

Quarterly Environment Construction Monitoring Report

Q1 and Q2 2023 – January – June 2023

Pitt Street Integrated Station Development

Project number:	N01070
Document number:	SMCSWSPS-CPB-STA-EM-REP-000024
TeamBinder:	SMCSWSPU-CPB-SPS-EM-REP-008824
Revision date:	20/09/2023
Revision:	1

Document approval

Rev.	Date	Prepared by	Reviewed by	Approved by	Remarks
A	03/08/2023	A Brajliah	E Eveleigh		Review by Renzo Tonin
0	03/08/2023	A Brajliah	E Eveleigh	S Knight	Issue to Sydney Metro
1	20/09/2023	A Brajliah	E Eveleigh	S Knight	Amendments following review
Signature					

Contents

1. Introduction.....	3
1.1 Project Summary	3
1.2 Site Activities	4
2. Reporting Requirements.....	5
2.1 Inspections	5
2.2 Water Quality Monitoring	6
2.3 Noise and Vibration Monitoring.....	9
3. Conclusion	32
4. Appendices	33
A – Weather Data	33
B – Photos of Real-Time Equipment	34
C – Calibration Certificates	35
D – Laboratory Results	36

1. Introduction

1.1 Project Summary

The Sydney Metro City and Southwest is the second portion of the new standalone rail network known as the Sydney Metro, which is Australia's largest public transport infrastructure project and a priority rail project for the NSW Government. CPB Contractors (CPB) have been contracted by Transport for New South Wales to design and construct the Integrated Station Development (ISD) component of the future Pitt Street Station.

Pitt Street is situated within the Sydney CBD, largely surrounded by high-rise commercial and residential buildings. The Station is a binocular cavern station with north and southbound platform caverns running beneath Pitt and Castlereagh Streets respectively. The Station has two entrance shafts from the surface one at Pitt Street North and Pitt Street South connected to the platform caverns via adit tunnels.

Pitt Street North is located on Park Street between Pitt and Castlereagh Street, with the station entrance facing onto Park Street. The Over Station Development (OSD) surrounds the station entrance and access is provided on Pitt, Park and Castlereagh Streets. Pitt Street South is located on the corner of Pitt and Bathurst Street. It is configured in an 'L' shape which wraps around the Edinburgh Castle Hotel with the station entrance opening onto Bathurst Street. Access to the OSD is provided from Pitt Street.

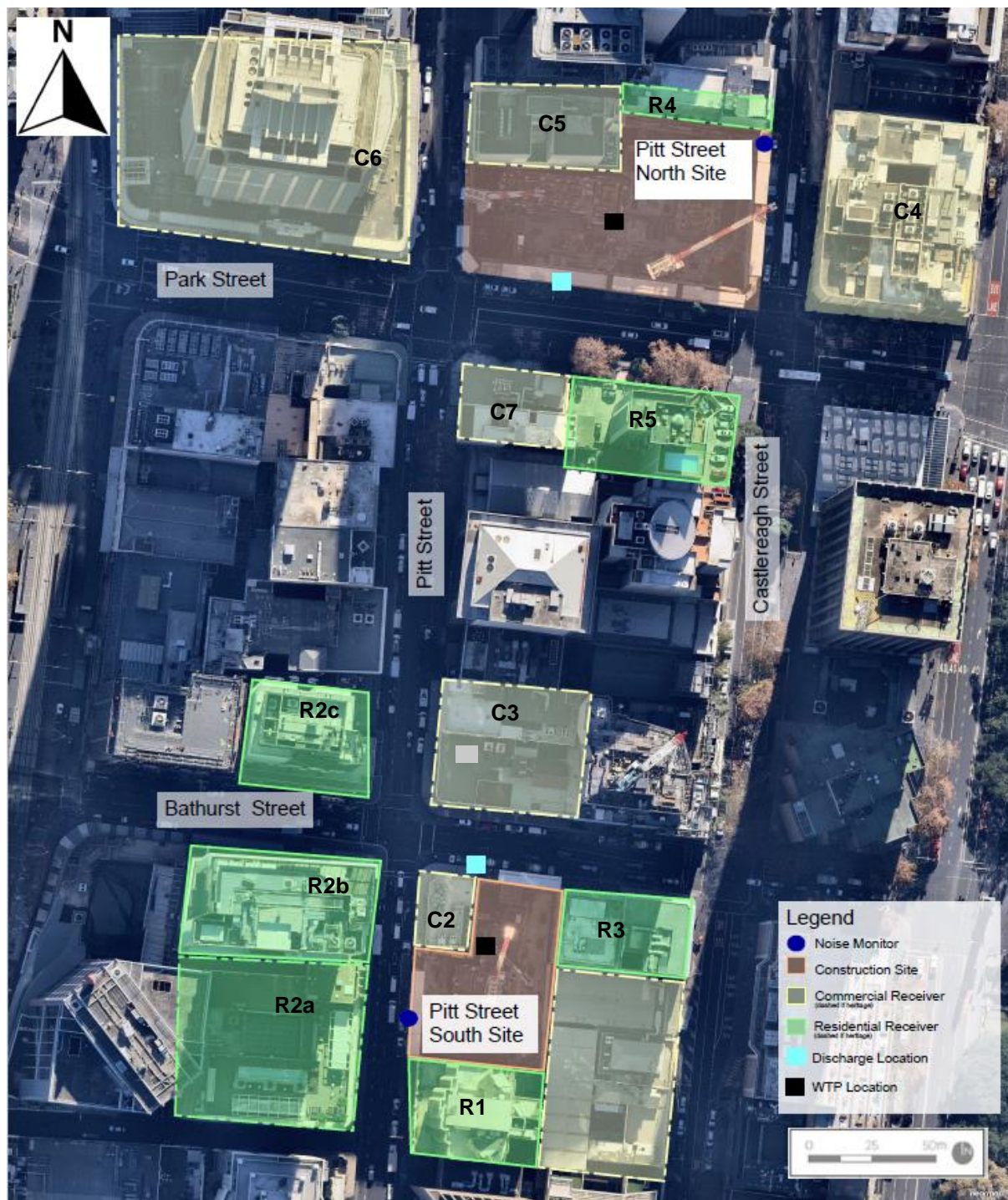


Figure 1-1 Pitt Street Station location and indicative monitoring layout

1.2 Site Activities

The Construction Environment Management Plan (CEMP) and associated sub-plans were approved by the Department of Planning, Industry and Environment (DPIE) on 24 December 2020 and construction works commenced on the project on 6 January 2021. The CEMP (Revision 4) was revised with minor updates and reviewed between January to June 2023. The CEMP was subsequently approved by the ER on 15 June 2023.

This is the first biannual Construction Monitoring Report for 2023 and reflects the monitoring that was conducted from January to June 2023. **Table 1-1** outlines the site activities that occurred during the reporting period.

Table 1-1 Site Activities

Location	Site Activities
Pitt Street North	Station Slab pours complete, minor penetration fill works ongoing Facade installation Level 2-Level 5 - Glazing and Louvres) Blockwork and services fit out all levels Stripping formwork Level 2-Level 5 Fit out B4 - Level 4 Hoarding modification Escalators installed
Pitt Street South	Installation of façade Precast & GRC panels Levels 1– 6 Blockwork construction completed up to Level 5 Fit out works (services & architectural) between B04 and Level 5 Minor infill concrete pours remain Hoarding modification
Caverns	GRC panel installation and rectification works Platform PSD cladding install 80% complete Terrazzo flooring completed on east platform Services delivery ongoing

2. Reporting Requirements

A Planning Approval has been obtained to construct Sydney Metro City and Southwest Chatswood to Sydenham, which was identified as Critical State-Significant Infrastructure (CSSI) SSI 15_7400. The current CSSI modification is MOD 9 which was determined on 30 June 2022.

Conditions C9 to C16 of the Planning Approval describes monitoring and reporting requirements for the ISD Works.

Monitoring and reporting requirements are detailed in the Construction Environmental Management Plan (approved by NSW DPE on 24 Dec 2020), and the following associated sub-plans:

- Soil, Water and Groundwater Management Sub-Plan; and
- Noise and Vibration Management Sub-Plan

The following report details environmental monitoring that was undertaken during this reporting period conducted as per the Planning Approval, the approved CEMP (Revision 4) and its associated sub-plans.

A copy of the Planning Approval can be found by following the link below to the NSW Planning Portal website.

<https://www.planningportal.nsw.gov.au/major-projects/project/3601>

The results of the Construction Monitoring Program are included in this Construction Monitoring Report and will be submitted to the Acoustic Advisor (AA), Sydney Metro and the Environmental Representative (ER) who will endorse the document prior to submission to DPE and being made publicly available on the project website located at [Pitt Street Sydney Metro ISD – Pitt Street Sydney Metro ISD \(wpcomstaging.com\)](http://Pitt_Street_Sydney_Metro_ISD_-_Pitt_Street_Sydney_Metro_ISD_wpcomstaging.com). CPB will also issue the Construction Monitoring report to Council, NRAR and EPA.

2.1 Inspections

Periodic environmental inspections are undertaken by CPB to verify the adequacy of all environmental mitigation measures. In addition, inspections are conducted before and following significant rainfall events that are predicted to be over 10mm in 24 hours. Weather data for the period is included in **Appendix A**.

The Site Environmental Plans (SEPs) identify the environmental control measures on both PSISD sites. SEPs and environmental controls are monitored through these periodic environmental inspections and are updated as required to reflect the changing nature of the PSISD sites. All records of SEP inspections are documented in the CPB Environmental Inspection Checklist. Internal CPB inspections are conducted by the CPB Environmental and Project Team. ER inspections are attended by Sydney Metro, CPB, the DPE endorsed Acoustic Advisor (AA) and the ER.

During the reporting period there were three inspections conducted by Sydney Metro Environmental Representatives and the ER/AA. Additionally, CPB completed twenty five internal environmental inspections during the reporting period.

2.2 Water Quality Monitoring

2.2.1 Background

Water quality parameters were determined from the Discharge Impact Assessment (supporting the Construction Environmental Management Plan Rev 0) which was updated in May 2021 to include the TSS/NTU correlation following ER review of the first Construction Monitoring Report (Q1 2021) and clarification of the Discharge Management Protocol.

Water quality parameters for the discharge criteria for the Project are presented in **Table 2-1**.

Table 2-1 Water Quality Discharge Criteria Parameters

Parameter	Unit	Discharge Criteria
pH	pH	6.5 – 8.5
Total Suspended Solids	mg/L	50mg/L (TSS:NTU correlation equivalent of 50NTU)
Oil and Grease	Visual	No visible surface sheen
Copper	mg/L	0.0013mg/L (50 percentile limit) 0.005mg/L (100 percentile limit)
Zinc	mg/L	0.015mg/L (50 percentile limit) 0.043mg/L (100 percentile limit)

CPB has a temporary stormwater connection for both the North site and South sites approved by the City of Sydney Council (CoSC) since 4 December 2020. Water is collected at the Pitt Street North site (PSN) and Pitt Street South site (PSS) in permanent stormwater tanks the capacity of which are approximately 200kL and 100kL respectively. Water is pumped from the stormwater tanks to the treatment system where it is then tested prior to discharge. At PSN there is a water reuse system established that provides water for site activities.

Water discharged from the site is predominantly rainwater and construction (potable) water. Negligible groundwater is encountered which is evidenced by the frequency of discharge relating more to rainfall events than construction activities.

2.2.2 Water Quality Monitoring Methodology

Regular field tests are conducted by CPB Environmental Team using the calibrated water quality probe within the stormwater pit to confirm parameters are within the discharge criteria for pH, NTU and no visible oil and grease. If water requires treatment it is treated in the stormwater pit with the appropriate chemicals and retested again until compliant values are obtained. If the parameters are within the field criteria and monthly laboratory samples have been obtained, a permit to dewater will be issued. Additional field tests are undertaken by taking a sample of water from the sample valve located post-treatment to confirm the pH and NTU values and no visible oil and grease during discharge.

Table 2-2 outlines the CPB water quality monitoring equipment used during the reporting period.

Table 2-2 Water Quality Monitoring Equipment Details

Monitoring Type	Equipment Details	Serial Number	Calibration Date
Water Quality Multi Parameter Meter	Yeo-Kal 618	676	16/03/2023

Laboratory testing is conducted monthly via grab samples to confirm the criteria in Table 2-1 in accordance with the Discharge Impact Assessment – Discharge Management Protocol.

Laboratory Testing of water quality is undertaken at Eurofins Sydney Laboratory in Lane Cove West, a NATA accredited laboratory. Laboratory results are provided in Appendix D.

2.2.3 Water Quality Monitoring Results

Detailed discharge monitoring results for this reporting period are presented in **Table 2-3**.

All analytical results were below the Water Quality Discharge Criteria with the exception of oil & grease for the PSN January verification (09/01/2023) and PSS June Verification (14/06/2023) and zinc for the PSS March verification (02/03/2023). No hazardous material spills had occurred prior to the sampling events, nor were any visual grease or oily sheens observed at the time of the water sampling, subsequently the results were suspected to be erroneous. The site supervisor was notified, and no dewatering permits were issued until the exceedance was investigated. Subsequently, the tank water was moved to the stormwater holding pit and the holding tank was cleaned. The water and holding tank cleaning water were retreated using the baffle treatment system, and additional samples were collected for oil and grease (11/01/2023 and 27/06/2023) and zinc (06/03/2023). The reported concentration for the additional sample were compliant with the discharge criteria. No monthly samples exceeded the Stage 3 protocol exceedance (3 consecutive exceedances of the same parameter) during the reporting period. All discharges were compliant with the Discharge Management Protocol.

Table 2-3 Discharge Water Monitoring Data

Identifier	Dates Sampled	Parameter, Criteria or Measured Value					Testing Method	Status
		pH (6.5-8.5)	Turbidity (<50NTU)	Copper (<0.005 mg/L)	Zinc (<0.043 mg/L)	Oil & Grease (No visible/ <10mg/L)		
PSS_01	9/01/2023	8.1	1.2	<0.001	<0.005	<10	Laboratory	Compliant
PSN_01	9/01/2023	7.4	2.3	<0.001	<0.005	30	Laboratory	Stage 2 exceedance
PSN_01	11/01/2023	-	-	-	-	<10	Laboratory	Compliant
PSS_01	19/01/2023	8.49	0.2	-	-	-	Field	Compliant
PSN_01	25/01/2023	7.66	4.6	-	-	-	Field	Compliant
PSS_01	31/01/2023	6.85	42.3	-	-	-	Field	Compliant
PSS_01	7/02/2023	7.6	1	<0.001	0.034	<10	Laboratory	Compliant
PSS_01	7/02/2023	8.25	2.7	-	-	-	Field	Compliant
PSS_01	22/02/2023	8.18	31.9	-	-	-	Field	Compliant
PSN_01	2/03/2023	7.8	1.6	<0.001	<0.005	<10	Laboratory	Compliant
PSS_01	2/03/2023	7.8	3.7	<0.001	0.016	<10	Laboratory	Stage 2 exceedance
PSS_01	6/03/2023	-	-	-	0.006	-	Laboratory	Compliant
PSS_01	6/03/2023	8.13	8.8	-	-	-	Field	Compliant
PSS_01	13/03/2023	7.44	0.2			-	Field	Compliant
PSN_01	23/03/2023	7.6	2.5	<0.001	<0.005	<10	Laboratory	Compliant
PSS_01	23/03/2023	7.3	1.1	<0.001	<0.005	<10	Laboratory	Compliant
PSS_01	19/04/2023	7.2	1	<0.001	<0.005	<10	Laboratory	Compliant
PSS_01	14/06/2023	8	7.1	<0.001	<0.005	11	Laboratory	Compliant
PSS_01	27/06/2023	-	-	-	-	<10	Laboratory	Compliant

PSS_01	29/06/2023	8.47	1.1				Field	Compliant
--------	------------	------	-----	--	--	--	-------	-----------

* No Laboratory testing was taken of these parameters. Only the parameter that exceeded the criteria was re-tested as a requirement of a Stage 2 exceedance.

2.2.4 Groundwater Monitoring Results

Water discharged from the site is predominantly rainwater collected and potable water used for dust suppression which is evident from the relation between rainfall events and the discharge dates. It is therefore determined that less than 7kL/day of groundwater seepage is being captured and discharged.

Monthly settlement monitoring of the buildings adjacent to the PSISD sites has been undertaken to monitor for any settlement due to groundwater seepage. Total Survey Solutions are engaged by CPB to monitor the movement of structures over the entire Pitt Street Metro Project. This includes monitoring of the external buildings adjacent to the North and South sites, walls of the North and South station boxes and through the caverns/ adits between them. The monitoring uses total station instruments to take direct measurements to reference targets on and inside adjacent buildings and walls to calculate any movement measured as an angle of tilt that is recorded live on Geomotion. The angles that trigger concern have been determined by Structural Engineers and alarms had been set to activate text messages if the triggers are reached. Settlement monitoring for the past 6 months to March 2023 has shown no displacement or settlement beyond concern. On 28 April 2023 CPB received confirmation from the Independent Property Impact Assessment Panel (IPIAP) that settlement monitoring was no longer required as described in condition E61.

2.3 Noise and Vibration Monitoring

2.3.1 Background

The Main Works Construction Noise and Vibration Impact Statement (CNVIS) is regularly reviewed to ensure it captures all works being undertaken prior to works commencing. **Table 2-4** outlines the CNVIS developed during the reporting period. The current CNVIS is provided on the project website at [Pitt Street Sydney Metro ISD – Pitt Street Sydney Metro ISD \(wpcomstaging.com\)](http://Pitt Street Sydney Metro ISD – Pitt Street Sydney Metro ISD (wpcomstaging.com)).

Table 2-4 CNVIS' developed and approved during the reporting period.

CNVIS	Details
CNVIS – Station Box Main Works	08/02/2023 – Revision 17.1 issued to Sydney Metro, ER and AA and endorsed by the AA on 13 February 2023

Out of Hours works (OOHW) were conducted during the reporting period in accordance with the Sydney Metro Out of Hours Protocol and subsequent approved Out of Hours Works Applications (OOHWA).

2.3.2 Noise and Vibration Criteria

Relevant criteria relating to noise and vibration are outlined in the PSISD Construction Noise and Vibration Management Sub Plan and respective CNVIS. These are outlined in **Table 2-5**.

Table 2-5 Construction noise management levels at receivers^{1, 2}

Receiver type	Time of Day ²	EIS Chapter 10 Requirements				CSSI Approval Requirements	
		ICNG*	Ground Borne Noise	Sleep Disturbance	Construction Traffic	Condition E37 ³	Condition E41 ⁴
Pitt Street South							
Residential	Day (Standard – 7am-6pm)	74dB(A) _{L_{eq}(15min)} 75dB(A) _{L_{eq}(15min)} – Highly Noise Affected Threshold	45dB(A) _{L_{eq}(15min)} (internal noise level)	N/A	60dB(A) _{L_{eq}(15hr)}	60dB(A) _{L_{eq}(15min)} (internal noise level) 80dB(A) _{L_{eq}(15min)} (external noise level)**	N/A
	Day (OOH)	69dB(A) _{L_{eq}(15min)}	45dB(A) _{L_{eq}(15min)} (internal noise level)	N/A	60dB(A) _{L_{eq}(15hr)}	60dB(A) _{L_{eq}(15min)} (internal noise level) 80dB(A) _{L_{eq}(15min)} (external noise level)**	N/A
	Evening (OOH)	66dB(A) _{L_{eq}(15min)}	40dB(A) _{L_{eq}(15min)} (internal noise level)	N/A	60dB(A) _{L_{eq}(15hr)}	N/A	60dB(A) _{L_{eq}(15min)} (internal noise level) 80dB(A) _{L_{eq}(15min)} (external noise level)**
	Night (OOH)	63dB(A) _{L_{eq}(15min)}	35dB(A) _{L_{eq}(15min)} (internal noise level)	65dB(A) _{L_{max}} (external noise level)	55dB(A) _{L_{eq}(9hr)}	N/A	45dB(A) _{L_{eq}(15min)} (internal noise level) 65dB(A) _{L_{eq}(15min)} (external noise level)**
Commercial	When in use	70dB(A) _{L_{eq}(15min)}	N/A	N/A	N/A	60dB(A) _{L_{eq}(15min)} (internal noise level) 80dB(A) _{L_{eq}(15min)} (external noise level)**	N/A
Pitt Street North							

Receiver type	Time of Day ²	EIS Chapter 10 Requirements				CSSI Approval Requirements	
		ICNG*	Ground Borne Noise	Sleep Disturbance	Construction Traffic	Condition E37 ³	Condition E41 ⁴
Residential	Day (Standard – 7am-6pm)	73dB(A) _{Leq(15min)} (weekdays) 75dB(A) – Highly Noise Affected Threshold	45dB(A) _{Leq(15min)} (internal noise level)	N/A	60dB(A) _{Leq(15hr)}	60dB(A) _{Leq(15min)} (internal noise level) 80dB(A) _{Leq(15min)} (external noise level)**	N/A
	Day (OOH)	68dB(A) _{Leq(15min)}	45dB(A) _{Leq(15min)} (internal noise level)	N/A	60dB(A) _{Leq(15hr)}	60dB(A) _{Leq(15min)} (internal noise level) 80dB(A) _{Leq(15min)} (external noise level)**	N/A
	Evening	66dB(A) _{Leq(15min)}	40dB(A) _{Leq(15min)} (internal noise level)	N/A	60dB(A) _{Leq(15hr)}	N/A	60dB(A) _{Leq(15min)} (internal noise level) 80dB(A) _{Leq(15min)} (external noise level)**
	Night	64dB(A) _{Leq(15min)}	35dB(A) _{Leq(15min)} (internal noise level)	65dB(A) _{L_{max}} (external noise level)	55dB(A) _{Leq(9hr)}	N/A	45dB(A) _{Leq(15min)} (internal noise level) 65dB(A) _{Leq(15min)} (external noise level)**
Commercial	When in use	70dB(A) _{Leq(15min)}	N/A	N/A	N/A	60dB(A) _{Leq(15min)} (internal noise level) 80dB(A) _{Leq(15min)} (external noise level)**	N/A

*ICNG noise management levels for residential receivers are based on the background noise levels presented in Section 4 of the CNVIS.

** External noise target determined by assuming a 20dB (A) noise reduction between outside and inside (closed windows).

1. Noise levels apply at the property boundary that is most exposed to construction noise, and at a height of 1.5m above ground level unless stated otherwise.
2. Noise management levels apply when receiver areas are in use only.
3. Exceedance of this level triggers the need for consideration of respite periods as per Conditions of Approval E38.
4. Exceedances of this level trigger the need to consider additional mitigation methods as detailed in Sydney Metro City and South West Noise and Vibration Strategy.

As a conservative approach, and in accordance with *British Standard BS 7385-2*, the vibration screening criteria has been applied to buildings at Pitt Street:

- Screening criteria – 2.5 mm/s (Peak Particle Velocity (PPV))

2.3.3 Attended Monitoring Methodology

Noise

Attended monitoring is undertaken when two OOH scenarios occur simultaneously where predicted exceedances are expected to be >20dB above RBL, as well as in response to recommendations by the ER and AA, or if required on receipt of a complaint.

Some measurement locations are affected by road traffic noise, (buses/truck passing by etc) intermittently generating noise levels similar or higher than the construction noise. As such, conducting a long-term noise measurement (15 minute LAeq) was not possible – the measurement would be affected by extraneous noise. To address this, shorter duration measurements LAeq had to be made during breaks in traffic (to get measurement periods not affected by intermittent extraneous noise). Given that acoustic criteria are set using a 15 minute LAeq descriptor, it is necessary to account for the fact that the equipment item operates for only a percentage of the 15 minute period, i.e.:

- When determining the LAeq(15min) noise level for equipment items such as a road saw, jackhammer and compactor, we assume the item is used for approximately 50% of any 15 minute period.
- When determining the LAeq(15min) noise level for equipment items such as concrete pumps and vacuum trucks, these are assumed to operate continuously.

The recordings were taken from a height of 1.2 m from the ground, at least 1m from the walls or other major reflecting surfaces.

No attended noise monitoring has been required during the reporting period.

Vibration

The CNVMP outlined the approach to manage potential vibration impacts on heritage items. The actions outlined in the CNVIS are:

- Identify heritage items where the 2.5 mm/s peak component particle velocity objective may be exceeded during specific construction activities
- Structural engineering report to be undertaken on identified heritage items, to confirm structural integrity of the building and confirm if item is 'structurally sound'
- If item confirmed as 'structurally sound', the screening criteria in Section 3.2.2 shall be adopted, or
- If item confirmed as 'structurally unsound', the more conservative cosmetic damage objectives of 2.5 mm/s peak component particle velocity would be adopted.

When a structural engineering report is unable to be obtained the attended vibration monitor notification system was set to 2.5 mm/s PPV. No attended vibration monitoring was conducted during the reporting period as no vibration generating activities with potential to adjacent structures were identified.

2.3.4 Real-Time Monitoring Methodology

Real-time noise monitors have been maintained and monitored by Acoustic Consultants Renzo Tonin since November 2020. The real-time links to the monitoring data have been submitted to Sydney Metro, DPE and EPA and all records stored. Locations of these monitors are depicted in **Figure 2-1**.

It is noted that the noise monitoring locations are conservative and measure external noise levels and not internal noise levels. Noise monitoring completed by Renzo Tonin in May 2022 determined that at least a 25 dB(A) (for the North) and 20dB(A) (for the South) noise reduction between the external noise level and the internal noise level (windows closed) has been determined following on-site outside/inside noise level measurements. This has been adopted by the project in assessing performance against the CoA E38 as approved in the CNVMP.

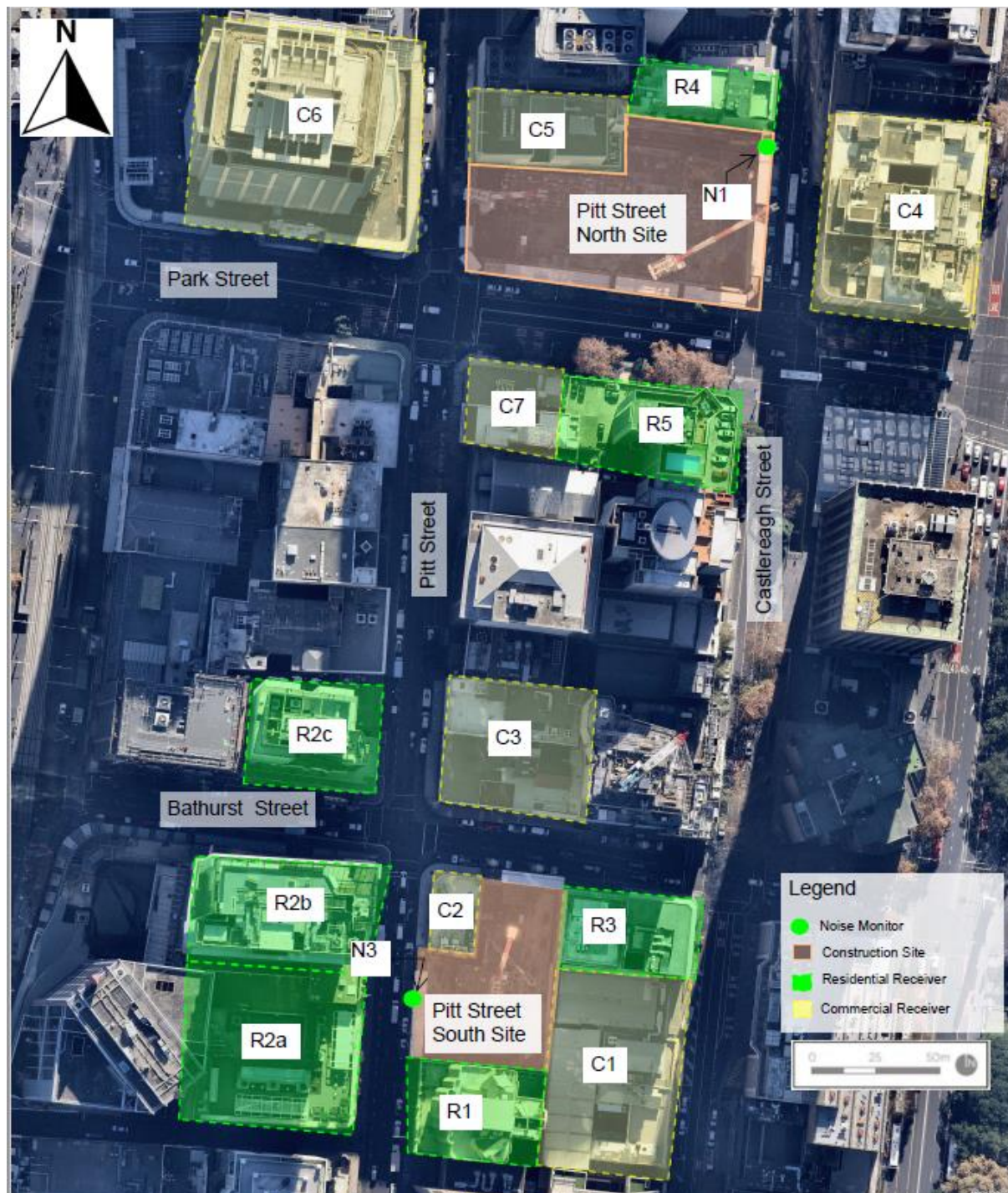


Figure 2-1 Pitt Street Station Real-Time Monitor Locations

Condition E28 of the CSSI 15_7400 requires that *vibration from construction activities does not exceed the vibration limits set out in the British Standard BS 7385-2:1993 Evaluation and measurement for vibration in buildings: Guide to damage levels from ground borne vibration* which was interpreted in the CNVIS to set a limit of 2.5 mm/s peak component particle velocity as a conservative approach for the

project. There are no construction activities during the reporting period identified in Table 1-1 that would be expected to generate vibration levels exceeding 2.5m/s.

Condition E38 of the CSSI 15_7400 requires that *internal noise levels be less than $L_{eq}(15 \text{ minute})$ 60 dB(A) for at least 6.5 hours between 7am and 8pm (Upper Limit), of which at least 3.25 hours must be below $L_{Aeq}(15 \text{ minute})$ 55 dB(A) (Lower Limit). Within these hours, works are 'permitted' to generate noise greater than 60dB(A) for up to 6.5 hours (the equivalent of 26x15 minute periods), and 'requires' 3.25 hours of noise generated to be less than 55dB(A) (the equivalent of 13x15 minute periods). A SMS/Email alert system has been set up to notify the project team that CoA E38 limits are approaching. Following receipt of an SMS / Email, site activities are reviewed and works with high noise are ceased. Compliance during the reporting period with this condition are shown below in **Tables 2-14 and 2-15**.*

The equipment used for noise measurements was an NTi Audio Type XL2 precision sound level analyser which is a class 1 instrument having accuracy suitable for field and laboratory use. The instrument was calibrated prior and subsequent to measurements using a Bruel & Kjaer Type 4231 calibrator. No significant drift in calibration was observed. All instrumentation complies with IEC 61672 (parts 1-3) 'Electroacoustics - Sound Level Meters' and IEC 60942 'Electroacoustics - Sound calibrators' and carries current NATA certification (or if less than 2 years old, manufacturers certification). **Table 2-14** outlines the noise monitoring equipment that has been used during the reporting period.

Photos of the real-time equipment are shown in **Appendix B** and calibration certificates for the equipment in **Table 2-14** can be seen in **Appendix C**.

Table 2-14 Monitoring Equipment Details

Monitoring Type / Location	Equipment Details	Serial Number	Last Calibration Date	Off Hire Date
Attended Noise	Rion NL-20	00143337	24/02/2023	N/A
Noise calibrator	Pulsar Model 106	93277	24/02/2023	N/A
Real-Time Noise – N1	NTi Audio Type XL2	RTA06-004	01/02/2023	On site
Real-Time Noise – N1 (additional monitor)	NTi Audio Type XL2	RTA07-005	02/07/2021	On site
Real-Time Noise – N3	NTi Audio Type XL2	RTA07-004	01/03/2023	On site

2.3.5 Real-Time Monitoring Results

Real-time noise monitors were operating at Pitt Street North and Pitt Street South during the reporting period. Summarized real-time noise monitoring results outlining compliance with CoA E38 are presented for the North site in Table 2-15 and for the South site in Table 2-16. Noise levels in this reporting period were compliant with the predicted noise levels set out in the CNVIS.

The monitor on the Pitt Street South site was offline from 19/01/2023 (12:00pm) to 20/01/2023 (12:00pm) as the power cable malfunctioned due to being flooded by heavy rainfall during this period. The power cable was swapped and secured on 20/01/2023 (12:00pm).

The monitor on the Pitt Street South site was offline on 22/03/2023 from 05:09am to 12:42pm and on 31/03/2023 from 04:53am to 10:58am as the power to the monitor was disconnected and inaccessible during these periods.

The monitor on the Pitt Street North site was offline from 31/03/2023 (01:38pm) to 04/04/2023 (01:07pm) as the power cable malfunctioned due to being flooded by rainfall during this period. The power cable was swapped and secured on 04/04/2023 (01:07pm).

The monitor on the Pitt Street North site was offline from 20/04/2023 (07:20am) to 21/04/2023 (08:57am), from 28/04/2023 (09:16am) to 01/05/2023 (07:41am), from 02/05/2023 (01:39pm) to 03/05/2023 (02:33pm), from 12/05/2023 (08:52pm) to 15/05/2023 (10:28am) and from 18/05/2023 (07:27am) to 22/05/2023 (12:18pm) as the power to the monitor was disconnected during these periods.

Due to the frequent power outages at PSN two unattended noise monitors were placed at the location until a dedicated power output has been provided to the monitor on 22/05/2023. Refer to Appendix C for Calibration Certificates

All real-time vibration monitors were removed in Q3 2021, the removal process occurred in consultation with the AA, ER and in accordance with the planning approval and CNVMP.

Table 2-15 Condition E38 Compliance North Site (Pitt Street)

Monitoring Location (Address)	Monitoring Date	Start Time	End Time	Period below 60 LAeq(15minute) dB(A) - (Hours)	Period below 55 LAeq(15minute) dB(A) - (Hours)	Min 6.5 hrs below 60dB(A) LAeq(15min)	Min 3.25 hrs below 55dB(A) LAeq(15min)
Pitt Street (North)	1/01/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	2/01/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	3/01/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	4/01/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	5/01/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	6/01/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	7/01/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	8/01/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	9/01/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	10/01/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	11/01/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	12/01/2023	7am	8pm	13	12.5	Yes	Yes
Pitt Street (North)	13/01/2023	7am	8pm	13	12.5	Yes	Yes
Pitt Street (North)	14/01/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	15/01/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	16/01/2023	7am	8pm	13	12.5	Yes	Yes
Pitt Street (North)	17/01/2023	7am	8pm	13	12.75	Yes	Yes
Pitt Street (North)	18/01/2023	7am	8pm	13	12.5	Yes	Yes
Pitt Street (North)	19/01/2023	7am	8pm	13	12.75	Yes	Yes
Pitt Street (North)	20/01/2023	7am	8pm	13	12.75	Yes	Yes
Pitt Street (North)	21/01/2023	7am	8pm	12	12	Yes	Yes

Monitoring Location (Address)	Monitoring Date	Start Time	End Time	Period below 60 LAeq(15minute) dB(A) - (Hours)	Period below 55 LAeq(15minute) dB(A) - (Hours)	Min 6.5 hrs below 60dB(A) LAeq(15min)	Min 3.25 hrs below 55dB(A) LAeq(15min)
Pitt Street (North)	22/01/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	23/01/2023	7am	8pm	12.5	11.5	Yes	Yes
Pitt Street (North)	24/01/2023	7am	8pm	13	12.5	Yes	Yes
Pitt Street (North)	25/01/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	26/01/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	27/01/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	28/01/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	29/01/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	30/01/2023	7am	8pm	13	12.75	Yes	Yes
Pitt Street (North)	31/01/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	1/02/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	2/02/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	3/02/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	4/02/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	5/02/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	6/02/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	7/02/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	8/02/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	9/02/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	10/02/2023	7am	8pm	13	12.5	Yes	Yes
Pitt Street (North)	11/02/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	12/02/2023	7am	8pm	13	13	Yes	Yes

Monitoring Location (Address)	Monitoring Date	Start Time	End Time	Period below 60 LAeq(15minute) dB(A) - (Hours)	Period below 55 LAeq(15minute) dB(A) - (Hours)	Min 6.5 hrs below 60dB(A) LAeq(15min)	Min 3.25 hrs below 55dB(A) LAeq(15min)
Pitt Street (North)	13/02/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	14/02/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	15/02/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	16/02/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	17/02/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	18/02/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	19/02/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	20/02/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	21/02/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	22/02/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	23/02/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	24/02/2023	7am	8pm	13	12.5	Yes	Yes
Pitt Street (North)	25/02/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	26/02/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	27/02/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	28/02/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	1/03/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	2/03/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	3/03/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	4/03/2023	7am	8pm	13	12.25	Yes	Yes
Pitt Street (North)	5/03/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	6/03/2023	7am	8pm	13	12.75	Yes	Yes

Monitoring Location (Address)	Monitoring Date	Start Time	End Time	Period below 60 LAeq(15minute) dB(A) - (Hours)	Period below 55 LAeq(15minute) dB(A) - (Hours)	Min 6.5 hrs below 60dB(A) LAeq(15min)	Min 3.25 hrs below 55dB(A) LAeq(15min)
Pitt Street (North)	7/03/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	8/03/2023	7am	8pm	12.5	11.75	Yes	Yes
Pitt Street (North)	9/03/2023	7am	8pm	13	11.75	Yes	Yes
Pitt Street (North)	10/03/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	11/03/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	12/03/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	13/03/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	14/03/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	15/03/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	16/03/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	17/03/2023	7am	8pm	11.75	9	Yes	Yes
Pitt Street (North)	18/03/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	19/03/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	20/03/2023	7am	8pm	13	11.75	Yes	Yes
Pitt Street (North)	21/03/2023	7am	8pm	13	12.25	Yes	Yes
Pitt Street (North)	22/03/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	23/03/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	24/03/2023	7am	8pm	13	12.5	Yes	Yes
Pitt Street (North)	25/03/2023	7am	8pm	13	12.75	Yes	Yes
Pitt Street (North)	26/03/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	27/03/2023	7am	8pm	13	12.5	Yes	Yes
Pitt Street (North)	28/03/2023	7am	8pm	13	13	Yes	Yes

Monitoring Location (Address)	Monitoring Date	Start Time	End Time	Period below 60 LAeq(15minute) dB(A) - (Hours)	Period below 55 LAeq(15minute) dB(A) - (Hours)	Min 6.5 hrs below 60dB(A) LAeq(15min)	Min 3.25 hrs below 55dB(A) LAeq(15min)
Pitt Street (North)	29/03/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	30/03/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	31/03/2023	7am	8pm	Monitor offline	Monitor offline	-	-
Pitt Street (North)	1/04/2023	7am	8pm	Monitor offline	Monitor offline	-	-
Pitt Street (North)	2/04/2023	7am	8pm	Monitor offline	Monitor offline	-	-
Pitt Street (North)	3/04/2023	7am	8pm	Monitor offline	Monitor offline	-	-
Pitt Street (North)	4/04/2023	7am	8pm	13	12.75	Yes	Yes
Pitt Street (North)	5/04/2023	7am	8pm	13	12.75	Yes	Yes
Pitt Street (North)	6/04/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	7/04/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	8/04/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	9/04/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	10/04/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	11/04/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	12/04/2023	7am	8pm	12.5	12	Yes	Yes
Pitt Street (North)	13/04/2023	7am	8pm	13	12	Yes	Yes
Pitt Street (North)	14/04/2023	7am	8pm	13	12.75	Yes	Yes
Pitt Street (North)	15/04/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	16/04/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	17/04/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	18/04/2023	7am	8pm	13	12.75	Yes	Yes
Pitt Street (North)	19/04/2023	7am	8pm	13	11.75	Yes	Yes

Monitoring Location (Address)	Monitoring Date	Start Time	End Time	Period below 60 LAeq(15minute) dB(A) - (Hours)	Period below 55 LAeq(15minute) dB(A) - (Hours)	Min 6.5 hrs below 60dB(A) LAeq(15min)	Min 3.25 hrs below 55dB(A) LAeq(15min)
Pitt Street (North)	20/04/2023	7am	8pm	Monitor offline	Monitor offline	-	-
Pitt Street (North)	21/04/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	22/04/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	23/04/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	24/04/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	25/04/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	26/04/2023	7am	8pm	13	12.75	Yes	Yes
Pitt Street (North)	27/04/2023	7am	8pm	13	12.25	Yes	Yes
Pitt Street (North)	28/04/2023	7am	8pm	Monitor offline	Monitor offline	-	-
Pitt Street (North)	29/04/2023	7am	8pm	Monitor offline	Monitor offline	-	-
Pitt Street (North)	30/04/2023	7am	8pm	Monitor offline	Monitor offline	-	-
Pitt Street (North)	1/05/2023	7am	8pm	13	12.75	Yes	Yes
Pitt Street (North)	2/05/2023	7am	8pm	13	12.75	Yes	Yes
Pitt Street (North)	3/05/2023	7am	8pm	Monitor offline	Monitor offline	-	-
Pitt Street (North)	4/05/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	5/05/2023	7am	8pm	12.75	11.75	Yes	Yes
Pitt Street (North)	6/05/2023	7am	8pm	13	12.75	Yes	Yes
Pitt Street (North)	7/05/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	8/05/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	9/05/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	10/05/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	11/05/2023	7am	8pm	13	13	Yes	Yes

Monitoring Location (Address)	Monitoring Date	Start Time	End Time	Period below 60 LAeq(15minute) dB(A) - (Hours)	Period below 55 LAeq(15minute) dB(A) - (Hours)	Min 6.5 hrs below 60dB(A) LAeq(15min)	Min 3.25 hrs below 55dB(A) LAeq(15min)
Pitt Street (North)	12/05/2023	7am	8pm	Monitor offline	Monitor offline	-	-
Pitt Street (North)	13/05/2023	7am	8pm	Monitor offline	Monitor offline	-	-
Pitt Street (North)	14/05/2023	7am	8pm	Monitor offline	Monitor offline	-	-
Pitt Street (North)	15/05/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	16/05/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	17/05/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	18/05/2023	7am	8pm	Monitor offline	Monitor offline	-	-
Pitt Street (North)	19/05/2023	7am	8pm	Monitor offline	Monitor offline	-	-
Pitt Street (North)	20/05/2023	7am	8pm	Monitor offline	Monitor offline	-	-
Pitt Street (North)	21/05/2023	7am	8pm	Monitor offline	Monitor offline	-	-
Pitt Street (North)	22/05/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	23/05/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	24/05/2023	7am	8pm	13	12.5	Yes	Yes
Pitt Street (North)	25/05/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	26/05/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	27/05/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	28/05/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	29/05/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	30/05/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	31/05/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	1/06/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	2/06/2023	7am	8pm	13	13	Yes	Yes

Monitoring Location (Address)	Monitoring Date	Start Time	End Time	Period below 60 LAeq(15minute) dB(A) - (Hours)	Period below 55 LAeq(15minute) dB(A) - (Hours)	Min 6.5 hrs below 60dB(A) LAeq(15min)	Min 3.25 hrs below 55dB(A) LAeq(15min)
Pitt Street (North)	3/06/2023	7am	8pm	12.75	12	Yes	Yes
Pitt Street (North)	4/06/2023	7am	8pm	13	11	Yes	Yes
Pitt Street (North)	5/06/2023	7am	8pm	13	12.75	Yes	Yes
Pitt Street (North)	6/06/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	7/06/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	8/06/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	9/06/2023	7am	8pm	13	12.25	Yes	Yes
Pitt Street (North)	10/06/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	11/06/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	12/06/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	13/06/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	14/06/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	15/06/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	16/06/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	17/06/2023	7am	8pm	13	10.5	Yes	Yes
Pitt Street (North)	18/06/2023	7am	8pm	13	12.75	Yes	Yes
Pitt Street (North)	19/06/2023	7am	8pm	13	12.75	Yes	Yes
Pitt Street (North)	20/06/2023	7am	8pm	13	12.75	Yes	Yes
Pitt Street (North)	21/06/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	22/06/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	23/06/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	24/06/2023	7am	8pm	13	11.25	Yes	Yes

Monitoring Location (Address)	Monitoring Date	Start Time	End Time	Period below 60 LAeq(15minute) dB(A) - (Hours)	Period below 55 LAeq(15minute) dB(A) - (Hours)	Min 6.5 hrs below 60dB(A) LAeq(15min)	Min 3.25 hrs below 55dB(A) LAeq(15min)
Pitt Street (North)	25/06/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	26/06/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	27/06/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	28/06/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	29/06/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	30/06/2023	7am	8pm	13	7.75	Yes	Yes

Table 2-16 Condition E38 Compliance South Site (Pitt Street)

Monitoring Location (Address)	Monitoring Date	Start Time	End Time	Period below 60 LAeq(15minute) dB(A) - (Hours)	Period below 55 LAeq(15minute) dB(A) - (Hours)	Min 6.5 hrs below 60dB(A) LAeq(15min)	Min 3.25 hrs below 55dB(A) LAeq(15min)
Pitt Street (South)	1/01/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	2/01/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	3/01/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	4/01/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	5/01/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	6/01/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	7/01/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	8/01/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	9/01/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	10/01/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	11/01/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	12/01/2023	7am	8pm	13	12.5	Yes	Yes
Pitt Street (South)	13/01/2023	7am	8pm	13	12.5	Yes	Yes

Monitoring Location (Address)	Monitoring Date	Start Time	End Time	Period below 60 LAeq(15minute) dB(A) - (Hours)	Period below 55 LAeq(15minute) dB(A) - (Hours)	Min 6.5 hrs below 60dB(A) LAeq(15min)	Min 3.25 hrs below 55dB(A) LAeq(15min)
Pitt Street (South)	14/01/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	15/01/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	16/01/2023	7am	8pm	13	12.5	Yes	Yes
Pitt Street (South)	17/01/2023	7am	8pm	13	12.75	Yes	Yes
Pitt Street (South)	18/01/2023	7am	8pm	13	12.5	Yes	Yes
Pitt Street (South)	19/01/2023	7am	8pm	Monitor offline	Monitor offline	-	-
Pitt Street (South)	20/01/2023	7am	8pm	13	12.75	Yes	Yes
Pitt Street (South)	21/01/2023	7am	8pm	12	12	Yes	Yes
Pitt Street (South)	22/01/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	23/01/2023	7am	8pm	12.5	11.5	Yes	Yes
Pitt Street (South)	24/01/2023	7am	8pm	13	12.5	Yes	Yes
Pitt Street (South)	25/01/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	26/01/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	27/01/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	28/01/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	29/01/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	30/01/2023	7am	8pm	13	12.75	Yes	Yes
Pitt Street (South)	31/01/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	1/02/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	2/02/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	3/02/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	4/02/2023	7am	8pm	13	13	Yes	Yes

Monitoring Location (Address)	Monitoring Date	Start Time	End Time	Period below 60 LAeq(15minute) dB(A) - (Hours)	Period below 55 LAeq(15minute) dB(A) - (Hours)	Min 6.5 hrs below 60dB(A) LAeq(15min)	Min 3.25 hrs below 55dB(A) LAeq(15min)
Pitt Street (South)	5/02/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	6/02/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	7/02/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	8/02/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	9/02/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	10/02/2023	7am	8pm	13	12.5	Yes	Yes
Pitt Street (South)	11/02/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	12/02/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	13/02/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	14/02/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	15/02/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	16/02/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	17/02/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	18/02/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	19/02/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	20/02/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	21/02/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	22/02/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	23/02/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	24/02/2023	7am	8pm	13	12.5	Yes	Yes
Pitt Street (South)	25/02/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	26/02/2023	7am	8pm	13	13	Yes	Yes

Monitoring Location (Address)	Monitoring Date	Start Time	End Time	Period below 60 LAeq(15minute) dB(A) - (Hours)	Period below 55 LAeq(15minute) dB(A) - (Hours)	Min 6.5 hrs below 60dB(A) LAeq(15min)	Min 3.25 hrs below 55dB(A) LAeq(15min)
Pitt Street (South)	27/02/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	28/02/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	1/03/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	2/03/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	3/03/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	4/03/2023	7am	8pm	13	12.25	Yes	Yes
Pitt Street (South)	5/03/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	6/03/2023	7am	8pm	13	12.75	Yes	Yes
Pitt Street (South)	7/03/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	8/03/2023	7am	8pm	12.5	11.75	Yes	Yes
Pitt Street (South)	9/03/2023	7am	8pm	13	11.75	Yes	Yes
Pitt Street (South)	10/03/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	11/03/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	12/03/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	13/03/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	14/03/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	15/03/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	16/03/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	17/03/2023	7am	8pm	11.75	9	Yes	Yes
Pitt Street (South)	18/03/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	19/03/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	20/03/2023	7am	8pm	13	11.75	Yes	Yes

Monitoring Location (Address)	Monitoring Date	Start Time	End Time	Period below 60 LAeq(15minute) dB(A) - (Hours)	Period below 55 LAeq(15minute) dB(A) - (Hours)	Min 6.5 hrs below 60dB(A) LAeq(15min)	Min 3.25 hrs below 55dB(A) LAeq(15min)
Pitt Street (South)	21/03/2023	7am	8pm	13	12.25	Yes	Yes
Pitt Street (South)	22/03/2023	7am	8pm	Monitor offline	Monitor offline	-	-
Pitt Street (South)	23/03/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	24/03/2023	7am	8pm	13	12.5	Yes	Yes
Pitt Street (South)	25/03/2023	7am	8pm	13	12.75	Yes	Yes
Pitt Street (South)	26/03/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	27/03/2023	7am	8pm	13	12.5	Yes	Yes
Pitt Street (South)	28/03/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	29/03/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	30/03/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	31/03/2023	7am	8pm	Monitor offline	Monitor offline	-	-
Pitt Street (South)	1/04/2023	7am	8pm	13	12.5	Yes	Yes
Pitt Street (South)	2/04/2023	7am	8pm	13	12.75	Yes	Yes
Pitt Street (South)	3/04/2023	7am	8pm	13	12.75	Yes	Yes
Pitt Street (South)	4/04/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	5/04/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	6/04/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	7/04/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	8/04/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	9/04/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	10/04/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	11/04/2023	7am	8pm	13	13	Yes	Yes

Monitoring Location (Address)	Monitoring Date	Start Time	End Time	Period below 60 LAeq(15minute) dB(A) - (Hours)	Period below 55 LAeq(15minute) dB(A) - (Hours)	Min 6.5 hrs below 60dB(A) LAeq(15min)	Min 3.25 hrs below 55dB(A) LAeq(15min)
Pitt Street (South)	12/04/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	13/04/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	14/04/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	15/04/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	16/04/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	17/04/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	18/04/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	19/04/2023	7am	8pm	13	12.5	Yes	Yes
Pitt Street (South)	20/04/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	21/04/2023	7am	8pm	13	12	Yes	Yes
Pitt Street (South)	22/04/2023	7am	8pm	13	13	-	-
Pitt Street (South)	23/04/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	24/04/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	25/04/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	26/04/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	27/04/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	28/04/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	29/04/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	30/04/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	1/05/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	2/05/2023	7am	8pm	13	12.5	Yes	Yes
Pitt Street (South)	3/05/2023	7am	8pm	13	13	Yes	Yes

Monitoring Location (Address)	Monitoring Date	Start Time	End Time	Period below 60 LAeq(15minute) dB(A) - (Hours)	Period below 55 LAeq(15minute) dB(A) - (Hours)	Min 6.5 hrs below 60dB(A) LAeq(15min)	Min 3.25 hrs below 55dB(A) LAeq(15min)
Pitt Street (South)	4/05/2023	7am	8pm	13	12.75	Yes	Yes
Pitt Street (South)	5/05/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	6/05/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	7/05/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	8/05/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	9/05/2023	7am	8pm	13	12	Yes	Yes
Pitt Street (South)	10/05/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	11/05/2023	7am	8pm	13	12.5	Yes	Yes
Pitt Street (South)	12/05/2023	7am	8pm	13	12.5	Yes	Yes
Pitt Street (South)	13/05/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	14/05/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	15/05/2023	7am	8pm	13	11.25	Yes	Yes
Pitt Street (South)	16/05/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	17/05/2023	7am	8pm	13	12	Yes	Yes
Pitt Street (South)	18/05/2023	7am	8pm	13	12.25	Yes	Yes
Pitt Street (South)	19/05/2023	7am	8pm	13	11.25	Yes	Yes
Pitt Street (South)	20/05/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	21/05/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	22/05/2023	7am	8pm	13	12.75	-	-
Pitt Street (South)	23/05/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	24/05/2023	7am	8pm	13	11.75	Yes	Yes
Pitt Street (South)	25/05/2023	7am	8pm	13	12	Yes	Yes

Monitoring Location (Address)	Monitoring Date	Start Time	End Time	Period below 60 LAeq(15minute) dB(A) - (Hours)	Period below 55 LAeq(15minute) dB(A) - (Hours)	Min 6.5 hrs below 60dB(A) LAeq(15min)	Min 3.25 hrs below 55dB(A) LAeq(15min)
Pitt Street (South)	26/05/2023	7am	8pm	13	12.5	Yes	Yes
Pitt Street (South)	27/05/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	28/05/2023	7am	8pm	13	10	Yes	Yes
Pitt Street (South)	29/05/2023	7am	8pm	13	12.75	Yes	Yes
Pitt Street (South)	30/05/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	31/05/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	1/06/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	2/06/2023	7am	8pm	13	12.75	Yes	Yes
Pitt Street (South)	3/06/2023	7am	8pm	13	12.75	Yes	Yes
Pitt Street (South)	4/06/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	5/06/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	6/06/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	7/06/2023	7am	8pm	13	12.75	Yes	Yes
Pitt Street (South)	8/06/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	9/06/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	10/06/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	11/06/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	12/06/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	13/06/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	14/06/2023	7am	8pm	13	12.75	Yes	Yes
Pitt Street (South)	15/06/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	16/06/2023	7am	8pm	13	13	Yes	Yes

Monitoring Location (Address)	Monitoring Date	Start Time	End Time	Period below 60 LAeq(15minute) dB(A) - (Hours)	Period below 55 LAeq(15minute) dB(A) - (Hours)	Min 6.5 hrs below 60dB(A) LAeq(15min)	Min 3.25 hrs below 55dB(A) LAeq(15min)
Pitt Street (South)	17/06/2023	7am	8pm	13	12.5	Yes	Yes
Pitt Street (South)	18/06/2023	7am	8pm	13	9.5	Yes	Yes
Pitt Street (South)	19/06/2023	7am	8pm	12.75	12	Yes	Yes
Pitt Street (South)	20/06/2023	7am	8pm	13	12.75	Yes	Yes
Pitt Street (South)	21/06/2023	7am	8pm	13	12.5	Yes	Yes
Pitt Street (South)	22/06/2023	7am	8pm	13	13	-	-
Pitt Street (South)	23/06/2023	7am	8pm	13	12.5	Yes	Yes
Pitt Street (South)	24/06/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	25/06/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	26/06/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	27/06/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	28/06/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	29/06/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	30/06/2023	7am	8pm	13	13	Yes	Yes

3. Conclusion

Based on the monitoring results presented in this report, compliance with the monitoring programs and criteria for Water Quality and Groundwater has been verified.

Observed noise levels do not exceed the forecasted levels presented in the project CNVIS Revision 17.1. Based on the monitoring results and site investigations, CPB considers that the noise associated with the stated construction works was compliant with the project approvals and requirements during the monitoring period.

4. Appendices

A – Weather Data

Sydney, New South Wales

January 2023 Daily Weather Observations

Most observations from Observatory Hill, but some from Fort Denison and Sydney Airport.



Australian Government
Bureau of Meteorology

Date	Day	Temps		Rain	Evap	Sun	Max wind gust			9am						3pm					
		Min	Max				Dirn	Spd	Time	Temp	RH	Cld	Dirn	Spd	MSLP	Temp	RH	Cld	Dirn	Spd	MSLP
		°C	°C					km/h	local	°C	%	eighths		km/h	hPa	°C	%	eighths		km/h	hPa
1	Su	20.1	27.4	0.2	5.4	10.6	E	41	17:42	23.8	73	6	ENE	19	1016.3	24.8	73	5	ENE	26	1014.3
2	Mo	18.9	28.1	0	8.4	10.2	NE	44	17:16	22.8	70	3	N	9	1014.3	27.8	54	3	E	30	1010.2
3	Tu	20.5	27.8	0	10.6	9.5	E	52	20:38	23.8	74	2	E	13	1006.9	27.3	60	1	ENE	26	1004.1
4	We	20.9	25.8	1.6	9.4	2.1	S	52	22:42	24.2	79	7	E	17	1004.8	22.3	87	8	E	28	1002.7
5	Th	17.1	23.2	13.0	3.2	5.3	S	65	10:43	19.0	85	5	SSW	31	1009.0	22.1	60	6	S	31	1010.0
6	Fr	15.1	20.6	2.0	6.4	0.3	SSE	63	11:05	18.1	89	8	SW	24	1011.0	18.4	98	8	SSE	30	1012.6
7	Sa	16.6	22.8	55.8	6.2	0.6	S	48	14:02	18.0	96	8	S	11	1014.5	22.1	59	6	S	28	1014.1
8	Su	15.5	25.2	3.4	5.0	11.5	ESE	39	14:29	19.5	74	4	SW	19	1014.6	24.7	54	2	SE	22	1012.9
9	Mo	15.6	27.3	0	6.6	13.3	ESE	28	16:23	20.1	76	1	W	13	1012.9	26.6	57	1	ESE	19	1011.5
10	Tu	17.0	26.6	0	7.6	12.7	SSE	39	15:23	21.0	80	1	WNW	13	1014.4	26.1	55	2	SE	24	1014.4
11	We	20.7	27.0	0	9.6	2.9	E	28	18:32	22.0	73	8	SSW	7	1015.6	25.6	56	5	ENE	11	1014.0
12	Th	20.8	27.1	0	6.2	6.1	E	35	17:47	22.8	74	7	N	4	1016.6	26.8	60	3	ENE	22	1015.3
13	Fr	19.4	27.3	0	6.8	7.8	ENE	37	15:50	22.3	81	6	W	9	1019.3	26.1	66	6	E	26	1017.5
14	Sa	20.0	26.9	2.6	7.6	7.0	ENE	46	15:45	20.0	93	7	N	11	1020.1	26.2	60	5	ENE	33	1017.2
15	Su	18.8	28.6	3.6	8.6	11.9	NE	43	14:51	22.9	71	0	N	11	1017.4	28.0	58	1	ENE	28	1014.5
16	Mo	21.4	29.2	0	9.8	10.6	E	30	14:29	24.2	70	3	E	13	1022.0	28.2	59	5	E	19	1021.3
17	Tu	20.0	28.6	0	8.0	11.4	NE	39	17:14	23.6	80	7	ESE	6	1020.7	26.7	66	5	E	28	1017.9
18	We	19.5	30.2	0.2	10.4	8.0	NE	44	17:05	23.4	73	1	NNE	11	1012.7	28.9	58	4	NE	24	1007.1
19	Th	18.7	20.3	20.0	10.6	0.0	SSE	56	07:58	18.7	94	8	SSE	35	1009.9	19.5	71	8	S	30	1011.5
20	Fr	16.7	22.0	6.4	4.0	0.0	SSE	39	03:07	18.0	91	8	SSE	19	1016.6	19.5	78	8	S	17	1016.5
21	Sa	16.5	25.5	2.8	3.8	7.2	ESE	33	13:17	19.3	85	1	WNW	9	1017.7	25.1	58	5	ESE	24	1015.5
22	Su	18.9	21.7	0.6	5.2	0.0	NE	41	00:44	18.9	94	8	WNW	11	1016.1	20.2	87	8	SSE	4	1015.3
23	Mo	16.8	27.0	9.6	0.6	8.6	SSE	33	15:24	19.8	89	7	W	13	1013.5	25.8	55	4	SSE	20	1011.9
24	Tu	18.2	27.9	0.2	7.4	12.2	E	33	14:20	21.2	81	3	W	9	1012.5	26.7	68	2	E	24	1009.9
25	We	18.1	28.4	3.2	5.8	11.1	E	28	14:14	21.2	90	1	WNW	11	1013.2	28.2	67	1	E	19	1011.7
26	Th	20.8	29.5	0	6.2	8.6	S	39	21:57	22.7	91	0	SSE	2	1012.9	26.9	75	4	E	20	1010.1
27	Fr	21.2	28.3	0	9.6	6.0	SSW	43	07:40	22.9	86	7	S	20	1015.4	26.9	71	3	S	17	1014.3
28	Sa	21.7	29.5	1.4	5.4	9.9	NNE	50	17:38	24.5	92	5	W	7	1014.3	28.9	75	1	ENE	26	1011.0
29	Su	23.9	29.7	0.2	8.0	2.6	NE	35	23:22	25.0	91	8	NNE	11	1012.8	28.4	79	7	E	6	1012.4
30	Mo	21.9	30.0	1.6	5.4	2.1	SSW	50	20:17	22.6	94	8	NNE	6	1010.8	28.1	68	7	E	20	1006.7
31	Tu	20.4	27.6	63.0	6.2	6.3	SW	56	21:00	23.0	76	5	SSW	19	1005.3	26.6	63	5	SSW	17	1002.6
Statistics for January 2023																					
Mean		19.1	26.7		6.9	7.0				21.6	82	4		13	1014.0	25.5	66	4		22	1012.3
Lowest		15.1	20.3		0.6	0.0				18.0	70	0	SSE	2	1004.8	18.4	54	1	SSE	4	1002.6
Highest		23.9	30.2	63.0	10.6	13.3	S	65		25.0	96	8	SSE	35	1022.0	28.9	98	8	ENE	33	1021.3
Total				191.4	214.0	216.4															

Temperature, humidity and rainfall observations are from Sydney (Observatory Hill) (station 066214). Pressure, cloud, evaporation and sunshine observations are from Sydney Airport AMO (station 066037). Wind observations are from Fort Denison (station 066022). Sydney Airport is about 10 km to the south of Observatory Hill.

IDCJDW2124.202301 Prepared at 13:00 UTC on 20 Jul 2023
Copyright © 2023 Bureau of Meteorology

Users of this product are deemed to have read the information and accepted the conditions described in the notes at
<http://www.bom.gov.au/climate/dwo/IDCJDW0000.pdf>

Sydney, New South Wales

February 2023 Daily Weather Observations

Most observations from Observatory Hill, but some from Fort Denison and Sydney Airport.



Australian Government

Bureau of Meteorology

Date	Day	Temps		Rain	Evap	Sun	Max wind gust			9am						3pm					
		Min	Max				Dirn	Spd	Time	Temp	RH	Cld	Dirn	Spd	MSLP	Temp	RH	Cld	Dirn	Spd	MSLP
		°C	°C					km/h	local	°C	%	eighths		km/h	hPa	°C	%	eighths		km/h	hPa
1	We	20.0	28.7	0	6.4	11.6	WSW	35	23:09	22.2	71	3	WSW	9	1003.8	27.0	55	3	ESE	22	1001.8
2	Th	21.6	29.1	0	6.0	11.4	NE	52	15:49	23.4	77	1	N	11	1000.5	28.9	68	2	NE	26	994.3
3	Fr	22.1	30.6	0	10.6	11.6	SE	37	14:02	22.8	45	1	W	17	995.6	28.1	43	1	ESE	31	994.5
4	Sa	17.5	28.9	0	10.8	12.7	WSW	44	13:47	18.8	45	1	WNW	20	1005.6	27.7	22	1	WNW	22	1004.6
5	Su	17.7	28.0	0	11.2	12.7	E	33	18:40	20.5	50	1	W	15	1015.1	27.4	43	0	E	20	1014.4
6	Mo	20.5	28.4	0	8.6	10.1	ENE	43	15:17	22.8	82	4	ENE	2	1018.1	28.0	65	1	E	30	1015.6
7	Tu	21.8	28.7	0	7.2	4.3	E	28	10:07	24.4	78	7	NNE	11	1016.2	28.4	59	5	E	20	1014.5
8	We	21.1	28.2	0	6.2	2.8	E	41	19:26	23.8	77	7	WNW	7	1015.6	25.8	74	6	ESE	24	1014.3
9	Th	19.4	23.4	27.8		1.5	ESE	56	15:04	22.0	94	8	ENE	19	1013.3	20.8	95	8	E	30	1010.5
10	Fr	17.8	28.0	19.4		12.0	ENE	31	16:40	20.0	97	1	WNW	13	1009.0	27.3	72	2	E	20	1005.7
11	Sa	19.3	30.4	0	8.0	11.0	NE	50	19:56	22.2	88	7	W	11	1006.5	29.9	65	1	NE	26	1002.2
12	Su	21.5	27.3	0	10.8	11.2	S	63	14:35	24.6	53	5	WSW	17	1003.7	26.8	64	1	SSE	37	1004.9
13	Mo	19.1	25.5	0.4	7.2	4.7	SSE	39	04:14	21.4	75	7	SSE	28	1011.0	24.9	60	7	S	22	1010.1
14	Tu	18.3	21.2	3.4	7.2	1.2	SSW	44	05:19	20.2	84	7	SSW	20	1011.8	18.6	99	7	SW	11	1012.8
15	We	18.1	26.9	45.8	1.8	9.0	NE	35	16:35	20.3	93	6	W	13	1017.0	26.1	59	1	E	22	1015.4
16	Th	18.2	28.3	0	7.8	12.3	NE	43	14:18	21.0	77	1	NNE	11	1018.0	27.5	57	2	ENE	26	1014.8
17	Fr	19.6	28.3	0	8.0	12.1	ENE	43	14:13	22.1	83	1	N	7	1016.9	27.6	65	1	ENE	24	1014.3
18	Sa	20.7	30.0	0	8.4	9.2	SW	70	17:48	22.7	85	1	ESE	6	1014.3	29.3	65	4	ENE	17	1010.4
19	Su	20.9	28.7	5.0	13.4	9.0	S	39	00:25	23.4	77	7	SSW	19	1018.9	25.7	74	4	ESE	11	1018.7
20	Mo	21.6	29.4	0	6.0	10.0	ENE	39	14:27	24.0	87	7	N	9	1020.1	28.7	66	1	ENE	24	1017.8
21	Tu	21.1	28.4	0	10.8	10.0	SSE	54	19:07	23.1	89	1	ESE	7	1021.5	27.9	66	1	E	20	1020.3
22	We	18.9	21.6			0.0	SSE	65	03:40	21.0	72	8	SSE	28	1025.6	18.6	91	8	SSE	17	1025.9
23	Th	18.5	24.4		5.0	1.8	ESE	50	06:43	19.0	87	8	E	24	1023.9	22.8	65	7	E	28	1023.4
24	Fr	16.9	26.8		3.6	8.7	ENE	37	14:52	19.9	85	4	WNW	9	1022.0	26.6	53	3	E	24	1019.6
25	Sa	17.7	26.9	0.2	5.4	11.8	NE	41	16:36	18.9	92	1	WNW	13	1018.5	26.1	56	2	NE	20	1015.5
26	Su	18.7	29.4	0	10.0	9.8	WSW	56	22:18	20.5	83	6	NNW	4	1013.1	28.3	61	1	ENE	13	1009.5
27	Mo	20.5	26.2	1.2	8.2	2.7	SSW	37	05:07	23.2	82	7	SSW	15	1012.4	25.6	72	7	SE	15	1011.3
28	Tu	20.8	27.7	2.4	6.2	4.8	E	33	14:50	22.1	86	5	WNW	9	1013.0	27.5	64	5	E	24	1009.1
Statistics for February 2023																					
Mean		19.6	27.5		7.8	8.2				21.8	78	4		13	1013.6	26.4	64	3		22	1011.6
Lowest		16.9	21.2		1.8	0.0				18.8	45	1	ENE	2	995.6	18.6	22	0	#	11	994.3
Highest		22.1	30.6	45.8	13.4	12.7	SW	70		24.6	97	8	SSE	28	1025.6	29.9	99	8	SSE	37	1025.9
Total				105.6	194.8	230.0															

Temperature, humidity and rainfall observations are from Sydney (Observatory Hill) (station 066214). Pressure, cloud, evaporation and sunshine observations are from Sydney Airport AMO (station 066037). Wind observations are from Fort Denison (station 066022). Sydney Airport is about 10 km to the south of Observatory Hill.

IDCJDW2124.202302 Prepared at 13:00 UTC on 19 Jul 2023

Copyright © 2023 Bureau of Meteorology

Users of this product are deemed to have read the information and accepted the conditions described in the notes at

<http://www.bom.gov.au/climate/dwo/IDCJDW0000.pdf>

Sydney, New South Wales

March 2023 Daily Weather Observations

Most observations from Observatory Hill, but some from Fort Denison and Sydney Airport.



Australian Government

Bureau of Meteorology

Date	Day	Temps		Rain	Evap	Sun	Max wind gust			9am						3pm					
		Min	Max				Dirn	Spd	Time	Temp	RH	Cld	Dirn	Spd	MSLP	Temp	RH	Cld	Dirn	Spd	MSLP
		°C	°C					km/h	local	°C	%	eighths		km/h	hPa	°C	%	eighths		km/h	hPa
1	We	21.5	28.1	0	4.8	9.8	SSW	65	14:12	22.7	89	7	W	15	1006.2	26.9	60	5	SSW	35	1007.2
2	Th	19.4	27.1	0	10.0	9.3	E	28	16:10	20.3	94	6	NNW	6	1013.6	26.0	67	3	E	15	1011.7
3	Fr	19.3	25.2	2.2	3.2	1.3	SSW	37	12:00	21.0	94	7	SSE	4	1016.2	22.5	90	8	S	24	1016.1
4	Sa	19.5	28.1	20.0	2.4	6.7	E	26	17:31	20.7	99	5	W	11	1017.5	25.6	62	7	E	13	1015.6
5	Su	18.3	28.1	0	6.4	11.1	NE	50	17:45	19.8	91	1	WNW	9	1013.6	27.8	62	1	ENE	24	1008.8
6	Mo	19.7	37.9	0	8.0	11.0	NNW	57	11:52	23.8	72	1	ENE	4	1004.5	36.8	28	3	NNW	28	1000.3
7	Tu	22.3	34.0	0	12.0	9.3	ENE	33	15:37	24.2	70	7	WNW	11	1006.6	28.4	52	1	E	22	1003.7
8	We	18.8	30.0	0	10.2	10.3	E	31	14:01	20.1	58	1	W	11	1006.3	27.2	41	1	E	24	1002.8
9	Th	16.7	28.4	0	7.0	11.5	SE	33	14:40	18.7	61	1	W	15	1010.7	26.8	45	1	ESE	22	1009.0
10	Fr	16.6	27.4	0	8.4	9.2	NE	46	19:44	18.7	83	1	WNW	15	1017.0	26.8	59	5	ENE	24	1014.6
11	Sa	18.7	28.6	0	6.4	10.6	NE	41	17:31	20.4	88	1	W	13	1014.0	28.0	66	1	ENE	17	1009.8
12	Su	20.4	27.0	0	7.0	6.0	SSW	50	11:28	23.1	81	6	SSW	22	1010.5	25.6	70	6	SSE	26	1010.4
13	Mo	21.4	24.9	0	8.6	3.8	ESE	43	09:16	22.4	71	6	ESE	28	1016.3	23.2	66	7	ESE	19	1016.7
14	Tu	20.4	23.8	0.6	2.8	0.7	ESE	33	03:02	21.7	91	7	E	13	1017.8	21.6	89	7	NE	7	1016.2
15	We	18.4	28.5	9.8	1.8	9.8	ENE	24	12:29	19.9	100	6	WNW	13	1014.0	26.5	70	2	E	19	1010.4
16	Th	18.9	36.2	0	5.0	10.5	W	37	16:02	20.1	99	3	WNW	11	1010.8	35.5	32	1	W	11	1005.9
17	Fr	20.0	31.6	0	10.0	9.1	SSE	41	11:56	24.1	48	0	W	13	1013.6	28.2	61	1	ESE	28	1014.9
18	Sa	20.7	29.1	0	6.8	10.5	NNE	41	18:09	22.7	92	5	NNE	4	1019.7	28.6	65	1	ENE	24	1016.7
19	Su	20.7	28.9	0	6.8	9.8	SSW	28	21:40	21.6	100	3	W	13	1018.0	28.4	70	1	ESE	19	1015.6
20	Mo	21.6	23.6	0	7.4	0.0	SSE	56	09:23	23.5	82	7	SSE	28	1023.1	22.5	71	8	SSE	31	1025.7
21	Tu	18.1	22.9	0.6	4.4	0.0	ESE	35	23:20	20.2	68	7	ESE	20	1029.3	22.4	60	7	ESE	15	1027.1
22	We	18.7	24.2	0.2	4.0	1.0	N	30	10:32	20.2	83	7	W	11	1023.1	23.4	72	7	NE	13	1020.2
23	Th	19.4	27.3	1.2	4.4	3.2	SSE	37	14:42	20.9	92	7	W	13	1017.7	25.4	71	7	S	13	1016.1
24	Fr	17.5	25.5	4.6	0.8	7.4	SSE	33	11:26	18.9	93	3	W	19	1016.9	24.9	73	5	SE	17	1016.4
25	Sa	18.9	24.6	0	6.2	1.2	E	37	18:16	22.2	72	7	ESE	20	1018.5	23.5	64	7	ESE	19	1017.3
26	Su	19.1	26.1	1.8	2.8	2.1	N	31	20:12	20.1	89	7	WNW	7	1018.0	24.8	69	7	ENE	20	1015.4
27	Mo	19.4	24.6	8.2	4.4	0.4	W	28	12:53	19.6	98	8	N	13	1013.3	23.4	86	7	W	19	1010.4
28	Tu	19.5	24.8	0.6	2.8	0.4	W	24	06:18	21.4	90	7	W	11	1013.8	23.2	81	8	WNW	11	1013.3
29	We	19.6	27.1	4.2	1.4	4.7	W	54	16:48	20.7	88	8	NNW	31	1007.1	24.3	69	6	NNW	26	1000.6
30	Th	15.6	25.7	0	5.8	10.3	W	41	12:49	17.2	69	1	W	24	1006.5	24.1	34	7	SW	24	1005.8
31	Fr	14.3	25.7	0	5.8	10.0	W	39	09:02	15.5	63	1	W	20	1011.6	25.0	38	1	ESE	15	1009.4
Statistics for March 2023																					
Mean		19.1	27.6		5.7	6.5				20.9	82	4		14	1014.4	26.0	62	4		20	1012.4
Lowest		14.3	22.9		0.8	0.0				15.5	48	0	#	4	1004.5	21.6	28	1	NE	7	1000.3
Highest		22.3	37.9	20.0	12.0	11.5	SSW	65		24.2	100	8	NNW	31	1029.3	36.8	90	8	SSW	35	1027.1
Total				54.0	177.8	201.0															

Temperature, humidity and rainfall observations are from Sydney (Observatory Hill) (station 066214). Pressure, cloud, evaporation and sunshine observations are from Sydney Airport AMO (station 066037). Wind observations are from Fort Denison (station 066022). Sydney Airport is about 10 km to the south of Observatory Hill.

IDCJDW2124.202303 Prepared at 13:00 UTC on 18 Jul 2023
Copyright © 2023 Bureau of Meteorology

Users of this product are deemed to have read the information and accepted the conditions described in the notes at
<http://www.bom.gov.au/climate/dwo/IDCJDW0000.pdf>

Sydney, New South Wales

April 2023 Daily Weather Observations

Most observations from Observatory Hill, but some from Fort Denison and Sydney Airport.



Australian Government

Bureau of Meteorology

Date	Day	Temps		Rain	Evap	Sun	Max wind gust			9am						3pm					
		Min	Max				Dirn	Spd	Time	Temp	RH	Cld	Dirn	Spd	MSLP	Temp	RH	Cld	Dirn	Spd	MSLP
		°C	°C					km/h	local	°C	%	eighths		km/h	hPa	°C	%	eighths		km/h	hPa
1	Sa	14.8	20.3	0	6.0	1.4	SSW	44	10:10	16.1	72	2	W	17	1014.2	16.7	93	8	SSW	19	1014.7
2	Su	15.4	20.3	89.4	3.2	0.4	E	46	07:15	16.0	100	7	W	20	1019.1	16.6	98	8	E	22	1018.9
3	Mo	15.2	23.8	26.0	2.6	8.2	E	35	14:21	17.8	100	7	WNW	9	1021.6	22.7	74	5	ESE	26	1019.4
4	Tu	15.2	26.3	0.8	3.8	9.0	ESE	30	14:18	18.2	92	5	WNW	13	1021.0	25.5	64	3	SE	19	1016.9
5	We	15.0	25.4	0	7.8	8.1	SSE	30	09:35	19.6	83	5	WNW	17	1016.7	24.7	60	3	SSE	15	1014.3
6	Th	16.0	23.0	3.6	4.0	2.2	W	22	05:34	18.5	95	7	WNW	11	1015.5	22.9	69	7	ENE	6	1012.3
7	Fr	15.6	24.8	0.2	2.2	5.2	WSW	44	20:45	18.7	87	7	W	17	1007.4	24.8	65	4	ENE	17	999.5
8	Sa	15.6	24.6	3.2	4.4	9.9	W	61	15:26	19.2	63	2	W	31	999.2	23.6	42	3	W	39	999.6
9	Su	14.9	21.8	0	7.0	10.8	W	61	08:10	16.9	47	1	WSW	30	1005.1	20.7	34	1	W	39	1004.9
10	Mo	10.7	22.1	0	7.2	9.8	W	41	10:27	14.2	55	1	W	26	1009.4	21.0	34	4	SE	15	1007.2
11	Tu	11.2	22.4	0	3.6	8.5	S	46	14:27	15.0	55	1	W	28	1012.0	21.2	53	6	S	26	1009.8
12	We	12.9	22.0	0	3.6	5.7	W	26	11:23	17.5	75	5	WNW	11	1009.4	20.6	50	7	NW	13	1005.4
13	Th	13.8	22.8	0.4	4.2	6.6	SSW	43	12:09	16.7	87	7	W	17	1009.4	22.4	67	5	S	24	1009.5
14	Fr	14.8	22.2	13.0	6.2	5.6	SE	41	12:41	16.7	98	5	WNW	19	1014.4	20.4	67	5	SSE	19	1011.7
15	Sa	13.4	25.6	2.0	2.4	9.6	NNE	35	21:48	16.2	91	1	W	9	1010.5	24.1	65	5	NE	20	1005.6
16	Su	16.2	25.1	0	5.8	4.4	W	54	14:07	20.5	65	7	NNE	15	1003.3	25.0	36	1	W	28	1005.2
17	Mo	12.9	22.7	0	5.8	10.4	W	37	04:24	17.0	67	1	WNW	17	1022.0	21.6	63	3	SE	19	1022.1
18	Tu	13.0	23.7	0	4.0	8.4	E	22	15:44	17.3	84	2	WNW	11	1025.8	23.2	56	2	E	13	1022.1
19	We	13.9	25.5	0	3.4	9.4	SSW	28	23:04	17.3	84	4	WNW	15	1020.1	23.6	59	2	ENE	17	1016.2
20	Th	17.3	19.8	1.6	5.8	0.0				18.6	79	8	SSE	28	1023.6	17.8	92	8	SSW	13	1023.0
21	Fr	13.8	21.6	4.6	0.4	6.4	SSW	33	10:28	17.1	82	3	SW	15	1028.5	18.8	78	3	SSW	6	1027.4
22	Sa	13.5	20.0	0.4	4.0	0.9	S	33	11:39	15.8	82	6	W	22	1030.9	18.6	93	7	SE	7	1029.0
23	Su	14.8	23.7	4.4	0.8	4.0	ESE	41	21:40	16.8	100	7	W	17	1031.9	22.3	65	7	SSE	15	1031.6
24	Mo	16.8	23.1	1.2	3.2	6.4	ESE	33	00:16	20.5	69	4	ESE	19	1033.8	23.0	68	7	ESE	17	1031.2
25	Tu	15.6	23.7	0.8	3.2	8.0	ENE	26	13:40	18.2	99	1	NE	2	1030.3	23.4	60	1	ENE	15	1026.2
26	We	14.8	21.7	0.2	5.2	5.1	ENE	35	20:35	17.0	92	6	WNW	11	1029.1	21.1	73	7	E	11	1026.2
27	Th	14.9	25.2	0	3.2	9.7	ENE	37	14:24	20.1	74	3	N	15	1025.8	23.9	62	1	NE	20	1021.3
28	Fr	14.7	27.5	0	4.2	9.9	NNE	31	20:25	17.2	92	1	WNW	6	1018.4	25.6	62	1	NE	19	1012.7
29	Sa	17.2	18.6	0	6.6	0.0	WNW	41	23:19	18.6	86	8	WNW	11	1011.3	18.3	93	8	W	11	1009.5
30	Su	14.1	21.1	27.0	0.6	5.1	WSW	39	00:01	16.2	88	7	WNW	20	1010.4	19.8	63	4	W	19	1009.6
Statistics for April 2023																					
Mean		14.6	23.0		4.1	6.3				17.5	81	4		16	1017.7	21.8	65	4		18	1015.4
Lowest		10.7	18.6		0.4	0.0				14.2	47	1	NE	2	999.2	16.6	34	1	#	6	999.5
Highest		17.3	27.5	89.4	7.8	10.8	W	61		20.5	100	8	W	31	1033.8	25.6	98	8	W	39	1031.6
Total				178.8	124.4	189.1															

Temperature, humidity and rainfall observations are from Sydney (Observatory Hill) (station 066214). Pressure, cloud, evaporation and sunshine observations are from Sydney Airport AMO (station 066037). Wind observations are from Fort Denison (station 066022). Sydney Airport is about 10 km to the south of Observatory Hill.

IDCJDW2124.202304 Prepared at 13:00 UTC on 17 Jul 2023

Copyright © 2023 Bureau of Meteorology

Users of this product are deemed to have read the information and accepted the conditions described in the notes at

<http://www.bom.gov.au/climate/dwo/IDCJDW0000.pdf>

Sydney, New South Wales

May 2023 Daily Weather Observations

Most observations from Observatory Hill, but some from Fort Denison and Sydney Airport.



Australian Government

Bureau of Meteorology

Date	Day	Temps		Rain	Evap	Sun	Max wind gust			9am						3pm					
		Min	Max				Dirn	Spd	Time	Temp	RH	Cld	Dirn	Spd	MSLP	Temp	RH	Cld	Dirn	Spd	MSLP
		°C	°C					km/h	local	°C	%	eighths		km/h	hPa	°C	%	eighths		km/h	hPa
1	Mo	10.6	21.3	0	1.4	9.3	W	33	16:16	13.5	83	1	WNW	15	1015.0	19.3	43	1	WNW	11	1011.5
2	Tu	11.2	22.9	0	5.0	9.1	W	46	12:37	15.9	68	1	WNW	19	1016.1	21.9	45	6	WSW	17	1014.2
3	We	13.9	23.7	0	5.2	10.0	W	65	22:25	18.9	59	1	NNW	24	1014.4	23.3	28	1	WNW	35	1010.6
4	Th	11.6	20.8	0	7.4	10.0	W	48	00:09	14.1	52	1	W	26	1019.8	19.7	48	1	S	13	1018.5
5	Fr	10.9	22.0	0	3.0	9.9	ENE	30	14:23	13.6	82	1	W	13	1019.6	20.3	60	1	ENE	22	1015.2
6	Sa	10.5	22.5	0	4.8	10.0	W	31	11:29	13.6	77	5	WNW	17	1019.3	22.3	40	1	NNW	11	1015.6
7	Su	10.2	15.9	0	3.4	5.4	W	76	13:07	14.1	68	7	W	26	1015.7	15.8	48	3	W	30	1012.7
8	Mo	7.1	16.3	10.2	4.0	4.8	W	67	03:31	11.6	50	2	W	33	1014.5	15.4	35	7	SSW	24	1015.8
9	Tu	9.9	19.2	0	3.2	7.7	SSW	46	12:00	13.0	62	1	W	26	1021.0	17.7	51	7	S	20	1021.6
10	We	9.7	19.8	0	4.0	9.8	W	30	02:30	13.1	68	1	WNW	24	1027.2	19.6	47	1	SSE	19	1025.7
11	Th	10.8	21.7	0	4.6	8.9	W	26	01:56	13.6	82	1	W	20	1030.2	20.7	62	2	E	13	1027.5
12	Fr	11.1	22.7	1.6	2.8	9.5	W	20	04:29	13.9	88	1	WNW	17	1030.0	20.6	69	1	E	15	1026.9
13	Sa	12.6	20.9	0	1.8	2.9	SSE	30	13:10	13.0	93	2	W	19	1032.0	18.6	65	7	SE	9	1029.7
14	Su	11.9	20.0	7.6	4.4	5.4	ESE	26	14:31	14.6	99	3	WNW	11	1030.7	18.7	83	7	ESE	20	1027.2
15	Mo	12.0	20.9	3.4	2.4	4.5	E	30	13:27	13.9	99	7	WNW	17	1026.4	20.1	72	3		Calm	1022.3
16	Tu	11.2	21.8	0	1.0	8.7	SSW	46	22:57	13.3	97	3	WNW	17	1020.1	20.5	38	1	SSE	20	1017.1
17	We	11.8	17.8	30.6	4.0	5.6	SSW	54	13:34	14.2	80	7	SSW	20	1023.4	17.1	64	6	SSW	24	1022.1
18	Th	9.4	17.1	7.8	4.6	7.1	SSW	41	12:34	12.0	80	4	W	24	1021.2	16.8	62	8	SSW	24	1017.7
19	Fr	8.5	19.8	0.4	2.8	9.6	W	35	07:25	11.4	73	1	W	22	1018.6	19.7	35	1	WNW	9	1014.9
20	Sa	8.3	19.3	0	2.4	9.6	W	39	12:59	11.3	70	1	W	26	1016.9	18.5	41	3	W	19	1013.5
21	Su	10.2	19.4	0	5.0	7.9	WSW	74	14:44	14.7	53	4	NW	15	1013.9	18.4	47	3	W	39	1013.7
22	Mo	8.3	20.4	0	3.6	9.2	W	35	03:03	11.8	71	0	W	22	1026.6	19.9	36	1	W	7	1024.2
23	Tu	7.7	19.7	0		9.5	WNW	26	07:54	11.6	66	0	WNW	19	1028.6	19.2	51	1	E	9	1026.1
24	We	7.9	20.1	0	4.0	9.3	W	28	07:03	10.5	80	1	WNW	15	1027.2	19.1	56	0	E	7	1023.3
25	Th	8.1	20.0	0	2.2	3.7	NNW	26	23:59	11.2	72	6	W	7	1020.6	18.4	48	7	NW	2	1014.8
26	Fr	11.1	17.5	0	3.6	1.6	SSE	61	10:54	17.4	61	7	S	26	1011.1	14.9	58	7	SSW	24	1014.0
27	Sa	6.9	19.2	0	5.4	9.4	W	37	19:10	9.8	74	1	W	26	1018.5	18.5	35	1	NW	9	1014.8
28	Su	6.7	17.3	0	3.6	5.7	W	35	15:41	9.7	69	3	W	13	1016.1	15.7	50	7	NW	11	1013.0
29	Mo	9.7	21.2	0	5.4	9.1	W	44	16:23	12.9	70	1	W	13	1016.9	20.3	39	1	WSW	30	1015.7
30	Tu	8.9	21.6	0	4.0	9.2	W	33	12:03	12.2	73	2	W	13	1023.5	21.0	46	7	WNW	17	1019.9
31	We	10.0	20.8	0	2.2	6.9	W	22	04:06	14.6	71	7	W	7	1020.8	19.9	57	7	WNW	7	1016.4
Statistics for May 2023																					
Mean		10.0	20.1		3.7	7.7				13.2	73	2		19	1021.2	19.1	50	3		16	1018.6
Lowest		6.7	15.9		1.0	1.6				9.7	50	0	W	7	1011.1	14.9	28	0		Calm	1010.6
Highest		13.9	23.7	30.6	7.4	10.0	W	76		18.9	99	7	W	33	1032.0	23.3	83	8	W	39	1029.7
Total				61.6	111.2	239.3															

Temperature, humidity and rainfall observations are from Sydney (Observatory Hill) (station 066214). Pressure, cloud, evaporation and sunshine observations are from Sydney Airport AMO (station 066037). Wind observations are from Fort Denison (station 066022). Sydney Airport is about 10 km to the south of Observatory Hill.

IDCJDW2124.202305 Prepared at 16:00 UTC on 16 Jul 2023

Copyright © 2023 Bureau of Meteorology

Users of this product are deemed to have read the information and accepted the conditions described in the notes at

<http://www.bom.gov.au/climate/dwo/IDCJDW0000.pdf>

Sydney, New South Wales

June 2023 Daily Weather Observations

Most observations from Observatory Hill, but some from Fort Denison and Sydney Airport.



Australian Government

Bureau of Meteorology

Date	Day	Temps		Rain	Evap	Sun	Max wind gust			9am						3pm					
		Min	Max				Dirn	Spd	Time	Temp	RH	Cld	Dirn	Spd	MSLP	Temp	RH	Cld	Dirn	Spd	MSLP
		°C	°C					km/h	local	°C	%	eighths		km/h	hPa	°C	%	eighths		km/h	hPa
1	Th	14.4	19.3	0	2.2	1.0	SSW	28	19:51	15.7	76	7	NNW	4	1018.2	19.2	67	3	SE	6	1017.1
2	Fr	12.1	19.8	0	1.8	8.0	WNW	24	01:51	14.1	96	4	WNW	13	1025.5	19.4	78	2	E	17	1022.9
3	Sa	14.1	22.0	0	1.8	5.8	SSE	35	23:06	14.7	100	7	W	13	1025.3	21.1	66	6	SE	11	1023.7
4	Su	14.6	18.4	0	3.8	0.2	S	35	00:32	17.3	74	7	SE	17	1033.4	17.5	65	6	ESE	20	1031.9
5	Mo	14.1	18.7	0	3.0	1.8	ENE	37	14:08	16.2	73	7	ESE	13	1032.7	15.7	86	7	E	6	1028.8
6	Tu	13.7	19.2	5.0	3.2	2.9	ENE	22	04:23	14.6	99	8	SW	2	1029.8	19.1	75	6	ENE	13	1026.4
7	We	12.1	20.7	0	2.6	8.3	NNE	37	12:21	13.8	98	1	WNW	11	1027.2	19.8	63	1	NE	20	1023.2
8	Th	12.8	17.8	0	2.2	0.6	N	31	16:45	15.2	87	7	E	2	1017.3	16.1	81	8	N	15	1011.8
9	Fr	10.0	20.6	0.2	2.4	9.7	W	43	14:52	13.9	62	1	WNW	11	1016.4	20.2	42	3	W	30	1014.5
10	Sa	8.9	19.0	0	4.0	9.1	WSW	33	02:32	10.4	81	1	WNW	15	1023.2	18.4	39	1	E	9	1021.4
11	Su	7.4	18.3	0	3.6	9.0	W	26	06:45	10.1	80	1	WNW	19	1026.3	18.1	52	1	ENE	11	1022.5
12	Mo	7.5	19.3	0	0.8	4.7	W	28	07:54	9.0	91	7	W	17	1022.8	19.1	65	3	ENE	15	1017.8
13	Tu	9.0	20.6	0	1.4	8.1	WSW	46	18:58	12.2	90	2	WNW	17	1014.7	20.2	51	1	NNW	26	1010.6
14	We	10.2	18.6	0	3.4	9.3	W	48	14:07	13.4	61	1	WNW	11	1013.3	18.4	31	1	W	30	1012.4
15	Th	7.9	18.8	0	4.0	9.2	W	33	03:09	10.5	67	1	WNW	9	1017.9	18.7	39	3	W	20	1015.3
16	Fr	8.0	19.0	0	3.6	9.2	W	24	08:10	10.6	76	1	W	19	1022.0	18.0	53	1	ESE	13	1019.8
17	Sa	7.8	18.4	0	2.8	9.3	NNW	24	21:34	9.9	81	0	WNW	17	1022.4	18.1	55	0	E	9	1017.1
18	Su	7.0	19.3	0	3.0	7.8	WNW	48	13:39	10.2	79	0	ESE	4	1016.1	18.2	36	5	W	22	1012.6
19	Mo	5.9	17.7	0	4.0	8.4	WSW	46	21:40	8.2	70	7	W	19	1016.8	17.4	34	1	NW	19	1011.5
20	Tu	6.8	15.3	0	4.4	9.1	W	43	01:43	9.1	57	1	W	24	1020.5	14.8	40	3	SSW	19	1020.0
21	We	5.2	17.3	0	2.2	9.1	W	33	07:44	7.1	71	1	W	22	1024.8	16.8	36	1	NW	9	1022.1
22	Th	7.1	15.2	0	2.0	1.0	W	26	03:08	9.7	73	7	WNW	17	1020.4	14.6	70	8	NNE	7	1015.7
23	Fr	9.7	18.9	8.6	2.4	8.1	NW	50	11:50	11.6	98	1	WNW	9	1009.3	18.7	36	1	WNW	22	1006.5
24	Sa	9.3	20.2	0	3.8	9.1	WNW	31	12:05	12.5	65	2	WNW	13	1014.4	20.0	38	3	NNW	15	1010.7
25	Su	11.6	20.3	0	4.4	9.2	W	61	13:43	14.0	48	1	WNW	9	1012.7	20.0	29	1	W	28	1009.7
26	Mo	10.8	19.5	0	6.4	9.0	W	67	16:39	14.4	47	1	NW	17	1013.9	18.9	33	1	W	35	1012.4
27	Tu	10.1	18.4	0	6.4	7.3	W	37	00:10	12.5	62	6	W	13	1021.8	18.3	43	7	WNW	11	1018.5
28	We	11.0	11.7	0.8	1.4	0.0	W	30	22:09	11.3	86	7	WNW	17	1017.7	10.4	96	8	W	13	1012.9
29	Th	7.9	16.3	3.0	1.6	9.1	W	39	10:13	10.2	69	1	W	9	1017.3	16.2	40	1	W	20	1015.5
30	Fr	7.5	18.9	0.2	3.0	9.2	W	46	12:38	10.7	60	0	W	30	1017.8	18.6	41	1	W	24	1016.6
Statistics for June 2023																					
Mean		9.8	18.6		3.1	6.8				12.1	75	3		13	1020.4	18.0	52	3		17	1017.4
Lowest		5.2	11.7		0.8	0.0				7.1	47	0	#	2	1009.3	10.4	29	0	#	6	1006.5
Highest		14.6	22.0	8.6	6.4	9.7	W	67		17.3	100	8	W	30	1033.4	21.1	96	8	W	35	1031.9
Total				17.8	91.6	202.6															

Temperature, humidity and rainfall observations are from Sydney (Observatory Hill) (station 066214). Pressure, cloud, evaporation and sunshine observations are from Sydney Airport AMO (station 066037). Wind observations are from Fort Denison (station 066022). Sydney Airport is about 10 km to the south of Observatory Hill.

IDCJDW2124.202306 Prepared at 16:00 UTC on 2 Aug 2023

Copyright © 2023 Bureau of Meteorology

Users of this product are deemed to have read the information and accepted the conditions described in the notes at

<http://www.bom.gov.au/climate/dwo/IDCJDW0000.pdf>

B – Photos of Real-Time Equipment

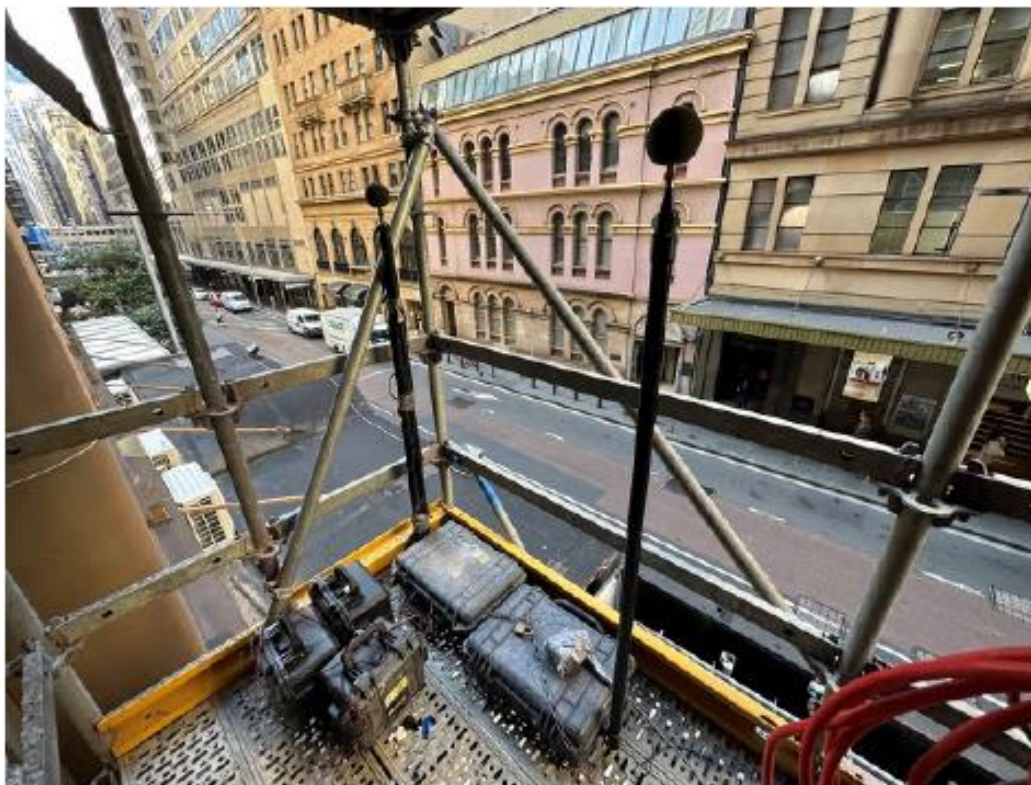


Figure B-1 N1 Pitt Street North (adjacent Castlereagh Street)



Figure B-2 N3 Pitt Street South (facing Pitt Street)

C – Calibration Certificates



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	01/03/2023	Job No	RC045	Operator	EF
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-TA	Serial No	#A2A-08038-E0
Microphone Make	NTI	Model	MC230A	Serial No	#A23491
Preamplifier Make	NTI	Model	MA220	Serial No	#3336
Ext'n Cable Make	NTI	Model	N/A	Serial No	N/A
Accessories	Nil			Firmware	V4.8

SLM Class	1
Filters Class	1

Environmental Conditions	Measured	
	Start	End
Air Temp. (°C)	24.3	23.9
Rel. Humidity (%)	63.1	61.5
Air Pressure (kPa)	100.1	100.6

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 33511B SN MY59001831
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 through an unbroken chain of calibrations, is ultimately traceable to the International System of Units (SI). 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 2.04.

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. As public evidence was available, from an independent testing organization responsible for approving the results of pattern evaluation tests performed in accordance with IEC 61672-2:2017 and IEC 61260-2:2017, 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, the sound level meter submitted for testing conforms to the class 1 specifications of 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: 03/03/2023

Template Document Name: RQT-05 SLM IEC61672 Verification (r86)

NATacoustic

Sound Level Meter Verification - Summary of Tests

Calibration Date	01/03/2023	Job No	RC045	Operator	EF
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-TA	Serial No	#A2A-08038-E0
Microphone Make	NTI	Model	MC230A	Serial No	#A23491
Preamplifier Make	NTI	Model	MA220	Serial No	#3336
Ext'n Cable Make	NTI	Model	N/A	Serial No	N/A
Accessories	Nil			Firmware	V4.8

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

SLM Class	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)	24.3	23.9
	Rel. Humidity (%)	63.1	61.5
	Air Pressure (kPa)	100.1	100.6
	Conforming	Yes	Yes

Test Description		Value / Conforming	Uncert (+/-)	
4(a). Initial Calibration	Calibration Frequency Hz	1000.0	N/A	
	Indicated Level Before Adjustment (dB)	115.6	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	17.0	0.09	
5(b). Self-Generated Noise, Electrical	A	10.7	0.09	
	C	14.4	0.09	
	Z	20.2	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	0.00	
	C	Yes	0.00	
	Z	Yes	0.00	
8. Frequency & Time Weightings 1kHz	8(a). Frequency Weighting	C	Yes	0.14
		Z	Yes	0.14
		FLAT	N/A	0.14
	8(b). Time Weighting	Slow	Yes	0.14
		Leq	Yes	0.14
9(a). Level Linearity 8kHz (Increasing)		Conforming	Yes	0.19
9(b). Level Linearity 8kHz (Decreasing)		Conforming	Yes	0.19
10(a). Level Linearity Including the Level Range (Reference Signal)		Conforming	Yes	0.17
10(b). Level Linearity Including the Level range (5dB Above Under-range)		Conforming	Yes	0.17
11. Toneburst Response	Fast	Yes	0.20	
	Slow	Yes	0.20	
	SEL/Leq	Yes	0.20	
	8 kHz	Yes	0.16	
12. Peak C sound level	500 Hz	Yes	0.16	
	Conforming	Yes	0.20	
13. Overload indication	Latches	Yes	N/A	
14. High-level Stability	Conforming	Yes	0.09	
15(a). Octave Band Filter Relative Attenuation (≤2kHz)		Conforming	Yes	0.16
15(b). Octave Band Filter Relative Attenuation (>2kHz)		Conforming	Yes	0.16
16. Octave Band Filter Relative Attenuation at Midband Frequency		Conforming	Yes	0.18
17(a). Octave Band Filter Level Linearity 31.5Hz (Increasing)		31.5Hz	Yes	0.19
17(b). Octave Band Filter Level Linearity 1kHz (Increasing)		1kHz	Yes	0.15
17(c). Octave Band Filter Level Linearity 16kHz (Increasing)		16kHz	Yes	0.19
18(a). Octave Band Filter Level Linearity 31.5Hz (Decreasing)		31.5Hz	Yes	0.20
18(b). Octave Band Filter Level Linearity 1kHz (Decreasing)		1kHz	Yes	0.17
18(c). Octave Band Filter Level Linearity 16kHz (Decreasing)		16kHz	Yes	0.20
19(a). Octave Level Linearity Including the Level range (31.5Hz)		31.5Hz	Yes	0.20
19(b). Octave Level Linearity Including the Level range (1kHz)		1kHz	Yes	0.17
19(c). Octave Level Linearity Including the Level range (16kHz)		16kHz	Yes	0.20
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	0.16
21(b). Third Octave Band Filter Relative Attenuation (40Hz-315Hz)		Conforming	Yes	0.16
21(c). Third Octave Band Filter Relative Attenuation (400Hz-3.15kHz)		Conforming	Yes	0.16
21(d). Third Octave Band Filter Relative Attenuation (≥24kHz)		Conforming	Yes	0.16
22. Third Octave Band Filter Relative Attenuation at Midband Frequency		Conforming	Yes	0.18

23(a). Third Octave Band Filter Level Linearity 31.5Hz (Increasing)	31.5Hz	Yes	0.19
23(b). Third Octave Band Filter Level Linearity 1kHz (Increasing)	1kHz	Yes	0.15
23(c). Third Octave Band Filter Level Linearity 16kHz (Increasing)	16kHz	Yes	0.19
24(a). Third Octave Band Filter Level Linearity 31.5Hz (Decreasing)	31.5Hz	Yes	0.20
24(b). Third Octave Band Filter Level Linearity 1kHz (Decreasing)	1kHz	Yes	0.17
24(c). Third Octave Band Filter Level Linearity 16kHz (Decreasing)	16kHz	Yes	0.20
25(a). Third Octave Level Linearity Including the Level range (31.5Hz)	31.5Hz	Yes	0.20
25(b). Third Octave Level Linearity Including the Level range (1kHz)	1kHz	Yes	0.17
25(c). Third Octave Level Linearity Including the Level range (16kHz)	16kHz	Yes	0.20
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	

Accredited for compliance with AS ISO/IEC 17025 - General requirements for the competence of testing and calibration laboratories.
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.

☒ Checked

Template Document Name: RQT-05 SLM IEC61672 Verification (r86)

1(a). Instrument Information

Calibration Date	01/03/2023	Job No	RC045	Operator	EF
------------------	------------	--------	-------	----------	----

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-TA	Serial	#A2A-08038-E0
Microphone Make	NTI	Model	MC230A	Serial	#A23491
Preampifier Make	NTI	Model	MA220	Serial	#3336
Ext'n Cable Make	NTI	Model		Serial	
Accessories	Nil	Firmware	V4.8		

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

Notes
Tests 16 & 22 low frequency results ignored due to unremovable filter in preamp

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 (A weighting)	40.0	120.0
8kHz Leq (A weighting)	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
------------	-----

Pattern Evaluation Test Report (Clause 3.5, IEC 61672-3:2013)	Type Approval Certificate
Reference Number or Page Number	PTB-1.53-4058763
Publication Date	14/01/2013
Source of Document (& Date of Download if Applicable)	N/A

Conforming	Yes
------------	-----

☒ 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	0.00								0.00	0.41
2k	0.30								0.30	0.41
4k	0.70								0.70	0.41
8k	2.60								2.60	0.58
12.5k	6.00								6.00	0.64
16k	7.30								7.30	0.64

Source of Mic FF to Pressure Correction	NTi Microphone specifications
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
Laboratory Equipment Check	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)	24.3	23.9	1.3	0.9	0.4	1.70	1.30	3	Yes	20	26
Rel. Humidity (%)	63.1	61.5	15.6	14.0	6.8	22.40	20.80	22.5	Yes	25	70
Air Pressure (kPa)	100.1	100.6	7.6	8.1	0.13	7.73	8.23	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)	44.3

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)	115.6
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

Uncertainty (+/-) dB

0.11

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

Observed Values		
Leq	N/A	
17.0	1	
	2	
	3	
	4	
	5	
	6	
	7	
	8	
	9	
	10	
	Avg	

Results				
Freq Wt	Observed	Quoted	Tolerance	Conforming
A	17.0	16.5	+5,-inf	Yes

Uncertainty (+/-) dB	0.09
----------------------	------

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
10.7	14.4	20.2	1			
			2			
			3			
			4			
			5			
			6			
			7			
			8			
			9			
			10			
			Avg			

Results		
Freq Wt	Observed	Quoted
A	10.7	12.4
C	14.4	13.5
Z	20.2	18.3-25.5

Uncertainty (+/-) dB	0.09
----------------------	------

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.

For information purposes, this laboratory compares the quoted noise floor to the measured value. This comparison is not used to check conformance to a specific requirement.

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	110.9	110.9	110.9	110.90	0.11	111.01	0.00	0.00	0.00	0.00	111.01	-2.96	-3.00	0.04	± 1.5	± 3.0	Yes	0.43	0.14	0.41
63	113.2	113.2	113.2	113.20	0.02	113.22	0.00	0.00	0.00	0.00	113.22	-0.75	-0.80	0.05	± 1.0	± 2.0	Yes	0.42	0.12	0.41
125	113.9	113.9	114.0	113.93	0.01	113.94	0.00	0.00	0.00	0.00	113.94	-0.03	-0.20	0.17	± 1.0	± 1.5	Yes	0.42	0.12	0.41
250	114.0	114.0	114.0	114.00	-0.01	113.99	0.00	0.00	0.00	0.00	113.99	0.02	0.00	0.02	± 1.0	± 1.5	Yes	0.42	0.12	0.41
500	114.1	114.0	114.1	114.07	-0.01	114.06	0.00	0.00	0.00	0.00	114.06	0.09	0.00	0.09	± 1.0	± 1.5	Yes	0.42	0.12	0.41
1k	114.0	114.0	114.0	114.00	-0.03	113.97	0.00	0.00	0.00	0.00	113.97	0.00	0.00	0.00	± 0.7	± 1.0	Yes	0.42	0.11	0.41
2k	113.8	113.7	113.7	113.73	0.02	113.75	0.30	0.00	0.00	0.00	114.05	0.08	-0.20	0.28	± 1.0	± 2.0	Yes	0.43	0.13	0.41
4k	113.0	112.9	113.1	113.00	-0.26	112.74	0.70	0.00	0.00	0.00	113.44	-0.53	-0.80	0.27	± 1.0	± 3.0	Yes	0.43	0.14	0.41
8k	108.5	108.3	108.5	108.43	-0.13	108.30	2.60	0.00	0.00	0.00	110.90	-3.07	-3.00	-0.07	+1.5; -2.5	± 5.0	Yes	0.60	0.15	0.58
12.5k	100.2	100.5	100.2	100.30	0.00	100.30	6.00	0.00	0.00	0.00	106.30	-7.67	-6.20	-1.47	+2.0; -5.0	+5,-inf	Yes	0.68	0.21	0.64
16k	96.7	96.9	96.8	96.80	0.20	97.00	7.30	0.00	0.00	0.00	104.30	-9.67	-8.50	-1.17	+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)	20
Generator Frequency (Hz)	1k
SPL Reference (dB)	75
Integration Time (s)	N/A
Generator Output (mVrms)	53.00

Freq Hz	Output (mV)	Indication A	Output (mV)	Indication C	Output (mV)	Indication Z	Tolerance		Uncertainty		
63	1082.12	74.9	58.11	74.9	53.00	75.0					
125	338.28	74.9	54.23	75.0	53.00	75.0					
250	142.65	74.9	53.00	75.0	53.00	75.0					
500	76.61	75.0	53.00	75.0	53.00	75.0					
1k	53.00	75.0	53.00	75.0	53.00	75.0					
2k	46.16	75.0	54.23	75.0	53.00	75.0					
4k	47.24	75.0	58.11	75.0	53.00	75.0					
8k	60.16	75.0	74.86	75.0	53.00	75.0					
16k	113.31	74.8	141.02	74.8	53.00	75.0					
Typical Microphone 0deg Free Field Response		0.00		0.00		0.00	Tolerance		Uncertainty		
		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		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					
		75.00		75.00		75.00					
		74.80		74.80		75.00					
Response re 1kHz (Deviation from Expected)		-0.10		-0.10		0.00	Type 1	Type 2	Total (+/-) dB	Lab (+/-) dB	Corrections (+/-) dB
		-0.10		0.00		0.00	± 1.0	± 2.0	0.44	0.18	0.41
		-0.10		0.00		0.00	± 1.0	± 1.5	0.44	0.18	0.41
		0.00		0.00		0.00	± 1.0	± 1.5	0.44	0.18	0.41
		0.00		0.00		0.00	± 1.0	± 1.5	0.44	0.18	0.41
		0.00		0.00		0.00	± 0.7	± 1.0	0.44	0.18	0.41
		0.00		0.00		0.00	± 1.0	± 2.0	0.44	0.18	0.41
		0.00		0.00		0.00	± 1.0	± 3.0	0.44	0.18	0.41
		0.00		0.00		0.00	+1.5; -2.5	± 5.0	0.61	0.18	0.58
		-0.20		-0.20		0.00	+2.5; -16.0	+5,-inf	0.67	0.18	0.64

Conforming	Yes	Yes	Yes
------------	-----	-----	-----

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
Generator Frequency (Hz)	1k
SPL Reference (dB)	114.0
Output (mVrms)	473.0

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
------------	-----	-----	-----

Uncertainty (+/-) dB	0.14
----------------------	------

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
------------	-----	-----

Uncertainty (+/-) dB	0.14
----------------------	------

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 time-averaged 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)

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)	1903.0
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	± 0.8	± 1.1
21.0	104.0	104.0	0.0	± 0.8	± 1.1
16.0	109.0	109.0	0.0	± 0.8	± 1.1
11.0	114.0	114.0	0.0	± 0.8	± 1.1
10.0	115.0	115.0	0.0	± 0.8	± 1.1
9.0	116.0	116.0	0.0	± 0.8	± 1.1
8.0	117.0	117.0	0.0	± 0.8	± 1.1
7.0	118.0	118.0	0.0	± 0.8	± 1.1
6.0	119.0	119.0	0.0	± 0.8	± 1.1
5.0	120.0	120.0	0.0	± 0.8	± 1.1
4.0	121.0	121.0	0.0	± 0.8	± 1.1
3.0	122.0	122.0	0.0	± 0.8	± 1.1
2.0	123.0	123.0	0.0	± 0.8	± 1.1
1.0	124.0	124.0	0.0	± 0.8	± 1.1
0.0	125.0	125.0	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
------------	-----

Uncertainty (+/-) dB	0.19
----------------------	------

Description of Tests

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
Generator Frequency (Hz)	8k
SPL Reference Starting Point (dB)	94
Output (mVrms)	54.0
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	± 0.8	± 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	54.1	0.1	± 0.8	± 1.1
45.0	49.0	49.0	0.0	± 0.8	± 1.1
49.0	45.0	45.1	0.1	± 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

Conforming	Yes
------------	-----

Uncertainty (+/-) dB	0.20
----------------------	------

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)	474.0

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
------------	-----

Uncertainty (+/-) dB	0.14
----------------------	------

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)	53.0

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
------------	-----

Uncertainty (+/-) dB	0.17
----------------------	------

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)	593.0

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
------------	-----

Uncertainty (+/-) dB	0.20
----------------------	------

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)	593.0

Toneburst (ms)	# Cycles	LASMax (dB)			Tolerance	
		Expected	Indicated	Difference	Type 1	Type 2
200	800	109.6	109.5	-0.1	± 0.5	± 1.0
2	8	90.0	89.9	-0.1	+ 1.0; -3.0	+ 1.0; -5.0

Conforming	Yes
------------	-----

Uncertainty (+/-) dB	0.20
----------------------	------

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)	593.0
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	89.9	89.9	90.0	-0.1	+ 1.0; -1.5	+ 1.0; -2.5
0.25	1	80.8	80.8	81.0	-0.2	+ 1.0; -3.0	+ 1.5; -5.0

Conforming	Yes
------------	-----

Uncertainty (+/-) dB	0.20
----------------------	------

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)	532.0

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	0.16
----------------------	------

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)	374.0
Output High Level (mV)	528.9
Output Low Level (mV)	-528.9

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	0.16
----------------------	------

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)	804.9	

	Half-Cycle Signal			Tolerance	
	Positive	Negative	Difference	Type 1	Type 2
Level (dB)	136.1	136.3	-0.2	± 1.5	± 1.5
Generator Output (mVrms)	5619.9	5739.7			

Conforming	Yes
------------	-----

Uncertainty (+/-) dB	0.20
----------------------	------

Overload Indicated	Yes
Overload Indicator Latches	Yes

Conforming	Yes
------------	-----

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)	839.0

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
------------	-----

Uncertainty (+/-) dB	0.09
----------------------	------

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	4195.0
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				41.0					37.9			
0.13				51.8					52.5			
0.25				75.1					77.8			
0.50				106.3					108.6			
0.71												
0.77				132.3					132.5			
0.84				132.8					132.9			
0.92				132.8					133.0			
1.00				132.8					133.0			
1.09				132.8					133.0			
1.19				132.7					133.0			
1.30				132.6					132.7			
1.41												
2.00				107.2					95.8			
4.00				75.1					32.8			
8.00				48.8					33.3			
16.00				38.1					32.8			
Attenuation dB				91.8					95.1		Class 1	Class 2
				81.0					80.5		+70/inf	+60/inf
				57.7					55.2		+60/inf	+54/inf
				26.5					24.4		+40.5/inf	+39.5/inf
											+16.6/inf	+15.6/inf
				0.5					0.5		-0.4/+5.3	-0.6/+5.8
				0.0					0.1		-0.4/+1.4	-0.6/+1.7
				0.0					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
				0.1					0.0		-0.4/+0.7	-0.6/+0.9
				0.2					0.3		-0.4/+1.4	-0.6/+1.7
											-0.4/+5.3	-0.6/+5.8
				25.6					37.2		+16.6/inf	+15.6/inf
				57.7					100.2		+40.5/inf	+39.5/inf
				84.0					99.7		+60/inf	+54/inf
				94.7					100.2		+70/inf	+60/inf

Ins Loss				-0.2					0.0	
----------	--	--	--	------	--	--	--	--	-----	--

Conforming	N/A	N/A	N/A	Yes	N/A	N/A	N/A	N/A	Yes	N/A
------------	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

Uncert (+/-) dB	≤80dB	0.16	>80dB	0.48
-----------------	-------	------	-------	------

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.

The ≤80dB uncertainty applies to those "Attenuation dB" cells where the value is less than or equal to 80, while the >80dB uncertainty applies to the remaining "Attenuation dB" cells.

☒ 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	4195.0
Noise Floor dB	-99.0

Ratio	1	2	3	4	5	6	7	8	9	10	Tolerance	
Freq	4kHz	8kHz	16kHz	32kHz								
0.06			44.3									
0.13			62.7									
0.25			87.6									
0.50			115.2									
0.71												
0.77			132.1									
0.84			132.8									
0.92			132.9									
1.00			133.0									
1.09			133.0									
1.19			133.0									
1.30			133.0									
1.41												
2.00			46.5									
4.00			43.4									
8.00			45.6									
16.00			43.8									
Attenuation dB			88.7								Class 1	Class 2
			70.3								+70/inf	+60/inf
			45.4								+60/inf	+54/inf
			17.8								+40.5/inf	+39.5/inf
											+16.6/inf	+15.6/inf
			0.9								-0.4/+5.3	-0.6/+5.8
			0.2								-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
			86.5								+16.6/inf	+15.6/inf
			89.6								+40.5/inf	+39.5/inf
			87.4								+60/inf	+54/inf
			89.2								+70/inf	+60/inf

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

Conforming	N/A	N/A	Yes	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
------------	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

Uncert (+/-) dB	≤80dB	0.16	>80dB	0.48
-----------------	-------	------	-------	------

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.

The ≤80dB uncertainty applies to those "Attenuation dB" cells where the value is less than or equal to 80, while the >80dB uncertainty applies to the remaining "Attenuation dB" cells.

☒ 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	10
Reference SPL 1kHz	94.0
Output mVrms	150.0

	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	94.0	94.0	94.0	94.0	94.0	94.0		
Ins Loss			0.3	-0.1	0.0	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	0.18
-----------------	------

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)	1710.0
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
------------	-----

Uncertainty (+/-) dB	0.19
----------------------	------

Description of Tests

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)	1670.0
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
------------	-----

Uncertainty (+/-) dB	0.15
----------------------	------

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)	1670.0
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
------------	-----

Uncertainty (+/-) dB	0.19
----------------------	------

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)	10
Generator Frequency (Hz)	31.5
SPL Reference Starting Point (dB)	94
Output (mVrms)	152.0
Noise Floor (dB)	-99.0

Decreasing level to Underrange				Tolerance	
Atten	Expected	Indicator	Diff	Type 1	Type 2
15.0	89.0	89.0	0.0	±0.5	±0.6
20.0	84.0	84.0	0.0	±0.5	±0.6
25.0	79.0	79.0	0.0	±0.7	±0.9
30.0	74.0	74.0	0.0	±0.7	±0.9
35.0	69.0	69.0	0.0	±0.7	±0.9
40.0	64.0	64.0	0.0	±0.7	±0.9
45.0	59.0	59.0	0.0	±0.7	±0.9
50.0	54.0	54.0	0.0	±0.7	±0.9
55.0	49.0	49.0	0.0	±0.7	±0.9
59.0	45.0	45.0	0.0	±0.7	±0.9
60.0	44.0	44.1	0.1	±0.7	±0.9
61.0	43.0	43.1	0.1	±0.7	±0.9
62.0	42.0	42.2	0.2	±0.7	±0.9
63.0	41.0	41.2	0.2	±0.7	±0.9
64.0	40.0	40.2	0.2	±0.7	±0.9

Conforming	Yes
------------	-----

Uncertainty (+/-) dB	0.20
----------------------	------

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)	10
Generator Frequency (Hz)	1kHz
SPL Reference Starting Point (dB)	94
Output (mVrms)	150.0
Noise Floor (dB)	-99.0

Decreasing level to Underrange				Tolerance	
Atten	Expected	Indicator	Diff	Type 1	Type 2
15.0	89.0	89.0	0.0	±0.5	±0.6
20.0	84.0	84.0	0.0	±0.5	±0.6
25.0	79.0	79.0	0.0	±0.7	±0.9
30.0	74.0	74.0	0.0	±0.7	±0.9
35.0	69.0	69.0	0.0	±0.7	±0.9
40.0	64.0	64.0	0.0	±0.7	±0.9
45.0	59.0	59.0	0.0	±0.7	±0.9
50.0	54.0	54.0	0.0	±0.7	±0.9
55.0	49.0	49.0	0.0	±0.7	±0.9
59.0	45.0	45.0	0.0	±0.7	±0.9
60.0	44.0	44.1	0.1	±0.7	±0.9
61.0	43.0	43.1	0.1	±0.7	±0.9
62.0	42.0	42.1	0.1	±0.7	±0.9
63.0	41.0	41.1	0.1	±0.7	±0.9
64.0	40.0	40.2	0.2	±0.7	±0.9

Conforming	Yes
------------	-----

Uncertainty (+/-) dB	0.17
----------------------	------

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)	10
Generator Frequency (Hz)	16kHz
SPL Reference Starting Point (dB)	94
Output (mVrms)	149.0
Noise Floor (dB)	-99.0

Decreasing level to Underrange				Tolerance	
Atten	Expected	Indicator	Diff	Type 1	Type 2
15.0	89.0	89.0	0.0	±0.5	±0.6
20.0	84.0	84.0	0.0	±0.5	±0.6
25.0	79.0	79.0	0.0	±0.7	±0.9
30.0	74.0	74.0	0.0	±0.7	±0.9
35.0	69.0	69.0	0.0	±0.7	±0.9
40.0	64.0	64.0	0.0	±0.7	±0.9
45.0	59.0	59.0	0.0	±0.7	±0.9
50.0	54.0	54.0	0.0	±0.7	±0.9
55.0	49.0	49.0	0.0	±0.7	±0.9
59.0	45.0	45.0	0.0	±0.7	±0.9
60.0	44.0	44.1	0.1	±0.7	±0.9
61.0	43.0	43.1	0.1	±0.7	±0.9
62.0	42.0	42.1	0.1	±0.7	±0.9
63.0	41.0	41.1	0.1	±0.7	±0.9
64.0	40.0	40.2	0.2	±0.7	±0.9

Conforming	Yes
------------	-----

Uncertainty (+/-) dB	0.20
----------------------	------

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)	152.0

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
------------	-----

Uncertainty (+/-) dB	0.20
----------------------	------

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)	150.0

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
------------	-----

Uncertainty (+/-) dB	0.17
----------------------	------

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)	149.0

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
------------	-----

Uncertainty (+/-) dB	0.20
----------------------	------

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>
--

☒ 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		16.2	13.4	12.4	9.1	7.6	5.8	6.0	7.6	9.0
Conforming	N/A	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Freq	4kHz	8kHz	16kHz	32kHz						
Measured	11.3	14.0	17.2							
Conforming	Yes	Yes	Yes	N/A						

Conforming	Yes
------------	-----

Uncert (+/-) dB	0.09
-----------------	------

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		11.8	13.0	8.6	8.2	5.9	4.0	4.3	3.5	2.4
Conforming	N/A	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Freq	4kHz	8kHz	16kHz	32kHz						
Measured	2.8	4.1	5.9							
Conforming	Yes	Yes	Yes	N/A						

Conforming	Yes
------------	-----

Uncert (+/-) dB	0.09
-----------------	------

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	4229.0
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										51.5	Tolerance	
0.33										59.0		
0.53										73.1		
0.77										102.9		
0.89												
0.92										132.0		
0.95										132.8		
0.97										132.9		
1.00										132.8		
1.03										132.9		
1.06										132.9		
1.09										132.8		
1.12												
1.30										106.1		
1.89										72.1		
3.07										47.4		
5.43										30.4		
Attenuation dB										81.3	Class 1	Class 2
										73.8	+70/inf	+60/inf
										59.7	+60/inf	+54/inf
										29.9	+40.5/inf	+39.5/inf
											+16.6/inf	+15.6/inf
										0.8	-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
										-0.1	-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
										0.0	-0.4/+1.4	-0.6/+1.7
											-0.4/+5.3	-0.6/+5.8
										26.7	+16.6/inf	+15.6/inf
										60.7	+40.5/inf	+39.5/inf
										85.4	+60/inf	+54/inf
										102.4	+70/inf	+60/inf

Ins Loss											-0.2
----------	--	--	--	--	--	--	--	--	--	--	------

Conforming	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Yes
------------	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

Uncert (+/-) dB	≤80dB	0.16	>80dB	0.48
-----------------	-------	------	-------	------

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.

The ≤80dB uncertainty applies to those "Attenuation dB" cells where the value is less than or equal to 80, while the >80dB uncertainty applies to

☒ 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	4229.0
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									44.6			
0.33									53.8			
0.53									72.4			
0.77									104.2			
0.89												
0.92									132.5			
0.95									133.0			
0.97									133.0			
1.00									133.0			
1.03									133.0			
1.06									133.0			
1.09									132.8			
1.12												
1.30									104.8			
1.89									69.7			
3.07									39.5			
5.43									24.0		Class 1	Class 2
Attenuation dB									88.4		+70/inf	+60/inf
									79.2		+60/inf	+54/inf
									60.6		+40.5/inf	+39.5/inf
									28.8		+16.6/inf	+15.6/inf
											-0.4/+5.3	-0.6/+5.8
									0.5		-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
									0.2		-0.4/+1.4	-0.6/+1.7
											-0.4/+5.3	-0.6/+5.8
									28.2		+16.6/inf	+15.6/inf
									63.3		+40.5/inf	+39.5/inf
									93.5		+60/inf	+54/inf
									109.0		+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	Yes	N/A
------------	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

Uncert (+/-) dB	≤80dB	0.16	>80dB	0.48
-----------------	-------	------	-------	------

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.

The ≤80dB uncertainty applies to those "Attenuation dB" cells where the value is less than or equal to 80, while the >80dB uncertainty applies to the remaining "Attenuation dB" cells.

☒ 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	4229.0
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					41.7							
0.33					59.2							
0.53					81.5							
0.77					109.7							
0.89												
0.92					132.5							
0.95					133.0							
0.97					133.0							
1.00					133.0							
1.03					133.0							
1.06					133.0							
1.09					132.9							
1.12												
1.30					86.9							
1.89					42.6							
3.07					28.4							
5.43					28.2							
Attenuation dB					91.3						Class 1	Class 2
					73.8						+70/inf	+60/inf
					51.5						+60/inf	+54/inf
					23.3						+40.5/inf	+39.5/inf
											+16.6/inf	+15.6/inf
					0.5						-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
					0.1						-0.4/+1.4	-0.6/+1.7
					46.1						-0.4/+5.3	-0.6/+5.8
					90.4						+16.6/inf	+15.6/inf
					104.6						+40.5/inf	+39.5/inf
					104.8						+60/inf	+54/inf
											+70/inf	+60/inf

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

Conforming	N/A	N/A	N/A	N/A	Yes	N/A	N/A	N/A	N/A	N/A	N/A	N/A
------------	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

Uncert (+/-) dB	≤80dB	0.16	>80dB	0.48
-----------------	-------	------	-------	------

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.

The ≤80dB uncertainty applies to those "Attenuation dB" cells where the value is less than or equal to 80, while the >80dB uncertainty applies to the remaining "Attenuation dB" cells.

☒ 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	4229.0
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							42.2					
0.33							59.4					
0.53							81.8					
0.77							110.7					
0.89												
0.92							132.8					
0.95							133.0					
0.97							133.0					
1.00							133.0					
1.03							133.0					
1.06							133.0					
1.09							132.6					
1.12												
1.30							85.3					
1.89							41.2					
3.07							38.3					
5.43							41.5					
Attenuation dB							90.8				Class 1	Class 2
							73.6				+70/inf	+60/inf
							51.2				+60/inf	+54/inf
							22.3				+40.5/inf	+39.5/inf
											+16.6/inf	+15.6/inf
							0.2				-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
							0.4				-0.4/+1.4	-0.6/+1.7
											-0.4/+5.3	-0.6/+5.8
							47.7				+16.6/inf	+15.6/inf
							91.8				+40.5/inf	+39.5/inf
							94.7				+60/inf	+54/inf
							91.5				+70/inf	+60/inf

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

Conforming	N/A	N/A	N/A	N/A	N/A	N/A	Yes	N/A	N/A	N/A
------------	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

Uncert (+/-) dB	≤80dB	0.16	>80dB	0.48
-----------------	-------	------	-------	------

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.

The ≤80dB uncertainty applies to those "Attenuation dB" cells where the value is less than or equal to 80, while the >80dB uncertainty applies to the remaining "Attenuation dB" cells.

☒ 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	10
Reference SPL 1kHz	94.0
Output mVrms	150.0

	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	Class 1	Class 2
Measured						94.2	94.3	94.1	93.9	93.9		
Ins Loss						0.2	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	Yes	Yes	Yes	Yes	Yes		

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

Uncert (+/-) dB	0.18
-----------------	------

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)	1710.0
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
------------	-----

Uncertainty (+/-) dB	0.19
----------------------	------

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)	1670.0
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
------------	-----

Uncertainty (+/-) dB	0.15
----------------------	------

Description of Tests

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)	1670.0
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
------------	-----

Uncertainty (+/-) dB	0.19
----------------------	------

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)	10
Generator Frequency (Hz)	31.5
SPL Reference Starting Point (dB)	94
Output (mVrms)	152.0
Noise Floor (dB)	-99.0

Decreasing level to Underrange				Tolerance	
Atten	Expected	Indicator	Diff	Type 1	Type 2
15.0	89.0	89.0	0.0	±0.5	±0.6
20.0	84.0	84.0	0.0	±0.5	±0.6
25.0	79.0	79.0	0.0	±0.7	±0.9
30.0	74.0	74.0	0.0	±0.7	±0.9
35.0	69.0	69.0	0.0	±0.7	±0.9
40.0	64.0	64.1	0.1	±0.7	±0.9
45.0	59.0	59.0	0.0	±0.7	±0.9
50.0	54.0	54.0	0.0	±0.7	±0.9
55.0	49.0	49.0	0.0	±0.7	±0.9
59.0	45.0	45.0	0.0	±0.7	±0.9
60.0	44.0	44.0	0.0	±0.7	±0.9
61.0	43.0	43.1	0.1	±0.7	±0.9
62.0	42.0	41.9	-0.1	±0.7	±0.9
63.0	41.0	41.4	0.4	±0.7	±0.9
64.0	40.0	40.4	0.4	±0.7	±0.9

Conforming	Yes
------------	-----

Uncertainty (+/-) dB	0.20
----------------------	------

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)	10
Generator Frequency (Hz)	1kHz
SPL Reference Starting Point (dB)	94
Output (mVrms)	149.0
Noise Floor (dB)	-99.0

Decreasing level to Underrange				Tolerance	
Atten	Expected	Indicator	Diff	Type 1	Type 2
15.0	89.0	89.0	0.0	±0.5	±0.6
20.0	84.0	84.0	0.0	±0.5	±0.6
25.0	79.0	79.0	0.0	±0.7	±0.9
30.0	74.0	74.0	0.0	±0.7	±0.9
35.0	69.0	69.0	0.0	±0.7	±0.9
40.0	64.0	64.0	0.0	±0.7	±0.9
45.0	59.0	59.0	0.0	±0.7	±0.9
50.0	54.0	54.0	0.0	±0.7	±0.9
55.0	49.0	49.0	0.0	±0.7	±0.9
59.0	45.0	44.9	-0.1	±0.7	±0.9
60.0	44.0	43.9	-0.1	±0.7	±0.9
61.0	43.0	43.0	0.0	±0.7	±0.9
62.0	42.0	42.0	0.0	±0.7	±0.9
63.0	41.0	41.0	0.0	±0.7	±0.9
64.0	40.0	40.0	0.0	±0.7	±0.9

Conforming	Yes
------------	-----

Uncertainty (+/-) dB	0.17
----------------------	------

Description of Tests

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)	10
Generator Frequency (Hz)	16kHz
SPL Reference Starting Point (dB)	94
Output (mVrms)	149.0
Noise Floor (dB)	-99.0

Decreasing level to Underrange				Tolerance	
Atten	Expected	Indicator	Diff	Type 1	Type 2
15.0	89.0	89.0	0.0	±0.5	±0.6
20.0	84.0	84.0	0.0	±0.5	±0.6
25.0	79.0	79.0	0.0	±0.7	±0.9
30.0	74.0	74.0	0.0	±0.7	±0.9
35.0	69.0	69.0	0.0	±0.7	±0.9
40.0	64.0	64.1	0.1	±0.7	±0.9
45.0	59.0	59.0	0.0	±0.7	±0.9
50.0	54.0	54.0	0.0	±0.7	±0.9
55.0	49.0	49.0	0.0	±0.7	±0.9
59.0	45.0	45.0	0.0	±0.7	±0.9
60.0	44.0	44.0	0.0	±0.7	±0.9
61.0	43.0	43.0	0.0	±0.7	±0.9
62.0	42.0	42.0	0.0	±0.7	±0.9
63.0	41.0	41.0	0.0	±0.7	±0.9
64.0	40.0	40.0	0.0	±0.7	±0.9

Conforming	Yes
------------	-----

Uncertainty (+/-) dB	0.20
----------------------	------

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)	152.0

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
------------	-----

Uncertainty (+/-) dB	0.20
----------------------	------

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)	149.0

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
------------	-----

Uncertainty (+/-) dB	0.17
----------------------	------

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)	149.0

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
------------	-----

Uncertainty (+/-) dB	0.20
----------------------	------

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>
--

☒ 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			12.4	10.5	9.7	11.2	10.6	7.9	8.9	7.7
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	6.2	7.5	3.5	2.8	3.4	2.7	1.7	2.1	1.8	1.8
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	1.3	2.0	1.6	2.9	2.4	3.0	3.3	4.2	4.9	6.2
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	6.6	7.2	8.1	9.3	10.1	11.3	12.6	13.7		
Conforming	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	N/A	N/A

Conforming	Yes
------------	-----

Uncert (+/-) dB	0.09
-----------------	------

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			15.1	6.6	10.1	10.7	11.8	8.7	8.5	5.4
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	5.6	7.8	3.4	3.3	4.7	2.1	1.9	0.5	0.4	0.2
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	U	U	U	U	U	U	U	U	U	U
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	U	U	U	U	U	0.7	1.2	1.9		
Conforming	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	N/A	N/A

Conforming	Yes
------------	-----

Uncert (+/-) dB	0.09
-----------------	------

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



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	02/07/2021	Job No	RB845	Operator	AH
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-TA	Serial No	#A2A-07073-E0
Microphone Make	NTI	Model	MC230	Serial No	#7713
Preamplifier Make	NTI	Model	MA220	Serial No	#3377
Ext'n Cable Make	NTI	Model	N/A	Serial No	N/A
Accessories	Nil			Firmware	V4.20

SLM Type	1
Filters Class	1

Environmental Conditions	Measured	
	Start	End
Air Temp. (°C)	22.3	22.1
Rel. Humidity (%)	40.6	40.8
Air Pressure (kPa)	101.0	101.0

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. As public evidence was available, from an independent testing organization responsible for approving the results of pattern evaluation tests performed in accordance with IEC 61672-2:2017 and IEC 61260-2:2017, 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, the sound level meter submitted for testing conforms to the class 1 specifications of 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: 06/07/2021

Template Document Name: RQT-05 SLM IEC61672 Verification (r73)

NATacoustic

Sound Level Meter Verification - Summary of Tests

Calibration Date 02/07/2021	Job No RB845	Operator AH
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-TA	Serial No #A2A-07073-E0	
Microphone Make NTI	Model MC230	Serial No #7713	
Preamplifier Make NTI	Model MA220	Serial No #3377	
Ext'n Cable Make NTI	Model N/A	Serial No N/A	
Accessories Nil		Firmware V4.20	

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)	22.3	22.1
	Rel. Humidity (%)	40.6	40.8
	Air Pressure (kPa)	101.0	101.0
	Conforming	Yes	Yes

Test Description		Value / Conforming	Uncert (+/-)
4(a). Initial Calibration	Calibration Frequency Hz	1000.0	N/A
	Indicated Level Before Adjustment (dB)	113.8	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	14.7	0.09
5(b). Self-Generated Noise, Electrical	A	10.2	0.09
	C	12.8	0.09
	Z	14.9	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
14. High-level Stability	Latches	N/A	N/A
	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	

Accredited for compliance with AS ISO/IEC 17025 - General requirements for the competence of testing and calibration laboratories.
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.

☒ Checked

Template Document Name: RQT-05 SLM IEC61672 Verification (r73)

1(a). Instrument Information

Calibration Date	02/07/2021	Job No	RB845	Operator	AH
------------------	------------	--------	-------	----------	----

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-TA	Serial	#A2A-07073-E0
Microphone Make	NTI	Model	MC230	Serial	#7713
Preampifier Make	NTI	Model	MA220	Serial	#3377
Ext'n Cable Make	NTI	Model		Serial	
Accessories	Nil	Firmware	V4.20		

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
------------	-----

Pattern Evaluation Test Report (Clause 3.5, IEC 61672-3:2013)	Type Approval Certificate
Reference Number or Page Number	PTB-1.53-4058763
Publication Date	14/01/2013
Source of Document (& Date of Download if Applicable)	N/A

Conforming	Yes
------------	-----

☒ 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	0.00								0.00	0.41
2k	0.30								0.30	0.41
4k	0.70								0.70	0.41
8k	2.60								2.60	0.58
12.5k	6.00								6.00	0.64
16k	7.30								7.30	0.64

Source of Mic FF to Pressure Correction	NTI SPECIFICATIONS TECHNICAL DATA MEASUREMENT MICROPHONES
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)	22.3	22.1	-0.7	-0.9	0.5	1.20	1.40	3	Yes	20	26
Rel. Humidity (%)	40.6	40.8	-6.9	-6.7	4.8	11.70	11.50	22.5	Yes	25	70
Air Pressure (kPa)	101.0	101.0	8.5	8.5	0.63	9.13	9.13	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)	47.8

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)	113.8
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
------------	-----

Uncertainty (+/-) dB	0.11
----------------------	------

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	14.7	16.6

Uncertainty (+/-) dB	0.09
----------------------	------

Observed Values		
Leq	N/A	
14.7	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
10.2	12.8	14.9	1			
			2			
			3			
			4			
			5			
			6			
			7			
			8			
			9			
			10			
			Avg			

Results		
Freq Wt	Observed	Quoted
A	10.2	12.4
C	12.8	13.5
Z	14.9	18.3-25.5

Uncertainty (+/-) dB	0.09
----------------------	------

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	110.9	110.9	110.9	110.90	0.10	111.00	0.00	0.00	0.00	0.00	111.00	-2.97	-3.00	0.03	± 1.5	± 3.0	Yes	0.43	0.14	0.41
63	113.2	113.2	113.3	113.23	0.01	113.24	0.00	0.00	0.00	0.00	113.24	-0.73	-0.80	0.07	± 1.0	± 2.0	Yes	0.42	0.12	0.41
125	113.9	113.9	114.0	113.93	-0.02	113.91	0.00	0.00	0.00	0.00	113.91	-0.06	-0.20	0.14	± 1.0	± 1.5	Yes	0.42	0.12	0.41
250	114.1	114.1	114.1	114.10	-0.03	114.07	0.00	0.00	0.00	0.00	114.07	0.10	0.00	0.10	± 1.0	± 1.5	Yes	0.42	0.12	0.41
500	114.1	114.1	114.1	114.10	-0.03	114.07	0.00	0.00	0.00	0.00	114.07	0.10	0.00	0.10	± 1.0	± 1.5	Yes	0.42	0.12	0.41
1k	114.0	114.0	114.1	114.03	-0.06	113.97	0.00	0.00	0.00	0.00	113.97	0.00	0.00	0.00	± 0.7	± 1.0	Yes	0.42	0.11	0.41
2k	113.7	113.6	113.7	113.67	-0.01	113.66	0.30	0.00	0.00	0.00	113.96	-0.02	-0.20	0.18	± 1.0	± 2.0	Yes	0.43	0.13	0.41
4k	112.6	112.6	112.7	112.63	-0.20	112.43	0.70	0.00	0.00	0.00	113.13	-0.84	-0.80	-0.04	± 1.0	± 3.0	Yes	0.43	0.14	0.41
8k	108.5	108.3	108.5	108.43	-0.19	108.24	2.60	0.00	0.00	0.00	110.84	-3.13	-3.00	-0.13	+1.5; -2.5	± 5.0	Yes	0.60	0.15	0.58
12.5k	102.5	102.3	102.3	102.37	-0.10	102.27	6.00	0.00	0.00	0.00	108.27	-5.71	-6.20	0.49	+2.0; -5.0	+5,-inf	Yes	0.68	0.21	0.64
16k	97.9	97.8	97.7	97.80	0.05	97.85	7.30	0.00	0.00	0.00	105.15	-8.82	-8.50	-0.32	+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)	20
Generator Frequency (Hz)	1k
SPL Reference (dB)	75
Integration Time (s)	N/A
Generator Output (mVrms)	57.10

Freq Hz	Output (mV)	Indication A	Output (mV)	Indication C	Output (mV)	Indication Z	Tolerance	
63	1165.83	74.9	62.61	74.9	57.10	74.9		
125	364.45	74.9	58.43	75.0	57.10	75.0		
250	153.69	74.9	57.10	75.0	57.10	75.0		
500	82.53	75.0	57.10	75.0	57.10	75.0		
1k	57.10	75.0	57.10	75.0	57.10	75.0		
2k	49.73	75.0	58.43	75.0	57.10	75.0		
4k	50.89	75.0	62.61	75.0	57.10	75.0		
8k	64.81	75.0	80.66	75.0	57.10	75.0		
16k	122.08	74.8	151.93	74.8	57.10	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		
		75.00		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
		0.00		0.00		0.00	± 1.0	± 1.5
		0.00		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
------------	-----	-----	-----

Uncertainty (+/-) dB	0.09
----------------------	------

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)	509.0

8(a). Frequency Weightings 1kHz

Time Wt	Frequency Weighting				Tolerance	
Fast	A	C	Z	N/A	Type 1	Type 2
1kHz	94.0	94.0	94.0		± 0.2	± 0.2
Difference		0.0	0.0			

Conforming	Yes	Yes	N/A
------------	-----	-----	-----

Uncertainty (+/-) dB	0.09
----------------------	------

8(b). Time Weightings 1kHz

Freq Wt	Time Weighting			Tolerance	
A	F	S	Leq	Type 1	Type 2
1kHz	94.0	94.0	94.0	± 0.1	± 0.1
Difference		0.0	0.0		

Conforming	Yes	Yes
------------	-----	-----

Uncertainty (+/-) dB	0.09
----------------------	------

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)

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)	2055.0
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	± 0.8	± 1.1
21.0	104.0	104.0	0.0	± 0.8	± 1.1
16.0	109.0	109.0	0.0	± 0.8	± 1.1
11.0	114.0	114.0	0.0	± 0.8	± 1.1
10.0	115.0	115.0	0.0	± 0.8	± 1.1
9.0	116.0	116.0	0.0	± 0.8	± 1.1
8.0	117.0	117.0	0.0	± 0.8	± 1.1
7.0	118.0	118.0	0.0	± 0.8	± 1.1
6.0	119.0	119.0	0.0	± 0.8	± 1.1
5.0	120.0	120.0	0.0	± 0.8	± 1.1
4.0	121.0	121.0	0.0	± 0.8	± 1.1
3.0	122.0	122.0	0.0	± 0.8	± 1.1
2.0	123.0	123.0	0.0	± 0.8	± 1.1
1.0	124.0	124.0	0.0	± 0.8	± 1.1
0.0	125.0	Y		± 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
------------	-----

Uncertainty (+/-) dB	0.13
----------------------	------

Description of Tests

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)	58.0
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	± 0.8	± 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

Conforming	Yes
------------	-----

Uncertainty (+/-) dB	0.13
----------------------	------

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)	509.0

Settings	Level (dB)			Tolerance	
	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
------------	-----

Uncertainty (+/-) dB	0.13
----------------------	------

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)	57.1

Settings	Level (dB)			Tolerance	
	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	25.1	0.1	± 0.8
					± 0.8
					± 0.8
					± 0.8
					± 0.8
					± 0.8
					± 0.8
					± 0.8

Conforming	Yes
------------	-----

Uncertainty (+/-) dB	0.13
----------------------	------

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)	642.4

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	89.9	-0.1	+ 1.0; -3.0	+ 1.5; -5.0

Conforming	Yes
------------	-----

Uncertainty (+/-) dB	0.09
----------------------	------

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)	642.4

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
------------	-----

Uncertainty (+/-) dB	0.09
----------------------	------

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)	642.4
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
------------	-----

Uncertainty (+/-) dB	0.13
----------------------	------

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)		574.4	

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)		402.7	

Test Signal	dB LCpeak Hold				Tolerance	
500 Hz	Indication	O'Load?	Expected	Difference	Type 1	Type 2
One +ve 1/2 cycle	114.4	No	114.4	0.0	± 1.0	± 2.0
One -ve 1/2 cycle	114.4	No	114.4	0.0	± 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)	808.8	

	Half-Cycle Signal			Tolerance	
	Positive	Negative	Difference	Type 1	Type 2
Level (dB)	126.4	126.4	0.0	± 1.5	± 1.5
Generator Output (mVrms)	1892.0	1891.0			

Conforming	Yes
------------	-----

Uncertainty (+/-) dB	0.09
----------------------	------

Overload Indicated	No
Overload Indicator Latches	N/A

Conforming	N/A
------------	-----

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)	906.1

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
------------	-----

Uncertainty (+/-) dB	0.09
----------------------	------

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	4545.0
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				50.1					48.4			
0.13				51.9					50.3			
0.25				58.2					53.7			
0.50				74.0					70.9			
0.71												
0.77				133.0					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				133.0					133.0			
1.30												
1.41												
2.00				45.8					39.6			
4.00				41.1					32.2			
8.00				26.6					33.7			
16.00				22.5					32.5			
Attenuation dB				82.8					84.6		Class 1	Class 2
				81.0					82.7		+70/inf	+60/inf
				74.7					79.3		+60/inf	+54/inf
				58.9					62.1		+40.5/inf	+39.5/inf
											+16.6/inf	+15.6/inf
				-0.1					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
				-0.1					0.0		-0.4/+1.4	-0.6/+1.7
											-0.4/+5.3	-0.6/+5.8
				87.1					93.4		+16.6/inf	+15.6/inf
				91.8					100.8		+40.5/inf	+39.5/inf
				106.3					99.3		+60/inf	+54/inf
				110.4					100.5		+70/inf	+60/inf

Ins Loss				-0.1					0.0	
----------	--	--	--	------	--	--	--	--	-----	--

Conforming	N/A	N/A	N/A	Yes	N/A	N/A	N/A	N/A	Yes	N/A
------------	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

Uncert (+/-) dB	≤80dB	0.09	>80dB	0.46
-----------------	-------	------	-------	------

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	4545.0
Noise Floor dB	-99.0

Ratio	1	2	3	4	5	6	7	8	9	10	Tolerance	
Freq	4kHz	8kHz	16kHz	32kHz								
0.06			43.2									
0.13			50.7									
0.25			51.7									
0.50			70.7									
0.71												
0.77			133.0									
0.84			133.0									
0.92			133.0									
1.00			133.0									
1.09			133.0									
1.19			133.0									
1.30			133.0									
1.41												
2.00			46.6									
4.00			53.1									
8.00			45.6									
16.00			44.0									
Attenuation dB			89.8								Class 1	Class 2
			82.3								+70/inf	+60/inf
			81.3								+60/inf	+54/inf
			62.3								+40.5/inf	+39.5/inf
											+16.6/inf	+15.6/inf
			0.0								-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
			0.0								-0.4/+1.4	-0.6/+1.7
											-0.4/+5.3	-0.6/+5.8
			86.4								+16.6/inf	+15.6/inf
			79.9								+40.5/inf	+39.5/inf
			87.4								+60/inf	+54/inf
			89.0								+70/inf	+60/inf

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

Conforming	N/A	N/A	Yes	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
------------	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

Uncert (+/-) dB	≤80dB	0.09	>80dB	0.46
-----------------	-------	------	-------	------

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	51.0

	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		93.9	93.9	93.9	93.9	94.1	94.0	94.0	94.0	94.0		
Ins Loss		-0.1	-0.1	-0.1	-0.1	0.1	0.0	0.0	0.0	0.0	-0.4/+0.4	-0.6/+0.6
Conforming	N/A	Yes	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
-----------------	------

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)	1834.0
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
------------	-----

Uncertainty (+/-) dB	0.13
----------------------	------

Description of Tests

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)	1805.0
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
------------	-----

Uncertainty (+/-) dB	0.13
----------------------	------

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)	1797.0
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	124.8	-0.2	±0.5	±0.6

Conforming	Yes
------------	-----

Uncertainty (+/-) dB	0.13
----------------------	------

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)	51.7
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	44.1	0.1	±0.7	±0.9
51.0	43.0	43.1	0.1	±0.7	±0.9
52.0	42.0	42.1	0.1	±0.7	±0.9
53.0	41.0	41.1	0.1	±0.7	±0.9
54.0	40.0	40.2	0.2	±0.7	±0.9

Conforming	Yes
------------	-----

Uncertainty (+/-) dB	0.13
----------------------	------

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)	50.9
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	40.0	0.0	±0.7	±0.9

Conforming	Yes
------------	-----

Uncertainty (+/-) dB	0.13
----------------------	------

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)	50.8
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	42.0	0.0	±0.7	±0.9
53.0	41.0	41.0	0.0	±0.7	±0.9
54.0	40.0	40.1	0.1	±0.7	±0.9

Conforming	Yes
------------	-----

Uncertainty (+/-) dB	0.13
----------------------	------

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)	163.4

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
------------	-----

Uncertainty (+/-) dB	0.13
----------------------	------

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)	161.0

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
------------	-----

Uncertainty (+/-) dB	0.13
----------------------	------

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)	160.2

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	70.1	0.1	± 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
------------	-----

Uncertainty (+/-) dB	0.13
----------------------	------

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>
--

☒ 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		15.2	13.6	9.2	8.4	4.7	5.7	5.2	6.4	8.0
Conforming	N/A	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Freq	4kHz	8kHz	16kHz	32kHz						
Measured	10.4	13.3	16.6							
Conforming	Yes	Yes	Yes	N/A						

Conforming	Yes
------------	-----

Uncert (+/-) dB	0.09
-----------------	------

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		11.5	11.2	5.8	4.9	4.7	4.8	2.8	1.8	1.3
Conforming	N/A	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Freq	4kHz	8kHz	16kHz	32kHz						
Measured	1.9	3.1	5.2							
Conforming	Yes	Yes	Yes	N/A						

Conforming	Yes
------------	-----

Uncert (+/-) dB	0.09
-----------------	------

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	4545.0
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										50.1		
0.33										56.8		
0.53										68.9		
0.77										69.6		
0.89												
0.92										132.4		
0.95										132.9		
0.97										132.9		
1.00										132.9		
1.03										132.9		
1.06										132.9		
1.09										132.2		
1.12												
1.30										66.1		
1.89										27.4		
3.07										23.9		
5.43										24.4		
Attenuation dB										82.8	Class 1	Class 2
										76.1	+70/inf	+60/inf
										64.0	+60/inf	+54/inf
										63.3	+40.5/inf	+39.5/inf
											+16.6/inf	+15.6/inf
										0.5	-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
										0.7	-0.4/+1.4	-0.6/+1.7
											-0.4/+5.3	-0.6/+5.8
										66.8	+16.6/inf	+15.6/inf
										105.5	+40.5/inf	+39.5/inf
										109.0	+60/inf	+54/inf
										108.5	+70/inf	+60/inf

Ins Loss											-0.1
----------	--	--	--	--	--	--	--	--	--	--	------

Conforming	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Yes
------------	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

Uncert (+/-) dB	≤80dB	0.09	>80dB	0.46
-----------------	-------	------	-------	------

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	4545.0
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									48.3			
0.33									54.4			
0.53									64.4			
0.77									70.9			
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									132.3			
1.12												
1.30									58.1			
1.89									51.6			
3.07									25.9			
5.43									23.3		Class 1	Class 2
Attenuation dB									84.7		+70/inf	+60/inf
									78.6		+60/inf	+54/inf
									68.6		+40.5/inf	+39.5/inf
									62.1		+16.6/inf	+15.6/inf
											-0.4/+5.3	-0.6/+5.8
									0.3		-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
									0.7		-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
									107.1		+60/inf	+54/inf
									109.7		+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	Yes	N/A
------------	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

Uncert (+/-) dB	≤80dB	0.09	>80dB	0.46
-----------------	-------	------	-------	------

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	4545.0
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					46.4							
0.33					47.8							
0.53					58.4							
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					58.0							
1.89					51.6							
3.07					27.6							
5.43					27.2							
Attenuation dB					86.6						Class 1	Class 2
					85.2						+70/inf	+60/inf
					74.6						+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
					75.0						-0.4/+5.3	-0.6/+5.8
					81.4						+16.6/inf	+15.6/inf
					105.4						+40.5/inf	+39.5/inf
					105.8						+60/inf	+54/inf
											+70/inf	+60/inf

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

Conforming	N/A	N/A	N/A	N/A	Yes	N/A	N/A	N/A	N/A	N/A	N/A	N/A
------------	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

Uncert (+/-) dB	≤80dB	0.09	>80dB	0.46
-----------------	-------	------	-------	------

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	4545.0
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							46.5					
0.33							49.4					
0.53							52.6					
0.77							70.5					
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							41.6					
3.07							38.1					
5.43							53.9					
Attenuation dB							86.5				Class 1	Class 2
							83.6				+70/inf	+60/inf
							80.4				+60/inf	+54/inf
							62.5				+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
											-0.4/+5.3	-0.6/+5.8
							74.9				+16.6/inf	+15.6/inf
							91.4				+40.5/inf	+39.5/inf
							94.9				+60/inf	+54/inf
							79.1				+70/inf	+60/inf

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

Conforming	N/A	N/A	N/A	N/A	N/A	N/A	Yes	N/A	N/A	N/A
------------	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

Uncert (+/-) dB	≤80dB	0.09	>80dB	0.46
-----------------	-------	------	-------	------

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	51.0

	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	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	94.0	94.0	94.0	94.1	94.1	94.0	94.0	94.0		
Ins Loss	-0.1	-0.1	0.0	0.0	0.0	0.1	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											

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)	1834.0
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
------------	-----

Uncertainty (+/-) dB	0.13
----------------------	------

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)	1805.0
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
------------	-----

Uncertainty (+/-) dB	0.13
----------------------	------

Description of Tests

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)	1797.0
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
------------	-----

Uncertainty (+/-) dB	0.13
----------------------	------

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)	51.7
Noise Floor (dB)	-99.0

[illegible]

Conforming	Yes
------------	-----

Uncertainty (+/-) dB	0.13
----------------------	------

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)	50.9
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
------------	-----

Uncertainty (+/-) dB	0.13
----------------------	------

Description of Tests

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)	50.8
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	42.0	0.0	±0.7	±0.9
53.0	41.0	41.1	0.1	±0.7	±0.9
54.0	40.0	40.1	0.1	±0.7	±0.9

Conforming	Yes
------------	-----

Uncertainty (+/-) dB	0.13
----------------------	------

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)	163.4

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
------------	-----

Uncertainty (+/-) dB	0.13
----------------------	------

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)	161.0

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
------------	-----

Uncertainty (+/-) dB	0.13
----------------------	------

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)	160.2

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	70.1	0.1	± 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
------------	-----

Uncertainty (+/-) dB	0.13
----------------------	------

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>
--

☒ 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			11.2	12.5	11.6	11.2	2.6	7.9	4.1	0.3
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	5.6	1.2	0.8	1.2	0.2	0.3	0.0	0.6	0.4	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	0.4	1.6	0.5	0.9	1.7	2.0	2.7	2.9	3.9	5.0
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	5.6	6.2	7.0	8.3	9.2	10.4	11.5	12.9		
Conforming	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	N/A	N/A

Conforming	Yes
------------	-----

Uncert (+/-) dB	0.09
-----------------	------

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			5.2	3.6	10.9	8.9	0.0	7.8	5.2	0.9
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	4.1	2.1	2.3	1.6	0.0	0.0	0.5	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	0.0	0.4	1.2		
Conforming	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	N/A	N/A

Conforming	Yes
------------	-----

Uncert (+/-) dB	0.09
-----------------	------

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



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	1/02/2023	Job No	RC040	Operator	EF
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-05312-E0 #RTA06-004
Microphone Make	GRAS	Model	40AE	Serial No	#165474
Preamplifier Make	NTI	Model	MA220	Serial No	#11043
Ext'n Cable Make	NTI	Model	N/A	Serial No	N/A
Accessories	Nil			Firmware	V4.82

SLM Class	1
Filters Class	1

Environmental Conditions	Measured	
	Start	End
Air Temp. (°C)	24.4	24.7
Rel. Humidity (%)	63.0	63.2
Air Pressure (kPa)	100.7	100.7

Applicable Standards:

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

Applicable Work Instruction:

RWI-08 SLM & Calibrator Verification

Laboratory Equipment :

B&K4226 Multifunction Acoustic Calibrator SN 2288472
Agilent Function Generator Model 33511B SN MY59001831
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 through an unbroken chain of calibrations, is ultimately traceable to the International System of Units (SI). 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 2.04.

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: 28/02/2023

Template Document Name: RQT-05 SLM IEC61672 Verification (r85)

NATacoustic

Sound Level Meter Verification - Summary of Tests

Calibration Date	1/02/2023	Job No	RC040	Operator	EF
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-05312-E0 #RTA06-004
Microphone Make	GRAS	Model	40AE	Serial No	#165474
Preamplifier Make	NTI	Model	MA220	Serial No	#11043
Ext'n Cable Make	NTI	Model	N/A	Serial No	N/A
Accessories	Nil			Firmware	V4.82

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

SLM Class	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)	24.4	24.7
	Rel. Humidity (%)	63.0	63.2
	Air Pressure (kPa)	100.7	100.7
	Conforming	Yes	Yes

Test Description		Value / Conforming	Uncert (+/-)	
4(a). Initial Calibration	Calibration Frequency Hz	1000.0	N/A	
	Indicated Level Before Adjustment (dB)	114.1	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	17.1	0.09	
5(b). Self-Generated Noise, Electrical	A	7.2	0.09	
	C	11.1	0.09	
	Z	17.2	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	0.00	
	C	Yes	0.00	
	Z	Yes	0.00	
8. Frequency & Time Weightings 1kHz	8(a). Frequency Weighting	C	Yes	0.14
		Z	Yes	0.14
		FLAT	N/A	0.14
	8(b). Time Weighting	Slow	Yes	0.14
		Leq	Yes	0.14
9(a). Level Linearity 8kHz (Increasing)		Conforming	Yes	0.19
9(b). Level Linearity 8kHz (Decreasing)		Conforming	Yes	0.19
10(a). Level Linearity Including the Level Range (Reference Signal)		Conforming	Yes	0.17
10(b). Level Linearity Including the Level range (5dB Above Under-range)		Conforming	Yes	0.17
11. Toneburst Response	Fast	Yes	0.16	
	Slow	Yes	0.16	
	SEL/Leq	Yes	0.16	
	8 kHz	Yes	0.16	
12. Peak C sound level	500 Hz	Yes	0.16	
13. Overload indication	Conforming	Yes	0.16	
	Latches	Yes	N/A	
14. High-level Stability	Conforming	Yes	0.09	
15(a). Octave Band Filter Relative Attenuation (≤2kHz)		Conforming	Yes	0.16
15(b). Octave Band Filter Relative Attenuation (>2kHz)		Conforming	Yes	0.16
16. Octave Band Filter Relative Attenuation at Midband Frequency		Conforming	Yes	0.18
17(a). Octave Band Filter Level Linearity 31.5Hz (Increasing)		31.5Hz	Yes	0.19
17(b). Octave Band Filter Level Linearity 1kHz (Increasing)		1kHz	Yes	0.15
17(c). Octave Band Filter Level Linearity 16kHz (Increasing)		16kHz	Yes	0.19
18(a). Octave Band Filter Level Linearity 31.5Hz (Decreasing)		31.5Hz	Yes	0.20
18(b). Octave Band Filter Level Linearity 1kHz (Decreasing)		1kHz	Yes	0.17
18(c). Octave Band Filter Level Linearity 16kHz (Decreasing)		16kHz	Yes	0.20
19(a). Octave Level Linearity Including the Level range (31.5Hz)		31.5Hz	Yes	0.20
19(b). Octave Level Linearity Including the Level range (1kHz)		1kHz	Yes	0.17
19(c). Octave Level Linearity Including the Level range (16kHz)		16kHz	Yes	0.20
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	0.16
21(b). Third Octave Band Filter Relative Attenuation (40Hz-315Hz)		Conforming	Yes	0.16
21(c). Third Octave Band Filter Relative Attenuation (400Hz-3.15kHz)		Conforming	Yes	0.16
21(d). Third Octave Band Filter Relative Attenuation (≥24kHz)		Conforming	Yes	0.16
22. Third Octave Band Filter Relative Attenuation at Midband Frequency		Conforming	Yes	0.18

23(a). Third Octave Band Filter Level Linearity 31.5Hz (Increasing)	31.5Hz	Yes	0.19
23(b). Third Octave Band Filter Level Linearity 1kHz (Increasing)	1kHz	Yes	0.15
23(c). Third Octave Band Filter Level Linearity 16kHz (Increasing)	16kHz	Yes	0.19
24(a). Third Octave Band Filter Level Linearity 31.5Hz (Decreasing)	31.5Hz	Yes	0.20
24(b). Third Octave Band Filter Level Linearity 1kHz (Decreasing)	1kHz	Yes	0.17
24(c). Third Octave Band Filter Level Linearity 16kHz (Decreasing)	16kHz	Yes	0.20
25(a). Third Octave Level Linearity Including the Level range (31.5Hz)	31.5Hz	Yes	0.20
25(b). Third Octave Level Linearity Including the Level range (1kHz)	1kHz	Yes	0.17
25(c). Third Octave Level Linearity Including the Level range (16kHz)	16kHz	Yes	0.20
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	

Accredited for compliance with AS ISO/IEC 17025 - General requirements for the competence of testing and calibration laboratories.
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.

☒ Checked

Template Document Name: RQT-05 SLM IEC61672 Verification (r85)

1(a). Instrument Information

Calibration Date	1/02/2023	Job No	RC040	Operator	EF
------------------	-----------	--------	-------	----------	----

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-05312-E0 #RTA06-004
Microphone Make	GRAS	Model	40AE	Serial	#165474
Preampifier Make	NTI	Model	MA220	Serial	#11043
Ext'n Cable Make	NTI	Model		Serial	
Accessories	Nil			Firmware	V4.82

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

Notes
MA220 preamp failed test 15 when subjected to a very low frequency (<10hz) signal. Preamp was replaced and tests were redone after which the SLM passed all tests satisfactorily .

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 (A weighting)	40.0	120.0
8kHz Leq (A weighting)	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	4.02.01
Publication Date	04/2018
Source of Document (& Date of Download if Applicable)	N/A

Conforming	Yes
------------	-----

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
------------	----

☒ 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	3.20								3.20	0.58
12.5k	5.60								5.60	0.64
16k	7.10								7.10	0.64

Source of Mic FF to Pressure Correction	Interpolated from GRAS Calibration Curve
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
Laboratory Equipment Check	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)	24.4	24.7	1.4	1.7	0.4	1.80	2.10	3	Yes	20	26
Rel. Humidity (%)	63.0	63.2	15.5	15.7	6.8	22.30	22.50	22.5	Yes	25	70
Air Pressure (kPa)	100.7	100.7	8.2	8.2	0.13	8.33	8.33	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)	50.6

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)	114.1
Adjustment required	Yes
Indicated level after adjust. (dB)	114

4(b). Final Calibration

Level at conclusion of testing (dB)	113.9
Difference	-0.1
Tolerance	± 0.1

Conforming

Yes

Uncertainty (+/-) dB

0.11

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

Observed Values		
Leq	N/A	
17.1	1	
	2	
	3	
	4	
	5	
	6	
	7	
	8	
	9	
	10	
	Avg	

Results				
Freq Wt	Observed	Quoted	Tolerance	Conforming
A	17.1	16.0	+5,-inf	Yes

Uncertainty (+/-) dB	0.09
----------------------	------

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
7.2	11.1	17.2	1			
			2			
			3			
			4			
			5			
			6			
			7			
			8			
			9			
			10			
			Avg			

Results		
Freq Wt	Observed	Quoted
A	7.2	12.4
C	11.1	13.5
Z	17.2	18.3-25.5

Uncertainty (+/-) dB	0.09
----------------------	------

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. For information purposes, this laboratory compares the quoted noise floor to the measured value. This comparison is not used to check conformance to a specific requirement.

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	111.0	111.0	110.9	110.97	0.11	111.08	0.00	0.00	0.00	0.00	111.08	-3.03	-3.00	-0.03	± 1.5	± 3.0	Yes	0.43	0.14	0.41
63	113.3	113.2	113.1	113.20	0.02	113.22	0.00	0.00	0.00	0.00	113.22	-0.88	-0.80	-0.08	± 1.0	± 2.0	Yes	0.42	0.12	0.41
125	114.0	114.0	113.8	113.93	0.01	113.94	0.00	0.00	0.00	0.00	113.94	-0.16	-0.20	0.04	± 1.0	± 1.5	Yes	0.42	0.12	0.41
250	114.0	114.0	114.0	114.00	-0.01	113.99	0.00	0.00	0.00	0.00	113.99	-0.11	0.00	-0.11	± 1.0	± 1.5	Yes	0.42	0.12	0.41
500	114.0	114.0	113.9	113.97	-0.01	113.96	0.00	0.00	0.00	0.00	113.96	-0.15	0.00	-0.15	± 1.0	± 1.5	Yes	0.42	0.12	0.41
1k	114.0	113.9	113.9	113.93	-0.03	113.90	0.20	0.00	0.00	0.00	114.10	0.00	0.00	0.00	± 0.7	± 1.0	Yes	0.42	0.11	0.41
2k	113.6	113.6	113.5	113.57	0.02	113.59	0.45	0.00	0.00	0.00	114.04	-0.07	-0.20	0.13	± 1.0	± 2.0	Yes	0.43	0.13	0.41
4k	112.8	112.6	112.6	112.67	-0.26	112.41	1.05	0.00	0.00	0.00	113.46	-0.65	-0.80	0.15	± 1.0	± 3.0	Yes	0.43	0.14	0.41
8k	109.5	109.2	109.0	109.23	-0.13	109.10	3.20	0.00	0.00	0.00	112.30	-1.80	-3.00	1.20	+1.5; -2.5	± 5.0	Yes	0.60	0.15	0.58
12.5k	104.1	103.5	103.3	103.63	0.00	103.63	5.60	0.00	0.00	0.00	109.23	-4.87	-6.20	1.33	+2.0; -5.0	+5,-inf	Yes	0.68	0.21	0.64
16k	100.4	99.6	99.3	99.77	0.20	99.97	7.10	0.00	0.00	0.00	107.07	-7.04	-8.50	1.46	+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)	20
Generator Frequency (Hz)	1k
SPL Reference (dB)	75
Integration Time (s)	N/A
Generator Output (mVrms)	60.70

Freq Hz	Output (mV)	Indication A	Output (mV)	Indication C	Output (mV)	Indication Z	Tolerance		Uncertainty		
63	1239.33	75.0	66.56	75.0	60.70	75.1					
125	387.43	75.0	62.11	75.1	60.70	75.1					
250	163.38	75.0	60.70	75.0	60.70	75.0					
500	87.74	75.0	60.70	75.1	60.70	75.0					
1k	60.70	75.0	60.70	75.0	60.70	75.0					
2k	52.87	75.0	62.11	75.1	60.70	75.0					
4k	54.10	75.0	66.56	75.0	60.70	75.0					
8k	68.90	75.0	85.74	75.0	60.70	75.0					
16k	129.77	74.9	161.51	75.0	60.70	75.1					
Typical Microphone 0deg Free Field Response		0.00		0.00		0.00	Tolerance		Uncertainty		
		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		75.00		75.00		75.10					
		75.00		75.10		75.10					
		75.00		75.00		75.00					
		75.00		75.10		75.00					
		75.00		75.10		75.00					
		75.00		75.00		75.00					
		75.00		75.00		75.00					
		74.90		75.00		75.10					
Response re 1kHz (Deviation from Expected)		0.00		0.00		0.10	Type 1	Type 2	Total (+/-) dB	Lab (+/-) dB	Corrections (+/-) dB
		0.00		0.10		0.10	± 1.0	± 2.0	0.44	0.18	0.41
		0.00		0.00		0.00	± 1.0	± 1.5	0.44	0.18	0.41
		0.00		0.00		0.00	± 1.0	± 1.5	0.44	0.18	0.41
		0.10		0.10		0.00	± 1.0	± 1.5	0.44	0.18	0.41
		0.00		0.00		0.00	± 0.7	± 1.0	0.44	0.18	0.41
		0.00		0.10		0.00	± 1.0	± 2.0	0.44	0.18	0.41
		0.00		0.00		0.00	± 1.0	± 3.0	0.44	0.18	0.41
		0.00		0.00		0.00	+1.5; -2.5	± 5.0	0.61	0.18	0.58
		-0.10		0.00		0.10	+2.5; -16.0	+5,-inf	0.67	0.18	0.64

Conforming	Yes	Yes	Yes
------------	-----	-----	-----

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
Generator Frequency (Hz)	1k
SPL Reference (dB)	114.0
Output (mVrms)	536.0

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
------------	-----	-----	-----

Uncertainty (+/-) dB	0.14
----------------------	------

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
------------	-----	-----

Uncertainty (+/-) dB	0.14
----------------------	------

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)

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)	1896.0
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	± 0.8	± 1.1
21.0	104.0	104.0	0.0	± 0.8	± 1.1
16.0	109.0	109.0	0.0	± 0.8	± 1.1
11.0	114.0	114.0	0.0	± 0.8	± 1.1
10.0	115.0	115.0	0.0	± 0.8	± 1.1
9.0	116.0	116.0	0.0	± 0.8	± 1.1
8.0	117.0	117.0	0.0	± 0.8	± 1.1
7.0	118.0	118.0	0.0	± 0.8	± 1.1
6.0	119.0	119.0	0.0	± 0.8	± 1.1
5.0	120.0	120.0	0.0	± 0.8	± 1.1
4.0	121.0	121.0	0.0	± 0.8	± 1.1
3.0	122.0	122.0	0.0	± 0.8	± 1.1
2.0	123.0	123.0	0.0	± 0.8	± 1.1
1.0	124.0	124.0	0.0	± 0.8	± 1.1
0.0	125.0	125.0	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
------------	-----

Uncertainty (+/-) dB	0.19
----------------------	------

Description of Tests

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)	10
Generator Frequency (Hz)	8k
SPL Reference Starting Point (dB)	94
Output (mVrms)	169.0
Noise Floor (dB)	-99.0

Decreasing level to Underrange				Tolerance	
Atten	Expected	Indicator	Diff	Type 1	Type 2
15.0	89.0	89.0	0.0	± 0.8	± 1.1
20.0	84.0	84.0	0.0	± 0.8	± 1.1
25.0	79.0	79.0	0.0	± 0.8	± 1.1
30.0	74.0	74.0	0.0	± 0.8	± 1.1
35.0	69.0	69.0	0.0	± 0.8	± 1.1
40.0	64.0	64.0	0.0	± 0.8	± 1.1
45.0	59.0	59.0	0.0	± 0.8	± 1.1
50.0	54.0	54.0	0.0	± 0.8	± 1.1
55.0	49.0	49.0	0.0	± 0.8	± 1.1
59.0	45.0	45.0	0.0	± 0.8	± 1.1
60.0	44.0	44.0	0.0	± 0.8	± 1.1
61.0	43.0	43.0	0.0	± 0.8	± 1.1
62.0	42.0	42.0	0.0	± 0.8	± 1.1
63.0	41.0	41.0	0.0	± 0.8	± 1.1
64.0	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

Conforming	Yes
------------	-----

Uncertainty (+/-) dB	0.20
----------------------	------

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)	539.0

Settings	Level (dB)			Tolerance	
Range	Expected	Indicated	Difference	Type 1	Type 2
HIGH	114.0	113.9	-0.1	± 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
------------	-----

Uncertainty (+/-) dB	0.14
----------------------	------

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)	60.0

Settings	Level (dB)			Tolerance	
Range	Atten	Expected	Indicated	Difference	Type 2
HIGH	30.0	65.0	65.0	0.0	± 1.1
MID	50.0	45.0	45.0	0.0	± 1.1
LOW	70.0	25.0	25.2	0.2	± 1.1
					± 1.1
					± 1.1
					± 1.1
					± 1.1
					± 1.1
					± 1.1
					± 1.1

Conforming	Yes
------------	-----

Uncertainty (+/-) dB	0.17
----------------------	------

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)	673.0

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	89.9	-0.1	+ 1.0; -3.0	+ 1.5; -5.0

Conforming	Yes
------------	-----

Uncertainty (+/-) dB	0.16
----------------------	------

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)	673.0

Toneburst (ms)	# Cycles	LASMax (dB)			Tolerance	
		Expected	Indicated	Difference	Type 1	Type 2
200	800	109.6	109.5	-0.1	± 0.5	± 1.0
2	8	90.0	89.9	-0.1	+ 1.0; -3.0	+ 1.0; -5.0

Conforming	Yes
------------	-----

Uncertainty (+/-) dB	0.16
----------------------	------

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)	673.0
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	80.8	80.8	81.0	-0.2	+ 1.0; -3.0	+ 1.5; -5.0

Conforming	Yes
------------	-----

Uncertainty (+/-) dB	0.16
----------------------	------

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)	602.0

Test Signal	dB LCpeak Hold				Tolerance	
8 kHz	Indication	O'Load?	Expected	Difference	Type 1	Type 2
1 Cycle	115.3	No	115.4	-0.1	± 2.0	± 3.0

Conforming	Yes
------------	-----

Uncertainty (+/-) dB	0.16
----------------------	------

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)	422.0
Output High Level (mV)	596.8
Output Low Level (mV)	-596.8

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	0.16
----------------------	------

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)	878.7	

	Half-Cycle Signal			Tolerance	
	Positive	Negative	Difference	Type 1	Type 2
Level (dB)	135.1	136.0	-0.9	± 1.5	± 1.5
Generator Output (mVrms)	5667.5	6641.6			

Conforming	Yes
------------	-----

Uncertainty (+/-) dB	0.16
----------------------	------

Overload Indicated	Yes
Overload Indicator Latches	Yes

Conforming	Yes
------------	-----

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)	958.0

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
------------	-----

Uncertainty (+/-) dB	0.09
----------------------	------

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	4817.0
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				39.0					37.5			
0.13				48.6					52.4			
0.25				74.4					77.8			
0.50				105.9					108.6			
0.71												
0.77				132.4					132.5			
0.84				132.9					132.9			
0.92				133.0					133.0			
1.00				132.9					133.0			
1.09				133.0					133.0			
1.19				133.0					133.0			
1.30				132.7					132.7			
1.41												
2.00				107.3					95.8			
4.00				75.1					33.6			
8.00				48.7					36.6			
16.00				26.7					32.5			
Attenuation dB				93.9					95.5		Class 1	Class 2
				84.3					80.6		+70/inf	+60/inf
				58.5					55.2		+60/inf	+54/inf
				27.0					24.4		+40.5/inf	+39.5/inf
											+16.6/inf	+15.6/inf
				0.5					0.5		-0.4/+5.3	-0.6/+5.8
				0.0					0.1		-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
				-0.1					0.0		-0.4/+0.4	-0.6/+0.6
				-0.1					0.0		-0.4/+0.5	-0.6/+0.7
				-0.1					0.0		-0.4/+0.7	-0.6/+0.9
				0.2					0.3		-0.4/+1.4	-0.6/+1.7
											-0.4/+5.3	-0.6/+5.8
				25.6					37.2		+16.6/inf	+15.6/inf
				57.8					99.4		+40.5/inf	+39.5/inf
				84.2					96.4		+60/inf	+54/inf
				106.2					100.5		+70/inf	+60/inf

Ins Loss				-0.1					0.0	
----------	--	--	--	------	--	--	--	--	-----	--

Conforming	N/A	N/A	N/A	Yes	N/A	N/A	N/A	N/A	Yes	N/A
------------	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

Uncert (+/-) dB	≤80dB	0.16	>80dB	0.48
-----------------	-------	------	-------	------

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.

The ≤80dB uncertainty applies to those "Attenuation dB" cells where the value is less than or equal to 80, while the >80dB uncertainty applies to the remaining "Attenuation dB" cells.

☒ 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	4817.0
Noise Floor dB	-99.0

Ratio	1	2	3	4	5	6	7	8	9	10	Tolerance	
Freq	4kHz	8kHz	16kHz	32kHz								
0.06			43.6									
0.13			62.7									
0.25			87.6									
0.50			115.2									
0.71												
0.77			132.1									
0.84			132.8									
0.92			132.9									
1.00			133.0									
1.09			133.0									
1.19			132.9									
1.30			132.9									
1.41												
2.00			47.4									
4.00			52.9									
8.00			48.4									
16.00			51.4									
Attenuation dB			89.4								Class 1	Class 2
			70.3								+70/inf	+60/inf
			45.4								+60/inf	+54/inf
			17.8								+40.5/inf	+39.5/inf
											+16.6/inf	+15.6/inf
			0.9								-0.4/+5.3	-0.6/+5.8
			0.2								-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
			0.1								-0.4/+0.5	-0.6/+0.7
			0.1								-0.4/+0.7	-0.6/+0.9
			0.1								-0.4/+1.4	-0.6/+1.7
											-0.4/+5.3	-0.6/+5.8
			85.6								+16.6/inf	+15.6/inf
			80.1								+40.5/inf	+39.5/inf
			84.6								+60/inf	+54/inf
			81.6								+70/inf	+60/inf

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

Conforming	N/A	N/A	Yes	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
------------	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

Uncert (+/-) dB	≤80dB	0.16	>80dB	0.48
-----------------	-------	------	-------	------

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.

The ≤80dB uncertainty applies to those "Attenuation dB" cells where the value is less than or equal to 80, while the >80dB uncertainty applies to the remaining "Attenuation dB" cells.

☒ 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	10
Reference SPL 1kHz	94.0
Output mVrms	169.0

	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		93.8	93.8	93.9	93.9	94.0	94.0	94.0	94.0	94.0		
Ins Loss		-0.2	-0.2	-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	Yes	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	0.18
-----------------	------

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)	1929.0
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
------------	-----

Uncertainty (+/-) dB	0.19
----------------------	------

Description of Tests

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)	1889.0
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	103.9	-0.1	±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	115.9	-0.1	±0.5	±0.6
8.0	117.0	116.9	-0.1	±0.5	±0.6
7.0	118.0	117.9	-0.1	±0.5	±0.6
6.0	119.0	118.9	-0.1	±0.5	±0.6
5.0	120.0	119.9	-0.1	±0.5	±0.6
4.0	121.0	120.9	-0.1	±0.5	±0.6
3.0	122.0	121.9	-0.1	±0.5	±0.6
2.0	123.0	122.9	-0.1	±0.5	±0.6
1.0	124.0	123.9	-0.1	±0.5	±0.6
0.0	125.0	124.9	-0.1	±0.5	±0.6

Conforming	Yes
------------	-----

Uncertainty (+/-) dB	0.15
----------------------	------

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)	1889.0
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
------------	-----

Uncertainty (+/-) dB	0.19
----------------------	------

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)	10
Generator Frequency (Hz)	31.5
SPL Reference Starting Point (dB)	94
Output (mVrms)	172.0
Noise Floor (dB)	-99.0

Decreasing level to Underrange				Tolerance	
Atten	Expected	Indicator	Diff	Type 1	Type 2
15.0	89.0	89.0	0.0	±0.5	±0.6
20.0	84.0	84.0	0.0	±0.5	±0.6
25.0	79.0	79.0	0.0	±0.7	±0.9
30.0	74.0	74.0	0.0	±0.7	±0.9
35.0	69.0	69.0	0.0	±0.7	±0.9
40.0	64.0	64.0	0.0	±0.7	±0.9
45.0	59.0	59.0	0.0	±0.7	±0.9
50.0	54.0	54.0	0.0	±0.7	±0.9
55.0	49.0	49.0	0.0	±0.7	±0.9
59.0	45.0	45.0	0.0	±0.7	±0.9
60.0	44.0	44.0	0.0	±0.7	±0.9
61.0	43.0	43.0	0.0	±0.7	±0.9
62.0	42.0	42.1	0.1	±0.7	±0.9
63.0	41.0	41.1	0.1	±0.7	±0.9
64.0	40.0	40.1	0.1	±0.7	±0.9

Conforming	Yes
------------	-----

Uncertainty (+/-) dB	0.20
----------------------	------

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)	10
Generator Frequency (Hz)	1kHz
SPL Reference Starting Point (dB)	94
Output (mVrms)	169.0
Noise Floor (dB)	-99.0

Decreasing level to Underrange				Tolerance	
Atten	Expected	Indicator	Diff	Type 1	Type 2
15.0	89.0	89.0	0.0	±0.5	±0.6
20.0	84.0	84.0	0.0	±0.5	±0.6
25.0	79.0	79.0	0.0	±0.7	±0.9
30.0	74.0	74.0	0.0	±0.7	±0.9
35.0	69.0	69.0	0.0	±0.7	±0.9
40.0	64.0	64.0	0.0	±0.7	±0.9
45.0	59.0	59.0	0.0	±0.7	±0.9
50.0	54.0	54.0	0.0	±0.7	±0.9
55.0	49.0	49.0	0.0	±0.7	±0.9
59.0	45.0	45.0	0.0	±0.7	±0.9
60.0	44.0	44.0	0.0	±0.7	±0.9
61.0	43.0	43.0	0.0	±0.7	±0.9
62.0	42.0	42.0	0.0	±0.7	±0.9
63.0	41.0	41.0	0.0	±0.7	±0.9
64.0	40.0	40.0	0.0	±0.7	±0.9

Conforming	Yes
------------	-----

Uncertainty (+/-) dB	0.17
----------------------	------

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)	10
Generator Frequency (Hz)	16kHz
SPL Reference Starting Point (dB)	94
Output (mVrms)	169.0
Noise Floor (dB)	-99.0

Decreasing level to Underrange				Tolerance	
Atten	Expected	Indicator	Diff	Type 1	Type 2
15.0	89.0	89.0	0.0	±0.5	±0.6
20.0	84.0	84.0	0.0	±0.5	±0.6
25.0	79.0	79.0	0.0	±0.7	±0.9
30.0	74.0	74.0	0.0	±0.7	±0.9
35.0	69.0	69.0	0.0	±0.7	±0.9
40.0	64.0	64.1	0.1	±0.7	±0.9
45.0	59.0	59.0	0.0	±0.7	±0.9
50.0	54.0	54.0	0.0	±0.7	±0.9
55.0	49.0	49.0	0.0	±0.7	±0.9
59.0	45.0	45.0	0.0	±0.7	±0.9
60.0	44.0	44.1	0.1	±0.7	±0.9
61.0	43.0	43.1	0.1	±0.7	±0.9
62.0	42.0	42.1	0.1	±0.7	±0.9
63.0	41.0	41.1	0.1	±0.7	±0.9
64.0	40.0	40.1	0.1	±0.7	±0.9

Conforming	Yes
------------	-----

Uncertainty (+/-) dB	0.20
----------------------	------

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)	172.0

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
------------	-----

Uncertainty (+/-) dB	0.20
----------------------	------

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)	169.0

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
------------	-----

Uncertainty (+/-) dB	0.17
----------------------	------

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)	169.0

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
------------	-----

Uncertainty (+/-) dB	0.20
----------------------	------

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>
--

☒ 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		13.1	11.8	8.6	6.7	4.8	3.7	4.3	5.9	7.6
Conforming	N/A	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Freq	4kHz	8kHz	16kHz	32kHz						
Measured	10.0	12.7	16.2							
Conforming	Yes	Yes	Yes	N/A						

Conforming	Yes
------------	-----

Uncert (+/-) dB	0.09
-----------------	------

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		13.2	12.3	8.0	5.4	3.2	2.6	1.0	1.4	0.9
Conforming	N/A	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Freq	4kHz	8kHz	16kHz	32kHz						
Measured	1.3	2.6	4.8							
Conforming	Yes	Yes	Yes	N/A						

Conforming	Yes
------------	-----

Uncert (+/-) dB	0.09
-----------------	------

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	4817.0
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										49.5		
0.33										58.1		
0.53										72.5		
0.77										102.9		
0.89												
0.92										132.0		
0.95										132.9		
0.97										133.0		
1.00										133.0		
1.03										133.0		
1.06										133.0		
1.09										132.9		
1.12												
1.30										106.1		
1.89										72.1		
3.07										47.4		
5.43										25.9		
Attenuation dB										83.5	Class 1	Class 2
										74.9	+70/inf	+60/inf
										60.5	+60/inf	+54/inf
										30.1	+40.5/inf	+39.5/inf
											+16.6/inf	+15.6/inf
											-0.4/+5.3	-0.6/+5.8
										1.0	-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
										0.1	-0.4/+1.4	-0.6/+1.7
											-0.4/+5.3	-0.6/+5.8
										26.9	+16.6/inf	+15.6/inf
										60.9	+40.5/inf	+39.5/inf
										85.6	+60/inf	+54/inf
										107.1	+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	N/A	Yes
------------	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

Uncert (+/-) dB	≤80dB	0.16	>80dB	0.48
-----------------	-------	------	-------	------

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.

The ≤80dB uncertainty applies to those "Attenuation dB" cells where the value is less than or equal to 80, while the >80dB uncertainty applies to

☒ 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	4817.0
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									39.4		Tolerance	
0.33									51.6			
0.53									71.9			
0.77									104.1			
0.89												
0.92									132.4			
0.95									132.9			
0.97									133.0			
1.00									133.0			
1.03									133.0			
1.06									133.0			
1.09									132.8			
1.12												
1.30									104.7			
1.89									69.6			
3.07									39.4			
5.43									24.0			
Attenuation dB									93.6		Class 1	Class 2
									81.4		+70/inf	+60/inf
									61.1		+60/inf	+54/inf
									28.9		+40.5/inf	+39.5/inf
											+16.6/inf	+15.6/inf
									0.6		-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
									0.2		-0.4/+1.4	-0.6/+1.7
											-0.4/+5.3	-0.6/+5.8
									28.3		+16.6/inf	+15.6/inf
									63.4		+40.5/inf	+39.5/inf
									93.6		+60/inf	+54/inf
									109.0		+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
------------	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

Uncert (+/-) dB	≤80dB	0.16	>80dB	0.48
-----------------	-------	------	-------	------

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.

The ≤80dB uncertainty applies to those "Attenuation dB" cells where the value is less than or equal to 80, while the >80dB uncertainty applies to the remaining "Attenuation dB" cells.

☒ 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	4817.0
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					40.7							
0.33					59.1							
0.53					81.5							
0.77					109.6							
0.89												
0.92					132.4							
0.95					132.9							
0.97					133.0							
1.00					133.0							
1.03					133.0							
1.06					133.0							
1.09					132.8							
1.12												
1.30					86.9							
1.89					42.5							
3.07					28.1							
5.43					28.5							
Attenuation dB					92.3						Class 1	Class 2
					73.9						+70/inf	+60/inf
					51.5						+60/inf	+54/inf
					23.4						+40.5/inf	+39.5/inf
											+16.6/inf	+15.6/inf
					0.6						-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
					0.2						-0.4/+1.4	-0.6/+1.7
					46.1						-0.4/+5.3	-0.6/+5.8
					90.5						+16.6/inf	+15.6/inf
					104.9						+40.5/inf	+39.5/inf
					104.5						+60/inf	+54/inf
											+70/inf	+60/inf

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

Conforming	N/A	N/A	N/A	N/A	Yes	N/A	N/A	N/A	N/A	N/A	N/A
------------	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

Uncert (+/-) dB	≤80dB	0.16	>80dB	0.48
-----------------	-------	------	-------	------

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.

The ≤80dB uncertainty applies to those "Attenuation dB" cells where the value is less than or equal to 80, while the >80dB uncertainty applies to the remaining "Attenuation dB" cells.

☒ 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	4817.0
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							41.5					
0.33							59.4					
0.53							81.8					
0.77							110.6					
0.89												
0.92							132.7					
0.95							132.9					
0.97							133.0					
1.00							133.0					
1.03							132.9					
1.06							132.5					
1.09												
1.12												
1.30							85.2					
1.89							42.2					
3.07							38.2					
5.43							42.2					
Attenuation dB							91.5				Class 1	Class 2
							73.6				+70/inf	+60/inf
							51.2				+60/inf	+54/inf
							22.4				+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
							0.1				-0.4/+0.7	-0.6/+0.9
							0.5				-0.4/+1.4	-0.6/+1.7
											-0.4/+5.3	-0.6/+5.8
							47.8				+16.6/inf	+15.6/inf
							90.8				+40.5/inf	+39.5/inf
							94.8				+60/inf	+54/inf
							90.8				+70/inf	+60/inf

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

Conforming	N/A	N/A	N/A	N/A	N/A	N/A	Yes	N/A	N/A	N/A
------------	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

Uncert (+/-) dB	≤80dB	0.16	>80dB	0.48
-----------------	-------	------	-------	------

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.

The ≤80dB uncertainty applies to those "Attenuation dB" cells where the value is less than or equal to 80, while the >80dB uncertainty applies to the remaining "Attenuation dB" cells.

☒ 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	10
Reference SPL 1kHz	94.0
Output mVrms	169.0

	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	Class 1	Class 2
Measured			93.7	93.9	94.0	94.0	93.8	93.9	93.9	93.9		
Ins Loss			-0.3	-0.1	0.0	0.0	-0.2	-0.1	-0.1	-0.1	-0.4/+0.4	-0.6/+0.6
Conforming	N/A	N/A	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		

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

Uncert (+/-) dB	0.18
-----------------	------

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)	1929.0
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
------------	-----

Uncertainty (+/-) dB	0.19
----------------------	------

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)	1900.0
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	Y		±0.5	±0.6

Conforming	Yes
------------	-----

Uncertainty (+/-) dB	0.15
----------------------	------

Description of Tests

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)	1900.0
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
------------	-----

Uncertainty (+/-) dB	0.19
----------------------	------

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)	10
Generator Frequency (Hz)	31.5
SPL Reference Starting Point (dB)	94
Output (mVrms)	172.0
Noise Floor (dB)	-99.0

Decreasing level to Underrange				Tolerance	
Atten	Expected	Indicator	Diff	Type 1	Type 2
15.0	89.0	89.0	0.0	±0.5	±0.6
20.0	84.0	84.0	0.0	±0.5	±0.6
25.0	79.0	79.0	0.0	±0.7	±0.9
30.0	74.0	74.0	0.0	±0.7	±0.9
35.0	69.0	69.0	0.0	±0.7	±0.9
40.0	64.0	64.0	0.0	±0.7	±0.9
45.0	59.0	59.0	0.0	±0.7	±0.9
50.0	54.0	54.0	0.0	±0.7	±0.9
55.0	49.0	49.0	0.0	±0.7	±0.9
59.0	45.0	45.0	0.0	±0.7	±0.9
60.0	44.0	44.0	0.0	±0.7	±0.9
61.0	43.0	43.1	0.1	±0.7	±0.9
62.0	42.0	42.1	0.1	±0.7	±0.9
63.0	41.0	41.1	0.1	±0.7	±0.9
64.0	40.0	40.1	0.1	±0.7	±0.9

Conforming	Yes
------------	-----

Uncertainty (+/-) dB	0.20
----------------------	------

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)	10
Generator Frequency (Hz)	1kHz
SPL Reference Starting Point (dB)	94
Output (mVrms)	172.0
Noise Floor (dB)	-99.0

Decreasing level to Underrange				Tolerance	
Atten	Expected	Indicator	Diff	Type 1	Type 2
15.0	89.0	89.0	0.0	±0.5	±0.6
20.0	84.0	84.0	0.0	±0.5	±0.6
25.0	79.0	79.0	0.0	±0.7	±0.9
30.0	74.0	74.0	0.0	±0.7	±0.9
35.0	69.0	69.0	0.0	±0.7	±0.9
40.0	64.0	64.0	0.0	±0.7	±0.9
45.0	59.0	59.0	0.0	±0.7	±0.9
50.0	54.0	54.0	0.0	±0.7	±0.9
55.0	49.0	49.0	0.0	±0.7	±0.9
59.0	45.0	45.0	0.0	±0.7	±0.9
60.0	44.0	44.0	0.0	±0.7	±0.9
61.0	43.0	43.1	0.1	±0.7	±0.9
62.0	42.0	42.1	0.1	±0.7	±0.9
63.0	41.0	41.1	0.1	±0.7	±0.9
64.0	40.0	40.2	0.2	±0.7	±0.9

Conforming	Yes
------------	-----

Uncertainty (+/-) dB	0.17
----------------------	------

Description of Tests

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)	10
Generator Frequency (Hz)	16kHz
SPL Reference Starting Point (dB)	94
Output (mVrms)	169.0
Noise Floor (dB)	-99.0

Decreasing level to Underrange				Tolerance	
Atten	Expected	Indicator	Diff	Type 1	Type 2
15.0	89.0	89.0	0.0	±0.5	±0.6
20.0	84.0	84.0	0.0	±0.5	±0.6
25.0	79.0	79.0	0.0	±0.7	±0.9
30.0	74.0	74.0	0.0	±0.7	±0.9
35.0	69.0	69.0	0.0	±0.7	±0.9
40.0	64.0	64.1	0.1	±0.7	±0.9
45.0	59.0	59.0	0.0	±0.7	±0.9
50.0	54.0	54.0	0.0	±0.7	±0.9
55.0	49.0	49.0	0.0	±0.7	±0.9
59.0	45.0	45.0	0.0	±0.7	±0.9
60.0	44.0	44.1	0.1	±0.7	±0.9
61.0	43.0	43.1	0.1	±0.7	±0.9
62.0	42.0	42.1	0.1	±0.7	±0.9
63.0	41.0	41.1	0.1	±0.7	±0.9
64.0	40.0	40.1	0.1	±0.7	±0.9

Conforming	Yes
------------	-----

Uncertainty (+/-) dB	0.20
----------------------	------

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)	172.0

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
------------	-----

Uncertainty (+/-) dB	0.20
----------------------	------

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)	169.0

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
------------	-----

Uncertainty (+/-) dB	0.17
----------------------	------

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)	169.0

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
------------	-----

Uncertainty (+/-) dB	0.20
----------------------	------

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>
--

☒ 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			6.7	6.6	6.4	5.3	5.7	5.2	6.9	4.6
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	2.5	1.7	2.0	1.3	1.0	0.7	U	U	0.4	0.3
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	U	0.5	0.9	0.5	1.2	1.4	2.2	2.6	3.4	4.4
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	5.2	6.4	6.9	8.0	9.0	10.3	11.5	12.4		
Conforming	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	N/A	N/A

Conforming	Yes
Uncert (+/-) dB	0.09

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			10.1	8.1	10.3	6.7	5.8	6.7	4.0	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	3.1	2.0	1.8	1.7	0.8	U	U	U	U	U
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	U	U	U	U	U	U	U	U	U	U
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	U	U	U	U	U	U	U	0.7		
Conforming	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	N/A	N/A

Conforming	Yes
Uncert (+/-) dB	0.09

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



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	24/02/2023	Job No	RC055	Operator	AM
Client Name	CPB CONTRACTORS				
Client Address	LEVEL 4, 201 ELIZABETH STREET, SYDNEY NSW 2000				

Test Item

Instrument Make	RION	Model	NL-20	Serial No	#143337
Microphone Make	RION	Model	UC-52	Serial No	#94478
Preamplifier Make	RION	Model	NH-21	Serial No	#10094
Ext'n Cable Make	Nil	Model	N/A	Serial No	N/A
Accessories	Nil			Firmware	N/A

SLM Class	2
Filters Class	N/A

Environmental Conditions	Measured	
	Start	End
Air Temp. (°C)	24.1	24.3
Rel. Humidity (%)	62.1	62.3
Air Pressure (kPa)	100.6	100.6

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 33511B SN MY59001831
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 through an unbroken chain of calibrations, is ultimately traceable to the International System of Units (SI). 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 2.04.

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



NATA Accredited Laboratory Number
14966

Accredited for compliance with
ISO/IEC 17025 - Calibration

Authorized Signatory:

Print Name: Ariel Michael

Date: 27/02/2023

Template Document Name: RQT-05 SLM IEC61672 Verification (r86)

NATacoustic

Sound Level Meter Verification - Summary of Tests

Calibration Date 24/02/2023	Job No RC055	Operator AM
Client Name CPB CONTRACTORS		
Client Address LEVEL 4, 201 ELIZABETH STREET, SYDNEY NSW 2000		

1. Instrument Information & Reference Conditions			
Instrument Make RION	Model NL-20	Serial No #143337	
Microphone Make RION	Model UC-52	Serial No #94478	
Preamplifier Make RION	Model NH-21	Serial No #10094	
Ext'n Cable Make Nil	Model N/A	Serial No N/A	
Accessories Nil		Firmware N/A	

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

SLM Class	2
Filter Class	N/A

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)	24.1	24.3
	Rel. Humidity (%)	62.1	62.3
	Air Pressure (kPa)	100.6	100.6
	Conforming	Yes	Yes

Test Description		Value / Conforming	Uncert (+/-)	
4(a). Initial Calibration	Calibration Frequency Hz	1000.0	N/A	
	Indicated Level Before Adjustment (dB)	93.7	0.11	
	Indicated Level After Adjustment (dB)	94.0	0.11	
	Stability During Continuous Operation (dB)	Yes	N/A	
5(a). Self-Generated Noise, Microphone Installed	A	18.3	0.09	
5(b). Self-Generated Noise, Electrical	A	17.7	0.09	
	C	23.0	0.09	
	Z		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	0.00	
	C	Yes	0.00	
	Z	N/A	0.00	
8. Frequency & Time Weightings 1kHz	8(a). Frequency Weighting	C	Yes	0.14
		Z	N/A	0.14
		FLAT	Yes	0.14
	8(b). Time Weighting	Slow	Yes	0.14
		Leq	Yes	0.14
		Conforming	Yes	0.19
9(a). Level Linearity 8kHz (Increasing)		Conforming	Yes	0.19
9(b). Level Linearity 8kHz (Decreasing)		Conforming	Yes	0.19
10(a). Level Linearity Including the Level Range (Reference Signal)		Conforming	Yes	0.17
10(b). Level Linearity Including the Level range (5dB Above Under-range)		Conforming	Yes	0.17
11. Toneburst Response	Fast	Yes	0.20	
	Slow	Yes	0.20	
	SEL/Leq	Yes	0.20	
	8 kHz	N/A	0.16	
12. Peak C sound level	500 Hz	N/A	0.16	
	Conforming	Yes	0.20	
13. Overload indication	Latches	Yes	N/A	
14. High-level Stability	Conforming	Yes	0.09	
15(a). Octave Band Filter Relative Attenuation (≤2kHz)		Conforming	N/A	0.16
15(b). Octave Band Filter Relative Attenuation (>2kHz)		Conforming	N/A	0.16
16. Octave Band Filter Relative Attenuation at Midband Frequency		Conforming	N/A	0.18
17(a). Octave Band Filter Level Linearity 31.5Hz (Increasing)		31.5Hz	N/A	0.19
17(b). Octave Band Filter Level Linearity 1kHz (Increasing)		1kHz	N/A	0.15
17(c). Octave Band Filter Level Linearity 16kHz (Increasing)		16kHz	N/A	0.19
18(a). Octave Band Filter Level Linearity 31.5Hz (Decreasing)		31.5Hz	N/A	0.20
18(b). Octave Band Filter Level Linearity 1kHz (Decreasing)		1kHz	N/A	0.17
18(c). Octave Band Filter Level Linearity 16kHz (Decreasing)		16kHz	N/A	0.20
19(a). Octave Level Linearity Including the Level range (31.5Hz)		31.5Hz	N/A	0.20
19(b). Octave Level Linearity Including the Level range (1kHz)		1kHz	N/A	0.17
19(c). Octave Level Linearity Including the Level range (16kHz)		16kHz	N/A	0.20
20(a). Octave Band Filter Lower Limit (Reference Range)		Conforming	N/A	0.09
20(b). Octave Band Filter Lower Limit (Lowest Range)		Conforming	N/A	0.09
21(a). Third Octave Band Filter Relative Attenuation (≤31.5Hz)		Conforming	N/A	0.16
21(b). Third Octave Band Filter Relative Attenuation (40Hz-315Hz)		Conforming	N/A	0.16
21(c). Third Octave Band Filter Relative Attenuation (400Hz-3.15kHz)		Conforming	N/A	0.16
21(d). Third Octave Band Filter Relative Attenuation (≥24kHz)		Conforming	N/A	0.16
22. Third Octave Band Filter Relative Attenuation at Midband Frequency		Conforming	N/A	0.18

23(a). Third Octave Band Filter Level Linearity 31.5Hz (Increasing)	31.5Hz	N/A	0.19
23(b). Third Octave Band Filter Level Linearity 1kHz (Increasing)	1kHz	N/A	0.15
23(c). Third Octave Band Filter Level Linearity 16kHz (Increasing)	16kHz	N/A	0.19
24(a). Third Octave Band Filter Level Linearity 31.5Hz (Decreasing)	31.5Hz	N/A	0.20
24(b). Third Octave Band Filter Level Linearity 1kHz (Decreasing)	1kHz	N/A	0.17
24(c). Third Octave Band Filter Level Linearity 16kHz (Decreasing)	16kHz	N/A	0.20
25(a). Third Octave Level Linearity Including the Level range (31.5Hz)	31.5Hz	N/A	0.20
25(b). Third Octave Level Linearity Including the Level range (1kHz)	1kHz	N/A	0.17
25(c). Third Octave Level Linearity Including the Level range (16kHz)	16kHz	N/A	0.20
26(a). Octave Band Filter Lower Limit (Reference Range)	Conforming	N/A	0.09
26(b). Octave Band Filter Lower Limit (Lowest Range)	Conforming	N/A	0.09
SLM Overall Conforming		Yes	

Accredited for compliance with AS ISO/IEC 17025 - General requirements for the competence of testing and calibration laboratories.
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.

☒ Checked

Template Document Name: RQT-05 SLM IEC61672 Verification (r86)

1(a). Instrument Information

Calibration Date	24/02/2023	Job No	RC055	Operator	AM
Client Name	CPB CONTRACTORS				
Client Address	LEVEL 4, 201 ELIZABETH STREET, SYDNEY NSW 2000				

1. Instrument Information

Instrument Make	RION	Model	NL-20	Serial	#143337
Microphone Make	RION	Model	UC-52	Serial	#94478
Preampifier Make	RION	Model	NH-21	Serial	#10094
Ext'n Cable Make	Nil	Model		Serial	
Accessories	Nil	Firmware	N/A		

Freq Weightings	A	Yes
	C	Yes
	Z	No
	FLAT	Yes

Time Weightings	Fast	Yes
	Slow	Yes
	Impulse	Yes

Functions	Leq	Yes
	SEL	Yes
	Peak	No

Notes
Test 12 not performed, no Lpeak setting
Filter tests not performed as there are no filters

Instrument Ranges	Range Name	Indicator Range		Primary Range	
		Low dB	High dB	Low dB	High dB
1	40-130	40	130	40	130
2	30-120	30	120	30	120
3	20-110	20	110	20	110
4	20-100	20	100	20	100
5	20-90	20	90	20	90
6	20-80	20	80	20	80
7					
8					
9					
10					
Check List	OK				

Reference Range	30-120
Ref. SPL @ 1kHz	94

Linearity Limits on Ref range	Low dB	High dB
1kHz Leq (A weighting)	30.0	120.0
4kHz Leq (A weighting)	30.0	120.0
8kHz Leq (A weighting)	30.0	120.0

Highest Range for 10(b),12,13	40-130
-------------------------------	--------

SLM Class	2
Filter Class	N/A
Filter Base	N/A

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)	Instruction Manual Sound Level Meter NL-20
Version	N/A
Publication Date	N/A
Source of Document (& Date of Download if Applicable)	N/A

Conforming	Yes
------------	-----

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
------------	----

☒ 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 Acoustic 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
Laboratory Equipment Check	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)	24.1	24.3	1.1	1.3	0.4	1.50	1.70	3	Yes	20	26
Rel. Humidity (%)	62.1	62.3	14.6	14.8	6.8	21.40	21.60	22.5	Yes	25	70
Air Pressure (kPa)	100.6	100.6	8.1	8.1	0.13	8.22	8.18	12.5	Yes	80	105
Conforming										Yes	

4(a). Initial Calibration

SLM Settings	
Time Weighting	Fast
Frequency Weighting	A
SLM Range	30-120
Microphone / Windshield Correction	OFF
Polarization Voltage (V)	0
Microphone Sensitivity (mV/Pa)	N/A

B&K 4226 Calibrator Settings	
"Sound Field"	Pressure
"Microphone"	N/A
Calibration Level (Lin)	94
Calibration Frequency (Hz)	1000

Calibration	
Indicated Level before adjust. (dB)	93.7
Adjustment required	Yes
Indicated level after adjust. (dB)	94

4(b). Final Calibration

Level at conclusion of testing (dB)	94.0
Difference	0.0
Tolerance	± 0.3

Conforming	Yes
------------	-----

Uncertainty (+/-) dB	0.11
----------------------	------

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	Slow
Frequency Weighting	A
SLM Range	20-80
Measurement Function	SPL
Integration time (s)	30

Observed Values		
N/A	SPL (10 Obs in 60 s)	
	1	18.2
	2	18.5
	3	18.2
	4	18.1
	5	18.2
	6	18.4
	7	18.7
	8	18.9
	9	18.0
	10	18.0
	Avg	18.3

Results				
Freq Wt	Observed	Quoted	Tolerance	Conforming
A	18.3	19.0	+5,-inf	Yes

Uncertainty (+/-) dB	0.09
----------------------	------

5(b). Self-Generated Noise, Electrical

SLM Settings	
Time Weighting	Fast
SLM Range	20-80
Measurement Function	Leq
Integration time (s)	30

Observed Values						
Leq			N/A			
A	C	N/A	Obs	A	C	N/A
17.7	23.0		1			
			2			
			3			
			4			
			5			
			6			
			7			
			8			
			9			
			10			
			Avg			

Results		
Freq Wt	Observed	Quoted
A	17.7	19.0
C	23.0	27.0
N/A		

Uncertainty (+/-) dB	0.09
----------------------	------

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. For information purposes, this laboratory compares the quoted noise floor to the measured value. This comparison is not used to check conformance to a specific requirement.

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	30-120
Microphone Compensation Filter	OFF
B&K 4226 Calibrator Settings	
"Sound Field"	Pressure
"Microphone"	N/A
Reference Setting (Lin)	94

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	91.5	91.5	91.6	91.53	0.10	91.63	0.00	0.00	0.00	0.00	91.63	-2.54	-3.00	0.46	± 1.5	± 3.0	Yes	0.43	0.14	0.41
63	93.6	93.6	93.6	93.60	0.01	93.61	0.00	0.00	0.00	0.00	93.61	-0.56	-0.80	0.24	± 1.0	± 2.0	Yes	0.42	0.12	0.41
125	94.1	94.1	94.1	94.10	0.01	94.11	0.00	0.00	0.00	0.00	94.11	-0.06	-0.20	0.14	± 1.0	± 1.5	Yes	0.42	0.12	0.41
250	94.2	94.2	94.2	94.20	-0.01	94.19	0.00	0.00	0.00	0.00	94.19	0.02	0.00	0.02	± 1.0	± 1.5	Yes	0.42	0.12	0.41
500	94.1	94.1	94.1	94.10	-0.01	94.09	0.00	0.00	0.00	0.00	94.09	-0.08	0.00	-0.08	± 1.0	± 1.5	Yes	0.42	0.12	0.41
1k	94.0	94.0	94.0	94.00	-0.03	93.97	0.20	0.00	0.00	0.00	94.17	0.00	0.00	0.00	± 0.7	± 1.0	Yes	0.42	0.11	0.41
2k	93.6	93.6	93.6	93.60	0.00	93.60	0.45	0.00	0.00	0.00	94.05	-0.12	-0.20	0.08	± 1.0	± 2.0	Yes	0.43	0.13	0.41
4k	92.1	92.0	92.3	92.13	-0.26	91.87	1.05	0.00	0.00	0.00	92.92	-1.25	-0.80	-0.45	± 1.0	± 3.0	Yes	0.43	0.14	0.41
8k	86.6	86.7	86.7	86.67	-0.19	86.48	2.80	0.00	0.00	0.00	89.28	-4.89	-3.00	-1.89	+1.5; -2.5	± 5.0	Yes	0.60	0.15	0.58
12.5k	81.6	81.4	81.5	81.50	-0.19	81.31	5.60	0.00	0.00	0.00	86.91	-7.26	-6.20	-1.06	+2.0; -5.0	+5; -inf	Yes	0.68	0.21	0.64
16k	79.2	79.0	79.0	79.07	-0.15	78.92	7.85	0.00	0.00	0.00	86.77	-7.40	-8.50	1.10	+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	30-120
Generator & Attenuator Settings	
Attenuation (dB)	30
Generator Frequency (Hz)	1k
SPL Reference (dB)	75
Integration Time (s)	N/A
Generator Output (mVrms)	75.28

Freq Hz	Output (mV)	Indication A	Output (mV)	Indication C	Output (mV)	N/A	Tolerance		Uncertainty		
63	1537.02	74.9	82.54	74.9							
125	480.48	74.9	77.03	75.0							
250	202.62	74.9	75.28	75.0							
500	108.81	74.9	75.28	75.0							
1k	75.28	75.0	75.28	75.0							
2k	65.57	75.1	77.03	75.1							
4k	67.09	75.0	82.54	75.0							
8k	85.44	75.1	106.34	75.1							
16k	160.95	73.0	200.30	73.0							
Typical Microphone 0deg Free Field Response		0.00		0.00		0.00	Tolerance		Uncertainty		
		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		75.00							
		74.90		75.00							
		74.90		75.00							
		75.00		75.00							
		75.10		75.10							
		75.00		75.00							
		75.10		75.10							
Response re 1kHz (Deviation from Expected)		73.00		73.00			Type 1	Type 2	Total (+/-) dB	Lab (+/-) dB	Corrections (+/-) dB
		-0.10		-0.10			± 1.0	± 2.0	0.44	0.18	0.41
		-0.10		0.00			± 1.0	± 1.5	0.44	0.18	0.41
		-0.10		0.00			± 1.0	± 1.5	0.44	0.18	0.41
		-0.10		0.00			± 1.0	± 1.5	0.44	0.18	0.41
		0.00		0.00			± 0.7	± 1.0	0.44	0.18	0.41
		0.10		0.10			± 1.0	± 2.0	0.44	0.18	0.41
		0.00		0.00			± 1.0	± 3.0	0.44	0.18	0.41
		0.10		0.10			+1.5; -2.5	± 5.0	0.61	0.18	0.58
		-2.00		-2.00			+2.5; -16.0	+5,-inf	0.67	0.18	0.64

Conforming	Yes	Yes	N/A
------------	-----	-----	-----

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	30-120
Generator & Attenuator Settings	
Attenuation (dB)	20
Generator Frequency (Hz)	1k
SPL Reference (dB)	94.0
Output (mVrms)	212.7

8(a). Frequency Weightings 1kHz

Time Wt	Frequency Weighting				Tolerance	
Fast	A	C	N/A	FLAT	Type 1	Type 2
1kHz	94.0	94.0		94.0	± 0.2	± 0.2
Difference		0.0		0.00		

Conforming	Yes	N/A	Yes
------------	-----	-----	-----

Uncertainty (+/-) dB	0.14
----------------------	------

8(b). Time Weightings 1kHz

Freq Wt	Time Weighting			Tolerance	
A	F	S	Leq	Type 1	Type 2
1kHz	94.0	94.0	94.0	± 0.1	± 0.1
Difference		0.0	0.0		

Conforming	Yes	Yes
------------	-----	-----

Uncertainty (+/-) dB	0.14
----------------------	------

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)

SLM Settings	
Time Weighting	Fast
Frequency Weighting	A
SLM Range	30-120
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)	855.1
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	± 0.8	± 1.1
21.0	104.0	104.0	0.0	± 0.8	± 1.1
16.0	109.0	109.0	0.0	± 0.8	± 1.1
11.0	114.0	114.0	0.0	± 0.8	± 1.1
10.0	115.0	115.0	0.0	± 0.8	± 1.1
9.0	116.0	116.0	0.0	± 0.8	± 1.1
8.0	117.0	117.0	0.0	± 0.8	± 1.1
7.0	118.0	118.0	0.0	± 0.8	± 1.1
6.0	119.0	119.0	0.0	± 0.8	± 1.1
5.0	120.0	120.0	0.0	± 0.8	± 1.1
4.0	121.0	121.0	0.0	± 0.8	± 1.1
3.0	122.0	122.0	0.0	± 0.8	± 1.1
2.0	123.0	123.0	0.0	± 0.8	± 1.1
1.0	124.0	124.0	0.0	± 0.8	± 1.1
0.0	125.0	125.0	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
------------	-----

Uncertainty (+/-) dB	0.19
----------------------	------

Description of Tests

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	30-120
Generator & Attenuator Settings	
Select dB Under SLM Range	0
Attenuation (dB)	10
Generator Frequency (Hz)	8k
SPL Reference Starting Point (dB)	94
Output (mVrms)	76.1
Noise Floor (dB)	-99.0

Decreasing level to Underrange				Tolerance	
Atten	Expected	Indicator	Diff	Type 1	Type 2
15.0	89.0	89.0	0.0	± 0.8	± 1.1
20.0	84.0	84.0	0.0	± 0.8	± 1.1
25.0	79.0	79.0	0.0	± 0.8	± 1.1
30.0	74.0	74.1	0.1	± 0.8	± 1.1
35.0	69.0	69.1	0.1	± 0.8	± 1.1
40.0	64.0	64.1	0.1	± 0.8	± 1.1
45.0	59.0	59.1	0.1	± 0.8	± 1.1
50.0	54.0	54.0	0.0	± 0.8	± 1.1
55.0	49.0	49.0	0.0	± 0.8	± 1.1
60.0	44.0	44.0	0.0	± 0.8	± 1.1
65.0	39.0	39.0	0.0	± 0.8	± 1.1
69.0	35.0	35.1	0.1	± 0.8	± 1.1
70.0	34.0	34.0	0.0	± 0.8	± 1.1
71.0	33.0	33.2	0.2	± 0.8	± 1.1
72.0	32.0	32.1	0.1	± 0.8	± 1.1
73.0	31.0	31.2	0.2	± 0.8	± 1.1
74.0	30.0	30.2	0.2	± 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
------------	-----

Uncertainty (+/-) dB	0.20
----------------------	------

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	30-120
Generator & Attenuator Settings	
Attenuation (dB)	20
Generator Frequency (Hz)	1k
Reference SPL (dB)	94
Output (mVrms)	212.7

Settings	Level (dB)			Tolerance	
Range	Expected	Indicated	Difference	Type 1	Type 2
40-130	94.0	94.0	0.0	± 0.8	± 1.1
30-120	94.0	94.0	0.0	± 0.8	± 1.1
20-110	94.0	94.0	0.0	± 0.8	± 1.1
20-100	94.0	94.0	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

Conforming	Yes
------------	-----

Uncertainty (+/-) dB	0.14
----------------------	------

10(b). Level Linearity Including the Level range (5dB Above Under-range)

SLM Settings	
Time Weighting	Fast
Frequency Weighting	A
SLM Range	40-130
Generator & Attenuator Settings	
Attenuation (dB)	60
Generator Frequency (Hz)	1k
Reference SPL (dB)	45
Output (mVrms)	75.9

Settings	Level (dB)			Tolerance	
Range	Atten	Expected	Indicated	Difference	Type 2
40-130	60.0	45.0	45.0	0.0	± 0.8
30-120	70.0	35.0	35.1	0.1	± 0.8
20-110	80.0	25.0	26.0	1.0	± 0.8
20-100	80.0	25.0	26.0	1.0	± 0.8
20-90	80.0	25.0	26.0	1.0	± 0.8
20-80	80.0	25.0	26.0	1.0	± 0.8
					± 0.8
					± 0.8
					± 0.8
					± 0.8

Conforming	Yes
------------	-----

Uncertainty (+/-) dB	0.17
----------------------	------

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	30-120
Generator & Attenuator Settings	
Attenuation (dB)	0.0
Generator Frequency (Hz)	4k
dB Down from Linearity Limit	3
Reference SPL (dB)	117.0
Output (mVrms)	267.4

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	99.0	0.0	+ 1.0; -1.5	+ 1.0; -2.5
0.25	1	90.0	89.9	-0.1	+ 1.0; -3.0	+ 1.5; -5.0

Conforming	Yes
------------	-----

Uncertainty (+/-) dB	0.20
----------------------	------

11(b). Slow ToneBurst

SLM Settings - Slow	
Time Weighting	Slow
Frequency Weighting	A
SLM Range	30-120
Generator & Attenuator Settings	
Attenuation (dB)	0.0
Generator Frequency (Hz)	4k
dB Down from Linearity Limit	3
Reference SPL (dB)	117.0
Output (mVrms)	267.4

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
------------	-----

Uncertainty (+/-) dB	0.20
----------------------	------

11(c). SEL ToneBurst

SLM Settings - SEL/Leq	
Function	SEL
Frequency Weighting	A
SLM Range	30-120
Generator & Attenuator Settings	
Attenuation (dB)	0.0
Generator Frequency (Hz)	4k
dB Down from Linearity Limit	3
Reference SPL (dB)	117.0
Output (mVrms)	267.4
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
------------	-----

Uncertainty (+/-) dB	0.20
----------------------	------

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	N/A
Frequency Weighting	C
SLM Range	40-130
Generator & Attenuator Settings	
Attenuation (dB)	0.0
Generator Frequency (Hz)	8k
Reference SPL (dB)	122.0
Output (mVrms)	

Test Signal	dB LCpeak Hold				Tolerance	
8 kHz	Indication	O'Load?	Expected	Difference	Type 1	Type 2
1 Cycle		No	125.4		± 2.0	± 3.0

Conforming	N/A
------------	-----

Uncertainty (+/-) dB	0.16
----------------------	------

12(b). Peak C 500 Hz

SLM Settings	
Time Weighting	N/A
Frequency Weighting	C
SLM Range	40-130
Generator & Attenuator Settings	
Attenuation (dB)	0.0
Generator Frequency (Hz)	500
Reference SPL (dB)	122.0
Output (mVrms)	
Output High Level (mV)	
Output Low Level (mV)	

Test Signal	dB LCpeak Hold				Tolerance	
500 Hz	Indication	O'Load?	Expected	Difference	Type 1	Type 2
One +ve 1/2 cycle		No	124.4		± 1.0	± 2.0
One -ve 1/2 cycle		No	124.4		± 1.0	± 2.0

Conforming	N/A
------------	-----

Uncertainty (+/-) dB	0.16
----------------------	------

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	40-130	
Generator & Attenuator Settings		
Attenuation (dB)	0.0	
Generator Frequency (Hz)	4k	
Reference SPL (dB)	129.0	
Output (mVrms)	1101.0	

	Half-Cycle Signal			Tolerance	
	Positive	Negative	Difference	Type 1	Type 2
Level (dB)	135.6	135.6	0.0	± 1.5	± 1.5
Generator Output (mVrms)	2365.0	2350.0			

Conforming	Yes
------------	-----

Uncertainty (+/-) dB	0.20
----------------------	------

Overload Indicated	Yes
Overload Indicator Latches	Yes

Conforming	Yes
------------	-----

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	30-120
Generator & Attenuator Settings	
Attenuation (dB)	0.0
Generator Frequency (Hz)	1k
Reference SPL (dB)	119.0
Output (mVrms)	378.4

Time Period to Apply Signal (min)	5.0
Record SPL at Conclusion of Time Period (dB)	119.0
Difference	0.0
Tolerance	± 0.3

Conforming	Yes
------------	-----

Uncertainty (+/-) dB	0.09
----------------------	------

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



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 Calibrator

Calibration Date 24/02/2023

Job No RC055

Operator AM

Client Name CPB CONTRACTORS

Client Address LEVEL 4, 201 ELIZABETH STREET, SYDNEY NSW 2000

Test Item

Calibrator Make PULSAR INSTRUMENTS

Model 106

Serial No #93277

Accessories N/A

Class (1 or 2) 2

Environmental Conditions	Measured	
	Start	End
Temperature (degC)	24.1	24.2
Rel. Humidity (%)	59	59.1
Air Pressure (kPa)	101.34	101.33

Applicable Standards:

IEC 60942:2017 "Electroacoustics - Sound calibrators"

Applicable Work Instruction:

RWi-08 SLM & Calibrator Verification

Laboratory Equipment :

GRAS Power Module type 12AK SN 1551616
GRAS 1/2" Pressure Microphone 40AD SN 252620 and preamplifier SN 292045
B&K4226 Multifunction Acoustic Calibrator SN 2288472
Agilent Digital Multimeter Model 34401A SN MY41004386
Vitrins Analyser Multi Instrument Pro V3.9 software
Behringer UCA222 USB Audio Interface U-Control

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 through an unbroken chain of calibrations, is ultimately traceable to the International System of Units (SI). 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 Calibrator 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 2.04.

Calibration Statement:

The sound calibrator has been shown to conform to the class 2 requirements for periodic testing, described in Annex B of IEC 60942:2017 for the sound pressure level(s) and frequency(ies) stated, for the environmental conditions under which the tests were performed. However, as public evidence was not available, from a testing organization responsible for pattern approval, to demonstrate that the model of sound calibrator conformed to the requirements for pattern evaluation described in Annex A of IEC 60942:2017, no general statement or conclusion can be made about conformance of the sound calibrator to the requirements of IEC 60942:2017.



NATA Accredited Laboratory
Number 14966

Accredited for compliance with
ISO/IEC 17025 - Calibration

Authorized Signatory:

Print Name: Ariel Michael

Date: 28/02/2023

Template Document Name: RQT-03 (rev 70) Calibrator Verification

NATacoustic Sound Level Calibrator Verification - Summary of Tests

Calibration Date 24/02/2023 Client Name CPB CONTRACTORS Client Address LEVEL 4, 201 ELIZABETH STREET, SYDNEY NSW 2000	Job No RC055	Operator AM
--	---------------------	--------------------

1. Instrument Information & Reference Conditions

Calibrator Make PULSAR INSTRUMENTS Accessories N/A	Model 106	Serial No #93277
---	------------------	-------------------------

Class (1 or 2)	2
-----------------------	---

1(a). Instrument Information (Instrument Manual is Available)

	Yes
--	-----

1(b). Preliminary Inspection and Power Supply

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

1(c). Environmental Conditions

Environmental Conditions	Measured	
	Start	End
Temperature (degC)	24.1	24.2
Rel. Humidity (%)	59	59.1
Air Pressure (kPa)	101.34	101.33
Conforming	Yes	Yes

Test Description

2(a). Absolute Sound Pressure Level

Calibrator Setting	SPL	Uncert (+/-) dB	Pass
1	93.97	0.11	Yes
2	N/A	N/A	N/A
3	N/A	N/A	N/A
4	N/A	N/A	N/A
5	N/A	N/A	N/A

2(b). Sound Pressure Level Fluctuation

Calibrator Setting	SPL	Uncert (+/-) dB	Pass
1	0.07	0.02	Yes
2	N/A	N/A	N/A
3	N/A	N/A	N/A
4	N/A	N/A	N/A
5	N/A	N/A	N/A

3(a). Frequency Deviation

Calibrator Setting	Freq Hz	Uncert (+/-) %	Pass
1	1000.281	0.010	Yes
2			N/A
3			N/A
4			N/A
5			N/A

3(b). Total Distortion

Calibrator Setting	Distortion %	Uncert (+/-) %	Pass
1	0.51	0.13	Yes
2		0.13	N/A
3		0.13	N/A
4		0.13	N/A
5		0.13	N/A

Calibrator Overall Conforming	Yes
--------------------------------------	------------

Accredited for compliance with AS ISO/IEC 17025 - General requirements for the competence of testing and calibration laboratories.
 This document shall not be reproduced, except in full.
 Periodic tests were performed in accordance with procedures from IEC 60942 Ed. 4.0 2017-11 Electroacoustics - Sound calibrators.

☒ Checked

Template Document Name: RQT-03 (rev 70) Calibrator Verification

1. Calibrator Information & Reference Conditions

Calibration Date	24/02/2023	Job No	RC055	Operator	AM
Client Name	CPB CONTRACTORS				
Client Address	LEVEL 4, 201 ELIZABETH STREET, SYDNEY NSW 2000				
Calibrator Make	PULSAR INSTRUMENTS	Model	106	Serial No	#93277
Accessories	N/A				

Microphone Type	GRAS 40AD Preamp SN: 292045 Capsule SN: 252620
Adaptor	Nil

1(a). Instrument Information

Class (1 or 2)	2
----------------	---

Calibrator Setting No	Nominal Settings		4226 Settings	
	Freq Hz	SPL	SPL	Uncert.
1	1k	94.0	94.03	0.06
2				
3				
4				
5				

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

Instruction Manual Title (Clause 6.3, IEC 60942:2017)	USER MANUAL FOR MODEL 105 & 106 ACOUSTIC CALIBRATOR
Version	06/07 MODEL 105 & 106/01
Publication Date	16/11/2015
Source of Document (& Date of Download if Applicable)	N/A

Conforming	Yes
------------	-----

Pattern Evaluation Test Report (Annex A, IEC 60942:2017)	
Reference Number or Page Number	
Publication Date	
Source of Document (& Date of Download if Applicable)	

Conforming	No
------------	----

1(b). Preliminary Inspection and Power Supply

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

1(c). Environmental Conditions

Environmental Conditions	Measured		Uncert.	Limits	
	Start	End		Min	Max
Air Temp. (°C)	24.1	24.2	0.4	20	26
Rel. Humidity (%)	59.0	59.1	6.8	25	90
Air Pressure (kPa)	101.3	101.3	0.13	80	105

Conforming	Yes	Yes
------------	-----	-----

☒ Checked

2. Sound Pressure Level

Calibrator Setting 1								
SLM & 4226 Settings								
Nominal SPL dB			94.0					
Nominal Frequency Hz			1k					
Reference B&K4226 SPL			94.03					
B&K4226 Setting "Microphone"			b					
B&K4226 Setting "Sound Field"			Pressure					
SPL Deviation from Nominal							Tolerance	
Trial No	Ref mV rms	Test mV rms	dB	Mean	Corr Mean	Deviation	Class 1	Class 2
#1	422.73	417.19	-0.11	-0.06	-0.03	0.03	0.25	0.40
#2	422.10	422.71	0.01					
#3	421.00	417.86	-0.07					
Fluctuation in SPL							Tolerance	
						Deviation	Class 1	Class 2
						0.07	0.07	0.15
Pass SPL		Yes	Uncertainty dB		0.11			
Pass Fluctuation in SPL		Yes	Uncertaintyv dB		0.02			

Calibrator Setting 2								
SLM & 4226 Settings								
Nominal SPL dB								
Nominal Frequency Hz								
Reference B&K4226 SPL								
B&K4226 Setting "Microphone"			b					
B&K4226 Setting "Sound Field"			Pressure					
SPL Deviation from Nominal							Tolerance	
Trial No	Ref mV rms	Test mV rms	dB	Mean	Corr Mean	Deviation	Class 1	Class 2
#1								
#2								
#3								
Fluctuation in SPL							Tolerance	
						Deviation	Class 1	Class 2
Pass SPL			N/A	Uncertainty dB		N/A		
Pass Fluctuation in SPL			N/A	Uncertainty dB		N/A		

Calibrator Setting 3								
SLM & 4226 Settings								
Nominal SPL dB								
Nominal Frequency Hz								
Reference B&K4226 SPL								
B&K4226 Setting "Microphone"			b					
B&K4226 Setting "Sound Field"			Pressure					
SPL Deviation from Nominal							Tolerance	
Trial No	Ref mV rms	Test mV rms	dB	Mean	Corr Mean	Deviation	Class 1	Class 2
#1								
#2								
#3								
Fluctuation in SPL						Tolerance		
						Deviation	Class 1	Class 2
Pass SPL		N/A		Uncertainty dB		N/A		
Pass Fluctuation in SPL		N/A		Uncertainty dB		N/A		

Calibrator Setting 4								
SLM & 4226 Settings								
Nominal SPL dB								
Nominal Frequency Hz								
Reference B&K4226 SPL								
B&K4226 Setting "Microphone"			b					
B&K4226 Setting "Sound Field"			Pressure					
SPL Deviation from Nominal							Tolerance	
Trial No	Ref mV rms	Test mV rms	dB	Mean	Corr Mean	Deviation	Class 1	Class 2
#1								
#2								

#3								
Fluctuation in SPL							Tolerance	
						Deviation	Class 1	Class 2
Pass SPL		N/A	Uncertainty dB		N/A			
Pass Fluctuation in SPL		N/A	Uncertainty dB		N/A			

Calibrator Setting 5								
SLM & 4226 Settings								
Nominal SPL dB								
Nominal Frequency Hz								
Reference B&K4226 SPL								
B&K4226 Setting "Microphone"			b					
B&K4226 Setting "Sound Field"			Pressure					
SPL Deviation from Nominal							Tolerance	
Trial No	Ref mV rms	Test mV rms	dB	Mean	Corr Mean	Deviation	Class 1	Class 2
#1								
#2								
#3								
Fluctuation in SPL							Tolerance	
						Deviation	Class 1	Class 2
Pass SPL		N/A	Uncertainty dB		N/A			
Pass Fluctuation in SPL		N/A	Uncertainty dB		N/A			

Description of Test

2. Sound Pressure Level (Clause B.4.6.3 Measurements)

B.4.6.3.1 Using the method described in B.4.6.2.1 or B.4.6.2.2, the principal sound pressure level at the principal frequency shall be measured at least three times. The microphone shall be coupled to the sound calibrator before each measurement and uncoupled after each measurement. The microphone shall be rotated around its axis at each coupling so that the rotational orientation of the microphone is evenly distributed over the measurements. The absolute value of the difference between the mean measured sound pressure level and the specified sound pressure level shall not exceed the acceptance limits given in Table 2 for the class of sound calibrator. Actual uncertainties of measurement, calculated for a coverage probability of 95 %, shall not exceed those given in Table A.1 for the class of sound calibrator.

B.4.6.3.2 For multi-frequency sound calibrators, unless not required by the customer (under B.1.2) measurements of the principal sound pressure level, as described in B.4.6.3.1, shall be repeated for the maximum and minimum frequency settings of the sound calibrator for which the instruction manual states that the instrument conforms to the requirements of this document.

B.4.6.3.3 The measurement of sound pressure level shall be repeated (excluding replications) for all other combinations of sound pressure level and frequency settings for which the instruction manual states that the instrument conforms to the requirements of this document, or for those combinations required by the customer (as described in B.1.2). The absolute value of the difference between each measured sound pressure level and the corresponding specified sound pressure level shall not exceed the acceptance limits given in Table 2 for the class of sound calibrator. Actual uncertainties of measurement, calculated for a coverage probability of 95 %, shall not exceed those given in Table A.1 for the class of sound calibrator. It is recommended that testing is normally performed for one model of microphone only.

Interpretation: The "Mean" is the average value of the three trials (Trial 1,2,3). The "Corr Mean" is the deviation of the sound pressure level from the required value. The "Deviation" is the absolute value of the Corr Mean which is to be compared to the "Tolerance" value for the class of instrument.

☒ Checked

3(a). Frequency & 3(b). Distortion

3(a). Frequency					
Calibrator Setting	Nominal Hz	Observed Hz	Deviation %	Tolerance %	
				Class 1	Class 2
1	1000	1000.281	0.03	0.7	1.7
2				0.7	1.7
3				0.7	1.7
4				0.7	1.7
5				0.7	1.7

Pass
Yes
N/A
N/A
N/A
N/A

Uncertainty %
0.010

3(b). Distortion					
Calibrator Setting	Nominal Hz	Observed %THD		Tolerance %	
				Class 1	Class 2
1	1000	0.51		2.5	3
2					
3					
4					
5					

Pass
Yes
N/A
N/A
N/A
N/A

Uncertainty %THD	0.13
------------------	------

Description of Test

3. Frequency (Clause B4.7 Frequency)

The frequency of the sound generated by the sound calibrator coupled to the microphone used in B.4.6 shall be measured as an average over a period of between 20 s and 25 s of operation, at the principal sound pressure level, for each frequency setting of the sound calibrator for which the instruction manual states that the instrument conforms to the requirements of this document, or for the principal frequency and for any other combinations of sound pressure level setting and frequency setting specified by the customer. The absolute value of the difference in per cent between each measured frequency and the corresponding specified frequency shall not exceed the acceptance limits given in Table 4 for the class of sound calibrator. Actual uncertainties of measurement, calculated for a coverage probability of 95 %, shall not exceed those given in Table A.2 for the class of sound calibrator.

Interpretation: The "Deviation %" column represents the percentage difference of the observed frequency Hz from the nominal frequency Hz.

Total Distortion (Clause B4.8 Total distortion + noise)

The total distortion + noise of the sound pressure signal generated by the sound calibrator shall be measured over a bandwidth of 22.4 Hz (nominal frequency) to 22.4 kHz (nominal frequency), as an average over a period of between 20 s and 25 s of operation with the microphone used in B.4.6, at the maximum and minimum sound pressure level settings available at each frequency for which the instruction manual states that the instrument conforms to the requirements of this document, or for the principal sound pressure level and principal frequency and for any other combinations of sound pressure level setting and frequency setting specified by the customer. The total distortion + noise can be measured using a rejection filter device (distortion factor meter) or an appropriate FFT analyser, and the method of measurement shall be reported. The measured total distortion + noise shall not exceed the acceptance limits given in Table 7 for the class of sound calibrator. Actual uncertainties of measurement, calculated for a coverage probability of 95 %, shall not exceed those given in Table A.3 for the class of sound calibrator. An instrument that measures total harmonic distortion only is not suitable.

Interpretation: The "%THD" column is the observed Percent Total Harmonic Distortion.

☒ Checked



Yeo-Kal Electronics Pty Ltd 18/26 Wattle Road, Brookvale NSW Australia
Telephone +61 2 9939 2616 Fax +61 2 9905 1100

CERTIFICATE OF CALIBRATION

Model: 618

Make: Yeo-Kal Electronics Pty Ltd.

Serial Number 676

Date/s of Calibration 16/03/23

Standards:

Temperature: Mercury in glass thermometer. Certified thermometer R246

Salinity: 35.00ppt seawater standardised with a model 610MK1V Salinometer against IAPSO Standard Seawater P101 K15= 1.00002 (Chlorinity 19.377). The conversion between conductivity and salinity is performed using the Practical Salinity Scale. UNESCO Technical Papers in marine Science 1983.

Conductivity: 1413us/cm. The conversion of low conductivity raw data to conductivity referenced to 25Deg C is performed using constants derived from the HANDBOOK OF CHEMISTRY AND PHYSICS 1963, Chemical Rubber Publishing Company, Page 2691, Conductivity of Standard Solutions using KCL, 0.001M Solution.

Dissolved Oxygen: 100% saturated distilled water. The YK611 measures dissolved oxygen as % saturation and then it automatically converts the reading to milligrams per litre. This conversion is calculated from the dissolved oxygen solubility tables found in International Oceanographic Tables vol.2. National Institute of Oceanography 1972. Zero oxygen achieved by purging probe with nitrogen/ or zero dummy plug.

Turbidity: Formazin 200ntu prepared as per Standard Methods. Ontu prepared using distilled water.

pH: 4 and 10 buffers prepared as per Standard Methods. Ref: Durst, R.A. 1975 Standard Reference Materials: Standardization of pH Measurements NBS Spec Publ.260-53, National Bur. Standards, Washington D.C.

ORP: Buffers 7 and 10 with quinhydrone prepared as per standard methods and American Society for Testing and Materials. The redox potential conforms to International Standard IEC 746-5 "Expressions of Performance of Electrochemical Analyzers, Part 5: Oxidation-Reduction potential". In accordance with this standard, the Redox potential is referred to the standard ("normal") hydrogen electrode (NHE) and is expressed in mV.

Depth: Calibrated using a Druck DPI 610 pressure calibrator / 2.0 meter water column.



Model 618- Serial 676

At the time of calibration the sensors were calibrated to the following accuracy.

Temperature: $\pm 0.05^{\circ}\text{C}$

Salinity: $\pm 0.1\text{ppt}$

Conductivity: $\pm 5\mu\text{S/cm}$

pH: ± 0.03

ORP: $\pm 3\text{mv}$

Dissolved Oxygen: Normally ($\pm 0.5\%$).

Turbidity: $\pm 0.3\text{ntu}$ for range of 0-200ntu.

Yeo-Kal Reference: RFS 2820

Calibrated by: G. Yeomans

Ver: 4.26

YEO-KAL MODEL R618

DATE OF DOWNLOAD: 16/03/23 10:25

DATE FORMAT: DD/MM/YY HH:MM

[illegible]

D – Laboratory Results

CPB Contractors Pty Ltd
Level 4, 177 Pacific Highway
North Sydney
NSW 2060



NATA Accredited
Accreditation Number 1261
Site Number 18217

Accredited for compliance with ISO/IEC 17025 – Testing
NATA is a signatory to the ILAC Mutual Recognition
Arrangement for the mutual recognition of the
equivalence of testing, medical testing, calibration,
inspection, proficiency testing scheme providers and
reference materials producers reports and certificates.

Attention: **Emma Eveleigh**

Report **954049-W**
Project name **PITT ST ISD**
Project ID **N01070**
Received Date **Jan 09, 2023**

Client Sample ID			PSN_01
Sample Matrix			Water
Eurofins Sample No.			S23-Ja0003638
Date Sampled			Jan 09, 2023
Test/Reference	LOR	Unit	
Oil & Grease (HEM)	10	mg/L	30
pH (at 25 °C)	0.1	pH Units	7.4
Total Suspended Solids Dried at 103 °C to 105 °C	5	mg/L	< 5
Turbidity	1	NTU	2.3
Heavy Metals			
Copper (filtered)	0.001	mg/L	< 0.001
Zinc (filtered)	0.005	mg/L	< 0.005

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Oil & Grease (HEM) - Method: LTM-INO-4380 Oil and Grease (APHA 5520B)	Melbourne	Jan 10, 2023	28 Days
pH (at 25 °C) - Method: LTM-GEN-7090 pH in water by ISE	Sydney	Jan 09, 2023	0 Hour
Total Suspended Solids Dried at 103 °C to 105 °C - Method: LTM-INO-4070 Analysis of Suspended Solids in Water by Gravimetry	Sydney	Jan 09, 2023	7 Days
Turbidity - Method: LTM-INO-4140 Turbidity by Nephelometric Method	Sydney	Jan 09, 2023	2 Days
Heavy Metals (filtered) - Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS	Sydney	Jan 09, 2023	180 Days

Company Name: CPB Contractors Pty Ltd
Address: Level 4, 177 Pacific Highway
North Sydney
NSW 2060

Project Name: PITT ST ISD
Project ID: N01070

Order No.: 6406177
Report #: 954049
Phone: 02 9035 5007
Fax:

Received: Jan 9, 2023 1:04 PM
Due: Jan 10, 2023
Priority: 1 Day
Contact Name: Emma Eveleigh

Eurofins Analytical Services Manager : Asim Khan

Sample Detail						Copper (filtered)	Oil & Grease (HEM)	pH (at 25 °C)	Total Suspended Solids Dried at 103 °C to 105 °C	Turbidity	Zinc (filtered)
Melbourne Laboratory - NATA # 1261 Site # 1254							X				
Sydney Laboratory - NATA # 1261 Site # 18217						X		X	X	X	X
External Laboratory											
No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID						
1	PSN_01	Jan 09, 2023		Water	S23-Ja0003638	X	X	X	X	X	X
Test Counts						1	1	1	1	1	1

Internal Quality Control Review and Glossary

General

- Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
- All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
- All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
- Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
- Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
- SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
- Samples were analysed on an 'as received' basis.
- Information identified on this report with blue colour, indicates data provided by customer that may have an impact on the results.
- This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

Units

mg/kg: milligrams per kilogram	mg/L: milligrams per litre	µg/L: micrograms per litre
ppm: parts per million	ppb: parts per billion	%: Percentage
org/100 mL: Organisms per 100 millilitres	NTU: Nephelometric Turbidity Units	MPN/100 mL: Most Probable Number of organisms per 100 millilitres
CFU: Colony forming unit		

Terms

APHA	American Public Health Association
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
TBTO	Tributyltin oxide (<i>bis</i> -tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment however free tributyltin was measured and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalency Quotient or Total Equivalence
QSM	US Department of Defense Quality Systems Manual Version 5.4
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

The acceptance criteria should be used as a guide only and may be different when site specific Sampling Analysis and Quality Plan (SAQP) have been implemented

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR: No Limit

Results between 10-20 times the LOR: RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

NOTE: pH duplicates are reported as a range not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.4 where no positive PFAS results have been reported have been reviewed and no data was affected.

QC Data General Comments

- Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
- Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
- pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
- Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery the term "INT" appears against that analyte.
- For Matrix Spikes and LCS results a dash "-" in the report means that the specific analyte was not added to the QC sample.
- Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test				Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank										
Total Suspended Solids Dried at 103 °C to 105 °C				mg/L	< 5			5	Pass	
Turbidity				NTU	< 1			1	Pass	
Method Blank										
Heavy Metals										
Copper (filtered)				mg/L	< 0.001			0.001	Pass	
Zinc (filtered)				mg/L	< 0.005			0.005	Pass	
LCS - % Recovery										
Total Suspended Solids Dried at 103 °C to 105 °C				%	108			70-130	Pass	
Turbidity				%	80			70-130	Pass	
LCS - % Recovery										
Heavy Metals										
Copper (filtered)				%	87			80-120	Pass	
Zinc (filtered)				%	92			80-120	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1				Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery										
					Result 1					
Total Suspended Solids Dried at 103 °C to 105 °C	R23-Ja0000739	NCP	%	102				70-130	Pass	
Spike - % Recovery										
					Result 1					
Copper (filtered)	S23-Ja0003639	NCP	%	90				75-125	Pass	
Zinc (filtered)	S23-Ja0003639	NCP	%	92				75-125	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1				Acceptance Limits	Pass Limits	Qualifying Code
Duplicate										
					Result 1	Result 2	RPD			
Total Suspended Solids Dried at 103 °C to 105 °C	S23-Ja0002363	NCP	mg/L	< 5	< 5	< 1	30%	Pass		
Turbidity	S23-Ja0003639	NCP	NTU	1.2	1.2	1.7	30%	Pass		
Duplicate										
					Result 1	Result 2	RPD			
Copper (filtered)	S23-Ja0003863	NCP	mg/L	0.002	0.001	17	30%	Pass		
Zinc (filtered)	S23-Ja0003863	NCP	mg/L	< 0.005	< 0.005	< 1	30%	Pass		

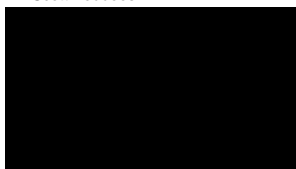
Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	No
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	N/A
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Authorised by:

Asim Khan	Analytical Services Manager
Dilani Samarakoon	Senior Analyst-Inorganic
Fang Yee Tan	Senior Analyst-Metal
Roopesh Rangarajan	Senior Analyst-Inorganic
Scott Beddoes	Senior Analyst-Inorganic



General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please [click here](#).

Eurofins shall not be liable for loss, cost, damages or expenses incurred by the client, or any other person or company, resulting from the use of any information or interpretation given in this report. In no case shall Eurofins be liable for consequential damages including, but not limited to, lost profits, damages for failure to meet deadlines and lost production arising from this report. This document shall not be reproduced except in full and relates only to the items tested. Unless indicated otherwise, the tests were performed on the samples as received.

CPB Contractors Pty Ltd
Level 4, 177 Pacific Highway
North Sydney
NSW 2060



NATA Accredited
Accreditation Number 1261
Site Number 18217

Accredited for compliance with ISO/IEC 17025 – Testing
NATA is a signatory to the ILAC Mutual Recognition
Arrangement for the mutual recognition of the
equivalence of testing, medical testing, calibration,
inspection, proficiency testing scheme providers and
reference materials producers reports and certificates.

Attention: **Emma Eveleigh**

Report **954051-W**
Project name **PITT ST ISD**
Project ID **N01070**
Received Date **Jan 09, 2023**

Client Sample ID			PSS_01
Sample Matrix			Water
Eurofins Sample No.			S23-Ja0003639
Date Sampled			Jan 09, 2023
Test/Reference	LOR	Unit	
Oil & Grease (HEM)	10	mg/L	< 10
pH (at 25 °C)	0.1	pH Units	8.1
Total Suspended Solids Dried at 103 °C to 105 °C	5	mg/L	< 5
Turbidity	1	NTU	1.2
Heavy Metals			
Copper (filtered)	0.001	mg/L	< 0.001
Zinc (filtered)	0.005	mg/L	< 0.005

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Oil & Grease (HEM) - Method: LTM-INO-4380 Oil and Grease (APHA 5520B)	Melbourne	Jan 10, 2023	28 Days
pH (at 25 °C) - Method: LTM-GEN-7090 pH in water by ISE	Sydney	Jan 09, 2023	0 Hour
Total Suspended Solids Dried at 103 °C to 105 °C - Method: LTM-INO-4070 Analysis of Suspended Solids in Water by Gravimetry	Sydney	Jan 09, 2023	7 Days
Turbidity - Method: LTM-INO-4140 Turbidity by Nephelometric Method	Sydney	Jan 09, 2023	2 Days
Heavy Metals (filtered) - Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS	Sydney	Jan 09, 2023	180 Days

Company Name: CPB Contractors Pty Ltd
Address: Level 4, 177 Pacific Highway
North Sydney
NSW 2060

Project Name: PITT ST ISD
Project ID: N01070

Order No.: 6406177
Report #: 954051
Phone: 02 9035 5007
Fax:

Received: Jan 9, 2023 1:04 PM
Due: Jan 10, 2023
Priority: 1 Day
Contact Name: Emma Eveleigh

Eurofins Analytical Services Manager : Asim Khan

Sample Detail						Copper (filtered)	Oil & Grease (HEM)	pH (at 25 °C)	Total Suspended Solids Dried at 103 °C to 105 °C	Turbidity	Zinc (filtered)
Melbourne Laboratory - NATA # 1261 Site # 1254							X				
Sydney Laboratory - NATA # 1261 Site # 18217						X		X	X	X	X
External Laboratory											
No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID						
1	PSS_01	Jan 09, 2023		Water	S23-Ja0003639	X	X	X	X	X	X
Test Counts						1	1	1	1	1	1

Internal Quality Control Review and Glossary

General

- Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
- All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
- All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
- Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
- Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
- SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
- Samples were analysed on an 'as received' basis.
- Information identified on this report with **blue** colour, indicates data provided by customer that may have an impact on the results.
- This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

Units

mg/kg: milligrams per kilogram	mg/L: milligrams per litre	µg/L: micrograms per litre
ppm: parts per million	ppb: parts per billion	%: Percentage
org/100 mL: Organisms per 100 millilitres	NTU: Nephelometric Turbidity Units	MPN/100 mL: Most Probable Number of organisms per 100 millilitres
CFU: Colony forming unit		

Terms

APHA	American Public Health Association
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
TBTO	Tributyltin oxide (<i>bis</i> -tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment however free tributyltin was measured and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalency Quotient or Total Equivalence
QSM	US Department of Defense Quality Systems Manual Version 5.4
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

The acceptance criteria should be used as a guide only and may be different when site specific Sampling Analysis and Quality Plan (SAQP) have been implemented

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR: No Limit

Results between 10-20 times the LOR: RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

NOTE: pH duplicates are reported as a range not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.4 where no positive PFAS results have been reported have been reviewed and no data was affected.

QC Data General Comments

- Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
- Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
- pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
- Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery the term "INT" appears against that analyte.
- For Matrix Spikes and LCS results a dash "-" in the report means that the specific analyte was not added to the QC sample.
- Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test				Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank										
Oil & Grease (HEM)				mg/L	< 10			10	Pass	
Total Suspended Solids Dried at 103 °C to 105 °C				mg/L	< 5			5	Pass	
Turbidity				NTU	< 1			1	Pass	
Method Blank										
Heavy Metals										
Copper (filtered)				mg/L	< 0.001			0.001	Pass	
Zinc (filtered)				mg/L	< 0.005			0.005	Pass	
LCS - % Recovery										
Oil & Grease (HEM)				%	72			70-130	Pass	
Total Suspended Solids Dried at 103 °C to 105 °C				%	108			70-130	Pass	
Turbidity				%	80			70-130	Pass	
LCS - % Recovery										
Heavy Metals										
Copper (filtered)				%	87			80-120	Pass	
Zinc (filtered)				%	92			80-120	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1				Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery										
					Result 1					
Total Suspended Solids Dried at 103 °C to 105 °C	R23-Ja0000739	NCP	%	102				70-130	Pass	
Spike - % Recovery										
Heavy Metals										
					Result 1					
Copper (filtered)	S23-Ja0003639	CP	%	90				75-125	Pass	
Zinc (filtered)	S23-Ja0003639	CP	%	92				75-125	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1				Acceptance Limits	Pass Limits	Qualifying Code
Duplicate										
					Result 1	Result 2	RPD			
Oil & Grease (HEM)	S23-Ja0003639	CP	mg/L	< 10	< 10	<1	30%	Pass		
Total Suspended Solids Dried at 103 °C to 105 °C	S23-Ja0002363	NCP	mg/L	< 5	< 5	<1	30%	Pass		
Turbidity	S23-Ja0003639	CP	NTU	1.2	1.2	1.7	30%	Pass		
Duplicate										
Heavy Metals										
					Result 1	Result 2	RPD			
Copper (filtered)	S23-Ja0003863	NCP	mg/L	0.002	0.001	17	30%	Pass		
Zinc (filtered)	S23-Ja0003863	NCP	mg/L	< 0.005	< 0.005	<1	30%	Pass		

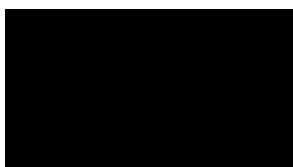
Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	No
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	N/A
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Authorised by:

Asim Khan	Analytical Services Manager
Dilani Samarakoon	Senior Analyst-Inorganic
Fang Yee Tan	Senior Analyst-Metal
Roopesh Rangarajan	Senior Analyst-Inorganic
	Senior Analyst-Inorganic



Glenn Jackson
General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please [click here](#).

Eurofins shall not be liable for loss, cost, damages or expenses incurred by the client, or any other person or company, resulting from the use of any information or interpretation given in this report. In no case shall Eurofins be liable for consequential damages including, but not limited to, lost profits, damages for failure to meet deadlines and lost production arising from this report. This document shall not be reproduced except in full and relates only to the items tested. Unless indicated otherwise, the tests were performed on the samples as received.

CPB Contractors Pty Ltd
Level 4, 177 Pacific Highway
North Sydney
NSW 2060



NATA Accredited
Accreditation Number 1261
Site Number 1254

Accredited for compliance with ISO/IEC 17025 – Testing
NATA is a signatory to the ILAC Mutual Recognition
Arrangement for the mutual recognition of the
equivalence of testing, medical testing, calibration,
inspection, proficiency testing scheme providers and
reference materials producers reports and certificates.

Attention: Emma Eveleigh

Report 954728-W
Project name PITT ST ISD
Project ID N01070
Received Date Jan 11, 2023

Client Sample ID			PSN_01
Sample Matrix			Water
Eurofins Sample No.			S23-Ja0007297
Date Sampled			Jan 11, 2023
Test/Reference	LOR	Unit	
Oil & Grease (HEM)	10	mg/L	< 10

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description

Oil & Grease (HEM)

Testing Site

Melbourne

Extracted

Jan 12, 2023

Holding Time

28 Days

- Method: LTM-INO-4380 Oil and Grease (APHA 5520B)

Company Name: CPB Contractors Pty Ltd
Address: Level 4, 177 Pacific Highway
North Sydney
NSW 2060

Project Name: PITT ST ISD
Project ID: N01070

Order No.: 6406177
Report #: 954728
Phone: 02 9035 5007
Fax:

Received: Jan 11, 2023 3:38 PM
Due: Jan 12, 2023
Priority: 1 Day
Contact Name: Emma Eveleigh

Eurofins Analytical Services Manager : Asim Khan

Sample Detail

Oil & Grease (HEM)

Melbourne Laboratory - NATA # 1261 Site # 1254

X

External Laboratory

No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID	
1	PSN_01	Jan 11, 2023		Water	S23-Ja0007297	X
Test Counts						1

Internal Quality Control Review and Glossary

General

- Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
- All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
- All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
- Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
- Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
- SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
- Samples were analysed on an 'as received' basis.
- Information identified on this report with blue colour, indicates data provided by customer that may have an impact on the results.
- This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

Units

mg/kg: milligrams per kilogram	mg/L: milligrams per litre	µg/L: micrograms per litre
ppm: parts per million	ppb: parts per billion	%: Percentage
org/100 mL: Organisms per 100 millilitres	NTU: Nephelometric Turbidity Units	MPN/100 mL: Most Probable Number of organisms per 100 millilitres
CFU: Colony forming unit		

Terms

APHA	American Public Health Association
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
TBTO	Tributyltin oxide (<i>bis</i> -tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment however free tributyltin was measured and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalency Quotient or Total Equivalence
QSM	US Department of Defense Quality Systems Manual Version 5.4
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

The acceptance criteria should be used as a guide only and may be different when site specific Sampling Analysis and Quality Plan (SAQP) have been implemented

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR: No Limit

Results between 10-20 times the LOR: RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

NOTE: pH duplicates are reported as a range not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.4 where no positive PFAS results have been reported have been reviewed and no data was affected.

QC Data General Comments

- Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
- Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
- pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
- Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery the term "INT" appears against that analyte.
- For Matrix Spikes and LCS results a dash "-" in the report means that the specific analyte was not added to the QC sample.
- Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test			Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank									
Oil & Grease (HEM)			mg/L	< 10			10	Pass	
LCS - % Recovery									
Oil & Grease (HEM)			%	77			70-130	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Duplicate									
				Result 1	Result 2	RPD			
Oil & Grease (HEM)	S23-Ja0007326	NCP	mg/L	280	310	9.5	30%	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Authorised by:

Asim Khan	Analytical Services Manager
Scott Beddoes	Senior Analyst-Inorganic



General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please [click here](#).

Eurofins shall not be liable for loss, cost, damages or expenses incurred by the client, or any other person or company, resulting from the use of any information or interpretation given in this report. In no case shall Eurofins be liable for consequential damages including, but not limited to, lost profits, damages for failure to meet deadlines and lost production arising from this report. This document shall not be reproduced except in full and relates only to the items tested. Unless indicated otherwise, the tests were performed on the samples as received.

CPB Contractors Pty Ltd
Level 4, 177 Pacific Highway
North Sydney
NSW 2060



NATA Accredited
Accreditation Number 1261
Site Number 18217

Accredited for compliance with ISO/IEC 17025 – Testing
NATA is a signatory to the ILAC Mutual Recognition
Arrangement for the mutual recognition of the
equivalence of testing, medical testing, calibration,
inspection, proficiency testing scheme providers and
reference materials producers reports and certificates.

Attention: Emma Eveleigh

Report 961770-W
Project name **PITT ST ISD**
Project ID **N01070**
Received Date Feb 08, 2023

Client Sample ID			PSS_01
Sample Matrix			Water
Eurofins Sample No.			S23-Fe0017019
Date Sampled			Feb 07, 2023
Test/Reference	LOR	Unit	
Oil & Grease (HEM)	10	mg/L	< 10
pH (at 25 °C)	0.1	pH Units	7.6
Total Suspended Solids Dried at 103 °C to 105 °C	5	mg/L	< 5
Turbidity	1	NTU	1.0
Heavy Metals			
Copper (filtered)	0.001	mg/L	0.001
Zinc (filtered)	0.005	mg/L	0.034

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Oil & Grease (HEM) - Method: LTM-INO-4380 Oil and Grease (APHA 5520B)	Melbourne	Feb 09, 2023	28 Days
pH (at 25 °C) - Method: LTM-GEN-7090 pH in water by ISE	Sydney	Feb 09, 2023	0 Hour
Total Suspended Solids Dried at 103 °C to 105 °C - Method: LTM-INO-4070 Analysis of Suspended Solids in Water by Gravimetry	Sydney	Feb 09, 2023	7 Days
Turbidity - Method: LTM-INO-4140 Turbidity by Nephelometric Method	Sydney	Feb 09, 2023	2 Days
Heavy Metals (filtered) - Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS	Sydney	Feb 09, 2023	180 Days

Company Name: CPB Contractors Pty Ltd
Address: Level 4, 177 Pacific Highway
North Sydney
NSW 2060

Project Name: PITT ST ISD
Project ID: N01070

Order No.: 6406177
Report #: 961770
Phone: 02 9035 5007
Fax:

Received: Feb 8, 2023 2:55 PM
Due: Feb 9, 2023
Priority: 1 Day
Contact Name: Emma Eveleigh

Eurofins Analytical Services Manager : Asim Khan

Sample Detail						Copper (filtered)	Oil & Grease (HEM)	pH (at 25 °C)	Total Suspended Solids Dried at 103 °C to 105 °C	Turbidity	Zinc (filtered)
Melbourne Laboratory - NATA # 1261 Site # 1254							X				
Sydney Laboratory - NATA # 1261 Site # 18217						X		X	X	X	X
External Laboratory											
No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID						
1	PSS_01	Feb 07, 2023		Water	S23-Fe0017019	X	X	X	X	X	X
Test Counts						1	1	1	1	1	1

Internal Quality Control Review and Glossary

General

- Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
- All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
- All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
- Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
- Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
- SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
- Samples were analysed on an 'as received' basis.
- Information identified on this report with blue colour, indicates data provided by customer that may have an impact on the results.
- This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

Units

mg/kg: milligrams per kilogram	mg/L: milligrams per litre	µg/L: micrograms per litre
ppm: parts per million	ppb: parts per billion	%: Percentage
org/100 mL: Organisms per 100 millilitres	NTU: Nephelometric Turbidity Units	MPN/100 mL: Most Probable Number of organisms per 100 millilitres
CFU: Colony forming unit		

Terms

APHA	American Public Health Association
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
TBTO	Tributyltin oxide (<i>bis</i> -tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment however free tributyltin was measured and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalency Quotient or Total Equivalence
QSM	US Department of Defense Quality Systems Manual Version 5.4
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

The acceptance criteria should be used as a guide only and may be different when site specific Sampling Analysis and Quality Plan (SAQP) have been implemented

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR: No Limit

Results between 10-20 times the LOR: RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

NOTE: pH duplicates are reported as a range not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.4 where no positive PFAS results have been reported have been reviewed and no data was affected.

QC Data General Comments

- Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
- Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
- pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
- Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery the term "INT" appears against that analyte.
- For Matrix Spikes and LCS results a dash "-" in the report means that the specific analyte was not added to the QC sample.
- Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test				Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank										
Total Suspended Solids Dried at 103 °C to 105 °C				mg/L	< 5			5	Pass	
LCS - % Recovery										
Total Suspended Solids Dried at 103 °C to 105 °C				%	118			70-130	Pass	
Turbidity				%	91			70-130	Pass	
Test	Lab Sample ID	QA Source		Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery										
					Result 1					
Total Suspended Solids Dried at 103 °C to 105 °C	S23-Fe0016961	NCP		%	102			70-130	Pass	
Spike - % Recovery										
Heavy Metals					Result 1					
Zinc (filtered)	S23-Fe0009966	NCP		%	81			75-125	Pass	
Test	Lab Sample ID	QA Source		Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Duplicate										
					Result 1	Result 2	RPD			
Total Suspended Solids Dried at 103 °C to 105 °C	S23-Fe0016961	NCP		mg/L	120	120	4.6	30%	Pass	
Turbidity	S23-Fe0017018	NCP		NTU	1.3	1.3	1.5	30%	Pass	

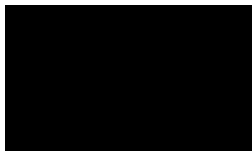
Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Authorised by:

Asim Khan	Analytical Services Manager
Fang Yee Tan	Senior Analyst-Metal
Mary Makarios	Senior Analyst-Inorganic
Ryan Phillips	Senior Analyst-Inorganic



General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please [click here](#).

Eurofins shall not be liable for loss, cost, damages or expenses incurred by the client, or any other person or company, resulting from the use of any information or interpretation given in this report. In no case shall Eurofins be liable for consequential damages including, but not limited to, lost profits, damages for failure to meet deadlines and lost production arising from this report. This document shall not be reproduced except in full and relates only to the items tested. Unless indicated otherwise, the tests were performed on the samples as received.

CPB Contractors Pty Ltd
Level 4, 177 Pacific Highway
North Sydney
NSW 2060



NATA Accredited
Accreditation Number 1261
Site Number 18217

Accredited for compliance with ISO/IEC 17025 – Testing
NATA is a signatory to the ILAC Mutual Recognition
Arrangement for the mutual recognition of the
equivalence of testing, medical testing, calibration,
inspection, proficiency testing scheme providers and
reference materials producers reports and certificates.

Attention: **Emma Eveleigh**

Report **968559-W**
Project name **PITT ST ISD**
Project ID **N01070**
Received Date **Mar 02, 2023**

Client Sample ID			PSN_01
Sample Matrix			Water
Eurofins Sample No.			S23- Ma0006050
Date Sampled			Mar 02, 2023
Test/Reference	LOR	Unit	
Oil & Grease (HEM)	10	mg/L	< 10
pH (at 25 °C)	0.1	pH Units	7.8
Total Suspended Solids Dried at 103 °C to 105 °C	5	mg/L	< 5
Turbidity	1	NTU	1.6
Heavy Metals			
Copper (filtered)	0.001	mg/L	< 0.001
Zinc (filtered)	0.005	mg/L	< 0.005

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Oil & Grease (HEM) - Method: LTM-INO-4380 Oil and Grease (APHA 5520B)	Melbourne	Mar 04, 2023	28 Days
pH (at 25 °C) - Method: LTM-GEN-7090 pH in water by ISE	Sydney	Mar 02, 2023	0 Hour
Total Suspended Solids Dried at 103 °C to 105 °C - Method: LTM-INO-4070 Analysis of Suspended Solids in Water by Gravimetry	Sydney	Mar 02, 2023	7 Days
Turbidity - Method: LTM-INO-4140 Turbidity by Nephelometric Method	Sydney	Mar 02, 2023	2 Days
Heavy Metals (filtered) - Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS	Sydney	Mar 02, 2023	180 Days

Company Name: CPB Contractors Pty Ltd
Address: Level 4, 177 Pacific Highway
North Sydney
NSW 2060

Project Name: PITT ST ISD
Project ID: N01070

Order No.: 6406177
Report #: 968559
Phone: 02 9035 5007
Fax:

Received: Mar 2, 2023 2:58 PM
Due: Mar 3, 2023
Priority: Overnight
Contact Name: Emma Eveleigh

Eurofins Analytical Services Manager : Asim Khan

Sample Detail						Copper (filtered)	Oil & Grease (HEM)	pH (at 25 °C)	Total Suspended Solids Dried at 103 °C to 105 °C	Turbidity	Zinc (filtered)
Melbourne Laboratory - NATA # 1261 Site # 1254							X				
Sydney Laboratory - NATA # 1261 Site # 18217						X		X	X	X	X
External Laboratory											
No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID						
1	PSN_01	Mar 02, 2023		Water	S23-Ma0006050	X	X	X	X	X	X
Test Counts						1	1	1	1	1	1



Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer that may have an impact on the results.
9. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

Units

mg/kg: milligrams per kilogram

mg/L: milligrams per litre

µg/L: micrograms per litre

ppm: parts per million

ppb: parts per billion

%: Percentage

org/100 mL: Organisms per 100 millilitres

NTU: Nephelometric Turbidity Units

MPN/100 mL: Most Probable Number of organisms per 100 millilitres

CFU: Colony forming unit

Terms

APHA	American Public Health Association
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
TBTO	Tributyltin oxide (<i>bis</i> -tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment however free tributyltin was measured and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalency Quotient or Total Equivalence
QSM	US Department of Defense Quality Systems Manual Version 5.4
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

The acceptance criteria should be used as a guide only and may be different when site specific Sampling Analysis and Quality Plan (SAQP) have been implemented

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR: No Limit

Results between 10-20 times the LOR: RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

NOTE: pH duplicates are reported as a range not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.4 where no positive PFAS results have been reported have been reviewed and no data was affected.

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
4. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery the term "INT" appears against that analyte.
5. For Matrix Spikes and LCS results a dash "-" in the report means that the specific analyte was not added to the QC sample.
6. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

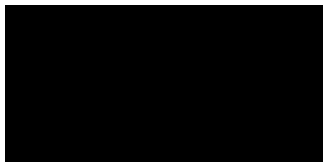
Test				Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank										
Total Suspended Solids Dried at 103 °C to 105 °C				mg/L	< 5			5	Pass	
Turbidity				NTU	< 1			1	Pass	
Method Blank										
Heavy Metals										
Copper (filtered)				mg/L	< 0.001			0.001	Pass	
Zinc (filtered)				mg/L	< 0.005			0.005	Pass	
LCS - % Recovery										
Turbidity				%	88			70-130	Pass	
LCS - % Recovery										
Heavy Metals										
Copper (filtered)				%	89			80-120	Pass	
Zinc (filtered)				%	89			80-120	Pass	
Test	Lab Sample ID	QA Source		Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery										
					Result 1					
Total Suspended Solids Dried at 103 °C to 105 °C	S23-Ma0006094	NCP		%	96			70-130	Pass	
Spike - % Recovery										
					Result 1					
Copper (filtered)	S23-Ma0004458	NCP		%	82			75-125	Pass	
Zinc (filtered)	S23-Ma0004458	NCP		%	84			75-125	Pass	
Test	Lab Sample ID	QA Source		Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Duplicate										
					Result 1	Result 2	RPD			
Total Suspended Solids Dried at 103 °C to 105 °C	S23-Ma0006094	NCP		mg/L	14	17	18	30%	Pass	
Turbidity	S23-Ma0006094	NCP		NTU	3.7	3.9	6.6	30%	Pass	
Duplicate										
					Result 1	Result 2	RPD			
Copper (filtered)	R23-Fe0049655	NCP		mg/L	0.014	0.014	3.6	30%	Pass	
Zinc (filtered)	R23-Fe0049655	NCP		mg/L	< 0.005	< 0.005	<1	30%	Pass	

Comments**Sample Integrity**

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Authorised by:

Asim Khan	Analytical Services Manager
Mary Makarios	Senior Analyst-Inorganic
Mickael Ros	Senior Analyst-Metal
Ryan Phillips	Senior Analyst-Inorganic

**General Manager**

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please [click here](#).

Eurofins shall not be liable for loss, cost, damages or expenses incurred by the client, or any other person or company, resulting from the use of any information or interpretation given in this report. In no case shall Eurofins be liable for consequential damages including, but not limited to, lost profits, damages for failure to meet deadlines and lost production arising from this report. This document shall not be reproduced except in full and relates only to the items tested. Unless indicated otherwise, the tests were performed on the samples as received.

CPB Contractors Pty Ltd
Level 4, 177 Pacific Highway
North Sydney
NSW 2060



NATA Accredited
Accreditation Number 1261
Site Number 18217

Accredited for compliance with ISO/IEC 17025 – Testing
NATA is a signatory to the ILAC Mutual Recognition
Arrangement for the mutual recognition of the
equivalence of testing, medical testing, calibration,
inspection, proficiency testing scheme providers and
reference materials producers reports and certificates.

Attention: **Emma Eveleigh**

Report **968567-W**
Project name **PITT ST ISD**
Project ID **N01070**
Received Date **Mar 02, 2023**

Client Sample ID			PSS_01
Sample Matrix			Water
Eurofins Sample No.			S23- Ma0006094
Date Sampled			Mar 02, 2023
Test/Reference	LOR	Unit	
Oil & Grease (HEM)	10	mg/L	< 10
pH (at 25 °C)	0.1	pH Units	7.8
Total Suspended Solids Dried at 103 °C to 105 °C	5	mg/L	14
Turbidity	1	NTU	3.7
Heavy Metals			
Copper (filtered)	0.001	mg/L	< 0.001
Zinc (filtered)	0.005	mg/L	0.16

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Oil & Grease (HEM) - Method: LTM-INO-4380 Oil and Grease (APHA 5520B)	Melbourne	Mar 04, 2023	28 Days
pH (at 25 °C) - Method: LTM-GEN-7090 pH in water by ISE	Sydney	Mar 02, 2023	0 Hour
Total Suspended Solids Dried at 103 °C to 105 °C - Method: LTM-INO-4070 Analysis of Suspended Solids in Water by Gravimetry	Sydney	Mar 02, 2023	7 Days
Turbidity - Method: LTM-INO-4140 Turbidity by Nephelometric Method	Sydney	Mar 02, 2023	2 Days
Heavy Metals (filtered) - Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS	Sydney	Mar 02, 2023	180 Days

Company Name: CPB Contractors Pty Ltd
Address: Level 4, 177 Pacific Highway
North Sydney
NSW 2060

Project Name: PITT ST ISD
Project ID: N01070

Order No.: 6406177
Report #: 968567
Phone: 02 9035 5007
Fax:

Received: Mar 2, 2023 2:20 PM
Due: Mar 3, 2023
Priority: Overnight
Contact Name: Emma Eveleigh

Eurofins Analytical Services Manager : Asim Khan

Sample Detail						Copper (filtered)	Oil & Grease (HEM)	pH (at 25 °C)	Total Suspended Solids Dried at 103 °C to 105 °C	Turbidity	Zinc (filtered)
Melbourne Laboratory - NATA # 1261 Site # 1254							X				
Sydney Laboratory - NATA # 1261 Site # 18217						X		X	X	X	X
External Laboratory											
No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID						
1	PSS_01	Mar 02, 2023		Water	S23-Ma0006094	X	X	X	X	X	X
Test Counts						1	1	1	1	1	1

Internal Quality Control Review and Glossary

General

- Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
- All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
- All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
- Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
- Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
- SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
- Samples were analysed on an 'as received' basis.
- Information identified on this report with blue colour, indicates data provided by customer that may have an impact on the results.
- This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

Units

mg/kg: milligrams per kilogram	mg/L: milligrams per litre	µg/L: micrograms per litre
ppm: parts per million	ppb: parts per billion	%: Percentage
org/100 mL: Organisms per 100 millilitres	NTU: Nephelometric Turbidity Units	MPN/100 mL: Most Probable Number of organisms per 100 millilitres
CFU: Colony forming unit		

Terms

APHA	American Public Health Association
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
TBTO	Tributyltin oxide (<i>bis</i> -tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment however free tributyltin was measured and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalency Quotient or Total Equivalence
QSM	US Department of Defense Quality Systems Manual Version 5.4
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

The acceptance criteria should be used as a guide only and may be different when site specific Sampling Analysis and Quality Plan (SAQP) have been implemented

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR: No Limit

Results between 10-20 times the LOR: RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

NOTE: pH duplicates are reported as a range not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.4 where no positive PFAS results have been reported have been reviewed and no data was affected.

QC Data General Comments

- Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
- Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
- pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
- Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery the term "INT" appears against that analyte.
- For Matrix Spikes and LCS results a dash "-" in the report means that the specific analyte was not added to the QC sample.
- Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

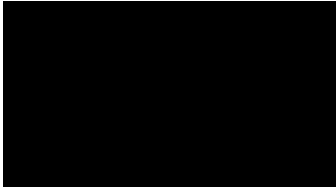
Test				Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank										
Total Suspended Solids Dried at 103 °C to 105 °C				mg/L	< 5			5	Pass	
Turbidity				NTU	< 1			1	Pass	
Method Blank										
Heavy Metals										
Copper (filtered)				mg/L	< 0.001			0.001	Pass	
Zinc (filtered)				mg/L	< 0.005			0.005	Pass	
LCS - % Recovery										
Turbidity				%	88			70-130	Pass	
LCS - % Recovery										
Heavy Metals										
Copper (filtered)				%	89			80-120	Pass	
Zinc (filtered)				%	89			80-120	Pass	
Test	Lab Sample ID	QA Source		Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery										
					Result 1					
Total Suspended Solids Dried at 103 °C to 105 °C	S23-Ma0006094	CP		%	96			70-130	Pass	
Spike - % Recovery										
					Result 1					
Copper (filtered)	S23-Ma0004458	NCP		%	82			75-125	Pass	
Zinc (filtered)	S23-Ma0004458	NCP		%	84			75-125	Pass	
Test	Lab Sample ID	QA Source		Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Duplicate										
					Result 1	Result 2	RPD			
Oil & Grease (HEM)	S23-Ma0006094	CP		mg/L	< 10	< 10	<1	30%	Pass	
Total Suspended Solids Dried at 103 °C to 105 °C	S23-Ma0006094	CP		mg/L	14	17	18	30%	Pass	
Turbidity	S23-Ma0006094	CP		NTU	3.7	3.9	6.6	30%	Pass	
Duplicate										
					Result 1	Result 2	RPD			
Copper (filtered)	R23-Fe0049655	NCP		mg/L	0.014	0.014	3.6	30%	Pass	
Zinc (filtered)	R23-Fe0049655	NCP		mg/L	< 0.005	< 0.005	<1	30%	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Authorised by:

Asim Khan	Analytical Services Manager
Mary Makarios	Senior Analyst-Inorganic
Mickael Ros	Senior Analyst-Metal
	Senior Analyst-Inorganic

General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please [click here](#).

Eurofins shall not be liable for loss, cost, damages or expenses incurred by the client, or any other person or company, resulting from the use of any information or interpretation given in this report. In no case shall Eurofins be liable for consequential damages including, but not limited to, lost profits, damages for failure to meet deadlines and lost production arising from this report. This document shall not be reproduced except in full and relates only to the items tested. Unless indicated otherwise, the tests were performed on the samples as received.

CPB Contractors Pty Ltd
Level 4, 177 Pacific Highway
North Sydney
NSW 2060



NATA Accredited
Accreditation Number 1261
Site Number 18217

Accredited for compliance with ISO/IEC 17025 – Testing
NATA is a signatory to the ILAC Mutual Recognition
Arrangement for the mutual recognition of the
equivalence of testing, medical testing, calibration,
inspection, proficiency testing scheme providers and
reference materials producers reports and certificates.

Attention: Emma Eveleigh

Report **970762-W**
Project name **PITT ST ISD**
Project ID **N01070**
Received Date **Mar 07, 2023**

Client Sample ID			PSS_01
Sample Matrix			Water
Eurofins Sample No.			S23- Ma0024914
Date Sampled			Mar 06, 2023
Test/Reference	LOR	Unit	
Heavy Metals			
Zinc (filtered)	0.005	mg/L	0.006

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description

Heavy Metals (filtered)

Testing Site

Sydney

Extracted

Mar 10, 2023

Holding Time

180 Days

- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS

Company Name: CPB Contractors Pty Ltd
Address: Level 4, 177 Pacific Highway
North Sydney
NSW 2060

Project Name: PITT ST ISD
Project ID: N01070

Order No.: 6406177
Report #: 970762
Phone: 02 9035 5007
Fax:

Received: Mar 7, 2023 12:30 PM
Due: Mar 7, 2023
Priority: Same day
Contact Name: Emma Eveleigh

Eurofins Analytical Services Manager : Asim Khan

Sample Detail

Zinc (filtered)

Sydney Laboratory - NATA # 1261 Site # 18217

External Laboratory

No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID	
1	PSS_01	Mar 06, 2023		Water	S23-Ma0024914	X
Test Counts						1

Internal Quality Control Review and Glossary

General

- Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
- All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
- All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
- Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
- Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
- SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
- Samples were analysed on an 'as received' basis.
- Information identified on this report with blue colour, indicates data provided by customer that may have an impact on the results.
- This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

Units

mg/kg: milligrams per kilogram	mg/L: milligrams per litre	µg/L: micrograms per litre
ppm: parts per million	ppb: parts per billion	%: Percentage
org/100 mL: Organisms per 100 millilitres	NTU: Nephelometric Turbidity Units	MPN/100 mL: Most Probable Number of organisms per 100 millilitres
CFU: Colony forming unit		

Terms

APHA	American Public Health Association
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
TBTO	Tributyltin oxide (<i>bis</i> -tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment however free tributyltin was measured and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalency Quotient or Total Equivalence
QSM	US Department of Defense Quality Systems Manual Version 5.4
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

The acceptance criteria should be used as a guide only and may be different when site specific Sampling Analysis and Quality Plan (SAQP) have been implemented

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR: No Limit

Results between 10-20 times the LOR: RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

NOTE: pH duplicates are reported as a range not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.4 where no positive PFAS results have been reported have been reviewed and no data was affected.

QC Data General Comments

- Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
- Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
- pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
- Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery the term "INT" appears against that analyte.
- For Matrix Spikes and LCS results a dash "-" in the report means that the specific analyte was not added to the QC sample.
- Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test				Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank										
Heavy Metals										
Zinc (filtered)				mg/L	< 0.005			0.005	Pass	
LCS - % Recovery										
Heavy Metals										
Zinc (filtered)				%	94			80-120	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1				Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery										
Heavy Metals										
Zinc (filtered)					Result 1					
Zinc (filtered)				%	84			75-125	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1				Acceptance Limits	Pass Limits	Qualifying Code
Duplicate										
Heavy Metals										
Zinc (filtered)					Result 1	Result 2	RPD			
Zinc (filtered)				mg/L	0.011	0.011	6.0	30%	Pass	

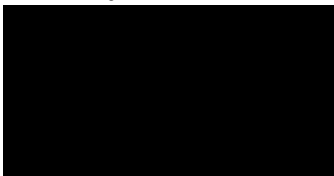
Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	N/A
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	N/A
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Authorised by:

Asim Khan	Analytical Services Manager
Fang Yee Tan	Senior Analyst-Metal



General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please [click here](#).

Eurofins shall not be liable for loss, cost, damages or expenses incurred by the client, or any other person or company, resulting from the use of any information or interpretation given in this report. In no case shall Eurofins be liable for consequential damages including, but not limited to, lost profits, damages for failure to meet deadlines and lost production arising from this report. This document shall not be reproduced except in full and relates only to the items tested. Unless indicated otherwise, the tests were performed on the samples as received.

CPB Contractors Pty Ltd
Level 4, 177 Pacific Highway
North Sydney
NSW 2060



NATA Accredited
Accreditation Number 1261
Site Number 18217

Accredited for compliance with ISO/IEC 17025 – Testing
NATA is a signatory to the ILAC Mutual Recognition
Arrangement for the mutual recognition of the
equivalence of testing, medical testing, calibration,
inspection, proficiency testing scheme providers and
reference materials producers reports and certificates.

Attention: **Emma Eveleigh**

Report **974691-W**
Project name **PITT ST ISD**
Project ID **NB01070**
Received Date **Mar 23, 2023**

Client Sample ID			PSS_01
Sample Matrix			Water
Eurofins Sample No.			S23- Ma0055307
Date Sampled			Mar 23, 2023
Test/Reference	LOR	Unit	
Oil & Grease (HEM)	10	mg/L	< 10
pH (at 25 °C)	0.1	pH Units	7.6
Total Suspended Solids Dried at 103 °C to 105 °C	5	mg/L	10
Turbidity	1	NTU	2.5
Heavy Metals			
Copper (filtered)	0.001	mg/L	< 0.001
Zinc (filtered)	0.005	mg/L	< 0.005

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Oil & Grease (HEM) - Method: LTM-INO-4380 Oil and Grease (APHA 5520B)	Melbourne	Mar 24, 2023	28 Days
pH (at 25 °C) - Method: LTM-GEN-7090 pH in water by ISE	Sydney	Mar 23, 2023	0 Hour
Total Suspended Solids Dried at 103 °C to 105 °C - Method: LTM-INO-4070 Analysis of Suspended Solids in Water by Gravimetry	Sydney	Mar 23, 2023	7 Days
Turbidity - Method: LTM-INO-4140 Turbidity by Nephelometric Method	Sydney	Mar 23, 2023	2 Days
Heavy Metals (filtered) - Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS	Sydney	Mar 23, 2023	180 Days

Company Name: CPB Contractors Pty Ltd
Address: Level 4, 177 Pacific Highway
North Sydney
NSW 2060

Project Name: PITT ST ISD
Project ID: NB01070

Order No.: 6406177
Report #: 974691
Phone: 02 9035 5007
Fax:

Received: Mar 23, 2023 2:08 PM
Due: Mar 24, 2023
Priority: 1 Day
Contact Name: Emma Eveleigh

Eurofins Analytical Services Manager : Asim Khan

Sample Detail						Copper (filtered)	Oil & Grease (HEM)	pH (at 25 °C)	Total Suspended Solids Dried at 103 °C to 105 °C	Turbidity	Zinc (filtered)
Melbourne Laboratory - NATA # 1261 Site # 1254							X				
Sydney Laboratory - NATA # 1261 Site # 18217						X		X	X	X	X
External Laboratory											
No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID						
1	PSS_01	Mar 23, 2023		Water	S23-Ma0055307	X	X	X	X	X	X
Test Counts						1	1	1	1	1	1

Internal Quality Control Review and Glossary

General

- Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
- All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
- All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
- Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
- Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
- SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
- Samples were analysed on an 'as received' basis.
- Information identified on this report with blue colour, indicates data provided by customer that may have an impact on the results.
- This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

Units

mg/kg: milligrams per kilogram	mg/L: milligrams per litre	µg/L: micrograms per litre
ppm: parts per million	ppb: parts per billion	%: Percentage
org/100 mL: Organisms per 100 millilitres	NTU: Nephelometric Turbidity Units	MPN/100 mL: Most Probable Number of organisms per 100 millilitres
CFU: Colony forming unit		

Terms

APHA	American Public Health Association
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
TBTO	Tributyltin oxide (<i>bis</i> -tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment however free tributyltin was measured and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalency Quotient or Total Equivalence
QSM	US Department of Defense Quality Systems Manual Version 5.4
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

The acceptance criteria should be used as a guide only and may be different when site specific Sampling Analysis and Quality Plan (SAQP) have been implemented

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR: No Limit

Results between 10-20 times the LOR: RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

NOTE: pH duplicates are reported as a range not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.4 where no positive PFAS results have been reported have been reviewed and no data was affected.

QC Data General Comments

- Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
- Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
- pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
- Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery the term "INT" appears against that analyte.
- For Matrix Spikes and LCS results a dash "-" in the report means that the specific analyte was not added to the QC sample.
- Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test				Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank										
Oil & Grease (HEM)				mg/L	< 10			10	Pass	
Total Suspended Solids Dried at 103 °C to 105 °C				mg/L	< 5			5	Pass	
Turbidity				NTU	< 1			1	Pass	
Method Blank										
Heavy Metals										
Copper (filtered)				mg/L	< 0.001			0.001	Pass	
Zinc (filtered)				mg/L	< 0.005			0.005	Pass	
LCS - % Recovery										
Oil & Grease (HEM)				%	118			70-130	Pass	
Total Suspended Solids Dried at 103 °C to 105 °C				%	113			70-130	Pass	
Turbidity				%	93			70-130	Pass	
LCS - % Recovery										
Heavy Metals										
Copper (filtered)				%	108			80-120	Pass	
Zinc (filtered)				%	107			80-120	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1				Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery										
					Result 1					
Total Suspended Solids Dried at 103 °C to 105 °C	S23-Ma0055307	CP	%	105				70-130	Pass	
Spike - % Recovery										
					Result 1					
Copper (filtered)	N23-Ma0041263	NCP	%	83				75-125	Pass	
Zinc (filtered)	N23-Ma0041263	NCP	%	86				75-125	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1				Acceptance Limits	Pass Limits	Qualifying Code
Duplicate										
					Result 1	Result 2	RPD			
Total Suspended Solids Dried at 103 °C to 105 °C	S23-Ma0055307	CP	mg/L	10	11	11	30%	Pass		
Turbidity	S23-Ma0055307	CP	NTU	2.5	2.6	<1	30%	Pass		
Duplicate										
					Result 1	Result 2	RPD			
Copper (filtered)	S23-Ma0054705	NCP	mg/L	< 0.01	< 0.001	<1	30%	Pass		
Zinc (filtered)	S23-Ma0054705	NCP	mg/L	< 0.05	< 0.005	<1	30%	Pass		

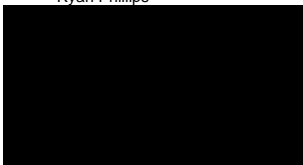
Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Authorised by:

Adam Bateup	Analytical Services Manager
Dilani Samarakoon	Senior Analyst-Inorganic
Fang Yee Tan	Senior Analyst-Metal
Mary Makarios	Senior Analyst-Inorganic
Roopesh Rangarajan	Senior Analyst-Inorganic
Ryan Phillips	Senior Analyst-Inorganic



General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please [click here](#).

Eurofins shall not be liable for loss, cost, damages or expenses incurred by the client, or any other person or company, resulting from the use of any information or interpretation given in this report. In no case shall Eurofins be liable for consequential damages including, but not limited to, lost profits, damages for failure to meet deadlines and lost production arising from this report. This document shall not be reproduced except in full and relates only to the items tested. Unless indicated otherwise, the tests were performed on the samples as received.

CPB Contractors Pty Ltd
Level 4, 177 Pacific Highway
North Sydney
NSW 2060



NATA Accredited
Accreditation Number 1261
Site Number 18217

Accredited for compliance with ISO/IEC 17025 – Testing
NATA is a signatory to the ILAC Mutual Recognition
Arrangement for the mutual recognition of the
equivalence of testing, medical testing, calibration,
inspection, proficiency testing scheme providers and
reference materials producers reports and certificates.

Attention: **Emma Eveleigh**

Report **974701-W**
Project name **PITT ST ISD**
Project ID **N01070**
Received Date **Mar 23, 2023**

Client Sample ID			PSN_01
Sample Matrix			Water
Eurofins Sample No.			S23- Ma0055395
Date Sampled			Mar 23, 2023
Test/Reference	LOR	Unit	
Oil & Grease (HEM)	10	mg/L	< 10
pH (at 25 °C)	0.1	pH Units	7.3
Total Suspended Solids Dried at 103 °C to 105 °C	5	mg/L	< 5
Turbidity	1	NTU	1.1
Heavy Metals			
Copper (filtered)	0.001	mg/L	< 0.001
Zinc (filtered)	0.005	mg/L	< 0.005

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Oil & Grease (HEM) - Method: LTM-INO-4380 Oil and Grease (APHA 5520B)	Melbourne	Mar 24, 2023	28 Days
pH (at 25 °C) - Method: LTM-GEN-7090 pH in water by ISE	Sydney	Mar 23, 2023	0 Hour
Total Suspended Solids Dried at 103 °C to 105 °C - Method: LTM-INO-4070 Analysis of Suspended Solids in Water by Gravimetry	Sydney	Mar 23, 2023	7 Days
Turbidity - Method: LTM-INO-4140 Turbidity by Nephelometric Method	Sydney	Mar 23, 2023	2 Days
Heavy Metals (filtered) - Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS	Sydney	Mar 23, 2023	180 Days

Company Name: CPB Contractors Pty Ltd
Address: Level 4, 177 Pacific Highway
North Sydney
NSW 2060

Project Name: PITT ST ISD
Project ID: N01070

Order No.: 6406177
Report #: 974701
Phone: 02 9035 5007
Fax:

Received: Mar 23, 2023 2:08 PM
Due: Mar 24, 2023
Priority: 1 Day
Contact Name: Emma Eveleigh

Eurofins Analytical Services Manager : Asim Khan

Sample Detail						Copper (filtered)	Oil & Grease (HEM)	pH (at 25 °C)	Total Suspended Solids Dried at 103 °C to 105 °C	Turbidity	Zinc (filtered)
Melbourne Laboratory - NATA # 1261 Site # 1254							X				
Sydney Laboratory - NATA # 1261 Site # 18217						X		X	X	X	X
External Laboratory											
No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID						
1	PSN_01	Mar 23, 2023		Water	S23-Ma0055395	X	X	X	X	X	X
Test Counts						1	1	1	1	1	1

Internal Quality Control Review and Glossary

General

- Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
- All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
- All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
- Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
- Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
- SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
- Samples were analysed on an 'as received' basis.
- Information identified on this report with blue colour, indicates data provided by customer that may have an impact on the results.
- This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

Units

mg/kg: milligrams per kilogram	mg/L: milligrams per litre	µg/L: micrograms per litre
ppm: parts per million	ppb: parts per billion	%: Percentage
org/100 mL: Organisms per 100 millilitres	NTU: Nephelometric Turbidity Units	MPN/100 mL: Most Probable Number of organisms per 100 millilitres
CFU: Colony forming unit		

Terms

APHA	American Public Health Association
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
TBTO	Tributyltin oxide (<i>bis</i> -tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment however free tributyltin was measured and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalency Quotient or Total Equivalence
QSM	US Department of Defense Quality Systems Manual Version 5.4
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

The acceptance criteria should be used as a guide only and may be different when site specific Sampling Analysis and Quality Plan (SAQP) have been implemented

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR: No Limit

Results between 10-20 times the LOR: RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

NOTE: pH duplicates are reported as a range not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.4 where no positive PFAS results have been reported have been reviewed and no data was affected.

QC Data General Comments

- Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
- Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
- pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
- Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery the term "INT" appears against that analyte.
- For Matrix Spikes and LCS results a dash "-" in the report means that the specific analyte was not added to the QC sample.
- Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test				Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank										
Oil & Grease (HEM)				mg/L	< 10			10	Pass	
Total Suspended Solids Dried at 103 °C to 105 °C				mg/L	< 5			5	Pass	
Turbidity				NTU	< 1			1	Pass	
Method Blank										
Heavy Metals										
Copper (filtered)				mg/L	< 0.001			0.001	Pass	
Zinc (filtered)				mg/L	< 0.005			0.005	Pass	
LCS - % Recovery										
Oil & Grease (HEM)				%	118			70-130	Pass	
Total Suspended Solids Dried at 103 °C to 105 °C				%	113			70-130	Pass	
Turbidity				%	93			70-130	Pass	
LCS - % Recovery										
Heavy Metals										
Copper (filtered)				%	108			80-120	Pass	
Zinc (filtered)				%	107			80-120	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1				Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery										
					Result 1					
Total Suspended Solids Dried at 103 °C to 105 °C	S23-Ma0055307	NCP	%	105				70-130	Pass	
Spike - % Recovery										
					Result 1					
Copper (filtered)	N23-Ma0041263	NCP	%	83				75-125	Pass	
Zinc (filtered)	N23-Ma0041263	NCP	%	86				75-125	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1				Acceptance Limits	Pass Limits	Qualifying Code
Duplicate										
					Result 1	Result 2	RPD			
Total Suspended Solids Dried at 103 °C to 105 °C	S23-Ma0055307	NCP	mg/L	10	11	11	30%	Pass		
Turbidity	S23-Ma0055307	NCP	NTU	2.5	2.6	<1	30%	Pass		
Duplicate										
					Result 1	Result 2	RPD			
Copper (filtered)	S23-Ma0054705	NCP	mg/L	< 0.01	< 0.001	<1	30%	Pass		
Zinc (filtered)	S23-Ma0054705	NCP	mg/L	< 0.05	< 0.005	<1	30%	Pass		

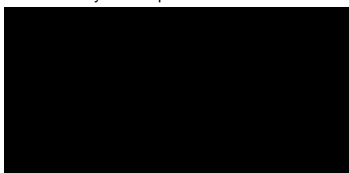
Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Authorised by:

Adam Bateup	Analytical Services Manager
Dilani Samarakoon	Senior Analyst-Inorganic
Fang Yee Tan	Senior Analyst-Metal
Mary Makarios	Senior Analyst-Inorganic
Roopesh Rangarajan	Senior Analyst-Inorganic
Ryan Phillips	Senior Analyst-Inorganic



General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please [click here](#).

Eurofins shall not be liable for loss, cost, damages or expenses incurred by the client, or any other person or company, resulting from the use of any information or interpretation given in this report. In no case shall Eurofins be liable for consequential damages including, but not limited to, lost profits, damages for failure to meet deadlines and lost production arising from this report. This document shall not be reproduced except in full and relates only to the items tested. Unless indicated otherwise, the tests were performed on the samples as received.

CPB Contractors Pty Ltd
Level 4, 177 Pacific Highway
North Sydney
NSW 2060



NATA Accredited
Accreditation Number 1261
Site Number 18217

Accredited for compliance with ISO/IEC 17025 – Testing
NATA is a signatory to the ILAC Mutual Recognition
Arrangement for the mutual recognition of the
equivalence of testing, medical testing, calibration,
inspection, proficiency testing scheme providers and
reference materials producers reports and certificates.

Attention: **ALL INVOICES**

Report **982155-W**
Project name **PITT ST ISD**
Project ID **N01070**
Received Date **Apr 19, 2023**

Client Sample ID			PSS_01
Sample Matrix			Water
Eurofins Sample No.			S23- Ap0039357
Date Sampled			Apr 19, 2023
Test/Reference	LOR	Unit	
Oil & Grease (HEM)	10	mg/L	< 10
pH (at 25 °C)	0.1	pH Units	7.2
Total Suspended Solids Dried at 103 °C to 105 °C	5	mg/L	8.4
Turbidity	1	NTU	< 1
Heavy Metals			
Copper (filtered)	0.001	mg/L	< 0.001
Zinc (filtered)	0.005	mg/L	< 0.005

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Oil & Grease (HEM) - Method: LTM-INO-4380 Oil and Grease (APHA 5520B)	Melbourne	Apr 20, 2023	28 Days
pH (at 25 °C) - Method: LTM-GEN-7090 pH in water by ISE	Sydney	Apr 19, 2023	0 Hour
Total Suspended Solids Dried at 103 °C to 105 °C - Method: LTM-INO-4070 Analysis of Suspended Solids in Water by Gravimetry	Sydney	Apr 19, 2023	7 Days
Turbidity - Method: LTM-INO-4140 Turbidity by Nephelometric Method	Sydney	Apr 19, 2023	2 Days
Heavy Metals (filtered) - Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS	Sydney	Apr 19, 2023	180 Days

Company Name: CPB Contractors Pty Ltd
Address: Level 4, 177 Pacific Highway
North Sydney
NSW 2060

Project Name: PITT ST ISD
Project ID: N01070

Order No.: 6406177
Report #: 982155
Phone: 02 9035 5007
Fax:

Received: Apr 19, 2023 1:10 PM
Due: Apr 20, 2023
Priority: 1 Day
Contact Name: ALL INVOICES

Eurofins Analytical Services Manager : Asim Khan

Sample Detail						Copper (filtered)	Oil & Grease (HEM)	pH (at 25 °C)	Total Suspended Solids Dried at 103 °C to 105 °C	Turbidity	Zinc (filtered)
Melbourne Laboratory - NATA # 1261 Site # 1254							X				
Sydney Laboratory - NATA # 1261 Site # 18217						X		X	X	X	X
External Laboratory											
No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID						
1	PSS_01	Apr 19, 2023		Water	S23-Ap0039357	X	X	X	X	X	X
Test Counts						1	1	1	1	1	1

Internal Quality Control Review and Glossary

General

- Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
- All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
- All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
- Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
- Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
- SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
- Samples were analysed on an 'as received' basis.
- Information identified on this report with blue colour, indicates data provided by customer that may have an impact on the results.
- This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

Units

mg/kg: milligrams per kilogram	mg/L: milligrams per litre	µg/L: micrograms per litre
ppm: parts per million	ppb: parts per billion	%: Percentage
org/100 mL: Organisms per 100 millilitres	NTU: Nephelometric Turbidity Units	MPN/100 mL: Most Probable Number of organisms per 100 millilitres
CFU: Colony forming unit		

Terms

APHA	American Public Health Association
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
TBTO	Tributyltin oxide (<i>bis</i> -tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment however free tributyltin was measured and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalency Quotient or Total Equivalence
QSM	US Department of Defense Quality Systems Manual Version 5.4
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

The acceptance criteria should be used as a guide only and may be different when site specific Sampling Analysis and Quality Plan (SAQP) have been implemented

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR: No Limit

Results between 10-20 times the LOR: RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

NOTE: pH duplicates are reported as a range not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.4 where no positive PFAS results have been reported have been reviewed and no data was affected.

QC Data General Comments

- Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
- Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
- pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
- Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery the term "INT" appears against that analyte.
- For Matrix Spikes and LCS results a dash "-" in the report means that the specific analyte was not added to the QC sample.
- Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test				Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank										
Oil & Grease (HEM)				mg/L	< 10			10	Pass	
Total Suspended Solids Dried at 103 °C to 105 °C				mg/L	< 5			5	Pass	
Turbidity				NTU	< 1			1	Pass	
Method Blank										
Heavy Metals										
Copper (filtered)				mg/L	< 0.001			0.001	Pass	
Zinc (filtered)				mg/L	< 0.005			0.005	Pass	
LCS - % Recovery										
Oil & Grease (HEM)				%	108			70-130	Pass	
Total Suspended Solids Dried at 103 °C to 105 °C				%	90			70-130	Pass	
Turbidity				%	95			70-130	Pass	
LCS - % Recovery										
Heavy Metals										
Copper (filtered)				%	103			80-120	Pass	
Zinc (filtered)				%	103			80-120	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1				Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery										
					Result 1					
Total Suspended Solids Dried at 103 °C to 105 °C	S23-Ap0039357	CP	%	90				70-130	Pass	
Spike - % Recovery										
					Result 1					
Copper (filtered)	S23-Ap0034020	NCP	%	88				75-125	Pass	
Zinc (filtered)	S23-Ap0034020	NCP	%	88				75-125	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1				Acceptance Limits	Pass Limits	Qualifying Code
Duplicate										
					Result 1	Result 2	RPD			
Oil & Grease (HEM)	M23-Ap0042057	NCP	mg/L	30	< 10	120	30%	Fail	Q15	
Total Suspended Solids Dried at 103 °C to 105 °C	S23-Ap0039357	CP	mg/L	8.4	9.2	9.1	30%	Pass		
Turbidity	S23-Ap0039357	CP	NTU	< 1	< 1	< 1	30%	Pass		
Duplicate										
					Result 1	Result 2	RPD			
Copper (filtered)	S23-Ap0031451	NCP	mg/L	< 0.001	< 0.001	< 1	30%	Pass		
Zinc (filtered)	S23-Ap0039467	NCP	mg/L	< 0.005	< 0.005	< 1	30%	Pass		

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Qualifier Codes/Comments

Code	Description
Q15	The RPD reported passes Eurofins Environment Testing's QC - Acceptance Criteria as defined in the Internal Quality Control Review and Glossary page of this report.

Authorised by:

Bonnie Pu	Analytical Services Manager
Caitlin Breeze	Senior Analyst-Inorganic
Mickael Ros	Senior Analyst-Metal
Roopesh Rangarajan	Senior Analyst-Inorganic
Ryan Phillips	Senior Analyst-Inorganic

Glenn Jackson
General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please [click here](#).

Eurofins shall not be liable for loss, cost, damages or expenses incurred by the client, or any other person or company, resulting from the use of any information or interpretation given in this report. In no case shall Eurofins be liable for consequential damages including, but not limited to, lost profits, damages for failure to meet deadlines and lost production arising from this report. This document shall not be reproduced except in full and relates only to the items tested. Unless indicated otherwise, the tests were performed on the samples as received.

CPB Contractors Pty Ltd
Level 4, 177 Pacific Highway
North Sydney
NSW 2060



NATA Accredited
Accreditation Number 1261
Site Number 18217

Accredited for compliance with ISO/IEC 17025 – Testing
NATA is a signatory to the ILAC Mutual Recognition
Arrangement for the mutual recognition of the
equivalence of testing, medical testing, calibration,
inspection, proficiency testing scheme providers and
reference materials producers reports and certificates.

Attention: **Emma Eveleigh**

Report **1000871-W**
Project name **PITT ST ISD**
Project ID **N01070**
Received Date **Jun 14, 2023**

Client Sample ID			PSS_01
Sample Matrix			Water
Eurofins Sample No.			S23-Jn0046828
Date Sampled			Jun 14, 2023
Test/Reference	LOR	Unit	
Oil & Grease (HEM)	10	mg/L	11
pH (at 25 °C)	0.1	pH Units	8.0
Total Suspended Solids Dried at 103 °C to 105 °C	5	mg/L	< 5
Turbidity	1	NTU	7.1
Heavy Metals			
Copper (filtered)	0.001	mg/L	< 0.001
Zinc (filtered)	0.005	mg/L	< 0.005

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Oil & Grease (HEM) - Method: LTM-INO-4380 Oil and Grease (APHA 5520B)	Melbourne	Jun 22, 2023	28 Days
pH (at 25 °C) - Method: LTM-GEN-7090 pH in water by ISE	Sydney	Jun 21, 2023	0 Hour
Total Suspended Solids Dried at 103 °C to 105 °C - Method: LTM-INO-4070 Analysis of Suspended Solids in Water by Gravimetry	Sydney	Jun 21, 2023	7 Days
Turbidity - Method: LTM-INO-4140 Turbidity by Nephelometric Method	Sydney	Jun 21, 2023	2 Days
Heavy Metals (filtered) - Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS	Sydney	Jun 21, 2023	180 Days

Company Name: CPB Contractors Pty Ltd
Address: Level 4, 177 Pacific Highway
North Sydney
NSW 2060

Project Name: PITT ST ISD
Project ID: N01070

Order No.: 6406177
Report #: 1000871
Phone: 02 9035 5007
Fax:

Received: Jun 14, 2023 4:50 PM
Due: Jun 19, 2023
Priority: 3 Day
Contact Name: Emma Eveleigh

Eurofins Analytical Services Manager : Asim Khan

Sample Detail						Copper (filtered)	Oil & Grease (HEM)	pH (at 25 °C)	Total Suspended Solids Dried at 103 °C to 105 °C	Turbidity	Zinc (filtered)
Melbourne Laboratory - NATA # 1261 Site # 1254							X				
Sydney Laboratory - NATA # 1261 Site # 18217						X		X	X	X	X
External Laboratory											
No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID						
1	PSS_01	Jun 14, 2023		Water	S23-Jn0046828	X	X	X	X	X	X
Test Counts						1	1	1	1	1	1

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer that may have an impact on the results.
9. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

Units

mg/kg: milligrams per kilogram	mg/L: milligrams per litre	µg/L: micrograms per litre
ppm: parts per million	ppb: parts per billion	%: Percentage
org/100 mL: Organisms per 100 millilitres	NTU: Nephelometric Turbidity Units	MPN/100 mL: Most Probable Number of organisms per 100 millilitres
CFU: Colony forming unit		

Terms

APHA	American Public Health Association
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
TBTO	Tributyltin oxide (<i>bis</i> -tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment however free tributyltin was measured and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalency Quotient or Total Equivalence
QSM	US Department of Defense Quality Systems Manual Version 5.4
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

The acceptance criteria should be used as a guide only and may be different when site specific Sampling Analysis and Quality Plan (SAQP) have been implemented

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR: No Limit

Results between 10-20 times the LOR: RPD must lie between 0-50%

Results >20 times the LOR: RPD must lie between 0-30%

NOTE: pH duplicates are reported as a range not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS. SVOCs recoveries 20 – 150%

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.4 where no positive PFAS results have been reported have been reviewed and no data was affected.

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
4. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery the term "INT" appears against that analyte.
5. For Matrix Spikes and LCS results a dash "-" in the report means that the specific analyte was not added to the QC sample.
6. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test			Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank									
Oil & Grease (HEM)			mg/L	< 10			10	Pass	
Total Suspended Solids Dried at 103 °C to 105 °C			mg/L	< 5			5	Pass	
Turbidity			NTU	< 1			1	Pass	
LCS - % Recovery									
Oil & Grease (HEM)			%	84			70-130	Pass	
Total Suspended Solids Dried at 103 °C to 105 °C			%	109			70-130	Pass	
Turbidity			%	95			70-130	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Duplicate									
				Result 1	Result 2	RPD			
Total Suspended Solids Dried at 103 °C to 105 °C	S23-Jn0046828	CP	mg/L	< 5	< 5	<1	30%	Pass	
Turbidity	R23-Jn0030576	NCP	NTU	< 1	< 1	<1	30%	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Authorised by:

Asim Khan	Analytical Services Manager
Dilani Samarakoon	Senior Analyst-Inorganic
Fang Yee Tan	Senior Analyst-Metal
Mary Makarios	Senior Analyst-Inorganic
	Senior Analyst-Inorganic

Managing Director

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please [click here](#).

Eurofins shall not be liable for loss, cost, damages or expenses incurred by the client, or any other person or company, resulting from the use of any information or interpretation given in this report. In no case shall Eurofins be liable for consequential damages including, but not limited to, lost profits, damages for failure to meet deadlines and lost production arising from this report. This document shall not be reproduced except in full and relates only to the items tested. Unless indicated otherwise, the tests were performed on the samples as received.

CPB Contractors Pty Ltd
Level 4, 177 Pacific Highway
North Sydney
NSW 2060



NATA Accredited
Accreditation Number 1261
Site Number 1254

Accredited for compliance with ISO/IEC 17025 – Testing
NATA is a signatory to the ILAC Mutual Recognition
Arrangement for the mutual recognition of the
equivalence of testing, medical testing, calibration,
inspection, proficiency testing scheme providers and
reference materials producers reports and certificates.

Attention: **Emma Eveleigh**

Report **1002761-W**
Project name **PITT ST ISD**
Project ID **N01070**
Received Date **Jun 27, 2023**

Client Sample ID			PSS_01
Sample Matrix			Water
Eurofins Sample No.			S23-Jn0062472
Date Sampled			Jun 27, 2023
Test/Reference	LOR	Unit	
Oil & Grease (HEM)	10	mg/L	< 10

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description

Oil & Grease (HEM)

Testing Site

Melbourne

Extracted

Jun 29, 2023

Holding Time

28 Days

- Method: LTM-INO-4380 Oil and Grease (APHA 5520B)

Company Name: CPB Contractors Pty Ltd
Address: Level 4, 177 Pacific Highway
North Sydney
NSW 2060

Project Name: PITT ST ISD
Project ID: N01070

Order No.: 6406177
Report #: 1002761
Phone: 02 9035 5007
Fax:

Received: Jun 27, 2023 4:30 PM
Due: Jun 29, 2023
Priority: 2 Day
Contact Name: Emma Eveleigh

Eurofins Analytical Services Manager : Asim Khan

Sample Detail

Oil & Grease (HEM)

Melbourne Laboratory - NATA # 1261 Site # 1254

External Laboratory

No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID	
1	PSS_01	Jun 27, 2023		Water	S23-Jn0062472	X
Test Counts						1

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer that may have an impact on the results.
9. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

Units

mg/kg: milligrams per kilogram	mg/L: milligrams per litre	µg/L: micrograms per litre
ppm: parts per million	ppb: parts per billion	%: Percentage
org/100 mL: Organisms per 100 millilitres	NTU: Nephelometric Turbidity Units	MPN/100 mL: Most Probable Number of organisms per 100 millilitres
CFU: Colony forming unit		

Terms

APHA	American Public Health Association
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
TBTO	Tributyltin oxide (<i>bis</i> -tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment however free tributyltin was measured and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalency Quotient or Total Equivalence
QSM	US Department of Defense Quality Systems Manual Version 5.4
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

The acceptance criteria should be used as a guide only and may be different when site specific Sampling Analysis and Quality Plan (SAQP) have been implemented

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR: No Limit

Results between 10-20 times the LOR: RPD must lie between 0-50%

Results >20 times the LOR: RPD must lie between 0-30%

NOTE: pH duplicates are reported as a range not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS. SVOCs recoveries 20 – 150%

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.4 where no positive PFAS results have been reported have been reviewed and no data was affected.

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
4. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery the term "INT" appears against that analyte.
5. For Matrix Spikes and LCS results a dash "-" in the report means that the specific analyte was not added to the QC sample.
6. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test			Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank									
Oil & Grease (HEM)			mg/L	< 10			10	Pass	
LCS - % Recovery									
Oil & Grease (HEM)			%	130			70-130	Pass	
Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Duplicate									
				Result 1	Result 2	RPD			
Oil & Grease (HEM)	M23-Jn0052035	NCP	mg/L	27	26	3.3	30%	Pass	

Comments**Sample Integrity**

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Authorised by:

Asim Khan	Analytical Services Manager
Mary Makarios	Senior Analyst-Inorganic



Glenn Jackson
Managing Director

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please [click here](#).

Eurofins shall not be liable for loss, cost, damages or expenses incurred by the client, or any other person or company, resulting from the use of any information or interpretation given in this report. In no case shall Eurofins be liable for consequential damages including, but not limited to, lost profits, damages for failure to meet deadlines and lost production arising from this report. This document shall not be reproduced except in full and relates only to the items tested. Unless indicated otherwise, the tests were performed on the samples as received.