

Barangaroo Metro Station

Noise & Vibration Monitoring Report

September 2021 to March 2022

23 August 2022

Caption: Queensland Country Bank Stadium,
Townsville

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Noise & Vibration Monitoring Report

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Project overview

Project Site Address:

Hickson Road
Barangaroo
NSW 2000

BESIX Watpac State Division Address:

Level 24, 44 Market Street
SYDNEY
NSW 2000

Project Commencement Date:

12 March 2021

BESIX Watpac ABN:

71 010 462 816


Document Control

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Version	Date	Revision Description	Release Sign off
00	07/06/22	Revised to address AA comments	Luke Hunter / Snr. Construction Manager
01	23/08/22	Final Revision	Luke Hunter / Snr. Construction Manager

BESIX Watpac Approvals

Name	Role & Title	Signature	Date
Mike Nevin	Author / Planning & Environment Manager		23/08/22
Luke Hunter	Reviewer / Senior Project Manager		23/08/22

Note: A controlled copy of the Noise and Vibration Monitoring Report will be distributed to the Sydney Metro Principal's Representative, Environmental Representative (ER), the Acoustic Advisor (AA) and other nominated stakeholders, and it will be made available to all BR COP employees and subcontractors in soft copy format through the project document control system.

This document, when printed, will be uncontrolled and it will be the responsibility of each user to confirm the currency of the plan through the project document control system.

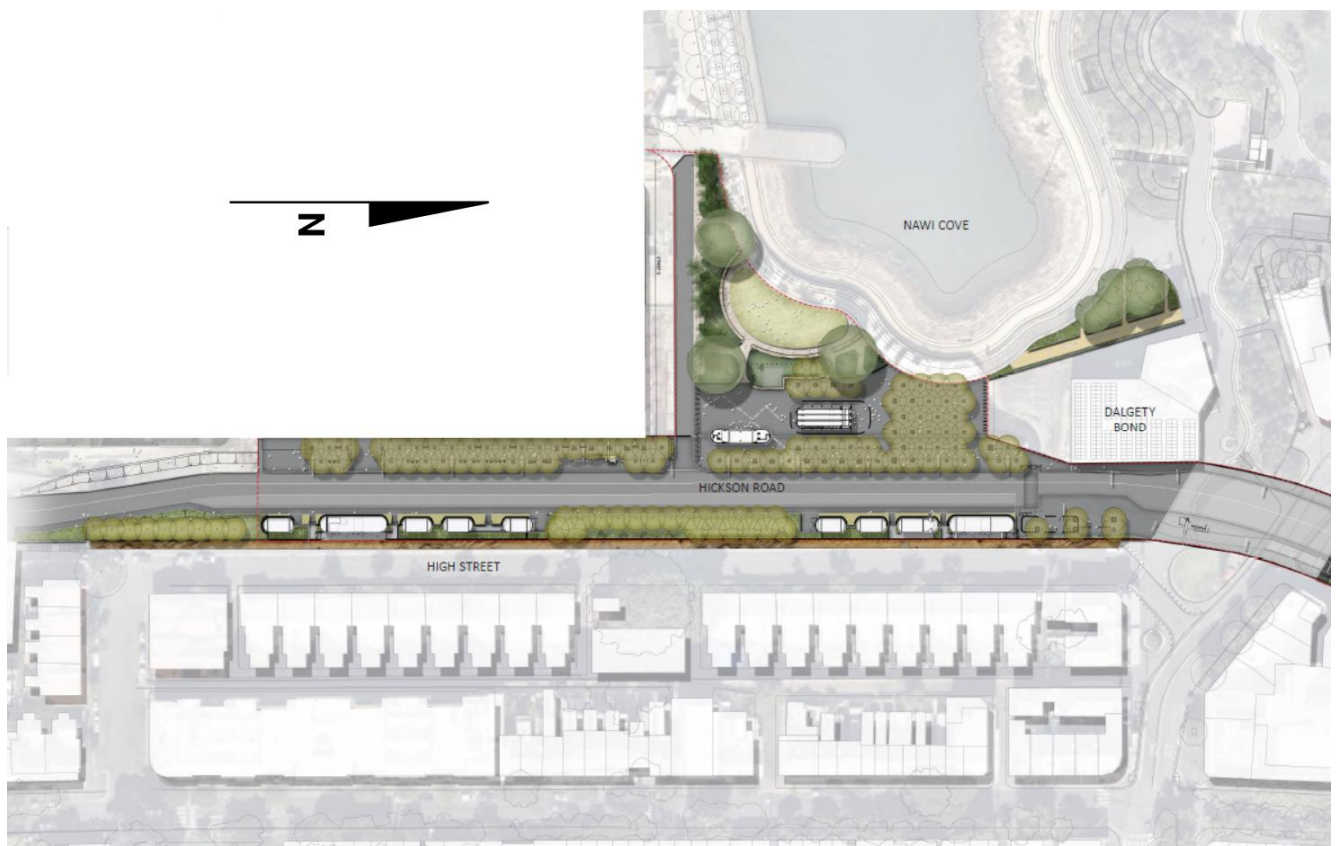
1. Introduction

The Sydney Metro City & Southwest Project is a 30-kilometre metro railway between Chatswood and Bankstown including 17 kilometres of new tunnels from Chatswood to Sydenham travelling under Sydney Harbour connecting 7 new underground stations at Crows Nest, Victoria Cross (North Sydney), Barangaroo, Pitt Street, Martin Place, Central and Waterloo. Upgrading 13 kilometres of the Bankstown line including 11 existing stations at Sydenham, Marrickville, Dulwich Hill, Hurlstone Park, Canterbury, Campsie, Belmore, Lakemba, Wiley Park, Punchbowl and Bankstown plus service facilities.

BESIX Watpac have been engaged by Sydney Metro to build the Barangaroo Station Construct Only Package (BR COP), forming part of the broader Sydney Metro City & Southwest Chatswood to Sydenham project.

The project site is located North of the Barangaroo precinct below Hickson Road on the North-western edge of the Sydney CBD and adjacent to Nawi Cove as shown in Figure 1. The station is the most northerly of the CBD stations.

Figure 1 - Location of Barangaroo Station



2. Purpose

This Noise and Vibration Management Report (NVMR) is a summary of all noise and vibration monitoring conducted over the 6-month period from the commencement of Construction on 16th September 2021 to 15th March 2022.

The Noise and Vibration Management Plan (CNVMP) outlines in Appendix E a Construction Noise and Vibration Monitoring Program which details the monitoring required by Condition of Approval (CoA) C10 and the frequency of reporting. The Construction Noise and Vibration Monitoring Program has been endorsed by the Acoustic Advisor (AA) and approved by the Secretary in accordance with CoA C13.

CoA C16 required the results of the monitoring program to be provided to the Secretary for information at the frequency identified in the program. The approved monitoring program states that the details of the noise and vibration monitoring will be reported on a six-monthly basis.

The independent Acoustic Advisor will be provided the report for endorsement prior to submission to the Secretary for information by Sydney Metro.

The applicable CoAs are shown in Table 1 below:

Table 1 Conditions of Approval

Condition		Reference
C9	<p>The following Construction Monitoring Programs must be prepared in consultation with the relevant government agencies identified for each Construction Monitoring Program to compare actual performance of construction of the CSSI against predicted performance.</p> <p>Required Construction Monitoring Programs and (Relevant government agencies to be consulted for each Construction Monitoring Program)</p> <p>Noise and Vibration (EPA and Relevant Council(s))</p> <p>Blasting (EPA and Relevant Council(s))</p> <p>Water Quality – (EPA and Relevant Council(s))</p> <p>Groundwater – (DPI Water)</p>	<p>Noise and Vibration – refer to the Construction Noise and Vibration Management Plan</p> <p>Blasting – Not applicable (Appendix A Staging Report)</p> <p>Water Quality – Not applicable (Appendix A Staging Report)</p> <p>Groundwater – Not applicable (Appendix A – Staging Report)</p>
C16	<p>The results of the Construction Monitoring Programs must be submitted to the Secretary for information, and relevant regulatory agencies, for information in the form of a Construction Monitoring Report at the frequency identified in the relevant Construction Monitoring Program</p>	<p>This report</p>

3. Construction Activities

Construction activities occurring on site during the reporting period have compromised the following:

- Deliveries
- Demolition of existing temporary steel and concrete access bridges
- Civil works including the installation of a stormwater trunk main, HV cabling and utility services installations
- Waterproofing of the roof of the station box
- Fit-out of the station box including services reticulation, installation of escalators, structural steelwork, precast concrete platform elements and blockworks walls

3.1 Standard Construction Hours

Construction has been carried out in accordance with the hours as outlined in CoA E36 as follows:

- 07.00am to 6:00pm Mondays to Fridays, inclusive
- 08.00am to 1.00pm Saturdays; and
- At no times on Sundays or public holidays

3.2 Out of Hours Construction Summary

Construction has been undertaken out of hours under CoA E44 and E47 under the approved Out of Hours Works Applications (OOHWA) listed in Table 2:

Table 2 Approved Out of Hours Applications

OOHWA	Works description	Approval	Approved Duration
OOHW-001	Deliveries	E48	September 2021 – December 2022
OOHWA-002	Station Works	E48	October 2021 – June 2022
OOHWA-003	Civil works – bridge jacking	E44(d)	October 2021 – November 2021
OOHWA-004	High voltage installation	E44(f)	October 2021 – November 2021
OOHWA-005	Ausgrid pit investigation	E44(f)	14 November 2021 – 15 November 2021
OOHWA-006	Civil Works Hickson Road	E44(f)	December 2021 – May 2022

3.3 Emergency Construction

Construction has been carried out as emergency construction in accordance with CoA E44b on one occasion during the reporting period. The hoist used as an emergency egress route out of the cross-over cavern was faulty and needed to be replaced to ensure emergency egress into / out of the station be always maintained. The works took place on 16/10/21 and 17/10/21. The Acoustic Advisor and Environmental representative were notified in accordance with CoA E45 and an Emergency Works report produced to satisfy Section 4.4 of the *Sydney Metro City & Southwest Out of Hours Work Strategy / Protocol*.

4. Monitoring Criteria

4.1 Noise Monitoring Criteria

The following noise parameters are required to be measured when assessing construction noise levels:

- LA1(1minute) - The typical 'maximum noise level for an event', used in the assessment of potential sleep disturbance during night-time periods. Alternatively, assessment may be conducted using the LAmax or maximum noise level.
- LAeq(15minute) - The "energy average noise level" evaluated over a 15-minute period. This parameter is used to assess the potential construction noise impacts and to assess compliance with the relevant internal or external NMLs
- LA90 – The "background noise level" or Rating Background Level" (RBL) in the absence of construction activities. This parameter represents the average minimum noise level during the daytime, evening and night-time periods respectively. The LAeq (15 minute) construction noise management levels (NMLs) are based on the RBLs.
- The subscript "A" indicates that the noise levels are filtered to match normal hearing characteristics (A weighted)

The NSW EPA Interim Construction Noise Guideline (ICNG) requires project specific Noise Management Levels (NMLs) to be established for noise affected receivers. Two site-specific Construction Noise and Vibration Impact Statements (CNVISs) has been prepared in accordance with CoA E33. Each CNVIS was prepared prior to the commencement of construction before noise and vibration impacts commenced and included specific mitigation measures adopted and predict noise impacts to nearby sensitive receivers. One CNVIS has been prepared for above-ground civil and landscaping construction activities (Civil CNVIS) and a second for construction activities taking place within the station box itself (Station CNVIS). In the event construction noise levels are predicted to be above the NMLs, all feasible and reasonable work practices are investigated to minimise noise emissions.

Environmental noise monitoring (excluding spot checks of plant and equipment) have been recorded over 15-minute sample intervals, excluding periods of extraneous noise until a representative sample has been obtained. A representative sample will be determined by the operator, who will be competent, suitability trained and experienced in undertaking noise measurements and familiar with the relevant Australian Standards.

For spot checks of noise intensive plant and equipment, duration of monitoring will depend on the source of noise being monitored. Sources of continuous noise (such as generators or fans), measurements will be monitored over one-to-two-minute intervals. For dynamic plant, such as front-end loaders, spot checks will capture a representative activity, such as one truck-and-trailer load cycle

Table 3 below which is reproduced from Addendum A of Sydney Metro CNVS sets out the internal noise criteria for residential and other sensitive receivers. The Barangaroo Metro station falls within an Identified Precinct in accordance with CoA E37.

Table 3 Internal construction noise criteria levels (Conditions of Approval)

Area	Receiver Type	Approved Condition	Time Period	Criteria (internal) ⁴
Identified Precincts ¹	All	E38	7am to 8pm	Noise levels are required to be less than LAeq (15 minute) 60 dB(A) for at least 6.5 hours between 7am and 8pm, of which at least 3.25 hours must be below LAeq (15 minute) 55 dB(A). Noise equal to or above LAeq (15 minute) 60 dB(A) is allowed for the remaining 6.5 hours between 7am and 8pm. ³

Area	Receiver Type	Approved Condition	Time Period	Criteria (internal) ⁴
Non-residential zones²	Residential	E41	8pm to 9pm 9pm to 7am	LAeq (15 minute) 60 dB(A) LAeq (15 minute) 45 dB(A)
Residential zones²	Residential	E42	8pm to 7am	LAeq (15 minute) 45 dB(A)
All	All	E43	All	LAeq (8 hour) 85 dB(A) (external) near the CSSI

Notes:

- 1.) Identified precincts are provided in CoA E37 and include Crows Nest, Victoria Cross, Barangaroo, Martin Place and Pitt Street
- 2.) These are identified by the applicable Local Environmental Plan land zoning of the receiver
- 3.) Criteria as described in CoA E38
- 4.) A 5 dB penalty shall be applied if rock breaking or any other annoying activity likely to result in ground-borne noise or a perceptible level of vibration is planned

4.2 Vibration Monitoring Criteria

The following vibration screening criteria have been applied:

- Reinforced or frame structures – 25.0mm/s
- Unreinforced or light framed structures – 7.5mm/s
- Heritage structures⁵ – 2.5mm/s

Notes:

- 5.) If a heritage structure is predicted to be exposed to vibration levels above the conservative vibration screening level of 2.5mm/s, further investigation would be undertaken to determine whether the structure is structurally sound.

5. Methodology

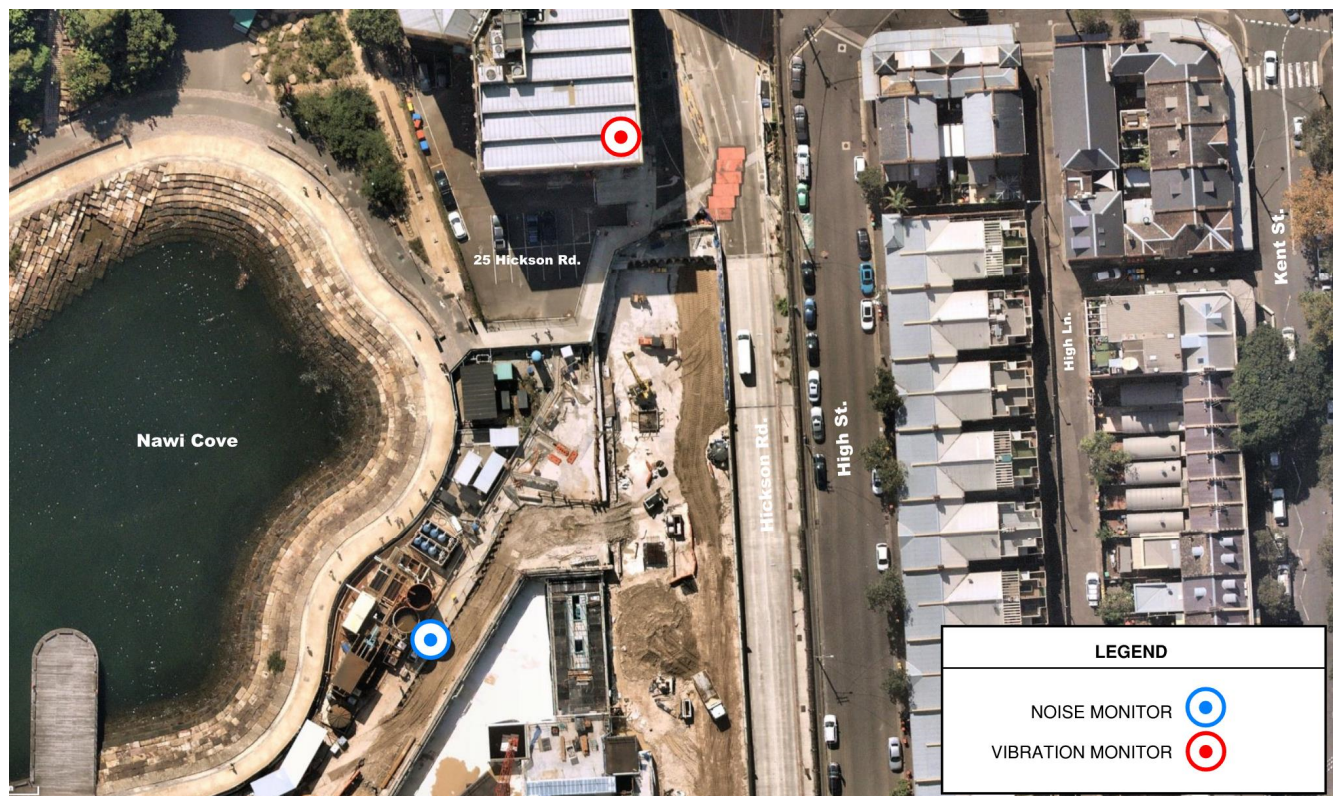
The Construction Noise and Vibration Monitoring Program is designed to compare actual performance of construction of the CSSI against predicted performance and to assess the effectiveness of the mitigation measures applied during construction of the Project. The program has been executed in accordance with Appendix E of the CNVMP. The Construction Monitoring Program commenced 16 September 2021 at Construction commencement and will continue for the duration of the project.

5.1 Monitoring Locations

Real-time noise and vibration monitors have been established on site, based on the recommendations of the acoustic engineer Renzo Tonin, and as shown in the Construction Noise and Vibration Management Plan (CNVMP).

The positions of noise and vibration monitors are shown below in Figure 2.

Figure 2 – Location of on-site Noise and Vibration monitors



5.2 Monitoring Equipment

The monitors used for the various monitoring completed during the reporting period are outlined in Table 4 below. Attended monitors were field calibrated before each field measurement

Table 4 – Monitoring Equipment Details

Equipment Details	Monitoring Type	Location	Serial No.
SiteHive Hexanode 85	Real-time noise	On site, 40 metres to the south of 25 Hickson Road, Barangaroo	000085

Equipment Details	Monitoring Type	Location	Serial No.
Sigicom Infra C22	Real-time vibration monitor	25 Hickson Road, Barangaroo	106847
Rion NL-42	Attended noise	Various	00469907
Rion NL-52	Attended noise	Various	00553919
NTI-XL2	Attended noise	Various	A2A-20373-E0
NTI-XL2	Attended noise	Various	A2A-05642-E0

5.3 Monitoring Results

5.3.1 Attended vibration monitoring summary

Attended vibration monitoring was not required during the reporting period. Vibration within 25 Hickson Road was monitored in real-time, as discussed below.

5.3.2 Attended noise monitoring summary

5.3.3 Attended noise monitoring

Attended noise monitoring results are summarised in Table 5 below:

Table 5 Attended noise monitoring results

Location / Receiver	Date	Main Activities	Noise Period	Noise Management Level (NML) dB(A) LAeq 15 minute	RBL	Predicted Noise Level	Measured External LAeq 15 minute	Measured External LA max (LA01 min)	Exceedance of NML LAeq 15 minute	Exceedance of RBL LAeq 15 minute	Difference to predicted Level	Comment
1-5 Towns Place, Millers Point	27/10/2021	High voltage electrical works	Evening	50	45	80	74.5	86.8	+24.5	+29.5	-5.5	Noise below predicted noise level
1-5 Towns Place, Millers Point	27/10/2021	Lifting of heavy equipment – HV works	Night	45	40	69	69.8	90.5	+24.8	+29.8	0.8	Negligible exceedance to predicted level.
56 – 56A High Street, Millers Point	27/10/2021	Bridge jacking and oxy cutting	Evening	50	45	55	50.1	72.2	+0.1	+5.1	-4.9	Noise below predicted noise level
56 – 56A High Street, Millers Point	27/10/2021	Bridge jacking and oxy cutting	Night	45	40	55	52.8	74.6	+7.8	+12.8	-2.2	Noise below predicted noise level
6 Argyle Place, Millers Point	16/11/2021	Drilling for cable tray installation	Evening	50	45	55	58.3	74.2	+8.3	+13.3	+3.3	Noise above predicted level. Work ceased.
2 High Street, Millers Point	16/02/2022	Drilling for cable tray installation	Night	45	40	50	48.3	60.6	+3.3	+8.3	-1.7	Noise below predicted level
8 High Street, Millers Point	14/02/2022	25t excavator with rock hammer demolishing concrete	Daytime	70	65	90	76	84	+6	+11	-14	The measured LA eq 15 min is higher than the cssi-7400 equivalent external LA eq 15 min noise level

Location / Receiver	Date	Main Activities	Noise Period	Noise Management Level (NML) dB(A) LAeq 15 minute	RBL	Predicted Noise Level	Measured External LAeq 15 minute	Measured External LA max (LA01 min)	Exceedance of NML LAeq 15 minute	Exceedance of RBL LAeq 15 minute	Difference to predicted Level	Comment
36 High Street, Millers Point	14/02/2022	25t excavator with rock hammer demolishing concrete	Daytime	70	65	90	72	77	+2	+25	-18	The measured LA eq 15 min is higher than the cssi-7400 equivalent external LA eq 15 min noise level
55 Kent Street, Millers Point	14/02/2022	25t excavator with rock hammer demolishing concrete	Daytime	70	65		62	69	-2			The measured LA eq 15 min is lower than the cssi-7400 equivalent external LA eq 15 min noise level
4-4A High Street, Millers Point	16/02/2022	Saw cutting road	Evening	50	45		60.3	70.5	+10.3	+15.3	-3.7	Results under OOHWA predicted level
10 – 12 Argyle Street	16/02/2022	Saw cutting	Evening	50			57.4	68.9	+7.4	+12.4	-15.6	Results under OOHWA predicted level
66 – 68 Bettington Street, Millers Point	16/02/2022	Saw Cutting	Evening				59.4	68.7	+9.4	+14.4	-10.6	Results under OOHWA predicted level
4-4A High Street, Millers Point	16/02/2022	Excavation	Night	45	40	64	55.2	66.4	+10.2	+15.2	-8.8	Results under OOHWA predicted level
66 – 68 Bettington Street, Millers Point	16/02/2022	Saw Cutting	Night	45	40	54	53.6	64.6	+8.6	+13.6	-0.4	Results under OOHWA predicted level
10 – 12 Argyle Street	16/02/2022	Saw cutting	Night	45	40	57	53.6	65.0	+8.6	+13.6	-3.4	Results under OOHWA predicted level

Location / Receiver	Date	Main Activities	Noise Period	Noise Management Level (NML) dB(A) LAeq 15 minute	RBL	Predicted Noise Level	Measured External LAeq 15 minute	Measured External LA max (LA01 min)	Exceedance of NML LAeq 15 minute	Exceedance of RBL LAeq 15 minute	Difference to predicted Level	Comment
20A High Street, Millers Point	28/03/2022	Vacuum truck and excavation	Night	45	40	68.0	61.2	70.8	+16.2	+21.2	-6.8	Results below predicted level
21A High Street, Millers Point	28/03/2022	Excavation	Evening	50	45q	76	58.1	69.7	+8.1	+13.1	-17.9	Results below predicted level.

5.3.4 Real-time vibration monitoring summary

Vibration monitoring data for the Barangaroo Metro station has been based on real-time monitoring results as these are considered to best represent the most impacted structure, being 25 Hickson Road, and group of receivers, being the personnel working within 25 Hickson road as this is the closest heritage structure, at risk of cosmetic damage per CoA e29, in the vicinity of the works. Vibration data for 25 Hickson Road for the reporting period is included below in Appendix C. The vibration monitor is located on the ground floor of the building, see Figure 3 below, mounted to an external wall nearest to where civil construction activities will occur. A single exceedance of the screening criteria occurred, as shown below in Table 6 which was confirmed to be a false alarm triggered by the monitor being bumped.

No exceedances were identified caused by BR COP works.

Table 6 Recorded exceedances vibration monitor

Date	Monitor Location	Recorded vibration (mm/s)	Screening Level (mm/s)	Investigation results
23/02/2022	25 Hickson Road, Barangaroo	8.4	7.5	The monitor was bumped when a piece of electrical equipment was lent against it.

Figure 3 – On site real-time vibration monitor at 25 Hickson Road



5.3.5 Real-time noise monitoring summary

CoA E37 requires that receivers be identified who are likely to experience internal noise levels greater than Leq 15 minute 60 dB(A) inclusive of a 5 dB penalty, if rock breaking or any other annoying activity likely to results in regenerated (ground-borne) noise or a perceptible level of vibration is planned, between 7am – 8pm at Barangaroo. These receivers are listed in the CNVIS for above ground Civil Works in Appendix D.2 of the CNVIS

CoA E38 requires that between the hours of 7am and 8pm, the following internal noise criteria apply:

- Criteria 1a - Noise levels be less than Leq 15 minute 60 dB(A) for at least 6.5 hours
- Criteria 1b - Noise levels be less than Leq 15 minute 55 dB(A) for 3.25 hours
- Criteria 2 – Noise level can be above Leq 15 minute 60 dB(A) for 6.5 hours

The condition also requires that consultation be undertaken with the receivers identified in CoA E37 with the objective of determining appropriate hours of respite so that construction noise (including ground-borne noise, does not exceed the internal noise levels described above.

Consultation in relation to CoA E38 has been undertaken and documented in the CNVMP and Civil CNVIS in Appendix D. Consultation with receivers is documented in Section 4.1.2. BESIX Watpac have carried out consultation with the following community organisations, to agree respite periods:

- The Millers Point Residents Action Group
- The Walsh Bay Precinct association
- KU Lance Children's Centre, Miller's Point
- The Langham Hotel, Miller's Point

It has been agreed with the above groups that the same respite periods as were adopted by the preceding TSE Contractor, who carried out the excavation of the station box, be adopted by the BR Contractor. These respite periods are between **09.30am to 10.30am and 12.30pm to 1.30pm** Monday to Friday.

To monitor compliance with CoA E38 and the requirement that between 7am and 8pm Noise levels be less than Leq 15 minute 55 dB(A) for 3.25 hours (Criteria 1b) the following should be considered:

- The hours worked on site are between 7am and 6pm Monday to Friday so each day there are at least 2 hours (6pm to 8pm) where no construction activities take place and the noise levels generated by default are less than Leq 15 minute 55 dB(A).
- The hours worked on Saturdays are 08.00am to 1.00pm, so each Saturday there are at least 8 hours where no construction activities take place and the noise levels generated by default are less than Leq 15 minute 55 dB(A).
- No works take place on Sundays, or public holidays.
- The BR Contractor implements a noise respite period each day (Mon – Fri) between 09.30am to 10.30am and 12.30pm to 1.30pm meaning that for 2 hours during the day noise levels generated on site are less than Leq 15 minute 55 dB(A).

In total, the noise levels generated by construction activities between 7am and 8pm occurring on site will be less than Leq 15 minute 55 dB(A) for at least 4 hours between Monday to Friday, 8 hours on Saturdays and 13 hours on Sundays and Public Holidays due to the construction hours worked and respite periods implemented.

To verify this and to monitor compliance with Criteria 1a (that noise levels be less than Leq 15 minute 60 dB(A) for at least 6.5 hours) and Criteria 1b (that noise levels be less than Leq 15 minute 55 dB(A) for 3.25 hours), the number of 15 minute periods between 7am and 8pm that internal noise levels were observed to be above 60dBa (Leq 15minute) and below 55dBA, respectively have been counted. Within these periods

works are allowed to generate noise levels above 60dBA for 6.5 hours (26 x 15-minute periods) and must be below 55dBA for at least 3.25 hours (13 x 15 minute periods).

Real-time monitoring results for September 2021 to March 2022 are included in Appendix A. The real-time noise monitor is located externally so a conservative 20dB(A) noise reduction has been applied to compare the measured noise levels at the real-time monitor with internal E38 noise levels. This reduction contemplates a 10dB reduction for façade loss, given the nearest receivers are Heritages houses, a 5dB reduction for the screening provided by the Hickson Road Wall and a 5dB reduction for the >45 metre distance from the monitor to the nearest receiver. The results of the daily real-time noise monitoring carried out for the reporting period show that Criteria 1a and Criteria 1b requirements were not observed to have been exceeded during the reporting period demonstrating compliance with CoA E38.

6. Conclusion

Observed noise and vibration levels are generally in accordance with, or below, the forecasts presented in the Construction Noise and Vibrations Impact Statements (CNVIS), or noise impact assessments prepared for Out of Hours Works applications (OOHWA).

Based on the monitoring results and site investigations, noise and vibration associated with the construction activities being undertaken at the BR COP was compliant with the project approvals and requirements during the monitoring period.

Appendix A

Real-time noise monitoring results



JANUARY 2022 - Daily Monitoring Results

Date	Classification	Total 15 minute intervals (07.00 to 20.00)	Total Hours (07.00 to 20.00)	LAeq(15min) < 55dBA for at least 3.25 hours. LAeq(15min) > 60dBA not more than 6.5 hours	Comments
1/01/2022	Below 55dBA	52	13	Compliant - fits the at least 3.25 hours below 55dBA criteria	Compliant
1/01/2022	Above 60 dBA	0	0	Compliant - fits the "less than 6.5 hours above 60dBA" criteria	Compliant
2/01/2022	Below 55dBA	52	13	Compliant - fits the at least 3.25 hours below 55dBA criteria	Compliant
2/01/2022	Above 60dBA	0	0	Compliant - fits the "less than 6.5 hours above 60dBA" criteria	Compliant
3/01/2022	Below 55dBA	52	13	Compliant - fits the at least 3.25 hours below 55dBA criteria	Compliant
3/01/2022	Above 60dBA	0	0	Compliant - fits the "less than 6.5 hours above 60dBA" criteria	Compliant
4/01/2022	Below 55dBA	52	13	Compliant - fits the at least 3.25 hours below 55dBA criteria	Compliant
4/01/2022	Above 60dBA	0	0	Compliant - fits the "less than 6.5 hours above 60dBA" criteria	Compliant
5/01/2022	Below 55dBA	52	13	Compliant - fits the at least 3.25 hours below 55dBA criteria	Compliant
5/01/2022	Above 60dBA	0	0	Compliant - fits the "less than 6.5 hours above 60dBA" criteria	Compliant
6/01/2022	Below 55dBA	52	13	Compliant - fits the at least 3.25 hours below 55dBA criteria	Compliant
6/01/2022	Above 60dBA	0	0	Compliant - fits the "less than 6.5 hours above 60dBA" criteria	Compliant
7/01/2022	Below 55dBA	52	13	Compliant - fits the at least 3.25 hours below 55dBA criteria	Compliant
7/01/2022	Above 60dBA	0	0	Compliant - fits the "less than 6.5 hours above 60dBA" criteria	Compliant
8/01/2022	Below 55dBA	52	13	Compliant - fits the at least 3.25 hours below 55dBA criteria	Compliant
8/01/2022	Above 60dBA	0	0	Compliant - fits the "less than 6.5 hours above 60dBA" criteria	Compliant
9/01/2022	Below 55dBA	52	13	Compliant - fits the at least 3.25 hours below 55dBA criteria	Compliant
9/01/2022	Above 60dBA	0	0	Compliant - fits the "less than 6.5 hours above 60dBA" criteria	Compliant
10/01/2022	Below 55dBA	52	13	Compliant - fits the at least 3.25 hours below 55dBA criteria	Compliant
10/01/2022	Above 60dBA	0	0	Compliant - fits the "less than 6.5 hours above 60dBA" criteria	Compliant
11/01/2022	Below 55dBA	49	12.25	Compliant - fits the at least 3.25 hours below 55dBA criteria	Compliant
11/01/2022	Above 60dBA	0	0	Compliant - fits the "less than 6.5 hours above 60dBA" criteria	Compliant
12/01/2022	Below 55dBA	45	11.25	Compliant - fits the at least 3.25 hours below 55dBA criteria	Compliant
12/01/2022	Above 60dBA	3	0.75	Compliant - fits the "less than 6.5 hours above 60dBA" criteria	Compliant
13/01/2022	Below 55dBA	33	8.25	Compliant - fits the at least 3.25 hours below 55dBA criteria	Compliant
13/01/2022	Above 60dBA	8	2	Compliant - fits the "less than 6.5 hours above 60dBA" criteria	Compliant
14/01/2022	Below 55dBA	37	9.25	Compliant - fits the at least 3.25 hours below 55dBA criteria	Compliant
14/01/2022	Above 60dBA	7	1.75	Compliant - fits the "less than 6.5 hours above 60dBA" criteria	Compliant
15/01/2022	Below 55dBA	45	11.25	Compliant - fits the at least 3.25 hours below 55dBA criteria	Compliant
15/01/2022	Above 60dBA	0	0	Compliant - fits the "less than 6.5 hours above 60dBA" criteria	Compliant
16/01/2022	Below 55dBA	37	9.25	Compliant - fits the at least 3.25 hours below 55dBA criteria	Compliant
16/01/2022	Above 60dBA	12	3	Compliant - fits the "less than 6.5 hours above 60dBA" criteria	Compliant
17/01/2022	Below 55dBA	52	13	Compliant - fits the at least 3.25 hours below 55dBA criteria	Compliant
17/01/2022	Above 60dBA	0	0	Compliant - fits the "less than 6.5 hours above 60dBA" criteria	Compliant
18/01/2022	Below 55dBA	52	13	Compliant - fits the at least 3.25 hours below 55dBA criteria	Compliant
18/01/2022	Above 60dBA	0	0	Compliant - fits the "less than 6.5 hours above 60dBA" criteria	Compliant
19/01/2022	Below 55dBA	52	13	Compliant - fits the at least 3.25 hours below 55dBA criteria	Compliant
19/01/2022	Above 60dBA	0	0	Compliant - fits the "less than 6.5 hours above 60dBA" criteria	Compliant
20/01/2022	Below 55dBA	18	4.5	Compliant - fits the at least 3.25 hours below 55dBA criteria	Compliant
20/01/2022	Above 60dBA	0	0	Compliant - fits the "less than 6.5 hours above 60dBA" criteria	Compliant
21/01/2022	Below 55dBA	18	4.5	Compliant - fits the at least 3.25 hours below 55dBA criteria	Compliant
21/01/2022	Above 60dBA	13	3.25	Compliant - fits the "less than 6.5 hours above 60dBA" criteria	Compliant
22/01/2022	Below 55dBA	15	3.75	Compliant - fits the at least 3.25 hours below 55dBA criteria	Compliant
22/01/2022	Above 60dBA	15	3.75	Compliant - fits the "less than 6.5 hours above 60dBA" criteria	Compliant
23/01/2022	Below 55dBA	42	10.5	Compliant - fits the at least 3.25 hours below 55dBA criteria	Compliant
23/01/2022	Above 60dBA	9	2.25	Compliant - fits the "less than 6.5 hours above 60dBA" criteria	Compliant
24/01/2022	Below 55dBA	14	3.5	Compliant - fits the at least 3.25 hours below 55dBA criteria	Compliant
24/01/2022	Above 60dBA	9	2.25	Compliant - fits the "less than 6.5 hours above 60dBA" criteria	Compliant
25/01/2022	Below 55dBA	35	8.75	Compliant - fits the at least 3.25 hours below 55dBA criteria	Compliant
25/01/2022	Above 60dBA	11	2.75	Compliant - fits the "less than 6.5 hours above 60dBA" criteria	Compliant

26/01/2022	Below 55dBA	48	12	Compliant - fits the at least 3.25 hours below 55dBA criteria	Compliant
26/01/2022	Above 60dBA	0	0	Compliant - fits the "less than 6.5 hours above 60dBA" criteria	Compliant
27/01/2022	Below 55dBA	52	13	Compliant - fits the at least 3.25 hours below 55dBA criteria	Compliant
27/01/2022	Above 60dBA	0	0	Compliant - fits the "less than 6.5 hours above 60dBA" criteria	Compliant
28/01/2022	Below 55dBA	51	12.75	Compliant - fits the at least 3.25 hours below 55dBA criteria	Compliant
28/01/2022	Above 60dBA	0	0	Compliant - fits the "less than 6.5 hours above 60dBA" criteria	Compliant
29/01/2022	Below 55dBA	48	12	Compliant - fits the at least 3.25 hours below 55dBA criteria	Compliant
29/01/2022	Above 60dBA	0	0	Compliant - fits the "less than 6.5 hours above 60dBA" criteria	Compliant
30/01/2022	Below 55dBA	52	13	Compliant - fits the at least 3.25 hours below 55dBA criteria	Compliant
30/01/2022	Above 60dBA	0	0	Compliant - fits the "less than 6.5 hours above 60dBA" criteria	Compliant
31/01/2022	Below 55dBA	50	12.5	Compliant - fits the at least 3.25 hours below 55dBA criteria	Compliant
31/01/2022	Above 60dBA	3	0.75	Compliant - fits the "less than 6.5 hours above 60dBA" criteria	Compliant

FEBRUARY 2022 - Daily Monitoring Results

Date	Classification	Total 15 minute intervals (07.00 to 20.00)	Total Hours (07.00 to 20.00)	LAeq(15min) < 55dBA for at least 3.25 hours. LAeq(15min) > 60dBA not more than 6.5 hours
1/02/2022	Below 55dBA	16	4	Compliant - fits the at least 3.25 hours below 55dB criteria
1/02/2022	Above 60dBA	21	5.25	Compliant - fits the "less than 6.5 hours above 60dB" criteria
2/01/2022	Below 55dBA	17	4.25	Compliant - fits the at least 3.25 hours below 55dB criteria
2/01/2022	Above 60dBA	15	3.75	Compliant - fits the "less than 6.5 hours above 60dB" criteria
3/02/2022	Below 55dBA	22	5.5	Compliant - fits the at least 3.25 hours below 55dB criteria
3/02/2022	Above 60dBA	2	0.5	Compliant - fits the "less than 6.5 hours above 60dB" criteria
4/02/2022	Below 55dBA	15	3.75	Compliant - fits the at least 3.25 hours below 55dB criteria
4/02/2022	Above 60dBA	12	3	Compliant - fits the "less than 6.5 hours above 60dB" criteria
5/02/2022	Below 55dBA	46	11.5	Compliant - fits the at least 3.25 hours below 55dB criteria
5/02/2022	Above 60dBA	0	0	Compliant - fits the "less than 6.5 hours above 60dB" criteria
6/02/2022	Below 55dBA	52	13	Compliant - fits the at least 3.25 hours below 55dB criteria
6/02/2022	Above 60dBA	0	0	Compliant - fits the "less than 6.5 hours above 60dB" criteria
7/02/2022	Below 55dBA	24	6	Compliant - fits the at least 3.25 hours below 55dB criteria
7/02/2022	Above 60dBA	0	0	Compliant - fits the "less than 6.5 hours above 60dB" criteria
8/02/2022	Below 55dBA	21	5.25	Compliant - fits the at least 3.25 hours below 55dB criteria
8/02/2022	Above 60dBA	1	0.25	Compliant - fits the "less than 6.5 hours above 60dB" criteria
9/02/2022	Below 55dBA	16	4	Compliant - fits the at least 3.25 hours below 55dB criteria
9/02/2022	Above 60dBA	0	0	Compliant - fits the "less than 6.5 hours above 60dB" criteria
10/02/2022	Below 55dBA	22	5.5	Compliant - fits the at least 3.25 hours below 55dB criteria
10/02/2022	Above 60dBA	0	0	Compliant - fits the "less than 6.5 hours above 60dB" criteria
11/02/2022	Below 55dBA	33	8.25	Compliant - fits the at least 3.25 hours below 55dB criteria
11/02/2022	Above 60dBA	4	1	Compliant - fits the "less than 6.5 hours above 60dB" criteria
12/02/2022	Below 55dBA	40	10	Compliant - fits the at least 3.25 hours below 55dB criteria
12/02/2022	Above 60dBA	4	1	Compliant - fits the "less than 6.5 hours above 60dB" criteria
13/02/2022	Below 55dBA	52	13	Compliant - fits the at least 3.25 hours below 55dB criteria
13/02/2022	Above 60dBA	0	0	Compliant - fits the "less than 6.5 hours above 60dB" criteria
14/02/2022	Below 55dBA	30	7.5	Compliant - fits the at least 3.25 hours below 55dB criteria
14/02/2022	Above 60dBA	9	2.25	Compliant - fits the "less than 6.5 hours above 60dB" criteria
15/02/2022	Below 55dBA	31	7.75	Compliant - fits the at least 3.25 hours below 55dB criteria
15/02/2022	Above 60dBA	5	1.25	Compliant - fits the "less than 6.5 hours above 60dB" criteria
16/02/2022	Below 55dBA	25	6.25	Compliant - fits the at least 3.25 hours below 55dB criteria
16/02/2022	Above 60dBA	12	3	Compliant - fits the "less than 6.5 hours above 60dB" criteria
17/02/2022	Below 55dBA	40	10	Compliant - fits the at least 3.25 hours below 55dB criteria
17/02/2022	Above 60dBA	1	0.25	Compliant - fits the "less than 6.5 hours above 60dB" criteria
18/02/2022	Below 55dBA	52	13	Compliant - fits the at least 3.25 hours below 55dB criteria
18/02/2022	Above 60dBA	0	0	Compliant - fits the "less than 6.5 hours above 60dB" criteria
19/02/2022	Below 55dBA	52	13	Compliant - fits the at least 3.25 hours below 55dB criteria
19/02/2022	Above 60dBA	0	0	Compliant - fits the "less than 6.5 hours above 60dB" criteria
20/02/2022	Below 55dBA	52	13	Compliant - fits the at least 3.25 hours below 55dB criteria
20/02/2022	Above 60dBA	0	0	Compliant - fits the "less than 6.5 hours above 60dB" criteria
21/02/2022	Below 55dBA	52	13	Compliant - fits the at least 3.25 hours below 55dB criteria
21/02/2022	Above 60dBA	0	0	Compliant - fits the "less than 6.5 hours above 60dB" criteria
22/02/2022	Below 55dBA	52	13	Compliant - fits the at least 3.25 hours below 55dB criteria
22/02/2022	Above 60dBA	0	0	Compliant - fits the "less than 6.5 hours above 60dB" criteria
23/02/2022	Below 55dBA	52	13	Compliant - fits the at least 3.25 hours below 55dB criteria
23/02/2022	Above 60dBA	0	0	Compliant - fits the "less than 6.5 hours above 60dB" criteria

24/02/2022	Below 55dBA	51	12.75	Compliant - fits the at least 3.25 hours below 55dB criteria
24/02/2022	Above 60dBA	0	0	Compliant - fits the "less than 6.5 hours above 60dB" criteria
25/02/2022	Below 55dBA	52	13	Compliant - fits the at least 3.25 hours below 55dB criteria
25/02/2022	Above 60dBA	0	0	Compliant - fits the "less than 6.5 hours above 60dB" criteria
26/02/2022	Below 55dBA	52	13	Compliant - fits the at least 3.25 hours below 55dB criteria
26/02/2022	Above 60dBA	0	0	Compliant - fits the "less than 6.5 hours above 60dB" criteria
27/02/2022	Below 55dBA	52	13	Compliant - fits the at least 3.25 hours below 55dB criteria
27/02/2022	Above 60dBA	0	0	Compliant - fits the "less than 6.5 hours above 60dB" criteria
28/02/2022	Below 55dBA	52	13	Compliant - fits the at least 3.25 hours below 55dB criteria
28/02/2022	Above 60dBA	0	0	Compliant - fits the "less than 6.5 hours above 60dB" criteria

OCTOBER 2021 - Daily Monitoring Results

Date	Classification	Total 15 minute intervals (07.00 to 20.00)	Total Hours (07.00 to 20.00)	LAeq(15min) < 55dBA for at least 3.25 hours. LAeq(15min) > 60dBA not more than 6.5 hours
12/10/2022	BELOW 55dBA	36	9	Compliant - fits the at least 3.25 hours below 55dB criteria
12/10/2022	ABOVE 60dBA	2	0.5	Compliant - fits the "less than 6.5 hours above 60dB" criteria
13/10/2022	BELOW 55dBA	52	13	Compliant - fits the at least 3.25 hours below 55dB criteria
13/10/2022	ABOVE 60dBA	0	0	Compliant - fits the "less than 6.5 hours above 60dB" criteria
14/10/2022	BELOW 55dBA	37	9.25	Compliant - fits the at least 3.25 hours below 55dB criteria
14/10/2022	ABOVE 60dBA	11	2.75	Compliant - fits the "less than 6.5 hours above 60dB" criteria
15/10/2022	BELOW 55dBA	50	12.5	Compliant - fits the at least 3.25 hours below 55dB criteria
15/10/2022	ABOVE 60dBA	0	0	Compliant - fits the "less than 6.5 hours above 60dB" criteria
16/10/2022	BELOW 55dBA	27	6.75	Compliant - fits the at least 3.25 hours below 55dB criteria
16/10/2022	ABOVE 60dBA	0	0	Compliant - fits the "less than 6.5 hours above 60dB" criteria
17/10/2022	BELOW 55dBA	50	12.5	Compliant - fits the at least 3.25 hours below 55dB criteria
17/10/2022	ABOVE 60dBA	0	0	Compliant - fits the "less than 6.5 hours above 60dB" criteria
18/10/2022	BELOW 55dBA	42	10.5	Compliant - fits the at least 3.25 hours below 55dB criteria
18/10/2022	ABOVE 60dBA	0	0	Compliant - fits the "less than 6.5 hours above 60dB" criteria
19/10/2022	BELOW 55dBA	30	7.5	Compliant - fits the at least 3.25 hours below 55dB criteria
19/10/2022	ABOVE 60dBA	2	0.5	Compliant - fits the "less than 6.5 hours above 60dB" criteria
20/10/2021	BELOW 55dBA	48	12	Compliant - fits the at least 3.25 hours below 55dB criteria
20/10/2021	ABOVE 60dBA	0	0	Compliant - fits the "less than 6.5 hours above 60dB" criteria
21/10/2021	BELOW 55dBA	44	11	Compliant - fits the at least 3.25 hours below 55dB criteria
21/10/2021	ABOVE 60dBA	0	0	Compliant - fits the "less than 6.5 hours above 60dB" criteria
22/10/2021	BELOW 55dBA	42	10.5	Compliant - fits the at least 3.25 hours below 55dB criteria
22/10/2021	ABOVE 60dBA	1	0.25	Compliant - fits the "less than 6.5 hours above 60dB" criteria
23/10/2021	BELOW 55dBA	51	12.75	Compliant - fits the at least 3.25 hours below 55dB criteria
23/10/2021	ABOVE 60dBA	0	0	Compliant - fits the "less than 6.5 hours above 60dB" criteria
24/10/2021	BELOW 55dBA	52	13	Compliant - fits the at least 3.25 hours below 55dB criteria
24/10/2021	ABOVE 60dBA	0	0	Compliant - fits the "less than 6.5 hours above 60dB" criteria
25/10/2021	BELOW 55dBA	44	11	Compliant - fits the at least 3.25 hours below 55dB criteria
25/10/2021	ABOVE 60dBA	0	0	Compliant - fits the "less than 6.5 hours above 60dB" criteria
26/10/2021	BELOW 55dBA	40	10	Compliant - fits the at least 3.25 hours below 55dB criteria
26/10/2021	ABOVE 60dBA	0	0	Compliant - fits the "less than 6.5 hours above 60dB" criteria
27/10/2021	BELOW 55dBA	41	10.25	Compliant - fits the at least 3.25 hours below 55dB criteria
27/10/2021	ABOVE 60dBA	0	0	Compliant - fits the "less than 6.5 hours above 60dB" criteria
28/10/2021	BELOW 55dBA	42	10.5	Compliant - fits the at least 3.25 hours below 55dB criteria
28/10/2021	ABOVE 60dBA	0	0	Compliant - fits the "less than 6.5 hours above 60dB" criteria
29/10/2021	BELOW 55dBA	42	10.5	Compliant - fits the at least 3.25 hours below 55dB criteria
29/10/2021	ABOVE 60dBA	0	0	Compliant - fits the "less than 6.5 hours above 60dB" criteria
30/10/2021	BELOW 55dBA	50	12.5	Compliant - fits the at least 3.25 hours below 55dB criteria
30/10/2021	ABOVE 60dBA	0	0	Compliant - fits the "less than 6.5 hours above 60dB" criteria

31/10/2021	BELOW 55dBA	52	13	Compliant - fits the at least 3.25 hours below 55dB criteria
31/10/2021	ABOVE 60dBA	0	0	Compliant - fits the "less than 6.5 hours above 60dB" criteria

NOVEMBER 2021 - Daily Monitoring Results

Date	Classification	Total 15 minute intervals (07.00 to 20.00)	Total Hours (07.00 to 20.00)	LAeq(15min) < 55dBA for at least 3.25 hours. LAeq(15min) > 60dBA not more than 6.5 hours
1/11/2021	Below 55dBA	51	12.75	Compliant - fits the at least 3.25 hours below 55dB criteria
1/11/2021	Above 60dBA	0	0	Compliant - fits the "less than 6.5 hours above 60dB" criteria
2/11/2021	Below 55dBA	52	13	Compliant - fits the at least 3.25 hours below 55dB criteria
2/11/2021	Above 60dBA	0	0	Compliant - fits the "less than 6.5 hours above 60dB" criteria
3/11/2021	Below 55dBA	45	11.25	Compliant - fits the at least 3.25 hours below 55dB criteria
3/11/2021	Above 60dBA	0	0	Compliant - fits the "less than 6.5 hours above 60dB" criteria
4/11/2021	Below 55dBA	51	12.75	Compliant - fits the at least 3.25 hours below 55dB criteria
4/11/2021	Above 60dBA	0	0	Compliant - fits the "less than 6.5 hours above 60dB" criteria
5/11/2021	Below 55dBA	40	10	Compliant - fits the at least 3.25 hours below 55dB criteria
5/11/2021	Above 60dBA	0	0	Compliant - fits the "less than 6.5 hours above 60dB" criteria
6/11/2021	Below 55dBA	52	13	Compliant - fits the at least 3.25 hours below 55dB criteria
6/11/2021	Above 60dBA	0	0	Compliant - fits the "less than 6.5 hours above 60dB" criteria
7/11/2021	Below 55dBA	52	13	Compliant - fits the at least 3.25 hours below 55dB criteria
7/11/2021	Above 60dBA	0	0	Compliant - fits the "less than 6.5 hours above 60dB" criteria
8/11/2021	Below 55dBA	37	9.25	Compliant - fits the at least 3.25 hours below 55dB criteria
8/11/2021	Above 60dBA	0	0	Compliant - fits the "less than 6.5 hours above 60dB" criteria
9/11/2021	Below 55dBA	37	9.25	Compliant - fits the at least 3.25 hours below 55dB criteria
9/11/2021	Above 60dBA	5	1.25	Compliant - fits the "less than 6.5 hours above 60dB" criteria
10/11/2021	Below 55dBA	36	9	Compliant - fits the at least 3.25 hours below 55dB criteria
10/11/2021	Above 60dBA	0	0	Compliant - fits the "less than 6.5 hours above 60dB" criteria
11/11/2021	Below 55dBA	36	9	Compliant - fits the at least 3.25 hours below 55dB criteria
11/11/2021	Above 60dBA	0	0	Compliant - fits the "less than 6.5 hours above 60dB" criteria
12/11/2021	Below 55dBA	41	10.25	Compliant - fits the at least 3.25 hours below 55dB criteria
12/11/2021	Above 60dBA	0	0	Compliant - fits the "less than 6.5 hours above 60dB" criteria
13/11/2021	Below 55dBA	50	12.5	Compliant - fits the at least 3.25 hours below 55dB criteria
13/11/2021	Above 60dBA	0	0	Compliant - fits the "less than 6.5 hours above 60dB" criteria
14/11/2021	Below 55dBA	52	13	Compliant - fits the at least 3.25 hours below 55dB criteria
14/11/2021	Above 60dBA	0	0	Compliant - fits the "less than 6.5 hours above 60dB" criteria
15/11/2021	Below 55dBA	19	4.75	Compliant - fits the at least 3.25 hours below 55dB criteria
15/11/2021	Above 60dBA	1	0.25	Compliant - fits the "less than 6.5 hours above 60dB" criteria
16/11/2021	Below 55dBA	51	12.75	Compliant - fits the at least 3.25 hours below 55dB criteria
16/11/2021	Above 60dBA	0	0	Compliant - fits the "less than 6.5 hours above 60dB" criteria
17/11/2021	Below 55dBA	52	13	Compliant - fits the at least 3.25 hours below 55dB criteria
17/11/2021	Above 60dBA	0	0	Compliant - fits the "less than 6.5 hours above 60dB" criteria
18/11/2021	Below 55dBA	49	12.25	Compliant - fits the at least 3.25 hours below 55dB criteria
18/11/2021	Above 60dBA	0	0	Compliant - fits the "less than 6.5 hours above 60dB" criteria
19/11/2021	Below 55dBA	17	4.25	Compliant - fits the at least 3.25 hours below 55dB criteria
19/11/2021	Above 60dBA	4	1	Compliant - fits the "less than 6.5 hours above 60dB" criteria
20/11/2021	Below 55dBA	52	13	Compliant - fits the at least 3.25 hours below 55dB criteria

20/11/2021	Above 60dBA	0	0	Compliant - fits the "less than 6.5 hours above 60dB" criteria
21/11/2021	Below 55dBA	52	13	Compliant - fits the at least 3.25 hours below 55dB criteria
21/11/2021	Above 60dBA	0	0	Compliant - fits the "less than 6.5 hours above 60dB" criteria
22/11/2021	Below 55dBA	18	4.5	Compliant - fits the at least 3.25 hours below 55dB criteria
22/11/2021	Above 60dBA	4	1	Compliant - fits the "less than 6.5 hours above 60dB" criteria
23/11/2021	Below 55dBA	46	11.5	Compliant - fits the at least 3.25 hours below 55dB criteria
23/11/2021	Above 60dBA	0	0	Compliant - fits the "less than 6.5 hours above 60dB" criteria
24/11/2021	Below 55dBA	45	11.25	Compliant - fits the at least 3.25 hours below 55dB criteria
24/11/2021	Above 60dBA	2	0.5	Compliant - fits the "less than 6.5 hours above 60dB" criteria
25/11/2021	Below 55dBA	51	12.75	Compliant - fits the at least 3.25 hours below 55dB criteria
25/11/2021	Above 60dBA	0	0	Compliant - fits the "less than 6.5 hours above 60dB" criteria
26/11/2021	Below 55dBA	52	13	Compliant - fits the at least 3.25 hours below 55dB criteria
26/11/2021	Above 60dBA	0	0	Compliant - fits the "less than 6.5 hours above 60dB" criteria
27/11/2021	Below 55dBA	43	10.75	Compliant - fits the at least 3.25 hours below 55dB criteria
27/11/2021	Above 60dBA	0	0	Compliant - fits the "less than 6.5 hours above 60dB" criteria
28/11/2021	Below 55dBA	52	13	Compliant - fits the at least 3.25 hours below 55dB criteria
28/11/2021	Above 60dBA	0	0	Compliant - fits the "less than 6.5 hours above 60dB" criteria
29/11/2021	Below 55dBA	51	12.75	Compliant - fits the at least 3.25 hours below 55dB criteria
29/11/2021	Above 60dBA	0	0	Compliant - fits the "less than 6.5 hours above 60dB" criteria
30/11/2021	Below 55dBA	19	4.75	Compliant - fits the at least 3.25 hours below 55dB criteria
30/11/2021	Above 60dBA	0	0	Compliant - fits the "less than 6.5 hours above 60dB" criteria

DECEMBER 2021 - Daily Monitoring Results

Date	Classification	Total 15 minute intervals (07.00 to 20.00)	Total Hours (07.00 to 20.00)	LAeq(15min) < 55dBA for at least 3.25 hours. LAeq(15min) > 60dBA not more than 6.5 hours
1/12/2021	Below 55dBA	17	4.25	Compliant - fits the at least 3.25 hours below 55dB criteria
1/12/2021	Above 60dBA	11	2.75	Compliant - fits the "less than 6.5 hours above 60dB" criteria
2/12/2021	Below 55dBA	20	5	Compliant - fits the at least 3.25 hours below 55dB criteria
2/12/2021	Above 60dBA	19	4.75	Compliant - fits the "less than 6.5 hours above 60dB" criteria
3/12/2021	Below 55dBA	38	9.5	Compliant - fits the at least 3.25 hours below 55dB criteria
3/12/2021	Above 60dBA	0	0	Compliant - fits the "less than 6.5 hours above 60dB" criteria
4/12/2021	Below 55dBA	52	13	Compliant - fits the at least 3.25 hours below 55dB criteria
4/12/2021	Above 60dBA	0	0	Compliant - fits the "less than 6.5 hours above 60dB" criteria
5/12/2021	Below 55dBA	52	13	Compliant - fits the at least 3.25 hours below 55dB criteria
5/12/2021	Above 60dBA	0	0	Compliant - fits the "less than 6.5 hours above 60dB" criteria
6/12/2021	Below 55dBA	52	13	Compliant - fits the at least 3.25 hours below 55dB criteria
6/12/2021	Above 60dBA	0	0	Compliant - fits the "less than 6.5 hours above 60dB" criteria
7/12/2021	Below 55dBA	51	12.75	Compliant - fits the at least 3.25 hours below 55dB criteria
7/12/2021	Above 60dBA	0	0	Compliant - fits the "less than 6.5 hours above 60dB" criteria
8/12/2021	Below 55dBA	31	7.75	Compliant - fits the at least 3.25 hours below 55dB criteria
8/12/2021	Above 60dBA	11	2.75	Compliant - fits the "less than 6.5 hours above 60dB" criteria
9/12/2021	Below 55dBA	17	4.25	Compliant - fits the at least 3.25 hours below 55dB criteria
9/12/2021	Above 60dBA	7	1.75	Compliant - fits the "less than 6.5 hours above 60dB" criteria
10/12/2021	Below 55dBA	34	8.5	Compliant - fits the at least 3.25 hours below 55dB criteria
10/12/2021	Above 60dBA	0	0	Compliant - fits the "less than 6.5 hours above 60dB" criteria
11/12/2021	Below 55dBA	22	5.5	Compliant - fits the at least 3.25 hours below 55dB criteria
11/12/2021	Above 60dBA	12	3	Compliant - fits the "less than 6.5 hours above 60dB" criteria
12/12/2021	Below 55dBA	52	13	Compliant - fits the at least 3.25 hours below 55dB criteria
12/12/2021	Above 60dBA	0	0	Compliant - fits the "less than 6.5 hours above 60dB" criteria
13/12/2021	Below 55dBA	17	4.25	Compliant - fits the at least 3.25 hours below 55dB criteria
13/12/2021	Above 60dBA	17	4.25	Compliant - fits the "less than 6.5 hours above 60dB" criteria
14/12/2021	Below 55dBA	19	4.75	Compliant - fits the at least 3.25 hours below 55dB criteria
14/12/2021	Above 60dBA	14	3.5	Compliant - fits the "less than 6.5 hours above 60dB" criteria
15/12/2021	Below 55dBA	23	5.75	Compliant - fits the at least 3.25 hours below 55dB criteria
15/12/2021	Above 60dBA	19	4.75	Compliant - fits the "less than 6.5 hours above 60dB" criteria
16/12/2021	Below 55dBA	22	5.5	Compliant - fits the at least 3.25 hours below 55dB criteria
16/12/2021	Above 60dBA	0	0	Compliant - fits the "less than 6.5 hours above 60dB" criteria
17/12/2021	Below 55dBA	21	5.25	Compliant - fits the at least 3.25 hours below 55dB criteria
17/12/2021	Above 60dBA	16	4	Compliant - fits the "less than 6.5 hours above 60dB" criteria
18/12/2021	Below 55dBA	50	12.5	Compliant - fits the at least 3.25 hours below 55dB criteria
18/12/2021	Above 60dBA	0	0	Compliant - fits the "less than 6.5 hours above 60dB" criteria
19/12/2021	Below 55dBA	50	12.5	Compliant - fits the at least 3.25 hours below 55dB criteria
19/12/2021	Above 60dBA	0	0	Compliant - fits the "less than 6.5 hours above 60dB" criteria
20/12/2021	Below 55dBA	51	12.75	Compliant - fits the at least 3.25 hours below 55dB criteria
20/12/2021	Above 60dBA	0	0	Compliant - fits the "less than 6.5 hours above 60dB" criteria

21/12/2021	Below 55dBA	20	5	Compliant - fits the at least 3.25 hours below 55dB criteria
21/12/2021	Above 60dBA	24	6	Compliant - fits the "less than 6.5 hours above 60dB" criteria
22/12/2021	Below 55dBA	19	4.75	Compliant - fits the at least 3.25 hours below 55dB criteria
22/12/2021	Above 60dBA	23	5.75	Compliant - fits the "less than 6.5 hours above 60dB" criteria
23/12/2021	Below 55dBA	43	10.75	Compliant - fits the at least 3.25 hours below 55dB criteria
23/12/2021	Above 60dBA	8	2	Compliant - fits the "less than 6.5 hours above 60dB" criteria
24/12/2021	Below 55dBA	52	13	Compliant - fits the at least 3.25 hours below 55dB criteria
24/12/2021	Above 60dBA	0	0	Compliant - fits the "less than 6.5 hours above 60dB" criteria
25/12/2021	Below 55dBA	52	13	Compliant - fits the at least 3.25 hours below 55dB criteria
25/12/2021	Above 60dBA	0	0	Compliant - fits the "less than 6.5 hours above 60dB" criteria
26/12/2021	Below 55dBA	52	13	Compliant - fits the at least 3.25 hours below 55dB criteria
26/12/2021	Above 60dBA	0	0	Compliant - fits the "less than 6.5 hours above 60dB" criteria
27/12/2021	Below 55dBA	52	13	Compliant - fits the at least 3.25 hours below 55dB criteria
27/12/2021	Above 60dBA	0	0	Compliant - fits the "less than 6.5 hours above 60dB" criteria
28/12/2021	Below 55dBA	52	13	Compliant - fits the at least 3.25 hours below 55dB criteria
28/12/2021	Above 60dBA	0	0	Compliant - fits the "less than 6.5 hours above 60dB" criteria
29/12/2021	Below 55dBA	52	13	Compliant - fits the at least 3.25 hours below 55dB criteria
29/12/2021	Above 60dBA	0	0	Compliant - fits the "less than 6.5 hours above 60dB" criteria
30/12/2021	Below 55dBA	52	13	Compliant - fits the at least 3.25 hours below 55dB criteria
30/12/2021	Above 60dBA	0	0	Compliant - fits the "less than 6.5 hours above 60dB" criteria
31/12/2021	Below 55dBA	52	13	Compliant - fits the at least 3.25 hours below 55dB criteria
31/12/2021	Above 60dBA	0	0	Compliant - fits the "less than 6.5 hours above 60dB" criteria

MARCH 2021 - Daily Monitoring Results

Date	Classification	Total 15 minute intervals (07.00 to 20.00)	Total Hours (07.00 to 20.00)	LAeq(15min) < 55dBA for at least 3.25 hours. LAeq(15min) > 60dBA not more than 6.5 hours
1/03/2022	Below 55dBA	52	13	Compliant - fits the at least 3.25 hours below 55dB criteria
1/03/2022	Above 60 dBA	0	0	Compliant - fits the "less than 6.5 hours above 60dB" criteria
2/03/2022	Below 55dBA	52	13	Compliant - fits the at least 3.25 hours below 55dB criteria
2/03/2022	Above 60 dBA	0	0	Compliant - fits the "less than 6.5 hours above 60dB" criteria
3/03/2022	Below 55dBA	52	13	Compliant - fits the at least 3.25 hours below 55dB criteria
3/03/2022	Above 60 dBA	0	0	Compliant - fits the "less than 6.5 hours above 60dB" criteria
4/03/2022	Below 55dBA	52	13	Compliant - fits the at least 3.25 hours below 55dB criteria
4/03/2022	Above 60 dBA	0	0	Compliant - fits the "less than 6.5 hours above 60dB" criteria
5/03/2022	Below 55dBA	52	13	Compliant - fits the at least 3.25 hours below 55dB criteria
5/03/2022	Above 60 dBA	0	0	Compliant - fits the "less than 6.5 hours above 60dB" criteria
6/03/2022	Below 55dBA	52	13	Compliant - fits the at least 3.25 hours below 55dB criteria
6/03/2022	Above 60 dBA	0	0	Compliant - fits the "less than 6.5 hours above 60dB" criteria
7/03/2022	Below 55dBA	51	12.75	Compliant - fits the at least 3.25 hours below 55dB criteria
7/03/2022	Above 60 dBA	0	0	Compliant - fits the "less than 6.5 hours above 60dB" criteria
8/03/2022	Below 55dBA	49	12.25	Compliant - fits the at least 3.25 hours below 55dB criteria
8/03/2022	Above 60 dBA	0	0	Compliant - fits the "less than 6.5 hours above 60dB" criteria
9/03/2022	Below 55dBA	39	9.75	Compliant - fits the at least 3.25 hours below 55dB criteria
9/03/2022	Above 60 dBA	0	0	Compliant - fits the "less than 6.5 hours above 60dB" criteria
10/03/2022	Below 55dBA	31	7.75	Compliant - fits the at least 3.25 hours below 55dB criteria
10/03/2022	Above 60 dBA	0	0	Compliant - fits the "less than 6.5 hours above 60dB" criteria
11/03/2022	Below 55dBA	51	12.75	Compliant - fits the at least 3.25 hours below 55dB criteria
11/03/2022	Above 60 dBA	0	0	Compliant - fits the "less than 6.5 hours above 60dB" criteria
12/03/2022	Below 55dBA	46	11.5	Compliant - fits the at least 3.25 hours below 55dB criteria
12/03/2022	Above 60 dBA	0	0	Compliant - fits the "less than 6.5 hours above 60dB" criteria
13/03/2022	Below 55dBA	52	13	Compliant - fits the at least 3.25 hours below 55dB criteria
13/03/2022	Above 60 dBA	0	0	Compliant - fits the "less than 6.5 hours above 60dB" criteria
14/03/2022	Below 55dBA	41	10.25	Compliant - fits the at least 3.25 hours below 55dB criteria
14/03/2022	Above 60 dBA	0	0	Compliant - fits the "less than 6.5 hours above 60dB" criteria
15/03/2022	Below 55dBA	34	8.5	Compliant - fits the at least 3.25 hours below 55dB criteria
15/03/2022	Above 60 dBA	0	0	Compliant - fits the "less than 6.5 hours above 60dB" criteria

Appendix B Calibration Certificates

CERTIFICATE OF CALIBRATION

CERTIFICATE No: **SLM31165**

EQUIPMENT TESTED: Sound Level Meter

Manufacturer: Rion
Type No: NL-52
Mic. Type: UC-59
Pre-Amp. Type: NH-25

Serial No: 00553919
Serial No: 08077
Serial No: 43963

Owner: Ward Civil & Environmental Engineering
Suite 2, Level 4, 65 Epping Rd
North Ryde, NSW 2113

Tests Performed: IEC 61672-3:2013

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

CONDITIONS OF TEST:

Ambient Pressure	1002 hPa ± 1 hPa	Date of Receipt :	15/11/2021
Temperature	24 $^{\circ}\text{C} \pm 1^{\circ}\text{C}$	Date of Calibration :	16/11/2021
Relative Humidity	32 % $\pm 5\%$	Date of Issue :	16/11/2021

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

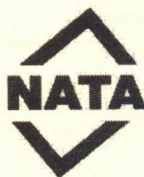
CHECKED BY: **AUTHORISED SIGNATURE:** *Hein Soe*

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%.



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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

The performance characteristics listed below were tested. The tests are based on the relevant clauses of IEC 61672-3:2013

Tests Performed:	Clause	Result
<i>Absolute Calibration</i>	10	Pass
<i>Acoustical Frequency Weighting</i>	12	Pass
<i>Self-Generated Noise</i>	11.1	Observed
<i>Electrical Noise</i>	11.2	Observed
<i>Long Term Stability</i>	15	Pass
<i>Electrical Frequency Weightings</i>	13	Pass
<i>Frequency and Time Weightings</i>	14	Pass
<i>Reference Level Linearity</i>	16	Pass
<i>Range Level Linearity</i>	17	Not Applicable
<i>Toneburst</i>	18	Pass
<i>Peak C Sound Level</i>	19	Pass
<i>Overload Indicator</i>	20	Pass
<i>High Level Stability</i>	21	Pass

Statement of Compliance: The sound level meter submitted for testing successfully completed the periodic tests of IEC 61672-3:-2013, 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 because evidence was not publically 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 because the periodic tests of IEC 61672-3:-2013 cover only a limited subset of the specifications in IEC 61672-1:-2013.

A full technical report is available on request.



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	9/12/2021	Job No	RB931	Operator	AM
Client Name	RENZO TONIN & ASSOCIATES (NSW) PTY LTD				
Client Address	LEVEL 1 418A ELIZABETH ST SURRY HILLS 2010				

Test Item

Instrument Make	NTI	Model	XL2	Serial No	#A2A-05642-E0 #RTA06-014
Microphone Make	GRAS	Model	40AE	Serial No	#165478
Preamplifier Make	NTI	Model	MA220	Serial No	#2357
Ext'n Cable Make	NTI	Model	N/A	Serial No	N/A
Accessories	Nil			Firmware	4.20

SLM Type	1
Filters Class	1

Environmental Conditions	Measured	
	Start	End
Air Temp. (°C)	23.6	24.7
Rel. Humidity (%)	63.2	54.3
Air Pressure (kPa)	100.3	100.2

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 Accredited Laboratory Number
14966

Accredited for compliance with
ISO/IEC 17025 - Calibration

Authorized Signatory:

Print Name: Ariel Michael

Date: 10/12/2021

Template Document Name: RQT-05 SLM IEC61672 Verification (r75)

NATacoustic

Sound Level Meter Verification - Summary of Tests

Calibration Date 9/12/2021	Job No RB931	Operator AM
Client Name RENZO TONIN & ASSOCIATES (NSW) PTY LTD		
Client Address LEVEL 1 418A ELIZABETH ST SURRY HILLS 2010		

1. Instrument Information & Reference Conditions		
Instrument Make NTI	Model XL2	Serial No #A2A-05642-E0 #RTA06-014
Microphone Make GRAS	Model 40AE	Serial No #165478
Preamplifier Make NTI	Model MA220	Serial No #2357
Ext'n Cable Make NTI	Model N/A	Serial No N/A
Accessories Nil		Firmware 4.20

Freq Weightings	FLAT	No	A	Yes	C	Yes	Z	Yes
Time Weightings	Fast	Yes	Slow	Yes	Impulse	Yes		

SLM Type	1
Filter Class	1

Instruction Manual is Available	Yes
---------------------------------	-----

2. Preliminary Inspection and Power Supply	Logger Inspected	Yes
	Calibration Equipment Okay	Yes
	Power Supply Ok (Start)	Yes
	Power Supply Ok (End)	Yes

3. Environmental Conditions	Environmental Conditions	Measured	
		Start	End
	Air Temp. (°C)	23.6	24.7
	Rel. Humidity (%)	63.2	54.3
	Air Pressure (kPa)	100.3	100.2
	Conforming	Yes	Yes

Test Description		Value / Conforming	Uncert (+/-)
4(a). Initial Calibration	Calibration Frequency Hz	1000.0	N/A
	Indicated Level Before Adjustment (dB)	113.9	0.11
	Indicated Level After Adjustment (dB)	114.0	0.11
	Stability During Continuous Operation (dB)	Yes	N/A
5(a). Self-Generated Noise, Microphone Installed	A	18.2	0.09
5(b). Self-Generated Noise, Electrical	A	9.5	0.09
	C	13.1	0.09
	Z	18.9	0.09
6. Acoustical Signal Test	125 Hz	Yes	0.42
	1 kHz	Yes	0.42
	8 kHz	Yes	0.60
7. Electrical Frequency Weighting	A	Yes	0.09
	C	Yes	0.09
	Z	Yes	0.09
8. Frequency & Time Weightings 1kHz	8(a). Frequency Weighting	C	Yes
		Z	Yes
		FLAT	N/A
	8(b). Time Weighting	Slow	Yes
	Leq	Yes	0.09
9(a). Level Linearity 8kHz (Increasing)	Conforming	Yes	0.13
9(b). Level Linearity 8kHz (Decreasing)	Conforming	Yes	0.13
10(a). Level Linearity Including the Level Range (Reference Signal)	Conforming	Yes	0.13
10(b). Level Linearity Including the Level range (5dB Above Under-range)	Conforming	Yes	0.13
11. Toneburst Response	Fast	Yes	0.13
	Slow	Yes	0.13
	SEL/Leq	Yes	0.13
12. Peak C sound level	8 kHz	Yes	0.09
	500 Hz	Yes	0.09
13. Overload indication	Conforming	Yes	0.09
	Latches	N/A	N/A
14. High-level Stability	Conforming	Yes	0.09
15(a). Octave Band Filter Relative Attenuation (<2kHz)	Conforming	Yes	0.09
15(b). Octave Band Filter Relative Attenuation (>2kHz)	Conforming	Yes	0.09
16. Octave Band Filter Relative Attenuation at Midband Frequency	Conforming	Yes	0.09
17(a). Octave Band Filter Level Linearity 31.5Hz (Increasing)	31.5Hz	Yes	0.13
17(b). Octave Band Filter Level Linearity 1kHz (Increasing)	1kHz	Yes	0.13
17(c). Octave Band Filter Level Linearity 16kHz (Increasing)	16kHz	Yes	0.13
18(a). Octave Band Filter Level Linearity 31.5Hz (Decreasing)	31.5Hz	Yes	0.13
18(b). Octave Band Filter Level Linearity 1kHz (Decreasing)	1kHz	Yes	0.13
18(c). Octave Band Filter Level Linearity 16kHz (Decreasing)	16kHz	Yes	0.13
19(a). Octave Level Linearity Including the Level range (31.5Hz)	31.5Hz	Yes	0.13
19(b). Octave Level Linearity Including the Level range (1kHz)	1kHz	Yes	0.13
19(c). Octave Level Linearity Including the Level range (16kHz)	16kHz	Yes	0.13
20(a). Octave Band Filter Lower Limit (Reference Range)	Conforming	Yes	0.09
20(b). Octave Band Filter Lower Limit (Lowest Range)	Conforming	Yes	0.09
21(a). Third Octave Band Filter Relative Attenuation (<31.5Hz)	Conforming	Yes	0.09
21(b). Third Octave Band Filter Relative Attenuation (40Hz-315Hz)	Conforming	Yes	0.09
21(c). Third Octave Band Filter Relative Attenuation (400Hz-3.15kHz)	Conforming	Yes	0.09
21(d). Third Octave Band Filter Relative Attenuation (>24kHz)	Conforming	Yes	0.09
22. Third Octave Band Filter Relative Attenuation at Midband Frequency	Conforming	Yes	0.09

23(a). Third Octave Band Filter Level Linearity 31.5Hz (Increasing)	31.5Hz	Yes	0.13
23(b). Third Octave Band Filter Level Linearity 1kHz (Increasing)	1kHz	Yes	0.13
23(c). Third Octave Band Filter Level Linearity 16kHz (Increasing)	16kHz	Yes	0.13
24(a). Third Octave Band Filter Level Linearity 31.5Hz (Decreasing)	31.5Hz	Yes	0.13
24(b). Third Octave Band Filter Level Linearity 1kHz (Decreasing)	1kHz	Yes	0.13
24(c). Third Octave Band Filter Level Linearity 16kHz (Decreasing)	16kHz	Yes	0.13
25(a). Third Octave Level Linearity Including the Level range (31.5Hz)	31.5Hz	Yes	0.13
25(b). Third Octave Level Linearity Including the Level range (1kHz)	1kHz	Yes	0.13
25(c). Third Octave Level Linearity Including the Level range (16kHz)	16kHz	Yes	0.13
26(a). Octave Band Filter Lower Limit (Reference Range)	Conforming	Yes	0.09
26(b). Octave Band Filter Lower Limit (Lowest Range)	Conforming	Yes	0.09
SLM Overall Conforming		Yes	

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The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.
This document shall not be reproduced, except in full.
Periodic tests were performed in accordance with procedures from IEC 61672-3 :2013 and IEC 61260-3 :2016.

1(a). Instrument Information

Calibration Date	9/12/2021	Job No	RB931	Operator	AM
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Client Name	RENZO TONIN & ASSOCIATES (NSW) PTY LTD
Client Address	LEVEL 1 418A ELIZABETH ST SURRY HILLS 2010

1. Instrument Information

Instrument Make	NTI	Model	XL2	Serial	#A2A-05642-E0 #RTA06-014
Microphone Make	GRAS	Model	40AE	Serial	#165478
Preampifier Make	NTI	Model	MA220	Serial	#2357
Ext'n Cable Make	NTI	Model		Serial	
Accessories	Nil			Firmware	4.20

Freq Weightings	A	Yes
	C	Yes
	Z	Yes
	FLAT	No

Time Weightings	Fast	Yes
	Slow	Yes
	Impulse	Yes

Functions	Leq	Yes
	SEL	Yes
	Peak	Yes

Instrument Ranges	Range Name	Indicator Range		Primary Range	
		Low dB	High dB	Low dB	High dB
1	HIGH	40	140	60	134
2	MID	20	120	40	120
3	LOW	0	100	20	100
4					
5					
6					
7					
8					
9					
10					
Check List	OK				

Reference Range	MID
Ref. SPL @ 1kHz	114

Linearity Limits on Ref range	Low dB	High dB
1kHz Leq (A weighting)	40.0	120.0
4kHz Leq	40.0	120.0
8kHz Leq	40.0	120.0

Highest Range for 10(b),12,13	MID
-------------------------------	-----

SLM Class	1
Filter Class	1
Filter Base	2

Colour Legend	
Enter Value	110
Operator Action	110
Difference	1.0
Error/Outside Tolerance	2.0
Tolerance	+/-1
Select Toggle	Val
Informative	110
Conforming	Yes

Instruction Manual Title (Clause 3.1&3.2, IEC 61672-3:2013)	NTI XL2 Operating Manual
Version	2.5
Publication Date	2/11/2012
Source of Document (& Date of Download if Applicable)	N/A

Conforming	Yes
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Pattern Evaluation Test Report (Clause 3.5, IEC 61672-3:2013)	
Reference Number or Page Number	
Publication Date	
Source of Document (& Date of Download if Applicable)	

Conforming	No
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☒ Checked

1(b). Acoustic Corrections

Absolute Corrections and Uncertainties										
Freq (Hz)	Mic FF to Pressure		Case		Windscreen		Other *		Total	
	dB	Uncert dB	dB	Uncert dB	dB	Uncert dB	dB	Uncert dB	dB	Uncert dB
31.5	0.00								0.00	0.41
63	0.00								0.00	0.41
125	0.00								0.00	0.41
250	0.00								0.00	0.41
500	0.00								0.00	0.41
1k	0.20								0.20	0.41
2k	0.45								0.45	0.41
4k	1.05								1.05	0.41
8k	2.80								2.80	0.58
12.5k	5.60								5.60	0.64
16k	7.85								7.85	0.64

Source of Mic FF to Pressure Correction	B&K Type 4226 Corrections
Source of Case Correction	Not Available
Source of Windscreen Correction	Not Available
*Description of Other Correction	N/A

Descriptions of Tests

1(b). Acoustical signal tests of a frequency weighting (IEC 61672-3)

(Clause 12.2)

Correction data shall account for:

- the equivalent free-field or random-incidence frequency response of the sound level meter if the source of sound or simulated sound is the pressure field in a multi-frequency sound calibrator, in a comparison coupler, or from an electrostatic actuator; and,
- if applicable, the average influence on the frequency response of a typical microphone of a windscreen and any accessories that are part of the configuration of the sound level meter for normal use.

(Clause 12.3)

Correction data shall be obtained from tables in the Instruction Manual for the sound level meter.

(Clause 12.4)

If the necessary correction data are not available from the Instruction Manual, data from the manufacturer of the microphone, multi-frequency sound calibrator, comparison coupler, or electrostatic actuator may then be used. This data shall be publicly available

(Clause 12.5)

The source for the free-field or random-incidence correction data shall be stated in the documentation for the results of the periodic tests. The source for the associated uncertainties of measurement shall be the same as the source for the corresponding correction data. If the uncertainties of the corresponding free-field correction data are not available, the applicable maximum-permitted uncertainties given in IEC 62585 shall be used in the calculation of the laboratory's total uncertainty budget.

NOTE: Where the uncertainties due to the "Mic FF to Pressure", "Case" or "Windscreen" are omitted in the table above, the following statement applies:

No information on the uncertainty of measurement, required by IEC 61672-3:2013, for the correction data given in the Instruction Manual or obtained from the manufacturer or supplier of the sound level meter, or the manufacturer of the microphone, or the manufacturer of the multi-frequency sound calibrator was provided in the Instruction Manual or made available by the manufacturer or supplier of the sound level meter. The uncertainty of measurement of the correction data was therefore assumed to be the maximum-permitted uncertainty given in IEC 62585 for the corresponding free-field correction data and for a coverage probability of 95 %.

☒ Checked

1(c). Electrical Corrections

Absolute Corrections and Uncertainties										
Freq (Hz)	Mic 0 deg FF Resp		Case		Windscreen		Other *		Total	
	dB	Uncert dB	dB	Uncert dB	dB	Uncert dB	dB	Uncert dB	dB	Uncert dB
31.5			0.00		0.00		0.00		0.00	0.41
63			0.00		0.00		0.00		0.00	0.41
125			0.00		0.00		0.00		0.00	0.41
250			0.00		0.00		0.00		0.00	0.41
500			0.00		0.00		0.00		0.00	0.41
1k			0.00		0.00		0.00		0.00	0.41
2k			0.00		0.00		0.00		0.00	0.41
4k			0.00		0.00		0.00		0.00	0.41
8k			0.00		0.00		0.00		0.00	0.58
12.5k			0.00		0.00		0.00		0.00	0.64
16k			0.00		0.00		0.00		0.00	0.64

Source of Mic 0 deg Free-field Response	Not Available
Source of Case Correction	Not Available
Source of Windscreen Correction	Not Available
*Description of Other Correction	N/A

Descriptions of Tests

1(c). Acoustical signal tests of a frequency weighting (IEC 61672-3)

(Clause 13.6)

For each frequency weighting and at each test frequency, corrections shall be applied to the relative frequency weightings determined in 13.5 to account for:

- the deviation of the free-field or random-incidence frequency response of the microphone in the reference direction from a uniform frequency response;
- the average effects of reflections from the case of the sound level meter and of diffraction of sound around the microphone and preamplifier; and,
- if applicable, the average influence on the frequency response of a typical microphone of a windscreen and any accessories that are part of the configuration of the sound level meter for normal use.

(Clause 13.7)

Corrections for the effects of reflections and diffraction and for the influence of the windscreen and windscreen accessories on the free-field or random-incidence frequency response shall be the same as used for the frequency-weighting tests with acoustical signals.

NOTE: Where the uncertainties due to the "Mic FF to Pressure", "Case" or "Windscreen" are omitted in the table above, the following statement applies:

No information on the uncertainty of measurement, required by IEC 61672-3:2013, for the correction data given in the Instruction Manual or obtained from the manufacturer or supplier of the sound level meter, or the manufacturer of the microphone, or the manufacturer of the multi-frequency sound calibrator was provided in the Instruction Manual or made available by the manufacturer or supplier of the sound level meter. The uncertainty of measurement of the correction data was therefore assumed to be the maximum-permitted uncertainty given in IEC 62585 for the corresponding free-field correction data and for a coverage probability of 95 %.

☒ Checked

2. Preliminary, 3. Environmental Conditions & 4. Calibration

2. Preliminary Inspection and Power Supply

Instrument Inspected	Yes
Laboratory Calibration Equipment Ok	Yes
Power Supply Ok (Start)	Yes
Power Supply Ok (End)	Yes

3. Environmental Conditions

Environmental Conditions	Measured		Devn from Mid Limits		Uncert.	Expanded Deviation			Complies	Limits	
	Start	End	Start	End		Start	End	Tolerance		Min	Max
Air Temp. (°C)	23.6	24.7	0.6	1.7	0.5	1.10	2.20	3	Yes	20	26
Rel. Humidity (%)	63.2	54.3	15.7	6.8	4.8	20.50	11.60	22.5	Yes	25	70
Air Pressure (kPa)	100.3	100.2	7.8	7.7	0.63	8.41	8.37	12.5	Yes	80	105
Conforming									Yes		

4(a). Initial Calibration

SLM Settings	
Time Weighting	Fast
Frequency Weighting	Z
SLM Range	MID
Microphone / Windshield Correction	OFF
Polarization Voltage (V)	0
Microphone Sensitivity (mV/Pa)	39.6

B&K 4226 Calibrator Settings	
"Sound Field"	Pressure
"Microphone"	N/A
Calibration Level (Lin)	114
Calibration Frequency (Hz)	1000

Calibration	
Indicated Level before adjust. (dB)	113.9
Adjustment required	Yes
Indicated level after adjust. (dB)	114

4(b). Final Calibration

Level at conclusion of testing (dB)	114.0
Difference	0.0
Tolerance	± 0.1

Conforming	Yes
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Uncertainty (+/-) dB	0.11
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Descriptions of Tests

2. Preliminary Inspection and Power Supply (IEC 61672-3 Clause 5 "Preliminary Inspection" & Clause 6 "Power Supply")

Prior to any measurements, the sound level meter and all accessories shall be visually inspected, paying particular attention to damage to, or accumulation of foreign material on, the protection grid or diaphragm of the microphone. All relevant controls shall be operated to ensure that they are in working order. If the controls, display, and other essential elements are not in proper working order, no periodic tests shall be performed.

For all tests, the sound level meter shall be powered from its preferred supply or a suitable alternative. Before and after conducting the set of tests with acoustical signals and before and after conducting the set of tests with electrical signals, the power supply for the sound level meter shall be checked by the method stated in the Instruction Manual to ensure that it is within the specified operating limits. If the voltage or the equivalent indication of the status of the power supply is not within the operating limits and the reason cannot be attributed to partially discharged batteries or an incorrect selection of the voltage of the public power supply, then no periodic tests shall be performed as a malfunction is indicated.

3. Environmental conditions (IEC 61672-3 Clause 7 "Environmental Conditions")

Periodic tests shall be performed within the following ranges of environmental conditions: 80 kPa to 105 kPa for static air pressure, 20 °C to 26 °C for air temperature and 25 % to 70 % for relative humidity. These conditions are recorded at the start and end of the testing.

4a. Calibration (IEC 61672-3 Clause 10 "Indication at the calibration check frequency")

The sound level meter shall be adjusted, if necessary, to indicate the required sound level for the environmental conditions under which the tests are performed. The indications of the sound level meter before and after adjustment shall be recorded.

4b. Long-term Stability (IEC 61672-3 Clause 15)

The long-term stability of a sound level meter is evaluated from the difference between the A-weighted sound levels indicated in response to steady 1 kHz signals applied at the beginning and end of a period of operation. For each indication, the level of the input signal shall be that which is required to display the reference sound pressure level on the reference level range for the first indication.

The period of continuous operation shall be between 25 min and 35 min during which any convenient set of tests that use electrical input signals are performed.

The measured difference between the initial and final indications of A-weighted sound level shall not exceed the acceptance limits given in IEC 61672-1.

☒ Checked

5. Self-Generated Noise

5(a). Self-Generated Noise, Microphone Installed

SLM Settings	
Time Weighting	Fast
Frequency Weighting	A
SLM Range	LOW
Measurement Function	Leq
Integration time (s)	30

Results		
Freq Wt	Observed	Quoted
A	18.2	16.6

Uncertainty (+/-) dB	0.09
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Observed Values		
Leq	N/A	
18.2	1	
	2	
	3	
	4	
	5	
	6	
	7	
	8	
	9	
	10	
	Avg	

5(b). Self-Generated Noise, Electrical

SLM Settings	
Time Weighting	Fast
SLM Range	LOW
Measurement Function	Leq
Integration time (s)	30

Observed Values						
Leq			N/A			
A	C	Z	Obs	A	C	Z
9.5	13.1	18.9	1			
			2			
			3			
			4			
			5			
			6			
			7			
			8			
			9			
			10			
			Avg			

Results		
Freq Wt	Observed	Quoted
A	9.5	12.4
C	13.1	13.5
Z	18.9	18.3-25.5

Uncertainty (+/-) dB	0.09
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Descriptions of Tests

5(a) Self-Generated Noise, Microphone Installed (IEC 61672-3 Clause 11.1)

Measurements of the level of self-generated noise shall be made in a location that is available to the testing laboratory and where the level of background noise is minimized. Any supplied windscreen and windscreen accessory need not be installed around the microphone for measurement of the level of self-generated noise. The sound level meter shall be in the configuration submitted for periodic testing and with the most-sensitive level range and frequency-weighting A selected.

The indicated level of the A-weighted self-generated noise on the most-sensitive level range shall be recorded and reported. The level of self-generated noise is preferably measured as a time-averaged sound level with an averaging time of at least 30 s. Time-averaged sound level may be measured directly or calculated from an indication of sound exposure level and integration time. If time-averaged sound level cannot be determined, the time-weighted sound level from the average of ten observations taken at random over a 60 s interval shall be measured. If the time-weighted sound level is recorded, the S time weighting shall be used if available; otherwise the F time weighting shall be used.

5(b) Self-Generated Noise - Electrical (IEC 61672-3 Clause 11.2)

With the microphone replaced by the electrical input-signal device (or using the specified means of inserting electrical signals), and with the device terminated in the manner specified in the Instruction Manual for measurements of the level of self-generated noise, the indicated level of the time-averaged or time-weighted self-generated noise, measured by the same procedure as with the microphone installed, shall be recorded and reported for all frequency weightings and for the most-sensitive level range.

☒ Checked

6. Acoustical Signal Test

SLM Settings	
Time Weighting	Fast
Frequency Weighting	C
SLM Range	MID
Microphone Compensation Filter	OFF
B&K 4226 Calibrator Settings	
"Sound Field"	Pressure
"Microphone"	N/A
Reference Setting (Lin)	114

Freq (Hz)	Observed Values			Mean Meter Reading	4226 calibrator corrections	Corrected Mean Readings	Pressure to Free Field	Case Effect Correction	Windscreen Effect Correction	Other Effect Correction	Equivalent Free Field	Response re 1kHz	C Weighting Response	Deviation from Expected	Tolerance		Conforming	Uncertainty		
	Set 1	Set 2	Set 3												Type 1	Type 2		Total (+/-) dB	Lab (+/-) dB	Corrections (+/-) dB
31.5	110.8	110.7	110.7	110.73	0.12	110.85	0.00	0.00	0.00	0.00	110.85	-3.32	-3.00	-0.32	± 1.5	± 3.0	Yes	0.43	0.14	0.41
63	113.1	113.1	113.1	113.10	0.04	113.14	0.00	0.00	0.00	0.00	113.14	-1.03	-0.80	-0.23	± 1.0	± 2.0	Yes	0.42	0.12	0.41
125	113.8	113.8	113.8	113.80	0.00	113.80	0.00	0.00	0.00	0.00	113.80	-0.37	-0.20	-0.17	± 1.0	± 1.5	Yes	0.42	0.12	0.41
250	114.0	114.0	114.0	114.00	0.00	114.00	0.00	0.00	0.00	0.00	114.00	-0.17	0.00	-0.17	± 1.0	± 1.5	Yes	0.42	0.12	0.41
500	114.0	114.0	114.0	114.00	0.00	114.00	0.00	0.00	0.00	0.00	114.00	-0.17	0.00	-0.17	± 1.0	± 1.5	Yes	0.42	0.12	0.41
1k	114.0	114.0	114.0	114.00	-0.03	113.97	0.20	0.00	0.00	0.00	114.17	0.00	0.00	0.00	± 0.7	± 1.0	Yes	0.42	0.11	0.41
2k	113.7	113.7	113.7	113.70	0.02	113.72	0.45	0.00	0.00	0.00	114.17	0.00	-0.20	0.20	± 1.0	± 2.0	Yes	0.43	0.13	0.41
4k	113.1	113.0	113.1	113.07	-0.18	112.89	1.05	0.00	0.00	0.00	113.94	-0.23	-0.80	0.57	± 1.0	± 3.0	Yes	0.43	0.14	0.41
8k	109.8	109.8	109.8	109.80	-0.15	109.65	2.80	0.00	0.00	0.00	112.45	-1.72	-3.00	1.28	+1.5; -2.5	± 5.0	Yes	0.60	0.15	0.58
12.5k	103.8	103.7	103.7	103.73	0.02	103.75	5.60	0.00	0.00	0.00	109.35	-4.82	-6.20	1.38	+2.0; -5.0	+5,-inf	Yes	0.68	0.21	0.64
16k	99.7	99.7	99.7	99.70	0.18	99.88	7.85	0.00	0.00	0.00	107.73	-6.44	-8.50	2.06	+2.5; -16.0	+5,-inf	Yes	0.74	0.37	0.64

Description of Tests

6. Acoustical signal tests of a frequency weighting (IEC 61672-3 Clause 12)

The sound level meter shall be set for frequency-weighting C, if available, otherwise for frequencyweighting A. The frequency weighting for tests with acoustical signals shall be determined at 125 Hz, 1 kHz, and 8 kHz. However, for information, this laboratory tests from 31.5Hz to 16kHz.

For frequency-weighting tests using a multi-frequency sound calibrator, the sound pressure level in the coupler of the sound calibrator shall preferably be set to the reference sound pressure level at 1 kHz, but shall be in the range from 70 dB to 125 dB at all frequencies.

At the discretion of the laboratory, the sound level meter shall be set to measure F-timeweighted sound level or S-time-weighted sound level. As a minimum, two repetitions of the coupling and measurements shall be performed to give a total of at least three tests.

The relative frequency weighting, relative to the response at 1 kHz, shall be determined from the average equivalent free-field or random-incidence sound level at a test frequency minus the average equivalent free-field or random-incidence sound level at 1 kHz. (Clause 12.15)

☒ Checked

7. Electrical Frequency Weighting

SLM Settings	
Time Weighting	Fast
Frequency Weighting	A
SLM Range	MID
Generator & Attenuator Settings	
Attenuation (dB)	30
Generator Frequency (Hz)	1k
SPL Reference (dB)	75
Integration Time (s)	N/A
Generator Output (mVrms)	149.60

Freq Hz	Output (mV)	Indication A	Output (mV)	Indication C	Output (mV)	Indication Z	Tolerance	
63	3054.44	74.9	164.03	74.9	149.60	74.9		
125	954.84	74.9	153.08	75.0	149.60	75.0		
250	402.65	74.9	149.60	75.0	149.60	75.0		
500	216.24	74.9	149.60	75.0	149.60	75.0		
1k	149.60	75.0	149.60	75.0	149.60	75.0		
2k	130.30	75.0	153.08	75.0	149.60	75.0		
4k	133.33	75.0	164.03	75.0	149.60	75.0		
8k	169.80	75.0	211.32	75.0	149.60	75.0		
16k	319.84	74.8	398.04	74.8	149.60	75.0		
Typical Microphone 0deg Free Field Response		0.00		0.00		0.00		
		0.00		0.00		0.00		
		0.00		0.00		0.00		
		0.00		0.00		0.00		
		0.00		0.00		0.00		
		0.00		0.00		0.00		
		0.00		0.00		0.00		
		0.00		0.00		0.00		
Case Effect Correction		0.00		0.00		0.00		
		0.00		0.00		0.00		
		0.00		0.00		0.00		
		0.00		0.00		0.00		
		0.00		0.00		0.00		
		0.00		0.00		0.00		
		0.00		0.00		0.00		
		0.00		0.00		0.00		
Windscreen Effect Correction		0.00		0.00		0.00		
		0.00		0.00		0.00		
		0.00		0.00		0.00		
		0.00		0.00		0.00		
		0.00		0.00		0.00		
		0.00		0.00		0.00		
		0.00		0.00		0.00		
		0.00		0.00		0.00		
Other Correction		0.00		0.00		0.00		
		0.00		0.00		0.00		
		0.00		0.00		0.00		
		0.00		0.00		0.00		
		0.00		0.00		0.00		
		0.00		0.00		0.00		
		0.00		0.00		0.00		
		0.00		0.00		0.00		
Equivalent Free Field		74.90		74.90		74.90		
		74.90		75.00		75.00		
		74.90		75.00		75.00		
		74.90		75.00		75.00		
		75.00		75.00		75.00		
		75.00		75.00		75.00		
		75.00		75.00		75.00		
		74.80		74.80		75.00		
Response re 1kHz (Deviation from Expected)		-0.10		-0.10		-0.10	Type 1	Type 2
		-0.10		0.00		0.00	± 1.0	± 2.0
		-0.10		0.00		0.00	± 1.0	± 1.5
		-0.10		0.00		0.00	± 1.0	± 1.5
		-0.10		0.00		0.00	± 1.0	± 1.5
		0.00		0.00		0.00	± 0.7	± 1.0
		0.00		0.00		0.00	± 1.0	± 2.0
		0.00		0.00		0.00	± 1.0	± 3.0
		0.00		0.00		0.00	+1.5; -2.5	± 5.0
		-0.20		-0.20		0.00	+2.5; -16.0	+5; -inf

Conforming	Yes	Yes	Yes
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Uncertainty (+/-) dB	0.09
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Description of Tests

7. Electrical signal tests of frequency weightings (IEC 61672-3 Clause 13)

Frequency weightings shall be determined using steady sinusoidal electrical input signals for all frequency weightings for which design goals and acceptance limits are specified in IEC 61672-1 and which are provided in the sound level meter. The sound level meter shall be set to display F-time-weighted sound level.

On the reference level range and for each frequency weighting to be tested, the level of a 1 kHz input signal shall be adjusted to yield an indication that is 45 dB less than the upper boundary stated in the Instruction Manual for the linear operating range at 1 kHz on the reference level range.

At test frequencies other than 1 kHz, the level of the input electrical signal shall be determined as the level of the input signal at 1 kHz minus the exact design-goal response, given in IEC 61672-1 for the selected frequency weighting at the test frequency.

☒ Checked

8. Frequency & Time Weightings 1kHz

SLM Settings	
Time Weighting	Fast
Frequency Weighting	A
SLM Range	MID
Generator & Attenuator Settings	
Attenuation (dB)	0.0
Generator Frequency (Hz)	1k
SPL Reference (dB)	114.0
Output (mVrms)	421.7

8(a). Frequency Weightings 1kHz

Time Wt	Frequency Weighting				Tolerance	
Fast	A	C	Z	N/A	Type 1	Type 2
1kHz	114.0	114.0	114.0		± 0.2	± 0.2
Difference		0.0	0.0			

Conforming	Yes	Yes	N/A
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Uncertainty (+/-) dB	0.09
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8(b). Time Weightings 1kHz

Freq Wt	Time Weighting			Tolerance	
A	F	S	Leq	Type 1	Type 2
1kHz	114.0	114.0	114.0	± 0.1	± 0.1
Difference		0.0	0.0		

Conforming	Yes	Yes
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Uncertainty (+/-) dB	0.09
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Description of Tests

8. Frequency and time weightings at 1 kHz (IEC 61672-3 Clause 14)

For a steady sinusoidal electrical input signal at 1 kHz on the reference level range and with an input signal that yields an indication of the reference sound pressure level with frequency weighting A, the indications shall be recorded for frequency weightings C and Z, as available, with the sound level meter set to display F-time-weighted sound level, or timeaveraged sound level, as available. In addition, the indications with frequency weighting A shall be recorded with the sound level meter set to display F-time-weighted sound level, S-time-weighted sound level, and time-averaged sound level, as available.

The measured deviation of the indication of the sound level frequency weightings and time weightings shall not exceed the acceptance limits given in IEC 61672-1.

☒ Checked

9(a). Level Linearity 8kHz (Increasing)	
1	0.00
2	0.00
3	0.00
4	0.00
5	0.00
6	0.00
7	0.00
8	0.00
9	0.00
10	0.00
11	0.00
12	0.00
13	0.00
14	0.00
15	0.00
16	0.00
17	0.00
18	0.00
19	0.00
20	0.00
21	0.00
22	0.00
23	0.00
24	0.00
25	0.00
26	0.00
27	0.00
28	0.00
29	0.00
30	0.00
31	0.00
32	0.00
33	0.00
34	0.00
35	0.00
36	0.00
37	0.00
38	0.00
39	0.00
40	0.00
41	0.00
42	0.00
43	0.00
44	0.00
45	0.00
46	0.00
47	0.00
48	0.00
49	0.00
50	0.00
51	0.00
52	0.00
53	0.00
54	0.00
55	0.00
56	0.00
57	0.00
58	0.00
59	0.00
60	0.00
61	0.00
62	0.00
63	0.00
64	0.00
65	0.00
66	0.00
67	0.00
68	0.00
69	0.00
70	0.00
71	0.00
72	0.00
73	0.00
74	0.00
75	0.00
76	0.00
77	0.00
78	0.00
79	0.00
80	0.00
81	0.00
82	0.00
83	0.00
84	0.00
85	0.00
86	0.00
87	0.00
88	0.00
89	0.00
90	0.00
91	0.00
92	0.00
93	0.00
94	0.00
95	0.00
96	0.00
97	0.00
98	0.00
99	0.00
100	0.00

SLM Settings	
Time Weighting	Fast
Frequency Weighting	A
SLM Range	MID
Generator & Attenuator Settings	
Select dB Over SLM Range	5
Attenuation (dB)	31.0
Generator Frequency (Hz)	8k
SPL Reference Starting Point (dB)	94.0
Output (mVrms)	1703.0
Noise Floor (dB)	-99.0

[illegible]

Conforming	Yes
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Uncertainty (+/-) dB	0.13
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Description of Tests	
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9(a). Level linearity on the reference level range (IEC 61672-3 Clause 16)

Level linearity shall be tested with steady sinusoidal electrical signals at a frequency of 8 kHz with the sound level meter set for frequency-weighting A. (61672-3 Clause 16.1).

Level linearity shall be measured in 5 dB steps of increasing input signal level from the starting point up to within 5 dB of the upper boundary stated in the Instruction Manual for the linear operating range at 8 kHz, then at 1 dB steps of increasing input signal level up to, but not including, the first indication of overload. The test of level linearity shall then be continued at 5 dB steps of decreasing input signal level from the starting point down to within 5 dB of the specified lower boundary, then at 1 dB steps of decreasing input signal level down to, but not including, the first indication of an under-range condition.

Measured level linearity deviations shall not exceed the applicable acceptance limits given in IEC 61672-1 from the specified upper boundary of the linear operating range up to, but not including, the first indication of overload and also from the specified lower boundary of the linear operating range down to, but not including, the first indication of an under-range condition.

"Y" means indicator over-range.

☒ Checked

9(b). Level Linearity 8kHz (Decreasing)

SLM Settings	
Time Weighting	Fast
Frequency Weighting	A
SLM Range	MID
Generator & Attenuator Settings	
Select dB Under SLM Range	0
Attenuation (dB)	0.0
Generator Frequency (Hz)	8k
SPL Reference Starting Point (dB)	94
Output (mVrms)	48.1
Noise Floor (dB)	-99.0

Decreasing level to Underrange				Tolerance	
Atten	Expected	Indicator	Diff	Type 1	Type 2
5.0	89.0	89.0	0.0	± 0.8	± 1.1
10.0	84.0	84.0	0.0	± 0.8	± 1.1
15.0	79.0	79.0	0.0	± 0.8	± 1.1
20.0	74.0	74.0	0.0	± 0.8	± 1.1
25.0	69.0	69.0	0.0	± 0.8	± 1.1
30.0	64.0	64.0	0.0	± 0.8	± 1.1
35.0	59.0	59.0	0.0	± 0.8	± 1.1
40.0	54.0	54.0	0.0	± 0.8	± 1.1
45.0	49.0	49.0	0.0	± 0.8	± 1.1
49.0	45.0	45.0	0.0	± 0.8	± 1.1
50.0	44.0	44.0	0.0	± 0.8	± 1.1
51.0	43.0	43.0	0.0	± 0.8	± 1.1
52.0	42.0	42.0	0.0	± 0.8	± 1.1
53.0	41.0	41.0	0.0	± 0.8	± 1.1
54.0	40.0	40.0	0.0	± 0.8	± 1.1
				± 0.8	± 1.1
				± 0.8	± 1.1
				± 0.8	± 1.1
				± 0.8	± 1.1
				± 0.8	± 1.1
				± 0.8	± 1.1
				± 0.8	± 1.1
				± 0.8	± 1.1
				± 0.8	± 1.1
				± 0.8	± 1.1

Conforming	Yes
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Uncertainty (+/-) dB	0.13
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Description of Tests

9(b). Level linearity on the reference level range (IEC 61672-3 Clause 16)

Level linearity shall be tested with steady sinusoidal electrical signals at a frequency of 8 kHz with the sound level meter set for frequency-weighting A. (61672-3 Clause 16.1).

Level linearity shall be measured in 5 dB steps of increasing input signal level from the starting point up to within 5 dB of the upper boundary stated in the Instruction Manual for the linear operating range at 8 kHz, then at 1 dB steps of increasing input signal level up to, but not including, the first indication of overload. The test of level linearity shall then be continued at 5 dB steps of decreasing input signal level from the starting point down to within 5 dB of the specified lower boundary, then at 1 dB steps of decreasing input signal level down to, but not including, the first indication of an under-range condition.

Measured level linearity deviations shall not exceed the applicable acceptance limits given in IEC 61672-1 from the specified upper boundary of the linear operating range up to, but not including, the first indication of overload and also from the specified lower boundary of the linear operating range down to, but not including, the first indication of an under-range condition.

"Y" means indicator under-range. However, if 20dB above noise floor is reached then no results are reported.

☒ Checked

10. Level Linearity with Level Ranges 1kHz

10(a). Level Linearity Including the Level Range (Reference Signal)

SLM Settings	
Time Weighting	Fast
Frequency Weighting	A
SLM Range	MID
Generator & Attenuator Settings	
Attenuation (dB)	0
Generator Frequency (Hz)	1k
Reference SPL (dB)	114
Output (mVrms)	421.7

Settings	Level (dB)			Tolerance	
Range	Expected	Indicated	Difference	Type 1	Type 2
HIGH	114.0	114.0	0.0	± 0.8	± 1.1
MID	114.0	114.0	0.0	± 0.8	± 1.1
				± 0.8	± 1.1
				± 0.8	± 1.1
				± 0.8	± 1.1
				± 0.8	± 1.1
				± 0.8	± 1.1
				± 0.8	± 1.1
				± 0.8	± 1.1
				± 0.8	± 1.1

Conforming	Yes
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Uncertainty (+/-) dB	0.13
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10(b). Level Linearity Including the Level range (5dB Above Under-range)

SLM Settings	
Time Weighting	Fast
Frequency Weighting	A
SLM Range	HIGH
Generator & Attenuator Settings	
Attenuation (dB)	30
Generator Frequency (Hz)	1k
Reference SPL (dB)	65
Output (mVrms)	47.3

Settings	Level (dB)			Tolerance	
Range	Atten	Expected	Indicated	Difference	Type 2
HIGH	30.0	65.0	65.0	0.0	± 0.8
MID	50.0	45.0	45.0	0.0	± 0.8
LOW	70.0	25.0	25.2	0.2	± 0.8
					± 0.8
					± 0.8
					± 0.8
					± 0.8
					± 0.8
					± 0.8
					± 0.8

Conforming	Yes
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Uncertainty (+/-) dB	0.13
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Description of Tests

10. Level linearity including the level range control (IEC 61672-3 Clause 17)

For sound level meters that have more than one level range, tests of level linearity errors including errors introduced by the level range control shall be performed with steady sinusoidal electrical input signals at a frequency of 1 kHz and with the sound level meter set for frequency weighting A. For each test, signal levels shall be recorded as indications of F-time-weighted sound level or time-average sound level. (61672-3 Clause 17.1).

With the input signal level kept constant, the indicated signal level shall be recorded for all level ranges where the signal level is displayed. The indicated signal levels and the corresponding anticipated indications of signal levels shall be recorded. (61672-3 Clause 17.3).

For each level range, the level of the input signal shall then be adjusted to yield a signal level that is expected to be 5 dB greater than the signal level that first causes an indication of under-range on a level range. The indicated signal levels and the corresponding anticipated levels shall be recorded. (61672-3 Clause 17.4).

Level linearity deviations shall be calculated as an indicated signal level minus the corresponding anticipated signal level. Measured level linearity deviations shall not exceed the applicable acceptance limits given in IEC 61672-1.

☒ Checked

11. Toneburst Response

11(a). Fast ToneBurst

SLM Settings - Fast	
Time Weighting	Fast
Frequency Weighting	A
SLM Range	MID
Generator & Attenuator Settings	
Attenuation (dB)	0.0
Generator Frequency (Hz)	4k
dB Down from Linearity Limit	3
Reference SPL (dB)	117.0
Output (mVrms)	532.9

Toneburst (ms)	# Cycles	LAFMax (dB)			Tolerance	
		Expected	Indicated	Difference	Type 1	Type 2
200	800	116.0	116.0	0.0	± 0.5	± 1.0
2	8	99.0	98.9	-0.1	+ 1.0; -1.5	+ 1.0; -2.5
0.25	1	90.0	89.8	-0.2	+ 1.0; -3.0	+ 1.5; -5.0

Conforming	Yes
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Uncertainty (+/-) dB	0.09
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11(b). Slow ToneBurst

SLM Settings - Slow	
Time Weighting	Slow
Frequency Weighting	A
SLM Range	MID
Generator & Attenuator Settings	
Attenuation (dB)	0.0
Generator Frequency (Hz)	4k
dB Down from Linearity Limit	3
Reference SPL (dB)	117.0
Output (mVrms)	532.9

Toneburst (ms)	# Cycles	LASMax (dB)			Tolerance	
		Expected	Indicated	Difference	Type 1	Type 2
200	800	109.6	109.6	0.0	± 0.5	± 1.0
2	8	90.0	90	0.0	+ 1.0; -3.0	+ 1.0; -5.0

Conforming	Yes
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Uncertainty (+/-) dB	0.09
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11(c). SEL ToneBurst

SLM Settings - SEL/Leq	
Function	SEL
Frequency Weighting	A
SLM Range	MID
Generator & Attenuator Settings	
Attenuation (dB)	0.0
Generator Frequency (Hz)	4k
dB Down from Linearity Limit	3
Reference SPL (dB)	117.0
Output (mVrms)	532.9
Integration Time (if SEL not available) (s)	

Toneburst (ms)	# Cycles	SEL				Tolerance	
		Indicated	Calc'd	Expected	Difference	Type 1	Type 2
200	800	110.0	110.0	110.0	0.0	± 0.5	± 1.0
2	8	90.0	90.0	90.0	0.0	+ 1.0; -1.5	+ 1.0; -2.5
0.25	1	80.9	80.9	81.0	-0.1	+ 1.0; -3.0	+ 1.5; -5.0

Conforming	Yes
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Uncertainty (+/-) dB	0.13
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Description of Tests

11. Toneburst response (IEC 61672-3 Clause 18)

The response of the sound level meter to short-duration signals shall be tested on the reference level range with 4 kHz tonebursts. The sound level meter shall be set to frequency weighting A. (61672-3 Clause 18.1).

For the toneburst signals, indications of the sound level meter to be recorded are maximum F-time-weighted sound level, maximum S-time-weighted sound level and sound exposure level, as applicable.

The level of the steady input signal shall be adjusted to display an F-time-weighted, S-time-weighted, or time-averaged sound level, as appropriate, that is 3 dB less than the upper boundary stated in the Instruction Manual for the linear operating range at 4 kHz on the reference level range. (61672-3 Clause 18.4).

Tonebursts are tested at 200ms, 2ms and, 0.25ms durations (the latter for Fast and SEL only) and the LMax or SEL recorded.

Measured deviations of the measured toneburst responses from the corresponding reference toneburst responses given in IEC 61672-1 shall not exceed the applicable

☒ Checked

12. Peak C sound level

12(a). Peak C 8 KHz

SLM Settings						
Time Weighting				Fast		
Frequency Weighting				C		
SLM Range				MID		
Generator & Attenuator Settings						
Attenuation (dB)				0.0		
Generator Frequency (Hz)				8k		
Reference SPL (dB)				112.0		
Output (mVrms)				475.6		
Test Signal		dB LCpeak Hold			Tolerance	
8 kHz	Indication	O'Load?	Expected	Difference	Type 1	Type 2
1 Cycle	115.4	No	115.4	0.0	± 2.0	± 3.0
Conforming				Yes		
Uncertainty (+/-) dB				0.09		

12(b). Peak C 500 Hz

SLM Settings						
Time Weighting				Fast		
Frequency Weighting				C		
SLM Range				MID		
Generator & Attenuator Settings						
Attenuation (dB)				0.0		
Generator Frequency (Hz)				500		
Reference SPL (dB)				112.0		
Output (mVrms)				334.6		
Test Signal		dB LCpeak Hold			Tolerance	
500 Hz	Indication	O'Load?	Expected	Difference	Type 1	Type 2
One +ve 1/2 cycle	114.2	No	114.4	-0.2	± 1.0	± 2.0
One -ve 1/2 cycle	114.2	No	114.4	-0.2	± 1.0	± 2.0
Conforming				Yes		
Uncertainty (+/-) dB				0.09		

Description of Tests

12. Peak C sound level (IEC 61672-3 Clause 19)
Indications of C-weighted peak sound level shall be tested on the least-sensitive level range. The test signals consist of (a) a single complete cycle of an 8 kHz sinusoid starting and stopping at zero crossings and (b) positive and negative half cycles of a 500 Hz sinusoid that also start and stop at zero crossings.

The level of the steady sinusoidal 8 kHz electrical input signal, from which a single complete cycle is extracted, shall be adjusted to yield an indication of C-weighted, F-time-weighted sound level, or C-weighted, time-averaged sound level, that is 8 dB less than the upper boundary stated in the Instruction Manual for the peak level range at 8 kHz on the least sensitive level range. The indication of steady sound level shall be recorded.

The indication of C-weighted peak sound level in response to a complete cycle of the 8 kHz signal shall be recorded. Application of the complete-cycle 8 kHz signal shall not cause indication of an overload condition.

The level of the steady sinusoidal 500 Hz electrical input signal, from which positive and negative half cycles are extracted, shall be adjusted to yield an indication of C-weighted, F-time-weighted sound level, or C-weighted, time-averaged sound level, that is 8 dB less than the upper boundary stated in the Instruction Manual for the peak level range on the least-sensitive level range. The indications of steady sound levels shall be recorded.

The indications of C-weighted peak sound level in response to a single positive half-cycle 500 Hz signal and to a single negative half-cycle 500 Hz signal shall be recorded and reported. Applications of the 500 Hz half-cycle signals shall not cause indications of an overload condition.

☒ Checked

13. Overload indication

SLM Settings		
Function	Leq	
Frequency Weighting	A	
SLM Range	MID	
Generator & Attenuator Settings		
Attenuation (dB)	0.0	
Generator Frequency (Hz)	4k	
Reference SPL (dB)	119.0	
Output (mVrms)	389.9	

	Half-Cycle Signal			Tolerance	
	Positive	Negative	Difference	Type 1	Type 2
Level (dB)	126.0	126.0	0.0	± 1.5	± 1.5
Generator Output (mVrms)	1547.0	1545.0			

Conforming	Yes
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Uncertainty (+/-) dB	0.09
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Overload Indicated	No
Overload Indicator Latches	N/A

Conforming	N/A
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Description of Tests

13. Overload Indication (IEC 61672-3 Clause 20)

The test of overload indication shall only be performed for sound level meters capable of displaying time-average sound level.

Overload indication shall be tested on the least-sensitive level range with the sound level meter set to display A-weighted, time-average sound level. Positive and negative one-half-cycle sinusoidal electrical signals at a frequency of 4 kHz shall be used.(IEC 61672-3 Clause 20.2)

The test shall begin at an indicated time-averaged level for the steady input signal that corresponds to 1 dB less than the upper boundary specified for the linear operating range at 4 kHz. The level of the single positive one-half-cycle input signal shall be increased to the first indication of overload, to a resolution of 0.1 dB. The process shall be repeated for the single negative one-half-cycle signal. The levels of the single one-half-cycle input signals that produced the first indications of overload shall be recorded to a resolution of 0.1 dB.

It shall be verified that the overload indicator latches on as specified in IEC 61672-1 when an overload condition occurs.

☒ Checked

14. High-level Stability

SLM Settings	
Time Weighting	F
Frequency Weighting	A
SLM Range	MID
Generator & Attenuator Settings	
Attenuation (dB)	0.0
Generator Frequency (Hz)	1k
Reference SPL (dB)	119.0
Output (mVrms)	751.3

Time Period to Apply Signal (min)	5.0
Record SPL at Conclusion of Time Period (dB)	119.0
Difference	0.0
Tolerance	± 0.1

Conforming	Yes
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Uncertainty (+/-) dB	0.09
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Description of Tests

14. High-level Stability (IEC 61672-3 Clause 21)

The ability of a sound level meter to operate continuously in response to high signal levels without significant change in sensitivity is evaluated from the difference between the Aweighted sound levels indicated in response to a steady 1 kHz electrical signal at the beginning and end of a 5 min period of continuous exposure to the signal.

The level of the steady electrical input signal shall be that which is required to display the sound level that is 1 dB less than the upper boundary of the 1 kHz linear operating range on the least-sensitive level range.

☒ Checked

15(a). Octave Band Filter Relative Attenuation (≤2kHz)

SLM, Attenuator & Generator Settings	
Time Weighting	Fast
Frequency Weighting	Z
Range	HIGH
Set dB Below Full Scale	-1
Attenuator dB	0.0
Reference SPL 1kHz	133.0
Output mVrms	3486.0
Noise Floor dB	-99.0

Ratio	1	2	3	4	5	6	7	8	9	10	Tolerance	
Freq	4 Hz	8 Hz	16 Hz	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz		
0.06				38.8					48.7			
0.13				45.2					50.1			
0.25				52.1					53.0			
0.50				73.0					70.9			
0.71												
0.77				132.9					133.0			
0.84				132.9					133.0			
0.92				132.8					133.0			
1.00				132.9					133.0			
1.09				132.9					133.0			
1.19				132.9					133.0			
1.30				132.9					133.0			
1.41												
2.00				45.9					40.1			
4.00				41.0					33.7			
8.00				26.4					33.5			
16.00				25.4					33.1			
Attenuation dB				94.1					84.3		Class 1	Class 2
				87.7					82.9		+70/inf	+60/inf
				80.8					80.0		+60/inf	+54/inf
				59.9					62.1		+40.5/inf	+39.5/inf
											+16.6/inf	+15.6/inf
				0.0					0.0		-0.4/+5.3	-0.6/+5.8
				0.0					0.0		-0.4/+1.4	-0.6/+1.7
				0.1					0.0		-0.4/+0.7	-0.6/+0.9
				0.0					0.0		-0.4/+0.5	-0.6/+0.7
				0.0					0.0		-0.4/+0.4	-0.6/+0.6
				0.0					0.0		-0.4/+0.5	-0.6/+0.7
				0.0					0.0		-0.4/+0.7	-0.6/+0.9
				0.0					0.0		-0.4/+1.4	-0.6/+1.7
											-0.4/+5.3	-0.6/+5.8
				87.0					92.9		+16.6/inf	+15.6/inf
				91.9					99.3		+40.5/inf	+39.5/inf
				106.5					99.5		+60/inf	+54/inf
				107.5					99.9		+70/inf	+60/inf

Ins Loss				-0.1					0.0	
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Conforming	N/A	N/A	N/A	Yes	N/A	N/A	N/A	N/A	Yes	N/A
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Uncert (+/-) dB	≤80dB	0.09	>80dB	0.46
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Description of Test

15(a) Octave Filter (IEC 61260-3 Clause 13)

13 Measurement of relative attenuation

13.1 The relative attenuation on the reference level range shall be tested for the same three filters as selected in Clause 11.

13.2 The measurements of relative attenuation are made as the response to constant amplitude sinusoidal signals at various frequencies. The level of the input signals shall be (1 ± 0.1) dB below the specified upper boundary of the linear operating range.

13.6 The measured relative attenuation shall not exceed the acceptance limits given in Table 1 for the appropriate class of filter.

Interpretation: The three filters specified in "Clause 11" are 31.5Hz, 1kHz and 16kHz. The limits in "Table 1" are the Tolerance values shown in green above. The yellow cells are the observed values. The "Attenuation dB" cells are the attenuation values of each filter with the filter's centre frequency attenuation assumed to be zero (i.e. the relative attenuation). The "Ins Loss" are the actual values of attenuation at the filter centre frequencies.

☒ Checked

15(b). Octave Band Filter Relative Attenuation (>2kHz)

SLM, Attenuator & Generator Settings	
Time Weighting	Fast
Frequency Weighting	Z
SLM Range	HIGH
Set dB Below Full Scale	-1.0
Attenuator dB	0.0
Reference SPL 1kHz	133.0
Output mVrms	3486.0
Noise Floor dB	-99.0

Ratio	1	2	3	4	5	6	7	8	9	10	Tolerance	
Freq	4kHz	8kHz	16kHz	32kHz								
0.06			44.4									
0.13			50.9									
0.25			51.4									
0.50			70.7									
0.71												
0.77			133.0									
0.84			133.1									
0.92			133.0									
1.00			133.1									
1.09			133.1									
1.19			133.1									
1.30			133.1									
1.41												
2.00			47.3									
4.00			44.4									
8.00			50.8									
16.00			44.8									
Attenuation dB			88.7								Class 1	Class 2
			82.2								+70/inf	+60/inf
			81.7								+60/inf	+54/inf
			62.4								+40.5/inf	+39.5/inf
											+16.6/inf	+15.6/inf
			0.1								-0.4/+5.3	-0.6/+5.8
			0.0								-0.4/+1.4	-0.6/+1.7
			0.1								-0.4/+0.7	-0.6/+0.9
			0.0								-0.4/+0.5	-0.6/+0.7
			0.0								-0.4/+0.4	-0.6/+0.6
			0.0								-0.4/+0.5	-0.6/+0.7
			0.0								-0.4/+0.7	-0.6/+0.9
			0.0								-0.4/+1.4	-0.6/+1.7
											-0.4/+5.3	-0.6/+5.8
			85.8								+16.6/inf	+15.6/inf
			88.7								+40.5/inf	+39.5/inf
			82.3								+60/inf	+54/inf
			88.3								+70/inf	+60/inf

Ins Loss			0.1								
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Conforming	N/A	N/A	Yes	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
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Uncert (+/-) dB	≤80dB	0.09	>80dB	0.46
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Description of Test

15(b) Octave Filter (IEC 61260-3 Clause 13)

13 Measurement of relative attenuation

13.1 The relative attenuation on the reference level range shall be tested for the same three filters as selected in Clause 11.

13.2 The measurements of relative attenuation are made as the response to constant amplitude sinusoidal signals at various frequencies. The level of the input signals shall be (1 ± 0.1) dB below the specified upper boundary of the linear operating range.

13.6 The measured relative attenuation shall not exceed the acceptance limits given in Table 1 for the appropriate class of filter.

Interpretation: The three filters specified in "Clause 11" are 31.5Hz, 1kHz and 16kHz. The limits in "Table 1" are the Tolerance values shown in green above. The yellow cells are the observed values. The "Attenuation dB" cells are the attenuation values of each filter with the filter's centre frequency attenuation assumed to be zero (i.e. the relative attenuation). The "Ins Loss" are the actual values of attenuation at the filter centre frequencies.

☒ Checked

16. Octave Band Filter Relative Attenuation at Midband Frequency

SLM, Attenuator & Generator Settings	
Time Weighting	Fast
Frequency Weighting	Z
Reference Range	MID
Attenuator dB	0.0
Reference SPL 1kHz	94.0
Output mVrms	38.9

	1	2	3	4	5	6	7	8	9	10	Tolerance	
Freq	4 Hz	8 Hz	16 Hz	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	Class 1	Class 2
Measured			94.3	93.9	93.9	94.0	94.0	94.0	94.0	94.0		
Ins Loss			0.3	-0.1	-0.1	0.0	0.0	0.0	0.0	0.0	-0.4/+0.4	-0.6/+0.6
Conforming	N/A	N/A	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		

Freq	4kHz	8kHz	16kHz	32kHz							Class 1	Class 2
Measured	94.0	94.0	94.0									
Ins Loss	0.0	0.0	0.0								-0.4/+0.4	-0.6/+0.6
Conforming	Yes	Yes	Yes	N/A								

Uncert (+/-) dB	0.09
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Description of Test

16. Octave Band Filter Relative Attenuation at Midband Frequency (IEC 61260-3 Clause 10.2)

10.2 Tests of relative attenuation at midband frequency

10.2.1 The relative attenuation at the exact midband frequency shall be measured for every filter in a set of filters. The relative attenuation $\Delta A(\Omega)$ at any midband frequency is determined from Formula (8) given in IEC 61260-1:2014. The reference level range shall be selected for the test. The level of the test signal shall be equal to the reference input signal level.

10.2.2 The measured relative attenuation shall not exceed the acceptance limits $\pm 0,4$ dB for Class 1 filters or $\pm 0,6$ dB for class 2 filters as specified in 5.10 in IEC 61260-1:2014.

Interpretation: The yellow cells are the observed values. The "Ins Loss" are the actual values of attenuation at the filter centre frequencies. The "Conforming" cells demonstrate compliance with the Tolerance limits depending upon the Class of filter.

☒ Checked

17(a). Octave Band Filter Level Linearity 31.5Hz (Increasing)

SLM Settings	
Time Weighting	Fast
Frequency Weighting	Z
SLM Range	MID
Generator & Attenuator Settings	
Select dB Over SLM Range	5
Attenuation (dB)	31.0
Generator Frequency (Hz)	31.5
SPL Reference Starting Point (dB)	94.0
Output (mVrms)	1518.0
Noise Floor (dB)	-99.0

[illegible]

Conforming	Yes
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Uncertainty (+/-) dB	0.13
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Description of Tests	
1	1. <i>Test 1</i>
2	2. <i>Test 2</i>
3	3. <i>Test 3</i>
4	4. <i>Test 4</i>
5	5. <i>Test 5</i>
6	6. <i>Test 6</i>
7	7. <i>Test 7</i>
8	8. <i>Test 8</i>
9	9. <i>Test 9</i>
10	10. <i>Test 10</i>
11	11. <i>Test 11</i>
12	12. <i>Test 12</i>
13	13. <i>Test 13</i>
14	14. <i>Test 14</i>
15	15. <i>Test 15</i>
16	16. <i>Test 16</i>
17	17. <i>Test 17</i>
18	18. <i>Test 18</i>
19	19. <i>Test 19</i>
20	20. <i>Test 20</i>
21	21. <i>Test 21</i>
22	22. <i>Test 22</i>
23	23. <i>Test 23</i>
24	24. <i>Test 24</i>
25	25. <i>Test 25</i>
26	26. <i>Test 26</i>
27	27. <i>Test 27</i>
28	28. <i>Test 28</i>
29	29. <i>Test 29</i>
30	30. <i>Test 30</i>
31	31. <i>Test 31</i>
32	32. <i>Test 32</i>
33	33. <i>Test 33</i>
34	34. <i>Test 34</i>
35	35. <i>Test 35</i>
36	36. <i>Test 36</i>
37	37. <i>Test 37</i>
38	38. <i>Test 38</i>
39	39. <i>Test 39</i>
40	40. <i>Test 40</i>
41	41. <i>Test 41</i>
42	42. <i>Test 42</i>
43	43. <i>Test 43</i>
44	44. <i>Test 44</i>
45	45. <i>Test 45</i>
46	46. <i>Test 46</i>
47	47. <i>Test 47</i>
48	48. <i>Test 48</i>
49	49. <i>Test 49</i>
50	50. <i>Test 50</i>
51	51. <i>Test 51</i>
52	52. <i>Test 52</i>
53	53. <i>Test 53</i>
54	54. <i>Test 54</i>
55	55. <i>Test 55</i>
56	56. <i>Test 56</i>
57	57. <i>Test 57</i>
58	58. <i>Test 58</i>
59	59. <i>Test 59</i>
60	60. <i>Test 60</i>
61	61. <i>Test 61</i>
62	62. <i>Test 62</i>
63	63. <i>Test 63</i>
64	64. <i>Test 64</i>
65	65. <i>Test 65</i>
66	66. <i>Test 66</i>
67	67. <i>Test 67</i>
68	68. <i>Test 68</i>
69	69. <i>Test 69</i>
70	70. <i>Test 70</i>
71	71. <i>Test 71</i>
72	72. <i>Test 72</i>
73	73. <i>Test 73</i>
74	74. <i>Test 74</i>
75	75. <i>Test 75</i>
76	76. <i>Test 76</i>
77	77. <i>Test 77</i>
78	78. <i>Test 78</i>
79	79. <i>Test 79</i>
80	80. <i>Test 80</i>
81	81. <i>Test 81</i>
82	82. <i>Test 82</i>
83	83. <i>Test 83</i>
84	84. <i>Test 84</i>
85	85. <i>Test 85</i>
86	86. <i>Test 86</i>
87	87. <i>Test 87</i>
88	88. <i>Test 88</i>
89	89. <i>Test 89</i>
90	90. <i>Test 90</i>
91	91. <i>Test 91</i>
92	92. <i>Test 92</i>
93	93. <i>Test 93</i>
94	94. <i>Test 94</i>
95	95. <i>Test 95</i>
96	96. <i>Test 96</i>
97	97. <i>Test 97</i>
98	98. <i>Test 98</i>
99	99. <i>Test 99</i>
100	100. <i>Test 100</i>

17(a). Filter Level linearity on the reference level range (IEC 61260-3 Clause 11)

The level linearity shall be tested for three filters in a set of filters. For a set of filters covering the audible range of frequencies, it is recommended to test filters with frequencies close to 31.5 Hz, 1 kHz and 16 kHz.

The test shall be performed on the reference level range for levels from the specified lower boundary of the specified linear operating range up to a level where the overload indicator displays an overload. Adjust the level of the input signal with steps that are not greater than 5 dB. The difference between successive steps of the input signal level shall be reduced to 1 dB when the distance to the lower or upper boundaries of a linear operating range is less than 5 dB and when the level is above the upper boundary. The boundaries are as stated in the instruction manual for the filter. If no overload is displayed, the filter does not conform to the requirements.

The measured level linearity deviation shall not exceed the acceptance limits given in 5.13 in IEC 61260-1:2014 for all measured levels between the lower boundary of the linear operating range, as stated in the instruction manual for the filter, and up to the highest level, measured as described above, without an overload indication.

An overload shall not be indicated if the level of the input signal is below the stated upper boundary of each appropriate linear operating range.

"Y" means indicator over-range.

☒ Checked

17(b). Octave Band Filter Level Linearity 1kHz (Increasing)

SLM Settings	
Time Weighting	Fast
Frequency Weighting	Z
SLM Range	MID
Generator & Attenuator Settings	
Select dB Over SLM Range	5
Attenuation (dB)	31.0
Generator Frequency (Hz)	1k
SPL Reference Starting Point (dB)	94.0
Output (mVrms)	1494.0
Noise Floor (dB)	-99.0

Increasing level to Overload				Tolerance	
Atten	Expected	Indicator	Diff	Type 1	Type 2
26.0	99.0	99.0	0.0	±0.5	±0.6
21.0	104.0	104.0	0.0	±0.5	±0.6
16.0	109.0	109.0	0.0	±0.5	±0.6
11.0	114.0	114.0	0.0	±0.5	±0.6
10.0	115.0	115.0	0.0	±0.5	±0.6
9.0	116.0	116.0	0.0	±0.5	±0.6
8.0	117.0	117.0	0.0	±0.5	±0.6
7.0	118.0	118.0	0.0	±0.5	±0.6
6.0	119.0	119.0	0.0	±0.5	±0.6
5.0	120.0	120.0	0.0	±0.5	±0.6
4.0	121.0	121.0	0.0	±0.5	±0.6
3.0	122.0	122.0	0.0	±0.5	±0.6
2.0	123.0	123.0	0.0	±0.5	±0.6
1.0	124.0	124.0	0.0	±0.5	±0.6
0.0	125.0	125.0	0.0	±0.5	±0.6

Conforming	Yes
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Uncertainty (+/-) dB	0.13
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Description of Tests

17(b). Filter Level linearity on the reference level range (IEC 61260-3 Clause 11)

The level linearity shall be tested for three filters in a set of filters. For a set of filters covering the audible range of frequencies, it is recommended to test filters with frequencies close to 31.5 Hz, 1 kHz and 16 kHz.

The test shall be performed on the reference level range for levels from the specified lower boundary of the specified linear operating range up to a level where the overload indicator displays an overload. Adjust the level of the input signal with steps that are not greater than 5 dB. The difference between successive steps of the input signal level shall be reduced to 1 dB when the distance to the lower or upper boundaries of a linear operating range is less than 5 dB and when the level is above the upper boundary. The boundaries are as stated in the instruction manual for the filter. If no overload is displayed, the filter does not conform to the requirements.

The measured level linearity deviation shall not exceed the acceptance limits given in 5.13 in IEC 61260-1:2014 for all measured levels between the lower boundary of the linear operating range, as stated in the instruction manual for the filter, and up to the highest level, measured as described above, without an overload indication.

An overload shall not be indicated if the level of the input signal is below the stated upper boundary of each appropriate linear operating range.

"Y" means indicator over-range.

☒ Checked

17(c). Octave Band Filter Level Linearity 16kHz (Increasing)

SLM Settings	
Time Weighting	Fast
Frequency Weighting	Z
SLM Range	MID
Generator & Attenuator Settings	
Select dB Over SLM Range	5
Attenuation (dB)	31.0
Generator Frequency (Hz)	16k
SPL Reference Starting Point (dB)	94.0
Output (mVrms)	1488.0
Noise Floor (dB)	-99.0

Increasing level to Overload				Tolerance	
Atten	Expected	Indicator	Diff	Type 1	Type 2
26.0	99.0	99.0	0.0	±0.5	±0.6
21.0	104.0	104.0	0.0	±0.5	±0.6
16.0	109.0	109.0	0.0	±0.5	±0.6
11.0	114.0	114.0	0.0	±0.5	±0.6
10.0	115.0	115.0	0.0	±0.5	±0.6
9.0	116.0	116.0	0.0	±0.5	±0.6
8.0	117.0	117.0	0.0	±0.5	±0.6
7.0	118.0	118.0	0.0	±0.5	±0.6
6.0	119.0	119.0	0.0	±0.5	±0.6
5.0	120.0	120.0	0.0	±0.5	±0.6
4.0	121.0	121.0	0.0	±0.5	±0.6
3.0	122.0	122.0	0.0	±0.5	±0.6
2.0	123.0	123.0	0.0	±0.5	±0.6
1.0	124.0	124.0	0.0	±0.5	±0.6
0.0	125.0	125.0	0.0	±0.5	±0.6

Conforming	Yes
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Uncertainty (+/-) dB	0.13
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Description of Tests

17(c). Filter Level linearity on the reference level range (IEC 61260-3 Clause 11)

The level linearity shall be tested for three filters in a set of filters. For a set of filters covering the audible range of frequencies, it is recommended to test filters with frequencies close to 31.5 Hz, 1 kHz and 16 kHz.

The test shall be performed on the reference level range for levels from the specified lower boundary of the specified linear operating range up to a level where the overload indicator displays an overload. Adjust the level of the input signal with steps that are not greater than 5 dB. The difference between successive steps of the input signal level shall be reduced to 1 dB when the distance to the lower or upper boundaries of a linear operating range is less than 5 dB and when the level is above the upper boundary. The boundaries are as stated in the instruction manual for the filter. If no overload is displayed, the filter does not conform to the requirements.

The measured level linearity deviation shall not exceed the acceptance limits given in 5.13 in IEC 61260-1:2014 for all measured levels between the lower boundary of the linear operating range, as stated in the instruction manual for the filter, and up to the highest level, measured as described above, without an overload indication.

An overload shall not be indicated if the level of the input signal is below the stated upper boundary of each appropriate linear operating range.

"Y" means indicator over-range.

☒ Checked

18(a). Octave Band Filter Level Linearity 31.5Hz (Decreasing)

SLM Settings	
Time Weighting	Fast
Frequency Weighting	Z
SLM Range	MID
Generator & Attenuator Settings	
Select dB Under SLM Range	0
Attenuation (dB)	0.0
Generator Frequency (Hz)	31.5
SPL Reference Starting Point (dB)	94
Output (mVrms)	42.8
Noise Floor (dB)	-99.0

Decreasing level to Underrange				Tolerance	
Atten	Expected	Indicator	Diff	Type 1	Type 2
5.0	89.0	89.0	0.0	±0.5	±0.6
10.0	84.0	84.0	0.0	±0.5	±0.6
15.0	79.0	79.0	0.0	±0.7	±0.9
20.0	74.0	74.0	0.0	±0.7	±0.9
25.0	69.0	69.0	0.0	±0.7	±0.9
30.0	64.0	64.0	0.0	±0.7	±0.9
35.0	59.0	59.0	0.0	±0.7	±0.9
40.0	54.0	54.0	0.0	±0.7	±0.9
45.0	49.0	49.0	0.0	±0.7	±0.9
49.0	45.0	45.0	0.0	±0.7	±0.9
50.0	44.0	44.0	0.0	±0.7	±0.9
51.0	43.0	43.0	0.0	±0.7	±0.9
52.0	42.0	41.9	-0.1	±0.7	±0.9
53.0	41.0	41.0	0.0	±0.7	±0.9
54.0	40.0	40.0	0.0	±0.7	±0.9

Conforming	Yes
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Uncertainty (+/-) dB	0.13
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Description of Tests

18(a). Filter Level linearity on the reference level range (IEC 61260-3 Clause 11)

The level linearity shall be tested for three filters in a set of filters. For a set of filters covering the audible range of frequencies, it is recommended to test filters with frequencies close to 31.5 Hz, 1 kHz and 16 kHz.

The test shall be performed on the reference level range for levels from the specified lower boundary of the specified linear operating range up to a level where the overload indicator displays an overload. Adjust the level of the input signal with steps that are not greater than 5 dB. The difference between successive steps of the input signal level shall be reduced to 1 dB when the distance to the lower or upper boundaries of a linear operating range is less than 5 dB and when the level is above the upper boundary. The boundaries are as stated in the instruction manual for the filter. If no overload is displayed, the filter does not conform to the requirements.

The measured level linearity deviation shall not exceed the acceptance limits given in 5.13 in IEC 61260-1:2014 for all measured levels between the lower boundary of the linear operating range, as stated in the instruction manual for the filter, and up to the highest level, measured as described above, without an overload indication.

An overload shall not be indicated if the level of the input signal is below the stated upper boundary of each appropriate linear operating range.

"Y" means indicator over-range.

☒ Checked

18(b). Octave Band Filter Level Linearity 1kHz (Decreasing)

SLM Settings	
Time Weighting	Fast
Frequency Weighting	Z
SLM Range	MID
Generator & Attenuator Settings	
Select dB Under SLM Range	0
Attenuation (dB)	0.0
Generator Frequency (Hz)	1kHz
SPL Reference Starting Point (dB)	94
Output (mVrms)	42.2
Noise Floor (dB)	-99.0

Decreasing level to Underange				Tolerance	
Atten	Expected	Indicator	Diff	Type 1	Type 2
5.0	89.0	89.0	0.0	±0.5	±0.6
10.0	84.0	84.0	0.0	±0.5	±0.6
15.0	79.0	79.0	0.0	±0.7	±0.9
20.0	74.0	74.0	0.0	±0.7	±0.9
25.0	69.0	69.0	0.0	±0.7	±0.9
30.0	64.0	64.0	0.0	±0.7	±0.9
35.0	59.0	59.0	0.0	±0.7	±0.9
40.0	54.0	54.0	0.0	±0.7	±0.9
45.0	49.0	49.0	0.0	±0.7	±0.9
49.0	45.0	45.0	0.0	±0.7	±0.9
50.0	44.0	44.0	0.0	±0.7	±0.9
51.0	43.0	43.0	0.0	±0.7	±0.9
52.0	42.0	42.0	0.0	±0.7	±0.9
53.0	41.0	41.0	0.0	±0.7	±0.9
54.0	40.0	39.9	-0.1	±0.7	±0.9

Conforming	Yes
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Uncertainty (+/-) dB	0.13
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Description of Tests

18(b). Filter Level linearity on the reference level range (IEC 61260-3 Clause 11)

The level linearity shall be tested for three filters in a set of filters. For a set of filters covering the audible range of frequencies, it is recommended to test filters with frequencies close to 31.5 Hz, 1 kHz and 16 kHz.

The test shall be performed on the reference level range for levels from the specified lower boundary of the specified linear operating range up to a level where the overload indicator displays an overload. Adjust the level of the input signal with steps that are not greater than 5 dB. The difference between successive steps of the input signal level shall be reduced to 1 dB when the distance to the lower or upper boundaries of a linear operating range is less than 5 dB and when the level is above the upper boundary. The boundaries are as stated in the instruction manual for the filter. If no overload is displayed, the filter does not conform to the requirements.

The measured level linearity deviation shall not exceed the acceptance limits given in 5.13 in IEC 61260-1:2014 for all measured levels between the lower boundary of the linear operating range, as stated in the instruction manual for the filter, and up to the highest level, measured as described above, without an overload indication.

An overload shall not be indicated if the level of the input signal is below the stated upper boundary of each appropriate linear operating range.

"Y" means indicator over-range.

☒ Checked

18(c). Octave Band Filter Level Linearity 16kHz (Decreasing)

SLM Settings	
Time Weighting	Fast
Frequency Weighting	Z
SLM Range	MID
Generator & Attenuator Settings	
Select dB Under SLM Range	0
Attenuation (dB)	0.0
Generator Frequency (Hz)	16kHz
SPL Reference Starting Point (dB)	94
Output (mVrms)	42.0
Noise Floor (dB)	-99.0

Decreasing level to Underrange				Tolerance	
Atten	Expected	Indicator	Diff	Type 1	Type 2
5.0	89.0	89.0	0.0	±0.5	±0.6
10.0	84.0	84.0	0.0	±0.5	±0.6
15.0	79.0	79.0	0.0	±0.7	±0.9
20.0	74.0	74.0	0.0	±0.7	±0.9
25.0	69.0	69.0	0.0	±0.7	±0.9
30.0	64.0	64.0	0.0	±0.7	±0.9
35.0	59.0	59.0	0.0	±0.7	±0.9
40.0	54.0	54.0	0.0	±0.7	±0.9
45.0	49.0	49.0	0.0	±0.7	±0.9
49.0	45.0	45.0	0.0	±0.7	±0.9
50.0	44.0	44.0	0.0	±0.7	±0.9
51.0	43.0	43.0	0.0	±0.7	±0.9
52.0	42.0	42.0	0.0	±0.7	±0.9
53.0	41.0	41.0	0.0	±0.7	±0.9
54.0	40.0	40.0	0.0	±0.7	±0.9

Conforming	Yes
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Uncertainty (+/-) dB	0.13
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Description of Tests

18(c). Filter Level linearity on the reference level range (IEC 61260-3 Clause 11)

The level linearity shall be tested for three filters in a set of filters. For a set of filters covering the audible range of frequencies, it is recommended to test filters with frequencies close to 31.5 Hz, 1 kHz and 16 kHz.

The test shall be performed on the reference level range for levels from the specified lower boundary of the specified linear operating range up to a level where the overload indicator displays an overload. Adjust the level of the input signal with steps that are not greater than 5 dB. The difference between successive steps of the input signal level shall be reduced to 1 dB when the distance to the lower or upper boundaries of a linear operating range is less than 5 dB and when the level is above the upper boundary. The boundaries are as stated in the instruction manual for the filter. If no overload is displayed, the filter does not conform to the requirements.

The measured level linearity deviation shall not exceed the acceptance limits given in 5.13 in IEC 61260-1:2014 for all measured levels between the lower boundary of the linear operating range, as stated in the instruction manual for the filter, and up to the highest level, measured as described above, without an overload indication.

An overload shall not be indicated if the level of the input signal is below the stated upper boundary of each appropriate linear operating range.

"Y" means indicator over-range.

☒ Checked

19. Octave Level Ranges

19(a). Octave Level Linearity Including the Level range (31.5Hz)

SLM Settings	
Time Weighting	Fast
Frequency Weighting	Z
SLM Range	MID
Generator & Attenuator Settings	
Attenuation (dB)	10
Generator Frequency (Hz)	31.5
Reference SPL (dB)	94
Output (mVrms)	135.4

Settings		Level (dB)			Tolerance	
Range	Atten	Expected	Indicated	Difference	Type 1	Type 2
HIGH	0.0	104.0	104.0	0.0	± 0.5	± 0.6
MID	14.0	90.0	90.0	0.0	± 0.5	± 0.6
LOW	34.0	70.0	70.0	0.0	± 0.5	± 0.6
					± 0.5	± 0.6
					± 0.5	± 0.6
					± 0.5	± 0.6
					± 0.5	± 0.6
					± 0.5	± 0.6
					± 0.5	± 0.6

Conforming	Yes
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Uncertainty (+/-) dB	0.13
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19(b). Octave Level Linearity Including the Level range (1kHz)

SLM Settings	
Time Weighting	Fast
Frequency Weighting	Z
SLM Range	MID
Generator & Attenuator Settings	
Attenuation (dB)	10
Generator Frequency (Hz)	1k
Reference SPL (dB)	94
Output (mVrms)	133.1

Settings		Level (dB)			Tolerance	
Range	Atten	Expected	Indicated	Difference	Type 1	Type 2
HIGH	0.0	104.0	103.9	-0.1	± 0.5	± 0.6
MID	14.0	90.0	90.0	0.0	± 0.5	± 0.6
LOW	34.0	70.0	70.0	0.0	± 0.5	± 0.6
					± 0.5	± 0.6
					± 0.5	± 0.6
					± 0.5	± 0.6
					± 0.5	± 0.6
					± 0.5	± 0.6
					± 0.5	± 0.6

Conforming	Yes
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Uncertainty (+/-) dB	0.13
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19(c). Octave Level Linearity Including the Level range (16kHz)

SLM Settings	
Time Weighting	Fast
Frequency Weighting	Z
SLM Range	MID
Generator & Attenuator Settings	
Attenuation (dB)	10
Generator Frequency (Hz)	16k
Reference SPL (dB)	94
Output (mVrms)	132.6

Settings		Level (dB)			Tolerance	
Range	Atten	Expected	Indicated	Difference	Type 1	Type 2
HIGH	0.0	104.0	104.0	0.0	± 0.5	± 0.6
MID	14.0	90.0	90.0	0.0	± 0.5	± 0.6
LOW	34.0	70.0	70.0	0.0	± 0.5	± 0.6
					± 0.5	± 0.6
					± 0.5	± 0.6
					± 0.5	± 0.6
					± 0.5	± 0.6
					± 0.5	± 0.6
					± 0.5	± 0.6

Conforming	Yes
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Uncertainty (+/-) dB	0.13
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Description of Tests

<p>19. Filter Level linearity including the level range control (IEC 61260-3 Clause 11.9)</p> <p>11.9 For the same three filters as selected above, test each available level range in the following way: based on the same reference level, adjust the input level to be 30 dB below upper boundary of the linear operating range for each of the selected range settings. The measured level linearity deviation shall not exceed the acceptance limits given in 5.13.3 and 5.13.4 of IEC 61260-1:2014</p> <p>The three filter frequencies are 31.5Hz, 1kHz and 16kHz.</p> <p>The level linearity differences are calculated as the indicated signal level minus the corresponding expected signal level.</p>
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☒ Checked

20. Octave Band Filter Lower Limit

20(a). Octave Band Filter Lower Limit (Reference Range)

SLM, Attenuator & Generator Settings	
Time Weighting	Fast
Frequency Weighting	Z
Reference Range	MID
Lower Limit for the Range	40

	1	2	3	4	5	6	7	8	9	10
Freq	4 Hz	8 Hz	16 Hz	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz
Measured		15.0	12.2	8.4	7.1	5.3	4.8	5.4	6.9	9.2
Conforming	N/A	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Freq	4kHz	8kHz	16kHz	32kHz						
Measured	11.7	14.6	18.0							
Conforming	Yes	Yes	Yes	N/A						

Conforming	Yes
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Uncert (+/-) dB	0.09
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20(b). Octave Band Filter Lower Limit (Lowest Range)

SLM, Attenuator & Generator Settings	
Time Weighting	Fast
Frequency Weighting	Z
Lowest Range	LOW
Lower Limit for the Range	20

	1	2	3	4	5	6	7	8	9	10
Freq	4 Hz	8 Hz	16 Hz	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz
Measured		14.7	11.8	8.1	6.6	4.3	2.7	1.6	1.5	1.4
Conforming	N/A	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Freq	4kHz	8kHz	16kHz	32kHz						
Measured	2.4	4.1	6.4							
Conforming	Yes	Yes	Yes	N/A						

Conforming	Yes
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Uncert (+/-) dB	0.09
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20. Octave Band Filter Lower Limit (IEC 61260-3 Clause 12)

12.2 Short-circuit the input terminal or use similar means to ensure that the level of the input signal is below the lower limit of the specified linear operating range. Record the output level from each filter in the set. The output level shall not exceed the specified lower limit for the appropriate filter and range.

Interpretation: The yellow cells are the observed values. The measured value must not exceed the Lower Limit for the Range.

☒ Checked

21(a). Third Octave Band Filter Relative Attenuation (≤31.5Hz)

SLM, Attenuator & Generator Settings	
Time Weighting	Fast
Frequency Weighting	Z
SLM Range	HIGH
Set dB Below Full Scale	-1
Attenuator dB	0.0
Reference SPL 1kHz	133.0
Output mVrms	3486.0
Noise Floor dB	-99.0

Ratio	1	2	3	4	5	6	7	8	9	10	Tolerance	
Freq	4Hz	5Hz	6.3Hz	8Hz	10Hz	12.5Hz	16Hz	20Hz	25Hz	31.5Hz		
0.18										40.8		
0.33										53.1		
0.53										64.8		
0.77										69.6		
0.89												
0.92										132.4		
0.95										132.9		
0.97										132.9		
1.00										132.8		
1.03										132.9		
1.06										132.9		
1.09										132.1		
1.12												
1.30										66.2		
1.89										28.8		
3.07										24.6		
5.43										23.1		
Attenuation dB										92.0	Class 1	Class 2
										92.0	+70/inf	+60/inf
										79.7	+60/inf	+54/inf
										68.0	+40.5/inf	+39.5/inf
										63.2	+16.6/inf	+15.6/inf
											-0.4/+5.3	-0.6/+5.8
										0.4	-0.4/+1.4	-0.6/+1.7
										-0.1	-0.4/+0.7	-0.6/+0.9
										-0.1	-0.4/+0.5	-0.6/+0.7
										0.0	-0.4/+0.4	-0.6/+0.6
										-0.1	-0.4/+0.5	-0.6/+0.7
										-0.1	-0.4/+0.7	-0.6/+0.9
										0.7	-0.4/+1.4	-0.6/+1.7
											-0.4/+5.3	-0.6/+5.8
										66.6	+16.6/inf	+15.6/inf
										104.0	+40.5/inf	+39.5/inf
										108.2	+60/inf	+54/inf
										109.7	+70/inf	+60/inf

Ins Loss											-0.2
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Conforming	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Yes
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Uncert (+/-) dB	≤80dB	0.09	>80dB	0.46
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Description of Test

21(a) Octave Filter (IEC 61260-3 Clause 13)

13 Measurement of relative attenuation

13.1 The relative attenuation on the reference level range shall be tested for the same three filters as selected in Clause 11.

13.2 The measurements of relative attenuation are made as the response to constant amplitude sinusoidal signals at various frequencies. The level of the input signals shall be (1 ± 0.1) dB below the specified upper boundary of the linear operating range.

13.6 The measured relative attenuation shall not exceed the acceptance limits given in Table 1 for the appropriate class of filter.

Interpretation: The three filters specified in "Clause 11" are 31.5Hz, 1kHz and 16kHz unless the client expands this range. The limits in "Table 1" are the Tolerance values shown in green above. The yellow cells are the observed values. The "Attenuation dB" cells are the attenuation values of each filter with the filter's centre frequency attenuation assumed to be zero (i.e. the relative attenuation). The "Ins Loss" are the actual values of attenuation at the filter centre frequencies.

☒ Checked

21(b). Third Octave Band Filter Relative Attenuation (40Hz-315Hz)

SLM, Attenuator & Generator Settings	
Time Weighting	Fast
Frequency Weighting	Z
SLM Range	HIGH
Set dB Below Full Scale	-1.0
Attenuator dB	0.0
Reference SPL 1kHz	133.0
Output mVrms	3486.0
Noise Floor dB	-99.0

Ratio	1	2	3	4	5	6	7	8	9	10	Tolerance	
Freq	40Hz	50Hz	63Hz	80Hz	100Hz	125Hz	160Hz	200Hz	250Hz	315Hz		
0.18									45.9		Tolerance	
0.33									49.0			
0.53									58.9			
0.77									70.8			
0.89												
0.92									132.7			
0.95									133.1			
0.97									133.0			
1.00									133.0			
1.03									133.0			
1.06									133.0			
1.09									132.2			
1.12												
1.30									58.1			
1.89									51.6			
3.07									26.8			
5.43									25.7			
Attenuation dB									87.1		Class 1	Class 2
									84.0		+70/inf	+60/inf
									74.1		+60/inf	+54/inf
									62.2		+40.5/inf	+39.5/inf
											+16.6/inf	+15.6/inf
									0.3		-0.4/+5.3	-0.6/+5.8
									-0.1		-0.4/+1.4	-0.6/+1.7
									0.0		-0.4/+0.7	-0.6/+0.9
									0.0		-0.4/+0.5	-0.6/+0.7
									0.0		-0.4/+0.4	-0.6/+0.6
									0.0		-0.4/+0.5	-0.6/+0.7
									0.0		-0.4/+0.7	-0.6/+0.9
									0.8		-0.4/+1.4	-0.6/+1.7
											-0.4/+5.3	-0.6/+5.8
									74.9		+16.6/inf	+15.6/inf
									81.4		+40.5/inf	+39.5/inf
									106.2		+60/inf	+54/inf
									107.3		+70/inf	+60/inf

Ins Loss										0.0	
----------	--	--	--	--	--	--	--	--	--	-----	--

Conforming	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Yes	N/A
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Uncert (+/-) dB	≤80dB	0.09	>80dB	0.46
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Description of Test

21(b) Octave Filter (IEC 61260-3 Clause 13)

13 Measurement of relative attenuation

13.1 The relative attenuation on the reference level range shall be tested for the same three filters as selected in Clause 11.

13.2 The measurements of relative attenuation are made as the response to constant amplitude sinusoidal signals at various frequencies. The level of the input signals shall be (1 ± 0.1) dB below the specified upper boundary of the linear operating range.

13.6 The measured relative attenuation shall not exceed the acceptance limits given in Table 1 for the appropriate class of filter.

Interpretation: The three filters specified in "Clause 11" are 31.5Hz, 1kHz and 16kHz unless the client expands this range. The limits in "Table 1" are the Tolerance values shown in green above. The yellow cells are the observed values. The "Attenuation dB" cells are the attenuation values of each filter with the filter's centre frequency attenuation assumed to be zero (i.e. the relative attenuation). The "Ins Loss" are the actual values of attenuation at the filter centre frequencies.

☒ Checked

21(c). Third Octave Band Filter Relative Attenuation (400Hz-3.15kHz)

SLM, Attenuator & Generator Settings	
Time Weighting	Fast
Frequency Weighting	Z
SLM Range	HIGH
Set dB Below Full Scale	-1.0
Attenuator dB	0.0
Reference SPL 1kHz	133.0
Output mVrms	3486.0
Noise Floor dB	-99.0

Ratio	1	2	3	4	5	6	7	8	9	10	Tolerance	
Freq	400Hz	500Hz	630Hz	800Hz	1kHz	1.25kHz	1.6kHz	2kHz	2.5kHz	3.15kHz		
0.18					46.0							
0.33					48.3							
0.53					57.6							
0.77					70.6							
0.89												
0.92					132.7							
0.95					133.0							
0.97					133.0							
1.00					133.0							
1.03					133.0							
1.06					133.0							
1.09					132.2							
1.12												
1.30					58.1							
1.89					51.7							
3.07					29.4							
5.43					28.9							
Attenuation dB					87.0						Class 1	Class 2
					84.7						+70/inf	+60/inf
					75.4						+60/inf	+54/inf
					62.4						+40.5/inf	+39.5/inf
											+16.6/inf	+15.6/inf
					0.3						-0.4/+5.3	-0.6/+5.8
					0.0						-0.4/+1.4	-0.6/+1.7
					0.0						-0.4/+0.7	-0.6/+0.9
					0.0						-0.4/+0.5	-0.6/+0.7
					0.0						-0.4/+0.4	-0.6/+0.6
					0.0						-0.4/+0.5	-0.6/+0.7
					0.0						-0.4/+0.7	-0.6/+0.9
					0.8						-0.4/+1.4	-0.6/+1.7
					74.9						-0.4/+5.3	-0.6/+5.8
					81.3						+16.6/inf	+15.6/inf
					103.6						+40.5/inf	+39.5/inf
					104.1						+60/inf	+54/inf
											+70/inf	+60/inf

Ins Loss					0.0							
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Conforming	N/A	N/A	N/A	N/A	Yes	N/A	N/A	N/A	N/A	N/A	N/A	N/A
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Uncert (+/-) dB	≤80dB	0.09	>80dB	0.46
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Description of Test

21(c) Octave Filter (IEC 61260-3 Clause 13)

13 Measurement of relative attenuation

13.1 The relative attenuation on the reference level range shall be tested for the same three filters as selected in Clause 11.

13.2 The measurements of relative attenuation are made as the response to constant amplitude sinusoidal signals at various frequencies. The level of the input signals shall be (1 ± 0,1) dB below the specified upper boundary of the linear operating range.

13.6 The measured relative attenuation shall not exceed the acceptance limits given in Table 1 for the appropriate class of filter.

Interpretation: The three filters specified in "Clause 11" are 31.5Hz, 1kHz and 16kHz unless the client expands this range. The limits in "Table 1" are the Tolerance values shown in green above. The yellow cells are the observed values. The "Attenuation dB" cells are the attenuation values of each filter with the filter's centre frequency attenuation assumed to be zero (i.e. the relative attenuation). The "Ins Loss" are the actual values of attenuation at the filter centre frequencies.

☒ Checked

21(d). Third Octave Band Filter Relative Attenuation (≥4kHz)

SLM, Attenuator & Generator Settings	
Time Weighting	Fast
Frequency Weighting	Z
SLM Range	HIGH
Set dB Below Full Scale	-1.0
Attenuator dB	0.0
Reference SPL 1kHz	133.0
Output mVrms	3486.0
Noise Floor dB	-99.0

Ratio	1	2	3	4	5	6	7	8	9	10	Tolerance	
Freq	4kHz	5kHz	6.3kHz	8kHz	10kHz	12.5kHz	16kHz	20kHz	25kHz	31.5kHz		
0.18							46.6					
0.33							49.1					
0.53							52.1					
0.77							70.5					
0.89												
0.92							132.7					
0.95							133.1					
0.97							133.0					
1.00							133.1					
1.03							133.0					
1.06							133.0					
1.09							132.3					
1.12												
1.30							58.3					
1.89							42.5					
3.07							39.1					
5.43							47.5					
Attenuation dB							86.5				Class 1	Class 2
							86.5				+70/inf	+60/inf
							84.0				+60/inf	+54/inf
							81.0				+40.5/inf	+39.5/inf
							62.6				+16.6/inf	+15.6/inf
											-0.4/+5.3	-0.6/+5.8
							0.4				-0.4/+1.4	-0.6/+1.7
							0.0				-0.4/+0.7	-0.6/+0.9
							0.1				-0.4/+0.5	-0.6/+0.7
							0.0				-0.4/+0.4	-0.6/+0.6
							0.1				-0.4/+0.5	-0.6/+0.7
							0.1				-0.4/+0.7	-0.6/+0.9
							0.8				-0.4/+1.4	-0.6/+1.7
											-0.4/+5.3	-0.6/+5.8
							74.8				+16.6/inf	+15.6/inf
							90.6				+40.5/inf	+39.5/inf
							94.0				+60/inf	+54/inf
							85.6				+70/inf	+60/inf

Ins Loss							0.1			
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Conforming	N/A	N/A	N/A	N/A	N/A	N/A	Yes	N/A	N/A	N/A
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Uncert (+/-) dB	≤80dB	0.09	>80dB	0.46
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Description of Test

21(d) Octave Filter (IEC 61260-3 Clause 13)

13 Measurement of relative attenuation

13.1 The relative attenuation on the reference level range shall be tested for the same three filters as selected in Clause 11.

13.2 The measurements of relative attenuation are made as the response to constant amplitude sinusoidal signals at various frequencies. The level of the input signals shall be (1 ± 0.1) dB below the specified upper boundary of the linear operating range.

13.6 The measured relative attenuation shall not exceed the acceptance limits given in Table 1 for the appropriate class of filter.

Interpretation: The three filters specified in "Clause 11" are 31.5Hz, 1kHz and 16kHz unless the client expands this range. The limits in "Table 1" are the Tolerance values shown in green above. The yellow cells are the observed values. The "Attenuation dB" cells are the attenuation values of each filter with the filter's centre frequency attenuation assumed to be zero (i.e. the relative attenuation). The "Ins Loss" are the actual values of attenuation at the filter centre frequencies.

☒ Checked

22. Third Octave Band Filter Relative Attenuation at Midband Frequency

SLM, Attenuator & Generator Settings	
Time Weighting	Fast
Frequency Weighting	Z
Reference Range	MID
Attenuator dB	0.0
Reference SPL 1kHz	94.0
Output mVrms	38.9

	1	2	3	4	5	6	7	8	9	10	Tolerance	
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Freq	4Hz	5Hz	6.3Hz	8Hz	10Hz	12.5Hz	16Hz	20Hz	25Hz	31.5Hz	Class 1	Class 2
Measured							94.3	94.1	93.9	93.9		
Ins Loss							0.3	0.1	-0.1	-0.1	-0.4/+0.4	-0.6/+0.6
Conforming	N/A	N/A	N/A	N/A	N/A	N/A	Yes	Yes	Yes	Yes		

Freq	40Hz	50Hz	63Hz	80Hz	100Hz	125Hz	160Hz	200Hz	250Hz	315Hz	Class 1	Class 2
Measured	93.9	93.9	93.9	93.9	94.0	94.0	94.1	94.0	94.0	94.0		
Ins Loss	-0.1	-0.1	-0.1	-0.1	0.0	0.0	0.1	0.0	0.0	0.0	-0.4/+0.4	-0.6/+0.6
Conforming	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		

Freq	400Hz	500Hz	630Hz	800Hz	1kHz	1.25kHz	1.6kHz	2kHz	2.5kHz	3.15kHz	Class 1	Class 2
Measured	94.0	94.0	94.0	94.0	94.0	94.0	94.0	94.0	94.0	94.0		
Ins Loss	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.4/+0.4	-0.6/+0.6
Conforming	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		

Freq	4kHz	5kHz	6.3kHz	8kHz	10kHz	12.5kHz	16kHz	20kHz	25kHz	31.5kHz	Class 1	Class 2
Measured	94.0	94.0	94.0	94.0	94.0	94.0	94.0	94.0				
Ins Loss	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			-0.4/+0.4	-0.6/+0.6
Conforming	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	N/A	N/A		

Uncert (+/-) dB	0.09
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Description of Test

22. Octave Band Filter Relative Attenuation at Midband Frequency (IEC 61260-3 Clause 10.2)

10.2 Tests of relative attenuation at midband frequency

10.2.1 The relative attenuation at the exact midband frequency shall be measured for every filter in a set of filters. The relative attenuation $\Delta A(\Omega)$ at any midband frequency is determined from Formula (8) given in IEC 61260-1:2014. The reference level range shall be selected for the test. The level of the test signal shall be equal to the reference input signal level.

10.2.2 The measured relative attenuation shall not exceed the acceptance limits $\pm 0,4$ dB for Class 1 filters or $\pm 0,6$ dB for class 2 filters as specified in 5.10 in IEC 61260-1:2014.

Interpretation: The yellow cells are the observed values. The "Ins Loss" are the actual values of attenuation at the filter centre frequencies. The "Conforming" cells demonstrate compliance with the Tolerance limits depending upon the Class of filter.

☒ Checked

23(a). Third Octave Band Filter Level Linearity 31.5Hz (Increasing)

SLM Settings	
Time Weighting	Fast
Frequency Weighting	Z
SLM Range	MID
Generator & Attenuator Settings	
Select dB Over SLM Range	5
Attenuation (dB)	31.0
Generator Frequency (Hz)	31.5
SPL Reference Starting Point (dB)	94.0
Output (mVrms)	1518.0
Noise Floor (dB)	-99.0

Increasing level to Overload				Tolerance	
Atten	Expected	Indicator	Diff	Type 1	Type 2
26.0	99.0	99.0	0.0	±0.5	±0.6
21.0	104.0	104.0	0.0	±0.5	±0.6
16.0	109.0	109.0	0.0	±0.5	±0.6
11.0	114.0	114.0	0.0	±0.5	±0.6
10.0	115.0	115.0	0.0	±0.5	±0.6
9.0	116.0	116.0	0.0	±0.5	±0.6
8.0	117.0	117.0	0.0	±0.5	±0.6
7.0	118.0	118.0	0.0	±0.5	±0.6
6.0	119.0	119.0	0.0	±0.5	±0.6
5.0	120.0	120.0	0.0	±0.5	±0.6
4.0	121.0	121.0	0.0	±0.5	±0.6
3.0	122.0	122.0	0.0	±0.5	±0.6
2.0	123.0	123.0	0.0	±0.5	±0.6
1.0	124.0	124.0	0.0	±0.5	±0.6
0.0	125.0	125.0	0.0	±0.5	±0.6

Conforming	Yes
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Uncertainty (+/-) dB	0.13
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Description of Tests

23(a). Filter Level linearity on the reference level range (IEC 61260-3 Clause 11)

The level linearity shall be tested for three filters in a set of filters. For a set of filters covering the audible range of frequencies, it is recommended to test filters with frequencies close to 31.5 Hz, 1 kHz and 16 kHz.

The test shall be performed on the reference level range for levels from the specified lower boundary of the specified linear operating range up to a level where the overload indicator displays an overload. Adjust the level of the input signal with steps that are not greater than 5 dB. The difference between successive steps of the input signal level shall be reduced to 1 dB when the distance to the lower or upper boundaries of a linear operating range is less than 5 dB and when the level is above the upper boundary. The boundaries are as stated in the instruction manual for the filter. If no overload is displayed, the filter does not conform to the requirements.

The measured level linearity deviation shall not exceed the acceptance limits given in 5.13 in IEC 61260-1:2014 for all measured levels between the lower boundary of the linear operating range, as stated in the instruction manual for the filter, and up to the highest level, measured as described above, without an overload indication.

An overload shall not be indicated if the level of the input signal is below the stated upper boundary of each appropriate linear operating range.

"Y" means indicator over-range.

☒ Checked

23(b). Third Octave Band Filter Level Linearity 1kHz (Increasing)

SLM Settings	
Time Weighting	Fast
Frequency Weighting	Z
SLM Range	MID
Generator & Attenuator Settings	
Select dB Over SLM Range	5
Attenuation (dB)	31.0
Generator Frequency (Hz)	1k
SPL Reference Starting Point (dB)	94.0
Output (mVrms)	1493.0
Noise Floor (dB)	-99.0

[illegible]

Conforming	Yes
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Uncertainty (+/-) dB	0.13
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Description of Tests	
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23(b). Filter Level linearity on the reference level range (IEC 61260-3 Clause 11)

The level linearity shall be tested for three filters in a set of filters. For a set of filters covering the audible range of frequencies, it is recommended to test filters with frequencies close to 31.5 Hz, 1 kHz and 16 kHz.

The test shall be performed on the reference level range for levels from the specified lower boundary of the specified linear operating range up to a level where the overload indicator displays an overload. Adjust the level of the input signal with steps that are not greater than 5 dB. The difference between successive steps of the input signal level shall be reduced to 1 dB when the distance to the lower or upper boundaries of a linear operating range is less than 5 dB and when the level is above the upper boundary. The boundaries are as stated in the instruction manual for the filter. If no overload is displayed, the filter does not conform to the requirements.

The measured level linearity deviation shall not exceed the acceptance limits given in 5.13 in IEC 61260-1:2014 for all measured levels between the lower boundary of the linear operating range, as stated in the instruction manual for the filter, and up to the highest level, measured as described above, without an overload indication.

An overload shall not be indicated if the level of the input signal is below the stated upper boundary of each appropriate linear operating range.

"Y" means indicator over-range.

☒ Checked

23(c). Third Octave Band Filter Level Linearity 16kHz (Increasing)

SLM Settings	
Time Weighting	Fast
Frequency Weighting	Z
SLM Range	MID
Generator & Attenuator Settings	
Select dB Over SLM Range	5
Attenuation (dB)	31.0
Generator Frequency (Hz)	16k
SPL Reference Starting Point (dB)	94.0
Output (mVrms)	1488.0
Noise Floor (dB)	-99.0

Increasing level to Overload				Tolerance	
Atten	Expected	Indicator	Diff	Type 1	Type 2
26.0	99.0	99.0	0.0	±0.5	±0.6
21.0	104.0	104.0	0.0	±0.5	±0.6
16.0	109.0	109.0	0.0	±0.5	±0.6
11.0	114.0	114.0	0.0	±0.5	±0.6
10.0	115.0	115.0	0.0	±0.5	±0.6
9.0	116.0	116.0	0.0	±0.5	±0.6
8.0	117.0	117.0	0.0	±0.5	±0.6
7.0	118.0	118.0	0.0	±0.5	±0.6
6.0	119.0	119.0	0.0	±0.5	±0.6
5.0	120.0	120.0	0.0	±0.5	±0.6
4.0	121.0	121.0	0.0	±0.5	±0.6
3.0	122.0	122.0	0.0	±0.5	±0.6
2.0	123.0	123.0	0.0	±0.5	±0.6
1.0	124.0	124.0	0.0	±0.5	±0.6
0.0	125.0	125.0	0.0	±0.5	±0.6

Conforming	Yes
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Uncertainty (+/-) dB	0.13
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Description of Tests

23(c). Level linearity on the reference level range (IEC 61672-3 Clause 16)

Level linearity shall be tested with steady sinusoidal electrical signals at a frequency of 8 kHz with the sound level meter set for frequency-weighting A. (61672-3 Clause 16.1).

Level linearity shall be measured in 5 dB steps of increasing input signal level from the starting point up to within 5 dB of the upper boundary stated in the Instruction Manual for the linear operating range at 8 kHz, then at 1 dB steps of increasing input signal level up to, but not including, the first indication of overload. The test of level linearity shall then be continued at 5 dB steps of decreasing input signal level from the starting point down to within 5 dB of the specified lower boundary, then at 1 dB steps of decreasing input signal level down to, but not including, the first indication of an under-range condition.

Measured level linearity deviations shall not exceed the applicable acceptance limits given in IEC 61672-1 from the specified upper boundary of the linear operating range up to, but not including, the first indication of overload and also from the specified lower boundary of the linear operating range down to, but not including, the first indication of an under-range condition.

"Y" means indicator over-range.

☒ Checked

24(a). Third Octave Band Filter Level Linearity 31.5Hz (Decreasing)

SLM Settings	
Time Weighting	Fast
Frequency Weighting	Z
SLM Range	MID
Generator & Attenuator Settings	
Select dB Under SLM Range	0
Attenuation (dB)	0.0
Generator Frequency (Hz)	31.5
SPL Reference Starting Point (dB)	94
Output (mVrms)	42.8
Noise Floor (dB)	-99.0

Decreasing level to Underrange				Tolerance	
Atten	Expected	Indicator	Diff	Type 1	Type 2
5.0	89.0	89.0	0.0	±0.5	±0.6
10.0	84.0	84.0	0.0	±0.5	±0.6
15.0	79.0	79.0	0.0	±0.7	±0.9
20.0	74.0	74.0	0.0	±0.7	±0.9
25.0	69.0	69.0	0.0	±0.7	±0.9
30.0	64.0	64.0	0.0	±0.7	±0.9
35.0	59.0	59.0	0.0	±0.7	±0.9
40.0	54.0	54.0	0.0	±0.7	±0.9
45.0	49.0	49.0	0.0	±0.7	±0.9
49.0	45.0	45.0	0.0	±0.7	±0.9
50.0	44.0	43.9	-0.1	±0.7	±0.9
51.0	43.0	42.9	-0.1	±0.7	±0.9
52.0	42.0	41.9	-0.1	±0.7	±0.9
53.0	41.0	41.0	0.0	±0.7	±0.9
54.0	40.0	39.9	-0.1	±0.7	±0.9

Conforming	Yes
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Uncertainty (+/-) dB	0.13
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Description of Tests

24(a). Level linearity on the reference level range (IEC 61672-3 Clause 16)

Level linearity shall be tested with steady sinusoidal electrical signals at a frequency of 8 kHz with the sound level meter set for frequency-weighting A. (61672-3 Clause 16.1).

Level linearity shall be measured in 5 dB steps of increasing input signal level from the starting point up to within 5 dB of the upper boundary stated in the Instruction Manual for the linear operating range at 8 kHz, then at 1 dB steps of increasing input signal level up to, but not including, the first indication of overload. The test of level linearity shall then be continued at 5 dB steps of decreasing input signal level from the starting point down to within 5 dB of the specified lower boundary, then at 1 dB steps of decreasing input signal level down to, but not including, the first indication of an under-range condition.

Measured level linearity deviations shall not exceed the applicable acceptance limits given in IEC 61672-1 from the specified upper boundary of the linear operating range up to, but not including, the first indication of overload and also from the specified lower boundary of the linear operating range down to, but not including, the first indication of an under-range condition.

"Y" means indicator under-range. However, if 20dB above noise floor is reached then no results are reported.

☒ Checked

24(b). Third Octave Band Filter Level Linearity 1kHz (Decreasing)

SLM Settings	
Time Weighting	Fast
Frequency Weighting	Z
SLM Range	MID
Generator & Attenuator Settings	
Select dB Under SLM Range	0
Attenuation (dB)	0.0
Generator Frequency (Hz)	1kHz
SPL Reference Starting Point (dB)	94
Output (mVrms)	42.2
Noise Floor (dB)	-99.0

[illegible]

Conforming	Yes
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Uncertainty (+/-) dB	0.13
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Description of Tests	
1	1. <i>Test 1</i>
2	2. <i>Test 2</i>
3	3. <i>Test 3</i>
4	4. <i>Test 4</i>
5	5. <i>Test 5</i>
6	6. <i>Test 6</i>
7	7. <i>Test 7</i>
8	8. <i>Test 8</i>
9	9. <i>Test 9</i>
10	10. <i>Test 10</i>
11	11. <i>Test 11</i>
12	12. <i>Test 12</i>
13	13. <i>Test 13</i>
14	14. <i>Test 14</i>
15	15. <i>Test 15</i>
16	16. <i>Test 16</i>
17	17. <i>Test 17</i>
18	18. <i>Test 18</i>
19	19. <i>Test 19</i>
20	20. <i>Test 20</i>
21	21. <i>Test 21</i>
22	22. <i>Test 22</i>
23	23. <i>Test 23</i>
24	24. <i>Test 24</i>
25	25. <i>Test 25</i>
26	26. <i>Test 26</i>
27	27. <i>Test 27</i>
28	28. <i>Test 28</i>
29	29. <i>Test 29</i>
30	30. <i>Test 30</i>
31	31. <i>Test 31</i>
32	32. <i>Test 32</i>
33	33. <i>Test 33</i>
34	34. <i>Test 34</i>
35	35. <i>Test 35</i>
36	36. <i>Test 36</i>
37	37. <i>Test 37</i>
38	38. <i>Test 38</i>
39	39. <i>Test 39</i>
40	40. <i>Test 40</i>
41	41. <i>Test 41</i>
42	42. <i>Test 42</i>
43	43. <i>Test 43</i>
44	44. <i>Test 44</i>
45	45. <i>Test 45</i>
46	46. <i>Test 46</i>
47	47. <i>Test 47</i>
48	48. <i>Test 48</i>
49	49. <i>Test 49</i>
50	50. <i>Test 50</i>
51	51. <i>Test 51</i>
52	52. <i>Test 52</i>
53	53. <i>Test 53</i>
54	54. <i>Test 54</i>
55	55. <i>Test 55</i>
56	56. <i>Test 56</i>
57	57. <i>Test 57</i>
58	58. <i>Test 58</i>
59	59. <i>Test 59</i>
60	60. <i>Test 60</i>
61	61. <i>Test 61</i>
62	62. <i>Test 62</i>
63	63. <i>Test 63</i>
64	64. <i>Test 64</i>
65	65. <i>Test 65</i>
66	66. <i>Test 66</i>
67	67. <i>Test 67</i>
68	68. <i>Test 68</i>
69	69. <i>Test 69</i>
70	70. <i>Test 70</i>
71	71. <i>Test 71</i>
72	72. <i>Test 72</i>
73	73. <i>Test 73</i>
74	74. <i>Test 74</i>
75	75. <i>Test 75</i>
76	76. <i>Test 76</i>
77	77. <i>Test 77</i>
78	78. <i>Test 78</i>
79	79. <i>Test 79</i>
80	80. <i>Test 80</i>
81	81. <i>Test 81</i>
82	82. <i>Test 82</i>
83	83. <i>Test 83</i>
84	84. <i>Test 84</i>
85	85. <i>Test 85</i>
86	86. <i>Test 86</i>
87	87. <i>Test 87</i>
88	88. <i>Test 88</i>
89	89. <i>Test 89</i>
90	90. <i>Test 90</i>
91	91. <i>Test 91</i>
92	92. <i>Test 92</i>
93	93. <i>Test 93</i>
94	94. <i>Test 94</i>
95	95. <i>Test 95</i>
96	96. <i>Test 96</i>
97	97. <i>Test 97</i>
98	98. <i>Test 98</i>
99	99. <i>Test 99</i>
100	100. <i>Test 100</i>

24(b). Level linearity on the reference level range (IEC 61672-3 Clause 16)

Level linearity shall be tested with steady sinusoidal electrical signals at a frequency of 8 kHz with the sound level meter set for frequency-weighting A. (61672-3 Clause 16.1).

Level linearity shall be measured in 5 dB steps of increasing input signal level from the starting point up to within 5 dB of the upper boundary stated in the Instruction Manual for the linear operating range at 8 KHz, then at 1 dB steps of increasing input signal level up to, but not including, the first indication of overload. The test of level linearity shall then be continued at 5 dB steps of decreasing input signal level from the starting point down to within 5 dB of the specified lower boundary, then at 1 dB steps of decreasing input signal level down to, but not including, the first indication of an under-range condition.

Measured level linearity deviations shall not exceed the applicable acceptance limits given in IEC 61672-1 from the specified upper boundary of the linear operating range up to, but not including, the first indication of overload and also from the specified lower boundary of the linear operating range down to, but not including, the first indication of an under-range condition.

"Y" means indicator under-range. However, if 20dB above noise floor is reached then no results are reported.

☒ Checked

24(c). Third Octave Band Filter Level Linearity 16kHz (Decreasing)

SLM Settings	
Time Weighting	Fast
Frequency Weighting	Z
SLM Range	MID
Generator & Attenuator Settings	
Select dB Under SLM Range	0
Attenuation (dB)	0.0
Generator Frequency (Hz)	16kHz
SPL Reference Starting Point (dB)	94
Output (mVrms)	42.0
Noise Floor (dB)	-99.0

Decreasing level to Underrange				Tolerance	
Atten	Expected	Indicator	Diff	Type 1	Type 2
5.0	89.0	89.0	0.0	±0.5	±0.6
10.0	84.0	84.0	0.0	±0.5	±0.6
15.0	79.0	79.0	0.0	±0.7	±0.9
20.0	74.0	74.0	0.0	±0.7	±0.9
25.0	69.0	69.0	0.0	±0.7	±0.9
30.0	64.0	64.0	0.0	±0.7	±0.9
35.0	59.0	59.0	0.0	±0.7	±0.9
40.0	54.0	54.0	0.0	±0.7	±0.9
45.0	49.0	49.0	0.0	±0.7	±0.9
49.0	45.0	45.0	0.0	±0.7	±0.9
50.0	44.0	44.0	0.0	±0.7	±0.9
51.0	43.0	43.0	0.0	±0.7	±0.9
52.0	42.0	42.0	0.0	±0.7	±0.9
53.0	41.0	41.0	0.0	±0.7	±0.9
54.0	40.0	40.0	0.0	±0.7	±0.9

Conforming	Yes
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Uncertainty (+/-) dB	0.13
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Description of Tests

24(c). Level linearity on the reference level range (IEC 61672-3 Clause 16)

Level linearity shall be tested with steady sinusoidal electrical signals at a frequency of 8 kHz with the sound level meter set for frequency-weighting A. (61672-3 Clause 16.1).

Level linearity shall be measured in 5 dB steps of increasing input signal level from the starting point up to within 5 dB of the upper boundary stated in the Instruction Manual for the linear operating range at 8 kHz, then at 1 dB steps of increasing input signal level up to, but not including, the first indication of overload. The test of level linearity shall then be continued at 5 dB steps of decreasing input signal level from the starting point down to within 5 dB of the specified lower boundary, then at 1 dB steps of decreasing input signal level down to, but not including, the first indication of an under-range condition.

Measured level linearity deviations shall not exceed the applicable acceptance limits given in IEC 61672-1 from the specified upper boundary of the linear operating range up to, but not including, the first indication of overload and also from the specified lower boundary of the linear operating range down to, but not including, the first indication of an under-range condition.

"Y" means indicator under-range. However, if 20dB above noise floor is reached then no results are reported.

☒ Checked

25. Third Octave Level Ranges

25(a). Third Octave Level Linearity Including the Level range (31.5Hz)

SLM Settings	
Time Weighting	Fast
Frequency Weighting	Z
SLM Range	MID
Generator & Attenuator Settings	
Attenuation (dB)	10
Generator Frequency (Hz)	31.5
Reference SPL (dB)	94
Output (mVrms)	135.4

Settings		Level (dB)			Tolerance	
Range	Atten	Expected	Indicated	Difference	Type 1	Type 2
HIGH	0.0	104.0	103.9	-0.1	± 0.5	± 0.6
MID	14.0	90.0	90.0	0.0	± 0.5	± 0.6
LOW	34.0	70.0	70.0	0.0	± 0.5	± 0.6
					± 0.5	± 0.6
					± 0.5	± 0.6
					± 0.5	± 0.6
					± 0.5	± 0.6
					± 0.5	± 0.6
					± 0.5	± 0.6

Conforming	Yes
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Uncertainty (+/-) dB	0.13
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25(b). Third Octave Level Linearity Including the Level range (1kHz)

SLM Settings	
Time Weighting	Fast
Frequency Weighting	Z
SLM Range	MID
Generator & Attenuator Settings	
Attenuation (dB)	10
Generator Frequency (Hz)	1k
Reference SPL (dB)	94
Output (mVrms)	133.2

Settings		Level (dB)			Tolerance	
Range	Atten	Expected	Indicated	Difference	Type 1	Type 2
HIGH	0.0	104.0	103.9	-0.1	± 0.5	± 0.6
MID	14.0	90.0	90.0	0.0	± 0.5	± 0.6
LOW	34.0	70.0	70.0	0.0	± 0.5	± 0.6
					± 0.5	± 0.6
					± 0.5	± 0.6
					± 0.5	± 0.6
					± 0.5	± 0.6
					± 0.5	± 0.6
					± 0.5	± 0.6

Conforming	Yes
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Uncertainty (+/-) dB	0.13
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25(c). Third Octave Level Linearity Including the Level range (16kHz)

SLM Settings	
Time Weighting	Fast
Frequency Weighting	Z
SLM Range	MID
Generator & Attenuator Settings	
Attenuation (dB)	10
Generator Frequency (Hz)	16k
Reference SPL (dB)	94
Output (mVrms)	132.6

Settings		Level (dB)			Tolerance	
Range	Atten	Expected	Indicated	Difference	Type 1	Type 2
HIGH	0.0	104.0	104.0	0.0	± 0.5	± 0.6
MID	14.0	90.0	90.0	0.0	± 0.5	± 0.6
LOW	34.0	70.0	70.0	0.0	± 0.5	± 0.6
					± 0.5	± 0.6
					± 0.5	± 0.6
					± 0.5	± 0.6
					± 0.5	± 0.6
					± 0.5	± 0.6
					± 0.5	± 0.6

Conforming	Yes
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Uncertainty (+/-) dB	0.13
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Description of Tests

<p>25. Filter Level linearity including the level range control (IEC 61260-3 Clause 11.9)</p> <p>11.9 For the same three filters as selected above, test each available level range in the following way: based on the same reference level, adjust the input level to be 30 dB below upper boundary of the linear operating range for each of the selected range settings. The measured level linearity deviation shall not exceed the acceptance limits given in 5.13.3 and 5.13.4 of IEC 61260-1:2014</p> <p>The three filter frequencies are 31.5Hz, 1kHz and 16kHz.</p> <p>The level linearity differences are calculated as the indicated signal level minus the corresponding expected signal level.</p>
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☒ Checked

26. Third Octave Band Filter Lower Limit

26(a). Octave Band Filter Lower Limit (Reference Range)

SLM, Attenuator & Generator Settings	
Time Weighting	Fast
Frequency Weighting	Z
Lowest Range	MID
Lower Limit for the Range	40

	1	2	3	4	5	6	7	8	9	10
Freq	4Hz	5Hz	6.3Hz	8Hz	10Hz	12.5Hz	16Hz	20Hz	25Hz	31.5Hz
Measured			11.6	8.8	8.9	7.2	6.1	5.6	4.9	4.3
Conforming	N/A	N/A	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Freq	40Hz	50Hz	63Hz	80Hz	100Hz	125Hz	160Hz	200Hz	250Hz	315Hz
Measured	3.6	4.1	1.5	0.9	1.0	0.0	0.5	0.4	0.0	0.0
Conforming	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Freq	400Hz	500Hz	630Hz	800Hz	1kHz	1.25kHz	1.6kHz	2kHz	2.5kHz	3.15kHz
Measured	0.5	0.7	0.9	1.7	1.9	2.7	3.4	4.3	5.2	5.9
Conforming	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Freq	4kHz	5kHz	6.3kHz	8kHz	10kHz	12.5kHz	16kHz	20kHz	25kHz	31.5kHz
Measured	6.8	7.8	8.8	9.7	10.8	11.9	13.1	14.5		
Conforming	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	N/A	N/A

Conforming	Yes
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Uncert (+/-) dB	0.09
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26(b). Octave Band Filter Lower Limit (Lowest Range)

SLM, Attenuator & Generator Settings	
Time Weighting	Fast
Frequency Weighting	Z
Lowest Range	LOW
Lower Limit for the Range	20

	1	2	3	4	5	6	7	8	9	10
Freq	4Hz	5Hz	6.3Hz	8Hz	10Hz	12.5Hz	16Hz	20Hz	25Hz	31.5Hz
Measured			9.7	10.7	8.2	8.7	7.2	6.2	4.6	3.8
Conforming	N/A	N/A	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Freq	40Hz	50Hz	63Hz	80Hz	100Hz	125Hz	160Hz	200Hz	250Hz	315Hz
Measured	2.6	2.2	1.4	0.7	0.0	0.0	0.0	0.0	0.0	0.0
Conforming	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Freq	400Hz	500Hz	630Hz	800Hz	1kHz	1.25kHz	1.6kHz	2kHz	2.5kHz	3.15kHz
Measured	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Conforming	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Freq	4kHz	5kHz	6.3kHz	8kHz	10kHz	12.5kHz	16kHz	20kHz	25kHz	31.5kHz
Measured	0.0	0.0	0.0	0.0	0.0	0.7	1.6	2.5		
Conforming	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	N/A	N/A

Conforming	Yes
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Uncert (+/-) dB	0.09
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26. Third Octave Band Filter Lower Limit (IEC 61260-3 Clause 12)

12.2 Short-circuit the input terminal or use similar means to ensure that the level of the input signal is below the lower limit of the specified linear operating range. Record the output level from each filter in the set. The output level shall not exceed the specified lower limit for the appropriate filter and range.

Interpretation: The yellow cells are the observed values. The measured value must not exceed the Lower Limit for the Range.

☒ Checked

CERTIFICATE OF CALIBRATION

CERTIFICATE No: G29987

EQUIPMENT TESTED : Ground Vibration Monitor

Manufacturer: Texcel
Meter Type: ETM
Transducers A: Triaxial

Serial No: 7497
Serial No: 7497

Owner: Ward Civil &
Environmental
Engineering
Unit 2, Level 4, 65 Epping Road
North Ryde NSW 2113

Tests Performed: Measured Frequency response, Correct level display,
Linearity display
Comments: Detailed overleaf.

CONDITION OF TEST:

Temperature 23 °C $\pm 1^{\circ}$ C
Relative Humidity 35 % $\pm 5\%$

Date of Receipt : 07/07/2021
Date of Calibration : 08/07/2021
Date of Issue : 08/07/2021

Acu-Vib Test AVP15 (Ground vibration Monitor & Low Frequency
Procedure: Transducer) based on AS2187.2 & DIN45669-1

CHECKED BY: *[Signature]*

AUTHORISED SIGNATURE: *[Signature]*

Jack Kieft

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%.



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Appendix C

Real-time vibration monitoring results

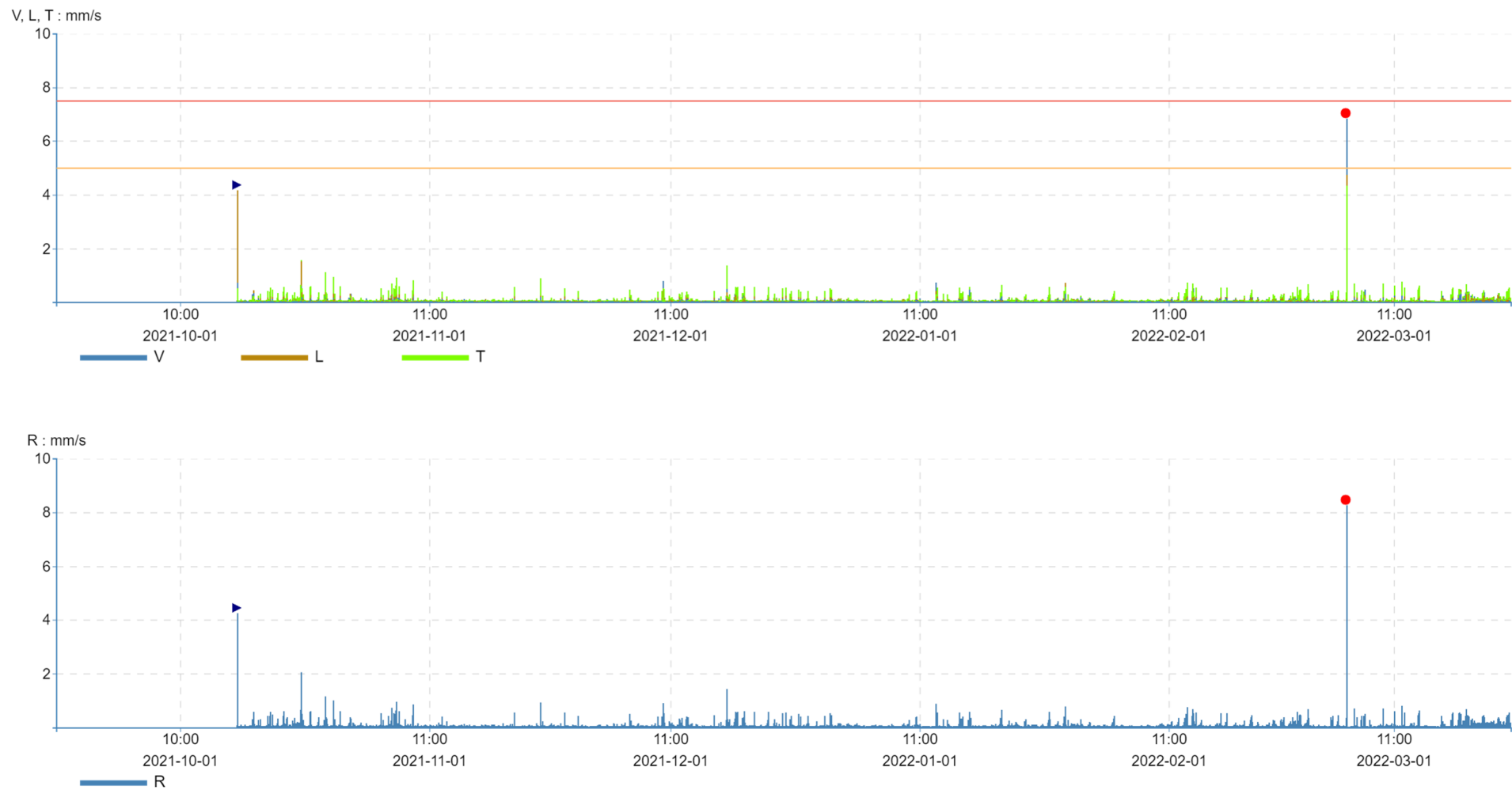


Figure 4 - Realtime vibration monitoring results

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