Dundonnell Wind Farm

Permit Noise Compliance Testing

Round 2

S5345.1C13

June 2023

sonus.

Sonus Pty Ltd
17 Ruthven Ave
Adelaide SA 5000
Phone: +61 (8) 8231 2100
Email: info@sonus.com.au
www.sonus.com.au

Document Title	: Dundonnell Wind Farm Permit Noise Compliance Testing - Round 2
Client	: Vestas Australia Wind Technology P/L
Document Reference	: S5345.1C13
Date	: June 2023
Author	: Byron Holmes, MAAS
Reviewer	: Chris Turnbull, MAAS

1 INTRODUCTION

In accordance with Condition 14 of Planning Permit No. 2015/23858 (the **Planning Permit**) for the Dundonnell Wind Farm (the **Wind Farm**), a Noise Compliance Test Plan (**NCTP**) was prepared by Sonus (with Sonus reference S5345C4, dated March 2018) and endorsed by the Minister for Planning on 16 October 2018. The NCTP provides the procedure for the post-construction noise assessment in accordance with the Planning Permit.

The Wind Farm is required to comply with the noise performance requirements as set out in Condition 11 of the Planning Permit.

In accordance with Condition 14 of the Planning Permit and the NCTP, an initial round of post-construction noise testing was required to be conducted within six months of commissioning of the Wind Farm, and repeated twelve months later.

Sonus has been engaged by Vestas Australia Wind Technology P/L to conduct both the initial testing and the second round of post-construction noise testing in accordance with the NCTP. The results of the initial round of testing were summarised in Sonus report S5345.1C12.

This report summarises the results of the second round of post-construction noise testing at four residences selected in accordance with the NCTP (and consistent with those selected for the initial post-construction noise testing). The assessment includes analysis of noise monitoring at the residential locations, intermediate locations between the residences and Wind Farm and nearfield locations around nominated turbines. The assessment also includes an analysis of the special audible characteristics of tonality and amplitude modulation in accordance with the NCTP.

2 NCTP TEST METHOD

The NCTP establishes a methodology to determine compliance in accordance with the Planning Permit Conditions and New Zealand Standard 6808:2010, *Acoustics – Wind Farm Noise* (the **Standard**). The NCTP provides four residential logging locations where noise levels from operation of the Wind Farm are to be measured. Where the Wind Farm is shown to be compliant with the noise criteria at the test locations, the Wind Farm is compliant with the Planning Permit Conditions in accordance with the NCTP. Table 1 provides the four locations.

Table 1: Residential test locations

No	Testing Location	Coordinates (UTM WGS 84 Zone 54)		Alternate Test Location
		Easting	Northing	
1	18	680221	5807762	17
2	46 (PN)	673610	5803201	47 (PN)
3	52 (PN)	671547	5811153	51 (PL)
4	62	675853	5812054	21

(PL) Participating Landholder
(PN) Participating Neighbour

There was one residential logging location where access was not granted (H52). Noise monitoring was therefore conducted at an alternate location (H51) with approximate coordinates 671667E, 5811042N.

Sonus conducted a pre-construction noise assessment of the Wind Farm, including derivation of the criteria which apply at residences in the vicinity of the Wind Farm. The relevant criteria applicable at each residential compliance monitoring location (based on the pre-construction noise assessment) are summarised in Table 2 below.

Table 2: Residential compliance monitoring criteria

Residential Logging Location	Criteria dB(A), at Integer Hub Height Wind Speed, m/s									
	3	4	5	6	7	8	9	10	11	12
H18	40	40	40	40	40	40	41	43	45	47
H46	40	40	40	40	40	40	41	43	44	46
H52 / H51	40	40	40	40	40	40	40	40	41	43
H62	40	40	40	40	40	40	41	40	43	44

In accordance with the NCTP, nearfield and intermediate testing was conducted for the purpose of determining the character of noise (tonality and amplitude modulation) from the turbines and enabling noise from other sources to be excluded from the data analysis. The testing was conducted at locations where the noise from other sources in the environment is minimised (in comparison to the noise level from wind turbines) and therefore the results can assist in determining compliance at the residential logging locations, when the noise from turbines is masked by other sources.

3 NEARFIELD AND INTERMEDIATE MEASUREMENTS

3.1 Nearfield Measurements

Nearfield measurements were conducted at two representative turbines in accordance with IEC 61400-11 Edition 3.0 (2012) (**IEC 61400-11**) from 11 April 2023 to 12 April 2023. WTGs H09 and G06 were selected due to the prevailing wind conditions at the time of the measurements. The results of the measurements in the nearfield have been analysed to determine:

- The apparent sound power level (in accordance with IEC 61400-11); and,
- If any special audible characteristics were present as follows:
    - Tonality: the K_t adjustment and frequency of any tones in accordance with Annex C of ISO 1996.2 (2007);
    - Excessive amplitude modulation: in accordance with the NZS 6808 Interim Test Method.

The apparent sound power levels provide an indication of the wind speed at which the highest noise is emitted from the turbines. If the noise at residential logging locations continues to increase at wind speeds above the wind speed of highest noise emission, it indicates that the noise is from sources other than the turbines (most commonly wind in trees) for high wind speed conditions.

Where the special audible characteristics of tonality or excessive amplitude modulation are identified in the nearfield measurements, there is the potential for the characteristic to be present at residential locations and a further assessment is required.

3.1.1 Data Collection

Noise measurements were made using Class 1 Rion NL-52, NATA calibrated, sound level meters equipped with a one-third octave band analyser. The sound level meters were calibrated before and after the measurements using a Class 1 Rion NC-74 calibrator (serial number 35094478), with negligible drift observed.

The measurements were taken in the proximity of two representative turbines, H09 and G06. Measurements were taken at two downwind locations relative to each turbine to capture a wider range of wind directions. The measurement locations are provided in Table 3 with the serial number of the sound level meters. The calibration certificates are provided in Appendix A.

Table 3: Nearfield Measurement Locations

Turbine	Sound Level Meter Serial Number	Coordinates		Slant Distance [m]	Downwind Direction [°]
		Easting	Northing		
G06	00710427	669999	5805716	194	165
G06	00710426	670082	5805717	194	195
H09	00710394	671703	5803391	196	165
H09	00320646	671787	5803389	196	195

A secondary wind shield was used for each sound level meter and was positioned over the microphone on the measurement board. Figure 1 shows an example of a nearfield monitoring setup used.

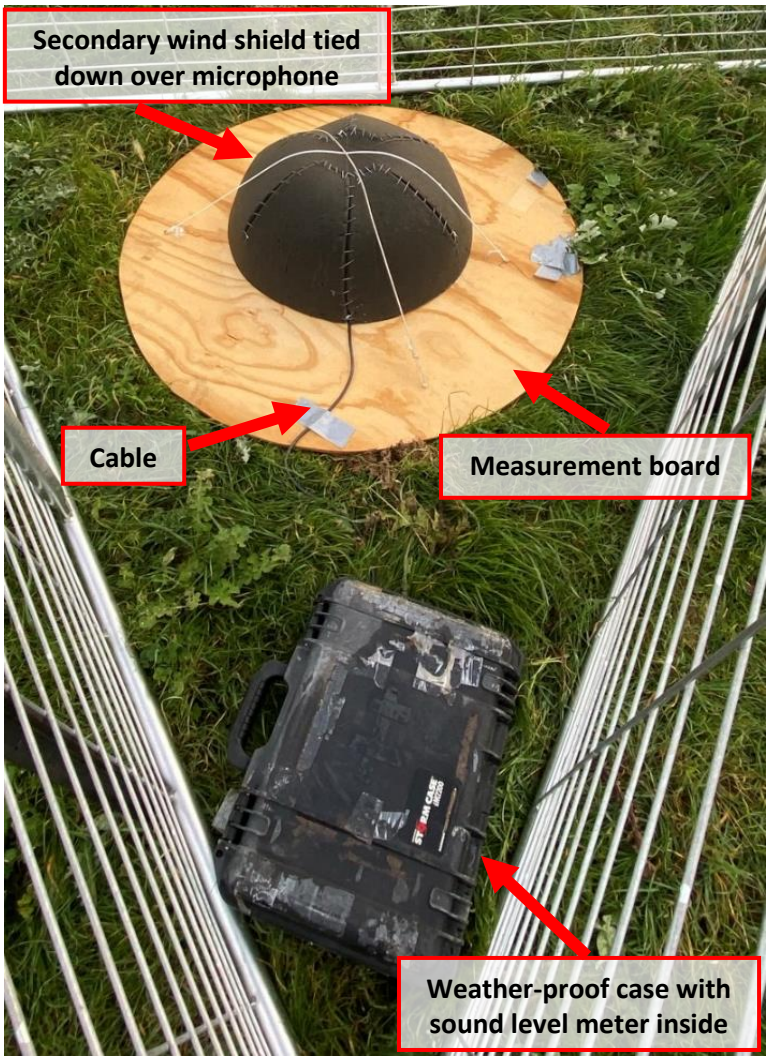


Figure 1: Example Nearfield Monitoring Setup

The insertion loss of the secondary wind shield has been measured and is summarised in Table 4.

Table 4: Secondary Wind Shield Insertion Loss

Frequency 1/3-octave band [Hz]	**20**	**25**	**31.5**	**40**	**50**	**63**	**80**	**100**	**125**	**160**
Insertion loss [dB]	-0.2	-0.2	-0.2	-0.2	-0.2	-0.5	-0.3	-0.6	-0.2	-0.3
Frequency 1/3-octave band [Hz]	**200**	**250**	**315**	**400**	**500**	**630**	**800**	**1000**	**1250**	**1600**
Insertion loss [dB]	-0.3	0.1	0.3	1.2	2.0	2.7	1.9	0.9	1.1	2.1
Frequency 1/3-octave band [Hz]	**2000**	**2500**	**3150**	**4000**	**5000**	**6300**	**8000**	**10000**		
Insertion loss [dB]	1.5	2.1	2.5	2.3	2.5	2.7	3.1	3.6		

3.1.2 Apparent Sound Power Level

The apparent sound power level at each integer wind speed has been derived using the procedure outlined in Section 9 of the IEC 61400-11:2012. It is noted that the wind speed based on power output of the wind turbine was not available during the measurements and therefore the nacelle anemometer has been used for the analysis of hub height wind speed while operating[1]. At times when the turbine is paused to obtain background noise level measurements (in the absence of the test turbine noise level), the wind speed from the closest meteorological mast is used to remove the effect of the stationary blade on the nacelle anemometer measurements.

Analysis Procedure

The steps taken to derive the apparent sound power level at each integer wind speed for turbines G06 and H09 are provided below:

1. Any data points which are outside of the downwind +/- 15 degrees range are excluded;
2. All measured equivalent sound pressure levels at each one-third octave band between 20 Hz to 10 kHz are normalised to the measured overall equivalent sound pressure level. The one-third octave band levels between 20Hz and 10kHz are logarithmically summed and its difference with the measured overall level is arithmetically added to each one-third octave band levels.

[1] It is noted that the use of anemometer wind speed instead of wind speed based on output power can result in inaccuracies at low wind speeds. The measurements of peak sound power level would not be affected.

3. The one-third octave band equivalent sound pressure levels are corrected for the influence of the secondary wind shield. The secondary wind shield insertion losses provided in Table 4 are arithmetically added to the one-third octave band levels. The resultant overall sound pressure level is obtained by logarithmically summing the corrected one third octave sound pressure levels.
4. The one-third octave band equivalent sound pressure levels are sorted into wind speed bins, each 0.5 m/s wide, centred at integer wind speeds. The turbine operational noise and background noise data are segregated into separate data sets.
5. The average one-third octave band equivalent sound pressure levels for each wind speed bin are determined logarithmically. The one-third octave band equivalent sound pressure levels at the bin centres are then calculated using linear interpolation between the bin average sound pressure level and wind speed values.
6. The background corrected wind turbine sound pressure levels are derived using the one-third octave band equivalent sound pressure levels (referenced to the bin centre) as follows:
    a. "turbine off" sound levels are logarithmically subtracted from the "turbine on" sound levels where the "turbine off" level is at least 3 dB(A) below the "turbine on" one-third octave band equivalent sound pressure level.
    b. In the case where the "turbine off" sound level is within 3 dB(A) of the one-third octave band "turbine on" sound pressure level, 3 dB(A) has been subtracted from the one-third octave band "turbine on" equivalent sound pressure level.
7. The background corrected wind turbine sound pressure levels at each one-third octave band are used to calculate the apparent sound power levels at each integer wind speed using Equation (26) in the IEC 61400-11:2012. The slant distance for each measurement location is presented in Table 3.
8. The overall apparent sound power level at each integer wind speed is determined by logarithmically summing the one-third octave band apparent sound power levels.

Analysis Results

Figure 2 and Figure 3 show the apparent sound power level for each of the test turbines at each integer wind speed from cut-in to the wind speed of rated power following the data analysis. It is noted that insufficient noise periods were recorded at 3 m/s at turbine G06 and therefore no results have been included for this wind speed in accordance with IEC 61400-11:2012.

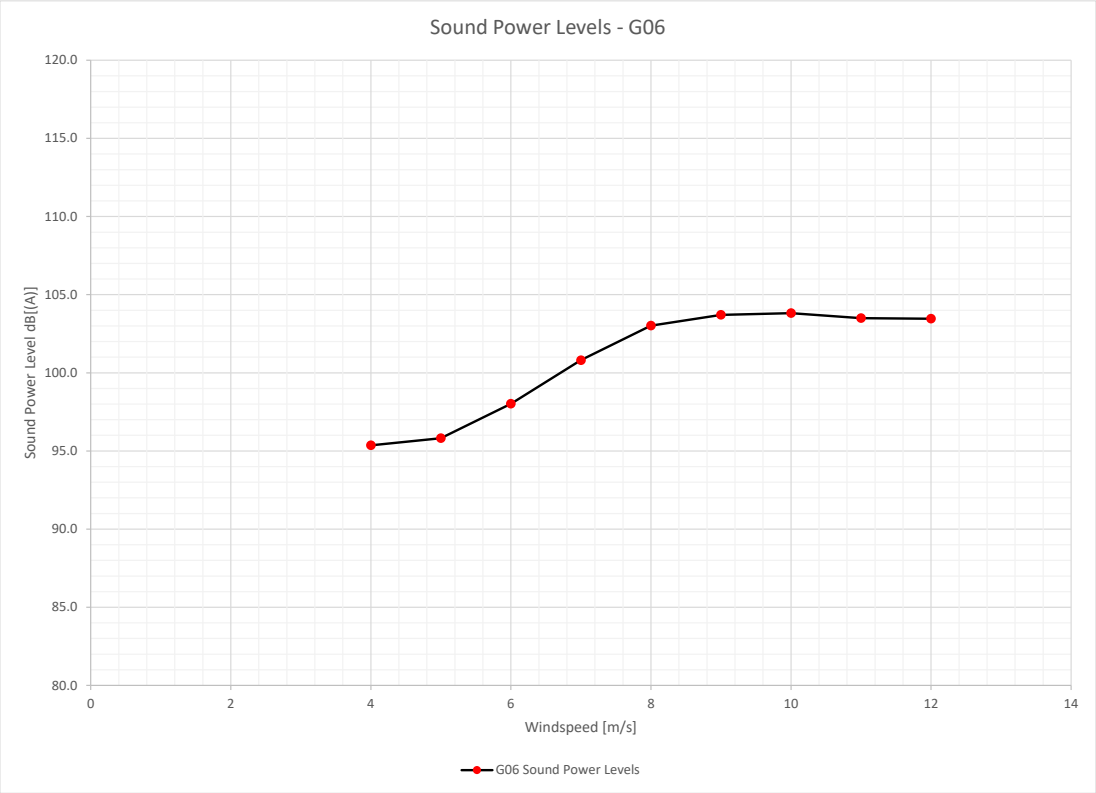


Figure 2: G06 Sound Power Levels

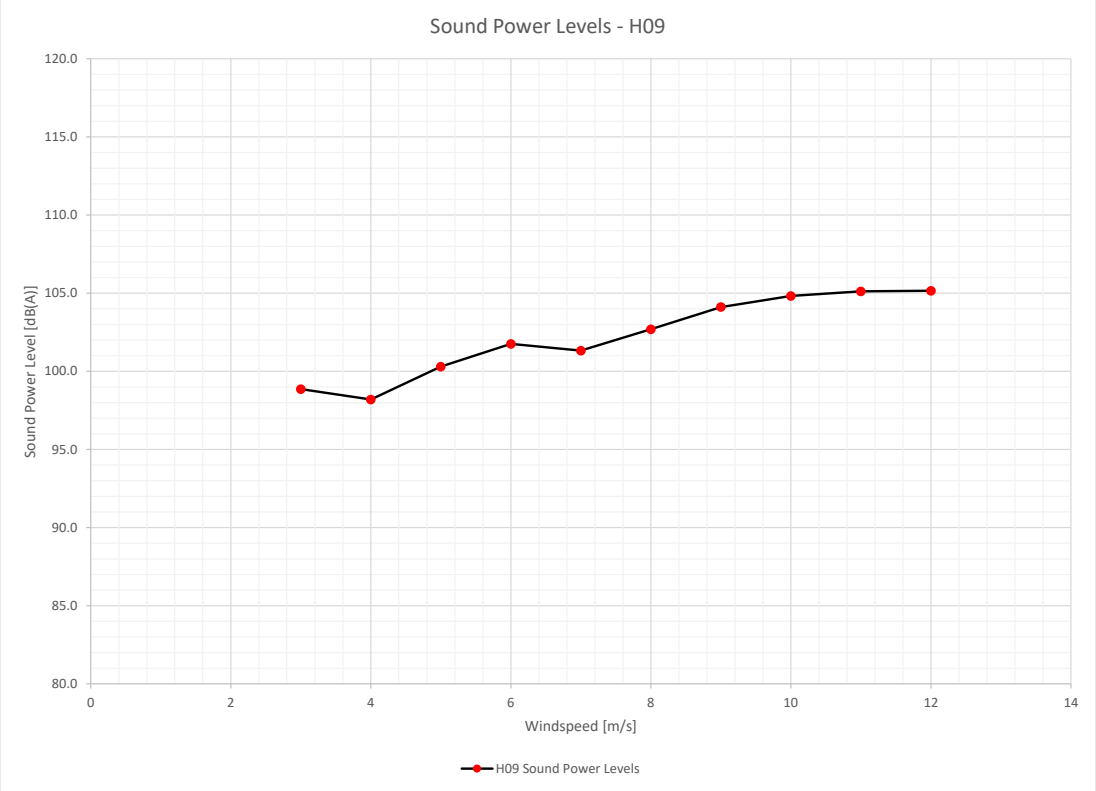


Figure 3: H09 Sound Power Levels

The results indicate that the noise level from the turbines reaches a plateau at a wind speed below 12m/s. Based on the results, any increase in noise level at residential logging locations above that measured at 12m/s will be as a result of noise sources other than the Wind Farm. The residential noise assessment has therefore been restricted to wind speeds up to and including 12m/s.

3.1.3 Tonality

An assessment has been made of the special audible characteristic of tonality at the nearfield locations in accordance with Annex C of ISO 1996-2:2007, based on the data measured in accordance with IEC 61400-11.

The level of tonality for each integer wind speed has been determined based on the tonality for 2-minute periods at each integer wind speed. The 2-minute periods analysed were those where the average wind speed was as close to each integer wind speed as practical. Where a 2-minute period was not found close to the integer wind speed, a 1-minute period has been used as a replacement. A total of 76 periods (43 for H09, 33 for G06) have been analysed for wind speeds ranging between 3 m/s and 12 m/s including each integer wind speed. Where the tonality adjustment K_t was greater than 0 dB for any of the assessed periods, an assessment was conducted at the residential logging locations. The nearfield tonality assessment identified the periods where tones were present as shown in Table 5.

Table 5: Tonal Adjustments K_t

Location	Windspeed [m/s]	Frequency [Hz]	K_t
H09	3	76.2	6.00
		76.2	5.98
	4	76.2	6.00
		76.2	6.00
		149.4	0.46
		76.2	6.00
		149.4	1.55
	5	79.1	6.00
		158.2	1.44
		96.7	1.48
	10	143.6	1.01

Location	Windspeed [m/s]	Frequency [Hz]	K_t
G06	4	73.2	6.00
		73.2	5.80
	5	93.8	1.40
	9	143.6	1.42
	10	143.6	4.29
	11	143.6	6.00
		143.6	0.61

In accordance with the NCTP and based on the above, tonality has been considered at the residential logging locations for integer wind speeds of 3 m/s to 5 m/s and 9 m/s to 11 m/s inclusive. Although the tonality detected was only in the one-third octave bands with centre frequencies of 80 Hz to 160 Hz, the assessment at residences was conservatively extended to include the 63 Hz and 200 Hz one-third octave bands. The assessment is detailed in Section 4.

3.1.4 Amplitude Modulation

The NCTP references the "interim test method" provided in Section 3.2 of NZS 6808:2010 to test for excessive amplitude modulation. Noise data from the two nearfield measurement locations have been used to determine if amplitude modulation was excessive, which is defined in the NCTP to occur when the measured A-weighted peak through trough levels exceed 5 dB(A) at the blade pass frequency on a regular basis.

Samples have been analysed for each integer wind speed and show amplitude modulation at approximately 1 Hz (the approximate blade pass frequency). Typical peak to trough values were in the order of 3 to 4 dB, which is below the 5 dB criterion. Figure 4 shows an example time series showing the amplitude modulation and further graphs of all wind speeds are shown in Appendix B.

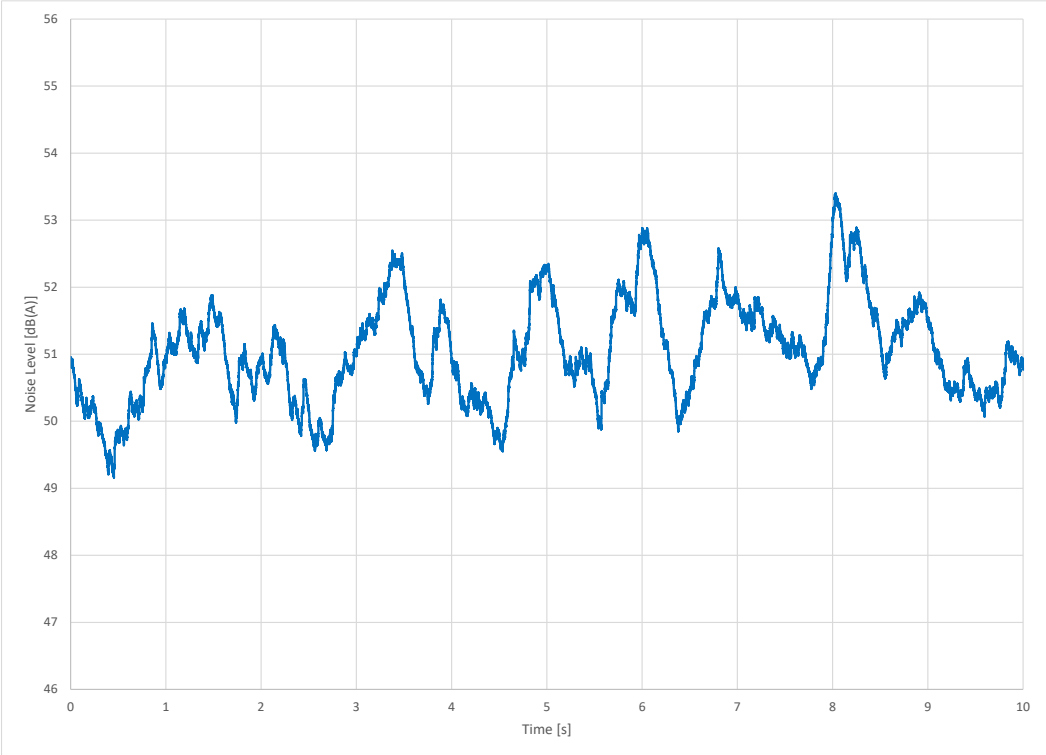


Figure 4: Amplitude modulation assessment example

Given that there is no indication of excessive amplitude modulation in the nearfield, the procedures outlined in the NCTP do not require further consideration at the residential logging locations and no adjustments or penalties are made to the measurements for the character of amplitude modulation.

3.2 Intermediate Measurements

The NCTP recommends that the noise level from the Wind Farm be measured simultaneously at the residential logging locations as well as intermediate locations, which:

- are between the Wind Farm and residence being assessed; and,
- have a higher Wind Farm noise level to background noise level ratio (the noise level from the Wind Farm is more likely to be measurable above the level of background noise).

Data filtering may remove time periods where noise data collected at an intermediate position confirms that the source of the noise at a residential logging location is not the wind turbines. For example, noise data collected in a particular 10-minute interval at a residential logging location may be removed:

- if the noise measured in the same period at the intermediate position (closer to the turbines) is at a lower level; or,
- if the frequency content of the noise at the receptor is not consistent with the frequency content at the Intermediate Position.

The locations of the intermediate measurements were a combination of residences associated with the Wind Farm (beneficiaries) between the residential logging locations and the Wind Farm, and locations within paddocks between the residences and the closest respective turbine. The intermediate locations were generally consistent with those used during the initial post-construction noise testing, with the following exceptions:

- H2 (H46 intermediate) was relocated approximately 25 metres to avoid proximity to local noise sources (primarily a pool pump);
- An additional intermediate position was provided for H46 in a paddock between the residence and the nearest WTG to the west (to provide a dataset less influenced by local noise sources and which covered the full logging period at H46); and,
- H51 intermediate was relocated slightly due to local flooding of the intermediate position used during the initial testing.

The noise level was measured at the intermediate locations using a combination of Rion NL-52, NL-42 and NL-21 Class 1 and 2, NATA calibrated, sound level meters. The coordinates of the intermediate locations and the serial numbers of the sound level meters used are provided in Table 6 and the calibration certificates are attached in Appendix A.

Table 6: Intermediate Logging Locations

Intermediate Logging Location	Coordinates		Sound Level Meter Serial Number
	Easting	Northing	
H18 Intermediate	678542	5807808	01298931
H51 Intermediate	671682	5810935	01298933
H62 Intermediate (H49)	673610	5803201	00710394
H46 Intermediate	672417	5803353	00198361
H46 Intermediate (H2)	672658	5804756	00710393

An aerial photograph showing the residential logging locations, the turbine layout and the intermediate locations is provided in Figure 5.

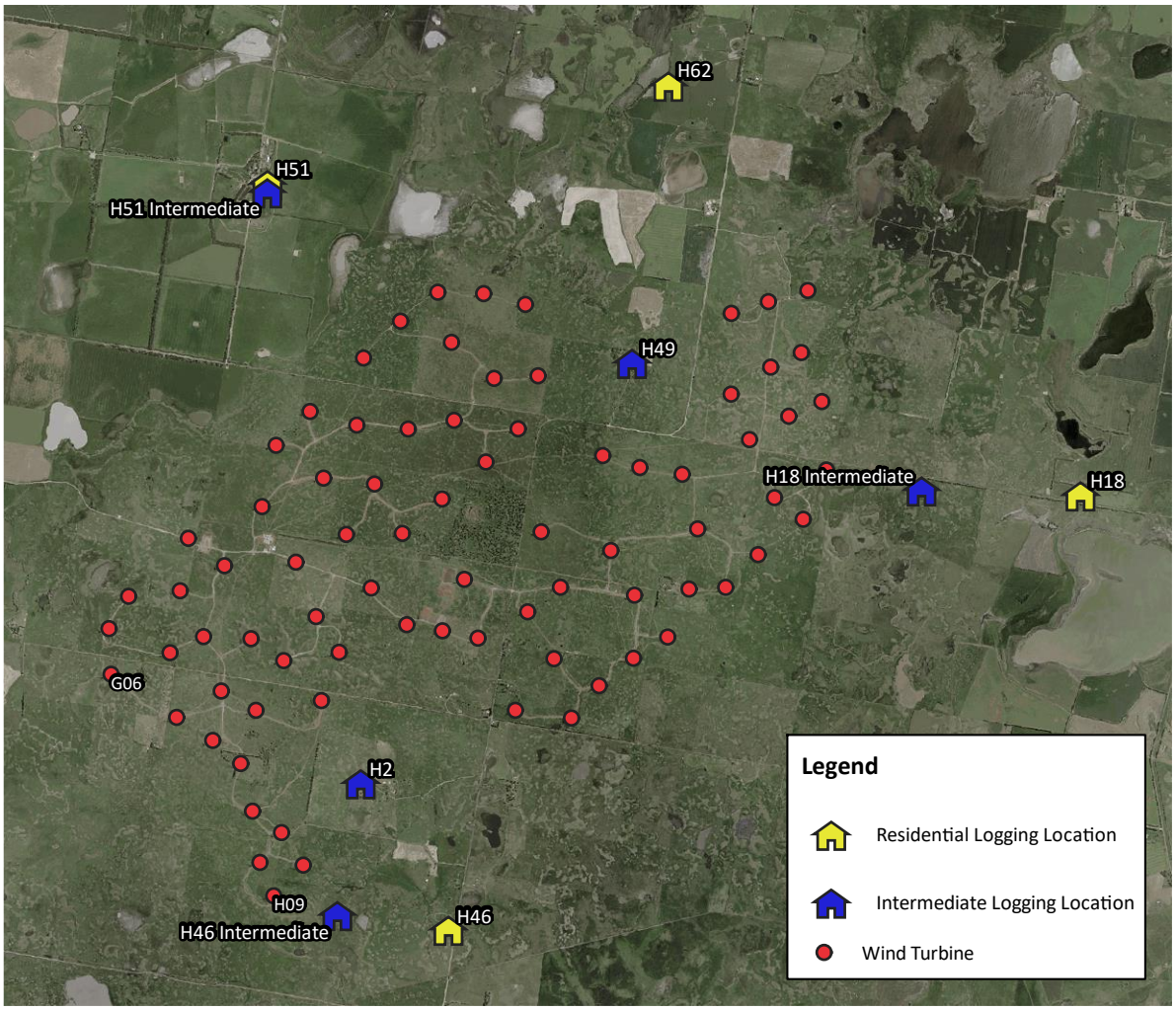


Figure 5: Aerial View of the Site

The use of the intermediate location measurements is discussed further in Section 4.

4 RESIDENTIAL LOGGING

The noise levels (L_{A90}) at each of the residential logging locations were measured continuously in 10-minute intervals over a minimum duration of at least six weeks between 19 December 2022 and 12 April 2023. It is noted that a curtailment of the Wind Farm's power output occurred over a period of approximately one week. The monitoring at each affected location was therefore extended by an equivalent period and any data affected by the curtailment was inherently excluded from the analysis by the procedure described in this section.

At each of the residential logging locations, noise monitoring equipment was placed at the equivalent position to the first round of post-construction noise logging and the background noise logging location prior to construction of the Wind Farm with the exception of:

- H51, where background noise levels have not been measured; and,
- H62, where the logger was placed approximately 15 metres further south to ensure line of sight to the closest turbines (not obstructed by buildings) and such that the location was on the Wind Farm side of the residence.

The position of noise loggers, in all instances, was on the Wind Farm side of the dwelling and at least 5 metres from the building facade, to remove the effects of large reflecting surfaces. A photograph of the noise logging equipment at each residential logging location is provided in Appendix C.

In addition to the noise logging, local wind speed logging was conducted at 3 locations (H2, H49 and H51), with rainfall data collected at 2 locations (H2 and H51). The rainfall data and the measured wind speed at the microphone height were used to identify periods when data might have been adversely affected by weather. For locations where the local weather logging equipment was not deployed, data from the closest weather logger has been used in the analysis.

At each of the monitoring locations, Rion NL-52 or NL-42, NATA calibrated, Class 1 or 2 sound level meters with a noise floor of less than 20 dB(A) were deployed. The serial numbers of the sound level meters are provided in Table 7 and the calibration certificates are in Appendix A.

Table 7: Sound Level Meter Serial Numbers

Residential Logging Location	Sound Level Meter Serial Number
H18	00320654
H46	00296499 / 00710393
H51	00710427
H62	00320649

The sound level meters were calibrated before and after the background noise monitoring with Class 1 Rion NC-74 and NC-75 calibrators (serial numbers 35094478 and 34913547 respectively) and the microphones were fitted with Rion WS-15 all-weather wind shields.

During the noise monitoring period, wind speed and direction was monitored at three meteorological masts located around the Wind Farm (**Operational Masts**). The three locations have been used to provide a hub height (114 metre) data set, free of wake effects. The wind speed data were then referenced back to the two locations where masts were located during the pre-construction noise monitoring (**Development Masts**). This was conducted based on correlations between the wind masts when all masts were operating, prior to the operation of the Wind Farm and the process has been reviewed by DNV GL. The review is summarised in report "10359504-AUME-T-04-A". The locations of the meteorological masts are provided in Table 8.

Table 8: Mast Locations

Mast Location	Coordinates (WGS 84 Zone 54)	
	Easting	Northing
Development Mast 1 (**Dev 1**)	671503	5806243
Development Mast 2 (**Dev 2**)	673295	5808362
Operational Mast 1	672712	5808278
Operational Mast 2	669927	5806734
Operational Mast 3	672116	5803360

4.1 Data Analysis

The NCTP allows noise from other sources to be removed as follows:

- By filtering out time periods:
    - affected by rain, hail or wind based on a weather logger placed at an equivalent location to one of the noise loggers. Data is adversely affected where precipitation occurs in a 10-minute period or where a wind speed greater than 5 m/s is exceeded for 90% of a 10-minute period;
    - when sufficient WTGs have not been connected to the grid to influence the measured level during the current 10-minute period; and,
    - considered abnormal, such as during local construction or maintenance activities.
- By filtering out time periods or frequency content where noise data collected at an Intermediate Position confirms that the source of the noise at a receptor is not the wind turbines (See Section 3.2).
- The subtraction of the background noise levels from the compliance noise measurements.

It is noted that:

- For a large wind farm, it is typical that at any given time one of more turbines will be out of operation or operating below their full potential power output for maintenance, operational or other reasons (such as at the direction of the energy grid operator). For an operating scenario with up to a 10% reduction in the number of active (randomly dispersed) turbines (equivalent to up to 8 WTGs out of service), the overall noise level would be reduced by less than 0.5 dB(A) compared with all turbines operating at their full potential. Overall noise levels therefore are unlikely to be affected by including points where up to 10% of the Wind Farm is inactive. Data periods were therefore filtered when the Wind Farm was operating at less than 90% of its total possible power output.
- Although the NCTP allows for additional data filtering based on the results at the intermediate location, this was only conducted for H18, data at other residences was not filtered. Not filtering data is considered a conservative approach as noise from other sources is included in the measured noise levels.
- Although the NCTP notes that the background noise level will be subtracted from the residential logging results where intermediate data is not used, the subtraction was not conducted. This is a conservative approach as noise from other sources is included in the measured noise levels. That is, the Wind Farm noise level is less than the measured noise levels which have been used to demonstrate compliance with the noise criteria in this report.

Following removal, the remaining noise data were correlated with the hub height wind speed data for each testing location. The hub height wind speed used for the correlation was taken from the same Development Mast location as the pre-construction background noise assessments. Table 9 provides the number of valid data points following removal of adverse data and identifies the wind mast which has been used for the correlations at each testing location.

Table 9: Number of valid data pairs and relevant wind mast

Testing Location	Valid Data Points	Relevant Mast
H18	4621 1115*	Development Mast 2
H46	5896	Development Mast 1
H51^	5718	Development Mast 1
	5739	Development Mast 2
H62	4705	Development Mast 2

^ For completeness, both masts have been used where it is unclear which mast was used for pre-construction background noise monitoring.
** Filtered based on the intermediate location*

A third order regression analysis was performed on the correlations to determine the noise levels to be compared with the criteria.

4.2 Residential Logging Results

The correlation graphs with the regression curve and criteria are provided in Figure 6 to Figure 10 inclusive. The measured noise levels and criteria for each integer hub height wind speed from 3 m/s to 12 m/s are also provided in Table 10.

The results indicate that the measured noise levels are less than the project criteria at wind speeds from cut-in to rated power without subtracting the pre-construction background noise level. The Wind Farm is therefore compliant with the noise criteria subject to the assessment of special audible characteristics.

Table 10: Resultant Wind Farm Noise Levels [dB(A)]

Testing Location	3m/s		4m/s		5m/s		6m/s		7m/s		8m/s		9m/s		10m/s		11m/s		12m/s	
	Measured	Criterion	Measured	Criterion	Measured	Criterion	Measured	Criterion	Measured	Criterion	Measured	Criterion	Measured	Criterion	Measured	Criterion	Measured	Criterion	Measured	Criterion
H18	25	40	27	40	28	40	28	40	28	40	27	40	28	41	29	43	32	45	37	47
H46	35	40	34	40	34	40	34	40	36	40	37	40	39	41	41	43	42	44	43	46
H51 Dev 1	32	40	33	40	33	40	34	40	34	40	35	40	36	40	38	40	39	41	40	43
H51 Dev 2	32	40	32	40	33	40	34	40	34	40	35	40	36	40	38	40	39	41	40	43
H62	30	40	30	40	31	40	31	40	32	40	33	40	34	41	36	40	37	43	39	44

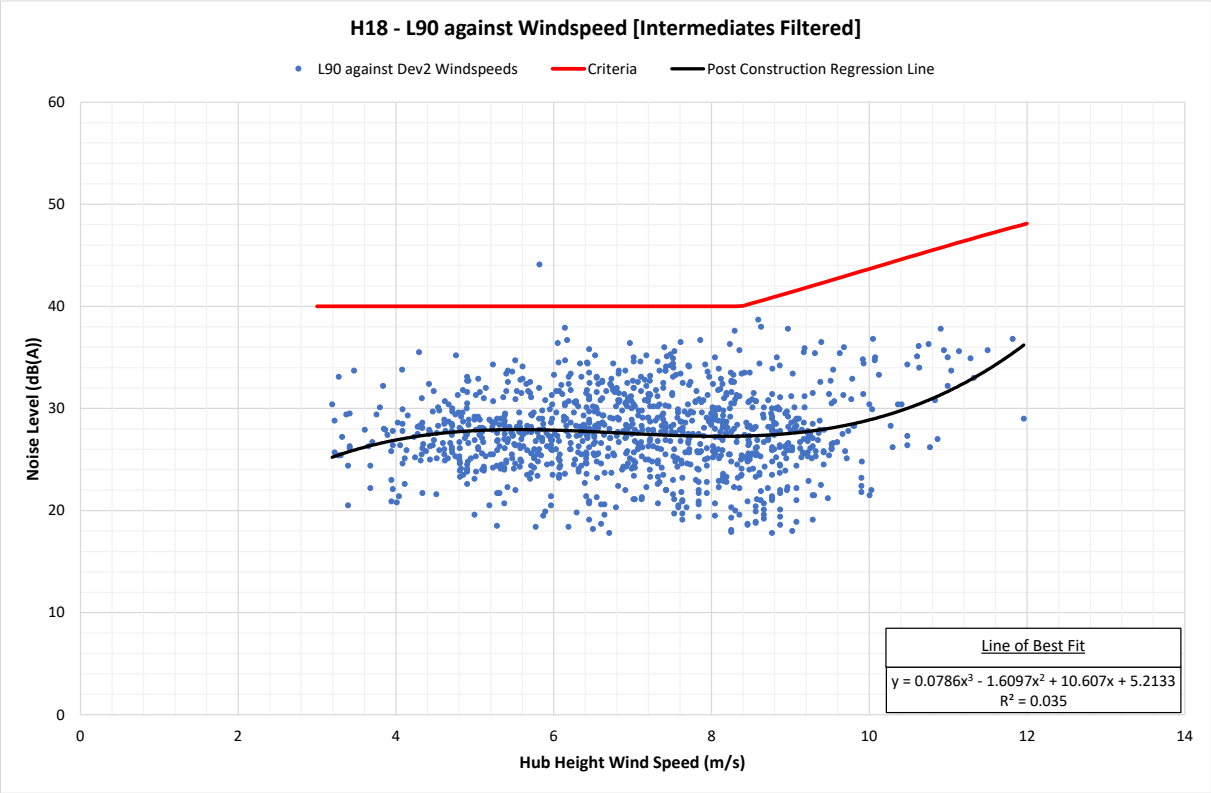


Figure 6: H18 - Filtered L90 Noise Level Correlations to Development Mast 2 Windspeeds

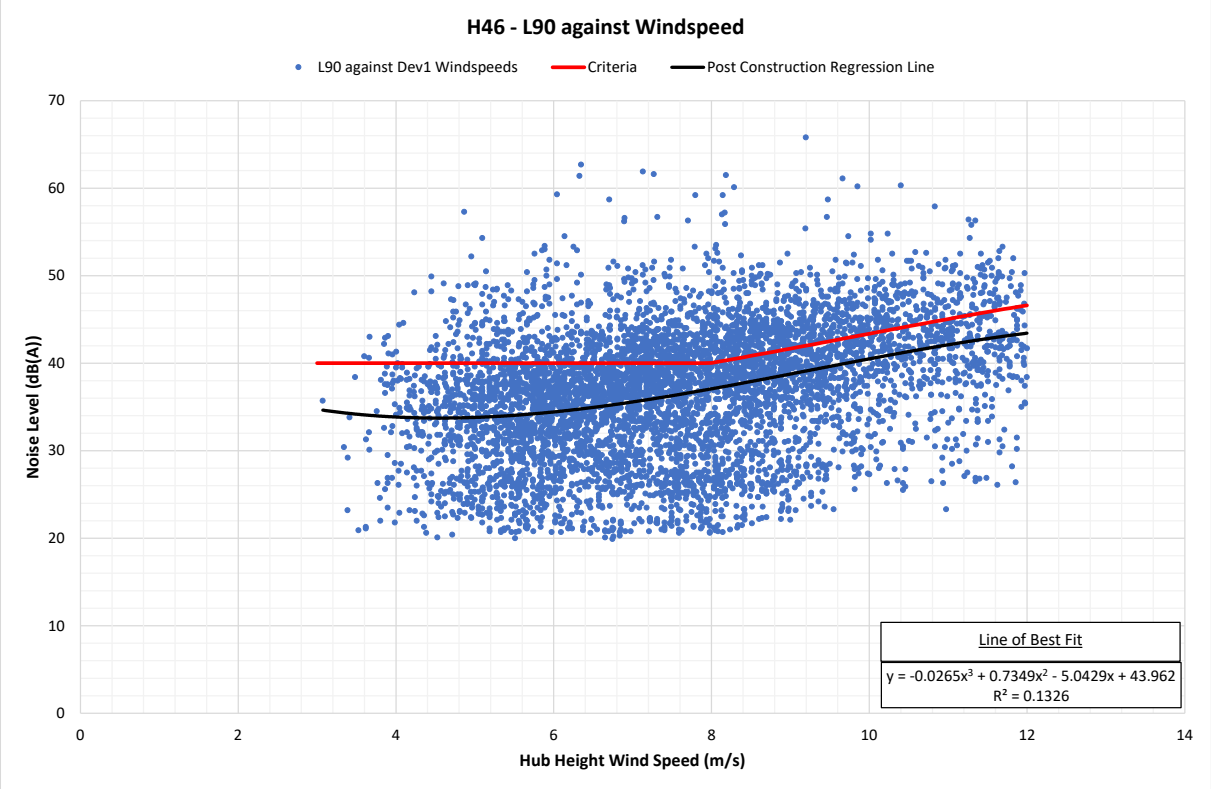


Figure 7: H46 - Filtered L90 Noise Level Correlations to Development Mast 1 Windspeeds

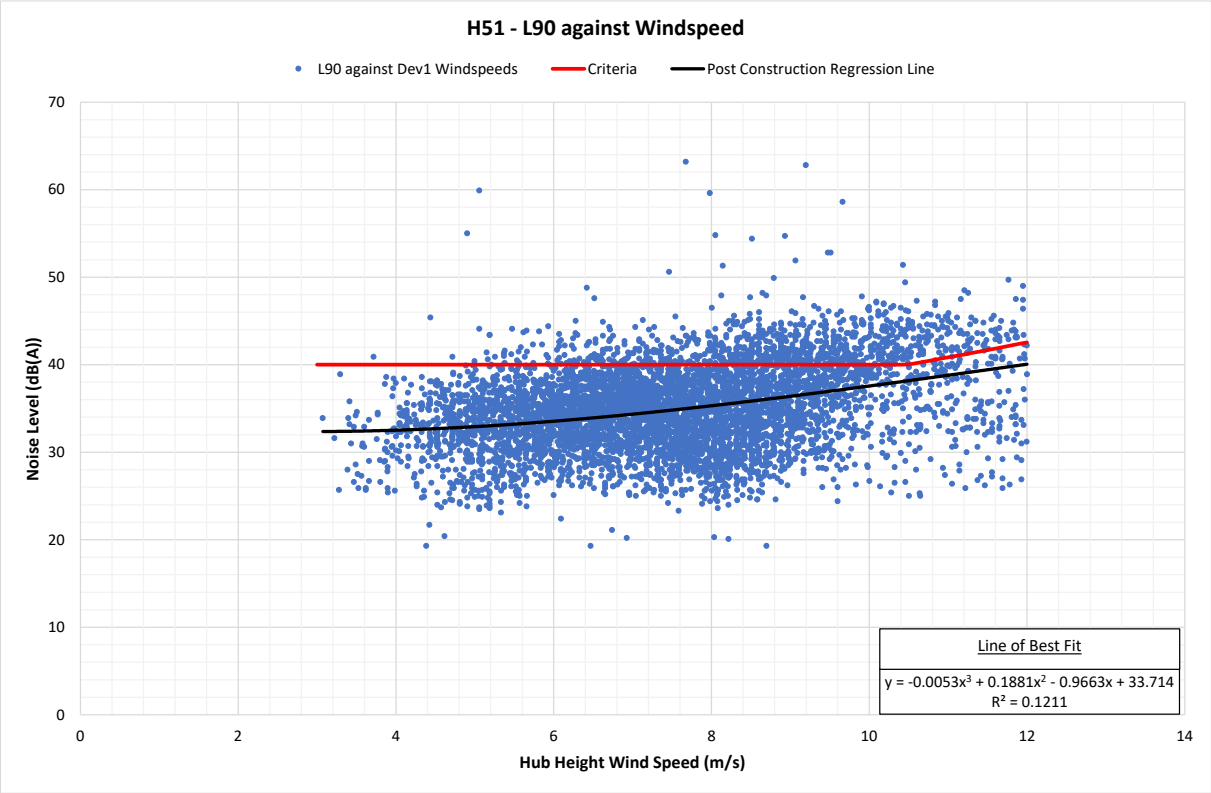


Figure 8: H51 - Filtered L90 Noise Level Correlations to Development Mast 1 Windspeeds

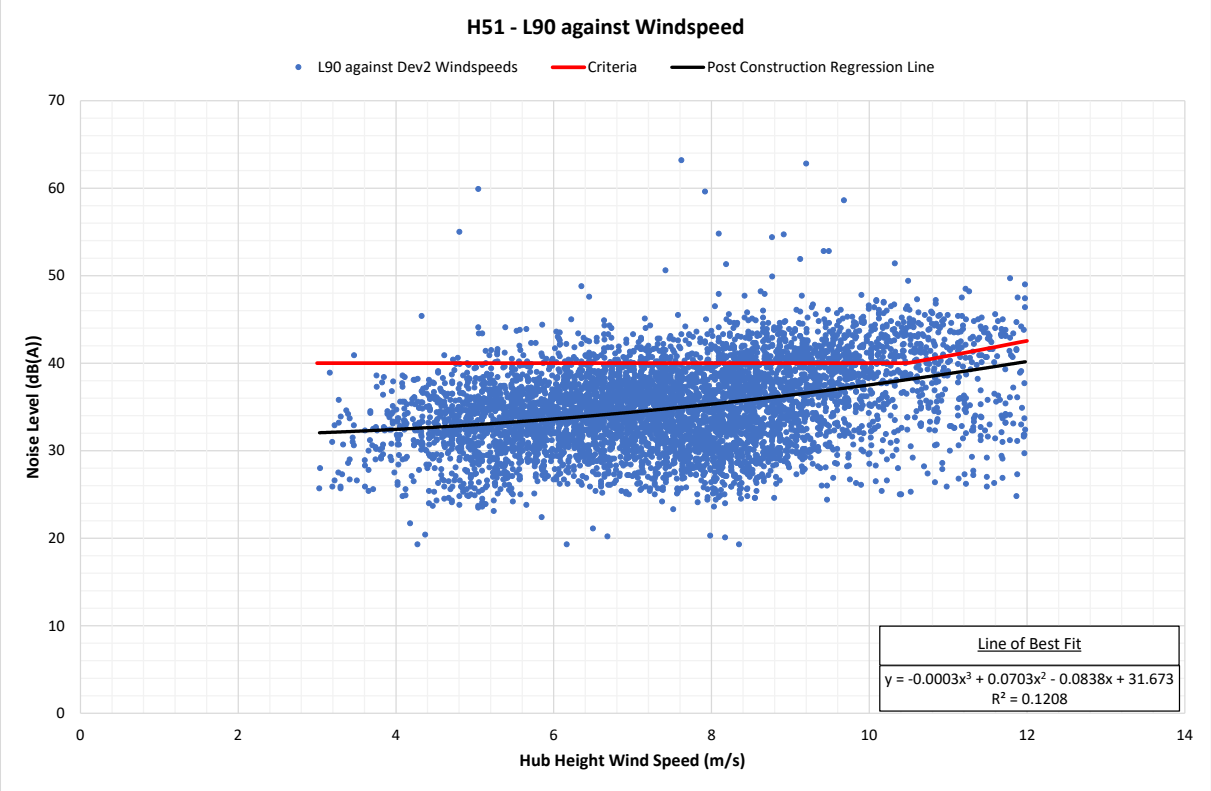


Figure 9: H51 - Filtered L90 Noise Level Correlations to Development Mast 2 Windspeeds

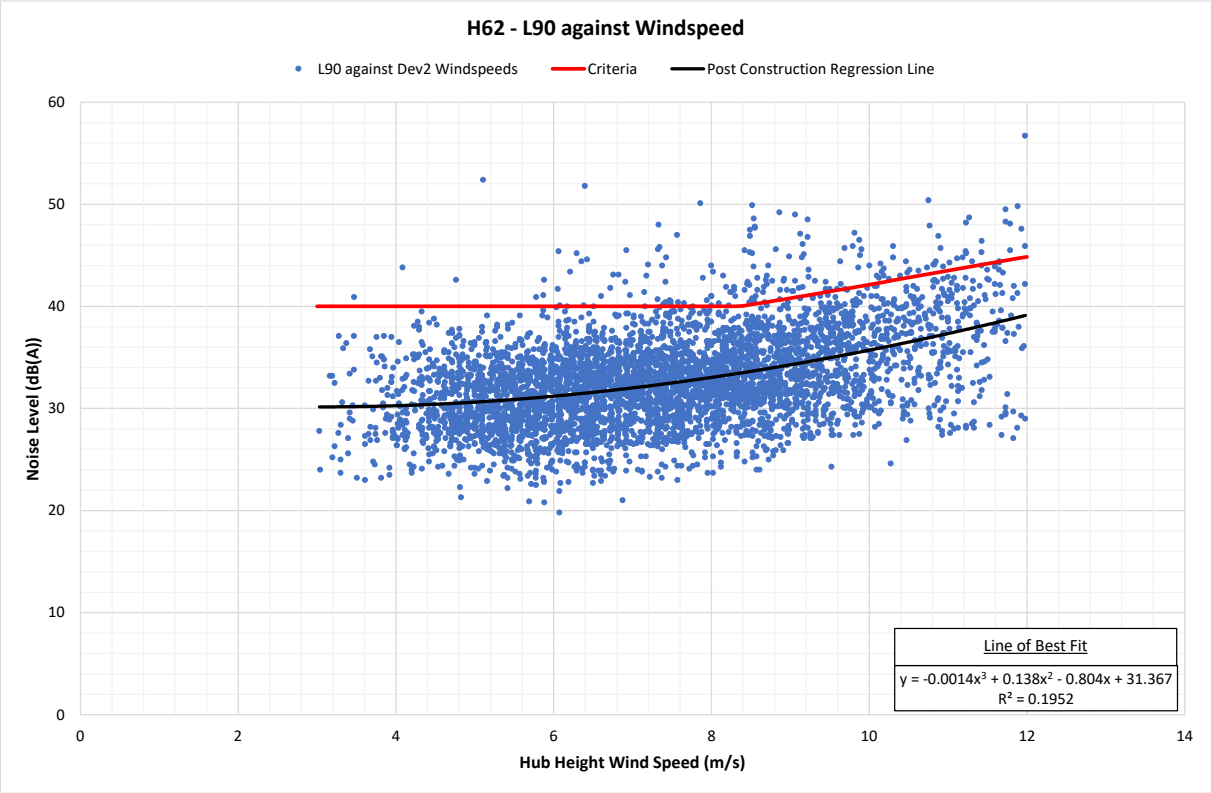


Figure 10: H62 - Filtered L90 Noise Level Correlations to Development Mast 2 Windspeeds

4.3 Special Audible Characteristics

4.3.1 Tonality Adjustments

There were eighteen instances when tonality was identified in the nearfield measurements, ranging between 76.2 Hz and 158.2 Hz, at windspeeds between 3 m/s to 5 m/s and 9 m/s to 11 m/s.

In accordance with the NCTP, a tonality assessment in accordance with the simplified method described by Annex D of ISO 1996-2:2007 is therefore required at residential logging locations for these wind speeds and frequencies of tone. It is noted that as a cautious approach, the tonal range was extended to the one-third octave bands with centre frequencies between 63 Hz and 200 Hz. The following summarises the assessment in accordance with the NCTP:

- For every 10-minute period, the equivalent sound pressure level in each unweighted one third octave band was compared against the equivalent sound pressure levels in the neighbouring one third octave bands.
- Where the sound pressure level exceeded the average level of adjacent bands by more than the values in Table 11 below, a potential tone was identified.

Table 11: Tonal Level Difference

One Third Octave Band	Level Difference
25-125 Hz	15 dB
160-400 Hz	8 dB
500-4000 Hz	5 dB

- For each of these potential tones, the collected data was reviewed to determine if the tone was associated with the Wind Farm.

There were eight instances where the 10-minute samples exhibited tonality within the one-third octave bands between 63 Hz and 200 Hz. These are shown in Table 12.

Table 12: Tones at Residences

Location	Tones detected
H18	0
H46	4
H51	3
H62	1

The collected data identified that in all cases, the tonality was attributed to sources other than the Wind Farm. These other sources were mostly local sources in the vicinity of the noise loggers, such as machinery, animals or human activity. Based on the assessment, no adjustments have been applied to the noise levels for tonality at the residences.

4.3.2 Modulation Adjustments

As noted in the nearfield measurement section of this report (Section 3.1.4), no excessive amplitude modulation was identified within the near field and therefore the NCTP does not require further assessment at residential logging locations. No adjustments are therefore made for the character of amplitude modulation.

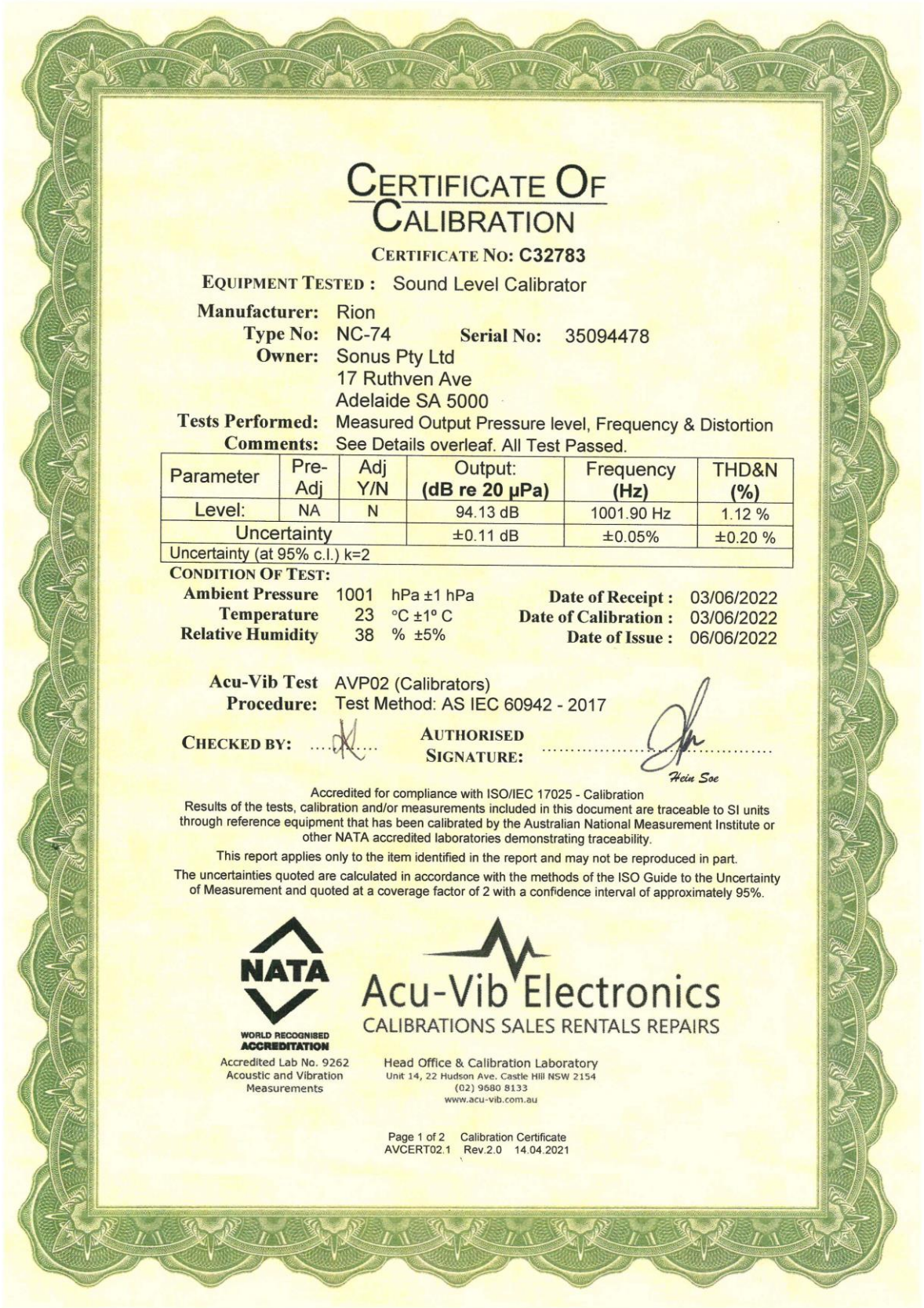
5 CONCLUSION

The second round of post-construction noise compliance testing has been conducted for the Dundonnell Wind Farm in accordance with the NCTP.

The testing included noise measurements at four residential logging locations in the vicinity of the Wind Farm, intermediate locations between these locations and the Wind Farm and in the nearfield of example turbines. The results of these measurements have been used to confirm that the noise from operation of the Wind Farm is less than the established noise criteria at all surrounding dwellings and that no penalties are warranted for the special audible characteristics of tonality or amplitude modulation.

The Project therefore complies with the noise performance requirements as set out in Condition 11 of the Planning Permit.

APPENDIX A: CALIBRATION CERTIFICATES



CERTIFICATE OF CALIBRATION

CERTIFICATE NO: C32783

EQUIPMENT TESTED : Sound Level Calibrator

Manufacturer: Rion
Type No: NC-74 **Serial No:** 35094478
Owner: Sonus Pty Ltd
17 Ruthven Ave
Adelaide SA 5000
Tests Performed: Measured Output Pressure level, Frequency & Distortion
Comments: See Details overleaf. All Test Passed.

Parameter	Pre-Adj	Adj Y/N	Output: (dB re 20 µPa)	Frequency (Hz)	THD&N (%)
Level:	NA	N	94.13 dB	1001.90 Hz	1.12 %
Uncertainty			±0.11 dB	±0.05%	±0.20 %
Uncertainty (at 95% c.l.) k=2					

CONDITION OF TEST:
Ambient Pressure 1001 hPa ±1 hPa
Temperature 23 °C ±1° C
Relative Humidity 38 % ±5%

Date of Receipt : 03/06/2022
Date of Calibration : 03/06/2022
Date of Issue : 06/06/2022

Acu-Vib Test Procedure: AVP02 (Calibrators)
Test Method: AS IEC 60942 - 2017

CHECKED BY: .....

AUTHORISED SIGNATURE: .....
Hein Soe

Accredited for compliance with ISO/IEC 17025 - Calibration
Results of the tests, calibration and/or measurements included in this document are traceable to SI units through reference equipment that has been calibrated by the Australian National Measurement Institute or other NATA accredited laboratories demonstrating traceability.

This report applies only to the item identified in the report and may not be reproduced in part.

The uncertainties quoted are calculated in accordance with the methods of the ISO Guide to the Uncertainty of Measurement and quoted at a coverage factor of 2 with a confidence interval of approximately 95%.

NATA
WORLD RECOGNISED ACCREDITATION
Accredited Lab No. 9262
Acoustic and Vibration Measurements

Acu-Vib Electronics
CALIBRATIONS SALES RENTALS REPAIRS

Head Office & Calibration Laboratory
Unit 14, 22 Hudson Ave. Castle Hill NSW 2154
(02) 9680 8133
www.acu-vib.com.au

Page 1 of 2 Calibration Certificate
AVCERT02.1 Rev.2.0 14.04.2021

CERTIFICATE OF CALIBRATION

CERTIFICATE NO: C33764

EQUIPMENT TESTED : Sound Level Calibrator

Manufacturer: Rion
Type No: NC-75 **Serial No:** 34913547
Owner: Sonus Pty Ltd
17 Ruthven Ave
Adelaide SA 5000
Tests Performed: Measured Output Pressure level, Frequency & Distortion
Comments: See Details overleaf. All Test Passed.

Parameter	Pre-Adj	Adj Y/N	Output: (dB re 20 µPa)	Frequency (Hz)	THD&N (%)
Level:	NA	N	94.01 dB	1000.00 Hz	1.26 %
Uncertainty			±0.11 dB	±0.05%	±0.20 %
Uncertainty (at 95% c.l.) k=2					

CONDITION OF TEST:

Ambient Pressure	991	hPa ±1 hPa	**Date of Receipt :**	15/09/2022
Temperature	23	°C ±1° C	**Date of Calibration :**	16/09/2022
Relative Humidity	48	% ±5%	**Date of Issue :**	16/09/2022

Acu-Vib Test Procedure: AVP02 (Calibrators)
Test Method: AS IEC 60942 - 2017

CHECKED BY: ..... **AUTHORISED SIGNATURE:** .....
Hein Soe

Accredited for compliance with ISO/IEC 17025 - Calibration
Results of the tests, calibration and/or measurements included in this document are traceable to SI units through reference equipment that has been calibrated by the Australian National Measurement Institute or other NATA accredited laboratories demonstrating traceability.

This report applies only to the item identified in the report and may not be reproduced in part.

The uncertainties quoted are calculated in accordance with the methods of the ISO Guide to the Uncertainty of Measurement and quoted at a coverage factor of 2 with a confidence interval of approximately 95%.

NATA
WORLD RECOGNISED ACCREDITATION
Accredited Lab No. 9262
Acoustic and Vibration Measurements

Acu-Vib Electronics
CALIBRATIONS SALES RENTALS REPAIRS

Head Office & Calibration Laboratory
Unit 14, 22 Hudson Ave. Castle Hill NSW 2154
(02) 9680 8133
www.acu-vib.com.au

RION CO., LTD.

3-20-41 Higashimotomachi Kokubunji Tokyo 185-8533
Phone:042(359)7888, Facsimile:042(359)7442

Certificate of Calibration

Name : **Sound Level Meter, Class 1**

Model : **NL-52** **S/No.** : **00710394**

Date of Calibration : **August, 20, 2021**

We hereby certify that the above product was tested and calibrated according to the prescribed Rion procedures, and that it fulfills specification requirements.
The measuring equipment and reference devices used for testing and calibrating this unit are managed under the Rion traceability system and are traceable according to official Japanese standards and official standards of countries belonging to the International Committee of Weights and Measures.

RION CO., LTD.

K. Ikeda

Manager, Quality Control Department

CERTIFICATE OF CALIBRATION

CERTIFICATE NO: SLM35180

EQUIPMENT TESTED: Sound Level Meter

Manufacturer:	Rion		
Type No:	NL-52	**Serial No:**	00320646
Mic. Type:	UC-59	**Serial No:**	03400
Pre-Amp. Type:	NH-25	**Serial No:**	10659

Owner: Sonus Pty Ltd
17 Ruthven Ave
Adelaide SA 5000

Tests Performed: IEC 61672-3:2013

Comments: All Tests passed for Class 1. (See overleaf for details)

CONDITIONS OF TEST:

Ambient Pressure	1004	hPa ±1 hPa	**Date of Receipt :**	14/02/2023
Temperature	22	°C ±1° C	**Date of Calibration :**	20/02/2023
Relative Humidity	46	% ±5%	**Date of Issue :**	20/02/2023

Acu-Vib Test Procedure: AVP10 (SLM) based on IEC 61672-3.

CHECKED BY: ..... **AUTHORISED SIGNATURE:** .....

Jack Kiely

Accredited for compliance with ISO/IEC 17025 - Calibration
Results of the tests, calibration and/or measurements included in this document are traceable to SI units through reference equipment that has been calibrated by the Australian National Measurement Institute or other NATA accredited laboratories demonstrating traceability.

This report applies only to the item identified in the report and may not be reproduced in part.

The uncertainties quoted are calculated in accordance with the methods of the ISO Guide to the Uncertainty of Measurement and quoted at a coverage factor of 2 with a confidence interval of approximately 95%.

NATA
WORLD RECOGNISED ACCREDITATION
Accredited Lab No. 9262
Acoustic and Vibration Measurements

Acu-Vib Electronics
CALIBRATIONS SALES RENTALS REPAIRS

Head Office & Calibration Laboratory
Unit 14, 22 Hudson Ave. Castle Hill NSW 2154
(02) 9680 8133
www.acu-vib.com.au

3-20-41 Higashimotomachi Kokubunji Tokyo 185-8533
Phone:042(359)7888, Facsimile:042(359)7442

Certificate of Calibration

Name : **Sound Level Meter, Class 1**

Model : **NL-52** **S/No.** : **00710427**

Date of Calibration : **September, 01, 2021**

We hereby certify that the above product was tested and calibrated according to the prescribed Rion procedures, and that it fulfills specification requirements.
The measuring equipment and reference devices used for testing and calibrating this unit are managed under the Rion traceability system and are traceable according to official Japanese standards and official standards of countries belonging to the International Committee of Weights and Measures.

RION CO., LTD.

K. Ikeda

Manager, Quality Control Department

RION CO., LTD.

3-20-41 Higashimotomachi Kokubunji Tokyo 185-8533
Phone:042(359)7888, Facsimile:042(359)7442

Certificate of Calibration

Name : **Sound Level Meter, Class 1**

Model : **NL-52** **S/No.** : **00710426**

Date of Calibration : **September, 01, 2021**

We hereby certify that the above product was tested and calibrated according to the prescribed Rion procedures, and that it fulfills specification requirements.
The measuring equipment and reference devices used for testing and calibrating this unit are managed under the Rion traceability system and are traceable according to official Japanese standards and official standards of countries belonging to the International Committee of Weights and Measures.

RION CO., LTD.

K. Ikeda

Manager, Quality Control Department

CERTIFICATE OF CALIBRATION

CERTIFICATE NO: SLM30672

EQUIPMENT TESTED: Sound Level Meter

Manufacturer:	Rion		
Type No:	NL-21	**Serial No:**	01298931
Mic. Type:	UC-52	**Serial No:**	127250
Pre-Amp. Type:	NH-21	**Serial No:**	31526

Owner: Sonus Pty Ltd
17 Ruthven Ave
Adelaide SA 5000

Tests Performed: IEC 61672-3:2013

Comments: All Tests passed for Class 2. (See overleaf for details)

CONDITIONS OF TEST:

Ambient Pressure	1002	hPa ±1 hPa	**Date of Receipt :**	23/09/2021
Temperature	24	°C ±1° C	**Date of Calibration :**	23/09/2021
Relative Humidity	39	% ±5%	**Date of Issue :**	23/09/2021

Acu-Vib Test Procedure: AVP10 (SLM) based on IEC 61672-3.

CHECKED BY: ..... **AUTHORISED SIGNATURE:** .....

Jack Kiett

Accredited for compliance with ISO/IEC 17025 - Calibration
Results of the tests, calibration and/or measurements included in this document are traceable to SI units through reference equipment that has been calibrated by the Australian National Measurement Institute or other NATA accredited laboratories demonstrating traceability.

This report applies only to the item identified in the report and may not be reproduced in part.

The uncertainties quoted are calculated in accordance with the methods of the ISO Guide to the Uncertainty of Measurement and quoted at a coverage factor of 2 with a confidence interval of approximately 95%.

NATA
WORLD RECOGNISED ACCREDITATION
Accredited Lab No. 9262
Acoustic and Vibration Measurements

Acu-Vib Electronics
CALIBRATIONS SALES RENTALS REPAIRS

Head Office & Calibration Laboratory
Unit 14, 22 Hudson Ave. Castle Hill NSW 2154
(02) 9680 8133
www.acu-vib.com.au

Page 1 of 2 Calibration Certificate
AVCERT10.11 Rev.2.0 14/04/2021

CERTIFICATE OF CALIBRATION

CERTIFICATE NO: SLM 29997

EQUIPMENT TESTED: Sound Level Meter

Manufacturer:	Rion		
Type No:	NL-21	**Serial No:**	01298933
Mic. Type:	UC-52	**Serial No:**	127252
Pre-Amp. Type:	NH-21	**Serial No:**	31528

Owner: Sonus Pty Ltd
17 Ruthven Ave
Adelaide SA 5000

Tests Performed: IEC 61672-3:2013

Comments: All Tests passed for Class 2. (See overleaf for details)

CONDITIONS OF TEST:

Ambient Pressure	1006	hPa ±1 hPa	**Date of Receipt :**	07/07/2021
Temperature	25	°C ±1° C	**Date of Calibration :**	08/07/2021
Relative Humidity	36	% ±5%	**Date of Issue :**	08/07/2021

Acu-Vib Test Procedure: AVP10 (SLM) based on IEC 61672-3

CHECKED BY: ..... **AUTHORISED SIGNATURE:** .....

Hein Soe

Accredited for compliance with ISO/IEC 17025 - Calibration
Results of the tests, calibration and/or measurements included in this document are traceable to SI units through reference equipment that has been calibrated by the Australian National Measurement Institute or other NATA accredited laboratories demonstrating traceability.

This report applies only to the item identified in the report and may not be reproduced in part.

The uncertainties quoted are calculated in accordance with the methods of the ISO Guide to the Uncertainty of Measurement and quoted at a coverage factor of 2 with a confidence interval of approximately 95%.

NATA
WORLD RECOGNISED ACCREDITATION
Accredited Lab No. 9262
Acoustic and Vibration Measurements

Acu-Vib Electronics
CALIBRATIONS SALES RENTALS REPAIRS

Head Office & Calibration Laboratory
Unit 14, 22 Hudson Ave. Castle Hill NSW 2154
(02) 9680 8133
www.acu-vib.com.au

Page 1 of 2 Calibration Certificate
AVCERT10.3 Rev.2.0 14/04/2021

CERTIFICATE OF CALIBRATION

CERTIFICATE NO: SLM32822

EQUIPMENT TESTED: Sound Level Meter

Manufacturer:	Rion		
Type No:	NL-21	**Serial No:**	00198361
Mic. Type:	UC-52	**Serial No:**	123586
Pre-Amp. Type:	NH-21	**Serial No:**	33540

Owner: Sonus Pty Ltd
17 Ruthven Ave
Adelaide SA 5000

Tests Performed: IEC 61672-3:2013

Comments: All Tests passed for Class 2. (See overleaf for details)

CONDITIONS OF TEST:

Ambient Pressure	996	hPa ±1 hPa	**Date of Receipt :**	06/06/2022
Temperature	23	°C ±1° C	**Date of Calibration :**	08/06/2022
Relative Humidity	36	% ±5%	**Date of Issue :**	08/06/2022

Acu-Vib Test Procedure: AVP10 (SLM) based on IEC 61672-3.

CHECKED BY: ...RRB... **AUTHORISED SIGNATURE:** .....

Hein Soe

Accredited for compliance with ISO/IEC 17025 - Calibration
Results of the tests, calibration and/or measurements included in this document are traceable to SI units through reference equipment that has been calibrated by the Australian National Measurement Institute or other NATA accredited laboratories demonstrating traceability.

This report applies only to the item identified in the report and may not be reproduced in part.

The uncertainties quoted are calculated in accordance with the methods of the ISO Guide to the Uncertainty of Measurement and quoted at a coverage factor of 2 with a confidence interval of approximately 95%.

NATA
WORLD RECOGNISED ACCREDITATION
Accredited Lab No. 9262
Acoustic and Vibration Measurements

Acu-Vib Electronics
CALIBRATIONS SALES RENTALS REPAIRS

Head Office & Calibration Laboratory
Unit 14, 22 Hudson Ave. Castle Hill NSW 2154
(02) 9680 8133
www.acu-vib.com.au

Page 1 of 2 Calibration Certificate
AVCERT10.11 Rev.2.0 14/04/2021

RION CO., LTD.

3-20-41 Higashimotomachi Kokubunji Tokyo 185-8533
Phone:042(359)7888, Facsimile:042(359)7442

Certificate of Calibration

Name : **Sound Level Meter, Class 1**

Model : **NL-52** **S/No.** : **00710393**

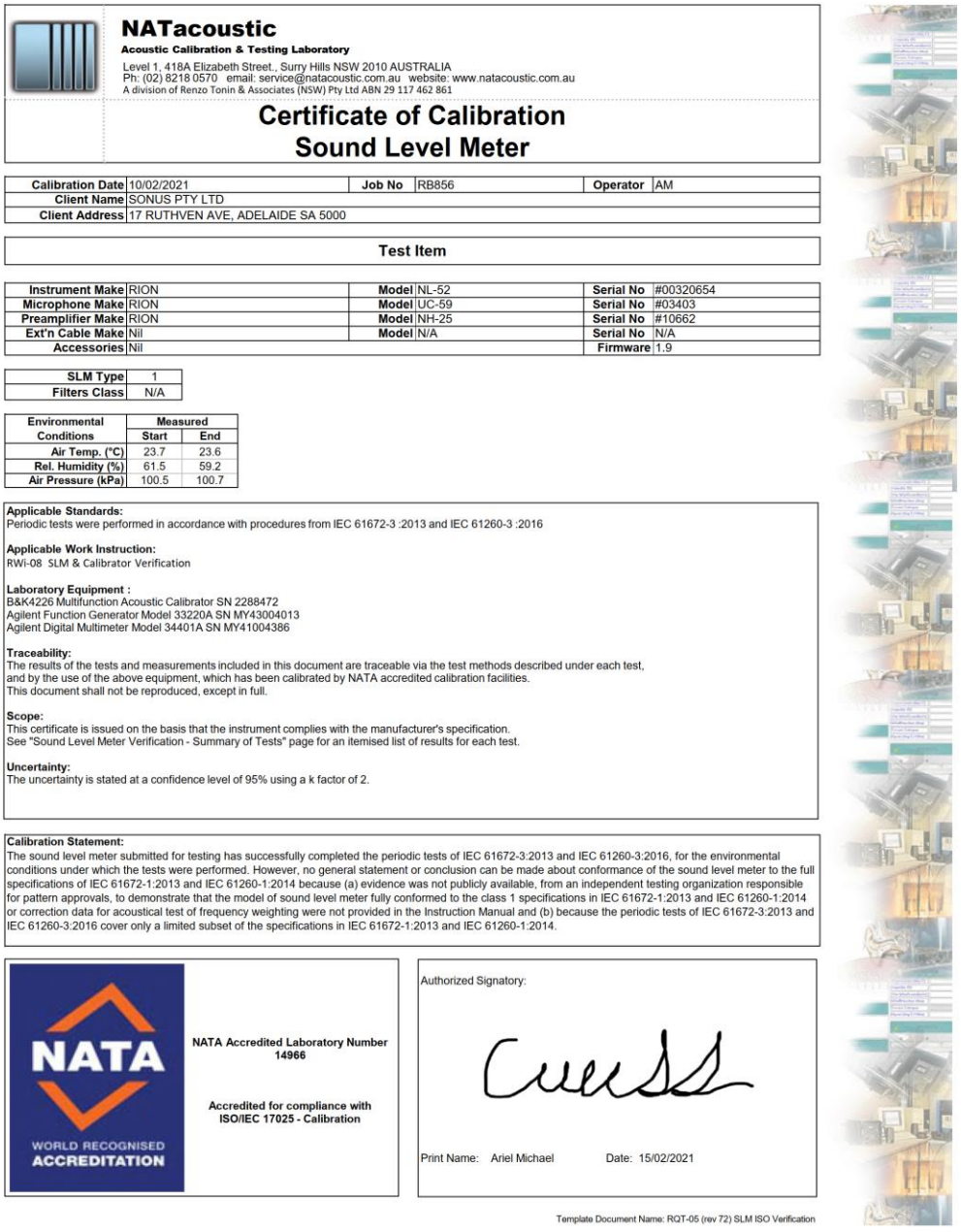
Date of Calibration : **August, 20, 2021**

We hereby certify that the above product was tested and calibrated according to the prescribed Rion procedures, and that it fulfills specification requirements.
The measuring equipment and reference devices used for testing and calibrating this unit are managed under the Rion traceability system and are traceable according to official Japanese standards and official standards of countries belonging to the International Committee of Weights and Measures.

RION CO., LTD.

K. Ikeda

Manager, Quality Control Department



NATacoustic
Acoustic Calibration & Testing Laboratory
Level 1, 418A Elizabeth Street., Surry Hills NSW 2010 AUSTRALIA
Ph: (02) 8218 0570 email: service@natacoustic.com.au website: www.natacoustic.com.au
A division of Renzo Tonin & Associates (NSW) Pty Ltd ABN 29 117 462 861

Certificate of Calibration
Sound Level Meter

Calibration Date	10/02/2021	**Job No**	RB856	**Operator**	AM
Client Name	SONUS PTY LTD				
Client Address	17 RUTHVEN AVE, ADELAIDE SA 5000				

Test Item

Instrument Make	RION	**Model**	NL-52	**Serial No**	#00320654
Microphone Make	RION	**Model**	UC-59	**Serial No**	#03403
Preamplifier Make	RION	**Model**	NH-25	**Serial No**	#10662
Ext'n Cable Make	Nil	**Model**	N/A	**Serial No**	N/A
Accessories	Nil			**Firmware**	1.9

SLM Type	1
Filters Class	N/A

Environmental Conditions	**Measured**	
	Start	**End**
Air Temp. (°C)	23.7	23.6
Rel. Humidity (%)	61.5	59.2
Air Pressure (kPa)	100.5	100.7

Applicable Standards:
Periodic tests were performed in accordance with procedures from IEC 61672-3 :2013 and IEC 61260-3 :2016

Applicable Work Instruction:
RWI-08 SLM & Calibrator Verification

Laboratory Equipment :
B&K4226 Multifunction Acoustic Calibrator SN 2288472
Agilent Function Generator Model 33220A SN MY43004013
Agilent Digital Multimeter Model 34401A SN MY41004386

Traceability:
The results of the tests and measurements included in this document are traceable via the test methods described under each test, and by the use of the above equipment, which has been calibrated by NATA accredited calibration facilities.
This document shall not be reproduced, except in full.

Scope:
This certificate is issued on the basis that the instrument complies with the manufacturer's specification.
See "Sound Level Meter Verification - Summary of Tests" page for an itemised list of results for each test.

Uncertainty:
The uncertainty is stated at a confidence level of 95% using a k factor of 2.

Calibration Statement:
The sound level meter submitted for testing has successfully completed the periodic tests of IEC 61672-3:2013 and IEC 61260-3:2016, for the environmental conditions under which the tests were performed. However, no general statement or conclusion can be made about conformance of the sound level meter to the full specifications of IEC 61672-1:2013 and IEC 61260-1:2014 because (a) evidence was not publicly available, from an independent testing organization responsible for pattern approvals, to demonstrate that the model of sound level meter fully conformed to the class 1 specifications in IEC 61672-1:2013 and IEC 61260-1:2014 or correction data for acoustical test of frequency weighting were not provided in the Instruction Manual and (b) because the periodic tests of IEC 61672-3:2013 and IEC 61260-3:2016 cover only a limited subset of the specifications in IEC 61672-1:2013 and IEC 61260-1:2014.

NATA
WORLD RECOGNISED ACCREDITATION

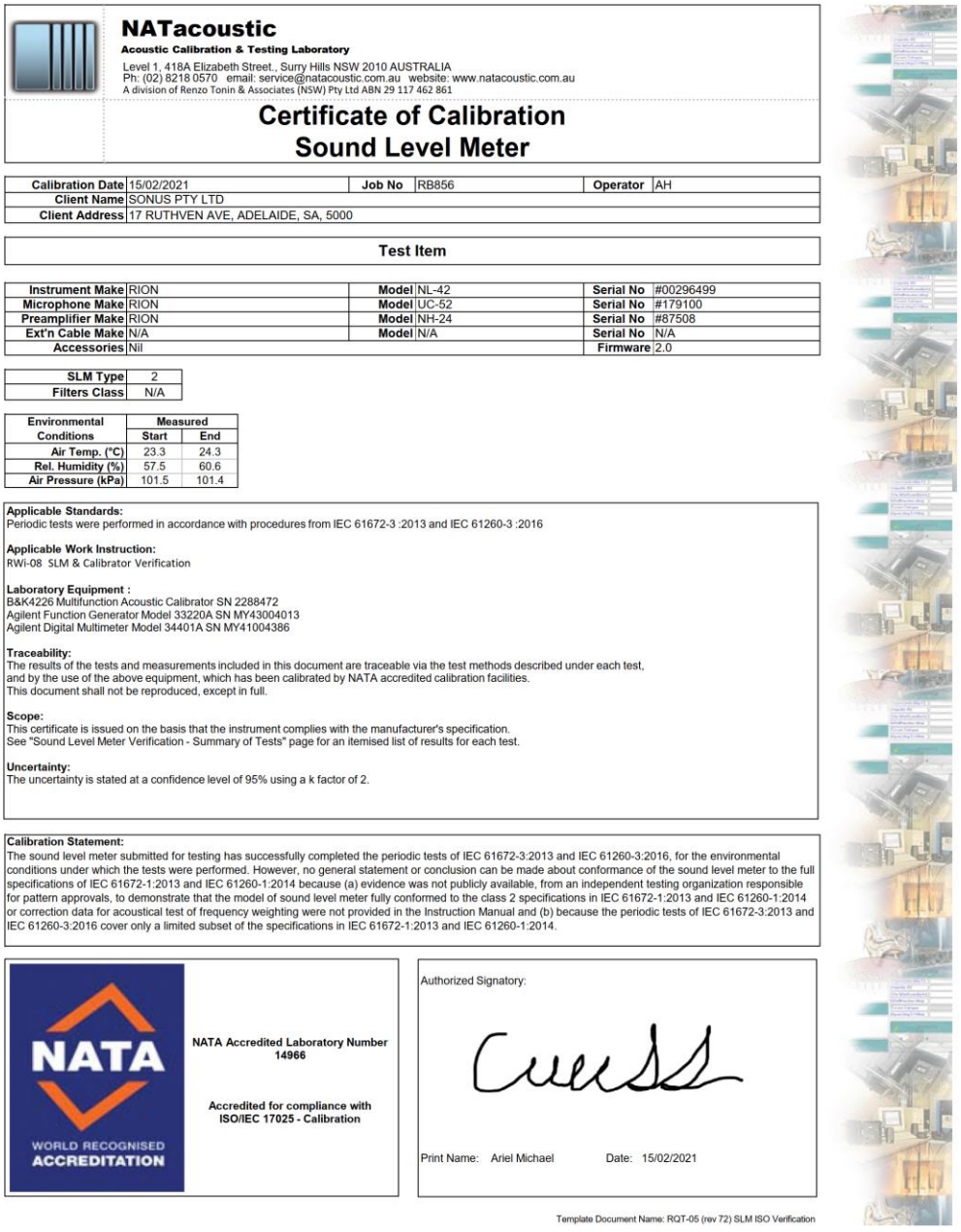
NATA Accredited Laboratory Number 14966

Accredited for compliance with ISO/IEC 17025 - Calibration

Authorized Signatory:

Print Name: Ariel Michael Date: 15/02/2021

Template Document Name: RQT-05 (rev 72) SLM ISO Verification



NATacoustic
Acoustic Calibration & Testing Laboratory
Level 1, 418A Elizabeth Street., Surry Hills NSW 2010 AUSTRALIA
Ph: (02) 8218 0570 email: service@natacoustic.com.au website: www.natacoustic.com.au
A division of Renzo Tonin & Associates (NSW) Pty Ltd ABN 29 117 462 861

Certificate of Calibration
Sound Level Meter

Calibration Date	15/02/2021	**Job No**	RB856	**Operator**	AH
Client Name	SONUS PTY LTD				
Client Address	17 RUTHVEN AVE, ADELAIDE, SA, 5000				

Test Item

Instrument Make	RION	**Model**	NL-42	**Serial No**	#00296499
Microphone Make	RION	**Model**	UC-52	**Serial No**	#179100
Preamplifier Make	RION	**Model**	NH-24	**Serial No**	#87508
Ext'n Cable Make	N/A	**Model**	N/A	**Serial No**	N/A
Accessories	Nil			**Firmware**	2.0

SLM Type	2
Filters Class	N/A

Environmental Conditions	**Measured**	
	Start	**End**
Air Temp. (°C)	23.3	24.3
Rel. Humidity (%)	57.5	60.6
Air Pressure (kPa)	101.5	101.4

Applicable Standards:
Periodic tests were performed in accordance with procedures from IEC 61672-3 :2013 and IEC 61260-3 :2016

Applicable Work Instruction:
RWI-08 SLM & Calibrator Verification

Laboratory Equipment :
B&K4226 Multifunction Acoustic Calibrator SN 2288472
Agilent Function Generator Model 33220A SN MY43004013
Agilent Digital Multimeter Model 34401A SN MY41004386

Traceability:
The results of the tests and measurements included in this document are traceable via the test methods described under each test, and by the use of the above equipment, which has been calibrated by NATA accredited calibration facilities.
This document shall not be reproduced, except in full.

Scope:
This certificate is issued on the basis that the instrument complies with the manufacturer's specification.
See "Sound Level Meter Verification - Summary of Tests" page for an itemised list of results for each test.

Uncertainty:
The uncertainty is stated at a confidence level of 95% using a k factor of 2.

Calibration Statement:
The sound level meter submitted for testing has successfully completed the periodic tests of IEC 61672-3:2013 and IEC 61260-3:2016, for the environmental conditions under which the tests were performed. However, no general statement or conclusion can be made about conformance of the sound level meter to the full specifications of IEC 61672-1:2013 and IEC 61260-1:2014 because (a) evidence was not publicly available, from an independent testing organization responsible for pattern approvals, to demonstrate that the model of sound level meter fully conformed to the class 2 specifications in IEC 61672-1:2013 and IEC 61260-1:2014 or correction data for acoustical test of frequency weighting were not provided in the Instruction Manual and (b) because the periodic tests of IEC 61672-3:2013 and IEC 61260-3:2016 cover only a limited subset of the specifications in IEC 61672-1:2013 and IEC 61260-1:2014.

NATA
WORLD RECOGNISED ACCREDITATION

NATA Accredited Laboratory Number 14966

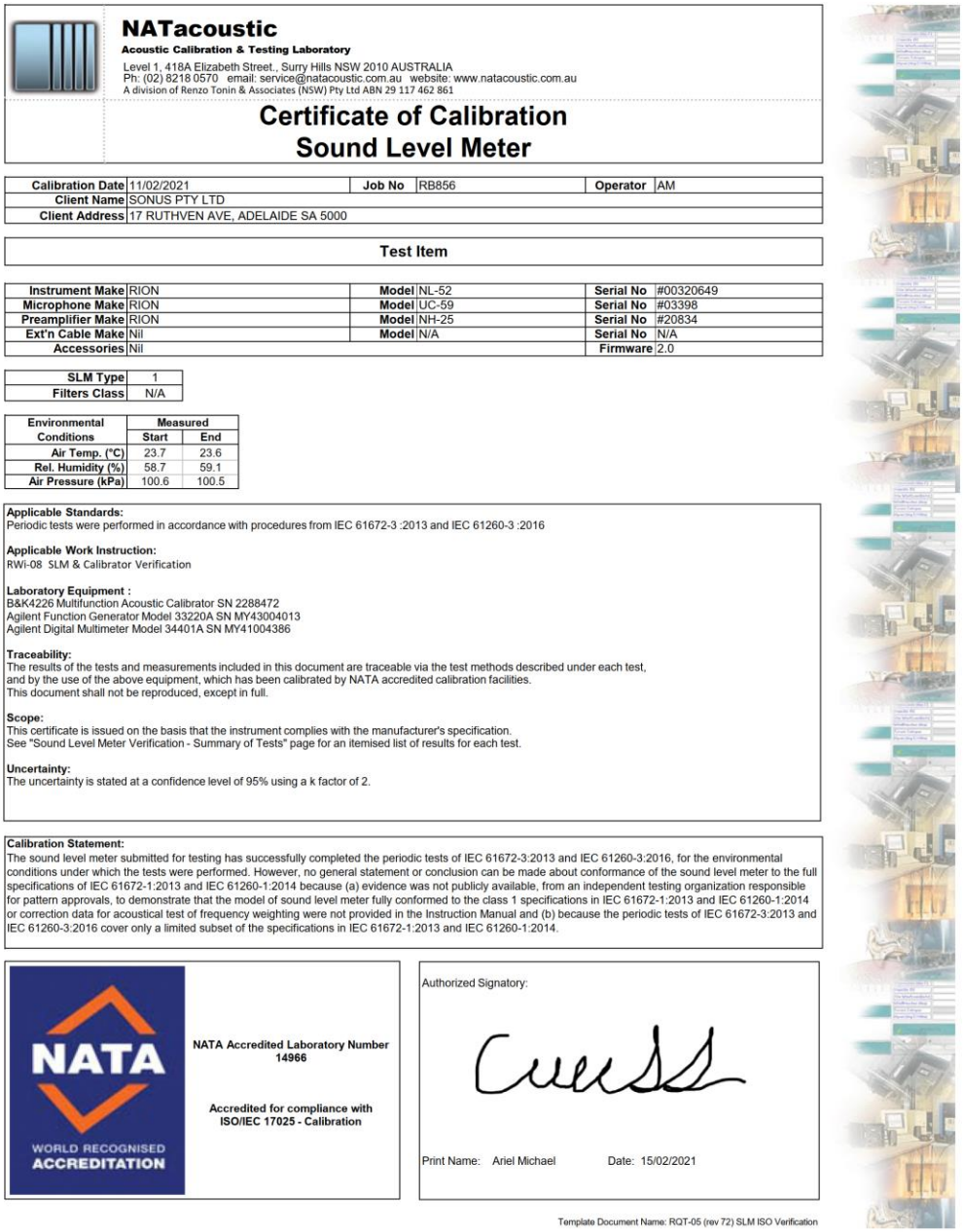
Accredited for compliance with ISO/IEC 17025 - Calibration

Authorized Signatory:

Print Name: Ariel Michael Date: 15/02/2021

Template Document Name: RQT-05 (rev 72) SLM ISO Verification

RB856F04 RION SLM MODEL NL-42 #00296499 (r1).xlsm 1 of 19 Certificate



NATacoustic
Acoustic Calibration & Testing Laboratory
Level 1, 418A Elizabeth Street., Surry Hills NSW 2010 AUSTRALIA
Ph: (02) 8218 0570 email: service@natacoustic.com.au website: www.natacoustic.com.au
A division of Renzo Tonin & Associates (NSW) Pty Ltd ABN 29 117 462 861

Certificate of Calibration
Sound Level Meter

Calibration Date	11/02/2021	**Job No**	RB856	**Operator**	AM
Client Name	SONUS PTY LTD				
Client Address	17 RUTHVEN AVE, ADELAIDE SA 5000				

Test Item

Instrument Make	RION	**Model**	NL-52	**Serial No**	#00320649
Microphone Make	RION	**Model**	UC-59	**Serial No**	#03398
Preamplifier Make	RION	**Model**	NH-25	**Serial No**	#20834
Ext'n Cable Make	Nil	**Model**	N/A	**Serial No**	N/A
Accessories	Nil			**Firmware**	2.0

SLM Type	1
Filters Class	N/A

Environmental Conditions	**Measured**	
	Start	**End**
Air Temp. (°C)	23.7	23.6
Rel. Humidity (%)	58.7	59.1
Air Pressure (kPa)	100.6	100.5

Applicable Standards:
Periodic tests were performed in accordance with procedures from IEC 61672-3 :2013 and IEC 61260-3 :2016

Applicable Work Instruction:
RWI-08 SLM & Calibrator Verification

Laboratory Equipment :
B&K4226 Multifunction Acoustic Calibrator SN 2288472
Agilent Function Generator Model 33220A SN MY43004013
Agilent Digital Multimeter Model 34401A SN MY41004386

Traceability:
The results of the tests and measurements included in this document are traceable via the test methods described under each test, and by the use of the above equipment, which has been calibrated by NATA accredited calibration facilities.
This document shall not be reproduced, except in full.

Scope:
This certificate is issued on the basis that the instrument complies with the manufacturer's specification.
See "Sound Level Meter Verification - Summary of Tests" page for an itemised list of results for each test.

Uncertainty:
The uncertainty is stated at a confidence level of 95% using a k factor of 2.

Calibration Statement:
The sound level meter submitted for testing has successfully completed the periodic tests of IEC 61672-3:2013 and IEC 61260-3:2016, for the environmental conditions under which the tests were performed. However, no general statement or conclusion can be made about conformance of the sound level meter to the full specifications of IEC 61672-1:2013 and IEC 61260-1:2014 because (a) evidence was not publicly available, from an independent testing organization responsible for pattern approvals, to demonstrate that the model of sound level meter fully conformed to the class 1 specifications in IEC 61672-1:2013 and IEC 61260-1:2014 or correction data for acoustical test of frequency weighting were not provided in the Instruction Manual and (b) because the periodic tests of IEC 61672-3:2013 and IEC 61260-3:2016 cover only a limited subset of the specifications in IEC 61672-1:2013 and IEC 61260-1:2014.

NATA
WORLD RECOGNISED ACCREDITATION

NATA Accredited Laboratory Number 14966

Accredited for compliance with ISO/IEC 17025 - Calibration

Authorized Signatory:

Print Name: Ariel Michael Date: 15/02/2021

Template Document Name: RQT-05 (rev 72) SLM ISO Verification

APPENDIX B: AMPLITUDE MODULATION GRAPHS

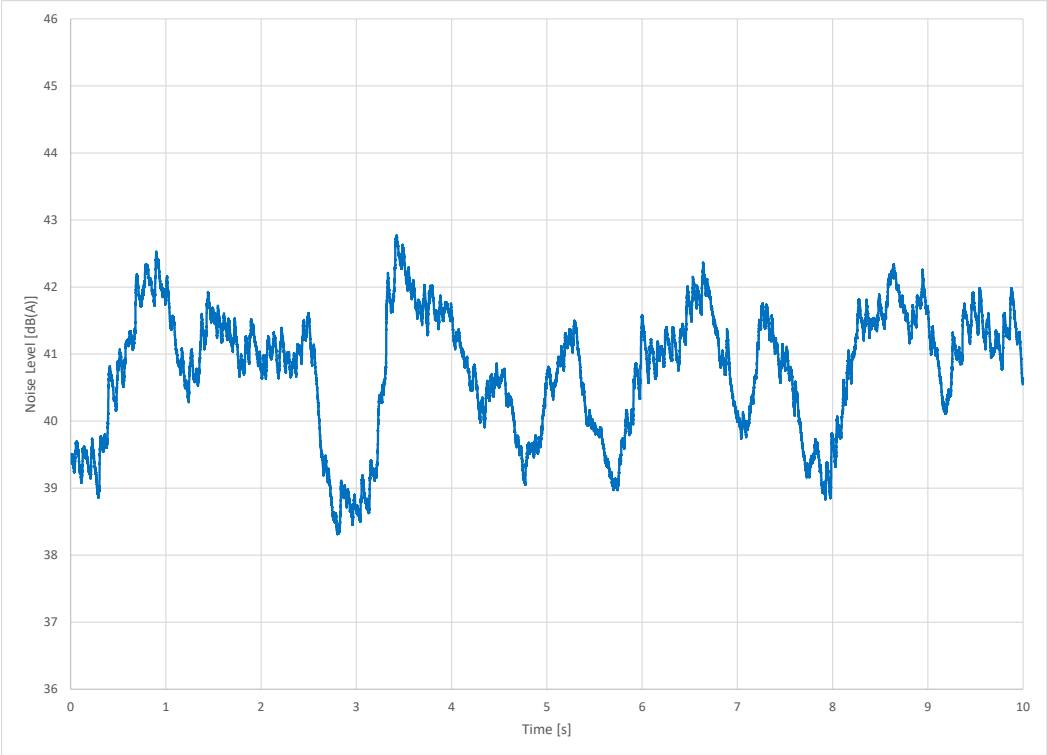


Figure 11: Amplitude Modulation - H09 - 3m/s

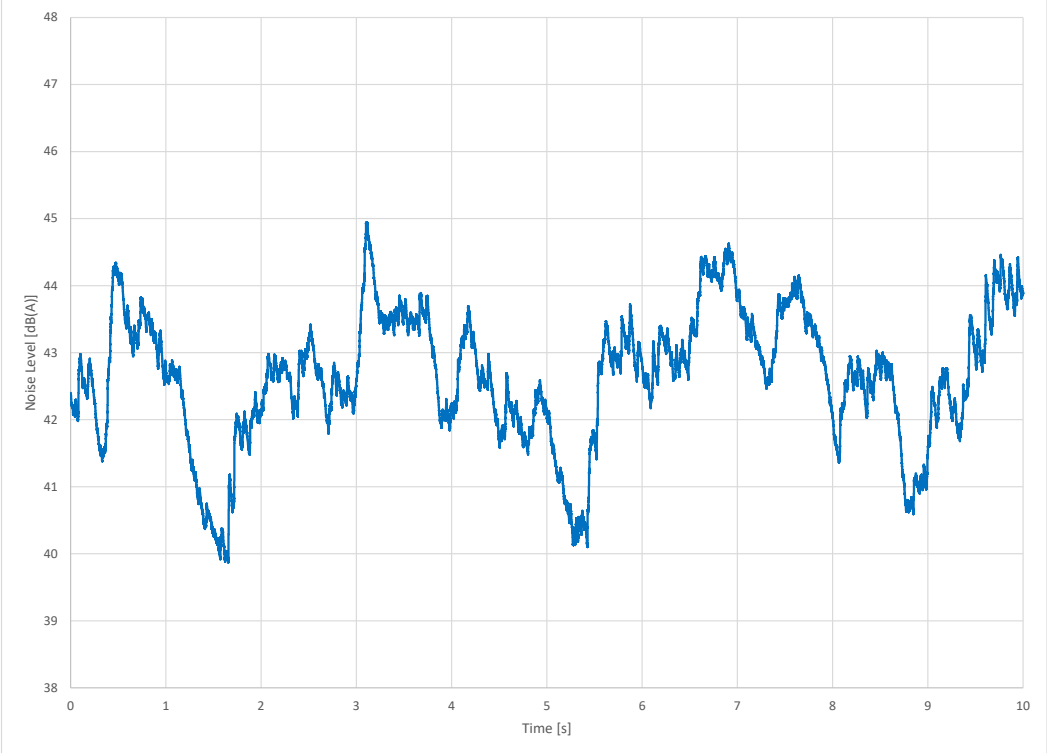


Figure 12: Amplitude Modulation - H09 - 4m/s

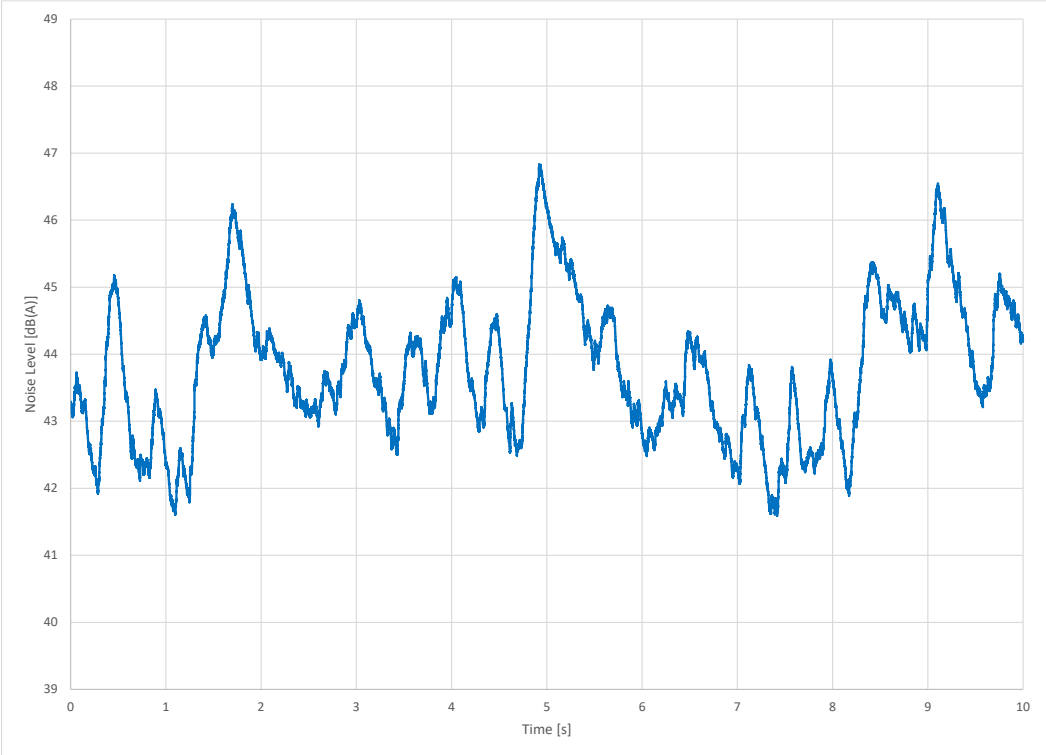


Figure 13: Amplitude Modulation - H09 - 5m/s

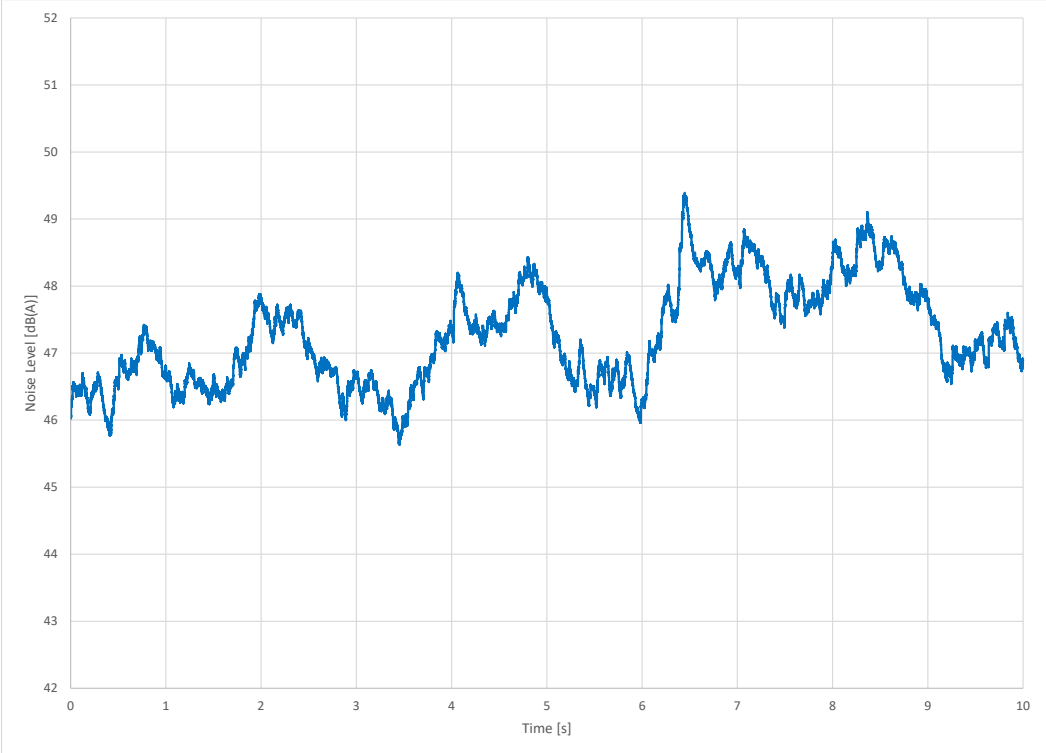


Figure 14: Amplitude Modulation - H09 - 6m/s

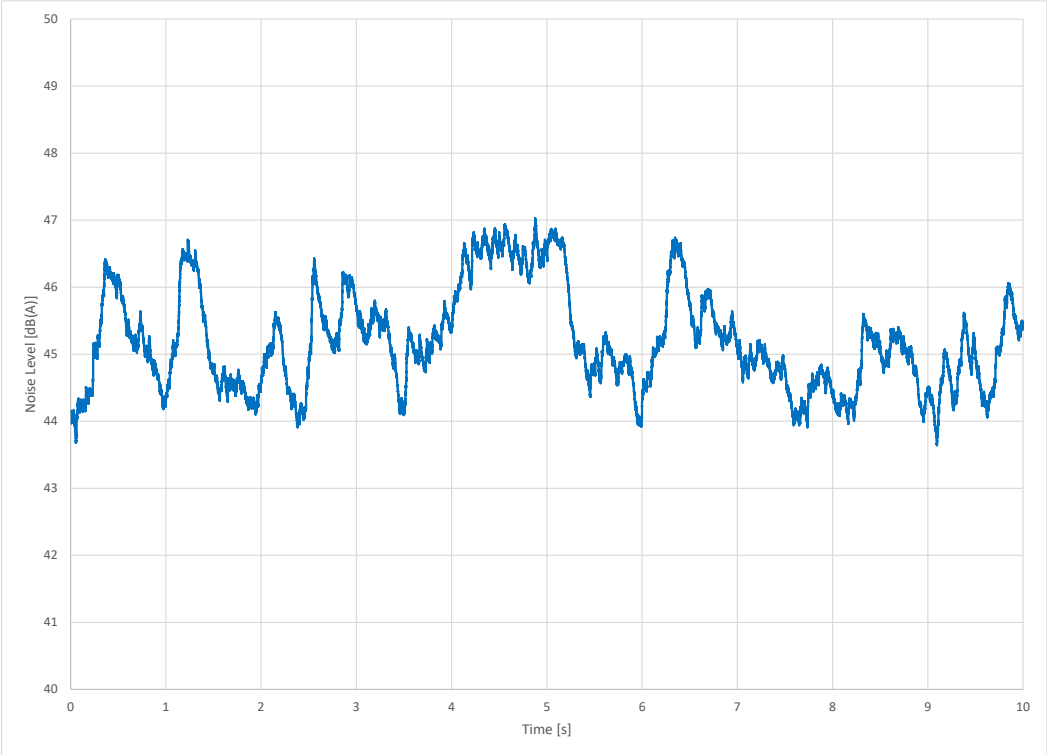


Figure 15: Amplitude Modulation - H09 - 7m/s

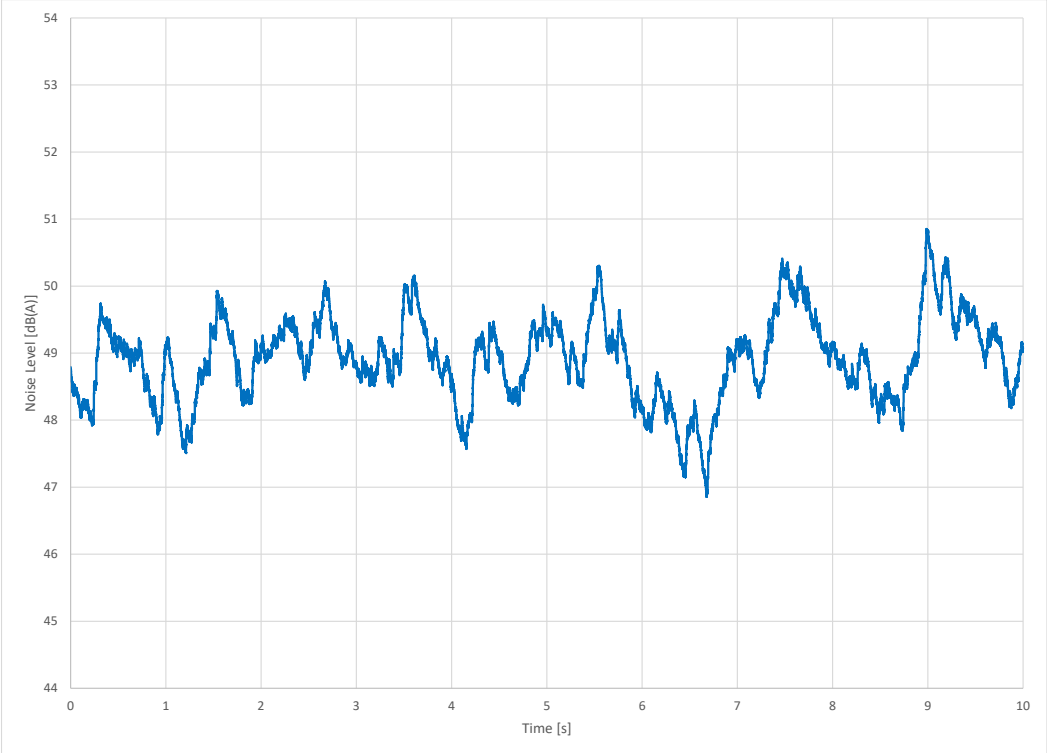


Figure 16: Amplitude Modulation - H09 - 8m/s

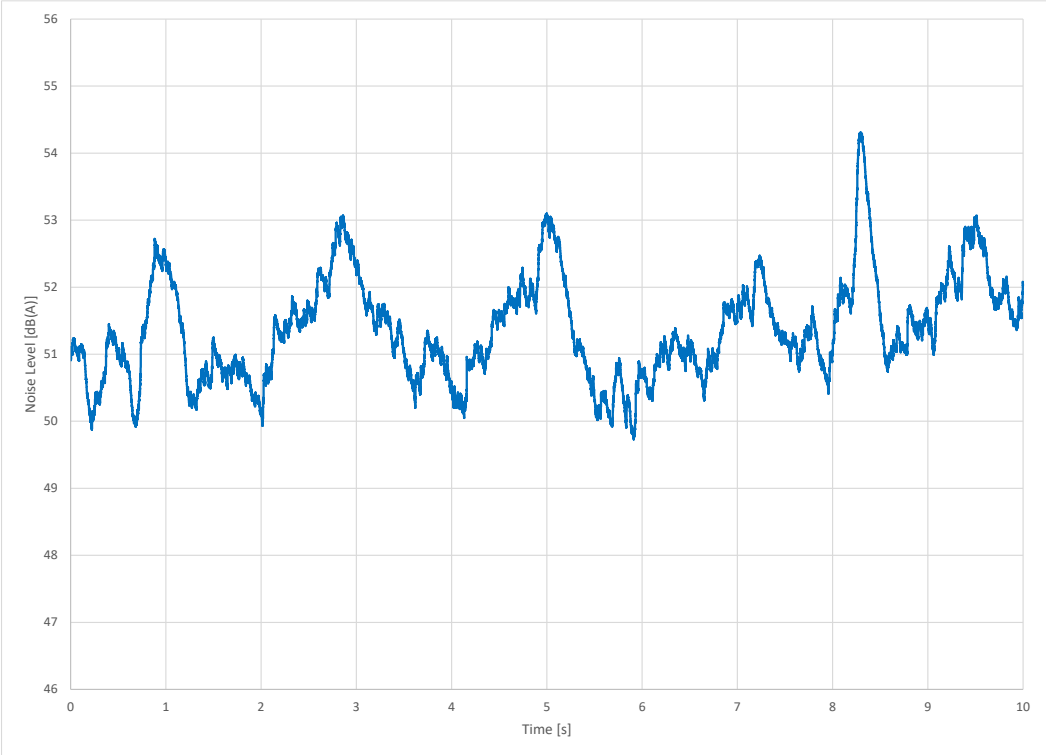


Figure 17: Amplitude Modulation - H09 - 9m/s

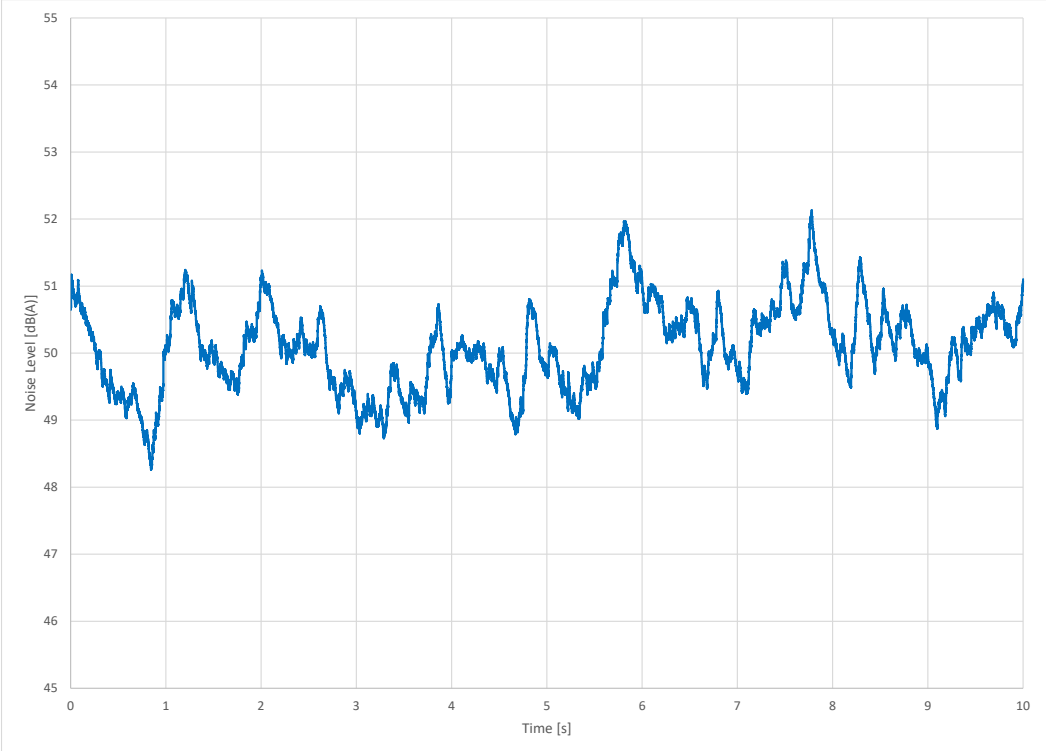


Figure 18: Amplitude Modulation - H09 - 10m/s

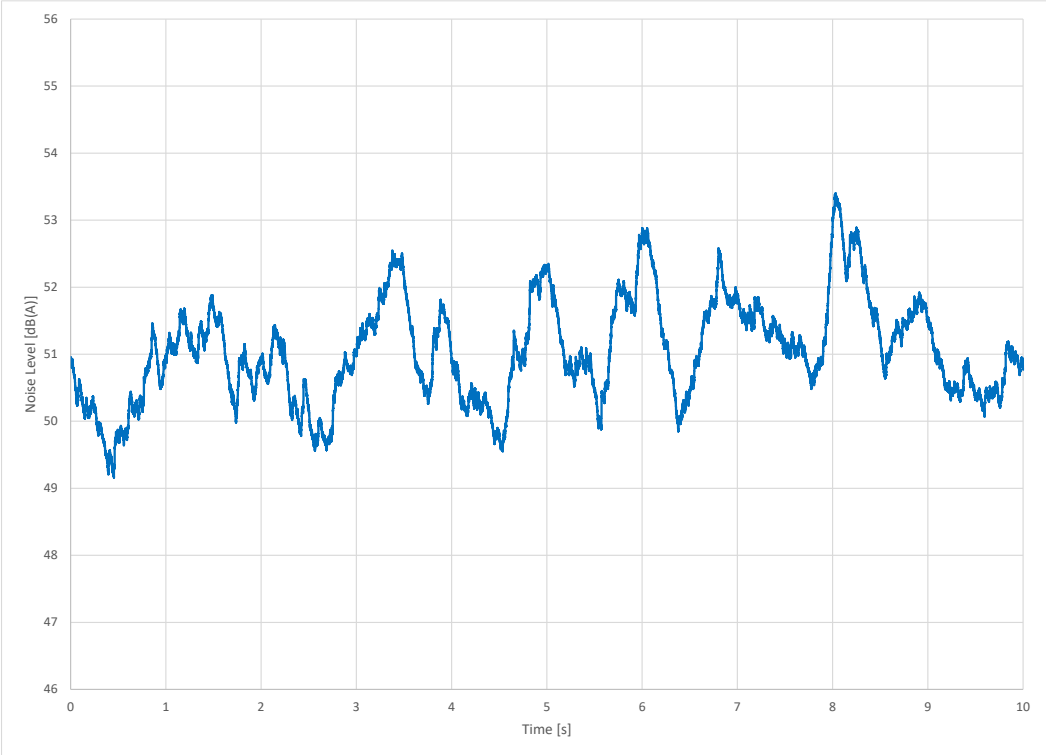


Figure 19: Amplitude Modulation - H09 - 11m/s

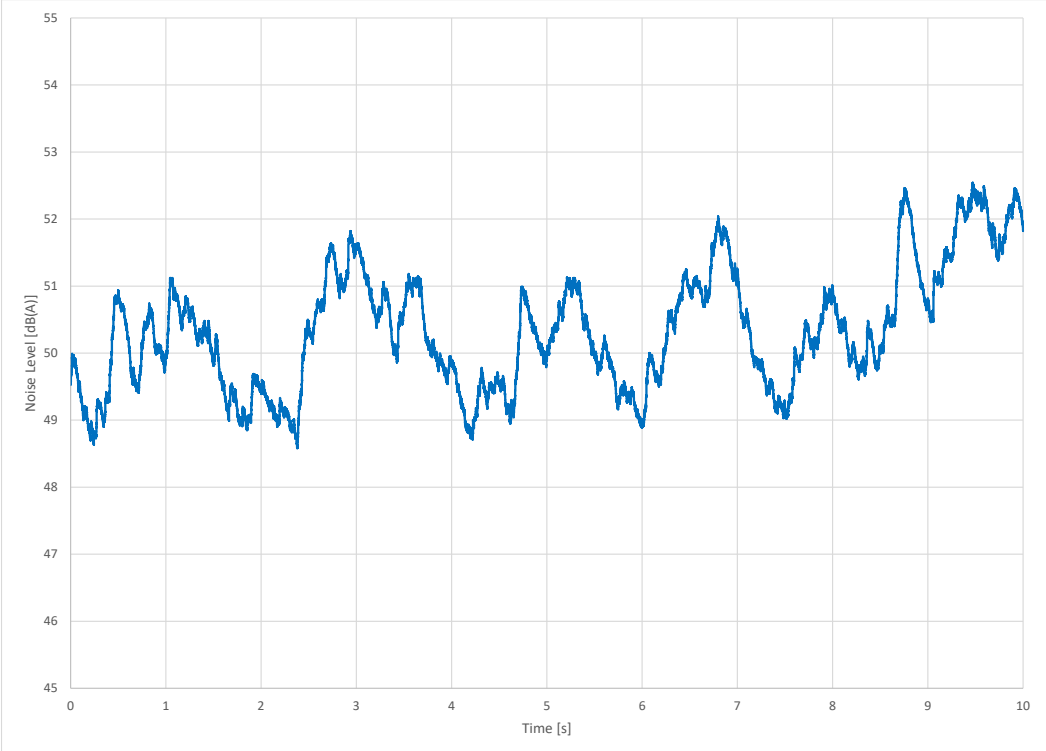


Figure 20: Amplitude Modulation - H09 - 12m/s

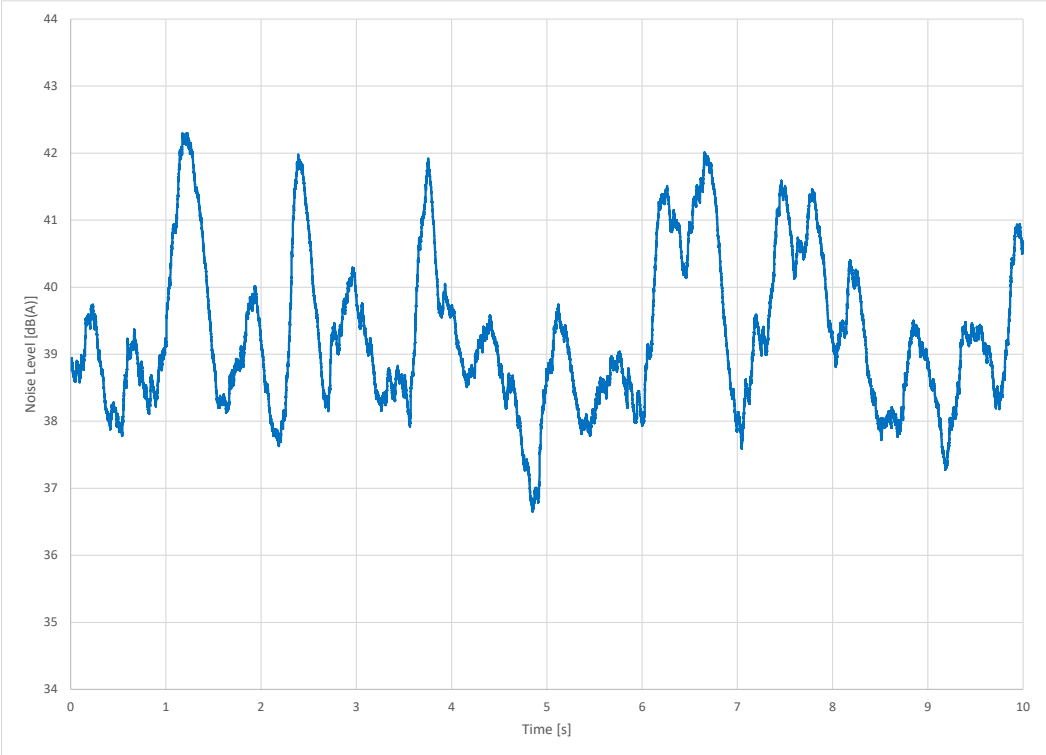


Figure 21: Amplitude Modulation - G06 - 4m/s

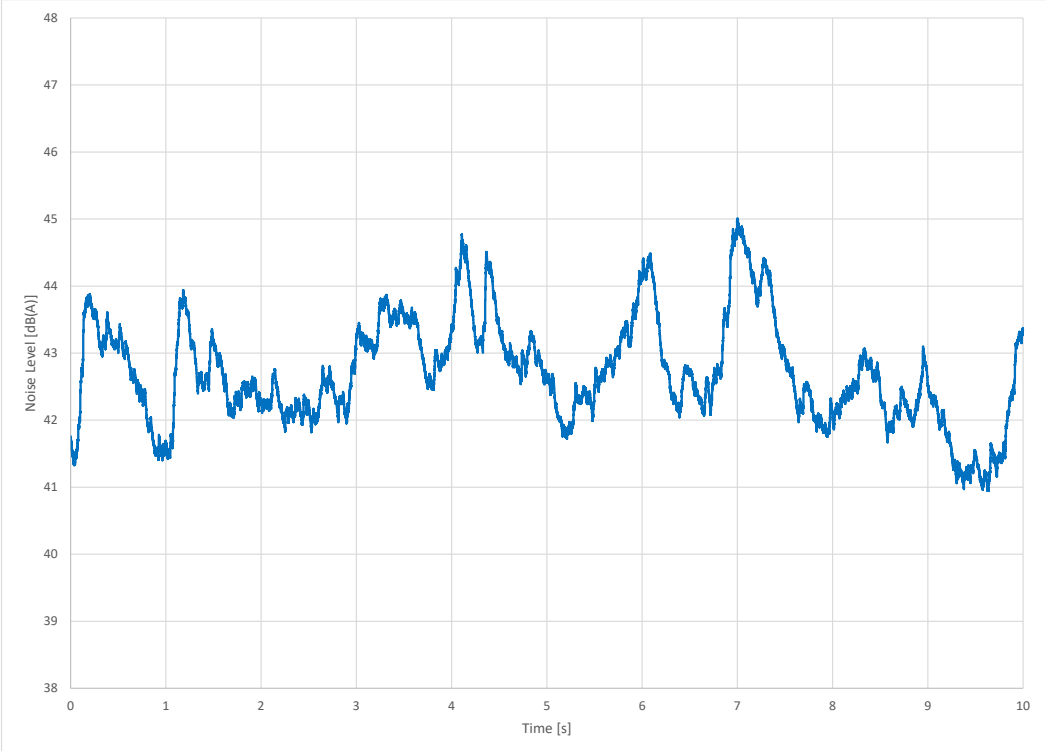


Figure 22: Amplitude Modulation - G06 - 5m/s

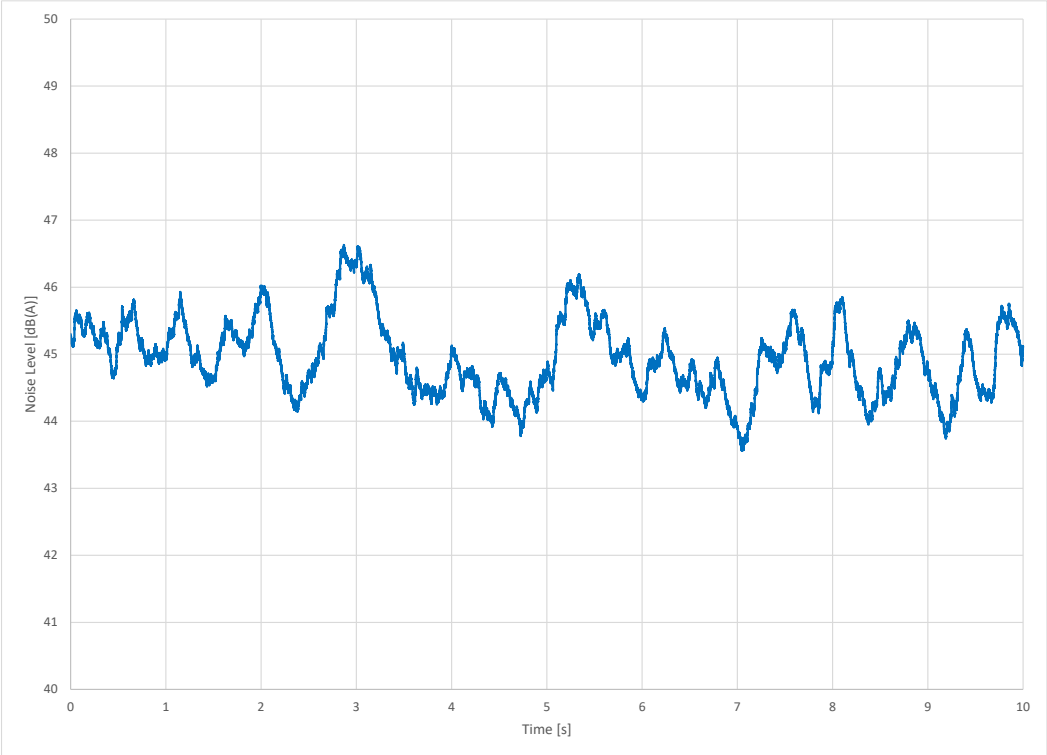


Figure 23: Amplitude Modulation - G06 - 6m/s

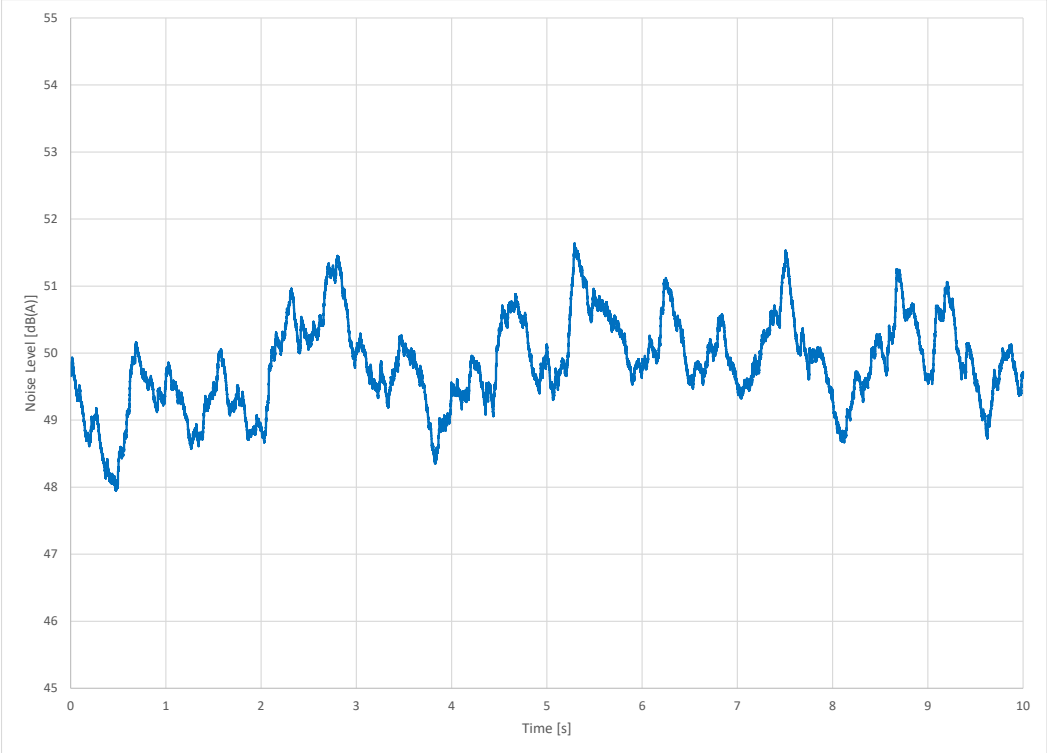


Figure 24: Amplitude Modulation - G06 - 7m/s

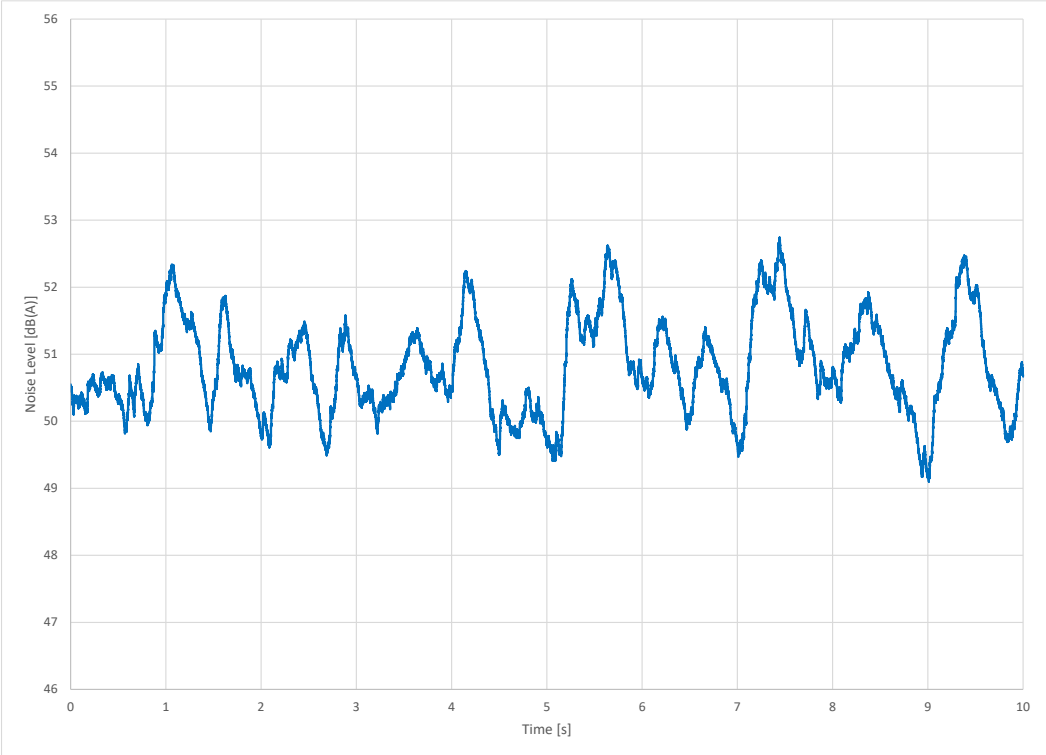


Figure 25: Amplitude Modulation - G06 - 8m/s

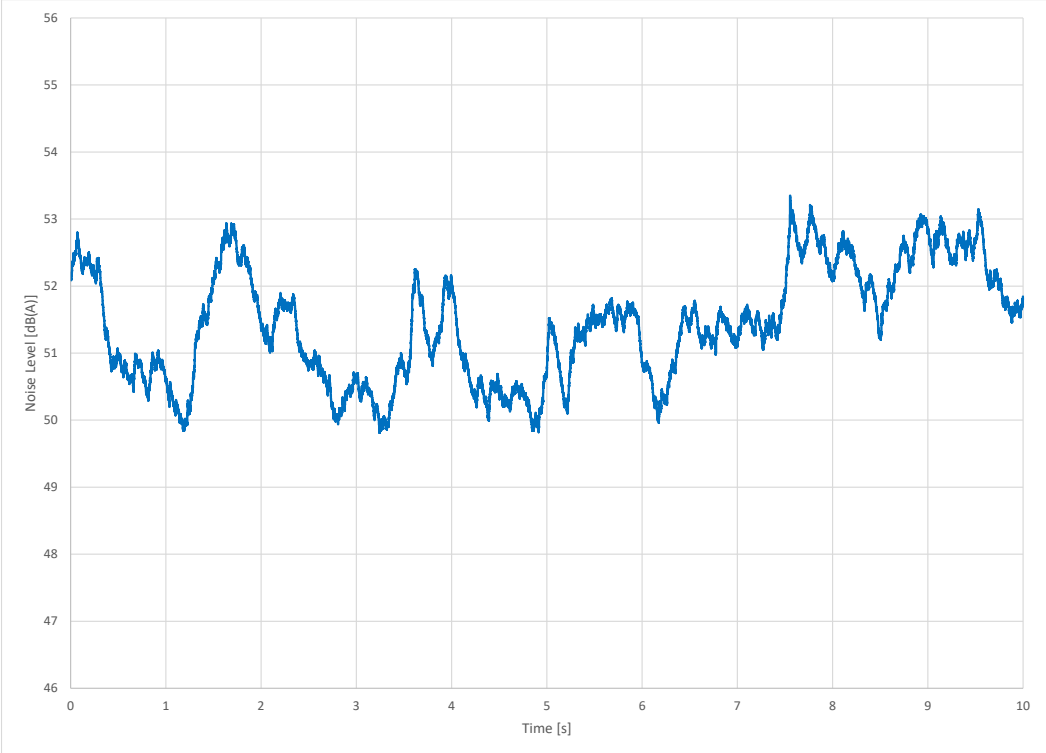


Figure 26: Amplitude Modulation - G06 - 9m/s

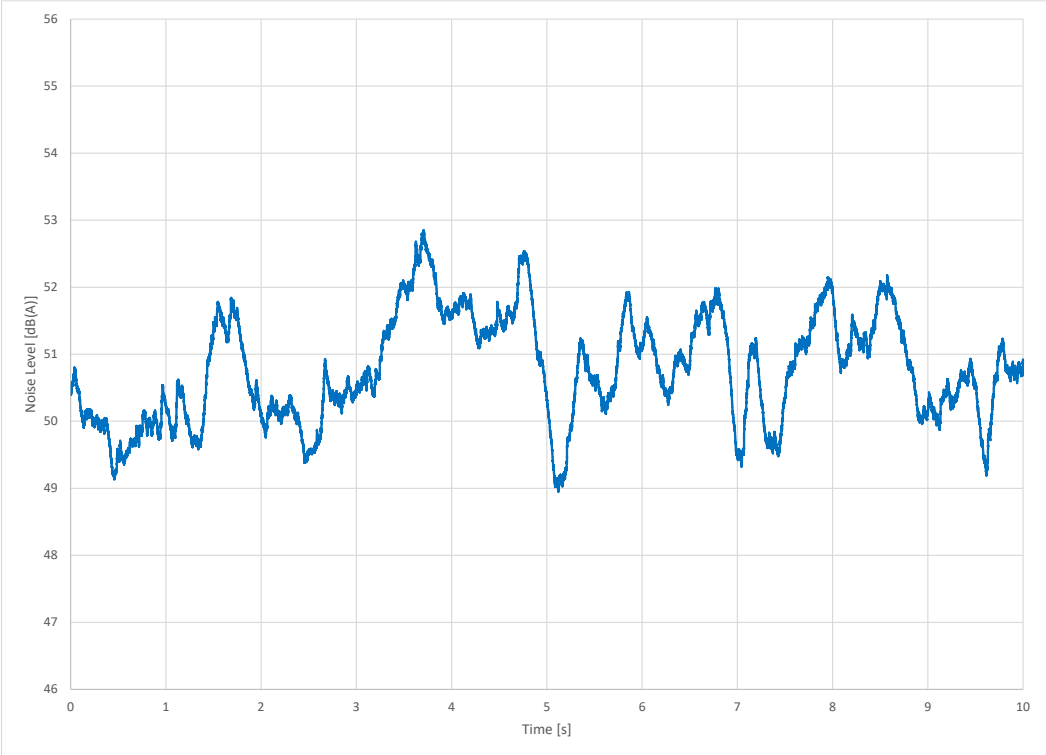


Figure 27: Amplitude Modulation - G06 - 10m/s

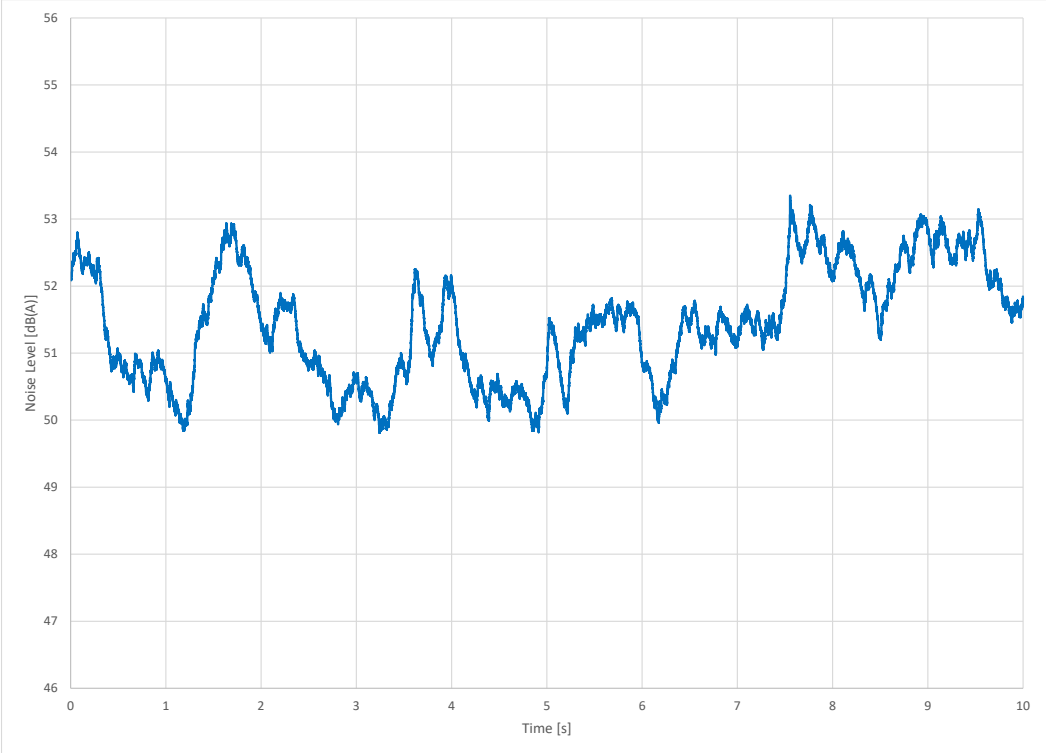


Figure 28: Amplitude Modulation - G06 - 11m/s

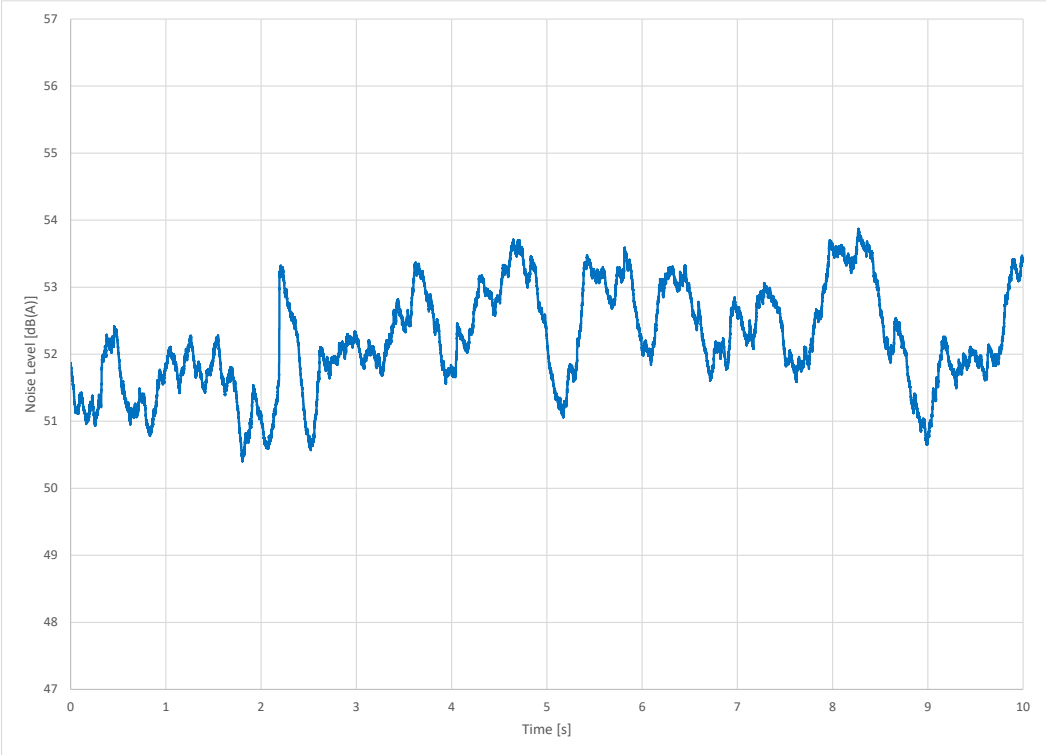


Figure 29: Amplitude Modulation - G06 - 12m/s

APPENDIX C: LOGGER LOCATION PHOTOS

Figure 30: H18 - First View

Figure 31: H18 - Second View

Figure 32: H18 - Third View

Figure 33: H46 - First View

Figure 34: H46 - Second View

Figure 35: H46 - Third View

Figure 36: H51 - First View

Figure 37: H51 - Second View

Figure 38: H51 - Third View

Figure 39: H62 - First View

Figure 40: H62 - Second View

Figure 41: H62 - Third View

Figure 42: Turbine H09