

***Via Electronic Submittal***

December 17, 2020

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**Re: Port Dover & Nanticoke Wind – 2020 Emission Audit Report Results  
Renewable Energy Approval 2869-8VDRCV**

Please find attached the 2020 emission audit report, prepared by Aercoustics for the Port Dover and Nanticoke Wind Farm.

If you have any questions, please contact either Casey Chan at (780) 392-5173 or the undersigned at (780) 392-5183.

Sincerely,



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Senior Manager, Environment

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**Report ID: 14000.07.T409.RP1**

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**Port Dover and Nanticoke Wind Farm / Turbine T409  
IEC 61400-11 Edition 3.0 Measurement Report**

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Prepared for:

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December 14, 2020

## Revision History

| Version | Description    | Author | Reviewed | Date              |
|---------|----------------|--------|----------|-------------------|
| RP1     | Initial Report | DAF    | DH       | December 14, 2020 |
|         |                |        |          |                   |
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**This report in its entirety, including appendices contains [122] pages.**

## Statement Qualifications and Limitations

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

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

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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## Executive Summary

Aercoustics Engineering Limited was retained by Capital Power Ltd. to conduct a detailed measurement and analysis of the acoustical emissions by a wind turbine generator (E-Audit), as required by the Ministry of the Environment, Conservation and Parks (MECP), as part of the Port Dover and Nanticoke Wind Farm Renewable Energy Approval (2869-8VDRCV). Following MECP requirements, this E-audit follows the CAN/CSA-IEC 61400-11:2013 methodology, this standard is identical to the IEC 61400-11:2012 test standard.

The purpose of this E-Audit is to confirm that the noise emissions of the turbine meets the acoustic performance specifications defined in Schedule B of the facility's Renewable Energy Approval and the Compliance Protocol for Wind Turbine Noise.

The turbine under investigation, T409, is located south of Concession 2 Woodhouse and east of East Quarter Line in Norfolk County. The turbine has a rated power of 1.8 MW and has a rated acoustic output of 103.5 dBA.

With the turbine operating as outlined in this report, the acoustic performance of this turbine was verified to meet the required acoustic performance specifications.

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## 1 Introduction

Aercoustics Engineering Limited (“Aercoustics”) was retained by Capital Power L.P. to conduct acoustic measurements of the wind turbine T409, located in the Port Dover and Nanticoke Wind Farm. Measurements were carried out in accordance with IEC 61400-11 (edition 3.0), “*Wind turbine generator systems – Part 11: Acoustic noise measurement techniques*”. The IEC 61400-11 (edition 3.0) test standard is referred to in this report by its citation reference, [1]. This report is specific only to turbine T409.

Aercoustics is an ISO/IEC 17025 test laboratory accredited for IEC 61400-11 testing.

## 2 Wind Turbine Information

### 2.1 Wind Turbine Equipment Details

Equipment information specific to turbine T409 was provided by the Capital Power L.P. and is summarized in Table 1 to Table 5.

Table 1 - Wind Turbine Details

| Wind Turbine Details       |              |
|----------------------------|--------------|
| Manufacturer               | Vestas       |
| Model Number               | V90 MK7.1    |
| Turbine ID (Serial Number) | T409 - 45163 |

Table 2 - Operating Details

| Operating Details  |                              |
|--|------------------------------|
| Vertical or Horizontal axis wind turbine                 | Horizontal                   |
| Upwind or downwind rotor                                 | Upwind                       |
| Hub height   | 95 m                         |
| Horizontal distance from rotor centre to tower axis      | 3500 mm                      |
| Diameter of rotor  | 90 m                         |
| Tower type (lattice or tube)                             | Tube                         |
| Passive stall, active stall, or pitch controlled turbine | Pitch controlled             |
| Constant or variable speed                               | Variable speed               |
| Power curve  | See Figure B.01 [Appendix B] |
| Rotational speed at each integer standardised wind speed | See Figure B.02 [Appendix B] |
| Rated power output                                       | 1815 kW                      |
| Control software version                                 | Turbine 2017.09.261          |

Table 3 - Rotor Details

| Rotor Details   |  |
|---|--|
| Rotor control devices   | Vestas Converter System                                    |
| Presence of aerodynamic add-ons, such as vortex generators, stall strips, serrated trailing edges, etc. | Yes – vortex generators                                    |
| Blade type  | 44A Copper Tip   |
| Serial number   | Set 257:<br>Blade A 123435, Blade B 123438, Blade C 123441 |
| Number of blades  | 3  |

Table 4 - Gearbox Details

| Gearbox Details |             |
|-----------------|-------------|
| Manufacturer    | Winergy     |
| Model number    | PEAB 4435.4 |
| Serial number   | 0001ZLBLTX  |

Table 5 - Generator Details

| Generator Details |             |
|-------------------|-------------|
| Manufacturer      | Vestas      |
| Model number      | DVSG 56015m |
| Serial number     | 0001XK18DG  |

## 2.2 Wind Turbine Location / Physical Environment

Turbine T409 is located in the municipality of Norfolk near the town of Port Dover, approximately 230 m south of Concession 2 Woodhouse and 560 m east of East Quarter Line.

UTM coordinates of Turbine T409 are 569,814 m E and 4,739,619 m N, Zone 17. The area surrounding the test turbine was flat and consists primarily of farmland.

A general layout of the test turbine and surrounding area is provided in the site plan (Figure A.01).

## 3 Measurement Details

### 3.1 Instrumentation

The instrumentation used to acquire acoustic, meteorological (“MET”), and turbine operational data is detailed in the following sections. All data was acquired synchronously using Aercoustics’ data acquisition system unless otherwise noted.

### 3.1.1 Acoustic Equipment

Acoustic equipment used for the testing is summarized in Table 6. The acoustic equipment used in the test conforms to the traceable calibration requirements prescribed in Section 6.3 of the test standard [1]. A field calibration of the measurement chain was performed at the beginning and end of each measurement day.

Table 6 – Acoustic Measurement Equipment

| Equipment               | Make & Model     | Serial Number | Last Calibration Date |
|-------------------------|------------------|---------------|-----------------------|
| Data acquisition system | LMS SCADA Mobile | 22163146      | Mar 12, 2020          |
| Microphone              | B&K 4189         | 2625417       | Aug 26, 2019          |
| Pre-amplifier           | B&K 2671         | 2614900       | Aug 26, 2019          |
| Acoustic calibrator     | B&K 4231         | 2513183       | Sept 15, 2020         |

### 3.1.2 Meteorological Equipment

Meteorological parameters were measured using an anemometer installed on top of a 10-m AGL<sup>1</sup> mast. The anemometer recorded wind speed, temperature, and atmospheric pressure for the duration of the test. Wind speed at hub-height was recorded from the test turbine. Meteorological equipment utilized and controlled by Aercoustics is summarized in Table 7; this equipment conforms to the traceable calibration requirements prescribed in Section 6.3 of the test standard [1]. Equipment used by the test turbine to measure turbine parameters are outside of Aercoustics’ control and not reported here.

Table 7 – Meteorological Measurement Equipment

| Equipment                  | Make & Model   | Serial Number | Last Calibration Date |
|----------------------------|----------------|---------------|-----------------------|
| Weather anemometer         | Vaisala WXT536 | R2510790      | Feb 4, 2020           |
| Serial to Analog Converter | Nokeval 7470   | A198729       | Mar 29, 2019          |

### 3.1.3 Turbine Operational Information

Turbine operational parameters were acquired from the turbine controller simultaneously with the acoustic and meteorological data using Aercoustics’ data acquisition system. Turbine parameters measured include electrical power, yaw angle, rotational speed, and nacelle wind speed. Equipment used by the test turbine to measure turbine parameters are outside of Aercoustics’ control and not reported here.

### 3.1.4 Microphone and MET Tower Placement

The measurement microphone was installed in Position 1, according to Figure 3 of the test standard [1]. The horizontal distance from microphone to the centerline of the wind turbine tower was  $R_0 = 141$  m. An elevation difference of 0 metres between the microphone position and the base of the wind turbine was noted by test personnel at the

<sup>1</sup> Above ground level

time of the measurements. The slant distance from microphone location to rotor centre was  $R_1 = 172.9$  m (includes the distance from rotor center to tower centreline).

The microphone was placed in a downwind position on the centre of a circular, acoustically reflective board. The downwind direction was determined using the turbine yaw angle output (Section 8.3 of the test standard [1]). The microphone position relative to downwind direction was monitored via the turbine yaw angle and data points were excluded from analysis when the turbine yaw angle exceeded  $\pm 15$  degrees from the microphone position (reference yaw angle). The microphone board was moved as needed during the measurement to maintain a downwind position from the wind turbine.

The area immediately surrounding the microphone board was a field containing soybean crops. There were no reflecting surfaces in the vicinity of the microphone position during the test. A small, wooded area was located roughly 60 m to the north of the microphone location.

The 10-m AGL mast was installed in a crosswind position from the turbine tower, according to Figure 5 of the test standard [1].

Photos of the 10-m AGL mast and microphone board used during the test are provided in Figure A.02.

### 3.1.5 Double Windscreen Setup

A double windscreen setup was not utilized and no adjustment for a double windscreen was applied to the measurement data.

## 3.2 Measurement Date and Time

Measurement data collected for this test was acquired during the following times.

Table 8 – Summary of Measurement Periods

| Date                     | Test Type  | Start Time | Finish time |
|--------------------------|------------|------------|-------------|
| Oct 7 <sup>th</sup> 2020 | Turbine ON | 14:00      | 15:10       |
|                          | Background | 15:20      | 16:00       |
|                          | Turbine ON | 16:00      | 16:40       |
|                          | Background | 16:55      | 17:05       |
|                          | Turbine ON | 17:05      | 17:50       |
|                          | Background | 17:50      | 18:00       |

## 3.3 Determination of Normalized Wind Speed

The normalized hub height wind speed for Turbine ON intervals was determined using one of the following two methods, depending on the hub-height wind speed during the interval:

The power curve method (Section 8.2.1.1 of the test standard [1]) is used to determine normalized hub-height wind speed if the power output during the interval falls within the allowable range of the power curve. The allowable range is defined per Equation (3) of the test standard [1] as the range of wind bins where the power curve has a positive slope.

The nacelle plus correction method (Section 8.2.1.2 of the test standard [1]) is used to determine normalized hub-height wind speed if the power output falls outside the allowable range of the power curve. If the application of this method results in a normalized wind speed that falls back inside the allowable range of the power curve, then that data point is excluded from analysis.

The normalized hub height wind speed for Background intervals is determined using the 10-m AGL anemometer wind speed and applying a correction factor ( $k_Z$ ) to adjust to hub-height (Section 8.2.2 of the test standard [1]).

### 3.3.1 Wind Speed Correction Factors

Following the methodologies described above, two correction factors are derived from the measurement data and used to determine the normalized hub-height wind speed outside the allowable power curve range.

The first correction factor ( $k_{nac}$ ) is used to correct nacelle wind speeds for Turbine ON intervals that fall outside of the allowable power curve range. The second correction factor ( $k_Z$ ) is used to correct Background 10-m AGL wind speeds to hub-height. The correction factors calculated for this measurement set are provided in Table 9.

Table 9 – Calculated nacelle anemometer ( $k_{nac}$ ) and 10 m ( $k_Z$ ) wind speed k-factor

| $k_{nac}$ | $k_Z$ |
|-----------|-------|
| 1.01      | 2.05  |

### 3.4 Deviations from IEC-61400-11 Edition 3.0

A significant acoustic influence suspected to originate from the turbine was present in the background sound levels around 800 Hz. This acoustic contribution is visible in the narrowband spectra provided in Appendix D. The contribution at this frequency was manually removed from the 1/3<sup>rd</sup> octave spectra of the background measurement periods by replacing the measured background sound level at 800 Hz with the average of the 630 Hz and 1000 Hz 1/3<sup>rd</sup> octave bands, thereby reducing the 800 Hz and overall background sound levels and removing its impact from the calculation of overall apparent sound power level. All 1/3<sup>rd</sup> octave band background spectra presented in this report have this adjustment applied.

### 3.5 Special Notes & Considerations

Turbines T407, T410 and T414 were parked during the measurement period. These turbines, and their position relative to the test turbine, are shown in Figure A.01.

Transient events (such as vehicle traffic, wildlife, air traffic, etc.) are manually excluded from the measurement data set.

Some contamination from electromagnetic interference was present in both the Background and Turbine ON spectra in the 8 kHz and 10 kHz 1/3<sup>rd</sup> octave bands. The influence on the overall sound levels is insignificant.

## 4 Measurement Results

Measurement results are summarized in this section. Detailed supporting information is provided in Appendix C (1/3<sup>rd</sup> octave sound levels and uncertainties), Appendix D (tonality assessment), and Appendix E (measurement dataset).

### 4.1 Sound Pressure Levels

Average overall sound pressure levels in each wind bin for all Turbine ON and Background periods are summarized in Table 10.

Table 10 – Summary of Sound Pressure Level Measurements

| Wind Speed (m/s) | Turbine ON |               | Background |               | Turbine ON, Background adjusted Leq, (dBA) |
|------------------|------------|---------------|------------|---------------|--|
|                  | Leq, (dBA) | # of data pts | Leq, (dBA) | # of data pts |  |
| 8.0              | 53.6       | 52            | 46.1       | 19            | 52.8                                       |
| 8.5              | 54.3       | 32            | 46.1       | 12            | 53.6                                       |
| 9.0              | 54.5       | 21            | 46.3       | 17            | 53.8                                       |
| 9.5              | 54.5       | 18            | 46.5       | 20            | 53.8                                       |
| 10.0             | 54.9       | 19            | 47.0       | 10            | 54.2                                       |
| 10.5             | 54.8       | 23            | 47.0       | 10            | 54.1                                       |
| 11.0             | 54.4       | 17            | 47.0       | 16            | 53.5                                       |
| 11.5             | 54.3       | 18            | 46.8       | 14            | 53.5                                       |
| 12.0             | 54.3       | 26            | 47.2       | 14            | 53.4                                       |
| 12.5             | 54.3       | 48            | 46.8       | 16            | 53.5                                       |
| 13.0             | 54.1       | 48            | 47.6       | 18            | 53.0                                       |

### 4.2 Apparent Sound Power Level

The calculated apparent sound power levels by hub height wind speed are summarized in Table 11. Corresponding sound power levels by 10 m height wind speed are summarized in Table 12. Wind speeds at 10 m are calculated per Section 9.4 of the test standard [1].

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

| Wind Speed (m/s) | Apparent $L_{WA}$ , (dBA) | Uncertainty (dB) |
|------------------|---------------------------|------------------|
| 8.0              | 102.5                     | 0.9              |
| 8.5              | 103.3                     | 0.9              |
| 9.0              | 103.6                     | 0.9              |
| 9.5              | 103.5                     | 0.9              |
| 10.0             | 103.9                     | 0.8              |
| 10.5             | 103.8                     | 1.0              |
| 11.0             | 103.3                     | 0.9              |
| 11.5             | 103.3                     | 1.0              |
| 12.0             | 103.1                     | 1.0              |
| 12.5             | 103.3                     | 1.0              |
| 13.0             | 102.8                     | 1.0              |

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

| Wind Speed (m/s) | Apparent $L_{WA}$ , (dBA) | Uncertainty (dB) |
|------------------|---------------------------|------------------|
| 5.0              | 101.0                     | 1.1              |
| 6.0              | 103.2                     | 0.9              |
| 7.0              | 103.8                     | 0.9              |
| 8.0              | 103.2                     | 1.0              |
| 9.0              | 103.0                     | 1.0              |

### 4.3 Uncertainty

The uncertainty of the test result is the combination of Type A and Type B uncertainty. Detailed uncertainties calculated for overall and 1/3<sup>rd</sup> octave band sound levels are provided in Appendix C.

#### 4.3.1 Type A Uncertainty

Type A measurement uncertainty is calculated based on the distribution of the measured sound levels and wind speeds during the test. Calculation of Type A uncertainty is conducted per Section 9.2 of the test standard [1].

#### 4.3.2 Type B Uncertainty

Type B uncertainty is determined using the guidance provided in Annex C of the test standard [1] and equipment calibration records. A summary of Type B uncertainties is provided in Table 13.

Table 13 – 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       |

| Component                   | Typical (dB) | Used (dB) |
|-----------------------------|--------------|-----------|
| 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       |

#### 4.4 Tonality Analysis

Tonal audibility is determined for each wind speed bin per Section 9.5 of the test standard [1]. The results of the tonality analysis are summarized in Table 14. All  $\Delta L_{tn}$  and  $\Delta L_a$  values reported represent the energy average of all data points having an identified tone that fall within the same frequency of origin (Section 9.5.8 of the test standard [1]). As no wind bin exhibited a tonal audibility greater than 3 dB there is no concern regarding the tonal nature of the turbine with respect to local regulatory compliance [2].

The average narrow band spectrum measured at each hub-height wind speed are provided in Appendix D.

Table 14 – Tonality Assessment Summary

| Wind Speed (m/s) | Frequency (Hz) | Tonality, $\Delta L_{tn}$ (dB) | Tonal audibility, $\Delta L_a$ (dB) | FFT's with tones | Total # of FFT's | Presence (%) |
|------------------|----------------|--------------------------------|-------------------------------------|------------------|------------------|--------------|
| 8.0              | 155            | -0.1                           | 2.0                                 | 34               | 52               | 65           |
| 8.0              | 571            | -2.9                           | -0.6                                | 23               | 52               | 44           |
| 8.5              | 160            | -2.8                           | -0.8                                | 19               | 32               | 59           |
| 8.5              | 535            | -5.1                           | -2.7                                | 28               | 32               | 88           |
| 9.0              | 161            | -4.6                           | -2.6                                | 19               | 21               | 90           |
| 9.0              | 521            | -4.3                           | -1.9                                | 7                | 21               | 33           |
| 9.0              | 601            | -3.9                           | -1.5                                | 12               | 21               | 57           |
| 9.5              | 536            | -5.3                           | -3.0                                | 17               | 18               | 94           |
| 10.0             | -              | -                              | No tones                            | -                | -                | -            |
| 10.5             | -              | -                              | No tones                            | -                | -                | -            |
| 11.0             | 159            | -4.3                           | -2.2                                | 16               | 17               | 94           |
| 11.5             | 161            | -4.9                           | -2.9                                | 14               | 18               | 78           |
| 12.0             | -              | -                              | No tones                            | -                | -                | -            |
| 12.5             | 161            | -5.0                           | -3.0                                | 38               | 48               | 79           |
| 13.0             | 160            | -5.0                           | -2.9                                | 38               | 48               | 79           |
| 13.0             | 540            | -4.7                           | -2.4                                | 29               | 48               | 60           |

## 5 Closure

Measurements and analyses per IEC 61400-11 (edition 3.0) were performed on turbine T409 of the Port Dover and Nanticoke Wind Farm, located in the municipality of Norfolk. The test turbine was found to have a maximum apparent sound power level of 103.9 dBA

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and a maximum tonal audibility of 2.0 dB. The test turbine was found to be within the acceptable range (+0.5 dB [2]) of the noise level requirements outlined in the Renewable Energy Approval under which the Port Dover and Nanticoke Wind Farm operates [3].

Supplementary information to address specific local regulatory requirements are attached separately in Appendix F.

## **6 References**

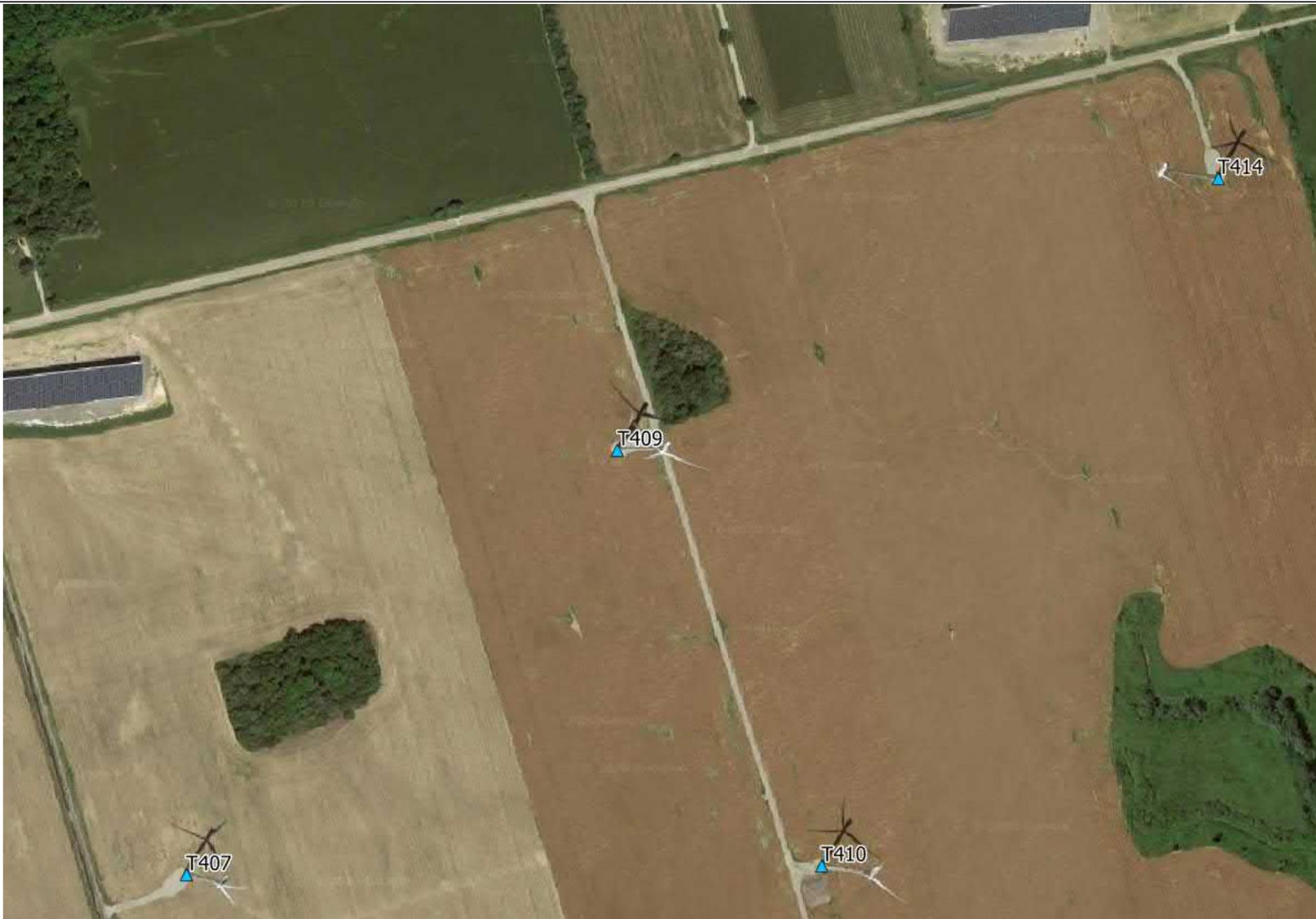
- [1] IEC 61400-11 . (2012). Wind Turbines – Part 11: Acoustic noise measurement techniques. *IEC 61400-11*. International Electrotechnical Commission.
- [2] Government of Ontario, NPC - 350 - Compliance protocol for wind turbine noise, Toronto: Ministry of the Environment and Climate Change, 2017.
- [3] Renewable Energy Approval #2869-8VDRCV, Toronto: Ontario Ministry of the Environment, 2012.

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## Appendix A

### Site Details

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|  |  |  |                                  |                    |
|--|--|--|----------------------------------|--------------------|
|  | 14000.07.T409.RP1  | <b>Project Name</b><br>Port Dover and Nanticoke Wind Farm - IEC 61400- 11 Edition 3.0 - Turbine T409 | <b>Figure Title</b><br>Site Plan | <b>Figure A.01</b> |
|  | Scale: As Shown<br>Drawn by: DAF<br>Reviewed by: DH<br>Date: Nov 2020<br>Revision: 1 |  |                                  |                    |



|   |  |  |  |
|---|--|--|--|
|  | 14000.07.T409.RP1  | <b>Project Name</b><br>Port Dover and Nanticoke Wind Farm - IEC 61400- 11 Edition 3.0 - Turbine T409 |  |
|   | Scale: As Shown<br>Drawn by: DAF<br>Reviewed by: DH<br>Date: Nov 2020<br>Revision: 1 | <b>Figure Title</b><br>Site Photos   |  |

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## **Appendix B**

### Turbine Information

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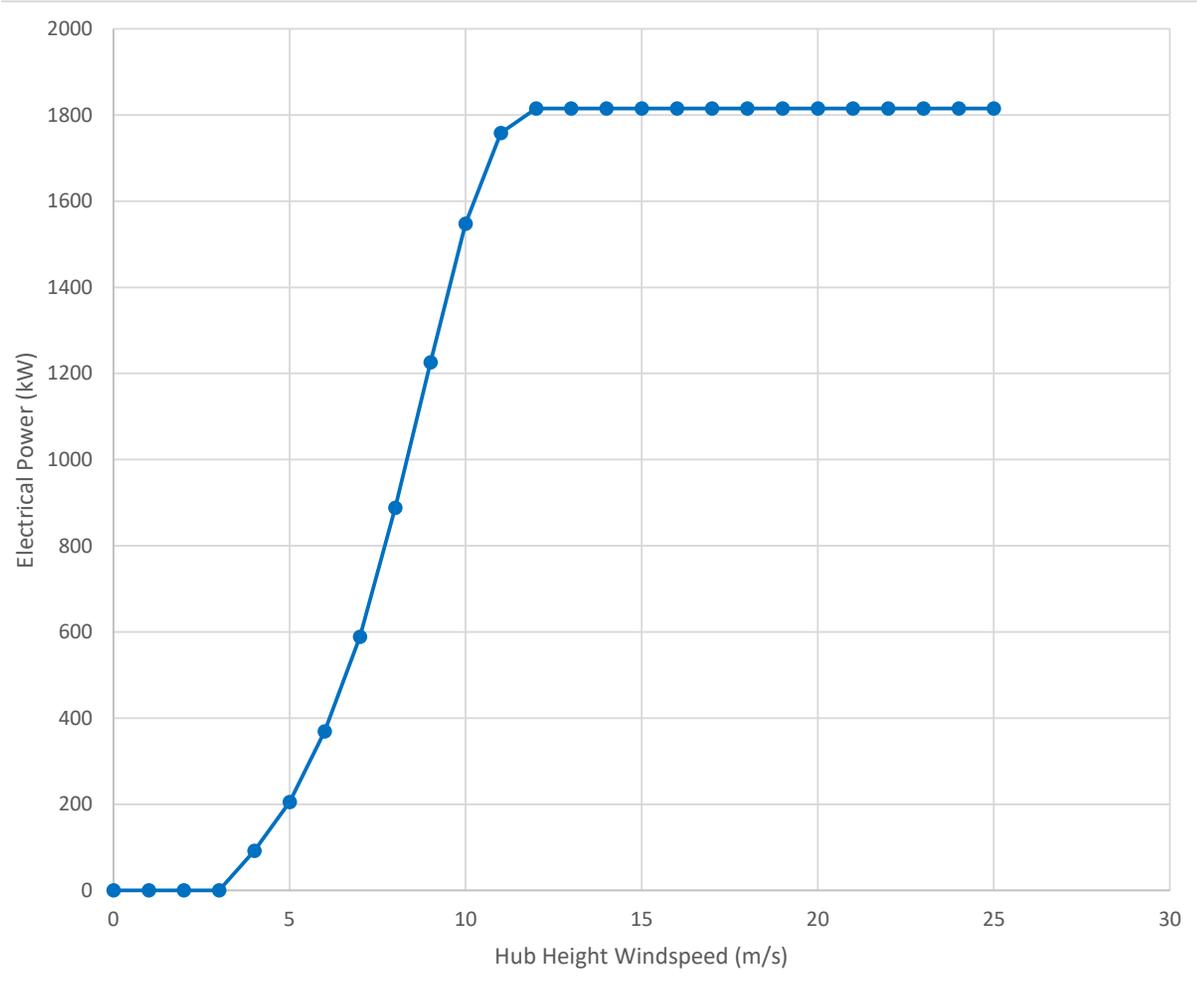
## Table B.01 Allowed range of power curve and required wind speeds

Project: Port Dover and Nanticoke Wind Farm - IEC 61400- 11 Edition 3.0 - Turbine T409  
 Report ID: 14000.07.T409.RP1

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| Power Curve & Required Wind Speeds |         |     |
|------------------------------------|---------|-----|
| Power Curve Tolerance              | 1.0%    |     |
| Acceptable range min               | 3       | m/s |
| Acceptable range max               | 11      | m/s |
| Min allowable range                | 3       | m/s |
| Max allowable range                | 11      | m/s |
| Power Output                       | 1815    | kW  |
| 85% Power                          | 1542.75 | kW  |
| Corresponding wind speed           | 9.98    | m/s |
| Minimum bin                        | 8.0     | m/s |
| Maximum bin                        | 13.0    | m/s |

| Power Curve          |            |       |
|----------------------|------------|-------|
| Hub Wind Speed (m/s) | Power [kW] | slope |
| 0                    | 0          | -36.3 |
| 1                    | 0          | -36.3 |
| 2                    | 0          | -36.3 |
| 3                    | 0          | 55.7  |
| 4                    | 92         | 76.7  |
| 5                    | 205        | 127.7 |
| 6                    | 369        | 183.7 |
| 7                    | 589        | 262.7 |
| 8                    | 888        | 301.7 |
| 9                    | 1226       | 285.7 |
| 10                   | 1548       | 173.7 |
| 11                   | 1758       | 20.7  |
| 12                   | 1815       | -36.3 |
| 13                   | 1815       | -36.3 |
| 14                   | 1815       | -36.3 |
| 15                   | 1815       | -36.3 |
| 16                   | 1815       | -36.3 |
| 17                   | 1815       | -36.3 |
| 18                   | 1815       | -36.3 |
| 19                   | 1815       | -36.3 |
| 20                   | 1815       | -36.3 |
| 21                   | 1815       | -36.3 |
| 22                   | 1815       | -36.3 |
| 23                   | 1815       | -36.3 |
| 24                   | 1815       | -36.3 |
| 25                   | 1815       |       |



| Power Curve          |            |
|----------------------|------------|
| Hub Wind Speed (m/s) | Power [kW] |
| 0                    | 0          |
| 1                    | 0          |
| 2                    | 0          |
| 3                    | 0          |
| 4                    | 92         |
| 5                    | 205        |
| 6                    | 369        |
| 7                    | 589        |
| 8                    | 888        |
| 9                    | 1226       |
| 10                   | 1548       |
| 11                   | 1758       |
| 12                   | 1815       |
| 13                   | 1815       |
| 14                   | 1815       |
| 15                   | 1815       |
| 16                   | 1815       |
| 17                   | 1815       |
| 18                   | 1815       |
| 19                   | 1815       |
| 20                   | 1815       |
| 21                   | 1815       |
| 22                   | 1815       |
| 23                   | 1815       |
| 24                   | 1815       |
| 25                   | 1815       |

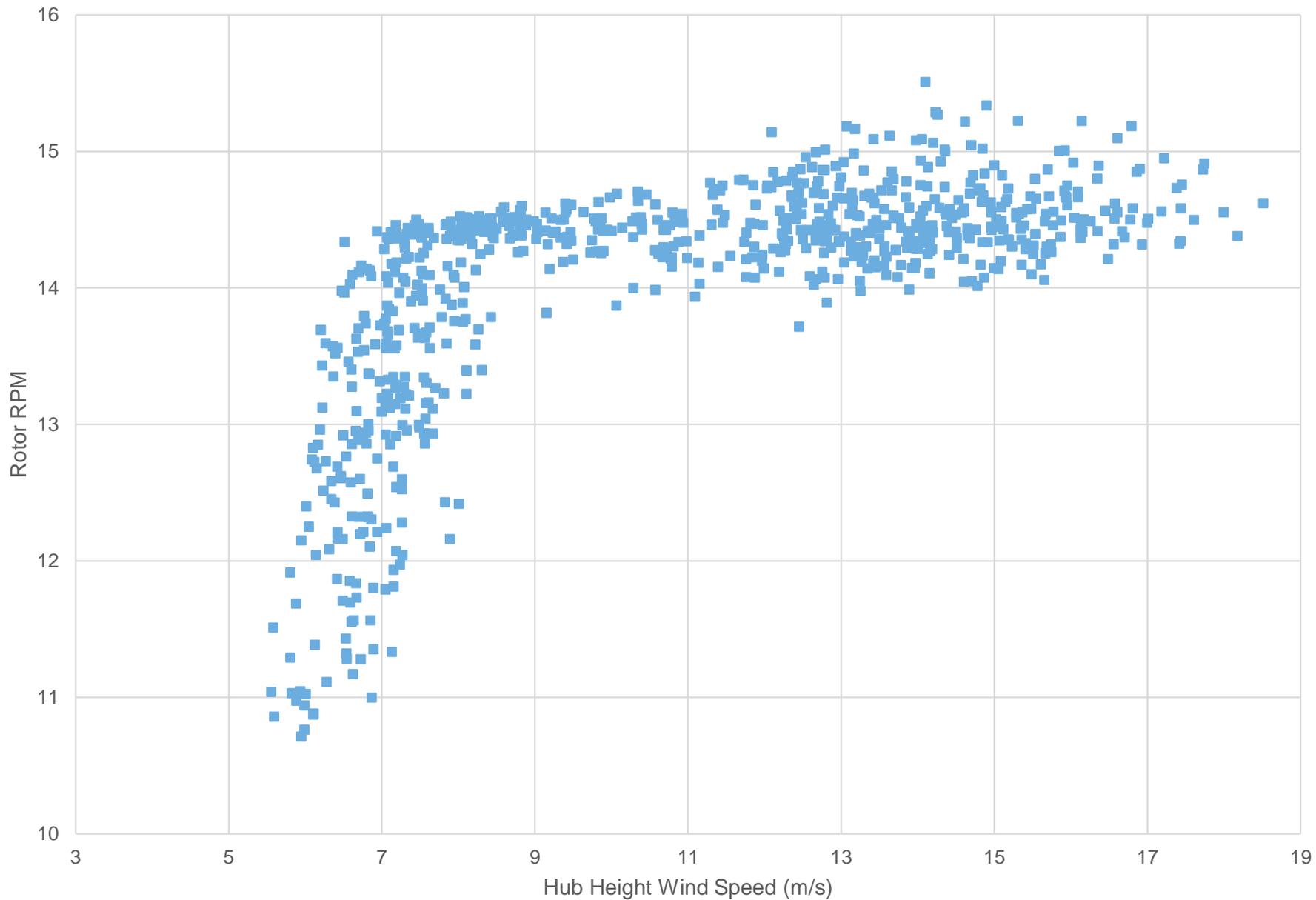
14000.07.T409.RP1  
 Scale: NTS  
 Drawn by: DAF  
 Reviewed by: DH  
 Date: Nov 2020  
 Revision: 1

**Project Name**  
 Port Dover and Nanticoke Wind Farm - IEC 61400- 11 Edition 3.0 - Turbine T409

**Figure Title**  
 Power Curve



**Figure B.01**



■ Rotor Speed vs. Hub Height Wind Speed

14000.07.T409.RP1

**Project Name**

Port Dover and Nanticoke Wind Farm - IEC 61400- 11 Edition 3.0 - Turbine T409

**Figure Title**

Rotor RPM vs. Wind Speed



Scale: NTS  
 Drawn by: DAF  
 Reviewed by: DH  
 Date: Nov 2020  
 Revision: 1

**Figure B.02**

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## Appendix C

### Apparent Sound Power Level

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

Project: Port Dover and Nanticoke Wind Farm - IEC 61400- 11 Edition 3.0 - Turbine T409

Report ID: 14000.07.T409.RP1

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 |
| 8.0            | Turbine ON (dBA)                  | 9.2                  | 12.2 | 17.4 | 21.6 | 24.9 | 28.7 | 31.0 | 32.9 | 35.3 | 41.5 | 37.1 | 39.1 | 40.6 | 40.4 | 43.0 | 42.6 | 44.1 | 42.7 | 42.9    | 43.0 | 41.8 | 41.1 | 39.3 | 37.3 | 35.3   | 30.4   | 32.0   | 31.5   | 53.6  |
|                | Background (dBA)                  | -2.1                 | 2.9  | 7.1  | 13.5 | 17.5 | 21.0 | 23.1 | 25.7 | 28.3 | 29.3 | 31.1 | 34.2 | 33.5 | 31.8 | 32.5 | 33.0 | 34.4 | 35.8 | 35.5    | 37.6 | 35.1 | 33.5 | 29.8 | 29.6 | 28.2   | 28.5   | 31.5   | 30.5   | 46.1  |
|                | Turbine ON - background adj (dBA) | 8.9                  | 11.7 | 17.0 | 20.9 | 24.1 | 27.9 | 30.2 | 32.0 | 34.4 | 41.3 | 35.8 | 37.4 | 39.7 | 39.8 | 42.6 | 42.1 | 43.6 | 41.8 | 42.0    | 41.4 | 40.8 | 40.2 | 38.8 | 36.4 | 34.3   | [27.4] | [29]   | [28.5] | 52.8  |
|                | Signal to noise (dB)              | 11.3                 | 9.4  | 10.3 | 8.1  | 7.4  | 7.7  | 7.9  | 7.2  | 7.0  | 12.2 | 6.0  | 4.9  | 7.1  | 8.6  | 10.5 | 9.6  | 9.7  | 6.9  | 7.3     | 5.3  | 6.8  | 7.6  | 9.5  | 7.6  | 7.1    | 1.9    | 0.5    | 1.1    | 7.5   |
|                | Uncertainty (dB)                  | 2.1                  | 1.8  | 1.2  | 1.8  | 1.3  | 1.1  | 1.0  | 1.0  | 1.0  | 0.9  | 1.1  | 0.9  | 0.8  | 0.8  | 0.8  | 0.8  | 0.8  | 0.9  | 1.0     | 1.1  | 0.9  | 1.0  | 1.2  | 1.3  | 1.3    | 2.4    | 3.1    | 3.8    | 0.9   |
| PWL (dBA)      | 58.7                              | 61.4                 | 66.7 | 70.6 | 73.8 | 77.6 | 79.9 | 81.7 | 84.1 | 91.0 | 85.6 | 87.1 | 89.4 | 89.5 | 92.3 | 91.9 | 93.4 | 91.5 | 91.7 | 91.2    | 90.5 | 90.0 | 88.5 | 86.2 | 84.1 | [77.1] | [78.7] | [78.3] | 102.5  |       |
| 8.5            | Turbine ON (dBA)                  | 10.3                 | 14.1 | 18.7 | 23.0 | 26.2 | 29.9 | 32.8 | 34.3 | 36.2 | 40.7 | 38.1 | 39.8 | 41.5 | 41.3 | 43.9 | 43.4 | 45.0 | 43.6 | 43.7    | 43.8 | 42.4 | 41.6 | 39.9 | 37.6 | 34.8   | 30.5   | 32.0   | 31.6   | 54.3  |
|                | Background (dBA)                  | 0.0                  | 4.9  | 8.9  | 14.1 | 16.6 | 21.0 | 22.8 | 25.6 | 28.5 | 29.5 | 31.1 | 34.0 | 33.7 | 32.4 | 32.9 | 33.2 | 34.4 | 35.7 | 35.3    | 37.2 | 34.7 | 33.3 | 30.0 | 30.4 | 28.1   | 27.8   | 30.6   | 29.6   | 46.0  |
|                | Turbine ON - background adj (dBA) | 9.9                  | 13.5 | 18.2 | 22.4 | 25.7 | 29.3 | 32.3 | 33.7 | 35.3 | 40.4 | 37.1 | 38.6 | 40.7 | 40.6 | 43.5 | 43.0 | 44.6 | 42.9 | 43.0    | 42.7 | 41.5 | 40.9 | 39.4 | 36.7 | 33.8   | [27.5] | [29]   | [28.6] | 53.6  |
|                | Signal to noise (dB)              | 10.3                 | 9.2  | 9.8  | 8.9  | 9.6  | 8.9  | 10.0 | 8.7  | 7.6  | 11.2 | 7.0  | 5.9  | 7.8  | 8.9  | 11.0 | 10.3 | 10.6 | 8.0  | 8.4     | 6.5  | 7.6  | 8.2  | 9.9  | 7.2  | 6.7    | 2.8    | 1.5    | 2.0    | 8.3   |
|                | Uncertainty (dB)                  | 2.1                  | 1.9  | 1.2  | 1.7  | 1.2  | 1.1  | 1.0  | 1.0  | 1.0  | 0.9  | 0.9  | 1.0  | 0.8  | 0.8  | 0.7  | 0.8  | 0.7  | 0.9  | 0.9     | 1.0  | 0.8  | 0.9  | 1.1  | 1.3  | 1.3    | 2.6    | 3.4    | 4.0    | 0.9   |
| PWL (dBA)      | 59.6                              | 63.3                 | 68.0 | 72.1 | 75.5 | 79.1 | 82.1 | 83.4 | 85.1 | 90.1 | 86.8 | 88.3 | 90.4 | 90.4 | 93.3 | 92.8 | 94.3 | 92.6 | 92.7 | 92.4    | 91.3 | 90.6 | 89.1 | 86.5 | 83.5 | [77.3] | [78.8] | [78.3] | 103.3  |       |
| 9.0            | Turbine ON (dBA)                  | 10.2                 | 14.6 | 19.2 | 23.1 | 26.5 | 30.6 | 33.8 | 34.8 | 36.9 | 41.5 | 38.6 | 40.4 | 41.8 | 41.3 | 43.9 | 43.7 | 45.4 | 43.8 | 43.7    | 43.8 | 42.5 | 41.7 | 40.0 | 37.3 | 34.4   | 30.4   | 32.1   | 31.4   | 54.5  |
|                | Background (dBA)                  | 1.8                  | 5.4  | 8.8  | 14.1 | 17.0 | 21.2 | 23.1 | 26.3 | 29.2 | 30.5 | 31.5 | 34.3 | 34.6 | 32.7 | 33.5 | 33.6 | 34.6 | 35.7 | 35.3    | 37.3 | 34.9 | 33.5 | 30.4 | 30.3 | 28.4   | 28.2   | 30.9   | 29.9   | 46.3  |
|                | Turbine ON - background adj (dBA) | 9.5                  | 14.0 | 18.7 | 22.6 | 26.0 | 30.1 | 33.4 | 34.1 | 36.0 | 41.1 | 37.7 | 39.2 | 40.9 | 40.7 | 43.5 | 43.2 | 45.0 | 43.1 | 43.0    | 42.8 | 41.7 | 41.0 | 39.5 | 36.4 | 33.1   | [27.4] | [29.1] | [28.4] | 53.8  |
|                | Signal to noise (dB)              | 8.4                  | 9.2  | 10.4 | 9.1  | 9.5  | 9.4  | 10.6 | 8.5  | 7.6  | 11.0 | 7.1  | 6.1  | 7.2  | 8.6  | 10.4 | 10.1 | 10.7 | 8.1  | 8.4     | 6.6  | 7.6  | 8.2  | 9.6  | 7.1  | 5.9    | 2.2    | 1.2    | 1.5    | 8.2   |
|                | Uncertainty (dB)                  | 2.3                  | 1.9  | 1.3  | 1.8  | 1.3  | 1.1  | 1.0  | 1.0  | 1.0  | 0.9  | 1.0  | 0.9  | 0.9  | 0.8  | 0.8  | 0.8  | 0.8  | 0.9  | 0.9     | 1.0  | 0.9  | 1.0  | 1.2  | 1.3  | 1.4    | 2.6    | 3.3    | 4.0    | 0.9   |
| PWL (dBA)      | 59.2                              | 63.8                 | 68.5 | 72.3 | 75.8 | 79.9 | 83.1 | 83.9 | 85.8 | 90.9 | 87.4 | 88.9 | 90.7 | 90.4 | 93.2 | 93.0 | 94.7 | 92.9 | 92.8 | 92.5    | 91.5 | 90.8 | 89.3 | 86.1 | 82.8 | [77.2] | [78.8] | [78.2] | 103.6  |       |
| 9.5            | Turbine ON (dBA)                  | 11.5                 | 15.9 | 20.1 | 24.0 | 27.5 | 31.2 | 34.5 | 35.6 | 37.3 | 41.3 | 38.9 | 40.5 | 42.3 | 41.4 | 43.8 | 43.3 | 45.3 | 43.7 | 43.7    | 43.7 | 42.6 | 41.9 | 40.2 | 37.7 | 34.8   | 30.7   | 32.2   | 31.5   | 54.5  |
|                | Background (dBA)                  | 6.4                  | 8.0  | 11.0 | 14.4 | 17.9 | 21.8 | 23.4 | 26.4 | 29.1 | 30.4 | 31.7 | 34.6 | 35.4 | 33.1 | 33.8 | 34.2 | 35.1 | 36.1 | 35.4    | 37.1 | 34.6 | 33.3 | 30.7 | 30.9 | 29.4   | 27.9   | 30.3   | 29.6   | 46.5  |
|                | Turbine ON - background adj (dBA) | 9.9                  | 15.1 | 19.5 | 23.5 | 27.0 | 30.7 | 34.1 | 35.1 | 36.6 | 41.0 | 38.0 | 39.2 | 41.3 | 40.7 | 43.3 | 42.8 | 44.8 | 42.9 | 43.0    | 42.6 | 41.8 | 41.2 | 39.7 | 36.6 | 33.3   | [27.7] | [29.2] | [28.5] | 53.8  |
|                | Signal to noise (dB)              | 5.1                  | 7.9  | 9.0  | 9.7  | 9.6  | 9.4  | 11.1 | 9.2  | 8.2  | 10.9 | 7.2  | 5.9  | 7.0  | 8.3  | 10.0 | 9.1  | 10.1 | 7.6  | 8.3     | 6.6  | 8.0  | 8.6  | 9.5  | 6.8  | 5.4    | 2.9    | 1.8    | 1.9    | 8.0   |
|                | Uncertainty (dB)                  | 3.0                  | 2.0  | 1.3  | 1.7  | 1.2  | 1.1  | 1.0  | 0.9  | 0.9  | 0.8  | 1.0  | 0.9  | 0.8  | 0.8  | 0.8  | 0.7  | 0.9  | 0.9  | 0.9     | 0.9  | 0.8  | 0.9  | 1.1  | 1.3  | 1.4    | 2.6    | 3.3    | 4.0    | 0.9   |
| PWL (dBA)      | 59.6                              | 64.8                 | 69.2 | 73.3 | 76.8 | 80.4 | 83.9 | 84.8 | 86.3 | 90.7 | 87.7 | 88.9 | 91.1 | 90.4 | 93.1 | 92.5 | 94.6 | 92.7 | 92.7 | 92.3    | 91.6 | 91.0 | 89.4 | 86.4 | 83.1 | [77.5] | [78.9] | [78.3] | 103.6  |       |
| 10.0           | Turbine ON (dBA)                  | 11.6                 | 16.3 | 20.6 | 24.9 | 28.4 | 32.3 | 35.9 | 36.3 | 38.0 | 42.0 | 39.5 | 41.1 | 43.0 | 41.9 | 43.7 | 43.5 | 45.6 | 44.1 | 43.9    | 43.9 | 42.9 | 42.3 | 40.7 | 38.2 | 35.5   | 31.3   | 32.3   | 31.5   | 54.9  |
|                | Background (dBA)                  | 7.7                  | 10.1 | 12.7 | 15.7 | 18.7 | 23.1 | 25.0 | 27.1 | 29.8 | 31.2 | 32.5 | 35.1 | 35.7 | 34.1 | 34.6 | 34.9 | 35.5 | 36.2 | 35.5    | 37.0 | 34.8 | 33.7 | 31.8 | 30.4 | 30.2   | 29.6   | 31.8   | 31.3   | 47.0  |
|                | Turbine ON - background adj (dBA) | 9.4                  | 15.1 | 19.9 | 24.3 | 27.9 | 31.7 | 35.5 | 35.8 | 37.3 | 41.6 | 38.6 | 39.9 | 42.1 | 41.0 | 43.1 | 42.8 | 45.1 | 43.3 | 43.3    | 42.9 | 42.1 | 41.6 | 40.2 | 37.4 | 33.9   | [28.3] | [29.3] | [28.5] | 54.2  |
|                | Signal to noise (dB)              | 4.0                  | 6.1  | 8.0  | 9.2  | 9.6  | 9.2  | 10.9 | 9.2  | 8.2  | 10.9 | 7.1  | 6.1  | 7.3  | 7.7  | 9.1  | 8.6  | 10.1 | 7.9  | 8.5     | 6.9  | 8.1  | 8.6  | 9.0  | 7.8  | 5.2    | 1.7    | 0.5    | 0.2    | 7.9   |
|                | Uncertainty (dB)                  | 3.4                  | 2.0  | 1.2  | 1.6  | 1.1  | 1.0  | 1.0  | 0.9  | 0.9  | 0.8  | 0.8  | 0.9  | 0.8  | 0.8  | 0.7  | 0.7  | 0.7  | 0.8  | 0.8     | 0.8  | 0.8  | 0.8  | 1.1  | 1.1  | 1.4    | 2.2    | 2.7    | 3.3    | 0.8   |
| PWL (dBA)      | 59.2                              | 64.8                 | 69.6 | 74.1 | 77.6 | 81.5 | 85.2 | 85.5 | 87.1 | 91.4 | 88.3 | 89.6 | 91.8 | 90.8 | 92.8 | 92.6 | 94.9 | 93.1 | 93.0 | 92.7    | 91.9 | 91.4 | 89.9 | 87.1 | 83.7 | [78]   | [79.1] | [78.3] | 103.9  |       |
| 10.5           | Turbine ON (dBA)                  | 12.0                 | 16.5 | 21.3 | 25.0 | 28.7 | 32.5 | 35.8 | 36.6 | 38.0 | 42.4 | 39.4 | 41.1 | 43.1 | 41.9 | 43.5 | 43.3 | 45.5 | 43.9 | 43.9    | 43.9 | 42.8 | 42.1 | 40.5 | 37.8 | 34.9   | 30.8   | 32.2   | 31.6   | 54.8  |
|                | Background (dBA)                  | 5.4                  | 9.1  | 11.8 | 14.9 | 18.0 | 22.7 | 24.4 | 27.1 | 29.9 | 31.0 | 32.4 | 34.9 | 36.2 | 34.2 | 34.8 | 35.1 | 35.6 | 36.2 | 35.5    | 36.8 | 34.6 | 33.5 | 31.6 | 30.1 | 29.3   | 29.5   | 31.8   | 31.2   | 47.0  |
|                | Turbine ON - background adj (dBA) | 11.0                 | 15.7 | 20.7 | 24.6 | 28.3 | 32.0 | 35.4 | 36.1 | 37.3 | 42.0 | 38.4 | 39.9 | 42.2 | 41.1 | 42.9 | 42.6 | 45.0 | 43.1 | 43.2    | 42.9 | 42.1 | 41.5 | 39.9 | 36.9 | 33.5   | [27.8] | [29.2] | [28.6] | 54.1  |
|                | Signal to noise (dB)              | 6.7                  | 7.4  | 9.4  | 10.1 | 10.7 | 9.8  | 11.3 | 9.5  | 8.2  | 11.3 | 7.0  | 6.2  | 6.9  | 7.7  | 8.7  | 8.2  | 9.8  | 7.7  | 8.4     | 7.0  | 8.2  | 8.6  | 8.9  | 7.6  | 5.6    | 1.3    | 0.4    | 0.3    | 7.9   |
|                | Uncertainty (dB)                  | 2.6                  | 2.1  | 1.3  | 1.7  | 1.2  | 1.1  | 1.0  | 1.0  | 1.0  | 0.9  | 0.9  | 1.0  | 1.0  | 1.0  | 0.9  | 0.9  | 0.8  | 0.9  | 1.0     | 1.0  | 0.9  | 1.0  | 1.2  | 1.3  | 1.5    | 2.4    | 3.0    | 3.7    | 1.0   |
| PWL (dBA)      | 60.7                              | 65.4                 | 70.5 | 74.3 | 78.1 | 81.8 | 85.2 | 85.8 | 87.1 | 91.8 | 88.1 | 89.7 | 91.9 | 90.8 | 92.6 | 92.4 | 94.8 | 92.8 | 92.9 | 92.7    | 91.8 | 91.2 | 89.7 | 86.7 | 83.2 | [77.6] | [79]   | [78.3] | 103.8  |       |

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

Project: Port Dover and Nanticoke Wind Farm - IEC 61400- 11 Edition 3.0 - Turbine T409

Report ID: 14000.07.T409.RP1

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  |       |
| 11.0           | Turbine ON (dBA)                  | 12.9                 | 17.0 | 21.4 | 25.4 | 28.6 | 32.2 | 35.4 | 36.3 | 37.7 | 42.3 | 38.8 | 40.6 | 42.2 | 40.8 | 42.4 | 42.3 | 45.0 | 43.2 | 43.3    | 43.6 | 42.8 | 42.3 | 40.6 | 37.8 | 35.4 | 31.8   | 32.8   | 32.8   | 54.4  |
|                | Background (dBA)                  | 5.7                  | 11.1 | 13.4 | 15.5 | 18.6 | 22.6 | 24.9 | 27.1 | 29.8 | 31.3 | 32.0 | 34.4 | 36.0 | 34.0 | 34.3 | 34.7 | 35.4 | 36.1 | 35.4    | 37.0 | 34.7 | 33.7 | 31.7 | 30.7 | 29.4 | 29.7   | 32.0   | 31.4   | 46.9  |
|                | Turbine ON - background adj (dBA) | 12.0                 | 15.7 | 20.7 | 24.9 | 28.2 | 31.7 | 35.0 | 35.8 | 36.9 | 41.9 | 37.8 | 39.4 | 41.0 | 39.8 | 41.6 | 41.4 | 44.5 | 42.3 | 42.6    | 42.6 | 42.1 | 41.6 | 40.0 | 36.9 | 34.2 | [28.8] | [29.8] | [29.8] | 53.6  |
|                | Signal to noise (dB)              | 7.2                  | 5.9  | 8.0  | 9.9  | 10.1 | 9.6  | 10.5 | 9.2  | 7.8  | 11.0 | 6.8  | 6.1  | 6.2  | 6.8  | 8.1  | 7.6  | 9.6  | 7.1  | 7.9     | 6.6  | 8.1  | 8.6  | 8.9  | 7.2  | 6.1  | 2.1    | 0.8    | 1.4    | 7.5   |
|                | Uncertainty (dB)                  | 2.3                  | 2.1  | 1.3  | 1.6  | 1.1  | 1.0  | 0.9  | 0.9  | 0.9  | 0.8  | 0.8  | 0.9  | 0.9  | 0.9  | 0.8  | 0.8  | 0.7  | 0.9  | 0.9     | 0.9  | 0.8  | 0.9  | 1.1  | 1.2  | 1.3  | 2.3    | 2.7    | 3.5    | 0.9   |
| 11.5           | PWL (dBA)                         | 61.7                 | 65.5 | 70.4 | 74.6 | 77.9 | 81.4 | 84.8 | 85.5 | 86.7 | 91.7 | 87.5 | 89.1 | 90.8 | 89.5 | 91.4 | 91.2 | 94.2 | 92.0 | 92.3    | 92.3 | 91.8 | 91.4 | 89.8 | 86.7 | 84.0 | [78.6] | [79.6] | [79.5] | 103.3 |
|                | Turbine ON (dBA)                  | 12.5                 | 16.6 | 21.4 | 25.3 | 28.6 | 32.2 | 35.4 | 36.4 | 37.8 | 41.5 | 39.0 | 40.7 | 42.5 | 40.9 | 42.7 | 42.4 | 44.8 | 43.3 | 43.4    | 43.8 | 42.8 | 42.3 | 40.5 | 37.6 | 35.0 | 31.8   | 33.4   | 35.1   | 54.4  |
|                | Background (dBA)                  | 5.8                  | 10.9 | 14.7 | 15.7 | 18.8 | 23.1 | 24.3 | 27.0 | 29.9 | 31.3 | 32.2 | 34.8 | 37.5 | 34.0 | 34.2 | 34.7 | 35.4 | 36.0 | 35.3    | 36.7 | 34.5 | 33.3 | 31.2 | 30.3 | 29.1 | 29.4   | 32.0   | 31.2   | 46.9  |
|                | Turbine ON - background adj (dBA) | 11.5                 | 15.3 | 20.3 | 24.8 | 28.1 | 31.7 | 35.1 | 35.9 | 37.0 | 41.1 | 37.9 | 39.3 | 40.9 | 39.9 | 42.0 | 41.5 | 44.3 | 42.5 | 42.7    | 42.8 | 42.2 | 41.7 | 40.0 | 36.7 | 33.7 | [28.8] | [30.4] | 32.8   | 53.6  |
|                | Signal to noise (dB)              | 6.8                  | 5.7  | 6.7  | 9.6  | 9.8  | 9.1  | 11.1 | 9.4  | 7.9  | 10.2 | 6.7  | 5.8  | 5.1  | 6.9  | 8.4  | 7.6  | 9.5  | 7.3  | 8.1     | 7.1  | 8.4  | 8.9  | 9.4  | 7.3  | 5.9  | 2.4    | 1.4    | 3.9    | 7.5   |
| 12.0           | Uncertainty (dB)                  | 2.6                  | 2.4  | 1.5  | 1.8  | 1.2  | 1.1  | 1.0  | 1.0  | 0.9  | 0.9  | 1.0  | 1.2  | 0.9  | 0.8  | 0.9  | 0.8  | 1.0  | 1.0  | 1.0     | 0.9  | 1.0  | 1.2  | 1.3  | 1.4  | 2.5  | 3.1    | 3.6    | 1.0    |       |
|                | PWL (dBA)                         | 61.3                 | 65.0 | 70.1 | 74.5 | 77.9 | 81.4 | 84.8 | 85.6 | 86.8 | 90.8 | 87.7 | 89.1 | 90.6 | 89.6 | 91.7 | 91.3 | 94.1 | 92.2 | 92.5    | 92.6 | 91.9 | 91.4 | 89.8 | 86.4 | 83.4 | [78.5] | [80.1] | 82.6   | 103.3 |
|                | Turbine ON (dBA)                  | 12.7                 | 17.3 | 21.4 | 25.4 | 28.7 | 32.4 | 35.7 | 36.2 | 37.6 | 41.9 | 39.0 | 40.3 | 42.3 | 40.7 | 42.3 | 42.1 | 44.6 | 43.0 | 43.2    | 43.5 | 42.7 | 42.1 | 40.3 | 37.3 | 34.8 | 31.3   | 32.5   | 31.7   | 54.2  |
|                | Background (dBA)                  | 4.8                  | 8.1  | 11.5 | 14.4 | 18.1 | 22.4 | 25.9 | 27.1 | 30.2 | 32.0 | 32.5 | 35.2 | 36.6 | 34.1 | 34.2 | 34.8 | 35.5 | 36.2 | 35.7    | 37.1 | 34.9 | 34.0 | 32.1 | 30.5 | 29.4 | 29.5   | 31.9   | 31.2   | 47.1  |
|                | Turbine ON - background adj (dBA) | 12.0                 | 16.8 | 20.9 | 25.1 | 28.2 | 32.0 | 35.3 | 35.7 | 36.7 | 41.4 | 37.9 | 38.7 | 41.0 | 39.6 | 41.6 | 41.2 | 44.1 | 42.0 | 42.4    | 42.4 | 41.9 | 41.4 | 39.6 | 36.3 | 33.3 | [28.3] | [29.5] | [28.7] | 53.3  |
| 12.5           | Signal to noise (dB)              | 7.9                  | 9.3  | 9.9  | 11.0 | 10.5 | 10.0 | 9.9  | 9.2  | 7.4  | 9.9  | 6.5  | 5.1  | 5.8  | 6.5  | 8.1  | 7.2  | 9.1  | 6.8  | 7.5     | 6.4  | 7.7  | 8.1  | 8.2  | 6.8  | 5.4  | 1.8    | 0.6    | 0.5    | 7.1   |
|                | Uncertainty (dB)                  | 2.4                  | 1.9  | 1.2  | 1.7  | 1.2  | 1.1  | 1.0  | 1.0  | 0.9  | 0.9  | 1.1  | 1.0  | 1.0  | 0.9  | 0.9  | 0.8  | 1.0  | 1.0  | 1.0     | 0.9  | 1.0  | 1.3  | 1.4  | 1.5  | 2.4  | 3.0    | 3.7    | 1.0    |       |
|                | PWL (dBA)                         | 61.7                 | 66.5 | 70.7 | 74.8 | 78.0 | 81.7 | 85.0 | 85.4 | 86.5 | 91.2 | 87.6 | 88.4 | 90.8 | 89.3 | 91.4 | 90.9 | 93.8 | 91.7 | 92.1    | 92.1 | 91.6 | 91.1 | 89.3 | 86.0 | 83.0 | [78.1] | [79.2] | [78.5] | 103.0 |
|                | Turbine ON (dBA)                  | 13.2                 | 17.5 | 21.5 | 25.3 | 28.8 | 32.2 | 36.3 | 36.1 | 37.7 | 41.9 | 39.0 | 40.5 | 42.5 | 40.8 | 42.6 | 42.3 | 44.7 | 43.1 | 43.3    | 43.6 | 42.9 | 42.3 | 40.5 | 37.7 | 35.3 | 32.1   | 33.1   | 33.5   | 54.4  |
|                | Background (dBA)                  | 3.4                  | 6.8  | 9.9  | 14.0 | 17.6 | 21.9 | 24.8 | 26.7 | 29.6 | 31.2 | 32.2 | 34.8 | 35.6 | 33.9 | 34.5 | 35.0 | 35.6 | 36.2 | 35.5    | 37.0 | 34.7 | 33.6 | 31.4 | 30.2 | 28.9 | 29.4   | 31.9   | 31.3   | 46.9  |
| 13.0           | Turbine ON - background adj (dBA) | 12.7                 | 17.1 | 21.2 | 25.0 | 28.4 | 31.8 | 36.0 | 35.6 | 37.0 | 41.5 | 38.0 | 39.2 | 41.6 | 39.8 | 41.9 | 41.4 | 44.1 | 42.1 | 42.5    | 42.5 | 42.1 | 41.7 | 40.0 | 36.8 | 34.2 | [29.1] | [30.1] | [30.5] | 53.5  |
|                | Signal to noise (dB)              | 9.7                  | 10.6 | 11.6 | 11.4 | 11.2 | 10.3 | 11.5 | 9.4  | 8.1  | 10.7 | 6.8  | 5.7  | 6.9  | 6.8  | 8.1  | 7.2  | 9.1  | 6.9  | 7.7     | 6.6  | 8.2  | 8.7  | 9.2  | 7.4  | 6.4  | 2.7    | 1.1    | 2.2    | 7.5   |
|                | Uncertainty (dB)                  | 2.2                  | 1.8  | 1.1  | 1.6  | 1.1  | 1.0  | 0.9  | 0.9  | 1.0  | 0.9  | 0.9  | 1.0  | 0.9  | 0.9  | 0.8  | 0.9  | 0.8  | 1.0  | 1.0     | 1.0  | 0.9  | 1.0  | 1.2  | 1.3  | 1.4  | 2.4    | 3.0    | 3.8    | 1.0   |
|                | PWL (dBA)                         | 62.4                 | 66.8 | 70.9 | 74.7 | 78.2 | 81.5 | 85.8 | 85.4 | 86.7 | 91.3 | 87.7 | 88.9 | 91.3 | 89.5 | 91.6 | 91.1 | 93.9 | 91.8 | 92.2    | 92.3 | 91.9 | 91.4 | 89.7 | 86.5 | 83.9 | [78.8] | [79.8] | [80.3] | 103.3 |
|                | Turbine ON (dBA)                  | 13.4                 | 17.5 | 21.8 | 25.2 | 28.6 | 32.1 | 35.5 | 36.1 | 37.6 | 41.6 | 38.7 | 40.1 | 42.1 | 40.3 | 42.2 | 41.7 | 44.2 | 42.7 | 42.9    | 43.4 | 42.8 | 42.3 | 40.5 | 37.8 | 36.4 | 32.5   | 33.5   | 33.5   | 54.1  |
| 13.0           | Background (dBA)                  | 5.8                  | 9.9  | 12.1 | 15.1 | 18.5 | 22.6 | 26.2 | 27.7 | 30.3 | 32.0 | 32.7 | 35.4 | 38.0 | 34.7 | 35.2 | 35.6 | 36.2 | 36.8 | 36.1    | 37.3 | 35.3 | 34.4 | 32.7 | 30.8 | 29.9 | 29.6   | 32.0   | 31.1   | 47.6  |
|                | Turbine ON - background adj (dBA) | 12.5                 | 16.6 | 21.4 | 24.8 | 28.2 | 31.6 | 35.0 | 35.4 | 36.7 | 41.1 | 37.4 | 38.4 | 40.0 | 38.9 | 41.3 | 40.5 | 43.5 | 41.4 | 41.9    | 42.2 | 42.0 | 41.6 | 39.7 | 36.9 | 35.3 | [29.5] | [30.5] | [30.5] | 53.0  |
|                | Signal to noise (dB)              | 7.5                  | 7.6  | 9.7  | 10.2 | 10.1 | 9.5  | 9.4  | 8.4  | 7.3  | 9.6  | 6.0  | 4.8  | 4.1  | 5.6  | 7.0  | 6.1  | 8.1  | 5.9  | 6.8     | 6.1  | 7.5  | 7.9  | 7.8  | 7.1  | 6.5  | 3.0    | 1.5    | 2.4    | 6.5   |
|                | Uncertainty (dB)                  | 2.4                  | 2.0  | 1.2  | 1.6  | 1.1  | 1.0  | 0.9  | 0.9  | 1.0  | 0.9  | 0.9  | 1.1  | 1.2  | 1.0  | 0.9  | 0.9  | 0.8  | 1.0  | 1.0     | 1.0  | 0.9  | 1.0  | 1.2  | 1.3  | 1.4  | 2.4    | 2.9    | 3.7    | 1.0   |
|                | PWL (dBA)                         | 62.3                 | 66.4 | 71.1 | 74.5 | 77.9 | 81.3 | 84.8 | 85.2 | 86.4 | 90.8 | 87.2 | 88.1 | 89.7 | 88.7 | 91.0 | 90.3 | 93.3 | 91.1 | 91.6    | 91.9 | 91.7 | 91.3 | 89.5 | 86.6 | 85.1 | [79.3] | [80.2] | [80.2] | 102.8 |

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

Project: Port Dover and Nanticoke Wind Farm - IEC 61400- 11 Edition 3.0 - Turbine T409

Report ID: 14000.07.T409.RP1

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)                  | 8.8                  | 11.3 | 16.3 | 20.6 | 23.8 | 27.8 | 30.2 | 31.7 | 34.7 | 39.9 | 36.0 | 38.0 | 39.4 | 39.4 | 41.1 | 40.6 | 43.3 | 41.6 | 41.6    | 41.8 | 40.7 | 40.0 | 37.9 | 36.2 | 35.5 | 29.9   | 31.9   | 31.3   | 52.4  |
|                | Background (dBA)                  | -1.8                 | 3.0  | 6.9  | 12.9 | 17.0 | 20.9 | 22.4 | 25.5 | 28.2 | 29.4 | 31.1 | 34.3 | 33.5 | 32.0 | 32.9 | 33.2 | 34.5 | 35.9 | 35.5    | 37.7 | 35.1 | 33.6 | 29.9 | 30.4 | 27.8 | 27.6   | 30.4   | 29.3   | 46.1  |
|                | Turbine ON - background adj (dBA) | 8.4                  | 10.6 | 15.8 | 19.8 | 22.8 | 26.8 | 29.5 | 30.5 | 33.6 | 39.5 | 34.3 | 35.5 | 38.1 | 38.6 | 40.4 | 39.7 | 42.7 | 40.3 | 40.4    | 39.6 | 39.3 | 38.8 | 37.1 | 34.9 | 34.7 | [26.9] | [28.9] | [28.3] | 51.2  |
|                | Signal to noise (dB)              | 10.6                 | 8.3  | 9.4  | 7.7  | 6.9  | 6.9  | 7.8  | 6.2  | 6.5  | 10.5 | 4.9  | 3.7  | 5.9  | 7.4  | 8.2  | 7.3  | 8.8  | 5.8  | 6.2     | 4.1  | 5.6  | 6.4  | 8.0  | 5.8  | 7.7  | 2.3    | 1.5    | 1.9    | 6.3   |
|                | Uncertainty (dB)                  | 2.1                  | 1.9  | 1.2  | 1.8  | 1.4  | 1.2  | 1.0  | 1.1  | 1.1  | 0.9  | 1.1  | 1.4  | 1.0  | 0.9  | 0.8  | 0.9  | 0.8  | 1.1  | 1.1     | 1.3  | 1.0  | 1.1  | 1.3  | 1.5  | 1.2  | 2.5    | 3.2    | 4.0    | 1.1   |
| 6.0            | PWL (dBA)                         | 58.1                 | 60.4 | 65.6 | 69.6 | 72.6 | 76.6 | 79.2 | 80.3 | 83.4 | 89.3 | 84.1 | 85.3 | 87.9 | 88.3 | 90.1 | 89.4 | 92.4 | 90.0 | 90.2    | 89.4 | 89.1 | 88.6 | 86.9 | 84.7 | 84.4 | [76.7] | [78.7] | [78]   | 101.0 |
|                | Turbine ON (dBA)                  | 10.0                 | 13.7 | 18.5 | 22.7 | 26.0 | 29.8 | 32.6 | 34.1 | 36.1 | 41.3 | 37.9 | 39.8 | 41.4 | 41.0 | 43.6 | 43.2 | 44.8 | 43.4 | 43.4    | 43.5 | 42.3 | 41.5 | 39.8 | 37.5 | 34.9 | 30.5   | 32.0   | 31.5   | 54.1  |
|                | Background (dBA)                  | 0.1                  | 4.5  | 8.3  | 13.9 | 16.8 | 21.1 | 23.1 | 25.9 | 28.7 | 29.8 | 31.2 | 34.1 | 33.9 | 32.3 | 33.0 | 33.2 | 34.4 | 35.7 | 35.3    | 37.4 | 34.8 | 33.4 | 30.0 | 30.1 | 28.3 | 28.2   | 31.0   | 30.0   | 46.1  |
|                | Turbine ON - background adj (dBA) | 9.6                  | 13.2 | 18.1 | 22.1 | 25.5 | 29.2 | 32.1 | 33.4 | 35.3 | 41.0 | 36.9 | 38.4 | 40.5 | 40.4 | 43.2 | 42.7 | 44.4 | 42.6 | 42.7    | 42.3 | 41.4 | 40.8 | 39.3 | 36.6 | 33.9 | [27.5] | [29]   | [28.5] | 53.4  |
|                | Signal to noise (dB)              | 9.9                  | 9.3  | 10.2 | 8.8  | 9.2  | 8.8  | 9.6  | 8.2  | 7.4  | 11.4 | 6.7  | 5.7  | 7.4  | 8.7  | 10.6 | 10.0 | 10.4 | 7.7  | 8.1     | 6.2  | 7.4  | 8.1  | 9.8  | 7.3  | 6.7  | 2.3    | 1.0    | 1.5    | 8.0   |
| 7.0            | Uncertainty (dB)                  | 2.0                  | 1.7  | 1.1  | 1.6  | 1.1  | 1.0  | 0.9  | 0.9  | 0.9  | 0.8  | 0.8  | 0.9  | 0.8  | 0.8  | 0.7  | 0.7  | 0.7  | 0.8  | 0.9     | 0.9  | 0.8  | 0.9  | 1.1  | 1.2  | 1.2  | 2.3    | 2.9    | 3.6    | 0.9   |
|                | PWL (dBA)                         | 59.3                 | 62.9 | 67.8 | 71.8 | 75.2 | 79.0 | 81.9 | 83.1 | 85.0 | 90.7 | 86.6 | 88.2 | 90.2 | 90.1 | 92.9 | 92.5 | 94.1 | 92.3 | 92.4    | 92.1 | 91.1 | 90.5 | 89.0 | 86.3 | 83.6 | [77.3] | [78.8] | [78.3] | 103.2 |
|                | Turbine ON (dBA)                  | 11.7                 | 16.2 | 20.7 | 24.7 | 28.3 | 32.1 | 35.4 | 36.2 | 37.8 | 41.9 | 39.3 | 40.9 | 42.8 | 41.8 | 43.7 | 43.4 | 45.5 | 43.9 | 43.9    | 43.9 | 42.8 | 42.1 | 40.5 | 37.9 | 35.1 | 31.0   | 32.3   | 31.6   | 54.8  |
|                | Background (dBA)                  | 6.7                  | 9.1  | 11.8 | 15.0 | 18.2 | 22.5 | 24.2 | 26.8 | 29.5 | 30.8 | 32.1 | 34.9 | 35.7 | 33.7 | 34.4 | 34.7 | 35.4 | 36.2 | 35.5    | 37.0 | 34.7 | 33.5 | 31.3 | 30.6 | 29.7 | 28.9   | 31.2   | 30.6   | 46.8  |
|                | Turbine ON - background adj (dBA) | 10.0                 | 15.3 | 20.1 | 24.2 | 27.8 | 31.6 | 35.1 | 35.7 | 37.1 | 41.6 | 38.4 | 39.7 | 41.9 | 41.0 | 43.2 | 42.8 | 45.0 | 43.2 | 43.2    | 42.8 | 42.1 | 41.5 | 40.0 | 37.0 | 33.6 | [28]   | [29.3] | [28.6] | 54.1  |
| 8.0            | Signal to noise (dB)              | 5.0                  | 7.2  | 8.9  | 9.7  | 10.0 | 9.6  | 11.3 | 9.4  | 8.3  | 11.1 | 7.2  | 6.1  | 7.1  | 8.0  | 9.4  | 8.7  | 10.1 | 7.8  | 8.4     | 6.8  | 8.1  | 8.6  | 9.3  | 7.3  | 5.4  | 2.1    | 1.1    | 1.0    | 8.0   |
|                | Uncertainty (dB)                  | 3.0                  | 2.1  | 1.3  | 1.7  | 1.2  | 1.1  | 0.9  | 1.0  | 1.0  | 0.9  | 0.9  | 1.0  | 0.9  | 0.9  | 0.8  | 0.8  | 0.8  | 0.9  | 0.9     | 1.0  | 0.9  | 1.0  | 1.2  | 1.3  | 1.5  | 2.4    | 3.1    | 3.8    | 0.9   |
|                | PWL (dBA)                         | 59.8                 | 65.1 | 69.9 | 74.0 | 77.6 | 81.3 | 84.9 | 85.4 | 86.9 | 91.3 | 88.1 | 89.5 | 91.7 | 90.8 | 92.9 | 92.6 | 94.8 | 92.9 | 92.9    | 92.6 | 91.8 | 91.2 | 89.7 | 86.8 | 83.4 | [77.7] | [79]   | [78.3] | 103.8 |
|                | Turbine ON (dBA)                  | 12.9                 | 17.0 | 21.3 | 25.3 | 28.6 | 32.2 | 35.6 | 36.3 | 37.6 | 41.9 | 38.8 | 40.5 | 42.3 | 40.8 | 42.4 | 42.2 | 44.8 | 43.2 | 43.3    | 43.6 | 42.8 | 42.2 | 40.5 | 37.6 | 35.1 | 31.7   | 32.8   | 33.2   | 54.3  |
|                | Background (dBA)                  | 5.6                  | 10.4 | 13.5 | 15.3 | 18.5 | 22.7 | 25.1 | 27.0 | 30.0 | 31.5 | 32.2 | 34.8 | 36.7 | 34.0 | 34.2 | 34.7 | 35.4 | 36.1 | 35.4    | 36.9 | 34.7 | 33.6 | 31.7 | 30.5 | 29.3 | 29.5   | 32.0   | 31.3   | 46.9  |
| 9.0            | Turbine ON - background adj (dBA) | 12.0                 | 15.9 | 20.5 | 24.9 | 28.1 | 31.7 | 35.2 | 35.7 | 36.8 | 41.5 | 37.8 | 39.1 | 40.9 | 39.8 | 41.7 | 41.4 | 44.3 | 42.2 | 42.5    | 42.6 | 42.0 | 41.6 | 39.9 | 36.7 | 33.8 | [28.7] | [29.8] | [30.2] | 53.5  |
|                | Signal to noise (dB)              | 7.3                  | 6.6  | 7.8  | 10.0 | 10.0 | 9.5  | 10.6 | 9.2  | 7.7  | 10.4 | 6.6  | 5.7  | 5.6  | 6.8  | 8.2  | 7.5  | 9.4  | 7.1  | 7.9     | 6.7  | 8.1  | 8.6  | 8.8  | 7.1  | 5.8  | 2.2    | 0.9    | 1.9    | 7.4   |
|                | Uncertainty (dB)                  | 2.5                  | 2.2  | 1.3  | 1.7  | 1.2  | 1.1  | 0.9  | 1.0  | 1.0  | 0.9  | 0.9  | 1.0  | 1.0  | 0.9  | 0.8  | 0.9  | 0.8  | 1.0  | 1.0     | 1.0  | 0.9  | 1.0  | 1.2  | 1.4  | 1.4  | 2.4    | 3.0    | 3.8    | 1.0   |
|                | PWL (dBA)                         | 61.7                 | 65.7 | 70.3 | 74.6 | 77.9 | 81.4 | 85.0 | 85.5 | 86.6 | 91.3 | 87.5 | 88.9 | 90.7 | 89.5 | 91.5 | 91.1 | 94.0 | 92.0 | 92.3    | 92.3 | 91.8 | 91.3 | 89.6 | 86.4 | 83.6 | [78.5] | [79.6] | [79.9] | 103.2 |
|                | Turbine ON (dBA)                  | 13.2                 | 17.5 | 21.7 | 25.3 | 28.7 | 32.2 | 35.8 | 36.2 | 37.6 | 41.8 | 38.9 | 40.3 | 42.3 | 40.5 | 42.4 | 42.0 | 44.4 | 42.8 | 43.0    | 43.4 | 42.8 | 42.3 | 40.5 | 37.6 | 35.6 | 32.1   | 33.2   | 33.4   | 54.2  |
| 9.0            | Background (dBA)                  | 6.7                  | 10.1 | 12.6 | 15.4 | 18.7 | 22.8 | 25.8 | 27.5 | 30.2 | 31.7 | 32.6 | 35.2 | 37.0 | 34.5 | 35.0 | 35.4 | 36.0 | 36.6 | 35.9    | 37.2 | 35.1 | 34.1 | 32.1 | 30.5 | 29.5 | 29.5   | 32.0   | 31.2   | 47.3  |
|                | Turbine ON - background adj (dBA) | 12.0                 | 16.6 | 21.1 | 24.9 | 28.2 | 31.7 | 35.4 | 35.5 | 36.8 | 41.4 | 37.7 | 38.7 | 40.8 | 39.3 | 41.5 | 40.9 | 43.8 | 41.6 | 42.1    | 42.3 | 42.0 | 41.6 | 39.8 | 36.7 | 34.4 | [29.1] | [30.2] | [30.4] | 53.2  |
|                | Signal to noise (dB)              | 6.4                  | 7.4  | 9.1  | 9.9  | 10.0 | 9.4  | 10.0 | 8.7  | 7.5  | 10.1 | 6.2  | 5.1  | 5.3  | 6.1  | 7.4  | 6.6  | 8.5  | 6.2  | 7.1     | 6.2  | 7.7  | 8.2  | 8.3  | 7.2  | 6.2  | 2.5    | 1.2    | 2.2    | 6.9   |
|                | Uncertainty (dB)                  | 2.6                  | 2.0  | 1.2  | 1.7  | 1.2  | 1.1  | 0.9  | 1.0  | 1.0  | 0.9  | 0.9  | 1.1  | 1.0  | 1.0  | 0.9  | 0.9  | 0.8  | 1.0  | 1.0     | 1.0  | 0.9  | 1.0  | 1.3  | 1.3  | 1.4  | 2.4    | 3.0    | 3.8    | 1.0   |
|                | PWL (dBA)                         | 61.8                 | 66.4 | 70.8 | 74.6 | 78.0 | 81.4 | 85.1 | 85.3 | 86.5 | 91.1 | 87.4 | 88.4 | 90.5 | 89.0 | 91.2 | 90.6 | 93.5 | 91.4 | 91.8    | 92.0 | 91.7 | 91.3 | 89.5 | 86.4 | 84.2 | [78.8] | [79.9] | [80.2] | 103.0 |

## Table C.03 Type B measurement uncertainty summary

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| 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                 | 2 dB  |
| 25                            | 0.8 dB                 | 1.6 dB  |
| 31.5                          | 0.5 dB                 | 1.1 dB  |
| 40                            | 0.5 dB                 | 1.5 dB  |
| 50                            | 0.5 dB                 | 1.1 dB  |
| 63                            | 0.5 dB                 | 0.9 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                 | 0.8 dB  |
| 1250                          | 0.3 dB                 | 0.8 dB  |
| 1600                          | 0.3 dB                 | 0.8 dB  |
| 2000                          | 0.3 dB                 | 0.7 dB  |
| 2500                          | 0.5 dB                 | 0.8 dB  |
| 3150                          | 0.5 dB                 | 1.1 dB  |
| 4000                          | 0.5 dB                 | 1.1 dB  |
| 5000                          | 0.5 dB                 | 1 dB  |
| 6300                          | 0.5 dB                 | 1.1 dB  |
| 8000                          | 0.5 dB                 | 1.4 dB  |
| 10000                         | 1.3 dB                 | 1.7 dB  |

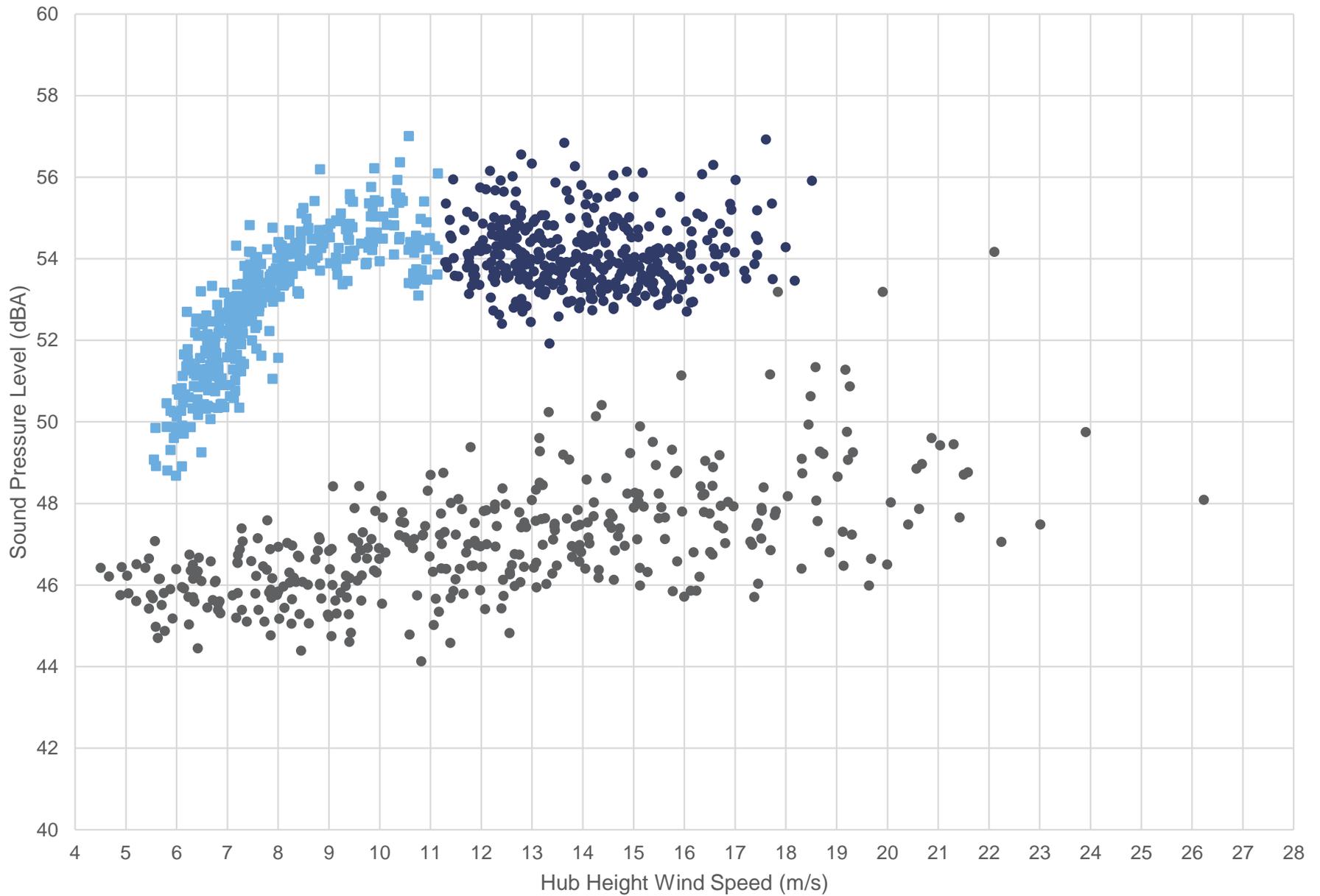
# Table C.04 Detailed measurement uncertainty at hub height

Project: Port Dover and Nanticoke Wind Farm - IEC 61400- 11 Edition 3.0 - Turbine T409  
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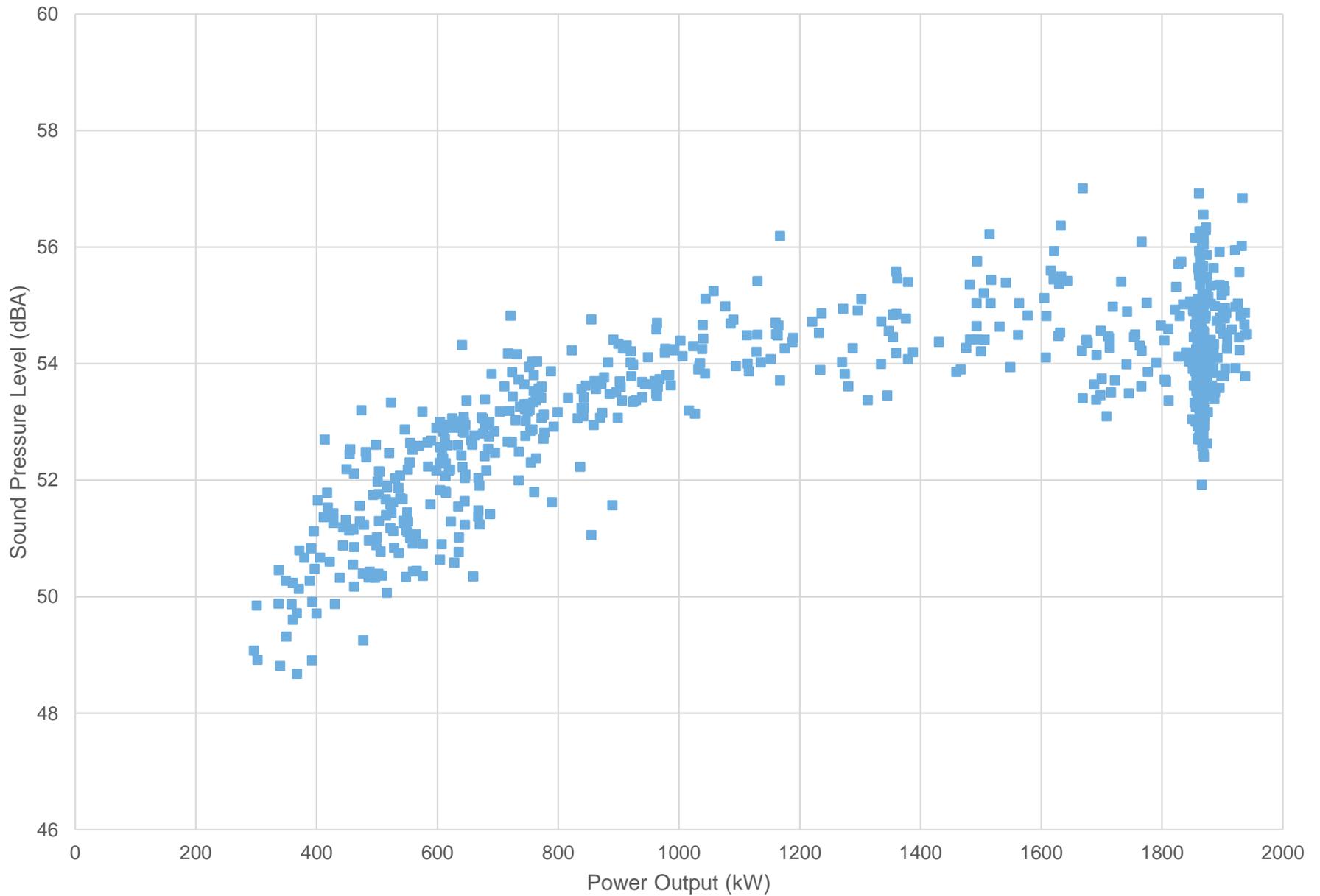
| Wind Bin (m/s) | Parameter  | Average Wind Speed (m/s) | # of data points | Parameter                 | 1/3 Octave Band (Hz) |      |               |      |      |      |      |      |      |      |      |      |      |      |      |      |      | Overall |      |      |      |      |      |      |      |      |      |      |       |      |      |      |
|----------------|------------|--------------------------|------------------|---------------------------|----------------------|------|---------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|---------|------|------|------|------|------|------|------|------|------|------|-------|------|------|------|
|                |            |                          |                  |                           | 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 |      |      |      |
| 8.0            | Turbine ON | 8.47                     | 32               | Average (dBA)             | 9.2                  | 12.3 | 17.4          | 21.6 | 25.0 | 28.7 | 31.0 | 32.9 | 35.4 | 41.6 | 37.1 | 39.1 | 40.6 | 40.5 | 43.0 | 42.7 | 44.1 | 42.8    | 42.9 | 43.0 | 41.8 | 41.1 | 39.3 | 37.3 | 35.2 | 30.4 | 32.0 | 31.5 | 53.6  |      |      |      |
|                |            |                          |                  | Uncertainty A (dB)        | 0.2                  | 0.2  | 0.2           | 0.2  | 0.2  | 0.2  | 0.2  | 0.1  | 0.1  | 0.5  | 0.1  | 0.1  | 0.1  | 0.1  | 0.1  | 0.2  | 0.2  | 0.1     | 0.1  | 0.1  | 0.1  | 0.1  | 0.1  | 0.1  | 0.1  | 0.1  | 0.1  | 0.3  | 0.0   | 0.0  | 0.1  |      |
|                |            |                          |                  | Uncertainty B (dB)        | 2.0                  | 1.6  | 1.1           | 1.5  | 1.1  | 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  | 0.8  | 0.8  | 0.8  | 0.7  | 0.8  | 1.1  | 1.1  | 1.0  | 1.1   | 1.4  | 1.7  |      |
|                |            |                          |                  | Combined Uncertainty (dB) | 2.0                  | 1.7  | 1.1           | 1.5  | 1.1  | 1.0  | 0.8  | 0.8  | 0.8  | 1.0  | 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  | 0.7  | 0.8  | 1.1  | 1.1  | 1.0  | 1.1   | 1.4  | 1.7  |      |
|                |            |                          |                  | Background                | 8.43                 | 13   | Average (dBA) | -2.2 | 2.7  | 7.0  | 13.5 | 17.6 | 21.0 | 23.1 | 25.7 | 28.3 | 29.3 | 31.1 | 34.2 | 33.5 | 31.8 | 32.5    | 33.0 | 34.4 | 35.9 | 35.5 | 37.7 | 35.1 | 33.5 | 29.8 | 29.6 | 28.2 | 28.6  | 31.5 | 30.5 | 46.1 |
| 8.5            | Turbine ON | 8.98                     | 21               | Uncertainty A (dB)        | 0.3                  | 0.3  | 0.4           | 0.4  | 0.5  | 0.3  | 0.4  | 0.2  | 0.2  | 0.3  | 0.2  | 0.2  | 0.6  | 0.3  | 0.2  | 0.3  | 0.2  | 0.2     | 0.2  | 0.1  | 0.2  | 0.2  | 0.2  | 0.2  | 0.3  | 0.9  | 1.1  | 1.1  |       |      |      |      |
|                |            |                          |                  | Uncertainty B (dB)        | 2.0                  | 1.6  | 1.1           | 1.5  | 1.1  | 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  | 0.8  | 0.8  | 0.8  | 0.7  | 0.8  | 1.1  | 1.1  | 1.0  | 1.1  | 1.4   | 1.7  |      |      |
|                |            |                          |                  | Combined Uncertainty (dB) | 2.0                  | 1.7  | 1.1           | 1.6  | 1.2  | 1.0  | 0.9  | 0.9  | 0.8  | 0.9  | 0.7  | 0.7  | 0.9  | 0.8  | 0.7  | 0.8  | 0.7  | 0.8     | 0.8  | 0.8  | 0.8  | 0.8  | 0.7  | 0.8  | 1.1  | 1.1  | 1.0  | 1.1  | 1.4   | 1.8  | 2.0  |      |
|                |            |                          |                  | Background                | 8.98                 | 17   | Average (dBA) | 10.3 | 14.0 | 18.7 | 22.9 | 26.2 | 29.9 | 32.8 | 34.3 | 36.1 | 40.7 | 38.0 | 39.8 | 41.4 | 41.2 | 43.9    | 43.4 | 44.9 | 43.6 | 43.7 | 43.8 | 42.3 | 41.6 | 39.8 | 37.7 | 34.8 | 30.6  | 32.0 | 31.6 | 54.3 |
|                |            |                          |                  | Uncertainty A (dB)        | 0.4                  | 0.4  | 0.4           | 0.4  | 0.3  | 0.4  | 0.3  | 0.2  | 0.4  | 0.2  | 0.1  | 0.2  | 0.2  | 0.1  | 0.1  | 0.1  | 0.1  | 0.1     | 0.1  | 0.1  | 0.1  | 0.1  | 0.1  | 0.1  | 0.1  | 0.1  | 0.1  | 0.2  | 0.1   | 0.0  | 0.1  |      |
| 9.0            | Turbine ON | 9.45                     | 18               | Uncertainty B (dB)        | 2.0                  | 1.6  | 1.1           | 1.5  | 1.1  | 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     | 0.8  | 0.8  | 0.8  | 0.7  | 0.8  | 1.1  | 1.1  | 1.0  | 1.1  | 1.4  | 1.7   |      |      |      |
|                |            |                          |                  | Combined Uncertainty (dB) | 2.0                  | 1.7  | 1.1           | 1.6  | 1.1  | 1.0  | 0.9  | 0.9  | 0.9  | 0.9  | 0.7  | 0.7  | 0.7  | 0.7  | 0.7  | 0.7  | 0.7  | 0.7     | 0.7  | 0.8  | 0.8  | 0.8  | 0.7  | 0.8  | 1.1  | 1.1  | 1.0  | 1.1  | 1.4   | 1.7  |      |      |
|                |            |                          |                  | Background                | 9.51                 | 18   | Average (dBA) | 1.6  | 5.3  | 8.7  | 14.0 | 17.0 | 21.2 | 23.1 | 26.2 | 29.2 | 30.5 | 31.5 | 34.3 | 34.6 | 32.7 | 33.5    | 33.6 | 34.6 | 35.7 | 35.3 | 37.3 | 34.9 | 33.5 | 30.3 | 28.4 | 28.3 | 30.9  | 29.6 | 29.6 | 46.3 |
|                |            |                          |                  | Uncertainty A (dB)        | 1.0                  | 0.7  | 0.6           | 0.4  | 0.3  | 0.3  | 0.5  | 0.4  | 0.4  | 0.5  | 0.3  | 0.2  | 0.7  | 0.4  | 0.3  | 0.4  | 0.3  | 0.2     | 0.3  | 0.3  | 0.3  | 0.3  | 0.3  | 0.3  | 0.4  | 0.3  | 0.5  | 1.3  | 1.6   | 1.7  |      |      |
|                |            |                          |                  | Uncertainty B (dB)        | 2.0                  | 1.6  | 1.1           | 1.5  | 1.1  | 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  | 0.8  | 0.8  | 0.8  | 0.8  | 0.7  | 0.8  | 1.1  | 1.1  | 1.0  | 1.1   | 1.4  | 1.7  |      |
| 9.5            | Turbine ON | 9.90                     | 19               | Combined Uncertainty (dB) | 2.2                  | 1.8  | 1.2           | 1.6  | 1.1  | 1.0  | 1.0  | 0.9  | 0.9  | 0.9  | 0.7  | 0.8  | 1.0  | 0.8  | 0.8  | 0.8  | 0.7  | 0.8     | 0.8  | 0.8  | 0.8  | 0.7  | 0.8  | 1.1  | 1.1  | 1.1  | 1.7  | 2.1  | 2.4   |      |      |      |
|                |            |                          |                  | Background                | 9.95                 | 12   | Average (dBA) | 11.5 | 15.8 | 20.0 | 24.0 | 27.4 | 31.1 | 34.3 | 35.6 | 37.2 | 41.3 | 38.8 | 40.4 | 42.2 | 41.3 | 43.8    | 43.3 | 45.2 | 43.7 | 43.7 | 43.6 | 42.6 | 41.8 | 40.1 | 37.6 | 34.7 | 30.7  | 32.1 | 31.5 | 54.5 |
|                |            |                          |                  | Uncertainty A (dB)        | 0.6                  | 0.7  | 0.6           | 0.5  | 0.5  | 0.4  | 0.5  | 0.4  | 0.3  | 0.3  | 0.3  | 0.2  | 0.3  | 0.3  | 0.3  | 0.3  | 0.2  | 0.2     | 0.2  | 0.2  | 0.2  | 0.1  | 0.1  | 0.1  | 0.1  | 0.2  | 0.2  | 0.1  | 0.0   | 0.1  |      |      |
|                |            |                          |                  | Uncertainty B (dB)        | 2.0                  | 1.6  | 1.1           | 1.5  | 1.1  | 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  | 0.8  | 0.8  | 0.8  | 0.8  | 0.7  | 0.8  | 1.1  | 1.1  | 1.0  | 1.1   | 1.4  | 1.7  |      |
|                |            |                          |                  | Combined Uncertainty (dB) | 2.1                  | 1.8  | 1.2           | 1.6  | 1.2  | 1.0  | 1.0  | 0.9  | 0.9  | 0.9  | 0.7  | 0.8  | 0.8  | 0.8  | 0.8  | 0.8  | 0.8  | 0.8     | 0.7  | 0.8  | 0.8  | 0.8  | 0.8  | 0.7  | 0.8  | 1.1  | 1.1  | 1.0  | 1.1   | 1.4  | 1.7  |      |
| 10.0           | Turbine ON | 10.50                    | 23               | Average (dBA)             | 6.5                  | 8.0  | 11.1          | 14.4 | 17.9 | 21.8 | 23.4 | 26.4 | 29.1 | 30.4 | 31.7 | 34.6 | 35.4 | 33.1 | 33.8 | 34.3 | 35.1 | 36.1    | 35.5 | 37.1 | 34.6 | 33.3 | 30.7 | 30.9 | 29.4 | 27.8 | 30.3 | 29.6 | 46.5  |      |      |      |
|                |            |                          |                  | Uncertainty A (dB)        | 1.9                  | 1.2  | 0.9           | 0.6  | 0.4  | 0.5  | 0.4  | 0.4  | 0.3  | 0.3  | 0.3  | 0.3  | 0.6  | 0.3  | 0.3  | 0.4  | 0.3  | 0.2     | 0.2  | 0.3  | 0.3  | 0.3  | 0.3  | 0.3  | 0.3  | 0.5  | 0.8  | 1.4  | 1.8   | 1.8  |      |      |
|                |            |                          |                  | Uncertainty B (dB)        | 2.0                  | 1.6  | 1.1           | 1.5  | 1.1  | 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     | 0.8  | 0.8  | 0.8  | 0.8  | 0.7  | 0.8  | 1.1  | 1.1  | 1.0  | 1.1  | 1.4   | 1.7  |      |      |
|                |            |                          |                  | Combined Uncertainty (dB) | 2.8                  | 2.0  | 1.4           | 1.6  | 1.2  | 1.0  | 0.9  | 0.9  | 0.9  | 0.9  | 0.7  | 0.8  | 0.9  | 0.7  | 0.8  | 0.8  | 0.8  | 0.8     | 0.8  | 0.8  | 0.8  | 0.8  | 0.8  | 0.7  | 0.8  | 1.1  | 1.2  | 1.2  | 1.3   | 1.8  | 2.2  | 2.5  |
|                |            |                          |                  | Background                | 10.55                | 10   | Average (dBA) | 11.6 | 16.2 | 20.5 | 24.9 | 28.3 | 32.3 | 35.9 | 36.3 | 38.0 | 41.9 | 39.6 | 41.1 | 42.9 | 41.8 | 43.7    | 43.5 | 45.6 | 44.1 | 44.0 | 43.9 | 42.9 | 42.3 | 40.8 | 38.3 | 35.6 | 31.4  | 32.3 | 31.5 | 54.9 |
| 10.5           | Turbine ON | 10.92                    | 17               | Uncertainty A (dB)        | 0.4                  | 0.5  | 0.4           | 0.4  | 0.4  | 0.4  | 0.6  | 0.3  | 0.3  | 0.3  | 0.2  | 0.3  | 0.2  | 0.2  | 0.2  | 0.2  | 0.1  | 0.2     | 0.1  | 0.1  | 0.1  | 0.1  | 0.2  | 0.2  | 0.3  | 0.3  | 0.1  | 0.1  |       |      |      |      |
|                |            |                          |                  | Uncertainty B (dB)        | 2.0                  | 1.6  | 1.1           | 1.5  | 1.1  | 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  | 0.8  | 0.8  | 0.8  | 0.7  | 0.8  | 1.1  | 1.1  | 1.0  | 1.1  | 1.4   | 1.7  |      |      |
|                |            |                          |                  | Combined Uncertainty (dB) | 2.0                  | 1.7  | 1.1           | 1.6  | 1.1  | 1.0  | 0.9  | 0.9  | 0.9  | 0.9  | 0.7  | 0.8  | 0.7  | 0.8  | 0.7  | 0.8  | 0.8  | 0.7     | 0.8  | 0.8  | 0.8  | 0.8  | 0.7  | 0.8  | 1.1  | 1.1  | 1.0  | 1.1  | 1.4   | 1.7  |      |      |
|                |            |                          |                  | Background                | 11.04                | 15   | Average (dBA) | 7.9  | 10.2 | 12.8 | 15.8 | 18.8 | 23.2 | 25.0 | 27.1 | 29.8 | 31.2 | 32.5 | 35.1 | 35.6 | 34.1 | 34.6    | 34.8 | 35.5 | 36.2 | 35.5 | 37.0 | 34.8 | 33.7 | 31.8 | 30.4 | 30.4 | 29.6  | 31.8 | 31.4 | 47.0 |
|                |            |                          |                  | Uncertainty A (dB)        | 2.0                  | 1.5  | 1.0           | 0.8  | 0.4  | 0.3  | 0.5  | 0.4  | 0.3  | 0.4  | 0.2  | 0.3  | 0.6  | 0.3  | 0.4  | 0.4  | 0.3  | 0.3     | 0.3  | 0.4  | 0.3  | 0.3  | 0.4  | 0.3  | 0.3  | 0.4  | 0.4  | 0.8  | 0.4   | 0.4  |      |      |





■ Turbine ON - Derived from power curve    
 ● Turbine ON - Derived from nacelle anemometer    
 ● Background

|  |   |                     |  |                    |
|--|---|---------------------|--|--------------------|
|  | 14000.07.T409.RP1   | <b>Project Name</b> | Port Dover and Nanticoke Wind Farm - IEC 61400- 11 Edition 3.0 - Turbine T409  | <b>Figure C.01</b> |
|  | Scale: NTS<br>Drawn by: DAF<br>Reviewed by: DH<br>Date: Nov 2020<br>Revision: 1 | <b>Figure Title</b> |  |                    |
|  |   |                     | Plot of overall measurement data pairs at Position 1 (Turbine ON & Background) |                    |



■ Total noise vs electrical power output



14000.07.T409.RP1

Scale: NTS  
 Drawn by: DAF  
 Reviewed by: DH  
 Date: Nov 2020  
 Revision: 1

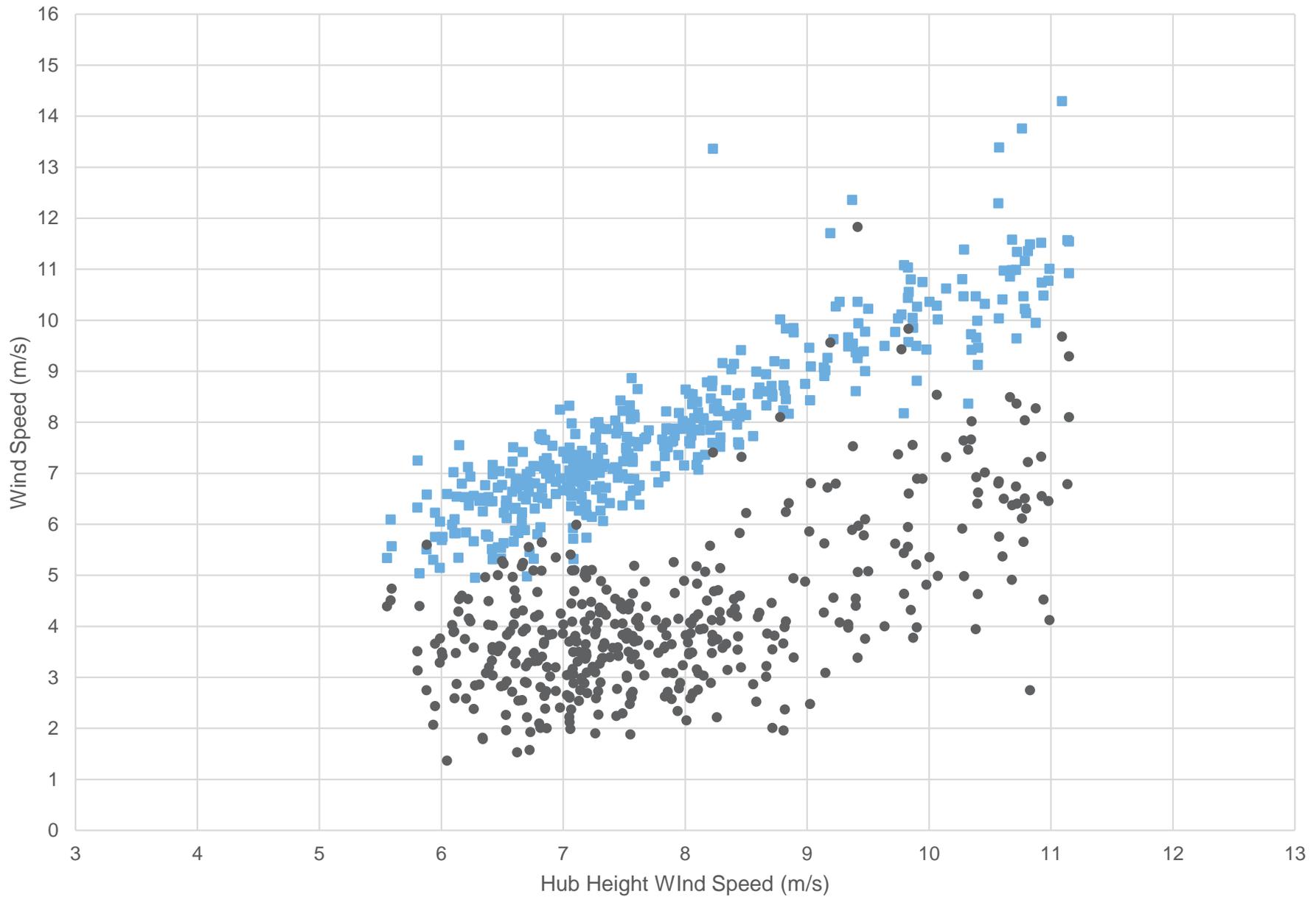
**Project Name**

Port Dover and Nanticoke Wind Farm - IEC 61400- 11 Edition 3.0 - Turbine T409

**Figure Title**

Plot of measured total noise vs. electrical power output

**Figure C.02**



■ Nacelle Anemometer Wind Speed    ● 10m Anemometer Wind Speed

14000.07.T409.RP1

**Project Name**

Port Dover and Nanticoke Wind Farm - IEC 61400- 11 Edition 3.0 - Turbine T409

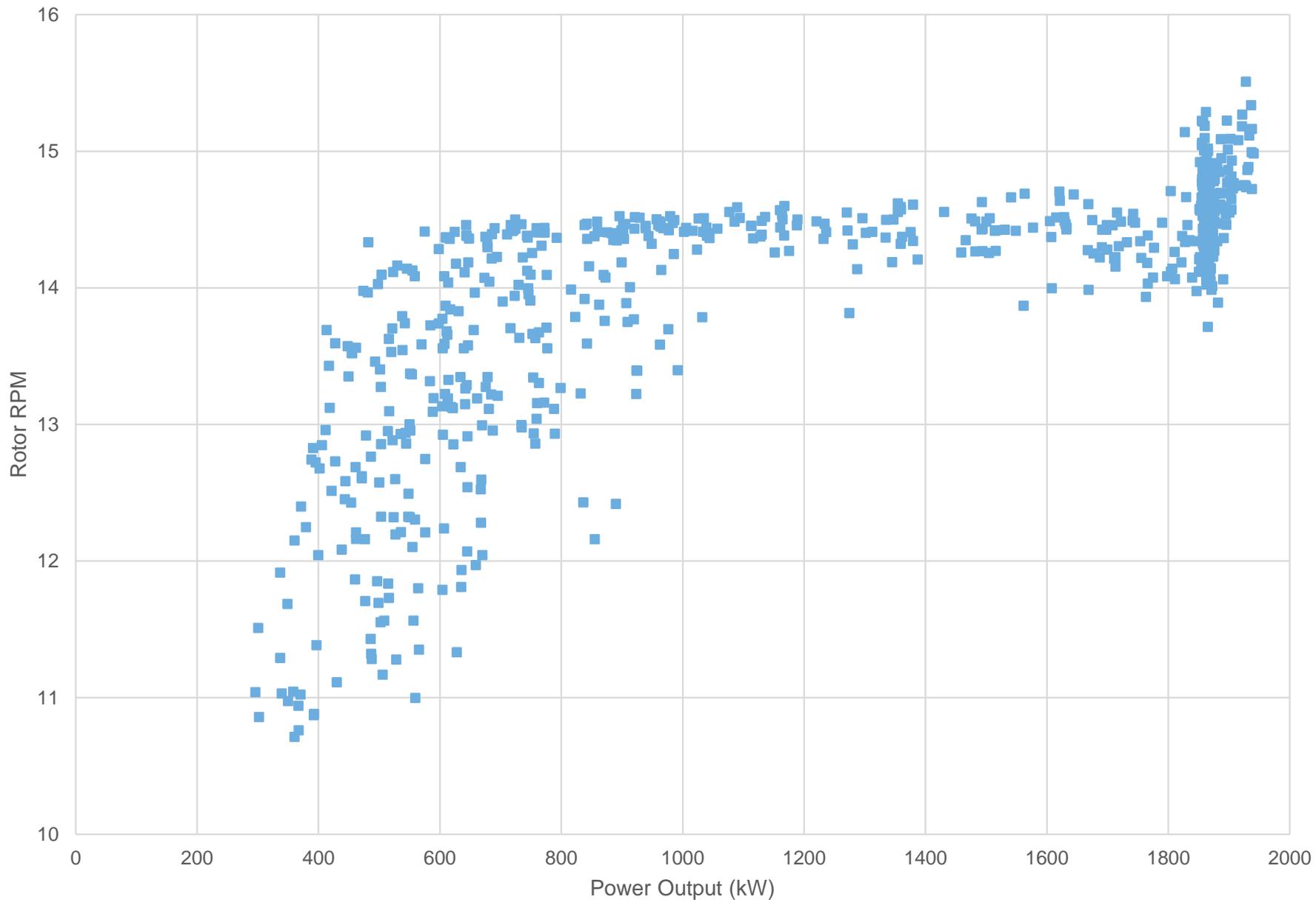
**Figure Title**

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



Scale: NTS  
 Drawn by: DAF  
 Reviewed by: DH  
 Date: Nov 2020  
 Revision: 1

**Figure C.03**



■ Rotor RPM vs electrical power output



14000.07.T409.RP1

Scale: NTS  
 Drawn by: DAF  
 Reviewed by: DH  
 Date: Nov 2020  
 Revision: 1

**Project Name**

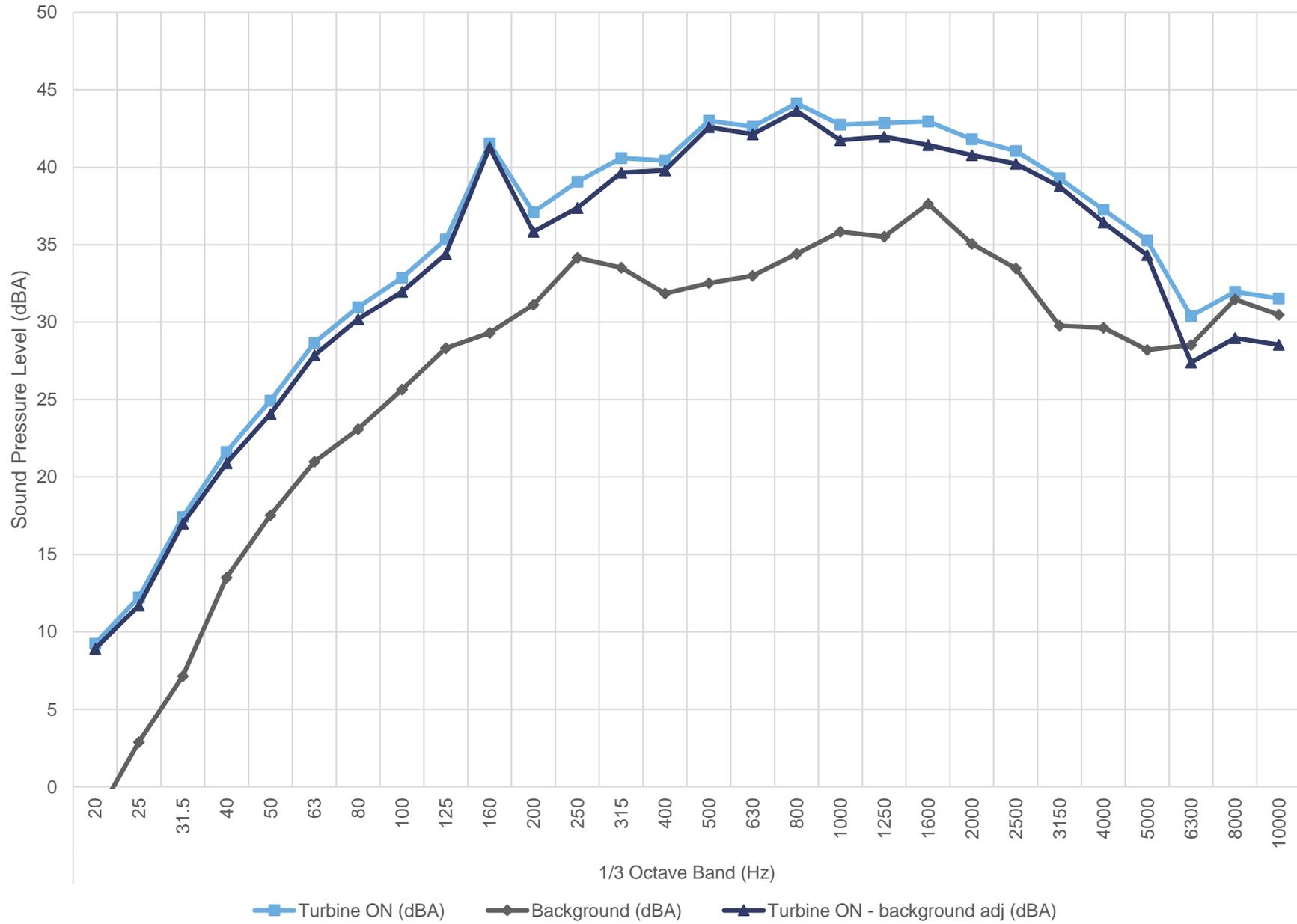
Port Dover and Nanticoke Wind Farm - IEC 61400- 11 Edition 3.0 - Turbine T409

**Figure Title**

Plot of Rotor RPM vs. electrical power output

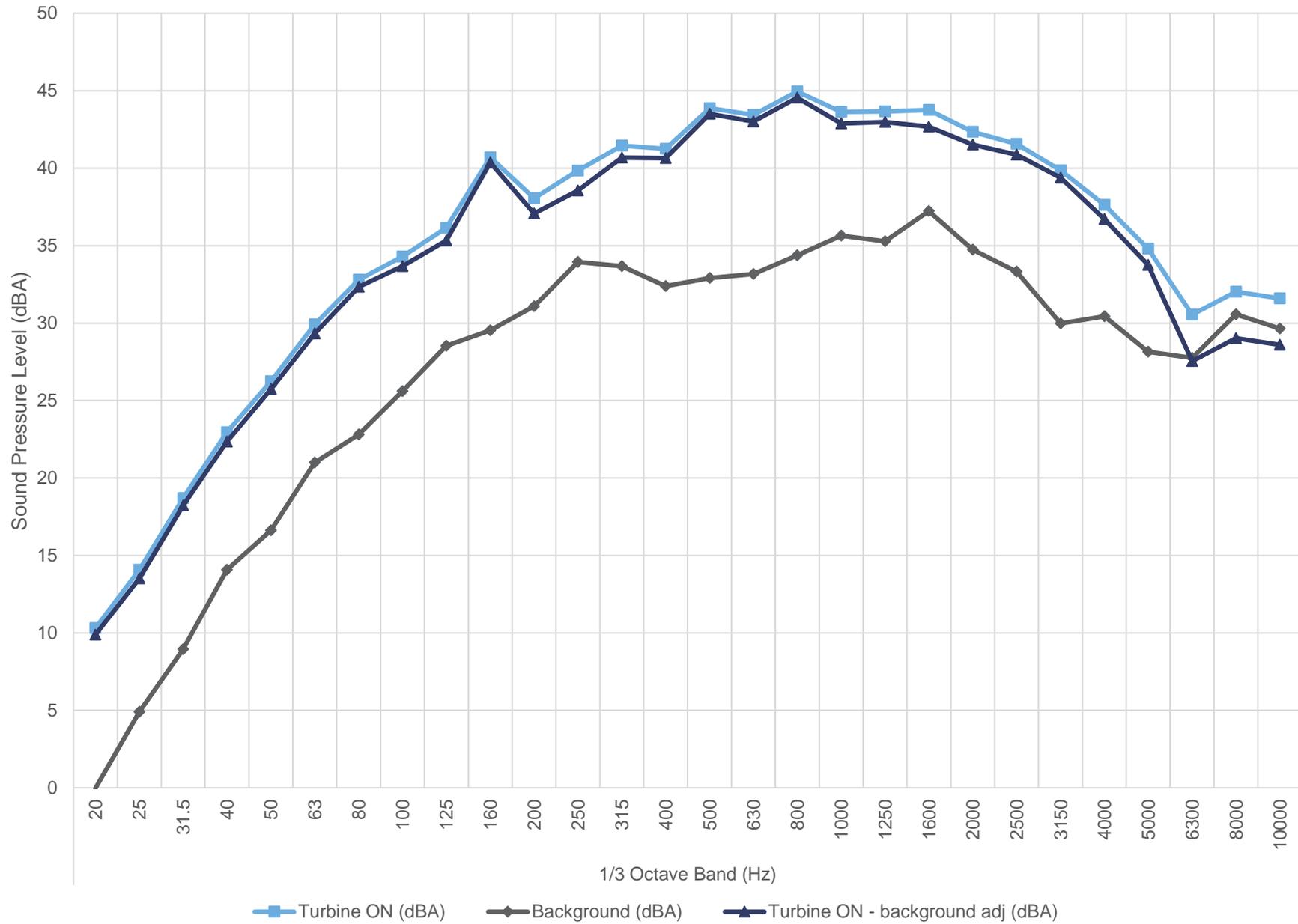
**Figure C.04**

### 8.0 m/s - Hub Height



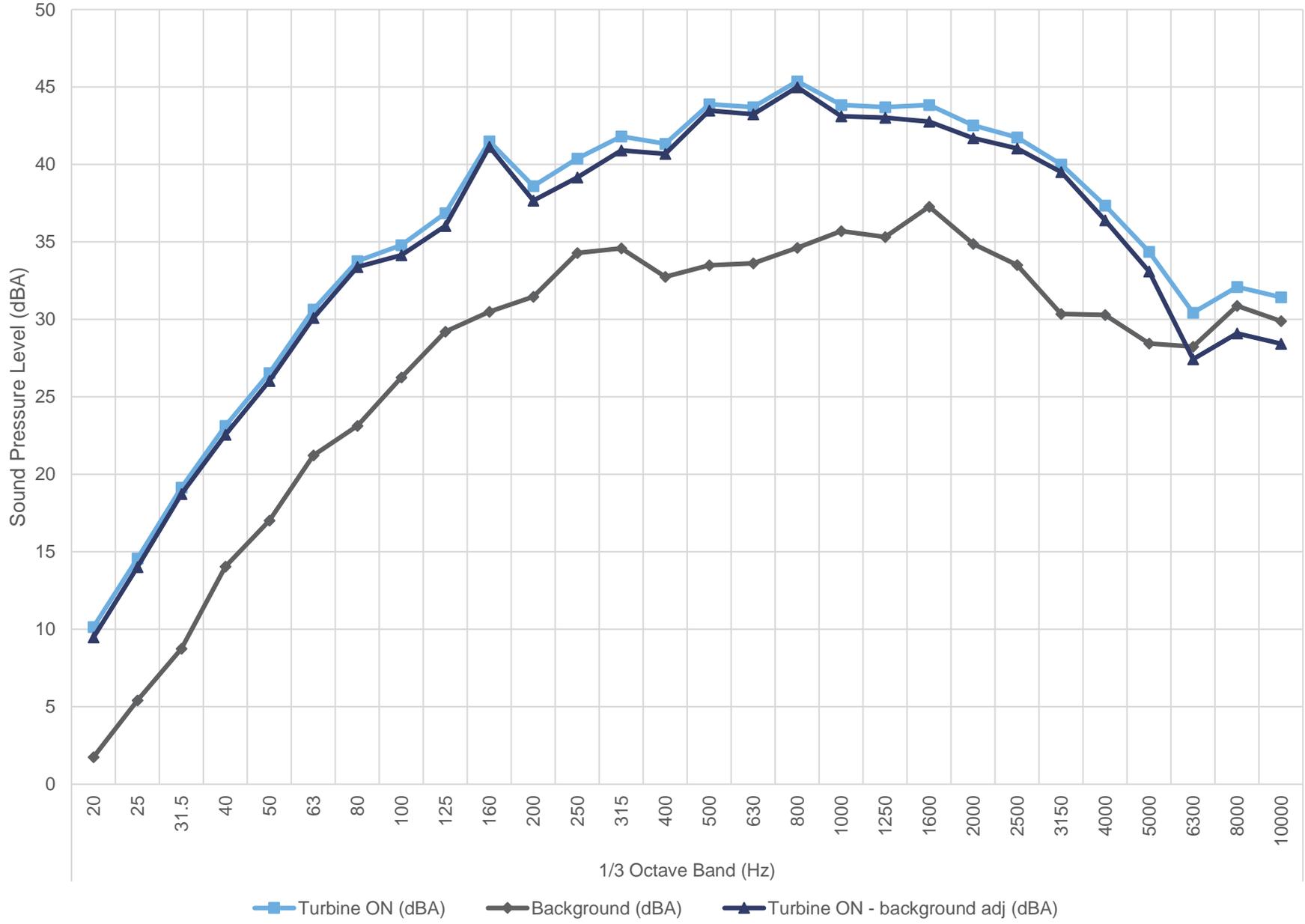
|  |  |  |                    |
|--|--|--|--------------------|
|  | 14000.07.T409.RP1<br>Scale: NTS<br>Drawn by: DAF<br>Reviewed by: DH<br>Date: Nov 2020<br>Revision: 1 | <b>Project Name</b><br>Port Dover and Nanticoke Wind Farm - IEC 61400- 11 Edition 3.0 - Turbine T409 | <b>Figure C.05</b> |
|  | <b>Figure Title</b><br>Plot of sound pressure spectrum at 1/3 Octave at 8.0 m/s                      |  |                    |

### 8.5 m/s - Hub Height



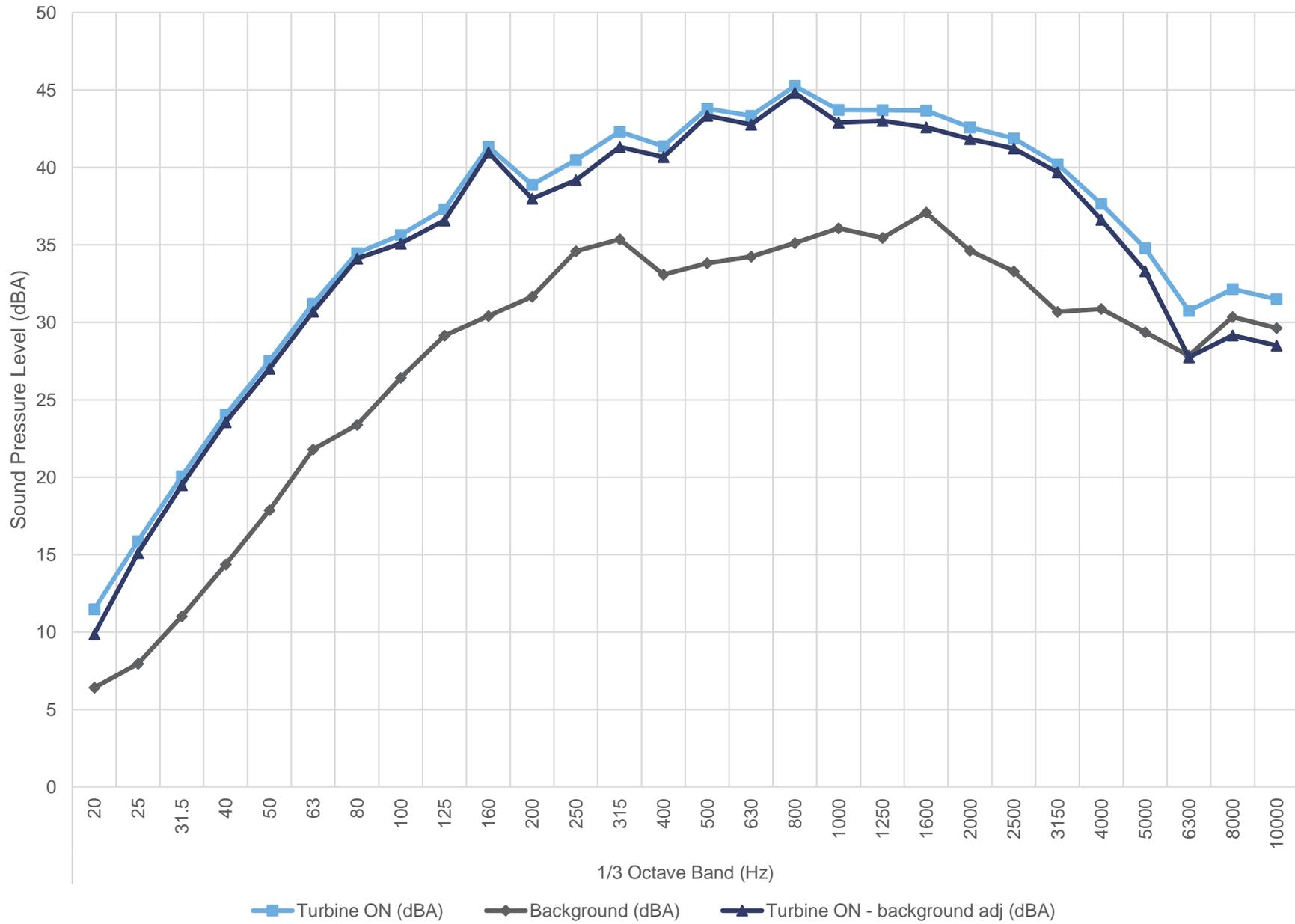
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|  | 14000.07.T409.RP1   | <b>Project Name</b>   | <h2>Figure C.06</h2> |
|  | Scale: NTS<br>Drawn by: DAF<br>Reviewed by: DH<br>Date: Nov 2020<br>Revision: 1 | Port Dover and Nanticoke Wind Farm - IEC 61400- 11 Edition 3.0 - Turbine T409   |                      |
|  |   | <b>Figure Title</b><br>Plot of sound pressure spectrum at 1/3 Octave at 8.5 m/s |                      |

### 9.0 m/s - Hub Height



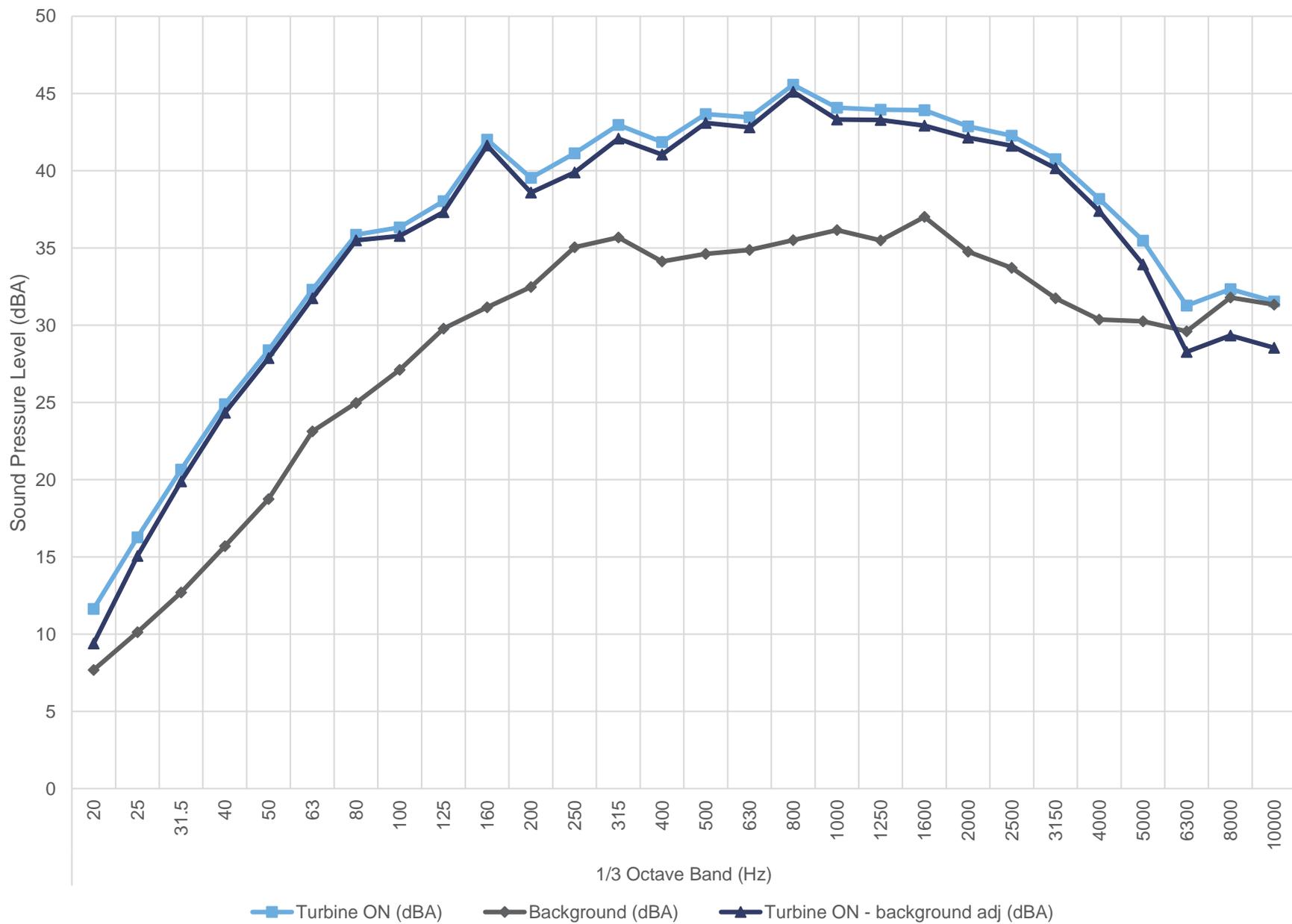
|  |   |   |                      |
|--|---|---|----------------------|
|  | 14000.07.T409.RP1   | <b>Project Name</b>   | <h2>Figure C.07</h2> |
|  | Scale: NTS<br>Drawn by: DAF<br>Reviewed by: DH<br>Date: Nov 2020<br>Revision: 1 | Port Dover and Nanticoke Wind Farm - IEC 61400- 11 Edition 3.0 - Turbine T409 |                      |
|  | <b>Figure Title</b>   |   |                      |
|  |   | Plot of sound pressure spectrum at 1/3 Octave at 9.0 m/s                      |                      |

### 9.5 m/s - Hub Height



|  |   |   |                      |
|--|---|---|----------------------|
|  | 14000.07.T409.RP1   | <b>Project Name</b>   | <h2>Figure C.08</h2> |
|  | Scale: NTS<br>Drawn by: DAF<br>Reviewed by: DH<br>Date: Nov 2020<br>Revision: 1 | Port Dover and Nanticoke Wind Farm - IEC 61400- 11 Edition 3.0 - Turbine T409   |                      |
|  |   | <b>Figure Title</b><br>Plot of sound pressure spectrum at 1/3 Octave at 9.5 m/s |                      |

### 10.0 m/s - Hub Height



14000.07.T409.RP1

Scale: NTS  
 Drawn by: DAF  
 Reviewed by: DH  
 Date: Nov 2020  
 Revision: 1

**Project Name**

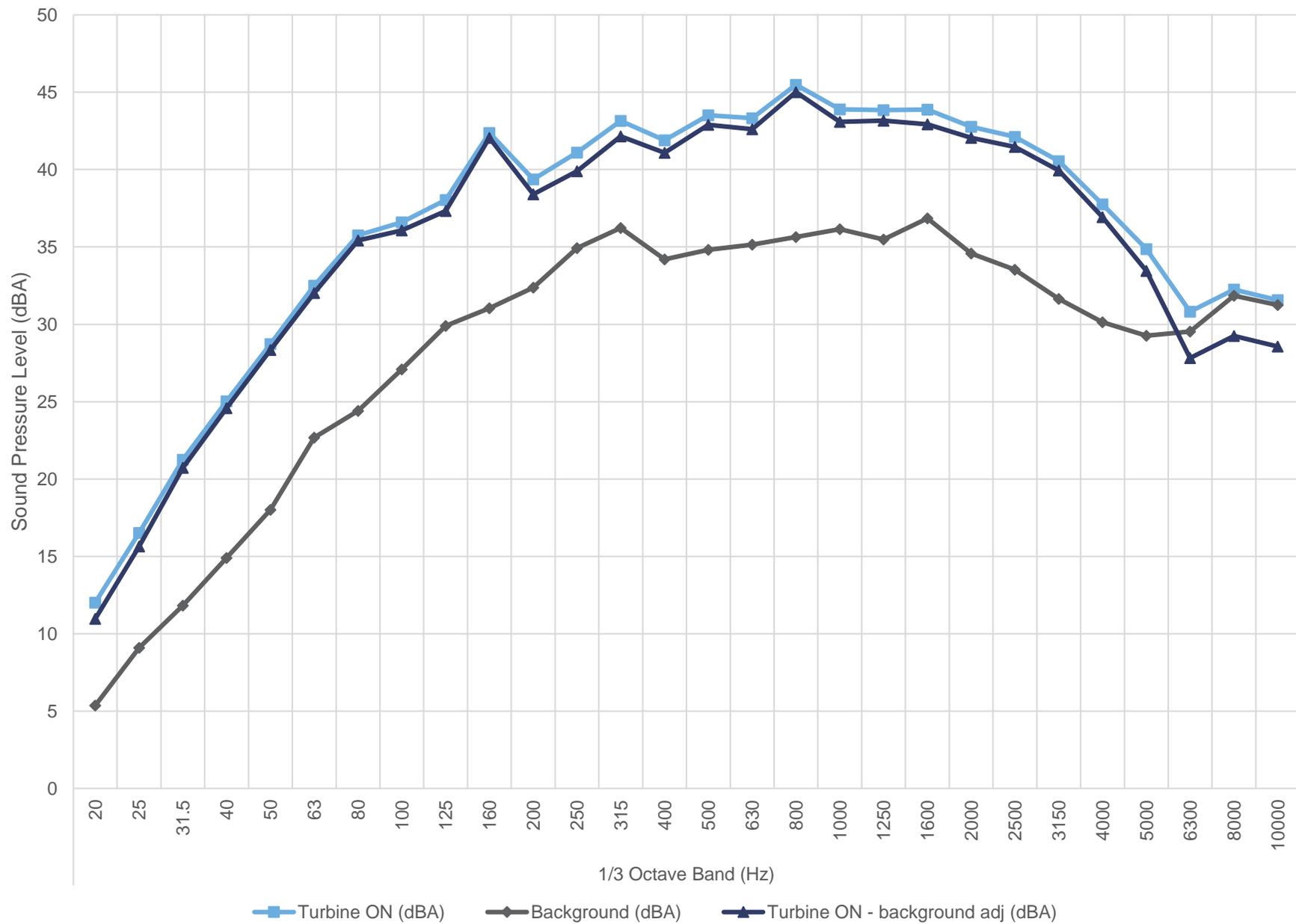
Port Dover and Nanticoke Wind Farm - IEC 61400- 11 Edition 3.0 - Turbine T409

**Figure Title**

Plot of sound pressure spectrum at 1/3 Octave at 10.0 m/s

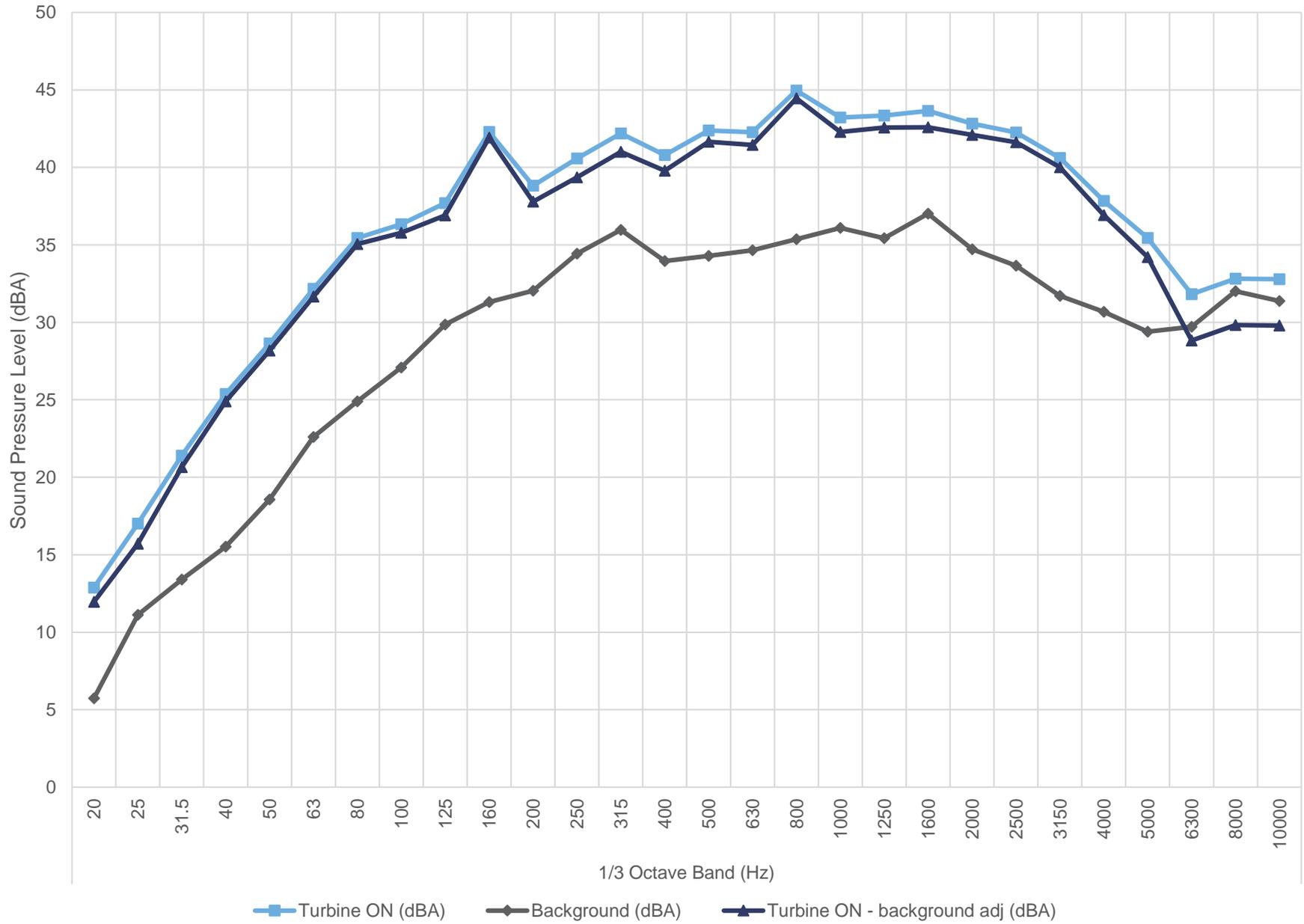
**Figure C.09**

### 10.5 m/s - Hub Height



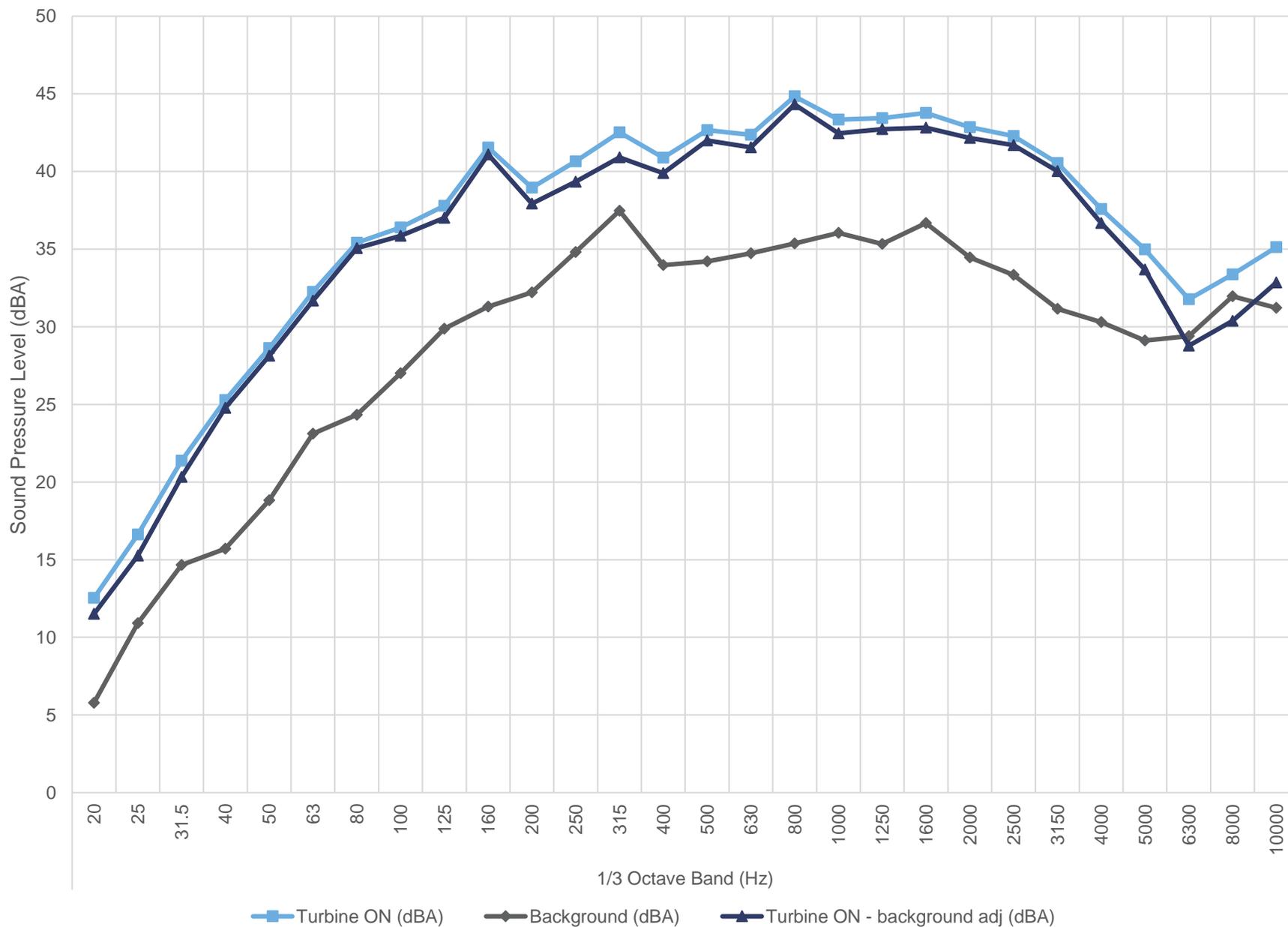
|  |   |  |  |                    |
|--|---|--|--|--------------------|
|  | 14000.07.T409.RP1   | <b>Project Name</b><br>Port Dover and Nanticoke Wind Farm - IEC 61400- 11 Edition 3.0 - Turbine T409 | <b>Figure Title</b><br>Plot of sound pressure spectrum at 1/3 Octave at 10.5 m/s | <b>Figure C.10</b> |
|  | Scale: NTS<br>Drawn by: DAF<br>Reviewed by: DH<br>Date: Nov 2020<br>Revision: 1 | <b>Figure Title</b><br>Plot of sound pressure spectrum at 1/3 Octave at 10.5 m/s                     |  |                    |

# 11.0 m/s - Hub Height



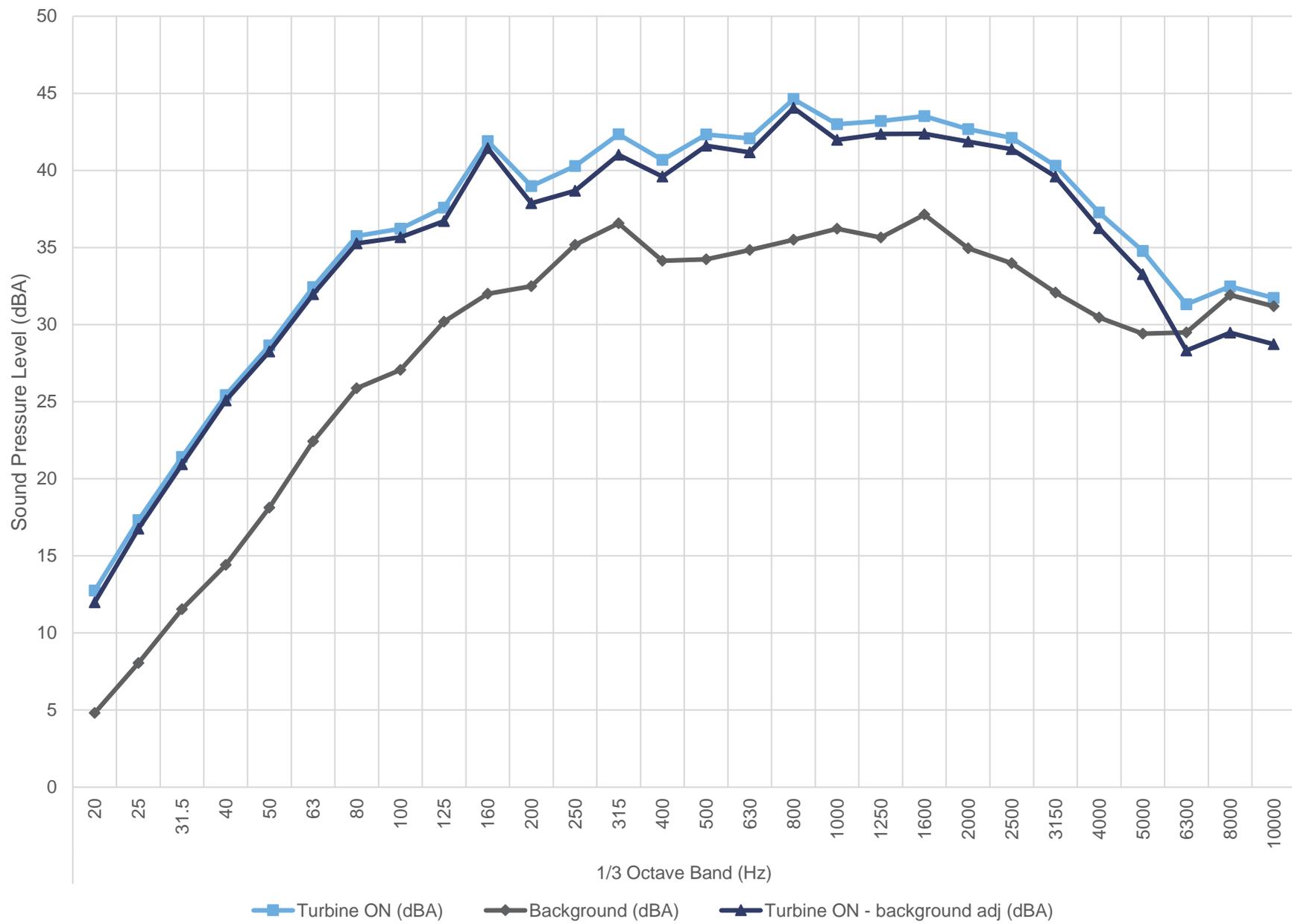
|  |   |  |                      |
|--|---|--|----------------------|
|  | 14000.07.T409.RP1   | <b>Project Name</b><br>Port Dover and Nanticoke Wind Farm - IEC 61400- 11 Edition 3.0 - Turbine T409 | <h2>Figure C.11</h2> |
|  | Scale: NTS<br>Drawn by: DAF<br>Reviewed by: DH<br>Date: Nov 2020<br>Revision: 1 | <b>Figure Title</b><br>Plot of sound pressure spectrum at 1/3 Octave at 11.0 m/s                     |                      |

### 11.5 m/s - Hub Height



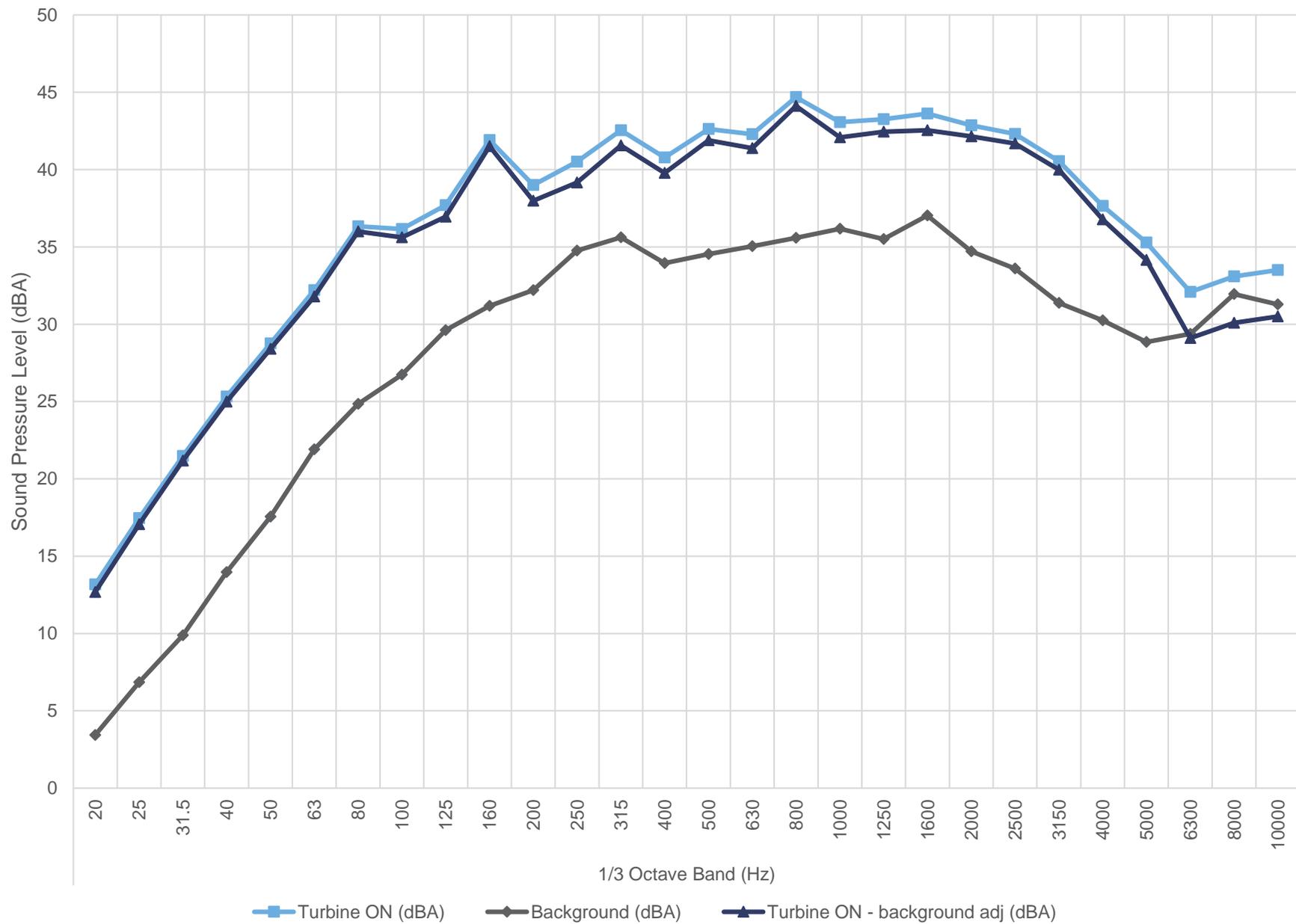
|  |   |  |                      |
|--|---|--|----------------------|
|  | 14000.07.T409.RP1   | <b>Project Name</b><br>Port Dover and Nanticoke Wind Farm - IEC 61400- 11 Edition 3.0 - Turbine T409 | <h2>Figure C.12</h2> |
|  | Scale: NTS<br>Drawn by: DAF<br>Reviewed by: DH<br>Date: Nov 2020<br>Revision: 1 | <b>Figure Title</b><br>Plot of sound pressure spectrum at 1/3 Octave at 11.5 m/s                     |                      |

### 12.0 m/s - Hub Height



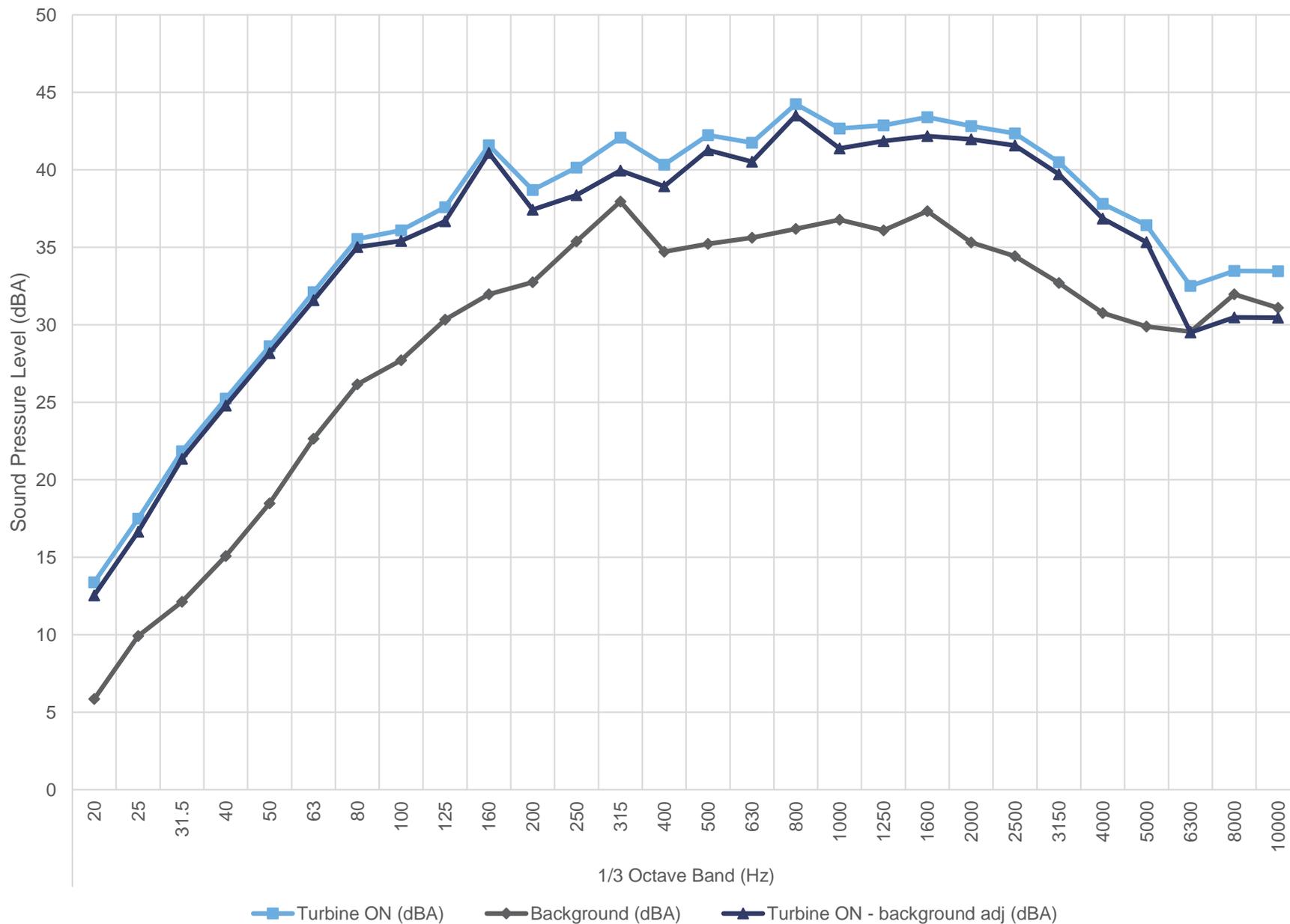
|  |  |  |                    |
|--|--|--|--------------------|
|  | 14000.07.T409.RP1<br>Scale: NTS<br>Drawn by: DAF<br>Reviewed by: DH<br>Date: Nov 2020<br>Revision: 1 | <b>Project Name</b><br>Port Dover and Nanticoke Wind Farm - IEC 61400- 11 Edition 3.0 - Turbine T409 | <b>Figure C.13</b> |
|  | <b>Figure Title</b><br>Plot of sound pressure spectrum at 1/3 Octave at 12.0 m/s                     |  |                    |

### 12.5 m/s - Hub Height



|  |   |   |                     |                    |
|--|---|---|---------------------|--------------------|
|  | 14000.07.T409.RP1   | <b>Project Name</b>   | <b>Figure Title</b> | <b>Figure C.14</b> |
|  | Scale: NTS<br>Drawn by: DAF<br>Reviewed by: DH<br>Date: Nov 2020<br>Revision: 1 | Port Dover and Nanticoke Wind Farm - IEC 61400- 11 Edition 3.0 - Turbine T409 |                     |                    |

### 13.0 m/s - Hub Height



|  |  |  |                    |
|--|--|--|--------------------|
|  | 14000.07.T409.RP1<br>Scale: NTS<br>Drawn by: DAF<br>Reviewed by: DH<br>Date: Nov 2020<br>Revision: 1 | <b>Project Name</b><br>Port Dover and Nanticoke Wind Farm - IEC 61400- 11 Edition 3.0 - Turbine T409 | <b>Figure C.15</b> |
|  | <b>Figure Title</b><br>Plot of sound pressure spectrum at 1/3 Octave at 13.0 m/s                     |  |                    |

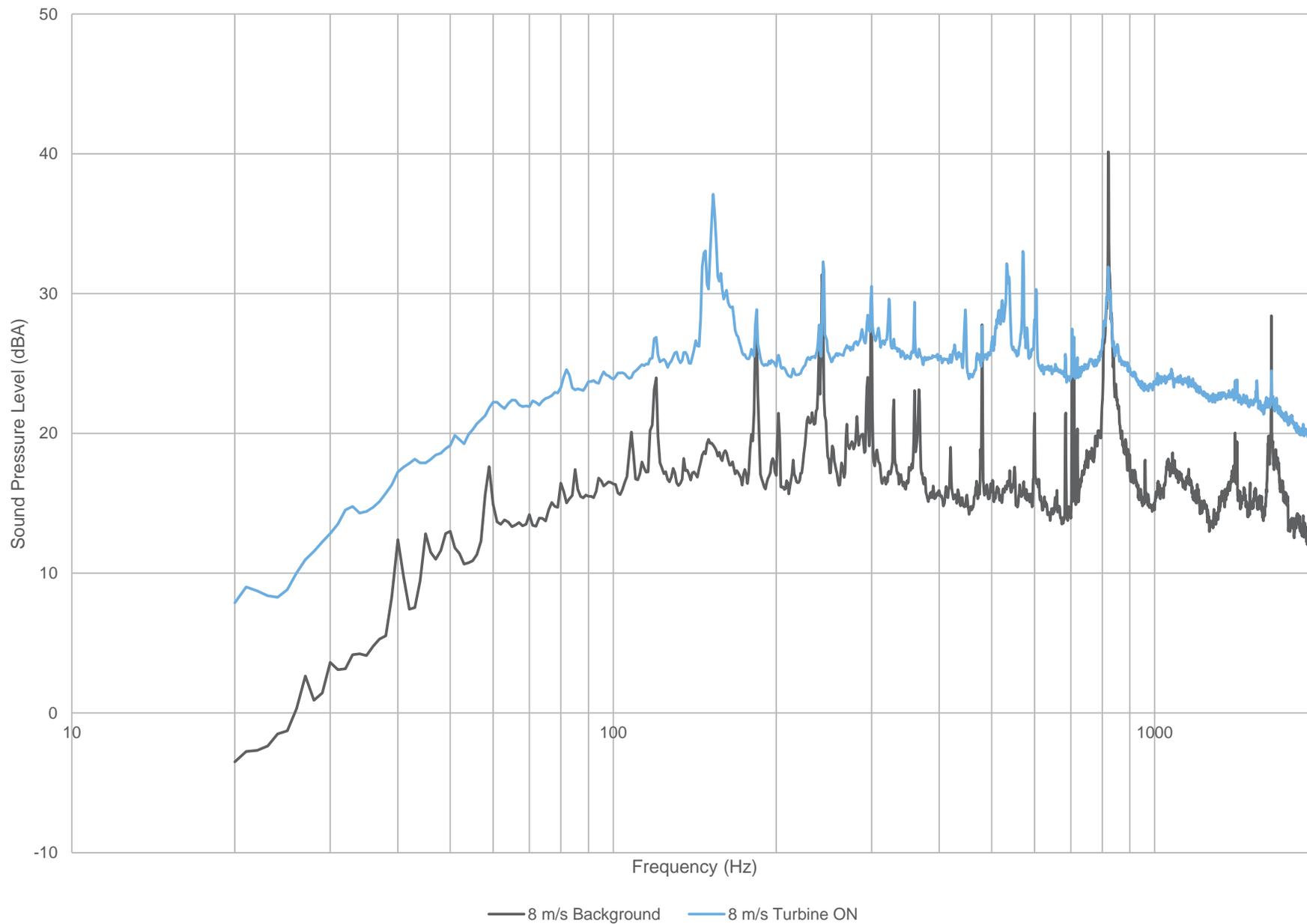
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## Appendix D

### Tonality Assessment

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8 m/s



14000.07.T409.RP1

Scale: NTS  
Drawn by: DAF  
Reviewed by: DH  
Date: Nov 2020  
Revision: 1

**Project Name**

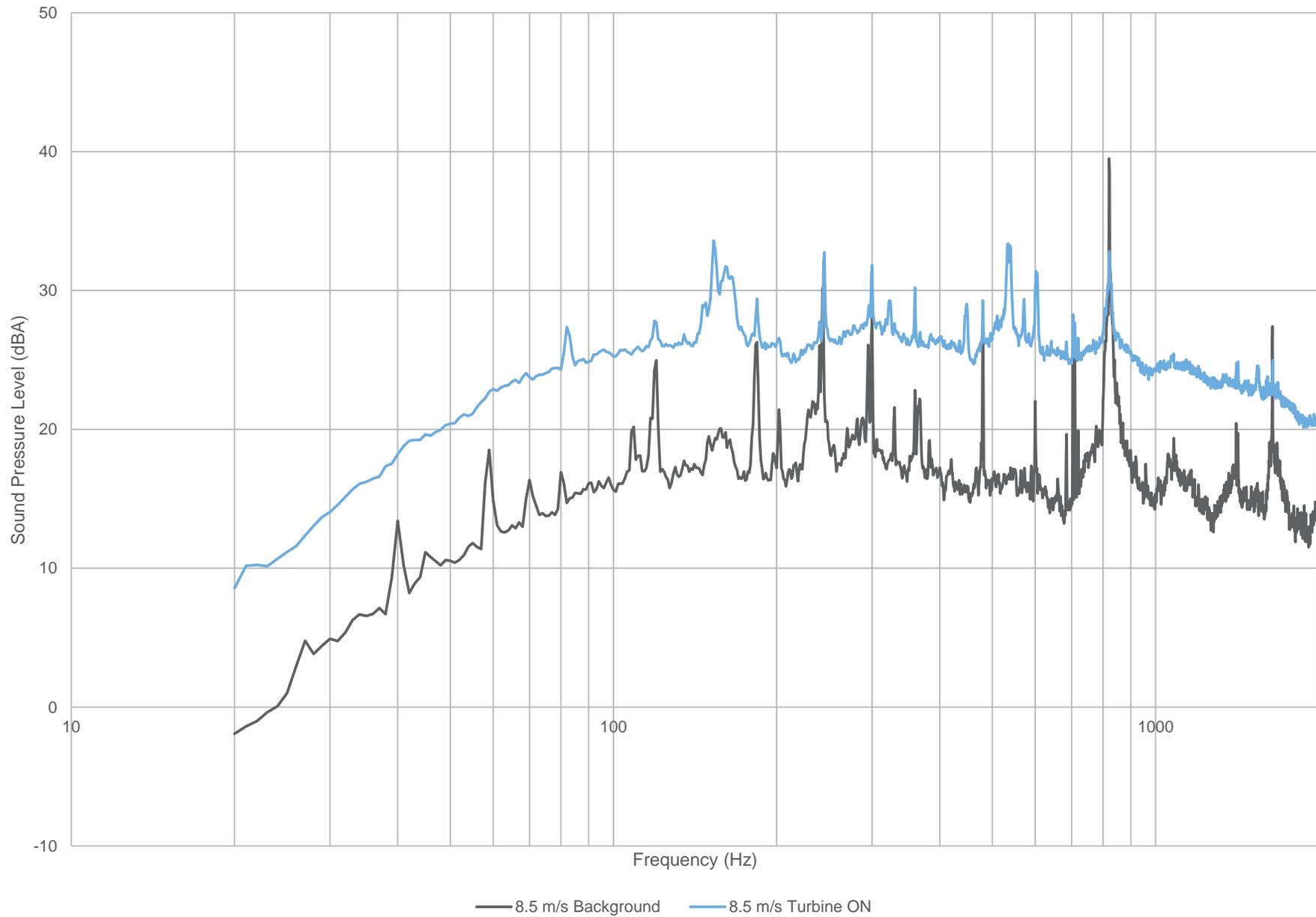
Port Dover and Nanticoke Wind Farm - IEC 61400- 11 Edition 3.0 - Turbine T409

**Figure Title**

Plot of narrow band spectra - Turbine ON vs. Background at 8.0 m/s

**Figure D.01**

8.5 m/s



14000.07.T409.RP1

Scale: NTS  
Drawn by: DAF  
Reviewed by: DH  
Date: Nov 2020  
Revision: 1

**Project Name**

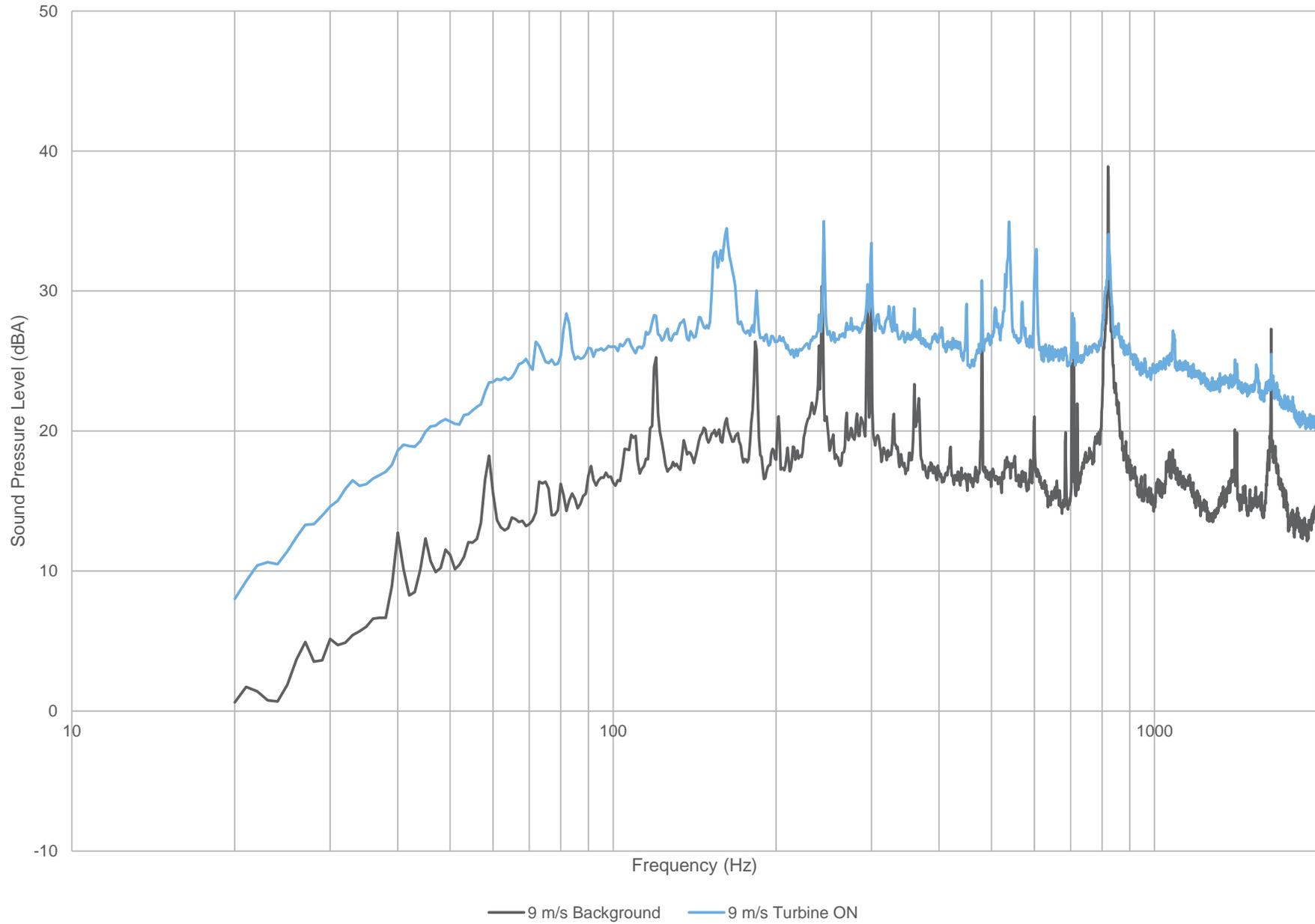
Port Dover and Nanticoke Wind Farm - IEC 61400- 11 Edition 3.0 - Turbine T409

**Figure Title**

Plot of narrow band spectra - Turbine ON vs. Background at 8.5 m/s

**Figure D.02**

9 m/s



14000.07.T409.RP1

**Project Name**

Scale: NTS  
Drawn by: DAF  
Reviewed by: DH  
Date: Nov 2020  
Revision: 1

Port Dover and Nanticoke Wind Farm - IEC 61400- 11 Edition 3.0 - Turbine T409

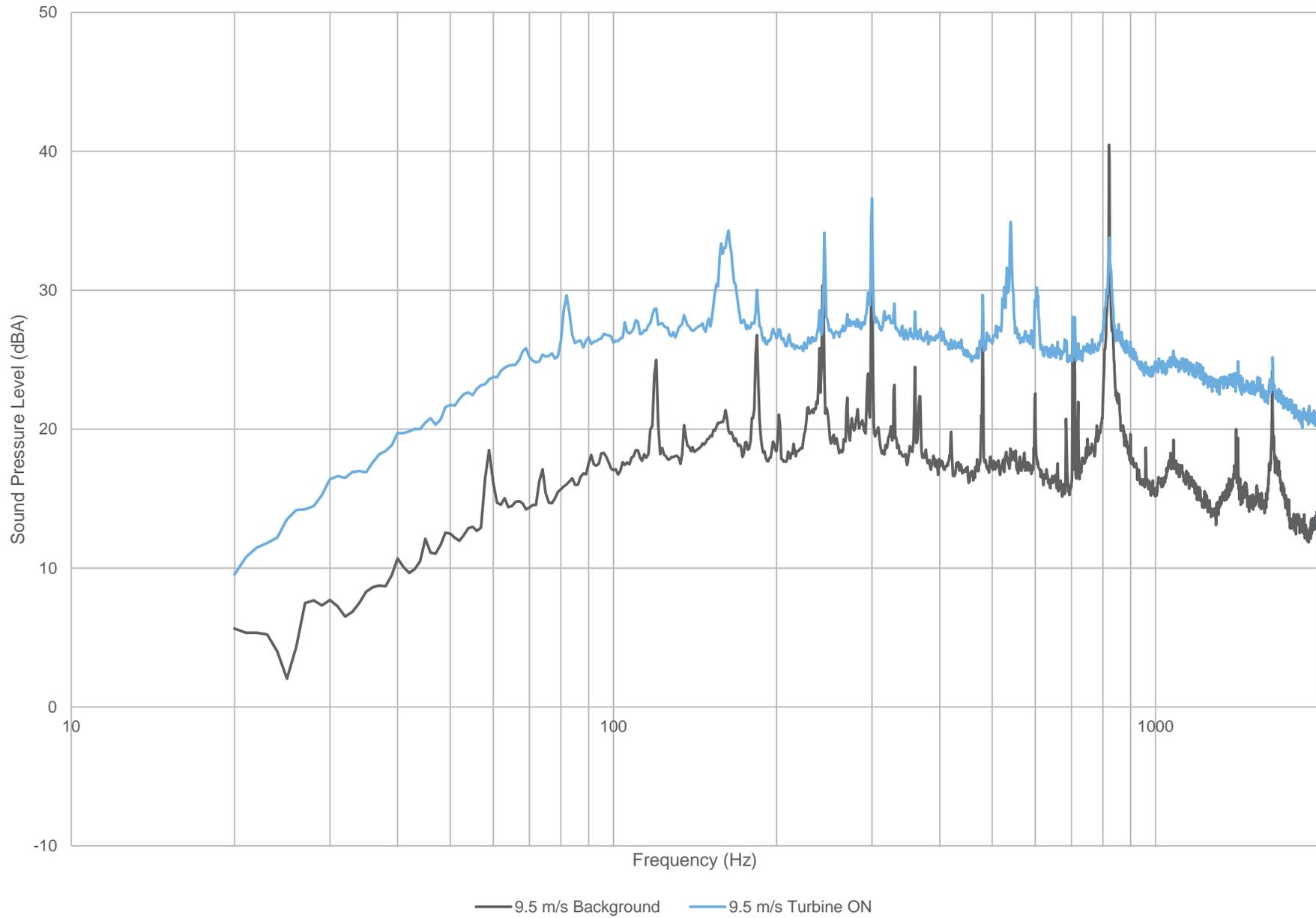
**Figure Title**

Plot of narrow band spectra - Turbine ON vs. Background at 9.0 m/s



**Figure D.03**

9.5 m/s



14000.07.T409.RP1

**Project Name**

Scale: NTS  
Drawn by: DAF  
Reviewed by: DH  
Date: Nov 2020  
Revision: 1

Port Dover and Nanticoke Wind Farm - IEC 61400- 11 Edition 3.0 - Turbine T409

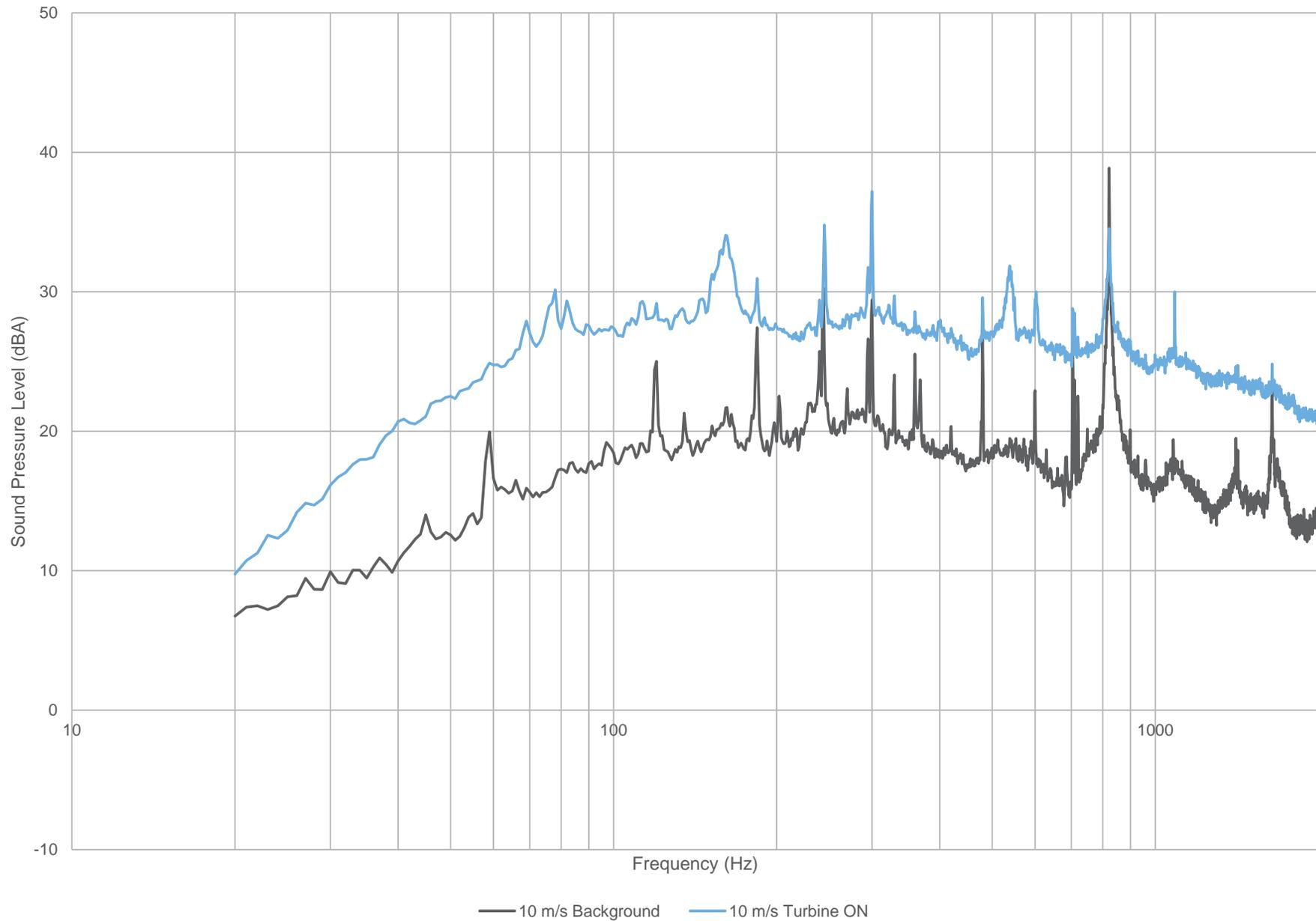
**Figure Title**

Plot of narrow band spectra - Turbine ON vs. Background at 9.5 m/s



**Figure D.04**

10 m/s



14000.07.T409.RP1

Scale: NTS  
Drawn by: DAF  
Reviewed by: DH  
Date: Nov 2020  
Revision: 1

**Project Name**

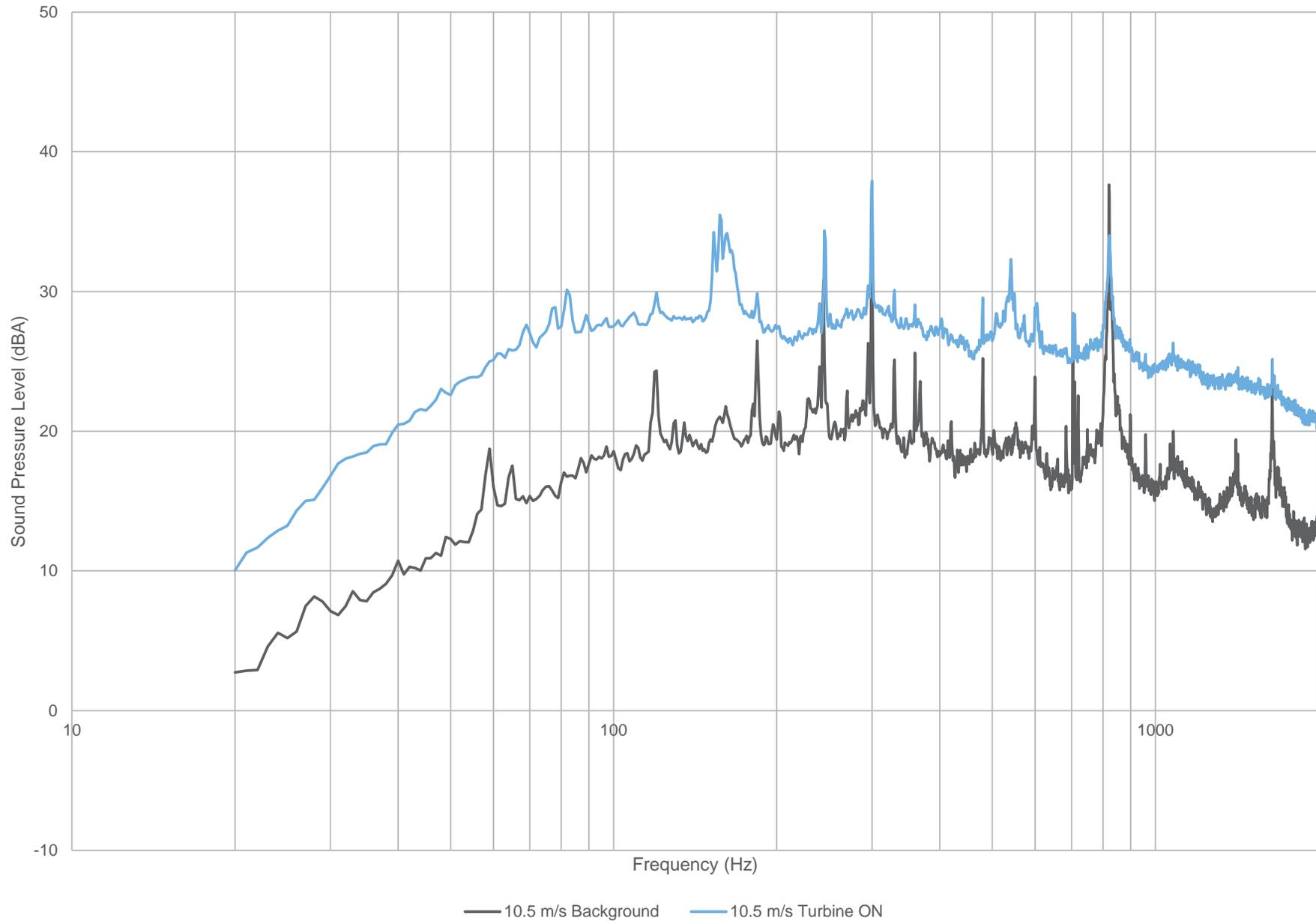
Port Dover and Nanticoke Wind Farm - IEC 61400- 11 Edition 3.0 - Turbine T409

**Figure Title**

Plot of narrow band spectra - Turbine ON vs. Background at 10.0 m/s

**Figure D.05**

10.5 m/s



14000.07.T409.RP1

Scale: NTS  
Drawn by: DAF  
Reviewed by: DH  
Date: Nov 2020  
Revision: 1

**Project Name**

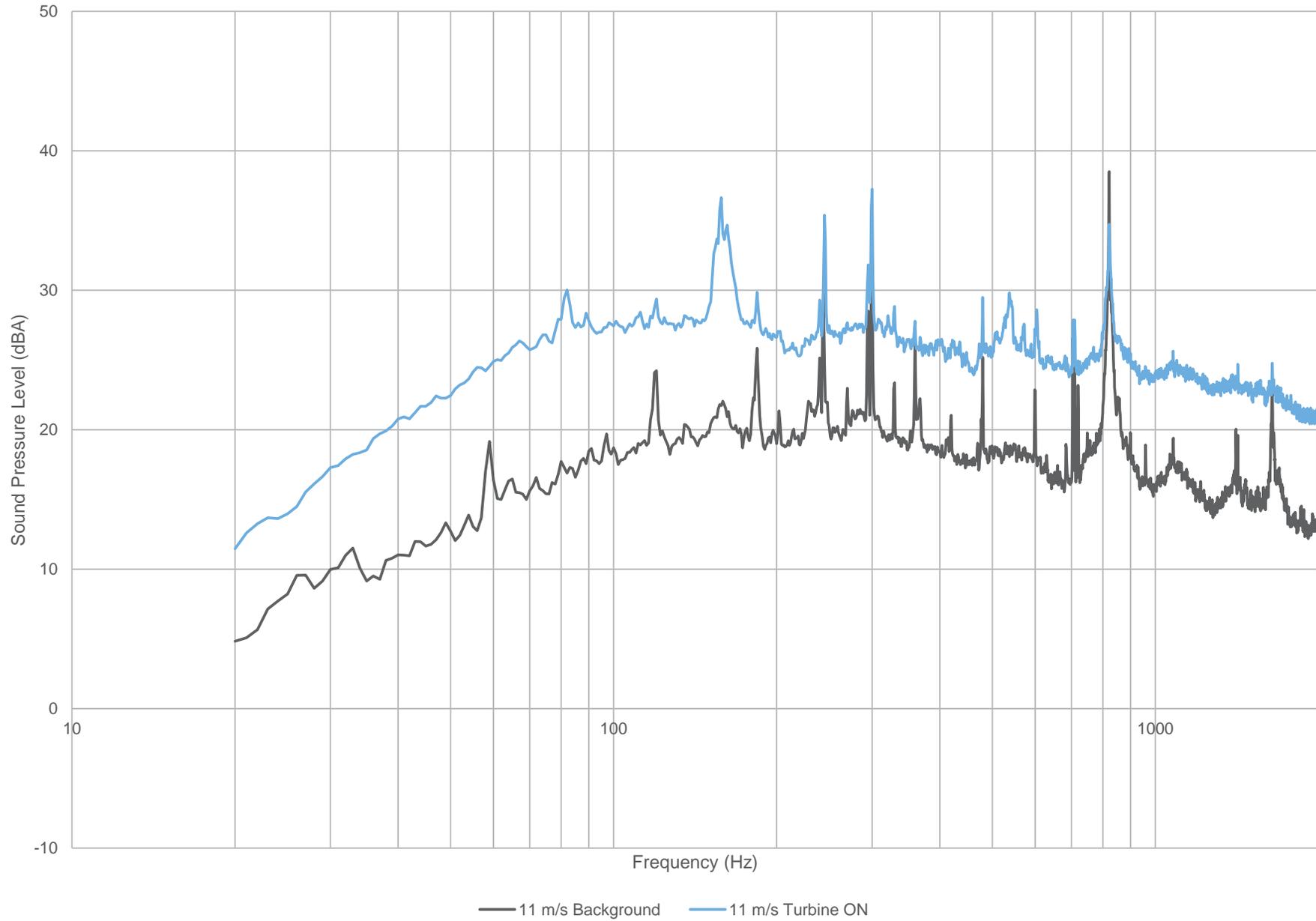
Port Dover and Nanticoke Wind Farm - IEC 61400- 11 Edition 3.0 - Turbine T409

**Figure Title**

Plot of narrow band spectra - Turbine ON vs. Background at 10.5 m/s

**Figure D.06**

11 m/s



14000.07.T409.RP1  
Scale: NTS  
Drawn by: DAF  
Reviewed by: DH  
Date: Nov 2020  
Revision: 1

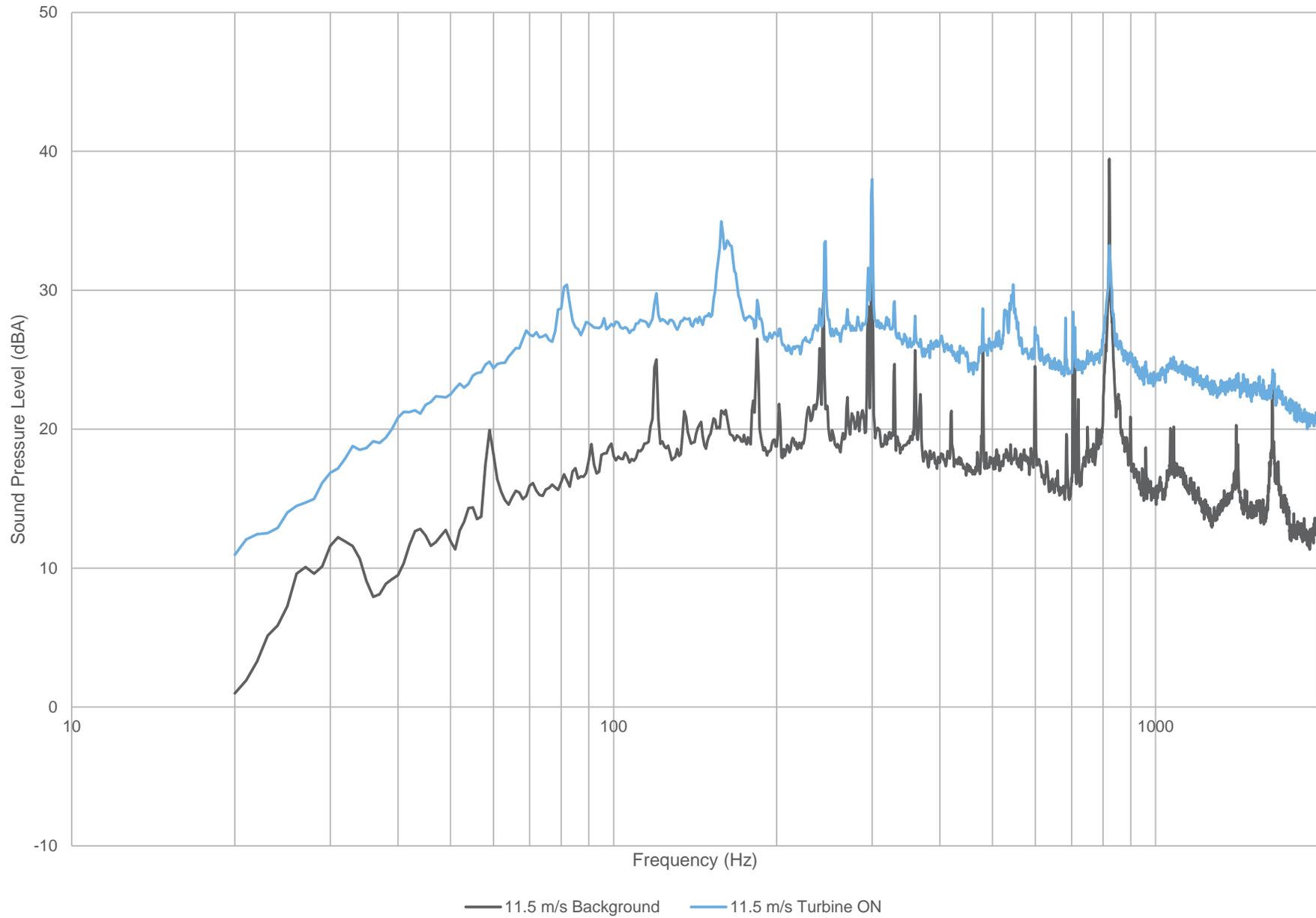
**Project Name**  
Port Dover and Nanticoke Wind Farm - IEC 61400- 11 Edition 3.0 - Turbine T409

**Figure Title**  
Plot of narrow band spectra - Turbine ON vs. Background at 11.0 m/s



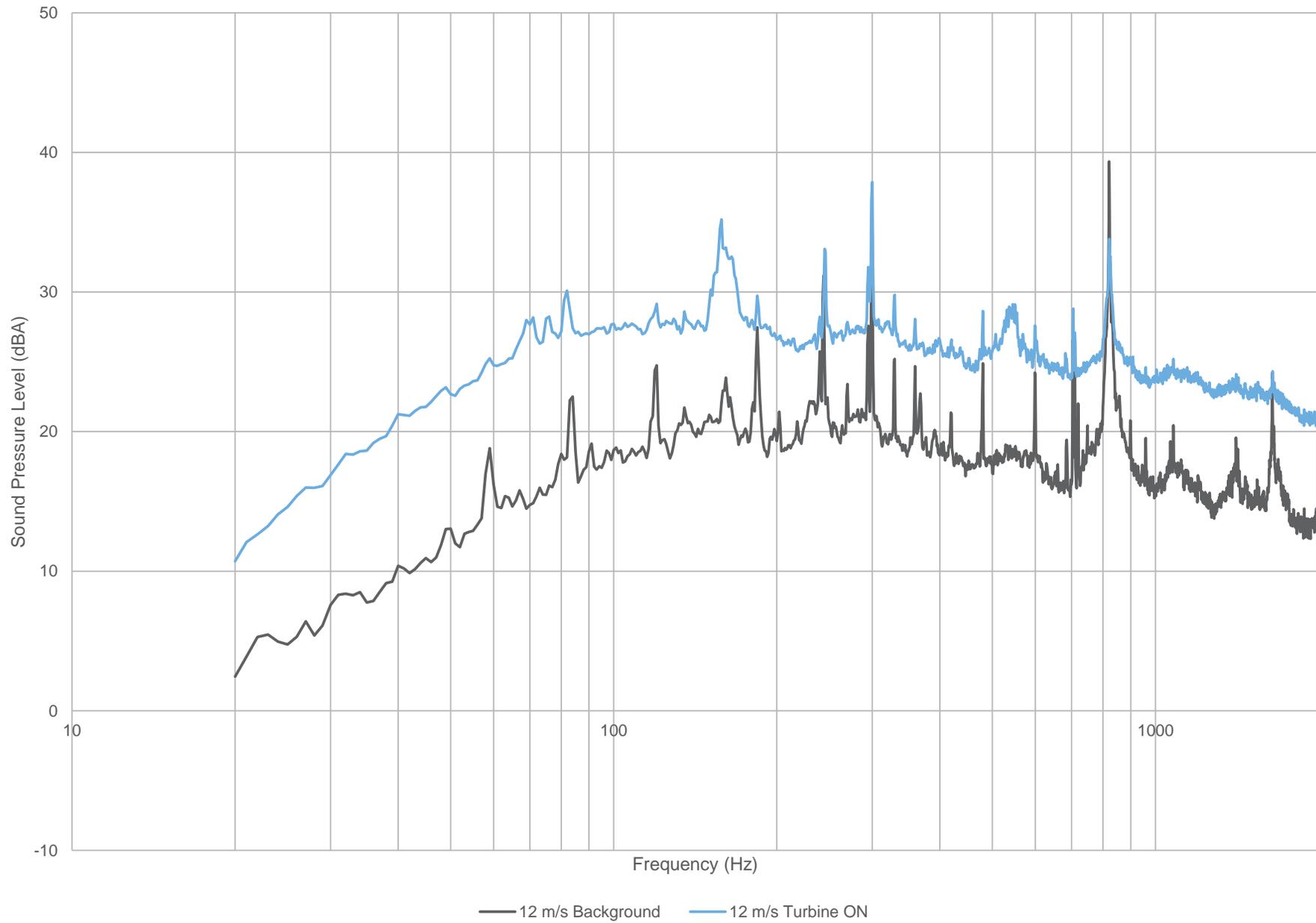
**Figure D.07**

11.5 m/s



|  |   |   |
|--|---|---|
|  | 14000.07.T409.RP1   | <b>Project Name</b>   |
|  | Scale: NTS<br>Drawn by: DAF<br>Reviewed by: DH<br>Date: Nov 2020<br>Revision: 1 | Port Dover and Nanticoke Wind Farm - IEC 61400- 11 Edition 3.0 - Turbine T409 |
|  |   | <b>Figure Title</b>   |
|  |   | Plot of narrow band spectra - Turbine ON vs. Background at 11.5 m/s           |
|  |   | <b>Figure D.08</b>  |

12 m/s



14000.07.T409.RP1

Scale: NTS  
Drawn by: DAF  
Reviewed by: DH  
Date: Nov 2020  
Revision: 1

**Project Name**

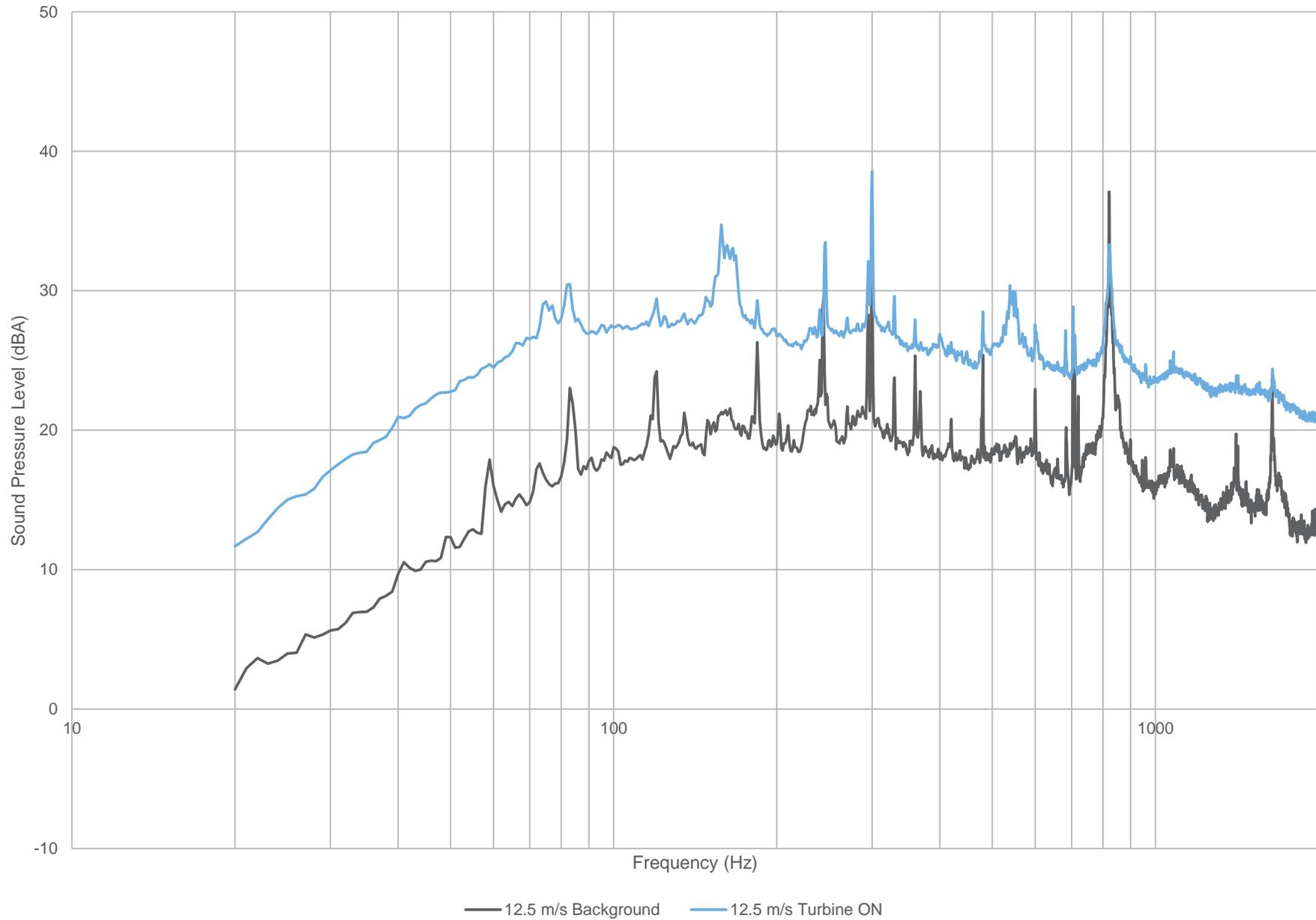
Port Dover and Nanticoke Wind Farm - IEC 61400- 11 Edition 3.0 - Turbine T409

**Figure Title**

Plot of narrow band spectra - Turbine ON vs. Background at 12.0 m/s

**Figure D.09**

12.5 m/s



14000.07.T409.RP1

**Project Name**

Scale: NTS  
Drawn by: DAF  
Reviewed by: DH  
Date: Nov 2020  
Revision: 1

Port Dover and Nanticoke Wind Farm - IEC 61400- 11 Edition 3.0 - Turbine T409

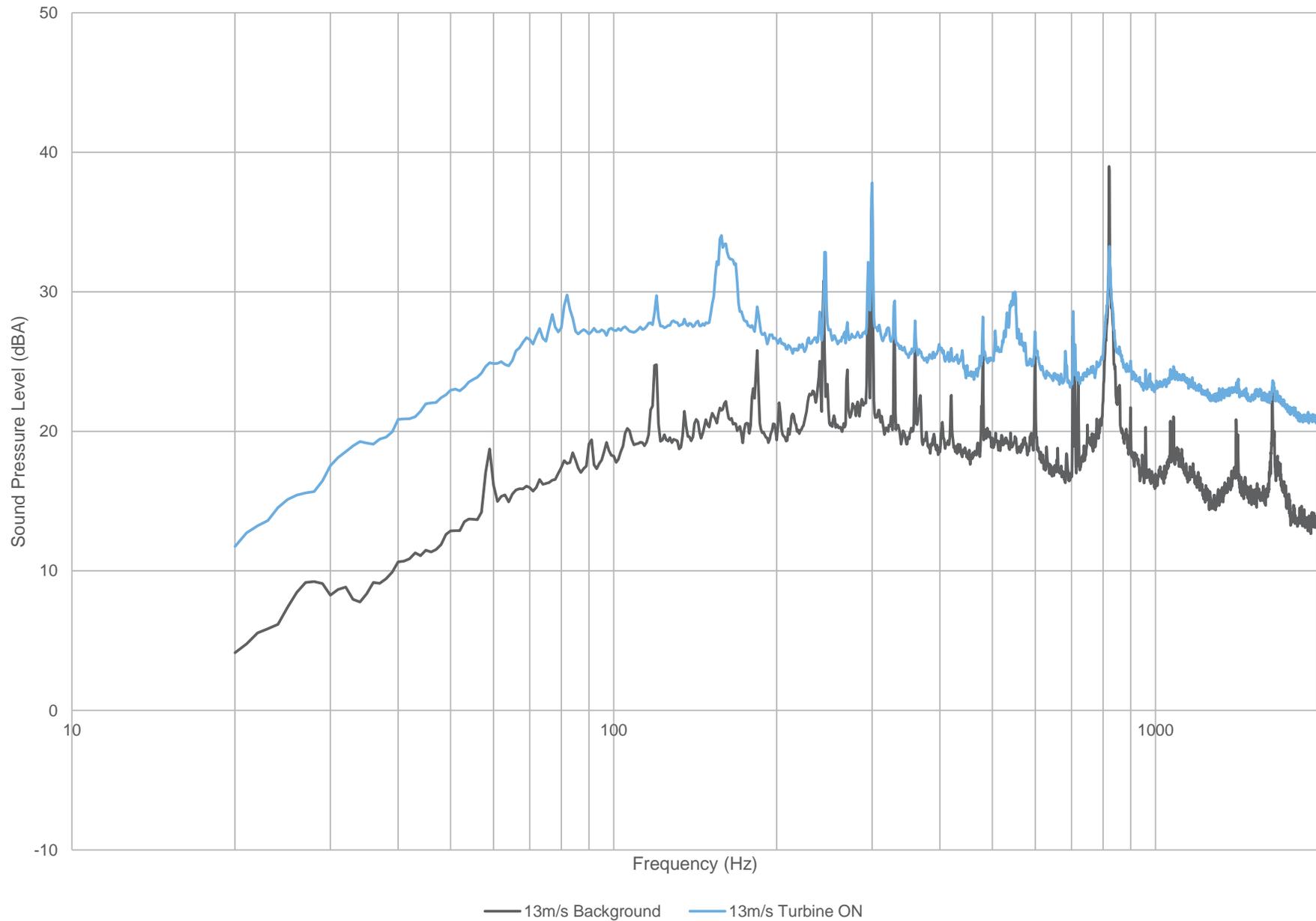
**Figure Title**

Plot of narrow band spectra - Turbine ON vs. Background at 12.5 m/s



**Figure D.10**

13 m/s



14000.07.T409.RP1

**Project Name**

Port Dover and Nanticoke Wind Farm - IEC 61400- 11 Edition 3.0 - Turbine T409

**Figure Title**

Plot of narrow band spectra - Turbine ON vs. Background at 13.0 m/s



Scale: NTS  
Drawn by: DAF  
Reviewed by: DH  
Date: Nov 2020  
Revision: 1

**Figure D.11**

# Table D.01 Tonality Assessment Table - 8 m/s

Project: Port Dover and Nanticoke Wind Farm - IEC 61400- 11 Edition 3.0 - Turbine T409

Report ID: 14000.07.T409.RP1

| 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) |
|---------------|-----------------------|--|-----------------|--|--------------------|-----------------|--------------------------------|---|-----------------------|
| 759           | 137                   |  |                 | 23.7                                     | 42.0               | 31.9            | -10.2                          | -2.0  | -8.2                  |
| 687           | 142                   |  |                 | 25.0                                     | 43.3               | 38.7            | -4.6                           | -2.0  | -2.6                  |
| 815           | 146                   |  |                 | 25.2                                     | 43.5               | 36.6            | -6.9                           | -2.0  | -4.9                  |
| 738           | 147                   |  |                 | 25.5                                     | 43.8               | 48.7            | 4.9                            | -2.0  | 6.9                   |
| 781           | 147                   |  |                 | 25.3                                     | 43.6               | 47.6            | 4.0                            | -2.0  | 6.0                   |
| 780           | 151                   |  |                 | 25.0                                     | 43.3               | 48.0            | 4.7                            | -2.0  | 6.7                   |
| 772           | 153                   |  |                 | 26.3                                     | 44.6               | 45.0            | 0.4                            | -2.0  | 2.4                   |
| 841           | 153                   |  |                 | 25.7                                     | 44.0               | 46.1            | 2.1                            | -2.0  | 4.1                   |
| 779           | 153                   |  |                 | 26.7                                     | 45.0               | 46.8            | 1.8                            | -2.0  | 3.9                   |
| 748           | 153                   |  |                 | 27.2                                     | 45.5               | 47.6            | 2.1                            | -2.0  | 4.2                   |
| 849           | 153                   |  |                 | 26.3                                     | 44.6               | 50.8            | 6.2                            | -2.0  | 8.2                   |
| 739           | 153                   |  |                 | 27.0                                     | 45.3               | 46.9            | 1.6                            | -2.0  | 3.6                   |
| 650           | 153                   |  |                 | 24.9                                     | 43.2               | 45.7            | 2.5                            | -2.0  | 4.5                   |
| 840           | 153                   |  |                 | 25.6                                     | 43.9               | 48.6            | 4.6                            | -2.0  | 6.6                   |
| 835           | 153                   |  |                 | 26.0                                     | 44.3               | 46.6            | 2.3                            | -2.0  | 4.3                   |
| 842           | 154                   |  |                 | 25.9                                     | 44.2               | 46.8            | 2.6                            | -2.0  | 4.6                   |
| 836           | 155                   |  |                 | 25.2                                     | 43.5               | 42.3            | -1.2                           | -2.0  | 0.9                   |
| 635           | 157                   |  |                 | 24.7                                     | 43.1               | 41.4            | -1.7                           | -2.0  | 0.3                   |
| 365           | 157                   |  |                 | 26.3                                     | 44.6               | 42.0            | -2.6                           | -2.0  | -0.6                  |
| 691           | 158                   |  |                 | 27.2                                     | 45.5               | 36.5            | -9.0                           | -2.0  | -7.0                  |
| 761           | 158                   |  |                 | 25.8                                     | 44.1               | 40.4            | -3.7                           | -2.0  | -1.7                  |
| 592           | 158                   |  |                 | 25.5                                     | 43.9               | 36.0            | -7.8                           | -2.0  | -5.8                  |
| 778           | 158                   |  |                 | 25.7                                     | 44.0               | 40.0            | -4.0                           | -2.0  | -2.0                  |
| 777           | 159                   |  |                 | 25.7                                     | 44.0               | 37.7            | -6.4                           | -2.0  | -4.4                  |
| 817           | 159                   |  |                 | 25.2                                     | 43.5               | 38.9            | -4.6                           | -2.0  | -2.6                  |
| 637           | 160                   |  |                 | 24.9                                     | 43.2               | 32.0            | -11.2                          | -2.0  | -9.2                  |
| 677           | 161                   |  |                 | 24.5                                     | 42.8               | 34.1            | -8.7                           | -2.0  | -6.7                  |
| 534           | 162                   |  |                 | 25.8                                     | 44.1               | 35.8            | -8.2                           | -2.0  | -6.2                  |
| 546           | 162                   |  |                 | 25.4                                     | 43.7               | 34.6            | -9.1                           | -2.0  | -7.1                  |
| 548           | 162                   |  |                 | 24.7                                     | 43.1               | 31.7            | -11.3                          | -2.0  | -9.3                  |
| 545           | 162                   |  |                 | 24.9                                     | 43.2               | 35.4            | -7.9                           | -2.0  | -5.8                  |
| 539           | 162                   |  |                 | 25.4                                     | 43.7               | 33.5            | -10.2                          | -2.0  | -8.2                  |
| 536           | 162                   |  |                 | 25.5                                     | 43.8               | 33.8            | -10.1                          | -2.0  | -8.1                  |
| 537           | 162                   |  |                 | 25.2                                     | 43.5               | 34.0            | -9.5                           | -2.0  | -7.5                  |
| Average       | 155                   |  |                 |  |                    |                 | -0.1                           | -2.0  | 2.0                   |

# Table D.02 Tonality Assessment Table - 8 m/s (2)

Project: Port Dover and Nanticoke Wind Farm - IEC 61400- 11 Edition 3.0 - Turbine T409

Report ID: 14000.07.T409.RP1

| 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) |
|---------------|-----------------------|--|-----------------|--|--------------------|-----------------|--------------------------------|---|-----------------------|
| 537           | 540                   |  |                 | 25.6                                     | 44.6               | 42.7            | -1.9                           | -2.3  | 0.4                   |
| 539           | 540                   |  |                 | 25.9                                     | 44.9               | 36.9            | -8.1                           | -2.3  | -5.7                  |
| 534           | 540                   |  |                 | 25.6                                     | 44.7               | 42.0            | -2.6                           | -2.3  | -0.3                  |
| 636           | 541                   |  |                 | 25.9                                     | 44.9               | 43.6            | -1.3                           | -2.3  | 1.1                   |
| 536           | 541                   |  |                 | 25.8                                     | 44.9               | 40.8            | -4.0                           | -2.3  | -1.7                  |
| 780           | 562                   |  |                 | 25.5                                     | 44.6               | 37.1            | -7.4                           | -2.4  | -5.1                  |
| 842           | 566                   |  |                 | 26.5                                     | 45.6               | 35.8            | -9.8                           | -2.4  | -7.4                  |
| 779           | 570                   |  |                 | 26.2                                     | 45.3               | 45.1            | -0.1                           | -2.4  | 2.3                   |
| 835           | 571                   |  |                 | 24.8                                     | 43.9               | 44.1            | 0.2                            | -2.4  | 2.6                   |
| 748           | 571                   |  |                 | 27.0                                     | 46.1               | 42.8            | -3.3                           | -2.4  | -0.9                  |
| 650           | 571                   |  |                 | 25.9                                     | 45.0               | 39.9            | -5.1                           | -2.4  | -2.7                  |
| 739           | 571                   |  |                 | 26.9                                     | 46.0               | 45.3            | -0.8                           | -2.4  | 1.6                   |
| 772           | 571                   |  |                 | 28.9                                     | 48.0               | 40.6            | -7.3                           | -2.4  | -5.0                  |
| 841           | 572                   |  |                 | 25.5                                     | 44.7               | 45.1            | 0.5                            | -2.4  | 2.8                   |
| 781           | 572                   |  |                 | 26.5                                     | 45.6               | 43.0            | -2.6                           | -2.4  | -0.2                  |
| 849           | 572                   |  |                 | 27.0                                     | 46.1               | 45.3            | -0.8                           | -2.4  | 1.6                   |
| 840           | 573                   |  |                 | 25.3                                     | 44.4               | 46.8            | 2.4                            | -2.4  | 4.8                   |
| 740           | 599                   |  |                 | 26.7                                     | 45.8               | 34.9            | -11.0                          | -2.4  | -8.6                  |
| 652           | 600                   |  |                 | 26.2                                     | 45.4               | 35.5            | -9.8                           | -2.4  | -7.4                  |
| 783           | 600                   |  |                 | 26.2                                     | 45.4               | 32.3            | -13.1                          | -2.4  | -10.7                 |
| 535           | 600                   |  |                 | 25.3                                     | 44.5               | 40.4            | -4.1                           | -2.4  | -1.7                  |
| 637           | 600                   |  |                 | 24.7                                     | 43.9               | 33.8            | -10.1                          | -2.4  | -7.7                  |
| 713           | 600                   |  |                 | 26.0                                     | 45.2               | 35.5            | -9.7                           | -2.4  | -7.3                  |
| Average       | 571                   |  |                 |  |                    |                 | -2.9                           | -2.4  | -0.6                  |

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

Project: Port Dover and Nanticoke Wind Farm - IEC 61400- 11 Edition 3.0 - Turbine T409

Report ID: 14000.07.T409.RP1

| 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) |
|---------------|-----------------------|--|-----------------|--|--------------------|-----------------|--------------------------------|---|-----------------------|
| 704           | 153                   |  |                 | 26.1                                     | 44.4               | 47.8            | 3.3                            | -2.0  | 5.3                   |
| 816           | 153                   |  |                 | 25.0                                     | 43.3               | 48.5            | 5.2                            | -2.0  | 7.2                   |
| 688           | 154                   |  |                 | 26.7                                     | 45.1               | 46.6            | 1.5                            | -2.0  | 3.5                   |
| 782           | 158                   |  |                 | 25.7                                     | 44.0               | 42.1            | -1.9                           | -2.0  | 0.1                   |
| 674           | 158                   |  |                 | 26.0                                     | 44.3               | 37.4            | -6.9                           | -2.0  | -4.9                  |
| 502           | 159                   |  |                 | 26.8                                     | 45.2               | 38.0            | -7.1                           | -2.0  | -5.1                  |
| 705           | 159                   |  |                 | 26.7                                     | 45.0               | 39.1            | -5.9                           | -2.0  | -3.9                  |
| 712           | 160                   |  |                 | 26.6                                     | 44.9               | 35.6            | -9.4                           | -2.0  | -7.3                  |
| 774           | 160                   |  |                 | 27.1                                     | 45.4               | 35.8            | -9.6                           | -2.0  | -7.5                  |
| 291           | 160                   |  |                 | 28.5                                     | 46.8               | 39.0            | -7.8                           | -2.0  | -5.8                  |
| 593           | 160                   |  |                 | 26.0                                     | 44.4               | 37.7            | -6.7                           | -2.0  | -4.6                  |
| 525           | 161                   |  |                 | 26.2                                     | 44.5               | 34.4            | -10.2                          | -2.0  | -8.1                  |
| 531           | 161                   |  |                 | 24.7                                     | 43.0               | 36.7            | -6.3                           | -2.0  | -4.3                  |
| 542           | 162                   |  |                 | 25.6                                     | 44.0               | 32.6            | -11.4                          | -2.0  | -9.3                  |
| 544           | 162                   |  |                 | 25.2                                     | 43.5               | 34.8            | -8.8                           | -2.0  | -6.7                  |
| 532           | 162                   |  |                 | 25.5                                     | 43.9               | 36.4            | -7.4                           | -2.0  | -5.4                  |
| 528           | 162                   |  |                 | 26.2                                     | 44.5               | 36.3            | -8.2                           | -2.0  | -6.2                  |
| 707           | 166                   |  |                 | 26.3                                     | 44.7               | 35.8            | -8.8                           | -2.0  | -6.8                  |
| 676           | 166                   |  |                 | 25.3                                     | 43.7               | 34.7            | -9.0                           | -2.0  | -6.9                  |
| Average       | 160                   |  |                 |  |                    |                 | -2.8                           | -2.0  | -0.8                  |

# Table D.04 Tonality Assessment Table - 8.5 m/s (2)

Project: Port Dover and Nanticoke Wind Farm - IEC 61400- 11 Edition 3.0 - Turbine T409

Report ID: 14000.07.T409.RP1

| 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) |
|---------------|-----------------------|--|-----------------|--|--------------------|-----------------|--------------------------------|---|-----------------------|
| 290           | 517                   |  |                 | 28.4                                     | 47.3               | 39.4            | -7.9                           | -2.3  | -5.6                  |
| 705           | 528                   |  |                 | 27.9                                     | 46.9               | 39.8            | -7.1                           | -2.3  | -4.8                  |
| 502           | 529                   |  |                 | 26.6                                     | 45.6               | 42.9            | -2.6                           | -2.3  | -0.3                  |
| 693           | 531                   |  |                 | 28.7                                     | 47.7               | 38.8            | -8.9                           | -2.3  | -6.5                  |
| 291           | 532                   |  |                 | 27.6                                     | 46.6               | 43.7            | -2.9                           | -2.3  | -0.5                  |
| 774           | 533                   |  |                 | 27.2                                     | 46.2               | 41.2            | -5.0                           | -2.3  | -2.7                  |
| 776           | 533                   |  |                 | 26.8                                     | 45.9               | 42.4            | -3.4                           | -2.3  | -1.1                  |
| 310           | 533                   |  |                 | 27.4                                     | 46.4               | 41.2            | -5.2                           | -2.3  | -2.9                  |
| 782           | 534                   |  |                 | 28.0                                     | 47.0               | 38.7            | -8.2                           | -2.3  | -5.9                  |
| 708           | 534                   |  |                 | 27.5                                     | 46.5               | 40.3            | -6.2                           | -2.3  | -3.9                  |
| 775           | 534                   |  |                 | 26.4                                     | 45.5               | 43.2            | -2.3                           | -2.3  | 0.1                   |
| 525           | 535                   |  |                 | 26.6                                     | 45.6               | 37.0            | -8.6                           | -2.3  | -6.3                  |
| 531           | 535                   |  |                 | 25.0                                     | 44.0               | 38.6            | -5.4                           | -2.3  | -3.1                  |
| 712           | 535                   |  |                 | 26.4                                     | 45.4               | 40.5            | -4.8                           | -2.3  | -2.5                  |
| 676           | 535                   |  |                 | 26.5                                     | 45.5               | 42.1            | -3.5                           | -2.3  | -1.1                  |
| 527           | 536                   |  |                 | 26.7                                     | 45.7               | 38.4            | -7.4                           | -2.3  | -5.0                  |
| 707           | 536                   |  |                 | 27.4                                     | 46.4               | 39.0            | -7.4                           | -2.3  | -5.0                  |
| 540           | 537                   |  |                 | 26.2                                     | 45.2               | 32.7            | -12.5                          | -2.3  | -10.2                 |
| 843           | 538                   |  |                 | 26.4                                     | 45.4               | 39.4            | -6.0                           | -2.3  | -3.7                  |
| 528           | 539                   |  |                 | 26.1                                     | 45.2               | 39.5            | -5.6                           | -2.3  | -3.3                  |
| 709           | 539                   |  |                 | 28.0                                     | 47.0               | 42.8            | -4.2                           | -2.3  | -1.8                  |
| 695           | 539                   |  |                 | 27.5                                     | 46.5               | 41.9            | -4.6                           | -2.3  | -2.3                  |
| 593           | 539                   |  |                 | 26.1                                     | 45.1               | 42.4            | -2.7                           | -2.3  | -0.4                  |
| 532           | 540                   |  |                 | 26.9                                     | 46.0               | 42.5            | -3.5                           | -2.3  | -1.2                  |
| 692           | 540                   |  |                 | 27.2                                     | 46.2               | 40.3            | -5.9                           | -2.3  | -3.6                  |
| 544           | 540                   |  |                 | 25.2                                     | 44.2               | 38.7            | -5.5                           | -2.3  | -3.1                  |
| 542           | 540                   |  |                 | 25.6                                     | 44.7               | 41.2            | -3.5                           | -2.3  | -1.1                  |
| 696           | 541                   |  |                 | 27.7                                     | 46.7               | 40.8            | -5.9                           | -2.3  | -3.5                  |
| Average       | 535                   |  |                 |  |                    |                 | -5.1                           | -2.3  | -2.7                  |

# Table D.05 Tonality Assessment Table - 9 m/s

Project: Port Dover and Nanticoke Wind Farm - IEC 61400- 11 Edition 3.0 - Turbine T409

Report ID: 14000.07.T409.RP1

| 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) |
|---------------|-----------------------|--|-----------------|--|--------------------|-----------------|--------------------------------|---|-----------------------|
| 326           | 153                   |  |                 | 27.3                                     | 45.6               | 45.3            | -0.3                           | -2.0  | 1.7                   |
| 307           | 155                   |  |                 | 28.5                                     | 46.8               | 44.3            | -2.4                           | -2.0  | -0.4                  |
| 30            | 155                   |  |                 | 28.4                                     | 46.7               | 45.4            | -1.3                           | -2.0  | 0.7                   |
| 357           | 158                   |  |                 | 27.7                                     | 46.0               | 45.9            | -0.2                           | -2.0  | 1.8                   |
| 309           | 160                   |  |                 | 27.9                                     | 46.2               | 39.7            | -6.5                           | -2.0  | -4.5                  |
| 511           | 161                   |  |                 | 26.7                                     | 45.0               | 39.8            | -5.3                           | -2.0  | -3.2                  |
| 513           | 161                   |  |                 | 28.7                                     | 47.0               | 37.9            | -9.1                           | -2.0  | -7.1                  |
| 516           | 161                   |  |                 | 26.7                                     | 45.0               | 39.3            | -5.7                           | -2.0  | -3.7                  |
| 489           | 161                   |  |                 | 27.5                                     | 45.8               | 38.5            | -7.4                           | -2.0  | -5.3                  |
| 522           | 162                   |  |                 | 25.8                                     | 44.2               | 38.7            | -5.5                           | -2.0  | -3.5                  |
| 523           | 162                   |  |                 | 26.2                                     | 44.6               | 38.7            | -5.9                           | -2.0  | -3.8                  |
| 524           | 162                   |  |                 | 25.9                                     | 44.2               | 39.1            | -5.1                           | -2.0  | -3.1                  |
| 514           | 162                   |  |                 | 28.9                                     | 47.3               | 35.8            | -11.4                          | -2.0  | -9.4                  |
| 521           | 162                   |  |                 | 25.8                                     | 44.1               | 38.1            | -6.0                           | -2.0  | -4.0                  |
| 515           | 162                   |  |                 | 27.2                                     | 45.5               | 39.8            | -5.8                           | -2.0  | -3.7                  |
| 526           | 163                   |  |                 | 27.0                                     | 45.3               | 38.2            | -7.1                           | -2.0  | -5.1                  |
| 354           | 164                   |  |                 | 27.7                                     | 46.0               | 39.4            | -6.6                           | -2.0  | -4.6                  |
| 530           | 165                   |  |                 | 25.3                                     | 43.7               | 37.6            | -6.1                           | -2.0  | -4.0                  |
| 706           | 166                   |  |                 | 26.6                                     | 45.0               | 35.8            | -9.1                           | -2.0  | -7.1                  |
| Average       | 161                   |  |                 |  |                    |                 | -4.6                           | -2.0  | -2.6                  |

# Table D.06 Tonality Assessment Table - 9 m/s (2)

Project: Port Dover and Nanticoke Wind Farm - IEC 61400- 11 Edition 3.0 - Turbine T409

Report ID: 14000.07.T409.RP1

| 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) |
|---------------|-----------------------|--|-----------------|--|--------------------|-----------------|--------------------------------|---|-----------------------|
| 526           | 480                   |  |                 | 27.0                                     | 45.9               | 33.8            | -12.0                          | -2.3  | -9.8                  |
| 326           | 508                   |  |                 | 25.4                                     | 44.4               | 43.2            | -1.1                           | -2.3  | 1.2                   |
| 307           | 528                   |  |                 | 26.6                                     | 45.6               | 38.3            | -7.3                           | -2.3  | -4.9                  |
| 354           | 530                   |  |                 | 27.9                                     | 46.9               | 43.1            | -3.8                           | -2.3  | -1.4                  |
| 511           | 531                   |  |                 | 25.8                                     | 44.8               | 40.9            | -3.9                           | -2.3  | -1.6                  |
| 530           | 534                   |  |                 | 25.6                                     | 44.7               | 42.4            | -2.3                           | -2.3  | 0.1                   |
| 513           | 535                   |  |                 | 27.2                                     | 46.2               | 38.7            | -7.6                           | -2.3  | -5.2                  |
| Average       | 521                   |  |                 |  |                    |                 | -4.3                           | -2.3  | -1.9                  |

# Table D.07 Tonality Assessment Table - 9 m/s (3)

Project: Port Dover and Nanticoke Wind Farm - IEC 61400- 11 Edition 3.0 - Turbine T409

Report ID: 14000.07.T409.RP1

| 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) |
|---------------|-----------------------|--|-----------------|--|--------------------|-----------------|--------------------------------|---|-----------------------|
| 326           | 570                   |  |                 | 25.8                                     | 44.9               | 44.6            | -0.3                           | -2.4  | 2.1                   |
| 489           | 601                   |  |                 | 24.5                                     | 43.7               | 34.9            | -8.8                           | -2.4  | -6.4                  |
| 530           | 601                   |  |                 | 25.1                                     | 44.3               | 40.7            | -3.6                           | -2.4  | -1.2                  |
| 511           | 602                   |  |                 | 25.6                                     | 44.8               | 37.1            | -7.7                           | -2.4  | -5.3                  |
| 513           | 602                   |  |                 | 26.4                                     | 45.6               | 41.5            | -4.2                           | -2.4  | -1.7                  |
| 521           | 602                   |  |                 | 25.6                                     | 44.8               | 39.6            | -5.2                           | -2.4  | -2.8                  |
| 516           | 603                   |  |                 | 25.5                                     | 44.6               | 42.9            | -1.7                           | -2.4  | 0.7                   |
| 514           | 603                   |  |                 | 26.7                                     | 45.9               | 41.2            | -4.7                           | -2.4  | -2.3                  |
| 523           | 605                   |  |                 | 25.8                                     | 45.0               | 41.9            | -3.1                           | -2.4  | -0.7                  |
| 515           | 605                   |  |                 | 26.6                                     | 45.8               | 41.6            | -4.1                           | -2.4  | -1.7                  |
| 522           | 606                   |  |                 | 25.7                                     | 44.9               | 41.6            | -3.3                           | -2.4  | -0.9                  |
| 675           | 606                   |  |                 | 26.4                                     | 45.6               | 38.8            | -6.9                           | -2.4  | -4.4                  |
| Average       | 601                   |  |                 |  |                    |                 | -3.9                           | -2.4  | -1.5                  |

# Table D.08 Tonality Assessment Table - 9.5 m/s

Project: Port Dover and Nanticoke Wind Farm - IEC 61400- 11 Edition 3.0 - Turbine T409

Report ID: 14000.07.T409.RP1

| 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) |
|---------------|-----------------------|--|-----------------|--|--------------------|-----------------|--------------------------------|---|-----------------------|
| 163           | 522                   |  |                 | 28.8                                     | 47.7               | 41.4            | -6.3                           | -2.3  | -4.0                  |
| 366           | 522                   |  |                 | 24.3                                     | 43.3               | 33.9            | -9.4                           | -2.3  | -7.0                  |
| 501           | 526                   |  |                 | 25.6                                     | 44.6               | 38.8            | -5.8                           | -2.3  | -3.5                  |
| 195           | 532                   |  |                 | 28.6                                     | 47.6               | 42.0            | -5.6                           | -2.3  | -3.3                  |
| 314           | 532                   |  |                 | 28.0                                     | 47.0               | 40.5            | -6.4                           | -2.3  | -4.1                  |
| 353           | 532                   |  |                 | 27.2                                     | 46.2               | 40.0            | -6.1                           | -2.3  | -3.8                  |
| 711           | 533                   |  |                 | 26.7                                     | 45.7               | 32.8            | -12.9                          | -2.3  | -10.6                 |
| 520           | 535                   |  |                 | 24.2                                     | 43.3               | 39.8            | -3.4                           | -2.3  | -1.1                  |
| 463           | 540                   |  |                 | 27.0                                     | 46.1               | 38.4            | -7.6                           | -2.3  | -5.3                  |
| 308           | 540                   |  |                 | 27.4                                     | 46.4               | 44.6            | -1.9                           | -2.3  | 0.5                   |
| 193           | 540                   |  |                 | 27.0                                     | 46.0               | 33.5            | -12.5                          | -2.3  | -10.2                 |
| 517           | 540                   |  |                 | 26.6                                     | 45.6               | 42.6            | -3.1                           | -2.3  | -0.7                  |
| 529           | 540                   |  |                 | 26.2                                     | 45.2               | 41.4            | -3.8                           | -2.3  | -1.5                  |
| 518           | 540                   |  |                 | 26.7                                     | 45.7               | 42.2            | -3.5                           | -2.3  | -1.2                  |
| 503           | 542                   |  |                 | 28.0                                     | 47.0               | 42.4            | -4.6                           | -2.3  | -2.3                  |
| 512           | 542                   |  |                 | 27.3                                     | 46.3               | 42.4            | -4.0                           | -2.3  | -1.7                  |
| 773           | 546                   |  |                 | 28.2                                     | 47.3               | 39.0            | -8.3                           | -2.3  | -5.9                  |
| Average       | 536                   |  |                 |  |                    |                 | -5.3                           | -2.3  | -3.0                  |

# Table D.09 Tonality Assessment Table - 10 m/s

Project: Port Dover and Nanticoke Wind Farm - IEC 61400- 11 Edition 3.0 - Turbine T409

Report ID: 14000.07.T409.RP1

| 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) |
|---------------------|-----------------------|--|-----------------|--|--------------------|-----------------|--------------------------------|---|-----------------------|
| No Reportable Tones |                       |  |                 |  |                    |                 |                                |   |                       |

# Table D.10 Tonality Assessment Table - 10.5 m/s

Project: Port Dover and Nanticoke Wind Farm - IEC 61400- 11 Edition 3.0 - Turbine T409

Report ID: 14000.07.T409.RP1

| 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) |
|---------------------|-----------------------|--|-----------------|--|--------------------|-----------------|--------------------------------|---|-----------------------|
| No Reportable Tones |                       |  |                 |  |                    |                 |                                |   |                       |

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

Project: Port Dover and Nanticoke Wind Farm - IEC 61400- 11 Edition 3.0 - Turbine T409

Report ID: 14000.07.T409.RP1

| 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) |
|---------------|-----------------------|--|-----------------|--|--------------------|-----------------|--------------------------------|---|-----------------------|
| 63            | 153                   |  |                 | 29.9                                     | 48.2               | 39.2            | -9.0                           | -2.0  | -7.0                  |
| 442           | 155                   |  |                 | 28.3                                     | 46.7               | 39.3            | -7.4                           | -2.0  | -5.4                  |
| 288           | 157                   |  |                 | 28.9                                     | 47.2               | 41.3            | -5.9                           | -2.0  | -3.9                  |
| 317           | 158                   |  |                 | 27.8                                     | 46.1               | 42.4            | -3.7                           | -2.0  | -1.7                  |
| 162           | 158                   |  |                 | 27.7                                     | 46.0               | 44.1            | -1.9                           | -2.0  | 0.1                   |
| 395           | 158                   |  |                 | 28.3                                     | 46.6               | 43.5            | -3.1                           | -2.0  | -1.0                  |
| 191           | 158                   |  |                 | 28.5                                     | 46.8               | 43.8            | -3.0                           | -2.0  | -1.0                  |
| 478           | 158                   |  |                 | 28.1                                     | 46.5               | 44.0            | -2.5                           | -2.0  | -0.5                  |
| 351           | 158                   |  |                 | 27.1                                     | 45.4               | 43.1            | -2.4                           | -2.0  | -0.4                  |
| 483           | 158                   |  |                 | 28.8                                     | 47.2               | 44.0            | -3.2                           | -2.0  | -1.2                  |
| 480           | 160                   |  |                 | 28.8                                     | 47.1               | 43.7            | -3.3                           | -2.0  | -1.3                  |
| 367           | 162                   |  |                 | 27.1                                     | 45.4               | 38.2            | -7.2                           | -2.0  | -5.2                  |
| 508           | 162                   |  |                 | 26.2                                     | 44.5               | 40.9            | -3.6                           | -2.0  | -1.5                  |
| 507           | 162                   |  |                 | 26.5                                     | 44.8               | 38.8            | -6.1                           | -2.0  | -4.0                  |
| 500           | 163                   |  |                 | 27.0                                     | 45.4               | 40.2            | -5.2                           | -2.0  | -3.2                  |
| 499           | 163                   |  |                 | 27.2                                     | 45.5               | 36.0            | -9.5                           | -2.0  | -7.5                  |
| Average       | 159                   |  |                 |  |                    |                 | -4.3                           | -2.0  | -2.2                  |

# Table D.12 Tonality Assessment Table - 11.5 m/s

Project: Port Dover and Nanticoke Wind Farm - IEC 61400- 11 Edition 3.0 - Turbine T409

Report ID: 14000.07.T409.RP1

| 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) |
|---------------|-----------------------|--|-----------------|--|--------------------|-----------------|--------------------------------|---|-----------------------|
| 184           | 156                   |  |                 | 28.1                                     | 46.4               | 39.7            | -6.7                           | -2.0  | -4.7                  |
| 71            | 156                   |  |                 | 29.5                                     | 47.8               | 38.1            | -9.7                           | -2.0  | -7.7                  |
| 220           | 158                   |  |                 | 27.6                                     | 45.9               | 43.7            | -2.1                           | -2.0  | -0.1                  |
| 29            | 158                   |  |                 | 27.2                                     | 45.5               | 44.1            | -1.4                           | -2.0  | 0.6                   |
| 303           | 158                   |  |                 | 27.4                                     | 45.7               | 45.0            | -0.7                           | -2.0  | 1.3                   |
| 457           | 159                   |  |                 | 26.6                                     | 44.9               | 44.2            | -0.7                           | -2.0  | 1.3                   |
| 487           | 161                   |  |                 | 27.4                                     | 45.8               | 38.7            | -7.1                           | -2.0  | -5.1                  |
| 436           | 162                   |  |                 | 28.2                                     | 46.5               | 38.9            | -7.6                           | -2.0  | -5.6                  |
| 479           | 162                   |  |                 | 29.2                                     | 47.5               | 35.6            | -11.9                          | -2.0  | -9.9                  |
| 474           | 162                   |  |                 | 27.1                                     | 45.4               | 36.7            | -8.7                           | -2.0  | -6.7                  |
| 506           | 163                   |  |                 | 26.3                                     | 44.6               | 39.9            | -4.7                           | -2.0  | -2.7                  |
| 426           | 165                   |  |                 | 29.8                                     | 48.2               | 38.4            | -9.7                           | -2.0  | -7.7                  |
| 347           | 165                   |  |                 | 27.6                                     | 45.9               | 36.2            | -9.8                           | -2.0  | -7.8                  |
| 74            | 165                   |  |                 | 27.8                                     | 46.2               | 35.5            | -10.7                          | -2.0  | -8.7                  |
| Average       | 161                   |  |                 |  |                    |                 | -4.9                           | -2.0  | -2.9                  |

# Table D.13 Tonality Assessment Table - 12 m/s

Project: Port Dover and Nanticoke Wind Farm - IEC 61400- 11 Edition 3.0 - Turbine T409

Report ID: 14000.07.T409.RP1

| 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) |
|---------------------|-----------------------|--|-----------------|--|--------------------|-----------------|--------------------------------|---|-----------------------|
| No Reportable Tones |                       |  |                 |  |                    |                 |                                |   |                       |

# Table D.14 Tonality Assessment Table - 12.5 m/s

Project: Port Dover and Nanticoke Wind Farm - IEC 61400- 11 Edition 3.0 - Turbine T409

Report ID: 14000.07.T409.RP1

| 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) |
|---------------|-----------------------|--|-----------------|--|--------------------|-----------------|--------------------------------|---|-----------------------|
| 323           | 148                   |  |                 | 29.2                                     | 47.5               | 42.4            | -5.1                           | -2.0  | -3.1                  |
| 66            | 154                   |  |                 | 28.7                                     | 47.0               | 39.2            | -7.9                           | -2.0  | -5.8                  |
| 277           | 154                   |  |                 | 29.0                                     | 47.3               | 45.4            | -1.9                           | -2.0  | 0.1                   |
| 25            | 155                   |  |                 | 27.6                                     | 45.9               | 36.9            | -9.0                           | -2.0  | -6.9                  |
| 200           | 156                   |  |                 | 29.3                                     | 47.6               | 41.1            | -6.5                           | -2.0  | -4.5                  |
| 5             | 157                   |  |                 | 27.4                                     | 45.7               | 42.8            | -2.9                           | -2.0  | -0.9                  |
| 330           | 157                   |  |                 | 28.3                                     | 46.6               | 37.8            | -8.8                           | -2.0  | -6.8                  |
| 393           | 157                   |  |                 | 28.8                                     | 47.2               | 43.9            | -3.2                           | -2.0  | -1.2                  |
| 249           | 157                   |  |                 | 26.5                                     | 44.8               | 40.8            | -4.1                           | -2.0  | -2.0                  |
| 232           | 158                   |  |                 | 28.7                                     | 47.1               | 40.4            | -6.6                           | -2.0  | -4.6                  |
| 296           | 158                   |  |                 | 26.6                                     | 44.9               | 42.6            | -2.3                           | -2.0  | -0.3                  |
| 262           | 158                   |  |                 | 28.6                                     | 46.9               | 38.8            | -8.1                           | -2.0  | -6.1                  |
| 234           | 158                   |  |                 | 27.5                                     | 45.8               | 46.0            | 0.2                            | -2.0  | 2.2                   |
| 124           | 158                   |  |                 | 26.7                                     | 45.0               | 39.3            | -5.7                           | -2.0  | -3.7                  |
| 180           | 158                   |  |                 | 28.6                                     | 46.9               | 39.1            | -7.8                           | -2.0  | -5.8                  |
| 452           | 158                   |  |                 | 25.4                                     | 43.7               | 42.3            | -1.4                           | -2.0  | 0.7                   |
| 73            | 158                   |  |                 | 27.8                                     | 46.1               | 44.7            | -1.4                           | -2.0  | 0.7                   |
| 304           | 159                   |  |                 | 27.4                                     | 45.7               | 45.5            | -0.2                           | -2.0  | 1.8                   |
| 41            | 161                   |  |                 | 28.0                                     | 46.4               | 39.2            | -7.1                           | -2.0  | -5.1                  |
| 438           | 161                   |  |                 | 28.5                                     | 46.9               | 38.0            | -8.8                           | -2.0  | -6.8                  |
| 433           | 161                   |  |                 | 26.6                                     | 44.9               | 35.2            | -9.7                           | -2.0  | -7.7                  |
| 410           | 161                   |  |                 | 27.2                                     | 45.5               | 36.7            | -8.8                           | -2.0  | -6.8                  |
| 37            | 161                   |  |                 | 27.5                                     | 45.9               | 41.0            | -4.9                           | -2.0  | -2.8                  |
| 398           | 161                   |  |                 | 28.2                                     | 46.6               | 35.9            | -10.7                          | -2.0  | -8.6                  |
| 447           | 162                   |  |                 | 27.8                                     | 46.1               | 39.3            | -6.8                           | -2.0  | -4.7                  |
| 219           | 162                   |  |                 | 29.1                                     | 47.4               | 36.3            | -11.0                          | -2.0  | -9.0                  |
| 24            | 162                   |  |                 | 27.6                                     | 45.9               | 40.4            | -5.4                           | -2.0  | -3.4                  |
| 253           | 165                   |  |                 | 26.7                                     | 45.0               | 37.1            | -7.9                           | -2.0  | -5.9                  |
| 276           | 165                   |  |                 | 28.3                                     | 46.7               | 40.6            | -6.0                           | -2.0  | -4.0                  |
| 211           | 166                   |  |                 | 28.3                                     | 46.6               | 41.5            | -5.1                           | -2.0  | -3.1                  |
| 186           | 166                   |  |                 | 27.3                                     | 45.6               | 38.4            | -7.2                           | -2.0  | -5.2                  |
| 32            | 166                   |  |                 | 28.9                                     | 47.3               | 35.2            | -12.1                          | -2.0  | -10.1                 |
| 46            | 168                   |  |                 | 28.1                                     | 46.5               | 37.8            | -8.7                           | -2.0  | -6.7                  |
| 492           | 168                   |  |                 | 25.3                                     | 43.7               | 41.7            | -2.0                           | -2.0  | 0.1                   |
| 221           | 168                   |  |                 | 27.6                                     | 45.9               | 38.1            | -7.7                           | -2.0  | -5.7                  |
| 222           | 168                   |  |                 | 27.0                                     | 45.3               | 37.2            | -8.1                           | -2.0  | -6.0                  |
| 477           | 168                   |  |                 | 28.1                                     | 46.4               | 34.9            | -11.5                          | -2.0  | -9.5                  |
| 321           | 168                   |  |                 | 28.4                                     | 46.7               | 43.7            | -3.0                           | -2.0  | -1.0                  |
| Average       | 161                   |  |                 |  |                    |                 | -5.0                           | -2.0  | -3.0                  |

# Table D.15 Tonality Assessment Table - 13 m/s

Project: Port Dover and Nanticoke Wind Farm - IEC 61400- 11 Edition 3.0 - Turbine T409

Report ID: 14000.07.T409.RP1

| 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) |
|---------------|-----------------------|--|-----------------|--|--------------------|-----------------|--------------------------------|---|-----------------------|
| 61            | 152                   |  |                 | 28.9                                     | 47.2               | 36.4            | -10.8                          | -2.0  | -8.8                  |
| 92            | 155                   |  |                 | 28.9                                     | 47.2               | 37.9            | -9.4                           | -2.0  | -7.3                  |
| 165           | 155                   |  |                 | 28.9                                     | 47.3               | 35.3            | -11.9                          | -2.0  | -9.9                  |
| 370           | 155                   |  |                 | 27.8                                     | 46.1               | 41.8            | -4.3                           | -2.0  | -2.3                  |
| 345           | 155                   |  |                 | 27.4                                     | 45.7               | 44.5            | -1.2                           | -2.0  | 0.8                   |
| 400           | 157                   |  |                 | 28.8                                     | 47.1               | 39.8            | -7.3                           | -2.0  | -5.3                  |
| 22            | 157                   |  |                 | 27.6                                     | 45.9               | 35.9            | -10.0                          | -2.0  | -8.0                  |
| 160           | 157                   |  |                 | 27.2                                     | 45.5               | 42.6            | -2.9                           | -2.0  | -0.8                  |
| 406           | 157                   |  |                 | 28.1                                     | 46.4               | 41.4            | -5.1                           | -2.0  | -3.0                  |
| 179           | 157                   |  |                 | 28.4                                     | 46.7               | 41.7            | -4.9                           | -2.0  | -2.9                  |
| 456           | 158                   |  |                 | 26.0                                     | 44.3               | 41.6            | -2.8                           | -2.0  | -0.7                  |
| 122           | 158                   |  |                 | 28.3                                     | 46.6               | 41.5            | -5.1                           | -2.0  | -3.1                  |
| 223           | 158                   |  |                 | 27.4                                     | 45.7               | 46.4            | 0.7                            | -2.0  | 2.7                   |
| 285           | 158                   |  |                 | 27.9                                     | 46.2               | 41.0            | -5.2                           | -2.0  | -3.2                  |
| 384           | 158                   |  |                 | 28.7                                     | 47.1               | 41.6            | -5.4                           | -2.0  | -3.4                  |
| 269           | 158                   |  |                 | 27.5                                     | 45.8               | 41.4            | -4.4                           | -2.0  | -2.4                  |
| 206           | 158                   |  |                 | 29.2                                     | 47.5               | 43.5            | -4.0                           | -2.0  | -2.0                  |
| 325           | 158                   |  |                 | 26.9                                     | 45.2               | 40.2            | -5.0                           | -2.0  | -3.0                  |
| 233           | 159                   |  |                 | 28.4                                     | 46.7               | 40.4            | -6.3                           | -2.0  | -4.3                  |
| 228           | 160                   |  |                 | 26.5                                     | 44.8               | 39.8            | -5.0                           | -2.0  | -2.9                  |
| 301           | 160                   |  |                 | 26.6                                     | 44.9               | 41.0            | -3.9                           | -2.0  | -1.9                  |
| 188           | 160                   |  |                 | 27.2                                     | 45.5               | 42.0            | -3.5                           | -2.0  | -1.4                  |
| 494           | 160                   |  |                 | 25.9                                     | 44.2               | 41.5            | -2.7                           | -2.0  | -0.7                  |
| 21            | 161                   |  |                 | 27.0                                     | 45.3               | 36.9            | -8.4                           | -2.0  | -6.3                  |
| 229           | 161                   |  |                 | 26.3                                     | 44.6               | 42.2            | -2.4                           | -2.0  | -0.4                  |
| 451           | 161                   |  |                 | 26.8                                     | 45.1               | 41.4            | -3.8                           | -2.0  | -1.7                  |
| 227           | 161                   |  |                 | 27.0                                     | 45.4               | 41.0            | -4.3                           | -2.0  | -2.3                  |
| 369           | 161                   |  |                 | 28.9                                     | 47.3               | 38.1            | -9.1                           | -2.0  | -7.1                  |
| 435           | 162                   |  |                 | 27.8                                     | 46.2               | 34.1            | -12.0                          | -2.0  | -10.0                 |
| 305           | 162                   |  |                 | 27.8                                     | 46.1               | 35.9            | -10.1                          | -2.0  | -8.1                  |
| 495           | 163                   |  |                 | 25.2                                     | 43.5               | 40.6            | -2.9                           | -2.0  | -0.9                  |
| 302           | 165                   |  |                 | 26.4                                     | 44.7               | 36.5            | -8.1                           | -2.0  | -6.1                  |
| 455           | 166                   |  |                 | 26.6                                     | 44.9               | 38.2            | -6.8                           | -2.0  | -4.7                  |
| 298           | 166                   |  |                 | 27.0                                     | 45.3               | 33.3            | -12.0                          | -2.0  | -10.0                 |
| 454           | 168                   |  |                 | 28.0                                     | 46.3               | 41.3            | -5.0                           | -2.0  | -3.0                  |
| 399           | 168                   |  |                 | 27.9                                     | 46.2               | 37.8            | -8.5                           | -2.0  | -6.4                  |
| 270           | 168                   |  |                 | 28.5                                     | 46.8               | 41.0            | -5.9                           | -2.0  | -3.8                  |
| 11            | 168                   |  |                 | 28.5                                     | 46.9               | 40.3            | -6.5                           | -2.0  | -4.5                  |
| Average       | 160                   |  |                 |  |                    |                 | -5.0                           | -2.0  | -2.9                  |

# Table D.16 Tonality Assessment Table - 13 m/s (2)

Project: Port Dover and Nanticoke Wind Farm - IEC 61400- 11 Edition 3.0 - Turbine T409

Report ID: 14000.07.T409.RP1

| 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) |
|---------------|-----------------------|--|-----------------|--|--------------------|-----------------|--------------------------------|---|-----------------------|
| 270           | 506                   |  |                 | 26.7                                     | 45.7               | 39.3            | -6.4                           | -2.3  | -4.1                  |
| 269           | 507                   |  |                 | 26.3                                     | 45.3               | 39.1            | -6.2                           | -2.3  | -3.9                  |
| 345           | 522                   |  |                 | 26.4                                     | 45.4               | 32.8            | -12.5                          | -2.3  | -10.2                 |
| 206           | 525                   |  |                 | 25.9                                     | 44.9               | 32.4            | -12.4                          | -2.3  | -10.1                 |
| 229           | 531                   |  |                 | 24.6                                     | 43.6               | 30.7            | -12.9                          | -2.3  | -10.6                 |
| 228           | 532                   |  |                 | 24.9                                     | 43.9               | 41.6            | -2.3                           | -2.3  | 0.0                   |
| 301           | 534                   |  |                 | 26.1                                     | 45.1               | 41.3            | -3.8                           | -2.3  | -1.5                  |
| 494           | 535                   |  |                 | 23.5                                     | 42.6               | 35.6            | -7.0                           | -2.3  | -4.7                  |
| 122           | 538                   |  |                 | 25.7                                     | 44.7               | 40.3            | -4.4                           | -2.3  | -2.1                  |
| 227           | 539                   |  |                 | 25.0                                     | 44.1               | 43.1            | -1.0                           | -2.3  | 1.4                   |
| 305           | 541                   |  |                 | 26.2                                     | 45.2               | 43.1            | -2.1                           | -2.3  | 0.3                   |
| 27            | 542                   |  |                 | 25.8                                     | 44.9               | 33.5            | -11.4                          | -2.3  | -9.0                  |
| 495           | 543                   |  |                 | 23.7                                     | 42.7               | 37.5            | -5.2                           | -2.3  | -2.8                  |
| 325           | 544                   |  |                 | 24.0                                     | 43.1               | 39.6            | -3.5                           | -2.3  | -1.2                  |
| 21            | 545                   |  |                 | 25.3                                     | 44.3               | 41.1            | -3.2                           | -2.3  | -0.9                  |
| 302           | 546                   |  |                 | 25.1                                     | 44.1               | 44.3            | 0.1                            | -2.3  | 2.5                   |
| 179           | 546                   |  |                 | 25.0                                     | 44.0               | 36.0            | -8.0                           | -2.3  | -5.6                  |
| 188           | 546                   |  |                 | 25.6                                     | 44.6               | 41.8            | -2.8                           | -2.3  | -0.5                  |
| 22            | 547                   |  |                 | 25.6                                     | 44.6               | 38.1            | -6.5                           | -2.4  | -4.2                  |
| 451           | 547                   |  |                 | 25.5                                     | 44.6               | 34.5            | -10.1                          | -2.4  | -7.7                  |
| 67            | 548                   |  |                 | 27.9                                     | 46.9               | 35.8            | -11.1                          | -2.4  | -8.8                  |
| 454           | 549                   |  |                 | 26.3                                     | 45.3               | 40.6            | -4.7                           | -2.4  | -2.4                  |
| 455           | 550                   |  |                 | 24.6                                     | 43.6               | 42.3            | -1.3                           | -2.4  | 1.1                   |
| 209           | 550                   |  |                 | 25.6                                     | 44.6               | 41.7            | -3.0                           | -2.4  | -0.6                  |
| 233           | 551                   |  |                 | 25.7                                     | 44.7               | 34.7            | -10.1                          | -2.4  | -7.7                  |
| 165           | 551                   |  |                 | 26.9                                     | 45.9               | 34.6            | -11.3                          | -2.4  | -9.0                  |
| 298           | 552                   |  |                 | 25.5                                     | 44.5               | 42.7            | -1.9                           | -2.4  | 0.5                   |
| 235           | 552                   |  |                 | 25.9                                     | 45.0               | 37.7            | -7.3                           | -2.4  | -4.9                  |
| 11            | 553                   |  |                 | 26.3                                     | 45.4               | 37.7            | -7.6                           | -2.4  | -5.3                  |
| Average       | 540                   |  |                 |  |                    |                 | -4.7                           | -2.3  | -2.4                  |

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## Appendix E

### Measurement Data

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# Table E.01 Measurement data - Turbine ON

Project: Port Dover and Nanticoke Wind Farm - IEC 61400- 11 Edition 3.0 - Turbine T409  
 Report ID: 14000.07.T409.RP1

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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 | LReq | 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            | 14.4                    | 53.3 | 1862                      | 304.0                   | 304.5         | 10.5            | 14.7      | 14.2                                | 8.7                             | 17.4                | 98.3           | 50                    |
| 2            | 15.5                    | 52.9 | 1862                      | 304.0                   | 304.5         | 12.8            | 14.6      | 15.3                                | 8.1                             | 17.4                | 98.3           | 50                    |
| 3            | 13.8                    | 53.0 | 1867                      | 304.0                   | 304.5         | 9.5             | 14.2      | 13.6                                | 9.1                             | 17.4                | 98.3           | 50                    |
| 4            | 13.8                    | 53.6 | 1861                      | 304.0                   | 304.5         | 7.8             | 14.3      | 13.7                                | 9.4                             | 17.4                | 98.3           | 50                    |
| 5            | 12.8                    | 53.7 | 1805                      | 304.0                   | 304.5         | 3.4             | 14.1      | 12.6                                | 7.1                             | 17.4                | 98.3           | 50                    |
| 6            | 10.3                    | 54.1 | 1608                      | 304.0                   | 304.5         | 1.1             | 14.4      | 10.5                                | 7.6                             | 17.4                | 98.3           | 50                    |
| 7            |                         |      | 1909                      | 304.0                   | 304.7         | 0.4             | 14.6      | 10.3                                | 8.0                             | 17.4                | 98.3           | 50                    |
| 8            |                         |      | 1892                      | 304.0                   | 304.6         | 2.3             | 14.7      | 10.5                                | 8.8                             | 17.4                | 98.3           | 50                    |
| 9            |                         |      | 1738                      | 304.0                   | 304.7         | -1.4            | 14.2      | 8.3                                 | 10.4                            | 17.4                | 98.3           | 50                    |
| 10           |                         |      | 1529                      | 304.0                   | 304.6         | -1.8            | 14.5      | 8.2                                 | 8.6                             | 17.4                | 98.3           | 50                    |
| 11           | 13.2                    | 54.5 | 1839                      | 304.0                   | 304.5         | 14.5            | 15.2      | 13.0                                | 8.5                             | 17.4                | 98.3           | 50                    |
| 12           | 14.7                    | 53.1 | 1869                      | 304.0                   | 304.5         | 11.7            | 14.8      | 14.5                                | 8.9                             | 17.4                | 98.3           | 49                    |
| 13           | 14.0                    | 53.4 | 1865                      | 304.0                   | 304.5         | 9.1             | 14.2      | 13.8                                | 8.3                             | 17.4                | 98.3           | 49                    |
| 14           | 13.3                    | 53.7 | 1807                      | 304.0                   | 304.5         | 5.8             | 14.1      | 13.2                                | 7.7                             | 17.4                | 98.3           | 49                    |
| 15           | 14.0                    | 54.6 | 1916                      | 304.0                   | 304.6         | 7.4             | 15.1      | 13.8                                | 10.9                            | 17.4                | 98.3           | 49                    |
| 16           | 15.2                    | 53.6 | 1859                      | 304.0                   | 304.5         | 11.1            | 14.3      | 15.0                                | 10.4                            | 17.4                | 98.3           | 49                    |
| 17           | 12.4                    | 54.3 | 1886                      | 304.0                   | 304.5         | 7.6             | 14.6      | 12.2                                | 7.6                             | 17.4                | 98.3           | 49                    |
| 18           | 14.7                    | 53.6 | 1864                      | 304.0                   | 304.6         | 11.3            | 14.8      | 14.5                                | 8.6                             | 17.4                | 98.3           | 49                    |
| 19           | 14.0                    | 52.9 | 1870                      | 304.0                   | 304.5         | 8.6             | 14.1      | 13.8                                | 9.0                             | 17.4                | 98.3           | 49                    |
| 20           | 12.4                    | 53.9 | 1862                      | 304.0                   | 304.7         | 8.2             | 14.5      | 12.2                                | 7.7                             | 17.4                | 98.3           | 49                    |
| 21           | 12.9                    | 53.5 | 1864                      | 304.0                   | 304.6         | 8.5             | 14.6      | 12.7                                | 7.4                             | 17.4                | 98.3           | 49                    |
| 22           | 13.0                    | 53.7 | 1866                      | 304.0                   | 304.6         | 7.9             | 14.4      | 12.9                                | 10.0                            | 17.4                | 98.3           | 49                    |
| 23           | 13.8                    | 53.8 | 1867                      | 304.0                   | 304.7         | 8.2             | 14.4      | 13.6                                | 7.0                             | 17.4                | 98.3           | 49                    |
| 24           | 12.3                    | 53.6 | 1866                      | 304.0                   | 304.5         | 6.6             | 14.4      | 12.1                                | 6.1                             | 17.4                | 98.3           | 49                    |
| 25           | 12.5                    | 53.5 | 1857                      | 304.0                   | 304.6         | 7.0             | 14.4      | 12.3                                | 9.2                             | 17.4                | 98.3           | 49                    |
| 26           | 14.7                    | 55.0 | 1888                      | 304.0                   | 304.7         | 5.6             | 14.7      | 14.5                                | 8.5                             | 17.4                | 98.3           | 49                    |
| 27           | 13.2                    | 53.8 | 1864                      | 304.0                   | 304.5         | 5.9             | 14.4      | 13.1                                | 7.8                             | 17.4                | 98.3           | 49                    |
| 28           | 11.9                    | 53.8 | 1867                      | 304.0                   | 304.5         | 4.6             | 14.5      | 11.7                                | 7.8                             | 17.4                | 98.3           | 49                    |
| 29           | 11.8                    | 53.9 | 1851                      | 304.0                   | 304.5         | 3.4             | 14.2      | 11.6                                | 6.8                             | 17.4                | 98.3           | 49                    |
| 30           | 9.2                     | 54.3 | 1288                      | 304.0                   | 304.6         | 1.6             | 14.1      | 11.7                                | 8.6                             | 17.5                | 98.3           | 49                    |
| 31           | 10.3                    | 55.9 | 1621                      | 304.0                   | 304.5         | -0.4            | 14.6      | 9.4                                 | 9.0                             | 17.5                | 98.3           | 49                    |
| 32           | 12.6                    | 55.6 | 1867                      | 304.0                   | 304.5         | 12.9            | 14.8      | 12.5                                | 12.5                            | 17.5                | 98.3           | 49                    |
| 33           | 13.9                    | 53.6 | 1875                      | 304.0                   | 304.5         | 7.4             | 14.8      | 13.7                                | 6.5                             | 17.5                | 98.3           | 49                    |
| 34           | 13.3                    | 53.6 | 1865                      | 304.0                   | 304.5         | 9.5             | 14.9      | 13.1                                | 6.7                             | 17.5                | 98.3           | 49                    |
| 35           | 14.4                    | 53.2 | 1864                      | 304.0                   | 304.5         | 10.5            | 14.6      | 14.2                                | 7.4                             | 17.5                | 98.3           | 49                    |
| 36           | 14.2                    | 54.2 | 1865                      | 304.0                   | 304.5         | 9.1             | 14.3      | 14.0                                | 12.3                            | 17.4                | 98.3           | 49                    |
| 37           | 12.7                    | 53.7 | 1865                      | 304.0                   | 304.7         | 8.3             | 14.4      | 12.5                                | 6.6                             | 17.5                | 98.3           | 49                    |
| 38           | 14.9                    | 54.7 | 1860                      | 304.0                   | 304.7         | 9.2             | 14.7      | 14.7                                | 8.9                             | 17.5                | 98.3           | 49                    |
| 39           | 15.1                    | 54.5 | 1869                      | 304.0                   | 304.7         | 11.0            | 14.5      | 14.9                                | 9.9                             | 17.5                | 98.3           | 49                    |
| 40           | 13.9                    | 53.9 | 1864                      | 304.0                   | 304.7         | 9.2             | 14.7      | 13.7                                | 9.9                             | 17.5                | 98.3           | 49                    |
| 41           | 12.7                    | 55.6 | 1860                      | 304.0                   | 304.7         | 8.6             | 14.4      | 12.5                                | 9.1                             | 17.5                | 98.3           | 48                    |
| 42           | 11.9                    | 54.2 | 1840                      | 304.0                   | 304.7         | 5.2             | 14.1      | 11.7                                | 7.9                             | 17.5                | 98.3           | 47                    |
| 43           | 11.3                    | 55.3 | 1896                      | 304.0                   | 304.7         | 1.8             | 14.5      | 11.2                                | 7.0                             | 17.5                | 98.3           | 47                    |
| 44           | 14.5                    | 54.1 | 1892                      | 304.0                   | 304.6         | 8.1             | 14.3      | 10.6                                | 8.5                             | 17.5                | 98.3           | 47                    |
| 45           | 11.4                    | 54.5 | 1865                      | 304.0                   | 304.7         | 3.7             | 14.7      | 11.3                                | 9.2                             | 17.5                | 98.3           | 47                    |
| 46           | 12.5                    | 54.3 | 1863                      | 304.0                   | 304.7         | 7.0             | 15.0      | 12.4                                | 12.4                            | 17.5                | 98.3           | 47                    |
| 47           | 15.5                    | 54.2 | 1856                      | 304.0                   | 304.6         | 11.0            | 14.8      | 15.3                                | 11.1                            | 17.4                | 98.3           | 47                    |
| 48           | 14.5                    | 54.1 | 1892                      | 304.0                   | 304.6         | 8.2             | 14.4      | 14.3                                | 11.4                            | 17.4                | 98.3           | 47                    |
| 49           | 14.0                    | 53.6 | 1883                      | 304.0                   | 304.5         | 9.8             | 14.5      | 13.8                                | 7.7                             | 17.4                | 98.3           | 47                    |
| 50           | 13.4                    | 53.4 | 1859                      | 304.0                   | 304.5         | 7.4             | 14.2      | 13.3                                | 6.7                             | 17.4                | 98.3           | 47                    |
| 51           | 13.4                    | 54.8 | 1872                      | 304.0                   | 304.5         | 4.9             | 14.7      | 13.3                                | 6.9                             | 17.4                | 98.3           | 47                    |
| 52           | 15.1                    | 53.8 | 1874                      | 304.0                   | 304.5         | 12.9            | 14.8      | 14.9                                | 7.6                             | 17.4                | 98.3           | 47                    |
| 53           | 16.8                    | 54.3 | 1867                      | 304.0                   | 304.5         | 11.0            | 14.8      | 16.6                                | 5.5                             | 17.4                | 98.3           | 48                    |
| 54           | 15.4                    | 53.6 | 1865                      | 304.0                   | 304.5         | 11.4            | 14.4      | 15.2                                | 7.1                             | 17.4                | 98.3           | 49                    |
| 55           | 15.3                    | 53.7 | 1869                      | 304.0                   | 304.5         | 10.3            | 14.4      | 15.2                                | 7.2                             | 17.4                | 98.3           | 49                    |
| 56           | 15.9                    | 53.8 | 1867                      | 304.0                   | 302.0         | 13.1            | 14.7      | 15.7                                | 7.3                             | 17.4                | 98.3           | 49                    |
| 57           | 15.2                    | 53.5 | 1867                      | 304.0                   | 298.8         | 12.8            | 14.7      | 15.0                                | 7.1                             | 17.4                | 98.3           | 49                    |
| 58           | 15.7                    | 53.3 | 1863                      | 304.0                   | 298.7         | 13.6            | 14.3      | 15.6                                | 7.3                             | 17.4                | 98.3           | 49                    |
| 59           | 15.4                    | 53.3 | 1869                      | 304.0                   | 298.8         | 12.3            | 14.6      | 15.2                                | 7.1                             | 17.4                | 98.3           | 49                    |
| 60           | 15.0                    | 53.8 | 1858                      | 304.0                   | 298.9         | 13.6            | 14.4      | 14.8                                | 7.7                             | 17.4                | 98.3           | 49                    |
| 61           | 12.8                    | 53.8 | 1862                      | 304.0                   | 298.9         | 5.4             | 13.9      | 9.3                                 | 14.9                            | 17.4                | 98.3           | 49                    |
| 62           | 12.2                    | 53.9 | 1877                      | 304.0                   | 298.8         | 6.5             | 14.6      | 12.0                                | 8.8                             | 17.4                | 98.3           | 49                    |
| 63           | 10.9                    | 55.4 | 1732                      | 304.0                   | 298.9         | 2.9             | 14.3      | 9.9                                 | 7.3                             | 17.4                | 98.3           | 49                    |
| 64           | 13.1                    | 55.0 | 1921                      | 304.0                   | 298.9         | 10.8            | 15.2      | 12.9                                | 9.2                             | 17.4                | 98.3           | 49                    |
| 65           | 14.8                    | 54.9 | 1869                      | 304.0                   | 298.9         | 14.0            | 14.7      | 14.6                                | 10.9                            | 17.4                | 98.3           | 48                    |
| 66           | 12.5                    | 54.4 | 1865                      | 304.0                   | 298.9         | 6.9             | 13.7      | 12.7                                | 15.4                            | 17.5                | 98.3           | 47                    |
| 67           | 12.8                    | 55.2 | 1899                      | 304.0                   | 298.8         | 7.5             | 14.9      | 12.6                                | 8.3                             | 17.5                | 98.3           | 47                    |
| 68           | 13.0                    | 54.9 | 1822                      | 304.0                   | 298.7         | 4.6             | 14.2      | 12.9                                | 7.3                             | 17.5                | 98.3           | 47                    |
| 69           | 14.4                    | 53.8 | 1868                      | 304.0                   | 298.8         | 10.3            | 14.2      | 14.2                                | 8.5                             | 17.5                | 98.3           | 47                    |
| 70           | 13.3                    | 53.2 | 1863                      | 304.0                   | 298.9         | 8.4             | 14.2      | 13.1                                | 7.0                             | 17.5                | 98.3           | 47                    |
| 71           | 11.4                    | 54.6 | 1867                      | 304.0                   | 298.9         | 2.6             | 14.2      | 11.2                                | 7.8                             | 17.5                | 98.3           | 47                    |
| 72           | 11.7                    | 53.8 | 1903                      | 304.0                   | 298.9         | 6.4             | 14.8      | 11.6                                | 9.2                             | 17.5                | 98.3           | 47                    |
| 73           | 12.3                    | 54.1 | 1871                      | 304.0                   | 298.9         | 2.6             | 14.3      | 12.7                                | 7.6                             | 17.5                | 98.3           | 47                    |
| 74           | 11.3                    | 53.9 | 1858                      | 304.0                   | 298.9         | 5.1             | 14.7      | 11.2                                | 6.4                             | 17.5                | 98.3           | 47                    |
| 75           | 12.0                    | 54.3 | 1867                      | 304.0                   | 298.9         | 2.9             | 14.2      | 11.8                                | 10.1                            | 17.5                | 98.3           | 47                    |
| 76           | 14.2                    | 54.4 | 1862                      | 304.0                   | 298.9         | 9.5             | 15.3      | 14.1                                | 6.9                             | 17.5                | 98.3           | 47                    |
| 77           | 15.7                    | 53.4 | 1868                      | 304.0                   | 298.9         | 13.5            | 14.7      | 15.5                                | 10.9                            | 17.5                | 98.3           | 47                    |
| 78           | 15.7                    | 53.4 | 1862                      | 304.0                   | 298.8         | 12.3            | 14.3      | 15.5                                | 10.0                            | 17.5                | 98.3           | 47                    |
| 79           | 15.1                    | 53.3 | 1861                      | 304.0                   | 298.9         | 12.5            | 14.6      | 14.9                                | 7.8                             | 17.5                | 98.3           | 47                    |
| 80           | 15.0                    | 54.5 | 1869                      | 304.0                   | 298.9         | 10.8            | 14.4      | 14.8                                | 6.7                             | 17.5                | 98.3           | 47                    |
| 81           | 15.9                    | 53.4 | 1867                      | 304.0                   | 298.9         | 13.4            | 14.7      | 15.7                                | 6.9                             | 17.5                | 98.3           | 47                    |
| 82           | 16.1                    | 53.9 | 1862                      | 304.0                   | 298.9         | 13.7            | 14.5      | 15.9                                | 10.9                            | 17.5                | 98.3           | 47                    |
| 83           | 13.9                    | 52.8 | 1868                      | 304.0                   | 298.9         | 10.8            | 14.1      | 13.8                                | 5.9                             | 17.5                | 98.3           | 47                    |
| 84           | 13.0                    | 53.4 | 1811                      | 304.0                   | 298.9         | 8.3             | 14.1      | 12.8                                | 6.0                             | 17.5                | 98.3           | 48                    |
| 85           | 14.1                    | 55.3 | 1903                      | 304.0                   | 298.9         | 10.0            | 15.1      | 13.3                                | 9.6                             | 17.5                | 98.3           | 48                    |
| 86           | 16.4                    | 56.1 | 1867                      | 304.0                   | 298.9         | 12.2            | 14.4      | 16.1                                | 14.1                            | 17.5                | 98.3           | 48                    |
| 87           | 13.5                    | 55.9 | 1874                      | 304.0                   | 298.9         | 8.7             | 14.5      | 13.9                                | 8.6                             | 17.5                | 98.3           | 48                    |
| 88           | 16.9                    | 55.3 | 1880                      | 304.0                   | 298.9         | 14.0            | 14.9      | 16.7                                | 10.2                            | 17.5                | 98.3           | 48                    |

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

| Data Point # | Standardized Wind Speed | LReq | 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           | 16.6                    | 56.3 | 1872                      | 304.0                   | 298.9         | 13.1            | 14.5      | 16.4                                | 9.8                             | 17.5                | 98.3           | 47                    |
| 90           | 16.1                    | 54.1 | 1863                      | 304.0                   | 298.9         | 13.9            | 14.4      | 15.9                                | 9.2                             | 17.5                | 98.3           | 47                    |
| 91           | 14.8                    | 53.3 | 1863                      | 304.0                   | 298.9         | 12.1            | 14.2      | 14.6                                | 12.1                            | 17.5                | 98.3           | 47                    |
| 92           | 13.2                    | 54.0 | 1874                      | 304.0                   | 298.9         | 7.2             | 14.2      | 13.0                                | 10.9                            | 17.5                | 98.3           | 47                    |
| 93           | 16.1                    | 54.7 | 1855                      | 304.0                   | 298.9         | 14.7            | 15.2      | 15.9                                | 10.2                            | 17.5                | 98.3           | 47                    |
| 94           | 13.9                    | 53.6 | 1871                      | 304.0                   | 298.9         | 12.0            | 14.0      | 13.7                                | 8.2                             | 17.5                | 98.3           | 47                    |
| 95           | 16.5                    | 54.1 | 1860                      | 304.0                   | 298.9         | 14.6            | 15.1      | 16.4                                | 8.5                             | 17.5                | 98.3           | 47                    |
| 96           | 18.2                    | 53.5 | 1862                      | 304.0                   | 298.9         | 15.6            | 14.4      | 18.0                                | 10.8                            | 17.5                | 98.3           | 47                    |
| 97           | 17.5                    | 54.5 | 1859                      | 304.0                   | 298.9         | 14.5            | 14.8      | 17.2                                | 9.5                             | 17.5                | 98.3           | 47                    |
| 98           | 16.5                    | 53.5 | 1866                      | 304.0                   | 298.8         | 13.1            | 14.2      | 16.3                                | 9.8                             | 17.5                | 98.3           | 47                    |
| 99           | 15.4                    | 53.4 | 1865                      | 304.0                   | 298.7         | 11.7            | 14.4      | 15.2                                | 9.6                             | 17.5                | 9              |                       |

# Table E.01 Measurement data - Turbine ON

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 Report ID: 14000.07.T409.RP1

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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 | LReq | 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          | 15.6                    | 53.6 | 1863                      | 304.0                   | 302.3         | 12.2            | 14.2      | 15.4                                | 9.7                             | 17.5                | 98.3           | 46                    |
| 178          | 14.0                    | 54.4 | 1863                      | 304.0                   | 302.4         | 9.9             | 14.3      | 13.9                                | 9.2                             | 17.5                | 98.3           | 46                    |
| 179          | 13.1                    | 53.4 | 1864                      | 304.0                   | 302.4         | 7.2             | 14.3      | 13.0                                | 7.6                             | 17.5                | 98.3           | 45                    |
| 180          | 12.7                    | 53.9 | 1870                      | 304.0                   | 302.3         | 5.7             | 14.3      | 12.5                                | 7.4                             | 17.5                | 98.3           | 45                    |
| 181          | 13.7                    | 53.8 | 1860                      | 304.0                   | 302.3         | 7.6             | 14.7      | 13.5                                | 10.5                            | 17.5                | 98.3           | 45                    |
| 182          | 15.1                    | 53.5 | 1865                      | 304.0                   | 302.3         | 9.7             | 14.6      | 15.0                                | 8.3                             | 17.5                | 98.0           | 45                    |
| 183          | 14.0                    | 53.7 | 1864                      | 304.0                   | 302.3         | 8.7             | 14.3      | 13.8                                | 6.6                             | 17.5                | 97.9           | 45                    |
| 184          | 11.8                    | 54.0 | 1861                      | 304.0                   | 302.4         | 6.1             | 14.4      | 11.6                                | 5.9                             | 17.5                | 97.9           | 45                    |
| 185          |                         | 1876 | 304.0                     | 302.3                   | 3.2           | 14.3            | 10.7      | 7.3                                 | 7.3                             | 17.5                | 97.9           | 46                    |
| 186          | 12.5                    | 53.8 | 1866                      | 304.0                   | 302.4         | 5.0             | 14.6      | 12.3                                | 7.0                             | 17.5                | 97.8           | 46                    |
| 187          | 12.2                    | 53.5 | 1866                      | 304.0                   | 302.4         | 4.7             | 14.4      | 12.1                                | 8.6                             | 17.5                | 97.8           | 46                    |
| 188          | 12.8                    | 54.1 | 1860                      | 304.0                   | 302.4         | 4.7             | 14.4      | 12.6                                | 7.2                             | 17.5                | 97.6           | 46                    |
| 189          | 10.6                    | 54.4 | 1677                      | 304.0                   | 302.4         | 1.0             | 14.3      | 11.0                                | 6.5                             | 17.5                | 97.5           | 46                    |
| 190          | 12.1                    | 54.2 | 1928                      | 304.0                   | 302.3         | 2.1             | 14.7      | 11.9                                | 5.7                             | 17.5                | 97.5           | 46                    |
| 191          | 10.8                    | 54.5 | 1711                      | 304.0                   | 302.3         | 1.0             | 14.2      | 10.5                                | 5.7                             | 17.5                | 97.5           | 45                    |
| 192          |                         | 1865 | 304.0                     | 302.3                   | 0.3           | 14.6            | 11.1      | 6.6                                 | 6.7                             | 17.5                | 97.5           | 45                    |
| 193          | 9.7                     | 53.9 | 1467                      | 304.0                   | 302.4         | -0.3            | 14.3      | 10.0                                | 7.4                             | 17.5                | 97.4           | 45                    |
| 194          | 10.9                    | 54.9 | 1742                      | 304.0                   | 302.3         | -1.2            | 14.5      | 10.7                                | 6.5                             | 17.5                | 97.9           | 45                    |
| 195          | 9.4                     | 55.5 | 1362                      | 304.0                   | 302.3         | -0.8            | 14.4      | 9.9                                 | 6.0                             | 17.5                | 98.3           | 45                    |
| 196          |                         | 1774 | 304.0                     | 302.3                   | -0.2          | 14.9            | 9.4       | 7.8                                 | 7.0                             | 17.5                | 98.3           | 45                    |
| 197          | 14.3                    | 53.9 | 1922                      | 304.0                   | 302.4         | 11.6            | 15.3      | 14.1                                | 8.0                             | 17.5                | 98.3           | 46                    |
| 198          | 15.1                    | 53.8 | 1866                      | 304.0                   | 302.4         | 10.6            | 14.4      | 14.9                                | 10.3                            | 17.5                | 98.3           | 46                    |
| 199          | 15.6                    | 53.6 | 1866                      | 304.0                   | 302.3         | 13.4            | 14.3      | 14.4                                | 7.2                             | 17.5                | 98.3           | 46                    |
| 200          | 12.6                    | 54.4 | 1861                      | 304.0                   | 302.3         | 6.9             | 14.4      | 12.4                                | 6.5                             | 17.5                | 97.9           | 46                    |
| 201          | 13.0                    | 54.9 | 1852                      | 304.0                   | 302.3         | 5.5             | 14.9      | 12.9                                | 6.4                             | 17.5                | 96.5           | 46                    |
| 202          | 17.2                    | 53.5 | 1888                      | 304.0                   | 302.3         | 12.9            | 14.9      | 17.0                                | 5.4                             | 17.5                | 96.5           | 46                    |
| 203          | 15.5                    | 53.7 | 1864                      | 304.0                   | 302.3         | 10.2            | 14.3      | 15.3                                | 6.9                             | 17.5                | 96.5           | 46                    |
| 204          | 14.1                    | 53.3 | 1854                      | 304.0                   | 302.3         | 11.8            | 14.6      | 13.9                                | 5.8                             | 17.5                | 96.4           | 46                    |
| 205          | 13.4                    | 54.4 | 1866                      | 304.0                   | 302.3         | 8.0             | 14.4      | 13.2                                | 6.1                             | 17.5                | 96.4           | 46                    |
| 206          | 13.0                    | 54.4 | 1881                      | 304.0                   | 302.3         | 7.0             | 14.3      | 12.8                                | 8.2                             | 17.5                | 96.9           | 46                    |
| 207          | 14.4                    | 54.9 | 1861                      | 304.0                   | 302.4         | 10.8            | 14.6      | 14.2                                | 10.8                            | 17.5                | 98.3           | 46                    |
| 208          |                         | 1872 | 304.0                     | 302.3                   | 9.3           | 14.3            | 10.8      | 9.3                                 | 9.9                             | 17.5                | 98.3           | 46                    |
| 209          | 13.0                    | 53.9 | 1855                      | 304.0                   | 302.3         | 9.6             | 14.7      | 12.8                                | 6.6                             | 17.5                | 98.3           | 45                    |
| 210          | 12.0                    | 54.2 | 1871                      | 304.0                   | 302.4         | 4.9             | 14.1      | 11.8                                | 6.6                             | 17.5                | 98.3           | 45                    |
| 211          | 12.5                    | 53.6 | 1861                      | 304.0                   | 302.4         | 6.9             | 14.8      | 12.4                                | 8.7                             | 17.5                | 98.3           | 45                    |
| 212          | 10.1                    | 54.5 | 1861                      | 304.0                   | 302.4         | 9.6             | 14.3      | 10.3                                | 9.2                             | 17.5                | 98.3           | 45                    |
| 213          |                         | 1811 | 304.0                     | 302.3                   | -0.2          | 14.8            | 10.3      | 6.2                                 | 6.2                             | 17.5                | 98.3           | 45                    |
| 214          | 15.3                    | 54.8 | 1896                      | 304.0                   | 302.3         | 10.1            | 15.2      | 15.1                                | 5.5                             | 17.5                | 97.0           | 46                    |
| 215          | 16.3                    | 53.8 | 1857                      | 304.0                   | 302.4         | 12.8            | 14.8      | 16.1                                | 7.6                             | 17.5                | 97.9           | 46                    |
| 216          | 14.8                    | 54.8 | 1872                      | 304.0                   | 302.4         | 9.4             | 14.6      | 14.0                                | 8.2                             | 17.5                | 96.6           | 46                    |
| 217          | 13.5                    | 54.5 | 1857                      | 304.0                   | 302.4         | 8.0             | 14.4      | 13.3                                | 4.7                             | 17.5                | 96.3           | 46                    |
| 218          | 10.3                    | 54.8 | 1608                      | 304.0                   | 302.4         | 2.1             | 14.0      | 11.4                                | 5.0                             | 17.5                | 96.4           | 46                    |
| 219          | 12.4                    | 55.6 | 1885                      | 304.0                   | 302.4         | 1.6             | 14.7      | 12.3                                | 9.7                             | 17.5                | 96.4           | 46                    |
| 220          | 11.7                    | 53.1 | 1863                      | 304.0                   | 302.4         | 3.3             | 14.6      | 11.6                                | 8.9                             | 17.5                | 97.6           | 46                    |
| 221          | 12.5                    | 54.4 | 1908                      | 304.0                   | 302.1         | 3.0             | 14.8      | 12.3                                | 8.0                             | 17.5                | 97.6           | 45                    |
| 222          | 12.3                    | 53.6 | 1871                      | 304.0                   | 298.5         | 7.8             | 14.8      | 12.1                                | 6.6                             | 17.5                | 98.2           | 45                    |
| 223          | 12.9                    | 54.1 | 1868                      | 304.0                   | 293.9         | 6.4             | 14.4      | 12.7                                | 6.3                             | 17.5                | 98.3           | 45                    |
| 224          | 14.7                    | 53.9 | 1855                      | 304.0                   | 292.9         | 11.4            | 15.0      | 14.5                                | 5.6                             | 17.5                | 98.3           | 45                    |
| 225          | 14.2                    | 53.2 | 1876                      | 304.0                   | 292.9         | 10.0            | 14.3      | 14.0                                | 4.5                             | 17.5                | 97.5           | 45                    |
| 226          | 14.1                    | 53.7 | 1860                      | 304.0                   | 292.9         | 10.4            | 14.4      | 13.9                                | 6.4                             | 17.5                | 96.8           | 46                    |
| 227          | 12.9                    | 53.6 | 1860                      | 304.0                   | 292.9         | 8.6             | 14.4      | 12.8                                | 5.3                             | 17.5                | 96.9           | 47                    |
| 228          | 13.2                    | 53.1 | 1865                      | 304.0                   | 292.9         | 8.0             | 14.5      | 13.1                                | 6.6                             | 17.5                | 96.9           | 47                    |
| 229          | 13.0                    | 52.4 | 1869                      | 304.0                   | 292.9         | 7.8             | 14.3      | 12.8                                | 8.2                             | 17.5                | 97.0           | 47                    |
| 230          | 13.7                    | 53.9 | 1857                      | 304.0                   | 292.9         | 8.4             | 14.5      | 13.5                                | 7.9                             | 17.5                | 97.1           | 47                    |
| 231          | 12.2                    | 54.6 | 1811                      | 304.0                   | 292.9         | 2.9             | 14.3      | 12.1                                | 7.8                             | 17.5                | 97.4           | 47                    |
| 232          | 12.4                    | 54.6 | 1887                      | 304.0                   | 292.9         | 5.0             | 14.8      | 12.3                                | 8.1                             | 17.5                | 97.3           | 46                    |
| 233          | 13.2                    | 53.5 | 1867                      | 304.0                   | 292.9         | 8.1             | 14.5      | 13.0                                | 9.2                             | 17.5                | 97.3           | 45                    |
| 234          | 12.5                    | 53.6 | 1868                      | 304.0                   | 292.9         | 5.2             | 14.3      | 12.4                                | 6.5                             | 17.5                | 97.6           | 45                    |
| 235          | 12.8                    | 53.0 | 1859                      | 304.0                   | 292.9         | 9.0             | 15.0      | 12.2                                | 6.3                             | 17.5                | 98.3           | 45                    |
| 236          | 14.0                    | 54.4 | 1864                      | 304.0                   | 292.9         | 10.6            | 14.4      | 13.6                                | 5.4                             | 17.5                | 98.3           | 45                    |
| 237          | 14.7                    | 53.4 | 1865                      | 304.0                   | 292.9         | 9.6             | 14.4      | 14.5                                | 8.2                             | 17.5                | 98.3           | 45                    |
| 238          | 15.3                    | 53.4 | 1866                      | 304.0                   | 292.9         | 9.7             | 14.5      | 15.1                                | 7.0                             | 17.5                | 98.2           | 46                    |
| 239          | 14.1                    | 53.3 | 1862                      | 304.0                   | 292.9         | 9.8             | 14.4      | 13.9                                | 7.0                             | 17.5                | 98.2           | 46                    |
| 240          | 14.4                    | 53.7 | 1869                      | 304.0                   | 292.9         | 7.0             | 14.2      | 14.2                                | 7.4                             | 17.5                | 98.3           | 46                    |
| 241          | 12.2                    | 53.7 | 1870                      | 304.0                   | 292.9         | 5.9             | 14.5      | 12.1                                | 7.3                             | 17.5                | 98.6           | 46                    |
| 242          | 13.5                    | 52.6 | 1867                      | 304.0                   | 292.8         | 8.8             | 14.7      | 13.4                                | 6.5                             | 17.5                | 96.7           | 46                    |
| 243          | 15.2                    | 53.6 | 1858                      | 304.0                   | 292.9         | 11.4            | 14.6      | 15.0                                | 7.5                             | 17.5                | 97.6           | 46                    |
| 244          | 14.8                    | 53.8 | 1865                      | 304.0                   | 292.9         | 9.7             | 14.3      | 14.7                                | 8.0                             | 17.5                | 97.5           | 46                    |
| 245          | 13.7                    | 53.9 | 1864                      | 304.0                   | 292.9         | 10.9            | 14.5      | 13.5                                | 9.1                             | 17.5                | 97.7           | 45                    |
| 246          | 15.7                    | 53.2 | 1862                      | 304.0                   | 292.9         | 13.4            | 14.5      | 15.5                                | 8.2                             | 17.5                | 98.3           | 46                    |
| 247          | 15.7                    | 53.0 | 1865                      | 304.0                   | 292.9         | 11.2            | 14.3      | 15.5                                | 6.6                             | 17.5                | 98.3           | 46                    |
| 248          | 14.6                    | 52.8 | 1864                      | 304.0                   | 292.9         | 11.1            | 14.6      | 14.4                                | 10.0                            | 17.5                | 98.3           | 46                    |
| 249          | 12.6                    | 52.8 | 1864                      | 304.0                   | 292.9         | 6.0             | 14.4      | 12.5                                | 8.2                             | 17.5                | 98.3           | 45                    |
| 250          |                         | 1870 | 304.0                     | 292.9                   | 4.3           | 14.4            | 10.5      | 8.7                                 | 6.7                             | 17.5                | 98.3           | 45                    |
| 251          |                         | 1828 | 304.0                     | 292.9                   | 1.9           | 14.1            | 10.7      | 7.7                                 | 7.7                             | 17.5                | 98.3           | 45                    |
| 252          |                         | 1909 | 304.0                     | 292.9                   | 0.2           | 14.6            | 9.9       | 9.4                                 | 9.4                             | 17.5                | 98.3           | 45                    |
| 253          | 12.5                    | 53.7 | 1864                      | 304.0                   | 292.9         | 4.6             | 14.9      | 13.3                                | 9.1                             | 17.5                | 98.3           | 45                    |
| 254          | 14.2                    | 53.0 | 1856                      | 304.0                   | 292.9         | 11.9            | 15.1      | 14.0                                | 8.6                             | 17.5                | 98.3           | 45                    |
| 255          | 13.7                    | 52.9 | 1860                      | 304.0                   | 292.9         | 10.4            | 14.3      | 13.5                                | 8.4                             | 17.5                | 98.3           | 45                    |
| 256          | 13.6                    | 53.6 | 1873                      | 304.0                   | 292.9         | 5.1             | 14.2      | 13.4                                | 8.2                             | 17.5                | 98.3           | 44                    |
| 257          | 14.1                    | 53.4 | 1873                      | 304.0                   | 292.9         | 9.1             | 14.9      | 14.0                                | 10.5                            | 17.5                | 98.3           | 44                    |
| 258          | 14.5                    | 53.9 | 1860                      | 304.0                   | 292.9         | 10.6            | 14.4      | 14.3                                | 9.3                             | 17.5                | 98.3           | 44                    |
| 259          | 13.6                    | 53.2 | 1862                      | 304.0                   | 292.9         | 9.5             | 14.5      | 13.4                                | 9.1                             | 17.5                | 98.3           | 44                    |
| 260          | 13.5                    | 53.7 | 1864                      | 304.0                   | 292.9         | 7.9             | 14.4      | 13.3                                | 8.4                             | 17.5                | 98.3           | 44                    |
| 261          | 12.0                    | 53.4 | 1865                      | 304.0                   | 292.9         | 5.1             | 14.2      | 11.8                                | 8.1                             | 17.5                | 98.3           | 44                    |
| 262          | 12.4                    | 53.4 | 1870                      | 304.0                   | 292.9         | 6.0             | 14.8      | 12.2                                | 6.2                             | 17.5                | 98.3           | 44                    |
| 263          | 16.8                    | 53.7 | 1860                      | 304.0                   | 292.9         | 14.8            | 15.2      | 16.6                                | 8.1                             | 17.5                | 98.3           | 45                    |
| 264          | 15.7                    | 53.2 | 1863                      | 304.0                   | 292.9         | 13.1            | 14.1      | 15.5                                | 7.0                             | 17.5                | 98.3           | 45                    |

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

| Data Point # | Standardized Wind Speed | LReq | 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          | 15.5                    | 53.9 | 1862                      | 304.0                   | 292.9         | 12.7            | 14.7      | 15.3                                | 8.1                             | 17.5                | 98.3           | 45                    |
| 266          | 15.3                    | 54.0 | 1869                      | 304.0                   | 295.0         | 12.7            | 14.5      | 15.1                                | 8.1                             | 17.5                | 98.3           | 45                    |
| 267          | 13.9                    | 54.0 | 1863                      | 304.0                   | 299.8         | 12.2            | 14.3      | 13.7                                | 8.1                             | 17.5                | 98.3           | 45                    |
| 268          | 13.6                    | 53.6 | 1865                      | 304.0                   | 303.4         | 9.2             | 14.1      | 13.4                                | 8.6                             | 17.5                | 98.3           | 45                    |
| 269          | 12.8                    | 54.2 | 1862                      | 304.0                   | 303.7         | 7.9             | 14.5      | 12.6                                | 8.8                             | 17.5                | 98.3           | 45                    |
| 270          | 13.0                    | 54.5 | 1866                      | 304.0                   | 303.7         | 7.9             | 14.7      | 12.9                                | 7.9                             | 17.5                | 98.3           | 45                    |
| 271          | 14.5                    | 53.8 | 1870                      | 304.0                   | 303.7         | 9.8             | 14.5      | 14.3                                | 8.0                             | 17.5                | 98.3           | 45                    |
| 272          | 15.0                    | 53.7 | 1857                      | 304.0                   | 303.8         | 11.6            | 14.8      | 14.8                                | 8.4                             | 17.5                | 98.3           | 45                    |
| 273          | 14.7                    | 53.2 | 1870                      | 304.0                   | 303.8         | 7.5             | 14.0      | 14.5                                | 7.8                             | 17.5                | 98.3           | 45                    |
| 274          | 14.0                    | 54.0 | 1844                      | 304.0                   | 303.7         | 5.9             | 14.3      | 13.8                                | 7.4                             | 17.5                | 98.3           | 45                    |
| 275          | 10.6                    | 54.2 | 166                       |                         |               |                 |           |                                     |                                 |                     |                |                       |

# Table E.01 Measurement data - Turbine ON

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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 | LAdq | 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          | 9.5                     | 54.1 | 1379                      | 304.0                   | 301.2         | -0.3            | 14.3      | 9.8                                 | 6.1                             | 17.5                 | 98.3           | 45                    |
| 354          | 9.2                     | 55.1 | 1302                      | 304.0                   | 301.6         | -1.1            | 14.4      | 10.3                                | 6.8                             | 17.5                 | 98.3           | 45                    |
| 355          | 10.5                    | 55.4 | 1644                      | 304.0                   | 301.0         | -1.3            | 14.7      | 10.3                                | 7.0                             | 17.5                 | 98.3           | 45                    |
| 356          |                         |      | 1822                      | 304.0                   | 301.0         | -0.5            | 14.5      | 10.7                                | 5.8                             | 17.5                 | 98.3           | 45                    |
| 357          | 8.9                     | 54.3 | 1175                      | 304.0                   | 301.0         | -1.0            | 14.3      | 8.2                                 | 6.4                             | 17.5                 | 98.3           | 45                    |
| 358          | 9.8                     | 55.0 | 1493                      | 304.0                   | 301.0         | -2.2            | 14.6      | 10.4                                | 5.6                             | 17.5                 | 98.3           | 45                    |
| 359          | 13.4                    | 54.5 | 1629                      | 304.0                   | 301.0         | -0.7            | 14.5      | 10.5                                | 3.9                             | 17.5                 | 98.2           | 45                    |
| 360          | 12.5                    | 54.4 | 1804                      | 304.0                   | 299.9         | 0.3             | 14.7      | 12.3                                | 3.9                             | 17.5                 | 97.9           | 45                    |
| 361          | 11.3                    | 53.9 | 1857                      | 304.0                   | 292.0         | 2.3             | 14.8      | 11.1                                | 4.1                             | 17.5                 | 97.2           | 46                    |
| 362          |                         |      | 1706                      | 304.0                   | 288.0         | 0.3             | 14.1      | 10.1                                | 4.0                             | 17.6                 | 97.0           | 46                    |
| 363          |                         |      | 1707                      | 304.0                   | 287.4         | 0.7             | 14.8      | 10.7                                | 5.6                             | 17.6                 | 98.9           | 46                    |
| 364          |                         |      | 1909                      | 304.0                   | 287.5         | 7.5             | 14.8      | 11.3                                | 4.4                             | 17.6                 | 97.1           | 46                    |
| 365          | 8.2                     | 53.6 | 965                       | 304.0                   | 316.6         | 12.1            | 14.1      | 13.4                                | 7.4                             | 16.8                 | 97.2           | 47                    |
| 366          | 9.4                     | 53.5 | 1345                      | 304.0                   | 316.6         | 8.9             | 14.2      | 12.4                                | 5.9                             | 16.8                 | 97.2           | 47                    |
| 367          | 10.8                    | 53.1 | 1708                      | 304.0                   | 316.6         | 8.5             | 14.5      | 13.8                                | 6.3                             | 16.8                 | 97.2           | 47                    |
| 368          | 13.3                    | 53.5 | 1866                      | 304.0                   | 316.4         | 6.3             | 14.3      | 13.2                                | 5.5                             | 16.8                 | 97.2           | 47                    |
| 369          | 12.8                    | 54.0 | 1872                      | 304.0                   | 316.6         | 4.8             | 14.4      | 12.6                                | 5.1                             | 16.8                 | 97.2           | 47                    |
| 370          | 12.9                    | 53.9 | 1777                      | 304.0                   | 316.6         | 5.7             | 14.3      | 12.7                                | 4.5                             | 16.8                 | 97.2           | 47                    |
| 371          | 9.8                     | 54.4 | 1482                      | 304.0                   | 316.6         | 1.3             | 14.3      | 11.1                                | 4.8                             | 16.8                 | 97.2           | 48                    |
| 372          | 9.8                     | 54.6 | 1493                      | 304.0                   | 316.6         | 0.3             | 14.4      | 11.0                                | 5.9                             | 16.8                 | 97.2           | 48                    |
| 373          |                         |      | 1875                      | 304.0                   | 316.5         | 0.0             | 14.8      | 10.1                                | 5.2                             | 16.8                 | 97.2           | 48                    |
| 374          |                         |      | 1888                      | 304.0                   | 316.6         | 2.1             | 14.5      | 9.1                                 | 4.6                             | 16.8                 | 97.2           | 48                    |
| 375          | 12.2                    | 56.2 | 1888                      | 304.0                   | 316.6         | 11.9            | 14.5      | 12.0                                | 5.5                             | 16.8                 | 97.2           | 48                    |
| 376          | 13.4                    | 54.1 | 1880                      | 304.0                   | 316.4         | 8.7             | 14.7      | 13.2                                | 6.0                             | 16.7                 | 97.1           | 48                    |
| 377          | 12.2                    | 54.8 | 1870                      | 304.0                   | 316.6         | 4.8             | 14.3      | 12.1                                | 10.4                            | 16.7                 | 97.2           | 48                    |
| 378          | 14.4                    | 54.7 | 1866                      | 304.0                   | 316.6         | 9.6             | 15.0      | 14.2                                | 10.0                            | 16.7                 | 97.2           | 48                    |
| 379          | 15.3                    | 54.2 | 1865                      | 304.0                   | 316.6         | 11.8            | 14.7      | 15.1                                | 10.7                            | 16.7                 | 97.2           | 48                    |
| 380          | 16.9                    | 54.7 | 1858                      | 304.0                   | 316.6         | 14.3            | 14.8      | 16.7                                | 11.2                            | 16.7                 | 97.2           | 48                    |
| 381          | 15.5                    | 54.3 | 1866                      | 304.0                   | 316.6         | 11.8            | 14.1      | 15.3                                | 10.7                            | 16.7                 | 97.2           | 48                    |
| 382          | 13.9                    | 54.0 | 1866                      | 304.0                   | 316.6         | 10.0            | 14.4      | 13.0                                | 8.9                             | 16.7                 | 97.2           | 48                    |
| 383          | 15.2                    | 54.0 | 1860                      | 304.0                   | 316.6         | 10.2            | 14.4      | 15.7                                | 6.9                             | 16.6                 | 97.1           | 48                    |
| 384          | 12.8                    | 54.8 | 1866                      | 304.0                   | 316.6         | 4.0             | 14.1      | 12.6                                | 6.3                             | 16.6                 | 97.1           | 48                    |
| 385          | 14.9                    | 54.7 | 1936                      | 304.0                   | 316.6         | 9.9             | 15.3      | 14.7                                | 6.3                             | 16.6                 | 97.1           | 48                    |
| 386          | 15.9                    | 54.0 | 1866                      | 304.0                   | 316.6         | 12.4            | 14.4      | 15.7                                | 6.2                             | 16.6                 | 97.2           | 48                    |
| 387          | 14.1                    | 54.0 | 1861                      | 304.0                   | 316.5         | 9.4             | 14.2      | 14.0                                | 6.3                             | 16.6                 | 97.1           | 48                    |
| 388          | 14.0                    | 54.6 | 1868                      | 304.0                   | 316.6         | 1.9             | 14.8      | 13.9                                | 9.9                             | 16.6                 | 97.1           | 48                    |
| 389          | 14.4                    | 54.4 | 1864                      | 304.0                   | 316.5         | 11.4            | 14.5      | 14.3                                | 9.9                             | 16.5                 | 97.1           | 49                    |
| 390          | 14.1                    | 54.4 | 1865                      | 304.0                   | 316.6         | 10.2            | 14.4      | 13.9                                | 7.6                             | 16.5                 | 97.1           | 49                    |
| 391          | 13.6                    | 53.7 | 1861                      | 304.0                   | 316.6         | 6.9             | 14.2      | 13.4                                | 7.6                             | 16.5                 | 97.1           | 49                    |
| 392          | 13.4                    | 54.1 | 1867                      | 304.0                   | 316.5         | 7.1             | 14.6      | 13.3                                | 10.8                            | 16.5                 | 97.1           | 49                    |
| 393          | 12.7                    | 55.3 | 1823                      | 304.0                   | 316.6         | 5.4             | 14.4      | 12.5                                | 8.4                             | 16.5                 | 97.1           | 49                    |
| 394          | 14.2                    | 55.2 | 1904                      | 304.0                   | 316.6         | 9.6             | 14.6      | 14.0                                | 5.5                             | 16.5                 | 97.1           | 49                    |
| 395          | 11.1                    | 56.1 | 1766                      | 304.0                   | 316.6         | 4.6             | 14.0      | 10.9                                | 9.3                             | 16.4                 | 97.1           | 50                    |
| 396          | 13.6                    | 55.8 | 1864                      | 304.0                   | 316.6         | 11.8            | 15.1      | 13.5                                | 10.0                            | 16.4                 | 97.1           | 50                    |
| 397          | 14.1                    | 55.0 | 1861                      | 304.0                   | 316.6         | 10.5            | 14.6      | 13.9                                | 7.9                             | 16.4                 | 97.1           | 50                    |
| 398          | 12.7                    | 54.7 | 1891                      | 304.0                   | 316.6         | 3.6             | 14.1      | 12.5                                | 6.2                             | 16.4                 | 97.1           | 50                    |
| 399          | 13.0                    | 56.3 | 1873                      | 304.0                   | 316.6         | 6.0             | 14.8      | 12.8                                | 6.7                             | 16.4                 | 97.1           | 50                    |
| 400          | 13.2                    | 55.1 | 1864                      | 304.0                   | 316.5         | 7.1             | 14.4      | 13.0                                | 6.8                             | 16.4                 | 97.1           | 50                    |
| 401          | 13.7                    | 55.7 | 1868                      | 304.0                   | 316.6         | 8.4             | 14.8      | 13.5                                | 7.0                             | 16.4                 | 97.1           | 50                    |
| 402          | 14.8                    | 54.8 | 1859                      | 304.0                   | 316.6         | 11.7            | 14.7      | 14.6                                | 7.4                             | 16.4                 | 97.1           | 50                    |
| 403          | 14.9                    | 55.0 | 1868                      | 304.0                   | 316.6         | 10.1            | 14.3      | 14.7                                | 7.6                             | 16.4                 | 97.1           | 50                    |
| 404          | 13.7                    | 55.4 | 1864                      | 304.0                   | 316.6         | 6.7             | 14.1      | 13.6                                | 8.4                             | 16.4                 | 97.1           | 50                    |
| 405          | 13.8                    | 56.3 | 1862                      | 304.0                   | 316.6         | 7.6             | 14.7      | 13.7                                | 7.7                             | 16.3                 | 97.0           | 50                    |
| 406          | 12.8                    | 56.6 | 1869                      | 304.0                   | 316.6         | 6.8             | 14.3      | 12.6                                | 6.7                             | 16.3                 | 97.0           | 50                    |
| 407          | 14.0                    | 56.8 | 1863                      | 304.0                   | 316.6         | 4.1             | 14.3      | 13.8                                | 5.3                             | 16.3                 | 97.1           | 50                    |
| 408          | 12.0                    | 55.7 | 1832                      | 304.0                   | 316.6         | 2.3             | 14.5      | 11.8                                | 5.2                             | 16.3                 | 97.1           | 50                    |
| 409          | 12.0                    | 54.8 | 1896                      | 304.0                   | 316.6         | 5.0             | 14.7      | 11.9                                | 8.8                             | 16.3                 | 97.0           | 50                    |
| 410          | 12.5                    | 55.0 | 1862                      | 304.0                   | 316.6         | 5.2             | 14.5      | 12.3                                | 8.6                             | 16.3                 | 97.1           | 50                    |
| 411          |                         |      | 1864                      | 304.0                   | 316.6         | 3.5             | 14.4      | 10.1                                | 8.5                             | 16.3                 | 97.1           | 50                    |
| 412          |                         |      | 1785                      | 304.0                   | 316.6         | -0.1            | 14.1      | 10.3                                | 8.2                             | 16.2                 | 97.1           | 50                    |
| 413          |                         |      | 1725                      | 304.0                   | 316.6         | -1.5            | 14.4      | 9.4                                 | 5.7                             | 16.2                 | 97.1           | 50                    |
| 414          |                         |      | 1875                      | 304.0                   | 316.6         | -1.5            | 14.5      | 9.4                                 | 5.2                             | 16.2                 | 97.1           | 50                    |
| 415          |                         |      | 1863                      | 304.0                   | 316.6         | -1.2            | 14.5      | 10.2                                | 4.9                             | 16.2                 | 97.1           | 50                    |
| 416          |                         |      | 1490                      | 304.0                   | 316.6         | 0.4             | 14.3      | 11.0                                | 6.8                             | 16.2                 | 97.1           | 50                    |
| 417          |                         |      | 1851                      | 304.0                   | 316.6         | 0.1             | 14.8      | 10.0                                | 5.0                             | 16.2                 | 97.1           | 50                    |
| 418          |                         |      | 1666                      | 304.0                   | 316.5         | 0.8             | 14.2      | 10.6                                | 6.2                             | 16.1                 | 97.1           | 51                    |
| 419          |                         |      | 1037                      | 304.0                   | 316.6         | -1.0            | 14.3      | 8.3                                 | 5.1                             | 16.1                 | 97.1           | 51                    |
| 420          |                         |      | 1511                      | 304.0                   | 316.6         | -2.1            | 14.6      | 10.3                                | 7.6                             | 16.1                 | 97.1           | 51                    |
| 421          |                         |      | 1781                      | 304.0                   | 316.6         | -1.3            | 14.4      | 8.2                                 | 10.2                            | 16.1                 | 97.1           | 51                    |
| 422          | 12.0                    | 54.5 | 1928                      | 304.0                   | 316.6         | 2.0             | 14.7      | 11.9                                | 6.8                             | 16.1                 | 97.1           | 51                    |
| 423          |                         |      | 1809                      | 304.0                   | 316.6         | 1.5             | 14.3      | 9.6                                 | 4.5                             | 16.1                 | 97.1           | 52                    |
| 424          |                         |      | 1874                      | 304.0                   | 316.6         | -0.6            | 14.5      | 11.0                                | 3.5                             | 16.0                 | 97.1           | 52                    |
| 425          |                         |      | 1788                      | 304.0                   | 316.6         | -0.2            | 14.5      | 10.4                                | 3.9                             | 16.0                 | 97.1           | 52                    |
| 426          | 11.4                    | 55.9 | 1921                      | 304.0                   | 316.6         | 0.6             | 14.7      | 11.3                                | 4.8                             | 16.0                 | 97.1           | 52                    |
| 427          | 14.6                    | 55.0 | 1858                      | 304.0                   | 316.6         | 10.7            | 15.2      | 14.4                                | 7.1                             | 16.0                 | 97.1           | 52                    |
| 428          | 14.1                    | 54.9 | 1867                      | 304.0                   | 316.6         | 8.9             | 14.3      | 13.9                                | 8.3                             | 16.0                 | 97.1           | 52                    |
| 429          | 14.6                    | 53.9 | 1866                      | 304.0                   | 316.6         | 9.6             | 14.4      | 14.4                                | 7.5                             | 15.9                 | 97.1           | 52                    |
| 430          | 14.2                    | 53.5 | 1865                      | 304.0                   | 316.6         | 9.7             | 14.4      | 14.0                                | 8.7                             | 15.8                 | 97.1           | 51                    |
| 431          | 14.5                    | 55.5 | 1864                      | 304.0                   | 316.6         | 9.7             | 14.6      | 14.4                                | 7.3                             | 15.8                 | 97.1           | 51                    |
| 432          | 14.6                    | 54.8 | 1865                      | 304.0                   | 316.6         | 8.2             | 14.2      | 14.4                                | 6.0                             | 15.8                 | 97.1           | 51                    |
| 433          | 12.5                    | 54.5 | 1860                      | 304.0                   | 316.6         | 7.0             | 14.4      | 12.3                                | 7.1                             | 15.8                 | 97.1           | 51                    |
| 434          | 12.3                    | 54.6 | 1868                      | 304.0                   | 316.5         | 5.4             | 14.3      | 12.2                                | 6.4                             | 15.8                 | 97.1           | 51                    |
| 435          | 12.9                    | 54.7 | 1865                      | 304.0                   | 316.4         | 4.7             | 14.5      | 12.7                                | 6.0                             | 15.7                 | 97.2           | 52                    |
| 436          | 11.7                    | 54.7 | 1863                      | 304.0                   | 316.6         | 7.0             | 14.8      | 11.5                                | 5.2                             | 15.6                 | 97.1           | 53                    |
| 437          | 13.8                    | 55.0 | 1865                      | 304.0                   | 316.4         | 8.1             | 14.5      | 13.6                                | 7.5                             | 15.6                 | 97.1           | 53                    |
| 438          | 12.6                    | 54.7 | 1868                      | 304.0                   | 316.6         | 6.2             | 14.1      | 12.4                                | 10.7                            | 15.6                 | 97.1           | 53                    |
| 439          | 9.8                     | 55.8 | 1494                      | 304.0                   | 316.6         | 0.5             | 14.3      | 9.6                                 | 8.4                             | 15.6                 | 97.1           | 53                    |
| 440          |                         |      | 1821                      | 304.0                   | 316.5         | 1.0             | 14.5      | 10.5                                | 8.4                             | 15.6                 | 97.1           | 53                    |

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

| Data Point # | Standardized Wind Speed | LAdq | 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          | 10.6                    | 57.0 | 1669                      | 304.0                   | 316.6         | -0.2            | 14.6      | 10.0                                | 6.8                             | 15.5                 | 97.1           | 54                    |
| 442          | 11.0                    | 54.5 | 1754                      | 304.0                   | 316.6         | 2.6             | 14.3      | 10.8                                | 6.8                             | 15.4                 | 97.2           | 55                    |
| 443          | 10.4                    | 56.4 | 1632                      | 304.0                   | 316.6         | -1.3            | 14.4      | 9.1                                 | 4.6                             | 15.4                 | 97.2           | 55                    |
| 444          | 9.9                     | 56.2 | 1514                      | 304.0                   | 316.6         | -1.9            | 14.4      | 9.5                                 | 5.2                             | 15.4                 | 97.3           | 55                    |
| 445          | 13.6                    | 53.9 | 1885                      | 304.0                   | 316.6         | 6.0             | 14.6      | 13.4                                | 8.4                             | 15.4                 | 97.0           | 55                    |
| 446          | 12.1                    | 53.8 | 1867                      | 304.0                   | 316.6         | 3.5             | 14.3      | 12.0                                | 8.4                             | 15.3                 | 96.7           | 55                    |
| 447          | 12.3                    | 54.3 | 1865                      | 304.0                   | 316.6         | 2.9             | 14.5      | 12.1                                | 8.3                             | 15.3                 | 96.5           | 56                    |
| 448          | 14.1                    | 54.4 | 1862                      | 304.0                   | 316.6         | 6.7             | 14.0      | 14.7                                | 14.0                            | 15.3                 | 96.3           | 56                    |
| 449          | 14.2                    | 54.5 | 1869                      | 304.0                   | 315.0         | 6.1             | 14.5      | 14.0                                | 6.3                             | 15.3                 | 96.2           | 56                    |
| 450          | 14.4                    | 54.5 | 1863                      | 304.0                   | 310.3         | 6.3             | 14.5      | 14.2                                | 3.4                             | 15.3                 | 96.1           | 56                    |
| 451          | 13.1                    | 54.0 | 1863                      | 304.0                   | 305.5         | 5.8             | 14.5      | 12.9                                | 5.7                             | 15.3                 | 96.1           | 56                    |
| 452          | 12.3                    | 53.4 | 1866                      | 304.0                   | 300.8         | 4.6             | 14.3      | 12.1                                | 6.7                             | 15.2                 |                |                       |

# Table E.01 Measurement data - Turbine ON

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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 | LRAeq | 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          | 9.4                     | 54.2  | 1369                      | 304.0                   | 304.2         | -2.1            | 14.6      | 9.3                                 | 3.4                             | 14.3                | 96.4           | 63                    |
| 530          | 8.8                     | 53.7  | 1167                      | 304.0                   | 304.2         | -1.3            | 14.4      | 9.8                                 | 4.1                             | 14.3                | 96.4           | 63                    |
| 531          | 8.4                     | 53.2  | 1016                      | 304.0                   | 304.2         | -1.5            | 14.4      | 9.0                                 | 4.3                             | 14.3                | 96.3           | 63                    |
| 532          | 8.4                     | 54.0  | 1035                      | 304.0                   | 304.2         | -2.3            | 14.5      | 7.6                                 | 3.8                             | 14.3                | 96.2           | 63                    |
| 533          | 8.2                     | 53.7  | 968                       | 304.0                   | 304.2         | -2.4            | 14.4      | 8.3                                 | 4.7                             | 14.3                | 96.3           | 63                    |
| 534          | 8.2                     | 53.6  | 957                       | 304.0                   | 304.2         | -2.4            | 14.5      | 7.8                                 | 5.6                             | 14.3                | 96.2           | 62                    |
| 535          | 7.9                     | 53.7  | 860                       | 304.0                   | 304.2         | -2.3            | 14.4      | 7.9                                 | 5.3                             | 14.4                | 96.1           | 61                    |
| 536          | 8.0                     | 53.5  | 896                       | 304.0                   | 304.2         | -2.3            | 14.5      | 7.9                                 | 3.7                             | 14.4                | 96.1           | 61                    |
| 537          | 8.1                     | 53.4  | 929                       | 304.0                   | 304.2         | -2.2            | 14.5      | 7.7                                 | 3.9                             | 14.4                | 96.2           | 61                    |
| 538          | 8.1                     | 53.4  | 906                       | 304.0                   | 304.1         | -2.2            | 14.5      | 7.8                                 | 4.0                             | 14.4                | 96.1           | 61                    |
| 539          | 8.1                     | 53.8  | 921                       | 304.0                   | 304.0         | -2.3            | 14.5      | 8.4                                 | 4.8                             | 14.4                | 96.0           | 61                    |
| 540          | 8.3                     | 53.6  | 986                       | 304.0                   | 304.0         | -2.5            | 14.5      | 7.7                                 | 4.1                             | 14.4                | 95.8           | 61                    |
| 541          | 8.0                     | 53.7  | 902                       | 304.0                   | 304.0         | -2.3            | 14.5      | 8.0                                 | 4.1                             | 14.4                | 95.8           | 61                    |
| 542          | 8.3                     | 53.8  | 980                       | 304.0                   | 304.1         | -2.3            | 14.5      | 8.2                                 | 4.7                             | 14.4                | 95.8           | 61                    |
| 543          | 8.3                     | 53.6  | 963                       | 304.0                   | 304.2         | -2.3            | 14.5      | 7.9                                 | 4.9                             | 14.4                | 95.7           | 61                    |
| 544          | 8.4                     | 53.1  | 1027                      | 304.0                   | 304.2         | -2.3            | 14.5      | 8.2                                 | 4.3                             | 14.4                | 95.6           | 61                    |
| 545          | 8.2                     | 53.4  | 964                       | 304.0                   | 304.2         | -2.3            | 14.5      | 7.6                                 | 3.8                             | 14.4                | 95.7           | 61                    |
| 546          | 8.2                     | 53.4  | 939                       | 304.0                   | 304.2         | -2.3            | 14.5      | 8.0                                 | 3.0                             | 14.4                | 95.8           | 62                    |
| 547          | 7.8                     | 53.1  | 842                       | 304.0                   | 304.2         | -2.4            | 14.5      | 8.2                                 | 4.1                             | 14.4                | 95.8           | 62                    |
| 548          | 7.9                     | 52.9  | 859                       | 304.0                   | 304.2         | -2.3            | 14.5      | 7.6                                 | 3.1                             | 14.4                | 95.8           | 62                    |
| 549          | 7.6                     | 53.1  | 772                       | 304.0                   | 304.2         | -2.3            | 14.4      | 7.6                                 | 3.7                             | 14.4                | 95.9           | 62                    |
| 550          | 7.3                     | 53.1  | 675                       | 304.0                   | 304.2         | -2.1            | 14.4      | 7.3                                 | 2.7                             | 14.4                | 96.0           | 62                    |
| 551          | 7.5                     | 52.9  | 740                       | 304.0                   | 304.1         | -2.1            | 14.0      | 7.7                                 | 3.0                             | 14.4                | 96.1           | 62                    |
| 552          | 7.1                     | 52.9  | 627                       | 304.0                   | 304.0         | -2.3            | 14.2      | 6.6                                 | 3.5                             | 14.4                | 96.1           | 62                    |
| 553          | 7.0                     | 52.2  | 585                       | 304.0                   | 304.0         | -1.9            | 13.7      | 6.9                                 | 4.2                             | 14.5                | 96.0           | 62                    |
| 554          | 6.8                     | 52.2  | 551                       | 304.0                   | 304.0         | -2.1            | 13.4      | 7.7                                 | 3.4                             | 14.5                | 96.0           | 62                    |
| 555          | 7.4                     | 52.7  | 717                       | 304.0                   | 304.0         | -2.3            | 13.7      | 7.1                                 | 4.0                             | 14.5                | 96.1           | 62                    |
| 556          | 7.6                     | 52.7  | 776                       | 304.0                   | 304.0         | -2.2            | 13.7      | 6.8                                 | 3.2                             | 14.5                | 96.0           | 62                    |
| 557          | 7.6                     | 52.4  | 763                       | 304.0                   | 304.0         | -2.0            | 13.3      | 6.9                                 | 3.7                             | 14.5                | 95.9           | 62                    |
| 558          | 7.3                     | 52.5  | 685                       | 304.0                   | 304.1         | -2.2            | 13.2      | 6.5                                 | 3.4                             | 14.5                | 95.9           | 62                    |
| 559          | 7.3                     | 51.9  | 670                       | 304.0                   | 304.0         | -2.0            | 13.0      | 6.7                                 | 2.6                             | 14.5                | 95.9           | 63                    |
| 560          | 6.4                     | 51.1  | 461                       | 304.0                   | 304.0         | -1.9            | 12.7      | 6.4                                 | 3.2                             | 14.5                | 95.9           | 63                    |
| 561          | 6.4                     | 51.1  | 464                       | 304.0                   | 304.0         | -1.9            | 12.4      | 5.8                                 | 4.0                             | 14.5                | 95.9           | 63                    |
| 562          | 6.6                     | 50.4  | 502                       | 304.0                   | 304.2         | -1.5            | 11.6      | 5.9                                 | 4.3                             | 14.5                | 96.0           | 63                    |
| 563          | 6.5                     | 50.4  | 488                       | 304.0                   | 304.2         | -2.2            | 11.3      | 6.5                                 | 3.8                             | 14.5                | 96.0           | 63                    |
| 564          | 6.6                     | 49.6  | 498                       | 304.0                   | 304.2         | -2.4            | 11.7      | 7.5                                 | 4.2                             | 14.5                | 96.1           | 63                    |
| 565          | 7.3                     | 53.0  | 682                       | 304.0                   | 304.0         | -2.3            | 14.0      | 7.5                                 | 4.9                             | 14.6                | 96.0           | 62                    |
| 566          | 7.1                     | 52.9  | 616                       | 304.0                   | 304.1         | -2.3            | 14.4      | 7.2                                 | 4.7                             | 14.6                | 96.0           | 62                    |
| 567          | 6.6                     | 52.1  | 504                       | 304.0                   | 304.2         | -2.0            | 14.1      | 6.9                                 | 4.6                             | 14.6                | 96.1           | 62                    |
| 568          | 6.4                     | 44.8  | 448                       | 304.0                   | 304.2         | -1.8            | 13.6      | 6.8                                 | 5.0                             | 14.6                | 96.1           | 62                    |
| 569          | 7.1                     | 51.8  | 613                       | 304.0                   | 304.2         | -1.7            | 13.2      | 5.9                                 | 3.7                             | 14.6                | 96.2           | 62                    |
| 570          | 6.9                     | 50.4  | 576                       | 304.0                   | 304.2         | -1.8            | 12.2      | 6.6                                 | 2.7                             | 14.6                | 96.2           | 61                    |
| 571          | 6.3                     | 50.3  | 438                       | 304.0                   | 304.2         | -2.2            | 12.1      | 6.5                                 | 2.9                             | 14.6                | 96.2           | 61                    |
| 572          | 6.4                     | 46.2  | 304                       | 304.0                   | 304.2         | -2.1            | 12.7      | 7.8                                 | 5.3                             | 14.7                | 97.1           | 62                    |
| 573          | 6.1                     | 51.7  | 402                       | 304.0                   | 304.2         | -2.4            | 12.7      | 7.5                                 | 4.5                             | 14.6                | 96.3           | 61                    |
| 574          | 6.4                     | 52.4  | 455                       | 304.0                   | 304.1         | -2.3            | 13.5      | 6.5                                 | 4.5                             | 14.6                | 96.3           | 61                    |
| 575          | 7.2                     | 52.0  | 646                       | 304.0                   | 304.0         | -1.4            | 12.9      | 6.4                                 | 3.5                             | 14.6                | 96.4           | 61                    |
| 576          | 6.6                     | 52.2  | 504                       | 304.0                   | 304.0         | -2.2            | 13.3      | 6.9                                 | 3.3                             | 14.7                | 96.5           | 62                    |
| 577          | 7.5                     | 52.0  | 735                       | 304.0                   | 304.1         | -2.3            | 13.0      | 7.0                                 | 4.1                             | 14.7                | 96.7           | 62                    |
| 578          | 7.0                     | 51.6  | 589                       | 304.0                   | 304.1         | -2.3            | 13.1      | 6.7                                 | 3.9                             | 14.7                | 96.7           | 62                    |
| 579          | 6.8                     | 51.3  | 551                       | 304.0                   | 304.2         | -2.1            | 13.0      | 6.5                                 | 3.9                             | 14.7                | 97.0           | 62                    |
| 580          | 6.9                     | 50.9  | 576                       | 304.0                   | 304.2         | -2.1            | 12.7      | 6.8                                 | 4.0                             | 14.7                | 97.1           | 62                    |
| 581          | 6.8                     | 51.4  | 550                       | 304.0                   | 304.0         | -2.3            | 13.0      | 7.8                                 | 5.1                             | 14.7                | 96.8           | 62                    |
| 582          | 7.1                     | 52.4  | 609                       | 304.0                   | 304.2         | -2.3            | 13.9      | 6.6                                 | 4.4                             | 14.7                | 97.4           | 62                    |
| 583          | 7.3                     | 52.9  | 679                       | 304.0                   | 304.2         | -1.8            | 13.3      | 6.7                                 | 4.3                             | 14.7                | 97.7           | 62                    |
| 584          | 6.2                     | 51.4  | 412                       | 304.0                   | 304.2         | -2.2            | 13.0      | 6.5                                 | 3.7                             | 14.7                | 97.8           | 62                    |
| 585          | 6.1                     | 51.1  | 395                       | 304.0                   | 304.2         | -1.9            | 12.7      | 5.8                                 | 3.5                             | 14.7                | 98.1           | 62                    |
| 586          | 6.4                     | 50.6  | 460                       | 304.0                   | 304.1         | -1.5            | 11.9      | 5.5                                 | 3.3                             | 14.7                | 98.2           | 62                    |
| 587          | 6.3                     | 49.9  | 430                       | 304.0                   | 304.0         | -1.6            | 11.1      | 4.9                                 | 2.8                             | 14.7                | 98.3           | 62                    |
| 588          | 6.1                     | 49.9  | 393                       | 304.0                   | 304.0         | -1.9            | 10.9      | 6.1                                 | 2.6                             | 14.8                | 98.4           | 62                    |
| 589          | 7.1                     | 50.6  | 628                       | 304.0                   | 304.0         | -1.9            | 11.3      | 6.3                                 | 2.5                             | 14.8                | 98.4           | 62                    |
| 590          | 7.1                     | 50.6  | 604                       | 304.0                   | 304.0         | -2.0            | 11.8      | 8.3                                 | 2.6                             | 14.8                | 98.5           | 62                    |
| 591          | 7.2                     | 52.4  | 639                       | 304.0                   | 304.0         | -2.2            | 13.6      | 7.2                                 | 2.9                             | 14.8                | 98.5           | 62                    |
| 592          | 7.9                     | 53.1  | 870                       | 304.0                   | 304.1         | -2.3            | 14.1      | 7.9                                 | 2.3                             | 14.8                | 98.5           | 62                    |
| 593          | 8.5                     | 54.3  | 1043                      | 304.0                   | 304.0         | -2.2            | 14.4      | 9.4                                 | 3.2                             | 14.8                | 98.5           | 62                    |
| 594          | 8.0                     | 53.1  | 899                       | 304.0                   | 304.0         | -2.0            | 14.4      | 8.6                                 | 3.4                             | 14.8                | 98.5           | 62                    |
| 595          | 5.8                     | 50.5  | 337                       | 304.0                   | 309.6         | 0.1             | 11.9      | 7.2                                 | 3.1                             | 15.3                | 97.4           | 60                    |
| 596          | 6.8                     | 52.3  | 554                       | 304.0                   | 309.6         | -2.3            | 13.4      | 7.2                                 | 3.7                             | 15.3                | 97.6           | 60                    |
| 597          | 6.4                     | 46.2  | 304                       | 304.0                   | 309.6         | -2.2            | 13.2      | 7.0                                 | 4.0                             | 15.3                | 97.7           | 60                    |
| 598          | 6.4                     | 52.5  | 456                       | 304.0                   | 309.6         | -2.0            | 13.5      | 6.4                                 | 3.2                             | 15.3                | 97.6           | 60                    |
| 599          | 6.5                     | 51.6  | 471                       | 304.0                   | 309.6         | -1.4            | 12.6      | 5.5                                 | 3.5                             | 15.2                | 97.7           | 60                    |
| 600          | 6.6                     | 50.4  | 508                       | 304.0                   | 309.6         | -1.5            | 11.6      | 5.8                                 | 2.5                             | 15.2                | 97.4           | 60                    |
| 601          | 6.9                     | 50.4  | 566                       | 304.0                   | 309.6         | -2.2            | 11.4      | 6.9                                 | 3.9                             | 15.2                | 97.9           | 60                    |
| 602          | 7.1                     | 50.3  | 607                       | 304.0                   | 309.6         | -2.5            | 12.2      | 7.0                                 | 2.0                             | 15.2                | 98.3           | 60                    |
| 603          | 7.1                     | 52.3  | 604                       | 304.0                   | 309.5         | -2.4            | 13.1      | 6.7                                 | 2.2                             | 15.2                | 98.5           | 60                    |
| 604          | 7.1                     | 52.3  | 609                       | 304.0                   | 309.9         | -2.1            | 13.2      | 6.4                                 | 2.4                             | 15.2                | 98.5           | 60                    |
| 605          | 6.5                     | 51.0  | 487                       | 304.0                   | 309.6         | -1.9            | 12.8      | 6.5                                 | 3.0                             | 15.2                | 98.5           | 60                    |
| 606          | 6.3                     | 51.2  | 444                       | 304.0                   | 309.9         | -2.1            | 12.6      | 6.3                                 | 1.8                             | 15.2                | 98.1           | 61                    |
| 607          | 6.0                     | 50.7  | 379                       | 304.0                   | 309.9         | -2.1            | 12.2      | 6.6                                 | 1.4                             | 15.2                | 97.2           | 61                    |
| 608          | 6.3                     | 50.9  | 444                       | 304.0                   | 309.9         | -2.2            | 12.5      | 6.5                                 | 1.8                             | 15.2                | 97.4           | 61                    |
| 609          | 6.7                     | 51.6  | 527                       | 304.0                   | 309.9         | -2.2            | 12.6      | 6.8                                 | 3.3                             | 15.2                | 97.4           | 61                    |
| 610          | 6.3                     | 51.4  | 428                       | 304.0                   | 309.9         | -2.2            | 12.7      | 6.6                                 | 3.6                             | 15.2                | 97.4           | 61                    |
| 611          | 6.0                     | 50.8  | 372                       | 304.0                   | 309.9         | -1.8            | 12.4      | 5.7                                 | 3.4                             | 15.2                | 97.5           | 61                    |
| 612          | 5.9                     | 50.3  | 349                       | 304.0                   | 309.9         | -1.7            | 11.7      | 5.5                                 | 2.7                             | 15.2                | 97.2           | 61                    |
| 613          | 5.9                     | 49.9  | 358                       | 304.0                   | 309.9         | -1.7            | 11.0      | 5.3                                 | 2.1                             | 15.2                | 97.2           | 61                    |
| 614          | 5.9                     | 50.2  | 361                       | 304.0                   | 309.9         | -2.1            | 10.7      | 6.2                                 | 2.0                             | 15.2                | 97.2           | 61                    |
| 615          | 6.1                     | 50.5  | 397                       | 304.0                   | 309.9         | -2.4            | 11.4      | 6.5                                 | 2.9                             | 15.2                | 97.0           | 61                    |
| 616          | 6.8                     | 51.0  | 555                       | 304.0                   | 309.9         | -2.4            | 12.1      | 7.2                                 | 2.6                             | 15.2                | 97.0           | 61                    |

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

| Data Point # | Standardized Wind Speed | LRAeq | 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          | 7.1                     | 51.8  | 605                       | 304.0                   | 308.9         | -2.4            | 12.9      | 7.5                                 | 2.6                             | 15.2                | 97.3           | 60                    |
| 618          | 7.1                     | 52.6  | 605                       | 304.0                   | 308.9         | -2.2            | 13.6      | 6.7                                 | 2.7                             | 15.2                | 98.2           | 60                    |
| 619          | 7.2                     | 52.8  | 642                       | 304.0                   | 308.9         | -2.0            | 13.3      | 7.0                                 | 4.1                             | 15.2                | 98.5           | 60                    |
| 620          | 6.7                     | 51.7  | 514                       | 304.0                   | 308.9         | -1.9            | 13.0      | 6.1                                 | 5.2                             | 15.2                | 98.5           | 60                    |
| 621          | 6.7                     | 51.1  | 527                       | 304.0                   | 308.9         | -1.8            | 12.2      | 6.6                                 | 5.6                             | 15.2                | 98.5           | 60                    |
| 622          | 6.8                     | 51.1  | 551                       | 304.0                   | 308.9         | -2.3            | 12.3      | 6.7                                 | 5.6                             | 15.2                | 98.4           | 60                    |
| 623          | 6.5                     | 51.3  | 471                       | 304.0                   | 308.9         | -2.3            | 12.6      | 6.7                                 | 5.0                             | 15.1                | 97.9           | 60                    |
| 624          | 6.8                     | 51.9  | 538                       | 304.0                   | 308.9         | -2.3            | 12.9      | 7.1                                 | 5.1                             | 15.1                | 97.9           | 60                    |
| 625          | 7.2                     | 52.8  | 644                       | 304.0                   | 308.9         | -2.2            | 13.3      | 7.2                                 | 5.1                             | 15.1                | 97.8           | 60                    |
| 626          | 7.6                     | 53.4  | 763                       | 304.0                   | 308.9         | -2.3            | 13.7      | 8.2                                 | 5.2                             | 15.1                | 97.8           | 60                    |
| 627          | 7.5                     | 53.9  | 752                       | 304.0                   | 308.9         | -2.3            | 14.3      | 7.6                                 | 4.4                             | 15.1                | 98.0           | 60                    |
| 628          | 7.5                     | 53.7  | 735                       | 304.0                   | 308.9         | -2.3            | 14.5      | 8.2                                 | 3.8                             | 15.1                | 97.8           | 60                    |
| 629          | 7.4                     | 54.2  | 717                       | 304.0                   | 308.9         | -2.3            | 14        |                                     |                                 |                     |                |                       |

# Table E.01 Measurement data - Turbine ON

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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 | LAdq | 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 (%) |
|--------------|-------------------------|------|---------------------------|-------------------------|---------------|-----------------|-----------|-------------------------------------|---------------------------------|---------------------|----------------|-----------------------|
| 705          | 8.7                     | 54.5 | 1130                      | 304.0                   | 298.8         | -2.3            | 14.4      | 8.5                                 | 2.0                             | 15.0                | 98.6           | 63                    |
| 706          | 8.8                     | 54.7 | 1165                      | 304.0                   | 298.8         | -2.3            | 14.5      | 8.6                                 | 2.4                             | 15.0                | 98.6           | 63                    |
| 707          | 8.7                     | 54.0 | 1114                      | 304.0                   | 298.8         | -2.4            | 14.5      | 8.3                                 | 3.2                             | 15.0                | 98.6           | 63                    |
| 708          | 8.3                     | 54.3 | 977                       | 304.0                   | 298.8         | -2.4            | 14.4      | 7.9                                 | 3.7                             | 15.0                | 98.6           | 63                    |
| 709          | 8.6                     | 54.8 | 1090                      | 304.0                   | 298.8         | -2.4            | 14.6      | 8.5                                 | 4.2                             | 15.0                | 98.6           | 63                    |
| 710          | 10.1                    | 55.0 | 1563                      | 304.0                   | 298.8         | -2.2            | 14.7      | 10.0                                | 5.0                             | 15.0                | 98.6           | 63                    |
| 711          | 9.3                     | 54.9 | 1335                      | 304.0                   | 298.8         | -1.3            | 14.4      | 9.7                                 | 4.0                             | 15.0                | 98.6           | 63                    |
| 712          | 8.7                     | 53.9 | 1116                      | 304.0                   | 298.8         | -1.8            | 14.4      | 8.6                                 | 3.9                             | 15.0                | 98.6           | 62                    |
| 713          | 8.0                     | 54.0 | 883                       | 304.0                   | 298.8         | -2.4            | 14.4      | 8.0                                 | 3.2                             | 15.0                | 98.6           | 62                    |
| 714          | 7.6                     | 53.8 | 760                       | 304.0                   | 298.8         | -2.4            | 14.4      | 7.3                                 | 3.8                             | 15.0                | 98.6           | 62                    |
| 715          | 6.5                     | 53.2 | 476                       | 304.0                   | 298.8         | -2.2            | 14.0      | 7.0                                 | 3.5                             | 15.0                | 98.6           | 62                    |
| 716          | 6.2                     | 52.7 | 414                       | 304.0                   | 298.8         | -1.7            | 13.7      | 5.8                                 | 2.6                             | 15.0                | 98.6           | 62                    |
| 717          | 6.8                     | 51.1 | 548                       | 304.0                   | 298.8         | -1.3            | 12.5      | 5.9                                 | 2.8                             | 15.0                | 98.6           | 62                    |
| 718          | 7.3                     | 51.2 | 670                       | 304.0                   | 298.8         | -2.2            | 12.0      | 7.7                                 | 3.9                             | 15.0                | 98.6           | 62                    |
| 719          | 7.2                     | 46.2 | 362                       | 304.0                   | 298.8         | -2.4            | 13.2      | 7.0                                 | 3.2                             | 15.0                | 98.6           | 62                    |
| 720          | 7.6                     | 54.0 | 757                       | 304.0                   | 298.8         | -2.3            | 13.6      | 7.1                                 | 2.6                             | 15.0                | 98.6           | 62                    |
| 721          | 6.7                     | 53.3 | 523                       | 304.0                   | 298.8         | -2.3            | 14.1      | 7.0                                 | 2.9                             | 15.0                | 98.6           | 62                    |
| 722          | 7.1                     | 53.0 | 631                       | 304.0                   | 298.8         | -1.7            | 13.8      | 6.8                                 | 2.7                             | 15.0                | 98.6           | 62                    |
| 723          | 7.6                     | 52.8 | 754                       | 304.0                   | 298.8         | -2.0            | 13.3      | 6.6                                 | 1.9                             | 15.0                | 98.6           | 63                    |
| 724          | 7.5                     | 52.5 | 735                       | 304.0                   | 298.8         | -2.0            | 13.0      | 6.4                                 | 2.3                             | 15.0                | 98.6           | 63                    |
| 725          | 7.2                     | 51.5 | 635                       | 304.0                   | 298.8         | -2.1            | 12.7      | 6.5                                 | 3.5                             | 15.0                | 98.6           | 63                    |
| 726          | 7.3                     | 51.5 | 668                       | 304.0                   | 298.8         | -2.2            | 12.6      | 7.2                                 | 3.8                             | 15.0                | 98.6           | 63                    |
| 727          | 7.1                     | 51.9 | 619                       | 304.0                   | 298.8         | -2.0            | 13.1      | 7.8                                 | 3.9                             | 15.0                | 98.6           | 63                    |
| 728          | 7.5                     | 53.3 | 749                       | 304.0                   | 298.8         | -2.4            | 13.9      | 6.9                                 | 3.5                             | 15.0                | 98.6           | 63                    |
| 729          | 7.5                     | 53.0 | 746                       | 304.0                   | 293.2         | -2.2            | 14.0      | 7.7                                 | 3.9                             | 15.0                | 98.6           | 62                    |
| 730          | 6.8                     | 52.6 | 555                       | 304.0                   | 292.9         | -2.2            | 14.1      | 7.1                                 | 3.7                             | 15.0                | 98.6           | 62                    |
| 731          | 6.5                     | 46.2 | 462                       | 304.0                   | 292.9         | -2.5            | 13.9      | 5.6                                 | 2.9                             | 15.0                | 98.6           | 62                    |
| 732          | 7.2                     | 51.2 | 646                       | 304.0                   | 292.8         | -1.3            | 12.5      | 6.2                                 | 5.0                             | 15.0                | 98.6           | 62                    |
| 733          | 7.2                     | 51.6 | 645                       | 304.0                   | 292.8         | -2.2            | 12.1      | 7.3                                 | 3.9                             | 15.0                | 98.6           | 62                    |
| 734          | 7.6                     | 53.3 | 759                       | 304.0                   | 292.8         | -2.5            | 13.0      | 7.3                                 | 3.8                             | 15.0                | 98.6           | 62                    |
| 735          | 7.5                     | 54.2 | 731                       | 304.0                   | 292.8         | -2.4            | 13.6      | 6.9                                 | 4.4                             | 15.0                | 98.6           | 61                    |
| 736          | 6.7                     | 51.6 | 507                       | 304.0                   | 292.8         | -1.9            | 13.6      | 6.4                                 | 4.4                             | 15.0                | 98.6           | 61                    |
| 737          | 7.4                     | 53.2 | 704                       | 304.0                   | 292.8         | -1.9            | 13.9      | 6.4                                 | 3.4                             | 15.0                | 98.6           | 61                    |
| 738          | 7.8                     | 53.1 | 832                       | 304.0                   | 292.8         | -1.8            | 13.2      | 7.7                                 | 4.0                             | 15.0                | 98.6           | 61                    |
| 739          | 8.1                     | 54.3 | 909                       | 304.0                   | 292.8         | -2.4            | 13.8      | 8.5                                 | 2.7                             | 15.0                | 98.6           | 61                    |
| 740          | 8.0                     | 54.0 | 892                       | 304.0                   | 292.8         | -2.4            | 14.3      | 7.9                                 | 2.9                             | 15.0                | 98.6           | 61                    |
| 741          | 7.4                     | 54.8 | 721                       | 304.0                   | 293.0         | -2.4            | 14.4      | 7.1                                 | 2.8                             | 15.1                | 98.6           | 62                    |
| 742          | 7.4                     | 54.8 | 721                       | 304.0                   | 293.0         | -2.4            | 14.4      | 7.1                                 | 2.8                             | 15.1                | 98.6           | 62                    |
| 743          | 7.4                     | 54.8 | 721                       | 304.0                   | 293.0         | -2.4            | 14.4      | 7.1                                 | 2.8                             | 15.1                | 98.6           | 62                    |
| 744          | 7.4                     | 54.8 | 721                       | 304.0                   | 293.0         | -2.4            | 14.4      | 7.1                                 | 2.8                             | 15.1                | 98.6           | 62                    |
| 745          | 7.2                     | 54.3 | 641                       | 304.0                   | 293.0         | -2.1            | 14.1      | 6.7                                 | 2.9                             | 15.1                | 98.6           | 62                    |
| 746          | 7.2                     | 52.6 | 634                       | 304.0                   | 293.0         | -1.5            | 13.3      | 6.5                                 | 3.0                             | 15.1                | 98.6           | 62                    |
| 747          | 7.7                     | 53.9 | 788                       | 304.0                   | 293.0         | -2.2            | 13.1      | 7.7                                 | 3.0                             | 15.1                | 98.6           | 62                    |
| 748          | 8.1                     | 54.3 | 907                       | 304.0                   | 293.0         | -1.1            | 12.2      | 8.4                                 | 2.8                             | 15.1                | 98.6           | 62                    |
| 749          | 8.1                     | 54.2 | 921                       | 304.0                   | 293.0         | -2.5            | 14.4      | 7.9                                 | 3.2                             | 15.1                | 98.6           | 62                    |
| 750          | 7.6                     | 54.0 | 765                       | 304.0                   | 293.0         | -2.4            | 14.4      | 8.1                                 | 3.4                             | 15.1                | 98.6           | 62                    |
| 751          | 7.3                     | 53.8 | 690                       | 304.0                   | 293.0         | -2.2            | 14.4      | 7.2                                 | 3.7                             | 15.1                | 98.6           | 62                    |
| 752          | 7.3                     | 53.4 | 679                       | 304.0                   | 293.0         | -2.0            | 14.3      | 7.9                                 | 3.3                             | 15.1                | 98.6           | 62                    |
| 753          | 7.2                     | 53.4 | 648                       | 304.0                   | 292.9         | -2.1            | 14.4      | 7.1                                 | 2.7                             | 15.1                | 98.6           | 62                    |
| 754          | 7.1                     | 52.3 | 614                       | 304.0                   | 293.0         | -2.1            | 14.0      | 7.2                                 | 3.1                             | 15.1                | 98.6           | 62                    |
| 755          | 6.4                     | 52.2 | 450                       | 304.0                   | 292.9         | -1.8            | 13.3      | 5.8                                 | 3.1                             | 15.1                | 98.6           | 62                    |
| 756          | 6.5                     | 50.4 | 477                       | 304.0                   | 292.9         | -1.1            | 12.2      | 5.5                                 | 2.8                             | 15.1                | 98.6           | 62                    |
| 757          | 6.5                     | 50.3 | 486                       | 304.0                   | 292.8         | -2.0            | 11.4      | 6.4                                 | 2.3                             | 15.1                | 98.6           | 62                    |
| 758          | 6.7                     | 51.4 | 515                       | 304.0                   | 292.8         | -2.4            | 11.8      | 6.2                                 | 2.6                             | 15.1                | 98.6           | 62                    |
| 759          | 7.9                     | 51.1 | 855                       | 304.0                   | 292.8         | -2.0            | 12.2      | 7.6                                 | 2.6                             | 15.1                | 98.6           | 62                    |
| 760          | 7.6                     | 52.3 | 755                       | 304.0                   | 292.8         | -2.0            | 12.9      | 8.1                                 | 2.7                             | 15.1                | 98.6           | 62                    |
| 761          | 7.9                     | 53.6 | 846                       | 304.0                   | 292.9         | -2.4            | 14.2      | 7.5                                 | 2.7                             | 15.1                | 98.6           | 62                    |
| 762          | 7.4                     | 53.2 | 720                       | 304.0                   | 293.0         | -2.3            | 14.4      | 7.8                                 | 2.2                             | 15.1                | 98.6           | 62                    |
| 763          | 6.9                     | 53.2 | 575                       | 304.0                   | 293.0         | -2.2            | 14.4      | 7.1                                 | 3.2                             | 15.1                | 98.6           | 62                    |
| 764          | 7.1                     | 52.4 | 607                       | 304.0                   | 293.0         | -1.8            | 14.1      | 6.8                                 | 3.0                             | 15.2                | 98.6           | 63                    |
| 765          | 7.6                     | 52.8 | 777                       | 304.0                   | 292.9         | -1.7            | 13.6      | 6.8                                 | 3.2                             | 15.2                | 98.6           | 63                    |
| 766          | 7.7                     | 53.2 | 799                       | 304.0                   | 292.9         | -2.2            | 13.3      | 7.8                                 | 3.6                             | 15.2                | 98.6           | 63                    |
| 767          | 7.5                     | 53.2 | 750                       | 304.0                   | 292.9         | -2.5            | 14.1      | 7.4                                 | 4.3                             | 15.2                | 98.6           | 63                    |
| 768          | 7.5                     | 53.3 | 737                       | 304.0                   | 293.0         | -2.2            | 14.2      | 7.2                                 | 4.3                             | 15.2                | 98.6           | 63                    |
| 769          | 7.1                     | 52.6 | 617                       | 304.0                   | 293.0         | -2.0            | 13.8      | 7.1                                 | 5.1                             | 15.2                | 98.6           | 63                    |
| 770          | 7.1                     | 52.5 | 608                       | 304.0                   | 293.0         | -1.9            | 13.6      | 6.6                                 | 5.4                             | 15.2                | 98.6           | 61                    |
| 771          | 7.4                     | 52.5 | 696                       | 304.0                   | 293.0         | -2.0            | 13.2      | 7.9                                 | 4.7                             | 15.2                | 98.6           | 61                    |
| 772          | 8.1                     | 54.3 | 913                       | 304.0                   | 292.9         | -2.5            | 14.0      | 8.1                                 | 4.2                             | 15.2                | 98.6           | 61                    |
| 773          | 8.0                     | 54.8 | 1365                      | 304.0                   | 292.9         | -2.5            | 14.6      | 8.6                                 | 4.4                             | 15.2                | 98.6           | 61                    |
| 774          | 8.7                     | 54.2 | 1128                      | 304.0                   | 292.9         | -2.3            | 14.4      | 8.7                                 | 4.5                             | 15.2                | 98.6           | 61                    |
| 775          | 8.6                     | 54.0 | 1094                      | 304.0                   | 293.0         | -2.0            | 14.5      | 8.7                                 | 4.3                             | 15.2                | 98.6           | 61                    |
| 776          | 8.4                     | 54.3 | 1038                      | 304.0                   | 293.0         | -2.2            | 14.4      | 7.6                                 | 4.6                             | 15.3                | 98.6           | 61                    |
| 777          | 8.0                     | 53.5 | 886                       | 304.0                   | 292.9         | -2.1            | 14.3      | 7.2                                 | 4.9                             | 15.3                | 98.6           | 61                    |
| 778          | 7.8                     | 53.4 | 816                       | 304.0                   | 292.9         | -2.0            | 14.0      | 7.1                                 | 4.1                             | 15.3                | 98.6           | 61                    |
| 779          | 7.8                     | 54.2 | 823                       | 304.0                   | 293.0         | -2.1            | 13.8      | 6.8                                 | 3.5                             | 15.3                | 98.6           | 61                    |
| 780          | 8.1                     | 54.4 | 925                       | 304.0                   | 293.0         | -1.9            | 13.4      | 7.1                                 | 3.1                             | 15.3                | 98.6           | 61                    |
| 781          | 8.1                     | 54.0 | 924                       | 304.0                   | 293.0         | -2.3            | 13.4      | 8.2                                 | 4.2                             | 15.3                | 98.6           | 61                    |
| 782          | 8.3                     | 54.2 | 986                       | 304.0                   | 292.9         | -2.4            | 14.2      | 7.5                                 | 5.1                             | 15.4                | 98.6           | 61                    |
| 783          | 8.2                     | 53.6 | 944                       | 304.0                   | 293.0         | -2.3            | 14.4      | 7.4                                 | 5.1                             | 15.4                | 98.6           | 61                    |
| 784          | 7.6                     | 53.1 | 776                       | 304.0                   | 292.9         | -1.8            | 14.1      | 6.4                                 | 4.0                             | 15.4                | 98.6           | 61                    |
| 785          | 7.3                     | 51.4 | 687                       | 304.0                   | 293.0         | -1.5            | 13.0      | 6.1                                 | 3.4                             | 15.4                | 98.6           | 61                    |
| 786          | 6.8                     | 54.8 | 548                       | 304.0                   | 292.9         | -2.0            | 12.3      | 7.7                                 | 4.9                             | 15.4                | 98.6           | 61                    |
| 787          | 7.0                     | 52.6 | 584                       | 304.0                   | 292.9         | -2.5            | 13.3      | 8.2                                 | 2.4                             | 15.4                | 98.6           | 61                    |
| 788          | 7.0                     | 52.9 | 598                       | 304.0                   | 292.9         | -2.5            | 14.3      | 7.3                                 | 2.6                             | 15.4                | 98.6           | 61                    |
| 789          | 6.7                     | 52.0 | 530                       | 304.0                   | 292.8         | -2.0            | 14.2      | 7.0                                 | 1.9                             | 15.4                | 98.6           | 60                    |
| 790          | 6.3                     | 51.3 | 428                       | 304.0                   | 292.8         | -2.4            | 13.6      | 5.7                                 | 2.4                             | 15.4                | 98.6           | 60                    |
| 791          | 6.1                     | 49.7 | 400                       | 304.0                   | 292.8         | -1.1            | 12.0      | 5.0                                 | 4.3                             | 15.4                | 98.6           | 60                    |
| 792          | 5.8                     | 48.8 | 340                       | 304.0                   | 292.8         | -1.4            | 11.0      | 5.0                                 | 4.4                             | 15.4                | 98.6           | 60                    |

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

| Data Point # | Standardized Wind Speed | LAdq | 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 (%) |
|--------------|-------------------------|------|---------------------------|-------------------------|---------------|-----------------|-----------|-------------------------------------|---------------------------------|---------------------|----------------|-----------------------|
| 793          | 6.1                     | 48.9 | 393                       | 304.0                   | 293.0         | -1.8            | 10.9      | 5.8                                 | 3.9                             | 15.4                | 98.6           | 60                    |
| 794          | 6.0                     | 48.7 | 368                       | 304.0                   | 293.0         | -2.3            | 10.8      | 6.1                                 | 3.5                             | 15.5                | 98.6           | 61                    |
| 795          | 5.8                     | 49.3 | 337                       | 304.0                   | 293.0         | -2.3            | 11.3      | 6.3                                 | 3.5                             | 15.5                | 98.6           | 61                    |
| 796          | 6.6                     | 50.3 | 497                       | 304.0                   | 292.9         | -2.3            | 11.9      | 6.6                                 | 2.7                             | 15.5                | 98.6           | 61                    |
| 797          | 6.9                     | 50.9 | 559                       | 304.0                   | 292.9         | -2.3            | 12.3      | 7.3                                 | 2.0                             | 15.5                | 98.6           | 61                    |
| 798          | 7.3                     | 52.8 | 676                       | 304.0                   | 292.8         | -2.4            | 13.3      | 8.0                                 | 2.3                             | 15.5                | 98.6           | 61                    |
| 799          | 6.8                     | 51.3 | 545                       | 304.0                   | 292.9         | -2.4            | 14.1      | 7.7                                 | 2.1                             | 15.5                | 98.6           | 61                    |
| 800          | 6.5                     | 52.4 | 482                       | 304.0                   | 292.8         | -2.1            | 14.3      | 6.2                                 | 15.5                            | 98.6                | 61             |                       |
| 801          | 7.1                     | 52.1 | 614                       | 304.0                   | 292.8         | -1.2            | 13.2      | 5.7                                 | 3.5                             | 15.5                | 98.6           | 61                    |
| 802          | 7.2                     | 50.3 | 660                       | 304.0                   | 292.8         | -1.2            | 12.0      | 6.1                                 | 5.1                             | 15.5                | 98.6           | 61                    |
| 803          | 7.2                     | 50.8 | 635                       | 304.0                   | 292.8         | -2.3            | 11.8      | 7.4                                 | 4.4                             | 15.5                | 98.6           | 61                    |
| 804          | 7.6                     | 51.8 | 761                       | 304.0                   | 292.9         | -2.3            | 13.2      | 6.7                                 | 4.6                             | 15.5                | 98.6           | 61                    |
| 805          | 7.1                     | 52.2 | 621                       | 304.0                   | 293.0         | -2.2            | 13.       |                                     |                                 |                     |                |                       |

# Table E.02 Measurement data - Background

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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 | RPM  | 10m Anemometer Wind Speed (m/s) | Air Temperature (°C) | Pressure (kPa) | Relative Humidity (%) |
|--------------|-------------------------|------|------|---------------------------------|----------------------|----------------|-----------------------|
| 1            | 13.5                    | 46.5 | 0.2  | 6.6                             | 18                   | 98.4           | 46                    |
| 2            | 13.1                    | 45.9 | 0.4  | 6.4                             | 18                   | 98.4           | 46                    |
| 3            | 13.4                    | 46.3 | 0.5  | 6.5                             | 18                   | 98.4           | 46                    |
| 4            | 11.0                    | 46.7 | 0.3  | 5.3                             | 18                   | 98.4           | 46                    |
| 5            | 16.1                    | 45.9 | 0.2  | 7.8                             | 18                   | 98.4           | 46                    |
| 6            | 17.5                    | 46.0 | 0.0  | 8.5                             | 18                   | 98.4           | 46                    |
| 7            | 15.1                    | 46.0 | 0.1  | 7.4                             | 18                   | 98.4           | 46                    |
| 8            | 17.4                    | 45.7 | 0.3  | 8.5                             | 18                   | 98.4           | 46                    |
| 9            | 14.2                    | 47.7 | 0.4  | 6.9                             | 18                   | 98.4           | 46                    |
| 10           | 11.4                    | 45.7 | 0.3  | 5.5                             | 18                   | 98.4           | 46                    |
| 11           | 11.2                    | 45.3 | 0.1  | 5.4                             | 18                   | 98.4           | 46                    |
| 12           | 14.0                    | 46.8 | 0.1  | 6.8                             | 18                   | 98.4           | 46                    |
| 13           | 13.1                    | 47.6 | 0.2  | 6.4                             | 18                   | 98.4           | 46                    |
| 14           | 15.9                    | 46.6 | 0.2  | 7.7                             | 18                   | 98.4           | 46                    |
| 15           | 12.0                    | 45.9 | 0.1  | 5.8                             | 18                   | 98.4           | 46                    |
| 16           | 9.2                     | 45.3 | 0.2  | 4.5                             | 18                   | 98.4           | 46                    |
| 17           | 8.4                     | 45.3 | 0.3  | 4.1                             | 18                   | 98.4           | 46                    |
| 18           | 9.6                     | 46.1 | 0.3  | 4.7                             | 18                   | 98.4           | 47                    |
| 19           | 12.4                    | 45.7 | 0.3  | 6.0                             | 18                   | 98.4           | 47                    |
| 20           | 12.1                    | 45.4 | 0.2  | 5.9                             | 18                   | 98.4           | 47                    |
| 21           | 10.0                    | 46.6 | 0.2  | 4.9                             | 18                   | 98.4           | 47                    |
| 22           | 14.6                    | 46.8 | 0.2  | 7.1                             | 18                   | 98.4           | 47                    |
| 23           | 19.2                    | 46.8 | 0.3  | 7.9                             | 18                   | 98.4           | 47                    |
| 24           | 16.0                    | 45.7 | 0.4  | 7.8                             | 18                   | 98.4           | 47                    |
| 25           | 12.6                    | 44.8 | 0.3  | 6.1                             | 18                   | 98.4           | 46                    |
| 26           | 9.3                     | 46.0 | 0.5  | 4.5                             | 18                   | 98.4           | 46                    |
| 27           | 11.5                    | 45.9 | 0.2  | 5.6                             | 18                   | 98.4           | 46                    |
| 28           | 9.4                     | 46.2 | 0.2  | 4.6                             | 18                   | 98.4           | 46                    |
| 29           | 11.9                    | 47.1 | 0.1  | 5.8                             | 18                   | 98.4           | 46                    |
| 30           | 13.4                    | 47.1 | -0.1 | 6.5                             | 18                   | 98.3           | 47                    |
| 31           | 12.6                    | 46.3 | 0.3  | 6.1                             | 18                   | 98.3           | 47                    |
| 32           | 13.3                    | 46.0 | 0.3  | 6.5                             | 18                   | 98.3           | 47                    |
| 33           | 19.1                    | 46.5 | 0.3  | 9.3                             | 18                   | 98.4           | 47                    |
| 34           | 12.6                    | 46.5 | 0.6  | 6.1                             | 18                   | 98.3           | 47                    |
| 35           | 11.3                    | 46.4 | 0.3  | 5.5                             | 18                   | 98.3           | 47                    |
| 36           | 8.4                     | 46.7 | 0.2  | 4.1                             | 18                   | 98.4           | 47                    |
| 37           | 10.1                    | 46.8 | 0.3  | 4.9                             | 18                   | 98.4           | 48                    |
| 38           | 14.3                    | 46.4 | 0.2  | 7.0                             | 18                   | 98.4           | 48                    |
| 39           | 11.2                    | 47.2 | 0.0  | 5.4                             | 18                   | 98.4           | 48                    |
| 40           | 11.2                    | 47.0 | 0.0  | 5.5                             | 18                   | 98.4           | 48                    |
| 41           | 9.8                     | 47.1 | 0.3  | 4.8                             | 18                   | 98.4           | 48                    |
| 42           | 8.8                     | 47.2 | 0.3  | 4.3                             | 18                   | 98.4           | 48                    |
| 43           | 13.4                    | 47.8 | 0.2  | 6.1                             | 18                   | 98.4           | 47                    |
| 44           | 9.9                     | 47.8 | 0.3  | 4.8                             | 18                   | 98.4           | 47                    |
| 45           | 14.1                    | 47.5 | 0.2  | 6.9                             | 18                   | 98.4           | 47                    |
| 46           | 20.6                    | 47.9 | 0.1  | 10.0                            | 18                   | 98.4           | 47                    |
| 47           | 16.8                    | 47.0 | 0.2  | 8.2                             | 18                   | 98.4           | 47                    |
| 48           | 19.1                    | 46.5 | 0.3  | 9.3                             | 18                   | 98.4           | 47                    |
| 49           | 19.6                    | 46.0 | 0.2  | 9.6                             | 18                   | 98.4           | 46                    |
| 50           | 17.3                    | 47.1 | 0.0  | 8.4                             | 18                   | 98.4           | 46                    |
| 51           | 13.9                    | 47.0 | 0.1  | 6.8                             | 18                   | 98.4           | 46                    |
| 52           | 10.8                    | 47.2 | 0.2  | 5.3                             | 18                   | 98.4           | 46                    |
| 53           | 9.6                     | 47.0 | 0.2  | 4.7                             | 18                   | 98.4           | 46                    |
| 54           | 8.2                     | 47.0 | 0.0  | 4.0                             | 18                   | 98.4           | 47                    |
| 55           | 9.8                     | 46.9 | 0.0  | 4.7                             | 18                   | 98.4           | 48                    |
| 56           | 9.7                     | 47.3 | 0.0  | 4.7                             | 18                   | 98.4           | 48                    |
| 57           | 14.7                    | 47.2 | 0.2  | 7.1                             | 18                   | 98.4           | 48                    |
| 58           | 16.5                    | 47.8 | 0.2  | 8.0                             | 18                   | 98.4           | 48                    |
| 59           | 15.5                    | 48.2 | 0.2  | 7.5                             | 18                   | 98.4           | 48                    |
| 60           | 12.4                    | 48.4 | 0.2  | 6.0                             | 18                   | 98.4           | 47                    |
| 61           | 16.6                    | 48.4 | 0.1  | 8.1                             | 18                   | 98.4           | 46                    |
| 62           | 15.1                    | 48.0 | 0.3  | 7.3                             | 18                   | 98.4           | 46                    |
| 63           | 14.5                    | 47.7 | 0.5  | 7.1                             | 18                   | 98.4           | 46                    |
| 64           | 14.5                    | 47.5 | 0.1  | 7.1                             | 18                   | 98.4           | 46                    |
| 65           | 16.4                    | 48.2 | -0.1 | 8.0                             | 18                   | 98.4           | 46                    |
| 66           | 14.6                    | 47.4 | 0.0  | 7.1                             | 18                   | 98.4           | 46                    |
| 67           | 13.9                    | 47.4 | 0.2  | 6.7                             | 18                   | 98.4           | 46                    |
| 68           | 6.8                     | 46.7 | 0.1  | 6.2                             | 18                   | 98.4           | 46                    |
| 69           | 12.1                    | 47.8 | 0.2  | 5.9                             | 18                   | 98.4           | 46                    |
| 70           | 12.3                    | 47.4 | 0.1  | 6.0                             | 18                   | 98.4           | 46                    |
| 71           | 10.9                    | 47.4 | 0.1  | 5.3                             | 18                   | 98.4           | 46                    |
| 72           | 11.2                    | 47.7 | 0.1  | 5.5                             | 18                   | 98.4           | 46                    |
| 73           | 13.8                    | 46.7 | 0.3  | 6.7                             | 18                   | 98.4           | 47                    |
| 74           | 12.3                    | 46.9 | 0.2  | 6.0                             | 18                   | 98.4           | 47                    |
| 75           | 11.9                    | 47.5 | 0.1  | 5.8                             | 18                   | 98.4           | 47                    |
| 76           | 12.8                    | 47.4 | 0.4  | 6.2                             | 18                   | 98.4           | 47                    |
| 77           | 10.5                    | 47.2 | -0.2 | 5.1                             | 18                   | 98.4           | 47                    |
| 78           | 10.0                    | 48.2 | 0.2  | 4.9                             | 18                   | 98.4           | 46                    |
| 79           | 11.3                    | 47.3 | 0.2  | 5.5                             | 18                   | 98.4           | 46                    |
| 80           | 15.6                    | 47.7 | 0.0  | 7.6                             | 18                   | 98.4           | 46                    |
| 81           | 16.4                    | 48.2 | 0.1  | 8.0                             | 18                   | 98.4           | 46                    |
| 82           | 17.6                    | 48.4 | 0.5  | 8.5                             | 18                   | 98.4           | 46                    |
| 83           | 13.3                    | 50.2 | 0.4  | 6.5                             | 18                   | 98.4           | 46                    |

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

| Data Point # | Standardized Wind Speed | LAeq | RPM  | 10m Anemometer Wind Speed (m/s) | Air Temperature (°C) | Pressure (kPa) | Relative Humidity (%) |
|--------------|-------------------------|------|------|---------------------------------|----------------------|----------------|-----------------------|
| 84           | 11.3                    | 48.7 | 0.3  | 5.5                             | 18                   | 98.4           | 46                    |
| 85           | 10.4                    | 47.6 | 0.0  | 5.1                             | 18                   | 98.4           | 46                    |
| 86           | 8.8                     | 46.8 | 0.2  | 4.3                             | 18                   | 98.4           | 46                    |
| 87           | 9.5                     | 47.9 | 0.1  | 4.6                             | 18                   | 98.4           | 46                    |
| 88           | 13.4                    | 47.5 | 0.1  | 6.5                             | 18                   | 98.4           | 46                    |
| 89           | 15.4                    | 48.9 | 0.2  | 7.5                             | 18                   | 98.4           | 46                    |
| 90           | 18.7                    | 49.3 | 0.2  | 9.1                             | 18                   | 98.4           | 46                    |
| 91           | 19.2                    | 49.8 | 0.2  | 9.3                             | 18                   | 98.4           | 46                    |
| 92           | 15.4                    | 49.5 | 0.3  | 7.5                             | 18                   | 98.4           | 46                    |
| 93           | 13.7                    | 49.1 | 0.1  | 6.7                             | 18                   | 98.4           | 46                    |
| 94           | 18.3                    | 48.7 | 0.0  | 8.9                             | 18                   | 98.4           | 46                    |
| 95           | 15.1                    | 48.2 | 0.0  | 7.3                             | 18                   | 98.4           | 46                    |
| 96           | 12.3                    | 47.9 | 0.1  | 6.0                             | 18                   | 98.4           | 46                    |
| 97           | 12.9                    | 47.5 | 0.2  | 6.2                             | 17                   | 98.4           | 46                    |
| 98           | 16.7                    | 47.9 | 0.3  | 8.1                             | 17                   | 98.4           | 46                    |
| 99           | 20.6                    | 48.9 | 0.1  | 10.0                            | 17                   | 98.4           | 46                    |
| 100          | 26.2                    | 48.1 | -0.1 | 12.8                            | 17                   | 98.4           | 46                    |
| 101          | 23.9                    | 49.7 | -0.1 | 11.6                            | 17                   | 98.4           | 46                    |
| 102          | 18.6                    | 48.1 | -0.3 | 9.0                             | 17                   | 98.4           | 46                    |
| 103          | 15.0                    | 47.9 | -0.3 | 7.3                             | 17                   | 98.4           | 45                    |
| 104          | 19.2                    | 49.1 | 0.1  | 9.3                             | 17                   | 98.4           | 45                    |
| 105          | 13.6                    | 49.2 | 0.0  | 6.6                             | 17                   | 98.4           | 45                    |
| 106          | 13.2                    | 48.5 | 0.2  | 6.4                             | 17                   | 98.4           | 45                    |
| 107          | 12.5                    | 48.0 | -0.2 | 6.1                             | 17                   | 98.4           | 45                    |
| 108          | 15.5                    | 47.6 | -0.1 | 7.5                             | 17                   | 98.4           | 45                    |
| 109          | 20.1                    | 48.0 | -0.2 | 9.8                             | 17                   | 98.4           | 45                    |
| 110          | 18.3                    | 49.1 | -0.1 | 8.9                             | 17                   | 98.4           | 46                    |
| 111          | 17.5                    | 47.9 | 0.1  | 8.5                             | 17                   | 98.4           | 46                    |
| 112          | 15.9                    | 48.8 | 0.1  | 7.7                             | 17                   | 98.4           | 46                    |
| 113          | 21.6                    | 48.8 | 0.1  | 10.5                            | 17                   | 98.4           | 46                    |
| 114          | 21.4                    | 47.7 | -0.1 | 10.4                            | 17                   | 98.4           | 46                    |
| 115          | 16.6                    | 48.9 | -0.2 | 8.1                             | 17                   | 98.4           | 46                    |
| 116          | 18.0                    | 48.7 | 0.1  | 11.8                            | 17                   | 98.4           | 46                    |
| 117          | 21.3                    | 49.5 | 0.1  | 10.4                            | 17                   | 98.4           | 46                    |
| 118          | 14.1                    | 48.6 | -0.2 | 6.8                             | 17                   | 98.4           | 46                    |
| 119          | 16.3                    | 48.4 | 0.0  | 7.9                             | 17                   | 98.4           | 46                    |
| 120          | 15.1                    | 49.9 | 0.0  | 7.4                             | 17                   | 98.4           | 46                    |
| 121          | 13.8                    | 49.8 | 0.1  | 6.2                             | 17                   | 98.4           | 46                    |
| 122          | 13.9                    | 47.5 | 0.1  | 6.6                             | 17                   | 98.4           | 46                    |
| 123          | 16.0                    | 47.8 | 0.5  | 7.8                             | 17                   | 98.4           | 46                    |
| 124          | 14.9                    | 49.2 | 0.3  | 7.3                             | 17                   | 98.4           | 46                    |
| 125          | 19.3                    | 50.9 | 0.4  | 9.4                             | 17                   | 98.4           | 46                    |
| 126          | 17.8                    | 47.8 | 0.2  | 8.7                             | 17                   | 98.4           | 46                    |
| 127          | 15.0                    | 48.3 | 0.1  | 7.3                             | 17                   | 98.4           | 47                    |
| 128          | 15.8                    | 49.3 | -0.1 | 7.7                             | 17                   | 98.4           | 47                    |
| 129          | 15.1                    | 48.1 | 0.1  | 7.3                             | 17                   | 98.4           | 47                    |
| 130          | 13.8                    | 47.0 | 0.2  | 6.7                             | 17                   | 98.4           | 47                    |
| 131          | 16.8                    | 47.4 | 0.1  | 8.2                             | 17                   | 98.4           | 47                    |
| 132          | 20.4                    | 47.5 | 0.0  | 9.9                             | 17                   | 98.4           | 47                    |
| 133          | 17.7                    | 46.9 | -0.2 | 8.6                             | 17                   | 98.4           | 47                    |
| 134          | 12.9                    | 47.4 | 0.2  | 6.3                             | 17                   | 98.4           | 47                    |
| 135          | 11.4                    | 48.0 | 0.3  | 5.5                             | 17                   | 98.4           | 47                    |
| 136          | 7.3                     | 47.1 | 0.2  | 3.6                             | 17                   | 98.4           | 47                    |
| 137          | 9.1                     | 48.4 | 0.3  | 4.4                             | 17                   | 98.4           | 47                    |
| 138          | 13.1                    | 48.3 | 0.3  | 6.4                             | 17                   | 98.4           | 47                    |
| 139          | 11.7                    | 46.8 | 0.2  | 5.7                             | 17                   | 98.4           | 48                    |
| 140          | 14.7                    | 47.4 | 0.1  | 7.2                             | 17                   | 98.4           | 48                    |
| 141          | 22.2                    | 47.1 | 0.2  | 10.8                            | 17                   | 98.4           | 48                    |
| 142          | 21.5                    | 48.7 | 0.1  | 10.5                            | 17                   | 98.4           | 48                    |
| 143          | 19.3                    | 49.2 | 0.0  | 9.4                             | 17                   | 98.4           | 48                    |
| 144          | 20.7                    | 49.0 | 0.2  | 10.1                            | 17                   | 97.6           | 48                    |
| 145          | 18.6                    | 47.6 | 0.2  | 9.1                             | 17                   | 97.8           | 47                    |
| 146          | 19.7                    | 46.6 | 0.0  | 9.6                             | 17                   | 98.3           | 47                    |
| 147          | 17.3                    | 47.0 | 0.1  | 8.4                             | 17                   | 98.2           | 47                    |
| 148          | 15.6                    | 47.9 | 0.1  | 7.6                             | 17                   | 97.4           | 47                    |
| 149          | 15.8                    | 48.7 | 0.3  | 7.7                             | 17                   | 97.0           | 47                    |
| 150          | 14.9                    | 48.2 | 0.3  | 7.2                             | 17                   | 96.7           | 47                    |
| 151          | 17.5                    | 47.8 | 0.3  | 8.5                             | 17                   | 96.7           | 47                    |
| 152          | 13.1                    | 49.6 | 0.3  | 6.4                             | 17                   | 97.3           | 47                    |
| 153          | 14.5                    | 48.6 | 0.2  | 7.0                             | 17                   | 98.4           | 47                    |
| 154          | 23.0                    | 47.5 | 0.2  | 11.2                            | 17                   | 98.4           | 47                    |
| 155          | 18.0                    | 48.2 | 0.0  | 8.8                             | 17                   | 98.4           | 47                    |
| 156          | 14.6                    | 47.7 | 0.2  | 7.1                             | 17                   | 98.4           | 47                    |
| 157          | 15.2                    | 47.9 | 0.2  | 7.4                             | 17                   | 98.4           | 47                    |
| 158          | 17.0                    | 47.9 | 0.2  | 8.3                             | 17                   | 98.4           | 47                    |
| 159          | 16.7                    | 47.5 | -0.2 | 8.1                             | 17                   | 98.4           | 47                    |
| 160          | 13.5                    | 47.3 | -0.3 | 6.5                             | 17                   | 98.4           | 47                    |
| 161          | 11.6                    | 48.1 | -0.1 | 5.6                             | 17                   | 98.3           | 47                    |
| 162          | 13.0                    | 48.1 | 0.0  | 6.3                             | 17                   | 98.3           | 47                    |
| 163          | 12.1                    | 47.8 | 0.0  | 5.9                             | 17                   | 97.9           | 47                    |
| 164          | 17.4                    | 47.4 | -0.1 | 8.5                             | 17                   | 97.5           | 47                    |
| 165          | 19.1                    | 47.3 | -0.1 | 9.3                             | 17                   | 97.6           | 47                    |
| 166          | 14.2                    | 48.0 | -0.2 | 6.9                             | 17                   | 97.8           | 47                    |

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

| Data Point # | Standardized Wind Speed | LAeq | RPM | 10m Anemometer Wind Speed (m/s) | Air Temperature (°C) | Pressure (kPa) | Relative Humidity (%) |
|--------------|-------------------------|------|-----|---------------------------------|----------------------|----------------|-----------------------|
| 167          | 10.5                    | 47.5 | 0.1 | 5.1                             | 17                   | 97.8           | 47                    |
| 168          | 10.9                    | 48.  |     |                                 |                      |                |                       |



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## **Appendix F**

### Supplementary Information for the Regulators

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## Appendix F.01 Calibration Certificates

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## ISO 17025

## As Found RECALIBRATION CERTIFICATE

|                     |   |
|---------------------|---|
| Sales Region:       | NA  |
| Account:            | Aercoustics engineering limited   |
| Instrument:         | Simcenter SCADAS  |
| Manufacturer:       | Siemens Industry Software B.V.  |
| Type:               | SCR202  |
| Serial number(s):   | 22163146  |
| Calibration method: | Two calibrated external standards (DC voltage and frequency) are used to calibrate the internal Simcenter SCADAS references: time/frequency accuracy of the internal system clock and amplitude accuracy of the internal signal sources. All input channels are calibrated against the internal references.                                     |
| Ambient conditions: | The calibrations have been carried out in a controlled environment, at an ambient temperature of $23.1^{\circ}\text{C} \pm 0.3^{\circ}\text{C}$ and a relative humidity of $42\% \pm 5\%$ .   |
| Calibration date:   | March 12, 2020  |
| Results:            | The calibration results, together with their associated uncertainties, are included in this calibration certificate.<br><i>Calibration results within specification.</i>  |
| Uncertainty:        | The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor $k=2$ , which for a normal distribution corresponds to a coverage probability of approximately 95%. The standard uncertainty of measurement has been determined in accordance with publication EA-4/02. |
| Traceability:       | The measurements have been executed using methods for which the traceability to international standards has been demonstrated towards the Raad voor Accreditatie.   |

Breda, March 20, 2020

Calibration performed by:

H. Dam, customer service engineer

Certificate approved by:

F. Lemmens, Production Manager

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

Reproduction of the complete certificate is allowed. Parts of the certificate may only be reproduced with written approval of the calibration laboratory.

This certificate is issued provided that neither Siemens Industry Software B.V. nor the Raad voor Accreditatie assumes any liability.

Certificate number: 22163146-20200312-0

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## 1 ***Explanation of the factory calibration procedure***

The production process of an Simcenter SCADAS front-end consists of a number of stages. Every single board or module that will be part of the system is tested extensively on reliability and functionality before it is inserted in the Simcenter SCADAS frame.

After assembly, the amplitude accuracy and offset errors of all input and output channels are adjusted to a value as close to zero as possible. The adjustment procedure incorporates external measurement equipment, which is documented in the next section of this report.

As a final step, the front-end is submitted to a factory calibration. The factory calibration verifies whether all input and output channels meet their published specifications with respect to amplitude accuracy, offset, and a number of dynamic capabilities such as distortion, signal to noise ratio and inter-channel crosstalk. The measurements that are done as a part of the calibration use an internal reference source, which has been calibrated against an external standard (documented in the next section of this report).

The results of this calibration procedure are documented in the *Calibration Certificate* you have in front of you.



## 2 External reference - used equipment

|                      | Type           | Serial Number | Cal Certificate | Cal Date      |
|----------------------|----------------|---------------|-----------------|---------------|
| Digital multimeter   | Agilent 34401A | MY41040399    | 201902414.00    | 2019 June, 24 |
| Calibration software | 2.15.0001      | NA            | NA              | NA            |

The external reference (DMM) is calibrated on a yearly basis by a calibration laboratory that is ISO17025:2005 accredited by The Dutch Accreditation Council RvA.



**3 System configuration**

| Frame      | Backplane Module | Conditioner | Unique number | Hardware version | Software version | Option |
|------------|------------------|-------------|---------------|------------------|------------------|--------|
| Master (0) |                  |             | 0022163146    |                  |                  |        |
|            | VD8_E (1)        |             | 2016335037    | 85               | 0                |        |
|            | VD8_E (2)        |             | 2016335043    | 85               | 0                |        |
|            | SYSCON_REC (3)   |             | 2015139002    | 11               | 0                |        |
|            |                  | SYSCPB (0)  | 2015145002    | 3                | 0                |        |
|            | PS12-2 MOB (4)   |             | 2016123030    | 19               | 11               |        |



4 VD8\_E\_h85s0

4.1 Gain Accuracy after Adjustment

**Description of calibration:**

Determination of the amplitude accuracy of the input channels over all input ranges and available ADC bandwidths, by applying an accurate 1kHz -3dBFS (max 4V) sine wave which is generated by the internal reference generator. For charge amplifiers, the reference voltage signal is translated to a reference charge signal.

The reported values represent the deviations from the expected signal amplitude, both absolute (either in Volt or Coulomb, depending on the input channel type) and relative (in %).

| AdcBw 25600Hz, Range 10V<br>Alternating voltage 3.16V < IR<br><= 10V<br>Spec: <= ±0.100%<br>Uncertainty: 530µV |                    |  |
|--|--------------------|--|
| Chan   | Value              |  |
| 0,1,x,0  | -0.446 mV, -0.011% |  |
| 0,1,x,1  | -0.546 mV, -0.014% |  |
| 0,1,x,2  | -0.154 mV, -0.004% |  |
| 0,1,x,3  | -0.322 mV, -0.008% |  |
| 0,1,x,4  | -0.653 mV, -0.016% |  |
| 0,1,x,5  | -0.614 mV, -0.015% |  |
| 0,1,x,6  | -0.383 mV, -0.010% |  |
| 0,1,x,7  | -0.323 mV, -0.008% |  |
| 0,2,x,0  | -0.220 mV, -0.005% |  |
| 0,2,x,1  | -0.244 mV, -0.006% |  |
| 0,2,x,2  | -0.431 mV, -0.011% |  |
| 0,2,x,3  | -0.414 mV, -0.010% |  |
| 0,2,x,4  | -0.477 mV, -0.012% |  |
| 0,2,x,5  | 0.071 mV, 0.002%   |  |
| 0,2,x,6  | -0.253 mV, -0.006% |  |
| 0,2,x,7  | -0.296 mV, -0.007% |  |

| AdcBw 25600Hz, Range 1V<br>Alternating voltage 316mV <<br>IR <= 1V<br>Spec: <= ±0.100%<br>Uncertainty: 120µV |                  |  |
|--|------------------|--|
| Chan   | Value            |  |
| 0,1,x,0  | 0.075 mV, 0.011% |  |
| 0,1,x,1  | 0.057 mV, 0.008% |  |
| 0,1,x,2  | 0.124 mV, 0.017% |  |
| 0,1,x,3  | 0.093 mV, 0.013% |  |
| 0,1,x,4  | 0.040 mV, 0.006% |  |
| 0,1,x,5  | 0.049 mV, 0.007% |  |
| 0,1,x,6  | 0.096 mV, 0.014% |  |
| 0,1,x,7  | 0.096 mV, 0.014% |  |
| 0,2,x,0  | 0.115 mV, 0.016% |  |
| 0,2,x,1  | 0.114 mV, 0.016% |  |
| 0,2,x,2  | 0.077 mV, 0.011% |  |
| 0,2,x,3  | 0.078 mV, 0.011% |  |
| 0,2,x,4  | 0.067 mV, 0.010% |  |
| 0,2,x,5  | 0.177 mV, 0.025% |  |
| 0,2,x,6  | 0.136 mV, 0.019% |  |
| 0,2,x,7  | 0.100 mV, 0.014% |  |

| AdcBw 25600Hz, Range<br>100mV<br>Not in Scope<br>Spec: 1.00000 ±0.10% |                |  |
|---|----------------|--|
| Chan  | Value          |  |
| 0,1,x,0   | 1.00012, 0.01% |  |
| 0,1,x,1   | 1.00009, 0.01% |  |
| 0,1,x,2   | 1.00019, 0.02% |  |
| 0,1,x,3   | 1.00015, 0.02% |  |
| 0,1,x,4   | 1.00007, 0.01% |  |
| 0,1,x,5   | 1.00008, 0.01% |  |
| 0,1,x,6   | 1.00014, 0.01% |  |
| 0,1,x,7   | 1.00014, 0.01% |  |
| 0,2,x,0   | 1.00018, 0.02% |  |
| 0,2,x,1   | 1.00018, 0.02% |  |
| 0,2,x,2   | 1.00013, 0.01% |  |
| 0,2,x,3   | 1.00013, 0.01% |  |
| 0,2,x,4   | 1.00011, 0.01% |  |
| 0,2,x,5   | 1.00027, 0.03% |  |
| 0,2,x,6   | 1.00019, 0.02% |  |
| 0,2,x,7   | 1.00016, 0.02% |  |

| AdcBw 25600Hz, Range 3.16V<br>Alternating voltage 1V < IR <= 3.16V<br>Spec: <= ±0.100%<br>Uncertainty: 310µV |                    |  |
|--|--------------------|--|
| Chan   | Value              |  |
| 0,1,x,0  | -0.114 mV, -0.005% |  |
| 0,1,x,1  | -0.185 mV, -0.008% |  |
| 0,1,x,2  | 0.032 mV, 0.001%   |  |
| 0,1,x,3  | -0.056 mV, -0.003% |  |
| 0,1,x,4  | -0.230 mV, -0.010% |  |
| 0,1,x,5  | -0.212 mV, -0.009% |  |
| 0,1,x,6  | -0.079 mV, -0.004% |  |
| 0,1,x,7  | -0.065 mV, -0.003% |  |
| 0,2,x,0  | 0.019 mV, 0.001%   |  |
| 0,2,x,1  | -0.011 mV, -0.000% |  |
| 0,2,x,2  | -0.097 mV, -0.004% |  |
| 0,2,x,3  | -0.081 mV, -0.004% |  |
| 0,2,x,4  | -0.122 mV, -0.005% |  |
| 0,2,x,5  | 0.180 mV, 0.008%   |  |
| 0,2,x,6  | -0.016 mV, -0.001% |  |
| 0,2,x,7  | -0.033 mV, -0.001% |  |

| AdcBw 25600Hz, Range<br>0.316V<br>Alternating voltage 100mV <<br>IR <= 316mV<br>Spec: <= ±0.100%<br>Uncertainty: 66µV |                  |  |
|---|------------------|--|
| Chan  | Value            |  |
| 0,1,x,0   | 0.028 mV, 0.013% |  |
| 0,1,x,1   | 0.021 mV, 0.009% |  |
| 0,1,x,2   | 0.042 mV, 0.019% |  |
| 0,1,x,3   | 0.032 mV, 0.015% |  |
| 0,1,x,4   | 0.016 mV, 0.007% |  |
| 0,1,x,5   | 0.018 mV, 0.008% |  |
| 0,1,x,6   | 0.034 mV, 0.015% |  |
| 0,1,x,7   | 0.032 mV, 0.014% |  |
| 0,2,x,0   | 0.041 mV, 0.018% |  |
| 0,2,x,1   | 0.039 mV, 0.017% |  |
| 0,2,x,2   | 0.029 mV, 0.013% |  |
| 0,2,x,3   | 0.030 mV, 0.013% |  |
| 0,2,x,4   | 0.026 mV, 0.011% |  |
| 0,2,x,5   | 0.060 mV, 0.027% |  |
| 0,2,x,6   | 0.046 mV, 0.020% |  |
| 0,2,x,7   | 0.035 mV, 0.016% |  |

| AdcBw 51200Hz, Range 10V<br>Alternating voltage 3.16V < IR<br><= 10V<br>Spec: <= ±0.100%<br>Uncertainty: 530µV |                    |  |
|--|--------------------|--|
| Chan   | Value              |  |
| 0,1,x,0  | -0.121 mV, -0.003% |  |
| 0,1,x,1  | -0.213 mV, -0.005% |  |
| 0,1,x,2  | 0.170 mV, 0.004%   |  |
| 0,1,x,3  | 0.001 mV, 0.000%   |  |
| 0,1,x,4  | -0.321 mV, -0.008% |  |
| 0,1,x,5  | -0.283 mV, -0.007% |  |
| 0,1,x,6  | -0.047 mV, -0.001% |  |
| 0,1,x,7  | 0.013 mV, 0.000%   |  |
| 0,2,x,0  | 0.116 mV, 0.003%   |  |
| 0,2,x,1  | 0.095 mV, 0.002%   |  |
| 0,2,x,2  | -0.101 mV, -0.003% |  |
| 0,2,x,3  | -0.082 mV, -0.002% |  |
| 0,2,x,4  | -0.147 mV, -0.004% |  |
| 0,2,x,5  | 0.401 mV, 0.010%   |  |
| 0,2,x,6  | 0.086 mV, 0.002%   |  |
| 0,2,x,7  | 0.043 mV, 0.001%   |  |



**AdcBw 51200Hz, Range 3.16V**  
**Alternating voltage 1V < IR <= 3.16V**  
**Spec: <= ±0.100%**  
**Uncertainty: 310µV**

| Chan    | Value              |
|---------|--------------------|
| 0,1,x,0 | -0.015 mV, -0.001% |
| 0,1,x,1 | -0.084 mV, -0.004% |
| 0,1,x,2 | 0.134 mV, 0.006%   |
| 0,1,x,3 | 0.046 mV, 0.002%   |
| 0,1,x,4 | -0.131 mV, -0.006% |
| 0,1,x,5 | -0.114 mV, -0.005% |
| 0,1,x,6 | 0.020 mV, 0.001%   |
| 0,1,x,7 | 0.034 mV, 0.002%   |
| 0,2,x,0 | 0.119 mV, 0.005%   |
| 0,2,x,1 | 0.091 mV, 0.004%   |
| 0,2,x,2 | 0.001 mV, 0.000%   |
| 0,2,x,3 | 0.018 mV, 0.001%   |
| 0,2,x,4 | -0.028 mV, -0.001% |
| 0,2,x,5 | 0.276 mV, 0.012%   |
| 0,2,x,6 | 0.085 mV, 0.004%   |
| 0,2,x,7 | 0.068 mV, 0.003%   |

**AdcBw 51200Hz, Range 0.316V**  
**Alternating voltage 100mV < IR <= 316mV**  
**Spec: <= ±0.100%**  
**Uncertainty: 66µV**

| Chan    | Value            |
|---------|------------------|
| 0,1,x,0 | 0.031 mV, 0.014% |
| 0,1,x,1 | 0.024 mV, 0.011% |
| 0,1,x,2 | 0.045 mV, 0.020% |
| 0,1,x,3 | 0.036 mV, 0.016% |
| 0,1,x,4 | 0.020 mV, 0.009% |
| 0,1,x,5 | 0.022 mV, 0.010% |
| 0,1,x,6 | 0.037 mV, 0.017% |
| 0,1,x,7 | 0.036 mV, 0.016% |
| 0,2,x,0 | 0.045 mV, 0.020% |
| 0,2,x,1 | 0.043 mV, 0.019% |
| 0,2,x,2 | 0.032 mV, 0.015% |
| 0,2,x,3 | 0.034 mV, 0.015% |
| 0,2,x,4 | 0.029 mV, 0.013% |
| 0,2,x,5 | 0.064 mV, 0.029% |
| 0,2,x,6 | 0.050 mV, 0.022% |
| 0,2,x,7 | 0.039 mV, 0.017% |

**AdcBw 102400Hz, Range 10V**  
**Alternating voltage 3.16V < IR <= 10V**  
**Spec: <= ±0.100%**  
**Uncertainty: 530µV**

| Chan    | Value              |
|---------|--------------------|
| 0,1,x,0 | -0.041 mV, -0.001% |
| 0,1,x,1 | -0.142 mV, -0.004% |
| 0,1,x,2 | 0.245 mV, 0.006%   |
| 0,1,x,3 | 0.072 mV, 0.002%   |
| 0,1,x,4 | -0.245 mV, -0.006% |
| 0,1,x,5 | -0.206 mV, -0.005% |
| 0,1,x,6 | 0.019 mV, 0.000%   |
| 0,1,x,7 | 0.078 mV, 0.002%   |
| 0,2,x,0 | 0.188 mV, 0.005%   |
| 0,2,x,1 | 0.161 mV, 0.004%   |
| 0,2,x,2 | -0.038 mV, -0.001% |
| 0,2,x,3 | -0.020 mV, -0.001% |
| 0,2,x,4 | -0.073 mV, -0.002% |
| 0,2,x,5 | 0.481 mV, 0.012%   |
| 0,2,x,6 | 0.153 mV, 0.004%   |
| 0,2,x,7 | 0.109 mV, 0.003%   |

**AdcBw 51200Hz, Range 1V**  
**Alternating voltage 316mV < IR <= 1V**  
**Spec: <= ±0.100%**  
**Uncertainty: 120µV**

| Chan    | Value            |
|---------|------------------|
| 0,1,x,0 | 0.092 mV, 0.013% |
| 0,1,x,1 | 0.074 mV, 0.010% |
| 0,1,x,2 | 0.141 mV, 0.020% |
| 0,1,x,3 | 0.110 mV, 0.016% |
| 0,1,x,4 | 0.057 mV, 0.008% |
| 0,1,x,5 | 0.066 mV, 0.009% |
| 0,1,x,6 | 0.113 mV, 0.016% |
| 0,1,x,7 | 0.114 mV, 0.016% |
| 0,2,x,0 | 0.134 mV, 0.019% |
| 0,2,x,1 | 0.132 mV, 0.019% |
| 0,2,x,2 | 0.094 mV, 0.013% |
| 0,2,x,3 | 0.095 mV, 0.013% |
| 0,2,x,4 | 0.084 mV, 0.012% |
| 0,2,x,5 | 0.195 mV, 0.028% |
| 0,2,x,6 | 0.153 mV, 0.022% |
| 0,2,x,7 | 0.117 mV, 0.017% |

**AdcBw 51200Hz, Range 100mV**  
**Not in Scope**  
**Spec: 1.00000 ±0.10%**

| Chan    | Value          |
|---------|----------------|
| 0,1,x,0 | 1.00013, 0.01% |
| 0,1,x,1 | 1.00010, 0.01% |
| 0,1,x,2 | 1.00020, 0.02% |
| 0,1,x,3 | 1.00016, 0.02% |
| 0,1,x,4 | 1.00008, 0.01% |
| 0,1,x,5 | 1.00009, 0.01% |
| 0,1,x,6 | 1.00015, 0.01% |
| 0,1,x,7 | 1.00015, 0.01% |
| 0,2,x,0 | 1.00019, 0.02% |
| 0,2,x,1 | 1.00019, 0.02% |
| 0,2,x,2 | 1.00014, 0.01% |
| 0,2,x,3 | 1.00014, 0.01% |
| 0,2,x,4 | 1.00012, 0.01% |
| 0,2,x,5 | 1.00028, 0.03% |
| 0,2,x,6 | 1.00020, 0.02% |
| 0,2,x,7 | 1.00017, 0.02% |

**AdcBw 102400Hz, Range 3.16V**  
**Alternating voltage 1V < IR <= 3.16V**  
**Spec: <= ±0.100%**  
**Uncertainty: 310µV**

| Chan    | Value              |
|---------|--------------------|
| 0,1,x,0 | 0.027 mV, 0.001%   |
| 0,1,x,1 | -0.048 mV, -0.002% |
| 0,1,x,2 | 0.172 mV, 0.008%   |
| 0,1,x,3 | 0.082 mV, 0.004%   |
| 0,1,x,4 | -0.096 mV, -0.004% |
| 0,1,x,5 | -0.077 mV, -0.003% |
| 0,1,x,6 | 0.051 mV, 0.002%   |
| 0,1,x,7 | 0.065 mV, 0.003%   |
| 0,2,x,0 | 0.153 mV, 0.007%   |
| 0,2,x,1 | 0.123 mV, 0.006%   |
| 0,2,x,2 | 0.034 mV, 0.002%   |
| 0,2,x,3 | 0.049 mV, 0.002%   |
| 0,2,x,4 | 0.011 mV, 0.000%   |
| 0,2,x,5 | 0.318 mV, 0.014%   |
| 0,2,x,6 | 0.116 mV, 0.005%   |
| 0,2,x,7 | 0.099 mV, 0.004%   |



**AdcBw 102400Hz, Range 1V**  
**Alternating voltage 316mV <**  
**IR <= 1V**  
**Spec: <= ±0.100%**  
**Uncertainty: 120µV**

| Chan    | Value            |
|---------|------------------|
| 0,1,x,0 | 0.108 mV, 0.015% |
| 0,1,x,1 | 0.087 mV, 0.012% |
| 0,1,x,2 | 0.154 mV, 0.022% |
| 0,1,x,3 | 0.122 mV, 0.017% |
| 0,1,x,4 | 0.070 mV, 0.010% |
| 0,1,x,5 | 0.078 mV, 0.011% |
| 0,1,x,6 | 0.123 mV, 0.017% |
| 0,1,x,7 | 0.124 mV, 0.018% |
| 0,2,x,0 | 0.146 mV, 0.021% |
| 0,2,x,1 | 0.144 mV, 0.020% |
| 0,2,x,2 | 0.106 mV, 0.015% |
| 0,2,x,3 | 0.106 mV, 0.015% |
| 0,2,x,4 | 0.097 mV, 0.014% |
| 0,2,x,5 | 0.209 mV, 0.030% |
| 0,2,x,6 | 0.166 mV, 0.023% |
| 0,2,x,7 | 0.129 mV, 0.018% |

**AdcBw 102400Hz, Range 0.316V**  
**Alternating voltage 100mV <**  
**IR <= 316mV**  
**Spec: <= ±0.100%**  
**Uncertainty: 66µV**

| Chan    | Value            |
|---------|------------------|
| 0,1,x,0 | 0.037 mV, 0.016% |
| 0,1,x,1 | 0.028 mV, 0.013% |
| 0,1,x,2 | 0.050 mV, 0.022% |
| 0,1,x,3 | 0.040 mV, 0.018% |
| 0,1,x,4 | 0.024 mV, 0.011% |
| 0,1,x,5 | 0.026 mV, 0.012% |
| 0,1,x,6 | 0.041 mV, 0.018% |
| 0,1,x,7 | 0.039 mV, 0.018% |
| 0,2,x,0 | 0.049 mV, 0.022% |
| 0,2,x,1 | 0.047 mV, 0.021% |
| 0,2,x,2 | 0.036 mV, 0.016% |
| 0,2,x,3 | 0.037 mV, 0.017% |
| 0,2,x,4 | 0.033 mV, 0.015% |
| 0,2,x,5 | 0.069 mV, 0.031% |
| 0,2,x,6 | 0.053 mV, 0.024% |
| 0,2,x,7 | 0.042 mV, 0.019% |

**AdcBw 102400Hz, Range 100mV**  
**Not in Scope**  
**Spec: 1.00000 ±0.10%**

| Chan    | Value          |
|---------|----------------|
| 0,1,x,0 | 1.00016, 0.02% |
| 0,1,x,1 | 1.00012, 0.01% |
| 0,1,x,2 | 1.00022, 0.02% |
| 0,1,x,3 | 1.00018, 0.02% |
| 0,1,x,4 | 1.00011, 0.01% |
| 0,1,x,5 | 1.00011, 0.01% |
| 0,1,x,6 | 1.00017, 0.02% |
| 0,1,x,7 | 1.00017, 0.02% |
| 0,2,x,0 | 1.00021, 0.02% |
| 0,2,x,1 | 1.00021, 0.02% |
| 0,2,x,2 | 1.00016, 0.02% |
| 0,2,x,3 | 1.00016, 0.02% |
| 0,2,x,4 | 1.00015, 0.01% |
| 0,2,x,5 | 1.00030, 0.03% |
| 0,2,x,6 | 1.00022, 0.02% |
| 0,2,x,7 | 1.00019, 0.02% |



## 4.2 Residual Offset after Adjustment

### Description of calibration:

Determination of the residual input offsets of the input channels over all input ranges and available ADC bandwidths, by internally shorting the input channels to ground.

| <b>AdcBw 102400Hz,<br/>Range 100mV<br/>Direct voltage IR &lt;= 316mV<br/>Spec: &lt;= ±0.100 mV<br/>Uncertainty: 4.8µV</b> |           | <b>AdcBw 102400Hz,<br/>Range 1V<br/>Direct voltage 316mV &lt; IR &lt;= 1V<br/>Spec: &lt;= ±1.000 mV<br/>Uncertainty: 5.2µV</b> |           | <b>AdcBw 102400Hz,<br/>Range 10V<br/>Direct voltage 3.16V &lt; IR &lt;= 10V<br/>Spec: &lt;= ±10.000 mV<br/>Uncertainty: 21µV</b> |           | <b>AdcBw 51200Hz,<br/>Range 0.316V<br/>Direct voltage IR &lt;= 316mV<br/>Spec: &lt;= ±0.316 mV<br/>Uncertainty: 4.8µV</b> |           |
|---|-----------|--|-----------|--|-----------|---|-----------|
| Chan  | Value     | Chan   | Value     | Chan   | Value     | Chan  | Value     |
| 0,1,x,0   | 0.032 mV  | 0,1,x,0  | -0.017 mV | 0,1,x,0  | -0.376 mV | 0,1,x,0   | 0.008 mV  |
| 0,1,x,1   | 0.020 mV  | 0,1,x,1  | -0.026 mV | 0,1,x,1  | -0.440 mV | 0,1,x,1   | 0.002 mV  |
| 0,1,x,2   | 0.014 mV  | 0,1,x,2  | -0.062 mV | 0,1,x,2  | -0.811 mV | 0,1,x,2   | -0.012 mV |
| 0,1,x,3   | -0.028 mV | 0,1,x,3  | -0.072 mV | 0,1,x,3  | -0.550 mV | 0,1,x,3   | -0.035 mV |
| 0,1,x,4   | -0.014 mV | 0,1,x,4  | -0.082 mV | 0,1,x,4  | -0.712 mV | 0,1,x,4   | -0.023 mV |
| 0,1,x,5   | -0.011 mV | 0,1,x,5  | -0.043 mV | 0,1,x,5  | -0.427 mV | 0,1,x,5   | -0.017 mV |
| 0,1,x,6   | -0.047 mV | 0,1,x,6  | -0.094 mV | 0,1,x,6  | -0.640 mV | 0,1,x,6   | -0.040 mV |
| 0,1,x,7   | -0.046 mV | 0,1,x,7  | -0.086 mV | 0,1,x,7  | -0.563 mV | 0,1,x,7   | -0.037 mV |
| 0,2,x,0   | -0.034 mV | 0,2,x,0  | -0.086 mV | 0,2,x,0  | -0.640 mV | 0,2,x,0   | -0.037 mV |
| 0,2,x,1   | -0.035 mV | 0,2,x,1  | -0.088 mV | 0,2,x,1  | -0.677 mV | 0,2,x,1   | -0.033 mV |
| 0,2,x,2   | -0.047 mV | 0,2,x,2  | -0.109 mV | 0,2,x,2  | -0.801 mV | 0,2,x,2   | -0.047 mV |
| 0,2,x,3   | -0.048 mV | 0,2,x,3  | -0.099 mV | 0,2,x,3  | -0.689 mV | 0,2,x,3   | -0.045 mV |
| 0,2,x,4   | -0.039 mV | 0,2,x,4  | -0.087 mV | 0,2,x,4  | -0.610 mV | 0,2,x,4   | -0.035 mV |
| 0,2,x,5   | -0.036 mV | 0,2,x,5  | -0.091 mV | 0,2,x,5  | -0.662 mV | 0,2,x,5   | -0.036 mV |
| 0,2,x,6   | -0.050 mV | 0,2,x,6  | -0.118 mV | 0,2,x,6  | -0.882 mV | 0,2,x,6   | -0.054 mV |
| 0,2,x,7   | -0.030 mV | 0,2,x,7  | -0.062 mV | 0,2,x,7  | -0.471 mV | 0,2,x,7   | -0.021 mV |

| <b>AdcBw 102400Hz,<br/>Range 0.316V<br/>Direct voltage IR &lt;= 316mV<br/>Spec: &lt;= ±0.316 mV<br/>Uncertainty: 4.8µV</b> |           | <b>AdcBw 102400Hz,<br/>Range 3.16V<br/>Direct voltage 1V &lt; IR &lt;= 3.16V<br/>Spec: &lt;= ±3.160 mV<br/>Uncertainty: 8µV</b> |           | <b>AdcBw 51200Hz,<br/>Range 100mV<br/>Direct voltage IR &lt;= 316mV<br/>Spec: &lt;= ±0.100 mV<br/>Uncertainty: 4.8µV</b> |           | <b>AdcBw 51200Hz,<br/>Range 1V<br/>Direct voltage 316mV &lt; IR &lt;= 1V<br/>Spec: &lt;= ±1.000 mV<br/>Uncertainty: 5.2µV</b> |           |
|--|-----------|---|-----------|--|-----------|---|-----------|
| Chan   | Value     | Chan  | Value     | Chan   | Value     | Chan  | Value     |
| 0,1,x,0  | 0.020 mV  | 0,1,x,0   | -0.085 mV | 0,1,x,0  | 0.019 mV  | 0,1,x,0   | -0.025 mV |
| 0,1,x,1  | 0.009 mV  | 0,1,x,1   | -0.128 mV | 0,1,x,1  | 0.011 mV  | 0,1,x,1   | -0.030 mV |
| 0,1,x,2  | -0.004 mV | 0,1,x,2   | -0.239 mV | 0,1,x,2  | 0.009 mV  | 0,1,x,2   | -0.070 mV |
| 0,1,x,3  | -0.037 mV | 0,1,x,3   | -0.171 mV | 0,1,x,3  | -0.022 mV | 0,1,x,3   | -0.075 mV |
| 0,1,x,4  | -0.030 mV | 0,1,x,4   | -0.232 mV | 0,1,x,4  | -0.007 mV | 0,1,x,4   | -0.072 mV |
| 0,1,x,5  | -0.016 mV | 0,1,x,5   | -0.133 mV | 0,1,x,5  | -0.008 mV | 0,1,x,5   | -0.041 mV |
| 0,1,x,6  | -0.055 mV | 0,1,x,6   | -0.233 mV | 0,1,x,6  | -0.028 mV | 0,1,x,6   | -0.080 mV |
| 0,1,x,7  | -0.053 mV | 0,1,x,7   | -0.201 mV | 0,1,x,7  | -0.026 mV | 0,1,x,7   | -0.073 mV |
| 0,2,x,0  | -0.043 mV | 0,2,x,0   | -0.209 mV | 0,2,x,0  | -0.024 mV | 0,2,x,0   | -0.079 mV |
| 0,2,x,1  | -0.046 mV | 0,2,x,1   | -0.224 mV | 0,2,x,1  | -0.021 mV | 0,2,x,1   | -0.078 mV |
| 0,2,x,2  | -0.060 mV | 0,2,x,2   | -0.278 mV | 0,2,x,2  | -0.033 mV | 0,2,x,2   | -0.096 mV |
| 0,2,x,3  | -0.060 mV | 0,2,x,3   | -0.239 mV | 0,2,x,3  | -0.034 mV | 0,2,x,3   | -0.087 mV |
| 0,2,x,4  | -0.048 mV | 0,2,x,4   | -0.205 mV | 0,2,x,4  | -0.024 mV | 0,2,x,4   | -0.073 mV |
| 0,2,x,5  | -0.048 mV | 0,2,x,5   | -0.214 mV | 0,2,x,5  | -0.025 mV | 0,2,x,5   | -0.082 mV |
| 0,2,x,6  | -0.064 mV | 0,2,x,6   | -0.301 mV | 0,2,x,6  | -0.037 mV | 0,2,x,6   | -0.106 mV |
| 0,2,x,7  | -0.036 mV | 0,2,x,7   | -0.152 mV | 0,2,x,7  | -0.012 mV | 0,2,x,7   | -0.046 mV |



**AdcBw 51200Hz,  
Range 3.16V  
Direct voltage 1V < IR  
<= 3.16V  
Spec: <= ±3.160 mV  
Uncertainty: 8µV**

| Chan    | Value     |
|---------|-----------|
| 0,1,x,0 | -0.101 mV |
| 0,1,x,1 | -0.132 mV |
| 0,1,x,2 | -0.246 mV |
| 0,1,x,3 | -0.174 mV |
| 0,1,x,4 | -0.221 mV |
| 0,1,x,5 | -0.133 mV |
| 0,1,x,6 | -0.222 mV |
| 0,1,x,7 | -0.185 mV |
| 0,2,x,0 | -0.201 mV |
| 0,2,x,1 | -0.221 mV |
| 0,2,x,2 | -0.273 mV |
| 0,2,x,3 | -0.230 mV |
| 0,2,x,4 | -0.187 mV |
| 0,2,x,5 | -0.215 mV |
| 0,2,x,6 | -0.286 mV |
| 0,2,x,7 | -0.133 mV |

**AdcBw 25600Hz,  
Range 100mV  
Direct voltage IR <= 316mV  
Spec: <= ±0.100 mV  
Uncertainty: 4.8µV**

| Chan    | Value     |
|---------|-----------|
| 0,1,x,0 | 0.008 mV  |
| 0,1,x,1 | 0.006 mV  |
| 0,1,x,2 | 0.000 mV  |
| 0,1,x,3 | -0.022 mV |
| 0,1,x,4 | -0.006 mV |
| 0,1,x,5 | -0.006 mV |
| 0,1,x,6 | -0.018 mV |
| 0,1,x,7 | -0.021 mV |
| 0,2,x,0 | -0.020 mV |
| 0,2,x,1 | -0.015 mV |
| 0,2,x,2 | -0.023 mV |
| 0,2,x,3 | -0.026 mV |
| 0,2,x,4 | -0.017 mV |
| 0,2,x,5 | -0.018 mV |
| 0,2,x,6 | -0.029 mV |
| 0,2,x,7 | -0.006 mV |

**AdcBw 25600Hz,  
Range 1V  
Direct voltage 316mV < IR <= 1V  
Spec: <= ±1.000 mV  
Uncertainty: 5.2µV**

| Chan    | Value     |
|---------|-----------|
| 0,1,x,0 | -0.036 mV |
| 0,1,x,1 | -0.039 mV |
| 0,1,x,2 | -0.073 mV |
| 0,1,x,3 | -0.075 mV |
| 0,1,x,4 | -0.072 mV |
| 0,1,x,5 | -0.043 mV |
| 0,1,x,6 | -0.076 mV |
| 0,1,x,7 | -0.068 mV |
| 0,2,x,0 | -0.070 mV |
| 0,2,x,1 | -0.072 mV |
| 0,2,x,2 | -0.089 mV |
| 0,2,x,3 | -0.082 mV |
| 0,2,x,4 | -0.066 mV |
| 0,2,x,5 | -0.071 mV |
| 0,2,x,6 | -0.102 mV |
| 0,2,x,7 | -0.046 mV |

**AdcBw 25600Hz,  
Range 10V  
Direct voltage 3.16V < IR <= 10V  
Spec: <= ±10.000 mV  
Uncertainty: 21µV**

| Chan    | Value     |
|---------|-----------|
| 0,1,x,0 | -0.414 mV |
| 0,1,x,1 | -0.485 mV |
| 0,1,x,2 | -0.791 mV |
| 0,1,x,3 | -0.552 mV |
| 0,1,x,4 | -0.701 mV |
| 0,1,x,5 | -0.408 mV |
| 0,1,x,6 | -0.627 mV |
| 0,1,x,7 | -0.559 mV |
| 0,2,x,0 | -0.595 mV |
| 0,2,x,1 | -0.667 mV |
| 0,2,x,2 | -0.752 mV |
| 0,2,x,3 | -0.677 mV |
| 0,2,x,4 | -0.572 mV |
| 0,2,x,5 | -0.638 mV |
| 0,2,x,6 | -0.827 mV |
| 0,2,x,7 | -0.390 mV |

**AdcBw 51200Hz,  
Range 10V  
Direct voltage 3.16V < IR <= 10V  
Spec: <= ±10.000 mV  
Uncertainty: 21µV**

| Chan    | Value     |
|---------|-----------|
| 0,1,x,0 | -0.409 mV |
| 0,1,x,1 | -0.459 mV |
| 0,1,x,2 | -0.786 mV |
| 0,1,x,3 | -0.570 mV |
| 0,1,x,4 | -0.730 mV |
| 0,1,x,5 | -0.414 mV |
| 0,1,x,6 | -0.682 mV |
| 0,1,x,7 | -0.518 mV |
| 0,2,x,0 | -0.640 mV |
| 0,2,x,1 | -0.673 mV |
| 0,2,x,2 | -0.804 mV |
| 0,2,x,3 | -0.653 mV |
| 0,2,x,4 | -0.601 mV |
| 0,2,x,5 | -0.665 mV |
| 0,2,x,6 | -0.852 mV |
| 0,2,x,7 | -0.432 mV |

**AdcBw 25600Hz,  
Range 0.316V  
Direct voltage IR <= 316mV  
Spec: <= ±0.316 mV  
Uncertainty: 4.8µV**

| Chan    | Value     |
|---------|-----------|
| 0,1,x,0 | -0.005 mV |
| 0,1,x,1 | -0.004 mV |
| 0,1,x,2 | -0.015 mV |
| 0,1,x,3 | -0.037 mV |
| 0,1,x,4 | -0.023 mV |
| 0,1,x,5 | -0.014 mV |
| 0,1,x,6 | -0.033 mV |
| 0,1,x,7 | -0.034 mV |
| 0,2,x,0 | -0.030 mV |
| 0,2,x,1 | -0.029 mV |
| 0,2,x,2 | -0.037 mV |
| 0,2,x,3 | -0.038 mV |
| 0,2,x,4 | -0.028 mV |
| 0,2,x,5 | -0.031 mV |
| 0,2,x,6 | -0.043 mV |
| 0,2,x,7 | -0.017 mV |

**AdcBw 25600Hz,  
Range 3.16V  
Direct voltage 1V < IR <= 3.16V  
Spec: <= ±3.160 mV  
Uncertainty: 8µV**

| Chan    | Value     |
|---------|-----------|
| 0,1,x,0 | -0.109 mV |
| 0,1,x,1 | -0.138 mV |
| 0,1,x,2 | -0.244 mV |
| 0,1,x,3 | -0.168 mV |
| 0,1,x,4 | -0.221 mV |
| 0,1,x,5 | -0.130 mV |
| 0,1,x,6 | -0.214 mV |
| 0,1,x,7 | -0.187 mV |
| 0,2,x,0 | -0.196 mV |
| 0,2,x,1 | -0.204 mV |
| 0,2,x,2 | -0.253 mV |
| 0,2,x,3 | -0.225 mV |
| 0,2,x,4 | -0.183 mV |
| 0,2,x,5 | -0.207 mV |
| 0,2,x,6 | -0.264 mV |
| 0,2,x,7 | -0.126 mV |



### 4.3 Total Harmonic Distortion

**Description of calibration:**

Determination of the harmonic distortion of the input channels over all input ranges, by applying an accurate 1kHz -3dBFS (max 4V) sine wave which is generated by the internal reference generator. For charge amplifiers, the reference voltage signal is translated to a reference charge signal. Harmonic components 2, 3, 4 and 5 are determined to calculate the harmonic content (either in Volt or Coulomb, depending on the input channel type) and the ratio between the fundamental tone and its harmonics (in dB).

| <b>Range 10V</b><br><b>Distortion 3.16V &lt; IR &lt;= 10V</b><br><b>Spec: &lt;= -84.0dB</b><br><b>Uncertainty: 2.6µV</b> |                     |
|--|---------------------|
| Chan   | Value               |
| 0,1,x,0  | 38.047 µV, -100.4dB |
| 0,1,x,1  | 37.310 µV, -100.6dB |
| 0,1,x,2  | 37.012 µV, -100.7dB |
| 0,1,x,3  | 35.219 µV, -101.1dB |
| 0,1,x,4  | 37.033 µV, -100.7dB |
| 0,1,x,5  | 36.231 µV, -100.9dB |
| 0,1,x,6  | 39.031 µV, -100.2dB |
| 0,1,x,7  | 35.817 µV, -101.0dB |
| 0,2,x,0  | 36.184 µV, -100.9dB |
| 0,2,x,1  | 35.106 µV, -101.1dB |
| 0,2,x,2  | 36.351 µV, -100.8dB |
| 0,2,x,3  | 36.018 µV, -100.9dB |
| 0,2,x,4  | 35.965 µV, -100.9dB |
| 0,2,x,5  | 33.492 µV, -101.5dB |
| 0,2,x,6  | 36.555 µV, -100.8dB |
| 0,2,x,7  | 34.870 µV, -101.2dB |

| <b>Range 0.1V</b><br><b>Not in Scope</b><br><b>Spec: &lt;= -87.00dB</b> |           |
|---|-----------|
| Chan  | Value     |
| 0,1,x,0   | -89.375dB |
| 0,1,x,1   | -89.318dB |
| 0,1,x,2   | -88.718dB |
| 0,1,x,3   | -88.965dB |
| 0,1,x,4   | -89.183dB |
| 0,1,x,5   | -89.144dB |
| 0,1,x,6   | -88.851dB |
| 0,1,x,7   | -88.880dB |
| 0,2,x,0   | -88.559dB |
| 0,2,x,1   | -88.800dB |
| 0,2,x,2   | -88.725dB |
| 0,2,x,3   | -88.726dB |
| 0,2,x,4   | -88.605dB |
| 0,2,x,5   | -89.094dB |
| 0,2,x,6   | -88.723dB |
| 0,2,x,7   | -88.911dB |



#### 4.4 RMS Noise

##### Description of calibration:

Determination of the noise contribution of the input channels, by internally shorting the input channels to ground. The reported values are RMS values over the corresponding bandwidth.

| Range 10V, Bw 80kHz<br>Not in Scope<br>Spec: < 310.8100µVrms |               |
|--|---------------|
| Chan   | Value         |
| 0,1,x,0  | 221.9236µVrms |
| 0,1,x,1  | 218.4185µVrms |
| 0,1,x,2  | 217.4824µVrms |
| 0,1,x,3  | 218.3484µVrms |
| 0,1,x,4  | 218.3148µVrms |
| 0,1,x,5  | 220.8400µVrms |
| 0,1,x,6  | 223.1020µVrms |
| 0,1,x,7  | 218.5880µVrms |
| 0,2,x,0  | 215.5867µVrms |
| 0,2,x,1  | 220.4896µVrms |
| 0,2,x,2  | 215.5162µVrms |
| 0,2,x,3  | 219.3813µVrms |
| 0,2,x,4  | 224.3620µVrms |
| 0,2,x,5  | 220.8540µVrms |
| 0,2,x,6  | 219.9414µVrms |
| 0,2,x,7  | 232.8684µVrms |

| Range 10V, Bw 40kHz<br>Not in Scope<br>Spec: < 51.4400µVrms |              |
|---|--------------|
| Chan  | Value        |
| 0,1,x,0   | 35.4184µVrms |
| 0,1,x,1   | 35.3290µVrms |
| 0,1,x,2   | 35.4532µVrms |
| 0,1,x,3   | 35.2025µVrms |
| 0,1,x,4   | 34.9440µVrms |
| 0,1,x,5   | 35.0183µVrms |
| 0,1,x,6   | 35.6211µVrms |
| 0,1,x,7   | 35.4466µVrms |
| 0,2,x,0   | 35.3280µVrms |
| 0,2,x,1   | 36.1734µVrms |
| 0,2,x,2   | 35.3243µVrms |
| 0,2,x,3   | 36.1043µVrms |
| 0,2,x,4   | 36.3409µVrms |
| 0,2,x,5   | 34.7698µVrms |
| 0,2,x,6   | 35.4312µVrms |
| 0,2,x,7   | 37.5424µVrms |

| Range 10V, Bw 20kHz<br>Noise 3.16V < IR <= 10V<br>Spec: <= 34.760 µV<br>Uncertainty: 3.4nV |           |
|--|-----------|
| Chan   | Value     |
| 0,1,x,0  | 24.300 µV |
| 0,1,x,1  | 24.511 µV |
| 0,1,x,2  | 24.464 µV |
| 0,1,x,3  | 24.565 µV |
| 0,1,x,4  | 23.995 µV |
| 0,1,x,5  | 24.098 µV |
| 0,1,x,6  | 24.337 µV |
| 0,1,x,7  | 24.702 µV |
| 0,2,x,0  | 24.513 µV |
| 0,2,x,1  | 25.038 µV |
| 0,2,x,2  | 24.529 µV |
| 0,2,x,3  | 24.629 µV |
| 0,2,x,4  | 24.858 µV |
| 0,2,x,5  | 24.336 µV |
| 0,2,x,6  | 24.375 µV |
| 0,2,x,7  | 24.468 µV |

| Range 0.1V, Bw 80kHz<br>Not in Scope<br>Spec: < 8.3400µVrms |             |
|---|-------------|
| Chan  | Value       |
| 0,1,x,0   | 5.7775µVrms |
| 0,1,x,1   | 5.7938µVrms |
| 0,1,x,2   | 5.7847µVrms |
| 0,1,x,3   | 5.8473µVrms |
| 0,1,x,4   | 5.8126µVrms |
| 0,1,x,5   | 5.8119µVrms |
| 0,1,x,6   | 5.8112µVrms |
| 0,1,x,7   | 5.7868µVrms |
| 0,2,x,0   | 5.7609µVrms |
| 0,2,x,1   | 5.8105µVrms |
| 0,2,x,2   | 5.7750µVrms |
| 0,2,x,3   | 5.7810µVrms |
| 0,2,x,4   | 5.8174µVrms |
| 0,2,x,5   | 5.7869µVrms |
| 0,2,x,6   | 5.8027µVrms |
| 0,2,x,7   | 5.8225µVrms |

| Range 0.1V, Bw 40kHz<br>Not in Scope<br>Spec: < 5.6900µVrms |             |
|---|-------------|
| Chan  | Value       |
| 0,1,x,0   | 3.8379µVrms |
| 0,1,x,1   | 3.8719µVrms |
| 0,1,x,2   | 3.8485µVrms |
| 0,1,x,3   | 3.8886µVrms |
| 0,1,x,4   | 3.8676µVrms |
| 0,1,x,5   | 3.8537µVrms |
| 0,1,x,6   | 3.8654µVrms |
| 0,1,x,7   | 3.8410µVrms |
| 0,2,x,0   | 3.8424µVrms |
| 0,2,x,1   | 3.8529µVrms |
| 0,2,x,2   | 3.8492µVrms |
| 0,2,x,3   | 3.8446µVrms |
| 0,2,x,4   | 3.8809µVrms |
| 0,2,x,5   | 3.8537µVrms |
| 0,2,x,6   | 3.8632µVrms |
| 0,2,x,7   | 3.8305µVrms |

| Range 0.1V, Bw 20kHz<br>Noise IR <= 316mV<br>Spec: <= 4.220 µV<br>Uncertainty: 2.0nV |          |
|--|----------|
| Chan   | Value    |
| 0,1,x,0  | 2.729 µV |
| 0,1,x,1  | 2.748 µV |
| 0,1,x,2  | 2.735 µV |
| 0,1,x,3  | 2.767 µV |
| 0,1,x,4  | 2.746 µV |
| 0,1,x,5  | 2.735 µV |
| 0,1,x,6  | 2.751 µV |
| 0,1,x,7  | 2.727 µV |
| 0,2,x,0  | 2.727 µV |
| 0,2,x,1  | 2.742 µV |
| 0,2,x,2  | 2.735 µV |
| 0,2,x,3  | 2.729 µV |
| 0,2,x,4  | 2.769 µV |
| 0,2,x,5  | 2.734 µV |
| 0,2,x,6  | 2.749 µV |
| 0,2,x,7  | 2.727 µV |



## 4.5 Spurious Free Floor

### Description of calibration:

Determination of the peak spurious components generated by the input channels, by internally shorting the input channels to ground. The reported values are peak values over the corresponding bandwidth.

| Range 10V, Bw 80kHz<br>Not in Scope<br>Spec: < 38.1000µV |           |
|--|-----------|
| Chan   | Value     |
| 0,1,x,0  | 20.0370µV |
| 0,1,x,1  | 18.3923µV |
| 0,1,x,2  | 20.5696µV |
| 0,1,x,3  | 19.9241µV |
| 0,1,x,4  | 16.8863µV |
| 0,1,x,5  | 20.9736µV |
| 0,1,x,6  | 20.8192µV |
| 0,1,x,7  | 18.8078µV |
| 0,2,x,0  | 19.8900µV |
| 0,2,x,1  | 17.2798µV |
| 0,2,x,2  | 19.4923µV |
| 0,2,x,3  | 18.3994µV |
| 0,2,x,4  | 23.3935µV |
| 0,2,x,5  | 22.6162µV |
| 0,2,x,6  | 22.0131µV |
| 0,2,x,7  | 18.3094µV |

| Range 10V, Bw 40kHz<br>Not in Scope<br>Spec: < 3.5000µV |          |
|---|----------|
| Chan  | Value    |
| 0,1,x,0   | 1.6388µV |
| 0,1,x,1   | 1.8518µV |
| 0,1,x,2   | 1.9966µV |
| 0,1,x,3   | 1.7499µV |
| 0,1,x,4   | 2.1277µV |
| 0,1,x,5   | 1.9611µV |
| 0,1,x,6   | 1.5838µV |
| 0,1,x,7   | 1.8340µV |
| 0,2,x,0   | 1.8584µV |
| 0,2,x,1   | 1.7366µV |
| 0,2,x,2   | 1.6010µV |
| 0,2,x,3   | 2.2792µV |
| 0,2,x,4   | 1.9977µV |
| 0,2,x,5   | 2.2373µV |
| 0,2,x,6   | 1.6325µV |
| 0,2,x,7   | 2.6448µV |

| Range 10V, Bw 20kHz<br>Spurious 3.16V < IR<br><= 10V<br>Spec: <= 2.500 µV<br>Uncertainty: 3.4nV |          |
|---|----------|
| Chan  | Value    |
| 0,1,x,0   | 1.476 µV |
| 0,1,x,1   | 1.302 µV |
| 0,1,x,2   | 1.438 µV |
| 0,1,x,3   | 1.648 µV |
| 0,1,x,4   | 1.209 µV |
| 0,1,x,5   | 1.513 µV |
| 0,1,x,6   | 1.275 µV |
| 0,1,x,7   | 1.339 µV |
| 0,2,x,0   | 1.680 µV |
| 0,2,x,1   | 1.969 µV |
| 0,2,x,2   | 2.351 µV |
| 0,2,x,3   | 1.503 µV |
| 0,2,x,4   | 1.375 µV |
| 0,2,x,5   | 1.265 µV |
| 0,2,x,6   | 1.432 µV |
| 0,2,x,7   | 1.322 µV |

| ICP<br>Not in Scope<br>Spec: < 3.5000µVp |           |
|--|-----------|
| Chan                                     | Value     |
| 0,1,x,0                                  | 0.1075µVp |
| 0,1,x,1                                  | 0.1105µVp |
| 0,1,x,2                                  | 0.1196µVp |
| 0,1,x,3                                  | 0.1154µVp |
| 0,1,x,4                                  | 0.1028µVp |
| 0,1,x,5                                  | 0.1117µVp |
| 0,1,x,6                                  | 0.1167µVp |
| 0,1,x,7                                  | 0.1126µVp |
| 0,2,x,0                                  | 0.1026µVp |
| 0,2,x,1                                  | 0.1021µVp |
| 0,2,x,2                                  | 0.1058µVp |
| 0,2,x,3                                  | 0.1129µVp |
| 0,2,x,4                                  | 0.1185µVp |
| 0,2,x,5                                  | 0.1154µVp |
| 0,2,x,6                                  | 0.1194µVp |
| 0,2,x,7                                  | 0.1121µVp |

| Range 0.1V, Bw 80kHz<br>Not in Scope<br>Spec: < 0.6000µV |          |
|--|----------|
| Chan   | Value    |
| 0,1,x,0  | 0.2676µV |
| 0,1,x,1  | 0.2452µV |
| 0,1,x,2  | 0.2941µV |
| 0,1,x,3  | 0.2428µV |
| 0,1,x,4  | 0.2616µV |
| 0,1,x,5  | 0.2465µV |
| 0,1,x,6  | 0.2495µV |
| 0,1,x,7  | 0.2562µV |
| 0,2,x,0  | 0.2730µV |
| 0,2,x,1  | 0.2517µV |
| 0,2,x,2  | 0.2427µV |
| 0,2,x,3  | 0.2746µV |
| 0,2,x,4  | 0.2671µV |
| 0,2,x,5  | 0.2670µV |
| 0,2,x,6  | 0.2323µV |
| 0,2,x,7  | 0.2386µV |

| Range 0.1V, Bw 40kHz<br>Not in Scope<br>Spec: < 0.4000µV |          |
|--|----------|
| Chan   | Value    |
| 0,1,x,0  | 0.1593µV |
| 0,1,x,1  | 0.1496µV |
| 0,1,x,2  | 0.1517µV |
| 0,1,x,3  | 0.1497µV |
| 0,1,x,4  | 0.1476µV |
| 0,1,x,5  | 0.1433µV |
| 0,1,x,6  | 0.1422µV |
| 0,1,x,7  | 0.1785µV |
| 0,2,x,0  | 0.1441µV |
| 0,2,x,1  | 0.1571µV |
| 0,2,x,2  | 0.1486µV |
| 0,2,x,3  | 0.1479µV |
| 0,2,x,4  | 0.1483µV |
| 0,2,x,5  | 0.1577µV |
| 0,2,x,6  | 0.1511µV |
| 0,2,x,7  | 0.1481µV |

| Range 0.1V, Bw 20kHz<br>Spurious IR <= 316mV<br>Spec: <= 0.300 µV<br>Uncertainty: 2.0nV |          |
|---|----------|
| Chan  | Value    |
| 0,1,x,0   | 0.104 µV |
| 0,1,x,1   | 0.122 µV |
| 0,1,x,2   | 0.102 µV |
| 0,1,x,3   | 0.113 µV |
| 0,1,x,4   | 0.105 µV |
| 0,1,x,5   | 0.112 µV |
| 0,1,x,6   | 0.109 µV |
| 0,1,x,7   | 0.101 µV |
| 0,2,x,0   | 0.116 µV |
| 0,2,x,1   | 0.131 µV |
| 0,2,x,2   | 0.103 µV |
| 0,2,x,3   | 0.108 µV |
| 0,2,x,4   | 0.116 µV |
| 0,2,x,5   | 0.095 µV |
| 0,2,x,6   | 0.109 µV |
| 0,2,x,7   | 0.118 µV |



## 4.6 Inter-channel Crosstalk

### Description of calibration:

Determination of the crosstalk between the input channels in a system. The channel under calibration is internally shorted to ground, while its neighbour channels are fed with a near full scale sine wave signal which is generated by the internal reference generator. This is done for two input range settings of the channel under calibration, and two signal frequencies. The reported results represent the measured crosstalk values in the channels under calibration (either in Volt or Coulomb, depending on the input channel type) and the ratio between the applied signal amplitude and the crosstalk values (in dB).

| Range 0.1V, F 1K5<br>Not in Scope<br>Spec: <= -94.00dB |            |
|--|------------|
| Chan   | Value      |
| 0,1,x,0  | -107.717dB |
| 0,2,x,0  | -107.711dB |
| 0,1,x,1  | -107.361dB |
| 0,2,x,1  | -107.087dB |
| 0,1,x,2  | -107.040dB |
| 0,2,x,2  | -107.146dB |
| 0,1,x,3  | -107.225dB |
| 0,2,x,3  | -107.315dB |
| 0,1,x,4  | -107.030dB |
| 0,2,x,4  | -107.178dB |
| 0,1,x,5  | -107.040dB |
| 0,2,x,5  | -107.278dB |
| 0,1,x,6  | -107.252dB |
| 0,2,x,6  | -107.131dB |
| 0,1,x,7  | -107.539dB |
| 0,2,x,7  | -107.525dB |

| Range 0.1V, F 15K<br>Not in Scope<br>Spec: <= -74.00dB |           |
|--|-----------|
| Chan   | Value     |
| 0,1,x,0  | -87.126dB |
| 0,2,x,0  | -87.070dB |
| 0,1,x,1  | -86.748dB |
| 0,2,x,1  | -86.726dB |
| 0,1,x,2  | -86.662dB |
| 0,2,x,2  | -86.669dB |
| 0,1,x,3  | -86.694dB |
| 0,2,x,3  | -86.743dB |
| 0,1,x,4  | -86.718dB |
| 0,2,x,4  | -86.748dB |
| 0,1,x,5  | -86.640dB |
| 0,2,x,5  | -86.747dB |
| 0,1,x,6  | -86.676dB |
| 0,2,x,6  | -86.749dB |
| 0,1,x,7  | -87.093dB |
| 0,2,x,7  | -87.165dB |

| Range 10V, F 1K5<br>Crosstalk 3.16V < IR <= 10V<br>Spec: <= -92.0dB<br>Uncertainty: 1.3µV |                    |
|---|--------------------|
| Chan  | Value              |
| 0,1,x,0   | 2.855 µV, -104.9dB |
| 0,2,x,0   | 3.076 µV, -104.2dB |
| 0,1,x,1   | 1.681 µV, -109.5dB |
| 0,2,x,1   | 2.205 µV, -107.1dB |
| 0,1,x,2   | 3.190 µV, -103.9dB |
| 0,2,x,2   | 3.195 µV, -103.9dB |
| 0,1,x,3   | 2.110 µV, -107.5dB |
| 0,2,x,3   | 2.759 µV, -105.2dB |
| 0,1,x,4   | 2.818 µV, -105.0dB |
| 0,2,x,4   | 3.196 µV, -103.9dB |
| 0,1,x,5   | 1.867 µV, -108.6dB |
| 0,2,x,5   | 2.426 µV, -106.3dB |
| 0,1,x,6   | 3.059 µV, -104.3dB |
| 0,2,x,6   | 3.049 µV, -104.3dB |
| 0,1,x,7   | 2.124 µV, -107.4dB |
| 0,2,x,7   | 2.068 µV, -107.7dB |

| Range 10V, F 15K<br>Crosstalk 3.16V < IR <= 10V<br>Spec: <= -73.0dB<br>Uncertainty: 1.3µV |                    |
|---|--------------------|
| Chan  | Value              |
| 0,1,x,0   | 23.331 µV, -86.6dB |
| 0,2,x,0   | 23.141 µV, -86.7dB |
| 0,1,x,1   | 24.109 µV, -86.3dB |
| 0,2,x,1   | 24.494 µV, -86.2dB |
| 0,1,x,2   | 24.744 µV, -86.1dB |
| 0,2,x,2   | 25.292 µV, -85.9dB |
| 0,1,x,3   | 24.451 µV, -86.2dB |
| 0,2,x,3   | 24.441 µV, -86.2dB |
| 0,1,x,4   | 25.464 µV, -85.9dB |
| 0,2,x,4   | 24.965 µV, -86.0dB |
| 0,1,x,5   | 24.387 µV, -86.2dB |
| 0,2,x,5   | 23.845 µV, -86.4dB |
| 0,1,x,6   | 25.572 µV, -85.8dB |
| 0,2,x,6   | 24.915 µV, -86.1dB |
| 0,1,x,7   | 22.954 µV, -86.8dB |
| 0,2,x,7   | 22.824 µV, -86.8dB |



## 4.7 Inter-channel Phase Match

### Description of calibration:

Determination of the phase difference between the input channels in a system, by applying an accurate -3dBFS (max 4V) sine wave which is generated by the internal reference generator. For charge amplifiers, the reference voltage signal is translated to a reference charge signal. The reported values represent the highest phase differences found between any of the channels in the system. This is done for two input range settings and two signal frequencies.

| Range 10V, F 9k9<br>Not in Scope<br>Spec: < 0.3000° |         | Range 10V, F 19k9<br>Not in Scope<br>Spec: < 0.4000° |         |
|---|---------|--|---------|
| Chan  | Value   | Chan   | Value   |
| 0,1,x,0   | 0.0580° | 0,1,x,0  | 0.1158° |
| 0,1,x,1   | 0.0945° | 0,1,x,1  | 0.1903° |
| 0,1,x,2   | 0.0569° | 0,1,x,2  | 0.1141° |
| 0,1,x,3   | 0.0653° | 0,1,x,3  | 0.1320° |
| 0,1,x,4   | 0.1133° | 0,1,x,4  | 0.2274° |
| 0,1,x,5   | 0.1057° | 0,1,x,5  | 0.2132° |
| 0,1,x,6   | 0.1003° | 0,1,x,6  | 0.2012° |
| 0,1,x,7   | 0.0644° | 0,1,x,7  | 0.1312° |
| 0,2,x,0   | 0.0867° | 0,2,x,0  | 0.1743° |
| 0,2,x,1   | 0.0783° | 0,2,x,1  | 0.1577° |
| 0,2,x,2   | 0.0675° | 0,2,x,2  | 0.1361° |
| 0,2,x,3   | 0.0874° | 0,2,x,3  | 0.1761° |
| 0,2,x,4   | 0.0703° | 0,2,x,4  | 0.1420° |
| 0,2,x,5   | 0.0779° | 0,2,x,5  | 0.1570° |
| 0,2,x,6   | 0.1133° | 0,2,x,6  | 0.2274° |
| 0,2,x,7   | 0.0675° | 0,2,x,7  | 0.1355° |

| Range 0.1V, F 9k9<br>Not in Scope<br>Spec: < 0.3000° |         | Range 0.1V, F 19k9<br>Not in Scope<br>Spec: < 0.4000° |         |
|--|---------|---|---------|
| Chan   | Value   | Chan  | Value   |
| 0,1,x,0  | 0.0751° | 0,1,x,0   | 0.1458° |
| 0,1,x,1  | 0.0683° | 0,1,x,1   | 0.1349° |
| 0,1,x,2  | 0.0658° | 0,1,x,2   | 0.1317° |
| 0,1,x,3  | 0.0654° | 0,1,x,3   | 0.1344° |
| 0,1,x,4  | 0.1255° | 0,1,x,4   | 0.2498° |
| 0,1,x,5  | 0.0937° | 0,1,x,5   | 0.1902° |
| 0,1,x,6  | 0.0780° | 0,1,x,6   | 0.1574° |
| 0,1,x,7  | 0.0693° | 0,1,x,7   | 0.1398° |
| 0,2,x,0  | 0.0891° | 0,2,x,0   | 0.1782° |
| 0,2,x,1  | 0.0852° | 0,2,x,1   | 0.1676° |
| 0,2,x,2  | 0.0821° | 0,2,x,2   | 0.1612° |
| 0,2,x,3  | 0.0786° | 0,2,x,3   | 0.1533° |
| 0,2,x,4  | 0.0776° | 0,2,x,4   | 0.1516° |
| 0,2,x,5  | 0.0839° | 0,2,x,5   | 0.1655° |
| 0,2,x,6  | 0.1255° | 0,2,x,6   | 0.2498° |
| 0,2,x,7  | 0.0671° | 0,2,x,7   | 0.1325° |



## 5 SYSCON\_REC\_h11s0

### 5.1 Gain Accuracy after Adjustment

#### Description of calibration:

Determination of the amplitude accuracy of the input channels over all input ranges and available ADC bandwidths, by applying an accurate 1kHz -3dBFS (max 4V) sine wave which is generated by the internal reference generator. For charge amplifiers, the reference voltage signal is translated to a reference charge signal.

The reported values represent the deviations from the expected signal amplitude, both absolute (either in Volt or Coulomb, depending on the input channel type) and relative (in %).

|                                |                    |
|--------------------------------|--------------------|
| <b>BW 25k6</b>                 |                    |
| Alternating voltage 3.16V < IR |                    |
| <= 10V                         |                    |
| Spec: <= ±0.100%               |                    |
| Uncertainty: 530µV             |                    |
| Chan                           | Value              |
| 0,x,x,0                        | -0.245 mV, -0.006% |
| 0,x,x,1                        | -0.144 mV, -0.004% |

|                                |                    |
|--------------------------------|--------------------|
| <b>BW 51k2</b>                 |                    |
| Alternating voltage 3.16V < IR |                    |
| <= 10V                         |                    |
| Spec: <= ±0.100%               |                    |
| Uncertainty: 530µV             |                    |
| Chan                           | Value              |
| 0,x,x,0                        | -0.091 mV, -0.002% |
| 0,x,x,1                        | 0.033 mV, 0.001%   |

|                      |                   |
|----------------------|-------------------|
| <b>BW 102k4</b>      |                   |
| Not in Scope         |                   |
| Spec: 1.00000 ±0.10% |                   |
| Chan                 | Value             |
| 0,x,x,0              | 999.97514m, 0.00% |
| 0,x,x,1              | 999.99573m, 0.00% |

# CERTIFICATE OF CALIBRATION

Customer: AERCOUSTICS ENGINEERING LTD  
1004 MIDDLEGATE ROAD  
SUITE 1100  
MISSISSAUGA, ON L4Y 0G1  
PO Number: TR2019 03 22\_875FT-00

Certificate/SO Number: 9-Q1F7P-20-1 Revision 0



Manufacturer: Nokeval  
Model Number: 7470  
Description: Serial to Analog Converter  
Serial Number: A198729  
ID: NONE

As-Found: In Tolerance  
As-Left: In Tolerance  
Calibration Date: Mar 29, 2019  
Due Date: Mar 29, 2021

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

Transcal Calibration Laboratories have been audited and found in compliance with ISO/IEC 17025:2005. Accredited calibrations performed within the Lab's Scope of Accreditation are indicated by the presence of the Accrediting Body's Logo and Certificate Number. Any measurements on an accredited calibration not covered by that Lab's Scope of Accreditation are listed in the notes section of the certificate. SCC, NRC, CLAS or ANAB do not guarantee the accuracy of an individual calibration by accredited laboratories.

Transcal calibrations, as applicable, are performed in compliance with the requirements of the Transcal Quality Manual QAC-P01-000 Revision 2.0, the customer's Purchase Order and/or Quality Agreement requirements, ISO 9001:2008, ANS/NCSL Z540-1-1994 (R2002) or NDA-1, as applicable. Complete records of work performed are maintained by Transcal and are available for inspection. Laboratory standards used in the performance of this calibration are listed on this certificate.

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

A binary decision rule, utilizing simple acceptance and simple rejection criteria is used for the determination of compliance. When compliance statements are present, they are reported without factoring in the effects of uncertainty and comply with the guidelines established by ASME B89.7.3.1-2001 (R2011) as follows:

- The acceptance zone is defined as: less than or equal to the high limit, and/or greater than or equal to the low limit. The rejection zones are defined as greater than the high limit and/or less than the low limit.
- Single measurement results in the acceptance zone are identified as in-tolerance. Single measurement results in the rejection zone are identified as out-of-tolerance (OOT).
- When all measurement results are in the acceptance zone for repeated measurements, for the same characteristic, the test is identified as in-tolerance. For repeated characteristic measurements, a single measurement result in the rejection zone, will cause the test to be identified as out-of-tolerance (OOT).

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

The results in this report relate only to the item calibrated or tested. Recorded calibration data is valid at the time of calibration within the stated uncertainties at the environmental conditions noted. The determination of compliance to the specification is specific to the model/serial no./ID no. referenced above based on the tolerances shown; these tolerances are either the original equipment manufacturers (OEM's) warranted specifications or the client's requested specifications. This certificate may not be reproduced except in full, without the written approval of Transcal. Additional information, if applicable may be included on separate report(s).

# CERTIFICATE OF CALIBRATION

Customer: AERCOUSTICS ENGINEERING LTD  
 1004 MIDDLEGATE ROAD  
 SUITE 1100  
 MISSISSAUGA, ON L4Y 0G1  
 PO Number: TR2019.03.22\_875FT-00

Certificate/SO Number: 9-Q1F7P-20-1 Revision 0



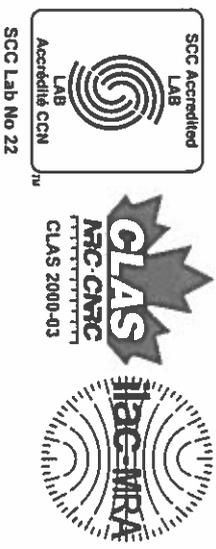
As Found/As Left Data

| Description                               | Setpoints | Accuracy     | Low Limit | High Limit | As Found / As Left | Cal Process |             | Measurement Uncertainty (k=2; ±) | Units     | TUR |
|---|-----------|--------------|-----------|------------|--------------------|-------------|-------------|----------------------------------|-----------|-----|
|   |           |              |           |            |                    | O           | U           |                                  |           |     |
|   |           |              |           |            |                    | O           | U           |                                  |           |     |
|   |           |              |           |            |                    | Uncertainty | Uncertainty |                                  |           |     |
|   |           |              |           |            |                    | (k=2; ±)    | (k=2; ±)    |                                  |           |     |
| <b>DC Current % Source - 4-20mA Ch #1</b> |           |              |           |            |                    |             |             |                                  |           |     |
| 4 - 20mA                                  | 0%        | ±(0.1% Span) | 3.984     | 4.016      | 4.003 mA           | 1.6e-004    | 1.9e-003    | mA                               | 100.0 : 1 |     |
|   | 25%       | ±(0.1% Span) | 7.984     | 8.016      | 8.001 mA           | 2.6e-004    | 1.9e-003    | mA                               | 61.5 : 1  |     |
|   | 50%       | ±(0.1% Span) | 11.984    | 12.016     | 12.002 mA          | 1.1e-003    | 2.2e-003    | mA                               | 14.5 : 1  |     |
|   | 75%       | ±(0.1% Span) | 15.984    | 16.016     | 16.000 mA          | 1.3e-003    | 2.3e-003    | mA                               | 12.3 : 1  |     |
|   | 100%      | ±(0.1% Span) | 19.984    | 20.016     | 19.998 mA          | 1.4e-003    | 2.3e-003    | mA                               | 11.4 : 1  |     |
| <b>DC Current % Source - 4-20mA Ch #2</b> |           |              |           |            |                    |             |             |                                  |           |     |
| 4 - 20mA                                  | 0%        | ±(0.1% Span) | 3.984     | 4.016      | 3.999 mA           | 1.6e-004    | 1.9e-003    | mA                               | 100.0 : 1 |     |
|   | 25%       | ±(0.1% Span) | 7.984     | 8.016      | 7.998 mA           | 2.6e-004    | 1.9e-003    | mA                               | 61.5 : 1  |     |
|   | 50%       | ±(0.1% Span) | 11.984    | 12.016     | 11.999 mA          | 1.1e-003    | 2.2e-003    | mA                               | 14.5 : 1  |     |
|   | 75%       | ±(0.1% Span) | 15.984    | 16.016     | 15.998 mA          | 1.3e-003    | 2.3e-003    | mA                               | 12.3 : 1  |     |
|   | 100%      | ±(0.1% Span) | 19.984    | 20.016     | 19.997 mA          | 1.4e-003    | 2.3e-003    | mA                               | 11.4 : 1  |     |
| <b>DC Current % Source - 4-20mA Ch #3</b> |           |              |           |            |                    |             |             |                                  |           |     |
| 4 - 20mA                                  | 0%        | ±(0.1% Span) | 3.984     | 4.016      | 3.999 mA           | 1.6e-004    | 1.9e-003    | mA                               | 100.0 : 1 |     |
|   | 25%       | ±(0.1% Span) | 7.984     | 8.016      | 7.998 mA           | 2.6e-004    | 1.9e-003    | mA                               | 61.5 : 1  |     |
|   | 50%       | ±(0.1% Span) | 11.984    | 12.016     | 12.003 mA          | 1.1e-003    | 2.2e-003    | mA                               | 14.5 : 1  |     |
|   | 75%       | ±(0.1% Span) | 15.984    | 16.016     | 16.001 mA          | 1.3e-003    | 2.3e-003    | mA                               | 12.3 : 1  |     |
|   | 100%      | ±(0.1% Span) | 19.984    | 20.016     | 19.999 mA          | 1.4e-003    | 2.3e-003    | mA                               | 11.4 : 1  |     |
| <b>DC Current % Source - 4-20mA Ch #4</b> |           |              |           |            |                    |             |             |                                  |           |     |
| 4 - 20mA                                  | 0%        | ±(0.1% Span) | 3.984     | 4.016      | 4.001 mA           | 1.6e-004    | 1.9e-003    | mA                               | 100.0 : 1 |     |
|   | 25%       | ±(0.1% Span) | 7.984     | 8.016      | 7.998 mA           | 2.6e-004    | 1.9e-003    | mA                               | 61.5 : 1  |     |
|   | 50%       | ±(0.1% Span) | 11.984    | 12.016     | 12.002 mA          | 1.1e-003    | 2.2e-003    | mA                               | 14.5 : 1  |     |
|   | 75%       | ±(0.1% Span) | 15.984    | 16.016     | 15.999 mA          | 1.3e-003    | 2.3e-003    | mA                               | 12.3 : 1  |     |
|   | 100%      | ±(0.1% Span) | 19.984    | 20.016     | 19.996 mA          | 1.4e-003    | 2.3e-003    | mA                               | 11.4 : 1  |     |

# CERTIFICATE OF CALIBRATION

Customer: AERCOUSTICS ENGINEERING LTD  
1004 MIDDLEGATE ROAD  
SUITE 1100  
MISSISSAUGA, ON L4Y 0G1  
PO Number: TR2019.03.22\_875FT-00

Certificate/SO Number: 9-Q1FTP-20-1 Revision 0



As Found/As Left Data

| Description                               | Setpoints | Accuracy     | Low Limit | High Limit | As Found / As Left | Cal Process Measurement |                      | Units | TUR       |
|---|-----------|--------------|-----------|------------|--------------------|-------------------------|----------------------|-------|-----------|
|   |           |              |           |            |                    | Uncertainty (k=2; ±)    | Uncertainty (k=2; ±) |       |           |
| <b>DC Current % Source - 0-20mA Ch #1</b> |           |              |           |            |                    |                         |                      |       |           |
| 0 - 20mA                                  | 0%        | ±(0.1% Span) | -0.020    | 0.020      | 0.004 mA           | 9.2e-007                | 2.3e-003             | mA    | 100.0 : 1 |
|   | 25%       | ±(0.1% Span) | 4.980     | 5.020      | 4.999 mA           | 1.9e-004                | 2.3e-003             | mA    | 100.0 : 1 |
|   | 50%       | ±(0.1% Span) | 9.980     | 10.020     | 9.999 mA           | 3.1e-004                | 2.3e-003             | mA    | 64.5 : 1  |
|   | 75%       | ±(0.1% Span) | 14.980    | 15.020     | 15.000 mA          | 1.2e-003                | 2.6e-003             | mA    | 16.7 : 1  |
| <b>DC Current % Source - 0-20mA Ch #2</b> |           |              |           |            |                    |                         |                      |       |           |
| 0 - 20mA                                  | 100%      | ±(0.1% Span) | 19.980    | 20.020     | 19.998 mA          | 1.4e-003                | 2.7e-003             | mA    | 14.3 : 1  |
|   | 0%        | ±(0.1% Span) | -0.020    | 0.020      | 0.001 mA           | 9.2e-007                | 2.3e-003             | mA    | 100.0 : 1 |
|   | 25%       | ±(0.1% Span) | 4.980     | 5.020      | 5.001 mA           | 1.9e-004                | 2.3e-003             | mA    | 100.0 : 1 |
|   | 50%       | ±(0.1% Span) | 9.980     | 10.020     | 10.002 mA          | 3.1e-004                | 2.3e-003             | mA    | 64.5 : 1  |
| <b>DC Current % Source - 0-20mA Ch #3</b> |           |              |           |            |                    |                         |                      |       |           |
| 0 - 20mA                                  | 75%       | ±(0.1% Span) | 14.980    | 15.020     | 15.003 mA          | 1.2e-003                | 2.6e-003             | mA    | 16.7 : 1  |
|   | 100%      | ±(0.1% Span) | 19.980    | 20.020     | 19.997 mA          | 1.4e-003                | 2.7e-003             | mA    | 14.3 : 1  |
|   | 0%        | ±(0.1% Span) | -0.020    | 0.020      | 0.002 mA           | 9.2e-007                | 2.3e-003             | mA    | 100.0 : 1 |
|   | 25%       | ±(0.1% Span) | 4.980     | 5.020      | 5.001 mA           | 1.9e-004                | 2.3e-003             | mA    | 100.0 : 1 |
| <b>DC Current % Source - 0-20mA Ch #4</b> |           |              |           |            |                    |                         |                      |       |           |
| 0 - 20mA                                  | 50%       | ±(0.1% Span) | 9.980     | 10.020     | 10.001 mA          | 3.1e-004                | 2.3e-003             | mA    | 64.5 : 1  |
|   | 75%       | ±(0.1% Span) | 14.980    | 15.020     | 15.000 mA          | 1.2e-003                | 2.6e-003             | mA    | 16.7 : 1  |
|   | 100%      | ±(0.1% Span) | 19.980    | 20.020     | 19.999 mA          | 1.4e-003                | 2.7e-003             | mA    | 14.3 : 1  |
|   | 0%        | ±(0.1% Span) | -0.020    | 0.020      | 0.000 mA           | 9.2e-007                | 2.3e-003             | mA    | 100.0 : 1 |
| 0 - 20mA                                  | 25%       | ±(0.1% Span) | 4.980     | 5.020      | 5.002 mA           | 1.9e-004                | 2.3e-003             | mA    | 100.0 : 1 |
|   | 50%       | ±(0.1% Span) | 9.980     | 10.020     | 10.000 mA          | 3.1e-004                | 2.3e-003             | mA    | 64.5 : 1  |
|   | 75%       | ±(0.1% Span) | 14.980    | 15.020     | 14.999 mA          | 1.2e-003                | 2.6e-003             | mA    | 16.7 : 1  |
|   | 100%      | ±(0.1% Span) | 19.980    | 20.020     | 19.996 mA          | 1.4e-003                | 2.7e-003             | mA    | 14.3 : 1  |

Customer: AERCOUSTICS ENGINEERING LTD  
1004 MIDDLEGATE ROAD  
SUITE 1100  
MISSISSAUGA, ON L4Y 0G1  
PO Number: TR2019.03.22\_875FT-00

Certificate/SO Number: 9-Q1FP-20-1 Revision 0



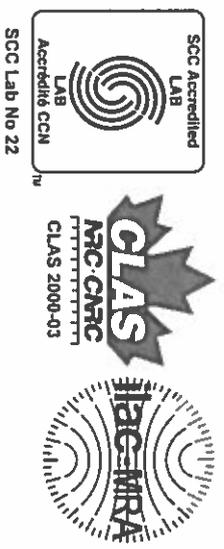
As Found/As Left Data

| Description                            | Setpoints | Accuracy     | Low Limit | High Limit | As Found / As Left | Cal Process Measurement |                        | Units | TUR       |
|--|-----------|--------------|-----------|------------|--------------------|-------------------------|------------------------|-------|-----------|
|  |           |              |           |            |                    | ○ Uncertainty (k=2; ±)  | ○ Uncertainty (k=2; ±) |       |           |
| <b>DC Voltage % Source - 0-5V CH#1</b> |           |              |           |            |                    |                         |                        |       |           |
| 0-5V                                   | 0%        | ±(0.1% Span) | -0.0050   | 0.0050     | 0.0018 V           | 5.8e-007                | 5.8e-004               | V     | 100.0 : 1 |
|  | 20%       | ±(0.1% Span) | 0.9950    | 1.0050     | 1.0009 V           | 5.6e-006                | 5.8e-004               | V     | 100.0 : 1 |
|  | 40%       | ±(0.1% Span) | 1.9950    | 2.0050     | 2.0000 V           | 1.1e-005                | 5.8e-004               | V     | 100.0 : 1 |
|  | 60%       | ±(0.1% Span) | 2.9950    | 3.0050     | 3.0010 V           | 1.6e-005                | 5.8e-004               | V     | 100.0 : 1 |
|  | 80%       | ±(0.1% Span) | 3.9950    | 4.0050     | 4.0005 V           | 2.1e-005                | 5.8e-004               | V     | 100.0 : 1 |
|  | 100%      | ±(0.1% Span) | 4.9950    | 5.0050     | 4.9997 V           | 2.6e-005                | 5.8e-004               | V     | 100.0 : 1 |
| <b>DC Voltage % Source - 0-5V CH#2</b> |           |              |           |            |                    |                         |                        |       |           |
| 0-5V                                   | 0%        | ±(0.1% Span) | -0.0050   | 0.0050     | 0.0006 V           | 5.8e-007                | 5.8e-004               | V     | 100.0 : 1 |
|  | 20%       | ±(0.1% Span) | 0.9950    | 1.0050     | 1.0002 V           | 5.6e-006                | 5.8e-004               | V     | 100.0 : 1 |
|  | 40%       | ±(0.1% Span) | 1.9950    | 2.0050     | 2.0004 V           | 1.1e-005                | 5.8e-004               | V     | 100.0 : 1 |
|  | 60%       | ±(0.1% Span) | 2.9950    | 3.0050     | 3.0006 V           | 1.6e-005                | 5.8e-004               | V     | 100.0 : 1 |
|  | 80%       | ±(0.1% Span) | 3.9950    | 4.0050     | 4.0007 V           | 2.1e-005                | 5.8e-004               | V     | 100.0 : 1 |
|  | 100%      | ±(0.1% Span) | 4.9950    | 5.0050     | 5.0014 V           | 2.6e-005                | 5.8e-004               | V     | 100.0 : 1 |
| <b>DC Voltage % Source - 0-5V CH#3</b> |           |              |           |            |                    |                         |                        |       |           |
| 0-5V                                   | 0%        | ±(0.1% Span) | -0.0050   | 0.0050     | 0.0008 V           | 5.8e-007                | 5.8e-004               | V     | 100.0 : 1 |
|  | 20%       | ±(0.1% Span) | 0.9950    | 1.0050     | 1.0002 V           | 5.6e-006                | 5.8e-004               | V     | 100.0 : 1 |
|  | 40%       | ±(0.1% Span) | 1.9950    | 2.0050     | 1.9997 V           | 1.1e-005                | 5.8e-004               | V     | 100.0 : 1 |
|  | 60%       | ±(0.1% Span) | 2.9950    | 3.0050     | 2.9988 V           | 1.6e-005                | 5.8e-004               | V     | 100.0 : 1 |
|  | 80%       | ±(0.1% Span) | 3.9950    | 4.0050     | 4.0012 V           | 2.1e-005                | 5.8e-004               | V     | 100.0 : 1 |
|  | 100%      | ±(0.1% Span) | 4.9950    | 5.0050     | 5.0015 V           | 2.6e-005                | 5.8e-004               | V     | 100.0 : 1 |
| <b>DC Voltage % Source - 0-5V CH#4</b> |           |              |           |            |                    |                         |                        |       |           |
| 0-5V                                   | 0%        | ±(0.1% Span) | -0.0050   | 0.0050     | 0.0007 V           | 5.8e-007                | 5.8e-004               | V     | 100.0 : 1 |
|  | 20%       | ±(0.1% Span) | 0.9950    | 1.0050     | 1.0018 V           | 5.6e-006                | 5.8e-004               | V     | 100.0 : 1 |
|  | 40%       | ±(0.1% Span) | 1.9950    | 2.0050     | 2.0008 V           | 1.1e-005                | 5.8e-004               | V     | 100.0 : 1 |
|  | 60%       | ±(0.1% Span) | 2.9950    | 3.0050     | 2.9993 V           | 1.6e-005                | 5.8e-004               | V     | 100.0 : 1 |
|  | 80%       | ±(0.1% Span) | 3.9950    | 4.0050     | 3.9988 V           | 2.1e-005                | 5.8e-004               | V     | 100.0 : 1 |
|  | 100%      | ±(0.1% Span) | 4.9950    | 5.0050     | 5.0009 V           | 2.6e-005                | 5.8e-004               | V     | 100.0 : 1 |

# CERTIFICATE OF CALIBRATION

Customer: AERCOUSTICS ENGINEERING LTD  
1004 MIDDLEGATE ROAD  
SUITE 1100  
MISSISSAUGA, ON L4Y 0G1  
PO Number: TR2019.03.22\_875FT-00

Certificate/SO Number: 9-Q1F7P-20-1 Revision 0



As Found/As Left Data

| Description                             | Setpoints | Accuracy     | Low Limit | High Limit | As Found / As Left | Cal Process          |                                  | Units | TUR       |
|---|-----------|--------------|-----------|------------|--------------------|----------------------|----------------------------------|-------|-----------|
|   |           |              |           |            |                    | Uncertainty (k=2; ±) | Measurement Uncertainty (k=2; ±) |       |           |
| <b>DC Voltage % Source - 0-10V Ch#1</b> |           |              |           |            |                    |                      |                                  |       |           |
| 0 - 10V                                 | 0%        | ±(0.1% Span) | -0.010    | 0.010      | 0.002 V            | 5.8e-007             | 1.2e-003                         | V     | 100.0 : 1 |
|   | 20%       | ±(0.1% Span) | 1.990     | 2.010      | 2.000 V            | 1.1e-005             | 1.2e-003                         | V     | 100.0 : 1 |
|   | 40%       | ±(0.1% Span) | 3.990     | 4.010      | 4.000 V            | 2.1e-005             | 1.2e-003                         | V     | 100.0 : 1 |
|   | 60%       | ±(0.1% Span) | 5.990     | 6.010      | 6.002 V            | 3.1e-005             | 1.2e-003                         | V     | 100.0 : 1 |
|   | 80%       | ±(0.1% Span) | 7.990     | 8.010      | 8.000 V            | 4.1e-005             | 1.2e-003                         | V     | 100.0 : 1 |
|   | 100%      | ±(0.1% Span) | 9.990     | 10.010     | 10.000 V           | 5.2e-005             | 1.2e-003                         | V     | 100.0 : 1 |
| <b>DC Voltage % Source - 0-10V Ch#2</b> |           |              |           |            |                    |                      |                                  |       |           |
| 0 - 10V                                 | 0%        | ±(0.1% Span) | -0.010    | 0.010      | 0.001 V            | 5.8e-007             | 1.2e-003                         | V     | 100.0 : 1 |
|   | 20%       | ±(0.1% Span) | 1.990     | 2.010      | 2.000 V            | 1.1e-005             | 1.2e-003                         | V     | 100.0 : 1 |
|   | 40%       | ±(0.1% Span) | 3.990     | 4.010      | 4.001 V            | 2.1e-005             | 1.2e-003                         | V     | 100.0 : 1 |
|   | 60%       | ±(0.1% Span) | 5.990     | 6.010      | 6.002 V            | 3.1e-005             | 1.2e-003                         | V     | 100.0 : 1 |
|   | 80%       | ±(0.1% Span) | 7.990     | 8.010      | 8.000 V            | 4.1e-005             | 1.2e-003                         | V     | 100.0 : 1 |
|   | 100%      | ±(0.1% Span) | 9.990     | 10.010     | 10.000 V           | 5.2e-005             | 1.2e-003                         | V     | 100.0 : 1 |
| <b>DC Voltage % Source - 0-10V Ch#3</b> |           |              |           |            |                    |                      |                                  |       |           |
| 0 - 10V                                 | 0%        | ±(0.1% Span) | -0.010    | 0.010      | 0.001 V            | 5.8e-007             | 1.2e-003                         | V     | 100.0 : 1 |
|   | 20%       | ±(0.1% Span) | 1.990     | 2.010      | 2.000 V            | 1.1e-005             | 1.2e-003                         | V     | 100.0 : 1 |
|   | 40%       | ±(0.1% Span) | 3.990     | 4.010      | 4.001 V            | 2.1e-005             | 1.2e-003                         | V     | 100.0 : 1 |
|   | 60%       | ±(0.1% Span) | 5.990     | 6.010      | 6.001 V            | 3.1e-005             | 1.2e-003                         | V     | 100.0 : 1 |
|   | 80%       | ±(0.1% Span) | 7.990     | 8.010      | 8.000 V            | 4.1e-005             | 1.2e-003                         | V     | 100.0 : 1 |
|   | 100%      | ±(0.1% Span) | 9.990     | 10.010     | 9.999 V            | 5.2e-005             | 1.2e-003                         | V     | 100.0 : 1 |
| <b>DC Voltage % Source - 0-10V Ch#4</b> |           |              |           |            |                    |                      |                                  |       |           |
| 0 - 10V                                 | 0%        | ±(0.1% Span) | -0.010    | 0.010      | 0.001 V            | 5.8e-007             | 1.2e-003                         | V     | 100.0 : 1 |
|   | 20%       | ±(0.1% Span) | 1.990     | 2.010      | 2.001 V            | 1.1e-005             | 1.2e-003                         | V     | 100.0 : 1 |
|   | 40%       | ±(0.1% Span) | 3.990     | 4.010      | 3.999 V            | 2.1e-005             | 1.2e-003                         | V     | 100.0 : 1 |
|   | 60%       | ±(0.1% Span) | 5.990     | 6.010      | 6.000 V            | 3.1e-005             | 1.2e-003                         | V     | 100.0 : 1 |
|   | 80%       | ±(0.1% Span) | 7.990     | 8.010      | 8.001 V            | 4.1e-005             | 1.2e-003                         | V     | 100.0 : 1 |
|   | 100%      | ±(0.1% Span) | 9.990     | 10.010     | 9.999 V            | 5.2e-005             | 1.2e-003                         | V     | 100.0 : 1 |

# CERTIFICATE OF CALIBRATION

Customer: AERCOUSTICS ENGINEERING LTD

1004 MIDDLEGATE ROAD

SUITE 1100

MISSISSAUGA, ON L4Y 0G1

PO Number: TR2019 03.22\_875FT-00

Certificate/SO Number: 9-Q1F7P-20-1 Revision 0



SCC Lab No 22



# CERTIFICATE OF CALIBRATION

Customer: AERCOUSTICS ENGINEERING LTD  
 1004 MIDDLEGATE ROAD  
 SUITE 1100  
 MISSISSAUGA, ON L4Y 0G1  
 PO Number: TR2019 03 22\_875FT-00

Certificate/SO Number: 9-Q1F7P-20-1 Revision 0



| Asset   | Manufacturer | Model Number  | Description                   | Cal Date | Due Date  | Traceability Number | Use   |
|---------|--------------|---------------|-------------------------------|----------|-----------|---------------------|-------|
| ED-0050 | HIP          | 3458A Opt 002 | Digital Multimeter, 8.5 Digit | 6-Jul-18 | 31-Jul-19 | 9-8ED-0050-12-1     | AF/AL |

The use of the standard is defined as: Af - used for as-found readings, AL - used for as-left readings.

### Traceable Standards

### Environmental Data

| Temperature      | Relative Humidity | Temp / RH Asset |
|------------------|-------------------|-----------------|
| 74.75°F /23.75°C | 18.40%            | LEM-0003        |

SCC Accreditation & Design Mark is an Official Mark of the Standards Council of Canada, used under license.

**Calibrated At:**  
 916 Gateway  
 Burlington, ON L7L 5K7

**Facility Responsible:**  
 916 Gateway  
 Burlington, ON L7L 5K7  
 800-828-1470

Unit Barcode:  
 90080177370

Date Received: March 26, 2019  
 Service Level: R9

**Calibrated By:**  
 Electronically Signed By:  
 Lawrence Loi

**Reviewed By:**  
 Electronically Signed By:  
 Tony Chanbari

|                        |                 |               |                 |
|------------------------|-----------------|---------------|-----------------|
| Lawrence Loi           | Mar 29, 2019    | Tony Chanbari | Mar 29, 2019    |
| Calibration Technician | 15:33:38 -04:00 | Lab Manager   | 15:39:53 -04:00 |

West Caldwell Calibration Laboratories Inc.

# Certificate of Calibration

for

## MICROPHONE UNIT

Manufactured by: BRUEL & KJAER  
Model No: 4189-A-021 (ID#00359)  
Serial No: 2622169  
Calibration Recall No: 30268

### Submitted By:

Customer: Iwona Stasiewicz  
Company: Aercoustics Engineering Ltd  
Address: 1004 Middlegate Road  
Mississauga, ON, Canada L4Y0G1

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

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

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

Within ( X )

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

The information supplied relates to the calibrated item listed above.

West Caldwell Calibration Laboratories' calibration control system meets the following requirements, ISO 10012-1 MIL STD 45662A, ANSI/NCSL Z540-1, IEC Guide 25, ISO 9001:2015 and ISO 17025

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

Approved by:

James Zhu

Calibration Date: 26-Aug-19

Quality Manager  
ISO/IEC 17025:2005

Certificate No: 30268 -2

QA Doc. #1051 Rev. 2.0 10/1/01

Certificate Page 1 of 1

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



Calibration Lab. Cert. # 1533.01

# REPORT OF CALIBRATION

Brüel & Kjær Microphone Unit

for  
 Model No.: 4189-A-021

Serial No.: 2622169

Mic. Model No.: 4189

Serial No.: 2625417

Preamp. Model No.: 2671

Serial No.: 2614900

Company: Aercoustics Engineering Ltd.

I. D. No.: 00359

|  |  |                               |  |
|--|--|-------------------------------|--|
| Calibration results:                                     |  | Ambient Temperature: 20.2 °C  |  |
| Before & after data same: ...X...                        |  | Ambient Humidity: 54.6 % RH   |  |
| Combined Sensitivity @ 250 Hz and pressure of 100.08 kPa | 0 Volts Polarization voltage (External): | Ambient Pressure: 100.083 kPa |  |
| (Sens. with mic. and preamp.)                            | -26.48 dB re.1V/Pascal                   | Calibration Date: 26-Aug-2019 |  |
|  | 47.42 mV/Pascal                          | Calibration Due: 26-Aug-2020  |  |
|  | 0.48 Ko ( - dB re 50 mV/Pascal)          | Report Number: 30268 -2       |  |
| Sensitivity: Pass  |  | Control Number: 30268         |  |
| Freq. Response: Pass                                     |  |                               |  |
| All tests: Pass  |  |                               |  |

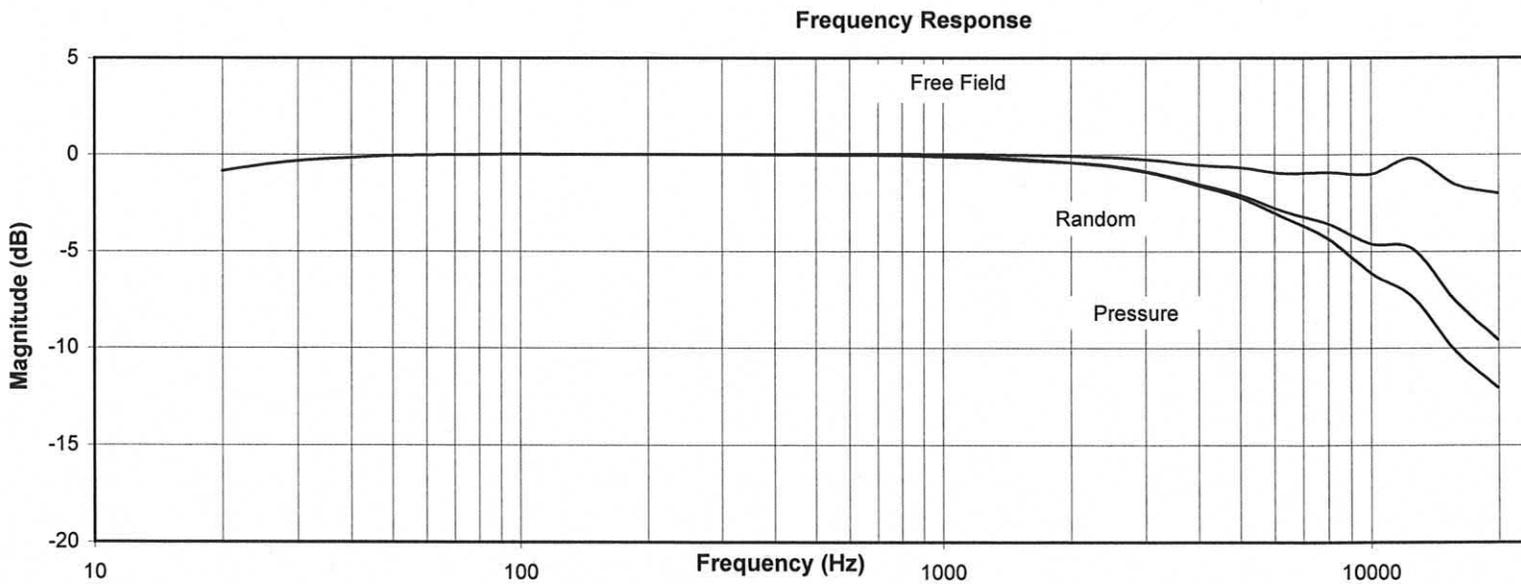
The above listed instrument meets or exceeds the tested manufacturer's specifications.

The IEC 651:1979 & 1993 Type 1 specification passed.

This Calibration is traceable through NIST test numbers: 683/290345-18

The expanded uncertainty of calibration: 0.12 dB at 95% confidence level with a coverage factor of k=2.

The pressure response recorded with electroacoustic method.



The above listed instrument was checked using calibration procedure documented in West Caldwell Calibration Laboratories Inc. procedure : Rev. 7.0 Jan. 24, 2014 Doc. # 1038 P4189A021B&K  
 Calibration was performed by West Caldwell Calibration Laboratories Inc. under Operating Procedures intended to implement the requirements of ISO10012-1, IEC Guide 25, ANSI/NCSL Z540-1, (MIL-STD-45662A) and ISO 9001:2015, ISO 17025

Calibrated on WCCL system type 9700

Measurements performed by: .....

**James Zhu**

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

**West Caldwell Calibration Laboratories Inc.**

1575 State Route 96, Victor NY 14564

Tel. (585) 586-3900 FAX (585) 586-4327

*Calibration Data Record*

for

Model No.: 4189-A-021

Serial No.: 2622169

I. D. No.: 00359

Brüel & Kjær Microphone Unit  
Company: Aercoustics Engineering Ltd.

**Frequency Response ( Reference = 0 dB @ 250Hz )**

| Frequency [Hz] | Pressure [dB] | Free Field (dB) | Random (dB) |
|----------------|---------------|-----------------|-------------|
| 19.95          | -0.84         | -0.84           | -0.84       |
| 25.12          | -0.51         | -0.51           | -0.51       |
| 31.62          | -0.27         | -0.27           | -0.27       |
| 39.81          | -0.17         | -0.17           | -0.17       |
| 50.12          | -0.05         | -0.05           | -0.05       |
| 63.10          | -0.02         | -0.02           | -0.02       |
| 79.43          | 0.00          | 0.00            | 0.00        |
| 100.00         | 0.01          | 0.01            | 0.01        |
| 125.89         | 0.01          | 0.01            | 0.01        |
| 158.49         | 0.00          | 0.00            | 0.00        |
| 199.53         | 0.00          | 0.00            | 0.00        |
| 251.19         | 0.00          | 0.00            | 0.00        |
| 316.23         | 0.00          | 0.00            | 0.00        |
| 398.11         | -0.01         | 0.00            | -0.01       |
| 501.19         | -0.01         | 0.01            | -0.01       |
| 630.96         | -0.03         | 0.01            | -0.03       |
| 794.33         | -0.05         | 0.02            | -0.05       |
| 1000.00        | -0.10         | 0.00            | -0.12       |
| 1258.93        | -0.15         | 0.00            | -0.18       |
| 1584.89        | -0.25         | -0.03           | -0.31       |
| 1995.26        | -0.41         | -0.08           | -0.41       |
| 2511.89        | -0.62         | -0.14           | -0.58       |
| 3162.28        | -1.01         | -0.29           | -0.97       |
| 3981.07        | -1.61         | -0.54           | -1.52       |
| 5011.87        | -2.24         | -0.66           | -2.10       |
| 6309.57        | -3.24         | -0.96           | -2.92       |
| 7943.28        | -4.30         | -0.92           | -3.55       |
| 10000.00       | -6.13         | -1.01           | -4.60       |
| 12589.25       | -7.39         | -0.20           | -4.88       |
| 15848.93       | -10.15        | -1.56           | -7.56       |
| 19952.62       | -12.04        | -1.99           | -9.56       |

Freq. response: Expanded Uncertainty (dB) with coverage factor K = 2  
20 to 63Hz 0.11 dB, 63 to 12.5kHz 0.10 dB, 12.5k to 16kHz 0.11 dB, 16k to 20kHz 0.5 dB.

| Instruments used for calibration: | Date of Cal. | Traceability No. | Re-cal. Due Date |
|-----------------------------------|--------------|------------------|------------------|
| Brüel & Kjær 4226 S/N 1445428     | 16-Jul-2019  | 683/290345-18    | 16-Jul-2020      |
| Brüel & Kjær 3560 S/N 2215835     | 28-Jun-2019  | 683/290345-18    | 28-Jun-2020      |
| HP 33120A S/N US360089            | 5-Jul-2019   | ,1010733         | 5-Jul-2020       |
| HP 34401A S/N US360942            | 5-Jul-2019   | ,1010733         | 5-Jul-2020       |

Cal. Date: 26-Aug-2019

Tested by: James Zhu

Calibrated on WCCL system type 9700

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



# SOH Wind Engineering LLC

141 Leroy Road · Williston, VT 05495 · USA

Tel 802.316.4368 · Fax 802.735.9106 · www.sohwind.com

## CERTIFICATE FOR CALIBRATION OF SONIC ANEMOMETER

**Certificate number:** 20.US1.00288

**Date of issue:** February 04, 2020

**Type:** Vaisala Weather Transmitter, WXT536

**Serial number:** R2510790

**Manufacturer:** Vaisala, Oyj, PL 26, FIN-00421 Helsinki, Finland

**Client:** Aercoustics Engineering Ltd., 1004 Middlegate RD, Suite 1100, S.Tower, Mississauga, ON L4Y 1M4, Canada

**Anemometer received:** January 30, 2020

**Anemometer calibrated:** February 04, 2020

**Calibrated by:** MEJ

**Procedure:** MEASNET, IEC 61400-12-1:2017 Annex F

**Certificate prepared by:** EJF

**Approved by:** Calibration engineer, EJF

**Calibration equation obtained:**  $v$  [m/s] = 0.98766 ·  $U$  [m/s] + 0.07507

**Standard uncertainty, slope:** 0.00199

**Standard uncertainty, offset:** 0.28086

**Covariance:** -0.0000388 (m/s)<sup>2</sup>/m/s

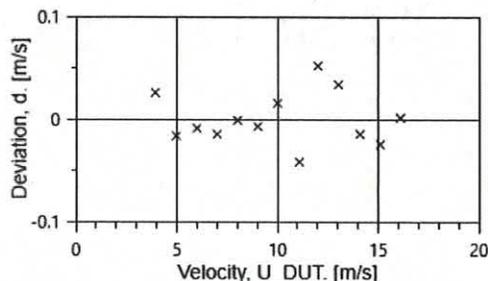
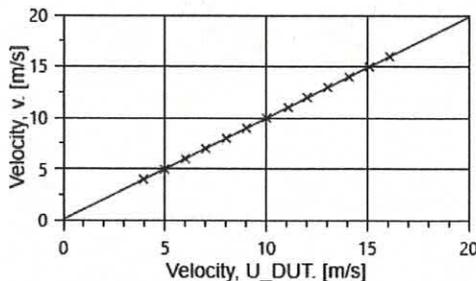
**Coefficient of correlation:**  $\rho$  = 0.999978

**Absolute maximum deviation:** 0.052 m/s at 11.995 m/s

**Barometric pressure:** 996.3 hPa

**Relative humidity:** 21.4%

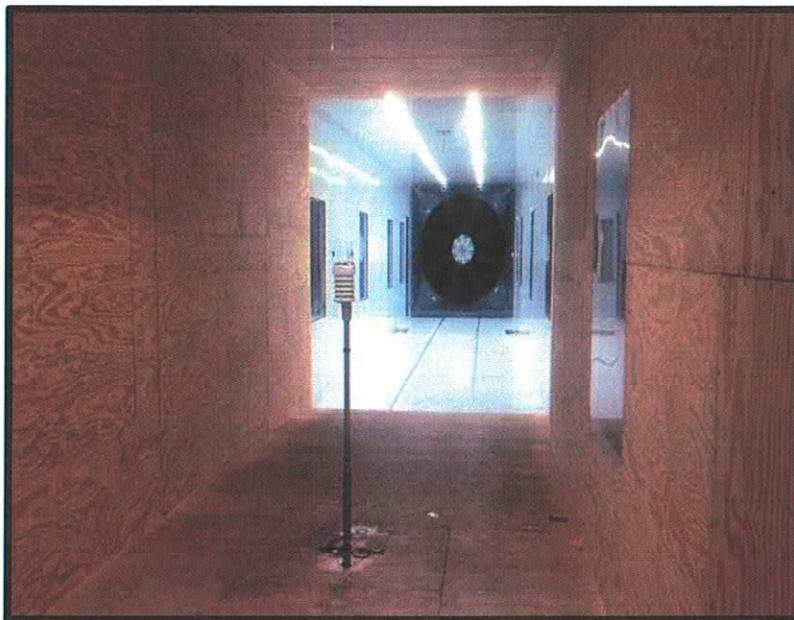
| Succession | Velocity pressure, q. [Pa] | Temperature in wind tunnel [°C] | Temperature in d.p. box [°C] | Wind velocity, v. [m/s] | Anemometer Output, U. [m/s] | Deviation, d. [m/s] | Uncertainty $u_c$ (k=2) [m/s] |
|------------|----------------------------|---------------------------------|------------------------------|-------------------------|-----------------------------|---------------------|-------------------------------|
| 1-first    | 9.45                       | 18.6                            | 24.7                         | 3.989                   | 3.9367                      | 0.026               | 0.023                         |
| 13-last    | 14.68                      | 18.9                            | 24.8                         | 4.974                   | 4.9767                      | -0.016              | 0.026                         |
| 2          | 21.30                      | 18.6                            | 24.7                         | 5.989                   | 5.9967                      | -0.009              | 0.030                         |
| 12         | 28.88                      | 18.9                            | 24.7                         | 6.977                   | 7.0033                      | -0.015              | 0.034                         |
| 3          | 37.96                      | 18.6                            | 24.7                         | 7.995                   | 8.0200                      | -0.001              | 0.038                         |
| 11         | 47.86                      | 19.0                            | 24.7                         | 8.983                   | 9.0267                      | -0.007              | 0.042                         |
| 4          | 59.19                      | 18.6                            | 24.7                         | 9.984                   | 10.0167                     | 0.016               | 0.047                         |
| 10         | 71.62                      | 19.0                            | 24.7                         | 10.990                  | 11.0933                     | -0.042              | 0.051                         |
| 5          | 85.42                      | 18.7                            | 24.7                         | 11.995                  | 12.0167                     | 0.052               | 0.055                         |
| 9          | 99.87                      | 19.0                            | 24.7                         | 12.978                  | 13.0300                     | 0.034               | 0.059                         |
| 6          | 116.04                     | 18.7                            | 24.7                         | 13.983                  | 14.0967                     | -0.014              | 0.064                         |
| 8          | 132.84                     | 18.9                            | 24.7                         | 14.968                  | 15.1033                     | -0.024              | 0.068                         |
| 7          | 151.36                     | 18.8                            | 24.7                         | 15.974                  | 16.0967                     | 0.001               | 0.072                         |



## EQUIPMENT USED

| Serial Number | Description  |
|---------------|--|
| Njord1        | Wind tunnel, blockage factor = 1.0035                              |
| 2254          | Control cup anemometer   |
| -             | Mounting tube, D = 19 mm   |
| TT004         | Summit Electronics, 1XPT100, 0-10V Output, wind tunnel temp.       |
| TP001         | PR Electronics 5102, 0-10V Output, differential pressure box temp. |
| DP005         | Setra Model 239, 0-1inWC, differential pressure transducer         |
| HY004         | Dwyer RHP-2D20, 0-10V Output, humidity transmitter                 |
| BP001         | Setra Model 278, barometer   |
| PL8           | Pitot tube   |
| XB002         | Computer Board. 16 bit A/D data acquisition board                  |
| Njord1-PC     | PC dedicated to data acquisition                                   |

The accuracies of all measurements were traceable to the SI through NIST or CIPM recognized NMI's.



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

## UNCERTAINTIES

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

## COMMENTS

This sensor was oriented in the 90° position during calibration.

**Certificate number:** 20.US1.00288

The results on this certificate relate only to the serial number listed.

All calibrations are done in the "As Left" condition unless otherwise noted.

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Page 2 of 2



# SOH Wind Engineering LLC

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## CERTIFICATE FOR CALIBRATION OF SONIC ANEMOMETER

**Certificate number:** 20.US1.00287      **Date of issue:** February 04, 2020  
**Type:** Vaisala Weather Transmitter, WXT536      **Serial number:** R2510790  
**Manufacturer:** Vaisala, Oyj, PL 26, FIN-00421 Helsinki, Finland  
**Client:** Aercoustics Engineering Ltd., 1004 Middlegate RD, Suite 1100, S.Tower, Mississauga, ON L4Y 1M4, Canada

**Anemometer received:** January 30, 2020      **Anemometer calibrated:** February 04, 2020  
**Calibrated by:** MEJ      **Procedure:** MEASNET, IEC 61400-12-1:2017 Annex F  
**Certificate prepared by:** EJF      **Approved by:** Calibration engineer, EJF

**Calibration equation obtained:**  $v \text{ [m/s]} = 0.99806 \cdot U \text{ [m/s]} + -0.02018$

**Standard uncertainty, slope:** 0.00267

**Standard uncertainty, offset:** -1.41229

**Covariance:** -0.0000711 (m/s)<sup>2</sup>/m/s

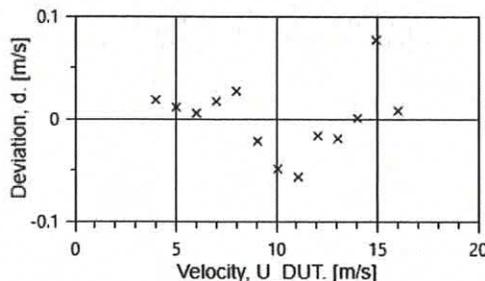
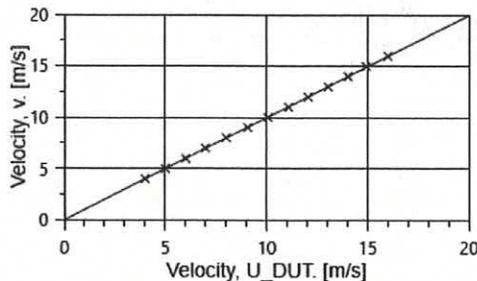
**Coefficient of correlation:**  $\rho = 0.999961$

**Absolute maximum deviation:** 0.077 m/s at 14.964 m/s

**Barometric pressure:** 996.2 hPa

**Relative humidity:** 21.6%

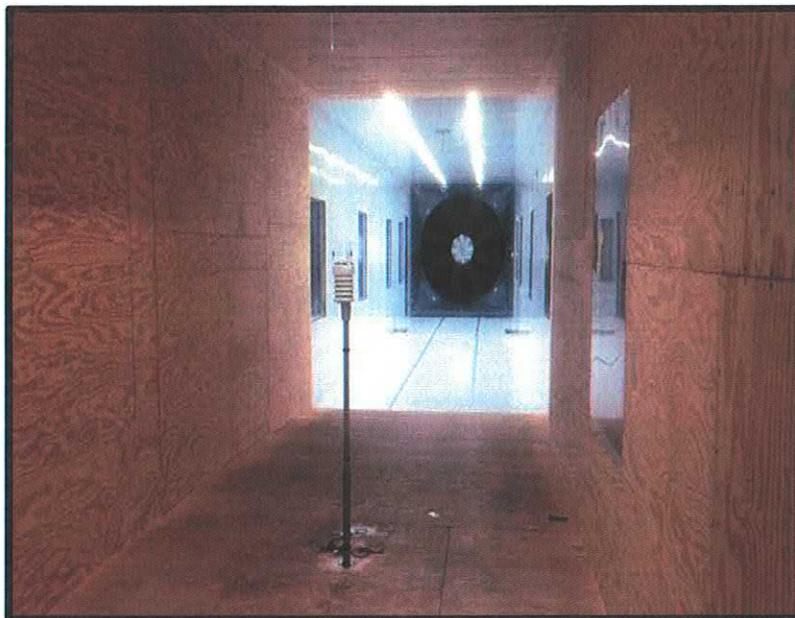
| Succession | Velocity pressure, q, [Pa] | Temperature in wind tunnel [°C] | Temperature in d.p. box [°C] | Wind velocity, v, [m/s] | Anemometer Output, U, [m/s] | Deviation, d, [m/s] | Uncertainty u <sub>c</sub> (k=2) [m/s] |
|------------|----------------------------|---------------------------------|------------------------------|-------------------------|-----------------------------|---------------------|--|
| 1-first    | 9.45                       | 18.4                            | 24.6                         | 3.987                   | 3.9967                      | 0.018               | 0.023                                  |
| 13-last    | 14.73                      | 18.7                            | 24.7                         | 4.981                   | 5.0000                      | 0.011               | 0.026                                  |
| 2          | 21.23                      | 18.3                            | 24.6                         | 5.977                   | 6.0033                      | 0.005               | 0.030                                  |
| 12         | 28.92                      | 18.7                            | 24.7                         | 6.980                   | 6.9967                      | 0.017               | 0.034                                  |
| 3          | 37.98                      | 18.3                            | 24.6                         | 7.995                   | 8.0033                      | 0.027               | 0.038                                  |
| 11         | 48.08                      | 18.7                            | 24.7                         | 9.000                   | 9.0600                      | -0.022              | 0.042                                  |
| 4          | 59.20                      | 18.4                            | 24.6                         | 9.981                   | 10.0700                     | -0.049              | 0.047                                  |
| 10         | 71.57                      | 18.8                            | 24.7                         | 10.981                  | 11.0800                     | -0.057              | 0.051                                  |
| 5          | 85.40                      | 18.4                            | 24.6                         | 11.990                  | 12.0500                     | -0.017              | 0.055                                  |
| 9          | 100.00                     | 18.7                            | 24.7                         | 12.982                  | 13.0467                     | -0.019              | 0.059                                  |
| 6          | 116.12                     | 18.5                            | 24.6                         | 13.983                  | 14.0300                     | 0.001               | 0.064                                  |
| 8          | 132.89                     | 18.7                            | 24.6                         | 14.964                  | 14.9367                     | 0.077               | 0.068                                  |
| 7          | 151.26                     | 18.6                            | 24.7                         | 15.963                  | 16.0067                     | 0.008               | 0.072                                  |



## EQUIPMENT USED

| Serial Number | Description  |
|---------------|--|
| Njord1        | Wind tunnel, blockage factor = 1.0035                              |
| 2254          | Control cup anemometer   |
| -             | Mounting tube, D = 19 mm   |
| TT004         | Summit Electronics, 1XPT100, 0-10V Output, wind tunnel temp.       |
| TP001         | PR Electronics 5102, 0-10V Output, differential pressure box temp. |
| DP005         | Setra Model 239, 0-1inWC, differential pressure transducer         |
| HY004         | Dwyer RHP-2D20, 0-10V Output, humidity transmitter                 |
| BP001         | Setra Model 278, barometer   |
| PL8           | Pitot tube   |
| XB002         | Computer Board. 16 bit A/D data acquisition board                  |
| Njord1-PC     | PC dedicated to data acquisition                                   |

The accuracies of all measurements were traceable to the SI through NIST or CIPM recognized NMI's.



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

## UNCERTAINTIES

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

## COMMENTS

This sensor was oriented in the  $0^\circ$  position during calibration.

**Certificate number:** 20.US1.00287

West Caldwell Calibration Laboratories Inc.

# Certificate of Conformance

for

## SOUND CALIBRATOR

Manufactured by: BRUEL & KJAER  
Model No: 4231 (ID#00355)  
Serial No: 2513183  
Calibration Recall No: 31240

### Submitted By:

Customer: Iwona Stasiewicz  
Company: Aercoustics Engineering Ltd  
Address: 1004 Middlegate Road  
Mississauga, ON. Canada L4Y0G1

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

West Caldwell Calibration Laboratories Procedure No. 4231 (ID# BRUE

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

Within ( X )

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

The information supplied relates to the calibrated item listed above and statement of conformance for ALL given specifications and standards fall under the decision rule:  $A=(L-(U95))$ , where A is acceptance limit, L is manufacturer specifications and U95 is confidence level of 95% at  $k=2$ . This includes but not limited to: 1. Measured value does not meet manufacturer's tolerance, 2. Manufacturer's tolerance is too small compared to calibration and measurement capability uncertainties, 3. Test uncertainty ratio does not meet the 4:1 ratio due to test instrumentation limitations. The decision rule has been communicated and approved by customer during contract

West Caldwell Calibration Laboratories' calibration control system meets the following requirements, ISO 10012-1 MIL STD 45662A, ANSI/NCSL Z540-1, IEC Guide 25, ISO 9001:2015, and ISO 17025

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

Approved by:

James Zhu

Calibration Date: 15-Sep-20

Certificate No: 31240 - 1

Quality Manager  
ISO/IEC 17025:2017

QA Doc. #1051 Rev. 3.0 5/29/20

Certificate Page 1 of 1

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



Calibration Lab. Cert. # 1533.01

# REPORT OF CALIBRATION

for

**Brüel & Kjær Sound Calibrator**  
 Company: **Aercoustics Engineering Ltd.**

**Model No.: 4231**

**Serial No.: 2513183**  
**ID No.: 00355**

**Calibration results:**

**Before data:** ..... **After data:** ...X.....  
**Before & after data same:** .....  
**Sound Pressure Level at 1000.0 Hz and pressure of 1013 hPa (mbar)**  
**was 114.02 dB re 20 µPa**

**Laboratory Environment:**  
 Ambient Temperature: **20.2 °C**  
 Ambient Humidity: **51.7 % RH**  
 Ambient Pressure: **100.593 kPa**  
 Calibration Date: **15-Sep-2020**  
 Calibration Due: **15-Sep-2021**  
 Report Number: **31240 -1**  
 Control Number: **31240**

(Calibrator tested with 1/2" adaptor UC 0210)

IEC 1094-4 Type WS 2 P Microphone was used for measurement.

|                               |               |              |
|-------------------------------|---------------|--------------|
|                               | <b>114 dB</b> | <b>94 dB</b> |
| <b>Sound Pressure Level:</b>  | <b>Pass</b>   | <b>Pass</b>  |
| <b>Frequency:</b>             | <b>Pass</b>   | <b>Pass</b>  |
| <b>Distortion:</b>            | <b>Pass</b>   | <b>Pass</b>  |
| <b>Stability:</b>             | <b>Pass</b>   | <b>Pass</b>  |
| <b>All tested parameters:</b> | <b>Pass</b>   | <b>Pass</b>  |

The above listed instrument meets or exceeds the tested manufacturer's specifications

The IEC 60942:2003 Class 1 specifications, passed.

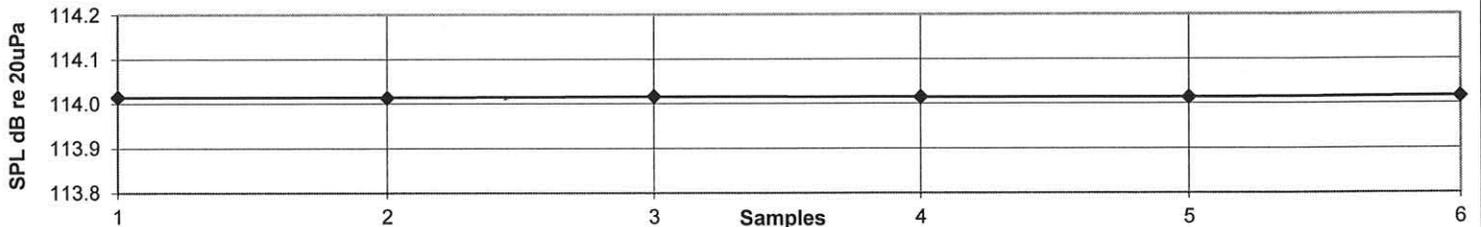
The ANSI S1.40-1984 specifications, passed.

This Calibration is traceable through NIST test numbers: 684.07/O-0000001126-20

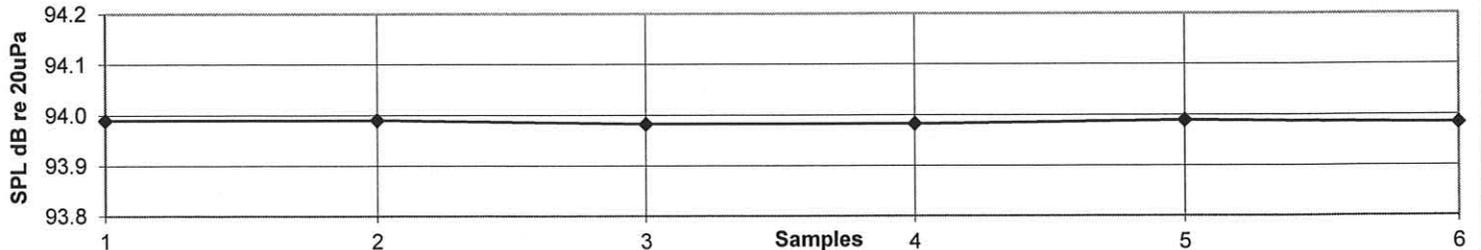
The absolute uncertainty of calibration: See last page. Unless otherwise noted, the reported values are both "as found" and "as left" data.

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

**Stability @ 114 dB SPL**



**Stability @ 94 dB SPL**



The above listed instrument was checked using calibration procedure documented in West Caldwell

Calibration Laboratories Inc. procedure :

Rev. 7.0 Jan. 24, 2014 Doc. # 1038 4231B&K

Calibration was performed by West Caldwell Calibration Laboratories Inc. under Operating Procedures

intended to implement the requirements of ISO10012-1, IEC Guide 25, ANSI/NCSS Z540-1, (MIL-STD-45662A), ISO 9001:2015 and ISO 17025

Cal. Date: 15-Sep-2020

Measurements performed by: *MS*

Calibrated on WCCL system type 9700

**Matthew Smith**

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Rev. 7.0 Jan. 24, 2014 Doc. # 1038 4231B&K

**West Caldwell Calibration Laboratories Inc.**1575 State Route 96, Victor NY 14564  
Tel. (585) 586-3900 FAX (585) 586-4327**Calibration Data Record**Brüel & Kjær Sound Calibrator  
Company: Aercoustics Engineering Ltd.for  
Model No.: 4231

Serial No.: 2513183

All tested parameters: Pass

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

| Sample         | 1 | 114.02 dB re 20 µPa               | 93.99 dB re 20 µPa                |
|----------------|---|-----------------------------------|-----------------------------------|
|                | 2 | 114.01                            | 93.99                             |
|                | 3 | 114.02                            | 93.98                             |
|                | 4 | 114.02                            | 93.98                             |
|                | 5 | 114.01                            | 93.99                             |
|                | 6 | 114.02                            | 93.98                             |
| <b>Average</b> |   | <b>114.02</b> Spec. 114dB ± 0.2dB | <b>93.99</b> Spec. 94 dB ± 0.2 dB |

**Frequency measured (Three samples at 30 sec. Interval)**

| Sample         | 1 | 999.96 Hz     | 999.99 Hz                         |
|----------------|---|---------------|-----------------------------------|
|                | 2 | 999.96        | 999.98                            |
|                | 3 | 999.96        | 999.98                            |
| <b>Average</b> |   | <b>999.96</b> | <b>999.98</b> Spec. 1000 Hz ±0.1% |

|                            |          |          |               |
|----------------------------|----------|----------|---------------|
| <b>Distortion measured</b> | -47.8 dB | -45.2 dB | Spec. ≤-40 dB |
|----------------------------|----------|----------|---------------|

The expanded uncertainty of calibration at 95% confidence level with a coverage factor of k=2.

| Parameter                                  | Test Instrumentation<br>Uncertainty | DUT<br>Uncertainty | Total DUT<br>Uncertainty |
|--|-------------------------------------|--------------------|--------------------------|
| Acoustic Level ([114 & 94] @ 1 kHz):       | 0.18                                | 0.1                | 0.28                     |
| Attenuator accuracy (Attenuation Measure): | 0.46                                | 0.1                | 0.56                     |
| Frequency Measure (DC to 10 MHz):          | 6.0 parts in [10 <sup>6</sup> ] Hz  |                    |                          |

| Instruments used for calibration: | Date of Cal. | Traceability No.       | Re-cal. Due Date |
|-----------------------------------|--------------|------------------------|------------------|
| Brüel & Kjær 4231 S/N 2205492     | 2-Jul-2020   | 684.07/O-0000001126-20 | 2-Jul-2021       |
| Brüel & Kjær 4134 S/N 1222616     | 2-Jul-2020   | 684.07/O-0000001126-20 | 2-Jul-2021       |
| Brüel & Kjær 2669 S/N 1835080     | 2-Jul-2020   | 684.07/O-0000001126-20 | 2-Jul-2021       |
| HP 34401A S/N US361025            | 3-Jul-2020   | ,610119                | 3-Jul-2021       |
| Brüel & Kjær 2636 S/N 1487493     | 3-Jul-2020   | 684.07/O-0000001126-20 | 3-Jul-2021       |
| HP 33120A S/N SG400116            | 3-Jul-2020   | ,610119                | 3-Jul-2021       |

Cal. Date: 15-Sep-2020

Tested by: Matthew Smith

Calibrated on WCCL system type 9700

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Rev. 7.0 Jan. 24, 2014 Doc. # 1038 4231B&amp;K



# REPORT OF CALIBRATION

for

**Brüel & Kjær Sound Calibrator**  
**Company: Aercoustics Engineering Ltd.**

**Model No.: 4231**

**Serial No.: 2513183**  
**ID No.: 00355**

**Calibration results:**

**Before data:** ...X..... **After data:** .....  
**Before & after data same:** .....  
**Sound Pressure Level at 1000.0 Hz and pressure of 1013 hPa (mbar)**  
**was 113.96 dB re 20 µPa**

**Laboratory Environment:**

**Ambient Temperature:** 20.2 °C  
**Ambient Humidity:** 51.7 % RH  
**Ambient Pressure:** 100.593 kPa  
**Calibration Date:** 15-Sep-2020  
**Calibration Due:** 15-Sep-2021  
**Report Number:** 31240 -1  
**Control Number:** 31240

**(Calibrator tested with ½" adaptor UC 0210)**

**IEC 1094-4 Type WS 2 P Microphone was used for measurement.**

|                               |               |              |
|-------------------------------|---------------|--------------|
|                               | <b>114 dB</b> | <b>94 dB</b> |
| <b>Sound Pressure Level:</b>  | <b>Pass</b>   | <b>Pass</b>  |
| <b>Frequency:</b>             | <b>Pass</b>   | <b>Pass</b>  |
| <b>Distortion:</b>            | <b>Pass</b>   | <b>Pass</b>  |
| <b>Stability:</b>             | <b>Pass</b>   | <b>Pass</b>  |
| <b>All tested parameters:</b> | <b>Pass</b>   | <b>Pass</b>  |

The above listed instrument meets or exceeds the tested manufacturer's specifications

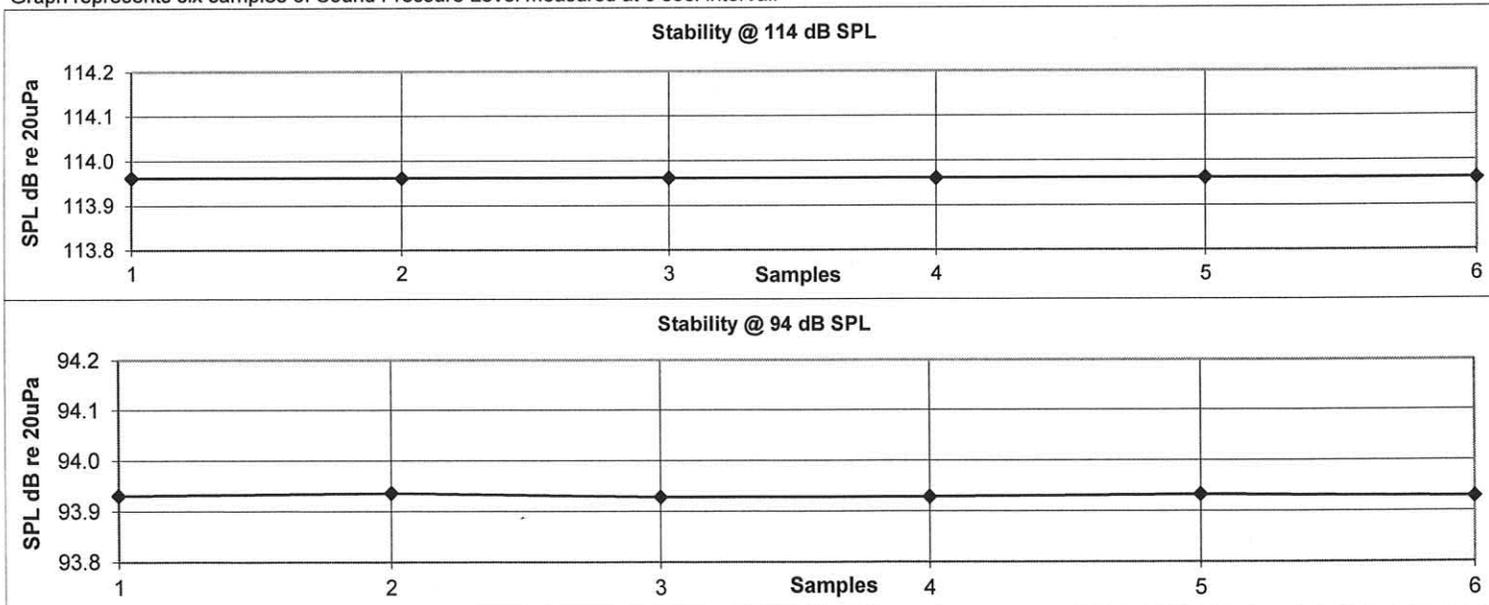
The IEC 60942:2003 Class 1 specifications, passed.

The ANSI S1.40-1984 specifications, passed.

This Calibration is traceable through NIST test numbers: 684.07/O-0000001126-20

The absolute uncertainty of calibration: See last page. Unless otherwise noted, the reported values are both "as found" and "as left" data.

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



The above listed instrument was checked using calibration procedure documented in West Caldwell

Calibration Laboratories Inc. procedure :

**Rev. 7.0 Jan. 24, 2014 Doc. # 1038 4231B&K**

Calibration was performed by West Caldwell Calibration Laboratories Inc. under Operating Procedures

intended to implement the requirements of ISO10012-1, IEC Guide 25, ANSI/NCSL Z540-1, (MIL-STD-45662A), ISO 9001:2015 and ISO 17025

**Cal. Date: 15-Sep-2020**

Measurements performed by: *MS*

Calibrated on WCCL system type 9700

**Matthew Smith**

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Rev. 7.0 Jan. 24, 2014 Doc. # 1038 4231B&K

## West Caldwell Calibration Laboratories Inc.

1575 State Route 96, Victor NY 14564  
Tel. (585) 586-3900 FAX (585) 586-4327**Calibration Data Record**

for

Model No.: 4231

Serial No.: 2513183

Brüel &amp; Kjær Sound Calibrator

Company: Aercoustics Engineering Ltd.

All tested parameters: Pass

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

|        |                |                                   |                                   |
|--------|----------------|-----------------------------------|-----------------------------------|
| Sample | 1              | 113.96 dB re 20 µPa               | 93.93 dB re 20 µPa                |
|        | 2              | 113.96                            | 93.94                             |
|        | 3              | 113.96                            | 93.93                             |
|        | 4              | 113.96                            | 93.93                             |
|        | 5              | 113.96                            | 93.93                             |
|        | 6              | 113.96                            | 93.93                             |
|        | <b>Average</b> | <b>113.96</b> Spec. 114dB ± 0.2dB | <b>93.93</b> Spec. 94 dB ± 0.2 dB |

**Frequency measured (Three samples at 30 sec. Interval)**

|        |                |               |                                   |
|--------|----------------|---------------|-----------------------------------|
| Sample | 1              | 999.96 Hz     | 999.97 Hz                         |
|        | 2              | 999.96        | 999.96                            |
|        | 3              | 999.96        | 999.95                            |
|        | <b>Average</b> | <b>999.96</b> | <b>999.96</b> Spec. 1000 Hz ±0.1% |

Distortion measured -48.6 dB -46.1 dB Spec. ≤40 dB

The expanded uncertainty of calibration at 95% confidence level with a coverage factor of k=2.

| Parameter                                  | Test Instrumentation<br>Uncertainty | DUT<br>Uncertainty | Total DUT<br>Uncertainty |
|--|-------------------------------------|--------------------|--------------------------|
| Acoustic Level ([114 & 94] @ 1 kHz):       | 0.18                                | 0.1                | 0.28                     |
| Attenuator accuracy (Attenuation Measure): | 0.46                                | 0.1                | 0.56                     |
| Frequency Measure (DC to 10 MHz):          | 6.0 parts in [10 <sup>6</sup> ] Hz  |                    |                          |

| Instruments used for calibration: |                     | Date of Cal. | Traceability No.       | Re-cal. Due Date |
|-----------------------------------|---------------------|--------------|------------------------|------------------|
| Brüel & Kjær                      | 4231 S/N 2205492    | 2-Jul-2020   | 684.07/O-0000001126-20 | 2-Jul-2021       |
| Brüel & Kjær                      | 4134 S/N 1222616    | 2-Jul-2020   | 684.07/O-0000001126-20 | 2-Jul-2021       |
| Brüel & Kjær                      | 2669 S/N 1835080    | 2-Jul-2020   | 684.07/O-0000001126-20 | 2-Jul-2021       |
| HP                                | 34401A S/N US361025 | 3-Jul-2020   | ,610119                | 3-Jul-2021       |
| Brüel & Kjær                      | 2636 S/N 1487493    | 3-Jul-2020   | 684.07/O-0000001126-20 | 3-Jul-2021       |
| HP                                | 33120A S/N SG400116 | 3-Jul-2020   | ,610119                | 3-Jul-2021       |

Cal. Date: 15-Sep-2020

Tested by: Matthew Smith

Calibrated on WCCL system type 9700

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## Appendix F.02

### Summary of Measurement Results

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## Summary of Measurement Results

This section provides a summary of the calculated apparent sound power level and tonal audibility results for the test turbine compared to the allowable limits and thresholds prescribed in the facility Renewable Energy Approval as well as the MECP guidance document Compliance Protocol for Wind Turbine Noise. A compliance statement is also provided with respect to whether the tested turbine has met the applicable regulatory limits.

### 1.1 Overall Sound Power Levels

From Table 11 of IEC test report 14000.07.T409.RP1:

| Wind Speed (m/s) | Apparent $L_{WA}$ , (dBA) | Maximum Sound Power Level (dBA) † |
|------------------|---------------------------|-----------------------------------|
| 8.0              | 102.5                     | 104.0                             |
| 8.5              | 103.3                     | 104.0                             |
| 9.0              | 103.6                     | 104.0                             |
| 9.5              | 103.6                     | 104.0                             |
| 10.0             | 103.9                     | 104.0                             |
| 10.5             | 103.8                     | 104.0                             |
| 11.0             | 103.3                     | 104.0                             |
| 11.5             | 103.3                     | 104.0                             |
| 12.0             | 103.0                     | 104.0                             |
| 12.5             | 103.3                     | 104.0                             |
| 13.0             | 102.8                     | 104.0                             |

† Based on the maximum sound power level listed in the Port Dover and Nanticoke Wind Farm Acoustic Assessment Report, dated November 14, 2014. Level includes +0.5 dB, per Section E3.1 of the MECP Compliance Protocol for Wind Turbine Noise

## 1.2 Tonal Audibility Values

From Table 14 of IEC test report 14000.07.T409.RP1:

| Wind Speed (m/s) | Frequency (Hz) | Tonal Audibility, $\Delta L_a$ (dB) | Tonal Audibility Threshold* (dB) |
|------------------|----------------|-------------------------------------|----------------------------------|
| 8.0              | 155            | 2.0                                 | 3                                |
| 8.0              | 571            | -0.6                                | 3                                |
| 8.5              | 160            | -0.8                                | 3                                |
| 8.5              | 535            | -2.7                                | 3                                |
| 9.0              | 161            | -2.6                                | 3                                |
| 9.0              | 521            | -1.9                                | 3                                |
| 9.0              | 601            | -1.5                                | 3                                |
| 9.5              | 536            | -3.0                                | 3                                |
| 10.0             | -              | No tones                            | 3                                |
| 10.5             | -              | No tones                            | 3                                |
| 11.0             | 159            | -2.2                                | 3                                |
| 11.5             | 161            | -2.9                                | 3                                |
| 12.0             | -              | No tones                            | 3                                |
| 12.5             | 161            | -3.0                                | 3                                |
| 13.0             | 160            | -2.9                                | 3                                |
| 13.0             | 540            | -2.4                                | 3                                |

\* Per Section D3.8.3 of the MECP Compliance Protocol for Wind Turbine Noise

## 1.3 Statement of Compliance and Closure

Based on the results in Table 11 of the IEC 61400-11 test report to which this statement is attached, the maximum apparent sound power level of the test turbine is below the maximum allowable sound power level and the sound power level used in the Acoustic Assessment Report for the Port Dover and Nanticoke Wind Farm.

Further, based on the results in Table 14 of the IEC 61400-11 to which this statement is attached, the maximum tonal audibility of the test turbine is below the 3 dB threshold stated in D3.8.3 of the MECP Compliance Protocol for Wind Turbine Noise.

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## Appendix F.03 E-Audit Checklist

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**Appendix F.02 - (2017 Compliance Protocol Appendix F6): E-Audit checklist for IEC 61400-11:2013**  
**Wind Energy Project – Screening Document – Acoustic Audit Report – Emission IEC61400-11:2013 Standard**  
**Information Required in the Acoustic Audit Report – Emission**

| Item # | Description  | Complete? | Comment   |
|--------|--|-----------|---|
| 1      | Characterization of the wind turbine<br>Items 1 to 26; IEC61400-11:2013, Section 10.2  | ✓         | Report Section 2.1  |
| 2      | Physical environment<br>Items 27 to 33; IEC61400-11:2013, Section 10.3, Physical Environment   | ✓         | Report Section 2.2, 3.1.4, 3.5, Appendix A                                    |
| 3      | Measurement instrumentation<br>Items 34 to 39; IEC61400-11:2013, Section 10.4, Instrumentation   | ✓         | Report Section 3.1, Appendix F.01   |
| 4      | Acoustic data<br>Items 40 to 52; IEC61400-11:2013, Section 10.5, Acoustic Data   | ✓         | Report Section 4, 3.3, Appendix C, Appendix D,                                |
| 5      | Non-acoustic data<br>Items 50 to 53, and 56; IEC61400-11:2003 Section 10.6, Non-Acoustic Data<br>Items 59 and 60; NPC-233, Section 12.3, Acoustic Audit – Acoustical Data, bullet point number 8, All necessary and supporting calculations  | ✓         | Report Section 3.3, Appendix C, Appendix E                                    |
| 6      | Uncertainty<br>the apparent sound power level at integer wind speeds<br>one-third octave band spectrum of the noise at the reference position at each integer wind speed<br>the Tonality of the sound emissions of the wind turbine measured at the reference position   | ✓         | Report Section 4.3, Appendix C  |
| 7      | Additional information<br>Item 60; NPC-233, Section 10, Report Format, bullet point number 4, Conclusions and Recommendations<br>Item 61; NPC-233, Section 12.3, Acoustic Audit – Acoustical Data, bullet point number 8, All necessary and supporting calculations<br>Item 62; NPC-233, Section 12.3, Acoustic Audit – Acoustical Data, bullet point number 3, Details of measurement procedure | ✓         | Report Section 3 and Section 5, Appendix F, data in Excel provided separately |
| 8      | Items 68 to 72; IEC61400-11:2013, Section 10.5, Acoustic Data  | ⊖         | Optional information, not provided in this report                             |
| 9      | Non-acoustic data<br>Items 73 to 74 are from IEC61400-11:2013, Section 10.6, Non-Acoustic Data   | ⊖         | Optional information, not provided in this report                             |

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**End of Report**

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