

PROPOSED BATTERY ENERGY STORAGE SYSTEM (BESS)

NOISE ASSESSMENT

Report No. M25381.01A

Site: 2049 The Bucketts Way
Wards Creek NSW 2422

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Date: 22 September 2026

SUMMARY

A new Battery Energy Storage System (BESS) is proposed at 2049 The Bucketts Way, Wards Creek NSW 2422.

Matrix Thornton Acoustic Report M25381.01 (Dated 9 February 2026) previously assessed the potential noise impacts for the pre-lodgement stage of the development. The site design has been updated and includes 2 additional BESS storage units.

This revision assesses the noise impacts of the finalised site design with the additional equipment.

Noise criteria were determined from noise measurements and the recommendations of the NSW EPA.

Noise modelling was done based on noise measurements of a similar BESS at Port Macquarie and the manufacture's acoustic data for the updated site plan. The Port Macquarie BESS measured levels were used to produce a conservative report.

The additional BESS equipment does not increase the noise levels modelled in Matrix Thornton Acoustic Report M25381.01.

Predicted noise levels comply with the trigger levels recommended by the NPfI.

No noise impact is predicted at the surrounding receivers.

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1 INTRODUCTION

A new Battery Energy Storage System (BESS) is proposed at 2049 The Bucketts Way, Wards Creek. In pre-lodgement meeting, Mid-Coast Council requested a noise assessment.

The client, Enerbyte, has engaged Matrix Thornton Consulting Engineers to assess the noise impact of the proposal. The resulting preliminary report is Matrix Thornton Acoustic Report M25381.01 (Dated 9 February 2026).

The site design has been updated to include 2 additional BESS storage units.

This revision, M25381.01A, assesses the noise impacts of the finalised site design with the additional equipment.

2 DESCRIPTION OF THE DEVELOPMENT

2.1 LOCATION

The location of the development is shown in Figure 2-1. The nearest 5 receivers are also shown. They are all more than 350m from the site.

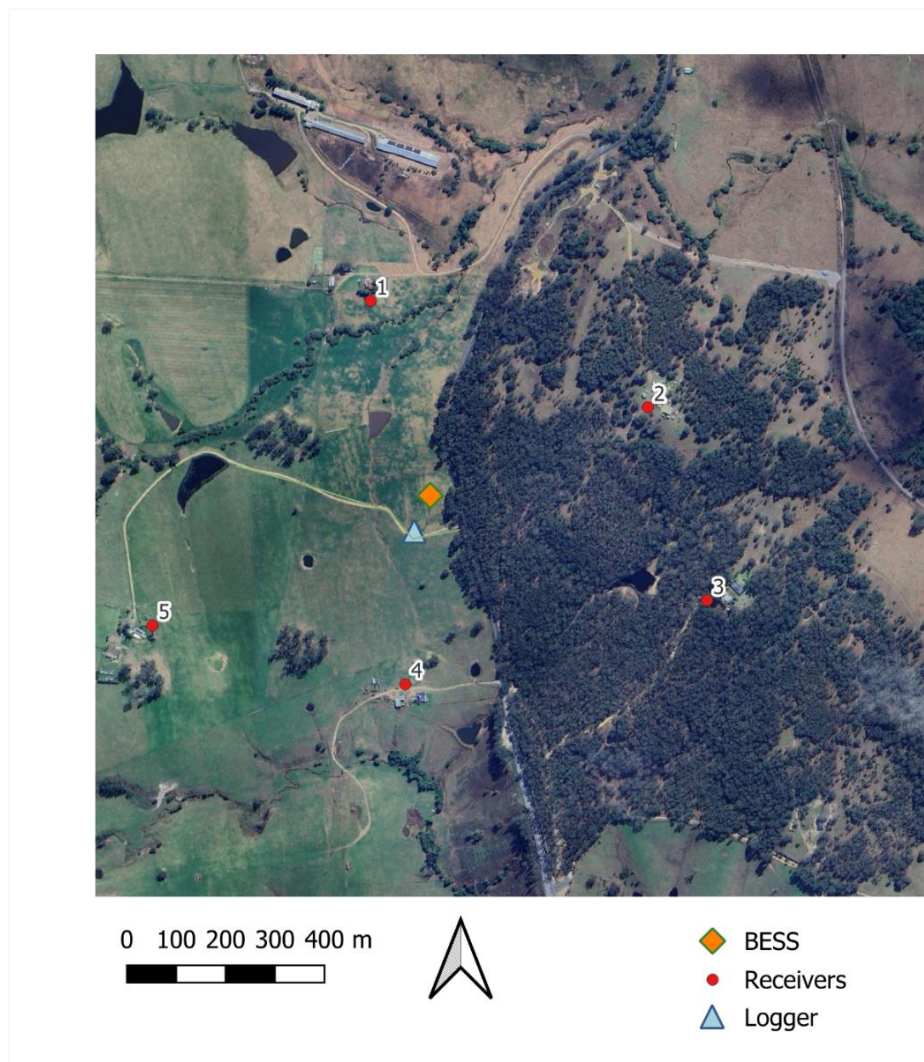


Figure 2-1 Location of BESS and Receivers

2.2 THE PROPOSAL

The proposal consists of 4 battery container units of 5010.0 kWh, and ancillary equipment such as storage inverters and power transformers. There will be four containers laid out as shown in Figure 2-2.

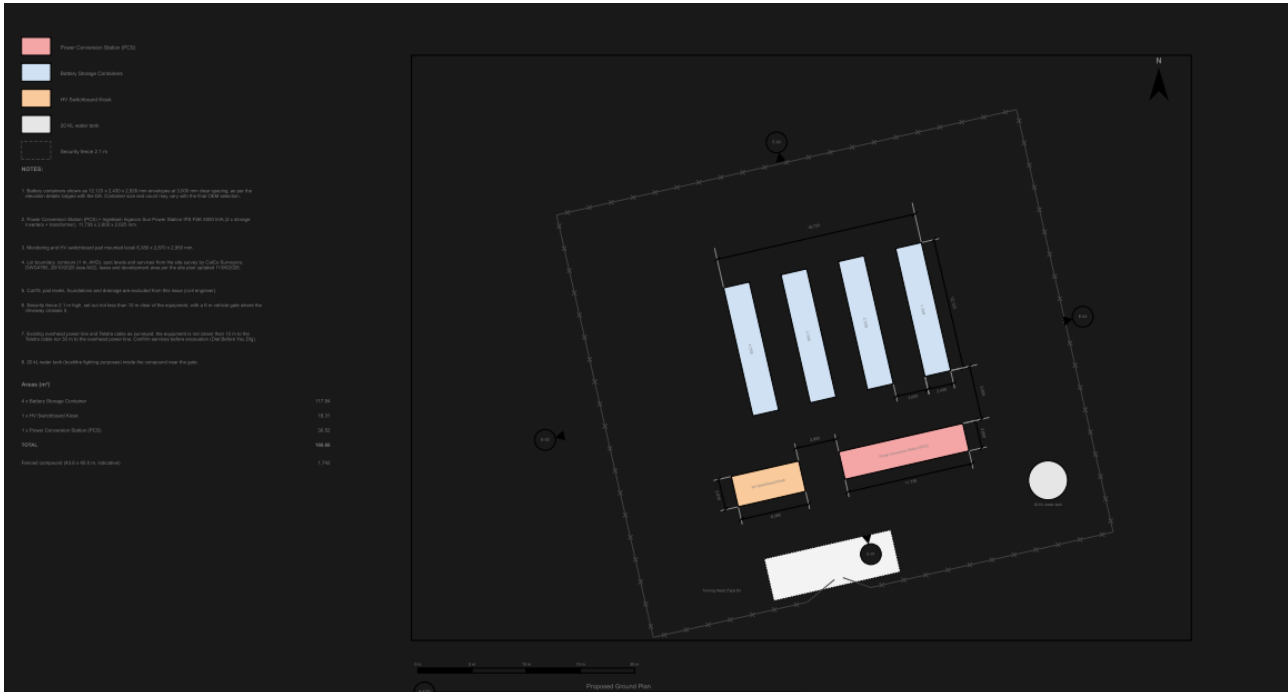


Figure 2-2 Site layout and example containers

2.3 SOURCE NOISE LEVELS

2.3.1 MEASURED LEVELS

To estimate the source noise levels, noise emission from a similarly sized BESS, located at the corner of Fernbank Creek Road and Winery Drive, Port Macquarie, were measured (9 December 2025). While noise is audible on all sides of the container, it was noted that the highest levels were emitted from the long sides of the containers which have ventilation openings. The noise level on the long side was 76dBA at 1.5m, and on the short sides 64dBA at 4m (we could not approach closer due to the enclosure).

The sound power level of the transformer kiosk was estimated to be 76dBA. Due to the influence of ambient noise, this is a conservative estimate.

To convert these levels to sound power level, we follow generally the engineering method set out in **Australian Standard is AS 5335:2019** “Acoustics — Determination of sound power levels and sound energy levels of noise sources using sound pressure — Engineering methods for an essentially free field over a reflecting plane”. This standard is the Australian adoption of ISO 3744:2010.

Taking into account the size of the measurement area around the container, the overall sound power level is predicted to be $L_{AW,eq}$ 96dB.

2.3.2 MANUFACTURE'S ACOUSTIC DATA

The project has **three key components** relevant to the noise assessment:

1. SMA PCS (Power Conversion System)

- Main electrical conversion equipment, there is 1 unit in the proposal.
- Includes cooling fans
- Significant noise source
- Acoustic data provided (White Paper BS-LS-7, TR+SC4)
- Based on the data, the Maximum Sound Power Level, is L_{Aw} 90dBA

2. Hyperstrong BESS (Battery System / Battery Box)

- Containerised battery units. There are 4 units in the proposal
- Noise primarily from HVAC/air-conditioning
- Orientation of HVAC can be adjusted to reduce impact
- Based on manufacturer's data the sound power level of each unit is L_{Aw} 85dBA

3. Switchgear Building

- Contains HV switching equipment
- **Not** a major noise source

Manufacture's noise data suggests a combined $L_{Aw,eq}$ 94dB at maximum output.

Copies of the data sheets can be found in [Appendix C](#) and [D](#) and [E](#).

2.3.3 SOURCE NOISE LEVEL USED FOR MODELLING

While the manufacture's noise data suggests a combined $L_{Aw,eq}$ 94dB at maximum output, the BESS measured $L_{Aw,eq}$ 96dB has been used for noise modelling to produce conservative results.



Figure 2-3 Measured BESS at Port Macquarie

3 NOISE ASSESSMENT CRITERIA

3.1 BACKGROUND NOISE MEASUREMENTS

Noise measurements were taken on site to determine the existing noise environment. As the results are used to set noise limits, the results of the measurements will be presented first.

Noise measurements were conducted from 2 to 9 December 2025 at the location shown in [Figure 2-1](#).

Long term background noise measurements were recorded using a Type I integrating sound level meter (SLM), model EL-316X, manufactured by Acoustic Research Labs. A Lutron sound level calibrator, model SC-941, was used as a reference sound source immediately before and after measurements were taken. Both instruments are in current calibration from a NATA registered laboratory. An integrating sound level meter can process a continuous, variable, intermittent or impulsive signal to give a single integrated level or L_{Aeq} for the sampling period. This equipment complies with AS 1259 ‘Acoustics-Sound level meters’, Part 2 “Integrating-Averaging” and the testing procedure with AS 2659 “Guide to the use of sound measuring equipment.

[Appendix B](#) shows the daily noise charts. Periods of excess wind or rain have been excluded as per NPfI recommendations.

Table 3-1 shows the measured background noise levels. The results show the quietest noise levels occurred during daytime, which is unusual. Inspection of the indicates that there was probably considerable animal noise during evening and night time periods. There was sufficient time spent below 30dBA for us to conclude that the appropriate RBL would be 30dBA for evening, and night time, being the lowest levels allowed by the EPA. This is consistent with previous results in similar rural areas.

Period	RBL (measured)	RBL (assumed)
Daytime	31	31
Evening	32	30
Night-time	35	30

Note: Daytime is defined as 7.00am to 6.00pm, Monday to Saturday; 8.00am to 6.00pm Sunday and Public Holidays.
Evening is defined as 6.00pm to 10.00pm, Monday to Saturday and Public Holidays.
Night is defined as 10.00pm to 7.00am, Monday to Saturday; 10.00pm to 8.00am Sunday and Public Holidays.

Table 3-1 Measured background A-weighted sound pressure levels.

3.2 ENVIRONMENT PROTECTION AGENCY GUIDELINES

For noise emission other than from children playing, assessment criteria are discussed in the New South Wales Noise Policy for Industry (NPfI). The NPfI gives a procedure for setting “trigger” noise levels. If noise is above a trigger level, a residual noise impact may exist. Depending on the severity of the residual noise impact mitigation or management needs to be considered.

The policy discusses “intrusiveness” and “amenity” levels which are a set based on the existing noise environment, and the type of residential area. The project specific trigger levels become the most stringent of the two.

3.2.1 INTRUSIVENESS NOISE LEVEL

For assessing intrusiveness, the background noise level (L_{A90}) is measured, and the Rating Background Level (RBL) determined. The intrusiveness of an industrial noise source may generally be considered acceptable if the equivalent continuous noise level (L_{Aeq}) of the source (measured over a 15-minute period) does not exceed the RBL by more than 5 dB.

3.2.2 AMENITY NOISE LEVEL

The amenity assessment is based on noise criteria specific to land use and associated activities. The criteria relate only to industrial-type noise and do not include transportation noise.

The amenity noise level aims to limit continuing increases in noise levels which may occur if the intrusiveness level alone is applied to successive development within an area.

The recommended amenity noise level represents the objective for total industrial noise at a receiver location. The project amenity noise level represents the objective for noise from a single industrial development at a receiver location.

To prevent increases in industrial noise due to the cumulative effect of several developments, the project amenity noise level for each new source of industrial noise is set at 5 dB below the recommended amenity noise level. While amenity is assessed over the entire 13-hour daytime period, under the NPfI it can be compared directly to the 15-minute assessment of intrusiveness by adding 3 dB to the period level.

Amenity noise levels are not used directly as regulatory limits. They are used in combination with the project intrusiveness noise level to assess the potential impact of noise, assess mitigation options and determine achievable noise requirements.

An extract from the NSW NPfI that relates to the amenity noise levels for surrounding receivers is given in Table 3-2 and applies to all receivers in this study.

Type of Receiver	Indicative Noise Amenity Area	Time of Day	Recommended L_{Aeq} Noise Level dB
Residential	Rural	Day	50
		Evening	45
		Night	40

Note: Daytime is defined as 7.00am to 6.00pm, Monday to Saturday; 8.00am to 6.00pm Sunday and Public Holidays.
Evening is defined as 6.00pm to 10.00pm, Monday to Saturday and Public Holidays.
Night is defined as 10.00pm to 7.00am, Monday to Saturday; 10.00pm to 8.00am Sunday and Public Holidays.

Table 3-2 Recommended amenity criteria from the NSW Noise Policy for Industry.

3.2.3 PROJECT NOISE TRIGGER LEVELS

The project noise trigger level provides a benchmark or objective for assessing a proposal or site. The project noise trigger levels are given in Table 3-3.

Period	Rating Background Level L _{A90,15min} (dBA)	Intrusiveness Noise Level ¹ L _{Aeq,15min} (dBA)	Project Amenity Noise Level ² L _{Aeq,15min} (dBA)	Project Trigger Levels L _{Aeq,15min} (dBA)
Daytime	31	36	48	36
Evening	30	35	43	35
Night-time	39	35	38	35

Note 1: Intrusiveness noise level is L_{Aeq,15min} ≤ RBL +5 dB

Note 2: Project amenity noise level (PANL) is suburban ANL minus 5dBA plus 3dBA to convert from a period level to a 15-minute level.

Table 3-3 Project trigger levels for all Receivers

4 PREDICTED NOISE LEVELS AND ASSESSMENT

Noise modelling was done using iNoise acoustic prediction software which uses the ISO 9613-2 algorithms. Local topography was sourced from Google Earth, and the location of receivers taken from Google Maps and NSW Department of Lands imagery.

The algorithms take into account ground cover, topographic shielding and distance to the receiver. The algorithm also includes the impact of adverse meteorological conditions on noise propagation, such as wind or enhancement by temperature inversion. Calculation under these conditions is the default recommended in the NPfI.

The receiver locations were placed 30m from the residence in the direction of the source, as recommended by the NPfI for rural residences.

4.1 PREDICTED NOISE LEVELS

The predicted noise levels are shown in Table 3-1. Noise levels at all receivers comply with the night time trigger level of 35dBA. As this is calculated under noise enhancing conditions, we conclude that compliance is achieved at all receivers for all times of the day. The predicted level at Receiver 5 is particularly low due to shielding by topography.

Description	Predicted Noise Level, L _{Aeq,15min} dBA
1	29.5
2	30.4
3	13.5
4	14.4
5	5.8

Table 4-1 Predicted Noise Levels of BESS

4.2 CORRECTION FOR ANNOYING CHARACTERISTICS

The NPfI requires correction for annoying characteristics such as tonality or intermittency. Based on our third octave measurements of the BESS at Port Macquarie, no corrections are applicable.

4.3 SLEEP DISTURBANCE

The potential for sleep disturbance should be assessed for night time operation. It occurs when short term intermittent noises rise significantly above the background level. As this noise source is continuous, and complies with the trigger level for continuous noise, no further assessment of sleep disturbance is necessary.

5 CONCLUSION

Matrix Thornton Acoustic Report M25381.01 previously assessed the potential noise impacts for the pre-lodgement stage of the proposed Battery Energy Storage System (BESS) located at 2049 The Bucketts Way, Wards River NSW 2422. The site design has been updated and includes 2 additional BESS storage units.

This report revision assesses the noise impacts of the finalised site design with the additional equipment.

The revised noise assessment of the proposed BESS at Wards River showed:

1. The additional BESS equipment does not increase the noise levels modelled in Matrix Thornton Acoustic Report M25381.01.
2. Noise source levels were estimated based on measurements of a similar BESS at Port Macquarie and the equipment manufacturer's noise data. The Port Macquarie BESS' measured levels were used to produce a conservative report.
3. Noise criteria were determined from noise measurements and the recommendations of the NSW EPA.
4. The proposed BESS at Wards River will be more than 350m from the nearest residences.
5. Predicted noise levels comply with the trigger levels recommended by the NPfI.
6. No noise impact is predicted at the surrounding receivers.

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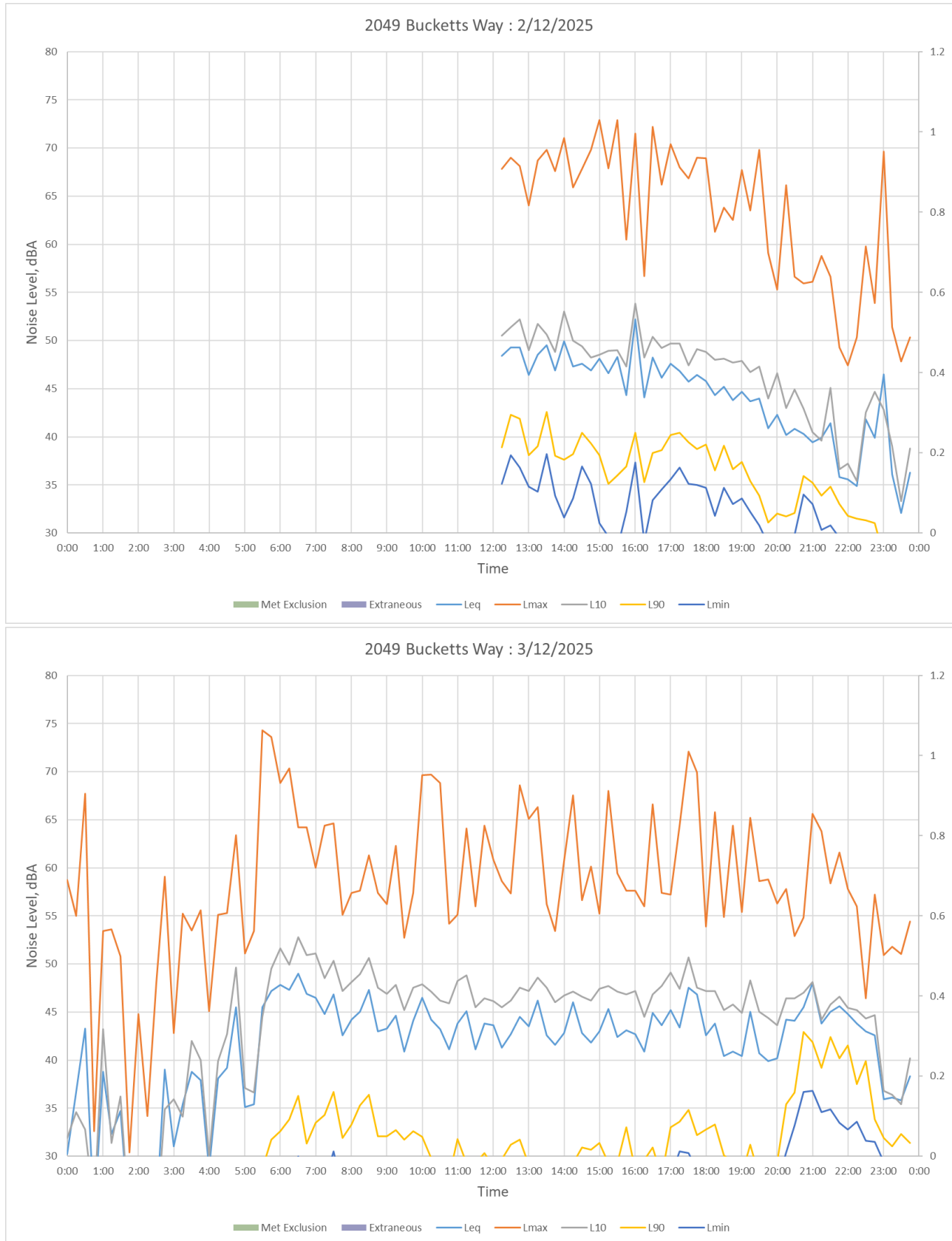
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National Professional Engineers Register No. 295662

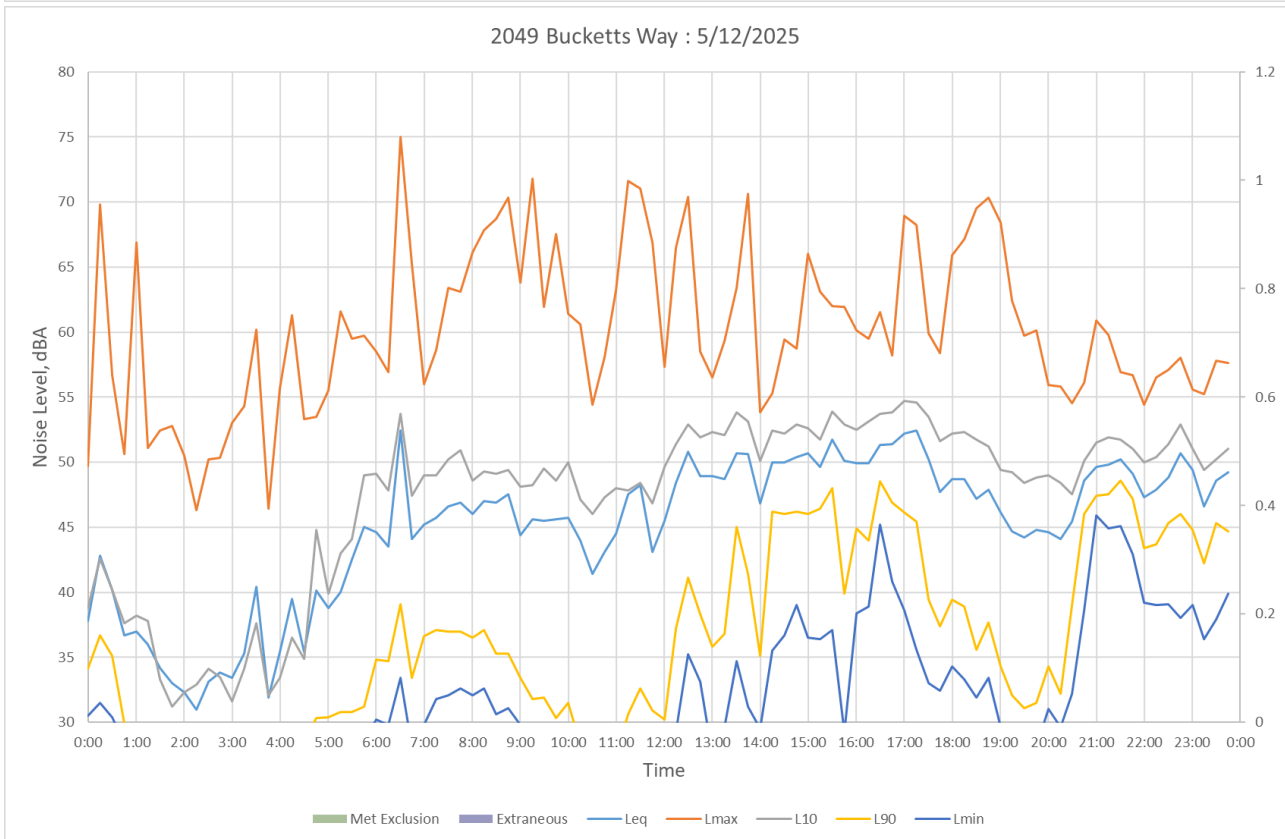
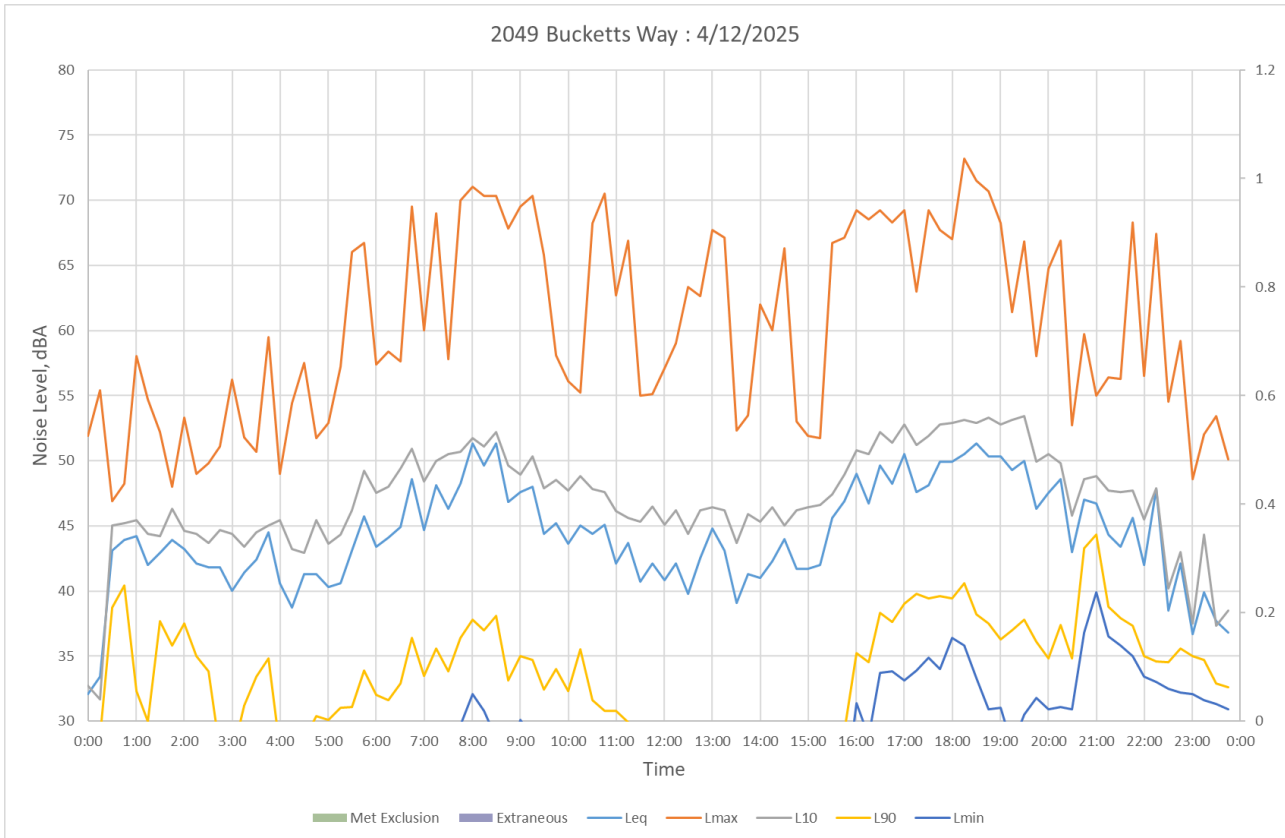


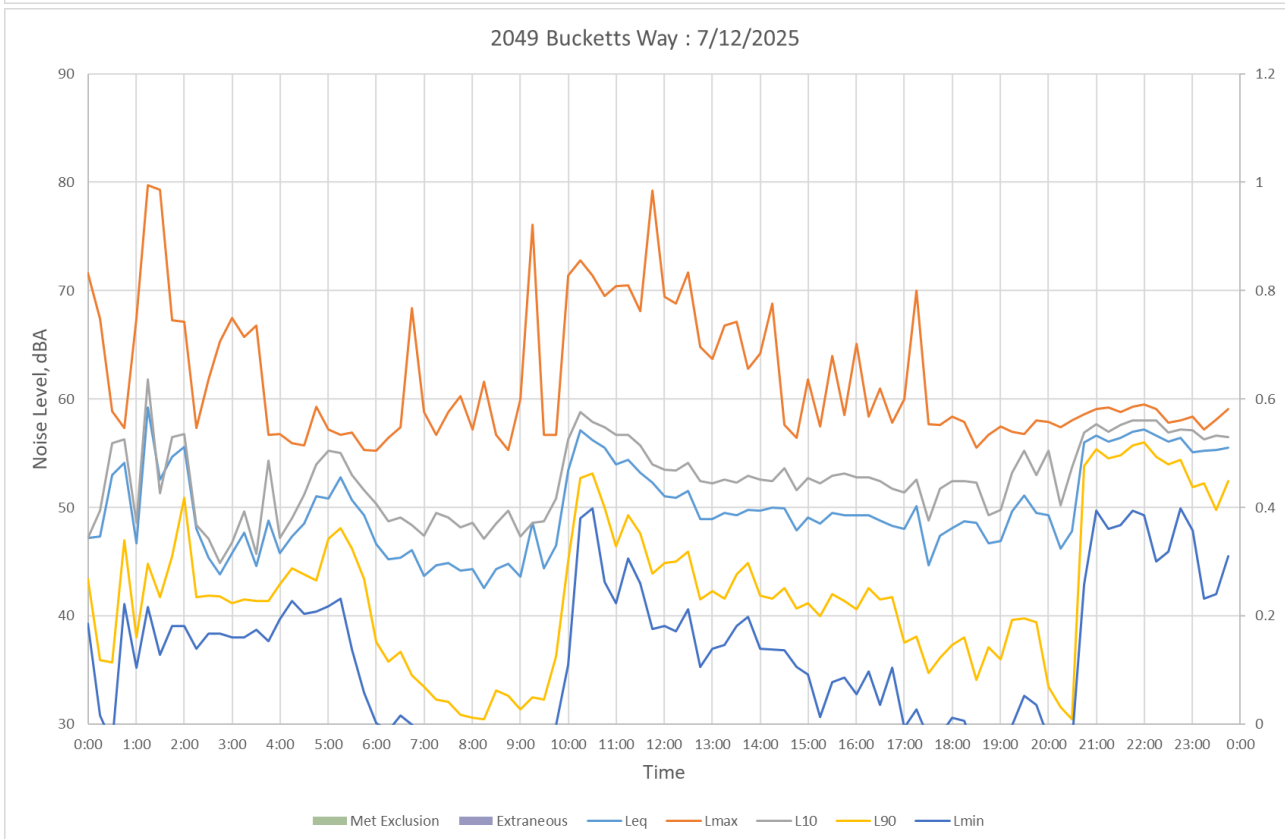
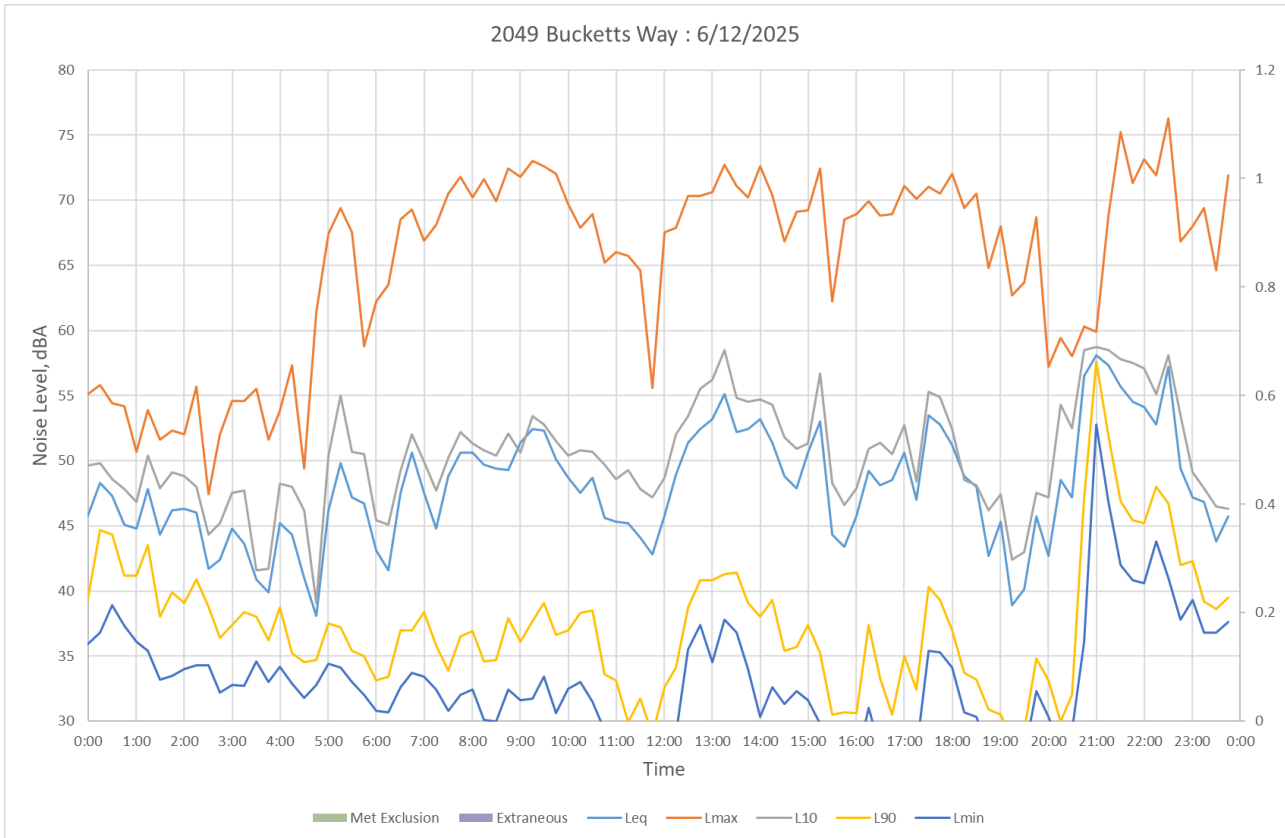
APPENDIX A: GLOSSARY OF ACOUSTIC TERMS

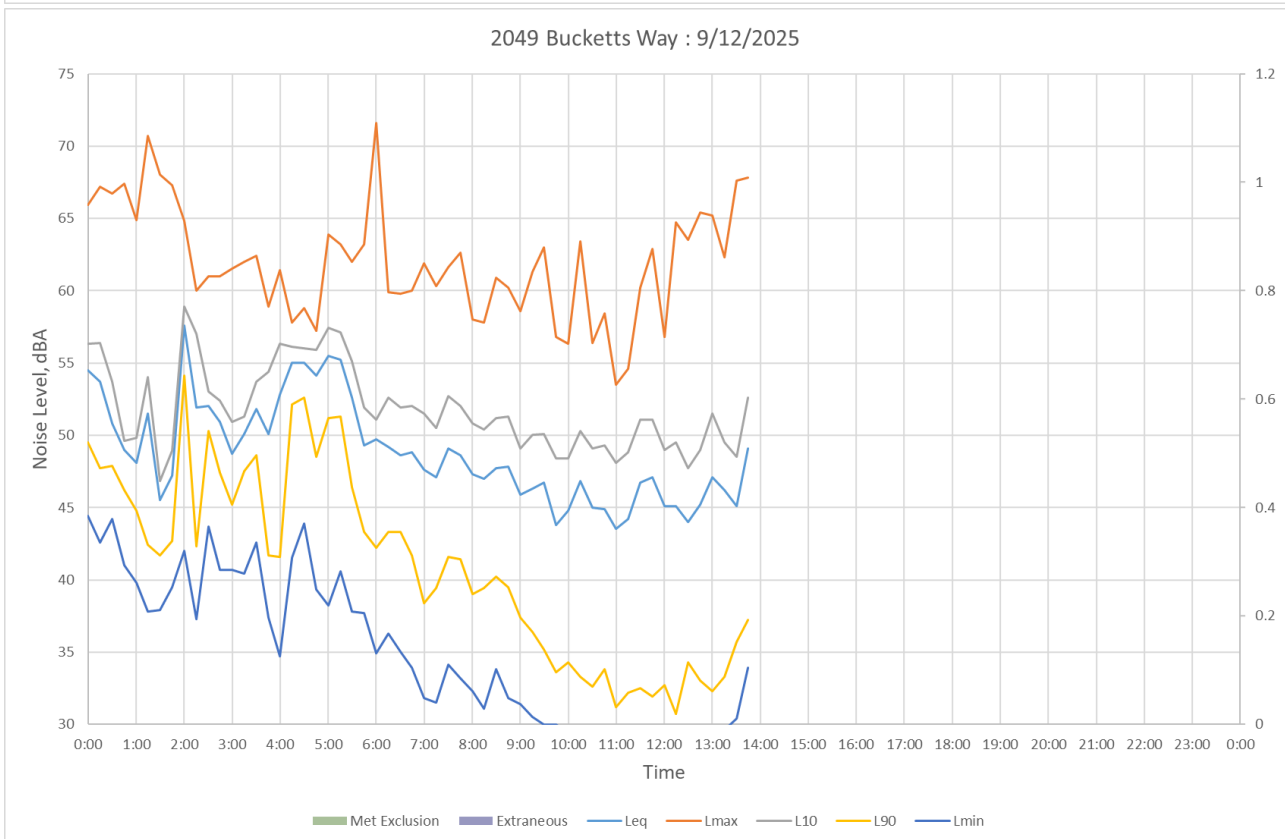
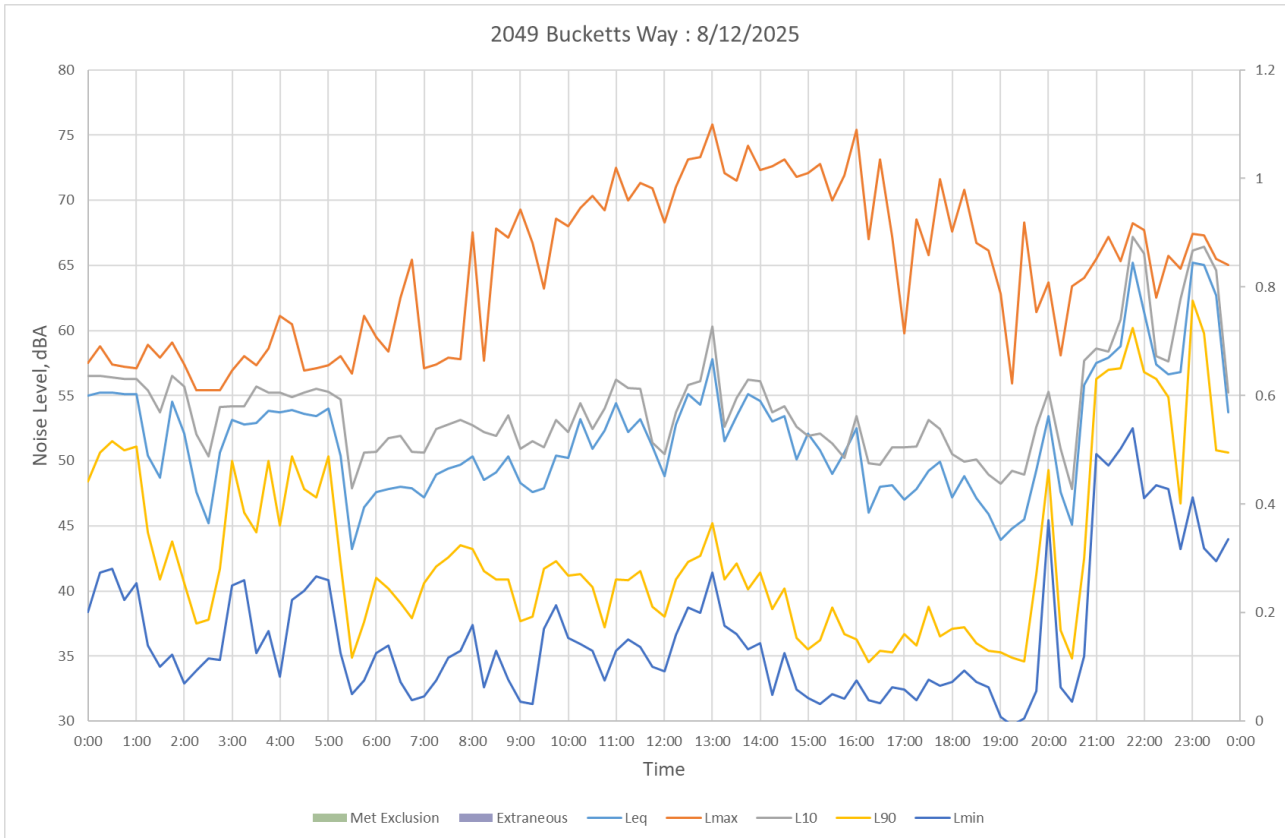
Assessment Period	The period in a day over which assessments are made.
dB(A)	Unit of sound level in A-weighted decibels. The A-weighting approximates the sensitivity of the human ear by filtering these frequencies. The dB(A) measurement is considered representative of average human hearing.
L_{Aeq}	The A-weighted equivalent continuous sound pressure level, used to quantify the average noise level over a time period.
L_{A10}	The A-weighted sound pressure level exceeded for 10% of the measurement period. It is usually used as the descriptor for intrusive noise level.
L_{A90}	The A-weighted sound pressure level exceeded for 90% of the measurement period. It is usually used as the descriptor for background noise level.
$L_{Aeq15min}$	Refers to the A-weighted energy averaged equivalent noise level over a 15 minute time period.
L_{Cpeak}	The highest instantaneous C-weighted sound pressure level over the measurement period. It is usually used for high impulsive noise.
L_{Amax}	The maximum A-weighted sound pressure level for the measurement period.
Loudness	A 3dB(A) change in sound pressure level is just noticeable or perceptible to the average human ear; a 5dB(A) increase is quite noticeable and a 10dB(A) increase is typically perceived as a doubling in loudness.
RBL	The overall single figure background level representing the assessment period over the whole monitoring period. For the short-term method of assessment, the RBL is the measured $L_{A90, 15min}$ value, or where a number of measurements have been made, the lowest $L_{A90, 15min}$ value.

APPENDIX B: NOISE LOGGER CHARTS





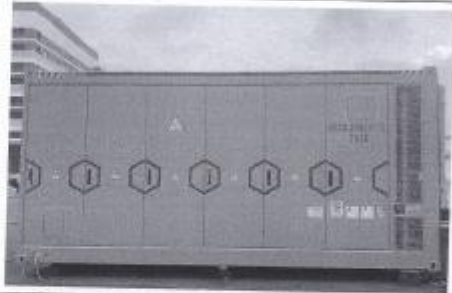




APPENDIX C: MANUFACTURE'S NOISE DATA HYPERBLOCK III



Empowering a Sustainable Future

NOISE LEVEL TEST REPORT Type Test Report Recommended Parameters of Noise Levels	
Report Number	HBSC-NLTR-20250408
Date of Issue	2025-04-08
Total number of pages	11
Company Name	Beijing HyperStrong Technology Co., Ltd.
Address.....	12F, Building 2C, No.9 Fenghao East Road, Haidian District, 100094 Beijing, P.R.China
Test Item Description	Noise level test
Test Specification	☐ ANSI/CAN/UL9540:2023 ☒ Customer Test Requirements
Test Item Description	Noise level test
System Particulars:	
Product.....	RECHARGEABLE Li-ion BATTERY SYSTEM
Type Designation.....	HSL3C7001-05015EU
Product Photo	





Empowering a Sustainable Future

Electrical Ratings	Auxiliary (AC)		Battery (DC)	
	Voltage:	400Vac	Voltage (nom):	1331.2 V
	Power (max):	40kW	Current (max):	2400 A
	Frequency:	50Hz	Power (max):	--
Dimensions (L x W x H)	6058*2438*2896 mm			
Liquid Cooled	Type:	Liquid cooling unit		
	Chiller Model No.:	LCI-600CR-20A1C5NOSX7Z3-3407C		
	Chiller Manufacturer:	Sanhe Tongfei Refrigeration Co., Ltd.		
Centrifugal fan.....	Type:	Axial fan		
	Chiller Model No.:	YWFD-315S-102/34-GP		
	Chiller Manufacturer:	Hangzhou Weiguang Electronic Co., Ltd.		
Air conditioner	Type:	Air-cooled AC		
	Chiller Model No.:	EC20HDNC1U		
	Chiller Manufacturer:	Shenzhen Envicool Technology Co., Ltd.		



Empowering a Sustainable Future

Test Equipment:			
	Description:	XL2 sound level meter	
	Manufacturer:	NTI audio	
	Model:	A2A-25755-E1	
	Calibration Expiration Date:	2026/01/10	
Test Parameters:			
Location:	HyperStrong (Zhuhai) Engineering Technology Co., Ltd.		
Date:	2025-03-27	Background noise:	53.6dB
Time:	14:20	Temperature:	24.2°C
\	\	Humidity:	68.5%RH

Test: Liwei Zhao Reviewed: Peiyan Qi Approval: Lei Wang



Testing Positions:

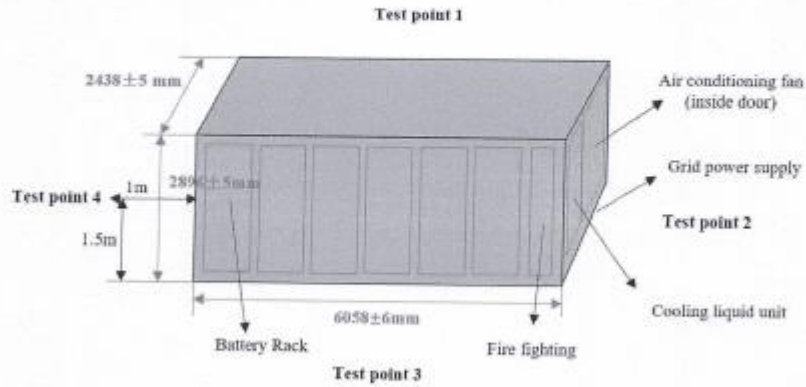


Figure 1 Noise Test Location (front view)

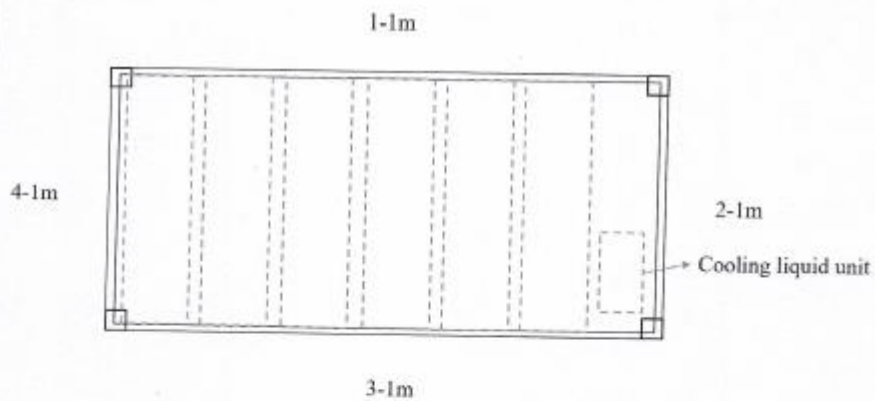


Figure 2 Noise Test Location (vertical view)

**Test requirements**

Test environment: Ambient temperature $25\pm5^{\circ}\text{C}$, there are no noise-producing equipment within 5m of each surrounding container system.

Pre-test preparation: The power is delivered to make the energy storage system run at the rated full power, and after the liquid cooling system and air conditioning are run, the noise test is carried out during the charging and discharging process of the system at full load.

Liquid-cooling unit setup: The liquid cooling system is operating normally according to the thermal management strategy (the system is in cooling mode).

Test location: Noise collection points are arranged around the energy storage system at equal intervals. As shown in the figure 1, the measurement points are 1, 2, 3 and 4.

The measurement points are 1.5m above ground level and 1m in front of the container.

Testing time: Record the average noise value about 20 seconds at each measurement point (The recording interval is 1s).

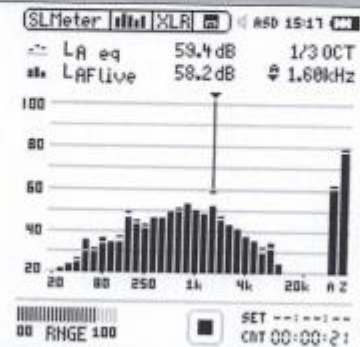
Recorded data requirements: Record the average value and frequency of the noise during the test process (1/3 octave), and provide analysis of the average value and frequency distribution of the noise sound level during the test cycle.

Note: The rated full power of the energy storage container system is: 2507.9 kW; The rated cooling power of the liquid cooling unit is: 60kW; The rated cooling power of the air conditioner is 2kW.

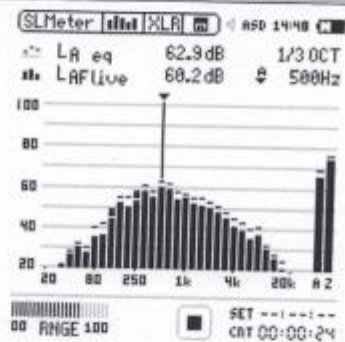
北京海博思创科技有限公司
BEIJING HYPERSTRONG TECHNOLOGY CO., LTD

Container noise level test picture

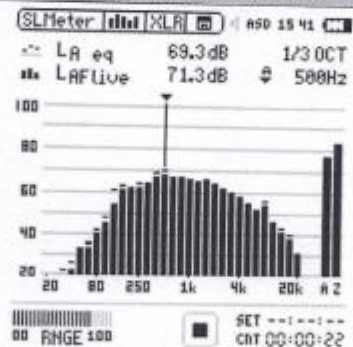
Test the noise level at point 1



Test the noise level at point 2

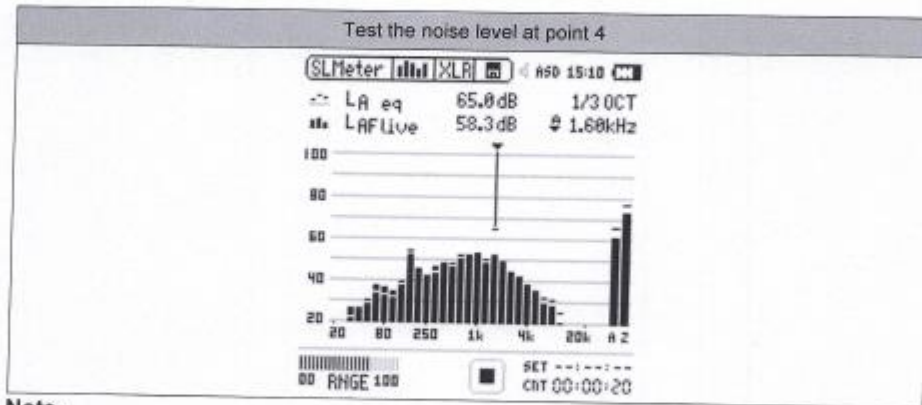


Test the noise level at point 3





point 2	32.9	46.1	49.2	59.3	55.7	53.8	49.3	54.4	59.3
point 3	29.9	37.8	44.6	51.1	50.6	47.1	44.5	41.7	52.3
Point 4	32	35.7	43	47.3	51.3	46.3	37.8	30.4	51.9
Container noise level test data (50% input/output power)									
Octave Band Center Frequency	63	125	250	500	1000	2000	4000	8000	dB (A)
point 1	31	36.3	43.4	48.7	52.4	46	37.8	31.7	52.7
point 2	30.4	46.7	57.9	59	53.8	49.9	42.4	41.7	59
point 3	29.3	39.1	44.6	51.6	51.2	46	37.6	36.8	52.8
Point 4	32.4	36.7	42.8	45.4	51	45.1	38.4	30.4	52.2
Container noise level test data (60% input/output power)									
Octave Band Center Frequency	63	125	250	500	1000	2000	4000	8000	dB (A)
point 1	31.5	37.9	40.5	46.1	49.2	44.7	40.6	34.9	53.8
point 2	32.1	46.7	48.8	59.4	54.8	516	44.5	55.1	59.4
point 3	29.6	38.7	44	50.8	50.2	45.5	37.5	39.3	53.8
Point 4	31.8	38	41.8	46.9	51	46.4	40.2	33.7	52.7
Container noise level test data (70% input/output power)									
Octave Band Center Frequency	63	125	250	500	1000	2000	4000	8000	dB (A)
point 1	31.1	39.2	43.1	48.6	51.8	46.4	40.1	33.8	53.6
point 2	31.9	46.5	48.4	60	55.9	53.9	48.9	55.5	60
point 3	42.7	42.5	44.5	47.5	50.6	45.9	39.6	38.1	53.7
Point 4	31.8	36.7	42	45.9	51.6	45.6	37.6	28.5	52.8
Container noise level test data (80% input/output power)									



Note:

1. **LAeq**: L stands for Level; A is the frequency weight, simulating the human ear's inhibition of high and low frequencies, acoustic measurement below 100 dB applies to "A" weight; eq represents the average received sound energy over a period of time and is easier to read on a display than a continuous sound pressure level.
2. **LAFlive**: F stands for fast, which means fast weighting measurement, and it takes only about 0.6 seconds to obtain the result value of the measured sound. Timing weights make measured values easier to read, stabilize rapidly changing values, and display results that are easy to read.
3. **1/3 OCT**: 1/3 Octave.



Octave Band Center Frequency	63	125	250	500	1000	2000	4000	8000	dB (A)
point 1	31.7	35	42.2	47	50.2	46.1	40.3	34.9	56.1
point 2	31.7	46.4	48.6	60.1	55.8	35.9	48.8	53.9	60.1
point 3	30.2	36.5	43.2	47.4	50.1	46.1	36.8	37.4	59.2
Point 4	31.8	43.2	49.8	50.4	51.5	46.8	40.2	33.7	53.4
Container noise level test data (90% input/output power)									
Octave Band Center Frequency	63	125	250	500	1000	2000	4000	8000	dB (A)
point 1	33.4	38.5	45.5	54.7	54.5	52.6	48.5	54.5	58.1
point 2	29.3	38.4	44.8	51.7	53	49.3	41.3	54.7	61.6
point 3	32.3	47.6	58.5	59.2	55.1	50.8	42.8	37.7	59.4
Point 4	33.5	42.5	45.7	48.9	51.4	46.8	41.1	34	56.6
Container noise level test data (100% input/output power)									
Octave Band Center Frequency	63	125	250	500	1000	2000	4000	8000	dB (A)
point 1	31.2	36.8	42.4	49.1	50.5	46.9	37.2	32.3	59.4
point 2	30	45.2	53.7	62.9	56.7	53.5	45.5	40.8	62.9
point 3	33.9	61	63.9	69.3	65.7	64.2	57.5	55.9	69.3
Point 4	34.1	38.1	42.2	47.3	52.6	49.4	38	30.8	65

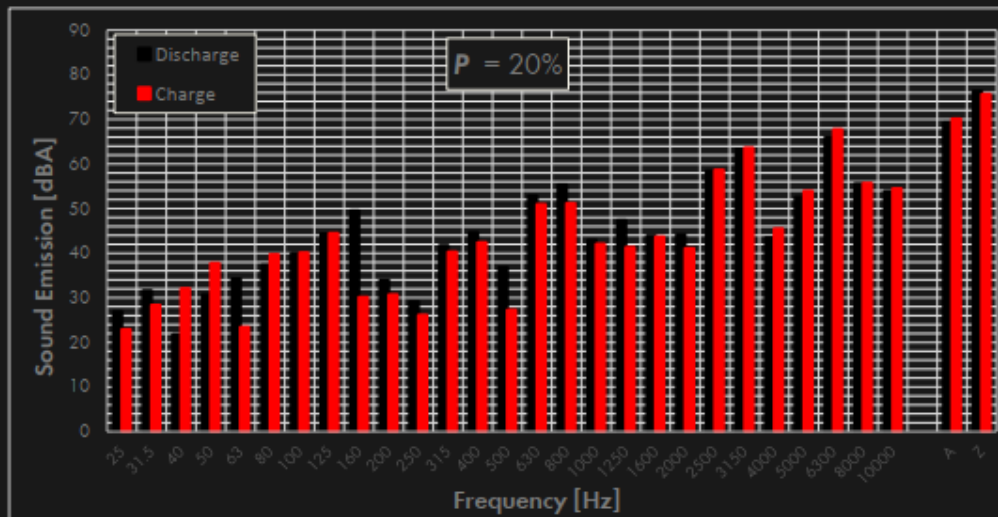
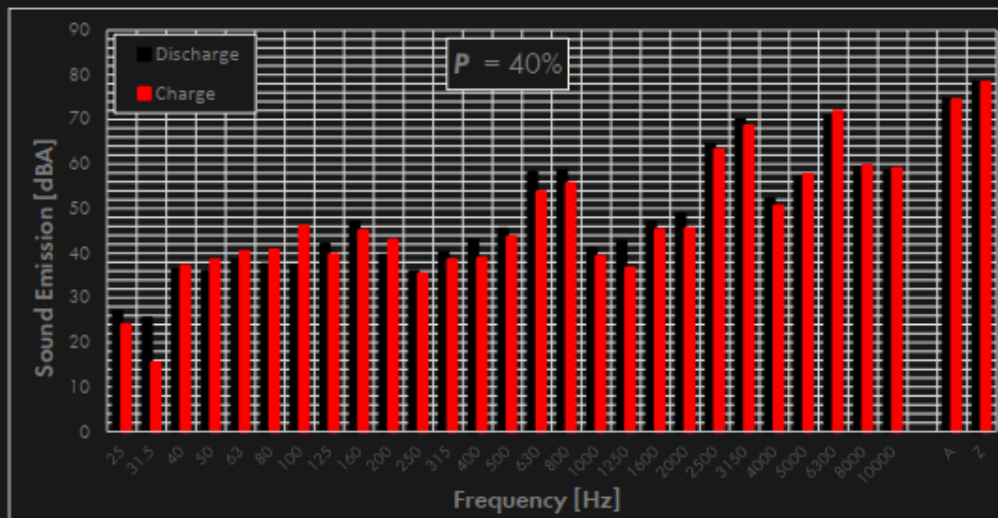


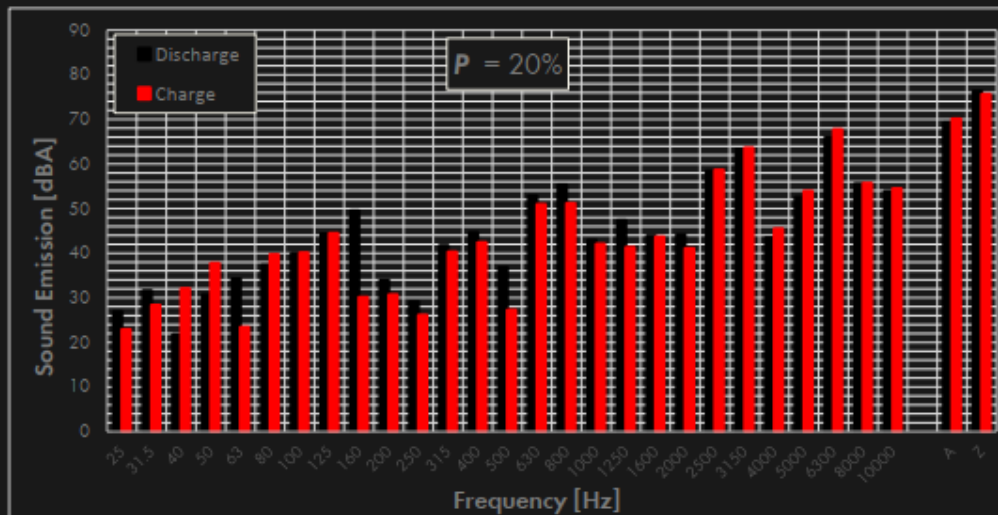
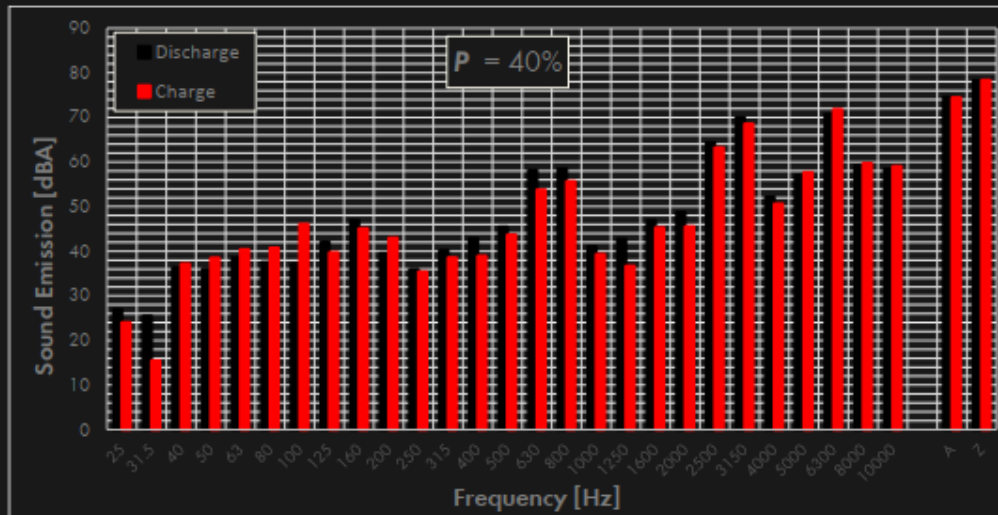
Test Conclusion:

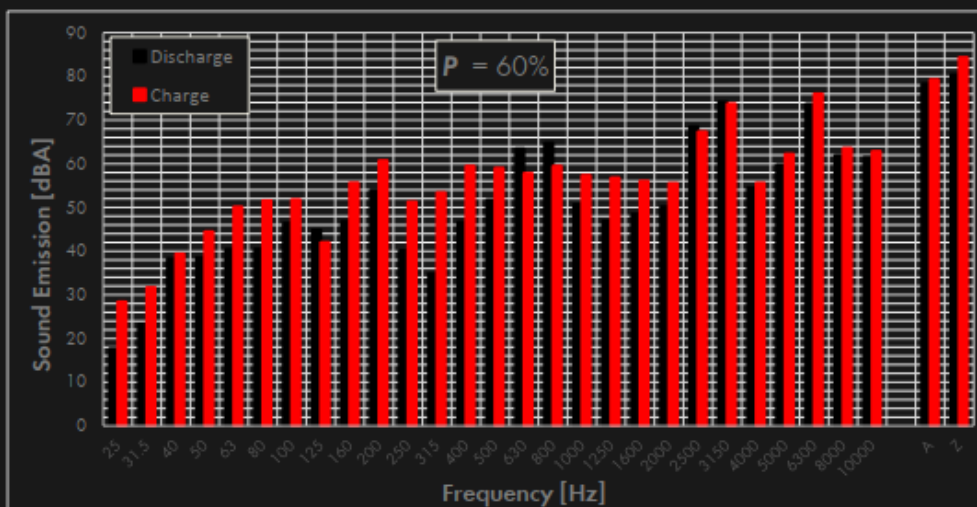
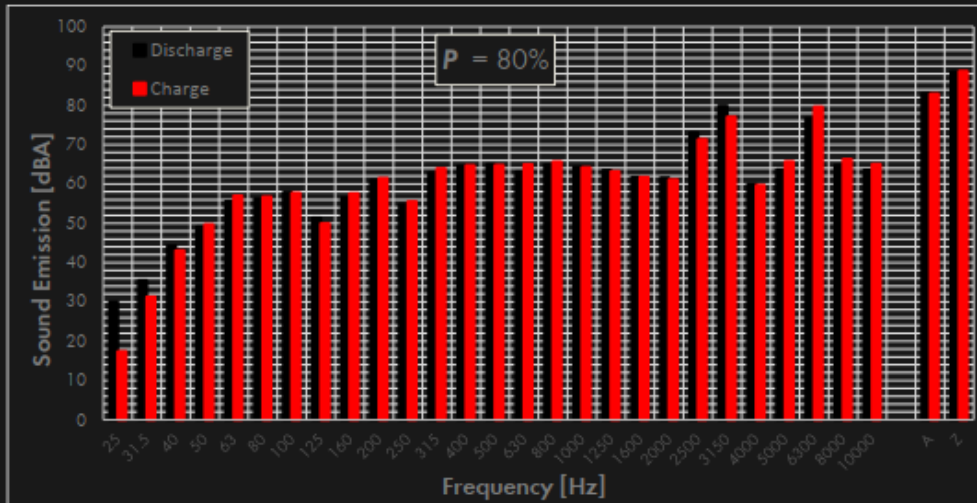
Test No.	Location	Description	Required (Average dB)	Measured (Average dB)	Pass/Fail
1	1 - 1m	1 meter from the side of the RECHARGEABLE Li-ion BATTERY SYSTEM (CONTAINER)-DC ESS. 1.5 meters from the ground.	< 75	59.4	Pass
2	2 - 1m		< 75	62.9	Pass
3	3 - 1m		< 75	69.3	Pass
4	4 - 1m		< 75	65	Pass

----- End -----

APPENDIX D: MANUFACTURE'S NOISE DATA SCS3950UP-XT

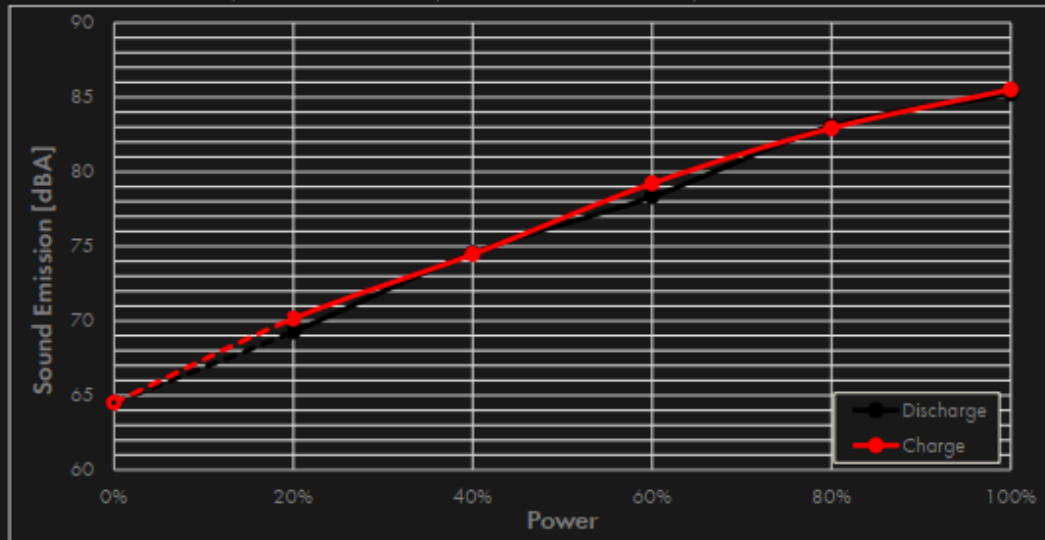








The following graph shows the A-weighted sound emission of SCS 4600 UPS based on the prior table. Sound emission at zero power has been extrapolated from the other datapoints.



The following graphs show the third octave band sound emission at different inverter power levels based on the tabled data above.

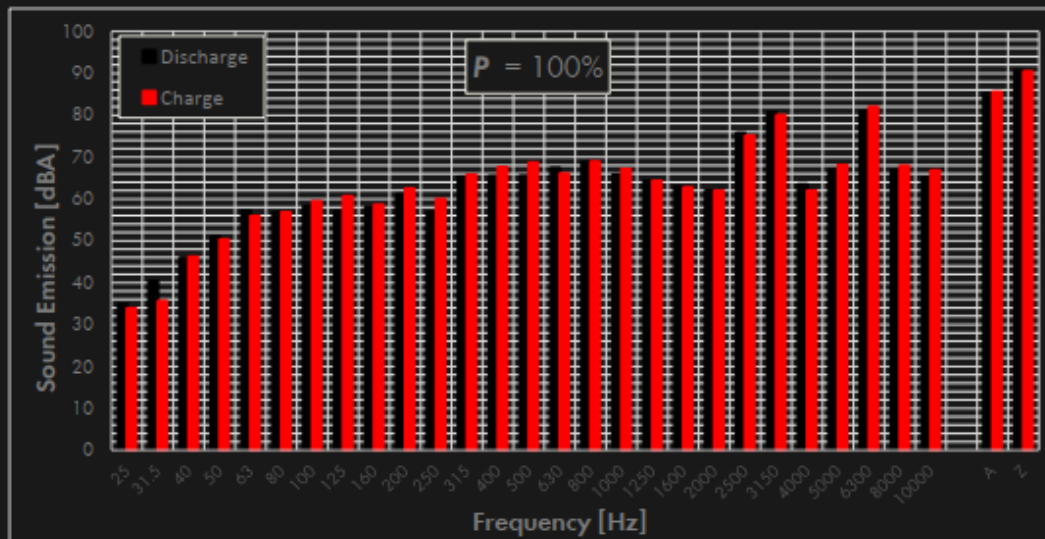




table sound power levels of the third octave band frequencies according to EN ISO 9614-2 are

22	23	26	27	30	31	36	37	32	33
3,88	34,82	17,38	30,01	28,39	17,68	24,03	26,92	22,90	26,91
5,60	40,35	31,25	35,47	31,64	23,28	15,47	25,47	28,34	31,59
6,18	45,98	43,03	44,25	39,33	38,25	37,18	36,35	32,04	21,73
10,29	50,98	49,66	49,12	44,45	38,56	38,52	35,99	37,76	30,68
15,88	57,24	57,00	55,57	50,12	40,43	40,39	38,51	23,41	34,22
16,77	56,74	56,72	56,21	51,53	40,51	40,72	37,54	39,67	37,35
19,39	58,28	57,66	57,87	51,78	46,42	46,10	37,12	40,10	39,97
20,58	57,13	49,93	51,41	41,99	44,85	39,71	42,02	44,45	44,35
28,60	58,07	57,56	56,53	55,64	46,81	45,11	47,01	30,11	49,50
32,43	61,12	61,43	61,03	60,72	53,94	43,00	39,53	30,70	33,92
39,91	56,78	55,50	54,84	51,25	40,16	35,34	35,94	26,08	29,13
45,75	65,27	63,91	62,87	53,40	34,80	38,54	40,16	40,26	41,73
47,54	65,44	64,72	64,57	59,46	46,63	38,88	42,84	42,38	44,62
48,64	65,51	64,76	65,00	59,02	51,75	43,65	45,44	27,23	36,83
46,05	67,36	64,98	63,08	57,79	63,39	53,77	58,13	50,93	52,86
48,87	68,74	65,66	64,98	59,49	64,72	55,62	58,53	51,13	55,31
47,13	65,74	64,20	64,32	57,36	50,70	39,31	41,07	42,05	42,89
44,29	64,32	63,19	63,50	56,77	46,86	36,67	42,68	41,28	47,35
42,74	62,92	61,70	61,67	56,04	48,53	45,29	46,91	43,64	43,85
41,93	61,96	61,07	61,58	55,53	50,19	45,49	48,69	41,05	44,13
45,06	75,68	71,31	73,06	67,32	68,54	63,24	64,33	58,64	58,43
49,96	80,59	77,02	79,87	73,73	74,16	68,54	69,91	63,62	63,29
41,93	63,47	59,66	59,90	55,55	54,55	50,60	52,13	45,50	43,46
48,08	66,94	65,72	63,62	62,23	59,74	57,66	57,06	53,90	52,57
49,28	78,30	77,02	74,27	73,57	71,34	69,49	68,41	65,52	63,79
47,86	66,78	66,30	64,83	63,52	61,87	59,69	59,22	55,67	55,58
46,79	65,10	65,03	63,55	62,86	61,48	59,02	58,48	54,50	53,84
44,49	84,35	81,85	82,49	78,15	77,57	73,31	73,68	69,00	68,37
40,12	90,43	88,46	88,42	84,04	79,92	77,92	77,93	75,31	76,16



Expanded Measurement Uncertainty [dB] for radiated acoustic emission 20Hz – 10kHz Intensity (via Sound Pressure) free field at 0,2m	Measurement according to Class	Actual
	2	+ / -2 [dB]

Result of Measurements

Sound power measurements performed with SCS 4600 UP-S with S_{rated} for discharging 4600kVA @35°C and with S_{rated} for charging 4600kVA @35°C.

The following tables show the sound power for the SCS 4600 UP-S with NRK for discharging and charging mode at various power bins.

- All Discharge power bins were conducted at $\cos\phi=0,95$ and DC Voltage of 1350V.
- All Charge power bins were conducted at $\cos\phi=1$ and DC voltage of 1450V.

The measured sound emissions are also applicable to SCS 4400 UP-S, which is operating at the same nominal current, but slightly lower rated AC voltage of 660 V.

Test Nr.	Power direction	Apparent Power [kVA]	Active Power [kW]	Reactive Power [kVar]	SCS 4600 UP-S Sound Power [dB _A] with NRK
22	Charge, 100%	4600	-4600	0	84.49
23	Discharge, 100%	4600	4370	1436	84.35
26	Charge, 80%	3680	-3680	0	81.85
27	Discharge, 80%	3680	3496	1149	82.49
30	Charge, 60%	2760	-2760	0	78.15
31	Discharge, 60%	2760	2622	862	77.57
36	Charge, 42%	1936	-1840	605	73.31
37	Discharge, 40%	1840	-1840	0	73.68
32	Charge, 20%	960	912	300	69.00
33	Discharge, 20%	960	-960	0	68.37

Table 1 Summary of test results for all power bins.



White Paper BU-LS-007: Sunny Central Storage UP-S(-US)

Sound Power Measurements on SCS 4600 UP-S(-US) central inverter with Noise Reduction Kit

Performed by:

SMA Solar Technology AG - Sonnenallee 1 - 34266 Niestetal, Germany – Test chamber 12

Revision History

Edition	Date	Annotations	Author
1.0	September 26th 2025	First Edition	Gkoutaras, Aris

Summing up of the Situation

Measurements were taken for SCS 4600 UP-S(-US). The sound power measurements were performed in accordance with the EN ISO 9614-2:2016 German Version, "Determination of sound power levels of noise sources using sound intensity".

The measurements were taken with Noise Reduction Kit (NRK) installed on the inverters, with all inverter fans operating at automatic speed.

Inspection Reference According to EN ISO 9614-2:2016 German Version

The sound level is determined according to DIN EN ISO 9614-2 "Determination of sound power levels of noise sources using sound intensity", Part 2: "Measurement by scanning".

This measurement procedure keeps interference on the measurement result caused by noises from the environment to a minimum. Discrepancies to previous measurements have been observed, low frequency sound power bins have been adjusted to filter out background noises.

Type of Test / Thresholds and Requirements:

Type of Test / Thresholds and Requirements:	Sound level measurement according DIN EN ISO 9614-2:2016 German Version of sinusoidal, irregularly shaped, transient signals. Classification of ambient conditions in compliance with the German Noise Control Guidelines (TA Lärm). (according to Section 2)
Result:	The requirements were fulfilled.

APPENDIX E: MANUFACTURE'S NOISE DATA: SMA NOISE REDUCTION KIT

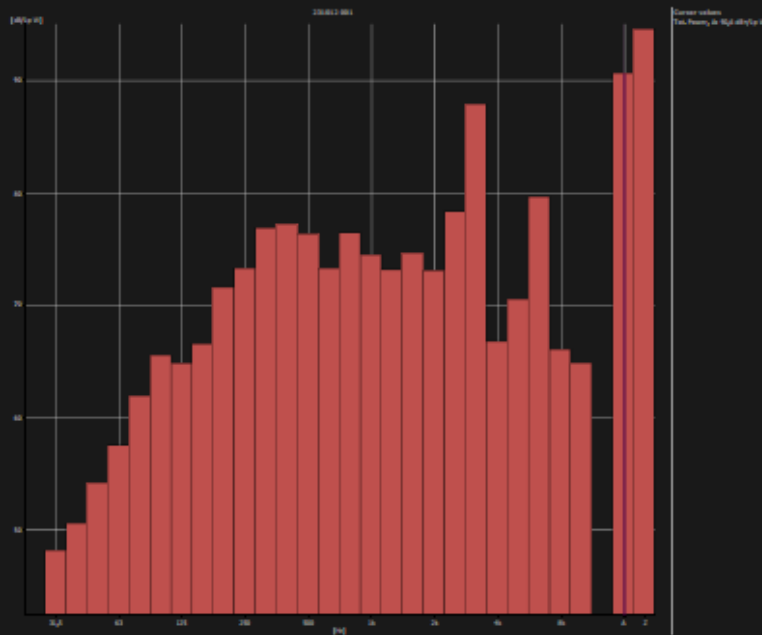
SCS3950UR-XT

SMA Solar Technology AG

1.2 Measurements

Measurement No. 1 at -4066 kVA without Silencer Kit (Reference)

Sound Power Levels of the Third Octave Band Frequencies according to EN ISO 9614-2



Overview of the Sound Power [dB]

231012 001	Meas. 1
Frequency	Tot.Pwr.A
25 Hz	42,42
31,5 Hz	48,14
40 Hz	50,5
50 Hz	54,1
63 Hz	57,5
80 Hz	61,9
100 Hz	65,51
125 Hz	64,8
160 Hz	66,51

SCS3950UR-XT

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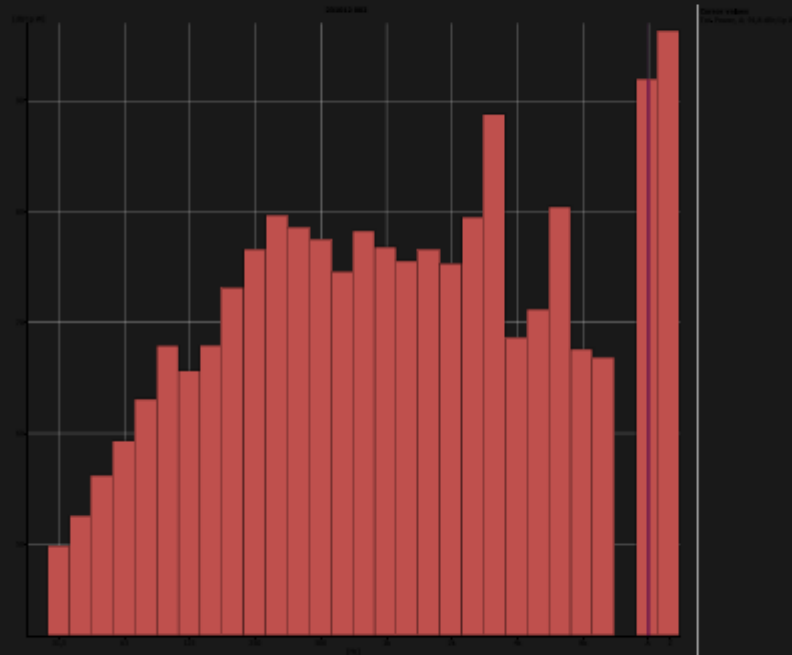
400 Hz	78,56
500 Hz	77,41
630 Hz	74,51
800 Hz	78,24
1 kHz	76,79
1,25 kHz	75,54
1,6 kHz	76,53
2 kHz	75,31
2,5 kHz	79,44
3,15 kHz	88,76
4 kHz	68,53
5 kHz	71,18
6,3 kHz	80,41
8 kHz	67,57
10 kHz	66,8
A	91,85
Z	96,32

Sound Power on finite surfaces [dB]

		AC Side		Stacks		
		82	82	80		
		78	79	82		
Air outlet	Front		Roof		Back	AC in
84	76	69	69	72	75	73
81	72	68	66	68	69	79
			DC Side			
		67	67	69		
		75	77	77		

SC53950UP-XT

SMA Solar Technology AG



Overview of the Sound Power [dB]

SCS3950UP-XT

SMA Solar Technology AG

200 Hz	71,58
250 Hz	73,27
315 Hz	76,83
400 Hz	77,13
500 Hz	76,31
630 Hz	73,27
800 Hz	76,44
1 kHz	74,41
1,25 kHz	73,14
1,6 kHz	74,61
2 kHz	73,06
2,5 kHz	78,32
3,15 kHz	87,86
4 kHz	66,76
5 kHz	70,46
6,3 kHz	79,64
8 kHz	66,04
10 kHz	64,83
A	90,57
Z	94,59

Sound Power on finite surfaces [dB]

		AC Side 80	82	Stacks 81		
		77	79	80		
Air outlet 82	Front 77	67	Roof 69	63	Back 73	AC in 72
81	69	68	65	65	68	76
		71	DC Side 67	70		
		75	75	74		