# iDB® and iVIBE® Performance Tests – Sound

*Identical circuits are used in both instruments and in what follows we refer to them collectively as iVIBE.*

The iVIBE sound processing circuits are designed to meet the Class 1 requirements of BS EN 61672-1:2013. The ultimate performance of the instrument will depend on whether a Class 1 or Class 2 microphone is used. The following tables and charts give details of the typical performance of the iDB and iVIBE instruments when an electrical stimulus is applied instead of the microphone.

For the purpose of these tests, the instrument was calibrated to give a reading of 94.0 dB when a 50.0 mV RMS 1.0 kHz sine wave stimulus is applied to the microphone input. The ACO 7146 Class 1 microphone (with integral preamplifier) normally supplied with the iVIBE has a typical sensitivity of 42.2 mV/Pa at 1.0 kHz (i.e. about -1.4dB less). A typical performance chart for this microphone is given in the Appendix

The iVIBE records inputs between +30 dB and +125 dB on a single range with a linearity of better the ±0.5 dB for inputs greater than 40 dB.

The iVIBE noise floor, as measured with the microphone input shorted, is typically 25 dB or less for both the A and C weightings with 50mV/Pa sensitivity.

iVIBE is able to measure and record A and C frequency weightings simultaneously together with $L_{Cpeak}$ and overload time as a percentage of measuring time. Both instruments also contain an accurate atmospheric pressure sensor.

For the purposes of these tests, the stimulus signals were generated by a TTi 50 MHz Function Generator (Model TG5011) and the RMS stimulus voltages measured by a Keysight 6.5 digit DVM (Model 34461A). A -50.00 dB precision attenuator was also used.

**The test results confirm that the performance of the iDB and iVIBE sound processing circuits exceed the Class 1 requirements of BS EN61672-1:2013.**

## Frequency Weightings - BS EN 61672-1 Section 5.5

500.0 mV RMS sine wave applied giving a reading of 114.0 dB at 1.0 kHz

| Frequency Hz | BS 61672 dB | | iVIBE dB | | Deviation dB | | Class 1 tolerance dB |
|---|---|---|---|---|---|---|---|
| | A | C | A | C | A | C | |
| 10.0 | -70.4 | -14.3 | -73.6 | -17.2 | -3.2 | -2.9 | +3.0, - infinity |
| 12.5 | -63.4 | -11.2 | -66.1 | -12.9 | -2.7 | -1.7 | +2.5, - infinity |
| 16.0 | -56.7 | -8.5 | -57.9 | -9.4 | -1.2 | -0.9 | +2.0, -4.0 |
| 20.0 | -50.5 | -6.2 | -51.7 | -7.3 | -1.2 | -1.1 | +2.0, -2.0 |
| 25.0 | -44.7 | -4.4 | -45.6 | -5.1 | -0.9 | -0.7 | +2.0, -1.5 |
| 31.5 | -39.4 | -3.0 | -39.9 | -3.4 | -0.5 | -0.4 | +1.5, -1.5 |
| 40.0 | -34.6 | -2.0 | -35.1 | -2.2 | -0.5 | -0.2 | +1.0, -1.0 |
| 50.0 | -30.2 | -1.3 | -30.5 | -1.4 | -0.3 | -0.1 | +1.0, -1.0 |
| 63.0 | -26.2 | -0.8 | -26.4 | -0.9 | -0.2 | -0.1 | +1.0, -1.0 |
| 80.0 | -22,5 | -0.5 | -23.0 | -0.6 | -0.5 | -0.1 | +1.0, -1.0 |
| 100 | -19.1 | -0.3 | -19.7 | -0.3 | -0.6 | 0.0 | +1.0, -1.0 |
| 125 | -16.1 | -0.2 | -16.3 | -0.2 | -0.2 | 0.0 | +1.0, -1.0 |
| 160 | -13.4 | -0.1 | -13.1 | -0.1 | 0.3 | 0.0 | +1.0, -1.0 |
| 200 | -10.9 | 0.0 | -10.9 | 0.0 | 0.0 | 0.0 | +1.0, -1.0 |
| 250 | -8.6 | 0.0 | -8.9 | 0.0 | -0.3 | 0.0 | +1.0, -1.0 |
| 315 | -6.6 | 0.0 | -6.9 | 0.0 | -0.3 | 0.0 | +1.0, -1.0 |
| 400 | -4.8 | 0.0 | -5.0 | 0.0 | -0.2 | 0.0 | +1.0, -1.0 |
| 500 | -3.2 | 0.0 | -3.3 | 0.0 | -0.1 | 0.0 | +1.0, -1.0 |
| 630 | -1.9 | 0.0 | -1.9 | 0.0 | 0.0 | 0.0 | +1.0, -1.0 |
| 800 | -0.8 | 0.0 | -0.8 | 0.0 | 0.1 | 0.0 | +1.0, -1.0 |
| 1000 | 0.0 | 0.00 | 0.0 | 0.0 | 0.0 | 0.0 | +0.7, -0.7 |
| 1250 | +0.6 | 0.0 | 0.6 | -0.1 | 0.0 | -0.1 | +1.0, -1.0 |
| 1600 | +1.0 | -0.1 | 0.9 | -0.1 | -0.1 | 0.0 | +1.0, -1.0 |
| 2000 | +1.2 | -0.2 | 1.1 | -0.2 | -0.1 | 0.0 | +1.0, -1.0 |
| 2500 | +1.3 | -0.3 | 1.2 | -0.3 | -0.1 | 0.0 | +1.0, -1.0 |
| 3150 | +1.2 | -0.5 | 1.1 | -0.6 | -0.1 | -0.1 | +1.0, -1.0 |
| 4000 | +1.0 | -0.8 | 0.9 | -0.9 | -0.1 | -0.1 | +1.0, -1.0 |
| 5000 | +0.5 | -1.3 | 0.6 | -1.4 | 0.1 | -0.1 | +1.5, -1.5 |
| 6300 | -0.1 | -2.0 | -0.1 | -2.1 | 0.0 | -0.1 | +1.5, -2.0 |
| 8000 | -1.1 | -3.0 | -1.1 | -3.2 | 0.0 | -0.3 | +1.5, -2.5 |
| 10,000 | -2.5 | -4.4 | -2.6 | -4.7 | -0.1 | -0.4 | +2.0, -3.0 |
| 12,500 | -4.3 | -6.2 | -4.6 | -6.7 | -0.3 | -0.5 | +2.0, -5.0 |
| 16,000 | -6.6 | -8.5 | -7.4 | -9.3 | -0.8 | -0.8 | +2.5. -16.0 |
| 20,000 | -9.3 | -11.2 | -10.3 | -11.8 | -1.0 | -0.6 | +3.0, - infinity |

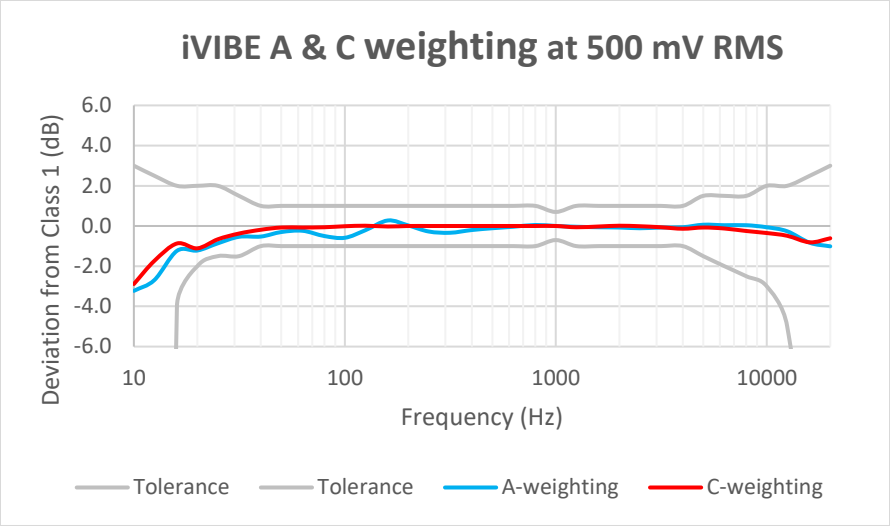
50.0 mV RMS sine wave applied giving a reading of 94.0 dB at 1.0 kHz

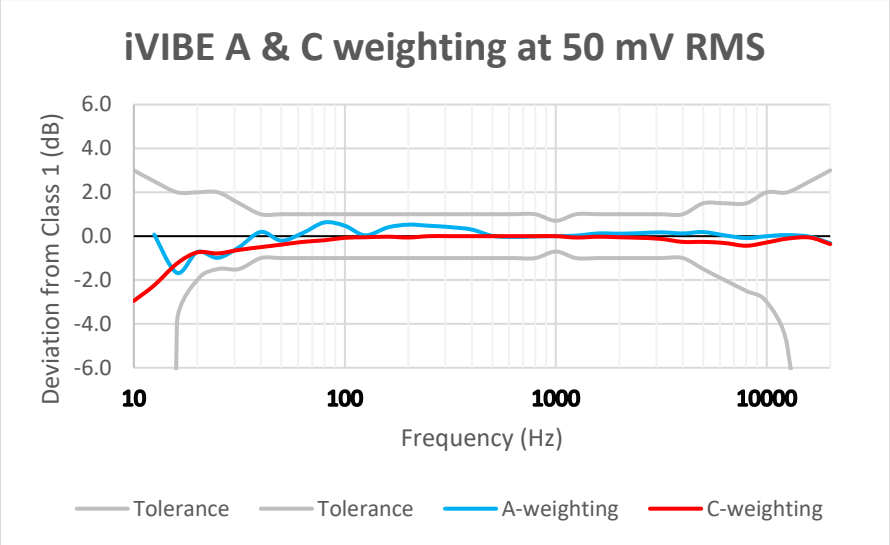
| Frequency Hz | BS 61672 dB | | iVIBE dB | | Deviation dB | | Class 1 tolerance dB |
|---|---|---|---|---|---|---|---|
| | A | C | A | C | A | C | |
| 10.0 | -70.4 | -14.3 | -65.2 | -17.3 | <35dB | -3.0 | +3.0, - infinity |
| 12.5 | -63.4 | -11.2 | -63.3 | -13.4 | 0.1 | -2.2 | +2.5, - infinity |
| 16.0 | -56.7 | -8.5 | -58.4 | -9.8 | -1.7 | -1.3 | +2.0, -4.0 |
| 20.0 | -50.5 | -6.2 | -51.2 | -6.9 | -0.7 | -0.7 | +2.0, -2.0 |
| 25.0 | -44.7 | -4.4 | -45.7 | -5.2 | -1.0 | -0.8 | +2.0, -1.5 |
| 31.5 | -39.4 | -3.0 | -39.9 | -3.6 | -0.5 | -0.6 | +1.5, -1.5 |
| 40.0 | -34.6 | -2.0 | -34.4 | -2.5 | 0.2 | -0.5 | +1.0, -1.0 |
| 50.0 | -30.2 | -1.3 | -30.4 | -1.7 | -0.2 | -0.4 | +1.0, -1.0 |
| 63.0 | -26.2 | -0.8 | -26.1 | -1.1 | 0.1 | -0.3 | +1.0, -1.0 |
| 80.0 | -22,5 | -0.5 | -21.9 | -0.7 | 0.6 | -0.2 | +1.0, -1.0 |
| 100 | -19.1 | -0.3 | -18.6 | -0.4 | 0.5 | -0.1 | +1.0, -1.0 |
| 125 | -16.1 | -0.2 | -16.1 | -0.3 | 0.0 | -0.1 | +1.0, -1.0 |
| 160 | -13.4 | -0.1 | -13.0 | -0.1 | 0.4 | 0.0 | +1.0, -1.0 |
| 200 | -10.9 | 0.0 | -10.4 | -0.1 | 0.5 | -0.1 | +1.0, -1.0 |
| 250 | -8.6 | 0.0 | -8.1 | 0.0 | 0.5 | 0.0 | +1.0, -1.0 |
| 315 | -6.6 | 0.0 | -6.2 | 0.0 | 0.4 | 0.0 | +1.0, -1.0 |
| 400 | -4.8 | 0.0 | -4.5 | 0.0 | 0.3 | 0.0 | +1.0, -1.0 |
| 500 | -3.2 | 0.0 | -3.2 | 0.0 | 0.0 | 0.0 | +1.0, -1.0 |
| 630 | -1.9 | 0.0 | -1.9 | 0.0 | 0.0 | 0.0 | +1.0, -1.0 |
| 800 | -0.8 | 0.0 | -0.8 | 0.0 | 0.0 | 0.0 | +1.0, -1.0 |
| 1000 | 0 | 0 | 0.0 | 0.0 | 0.0 | 0.0 | +0.7, -0.7 |
| 1250 | +0.6 | 0.0 | 0.6 | -0.1 | 0.0 | -0.1 | +1.0, -1.0 |
| 1600 | +1.0 | -0.1 | 1.1 | -0.1 | 0.1 | 0.0 | +1.0, -1.0 |
| 2000 | +1.2 | -0.2 | 1.3 | -0.3 | 0.1 | -0.1 | +1.0, -1.0 |
| 2500 | +1.3 | -0.3 | 1.4 | -0.4 | 0.1 | -0.1 | +1.0, -1.0 |
| 3150 | +1.2 | -0.5 | 1.4 | -0.6 | 0.2 | -0.1 | +1.0, -1.0 |
| 4000 | +1.0 | -0.8 | 1.1 | -1.1 | 0.1 | -0.3 | +1.0, -1.0 |
| 5000 | +0.5 | -1.3 | 0.7 | -1.6 | 0.2 | -0.3 | +1.5, -1.5 |
| 6300 | -0.1 | -2.0 | -0.1 | -2.3 | 0.0 | -0.3 | +1.5, -2.0 |
| 8000 | -1.1 | -3.0 | -1.2 | -3.4 | -0.1 | -0.4 | +1.5, -2.5 |
| 10,000 | -2.5 | -4.4 | -2.5 | -4.7 | 0.0 | -0.3 | +2.0, -3.0 |
| 12,500 | -4.3 | -6.2 | -4.3 | -6.3 | 0.0 | -0.1 | +2.0, -5.0 |
| 16,000 | -6.6 | -8.5 | -6.6 | -8.6 | 0.0 | -0.1 | +2.5. -16.0 |
| 20,000 | -9.3 | -11.2 | -9.6 | -11.6 | -0.3 | -0.4 | +3.0, - infinity |

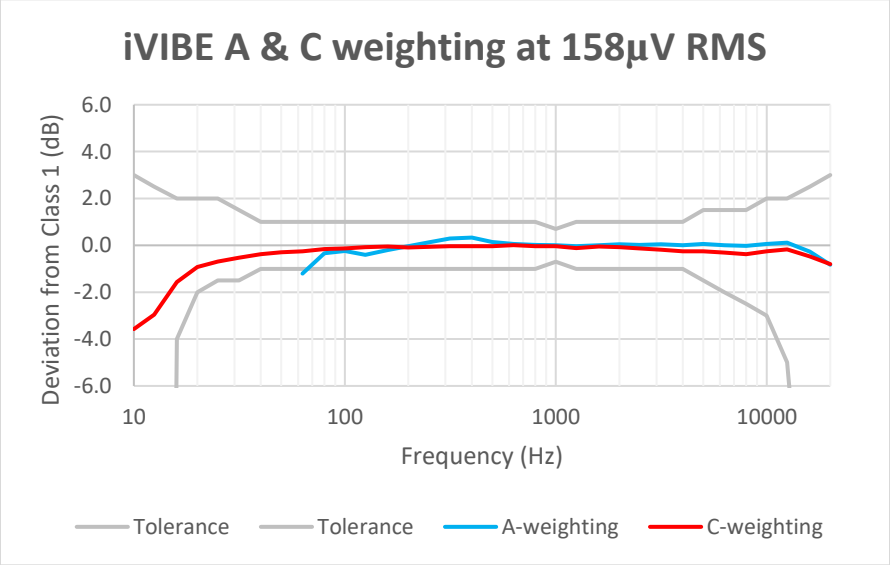
158.1 µV RMS sine wave applied giving a reading of 64.0 dB at 1.0 kHz

| Frequency Hz | BS 61672 dB | | iVIBE dB | | Deviation dB | | Class 1 tolerance dB |
|---|---|---|---|---|---|---|---|
| | A | C | A | C | A | C | |
| 10.0 | -70.4 | -14.3 | -40.6 | -17.9 | <35dB | -3.6 | +3.0, - infinity |
| 12.5 | -63.4 | -11.2 | -40.6 | -14.2 | <35dB | -3.0 | +2.5, - infinity |
| 16.0 | -56.7 | -8.5 | -40.6 | -10.1 | <35dB | -1.6 | +2.0, -4.0 |
| 20.0 | -50.5 | -6.2 | -40.5 | -7.1 | <35dB | -0.9 | +2.0, -2.0 |
| 25.0 | -44.7 | -4.4 | -40.2 | -5.1 | <35dB | -0.7 | +2.0, -1.5 |
| 31.5 | -39.4 | -3.0 | -39.3 | -3.5 | <35dB | -0.5 | +1.5, -1.5 |
| 40.0 | -34.6 | -2.0 | -36.9 | -2.4 | <35dB | -0.4 | +1.0, -1.0 |
| 50.0 | -30.2 | -1.3 | -32.5 | -1.6 | <35dB | -0.3 | +1.0, -1.0 |
| 63.0 | -26.2 | -0.8 | -27.4 | -1.1 | -1.2 | -0.3 | +1.0, -1.0 |
| 80.0 | -22,5 | -0.5 | -22.8 | -0.7 | -0.3 | -0.2 | +1.0, -1.0 |
| 100 | -19.1 | -0.3 | -19.3 | -0.4 | -0.2 | -0.1 | +1.0, -1.0 |
| 125 | -16.1 | -0.2 | -16.5 | -0.3 | -0.4 | -0.1 | +1.0, -1.0 |
| 160 | -13.4 | -0.1 | -13.6 | -0.2 | -0.2 | -0.1 | +1.0, -1.0 |
| 200 | -10.9 | 0.0 | -10.9 | -0.1 | 0.0 | -0.1 | +1.0, -1.0 |
| 250 | -8.6 | 0.0 | -8.5 | -0.1 | 0.1 | -0.1 | +1.0, -1.0 |
| 315 | -6.6 | 0.0 | -6.3 | 0.0 | 0.3 | 0.0 | +1.0, -1.0 |
| 400 | -4.8 | 0.0 | -4.5 | 0.0 | 0.3 | 0.0 | +1.0, -1.0 |
| 500 | -3.2 | 0.0 | -3.1 | 0.0 | 0.1 | 0.0 | +1.0, -1.0 |
| 630 | -1.9 | 0.0 | -1.8 | 0.0 | 0.1 | 0.0 | +1.0, -1.0 |
| 800 | -0.8 | 0.0 | -0.8 | 0.0 | 0.0 | 0.0 | +1.0, -1.0 |
| 1000 | 0 | 0 | 0 | 0.0 | 0.0 | 0.0 | +0.7, -0.7 |
| 1250 | +0.6 | 0.0 | 0.6 | -0.1 | 0.0 | -0.1 | +1.0, -1.0 |
| 1600 | +1.0 | -0.1 | 1.0 | -0.2 | 0.0 | -0.1 | +1.0, -1.0 |
| 2000 | +1.2 | -0.2 | 1.3 | -0.3 | 0.1 | -0.1 | +1.0, -1.0 |
| 2500 | +1.3 | -0.3 | 1.3 | -0.4 | 0.0 | -0.1 | +1.0, -1.0 |
| 3150 | +1.2 | -0.5 | 1.3 | -0.7 | 0.1 | -0.2 | +1.0, -1.0 |
| 4000 | +1.0 | -0.8 | 1.0 | -1.1 | 0.0 | -0.3 | +1.0, -1.0 |
| 5000 | +0.5 | -1.3 | 0.6 | -1.6 | 0.1 | -0.3 | +1.5, -1.5 |
| 6300 | -0.1 | -2.0 | -0.1 | -2.3 | 0.0 | -0.3 | +1.5, -2.0 |
| 8000 | -1.1 | -3.0 | -1.1 | -3.4 | 0.0 | -0.4 | +1.5, -2.5 |
| 10,000 | -2.5 | -4.4 | -2.4 | -4.7 | 0.1 | -0.3 | +2.0, -3.0 |
| 12,500 | -4.3 | -6.2 | -4.2 | -6.4 | 0.1 | -0.2 | +2.0, -5.0 |
| 16,000 | -6.6 | -8.5 | -6.9 | -9.0 | -0.3 | -0.5 | +2.5. -16.0 |
| 20,000 | -9.3 | -11.2 | -10.1 | -12.0 | -0.8 | -0.8 | +3.0, - infinity |

Note: 158.1 µV signal generated using a -50.00 dB attenuator


iVIBE A & C weighting at 500 mV RMS
Deviation from Class 1 (dB)
6.0
4.0
2.0
0.0
-2.0
-4.0
-6.0
10
100
1000
10000
Frequency (Hz)
Tolerance
Tolerance
A-weighting
C-weighting


iVIBE A & C weighting at 50 mV RMS
Deviation from Class 1 (dB)
6.0
4.0
2.0
0.0
-2.0
-4.0
-6.0
10
100
1000
10000
Frequency (Hz)
Tolerance
Tolerance
A-weighting
C-weighting


iVIBE A & C weighting at 158µV RMS
Deviation from Class 1 (dB)
6.0
4.0
2.0
0.0
-2.0
-4.0
-6.0
10
100
1000
10000
Frequency (Hz)
Tolerance
Tolerance
A-weighting
C-weighting

## Level Linearity - BS EN 61672-1 Section 5.5

iVIBE has a single measurement range spanning 95 dB for sound pressure levels between 30 dB and 125 dB for both A and C frequency weightings. Performance tests were carried out at frequencies of 4.0 kHz, 1.0 kHz and 40 Hz. Stimuli below 10 mV RMS were generated with the aid of a -50.00 dB precision attenuator.

For BS 61672 Class 1, the linearity deviations (Dev.) shall not exceed ±0.8 dB over the linear measurement range of the instrument and shall not exceed ±0.3 dB within any 10 dB portion thereof.

iVIBE Level Linearity at 4.0 kHz

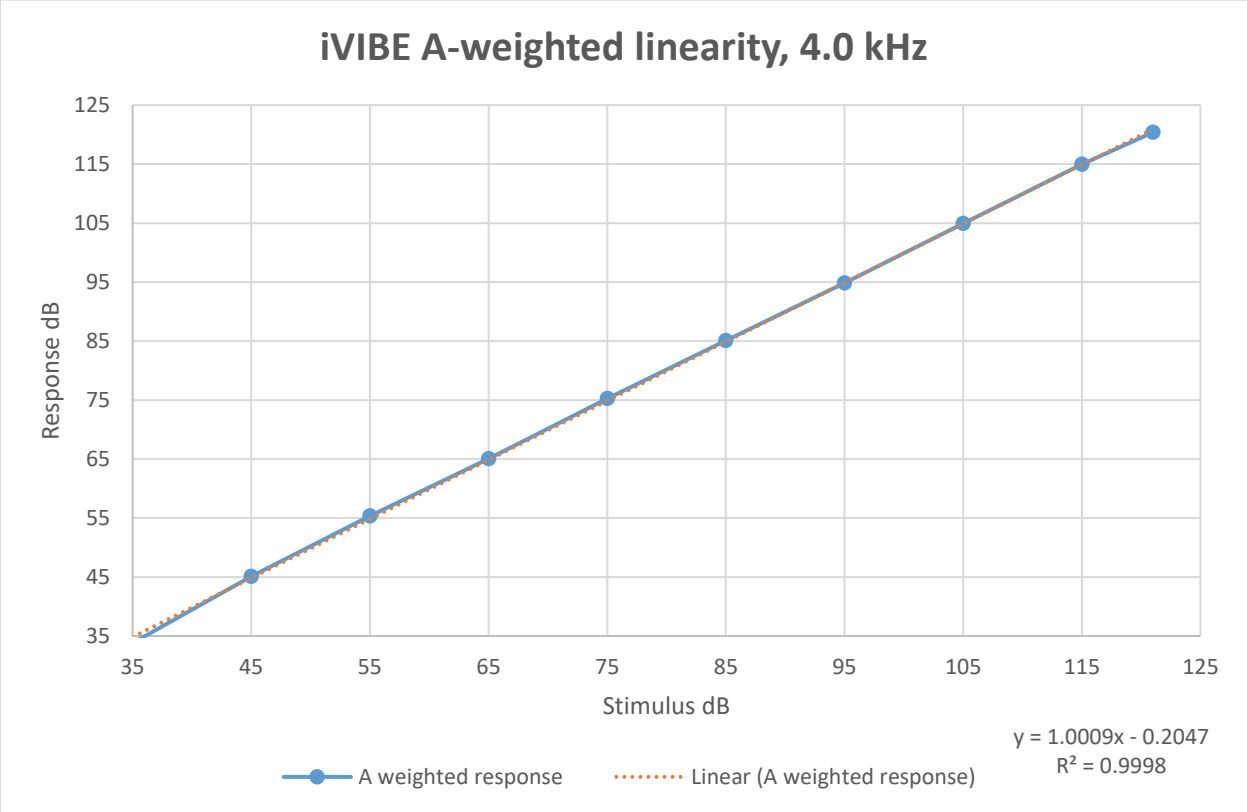
| Stimulus mV RMS | True A dB | iVIBE A dB | Dev. A dB | True C dB | iVIBE C dB | Dev. C dB |
|---|---|---|---|---|---|---|
| 1000.0 | 121.0 | 120.4 | -0.6 | 119.2 | 118.4 | -0.8 |
| 500.0 | 115.0 | 114.9 | -0.1 | 113.2 | 113.1 | -0.1 |
| 158.1 | 105.0 | 104.9 | -0.1 | 103.2 | 103.1 | -0.0 |
| 50.00 | 95.0 | 94.8 | -0.2 | 93.2 | 92.9 | -0.3 |
| 15.81 | 85.0 | 85.1 | 0.1 | 83.2 | 83.4 | 0.2 |
| 5.00 | 75.0 | 75.2 | 0.3 | 73.2 | 73.4 | 0.2 |
| 1.581 | 65.0 | 65.1 | 0.1 | 63.2 | 63.0 | -0.2 |
| 0.500 | 55.0 | 55.3 | 0.3 | 53.2 | 53.1 | 0.0 |
| 0.158 | 45.0 | 45.1 | 0.1 | 43.2 | 43.1 | -0.1 |
| 0.050 | 35.0 | 33.8 | -1.2 | 33.3 | 31.6 | -1.7 |

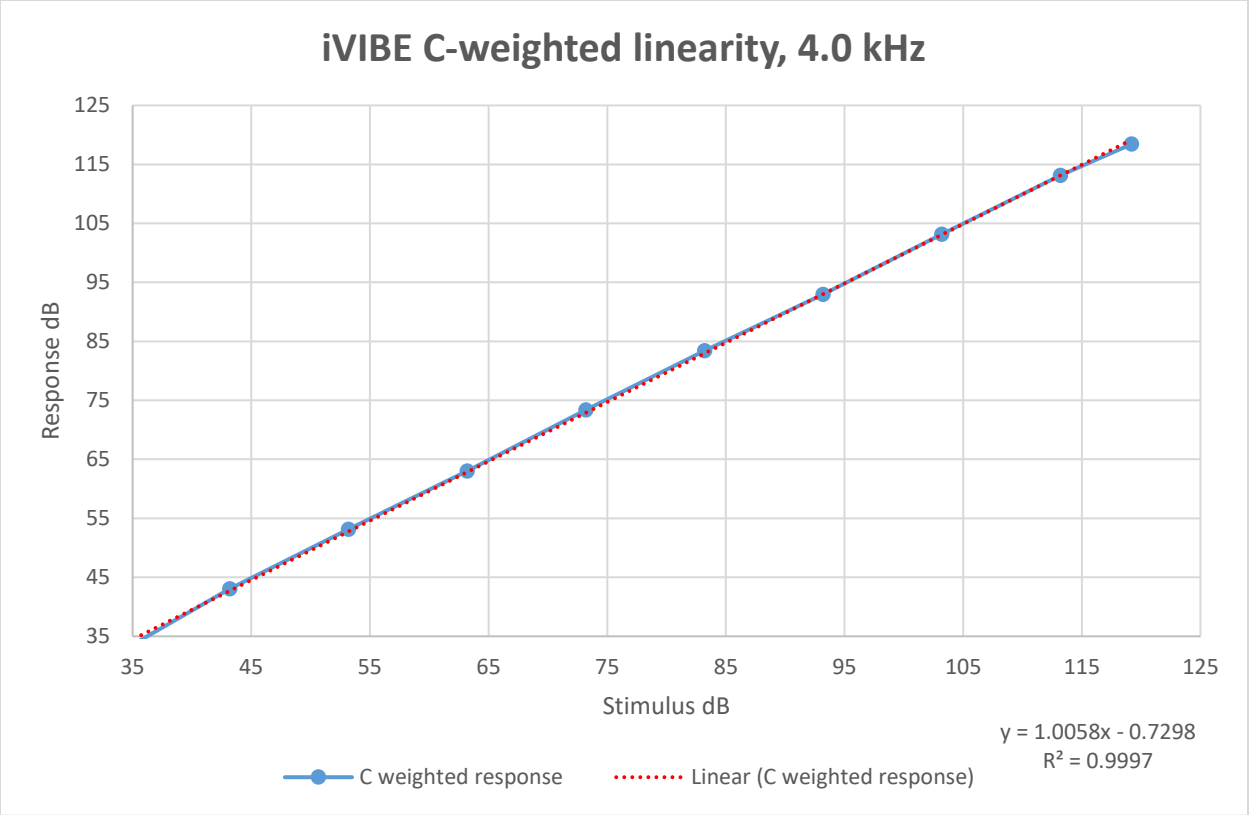
iVIBE Level Linearity at 1.0 kHz

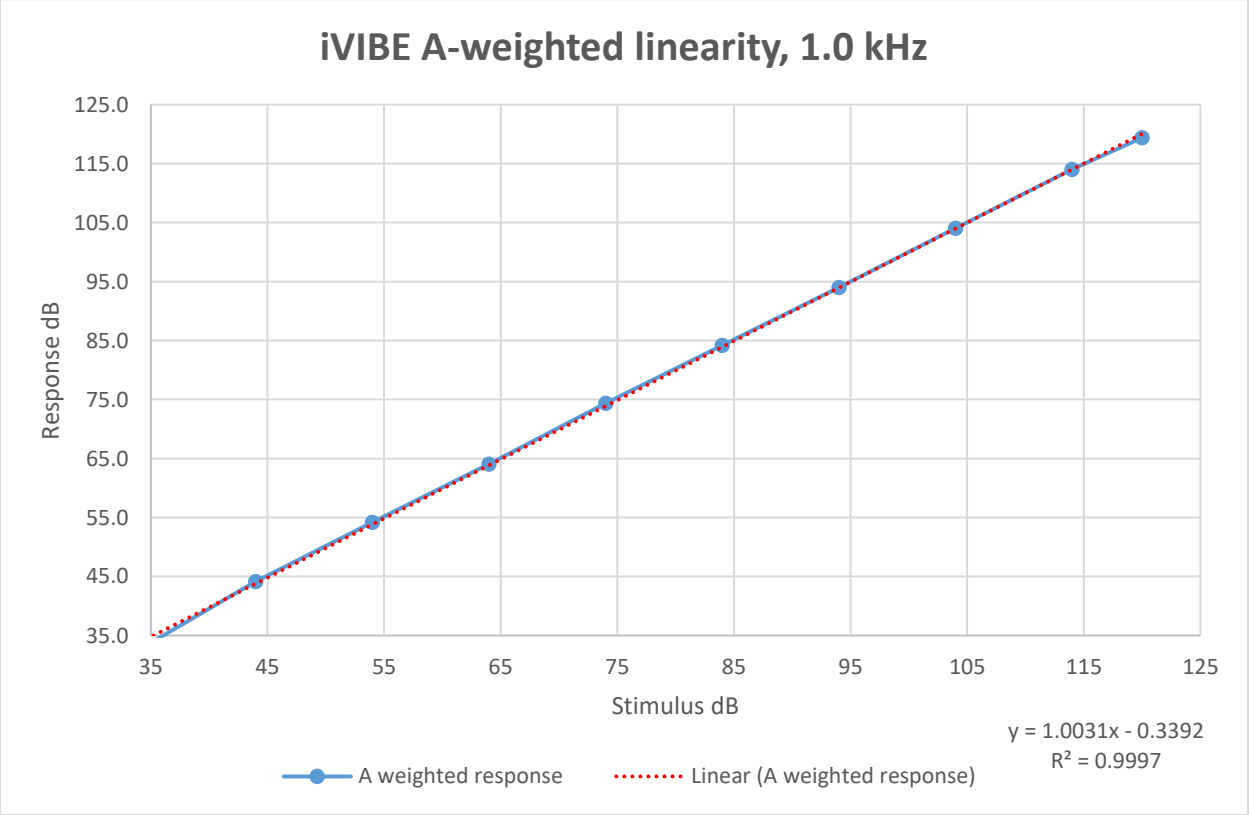
| Stimulus mV RMS | True A dB | iVIBE A dB | Dev. A dB | True C dB | iVIBE C dB | Dev. C dB |
|---|---|---|---|---|---|---|
| 1000.0 | 120.0 | 119.4 | -0.6 | 120.0 | 119.4 | -0.6 |
| 500.0 | 114.0 | 114.0 | 0.0 | 114.0 | 114.0 | 0.0 |
| 158.1 | 104.0 | 104.1 | 0.1 | 104.0 | 104.1 | 0.1 |
| 50.00 | 94.0 | 94.0 | 0.0 | 94.0 | 94.0 | 0.0 |
| 15.81 | 84.0 | 84.2 | 0.2 | 84.0 | 84.2 | 0.2 |
| 5.00 | 74.0 | 74.4 | 0.4 | 74.0 | 74.3 | 0.3 |
| 1.581 | 64.0 | 64.1 | 0.1 | 64.0 | 64.0 | 0.0 |
| 0.500 | 54.0 | 54.2 | 0.2 | 54.0 | 54.2 | 0.2 |
| 0.158 | 44.0 | 44.2 | 0.2 | 44.0 | 44.1 | 0.1 |
| 0.050 | 34.0 | 32.6 | -1.4 | 34.0 | 32.8 | -1.2 |

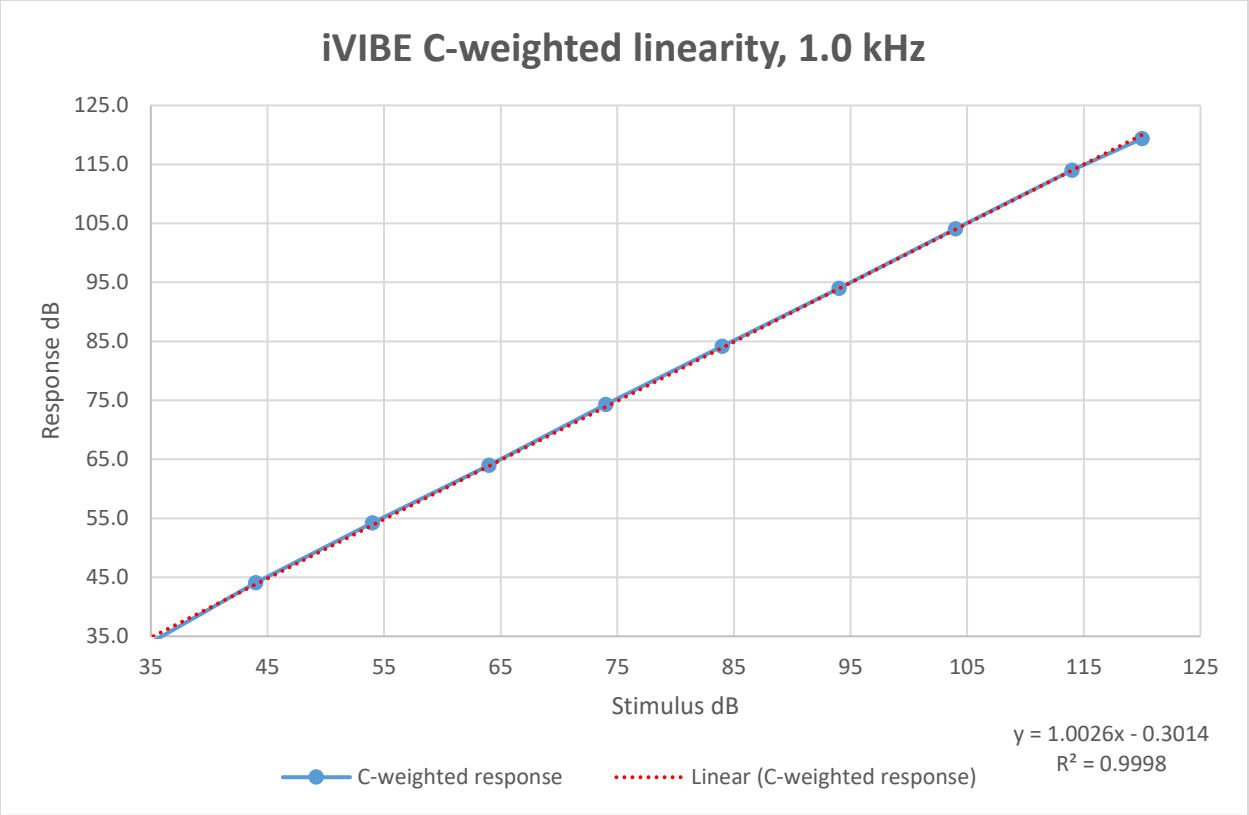
iVIBE Level Linearity at 40 Hz

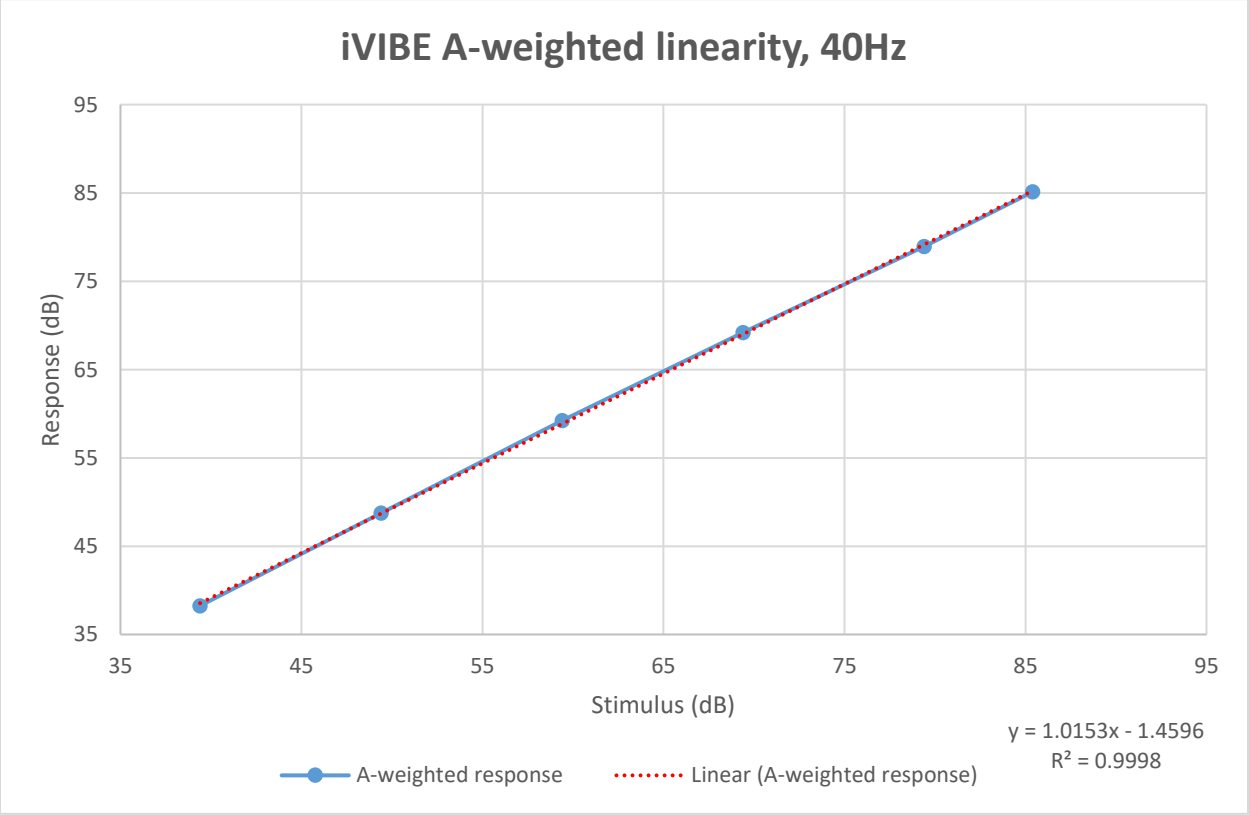
| Stimulus mV RMS | True A dB | iVIBE A dB | Dev. A dB | True C dB | iVIBE C dB | Dev. C dB |
|---|---|---|---|---|---|---|
| 1000.0 | 85.4 | 85.1 | -0.3 | 118.0 | 117.1 | -0.9 |
| 500.0 | 79.4 | 78.9 | -0.5 | 112.0 | 111.8 | -0.2 |
| 158.1 | 69.4 | 69.2 | -0.2 | 102.0 | 101.9 | -0.1 |
| 50.00 | 59.4 | 59.2 | -0.2 | 92.0 | 91.8 | -0.2 |
| 15.81 | 49.4 | 48.8 | -0.6 | 82.0 | 82.0 | 0.0 |
| 5.00 | 39.4 | 38.2 | -1.2 | 72.0 | 72.1 | 0.1 |
| 1.581 | 29.4 | <35dB | | 62.0 | 61.8 | -0.2 |
| 0.500 | 19.4 | <35dB | | 52.0 | 51,6 | -0.4 |
| 0.158 | 9.4 | <35dB | | 42.0 | 41.7 | -0.3 |
| 0.050 | -0.6 | <35dB | | 32.0 | 29.8 | -2.1 |

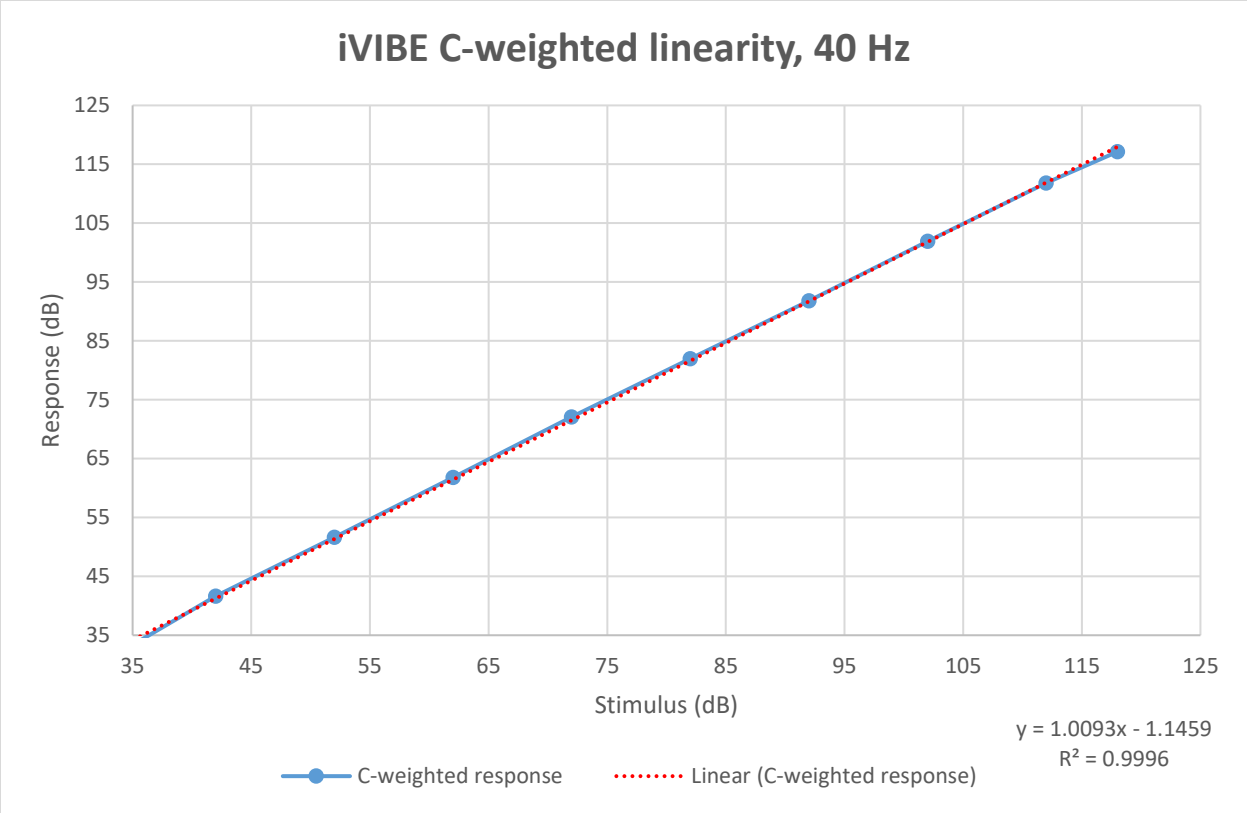



iVIBE C-weighted linearity, 4.0 kHz
Response dB
125
115
105
95
85
75
65
55
45
35
35
45
55
65
75
85
95
105
115
125
Stimulus dB
y = 1.0058x - 0.7298
R² = 0.9997
C weighted response
Linear (C weighted response)


iVIBE A-weighted linearity, 1.0 kHz
Response dB
125.0
115.0
105.0
95.0
85.0
75.0
65.0
55.0
45.0
35.0
35
45
55
65
75
85
95
105
115
125
Stimulus dB
y = 1.0031x - 0.3392
R² = 0.9997
A weighted response
Linear (A weighted response)


iVIBE C-weighted linearity, 1.0 kHz
125.0
115.0
105.0
95.0
85.0
75.0
65.0
55.0
45.0
35.0
Response dB
35
45
55
65
75
85
95
105
115
125
Stimulus dB
y = 1.0026x - 0.3014
R² = 0.9998
C-weighted response
Linear (C-weighted response)


iVIBE A-weighted linearity, 40Hz
95
85
75
65
55
45
35
Response (dB)
35
45
55
65
75
85
95
Stimulus (dB)
y = 1.0153x - 1.4596
R² = 0.9998
A-weighted response
Linear (A-weighted response)




## Noise Floor - BS EN 61672-1 Section 5.7

| iVIBE | A -weighting | C-weighting |
|---|---|---|
| | | |
| Maximum noise floor at 50mV/Pa | 25 dB | 25 dB |
| Level at which noise floor causes a non-linearity of < 0.4dB | 42 dB | 42 dB |
| Level at which noise floor causes a non-linearity of < 1.0 dB | 37 dB | 37 dB |
| | | |

## Time-weightings F and S – BS EN 61672-1 Section 5.8

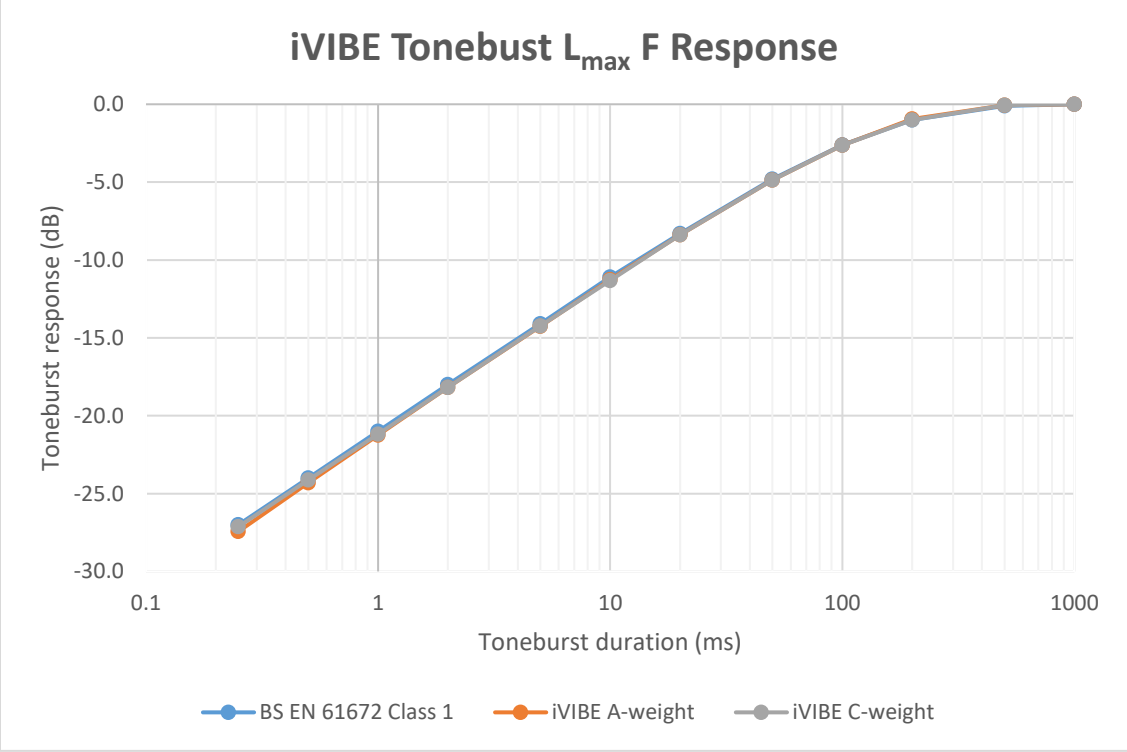
iVIBE uses digital filters to meet the design goal time constants of 0.125 sec for the F time weight filter and 1.0 sec for the S time weight filter. Their accuracy is confirmed by the accuracy of the following toneburst measurements.

## Toneburst Response - BS EN 61672-1 Section 5.9

4.0 kHz toneburst, $L_{max}$ response, F time weighting

iVIBE: $L_A$= 114.8 dB, iVIBE: Lc =113.0dB

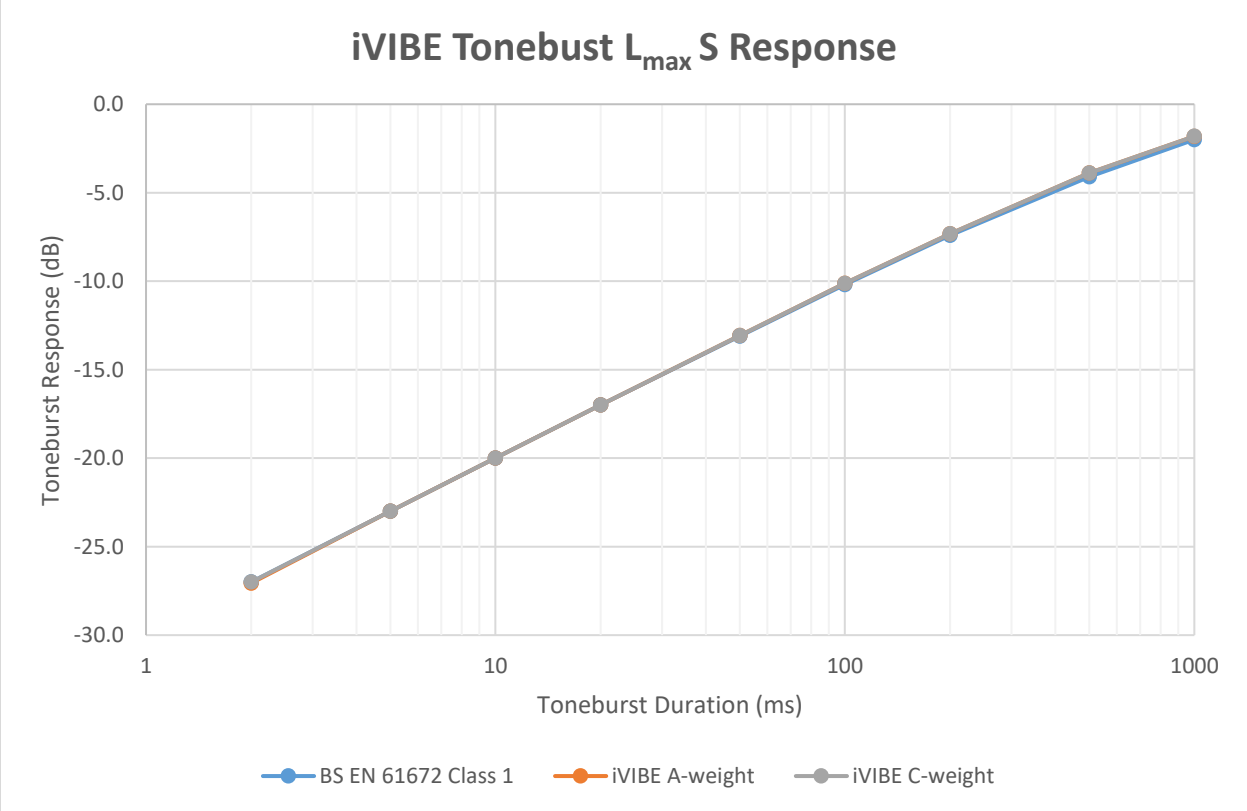
| Toneburst Duration<br>ms | BS 61672 $L_{AFmax}$ - $L_A$ $L_{CFmax}$ – $L_C$<br>dB | iVIBE $L_{AFmax}$ - $L_A$<br>dB | iVIBE $L_{CFmax}$ – $L_C$<br>dB | iVIBE $L_{AFmax}$<br>dB | iVIBE $L_{CFmax}$<br>dB | Class 1 Tol. +<br>dB | Class 1 Tol. –<br>dB |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| 1000 | 0.0 | 0 | 0 | 114.8 | 113.0 | 0.5 | -0.5 |
| 500 | -0.1 | -0.1 | -0.1 | 114.7 | 112.9 | 0.5 | -0.5 |
| 200 | -1.0 | -0.9 | -1.0 | 113.9 | 112.0 | 0.5 | -0.5 |
| 100 | -2.6 | -2.6 | -2.6 | 112.2 | 110.4 | 1.0 | -1.0 |
| 50 | -4.8 | -4.9 | -4.9 | 109.9 | 108.1 | 1.0 | -1.0 |
| 20 | -8.3 | -8.4 | -8.4 | 106.4 | 104.6 | 1.0 | -1.0 |
| 10 | -11.1 | -11.3 | -11.3 | 103.6 | 101.7 | 1.0 | -1.0 |
| 5 | -14.1 | -14.3 | -14.3 | 100.6 | 98.7 | 1.0 | -1.0 |
| 2 | -18.0 | -18.1 | -18.2 | 96.6 | 94.8 | 1.0 | -1.5 |
| 1 | -21.0 | -21.3 | -21.2 | 93.6 | 91.8 | 1.0 | -2.0 |
| 0.5 | -24.0 | -24.3 | -24.1 | 90.5 | 88.9 | 1.0 | -2.5 |
| 0.25 | -27.0 | -27.4 | -27.1 | 87.4 | 85.9 | 1.0 | -3.0 |



4.0 kHz toneburst, $L_{max}$ response, S time weighting

iVIBE: $L_A$= 114.8 dB, iVIBE: Lc =113.0dB

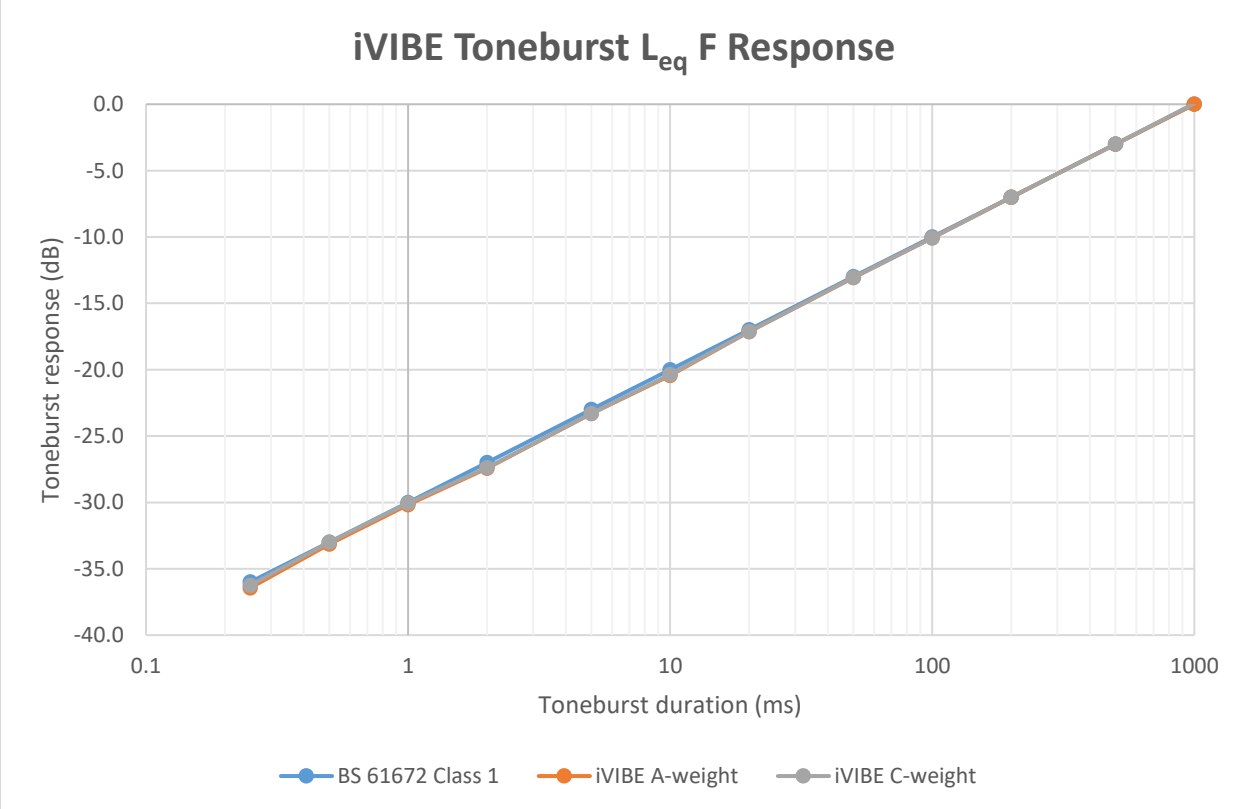
| Toneburst Duration<br><br>ms | BS 61672<br>$L_{ASmax}$ - $L_A$<br>$L_{CSmax}$ – $L_C$<br>dB | iVIBE<br>$L_{ASmax}$ - $L_A$<br><br>dB | iVIBE<br>$L_{CSmax}$ – $L_C$<br><br>dB | iVIBE<br>$L_{ASmax}$<br><br>dB | iVIBE<br>$L_{CSmax}$<br><br>dB | Class 1<br>Tol. +<br><br>dB | Class 1<br>Tol. –<br><br>dB |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| 1000 | -2.0 | -1.8 | -1.8 | 113.0 | 111.2 | 0.5 | -0.5 |
| 500 | -4.1 | -3.9 | -3.9 | 110.9 | 109.1 | 0.5 | -0.5 |
| 200 | -7.4 | -7.3 | -7.3 | 107.5 | 105.7 | 0.5 | -0.5 |
| 100 | -10.2 | -10.1 | -10.1 | 104.7 | 102.9 | 1.0 | -1.0 |
| 50 | -13.1 | -13.1 | -13.1 | 101.8 | 99.9 | 1.0 | -1.0 |
| 20 | -17.0 | -17.0 | -17.0 | 97.8 | 96.0 | 1.0 | -1.5 |
| 10 | -20.0 | -20.0 | -20.0 | 94.8 | 93.0 | 1.0 | -2.0 |
| 5 | -23.0 | -23.0 | -23.0 | 91.8 | 90.0 | 1.0 | -2.5 |
| 2 | -27.0 | -27.0 | -27.0 | 87.8 | 86.0 | 1.0 | -3.0 |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |



4.0 kHz toneburst, $L_{eq}$ response, F time weighting

iVIBE: $L_A$= 114.8 dB, iVIBE: Lc =113.0dB

| Toneburst Duration ms | BS 61672 $L_{AE}$ - $L_A$ $L_{CE}$ – $L_C$ dB | iVIBE $L_{AE}$ - $L_A$ dB | iVIBE $L_{CE}$ – $L_C$ dB | iVIBE $L_{AE}$ dB | iVIBE $L_{CE}$ dB | Class 1 Tol. + dB | Class 1 Tol. – dB |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| 1000 | 0.0 | 0.0 | 00.0 | 114.8 | 113.0 | 0.5 | -0.5 |
| 500 | -3.0 | -3.0 | -7.0 | 111.8 | 110.0 | 0.5 | -0.5 |
| 200 | -7.0 | -7.0 | -7.0 | 107.8 | 106.0 | 0.5 | -0.5 |
| 100 | -10.0 | -10.1 | -10.1 | 104.7 | 102.9 | 1.0 | -1.0 |
| 50 | -13.0 | -13.1 | -13.1 | 101.7 | 99.9 | 1.0 | -1.0 |
| 20 | -17.0 | -17.1 | -17.1 | 97.7 | 95.9 | 1.0 | -1.0 |
| 10 | -20.0 | -20.4 | -20.4 | 94.4 | 92.6 | 1.0 | -1.0 |
| 5 | -23.0 | -23.3 | -23.3 | 91.5 | 89.7 | 1.0 | -1.0 |
| 2 | -27.0 | -27.4 | -27.4 | 87.4 | 84.6 | 1.0 | -1.5 |
| 1 | -30.0 | -30.2 | -30.1 | 84.6 | 82.9 | 1.0 | -2.0 |
| 0.5 | -33.0 | -33.1 | -33.0 | 81.7 | 80.0 | 1.0 | -2.5 |
| 0.25 | -36.0 | -36.4 | -36.2 | 78.4 | 76.8 | 1.0 | -3.0 |



## C-weighted peak sound level - BS EN 61672 Section 5.13

| | | BS 61672 | iVIBE | iVIBE | iVIBE | Tol. |
|---|---|---|---|---|---|---|
| **Cycles** | **Frequency Hz** | **$L_{Cpeak}$-$L_C$ dB** | **$L_{Cpeak}$-$L_C$ dB** | **$L_{Cpeak}$ dB** | **$L_C$ dB** | **Class 1 dB** |
| | | | | | | |
| one | 31.5 | 2.5 | 3.2 | 113.8 | 110.6 | +2, -2 |
| one | 500 | 3.5 | 3.4 | 117.4 | 114.0 | +1, -1 |
| one | 8000 | 3.4 | 3.6 | 114.3 | 110.7 | +2, -2 |
| | | | | | | |
| +half cycle | 500 | 2.4 | 2.3 | 116.3 | 114.0 | +1, -1 |
| -half cycle | 500 | 2.4 | 2.4 | 116.4 | 114.0 | +1, -1 |

**NOTES**

Revision history:

- Issue 1, 18 October 2016, original

© 2016, Turnkey , MJL, Issue1

Turnkey®, iVIBE® and iDB® are registered trademarks

# APPENDIX – CLASS 1 MICROPHONE PERFORMANCE

## Calibration Chart

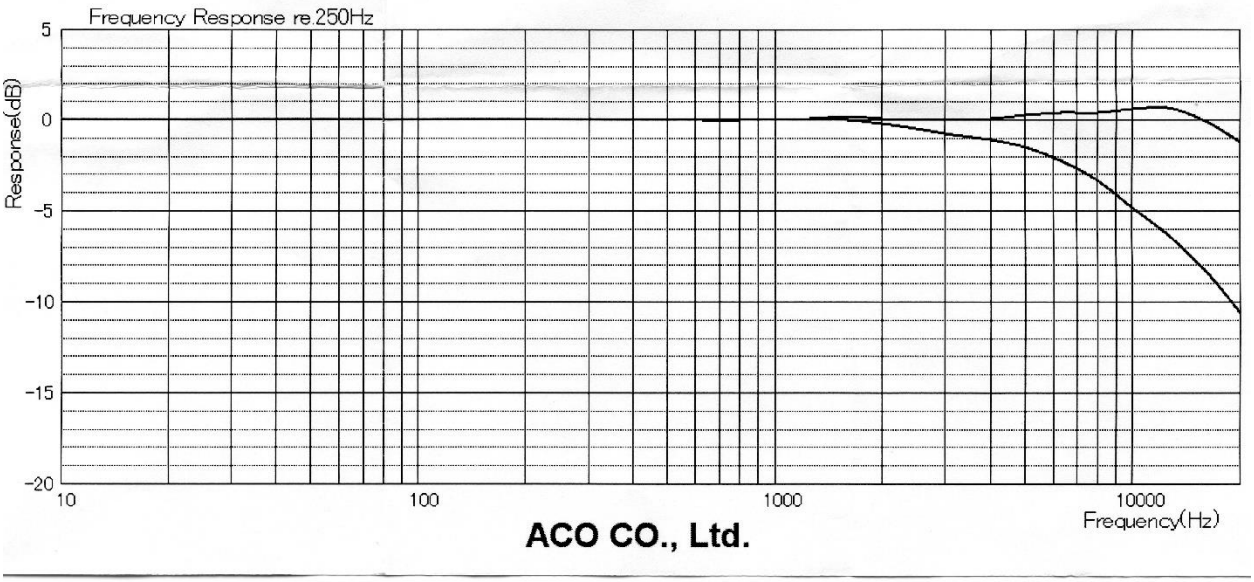
1/2" Prepolarized Microphone

| | | |
|---|---|---|
| Cartridge TYPE | : | 7146 |
| Serial No | : | 64634/9873 |
| Sensitivity (at 250Hz) | : | 48.4 mV/Pa |
| | | −26.3 dB re 1V/Pa |
| Cartridge Capacitance | : | 17.4 pF |
| Polarization Voltage | : | 0 V |

Pressure Sensitivity(Included preamplifier) : 42.2 mV/Pa

Envitonmental Calibration Conditions

| | | |
|---|---|---|
| Temperature | : | 24 ℃ |
| Humidity | : | 62 % |
| Barometric pressure | : | 994 hpa |
| Date | : | 2016/5/13 |
| Operator | : | A. I |




ACO CO., Ltd.