Quarterly Environment Construction Monitoring Report

Q3 and Q4 2023 –

July - December 2023

Pitt Street Integrated Station Development

Project number:	N01070
Document number:	SMCSWSPS-CPB-STA-EM-REP-000026
TeamBinder:	SMCSWSPU-CPB-SPS-EM-REP-008826
Revision date:	17/05/2024
Revision:	**2**

Document approval

Rev.	Date	Prepared by	Reviewed by	Approved by	Remarks
A	12/01/2024	A Brajlih	E Eveleigh		Review by Renzo Tonin
0	12/01/2024	A Brajlih	E Eveleigh	S Knight	Issue to Sydney Metro
1	17/04/2024	A Brajlih	E Eveleigh	S Knight	Amendments following receiving comments
2	17/05/2024	E Eveleigh		S Knight	Additional AA comments addressed
Signature		[redacted]			

APPROVAL

CITY & SOUTHWEST ACOUSTICS ADVISOR

Review of	**Quarterly Environment Construction Monitoring Report Q3 and Q4 2023 – July – December 2023 (PSISD)**	**Document reference:**	**Quarterly Environment Construction Monitoring Report Q3 and Q4 2023 – July – December 2023 Pitt Street Integrated Station Development Prepared by CPB.** *Project Number: N01070* *Document number: SMCSWSPS-CPB-STA-EM-REP-000026* *Team Binder: SMCSWSPU-CPB-SPS-EM-REP-008826* *Revision date: 17/5/2024* *Revision: 2*
Prepared by:	Carl Fokkema Alternate Acoustics Advisor		
Date of issue:	20 May 2024		

As approved Alternate Acoustics Advisor for the Sydney Metro City & Southwest project, I have reviewed and provided comment on the Quarterly Environmental Construction Monitoring Report (CMR) for the Pitt Street Integrated Station Development, as required under A27 (d) of the project approval conditions (SSI 15-7400).

I reviewed and commented on previous revision (Rev 0 and 1) of the CMR Q3 and Q4 2023. This revision 2 includes minor amendments that required updating or were of an administrative or minor nature and are consistent with the terms of approval and the document approved by the Secretary.

I am satisfied that such amendments are necessary, approve revision 2 of the CMR Q3 and Q4 2023 (dated 17 May 2024), and consider that the document is appropriate for submission to the Secretary for information.

Carl Fokkema, City & Southwest Alternate Acoustics Advisor

Contents

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.

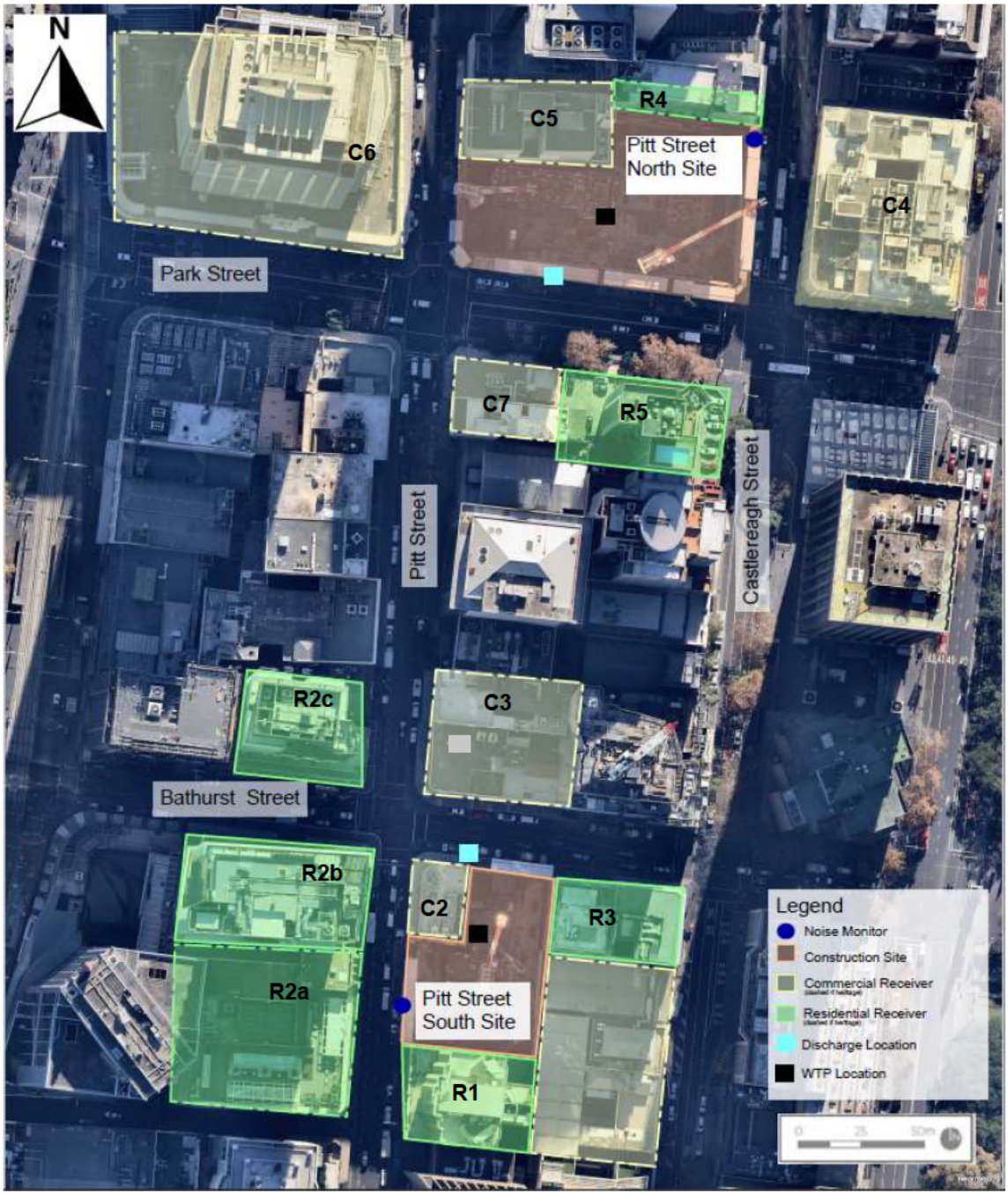


Figure 1-1 Pitt Street Station location and indicative monitoring layout

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. CEMP (Revision 4) was the current approved management plan during the period between July and December 2023. The CEMP was approved by the ER on 15 June 2023.

This is the second biannual Construction Monitoring Report for 2023 and reflects the monitoring that was conducted from July to December 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	Final internal finishes works on L04 including waterproofing, blockwork, painting and door installation. Services commissioning all levels L00 main entry fitout, including baffle ceiling and colour back glass installation Defects rectification works all floors Signage installation all floors Façade installation L00 – L02 and Sandstone Fins L02-L04.
Pitt Street South	Completion of blockwork Completion of internal finishes Escalator testing and commissioning completed Lift testing and commissioning completed Installation of internal services with testing and commissioning ongoing (i.e. SAT testing) Façade and awning installation works from level 00 and 01 (Bathurst Street and Pitt Street) Installation of façade to The Edinburgh Castle from levels 3 - 6
Caverns	GRC panel installation and rectification complete Platform PSD cladding complete Terrazzo flooring complete at all FOH areas Signage 95% complete

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 (now DPHI) 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 DPHI (formerly DPE) and being made publicly available on the project website located at 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 DPHI (Formerly DPE) endorsed Acoustic Advisor (AA) and the ER.

During the reporting period there were six inspections conducted by Sydney Metro Environmental Representatives and the ER/AA. Additionally, CPB completed twenty-four 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 to date is predominantly rainwater and construction (non-potable runoff) 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.

No water has been discharged to stormwater during the reporting period. Due to the progression of the site construction and rainwater are now captured and managed by the Pitt Street North and South Over station Development sites respectively. Water management was handed to the OSD sites in August 2023. Groundwater remains within the sump locations at both Pitt Street South and North site and has instead been reused within site amenities.

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).

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
	16/08/2023 – Revision 18.3 issued to Sydney Metro, ER and AA and endorsed by the AA on 16 August 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)$L_{eq(15min)}$ (weekdays) 75dB(A) – 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)	68dB(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	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	64dB(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

*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 receival of a complaint.

Some measurement locations are affected by road traffic noise, (buses/truck passing by etc) intermittently generating noise levels similar to or higher than the construction noise. As such, conducting a long-term noise measurement ($L_{Aeq,\ 15\text{-}minute}$) 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 $L_{Aeq,15minute}$ 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 $L_{Aeq,15minute}$ 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.

Seven instances attended noise monitoring have 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 the 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 performed during the reporting period as no vibration generating activities with potential to adjacent structures were identified.

2.3.4 Attended Monitoring Results

Attended Monitoring Results – 05 July 2023 (Station Box (North Site) – Utilities Installation)

Attended noise measurements provided below in Table 2-7 for Out of Hours works at Station Box (Services Investigation), were conducted by attended noise measurements at Pitt Street North on 05/07/2023.

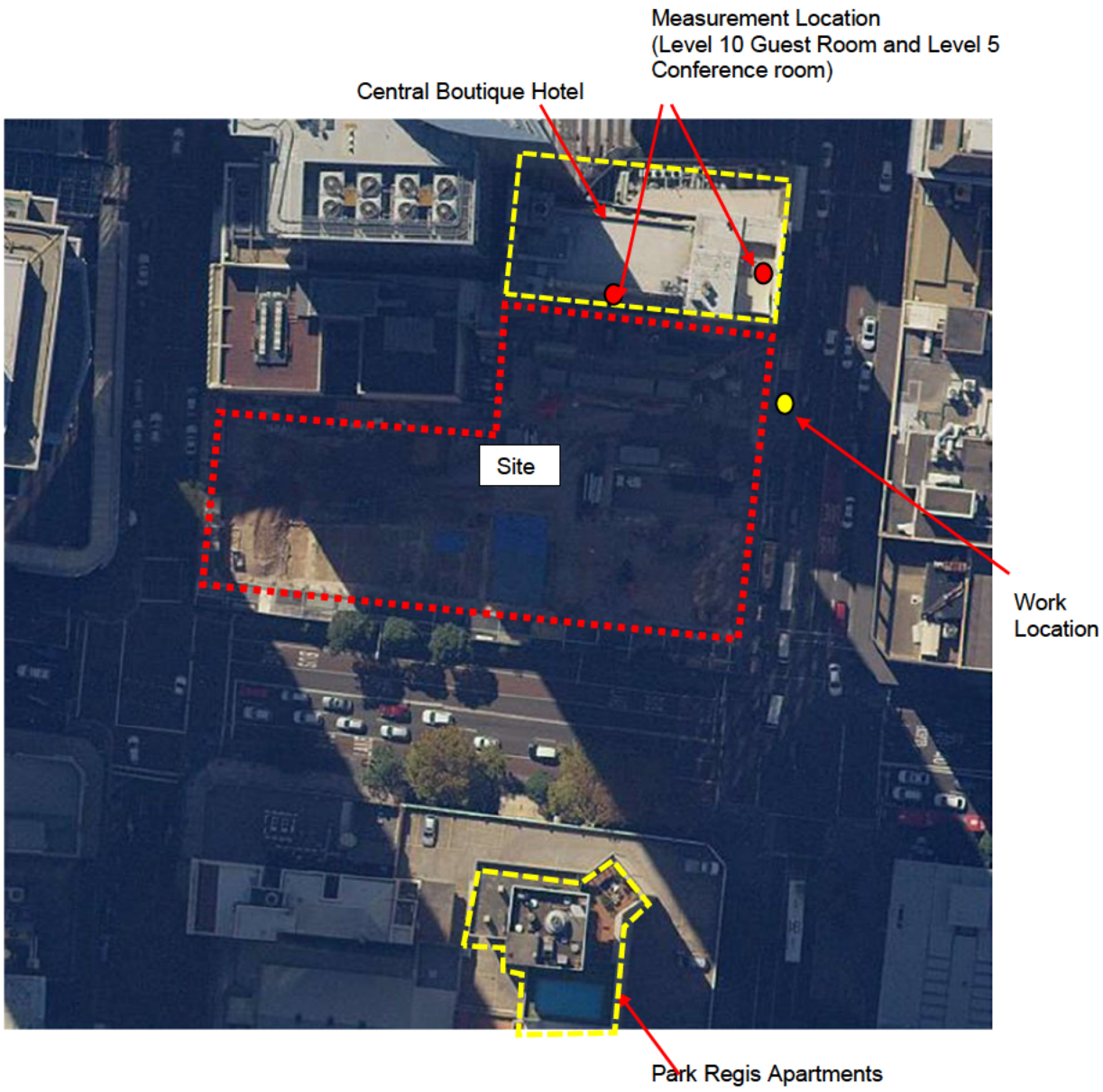
Table 2-7 Measured Noise Levels (Castlereagh Boutique Hotel, R5N) – Construction Activities – Vacuum Truck Use

Work Location	Activity	Measurement Location	Noise Level (at measurement location)	Predicted Noise Level (Level 6 – nearest guest room)	Comment
Location 1 (Before 12am)	Vacuum Truck with Pressure Washer	Level 10 – Guest Room facing Castlereagh Street	68dB(A)$L_{eq(15min)}$ 69dB(A)L_{max} *(44dB(A)$L_{eq(15min)}$ inside)*	**71dB(A)$L_{eq(15min)}$** 72dB(A)L_{max} *(47dB(A)$L_{eq(15min)}$ inside)*	Complies CNVIS prediction to R5 (74dB(A)$L_{eq(15min)}$ - outside) *(49dB(A)$L_{eq(15min)}$ - inside)* Measurement time: 11:15pm
	Vacuum Truck without Pressure Washer	Level 10 – Guest Room facing Castlereagh Street	66dB(A)$L_{eq(15min)}$ 67dB(A)L_{max} *(42dB(A)$L_{eq(15min)}$ inside)*	**69dB(A)$L_{eq(15min)}$** 70dB(A)L_{max} *(45dB(A)$L_{eq(15min)}$ inside)*	Complies CNVIS prediction to R5 (74dB(A)$L_{eq(15min)}$ - outside) *(49dB(A)$L_{eq(15min)}$ - inside)* Measurement time: 11:45pm

Work Location	Activity	Measurement Location	Noise Level (at measurement location)	Predicted Noise Level (Level 6 – nearest guest room)	Comment
	Vacuum Truck with Pressure Washer	Level 5 – Conference Room facing Castlereagh Street	76dB(A)$L_{eq(15min)}$ 78dB(A)L_{max} *(49dB(A)$L_{eq(15min)}$ inside)*	**75dB(A)$L_{eq(15min)}$** 77dB(A)L_{max} *(48dB(A)$L_{eq(15min)}$ inside)*	Exceeds CNVIS prediction to R5 by one 1dB(A)(74dB(A)$L_{eq(15min)}$ - outside) *(49dB(A)$L_{eq(15min)}$ - inside)* Note: During this measurement the vacuum truck pump was running at higher rpm than usual. The pump speed was reduced to 1007rpm after 11pm. Measurement time: 10:05pm
	Vacuum Truck without Pressure Washer	Level 5 – Conference Room facing Castlereagh Street	75dB(A)$L_{eq(15min)}$ 77dB(A)L_{max} *(47dB(A)$L_{eq(15min)}$ inside)*	**74dB(A)$L_{eq(15min)}$** 76dB(A)L_{max} *(46dB(A)$L_{eq(15min)}$ inside)*	Complies CNVIS prediction to R5 (74dB(A)$L_{eq(15min)}$ - outside) *(49dB(A)$L_{eq(15min)}$ - inside)* Note: During this measurement the vacuum truck pump was running at higher rpm than usual. The pump speed was reduced to 1007rpm after 11pm. Measurement time: 10:30pm

For measurements in the Level 10 guest room on the southern façade (facing Park Street), work noise was not audible in an ambient environment of 30dB(A)L_{90}.

See below for measurement locations.


Measurement Location
(Level 10 Guest Room and Level 5
Conference room)
Central Boutique Hotel
Site
Work
Location
Park Regis Apartments

Attended Monitoring Results – 09 July 2023 (Station Box (South Site) - Gas Diversion)

Attended noise measurements provided below in Table 2-8 and Table 2-9 for Out of Hours works at Station Box (Gas Diversion), were conducted by on-site measurements at Pitt Street South on 09/07/2023.

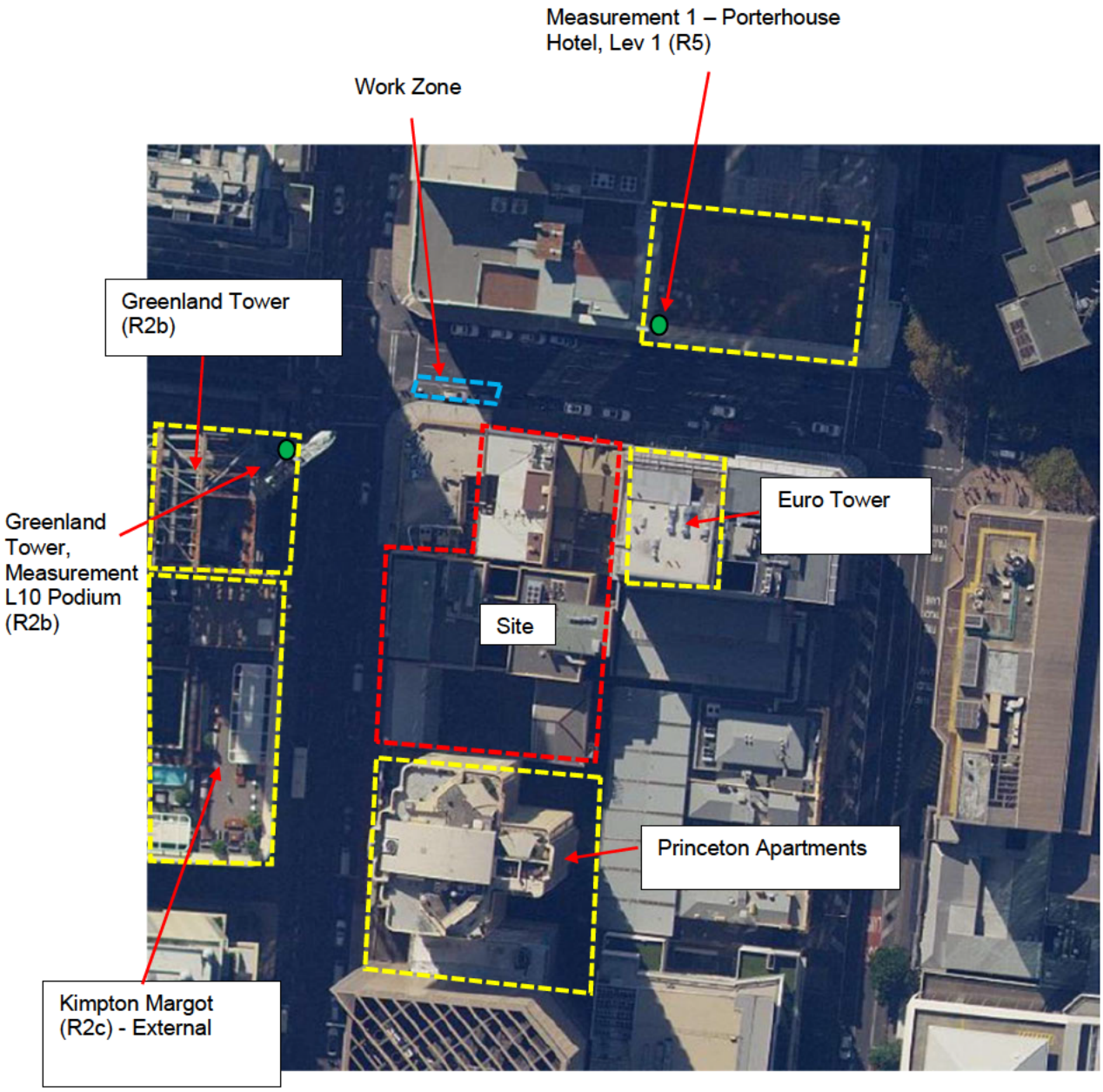
Table 2-8 Measured Noise Levels at Porterhouse Hotel (Receiver R5) - Level 1 Room 110

Work Location	Activity	Measurement Location	Comment
Works before 12am			
Bathurst Street Frontage (see aerial photo)	Road Saw – NO tent	Outside: **78dB(A)$L_{eq(15min)}$** 81dB(A)L_{Max} Inside: **43dB(A)$L_{eq(15min)}$** 47dB(A)L_{Max}	Outside: Consistent with CNVIS prediction to R5 (72dB(A)$L_{eq(15min)}$ predicted with tent, 77dB(A) if no tent). Inside: Below with CNVIS prediction to R5 (47dB(A)$L_{eq(15min)}$ predicted). Measurement time: 09:30pm
	Road Saw – with tent (tent opening faced west)	Outside: **73dB(A)$L_{eq(15min)}$** 76dB(A)L_{Max} Inside: **39dB(A)$L_{eq(15min)}$** 43dB(A)L_{Max}	Outside: Consistent with CNVIS prediction to R5 (72dB(A)$L_{eq(15min)}$ predicted with tent). Inside: Below with CNVIS prediction to R5 (42dB(A)$L_{eq(15min)}$ predicted). Measurement time: 9:50pm

Table 2-9 Measured Noise Levels at Greenland Tower (Receiver R2) - Level 10 Podium

Work Location	Activity	Measurement Location	Comment
Works before 12am			
Bathurst Street Frontage (see aerial photo)	Road Saw – NO tent	**Edge of Podium - 77dB(A)$L_{eq(15min)}$** 84dB(A)L_{max} First occupied level prediction 76dB(A)$L_{eq(15min)}$	Within 2dB(A) of CNVIS prediction to R2 assuming no tent. (69dB(A)$L_{eq(15min)}$ predicted with tent, 74dB(A) if no tent). Measurement time: 10:20pm
	Road Saw – (tent opening faced west)	**76dB(A)$L_{eq(15min)}$** 83dB(A)L_{max}	Generally compliant (within 2dB(A) of CNVIS prediction to R2 assuming no tent (69dB(A)$L_{eq(15min)}$ predicted with tent, 74dB(A) if no tent). As the tent opening faced R2, minimal benefit from the tent was observed. Measurement time: 10:45pm

See below for measurement locations.


Measurement 1 – Porterhouse Hotel, Lev 1 (R5)
Work Zone
Greenland Tower (R2b)
Greenland Tower, Measurement L10 Podium (R2b)
Euro Tower
Site
Princeton Apartments
Kimpton Margot (R2c) - External

Attended Monitoring Results – 16 July 2023 (Station Box (South Site) - Gas Diversion)

Attended noise measurements provided below in Table 2-10, Table 2-11, Table 2-12, and Table 2-13 for Out of Hours works at Station Box (Gas Diversion), were conducted by on-site measurements at Pitt Street South on 16/07/2023.

Table 2-10 Measured Noise Levels (Greenland Tower – R2b) – Level 10 Podium

Work Location	Activity	Measurement Location	Comment
Works before 12am			
Bathurst Street Frontage (see aerial photo)	Hydraulic Hammer – with tent	**67-70dB(A)$L_{eq(15min)}$** 75-80dB(A)L_{max}	Consistent with CNVIS prediction to R2 (69dB(A)$L_{eq(15min)}$ predicted with tent, 74dB(A) if no tent). Measurement time: 08:51pm
	Hydraulic Hammer – NO tent	**70-73dB(A)$L_{eq(15min)}$** 76-83dB(A)L_{max}	Consistent with CNVIS prediction to R2 (69dB(A)$L_{eq(15min)}$ predicted with tent, 74dB(A) if no tent). Measurement time: 09:28pm
Works after 12am			
Bathurst Street Frontage (see aerial photo)	Vacuum Truck (reduced pump speed – 1469RPM)	**74dB(A)$L_{eq(15min)}$** 76dB(A)L_{max}	Exceeds CNVIS prediction to R2 (64dB(A)$L_{eq(15min)}$). There had been a change in operating speed which had provided a 6dB benefit. Due to the exceedance works were ceased for the evening. Measurement time: 12:31am

Table 2-11 Measured Noise Levels at Kimpton Margot (Receiver R4) (Ground Level, External)

Work Location	Activity	Measurement Location	Comment
Works before 12am			
Bathurst Street Frontage (see aerial photo)	Vacuum Truck (reduced pump speed – 1469RPM)	**65dB(A)$L_{eq(15min)}$** 66dB(A)L_{max}	Consistent with CNVIS prediction to R2 (64dB(A)$L_{eq(15min)}$) Measurement time: 10:29pm

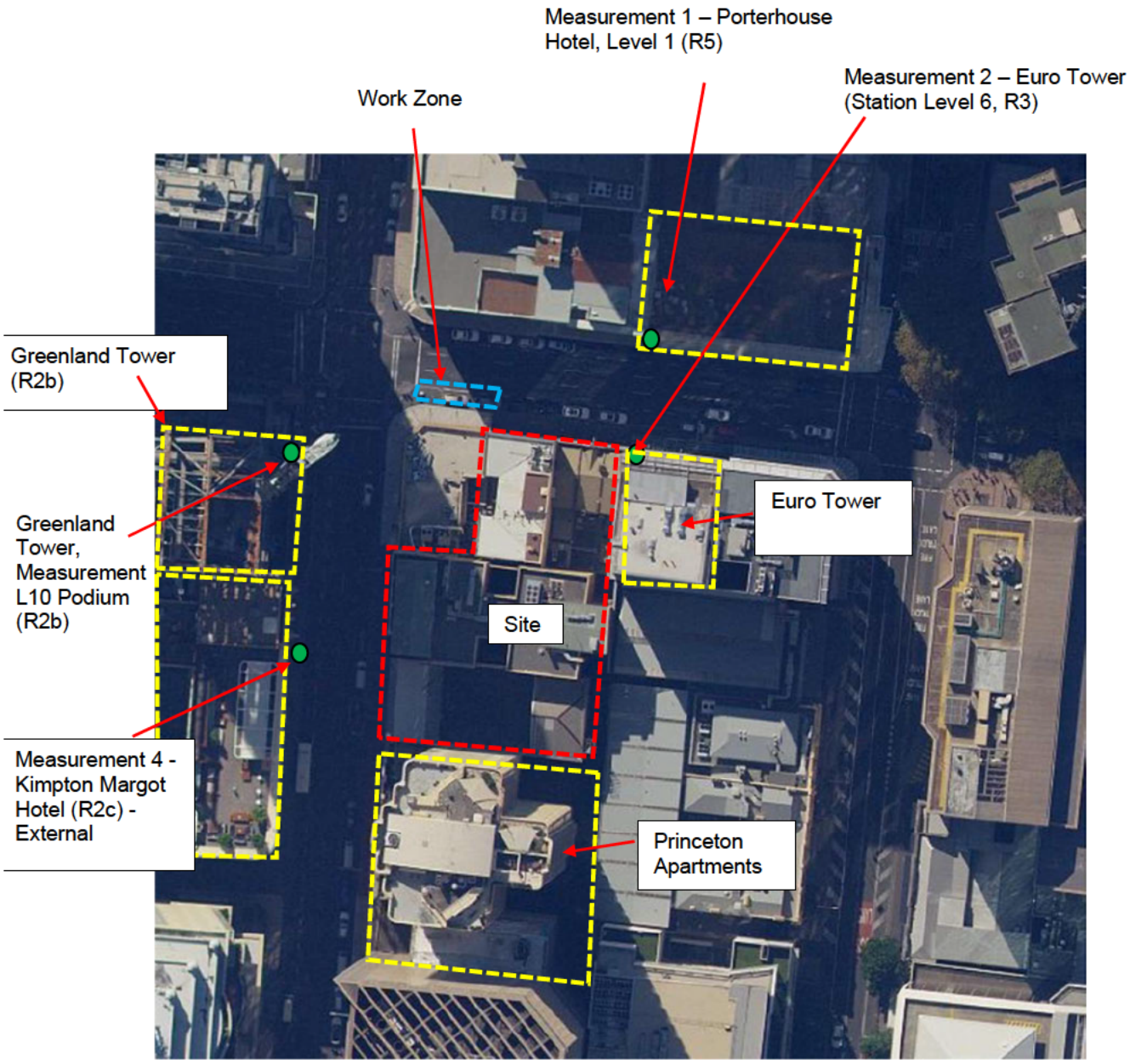
Table 2-12 Measured Noise Levels at Euro Tower (Receiver R3) (Station Box Podium Lev 6, adjacent to Euro Tower Balcony)

Work Location	Activity	Measurement Location	Comment
Works before 12am			
Bathurst Street Frontage (see aerial photo)	Hydraulic Hammer – with tent (tent opening faced east, and so providing no attenuation)	**79dB(A)$L_{eq(15min)}$** 84dB(A)L_{max}	Consistent with CNVIS prediction to R3 (75dB(A)$L_{eq(15min)}$ predicted with tent, 80dB(A) if no tent). Measurement time: 09:52pm
Works after 12am			
Bathurst Street Frontage (see aerial photo)	Vacuum Truck (reduced pump speed – 1469RPM)	**78dB(A)$L_{eq(15min)}$** 80dB(A)L_{max}	Exceeds CNVIS prediction to R3 (70dB(A)$L_{eq(15min)}$) Due to the exceedance works were ceased for the evening. Measurement time: 12:25am

Table 2-13 Measured Noise Levels at Porterhouse Hotel (Receiver R5) (Level 1 Rooms 109 and 110)

Work Location	Activity	Measurement Location	Comment
Works before 12am			
Bathurst Street Frontage (see aerial photo)	Hydraulic Hammer – with tent (tent opening faced east and providing no noise attenuation)	Outside: **78dB(A)$L_{eq(15min)}$** 80-85dB(A)L_{Max}	Outside: Generally consistent with CNVIS prediction to R5 (72dB(A)$L_{eq(15min)}$ predicted with tent, 77dB(A) if no tent).
		Inside: **40dB(A)$L_{eq(15min)}$** 46-50dB(A)L_{Max}	Inside: Below with CNVIS prediction to R5 (47dB(A)$L_{eq(15min)}$ predicted). Measurement time: 10:55pm
Works after 12am			
Bathurst Street Frontage (see aerial photo, Section 2)	Vacuum Truck (reduced pump speed – 1469RPM)	Outside: **78dB(A)$L_{eq(15min)}$** 80dB(A)L_{Max}	Outside: Exceeds CNVIS prediction to R5 (67dB(A)$L_{eq(15min)}$)
		Inside: **40dB(A)$L_{eq(15min)}$** 42dB(A)L_{Max}	Pump speed reduced after Porterhouse Measurement and prior to commencement of next measurement (Eurotower). Change in operating speed which had provided a 6dB benefit. Works ultimately ceased due to the exceedance works were ceased for the evening. Inside: Below with CNVIS prediction to R5 (42dB(A)$L_{eq(15min)}$ predicted). Measurement time: 12:15am

See below for measurement locations.


Measurement 1 – Porterhouse Hotel, Level 1 (R5)
Measurement 2 – Euro Tower (Station Level 6, R3)
Work Zone
Greenland Tower (R2b)
Greenland Tower, Measurement L10 Podium (R2b)
Measurement 4 - Kimpton Margot Hotel (R2c) - External
Euro Tower
Site
Princeton Apartments

Attended Monitoring Results – 09 August 2023 (Station Box (South Site) - Vacuum Truck)

Attended noise measurements provided below in Table 2-14, Table 2-15, and Table 2-16 for Out of Hours works at Station Box (Vacuum Truck), were conducted by on-site measurements at Pitt Street South on 09/08/2023.

Vacuum truck pump motor reduced from Full Speed to 1077RPM at 11pm.

Table 2-14 Measured Noise Levels at Porterhouse Hotel (Receiver R5) (Footpath, Ground Level – Western End of Frontage)

Work Location	Activity	Measurement Location	Comment
Works after 11pm			
Bathurst Street Frontage – towards eastern end.	Vacuum Truck (reduced pump speed – 1077RPM)	Outside: **74dB(A)$L_{eq(15min)}$** 75dB(A)L_{Max} Inside (Assumed based on 35dB(A) outside inside reduction measured previously): **38dB(A)$L_{eq(15min)}$** 39dB(A)L_{Max}	Outside: Consistent with CNVIS prediction to R5 (74dB(A)$L_{eq(15min)}$) Measurement time: 11:00pm

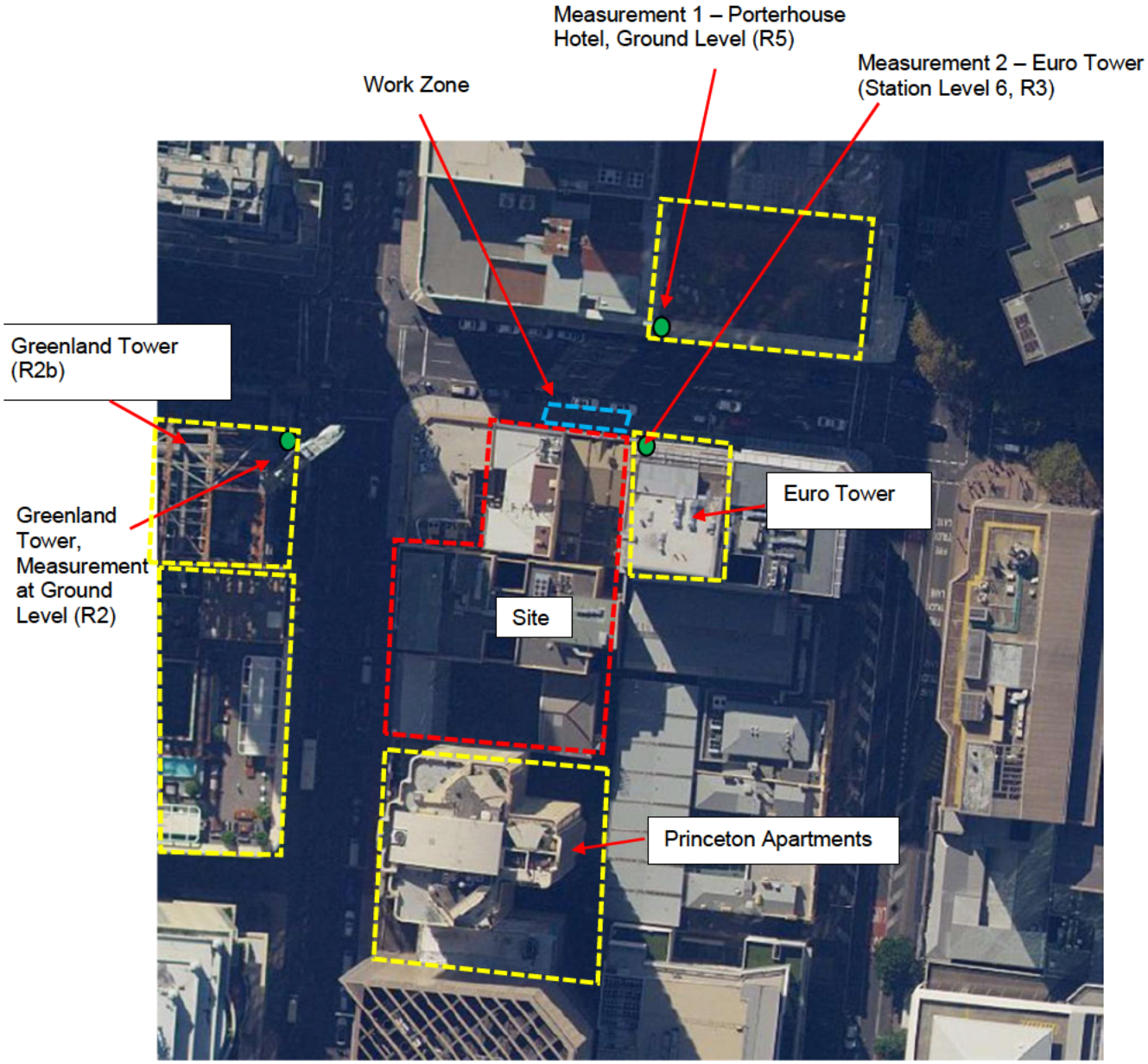
Table 2-15 Measured Noise Levels (Level 6 of Station Box, adjacent to Euro Tower)

Work Location	Activity	Measurement Location	Comment
Works after 11pm			
Bathurst Street Frontage – towards eastern end.	Vacuum Truck (reduced pump speed – 1077RPM)	Outside: **75dB(A)$L_{eq(15min)}$** 76dB(A)L_{Max} Inside (Assumed 25dB reduction as per CNVIS): **50dB(A)$L_{eq(15min)}$** 51dB(A)L_{Max}	Outside: Consistent with CNVIS prediction to R5 (76dB(A)$L_{eq(15min)}$) Measurement time: 11:30pm

Table 2-16 Measured Noise Levels at Greenland Tower (Receiver R2 – Level 10) (Footpath, Ground Level – Pitt and Bathurst)

Work Location	Activity	Measurement Location	Comment
Works after 11pm			
Bathurst Street Frontage – towards eastern end.	Vacuum Truck (reduced pump speed – 1077RPM)	Outside Ground Level Measurement Location: **67dB(A)$L_{eq(15min)}$** 68dB(A)L_{Max} Nearest Apt - Level 10 – Predicted: **65dB(A)$L_{eq(15min)}$** 66dB(A)L_{Max} Inside (Assumed 25dB reduction as per CNVIS): **40dB(A)$L_{eq(15min)}$** 41dB(A)L_{Max}	Outside: Consistent with CNVIS prediction to R2 (63dB(A)$L_{eq(15min)}$). Measurement time: 11:15pm

See below for measurement locations.



Attended Monitoring Results – 27 October 2023 (South Site - Utilities Works, 2 Crews)

Attended noise measurements provided below in Table 2-17, Table 2-18, and Table 2-19 for Out of Hours works, were conducted by on-site measurements at Pitt Street South on 27/10/2023.

Table 2-17 Measured Noise Levels at Princeton Apartment, R1 (Level 12 – 21approx.. 6 Levels above ground)

Work Location	Activity	Measured Noise Level	Comment
Works before 12am			
Work Zone 1	Vacuum Truck (full speed)	Outside: **65dB(A)$L_{eq(15min)}$** 67dB(A)L_{Max} Inside (measured): **44dB(A)$L_{eq(15min)}$** 46dB(A)L_{Max}	Outside: Consistent with CNVIS prediction to R1 (70dB(A)$L_{eq(15min)}$) Measurement time - 10:40pm
Works before 12am			
Work Zone 2	Road saw in tent	Outside: **68dB(A)$L_{eq(15min)}$** 70dB(A)L_{Max} Inside (measured): **45dB(A)$L_{eq(15min)}$** 47dB(A)L_{Max}	Outside: Consistent with CNVIS prediction to R1 (79dB(A)$L_{eq(15min)}$) Measurement time - 10:40pm
	Hammer	Outside: **73dB(A)$L_{eq(15min)}$** 77dB(A)L_{Max} Inside (measured): **53dB(A)$L_{eq(15min)}$** 55dB(A)L_{Max}	Outside: Consistent with CNVIS prediction to R1 (79dB(A)$L_{eq(15min)}$) Measurement time - 10:50pm
	Vacuum Truck (full speed)	Outside: **67dB(A)$L_{eq(15min)}$** 69dB(A)L_{Max} Inside (measured): **46dB(A)$L_{eq(15min)}$** 48dB(A)L_{Max}	Outside: Consistent with CNVIS prediction to R1 (76dB(A)$L_{eq(15min)}$) Measurement time - 11:55pm

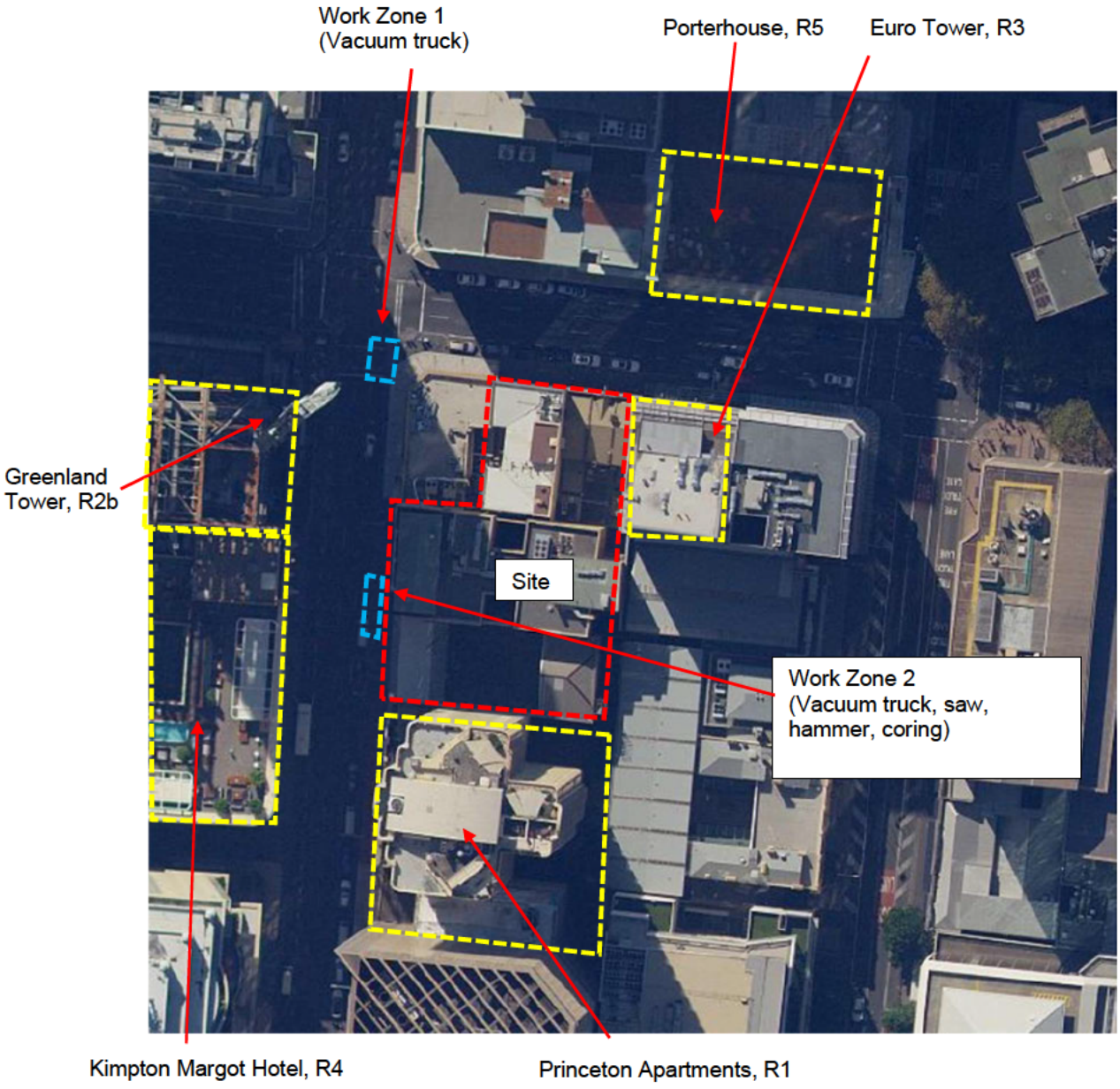
Table 2-18 Measured Noise Levels at Kimpton Margo Hotel, R4 (Level 1)

Work Location	Activity	Measured Noise Level	Comment
Works before 12am			
Work Zone 1	Vacuum Truck (full speed)	Outside: **65dB(A)$L_{eq(15min)}$** 67dB(A)L_{Max} Inside (measured): **44dB(A)$L_{eq(15min)}$** 46dB(A)L_{Max}	Outside: Consistent with CNVIS prediction to R4 (70dB(A)$L_{eq(15min)}$) Measurement time - 11:05pm
Works before 12am			
Work Zone 2	Road saw in tent	Outside: **76dB(A)$L_{eq(15min)}$** 78dB(A)L_{Max} Inside (measured): **42dB(A)$L_{eq(15min)}$** 44dB(A)L_{Max}	Outside: Consistent with CNVIS prediction to R4 (81dB(A)$L_{eq(15min)}$) Measurement time - 11:10pm
	Coring	Outside: **76dB(A)$L_{eq(15min)}$** 78dB(A)L_{Max} Inside (measured): **44dB(A)$L_{eq(15min)}$** 46dB(A)L_{Max}	Outside: Consistent with CNVIS prediction to R4 (81dB(A)$L_{eq(15min)}$) Measurement time - 11:15pm
	Vacuum Truck (full speed)	Outside: **79dB(A)$L_{eq(15min)}$** 80dB(A)L_{Max} Inside (measured): **47dB(A)$L_{eq(15min)}$** 49dB(A)L_{Max}	Outside: Consistent with CNVIS prediction to R4 (78dB(A)$L_{eq(15min)}$) Measurement time - 11:45pm

Table 2-19 Measured Noise Levels at Greenland Tower, R2 (Level 10)

Work Location	Activity	Measured Noise Level	Comment
Works before 12am			
Work Zone 1 (Measurement at North end of Level 10 Terrace)	Vacuum Truck (full speed)	Outside: **73dB(A)$L_{eq(15min)}$** 74dB(A)L_{Max} Inside (Assumed 25dB reduction as per CNVIS): **48dB(A)$L_{eq(15min)}$** 49dB(A)L_{Max}	Outside: Consistent with CNVIS prediction to R2 (72dB(A)$L_{eq(15min)}$) Measurement time - 11:25pm
Works before 12am			
Work Zone 2 (Measurement at South end of Level 10 Terrace)	Hydraulic Hammer	Outside: **75dB(A)$L_{eq(15min)}$** 78dB(A)L_{Max} Inside (Assumed 25dB reduction as per CNVIS): **50dB(A)$L_{eq(15min)}$** 52dB(A)L_{Max}	Outside: Consistent with CNVIS prediction to R2 (77dB(A)$L_{eq(15min)}$) Measurement time - 11:25pm
	Vacuum Truck (full speed)	Outside: **71dB(A)$L_{eq(15min)}$** 73dB(A)L_{Max} Inside (Assumed 25dB reduction as per CNVIS): **46dB(A)$L_{eq(15min)}$** 48dB(A)L_{Max}	Outside: Consistent with CNVIS prediction to R2 (72dB(A)$L_{eq(15min)}$) Measurement time - 11:35pm

See below for measurement locations.


Work Zone 1
(Vacuum truck)
Porterhouse, R5
Euro Tower, R3
Greenland
Tower, R2b
Site
Work Zone 2
(Vacuum truck, saw,
hammer, coring)
Kimpton Margot Hotel, R4
Princeton Apartments, R1

Attended Monitoring Results – 06 November 2023 (South Site - Utilities Works, 2 Crews)

Attended noise measurements provided below in Table 2-20, Table 2-21, Table 2-22, and Table 2-23 for Out of Hours works, were conducted by on-site measurements at Pitt Street South on 06/11/2023.

Table 2-20 Measured Noise Levels at Greenland Tower (R2 - Level 10 Terrace)

Work Location	Activity	Measured Noise Level	Comment/Comparison to Predictions
Work Zone 1			
Before 12am	Road Saw (in tent)	Outside: **69dB(A)$L_{eq(15min)}$** 70dB(A)L_{Max} Inside (Assumed 25dB reduction as per CNVIS): **44dB(A)$L_{eq(15min)}$** 45dB(A)L_{Max}	Outside: Consistent with OOH 59 Application prediction to R2 (69dB(A)$L_{eq(15min)}$) Measurement time - 10:30pm
	Hammer	Outside: **68dB(A)$L_{eq(15min)}$** 70dB(A)L_{Max} Inside (Assumed 25dB reduction as per CNVIS): **43dB(A)$L_{eq(15min)}$** 45dB(A)L_{Max}	Outside: Consistent with OOH 59 Application prediction to R2 (69dB(A)$L_{eq(15min)}$) Measurement time - 10:35pm
	Vacuum Truck (full speed)	Outside: **75dB(A)$L_{eq(15min)}$** 76dB(A)L_{Max} Inside (Assumed 25dB reduction as per CNVIS): **50dB(A)$L_{eq(15min)}$** 51dB(A)L_{Max}	N/A - No CNVIS prediction for 100% Vac truck prior midnight Measurement time - 11:40pm
After 12am	Vacuum Truck (reduced speed, approx. 1000RPM)	Outside: **71dB(A)$L_{eq(15min)}$** 72dB(A)L_{Max} Inside (Assumed 25dB reduction as per CNVIS): **46dB(A)$L_{eq(15min)}$** 47dB(A)L_{Max}	Outside: Consistent with OOH 59 Application prediction to R2 (69dB(A)$L_{eq(15min)}$) Measurement time - 12:15am
Work Zone 2			
Before 12am	Concrete Truck	Outside: **63dB(A)$L_{eq(15min)}$** 64dB(A)L_{Max} Inside (Assumed 25dB reduction as per CNVIS): **38dB(A)$L_{eq(15min)}$** 39dB(A)L_{Max}	N/A - No CNVIS prediction for concrete truck Measurement time: 11:40m

Table 2-21 Measured Noise Levels at Kimpton Margot Hotel (R4 – Footpath)

Work Location	Activity	Measured Noise Level	Comment/Comparison to Predictions
Work Zone 1			
Before 12am	Vacuum Truck (full speed)	Outside: **68dB(A)$L_{eq(15min)}$** 69dB(A)L_{Max} Inside (Assumed 25dB reduction as per CNVIS): **38dB(A)$L_{eq(15min)}$** 39dB(A)L_{Max}	N/A (vacuum truck noise prior to 12am not predicted in CNVIS as it was not anticipated to start use until later at night) Measurement time: 11:55pm
Work Zone 2			
	Concrete Truck	Outside: **67dB(A)$L_{eq(15min)}$** 68dB(A)L_{Max} Inside (Assumed 30dB reduction as per CNVIS): **37dB(A)$L_{eq(15min)}$** 38dB(A)L_{Max}	Measurement time: 11:55m

Table 2-22 Measured Noise Levels at Porterhouse Hotel (R5 - Footpath)

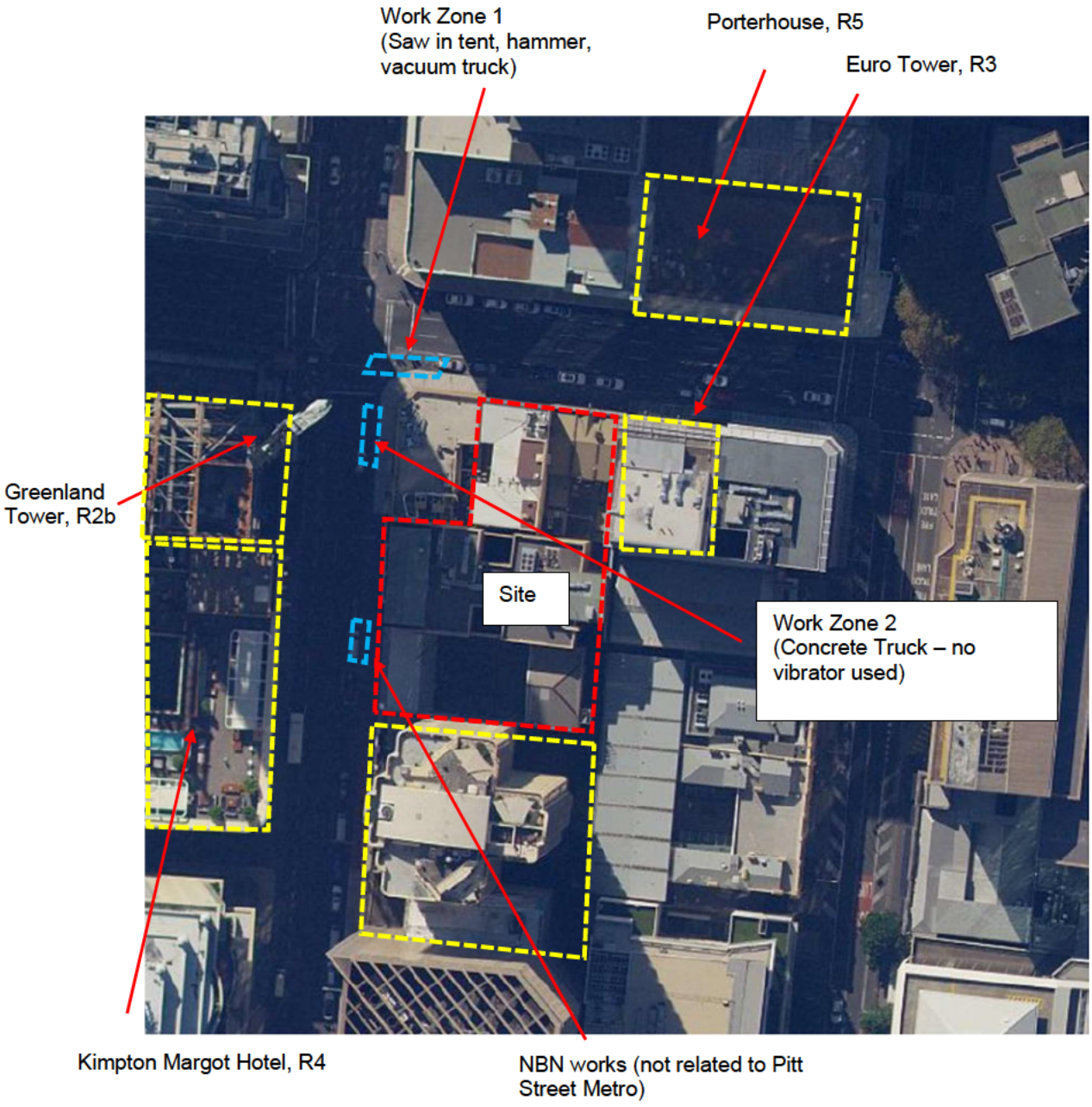
Work Location	Activity	Measured Noise Level	Comment/Comparison to Predictions
Work Zone 1			
Before 12am	Road Saw (in tent)	Outside: **73dB(A)$L_{eq(15min)}$** 74dB(A)L_{Max} Inside (Assumed 25dB reduction as per CNVIS): **38dB(A)$L_{eq(15min)}$** 39dB(A)L_{Max}	Outside: Consistent with OOH 59 Application prediction to R5 (74dB(A)$L_{eq(15min))}$) Measurement time - 10:20pm
	Hammer	Outside: **72dB(A)$L_{eq(15min)}$** 74dB(A)L_{Max} Inside (Assumed 25dB reduction as per CNVIS): **37dB(A)$L_{eq(15min)}$** 39dB(A)L_{Max}	Outside: Consistent with OOH 59 Application prediction to R5 (74dB(A)$L_{eq(15min))}$) Measurement time - 10:50pm

Work Location	Activity	Measured Noise Level	Comment/Comparison to Predictions
	Vacuum Truck (full speed – 1500RPM)	Outside: **76dB(A)$L_{eq(15min)}$** 77dB(A)L_{Max} Inside (Assumed 25dB reduction as per CNVIS): **41dB(A)$L_{eq(15min)}$** 42dB(A)L_{Max}	Measurement time - 11:25pm (Vacuum truck noise prior to 12am not predicted in CNVIS as it was not anticipated to start use until later at night)
After 12am	Vacuum Truck (reduced speed)	Outside: **70dB(A)$L_{eq(15min)}$** 71dB(A)L_{Max} Inside (Assumed 25dB reduction as per CNVIS): **35dB(A)$L_{eq(15min)}$** 36dB(A)L_{Max}	Outside: Consistent with CNVIS prediction to R2 (68dB(A)$L_{eq(15min))}$) Measurement time - 12:00am

Table 2-23 Measured Noise Levels at Euro Tower (R3 - Footpath)

Work Location	Activity	Measured Noise Level	Comment/Comparison to Predictions
Work Zone 1			
Before 12am	Road Saw (in tent)	Outside: **73dB(A)$L_{eq(15min)}$** 74dB(A)L_{Max} Inside (Assumed 25dB reduction as per CNVIS): **38dB(A)$L_{eq(15min)}$** 39dB(A)L_{Max}	Outside: Consistent with OOH 59 Application prediction to R5 (74dB(A)$L_{eq(15min))}$) Measurement time - 10:15pm
	Vacuum Truck (full speed – 1500RPM)	Outside: **76dB(A)$L_{eq(15min)}$** 77dB(A)L_{Max} Inside (Assumed 25dB reduction as per CNVIS): **51dB(A)$L_{eq(15min)}$** 52dB(A)L_{Max}	Measurement time - 11:20pm (Vacuum truck noise prior to 12am not predicted in CNVIS as it was not anticipated to start use until later at night)
After 12am	Vacuum Truck (reduced speed, approx. 1000RPM)	Outside: **70dB(A)$L_{eq(15min)}$** 71dB(A)L_{Max} Inside (Assumed 25dB reduction as per CNVIS): **45dB(A)$L_{eq(15min)}$** 46dB(A)L_{Max}	Outside: Consistent with CNVIS prediction to R2 (71dB(A)$L_{eq(15min))}$) Measurement time - 12:05am

See below for measurement locations.


Work Zone 1
(Saw in tent, hammer, vacuum truck)
Porterhouse, R5
Euro Tower, R3
Greenland Tower, R2b
Site
Work Zone 2
(Concrete Truck – no vibrator used)
Kimpton Margot Hotel, R4
NBN works (not related to Pitt Street Metro)

Attended Monitoring Results – 15 November 2023 (South Site - Utilities Works, 2 Crews)

Attended noise measurements provided below in Table 2-24, Table 2-25, Table 2-26, and Table 2-27 for Out of Hours works, were conducted by on-site measurements at Pitt Street South on 15/11/2023.

Table 2-24 Measured Noise Levels at Greenland Tower (R2 - Level 10 Terrace)

Work Location	Activity	Measured Noise Level	Comment/Comparison to Predictions
Work Zone 1			
Before 12am	Road Saw (in tent, opening facing east)	Outside: **69dB(A)$L_{eq(15min)}$** 70dB(A)L_{Max} Inside (Assumed 25dB reduction as per CNVMP): **44dB(A)$L_{eq(15min)}$** 45dB(A)L_{Max}	Outside: Consistent with OOH 59 Application prediction to R2 (69dB(A)$L_{eq(15min)}$) Measurement Time: 10.30pm
	Hammer (in shroud and tent, opening facing east)	Outside: **63dB(A)$L_{eq(15min)}$** 65dB(A)L_{Max} Inside (Assumed 25dB reduction as per CNVMP): **38dB(A)$L_{eq(15min)}$** 40dB(A)L_{Max}	Outside: Below prediction to R2 (72dB(A)$L_{eq(15min)}$) Measurement Time: 10.40pm
After 12am	Vacuum Truck (reduced speed, approx 1000RPM)	Outside: **71dB(A)$L_{eq(15min)}$** 72dB(A)L_{Max} Inside (Assumed 25dB reduction as per CNVMP): **46dB(A)$L_{eq(15min)}$** 47dB(A)L_{Max}	Outside: Consistent with prediction to R2 (68dB(A)$L_{eq(15min)}$) Measurement Time: 11:55pm
Work Zone 2			
	Vacuum Truck (full speed – 1500RPM)	Outside: **73dB(A)$L_{eq(15min)}$** 74dB(A)L_{Max} Inside (Assumed 25dB reduction as per CNVMP): **48dB(A)$L_{eq(15min)}$** 49dB(A)L_{Max}	Measurement Time: 10.35pm (Vacuum truck noise prior to 12am not predicted in CNVIS as it was not anticipated to start use until later at night)

Table 2-25 Measured Noise Levels at Kimpton Margo Hotel (R4 – Footpath)

Work Location	Activity	Measured Noise Level	Comment/Comparison to Predictions
Work Zone 1			
After 12am	Vacuum Truck (reduced speed, approx 1000RPM)	Outside: **69dB(A)$L_{eq(15min)}$** 70dB(A)L_{Max} Inside (Assumed 30dB reduction as per CNVMP): **39dB(A)$L_{eq(15min)}$** 40dB(A)L_{Max}	Outside: Consistent with prediction to R4 (73dB(A)$L_{eq(15min))}$) Measurement Time: 12:10pm

Table 2-26 Measured Noise Levels at Porterhouse Hotel (R5 - Footpath)

Work Location	Activity	Measured Noise Level	Comment/Comparison to Predictions
Work Zone 1			
Before 12am	Road Saw (in tent, opening facing east)	Outside: **73dB(A)$L_{eq(15min)}$** 74dB(A)L_{Max} Inside (Assumed 25dB reduction as per CNVMP): **38dB(A)$L_{eq(15min)}$** 39dB(A)L_{Max}	Outside: Consistent with OOH 59 Application prediction to R5 (74dB(A)$L_{eq(15min))}$) Measurement Time: 10.15pm
	Hydraulic Hammer (with shroud, in tent – opening facing east)	Outside: **76dB(A)$L_{eq(15min)}$** 79dB(A)L_{Max} Inside (Assumed 25dB reduction as per CNVMP): **41dB(A)$L_{eq(15min)}$** 42dB(A)L_{Max}	Outside: Consistent with prediction to R5 (74dB(A)$L_{eq(15min))}$) Measurement Time: 10.45pm
After 12am	Vacuum Truck (reduced speed, approx 1000RPM)	Outside: **73dB(A)$L_{eq(15min)}$** 74dB(A)L_{Max} Inside (Assumed 25dB reduction as per CNVMP): **38dB(A)$L_{eq(15min)}$** 39dB(A)L_{Max}	Outside: Consistent with prediction to R5 (71dB(A)$L_{eq(15min))}$) Measurement Time: 12:05pm

Table 2-27 Measured Noise Levels at Euro Tower (R3 - Footpath)

Work Location	Activity	Measured Noise Level	Comment/Comparison to Predictions
Work Zone 1			
Before 12am	Road Saw (in tent, opening facing)	Outside: **77dB(A)$L_{eq(15min)}$** 78dB(A)L_{Max} Inside (Assumed 25dB reduction as per CNVMP): **52dB(A)$L_{eq(15min)}$** 53dB(A)L_{Max}	Outside: Consistent with prediction to R3 (76dB(A)$L_{eq(15min))}$) Measurement Time: 10.20pm
	Hydraulic Hammer (with shroud, in tent – opening facing east)	Outside: **79dB(A)$L_{eq(15min)}$** 80dB(A)L_{Max} Inside (Assumed 25dB reduction as per CNVMP): **54dB(A)$L_{eq(15min)}$** 55dB(A)L_{Max}	Outside: Consistent with prediction to R3 (76dB(A)$L_{eq(15min))}$) Measurement Time: 10.50pm
After 12am	Vacuum Truck (reduced speed – 1000RPM)	Outside (footpath – measured): **74dB(A)$L_{eq(15min)}$** 75dB(A)L_{Max} Outside (Level 5 Euro predicted) **73dB(A)$L_{eq(15min)}$** 74dB(A)L_{Max} Inside (Assumed 25dB reduction as per CNVMP): **49dB(A)$L_{eq(15min)}$** 50dB(A)L_{Max}	Outside: Consistent with prediction to R3 (71dB(A)$L_{eq(15min))}$) Measurement Time: 12:00pm

See below for measurement locations.

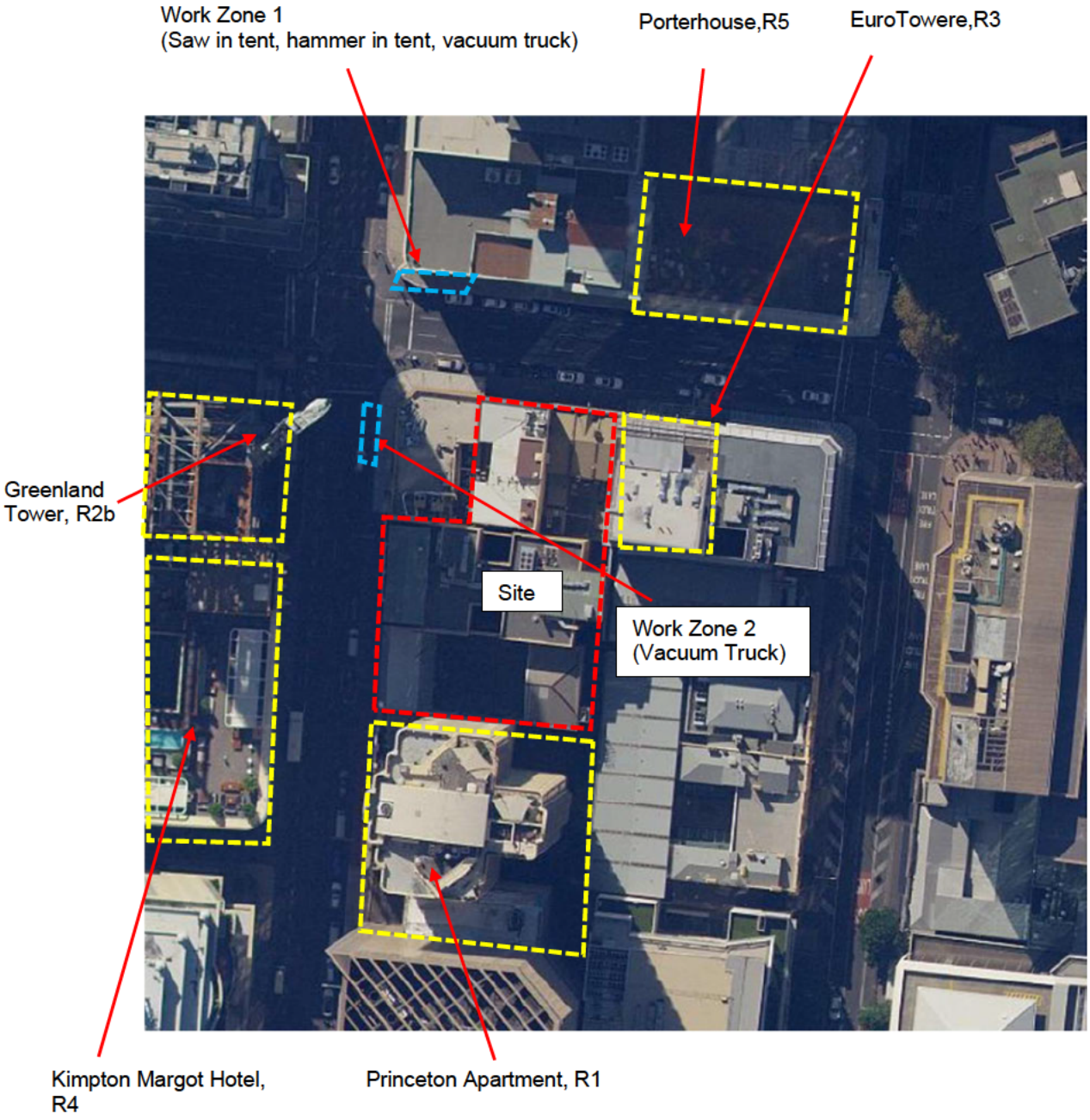
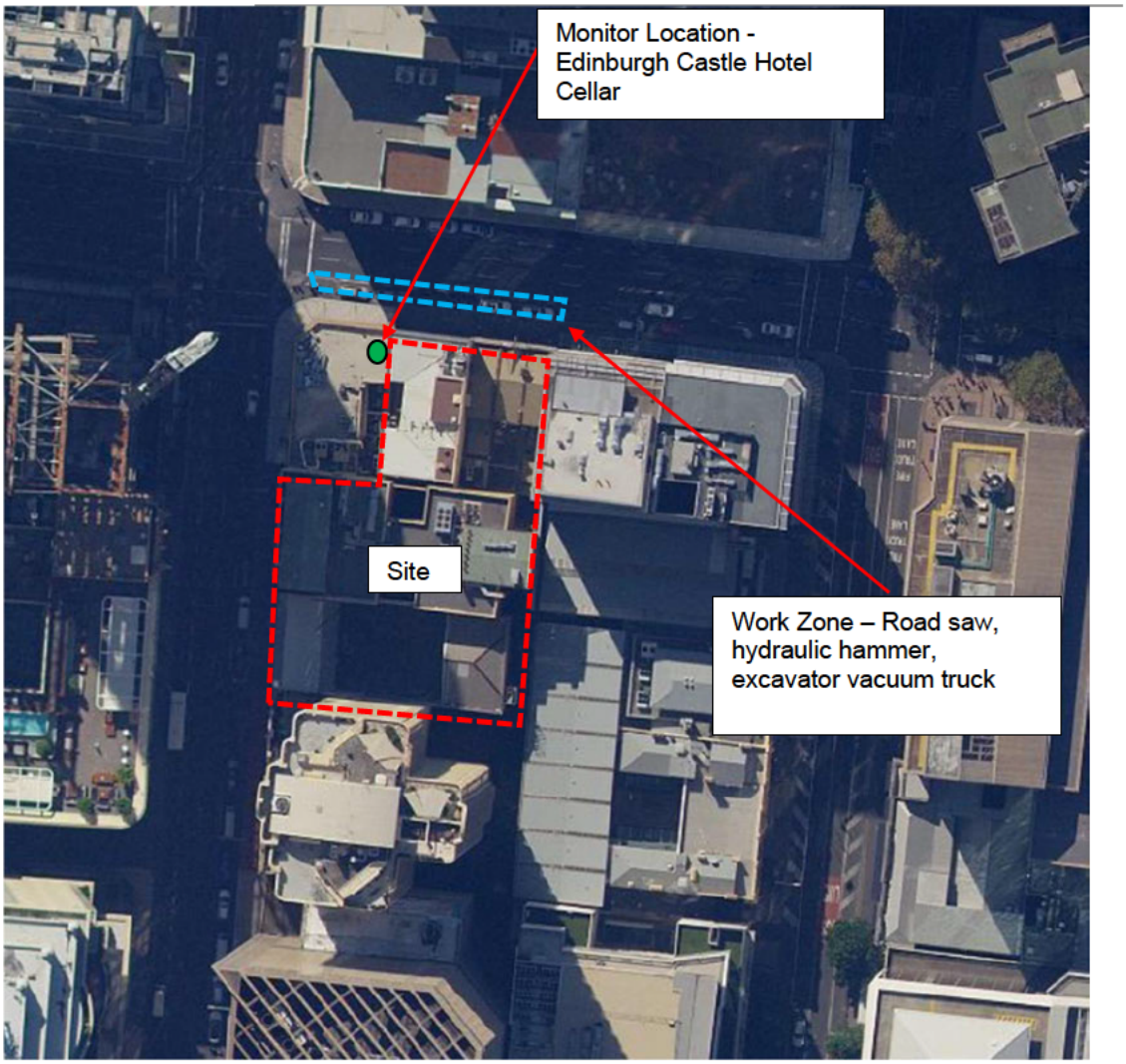


Table 2-13 Measured Vibration Levels (Pitt Street) – Construction Activities

Work Location	Activity	Measured Vibration Value	Comment
Pitt Street South – Adjacent Edinburgh Castle Hotel	Gas Diversion works	**<2.0 mm/s**	Complies 2.5 mm/s PPV screening level



2.3.5 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, DPHI (formerly DPE) and EPA and all records stored. The 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. Attended measurements have helped to determine the outside/inside noise reduction at various receivers (CNVIS Rev 18.3), which are:

- Princeton (R1) – 20dB(A) reduction.
- Greenland Tower (R2) – 25dB(A) reduction.
- EurotowerTower (R3) (25dB(A) reduction.
- Kimpton Margot (R4) - (30dB(A) Reduction).
- Porterhouse Hotel (R5) - (35dB(A) reduction).
- Castlereagh Boutique Hotel (R4N) – 35dB(A) reduction.
- Park Regis (R5N) – 20dB(A) reduction.

This has been adopted by the project in assessing performance against the CoA E38 as approved in the CNVMP.

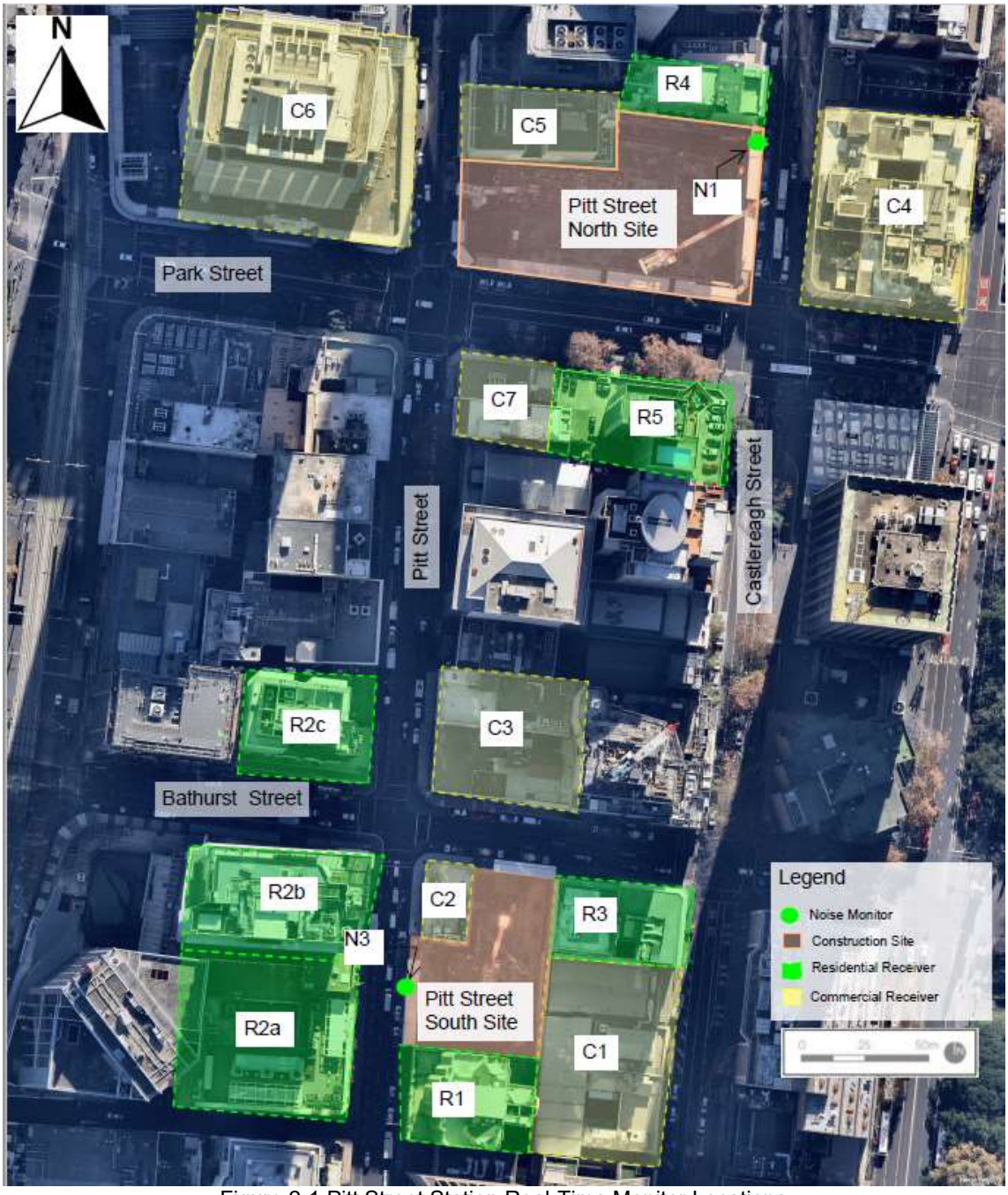


Figure 2-1 Pitt Street Station Real-Time Monitor Locations

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 $L_{eq(15\ minute)}$ 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 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 2-15 and 2-16.**

Due to progress of work, there is limited high impact activities occurring within standard hours on site. As per, agreement with ER and AA monitoring will no longer be completed to meet E38 as at Q1 2024. The unattended monitor will remain to monitor any complaints that are received for the site.

The equipment used for noise measurements was an NTi Audio Type XL2 precision sound level analyzer 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	A2A-05312-E0	01/02/2023	On site
Real-Time Noise – N3	NTi Audio Type XL2	A2A-08038-E0	01/03/2023	On site

2.3.6 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 North site was offline from 21/08/2023 (09:45am) to 22/08/2023 (12:45pm), 14/08/2023 (09:10am) to 16/08/2023 (01:00pm), from 19/09/2023 (12:15pm) to 20/09/2023 (11:15pm), from 03/11/2023 (13:00pm) to 06/11/2023 (11:00pm) and 17/11/2023 (09:45pm) to 28/11/2023 (09:05pm) due to equipment malfunction.

Refer to Appendix C for Calibration Certificates

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

Monitoring Location (Address)	Monitoring Date	Start Time	End Time	Period below 60 $LA_{eq(15minute)}$ dB(A) - (Hours)	Period below 55 $LA_{eq(15minute)}$ dB(A) - (Hours)	Min 6.5 hrs below 60dB(A) $LA_{eq(15min)}$	Min 3.25 hrs below 55dB(A) $LA_{eq(15min)}$
Pitt Street (North)	1/07/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	2/07/2023	7am	8pm	13	12.5	Yes	Yes
Pitt Street (North)	3/07/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	4/07/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	5/07/2023	7am	8pm	13	12.75	Yes	Yes
Pitt Street (North)	6/07/2023	7am	8pm	13	11.25	Yes	Yes
Pitt Street (North)	7/07/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	8/07/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	9/07/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	10/07/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	11/07/2023	7am	8pm	13	9.25	Yes	Yes
Pitt Street (North)	12/07/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	13/07/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	14/07/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	15/07/2023	7am	8pm	13	11.5	Yes	Yes
Pitt Street (North)	16/07/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	17/07/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	18/07/2023	7am	8pm	13	10.75	Yes	Yes
Pitt Street (North)	19/07/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	20/07/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	21/07/2023	7am	8pm	Monitor offline	Monitor offline	-	-

Monitoring Location (Address)	Monitoring Date	Start Time	End Time	Period below 60 $LA_{eq(15minute)}$ dB(A) - (Hours)	Period below 55 $LA_{eq(15minute)}$ dB(A) - (Hours)	Min 6.5 hrs below 60dB(A) $LA_{eq(15min)}$	Min 3.25 hrs below 55dB(A) $LA_{eq(15min)}$
Pitt Street (North)	22/07/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	23/07/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	24/07/2023	7am	8pm	13	11	Yes	Yes
Pitt Street (North)	25/07/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	26/07/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	27/07/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	28/07/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	29/07/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	30/07/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	31/07/2023	7am	8pm	13	11	Yes	Yes
Pitt Street (North)	1/08/2023	7am	8pm	13	11.5	Yes	Yes
Pitt Street (North)	2/08/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	3/08/2023	7am	8pm	13	9.5	Yes	Yes
Pitt Street (North)	4/08/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	5/08/2023	7am	8pm	13	11.25	Yes	Yes
Pitt Street (North)	6/08/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	7/08/2023	7am	8pm	13	8.5	Yes	Yes
Pitt Street (North)	8/08/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	9/08/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	10/08/2023	7am	8pm	13	11.75	Yes	Yes
Pitt Street (North)	11/08/2023	7am	8pm	13	10.75	Yes	Yes
Pitt Street (North)	12/08/2023	7am	8pm	13	13	Yes	Yes

Monitoring Location (Address)	Monitoring Date	Start Time	End Time	Period below 60 $LA_{eq(15minute)}$ dB(A) - (Hours)	Period below 55 $LA_{eq(15minute)}$ dB(A) - (Hours)	Min 6.5 hrs below 60dB(A) $LA_{eq(15min)}$	Min 3.25 hrs below 55dB(A) $LA_{eq(15min)}$
Pitt Street (North)	13/08/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	14/08/2023	7am	8pm	Monitor offline	Monitor offline	-	-
Pitt Street (North)	15/08/2023	7am	8pm	Monitor offline	Monitor offline	-	-
Pitt Street (North)	16/08/2023	7am	8pm	13	12.25	Yes	Yes
Pitt Street (North)	17/08/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	18/08/2023	7am	8pm	13	12.5	Yes	Yes
Pitt Street (North)	19/08/2023	7am	8pm	12.5	6.75	Yes	Yes
Pitt Street (North)	20/08/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	21/08/2023	7am	8pm	13	11.25	Yes	Yes
Pitt Street (North)	22/08/2023	7am	8pm	12.75	9.25	Yes	Yes
Pitt Street (North)	23/08/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	24/08/2023	7am	8pm	13	8.25	Yes	Yes
Pitt Street (North)	25/08/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	26/08/2023	7am	8pm	12.25	7	Yes	Yes
Pitt Street (North)	27/08/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	28/08/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	29/08/2023	7am	8pm	13	11	Yes	Yes
Pitt Street (North)	30/08/2023	7am	8pm	13	12.25	Yes	Yes
Pitt Street (North)	31/08/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	1/09/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	2/09/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	3/09/2023	7am	8pm	13	13	Yes	Yes

Monitoring Location (Address)	Monitoring Date	Start Time	End Time	Period below 60 $LA_{eq(15minute)}$ dB(A) - (Hours)	Period below 55 $LA_{eq(15minute)}$ dB(A) - (Hours)	Min 6.5 hrs below 60dB(A) $LA_{eq(15min)}$	Min 3.25 hrs below 55dB(A) $LA_{eq(15min)}$
Pitt Street (North)	4/09/2023	7am	8pm	13	10.5	Yes	Yes
Pitt Street (North)	5/09/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	6/09/2023	7am	8pm	13	12	Yes	Yes
Pitt Street (North)	7/09/2023	7am	8pm	12.75	11.25	Yes	Yes
Pitt Street (North)	8/09/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	9/09/2023	7am	8pm	13	11.75	Yes	Yes
Pitt Street (North)	10/09/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	11/09/2023	7am	8pm	12.75	10.25	Yes	Yes
Pitt Street (North)	12/09/2023	7am	8pm	12.75	12.25	Yes	Yes
Pitt Street (North)	13/09/2023	7am	8pm	13	10.5	Yes	Yes
Pitt Street (North)	14/09/2023	7am	8pm	13	12.25	Yes	Yes
Pitt Street (North)	15/09/2023	7am	8pm	13	12.25	Yes	Yes
Pitt Street (North)	16/09/2023	7am	8pm	13	9.25	Yes	Yes
Pitt Street (North)	17/09/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	18/09/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	19/09/2023	7am	8pm	Monitor offline	Monitor offline	-	-
Pitt Street (North)	20/09/2023	7am	8pm	Monitor offline	Monitor offline	-	-
Pitt Street (North)	21/09/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	22/09/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	23/09/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	24/09/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	25/09/2023	7am	8pm	13	13	Yes	Yes

Monitoring Location (Address)	Monitoring Date	Start Time	End Time	Period below 60 $LA_{eq(15minute)}$ dB(A) - (Hours)	Period below 55 $LA_{eq(15minute)}$ dB(A) - (Hours)	Min 6.5 hrs below 60dB(A) $LA_{eq(15min)}$	Min 3.25 hrs below 55dB(A) $LA_{eq(15min)}$
Pitt Street (North)	26/09/2023	7am	8pm	13	11.75	Yes	Yes
Pitt Street (North)	27/09/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	28/09/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	29/09/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	30/09/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	1/10/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	2/10/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	3/10/2023	7am	8pm	13	12.75	Yes	Yes
Pitt Street (North)	4/10/2023	7am	8pm	13	12.25	Yes	Yes
Pitt Street (North)	5/10/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	6/10/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	7/10/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	8/10/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	9/10/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	10/10/2023	7am	8pm	13	12	Yes	Yes
Pitt Street (North)	11/10/2023	7am	8pm	13	11.25	Yes	Yes
Pitt Street (North)	12/10/2023	7am	8pm	13	11.25	Yes	Yes
Pitt Street (North)	13/10/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	14/10/2023	7am	8pm	13	12.25	Yes	Yes
Pitt Street (North)	15/10/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	16/10/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	17/10/2023	7am	8pm	13	13	Yes	Yes

Monitoring Location (Address)	Monitoring Date	Start Time	End Time	Period below 60 $LA_{eq(15minute)}$ dB(A) - (Hours)	Period below 55 $LA_{eq(15minute)}$ dB(A) - (Hours)	Min 6.5 hrs below 60dB(A) $LA_{eq(15min)}$	Min 3.25 hrs below 55dB(A) $LA_{eq(15min)}$
Pitt Street (North)	18/10/2023	7am	8pm	13	12.25	Yes	Yes
Pitt Street (North)	19/10/2023	7am	8pm	13	10.5	Yes	Yes
Pitt Street (North)	20/10/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	21/10/2023	7am	8pm	12.75	9	Yes	Yes
Pitt Street (North)	22/10/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	23/10/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	24/10/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	25/10/2023	7am	8pm	13	12.75	Yes	Yes
Pitt Street (North)	26/10/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	27/10/2023	7am	8pm	13	8.75	Yes	Yes
Pitt Street (North)	28/10/2023	7am	8pm	13	10.75	Yes	Yes
Pitt Street (North)	29/10/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	30/10/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	31/10/2023	7am	8pm	12.25	10.5	Yes	Yes
Pitt Street (North)	1/11/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	2/11/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	3/11/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	4/11/2023	7am	8pm	Monitor offline	Monitor offline	-	-
Pitt Street (North)	5/11/2023	7am	8pm	Monitor offline	Monitor offline	-	-
Pitt Street (North)	6/11/2023	7am	8pm	13	12.5	Yes	Yes
Pitt Street (North)	7/11/2023	7am	8pm	13	8.25	Yes	Yes
Pitt Street (North)	8/11/2023	7am	8pm	13	13	Yes	Yes

Monitoring Location (Address)	Monitoring Date	Start Time	End Time	Period below 60 $LA_{eq(15minute)}$ dB(A) - (Hours)	Period below 55 $LA_{eq(15minute)}$ dB(A) - (Hours)	Min 6.5 hrs below 60dB(A) $LA_{eq(15min)}$	Min 3.25 hrs below 55dB(A) $LA_{eq(15min)}$
Pitt Street (North)	9/11/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	10/11/2023	7am	8pm	13	9	Yes	Yes
Pitt Street (North)	11/11/2023	7am	8pm	13	9.75	Yes	Yes
Pitt Street (North)	12/11/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	13/11/2023	7am	8pm	13	12.5	Yes	Yes
Pitt Street (North)	14/11/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	15/11/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	16/11/2023	7am	8pm	13	11.5	Yes	Yes
Pitt Street (North)	17/11/2023	7am	8pm	Monitor offline	Monitor offline	-	-
Pitt Street (North)	18/11/2023	7am	8pm	Monitor offline	Monitor offline	-	-
Pitt Street (North)	19/11/2023	7am	8pm	Monitor offline	Monitor offline	-	-
Pitt Street (North)	20/11/2023	7am	8pm	Monitor offline	Monitor offline	-	-
Pitt Street (North)	21/11/2023	7am	8pm	Monitor offline	Monitor offline	-	-
Pitt Street (North)	22/11/2023	7am	8pm	Monitor offline	Monitor offline	-	-
Pitt Street (North)	23/11/2023	7am	8pm	Monitor offline	Monitor offline	-	-
Pitt Street (North)	24/11/2023	7am	8pm	Monitor offline	Monitor offline	-	-
Pitt Street (North)	25/11/2023	7am	8pm	Monitor offline	Monitor offline	-	-
Pitt Street (North)	26/11/2023	7am	8pm	Monitor offline	Monitor offline	-	-
Pitt Street (North)	27/11/2023	7am	8pm	Monitor offline	Monitor offline	-	-
Pitt Street (North)	28/11/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	29/11/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	30/11/2023	7am	8pm	13	13	Yes	Yes

Monitoring Location (Address)	Monitoring Date	Start Time	End Time	Period below 60 $LA_{eq(15minute)}$ dB(A) - (Hours)	Period below 55 $LA_{eq(15minute)}$ dB(A) - (Hours)	Min 6.5 hrs below 60dB(A) $LA_{eq(15min)}$	Min 3.25 hrs below 55dB(A) $LA_{eq(15min)}$
Pitt Street (North)	1/12/2023	7am	8pm	13	12	Yes	Yes
Pitt Street (North)	2/12/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	3/12/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	4/12/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	5/12/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	6/12/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	7/12/2023	7am	8pm	13	11.5	Yes	Yes
Pitt Street (North)	8/12/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	9/12/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	10/12/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	11/12/2023	7am	8pm	13	12	Yes	Yes
Pitt Street (North)	12/12/2023	7am	8pm	13	12.75	Yes	Yes
Pitt Street (North)	13/12/2023	7am	8pm	13	12.5	Yes	Yes
Pitt Street (North)	14/12/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	15/12/2023	7am	8pm	13	12.25	Yes	Yes
Pitt Street (North)	16/12/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	17/12/2023	7am	8pm	Monitor offline	Monitor offline	Yes	Yes
Pitt Street (North)	18/12/2023	7am	8pm	13	11	Yes	Yes
Pitt Street (North)	19/12/2023	7am	8pm	13	12.25	Yes	Yes
Pitt Street (North)	20/12/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	21/12/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	22/12/2023	7am	8pm	13	13	Yes	Yes

Monitoring Location (Address)	Monitoring Date	Start Time	End Time	Period below 60 $LA_{eq(15minute)}$ dB(A) - (Hours)	Period below 55 $LA_{eq(15minute)}$ dB(A) - (Hours)	Min 6.5 hrs below 60dB(A) $LA_{eq(15min)}$	Min 3.25 hrs below 55dB(A) $LA_{eq(15min)}$
Pitt Street (North)	23/12/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	24/12/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	25/12/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	26/12/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	27/12/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	28/12/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	29/12/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	30/12/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (North)	31/12/2023	7am	8pm	13	13	Yes	Yes

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

Monitoring Location (Address)	Monitoring Date	Start Time	End Time	Period below 60 $LA_{eq(15minute)}$ dB(A) - (Hours)	Period below 55 $LA_{eq(15minute)}$ dB(A) - (Hours)	Min 6.5 hrs below 60dB(A) $LA_{eq(15min)}$	Min 3.25 hrs below 55dB(A) $LA_{eq(15min)}$
Pitt Street (South)	1/07/2023	7am	8pm	13	12.75	Yes	Yes
Pitt Street (South)	2/07/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	3/07/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	4/07/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	5/07/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	6/07/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	7/07/2023	7am	8pm	12.75	12.75	Yes	Yes
Pitt Street (South)	8/07/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	9/07/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	10/07/2023	7am	8pm	13	13	Yes	Yes

Monitoring Location (Address)	Monitoring Date	Start Time	End Time	Period below 60 $LA_{eq(15minute)}$ dB(A) - (Hours)	Period below 55 $LA_{eq(15minute)}$ dB(A) - (Hours)	Min 6.5 hrs below 60dB(A) $LA_{eq(15min)}$	Min 3.25 hrs below 55dB(A) $LA_{eq(15min)}$
Pitt Street (South)	11/07/2023	7am	8pm	13	12.75	Yes	Yes
Pitt Street (South)	12/07/2023	7am	8pm	13	12.75	Yes	Yes
Pitt Street (South)	13/07/2023	7am	8pm	13	11.5	Yes	Yes
Pitt Street (South)	14/07/2023	7am	8pm	13	12.75	Yes	Yes
Pitt Street (South)	15/07/2023	7am	8pm	13	12.75	Yes	Yes
Pitt Street (South)	16/07/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	17/07/2023	7am	8pm	13	12.5	Yes	Yes
Pitt Street (South)	18/07/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	19/07/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	20/07/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	21/07/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	22/07/2023	7am	8pm	13	12.25	Yes	Yes
Pitt Street (South)	23/07/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	24/07/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	25/07/2023	7am	8pm	13	12.25	Yes	Yes
Pitt Street (South)	26/07/2023	7am	8pm	13	12.75	Yes	Yes
Pitt Street (South)	27/07/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	28/07/2023	7am	8pm	12.75	12.5	Yes	Yes
Pitt Street (South)	29/07/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	30/07/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	31/07/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	1/08/2023	7am	8pm	13	12.75	Yes	Yes

Monitoring Location (Address)	Monitoring Date	Start Time	End Time	Period below 60 $LA_{eq(15minute)}$ dB(A) - (Hours)	Period below 55 $LA_{eq(15minute)}$ dB(A) - (Hours)	Min 6.5 hrs below 60dB(A) $LA_{eq(15min)}$	Min 3.25 hrs below 55dB(A) $LA_{eq(15min)}$
Pitt Street (South)	2/08/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	3/08/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	4/08/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	5/08/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	6/08/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	7/08/2023	7am	8pm	12.75	12.75	Yes	Yes
Pitt Street (South)	8/08/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	9/08/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	10/08/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	11/08/2023	7am	8pm	13	12.75	Yes	Yes
Pitt Street (South)	12/08/2023	7am	8pm	13	12.75	Yes	Yes
Pitt Street (South)	13/08/2023	7am	8pm	13	11.5	Yes	Yes
Pitt Street (South)	14/08/2023	7am	8pm	13	12.75	Yes	Yes
Pitt Street (South)	15/08/2023	7am	8pm	13	12.75	Yes	Yes
Pitt Street (South)	16/08/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	17/08/2023	7am	8pm	13	12.5	Yes	Yes
Pitt Street (South)	18/08/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	19/08/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	20/08/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	21/08/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	22/08/2023	7am	8pm	13	12.25	Yes	Yes
Pitt Street (South)	23/08/2023	7am	8pm	13	13	Yes	Yes

Monitoring Location (Address)	Monitoring Date	Start Time	End Time	Period below 60 $LA_{eq(15minute)}$ dB(A) - (Hours)	Period below 55 $LA_{eq(15minute)}$ dB(A) - (Hours)	Min 6.5 hrs below 60dB(A) $LA_{eq(15min)}$	Min 3.25 hrs below 55dB(A) $LA_{eq(15min)}$
Pitt Street (South)	24/08/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	25/08/2023	7am	8pm	13	12.25	Yes	Yes
Pitt Street (South)	26/08/2023	7am	8pm	13	12.75	Yes	Yes
Pitt Street (South)	27/08/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	28/08/2023	7am	8pm	12.75	12.5	Yes	Yes
Pitt Street (South)	29/08/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	30/08/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	31/08/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	1/09/2023	7am	8pm	13	12.75	Yes	Yes
Pitt Street (South)	2/09/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	3/09/2023	7am	8pm	13	12.5	Yes	Yes
Pitt Street (South)	4/09/2023	7am	8pm	13	12.5	Yes	Yes
Pitt Street (South)	5/09/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	6/09/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	7/09/2023	7am	8pm	13	12.75	Yes	Yes
Pitt Street (South)	8/09/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	9/09/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	10/09/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	11/09/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	12/09/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	13/09/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	14/09/2023	7am	8pm	13	13	Yes	Yes

Monitoring Location (Address)	Monitoring Date	Start Time	End Time	Period below 60 $LA_{eq(15minute)}$ dB(A) - (Hours)	Period below 55 $LA_{eq(15minute)}$ dB(A) - (Hours)	Min 6.5 hrs below 60dB(A) $LA_{eq(15min)}$	Min 3.25 hrs below 55dB(A) $LA_{eq(15min)}$
Pitt Street (South)	15/09/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	16/09/2023	7am	8pm	13	12	Yes	Yes
Pitt Street (South)	17/09/2023	7am	8pm	13	12.75	Yes	Yes
Pitt Street (South)	18/09/2023	7am	8pm	13	12.25	Yes	Yes
Pitt Street (South)	19/09/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	20/09/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	21/09/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	22/09/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	23/09/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	24/09/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	25/09/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	26/09/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	27/09/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	28/09/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	29/09/2023	7am	8pm	13	12.75	Yes	Yes
Pitt Street (South)	30/09/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	1/10/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	2/10/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	3/10/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	4/10/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	5/10/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	6/10/2023	7am	8pm	13	13	Yes	Yes

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

Monitoring Location (Address)	Monitoring Date	Start Time	End Time	Period below 60 $LA_{eq(15minute)}$ dB(A) - (Hours)	Period below 55 $LA_{eq(15minute)}$ dB(A) - (Hours)	Min 6.5 hrs below 60dB(A) $LA_{eq(15min)}$	Min 3.25 hrs below 55dB(A) $LA_{eq(15min)}$
Pitt Street (South)	29/10/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	30/10/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	31/10/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	1/11/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	2/11/2023	7am	8pm	13	12.75	Yes	Yes
Pitt Street (South)	3/11/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	4/11/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	5/11/2023	7am	8pm	13	12.75	Yes	Yes
Pitt Street (South)	6/11/2023	7am	8pm	13	12.75	Yes	Yes
Pitt Street (South)	7/11/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	8/11/2023	7am	8pm	13	12.75	Yes	Yes
Pitt Street (South)	9/11/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	10/11/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	11/11/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	12/11/2023	7am	8pm	12.25	12.25	Yes	Yes
Pitt Street (South)	13/11/2023	7am	8pm	13	12.5	Yes	Yes
Pitt Street (South)	14/11/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	15/11/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	16/11/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	17/11/2023	7am	8pm	13	12.5	Yes	Yes
Pitt Street (South)	18/11/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	19/11/2023	7am	8pm	13	12.75	Yes	Yes

Monitoring Location (Address)	Monitoring Date	Start Time	End Time	Period below 60 $LA_{eq(15minute)}$ dB(A) - (Hours)	Period below 55 $LA_{eq(15minute)}$ dB(A) - (Hours)	Min 6.5 hrs below 60dB(A) $LA_{eq(15min)}$	Min 3.25 hrs below 55dB(A) $LA_{eq(15min)}$
Pitt Street (South)	20/11/2023	7am	8pm	13	12.75	Yes	Yes
Pitt Street (South)	21/11/2023	7am	8pm	13	12.75	Yes	Yes
Pitt Street (South)	22/11/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	23/11/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	24/11/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	25/11/2023	7am	8pm	13	12.75	Yes	Yes
Pitt Street (South)	26/11/2023	7am	8pm	13	10.5	Yes	Yes
Pitt Street (South)	27/11/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	28/11/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	29/11/2023	7am	8pm	13	12.75	Yes	Yes
Pitt Street (South)	30/11/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	1/12/2023	7am	8pm	13	12.5	Yes	Yes
Pitt Street (South)	2/12/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	3/12/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	4/12/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	5/12/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	6/12/2023	7am	8pm	13	12.75	Yes	Yes
Pitt Street (South)	7/12/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	8/12/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	9/12/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	10/12/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	11/12/2023	7am	8pm	13	13	Yes	Yes

Monitoring Location (Address)	Monitoring Date	Start Time	End Time	Period below 60 $LA_{eq(15minute)}$ dB(A) - (Hours)	Period below 55 $LA_{eq(15minute)}$ dB(A) - (Hours)	Min 6.5 hrs below 60dB(A) $LA_{eq(15min)}$	Min 3.25 hrs below 55dB(A) $LA_{eq(15min)}$
Pitt Street (South)	12/12/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	13/12/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	14/12/2023	7am	8pm	13	12.75	Yes	Yes
Pitt Street (South)	15/12/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	16/12/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	17/12/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	18/12/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	19/12/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	20/12/2023	7am	8pm	13	12.75	Yes	Yes
Pitt Street (South)	21/12/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	22/12/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	23/12/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	24/12/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	25/12/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	26/12/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	27/12/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	28/12/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	29/12/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	30/12/2023	7am	8pm	13	13	Yes	Yes
Pitt Street (South)	31/12/2023	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 18.3 with the exception of Vacuum Truck usage during Utilities Investigation on 5and 16 July. During works on the 5 July 2023 the vacuum truck measured noise level was within 2 dB(A) and is a negligible difference of the CNVIS prediction level. The vacuum truck that attended site on 16 July 2023 was measured as10 dB(A) above the CNVIS predicted level, as a result works were ceased for the evening.

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
July 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	mm	mm	hours		km/h	local	°C	%	eighths		km/h	hPa	°C	%	eighths		km/h	hPa
1	Sa	7.3	18.6	0	2.8	9.1	W	41	14:37	10.8	70	2	W	9	1020.6	18.4	43	2	WSW	19	1019.3
2	Su	7.9	17.8	0	5.8	8.6	SSE	33	15:33	10.0	73	2	WNW	22	1030.8	17.0	56	4	S	19	1029.3
3	Mo	9.8	18.3	0	2.0	2.8	W	26	01:09	11.1	80	7	WNW	17	1031.2	17.2	73	7	ESE	11	1027.2
4	Tu	11.1	15.9	2.4	1.2	0.0	N	22	12:47	13.2	99	8	WNW	4	1021.0	15.6	93	8	NW	11	1015.3
5	We	12.4	21.6	2.0	1.0	6.5	W	26	05:45	12.9	99	7	WNW	15	1012.6	21.6	55	3	WNW	13	1010.4
6	Th	9.4	17.6	0	2.4	8.2	NW	37	15:53	11.1	80	1	W	17	1014.5	16.0	52	7	WNW	9	1009.7
7	Fr	8.9	18.9	0	3.4	9.3	W	41	15:11	11.3	75	1	W	9	1011.2	18.1	36	1	WSW	24	1010.2
8	Sa	8.7	19.7	0	3.4	9.3	NW	69	14:32	12.9	56	1	N	26	1013.8	19.6	32	1	WNW	44	1009.6
9	Su	11.1	19.0	0	5.2	9.3	W	59	12:27	13.7	54	1	WNW	33	1017.0	18.7	41	1	W	35	1016.3
10	Mo	9.7	19.9	0	6.2	9.3	W	33	19:43	12.7	67	1	W	9	1022.5	19.7	42	1	WNW	9	1020.2
11	Tu	7.4	20.3	0	2.8	9.4	W	35	10:43	10.1	70	0	W	20	1026.0	20.2	36	0	WNW	11	1024.3
12	We	7.8	19.6	0	2.6	9.3	W	26	09:24	10.0	81	1	W	19	1030.7	18.2	59	1	ENE	17	1027.2
13	Th	7.5	21.9	0	2.8	9.4	W	20	04:45	9.0	91	0	WNW	13	1028.2	21.2	36	1	WSW	6	1024.5
14	Fr	8.3	23.3	0	3.2	9.3	NW	26	21:36	10.8	75	4	WNW	7	1025.2	23.2	35	3	NNW	15	1020.5
15	Sa	10.8	23.6	0	2.2	7.5	WNW	44	15:09	16.7	58	7	N	17	1021.2	23.1	33	7	WNW	22	1018.4
16	Su	13.5	18.1	0	7.4	0.0	SSW	41	13:30	16.4	85	7	SSW	9	1027.6	15.8	90	7	S	7	1027.7
17	Mo	12.0	18.2	2.4	0.6	4.4	ENE	22	15:51	13.4	99	7	W	17	1030.6	16.8	80	6	ENE	11	1027.8
18	Tu	10.2	21.9	0	2.8	6.8				12.2	98	2	WNW	17	1024.1	21.7	39	2	WNW	15	1018.4
19	We	8.7	16.0	0.2	2.8	9.4				10.3	57	1	W	20	1023.4	15.5	41	1	S	17	1022.2
20	Th	5.1	19.5	0	4.0	9.4				7.5	81	2	W	22	1021.7	19.4	35	3	N	9	1014.3
21	Fr	7.5	20.1	0	3.8	4.6	WNW	48	13:04	13.6	61	6	WNW	24	1016.5	17.6	50	5	SSE	20	1015.7
22	Sa	7.1	17.0	0	3.2	9.2	W	35	05:34	9.3	65	2	W	28	1022.6	15.6	53	5	S	20	1020.6
23	Su	7.3	17.7	0	2.8	8.6	S	41	12:14	9.8	77	4	WNW	20	1023.3	17.6	49	4	SSW	20	1022.7
24	Mo	9.8	17.1	14.0	3.8	3.8	W	33	00:21	12.3	100	5	WNW	20	1029.0	16.7	68	4	S	15	1028.5
25	Tu	7.9	19.7	0	2.2	9.5	WNW	26	05:06	10.1	88	1	W	19	1036.0	16.9	69	2	SE	13	1034.8
26	We	8.3	20.7	0	2.6	9.5	WSW	24	23:34	10.0	95	1	WNW	17	1036.2	19.6	53	0	E	11	1030.7
27	Th	8.1	19.5	0	3.0	9.7	W	30	08:33	10.5	76	1	W	22	1032.2	18.9	70	1	ENE	17	1026.3
28	Fr	10.4	24.4	0	4.8	6.1	W	31	14:21	15.9	57	7	N	15	1021.7	24.1	35	5	W	20	1019.2
29	Sa	12.8	22.6	0	3.8	7.3	ENE	26	13:54	15.4	79	4	WNW	11	1023.4	20.2	58	7	ENE	17	1019.7
30	Su	11.6	25.2	0	4.0	9.8	NW	31	13:32	14.6	78	1	W	13	1020.8	24.9	35	2	WNW	20	1016.0
31	Mo	12.3	23.5	0	4.0	9.7	W	46	10:21	15.1	59	1	WNW	20	1022.7	23.4	33	0	WNW	11	1020.1
Statistics for July 2023																					
	Mean	9.4	19.9		3.3	7.6				12.0	76	3		17	1023.8	19.1	50	3		16	1020.9
	Lowest	5.1	15.9		0.6	0.0				7.5	54	0	WNW	4	1011.2	15.5	32	0	WSW	6	1009.6
	Highest	13.5	25.2	14.0	7.4	9.8	NW	69		16.7	100	8	WNW	33	1036.2	24.9	93	8	WNW	44	1034.8
	Total			21.0	102.6	235.1															

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.

IDCJDW2124.202307 Prepared at 13:00 UTC on 6 Jan 2024

Sydney, New South Wales
August 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	mm	mm	hours		km/h	local	°C	%	eighths		km/h	hPa	°C	%	eighths		km/h	hPa
1	Tu	10.7	21.9	0	4.2	9.7	W	37	00:40	13.4	62	1	W	24	1026.6	21.4	37	1	E	13	1026.4
2	We	11.1	18.9	0	3.0	1.4	W	24	05:57	13.5	77	6	WNW	17	1035.8	17.6	72	7	E	13	1034.3
3	Th	9.7	21.7	0	1.6	9.8	NNE	31	16:49	12.3	97	1	W	11	1035.9	19.8	64	2	NE	17	1031.6
4	Fr	10.1	20.7	0	4.0	9.8	NNE	33	20:33	12.1	89	5	WNW	9	1033.7	19.9	64	2	ENE	15	1028.5
5	Sa	12.1	16.4	0	5.0	0.0	W	30	09:48	14.1	67	7	WNW	11	1030.0	16.3	66	7	E	4	1028.6
6	Su	12.2	17.0	16.6	1.4	0.5	SSW	37	13:13	13.5	91	6	W	11	1033.0	16.2	70	7	SSW	19	1031.2
7	Mo	10.8	16.3	0	2.4	0.3	SW	24	08:41	13.5	86	7	SSW	13	1031.7	15.5	76	7	SSW	15	1029.9
8	Tu	11.0	19.2	8.2	0.6	6.7	SSE	28	13:33	11.9	96	5	WNW	17	1032.5	18.0	59	5	SSE	17	1030.0
9	We	11.0	20.9	0	3.4	8.8	N	39	21:16	13.4	88	1	W	19	1032.0	20.7	57	1	NE	19	1026.2
10	Th	12.4	23.8	0	3.6	9.1	W	54	12:50	16.6	50	5	N	17	1021.0	21.4	32	5	WNW	33	1015.7
11	Fr	9.2	19.7	0	4.0	10.0	W	31	01:33	12.3	60	1	W	22	1023.2	17.7	55	1	ENE	17	1019.8
12	Sa	7.7	21.3	0	5.2	8.5	W	28	04:17	11.5	73	1	W	11	1019.8	20.7	33	5	SW	13	1015.6
13	Su	11.5	18.5	0	4.2	2.9	SSE	31	14:51	13.8	71	7	W	11	1019.4	15.9	71	6	SSE	24	1018.1
14	Mo	11.6	16.0	15.6	1.6	0.5	S	31	14:53	13.2	99	7	SSW	7	1016.9	13.6	95	7	SSW	15	1014.7
15	Tu	8.3	16.7	3.0	1.4	8.6	SSE	41	13:07	11.2	86	3	W	22	1020.7	16.4	66	5	S	22	1020.0
16	We	8.8	17.3	12.6	1.8	6.0	W	24	05:46	10.9	98	7	W	19	1023.6	15.3	73	6	E	15	1019.1
17	Th	8.2	21.3	0	3.4	9.8	WNW	24	06:56	10.9	92	1	W	19	1014.9	19.7	45	4	E	17	1009.4
18	Fr	10.9	19.2	9.2	2.8	9.4	W	67	15:06	13.3	86	5	NW	22	1002.9	17.7	35	4	W	33	1003.3
19	Sa	8.9	19.1	0.2	6.4	10.6	WSW	54	17:26	11.8	53	1	W	26	1016.3	17.9	42	3	W	22	1015.3
20	Su	11.0	22.5	0	4.2	11.0	W	33	00:10	14.5	66	1	W	22	1022.9	20.1	46	1	E	20	1021.0
21	Mo	11.5	21.6	0	4.8	10.2	E	24	13:05	14.8	69	1	WNW	13	1023.7	18.8	59	1	ENE	17	1020.0
22	Tu	10.1	24.6	0	4.4	7.8	NNW	44	19:43	13.5	77	6	WNW	13	1021.1	22.5	50	7	NE	19	1016.3
23	We	11.4	18.6	1.0	5.2	5.0	W	50	09:06	14.2	58	1	W	28	1022.7	15.0	86	8	SSW	22	1023.9
24	Th	11.2	20.8	0.8	2.8	6.9	WNW	22	06:14	13.7	93	3	WNW	17	1029.8	18.3	57	5	E	11	1027.0
25	Fr	9.1		0	3.0	10.6	SSW	24	11:52	12.6	80	1	WNW	17	1027.0	20.6	55	3	SE	17	1024.9
26	Sa	10.3	20.2	0	3.6	9.4	SSE	28	14:53	13.8	84	5	WNW	17	1029.4	18.4	68	3	SSE	15	1027.4
27	Su	10.5	20.5	0		9.4	E	24	15:30	14.0	90	2	W	13	1029.0	19.5	61	4	E	17	1026.3
28	Mo	10.7	20.4	0	3.2	8.7	NE	33	15:37	14.3	90	3	W	11	1026.8	19.8	60	5	ENE	20	1022.3
29	Tu	11.0	20.9	0	4.8	10.5	NNE	31	16:40	14.2	90	1	W	7	1021.3	20.3	63	2	ENE	17	1016.2
30	We	11.8	27.5	0	5.2	6.8	SSW	52	16:27	15.4	71	3	W	4	1014.3	20.9	62	7	ENE	13	1010.2
31	Th	11.5	20.5	9.4	4.6	9.7	S	39	11:26	15.1	85	3	W	17	1016.7	18.5	69	3	SE	13	1014.7
Statistics for August 2023																					
	Mean	10.5	20.1		3.5	7.4				13.3	79	3		15	1024.3	18.5	59	4		17	1021.5
	Lowest	7.7	16.0		0.6	0.0				10.9	50	1	W	4	1002.9	13.6	32	1	E	4	1003.3
	Highest	12.4	27.5	16.6	6.4	11.0	W	67		16.6	99	7	W	28	1035.9	22.5	95	8	#	33	1034.3
	Total			76.6	105.8	228.4															

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.

IDCJDW2124.202308 Prepared at 13:00 UTC on 5 Jan 2024

Sydney, New South Wales
September 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	mm	mm	hours		km/h	local	°C	%	eighths		km/h	hPa	°C	%	eighths		km/h	hPa
1	Fr	11.1	18.5	0.4	3.8	8.6	SSE	63	15:37	13.5	79	6	WNW	11	1019.7	17.0	47	2	SSE	37	1019.2
2	Sa	8.7	18.7	0.4	5.8	10.3	S	37	11:07	12.7	65	3	W	17	1023.7	18.2	59	3	S	17	1020.4
3	Su	10.3	21.0	0.2	4.6	7.9	ESE	24	15:09	13.2	84	6	WNW	9	1022.6	19.2	55	5	ESE	17	1018.7
4	Mo	10.3	20.6	0	3.0	9.7	NE	41	14:45	14.6	80	2	W	6	1017.1	20.1	65	4	ENE	22	1011.2
5	Tu	13.5	25.5	0	3.6	9.8	WSW	48	10:18	18.9	56	1	W	31	1010.9	24.8	18	1	W	19	1011.3
6	We	10.4	21.0	0	7.0	10.7	NNE	48	19:58	15.7	56	0	NW	2	1023.2	19.9	51	0	NE	22	1019.6
7	Th	10.3	25.3	0	6.0	10.2	NW	69	22:41	13.8	78	1	W	13	1020.0	21.2	67	1	NE	20	1013.4
8	Fr	13.0	19.1	5.0	9.2	3.7	NW	74	01:22	13.1	92	7	W	20	1016.8	18.6	32	1	WNW	28	1014.8
9	Sa	9.3	19.7	2.8	4.4	10.7	W	44	08:06	12.9	47	0	WSW	24	1025.5	17.2	35	1	SE	19	1024.2
10	Su	7.3	19.8	0	5.0	9.8	W	31	03:54	12.6	57	1	W	17	1030.5	18.0	51	1	ESE	19	1027.8
11	Mo	8.3	20.8	0	3.4	10.5	ESE	30	13:31	13.5	65	2	WNW	17	1032.4	19.1	47	5	ESE	19	1029.7
12	Tu	9.4	21.2	0	4.4	6.3	W	22	07:49	14.4	75	2	WNW	13	1031.1	17.5	66	7	E	13	1027.5
13	We	10.3	23.3	0	3.0	10.4	E	24	12:54	15.3	79	0	WNW	15	1028.8	21.4	56	1	ENE	15	1026.0
14	Th	10.9	23.1	0	4.8	10.2	E	22	12:33	16.5	66	1	WNW	13	1028.8	22.0	52	1	ENE	13	1025.3
15	Fr	12.0	23.9	0	5.4	10.1	NNE	37	16:21	17.1	64	7	W	11	1025.1	23.7	48	3	NE	15	1020.7
16	Sa	13.9	31.8	0	5.6	10.8	ENE	31	14:43	20.2	51	0	WNW	9	1022.2	29.4	31	0	ENE	24	1017.2
17	Su	16.7	32.8	0	10.2	10.9	WNW	24	09:17	22.9	41	0	WNW	19	1022.6	32.6	19	0	NW	11	1018.3
18	Mo	14.3	29.8	0	8.0	10.7	NE	35	16:37	20.6	49	0	W	17	1021.5	27.4	41	0	ESE	15	1015.8
19	Tu	16.4	34.6	0	8.4	10.6	NNW	41	12:59	25.4	39	0	E	2	1017.0	27.4	47	1	E	4	1010.7
20	We	20.5	33.9	0	11.6	10.5	WNW	67	11:56	27.2	26	1	NW	31	1010.2	33.6	18	1	NW	35	1005.6
21	Th	16.0	23.0	0	13.8	10.1	WSW	54	09:47	20.0	38	2	W	26	1015.7	20.0	56	5	SE	24	1018.0
22	Fr	11.1	19.4	9.4	8.2	4.9	S	39	11:46	14.1	84	6	W	13	1029.7	17.0	59	2	SSE	20	1028.0
23	Sa	9.3	20.9	1.6	4.6	6.0	ESE	24	15:15	17.3	67	7	WNW	11	1030.8	19.7	49	5	E	15	1027.6
24	Su	12.1	21.2	0	3.0	5.3	E	28	16:59	16.5	70	7	WNW	11	1029.4	20.0	50	1	E	20	1025.3
25	Mo	11.2	23.3	0	6.6	10.3	E	31	15:47	18.2	68	0	W	11	1024.2	22.4	60	1	NE	13	1018.5
26	Tu	13.8	21.6	0	5.8	5.2	SSW	39	08:05	19.6	82	7	SSW	24	1022.1	21.0	64	4	SE	13	1019.5
27	We	14.8	24.0	1.4	3.2	4.9	E	24	15:40	18.1	91	7	W	4	1020.7	21.7	72	5	E	17	1018.4
28	Th	15.2	21.5	9.8	4.2	4.3	SE	31	03:57	17.9	83	7	SSE	13	1028.9	20.4	69	4	E	19	1025.5
29	Fr	13.3	25.8	0	3.8	10.5	ESE	26	14:13	19.5	78	1	W	9	1024.4	23.0	64	0	ESE	19	1020.9
30	Sa	14.6	25.0	0	4.0	9.7	NNE	35	18:40	21.1	82	1	NNE	15	1023.1	23.2	74	0	ENE	19	1016.4
Statistics for September 2023																					
Mean		12.3	23.7		5.8	8.8				17.2	66	2		14	1023.3	21.9	50	2		18	1019.9
Lowest		7.3	18.5		3.0	3.7				12.6	26	0	#	2	1010.2	17.0	18	0	E	4	1005.6
Highest		20.5	34.6	9.8	13.8	10.9	NW	74		27.2	92	7	#	31	1032.4	33.6	74	7	SSE	37	1029.7
Total				31.0	174.4	263.6															

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.

IDCJDW2124.202309 Prepared at 13:00 UTC on 4 Jan 2024

Sydney, New South Wales
October 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	mm	mm	hours		km/h	local	°C	%	eighths		km/h	hPa	°C	%	eighths		km/h	hPa
1	Su	16.5	35.6	0	6.8	9.6	S	65	20:07	22.7	50	7	WNW	9	1013.2	35.5	17	2	W	33	1008.0
2	Mo	16.2	23.4	0	12.6	9.8	SSE	46	23:22	19.0	63	5	SE	13	1023.6	22.4	59	2	E	22	1020.3
3	Tu	17.1	35.7	0	5.4	9.2	N	52	14:21	21.2	75	3	ESE	7	1016.4	35.2	21	5	NNW	30	1011.2
4	We	20.0	27.9	0	14.6	0.9	NNW	65	22:49	21.1	69	8	NE	17	1011.8	25.9	43	8	N	28	1008.4
5	Th	12.9	23.1	8.2	5.4	11.3	NW	54	03:30	15.6	48	1	WNW	31	1014.5	22.6	22	1	WSW	28	1015.8
6	Fr	11.6	22.9	0.2	7.6	7.1	SSE	48	13:36	15.1	57	2	W	22	1024.3	18.0	66	7	SSE	31	1025.2
7	Sa	11.5	20.1	1.8	5.6	11.1	SSE	43	00:53	14.1	70	5	SSW	17	1031.8	19.0	54	5	SSE	17	1030.2
8	Su	12.6	22.9	0	6.6	8.9	ESE	26	13:31	15.4	74	7	W	13	1032.8	21.1	55	4	E	19	1029.4
9	Mo	11.7	23.2	0	5.2	11.4	ENE	37	15:11	14.8	81	1	W	11	1027.1	22.0	54	1	ENE	22	1021.8
10	Tu	13.6	23.6	0	6.4	7.6	ESE	31	16:40	17.7	84	7	WNW	9	1023.5	22.7	64	5	ESE	22	1021.4
11	We	15.5	24.3	0	6.2	10.2	NNE	44	18:36	18.4	84	4	W	9	1024.6	23.7	63	1	NE	26	1021.1
12	Th	14.4	33.2	0	7.4	11.0	SSW	72	21:06	17.1	91	4	W	7	1017.9	32.8	23	1	ENE	26	1009.1
13	Fr	12.8	24.7	2.4	10.4	11.2	W	46	01:48	15.0	54	1	W	24	1017.9	22.6	42	1	E	22	1015.3
14	Sa	13.6	30.1	0	6.6	9.8	W	37	00:59	17.6	55	3	W	17	1017.9	29.3	29	4	NW	6	1012.2
15	Su	14.5	24.6	0	8.6	11.7	WSW	39	01:02	17.6	51	2	WNW	11	1018.5	23.3	44	2	ESE	19	1012.9
16	Mo	14.6	26.5	0	8.0	6.3	WNW	85	14:03	18.9	60	6	W	13	1011.6	24.1	28	7	W	46	1009.5
17	Tu	9.8		0.4	6.2	4.1	SSW	54	14:39	13.0	85	7	WSW	19	1026.0	18.4	69	7	SSW	28	1028.0
18	We	12.6	22.3		4.8	7.1	ESE	33	03:22	15.8	93	7	WNW	13	1030.5	21.0	51	2	ESE	19	1028.3
19	Th	12.9	23.9	2.6	4.8	5.4	ENE	33	16:31	17.3	79	7	WNW	15	1026.0	21.7	53	6	NE	19	1021.3
20	Fr	13.5	25.6	0	5.4	12.1	ENE	41	14:07	16.8	88	1	W	9	1020.0	24.5	59	1	NE	20	1015.7
21	Sa	16.1	25.7	0	7.2	10.3	NE	52	20:11	18.8	95	3	W	9	1017.2	23.6	71	6	NE	30	1012.6
22	Su	16.9	28.7	0	8.0	11.7	NNE	37	23:06	20.9	73	1	WSW	6	1009.7	27.1	51	1	E	20	1007.3
23	Mo	14.1	27.1	0	7.6	12.3	ENE	31	14:11	18.8	48	2	W	13	1013.8	24.6	45	2	ENE	26	1010.3
24	Tu	14.8	26.2	0	7.8	11.9	NE	43	15:11	18.8	78	2	WNW	11	1014.6	24.8	63	1	NE	20	1009.3
25	We	18.8	24.6	0	9.4	9.7	SSW	48	06:43	20.2	78	3	SSW	24	1011.9	23.6	60	5	SE	17	1010.8
26	Th	12.7	16.4	3.2	7.8	0.2	SSE	56	12:39	14.2	78	7	S	11	1022.4	15.6	60	7	SSE	35	1022.8
27	Fr	11.6	19.4	14.0	6.6	7.7	SSE	56	01:07	14.9	84	7	SSE	30	1030.0	18.2	57	7	SSE	30	1029.9
28	Sa	12.1	22.6	2.4	6.4	5.3	SE	31	00:31	15.4	77	7	WNW	15	1030.0	19.3	57	6	E	13	1027.2
29	Su	12.4	25.1	0	5.4	11.9	NE	43	17:27	17.6	70	0	NNW	11	1021.5	24.2	51	3	NE	22	1016.6
30	Mo	14.9	31.3	0	8.4	9.3	NE	44	15:22	20.3	64	3	ESE	9	1013.4	27.5	46	6	NE	20	1006.4
31	Tu	20.3	29.8	0	11.8	11.3	WNW	69	03:32	25.7	31	4	W	24	1009.0	23.9	50	2	SSE	33	1013.1
Statistics for October 2023																					
	Mean	14.3	25.7		7.5	8.9				17.7	70	4		14	1020.1	23.8	49	3		24	1017.1
	Lowest	9.8	16.4		4.8	0.2				13.0	31	0	WSW	6	1009.0	15.6	17	1	NW	6	1006.4
	Highest	20.3	35.7	14.0	14.6	12.3	WNW	85		25.7	95	8	WNW	31	1032.8	35.5	71	8	W	46	1030.2
	Total			35.2	231.0	277.4															

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.

IDCJDW2124.202310 Prepared at 13:00 UTC on 3 Jan 2024

Sydney, New South Wales
November 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	mm	mm	hours		km/h	local	°C	%	eighths		km/h	hPa	°C	%	eighths		km/h	hPa
1	We	16.0	22.3	0	10.0	5.1	SSE	39	13:24	19.0	68	5	S	11	1021.1	21.4	52	5	SE	24	1019.6
2	Th	14.5	23.1	0	6.8	7.1	SW	31	08:29	18.7	69	5	SSW	11	1022.1	22.0	54	3	ESE	19	1019.4
3	Fr	16.3	24.5	4.4	6.0	4.2	ESE	31	15:31	18.8	86	7	S	2	1020.2	22.8	67	6	ESE	20	1017.4
4	Sa	16.9	22.3	0	5.2	1.4	SE	50	15:46	20.9	79	7	ENE	15	1021.2	18.9	92	8	SSE	15	1021.4
5	Su	15.6	20.2	16.8		0.1	ESE	44	07:59	15.9	100	8	ESE	33	1026.5	18.7	66	8	ESE	24	1026.8
6	Mo	13.7	22.0	3.0	3.8	5.4	ENE	31	15:05	17.8	83	6	WNW	6	1026.8	21.4	63	6	E	22	1023.6
7	Tu	14.0	24.2	0.2	5.2	11.6	ENE	46	15:58	19.6	76	4	WNW	4	1023.3	23.6	61	5	NE	28	1019.2
8	We	15.8	25.9	0	7.4	10.7	ENE	44	14:47	21.1	81	5	E	4	1019.6	24.2	71	5	E	30	1015.9
9	Th	17.7	25.5	0	8.6	5.8	ENE	43	12:57	21.2	87	5	ENE	9	1017.0	22.5	76	5	NE	19	1013.5
10	Fr	16.2	25.1	10.6	5.2	11.8	E	46	14:54	19.1	92	6	WSW	13	1018.0	24.3	73	3	ENE	31	1016.7
11	Sa	18.6	27.1	0.2	6.2	12.2	NNE	56	17:11	22.2	87	1	ENE	9	1018.9	26.3	66	6	NE	22	1014.4
12	Su	18.2	26.3	0	11.0	7.9	S	44	01:47	21.2	77	2	S	15	1016.7	23.1	78	7	ESE	17	1012.8
13	Mo	17.5	23.2	0.8	6.4	6.3	SSE	44	00:05	18.4	87	7	SSE	17	1019.2	22.9	59	6	ESE	19	1017.1
14	Tu	16.3	25.2	0.2	8.0	9.5	E	35	13:24	21.8	75	3	N	11	1014.9	23.6	71	5	E	24	1012.1
15	We	19.6	26.2	0.4	7.8	6.8	S	41	14:58	21.8	89	7	ESE	9	1012.8	24.4	74	7	S	24	1010.5
16	Th	19.6	27.1	0	5.8	9.1				23.0	77	5	SE	4	1010.0	23.9	68	7	ESE	24	1008.2
17	Fr	15.7	22.8	12.6	7.4	10.1	SSE	54	15:23	18.3	66	7	S	26	1017.3	21.5	56	6	S	30	1017.7
18	Sa	14.6	24.4	0.6	9.0	12.7	NE	44	15:13	20.6	69	4	N	15	1021.4	23.4	56	2	NE	26	1019.4
19	Su	15.6	26.1	0	9.6	12.6	NE	54	17:28	21.4	69	1	NE	15	1021.2	25.2	63	1	NE	26	1017.9
20	Mo	19.4	24.8	0	8.4	0.1	NNE	44	18:12	21.6	85	8	NW	9	1019.5	23.8	79	8	NE	13	1017.5
21	Tu	18.6	25.8	3.4	6.0	3.1	ENE	48	00:58	19.5	98	7	ESE	6	1019.8	23.6	75	7	SSW	15	1017.4
22	We	18.8	26.6	0	4.0	9.3	SSE	50	12:51	23.4	75	6	SSW	19	1021.1	25.7	63	4	SSE	31	1020.2
23	Th	19.1	24.7	0.8	2.8	2.4	SSW	43	13:05	21.1	91	7	SSW	19	1022.8	20.7	97	7	S	20	1021.8
24	Fr	18.7	23.6	14.8	4.2	0.0	NE	35	20:21	20.1		8	W	4	1021.5	22.5	89	8	E	15	1018.9
25	Sa	18.3	23.3	6.0	2.2	0.1	NE	37	16:03	20.2	100	8	NNE	13	1015.8	21.4	93	7	NE	19	1011.9
26	Su	18.5	32.0	1.8	3.2	10.4	NE	37	15:46	22.6	89	3	ESE	2	1010.7	26.4	65	6	ESE	24	1008.8
27	Mo	20.4	26.8	0.2	7.0	11.7	SSE	33	06:18	23.3	83	7	SSE	26	1013.0	24.3	77	7	ESE	24	1011.9
28	Tu	20.2	21.3	0	6.8	0.0	E	50	19:22	21.0	88	8	E	20	1015.8	20.6	93	8	E	33	1013.1
29	We	19.6	25.7	9.4	2.6	3.4	NE	56	12:19	21.1	99	7	NE	20	1005.6	22.3	90	7	NE	26	1000.9
30	Th	16.8	27.3	33.8	0.8	7.3				20.3	92	2	ESE	6	1002.1	27.0	54	7	N	20	999.3
Statistics for November 2023																					
Mean		17.4	24.8		6.1	6.6				20.5	83	5		12	1017.9	23.1	71	5		22	1015.5
Lowest		13.7	20.2		0.8	0.0				15.9	66	1	#	2	1002.1	18.7	52	1	NE	13	999.3
Highest		20.4	32.0	33.8	11.0	12.7	#	56		23.4	100	8	ESE	33	1026.8	27.0	97	8	E	33	1026.8
Total				120.0	177.4	198.2															

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.

IDCJDW2124.202311 Prepared at 16:00 UTC on 2 Jan 2024

Sydney, New South Wales
December 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	mm	mm	hours		km/h	local	°C	%	eighths		km/h	hPa	°C	%	eighths		km/h	hPa
1	Fr	17.9	26.6	0.4	6.8	10.1	S	35	18:07	22.9	75	4	SW	7	1006.0	25.6	63	5	ESE	20	1004.2
2	Sa	19.8	27.2	0	6.2	2.7	WNW	46	20:41	21.4	83	7	S	7	1009.1	24.0	81	7	ESE	15	1007.7
3	Su	15.6	26.7	12.6	4.8	11.5	E	52	16:24	20.3	87	1	WNW	9	1013.2	25.6	61	4	SSE	26	1012.6
4	Mo	18.7	26.2	0.6	8.0	11.5	E	28	15:56	19.4	87	7	WNW	11	1019.7	25.0	60	4	E	19	1017.4
5	Tu	17.2	28.5	0.2	7.0	12.9	E	31	16:48	23.6	73	2	NNE	13	1017.0	27.5	64	1	E	15	1012.4
6	We	21.4	26.8	0	11.2	11.2	S	57	03:49	23.7	76	1	S	17	1018.0	25.7	64	2	SE	19	1017.3
7	Th	18.9	26.5	0	7.2	9.6	ENE	31	10:42	23.2	79	6	NNE	13	1017.6	25.8	72	7	E	17	1017.7
8	Fr	20.3	29.5	0	7.4	10.8				25.5	77	2	ESE	9	1017.0	27.5	76	4	ENE	20	1012.9
9	Sa	22.6	40.0	0	10.6	9.6	S	72	22:58	29.0	70	1	E	11	1011.2	31.2	54	7	SE	15	1008.3
10	Su	20.3	27.6	1.2	9.8	3.8	S	65	23:06	21.0	100	7	SSW	20	1019.4	26.8	76	6	S	15	1017.1
11	Mo	20.7	29.4	0	4.0	10.3	ESE	28	12:55	24.8	84	5	E	2	1017.3	28.7	68	3	ESE	19	1016.2
12	Tu	21.5	29.3	0	7.6	8.1	E	33	15:42	25.9	79	6	ESE	11	1020.2	28.8	64	5	E	22	1017.3
13	We	20.4	29.2	0	7.8	10.2	WSW	65	21:56	25.4	83	6	NE	13	1016.3	29.1	69	3	ENE	28	1011.0
14	Th	21.9	38.9	2.2	9.6	11.6	W	65	13:37	27.1	77	6	N	9	1006.2	38.7	23	4	W	33	1001.7
15	Fr	21.1	28.3	0	12.6	12.2	ENE	43	16:46	25.1	69	2	SE	11	1011.1	26.1	62	1	E	20	1008.4
16	Sa	19.7	35.3	0	9.0	12.5	W	39	11:04	24.6	75	2	W	15	1005.7	31.9	45	1	E	20	1003.4
17	Su	20.4	28.5	0	11.2	8.3	E	39	15:13	22.3	77	7	E	19	1015.2	27.5	56	2	E	26	1014.1
18	Mo	20.3	29.0	0	9.2	4.3	E	30	15:53	23.9	83	8	ESE	9	1015.4	27.8	72	1	E	19	1011.3
19	Tu	23.4	33.5	0	4.0	0.0	S	67	19:41	25.1	91	8	WNW	6	1010.6	32.2	53	8	N	22	1007.7
20	We	18.2	18.5	9.2	8.2	0.0	S	57	08:54	18.3	98	8	S	31	1013.3	17.3	98	8	SSW	30	1014.1
21	Th	16.4	22.0	22.2	1.8	2.6	SSW	59	15:51	18.4	98	8	SSW	24	1015.6	21.8	69	7	SSW	33	1016.0
22	Fr	16.2	25.6	2.0	5.8	12.7	SSE	44	16:59	20.6	65	4	SSW	15	1017.5	25.0	41	6	SSE	28	1014.8
23	Sa	16.5	25.9	3.2	8.2	8.2	SSW	30	23:53	20.0	87	7	SSW	9	1014.3	25.2	63	2	ESE	20	1010.0
24	Su	19.7	24.4	0.4	7.2	1.1	SW	56	16:16	21.1	81	7	ESE	15	1008.5	21.1	98	7	ENE	15	1006.3
25	Mo	17.9	27.9	23.4		6.1	ENE	50	18:53	20.5	98	7	WNW	7	1007.3	27.1	74	5	E	19	1004.9
26	Tu	20.4	29.7	0.6	5.4	4.7	ENE	46	15:56	23.8	90	6	SW	15	1007.7	24.3	86	6	E	11	1005.7
27	We	19.8	26.3	0.2	4.0	8.5	WSW	78	13:29	23.0	79	5	SSW	15	1009.5	17.2	95	7	WSW	4	1008.7
28	Th	17.0	29.5	10.2	5.8	13.3	ESE	30	15:01	22.7	74	4	W	13	1010.5	27.5	48	4	ESE	20	1009.4
29	Fr	19.6	26.6	0	8.0	0.9	WNW	28	20:26	23.8	86	7	SSE	7	1012.5	25.3	79	8	E	15	1011.4
30	Sa	19.2	27.7	0	3.8	11.6	ESE	46	16:23	22.7	68	3	S	7	1010.9	25.9	63	3	ESE	20	1009.3
31	Su	17.0	21.6	9.6	9.2	0.0	E	35	18:26	19.4	77	8	SSE	15	1020.9	20.8	70	8	ESE	17	1021.6
Statistics for December 2023																					
	Mean	19.4	28.2		7.4	7.8				22.9	81	5		12	1013.4	26.3	66	4		20	1011.3
	Lowest	15.6	18.5		1.8	0.0				18.3	65	1	E	2	1005.7	17.2	23	1	WSW	4	1001.7
	Highest	23.4	40.0	23.4	12.6	13.3	WSW	78		29.0	100	8	S	31	1020.9	38.7	98	8	#	33	1021.6
	Total			98.2	221.4	240.9															

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.

IDCJDW2124.202312 Prepared at 13:00 UTC on 7 Jan 2024

B – Photos of Real-Time Equipment

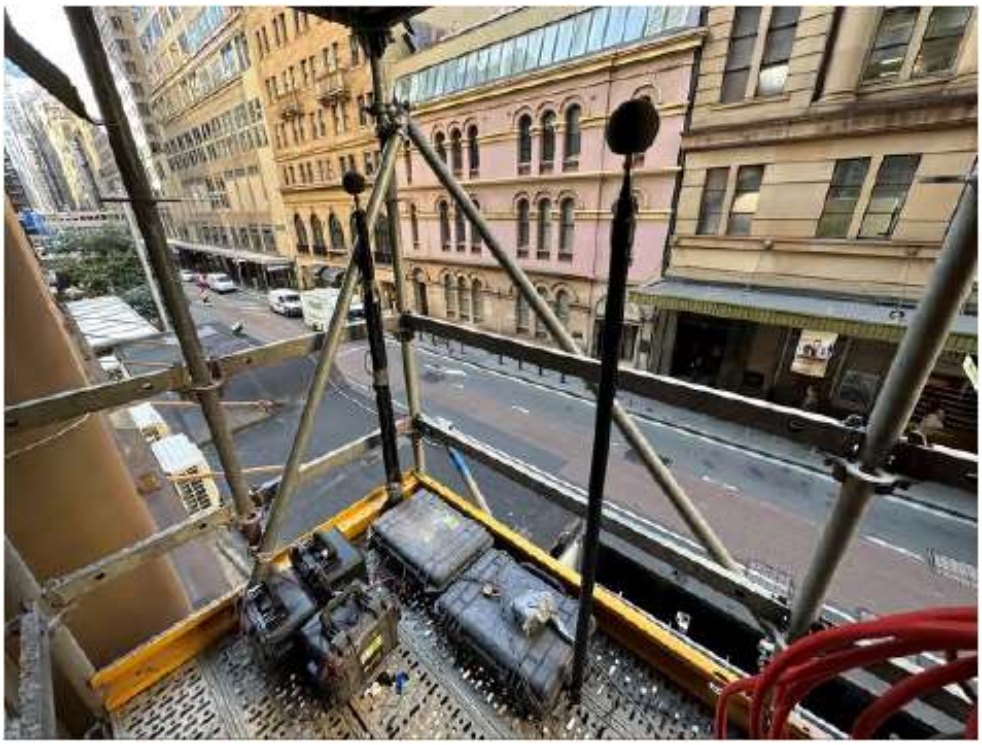


Figure B-1 N1 Pitt Street North (adjacent Castlereagh Street)

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).

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
WORLD RECOGNISED ACCREDITATION

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

		Measured	
3. Environmental Conditions	**Environmental Conditions**	**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
12. Peak C sound level		**8 kHz**	Yes	0.16
		500 Hz	Yes	0.16
13. Overload indication		**Conforming**	Yes	0.20
		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 (≥4kHz)		**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**	

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	pF	15
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	Mic FF to Pressure		Case		Windscreen		Other *		Total	
(Hz)	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	Mic 0 deg FF Resp		Case		Windscreen		Other *		Total	
(Hz)	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	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		
															Type 1	Type 2		Total	Lab	Corrections
(Hz)	Set 1	Set 2	Set 3															(+/-) dB	(+/-) dB	(+/-) 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					
		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					
		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					
		0.00		0.00		0.00					
OtherCorrection		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					
		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					
		75.00		75.00		75.00					
		74.80		74.80		75.00	Type 1	Type 2	Total (+/-) dB	Lab (+/-) dB	Corrections (+/-) dB
Response re 1kHz (Deviation from Expected)		-0.10		-0.10		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**
		-0.10		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**	± 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		
1kHz	114.0	114.0	114.0		Type 1	Type 2
Difference		0.0	0.0		± 0.2	± 0.2

Conforming	Yes	Yes	N/A

Uncertainty (+/-) dB	0.14

8(b). Time Weightings 1kHz

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

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-timeweighted 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 Underange				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
				± 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 1	Type 2
HIGH	30.0	65.0	65.0	0.0	± 0.8	± 1.1
MID	50.0	45.0	45.0	0.0	± 0.8	± 1.1
LOW	70.0	25.0	25.2	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	0.17

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, Stime-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-timeweighted 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 leastsensitive 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, Ftime-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 halfcycle 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		Class 1	Class 2
Attenuation dB				91.8					95.1		+70/inf	+60/inf
				81.0					80.5		+60/inf	+54/inf
				57.7					55.2		+40.5/inf	+39.5/inf
				26.5					24.4		+16.6/inf	+15.6/inf
											-0.4/+5.3	-0.6/+5.8
				0.5					0.5		-0.4/+1.4	-0.6/+1.7
				0.0					0.1		-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								Class 1	Class 2
Attenuation dB			88.7								+70/inf	+60/inf
			70.3								+60/inf	+54/inf
			45.4								+40.5/inf	+39.5/inf
			17.8								+16.6/inf	+15.6/inf
											-0.4/+5.3	-0.6/+5.8
			0.9								-0.4/+1.4	-0.6/+1.7
			0.2								-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
			0.0								-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

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 ± 0,4 dB for Class 1 filters or ± 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 Underange				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 Underange				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 Underange				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
					± 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
					± 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
					± 0.5	± 0.6

Conforming	Yes

Uncertainty (+/-) dB	0.20

Description of Tests

19. Filter Level linearity including the level range control (IEC 61260-3 Clause 11.9)

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

The three filter frequencies are 31.5Hz, 1kHz and 16kHz.

The level linearity differences are calculated as the indicated signal level minus the corresponding expected signal level.

☑ 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		
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	Class 1	Class 2
Attenuation dB										81.3	+70/inf	+60/inf
										73.8	+60/inf	+54/inf
										59.7	+40.5/inf	+39.5/inf
										29.9	+16.6/inf	+15.6/inf
											-0.4/+5.3	-0.6/+5.8
										0.8	-0.4/+1.4	-0.6/+1.7
										0.0	-0.4/+0.7	-0.6/+0.9
										-0.1	-0.4/+0.5	-0.6/+0.7
										0.0	-0.4/+0.4	-0.6/+0.6
										-0.1	-0.4/+0.5	-0.6/+0.7
										-0.1	-0.4/+0.7	-0.6/+0.9
										0.0	-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	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						Class 1	Class 2
Attenuation dB					91.3						+70/inf	+60/inf
					73.8						+60/inf	+54/inf
					51.5						+40.5/inf	+39.5/inf
					23.3						+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
					0.1						-0.4/+1.4	-0.6/+1.7
											-0.4/+5.3	-0.6/+5.8
					46.1						+16.6/inf	+15.6/inf
					90.4						+40.5/inf	+39.5/inf
					104.6						+60/inf	+54/inf
					104.8						+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

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	Class 1	Class 2
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				+70/inf	+60/inf
Attenuation dB							90.8				+60/inf	+54/inf
							73.6				+40.5/inf	+39.5/inf
							51.2				+16.6/inf	+15.6/inf
							22.3				-0.4/+5.3	-0.6/+5.8
											-0.4/+1.4	-0.6/+1.7
							0.2				-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				-0.4/+5.3	-0.6/+5.8
											+16.6/inf	+15.6/inf
							47.7				+40.5/inf	+39.5/inf
							91.8				+60/inf	+54/inf
							94.7				+70/inf	+60/inf
							91.5					

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 ± 0,4 dB for Class 1 filters or ± 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 Underange				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 Underange				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 Underange				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
					± 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
					± 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
					± 0.5	± 0.6

Conforming	Yes

Uncertainty (+/-) dB	0.20

Description of Tests

25. Filter Level linearity including the level range control (IEC 61260-3 Clause 11.9)

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

The three filter frequencies are 31.5Hz, 1kHz and 16kHz.

The level linearity differences are calculated as the indicated signal level minus the corresponding expected signal level.

☑ 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	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).

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
WORLD RECOGNISED ACCREDITATION

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

		Measured	
3. Environmental Conditions	**Environmental Conditions**	**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
12. Peak C sound level		**8 kHz**	Yes	0.16
		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 (≥4kHz)		**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**	

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	pF	15
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 preampfailed 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	Mic FF to Pressure		Case		Windscreen		Other *		Total	
(Hz)	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	Mic 0 deg FF Resp		Case		Windscreen		Other *		Total	
(Hz)	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	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		
															Type 1	Type 2		Total	Lab	Corrections
(Hz)	Set 1	Set 2	Set 3															(+/-) dB	(+/-) dB	(+/-) 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					
		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					
		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					
		0.00		0.00		0.00					
OtherCorrection		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					
		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		**75.00**		**75.00**					
		75.00		75.10		75.00					
		75.00		75.00		75.00					
		75.00		75.00		75.00			Total	Lab	Corrections
		74.90		75.00		75.10	Type 1	Type 2	(+/-) dB	(+/-) dB	(+/-) dB
Response re 1kHz (Deviation from Expected)		0.00		0.00		0.10	± 1.0	± 2.0	**0.44**	**0.18**	**0.41**
		0.00		0.10		0.10	± 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		0.10		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		
1kHz	114.0	114.0	114.0		Type 1	Type 2
Difference		0.0	0.0		± 0.2	± 0.2

Conforming	Yes	Yes	N/A

Uncertainty (+/-) dB	0.14

8(b). Time Weightings 1kHz

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

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-timeweighted 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 Underange				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
				± 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 1	Type 2
HIGH	30.0	65.0	65.0	0.0	± 0.8	± 1.1
MID	50.0	45.0	45.0	0.0	± 0.8	± 1.1
LOW	70.0	25.0	25.2	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	0.17

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, Stime-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-timeweighted 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 leastsensitive 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, Ftime-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 halfcycle 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		Class 1	Class 2
Attenuation dB				93.9					95.5		+70/inf	+60/inf
				84.3					80.6		+60/inf	+54/inf
				58.5					55.2		+40.5/inf	+39.5/inf
				27.0					24.4		+16.6/inf	+15.6/inf
											-0.4/+5.3	-0.6/+5.8
				0.5					0.5		-0.4/+1.4	-0.6/+1.7
				0.0					0.1		-0.4/+0.7	-0.6/+0.9
				-0.1					0.0		-0.4/+0.5	-0.6/+0.7
				0.0					**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								Class 1	Class 2
Attenuation dB			89.4								+70/inf	+60/inf
			70.3								+60/inf	+54/inf
			45.4								+40.5/inf	+39.5/inf
			17.8								+16.6/inf	+15.6/inf
											-0.4/+5.3	-0.6/+5.8
			0.9								-0.4/+1.4	-0.6/+1.7
			0.2								-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
			0.0								-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

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 ± 0,4 dB for Class 1 filters or ± 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 Underange				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 Underange				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 Underange				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
					± 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
					± 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
					± 0.5	± 0.6

Conforming	Yes

Uncertainty (+/-) dB	0.20

Description of Tests

19. Filter Level linearity including the level range control (IEC 61260-3 Clause 11.9)

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

The three filter frequencies are 31.5Hz, 1kHz and 16kHz.

The level linearity differences are calculated as the indicated signal level minus the corresponding expected signal level.

☑ 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	Class 1	Class 2
Attenuation dB										83.5	+70/inf	+60/inf
										74.9	+60/inf	+54/inf
										60.5	+40.5/inf	+39.5/inf
										30.1	+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	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			
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		Class 1	Class 2
Attenuation dB									93.6		+70/inf	+60/inf
									81.4		+60/inf	+54/inf
									61.1		+40.5/inf	+39.5/inf
									28.9		+16.6/inf	+15.6/inf
											-0.4/+5.3	-0.6/+5.8
									0.6		-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
									0.2		-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	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						Class 1	Class 2
Attenuation dB					92.3						+70/inf	+60/inf
					73.9						+60/inf	+54/inf
					51.5						+40.5/inf	+39.5/inf
					23.4						+16.6/inf	+15.6/inf
											-0.4/+5.3	-0.6/+5.8
					0.6						-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
					0.2						-0.4/+1.4	-0.6/+1.7
											-0.4/+5.3	-0.6/+5.8
					46.1						+16.6/inf	+15.6/inf
					90.5						+40.5/inf	+39.5/inf
					104.9						+60/inf	+54/inf
					104.5						+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		

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							133.0					
1.06							132.9					
1.09							132.5					
1.12												
1.30							85.2					
1.89							42.2					
3.07							38.2					
5.43							42.2				Class 1	Class 2
Attenuation dB							91.5				+70/inf	+60/inf
							73.6				+60/inf	+54/inf
							51.2				+40.5/inf	+39.5/inf
							22.4				+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
							0.1				-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 ± 0,4 dB for Class 1 filters or ± 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 Underange				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 Underange				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 Underange				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
					± 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
					± 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
					± 0.5	± 0.6

Conforming	Yes

Uncertainty (+/-) dB	0.20

Description of Tests

25. Filter Level linearity including the level range control (IEC 61260-3 Clause 11.9)

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

The three filter frequencies are 31.5Hz, 1kHz and 16kHz.

The level linearity differences are calculated as the indicated signal level minus the corresponding expected signal level.

☑ 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).

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
WORLD RECOGNISED ACCREDITATION

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**	**Measured 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
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
12. Peak C sound level		**8 kHz**	N/A	0.16
		500 Hz	N/A	0.16
13. Overload indication		**Conforming**	Yes	0.20
		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 (≥4kHz)		**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**	

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	pF	12
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	Mic FF to Pressure		Case		Windscreen		Other *		Total	
(Hz)	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	Mic 0 deg FF Resp		Case		Windscreen		Other *		Total	
(Hz)	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

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

Uncertainty (+/-) dB	0.09

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

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	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		
															Type 1	Type 2		Total	Lab	Corrections
(Hz)	Set 1	Set 2	Set 3															(+/-) dB	(+/-) dB	(+/-) 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		
									Total	Lab	Corrections
							Type 1	Type 2	(+/-) dB	(+/-) dB	(+/-) dB
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					
		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					
		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					
		0.00		0.00		0.00					
OtherCorrection		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					
		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							
		73.00		73.00							
Response re 1kHz (Deviation from Expected)		-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		
1kHz	94.0	94.0		94.0	Type 1	Type 2
Difference		0.0		0.00	± 0.2	± 0.2

Conforming	Yes	N/A	Yes

Uncertainty (+/-) dB	0.14

8(b). Time Weightings 1kHz

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

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-timeweighted 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 Underange				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
				± 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
				± 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 1	Type 2
40-130	60.0	45.0	45.0	0.0	± 0.8	± 1.1
30-120	70.0	35.0	35.1	0.1	± 0.8	± 1.1
20-110	80.0	25.0	26.0	1.0	± 0.8	± 1.1
20-100	80.0	25.0	26.0	1.0	± 0.8	± 1.1
20-90	80.0	25.0	26.0	1.0	± 0.8	± 1.1
20-80	80.0	25.0	26.0	1.0	± 0.8	± 1.1
					± 0.8	± 1.1
					± 0.8	± 1.1
					± 0.8	± 1.1
					± 0.8	± 1.1

Conforming	Yes

Uncertainty (+/-) dB	0.17

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, Stime-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-timeweighted 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 leastsensitive 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, Ftime-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 halfcycle 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).

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
WORLD RECOGNISED ACCREDITATION

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	**Job No**	RC055	**Operator**	AM
Client Name	CPB CONTRACTORS				
Client Address	LEVEL 4, 201 ELIZABETH STREET, SYDNEY NSW 2000				

1. Instrument Information & Reference Conditions

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

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.

Periodic tests were performed in accordance with procedures from IEC 60942 Ed. 4.0 2017-11 Electroacuostics - 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	**Nominal Settings**		**4226 Settings**	
No	**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 CALIBRAT(
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	Uncertainty 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	Tolerance % Class 2	Pass	Uncertainty %
1	1000	1000.281	0.03	0.7	1.7	Yes	0.010
2				0.7	1.7	N/A	
3				0.7	1.7	N/A	
4				0.7	1.7	N/A	
5				0.7	1.7	N/A	

3(b). Distortion						
Calibrator Setting	Nominal Hz	Observed %THD		Tolerance % Class 1	Tolerance % Class 2	Pass
1	1000	0.51		2.5	3	Yes
2						N/A
3						N/A
4						N/A
5						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. 0ntu 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: $^{+}/_{-}$ 0.05 $^{\circ}$ C

Salinity: +/-0.1ppt

Conductivity: +/- 5us/cm

pH: +/- 0.03

ORP: +/- 3mv

Dissolved Oxygen: Normally ($^{+}/_{-}$ 0.5%).

Turbidity: +/- 0.3ntu for range of 0-200ntu.

Yeo-Kal Reference: RFS 2820

Calibrated by: G. Yeomans

CALIBRATION PARAMETERS

Ver: 4.26
$H
YEO-KAL MODEL R618
SERIAL NUMBER: 676
DATE OF DOWNLOAD: 16/03/23 10:25
DATE FORMAT: DD/MM/YY HH:MM

Param	Date	Time	lo_dat	lo_sp	lo_temp	hi_dat	hi_sp	hi_temp	offset	slope
Temp (C)	16/03/23	09:44	276753	12.70	12.71	343285	34.50	34.47	237993.5	3051.926
E.C (uscm)	16/03/23	09:47	299852	0	21.37	301165	1413	25.11	299852.0	0.927106
Turb (ntu)	16/03/23	10:15	300954	0	24.20	308394	200	25.39	300954.0	37.20000
pH (pH)	16/03/23	10:01	337872	4	25.87	228624	10	25.54	410828.8	-18188.8
ORP (mv)	16/03/23	10:05	310712	295	23.92	329448	472	25.62	279485.3	105.8531
Sal (ppt)	16/03/23	09:54	299971	0	0.00	311455	35	24.70	299971.0	217625.6
D.O.(%sat)	16/03/23	10:10	299890	0	0.00	314753	100	24.31	299890.0	71.34378

$D
$H