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CASE REFERENCE: JP14.318314

RESPONSE TO:	**REQUEST FOR FURTHER INFORMATION**
Title:	Noise Impact Assessment
Development Address:	Lanesborough, North Commons, Co Longford
Date:	22nd of August 2025
Prepared By:	Dirun Ergin BA MSc Principal Acoustic Consultant at Allegro Acoustics
Reviewed By:	Stephen Kearney BE MIEI MIOA Technical Director at Allegro Acoustics

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Appendices

Glossary of Terminology

L_{Aeq}: Equivalent Continuous A-weighted Sound Level. The continuous steady noise level, which would have the same total A-weighted acoustic energy as the real fluctuating noise measured over the same period of time.

L_{A90}: The A-weighted noise level that is equalled or exceeded for 90% of the measurement period. This is typically used to indicate the background noise level at a location.

L_{A10}: The A-weighted noise level that is equalled or exceeded for 10% of the measurement period.

L_{Amax}: The A-weighted maximum instantaneous noise level that is measured throughout a noise measurement.

L_{Amin}: The A-weighted minimum noise level that is measured throughout a noise measurement.

1 Introduction

Allegro Acoustics was commissioned by De Blacam and Meagher Architects to carry out a noise impact assessment in response to a Request for Further Information (RFI) for Case Reference Number: JP14.318314. This refers to a 500 seat outdoor community amphitheatre located at Commons North in Lanesborough, Co. Longford. Location for the proposed theatre is shown in Figure 1 below.

Figure 1: Satellite image showing the location of the proposed Lime Quarry Theatre in red.

The purpose of the noise assessment is to address noise related questions that were raised by the Planning Authority.

2 Suitably Qualified Consultant

This response was reviewed by Stephen Kearney. Stephen is the Technical Director at Allegro Acoustics and a summary of Stephen's qualifications and experience is presented in Table 1 below.

Qualifications and Experience of the Report Author
Stephen Kearney BEng MIEI MIOA *Technical Director at Allegro Acoustics* Qualifications: • Postgraduate Diploma in Acoustics and Noise Control from Trinity College Dublin and the Institute of Acoustics (IOA) (Hons 1:1, 2016) • Bachelor's Degree in Energy Systems Engineering from National University of Ireland, Galway (Hons 2:1 2014) Professional Memberships: • Member of Engineers Ireland (MIEI) • Member of the Institute of Acoustics (MIOA) Experience: Stephen has 11 years' experience working on the acoustic design of buildings.

Table 1: Qualifications and experience of the report author.

3 Raised Question 1, Operational Plan, Chapter 5

5. Sound System Strategy

Comprehensive details of the nature and type of sound system(s), and lighting arrangements which will be used within the Proposed Development. In this regard, while it is noted that a noise report has been prepared to inform the submitted NIS, the basis for this has been a specified sound/amplification system, and there has been no commitment or comment from the applicant as to whether this will be the sole type of sound equipment used. Furthermore, the submitted documentation does not appear to give consideration or an allowance for crowd-generated noise (during events or accessing events) and whether this will give rise to additional impact or require additional mitigation. The noise report should be updated to accordingly and detailed commitment to event noise management and operations provided. It should be noted that due to the sensitivity of the location of the site and on the basis of the documentation submitted to date, a restriction on the extent and nature of noise levels arising and timing of events may be necessary to avoid intrusive events taking place.

Figure 2: Question raised in Operational Plan, Chapter 5.

In the Planning Stage Noise Assessment Report [1], the number, placement, directivity pattern, and an example product for the modelled loudspeakers have been provided, along with the achieved sound pressure levels across the entire audience area in Section 4.3.3.2. The predicted noise levels at noise sensitive receptors will remain similar as long as the recommended (or an equivalent) loudspeaker setup is implemented. We can update the environmental noise model and provide revised results, and recommend mitigation measures, if necessary, once the sound system design has been finalised and the loudspeakers have been selected.

The Planning Stage Noise Assessment Report [1] outlines noise impact results of two different noise source representation. The first scenario (Scenario 1) consists of a 15minute period with 2.5 minutes of clapping and 12.5 minutes of talking for 500 occupants, which represents the "crown-generated noise".

The predicted noise levels of crowd-generated noise have been provided in Section 4.3.3 [1] for noise sensitive receivers and in Section 4.5 for ecological receivers. These predictions are based on the results of 3D Environmental Noise Model of the proposed Lime Quarry Theatre and of the surrounding area, developed using SoundPLAN Version 7.3 environmental noise modelling software.

For ease of reference, the locations of noise sensitive receivers and ecological receivers, together with the predicted noise levels are presented below.

Figure 3: Graphic showing the noise sensitive receiver locations.

Modelled Noise Levels - Scenario 1: Talking and Clapping			
Model Receiver	Predicted Noise Levels (dB L_{Aeq})	Proposed Criteria (dB L_{Aeq})	Criteria Achieved
R01	42	≤55	Yes
R02	47	≤55	Yes
R03	47	≤55	Yes
R04	51	≤55	Yes
R05	52	≤55	Yes
R06	50	≤55	Yes
R07	44	≤55	Yes
R08	43	≤55	Yes
R09	51	≤55	Yes
R10	45	≤55	Yes
R11	33	≤55	Yes
R12	33	≤55	Yes
R13	37	≤55	Yes
R14	37	≤55	Yes
R15	41	≤55	Yes
R16	30	≤55	Yes

Table 2: Predicted noise levels for crowd-generated noise at noise sensitive receivers.

Additional receivers that were included in the noise model to assist an ecological survey are shown below.

Figure 4: Graphic showing the ecological receiver locations.

Modelled Noise Levels - Scenario 1: Talking + Clapping	
Model Receiver	Predicted Noise Levels (dB L_{Aeq})
E01	43
E02	41
E03	44
E04	39
E05	38
E06	36
E07	35
E08	34

Table 3: Predicted noise levels for crowd-generated noise for the ecological survey.

Our recommendations regarding the event noise management and operations are outlined below:

- Restrict event sound checks to daytime hours only.
- Ensure that no music events take place after 11:00 pm.
- Implement real-time noise monitoring at noise-sensitive locations during events.
- Undertake continuous measurement and record keeping to ensure that noise levels remain below the suggested limit of 55 dB L_{Aeq}.
- Design loudspeaker systems in line with the setup modelled in the assessment to minimise noise impact on surrounding sensitive receptors.

4 Raised Question 2, Response to Development Applications Unit Observations, Chapter 2.7

2.7

Observation: *"Whilst it is noted that it is stated that the acoustic modelling exercise was tailored to address ecological impacts, it is difficult to understand how "amplified music events" could result in such low sound levels. If permitted, it would be necessary to restrict the types of events that could be held at the venue to ensure that elevated noise levels or particularly intrusive events do not take place."*

Figure 5: Question raised in Response to Development Applications Unit Observations, Chapter 2.7.

In the Planning Stage Noise Assessment Report [1], the predicted noise levels for the second scenario (Scenario 2) shows the results of loudspeaker setup providing 77-80dBA throughout the entirety of the audience area which represents the "amplified music events".

The predicted noise levels of amplified music events have been provided in Section 4.3.3 for noise sensitive receivers, and in Section 4.5 for ecological receivers. These predictions are based on the results of 3D Environmental Noise Model of the proposed Lime Quarry Theatre and of the surrounding area, developed using SoundPLAN Version 7.3 environmental noise modelling software [1].

According to the model results, noise levels at surrounding noise sensitive receivers are not expected to exceed the suggested limit of 55 dB L_{Aeq}, with the modelled number, placement, and directivity of loudspeakers. For ease of reference, the predicted noise levels are presented below.

Modelled Noise Levels - Scenario 2: Amplified Performance			
Model Receiver	Predicted Noise Levels (dB L_{Aeq})	Proposed Criteria (dB L_{Aeq})	Criteria Achieved
R01	49	≤55	Yes
R02	52	≤55	Yes
R03	52	≤55	Yes
R04	52	≤55	Yes
R05	53	≤55	Yes
R06	52	≤55	Yes
R07	48	≤55	Yes
R08	47	≤55	Yes
R09	52	≤55	Yes
R10	47	≤55	Yes
R11	37	≤55	Yes

R12	36	≤55	Yes
R13	40	≤55	Yes
R14	41	≤55	Yes
R15	44	≤55	Yes
R16	37	≤55	Yes

Table 4: Predicted noise levels for amplified music noise at noise sensitive receivers.

Modelled Noise Levels - Scenario 2: Amplified Performance	
Model Receiver	Predicted Noise Levels (dB L_{Aeq})
E01	52
E02	50
E03	52
E04	44
E05	42
E06	39
E07	39
E08	38

Table 5: Predicted noise levels for amplified music noise for the ecological survey.

5 Raised Question 3, Response to Pauline Smyth, Chapter 3.6

3.6

Observation: *"The background level noise survey for this project (Allegro Acoustics) was carried out during the highest level (level 5) of Covid-19 social and travel restrictions (April 8th and April 9 2021). As such, the baseline noise levels in the area have increased very significantly to now normal levels, since Covid-19 related travel restrictions have been removed.*

Basis for objection:

- *The noise survey does not reflect normal noise levels as it was carried out during the highest (level 5) covid 19 social and travel restrictions. This caveat is included on page 8 of the report."*

Figure 6: Question raised in Response to Pauline Smyth, Chapter 3.6.

A follow-up environmental noise survey was conducted by Allegro Acoustics on the 7th of August 2025. The details of the survey and the results are presented in this section.

5.1 Baseline Noise Levels

In order to establish the existing noise environment in the vicinity of the proposed theatre, Allegro Acoustics carried out a manned noise survey at four locations at the site of the proposed development on the 7th of August 2025. Noise measurements were carried out during day and evening times. Night time measurements were not undertaken as the theatre will not be operational during night time hours. Noise monitoring was carried out according to the methodologies outlined in the following standards:

- International Standards Organization, *ISO 1996 Acoustics – Description and Measurement of Environmental Noise* [2].
- Environmental Protection Agency, *Guidance Note for Noise: License Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4)* [3].

Four noise monitoring locations were chosen for this noise survey. These monitoring locations represent the closest noise sensitive locations to the proposed theatre. The noise monitoring locations, denoted as NSL1, NSL2, NSL3 and NSL4 are detailed in Table 6 below.

Noise Monitoring Locations	
Monitoring Point	Receptor Type
NSL1	Amenity Area
NSL2	Residential
NSL3	Residential
NSL4	Residential

Table 6: Description of the noise monitoring locations.

Figure 7: Baseline Noise Survey Monitoring Locations.

The duration and number of measurements at each monitoring location is presented in Table 7 below. As per the guidance provided by the Environmental Protection Agency in *Guidance Note for Noise (NG4)* [3], day and evening time periods are defined as follows:

- Day: 07:00 - 19:00
- Evening: 19:00 - 23:00

Noise Monitoring Duration		
Monitoring Point	Day Time (07:00 – 19:00)	Evening Time (19:00 – 23:00)
NSL1	1 x 30 Minutes	1 x 30 Minutes
NSL2	1 x 30 Minutes	1 x 30 Minutes
NSL3	1 x 30 Minutes	1 x 30 Minutes
NSL4	1 x 30 Minutes	1 x 30 Minutes

Table 7: Noise monitoring duration.

Weather conditions were observed to be conducive to noise monitoring during the noise survey (wind <5m/s, rain <1mm per hour [3]). The characteristics of the noise environment are described in Table 8 below.

Characteristics of the Noise Environment		
Location	Period	Observations
NSL1	Day	The primary noise sources at NSL1 during the day time measurement were observed to be cars entering/leaving the adjacent car park, pedestrians talking and a consistent flapping noise from some fabric on a small boat that was anchored nearby. Additional noise sources included rustling foliage, birdsong, and occasional engine noise from boats passing by.
	Eve	The primary noise sources at NSL1 during the evening time measurement were observed to be cars entering/leaving the adjacent car park, and pedestrians talking. Additional noise sources included rustling foliage, geese honking, and an occasional flapping noise from some fabric on a small boat that was anchored nearby.
NSL2	Day	The primary noise sources during the day time measurement at NSL2 were observed to be frequent traffic on the adjacent Rathcline Road, and an occasional grinding noise from a neighbour using power tools while working on their car. Additional noise sources included rustling foliage, and birdsong.
	Eve	The primary noise source during the evening time measurement at NSL2 was observed to be occasional traffic on the adjacent Rathcline Road. Additional noise sources included rustling foliage, and birdsong.
NSL3	Day	The primary noise source during the day time measurement at NSL3 was observed to be frequent traffic on the adjacent Rathcline Road. Additional noise sources included rustling foliage, and birdsong.
	Eve	The primary noise source during the evening time measurement at NSL3 was observed to be occasional traffic on the adjacent Rathcline Road. Additional noise sources included rustling foliage, and birdsong.
NSL4	Day	The primary noise source during the day time measurement at NSL4 was observed to be frequent traffic on the adjacent Rathcline Road. Additional noise sources included rustling foliage, and birdsong.
	Eve	The primary noise source during the evening time measurement at NSL4 was observed to be occasional traffic on the adjacent Rathcline Road. Additional noise sources included rustling foliage, and birdsong.

Table 8: Characteristics of the noise environment as observed during the noise survey.

The results of the noise survey are presented in Table 9 and Figure 8 below. A detailed table of results showing the measured 1/3rd octave dB L_{eq} and dB L_{90} values for each measurement are also included in Appendix A. Note that the background noise level is typically depicted using the dB L_{A90} statistical indicator [4].

Measured Noise Levels									
Location	Meas No.	Start Time	Period	Duration	dB L_{Aeq}	dB L_{A90}	dB L_{A10}	dB L_{Amax}	dB L_{Amin}
NSL1	3	07/08/2025 17:44	Day	00:30:00	62	40	50	97	32
	8	07/08/2025 21:13	Eve	00:30:00	44	36	46	71	29
NSL2	4	07/08/2025 18:20	Day	00:30:00	59	39	60	82	32
	7	07/08/2025 20:31	Eve	00:30:00	60	34	61	81	31
NSL3	2	07/08/2025 17:08	Day	00:30:00	63	40	63	87	35
	6	07/08/2025 19:55	Eve	00:30:00	58	37	58	82	32
NSL4	1	07/08/2025 16:35	Day	00:30:00	60	39	61	82	34
	5	07/08/2025 19:13	Eve	00:30:00	61	37	61	82	33

Table 9: Measured noise levels at the site of the proposed development.

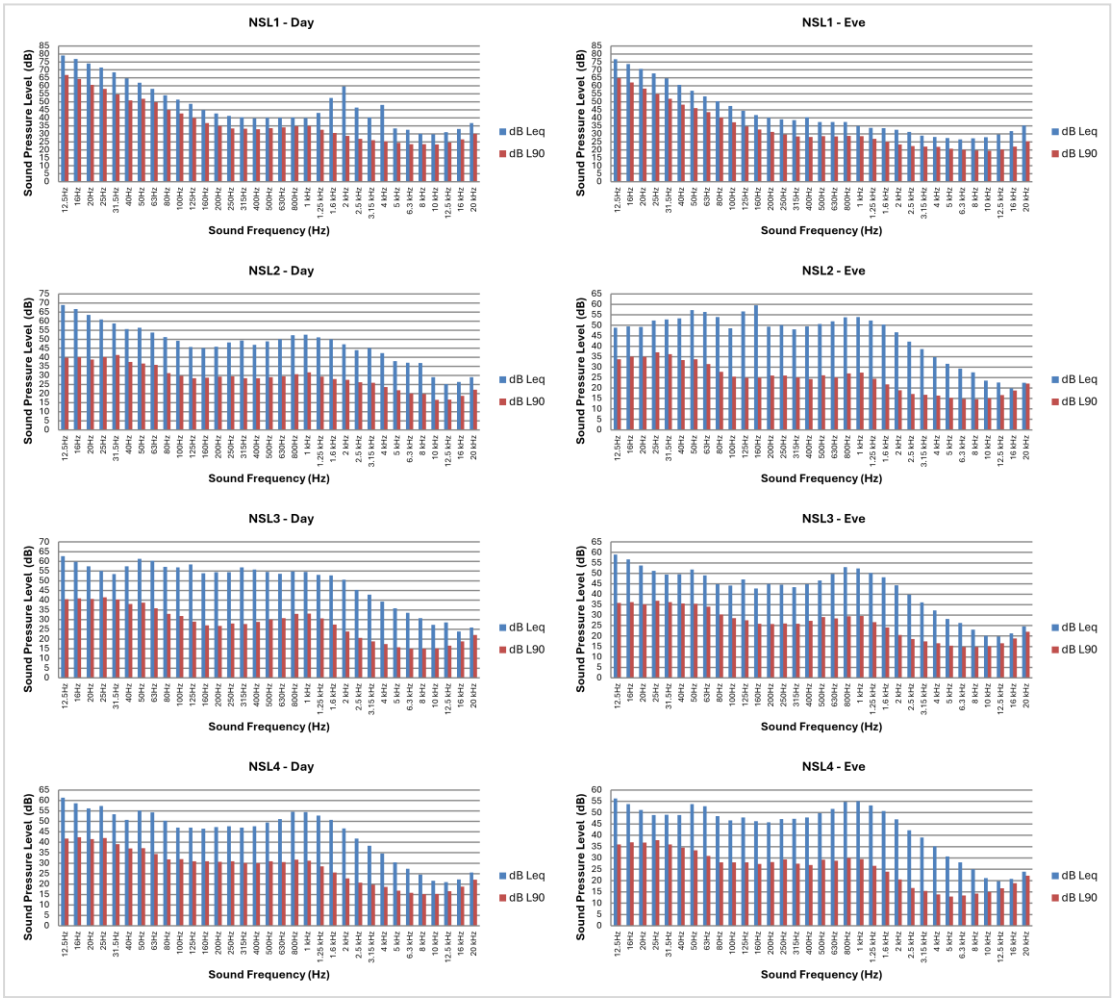

Figure 8: Graphical representation of the measured 1/3rd octave dB L_{eq} and dB L_{90} values for each measurement. This data is included in tabular format in Appendix A.

The 1/3rd Octave frequency breakdown for each measurement has been assessed for tonality using the 1/3rd Octave method outlined by the Environmental Protection Agency in *Guidance Note for Noise (NG4)* [2]. During the NSL1 Day measurement, it can be seen in the L_{eq} spectrum that there was elevated sound energy at 2kHz and at 4kHz. This can be seen in the 1/3rd octave band spectrum shown in figure below.

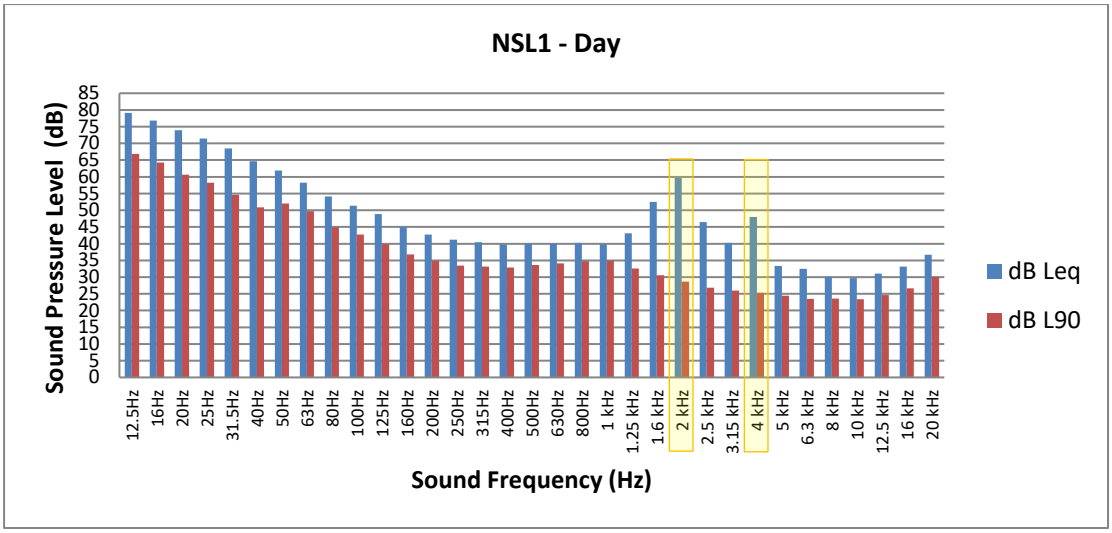

Figure 9: The 1/3rd octave band spectrum for the Day measurement at NSL1, showcasing elevated noise energy in the L_{eq} spectrum at 2kHz and 4kHz.

In each case, the elevated sound energy exceeded the adjacent bands by the given margin of 5dB in high-frequency bands (500Hz to 10,000Hz). However, the elevated sound energy was not observed in the L_{90} spectrum, nor was it observed during the evening time measurement at this location. It is likely that this elevated sound energy was caused by the flapping fabric on a nearby anchored boat, as mentioned in the sound observations during this measurement.

The background noise environment at the site of the proposed development was not observed to have any significant impulsive characteristics.

6 References

[1] Allegro Acoustics, “DC2068-01 Lime Quarry Theatre Planning Stage Noise Assessment,” 21.12.2022.

[2] International Standards Organisation, “ISO 1996-1 Acoustics - Description and measurent of environmental noise - Part 1: Basic quantities and assessment procedures,” 2016.

[3] Environmental Protection Agency, “Guidance Note for Noise: License Applications, Surveys and Assessments in Relation to Scheduled Activities,” 2016.

[4] British Standards Institution, “BS 4142 Method for rating and assessing industrial and commercial sound,” 2014.

[5] World Health Organisation, “Guidelines for Community Noise,” 1999.

[6] International Standards Organisation , ISO 9613-1 Acoustics — Attenuation of sound during propagation outdoors, 1993.

[7] International Standards Organisation, ISO 9613-2 Acoustics — Attenuation of sound during propagation outdoors, 1996.

[8] National Roads Authority, “Guidelines for the Treatment of Noise and Vibration in National Road Schemes,” 2004.

[9] SoundPLAN V7.3, Noise Emissions Library.

[10] N. M. P. a. G. E. Stavroulakis, Handclap for Acoustic Measurements: Optimal Application and Limitations, 2020.

Appendix A

L_{eq} and L_{90} 1/3rd Octave Frequency Data and Graphs

ALLEGRO
acoustics

Testing Agency:	Allegro Acoustics
Testing Operator:	Mark Kearney BE
SLM:	Cirrus CR171B
SLM Serial Number:	G301877
SLM Factory Calibration Date:	24/10/2024
Sound Field Correction:	Free Field
Bandwidth:	1/3rd Octave - Fully Integrating
Time Weighting:	Fast

dB Leq Measurement Data

Location	Period	Measurement	Start Time	Elapsed	LZeq	LZeq	LZeq	LZeq	LZeq	LZeq	LZeq	LZeq	LZeq	LZeq	LZeq	LZeq	LZeq	LZeq	LZeq	LZeq	LZeq	LZeq	LZeq	LZeq	LZeq	LZeq	LZeq	LZeq	LZeq	LZeq	LZeq	LZeq	LZeq	LZeq	LZeq
				Time	12.5Hz	16Hz	20Hz	25Hz	31.5Hz	40Hz	50Hz	63Hz	80Hz	100Hz	125Hz	160Hz	200Hz	250Hz	315Hz	400Hz	500Hz	630Hz	800Hz	1 kHz	1.25 kHz	1.6 kHz	2 kHz	2.5 kHz	3.15 kHz	4 kHz	5 kHz	6.3 kHz	8 kHz	10 kHz	12.5 kHz	16 kHz	20 kHz
NSL1	Day	3	07/08/2025 17:44	00:30:00	79.1	76.8	73.9	71.5	68.5	64.7	61.9	58.2	54.1	51.4	48.8	45.0	42.8	41.2	40.4	39.7	40.1	40.1	40.3	39.9	43.1	52.5	59.7	46.5	40.3	48.0	33.4	32.5	30.1	29.7	31.1	33.1	36.7
NSL1	Eve	8	07/08/2025 21:13	00:30:00	76.6	73.7	70.6	67.7	64.6	60.6	56.9	53.4	50.4	47.5	44.5	41.8	40.1	39.1	38.5	40.4	37.4	37.3	37.4	34.9	33.7	33.5	32.6	31.3	28.9	28.1	27.4	26.6	27.2	27.9	29.6	31.7	35.3
NSL2	Day	4	07/08/2025 18:20	00:30:00	68.9	66.6	63.5	61.0	58.7	55.7	56.4	53.7	51.3	49.2	45.8	45.2	45.9	48.2	49.2	46.9	48.9	50.1	52.3	52.5	51.0	50.0	47.2	44.0	45.1	42.4	37.9	37.1	36.9	29.1	25.2	26.5	29.1
NSL2	Eve	7	07/08/2025 20:31	00:30:00	48.8	49.5	49.2	52.3	52.8	53.3	57.3	56.4	54.0	48.6	56.7	59.6	49.3	50.2	48.1	49.4	50.6	52.0	53.8	53.9	52.3	50.3	46.7	42.3	38.7	34.8	31.6	29.2	27.4	23.5	22.6	19.8	22.6
NSL3	Day	2	07/08/2025 17:08	00:30:00	62.7	59.8	57.4	55.1	53.5	57.5	61.3	60.3	57.1	56.9	58.4	53.8	54.5	54.4	56.9	55.8	54.6	53.6	54.9	54.6	53.0	52.8	50.5	45.4	42.9	39.3	35.8	33.5	30.8	27.4	28.6	23.9	25.9
NSL3	Eve	6	07/08/2025 19:55	00:30:00	59.0	56.7	53.7	51.2	49.4	49.5	51.8	49.0	44.8	44.1	47.1	42.7	44.9	44.5	43.3	44.8	46.6	49.6	53.0	52.3	50.2	48.1	44.2	39.8	36.1	32.2	28.2	26.2	23.0	20.2	19.8	21.3	24.6
NSL4	Day	1	07/08/2025 16:35	00:30:00	61.3	58.6	56.3	57.3	53.4	50.7	55.1	54.3	50.4	47.0	47.0	46.5	47.3	47.6	47.0	47.7	49.4	51.2	54.5	54.4	52.8	50.7	46.6	41.8	38.3	34.6	30.4	27.4	24.5	21.6	21.0	22.2	25.5
NSL4	Eve	5	07/08/2025 19:13	00:30:00	56.3	53.7	51.2	48.9	49.1	48.9	53.8	52.8	48.4	46.6	47.9	46.3	45.7	47.1	47.3	47.9	49.7	51.6	54.8	55.0	53.2	50.7	47.1	42.2	39.1	35.1	30.6	28.1	24.9	21.1	19.6	20.7	23.9

dB L90 Measurement Data

Location	Period	Measurement	Start Time	Elapsed	LZ90	LZ90	LZ90	LZ90	LZ90	LZ90	LZ90	LZ90	LZ90	LZ90	LZ90	LZ90	LZ90	LZ90	LZ90	LZ90	LZ90	LZ90	LZ90	LZ90	LZ90	LZ90	LZ90	LZ90	LZ90	LZ90	LZ90	LZ90	LZ90	LZ90	LZ90
				Time	12.5Hz	16Hz	20Hz	25Hz	31.5Hz	40Hz	50Hz	63Hz	80Hz	100Hz	125Hz	160Hz	200Hz	250Hz	315Hz	400Hz	500Hz	630Hz	800Hz	1 kHz	1.25 kHz	1.6 kHz	2 kHz	2.5 kHz	3.15 kHz	4 kHz	5 kHz	6.3 kHz	8 kHz	10 kHz	12.5 kHz	16 kHz	20 kHz
NSL1	Day	3	07/08/2025 17:44	00:30:00	66.9	64.3	60.6	58.2	54.6	50.9	52.0	49.7	44.9	42.7	39.9	36.8	34.9	33.4	33.2	32.9	33.6	34.1	34.8	34.9	32.6	30.6	28.7	26.8	26.0	25.3	24.4	23.5	23.6	23.4	24.6	26.6	30.1
NSL1	Eve	8	07/08/2025 21:13	00:30:00	64.8	62.1	58.3	54.9	51.9	48.3	46.1	43.6	40.3	37.3	34.5	32.7	31.3	29.5	28.4	28.1	28.5	28.3	28.7	28.6	26.9	25.0	23.4	22.4	22.0	21.8	20.7	20.0	19.5	19.4	20.2	22.1	25.3
NSL2	Day	4	07/08/2025 18:20	00:30:00	39.9	40.2	38.8	40.2	41.3	37.4	36.6	35.8	31.3	29.8	28.5	28.7	29.4	29.5	28.5	28.5	29.0	29.5	30.7	31.7	29.4	28.0	27.6	26.3	26.0	23.6	21.9	20.1	19.8	16.5	16.7	18.8	22.1
NSL2	Eve	7	07/08/2025 20:31	00:30:00	33.8	35.0	34.9	37.1	36.2	33.4	33.8	31.4	27.7	25.4	24.9	24.9	26.0	26.0	25.0	24.3	26.1	25.1	27.0	27.4	24.4	21.8	18.9	17.2	16.8	16.4	15.4	14.7	14.6	15.1	16.6	18.8	22.1
NSL3	Day	2	07/08/2025 17:08	00:30:00	40.5	40.9	40.7	41.5	40.4	38.0	38.7	35.8	32.9	31.8	29.0	27.1	26.8	28.0	27.7	28.8	30.0	30.8	32.9	33.1	30.6	27.4	23.9	20.5	18.8	17.4	15.8	15.1	15.0	15.2	16.6	18.8	22.1
NSL3	Eve	6	07/08/2025 19:55	00:30:00	35.9	36.2	35.2	36.9	36.2	35.6	35.4	34.1	30.3	28.5	27.5	25.9	25.7	26.0	25.9	27.3	29.1	28.4	29.5	29.6	26.7	24.1	20.5	18.6	17.4	16.6	15.4	14.8	14.7	15.1	16.6	18.8	22.1
NSL4	Day	1	07/08/2025 16:35	00:30:00	41.7	42.4	41.5	42.0	39.1	37.0	37.2	34.4	31.8	31.9	30.9	30.9	30.6	30.9	30.1	30.0	30.9	30.5	31.7	31.2	28.5	25.5	22.7	20.7	19.7	18.6	16.9	15.8	15.2	15.3	16.6	18.8	22.1
NSL4	Eve	5	07/08/2025 19:13	00:30:00	35.9	36.9	36.8	37.8	36.0	34.5	33.4	30.9	28.1	28.1	28.1	27.3	28.2	29.3	27.4	26.9	29.2	28.8	29.9	29.5	26.5	23.9	20.5	16.7	15.4	13.9	13.0	13.4	14.2	15.0	16.6	18.8	22.2

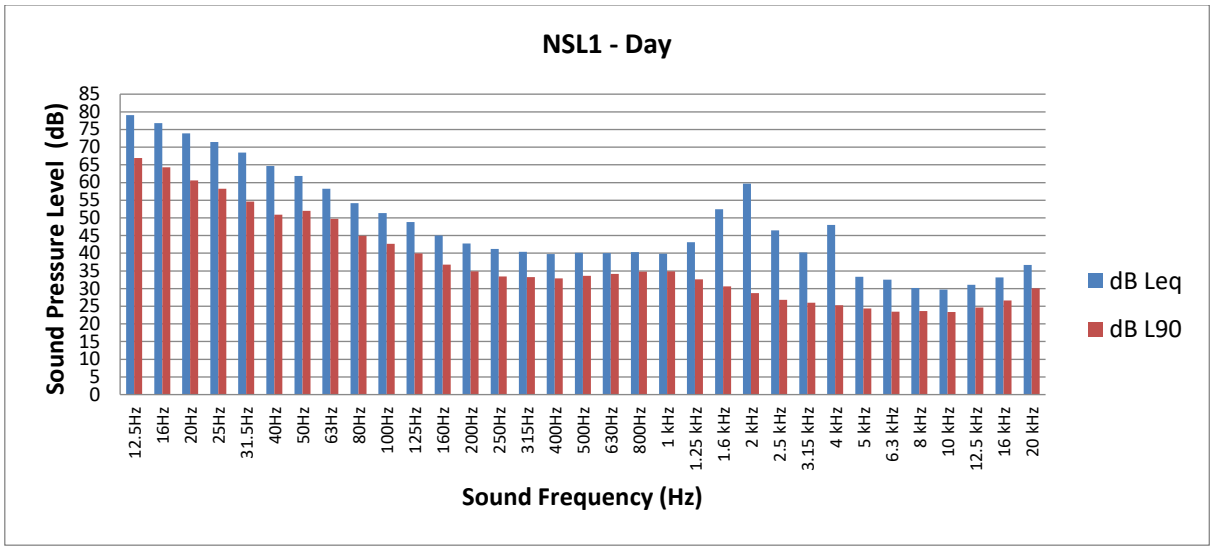

Figure A1: NSL1 Day time 1/3rd Octave Band Frequency Analysis

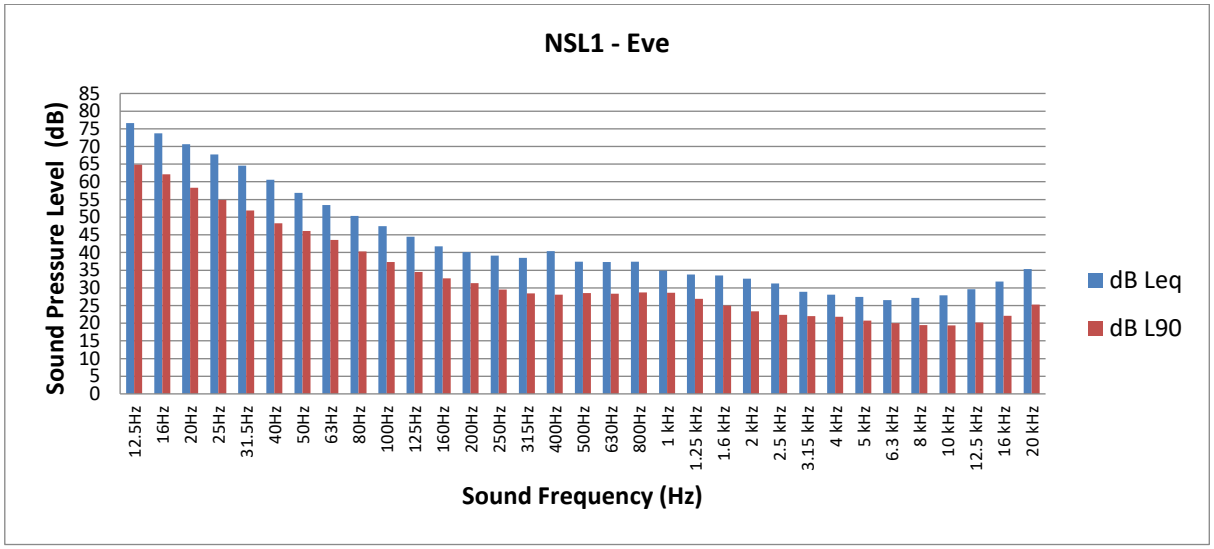

Figure A2: NSL1 Eve time 1/3rd Octave Band Frequency Analysis

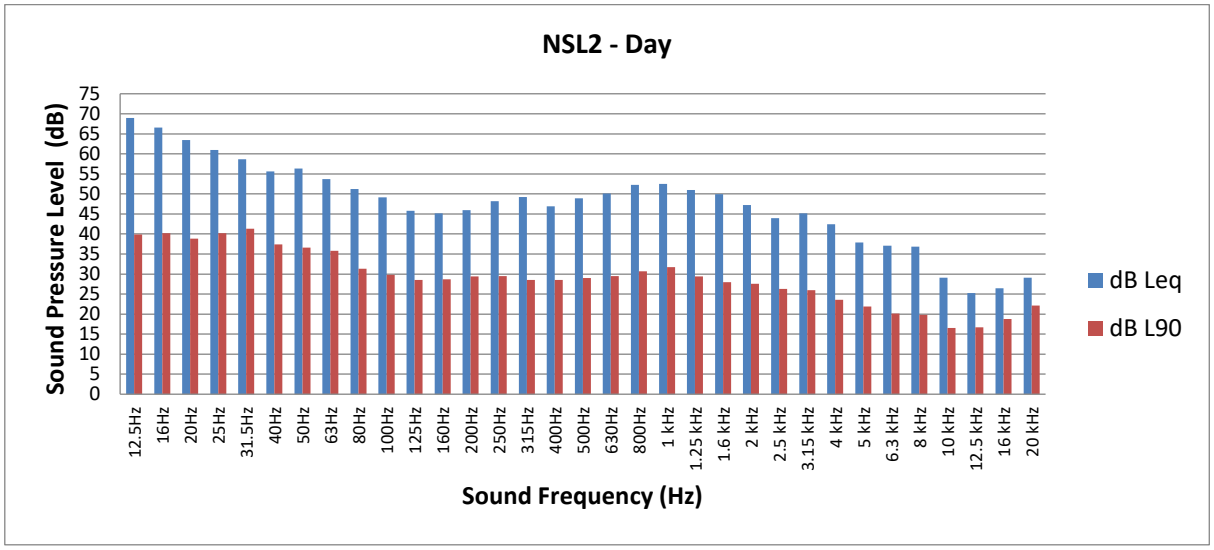

Figure A3: NSL2 Day time 1/3rd Octave Band Frequency Analysis

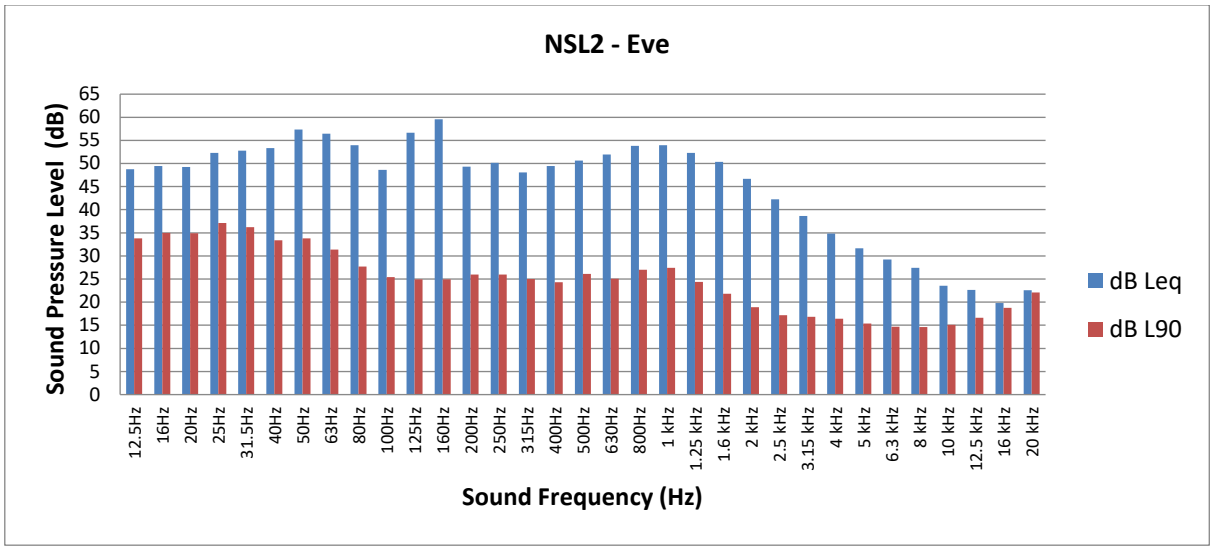

Figure A4: NSL2 Eve time 1/3rd Octave Band Frequency Analysis

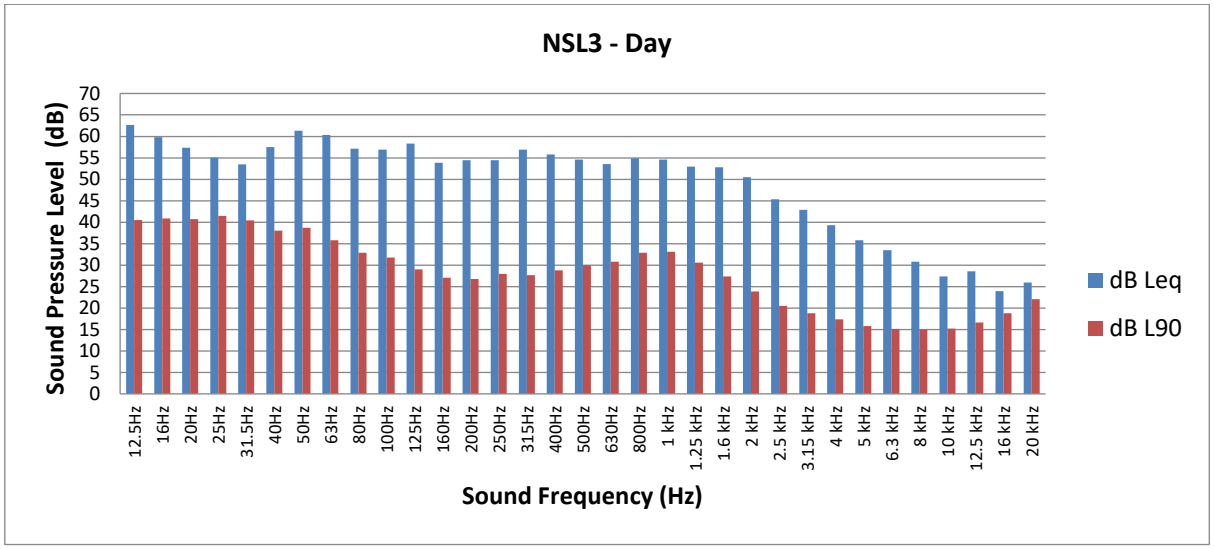

Figure A5: NSL3 Day time 1/3rd Octave Band Frequency Analysis

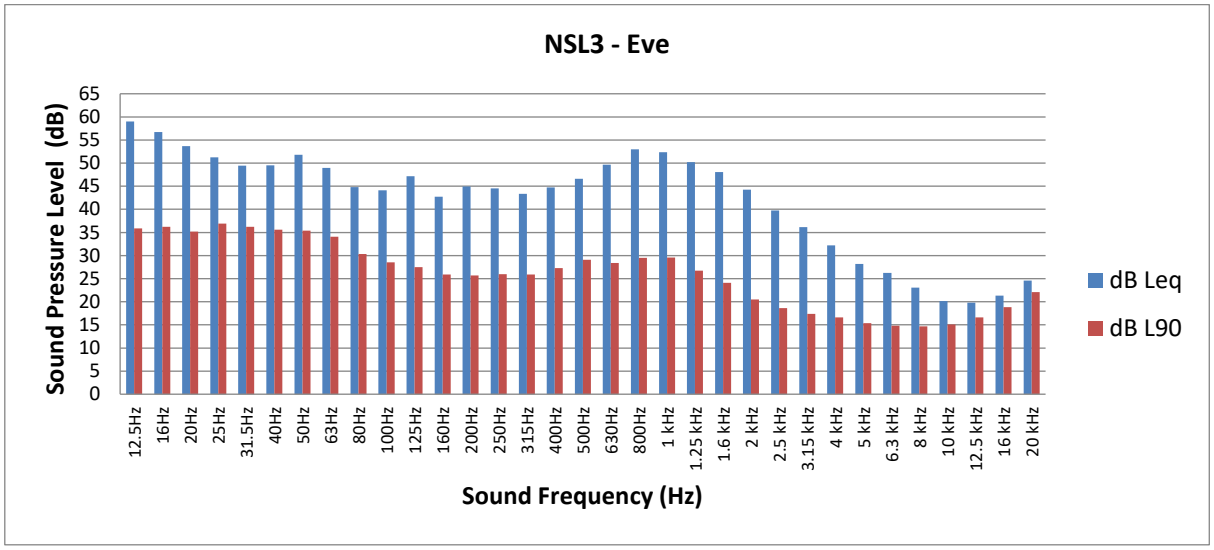

Figure A6: NSL3 Eve time 1/3rd Octave Band Frequency Analysis

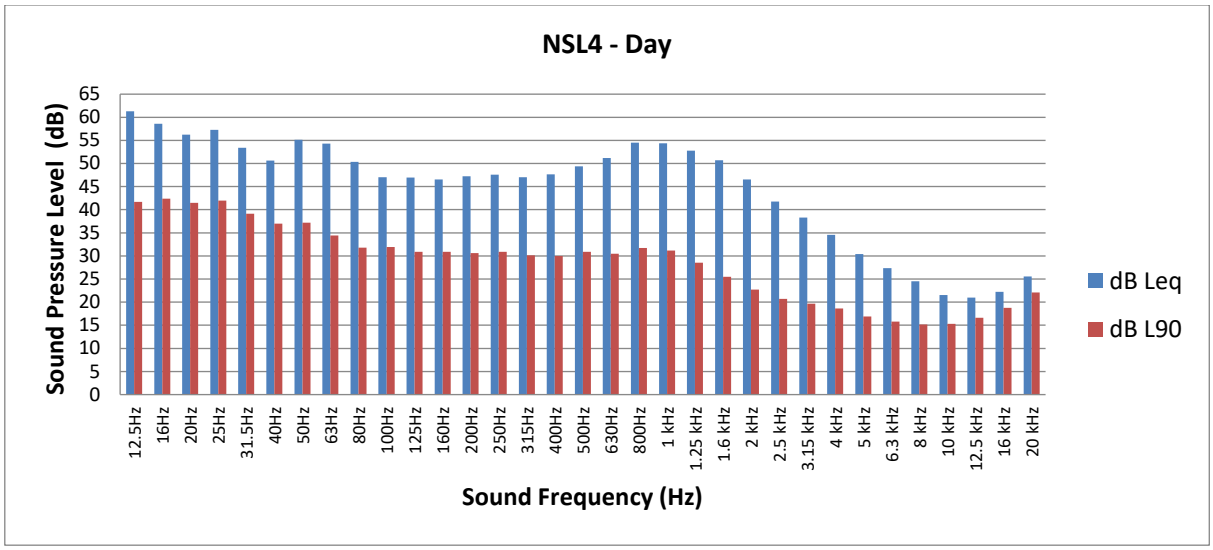

Figure A7: NSL4 Day time 1/3rd Octave Band Frequency Analysis

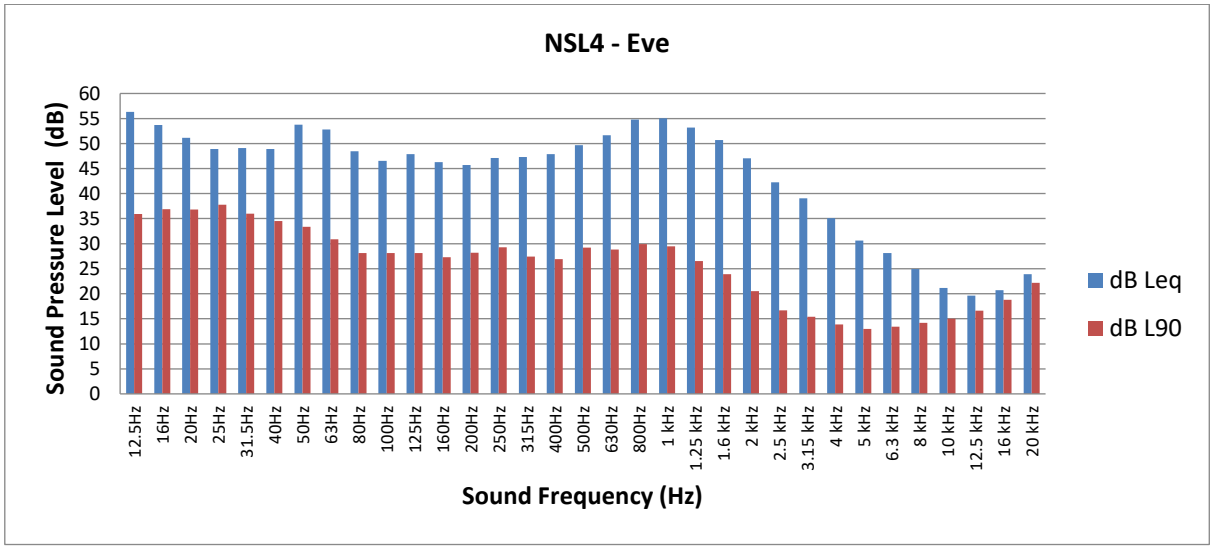

Figure A8: NSL4 Eve time 1/3rd Octave Band Frequency Analysis

Appendix B

Calibration Certification

SONITUS SYSTEMS

Statement of Calibration

Issued to:

Allegro Acoustics
C1 South City Business Park
Tallaght
Dublin 24

Calibration Reference
SLM240275

Test Date: 24/10/2024
Procedure: TP-SLM-1

Equipment

Item Calibrated:	Sound Level Meter	**Model**	CR:171B
Make:	Cirrus Research	**Serial Number:**	G301877

Calibration Procedure

The sound level meter was allowed to stabilize for a suitable period, as described in the manufacturer's instruction manual, in laboratory conditions. The sound level meter was calibrated by carrying out the verification tests detailed in IEC 61672-3 (2006), Periodic tests, specification of sound level meters. Tolerances for verification procedures are specified in IEC 61672-1 (2003).

Calibration Standards

Description	Serial Number
National Instruments PXI-4461	20D2877
Stanford Research DS360	123803

The standards used in this calibration are traceable to NIST and/or other National Measurement Institutes (NMI's) that are signatories of the International Committee of Weights and Measures (CIPM) mutual recognition agreement (MRA).

Signed on behalf of Sonitus Systems:

Deemot Geraghty

Certificate of Calibration

Issued to:	Certificate Number
Allegro Acoustics C1 South City Business Park Tallaght Dublin 24 D24 PN28	AC250299

Test Date: 28/05/2025
Procedure: TP-ACOCAL-1

Equipment Information

Item Calibrated:	Acoustic Calibrator	**Model:**	CR:515
Make:	Cirrus Research	**Serial Number:**	95716

Calibration Procedure

The above calibrator was verified in line with the requirements of BS EN 60942:2003. The calibrator was allowed to stablize for a suitable period, as described in the manufacturer's instruction manual, in laboratory conditions. The sound pressure level in the cavity (half-inch) was measured. The operating frequency and signal distortion were also measured.

Calibration Standards

Description	Serial Number
National Instruments PXI-4461	148F7F9
GRAS 42AA Pistonphone	227947
GRAS 46A0 Pressure Field Microphone	228216

The standards used in this calibration are traceable to NIST and/or other National Measurement Institutes (NMI's) that are signatories of the International Committee of Weights and Measures (CIPM) mutual recognition agreement (MRA).

Signed on behalf of Sonitus Systems: