8.7	-2.0	-6.6
373	119			21.4	39.7	36.4	-3.3	-2.0	-1.3
286	119			22.9	41.2	30.6	-10.6	-2.0	-8.6
285	119			21.9	40.2	33.9	-6.3	-2.0	-4.3
388	119			21.0	39.3	34.8	-4.5	-2.0	-2.5
21	119			22.0	40.3	37.6	-2.7	-2.0	-0.7
162	119			21.1	39.3	34.1	-5.2	-2.0	-3.2
349	120			23.4	41.6	34.9	-6.7	-2.0	-4.7
281	120			22.8	41.1	36.7	-4.3	-2.0	-2.3
348	120			21.8	40.1	29.8	-10.3	-2.0	-8.3
146	120			22.3	40.6	36.4	-4.2	-2.0	-2.2
269	120			22.2	40.5	35.5	-5.0	-2.0	-3.0
399	120			21.5	39.8	33.0	-6.8	-2.0	-4.8
260	120			22.2	40.5	29.9	-10.6	-2.0	-8.6
243	120			21.6	39.9	35.7	-4.3	-2.0	-2.3
398	120			22.7	41.0	34.9	-6.1	-2.0	-4.1
400	120			21.0	39.3	30.6	-8.7	-2.0	-6.7
251	124			22.7	41.0	29.2	-11.8	-2.0	-9.8
Average	118						-4.2	-2.0	-2.2

Table D.09 Tonality Assessment Table - 11.5m/s

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)
283	470			22.1	40.9	43.5	2.6	-2.3	4.9
54	474			22.6	41.5	42.4	0.9	-2.3	3.1
407	475			22.0	40.8	40.9	0.1	-2.3	2.4
409	477			22.4	41.3	43.8	2.5	-2.3	4.7
272	477			22.6	41.4	40.4	-1.0	-2.3	1.2
155	478			23.1	41.9	45.3	3.4	-2.3	5.6
393	478			22.8	41.6	40.7	-0.9	-2.3	1.3
334	481			22.5	41.4	41.4	0.0	-2.3	2.3
290	481			22.7	41.6	41.4	-0.2	-2.3	2.1
387	482			22.3	41.2	40.6	-0.6	-2.3	1.7
172	482			23.1	42.0	40.0	-2.0	-2.3	0.3
408	482			22.7	41.6	42.8	1.2	-2.3	3.5
421	483			23.6	42.4	42.5	0.0	-2.3	2.3
367	483			23.6	42.5	42.6	0.1	-2.3	2.4
271	486			23.0	41.9	41.2	-0.7	-2.3	1.6
237	486			22.1	41.0	40.6	-0.4	-2.3	1.9
285	487			22.3	41.2	41.8	0.5	-2.3	2.8
388	488			22.8	41.7	44.1	2.5	-2.3	4.7
394	488			23.1	42.0	42.1	0.1	-2.3	2.4
344	489			23.2	42.1	39.2	-2.9	-2.3	-0.6
277	489			22.6	41.5	41.2	-0.3	-2.3	2.0
269	491			22.6	41.5	40.9	-0.6	-2.3	1.7
349	491			22.2	41.1	41.3	0.2	-2.3	2.4
373	491			22.7	41.6	41.5	-0.2	-2.3	2.1
162	492			23.0	41.9	39.5	-2.4	-2.3	-0.1
21	492			22.4	41.3	39.7	-1.6	-2.3	0.7
399	492			22.9	41.8	40.9	-0.9	-2.3	1.4
146	493			22.7	41.6	43.8	2.2	-2.3	4.5
243	493			22.3	41.2	40.6	-0.5	-2.3	1.8
101	494			23.5	42.4	36.8	-5.6	-2.3	-3.3
190	494			22.1	41.1	43.0	1.9	-2.3	4.2
398	494			23.6	42.6	41.3	-1.3	-2.3	1.0
175	494			22.8	41.7	43.2	1.5	-2.3	3.8
281	494			22.7	41.6	43.4	1.8	-2.3	4.1
286	495			23.4	42.3	38.9	-3.4	-2.3	-1.1
260	496			22.9	41.8	36.1	-5.7	-2.3	-3.4
348	497			22.1	41.0	42.0	1.0	-2.3	3.3
132	498			22.6	41.6	40.7	-0.9	-2.3	1.4
182	498			23.2	42.1	46.5	4.4	-2.3	6.6
400	498			22.9	41.8	42.6	0.7	-2.3	3.0
240	498			22.6	41.5	40.4	-1.1	-2.3	1.2
Average	488						0.3	-2.3	2.6

Table D.10 Tonality Assessment Table - 12.0 m/s

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)
122	481			21.9	40.8	42.1	1.3	-2.3	3.6
49	482			22.8	41.7	46.3	4.6	-2.3	6.9
184	483			22.0	40.9	44.3	3.3	-2.3	5.6
112	485			22.0	40.9	39.7	-1.1	-2.3	1.1
152	488			22.3	41.2	44.4	3.2	-2.3	5.5
128	488			21.9	40.8	40.2	-0.6	-2.3	1.7
154	488			23.0	41.9	43.9	2.0	-2.3	4.3
137	489			22.2	41.1	41.2	0.1	-2.3	2.4
248	490			23.1	42.0	42.5	0.5	-2.3	2.8
185	492			23.0	41.9	45.9	4.0	-2.3	6.3
266	493			22.4	41.3	43.2	1.9	-2.3	4.2
267	494			22.0	40.9	43.5	2.6	-2.3	4.9
178	495			22.2	41.1	43.6	2.5	-2.3	4.8
143	496			22.7	41.6	40.8	-0.8	-2.3	1.5
263	498			22.3	41.2	41.1	-0.1	-2.3	2.2
141	499			21.7	40.6	45.1	4.4	-2.3	6.7
10	501			22.2	41.1	36.2	-4.9	-2.3	-2.6
125	502			22.6	41.5	39.5	-2.0	-2.3	0.3
189	508			23.4	42.4	33.4	-8.9	-2.3	-6.6
106	522			23.2	42.2	46.1	3.9	-2.3	6.2
Average	494						1.7	-2.3	4.0

Table D.11 Tonality Assessment Table - 12.5 m/s

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)
122	481			21.9	40.8	42.1	1.3	-2.3	3.6
49	482			22.8	41.7	46.3	4.6	-2.3	6.9
184	483			22.0	40.9	44.3	3.3	-2.3	5.6
112	485			22.0	40.9	39.7	-1.1	-2.3	1.1
152	488			22.3	41.2	44.4	3.2	-2.3	5.5
128	488			21.9	40.8	40.2	-0.6	-2.3	1.7
154	488			23.0	41.9	43.9	2.0	-2.3	4.3
137	489			22.2	41.1	41.2	0.1	-2.3	2.4
248	490			23.1	42.0	42.5	0.5	-2.3	2.8
185	492			23.0	41.9	45.9	4.0	-2.3	6.3
266	493			22.4	41.3	43.2	1.9	-2.3	4.2
267	494			22.0	40.9	43.5	2.6	-2.3	4.9
178	495			22.2	41.1	43.6	2.5	-2.3	4.8
143	496			22.7	41.6	40.8	-0.8	-2.3	1.5
263	498			22.3	41.2	41.1	-0.1	-2.3	2.2
141	499			21.7	40.6	45.1	4.4	-2.3	6.7
10	501			22.2	41.1	36.2	-4.9	-2.3	-2.6
125	502			22.6	41.5	39.5	-2.0	-2.3	0.3
189	508			23.4	42.4	33.4	-8.9	-2.3	-6.6
106	522			23.2	42.2	46.1	3.9	-2.3	6.2
Average	494						1.7	-2.3	4.0

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Appendix E
Measurement Data

Table E.01 Measurement data - Turbine ON

Project: Grand Renewables Wind Farm - Turbine T10 - IEC 61400-11 Measurement

Report ID: 14284.00.T10.RP4

Created on: 1/23/2018

***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	9.5	53.8	1801	255.0	261.2	-0.2	14.2	9.0	9.9	15.1	97.4	51
2	9.6	54.0	1846	255.0	261.2	0.0	14.4	9.9	8.8	15.1	97.4	51
3	10.1	54.3	1985	255.0	261.2	1.0	14.4	10.5	8.1	15.1	97.4	51
4	9.7	53.7	1893	255.0	261.2	0.4	14.2	9.8	8.4	15.1	97.4	51
5	9.8	54.0	1925	255.0	261.3	0.6	14.4	10.9	9.2	15.0	97.4	51
6	9.8	54.2	1903	255.0	261.2	0.5	14.3	9.9	7.9	14.9	97.4	51
7	9.9	54.2	1942	255.0	262.2	0.7	14.4	9.7	7.3	14.9	97.4	51
8			2042	255.0	264.5	1.5	14.4	9.0	8.7	14.9	97.4	51
9			2099	255.0	264.5	2.0	14.6	8.7	9.0	14.9	97.4	51
10	12.3	54.5	2142	255.0	264.5	4.3	15.2	11.6	7.7	14.9	97.4	51
11	11.2	54.5	2134	255.0	263.5	4.8	14.9	10.5	9.2	14.7	97.4	52
12	12.1	54.2	2129	255.0	260.9	4.0	14.7	11.4	9.6	14.6	97.4	52
13			2054	255.0	260.9	1.6	14.3	9.1	9.4	14.6	97.4	52
14	9.7	54.3	1873	255.0	260.9	0.3	14.1	9.9	8.9	14.6	97.4	52
15	10.5	54.4	2041	255.0	260.9	1.2	14.6	9.9	8.3	14.7	97.4	52
16	11.2	54.4	2089	255.0	260.9	1.6	14.4	10.6	8.4	14.7	97.4	52
17	10.1	54.2	1990	255.0	260.9	1.1	14.2	9.8	8.6	14.6	97.4	52
18			2038	255.0	260.9	1.2	14.4	9.4	7.7	14.5	97.4	52
19	12.2	54.5	2131	255.0	260.9	2.5	14.8	11.5	7.4	14.5	97.4	52
20	11.2	54.4	2136	255.0	260.9	3.6	15.0	10.6	7.4	14.5	97.4	52
21	11.5	54.4	2137	255.0	260.9	2.9	14.8	10.8	8.3	14.5	97.4	52
22	11.0	54.3	2093	255.0	260.9	1.7	14.5	10.4	7.4	14.5	97.4	52
23	9.7	54.0	1893	255.0	260.9	0.4	14.1	10.2	7.6	14.5	97.4	53
24	9.5	54.6	1800	255.0	260.9	-0.2	14.2	9.2	6.9	14.5	97.4	53
25	9.7	54.4	1897	255.0	260.9	0.4	14.4	9.1	7.3	14.5	97.4	53
26	9.4	54.0	1791	255.0	260.9	-0.2	14.2	8.8	8.3	14.4	97.4	53
27	9.5	54.2	1806	255.0	260.8	-0.1	14.4	8.7	8.1	14.4	97.4	53
28	9.6	54.8	1865	255.0	258.3	0.2	14.4	8.9	7.6	14.4	97.4	53
29	9.7	54.7	1871	255.0	257.6	0.3	14.3	9.3	8.0	14.4	97.4	53
30	9.2	54.4	1706	255.0	257.4	-0.8	14.2	8.9	8.5	14.3	97.4	53
31	8.9	54.7	1606	255.0	254.4	-1.4	14.2	8.2	7.6	14.3	97.4	53
32	9.1	54.7	1700	255.0	253.7	-1.1	14.4	9.8	8.2	14.3	97.4	53
33	9.6	54.6	1835	255.0	253.7	0.0	14.4	9.8	7.3	14.3	97.4	53
34	9.3	54.2	1747	255.0	253.7	-0.6	14.3	8.1	6.9	14.3	97.4	53
35			2113	255.0	253.7	1.8	14.7	9.1	6.5	14.3	97.4	53
36			2009	255.0	252.6	1.2	14.2	8.3	6.8	14.2	97.4	53
37	10.0	54.2	1977	255.0	250.4	1.0	14.3	9.2	6.8	14.2	97.4	53
38	10.9	55.0	2052	255.0	250.4	1.4	14.4	10.3	6.7	14.2	97.4	53
39	11.2	54.6	2141	255.0	250.4	2.4	14.9	10.6	5.1	14.2	97.4	53
40	10.8	54.5	2141	255.0	250.4	2.9	14.9	10.2	6.9	14.2	97.4	53
41	11.1	55.3	2143	255.0	250.4	2.5	14.8	10.5	5.2	14.2	97.4	53
42	10.4	55.6	2099	255.0	250.4	1.8	14.5	9.9	5.3	14.2	97.4	54
43	9.6	54.6	1842	255.0	250.4	0.2	14.1	9.2	7.7	14.2	97.4	54
44	9.6	54.3	1862	255.0	250.4	0.2	14.3	9.4	7.9	14.2	97.4	54
45	9.5	54.4	1827	255.0	250.4	-0.1	14.3	9.2	6.1	14.2	97.4	54
46	9.9	54.5	1936	255.0	250.4	0.7	14.4	9.9	6.3	14.2	97.4	54
47	9.4	54.2	1799	255.0	250.4	-0.2	14.2	9.6	7.3	14.2	97.4	53
48	9.7	54.4	1888	255.0	250.0	0.3	14.4	10.0	6.1	14.2	97.4	53
49	12.3	54.5	2085	255.0	248.3	1.7	14.6	11.6	6.9	14.2	97.4	53
50	11.1	55.2	2136	255.0	248.2	3.6	15.0	10.4	6.1	14.2	97.4	53
51			2133	255.0	248.2	2.7	14.8	9.3	5.1	14.2	97.4	53
52	11.1	54.2	2140	255.0	248.2	3.9	15.0	10.5	5.6	14.2	97.4	53
53	10.3	54.1	2104	255.0	248.2	1.9	14.5	9.7	6.1	14.3	97.4	54
54	11.6	54.3	2049	255.0	248.2	1.4	14.3	11.0	5.4	14.3	97.4	54
55	11.1	54.2	2070	255.0	249.8	1.6	14.5	10.5	7.9	14.3	97.4	54
56	10.7	55.1	2095	255.0	251.4	1.7	14.5	10.1	8.2	14.3	97.4	54
57	9.8	54.4	1909	255.0	251.4	0.5	14.2	9.9	8.4	14.3	97.4	54
58	9.2	53.8	1734	255.0	251.4	-0.6	14.1	9.2	7.6	14.3	97.4	54
59	8.9	53.9	1602	255.0	251.4	-1.5	14.2	8.3	7.3	14.4	97.4	54
60	8.6	54.5	1478	255.0	251.4	-2.4	14.2	8.2	7.7	14.4	97.4	54
61	8.9	54.8	1625	255.0	250.9	-1.3	14.4	8.7	7.1	14.4	97.4	54
62	9.1	54.4	1699	255.0	248.6	-0.8	14.4	8.9	6.8	14.4	97.4	54
63	8.9	53.9	1600	255.0	248.6	-1.5	14.2	8.7	4.1	14.4	97.4	54
64	8.1	53.8	1254	255.0	248.6	-2.9	14.0	8.1	5.2	14.4	97.4	54
65	7.7	53.8	1081	255.0	248.6	-3.0	14.1	7.0	6.2	14.6	97.4	54
66	7.9	53.3	1166	255.0	248.6	-3.0	13.5	6.8	6.5	14.6	97.4	55
67	7.7	51.3	1074	255.0	248.6	-3.0	12.6	6.8	5.0	14.6	97.4	55
68	7.7	51.4	1091	255.0	248.6	-3.0	12.7	6.6	5.9	14.6	97.4	55
69	7.7	51.9	1063	255.0	248.6	-3.0	12.6	7.3	7.7	14.7	97.4	55
70	7.5	51.7	1000	255.0	250.5	-3.0	12.6	7.2	7.9	14.7	97.4	55
71	7.4	51.7	965	255.0	251.9	-3.0	12.5	6.5	7.2	14.7	97.4	53
72	7.8	51.4	1128	255.0	251.9	-2.9	12.7	6.6	6.9	14.7	97.4	53
73	7.8	52.0	1122	255.0	251.9	-2.7	12.7	7.2	5.8	14.7	97.4	53
74	7.2	51.4	879	255.0	251.9	-2.7	12.3	6.9	6.1	14.7	97.4	53
75	6.8	50.2	745	255.0	251.9	-2.7	11.6	5.8	6.3	14.7	97.4	53
76	6.5	49.0	625	255.0	251.9	-2.7	11.1	5.5	7.3	14.7	97.4	53
77	6.2	47.9	543	255.0	251.9	-2.7	10.5	5.1	6.9	14.8	97.4	53
78	5.9	47.0	466	255.0	251.9	-2.8	10.0	4.8	6.6	14.9	97.4	53
79	5.6	46.0	401	255.0	251.9	-3.0	9.4	4.9	5.6	14.9	97.4	53
80	5.5	45.8	382	255.0	251.9	-3.0	9.3	4.6	6.5	14.9	97.4	53
81	5.9	46.2	460	255.0	251.9	-3.0	9.9	5.8	6.9	14.9	97.4	53
82	6.2	47.0	537	255.0	251.9	-3.0	10.5	5.2	6.6	14.9	97.4	53
83	6.8	48.6	720	255.0	251.9	-3.0	11.6	6.1	7.0	14.8	97.4	54
84	7.8	51.6	1108	255.0	251.1	-2.9	12.7	7.3	6.6	14.8	97.4	54
85	8.0	52.9	1207	255.0	248.9	-2.7	12.8	7.2	6.4	14.8	97.4	54
86	7.9	52.2	1164	255.0	248.9	-2.7	12.8	7.1	7.9	14.8	97.4	54
87	8.0	51.6	1218	255.0	248.9	-2.7	12.9	8.0	8.5	14.8	97.4	54
88	8.5	53.7	1414	255.0	248.9	-1.5	14.3	8.0	7.2	14.8	97.4	54

***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	54.5	1521	255.0	248.9	-1.7	14.3	8.7	7.7	14.9	97.4	53
90	8.5	54.4	1411	255.0	248.9	-2.3	14.2	7.7	7.6	14.9	97.4	53
91	8.6	54.7	1490	255.0	248.9	-1.8	14.4	8.9	5.3	14.9	97.4	53
92	9.5	55.1	1807	255.0	248.9	-0.1	14.5	10.3	6.4	14.9	97.4	53
93			2051	255.0	248.9	1.4	14.7	9.7	6.9	14.9	97.4	53
94	11.0	54.7	2142	255.0	248.9	4.2	15.2	10.4	4.6	14.9	97.4	53
95	10.6	54.5	2134	255.0	248.9	5.4	15.0	10.0	4.6	15.0	97.4	53
96	10.4	54.5	2125	255.0	249.0	3.6	14.7	9.9	7.3	15.0	97.4	54
97			2141	255.0	251.4	3.4	14.8	9.4	8.4	15.0	97.4	54
98	10.7	54.6	2117	255.0	252.7	2.1	14.6	10.1	8.6	15.0	97.4	54
99	10.6	54.4	2086	255.0	252.8	1.7	14.5	10.0	7.9	15.0	97.4	54
100	10.5	54.6	2082	255.0	252.8	1.5	14.4	10.0	8.9	15.0	97.4	54
101	11.5	54.8	2140	255.0	252.8	3.1	14.9	10.8	9.1	15.1	97.4	52
102			2073	255.0	252.8	1.8	14.4	9.4	10.2	15.1	97.4	52
103	10.2	54.7	2004	255.0	252.8	1.2	14.3	8.8	9.4	15.1	97.4	52
104	9.9	54.3	1955	255.0	254.3	1.0	14.3	9.4	10.7	15.1	97.4	52
105			2031	255.0	256.7	1.9	14.7	9.7	9.9	15.1	97.4	52
106			2147	255.0	256.7	7.6	15.8	11.7	9.8	15.1	97.4	52
107	13.9	55.4	2137	255.0	256.7	9.5	15.2	13.1	9.5	15.1	97.4	51
108	13.7	53.8	2113	255.0	256.7	8.0	14.6	12.9	7.5	15.0	97.4	50
109	12.9	53.7	2139	255.0	256.7	7.6	14.8	12.2	9.8	15.0	97.4	50
110	14.3	54.0	2148	255.0	256.7	8.2	15.1	13.5	11.2	15.0	97.4	50
111	13.2	54.3	2117	255.0	256.7	7.6	14.6	12.4	10.0	15.0	97.4	50
112	12.4	54.1	2118	255.0	256.7	5.8	14.6	11.7	9.2	15.0	97.4	50
113	11.8	53.8	2111	255.0	256.7	3.8	14.6	11.1	9.6	15.0	97.4	51
114	12.1	54.6	2142	255.0	256.7	4.4	15.0	11.4	9.8	14.9	97.4	51
115	10.8	54.4	2136	255.0	256.7	3.4	14.8	10.2	9.8	14.9	97.4	51
116	14.4	54.7	2146	255.0	256.7	7.4	15.7	13.7	8.9	14.9	97.4	51
117	10.5	54.4	2095	255.0	256.9	5.8	14.6	9.9	8.9	14.9	97.4	51
118	13.7	54.4	2131	255.0	259.7	8.3	15.5	12.9	10.3	14.9	97.4	51
119	13.4	54.3	2140	255.0	260.2	8.5	14.8	12.7	10.6	14.9	97.4	51
120	13.6	53.6	2134	255.0	260.2	7.7	14.7	12.8	8.9	14.9	97.4	52
121	12.0	54.0	2130	255.0	260.2	6.5	14.7	11.4	7.5	14.9	97.4	52
122	12.3	54.0	2121	255.0	260.3	5.4	14.6	11.6	8.3	14.9	97.4	52
123	12.0	53.9	2128	255.0	260.3	4.0	14.8	11.4	10.7	14.9	97.4	52
124	10.8	54.4	2137	255.0	260.3	4.7	15.0	10.2	10.2	14.9	97.4	52
125	12.7	54.4	2142	255.0	260.3	6.0	15.1	12.0	10.0	14.9	97.4	51
126	13.8	54.7	2145	255.0	260.3	6.0	14.8	13.0	8.4	14.9	97.4	51
127	13.5	54.5	2146	255.0	260.3	5.7	14.8	12.7	9.2	14.9	97.4	51
128	12.6	53.6	2131	255.0	260.3	4.7	14.7	11.9	10.2	14.9	97.4	51
129	10.9	53.9	2139	255.0	260.3	4.0	14.8	10.3	9.9	14.9	97.4	51
130			2125	255.0	260.3	3.4	14.7	9.4	9.7	14.9	97.4	51
131	11.0	54.9	2098	255.0	260.0	2.1	14.6	10.4	8.6	14.9	97.4	51
132	11.4	54.7	2143	255.0	257.2	4.4	15.1	10.8	8.7	14.9	97.4	52
133	10.7	54.6	2145	255.0	256.8	5.5	15.1	10.1	8.4	14.9	97.4	52
134	12.8	54.6	2142	255.0	256.7	7.9	15.3	12.1	8.0	14.9	97.4	52
135	13.4	54.2	2138	255.0	256.7	7.5	14.8	12.7	8.0	14.9	97.4	52
136	13.4	54.6	2140	255.0	256.7	7.4	14.8	12.7	8.5	14.9	97.4	52
137	12.7	54.1	2127	255.0	256.7	7.0	14.9	12.0	10.1	14.9	97.4	51
138	13.6	54.1	2145	255.0	256.7	7.8	15.0	12.9	8.9	14.9	97.4	51
139	13.6	54.0	2145	255.0	256.7	8.0	14.9	12.8	7.8	14.9	97.4	51
140	11.9	54.0	2147	255.0	256.6	7.9	14.8	11.2	8.3	14.9	97.4	51
141	12.5	54.5	2141	255.0	256.6	8.2	14.9	11.8	9.1	14.9	97.4	51
142	12.1	53.8	2104	255.0	256.6	6.2	14.5	11.5	9.0	14.9	97.4	51
143	12.4	54.1	2133	255.0	256.6	6.8	15.1	11.7	10.1	14.9	97.4	51
144	13.2	54.4	2132	255.0	256.6	8.3	15.1	12.5	10.6	14.9	97.4	51
145	12.2	54.0	2094	255.0	256.7	5.7	14.5	11.5	8.6	14.9	97.4	51
146	11.5	54.2	2143	255.0	256.6	5.4	14.9	10.9	9.1	14.9	97.4	51
147	10.8	54.8	2144	255.0	256.6	5.6	14.9	10.2	8.7	14.9	97.4	51
148	13.6	54.3	2145	255.0	256.6	7.5	15.3	12.9	9.1	14.9	97.4	51
149	14.1	54.1	2134	255.0	256.6	8.5	15.1	13.4	10.2	14.8	97.4	51
150	13.4	54.4	2124	255.0	256.6	8.2	14.8	12.7	9.6	14.7	97.4	51
151	11.8	54.4	2126	255.0	256.6	7.1	14.7	11.1	8.5	14.7	97.4	51
152	12.4	54.4	2140	255.0	256.6	6.9	14.9	11.7	9.2	14.7	97.4	51
153	13.1	54.3	2140	255.0	256.6	7.9	15.0	12.4	8.7	14.7	97.4	51
154	12.5	54.6	2124	255.0	256.6	6.9	14.7	11.8	8.9	14.7	97.4	51
155	11.6	54.7	2100	255.0	256.6	4.5	14.5	11.0	8.7	14.7	97.4	52
156	11.6	55.1	2144	255.0	256.6	5.8	15.1	11.0	8.3	14.7	97.4	52
157	11.0	54.7	2126	255.0	256.6	5.1	14.7	10.4	8.4	14.7	97.4	52
158			2124	255.0	256.6	3.5	14.7	9.4	9.2	14.7	97.4	52
159	11.2	54.6	2129	255.0	256.6	2.4	14.7	10.5	9.3	14.7	97.4	52
160	11.1	54.9	2094	255.0	256.6	1.7	14.5	10.5	9.1	14.7	97.4	52
161	11.0	54.7	2148	255.0	256.6	3.4	15.1	10.4	8.8	14.7	97.4	51
162	11.5	54.5	2142	255.0	256.6	4.5	15.0	10.9	8.1	14.7	97.4	51
163	10.8	54.1	2131	255.0	256.6	3.3	14.7	10.2	7.9	14.7	97.4	51
164			2101	255.0	256.6	1.7	14.5	9.4	7.4	14.7	97.4	51
165	10.2	53.6	2005	255.0	256.6	1.1	14.2	9.6	8.1	14.7	97.4	51
166	11.0	53.9	2070	255.0	256.6	1.5	14.5	10.4	7.9	14.7	97.4	51
167	10.8	54.1	2101	255.0	256.6	1.7	14.5	10.3	9.2	14.7	97.4	51
168			2133	255.0	256.6	2.2	14.8	9.5	9.3	14.6	97.4	51
169			2141	255.0	256.6	3.2	14.9	9.5	7.6	14.6	97.4	51
170	10.3	54.6	2031	255.0	256.6	1.3	14.3	9.8	7.8	14.6	97.4	51
171			2032	255.0	256.6	1.2	14.4	9.1	6.8	14.6	97.4	51
172	11.3	54.8	2119	255.0	256.6	1.9	14.7	10.7	7.5	14.6	97.4	51
173	11.7	55.0	2143	255.0	256.6	5.2	15.4	11.1	6.2	14.6	97.4	53
174			2109	255.0	256.6	3.5	14.6	8.7	6.9	14.6	97.4	53
175	11.5	54.9	2124	255.0	256.6	2.8	14.8	10.8	6.9	14.6	97.4	53
176	11.8	54.4	2120	255.0	256.6	2.4	14.8	11.1	7.9	14.6	97.4	53

Table E.01 Measurement data - Turbine ON

***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	12.0	55.3	2142	255.0	256.6	6.6	15.5	11.4	7.3	14.6	97.4	53
178	12.6	54.5	2140	255.0	256.6	7.2	14.9	11.9	7.9	14.6	97.4	53
179	13.5	54.3	2141	255.0	256.6	7.0	14.9	12.8	7.6	14.8	97.4	53
180	12.9	54.3	2144	255.0	256.6	7.6	15.0	12.2	8.8	14.8	97.4	53
181	13.6	54.3	2115	255.0	256.6	7.8	14.9	12.9	8.5	14.8	97.4	53
182	11.3	55.2	2132	255.0	256.6	6.9	14.8	10.7	6.4	14.8	97.4	53
183	13.1	55.0	2139	255.0	256.6	7.4	14.9	12.4	8.6	14.8	97.4	53
184	12.7	54.5	2121	255.0	256.6	6.0	14.7	12.0	8.9	14.8	97.4	53
185	12.3	54.6	2137	255.0	254.7	6.0	14.8	11.7	8.9	14.9	97.4	52
186	9.8	53.8	1908	255.0	253.7	0.3	14.5	9.4	6.5	15.0	97.4	51
187	10.9	54.5	2049	255.0	253.7	1.5	14.4	10.3	6.6	15.0	97.4	51
188	11.0	54.3	2064	255.0	253.7	1.5	14.5	10.4	7.0	15.0	97.4	51
189	12.3	54.9	2139	255.0	253.7	4.5	15.2	11.7	6.2	15.0	97.4	51
190	11.5	54.5	2118	255.0	253.7	3.9	14.7	10.9	6.2	15.0	97.4	51
191	9.7	53.9	1887	255.0	253.7	0.4	14.1	8.4	6.1	15.0	97.4	51
192	9.5	54.2	1812	255.0	253.8	-0.1	14.3	7.4	7.2	15.0	97.4	51
193	9.5	54.8	1820	255.0	257.2	0.1	14.3	9.1	7.6	15.1	97.4	51
194	8.8	54.4	1546	255.0	258.8	-1.7	14.1	8.6	7.0	15.1	97.4	52
195	8.9	54.3	1613	255.0	258.8	-1.4	14.3	7.6	5.9	15.1	97.4	52
196	8.0	54.1	1208	255.0	258.8	-2.9	14.0	7.0	7.1	15.1	97.4	52
197	7.8	53.8	1119	255.0	258.8	-2.9	14.2	6.8	8.2	15.1	97.4	52
198	8.3	54.3	1328	255.0	258.8	-2.5	14.3	6.8	7.4	15.1	97.4	52
199	9.5	54.5	1812	255.0	258.8	-0.4	14.7	8.6	7.6	15.2	97.4	51
200			2063	255.0	258.8	1.6	14.5	9.1	8.0	15.2	97.4	51
201	9.3	53.8	1762	255.0	258.1	-0.3	14.1	8.2	8.7	15.2	97.4	51
202	9.3	54.0	1761	255.0	255.4	-0.5	14.4	8.4	7.5	15.2	97.4	51
203	9.8	54.7	1913	255.0	255.2	0.6	14.4	9.3	8.5	15.2	97.4	51
204	9.3	54.4	1759	255.0	255.2	-0.2	14.2	10.1	8.8	15.2	97.4	51
205	9.0	54.4	1655	255.0	255.2	-1.1	14.3	8.4	7.9	15.2	97.4	51
206	8.6	54.5	1489	255.0	255.2	-2.0	14.1	7.4	7.7	15.2	97.4	51
207	8.6	54.3	1457	255.0	255.2	-2.5	14.3	7.9	9.1	15.2	97.4	51
208	8.4	54.5	1385	255.0	253.8	-2.9	14.3	8.6	9.7	15.2	97.4	51
209	9.2	54.3	1724	255.0	252.2	-0.9	14.5	8.3	9.2	15.2	97.4	51
210	9.1	54.4	1682	255.0	252.2	-1.0	14.4	7.1	9.2	15.2	97.4	51
211	9.2	53.9	1712	255.0	252.2	-0.7	14.3	8.7	8.9	15.2	97.4	51
212	8.8	54.3	1576	255.0	252.2	-1.7	14.2	8.3	9.7	15.2	97.4	51
213	9.0	55.0	1641	255.0	252.2	-1.3	14.4	8.6	8.6	15.2	97.4	51
214	9.3	54.9	1766	255.0	252.2	-0.4	14.4	8.8	8.8	15.2	97.4	51
215	8.6	54.1	1479	255.0	252.2	-2.3	14.2	8.5	8.5	15.2	97.4	51
216	8.3	54.1	1329	255.0	252.2	-2.7	14.1	8.4	6.8	15.2	97.4	51
217	8.4	54.1	1374	255.0	252.2	-2.6	14.4	7.7	8.0	15.2	97.4	51
218	8.5	54.3	1422	255.0	252.2	-2.7	14.3	7.8	7.7	15.1	97.4	51
219	8.2	54.1	1286	255.0	252.2	-2.9	14.2	7.3	7.3	15.1	97.4	51
220	8.2	54.1	1283	255.0	253.1	-2.9	14.3	7.3	6.3	15.1	97.4	51
221	8.3	54.6	1348	255.0	256.3	-2.9	14.4	7.9	7.8	15.1	97.4	51
222	8.2	54.8	1304	255.0	256.6	-2.9	14.2	8.1	7.0	15.1	97.4	51
223	7.7	53.8	1082	255.0	256.6	-3.0	14.0	7.1	6.9	15.1	97.4	51
224	7.8	53.6	1120	255.0	257.4	-2.9	14.1	7.1	7.9	15.1	97.4	51
225	8.9	54.1	1591	255.0	260.0	-1.6	14.5	8.3	7.2	15.1	97.4	51
226	9.0	54.3	1639	255.0	260.1	-1.2	14.4	9.5	7.6	15.1	97.4	51
227	8.9	54.1	1601	255.0	260.1	-1.6	14.3	8.0	6.7	15.1	97.4	51
228	9.6	54.4	1851	255.0	260.2	0.0	14.5	9.1	5.7	15.1	97.4	51
229	11.1	54.4	2100	255.0	263.5	1.7	14.7	10.4	6.4	15.1	97.4	51
230	11.9	54.9	2145	255.0	264.9	3.0	15.0	11.3	8.2	15.0	97.4	52
231	11.9	54.2	2143	255.0	264.9	4.2	15.1	11.2	9.7	15.0	97.4	52
232	12.0	54.1	2121	255.0	264.9	3.5	14.7	11.3	9.4	15.0	97.4	52
233	11.8	54.5	2124	255.0	264.9	3.0	14.8	11.2	9.1	15.0	97.4	52
234	10.5	54.8	2136	255.0	264.9	4.7	15.0	10.0	7.9	15.0	97.4	52
235	11.3	54.3	2128	255.0	264.9	4.3	15.0	10.7	7.4	15.1	97.4	51
236	10.8	54.9	2134	255.0	264.9	5.5	15.0	10.2	8.4	15.1	97.4	51
237	11.4	54.1	2107	255.0	264.2	3.7	14.6	10.8	8.4	15.1	97.4	51
238	9.8	53.7	1899	255.0	261.4	0.6	14.1	8.1	8.4	15.1	97.4	51
239	11.0	54.3	2042	255.0	261.2	2.1	14.9	10.4	9.8	15.1	97.4	51
240	11.7	54.5	2131	255.0	261.2	5.5	15.2	11.1	8.8	15.1	97.4	51
241	12.1	54.3	2135	255.0	261.1	4.5	14.8	11.4	7.2	15.1	97.4	51
242	12.1	54.7	2147	255.0	261.1	4.5	14.9	11.4	7.1	15.1	97.4	51
243	11.7	54.7	2134	255.0	261.2	3.8	14.8	11.1	6.6	15.1	97.4	51
244	10.8	53.9	2056	255.0	261.2	1.6	14.3	10.2	5.8	15.1	97.4	51
245	9.1	53.6	1695	255.0	258.8	-0.6	14.0	9.5	7.1	15.1	97.4	51
246	8.8	54.2	1574	255.0	257.5	-1.8	14.2	8.3	6.7	15.1	97.4	51
247	10.3	55.3	2088	255.0	257.5	2.5	15.1	9.7	6.3	15.1	97.4	51
248	12.6	54.9	2139	255.0	257.5	5.7	15.2	11.9	7.8	15.1	97.4	51
249	11.1	54.2	2101	255.0	257.5	3.5	14.6	10.5	8.4	15.1	97.4	51
250	10.3	54.5	2137	255.0	257.5	3.2	15.1	9.8	11.0	15.1	97.4	51
251	11.4	54.9	2141	255.0	257.5	5.7	15.2	10.8	9.5	15.1	97.4	51
252	11.2	53.8	2115	255.0	257.5	3.5	14.6	10.6	11.7	15.1	97.4	51
253	10.7	54.2	2085	255.0	257.5	1.7	14.5	10.1	10.9	15.1	97.4	51
254	11.0	54.4	2045	255.0	257.5	1.4	14.3	10.4	11.0	15.1	97.4	50
255	9.7	53.7	1872	255.0	257.5	0.2	14.2	9.5	10.6	15.1	97.4	50
256	10.1	55.0	1996	255.0	257.4	1.0	14.4	10.2	10.8	15.1	97.4	50
257	9.0	54.1	1669	255.0	257.5	-1.0	14.1	7.2	11.4	15.1	97.4	50
258	9.8	54.4	1898	255.0	257.5	0.3	14.5	9.1	10.3	15.1	97.4	50
259	10.3	54.7	2139	255.0	257.9	3.2	15.1	9.8	10.0	15.1	97.4	50
260	11.3	54.8	2140	255.0	260.6	5.3	15.2	10.7	9.7	15.0	97.5	50
261	12.8	54.1	2141	255.0	260.9	5.2	14.8	12.1	9.3	15.0	97.4	50
262	12.1	54.0	2133	255.0	260.9	4.0	14.7	11.5	9.3	15.0	97.4	50
263	12.6	54.6	2146	255.0	260.9	4.5	15.0	12.0	8.7	15.0	97.4	50
264	11.8	54.5	2137	255.0	260.9	4.1	14.8	11.2	7.9	15.0	97.4	50

***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	12.5	54.3	2139	255.0	260.9	5.6	15.2	11.8	8.8	15.0	97.4	50
266	12.5	54.0	2138	255.0	260.9	5.6	14.8	11.8	10.3	14.9	97.4	51
267	12.4	54.7	2136	255.0	260.9	5.3	14.8	11.7	10.0	14.9	97.4	51
268	10.9	53.9	2129	255.0	260.9	3.9	14.7	10.3	9.2	14.9	97.4	51
269	11.3	54.0	2140	255.0	260.9	4.2	14.9	10.6	8.6	14.9	97.4	51
270	11.2	54.4	2129	255.0	260.9	3.3	14.7	10.6	8.6	14.9	97.4	51
271	11.7	54.7	2109	255.0	260.9	1.8	14.6	11.0	8.0	14.9	97.4	51
272	11.5	54.1	2074	255.0	260.9	1.5	14.3	10.9	8.3	14.9	97.4	51
273	9.9	54.2	1953	255.0	260.9	0.9	14.2	10.1	7.5	14.9	97.4	51
274	9.0	54.1	1666	255.0	260.9	-1.1	14.1	8.9	7.3	14.8	97.4	51
275	9.4	54.0	1786	255.0	260.9	-0.3	14.4	9.1	7.8	14.8	97.4	51
276	11.0	54.4	2014	255.0	260.9	1.1	14.6	10.4	7.7	14.8	97.4	51
277	11.4	54.3	2106	255.0	260.9	1.8	14.6	10.8	7.7	14.8	97.4	52
278	9.9	53.8	1948	255.0	260.9	0.8	14.2	10.3	7.3	14.8	97.4	52
279	10.0	53.9	1980	255.0	260.9	0.8	14.3	9.7	6.8	14.8	97.4	52
280	10.3	53.9	2045	255.0	260.9	1.3	14.4	9.8	6.9	14.8	97.4	52
281	11.4	54.0	2130	255.0	260.9	2.2	14.8	10.8	7.1	14.8	97.4	52
282	10.8	54.5	2120	255.0	260.9	2.0	14.7	10.2	6.8	14.8	97.4	52
283	11.7	54.2	2024	255.0	260.9	1.3	14.3	11.1	7.1	14.8	97.4	52
284	10.7	54.3	2073	255.0	260.9	1.5	14.4	10.1	7.9	14.8	97.4	53
285	11.7	54.3	2127	255.0	260.9	1.9	14.7	11.1	6.7	14.8	97.4	53
286	11.3	54.5	2135	255.0	261.0	2.2	14.8	10.7	7.1	14.8	97.4	53
287	9.2	54.2	1718	255.0	261.0	-0.5	13.9	8.6	6.3	14.8	97.4	53
288	8.9	53.8	1611	255.0	261.0	-1.6	14.3	8.0	7.2	14.8	97.4	53
289	9.7	54.7	1887	255.0	261.0	0.2	14.4	9.2	8.0	14.9	97.4	52
290	11.5	54.1	2047	255.0	261.0	1.4	14.5	10.8	7.5	14.9	97.4	52
291	10.0	54.3	1971	255.0	261.0	0.9	14.3	10.8	8.1	14.9	97.4	52
292	9.7	53.9	1894	255.0	261.0	0.4	14.3	9.6	7.8	14.9	97.4	52
293	9.7	54.1	1872	255.0	261.0	0.3	14.3	10.1	9.3	14.9	97.4	52
294	9.5	53.7	1822	255.0	261.0	0.0	14.3	10.3	8.9	14.9	97.4	52
295	9.5	54.0	1801	255.0	261.0	-0.2	14.3	9.6	8.3	14.9	97.4	51
296	9.5	54.2	1806	255.0	261.0	-0.2	14.4	9.3	7.9	14.8	97.4	51
297	9.3	54.7	1746	255.0	261.0	-0.5	14.3	9.0	7.1	14.8	97.4	51
298	8.6	54.2	1464	255.0	261.0	-2.2	14.1	8.3	6.9	14.8	97.4	51
299	8.2	54.0	1283	255.0	261.0	-3.0	14.2	7.8	8.2	14.8	97.4	51
300	7.9	54.9	1164	255.0	261.0	-2.9	14.2	7.4	6.9	14.8	97.4	51
301	7.8	54.3	1109	255.0	261.0	-2.9	14.2	7.3	7.1	14.8	97.4	52
302	7.8	53.9	1117	255.0	261.0	-3.0	13.9	7.2	7.3	14.8	97.4	53
303	7.5	52.2	993	255.0	261.0	-3.0	12.5	6.5	6.4	14.8	97.4	53
304	7.3	50.8	918	255.0	261.0	-3.0	12.4	6.8	6.4	14.8	97.4	53
305	7.4	51.3	968	255.0	261.0	-3.0	12.6	7.1	7.0	14.8	97.4	53
306	7.6	51.6	1017	255.0	259.2	-3.0	12.7	7.3	8.1	14.8	97.4	53
307	7.7	51.8	1082	255.0	257.2	-3.0	12.7	7.2	8.4	14.8	97.4	52
308	8.2	52.0	1286	255.0	257.2	-3.0	13.2	7.9	7.8	14.8	97.4	52
309	8.4	54.2	1385	255.0	257.2	-2.4	14.3	8.8	7.3	14.8	97.4	52
310	8.4	54.5	1378	255.0	257.2	-2.8	14.2	7.9	7.4	14.8	97.4	52
311	8.8	54.6	1583	255.0	257.2	-1.7	14.5	8.1	7.4	14.8	97.4	52
312	9.6	54.8	1856	255.0	257.2	0.0	14.4	7.6	6.3	14.8	97.4	52
313	9.5	54.8	1807	255.0	257.2	-0.5	14.4	8.3	6.6	14.8	97.4	53
314	9.6	54.8	1838	255.0	257.5	0.1	14.4	9.1	5.9	14.8	97.4	53
315	9.1	54.3	1688	255.0	260.3	-0.7	14.1	8.1	6.6	14.8	97.4	53
316	9.5	54.0	1813	255.0	260.6	-0.4	14.5	9.2	6.5	14.8	97.4	53
317	9.7	54.2	1896	255.0	260.6	0.5	14.3	9.3	6.9	14.8	97.4	53
318	9.3	54.2	1753	255.0	260.6	-0.5	14.3	8.3	7.2	14.8	97.4	53
319	9.3	54.4	1755	255.0	262.1	-0.4	14.4	8.3	9.2	14.8	97.4	53
320	9.3	55.0	1745	255.0	263.6	-0.5	14.3	9.7	9.5	14.8	97.4	53
321	8.6	54.3	1486	255.0	263.6	-2.2	14.1	7.4	10.1	14.8	97.4	53
322	8.5	54.0	1436	255.0	263.5	-2.5	14.2	8.8	10.2	14.9	97.4	53
323	8.0	54.0	1185	255.0	263.5	-2.9	14.1	6.9	8.2	14.9	97.4	53
324	8.5	55.0	1446	255.0	263.5	-2.2	14.5	6.9	8.1	14.9	97.4	53
325	9.7	55.1	1887	255.0	262.7	0.5	14.6	9.6	9.0	14.8	97.4	53
326	10.6	54.7	2050	255.0	260.3	1.4	14.6	10.0	9.6	14.7	97.4	53
327	11.9	54.4	2142	255.0	260.2	2.3	14.8	11.3	8.3	14.7	97.4	53
328	10.8	53.9	2099	255.0	260.2	1.7	14.5	10.2	7.0	14.7	97.4	53
329			2041	255.0	260.1	1.3	14.3	9.4	6.5	14.7	97.4	53
330	11.2	54.2	2012	255.0	260.1	1.2	14.3	10.6	5.7	14.7	97.4	53
331	9.7	53.8	1867	255.0	260.1	0.2	14.2	9.4	7.0	14.7	97.4	53
332	9.9	54.1	1934	255.0	260.1	0.6	14.4	9.6	7.0	14.7	97.4	53
333	10.0	53.8	1963	255.0	260.1	0.8	14.4	10.6	7.2	14.7	97.4	53
334	11.7	53.9	2091	255.0	260.1	1.7	14.5	11.0	6.8	14.7	97.4	53
335	10.8	54.2	2109	255.0	260.1	1.7	14.6	10.2	7.6	14.7	97.4	53
336	10.1	54.0	1993	255.0	260.1	1.1	14.2	9.7	8.8	14.7	97.4	53
337	9.6	53.9	1833	255.0	260.0	0.0	14.2	9.0	7.4	14.7	97.4	53
338	9.6	54.3	1852	255.0	260.1	0.1	14.3	10.0	6.6	14.7	97.4	53
339	9.8	54.7	1928	255.0	260.1	0.6	14.4	10.2	5.7	14.7	97.4	53
340	9.5	53.9	1830	255.0	261.2	0.0	14.3	9.8	6.2	14.7	97.4	53
341	9.7	54.2	1876	255.0	263.3	0.2	14.4	9.8	6.6	14.7	97.4	53
342	9.8	54.0	1927	255.0	263.3	0.6	14.4	10.1	6.1	14.7	97.4	53
343	9.8	54.1	1913	255.0	263.3	0.5	14.4	9.7	8.2	14.7	97.4	53
344	11.5	54.5	2086	255.0	263.3	1.7	14.6	10.9	8.9	14.7	97.4	53
345	12.0	54.5	2143	255.0	263.3	3.4	15.1	11.4	7.6	14.7	97.4	53
346	10.5	54.5	2132	255.0	263.3	3.6	14.8	9.9	7.4	14.7	97.4	53
347	12.0	54.7	2145	255.0	263.3	4.3	15.1	11.3	8.2	14.7	97.4	53
348	11.5	54.3	2137	255.0	263.3	5.0	14.9	10.8	8.0	14.7	97.4	53
349	11.6	54.0	2117	255.0	263.3	3.5	14.7	11.0	7.6	14.7	97.4	53
350	11.0	54.9	2141	255.0	263.3	3.4	14.9	10.4	7.7	14.7	97.4	53
351	10.7	54.7	2137	255.0	263.3	3.0	14.9	10.1	7.0	14.7	97.4	53
352	11.8	55.2	2133	255.0	263.3	4.0	14.9	11.2	6.8	14.7	97.4	53

Table E.01 Measurement data - Turbine ON

Project: Grand Renewables Wind Farm - Turbine T10 - IEC 61400-11 Measurement

Report ID: 14284.00.T10.RP4

Created on: 1/23/2018

***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	10.9	54.7	2121	255.0	263.3	2.0	14.7	10.3	7.8	14.7	97.4	53
354	10.3	54.1	2041	255.0	263.3	1.5	14.4	9.7	8.2	14.7	97.4	53
355	9.1	54.2	1681	255.0	263.3	-1.0	14.0	9.1	7.5	14.7	97.4	53
356	8.8	54.4	1573	255.0	261.0	-1.7	14.2	8.1	7.6	14.7	97.4	53
357	8.7	54.3	1527	255.0	260.0	-2.1	14.3	8.4	8.1	14.7	97.4	53
358	8.8	54.9	1557	255.0	260.0	-1.8	14.3	8.0	8.1	14.7	97.4	53
359	8.9	54.3	1618	255.0	259.9	-1.4	14.4	8.1	8.5	14.7	97.4	53
360	9.2	54.5	1715	255.0	259.9	-0.8	14.4	7.3	9.2	14.7	97.4	53
361	9.7	54.3	1885	255.0	260.0	0.4	14.4	9.8	8.6	14.7	97.4	54
362	9.2	53.7	1707	255.0	260.0	-0.7	14.2	8.9	8.6	14.7	97.4	54
363	8.8	54.2	1580	255.0	260.0	-1.5	14.2	8.9	7.3	14.7	97.4	54
364	8.5	54.4	1448	255.0	259.3	-2.6	14.2	7.9	6.0	14.7	97.4	54
365	8.7	54.6	1529	255.0	257.5	-2.1	14.4	8.7	6.0	14.7	97.4	54
366	10.0	54.6	1973	255.0	257.4	0.7	14.7	9.8	6.1	14.7	97.4	54
367	11.3	54.6	2118	255.0	257.3	1.9	14.7	10.7	6.0	14.6	97.4	54
368	11.2	54.9	2138	255.0	257.3	2.7	14.8	10.6	6.0	14.5	97.4	54
369			2100	255.0	257.3	1.7	14.5	9.4	5.4	14.5	97.4	54
370	11.1	54.4	2142	255.0	257.1	3.3	15.0	10.5	5.8	14.5	97.4	54
371			2130	255.0	254.5	3.3	14.8	9.5	6.4	14.5	97.4	54
372			2135	255.0	254.1	2.5	14.8	9.3	5.8	14.5	97.4	54
373	11.3	54.5	2144	255.0	254.1	2.1	14.8	10.7	6.8	14.6	97.5	54
374	10.8	54.7	2146	255.0	254.1	2.7	14.9	10.2	7.3	14.5	97.5	54
375	10.3	54.7	2130	255.0	254.1	2.0	14.7	9.8	7.2	14.5	97.5	54
376	9.7	54.0	1868	255.0	254.8	0.3	14.1	8.5	6.5	14.5	97.5	54
377	9.5	53.6	1825	255.0	257.9	0.0	14.3	10.2	6.6	14.5	97.5	54
378	9.6	53.7	1855	255.0	258.0	0.0	14.4	10.9	5.6	14.5	97.5	54
379	9.7	53.9	1866	255.0	258.0	0.1	14.3	10.8	5.6	14.5	97.5	55
380	9.5	54.0	1820	255.0	258.1	-0.1	14.3	9.9	5.6	14.5	97.5	55
381	9.5	54.0	1802	255.0	260.3	-0.2	14.3	9.2	7.9	14.5	97.5	55
382	9.5	53.9	1825	255.0	261.4	-0.1	14.3	9.5	7.4	14.5	97.5	55
383	9.6	53.9	1845	255.0	261.4	0.0	14.4	9.4	6.9	14.5	97.5	55
384	9.7	54.1	1867	255.0	261.4	0.3	14.4	9.4	7.8	14.5	97.5	55
385	9.5	53.9	1818	255.0	261.4	-0.1	14.3	9.4	7.0	14.5	97.5	54
386	10.8	54.5	2023	255.0	261.3	1.1	14.5	10.2	7.2	14.5	97.5	54
387	11.6	54.3	2098	255.0	261.2	1.7	14.5	10.9	7.4	14.5	97.5	54
388	11.5	54.6	2128	255.0	261.2	1.9	14.7	10.9	6.9	14.5	97.5	54
389	10.7	54.5	2113	255.0	261.2	1.8	14.6	10.1	6.8	14.5	97.5	54
390	11.2	54.1	2014	255.0	261.3	1.2	14.3	10.6	7.2	14.5	97.5	54
391	9.9	54.3	1946	255.0	261.4	0.7	14.2	10.4	7.6	14.5	97.5	54
392	9.7	54.2	1877	255.0	261.4	0.2	14.3	9.8	8.4	14.5	97.5	54
393	11.5	54.4	2039	255.0	261.4	1.2	14.5	10.9	7.4	14.5	97.5	54
394	11.6	54.6	2128	255.0	261.4	1.9	14.7	11.0	7.1	14.5	97.5	54
395	10.3	54.4	2037	255.0	261.4	1.3	14.3	9.7	7.2	14.5	97.5	54
396			2014	255.0	261.4	1.1	14.3	9.7	6.8	14.5	97.5	54
397	11.0	54.4	2101	255.0	261.4	1.7	14.5	10.4	6.9	14.5	97.5	54
398	11.3	54.7	2138	255.0	261.3	2.1	14.8	10.7	6.5	14.5	97.5	55
399	11.4	54.6	2127	255.0	259.6	2.1	14.8	10.8	7.0	14.5	97.5	55
400	11.7	54.7	2146	255.0	258.8	2.9	15.0	11.1	7.5	14.5	97.5	55
401	11.2	54.5	2143	255.0	258.8	2.6	14.8	10.6	7.0	14.5	97.5	55
402	11.2	54.6	2126	255.0	258.8	2.0	14.7	10.6	6.4	14.5	97.5	55
403	10.9	54.9	2063	255.0	258.8	1.5	14.3	10.3	6.9	14.5	97.5	54
404	11.2	53.9	2084	255.0	258.8	1.5	14.4	10.6	6.8	14.5	97.5	54
405	10.4	55.0	2035	255.0	258.8	1.3	14.3	9.9	6.3	14.5	97.5	54
406	10.1	54.0	1990	255.0	258.8	0.9	14.3	9.8	6.2	14.5	97.5	54
407	11.3	53.9	2036	255.0	258.8	1.3	14.4	10.7	7.7	14.5	97.5	54
408	11.4	53.7	2078	255.0	258.8	1.6	14.4	10.8	7.9	14.5	97.5	54
409	11.5	54.4	2086	255.0	258.8	1.6	14.4	10.8	7.0	14.5	97.5	54
410	9.8	53.9	1898	255.0	256.9	0.5	14.2	9.9	7.4	14.5	97.5	55
411	9.6	54.3	1861	255.0	256.1	0.1	14.3	10.0	6.9	14.5	97.5	55
412	9.9	54.1	1944	255.0	256.1	0.7	14.4	9.1	5.5	14.5	97.5	55
413	9.5	54.2	1810	255.0	256.0	-0.1	14.3	8.7	5.2	14.5	97.5	55
414	9.1	54.1	1681	255.0	256.0	-1.0	14.2	8.3	7.2	14.5	97.5	55
415	9.3	54.2	1758	255.0	256.0	-0.6	14.4	8.5	6.6	14.5	97.5	55
416	9.2	54.5	1720	255.0	256.0	-0.8	14.3	9.0	6.8	14.5	97.5	55
417	9.1	54.5	1684	255.0	254.8	-0.9	14.3	7.9	6.9	14.5	97.5	55
418	9.7	54.4	1888	255.0	252.0	0.3	14.5	8.1	8.1	14.5	97.5	55
419	9.8	54.2	1901	255.0	251.9	0.4	14.3	9.1	10.3	14.5	97.5	55
420	10.9	54.5	2049	255.0	249.1	1.3	14.5	10.3	8.6	14.5	97.5	55
421	11.4	54.8	2118	255.0	248.5	2.5	14.8	10.8	6.7	14.5	97.5	55
422	11.4	54.7	2143	255.0	248.4	5.4	15.2	10.8	7.3	14.5	97.5	56
423	10.8	55.0	2127	255.0	248.5	4.4	14.7	10.2	8.0	14.5	97.5	56
424	10.8	54.4	2124	255.0	248.5	3.1	14.7	10.2	7.0	14.5	97.5	56
425	10.3	54.7	2109	255.0	248.5	1.7	14.6	9.7	7.1	14.5	97.5	56
426	10.7	54.7	2071	255.0	248.5	1.5	14.3	10.1	5.5	14.5	97.5	56
427	9.9	53.7	1959	255.0	248.4	0.9	14.2	9.4	5.8	14.5	97.5	56
428	9.5	54.4	1827	255.0	246.1	0.0	14.2	8.6	5.7	14.5	97.5	57
429	10.2	54.6	1998	255.0	245.9	0.9	14.5	8.9	6.5	14.5	97.5	57
430	10.7	54.6	2133	255.0	245.9	3.1	15.0	10.1	6.1	14.5	97.5	57
431	10.9	54.5	2138	255.0	245.9	3.7	14.9	10.3	4.9	14.5	97.5	57
432	11.2	54.5	2135	255.0	245.9	2.5	14.8	10.6	5.7	14.5	97.5	57
433	11.1	54.4	2142	255.0	245.9	3.0	14.9	10.5	4.3	14.5	97.5	57
434			2140	255.0	245.9	2.6	14.9	9.6	2.6	14.5	97.5	57
435	10.7	54.5	2140	255.0	245.9	3.6	15.0	10.1	3.7	14.5	97.5	57
436	10.7	54.0	2098	255.0	245.9	2.0	14.5	10.1	4.9	14.5	97.5	57
437	9.6	54.1	1840	255.0	245.9	0.1	14.1	8.9	5.4	14.5	97.5	57
438	9.7	54.5	1880	255.0	245.9	0.2	14.3	9.3	6.5	14.5	97.5	57
439	10.2	54.9	1999	255.0	245.7	1.0	14.4	9.5	4.7	14.4	97.5	57
440	10.5	54.7	2047	255.0	243.5	1.4	14.4	9.9	5.7	14.3	97.5	57

***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	9.8	54.3	1917	255.0	243.2	0.6	14.2	9.2	5.8	14.3	97.5	57
442	9.2	54.1	1723	255.0	243.2	-0.7	14.2	9.3	5.3	14.3	97.5	57
443			1867	255.0	239.9	0.2	14.4	9.9	2.9	14.3	97.5	58
444			2019	255.0	239.9	1.1	14.5	9.8	4.3	14.3	97.5	58
445			2112	255.0	239.9	1.8	14.6	10.8	6.2	14.3	97.5	58
446			2141	255.0	239.9	2.8	15.0	10.7	5.6	14.3	97.5	58
447			2087	255.0	239.9	2.0	14.5	9.8	3.9	14.3	97.5	58
448			1869	255.0	239.9	0.3	14.2	9.1	2.0	14.3	97.4	58
449			1776	255.0	239.9	-0.2	14.2	9.4	2.6	14.3	97.4	58
450			1735	255.0	239.9	-0.6	14.2	7.9	3.6	14.3	97.4	58
451			1391	255.0	239.9	-2.6	14.1	7.6	4.9	14.3	97.4	58
452			1654	255.0	239.9	-1.5	14.5	9.2	5.3	14.3	97.4	58
453			2065	255.0	239.9	1.5	14.6	9.4	5.1	14.3	97.4	58
454			2012	255.0	239.9	1.2	14.3	9.5	3.5	14.3	97.4	58
455			1934	255.0	239.9	0.6	14.3	9.5	3.7	14.3	97.4	58
456			2127	255.0	239.9	1.9	14.7	9.9	3.8	14.3	97.4	58
457			2093	255.0	239.9	1.6	14.5	10.3	5.4	14.3	97.4	58
458			1935	255.0	239.9	0.7	14.2	9.2	5.8	14.3	97.4	58
459			1773	255.0	239.9	-0.4	14.2	8.2	5.2	14.3	97.4	58
460			1817	255.0	239.9	-0.2	14.4	8.9	4.4	14.3	97.4	58
461			1954	255.0	239.9	0.7	14.4	8.6	4.7	14.3	97.4	58
462			1855	255.0	239.9	0.2	14.3	8.5	7.1	14.3	97.4	58
463			1725	255.0	239.8	-0.7	14.2	8.1	6.8	14.3	97.4	58
464			1751	255.0	239.8	-0.6	14.4	9.5	5.4	14.3	97.4	58
465			1907	255.0	239.9	0.5	14.4	10.1	4.8	14.3	97.4	58
466			1829	255.0	240.0	0.0	14.3	9.6	5.3	14.3	97.4	58
467	9.7	55.0	1888	255.0	241.8	0.3	14.4	9.2	7.1	14.3	97.4	58
468	10.6	55.0	2032	255.0	241.9	1.3	14.4	10.1	5.9	14.3	97.4	58
469	9.9	54.7	1938	255.0	242.0	0.7	14.3	11.1	6.0	14.3	97.4	58
470	9.6	54.4	1863	255.0	242.0	0.3	14.2	10.6	5.8	14.3	97.4	58
471	9.6	54.1	1842	255.0	242.1	0.1	14.3	9.0	5.9	14.4	97.5	58
472	9.2	53.8	1721	255.0	242.1	-0.6	14.2	7.8	4.9	14.4	97.5	58
473	9.2	54.8	1725	255.0	242.1	-0.7	14.3	9.1	6.6	14.4	97.5	58
474	8.7	54.1	1497	255.0	242.1	-2.2	14.1	9.2	6.3	14.4	97.5	58
475	8.4	54.3	1401	255.0	242.1	-2.8	14.2	8.3	6.3	14.4	97.5	58
476	8.4	54.1	1397	255.0	242.8	-2.9	14.3	7.5	5.2	14.4	97.5	58
477	8.1	54.5	1257	255.0	246.6	-3.0	14.2	7.4	4.0	14.4	97.5	58
478	7.9	54.5	1157	255.0	247.2	-3.0	14.2	7.2	3.6	14.4	97.5	58
479	7.8	54.2	1105	255.0	247.2	-3.0	14.2	7.2	4.2	14.4	97.5	58
480	8.3	54.1	1323	255.0	247.2	-2.8	14.4	7.3	4.0	14.4	97.5	58
481	8.7	54.6	1536	255.0	247.2	-2.0	14.4	8.4	5.2	14.4	97.5	58
482	8.6	54.5	1472	255.0	247.2	-2.4	14.4	7.6	6.0	14.4	97.5	58
483	8.6	54.7	1490	255.0	247.2	-2.2	14.3	8.1	6.0	14.4	97.5	58
484	8.3	53.8	1326	255.0	247.2	-2.9	14.2	7.6	4.9	14.4	97.5	58
485	8.1	54.2	1252	255.0	247.2	-2.9	14.3	7.9	5.3	14.4	97.5	58
486	8.0	54.2	1190	255.0	247.2	-2.9	14.3	7.6	4.4	14.4	97.5	58
487	8.4	54.7	1376	255.0	247.2	-2.7	14.4	8.1	4.6	14.4	97.5	58
488	8.7	55.3	1506	255.0	246.7	-2.0	14.4	8.7	4.2	14.4	97.5	58
489	8.2	54.1	1275	255.0	244.2	-3.0	14.2	7.6	4.9	14.5	97.5	58
490	8.1	54.3	1226	255.0	244.1	-3.0	14.3	7.4	4.1	14.5	97.5	58
491	7.8	54.5	1120	255.0	244.1	-3.0	14.2	7.6	3.6	14.5	97.5	58
492	8.1	54.4	1245	255.0	244.1	-2.9	14.3	7.8	4.1	14.5	97.5	58
493	8.8	55.3	1563	255.0	244.1	-1.7	14.5	8.2	2.6	14.5	97.5	58
494	9.3	54.3	1741	255.0	244.1	-0.5	14.5	9.1	4.2	14.5	97.5	58
495	9.3	54.7	1763	255.0	244.0	-0.5	14.4	9.3	4.2	14.5	97.5	58
496	9.7	55.2	1883	255.0	244.0	0.3	14.4	9.4	5.1	14.5	97.5	58
497	9.6	54.2	1858	255.0	244.0	0.2	14.3	9.5	4.6	14.5	97.5	58
498	8.7	54.1	1530	255.0	244.0	-1.9	14.1	8.7	3.3	14.5	97.5	58
499	8.3	53.4	1316	255.0	244.0	-2.9	14.1	8.4	4.4	14.5	97.5	58
500	7.8	53.6	1097	255.0	244.0	-3.0	14.1	7.3	4.1	14.5	97.5	58
501	7.9	53.9	1143	255.0	244.0	-2.9	14.2	7.3	5.0	14.5	97.5	58
502	7.8	54.1	1124	255.0	244.0	-3.0	13.8	7.0	5.1	14.5	97.5	58
503	7.5	52.5	1009	255.0	244.0	-3.0	12.6	6.7	4.4	14.5	97.5	58
504	7.4	51.4	963	255.0	244.0	-3.0	12.6	6.9	5.6	14.5	97.5	58
505	7.3	51.8	908	255.0	244.0	-3.0	12.4	6.4	4.3	14.5	97.5	58
506	7.4	51.5	971	255.0	243.1	-3.0	12.6	6.9	5.6	14.5	97.5	58
507	7.6	51.6	1045	255.0	241.2	-2.9	12.7	7.3	4.8	14.5	97.5	58
508	7.7	51.9	1091	255.0	241.2	-2.7	12.7	7.3	4.0	14.5	97.5	57
509	7.7	52.0	1058	255.0	241.2	-2.7	12.7	6.8	3.8	14.5	97.5	57
510			2139	255.0	266.5	4.3	15.0	10.9	7.2	14.9	97.5	54
511			2133	255.0	266.5	5.1	14.9	11.2	7.8	15.0	97.5	54
512			2143	255.0	266.5	5.5	15.0	12.4	9.2	15.0	97.5	55
513			2134	255.0	268.0	6.0	14.9	11.3	9.8	15.0	97.5	55
514			2097	255.0	270.2	3.4	14.6	11.3	9.8	15.0	97.5	55
515			2131	255.0	270.2	2.3	14.8	11.2	9.6	15.0	97.5	55
516			2140	255.0	270.3	2.4	14.8	11.3	9.6	15.0	97.5	55
517			2145	255.0	270.3	2.1	14.8	11.3	8.3	15.0	97.5	54
518			2145	255.0	270.3	4.0	15.2	11.3	8.5	14.9	97.5	54
519			2148	255.0	270.3	4.3	14.9	10.4	7.7	14.9	97.5	54
520			2137	255.0	270.3	4.9	14.9	11.7	7.8	14.9	97.5	54
521			2117	255.0	270.3	3.2	14.7	11.4	9.0	14.9	97.5	54
522			2145	255.0	270.3	2.8	14.9	11.1	9.8	14.9	97.5	54
523			2143	255.0	270.3	4.0	15.1	11.1	9.2	14.9	97.5	54
524			2134	255.0	270.3	4.9	14.9	12.1	9.2	14.9	97.5	53
525			2116	255.0	270.3	2.4	14.7	10.2	9.5	14.9	97.5	53
526			2056	255.0	270.3	1.5	14.4	9.3	9.3	14.9	97.5	53
527			2015	255.0	270.3	1.1	14.3	10.5	9.2	14.9	97.5	53
528			2018	255.0	270.3	1.1	14.4	10.2	9.2	14.9	97.5	53

Table E.01 Measurement data - Turbine ON

***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			1923	255.0	270.3	0.6	14.2	9.5	8.1	14.9	97.5	54
530			1848	255.0	270.3	0.1	14.3	9.5	8.2	14.9	97.5	54
531			1874	255.0	270.3	0.3	14.4	9.0	8.2	14.9	97.5	54
532			1990	255.0	270.3	1.0	14.4	9.7	7.1	14.9	97.5	54
533			1905	255.0	270.2	0.5	14.3	10.3	7.6	14.9	97.5	54
534			1964	255.0	268.0	0.9	14.4	9.9	6.7	14.9	97.5	54
535			1892	255.0	267.7	0.4	14.3	8.9	6.4	14.9	97.5	54
536			1954	255.0	267.7	0.7	14.4	9.6	7.2	14.9	97.5	55
537			2002	255.0	267.7	1.0	14.4	9.9	7.6	14.9	97.5	55
538			2091	255.0	267.7	1.7	14.5	10.2	8.6	14.9	97.5	55
539			1729	255.0	267.7	-0.5	14.0	9.0	8.4	14.9	97.5	55
540			1620	255.0	267.7	-1.4	14.2	9.3	8.2	14.9	97.5	55
541			1711	255.0	267.7	-1.0	14.5	8.3	7.6	14.9	97.5	55
542			2125	255.0	265.8	2.2	14.9	9.5	9.6	14.9	97.5	54
543			2145	255.0	264.0	3.5	15.2	10.4	8.0	14.9	97.5	54
544			2141	255.0	264.0	5.8	15.2	11.0	9.0	14.9	97.5	54
545			2131	255.0	264.0	5.3	14.8	12.1	8.4	14.9	97.5	54
546			2078	255.0	264.0	2.4	14.4	10.1	9.1	14.9	97.5	54
547			1617	255.0	263.9	-1.2	13.9	8.2	8.2	14.9	97.5	54
548			1874	255.0	263.9	0.0	14.6	8.7	10.0	14.9	97.5	54
549			2142	255.0	264.0	2.2	14.8	10.1	10.3	14.9	97.5	54
550			2144	255.0	264.0	2.8	15.0	11.3	8.7	14.9	97.5	54
551			2141	255.0	264.0	4.5	15.1	11.0	9.3	14.9	97.5	54
552			2122	255.0	264.0	4.5	14.8	10.7	8.5	14.9	97.5	54
553			2121	255.0	264.0	2.2	14.7	10.5	7.6	14.9	97.5	54
554			2131	255.0	264.0	2.7	14.8	9.6	8.6	14.9	97.5	55
555			2109	255.0	264.0	1.8	14.6	10.8	10.0	14.9	97.5	55
556			1864	255.0	264.0	0.3	14.1	9.4	10.3	14.9	97.5	55
557			1809	255.0	264.0	0.0	14.3	10.4	10.3	14.9	97.5	55
558			1824	255.0	264.0	0.0	14.3	9.6	10.8	14.9	97.5	55
559			1520	255.0	263.1	-1.9	14.1	7.6	10.0	14.8	97.5	55
560			1864	255.0	260.4	0.0	14.6	8.5	9.6	14.7	97.5	54
561			2077	255.0	260.4	1.5	14.6	10.1	8.9	14.7	97.5	54
562			2133	255.0	260.4	2.2	14.8	10.5	9.8	14.7	97.5	54
563			2146	255.0	260.4	2.9	14.9	10.9	9.5	14.7	97.5	54
564			2141	255.0	260.4	4.1	15.1	10.1	7.3	14.7	97.5	54
565			2134	255.0	260.0	4.6	14.9	10.9	7.4	14.7	97.5	54
566			2122	255.0	257.5	3.1	14.7	11.4	7.2	14.7	97.5	55
567			2097	255.0	257.3	1.7	14.5	10.1	7.9	14.7	97.5	55
568			2101	255.0	257.2	1.7	14.5	10.3	8.1	14.7	97.5	55
569			2142	255.0	257.2	3.7	15.1	11.5	8.2	14.7	97.5	55
570			2136	255.0	255.7	4.8	15.0	11.1	7.9	14.7	97.5	55
571			2143	255.0	253.9	5.0	14.9	11.5	7.7	14.7	97.5	55
572			2144	255.0	253.9	6.0	15.1	12.1	8.6	14.7	97.5	55
573			2135	255.0	254.0	7.3	15.1	12.1	9.0	14.7		55
574			2131	255.0	254.0	6.7	14.7	12.3	8.2	14.7	97.5	55
575			2129	255.0	253.1	6.2	14.9	12.2	8.8	14.7	97.5	55
576			2144	255.0	251.2	7.0	15.0	12.2	8.8	14.7	97.5	55
577			2144	255.0	251.2	6.9	14.8	11.9	7.6	14.7	97.5	55
578			2108	255.0	251.2	5.4	14.6	12.1	7.8	14.7	97.5	55
579			2134	255.0	251.2	5.3	14.9	12.4	7.9	14.7	97.5	55
580			2139	255.0	251.2	4.6	14.7	11.8	7.3	14.7	97.5	55
581			2146	255.0	251.2	5.4	15.1	11.9	6.6	14.7	97.5	55
582			2146	255.0	251.2	6.6	15.1	12.6	8.5	14.7	97.5	55
583			2110	255.0	252.0	5.6	14.7	11.5	7.6	14.7	97.5	55
584			2135	255.0	254.7	6.3	15.1	12.6	7.3	14.7	97.5	56
585			2124	255.0	254.8	5.6	14.7	11.5	7.6	14.7	97.5	56
586			2119	255.0	254.9	3.5	14.6	10.8	8.6	14.7	97.5	56
587			2128	255.0	254.9	2.7	14.7	10.4	8.3	14.7	97.5	56
588			1787	255.0	254.9	0.0	14.0	10.4	8.2	14.7	97.5	56
589			1738	255.0	254.9	-0.6	14.3	8.8	8.2	14.7	97.5	56
590			1534	255.0	255.0	-1.8	14.1	7.9	7.7	14.7	97.5	55
591			1412	255.0	257.6	-2.7	14.2	8.2	6.9	14.7	97.5	55
592			1461	255.0	258.1	-2.5	14.3	7.4	7.2	14.7	97.5	55
593			1661	255.0	258.9	-1.2	14.5	8.4	8.0	14.7	97.5	55
594			1852	255.0	261.3	0.2	14.5	9.1	7.8	14.7	97.5	55
595			1627	255.0	261.4	-1.2	14.2	7.4	6.9	14.7	97.5	56
596			1753	255.0	261.4	-0.5	14.4	8.1	7.2	14.7	97.5	56
597			1930	255.0	261.4	0.6	14.5	9.0	8.6	14.7	97.5	56
598			2007	255.0	261.4	1.3	14.4	10.6	8.9	14.7	97.5	56
599			2056	255.0	261.4	1.8	14.7	9.8	8.4	14.7	97.5	56
600			2144	255.0	261.4	5.1	15.3	12.5	7.8	14.7	97.5	56
601			2141	255.0	261.4	5.6	14.9	10.8	7.1	14.7	97.5	56
602			2141	255.0	261.4	6.0	15.0	12.5	7.3	14.7	97.5	56
603			2144	255.0	261.4	7.1	15.1	12.4	9.0	14.7	97.5	56
604			2122	255.0	261.4	6.2	14.7	12.0	9.2	14.7	97.5	56
605			2115	255.0	261.4	4.7	14.7	11.2	9.2	14.7	97.5	56
606			2141	255.0	261.4	5.2	14.9	11.8	9.8	14.7	97.5	56
607			2146	255.0	261.4	5.1	14.9	11.5	10.6	14.7	97.5	56
608			2135	255.0	261.4	4.4	14.8	11.5	10.1	14.7	97.5	55
609			2135	255.0	261.4	3.6	14.8	10.1	8.6	14.7	97.5	55
610			2140	255.0	261.4	4.3	14.9	11.1	9.4	14.7	97.5	55
611			2121	255.0	261.4	3.5	14.8	10.8	9.5	14.7	97.5	55
612			2109	255.0	261.4	1.8	14.6	9.1	9.7	14.7	97.5	55
613			1884	255.0	259.9	0.5	14.1	8.7	9.2	14.7	97.5	55
614			1763	255.0	258.1	-0.4	14.2	8.2	9.5	14.7	97.5	55
615			1888	255.0	258.1	0.2	14.4	9.2	10.6	14.7	97.5	55
616			1994	255.0	258.1	1.0	14.4	9.5	9.4	14.7	97.5	55

***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 (%)
617			2134	255.0	258.1	3.5	15.1	11.0	7.4	14.7	97.5	55
618			2118	255.0	258.1	3.9	14.8	10.5	7.1	14.7	97.5	55
619			2131	255.0	258.1	2.2	14.7	10.6	6.2	14.7	97.5	56
620			2142	255.0	258.1	2.9	15.0	10.8	8.5	14.7	97.5	56
621			2140	255.0	258.1	4.9	15.1	10.5	9.2	14.7	97.5	56
622			2141	255.0	258.1	5.0	14.9	11.1	8.2	14.7	97.5	56
623			2102	255.0	258.1	2.7	14.6	10.3	7.5	14.7	97.5	56
624			2078	255.0	258.1	1.6	14.4	10.2	6.4	14.7	97.5	56
625			2063	255.0	258.1	1.4	14.4	10.7	5.0	14.7	97.5	56
626			2139	255.0	258.1	2.3	14.8	10.3	5.9	14.7	97.5	56
627			1964	255.0	256.2	1.0	14.2	10.1	8.0	14.7	97.5	56
628			1845	255.0	255.4	0.1	14.2	10.4	8.3	14.7	97.5	56
629			1787	255.0	255.5	-0.2	14.2	9.4	7.1	14.7	97.5	56
630			1404	255.0	255.5	-2.6	14.0	7.7	8.6	14.7	97.5	56
631			1488	255.0	255.5	-2.2	14.4	8.8	7.8	14.7	97.5	56
632			1660	255.0	255.5	-1.0	14.3	8.6	6.8	14.7	97.5	56
633			1319	255.0	255.2	-2.9	14.1	7.0	7.4	14.7	97.5	56
634			1618	255.0	252.5	-1.4	14.5	8.9	7.7	14.7	97.5	56
635			1930	255.0	252.1	0.6	14.6	9.6	7.9	14.7	97.5	56
636			1862	255.0	252.1	0.3	14.3	9.7	7.6	14.7	97.5	56
637			1854	255.0	250.7	0.3	14.3	7.5	7.5	14.7	97.5	56
638			1838	255.0	249.0	0.0	14.3	9.4	7.5	14.7	97.5	56
639			1877	255.0	249.0	0.2	14.4	9.3	7.2	14.7	97.5	56
640			2026	255.0	249.0	1.3	14.5	9.3	6.5	14.7	97.5	56
641			2038	255.0	249.0	1.3	14.4	10.0	5.9	14.7	97.5	56
642			1732	255.0	249.0	-0.5	14.1	8.6	5.8	14.7	97.5	56
643			1520	255.0	249.0	-2.1	14.2	8.8	5.7	14.7	97.5	56
644			1671	255.0	248.9	-1.1	14.4	9.0	5.8	14.7	97.5	57
645			1551	255.0	249.0	-1.8	14.2	8.8	7.8	14.7	97.5	57
646			1543	255.0	249.0	-1.9	14.3	8.4	6.8	14.7	97.5	57
647			1530	255.0	249.0	-2.1	14.3	8.4	5.8	14.7	97.5	57
648			1498	255.0	249.0	-2.3	14.3	7.9	5.9	14.7	97.5	57
649			1556	255.0	249.0	-1.9	14.4	9.5	6.4	14.7	97.5	56
650			1492	255.0	249.0	-2.3	14.3	8.2	6.3	14.7	97.5	56
651			1783	255.0	249.0	-0.3	14.5	8.2	6.3	14.7	97.5	56
652			1764	255.0	249.0	-0.4	14.4	9.2	6.1	14.7	97.5	56
653			1587	255.0	249.0	-1.6	14.2	7.0	5.9	14.7	97.5	56
654			1261	255.0	250.4	-2.9	14.1	7.6	5.6	14.7	97.5	56
655			1452	255.0	251.8	-2.5	14.4	7.4	5.5	14.7	97.5	56
656			1369	255.0	251.8	-2.9	14.3	8.3	5.9	14.7	97.5	57
657			1669	255.0	251.8	-1.2	14.6	8.6	6.6	14.7	97.5	57
658			1839	255.0	251.9	0.2	14.5	8.4	5.3	14.7	97.5	57
659			1772	255.0	251.9	-0.5	14.4	9.5	7.8	14.7	97.5	57
660			1962	255.0	251.9	0.8	14.4	9.8	7.2	14.7	97.5	57
661			1955	255.0	251.9	0.9	14.3	9.5	7.4	14.7	97.5	57
662			1866	255.0	251.9	0.2	14.3	9.5	9.3	14.7	97.5	56
663			1921	255.0	251.9	0.7	14.4	8.4	9.9	14.7	97.5	56
664			2070	255.0	251.9	1.7	14.6	9.5	7.9	14.7	97.5	56
665			2140	255.0	252.1	3.6	15.0	11.4	7.5	14.7	97.5	56
666			2124	255.0	254.7	2.5	14.7	9.4	7.3	14.7	97.5	56
667			2146	255.0	255.2	3.5	15.1	11.2	7.0	14.7	97.5	57
668			2126	255.0	255.5	6.7	15.4	10.6	6.9	14.7	97.5	57
669			2115	255.0	258.3	5.4	14.7	11.2	8.8	14.7	97.5	57
670			2143	255.0	258.5	5.3	14.9	11.5	9.0	14.7	97.5	57
671			2139	255.0	258.5	5.4	14.8	11.5	6.5	14.7	97.5	57
672			2103	255.0	258.5	2.9	14.6	10.8	7.3	14.7	97.5	57
673			2107	255.0	258.5	1.9	14.6	9.3	7.5	14.8	97.5	57
674			2132	255.0	258.8	4.3	15.2	11.1	6.8	14.7	97.5	56
675			2132	255.0	260.9	5.1	14.9	10.8	6.4	14.7	97.5	56
676			2065	255.0	261.0	1.7	14.3	8.8	6.7	14.7	97.5	56
677			1799	255.0	261.0	0.0	14.1	8.7	6.5	14.7	97.5	56
678			1640	255.0	261.0	-1.0	14.1	8.2	8.1	14.7	97.5	56
679			1778	255.0	261.0	-0.5	14.5	8.8	8.4	14.8	97.5	56
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Table E.02 Measurement data - Background

Project: Grand Renewables Wind Farm - Turbine T10 - IEC 61400-11 Measurement

Report ID: 14284.00.T10.RP4

Created on: 1/23/2018

***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	8.3	36.0	0.7	5.9	15	97.4	56
2	8.2	36.6	0.6	5.9	15	97.4	56
3	10.1	38.1	0.3	7.2	15	97.4	56
4	10.3	39.4	0.3	7.4	15	97.4	56
5	9.7	36.8	0.3	7.0	15	97.4	54
6	10.4	37.8	0.4	7.5	15	97.4	53
7	9.1	41.9	0.3	6.6	15	97.4	53
8	8.7	42.4	0.5	6.3	15	97.4	53
9	9.7	42.5	0.5	6.9	15	97.4	53
10	10.7	41.6	0.5	7.7	15	97.4	53
11	10.5	37.0	0.4	7.5	15	97.4	54
12	9.4	36.5	0.3	6.7	15	97.4	54
13	11.5	35.5	0.5	8.2	15	97.4	54
14	11.9	35.1	0.4	8.6	15	97.4	54
15	10.2	35.1	0.3	7.3	15	97.4	54
16	10.5	34.8	0.3	7.5	15	97.4	54
17	10.5	37.7	0.3	7.5	15	97.4	52
18	11.4	36.8	0.5	8.1	15	97.4	51
19	10.5	37.4	0.5	7.5	15	97.4	51
20			0.5	7.1	15	97.4	51
21			0.8	6.8	15	97.4	51
22			1.2	7.1	15	97.4	51
23			1.4	7.5	15	97.4	52
24	8.0	39.7	0.4	5.8	15	97.4	53
25	8.4	40.2	0.4	6.0	15	97.4	53
26	9.1	40.8	0.5	6.5	15	97.4	53
27	9.7	40.0	0.6	6.9	15	97.4	53
28	10.7	40.5	0.5	7.7	15	97.4	53
29	13.5	39.9	0.5	9.7	15	97.4	53
30	13.8	39.4	0.6	9.9	15	97.4	53
31	12.6	39.6	0.6	9.0	15	97.4	53
32	13.9	39.2	0.5	10.0	15	97.4	53
33	14.3	39.5	0.4	10.3	15	97.4	53
34	15.5	39.3	0.7	11.1	15	97.4	51
35	14.0	40.3	0.7	10.0	15	97.4	50
36	13.3	42.4	0.6	9.5	15	97.4	50
37	11.1	43.7	0.7	8.0	15	97.4	50
38	10.7	44.0	0.6	7.7	15	97.4	50
39	11.6	42.2	0.7	8.3	15	97.4	50
40	11.2	43.0	0.8	8.0	15	97.4	50
41	11.7	42.7	0.7	8.4	15	97.4	50
42	12.2	43.0	0.6	8.7	15	97.4	50
43	11.6	44.7	0.5	8.3	15	97.4	50
44	11.2	43.6	0.6	8.0	15	97.4	50
45	13.0	43.5	0.5	9.3	15	97.4	50
46	16.5	46.0	0.5	11.9	15	97.4	49
47	15.7	46.6	0.5	11.3	15	97.4	48
48	15.3	44.8	0.6	11.0	15	97.4	48
49	14.9	43.0	0.5	10.7	15	97.4	48
50	15.5	45.7	0.5	11.1	15	97.4	48
51	14.2	44.8	0.5	10.2	15	97.4	48
52	15.4	44.0	0.6	11.0	15	97.4	48
53	16.1	42.1	0.4	11.6	15	97.4	48
54	15.2	42.5	0.6	10.9	15	97.4	48
55	13.7	42.0	0.5	9.8	15	97.4	48
56	15.4	42.7	0.6	11.0	15	97.4	48
57	14.1	42.0	0.6	10.1	15	97.4	48
58	13.4	42.1	0.6	9.6	15	97.4	49
59	13.4	42.2	0.5	9.6	15	97.4	49
60	13.7	41.9	0.5	9.8	15	97.4	49
61	14.5	40.3	0.6	10.4	15	97.4	49
62	13.3	39.7	0.6	9.6	15	97.4	49
63	11.9	40.1	0.6	8.5	15	97.4	49
64	12.0	40.1	0.5	8.6	15	97.4	49
65	11.7	41.0	0.4	8.4	15	97.4	50
66	11.9	43.4	0.4	8.6	15	97.4	50
67	13.9	40.3	0.6	10.0	15	97.4	50
68	14.9	40.0	0.5	10.7	15	97.4	50
69	14.9	41.0	0.5	10.7	15	97.4	50
70	14.1	41.4	0.4	10.1	15	97.4	50
71	13.8	40.0	0.4	9.9	15	97.4	50
72	14.1	41.3	0.4	10.1	15	97.4	50
73	14.6	40.5	0.5	10.5	15	97.4	50
74	14.4	39.2	0.4	10.3	15	97.4	50
75	13.2	39.4	0.5	9.5	15	97.4	50
76	15.3	39.0	0.5	11.0	15	97.4	50
77	15.3	38.6	0.5	11.0	15	97.4	51
78	14.1	39.4	0.4	10.1	15	97.4	51
79	14.5	39.5	0.4	10.4	15	97.4	51
80	12.9	39.4	0.5	9.3	15	97.4	51
81	12.5	39.3	0.2	9.0	15	97.4	51
82	10.8	38.9	0.5	7.7	14	97.4	51
83	10.8	38.2	0.4	7.8	14	97.4	51

***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	11.4	38.9	0.5	8.2	14	97.4	51
85	11.6	39.9	0.6	8.3	14	97.4	51
86	9.4	39.8	0.7	6.7	14	97.4	51
87	9.8	40.5	0.6	7.0	14	97.4	51
88	8.5	41.9	0.8	6.1	14	97.4	52
89	9.2	40.6	0.6	6.6	14	97.4	52
90	8.4	40.6	0.3	6.0	14	97.4	52
91	11.1	41.4	0.5	8.0	14	97.4	52
92	11.7	44.9	0.5	8.4	14	97.4	52
93	11.8	41.6	0.6	8.4	14	97.4	52
94	13.2	42.3	0.5	9.5	14	97.4	52
95	11.9	43.8	0.7	8.5	14	97.4	51
96	13.2	44.3	0.5	9.5	14	97.4	51
97	14.6	41.6	0.4	10.5	14	97.4	51
98	14.4	43.1	0.5	10.3	14	97.4	51
99	14.0	43.3	0.5	10.1	14	97.4	51
100	15.8	43.5	0.5	11.4	15	97.4	51
101	13.9	42.8	0.5	10.0	15	97.4	51
102	13.5	42.7	0.5	9.7	15	97.4	51
103	14.0	42.4	0.6	10.0	15	97.4	51
104	13.8	41.9	0.5	9.9	15	97.4	51
105	11.4	42.8	0.5	8.2	15	97.4	51
106	11.6	45.0	0.6	8.3	15	97.4	52
107	12.3	44.7	0.6	8.9	15	97.4	52
108	13.1	43.8	0.5	9.4	15	97.4	52
109	14.7	43.7	0.5	10.5	15	97.4	52
110	13.4	42.5	0.5	9.6	15	97.4	52
111	12.7	42.0	0.6	9.1	15	97.4	52
112	15.2	44.0	0.5	10.9	15	97.4	51
113	14.2	43.2	0.5	10.2	15	97.4	50
114	14.0	42.4	0.5	10.1	15	97.4	50
115	13.7	41.9	0.5	9.8	15	97.4	50
116	12.6	41.6	0.5	9.1	15	97.4	50
117	14.5	40.0	0.5	10.4	15	97.4	50
118	13.4	40.0	0.5	9.6	15	97.4	50
119	12.8	40.0	0.5	9.2	15	97.4	50
120	11.9	39.8	0.6	8.5	15	97.4	50
121	12.5	41.4	0.5	9.0	15	97.4	50
122	10.9	39.1	0.4	7.8	15	97.4	50
123	10.8	38.5	0.4	7.8	15	97.4	50
124	12.6	37.8	0.4	9.1	15	97.4	50
125	10.3	37.5	0.4	7.4	15	97.4	50
126	11.1	39.3	0.5	8.0	15	97.4	50
127	11.0	38.3	0.4	7.9	15	97.4	50
128	12.7	36.7	0.3	9.1	15	97.4	50
129	12.9	38.0	0.4	9.2	15	97.4	50
130	11.4	37.7	0.4	8.2	15	97.4	50
131	9.0	38.4	0.4	6.4	15	97.4	50
132	7.6	38.8	0.5	5.4	15	97.4	50
133	8.4	38.5	0.6	6.0	15	97.4	50
134	7.1	39.0	0.6	5.1	15	97.4	50
135	6.3	40.1	0.5	4.5	15	97.4	50
136	8.1	42.2	0.6	5.8	15	97.4	51
137	9.5	38.6	0.6	6.8	15	97.4	51
138	12.7	39.5	0.6	9.1	15	97.4	51
139	9.7	40.9	0.5	7.0	15	97.4	51
140	8.9	38.7	0.5	6.4	15	97.4	51
141	7.8	38.4	0.5	5.6	15	97.4	51
142	8.8	38.7	0.6	6.3	15	97.4	51
143	10.2	38.3	0.5	7.3	15	97.4	51
144	11.8	38.8	0.4	8.5	15	97.4	51
145	12.0	38.8	0.6	8.6	15	97.4	51
146	12.5	38.9	0.6	9.0	15	97.4	51
147	11.6	38.3	0.5	8.3	15	97.4	51
148	11.0	38.2	0.5	7.9	15	97.4	51
149	11.0	38.4	0.5	7.9	15	97.4	51
150	12.4	39.4	0.5	8.9	15	97.4	51
151	12.6	40.9	0.7	9.0	15	97.4	51
152	11.4	39.9	0.7	8.2	15	97.4	51
153	12.9	40.2	0.6	9.2	15	97.4	51
154	15.2	42.9	0.6	10.9	15	97.4	49
155	16.1	39.4	0.5	11.6	15	97.4	49
156	15.6	40.6	0.5	11.2	15	97.4	49
157	14.8	41.8	0.4	10.6	15	97.4	49
158	14.7	42.4	0.4	10.5	15	97.4	49
159	15.5	41.9	0.2	11.1	15	97.4	49
160	14.4	42.8	0.4	10.3	15	97.4	49
161	11.9	44.1	0.5	8.5	15	97.4	48
162	13.3	43.2	0.6	9.5	15	97.4	48
163	15.1	41.9	0.3	10.9	15	97.4	48
164	14.8	42.8	0.2	10.6	15	97.4	48
165	14.2	43.2	0.4	10.2	15	97.4	48
166	14.3	40.1	0.4	10.3	15	97.4	48

***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	8.9	42.2	0.5	6.4	15	97.4	50
168	10.4	43.9	0.5	7.5	15	97.4	50
169	11.9	41.7	0.6	8.5	15	97.4	50
170	15.4	39.9	0.6	11.0	15	97.4	50
171	16.2	39.9	0.6	11.6	15	97.4	50
172	16.3	39.1	0.4	11.7	15	97.4	50
173	16.2	38.6	0.4	11.7	15	97.4	50
174	15.0	39.8	0.5	10.8	15	97.4	50
175	16.0	39.0	0.8	11.5	15	97.4	50
176	16.5	39.0	0.6	11.8	15	97.4	49
177	14.6	37.6	0.6	10.5	15	97.4	49
178	12.5	37.7	0.6	9.0	15	97.4	49
179	12.4	37.8	0.6	8.9	15	97.4	49
180	11.1	38.5	0.5	8.0	15	97.4	49
181	11.9	39.1	0.4	8.5	15	97.4	50
182	12.2	38.8	0.5	8.8	15	97.4	50
183	9.8	38.7	0.4	7.1	15	97.4	50
184	9.6	40.8	0.4	6.9	15	97.4	50
185	12.0	38.5	0.3	8.6	15	97.4	50
186	15.1	38.6	0.4	10.8	15	97.4	50
187	12.7	39.2	0.2	9.1	15	97.4	50
188	11.2	38.1	0.4	8.0	15	97.4	49
189	12.4	37.7	0.5	8.9	15	97.4	49
190	11.1	38.1	0.4	7.9	15	97.4	49
191	10.0	38.5	0.4	7.2	15	97.4	49
192	10.5	38.7	0.5	7.6	15	97.4	49
193	10.8	39.0	0.4	7.7	15	97.4	49
194	11.1	39.0	0.4	8.0	15	97.4	50
195	11.2	38.3	0.3	8.0	15	97.4	50
196	11.0	38.8	0.3	7.9	15	97.4	50
197	11.7	39.1	0.4	8.4	15	97.4	50
198	12.4	38.3	0.4	8.9	15	97.4	50
199	12.8	38.4	0.4	9.2	15	97.4	50
200	11.5	40.1	0.4	8.3	15	97.4	50
201	10.8	38.5	0.4	7.7	15	97.4	50
202	10.6	37.8	0.5	7.6	15	97.4	50
203	9.3	37.6	0.4	6.7	15	97.4	50
204	9.4	38.2	0.3	6.8	15	97.4	50
205	10.3	39.3	0.4	7.4	15	97.4	50
206	10.3	41.1	0.4	7.4	15	97.4	50
207	10.7	38.7	0.5	7.7	15	97.4	50
208	10.3	39.3	0.5	7.4	15	97.4	50
209	11.1	42.5	0.4	8.0	15	97.4	50
210	9.5	39.0	0.4	6.8	15	97.4	50
211	8.1	40.2	0.5	5.8	15	97.4	51
212	10.7	40.6	0.6	7.7	15	97.4	51
213	11.1	38.6	0.4	8.0	15	97.4	51
214	12.8	38.4	0.6	9.2	15	97.4	51
215	12.9	38.0	0.6	9.2	15	97.4	51
216	12.2	37.6	0.5	8.8	15	97.4	51
217	14.8	38.6	0.4	10.6	15	97.4	50
218	13.8	38.6	0.5	9.9	15	97.4	49
219	12.1	38.8	0.4	8.7	15	97.4	49
220	15.9	39.2	0.5	11.4	15	97.4	49
221	17.4	38.9	0.6	12.5	15	97.4	49
222	15.8	38.6	0.6	11.3	15	97.4	49
223	15.4	39.6	0.4	11.0	15	97.4	49
224	16.3	38.9	0.5	11.7	16	97.4	49
225	13.4	38.7	0.4	9.6	16	97.4	49
226	10.8	38.4	0.3	7.8	16	97.4	49
227	10.9	39.0	0.3	7.8	16	97.4	49
228	10.6	41.0	0.3	7.6	16	97.4	49
229	12.4	39.5	0.4	8.9	15	97.4	49
230	11.0	39.2	0.6	7.9	15	97.4	49
231	10.6	38.4	0.5	7.6	15	97.4	49
232	10.7	38.4	0.5	7.7	15	97.4	49
233	9.0	37.8	0.4	6.5	15	97.4	49
234	12.1	38.9	0.3	8.7	15	97.4	49
235	10.6	38.4	0.3	7.6	15	97.4	49
236	12.3	39.4	0.4	8.8	15	97.4	49
237	13.4	39.1	0.5	9.6	15	97.4	49
238	13.2	40.0	0.5	9.5	15	97.4	49
239	13.0	39.5	0.5	9.3	15	97.4	49
240	16.3	39.2	0.5	11.7	15	97.4	49
241	17.0	39.9	0.5	12.2	15	97.4	49
242	14.2	40.6	0.5	10.2	15	97.4	48
243	14.0	41.4	0.4	10.0	15	97.4	48
244	14.9	42.1	0.5	10.7	15	97.4	48
245	15.1	40.6	0.4	10.9	15	97.4	48
246	13.3	40.1	0.5	9.5	15	97.4	48
247	12.3	39.3	0.4	8.8	15	97.4	49
248	13.8	39.1	0.4	9.9	15	97.4	49
249	11.8	38.4	0.5	8.5	15	97.4	49

Table E.02 Measurement data - Background

Project: Grand Renewables Wind Farm - Turbine T10 - IEC 61400-11 Measurement

Report ID: 14284.00.T10.RP4

Created on: 1/23/2018

***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	12.1	39.2	0.4	8.6	15	97.4	49
251	11.8	39.7	0.5	8.5	15	97.4	49
252	11.1	40.5	0.4	8.0	15	97.4	49
253	10.7	39.5	0.5	7.7	15	97.4	49
254	10.1	40.7	0.5	7.3	15	97.4	49
255	10.8	41.9	0.5	7.7	15	97.4	49
256	10.6	40.2	0.4	7.6	15	97.4	49
257	10.1	41.8	0.4	7.3	15	97.4	49
258	10.8	41.3	0.5	7.7	15	97.4	49
259	13.3	40.7	0.5	9.6	15	97.4	49
260	14.7	39.7	0.5	10.5	15	97.4	49
261	13.8	40.2	0.6	9.9	15	97.4	49
262	15.0	39.4	0.5	10.7	15	97.4	49
263	15.6	40.5	0.5	11.2	15	97.4	49
264	12.2	41.5	0.5	8.8	15	97.4	49
265	13.0	40.6	0.5	9.3	15	97.4	49
266	14.4	38.8	0.4	10.3	15	97.4	49
267	15.5	40.3	0.5	11.2	15	97.4	49
268	15.4	40.0	0.5	11.1	15	97.4	49
269	13.8	40.1	0.3	9.9	15	97.4	49
270	13.2	42.0	0.3	9.5	15	97.4	49
271	11.4	43.9	0.4	8.2	15	97.4	49
272	10.3	41.6	0.4	7.4	15	97.4	49
273	10.7	39.9	0.4	7.7	15	97.4	49
274	11.0	40.2	0.3	7.9	15	97.4	49
275	11.3	42.2	0.4	8.1	15	97.4	49
276	10.5	46.3	0.5	7.5	15	97.4	49
277	11.3	50.6	0.4	8.1	15	97.4	49
278	11.2	51.3	0.3	8.0	15	97.4	50
279	10.5	55.0	0.4	7.5	15	97.4	50
280	11.9	52.1	0.4	8.5	15	97.4	50
281	13.3	51.7	0.5	9.6	15	97.4	50
282	11.9	48.4	0.3	8.5	15	97.4	50
283	10.6	46.5	0.4	7.6	15	97.4	49
284	11.0	43.8	0.4	7.9	15	97.4	49
285	8.3	42.5	0.5	6.0	15	97.4	49
286	9.6	40.2	0.4	6.9	15	97.4	49
287	10.4	40.8	0.4	7.5	15	97.4	49
288	10.7	41.4	0.5	7.7	15	97.4	49
289	12.1	39.2	0.4	8.6	15	97.4	50
290	13.7	38.3	0.4	9.8	15	97.4	50
291	13.6	37.9	0.2	9.8	15	97.4	50
292	13.2	38.5	0.2	9.4	15	97.4	50
293	11.8	38.3	0.2	8.5	15	97.4	50
294	11.5	37.2	0.2	8.2	15	97.4	50
295	12.1	37.3	0.5	8.7	15	97.4	50
296	11.4	36.7	0.3	8.2	15	97.4	49
297	10.4	37.8	0.3	7.4	15	97.4	49
298	10.5	37.2	0.3	7.5	15	97.4	49
299	9.3	37.6	0.3	6.7	15	97.4	49
300	10.8	38.0	0.5	7.8	15	97.4	49
301	11.6	38.6	0.4	8.3	15	97.4	49
302	13.3	38.1	0.4	9.5	15	97.4	49
303	12.2	38.2	0.5	8.8	15	97.4	49
304	10.1	40.9	0.5	7.3	15	97.4	49
305	9.7	41.2	0.6	6.9	15	97.4	49
306	10.2	41.7	0.4	7.3	15	97.4	49
307	8.1	42.3	0.5	5.8	15	97.4	50
308	8.0	44.9	0.4	5.7	15	97.4	51
309	11.0	42.3	0.3	7.9	15	97.4	51
310	12.4	41.8	0.5	8.9	15	97.4	51
311	11.0	42.4	0.6	7.9	15	97.4	51
312	12.1	41.1	0.4	8.7	15	97.4	51
313	15.2	40.7	0.4	10.9	15	97.4	50
314	14.7	45.0	0.5	10.6	16	97.4	50
315	14.0	41.3	0.5	10.0	16	97.4	50
316	13.5	39.7	0.5	9.7	16	97.4	50
317	14.1	40.8	0.4	10.1	16	97.4	50
318	14.6	39.0	0.4	10.5	16	97.4	50
319	13.4	40.5	0.5	9.6	16	97.4	49
320	11.8	39.8	0.5	8.5	16	97.4	49
321	10.0	42.4	0.5	7.2	16	97.4	49
322	11.8	41.1	0.3	8.4	16	97.5	49
323	13.5	38.4	0.3	9.7	16	97.5	49
324	13.6	38.8	0.5	9.7	16	97.5	49
325	12.6	39.2	0.5	9.1	16	97.5	49
326	14.4	39.3	0.5	10.3	16	97.5	49
327	12.2	39.0	0.4	8.8	16	97.5	49
328	12.6	38.6	0.5	9.0	16	97.5	49
329	9.7	40.3	0.4	6.9	16	97.5	49
330	11.2	41.6	0.5	8.0	16	97.5	49
331	15.3	40.0	0.4	11.0	16	97.4	49
332	14.4	39.6	0.3	10.4	16	97.4	49

***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	13.5	40.7	0.5	9.7	16	97.4	49
334	13.5	38.9	0.5	9.7	16	97.4	49
335	14.7	39.1	0.5	10.5	16	97.4	49
336	13.8	40.0	0.6	9.9	16	97.4	49
337	13.4	41.8	0.5	9.6	15	97.4	49
338	14.9	39.3	0.6	10.7	15	97.4	48
339	7.5	41.0	0.4	5.4	15	97.5	58
340	8.0	43.3	0.5	5.8	15	97.5	58
341	7.0	40.9	0.5	5.0	15	97.5	58
342	5.5	41.7	0.5	4.0	15	97.5	58
343	8.5	43.6	0.5	6.1	15	97.5	58
344	8.1	40.8	0.6	5.8	15	97.5	58
345	7.3	39.8	0.6	5.3	15	97.5	58
346	5.2	39.8	0.4	3.7	15	97.5	58
347	6.4	38.4	0.4	4.6	15	97.5	58
348	7.2	38.8	0.4	5.2	15	97.5	58
349	5.9	39.4	0.3	4.3	15	97.5	58
350	6.2	38.3	0.4	4.4	15	97.5	58
351	7.0	38.3	0.4	5.1	15	97.5	58
352	5.7	38.3	0.3	4.1	15	97.5	58
353	5.2	37.2	0.2	3.8	15	97.5	58
354	4.9	37.9	0.3	3.5	15	97.5	58
355	3.9	37.4	0.2	2.8	15	97.5	58
356	3.9	37.7	0.2	2.8	15	97.5	58
357	4.0	36.6	0.4	2.9	15	97.5	58
358	5.5	36.6	0.3	3.9	15	97.5	58
359	6.8	37.2	0.3	4.9	15	97.5	58
360	7.8	36.7	0.3	5.6	15	97.5	58
361	7.1	36.9	0.2	5.1	15	97.5	58
362	6.7	37.1	0.2	4.8	15	97.5	57
363	6.2	37.4	0.2	4.5	15	97.5	57
364	7.2	37.1	0.3	5.1	15	97.5	57
365	7.5	36.9	0.6	5.4	15	97.5	57
366	5.8	38.0	0.4	4.2	15	97.5	57
367	4.5	39.0	0.5	3.2	15	97.5	57
368	1.9	38.0	0.3	1.3	15	97.5	58
369	5.4	37.4	0.4	3.9	15	97.5	58
370	6.4	37.9	0.4	4.6	15	97.5	58
371	6.3	39.6	0.4	4.5	15	97.5	58
372	6.0	38.6	0.5	4.3	15	97.5	58
373	6.9	37.9	0.5	5.0	15	97.5	58
374	6.2	37.3	0.4	4.4	15	97.5	58
375	6.0	37.6	0.3	4.3	15	97.5	58
376	5.0	38.4	0.4	3.6	15	97.5	58
377	6.3	38.0	0.4	4.5	15	97.5	58
378	6.2	39.2	0.4	4.5	15	97.5	58
379	6.0	39.4	0.4	4.3	15	97.5	58
380	6.4	40.1	0.4	4.6	15	97.5	57
381	7.5	38.3	0.4	5.4	15	97.5	57
382	6.8	37.2	0.4	4.9	15	97.5	57
383	6.3	38.0	0.4	4.6	15	97.5	57
384	5.8	38.8	0.4	4.2	15	97.5	57
385	6.4	38.6	0.4	4.6	15	97.5	57
386	6.3	37.9	0.4	4.5	15	97.5	57
387	6.4	37.5	0.4	4.6	15	97.5	57
388	8.7	37.3	0.4	6.2	15	97.5	57
389	8.6	37.5	0.5	6.2	15	97.5	57
390	7.2	38.1	0.4	5.1	15	97.5	57
391	7.1	38.3	0.4	5.1	15	97.5	57
392	5.6	38.2	0.4	4.0	15	97.5	57
393	5.3	38.6	0.3	3.8	15	97.5	57
394	4.5	38.0	0.4	3.2	15	97.5	57
395	5.7	36.9	0.4	4.1	15	97.5	57
396	8.4	36.8	0.4	6.0	15	97.5	57
397	8.5	36.5	0.4	6.1	15	97.5	57
398	7.6	35.2	0.4	5.5	15	97.5	57
399	5.7	35.0	0.5	4.1	15	97.5	58
400	4.9	35.5	0.4	3.5	15	97.5	58
401	6.5	36.0	0.5	4.7	15	97.5	58
402	5.8	36.3	0.4	4.2	15	97.5	58
403	6.9	36.9	0.6	5.0	15	97.5	58
404	7.8	37.2	0.5	5.6	15	97.5	58
405	8.3	36.3	0.5	6.0	15	97.5	58
406	7.7	37.0	0.5	5.6	15	97.5	58
407	7.4	39.2	0.4	5.3	15	97.5	58
408	8.1	38.3	0.5	5.8	15	97.5	58
409	7.7	37.2	0.4	5.5	15	97.5	58
410	9.9	37.6	0.4	7.1	15	97.5	57
411	8.9	36.7	0.3	6.4	15	97.5	56
412	9.4	37.3	0.3	6.7	15	97.5	56
413	9.6	37.1	0.5	6.9	15	97.5	56
414	12.1	37.1	0.3	8.7	15	97.5	56
415	10.6	36.8	0.1	7.6	15	97.5	56

***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 (%)
416	8.9	36.8	0.4	6.4	15	97.5	56
417	8.4	36.1	0.4	6.0	15	97.5	55
418	10.3	37.1	0.4	7.4	15	97.5	55
419	6.8	36.3	0.4	4.9	15	97.5	55
420	3.3	35.6	0.4	2.4	15	97.5	55
421	4.7	36.5	0.4	3.4	15	97.5	55
422	6.5	36.7	0.4	4.6	15	97.5	56
423	8.8	38.5	0.5	6.3	15	97.5	56
424	12.2	38.9	0.4	8.8	15	97.5	56
425	11.4	39.3	0.4	8.1	15	97.5	56
426	14.6	38.8	0.4	10.5	15	97.5	56
427	12.8	39.3	0.3	9.2	15	97.5	56
428	12.1	39.1	0.4	8.7	15	97.5	55
429	11.7	40.3	0.4	8.4	15	97.5	55
430	12.1	38.8	0.6	8.7	15	97.5	55
431	10.3	37.9	0.5	7.4	15	97.5	55
432	11.6	38.0	0.7	8.3	15	97.5	55
433	11.8	39.4	0.6	8.5	15	97.5	55
434	11.9	38.1	0.6	8.5	15	97.5	55
435	11.8	38.3	0.6	8.5	15	97.5	55
436	10.8	37.7	0.5	7.7	15	97.5	55
437	8.5	38.4	0.4	6.1	15	97.5	55
438	9.5	39.3	0.5	6.8	15	97.5	55
439	9.7	39.1	0.4	6.9	15	97.5	55
440	10.3	38.4	0.4	7.4	15	97.5	55
441	12.8	39.4	0.4	9.2	15	97.5	54
442	12.1	40.3	0.4	8.7	15	97.5	54
443	13.4	41.1	0.7	9.6	15	97.5	54
444	12.4	41.5	0.6	8.9	15	97.5	54
445	12.4	41.4	0.3	8.9	15	97.5	54
446	10.5	39.1	0.3	7.6	15	97.5	55
447	10.5	38.6	0.5	7.5	15	97.5	55
448	9.4	38.5	0.3	6.7	15	97.5	54
449	5.5	38.4	0.2	4.0	15	97.5	54
450	10.0	39.2	0.3	7.2	15	97.5	54
451	11.3	39.0	0.3	8.1	15	97.5	54
452	12.5	38.7	0.3	8.9	15	97.5	54
453	12.9	38.9	0.3	9.2	15	97.5	54
454	11.7	37.2	0.4	8.4	15	97.5	54
455	12.6	36.9	0.4	9.1	15	97.5	54
456	11.1	39.0	0.5	8.0	15	97.5	53
457	9.0	37.7	0.6	6.5	15	97.5	53
458	8.6	39.0	0.4	6.2	15	97.5	53
459	7.9	38.5	0.6	5.7	15	97.5	53
460	7.1	37.8	0.4	5.1	15	97.5	53
461	7.3	38.7	0.4	5.2	15	97.5	53
462	8.9	38.7	0.4	6.4	15	97.5	54
463	9.0	38.3	0.4	6.4	15	97.5	55
464	6.8	38.3	0.6	4.9	15	97.5	55
465	10.0	37.4	0.4	7.2	15	97.5	55
466	9.7	37.5	0.4	7.0	15	97.5	55
467	9.4	38.3	0.4	6.7	15	97.5	55
468	8.8	37.9	0.6	6.3	15	97.5	55
469	11.6	38.5	0.5	8.4	15	97.5	54
470	11.0	37.4	0.4	7.9	15	97.5	54
471	7.9	37.5	0.4	5.7	15	97.5	54
472	6.1	38.2	0.5	4.4	15	97.5	54
473	5.5	41.6	0.5	3.9	15	97.5	54
474	4.8	40.3	0.4	3.4	15	97.5	55
475	8.4	38.9	0.4	6.0	15	97.5	55
476	10.5	39.3	0.4	7.6	15	97.5	55
477	12.3	37.9	0.5	8.8	15	97.5	55
478	10.6	38.1	0.5	7.6	15	97.5	55
479	11.4	37.4	0.5	8.2	15	97.5	55
480	11.4	37.6	0.4	8.2	15	97.5	54
481	11.5	37.8	0.5	8.3	15	97.5	54
482	9.9	39.2	0.5	7.1	15	97.5	54
483	9.9	39.4	0.5	7.1	15	97.5	54
484	10.2	38.2	0.4	7.3	15	97.5	54
485	9.2	40.9	0.3	6.6	15	97.5	54
486	11.1	40.2	0.4	8.0	15	97.5	54
487	11.0	39.7	0.4	7.9	15	97.5	54
488	10.5	38.6	0.4	7.5	15	97.5	54
489	9.4	38.6	0.4	6.7	15	97.5	54
490	7.7	37.4	0.4	5.6	15	97.5	54
491	7.8	37.4	0.5	5.6	15	97.5	54
492	6.3	37.6	0.5	4.5	15	97.5	55
493	8.6	38.4	0.4	6.2	15	97.5	55
494	8.5	38.5	0.5	6.1	15	97.5	55
495	9.6	38.8	0.5	6.9	15	97.5	55
496	8.2	39.4	0.5	5.9	15	97.5	55
497	8.0	40.2	0.5	5.7	15	97.5	55
498	8.0	39.9	0.5	5.8	15	97.5	54

Table E.02 Measurement data - Background

Project: Grand Renewables Wind Farm - Turbine T10 - IEC 61400-11 Measurement

Report ID: 14284.00.T10.RP4

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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 (%)
499	8.1	39.7	0.6	5.8	15	97.5	54
500	9.3	39.6	0.5	6.7	15	97.5	54
501	9.9	39.6	0.5	7.1	15	97.5	54
502	10.1	40.2	0.4	7.3	15	97.5	54
503	8.7	41.1	0.5	6.2	15	97.5	54
504	10.4	40.7	0.5	7.4	15	97.5	54
505	12.9	40.2	0.5	9.3	15	97.5	54
506	13.6	39.4	0.6	9.7	15	97.5	54
507	13.1	40.1	0.6	9.4	15	97.5	54
508	13.0	39.5	0.5	9.3	15	97.5	54
509	11.8	39.2	0.6	8.5	15	97.5	54
510	14.0	41.7	0.5	10.1	15	97.5	53
511	13.7	39.8	0.5	9.8	15	97.5	53
512	13.7	42.0	0.4	9.8	15	97.5	53
513	12.5	41.4	0.5	9.0	15	97.5	53
514	11.0	42.2	0.4	7.9	15	97.5	53
515	12.5	42.9	0.5	8.9	15	97.5	53
516	14.3	41.2	0.6	10.3	15	97.5	53
517	13.9	40.6	0.4	10.0	15	97.5	53

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End of Report