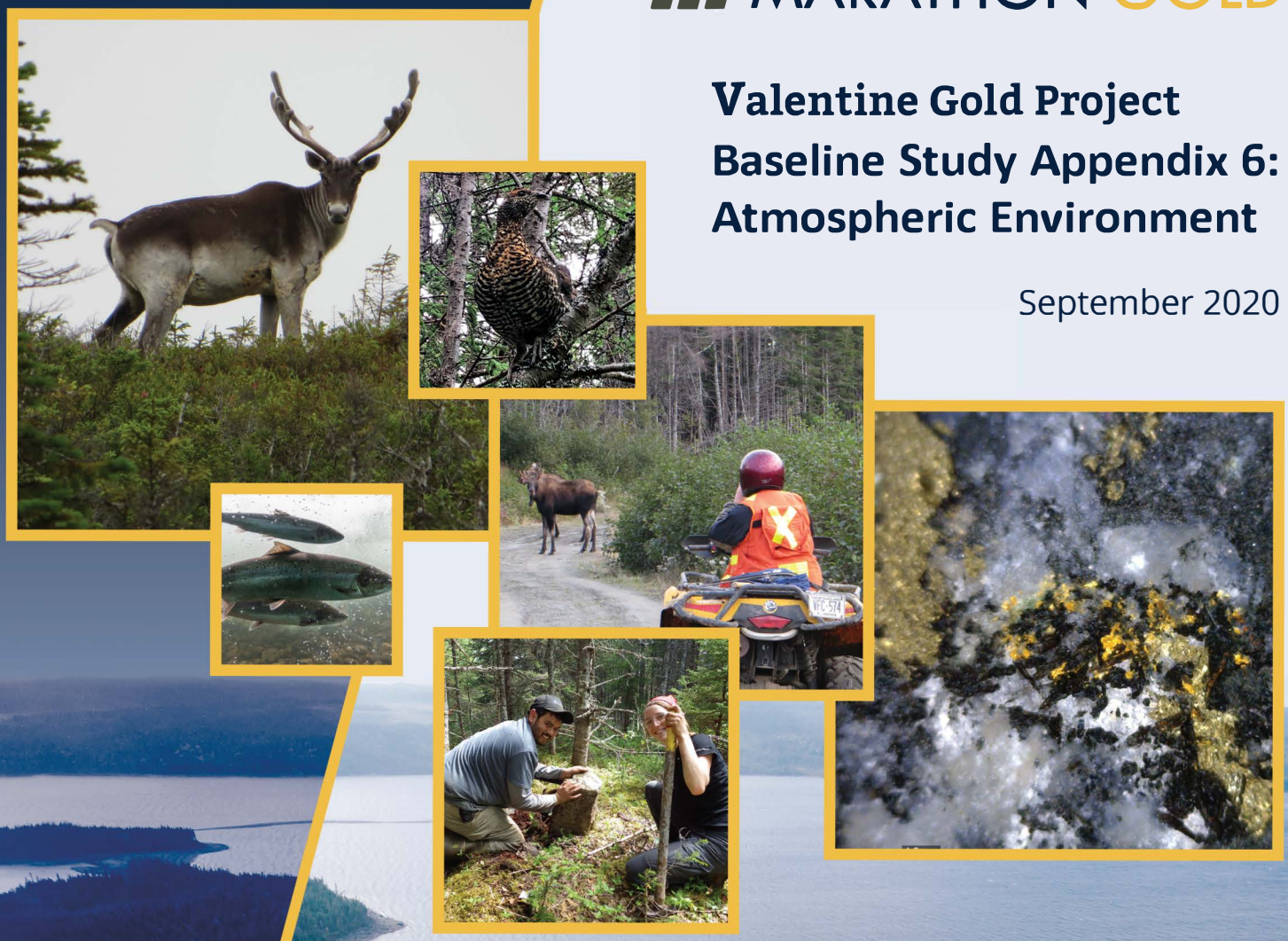
MARATHON GOLD

Valentine Gold Project Baseline Study Appendix 6: Atmospheric Environment

September 2020



Valentine Gold Project
Environmental Impact Statement

Final Report

Baseline Study Appendix 6:
Atmospheric Environment (BSA.6)

Prepared for:

Marathon Gold Corporation
36 Lombard Street, Suite 600
Toronto, ON M5C 2X3

Prepared by:

Stantec Consulting Ltd.
141 Kelsey Drive
St. John's, NL A1B 0L2
Tel: (709) 576-1458
Fax: (709) 576-2126

File No: 121416288

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Abbreviations and Acronyms

AAQM	Ambient air quality monitoring
BSA	Baseline Study Appendix
CAAQS	Canadian Ambient Air Quality Standards
cd	Candela
CH_4	Methane
CO	Carbon monoxide
CO_2	Carbon dioxide
CO_{2e}	CO_2 equivalents
EAC	Environmental Assessment Committee
ECCC	Environment and Climate Change Canada
EIS	Environmental Impact Statement
EOG	Earth Observation Group
GHGs	Greenhouse Gases
%HA	Percent highly annoyed
km	Kilometres
L_d	Day sound pressure level
L_{dn}	Day night sound pressure level
L_{eq}	Equivalent sound pressure level
L_n	Night sound pressure level
lux	Illuminance
kt CO_{2e} /y	Kilotonnes of CO_2 equivalent per year
mag/arcsec^2	Magnitudes per square arcsecond
Marathon	Marathon Gold Corporation
NAPS	National Air Pollutant Surveillance
NIR	National Inventory Report
NL	Newfoundland and Labrador
NL AAQS	NL Ambient Air Quality Standards
NLDECCM	NL Department of Environment, Climate Change and Municipalities
NLDMAE	NL Department of Municipal Affairs and Environment
NLEPA	NL *Environmental Protection Act*

NO_2	Nitrogen dioxide
NO_x	Nitrogen oxides
NO	Nitric oxide
N_2O	Nitrous oxide
NOAA	National Oceanic and Atmospheric Administration
NPRI	National Pollutant Release Inventory
O_3	Ozone
PM	Particulate matter
PM_{10}	Particulate matter less than 10 microns in diameter
$PM_{2.5}$	Particulate matter less than 2.5 microns in diameter
SO_2	Sulphur dioxide
SQM-L	Sky Quality Meter with lens
TMF	Tailings Management Facility
TSP	Total Suspended Particulate matter
US EPA	United States Environmental Protection Agency
VC	Valued Components
VOCs	Volatile organic compounds

1.0 INTRODUCTION

Marathon Gold Corporation (Marathon) is planning to develop an open pit gold mine south of Valentine Lake, located in the Central Region of the Island of Newfoundland, approximately 60 kilometres (km) southwest of the town of Millertown, Newfoundland and Labrador (NL) (Figure 1-1). The Valentine Gold Project (the Project) will consist primarily of open pits, waste rock piles, crushing and stockpiling areas, conventional milling and processing facilities (the mill), a tailings management facility, personnel accommodations, and supporting infrastructure including roads, on-site power lines, buildings, and water and effluent management facilities. The mine site is accessed by an existing public access road that extends south from Millertown approximately 88 km to Marathon's existing exploration camp. Marathon will upgrade and maintain the access road from a turnoff approximately 8 km southwest of Millertown to the mine site, a distance of approximately 76 km.

The Minister of the NL Department of Environment, Climate Change and Municipalities (NLDECCM) has determined that the Project requires the preparation of an Environmental Impact Statement (EIS) under the provincial *Environmental Protection Act* (NLEPA). The Final EIS Guidelines were issued by the Environmental Assessment Committee (EAC) in January 2020 (Provincial EIS Guidelines, January 2020). The Provincial EIS Guidelines require the preparation of a number of baseline studies to describe and provide data on specific components of the EIS. The baseline studies are needed to address baseline data requirements to support the assessment of one or more Valued Components (VCs); and to support the development of mitigation measures and follow-up monitoring programs. Each has been prepared as a stand-alone Baseline Study Appendix (BSA) to the EIS:

- BSA.1: Dam Safety
- BSA.2: Woodland Caribou
- BSA.3: Water Resources
- BSA.4: Fish, Fish Habitat and Fisheries
- BSA.5: Acid Rock Drainage / Metal Leaching (ARD/ML)
- BSA.6: Atmospheric Environment
- BSA.7: Avifauna, Other Wildlife and Their Habitats
- BSA.8: Species at Risk (SAR) / Species of Conservation Concern (SOCC)
- BSA.9: Community Health, Services and Infrastructure / Employment and Economy
- BSA.10: Historic Resources

This report represents BSA.6: Atmospheric Environment and presents an overview of the existing conditions with respect to air quality, greenhouse gas (GHG) emissions, sound quality and lighting within the Project Area. As per the Final Provincial EIS Guidelines (January 2020), BSA.6 includes the following:

- Ambient air quality within and surrounding the Project Area
- Ambient noise levels within and surrounding the Project Area
- Ambient light levels within and surrounding the Project Area
- Provincial climate change precipitation projections for Port Aux Basques, Burgeo, Bay d'Espoir and Exploits Dam (nearest regional sites)
- Historical and current provincial GHG emissions, including emissions from the industrial sector

The Provincial EIS Guideline also required a comparison and assessment of predicted Project GHG emissions in the context of the *Management of Greenhouse Gas Act*, the *Revenue Administration Act*, and the provincial GHG reduction target for 2030. A comparison and assessment of predicted Project GHG emissions in the context of the *Management of Greenhouse Gas Act*, the *Revenue Administration Act* and the provincial GHG reduction target for 2030, have been conducted as part of the EIS (Chapter 5).

As the purpose of the BSA is to characterize the baseline conditions (i.e., existing conditions) within the Project Area, this study is focused on current existing air quality, GHGs, sound quality and lighting. Information pertaining to Project predictions or potential effects from the Project on the atmospheric environment are presented in the Environmental Impact Statement (EIS) for the Project.

In addition, the predicted effects of climate change on the Project (including an overview of the provincial climate change precipitation projections for Port Aux Basques, Burgeo, Bay d'Espoir and Exploit's Dam) have been assessed within the EIS (Chapter 22).

An overview of the study area, the study methods used to characterize the existing conditions with respect to air quality, GHGs, sound quality and lighting, and the results obtained are provided in the following sections.

Note that the BSAs consist of data reports that have been prepared for Marathon over a number of years (i.e., 2011 to 2020), during which the Project has undergone a series of refinements. The study areas and Project references in these data reports reflect the Project description at the time of preparation of these reports. The current Project description for the purposes of environmental assessment is found in Section 2 of the EIS.

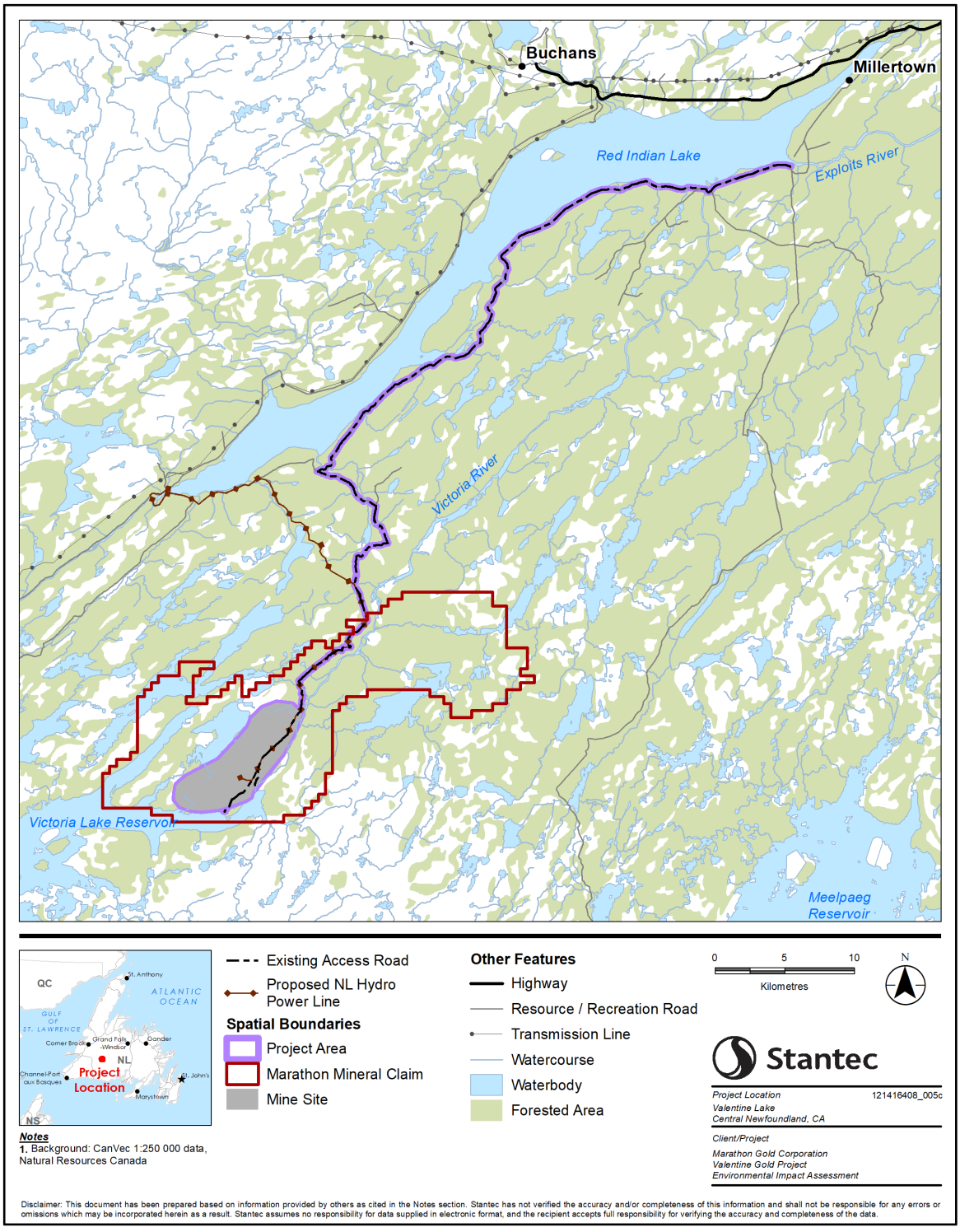

Figure 1-1 Project Location

2.0 DESCRIPTION OF THE STUDY AREA

The Project is located in rural west-central Newfoundland, in the province of NL (Figure 1-1), with the mine site located approximately 49 km south of the nearest community of Buchans, and approximately 60 km southwest of the Town of Millertown.

The Project is accessed by road via Millertown (82 km by road), with provincial highways connecting Millertown and Buchans to the Trans-Canada Highway. It is anticipated that most materials, equipment and supplies will be brought to the mine site by road from larger communities in NL, such as Grand Falls-Windsor and Gander, and ultimately via the Marine Atlantic-operated ferry which connects North Sydney, Nova Scotia with Port-aux-Basques on the west coast of the Island, approximately 540 km distance by road from the Project, or by ferry to Argentia, approximately 480 km by road. The Project is also located approximately 210 km from the airport in Gander and approximately 320 km from the airport in Deer Lake.

The center of the mine site is located at Universal Transverse Mercator 490055 m Easting and 5358023 m Northing, Zone 21, North American Datum 1983 (NAD83 Zone 21). It is located within National Topographic System map sheets 12A/06. The Project Area is located with National Topographic System map sheets 12A/06, 12A/10, 12A/11, and 12A/15. This part of the Island is boreal forest, characterized by mainly coniferous trees. The location has cold winters (average -4.5°C) and warm summers (average 16°C). It is a rural area, with a history of mining exploration and development activities and other land and resource uses, including commercial forestry, outfitting and recreational land use.

The Project Area (Figure 2-1) consists of the mine site and the portion of the existing access road to be upgraded and maintained by Marathon, with a 20 m buffer on either side of the access road to account for activities associated with upgrading.

Within the LAA/RAA, there are approximately 35 seasonal dwellings (three active outfitters, two inactive outfitters and 30 cabins), which represent the nearest sensitive receptors to the Project (Figure 2-1). The Miawpukek First Nation reserve at Conne River is 113 km from the Project Area.

For the purposes of this BSA, the Study Area boundaries are defined as an area within and surrounding the Project Area (Figure 2-1) and is analogous to the Local Assessment Area considered for the environmental effects assessment of the Atmospheric Environment Valued Component (VC) (Chapter 5 of the EIS).

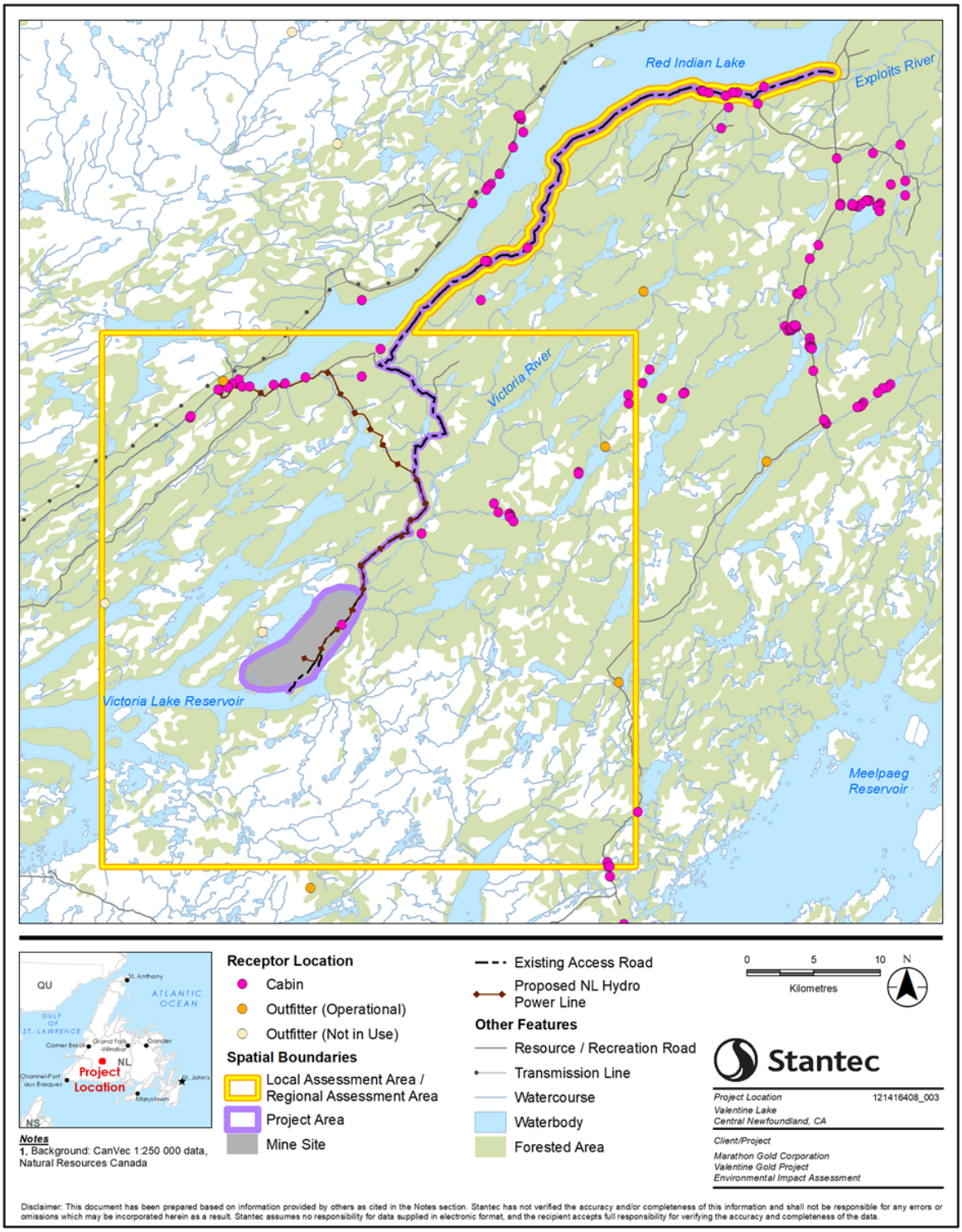

Figure 2-1 Study Area

3.0 METHODS

The existing conditions for the atmospheric environment, including air quality, GHGs, sound quality and lighting, have been characterized using a combination of publicly available data, results from recent field surveys, and known information regarding the Study Area.

The approach and methods used to characterize the baseline conditions of the atmospheric environment are presented in the following sub-sections.

3.1 AIR QUALITY

A baseline ambient air quality monitoring survey was conducted at one location near the proposed mine site in June 2020 (Figure 3-1). The survey consisted of measuring ambient concentrations of total suspended particulate matter (TSP), particulate matter less than 10 microns in diameter (PM_{10}), metals, sulphur dioxide (SO_2) and nitrogen dioxide (NO_2) over a four day period. The monitoring event was conducted from June 15-19, 2020, and the data are considered to be reasonably representative of summer conditions.

3.2 GREENHOUSE GASES

Historical and current provincial and national GHG emissions within the Study Area, including emissions from the industrial sector (mining), were characterized by summarizing provincial and national GHG emissions inventory data. Data published for the 2018 reporting year were used, as it presents the most recently available information. The GHG emissions information was obtained from the ECCC National Inventory Report (NIR) (ECCC 2020).

3.3 SOUND QUALITY

Current ambient sound levels within the Study Area were characterized by conducting a baseline sound quality monitoring survey. The baseline sound quality monitoring survey was conducted from June 15 to 19, 2020 at one location near the mine site (Figure 3-1) and is representative of the nearest seasonal receptor.

The baseline sound quality monitoring was conducted in accordance with ISO 1996-2:2007 (“Acoustics – Description, measurement and assessment of environmental noise – Part 2L Determination of environmental noise levels”), as recommended by Health Canada (Health Canada 2017). Ambient sound levels were measured using a Larson and Davis Type 1 Sound Pressure Level Meter (Model 831). The microphone was positioned on a tripod approximately 1.5 meters above grade. The microphone was equipped with a wind screen to reduce extraneous noise due to the wind, and the monitoring did not occur during periods with precipitation. Digital audio recordings were also logged so that the recordings could be reviewed afterward and any abnormalities in the data checked. The sound pressure level meter was set up to log one-minute equivalent sound pressure level (Leq) values over a period of four to five days.

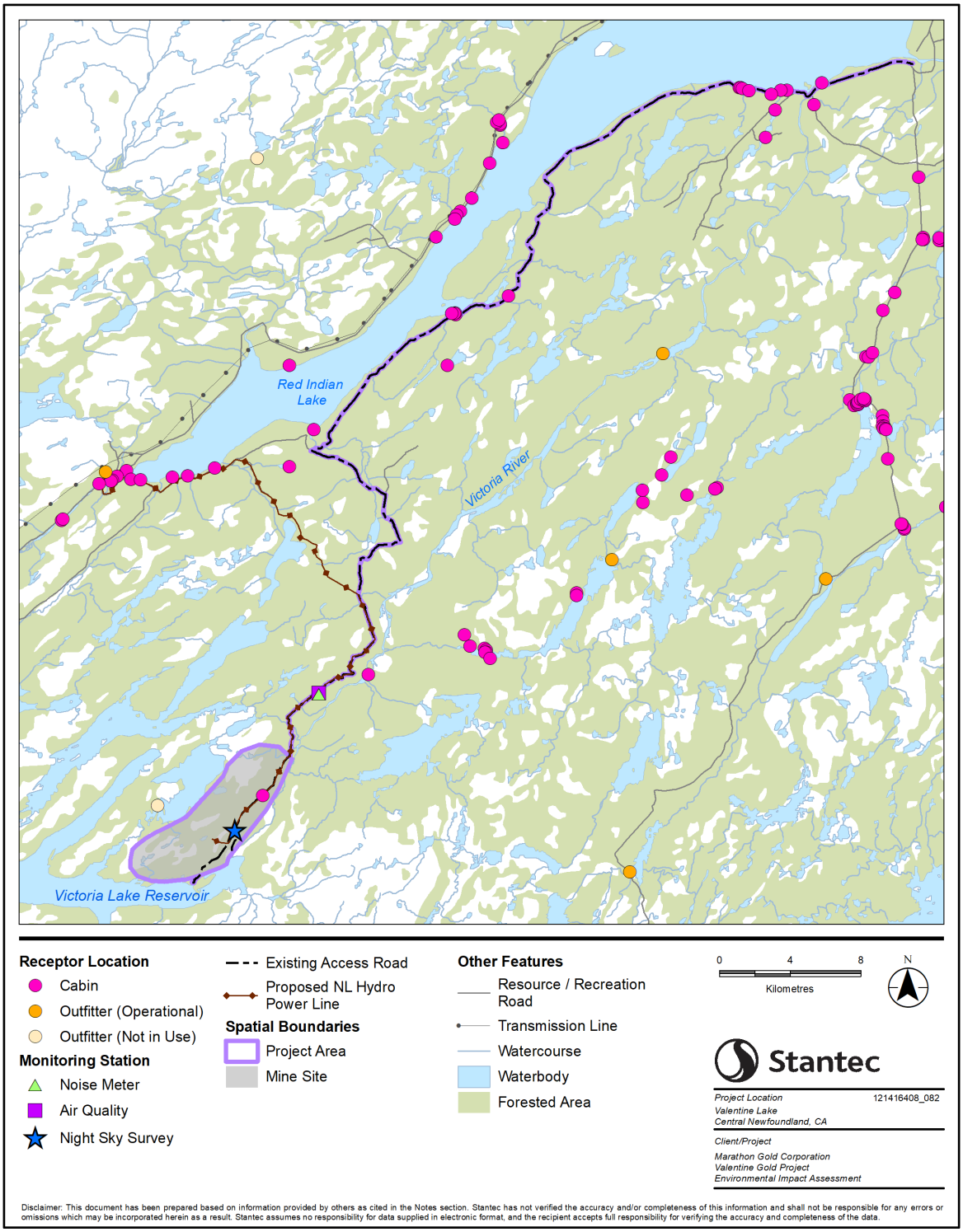

Figure 3-1 Baseline Air, Sound and Light Monitoring Locations

Upon completion of the sound monitoring, the baseline measurements were downloaded from the sound pressure level meter and analyzed in relation to meteorological conditions during the time of monitoring, potential nearby sources of sound (both natural and anthropogenic) and the audio recordings. Further calculations were performed on the raw data to obtain the daytime sound pressure level (Ld), the nighttime sound pressure level (Ln), the day-night average sound pressure level (Ldn), and the percent highly annoyed (%HA) for baseline conditions (Health Canada 2017).

Calibration records for the monitoring equipment used to conduct the baseline sound quality monitoring survey are included in Appendix A.

3.4 LIGHTING

Existing ambient light levels at the mine site and within the Project Area were characterized by conducting ambient light monitoring, reviewing satellite observations of artificial light (World Atlas 2015), and making assumptions based on the Project location, nearby communities, nearby sources of light, and Stantec's professional experience.

Three attributes: light trespass, glare and sky glow, were used to characterize the light and ambient light levels and these attributes are described below:

- Light trespass refers to the transmission of light from fixtures within a facility to the environment and receptors outside the facility. The unit of measure for light incidence (i.e. luminance) either in or outside the facility is a lux. A lux is equal to one lumen lighting up an area of 1 m^2, or 1 lumen/m^2. A 60-watt incandescent light bulb emits approximately 800 lumens. Light trespass reaches problematic levels, for example, when lights (also referred to as luminaires) located on the outside of an industrial facility shine in through the windows of nearby residential homes at levels that could disrupt sleep or distract from normal levels.
- Glare refers to intense, harsh, or contrasting lighting conditions that reduce the ability of humans, birds and other organisms to see clearly. The most common example of glare is oncoming high-beam vehicle headlights that provide ample light for the driver in the oncoming vehicle, but result in poor visibility, potentially reaching hazardous conditions for the driver meeting the other vehicle. The unit of measure is luminance, which is equal to lumens per steradian: this is the unit candela (cd).
- Sky glow refers to the illumination of the clouds by light sources on the surface of the Earth, such as street lighting, and haze in the atmosphere that replaces the natural nighttime sky with a translucent to opaque lighted dome. The sky appears washed out, or brownish-purple and may be devoid of visible stars in the extreme. Sky glow is the cumulative effect of all the lights at the surface either emitting upward or being reflected upward by the surface, plus the emission from photochemical activity in the atmosphere. The unit of measure for the brightness of the sky, including sky glow, is magnitudes per square arcsecond (mag/arcsec^2). A sky glow measurement representative of a clear sky would be approximately 21 to 22 mag/arcsec^2 and within a city or urban area approximately 18-19 mag/arcsec^2 (Berry 1976).

Light monitoring was conducted at night on June 16, 2020 at one location near the center of the mine site (Figure 3-1). Ambient light monitoring included measurements of illuminance (lux) and sky glow (mag/arc sec^2). Illuminance was measured using a conventional, integrating hemispherical light meter (Extech EA33) with a resolution of 0.01 lux. Sky glow was measured using a Unihedron Sky Quality Meter with lens (SQM-L).

Existing ambient light levels at the mine site and within the Project Area were also characterized by reviewing satellite observations of artificial light (Interactive world light pollution map based on the National Oceanic and Atmospheric Administration (NOAA) / Earth Observation Group (EOG) overlay (World Atlas 2015).

4.0 STUDY OUTPUTS

4.1 AIR QUALITY

Given the largely undeveloped nature of the Study Area, there are few sources of air contaminants from human activities in the area, nor are there large industrial emissions sources within the Study Area. Based on a review of the NPRI data for the Island of Newfoundland, the nearest sources of air contaminants to the mine site (but outside of the Study Area) consist of two mine sites which are no longer operational, and the Corner Brook Pulp and Paper Mill. The two mine sites include the Teck Resources Duck Pond Mine and Barite Mud Services and are located approximately 57 km and 41 km northeast of the mine site, respectively. The Duck Pond Mine is no longer operational and is in the closure and rehabilitation phase, while Barite Mud Services is operational on a seasonal basis. Although both sites are no longer fully operational, potential exists for fugitive dust to be generated at each site. In addition, decommissioning activities are on-going at the Duck Pond Mine, which could result in further fugitive dust emissions. The Corner Brook Pulp and Paper Mill is located approximately 90 km to the northwest of the mine site. Based on NPRI reporting data, substantive air contaminant emissions from the pulp and paper mill consist of combustion gases (nitrogen oxides [NO_X], carbon monoxide [CO], and SO_2), particulate matter (PM), volatile organic compounds (VOCs) and selected trace metals.

Given that the nearest sources of air contaminant emissions are outside of the Study Area and distant from the mine site, it is unlikely that these air contaminant releases would contribute to reduced air quality in any substantive way within the Study Area for this Project.

Existing air quality conditions within the Study Area were characterized using background concentrations of air contaminants of potential concern to the Project. Existing air quality within the Study Area was characterized using results of a field survey conducted in June 2020, and ambient air quality data published by ECCC through the National Air Pollutant Surveillance (NAPS) Program and the NLDECCM.

The nearest and most representative NAPS ambient air quality monitoring (AAQM) station to the mine site is at Grand Falls-Windsor, approximately 120 km northeast of the mine site. There is also a NAPS station located at Corner Brook, which is closer to the mine site; however, this station is immediately adjacent to the Corner Brook Pulp and Paper Mill. Therefore, air contaminant concentrations measured at

the Corner Brook station are likely to be less representative of existing ambient concentrations in the area of the Project than those measured at the Grand Falls-Windsor station, as there are no large emissions sources near the Grand Falls-Windsor station.

Concentrations of the following air contaminants are measured at the Grand Falls-Windsor station:

- Particulate matter ≤ 2.5 microns ($PM_{2.5}$)
- Ozone (O_3)
- Nitric oxide (NO)
- NO_2
- NO_X
- CO
- SO_2

An overview of the 2016-2017 NAPS monitoring results for the Grand Falls-Windsor station, for those air contaminants relevant to the Project, is presented in Table 4.1.

Table 4.1 Ambient Air Quality Data as Measured at the Grand-Falls Windsor NAPS Monitoring Location (2016 – 2017)

Value	Measured Concentrations (ug/m^3)			
	SO_2	**NO_2**	**$PM_{2.5}$**	**CO**
Max Hourly	15.7	73.4	76.0	916
98th Percentile	2.62	11.3	16.0	286
90th Percentile	2.62	3.76	9.00	206
3-hour 90th percentile	2.62	-	-	-
8-hour 90th percentile	-	-	-	200
Max Daily	2.95	12.7	16.1	373
Max Daily (excl hourly values >90th percentile)	0	1.88	8.00	195
Daily 98th Percentile*	-	-	10.3	-
Daily Average	-	-	-	-
Max Annual Average	0.78	2.56	4.66	155
Annual Average (excl hourly values >90th percentile)	0.78	1.40	3.84	144

Notes:
* Average of 2016 and 2017 annual 24-hour 98th percentiles, for comparison with CAAQS for $PM_{2.5}$
NL AAQS for 24-hour time averaging period: SO_2 - 300 ug/m^3, NO_2 - 200 ug/m^3, $PM_{2.5}$ - 25 ug/m^3
NL AAQS for 8-hour time averaging period: CO – 15,000 ug/m^3
NL AAQS for the annual time averaging period: SO_2 - 60 ug/m^3, NO_2 - 100 ug/m^3, $PM_{2.5}$ – 8.8 ug/m^3
Source: ECCC 2019

As presented in Table 4.1, the ambient air quality monitoring data collected at the NAPS monitoring location in Grand Falls-Windsor in 2016-2017, for those air contaminants of interest to the Project, were below applicable ambient air quality standards in NL.

In addition to the NAPS data presented above, according to the Newfoundland and Labrador 2018 Ambient Air Quality Report, there were no measured concentrations that exceeded the NL Ambient Air Quality Standards (NL AAQS) (for SO_2, NO_2 or CO) or the federal Canadian Ambient Air Quality Standards (CAAQS) (for $PM_{2.5}$ – 27 ug/m^3) in 2018 at the Grand Falls-Windsor NAPS station (NLDMAE 2019).

The results of the ambient air quality monitoring conducted within the Project Area in June 2020 for TSP, PM_{10} and speciated metals are presented in Table 4.2.

Table 4.2 Ambient Air Quality Monitoring Survey Results for TSP, PM_{10} and Metals within the Project Area, June 2020

Parameter	NL AAQS (µg/m^3)	Monitoring Results (24-hour Concentrations (µg/m^3)		
		June 15-16, 2020	June 16-17, 2020	June 17-18, 2020
Total Suspended Particulate Matter (TSP)	120	5.1	8.6	13.8
Particulate Matter less than 10 Microns (PM_{10})	50	5.1	7.5	13
Metals				
Total Aluminum (Al)	-	<0.084	0.087	0.17
Total Antimony (Sb)	-	<0.0021	<0.0021	<0.0021
Total Arsenic (As)	0.3	<0.0021	<0.0021	<0.0021
Total Barium (Ba)	-	<0.0021	<0.0021	<0.0021
Total Beryllium (Be)	-	<0.0013	<0.0012	<0.0012
Total Bismuth (Bi)	-	<0.0021	<0.0021	<0.0021
Total Boron (B)	-	<0.042	<0.042	<0.042
Total Cadmium (Cd)	-	<0.00042	<0.00042	<0.00042
Total Calcium (Ca)	2.0	<0.21	0.21	0.24
Total Chromium (Cr)	-	<0.0021	<0.0021	<0.0021
Total Cobalt (Co)	-	<0.0013	<0.0012	<0.0012
Total Copper (Cu)	50	<0.0013	<0.0012	<0.0012
Total Iron (Fe)	-	<0.21	<0.21	<0.21
Total Lead (Pb)	2.0	<0.0013	<0.0012	<0.0012
Total Magnesium (Mg)	-	<0.042	0.050	0.11
Total Manganese (Mn)	-	0.0031	0.0032	0.0070
Total Molybdenum (Mo)	-	<0.0013	<0.0012	<0.0012
Total Nickel (Ni)	2.0	<0.0021	<0.0021	<0.0021
Total Potassium (K)	-	<0.21	<0.21	<0.21
Total Selenium (Se)	-	<0.0042	<0.0042	<0.0042
Total Silver (Ag)	-	<0.00042	<0.00042	<0.00042
Total Sodium (Na)	-	<0.21	<0.21	0.44

Table 4.2 Ambient Air Quality Monitoring Survey Results for TSP, PM_{10} and Metals within the Project Area, June 2020

Parameter	NL AAQS ($\mu g/m^3$)	Monitoring Results (24-hour Concentrations ($\mu g/m^3$)		
		June 15-16, 2020	June 16-17, 2020	June 17-18, 2020
Total Strontium (Sr)	-	<0.0021	<0.0021	<0.0021
Total Thallium (Tl)	-	<0.00042	<0.00042	<0.00042
Total Tin (Sn)	-	<0.0013	<0.0012	<0.0012
Total Titanium (Ti)	-	<0.0042	<0.0042	0.0043
Total Uranium (U)	-	<0.00042	<0.00042	<0.00042
Total Vanadium (V)	2.0	<0.0013	<0.0012	<0.0012
Total Zinc (Zn)	120	<0.021	<0.021	<0.021
Note:"<" indicates analysis below the reportable detection limit "-"indicates no applicable criteria in the province of NL				

The 24-hour measured concentrations of TSP, PM_{10} and metals were well below applicable ambient air quality criteria in NL. Measured concentrations of particulate matter (TSP and PM_{10}) ranged from 5.1 $\mu g/m^3$ to 13.8 $\mu g/m^3$ and the concentrations of TSP and PM_{10} were consistent, suggesting that the existing particulate matter within the Study Area is made up mostly of PM_{10}. Metals detected in the samples include aluminum, calcium, magnesium, manganese, sodium and titanium; the measured concentrations were below the regulatory standards where they exist. The remaining metals that were sampled were not detected above the analytical method reportable detection limits.

The results of the ambient air quality monitoring conducted within the Project Area in June 2020 for NO_2 and SO_2 are presented in Table 4.3.

Table 4.3 Ambient Air Quality Monitoring Survey Results for SO_2 and NO_2 within the Project Area, June 2020

Parameter	Monitoring Results, Concentration over Monitoring Period, June 15 – 19, 2020 ($\mu g/m^3$)	Monitoring Results, Converted to an estimated24-hour Concentration* ($\mu g/m^3$)	NL AAQS ($\mu g/m^3$)
Sulphur Dioxide (SO_2)	2.62	3.84	300
Nitrogen Dioxide (NO_2)	<0.188	0.276	200
Notes: *Measured concentrations were converted to an estimated 24-hour concentration using guidance published in the "Air Dispersion Modelling Guideline for Ontario" (OMECC 2017)			

The measured concentrations of SO_2 and NO_2 were below applicable ambient air quality criteria in NL and were consistent with data measured through NAPS at the Grand Falls-Windsor monitoring station.

The laboratory analysis certificate reports for the air quality monitoring survey are included in Appendix B.

The following Project activities were being carried out during the time of monitoring:

- Exploration drilling within the mine site, approximately 15 km from the ambient air monitoring equipment, on June 16, 17 and 18, 2020
- Tree trimming approximately 500 m from the ambient air monitoring equipment on June 17, 2020

In summary, the measured baseline concentrations are consistent with other data measured near the Project Area (i.e., within Grand Falls-Windsor). Concentrations are deemed representative of the background ambient air quality at the Project Area and within the Study Area, and do not seem to have been affected by the limited exploration and tree trimming activity occurring within the mine site and near the monitoring equipment during the baseline ambient air quality survey.

4.2 GREENHOUSE GASES

As noted above, there are no large industrial emission sources located within the Study Area.

Provincial and national GHG emissions (ECCC 2020) are presented in **Error! Reference source not found.** for the latest year for which data has been published (2018). The provincial NL GHG emissions accounted for 1.5% of the national GHG emissions. An overview of historical provincial and national GHG emissions, as well as emissions from the mining industry, are presented in Table 4.5.

Table 4.4 Provincial and National GHG Emissions (2018)

Parameter	Units	CO_2	CH_4	N_2O	Other GHGs [a] (expressed as CO_{2e})	Total (expressed as CO_{2e})
NL GHG Emissions	kt CO_{2e} /y	9,780	900	140	192	11,000
National GHG Emissions	kt CO_{2e} /y	587,000	91,000	38,000	13,930	729,000
NL contribution to National GHG Emissions	%	1.7%	0.99	0.4%	1.4%	1.5%

Note:
kt CO_{2e} /y kilotonnes of CO_2 equivalent per year
[a] Other GHGs include sulphur hexafluoride, hydrofluorocarbons, perfluorocarbons and nitrogen trifluoride.
Source: ECCC NIR (ECCC 2020)

Table 4.5 Historical Provincial, National and Mining GHG Emissions (2013 – 2018)

Parameter	Units	2013	2014	2015	2016	2017	2018
NL GHG Emissions	kt CO_{2e} /y	10,000	11,000	11,000	11,000	11,000	11,000
National GHG Emissions	kt CO_{2e} /y	721,000	721,000	720,000	706,000	714,000	729,000
NL contribution to National GHG Emissions	%	1.39	1.53	1.53	1.56	1.54	1.51
National Mining Industry GHG Emissions	kt CO_{2e} /y	5,400	5,100	4,600	4,300	4,700	4,900
National Mining Industry Contribution to National GHG Emissions	%	0.75	0.71	0.64	0.61	0.66	0.67

Note:
kt CO_{2e} /y kilotonnes of CO_2 equivalent per year
Source: ECCC 2020

As presented above in Tables 4.4 and 4.5, GHG emissions from NL currently represent a small fraction (approximately 1.5%) of the national reported emissions considering both current and historical data. As well, the national GHG emissions from the mining industry represent a small fraction of the national GHG emissions, ranging from 0.61 % to 0.75 % from 2013 to 2018.

4.3 SOUND QUALITY

The mine site is in a remote area with very limited human activity (except for the limited exploration activities around the mine site), and no substantive anthropogenic noise sources occur within 50 km. The mine site is located approximately 49 km southwest of the Town of Buchans and 60 km southwest of the Town of Millertown. Within the Study Area, there are approximately 35 seasonal dwellings (three active outfitters, 2 inactive outfitters and 30 cabins), which represent the nearest sensitive receptors to the Project (Figure 2-1).

A baseline sound quality monitoring survey was conducted in June 2020. The hourly sound pressure levels measured during the baseline survey are presented in Table 4.6, and a summary of the daytime sound level (L_d), nighttime sound level (L_n), the day-night average sound level (L_{dn}), and percent highly annoyed (%HA) values for baseline conditions are presented in Table 4.7. Values for L_d, L_n, L_{dn} and %HA were calculated for only those monitoring days where a full set of data (i.e., midnight to midnight) was collected, June 16 and 17, 2020.

Table 4.6 Measured Hourly Equivalent Sound Pressure Levels (1-hr L_{eq}, dBA) within the Project Area, June 2020

Time of Day	Hourly Equivalent Sound Pressure Level (1-hr, L_{eq})			
	Day 1 – June 15	Day 2 – June 16	Day 3 – June 17	Day 4 – June 18
0:00	-	32.1	31.4	39.3
1:00	-	32.0	33.6	39.9
2:00	-	32.3	34.7	37.6

Table 4.6 Measured Hourly Equivalent Sound Pressure Levels (1-hr L_{eq}, dBA) within the Project Area, June 2020

Time of Day	Hourly Equivalent Sound Pressure Level (1-hr, L_{eq})			
	Day 1 – June 15	Day 2 – June 16	Day 3 – June 17	Day 4 – June 18
3:00	-	31.7	34.7	38.7
4:00	-	46.5	45.5	55.0
5:00	-	43.3	40.0	53.4
6:00	-	40.8	42.3	51.4
7:00	-	40.8	34.6	42.8
8:00	-	43.9	37.3	43.5
9:00	-	41.9	42.8	44.0
10:00	-	37.1	44.8	41.9
11:00	-	43.8	42.8	43.2
12:00	-	42.0	45.8	48.2
13:00	-	41.6	47.1	43.7
14:00	-	46.9	47.9	41.3
15:00	-	46.5	46.0	39.9
16:00	-	47.6	46.0	42.4
17:00	-	47.7	48.3	41.5
18:00	36.3	48.1	43.9	-
19:00	37.9	42.2	42.3	-
20:00	36.5	36.6	40.5	-
21:00	38.3	39.2	33.9	-
22:00	33.6	38.4	32.3	-
23:00	31.9	33.3	31.0	-

Note:
Winds ranged from light to moderate during the sound survey, and there was no precipitation
"-" denotes no data available; Monitoring was initiated on the evening of June 15 and commenced on the morning of June 19. However, due to a malfunction of the sound pressure level meter no data was collected on the evening of June 18 or morning of June 19.

Table 4.7 Baseline L_d, L_n, L_{dn}, and %HA Values

Parameter	Day 2 – June 16	Day 3 – June 17
Daytime Sound Level, L_d (dBA)	44.4	44.6
Nighttime Sound Level L_n (dBA)	39.6	38.1
Day Night Average Sound Level (dBA)	47.4	46.9
Baseline Percent Highly Annoyed (%HA)	1.57	1.47

The baseline L_d, L_n, L_{dn}, and %HA values are representative of a quiet, rural area, with limited to no existing sources of noise, and are consistent with Health Canada's approximate values for estimating baseline sound levels for a quiet rural area (i.e., L_{dn} 45 dBA or less) (Health Canada 2017).

As noted above (Section 4.1), limited activities related to the Project (i.e., exploration drilling and tree trimming) were occurring within the Project Area, near the mine site, and near the monitoring equipment, when the baseline sound quality survey was conducted. However, based on the values measured and the distances from the monitoring equipment to the location of activity, it is not likely that the sound associated with these activities impacted the baseline sound quality survey.

4.4 LIGHTING

The mine site is located approximately 49 km southwest of the Town of Buchans and 60 km southwest of the Town of Millertown (refer to Figure 1-1). There are no communities, residential receptors or major roadways located within the Study Area. There are approximately 35 seasonal cabins/outfitter locations located within the Study Area.

Error! Reference source not found. shows the distribution of artificial light surrounding the Project Area (Interactive world light pollution map based on the NOAA / EOG overlay 2015, World Atlas 2015). As can be seen in **Error! Reference source not found.**, there are essentially no existing sources of artificial light contributing to the existing ambient light environment within the Project Area. The sky glow levels within these areas are 22.0 mag/arc sec^2. Sky glow levels in this range are representative of an unpolluted starry sky, where, on clear nights with no haze, many thousands of stars would be visible and the Milky Way would be clearly visible (Berry 1976; United States Department of Energy (U.S. DOE) 2017).

The results of the ambient light monitoring field survey, conducted in June 2020, for sky glow were similar to the values presented on the satellite imaginary and ranged from 21.84 to 22.81 mag/arc sec^2. Field measurements of incident light were less than 0.01 lux.

The baseline light measurements taken in June occurred during clear skies when the moon was not in the sky. Incident light levels are not sensitive to seasonal variation, and sky glow typically varies by 0.2 mag/arcsec^2 depending on the season (Patat 2007). Sky glow is usually dominated by other factors, including anthropogenic light, celestial objects (e.g., the moon) and meteorological conditions (e.g., cloud cover).

Based on the ambient light levels (both sky glow and light trespass), the Project Area and surrounding environment can be considered a dark, rural area (environmental zone, Category E1) according to the International Commission on Illumination (CIE 2017).

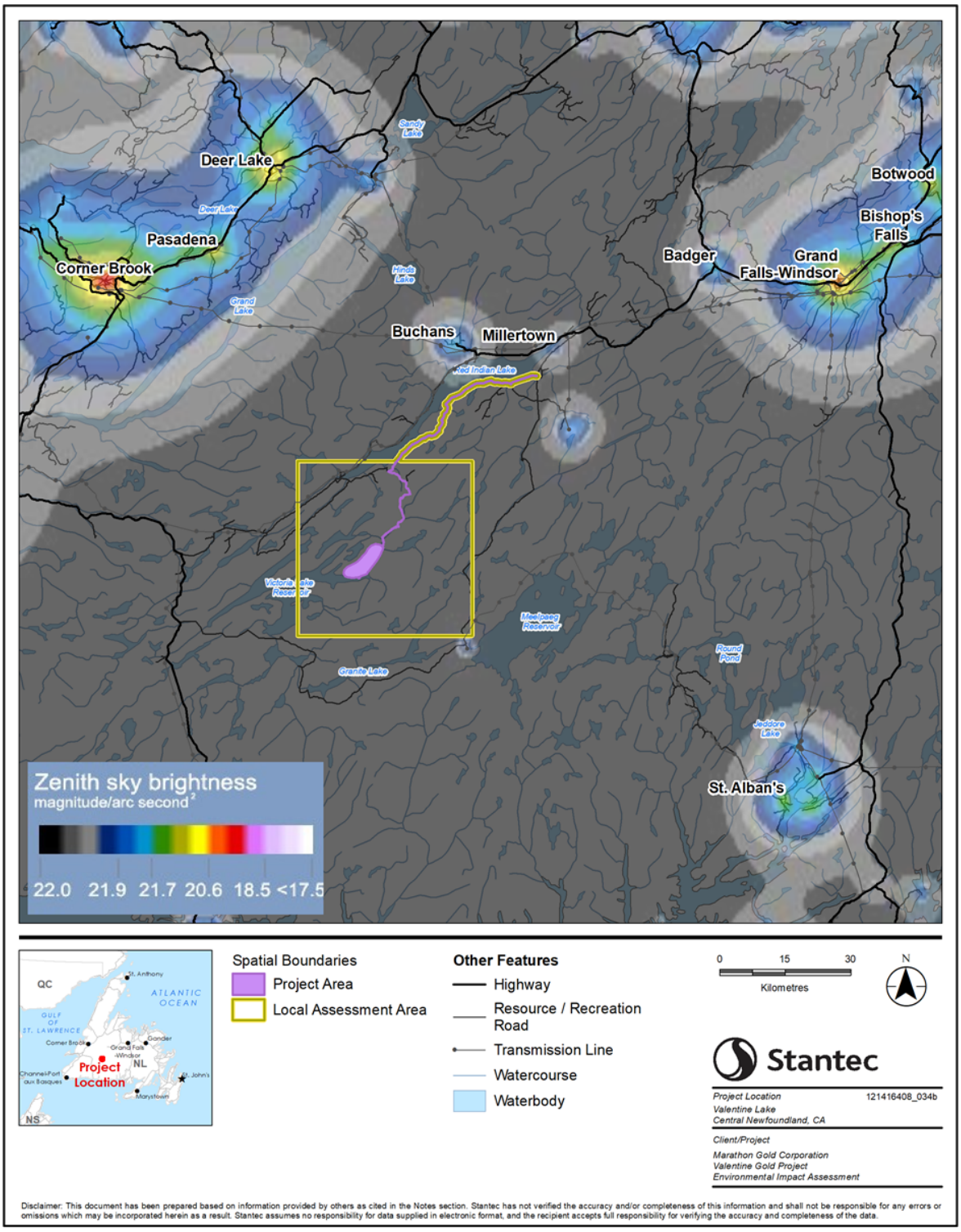

Figure 4-1 Distribution of Artificial Light Within and Surrounding the Project Area

5.0 SUMMARY

In summary, the existing air quality, sound quality and lighting within the Project Area and Study Area are representative of rural, uninhabited areas, with limited to no existing sources of atmospheric emissions.

The GHGs released to the atmosphere from the mining industry on a national level represent approximately 0.6% of the national total. The GHGs released to the atmosphere within NL, considering each industrial sector, represent approximately 1.5% of the national total.

6.0 CLOSURE

This report has been prepared by Stantec for the sole benefit of Marathon Gold Corporation. The report may not be relied upon by any other person, entity, other than for its intended purposes, without the express written consent of Stantec. This report was undertaken exclusively for the purpose outlined herein and is limited to the scope and purpose specifically expressed in this report. This report cannot be used or applied under any circumstances to another location or situation or for any other purpose without further evaluation of the data and related limitations. This report presents the best professional judgment of Stantec personnel available at the time of its preparation. Stantec reserves the right to modify the contents of this report, in whole or in part, to reflect any new information that becomes available.

The report was prepared by Gillian Hatcher, M.A.Sc. and quality reviewed by Mike Murphy, PhD, P.Eng. Independent review was conducted by Vicki Corning, P.Eng..

7.0 REFERENCES

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APPENDIX A

Calibration Records

INSTRUMENT CALIBRATION REPORT

Pine Environmental Services LLC

6580 Kestrel Road
Mississauga, ONTARIO L5T 2C8
Toll-free: (866) 688-0388

Pine Environmental Services, Inc.

Instrument ID 17701
Description BGI PQ100 Air Sampling System
Calibrated 5/22/2020 8:52:34AM

Manufacturer BGI
Model Number PQ100
Serial Number/ Lot Number 0962
Location Ontario
Department

State Certified
Status Pass
Temp °C 22
Humidity % 30

Calibration Specifications

Group # 1
Group Name Functionality Test
Test Performed: Yes **As Found Result: Pass** **As Left Result: Pass**

Test Instruments Used During the Calibration **(As Of Cal Entry Date)**

Test Standard ID	Description	Manufacturer	Model Number	Serial Number / Lot Number	Last Cal Date/ Opened Date	Next Cal Date / Expiration Date

Notes about this calibration

Calibration Result Calibration Successful
Who Calibrated Vick Nathan

All instruments are calibrated by Pine Environmental Services LLC according to the manufacturer's specifications, but it is the customer's responsibility to calibrate and maintain this unit in accordance with the manufacturer's specifications and/or the customer's own specific needs.

Notify Pine Environmental Services LLC of any defect within 24 hours of receipt of equipment
Please call 800-301-9663 for Technical Assistance

INSTRUMENT CALIBRATION REPORT

Pine Environmental Services LLC

6580 Kestrel Road
Mississauga, ONTARIO L5T 2C8
Toll-free: (866) 688-0388

Pine Environmental Services, Inc.

Instrument ID R12263
Description BGI Delta Cal
Calibrated 6/8/2020 10:19:39AM

Manufacturer BGI
Model Number Deltacal
Serial Number/ Lot Number 968
Location Ontario
Department

State Certified
Status Pass
Temp °C 23
Humidity % 55

Calibration Specifications

Group # 1
Group Name Functionality test
Test Performed: Yes **As Found Result: Pass** **As Left Result: Pass**

Test Instruments Used During the Calibration **(As Of Cal Entry Date)**

Test Standard ID	Description	Manufacturer	Model Number	Serial Number / Lot Number	Last Cal Date/ Opened Date	Next Cal Date / Expiration Date

Notes about this calibration

Calibration Result Calibration Successful
Who Calibrated Vick Nathan

All instruments are calibrated by Pine Environmental Services LLC according to the manufacturer's specifications, but it is the customer's responsibility to calibrate and maintain this unit in accordance with the manufacturer's specifications and/or the customer's own specific needs.

Notify Pine Environmental Services LLC of any defect within 24 hours of receipt of equipment
Please call 800-301-9663 for Technical Assistance

INSTRUMENT CALIBRATION REPORT

Pine Environmental Services LLC

6580 Kestrel Road
Mississauga, ONTARIO L5T 2C8
Toll-free: (866) 688-0388

Pine Environmental Services, Inc.

Instrument ID R12342
Description BGI PQ100 Air Sampling System
Calibrated 5/22/2020 8:52:09AM

Manufacturer BGI
Model Number PQ100
Serial Number/ Lot Number 0841
Location Ontario
Department

State Certified
Status Pass
Temp °C 22
Humidity % 30

Calibration Specifications

Group # 1
Group Name Flow test with Deltacal
Test Performed: Yes **As Found Result: Pass** **As Left Result: Pass**

Test Instruments Used During the Calibration **(As Of Cal Entry Date)**

Test Standard ID	Description	Manufacturer	Model Number	Serial Number / Lot Number	Last Cal Date/ Opened Date	Next Cal Date / Expiration Date

Notes about this calibration

Calibration Result Calibration Successful
Who Calibrated Vick Nathan

All instruments are calibrated by Pine Environmental Services LLC according to the manufacturer's specifications, but it is the customer's responsibility to calibrate and maintain this unit in accordance with the manufacturer's specifications and/or the customer's own specific needs.

Notify Pine Environmental Services LLC of any defect within 24 hours of receipt of equipment
Please call 800-301-9663 for Technical Assistance

Calibration Certificate

Certificate Number 2020002608

Customer:

The Modal Shop
3149 East Kemper Road
Cincinnati, OH 45241, United States

Model Number	831C	***Procedure Number***	D0001.8378		
Serial Number	10702	***Technician***	Jason Grace		
Test Results	**Pass**	***Calibration Date***	26 Feb 2020		
Initial Condition	AS RECEIVED same as shipped	***Calibration Due***			
		Temperature	23.62	°C	± 0.25 °C
Description	Larson Davis Model 831C Class 1 Sound Level Meter Firmware Revision: 04.0.8R0	***Humidity***	50.8	%RH	± 2.0 %RH
		Static Pressure	87.27	kPa	± 0.13 kPa

Evaluation Method Tested electrically using Larson Davis PRM831 S/N 051284 and a 12.0 pF capacitor to simulate microphone capacitance. Data reported in dB re 20 µPa assuming a microphone sensitivity of 50.0 mV/Pa.

Compliance Standards Compliant to Manufacturer Specifications and the following standards when combined with Calibration Certificate from procedure D0001.8384:

IEC 60651:2001 Type 1	ANSI S1.4-2014 Class 1
IEC 60804:2000 Type 1	ANSI S1.4 (R2006) Type 1
IEC 61672:2013 Class 1	ANSI S1.43 (R2007) Type 1
IEC 61260:2014 Class 1	ANSI S1.11-2014 Class 1

Issuing lab certifies that the instrument described above meets or exceeds all specifications as stated in the referenced procedure (unless otherwise noted). It has been calibrated using measurement standards traceable to the International System of Units (SI) through the National Institute of Standards and Technology (NIST), or other national measurement institutes, and meets the requirements of ISO/IEC 17025:2005. **Test points marked with a ‡ in the uncertainties column do not fall within this laboratory's scope of accreditation.**

The quality system is registered to ISO 9001:2015.

This calibration is a direct comparison of the unit under test to the listed reference standards and did not involve any sampling plans to complete. No allowance has been made for the instability of the test device due to use, time, etc. Such allowances would be made by the customer as needed.

The uncertainties were computed in accordance with the ISO Guide to the Expression of Uncertainty in Measurement (GUM). A coverage factor of approximately 2 sigma (k=2) has been applied to the standard uncertainty to express the expanded uncertainty at approximately 95% confidence level.

Correction data from Larson Davis SoundAdvisor Model 831C Reference Manual, I831C.01 Rev M, 2019-09-10

Calibration Check Frequency: 1000 Hz; Reference Sound Pressure Level: 114 dB re 20 µPa; Reference Range: 0 dB gain

Periodic tests were performed in accordance with precedures from IEC 61672-3:2013 / ANSI/ASA S1.4-2014/Part3.

LARSON DAVIS - A PCB PIEZOTRONICS DIV.
1681 West 820 North
Provo, UT 84601, United States
716-684-0001

ACCREDITED Cert. #3622.01

LARSON DAVIS
A PCB PIEZOTRONICS DIV.

No Pattern approval for IEC 61672-1:2013 / ANSI/ASA S1.4-2014/Part 1 available.

The sound level meter submitted for testing successfully completed the periodic tests of IEC 61672-3:2013 / ANSI/ASA S1.4-2014/Part 3, 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 / ANSI/ASA S1.4-2014/Part 1 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 / ANSI/ASA S1.4-2014/Part 1 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 / ANSI/ASA S1.4-2014/Part 3 cover only a limited subset of the specifications in IEC 61672-1:2013 / ANSI/ASA S1.4-2014/Part 1.

Periodic tests were performed in accordance with precedures from IEC 61260-3:2016 Part 3 and ANSI/ASA S1.11-2016 Part 3.

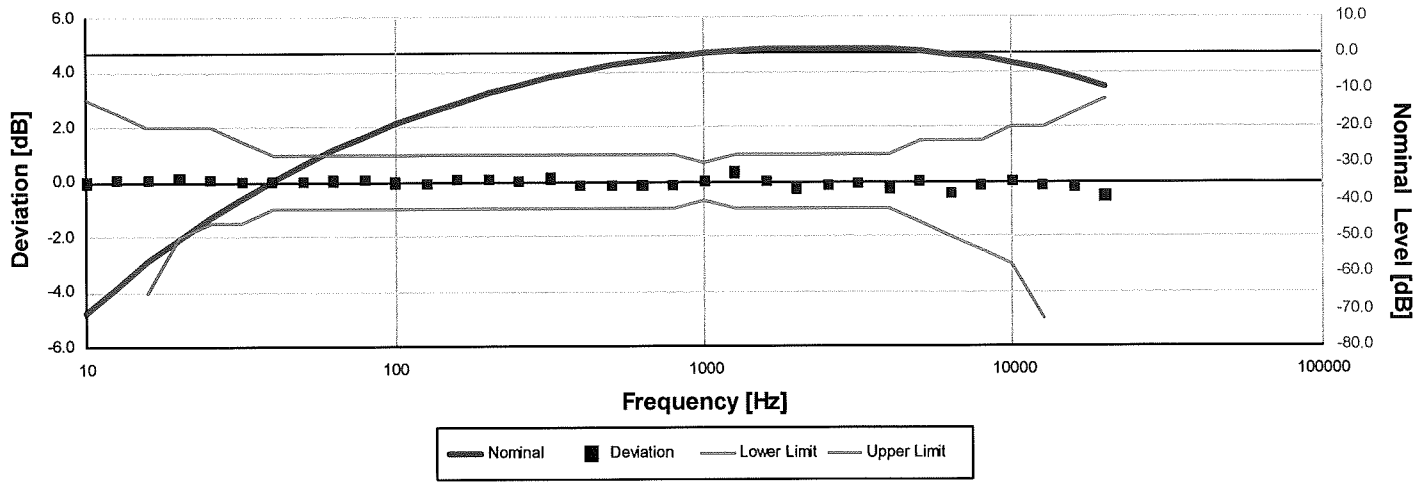
No Pattern approval for IEC 61260-1:2014 Part 1 and ANSI/ASA S1.11-2014 Part 1 available.

The filter submitted for testing successfully completed the periodic tests of IEC 61260-3:2016 Part 3 and ANSI/ASA S1.11-2016 Part 3, for the environmental conditions under which the tests were performed. However, no general statement or conclusion can be made about conformance of the filter to the full specifications of IEC 61260-1:2014 Part 1 and ANSI/ASA S1.11-2014 Part 1 because (a) evidence was not publicly available, from an independent testing organization responsible for pattern approvals, to demonstrate that the model of filter fully conformed to the class 1 specifications in IEC 61260-1:2014 Part 1 and ANSI/ASA S1.11-2014 Part 1 and (b) because the periodic tests of IEC 61260-3:2016 Part 3 and ANSI/ASA S1.11-2016 Part 3 cover only a limited subset of the specifications in IEC 61260-1:2014 Part 1 and ANSI/ASA S1.11-2014 Part 1.

Standards Used

Description	Cal Date	Cal Due	Cal Standard
Hart Scientific 2626-S Humidity/Temperature Sensor	2019-07-18	2020-07-18	006946
SRS DS360 Ultra Low Distortion Generator	2020-01-24	2021-01-24	007710

A-weight Filter Response

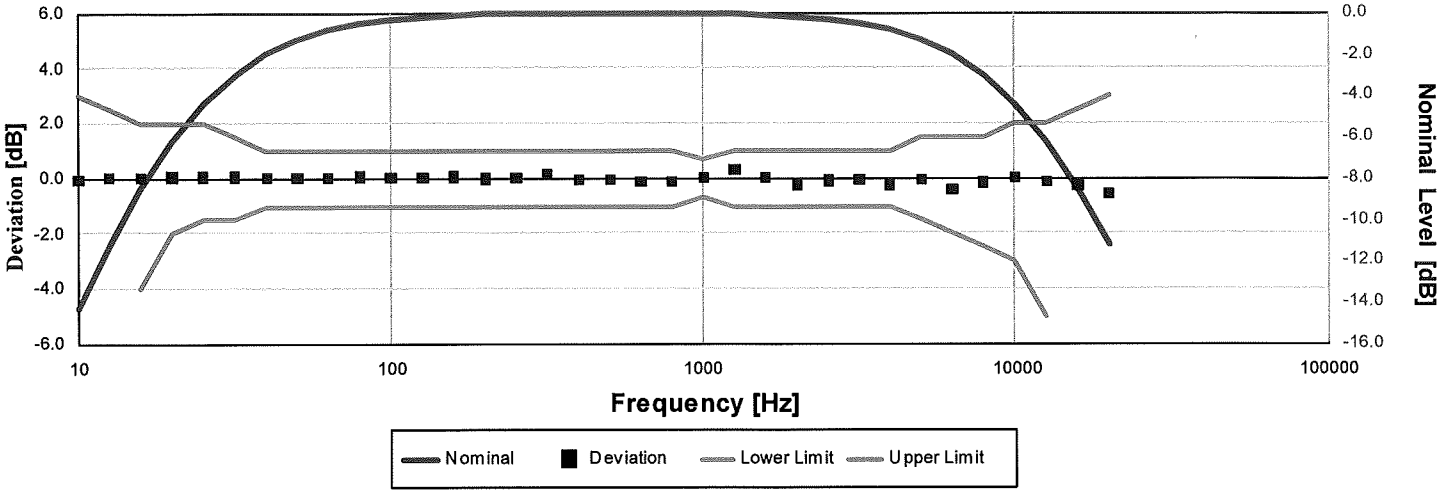


Electrical signal test of frequency weighting performed according to IEC 61672-3:2013 13 and ANSI S1.4-2014 Part 3: 13 for compliance to IEC 61672-1:2013 5.5; IEC 60651:2001 6.1 and 9.2.2; IEC 60804:2000 5; ANSI S1.4:1983 (R2006) 5.1 and 8.2.1; ANSI S1.4-2014 Part 1: 5.5

Frequency [Hz]	Test Result [dB]	Deviation [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
10.00	-70.43	-0.03	-inf	3.00	0.25	Pass
12.59	-63.32	0.08	-inf	2.50	0.25	Pass
15.85	-56.63	0.07	-4.00	2.00	0.25	Pass
19.95	-50.36	0.14	-2.00	2.00	0.25	Pass
25.12	-44.64	0.06	-1.50	2.00	0.25	Pass
31.62	-39.37	0.03	-1.50	1.50	0.25	Pass
39.81	-34.60	0.00	-1.00	1.00	0.25	Pass
50.12	-30.19	0.01	-1.00	1.00	0.25	Pass
63.10	-26.16	0.04	-1.00	1.00	0.25	Pass
79.43	-22.44	0.06	-1.00	1.00	0.25	Pass
100.00	-19.13	-0.03	-1.00	1.00	0.25	Pass
125.89	-16.14	-0.04	-1.00	1.00	0.25	Pass
158.49	-13.32	0.08	-1.00	1.00	0.25	Pass
199.53	-10.85	0.05	-1.00	1.00	0.25	Pass
251.19	-8.60	0.00	-1.00	1.00	0.25	Pass
316.23	-6.48	0.12	-1.00	1.00	0.25	Pass
398.11	-4.92	-0.12	-1.00	1.00	0.25	Pass
501.19	-3.33	-0.13	-1.00	1.00	0.25	Pass
630.96	-2.05	-0.15	-1.00	1.00	0.25	Pass
794.33	-0.95	-0.15	-1.00	1.00	0.25	Pass
1,000.00	0.00	0.00	-0.70	0.70	0.25	Pass
1,258.93	0.93	0.33	-1.00	1.00	0.25	Pass
1,584.89	0.99	-0.01	-1.00	1.00	0.25	Pass
1,995.26	0.93	-0.27	-1.00	1.00	0.25	Pass
2,511.89	1.18	-0.12	-1.00	1.00	0.25	Pass
3,162.28	1.14	-0.06	-1.00	1.00	0.25	Pass
3,981.07	0.75	-0.25	-1.00	1.00	0.25	Pass
5,011.87	0.48	-0.02	-1.50	1.50	0.25	Pass
6,309.57	-0.54	-0.44	-2.00	1.50	0.25	Pass
7,943.28	-1.27	-0.17	-2.50	1.50	0.25	Pass
10,000.00	-2.49	0.01	-3.00	2.00	0.25	Pass
12,589.25	-4.42	-0.12	-5.00	2.00	0.25	Pass
15,848.93	-6.82	-0.22	-16.00	2.50	0.25	Pass
19,952.62	-9.84	-0.54	-inf	3.00	0.25	Pass

-- End of measurement results--

C-weight Filter Response

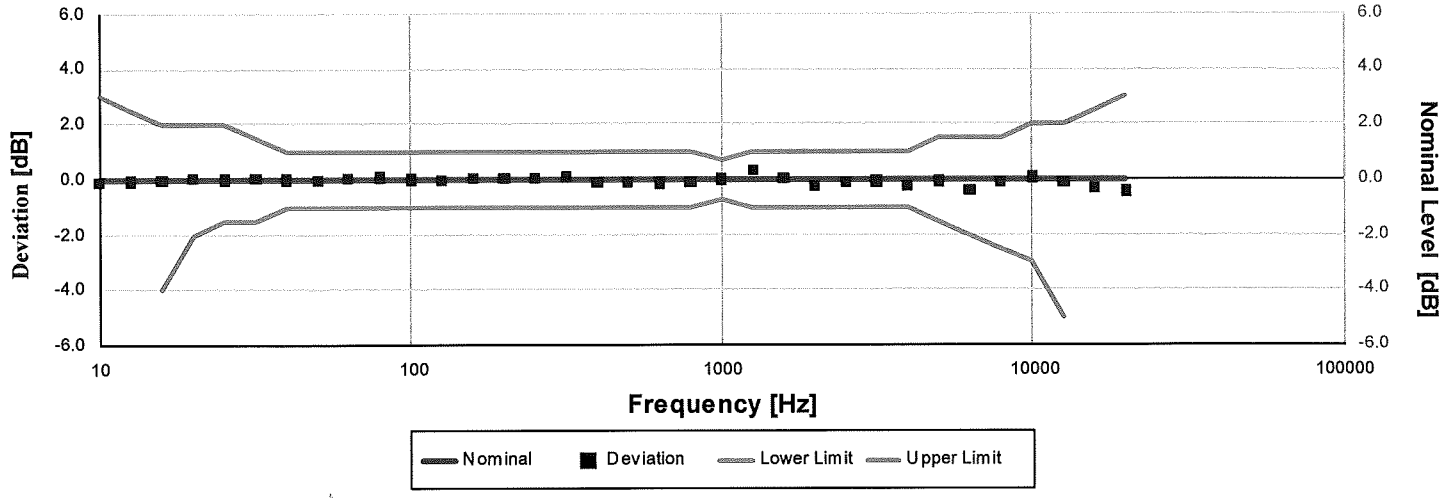


Electrical signal test of frequency weighting performed according to IEC 61672-3:2013 13 and ANSI S1.4-2014 Part 3: 13 for compliance to IEC 61672-1:2013 5.5; IEC 60651:2001 6.1 and 9.2.2; IEC 60804:2000 5; ANSI S1.4:1983 (R2006) 5.1 and 8.2.1; ANSI S1.4-2014 Part 1: 5.5

Frequency [Hz]	Test Result [dB]	Deviation [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
10.00	-14.34	-0.04	-inf	3.00	0.25	Pass
12.59	-11.21	-0.01	-inf	2.50	0.25	Pass
15.85	-8.49	0.01	-4.00	2.00	0.25	Pass
19.95	-6.14	0.06	-2.00	2.00	0.25	Pass
25.12	-4.35	0.05	-1.50	2.00	0.25	Pass
31.62	-2.95	0.05	-1.50	1.50	0.25	Pass
39.81	-1.96	0.04	-1.00	1.00	0.25	Pass
50.12	-1.30	0.00	-1.00	1.00	0.25	Pass
63.10	-0.79	0.01	-1.00	1.00	0.25	Pass
79.43	-0.44	0.06	-1.00	1.00	0.25	Pass
100.00	-0.27	0.03	-1.00	1.00	0.25	Pass
125.89	-0.21	-0.01	-1.00	1.00	0.25	Pass
158.49	-0.05	0.05	-1.00	1.00	0.25	Pass
199.53	-0.02	-0.02	-1.00	1.00	0.25	Pass
251.19	0.02	0.02	-1.00	1.00	0.25	Pass
316.23	0.15	0.15	-1.00	1.00	0.25	Pass
398.11	-0.08	-0.08	-1.00	1.00	0.25	Pass
501.19	-0.08	-0.08	-1.00	1.00	0.25	Pass
630.96	-0.12	-0.12	-1.00	1.00	0.25	Pass
794.33	-0.11	-0.11	-1.00	1.00	0.25	Pass
1,000.00	0.00	0.00	-0.70	0.70	0.25	Pass
1,258.93	0.31	0.31	-1.00	1.00	0.25	Pass
1,584.89	-0.07	0.03	-1.00	1.00	0.25	Pass
1,995.26	-0.44	-0.24	-1.00	1.00	0.25	Pass
2,511.89	-0.39	-0.09	-1.00	1.00	0.25	Pass
3,162.28	-0.56	-0.06	-1.00	1.00	0.25	Pass
3,981.07	-1.04	-0.24	-1.00	1.00	0.25	Pass
5,011.87	-1.36	-0.06	-1.50	1.50	0.25	Pass
6,309.57	-2.41	-0.41	-2.00	1.50	0.25	Pass
7,943.28	-3.17	-0.17	-2.50	1.50	0.25	Pass
10,000.00	-4.40	0.00	-3.00	2.00	0.25	Pass
12,589.25	-6.34	-0.14	-5.00	2.00	0.25	Pass
15,848.93	-8.75	-0.25	-16.00	2.50	0.25	Pass
19,952.62	-11.77	-0.57	-inf	3.00	0.25	Pass

-- End of measurement results--

Z-weight Filter Response



Electrical signal test of frequency weighting performed according to IEC 61672-3:2013 13 and ANSI S1.4-2014 Part 3: 13 for compliance to IEC 61672-1:2013 5.5; IEC 60651:2001 6.1 and 9.2.2; IEC 60804:2000 5; ANSI S1.4:1983 (R2006) 5.1 and 8.2.1; ANSI S1.4-2014 Part 1: 5.5

Frequency [Hz]	Test Result [dB]	Deviation [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
10.00	-0.13	-0.13	-inf	3.00	0.25	Pass
12.59	-0.08	-0.08	-inf	2.50	0.25	Pass
15.85	-0.04	-0.04	-4.00	2.00	0.25	Pass
19.95	0.02	0.02	-2.00	2.00	0.25	Pass
25.12	0.00	0.00	-1.50	2.00	0.25	Pass
31.62	0.03	0.03	-1.50	1.50	0.25	Pass
39.81	0.00	0.00	-1.00	1.00	0.25	Pass
50.12	-0.02	-0.02	-1.00	1.00	0.25	Pass
63.10	0.01	0.01	-1.00	1.00	0.25	Pass
79.43	0.06	0.06	-1.00	1.00	0.25	Pass
100.00	-0.01	-0.01	-1.00	1.00	0.25	Pass
125.89	-0.05	-0.05	-1.00	1.00	0.25	Pass
158.49	0.03	0.03	-1.00	1.00	0.25	Pass
199.53	0.01	0.01	-1.00	1.00	0.25	Pass
251.19	0.03	0.03	-1.00	1.00	0.25	Pass
316.23	0.13	0.13	-1.00	1.00	0.25	Pass
398.11	-0.10	-0.10	-1.00	1.00	0.25	Pass
501.19	-0.10	-0.10	-1.00	1.00	0.25	Pass
630.96	-0.15	-0.15	-1.00	1.00	0.25	Pass
794.33	-0.13	-0.13	-1.00	1.00	0.25	Pass
1,000.00	0.00	0.00	-0.70	0.70	0.25	Pass
1,258.93	0.34	0.34	-1.00	1.00	0.25	Pass
1,584.89	0.01	0.01	-1.00	1.00	0.25	Pass
1,995.26	-0.28	-0.28	-1.00	1.00	0.25	Pass
2,511.89	-0.10	-0.10	-1.00	1.00	0.25	Pass
3,162.28	-0.07	-0.07	-1.00	1.00	0.25	Pass
3,981.07	-0.24	-0.24	-1.00	1.00	0.25	Pass
5,011.87	-0.09	-0.09	-1.50	1.50	0.25	Pass
6,309.57	-0.42	-0.42	-2.00	1.50	0.25	Pass
7,943.28	-0.13	-0.13	-2.50	1.50	0.25	Pass
10,000.00	0.06	0.06	-3.00	2.00	0.25	Pass
12,589.25	-0.09	-0.09	-5.00	2.00	0.25	Pass
15,848.93	-0.35	-0.35	-16.00	2.50	0.25	Pass
19,952.62	-0.43	-0.44	-inf	3.00	0.25	Pass

-- End of measurement results--

High Level Stability

Electrical signal test of high level stability performed according to IEC 61672-3:2013 21 and ANSI S1.4-2014 Part 3: 21 for compliance to IEC 61672-1:2013 5.15 and ANSI S1.4-2014 Part 1: 5.15

Measurement	Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
High Level Stability	0.00	-0.10	0.10	0.01 ‡	Pass

-- End of measurement results--

Long-Term Stability

Electrical signal test of long term stability performed according to IEC 61672-3:2013 15 and ANSI S1.4-2014 Part 3: 15 for compliance to ISC 61672-1:2013 5.14 and ANSI S1.4-2014 Part 1: 5.14

Test Duration [min]	Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
35	0.00	-0.10	0.10	0.02 ‡	Pass

-- End of measurement results--

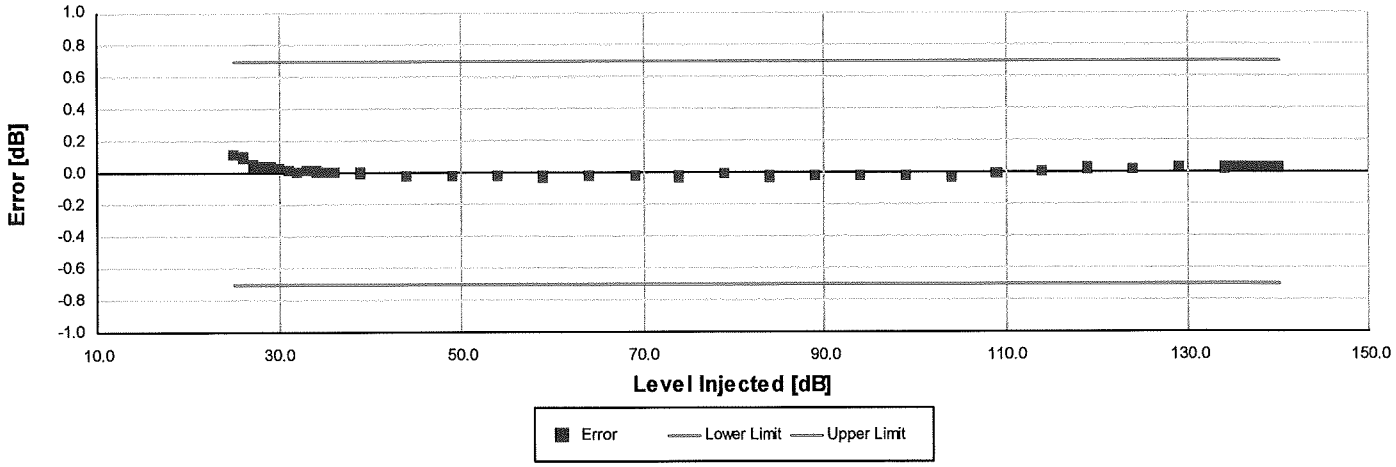
1 kHz Reference Levels

Frequency weightings and time weightings at 1 kHz (reference is A weighted Fast) performed according to IEC 61672-3:2013 14 and ANSI S1.4-2014 Part 3: 14 for compliance to IEC 61672-1:2013 5.5.9 and 5.8.3 and ANSI S1.4-2014 Part 1: 5.5.9 and 5.8.3

Measurement	Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
C weight	114.01	113.81	114.21	0.15	Pass
Z weight	114.00	113.81	114.21	0.15	Pass
Slow	114.01	113.91	114.11	0.15	Pass
Impulse	114.01	113.91	114.11	0.15	Pass

-- End of measurement results--

A-weighted 0 dB Gain Broadband Log Linearity: 8,000.00 Hz



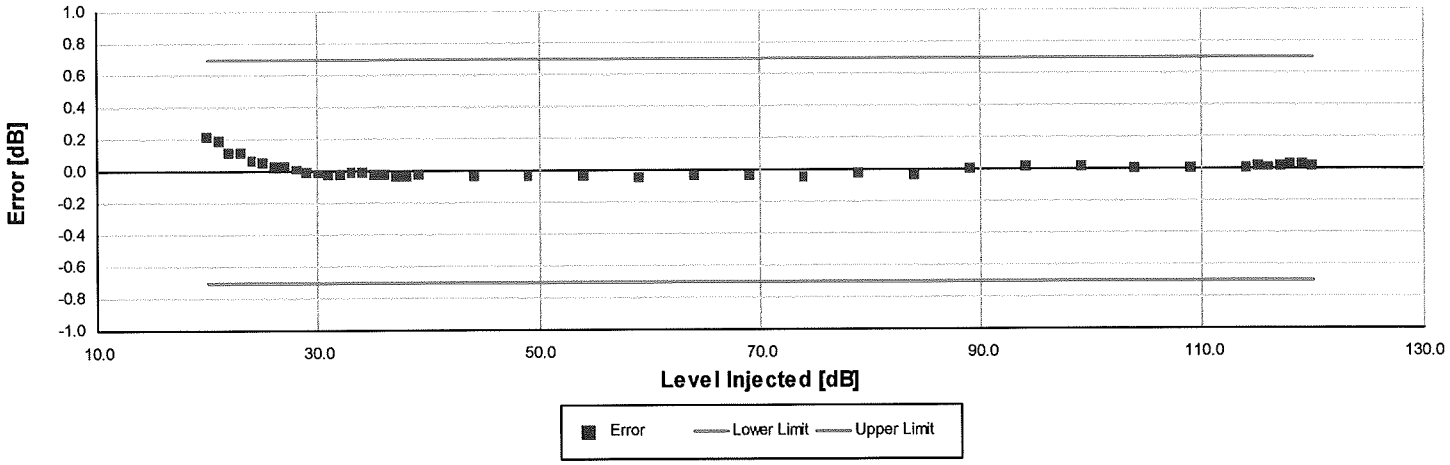
Broadband level linearity performed according to IEC 61672-3:2013 16 and ANSI S1.4-2014 Part 3: 16 for compliance to IEC 61672-1:2013 5.6, IEC 60804:2000 6.2, IEC 61252:2002 8, ANSI S1.4 (R2006) 6.9, ANSI S1.4-2014 Part 1: 5.6, ANSI S1.43 (R2007) 6.2

Level [dB]	Error [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
25.00	0.11	-0.70	0.70	0.16	Pass
26.00	0.10	-0.70	0.70	0.16	Pass
27.00	0.05	-0.70	0.70	0.16	Pass
28.00	0.04	-0.70	0.70	0.16	Pass
29.00	0.04	-0.70	0.70	0.18	Pass
30.00	0.03	-0.70	0.70	0.17	Pass
31.00	0.02	-0.70	0.70	0.17	Pass
32.00	0.01	-0.70	0.70	0.17	Pass
33.00	0.01	-0.70	0.70	0.16	Pass
34.00	0.01	-0.70	0.70	0.16	Pass
35.00	0.00	-0.70	0.70	0.16	Pass
36.00	0.00	-0.70	0.70	0.16	Pass
39.00	0.00	-0.70	0.70	0.16	Pass
44.00	-0.02	-0.70	0.70	0.16	Pass
49.00	-0.02	-0.70	0.70	0.16	Pass
54.00	-0.01	-0.70	0.70	0.16	Pass
59.00	-0.03	-0.70	0.70	0.16	Pass
64.00	-0.02	-0.70	0.70	0.16	Pass
69.00	-0.02	-0.70	0.70	0.16	Pass
74.00	-0.03	-0.70	0.70	0.16	Pass
79.00	-0.01	-0.70	0.70	0.16	Pass
84.00	-0.03	-0.70	0.70	0.16	Pass
89.00	-0.02	-0.70	0.70	0.16	Pass
94.00	-0.02	-0.70	0.70	0.16	Pass
99.00	-0.02	-0.70	0.70	0.16	Pass
104.00	-0.04	-0.70	0.70	0.15	Pass
109.00	0.00	-0.70	0.70	0.15	Pass
114.00	0.00	-0.70	0.70	0.15	Pass
119.00	0.02	-0.70	0.70	0.15	Pass
124.00	0.01	-0.70	0.70	0.15	Pass
129.00	0.03	-0.70	0.70	0.15	Pass
134.00	0.02	-0.70	0.70	0.15	Pass
135.00	0.03	-0.70	0.70	0.15	Pass
136.00	0.03	-0.70	0.70	0.15	Pass
137.00	0.03	-0.70	0.70	0.15	Pass
138.00	0.03	-0.70	0.70	0.15	Pass

Level [dB]	Error [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
139.00	0.03	-0.70	0.70	0.15	Pass
140.00	0.03	-0.70	0.70	0.15	Pass

-- End of measurement results--

A-weighted 20 dB Gain Broadband Log Linearity: 8,000.00 Hz



Broadband level linearity performed according to IEC 61672-3:2013 16 and ANSI S1.4-2014 Part 3: 16 for compliance to IEC 61672-1:2013 5.6, IEC 60804:2000 6.2, IEC 61252:2002 8, ANSI S1.4 (R2006) 6.9, ANSI S1.4-2014 Part 1: 5.6, ANSI S1.43 (R2007) 6.2

Level [dB]	Error [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
20.00	0.21	-0.70	0.70	0.17	Pass
21.00	0.19	-0.70	0.70	0.16	Pass
22.00	0.12	-0.70	0.70	0.16	Pass
23.00	0.12	-0.70	0.70	0.16	Pass
24.00	0.07	-0.70	0.70	0.16	Pass
25.00	0.05	-0.70	0.70	0.16	Pass
26.00	0.03	-0.70	0.70	0.19	Pass
27.00	0.02	-0.70	0.70	0.18	Pass
28.00	0.01	-0.70	0.70	0.19	Pass
29.00	-0.01	-0.70	0.70	0.18	Pass
30.00	-0.02	-0.70	0.70	0.17	Pass
31.00	-0.03	-0.70	0.70	0.17	Pass
32.00	-0.03	-0.70	0.70	0.17	Pass
33.00	-0.01	-0.70	0.70	0.16	Pass
34.00	-0.01	-0.70	0.70	0.16	Pass
35.00	-0.03	-0.70	0.70	0.16	Pass
36.00	-0.02	-0.70	0.70	0.16	Pass
37.00	-0.03	-0.70	0.70	0.16	Pass
38.00	-0.03	-0.70	0.70	0.16	Pass
39.00	-0.02	-0.70	0.70	0.16	Pass
44.00	-0.04	-0.70	0.70	0.16	Pass
49.00	-0.03	-0.70	0.70	0.16	Pass
54.00	-0.03	-0.70	0.70	0.16	Pass
59.00	-0.04	-0.70	0.70	0.16	Pass
64.00	-0.04	-0.70	0.70	0.16	Pass
69.00	-0.03	-0.70	0.70	0.16	Pass
74.00	-0.04	-0.70	0.70	0.16	Pass
79.00	-0.03	-0.70	0.70	0.16	Pass
84.00	-0.04	-0.70	0.70	0.16	Pass
89.00	0.00	-0.70	0.70	0.16	Pass
94.00	0.01	-0.70	0.70	0.16	Pass
99.00	0.02	-0.70	0.70	0.16	Pass
104.00	0.00	-0.70	0.70	0.15	Pass
109.00	0.01	-0.70	0.70	0.15	Pass
114.00	0.00	-0.70	0.70	0.15	Pass
115.00	0.01	-0.70	0.70	0.15	Pass

Level [dB]	Error [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
116.00	0.01	-0.70	0.70	0.15	Pass
117.00	0.02	-0.70	0.70	0.15	Pass
118.00	0.02	-0.70	0.70	0.15	Pass
119.00	0.03	-0.70	0.70	0.15	Pass
120.00	0.02	-0.70	0.70	0.15	Pass

-- End of measurement results--

Slow Detector

Toneburst response performed according to IEC 61672-3:2013 18 and ANSI S1.4-2014 Part 3: 18 for compliance to IEC 61672-1:2013 5.9, IEC 60651:2001 9.4.2, ANSI S1.4:1983 (R2006) 8.4.2 and ANSI S1.4-2014 Part 1: 5.9

Amplitude [dB]	Duration [ms]	Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
137.00	200	-7.60	-7.92	-6.92	0.15	Pass
	2	-27.21	-29.99	-25.99	0.15	Pass

-- End of measurement results--

Fast Detector

Toneburst response performed according to IEC 61672-3:2013 18 and ANSI S1.4-2014 Part 3: 18 for compliance to IEC 61672-1:2013 5.9, IEC 60651:2001 9.4.2, ANSI S1.4:1983 (R2006) 8.4.2 and ANSI S1.4-2014 Part 1: 5.9

Amplitude [dB]	Duration [ms]	Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
137.00	200.00	-1.11	-1.48	-0.48	0.15	Pass
	2.00	-18.41	-19.49	-16.99	0.16	Pass
	0.25	-27.44	-29.99	-25.99	0.15	Pass

-- End of measurement results--

Sound Exposure Level

Toneburst response performed according to IEC 61672-3:2013 18 and ANSI S1.4-2014 Part 3: 18 for compliance to IEC 61672-1:2013 5.9, IEC 60651:2001 9.4.2, ANSI S1.4:1983 (R2006) 8.4.2 and ANSI S1.4-2014 Part 1: 5.9

Amplitude [dB]	Duration [ms]	Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
137.00	200.00	-7.05	-7.49	-6.49	0.15	Pass
	2.00	-27.08	-28.49	-25.99	0.15	Pass
	0.25	-36.19	-39.02	-35.02	0.15	Pass

-- End of measurement results--

Peak C-weight

C-weighted peak sound level performed according to IEC 61672-3:2013 19 and ANSI S1.4-2014 Part 3: 19 for compliance to IEC 61672-1:2013 5.13 and ANSI S1.4-2014 Part 1: 5.13

Level [dB]	Frequency [Hz]	Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
135.00	31.50	138.06	135.50	139.50	0.15	Pass
135.00	500.00	138.50	137.50	139.50	0.15	Pass
135.00	8,000.00	137.63	136.40	140.40	0.15	Pass
135.00, Negative	500.00	137.15	136.40	138.40	0.15	Pass
135.00, Positive	500.00	137.15	136.40	138.40	0.15	Pass

-- End of measurement results--

Peak Z-weight

Z-weighted peak sound level performed according to IEC 60651:2001 9.4.4 and ANSI S1.4:1983 (R2006) 8.4.4

Amplitude [dB]	Duration[µs]		Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
136.00	100	Negative Pulse	136.18	134.11	138.11	0.15	Pass
	100	Positive Pulse	136.18	134.11	138.11	0.15	Pass
126.00	100	Negative Pulse	126.05	123.94	127.94	0.15	Pass
	100	Positive Pulse	126.07	123.97	127.97	0.15	Pass
116.00	100	Negative Pulse	116.12	113.93	117.93	0.15	Pass
	100	Positive Pulse	116.13	114.05	118.05	0.15	Pass
106.00	100	Negative Pulse	106.09	103.95	107.95	0.15	Pass
	100	Positive Pulse	106.12	104.04	108.04	0.15	Pass

-- End of measurement results--

Overload Detector

Overload indication performed according to IEC 61672-3:2013 20 and ANSI S1.4-2014 Part 3: 20 for compliance to IEC 61672-1:2013 5.11, IEC 60804:2000 9.3.5, IEC 61252:2002 11, ANSI S1.4 (R2006) 5.8, and ANSI S1.4-2014 Part 1: 5.11, ANSI S1.25 (R2007) 7.6, ANSI S1.43 (R2007) 7

Measurement	Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
Positive	140.70	140.00	142.00	0.16	Pass
Negative	140.70	140.00	142.00	0.16	Pass
Difference	0.00	-1.50	1.50	0.15	Pass

-- End of measurement results--

Peak Rise Time

Peak rise time performed according to IEC 60651:2001 9.4.4 and ANSI S1.4:1983 (R2006) 8.4.4

Amplitude [dB]	Duration [µs]		Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
139.00	40	Negative Pulse	135.91	134.64	136.64	0.15	Pass
		Positive Pulse	135.93	134.61	136.61	0.15	Pass
	30	Negative Pulse	135.03	134.64	136.64	0.15	Pass
		Positive Pulse	135.06	134.61	136.61	0.15	Pass

-- End of measurement results--

Positive Pulse Crest Factor

200 µs pulse tests at 2.0, 12.0, 22.0, 32.0 dB below Overload Limit

Crest Factor measured according to IEC 60651:2001 9.4.2 and ANSI S1.4:1983 (R2006) 8.4.2

Amplitude [dB]	Crest Factor	Test Result [dB]	Limits [dB]	Expanded Uncertainty [dB]	Result
138.00	3	OVLD	± 0.50	0.15 ‡	Pass
	5	OVLD	± 1.00	0.15 ‡	Pass
	10	OVLD	± 1.50	0.15 ‡	Pass
128.00	3	-0.12	± 0.50	0.15 ‡	Pass
	5	-0.12	± 1.00	0.15 ‡	Pass
	10	OVLD	± 1.50	0.15 ‡	Pass
118.00	3	-0.15	± 0.50	0.15 ‡	Pass
	5	-0.16	± 1.00	0.15 ‡	Pass
	10	-0.28	± 1.50	0.15 ‡	Pass
108.00	3	-0.14	± 0.50	0.15 ‡	Pass
	5	-0.10	± 1.00	0.15 ‡	Pass
	10	-0.25	± 1.50	0.15 ‡	Pass

-- End of measurement results--

Negative Pulse Crest Factor

200 µs pulse tests at 2.0, 12.0, 22.0, 32.0 dB below Overload Limit

Crest Factor measured according to IEC 60651:2001 9.4.2 and ANSI S1.4:1983 (R2006) 8.4.2

Amplitude [dB]	Crest Factor	Test Result [dB]	Limits [dB]	Expanded Uncertainty [dB]	Result
138.00	3	OVLD	± 0.50	0.15 ‡	Pass
	5	OVLD	± 1.00	0.15 ‡	Pass
	10	OVLD	± 1.50	0.15 ‡	Pass
128.00	3	-0.12	± 0.50	0.15 ‡	Pass
	5	-0.13	± 1.00	0.15 ‡	Pass
	10	OVLD	± 1.50	0.15 ‡	Pass
118.00	3	-0.15	± 0.50	0.15 ‡	Pass
	5	-0.16	± 1.00	0.15 ‡	Pass
	10	-0.12	± 1.50	0.15 ‡	Pass
108.00	3	-0.14	± 0.50	0.15 ‡	Pass
	5	-0.11	± 1.00	0.15 ‡	Pass
	10	-0.09	± 1.50	0.16 ‡	Pass

-- End of measurement results--

Tone Burst

2kHz tone burst tests at 2.0, 12.0, 22.0, 32.0 dB below Overload Limit

Tone burst response measured according to IEC 60651:2001 9.4.2 and ANSI S1.4:1983 (R2006) 8.4.2

Amplitude [dB]	Crest Factor	Test Result [dB]	Limits [dB]	Expanded Uncertainty [dB]	Result
138.00	3	OVLD	± 0.50	0.15	Pass
	5	OVLD	± 1.00	0.15	Pass
128.00	3	-0.09	± 0.50	0.15	Pass
	5	-0.09	± 1.00	0.15	Pass
118.00	3	-0.10	± 0.50	0.15	Pass
	5	-0.08	± 1.00	0.15	Pass
108.00	3	-0.06	± 0.50	0.15	Pass
	5	-0.06	± 1.00	0.15	Pass

-- End of measurement results--

Impulse Detector - Repeat

Impulse Detector measured according to IEC 60651:2001 9.4.3 and ANSI S1.4:1983 (R2006) 8.4.3

Amplitude [dB]	Repitition Rate [Hz]	Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
140	100.00	-2.91	-3.71	-1.71	0.15	Pass
	20.00	-7.81	-9.57	-5.57	0.20	Pass
	2.00	-8.80	-10.76	-6.76	0.16	Pass
Step	2.00	5.11	4.00	6.00	0.16	Pass

-- End of measurement results--

Impulse Detector - Single

Impulse Detector measured according to IEC 60651:2001 9.4.3 and ANSI S1.4:1983 (R2006) 8.4.3

Amplitude [dB]	Duration [ms]	Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
140	20.00	-3.73	-5.11	-2.11	0.15	Pass
	5.00	-9.03	-10.76	-6.76	0.15	Pass
	2.00	-12.64	-14.55	-10.55	0.16	Pass
Step	2.00	10.04	9.00	11.00	0.16	Pass

-- End of measurement results--

Gain

Gain measured according to IEC 61672-3:2013 17.3 and 17.4 and ANSI S1.4-2014 Part 3: 17.3 and 17.4

Measurement	Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
0 dB Gain	93.98	93.88	94.08	0.15	Pass
0 dB Gain, Linearity	28.05	27.28	28.68	0.16	Pass
20 dB Gain	94.00	93.88	94.08	0.15	Pass
20 dB Gain, Linearity	23.08	22.28	23.68	0.16	Pass
OBA High Range	93.98	93.20	94.80	0.15	Pass
OBA Normal Range	93.98	93.88	94.08	0.15	Pass

-- End of measurement results--

Broadband Noise Floor

Self-generated noise measured according to IEC 61672-3:2013 11.2 and ANSI S1.4-2014 Part 3: 11.2

Measurement	Test Result [dB]	Upper limit [dB]	Result
A-weight Noise Floor	6.35	9.00	Pass
C-weight Noise Floor	12.31	15.00	Pass
Z-weight Noise Floor	22.27	25.00	Pass

-- End of measurement results--

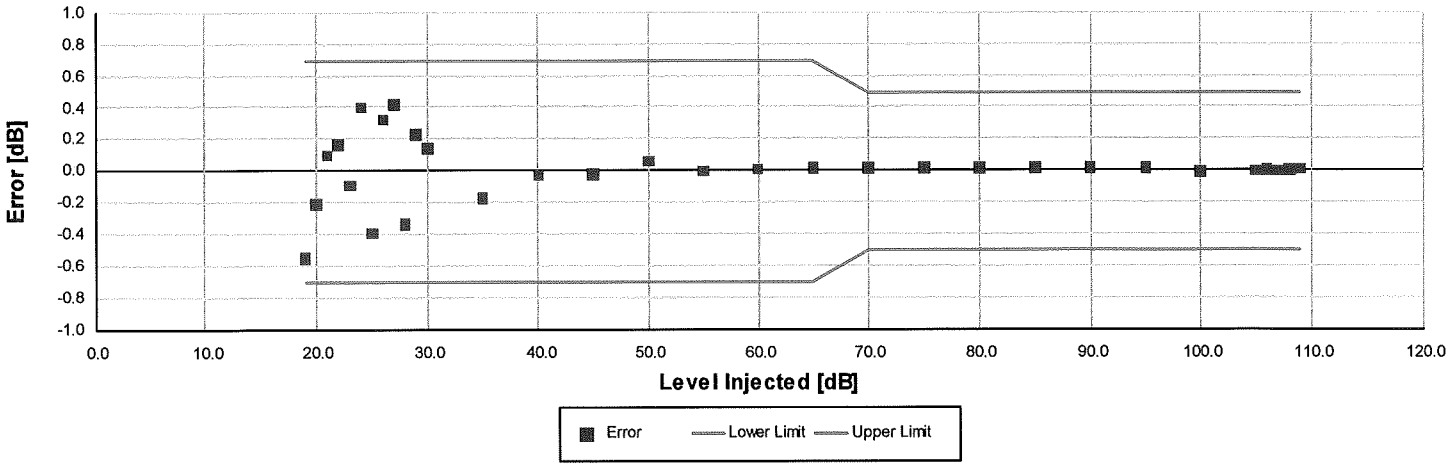
Total Harmonic Distortion

Measured using 1/3-Octave filters

Measurement	Test Result [dB]	Lower Limit [dB]	Upper Limit [dB]	Expanded Uncertainty [dB]	Result
10 Hz Signal	137.55	137.20	138.80	0.15	Pass
THD	-80.11		-60.00	1.30 ‡	Pass
THD+N	-78.69		-60.00	1.30 ‡	Pass

-- End of measurement results--

1/1 Octave Log Linearity: 31.50 Hz

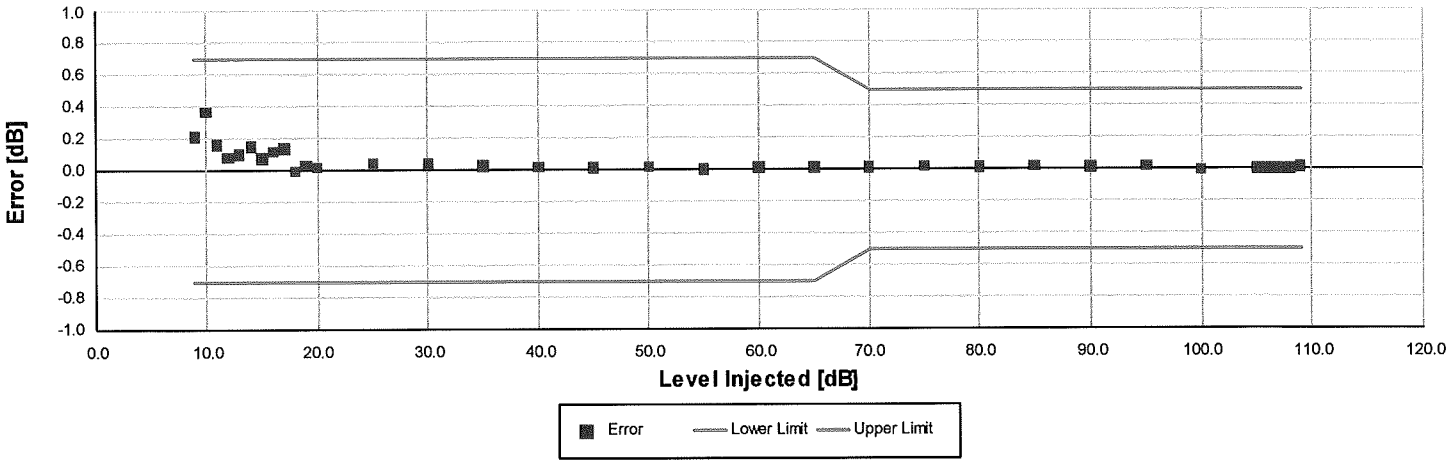


1/1 octave level linearity at normal range with 0 dB gain performed according to IEC 61260-3:2016 11 and ANSI S1.11-2016 Part 3 11 for compliance to IEC 61260-1:2014 5.13 and ANSI S1.11-2014 Part 1 5.13

Level [dB]	Error [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
19.00	-0.55	-0.70	0.70	0.17	Pass
20.00	-0.21	-0.70	0.70	0.17	Pass
21.00	0.10	-0.70	0.70	0.16	Pass
22.00	0.17	-0.70	0.70	0.16	Pass
23.00	-0.09	-0.70	0.70	0.16	Pass
24.00	0.40	-0.70	0.70	0.16	Pass
25.00	-0.39	-0.70	0.70	0.16	Pass
26.00	0.32	-0.70	0.70	0.16	Pass
27.00	0.42	-0.70	0.70	0.16	Pass
28.00	-0.33	-0.70	0.70	0.16	Pass
29.00	0.23	-0.70	0.70	0.16	Pass
30.00	0.14	-0.70	0.70	0.16	Pass
35.00	-0.17	-0.70	0.70	0.16	Pass
40.00	-0.03	-0.70	0.70	0.16	Pass
45.00	-0.02	-0.70	0.70	0.16	Pass
50.00	0.06	-0.70	0.70	0.16	Pass
55.00	0.00	-0.70	0.70	0.16	Pass
60.00	0.01	-0.70	0.70	0.16	Pass
65.00	0.02	-0.70	0.70	0.16	Pass
70.00	0.01	-0.50	0.50	0.16	Pass
75.00	0.01	-0.50	0.50	0.16	Pass
80.00	0.01	-0.50	0.50	0.16	Pass
85.00	0.02	-0.50	0.50	0.16	Pass
90.00	0.01	-0.50	0.50	0.16	Pass
95.00	0.02	-0.50	0.50	0.16	Pass
100.00	-0.01	-0.50	0.50	0.15	Pass
105.00	0.00	-0.50	0.50	0.15	Pass
106.00	0.00	-0.50	0.50	0.15	Pass
107.00	0.00	-0.50	0.50	0.15	Pass
108.00	0.00	-0.50	0.50	0.15	Pass
109.00	0.01	-0.50	0.50	0.15	Pass

-- End of measurement results--

1/1 Octave Log Linearity: 1,000.00 Hz

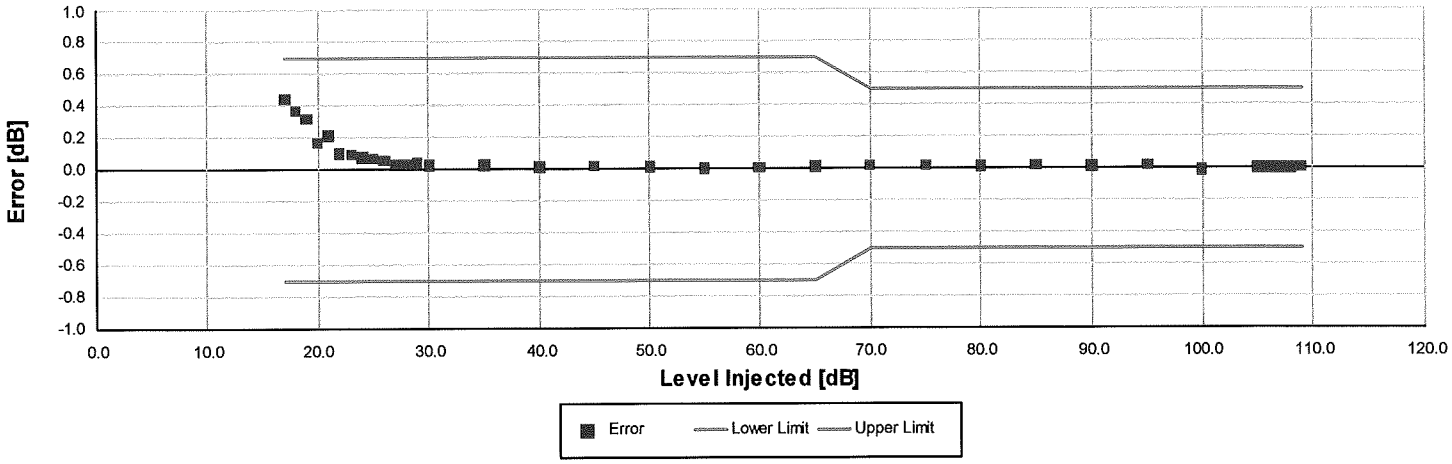


1/1 octave level linearity at normal range with 0 dB gain performed according to IEC 61260-3:2016 11 and ANSI S1.11-2016 Part 3 11 for compliance to IEC 61260-1:2014 5.13 and ANSI S1.11-2014 Part 1 5.13

Level [dB]	Error [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
9.00	0.21	-0.70	0.70	0.19	Pass
10.00	0.37	-0.70	0.70	0.19	Pass
11.00	0.17	-0.70	0.70	0.18	Pass
12.00	0.08	-0.70	0.70	0.18	Pass
13.00	0.10	-0.70	0.70	0.18	Pass
14.00	0.15	-0.70	0.70	0.17	Pass
15.00	0.07	-0.70	0.70	0.17	Pass
16.00	0.12	-0.70	0.70	0.17	Pass
17.00	0.14	-0.70	0.70	0.17	Pass
18.00	-0.01	-0.70	0.70	0.17	Pass
19.00	0.03	-0.70	0.70	0.17	Pass
20.00	0.02	-0.70	0.70	0.17	Pass
25.00	0.04	-0.70	0.70	0.16	Pass
30.00	0.04	-0.70	0.70	0.16	Pass
35.00	0.02	-0.70	0.70	0.16	Pass
40.00	0.02	-0.70	0.70	0.16	Pass
45.00	0.02	-0.70	0.70	0.16	Pass
50.00	0.02	-0.70	0.70	0.16	Pass
55.00	0.00	-0.70	0.70	0.16	Pass
60.00	0.01	-0.70	0.70	0.16	Pass
65.00	0.01	-0.70	0.70	0.16	Pass
70.00	0.02	-0.50	0.50	0.16	Pass
75.00	0.02	-0.50	0.50	0.16	Pass
80.00	0.01	-0.50	0.50	0.16	Pass
85.00	0.02	-0.50	0.50	0.16	Pass
90.00	0.02	-0.50	0.50	0.16	Pass
95.00	0.02	-0.50	0.50	0.16	Pass
100.00	-0.01	-0.50	0.50	0.15	Pass
105.00	0.00	-0.50	0.50	0.15	Pass
106.00	0.00	-0.50	0.50	0.15	Pass
107.00	0.00	-0.50	0.50	0.15	Pass
108.00	0.00	-0.50	0.50	0.15	Pass
109.00	0.01	-0.50	0.50	0.15	Pass

-- End of measurement results--

1/1 Octave Log Linearity: 16,000.00 Hz

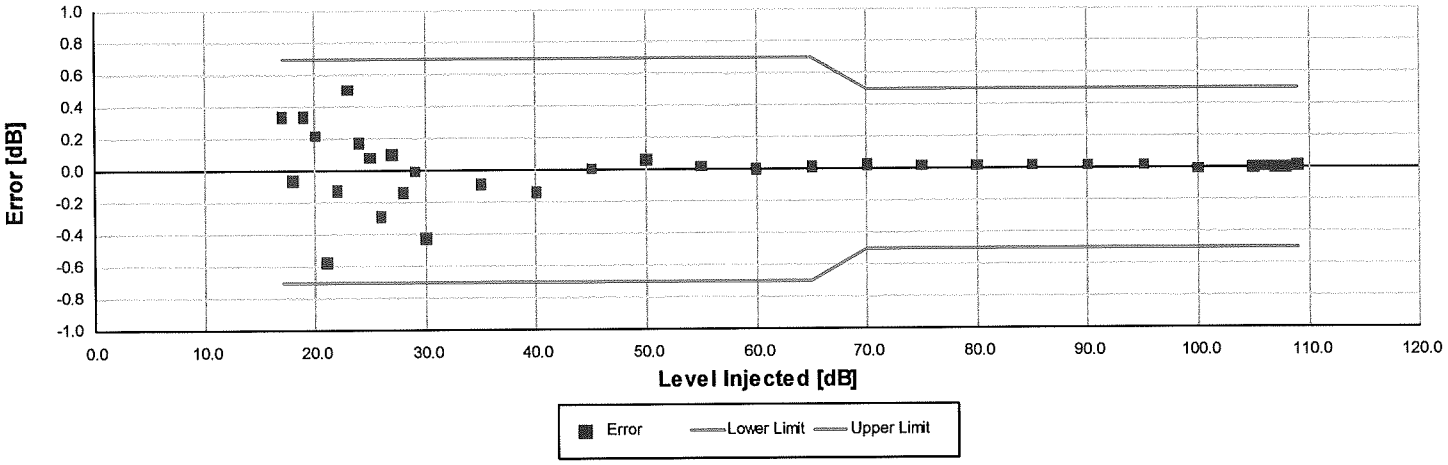


1/1 octave level linearity at normal range with 0 dB gain performed according to IEC 61260-3:2016 11 and ANSI S1.11-2016 Part 3 11 for compliance to IEC 61260-1:2014 5.13 and ANSI S1.11-2014 Part 1 5.13

Level [dB]	Error [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
17.00	0.45	-0.70	0.70	0.17	Pass
18.00	0.37	-0.70	0.70	0.17	Pass
19.00	0.32	-0.70	0.70	0.17	Pass
20.00	0.17	-0.70	0.70	0.17	Pass
21.00	0.21	-0.70	0.70	0.16	Pass
22.00	0.10	-0.70	0.70	0.16	Pass
23.00	0.09	-0.70	0.70	0.16	Pass
24.00	0.08	-0.70	0.70	0.16	Pass
25.00	0.07	-0.70	0.70	0.16	Pass
26.00	0.05	-0.70	0.70	0.16	Pass
27.00	0.03	-0.70	0.70	0.16	Pass
28.00	0.03	-0.70	0.70	0.16	Pass
29.00	0.04	-0.70	0.70	0.16	Pass
30.00	0.03	-0.70	0.70	0.16	Pass
35.00	0.03	-0.70	0.70	0.16	Pass
40.00	0.01	-0.70	0.70	0.16	Pass
45.00	0.02	-0.70	0.70	0.16	Pass
50.00	0.02	-0.70	0.70	0.16	Pass
55.00	0.00	-0.70	0.70	0.16	Pass
60.00	0.01	-0.70	0.70	0.16	Pass
65.00	0.01	-0.70	0.70	0.16	Pass
70.00	0.02	-0.50	0.50	0.16	Pass
75.00	0.02	-0.50	0.50	0.16	Pass
80.00	0.01	-0.50	0.50	0.16	Pass
85.00	0.02	-0.50	0.50	0.16	Pass
90.00	0.02	-0.50	0.50	0.16	Pass
95.00	0.02	-0.50	0.50	0.16	Pass
100.00	-0.01	-0.50	0.50	0.15	Pass
105.00	0.00	-0.50	0.50	0.15	Pass
106.00	0.00	-0.50	0.50	0.15	Pass
107.00	0.00	-0.50	0.50	0.15	Pass
108.00	0.00	-0.50	0.50	0.15	Pass
109.00	0.01	-0.50	0.50	0.15	Pass

-- End of measurement results--

1/3 Octave Log Linearity: 31.50 Hz

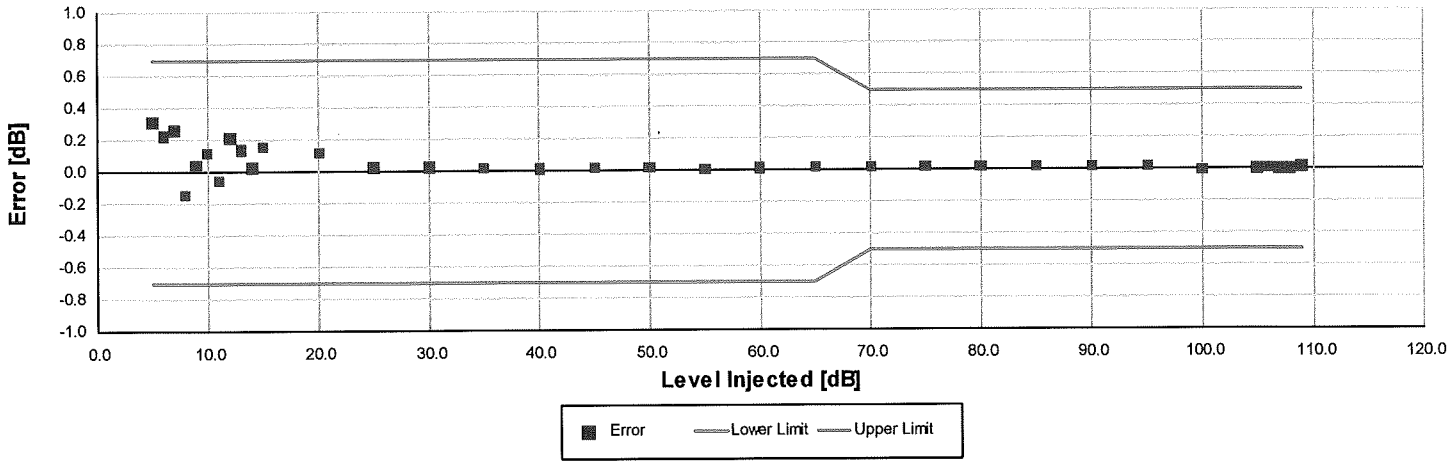


1/3 octave level linearity at normal range with 0 dB gain performed according to IEC 61260-3:2016 11 and ANSI S1.11-2016 Part 3 11 for compliance to IEC 61260-1:2014 5.13 and ANSI S1.11-2014 Part 1 5.13

Level [dB]	Error [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
17.00	0.34	-0.70	0.70	0.17	Pass
18.00	-0.06	-0.70	0.70	0.17	Pass
19.00	0.34	-0.70	0.70	0.17	Pass
20.00	0.22	-0.70	0.70	0.17	Pass
21.00	-0.57	-0.70	0.70	0.16	Pass
22.00	-0.13	-0.70	0.70	0.16	Pass
23.00	0.50	-0.70	0.70	0.16	Pass
24.00	0.17	-0.70	0.70	0.16	Pass
25.00	0.08	-0.70	0.70	0.16	Pass
26.00	-0.29	-0.70	0.70	0.16	Pass
27.00	0.10	-0.70	0.70	0.16	Pass
28.00	-0.14	-0.70	0.70	0.16	Pass
29.00	-0.01	-0.70	0.70	0.16	Pass
30.00	-0.43	-0.70	0.70	0.16	Pass
35.00	-0.09	-0.70	0.70	0.16	Pass
40.00	-0.14	-0.70	0.70	0.16	Pass
45.00	0.01	-0.70	0.70	0.16	Pass
50.00	0.06	-0.70	0.70	0.16	Pass
55.00	0.02	-0.70	0.70	0.16	Pass
60.00	0.00	-0.70	0.70	0.16	Pass
65.00	0.01	-0.70	0.70	0.16	Pass
70.00	0.02	-0.50	0.50	0.16	Pass
75.00	0.02	-0.50	0.50	0.16	Pass
80.00	0.01	-0.50	0.50	0.16	Pass
85.00	0.02	-0.50	0.50	0.16	Pass
90.00	0.01	-0.50	0.50	0.16	Pass
95.00	0.02	-0.50	0.50	0.16	Pass
100.00	-0.01	-0.50	0.50	0.15	Pass
105.00	0.00	-0.50	0.50	0.15	Pass
106.00	0.00	-0.50	0.50	0.15	Pass
107.00	0.00	-0.50	0.50	0.15	Pass
108.00	0.00	-0.50	0.50	0.15	Pass
109.00	0.01	-0.50	0.50	0.15	Pass

-- End of measurement results--

1/3 Octave Log Linearity: 1,000.00 Hz

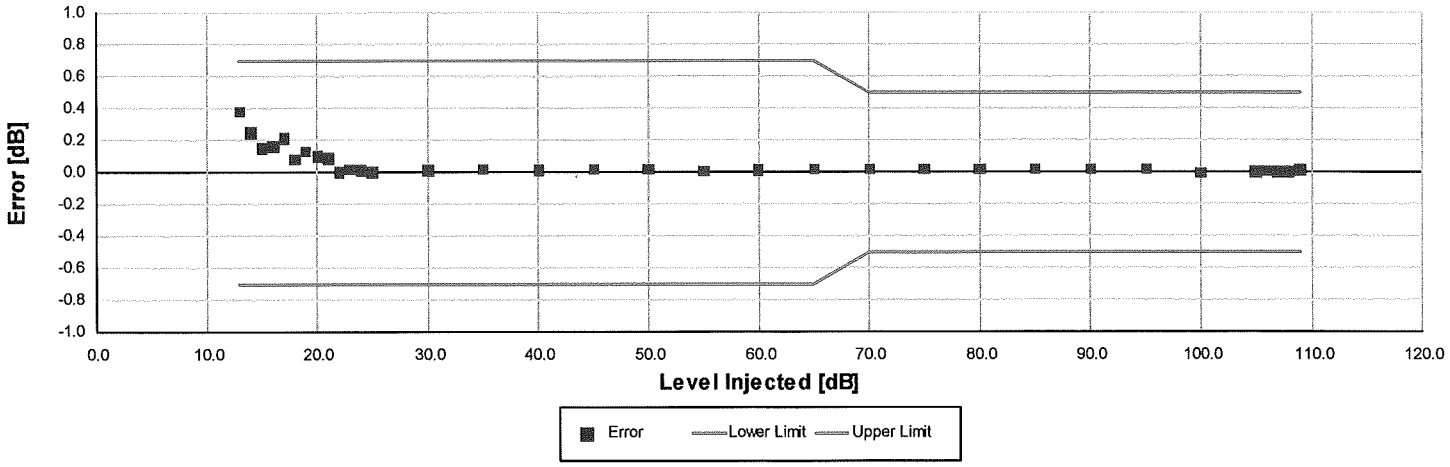


1/3 octave level linearity at normal range with 0 dB gain performed according to IEC 61260-3:2016 11 and ANSI S1.11-2016 Part 3 11 for compliance to IEC 61260-1:2014 5.13 and ANSI S1.11-2014 Part 1 5.13

Level [dB]	Error [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
5.00	0.31	-0.70	0.70	0.21	Pass
6.00	0.22	-0.70	0.70	0.21	Pass
7.00	0.26	-0.70	0.70	0.20	Pass
8.00	-0.14	-0.70	0.70	0.19	Pass
9.00	0.04	-0.70	0.70	0.19	Pass
10.00	0.12	-0.70	0.70	0.19	Pass
11.00	-0.06	-0.70	0.70	0.18	Pass
12.00	0.21	-0.70	0.70	0.18	Pass
13.00	0.13	-0.70	0.70	0.18	Pass
14.00	0.02	-0.70	0.70	0.17	Pass
15.00	0.16	-0.70	0.70	0.17	Pass
20.00	0.12	-0.70	0.70	0.17	Pass
25.00	0.02	-0.70	0.70	0.16	Pass
30.00	0.02	-0.70	0.70	0.16	Pass
35.00	0.02	-0.70	0.70	0.16	Pass
40.00	0.01	-0.70	0.70	0.16	Pass
45.00	0.02	-0.70	0.70	0.16	Pass
50.00	0.02	-0.70	0.70	0.16	Pass
55.00	0.00	-0.70	0.70	0.16	Pass
60.00	0.01	-0.70	0.70	0.16	Pass
65.00	0.01	-0.70	0.70	0.16	Pass
70.00	0.02	-0.50	0.50	0.16	Pass
75.00	0.02	-0.50	0.50	0.16	Pass
80.00	0.01	-0.50	0.50	0.16	Pass
85.00	0.02	-0.50	0.50	0.16	Pass
90.00	0.02	-0.50	0.50	0.16	Pass
95.00	0.02	-0.50	0.50	0.16	Pass
100.00	-0.01	-0.50	0.50	0.15	Pass
105.00	0.00	-0.50	0.50	0.15	Pass
106.00	0.00	-0.50	0.50	0.15	Pass
107.00	0.00	-0.50	0.50	0.15	Pass
108.00	0.00	-0.50	0.50	0.15	Pass
109.00	0.01	-0.50	0.50	0.15	Pass

-- End of measurement results--

1/3 Octave Log Linearity: 16,000.00 Hz



1/3 octave level linearity at normal range with 0 dB gain performed according to IEC 61260-3:2016 11 and ANSI S1.11-2016 Part 3 11 for compliance to IEC 61260-1:2014 5.13 and ANSI S1.11-2014 Part 1 5.13

Level [dB]	Error [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
13.00	0.38	-0.70	0.70	0.18	Pass
14.00	0.25	-0.70	0.70	0.17	Pass
15.00	0.15	-0.70	0.70	0.17	Pass
16.00	0.16	-0.70	0.70	0.17	Pass
17.00	0.21	-0.70	0.70	0.17	Pass
18.00	0.08	-0.70	0.70	0.17	Pass
19.00	0.13	-0.70	0.70	0.17	Pass
20.00	0.10	-0.70	0.70	0.17	Pass
21.00	0.09	-0.70	0.70	0.16	Pass
22.00	0.00	-0.70	0.70	0.16	Pass
23.00	0.01	-0.70	0.70	0.16	Pass
24.00	0.01	-0.70	0.70	0.16	Pass
25.00	0.00	-0.70	0.70	0.16	Pass
30.00	0.01	-0.70	0.70	0.16	Pass
35.00	0.02	-0.70	0.70	0.16	Pass
40.00	0.01	-0.70	0.70	0.16	Pass
45.00	0.01	-0.70	0.70	0.16	Pass
50.00	0.02	-0.70	0.70	0.16	Pass
55.00	0.00	-0.70	0.70	0.16	Pass
60.00	0.01	-0.70	0.70	0.16	Pass
65.00	0.01	-0.70	0.70	0.16	Pass
70.00	0.02	-0.50	0.50	0.16	Pass
75.00	0.02	-0.50	0.50	0.16	Pass
80.00	0.01	-0.50	0.50	0.16	Pass
85.00	0.02	-0.50	0.50	0.16	Pass
90.00	0.02	-0.50	0.50	0.16	Pass
95.00	0.02	-0.50	0.50	0.16	Pass
100.00	-0.01	-0.50	0.50	0.15	Pass
105.00	0.00	-0.50	0.50	0.15	Pass
106.00	0.00	-0.50	0.50	0.15	Pass
107.00	0.00	-0.50	0.50	0.15	Pass
108.00	0.00	-0.50	0.50	0.15	Pass
109.00	0.01	-0.50	0.50	0.15	Pass

-- End of measurement results--

1/1 Octave Log Linearity

1/1 octave level linearity measured according to IEC 61260-3:2016 11.9 and ANSI S1.11-2016 Part 3: 11.9

Measurement	Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
0 dB, Normal Range, 31.5 Hz	79.59	79.09	80.09	0.16	Pass
0 dB, Normal Range, 1000.0 Hz	79.61	79.11	80.11	0.16	Pass
0 dB, Normal Range, 16000.0 Hz	79.57	79.08	80.08	0.16	Pass
0 dB, High Range, 31.5 Hz	109.59	109.09	110.09	0.15	Pass
0 dB, High Range, 1000.0 Hz	109.61	109.11	110.11	0.15	Pass
0 dB, High Range, 16000.0 Hz	109.57	109.07	110.07	0.15	Pass
20 dB, Normal Range, 31.5 Hz	59.57	59.06	60.06	0.16	Pass
20 dB, Normal Range, 1000.0 Hz	59.59	59.08	60.08	0.16	Pass
20 dB, Normal Range, 16000.0 Hz	59.55	59.05	60.05	0.16	Pass
20 dB, High Range, 31.5 Hz	89.58	89.08	90.08	0.16	Pass
20 dB, High Range, 1000.0 Hz	89.61	89.11	90.11	0.16	Pass
20 dB, High Range, 16000.0 Hz	89.57	89.07	90.07	0.16	Pass

-- End of measurement results--

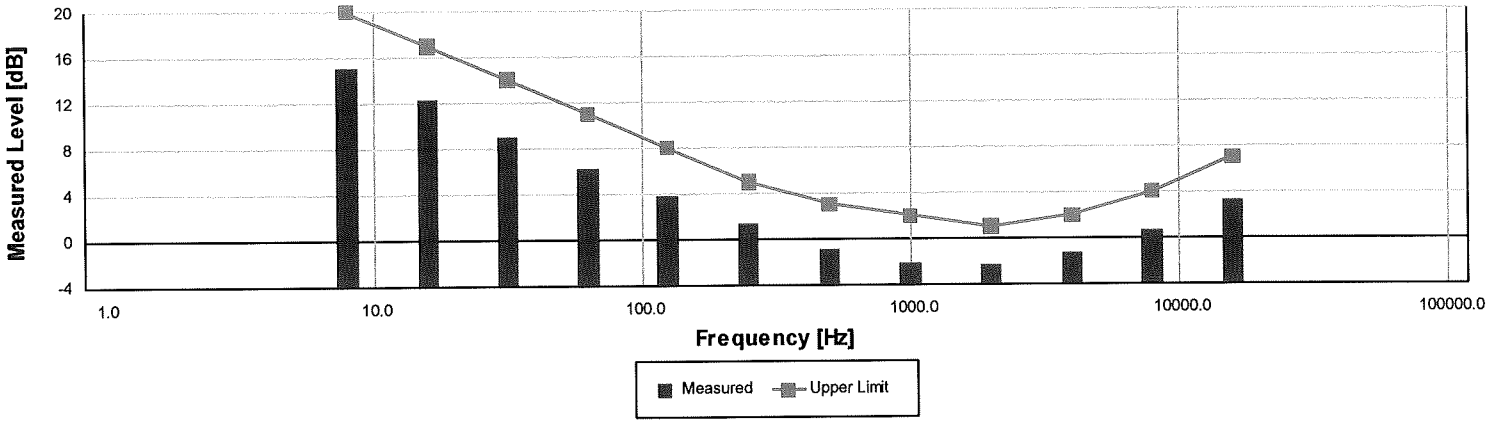
1/3 Octave Log Linearity

1/3 octave level linearity measured according to IEC 61260-3:2016 11.9 and ANSI S1.11-2016 Part 3: 11.9

Measurement	Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
0 dB, Normal Range, 31.5 Hz	79.59	79.09	80.09	0.16	Pass
0 dB, Normal Range, 1000.0 Hz	79.61	79.11	80.11	0.16	Pass
0 dB, Normal Range, 16000.0 Hz	79.57	79.08	80.08	0.16	Pass
0 dB, High Range, 31.5 Hz	109.58	109.09	110.09	0.15	Pass
0 dB, High Range, 1000.0 Hz	109.61	109.11	110.11	0.15	Pass
0 dB, High Range, 16000.0 Hz	109.57	109.07	110.07	0.15	Pass
20 dB, Normal Range, 31.5 Hz	59.56	59.06	60.06	0.16	Pass
20 dB, Normal Range, 1000.0 Hz	59.59	59.08	60.08	0.16	Pass
20 dB, Normal Range, 16000.0 Hz	59.55	59.05	60.05	0.16	Pass
20 dB, High Range, 31.5 Hz	89.58	89.08	90.08	0.16	Pass
20 dB, High Range, 1000.0 Hz	89.61	89.11	90.11	0.16	Pass
20 dB, High Range, 16000.0 Hz	89.57	89.07	90.07	0.16	Pass

-- End of measurement results--

1/1-Octave Self-Generated Noise

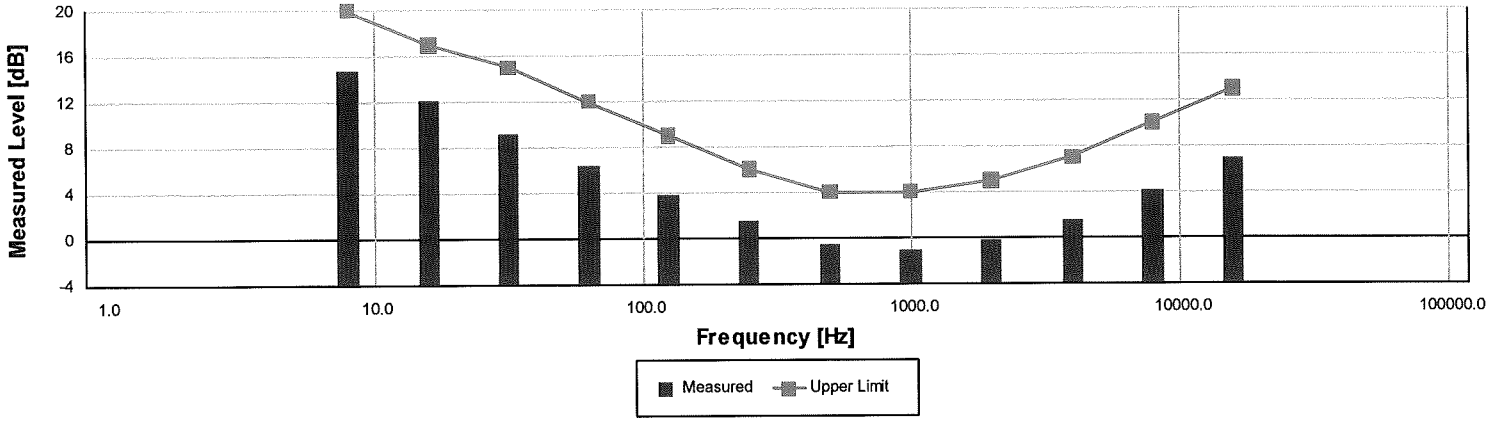


The SLM is set to normal range and 20 dB gain. Performed according to IEC 61260-3:2016 12 and ANSI S1.11-2016 Part 3 12.

Frequency [Hz]	Test Result [dB]	Upper limit [dB]	Result
8.00	15.05	20.00	Pass
16.00	12.25	17.00	Pass
31.50	9.05	14.00	Pass
63.00	6.23	11.00	Pass
125.00	3.75	8.00	Pass
250.00	1.38	5.00	Pass
500.00	-0.91	3.00	Pass
1,000.00	-2.06	2.00	Pass
2,000.00	-2.24	1.00	Pass
4,000.00	-1.19	2.00	Pass
8,000.00	0.66	4.00	Pass
16,000.00	3.18	7.00	Pass

-- End of measurement results--

1/1-Octave Self-Generated Noise

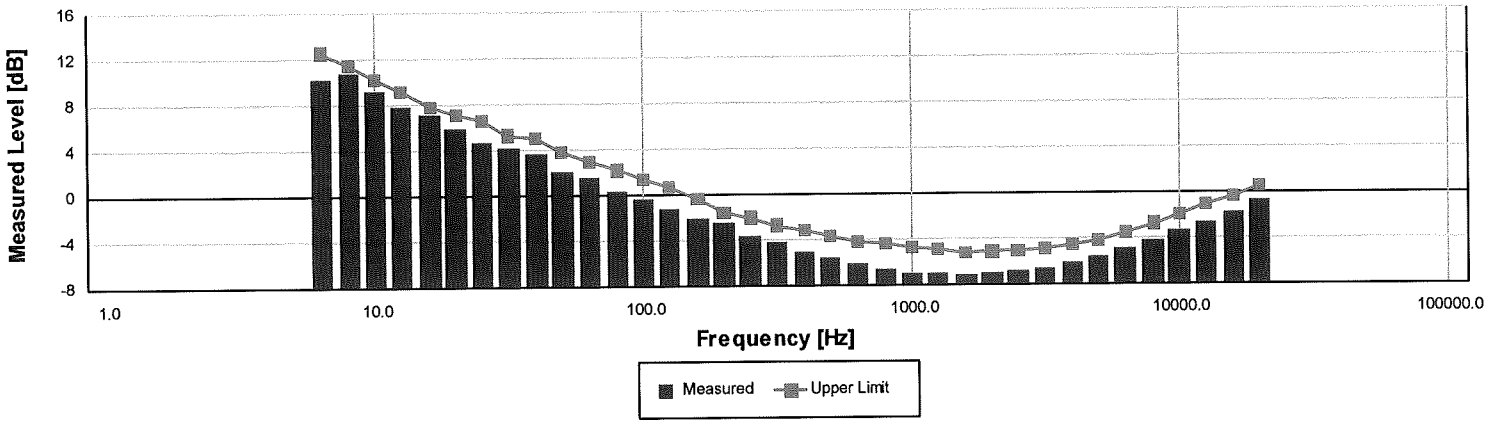


The SLM is set to normal range and 0 dB gain. Performed according to IEC 61260-3:2016 12 and ANSI S1.11-2016 Part 3 12.

Frequency [Hz]	Test Result [dB]	Upper limit [dB]	Result
8.00	14.80	20.00	Pass
16.00	12.04	17.00	Pass
31.50	9.11	15.00	Pass
63.00	6.32	12.00	Pass
125.00	3.79	9.00	Pass
250.00	1.49	6.00	Pass
500.00	-0.50	4.00	Pass
1,000.00	-1.03	4.00	Pass
2,000.00	-0.23	5.00	Pass
4,000.00	1.58	7.00	Pass
8,000.00	4.06	10.00	Pass
16,000.00	6.84	13.00	Pass

-- End of measurement results--

1/3-Octave Self-Generated Noise

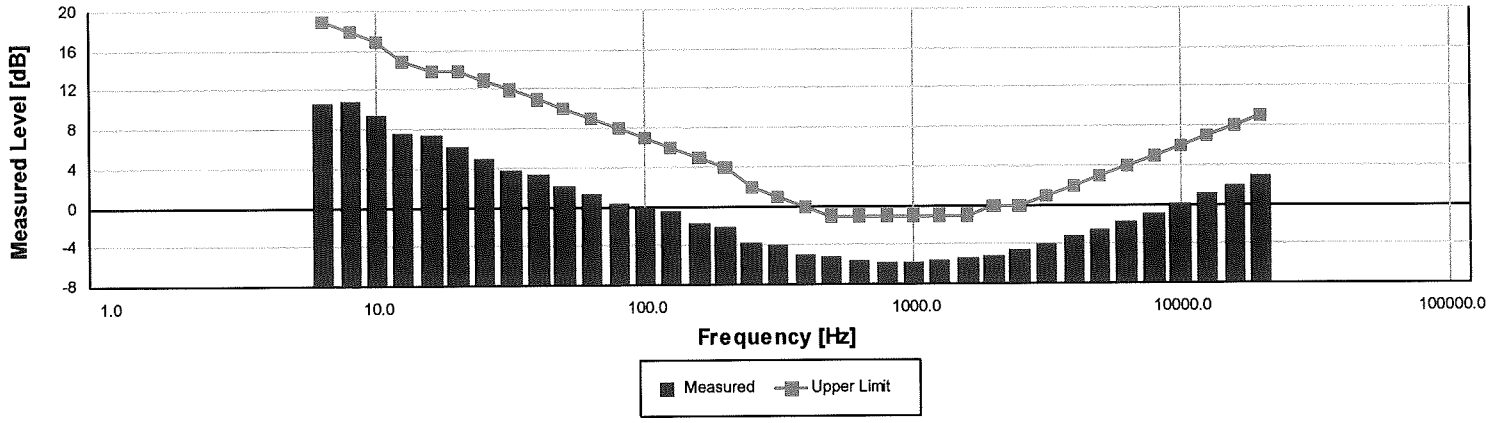


The SLM is set to normal range and 20 dB gain. Performed according to IEC 61260-3:2016 12 and ANSI S1.11-2016 Part 3 12.

Frequency [Hz]	Test Result [dB]	Upper limit [dB]	Result
6.30	10.34	12.60	Pass
8.00	10.79	11.50	Pass
10.00	9.15	10.20	Pass
12.50	7.90	9.20	Pass
16.00	7.17	7.90	Pass
20.00	5.99	7.20	Pass
25.00	4.77	6.60	Pass
31.50	4.24	5.30	Pass
40.00	3.60	5.00	Pass
50.00	2.06	3.80	Pass
63.00	1.50	3.00	Pass
80.00	0.39	2.20	Pass
100.00	-0.37	1.40	Pass
125.00	-1.28	0.70	Pass
160.00	-2.00	-0.40	Pass
200.00	-2.34	-1.50	Pass
250.00	-3.64	-2.00	Pass
315.00	-4.20	-2.70	Pass
400.00	-5.05	-3.10	Pass
500.00	-5.55	-3.70	Pass
630.00	-6.16	-4.10	Pass
800.00	-6.55	-4.30	Pass
1,000.00	-6.91	-4.70	Pass
1,250.00	-6.95	-4.80	Pass
1,600.00	-7.15	-5.20	Pass
2,000.00	-7.02	-5.10	Pass
2,500.00	-6.81	-5.00	Pass
3,150.00	-6.51	-4.80	Pass
4,000.00	-5.99	-4.50	Pass
5,000.00	-5.49	-4.10	Pass
6,300.00	-4.81	-3.40	Pass
8,000.00	-4.10	-2.70	Pass
10,000.00	-3.37	-1.90	Pass
12,500.00	-2.52	-1.10	Pass
16,000.00	-1.64	-0.30	Pass
20,000.00	-0.73	0.60	Pass

-- End of measurement results--

1/3-Octave Self-Generated Noise

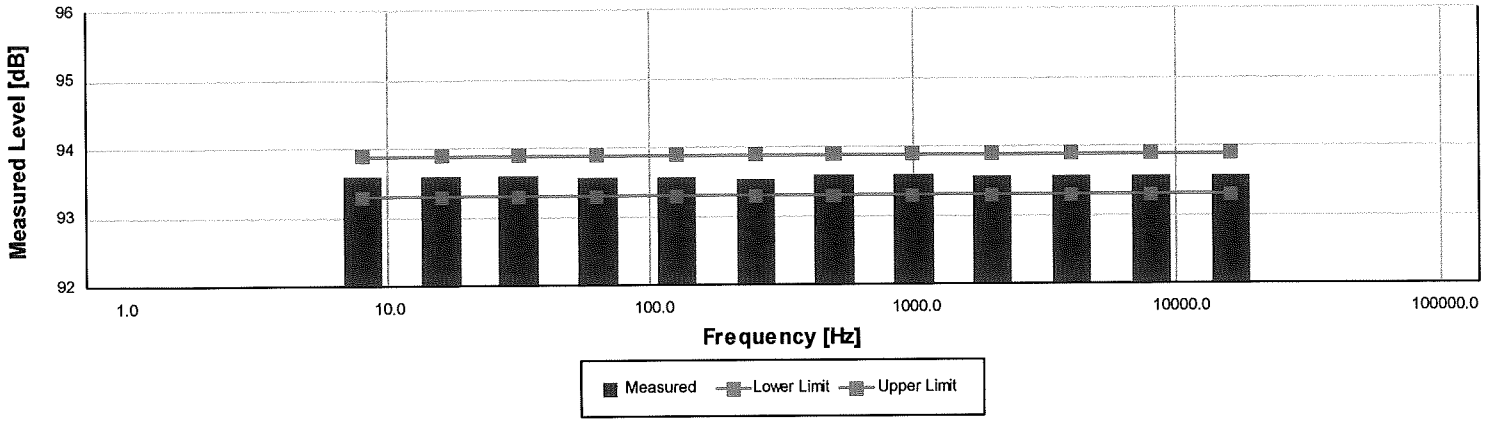


The SLM is set to normal range and 0 dB gain. Performed according to IEC 61260-3:2016 12 and ANSI S1.11-2016 Part 3 12.

Frequency [Hz]	Test Result [dB]	Upper limit [dB]	Result
6.30	10.69	19.00	Pass
8.00	10.82	18.00	Pass
10.00	9.51	17.00	Pass
12.50	7.61	15.00	Pass
16.00	7.51	14.00	Pass
20.00	6.21	14.00	Pass
25.00	5.00	13.00	Pass
31.50	3.70	12.00	Pass
40.00	3.39	11.00	Pass
50.00	2.22	10.00	Pass
63.00	1.28	9.00	Pass
80.00	0.40	8.00	Pass
100.00	-0.05	7.00	Pass
125.00	-0.57	6.00	Pass
160.00	-1.78	5.00	Pass
200.00	-2.13	4.00	Pass
250.00	-3.70	2.00	Pass
315.00	-3.98	1.00	Pass
400.00	-4.89	0.00	Pass
500.00	-5.14	-1.00	Pass
630.00	-5.48	-1.00	Pass
800.00	-5.80	-1.00	Pass
1,000.00	-5.82	-1.00	Pass
1,250.00	-5.62	-1.00	Pass
1,600.00	-5.38	-1.00	Pass
2,000.00	-5.05	0.00	Pass
2,500.00	-4.56	0.00	Pass
3,150.00	-3.95	1.00	Pass
4,000.00	-3.20	2.00	Pass
5,000.00	-2.42	3.00	Pass
6,300.00	-1.63	4.00	Pass
8,000.00	-0.79	5.00	Pass
10,000.00	0.11	6.00	Pass
12,500.00	1.06	7.00	Pass
16,000.00	2.02	8.00	Pass
20,000.00	3.00	9.00	Pass

-- End of measurement results--

1/1-Octave Relative Attenuation

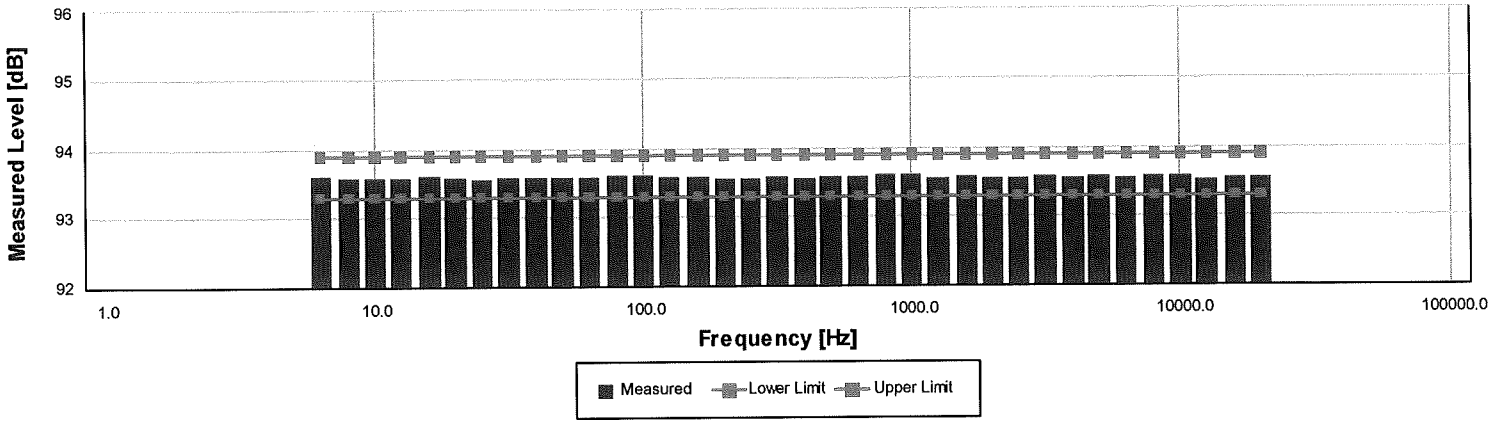


The SLM is set to normal range and 0 dB gain. Performed according to IEC 61260-3:2016 10.2 and ANSI S1.11-2016 Part 3 10.2 for compliance to IEC 61260-1:2014 5.10 and ANSI S1.11-2014 Part 1 5.10.

Frequency [Hz]	Measured Level [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
8.00	93.59	93.30	93.90	0.15	Pass
16.00	93.60	93.30	93.90	0.15	Pass
31.50	93.59	93.30	93.90	0.15	Pass
63.00	93.58	93.30	93.90	0.15	Pass
125.00	93.57	93.30	93.90	0.15	Pass
250.00	93.55	93.30	93.90	0.15	Pass
500.00	93.59	93.30	93.90	0.15	Pass
1,000.00	93.60	93.30	93.90	0.15	Pass
2,000.00	93.56	93.30	93.90	0.15	Pass
4,000.00	93.56	93.30	93.90	0.15	Pass
8,000.00	93.58	93.30	93.90	0.15	Pass
16,000.00	93.57	93.30	93.90	0.15	Pass

-- End of measurement results--

1/3-Octave Relative Attenuation

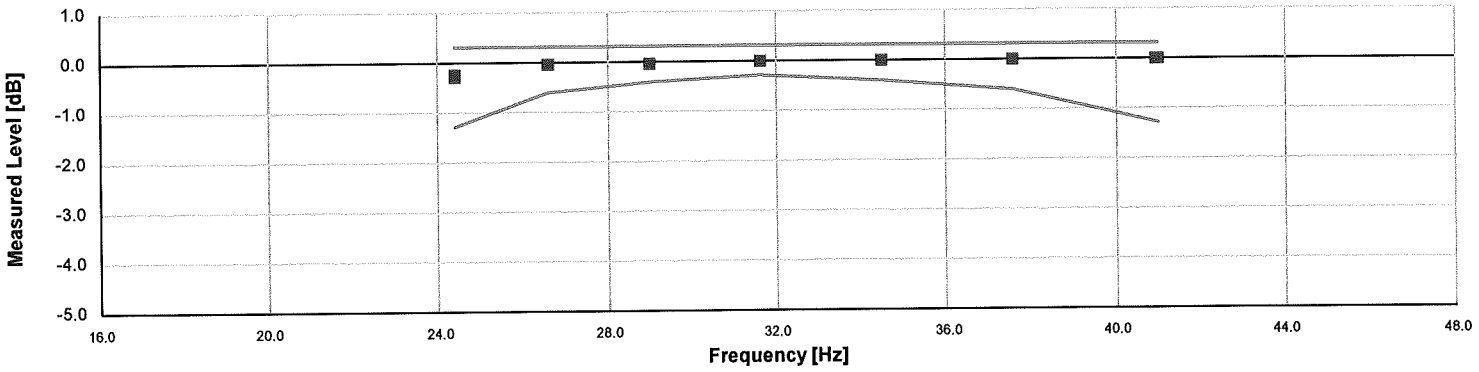


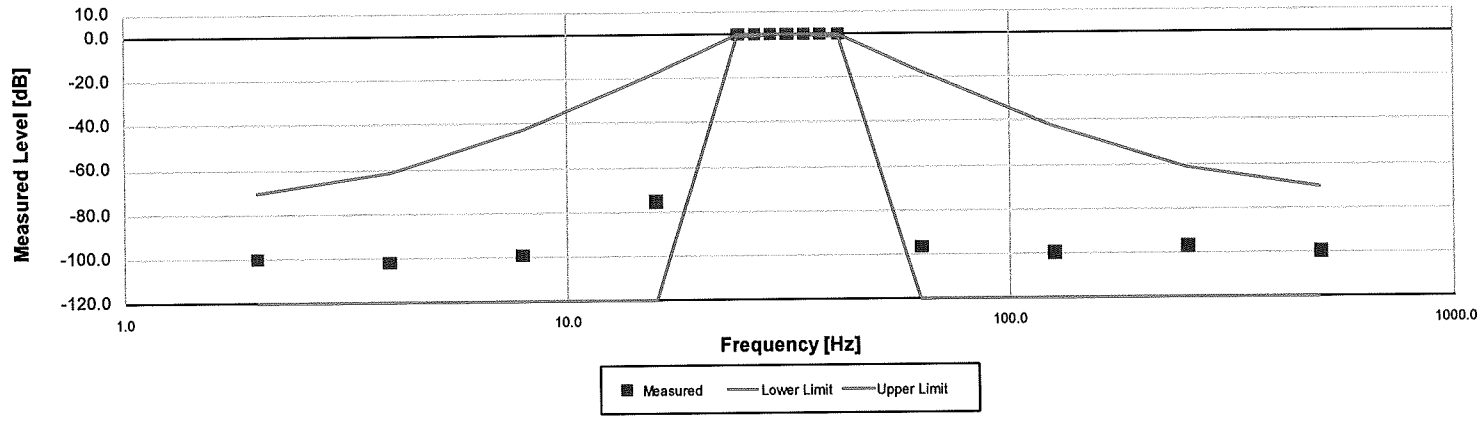
The SLM is set to normal range and 0 dB gain. Performed according to IEC 61260-3:2016 10.2 and ANSI S1.11-2016 Part 3 10.2 for compliance to IEC 61260-1:2014 5.10 and ANSI S1.11-2014 Part 1 5.10.

Frequency [Hz]	Measured Level [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
6.30	93.61	93.30	93.90	0.15	Pass
8.00	93.58	93.30	93.90	0.15	Pass
10.00	93.59	93.30	93.90	0.15	Pass
12.50	93.59	93.30	93.90	0.15	Pass
16.00	93.60	93.30	93.90	0.15	Pass
20.00	93.57	93.30	93.90	0.15	Pass
25.00	93.55	93.30	93.90	0.15	Pass
31.50	93.59	93.30	93.90	0.15	Pass
40.00	93.57	93.30	93.90	0.15	Pass
50.00	93.58	93.30	93.90	0.15	Pass
63.00	93.58	93.30	93.90	0.15	Pass
80.00	93.60	93.30	93.90	0.15	Pass
100.00	93.60	93.30	93.90	0.15	Pass
125.00	93.57	93.30	93.90	0.15	Pass
160.00	93.59	93.30	93.90	0.15	Pass
200.00	93.56	93.30	93.90	0.15	Pass
250.00	93.55	93.30	93.90	0.15	Pass
315.00	93.58	93.30	93.90	0.15	Pass
400.00	93.56	93.30	93.90	0.15	Pass
500.00	93.59	93.30	93.90	0.15	Pass
630.00	93.58	93.30	93.90	0.15	Pass
800.00	93.61	93.30	93.90	0.15	Pass
1,000.00	93.60	93.30	93.90	0.15	Pass
1,250.00	93.56	93.30	93.90	0.15	Pass
1,600.00	93.58	93.30	93.90	0.15	Pass
2,000.00	93.56	93.30	93.90	0.15	Pass
2,500.00	93.55	93.30	93.90	0.15	Pass
3,150.00	93.57	93.30	93.90	0.15	Pass
4,000.00	93.55	93.30	93.90	0.15	Pass
5,000.00	93.57	93.30	93.90	0.15	Pass
6,300.00	93.56	93.30	93.90	0.15	Pass
8,000.00	93.58	93.30	93.90	0.15	Pass
10,000.00	93.57	93.30	93.90	0.15	Pass
12,500.00	93.53	93.30	93.90	0.15	Pass
16,000.00	93.57	93.30	93.90	0.15	Pass
20,000.00	93.54	93.30	93.90	0.15	Pass

-- End of measurement results--

1/1 Octave Filter: 31.5 Hz



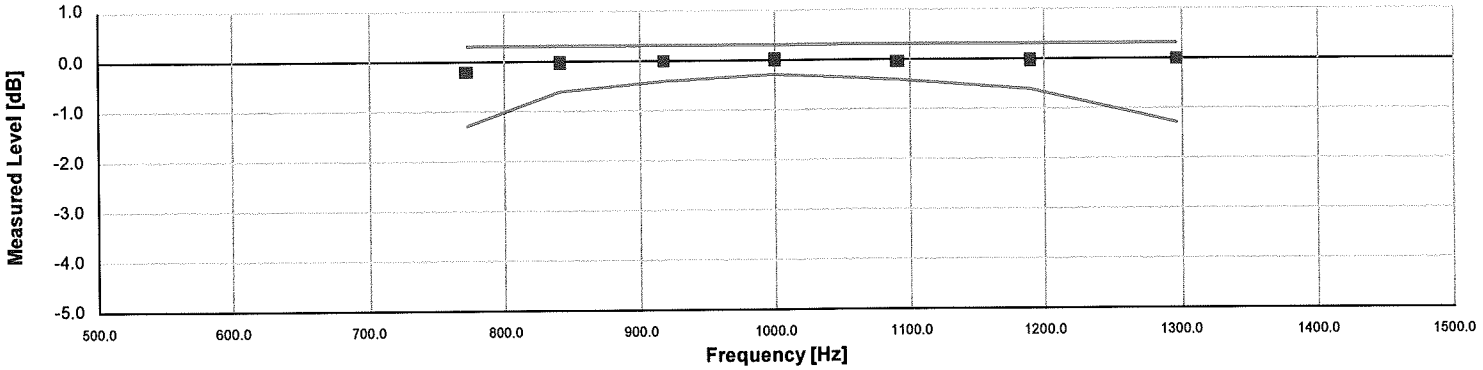


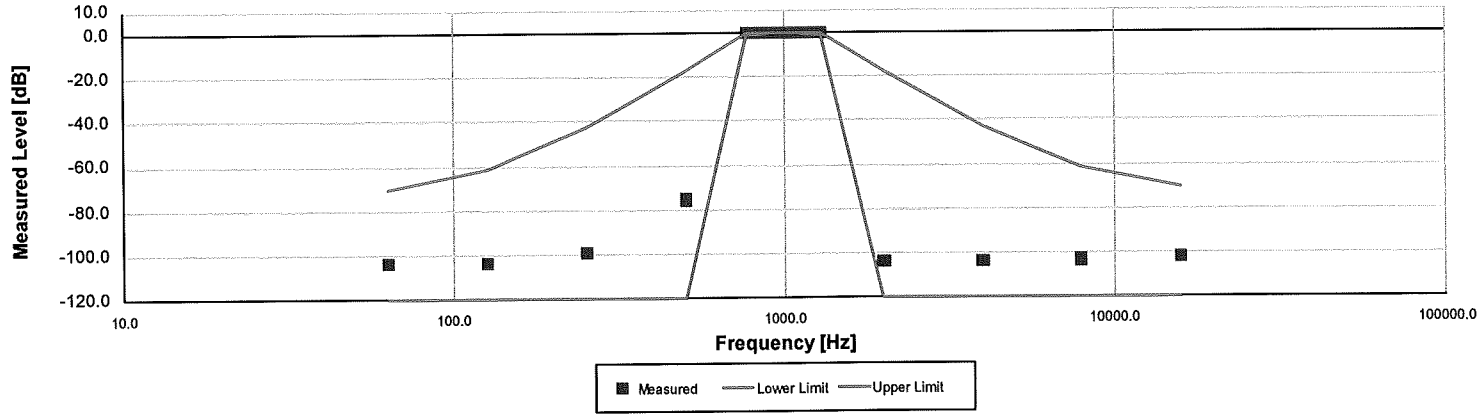
The SLM is set to normal range and 0 dB gain. Filter shape measured according to IEC 61260-3:2016 13 and ANSI S1.11-2016 Part 3 13 for compliance to IEC 61260-1:2014 5.10 and ANSI S1.11-2014 Part 1 5.10

Frequency [Hz]	Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
2.00	-99.81	-inf	-70.00	4.70	Pass
3.98	-101.47	-inf	-61.00	3.70	Pass
7.94	-99.16	-inf	-42.00	4.80	Pass
15.85	-75.18	-inf	-17.50	1.30	Pass
24.41	-0.27	-1.30	0.30	0.15	Pass
26.61	-0.05	-0.60	0.30	0.15	Pass
29.01	-0.05	-0.40	0.30	0.15	Pass
31.62	-0.02	-0.30	0.30	0.15	Pass
34.47	-0.01	-0.40	0.30	0.15	Pass
37.58	0.00	-0.60	0.30	0.15	Pass
40.97	-0.01	-1.30	0.30	0.15	Pass
63.10	-96.43	-inf	-17.50	1.50	Pass
125.89	-99.46	-inf	-42.00	2.00	Pass
251.19	-96.71	-inf	-61.00	1.60	Pass
501.19	-99.44	-inf	-70.00	1.00	Pass

-- End of measurement results--

1/1 Octave Filter: 1 kHz



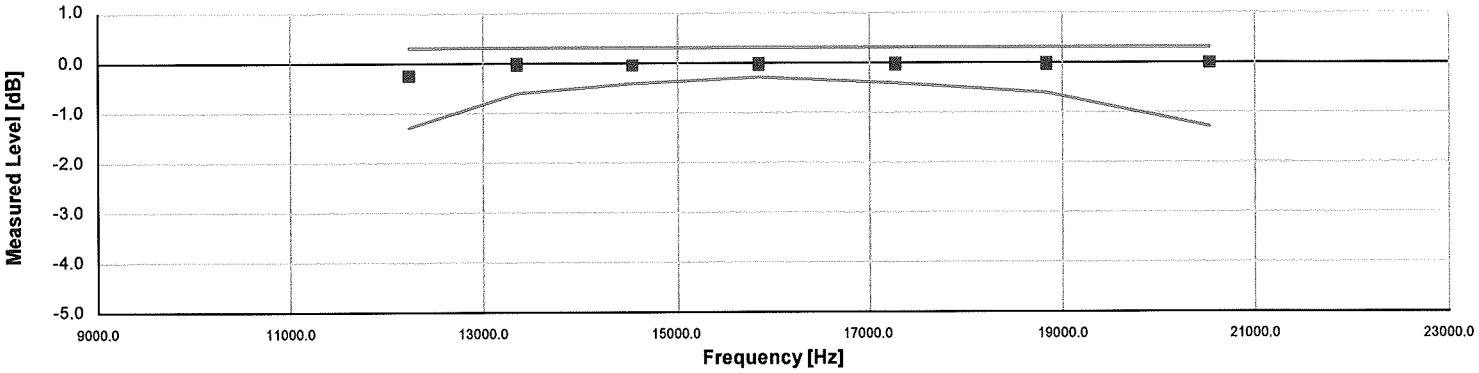


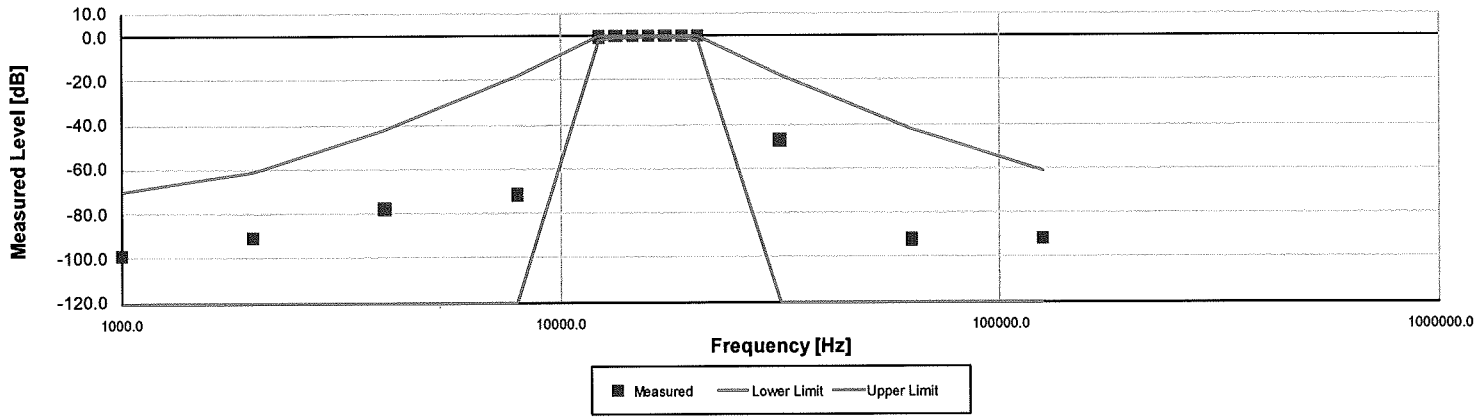
The SLM is set to normal range and 0 dB gain. Filter shape measured according to IEC 61260-3:2016 13 and ANSI S1.11-2016 Part 3 13 for compliance to IEC 61260-1:2014 5.10 and ANSI S1.11-2014 Part 1 5.10

Frequency [Hz]	Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
63.10	-103.27	-inf	-70.00	1.10	Pass
125.89	-103.23	-inf	-61.00	1.60	Pass
251.19	-99.01	-inf	-42.00	1.50	Pass
501.19	-75.23	-inf	-17.50	0.15	Pass
771.79	-0.22	-1.30	0.30	0.15	Pass
841.40	-0.03	-0.60	0.30	0.15	Pass
917.28	-0.02	-0.40	0.30	0.15	Pass
1,000.00	0.00	-0.30	0.30	0.15	Pass
1,090.18	-0.04	-0.40	0.30	0.15	Pass
1,188.50	-0.04	-0.60	0.30	0.15	Pass
1,295.69	-0.01	-1.30	0.30	0.15	Pass
1,995.26	-103.45	-inf	-17.50	0.35	Pass
3,981.07	-103.17	-inf	-42.00	0.40	Pass
7,943.28	-103.00	-inf	-61.00	0.54	Pass
15,848.93	-101.34	-inf	-70.00	0.53	Pass

-- End of measurement results--

1/1 Octave Filter: 16 kHz



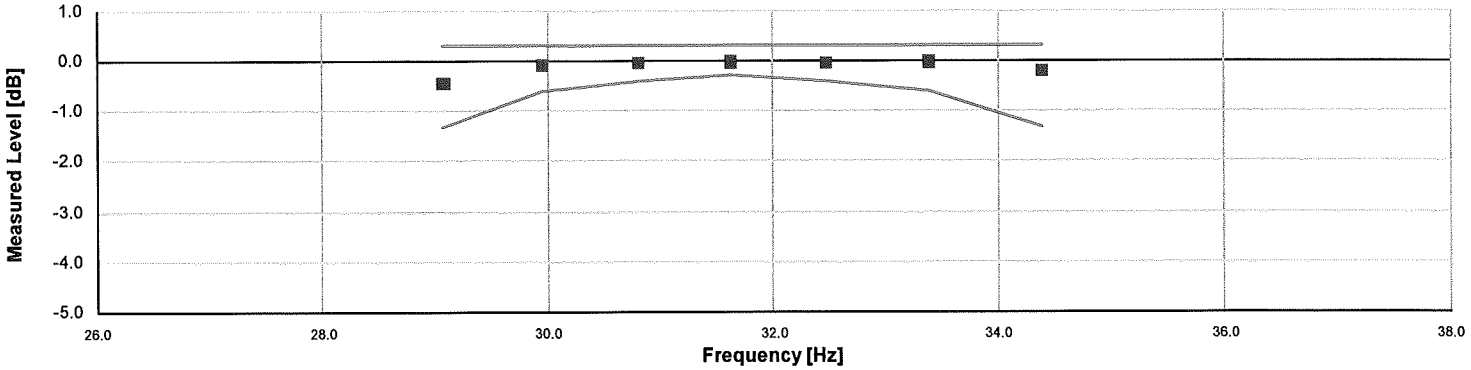


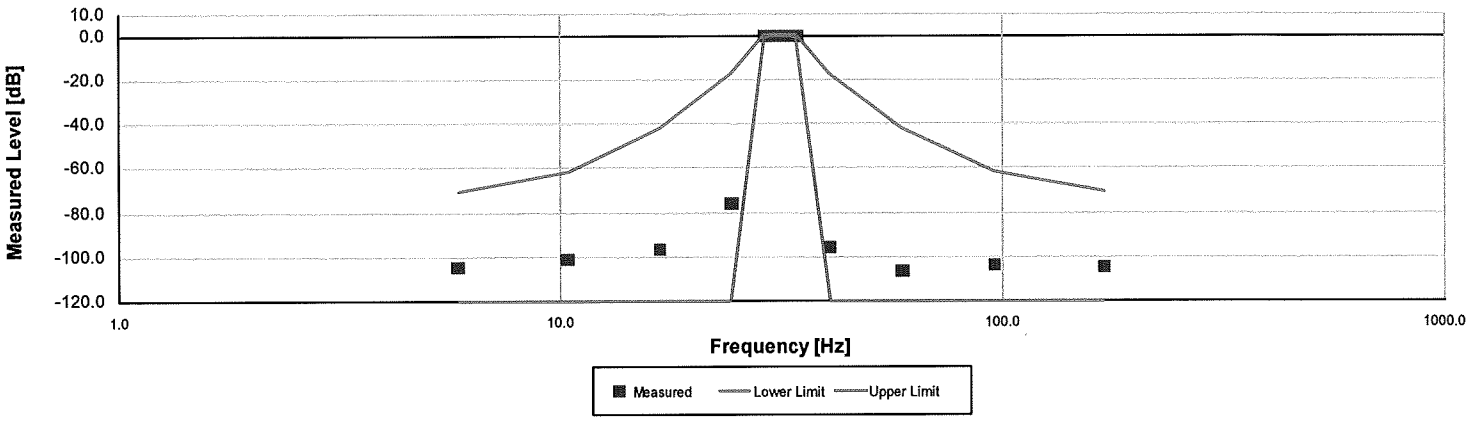
The SLM is set to normal range and 0 dB gain. Filter shape measured according to IEC 61260-3:2016 13 and ANSI S1.11-2016 Part 3 13 for compliance to IEC 61260-1:2014 5.10 and ANSI S1.11-2014 Part 1 5.10

Frequency [Hz]	Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
1,000.00	-98.86	-inf	-70.00	1.80	Pass
1,995.26	-90.83	-inf	-61.00	0.87	Pass
3,981.07	-77.82	-inf	-42.00	1.40	Pass
7,943.28	-71.45	-inf	-17.50	0.16	Pass
12,232.07	-0.27	-1.30	0.30	0.15	Pass
13,335.21	-0.04	-0.60	0.30	0.15	Pass
14,537.84	-0.05	-0.40	0.30	0.15	Pass
15,848.93	-0.04	-0.30	0.30	0.15	Pass
17,278.26	-0.03	-0.40	0.30	0.15	Pass
18,836.49	-0.04	-0.60	0.30	0.15	Pass
20,535.25	-0.03	-1.30	0.30	0.15	Pass
31,622.78	-47.24	-inf	-17.50	0.16	Pass
63,095.73	-92.13	-inf	-42.00	0.26	Pass
125,892.54	-91.62	-inf	-61.00	0.51	Pass

-- End of measurement results--

1/3 Octave Filter: 31.5 Hz



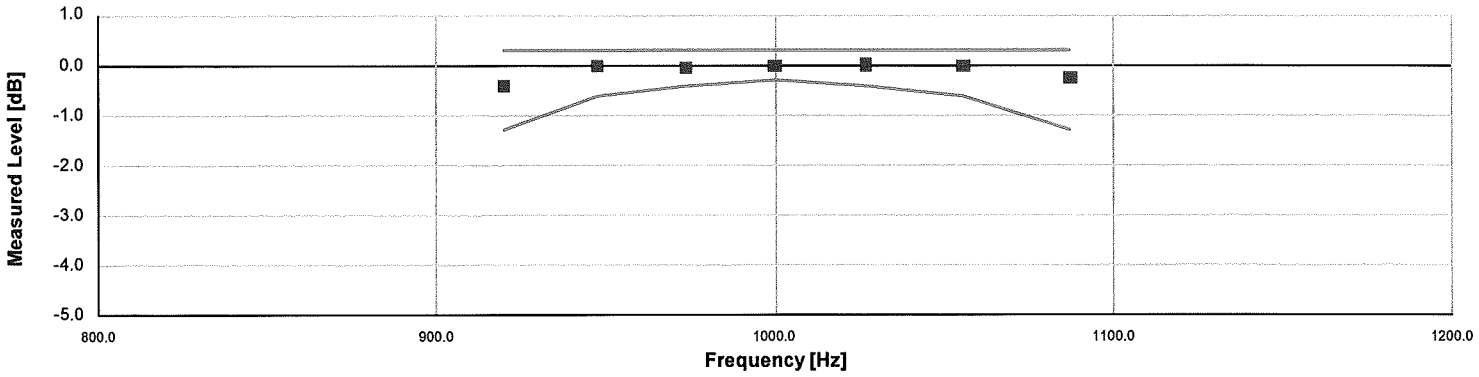


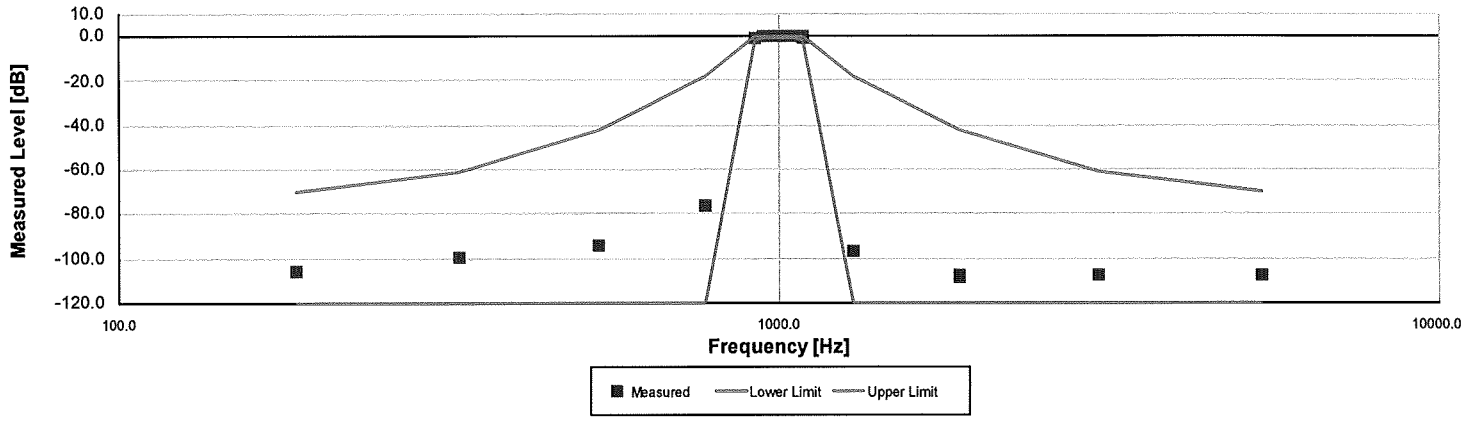
The SLM is set to normal range and 0 dB gain. Filter shape measured according to IEC 61260-3:2016 13 and ANSI S1.11-2016 Part 3 13 for compliance to IEC 61260-1:2014 5.10 and ANSI S1.11-2014 Part 1 5.10

Frequency [Hz]	Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
5.86	-104.35	-inf	-70.00	4.90	Pass
10.36	-101.33	-inf	-61.00	4.70	Pass
16.81	-96.48	-inf	-42.00	2.90	Pass
24.43	-75.94	-inf	-17.50	0.23	Pass
29.08	-0.45	-1.30	0.30	0.15	Pass
29.95	-0.08	-0.60	0.30	0.15	Pass
30.80	-0.05	-0.40	0.30	0.15	Pass
31.62	-0.03	-0.30	0.30	0.15	Pass
32.47	-0.04	-0.40	0.30	0.15	Pass
33.39	-0.02	-0.60	0.30	0.15	Pass
34.39	-0.21	-1.30	0.30	0.15	Pass
40.93	-95.67	-inf	-17.50	0.31	Pass
59.51	-106.55	-inf	-42.00	2.10	Pass
96.56	-103.80	-inf	-61.00	1.70	Pass
170.51	-104.53	-inf	-70.00	2.20	Pass

-- End of measurement results--

1/3 Octave Filter: 1 kHz



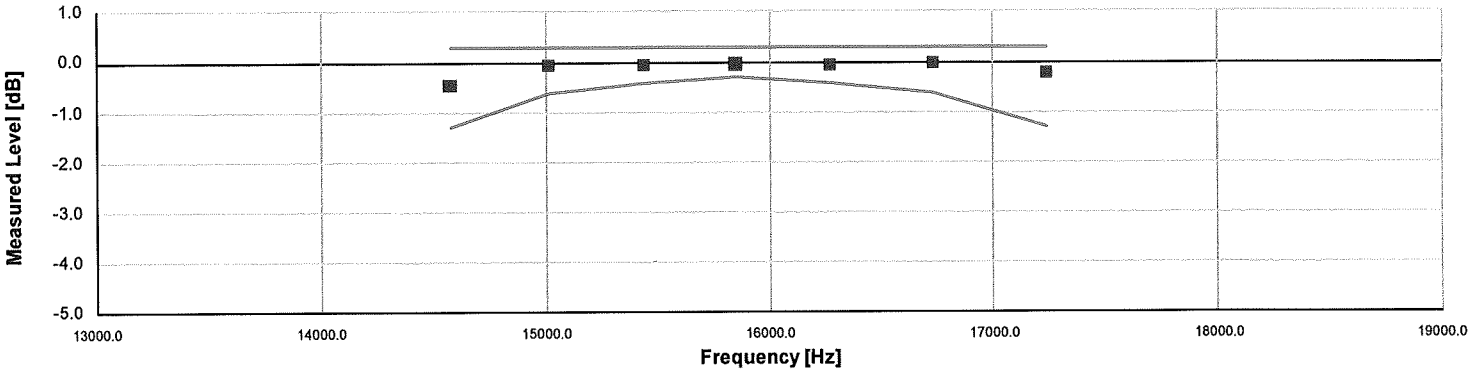


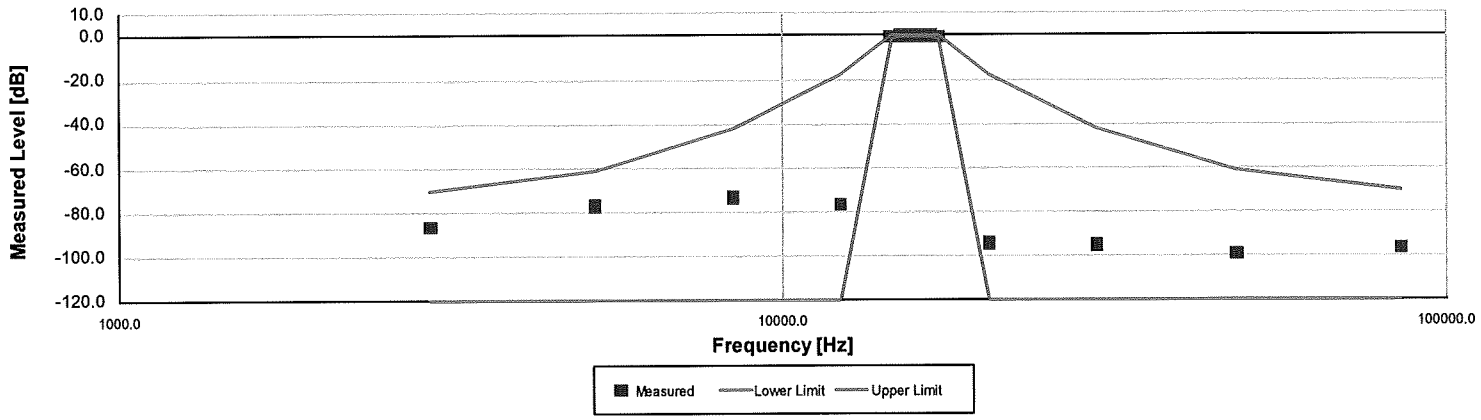
The SLM is set to normal range and 0 dB gain. Filter shape measured according to IEC 61260-3:2016 13 and ANSI S1.11-2016 Part 3 13 for compliance to IEC 61260-1:2014 5.10 and ANSI S1.11-2014 Part 1 5.10

Frequency [Hz]	Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
185.46	-105.76	-inf	-70.00	2.30	Pass
327.48	-99.45	-inf	-61.00	1.50	Pass
531.43	-94.13	-inf	-42.00	1.00	Pass
772.57	-76.22	-inf	-17.50	0.16	Pass
919.58	-0.41	-1.30	0.30	0.15	Pass
947.19	0.00	-0.60	0.30	0.15	Pass
974.02	-0.04	-0.40	0.30	0.15	Pass
1,000.00	0.00	-0.30	0.30	0.15	Pass
1,026.67	0.00	-0.40	0.30	0.15	Pass
1,055.75	-0.01	-0.60	0.30	0.15	Pass
1,087.46	-0.24	-1.30	0.30	0.15	Pass
1,294.37	-96.99	-inf	-17.50	0.22	Pass
1,881.73	-108.15	-inf	-42.00	0.41	Pass
3,053.65	-107.46	-inf	-61.00	0.38	Pass
5,391.95	-107.54	-inf	-70.00	0.43	Pass

-- End of measurement results--

1/3 Octave Filter: 16 kHz





The SLM is set to normal range and 0 dB gain. Filter shape measured according to IEC 61260-3:2016 13 and ANSI S1.11-2016 Part 3 13 for compliance to IEC 61260-1:2014 5.10 and ANSI S1.11-2014 Part 1 5.10

Frequency [Hz]	Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
2,939.37	-86.50	-inf	-70.00	2.10	Pass
5,190.16	-76.79	-inf	-61.00	1.30	Pass
8,422.54	-73.06	-inf	-42.00	2.10	Pass
12,244.48	-75.96	-inf	-17.50	0.16	Pass
14,574.31	-0.45	-1.30	0.30	0.15	Pass
15,011.95	-0.06	-0.60	0.30	0.15	Pass
15,437.16	-0.05	-0.40	0.30	0.15	Pass
15,848.93	-0.04	-0.30	0.30	0.15	Pass
16,271.69	-0.06	-0.40	0.30	0.15	Pass
16,732.58	-0.03	-0.60	0.30	0.15	Pass
17,235.03	-0.23	-1.30	0.30	0.15	Pass
20,514.45	-93.83	-inf	-17.50	0.32	Pass
29,823.37	-94.75	-inf	-42.00	0.69	Pass
48,397.12	-98.75	-inf	-61.00	0.36	Pass
85,456.63	-96.46	-inf	-70.00	0.35	Pass

-- End of measurement results--

-- End of Report--

Signatory: *Jason Grace*

LARSON DAVIS - A PCB PIEZOTRONICS DIV.
1681 West 820 North
Provo, UT 84601, United States
716-684-0001

ACCREDITED Cert. #3622.01

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A PCB PIEZOTRONICS DIV.

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A PCB GROUP CO.

3149 East Kemper Rd.
Cincinnati, OH 45241
Ph: 513-351-9919
Fax: 513-458-2172
www.modalshop.com

~Certificate of Calibration~

Manufacturer: PCB
Model Number: 377B02
Serial Number: 311788
Asset ID:
Description: Free-Field Microphone

Customer: TMS Rental
Address:

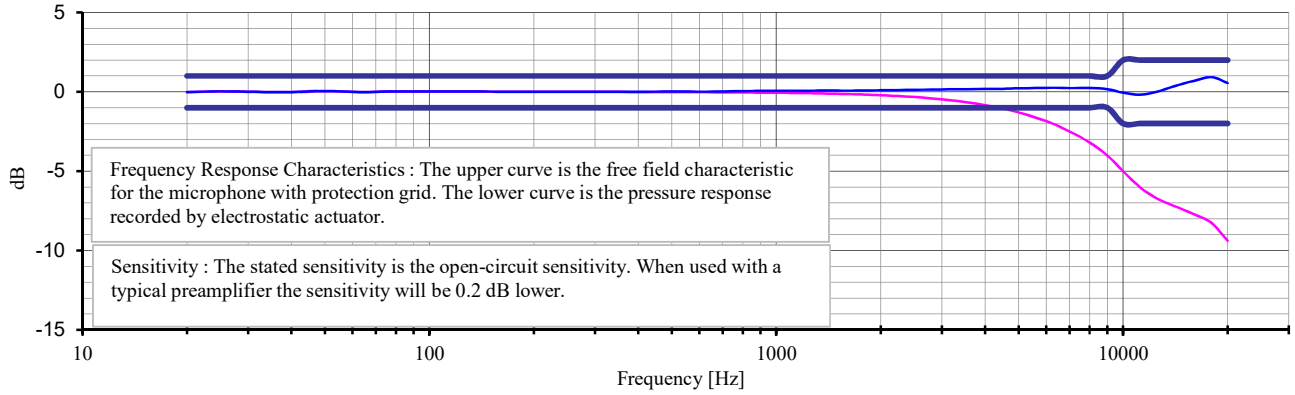
Cal Date / Cal ID: Apr 20, 2020 09:32:01
Due Date:

Sensitivity:	**250 Hz**	**1 kHz**	
	-25.29	-25.35	dB re. 1V/Pa
	54.39	54.00	mV/Pa

Temperature: 71 (22) °F (°C)
Humidity: 32 %
Ambient Pressure: 987 mbar

Reference Sens: In Tolerance
Freq. Response: In Tolerance

Polarization Voltage: 0 VDC



Traceability: The calibration is traceable through NIST Project A2007.
Notes: Calibration results relate only to the items calibrated.
This certificate may not be reproduced, except in full, without written permission.
This calibration is performed in compliance with ISO 9001, ISO 17025 and ANSI Z540.
Measurement uncertainty (250 Hz sensitivity calibration) at 95% confidence level: 0.30 dB
Calibrated per procedure PRD-P204.

User Note: As Found / As Left: In Tolerance.

Frequency Response with reference to level at 250 Hz

Frequency (Hz)	Upper (dB)	Frequency (Hz)	Upper (dB)	Frequency (Hz)	Upper (dB)	Frequency (Hz)	Upper (dB)
20	-0.02	**630**	0.01	**4500**	0.19		
25	0.03	**800**	0.05	**5000**	0.22		
31.5	-0.01	**1000**	0.06	**5600**	0.24		
40	-0.02	**1120**	0.07	**6300**	0.26		
50	0.05	**1250**	0.07	**7100**	0.23		
63	-0.01	**1400**	0.08	**8000**	0.24		
80	0.03	**1600**	0.07	**9000**	0.17		
100	0.02	**1800**	0.08	**10000**	-0.06		
125	0.02	**2000**	0.10	**11200**	-0.18		
160	0.01	**2240**	0.10	**12500**	0.00		
200	0.01	**2500**	0.13	**14000**	0.34		
250	0.00	**2800**	0.14	**16000**	0.69		
315	0.01	**3150**	0.16	**18000**	0.92		
400	0.00	**3550**	0.16	**20000**	0.56		
500	0.02	**4000**	0.18				

Technician: Ed Devlin
Approval: <Original signed by>

Reference Equipment Used:

Manuf.	*Model*	*Serial*	*Cal. Date*	*Due Date*
GRAS	40AG	58094	2/19/2020	2/19/2021

ACCREDITED
Calibration Lab
CALIBRATION CERT 2649.01

Calibration Certificate

Certificate Number 2019009566

Customer:
The Modal Shop
3149 East Kemper Road
Cincinnati, OH 45241, United States

Model Number	CAL200	***Procedure Number***	D0001.8386		
Serial Number	17041	***Technician***	Scott Montgomery		
Test Results	**Pass**	***Calibration Date***	1 Aug 2019		
Initial Condition	As Manufactured	***Calibration Due***			
		Temperature	22	°C	± 0.3 °C
Description	Larson Davis CAL200 Acoustic Calibrator	***Humidity***	45	%RH	± 3 %RH
		Static Pressure	100.9	kPa	± 1 kPa

Evaluation Method The data is aquired by the insert voltage calibration method using the reference microphone's open circuit sensitivity. Data reported in dB re 20 µPa.

Compliance Standards Compliant to Manufacturer Specifications per D0001.8190 and the following standards:
IEC 60942:2017 ANSI S1.40-2006

Issuing lab certifies that the instrument described above meets or exceeds all specifications as stated in the referenced procedure (unless otherwise noted). It has been calibrated using measurement standards traceable to the SI through the National Institute of Standards and Technology (NIST), or other national measurement institutes, and meets the requirements of ISO/IEC 17025:2005.
Test points marked with a ‡ in the uncertainties column do not fall within this laboratory's scope of accreditation.

The quality system is registered to ISO 9001:2015.

This calibration is a direct comparison of the unit under test to the listed reference standards and did not involve any sampling plans to complete. No allowance has been made for the instability of the test device due to use, time, etc. Such allowances would be made by the customer as needed.

The uncertainties were computed in accordance with the ISO Guide to the Expression of Uncertainty in Measurement (GUM). A coverage factor of approximately 2 sigma (k=2) has been applied to the standard uncertainty to express the expanded uncertainty at approximately 95% confidence level.

Standards Used

Description	Cal Date	Cal Due	Cal Standard
Agilent 34401A DMM	09/06/2018	09/06/2019	001021
Larson Davis Model 2900 Real Time Analyzer	04/02/2019	04/02/2020	001051
Microphone Calibration System	03/04/2019	03/04/2020	005446
1/2" Preamplifier	09/20/2018	09/20/2019	006506
Larson Davis 1/2" Preamplifier 7-pin LEMO	08/07/2018	08/07/2019	006507
1/2 inch Microphone - RI - 200V	11/12/2018	11/12/2019	006511
Pressure Transducer	06/24/2019	06/24/2020	007310

Output Level

Nominal Level [dB]	Pressure [kPa]	Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
114	101.0	114.00	113.80	114.20	0.14	Pass
94	100.9	93.99	93.80	94.20	0.14	Pass

-- End of measurement results--

Frequency

Nominal Level [dB]	Pressure [kPa]	Test Result [Hz]	Lower limit [Hz]	Upper limit [Hz]	Expanded Uncertainty [Hz]	Result
114	101.0	1,000.08	990.00	1,010.00	0.20	Pass
94	100.9	1,000.08	990.00	1,010.00	0.20	Pass

-- End of measurement results--

Total Harmonic Distortion + Noise (THD+N)

Nominal Level [dB]	Pressure [kPa]	Test Result [%]	Lower limit [%]	Upper limit [%]	Expanded Uncertainty [%]	Result
114	101.0	0.33	0.00	2.00	0.25 ‡	Pass
94	100.9	0.44	0.00	2.00	0.25 ‡	Pass

-- End of measurement results--

Level Change Over Pressure

Tested at: 114 dB, 23 °C, 46 %RH

Nominal Pressure [kPa]	Pressure [kPa]	Test Result [dB]	Lower limit [dB]	Upper limit [dB]	Expanded Uncertainty [dB]	Result
108.0	108.0	-0.03	-0.30	0.30	0.04 ‡	Pass
101.3	101.4	0.00	-0.30	0.30	0.04 ‡	Pass
92.0	92.0	0.04	-0.30	0.30	0.04 ‡	Pass
83.0	82.9	0.05	-0.30	0.30	0.04 ‡	Pass
74.0	74.0	0.04	-0.30	0.30	0.04 ‡	Pass
65.0	65.1	-0.01	-0.30	0.30	0.04 ‡	Pass

-- End of measurement results--

Frequency Change Over Pressure

Tested at: 114 dB, 23 °C, 46 %RH

Nominal Pressure [kPa]	Pressure [kPa]	Test Result [Hz]	Lower limit [Hz]	Upper limit [Hz]	Expanded Uncertainty [Hz]	Result
108.0	108.0	0.00	-10.00	10.00	0.20 ‡	Pass
101.3	101.4	0.00	-10.00	10.00	0.20 ‡	Pass
92.0	92.0	0.00	-10.00	10.00	0.20 ‡	Pass
83.0	82.9	-0.01	-10.00	10.00	0.20 ‡	Pass
74.0	74.0	-0.01	-10.00	10.00	0.20 ‡	Pass
65.0	65.1	-0.01	-10.00	10.00	0.20 ‡	Pass

-- End of measurement results--

Total Harmonic Distortion + Noise (THD+N) Over Pressure

Tested at: 114 dB, 23 °C, 46 %RH

Nominal Pressure [kPa]	Pressure [kPa]	Test Result [%]	Lower limit [%]	Upper limit [%]	Expanded Uncertainty [%]	Result
108.0	108.0	0.32	0.00	2.00	0.25 ‡	Pass
101.3	101.4	0.32	0.00	2.00	0.25 ‡	Pass
92.0	92.0	0.31	0.00	2.00	0.25 ‡	Pass
83.0	82.9	0.32	0.00	2.00	0.25 ‡	Pass
74.0	74.0	0.33	0.00	2.00	0.25 ‡	Pass
65.0	65.1	0.36	0.00	2.00	0.25 ‡	Pass

-- End of measurement results--

Signatory: *Scott Montgomery*

LARSON DAVIS - A PCB PIEZOTRONICS DIV.
1681 West 820 North
Provo, UT 84601, United States
716-684-0001

ilac-MRA A2LA ACCREDITED Cert. #3622.01

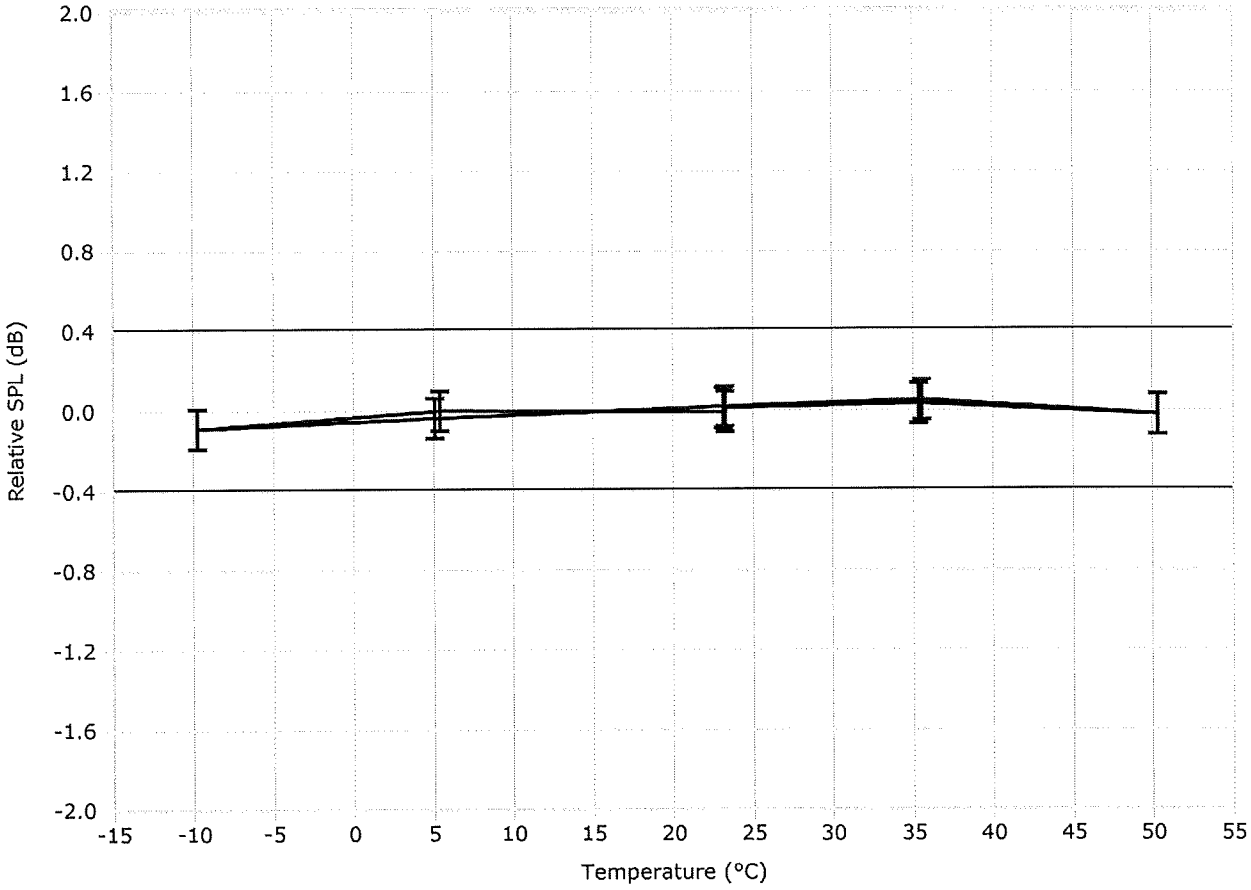
LARSON DAVIS
A PCB PIEZOTRONICS DIV.

Model CAL200 Relative SPL vs. Temperature

Larson Davis Model CAL200 Serial Number: 17041

Model CAL200 Relative SPL vs. Temperature at 50% RH.
A 2559 Mic (SN: 2892) with a PRM901 Preamp (SN: 0148), station 2 was used to check the levels.

Test Date: 24 Jun 2019 2:34:29 PM



0.1dB expanded uncertainty at ~95% confidence level (k=2)

Sequence File: CAL200.SEQ

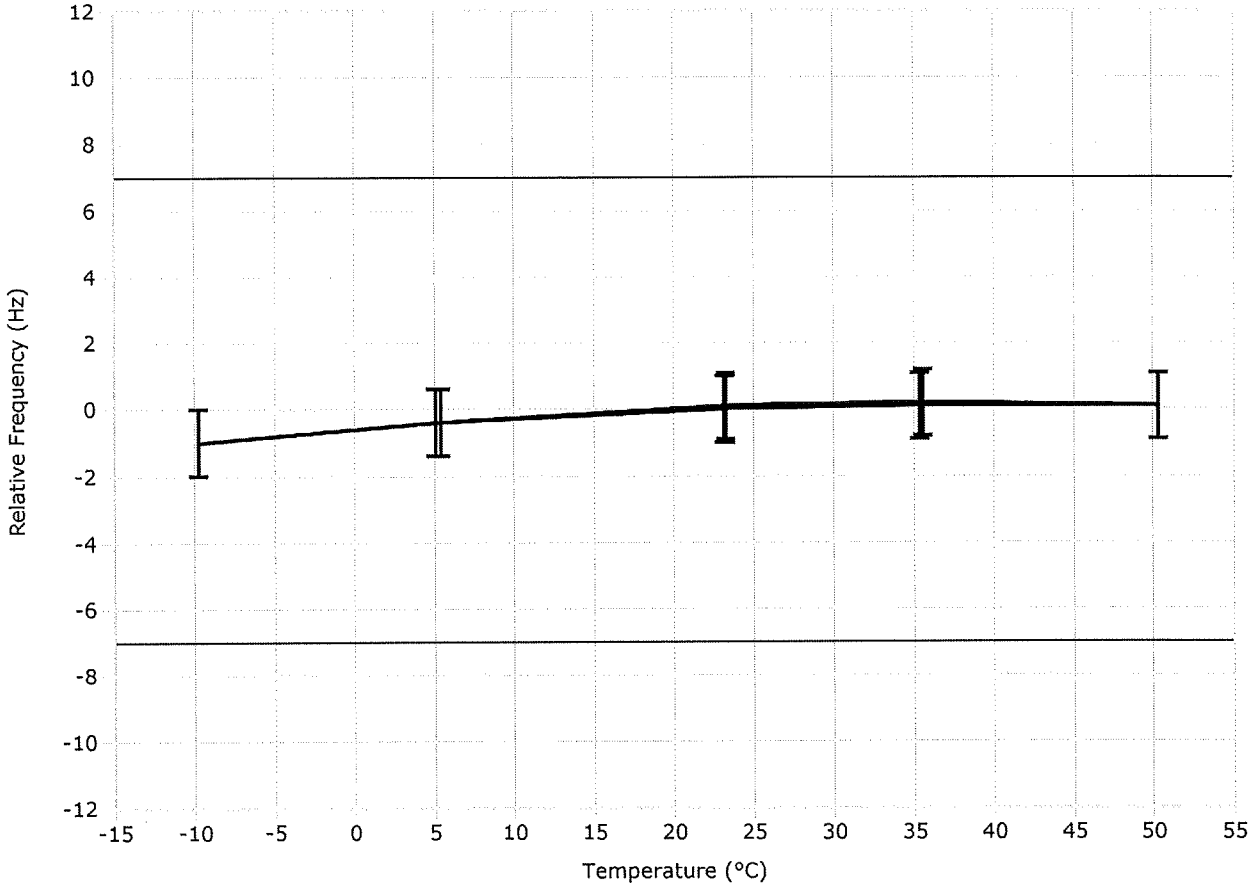
Test Location: Larson Davis, a division of PCB Piezotronics, Inc.
1681 West 820 North, Provo, Utah 84601
Tel: 716 684-0001 www.LarsonDavis.com

Model CAL200 Relative Frequency vs. Temperature

Larson Davis Model CAL200 Serial Number: 17041

Model CAL200 Relative Frequency vs. Temperature at 50% RH.
A 2559 Mic (SN: 2892) with a PRM901 Preamp (SN: 0148), station 2 was used to check the levels.

Test Date: 24 Jun 2019 2:34:29 PM



1.0 Hz expanded uncertainty at ~95% confidence level (k=2)

Sequence File: CAL200.SEQ

Test Location: Larson Davis, a division of PCB Piezotronics, Inc.
1681 West 820 North, Provo, Utah 84601
Tel: 716 684-0001 www.LarsonDavis.com

APPENDIX B

Laboratory Analysis Reports

Your Project #: 121416288
Site Location: Pasadena NL

Attention: GILLIAN HATCHER

STANTEC CONSULTING LTD
40 HIGHFIELD PARK DRIVE
SUITE 102
DARTMOUTH, NS
CANADA B3A 0A3

Report Date: 2020/07/09
Report #: R2900683
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C045073
Received: 2020/06/30, 14:35

Sample Matrix: Air
Samples Received: 2

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
NO2 Passive Analysis	1	2020/07/02	2020/07/09	PTC SOP-00148	Passive NO2 in ATM
SO2 Passive Analysis	1	2020/07/02	2020/07/09	PTC SOP-00149	Passive SO2 in ATM

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Levi Manchak, Project Manager SR
Email: Levi.MANCHAK@bvlabs.com
Phone# (780)378-8542

==========

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Bureau Veritas Laboratories Edmonton: 6744 - 50th Street T6B 3M9 Telephone(780) 378-8500 FAX(780) 378-8699

BV Labs Job #: C045073
Report Date: 2020/07/09

STANTEC CONSULTING LTD
Client Project #: 121416288
Site Location: Pasadena NL

RESULTS OF CHEMICAL ANALYSES OF AIR

BV Labs ID		XZ9919	XZ9929		
Sampling Date		2020/06/15	2020/06/15		
	UNITS	VICSO2-20200619	VICNO2-20200619	RDL	QC Batch
Passive Monitoring					
Calculated NO2	ppb	N/A	<0.1	0.1	9907601
Calculated SO2	ppb	1.0	N/A	0.1	9905667

RDL = Reportable Detection Limit
N/A = Not Applicable

Bureau Veritas Laboratories Edmonton: 6744 - 50th Street T6B 3M9 Telephone(780) 378-8500 FAX(780) 378-8699

GENERAL COMMENTS

Results relate only to the items tested.

Bureau Veritas Laboratories Edmonton: 6744 - 50th Street T6B 3M9 Telephone(780) 378-8500 FAX(780) 378-8699

BV Labs Job #: C045073
Report Date: 2020/07/09

QUALITY ASSURANCE REPORT

STANTEC CONSULTING LTD
Client Project #: 121416288
Site Location: Pasadena NL

			Spiked Blank		Method Blank	
QC Batch	**Parameter**	**Date**	**% Recovery**	**QC Limits**	**Value**	**UNITS**
9905667	Calculated SO2		103	90 - 110	<0.1	ppb
9907601	Calculated NO2		98	90 - 110	<0.1	ppb

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Bureau Veritas Laboratories Edmonton: 6744 - 50th Street T6B 3M9 Telephone(780) 378-8500 FAX(780) 378-8699

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

<Original signed by>

Carmen Toker, CT, Manager Air Laboratory Services

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Bureau Veritas Laboratories Edmonton: 6744 - 50th Street T6B 3M9 Telephone(780) 378-8500 FAX(780) 378-8699

Your Project #: 121416288.400.800
Site Location: MARATHON GOLD
Your C.O.C. #: na

Attention: Gillian Hatcher

Stantec Consulting Ltd
40 Highfield Park Drive
Suite 102
Dartmouth, NS
CANADA B3A 0A3

Report Date: 2020/07/21
Report #: R6255098
Version: 2 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

BV LABS JOB #: C0G6519
Received: 2020/07/06, 09:50

Sample Matrix: Filter
Samples Received: 8

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Total Metals on Hi-Vol Filter (6020Amod)	3	2020/07/07	2020/07/08	BRL SOP-00103 / BRL SOP-00102	EPA 6020A m
Total Metals on Small Filter (6020Bmod)	4	2020/07/14	2020/07/16	BRL SOP-00103 / BRL SOP-00102	EPA 6020B m
Particulate Calculation PM 10 (IO-2mod)	3	N/A	2020/07/08	BRL SOP-00109	EPA IO-2mod
Total Particulate (PM10)	4	N/A	2020/07/08	BRL SOP-00109	Mthd IO-3-1
Particulate Calculation	3	N/A	2020/07/21	BRL SOP-00109	EPA IO-2mod
Total Particulate	4	N/A	2020/07/08	BRL SOP-00109	Mthd IO-3-1
Air Volume from LoVol Sampling	6	N/A	2020/07/08		

Remarks:

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by BV Labs are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by BV Labs, unless otherwise agreed in writing. BV Labs is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by BV Labs, results relate to the supplied samples tested.

Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

55555 North Service Road, Burlington, Ontario, Canada L7L 5H7 Tel: (905) 332-8788 Toll Free: (800) 668-0639 Fax: (905) 332-9169

Your Project #: 121416288.400.800
Site Location: MARATHON GOLD
Your C.O.C. #: na

Attention: Gillian Hatcher

Stantec Consulting Ltd
40 Highfield Park Drive
Suite 102
Dartmouth, NS
CANADA B3A 0A3

Report Date: 2020/07/21
Report #: R6255098
Version: 2 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

BV LABS JOB #: C0G6519
Received: 2020/07/06, 09:50

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Cristina (Maria) Bacchus, Project Manager
Email: MariaCristina.Bacchus@bvlabs.com
Phone# (905)817-5763
==========
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55555 North Service Road, Burlington, Ontario, Canada L7L 5H7 Tel: (905) 332-8788 Toll Free: (800) 668-0639 Fax: (905) 332-9169

BV Labs Job #: C0G6519
Report Date: 2020/07/21

Stantec Consulting Ltd
Client Project #: 121416288.400.800
Site Location: MARATHON GOLD
Sampler Initials: DR

RESULTS OF ANALYSES OF FILTER

BV Labs ID		NAN906		NAN907			NAN908		
Sampling Date		2020/06/15		2020/06/15			2020/06/16		
COC Number		na		na			na		
	UNITS	**PM10-01-20200615 83110050**	**QC Batch**	**TSP-01-20200615 83110043**	**RDL**	**QC Batch**	**PM10-02-20200616 83110044**	**RDL**	**QC Batch**
Particulate	ug/m3	N/A	6847014	5.1	1.3	6847014	N/A	1.3	6847014
PM 10 Particulate	ug/m3	5.1	6823141	N/A	1.2	6823141	7.5	1.3	6823141
Particulate Weight on Filter	ug	124	6824471	123	30	6847081	178	30	6824471
Volume	m3	24.10	ONSITE	23.80	N/A	ONSITE	23.89	N/A	ONSITE

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

BV Labs ID		NAN909		NAN910		NAN911		
Sampling Date		2020/06/16		2020/06/17		2020/06/17		
COC Number		na		na		na		
	UNITS	**TSP-02-20200616 83110045**	**QC Batch**	**PM10-03-20200617 83110047**	**QC Batch**	**TSP-03-20200617 83110042**	**RDL**	**QC Batch**
Particulate	ug/m3	8.6	6847014	N/A	6847014	13.8	1.2	6847014
PM 10 Particulate	ug/m3	N/A	6823141	13.0	6823141	N/A	1.2	6823141
Particulate Weight on Filter	ug	207	6847081	314	6824471	332	30	6847081
Volume	m3	24.01	ONSITE	24.03	ONSITE	24.04	N/A	ONSITE

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

BV Labs ID		NAN912		NAN913		
Sampling Date		2020/06/17		2020/06/17		
COC Number		na		na		
	UNITS	**PM10-FB-20200617 83110049**	**QC Batch**	**TSP-FB-20200617 83110046**	**RDL**	**QC Batch**
Particulate Weight on Filter	ug	36	6824471	31	30	6847081

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

55555 North Service Road, Burlington, Ontario, Canada L7L 5H7 Tel: (905) 332-8788 Toll Free: (800) 668-0639 Fax: (905) 332-9169

BV Labs Job #: C0G6519
Report Date: 2020/07/21

Stantec Consulting Ltd
Client Project #: 121416288.400.800
Site Location: MARATHON GOLD
Sampler Initials: DR

ELEMENTS BY ATOMIC SPECTROSCOPY (FILTER)

BV Labs ID		NAN907	NAN907		NAN909		
Sampling Date		2020/06/15	2020/06/15		2020/06/16		
COC Number		na	na		na		
	UNITS	**TSP-01-20200615 83110043**	**TSP-01-20200615 83110043 Lab-Dup**	**RDL**	**TSP-02-20200616 83110045**	**RDL**	**QC Batch**
Metals							
Total Aluminum (Al)	ug	<2.0	<2.0	2.0	2.1	2.0	6834730
Total Aluminum (Al)	ug/m3	<0.084	N/A	0.084	0.087	0.083	6823140
Total Antimony (Sb)	ug	<0.050	<0.050	0.050	<0.050	0.050	6834730
Total Antimony (Sb)	ug/m3	<0.0021	N/A	0.0021	<0.0021	0.0021	6823140
Total Arsenic (As)	ug	<0.050	<0.050	0.050	<0.050	0.050	6834730
Total Arsenic (As)	ug/m3	<0.0021	N/A	0.0021	<0.0021	0.0021	6823140
Total Barium (Ba)	ug	<0.050	<0.050	0.050	<0.050	0.050	6834730
Total Barium (Ba)	ug/m3	<0.0021	N/A	0.0021	<0.0021	0.0021	6823140
Total Beryllium (Be)	ug	<0.030	<0.030	0.030	<0.030	0.030	6834730
Total Beryllium (Be)	ug/m3	<0.0013	N/A	0.0013	<0.0012	0.0012	6823140
Total Bismuth (Bi)	ug	<0.050	<0.050	0.050	<0.050	0.050	6834730
Total Bismuth (Bi)	ug/m3	<0.0021	N/A	0.0021	<0.0021	0.0021	6823140
Total Boron (B)	ug	<1.0	<1.0	1.0	<1.0	1.0	6834730
Total Boron (B)	ug/m3	<0.042	N/A	0.042	<0.042	0.042	6823140
Total Cadmium (Cd)	ug	<0.010	<0.010	0.010	<0.010	0.010	6834730
Total Cadmium (Cd)	ug/m3	<0.00042	N/A	0.00042	<0.00042	0.00042	6823140
Total Calcium (Ca)	ug	<5.0	<5.0	5.0	5.0	5.0	6834730
Total Calcium (Ca)	ug/m3	<0.21	N/A	0.21	0.21	0.21	6823140
Total Chromium (Cr)	ug	<0.050	<0.050	0.050	<0.050	0.050	6834730
Total Chromium (Cr)	ug/m3	<0.0021	N/A	0.0021	<0.0021	0.0021	6823140
Total Cobalt (Co)	ug	<0.030	<0.030	0.030	<0.030	0.030	6834730
Total Cobalt (Co)	ug/m3	<0.0013	N/A	0.0013	<0.0012	0.0012	6823140
Total Copper (Cu)	ug	<0.030	<0.030	0.030	<0.030	0.030	6834730
Total Copper (Cu)	ug/m3	<0.0013	N/A	0.0013	<0.0012	0.0012	6823140
Total Iron (Fe)	ug	<5.0	<5.0	5.0	<5.0	5.0	6834730
Total Iron (Fe)	ug/m3	<0.21	N/A	0.21	<0.21	0.21	6823140
Total Lead (Pb)	ug	<0.030	<0.030	0.030	<0.030	0.030	6834730
Total Lead (Pb)	ug/m3	<0.0013	N/A	0.0013	<0.0012	0.0012	6823140
Total Magnesium (Mg)	ug	<1.0	<1.0	1.0	1.2	1.0	6834730
Total Magnesium (Mg)	ug/m3	<0.042	N/A	0.042	0.050	0.042	6823140
Total Manganese (Mn)	ug	0.074	0.064	0.050	0.076	0.050	6834730
Total Manganese (Mn)	ug/m3	0.0031	N/A	0.0021	0.0032	0.0021	6823140

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
N/A = Not Applicable

55555 North Service Road, Burlington, Ontario, Canada L7L 5H7 Tel: (905) 332-8788 Toll Free: (800) 668-0639 Fax: (905) 332-9169

BV Labs Job #: C0G6519
Report Date: 2020/07/21

Stantec Consulting Ltd
Client Project #: 121416288.400.800
Site Location: MARATHON GOLD
Sampler Initials: DR

ELEMENTS BY ATOMIC SPECTROSCOPY (FILTER)

BV Labs ID		NAN907	NAN907		NAN909		
Sampling Date		2020/06/15	2020/06/15		2020/06/16		
COC Number		na	na		na		
	UNITS	**TSP-01-20200615 83110043**	**TSP-01-20200615 83110043 Lab-Dup**	**RDL**	**TSP-02-20200616 83110045**	**RDL**	**QC Batch**
Total Molybdenum (Mo)	ug	<0.030	<0.030	0.030	<0.030	0.030	6834730
Total Molybdenum (Mo)	ug/m3	<0.0013	N/A	0.0013	<0.0012	0.0012	6823140
Total Nickel (Ni)	ug	<0.050	<0.050	0.050	<0.050	0.050	6834730
Total Nickel (Ni)	ug/m3	<0.0021	N/A	0.0021	<0.0021	0.0021	6823140
Total Phosphorus (P)	ug	<5.0	<5.0	5.0	<5.0	5.0	6834730
Total Potassium (K)	ug	<5.0	<5.0	5.0	<5.0	5.0	6834730
Total Potassium (K)	ug/m3	<0.21	N/A	0.21	<0.21	0.21	6823140
Total Selenium (Se)	ug	<0.10	<0.10	0.10	<0.10	0.10	6834730
Total Selenium (Se)	ug/m3	<0.0042	N/A	0.0042	<0.0042	0.0042	6823140
Total Silver (Ag)	ug	<0.010	<0.010	0.010	<0.010	0.010	6834730
Total Silver (Ag)	ug/m3	<0.00042	N/A	0.00042	<0.00042	0.00042	6823140
Total Sodium (Na)	ug	<5.0	<5.0	5.0	<5.0	5.0	6834730
Total Sodium (Na)	ug/m3	<0.21	N/A	0.21	<0.21	0.21	6823140
Total Strontium (Sr)	ug	<0.050	<0.050	0.050	<0.050	0.050	6834730
Total Strontium (Sr)	ug/m3	<0.0021	N/A	0.0021	<0.0021	0.0021	6823140
Total Thallium (Tl)	ug	<0.010	<0.010	0.010	<0.010	0.010	6834730
Total Thallium (Tl)	ug/m3	<0.00042	N/A	0.00042	<0.00042	0.00042	6823140
Total Tin (Sn)	ug	<0.030	<0.030	0.030	<0.030	0.030	6834730
Total Tin (Sn)	ug/m3	<0.0013	N/A	0.0013	<0.0012	0.0012	6823140
Total Titanium (Ti)	ug	<0.10	<0.10	0.10	<0.10	0.10	6834730
Total Titanium (Ti)	ug/m3	<0.0042	N/A	0.0042	<0.0042	0.0042	6823140
Total Uranium (U)	ug	<0.010	<0.010	0.010	<0.010	0.010	6834730
Total Uranium (U)	ug/m3	<0.00042	N/A	0.00042	<0.00042	0.00042	6823140
Total Vanadium (V)	ug	<0.030	<0.030	0.030	<0.030	0.030	6834730
Total Vanadium (V)	ug/m3	<0.0013	N/A	0.0013	<0.0012	0.0012	6823140
Total Zinc (Zn)	ug	<0.50	<0.50	0.50	<0.50	0.50	6834730
Total Zinc (Zn)	ug/m3	<0.021	N/A	0.021	<0.021	0.021	6823140

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
N/A = Not Applicable

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Stantec Consulting Ltd
Client Project #: 121416288.400.800
Site Location: MARATHON GOLD
Sampler Initials: DR

ELEMENTS BY ATOMIC SPECTROSCOPY (FILTER)

BV Labs ID		NAN911	NAN913		
Sampling Date		2020/06/17	2020/06/17		
COC Number		na	na		
	UNITS	**TSP-03-20200617 83110042**	**TSP-FB-20200617 83110046**	**RDL**	**QC Batch**
Metals					
Total Aluminum (Al)	ug	4.0	<2.0	2.0	6834730
Total Aluminum (Al)	ug/m3	0.17	N/A	0.083	6823140
Total Antimony (Sb)	ug	<0.050	<0.050	0.050	6834730
Total Antimony (Sb)	ug/m3	<0.0021	N/A	0.0021	6823140
Total Arsenic (As)	ug	<0.050	<0.050	0.050	6834730
Total Arsenic (As)	ug/m3	<0.0021	N/A	0.0021	6823140
Total Barium (Ba)	ug	<0.050	<0.050	0.050	6834730
Total Barium (Ba)	ug/m3	<0.0021	N/A	0.0021	6823140
Total Beryllium (Be)	ug	<0.030	<0.030	0.030	6834730
Total Beryllium (Be)	ug/m3	<0.0012	N/A	0.0012	6823140
Total Bismuth (Bi)	ug	<0.050	<0.050	0.050	6834730
Total Bismuth (Bi)	ug/m3	<0.0021	N/A	0.0021	6823140
Total Boron (B)	ug	<1.0	<1.0	1.0	6834730
Total Boron (B)	ug/m3	<0.042	N/A	0.042	6823140
Total Cadmium (Cd)	ug	<0.010	<0.010	0.010	6834730
Total Cadmium (Cd)	ug/m3	<0.00042	N/A	0.00042	6823140
Total Calcium (Ca)	ug	5.7	<5.0	5.0	6834730
Total Calcium (Ca)	ug/m3	0.24	N/A	0.21	6823140
Total Chromium (Cr)	ug	<0.050	0.052	0.050	6834730
Total Chromium (Cr)	ug/m3	<0.0021	N/A	0.0021	6823140
Total Cobalt (Co)	ug	<0.030	<0.030	0.030	6834730
Total Cobalt (Co)	ug/m3	<0.0012	N/A	0.0012	6823140
Total Copper (Cu)	ug	<0.030	<0.030	0.030	6834730
Total Copper (Cu)	ug/m3	<0.0012	N/A	0.0012	6823140
Total Iron (Fe)	ug	<5.0	<5.0	5.0	6834730
Total Iron (Fe)	ug/m3	<0.21	N/A	0.21	6823140
Total Lead (Pb)	ug	<0.030	<0.030	0.030	6834730
Total Lead (Pb)	ug/m3	<0.0012	N/A	0.0012	6823140
Total Magnesium (Mg)	ug	2.7	<1.0	1.0	6834730
Total Magnesium (Mg)	ug/m3	0.11	N/A	0.042	6823140
Total Manganese (Mn)	ug	0.17	<0.050	0.050	6834730
Total Manganese (Mn)	ug/m3	0.0070	N/A	0.0021	6823140
Total Molybdenum (Mo)	ug	<0.030	<0.030	0.030	6834730

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

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Stantec Consulting Ltd
Client Project #: 121416288.400.800
Site Location: MARATHON GOLD
Sampler Initials: DR

ELEMENTS BY ATOMIC SPECTROSCOPY (FILTER)

BV Labs ID		NAN911	NAN913		
Sampling Date		2020/06/17	2020/06/17		
COC Number		na	na		
	UNITS	**TSP-03-20200617 83110042**	**TSP-FB-20200617 83110046**	**RDL**	**QC Batch**
Total Molybdenum (Mo)	ug/m3	<0.0012	N/A	0.0012	6823140
Total Nickel (Ni)	ug	<0.050	<0.050	0.050	6834730
Total Nickel (Ni)	ug/m3	<0.0021	N/A	0.0021	6823140
Total Phosphorus (P)	ug	<5.0	<5.0	5.0	6834730
Total Potassium (K)	ug	<5.0	<5.0	5.0	6834730
Total Potassium (K)	ug/m3	<0.21	N/A	0.21	6823140
Total Selenium (Se)	ug	<0.10	<0.10	0.10	6834730
Total Selenium (Se)	ug/m3	<0.0042	N/A	0.0042	6823140
Total Silver (Ag)	ug	<0.010	<0.010	0.010	6834730
Total Silver (Ag)	ug/m3	<0.00042	N/A	0.00042	6823140
Total Sodium (Na)	ug	11	<5.0	5.0	6834730
Total Sodium (Na)	ug/m3	0.44	N/A	0.21	6823140
Total Strontium (Sr)	ug	<0.050	<0.050	0.050	6834730
Total Strontium (Sr)	ug/m3	<0.0021	N/A	0.0021	6823140
Total Thallium (Tl)	ug	<0.010	<0.010	0.010	6834730
Total Thallium (Tl)	ug/m3	<0.00042	N/A	0.00042	6823140
Total Tin (Sn)	ug	<0.030	<0.030	0.030	6834730
Total Tin (Sn)	ug/m3	<0.0012	N/A	0.0012	6823140
Total Titanium (Ti)	ug	0.10	<0.10	0.10	6834730
Total Titanium (Ti)	ug/m3	0.0043	N/A	0.0042	6823140
Total Uranium (U)	ug	<0.010	<0.010	0.010	6834730
Total Uranium (U)	ug/m3	<0.00042	N/A	0.00042	6823140
Total Vanadium (V)	ug	<0.030	<0.030	0.030	6834730
Total Vanadium (V)	ug/m3	<0.0012	N/A	0.0012	6823140
Total Zinc (Zn)	ug	<0.50	<0.50	0.50	6834730
Total Zinc (Zn)	ug/m3	<0.021	N/A	0.021	6823140

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

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BV Labs Job #: C0G6519
Report Date: 2020/07/21

Stantec Consulting Ltd
Client Project #: 121416288.400.800
Site Location: MARATHON GOLD
Sampler Initials: DR

TEST SUMMARY

BV Labs ID: NAN906
Sample ID: PM10-01-20200615 83110050
Matrix: Filter

Collected: 2020/06/15
Shipped:
Received: 2020/07/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Particulate Calculation PM 10 (IO-2mod)	CALC	6823141	N/A	2020/07/08	Automated Statchk
Total Particulate (PM10)	BAL	6824471	N/A	2020/07/08	Brenda Moore
Air Volume from LoVol Sampling		ONSITE	N/A	2020/07/08	Cristina (Maria) Bacchus

BV Labs ID: NAN907
Sample ID: TSP-01-20200615 83110043
Matrix: Filter

Collected: 2020/06/15
Shipped:
Received: 2020/07/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6020Amod)	CALC	6823140	2020/07/08	2020/07/08	Automated Statchk
Total Metals on Small Filter (6020Bmod)	ICP1/MS	6834730	2020/07/14	2020/07/16	Nan Raykha
Particulate Calculation	CALC	6847014	N/A	2020/07/21	Automated Statchk
Total Particulate	BAL	6847081	N/A	2020/07/08	Brenda Moore
Air Volume from LoVol Sampling		ONSITE	N/A	2020/07/08	Cristina (Maria) Bacchus

BV Labs ID: NAN907 Dup
Sample ID: TSP-01-20200615 83110043
Matrix: Filter

Collected: 2020/06/15
Shipped:
Received: 2020/07/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Small Filter (6020Bmod)	ICP1/MS	6834730	2020/07/14	2020/07/16	Nan Raykha

BV Labs ID: NAN908
Sample ID: PM10-02-20200616 83110044
Matrix: Filter

Collected: 2020/06/16
Shipped:
Received: 2020/07/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Particulate Calculation PM 10 (IO-2mod)	CALC	6823141	N/A	2020/07/08	Automated Statchk
Total Particulate (PM10)	BAL	6824471	N/A	2020/07/08	Brenda Moore
Air Volume from LoVol Sampling		ONSITE	N/A	2020/07/08	Cristina (Maria) Bacchus

BV Labs ID: NAN909
Sample ID: TSP-02-20200616 83110045
Matrix: Filter

Collected: 2020/06/16
Shipped:
Received: 2020/07/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6020Amod)	CALC	6823140	2020/07/08	2020/07/08	Automated Statchk
Total Metals on Small Filter (6020Bmod)	ICP1/MS	6834730	2020/07/14	2020/07/16	Nan Raykha
Particulate Calculation	CALC	6847014	N/A	2020/07/21	Automated Statchk
Total Particulate	BAL	6847081	N/A	2020/07/08	Brenda Moore
Air Volume from LoVol Sampling		ONSITE	N/A	2020/07/08	Cristina (Maria) Bacchus

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BV Labs Job #: C0G6519
Report Date: 2020/07/21

Stantec Consulting Ltd
Client Project #: 121416288.400.800
Site Location: MARATHON GOLD
Sampler Initials: DR

TEST SUMMARY

BV Labs ID: NAN910
Sample ID: PM10-03-20200617 83110047
Matrix: Filter

Collected: 2020/06/17
Shipped:
Received: 2020/07/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Particulate Calculation PM 10 (IO-2mod)	CALC	6823141	N/A	2020/07/08	Automated Statchk
Total Particulate (PM10)	BAL	6824471	N/A	2020/07/08	Brenda Moore
Air Volume from LoVol Sampling		ONSITE	N/A	2020/07/08	Cristina (Maria) Bacchus

BV Labs ID: NAN911
Sample ID: TSP-03-20200617 83110042
Matrix: Filter

Collected: 2020/06/17
Shipped:
Received: 2020/07/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Hi-Vol Filter (6020Amod)	CALC	6823140	2020/07/08	2020/07/08	Automated Statchk
Total Metals on Small Filter (6020Bmod)	ICP1/MS	6834730	2020/07/14	2020/07/16	Nan Raykha
Particulate Calculation	CALC	6847014	N/A	2020/07/21	Automated Statchk
Total Particulate	BAL	6847081	N/A	2020/07/08	Brenda Moore
Air Volume from LoVol Sampling		ONSITE	N/A	2020/07/08	Cristina (Maria) Bacchus

BV Labs ID: NAN912
Sample ID: PM10-FB-20200617 83110049
Matrix: Filter

Collected: 2020/06/17
Shipped:
Received: 2020/07/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Particulate (PM10)	BAL	6824471	N/A	2020/07/08	Brenda Moore

BV Labs ID: NAN913
Sample ID: TSP-FB-20200617 83110046
Matrix: Filter

Collected: 2020/06/17
Shipped:
Received: 2020/07/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Metals on Small Filter (6020Bmod)	ICP1/MS	6834730	2020/07/14	2020/07/16	Nan Raykha
Total Particulate	BAL	6847081	N/A	2020/07/08	Brenda Moore

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GENERAL COMMENTS

Results relate only to the items tested.

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BV Labs Job #: C0G6519
Report Date: 2020/07/21

QUALITY ASSURANCE REPORT

Stantec Consulting Ltd
Client Project #: 121416288.400.800
Site Location: MARATHON GOLD
Sampler Initials: DR

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
6834730	Total Aluminum (Al)	2020/07/16	104	70 - 130	103	85 - 115	<2.0	ug	NC	20
6834730	Total Antimony (Sb)	2020/07/16	97	70 - 130	100	85 - 115	<0.050	ug	NC	20
6834730	Total Arsenic (As)	2020/07/16	97	70 - 130	97	85 - 115	<0.050	ug	NC	20
6834730	Total Barium (Ba)	2020/07/16	99	70 - 130	101	85 - 115	<0.050	ug	NC	20
6834730	Total Beryllium (Be)	2020/07/16	98	70 - 130	100	85 - 115	<0.030	ug	NC	20
6834730	Total Bismuth (Bi)	2020/07/16	97	70 - 130	96	85 - 115	<0.050	ug	NC	20
6834730	Total Boron (B)	2020/07/16	98	70 - 130	101	85 - 115	<1.0	ug	NC	20
6834730	Total Cadmium (Cd)	2020/07/16	95	70 - 130	97	85 - 115	<0.010	ug	NC	20
6834730	Total Calcium (Ca)	2020/07/16	102	70 - 130	100	85 - 115	<5.0	ug	NC	20
6834730	Total Chromium (Cr)	2020/07/16	96	70 - 130	97	85 - 115	<0.050	ug	NC	20
6834730	Total Cobalt (Co)	2020/07/16	95	70 - 130	97	85 - 115	<0.030	ug	NC	20
6834730	Total Copper (Cu)	2020/07/16	107	70 - 130	105	85 - 115	<0.030	ug	NC	20
6834730	Total Iron (Fe)	2020/07/16	101	70 - 130	101	85 - 115	<5.0	ug	NC	20
6834730	Total Lead (Pb)	2020/07/16	94	70 - 130	95	85 - 115	<0.030	ug	NC	20
6834730	Total Magnesium (Mg)	2020/07/16	100	70 - 130	101	85 - 115	<1.0	ug	NC	20
6834730	Total Manganese (Mn)	2020/07/16	101	70 - 130	98	85 - 115	<0.050	ug	13	20
6834730	Total Molybdenum (Mo)	2020/07/16	96	70 - 130	97	85 - 115	<0.030	ug	NC	20
6834730	Total Nickel (Ni)	2020/07/16	97	70 - 130	95	85 - 115	<0.050	ug	NC	20
6834730	Total Phosphorus (P)	2020/07/16	103	70 - 130	109	85 - 115	<5.0	ug	NC	20
6834730	Total Potassium (K)	2020/07/16	102	70 - 130	102	85 - 115	<5.0	ug	NC	20
6834730	Total Selenium (Se)	2020/07/16	96	70 - 130	95	85 - 115	<0.10	ug	NC	20
6834730	Total Silver (Ag)	2020/07/16	94	70 - 130	94	85 - 115	<0.010	ug	NC	20
6834730	Total Sodium (Na)	2020/07/16	105	70 - 130	106	85 - 115	<5.0	ug	NC	20
6834730	Total Strontium (Sr)	2020/07/16	94	70 - 130	94	85 - 115	<0.050	ug	NC	20
6834730	Total Thallium (Tl)	2020/07/16	94	70 - 130	97	85 - 115	<0.010	ug	NC	20
6834730	Total Tin (Sn)	2020/07/16	97	70 - 130	99	85 - 115	<0.030	ug	NC	20
6834730	Total Titanium (Ti)	2020/07/16	94	70 - 130	95	85 - 115	<0.10	ug	NC	20
6834730	Total Uranium (U)	2020/07/16	94	70 - 130	98	85 - 115	<0.010	ug	NC	20
6834730	Total Vanadium (V)	2020/07/16	100	70 - 130	100	85 - 115	<0.030	ug	NC	20

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BV Labs Job #: C0G6519
Report Date: 2020/07/21

QUALITY ASSURANCE REPORT(CONT'D)

Stantec Consulting Ltd
Client Project #: 121416288.400.800
Site Location: MARATHON GOLD
Sampler Initials: DR

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
6834730	Total Zinc (Zn)	2020/07/16	95	70 - 130	94	85 - 115	<0.50	ug	NC	20

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

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BV Labs Job #: C0G6519
Report Date: 2020/07/21

Stantec Consulting Ltd
Client Project #: 121416288.400.800
Site Location: MARATHON GOLD
Sampler Initials: DR

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

<Original signed by>

Cristina (Maria) Bacchus, Project Manager

<Original signed by>

Frank Mo, B.Sc., Inorganic Lab. Manager

<Original signed by>

John Bowman, Supervisor, Metals Group

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports.
For Service Group specific validation please refer to the Validation Signature Page.

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