

# CERTIFICATE OF CALIBRATION # OM2021-1 FOR BRÜEL & KJÆR HANDHELD ANALYZER

|                                 |                           |
|---------------------------------|---------------------------|
| Model <b>2250</b>               | Serial No. <b>2505945</b> |
| With Microphone <b>4189</b>     | ID No. <b>N/A</b>         |
| With Preamplifier <b>ZC0032</b> | Serial No. <b>2508686</b> |
|                                 | ID No. <b>3745</b>        |

Customer: **Odin Metrology, Inc.**  
**Thousand Oaks, CA 91320**                      P.O. No. **N/A**

was tested and met Brüel & Kjær specifications at the points tested  
and as outlined in IEC 61672-3:2006 Class 1

on **01 JUN 2021**    **BY HAROLD LYNCH**  
Service Manager

As received and left condition: Within Specification.  
Re-calibration due on: **01 JUN 2022**

| Certified References* |        |            |             |             |
|-----------------------|--------|------------|-------------|-------------|
| Mfg.                  | Type   | Serial No. | Cal Date    | Due Date    |
| B&K                   | 1051   | 1846829    | 26 AUG 2020 | 26 AUG 2021 |
| B&K                   | 2636   | 1601487    | 12 MAY 2021 | 12 MAY 2022 |
| B&K                   | 4226   | 3274134    | 30 NOV 2020 | 30 NOV 2021 |
| B&K                   | 4231   | 2094472    | 12 FEB 2021 | 12 FEB 2022 |
| HP                    | 34401A | 3146A74093 | 12 MAY 2020 | 12 MAY 2022 |
| HP                    | 3458A  | 2823A17713 | 01 SEP 2020 | 01 SEP 2021 |

Performed in Compliance with ANSI, NCSL Z-540-1, 1994 and ISO 17025,  
ISO 9001:2015 Certification NQA No. 11252  
\*References are traceable to NIST (National Institute of Standards and Technology).

Note: For calibration data see enclosed pages.  
The data represent both “as found” and “as left” conditions.

Reference Test Procedure: **ACCT Procedure 2250-Light-2270 Version 3.2.1.** Rev. 1/29/14

|                            |                                  |  |
|----------------------------|----------------------------------|--|
| Temperature<br><b>23°C</b> | Relative Humidity<br><b>42 %</b> | Barometric Pressure<br><b>988.93 hPa</b> |
|----------------------------|----------------------------------|--|

*Note: This calibration report shall not be reproduced, except in full, without written consent by Odin Metrology, Inc.*

Signed:

**ODIN METROLOGY, INC.**  
 CALIBRATION OF BRÜEL & KJÆR INSTRUMENTS  
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Calibration data for  
**Brüel & Kjær Handheld Analyzer**  
**Type 2250# 2505945, ID# N/A**  
 With Microphone 4189# 2508686 and Preamplifier ZC0032# 3745  
 Performed on June 1, 2021  
 for  
 Odin Metrology, Inc.

PO#: N/A  
 Certificate#: OM2021-1  
 Calibration performed by: HL

Environmental Conditions  
 Relative humidity: 42%  
 Ambient temperature: 23°C  
 Ambient pressure: 988.93 hPa

The following calibration was performed per ACCT Procedure 2250-Light-2270 version 3.2.1.  
 The data represent both the "As Found" and the "As Left" conditions.

| Page No.                                     | Test  | IEC Section       | Result          |
|--|---|-------------------|-----------------|
| <b>Sound Level Meter (IEC 61672 Class 1)</b> |   |                   |                 |
| 3  | Internal Clock                                    | Reference Only    | <b>See Data</b> |
| 3  | Sensitivity Verification with Acoustic Calibrator | 3 § 9             | <b>See Data</b> |
| 3  | Acoustic Frequency Response with Microphone       | 3 § 11            | <b>Pass</b>     |
| 3  | Self-Generated Noise                              | 3 § 10            | <b>See Data</b> |
| 4  | Output Impedance with Shorted Output              | 2 § 9.18          | <b>Pass</b>     |
| 4  | AC Full Scale Output Voltage                      | Reference Only    | <b>See Data</b> |
| 4  | DC Full Scale Output Voltage                      | Reference Only    | <b>See Data</b> |
| 4  | Reset   | 2 § 9.17          | <b>Pass</b>     |
| 4  | Overload Indication                               | 3 § 18            | <b>Pass</b>     |
| 5  | DC Linearity                                      | Reference Only    | <b>See Data</b> |
| 5  | Peak-C Sound Level                                | 3 § 17            | <b>Pass</b>     |
| 5  | Decay Time Constants                              | 2 § 9.11          | <b>Pass</b>     |
| 6  | Difference in Indication                          | 3 § 13            | <b>Pass</b>     |
| 6  | Frequency Response                                | 3 § 12            | <b>Pass</b>     |
| 6  | A-Weighted  |                   | <b>Pass</b>     |
| 7  | C-Weighted  |                   | <b>Pass</b>     |
| 8  | Z-Weighted  |                   | <b>Pass</b>     |
| 9  | Single Toneburst Response (Fast)                  | 3 § 16            | <b>Pass</b>     |
| 9  | A-Weighted  |                   | <b>Pass</b>     |
| 9  | C-Weighted  |                   | <b>Pass</b>     |
| 10   | Z-Weighted  |                   | <b>Pass</b>     |
| 10   | Single Toneburst Response (Slow)                  | 3 § 16            | <b>Pass</b>     |
| 10   | A-Weighted  |                   | <b>Pass</b>     |
| 10   | C-Weighted  |                   | <b>Pass</b>     |
| 11   | Z-Weighted  |                   | <b>Pass</b>     |
| 11   | SEL Response to Repeated Tonebursts               | 1 § 5.9           | <b>Pass</b>     |
| 12   | Level Linearity                                   | 3 § 14, 1 § 5.5.6 | <b>Pass</b>     |
| <b>RTA Octave Filter (IEC 61260 Class 0)</b> |   |                   |                 |
| 14   | Level Verification of Filter+SLM                  | Reference Only    | <b>Pass</b>     |
| 14   | 1/1 Octave  |                   | <b>Pass</b>     |
| 14   | 1/3 Octave  |                   | <b>Pass</b>     |
| 15   | Filter Check                                      | Reference Only    | <b>Pass</b>     |
| 15   | 1/1 Octave  |                   | <b>Pass</b>     |
| 15   | 1/3 Octave  |                   | <b>Pass</b>     |
| 16   | Relative Attenuation (1/1 Octave)                 | § 5.3             | <b>Pass</b>     |

The expanded uncertainties stated in this document are the maximum expanded uncertainties permitted by IEC 61672-1. Odin Metrology's actual expanded uncertainties are less than or equal to the values stated herein.

**Internal Clock**

Date and time are transferred from SLM, then the SLM date and time are set according to Odin Metrology's clock and the date and time are transferred from the SLM a second time. Time zones (with minor simplifications) and DST are obeyed.

Local Date/Time: Date and time according to Odin Metrology's clock (Pacific Daylight Time) at the time of the clock setting

Location: US state or other location for which the SLM clock is set (some time zone simplifications are made)

UTC Offset: UTC offset for the given location

Daylight Saving Time: whether DST is currently observed for the given location

SLM Clock Before Set: readouts of the SLM's system date and time before any changes are made

SLM Clock After Set: readouts of the SLM's system date and time after setting

| Local (Pacific Daylight Time) |             | Location   | UTC Offset<br>(Hr:Min) | Daylight<br>Saving Time | SLM Clock Before Set |             | SLM Clock After Set |             |
|-------------------------------|-------------|------------|------------------------|-------------------------|----------------------|-------------|---------------------|-------------|
| Date                          | Time        |            |                        |                         | Date                 | Time        | Date                | Time        |
| 06/01/2021                    | 01:17:43 PM | New Mexico | -6:00                  | Yes                     | 06/01/2021           | 02:18:06 PM | 06/01/2021          | 02:18:19 PM |

**Sensitivity Verification with Acoustic Calibrator (IEC 61672-3 § 9)**

A sound level calibrator is mounted on the sound level meter and the internal calibration is started. The SLM indication is recorded before and after calibration.

Calibrator Frequency: the frequency of the signal generated by the sound level calibrator

Calibrator SPL: the SPL of the signal generated by the sound level calibrator

SLM SPL Before: SLM indication before internal calibration sequence

SLM SPL After: SLM indication after internal calibration sequence (note: ideal value is 93.85 dB due to free-field correction of 0.15 dB)

Uncertainty: maximum expanded uncertainty of measurement with approximately 95% confidence level (coverage factor  $k=2$ )

*Performed with microphone 4189# 2508686, preamplifier ZC0032# 3745, and calibrator 4231# 2094472.*

| Calibrator<br>Frequency (Hz) | Calibrator<br>SPL (dB) | SLM SPL<br>Before (dB) | SLM SPL<br>After (dB) | Uncertainty<br>(dB) |
|------------------------------|------------------------|------------------------|-----------------------|---------------------|
| 1,000.0                      | 94.0                   | 93.96                  | 93.96                 | 0.40                |

**Acoustic Frequency Response with Microphone (61672-3 § 11)**

The acoustical frequency response is tested using a multifunction acoustical calibrator type 4226 in C frequency weighting. If a windscreen is used, these data are to be corrected.

Frequency: the frequency of the signal to the sound level meter (frequency of 4226 multifunction acoustic calibrator)

Data Found: the value the sound level meter actually indicates (this is a pressure measurement)

FF Corr: free-field correction for microphone to be added to displayed SLM (pressure) value

Corrected Response: SLM's reading plus the correction indicated

Nominal Value: what the sound level meter should indicate according to IEC 61672

Tolerance: the acceptable range, including the stated uncertainty, for what the sound level meter should indicate according to IEC 61672

Uncertainty: maximum expanded uncertainty of measurement according to IEC with approximately 95% confidence level (coverage factor

Deviation: the difference between the nominal value and the data found

*Performed with microphone 4189# 2508686, preamplifier ZC0032# 3745, and calibrator 4226# 3274134.*

| Frequency<br>(Hz) | Data             | FF Corr. | Corrected     | Nominal      | Tolerance (dB) |         | Uncertainty<br>(dB) | Deviation<br>(dB) | Pass/Fail |
|-------------------|------------------|----------|---------------|--------------|----------------|---------|---------------------|-------------------|-----------|
|                   | Found (dB C)     | (dB)     | Response (dB) | Value (dB C) | Minimum        | Maximum |                     |                   |           |
| 31.5              | 91.19            | 0.00     | 91.19         | 90.99        | 89.49          | 92.49   |                     | 0.20              | Pass      |
| 63.0              | 93.31            | 0.00     | 93.31         | 93.18        | 92.18          | 94.18   | 0.50                | 0.13              | Pass      |
| 125.0             | 93.89            | 0.00     | 93.89         | 93.83        | 92.83          | 94.83   |                     | 0.06              | Pass      |
| 250.0             | 94.04            | 0.00     | 94.04         | 94.00        | 93.00          | 95.00   |                     | 0.04              | Pass      |
| 500.0             | 94.07            | 0.00     | 94.07         | 94.03        | 93.03          | 95.03   | 0.40                | 0.04              | Pass      |
| 1,000.0           | <b>Reference</b> |          |               |              |                |         |                     |                   |           |
| 2,000.0           | 94.04            | 0.36     | 94.40         | 93.83        | 92.83          | 94.83   |                     | 0.57              | Pass      |
| 4,000.0           | 92.65            | 1.21     | 93.86         | 93.18        | 92.18          | 94.18   | 0.60                | 0.68              | Pass      |
| 8,000.0           | 88.66            | 3.62     | 92.28         | 90.99        | 88.49          | 92.49   |                     | 1.29              | Pass      |
| 12,500.0          | 82.75            | 6.51     | 89.26         | 87.76        | 82.76          | 89.76   | 1.00                | 1.50              | Pass      |
| 16,000.0          | 80.35            | 7.59     | 87.94         | 85.47        | 69.47          | 87.97   |                     | 2.47              | Pass      |

**Self-Generated Noise (61672-3 § 10)**

For A-weighting, the noise is measured with the microphone installed and an acoustic chamber on the microphone which eliminates ambient noise. For C- and Z-weighting, the input is terminated with a shorted dummy microphone of equal capacitance.

Frequency Weighting: the frequency weighting setting on the sound level meter

Typical Noise: the typical self-generated noise level according to the manufacturer

Data Found: the 30-second Leq value the sound level meter indicates

Uncertainty: maximum expanded uncertainty of measurement with approximately 95% confidence level (coverage factor  $k=2$ )

| Frequency<br>Weighting | Typical<br>Noise (dB) | Data<br>Found (dB) | Uncertainty<br>(dB) |
|------------------------|-----------------------|--------------------|---------------------|
| A                      | 16.60                 | 14.48              |                     |
| C                      | 12.90                 | 14.08              | 0.003               |
| Z                      | 25.50                 | 19.63              |                     |

**Output Impedance with Shorted Output (61672-2 § 9.18)**

A reference signal is applied to the sound level meter and the outputs are shorted. The indicated level may not be affected by more than the specified tolerance.

Frequency: the frequency of the signal to the sound level meter

Input Level: the level (amplitude) of the signal to the sound level meter

Nominal Value: the value the sound level meter should indicate

Tolerance: the acceptable difference from nominal, including the stated uncertainty, for what the sound level meter should indicate

Data Found: the value the sound level meter actually indicates

Uncertainty: maximum expanded uncertainty of measurement with approximately 95% confidence level (coverage factor  $k=2$ )

Deviation: the difference between the nominal value and the data found

| Frequency<br>(kHz) | Input<br>Level (dB) | Nominal<br>Value (dB) | Tolerance<br>(± dB) | Data<br>Found (dB) | Uncertainty<br>(dB) | Deviation<br>(dB) | Pass/Fail   |
|--------------------|---------------------|-----------------------|---------------------|--------------------|---------------------|-------------------|-------------|
| 1.0                | 94.0                | 94.0                  | 0.10                | 93.98              | 0.10                | -0.02             | <b>Pass</b> |

**AC Full Scale Output Voltage**

The sound level meter is set up to indicate full-scale on the display and the AC output is measured. Input frequency is 1,000 Hz.

SPL Reading: the input to the sound level meter is adjusted so that it indicates this full-scale value

Data Found: the value the sound level meter actually indicates

Uncertainty: maximum expanded uncertainty of measurement with approximately 95% confidence level (coverage factor  $k=2$ )

| SPL<br>Reading (dB) | Data<br>Found (mV) | Uncertainty<br>(mV) |
|---------------------|--------------------|---------------------|
| 140.00              | 4,230.14           | 0.10                |

**DC Full Scale Output Voltage**

The sound level meter is set up to indicate full-scale on the display and the DC output is measured. Input frequency is 1,000 Hz.

SPL Reading: the input to the sound level meter is adjusted so that it indicates this full-scale value

Data Found: the value the sound level meter actually indicates

Uncertainty: maximum expanded uncertainty of measurement with approximately 95% confidence level (coverage factor  $k=2$ )

| SPL<br>Reading (dB) | Data<br>Found (mV) | Uncertainty<br>(mV) |
|---------------------|--------------------|---------------------|
| 140.00              | 2,807.67           | 0.10                |

**Reset (IEC 61672-2 § 9.17)**

It is verified that the display resets after pressing the reset button on the SLM. The initial input level is FSD.

Before: displayed value before pressing the reset key

After: displayed value after pressing the reset key

Tolerance: the acceptable range, including the stated uncertainty, for what the sound level meter should indicate

Uncertainty: maximum expanded uncertainty of measurement with approximately 95% confidence level (coverage factor  $k=2$ )

| Before<br>(dB) | After<br>(dB) | Tolerance<br>(< dB) | Uncertainty<br>(dB) | Pass/Fail   |
|----------------|---------------|---------------------|---------------------|-------------|
| 120.06         | 14.66         | 50.0                | 0.003               | <b>Pass</b> |

**Overload Indication (IEC 61672-3 § 18)**

The first Leq indication of overload at a level higher than FSD-1 dB is recorded for both positive- and negative-one-half-cycle signals at 4.0 kHz. The difference between the two levels may not exceed the specified tolerance.

Overload Level: input signal level (amplitude) at which the meter was found to overload for the specified input signal type

Difference: difference between the overload levels for the positive and negative half-cycle signal inputs

Tolerance: the acceptable difference, including the stated uncertainty, between positive and negative overload levels according to IEC 61672

Uncertainty: maximum expanded uncertainty of measurement with approximately 95% confidence level (coverage factor  $k=2$ )

| Overload Level (dB)<br>Positive | Overload Level (dB)<br>Negative | Difference<br>(dB) | Tolerance<br>(≤ dB) | Uncertainty<br>(dB) | Pass/Fail   |
|---------------------------------|---------------------------------|--------------------|---------------------|---------------------|-------------|
| 140.34                          | 140.33                          | 0.01               | 1.5                 | 0.3                 | <b>Pass</b> |

**DC Linearity**

The sound level meter is set up to indicate full-scale on the display and the DC-output voltage is recorded in decreasing 10-dB steps.

Rel. Input Level: the level (amplitude) of the signal to the sound level meter relative to the reference of full-scale

Data Found: the measured DC-output from the SLM

Uncertainty: maximum expanded uncertainty of measurement with approximately 95% confidence level (coverage factor  $k=2$ )

Sensitivity: the calculated sensitivity based on the DC-outputs at the highest and lowest levels indicated

| Rel. Input Level (dB) | Data Found (mV) | Uncertainty (mV) | Sensitivity (mV/dB) |
|-----------------------|-----------------|------------------|---------------------|
| 0.0                   | 2808.17         |                  | 20.07               |
| -10.0                 | 2606.66         |                  |                     |
| -20.0                 | 2407.12         |                  |                     |
| -30.0                 | 2206.25         |                  |                     |
| -40.0                 | 2005.31         | 0.40             |                     |
| -50.0                 | 1804.58         |                  |                     |
| -60.0                 | 1604.17         |                  |                     |
| -70.0                 | 1403.42         |                  |                     |
| -80.0                 | 1203.16         |                  |                     |
| -90.0                 | 1001.79         |                  |                     |
| -100.0                | 801.94          |                  |                     |
| -110.0                | 604.16          | 0.05             |                     |
| -120.0                | 424.17          |                  |                     |

**Peak-C Sound Level (IEC 61672-3 §17)**

The sound level meter's peak-C response to single one-cycle and positive- and negative-going half-cycle sinusoidal signals is measured.

Input Level: the steady-state level (amplitude) of the signal to the sound level meter from which the one- and half-cycle signals are extracted

Cycles in Test Signal: the type of burst used (one period, positive half period, or negative half period)

Frequency: the frequency of the signal to the sound level meter

Nominal Value: what the sound level meter should indicate according to IEC 61672

Tolerance: the acceptable difference from nominal, including the stated uncertainty, for what the sound level meter should indicate

$L_{Cpeak}$  Found: the peak-C sound level value indicated on the sound level meter

Data Found: the difference between the peak-C sound level and the steady-state C-weighted sound level as indicated by the sound level meter ( $L_{Cpeak}-L_C$ )

Uncertainty: maximum expanded uncertainty of measurement with approximately 95% confidence level (coverage factor  $k=2$ )

Deviation: the difference between the nominal value and the data found

| Input Level (dB C) | Cycles in Test Signal | Frequency (Hz) | Nominal Value (dB) | Tolerance ( $\pm$ dB) | $L_{Cpeak}$ Found (dB) | Data Found (dB) | Uncertainty (dB) | Deviation (dB) | Pass/Fail |
|--------------------|-----------------------|----------------|--------------------|-----------------------|------------------------|-----------------|------------------|----------------|-----------|
|                    | One                   | 8,000.00       | 3.40               | 2.00                  | 135.39                 | 3.39            |                  | -0.01          | Pass      |
| 132.00             | Positive 1/2          | 500.00         | 2.40               | 1.00                  | 134.03                 | 2.03            | 0.40             | -0.37          | Pass      |
|                    | Negative 1/2          |                |                    |                       | 134.07                 | 2.07            |                  | -0.33          | Pass      |

**Decay Time Constants for Time Weightings Fast and Slow (IEC 61672-2 § 9.11)**

The decay rate of the display value on the sound level meter is measured after a steady 4.0 kHz signal is removed.

Time Weighting: the time weighting setting on the sound level meter

Nominal Rate: the decay rate the sound level meter should exhibit according to IEC 61672

Tolerance: the acceptable range, including the stated tolerance, for what the sound level meter should indicate according to IEC 61672

Measured Rate: the actual decay rate measured on the sound level meter

Uncertainty: maximum expanded uncertainty of measurement with approximately 95% confidence level (coverage factor  $k=2$ )

Deviation: the difference between the nominal value and the data found

| Time Weighting | Nominal Rate (dB/s) | Tolerance (dB/s) |         | Measured Rate (dB/s) | Uncertainty (dB/s) | Deviation (dB/S) | Pass/Fail |
|----------------|---------------------|------------------|---------|----------------------|--------------------|------------------|-----------|
|                |                     | Minimum          | Maximum |                      |                    |                  |           |
| Fast           | N/A                 | 27.00            | N/A     | 40.89                | 2.00               | N/A              | Pass      |
| Slow           | 4.35                | 3.80             | 4.90    | 4.60                 | 0.40               | 0.25             | Pass      |

**Difference in Indication (IEC 61672-3 § 13)**

With reference to fast time weighting and A frequency weighting at the SLM reference level indicated, the measurements of all other frequency weighting parameters and all other time weighting parameters may not differ by more than the specified tolerance.

Time Weighting: time weighting setting on the SLM

Frequency Weighting: frequency weighting setting on the SLM

Input Level: the level (amplitude) of the signal to the sound level meter

Nominal Value: the value the sound level meter should indicate according to IEC 61672

Tolerance: the acceptable difference from nominal, including the stated uncertainty, for what the sound level meter should indicate

Data Found: the value the sound level meter actually indicates

Uncertainty: maximum expanded uncertainty of measurement with approximately 95% confidence level (coverage factor  $k=2$ )

Deviation: the difference between the nominal value and the data found

| Time Weighting | Frequency Weighting | Input Level (dB) | Nominal Value (dB) | Tolerance ( $\pm$ dB) | Data Found (dB) | Uncertainty (dB) | Deviation (dB)   | Pass/Fail |
|----------------|---------------------|------------------|--------------------|-----------------------|-----------------|------------------|------------------|-----------|
|                | A                   |                  | <b>Reference</b>   |                       |                 |                  | <b>Reference</b> |           |
| Fast           | C                   | 94.0             | 94.0               | 0.2                   | 93.98           | 0.1              | -0.02            | Pass      |
|                | Z                   |                  |                    |                       | 93.98           |                  | -0.02            | Pass      |
| Slow           | A                   |                  |                    | 0.1                   | 93.98           | 0.1              | -0.02            | Pass      |
|                | C                   |                  |                    |                       | 93.98           |                  | -0.02            | Pass      |
|                | Z                   |                  |                    |                       | 93.98           |                  | -0.02            | Pass      |

**A-Frequency-Weighted Frequency Response (61672-3 § 12)**

The sound level meter's frequency response is recorded by varying the frequency as specified. The reference level is 45 dB less than full scale at 1.0 kHz.

Frequency: the frequency of the signal to the sound level meter

Nominal Value: the value the sound level meter should indicate according to IEC 61672 (this is relative to the reference value at 1.0 kHz)

Tolerance: the acceptable range, including the stated uncertainty, for what the sound level meter should indicate according to IEC 61672

Data Found: the value the sound level meter actually indicates

Uncertainty: maximum expanded uncertainty of measurement with approximately 95% confidence level (coverage factor  $k=2$ )

Deviation: the difference between the nominal value and the data found

| Frequency (Hz) | Nominal Value (dB) | Tolerance (dB) |         | Data Found (dB) | Uncertainty (dB) | Deviation (dB) | Pass/Fail |
|----------------|--------------------|----------------|---------|-----------------|------------------|----------------|-----------|
|                |                    | Minimum        | Maximum |                 |                  |                |           |
| 10.0           | -70.4              | N/A            | -67.4   | -68.73          |                  | 1.70           | Pass      |
| 12.6           | -63.4              | N/A            | -60.9   | -63.10          |                  | 0.27           | Pass      |
| 15.8           | -56.7              | -60.7          | -54.7   | -56.66          |                  | 0.03           | Pass      |
| 20.0           | -50.5              | -52.5          | -48.5   | -50.45          |                  | 0.00           | Pass      |
| 25.1           | -44.7              | -46.2          | -42.7   | -44.78          |                  | -0.08          | Pass      |
| 31.6           | -39.4              | -40.9          | -37.9   | -39.47          |                  | -0.03          | Pass      |
| 39.8           | -34.6              | -35.6          | -33.6   | -34.67          | 0.50             | -0.04          | Pass      |
| 50.1           | -30.2              | -31.2          | -29.2   | -30.17          |                  | 0.06           | Pass      |
| 63.1           | -26.2              | -27.2          | -25.2   | -26.19          |                  | 0.00           | Pass      |
| 79.4           | -22.5              | -23.5          | -21.5   | -22.50          |                  | 0.00           | Pass      |
| 100.0          | -19.1              | -20.1          | -18.1   | -19.12          |                  | 0.02           | Pass      |
| 125.9          | -16.1              | -17.1          | -15.1   | -16.08          |                  | 0.02           | Pass      |
| 158.5          | -13.4              | -14.4          | -12.4   | -13.32          |                  | 0.03           | Pass      |
| 199.5          | -10.9              | -11.9          | -9.9    | -10.81          |                  | 0.06           | Pass      |
| 251.2          | -8.6               | -9.6           | -7.6    | -8.58           |                  | 0.05           | Pass      |
| 316.2          | -6.6               | -7.6           | -5.6    | -6.55           |                  | 0.06           | Pass      |
| 398.1          | -4.8               | -5.8           | -3.8    | -4.76           | 0.40             | 0.05           | Pass      |
| 501.2          | -3.2               | -4.2           | -2.2    | -3.17           |                  | 0.06           | Pass      |
| 631.0          | -1.9               | -2.9           | -0.9    | -1.83           |                  | 0.07           | Pass      |
| 794.3          | -0.8               | -1.8           | 0.2     | -0.76           |                  | 0.06           | Pass      |
| 1,000.0        | 0.0                |                |         |                 | <b>Reference</b> |                |           |
| 1,258.9        | 0.6                | -0.4           | 1.6     | 0.66            | 0.40             | 0.07           | Pass      |
| 1,584.9        | 1.0                | 0.0            | 2.0     | 1.05            |                  | 0.07           | Pass      |
| 1,995.3        | 1.2                | 0.2            | 2.2     | 1.28            |                  | 0.08           | Pass      |
| 2,511.9        | 1.3                | 0.3            | 2.3     | 1.35            |                  | 0.08           | Pass      |
| 3,162.3        | 1.2                | 0.2            | 2.2     | 1.29            |                  | 0.09           | Pass      |
| 3,981.1        | 1.0                | 0.0            | 2.0     | 1.06            | 0.60             | 0.09           | Pass      |
| 5,011.9        | 0.5                | -1.0           | 2.0     | 0.66            |                  | 0.11           | Pass      |
| 6,309.6        | -0.1               | -2.1           | 1.4     | 0.00            |                  | 0.12           | Pass      |
| 7,943.3        | -1.1               | -3.6           | 0.4     | -1.02           |                  | 0.09           | Pass      |
| 10,000.0       | -2.5               | -5.5           | -0.5    | -2.52           |                  | -0.03          | Pass      |
| 12,589.3       | -4.3               | -9.3           | -2.3    | -4.68           |                  | -0.36          | Pass      |
| 15,848.9       | -6.6               | -22.6          | -4.1    | -7.42           | 1.00             | -0.82          | Pass      |
| 19,952.6       | -9.3               | N/A            | -6.3    | -8.84           |                  | 0.48           | Pass      |

**C-Frequency-Weighted Frequency Response (61672-3 § 12)**

The sound level meter's frequency response is recorded by varying the frequency as specified. The reference level is 45 dB less than full scale at 1.0 kHz.

Frequency: the frequency of the signal to the sound level meter

Nominal Value: the value the sound level meter should indicate according to IEC 61672 (this is relative to the reference value at 1.0 kHz)

Tolerance: the acceptable range, including the stated uncertainty, for what the sound level meter should indicate according to IEC 61672

Data Found: the value the sound level meter actually indicates

Uncertainty: maximum expanded uncertainty of measurement with approximately 95% confidence level (coverage factor  $k=2$ )

Deviation: the difference between the nominal value and the data found

| Frequency<br>(Hz) | Nominal<br>Value (dB) | Tolerance (dB)   |         | Data<br>Found (dB) | Uncertainty<br>(dB) | Deviation<br>(dB) | Pass/Fail |
|-------------------|-----------------------|------------------|---------|--------------------|---------------------|-------------------|-----------|
|                   |                       | Minimum          | Maximum |                    |                     |                   |           |
| 10.0              | -14.3                 | N/A              | -11.3   | -14.59             |                     | -0.26             | Pass      |
| 12.6              | -11.2                 | N/A              | -8.7    | -11.41             |                     | -0.16             | Pass      |
| 15.8              | -8.5                  | -12.5            | -6.5    | -8.70              |                     | -0.17             | Pass      |
| 20.0              | -6.2                  | -8.2             | -4.2    | -6.24              |                     | 0.00              | Pass      |
| 25.1              | -4.4                  | -5.9             | -2.4    | -4.38              |                     | 0.02              | Pass      |
| 31.6              | -3.0                  | -4.5             | -1.5    | -3.05              |                     | -0.04             | Pass      |
| 39.8              | -2.0                  | -3.0             | -1.0    | -1.97              | 0.50                | 0.03              | Pass      |
| 50.1              | -1.3                  | -2.3             | -0.3    | -1.31              |                     | -0.02             | Pass      |
| 63.1              | -0.8                  | -1.8             | 0.2     | -0.83              |                     | -0.01             | Pass      |
| 79.4              | -0.5                  | -1.5             | 0.5     | -0.48              |                     | 0.02              | Pass      |
| 100.0             | -0.3                  | -1.3             | 0.7     | -0.23              |                     | 0.07              | Pass      |
| 125.9             | -0.2                  | -1.2             | 0.8     | -0.11              |                     | 0.06              | Pass      |
| 158.5             | -0.1                  | -1.1             | 0.9     | -0.03              |                     | 0.06              | Pass      |
| 199.5             | 0.0                   | -1.0             | 1.0     | 0.02               |                     | 0.05              | Pass      |
| 251.2             | 0.0                   | -1.0             | 1.0     | 0.06               |                     | 0.06              | Pass      |
| 316.2             | 0.0                   | -1.0             | 1.0     | 0.07               |                     | 0.05              | Pass      |
| 398.1             | 0.0                   | -1.0             | 1.0     | 0.09               | 0.40                | 0.06              | Pass      |
| 501.2             | 0.0                   | -1.0             | 1.0     | 0.10               |                     | 0.07              | Pass      |
| 631.0             | 0.0                   | -1.0             | 1.0     | 0.09               |                     | 0.06              | Pass      |
| 794.3             | 0.0                   | -1.0             | 1.0     | 0.08               |                     | 0.06              | Pass      |
| 1,000.0           | 0.0                   | <b>Reference</b> |         |                    |                     |                   |           |
| 1,258.9           | 0.0                   | -1.0             | 1.0     | 0.04               | 0.40                | 0.07              | Pass      |
| 1,584.9           | -0.1                  | -1.1             | 0.9     | -0.01              |                     | 0.08              | Pass      |
| 1,995.3           | -0.2                  | -1.2             | 0.8     | -0.09              |                     | 0.08              | Pass      |
| 2,511.9           | -0.3                  | -1.3             | 0.7     | -0.22              |                     | 0.08              | Pass      |
| 3,162.3           | -0.5                  | -1.5             | 0.5     | -0.42              |                     | 0.08              | Pass      |
| 3,981.1           | -0.8                  | -1.8             | 0.2     | -0.73              | 0.60                | 0.09              | Pass      |
| 5,011.9           | -1.3                  | -2.8             | 0.2     | -1.18              |                     | 0.11              | Pass      |
| 6,309.6           | -2.0                  | -4.0             | -0.5    | -1.88              |                     | 0.12              | Pass      |
| 7,943.3           | -3.0                  | -5.5             | -1.5    | -2.92              |                     | 0.09              | Pass      |
| 10,000.0          | -4.4                  | -7.4             | -2.4    | -4.43              |                     | -0.02             | Pass      |
| 12,589.3          | -6.2                  | -11.2            | -4.2    | -6.61              |                     | -0.37             | Pass      |
| 15,848.9          | -8.5                  | -24.5            | -6.0    | -9.35              | 1.00                | -0.82             | Pass      |
| 19,952.6          | -11.2                 | N/A              | -8.2    | -10.76             |                     | 0.49              | Pass      |

**Z-Frequency-Weighted Frequency Response (61672-3 § 12)**

The sound level meter's frequency response is recorded by varying the frequency as specified. The reference level is 45 dB less than full scale at 1.0 kHz.

Frequency: the frequency of the signal to the sound level meter

Nominal Value: the value the sound level meter should indicate according to IEC 61672 (this is relative to the reference value at 1.0 kHz)

Tolerance: the acceptable range, including the stated uncertainty, for what the sound level meter should indicate according to IEC 61672

Data Found: the value the sound level meter actually indicates

Uncertainty: maximum expanded uncertainty of measurement with approximately 95% confidence level (coverage factor  $k=2$ )

Deviation: the difference between the nominal value and the data found

| Frequency<br>(Hz) | Nominal<br>Value (dB) | Tolerance (dB)   |         | Data<br>Found (dB) | Uncertainty<br>(dB) | Deviation<br>(dB) | Pass/Fail |
|-------------------|-----------------------|------------------|---------|--------------------|---------------------|-------------------|-----------|
|                   |                       | Minimum          | Maximum |                    |                     |                   |           |
| 10.0              |                       | N/A              | 3.0     | 0.18               |                     | 0.18              | Pass      |
| 12.6              |                       | N/A              | 2.5     | -0.11              |                     | -0.11             | Pass      |
| 15.8              |                       | -4.0             | 2.0     | 0.17               |                     | 0.17              | Pass      |
| 20.0              |                       | -2.0             | 2.0     | 0.07               |                     | 0.07              | Pass      |
| 25.1              |                       | -1.5             | 2.0     | 0.11               |                     | 0.11              | Pass      |
| 31.6              |                       | -1.5             | 1.5     | -0.03              |                     | -0.03             | Pass      |
| 39.8              |                       | -1.0             | 1.0     | -0.02              | 0.50                | -0.02             | Pass      |
| 50.1              |                       | -1.0             | 1.0     | 0.07               |                     | 0.07              | Pass      |
| 63.1              |                       | -1.0             | 1.0     | 0.05               |                     | 0.05              | Pass      |
| 79.4              |                       | -1.0             | 1.0     | 0.07               |                     | 0.07              | Pass      |
| 100.0             |                       | -1.0             | 1.0     | 0.05               |                     | 0.05              | Pass      |
| 125.9             |                       | -1.0             | 1.0     | 0.05               |                     | 0.05              | Pass      |
| 158.5             |                       | -1.0             | 1.0     | 0.06               |                     | 0.06              | Pass      |
| 199.5             |                       | -1.0             | 1.0     | 0.06               |                     | 0.06              | Pass      |
| 251.2             |                       | -1.0             | 1.0     | 0.05               |                     | 0.05              | Pass      |
| 316.2             |                       | -1.0             | 1.0     | 0.07               |                     | 0.07              | Pass      |
| 398.1             | 0.0                   | -1.0             | 1.0     | 0.07               | 0.40                | 0.07              | Pass      |
| 501.2             |                       | -1.0             | 1.0     | 0.07               |                     | 0.07              | Pass      |
| 631.0             |                       | -1.0             | 1.0     | 0.06               |                     | 0.06              | Pass      |
| 794.3             |                       | -1.0             | 1.0     | 0.07               |                     | 0.07              | Pass      |
| 1,000.0           |                       | <b>Reference</b> |         |                    |                     |                   |           |
| 1,258.9           |                       | -1.0             | 1.0     | 0.07               | 0.40                | 0.07              | Pass      |
| 1,584.9           |                       | -1.0             | 1.0     | 0.08               |                     | 0.08              | Pass      |
| 1,995.3           |                       | -1.0             | 1.0     | 0.08               |                     | 0.08              | Pass      |
| 2,511.9           |                       | -1.0             | 1.0     | 0.08               |                     | 0.08              | Pass      |
| 3,162.3           |                       | -1.0             | 1.0     | 0.09               |                     | 0.09              | Pass      |
| 3,981.1           |                       | -1.0             | 1.0     | 0.11               | 0.60                | 0.11              | Pass      |
| 5,011.9           |                       | -1.5             | 1.5     | 0.12               |                     | 0.12              | Pass      |
| 6,309.6           |                       | -2.0             | 1.5     | 0.11               |                     | 0.11              | Pass      |
| 7,943.3           |                       | -2.5             | 1.5     | 0.08               |                     | 0.08              | Pass      |
| 10,000.0          |                       | -3.0             | 2.0     | -0.03              |                     | -0.03             | Pass      |
| 12,589.3          |                       | -5.0             | 2.0     | -0.36              |                     | -0.36             | Pass      |
| 15,848.9          |                       | -16.0            | 2.5     | -0.78              | 1.00                | -0.78             | Pass      |
| 19,952.6          |                       | N/A              | 3.0     | 0.33               |                     | 0.33              | Pass      |



**Single Toneburst Response (Fast Time Weighting, A Frequency Weighting) (61672-3 § 16)**

The sound level meter's response to single tonebursts at 4.0 kHz is measured. The baseline input level is 3 dB less than full scale.

Toneburst Duration: the length of time each burst lasts

Nominal Value: the value sound level meter should indicate according to IEC 61672

Tolerance: the acceptable range, including the stated tolerance, for what the sound level meter should indicate according to IEC 61672

Data Found: the value the sound level meter actually indicates; equal to  $L_{AFmax}(toneburst) - L_{AF}(steady-state)$

Uncertainty: maximum expanded uncertainty of measurement with approximately 95% confidence level (coverage factor  $k=2$ )

Deviation: the difference between the nominal value and the data found

| Toneburst<br>Duration (ms) | Nominal    | Tolerance (dB) |         | Data       | Uncertainty<br>(dB) | Deviation<br>(dB) | Pass/Fail |
|----------------------------|------------|----------------|---------|------------|---------------------|-------------------|-----------|
|                            | Value (dB) | Minimum        | Maximum | Found (dB) |                     |                   |           |
| 1,000.00                   | 0.0        | -0.5           | 0.5     | -0.05      | 0.20                | -0.05             | Pass      |
| 500.00                     | -0.1       | -0.6           | 0.4     | -0.13      |                     | -0.03             | Pass      |
| 200.00                     | -1.0       | -1.5           | -0.5    | -1.04      |                     | -0.04             | Pass      |
| 100.00                     | -2.6       | -3.6           | -1.6    | -2.66      |                     | -0.06             | Pass      |
| 50.00                      | -4.8       | -5.8           | -3.8    | -4.91      |                     | -0.11             | Pass      |
| 20.00                      | -8.3       | -9.3           | -7.3    | -8.39      |                     | -0.09             | Pass      |
| 10.00                      | -11.1      | -12.1          | -10.1   | -11.24     |                     | -0.14             | Pass      |
| 5.00                       | -14.1      | -15.1          | -13.1   | -14.18     |                     | -0.08             | Pass      |
| 2.00                       | -18.0      | -19.5          | -17.0   | -18.11     |                     | -0.11             | Pass      |
| 1.00                       | -21.0      | -23.0          | -20.0   | -21.12     |                     | -0.12             | Pass      |
| 0.50                       | -24.0      | -26.5          | -23.0   | -24.18     |                     | -0.18             | Pass      |
| 0.25                       | -27.0      | -30.0          | -26.0   | -27.20     |                     | -0.20             | Pass      |

**Single Toneburst Response (Fast Time Weighting, C Frequency Weighting) (61672-3 § 16)**

The sound level meter's response to single tonebursts at 4.0 kHz is measured. The baseline input level is 3 dB less than full scale.

Toneburst Duration: the length of time each burst lasts

Nominal Value: the value sound level meter should indicate according to IEC 61672

Tolerance: the acceptable range, including the stated tolerance, for what the sound level meter should indicate according to IEC 61672

Data Found: the value the sound level meter actually indicates; equal to  $L_{AFmax}(toneburst) - L_{AF}(steady-state)$

Uncertainty: maximum expanded uncertainty of measurement with approximately 95% confidence level (coverage factor  $k=2$ )

Deviation: the difference between the nominal value and the data found

| Toneburst<br>Duration (ms) | Nominal    | Tolerance (dB) |         | Data       | Uncertainty<br>(dB) | Deviation<br>(dB) | Pass/Fail |
|----------------------------|------------|----------------|---------|------------|---------------------|-------------------|-----------|
|                            | Value (dB) | Minimum        | Maximum | Found (dB) |                     |                   |           |
| 1,000.00                   | 0.0        | -0.5           | 0.5     | 0.16       | 0.20                | 0.16              | Pass      |
| 500.00                     | -0.1       | -0.6           | 0.4     | 0.08       |                     | 0.18              | Pass      |
| 200.00                     | -1.0       | -1.5           | -0.5    | -0.83      |                     | 0.17              | Pass      |
| 100.00                     | -2.6       | -3.6           | -1.6    | -2.45      |                     | 0.15              | Pass      |
| 50.00                      | -4.8       | -5.8           | -3.8    | -4.70      |                     | 0.10              | Pass      |
| 20.00                      | -8.3       | -9.3           | -7.3    | -8.17      |                     | 0.13              | Pass      |
| 10.00                      | -11.1      | -12.1          | -10.1   | -11.02     |                     | 0.08              | Pass      |
| 5.00                       | -14.1      | -15.1          | -13.1   | -13.95     |                     | 0.15              | Pass      |
| 2.00                       | -18.0      | -19.5          | -17.0   | -17.86     |                     | 0.14              | Pass      |
| 1.00                       | -21.0      | -23.0          | -20.0   | -20.83     |                     | 0.17              | Pass      |
| 0.50                       | -24.0      | -26.5          | -23.0   | -23.83     |                     | 0.17              | Pass      |
| 0.25                       | -27.0      | -30.0          | -26.0   | -26.78     |                     | 0.22              | Pass      |

**Single Toneburst Response (Fast Time Weighting, Z Frequency Weighting) (61672-3 § 16)**

The sound level meter's response to single tonebursts at 4.0 kHz is measured. The baseline input level is 3 dB less than full scale.

Toneburst Duration: the length of time each burst lasts

Nominal Value: the value sound level meter should indicate according to IEC 61672

Tolerance: the acceptable range, including the stated tolerance, for what the sound level meter should indicate according to IEC 61672

Data Found: the value the sound level meter actually indicates; equal to  $L_{AFmax(toneburst)} - L_{AF(steady-state)}$

Uncertainty: maximum expanded uncertainty of measurement with approximately 95% confidence level (coverage factor  $k=2$ )

Deviation: the difference between the nominal value and the data found

| Toneburst     | Nominal    | Tolerance (dB) |         | Data       | Uncertainty | Deviation | Pass/Fail |
|---------------|------------|----------------|---------|------------|-------------|-----------|-----------|
| Duration (ms) | Value (dB) | Minimum        | Maximum | Found (dB) | (dB)        | (dB)      |           |
| 1,000.00      | 0.0        | -0.5           | 0.5     | -0.01      |             | -0.01     | Pass      |
| 500.00        | -0.1       | -0.6           | 0.4     | -0.10      |             | 0.00      | Pass      |
| 200.00        | -1.0       | -1.5           | -0.5    | -1.01      |             | -0.01     | Pass      |
| 100.00        | -2.6       | -3.6           | -1.6    | -2.63      |             | -0.03     | Pass      |
| 50.00         | -4.8       | -5.8           | -3.8    | -4.85      |             | -0.05     | Pass      |
| 20.00         | -8.3       | -9.3           | -7.3    | -8.36      | 0.20        | -0.06     | Pass      |
| 10.00         | -11.1      | -12.1          | -10.1   | -11.19     |             | -0.09     | Pass      |
| 5.00          | -14.1      | -15.1          | -13.1   | -14.11     |             | -0.01     | Pass      |
| 2.00          | -18.0      | -19.5          | -17.0   | -18.03     |             | -0.03     | Pass      |
| 1.00          | -21.0      | -23.0          | -20.0   | -21.03     |             | -0.03     | Pass      |
| 0.50          | -24.0      | -26.5          | -23.0   | -24.03     |             | -0.03     | Pass      |
| 0.25          | -27.0      | -30.0          | -26.0   | -27.05     |             | -0.05     | Pass      |

**Single Toneburst Response (Slow Time Weighting, A Frequency Weighting) (61672-3 § 16)**

The sound level meter's response to single tonebursts at 4.0 kHz is measured. The baseline input level is 3 dB less than full scale.

Toneburst Duration: the length of time each burst lasts

Nominal Value: the value sound level meter should indicate according to IEC 61672

Tolerance: the acceptable range, including the stated tolerance, for what the sound level meter should indicate according to IEC 61672

Data Found: the value the sound level meter actually indicates; equal to  $L_{AFmax(toneburst)} - L_{AF(steady-state)}$

Uncertainty: maximum expanded uncertainty of measurement with approximately 95% confidence level (coverage factor  $k=2$ )

Deviation: the difference between the nominal value and the data found

| Toneburst     | Nominal    | Tolerance (dB) |         | Data       | Uncertainty | Deviation | Pass/Fail |
|---------------|------------|----------------|---------|------------|-------------|-----------|-----------|
| Duration (ms) | Value (dB) | Minimum        | Maximum | Found (dB) | (dB)        | (dB)      |           |
| 1,000.0       | -2.0       | -2.5           | -1.5    | -2.05      |             | -0.05     | Pass      |
| 500.0         | -4.1       | -4.6           | -3.6    | -4.11      |             | -0.01     | Pass      |
| 200.0         | -7.4       | -7.9           | -6.9    | -7.48      |             | -0.08     | Pass      |
| 100.0         | -10.2      | -10.7          | -9.7    | -10.28     |             | -0.08     | Pass      |
| 50.0          | -13.1      | -13.6          | -12.6   | -13.19     | 0.20        | -0.09     | Pass      |
| 20.0          | -17.0      | -17.5          | -16.5   | -17.11     |             | -0.11     | Pass      |
| 10.0          | -20.0      | -20.5          | -19.5   | -20.10     |             | -0.10     | Pass      |
| 5.0           | -23.0      | -23.5          | -22.5   | -23.10     |             | -0.10     | Pass      |
| 2.0           | -27.0      | -27.5          | -26.5   | -27.09     |             | -0.09     | Pass      |

**Single Toneburst Response (Slow Time Weighting, C Frequency Weighting) (61672-3 § 16)**

The sound level meter's response to single tonebursts at 4.0 kHz is measured. The baseline input level is 3 dB less than full scale.

Toneburst Duration: the length of time each burst lasts

Nominal Value: the value sound level meter should indicate according to IEC 61672

Tolerance: the acceptable range, including the stated tolerance, for what the sound level meter should indicate according to IEC 61672

Data Found: the value the sound level meter actually indicates; equal to  $L_{AFmax(toneburst)} - L_{AF(steady-state)}$

Uncertainty: maximum expanded uncertainty of measurement with approximately 95% confidence level (coverage factor  $k=2$ )

Deviation: the difference between the nominal value and the data found

| Toneburst     | Nominal    | Tolerance (dB) |         | Data       | Uncertainty | Deviation | Pass/Fail |
|---------------|------------|----------------|---------|------------|-------------|-----------|-----------|
| Duration (ms) | Value (dB) | Minimum        | Maximum | Found (dB) | (dB)        | (dB)      |           |
| 1,000.0       | -2.0       | -2.5           | -1.5    | -1.83      |             | 0.17      | Pass      |
| 500.0         | -4.1       | -4.6           | -3.6    | -3.90      |             | 0.20      | Pass      |
| 200.0         | -7.4       | -7.9           | -6.9    | -7.27      |             | 0.13      | Pass      |
| 100.0         | -10.2      | -10.7          | -9.7    | -10.07     |             | 0.13      | Pass      |
| 50.0          | -13.1      | -13.6          | -12.6   | -12.98     | 0.20        | 0.12      | Pass      |
| 20.0          | -17.0      | -17.5          | -16.5   | -16.89     |             | 0.11      | Pass      |
| 10.0          | -20.0      | -20.5          | -19.5   | -19.88     |             | 0.12      | Pass      |
| 5.0           | -23.0      | -23.5          | -22.5   | -22.87     |             | 0.13      | Pass      |
| 2.0           | -27.0      | -27.5          | -26.5   | -26.84     |             | 0.16      | Pass      |

**Single Toneburst Response (Slow Time Weighting, Z Frequency Weighting) (61672-3 § 16)**

The sound level meter's response to single tonebursts at 4.0 kHz is measured. The baseline input level is 3 dB less than full scale.

Toneburst Duration: the length of time each burst lasts

Nominal Value: the value sound level meter should indicate according to IEC 61672

Tolerance: the acceptable range, including the stated tolerance, for what the sound level meter should indicate according to IEC 61672

Data Found: the value the sound level meter actually indicates; equal to  $L_{AFmax(toneburst)} - L_{AF(steady-state)}$

Uncertainty: maximum expanded uncertainty of measurement with approximately 95% confidence level (coverage factor  $k=2$ )

Deviation: the difference between the nominal value and the data found

| Toneburst     | Nominal    | Tolerance (dB) |         | Data       | Uncertainty | Deviation | Pass/Fail |
|---------------|------------|----------------|---------|------------|-------------|-----------|-----------|
| Duration (ms) | Value (dB) | Minimum        | Maximum | Found (dB) | (dB)        | (dB)      |           |
| 1,000.0       | -2.0       | -2.5           | -1.5    | -2.00      | 0.20        | 0.00      | Pass      |
| 500.0         | -4.1       | -4.6           | -3.6    | -4.07      |             | 0.03      | Pass      |
| 200.0         | -7.4       | -7.9           | -6.9    | -7.45      |             | -0.05     | Pass      |
| 100.0         | -10.2      | -10.7          | -9.7    | -10.25     |             | -0.05     | Pass      |
| 50.0          | -13.1      | -13.6          | -12.6   | -13.15     |             | -0.05     | Pass      |
| 20.0          | -17.0      | -17.5          | -16.5   | -17.07     |             | -0.07     | Pass      |
| 10.0          | -20.0      | -20.5          | -19.5   | -20.05     |             | -0.05     | Pass      |
| 5.0           | -23.0      | -23.5          | -22.5   | -23.05     |             | -0.05     | Pass      |
| 2.0           | -27.0      | -27.5          | -26.5   | -27.02     |             | -0.02     | Pass      |

**SEL Response to Repeated Tonebursts (61672-1 § 5.9)**

The sound level meter's SEL response to repeated tonebursts at 4.0 kHz is measured. The baseline input level is 3 dB less than full scale and the toneburst repetition rate is three times the toneburst duration.

Toneburst Duration: the length of time each burst lasts

Nominal Value: the value the sound level meter should indicate according to IEC 61672

Tolerance: the acceptable range, including the stated tolerance, for what the sound level meter should indicate according to IEC 61672

Data Found: the value the sound level meter actually indicates; equal to  $L_{AFmax(toneburst)} - L_{AF(steady-state)}$

Uncertainty: maximum expanded uncertainty of measurement with approximately 95% confidence level (coverage factor  $k=2$ )

Deviation: the difference between the nominal value and the data found

| Toneburst     | Nominal    | Tolerance (dB) |         | Data       | Uncertainty | Deviation | Pass/Fail |
|---------------|------------|----------------|---------|------------|-------------|-----------|-----------|
| Duration (ms) | Value (dB) | Minimum        | Maximum | Found (dB) | (dB)        | (dB)      |           |
| 1000.0        | 0.0        | -0.5           | 0.5     | -0.06      | 0.20        | -0.06     | Pass      |
| 500.0         | -3.0       | -3.5           | -2.5    | -3.07      |             | -0.07     | Pass      |
| 200.0         | -7.0       | -7.5           | -6.5    | -7.06      |             | -0.06     | Pass      |
| 100.0         | -10.0      | -11.0          | -9.0    | -10.07     |             | -0.07     | Pass      |
| 50.0          | -13.0      | -14.0          | -12.0   | -13.08     |             | -0.08     | Pass      |
| 20.0          | -17.0      | -18.0          | -16.0   | -17.07     |             | -0.07     | Pass      |
| 10.0          | -20.0      | -21.0          | -19.0   | -20.08     |             | -0.08     | Pass      |
| 5.0           | -23.0      | -24.0          | -22.0   | -23.09     |             | -0.09     | Pass      |
| 2.0           | -27.0      | -28.5          | -26.0   | -27.09     |             | -0.09     | Pass      |
| 1.0           | -30.0      | -32.0          | -29.0   | -30.12     |             | -0.12     | Pass      |
| 0.5           | -33.0      | -35.5          | -32.0   | -33.17     |             | -0.17     | Pass      |
| 0.25          | -36.0      | -39.0          | -35.0   | -36.20     |             | -0.20     | Pass      |

**Level Linearity (IEC 61672-3 § 14, IEC 61672-1 § 5.5.6)**

Level linearity is tested in A-weighting at 8.0 kHz. Increasing input levels continue up to the first indication of overload. The test is continued with decreasing input levels down to the lower limit or the first indication of underrange.

Input Level: the level (amplitude) of the signal to the sound level meter

Nominal Value: the value the sound level meter should indicate according to IEC 61672

Tolerance: the acceptable difference from nominal, including the stated uncertainty, according to IEC 61672

Data Found: the value the sound level meter actually indicates

Uncertainty: maximum expanded uncertainty of measurement with approximately 95% confidence level (coverage factor  $k=2$ )

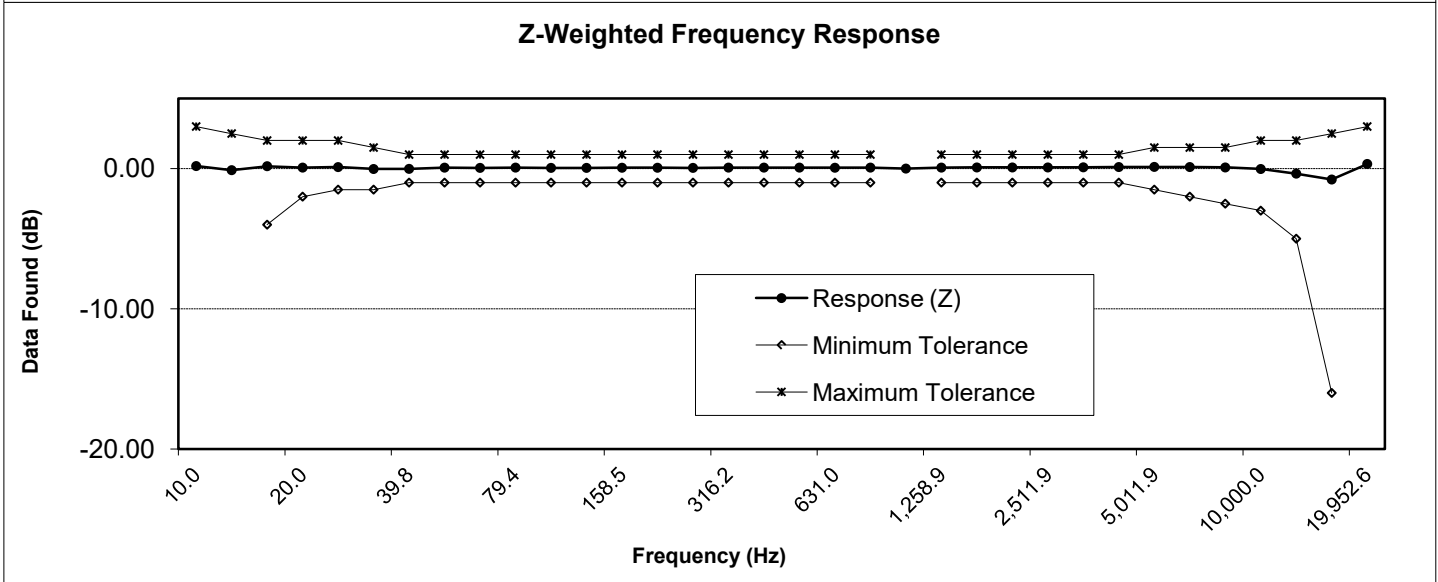
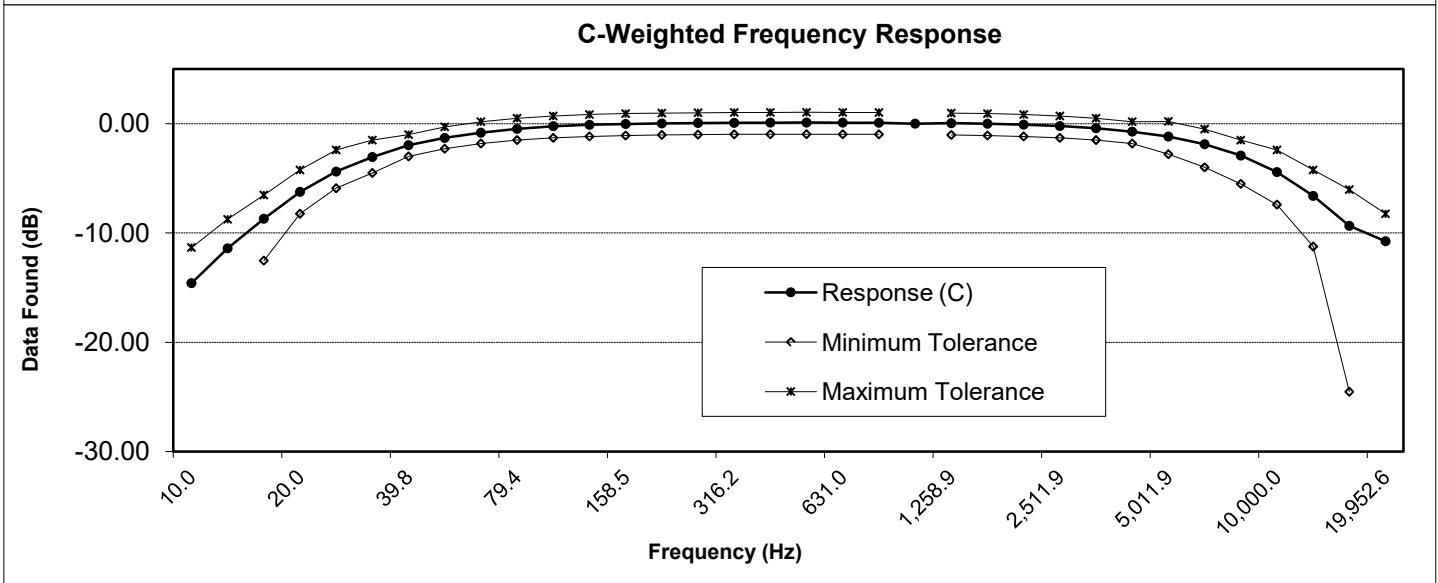
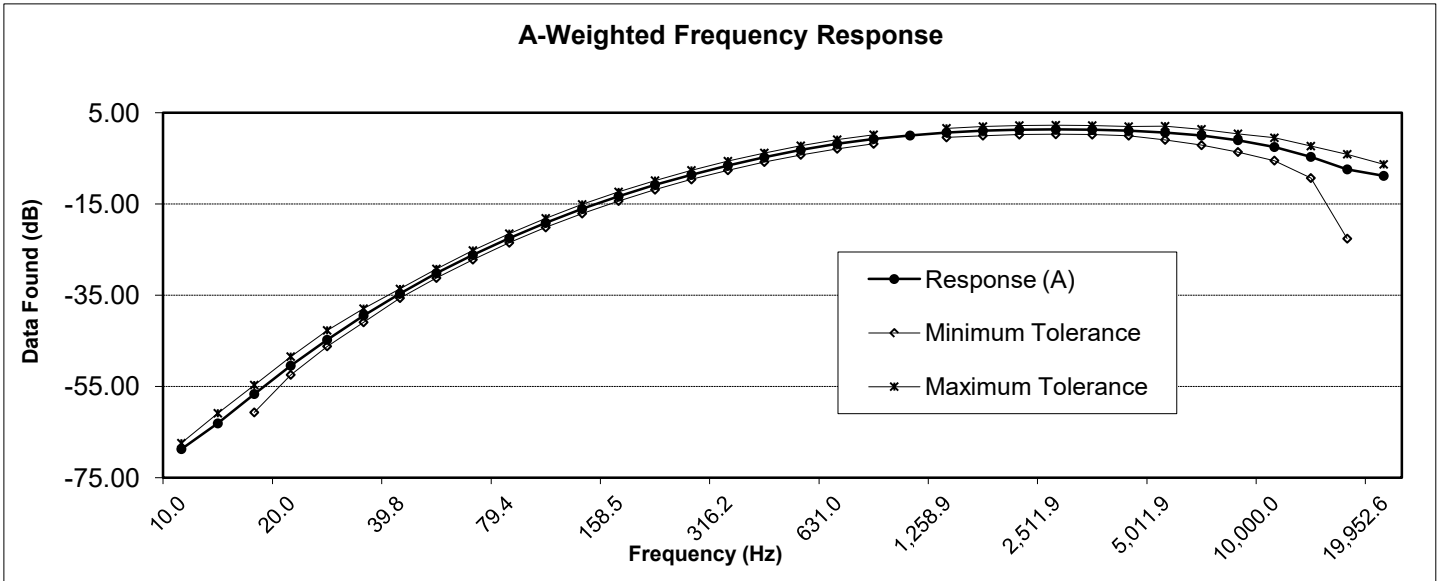
Deviation: the difference between the nominal value and the data found; differential: current and previous measurement is not allowed to exceed 0.5 dB according to IEC 61672-1 § 5.5.6

**Part 1: Increasing Input Levels**

| Input Level (dB)   | Nominal Value (dB) | Tolerance ( $\pm$ dB) | Data Found (dB) | Uncertainty (dB) | Deviation (dB) |              | Pass/Fail |
|--------------------|--------------------|-----------------------|-----------------|------------------|----------------|--------------|-----------|
|                    |                    |                       |                 |                  | Measured       | Differential |           |
| 94.0               |                    |                       |                 |                  |                |              |           |
| <b>Reference 1</b> |                    |                       |                 |                  |                |              |           |
| 99.0               | 99.0               |                       | 99.00           |                  | 0.00           | N/A          | Pass      |
| 104.0              | 104.0              |                       | 103.98          |                  | -0.02          | -0.02        | Pass      |
| 109.0              | 109.0              |                       | 108.99          |                  | -0.01          | 0.01         | Pass      |
| 114.0              | 114.0              |                       | 113.97          |                  | -0.03          | -0.02        | Pass      |
| 119.0              | 119.0              |                       | 119.00          |                  | 0.00           | 0.03         | Pass      |
| 124.0              | 124.0              |                       | 123.98          |                  | -0.02          | -0.02        | Pass      |
| 129.0              | 129.0              |                       | 128.98          |                  | -0.02          | 0.00         | Pass      |
| 134.0              | 134.0              |                       | 133.98          |                  | -0.02          | 0.00         | Pass      |
| 139.0              | 139.0              |                       | 138.99          |                  | -0.01          | 0.01         | Pass      |
| 140.0              | 140.0              |                       | 139.98          |                  | -0.02          | -0.01        | Pass      |
| 141.0              | 141.0              |                       | Overload        |                  | N/A            | N/A          | N/A       |
| 142.0              | 142.0              |                       |                 |                  |                |              |           |
| 143.0              | 143.0              |                       |                 |                  |                |              |           |
| 144.0              | 144.0              | 0.8                   |                 | 0.3              |                |              |           |
| 145.0              | 145.0              |                       |                 |                  |                |              |           |
| 146.0              | 146.0              |                       |                 |                  |                |              |           |
| 147.0              | 147.0              |                       |                 |                  |                |              |           |
| 148.0              | 148.0              |                       |                 |                  |                |              |           |
| 149.0              | 149.0              |                       |                 |                  |                |              |           |
| 150.0              | 150.0              |                       |                 |                  |                |              |           |
| 151.0              | 151.0              |                       |                 |                  |                |              |           |
| 152.0              | 152.0              |                       |                 |                  |                |              |           |
| 153.0              | 153.0              |                       |                 |                  |                |              |           |
| 154.0              | 154.0              |                       |                 |                  |                |              |           |
| 155.0              | 155.0              |                       |                 |                  |                |              |           |
| 156.0              | 156.0              |                       |                 |                  |                |              |           |
| 157.0              | 157.0              |                       |                 |                  |                |              |           |

**Part 2: Decreasing Input Levels**

| Input Level (dB)   | Nominal Value (dB) | Tolerance ( $\pm$ dB) | Data Found (dB) | Uncertainty (dB) | Deviation (dB) |              | Pass/Fail |
|--------------------|--------------------|-----------------------|-----------------|------------------|----------------|--------------|-----------|
|                    |                    |                       |                 |                  | Measured       | Differential |           |
| 140.0              |                    |                       |                 |                  |                |              |           |
| <b>Reference 2</b> |                    |                       |                 |                  |                |              |           |
| 135.0              | 135.0              |                       | 135.01          |                  | 0.01           | N/A          | Pass      |
| 130.0              | 130.0              |                       | 130.01          |                  | 0.01           | 0.00         | Pass      |
| 125.0              | 125.0              |                       | 125.01          |                  | 0.01           | 0.00         | Pass      |
| 120.0              | 120.0              |                       | 120.01          |                  | 0.01           | 0.00         | Pass      |
| 115.0              | 115.0              |                       | 115.02          |                  | 0.02           | 0.01         | Pass      |
| 110.0              | 110.0              |                       | 110.03          |                  | 0.03           | 0.01         | Pass      |
| 105.0              | 105.0              |                       | 105.02          |                  | 0.02           | -0.01        | Pass      |
| 100.0              | 100.0              |                       | 100.02          |                  | 0.02           | 0.00         | Pass      |
| 95.0               | 95.0               |                       | 95.03           |                  | 0.03           | 0.01         | Pass      |
| 90.0               | 90.0               |                       | 90.00           |                  | 0.00           | -0.03        | Pass      |
| 85.0               | 85.0               |                       | 85.01           |                  | 0.01           | 0.01         | Pass      |
| 80.0               | 80.0               |                       | 80.00           |                  | 0.00           | -0.01        | Pass      |
| 75.0               | 75.0               |                       | 75.01           |                  | 0.01           | 0.01         | Pass      |
| 70.0               | 70.0               | 0.8                   | 70.02           | 0.3              | 0.02           | 0.01         | Pass      |
| 65.0               | 65.0               |                       | 65.01           |                  | 0.01           | -0.01        | Pass      |
| 60.0               | 60.0               |                       | 60.01           |                  | 0.01           | 0.00         | Pass      |
| 55.0               | 55.0               |                       | 55.01           |                  | 0.01           | 0.00         | Pass      |
| 50.0               | 50.0               |                       | 49.99           |                  | -0.01          | -0.02        | Pass      |
| 45.0               | 45.0               |                       | 45.00           |                  | 0.00           | 0.01         | Pass      |
| 40.0               | 40.0               |                       | 40.01           |                  | 0.01           | 0.01         | Pass      |
| 35.0               | 35.0               |                       | 35.02           |                  | 0.02           | 0.01         | Pass      |
| 30.0               | 30.0               |                       | 30.13           |                  | 0.13           | 0.11         | Pass      |
| 25.0               | 25.0               |                       | 25.37           |                  | 0.37           | 0.24         | Pass      |
| 24.8               | 24.8               |                       | 25.14           |                  | 0.34           | -0.03        | Pass      |



**Level Verification of Filter+SLM (1/1 Octave)**

For each 1/1 octave filter center frequency, it is verified that the meter indicates within the tolerance shown if the input frequency matches the center frequency.

Filter Center Frequency: center frequency setting on the filter

Input Frequency: frequency of the input signal to the filter

Tolerance: the acceptable range for what the filter should indicate according to Odin Metrology, Inc.

Data Found: the level the sound level meter indicates

| Filter Center Freq. (Hz) | Input Freq. (Hz) | Tolerance (± dB) | Data Found (dB) | Result |
|--------------------------|------------------|------------------|-----------------|--------|
| 15.6                     | 15.6             |                  | 0.16            | Pass   |
| 31.3                     | 31.3             |                  | 0.05            | Pass   |
| 62.5                     | 62.5             |                  | 0.02            | Pass   |
| 125.0                    | 125.0            |                  | 0.00            | Pass   |
| 250.0                    | 250.0            | 0.5              | 0.00            | Pass   |
| 500.0                    | 500.0            |                  | 0.00            | Pass   |
| 1,000.0                  | 1,000.0          |                  | -0.01           | Pass   |
| 2,000.0                  | 2,000.0          |                  | -0.01           | Pass   |
| 4,000.0                  | 4,000.0          |                  | 0.01            | Pass   |
| 8,000.0                  | 8,000.0          |                  | 0.02            | Pass   |
| 16,000.0                 | 16,000.0         |                  | 0.00            | Pass   |

**Level Verification of Filter+SLM (1/3 Octave)**

For each 1/3 octave filter center frequency, it is verified that the meter indicates within the tolerance shown if the input frequency matches the center frequency.

Filter Center Frequency: center frequency setting on the filter

Input Frequency: frequency of the input signal to the filter

Tolerance: the acceptable range for what the filter should indicate according to Odin Metrology, Inc.

Data Found: the level the sound level meter indicates

| Filter Center Freq. (Hz) | Input Freq. (Hz) | Tolerance (± dB) | Data Found (dB) | Result |
|--------------------------|------------------|------------------|-----------------|--------|
| 12.4                     | 12.4             |                  | 0.18            | Pass   |
| 15.6                     | 15.6             |                  | -0.15           | Pass   |
| 19.7                     | 19.7             |                  | -0.16           | Pass   |
| 24.8                     | 24.8             |                  | 0.07            | Pass   |
| 31.3                     | 31.3             |                  | -0.10           | Pass   |
| 39.4                     | 39.4             |                  | -0.03           | Pass   |
| 49.6                     | 49.6             |                  | -0.04           | Pass   |
| 62.5                     | 62.5             |                  | -0.01           | Pass   |
| 78.7                     | 78.7             |                  | 0.02            | Pass   |
| 99.2                     | 99.2             |                  | 0.01            | Pass   |
| 125.0                    | 125.0            |                  | 0.01            | Pass   |
| 157.5                    | 157.5            |                  | -0.02           | Pass   |
| 198.4                    | 198.4            |                  | 0.00            | Pass   |
| 250.0                    | 250.0            |                  | -0.01           | Pass   |
| 315.0                    | 315.0            |                  | -0.01           | Pass   |
| 396.9                    | 396.9            | 0.5              | 0.00            | Pass   |
| 500.0                    | 500.0            |                  | -0.01           | Pass   |
| 630.0                    | 630.0            |                  | -0.01           | Pass   |
| 793.7                    | 793.7            |                  | -0.01           | Pass   |
| 1,000.0                  | 1,000.0          |                  | -0.02           | Pass   |
| 1,259.9                  | 1,259.9          |                  | -0.01           | Pass   |
| 1,587.4                  | 1,587.4          |                  | -0.01           | Pass   |
| 2,000.0                  | 2,000.0          |                  | -0.01           | Pass   |
| 2,519.8                  | 2,519.8          |                  | -0.01           | Pass   |
| 3,174.8                  | 3,174.8          |                  | 0.00            | Pass   |
| 4,000.0                  | 4,000.0          |                  | 0.00            | Pass   |
| 5,039.7                  | 5,039.7          |                  | 0.00            | Pass   |
| 6,349.6                  | 6,349.6          |                  | 0.00            | Pass   |
| 8,000.0                  | 8,000.0          |                  | 0.02            | Pass   |
| 10,079.4                 | 10,079.4         |                  | 0.02            | Pass   |
| 12,699.2                 | 12,699.2         |                  | 0.01            | Pass   |
| 16,000.0                 | 16,000.0         |                  | 0.00            | Pass   |
| 20,158.7                 | 20,158.7         |                  | 0.00            | Pass   |

**Filter Check (1/1 Octave)**

At each center frequency in 1/1 octave step size mode, frequencies equaling the center frequency plus and minus one half octave shall cause the filter to respond with attenuation within the limits stated below.

Filter Center Frequency: center frequency setting on the filter

Input Frequency: the input frequency to the filter calculated as plus and minus one half octave from the center

Tolerance: the acceptable range for what the filter should indicate according to Odin Metrology, Inc.

Data Found: the level the sound level meter indicates

| Filter Center<br>Freq. (Hz) | Input Frequency (Hz) |             | Tolerance (dB) |         | Data Found (dB) |             | Result |
|-----------------------------|----------------------|-------------|----------------|---------|-----------------|-------------|--------|
|                             | -1/2 Octave          | +1/2 Octave | Minimum        | Maximum | -1/2 Octave     | +1/2 Octave |        |
| 15.6                        | 11.1                 | 22.1        |                |         | -3.63           | -3.62       | Pass   |
| 31.3                        | 22.1                 | 44.1        |                |         | -3.59           | -3.60       | Pass   |
| 62.5                        | 44.2                 | 88.3        |                |         | -3.61           | -3.58       | Pass   |
| 125.0                       | 88.5                 | 176.6       |                |         | -3.60           | -3.59       | Pass   |
| 250.0                       | 177.0                | 353.1       |                |         | -3.60           | -3.59       | Pass   |
| 500.0                       | 354.0                | 706.3       |                |         | -3.60           | -3.59       | Pass   |
| 1,000.0                     | 707.9                | 1,412.5     | -5.7           | -1.2    | -3.60           | -3.59       | Pass   |
| 2,000.0                     | 1,415.9              | 2,825.1     |                |         | -3.60           | -3.58       | Pass   |
| 4,000.0                     | 2,831.8              | 5,650.2     |                |         | -3.61           | -3.59       | Pass   |
| 8,000.0                     | 5,663.6              | 11,300.3    |                |         | -3.60           | -3.60       | Pass   |
| 16,000.0                    | 11,327.1             | 22,600.6    |                |         | N/A             | N/A         | N/A    |

**Filter Check (1/3 Octave)**

At each center frequency in 1/3 octave bandwidth, frequencies equaling the center frequency plus and minus one sixth octave shall cause the filter to respond with attenuation within the limits stated below.

Filter Center Frequency: center frequency setting on the filter

Input Frequency: the input frequency to the filter calculated as plus and minus one sixth octave from the

Tolerance: the acceptable range for what the filter should indicate according to Odin Metrology, Inc.

Data Found: the level the sound level meter indicates

| Filter Center<br>Freq. (Hz) | Input Frequency (Hz) |             | Tolerance (dB) |         | Data Found (dB) |             | Result |
|-----------------------------|----------------------|-------------|----------------|---------|-----------------|-------------|--------|
|                             | -1/6 Octave          | +1/6 Octave | Minimum        | Maximum | -1/6 Octave     | +1/6 Octave |        |
| 12.4                        | 11.1                 | 13.9        |                |         | N/A             | N/A         | N/A    |
| 15.6                        | 13.9                 | 17.5        |                |         | N/A             | N/A         | N/A    |
| 19.7                        | 17.5                 | 22.1        |                |         | N/A             | N/A         | N/A    |
| 24.8                        | 22.1                 | 27.8        |                |         | -3.7            | -3.7        | Pass   |
| 31.3                        | 27.9                 | 35.1        |                |         | -3.6            | -3.7        | Pass   |
| 39.4                        | 35.1                 | 44.2        |                |         | -3.6            | -3.6        | Pass   |
| 49.6                        | 44.2                 | 55.7        |                |         | -3.6            | -3.7        | Pass   |
| 62.5                        | 55.7                 | 70.1        |                |         | -3.6            | -3.7        | Pass   |
| 78.7                        | 70.2                 | 88.4        |                |         | -3.6            | -3.6        | Pass   |
| 99.2                        | 88.4                 | 111.3       |                |         | -3.6            | -3.6        | Pass   |
| 125.0                       | 111.4                | 140.3       |                |         | -3.6            | -3.6        | Pass   |
| 157.5                       | 140.4                | 176.7       |                |         | -3.6            | -3.6        | Pass   |
| 198.4                       | 176.8                | 222.6       |                |         | -3.6            | -3.6        | Pass   |
| 250.0                       | 222.8                | 280.5       |                |         | -3.6            | -3.7        | Pass   |
| 315.0                       | 280.7                | 353.4       |                |         | -3.6            | -3.7        | Pass   |
| 396.9                       | 353.7                | 445.3       |                |         | -3.6            | -3.7        | Pass   |
| 500.0                       | 445.6                | 561.0       | -5.7           | -1.2    | -3.6            | -3.7        | Pass   |
| 630.0                       | 561.5                | 706.8       |                |         | -3.6            | -3.7        | Pass   |
| 793.7                       | 707.4                | 890.5       |                |         | -3.6            | -3.7        | Pass   |
| 1,000.0                     | 891.3                | 1,122.0     |                |         | -3.6            | -3.7        | Pass   |
| 1,259.9                     | 1,122.9              | 1,413.7     |                |         | -3.6            | -3.7        | Pass   |
| 1,587.4                     | 1,414.8              | 1,781.1     |                |         | -3.6            | -3.7        | Pass   |
| 2,000.0                     | 1,782.5              | 2,244.0     |                |         | -3.6            | -3.7        | Pass   |
| 2,519.8                     | 2,245.8              | 2,827.3     |                |         | -3.6            | -3.6        | Pass   |
| 3,174.8                     | 2,829.5              | 3,562.2     |                |         | -3.6            | -3.6        | Pass   |
| 4,000.0                     | 3,565.0              | 4,488.1     |                |         | -3.7            | -3.7        | Pass   |
| 5,039.7                     | 4,491.6              | 5,654.6     |                |         | -3.7            | -3.6        | Pass   |
| 6,349.6                     | 5,659.1              | 7,124.4     |                |         | -3.7            | -3.7        | Pass   |
| 8,000.0                     | 7,130.0              | 8,976.1     |                |         | -3.6            | -3.7        | Pass   |
| 10,079.4                    | 8,983.2              | 11,309.2    |                |         | -3.6            | -3.8        | Pass   |
| 12,699.2                    | 11,318.2             | 14,248.7    |                |         | -3.4            | -3.9        | Pass   |
| 16,000.0                    | 14,260.0             | 17,952.3    |                |         | N/A             | N/A         | N/A    |
| 20,158.7                    | 17,966.5             | 22,618.5    |                |         | N/A             | N/A         | N/A    |

**Relative Attenuation at 1,000 Hz (1/1 Octave) (IEC 61260 § 5.3)**

The attenuation of the filter at the given frequencies shall be within the stated tolerance. The frequencies are calculated as octaves from the center frequency. The factors defined by IEC 61260 (Table 1) are:  $\pm 4$ ,  $\pm 3$ ,  $\pm 2$ ,  $\pm 1$ ,  $\pm 1/2$ ,  $\pm 3/8$ ,  $\pm 1/4$ ,  $\pm 1/8$  and 0.

Octaves from Center Frequency: the difference, in octaves, between the selected center frequency (1,000 Hz) and the current input frequency

Input Frequency: the input frequency to the filter

Tolerance: the acceptable range for what the filter should indicate according to IEC 61260

Data Found: the level the sound level meter indicates

| Octaves from Center Freq. | Input Freq. (Hz) | Tolerance (dB) |         | Data Found (dB) | Result |
|---------------------------|------------------|----------------|---------|-----------------|--------|
|                           |                  | Minimum        | Maximum |                 |        |
| -4                        | 63.1             | N/A            | -70.0   | -82.14          | Pass   |
| -3                        | 125.9            | N/A            | -61.0   | -63.82          | Pass   |
| -2                        | 251.2            | N/A            | -42.0   | -44.53          | Pass   |
| -1                        | 501.2            | N/A            | -17.5   | -20.71          | Pass   |
| - 1/2                     | 707.9            | -5.0           | -2.0    | -3.57           | Pass   |
| - 3/8                     | 771.8            | -1.3           | 0.3     | -0.85           | Pass   |
| - 1/4                     | 841.4            | -0.6           | 0.3     | -0.04           | Pass   |
| - 1/8                     | 917.3            | -0.4           | 0.3     | 0.00            | Pass   |
| 0                         | 1,000.0          | -0.3           | 0.3     | 0.00            | Pass   |
| 1/8                       | 1,090.2          | -0.4           | 0.3     | 0.05            | Pass   |
| 1/4                       | 1,188.5          | -0.6           | 0.3     | -0.08           | Pass   |
| 3/8                       | 1,295.7          | -1.3           | 0.3     | -0.85           | Pass   |
| 1/2                       | 1,412.5          | -5.0           | -2.0    | -3.54           | Pass   |
| 1                         | 1,995.3          | N/A            | -17.5   | -20.78          | Pass   |
| 2                         | 3,981.1          | N/A            | -42.0   | -55.79          | Pass   |
| 3                         | 7,943.3          | N/A            | -61.0   | -91.12          | Pass   |
| 4                         | 15,848.9         | N/A            | -70.0   | -109.32         | Pass   |

