Those wishing to get headphones measured should send all inquiries by email to:

Tyll Hertsens
InnerFidelity, Editor-in-Chief
tyll@innerfidelity.com

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Headphone Measurement Datasheets

Full-Size Open

http://www.innerfidelity.com

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Headphone Measurements: AKG K812 SN001130

Volts RMS required to reach 90dB SPL: 0.191 Vrms
Impedance @ 1kHz: 44 Ohms
Power Needed for 90d BSPL: 0.83 mW
Broadband Isolation in dB (100Hz to 10kHz): -3 dBr

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Headphone Measurements: AKG K812 SN002100

Volts RMS required to reach 90dB SPL: 0.174 Vrms
Impedance @ 1kHz: 49 Ohms
Power Needed for 90d BSPL: 0.63 mW
Broadband Isolation in dB (100Hz to 10kHz): -3 dB

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Headphone Measurements: AKG K501

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**Impulse Response**

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Voltage RMS required to reach 90dB SPL:** 0.390 Vrms
**Impedance @ 1kHz:** 123 Ohms
**Power Needed for 90dB SPL:** 1.24 mW
**Broadband Isolation in dB (100Hz to 10kHz):** -4 dBdr

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Headphone Measurements: AKG K601 2007

**Headphone Measurements**

- **Volts RMS required to reach 90dB SPL**: 0.481 Vrms
- **Impedance @ 1kHz**: 130 Ohms
- **Power Needed for 90dB SPL**: 1.78 mW
- **Broadband Isolation in dB (100Hz to 10kHz)**: -4 dB

---

**Graphs and Diagrams**

1. **Frequency Response**
   - Top: Compensated and Averaged
   - Bottom: Raw Data for Five Headphone Positions

2. **Isolation**
   - Attenuation of External Sound vs. Frequency

3. **Electrical Impedance and Phase**
   - Measured with 600 Ohm output impedance.

4. **%THD+noise @ 90dB and 100dB**

5. **30 Hz Square Wave**

6. **300 Hz Square Wave**

7. **Impulse Response**

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Headphone Measurements: AKG K701

Volts RMS required to reach 90dB SPL: 0.320 Vrms
Impedance @ 1kHz: 65 Ohms
Power Needed for 90d BSPL: 1.57 mW
Broadband Isolation in dB (100Hz to 10kHz): -4 dB
Headphone Measurements: AKG K701 Sample B

Volts RMS required to reach 90dB SPL: 0.283 Vrms
Impedance @ 1kHz: 67 Ohms
Power Needed for 90dB SPL: 1.20 mW
Broadband Isolation in dB (100Hz to 10kHz): -4 dB
Headphone Measurements:  AKG Quincy Jones Q701

- Volts RMS required to reach 90dB SPL: 0.301 Vrms
- Impedance @ 1kHz: 64 Ohms
- Power Needed for 90dB SPL: 1.42 mW
- Broadband Isolation in dB (100Hz to 10kHz): -7 dBr

**Frequency Response**
- Top - Compensated and Averaged
- Bottom - Raw Data for Five Headphone Positions

**Isolation**
- Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100db**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

Volts RMS required to reach 90dB SPL: 0.301 Vrms
Impedance @ 1kHz: 64 Ohms
Power Needed for 90dB SPL: 1.42 mW
Broadband Isolation in dB (100Hz to 10kHz): -7 dBr
**Headphone Measurements: AKG K702**

- **Volts RMS required to reach 90dB SPL:** 0.322 Vrms
- **Impedance @ 1kHz:** 67 Ohms
- **Power Needed for 90dB SPL:** 1.56 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -6 dB

---

**Frequency Response**
- Top - Compensated and Averaged
- Bottom - Raw Data for Five Headphone Positions

**Isolation**
- Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

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Headphone Measurements: AKG K702 65th Anv Ed 2014

Volts RMS required to reach 90dB SPL: 0.270 Vrms
Impedance @ 1kHz: 64 Ohms
Power Needed for 90dB SPL: 1.13 mW
Broadband Isolation in dB (100Hz to 10kHz): -6 dB
Headphone Measurements:  
AKG K712

**Frequency Response**
- Top - Compensated and Averaged
- Bottom - Raw Data for Five Headphone Positions

**Isolation**
- Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**Impulse Response**

- Volts RMS required to reach 90dB SPL: 0.327 Vrms
- Impedance @ 1kHz: 66 Ohms
- Power Needed for 90dB SPL: 1.62 mW
- Broadband Isolation in dB (100Hz to 10kHz): -6 dB
Headphone Measurements: AKG K712

---

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

---

**30 Hz Square Wave**

---

**%THD+noise @ 90dB and 100dB**

---

**300 Hz Square Wave**

---

**Impulse Response**

---

**Isolation**
Attenuation of External Sound vs. Frequency

---

**Volts RMS required to reach 90dB SPL:** 0.237 Vrms
**Impedance @ 1kHz:** 67 Ohms
**Power Needed for 90d BSPL:** 0.84 mW
**Broadband Isolation in dB (100Hz to 1kHz):** -5 dB
Headphone Measurements: AKG K7XX

- **Volts RMS required to reach 90dB SPL:** 0.206 Vrms
- **Impedance @ 1kHz:** 66 Ohms
- **Power Needed for 90dB SPL:** 0.64 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -6 dBr

---

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

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Headphone Measurements: AKG K612

**Headphone Measurements**

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**Impulse Response**

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**30 Hz Square Wave**

**300 Hz Square Wave**

**%THD+noise @ 90dB and 100dB**

**Impulse Response**

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Headphone Measurements: AKG K1000

Electrical Impedance and phase measurements unavailable for electrostatic and wireless headphones.
**Headphone Measurements: Audeze EL8 Open**

- **Volts RMS required to reach 90dB SPL:** 0.068 Vrms
- **Impedance @ 1kHz:** 34 Ohms
- **Power Needed for 90d BSPL:** 0.14 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -5 dBr

---

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

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Headphone Measurements: Audeze LCD X SN7454971

- Volts RMS required to reach 90dB SPL: 0.065 Vrms
- Impedance @ 1kHz: 15 Ohms
- Power Needed for 90dB SPL: 0.28 mW
- Broadband Isolation in dB (100Hz to 10kHz): -3 dB

Frequency Response
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

Impedance and Phase
Measured with 600 Ohm output impedance.

%THD+noise @ 90dB and 100dB

30 Hz Square Wave

300 Hz Square Wave

Impulse Response

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Headphone Measurements:
Audeze LCDX sn 7456406 Bob Katz

Frequency Response
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

Electrical Impedance and Phase
Measured with 600 Ohm output impedance.

%THD+noise @ 90dB and 100dB

30 Hz Square Wave

300 Hz Square Wave

Impulse Response

Volts RMS required to reach 90dB SPL: 0.072 Vrms
Impedance @ 1kHz: 21 Ohms
Power Needed for 90dB SPL: 0.24 mW
Broadband Isolation in dB (100Hz to 10kHz): -3 dB

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Frequency Response
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

Electrical Impedance and Phase
Measured with 600 Ohm output impedance.

%THD+noise @ 90dB and 100dB

Impulse Response

Volts RMS required to reach 90dB SPL: 0.310 Vrms
Impedance @ 1kHz: 49 Ohms
Power Needed for 90dB SPL: 1.96 mW
Broadband Isolation in dB (100Hz to 10kHz): -6 dB
Headphone Measurements: Audeze LCD-2 SN5325928

- **Volts RMS required to reach 90dB SPL**: 0.170 Vrms
- **Impedance @ 1kHz**: 59 Ohms
- **Power Needed for 90dB SPL**: 0.50 mW
- **Broadband Isolation in dB (100Hz to 10kHz)**: -1 dBr
Headphone Measurements: Audeze LCD-2 sn53211704

**Headphone Measurements**
- **Volts RMS required to reach 90dB SPL**: 0.209 Vrms
- **Impedance @ 1kHz**: 59 Ohms
- **Power Needed for 90d BSPL**: 0.75 mW
- **Broadband Isolation in dB (100Hz to 10kHz)**: -1 dB

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**Isolation**
- **Attenuation of External Sound vs. Frequency**

**Impulse Response**
- **Impedance in Ohms**
- **Phase in Degrees**

**Frequency Response**
- **Top - Compensated and Averaged**
- **Bottom - Raw Data for Five Headphone Positions**

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

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Headphone Measurements: Audeze LCD-2

**Headphone Measurements:**

- **Volts RMS required to reach 90dB SPL:** 0.106 Vrms
- **Impedance @ 1kHz:** 47 Ohms
- **Power Needed for 90dB SPL:** 0.24 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -3 dB

**Graphs:**

- **Frequency Response**
  - Top: Compensated and Averaged
  - Bottom: Raw Data for Five Headphone Positions

- **Isolation**
  - Attenuation of External Sound vs. Frequency

- **Electrical Impedance and Phase**
  - Measured with 600 Ohm output impedance.

- **%THD+noise @ 90dB and 100dB**

- **30 Hz Square Wave**

- **300 Hz Square Wave**

- **Impulse Response**
**Headphone Measurements:** Audeze LCD-2 SN 531213

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Impedance and Phase**
Measured with 600 Ohm output impedance.

**Isolation**
Attenuation of External Sound vs. Frequency

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

Volts RMS required to reach 90dB SPL: 0.165 Vrms
Impedance @ 1kOhm: 49 Ohms
Power Needed for 90dB SPL: 0.55 mW
Broadband Isolation in dB (100Hz to 10kHz): -2 dB
Headphone Measurements:

**Audeze LCD-2 Rev 2**

- **Volts RMS required to reach 90dB SPL:** 0.225 Vrms
- **Impedance @ 1kHz:** 58 Ohms
- **Power Needed for 90dB SPL:** 0.87 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -1 dBr

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**Isolation**
Attenuation of External Sound vs. Frequency

**Impulse Response**

---

Volts RMS required to reach 90dB SPL: 0.225 Vrms
Impedance @ 1kHz: 58 Ohms
Power Needed for 90dB SPL: 0.87 mW
Broadband Isolation in dB (100Hz to 10kHz): -1 dBr

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Headphone Measurements: Audeze LCD-3 Fazor sn2715432

- **Volts RMS required to reach 90dB SPL:** 0.127 Vrms
- **Impedance @ 1kHz:** 114 Ohms
- **Power Needed for 90dB SPL:** 0.14 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -3 dB

**Frequency Response**
- Top: Compensated and Averaged
- Bottom: Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**Impulse Response**

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

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Headphone Measurements:  
Audeze LCD-3 sn2717210

**Headphone Measurements**

Volts RMS required to reach 90dB SPL: 0.146 Vrms
Impedance @ 1kHz: 117 Ohms
Power Needed for 90dB SPL: 0.18 mW
Broadband Isolation in dB (100Hz to 10kHz): -2 dBr

**Frequency Response**

Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**

Attenuation of External Sound vs. Frequency

**Impulse Response**

**Electrical Impedance and Phase**

Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Frequency Response**

Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Impulse Response**

**Electrical Impedance and Phase**

Measured with 600 Ohm output impedance.
Headphone Measurements: Audeze LCD-3F SN2614302

**Headphone Measurements:**

- **Volts RMS required to reach 90dB SPL:** 0.154 Vrms
- **Impedance @ 1kHz:** 116 Ohms
- **Power Needed for 90d BSPL:** 0.20 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -3 dB

---

**Frequency Response**

- Top - Compensated and Averaged
- Bottom - Raw Data for Five Headphone Positions

**Electrical Impedance and Phase**

- Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

---

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Headphone Measurements: Audeze LCD-3 Rev 2 sn2613375

- Volt RMS required to reach 90dB SPL: 0.196 Vrms
- Impedance @ 1kHz: 58 Ohms
- Power Needed for 90dBSPL: 0.66 mW
- Broadband Isolation in dB (100Hz to 10kHz): -2 dB
Headphone Measurements: Audeze LCD-3 sn 2312488

**Headphone Measurements**

**Volts RMS required to reach 90dB SPL:** 0.160 Vrms
**Impedance @ 1kHz:** 44 Ohms
**Power Needed for 90d BSPL:** 0.58 mW
**Broadband Isolation in dB (100Hz to 10kHz):** -2 dBa

---

**Frequency Response**

*Top - Compensated and Averaged*
*Bottom - Raw Data for Five Headphone Positions*

**Isolation**

*Attenuation of External Sound vs. Frequency*

---

**Electrical Impedance and Phase**

*Measured with 600 Ohm output impedance.*

---

**%THD+noise @ 90dB and 100dB**

---

**30 Hz Square Wave**

---

**300 Hz Square Wave**

---

**Impulse Response**

---

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**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**Impulse Response**

---

**Headphone Measurements:**
Audeze LCD-3 sn 2312341

Volts RMS required to reach 90dB SPL: 0.198 Vrms
Impedance @ 1kHz: 45 Ohms
Power Needed for 90d BSPL: 0.88 mW
Broadband Isolation in dB (100Hz to 10kHz): -2 dB
Headphone Measurements: Audeze LCD-3 #2312454

Headphone Measurements:

- Volts RMS required to reach 90dB SPL: 0.157 Vrms
- Impedance @ 1kHz: 47 Ohms
- Power Needed for 90dB SPL: 0.53 mW
- Broadband Isolation in dB (100Hz to 10kHz): -2 dBr

Frequency Response
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

Isolation
Attenuation of External Sound vs. Frequency

Electrical Impedance and Phase
Measured with 600 Ohm output impedance.

%THD+noise @ 90dB and 100dB

30 Hz Square Wave

300 Hz Square Wave

Impulse Response

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Headphone Measurements: Audeze LCD-3 sn 2312260

- **Volts RMS required to reach 90dB SPL:** 0.244 Vrms
- **Impedance @ 1kHz:** 49 Ohms
- **Power Needed for 90dB SPL:** 1.21 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -3 dB

---

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Impulse Response**

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**30 Hz Square Wave**

**300 Hz Square Wave**

---

%THD+noise @ 90dB and 100dB

---

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**Headphone Measurements: Audeze LCD-4**

**Volts RMS required to reach 90dB SPL:** 0.482 Vrms

**Impedance @ 1kHz:** 206 Ohms

**Power Needed for 90dB SPL:** 1.13 mW

**Broadband Isolation in dB (100Hz to 10kHz):** -2 dBr

---

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**Impulse Response**

---

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

---

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

---

**Impedance and Phase**
Measured with 600 Ohm output impedance.

---

**Volts RMS required to reach 90dB SPL:** 0.482 Vrms

**Impedance @ 1kHz:** 206 Ohms

**Power Needed for 90dB SPL:** 1.13 mW

**Broadband Isolation in dB (100Hz to 10kHz):** -2 dBr

---

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**Headphone Measurements: Audio Technica ATH AD2000X**

- **Volts RMS required to reach 90dB SPL:** 0.034 Vrms
- **Impedance @ 1kHz:** 43 Ohms
- **Power Needed for 90d BSPL:** 0.03 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -3 dB

---

**Frequency Response**
- Top - Compensated and Averaged
- Bottom - Raw Data for Five Headphone Positions

**Isolation**
- Attenuation of External Sound vs. Frequency

**Impulse Response**
- Time in Seconds

---

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

---

**%THD+noise @ 90dB and 100dB**
- Left 90dB
- Right 90dB
- Left 100dB
- Right 100dB

---

**30 Hz Square Wave**
- Time in Seconds

---

**300 Hz Square Wave**
- Time in Seconds

---

**Impedance**
- Impedance in Ohms
- Phase in Degrees

---

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Headphone Measurements: Audio Technica ADH-AD900

- **Volts RMS required to reach 90dB SPL:** 0.062 Vrms
- **Impedance @ 1kHz:** 35 Ohms
- **Power Needed for 90dB SPL:** 0.11 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -2 dB
Headphone Measurements: Audio Technica ATH-AD700

- **Volts RMS required to reach 90dB SPL:** 0.055 Vrms
- **Impedance @ 1kHz:** 34 Ohms
- **Power Needed for 90d BSPL:** 0.09 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -2 dB

---

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

---

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Headphone Measurements: Audio Technica ATH-AD500

**Volts RMS required to reach 90dB SPL:** 0.045 Vrms

**Impedance @ 1kHz:** 67 Ohms

**Power Needed for 90dB SPL:** 0.03 mW

**Broadband Isolation in dB (100Hz to 10kHz):** -3 dB
Headphone Measurements:  Audio Technica ATH R70x

- Volts RMS required to reach 90dB SPL: 0.195 Vrms
- Impedance @ 1kHz: 473 Ohms
- Power Needed for 90d BSPL: 0.08 mW
- Broadband Isolation in dB (100Hz to 10kHz): -4 dBr
**Headphone Measurements:**

**Audio Zenith PMx2**

---

**Frequency Response**

Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Impedance and Phase**

Measured with 600 Ohm output impedance.

**Isolation**

Attenuation of External Sound vs. Frequency

**30 Hz Square Wave**

**300 Hz Square Wave**

**%THD+noise @ 90dB and 100dB**

**Impulse Response**

Volts RMS required to reach 90dB SPL: 0.066 Vrms
Impedance @ 1kHz: 34 Ohms
Power Needed for 90d BSPL: 0.13 mW
Broadband Isolation in dB (100Hz to 10kHz): -6 dBr
Headphone Measurements:
AudioQuest NightHawk Stock Pads

Volts RMS required to reach 90dB SPL: 0.165 Vrms
Impedance @ 1kHz: 26 Ohms
Power Needed for 90dB SPL: 1.04 mW
Broadband Isolation in dB (100Hz to 10kHz): -17 dBm
Headphone Measurements:  
Beyerdynamic T1

**Headphone Measurements**

- **Volts RMS required to reach 90dB SPL:** 0.346 Vrms
- **Impedance @ 1kHz:** 665 Ohms
- **Power Needed for 90dB SPL:** 0.18 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -3 dBr

---

**Frequency Response**

- **Top - Compensated and Averaged**
- **Bottom - Raw Data for Five Headphone Positions**

**Isolation**

- **Attenuation of External Sound vs. Frequency**

**Electrical Impedance and Phase**

- **Measured with 600 Ohm output impedance.**

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

- **Volts RMS required to reach 90dB SPL:** 0.346 Vrms
- **Impedance @ 1kHz:** 665 Ohms
- **Power Needed for 90dB SPL:** 0.18 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -3 dBr

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Headphone Measurements:  
Beyerdynamic T1 SN3964

**Volts RMS required to reach 90dB SPL**: 0.436 Vrms

**Impedance @ 1kHz**: 683 Ohms

**Power Needed for 90dB SPL**: 0.28 mW

**Broadband Isolation in dB (100Hz to 10kHz)**: -3 dBr
**Headphone Measurements:**

**Beyerdynamic DT 880 250 ohm**

**Volts RMS required to reach 90dB SPL:** 0.299 Vrms

**Impedance @ 1kHz:** 236 Ohms

**Power Needed for 90dB SPL:** 0.38 mW

**Broadband Isolation in dB (100Hz to 10kHz):** -3 dB

---

**Frequency Response**

Top - Compensated and Averaged

Bottom - Raw Data for Five Headphone Positions

**Isolation**

Attenuation of External Sound vs. Frequency

---

**Electrical Impedance and Phase**

Measured with 600 Ohm output impedance.

---

**%THD+noise @ 90dB and 100dB**

---

**30 Hz Square Wave**

---

**300 Hz Square Wave**

---

**Impulse Response**

---

Copyright © SOURCE INTERLINK MEDIA All rights reserved.
Headphone Measurements:  
Beyerdynamic DT 880 32 ohm

- Volts RMS required to reach 90dB SPL: 0.125 Vrms
- Impedance @ 1kHz: 33 Ohms
- Power Needed for 90d BSPL: 0.47 mW
- Broadband Isolation in dB (100Hz to 10kHz): -3 dB

---

**Frequency Response**

Top - Compensated and Averaged  
Bottom - Raw Data for Five Headphone Positions

**Isolation**

Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**

Measured with 600 Ohm output impedance.

%THD+noise @ 90dB and 100dB

30 Hz Square Wave

300 Hz Square Wave

Impulse Response

Copyright © SOURCE INTERLINK MEDIA All rights reserved.
Headphone Measurements: Beyerdynamic DT 880 600 ohm

**Headphone Measurements**

- **Volts RMS required to reach 90dB SPL:** 0.514 Vrms
- **Impedance @ 1kHz:** 619 Ohms
- **Power Needed for 90dB SPL:** 0.43 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -3 dBr

---

**Impulse Response**

**Volts RMS required to reach 90dB SPL:** 0.514 Vrms
**Impedance @ 1kHz:** 619 Ohms
**Power Needed for 90dB SPL:** 0.43 mW
**Broadband Isolation in dB (100Hz to 10kHz):** -3 dBr

---

**Frequency Response**

Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**

Attenuation of External Sound vs. Frequency
Headphone Measurements:

**Headphone Measurements: Enigmacoustics Dharma Production 2015**

**Headphone Measurements:**

- Volts RMS required to reach 90dB SPL: 0.091 Vrms
- Impedance @ 1kHz: 28 Ohms
- Power Needed for 90dBSPL: 0.30 mW
- Broadband Isolation in dB (100Hz to 10kHz): -6 dB

**Frequency Response**

Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Electrical Impedance and Phase**

Measured with 600 Ohm output impedance.

**Isolation**

Attenuation of External Sound vs. Frequency

**30 Hz Square Wave**

**300 Hz Square Wave**

**%THD+noise @ 90dB and 100dB**

**Impulse Response**

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Headphone Measurements: Focal Elear

**Impulse Response**

- **Volts RMS required to reach 90dB SPL:** 0.096 Vrms
- **Impedance @ 1kHz:** 86 Ohms
- **Power Needed for 90d BSPL:** 0.11 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -5 dBr

---

**Frequency Response**

- **Top - Compensated and Averaged**
- **Bottom - Raw Data for Five Headphone Positions**

**Isolation**

- **Attenuation of External Sound vs. Frequency**

**Electrical Impedance and Phase**

- **Measured with 600 Ohm output impedance.**

---

**%THD+noise @ 90dB and 100db**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**
Headphone Measurements: Focal Elear sn 1BEGB04809

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

**Volts RMS required to reach 90dB SPL:** 0.115 Vrms
**Impedance @ 1kHz:** 83 Ohms
**Power Needed for 90dB SPL:** 0.16 mW
**Broadband Isolation in dB (100Hz to 10kHz):** -4 dBr

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Headphone Measurements:  Focal Elear with Utopia Pads

**Volts RMS required to reach 90dB SPL:** 0.069 Vrms

**Impedance @ 1kHz:** 85 Ohms

**Power Needed for 90dB SPL:** 0.06 mW

**Broadband Isolation in dB (100Hz to 10kHz):** -4 dBr
Headphone Measurements: Focal Utopia snA1BEHG003253

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

Volts RMS required to reach 90dB SPL: 0.119 Vrms
Impedance @ 1kHz: 86 Ohms
Power Needed for 90dB SPL: 0.16 mW
Broadband Isolation in dB (100Hz to 10kHz): 1 dB
Headphone Measurements: Focal Utopia with Elear Pads

- **Volts RMS required to reach 90dB SPL:** 0.144 Vrms
- **Impedance @ 1kHz:** 86 Ohms
- **Power Needed for 90dB SPL:** 0.24 mW

**Broadband Isolation in dB (100Hz to 10kHz):** -8 dB

---

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

---

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**Headphone Measurements:** Focal Utopia with Elear Pads

- **Volts RMS required to reach 90dB SPL:** 0.054 Vrms
- **Impedance @ 1kHz:** 86 Ohms
- **Power Needed for 90dB SPL:** 0.03 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -5 dBr

---

**Frequency Response**

Top - Compensated and Averaged

Bottom - Raw Data for Five Headphone Positions

**Isolation**

Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**

Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

- **Volts RMS required to reach 90dB SPL:** 0.054 Vrms
- **Impedance @ 1kHz:** 86 Ohms
- **Power Needed for 90dB SPL:** 0.03 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -5 dBr
Headphone Measurements: Fostex T50

- **Headphone Measurements**
  - **Volts RMS required to reach 90dB SPL**: 0.166 Vrms
  - **Impedance @ 1kHz**: 62 Ohms
  - **Power Needed for 90dB SPL**: 0.45 mW
  - **Broadband Isolation in dB (100Hz to 10kHz)**: -5 dBr

- **Impulse Response**
  - **Impedance in Ohms**: Measured with 600 Ohm output impedance.
  - **Phase in Degrees**: Measured with 600 Ohm output impedance.

- **%THD+noise @ 90dB and 100dB**

- **30 Hz Square Wave**

- **300 Hz Square Wave**

**Top - Compensated and Averaged**
**Bottom - Raw Data for Five Headphone Positions**

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**Headphone Measurements: Fostex T50RP 2011 A**

### Headphone Measurements

**Volts RMS required to reach 90dB SPL:** 0.088 Vrms

**Impedance @ 1kHz:** 57 Ohms

**Power Needed for 90dB SPL:** 0.14 mW

**Broadband Isolation in dB (100Hz to 10kHz):** -9 dBr

---

**Frequency Response**

Top - Compensated and Averaged

Bottom - Raw Data for Five Headphone Positions

**Isolation**

Attenuation of External Sound vs. Frequency

---

**Electrical Impedance and Phase**

Measured with 600 Ohm output impedance.

---

**%THD+noise @ 90dB and 100dB**

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**30 Hz Square Wave**

---

**300 Hz Square Wave**

---

**Impulse Response**

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Headphone Measurements: Fostex T50RP 2011 B

- Volts RMS required to reach 90dB SPL: 0.116 Vrms
- Impedance @ 1kHz: 47 Ohms
- Power Needed for 90dB SPL: 0.29 mW
- Broadband Isolation in dB (100Hz to 10kHz): -9 dBr

---

**Frequency Response**
- Top - Compensated and Averaged
- Bottom - Raw Data for Five Headphone Positions

**Isolation**
- Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**
Headphone Measurements:  Fostex T50RP Mk2

- **Volts RMS required to reach 90dB SPL**: 0.062 Vrms
- **Impedance @ 1kHz**: 56 Ohms
- **Power Needed for 90dB SPL**: 0.07 mW
- **Broadband Isolation in dB (100Hz to 10kHz)**: -15 dB

---

**Frequency Response**
- Top - Compensated and Averaged
- Bottom - Raw Data for Five Headphone Positions

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

**Isolation**
- Attenuation of External Sound vs. Frequency

---

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Headphone Measurements: Fostex T50RP Mk3

Volts RMS required to reach 90dB SPL: 0.206 Vrms
Impedance @ 1kHz: 53 Ohms
Power Needed for 90d BSPL 0.80 mW
Broadband Isolation in dB (100Hz to 10kHz): -7 dB

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Headphone Measurements: Fostex T20RP Mk3

Frequency Response
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

Isolation
Attenuation of External Sound vs. Frequency

Electrical Impedance and Phase
Measured with 600 Ohm output impedance.

30 Hz Square Wave

%THD+noise @ 90dB and 100dB

300 Hz Square Wave

Impulse Response

Volts RMS required to reach 90dB SPL: 0.166 Vrms
Impedance @ 1kHz: 50 Ohms
Power Needed for 90dB SPL: 0.55 mW
Broadband Isolation in dB (100Hz to 10kHz): -8 dB
Headphone Measurements: HIFIMAN Edition X

Headphone Measurements:

- **Volts RMS required to reach 90dB SPL:** 0.071 Vrms
- **Impedance @ 1kHz:** 23 Ohms
- **Power Needed for 90dB SPL:** 0.22 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -2 dB

**Frequency Response**
- Top - Compensated and Averaged
- Bottom - Raw Data for Five Headphone Positions

**Isolation**
- Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**30 Hz Square Wave**

**%THD+noise @ 90dB and 100dB**

**300 Hz Square Wave**

**Impulse Response**

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Headphone Measurements:  HiFiMAN Edition X V2

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

Volts RMS required to reach 90dB SPL: 0.143 Vrms
Impedance @ 1kHz: 25 Ohms
Power Needed for 90dB SPL: 0.80 mW
Broadband Isolation in dB (100Hz to 10kHz): -4 dBr

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**Headphone Measurements: HIFIMAN HE-300**

**Volts RMS required to reach 90dB SPL:** 0.262 Vrms

**Impedance @ 1kHz:** 58 Ohms

**Power Needed for 90d BSPL:** 1.19 mW

**Broadband Isolation in dB (100Hz to 10kHz):** -4 dBr

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**Headphone Measurements:**

**HIFIMAN HE-300 Rev 2**

- **Volts RMS required to reach 90dB SPL:** 0.189 Vrms
- **Impedance @ 1kHz:** 57 Ohms
- **Power Needed for 90dB SPL:** 0.63 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -4 dB

---

**Frequency Response**
- Top - Compensated and Averaged
- Bottom - Raw Data for Five Headphone Positions

**Isolation**
- Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

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Headphone Measurements: HIFIMAN HE400 2014

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**Impulse Response**

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Volts RMS required to reach 90dB SPL: 0.162 Vrms
Impedance @ 1kHz: 45 Ohms
Power Needed for 90d BSPL: 0.59 mW
Broadband Isolation in dB (100Hz to 10kHz): -2 dB

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**Headphone Measurements: HIFIMAN HE400S**

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

Volts RMS required to reach 90dB SPL: 0.086 Vrms
Impedance @ 1kHz: 22 Ohms
Power Needed for 90dB SPL: 0.34 mW
Broadband Isolation in dB (100Hz to 10kHz): -2 dB

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Headphone Measurements: HIFIMAN HE-5

**Headphone Measurements: HIFIMAN HE-5**

- **Volts RMS required to reach 90dB SPL:** 0.380 Vrms
- **Impedance @ 1kHz:** 31 Ohms
- **Power Needed for 90dB SPL:** 4.65 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -2 dBr

---

### Frequency Response

*Top - Compensated and Averaged*

*Bottom - Raw Data for Five Headphone Positions*

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### Isolation

*Attenuation of External Sound vs. Frequency*

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### Electrical Impedance and Phase

*Measured with 600 Ohm output impedance.*

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### %THD+noise @ 90dB and 100dB

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### 30 Hz Square Wave

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### 300 Hz Square Wave

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### Impulse Response

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Headphone Measurements: HIFIMAN HE-500

- **Volts RMS required to reach 90dB SPL**: 0.310 Vrms
- **Impedance @ 1kHz**: 47 Ohms
- **Power Needed for 90dB SPL**: 2.04 mW
- **Broadband Isolation in dB (100Hz to 10kHz)**: -1 dB
Headphone Measurements:  
HIFIMAN HE-560 2014

- **Volts RMS required to reach 90dB SPL**: 0.330 Vrms
- **Impedance @ 1kHz**: 43 Ohms
- **Power Needed for 90dB SPL**: 2.53 mW
- **Broadband Isolation in dB (100Hz to 10kHz)**: -1 dB

**Frequency Response**
- Top - Compensated and Averaged
- Bottom - Raw Data for Five Headphone Positions

**Isolation**
- Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

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Headphone Measurements:

**HiFiMAN HE-5LE**

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

**Isolation**
Attenuation of External Sound vs. Frequency

Volts RMS required to reach 90dB SPL: 0.439 Vrms
Impedance @ 1kHz: 41 Ohms
Power Needed for 90dB SPL: 4.73 mW
Broadband Isolation in dB (100Hz to 10kHz): -2 dB

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Headphone Measurements: HIFIMAN HE-6

Headphone Measurements:

- **Volts RMS required to reach 90dB SPL:** 1.018 Vrms
- **Impedance @ 1kHz:** 53 Ohms
- **Power Needed for 90dB SPL:** 19.69 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -2 dBr

**Frequency Response**
- Top: Compensated and Averaged
- Bottom: Raw Data for Five Headphone Positions

**Isolation**
- Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

- Volts RMS required to reach 90dB SPL: 1.018 Vrms
- Impedance @ 1kHz: 53 Ohms
- Power Needed for 90dB SPL: 19.69 mW
- Broadband Isolation in dB (100Hz to 10kHz): -2 dBr

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Headphone Measurements:  

**HIFIMAN HE1000**

**Impedance @ 1kHz**: 34 Ohms

**Power Needed for 90dB SPL**: 2.60 mW

**Broadband Isolation in dB (100Hz to 10kHz)**: -2 dB

---

**Frequency Response**

- **Top**: Compensated and Averaged
- **Bottom**: Raw Data for Five Headphone Positions

**Isolation**

- Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**

- Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

- Amplitude (dB)

**300 Hz Square Wave**

- Amplitude (dB)

**Impulse Response**

- Time in Seconds

---

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Headphone Measurements: HIFIMAN HE1000 PreProduction

Frequency Response
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

Electrical Impedance and Phase
Measured with 600 Ohm output impedance.

%THD+noise @ 90dB and 100dB

30 Hz Square Wave

300 Hz Square Wave

Impulse Response

Volts RMS required to reach 90dB SPL: 0.287 Vrms
Impedance @ 1kHz: 34 Ohms
Power Needed for 90d BSPL: 2.45 mW
Broadband Isolation in dB (100Hz to 10kHz): -2 dB
Headphone Measurements:  
Koss ESP950

**Impulse Response**

Broadband Isolation in dB (100Hz to 10kHz): -1 dB

Electrical impedance and phase measurements unavailable for Electrostatic headphones.
Headphone Measurements: Koss ESP950 Sample 2

Frequency Response
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

Isolation
Attenuation of External Sound vs. Frequency

%THD+noise @ 90dB and 100dB

30 Hz Square Wave

300 Hz Square Wave

Impulse Response

Broadband Isolation in dB (100Hz to 10kHz): -2 dB
Headphone Measurements: Massdrop HD 6XX

**Volts RMS required to reach 90dB SPL:** 0.172 Vrms

**Impedance @ 1kHz:** 330 Ohms

**Power Needed for 90dB SPL:** 0.09 mW

**Broadband Isolation in dB (100Hz to 10kHz):** -6 dB

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

**Electrical Impedance and Phase**

Measured with 600 Ohm output impedance.

**Isolation**

Attenuation of External Sound vs. Frequency

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Headphone Measurements: Mr Speakers Ether

Volts RMS required to reach 90dB SPL: 0.071 Vrms
Impedance @ 1kHz: 23 Ohms
Power Needed for 90d BSPL: 0.21 mW
Broadband Isolation in dB (100Hz to 10kHz): -5 dB

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Headphone Measurements: Mr Speakers Ether Flow

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

Volts RMS required to reach 90dB SPL: 0.163 Vrms
Impedance @ 1kHz: 25 Ohms
Power Needed for 90db SPL: 1.58 mW
Broadband Isolation in dB (100Hz to 10kHz): -12 dBr
Headphone Measurements: MyST IzoPhones 60

Volts RMS required to reach 90dB SPL: 1.017 Vrms
Impedance @ 1kHz: 63 Ohms
Power Needed for 90dB SPL: 16.41 mW
Broadband Isolation in dB (100Hz to 10kHz): -1 dBm

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Headphone Measurements:  NAD RP18 Bass Light Version

- **Volts RMS required to reach 90dB SPL:** 0.209 Vrms
- **Impedance @ 1kHz:** 63 Ohms
- **Power Needed for 90dB SPL:** 0.70 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -5 dB

**Frequency Response**

Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**

Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**

Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

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**Headphone Measurements:**

Obravo HAMT1

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**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

Volts RMS required to reach 90dB SPL: 0.141 Vrms
Impedance @ 1kHz: 22 Ohms
Power Needed for 90dB SPL: 0.89 mW
Broadband Isolation in dB (100Hz to 10kHz): -6 dB
Headphone Measurements: Oppo PM1

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

Volts RMS required to reach 90dB SPL: 0.053 V rms
Impedance @ 1kHz: 32 Ohms
Power Needed for 90dBSPL: 0.09 mW
Broadband Isolation in dB (100Hz to 10kHz): -4 dB
Headphone Measurements: Oppo PM1 Velour Pads

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

Volts RMS required to reach 90dB SPL: 0.072 Vrms
Impedance @ 1kHz: 32 Ohms
Power Needed for 90dB SPL: 0.16 mW
Broadband Isolation in dB (100Hz to 10kHz): -5 dB
Headphone Measurements:

Oppo PM1 2014 Alt Pads

Headphone Measurements:

Volts RMS required to reach 90dB SPL: 0.054 Vrms
Impedance @ 1kHz: 33 Ohms
Power Needed for 90dBSPL: 0.09 mW
Broadband Isolation in dB (100Hz to 10kHz): -6 dB

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Headphone Measurements: Oppo PM1 2014 PM2 Pad

Headphone Measurements:

- **Volts RMS required to reach 90dB SPL**: 0.064 Vrms
- **Impedance @ 1kHz**: 33 Ohms
- **Power Needed for 90dB SPL**: 0.13 mW
- **Broadband Isolation in dB (100Hz to 10kHz)**: -5 dB

---

**Sound Quality Metrics**

- **%THD+noise @ 90dB and 100dB**

- **30 Hz Square Wave**
  - Amplitude in Volts
  - Time in Seconds
  - Impedance in Ohms
  - Phase in Degrees

- **300 Hz Square Wave**
  - Amplitude in Volts
  - Time in Seconds
  - Impedance in Ohms
  - Phase in Degrees

---

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Headphone Measurements: Oppo PM2 2014 Stock Pads

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

- Volts RMS required to reach 90dB SPL: 0.058 Vrms
- Impedance @ 1kHz: 33 Ohms
- Power Needed for 90dB SPL: 0.10 mW
- Broadband Isolation in dB (100Hz to 10kHz): -5 dB
Headphone Measurements: Oppo PM2 2014 PM1 Leather Pad

**Headphone Measurements**

Volts RMS required to reach 90dB SPL: 0.056 Vrms
Impedance @ 1kHz: 33 Ohms
Power Needed for 90d BSPL: 0.09 mW
Broadband Isolation in dB (100Hz to 10kHz): -5 dB

---

**Frequency Response**
- Top - Compensated and Averaged
- Bottom - Raw Data for Five Headphone Positions

**Isolation**
- Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

---

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Headphone Measurements: Oppo PM2 2014 PM1 Velour Pads

Headphone Measurements:

- **Volts RMS required to reach 90dB SPL:** 0.068 Vrms
- **Impedance @ 1kHz:** 33 Ohms
- **Power Needed for 90dB SPL:** 0.14 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -5 dB

**Frequency Response**
- Top - Compensated and Averaged
- Bottom - Raw Data for Five Headphone Positions

**Impulse Response**

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**30 Hz Square Wave**

**300 Hz Square Wave**

**%THD+noise @ 90dB and 100dB**

**Isolation**
- Attenuation of External Sound vs. Frequency

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Headphone Measurements: Oppo PM2 2014 PM1 Alt Pads

**Frequency Response**
Top - Compensated and Averaged  
Bottom - Raw Data for Five Headphone Positions

**Isolation**  
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**  
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

Volts RMS required to reach 90dB SPL: 0.057 Vrms  
Impedance @ 1kHz: 33 Ohms  
Power Needed for 90dB SPL: 0.10 mW  
Broadband Isolation in dB (100Hz to 1kHz): -5 dBr

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**Headphone Measurements: Philips Fidelio X1**

**Volts RMS required to reach 90dB SPL:** 0.181 Vrms

**Impedance @ 1kHz:** 37 Ohms

**Power Needed for 90dB SPL:** 0.89 mW

**Broadband Isolation in dB (100Hz to 10kHz):** -4 dB
Headphone Measurements: Philips Fidelio X2

- Volts RMS required to reach 90dB SPL: 0.089 Vrms
- Impedance @ 1kHz: 35 Ohms
- Power Needed for 90dB SPL: 0.23 mW
- Broadband Isolation in dB (100Hz to 10kHz): -9 dB

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**Headphone Measurements:**

**Philips Fidelio L1**

**Frequency Response**
Top - Compensated and Averaged  
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**30 Hz Square Wave**

**%THD+noise @ 90dB and 100dB**

**300 Hz Square Wave**

**Impulse Response**

Volts RMS required to reach 90dB SPL: 0.139 Vrms  
Impedance @ 1kHz: 28 Ohms  
Power Needed for 90dB SPL: 0.69 mW  
Broadband Isolation in dB (100Hz to 10kHz): -9 dB
Headphone Measurements: Philips L2

**Headphone Measurements**

**Volts RMS required to reach 90dB SPL:** 0.052 Vrms

**Impedance @ 1kHz:** 19 Ohms

**Power Needed for 90dB SPL:** 0.14 mW

**Broadband Isolation in dB (100Hz to 10kHz):** -8 dB

---

**Frequency Response**

Top - Compensated and Averaged

Bottom - Raw Data for Five Headphone Positions

**Isolation**

Attenuation of External Sound vs. Frequency

**Impulse Response**

**Electrical Impedance and Phase**

Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

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Headphone Measurements: Philips SBC HP910

Headphone Measurements:

**Volts RMS required to reach 90dB SPL:** 0.082 Vrms

**Impedance @ 1kHz:** 35 Ohms

**Power Needed for 90dB SPL:** 0.19 mW

**Broadband Isolation in dB (100Hz to 10kHz):** -3 dB
Headphone Measurements:  Pioneer SE-A1000

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**Impulse Response**

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Volts RMS required to reach 90dB SPL:** 0.010 Vrms
**Impedance @ 1kHz:** 49 Ohms
**Power Needed for 90d BSPL:** 0.05 mW
**Broadband Isolation in dB (100Hz to 10kHz):** -2 dB

---

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Headphone Measurements: Pioneer SE Master 1

**Headphone Measurements**

**Volts RMS required to reach 90dB SPL:** 0.134 Vrms

**Impedance @ 1kHz:** 46 Ohms

**Power Needed for 90dB SPL:** 0.39 mW

**Broadband Isolation in dB (100Hz to 10kHz):** -5 dB
Headphone Measurements:  Sennheiser HD 560 Ovation II

**Headphone Measurements:**

- **Volts RMS required to reach 90dB SPL:** 0.257 Vrms
- **Impedance @ 1kHz:** 310 Ohms
- **Power Needed for 90d BSPL:** 0.21 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -2 dB

**Frequency Response**

Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**

Attenuation of External Sound vs. Frequency

**Impulse Response**

**Electrical Impedance and Phase**

Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

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Headphone Measurements: Sennheiser HD 565 Ovation

**Frequency Response**
- Top - Compensated and Averaged
- Bottom - Raw Data for Five Headphone Positions

**Isolation**
- Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

Volts RMS required to reach 90dB SPL: 0.155 Vrms
Impedance @ 1kHz: 173 Ohms
Power Needed for 90dB SPL: 0.08 mW
Broadband Isolation in dB (100Hz to 1kHz): -3 dB
Headphone Measurements: Sennheiser HD 575

- **Volts RMS required to reach 90dB SPL:** 0.156 Vrms
- **Impedance @ 1kHz:** 179 Ohms
- **Power Needed for 90dB SPL:** 0.14 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -1 dB

---

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

---

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**Headphone Measurements:**

**Sennheiser HD 580 (HD600 headband)**

---

**Frequency Response**

- Top: Compensated and Averaged
- Bottom: Raw Data for Five Headphone Positions

**Isolation**

- Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**

- Measured with 600 Ohm output impedance.

**30 Hz Square Wave**

**300 Hz Square Wave**

---

**Impulse Response**

---

Volts RMS required to reach 90dB SPL: 0.173 Vrms
Impedance @ 1kHz: 330 Ohms
Power Needed for 90dB SPL: 0.09 mW
Broadband Isolation in dB (100Hz to 10kHz): -2 dB
**Headphone Measurements: Sennheiser HD 595**

**Volts RMS required to reach 90dB SPL:** 0.055 Vrms

**Impedance @ 1kHz:** 55 Ohms

**Power Needed for 90dB SPL:** 0.05 mW

**Broadband Isolation in dB (100Hz to 10kHz):** -2 dB
**Headphone Measurements: Sennheiser HD 598**

**Headphone Measurements:**
- **Volts RMS required to reach 90dB SPL:** 0.090 Vrms
- **Impedance @ 1kHz:** 61 Ohms
- **Power Needed for 90dB SPL:** 0.13 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -3 dB

---

**Frequency Response**
- Top - Compensated and Averaged
- Bottom - Raw Data for Five Headphone Positions

**Isolation**
- Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**30 Hz Square Wave**

**300 Hz Square Wave**

**%THD+noise @ 90dB and 100dB**

**Impulse Response**

---

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Headphone Measurements:  Sennheiser HD 600

**Volts RMS required to reach 90dB SPL:** 0.230 Vrms

**Impedance @ 1kHz:** 307 Ohms

**Power Needed for 90dB SPL:** 0.17 mW

**Broadband Isolation in dB (100Hz to 10kHz):** -3 dB
Headphone Measurements: Sennheiser HD 650

- **Volts RMS required to reach 90dB SPL**: 0.205 Vrms
- **Impedance @ 1kHz**: 320 Ohms
- **Power Needed for 90d BSPL**: 0.13 mW
- **Broadband Isolation in dB (100Hz to 10kHz)**: -2 dBr

---

**Frequency Response**
- Top - Compensated and Averaged
- Bottom - Raw Data for Five Headphone Positions

**Isolation**
- Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

---

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Headphone Measurements:

Sennheiser HD 700

**Headphone Measurements:**

**Volts RMS required to reach 90dB SPL:**
0.153 Vrms

**Impedance @ 1kHz:**
167 Ohms

**Power Needed for 90dB SPL:**
0.14 mW

**Broadband Isolation in dB (100Hz to 10kHz):**
-3 dB

---

**Frequency Response**

- **Top - Compensated and Averaged**
- **Bottom - Raw Data for Five Headphone Positions**

**Isolation**

- **Attenuation of External Sound vs. Frequency**

---

**Electrical Impedance and Phase**

- Measured with 600 Ohm output impedance.

---

**%THD+noise @ 90dB and 100dB**

---

**30 Hz Square Wave**

---

**300 Hz Square Wave**

---

**Impulse Response**

---

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Headphone Measurements: Sennheiser HD 800

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

<table>
<thead>
<tr>
<th>Volts RMS required to reach 90dB SPL:</th>
<th>0.242 Vrms</th>
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</thead>
<tbody>
<tr>
<td>Impedance @ 1kHz:</td>
<td>361 Ohms</td>
</tr>
<tr>
<td>Power Needed for 90d BSPL</td>
<td>0.16 mW</td>
</tr>
<tr>
<td>Broadband Isolation in dB (100Hz to 10kHz):</td>
<td>-3 dBf</td>
</tr>
</tbody>
</table>

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Headphone Measurements: Sennheiser HD 800 sn 15001 stock

Frequency Response
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

Impedance and Phase
Measured with 600 Ohm output impedance.

Electrical Impedance and Phase

%THD+noise @ 90dB and 100dB

Isolation
Attenuation of External Sound vs. Frequency

30 Hz Square Wave

300 Hz Square Wave

Impulse Response

Volts RMS required to reach 90dB SPL: 0.257 Vrms
Impedance @ 1kHz: 368 Ohms
Power Needed for 90dB SPL: 0.18 mW
Broadband Isolation in dB (100Hz to 10kHz): -5 dB

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**Headphone Measurements: Sennheiser HD 800 S**

**Frequency Response**
- Top - Compensated and Averaged
- Bottom - Raw Data for Five Headphone Positions

**Isolation**
- Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**Impulse Response**

<table>
<thead>
<tr>
<th>Volts RMS required to reach 90dB SPL</th>
<th>0.000 Vrms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impedance @ 1kHz</td>
<td>374 Ohms</td>
</tr>
<tr>
<td>Power Needed for 90dB SPL</td>
<td>0.50 mW</td>
</tr>
<tr>
<td>Broadband Isolation in dB (10Hz to 10kHz)</td>
<td>-5 dBm</td>
</tr>
</tbody>
</table>
**Headphone Measurements:**

**Sennheiser HD 800 S sn 01070**

- **Volts RMS required to reach 90dB SPL:** 0.224 Vrms
- **Impedance @ 1kHz:** 375 Ohms
- **Power Needed for 90dBSPL:** 0.13 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -5 dB

---

**Frequency Response**

Top - Compensated and Averaged

Bottom - Raw Data for Five Headphone Positions

**Isolation**

Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**

Measured with 600 Ohm output impedance.

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

Volts RMS required to reach 90dB SPL: 0.224 Vrms

Impedance @ 1kHz: 375 Ohms

Power Needed for 90dBSPL: 0.13 mW

Broadband Isolation in dB (100Hz to 10kHz): -5 dB
Headphone Measurements: Sennheiser HE-60

Frequency Response
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

Isolation
Attenuation of External Sound vs. Frequency

Electrical impedance and phase measurements unavailable for Electrostatic headphones.

%THD+noise @ 90dB and 100dB

30 Hz Square Wave

300 Hz Square Wave

Impulse Response

Broadband Isolation in dB (100Hz to 1kHz): -1 dBr

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**Headphone Measurements: Shure SRH1840**

**Frequency Response**
- Top - Compensated and Averaged
- Bottom - Raw Data for Five Headphone Positions

**Isolation**
- Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

**Headphone Measurements:**

- Volts RMS required to reach 90dB SPL: 0.160 Vrms
- Impedance @ 1kHz: 65 Ohms
- Power Needed for 90dB SPL: 0.39 mW
- Broadband Isolation in dB (100Hz to 10kHz): -3 dB
Headphone Measurements: Shure SRH1440

Volts RMS required to reach 90dB SPL: 0.098 Vrms
Impedance @ 1kHz: 37 Ohms
Power Needed for 90dB SPL: 0.26 mW
Broadband Isolation in dB (100Hz to 10kHz): -4 dB!r

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Headphone Measurements: Sonoma Model One

Electrical Impedance and phase measurements unavailable for electrostatic and wireless headphones.

- **Broadband Isolation in dB (100Hz to 10kHz):** -1 dBr

- **%THD+noise @ 90dB and 100dB**

- **30 Hz Square Wave**

- **300 Hz Square Wave**

- **Impulse Response**

- **Frequency Response**
  - Top - Compensated and Averaged
  - Bottom - Raw Data for Five Headphone Positions

- **Budget**

- **Isolation**
  - Attenuation of External Sound vs. Frequency

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**Headphone Measurements:** Sony MDR-SA3000

**Headphone Measurements:**

- Volts RMS required to reach 90dB SPL: 0.093 Vrms
- Impedance @ 1kHz: 76 Ohms
- Power Needed for 90dB SPL: 0.11 mW
- Broadband Isolation in dB (100Hz to 10kHz): -4 dB
Headphone Measurements: Sony MDRV-SA5000

**Impulse Response**

- **Volts RMS required to reach 90dB SPL:** 0.080 Vrms
- **Impedance @ 1kHz:** 75 Ohms
- **Power Needed for 90dB SPL:** 0.09 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -6 dB
Headphone Measurements:  
SoundMAGIC HP200

**Frequency Response**
Top - Compensated and Averaged  
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

Volts RMS required to reach 90dB SPL: 0.110 Vrms  
Impedance @ 1kHz: 35 Ohms  
Power Needed for 90dB SPL 0.35 mW  
Broadband Isolation in dB (100Hz to 10kHz): -12 dB

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Headphone Measurements: Stax SR-L300

Electrical impedance and phase measurements unavailable for electrostatic and wireless headphones.

Frequency Response
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

Isolation
Attenuation of External Sound vs. Frequency

%THD+noise @ 90dB and 100dB

30 Hz Square Wave

300 Hz Square Wave

Impulse Response

Broadband isolation in dB (100Hz to 10kHz): -7 dBir

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**Headphone Measurements:**

**Stax SR-009**

**Frequency Response**
Top - Compensated and Averaged  
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**Impulse Response**

---

Electrical impedance and phase measurements unavailable for Electrostatic headphones.

---

Volts RMS required to reach 90dB SPL: 0.000 Vrms
Impedance @ 1kHz: #DIV/0! Ohms
Power Needed for 90dB SPL: #DIV/0! mW
Broadband Isolation in dB (100Hz to 10kHz): 0 dB

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Headphone Measurements: Stax SR-009 SZ9-1278

Electrical Impedance and phase measurements unavailable for Electrostatic headphones.

Isolation
Attenuation of External Sound vs. Frequency

30 Hz Square Wave

300 Hz Square Wave

%THD+noise @ 90dB and 100dB

Impulse Response

Broadband Isolation in dB (100Hz to 10kHz): -1 dBr

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Headphone Measurements: Stax SR-009 SZ9-1278 after burnin

Electrical impedance and phase measurements unavailable for Electrostatic headphones.

Isolation
Attenuation of External Sound vs. Frequency

30 Hz Square Wave

300 Hz Square Wave

Impulse Response

Broadband Isolation in dB (100Hz to 10kHz): 0 dBr

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Headphone Measurements:  Stax SR-007

**Headphone Measurements:**

**Stax SR-007**

**Electrical Impedance and phase measurements unavailable for Electrostatic headphones.**

**Broadband Isolation in dB (100Hz to 10kHz):** -1 dBr

- **%THD+noise @ 90dB and 100dB**
- **30 Hz Square Wave**
- **300 Hz Square Wave**
- **Impulse Response**

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

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Headphone Measurements: Stax SR-007 SZ3-1576

Frequency Response
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

Isolation
Attenuation of External Sound vs. Frequency

Electrical impedance and phase measurements unavailable for Electrostatic headphones.

30 Hz Square Wave

%THD+noise @ 90dB and 100dB

300 Hz Square Wave

Impulse Response

Broadband isolation in dB (100Hz to 10kHz): -4 dB

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Headphone Measurements:  Stax SR-507 SE1-1049

**Isolation**
Attenuation of External Sound vs. Frequency

**Impulse Response**

Electrical impedance and phase measurements unavailable for Electrostatic headphones.

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Broadband Isolation in dB (100Hz to 10kHz):** 0 dBr
Electrical impedance and phase measurements unavailable for Electrostatic headphones.

Headphone Measurements:  Stax SR-404 Ltd SSL-0670

Isolation
Attenuation of External Sound vs. Frequency

Frequency Response
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

%THD+noise @ 90dB and 100dB

30 Hz Square Wave

300 Hz Square Wave

Impulse Response

Broadband Isolation in dB (100Hz to 10kHz): 0 dBr

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Headphone Measurements: Stax SR-404 S 2742

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

Electrical impedance and phase measurements unavailable for Electrostatic headphones.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

Broadband Isolation in dB (100Hz to 10kHz): -1 dBr

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Headphone Measurements: Stax SR-207 SB2217

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**Impulse Response**

Electrical impedance and phase measurements unavailable for electrostatic and wireless headphones.

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Headphone Measurements: Stax SR207 EP507 Leather Pads
SerNum SB2 2217

- Electrical Impedance and phase measurements unavailable for electrostatic and wireless headphones

- Broadband Isolation in dB (100Hz to 10kHz): -3 dBr

- Isolation: Attenuation of External Sound vs. Frequency

- Frequency Response: Top - Compensated and Averaged
  Bottom - Raw Data for Five Headphone Positions

- Impulse Response

- %THD+noise @ 90dB and 100dB

- 30 Hz Square Wave

- 300 Hz Square Wave

- Broadband Isolation in dB (100Hz to 10kHz): -3 dBr
Frequency Response
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

Isolation
Attenuation of External Sound vs. Frequency

30 Hz Square Wave

%THD+noise @ 90dB and 100dB

300 Hz Square Wave

Impulse Response

Headphone Measurements: Stax SR40 Electret SR4 Adapter

Broadband Isolation in dB (100Hz to 10kHz): -1 dB

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**Headphone Measurements: Stax SR-3**

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**30 Hz Square Wave**

**%THD+noise @ 90dB and 100dB**

**300 Hz Square Wave**

**Impulse Response**

Broadband Isolation in dB (100Hz to 10kHz): -8 dBir

Electrical Impedance and phase measurements unavailable for electrostatic and wireless headphones.
Headphone Measurements: Stax SR-1

Electrical Impedance and phase measurements unavailable for electrostatic and wireless headphones.
Headphone Measurements: Stax SR-Alpha Pro wYax1 Pads

- **Frequency Response**
  - Top: Compensated and Averaged
  - Bottom: Raw Data for Five Headphone Positions

- **Isolation**
  - Attenuation of External Sound vs. Frequency

- **%THD+noise @ 90dB and 100dB**

- **30 Hz Square Wave**

- **300 Hz Square Wave**

- **Impulse Response**

- **Broadband Isolation in dB (100Hz to 15kHz): -6 dBr**

Electrical Impedance and phase measurements unavailable for electrostatic and wireless headphones.

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Electrical Impedance and phase measurements unavailable for electrostatic and wireless headphones.
Headphone Measurements: Stax SR-Gamma Pro

Electrical impedance and phase measurements unavailable for electrostatic and wireless headphones.

Isolation
Attenuation of external sound vs. frequency

Impulse Response
Broadband isolation in dB (100Hz to 10kHz): -6 dBr
Headphone Measurements: Stax SR-Sigma 07381

Electrical impedance and phase measurements unavailable for Electrostatic headphones.

%THD+noise @ 90dB and 100dB

30 Hz Square Wave

300 Hz Square Wave

Impulse Response

Broadband Isolation in dB (100Hz to 10kHz): -2 dBr
Electrical impedance and phase measurements unavailable for electrostatic and wireless headphones.

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**30 Hz Square Wave**

**%THD+noise @ 90dB and 100dB**

**300 Hz Square Wave**

**Impulse Response**

Broadband Isolation in dB (100Hz to 10kHz): -11 dBr
Headphone Measurements:  
Stax Lambda SB A19858

**Headphone Measurements: Stax Lambda SB A19858**

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**30 Hz Square Wave**

**%THD+noise @ 90dB and 100dB**

**300 Hz Square Wave**

**Impulse Response**

Electrical impedance and phase measurements unavailable for Electrostatic headphones.

Broadband Isolation in dB (100Hz to 10kHz): -2 dB
Electrical Impedance and phase measurements unavailable for electrostatic and wireless headphones.
Headphone Measurements: Stax Lambda Nova Signature

**Frequency Response**

Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

Electrical Impedance and phase measurements unavailable for electrostatic and wireless headphones

**Isolation**

Attenuation of External Sound vs. Frequency

**30 Hz Square Wave**

**300 Hz Square Wave**

**%THD+noise @ 90dB and 100dB**

**Impulse Response**

Broadband Isolation in dB (100Hz to 10kHz): -3 dBr
**Headphone Measurements:** Toshiba HR-810 Low Gain

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

Volts RMS required to reach 90dB SPL: 0.313 Vrms
Impedance @ 1kHz: 169 Ohms
Power Needed for 90dB SPL: 0.58 mW
Broadband Isolation in dB (100Hz to 1kHz): -3 dB
**Headphone Measurements: Ultrasone PRO 2900**

**Volts RMS required to reach 90dB SPL:** 0.131 Vrms

**Impedance @ 1kHz:** 41 Ohms

**Power Needed for 90dB SPL:** 0.42 mW

**Broadband Isolation in dB (100Hz to 10kHz):** -2 dB
**Headphone Measurements:**
**Ultrasone HFI-2400**

- **Volts RMS required to reach 90dB SPL:** 0.162 Vrms
- **Impedance @ 1kHz:** 80 Ohms
- **Power Needed for 90dB SPL:** 0.33 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -2 dB
**Headphone Measurements: Ultrasone Edition 10**

- **Volts RMS required to reach 90dB SPL:** 0.121 Vrms
- **Impedance @ 1kHz:** 35 Ohms
- **Power Needed for 90dB SPL:** 0.42 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -2 dB

---

**Frequency Response**
- Top - Compensated and Averaged
- Bottom - Raw Data for Five Headphone Positions

**Isolation**
- Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

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Headphone Measurements: Yamaha HP1

**Headphone Measurements: Yamaha HP1**

**Volts RMS required to reach 90dB SPL:** 0.381 Vrms

**Impedance @ 1kHz:** 140 Ohms

**Power Needed for 90d BSPL:** 1.03 mW

**Broadband Isolation in dB (100Hz to 10kHz):** -4 dB
Headphone Measurements: Yamaha HP3

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

Volts RMS required to reach 90dB SPL: 0.254 Vrms
Impedance @ 1kHz: 142 Ohms
Power Needed for 90d BSPL: 0.46 mW
Broadband Isolation in dB (100Hz to 1kHz): -5 dB
Headphone Measurements: 1More MK801

**Volts RMS required to reach 90dB SPL:** 0.032 Vrms
**Impedance @ 1kHz:** 37 Ohms
**Power Needed for 90dB SPL:** 0.03 mW
**Broadband Isolation in dB (100Hz to 1kHz):** -15 dBr

---

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

---

**30 Hz Square Wave**

---

**300 Hz Square Wave**

---

**Impulse Response**
**Headphone Measurements:**

**Accidentally Extraordinary 51st Studios**

**Frequency Response**
- Top: Compensated and Averaged
- Bottom: Raw Data for Five Headphone Positions

**Impulse Response**

**30 Hz Square Wave**

**300 Hz Square Wave**

**%THD+noise @ 90dB and 100dB**

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**30 Hz Square Wave**

**Isolation**
- Attenuation of External Sound vs. Frequency

**Impedance**

**Phase**

- Measured with 600 Ohm output impedance.

- Volts RMS required to reach 90dB SPL: 0.023 Vrms
- Impedance @ 1kHz: 41 Ohms
- Power Needed for 90dBSPL: 0.01 mW
- Broadband Isolation in dB (100Hz to 10kHz): -11 dB
Headphone Measurements: Aiaiai TMA-1

**Headphone Measurements:**
- Volts RMS required to reach 90dB SPL: 0.027 Vrms
- Impedance @ 1kHz: 39 Ohms
- Power Needed for 90dB SPL: 0.02 mW
- Broadband Isolation in dB (100Hz to 10kHz): -10 dB

---

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

---

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

---

**%THD+noise @ 90dB and 100dB**

---

**30 Hz Square Wave**

---

**300 Hz Square Wave**

---

**Impulse Response**

---

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Headphone Measurements: Aiaiai TMA-1 Studio

- Volts RMS required to reach 90dB SPL: 0.030 Vrms
- Impedance @ 1kHz: 38 Ohms
- Power Needed for 90dB SPL: 0.02 mW
- Broadband Isolation in dB (100Hz to 10kHz): -9 dB
Headphone Measurements: Akai MPC

- **Volts RMS required to reach 90dB SPL:** 0.020 Vrms
- **Impedance @ 1kHz:** 19 Ohms
- **Power Needed for 90dB SPL:** 0.02 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -18 dB

---

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**
Headphone Measurements: AKG K550

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

Volts RMS required to reach 90dB SPL: 0.055 Vrms
Impedance @ 1kHz: 35 Ohms
Power Needed for 90dB SPL: 0.09 mW
Broadband Isolation in dB (100Hz to 1kHz): -14 dB
Headphone Measurements: AKG K72 HD

Frequency Response
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

Isolation
Attenuation of External Sound vs. Frequency

Electrical Impedance and Phase
Measured with 600 Ohm output impedance.

%THD+noise @ 90dB and 100dB

30 Hz Square Wave

300 Hz Square Wave

Impulse Response

Volts RMS required to reach 90dB SPL: 0.145 Vrms
Impedance @ 1kHz: 60 Ohms
Power Needed for 90dB SPL: 0.35 mW
Broadband Isolation in dB (100Hz to 10kHz): -13 dB

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Headphone Measurements: AKG K271 MkII

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

Volts RMS required to reach 90dB SPL: 0.093 Vrms
Impedance @ 1kHz: 60 Ohms
Power Needed for 90dBSPL: 0.14 mW
Broadband Isolation in dB (100Hz to 10kHz): -16 dB
Headphone Measurements:  
AKG K340 Stock

Headphone Measurements:

Volts RMS required to reach 90dB SPL: 0.670 Vrms
Impedance @ 1kHz: 352 Ohms
Power Needed for 90dB SPL: 1.27 mW
Broadband Isolation in dB (100Hz to 10kHz): -12 dBr

Isolation
Attenuation of External Sound vs. Frequency

Frequency Response
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

Impulse Response

Electrical Impedance and Phase
Measured with 600 Ohm output impedance.

%THD+noise @ 90dB and 100dB

30 Hz Square Wave

300 Hz Square Wave

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Headphone Measurements: AKG K240 Sextett

Volume RMS required to reach 90dB SPL: 0.893 Vrms
Impedance @ 1kHz: 630 Ohms
Power Needed for 90dB SPL: 1.27 mW
Broadband Isolation in dB (100Hz to 10kHz): -6 dB
Headphone Measurements:  
AKG K240 Monitor

**Frequency Response**
Top - Compensated and Averaged  
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

Volts RMS required to reach 90dB SPL: 0.447 Vrms  
Impedance @ 1kHz: 688 Ohms  
Power Needed for 90dB SPL: 0.29 mW  
Broadband Isolation in dB (100Hz to 10kHz): -7 dB
Headphone Measurements: AKG K702 65th Anv Ed 2014

Volts RMS required to reach 90dB SPL: 0.270 Vrms
Impedance @ 1kHz: 64 Ohms
Power Needed for 90d BSPL: 1.13 mW
Broadband Isolation in dB (100Hz to 10kHz): -6 dB
Headphone Measurements: AKG K267 Tiesto Studio Setting

**Headphone Measurements:**

- **Volts RMS required to reach 90dB SPL:** 0.034 Vrms
- **Impedance @ 1kHz:** 33 Ohms
- **Power Needed for 90dB SPL:** 0.04 mW
- **Broadband Isolation in dB (100Hz to 1kHz):** -15 dBc

---

**Frequency Response**

- **Top:** Compensated and Averaged
- **Bottom:** Raw Data for Five Headphone Positions

**Isolation**

Attenuation of External Sound vs. Frequency

---

**Electrical Impedance and Phase**

Measured with 600 Ohm output impedance.

**30 Hz Square Wave**

**300 Hz Square Wave**

**%THD+noise @ 90dB and 100dB**

---

**Impulse Response**

---

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Headphone Measurements: AKG K267 Tiesto Club Setting

**Headphone Measurements:**

- Volts RMS required to reach 90dB SPL: 0.032 Vrms
- Impedance @ 1kHz: 33 Ohms
- Power Needed for 90dB SPL: 0.03 mW
- Broadband Isolation in dB (100Hz to 10kHz): -15 dB

**Frequency Response**
- Top - Compensated and Averaged
- Bottom - Raw Data for Five Headphone Positions

**Isolation**
- Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

Copyright © SOURCE INTERLINK MEDIA All rights reserved.
**Headphone Measurements: AKG K267 Tiesto Stage Setting**

**Volts RMS required to reach 90dB SPL:** 0.038 Vrms

**Impedance @ 1kHz:** 33 Ohms

**Power Needed for 90dB SPL:** 0.04 mW

**Broadband Isolation in dB (100Hz to 10kHz):** -14 dB

---

**Frequency Response**

Top - Compensated and Averaged

Bottom - Raw Data for Five Headphone Positions

**Impedance and Phase**

Measured with 600 Ohm output impedance.

---

**%THD+noise @ 90dB and 100dB**

---

**30 Hz Square Wave**

---

**300 Hz Square Wave**

---

**Impulse Response**

---

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Headphone Measurements: AKG K167 Tiesto

- **Volts RMS required to reach 90dB SPL**: 0.057 Vrms
- **Impedance @ 1kHz**: 34 Ohms
- **Power Needed for 90d BSPL**: 0.10 mW
- **Broadband Isolation in dB (100Hz to 10kHz)**: -15 dBr

---

**Frequency Response**
- Top - Compensated and Averaged
- Bottom - Raw Data for Five Headphone Positions

**Isolation**
- Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**30 Hz Square Wave**

**300 Hz Square Wave**

**%THD+noise @ 90dB and 100dB**

**Impulse Response**

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Headphone Measurements:  
Alpha Design Labs H128

**Headphone Measurements:**

- **Volts RMS required to reach 90dB SPL:** 0.043 Vrms
- **Impedance @ 1kHz:** 72 Ohms
- **Power Needed for 90d BSPL:** 0.03 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -18 dBr

---

**Frequency Response**

- **Top -** Compensated and Averaged
- **Bottom -** Raw Data for Five Headphone Positions

**Isolation**

- Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**

- Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

- Left 90dB, Right 90dB, Left 100dB, Right 100dB

**30 Hz Square Wave**

- Time in Seconds, Volts

**300 Hz Square Wave**

- Time in Seconds, Volts

**Impulse Response**

- Time in Seconds, Volts

---

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Headphone Measurements: Audeze EL8 Closed

**Volts RMS required to reach 90dB SPL:** 0.112 Vrms

**Impedance @ 1kHz:** 37 Ohms

**Power Needed for 90dB SPL:** 0.34 mW

**Broadband Isolation in dB (100Hz to 10kHz):** -22 dB

---

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

---

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Headphone Measurements: Audeze LCD XC

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

Volts RMS required to reach 90dB SPL: 0.090 Vrms
Impedance @ 1kHz: 21 Ohms
Power Needed for 90dB SPL: 0.39 mW
Broadband Isolation in dB (100Hz to 10kHz): -13 dB

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Headphone Measurements: Audeze LCD XC Sample 2

- **Volts RMS required to reach 90dB SPL:** 0.071 Vrms
- **Impedance @ 1kHz:** 23 Ohms
- **Power Needed for 90dB SPL:** 0.22 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -16 dB
Headphone Measurements: AudioQuest NightOwl Stock Pads

- Volts RMS required to reach 90dB SPL: 0.043 Vrms
- Impedance @ 1kHz: 27 Ohms
- Power Needed for 90dB SPL: 0.07 mW
- Broadband Isolation in dB (100Hz to 10kHz): -20 dBr

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Headphone Measurements: Audio Technica ATH-W5000 2013

**Headphone Measurements:**

- **Volts RMS required to reach 90dB SPL:** 0.036 Vrms
- **Impedance @ 1kHz:** 41 Ohms
- **Power Needed for 90dB SPL:** 0.03 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -6 dBr

---

**Impulse Response**

- **Current RMS required to reach 90dB SPL:**
- **Impedance @ 1kHz:**
- **Power Needed for 90dB SPL:**
- **Broadband Isolation in dB (100Hz to 10kHz):**

---

**Frequency Response**

- **Top - Compensated and Averaged**
- **Bottom - Raw Data for Five Headphone Positions**

---

**Electrical Impedance and Phase**

- **Measured with 600 Ohm output impedance.**

---

**30 Hz Square Wave**

- **%THD+noise @ 90dB and 100dB**

---

**300 Hz Square Wave**

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**Isolation**

- **Attenuation of External Sound vs. Frequency**

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**Headphone Measurements:**  
Audio Technical ATH-W5000

---

**Impulse Response**

---

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

---

**Frequency Response**
Top - Compensated and Averaged  
Bottom - Raw Data for Five Headphone Positions

---

**%THD+noise @ 90dB and 100dB**

---

**30 Hz Square Wave**

---

**300 Hz Square Wave**

---

**Isolation**  
Attenuation of External Sound vs. Frequency

---

**Headphone Measurements:**

<table>
<thead>
<tr>
<th>Measurements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volts RMS required to reach 90dB SPL: 0.031 Vrms</td>
</tr>
<tr>
<td>Impedance @ 1kHz: 38 Ohms</td>
</tr>
<tr>
<td>Power Needed for 90dB SPL: 0.03 mW</td>
</tr>
<tr>
<td>Broadband Isolation in dB (100Hz to 10kHz): -7 dB</td>
</tr>
</tbody>
</table>

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Headphone Measurements: Audio Technica ATH A2000Z

Volts RMS required to reach 90dB SPL: 0.054 Vrms
Impedance @ 1kHz: 48 Ohms
Power Needed for 90dB SPL: 0.06 mW
Broadband Isolation in dB (100Hz to 10kHz): -20 dB
Headphone Measurements: Audio Technica ATH A1000X

- **Volts RMS required to reach 90dB SPL**: 0.011 Vrms
- **Impedance @ 1kHz**: 43 Ohms
- **Power Needed for 90dBSPL**: 0.00 mW
- **Broadband Isolation in dB (100Hz to 10kHz)**: -14 dBr

---

**Frequency Response**
- Top - Compensated and Averaged
- Bottom - Raw Data for Five Headphone Positions

**Isolation**
- Attenuation of External Sound vs. Frequency

**Impulse Response**
- Time in Seconds
- Volts

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**
- Amplitude (dB)

**30 Hz Square Wave**
- Time in Seconds
- Volts

**300 Hz Square Wave**
- Time in Seconds
- Volts

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**Headphone Measurements:**

Audio Technica ATH A900X

**Headphone Measurements:**

- **Volts RMS required to reach 90dB SPL:** 0.049 Vrms
- **Impedance @ 1kHz:** 45 Ohms
- **Power Needed for 90d BSPL:** 0.05 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -19 dB

---

**Frequency Response**
- **Top - Compensated and Averaged**
- **Bottom - Raw Data for Five Headphone Positions**

**Isolation**
- Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100db**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

---

Copyright © SOURCE INTERLINK MEDIA All rights reserved.
Headphone Measurements: Audio Technica ATH-W1000X

Volts RMS required to reach 90dB SPL: 0.046 Vrms
Impedance @ 1kHz: 41 Ohms
Power Needed for 90dB SPL: 0.05 mW
Broadband Isolation in dB (100Hz to 10kHz): -10 dB

Headphone Measurements:

Frequency Response
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

Isolation
Attenuation of External Sound vs. Frequency

Impulse Response

Electrical Impedance and Phase
Measured with 600 Ohm output impedance.

%THD+noise @ 90dB and 100dB

30 Hz Square Wave

300 Hz Square Wave

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Headphone Measurements: Audio Technica ATH MSR7

**Headphone Measurements:**
- Volts RMS required to reach 90dB SPL: 0.023 Vrms
- Impedance @ 1kHz: 37 Ohms
- Power Needed for 90dBSPL: 0.01 mW
- Broadband Isolation in dB (100Hz to 10kHz): -15 dBr

---

**Frequency Response**
Top - Compensated and Averaged  
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

---

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Headphone Measurements: Audio Technica ATH M70x

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

Volts RMS required to reach 90dB SPL: 0.048 Vrms
Impedance @ 1kHz: 37 Ohms
Power Needed for 90dB SPL: 0.06 mW
Broadband Isolation in dB (100Hz to 10kHz): -19 dB
Headphone Measurements: Audio Technica ATH M50x

- Volts RMS required to reach 90dB SPL: 0.042 Vrms
- Impedance @ 1kHz: 37 Ohms
- Power Needed for 90dB SPL: 0.05 mW
- Broadband Isolation in dB (100Hz to 10kHz): -13 dB

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Headphone Measurements: Audio Technica ATH-M50 B2012

Frequency Response
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

Isolation
Attenuation of External Sound vs. Frequency

Electrical Impedance and Phase
Measured with 600 Ohm output impedance.

%THD+noise @ 90dB and 100dB

Impulse Response

Headspace Measurements:
- Volts RMS required to reach 90dB SPL: 0.073 Vrms
- Impedance @ 1kHz: 39 Ohms
- Power Needed for 90d BSPL: 0.13 mW
- Broadband Isolation in dB (100Hz to 10kHz): -12 dB

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Headphone Measurements: Audio Technica ATH-M50

**Headphone Measurements:**

- **Volts RMS required to reach 90dB SPL:** 0.041 Vrms
- **Impedance @ 1kHz:** 38 Ohms
- **Power Needed for 90d BSPL:** 0.04 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -9 dBr

---

**Frequency Response**

- **Top - Compensated and Averaged**
- **Bottom - Raw Data for Five Headphone Positions**

**Isolation**

- **Attenuation of External Sound vs. Frequency**

**Electrical Impedance and Phase**

- **Measured with 600 Ohm output impedance.**

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

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**Headphone Measurements: Audio Technica ATH-M10**

- **Volts RMS required to reach 90dB SPL:** 0.032 Vrms
- **Impedance @ 1kHz:** 46 Ohms
- **Power Needed for 90dB SPL:** 0.02 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -9 dB
Headphone Measurements: Audio Technica ATH WS99

Volts RMS required to reach 90dB SPL: 0.035 Vrms
Impedance @ 1kHz: 37 Ohms
Power Needed for 90d BSPL 0.03 mW
Broadband Isolation in dB (100Hz to 10kHz): -12 dB
Headphone Measurements:  Bang Olufsen H6 2nd Gen

- **Volts RMS required to reach 90dB SPL:** 0.045 Vrms
- **Impedance @ 1kHz:** 38 Ohms
- **Power Needed for 90dB SPL:** 0.05 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -16 dB

---

**Frequency Response**
- Top - Compensated and Averaged
- Bottom - Raw Data for Five Headphone Positions

**Isolation**
- Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

---

- **Volts RMS required to reach 90dB SPL:** 0.045 Vrms
- **Impedance @ 1kHz:** 38 Ohms
- **Power Needed for 90dB SPL:** 0.05 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -16 dB
Headphone Measurements: Beyerdynamic Custom Pro One

switch position 1

Volts RMS required to reach 90dB SPL: 0.056 Vrms
Impedance @ 1kHz: 17 Ohms
Power Needed for 90dB SPL: 0.18 mW
Broadband Isolation in dB (100Hz to 10kHz): -16 dB
**Headphone Measurements:**

**Beyerdynamic Custom One Pro**

*switch position 2*

---

**Headphone Measurements:**

- **Volts RMS required to reach 90dB SPL:** 0.038 Vrms
- **Impedance @ 1kHz:** 17 Ohms
- **Power Needed for 90dB SPL:** 0.09 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -18 dB

---

**Frequency Response**

Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

---

**Electrical Impedance and Phase**

Measured with 600 Ohm output impedance.

---

**Isolation**

Attenuation of External Sound vs. Frequency

---

**Impulse Response**

---

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Headphone Measurements: Beyerdynamic Custom One Pro
switch position 3

Volts RMS required to reach 90dB SPL: 0.038 Vrms
Impedance @ 1kHz: 17 Ohms
Power Needed for 90dB SPL: 0.08 mW
Broadband Isolation in dB (100Hz to 10kHz): -17 dB
**Headphone Measurements:**

- **Beyerdynamic Custom One Pro switch position 4**

---

**Frequency Response**

Top - Compensated and Averaged

Bottom - Raw Data for Five Headphone Positions

---

**Electrical Impedance and Phase**

Measured with 600 Ohm output impedance.

---

**%THD+noise @ 90dB and 100dB**

---

**30 Hz Square Wave**

---

**300 Hz Square Wave**

---

**Impulse Response**

---

**Isolation**

Attenuation of External Sound vs. Frequency

---

**Amplitude (dB)**

---

**Impedance in Ohms**

---

**Phase in Degrees**

---

**Volts RMS required to reach 90dB SPL:** 0.038 Vrms

**Impedance @ 1kHz:** 17 Ohms

**Power Needed for 90dB SPL:** 0.08 mW

**Broadband Isolation in dB (100Hz to 10kHz):** -15 dB
**Headphone Measurements:**

**Beyerdynamic T 70 p #0002**

**Headphone Measurements:**

- **Volts RMS required to reach 90dB SPL:** 0.033 Vrms
- **Impedance @ 1kHz:** 38 Ohms
- **Power Needed for 90dB SPL:** 0.03 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -17 dB

---

**Frequency Response**

- **Top:** Compensated and Averaged
- **Bottom:** Raw Data for Five Headphone Positions

**Isolation**

- **Attenuation of External Sound vs. Frequency**

**Electrical Impedance and Phase**

- **Measured with 600 Ohm output impedance.**

**30 Hz Square Wave**

**300 Hz Square Wave**

**%THD+noise @ 90dB and 100dB**

**Impulse Response**

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Headphone Measurements:

**Beyerdynamic T70 250 Ohm**

**Volts RMS required to reach 90dB SPL:** 0.099 Vrms

**Impedance @ 1kHz:** 313 Ohms

**Power Needed for 90dB SPL:** 0.03 mW

**Broadband Isolation in dB (100Hz to 10kHz):** -18 dB

---

**Frequency Response**

Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

---

**Isolation**

Attenuation of External Sound vs. Frequency

---

**Electrical Impedance and Phase**

Measured with 600 Ohm output impedance.

---

**30 Hz Square Wave**

---

**%THD+noise @ 90dB and 100dB**

---

**300 Hz Square Wave**

---

**Impulse Response**

---

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**Headphone Measurements:**

**Beyerdynamic T70 250 Ohm**

**sn01111**

- **Volts RMS required to reach 90dB SPL:** 0.073 Vrms
- **Impedance @ 1kHz:** 316 Ohms
- **Power Needed for 90d BSPL:** 0.02 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -13 dB

---

**Impedance**

**Measured with 600 Ohm output impedance.**

- **Impedance in Ohms**
- **Phase in Degrees**

---

**Isolation**

**Attenuation of External Sound vs. Frequency**

---

**Frequency Response**

**Top - Compensated and Averaged**

**Bottom - Raw Data for Five Headphone Positions**

---

**%THD+noise @ 90dB and 100dB**

---

**30 Hz Square Wave**

---

**300 Hz Square Wave**

---

**Impulse Response**

---

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Headphone Measurements:  Beyerdynamic T90

**Volts RMS required to reach 90dB SPL**: 0.225 Vrms

**Impedance @ 1kHz**: 281 Ohms

**Power Needed for 90dB SPL**: 0.18 mW

**Broadband Isolation in dB (100Hz to 10kHz)**: -5 dBr

---

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**
Headphone Measurements: Beyerdynamic T5p

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

Volts RMS required to reach 90dB SPL: 0.049 Vrms
Impedance @ 1kHz: 35 Ohms
Power Needed for 90dB SPL: 0.07 mW
Broadband Isolation in dB (100Hz to 10kHz): -17 dB

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Headphone Measurements:

Beyerdynamic T5p SN2866

**Headphone Measurements:**

**Volts RMS required to reach 90dB SPL:** 0.055 Vrms

**Impedance @ 1kHz:** 34 Ohms

**Power Needed for 90d BSPL:** 0.09 mW

**Broadband Isolation in dB (100Hz to 10kHz):** -20 dB

---

**Frequency Response**

Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

---

**Impulse Response**

---

**Isolation**

Attenuation of External Sound vs. Frequency

---

**Electrical Impedance and Phase**

Measured with 600 Ohm output impedance.

---

%THD+noise @ 90dB and 100dB

---

30 Hz Square Wave

---

300 Hz Square Wave

---

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Headphone Measurements: Beyerdynamic DT 770

**Volts RMS required to reach 90dB SPL:** 0.592 Vrms

**Impedance @ 1kHz:** 633 Ohms

**Power Needed for 90dB SPL:** 0.55 mW

**Broadband Isolation in dB (100Hz to 10kHz):** -15 dBr

---

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**
Headphone Measurements: Beyerdynamic DJX-1

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

Volts RMS required to reach 90dB SPL: 0.043 Vrms
Impedance @ 1kHz: 39 Ohms
Power Needed for 90dB SPL: 0.05 mW
Broadband Isolation in dB (100Hz to 10kHz): -11 dB
Headphone Measurements: Beyerdynamic DT100 2X2kOhm

- Volts RMS required to reach 90dB SPL: 1.225 Vrms
- Impedance @ 1kHz: 2050 Ohms
- Power Needed for 90d BSPL: 0.73 mW
- Broadband Isolation in dB (100Hz to 10kHz): -19 dB

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Headphone Measurements: Beyerdynamic DT 150 250 Ohm

**Headphone Measurements:**

- **Volts RMS required to reach 90dB SPL:** 0.171 Vrms
- **Impedance @ 1kHz:** 247 Ohms
- **Power Needed for 90dB SPL:** 0.12 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -18 dBr

---

**Frequency Response**

*Top - Compensated and Averaged*
*Bottom - Raw Data for Five Headphone Positions*

**Isolation**

*Attenuation of External Sound vs. Frequency*

**Electrical Impedance and Phase**

*Measured with 600 Ohm output impedance.*

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

*Volts RMS required to reach 90dB SPL: 0.171 Vrms*
*Impedance @ 1kHz: 247 Ohms*
*Power Needed for 90dB SPL: 0.12 mW*
*Broadband Isolation in dB (100Hz to 10kHz): -18 dBr*
Headphone Measurements:  
Beyerdynamic DT250-250

**Headphone Measurements:**

- **Volts RMS required to reach 90dB SPL:** 0.161 Vrms
- **Impedance @ 1kHz:** 257 Ohms
- **Power Needed for 90dB SPL:** 0.10 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -10 dBr

**Frequency Response**

- Top - Compensated and Averaged
- Bottom - Raw Data for Five Headphone Positions

**Isolation**

- Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**

- Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

- 30 Hz Square Wave
- 300 Hz Square Wave

**Impulse Response**

- Volts RMS required to reach 90dB SPL: 0.161 Vrms
- Impedance @ 1kHz: 257 Ohms
- Power Needed for 90dB SPL: 0.10 mW
- Broadband Isolation in dB (100Hz to 10kHz): -10 dBr

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Headphone Measurements:  
Beyerdynamic DT48

**Frequency Response**  
Top - Compensated and Averaged  
Bottom - Raw Data for Five Headphone Positions

**Isolation**  
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**  
Measured with 600 Ohm output impedance.

**%THD+Noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

Volts RMS required to reach 90dB SPL: 0.075 Vrms  
Impedance @ 1kHz: 35 Ohms  
Power Needed for 90dB SPL: 0.16 mW  
Broadband Isolation in dB (100Hz to 10kHz): -18 dB
Headphone Measurements: Beyerdynamic DT 48 E 120 Ohm

**Volts RMS required to reach 90dB SPL:** 0.389 Vrms
**Impedance @ 1kHz:** 150 Ohms
**Power Needed for 90dB SPL:** 1.01 mW
**Broadband Isolation in dB (100Hz to 10kHz):** -19 dB
**Headphone Measurements:**

**Beyerdynamic DT 48 E pad holes**

**Frequency Response**
- Top - Compensated and Averaged
- Bottom - Raw Data for Five Headphone Positions

**Isolation**
- Attenuation of External Sound vs. Frequency

**Impulse Response**
- Time in Seconds

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**30 Hz Square Wave**
- Time in Seconds

**300 Hz Square Wave**
- Time in Seconds

**%THD+noise @ 90dB and 100dB**
- Frequency

**Volts RMS required to reach 90dB SPL:** 0.043 Vrms  
**Impedance @ 1kHz:** 34 Ohms  
**Power Needed for 90dB SPL:** 0.05 mW  
**Broadband Isolation in dB (100Hz to 10kHz):** -20 dB

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Headphone Measurements:  Beyerdynamic DT 48 Loose

**Frequency Response**
Top - Compensated and Averaged  
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

Volts RMS required to reach 90dB SPL: 0.081 Vrms  
Impedance @ 1kHz: 35 Ohms  
Power Needed for 90d BSPL: 0.19 mW  
Broadband Isolation in dB (100Hz to 10kHz): -17 dB

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Headphone Measurements:  
Beyerdynamic DT48 S 5 Ohm

**Impedance**

- **Impedance @ 1kHz**: 6 Ohms
- **Power Needed for 90dB SPL**: 0.01 mW

**Isolation**

- **Broadband Isolation in dB (100Hz to 10kHz)**: -6 dB

**Frequency Response**

- **Top**: Compensated and Averaged
- **Bottom**: Raw Data for Five Headphone Positions

**Electrical Impedance and Phase**

- Measured with 600 Ohm output impedance

**%THD+noise @ 90dB and 100dB**

- **30 Hz Square Wave**: 0.05
- **300 Hz Square Wave**: 0.03

**Impulse Response**

- Volts RMS required to reach 90dB SPL: 0.007 Vrms
- Impedance @ 1kHz: 6 Ohms
- Power Needed for 90dB SPL: 0.01 mW
- Broadband Isolation in dB (100Hz to 1kHz): -6 dB

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Headphone Measurements: BKHC BK9

**Headphone Measurements:**

- **Volts RMS required to reach 90dB SPL:** 0.012 Vrms
- **Impedance @ 1kHz:** 28 Ohms
- **Power Needed for 90d BSPL:** 0.05 mW
- **Broadband Isolation in dB (100Hz to 1kHz):** -11 dB

**Graphs:**

- **Frequency Response**
  - Top - Compensated and Averaged
  - Bottom - Raw Data for Five Headphone Positions
- **Isolation**
  - Attenuation of External Sound vs. Frequency
- **Impulse Response**
- **Electrical Impedance and Phase**
  - Measured with 600 Ohm output impedance.
- **%THD+noise @ 90dB and 100dB**
- **30 Hz Square Wave**
- **300 Hz Square Wave**

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Headphone Measurements: Bluedio R2-WH

**Headphone Measurements:**
- **Volts RMS required to reach 90dB SPL:** 0.029 Vrms
- **Impedance @ 1kHz:** 35 Ohms
- **Power Needed for 90dB SPL:** 0.02 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -11 dB
Headphone Measurements: Blue Lola

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

- **Volts RMS required to reach 90dB SPL:** 0.058 Vrms
- **Impedance @ 1kHz:** 44 Ohms
- **Power Needed for 90dB SPL** 0.07 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -20 dBr

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Headphone Measurements: Blue MOFi Passive

- **Volts RMS required to reach 90dB SPL:** 0.037 Vrms
- **Impedance @ 1kHz:** 44 Ohms
- **Power Needed for 90dB SPL:** 0.03 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -18 dB
Headphone Measurements:  Blue MOFi Active On

Frequency Response
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

Electrical Impedance and Phase
Measured with 600 Ohm output impedance.

%THD+noise @ 90dB and 100dB

30 Hz Square Wave

300 Hz Square Wave

Impulse Response

Impedance RMS required to reach 90dB SPL: 0.010 Vrms
Impedance @ 1kHz: 2847 Ohms
Power Needed for 90d BSPL: 0.00 mW
Broadband Isolation in dB (100Hz to 10kHz): -19 dB
Headphone Measurements:  Blue MOFi Active On Plus

Frequency Response
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

Isolation
Attenuation of External Sound vs. Frequency

Electrical Impedance and Phase
Measured with 600 Ohm output impedance.

%THD+noise @ 90dB and 100dB

30 Hz Square Wave

300 Hz Square Wave

Impulse Response

Volts RMS required to reach 90dB SPL: 0.010 Vrms
Impedance @ 1kHz: 4633 Ohms
Power Needed for 90dB SPL: 0.00 mW
Broadband Isolation in dB (100Hz to 10kHz): -19 dB
### Headphone Measurements: Bose AE2

**Volts RMS required to reach 90dB SPL:** 0.071 Vrms

**Impedance @ 1kHz:** 38 Ohms

**Power Needed for 90dB SPL:** 0.13 mW

**Broadband Isolation in dB (100Hz to 10kHz):** -15 dB

---

**Frequency Response**
- **Top - Compensated and Averaged**
- **Bottom - Raw Data for Five Headphone Positions**

**Isolation**
- **Attenuation of External Sound vs. Frequency**

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**30 Hz Square Wave**

**300 Hz Square Wave**

**%THD+noise @ 90dB and 100dB**

**Impulse Response**

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Headphone Measurements: Bowers Wilkins P7

Headphone Measurements:

- Volts RMS required to reach 90dB SPL: 0.044 Vrms
- Impedance @ 1kHz: 24 Ohms
- Power Needed for 90dB SPL: 0.08 mW
- Broadband Isolation in dB (100Hz to 10kHz): -15 dB

Frequency Response
- Top - Compensated and Averaged
- Bottom - Raw Data for Five Headphone Positions

Electrical Impedance and Phase
- Measured with 600 Ohm output impedance.

%THD+noise @ 90dB and 100dB

30 Hz Square Wave

300 Hz Square Wave

Impulse Response

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Headphone Measurements: California Headphone Silverado

Volts RMS required to reach 90dB SPL: 0.117 Vrms
Impedance @ 1kHz: 35 Ohms
Power Needed for 90dB SPL: 0.39 mW
Broadband Isolation in dB (100Hz to 10kHz): -17 dB
Headphone Measurements: Creative Aurvana Live 2

**Headphone Measurements**

**Volts RMS required to reach 90dB SPL:** 0.041 Vrms

**Impedance @ 1kHz:** 37 Ohms

**Power Needed for 90d BSPL:** 0.05 mW

**Broadband Isolation in dB (100Hz to 10kHz):** -10 dB

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**Headphone Measurements:**

**Creative Aurvana**

- **Volts RMS required to reach 90dB SPL:** 0.039 Vrms
- **Impedance @ 1kHz:** 33 Ohms
- **Power Needed for 90dB SPL:** 0.05 mW
- **Broadband Isolation in dB (100Hz to 1kHz):** -8 dB
Headphone Measurements: Creative Fatality

Volts RMS required to reach 90dB SPL: 0.050 Vrms
Impedance @ 1kHz: 35 Ohms
Power Needed for 90d BSPL: 0.07 mW
Broadband Isolation in dB (100Hz to 10kHz): -5 dBr

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**Headphone Measurements:**

**Denon AH-D1001**

- **Volts RMS required to reach 90dB SPL:** 0.046 Vrms
- **Impedance @ 1kHz:** 34 Ohms
- **Power Needed for 90d BSPL:** 0.06 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -5 dBr

---

**Frequency Response**

Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

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**Isolation**

Attenuation of External Sound vs. Frequency

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**Electrical Impedance and Phase**

Measured with 600 Ohm output impedance.

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**%THD+noise @ 90dB and 100dB**

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**30 Hz Square Wave**

---

**300 Hz Square Wave**

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**Impulse Response**
Headphone Measurements:  Denon AH-D1100

- Volts RMS required to reach 90dB SPL: 0.052 Vrms
- Impedance @ 1kHz: 31 Ohms
- Power Needed for 90dB SPL: 0.09 mW
- Broadband Isolation in dB (100Hz to 10kHz): -15 dB

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**Headphone Measurements: Denon AH-D400**

- **Volts RMS required to reach 90dB SPL:** 0.021 Vrms
- **Impedance @ 1kHz:** 16 Ohms
- **Power Needed for 90dB SPL:** 0.03 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -14 dB

---

**Frequency Response**

- Top - Compensated and Averaged
- Bottom - Raw Data for Five Headphone Positions

**Isolation**

- Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**

- Measured with 600 Ohm output impedance

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

Copyright © SOURCE INTERLINK MEDIA All rights reserved.
Headphone Measurements: Denon AH-D600

Volts RMS required to reach 90dB SPL: 0.071 Vrms
Impedance @ 1kHz: 30 Ohms
Power Needed for 90dBSPL: 0.17 mW
Broadband Isolation in dB (100Hz to 10kHz): -16 dBr

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Headphone Measurements: Denon AH-D7100

Volts RMS required to reach 90dB SPL: 0.044 Vrms
Impedance @ 1kHz: 30 Ohms
Power Needed for 90dB SPL: 0.06 mW
Broadband Isolation in dB (100Hz to 10kHz): -16 dB
Headphone Measurements: Denon AH-D2000 B2012

- **Volts RMS required to reach 90dB SPL:** 0.064 Vrms
- **Impedance @ 1kHz:** 25 Ohms
- **Power Needed for 90dB SPL:** 0.17 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -8 dB

---

**Frequency Response**

Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**

Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**

Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**
Headphone Measurements: Denon D2000

Volts RMS required to reach 90dB SPL: 0.073 Vrms
Impedance @ 1kHz: 24 Ohms
Power Needed for 90d BSPL: 0.22 mW
Broadband Isolation in dB (100Hz to 10kHz): -7 dB

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Headphone Measurements: Denon AH-D2000 B2012 Lawton Pads

- **Volts RMS required to reach 90dB SPL:** 0.080 Vrms
- **Impedance @ 1kHz:** 25 Ohms
- **Power Needed for 90dB SPL:** 0.25 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -8 dBr
Headphone Measurements: Denon AH-D2000 - Old Headphone, New Pads

Headphone Measurements:

- **Volts RMS required to reach 90dB SPL:** 0.062 Vrms
- **Impedance @ 1kHz:** 26 Ohms
- **Power Needed for 90dB SPL:** 0.15 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -7 dBr

**Frequency Response**
- Top - Compensated and Averaged
- Bottom - Raw Data for Five Headphone Positions

**Isolation**
- Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**30 Hz Square Wave**

**300 Hz Square Wave**

**%THD+noise @ 90dB and 100dB**

**Impulse Response**

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Headphone Measurements: 
Denon AH-D2000 - Old Headphones, Old Pads

Headphone Measurements:

Volts RMS required to reach 90dB SPL: 0.064 Vrms
Impedance @ 1kHz: 26 Ohms
Power Needed for 90d BSPL 0.16 mW
Broadband Isolation in dB (100Hz to 10kHz): -7 dBr

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Headphone Measurements: Denon D200 JMoney Pads

- Volts RMS required to reach 90dB SPL: 0.103 Vrms
- Impedance @ 1kHz: 24 Ohms
- Power Needed for 90dB SPL: 0.43 mW
- Broadband Isolation in dB (100Hz to 10kHz): -7 dB

%THD+noise @ 90dB and 100dB

30 Hz Square Wave

300 Hz Square Wave

Impulse Response

Volts RMS required to reach 90dB SPL: 0.193 Vrms
Impedance @ 1kHz: 24 Ohms
Power Needed for 90dB SPL: 0.43 mW
Broadband Isolation in dB (100Hz to 10kHz): -7 dB
Headphone Measurements:  Denon AH-D5000 B2012

**Headphone Measurements: Denon AH-D5000 B2012**

**Headphone Specifications:**
- **Volts RMS required to reach 90dB SPL:** 0.081 Vrms
- **Impedance @ 1kHz:** 25 Ohms
- **Power Needed for 90dB SPL:** 0.26 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -6 dB

**Frequency Response:**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation:**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase:**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB:**

**30 Hz Square Wave:**

**300 Hz Square Wave:**

**Impulse Response:**

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Headphone Measurements:  Denon D5000

**Volts RMS required to reach 90dB SPL:** 0.082 Vrms
**Impedance @ 1kHz:** 25 Ohms
**Power Needed for 90dBSPL:** 0.27 mW
**Broadband Isolation in dB (100Hz to 10kHz):** -6 dB

---

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

---

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Headphone Measurements: Denon AH-D5000 - old headphones with new (2012) pads

**Headphone Measurements:**

- **Volts RMS required to reach 90dB SPL:** 0.109 Vrms
- **Impedance @ 1kHz:** 25 Ohms
- **Power Needed for 90dB SPL:** 0.48 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -6 dBr

---

**Frequency Response**

*Top - Compensated and Averaged*

*Bottom - Raw Data for Five Headphone Positions*

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**Electrical Impedance and Phase**

*Measured with 600 Ohm output impedance.*

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**%THD+noise @ 90dB and 100dB**

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**30 Hz Square Wave**

---

**300 Hz Square Wave**

---

**Impulse Response**

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Headphone Measurements: Denon AH-D5000 - Old Headphones, Old Pads

- **Volts RMS required to reach 90dB SPL**: 0.102 Vrms
- **Impedance @ 1kHz**: 25 Ohms
- **Power Needed for 90dB SPL**: 0.42 mW
- **Broadband Isolation in dB (100Hz to 10kHz)**: -6 dB

---

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

Volts RMS required to reach 90dB SPL: 0.102 Vrms
Impedance @ 1kHz: 25 Ohms
Power Needed for 90dB SPL: 0.42 mW
Broadband Isolation in dB (100Hz to 10kHz): -6 dB

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Headphone Measurements: Denon AH-D5000 B2012 Lawton Pads

**Headphone Measurements:**

- Volts RMS required to reach 90dB SPL: 0.138 Vrms
- Impedance @ 1kHz: 25 Ohms
- Power Needed for 90d BSPL: 0.76 mW
- Broadband Isolation in dB (100Hz to 10kHz): -6 dB

**Graphs:**

1. **Frequency Response**
   - Top - Compensated and Averaged
   - Bottom - Raw Data for Five Headphone Positions

2. **Isolation**
   - Attenuation of External Sound vs. Frequency

3. **Electrical Impedance and Phase**
   - Measured with 600 Ohm output impedance.

4. **%THD+noise @ 90dB and 100dB**

5. **30 Hz Square Wave**

6. **300 Hz Square Wave**

7. **Impulse Response**

---

Volts RMS required to reach 90dB SPL: 0.138 Vrms
Impedance @ 1kHz: 25 Ohms
Power Needed for 90d BSPL: 0.76 mW
Broadband Isolation in dB (100Hz to 10kHz): -6 dB
Headphone Measurements: Denon D5000 JMone Pads

**Volts RMS required to reach 90dB SPL**: 0.132 Vrms

**Impedance @ 1kHz**: 25 Ohms

**Power Needed for 90dB SPL**: 0.71 mW

**Broadband Isolation in dB (100Hz to 10kHz)**: -6 dBr

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Headphone Measurements: Denon AH-D7000 B2012

Volts RMS required to reach 90dB SPL: 0.060 Vrms
Impedance @ 1kHz: 24 Ohms
Power Needed for 90dBSPL: 0.15 mW
Broadband Isolation in dB (100Hz to 10kHz): -7 dB
Headphone Measurements: Denon AH-D7000

- **Headphone Measurements:**
  - **Volts RMS required to reach 90dB SPL:** 0.053 Vrms
  - **Impedance @ 1kHz:** 25 Ohms
  - **Power Needed for 90dB SPL:** 0.11 mW
  - **Broadband Isolation in dB (100Hz to 10kHz):** -5 dBr

- **Frequency Response:**
  - Top - Compensated and Averaged
  - Bottom - Raw Data for Five Headphone Positions

- **Isolation:**
  - Attenuation of External Sound vs. Frequency

- **Impulse Response:**
  - Time in Seconds:
  - Volts

- **%THD+noise @ 90dB and 100dB:**
  - Frequency
  - %THD+noise

- **30 Hz Square Wave:**
  - Time in Seconds:
  - Volts

- **300 Hz Square Wave:**
  - Time in Seconds:
  - Volts

- **%THD+noise @ 90dB and 100dB:**
  - Frequency

- **30 Hz Square Wave:**
  - Time in Seconds:
  - Volts

- **300 Hz Square Wave:**
  - Time in Seconds:
  - Volts

- **Impulse Response:**
  - Time in Seconds:
  - Volts

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**Headphone Measurements:**

**Denon AH-D7000 - Old Headphones, Old Pads**

- **Volts RMS required to reach 90dB SPL:** 0.061 Vrms
- **Impedance @ 1kHz:** 26 Ohms
- **Power Needed for 90d BSPL:** 0.14 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -7 dBr

---

**Frequency Response**

Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

---

**Isolation**

Attenuation of External Sound vs. Frequency

---

**Electrical Impedance and Phase**

Measured with 600 Ohm output impedance.

---

**%THD+noise @ 90dB and 100dB**

---

**30 Hz Square Wave**

---

**300 Hz Square Wave**

---

**Impulse Response**

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Headphone Measurements: Denon AH-D2000 - Old Headphone, New Pads

- **Volts RMS required to reach 90dB SPL:** 0.062 Vrms
- **Impedance @ 1kHz:** 26 Ohms
- **Power Needed for 90dBSPL:** 0.15 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -7 dB

**Impulse Response**

**30 Hz Square Wave**

**300 Hz Square Wave**

**%THD+noise @ 90dB and 100dB**

**Frequency Response**

**Isolation**

**Electrical Impedance and Phase**

Measured with 600 Ohm output impedance.

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Headphone Measurements:

**Denon AH-D7000 B2012 Lawton Pad**

**Headphone Measurements:**

- **Volts RMS required to reach 90dB SPL:** 0.089 Vrms
- **Impedance @ 1kHz:** 24 Ohms
- **Power Needed for 90dB SPL:** 0.33 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -7 dB

---

**Isolation**

Attenuation of External Sound vs. Frequency

---

**Frequency Response**

Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

---

**Electrical Impedance and Phase**

Measured with 600 Ohm output impedance.

---

**%THD+noise @ 90dB and 100dB**

---

**30 Hz Square Wave**

---

**300 Hz Square Wave**

---

**Impulse Response**

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Headphone Measurements:  E-Mu Teak 2016

- **Volts RMS required to reach 90dB SPL:** 0.055 Vrms
- **Impedance @ 1kHz:** 27 Ohms
- **Power Needed for 90d BSPL:** 0.11 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -10 dBr

---

**Isolation**

Attenuation of External Sound vs. Frequency

---

**Frequency Response**

Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

---

**Electrical Impedance and Phase**

Measured with 600 Ohm output impedance.

---

**%THD+noise @ 90dB and 100dB**

---

**30 Hz Square Wave**

---

**300 Hz Square Wave**

---

**Impulse Response**

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Headphone Measurements: EMu Teak Mahogany Cups

Frequency Response
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

Isolation
Attenuation of External Sound vs. Frequency

Electrical Impedance and Phase
Measured with 600 Ohm output impedance.

%THD+noise @ 90dB and 100dB

Impulse Response

Volts RMS required to reach 90dB SPL: 0.055 Vrms
Impedance @ 1kHz: 25 Ohms
Power Needed for 90d BSPL: 0.12 mW
Broadband Isolation in dB (100Hz to 10kHz): -12 dB

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Headphone Measurements: EMu Teak Rosewood Cups

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

Volts RMS required to reach 90dB SPL: 0.056 Vrms
Impedance @ 1kHz: 25 Ohms
Power Needed for 90dB SPL: 0.13 mW
Broadband Isolation in dB (100Hz to 10kHz): -12 dB

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Headphone Measurements:  E-Mu Walnut

Frequency Response
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

Impedance and Phase
Measured with 600 Ohm output impedance.

%THD+noise @ 90dB and 100dB

30 Hz Square Wave

300 Hz Square Wave

Impulse Response

Volts RMS required to reach 90dB SPL: 0.031 Vrms
Impedance @ 1kHz: 33 Ohms
Power Needed for 90dB SPL: 0.03 mW
Broadband Isolation in dB (100Hz to 10kHz): -12 dB
**Headphone Measurements:**

- **Volts RMS required to reach 90dB SPL:** 3.640 Vrms
- **Impedance @ 1kHz:** 53 Ohms
- **Power Needed for 90dB SPL:** 249.62 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -16 dBr

---

**Graphs:**

1. **Frequency Response - Top:** Compensated and Averaged, Bottom - Raw Data for Five Headphone Positions
2. **Isolation - Attenuation of External Sound vs. Frequency**
3. **Electrical Impedance and Phase - Measured with 600 Ohm output impedance.**
4. **%THD+noise @ 90dB and 100dB**
5. **30 Hz Square Wave**
6. **300 Hz Square Wave**
7. **Impulse Response**

---

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Headphone Measurements: Final Audio Pandora Hope 4

- **Volts RMS required to reach 90dB SPL:** 0.022 Vrms
- **Impedance @ 1kHz:** 11 Ohms
- **Power Needed for 90dB SPL:** 0.04 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -20 dB

---

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

---

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Headphone Measurements: Fischer Audio FA-003

Volts RMS required to reach 90dB SPL: 0.115 Vrms
Impedance @ 1kHz: 69 Ohms
Power Needed for 90dB SPL: 0.19 mW
Broadband Isolation in dB (100Hz to 10kHz): -15 dBf

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Headphone Measurements: Fischer Audio FA-011 LE

**Headphone Measurements:**

Volts RMS required to reach 90dB SPL: 0.090 Vrms
Impedance @ 1kHz: 128 Ohms
Power Needed for 90dB SPL: 0.06 mW
Broadband Isolation in dB (100Hz to 10kHz): -7 dB

---

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

---

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Flare Audio Reference R1

Headphone Measurements:

- **Volts RMS required to reach 90dB SPL**: 0.030 Vrms
- **Impedance @ 1kHz**: 33 Ohms
- **Power Needed for 90d BSPL**: 0.03 mW
- **Broadband Isolation in dB (100Hz to 1kHz)**: -8 dB

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**Headphone Measurements:**

**Focal Listen**

**Volts RMS required to reach 90dB SPL:** 0.025 Vrms

**Impedance @ 1kHz:** 29 Ohms

**Power Needed for 90d BSPL:** 0.02 mW

**Broadband Isolation in dB (100Hz to 10kHz):** -24 dB

---

**Frequency Response**

Top - Compensated and Averaged

Bottom - Raw Data for Five Headphone Positions

**Isolation**

Attenuation of External Sound vs. Frequency

---

**Electrical Impedance and Phase**

Measured with 600 Ohm output impedance.

---

**%THD+noise @ 90dB and 100dB**

---

**Impulse Response**

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Headphone Measurements: Focal Spirit Professional

Headphone Measurements:

- **Volts RMS required to reach 90dB SPL:** 0.036 Vrms
- **Impedance @ 1kHz:** 34 Ohms
- **Power Needed for 90dB SPL:** 0.04 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -19 dB
Headphone Measurements: Focal Spirit One Classic

**Headphone Measurements:**

- **Impedance @ 1kHz:** 34 Ohms
- **Volts RMS required to reach 90dB SPL:** 0.043 Vrms
- **Power Needed for 90dB SPL:** 0.05 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -19 dB

---

**Frequency Response**

Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**

Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**

Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

- **Time in Seconds**
- **Volts**
- **Impedance in Ohms**
- **Phase in Degrees**

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Headphone Measurements: Focal Spirit One S

**Headphone Measurements:**

- **Impedance @ 1kHz:** 35 Ohms
- **Volts RMS required to reach 90dB SPL:** 0.032 Vrms
- **Power Needed for 90dB SPL:** 0.03 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -16 dB

---

**Frequency Response**

**Top - Compensated and Averaged**

- **Bottom - Raw Data for Five Headphone Positions**

**Isolation**

Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**

Measured with 600 Ohms as an input resistance.

---

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

---

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Headphone Measurements: Focal Spirit One 2013 B

**Headphone Measurements:**

- **Volts RMS required to reach 90dB SPL:** 0.035 Vrms
- **Impedance @ 1kHz:** 36 Ohms
- **Power Needed for 90dB SPL:** 0.03 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -18 dB
Headphone Measurements:  
Focal Spirit One

- **Volts RMS required to reach 90dB SPL**: 0.032 Vrms
- **Impedance @ 1kHz**: 35 Ohms
- **Power Needed for 90dB SPL**: 0.03 mW
- **Broadband Isolation in dB (100Hz to 10kHz)**: -17 dB

---

**Frequency Response**
- Top: Compensated and Averaged
- Bottom: Raw Data for Five Headphone Positions

**30 Hz Square Wave**

**300 Hz Square Wave**

**%THD+noise @ 90dB and 100dB**

**Impulse Response**
Headphone Measurements:  Fostex TH-900

Frequency Response
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

Isolation
Attenuation of External Sound vs. Frequency

Electrical Impedance and Phase
Measured with 600 Ohm output impedance.

%THD+noise @ 90dB and 100dB

30 Hz Square Wave

300 Hz Square Wave

Impulse Response

Volts RMS required to reach 90dB SPL: 0.062 Vrms
Impedance @ 1kHz: 26 Ohms
Power Needed for 90dB SPL: 0.15 mW
Broadband Isolation in dB (100Hz to 10kHz): -7 dBr

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Headphone Measurements:  Fostex TH900mk2

- **Volts RMS required to reach 90dB SPL:** 0.078 Vrms
- **Impedance @ 1kHz:** 28 Ohms
- **Power Needed for 90dB SPL:** 0.22 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -11 dB

---

**Impulse Response**

- Volt RMS required to reach 90dB SPL: 0.078 Vrms
- Impedance @ 1kHz: 28 Ohms
- Power Needed for 90dB SPL: 0.22 mW
- Broadband Isolation in dB (100Hz to 10kHz): -11 dB
**Headphone Measurements:**

**Fostex TH900mk2TH610Pads**

**Volts RMS required to reach 90dB SPL:** 0.047 Vrms

**Impedance @ 1kHz:** 26 Ohms

**Power Needed for 90dB SPL:** 0.08 mW

**Broadband Isolation in dB (100Hz to 10kHz):** -13 dBkr
Headphone Measurements: Fostex TH600

- Volts RMS required to reach 90dB SPL: 0.069 Vrms
- Impedance @ 1kHz: 25 Ohms
- Power Needed for 90dB SPL: 0.19 mW
- Broadband Isolation in dB (100Hz to 10kHz): -7 dB
Headphone Measurements:  Fostex TH-X00 sn1927

**Headphone Measurements**

- **Volts RMS required to reach 90dB SPL:** 0.050 Vrms
- **Impedance @ 1kHz:** 26 Ohms
- **Power Needed for 90dB SPL:** 0.10 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -10 dB

---

**Frequency Response**

- Top - Compensated and Averaged
- Bottom - Raw Data for Five Headphone Positions

**Isolation**

- Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**

- Measured with 600 Ohm output impedance

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

- Volts RMS required to reach 90dB SPL: 0.050 Vrms
- Impedance @ 1kHz: 26 Ohms
- Power Needed for 90dB SPL: 0.10 mW
- Broadband Isolation in dB (100Hz to 10kHz): -10 dB
Headphone Measurements: Fostex T40RP Mk3

Volts RMS required to reach 90dB SPL: 0.206 Vrms
Impedance @ 1kHz: 54 Ohms
Power Needed for 90d BSPL: 0.78 mW
Broadband Isolation in dB (100Hz to 10kHz): -9 dB
Headphone Measurements: JBL J88i

**Headphone Measurements:**

- **Volts RMS required to reach 90dB SPL:** 0.023 Vrms
- **Impedance @ 1kHz:** 33 Ohms
- **Power Needed for 90d BSPL:** 0.02 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -14 dB

**Isolation**

Attenuation of External Sound vs. Frequency

**Frequency Response**

Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Electrical Impedance and Phase**

Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

- **Volts RMS required to reach 90dB SPL:** 0.023 Vrms
- **Impedance @ 1kHz:** 33 Ohms
- **Power Needed for 90d BSPL:** 0.02 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -14 dB

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Headphone Measurements:
House of Marley Liberate XLBT
Wired

Headphone Measurements:

- **Volts RMS required to reach 90dB SPL:** 0.016 Vrms
- **Impedance @ 1kHz:** 41 Ohms
- **Power Needed for 90dB SPL:** 0.01 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -15 dB
Headphone Measurements: Howard Leight Sync

- **Volts RMS required to reach 90dB SPL**: 0.370 Vrms
- **Impedance @ 1kHz**: 22 Ohms
- **Power Needed for 90dB SPL**: 6.13 mW
- **Broadband Isolation in dB (100Hz to 10kHz)**: -24 dBr
Kennerton Magister

**Headphone Measurements:**

- **Volts RMS required to reach 90dB SPL:** 0.068 Vrms
- **Impedance @ 1kHz:** 70 Ohms
- **Power Needed for 90dB SPL:** 0.07 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -19 dB
Headphone Measurements: Koss BT540i Wired Passive

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Measured Data

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**30 Hz Square Wave**

**300 Hz Square Wave**

**%THD+noise @ 90dB and 100dB**

**Impulse Response**

Volts RMS required to reach 90dB SPL: 0.003 Vrms
Impedance @ 1kHz: 35 Ohms
Power Needed for 90dB SPL: 0.00 mW
Broadband Isolation in dB (100Hz to 10KHz): -14 dB
Headphone Measurements: Koss Pro4AA 2014

**Headphone Measurements**
- Volts RMS required to reach 90dB SPL: 0.210 Vrms
- Impedance @ 1kHz: 253 Ohms
- Power Needed for 90dB SPL: 0.17 mW
- Broadband Isolation in dB (100Hz to 10kHz): -10 dB

**Volts RMS required to reach 90dB SPL**

- 0.210 Vrms

**Impedance @ 1kHz**

- 253 Ohms

**Power Needed for 90dB SPL**

- 0.17 mW

**Broadband Isolation in dB (100Hz to 10kHz)**

- -10 dB
**Headphone Measurements:**

**Koss Pro 4AA 1975**

**Frequency Response**
- Top - Compensated and Averaged
- Bottom - Raw Data for Five Headphone Positions

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**Isolation**
- Attenuation of External Sound vs. Frequency

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

- Volts RMS required to reach 90dB SPL: 0.265 Vrms
- Impedance @ 1kHz: 260 Ohms
- Power Needed for 90dB SPL: 0.16 mW
- Broadband Isolation in dB (100Hz to 10kHz): -16 dB
Headphone Measurements: Koss Pro4AAA

- Volts RMS required to reach 90dB SPL: 0.130 Vrms
- Impedance @ 1kHz: 230 Ohms
- Power Needed for 90d BSPL: 0.07 mW
- Broadband Isolation in dB (100Hz to 10kHz): -19 dB

---

Frequency Response
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

Isolation
Attenuation of External Sound vs. Frequency

Electrical Impedance and Phase
Measured with 600 Ohm output impedance.

%THD+noise @ 90dB and 100dB

30 Hz Square Wave

300 Hz Square Wave

Impulse Response

Volts RMS required to reach 90dB SPL: 0.130 Vrms
Impedance @ 1kHz: 230 Ohms
Power Needed for 90d BSPL: 0.07 mW
Broadband Isolation in dB (100Hz to 10kHz): -19 dB

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**Headphone Measurements:**

**Koss Pro4S**

- **Volts RMS required to reach 90dB SPL:** 0.038 Vrms
- **Impedance @ 1kHz:** 37 Ohms
- **Power Needed for 90dB SPL:** 0.04 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -20 dB

---

**Frequency Response**

Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Electrical Impedance and Phase**

Measured with 600 Ohm output impedance.

---

**Isolation**

Attenuation of External Sound vs. Frequency

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**30 Hz Square Wave**

---

**%THD+noise @ 90dB and 100dB**

---

**300 Hz Square Wave**

---

**Impulse Response**

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Headphone Measurements:  Koss SP540

Volts RMS required to reach 90dB SPL: 0.084 Vrms
Impedance @ 1kHz: 36 Ohms
Power Needed for 90dB SPL: 0.20 mW
Broadband Isolation in dB (100Hz to 10kHz): -17 dB
Headphone Measurements: Koss Tony Bennett

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Impulse Response**

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**Isolation**
Attenuation of External Sound vs. Frequency

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

Volts RMS required to reach 90dB SPL: 0.050 Vrms
Impedance @ 1kHz: 39 Ohms
Power Needed for 90dB SPL: 0.08 mW
Broadband Isolation in dB (100Hz to 10kHz): -12 dB
**Headphone Measurements:**

**KRK KNS 8400**

- **Volts RMS required to reach 90dB SPL:** 0.139 Vrms
- **Impedance @ 1kHz:** 35 Ohms
- **Power Needed for 90dB SPL:** 0.55 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -16 dB
- **%THD+noise @ 90dB and 100dB**
- **30 Hz Square Wave**
- **300 Hz Square Wave**
- **Impulse Response**
Headphone Measurements:  KRK KNS 6400

**Headphone Measurements:**
- **Volts RMS required to reach 90dB SPL:** 0.091 Vrms
- **Impedance @ 1kHz:** 34 Ohms
- **Power Needed for 90dB SPL:** 0.24 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -14 dB

---

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

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Headphone Measurements: Logitech UE 9000

- Volts RMS required to reach 90dB SPL: 0.052 Vrms
- Impedance @ 1kHz: 57 Ohms
- Power Needed for 90dB SPL: 0.05 mW
- Broadband Isolation in dB (100Hz to 10kHz): -16 dB

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

Copyright © SOURCE INTERLINK MEDIA All rights reserved.
**Headphone Measurements:** Logitech UE 6000 passive

- **Volts RMS required to reach 90dB SPL:** 0.053 Vrms
- **Impedance @ 1kHz:** 52 Ohms
- **Power Needed for 90dB SPL:** 0.05 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -14 dB

---

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**30 Hz Square Wave**

**%THD+noise @ 90dB and 100dB**

**300 Hz Square Wave**

**Impulse Response**

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Headphone Measurements: Massdrop THX00

- **Volts RMS required to reach 90dB SPL**: 0.068 Vrms
- **Impedance @ 1kHz**: 25 Ohms
- **Power Needed for 90d BSPL**: 0.18 mW

**Broadband Isolation in dB (100Hz to 10kHz)**: -9 dB

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

**Isolation**

**Frequency Response**

Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Electrical Impedance and Phase**

Measured with 600 Ohm output impedance.

**30 Hz Wave**

**300 Hz Wave**
**Headphone Measurements:** Massdrop x EMu Purpleheart

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

Volts RMS required to reach 90dB SPL: 0.052 Vrms
Impedance @ 1kHz: 34 Ohms
Power Needed for 90dB SPL: 0.08 mW
Broadband Isolation in dB (100Hz to 10kHz): -11 dB

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**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

Volts RMS required to reach 90dB SPL: 0.028 Vrms
Impedance @ 1kHz: 39 Ohms
Power Needed for 90dB SPL: 0.02 mW
Broadband Isolation in dB (100Hz to 10kHz): -13 dB
Headphone Measurements: Mayflower Electronics T50RP
Version 2

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**Headphone Measurements**

**Volts RMS required to reach 90dB SPL:** 0.458 Vrms
**Impedance @ 1kHz:** 53 Ohms
**Power Needed for 90dB SPL:** 3.97 mW
**Broadband Isolation in dB (100Hz to 1kHz):** -20 dB

---

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

---

**Impulse Response**

---

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

---

**%THD+noise @ 90dB and 100dB**

---

**30 Hz Square Wave**

---

**300 Hz Square Wave**

---

**Isolation**
Attenuation of External Sound vs. Frequency

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**Headphone Measurements: Meelectronics Air-Fi Matrix2 AF62 Wired**

- **Volts RMS required to reach 90dB SPL:** 0.031 Vrms
- **Impedance @ 1kHz:** 37 Ohms
- **Power Needed for 90dB SPL:** 0.03 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -12 dB
Headphone Measurements:  Meze Classics 88

**Headphone Measurements**

- **Volts RMS required to reach 90dB SPL:** 0.016 Vrms
- **Impedance @ 1kHz:** 43 Ohms
- **Power Needed for 90d BSPL:** 0.01 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -11 dB
Headphone Measurements:  Meze Classic 99

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

Volts RMS required to reach 90dB SPL: 0.021 Vrms
Impedance @ 1kHz: 21 Ohms
Power Needed for 90dB SPL: 0.02 mW
Broadband Isolation in dB (100Hz to 10kHz): -17 dBf

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Headphone Measurements: Meze 99 Classic with New Pads

**Frequency Response**
- Top - Compensated and Averaged
- Bottom - Raw Data for Five Headphone Positions

**Isolation**
- Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

Volts RMS required to reach 90dB SPL: 0.043 Vrms
Impedance @ 1kHz: 20 Ohms
Power Needed for 90dBSPL: 0.10 mW
Broadband Isolation in dB (100Hz to 10kHz): -8 dBm

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Headphone Measurements: Meze 99 Neo

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

---

Volts RMS required to reach 90dB SPL: 0.040 Vrms
Impedance @ 1kHz: 20 Ohms
Power Needed for 90dB SPL: 0.08 mW
Broadband Isolation in dB (100Hz to 10kHz): -8 dB/Hz

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**Headphone Measurements:**

**Meze 99 Neo with Classic Pads**

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Impedance**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

Volts RMS required to reach 90dB SPL: 0.027 Vrms
Impedance @ 1kHz: 19 Ohms
Power Needed for 90dB SPL: 0.04 mW
Broadband Isolation in dB (100Hz to 10kHz): -7 dBr

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Headphone Measurements: Monoprice 8323

**Headphone Measurements**

**Impedance @ 1kHz:** 43 Ohms

**Power Needed for 90dB SPL:** 0.01 mW

**Broadband Isolation in dB (100Hz to 10kHz):** -13 dB

---

**Frequency Response**

Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**

Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**

Measured with 600 Ohm output impedance.

**30 Hz Square Wave**

**%THD+noise @ 90dB and 100dB**

**300 Hz Square Wave**

**Impulse Response**

Volts RMS required to reach 90dB SPL: 0.025 Vrms
Impedance @ 1kHz: 43 Ohms
Power Needed for 90dB SPL: 0.01 mW
Broadband Isolation in dB (100Hz to 10kHz): -13 dB

---

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**Headphone Measurements:**

**Monster Beats Pro**

**Headphone Measurements:**

**Volts RMS required to reach 90dB SPL:** 0.034 Vrms

**Impedance @ 1kHz:** 18 Ohms

**Power Needed for 90dBSPL:** 0.06 mW

**Broadband Isolation in dB (100Hz to 10kHz):** -9 dB

---

**Impulse Response**

**Time in Seconds**

-0.02 0.00 0.02 0.04 0.06 0.08 0.1 0.12 0.14 0.16 0.18 0.2 0.22

---

**Frequency Response**

**Top - Compensated and Averaged**

**Bottom - Raw Data for Five Headphone Positions**

---

**Isolation**

**Attenuation of External Sound vs. Frequency**

---

**Electrical Impedance and Phase**

**Measured with 600 Ohm output impedance.**

---

**%THD+noise @ 90dB and 100dB**

---

**30 Hz Square Wave**

---

**300 Hz Square Wave**

---

**Voiles RMS required to reach 90dB SPL:** 0.034 Vrms

**Impedance @ 1kHz:** 18 Ohms

**Power Needed for 90dBSPL:** 0.06 mW

**Broadband Isolation in dB (100Hz to 10kHz):** -9 dB

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Headphone Measurements: Monster DNA Pro2

Volts RMS required to reach 90dB SPL: 0.028 Vrms
Impedance @ 1kHz: 35 Ohms
Power Needed for 90dB SPL: 0.02 mW
Broadband Isolation in dB (100Hz to 10kHz): -11 dB
**Headphone Measurements:**

**Monster Inspiration**

**Headphone Measurements:**

- **Volts RMS required to reach 90dB SPL:** 0.028 Vrms
- **Impedance @ 1kHz:** 35 ohms
- **Power Needed for 90dB SPL:** 0.02 mW
- **Broadband Isolation in dB (100Hz to 1kHz):** -12 dB

---

**Frequency Response**

*Top - Compensated and Averaged*  
*Bottom - Raw Data for Five Headphone Positions*

**Isolation**  
*Attenuation of External Sound vs. Frequency*

**Electrical Impedance and Phase**  
*Measured with 600 Ohm output impedance.*

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

---

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Headphone Measurements: MrSpeakers Aeon snACXB168

**Frequency Response**
- Top - Compensated and Averaged
- Bottom - Raw Data for Five Headphone Positions

**Isolation**
- Attenuation of External Sound vs. Frequency

**Impulse Response**

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**30 Hz Square Wave**

**300 Hz Square Wave**

**%THD+noise @ 90dB and 100dB**

**Amplitude (dB)**

**Impedance and Phase**
- Measured with 600 Ohm output impedance.

**Impedance in Ohms**

**Phase in Degrees**

**Volts RMS required to reach 90dB SPL:** 0.445 Vrms
**Impedance @ 1kHz:** 15 Ohms
**Power Needed for 90dB SPL:** 13.42 mW
**Broadband Isolation in dB (100Hz to 10kHz):** -28 dB
Headphone Measurements: MrSpeakers Aeon snACXB168 w Filters

- **Volts RMS required to reach 90dB SPL:** 0.196 Vrms
- **Impedance @ 1kHz:** 14 Ohms
- **Power Needed for 90dB SPL:** 2.65 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -24 dB

### Electrical Impedance and Phase
Measured with 600 Ohm output impedance.

- **Frequency Response**
  - Top - Compensated and Averaged
  - Bottom - Raw Data for Five Headphone Positions

- **Isolation**
  - Attenuation of External Sound vs. Frequency

- **%THD+noise @ 90dB and 100dB**

- **30 Hz Square Wave**

- **300 Hz Square Wave**

- **Impulse Response**
Headphone Measurements: Mr Speakers Ether C

- Volts RMS required to reach 90dB SPL: 0.117 Vrms
- Impedance @ 1kHz: 22 Ohms
- Power Needed for 90dB SPL: 0.64 mW
- Broadband Isolation in dB (100Hz to 10kHz): -22 dB

**Frequency Response**
- Top: Compensated and Averaged
- Bottom: Raw Data for Five Headphone Positions

**Isolation**
- Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**
**Headphone Measurements: Mr Speakers Ether Flow C**

- **Volts RMS required to reach 90dB SPL:** 0.230 Vrms
- **Impedance @ 1kHz:** 24 Ohms
- **Power Needed for 90dB SPL:** 2.25 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -20 dBr

---

**Amplitude (dB)**

- **Frequency Response:**
  - Top - Compensated and Averaged
  - Bottom - Raw Data for Five Headphone Positions

- **Impulse Response**

- **Electrical Impedance and Phase**
  - Measured with 600 Ohm output impedance.

- **%THD+noise @ 90dB and 100dB**

- **30 Hz Square Wave**

- **300 Hz Square Wave**

- **Isolation**
  - Attenuation of External Sound vs. Frequency

---

Voltage RMS required to reach 90dB SPL: 0.230 Vrms
Impedance at 1kHz: 24 Ohms
Power Needed for 90dB SPL: 2.25 mW
Broadband Isolation in dB (100Hz to 10kHz): -20 dBr
Headphone Measurements: Mr. Speakers Ether C Flow EStat Pads

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

Volts RMS required to reach 90dB SPL: 0.228 Vrms
Impedance @ 1kHz: 24 Ohms
Power Needed for 90dB SPL: 2.21 mW
Broadband Isolation in dB (10Hz to 10kHz): -59 dBr

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Headphone Measurements: Mr Speakers Ether C 1 Black Filter

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

Vols RMS required to reach 90dSPL: 0.133 Vrms
Impedance @ 1kHz: 22 Ohms
Power Needed for 90dB SPL: 0.79 mW
Broadband Isolation in dB (100Hz to 10kHz): -23 dB
Headphone Measurements:  
Mr Speakers Ether C2 Black Filters

Volts RMS required to reach 90dB SPL: 0.127 Vrms
Impedance @ 1kHz: 22 Ohms
Power Needed for 90dB SPL: 0.74 mW
Broadband Isolation in dB (100Hz to 10kHz): -22 dB

---

**Electrical Impedance and Phase**  
Measured with 600 Ohm output impedance.

---

**Frequency Response**  
Top - Compensated and Averaged  
Bottom - Raw Data for Five Headphone Positions

---

**Isolation**  
Attenuation of External Sound vs. Frequency

---

**%THD+noise @ 90dB and 100dB**

---

**30 Hz Square Wave**

---

**300 Hz Square Wave**

---

**Impulse Response**

---

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Headphone Measurements: Mr Speakers Ether C White Filter

**Headphone Measurements:**

- Headphone Measurements:
  - Volts RMS required to reach 90dB SPL: 0.113 Vrms
  - Impedance @ 1kHz: 22 Ohms
  - Power Needed for 90dB SPL: 0.58 mW
  - Broadband Isolation in dB (100Hz to 10kHz): -24 dB

---

**Frequency Response**

Top - Compensated and Averaged

Bottom - Raw Data for Five Headphone Positions

**Isolation**

Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**

Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

---

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Headphone Measurements:  Mr Speakers Alpha Prime

**Frequency Response**
Top - Compensated and Averaged  
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

Volts RMS required to reach 90dB SPL: 0.174 Vrms  
Impedance @ 1kHz: 49 Ohms  
Power Needed for 90dB SPL: 0.61 mW  
Broadband Isolation in dB (100Hz to 10kHz): -21 dB
**Headphone Measurements: Mr Speakers Alpha Dog 2014**

### Headphone Measurements

- **Volts RMS required to reach 90dB SPL:** 0.208 Vrms
- **Impedance @ 1kHz:** 47 Ohms
- **Power Needed for 90dB SPL:** 0.92 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -23 dB

### Diagrams

1. **Frequency Response**
   - Top - Compensated and Averaged
   - Bottom - Raw Data for Five Headphone Positions
   - Measured with 600 Ohm output impedance.

2. **Isolation**
   - Attenuation of External Sound vs. Frequency
   - Measured with 600 Ohm output impedance.

3. **Impulse Response**
   - Measured with 600 Ohm output impedance.

4. **%THD+noise @ 90dB and 100dB**
   - Measured with 600 Ohm output impedance.

5. **30 Hz Square Wave**
   - Measured with 600 Ohm output impedance.

6. **300 Hz Square Wave**
   - Measured with 600 Ohm output impedance.

---

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Headphone Measurements: Mr Speakers Mad Dog 2014

**Headphone Measurements:**

- **Volts RMS required to reach 90dB SPL:** 0.208 Vrms
- **Impedance @ 1kHz:** 47 Ohms
- **Power Needed for 90d BSPL:** 0.92 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -20 dB

---

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

---

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Headphone Measurements: Mr. Speakers Mad Dog 2013

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

Volts RMS required to reach 90dB SPL: 0.127 Vrms
Impedance @ 1kHz: 56 Ohms
Power Needed for 90dB SPL: 0.29 mW
Broadband Isolation in dB (100Hz to 10kHz): -16 dB
Headphone Measurements: Mr Speakers Mad Dog

**Frequency Response**
- Top: Compensated and Averaged
- Bottom: Raw Data for Five Headphone Positions

**Isolation**
- Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**30 Hz Square Wave**
- Time in Seconds
- Volts
- Right
- Left

**300 Hz Square Wave**
- Time in Seconds
- Volts
- Right
- Left

**Impulse Response**
- Time in Seconds

**%THD+noise @ 90dB and 100dB**

**Amplitude (dB)**

**Frequency Response**

**Top - Compensated and Averaged**

**Bottom - Raw Data for Five Headphone Positions**

- Volts RMS required to reach 90dB SPL: 0.166 Vrms
- Impedance @ 1kHz: 53 Ohms
- Power Needed for 90dB SPL: 0.52 mW
- Broadband Isolation in dB (100Hz to 10kHz): -17 dB
Headphone Measurements:  Munitio Pro40

- **Volts RMS required to reach 90dB SPL:** 0.021 Vrms
- **Impedance @ 1kHz:** 36 Ohms
- **Power Needed for 90dB SPL:** 0.01 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -12 dB

**Electrical Impedance and Phase**

Measured with 600 Ohm output impedance.

**Frequency Response**

Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

- **30 Hz Square Wave**
- **300 Hz Square Wave**

**%THD+noise @ 90dB and 100dB**

- **Impulse Response**

- **Isolation**

Attenuation of External Sound vs. Frequency

- **Amplitude (dB)**
- **Reduction in dB**
- **Impulse Response**
- **Isolation of External Sound vs. Frequency**

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Headphone Measurements: NAD VISO HP50

Headphone Measurements:

- **Volts RMS required to reach 90dB SPL**: 0.037 Vrms
- **Impedance @ 1kHz**: 36 Ohms
- **Power Needed for 90dB SPL**: 0.04 mW
- **Broadband Isolation in dB (100Hz to 10kHz)**: -16 dB

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

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Headphone Measurements: Nixon RPM

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Impedance**
- Measured with 600 Ohm output impedance.
  - Impedance in Ohms
  - Phase in Degrees

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

**Isolation**
Attenuation of External Sound vs. Frequency

- Volts RMS required to reach 90dB SPL: 0.023 Vrms
- Impedance @ 1kHz: 37 Ohms
- Power Needed for 90dB SPL: 0.01 mW
- Broadband Isolation in dB (100Hz to 10kHz): -11 dB
**Headphone Measurements:**

**Noontec Hammo S**

- **Volts RMS required to reach 90dB SPL:** 0.039 Vrms
- **Impedance @ 1kHz:** 37 Ohms
- **Power Needed for 90dB SPL:** 0.04 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -14 dB

**Frequency Response**
- Top - Compensated and Averaged
- Bottom - Raw Data for Five Headphone Positions

**Isolation**
- Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

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Headphone Measurements: Noontec Hammo S Padding Removed

**Headphone Measurements**

- **Volts RMS required to reach 90dB SPL:** 0.032 Vrms
- **Impedance @ 1kHz:** 37 Ohms
- **Power Needed for 90dBSPL:** 0.03 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -14 dB

**Frequency Response**

<table>
<thead>
<tr>
<th>Frequency (Hz)</th>
<th>Amplitude (dB)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>-10</td>
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<tr>
<td>100</td>
<td>-20</td>
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<tr>
<td>1000</td>
<td>-30</td>
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<tr>
<td>10000</td>
<td>-40</td>
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<tr>
<td>100000</td>
<td>-50</td>
</tr>
</tbody>
</table>

**Isolation**

<table>
<thead>
<tr>
<th>Frequency (Hz)</th>
<th>Reduction in dB</th>
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<tr>
<td>10000</td>
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<tr>
<td>100000</td>
<td>-30</td>
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</tbody>
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**Electrical Impedance and Phase**

<table>
<thead>
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<th>Frequency (Hz)</th>
<th>Impedance in Ohms</th>
<th>Phase in Degrees</th>
</tr>
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<tr>
<td>10</td>
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<tr>
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</table>

**%THD+noise @ 90dB and 100dB**

<table>
<thead>
<tr>
<th>Frequency (Hz)</th>
<th>%THD+noise @ 90dB</th>
<th>%THD+noise @ 100dB</th>
</tr>
</thead>
<tbody>
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</table>

**Impulse Response**

<table>
<thead>
<tr>
<th>Time in Seconds</th>
<th>Volts</th>
</tr>
</thead>
<tbody>
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<tr>
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</tr>
<tr>
<td>0.0005</td>
<td>0</td>
</tr>
</tbody>
</table>

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Headphone Measurements: Nu Force HP-800

- Volts RMS required to reach 90dB SPL: 0.068 Vrms
- Impedance @ 1kHz: 36 Ohms
- Power Needed for 90dB SPL: 0.13 mW
- Broadband Isolation in dB (100Hz to 10kHz): -16 dB

---

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Headphone Measurements:  NVX XPT100 Flat Pads

Headphone Measurements:

- Volts RMS required to reach 90dB SPL: 0.068 Vrms
- Impedance @ 1kHz: 70 Ohms
- Power Needed for 90dB SPL: 0.07 mW
- Broadband Isolation in dB (100Hz to 10kHz): -20 dB

**Frequency Response**
- Top - Compensated and Averaged
- Bottom - Raw Data for Five Headphone Positions

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**Isolation**
- Attenuation of External Sound vs. Frequency

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

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Headphone Measurements: NVX XPT100

- Volts RMS required to reach 90dB SPL: 0.071 Vrms
- Impedance @ 1kHz: 70 Ohms
- Power Needed for 90dBSPL: 0.07 mW
- Broadband Isolation in dB (100Hz to 10kHz): -19 dB
Headphone Measurements:  Oppo PM3

Volts RMS required to reach 90dB SPL: 0.037 Vrms
Impedance @ 1kHz: 26 Ohms
Power Needed for 90d BSPL: 0.05 mW
Broadband Isolation in dB (100Hz to 1kHz): -22 dB
**Headphone Measurements: Ortofon 0-One**

- **Volts RMS required to reach 90dB SPL:** 0.069 Vrms
- **Impedance @ 1kHz:** 40 Ohms
- **Power Needed for 90dB SPL:** 0.12 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -13 dB

---

### Frequency Response

Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

### Isolation

Attenuation of External Sound vs. Frequency

### Electrical Impedance and Phase

Measured with 600 Ohm output impedance.

### %THD+noise @ 90dB and 100dB

### 30 Hz Square Wave

### 300 Hz Square Wave

### Impulse Response

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**Panasonic RP HT600 S**

- **Volts RMS required to reach 90dB SPL:** 0.054 Vrms
- **Impedance @ 1kHz:** 59 Ohms
- **Power Needed for 90dB SPL:** 0.05 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -10 dBr

---

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

---

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Headphone Measurements: Phaz P2

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

| Volts RMS required to reach 90dB SPL: | 0.027 Vrms |
| Impedance @ 1kHz: | 20 Ohms |
| Power Needed for 90dB SPL: | 0.04 mW |
| Broadband Isolation in dB (100Hz to 10kHz): | -10 dBr |

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**Headphone Measurements: Phaz P2**

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

<table>
<thead>
<tr>
<th>Volts RMS required to reach 90dB SPL:</th>
<th>0.027 Vrms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impedance @ 1kHz:</td>
<td>20 Ohms</td>
</tr>
<tr>
<td>Power Needed for 90dB SPL:</td>
<td>0.04 mW</td>
</tr>
<tr>
<td>Broadband Isolation in dB (100Hz to 10kHz):</td>
<td>-10 dBr</td>
</tr>
</tbody>
</table>

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Headphone Measurements: Phiton PS500

- Volts RMS required to reach 90dB SPL: 0.039 Vrms
- Impedance @ 1kHz: 40 Ohms
- Power Needed for 90dB SPL: 0.04 mW
- Broadband Isolation in dB (100Hz to 10kHz): -15 dB

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Headphone Measurements: Philips O'Neil Crash

**Headphone Measurements:**
- Volts RMS required to reach 90dB SPL: 0.068 Vrms
- Impedance @ 1kHz: 20 Ohms
- Power Needed for 90dB SPL: 0.23 mW
- Broadband Isolation in dB (100Hz to 10kHz): -24 dB

**Isolation**
- Attenuation of External Sound vs. Frequency

**Frequency Response**
- Top - Compensated and Averaged
- Bottom - Raw Data for Five Headphone Positions

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**Impulse Response**
- Measured with 600 Ohm output impedance.
Headphone Measurements:  

**Phonon SMB2**

- **Volts RMS required to reach 90dB SPL:** 0.036 Vrms
- **Impedance @ 1kHz:** 46 Ohms
- **Power Needed for 90dB SPL:** 0.03 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -10 dB

---

**Frequency Response**
- Top - Compensated and Averaged
- Bottom - Raw Data for Five Headphone Positions

**Isolation**
- Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

---

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

---

**Impulse Response**

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**Headphone Measurements: Pioneer HDJ-2000**

- **Volts RMS required to reach 90dB SPL:** 0.049 Vrms
- **Impedance @ 1kHz:** 36 Ohms
- **Power Needed for 90dB SPL:** 0.07 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -9 dB

**Frequency Response**
- Top - Compensated and Averaged
- Bottom - Raw Data for Five Headphone Positions

**Isolation**
- Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**
Headphone Measurements: Pioneer HDJ-1000

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

Volts RMS required to reach 90dB SPL: 0.037 Vrms
Impedance @ 1kHz: 38 Ohms
Power Needed for 90d BSPL: 0.04 mW
Broadband Isolation in dB (100Hz to 10kHz): -8 dB
Headphone Measurements:  

**Pioneer HDJ-500**

- **Volts RMS required to reach 90dB SPL**: 0.036 Vrms
- **Impedance @ 1kHz**: 46 Ohms
- **Power Needed for 90dB SPL**: 0.03 mW
- **Broadband Isolation in dB (100Hz to 10kHz)**: -8 dB

**Frequency Response**

Top - Compensated and Averaged

Bottom - Raw Data for Five Headphone Positions

**Isolation**

Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**

Measured with 600 Ohm output impedance.

**30 Hz Square Wave**

**300 Hz Square Wave**

**%THD+noise @ 90dB and 100dB**

**Impulse Response**

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Headphone Measurements: Pioneer SE-M290

**Headphone Measurements:**

- **Volts RMS required to reach 90dB SPL:** 0.091 Vrms
- **Impedance @ 1kHz:** 37 Ohms
- **Power Needed for 90dB SPL:** 0.22 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -8 dB

---

**Frequency Response**

Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**

Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**

Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

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Headphone Measurements:  Pioneer Monitor 10 II

Headphone Measurements:

Volts RMS required to reach 90dB SPL: 0.055 Vrms
Impedance @ 1kHz: 29 Ohms
Power Needed for 90d BSPL 0.10 mW
Broadband Isolation in dB (100Hz to 10kHz): -15 dBr

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Headphone Measurements:

**Pioneer Monitor 10II B in box**

- **Volts RMS required to reach 90dB SPL:** 0.048 Vrms
- **Impedance @ 1kHz:** 25 Ohms
- **Power Needed for 90dB SPL:** 0.09 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -15 dB

---

**Frequency Response**

- Top - Compensated and Averaged
- Bottom - Raw Data for Five Headphone Positions

**Isolation**

Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**

Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

- Volts RMS required to reach 90dB SPL: 0.048 Vrms
- Impedance @ 1kHz: 25 Ohms
- Power Needed for 90dB SPL: 0.09 mW
- Broadband Isolation in dB (100Hz to 10kHz): -15 dB

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Headphone Measurements: Polk Buckle

**Headphone Measurements:**

- **Volts RMS required to reach 90dB SPL:** 0.040 Vrms
- **Impedance @ 1kHz:** 34 Ohms
- **Power Needed for 90dB SPL:** 0.05 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -16 dB

---

**Frequency Response**

Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**

Attenuation of External Sound vs. Frequency

**Impulse Response**

**Electrical Impedance and Phase**

Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

---

Copyright © SOURCE INTERLINK MEDIA All rights reserved.
Headphone Measurements: Polk Melee

**Volts RMS required to reach 90dB SPL:** 0.048 Vrms

**Impedance @ 1kHz:** 25 Ohms

**Power Needed for 90dB SPL:** 0.09 mW

**Broadband Isolation in dB (100Hz to 10kHz):** -18 dB

---

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

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Headphone Measurements: PSB M4U 1

Volts RMS required to reach 90dB SPL: 0.045 Vrms
Impedance @ 1kHz: 36 Ohms
Power Needed for 90dB SPL: 0.08 mW
Broadband Isolation in dB (100Hz to 10kHz): -16 dB
**Headphone Measurements: Sennheiser HD6 DJ**

- **Volts RMS required to reach 90dB SPL:** 0.040 Vrms
- **Impedance @ 1kHz:** 182 Ohms
- **Power Needed for 90d BSPL:** 0.01 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -19 dBr

**Frequency Response**
- Top - Compensated and Averaged
- Bottom - Raw Data for Five Headphone Positions

**Isolation**
- Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

---

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Headphone Measurements: Sennheiser HD7 DJ

**Headphone Measurements**

- Volts RMS required to reach 90dB SPL: 0.035 Vrms
- Impedance @ 1kHz: 110 Ohms
- Power Needed for 90dBSPL: 0.01 mW
- Broadband Isolation in dB (100Hz to 10kHz): -18 dB

---

**Frequency Response**

Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**

Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**

Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**
Headphone Measurements: Sennheiser HD8 DJ

**Headphone Measurements**

- **Volts RMS required to reach 90dB SPL:** 0.051 Vrms
- **Impedance @ 1kHz:** 110 Ohms
- **Power Needed for 90dB SPL:** 0.02 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -18 dB

**Frequency Response**
- Top - Compensated and Averaged
- Bottom - Raw Data for Five Headphone Positions

**Isolation**
- Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

---

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Headphone Measurements:  Sennheiser Momentum

- Volts RMS required to reach 90dB SPL: 0.022 Vrms
- Impedance @ 1kHz: 22 Ohms
- Power Needed for 90dB SPL: 0.02 mW
- Broadband Isolation in dB (100Hz to 10kHz): -15 dB

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**Impulse Response**

**30 Hz Square Wave**

**300 Hz Square Wave**

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Headphone Measurements: Sennheiser Momentum M2

- Volts RMS required to reach 90dB SPL: 0.030 Vrms
- Impedance @ 1kHz: 24 Ohms
- Power Needed for 90dB SPL: 0.04 mW
- Broadband Isolation in dB (100Hz to 10kHz): -18 dB

---

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

---

Copyright © SOURCE INTERLINK MEDIA All rights reserved.
Headphone Measurements:
Sennheiser Momentum Wireless
Wired Passive

**Volts RMS required to reach 90dB SPL:** 0.035 Vrms

**Impedance @ 1kHz:** 28 Ohms

**Power Needed for 90dB SPL:** 0.04 mW

**Broadband Isolation in dB (100Hz to 10kHz):** -18 dB
Headphone Measurements: Sennheiser HD 201

Volts RMS required to reach 90dB SPL: 0.074 V rms
Impedance @ 1kHz: 25 Ohms
Power Needed for 90dB SPL: 0.22 mW
Broadband Isolation in dB (100Hz to 10kHz): -5 dB

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Headphone Measurements: Sennheiser HD 202

Frequency Response
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

Isolation
Attenuation of External Sound vs. Frequency

Electrical Impedance and Phase
Measured with 600 Ohm output impedance.

%THD+noise @ 90dB and 100dB

30 Hz Square Wave

300 Hz Square Wave

Impulse Response

Volts RMS required to reach 90dB SPL: 0.032 Vrms
Impedance @ 1kHz: 37 Ohms
Power Needed for 90dB SPL: 0.03 mW
Broadband Isolation in dB (100Hz to 10kHz): -16 dBr

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**Headphone Measurements: Sennheiser HD 250 II**

**Volts RMS required to reach 90dB SPL:** 0.258 Vrms

**Impedance @ 1kHz:** 338 Ohms

**Power Needed for 90dB SPL:** 0.20 mW

**Broadband Isolation in dB (100Hz to 10kHz):** -18 dB

**Impedance and Phase**
- Measured with 600 Ohm output impedance.

**Frequency Response**
- Top - Compensated and Averaged
- Bottom - Raw Data for Five Headphone Positions

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

Copyright © SOURCE INTERLINK MEDIA All rights reserved.
Headphone Measurements: Sennheiser HD 280 Pro

Headphone Measurements:

- Volts RMS required to reach 90dB SPL: 0.061 Vrms
- Impedance @ 1kHz: 65 Ohms
- Power Needed for 90dB SPL: 0.06 mW
- Broadband Isolation in dB (100Hz to 10kHz): -16 dB

Frequency Response
- Top - Compensated and Averaged
- Bottom - Raw Data for Five Headphone Positions

Isolation
- Attenuation of External Sound vs. Frequency

Electrical Impedance and Phase
- Measured with 600 Ohm output impedance

%THD+noise @ 90dB and 100dB

30 Hz Square Wave

300 Hz Square Wave

Impulse Response

Copyright © SOURCE INTERLINK MEDIA All rights reserved.
Headphone Measurements:  Sennheiser HD 380 Pro

Volts RMS required to reach 90dB SPL: 0.310 Vrms
Impedance @ 1kHz: 61 Ohms
Power Needed for 90d BSPL: 1.57 mW
Broadband Isolation in dB (100Hz to 10kHz): -27 dBr
Sennheiser HD 448

**Headphone Measurements:**

- **Volts RMS required to reach 90dB SPL:** 0.059 Vrms
- **Impedance @ 1kHz:** 35 Ohms
- **Power Needed for 90dB SPL:** 0.10 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -14 dB
Headphone Measurements: Sennheiser HD 419

**Frequency Response**
- Top - Compensated and Averaged
- Bottom - Raw Data for Five Headphone Positions

**Impedance and Phase**
- Measured with 600 Ohm output impedance.

**Electrical Impedance and Phase**
- 30 Hz Square Wave
- 300 Hz Square Wave

**Isolation**
- Attenuation of External Sound vs. Frequency

**%THD+noise @ 90dB and 100dB**

**Impulse Response**

Volts RMS required to reach 90dB SPL: 0.081 Vrms
Impedance @ 1kHz: 37 Ohms
Power Needed for 90dB SPL: 0.18 mW
Broadband Isolation in dB (100Hz to 10kHz): -13 dB
**Headphone Measurements:**

**Sennheiser HD 429**

- **Volts RMS required to reach 90dB SPL:** 0.061 Vrms
- **Impedance @ 1kHz:** 38 Ohms
- **Power Needed for 90d BSPL:** 0.10 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -13 dB
**Headphone Measurements:**

**Sennheiser HD 439**

- **Volts RMS required to reach 90dB SPL:** 0.047 Vrms
- **Impedance @ 1kHz:** 36 Ohms
- **Power Needed for 90d BSPL:** 0.08 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -11 dB

---

**Frequency Response**

Top - Compensated and Averaged

Bottom - Raw Data for Five Headphone Positions

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**Isolation**

Attenuation of External Sound vs. Frequency

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**Electrical Impedance and Phase**

Measured with 600 Ohm output impedance.

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**%THD+noise @ 90dB and 100dB**

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**30 Hz Square Wave**

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**300 Hz Square Wave**

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**Impulse Response**

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Headphone Measurements: Sennheiser HD 449

- **Volts RMS required to reach 90dB SPL:** 0.070 Vrms
- **Impedance @ 1kHz:** 34 Ohms
- **Power Needed for 90dB SPL:** 0.14 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -15 dBr

---

**Frequency Response**

Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**

Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**

Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

- Volts RMS required to reach 90dB SPL: 0.070 Vrms
- Impedance @ 1kHz: 34 Ohms
- Power Needed for 90dB SPL: 0.14 mW
- Broadband Isolation in dB (100Hz to 10kHz): -15 dBr

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Headphone Measurements: Sennheiser PXC 550 Wired
Power On

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**Impulse Response**

Voltage RMS required to reach 90dB SPL: 0.351 Vrms
Impedance @ 1kHz: 477 Ohms
Power Needed for 90dB SPL: 0.26 mW
Broadband Isolation in dB (100Hz to 10kHz): -20 dBr

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**Headphone Measurements:**

**Sennheiser PX 360**

**Headphone Measurements:**

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

Volts RMS required to reach 90dB SPL: 0.079 Vrms
Impedance @ 1kHz: 37 Ohms
Power Needed for 90dB SPL: 0.17 mW
Broadband Isolation in dB (100Hz to 10kHz): -15 dB
**Headphone Measurements:** Sennheiser Urbanite XL

- **Volts RMS required to reach 90dB SPL:** 0.041 Vrms
- **Impedance @ 1kHz:** 23 Ohms
- **Power Needed for 90dB SPL:** 0.07 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -19 dB

---

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

---

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Headphone Measurements: Shure SRH440

Frequency Response
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

Isolation
Attenuation of External Sound vs. Frequency

Electrical Impedance and Phase
Measured with 600 Ohm output impedance.

%THD+noise @ 90dB and 100dB

30 Hz Square Wave

300 Hz Square Wave

Impulse Response

Volts RMS required to reach 90dB SPL: 0.050 Vrms
Impedance @ 1kHz: 41 Ohms
Power Needed for 90d BSPL: 0.06 mW
Broadband Isolation in dB (100Hz to 10kHz): -15 dB
Headphone Measurements: Shure SRH-750DJ

**Frequency Response**
- Top - Compensated and Averaged
- Bottom - Raw Data for Five Headphone Positions

**Impedance**
- Measured with 600 Ohm output impedance.

**Isolation**
- Attenuation of External Sound vs. Frequency

**%THD+noise** @ 90dBSPL and 100dBSPL

**Time in Seconds**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

Volts RMS required to reach 90dBSPL: 0.087 Vrms
Impedance @ 1kHz: 38 Ohms
Power Needed for 90dBSPL: 0.20 mW
Broadband Isolation in dB (100Hz to 10kHz): -10 dBr
Headphone Measurements: Shure SRH840

- Volts RMS required to reach 90dB SPL: 0.066 Vrms
- Impedance @ 1kHz: 42 Ohms
- Power Needed for 90d BSPL: 0.11 mW
- Broadband Isolation in dB (100Hz to 10kHz): -15 dB
Headphone Measurements: Shure SRH940

**Headphone Measurements:**

- **Volts RMS required to reach 90dB SPL:** 0.066 Vrms
- **Impedance @ 1kHz:** 39 Ohms
- **Power Needed for 90dB SPL:** 0.11 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -12 dB

---

**Frequency Response**

Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**

Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**

Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

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Headphone Measurements: Shure SRH1540

Headphone Measurements:

- Volts RMS required to reach 90dB SPL: 0.109 Vrms
- Impedance @ 1kHz: 46 Ohms
- Power Needed for 90dB SPL: 0.26 mW
- Broadband Isolation in dB (100Hz to 10kHz): -16 dB

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**30 Hz Square Wave**

**%THD+noise @ 90dB and 100dB**

**300 Hz Square Wave**

**Impulse Response**

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**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Impulse Response**

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**30 Hz Square Wave**

**300 Hz Square Wave**

**%THD+noise @ 90dB and 100dB**

**Isolation**
Attenuation of External Sound vs. Frequency

**Volts RMS required to reach 90dB SPL:** 0.043 Vrms
**Impedance @ 1kHz:** 36 Ohms
**Power Needed for 90dB SPL:** 0.05 mW
**Broadband Isolation in dB (100Hz to 1kHz):** -12 dB
**Headphone Measurements:**

**Skullcandy Aviators no Lens**

**Volts RMS required to reach 90dB SPL:** 0.037 Vrms

**Impedance @ 1kHz:** 35 Ohms

**Power Needed for 90dB SPL:** 0.04 mW

**Broadband Isolation in dB (100Hz to 10kHz):** -3 dB
**Headphone Measurements:**

**Skullcandy Roc Nation Aviator**

- **Volts RMS required to reach 90dB SPL:** 0.055 Vrms
- **Impedance @ 1kHz:** 35 Ohms
- **Power Needed for 90dB SPL:** 0.09 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -8 dB
Headphone Measurements: Skullcandy Mix Master

**Headphone Measurements:**

- **Volts RMS required to reach 90dB SPL:** 0.027 Vrms
- **Impedance @ 1kHz:** 20 Ohms
- **Power Needed for 90dB SPL:** 0.04 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -11 dB

**Impedance and Phase**

Measured with 600 Ohm output impedance.

**Frequency Response**

Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**

Attenuation of External Sound vs. Frequency

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

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Headphone Measurements:  

**SMS DJ Pro**

**Frequency Response**
Top - Compensated and Averaged  
Bottom - Raw Data for Five Headphone Positions

**Isolation**  
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**Volts RMS required to reach 90dB SPL:** 0.039 Vrms  
**Impedance @ 1kHz:** 34 Ohms  
**Power Needed for 90d BSPL:** 0.04 mW  
**Broadband Isolation in dB (100Hz to 10kHz):** -20 dB

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

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Frequency Response  
Top - Compensated and Averaged  
Bottom - Raw Data for Five Headphone Positions

Isolation  
Attenuation of External Sound vs. Frequency

Electrical Impedance and Phase  
Measured with 600 Ohm output impedance.

%THD+noise @ 90dB and 100dB

Impulse Response

Headphone Measurements: Street by 50

Volts RMS required to reach 90dB SPL: 0.061 Vrms
Impedance @ 1kHz: 33 Ohms
Power Needed for 90dB SPL: 0.11 mW
Broadband Isolation in dB (100Hz to 1kHz): -8 dB
Headphone Measurements:  
Sony MDR-1R

**Impulse Response**

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Frequency Response**
Top - Compensated and Averaged  
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

Volts RMS required to reach 90dB SPL: 0.024 Vrms  
Impedance @ 1kHz: 31 Ohms  
Power Needed for 90d BSPL: 0.02 mW  
Broadband Isolation in dB (100Hz to 10kHz): -11 dB

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Headphone Measurements: Sony MDR-7520

Volts RMS required to reach 90dB SPL: 0.055 Vrms
Impedance @ 1kHz: 27 Ohms
Power Needed for 90dB SPL: 0.11 mW
Broadband Isolation in dB (100Hz to 10kHz): -20 dB
**Headphone Measurements: Sony MDR-V6**

### Frequency Response
Top - Compensated and Averaged  
Bottom - Raw Data for Five Headphone Positions

### Isolation
Attenuation of External Sound vs. Frequency

### Electrical Impedance and Phase
Measured with 600 Ohm output impedance.

### %THD+noise @ 90dB and 100dB

### 30 Hz Square Wave

### 300 Hz Square Wave

### Impulse Response

Volts RMS required to reach 90dB SPL: 0.061 Vrms  
Impedance @ 1kHz: 77 Ohms  
Power Needed for 90dB SPL: 0.05 mW  
Broadband Isolation in dB (100Hz to 10kHz): -8 dB
Headphone Measurements:  Sony MDRV-CD3000

- **Volts RMS required to reach 90dB SPL:** 0.045 Vrms
- **Impedance @ 1kHz:** 36 Ohms
- **Power Needed for 90dB SPL:** 0.06 mW
- **Broadband Isolation in dB:** (-11 dBr)

---

**Frequency Response**
- Top - Compensated and Averaged
- Bottom - Raw Data for Five Headphone Positions

**Isolation**
- Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

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**Headphone Measurements:**

*Sony MDR D77 Eggo*

**Headphone Measurements:**

- **Volts RMS required to reach 90dB SPL:** 0.025 Vrms
- **Impedance @ 1kHz:** 46 Ohms
- **Power Needed for 90dB SPL:** 0.01 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -9 dB

---

**Frequency Response**

*Top - Compensated and Averaged*

*Bottom - Raw Data for Five Headphone Positions*

**Isolation**

*Attenuation of External Sound vs. Frequency*

**Electrical Impedance and Phase**

*Measured with 600 Ohm output impedance.*

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

Volts RMS required to reach 90dB SPL: 0.025 Vrms
Impedance @ 1kHz: 46 Ohms
Power Needed for 90dB SPL: 0.01 mW
Broadband Isolation in dB (100Hz to 10kHz): -9 dB
Headphone Measurements: Sony DR-Z7

**Volts RMS required to reach 90dB SPL:** 0.063 Vrms

**Impedance @ 1kHz:** 111 Ohms

**Power Needed for 90dB SPL:** 0.04 mW

**Broadband Isolation in dB (100Hz to 10kHz):** -13 dB

---

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

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Headphone Measurements: Sony MDR-V600

**Headphone Measurements: Sony MDR-V600**

- **Volts RMS required to reach 90dB SPL:** 0.030 Vrms
- **Impedance @ 1kHz:** 49 Ohms
- **Power Needed for 90d BSPL:** 0.02 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -13 dB

**Frequency Response**
- Compensated and Averaged
- Raw Data for Five Headphone Positions

**Isolation**
- Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

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Headphone Measurements: Sony MDR-XB1000

Volts RMS required to reach 90dB SPL: 0.090 Vrms
Impedance @ 1kHz: 28 Ohms
Power Needed for 90dB SPL: 0.28 mW
Broadband Isolation in dB (100Hz to 10kHz): -10 dB

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Headphone Measurements: Sony MDR-XB700

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**Impulse Response**

Volt RMS required to reach 90dB SPL: 0.072 Vrms
Impedance @ 1kHz: 28 Ohms
Power Needed for 90dB SPL: 0.19 mW
Broadband Isolation in dB (100Hz to 10kHz): -12 dB
Headphone Measurements: Sony MDR-XB500

- **Volts RMS required to reach 90dB SPL**: 0.046 Vrms
- **Impedance @ 1kHz**: 44 Ohms
- **Power Needed for 90dB SPL**: 0.05 mW
- **Broadband Isolation in dB (100Hz to 10kHz)**: -10 dBr

---

**Frequency Response**
- **Top - Compensated and Averaged**
- **Bottom - Raw Data for Five Headphone Positions**

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**Isolation**
- Attenuation of External Sound vs. Frequency

**%THD+noise @ 90dB and 100dB**
- **30 Hz Square Wave**
  - Amplitude (dB)
  - Time in Seconds
  - Right
  - Left

**300 Hz Square Wave**
- Amplitude (dB)
- Time in Seconds
- Right
- Left

**Impulse Response**
- Time in Seconds

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**Headphone Measurements: Sony MDR Z1R sn 3922**

- **Volts RMS required to reach 90dB SPL:** 0.106 Vrms
- **Impedance @ 1kHz:** 62 Ohms
- **Power Needed for 90d BSPL:** 0.18 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -14 dB

---

**Frequency Response**

Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**

Attenuation of External Sound vs. Frequency

**Impulse Response**

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Electrical Impedance and Phase**

Measured with 600 Ohm output impedance.

**Amplitude (dB)**

**Impedance in Ohms**

**Phase in Degrees**

---

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Frequency Response
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

Impedance in Ohms
Phase in Degrees

%THD+noise @ 90dB and 100dB

%THD+noise

Impulse Response

30 Hz Square Wave

300 Hz Square Wave

Volts RMS required to reach 90dB SPL: 0.072 Vrms
Impedance @ 1kHz: 77 Ohms
Power Needed for 90dB SPL: 0.07 mW
Broadband Isolation in dB (100Hz to 10kHz): -11 dB
**Headphone Measurements: Sony MDR-ZX1000**

- **Volts RMS required to reach 90dB SPL:** 0.034 Vrms
- **Impedance @ 1kHz:** 26 Ohms
- **Power Needed for 90dB SPL:** 0.05 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -11 dB
Headphone Measurements:  Soul by Ludacris SL150

- **Volts RMS required to reach 90dB SPL:** 0.040 Vrms
- **Impedance @ 1kHz:** 46 Ohms
- **Power Needed for 90dB SPL:** 0.03 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -11 dB
Headphone Measurements: Soul Combat

**Headphone Measurements:**

- **Volts RMS required to reach 90dB SPL:** 0.041 Vrms
- **Impedance @ 1kHz:** 35 Ohms
- **Power Needed for 90dB SPL:** 0.05 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -13 dB
**Headphone Measurements:**

**SoundMAGIC HP100**

- **Volts RMS required to reach 90dB SPL:** 0.069 Vrms
- **Impedance @ 1kHz:** 36 Ohms
- **Power Needed for 90dB SPL:** 0.13 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -19 dB

---

**Isolation**

Attenuation of External Sound vs. Frequency

**Frequency Response**

Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Electrical Impedance and Phase**

Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

- Volts RMS required to reach 90dB SPL: 0.069 Vrms
- Impedance @ 1kHz: 36 Ohms
- Power Needed for 90dB SPL: 0.13 mW
- Broadband Isolation in dB (100Hz to 10kHz): -19 dB
**Headphone Measurements: Status SM-CB1**

**Frequency Response**
- Top: Compensated and Averaged
- Bottom: Raw Data for Five Headphone Positions

**Isolation**
- Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

---

Volts RMS required to reach 90dB SPL: 0.068 Vrms
Impedance @ 1kHz: 39 Ohms
Power Needed for 90dB SPL: 0.12 mW
Broadband Isolation in dB (100Hz to 10kHz): -14 dB

---

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Headphone Measurements:  Stax 4070

Electrical Impedance and phase measurements unavailable for electrostatic and wireless headphones

Amplitude (dB)

Frequency

30 Hz Square Wave

Time in Seconds

Volts

%THD+noise @ 90dB and 100dB

Frequency

Impulse Response

Broadband Isolation in dB (100Hz to 10kHz): -24 dBr

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Headphone Measurements:  
Superlux HD 681

- **Volts RMS required to reach 90dB SPL:** 0.110 Vrms
- **Impedance @ 1kHz:** 34 Ohms
- **Power Needed for 90dB SPL:** 0.35 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -8 dB
Headphone Measurements: Superlux HD 668B

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**Impulse Response**

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

Volts RMS required to reach 90dB SPL: 0.181 Vrms
Impedance @ 1kHz: 65 Ohms
Power Needed for 90dBSPL: 0.55 mW
Broadband Isolation in dB (100Hz to 10kHz): -7 dB
Headphone Measurements:  Takstar Pro 80

- **Volts RMS required to reach 90dB SPL:** 0.042 Vrms
- **Impedance @ 1kHz:** 60 Ohms
- **Power Needed for 90dB SPL:** 0.03 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -17 dB

---

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**Impulse Response**

---

**30 Hz Square Wave**

**300 Hz Square Wave**

---

**Impedance**

**Phase**
Headphone Measurements:

**Volts RMS required to reach 90dB SPL:** 0.029 Vrms

**Impedance @ 1kHz:** 38 Ohms

**Power Needed for 90dB SPL:** 0.02 mW

**Broadband Isolation in dB (100Hz to 10kHz):** -3 dB

---

**Impulse Response**

- Time in Seconds
- Volts

---

**Electrical Impedance and Phase**

- 600 Ohm output impedance.

---

**%THD+noise @ 90dB and 100dB**

---

**30 Hz Square Wave**

---

**300 Hz Square Wave**

---

**Frequency Response**

- Top: Compensated and Averaged
- Bottom: Raw Data for Five Headphone Positions

---

**Isolation**

- Attenuation of External Sound vs. Frequency

---

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Headphone Measurements:  Torque t402v OverEar Yellow

- **Volts RMS required to reach 90dB SPL:** 0.117 Vrms
- **Impedance @ 1kHz:** 22 Ohms
- **Power Needed for 90dB SPL:** 0.63 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -20 dB
**Headphone Measurements: Torque t402v OverEar Red**

- **Volts RMS required to reach 90dB SPL:** 0.112 Vrms
- **Impedance @ 1kHz:** 22 Ohms
- **Power Needed for 90dB SPL:** 0.57 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -15 dB

---

**Frequency Response**

- Top - Compensated and Averaged
- Bottom - Raw Data for Five Headphone Positions

**Isolation**

Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**

Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

Volts RMS required to reach 90dB SPL: 0.112 Vrms
Impedance @ 1kHz: 22 Ohms
Power Needed for 90dB SPL: 0.57 mW
Broadband Isolation in dB (100Hz to 10kHz): -15 dB
Headphone Measurements: Torque t402v OverEar Blue

- Volts RMS required to reach 90dBSPL: 0.088 Vrms
- Impedance @ 1kHz: 22 Ohms
- Power Needed for 90dB SPL: 0.34 mW
- Broadband Isolation in dB (100Hz to 10kHz): -16 dB

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Headphone Measurements: Torque t402v OverEar Black

**Volts RMS required to reach 90dB SPL:** 0.096 Vrms

**Impedance @ 1kHz:** 22 Ohms

**Power Needed for 90dB SPL:** 0.42 mW

**Broadband Isolation in dB (100Hz to 10kHz):** -14 dBr
Headphone Measurements: Ultrasonic HFI-450

**Headphone Measurements:**

- **Volts RMS required to reach 90dB SPL:** 0.091 Vrms
- **Impedance @ 1kHz:** 34 Ohms
- **Power Needed for 90dB SPL:** 0.25 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -11 dB
**Headphone Measurements: Ultrasone HFI-780**

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

Volts RMS required to reach 90dB SPL: 0.061 Vrms
Impedance @ 1kHz: 42 Ohms
Power Needed for 90dB SPL: 0.09 mW
Broadband Isolation in dB (100Hz to 10kHz): -10 dB
**Headphone Measurements:**

**Ultrasone PRO-550**

- **Volts RMS required to reach 90dB SPL:** 0.083 Vrms
- **Impedance @ 1kHz:** 66 Ohms
- **Power Needed for 90dB SPL:** 0.10 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -8 dBr

---

**Frequency Response**

**Top - Compensated and Averaged**

**Bottom - Raw Data for Five Headphone Positions**

---

**Electrical Impedance and Phase**

Measured with 600 Ohm output impedance.

---

**%THD+noise @ 90dB and 100dB**

---

**Impulse Response**

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**Isolation**

Attenuation of External Sound vs. Frequency

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Headphone Measurements: Ultrasone PRO-650

**Volts RMS required to reach 90dB SPL:** 0.129 Vrms

**Impedance @ 1kHz:** 80 Ohms

**Power Needed for 90dB SPL:** 0.21 mW

**Broadband Isolation in dB (100Hz to 10kHz):** -10 dBr

---

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

Volts RMS required to reach 90dB SPL: 0.129 Vrms
Impedance @ 1kHz: 80 Ohms
Power Needed for 90dB SPL: 0.21 mW
Broadband Isolation in dB (100Hz to 10kHz): -10 dBr

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Headphone Measurements:  
Ultrasone PRO 900

Headphone Measurements:

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

Volts RMS required to reach 90dB SPL: 0.175 Vrms
Impedance @ 1kHz: 41 Ohms
Power Needed for 90dB SPL: 0.75 mW
Broadband Isolation in dB (100Hz to 10kHz): -11 dB

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Headphone Measurements: Ultrasone Signature Pro

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**30 Hz Square Wave**

**%THD+noise @ 90dB and 100dB**

**300 Hz Square Wave**

**Impulse Response**

---

Volts RMS required to reach 90dB SPL: 0.033 Vrms
Impedance @ 1kHz: 35 Ohms
Power Needed for 90d BSPL: 0.03 mW
Broadband Isolation in dB (100Hz to 10kHz): -15 dB
**Headphone Measurements: Ultrasone Edition 8**

- **Volts RMS required to reach 90dB SPL**: 0.065 Vrms
- **Impedance @ 1kHz**: 33 Ohms
- **Power Needed for 90d BSPL**: 0.13 mW
- **Broadband Isolation in dB (100Hz to 10kHz)**: -14 dB

---

**Frequency Response**

Top - Compensated and Averaged

Bottom - Raw Data for Five Headphone Positions

**Isolation**

Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**

Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

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### Headphone Measurements: V-Moda M-100

#### Frequency Response
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

#### Isolation
Attenuation of External Sound vs. Frequency

#### Electrical Impedance and Phase
Measured with 600 Ohm output impedance.

#### 30 Hz Square Wave

#### 300 Hz Square Wave

#### Impulse Response

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V-Moda M-100

- **Volts RMS required to reach 90dB SPL:** 0.031 Vrms
- **Impedance @ 1kHz:** 36 Ohms
- **Power Needed for 90dB SPL:** 0.03 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -13 dB

---

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Headphone Measurements: V-Moda Crossfade LP

- **Frequency Response**: Top - Compensated and Averaged, Bottom - Raw Data for Five Headphone Positions
- **Isolation**: Attenuation of External Sound vs. Frequency
- **Electrical Impedance and Phase**: Measured with 600 Ohm output impedance.
- **%THD+noise @ 90dB and 100dB**
- **30 Hz Square Wave**
- **300 Hz Square Wave**
- **Impulse Response**

---

**Headphone Measurements**

- Volts RMS required to reach 90dB SPL: 0.034 Vrms
- Impedance @ 1kHz: 37 Ohms
- Power Needed for 90d BSPL: 0.03 mW
- Broadband Isolation in dB (100Hz to 10kHz): -9 dB
**Headphone Measurements: V-Moda Crossfade LP2**

**Headphone Measurements:**

- **Volts RMS required to reach 90dB SPL**: 0.026 Vrms
- **Impedance @ 1kHz**: 37 Ohms
- **Power Needed for 90dB SPL**: 0.02 mW
- **Broadband Isolation in dB (100Hz to 10kHz)**: -11 dB
Headphone Measurements:

V-MODA Crossfade Wireless
Wired Mode

Volts RMS required to reach 90dB SPL: 0.035 Vrms
Impedance @ 1kHz: 35 Ohms
Power Needed for 90d BSPL: 0.03 mW
Broadband Isolation in dB (100Hz to 10kHz): -15 dBr

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**Headphone Measurements: Yamaha Pro500**

- **Volts RMS required to reach 90dB SPL:** 0.013 Vrms
- **Impedance @ 1kHz:** 20 Ohms
- **Power Needed for 90dB SPL:** 0.01 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -12 dB

---

**Frequency Response**
- **Top - Compensated and Averaged**
- **Bottom - Raw Data for Five Headphone Positions**

**Isolation**
- **Attenuation of External Sound vs. Frequency**

**Impulse Response**
- **Time in Seconds**

---

**Electrical Impedance and Phase**
- **Measured with 600 Ohm output impedance.**

**%THD+noise @ 90dB and 100dB**
- **Frequency**

---

**30 Hz Square Wave**
- **Time in Seconds**

**300 Hz Square Wave**
- **Time in Seconds**

---

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Headphone Measurements:  
Yamaha Pro400

**Headphone Measurements:**

- **Volts RMS required to reach 90dB SPL:** 0.016 Vrms
- **Impedance @ 1kHz:** 20 Ohms
- **Power Needed for 90dB SPL:** 0.01 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -13 dB

---

**Frequency Response**

*Top - Compensated and Averaged*

*Bottom - Raw Data for Five Headphone Positions*

**Isolation**

*Attenuation of External Sound vs. Frequency*

**Electrical Impedance and Phase**

*Measured with 600 Ohm output impedance.*

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**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

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Headphone Measurements: ZMF Eikon

**Headphone Measurements:**

- **Volts RMS required to reach 90dB SPL:** 0.291 Vrms
- **Impedance @ 1kHz:** 331 Ohms
- **Power Needed for 90dB SPL:** 0.25 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -26 dBr

---

**Frequency Response**

- **Top - Compensated and Averaged**
- **Bottom - Raw Data for Five Headphone Positions**

---

**Isolation**

- **Attenuation of External Sound vs. Frequency**

---

**Electrical Impedance and Phase**

- **Measured with 600 Ohm output impedance.**

---

**%THD+noise @ 90dB and 100dB**

---

**30 Hz Square Wave**

---

**300 Hz Square Wave**

---

**Impulse Response**

---

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**Headphone Measurements:**

**ZMF Atticus**

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Impedance @ 1kHz:** 335 Ohms

**Power Needed for 90d BSPL:** 0.17 mW

**Broadband Isolation in dB (100Hz to 10kHz):** -21 dB

---

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

---

**Volts RMS required to reach 90dB SPL:** 0.238 Vrms

**Impedance @ 1kHz:** 335 Ohms

**Power Needed for 90dB SPL:** 0.17 mW

**Broadband Isolation in dB (100Hz to 10kHz):** -21 dB
Headphone Measurement Datasheets

Earpad Open
**Headphone Measurements: Audeze Sine DX**

- **Volts RMS required to reach 90dB SPL:** 0.047 Vrms
- **Impedance @ 1kHz:** 19 Ohms
- **Power Needed for 90dB SPL:** 0.12 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -3 dB

---

**Frequency Response**
- Top - Compensated and Averaged
- Bottom - Raw Data for Five Headphone Positions

**Isolation**
- Attenuation of External Sound vs. Frequency

**Impulse Response**
- Volts RMS required to reach 90dB SPL: 0.047 Vrms
- Impedance @ 1kHz: 19 Ohms
- Power Needed for 90dB SPL: 0.12 mW
- Broadband Isolation in dB (100Hz to 10kHz): -3 dB
Headphone Measurements:  Aurex HR V9

**Headphone Measurements**

**Volts RMS required to reach 90dB SPL:** 0.581 Vrms

**Impedance @ 1kHz:** 3853 Ohms

**Power Needed for 90dB SPL:** 0.09 mW

**Broadband Isolation in dB (100Hz to 10kHz):** -7 dB

---

**Frequency Response**

- Top - Compensated and Averaged
- Bottom - Raw Data for Five Headphone Positions

**Isolation**

Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**

Measured with 600 Ohm output impedance.

**30 Hz Square Wave**

**%THD+noise @ 90dB and 100dB**

**300 Hz Square Wave**

**Impulse Response**

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Headphone Measurements: Bedphones

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

Volts RMS required to reach 90dB SPL: 0.031 Vrms
Impedance @ 1kHz: 33 Ohms
Power Needed for 90dB SPL: 0.03 mW
Broadband Isolation in dB (100Hz to 10kHz): -5 dBr

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Headphone Measurements:  Bloc Roc Galvanize S2

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**Impulse Response**

Volts RMS required to reach 90dB SPL: 0.038 Vrms
Impedance @ 1kHz: 35 Ohms
Power Needed for 90dB SPL: 0.04 mW
Broadband Isolation in dB (100Hz to 10kHz): -17 dB

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Headphone Measurements: Grado HF1 69 Goo Bowl

**Headphone Measurements**

- Volts RMS required to reach 90dB SPL: 0.073 Vrms
- Impedance @ 1kHz: 34 Ohms
- Power Needed for 90d BSPL: 0.16 mW
- Broadband Isolation in dB (100Hz to 10kHz): -2 dB

---

**Frequency Response**

Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**

Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**

Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

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**Headphone Measurements: Grado HF-1 Prototype**

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

- Volts RMS required to reach 90dB SPL: 0.126 Vrms
- Impedance @ 1kHz: 34 Ohms
- Power Needed for 90d BSPL: 0.47 mW
- Broadband Isolation in dB (100Hz to 10kHz): -1 dBr

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**Headphone Measurements:**

**Grado HF-1 Serial 69**

**Volts RMS required to reach 90dB SPL:** 0.079 Vrms

**Impedance @ 1kHz:** 34 Ohms

**Power Needed for 90dB SPL:** 0.19 mW

**Broadband Isolation in dB (100Hz to 10kHz):** 0 dB

---

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

---

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Headphone Measurements: Grado HF-2

**Volts RMS required to reach 90dB SPL:** 0.110 Vrms

**Impedance @ 1kHz:** 32 Ohms

**Power Needed for 90dB SPL:** 0.37 mW

**Broadband Isolation in dB (100Hz to 10kHz):** 0 dB
Headphone Measurements: Grado RS1

Headphone Measurements:

- **Volts RMS required to reach 90dB SPL:** 0.161 Vrms
- **Impedance @ 1kHz:** 33 Ohms
- **Power Needed for 90dB SPL:** 0.78 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** 0 dB

---

**Frequency Response**

Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**

Attenuation of External Sound vs. Frequency

**Impulse Response**

- **%THD+noise @ 90dB and 100dB**
- **30 Hz Square Wave**
- **300 Hz Square Wave**

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**Headphone Measurements:**

**Grado RS1e Bowl Pads**

**Headphone Measurements:**

- **Volts RMS required to reach 90dB SPL:** 0.038 Vrms
- **Impedance @ 1kHz:** 34 Ohms
- **Power Needed for 90dB SPL:** 0.04 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -1 dB
Headphone Measurements: Grado RS1e S Cushions

Volts RMS required to reach 90dB SPL: 0.030 Vrms
Impedance @ 1kHz: 34 Ohms
Power Needed for 90dB SPL: 0.03 mW
Broadband Isolation in dB (100Hz to 10kHz): -4 dB

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Headphone Measurements:  Grado RS1e Flat Pads

Frequency Response
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

Isolation
Attenuation of External Sound vs. Frequency

Electrical Impedance and Phase
Measured with 600 Ohm output impedance.

%THD+noise @ 90dB and 100dB

30 Hz Square Wave

300 Hz Square Wave

Impulse Response

Volts RMS required to reach 90dB SPL: 0.021 Vrms
Impedance @ 1kHz: 34 Ohms
Power Needed for 90dB SPL: 0.04 mW
Broadband Isolation in dB (100Hz to 10kHz): -1 dB
**Headphone Measurements:**

Grado RS1e Yellow Pads

**Headphone Measurements:**

- **Volts RMS required to reach 90dB SPL:** 0.025 Vrms
- **Impedance @ 1kHz:** 34 Ohms
- **Power Needed for 90dB SPL:** 0.02 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -2 dB
Headphone Measurements:  
Grado GS1000

**Headphone Measurements:**
- **Volts RMS** required to reach 90dB SPL: 0.188 Vrms
- **Impedance @ 1kHz**: 33 Ohms
- **Power Needed for 90dB SPL**: 1.06 mW
- **Broadband Isolation in dB (100Hz to 10kHz)**: -2 dBr

**Frequency Response**
- *Top - Compensated and Averaged*
- *Bottom - Raw Data for Five Headphone Positions*

**Isolation**
- *Attenuation of External Sound vs. Frequency*

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

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Headphone Measurements:  Grado PS1000

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

Volts RMS required to reach 90dB SPL: 0.189 Vrms
Impedance @ 1kHz: 33 Ohms
Power Needed for 90d BSPL: 1.09 mW
Broadband Isolation in dB (100Hz to 10kHz): -2 dB
Headphone Measurements: Grado RS2

**Headphone Measurements**: Grado RS2

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**Impulse Response**

Volts RMS required to reach 90dB SPL: 0.175 Vrms
Impedance @ 1kHz: 33 Ohms
Power Needed for 90dB SPL: 0.92 mW
Broadband Isolation in dB (100Hz to 10kHz): 0 dBr

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Headphone Measurements:  

**Grado PS500**

- **Volts RMS required to reach 90dB SPL:** 0.039 Vrms
- **Impedance @ 1kHz:** 33 Ohms
- **Power Needed for 90dB SPL:** 0.05 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -1 dB

---

**Frequency Response**  
Top - Compensated and Averaged  
Bottom - Raw Data for Five Headphone Positions

**Isolation**  
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**  
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

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Headphone Measurements: Grado SR125i

**Headphone Measurements:**

Volts RMS required to reach 90dB SPL: 0.104 Vrms
Impedance @ 1kHz: 33 Ohms
Power Needed for 90dB SPL: 0.33 mW
Broadband Isolation in dB (100Hz to 10kHz): -1 dBr

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**30 Hz Square Wave**

**300 Hz Square Wave**

**%THD+noise @ 90dB and 100dB**

**Impulse Response**

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### Headphone Measurements: Grado SR225 Comfy Pad with Hole

**Volts RMS required to reach 90dB SPL:** 4.727 Vrms

**Impedance @ 1kHz:** 33 Ohms

**Power Needed for 90dB SPL:** 686.40 mW

**Broadband Isolation in dB (100Hz to 10kHz):** -2 dB

---

**Frequency Response**
- Top - Compensated and Averaged
- Bottom - Raw Data for Five Headphone Positions

**Isolation**
- Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**Impulse Response**

---

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**Headphone Measurements: Grado SR225i**

- **Volts RMS required to reach 90dB SPL:** 0.116 Vrms
- **Impedance @ 1kHz:** 32 Ohms
- **Power Needed for 90dB SPL:** 0.42 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -1 dBr

---

**Frequency Response**
- Top - Compensated and Averaged
- Bottom - Raw Data for Five Headphone Positions

**Isolation**
- Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

---

**30 Hz Square Wave**

---

**300 Hz Square Wave**

---

**Impulse Response**

---

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**Headphone Measurements:**

Grado SR225i Bowls Tape Mod

**Headphone Measurements:**

- **Volts RMS required to reach 90dB SPL:** 0.094 Vrms
- **Impedance @ 1kHz:** 32 Ohms
- **Power Needed for 90dB SPL:** 0.27 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -3 dB
Headphone Measurements:

Grado SR225i Comfy Pads

**Volts RMS required to reach 90dB SPL:** 0.079 Vrms

**Impedance @ 1kHz:** 32 Ohms

**Power Needed for 90dB SPL:** 0.19 mW

**Broadband Isolation in dB (100Hz to 10kHz):** -1 dB

---

**Frequency Response**

<table>
<thead>
<tr>
<th>Frequency (Hz)</th>
<th>Amplitude (dB)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>-10</td>
</tr>
<tr>
<td>100</td>
<td>-20</td>
</tr>
<tr>
<td>1000</td>
<td>-30</td>
</tr>
<tr>
<td>10000</td>
<td>-40</td>
</tr>
</tbody>
</table>

**Isolation**

<table>
<thead>
<tr>
<th>Frequency (Hz)</th>
<th>Reduction in dB</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>-50</td>
</tr>
<tr>
<td>100</td>
<td>-45</td>
</tr>
<tr>
<td>1000</td>
<td>-40</td>
</tr>
<tr>
<td>10000</td>
<td>-35</td>
</tr>
<tr>
<td>100000</td>
<td>-30</td>
</tr>
</tbody>
</table>

---

**Electrical Impedance and Phase**

<table>
<thead>
<tr>
<th>Frequency (Hz)</th>
<th>Impedance in Ohms</th>
<th>Phase (Degrees)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>32</td>
<td>30</td>
</tr>
<tr>
<td>100</td>
<td>30</td>
<td>25</td>
</tr>
<tr>
<td>1000</td>
<td>25</td>
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<td>10000</td>
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<td>15</td>
</tr>
<tr>
<td>100000</td>
<td>15</td>
<td>10</td>
</tr>
</tbody>
</table>

---

**%THD+noise @ 90dB and 100dB**

<table>
<thead>
<tr>
<th>Frequency (Hz)</th>
<th>%THD+noise</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>0.01</td>
</tr>
<tr>
<td>100</td>
<td>0.02</td>
</tr>
<tr>
<td>1000</td>
<td>0.03</td>
</tr>
<tr>
<td>10000</td>
<td>0.04</td>
</tr>
<tr>
<td>100000</td>
<td>0.05</td>
</tr>
</tbody>
</table>

---

**Impulse Response**

<table>
<thead>
<tr>
<th>Time in Seconds</th>
<th>Volts</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>0.001</td>
<td>0.001</td>
</tr>
<tr>
<td>0.002</td>
<td>0.002</td>
</tr>
<tr>
<td>0.003</td>
<td>0.003</td>
</tr>
</tbody>
</table>

---

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Headphone Measurements: Grado SR225i Goo Bowl

- **Impedance @ 1kHz**: 32 Ohms
- **Power Needed for 90dB SPL**: 0.39 mW
- **Broadband Isolation in dB (100Hz to 10kHz)**: -1 dB

---

**Frequency Response**
- Top - Compensated and Averaged
- Bottom - Raw Data for Five Headphone Positions

**Isolation**
- Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**
Headphone Measurements: Grado SR225i G Pads

**Volts RMS required to reach 90dB SPL:** 0.151 Vrms

**Impedance @ 1kHz:** 32 Ohms

**Power Needed for 90dB SPL:** 0.71 mW

**Broadband Isolation in dB (100Hz to 10kHz):** -3 dB

---

**Frequency Response**
- Top - Compensated and Averaged
- Bottom - Raw Data for Five Headphone Positions

**Isolation**
- Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

---

**30 Hz Square Wave**

**300 Hz Square Wave**

---

**Impulse Response**

---

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Headphone Measurements: Grado SR225i Reverse Bowls

- **Volts RMS required to reach 90dB SPL**: 0.091 Vrms
- **Impedance @ 1kHz**: 32 Ohms
- **Power Needed for 90dB SPL**: 0.25 mW
- **Broadband Isolation in dB (100Hz to 10kHz)**: -1 dBr

---

**Impulse Response**

**Electrical Impedance and Phase**

Measured with 600 Ohm output impedance.

**Isolation**

Attenuation of External Sound vs. Frequency

---

**Frequency Response**

Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

---

**%THD+noise @ 90dB and 100dB**

---

**30 Hz Square Wave**

---

**300 Hz Square Wave**

---

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**Headphone Measurements:**

**Grado SR225i Small Flat Pads**

**Frequency Response**

Top - Compensated and Averaged  
Bottom - Raw Data for Five Headphone Positions

**Isolation**

Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**

Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

Volts RMS required to reach 90dB SPL: 0.063 Vrms  
Impedance @ 1kHz: 33 Ohms  
Power Needed for 90dB SPL: 0.12 mW  
Broadband Isolation in dB (100Hz to 10kHz): -2 dBr

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**Headphone Measurements:**

Grado SR225i TTVJ Flat Pads

**Headphone Measurements:**

Volts RMS required to reach 90dB SPL: 0.069 Vrms
Impedance @ 1kHz: 32 Ohms
Power Needed for 90dB SPL: 0.14 mW
Broadband Isolation in dB (100Hz to 10kHz): 0 dB
**Headphone Measurements: Grado SR325**

- **Volts RMS required to reach 90dB SPL:** 0.120 Vrms
- **Impedance @ 1kHz:** 33 Ohms
- **Power Needed for 90dB SPL:** 0.43 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -1 dBm

---

**Frequency Response**
- Top - Compensated and Averaged
- Bottom - Raw Data for Five Headphone Positions

**Isolation**
- Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

---

**Impulse Response**

---

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**Headphone Measurements: Grado SR325i**

- **Volts RMS required to reach 90dB SPL:** 0.112 Vrms
- **Impedance @ 1kHz:** 34 Ohms
- **Power Needed for 90dB SPL:** 0.37 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -1 dB

---

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**Impulse Response**

---

**%THD+noise @ 90dB and 100dB**

---

**30 Hz Square Wave**

---

**300 Hz Square Wave**

---

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

---

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Headphone Measurements: Grado SR325e

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Impulse Response**

<table>
<thead>
<tr>
<th>Time in Seconds</th>
<th>Volts</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0000</td>
<td>0.003</td>
</tr>
<tr>
<td>0.0003</td>
<td>0.002</td>
</tr>
<tr>
<td>0.0006</td>
<td>0.001</td>
</tr>
<tr>
<td>0.0009</td>
<td>0.000</td>
</tr>
<tr>
<td>0.0012</td>
<td>-0.001</td>
</tr>
<tr>
<td>0.0015</td>
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</tr>
<tr>
<td>0.0018</td>
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</tr>
<tr>
<td>0.0021</td>
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</tr>
<tr>
<td>0.0024</td>
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<td>0.0027</td>
<td>-0.006</td>
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<tr>
<td>0.0030</td>
<td>-0.007</td>
</tr>
</tbody>
</table>

**%THD+noise @ 90dB and 100dB**

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Left 90dB</th>
<th>Right 90dB</th>
<th>Left 100dB</th>
<th>Right 100dB</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>0.01</td>
<td>0.02</td>
<td>0.03</td>
<td>0.04</td>
</tr>
<tr>
<td>100</td>
<td>0.05</td>
<td>0.06</td>
<td>0.07</td>
<td>0.08</td>
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<td>1000</td>
<td>0.09</td>
<td>0.10</td>
<td>0.11</td>
<td>0.12</td>
</tr>
<tr>
<td>10000</td>
<td>0.13</td>
<td>0.14</td>
<td>0.15</td>
<td>0.16</td>
</tr>
<tr>
<td>100000</td>
<td>0.17</td>
<td>0.18</td>
<td>0.19</td>
<td>0.20</td>
</tr>
</tbody>
</table>

**30 Hz Square Wave**

<table>
<thead>
<tr>
<th>Time in Seconds</th>
<th>Volts</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0000</td>
<td>0.004</td>
</tr>
<tr>
<td>0.0001</td>
<td>0.003</td>
</tr>
<tr>
<td>0.0002</td>
<td>0.002</td>
</tr>
<tr>
<td>0.0003</td>
<td>0.001</td>
</tr>
<tr>
<td>0.0004</td>
<td>0.000</td>
</tr>
<tr>
<td>0.0005</td>
<td>-0.001</td>
</tr>
<tr>
<td>0.0006</td>
<td>-0.002</td>
</tr>
<tr>
<td>0.0007</td>
<td>-0.003</td>
</tr>
<tr>
<td>0.0008</td>
<td>-0.004</td>
</tr>
<tr>
<td>0.0009</td>
<td>-0.005</td>
</tr>
<tr>
<td>0.0010</td>
<td>-0.006</td>
</tr>
</tbody>
</table>

**300 Hz Square Wave**

<table>
<thead>
<tr>
<th>Time in Seconds</th>
<th>Volts</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0000</td>
<td>0.004</td>
</tr>
<tr>
<td>0.0001</td>
<td>0.003</td>
</tr>
<tr>
<td>0.0002</td>
<td>0.002</td>
</tr>
<tr>
<td>0.0003</td>
<td>0.001</td>
</tr>
<tr>
<td>0.0004</td>
<td>0.000</td>
</tr>
<tr>
<td>0.0005</td>
<td>-0.001</td>
</tr>
<tr>
<td>0.0006</td>
<td>-0.002</td>
</tr>
<tr>
<td>0.0007</td>
<td>-0.003</td>
</tr>
<tr>
<td>0.0008</td>
<td>-0.004</td>
</tr>
<tr>
<td>0.0009</td>
<td>-0.005</td>
</tr>
<tr>
<td>0.0010</td>
<td>-0.006</td>
</tr>
</tbody>
</table>

**Isolation**
Attenuation of External Sound vs. Frequency

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Reduction in dB</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>0.01</td>
</tr>
<tr>
<td>100</td>
<td>0.02</td>
</tr>
<tr>
<td>1000</td>
<td>0.03</td>
</tr>
<tr>
<td>10000</td>
<td>0.04</td>
</tr>
<tr>
<td>100000</td>
<td>0.05</td>
</tr>
</tbody>
</table>

**Headphone Measurements:**

- **Volts RMS required to reach 90dB SPL:** 0.042 Vrms
- **Impedance @ 1kHz:** 32 Ohms
- **Power Needed for 90dB SPL:** 0.08 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -1 dB

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Headphone Measurements:  Grado SR60i

**Headphone Measurements:**

- **Volts RMS required to reach 90dB SPL:** 0.088 Vrms
- **Impedance @ 1kHz:** 33 Ohms
- **Power Needed for 90d BSPL:** 0.24 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** 0 dB

---

**Frequency Response**

Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**

Attenuation of External Sound vs. Frequency

---

**Electrical Impedance and Phase**

Measured with 600 Ohm output impedance.

---

**30 Hz Square Wave**

---

**300 Hz Square Wave**

---

**Impulse Response**

---

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Headphone Measurements: Jays v-JAYS

Volts RMS required to reach 90dB SPL: 0.071 Vrms
Impedance @ 1kHz: 27 Ohms
Power Needed for 90dB SPL: 0.19 mW
Broadband Isolation in dB (100Hz to 10kHz): -1 dB
Headphone Measurements:  Koss Porta Pro

- Volts RMS required to reach 90dB SPL: 0.047 Vrms
- Impedance @ 1kHz: 60 Ohms
- Power Needed for 90dB SPL: 0.04 mW
- Broadband Isolation in dB (100Hz to 10kHz): -1 dB
Headphone Measurements:  Koss KSC75

- **Volts RMS required to reach 90dB SPL:** 0.085 Vrms
- **Impedance @ 1kHz:** 60 Ohms
- **Power Needed for 90dB SPL:** 0.12 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -2 dBf

---

**Frequency Response**
- Top - Compensated and Averaged
- Bottom - Raw Data for Five Headphone Positions

**Isolation**
- Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100db**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**
**Headphone Measurements:**

**Koss KPH7**

- **Volts RMS required to reach 90dB SPL:** 0.162 Vrms
- **Impedance @ 1kHz:** 33 Ohms
- **Power Needed for 90dB SPL:** 0.79 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -1 dB
Headphone Measurements: Polk UltraFit 2000

Volts RMS required to reach 90dB SPL: 0.078 Vrms
Impedance @ 1kHz: 22 Ohms
Power Needed for 90d BSPL: 0.27 mW
Broadband Isolation in dB (100Hz to 1kHz): -2 dB
Headphone Measurements: Sennheiser HD 238

Volts RMS required to reach 90dB SPL: 0.119 Vrms
Impedance @ 1kHz: 37 Ohms
Power Needed for 90dB SPL: 0.38 mW
Broadband Isolation in dB (100Hz to 10kHz): -1 dB
Headphone Measurements: Sennheiser HD 414

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

Volts RMS required to reach 90dB SPL: 0.323 Vrms
Impedance @ 1kHz: 1974 Ohms
Power Needed for 90dB SPL: 0.05 mW
Broadband Isolation in dB (100Hz to 10kHz): -3 dB

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Headphone Measurements:  Sennheiser HD 424

**Headphone Measurements:**
- Volts RMS required to reach 90dB SPL: 0.405 Vrms
- Impedance @ 1kHz: 2096 Ohms
- Power Needed for 90dB SPL: 0.08 mW
- Broadband Isolation in dB (100Hz to 10kHz): -2 dB

**Graphs:**
- **Frequency Response**:
  - Top - Compensated and Averaged
  - Bottom - Raw Data for Five Headphone Positions
- **Isolation**: Attenuation of External Sound vs. Frequency
- **Electrical Impedance and Phase**: Measured with 600 Ohm output impedance.
- **%THD+noise @ 90dB and 100dB**
- **30 Hz Square Wave**
- **300 Hz Square Wave**
- **Impulse Response**

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Headphone Measurements: Sennheiser PX 100-ii

Volts RMS required to reach 90dB SPL: 0.054 Vrms
Impedance @ 1kHz: 37 Ohms
Power Needed for 90dB SPL: 0.08 mW
Broadband Isolation in dB (100Hz to 10kHz): -1 dB

%THD + noise @ 90dB and 100dB

30 Hz Square Wave

300 Hz Square Wave

Impulse Response

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Headphone Measurements: Sennheiser PX100

- Voltage RMS required to reach 90dB SPL: 0.050 Vrms
- Impedance @ 1kHz: 33 Ohms
- Power Needed for 90dB SPL: 0.07 mW
- Broadband Isolation in dB (100Hz to 10kHz): -2 dB
**Headphone Measurements:**

**Ultrasone Zino**

- **Volts RMS required to reach 90dB SPL:** 0.094 Vrms
- **Impedance @ 1kHz:** 41 Ohms
- **Power Needed for 90d BSPL:** 0.22 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -3 dB

### Frequency Response
- **Top:** Compensated and Averaged
- **Bottom:** Raw Data for Five Headphone Positions

### Isolation
- Attenuation of External Sound vs. Frequency

### Electrical Impedance and Phase
- Measured with 600 Ohm output impedance.

### 30 Hz Square Wave

### 300 Hz Square Wave

### Impulse Response

---

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Headphone Measurement Datasheets

Earpad Sealed
**Headphone Measurements:** Aedle VK1

- Volts RMS required to reach 90dB SPL: 0.047 Vrms
- Impedance @ 1kHz: 34 Ohms
- Power Needed for 90d BSPL: 0.06 mW
- Broadband Isolation in dB (100Hz to 10kHz): -9 dB
Headphone Measurements: AKG K67 Tiesto

**Headphone Measurements**

**Volts RMS required to reach 90dB SPL:** 0.006 Vrms

**Impedance @ 1kHz:** 34 Ohms

**Power Needed for 90dB SPL:** 0.00 mW

**Broadband Isolation in dB (100Hz to 10kHz):** -12 dB

---

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

---

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**Headphone Measurements:**

**AKG K450**

**Volts RMS required to reach 90dB SPL:** 0.024 Vrms

**Impedance @ 1kHz:** 36 Ohms

**Power Needed for 90dB SPL:** 0.02 mW

**Broadband Isolation in dB (100Hz to 10kHz):** -9 dB
Headphone Measurements: AKG K581LE

Volts RMS required to reach 90dB SPL: 0.056 Vrms
Impedance @ 1kHz: 34 Ohms
Power Needed for 90dB SPL: 0.09 mW
Broadband Isolation in dB (100Hz to 10kHz): -16 dBr

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Headphone Measurements: AKG K619

- Volts RMS required to reach 90dB SPL: 0.037 Vrms
- Impedance @ 1kHz: 35 Ohms
- Power Needed for 90dB SPL: 0.04 mW
- Broadband Isolation in dB (100Hz to 10kHz): -16 dB

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Headphone Measurements: AKG K81DJ

- **Headphone Measurements**
  - Volts RMS required to reach 90dB SPL: 0.060 Vrms
  - Impedance @ 1kHz: 35 Ohms
  - Power Needed for 90dB SPL: 0.10 mW
  - Broadband Isolation in dB (100Hz to 10kHz): -15 dBr

- **Frequency Response**
  - Top - Compensated and Averaged
  - Bottom - Raw Data for Five Headphone Positions

- **Isolation**
  - Attenuation of External Sound vs. Frequency

- **Electrical Impedance and Phase**
  - Measured with 600 Ohm output impedance.

- **%THD+noise @ 90dB and 100dB**

- **30 Hz Square Wave**

- **300 Hz Square Wave**

- **Impulse Response**

---

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Headphone Measurements:  
AKG Quincy Jones Q460

**Headphone Measurements:**

- **Volts RMS required to reach 90dB SPL:** 0.023 Vrms
- **Impedance @ 1kHz:** 35 Ohms
- **Power Needed for 90dB SPL:** 0.01 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -12 dB

---

**Frequency Response**

- **Top - Compensated and Averaged**
- **Bottom - Raw Data for Five Headphone Positions**

**Isolation**

- **Attenuation of External Sound vs. Frequency**

**Electrical Impedance and Phase**

- **Measured with 600 Ohm output impedance.**

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

---

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Headphone Measurements: Audeze SINE

**Volts RMS required to reach 90dB SPL:** 0.096 Vrms

**Impedance @ 1kHz:** 24 Ohms

**Power Needed for 90dB SPL:** 0.38 mW

**Broadband Isolation in dB (100Hz to 10kHz):** -11 dB

---

**Frequency Response**
- Top: Compensated and Averaged
- Bottom: Raw Data for Five Headphone Positions

**Isolation**
- Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

---

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Headphone Measurements: Audio Technica ATH-ESW9

Headphone Measurements:

- **Volts RMS required to reach 90dB SPL**: 0.043 Vrms
- **Impedance @ 1kHz**: 44 Ohms
- **Power Needed for 90d BSPL**: 0.04 mW
- **Broadband Isolation in dB (100Hz to 10kHz)**: -7 dB

---

**Frequency Response**
- **Top - Compensated and Averaged**
- **Bottom - Raw Data for Five Headphone Positions**

**Isolation**
- Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

Copyright © SOURCE INTERLINK MEDIA All rights reserved.
Headphone Measurements:  
Audio Technica ATH-WS55

Volts RMS required to reach 90dB SPL: 0.034 Vrms
Impedance @ 1kHz: 45 Ohms
Power Needed for 90dB SPL: 0.03 mW
Broadband Isolation in dB (100Hz to 10kHz): 12 dB
Headphone Measurements: Audio Technica ATH-ES55

- **Volts RMS required to reach 90dB SPL:** 0.033 Vrms
- **Impedance @ 1kHz:** 40 Ohms
- **Power Needed for 90dB SPL:** 0.03 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -8 dB

---

**Impulse Response**

- Time in Seconds
- Amplitude in dB

---

**Frequency Response**

- Top - Compensated and Averaged
- Bottom - Raw Data for Five Headphone Positions

---

**Electrical Impedance and Phase**

- Measured with 600 Ohm output impedance.

---

**Isolation**

- Attenuation of External Sound vs. Frequency

---

**%THD+noise @ 90dB and 100dB**

- Frequency
- %THD+noise

---

**30 Hz Square Wave**

- Time in Seconds
- Volts

---

**300 Hz Square Wave**

- Time in Seconds
- Volts

---

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Headphone Measurements: Audio Technica ATH-FC700

**Headphone Measurements:**

- **Volts RMS required to reach 90dB SPL:** 0.074 Vrms
- **Impedance @ 1kHz:** 42 Ohms
- **Power Needed for 90d BSPL:** 0.13 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -6 dB
**Headphone Measurements:**

Audio Technical ATH-ES55

---

**Frequency Response**

Top - Compensated and Averaged

Bottom - Raw Data for Five Headphone Positions

---

**Electrical Impedance and Phase**

Measured with 600 Ohm output impedance.

---

**Isolation**

Attenuation of External Sound vs. Frequency

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**%THD+noise @ 90dB and 100dB**

---

**Impulse Response**

---

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**Headphone Measurements:**  
**Bang Olufsen H6**

- **Volts RMS required to reach 90dB SPL:** 0.044 Vrms
- **Impedance @ 1kHz:** 34 Ohms
- **Power Needed for 90d BSPL:** 0.06 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -16 dBr

---

**Frequency Response**

Top - Compensated and Averaged  
Bottom - Raw Data for Five Headphone Positions

**Isolation**

Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**

Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

[Graphs and charts showing various measurements and analyses for the Bang Olufsen H6 headphones]
Headphone Measurements: Beats Solo II 2014

Volts RMS required to reach 90dB SPL: 0.040 Vrms
Impedance @ 1kHz: 33 Ohms
Power Needed for 90dB SPL: 0.05 mW
Broadband Isolation in dB (100Hz to 10kHz): -17 dB
Headphone Measurements: Beats Solo3 Wired

- **Volts RMS required to reach 90dB SPL:** 0.046 Vrms
- **Impedance @ 1kHz:** 37 Ohms
- **Power Needed for 90dB SPL:** 0.06 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -15 dBu
**Headphone Measurements:**

**Beats Mixr 2014**

**Volts RMS required to reach 90dB SPL:** 0.020 Vrms

**Impedance @ 1kHz:** 18 Ohms

**Power Needed for 90dB SPL:** 0.02 mW

**Broadband Isolation in dB (100Hz to 10kHz):** -15 dB

---

**Frequency Response**

- Top - Compensated and Averaged
- Bottom - Raw Data for Five Headphone Positions

**Isolation**

- Attenuation of External Sound vs. Frequency

---

**30 Hz Square Wave**

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**300 Hz Square Wave**

---

**Impulse Response**

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Headphone Measurements: Behringer HPS5000

Frequency Response
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

Impedance and Phase
Measured with 600 Ohm output impedance.

%THD+noise @ 90dB and 100dB

30 Hz Square Wave

300 Hz Square Wave

Impulse Response

Volts RMS required to reach 90dB SPL: 0.040 Vrms
Impedance @ 1kΩ: 35 Ohms
Power Needed for 90dB SPL: 0.04 mW
Broadband Isolation in dB (100Hz to 10kHz): -7 dBr

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Headphone Measurements:  

**Beyerdynamic DT 235**

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**Headphone Measurements:**

- **Volts RMS required to reach 90dB SPL:** 0.099 Vrms
- **Impedance @ 1kHz:** 34 Ohms
- **Power Needed for 90dB SPL:** 0.29 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -3 dB

---

**Frequency Response**

- **Top - Compensated and Averaged**
- **Bottom - Raw Data for Five Headphone Positions**

---

**Isolation**

- **Attenuation of External Sound vs. Frequency**

---

**Electrical Impedance and Phase**

- **Measured with 600 Ohm output impedance.**

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**%THD+noise @ 90dB and 100dB**

---

**30Hz Square Wave**

---

**300Hz Square Wave**

---

**Impulse Response**

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Headphone Measurements:  
**Beyerdynamic DT 1350**

**Headphone Measurements:**

- **Volts RMS required to reach 90dB SPL:** 0.051 Vrms
- **Impedance @ 1kHz:** 89 Ohms
- **Power Needed for 90dB SPL:** 0.03 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -19 dB

**Frequency Response**

- Top - Compensated and Averaged
- Bottom - Raw Data for Five Headphone Positions

**Isolation**

- Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**

- Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

- Volts RMS required to reach 90dB SPL: 0.051 Vrms
- Impedance @ 1kHz: 89 Ohms
- Power Needed for 90dB SPL: 0.03 mW
- Broadband Isolation in dB (100Hz to 10kHz): -19 dB

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Headphone Measurements:  
Beyerdynamic T 51 i

- **Volts RMS required to reach 90dB SPL**: 0.035 Vrms
- **Impedance @ 1kHz**: 36 Ohms
- **Power Needed for 90dB SPL**: 0.03 mW
- **Broadband Isolation in dB (100Hz to 10kHz)**: -22 dB

---

**Frequency Response**
- Top - Compensated and Averaged
- Bottom - Raw Data for Five Headphone Positions

**Isolation**
- Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**Impulse Response**

---

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**Headphone Measurements:**

**Beyerdynamic T50p**

- **Volts RMS required to reach 90dB SPL:** 0.020 Vrms
- **Impedance @ 1kHz:** 37 Ohms
- **Power Needed for 90dB SPL:** 0.01 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -15 dB

---

**Frequency Response**

Top - Compensated and Averaged

Bottom - Raw Data for Five Headphone Positions

---

**Isolation**

Attenuation of External Sound vs. Frequency

---

**Electrical Impedance and Phase**

Measured with 600 Ohm output impedance.

---

**30 Hz Square Wave**

---

**%THD+noise @ 90dB and 100dB**

---

**300 Hz Square Wave**

---

**Impulse Response**

---

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**Headphone Measurements:**

**Beyerdynamic T50p Sample B**

- **Volts RMS required to reach 90dB SPL:** 0.013 Vrms
- **Impedance @ 1kHz:** 39 Ohms
- **Power Needed for 90dB SPL:** 0.00 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -18 dB
Headphone Measurements: Beyerdynamic T50p SN16912

- **Volts RMS required to reach 90dB SPL:** 0.025 Vrms
- **Impedance @ 1kHz:** 36 Ohms
- **Power Needed for 90dB SPL:** 0.02 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -16 dB

---

**Frequency Response**
- Top - Compensated and Averaged
- Bottom - Raw Data for Five Headphone Positions

**Isolation**
- Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

---

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Headphone Measurements:  Beyerdynamic DTX 350 m

- **Volts RMS required to reach 90dB SPL:** 0.069 Vrms
- **Impedance @ 1kHz:** 37 Ohms
- **Power Needed for 90dB SPL:** 0.13 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -19 dBr

---

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

Volts RMS required to reach 90dB SPL: 0.069 Vrms
Impedance @ 1kHz: 37 Ohms
Power Needed for 90dB SPL: 0.13 mW
Broadband Isolation in dB (100Hz to 10kHz): -19 dBr
Headphone Measurements:  
Beyerdynamic DTX300p

**Headphone Measurements:**

- **Volts RMS required to reach 90dB SPL:** 0.028 Vrms
- **Impedance @ 1kHz:** 37 Ohms
- **Power Needed for 90dB SPL:** 0.02 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -10 dB
**Headphone Measurements: BlueAnt Embrace**

- **Volts RMS required to reach 90dB SPL:** 0.043 Vrms
- **Impedance @ 1kHz:** 28 Ohms
- **Power Needed for 90dB SPL:** 0.07 mW
- **Broadband Isolation in dB (100Hz to 1kHz):** -11 dB

---

**Frequency Response**
- Top - Compensated and Averaged
- Bottom - Raw Data for Five Headphone Positions

**Isolation**
- Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

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Headphone Measurements:  Bowers Wilkins P5 Series 2

**Headphone Measurements:**

- **Volts RMS required to reach 90dB SPL:** 0.084 Vrms
- **Impedance @ 1kHz:** 25 Ohms
- **Power Needed for 90dB SPL:** 0.28 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -14 dB

---

**Frequency Response**
- **Top - Compensated and Averaged**
- **Bottom - Raw Data for Five Headphone Positions**

**Isolation**
- Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

Impulse Response

---

Copyright © SOURCE INTERLINK MEDIA All rights reserved.
Headphone Measurements: Bowers and Wilkins P5 Test 2

**Headphone Measurements:**

- **Volts RMS required to reach 90dB SPL:** 0.051 Vrms
- **Impedance @ 1kHz:** 27 Ohms
- **Power Needed for 90d BSPL:** 0.09 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -16 dBr

**Graphs and Diagrams:**

1. **Frequency Response**
   - Top: Compensated and Averaged
   - Bottom: Raw Data for Five Headphone Positions

2. **Electrical Impedance and Phase**
   - Measured with 600 Ohm output impedance

3. **%THD+noise @ 90dB and 100dB**

4. **Impulse Response**

5. **Isolation**
   - Attenuation of External Sound vs. Frequency

6. **30 Hz Square Wave**

7. **300 Hz Square Wave**

---

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Headphone Measurements: Bowers Wilkins P3

**Headphone Measurements**

- **Volts RMS required to reach 90dB SPL:** 0.050 Vrms
- **Impedance @ 1kHz:** 37 Ohms
- **Power Needed for 90d BSPL:** 0.07 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -10 dB
- **%THD+noise @ 90dB and 100dB**
- **30 Hz Square Wave**
- **300 Hz Square Wave**
- **Impulse Response**

---

**Frequency Response**

- Top - Compensated and Averaged
- Bottom - Raw Data for Five Headphone Positions

**Isolation**

- Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**

- Measured with 600 Ohm output impedance.
Headphone Measurements:

**California Headphone Lorado**

### Frequency Response
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

### Isolation
Attenuation of External Sound vs. Frequency

### Electrical Impedance and Phase
Measured with 600 Ohm output impedance.

### %THD+noise @ 90dB and 100dB

### 30 Hz Square Wave

### 300 Hz Square Wave

### Impulse Response

Volts RMS required to reach 90dB SPL: 0.040 Vrms
Impedance @ 1kHz: 34 Ohms
Power Needed for 90d BSPL: 0.05 mW
Broadband Isolation in dB (100Hz to 10kHz): -12 dB
Headphone Measurements: Ceaden Linea No 10 Passive Wired

- **Volts RMS required to reach 90dB SPL**: 0.039 Vrms
- **Impedance @ 1kHz**: 25 Ohms
- **Power Needed for 90dB SPL**: 0.06 mW
- **Broadband Isolation in dB (100Hz to 10kHz)**: -17 dB

---

**Frequency Response**

Top - Compensated and Averaged  
Bottom - Raw Data for Five Headphone Positions

**Isolation**

Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**

Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

Volt RMS required to reach 90dB SPL: 0.039 Vrms  
Impedance @ 1kHz: 25 Ohms  
Power Needed for 90dB SPL: 0.06 mW  
Broadband Isolation in dB (100Hz to 10kHz): -17 dB

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Headphone Measurements: Caeden Linea No10 Active Wired

Volts RMS required to reach 90dB SPL: 0.057 Vrms
Impedance @ 1kHz: 72699 Ohms
Power Needed for 90dB SPL: 0.00 mW
Broadband Isolation in dB (100Hz to 10kHz): -17 dB

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Headphone Measurements: Eskuche 33 1/3 B

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Impedance and Phase**
Measured with 600 Ohm output impedance.

**Isolation**
Attenuation of External Sound vs. Frequency

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

Volts RMS required to reach 90dB SPL: 0.023 Vrms
Impedance @ 1kHz: 33 Ohms
Power Needed for 90dBSPL: 0.02 mW
Broadband Isolation in dB (100Hz to 10kHz): -8 dB
**Headphone Measurements:**

**House of Marley Exodus Second Pair**

**Impedance**
- **Impedance @ 1kHz:** 33 Ohms
- **Power Needed for 90dB SPL:** 0.03 mW

**Isolation**
- **Broadband Isolation in dB (100Hz to 10kHz):** -11 dB

---

**Frequency Response**
- **Top - Compensated and Averaged**
- **Bottom - Raw Data for Five Headphone Positions**

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**Impulse Response**
- Volts RMS required to reach 90dB SPL: 0.029 Vrms
- Impedance @ 1kHz: 33 Ohms
- Power Needed for 90dB SPL: 0.03 mW
- Broadband Isolation in dB (100Hz to 10kHz): -11 dB

---

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Headphone Measurements: I-Mego Throne

Volts RMS required to reach 90dB SPL: 0.022 Vrms
Impedance @ 1kHz: 34 Ohms
Power Needed for 90db SPL: 0.04 mW
Broadband Isolation in dB (100Hz to 10kHz): -13 dB
Headphone Measurements: JAYS u-JAYS

Volts RMS required to reach 90dB SPL: 0.064 Vrms
Impedance @ 1kHz: 5 Ohms
Power Needed for 90dB SPL: 0.81 mW
Broadband Isolation in dB (100Hz to 10kHz): -16 dBr
Headphone Measurements: JBL J55i

**Headphone Measurements:**

- **Volts RMS required to reach 90dB SPL:** 0.024 Vrms
- **Impedance @ 1kHz:** 37 Ohms
- **Power Needed for 90dB SPL:** 0.02 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -13 dB

---

**Frequency Response**

Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**

Attenuation of External Sound vs. Frequency

---

**Electrical Impedance and Phase**

Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

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Headphone Measurements: JVC HA-S500-Z

**Headphone Measurements:**

- **Volts RMS required to reach 90dB SPL:** 0.018 Vrms
- **Impedance @ 1kHz:** 37 Ohms
- **Power Needed for 90dB SPL:** 0.01 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -12 dB

---

**Frequency Response**

Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**

Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**

Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

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Headphone Measurements: KEF M500

**Headphone Measurements:**

**Volts RMS required to reach 90dB SPL:** 0.030 Vrms

**Impedance @ 1kHz:** 34 Ohms

**Power Needed for 90dB SPL:** 0.03 mW

**Broadband Isolation in dB (100Hz to 10kHz):** -16 dB

---

**Frequency Response**

*Top - Compensated and Averaged*

*Bottom - Raw Data for Five Headphone Positions*

---

**Isolation**

*Attenuation of External Sound vs. Frequency*

---

**Electrical Impedance and Phase**

*Measured with 600 Ohm output impedance.*

---

**Impulse Response**

---

**%THD+noise @ 90dB and 100dB**

---

**30 Hz Square Wave**

---

**300 Hz Square Wave**

---

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Headphone Measurements:  Klipsch Image One

---

**Frequency Response**

Top - Compensated and Averaged  
Bottom - Raw Data for Five Headphone Positions

---

**Isolation**

Attenuation of External Sound vs. Frequency

---

**Electrical Impedance and Phase**

Measured with 600 Ohm output impedance.

---

**%THD+noise @ 90dB and 100dB**

---

**30 Hz Square Wave**

---

**300 Hz Square Wave**

---

**Impulse Response**

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---

- Volts RMS required to reach 90dB SPL: 0.049 Vrms
- Impedance @ 1kHz: 35 Ohms
- Power Needed for 90dB SPL: 0.07 mW
- Broadband Isolation in dB (100Hz to 10kHz): -8 dB
### Headphone Measurements: Klipsch Image One B

- **Volts RMS required to reach 90dB SPL:** 0.049 Vrms
- **Impedance @ 1kHz:** 35 Ohms
- **Power Needed for 90dBSPL:** 0.07 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -10 dB

---

### Frequency Response

- **Top - Compensated and Averaged**
- **Bottom - Raw Data for Five Headphone Positions**

### Isolation

- **Attenuation of External Sound vs. Frequency**

### Electrical Impedance and Phase

- Measured with 600 Ohm output impedance.

### %THD+noise @ 90dB and 100dB

### 30 Hz Square Wave

### 300 Hz Square Wave

### Impulse Response

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Headphone Measurements: Klipsch Reference On Ear

Volts RMS required to reach 90dB SPL: 0.040 Vrms
Impedance @ 1kHz: 35 Ohms
Power Needed for 90dB SPL: 0.05 mW
Broadband Isolation in dB (100Hz to 10kHz): -19 dBm
Headphone Measurements: Klipsch Reference One

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

---

Frequency Response:
- Volts RMS required to reach 90dB SPL: 0.038 Vrms
- Impedance @ 1kHz: 35 Ohms
- Power Needed for 90dB SPL: 0.04 mW
- Broadband Isolation in dB (100Hz to 10kHz): -10 dB

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Headphone Measurements: Koss SP330

Headphone Measurements:

- **Volts RMS required to reach 90dB SPL:** 0.051 Vrms
- **Impedance @ 1kHz:** 36 Ohms
- **Power Needed for 90dB SPL:** 0.07 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -19 dB

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Headphone Measurements:

**Volts RMS required to reach 90dB SPL:** 0.018 Vrms

**Impedance @ 1kHz:** 37 Ohms

**Power Needed for 90d BSPL:** 0.01 mW

**Broadband Isolation in dB (100Hz to 10kHz):** -15 dB

---

**Frequency Response**

*Top - Compensated and Averaged*

*Bottom - Raw Data for Five Headphone Positions*

**Isolation**

*Attenuation of External Sound vs. Frequency*

**Electrical Impedance and Phase**

*Measured with 600 Ohm output impedance.*

---

**%THD+noise @ 90dB and 100dB**

---

**Impulse Response**

---

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Headphone Measurements: Marshall Major

**Volts RMS required to reach 90dB SPL:** 0.047 Vrms

**Impedance @ 1kHz:** 36 Ohms

**Power Needed for 90dB SPL:** 0.06 mW

**Broadband Isolation in dB (100Hz to 10kHz):** -6 dB
Headphone Measurements: Master Dynamic MH30

- **Volts RMS required to reach 90dB SPL:** 0.034 Vrms
- **Impedance @ 1kHz:** 37 Ohms
- **Power Needed for 90d BSPL:** 0.03 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -22 db

---

**Isolation**

Attenuation of External Sound vs. Frequency

---

**Electrical Impedance and Phase**

Measured with 600 Ohm output impedance.

---

**%THD+noise @ 90dB and 100dB**

---

**30 Hz Square Wave**

---

**300 Hz Square Wave**

---

**Impulse Response**

---

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### Headphone Measurements: Meze Classics 66

**Headphone Measurements:**

**Volts RMS required to reach 90dB SPL:**
0.028 Vrms

**Impedance @ 1kHz:**
34 Ohms

**Power Needed for 90dB SPL:**
0.02 mW

**Broadband Isolation in dB (100Hz to 1kHz):**
-13 dB

---

**Frequency Response**

Top - Compensated and Averaged

Bottom - Raw Data for Five Headphone Positions

**Isolation**

Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**

Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30Hz Square Wave**

**300Hz Square Wave**

**Impulse Response**

Volts RMS required to reach 90dB SPL: 0.028 Vrms

Impedance @ 1kHz: 34 Ohms

Power Needed for 90dB SPL: 0.02 mW

Broadband Isolation in dB (100Hz to 1kHz): -13 dB
**Headphone Measurements:**

**Monster Beats Solo**

---

**Headphone Measurements:**

- **Volts RMS required to reach 90dB SPL:** 0.038 Vrms
- **Impedance @ 1kHz:** 35 Ohms
- **Power Needed for 90dB SPL:** 0.04 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -14 dB

---

**Frequency Response**

- Top - Compensated and Averaged
- Bottom - Raw Data for Five Headphone Positions

**Electrical Impedance and Phase**

- Measured with 600 Ohm output impedance.

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

---

**Isolation**

- Attenuation of External Sound vs. Frequency

---

**%THD+noise @ 90dB and 100dB**

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**Headphone Measurements:**

**Monster Beats Solo Sample 2**

**Headphone Measurements:**

- **Volts RMS required to reach 90dB SPL:** 0.033 Vrms
- **Impedance @ 1kHz:** 34 Ohms
- **Power Needed for 90dB SPL:** 0.03 mW
- **Broadband Isolation in dB (100Hz to 1kHz):** -12 dB

---

**Frequency Response**

Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**

Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**

Measured with 600 Ohm output impedance.

**30 Hz Square Wave**

**300 Hz Square Wave**

**%THD+noise @ 90dB and 100dB**

**Impulse Response**

- Time in Seconds
- Volts

---

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Headphone Measurements: Monster Beats by Dr Dre Solo HD

- **Volts RMS required to reach 90dB SPL:** 0.030 Vrms
- **Impedance @ 1kHz:** 35 Ohms
- **Power Needed for 90dB SPL:** 0.03 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -17 dB
Headphone Measurements:  
Music Hall DeBe

- **Volts RMS required to reach 90dB SPL:** 0.020 Vrms
- **Impedance @ 1kHz:** 37 Ohms
- **Power Needed for 90dB SPL:** 0.01 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -14 dB

---

**Frequency Response**
- Top - Compensated and Averaged
- Bottom - Raw Data for Five Headphone Positions

**Isolation**
- Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

---

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**Headphone Measurements:**

**Musical Fidelity MF100**

- **Volts RMS required to reach 90dB SPL:** 0.057 Vrms
- **Impedance @ 1kHz:** 74 Ohms
- **Power Needed for 90dB SPL:** 0.04 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -9 dBr

---

**Frequency Response**

Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**

Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**

Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

Volts RMS required to reach 90dB SPL: 0.057 Vrms
Impedance @ 1kHz: 74 Ohms
Power Needed for 90dB SPL: 0.04 mW
Broadband Isolation in dB (100Hz to 10kHz): -9 dBr

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Headphone Measurements: Musical Fidelity MF200

Frequency Response
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

Impedance and Phase
Measured with 600 Ohm output impedance.

%THD+noise @ 90dB and 100dB

30 Hz Square Wave

300 Hz Square Wave

Impulse Response

Volts RMS required to reach 90dB SPL: 0.041 Vrms
Impedance @ 1kHz: 70 Ohms
Power Needed for 90dB SPL: 0.02 mW
Broadband Isolation in dB (100Hz to 10kHz): -10 dBr

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Headphone Measurements: Nocs NS700

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**30 Hz Square Wave**

**%THD+noise @ 90dB and 100dB**

**300 Hz Square Wave**

**Impulse Response**

Volts RMS required to reach 90dB SPL: 0.042 Vrms
Impedance @ 1kHz: 34 Ohms
Power Needed for 90d BSPL: 0.05 mW
Broadband Isolation in dB (100Hz to 10kHz): -15 dB
Headphone Measurements:  Nocs NS300

**Headphone Measurements:**

- **Volts RMS required to reach 90dB SPL:** 0.028 Vrms
- **Impedance @ 1kHz:** 34 Ohms
- **Power Needed for 90dB SPL:** 0.02 mW
- **Broadband Isolation in dB (100Hz to 1kHz):** -12 dB
**Headphone Measurements: Noontec Zoro II Wireless Passive**

### Frequency Response
- **Top - Compensated and Averaged**
- **Bottom - Raw Data for Five Headphone Positions**

### Impedance and Phase
- Measured with 600 Ohm output impedance.

### Isolation
- Attenuation of External Sound vs. Frequency

### Electrical Impedance and Phase

### %THD+noise @ 90dB and 100dB

### 30 Hz Square Wave

### 300 Hz Square Wave

### Impulse Response

---

**Technical Specifications:**

- **Volts RMS required to reach 90dB SPL:** 0.037 Vrms
- **Impedance @ 1kHz:** 36 Ohms
- **Power Needed for 90dB SPL:** 0.04 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -17 dBr

---

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Headphone Measurements: Noontec Zoro II HD

Volts RMS required to reach 90dB SPL: 0.030 Vrms
Impedance @ 1kHz: 34 Ohms
Power Needed for 90dB SPL: 0.03 mW
Broadband Isolation in dB (100Hz to 10kHz): -15 dB

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Headphone Measurements:  Noontech Zoro HD

- **Volts RMS required to reach 90dB SPL**: 0.030 Vrms
- **Impedance @ 1kHz**: 35 Ohms
- **Power Needed for 90dB SPL**: 0.03 mW
- **Broadband Isolation in dB (100Hz to 10kHz)**: -12 dB

---

**Frequency Response**
- Top - Compensated and Averaged
- Bottom - Raw Data for Five Headphone Positions

**Isolation**
- Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

Copyright © SOURCE INTERLINK MEDIA All rights reserved.
Headphone Measurements: Noontec Zoro

**Headphone Measurements:**

- **Volts RMS required to reach 90dB SPL:** 0.016 Vrms
- **Impedance @ 1kHz:** 20 Ohms
- **Power Needed for 90dB SPL:** 0.01 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -9 dB

**Graphs:**

1. **Frequency Response**
   - Compensated and Averaged
   - Raw Data for Five Headphone Positions

2. **Isolation**
   - Attenuation of External Sound vs. Frequency

3. **Electrical Impedance and Phase**
   - Measured with 600 Ohm output impedance.

4. **30 Hz Square Wave**
   - Time in Seconds
   - Volts

5. **300 Hz Square Wave**
   - Time in Seconds
   - Volts

6. **Impulse Response**
   - Time in Seconds

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Headphone Measurements: Phiaton Chord MS530

- **Volts RMS required to reach 90dB SPL:** 0.020 Vrms
- **Impedance @ 1kHz:** 29 Ohms
- **Power Needed for 90d BSPL:** 0.05 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -14 dB
Headphone Measurements: Phiaton Bridge MS 500

**Headphone Measurements**
- **Volts RMS required to reach 90dB SPL:** 0.022 Vrms
- **Impedance @ 1kHz:** 17 Ohms
- **Power Needed for 90dB SPL:** 0.03 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -14 dB

**Frequency Response**
- Top - Compensated and Averaged
- Bottom - Raw Data for Five Headphone Positions

**Isolation**
- Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

Copyright © SOURCE INTERLINK MEDIA All rights reserved.
Headphone Measurements: Phiaton MS 300

- **Volts RMS required to reach 90dB SPL:** 0.020 Vrms
- **Impedance @ 1kHz:** 37 Ohms
- **Power Needed for 90dB SPL:** 0.01 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -10 dB

**Frequency Response**
- Top - Compensated and Averaged
- Bottom - Raw Data for Five Headphone Positions

**Isolation**
- Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

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**Headphone Measurements:**

**Phiaton PS 320**

**Frequency Response**

Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**

Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**

Measured with 600 Ohm output impedance.

**30 Hz Square Wave**

**300 Hz Square Wave**

**%THD+noise @ 90dB and 100dB**

**Impulse Response**

Volts RMS required to reach 90dB SPL: 0.050 Vrms
Impedance @ 1kHz: 35 Ohms
Power Needed for 90dB SPL: 0.07 mW
Broadband Isolation in dB (100Hz to 10kHz): -13 dB
Headphone Measurements: Philips Fidelio M1 Mk1 2012

Headphone Measurements:

- **Volts RMS required to reach 90dB SPL**: 0.027 Vrms
- **Impedance @ 1kHz**: 20 Ohms
- **Power Needed for 90dB SPL**: 0.04 mW
- **Broadband Isolation in dB (100Hz to 10kHz)**: -18 dB

**Frequency Response**
- Top - Compensated and Averaged
- Bottom - Raw Data for Five Headphone Positions

**Isolation**
- Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

Copyright © SOURCE INTERLINK MEDIA All rights reserved.
**Headphone Measurements: Philips Fidelio M1**

- **Volts RMS required to reach 90dB SPL**: 0.052 Vrms
- **Impedance @ 1kHz**: 30 Ohms
- **Power Needed for 90dBSPL**: 0.09 mW
- **Broadband Isolation in dB (100Hz to 10kHz)**: -10 dB

**Frequency Response**

Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**

Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**

Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

Volts RMS required to reach 90dB SPL: 0.052 Vrms
Impedance @ 1kHz: 30 Ohms
Power Needed for 90dBSPL: 0.09 mW
Broadband Isolation in dB (100Hz to 10kHz): -10 dB

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Headphone Measurements: Philips ActionFit SHQ5200

- Volts RMS required to reach 90dB SPL: 0.034 Vrms
- Impedance @ 1kHz: 33 Ohms
- Power Needed for 90d BSPL: 0.04 mW
- Broadband Isolation in dB (100Hz to 1kHz): -5 dBr

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Headphone Measurements: Philips Cityscape Downtown

**Headphone Measurements:**

- **Volts RMS required to reach 90dB SPL:** 0.027 Vrms
- **Impedance @ 1kHz:** 34 Ohms
- **Power Needed for 90dB SPL:** 0.02 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -16 dB

**Frequency Response**
- Top: Compensated and Averaged
- Bottom: Raw Data for Five Headphone Positions

**Isolation**
- Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

---

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Headphone Measurements: Philips O’Neil Bend

**Headphone Measurements:**
- **Volts RMS required to reach 90dB SPL:** 0.062 Vrms
- **Impedance @ 1kHz:** 32 Ohms
- **Power Needed for 90dB SPL:** 0.12 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -15 dB

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**30 Hz Square Wave**

**300 Hz Square Wave**

**%THD+noise @ 90dB and 100dB**

**Impulse Response**

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**Headphone Measurements:**

- **Philips Construct**

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**Frequency Response**
- Top: Compensated and Averaged
- Bottom: Raw Data for Five Headphone Positions

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**Isolation**
- Attenuation of External Sound vs. Frequency

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

---

Volts RMS required to reach 90dB SPL: 0.181 Vrms
Impedance @ 1kHz: 388 Ohms
Power Needed for 90dB SPL: 0.08 mW
Broadband Isolation in dB (100Hz to 10kHz): -15 dB
**Headphone Measurements: Philips SHL3000**

**Volts RMS required to reach 90dB SPL:** 0.051 Vrms  
**Impedance @ 1kHz:** 27 Ohms  
**Power Needed for 90d BSPL:** 0.10 mW  
**Broadband Isolation in dB (100Hz to 1kHz):** -5 dB

**Isolation**  
Attenuation of External Sound vs. Frequency

**Impulse Response**

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

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Headphone Measurements: Pioneer SE-MJ31

**Headphone Measurements:**

- **Headphone Measurements**

  **Volts RMS required to reach 90dB SPL:** 0.054 Vrms
  **Impedance @ 1kHz:** 33 Ohms
  **Power Needed for 90dB SPL:** 0.09 mW
  **Broadband Isolation in dB (100Hz to 10kHz):** -4 dB
Headphone Measurements:  
**Plugged Crown**

**Frequency Response**
Top - Compensated and Averaged  
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

Volts RMS required to reach 90dB SPL: 0.038 Vrms  
Impedance @ 1kHz: 21 Ohms  
Power Needed for 90dB SPL: 0.07 mW  
Broadband Isolation in dB (100Hz to 10kHz): -17 dB

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Headphone Measurements:

- **Headphone Measurements:**
  - **Polk Hinge**

**Headphone Measurements**

- Volts RMS required to reach 90dB SPL: 0.064 Vrms
- Impedance @ 1kHz: 37 Ohms
- Power Needed for 90dB SPL: 0.11 mW
- Broadband Isolation in dB (100Hz to 10kHz): -18 dB

---

**Frequency Response**

- Top - Compensated and Averaged
- Bottom - Raw Data for Five Headphone Positions

**Electrical Impedance and Phase**

- Measured with 600 Ohm output impedance.

**Isolation**

- Attenuation of External Sound vs. Frequency

---

**30 Hz Square Wave**

- Time in Seconds
- Volts
- Right
- Left

**300 Hz Square Wave**

- Time in Seconds
- Volts
- Right
- Left

---

**Impulse Response**

- Time in Seconds

---

**%THD+noise @ 90dB and 100dB**

- Frequency
- Left 90dB
- Right 90dB
- Left 100dB
- Right 100dB

---

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Headphone Measurements: RHA SA950i

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

**Volts RMS required to reach 90dB SPL:** 0.062 Vrms
**Impedance @ 1kHz:** 37 Ohms
**Power Needed for 90dB SPL:** 0.10 mW
**Broadband Isolation in dB (100Hz to 10kHz):** -10 dBr

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Headphone Measurements: 

Reid and Heath Acoustics SA-850

**Headphone Measurements:**

- **Volts RMS required to reach 90dB SPL:** 0.049 Vrms
- **Impedance @ 1kHz:** 37 Ohms
- **Power Needed for 90dB SPL:** 0.07 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -6 dB

---

**Impulse Response**

**Isolation**

Attenuation of External Sound vs. Frequency

---

**Frequency Response**

Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

---

**Electrical Impedance and Phase**

Measured with 600 Ohm output impedance.

---

**%THD+noise @ 90dB and 100dB**

---

**30 Hz Square Wave**

---

**300 Hz Square Wave**

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Headphone Measurements: Samsung Level On

Volts RMS required to reach 90dB SPL: 0.049 Vrms
Impedance @ 1kHz: 33 Ohms
Power Needed for 90dB SPL: 0.07 mW
Broadband Isolation in dB (100Hz to 10kHz): -21 dB
Headphone Measurements:  
Sansui SS100

Volts RMS required to reach 90dB SPL: 0.153 Vrms
Impedance @ 1kHz: 59 Ohms
Power Needed for 90dB SPL: 0.40 mW
Broadband Isolation in dB (100Hz to 10kHz): -5 dB
Headphone Measurements: Sansui SS35

**Headphone Measurements:**

- **Volts RMS required to reach 90dB SPL:** 0.017 Vrms
- **Impedance @ 1kHz:** 29 Ohms
- **Power Needed for 90dB SPL:** 0.05 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -11 dB
Headphone Measurements:  Sansui SS35 Pads Off

**Headphone Measurements:**

- **Volts RMS required to reach 90dB SPL:** 0.016 Vrms
- **Impedance @ 1kHz:** 29 Ohms
- **Power Needed for 90dB SPL:** 0.05 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -20 dB

**Graphs:**

- **Frequency Response**
  - Top - Compensated and Averaged
  - Bottom - Raw Data for Five Headphone Positions

- **Isolation**
  - Attenuation of External Sound vs. Frequency

- **Electrical Impedance and Phase**
  - Measured with 600 Ohm output impedance.

- **30 Hz Square Wave**

- **300 Hz Square Wave**

- **%THD+noise @ 90dB and 100dB**

- **Impulse Response**

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**Headphone Measurements:**

**Sennheiser Amperior**

- **Volts RMS required to reach 90dB SPL:** 0.024 Vrms
- **Impedance @ 1kHz:** 24 Ohms
- **Power Needed for 90dB SPL:** 0.02 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -13 dB

---

**Frequency Response**

Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**

Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**

Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

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Headphone Measurements: Sennheiser HD 25 Aluminum

**Headphone Measurements: Sennheiser HD 25 Aluminum**

- **Volts RMS required to reach 90dB SPL:** 0.059 Vrms
- **Impedance @ 1kHz:** 77 Ohms
- **Power Needed for 90d BSPL:** 0.04 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -16 dB

---

**Frequency Response**

Top - Compensated and Averaged  
Bottom - Raw Data for Five Headphone Positions

**Electrical Impedance and Phase**

Measured with 600 Ohm output impedance.

**Isolation**

Attenuation of External Sound vs. Frequency

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

Volts RMS required to reach 90dB SPL: 0.059 Vrms  
Impedance @ 1kHz: 77 Ohms  
Power Needed for 90dB SPL: 0.04 mW  
Broadband Isolation in dB (100Hz to 10kHz): -16 dB
Headphone Measurements:

Sennheiser HD 25-1 II B (2012 model)

**Headphone Measurements**

- **Volts RMS required to reach 90dB SPL:** 0.055 Vrms
- **Impedance @ 1kHz:** 74 Ohms
- **Power Needed for 90dB SPL:** 0.04 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -16 dB

---

**Frequency Response**

- **Top - Compensated and Averaged**
- **Bottom - Raw Data for Five Headphone Positions**

**Isolation**

- **Attenuation of External Sound vs. Frequency**

**Electrical Impedance and Phase**

- **Measured with 600 Ohm output impedance.**

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

- **Volts RMS required to reach 90dB SPL:** 0.055 Vrms
- **Impedance @ 1kHz:** 74 Ohms
- **Power Needed for 90dB SPL:** 0.04 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -16 dB

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Headphone Measurements: Sennheiser HD 25-1 II

**Headphone Measurements**

- **Volts RMS required to reach 90dB SPL:** 0.051 Vrms
- **Impedance @ 1kHz:** 75 Ohms
- **Power Needed for 90dB SPL:** 0.03 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -14 dB

**Isolation**

- Attenuation of External Sound vs. Frequency

**Frequency Response**

- Top - Compensated and Averaged
- Bottom - Raw Data for Five Headphone Positions

**Electrical Impedance and Phase**

- Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

- Chart displaying % THD noise at 90dB and 100dB levels.

**30 Hz Square Wave**

- Chart showing voltage over time for 30Hz square wave.

**300 Hz Square Wave**

- Chart showing voltage over time for 300Hz square wave.

**Impulse Response**

- Chart showing impulse response over time.
**Headphone Measurements: Sennheiser HD 25-1**

**Volts RMS required to reach 90dB SPL:** 0.048 Vrms

**Impedance @ 1kHz:** 80 Ohms

**Power Needed for 90dB SPL:** 0.03 mW

**Broadband Isolation in dB (100Hz to 10kHz):** -14 dB

---

**Frequency Response**
- Top: Compensated and Averaged
- Bottom: Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

Volts RMS required to reach 90dB SPL: 0.048 Vrms
Impedance @ 1kHz: 80 Ohms
Power Needed for 90dB SPL: 0.03 mW
Broadband Isolation in dB (100Hz to 10kHz): -14 dB

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Headphone Measurements: Sennheiser HD 218

Frequency Response
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

Electrical Impedance and Phase
Measured with 600 Ohm output impedance.

%THD+noise @ 90dB and 100dB

Impulse Response

Volts RMS required to reach 90dB SPL: 0.097 Vrms
Impedance @ 1kHz: 25 Ohms
Power Needed for 90dB SPL: 0.38 mW
Broadband Isolation in dB (100Hz to 10kHz): -13 dB
**Headphone Measurements: Sennheiser HD 228**

**Frequency Response**
- Top - Compensated and Averaged
- Bottom - Raw Data for Five Headphone Positions

**Impulse Response**

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Volts RMS required to reach 90dB SPL:** 0.097 Vrms
**Impedance @ 1kHz:** 25 Ohms
**Power Needed for 90d BSPL:** 0.37 mW
**Broadband Isolation in dB (100Hz to 10kHz):** -12 dB
Headphone Measurements: Sennheiser HD 219

- Volts RMS required to reach 90dB SPL: 0.055 Vrms
- Impedance @ 1kHz: 19 Ohms
- Power Needed for 90dB SPL: 0.16 mW
- Broadband Isolation in dB (100Hz to 10kHz): -17 dBr
Headphone Measurements: Sennheiser HD 229

Frequency Response
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

Electrical Impedance and Phase
Measured with 600 Ohm output impedance.

%THD+noise @ 90dB and 100dB

30 Hz Square Wave

300 Hz Square Wave

Impulse Response

Volts RMS required to reach 90dB SPL: 0.055 Vrms
Impedance @ 1kHz: 19 Ohms
Power Needed for 90dB SPL: 0.16 mW
Broadband Isolation in dB (100Hz to 10kHz): -16 dB
Headphone Measurements: Sennheiser PX 200

Volts RMS required to reach 90dB SPL: 0.052 Vrms
Impedance @ 1kHz: 36 Ohms
Power Needed for 90dB SPL: 0.07 mW
Broadband Isolation in dB (100Hz to 10kHz): -8 dB
Headphone Measurements: Sennheiser PX 200-ll

- **Volts RMS required to reach 90dB SPL:** 0.055 Vrms
- **Impedance @ 1kHz:** 38 Ohms
- **Power Needed for 90dBSPL:** 0.08 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -9 dB

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**30 Hz Square Wave**

**300 Hz Square Wave**

**%THD+noise @ 90dB and 100dB**

**Impulse Response**

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**Headphone Measurements: Sennheiser Momentum On-Ear**

- **Volts RMS required to reach 90dB SPL:** 0.050 Vrms
- **Impedance @ 1kHz:** 23 Ohms
- **Power Needed for 90dBSPL:** 0.11 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -7 dBr

---

**Frequency Response**
- Top - Compensated and Averaged
- Bottom - Raw Data for Five Headphone Positions

**Isolation**
- Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

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**Headphone Measurements:**

**Sennheiser Urbanite**

**Volts RMS required to reach 90dB SPL:** 0.018 Vrms

**Impedance @ 1kHz:** 22 Ohms

**Power Needed for 90dB SPL:** 0.01 mW

**Broadband Isolation in dB (100Hz to 10kHz):** -20 dB

---

**Frequency Response**

Top - Compensated and Averaged

Bottom - Raw Data for Five Headphone Positions

---

**Isolation**

Attenuation of External Sound vs. Frequency

---

**Impulse Response**

---

**Electrical Impedance and Phase**

Measured with 600 Ohm output impedance.

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**%THD+noise @ 90dB and 100dB**

---

**30 Hz Square Wave**

---

**300 Hz Square Wave**

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Headphone Measurements: Skullcandy Grind

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

- Volts RMS required to reach 90dB SPL: 0.049 Vrms
- Impedance @ 1kHz: 34 Ohms
- Power Needed for 90dBSPL: 0.07 mW
- Broadband Isolation in dB (100Hz to 10kHz): -12 dB
**Headphone Measurements:**  
**Skullcandy Navigator**

**Frequency Response**  
Top - Compensated and Averaged  
Bottom - Raw Data for Five Headphone Positions

**Isolation**  
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**  
Measured with 600 Ohm output impedance.

**30 Hz Square Wave**

**300 Hz Square Wave**

**%THD+noise @ 90dB and 100dB**

**Impulse Response**

- Volts RMS required to reach 90dB SPL: 0.005 Vrms
- Impedance @ 1kHz: 37 Ohms
- Power Needed for 90dB SPL: 0.00 mW
- Broadband Isolation in dB (100Hz to 10kHz): -12 dB
Headphone Measurements: Sol Republic Master Tracks XC

Frequency Response
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

Electrical Impedance and Phase
Measured with 600 Ohm output impedance.

%THD+noise @ 90dB and 100dB

30 Hz Square Wave

300 Hz Square Wave

Impulse Response

Volts RMS required to reach 90dB SPL: 0.020 Vrms
Impedance @ 1kHz: 35 Ohms
Power Needed for 90dB SPL: 0.01 mW
Broadband Isolation in dB (100Hz to 10kHz): -15 dB
Headphone Measurements: Sol Republic Tracks

**Headphone Measurements:**

- **Volts RMS required to reach 90dB SPL:** 0.040 Vrms
- **Impedance @ 1kHz:** 61 Ohms
- **Power Needed for 90dB SPL:** 0.03 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -12 dB

---

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

---

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Headphone Measurements:  
SOL Republic Tracks B

### Frequency Response

- **Top**: Compensated and Averaged
- **Bottom**: Raw Data for Five Headphone Positions

### Impedance and Phase

Measured with 600 Ohm output impedance.

#### 30 Hz Square Wave

#### 300 Hz Square Wave

#### Impulse Response

- Volts RMS required to reach 90dB SPL: 0.042 Vrms
- Impedance @ 1kHz: 60 Ohms
- Power Needed for 90dB SPL: 0.03 mW
- Broadband Isolation in dB (100Hz to 10kHz): -11 dB
Headphone Measurements: Sony MDR-7502

- Volts RMS required to reach 90dB SPL: 0.042 Vrms
- Impedance @ 1kHz: 29 Ohms
- Power Needed for 90d BSPL: 0.06 mW
- Broadband Isolation in dB (100Hz to 10kHz): -10 dB
Headphone Measurements: Sony MDR-7505

**Headphone Measurements:**

- **Volts RMS required to reach 90dB SPL:** 0.035 Vrms
- **Impedance @ 1kHz:** 43 Ohms
- **Power Needed for 90dB SPL:** 0.03 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -9 dB
Headphone Measurements: Sony MDR-7509HD

Volts RMS required to reach 90dB SPL: 0.049 Vrms
Impedance @ 1kHz: 27 Ohms
Power Needed for 90d BSPL: 0.09 mW
Broadband Isolation in dB (100Hz to 10kHz): -11 dB
**Headphone Measurements:**

**Sony MDR-ZX700**

- **Volts RMS required to reach 90dB SPL:** 0.040 Vrms
- **Impedance @ 1kHz:** 27 Ohms
- **Power Needed for 90dB SPL:** 0.06 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -13 dB

**Graphs:**

- **Frequency Response:**
  - Top - Compensated and Averaged
  - Bottom - Raw Data for Five Headphone Positions

- **Isolation:**
  - Attenuation of External Sound vs. Frequency

- **Electrical Impedance and Phase:**
  - Measured with 600 Ohm output impedance.

- **%THD+noise @ 90dB and 100dB**

- **30 Hz Square Wave**

- **300 Hz Square Wave**

- **Impulse Response**

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**Headphone Measurements: Sony MDR-XB300**

- **Volts RMS required to reach 90dB SPL:** 0.073 Vrms
- **Impedance @ 1kHz:** 28 Ohms
- **Power Needed for 90dB SPL:** 0.19 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -8 dB

---

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

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Headphone Measurements: Soul by Ludacris SL100

**Volts RMS required to reach 90dB SPL:** 0.031 Vrms

**Impedance @ 1kHz:** 36 Ohms

**Power Needed for 90dB SPL:** 0.03 mW

**Broadband Isolation in dB (100Hz to 10kHz):** -12 dBr

---

**Frequency Response**

Top - Compensated and Averaged

Bottom - Raw Data for Five Headphone Positions

**Isolation**

Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**

Measured with 600 Ohm output impedance.

**30 Hz Square Wave**

**300 Hz Square Wave**

**%THD+noise @ 90dB and 100dB**

**Impulse Response**

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Headphone Measurements: Spider PowerForce

Frequency Response
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

Electrical Impedance and Phase
Measured with 600 Ohm output impedance.

%THD+noise @ 90dB and 100dB

30 Hz Square Wave

300 Hz Square Wave

Impulse Response

Volts RMS required to reach 90dB SPL: 0.044 Vrms
Impedance @ 1kHz: 35 Ohms
Power Needed for 90dB SPL: 0.06 mW
Broadband Isolation in dB (100Hz to 10kHz): -14 dBr
Headphone Measurements:

**Sterling TE-400**

**Headphone Measurements:**

- **Volts RMS required to reach 90dB SPL:** 0.047 Vrms
- **Impedance @ 1kHz:** 40 Ohms
- **Power Needed for 90dB SPL:** 0.05 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -11 dB

---

**Frequency Response**

- Top - Compensated and Averaged
- Bottom - Raw Data for Five Headphone Positions

**Isolation**

- Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**

- Measured with 600 Ohm output impedance.

**30 Hz Square Wave**

- **%THD+noise @ 90dB and 100dB**

**300 Hz Square Wave**

**Impulse Response**

- Volts RMS required to reach 90dB SPL: 0.047 Vrms
- Impedance @ 1kHz: 40 Ohms
- Power Needed for 90dB SPL: 0.05 mW
- Broadband Isolation in dB (100Hz to 10kHz): -11 dB

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**Headphone Measurements: Teac CT-H02**

**Frequency Response**

*Top - Compensated and Averaged*
*Bottom - Raw Data for Five Headphone Positions*

**Isolation**

*Attenuation of External Sound vs. Frequency*

**Electrical Impedance and Phase**

*Measured with 600 Ohm output impedance.*

**30 Hz Square Wave**

**300 Hz Square Wave**

**%THD+noise @ 90dB and 100dB**

**Impulse Response**

Volts RMS required to reach 90dB SPL: 0.035 Vrms

Impedance @ 1kHz: 38 Ohms

Power Needed for 90dB SPL: 0.03 mW

Broadband Isolation in dB (100Hz to 10kHz): -16 dB

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**Headphone Measurements: thinksound On1**

### Frequency Response

**Top - Compensated and Averaged**
**Bottom - Raw Data for Five Headphone Positions**

### Impulse Response

### Electrical Impedance and Phase

Measured with 600 Ohm output impedance.

### %THD+noise @ 90dB and 100dB

### 30 Hz Square Wave

### 300 Hz Square Wave

### Isolation

Attenuation of External Sound vs. Frequency

### Volts RMS required to reach 90dB SPL:
0.041 Vrms

**Impedance @ 1kHz:**
54 Ohms

**Power Needed for 90dB SPL:**
0.03 mW

**Broadband Isolation in dB (100Hz to 10kHz):**
-20 dBr

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Headphone Measurements: Torque t402v OnEar Yellow

**Headphone Measurements:**

- **Volts RMS required to reach 90dB SPL:** 0.062 Vrms
- **Impedance @ 1kHz:** 22 Ohms
- **Power Needed for 90d BSPL:** 0.17 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -16 dB

**Frequency Response**

- Top - Compensated and Averaged
- Bottom - Raw Data for Five Headphone Positions

**Isolation**

- Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**

- Measured with 600 Ohm output impedance.

**30 Hz Square Wave**

**%THD+noise @ 90dB and 100dB**

**300 Hz Square Wave**

**Impulse Response**
Headphone Measurements: Torque T402v OnEar Red

**Headphone Measurements:**

- **Volts RMS required to reach 90dB SPL:** 0.057 Vrms
- **Impedance @ 1kHz:** 22 Ohms
- **Power Needed for 90dB SPL:** 0.15 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -14 dB
**Headphone Measurements:**

**Volts RMS required to reach 90dB SPL:** 0.057 Vrms

**Impedance @ 1kHz:** 22 Ohms

**Power Needed for 90dB SPL:** 0.15 mW

**Broadband Isolation in dB (100Hz to 10kHz):** -15 dB

---

**Frequency Response**

Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**

Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**

Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

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Headphone Measurements: Torque t402v OnEar Black

**Headphone Measurements:**

- **Volts RMS required to reach 90dB SPL:** 0.053 Vrms
- **Impedance @ 1kHz:** 22 Ohms
- **Power Needed for 90d BSPL:** 0.13 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -10 dB

**Frequency Response**
- Top - Compensated and Averaged
- Bottom - Raw Data for Five Headphone Positions

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**Isolation**
- Attenuation of External Sound vs. Frequency

**Impulse Response**
- Time in Seconds
- Volts

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Headphone Measurements: Urbanears Plattan

- **Volts RMS required to reach 90dB SPL:** 0.023 Vrms
- **Impedance @ 1kHz:** 60 Ohms
- **Power Needed for 90d BSPL:** 0.01 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -11 dB
Headphone Measurements:  V-Moda V-80 True Blood

**Frequency Response**
Top - Compensated and Averaged  
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**Impulse Response**

Volts RMS required to reach 90dB SPL: 0.037 Vrms  
Impedance @ 1kHz: 32 Ohms  
Power Needed for 90d BSPL: 0.04 mW  
Broadband Isolation in dB (100Hz to 10kHz): -12 dB

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**Headphone Measurements:**

**V-Moda M-80**

**Headphone Measurements:**

**Volts RMS required to reach 90dB SPL:** 0.039 Vrms

**Impedance @ 1kHz:** 31 Ohms

**Power Needed for 90dB SPL:** 0.05 mW

**Broadband Isolation in dB (100Hz to 10kHz):** -10 dB
Headphone Measurements: V-Moda XS

- **Volts RMS required to reach 90dB SPL:** 0.036 Vrms
- **Impedance @ 1kHz:** 32 Ohms
- **Power Needed for 90dB SPL:** 0.04 mW
- **Broadband Isolation in dB (100Hz to 1kHz):** -13 dB

Frequency Response
- Top - Compensated and Averaged
- Bottom - Raw Data for Five Headphone Positions

Isolation
- Attenuation of External Sound vs. Frequency

Electrical Impedance and Phase
- Measured with 600 Ohm output impedance.

%THD+noise @ 90dB and 100dB

30Hz Square Wave

300Hz Square Wave

Impulse Response

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Headphone Measurements: Wiss Audio On Ear Force 1 HP
P244

- Volts RMS required to reach 90dB SPL: 0.026 Vrms
- Impedance @ 1kHz: 19 Ohms
- Power Needed for 90dB SPL: 0.03 mW
- Broadband Isolation in dB (100Hz to 10kHz): -16 dB
Headphone Measurements: Yamaha HP1 Sn051712

Headphone Measurements:

- **Volts RMS required to reach 90dB SPL:** 0.268 Vrms
- **Impedance @ 1kHz:** 136 Ohms
- **Power Needed for 90dB SPL:** 0.53 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -8 dBr

---

**Frequency Response**

- **Top - Compensated and Averaged**
- **Bottom - Raw Data for Five Headphone Positions**

**Isolation**

- **Attenuation of External Sound vs. Frequency**

**Electrical Impedance and Phase**

- **Measured with 600 Ohm output impedance.**

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

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Headphone Measurements: Yamaha Pro300

- **Volts RMS required to reach 90dB SPL:** 0.039 Vrms
- **Impedance @ 1kHz:** 54 Ohms
- **Power Needed for 90dB SPL:** 0.03 mW
- **Broadband Isolation in dB (100Hz to 1kHz):** -6 dB

---

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**30 Hz Square Wave**

**%THD+noise @ 90dB and 100dB**

**300 Hz Square Wave**

**Impulse Response**
**Headphone Measurements:**

- **Volts RMS required to reach 90dB SPL:** 0.121 Vrms
- **Impedance @ 1kHz:** 139 Ohms
- **Power Needed for 90dB SPL:** 0.11 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -5 dBr

---

**Frequency Response**

Top - Compensated and Averaged

Bottom - Raw Data for Five Headphone Positions

---

**Isolation**

Attenuation of External Sound vs. Frequency

---

**Electrical Impedance and Phase**

Measured with 600 Ohm output impedance.

---

**%THD+noise @ 90dB and 100dB**

---

**30 Hz Square Wave**

---

**300 Hz Square Wave**

---

**Impulse Response**

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Headphone Measurements: Yamaha YH3 Sn180629

**Headphone Measurements:**
- **Volts RMS required to reach 90dB SPL:** 0.389 Vrms
- **Impedance @ 1kHz:** 137 Ohms
- **Power Needed for 90dB SPL:** 1.11 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -8 dB

**Frequency Response**
- Top: Compensated and Averaged
- Bottom: Raw Data for Five Headphone Positions

**Isolation**
- Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

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**Headphone Measurements:**

1 More Crystal Piston

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**Headphone Measurements:**

- **Volts RMS required to reach 90dB SPL:** 0.078 Vrms
- **Impedance @ 1kHz:** 31 Ohms
- **Power Needed for 90dB SPL:** 0.19 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -19 dB

---

**Isolation**

Attenuation of External Sound vs. Frequency

---

**Frequency Response**

Top - Compensated and Averaged
Bottom - Raw Measured Data

---

**Electrical Impedance and Phase**

Measured with 600 Ohm output impedance.

---

**%THD+noise @ 90dB and 100dB**

---

**30 Hz Square Wave**

---

**300 Hz Square Wave**

---

**Impulse Response**

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Headphone Measurements: 1More Multi Unit Earphones

**Volts RMS required to reach 90dB SPL:** 0.052 Vrms
**Impedance @ 1kHz:** 31 Ohms
**Power Needed for 90dBSPL:** 0.09 mW
**Broadband Isolation in dB (100Hz to 10kHz):** -20 dB

---

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Measured Data

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

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Headphone Measurements: 1MORE Triple Driver

**Volts RMS required to reach 90dB SPL:** 0.055 Vrms

**Impedance @ 1kHz:** 32 Ohms

**Power Needed for 90dB SPL:** 0.09 mW

**Broadband Isolation in dB (100Hz to 10kHz):** -18 dB

---

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Measured Data

---

**Isolation**
Attenuation of External Sound vs. Frequency

---

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

---

**%THD+noise @ 90dB and 100dB**

---

**30 Hz Square Wave**

---

**300 Hz Square Wave**

---

**Impulse Response**
**Headphone Measurements:**

- **Volts RMS required to reach 90dB SPL:** 0.052 Vrms
- **Impedance @ 1kHz:** 33 Ohms
- **Power Needed for 90dB SPL:** 0.08 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -16 dB

---

**Isolation**

Attenuation of External Sound vs. Frequency

---

**Impulse Response**

---

**Frequency Response**

Top - Compensated and Averaged
Bottom - Raw Measured Data

---

**Electrical Impedance and Phase**

Measured with 600 Ohm output impedance.

---

**30 Hz Square Wave**

---

**%THD+noise @ 90dB and 100dB**

---

**300 Hz Square Wave**

---

**Impulse Response**
Headphone Measurements:  Accidentally Extraordinary Bamboö

**Headphone Measurements:**

**Volts RMS required to reach 90dB SPL:** 0.031 Vrms

**Impedance @ 1kHz:** 19 Ohms

**Power Needed for 90dB SPL:** 0.05 mW

**Broadband Isolation in dB (100Hz to 1kHz):** -18 dB
Headphone Measurements: ADV Sound M4

- Volts RMS required to reach 90dB SPL: 0.036 Vrms
- Impedance @ 1kHz: 19 Ohms
- Power Needed for 90dB SPL: 0.07 mW
- Broadband Isolation in dB (100Hz to 10kHz): -32 dB

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Measured Data

**Isolation**
Attenuation of External Sound vs. Frequency

**Impulse Response**

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**
**Headphone Measurements: AirBuds**

- **Volts RMS required to reach 90dB SPL:** 0.040 Vrms
- **Impedance @ 1kHz:** 16 Ohms
- **Power Needed for 90dB SPL:** 0.10 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -19 dBr

---

### Frequency Response

Top - Compensated and Averaged

Bottom - Raw Measured Data

### Isolation

Attenuation of External Sound vs. Frequency

### Electrical Impedance and Phase

Measured with 600 Ohm output impedance.

### %THD+noise @ 90dB and 100dB

### 30 Hz Square Wave

### 300 Hz Square Wave

### Impulse Response

Volts RMS required to reach 90dB SPL: 0.040 Vrms
Impedance @ 1kHz: 16 Ohms
Power Needed for 90dB SPL: 0.10 mW
Broadband Isolation in dB (100Hz to 10kHz): -19 dBr

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Headphone Measurements: AKG K3003 Reference Filter

**Headphone Measurements**

- **Volts RMS required to reach 90dB SPL**: 0.023 Vrms
- **Impedance @ 1kHz**: 9 Ohms
- **Power Needed for 90dB SPL**: 0.06 mW
- **Broadband Isolation in dB (100Hz to 10kHz)**: -16 dB

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Headphone Measurements: AKG K3003 High Boost Filter

Volts RMS required to reach 90dB SPL: 0.024 Vrms
Impedance @ 1kHz: 9 Ohms
Power Needed for 90dB SPL: 0.06 mW
Broadband Isolation in dB (100Hz to 10kHz): -15 dB
Headphone Measurements: AKG K3003 Bass Boost Filter

Volts RMS required to reach 90dB SPL: 0.051 Vrms
Impedance @ 1kHz: 10 Ohms
Power Needed for 90dB SPL: 0.27 mW
Broadband Isolation in dB (100Hz to 10kHz): -16 dB

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Headphone Measurements: AKG K376

**Impulse Response**

**Frequency Response**
- Top: Compensated and Averaged
- Bottom: Raw Measured Data

**Isolation**
Attenuation of External Sound vs. Frequency

**Electronic Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

Volts RMS required to reach 90dB SPL: 0.047 Vrms
Impedance @ 1kHz: 31 Ohms
Power Needed for 90dB SPL: 0.07 mW
Broadband Isolation in dB (100Hz to 10kHz): -23 dB
Headphone Measurements: AKG Q350

- Volts RMS required to reach 90dB SPL: 0.038 Vrms
- Impedance @ 1kHz: 19 Ohms
- Power Needed for 90dB SPL: 0.08 mW
- Broadband Isolation in dB (100Hz to 10kHz): -16 dB
Headphone Measurements: Alpha and Delta AD01

Volts RMS required to reach 90dB SPL: 0.029 Vrms
Impedance @ 1kHz: 10 Ohms
Power Needed for 90dB SPL: 0.09 mW
Broadband Isolation in dB (100Hz to 10kHz): -28 dB
Headphone Measurements: Apple In-Ear 2013

Volts RMS required to reach 90dB SPL: 0.035 Vrms
Impedance @ 1kHz: 49 Ohms
Power Needed for 90dB SPL: 0.02 mW
Broadband Isolation in dB (100Hz to 10kHz): -33 dB
Headphone Measurements: Astrotec AM90

- Volts RMS required to reach 90dB SPL: 0.019 Vrms
- Impedance @ 1kHz: 57 Ohms
- Power Needed for 90d BSPL: 0.01 mW
- Broadband Isolation in dB (100Hz to 10kHz): -31 dB
Headphone Measurements:  
Astrotec AX7

- **Volts RMS required to reach 90dB SPL:** 0.027 Vrms
- **Impedance @ 1kHz:** 55 Ohms
- **Power Needed for 90dB SPL:** 0.01 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -32 dB

---

**Frequency Response**

- Top - Compensated and Averaged
- Bottom - Raw Measured Data

**Isolation**

- Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**

- Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

- 30 Hz Square Wave

- 300 Hz Square Wave

**Impulse Response**

- Time in Seconds

---

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Headphone Measurements: Astrotec AX35

Volts RMS required to reach 90dB SPL: 0.022 Vrms
Impedance @ 1kHz: 14 Ohms
Power Needed for 90d BSPL: 0.04 mW
Broadband Isolation in dB (100Hz to 10kHz): -16 dBr

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Headphone Measurements: Audeo PFE 121 Black Filter

**Impulse Response**

**Isolation**

**Electrical Impedance and Phase**

**Frequency Response**

**30 Hz Square Wave**

**300 Hz Square Wave**

**%THD+noise @ 90dB and 100dB**

**Volts RMS required to reach 90dB SPL:** 0.050 Vrms
**Impedance @ 1kHz:** 36 Ohms
**Power Needed for 90d BSPL:** 0.07 mW
**Broadband Isolation in dB (100Hz to 10kHz):** -29 dB
Headphone Measurements:  Audeo PFE 121 Gray Filter

**Headphone Measurements**

**Volts RMS required to reach 90dB SPL:** 0.036 Vrms

**Impedance @ 1kHz:** 36 Ohms

**Power Needed for 90dB SPL:** 0.04 mW

**Broadband Isolation in dB (100Hz to 1kHz):** -26 dBr
Headphone Measurements: Audeo PFE 121 Green Filter

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Measured Data

**Impulse Response**

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**30 Hz Square Wave**

**300 Hz Square Wave**

**%THD+noise @ 90dB and 100dB**

**Isolation**
Attenuation of External Sound vs. Frequency

---

Volts RMS required to reach 90dB SPL: 0.067 Vrms
Impedance @ 1kHz: 36 Ohms
Power Needed for 90dB SPL: 0.12 mW
Broadband Isolation in dB (100Hz to 10kHz): -26 dB
Headphone Measurements:  Audeo PFE 232

- Volts RMS required to reach 90dB SPL: 0.065 Vrms
- Impedance @ 1kHz: 46 Ohms
- Power Needed for 90dB SPL: 0.09 mW
- Broadband Isolation in dB (100Hz to 10kHz): -36 dB

Electrical Impedance and Phase
- Measured with 600 Ohm output impedance.

Isolation
- Attenuation of External Sound vs. Frequency

Frequency Response
- Top - Compensated and Averaged
- Bottom - Raw Measured Data

%THD+noise @ 90dB and 100dB

30 Hz Square Wave

300 Hz Square Wave

Impulse Response

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Headphone Measurements: Audeze iSine20

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Measured Data

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**Isolation**
Attenuation of External Sound vs. Frequency

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

Volts RMS required to reach 90dB SPL: 0.018 Vrms
Impedance @ 1kHz: 27 Ohms
Power Needed for 90dB SPL: 0.01 mW
Broadband Isolation in dB (100Hz to 10kHz): -3 dB

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Headphone Measurements: Audiofly Adagio Club Life

- **Volts RMS required to reach 90dB SPL:** 0.016 Vrms
- **Impedance @ 1kHz:** 8 Ohms
- **Power Needed for 90dB SPL:** 0.03 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -31 dB
Headphone Measurements: AudioFly AF180

Volts RMS required to reach 90dB SPL: 0.017 Vrms
Impedance @ 1kHz: 14 Ohms
Power Needed for 90dB SPL: 0.02 mW
Broadband Isolation in dB (100Hz to 10kHz): -40 dB

Frequency Response
Top - Compensated and Averaged
Bottom - Raw Measured Data

Isolation
Attenuation of External Sound vs. Frequency

Electrical Impedance and Phase
Measured with 600 Ohm output impedance.

%THD+noise @ 90dB and 100dB

30 Hz Square Wave

300 Hz Square Wave

Impulse Response

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Headphone Measurements: AudioFly AF160

**Volts RMS required to reach 90dB SPL:** 0.016 Vrms
**Impedance @ 1kHz:** 26 Ohms
**Power Needed for 90d BSPL:** 0.01 mW
**Broadband Isolation in dB (100Hz to 10kHz):** -42 dB
Headphone Measurements: AudioFly AF140

**Headphone Measurements:**

- **Volts RMS required to reach 90dB SPL:** 0.066 Vrms
- **Impedance @ 1kHz:** 37 Ohms
- **Power Needed for 90dB SPL:** 0.12 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -23 dB

---

**Frequency Response**

<table>
<thead>
<tr>
<th>Frequency (Hz)</th>
<th>Amplitude (dB)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>-20</td>
</tr>
<tr>
<td>100</td>
<td>-20</td>
</tr>
<tr>
<td>1000</td>
<td>-20</td>
</tr>
<tr>
<td>10000</td>
<td>-20</td>
</tr>
</tbody>
</table>

**Impulse Response**

<table>
<thead>
<tr>
<th>Time in Seconds</th>
<th>Volts</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.000</td>
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</tr>
<tr>
<td>0.003</td>
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</tr>
</tbody>
</table>

---

**Electrical Impedance and Phase**

Measured with 600 Ohm output impedance.

**30 Hz Square Wave**

<table>
<thead>
<tr>
<th>Time in Seconds</th>
<th>Volts</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.000</td>
<td>0.00</td>
</tr>
<tr>
<td>0.0001</td>
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</tr>
<tr>
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<tr>
<td>0.0003</td>
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</tbody>
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---

**%THD+noise @ 90dB and 100dB**

<table>
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<tr>
<th>Frequency (Hz)</th>
<th>%THD+noise</th>
</tr>
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</tr>
<tr>
<td>100</td>
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<tr>
<td>1000</td>
<td>0.01</td>
</tr>
<tr>
<td>10000</td>
<td>0.01</td>
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</tbody>
</table>

---

**300 Hz Square Wave**

<table>
<thead>
<tr>
<th>Time in Seconds</th>
<th>Volts</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.000</td>
<td>0.00</td>
</tr>
<tr>
<td>0.0001</td>
<td>0.00</td>
</tr>
<tr>
<td>0.0002</td>
<td>0.00</td>
</tr>
<tr>
<td>0.0003</td>
<td>0.00</td>
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---

**Isolation**

Attenuation of External Sound vs. Frequency

<table>
<thead>
<tr>
<th>Frequency (Hz)</th>
<th>Reduction in dB</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>-70</td>
</tr>
<tr>
<td>100</td>
<td>-65</td>
</tr>
<tr>
<td>1000</td>
<td>-60</td>
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</tbody>
</table>

---

**Impedance and Phase**

Measured with 600 Ohm output impedance.

<table>
<thead>
<tr>
<th>Frequency (Hz)</th>
<th>Impedance in Ohms</th>
<th>Phase in Degrees</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>-50</td>
<td>0</td>
</tr>
<tr>
<td>100</td>
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<tr>
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</tr>
<tr>
<td>10000</td>
<td>-35</td>
<td>0</td>
</tr>
</tbody>
</table>

---

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Headphone Measurements: Audio Technica ATH CKX5iS

Volts RMS required to reach 90dB SPL: 0.043 Vrms
Impedance @ 1kHz: 18 Ohms
Power Needed for 90dB SPL: 0.10 mW
Broadband Isolation in dB (100Hz to 10kHz): -31 dB

%THD+noise @ 90dB and 100dB

30 Hz Square Wave

300 Hz Square Wave

Impulse Response

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Headphone Measurements: Audio Technica ATH-CKM500

Volts RMS required to reach 90dB SPL: 0.046 Vrms
Impedance @ 1kHz: 15 Ohms
Power Needed for 90dB SPL: 0.14 mW
Broadband Isolation in dB (100Hz to 10kHz): -16 dB
**Headphone Measurements:**

**Audio Technica ATH-IM02**

**Volts RMS required to reach 90dB SPL:** 0.016 Vrms

**Impedance @ 1kHz:** 38 Ohms

**Power Needed for 90dB SPL:** 0.01 mW

**Broadband Isolation in dB (100Hz to 10kHz):** -31 dB

---

**Frequency Response**

Top - Compensated and Averaged

Bottom - Raw Measured Data

---

**Isolation**

Attenuation of External Sound vs. Frequency

---

**Electrical Impedance and Phase**

Measured with 600 Ohm output impedance.

---

**%THD+noise @ 90dB and 100dB**

---

**30 Hz Square Wave**

---

**300 Hz Square Wave**

---

**Impulse Response**

---

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Headphone Measurements:

**Aurisonic Rockets**

---

**Volts RMS required to reach 90dB SPL:** 0.040 Vrms
**Impedance @ 1kHz:** 18 Ohms
**Power Needed for 90dB SPL:** 0.09 mW
**Broadband Isolation in dB (100Hz to 10kHz):** -47 dB
Headphone Measurements: Beats Tour 2014

Volts RMS required to reach 90dB SPL: 0.023 Vrms
Impedance @ 1kHz: 17 Ohms
Power Needed for 90dB SPL: 0.03 mW
Broadband Isolation in dB (100Hz to 10kHz): -28 dB
Headphone Measurements:

- **Bogari Q1**

**Frequency Response**
- Top: Compensated and Averaged
- Bottom: Raw Measured Data

**Isolation**
- Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**Impulse Response**

- Volts RMS required to reach 90dB SPL: 0.024 Vrms
- Impedance @ 1kHz: 17 Ohms
- Power Needed for 90dB SPL: 0.03 mW
- Broadband Isolation in dB (100Hz to 10kHz): -8 dB
Headphone Measurements: Bowers and Wilkins C5

Volts RMS required to reach 90dB SPL: 0.048 Vrms
Impedance @ 1kHz: 35 Ohms
Power Needed for 90dB SPL: 0.07 mW
Broadband Isolation in dB (100Hz to 10kHz): -26 dB

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Headphone Measurements: Brainwavz M2

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Measured Data

**Impedance**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

**Isolation**
Attenuation of External Sound vs. Frequency

**Volts RMS required to reach 90dB SPL:** 0.018 Vrms
**Impedance @ 1kHz:** 21 Ohms
**Power Needed for 90dB SPL:** 0.01 mW
**Broadband Isolation in dB (100Hz to 10kHz):** -14 dB
Headphone Measurements:

Brainwavz R3

**Headphone Measurements:**

- **Volts RMS required to reach 90dB SPL:** 0.034 Vrms
- **Impedance @ 1kHz:** 18 Ohms
- **Power Needed for 90dB SPL:** 0.07 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -28 dB
Headphone Measurements:  
**Brainwavz S0**

**Headphone Measurements:**
- Volts RMS required to reach 90dB SPL: 0.027 Vrms
- Impedance @ 1kHz: 15 Ohms
- Power Needed for 90dB SPL: 0.05 mW
- Broadband Isolation in dB (100Hz to 10kHz): -23 dB

**Frequency Response**
- Top: Compensated and Averaged
- Bottom: Raw Measured Data

**Isolation**
- Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

Volts RMS required to reach 90dB SPL: 0.027 Vrms
Impedance @ 1kHz: 15 Ohms
Power Needed for 90dB SPL: 0.05 mW
Broadband Isolation in dB (100Hz to 10kHz): -23 dB

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Headphone Measurements: Brainwavz S1

Volts RMS required to reach 90dB SPL: 0.034 Vrms
Impedance @ 1kHz: 17 Ohms
Power Needed for 90dB SPL: 0.07 mW
Broadband Isolation in dB (100Hz to 10kHz): -27 dB
Headphone Measurements: Brainwavz S5

Volts RMS required to reach 90dB SPL: 0.035 Vrms
Impedance @ 1kHz: 17 Ohms
Power Needed for 90dB SPL: 0.07 mW
Broadband Isolation in dB (100Hz to 10kHz): -29 dB

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Headphone Measurements: Cardas EM5813

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

Volts RMS required to reach 90dB SPL: 0.022 Vrms
Impedance @ 1kHz: 34 Ohms
Power Needed for 90dB SPL: 0.016 mW
Broadband Isolation in dB (100Hz to 10kHz): -20 dB
Headphone Measurements:

Creative Aurvana InEar 3

Impedance @ 1kHz: 86 Ohms

Power Needed for 90dB SPL: 0.00 mW

Broadband Isolation in dB (100Hz to 10kHz): -31 dB
Headphone Measurements:

**Cyberdrive Forte Impact Bass**

- **Volts RMS required to reach 90dB SPL:** 0.019 Vrms
- **Impedance @ 1kHz:** 17 Ohms
- **Power Needed for 90d BSPL:** 0.02 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -32 dB

---

**Frequency Response**
- Top - Compensated and Averaged
- Bottom - Raw Measured Data

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

<table>
<thead>
<tr>
<th>Time in Seconds</th>
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<th>Left</th>
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</thead>
<tbody>
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</tr>
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<tr>
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<td>0.010</td>
<td>0.010</td>
</tr>
</tbody>
</table>

---

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**Headphone Measurements:**

**Cyberdrive Forte Classic Soprano**

**Volts RMS required to reach 90dB SPL:** 0.035 Vrms

**Impedance @ 1kHz:** 17 Ohms

**Power Needed for 90dB SPL:** 0.07 mW

**Broadband Isolation in dB (100Hz to 10kHz):** -34 dB

---

**Frequency Response**

Top - Compensated and Averaged

Bottom - Raw Measured Data

---

**Isolation**

Attenuation of External Sound vs. Frequency

---

**Impulse Response**

---

**%THD+noise @ 90dB and 100dB**

---

**30 Hz Square Wave**

---

**300 Hz Square Wave**

---
Headphone Measurements: Cyberdrive Forte Classic Bass

**Frequency Response**
- Top: Compensated and Averaged
- Bottom: Raw Measured Data

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

Volts RMS required to reach 90dB SPL: 0.018 Vrms
Impedance @ 1kHz: 18 Ohms
Power Needed for 90dB SPL: 0.02 mw
Broadband Isolation in dB (100Hz to 10kHz): -31 dBr
Headphone Measurements: Cypher Labs Astru IEM Bass Boo

**Headphone Measurements:**

- **Volts RMS required to reach 90dB SPL:** 4.412 Vrms
- **Impedance @ 1kHz:** 49 Ohms
- **Power Needed for 90dB SPL:** 395.30 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -42 dB

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Measured Data

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

(Charts and graphs showing various measurements and data.)

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Headphone Measurements: Cypher Labs Astru IEM

**Headphone Measurements:**

- **Volts RMS required to reach 90dB SPL:** 0.034 Vrms
- **Impedance @ 1kHz:** 166 Ohms
- **Power Needed for 90dB SPL:** 0.01 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -42 dB

---

**Frequency Response**

- Top: Compensated and Averaged
- Bottom: Raw Measured Data

**Isolation**

- Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**

- Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

- Volts RMS required to reach 90dB SPL: 0.034 Vrms
- Impedance @ 1kHz: 166 Ohms
- Power Needed for 90dB SPL: 0.01 mW
- Broadband Isolation in dB (100Hz to 10kHz): -42 dB
Headphone Measurements: Denon AH-C360

Volts RMS required to reach 90dB SPL: 0.036 Vrms
Impedance @ 1kHz: 17 Ohms
Power Needed for 90d BSPL 0.08 mW
Broadband Isolation in dB (100Hz to 10kHz): -25 dBr

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Headphone Measurements: Denon AH-C551

Headphone Measurements:

- Volts RMS required to reach 90dB SPL: 0.045 Vrms
- Impedance @ 1kHz: 17 Ohms
- Power Needed for 90dB SPL: 0.12 mW
- Broadband Isolation in dB (100Hz to 10kHz): -18 dBr
Headphone Measurements: Denon AH-C560R

- **Volts RMS required to reach 90dB SPL**: 0.027 Vrms
- **Impedance @ 1kHz**: 18 Ohms
- **Power Needed for 90dB SPL**: 0.04 mW
- **Broadband Isolation in dB (100Hz to 10kHz)**: -13 dB
**Headphone Measurements:**

**Denon AH-C710**

**Headphone Measurements**

**Volts RMS required to reach 90dB SPL:** 0.024 Vrms

**Impedance @ 1kHz:** 17 Ohms

**Power Needed for 90dB SPL:** 0.03 mW

**Broadband Isolation in dB (100Hz to 10kHz):** -21 dB
Headphone Measurements: Dunu DN900

**Volts RMS required to reach 90dB SPL:** 0.012 Vrms

**Impedance @ 1kHz:** 16 Ohms

**Power Needed for 90dB SPL:** 0.01 mW

**Broadband Isolation in dB (100Hz to 10kHz):** -33 dB
Dunu DN1000

**Headphone Measurements:**

- **Volts RMS required to reach 90dB SPL:** 0.023 Vrms
- **Impedance @ 1kHz:** 10 Ohms
- **Power Needed for 90dB SPL:** 0.05 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -30 dB

**Frequency Response**
- Top - Compensated and Averaged
- Bottom - Raw Measured Data

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**Isolation**
- Attenuation of External Sound vs. Frequency

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

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Headphone Measurements: Dunu DN 2000

- Volts RMS required to reach 90dB SPL: 0.015 Vrms
- Impedance @ 1kHz: 17 Ohms
- Power Needed for 90dBSPL: 0.01 mW
- Broadband Isolation in dB (100Hz to 10kHz): -33 dB

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Headphone Measurements:  Dunu DN2000J

**Volts RMS required to reach 90dB SPL:** 0.027 Vrms

**Impedance @ 1kHz:** 8 Ohms

**Power Needed for 90dB SPL:** 0.09 mW

**Broadband Isolation in dB (100Hz to 10kHz):** -22 dB

---

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Measured Data

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**
Headphone Measurements: Dunu Titan 1

Volts RMS required to reach 90dB SPL: 0.041 Vrms
Impedance @ 1kHz: 18 Ohms
Power Needed for 90dB SPL: 0.10 mW
Broadband Isolation in dB (100Hz to 10kHz): -12 dB
Headphone Measurements: Dunu Titan 3

- **Volts RMS required to reach 90dB SPL**: 0.019 Vrms
- **Impedance @ 1kHz**: 18 Ohms
- **Power Needed for 90dB SPL**: 0.02 mW
- **Broadband Isolation in dB (100Hz to 10kHz)**: -26 dBr

---

**Frequency Response**
- Top - Compensated and Averaged
- Bottom - Raw Measured Data

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

---

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Headphone Measurements:  
Dunu Titan 5

- **Volts RMS required to reach 90dB SPL:** 0.029 Vrms
- **Impedance @ 1kHz:** 34 Ohms
- **Power Needed for 90dBSPL:** 0.03 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -20 dBr

---

**Impulse Response**

- **Time in Seconds:** 0.0000 to 0.0030
- **Volts:** -0.03 to 0.03

**30 Hz Square Wave**

- **Time in Seconds:** 0.00 to 0.10
- **Volts:** -0.05 to 0.05

**300 Hz Square Wave**

- **Time in Seconds:** 0.0000 to 0.010
- **Volts:** -0.04 to 0.04

---

**Frequency Response**

- **Amplitude (dB):** -60 to 20

**Isolation**

- **Reduction in dB:** -70 to 0

---

**Electrical Impedance and Phase**

- **Impedance in Ohms:** 0 to 45
- **Phase in Degrees:** -60 to 60

---

**%THD+noise @ 90dB and 100dB**

- **%THD+noise:** 0.01 to 10

---

**30 Hz Wave**

- **Time in Seconds:** 0.00 to 0.10
- **Volts:** 0 to 0.1

---

**300 Hz Wave**

- **Time in Seconds:** 0.0000 to 0.010
- **Volts:** 0 to 0.05

---

**Voltage RMS required to reach 90dB SPL:** 0.029 Vrms

**Impedance @ 1kHz:** 34 Ohms

**Power Needed for 90dBSPL:** 0.03 mW

**Broadband Isolation in dB (100Hz to 10kHz):** -20 dBr
Headphone Measurements:  Earsonics Velvet Pot CCW

**Frequency Response**
- Top - Compensated and Averaged
- Bottom - Raw Measured Data

**Isolation**
- Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

Volts RMS required to reach 90dB SPL: 0.024 Vrms
Impedance @ 1kHz: 22 Ohms
Power Needed for 90d BSPL: 0.03 mW
Broadband Isolation in dB (100Hz to 10kHz): -34 dB
Headphone Measurements:  Earsonics Velvet Pot Centered

Volts RMS required to reach 90dB SPL: 0.026 Vrms
Impedance @ 1kHz: 17 Ohms
Power Needed for 90dB SPL: 0.04 mW
Broadband Isolation in dB (100Hz to 10kHz): -34 dB
Headphone Measurements: Earsonics Velvet Pot CW

Frequency Response
Top - Compensated and Averaged
Bottom - Raw Measured Data

Impedance and Phase
Measured with 600 Ohm output impedance.

%THD+noise @ 90dB and 100dB

30 Hz Square Wave

300 Hz Square Wave

Impulse Response

Volts RMS required to reach 90dB SPL: 0.028 Vrms
Impedance @ 1kHz: 13 Ohms
Power Needed for 90dB SPL: 0.06 mW
Broadband Isolation in dB (100Hz to 10kHz): -34 dB
**Headphone Measurements:**  
**EarSonics ES3**

**Volts RMS required to reach 90dB SPL:** 0.026 Vrms  
**Impedance @ 1kHz:** 14 Ohms  
**Power Needed for 90d BSPL:** 0.05 mW  
**Broadband Isolation in dB (100Hz to 10kHz):** -33 dB
Headphone Measurements:  Echobox Finder X1 White Filter

Volts RMS required to reach 90dB SPL: 0.055 Vrms
Impedance @ 1kHz: 23 Ohms
Power Needed for 90dB SPL: 0.13 mW
Broadband Isolation in dB (100Hz to 10kHz): -18 dB
**Headphone Measurements:**

**Echobox Finder X1 Red Filter**

**Volts RMS required to reach 90dB SPL:** 0.052 Vrms

**Impedance @ 1kHz:** 23 Ohms

**Power Needed for 90dB SPL:** 0.12 mW

**Broadband Isolation in dB (100Hz to 10kHz):** -37 dB

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

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Headphone Measurements: Echobox Finder X1 Black Filter

**Headphone Measurements:**

- **Volts RMS required to reach 90dB SPL:** 0.058 Vrms
- **Impedance @ 1kHz:** 22 Ohms
- **Power Needed for 90dB SPL:** 0.15 mW
- **Broadband Isolation in dB (10Hz to 10kHz):** -33 dB

**Frequency Response**
- Top - Compensated and Averaged
- Bottom - Raw Measured Data

**Isolation**
- Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**30 Hz Square Wave**

**300 Hz Square Wave**

**%THD+noise @ 90dB and 100dB**

**Impulse Response**

---

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### Headphone Measurements: Etymotic EK5

**Volts RMS required to reach 90dB SPL:** 0.425 Vrms

**Impedance @ 1kHz:** 210 Ohms

**Power Needed for 90dB SPL:** 0.86 mW

**Broadband Isolation in dB (100Hz to 10kHz):** -36 dB

---

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Measured Data

---

**Isolation**
Attenuation of External Sound vs. Frequency

---

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

---

**%THD+noise @ 90dB and 100dB**

---

**30 Hz Square Wave**

---

**300 Hz Square Wave**

---

**Impulse Response**
Headphone Measurements:  
Etymotic ER4PT

**Headphone Measurements**

- **Volts RMS required to reach 90dB SPL:** 0.027 Vrms
- **Impedance @ 1kHz:** 27 Ohms
- **Power Needed for 90dB SPL:** 0.03 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -43 dB

---

**Frequency Response**

- **Top - Compensated and Averaged**
- **Bottom - Raw Measured Data**

**Isolation**

- **Attenuation of External Sound vs. Frequency**

**Electrical Impedance and Phase**

- **Measured with 600 Ohm output impedance.**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

- **Volts RMS required to reach 90dB SPL:** 0.027 Vrms
- **Impedance @ 1kHz:** 27 Ohms
- **Power Needed for 90dB SPL:** 0.03 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -43 dB

---

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**Headphone Measurements:**

**Etymotic ER4SR**

**Frequency Response**
- Top - Compensated and Averaged
- Bottom - Raw Measured Data

**Isolation**
- Attenuation of External Sound vs. Frequency

**Impedance and Phase**
- Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

---

Volts RMS required to reach 90dB SPL: 0.049 Vrms

Impedance @ 1kHz: 47 Ohms

Power Needed for 90dB SPL: 0.05 mW

Broadband Isolation in dB (100Hz to 10kHz): -40 dB

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Headphone Measurements: Etymotic ER4XR

**Headphone Measurements:**

- Volts RMS required to reach 90dB SPL: 0.044 Vrms
- Impedance @ 1kHz: 48 Ohms
- Power Needed for 90dB SPL: 0.04 mW
- Broadband Isolation in dB (100Hz to 10kHz): -39 dBr

---

**Electrical Impedance and Phase**

Measured with 600 Ohm output impedance.

**Frequency Response**

Top - Compensated and Averaged
Bottom - Raw Measured Data

**Isolation**

Attenuation of External Sound vs. Frequency

**Impulse Response**

Volts RMS required to reach 90dB SPL: 0.044 Vrms
Impedance @ 1kHz: 48 Ohms
Power Needed for 90dB SPL: 0.04 mW
Broadband Isolation in dB (100Hz to 10kHz): -39 dBr
Headphone Measurements:  Etymotic mc3

**Headphone Measurements**

- **Volts RMS required to reach 90dB SPL**: 0.042 Vrms
- **Impedance @ 1kHz**: 18 Ohms
- **Power Needed for 90dB SPL**: 0.10 mW
- **Broadband Isolation in dB**: -35 dBr

---

**Isolation**

Attenuation of External Sound vs. Frequency

---

**Frequency Response**

Top - Compensated and Averaged
Bottom - Raw Measured Data

---

**Electrical Impedance and Phase**

Measured with 600 Ohm output impedance.

---

**%THD+noise @ 90dB and 100dB**

---

**30 Hz Square Wave**

---

**300 Hz Square Wave**

---

**Impulse Response**

---

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Headphone Measurements:

**Etymotic Mk5**

- **Volts RMS required to reach 90dB SPL:** 0.064 Vrms
- **Impedance @ 1kHz:** 33 Ohms
- **Power Needed for 90dB SPL:** 0.12 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -44 dB

---

### Frequency Response

- **Top - Compensated and Averaged**
- **Bottom - Raw Measured Data**

### Isolation

**Attenuation of External Sound vs. Frequency**

### Electrical Impedance and Phase

- Measured with 600 Ohm output impedance.

### %THD+noise @ 90dB and 100dB

### 30 Hz Square Wave

### 300 Hz Square Wave

### Impulse Response

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Headphone Measurements:  
Focal Spark

- **Volts RMS required to reach 90dB SPL**: 0.045 Vrms
- **Impedance @ 1kHz**: 18 Ohms
- **Power Needed for 90dB SPL**: 0.12 mW
- **Broadband Isolation in dB (100Hz to 10kHz)**: -19 dB

---

**Frequency Response**
- Top: Compensated and Averaged
- Bottom: Raw Measured Data

**Isolation**
- Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**30 Hz Square Wave**
- Amplitude (Volts)

**300 Hz Square Wave**
- Amplitude (Volts)

**Impulse Response**
- Time in Seconds

---

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Headphone Measurements:  
Fender FXA6

- **Volts RMS required to reach 90dB SPL:** 0.037 Vrms
- **Impedance @ 1kHz:** 16 Ohms
- **Power Needed for 90dB SPL:** 0.09 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -39 dB

**Impulse Response**

- **Volts RMS required to reach 90dB SPL:** 0.037 Vrms
- **Impedance @ 1kHz:** 16 Ohms
- **Power Needed for 90dB SPL:** 0.09 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -39 dB
Headphone Measurements: Fidue A31s

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Measured Data

**Isolation**
Attenuation of External Sound vs. Frequency

**Impedance and Phase**
Measured with 600 Ohm output impedance.

**Electrical Impedance and Phase**
30 Hz Square Wave
300 Hz Square Wave

**%THD+noise @ 90dB and 100dB**

**Impulse Response**

Volts RMS required to reach 90dB SPL: 0.030 Vrms
Impedance @ 1kHz: 22 Ohms
Power Needed for 90dB SPL: 0.04 mW
Broadband Isolation in dB (100Hz to 10kHz): -27 dB
Headphone Measurements: Fidue A63

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**Isolation**
Attenuation of External Sound vs. Frequency

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Measured Data

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

Volts RMS required to reach 90dB SPL: 0.040 Vrms
Impedance @ 1kHz: 20 Ohms
Power Needed for 90dB SPL: 0.08 mW
Broadband Isolation in dB (100Hz to 10kHz): -14 dB
Headphone Measurements:

Fidue A65

Volts RMS required to reach 90dB SPL: 0.041 Vrms
Impedance @ 1kHz: 19 Ohms
Power Needed for 90d BSPL: 0.09 mW
Broadband Isolation in dB (100Hz to 10kHz): -16 dB
Headphone Measurements: Fidue A71

Volts RMS required to reach 90dB SPL: 0.026 Vrms
Impedance @ 1kHz: 17 Ohms
Power Needed for 90dB SPL: 0.04 mW
Broadband Isolation in dB (100Hz to 10kHz): -20 dB
Headphone Measurements: Fidue A81

**Headphone Measurements:**

- **Volts RMS required to reach 90dB SPL:** 0.037 Vrms
- **Impedance @ 1kHz:** 18 Ohms
- **Power Needed for 90d BSPL:** 0.07 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -16 dB

---

**Frequency Response**

- **Top:** Compensated and Averaged
- **Bottom:** Raw Measured Data

**Isolation**

- **Attenuation of External Sound vs. Frequency**

**Electrical Impedance and Phase**

- Measured with 600 Ohm output impedance.

**30 Hz Square Wave**

**300 Hz Square Wave**

**%THD+noise @ 90dB and 100dB**

**Impulse Response**

- Volts RMS required to reach 90dB SPL: 0.037 Vrms
- Impedance @ 1kHz: 18 Ohms
- Power Needed for 90dB SPL: 0.07 mW
- Broadband Isolation in dB (100Hz to 10kHz): -16 dB

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Headphone Measurements: Fidue A83

**Headphone Measurements:**

- **Volts RMS required to reach 90dB SPL:** 0.019 Vrms
- **Impedance @ 1kHz:** 12 Ohms
- **Power Needed for 90dB SPL:** 0.03 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -15 dB

**Frequency Response**
- Top - Compensated and Averaged
- Bottom - Raw Measured Data

**Isolation**
- Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

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Headphone Measurements:

- Volts RMS required to reach 90dB SPL: 0.026 Vrms
- Impedance @ 1kHz: 18 Ohms
- Power Needed for 90dB SPL: 0.04 mW
- Broadband Isolation in dB (100Hz to 10kHz): -26 dB

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**Headphone Measurements:**

- **Final Audio Heaven A**

**Impulse Response**

- Volts RMS required to reach 90dB SPL: 0.012 Vrms
- Impedance @ 1kHz: 11 Ohms
- Power Needed for 90dB SPL: 0.01 mW
- Broadband Isolation in dB (100Hz to 10kHz): -28 dB

**Frequency Response**

- Top: Compensated and Averaged
- Bottom: Raw Measured Data

**Isolation**

- Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**

- Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**
Headphone Measurements: Final Audio Heaven S

- **Volts RMS required to reach 90dB SPL:** 0.013 Vrms
- **Impedance @ 1kHz:** 11 Ohms
- **Power Needed for 90dB SPL:** 0.01 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -27 dB

---

**Frequency Response**
- **Top - Compensated and Averaged**
- **Bottom - Raw Measured Data**

**Isolation**
- Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

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Headphone Measurements:  First Harmonic IEB6

- **Volts RMS required to reach 90dB SPL:** 0.057 Vrms
- **Impedance @ 1kHz:** 18 Ohms
- **Power Needed for 90d BSPL:** 0.18 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -21 dB

---

**Frequency Response**
- Top - Compensated and Averaged
- Bottom - Raw Measured Data

**Isolation**
- Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

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Headphone Measurements: Final Audio Heaven II

- Volts RMS required to reach 90dB SPL: 0.022 Vrms
- Impedance @ 1kHz: 17 Ohms
- Power Needed for 90dB SPL: 0.03 mW
- Broadband Isolation in dB (100Hz to 10kHz): -36 dB
**Headphone Measurements:**

**Fischer Audio Tandem**

- **Volts RMS required to reach 90dB SPL:** 0.035 Vrms
- **Impedance @ 1kHz:** 39 Ohms
- **Power Needed for 90dB SPL:** 0.03 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -17 dB

---

**Frequency Response**
- Top - Compensated and Averaged
- Bottom - Raw Measured Data

**Isolation**
- Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

---

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Headphone Measurements: FLC Technologies FLC8 G G Bk De

- **Volts RMS required to reach 90dB SPL:** 0.013 Vrms
- **Impedance @ 1kHz:** 15 Ohms
- **Power Needed for 90dB SPL:** 0.01 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -30 dB

---

**Frequency Response**
- Top - Compensated and Averaged
- Bottom - Raw Measured Data

---

**Impedance Response**
- Measured with 600 Ohm output impedance.

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**%THD+noise @ 90dB and 100dB**

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**30 Hz Square Wave**

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**300 Hz Square Wave**

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**Impulse Response**

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Headphone Measurements:  
FLC Technologies FLC8 GGB

**Frequency Response**
Top - Compensated and Averaged  
Bottom - Raw Measured Data

**Isolation**  
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**  
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

Volts RMS required to reach 90dB SPL: 0.019 Vrms
Impedance @ 1kHz: 14 Ohms
Power Needed for 90d BSPL: 0.03 mW
Broadband Isolation in dB (100Hz to 10kHz): -31 dB

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**Headphone Measurements:**

**FLC Technologies FLC8 CCY Voca**

- **Volts RMS required to reach 90dB SPL:** 0.016 Vrms
- **Impedance @ 1kHz:** 14 Ohms
- **Power Needed for 90dB SPL:** 0.02 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -27 dB

---

**Frequency Response**

Top - Compensated and Averaged  
Bottom - Raw Measured Data

**Isolation**

Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**

Measured with 600 Ohm output impedance.

**30 Hz Square Wave**

**%THD+noise @ 90dB and 100dB**

**300 Hz Square Wave**

**Impulse Response**

---

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Headphone Measurements: FLC Technology FLC8 C C Gn Stri

- **Volts RMS required to reach 90dB SPL:** 0.014 Vrms
- **Impedance @ 1kHz:** 19 Ohms
- **Power Needed for 90dB SPL:** 0.01 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -29 dB

---

**Frequency Response**
- Top - Compensated and Averaged
- Bottom - Raw Measured Data

**Isolation**
- Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

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Headphone Measurements: FLC Technology FLC8 C C Bk Ligh

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Measured Data

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**30 Hz Square Wave**

**%THD+noise @ 90dB and 100dB**

**300 Hz Square Wave**

**Impulse Response**

Volts RMS required to reach 90dB SPL: 0.014 Vrms
Impedance @ 1kHz: 14 Ohms
Power Needed for 90d BSPL: 0.01 mW
Broadband Isolation in dB (100Hz to 10kHz): -28 dB
Headphone Measurements:  
FLC Technologies FLC8 Bk Gy Bk

- **Volts RMS required to reach 90dB SPL:** 0.015 Vrms
- **Impedance @ 1kHz:** 14 Ohms
- **Power Needed for 90dB SPL:** 0.01 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -30 dB

---

**Frequency Response**

Top - Compensated and Averaged  
Bottom - Raw Measured Data

**Isolation**

Attenuation of External Sound vs. Frequency

---

**Electrical Impedance and Phase**

Measured with 600 Ohm output impedance.

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**%THD+noise @ 90dB and 100dB**

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**30 Hz Square Wave**

---

**300 Hz Square Wave**

---

**Impulse Response**
**Headphone Measurements:**

**Focal Sphear**

- **Volts RMS required to reach 90dB SPL:** 0.040 Vrms
- **Impedance @ 1kHz:** 19 Ohms
- **Power Needed for 90dB SPL:** 0.09 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -16 dBr

---

**Frequency Response**
- Top - Compensated and Averaged
- Bottom - Raw Measured Data

**Isolation**
- Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

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Headphone Measurements: Fujisan Telos

Volts RMS required to reach 90dB SPL: 0.029 Vrms
Impedance @ 1kHz: 17 Ohms
Power Needed for 90dB SPL: 0.05 mW
Broadband Isolation in dB (100Hz to 10kHz): -18 dB
### Headphone Measurements: Grado GR8

- **Volts RMS required to reach 90dB SPL:** 0.025 Vrms
- **Impedance @ 1kHz:** 99 Ohms
- **Power Needed for 90dB SPL:** 0.01 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -27 dB

---

**Impulse Response**

**Frequency Response**
- **Top:** Compensated and Averaged
- **Bottom:** Raw Measured Data

**Isolation**
- Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

---

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Headphone Measurements: Harman Kardon NI

- **Volts RMS required to reach 90dB SPL:** 0.054 Vrms
- **Impedance @ 1kHz:** 30 Ohms
- **Power Needed for 90dB SPL:** 0.09 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -22 dB

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**Headphone Measurements:**

- **Harman Kardon AE**

- **Volts RMS required to reach 90dB SPL:** 0.043 Vrms
- **Impedance @ 1kHz:** 31 Ohms
- **Power Needed for 90dB SPL:** 0.06 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -19 dB

---

**Frequency Response**

Top - Compensated and Averaged
Bottom - Raw Measured Data

**Electrical Impedance and Phase**

Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

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Headphone Measurements: Havi B3 Pro1

- Volts RMS required to reach 90dB SPL: 0.049 Vrms
- Impedance @ 1kHz: 34 Ohms
- Power Needed for 90dB SPL: 0.07 mW
- Broadband Isolation in dB (100Hz to 10kHz): -26 dB

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Headphone Measurements:  
HIFIMAN RE-600

- **Volts RMS required to reach 90dB SPL**: 0.018 Vrms
- **Impedance @ 1kHz**: 17 Ohms
- **Power Needed for 90dB SPL**: 0.02 mW
- **Broadband Isolation in dB (100Hz to 10kHz)**: -27 dB
Headphone Measurements: HIFIMAN IE400

Electrical Impedance and Phase
Measured with 600 Ohm output impedance.

%THD+noise @ 90dB and 100dB

30 Hz Square Wave

300 Hz Square Wave

Impulse Response

Volts RMS required to reach 90dB SPL: 0.029 Vrms
Impedance @ 1kHz: 36 Ohms
Power Needed for 90dB SPL: 0.02 mW
Broadband Isolation in dB (100Hz to 10kHz): -25 dB

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Headphone Measurements: HIFIMAN RE300

Volts RMS required to reach 90dB SPL: 0.011 Vrms
Impedance @ 1kHz: 21 Ohms
Power Needed for 90dB SPL: 0.01 mW
Broadband Isolation in dB (100Hz to 10kHz): -26 dB
Headphone Measurements:  

**HiFiMAN RE-272**

Volts RMS required to reach 90dB SPL: 0.029 Vrms
Impedance @ 1kHz: 21 Ohms
Power Needed for 90dB SPL: 0.04 mW
Broadband Isolation in dB (100Hz to 10kHz): 28 dB

---

**Frequency Response**
Top - Compensated and Averaged  
Bottom - Raw Measured Data

**Isolation**
Attenuation of External Sound vs. Frequency

**Impulse Response**

---

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

---

**%THD+noise @ 90dB and 100dB**

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**30 Hz Square Wave**

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**300 Hz Square Wave**

---

**Impedance in Ohms**

---

**Phase in Degrees**

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**Frequency Response**  
Top - Compensated and Averaged  
Bottom - Raw Measured Data

**Impulse Response**

**30 Hz Square Wave**

**%THD+noise @ 90dB and 100dB**

**300 Hz Square Wave**

**Isolation**  
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**  
Measured with 600 Ohm output impedance.

**Volts RMS required to reach 90dB SPL:** 0.043 Vrms  
**Impedance @ 1kHz:** 149 Ohms  
**Power Needed for 90dB SPL:** 0.01 mW  
**Broadband Isolation in dB (100Hz to 10kHz):** -26 dB
Headphone Measurements: HiSoundAudio BA-100

**Headphone Measurements:**

- **Volts RMS required to reach 90dB SPL:** 0.044 Vrms
- **Impedance @ 1kHz:** 76 Ohms
- **Power Needed for 90dB SPL:** 0.03 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -28 dB

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Headphone Measurements:  
HiSoundAudio Crystal

**Headphone Measurements:**

- **Volts RMS required to reach 90dB SPL:** 0.062 Vrms
- **Impedance @ 1kHz:** 17 Ohms
- **Power Needed for 90dB SPL:** 0.23 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -35 dB

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Headphone Measurements: HiSoundAudio Hiphone HP4

**Headphone Measurements**

- **Volts RMS required to reach 90dB SPL:** 0.041 Vrms
- **Impedance @ 1kHz:** 16 Ohms
- **Power Needed for 90dB SPL:** 0.10 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -27 dBr

**Frequency Response**
- Top: Compensated and Averaged
- Bottom: Raw Measured Data

**Isolation**
- Attenuation of External Sound vs. Frequency

**Impulse Response**

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Copyright © SOURCE INTERLINK MEDIA All rights reserved.**
**Headphone Measurements:**

**HiSoundAudio Golden Crystal**

- **Volts RMS required to reach 90dB SPL:** 0.062 Vrms
- **Impedance @ 1kHz:** 17 Ohms
- **Power Needed for 90dB SPL:** 0.22 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -34 dB
Headphone Measurements: House of Marley Legend

- **Volts RMS required to reach 90dB SPL**: 0.014 Vrms
- **Impedance @ 1kHz**: 42 Ohms
- **Power Needed for 90dB SPL**: 0.00 mW
- **Broadband Isolation in dB (100Hz to 10kHz)**: -31 dB
**Headphone Measurements: HZSOUND HZ-EP001**

- **Volts RMS required to reach 90dB SPL:** 0.023 Vrms
- **Impedance @ 1kHz:** 18 Ohms
- **Power Needed for 90dB SPL:** 0.03 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -29 dB

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**Frequency Response**
- Top: Compensated and Averaged
- Bottom: Raw Measured Data

**Isolation**
- Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

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Headphone Measurements: HZSOUND HZ3

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Measured Data

**Isolation**
Attenuation of External Sound vs. Frequency

**Impulse Response**

Volts RMS required to reach 90dB SPL: 0.034 Vrms
Impedance @ 1kHz: 34 Ohms
Power Needed for 90dB SPL: 0.03 mW
Broadband Isolation in dB (100Hz to 10kHz): -18 dB
Headphone Measurements: iHarmonix Platinum ev-Series

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Measured Data

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

Volts RMS required to reach 90dB SPL: 0.030 Vrms
Impedance @ 1kHz: 21 Ohms
Power Needed for 90dB SPL: 0.04 mW
Broadband Isolation in dB (100Hz to 10kHz): -18 dBr

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Headphone Measurements:  

iMetal iM590

**Volts RMS required to reach 90dB SPL:** 0.021 Vrms

**Impedance @ 1kHz:** 18 Ohms

**Power Needed for 90dB SPL:** 0.02 mW

**Broadband Isolation in dB (100Hz to 10kHz):** -20 dB
Headphone Measurements: InEar StageDriver SD2

**Headphone Measurements**

- **Volts RMS required to reach 90dB SPL**: 0.015 Vrms
- **Impedance @ 1kHz**: 40 Ohms
- **Power Needed for 90dB SPL**: 0.01 mW
- **Broadband Isolation in dB (100Hz to 10kHz)**: -32 dB

**Frequency Response**

- Top: Compensated and Averaged
- Bottom: Raw Measured Data

**Isolation**

Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**

Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

Volts RMS required to reach 90dB SPL: 0.015 Vrms
Impedance @ 1kHz: 40 Ohms
Power Needed for 90dB SPL: 0.01 mW
Broadband Isolation in dB (100Hz to 10kHz): -32 dB

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Headphone Measurements:

InEar StageDriver 3

**Headphone Measurements:**

- **Volts RMS required to reach 90dB SPL:** 0.018 Vrms
- **Impedance @ 1kHz:** 23 Ohms
- **Power Needed for 90dB SPL:** 0.01 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -35 dB
Headphone Measurements:  InEar StageDriver SD2

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Measured Data

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

Volts RMS required to reach 90dB SPL: 0.015 Vrms
Impedance @ 1kHz: 40 Ohms
Power Needed for 90dB SPL: 0.01 mW
Broadband Isolation in dB (100Hz to 10kHz): -32 dB

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Headphone Measurements: Ivery IS-1

**Headphone Measurements**

- **Volts RMS required to reach 90dB SPL:** 0.030 Vrms
- **Impedance @ 1kHz:** 20 Ohms
- **Power Needed for 90dB SPL:** 0.05 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -25 dB

---

**Frequency Response**

Top - Compensated and Averaged
Bottom - Raw Measured Data

- **Frequency Response Top**
  - Amplitude in dB
  - Frequency range from 10Hz to 100kHz

- **Frequency Response Bottom**
  - Amplitude in dB
  - Frequency range from 10Hz to 100kHz

**Electrical Impedance and Phase**

- Measured with 600 Ohm output impedance.

**Isolation**

Attenuation of External Sound vs. Frequency

**Impulse Response**

- Time in Seconds
- Impedance in Ohms
- Phase in Degrees

---

**%THD+noise @ 90dB and 100dB**

- Time in Seconds
- Frequency range from 10Hz to 100kHz

**30 Hz Square Wave**

- Time in Seconds
- Frequency range from 0.00 to 0.10

**300 Hz Square Wave**

- Time in Seconds
- Frequency range from 0.00 to 0.10

---

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Headphone Measurements:  

**Jays q-JAY**

- **Volts RMS required to reach 90dB SPL:** 0.031 Vrms
- **Impedance @ 1kHz:** 45 Ohms
- **Power Needed for 90dB SPL:** 0.02 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -36 dB
**Headphone Measurements: Jays A Jays 5**

- **Volts RMS required to reach 90dB SPL:** 0.037 Vrms
- **Impedance @ 1kHz:** 19 Ohms
- **Power Needed for 90dB SPL:** 0.07 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -19 dB

**Impulse Response**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Isolation**

**Electrical Impedance and Phase**

**Frequency Response**

- **Top - Compensated and Averaged**
- **Bottom - Raw Measured Data**

---

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**Headphone Measurements:**

**JBL J22i**

- **Volts RMS required to reach 90dB SPL:** 0.063 Vrms
- **Impedance @ 1kHz:** 35 Ohms
- **Power Needed for 90dB SPL:** 0.12 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -21 dB

---

**Frequency Response**

Top - Compensated and Averaged
Bottom - Raw Measured Data

---

**Isolation**

Attenuation of External Sound vs. Frequency

---

**Impedance and Phase**

Measured with 600 Ohm output impedance.

---

**%THD+noise @ 90dB and 100dB**

---

**30 Hz Square Wave**

---

**300 Hz Square Wave**

---

**Impulse Response**

---

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Headphone Measurements: JVC XX Elation HA FR100X

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Measured Data

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

Volts RMS required to reach 90dB SPL: 0.027 Vrms
Impedance @ 1kHz: 17 Ohms
Power Needed for 90d BSPL: 0.04 mW
Broadband Isolation in dB (100Hz to 10kHz): -13 dB
Headphone Measurements: JVC HA-FXT90

- **Volts RMS required to reach 90dB SPL:** 0.033 Vrms
- **Impedance @ 1kHz:** 12 Ohms
- **Power Needed for 90dB SPL:** 0.09 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -13 dB

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Headphone Measurements: KEF M200

- **Volts RMS required to reach 90dB SPL**: 0.078 Vrms
- **Impedance @ 1kHz**: 13 Ohms
- **Power Needed for 90dB SPL**: 0.46 mW
- **Broadband Isolation in dB (100Hz to 10kHz)**: -24 dB

---

**Frequency Response**
- Top - Compensated and Averaged
- Bottom - Raw Measured Data

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**Isolation**
- Attenuation of External Sound vs. Frequency

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

---

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Headphone Measurements: Klipsch X6i

- **Volts RMS required to reach 90dB SPL:** 0.026 Vrms
- **Impedance @ 1kHz:** 58 Ohms
- **Power Needed for 90dB SPL:** 0.01 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -33 dB

**Graphs:**
- **Frequency Response:** Top - Compensated and Averaged  
  Bottom - Raw Measured Data  
- **Isolation:** Attenuation of External Sound vs. Frequency
- **Electrical Impedance and Phase:** Measured with 600 Ohm output impedance.
- **%THD+noise @ 90dB and 100dB**
- **30 Hz Square Wave**
- **300 Hz Square Wave**
- **Impulse Response**

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Headphone Measurements: Klipsch XR8i

**Impulse Response**

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Measured Data

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

<table>
<thead>
<tr>
<th>Frequency</th>
<th>10</th>
<th>100</th>
<th>1000</th>
<th>10000</th>
<th>100000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amplitude (dB)</td>
<td>-50</td>
<td>-40</td>
<td>-30</td>
<td>-20</td>
<td>-10</td>
</tr>
</tbody>
</table>

**30 Hz Square Wave**

<table>
<thead>
<tr>
<th>Time in Seconds</th>
<th>0</th>
<th>0.01</th>
<th>0.02</th>
<th>0.03</th>
<th>0.04</th>
<th>0.05</th>
<th>0.06</th>
<th>0.07</th>
<th>0.08</th>
<th>0.09</th>
<th>0.10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volts Right</td>
<td>0</td>
<td>0.01</td>
<td>0.02</td>
<td>0.03</td>
<td>0.04</td>
<td>0.05</td>
<td>0.06</td>
<td>0.07</td>
<td>0.08</td>
<td>0.09</td>
<td>0.10</td>
</tr>
<tr>
<td>Volts Left</td>
<td>0</td>
<td>0.01</td>
<td>0.02</td>
<td>0.03</td>
<td>0.04</td>
<td>0.05</td>
<td>0.06</td>
<td>0.07</td>
<td>0.08</td>
<td>0.09</td>
<td>0.10</td>
</tr>
</tbody>
</table>

**300 Hz Square Wave**

<table>
<thead>
<tr>
<th>Time in Seconds</th>
<th>0</th>
<th>0.001</th>
<th>0.002</th>
<th>0.003</th>
<th>0.004</th>
<th>0.005</th>
<th>0.006</th>
<th>0.007</th>
<th>0.008</th>
<th>0.009</th>
<th>0.010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volts Right</td>
<td>0</td>
<td>0.001</td>
<td>0.002</td>
<td>0.003</td>
<td>0.004</td>
<td>0.005</td>
<td>0.006</td>
<td>0.007</td>
<td>0.008</td>
<td>0.009</td>
<td>0.010</td>
</tr>
<tr>
<td>Volts Left</td>
<td>0</td>
<td>0.001</td>
<td>0.002</td>
<td>0.003</td>
<td>0.004</td>
<td>0.005</td>
<td>0.006</td>
<td>0.007</td>
<td>0.008</td>
<td>0.009</td>
<td>0.010</td>
</tr>
</tbody>
</table>

**Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

<table>
<thead>
<tr>
<th>Frequency</th>
<th>10</th>
<th>100</th>
<th>1000</th>
<th>10000</th>
<th>100000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impedance in Ohms</td>
<td>0</td>
<td>10</td>
<td>100</td>
<td>1000</td>
<td>10000</td>
</tr>
<tr>
<td>Phase in Degrees</td>
<td>0</td>
<td>10</td>
<td>20</td>
<td>30</td>
<td>40</td>
</tr>
</tbody>
</table>

**Power Needed for 90dB SPL**: 0.08 mW

**Broadband Isolation in dB (100Hz to 10kHz)**: -27 dB

**Volts RMS required to reach 90dB SPL**: 0.035 Vrms

**Impedance @ 1kHz**: 14 Ohms

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Headphone Measurements: Klipsch X10

**Headphone Measurements: Klipsch X10**

- **Volts RMS required to reach 90dB SPL:** 0.033 Vrms
- **Impedance @ 1kHz:** 50 Ohms
- **Power Needed for 90d BSPL:** 0.02 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -31 dB

---

**Klipsch X10**

**%THD+noise @ 90dB and 100dB**

- **30 Hz Square Wave**

- **300 Hz Square Wave**

**Impulse Response**

---

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**Headphone Measurements:**  
**Klipsch X12i**

- **Volts RMS required to reach 90dB SPL:** 0.031 Vrms
- **Impedance @ 1kHz:** 49 Ohms
- **Power Needed for 90dB SPL:** 0.02 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -34 dB

---

**Frequency Response**
- Top - Compensated and Averaged
- Bottom - Raw Measured Data

**Isolation**
- Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

---

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Headphone Measurements: Klipsch X20i

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Measured Data

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

Volts RMS required to reach 90dB SPL: 0.032 Vrms
Impedance @ 1kHz: 52 Ohms
Power Needed for 90d BSPL: 0.02 mW
Broadband Isolation in dB (100Hz to 10kHz): -33 dBr

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Headphone Measurements: Jays A Jays 5

- **Volts RMS required to reach 90dB SPL:** 0.037 Vrms
- **Impedance @ 1kHz:** 19 Ohms
- **Power Needed for 90dB SPL:** 0.07 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -19 dB

**Frequency Response**
- Top: Compensated and Averaged
- Bottom: Raw Measured Data

**Isolation**
- Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**
### Headphone Measurements: Lear LUF 4C

**Volts RMS required to reach 90dB SPL:** 0.032 Vrms

**Impedance @ 1kHz:** 27 Ohms

**Power Needed for 90dB SPL:** 0.04 mW

**Broadband Isolation in dB (100Hz to 1kHz):** -35 dB

---

**Frequency Response**
- Top - Compensated and Averaged
- Bottom - Raw Measured Data

**Isolation**
- Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**30 Hz Square Wave**

**300 Hz Square Wave**

**%THD+noise @ 90dB and 100dB**

**Impulse Response**

---

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Headphone Measurements: Lear LUF-4F

Volts RMS required to reach 90dB SPL: 0.027 Vrms
Impedance @ 1kHz: 28 Ohms
Power Needed for 90dB SPL: 0.03 mW
Broadband Isolation in dB (100Hz to 10kHz): -39 dB

---

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Measured Data

**Isolation**
Attenuation of External Sound vs. Frequency

---

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

---

**%THD+noise @ 90dB and 100dB**

---

**30 Hz Square Wave**

---

**300 Hz Square Wave**

---

**Impulse Response**

---

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Headphone Measurements:  Lenntek Pro Series

**Headphone Measurements:**
- Volts RMS required to reach 90dB SPL: 0.012 Vrms
- Impedance @ 1kHz: 27 Ohms
- Power Needed for 90d BSPL: 0.01 mW
- Broadband Isolation in dB (100Hz to 10kHz): -29 dB

**Graphs:**
- Frequency Response: 
  - Top - Compensated and Averaged 
  - Bottom - Raw Measured Data
- Isolation: 
  - Attenuation of External Sound vs. Frequency
- Electrical Impedance and Phase: 
  - Measured with 600 Ohm output impedance.
- %THD+noise @ 90dB and 100dB
- 30 Hz Square Wave
- 300 Hz Square Wave
- Impulse Response

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Headphone Measurements:

**Volts RMS required to reach 90dB SPL:** 0.027 Vrms

**Impedance @ 1kHz:** 103 Ohms

**Power Needed for 90d BSPL:** 0.01 mW

**Broadband Isolation in dB (100Hz to 10kHz):** -32 dB
Headphone Measurements: LG Quadbeat HSS-F420

**Headphone Measurements:**

- **Volts RMS required to reach 90dB SPL:** 0.032 Vrms
- **Impedance @ 1kHz:** 25 Ohms
- **Power Needed for 90dB SPL:** 0.04 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -24 dB

**Frequency Response**
- **Top:** Compensated and Averaged
- **Bottom:** Raw Measured Data

**Isolation**
- Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**30 Hz Square Wave**
- %THD+noise @ 90dB and 100dB

**300 Hz Square Wave**
- Impulse Response

---

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Headphone Measurements: Logitech UE4000 sample A

**Headphone Measurements:**

**Volts RMS required to reach 90dB SPL:** 0.043 Vrms

**Impedance @ 1kHz:** 34 Ohms

**Power Needed for 90dB SPL:** 0.05 mW

**Broadband Isolation in dB (100Hz to 10kHz):** -16 dB

---

**Frequency Response**

Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**

Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**

Measured with 600 Ohm output impedance.

---

**30 Hz Square Wave**

**300 Hz Square Wave**

**%THD+noise @ 90dB and 100dB**

---

**Impulse Response**

---

---
Headphone Measurements: Logitech UE 600vi

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Measured Data

**Impedance and Phase**
Measured with 600 Ohm output impedance.

**30 Hz Square Wave**

**300 Hz Square Wave**

**%THD+noise @ 90dB and 100dB**

**Impulse Response**

Volts RMS required to reach 90dB SPL: 0.010 Vrms
Impedance @ 1kHz: 12 Ohms
Power Needed for 90d BSPL: 0.01 mW
Broadband Isolation in dB (100Hz to 10kHz): -33 dB

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Headphone Measurements: Logitech UE 500vi

**Headphone Measurements:**

- **Volts RMS required to reach 90dB SPL:** 0.041 Vrms
- **Impedance @ 1kHz:** 16 Ohms
- **Power Needed for 90dBSPL:** 0.11 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -34 dB
Headphone Measurements: Logitech UE 350vi

**Volts RMS required to reach 90dB SPL:** 0.037 Vrms

**Impedance @ 1kHz:** 18 Ohms

**Power Needed for 90d BSPL:** 0.08 mW

**Broadband Isolation in dB (100Hz to 10kHz):** -32 dB

---

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Measured Data

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

---

**Impulse Response**

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**Headphone Measurements: Massdrop Nobel X**

**Frequency Response**
- Top: Compensated and Averaged
- Bottom: Raw Measured Data

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

Volts RMS required to reach 90dB SPL: 0.022 Vrms
Impedance @ 1kHz: 32 Ohms
Power Needed for 90dB SPL: 0.02 mW
Broadband Isolation in dB (100Hz to 10kHz): -29 dB
Headphone Measurements:

- **Volts RMS required to reach 90dB SPL**: 0.141 Vrms
- **Impedance @ 1kHz**: 18 Ohms
- **Power Needed for 90dB SPL**: 1.12 mW
- **Broadband Isolation in dB (100Hz to 10kHz)**: -44 dBr

---

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Measured Data

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

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Headphone Measurements: Logitech UE 900

**Voltage RMS required to reach 90dB SPL:** 0.022 Vrms

**Impedance @ 1kHz:** 31 Ohms

**Power Needed for 90dBSPL:** 0.02 mW

**Broadband Isolation in dB (100Hz to 10kHz):** -31 dB
Headphone Measurements:  Master Dynamic ME05

**Headphone Measurements:**

- **Volts RMS required to reach 90dB SPL:** 0.038 Vrms
- **Impedance @ 1kHz:** 17 Ohms
- **Power Needed for 90dB SPL:** 0.08 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -19 dB

---

**Frequency Response**

- Top: Compensated and Averaged
- Bottom: Raw Measured Data

**Isolation**

- Attenuation of External Sound vs. Frequency

**Impulse Response**

**30 Hz Square Wave**

**300 Hz Square Wave**

**%THD+noise @ 90dB and 100dB**

**Electrical Impedance and Phase**

- Measured with 600 Ohm output impedance.

**30 Hz Square Wave**

**300 Hz Square Wave**

**%THD+noise @ 90dB and 100dB**

**Impulse Response**

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Headphone Measurements: MEE A161P

- Volts RMS required to reach 90dB SPL: 0.017 Vrms
- Impedance @ 1kHz: 35 Ohms
- Power Needed for 90dB SPL: 0.01 mW
- Broadband Isolation in dB (100Hz to 10kHz): -34 dB
Headphone Measurements: Meze 11 Deco

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Measured Data

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

- Volts RMS required to reach 90dB SPL: 0.021 Vrms
- Impedance @ 1kHz: 17 Ohms
- Power Needed for 90dB SPL: 0.03 mW
- Broadband Isolation in dB (100Hz to 1kHz): -25 dB
**Headphone Measurements: Meze 11 Neo**

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Measured Data

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

Volts RMS required to reach 90dB SPL: 0.034 Vrms
Impedance @ 1kHz: 19 Ohms
Power Needed for 90dB SPL: 0.06 mW
Broadband Isolation in dB (100Hz to 10kHz): -13 dB

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Headphone Measurements: Meze 12 Classic

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Measured Data

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

Voltage RMS required to reach 90dB SPL: 0.000 Vrms
Impedance @ 1kHz: 19 Ohms
Power Needed for 90dB SPL: 0.00 mW
Broadband Isolation in dB (100Hz to 10kHz): -13 dBr
Headphone Measurements: MOE SS01

- Volts RMS required to reach 90dB SPL: 0.033 Vrms
- Impedance @ 1kHz: 12 Ohms
- Power Needed for 90dB SPL: 0.09 mW
- Broadband Isolation in dB (100Hz to 10kHz): -25 dB

**Frequency Response**

Top - Compensated and Averaged
Bottom - Raw Measured Data

**Isolation**

Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**

Measured with 600 Ohm output impedance.

**30 Hz Square Wave**

**%THD+noise @ 90dB and 100dB**

**300 Hz Square Wave**

**Impulse Response**

Volts RMS required to reach 90dB SPL: 0.033 Vrms
Impedance @ 1kHz: 12 Ohms
Power Needed for 90dB SPL: 0.09 mW
Broadband Isolation in dB (100Hz to 10kHz): -25 dB

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Monoprice 8320

Headphone Measurements:

**Volts RMS required to reach 90dB SPL**: 0.038 Vrms
**Impedance @ 1kHz**: 32 Ohms
**Power Needed for 90d BSPL**: 0.05 mW
**Broadband Isolation in dB (100Hz to 10kHz)**: -9 dB

---

**Frequency Response**

- Top: Compensated and Averaged
- Bottom: Raw Measured Data

**Isolation**

- Attenuation of External Sound vs. Frequency

**Impulse Response**

- Time in Seconds
- Volts

**Electrical Impedance and Phase**

- Measured with 600 Ohm output impedance

**%THD+noise @ 90dB and 100dB**

- Frequency

**30 Hz Square Wave**

- Time in Seconds
- Volts

**300 Hz Square Wave**

- Time in Seconds
- Volts

---

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Headphone Measurements:

**Volts RMS required to reach 90dB SPL:** 0.037 Vrms

**Impedance @ 1kHz:** 16 Ohms

**Power Needed for 90dB SPL:** 0.08 mW

**Broadband Isolation in dB (100Hz to 10kHz):** -29 dB

---

**Frequency Response**

Top - Compensated and Averaged
Bottom - Raw Measured Data

---

**Impulse Response**

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**Electrical Impedance and Phase**

Measured with 600 Ohm output impedance.

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**Isolation**

Attenuation of External Sound vs. Frequency

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**%THD+noise @ 90dB and 100dB**

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**30 Hz Square Wave**

---

**300 Hz Square Wave**

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Headphone Measurements: Monster Jamz

- Volts RMS required to reach 90dB SPL: 0.036 Vrms
- Impedance @ 1kHz: 19 Ohms
- Power Needed for 90dB SPL: 0.07 mW
- Broadband Isolation in dB (100Hz to 10kHz): -35 dB

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Measured Data

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

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Headphone Measurements: Monster Lady Gaga

Headphone Measurements:

- **Volts RMS required to reach 90dB SPL:** 0.052 Vrms
- **Impedance @ 1kHz:** 19 Ohms
- **Power Needed for 90dBSPL:** 0.14 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -29 dB
**Headphone Measurements:**

**Impedance**
- Impedance @ 1kHz: 17 Ohms
- Power Needed for 90dB SPL: 0.11 mW

**Isolation**
- Broadband Isolation in dB (100Hz to 10kHz): -28 dB

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**
**Headphone Measurements:**

**Monster Miles Davis Tribute**

- **Volts RMS required to reach 90dB SPL:** 0.039 Vrms
- **Impedance @ 1kHz:** 19 Ohms
- **Power Needed for 90d BSPL:** 0.08 mW
- **Broadband Isolation in dB (100Hz to 1kHz):** -30 dB$	ext{re}$

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**Frequency Response**

Top - Compensated and Averaged
Bottom - Raw Measured Data

**Isolation**

Attenuation of External Sound vs. Frequency

**Impedance Response**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

---

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**Headphone Measurements:**

**Monster Turbine**

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**Floor Response**
- Top - Compensated and Averaged
- Bottom - Raw Measured Data

**Isolation**
- Attenuation of External Sound vs. Frequency

**Impulse Response**

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Volts RMS required to reach 90dB SPL:** 0.049 Vrms

**Impedance @ 1kHz:** 19 Ohms

**Power Needed for 90dB SPL:** 0.13 mW

**Broadband Isolation in dB (100Hz to 10kHz):** -32 dB

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Headphone Measurements: Monster Turbine Pro Copper

Frequency Response
Top - Compensated and Averaged
Bottom - Raw Measured Data

Isolation
Attenuation of External Sound vs. Frequency

Electrical Impedance and Phase
Measured with 600 Ohm output impedance.

%THD+noise @ 90dB and 100dB

30 Hz Square Wave

300 Hz Square Wave

Impulse Response

Volts RMS required to reach 90dB SPL: 0.039 Vrms
Impedance @ 1kHz: 20 Ohms
Power Needed for 90d BSPL: 0.08 mW
Broadband Isolation in dB (100Hz to 10kHz): -35 dB
**Headphone Measurements: Monster Turbine Pro Gold**

- **Volts RMS required to reach 90dB SPL:** 0.041 Vrms
- **Impedance @ 1kHz:** 19 Ohms
- **Power Needed for 90dB SPL:** 0.09 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -28 dB
**Headphone Measurements: NarMoo B2M**

- **Volts RMS required to reach 90dB SPL:** 0.026 Vrms
- **Impedance @ 1kHz:** 10 Ohms
- **Power Needed for 90dB SPL:** 0.07 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -32 dB

---

**Frequency Response**
- Top - Compensated and Averaged
- Bottom - Raw Measured Data

**Isolation**
- Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**30 Hz Square Wave**

**300 Hz Square Wave**

**%THD+noise @ 90dB and 100dB**

**Impulse Response**

---

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Headphone Measurements: NarMoo S1

**Headphone Measurements:**

- **Impedance @ 1kHz:** 9 Ohms
- **Power Needed for 90dB SPL:** 0.13 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -28 dB

---

**Frequency Response**

*Top - Compensated and Averaged
Bottom - Raw Measured Data*

**Impedance and Phase**

Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

---

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**Headphone Measurements:**

- **NarMoo R1M Silver Ports**

**Frequency Response**
- Top: Compensated and Averaged
- Bottom: Raw Measured Data

**Isolation**
- Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

Volts RMS required to reach 90dB SPL: 0.033 Vrms
Impedance @ 1kHz: 17 Ohms
Power Needed for 90d BSPL: 0.06 mW
Broadband Isolation in dB (100Hz to 10kHz): -34 dB

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Headphone Measurements:  
NarMoo R1M Gunmetal Port

Volts RMS required to reach 90dB SPL: 0.034 Vrms
Impedance @ 1kHz: 17 Ohms
Power Needed for 90d BSPL: 0.07 mW
Broadband Isolation in dB (100Hz to 10kHz): -33 dB

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**Headphone Measurements:**

**NarMoo R1M Black Ports**

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Measured Data

**Isolation**
Attenuation of External Sound vs. Frequency

**30 Hz Square Wave**

**%THD+noise @ 90dB and 100dB**

**300 Hz Square Wave**

**Impulse Response**

Volts RMS required to reach 90dB SPL: 0.033 Vrms
Impedance @ 1kHz: 17 Ohms
Power Needed for 90dB SPL: 0.06 mW
Broadband Isolation in dB (100Hz to 10kHz): -28 dB
Headphone Measurements: NarMoo W1M

**Headphone Measurements**

- **Volts RMS required to reach 90dB SPL:** 0.022 Vrms
- **Impedance @ 1kHz:** 10 Ohms
- **Power Needed for 90dB SPL:** 0.05 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -32 dB

**Frequency Response**
- Top - Compensated and Averaged
- Bottom - Raw Measured Data

**Isolation**
- Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

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Headphone Measurements: NHT Super Buds

Frequency Response
Top - Compensated and Averaged
Bottom - Raw Measured Data

Isolation
Attenuation of External Sound vs. Frequency

Electrical Impedance and Phase
Measured with 600 Ohm output impedance.

%THD+noise @ 90dB and 100dB

Impulse Response

Volts RMS required to reach 90dB SPL: 0.040 Vrms
Impedance @ 1kHz: 33 Ohms
Power Needed for 90dB SPL: 0.05 mW
Broadband Isolation in dB (100Hz to 1kHz): -31 dB
**Headphone Measurements:** Noble PR P Tuning

- **Volts RMS required to reach 90dB SPL:** 0.084 Vrms
- **Impedance @ 1kHz:** 387 Ohms
- **Power Needed for 90dB SPL:** 0.02 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -37 dB

---

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Measured Data

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

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Headphone Measurements:  Noble PR R Tuning

**Headphone Measurements**

**Volts RMS required to reach 90dB SPL:** 0.029 Vrms

**Impedance @ 1kHz:** 30 Ohms

**Power Needed for 90dB SPL:** 0.03 mW

**Broadband Isolation in dB (100Hz to 10kHz):** -37 dBd

---

**Frequency Response**

- **Top:** Compensated and Averaged
- **Bottom:** Raw Measured Data

**Isolation**

Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**

Measured with 600 Ohm output impedance.

**30 Hz Square Wave**

**%THD+noise @ 90dB and 100dB**

**300 Hz Square Wave**

**Impulse Response**

---

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Headphone Measurements: Nocs NS800

**Volts RMS required to reach 90dB SPL:** 0.042 Vrms
**Impedance @ 1kHz:** 67 Ohms
**Power Needed for 90d BSPL:** 0.03 mW
**Broadband Isolation in dB (100Hz to 10kHz):** -37 dB

---

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Measured Data

---

**Isolation**
Attenuation of External Sound vs. Frequency

---

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

---

**%THD+noise @ 90dB and 100dB**

---

**30 Hz Square Wave**

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**300 Hz Square Wave**

---

**Impulse Response**

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Headphone Measurements: Nocs NS 400

**Frequency Response**
- **Top - Compensated and Averaged**
- **Bottom - Raw Measured Data**

**Impedance**
- Measured with 600 Ohm output impedance.

**Electrical Impedance and Phase**
- 0 Ohm to 20 Ohm

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**
- Time in Seconds: 0.00 to 0.10

**300 Hz Square Wave**
- Time in Seconds: 0.00 to 0.10

**Impulse Response**
- Time in Seconds: 0.00 to 0.03

- Volts RMS required to reach 90dB SPL: 0.036 Vrms
- Impedance @ 1kHz: 16 Ohms
- Power Needed for 90d BSPL: 0.08 mW
- Broadband Isolation in dB (100Hz to 10kHz): -35 dB
Headphone Measurements: Nocs NS200

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Measured Data

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

Volts RMS required to reach 90dB SPL: 0.036 Vrms
Impedance @ 1kHz: 17 Ohms
Power Needed for 90dB SPL: 0.08 mW
Broadband Isolation in dB (100Hz to 1kHz): -34 dB
Headphone Measurements: Noontec Rio

- **Volts RMS required to reach 90dB SPL:** 0.046 Vrms
- **Impedance @ 1kHz:** 18 Ohms
- **Power Needed for 90dBSPL:** 0.12 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -30 dBr

---

**Frequency Response**

- **Top:** Compensated and Averaged
- **Bottom:** Raw Measured Data

**Isolation**

Attenuation of External Sound vs. Frequency

---

**Electrical Impedance and Phase**

Measured with 600 Ohm output impedance.

---

**Percentage THD+noise @ 90dB and 100dB**

---

**Impulse Response**

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Headphone Measurements: NuForce HEM8

- **Volts RMS required to reach 90dB SPL:** 0.010 Vrms
- **Impedance @ 1kHz:** 9 Ohms
- **Power Needed for 90dB SPL:** 0.01 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -32 dB

---

**Frequency Response**
- Top - Compensated and Averaged
- Bottom - Raw Measured Data

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**Isolation**
- Attenuation of External Sound vs. Frequency

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

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Headphone Measurements: NuForce NE 600X

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Measured Data

**Isolation**
Attenuation of External Sound vs. Frequency

**Impulse Response**

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

Volts RMS required to reach 90dB SPL: 0.026 Vrms
Impedance @ 1kHz: 18 Ohms
Power Needed for 90dBSPL: 0.04 mW
Broadband Isolation in dB (100Hz to 10kHz): -56 dB
**Headphone Measurements:** NuForce NE700M 2013

**Headphone Measurements:**

- **Volts RMS required to reach 90dB SPL:** 0.037 Vrms
- **Impedance @ 1kHz:** 16 Ohms
- **Power Needed for 90dB SPL:** 0.08 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -29 dB

---

**Frequency Response**

- **Top - Compensated and Averaged**
- **Bottom - Raw Measured Data**

**Isolation**

- Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**

- Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

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Headphone Measurements: NuForce Primo 8

- Volts RMS required to reach 90dB SPL: 0.014 Vrms
- Impedance @ 1kHz: 41 Ohms
- Power Needed for 90dB SPL: 0.00 mW
- Broadband Isolation in dB (100Hz to 10kHz): -28 dB

---

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Measured Data

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

---

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Headphone Measurements: NVX EX10S

Volts RMS required to reach 90dB SPL: 0.011 Vrms
Impedance @ 1kHz: 25 Ohms
Power Needed for 90dB SPL: 0.01 mW
Broadband Isolation in dB (100Hz to 10kHz): -20 dBm

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Headphone Measurements: Ocharaku Flat4 Kuro Type II

- Volts RMS required to reach 90dB SPL: 0.036 Vrms
- Impedance @ 1kHz: 17 Ohms
- Power Needed for 90dB SPL: 0.08 mW
- Broadband Isolation in dB (100Hz to 10kHz): -20 dB

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Headphone Measurements: Onkyo IE-HF300S

**Volts RMS required to reach 90dB SPL:** 0.029 Vrms

**Impedance @ 1kHz:** 32 Ohms

**Power Needed for 90d BSPL:** 0.03 mW

**Broadband Isolation in dB (100Hz to 1kHz):** -15 dB

---

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Measured Data

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

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**Headphone Measurements: Ostry KC06**

- **Volts RMS required to reach 90dB SPL:** 0.016 Vrms
- **Impedance @ 1kHz:** 17 Ohms
- **Power Needed for 90dB SPL:** 0.01 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -16 dB

---

**Frequency Response**

Top - Compensated and Averaged  
Bottom - Raw Measured Data

**Isolation**  
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**  
Measured with 600 Ohm output impedance.

**30 Hz Square Wave**

**%THD+noise @ 90dB and 100dB**

**300 Hz Square Wave**

**Impulse Response**

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Panasonic HJE120

**Headphone Measurements:**

- **Volts RMS required to reach 90dB SPL:** 0.043 Vrms
- **Impedance @ 1kHz:** 17 Ohms
- **Power Needed for 90d BSPL:** 0.10 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -25 dB

**Frequency Response**
- Top - Compensated and Averaged
- Bottom - Raw Measured Data

**Isolation**
- Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

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**Headphone Measurements: Paradigm Shift E1**

### Frequency Response

- **Top - Compensated and Averaged**
- **Bottom - Raw Measured Data**

### Isolation

Attenuation of External Sound vs. Frequency

### Electrical Impedance and Phase

Measured with 600 Ohm output impedance.

### %THD+noise @ 90dB and 100dB

### 30 Hz Square Wave

### 300 Hz Square Wave

### Impulse Response

Voices RMS required to reach 90dB SPL: 0.019 Vrms
Impedance @ 1kHz: 21 Ohms
Power Needed for 90d BSPL: 0.02 mW
Broadband Isolation in dB (100Hz to 1kHz): -28 dB
**Headphone Measurements:**

**Paradigm Shift E3m**

- **Volts RMS required to reach 90dB SPL:** 0.024 Vrms
- **Impedance @ 1kHz:** 21 Ohms
- **Power Needed for 90dB SPL:** 0.03 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -27 dB
Headphone Measurements: Phiaton MS 100 BA

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Measured Data

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

Volts RMS required to reach 90dB SPL: 0.023 Vrms
Impedance @ 1kHz: 67 Ohms
Power Needed for 90dB SPL: 0.01 mW
Broadband Isolation in dB (100Hz to 10kHz): -31 dB
**Headphone Measurements: Phiaton PS 20**

**Volts RMS required to reach 90dB SPL:** 0.022 Vrms

**Impedance @ 1kHz:** 32 Ohms

**Power Needed for 90dB SPL:** 0.02 mW

**Broadband Isolation in dB (100Hz to 10kHz):** -7 dB
Headphone Measurements:

**Phiaton PS 200**

- **Volts RMS required to reach 90dB SPL:** 0.023 Vrms
- **Impedance @ 1kHz:** 54 Ohms
- **Power Needed for 90dB SPL:** 0.01 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -30 dB

---

**Frequency Response**

Top - Compensated and Averaged

Bottom - Raw Measured Data

**Isolation**

Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**

Measured with 600 Ohm output impedance.

**30 Hz Square Wave**

**300 Hz Square Wave**

**%THD+noise @ 90dB and 100dB**

**Impulse Response**

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**Headphone Measurements:**

**Phiaton PS 210**

**Electrical Impedance and Phase**

- Measured with 600 Ohm output impedance.

**30 Hz Square Wave**

**300 Hz Square Wave**

**%THD+noise @ 90dB and 100dB**

**Impulse Response**

- Volts RMS required to reach 90dB SPL: 0.034 Vrms
- Impedance @ 1kHz: 32 Ohms
- Power Needed for 90dB SPL: 0.04 mW
- Broadband Isolation in dB (100Hz to 10kHz): -4 dB
Headphone Measurements: Philips TX1

**Headphone Measurements:**

- **Volts RMS required to reach 90dB SPL:** 0.038 Vrms
- **Impedance @ 1kHz:** 31 Ohms
- **Power Needed for 90dB SPL:** 0.05 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -20 dB

---

**Frequency Response**

- Top: Compensated and Averaged
- Bottom: Raw Measured Data

**Isolation**

- Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**

- Measured with 600 Ohm output impedance

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

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Headphone Measurements: Philips TX2

- **Volts RMS required to reach 90dB SPL:** 0.036 Vrms
- **Impedance @ 1kHz:** 31 Ohms
- **Power Needed for 90dB SPL:** 0.04 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -17 dB

- **%THD+noise @ 90dB and 100dB**
- **30 Hz Square Wave**
- **300 Hz Square Wave**

- **Isolation**: Attenuation of External Sound vs. Frequency

- **Impulse Response**

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Headphone Measurements: Philips Fidelio S1 Early 2013

Volts RMS required to reach 90dB SPL: 0.039 Vrms
Impedance @ 1kHz: 36 Ohms
Power Needed for 90dB SPL: 0.04 mW
Broadband Isolation in dB (100Hz to 10kHz): -16 dB

Frequency Response
Top - Compensated and Averaged
Bottom - Raw Measured Data

Isolation
Attenuation of External Sound vs. Frequency

Electrical Impedance and Phase
Measured with 600 Ohm output impedance.

%THD+noise @ 90dB and 100dB

30 Hz Square Wave

300 Hz Square Wave

Impulse Response
Headphone Measurements: Philips Fidelio S1 2013

Volts RMS required to reach 90dB SPL: 0.046 Vrms
Impedance @ 1kHz: 36 Ohms
Power Needed for 90d BSPL: 0.06 mW
Broadband Isolation in dB (100Hz to 10kHz): -19 dB

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Headphone Measurements: Philips Fidelio S2 Early 2013

Frequency Response
Top - Compensated and Averaged
Bottom - Raw Measured Data

Isolation
Attenuation of External Sound vs. Frequency

Electrical Impedance and Phase
Measured with 600 Ohm output impedance.

%THD+noise @ 90dB and 100dB

30 Hz Square Wave

300 Hz Square Wave

Impulse Response

Volets RMS required to reach 90dB SPL: 0.034 Vrms
Impedance @ 1kHz: 25 Ohms
Power Needed for 90dB SPL: 0.05 mW
Broadband Isolation in dB (100Hz to 10kHz): -16 dB
Headphone Measurements: Philips Fidelio S2 2013

- Volts RMS required to reach 90dB SPL: 0.044 Vrms
- Impedance @ 1kHz: 24 Ohms
- Power Needed for 90dB SPL: 0.08 mW
- Broadband Isolation in dB (100Hz to 10kHz): -19 dB

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Headphone Measurements: Philips SME3580

Headphone Measurements:

**Volts RMS required to reach 90dB SPL:** 0.038 Vrms

**Impedance @ 1kHz:** 18 Ohms

**Power Needed for 90dB SPL:** 0.08 mW

**Broadband Isolation in dB (100Hz to 10kHz):** -28 dB
Headphone Measurements: Philips SHE3590

**Frequency Response**
Top - Compensated and Averaged  
Bottom - Raw Measured Data

**Impedance & Phase**
Measured with 600 Ohm output impedance.

**Isolation**
Attenuation of External Sound vs. Frequency

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

Vols RMS required to reach 90dB SPL: 0.043 Vrms  
Impedance @ 1kHz: 18 Ohms  
Power Needed for 90dB BSPL: 0.10 mW  
Broadband Isolation in dB (100Hz to 10kHz): -26 dBr

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Headphone Measurements:  
Platon Moderna MS200

- **Volts RMS required to reach 90dB SPL:** 0.047 Vrms
- **Impedance @ 1kHz:** 34 Ohms
- **Power Needed for 90dB SPL:** 0.07 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -6 dB

---

**Frequency Response**

Top - Compensated and Averaged  
Bottom - Raw Measured Data

**Isolation**  
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**  
Measured with 600 Ohm output impedance.

**30 Hz Square Wave**

**%THD+noise @ 90dB and 100dB**

**300 Hz Square Wave**

**Impulse Response**

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Headphone Measurements:

**PNY Uptown**

**Headphone Measurements**

- **Volts RMS required to reach 90dB SPL:** 0.057 Vrms
- **Impedance @ 1kHz:** 35 Ohms
- **Power Needed for 90d BSPL:** 0.09 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -29 dBr

**Frequency Response**

- Top: Compensated and Averaged
- Bottom: Raw Measured Data

**Isolation**

Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**

Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

- Volts RMS required to reach 90dB SPL: 0.057 Vrms
- Impedance @ 1kHz: 35 Ohms
- Power Needed for 90d BSPL: 0.09 mW
- Broadband Isolation in dB (100Hz to 10kHz): -29 dBr

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Headphone Measurements: PNY Midtown

- **Volts RMS required to reach 90dB SPL:** 0.050 Vrms
- **Impedance @ 1kHz:** 36 Ohms
- **Power Needed for 90dB SPL:** 0.07 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -25 dB

---

**Frequency Response**
- Top: Compensated and Averaged
- Bottom: Raw Measured Data

**Isolation**
- Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

---

**Impulse Response**

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Headphone Measurements:  Polk UltraFit 300

**Headphone Measurements:**

- **Volts RMS required to reach 90dB SPL:** 0.032 Vrms
- **Impedance @ 1kHz:** 18 Ohms
- **Power Needed for 90dB SPL:** 0.06 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -27 dB

**Frequency Response**

- Top - Compensated and Averaged
- Bottom - Raw Measured Data

**Isolation**

- Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**

- Measured with 600 Ohm output impedance.

**30 Hz Square Wave**

- **300 Hz Square Wave**

**%THD+noise @ 90dB and 100dB**

**Impulse Response**

- Time in Seconds
- Volts

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Headphone Measurements: Popclik EVOLO

- **Volts RMS required to reach 90dB SPL**: 0.036 Vrms
- **Impedance @ 1kHz**: 17 Ohms
- **Power Needed for 90dB SPL**: 0.08 mW
- **Broadband Isolation in dB (100Hz to 10kHz)**: -26 dBr

---

**Frequency Response**

- Top - Compensated and Averaged
- Bottom - Raw Measured Data

**Electrical Impedance and Phase**

Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

---

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Headphone Measurements: Popclik EVOLO

**Headphone Measurements:**

- **Volts RMS required to reach 90dB SPL:** 0.036 Vrms
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- **Power Needed for 90dB SPL:** 0.08 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -26 dB

**Impulse Response**

- **Volts RMS required to reach 90dB SPL:** 0.036 Vrms
- **Impedance @ 1kHz:** 17 Ohms
- **Power Needed for 90dB SPL:** 0.08 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -26 dB

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Headphone Measurements:

**Impulse Response**
- Volts RMS required to reach 90dB SPL: 0.028 Vrms
- Impedance @ 1kHz: 19 Ohms
- Power Needed for 90dB SPL: 0.04 mW
- Broadband Isolation in dB (100Hz to 10kHz): -17 dB

**Popclick String**

**Isolation**
- Attenuation of External Sound vs. Frequency

**Frequency Response**
- Top - Compensated and Averaged
- Bottom - Raw Measured Data

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**
Headphone Measurements: PSB M4U 4

Volts RMS required to reach 90dB SPL: 0.045 Vrms
Impedance @ 1kHz: 18 Ohms
Power Needed for 90dB SPL: 0.12 mW
Broadband Isolation in dB (100Hz to 10kHz): -32 dB
Headphone Measurements:  Pump Audio Earphones

Volts RMS required to reach 90dB SPL: 0.029 Vrms
Impedance @ 1kHz: 18 Ohms
Power Needed for 90dB SPL: 0.05 mW
Broadband Isolation in dB (100Hz to 10kHz): -28 dB
**Headphone Measurements:**

**PureSound Clarity One**

**Volts RMS required to reach 90dB SPL:** 0.032 Vrms

**Impedance @ 1kHz:** 9 Ohms

**Power Needed for 90dB SPL:** 0.11 mW

**Broadband Isolation in dB (100Hz to 10kHz):** -20 dB

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**Frequency Response**

- Top - Compensated and Averaged
- Bottom - Raw Measured Data

**Isolation**

Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**

Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

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Headphone Measurements:  
Radius HP-TWF41

Volts RMS required to reach 90dB SPL: 0.072 Vrms
Impedance @ 1kHz: 36 Ohms
Power Needed for 90dB SPL: 0.14 mW
Broadband Isolation in dB (100Hz to 10kHz): -15 dBr
Headphone Measurements: Radius HP-TWF31

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Measured Data

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

Volts RMS required to reach 90dB SPL: 0.038 Vrms
Impedance @ 1kHz: 36 Ohms
Power Needed for 90dB SPL: 0.04 mW
Broadband Isolation in dB (10Hz to 10kHz): -14 dB
Headphone Measurements: Radius HP-NHR11

- **Volts RMS required to reach 90dB SPL:** 0.028 Vrms
- **Impedance @ 1kHz:** 27 Ohms
- **Power Needed for 90dB SPL:** 0.03 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -29 dB

**Frequency Response**
- Top: Compensated and Averaged
- Bottom: Raw Measured Data

**Isolation**
- Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

V RMS required to reach 90dB SPL: 0.028 Vrms
Impedance @ 1kHz: 27 Ohms
Power Needed for 90dB SPL: 0.03 mW
Broadband Isolation in dB (100Hz to 10kHz): -29 dB

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Headphone Measurements: Radius HP-NHA11

**Frequency Response**
- Top - Compensated and Averaged
- Bottom - Raw Measured Data

**Isolation**
- Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

Volts RMS required to reach 90dB SPL: 0.031 Vrms
Impedance @ 1kHz: 28 Ohms
Power Needed for 90dB SPL: 0.03 mW
Broadband Isolation in dB (100Hz to 10kHz): -20 dBm
**Headphone Measurements: RBH EP3**

**Volts RMS required to reach 90dB SPL:** 0.037 Vrms

**Impedance @ 1kHz:** 17 Ohms

**Power Needed for 90dB SPL:** 0.08 mW

**Broadband Isolation in dB (100Hz to 10kHz):** -26 dB

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**Headphone Measurements:**

Rock Jaw Alpha Genus Silver Filters

**Headphone Measurements:**

**Volts RMS required to reach 90dB SPL:** 0.042 Vrms

**Impedance @ 1kHz:** 23 Ohms

**Power Needed for 90dB SPL:** 0.08 mW

**Broadband Isolation in dB (100Hz to 10kHz):** -28 dB

---

**Frequency Response**

**Top - Compensated and Averaged**

**Bottom - Raw Measured Data**

**Isolation**

**Attenuation of External Sound vs. Frequency**

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**Electrical Impedance and Phase**

Measured with 600 Ohm output impedance.

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**%THD+noise @ 90dB and 100dB**

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**30 Hz Square Wave**

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**300 Hz Square Wave**

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**Impulse Response**

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Headphone Measurements: Rock Jaw Alpha Genus Black Filter (Left Channel Only, black filter in right ear faulty)

Volts RMS required to reach 90dB SPL: 0.042 Vrms
Impedance @ 1kHz: 23 Ohms
Power Needed for 90dB SPL: 0.08 mW
Broadband Isolation in dB (100Hz to 10kHz): -20 dBr

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Headphone Measurements: Rockit Sounds R30

**Volts RMS required to reach 90dB SPL:** 0.011 Vrms

**Impedance @ 1kHz:** 23 Ohms

**Power Needed for 90dB SPL:** 0.00 mW

**Broadband Isolation in dB (100Hz to 10kHz):** -6 dB
Headphone Measurements: RBH EP1

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Measured Data

**Isolation**
Attenuation of External Sound vs. Frequency

**Impulse Response**

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Volts RMS required to reach 90dB SPL:** 0.031 Vrms
**Impedance @ 1kHz:** 20 Ohms
**Power Needed for 90d BSPL:** 0.05 mW
**Broadband Isolation in dB (100Hz to 10kHz):** -31 dB

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Headphone Measurements: Read Heath Acoustics MA750

- Volts RMS required to reach 90dB SPL: 0.032 Vrms
- Impedance @ 1kHz: 19 Ohms
- Power Needed for 90dB SPL: 0.06 mW
- Broadband Isolation in dB (100Hz to 10kHz): -32 dB

**Frequency Response**
- Top - Compensated and Averaged
- Bottom - Raw Measured Data

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**Isolation**
- Attenuation of External Sound vs. Frequency

**30 Hz Square Wave**

**300 Hz Square Wave**

**%THD+noise @ 90dB and 100dB**

**Impulse Response**

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Headphone Measurements:  
Read Heath Audio MA600

- **Volts RMS required to reach 90dB SPL**: 0.041 Vrms
- **Impedance @ 1kHz**: 17 Ohms
- **Power Needed for 90dB SPL**: 0.10 mW
- **Broadband Isolation in dB (100Hz to 10kHz)**: -22 dB

---

*Frequency Response*

Top - Compensated and Averaged  
Bottom - Raw Measured Data

*Isolation*

Attenuation of External Sound vs. Frequency

*Electrical Impedance and Phase*

Measured with 600 Ohm output impedance.

*%THD+noise @ 90dB and 100dB*

*30 Hz Square Wave*

*300 Hz Square Wave*

*Impulse Response*

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Headphone Measurements: Read and Heath Acoustics MA-350

**Volts RMS required to reach 90dB SPL:** 0.020 Vrms

**Impedance @ 1kHz:** 17 Ohms

**Power Needed for 90dB SPL:** 0.02 mW

**Broadband Isolation in dB (100Hz to 10kHz):** -30 dBr

---

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Measured Data

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**Impulse Response**
Headphone Measurements: RHA MA450i

**Headphone Measurements:**

**Volts RMS required to reach 90dB SPL:** 0.022 Vrms

**Impedance @ 1kHz:** 17 Ohms

**Power Needed for 90dB SPL:** 0.03 mW

**Broadband Isolation in dB (100Hz to 10kHz):** -26 dB

---

**Frequency Response**

*Top - Compensated and Averaged*
*Bottom - Raw Measured Data*

**Isolation**

Attenuation of External Sound vs. Frequency

**Impulse Response**

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**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

---

**Electrical Impedance and Phase**

Measured with 600 Ohm output impedance.

---

**Frequency Response**

*Top - Compensated and Averaged*
*Bottom - Raw Measured Data*

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Headphone Measurements: RHA MA150

Volts RMS required to reach 90dB SPL: 0.045 Vrms
Impedance @ 1kHz: 32 Ohms
Power Needed for 90dB SPL: 0.06 mW
Broadband Isolation in dB (100Hz to 10kHz): -22 dB
Headphone Measurements:  
RHA S500i

**Headphone Measurements:**

- **Volts RMS required to reach 90dB SPL:** 0.060 Vrms
- **Impedance @ 1kHz:** 18 Ohms
- **Power Needed for 90dB SPL:** 0.20 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -22 dB

**Frequency Response**
- Top - Compensated and Averaged
- Bottom - Raw Measured Data

**Isolation**
- Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

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Headphone Measurements: RHA T10i Bass Filter

Volts RMS required to reach 90dB SPL: 0.050 Vrms
Impedance @ 1kHz: 18 Ohms
Power Needed for 90dB SPL: 0.14 mW
Broadband Isolation in dB (100Hz to 10kHz): -27 dB
**Headphone Measurements: RHA T10i Reference Filter**

- **Volts RMS required to reach 90dB SPL**: 0.046 Vrms
- **Impedance @ 1kHz**: 18 Ohms
- **Power Needed for 90dB SPL**: 0.12 mW
- **Broadband Isolation in dB (100Hz to 10kHz)**: -26 dB

**Frequency Response**
- Top - Compensated and Averaged
- Bottom - Raw Measured Data

**Isolation**
- Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

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Headphone Measurements:  RHA T10i Treble Filter

**Volts RMS required to reach 90dB SPL:** 0.048 Vrms

**Impedance @ 1kHz:** 18 Ohms

**Power Needed for 90dBSPL:** 0.13 mW

**Broadband Isolation in dB (100Hz to 10kHz):** -26 dB

---

**Frequency Response**

*Top - Compensated and Averaged*

*Bottom - Raw Measured Data*

**Isolation**

*Attenuation of External Sound vs. Frequency*

**Electrical Impedance and Phase**

*Measured with 600 Ohm output impedance.*

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

Volts RMS required to reach 90dB SPL: 0.048 Vrms

Impedance @ 1kHz: 18 Ohms

Power Needed for 90dB SPL: 0.13 mW

Broadband Isolation in dB (100Hz to 10kHz): -26 dB

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Headphone Measurements:

RHA T20 Reference Filter

---

**Headphone Measurements**

**Volts RMS required to reach 90dB SPL:** 0.031 Vrms

**Impedance @ 1kHz:** 10 Ohms

**Power Needed for 90dB SPL:** 0.10 mW

**Broadband Isolation in dB (100Hz to 10kHz):** -29 dB

---

**Frequency Response**

Top - Compensated and Averaged

Bottom - Raw Measured Data

---

**Isolation**

Attenuation of External Sound vs. Frequency

---

**Electrical Impedance and Phase**

Measured with 600 Ohm output impedance.

---

**Impulse Response**

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**%THD+noise @ 90dB and 100dB**

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Headphone Measurements:

RHA T20 Bass Filter

---

Headphone Measurements:

- **Volts RMS required to reach 90dB SPL:** 0.031 Vrms
- **Impedance @ 1kHz:** 10 Ohms
- **Power Needed for 90dB SPL:** 0.10 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -30 dB

---

**Isolation**

Attenuation of External Sound vs. Frequency

---

**Impulse Response**

---

**Frequency Response**

Top - Compensated and Averaged

Bottom - Raw Measured Data

---

**Electrical Impedance and Phase**

Measured with 600 Ohm output impedance.
Headphone Measurements: RHA T20 Treble Filter

- **Volts RMS required to reach 90dB SPL:** 0.031 Vrms
- **Impedance @ 1kHz:** 10 Ohms
- **Power Needed for 90dB SPL:** 0.10 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -30 dB

---

**Frequency Response**
- Top: Compensated and Averaged
- Bottom: Raw Measured Data

**Isolation**
- Attenuation of External Sound vs. Frequency

**Impedance Response**
- Measured with 600 Ohm output impedance

---

**Electrical Impedance and Phase**

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

---

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Headphone Measurements: RockIt Sounds R50

- **Impedance @ 1kHz:** 48 Ohms
- **Power Needed for 90dB SPL:** 0.02 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -29 dB

**Frequency Response**
- Top: Compensated and Averaged
- Bottom: Raw Measured Data

**Impulse Response**

**30 Hz Square Wave**

**300 Hz Square Wave**

**%THD+noise @ 90dB and 100dB**

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**Isolation**
- Attenuation of External Sound vs. Frequency

---

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Headphone Measurements: Santa Cruz Audio SC1000 Passiv

**Headphone Measurements:**

- **Volts RMS required to reach 90dB SPL:** 0.058 Vrms
- **Impedance @ 1kHz:** 16 Ohms
- **Power Needed for 90dB SPL:** 0.21 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -25 dBr

---

**Frequency Response**

- Top - Compensated and Averaged
- Bottom - Raw Measured Data

**Isolation**

Attenuation of External Sound vs. Frequency

**Impulse Response**

**30 Hz Square Wave**

**300 Hz Square Wave**

**%THD+noise @ 90dB and 100dB**

**Electrical Impedance and Phase**

Measured with 600 Ohm output impedance.

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

Volts RMS required to reach 90dB SPL: 0.058 Vrms
Impedance @ 1kHz: 16 Ohms
Power Needed for 90dB SPL: 0.21 mW
Broadband Isolation in dB (100Hz to 10kHz): -25 dB
Headphone Measurements: Santa Cruz Audio SC1000 Active

**Frequency Response**
- Top - Compensated and Averaged
- Bottom - Raw Measured Data

**Isolation**
- Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

- Volts RMS required to reach 90dB SPL: 0.033 Vrms
- Impedance @ 1kHz: 148 Ohms
- Power Needed for 90dB SPL: 0.01 mW
- Broadband Isolation in dB (100Hz to 10kHz): -21 dB

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Headphone Measurements: Sennheiser IE 800 sample C

**Headphone Measurements:**
- **Volts RMS required to reach 90dB SPL:** 0.036 Vrms
- **Impedance @ 1kHz:** 20 Ohms
- **Power Needed for 90dB SPL:** 0.07 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -29 dBr

**Frequency Response**
- Top: Compensated and Averaged
- Bottom: Raw Measured Data

**Isolation**
- Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

Copyright © SOURCE INTERLINK MEDIA All rights reserved.
Headphone Measurements: Sennheiser IE 800 2013

Volts RMS required to reach 90dB SPL: 0.036 Vrms
Impedance @ 1kHz: 18 Ohms
Power Needed for 90dB SPL: 0.07 mW
Broadband Isolation in dB (100Hz to 10kHz): -35 dB

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Headphone Measurements:  Sennheiser IE 800

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**Isolation**
Attenuation of External Sound vs. Frequency

**Impulse Response**

Volts RMS required to reach 90dB SPL: 0.020 Vrms
Impedance @ 1kHz: 16 Ohms
Power Needed for 90d BSPL: 0.03 mW
Broadband Isolation in dB (100Hz to 10kHz): -17 dB
Headphone Measurements: Sennheiser Momentum In-Ear

**Frequency Response**
- Top: Compensated and Averaged
- Bottom: Raw Measured Data

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

**Isolation**
- Attenuation of External Sound vs. Frequency

**Headphone Measurements**
- Volts RMS required to reach 90dB SPL: 0.043 Vrms
- Impedance @ 1kHz: 21 Ohms
- Power Needed for 90dB SPL: 0.09 mW
- Broadband Isolation in dB (100Hz to 10kHz): -28 dB
Headphone Measurements:  

**Sennheiser IE 6**

- **Volts RMS required to reach 90dB SPL:** 0.027 Vrms
- **Impedance @ 1kHz:** 17 Ohms
- **Power Needed for 90dB SPL:** 0.04 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -19 dB
Headphone Measurements: Sennheiser CX1.00

**Headphone Measurements:**
- Volts RMS required to reach 90dB SPL: 0.047 Vrms
- Impedance @ 1kHz: 32 Ohms
- Power Needed for 90dB SPL: 0.07 mW
- Broadband Isolation in dB (100Hz to 10kHz): -31 dB

**Frequency Response**
- Top - Compensated and Averaged
- Bottom - Raw Measured Data

**Isolation**
- Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**Impulse Response**

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Headphone Measurements: Sennheiser CX200

- Volts RMS required to reach 90dB SPL: 0.042 Vrms
- Impedance @ 1kHz: 31 Ohms
- Power Needed for 90dB SPL: 0.06 mW
- Broadband Isolation in dB (100Hz to 10kHz): -31 dB

Sennheiser CX200

- %THD+noise @ 90dB and 100dB
- 30 Hz Square Wave
- 300 Hz Square Wave
- Impulse Response
- Electrical Impedance and Phase
- Isolation

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Headphone Measurements: Shure SE215

Frequency Response
Top - Compensated and Averaged
Bottom - Raw Measured Data

Electrical Impedance and Phase
Measured with 600 Ohm output impedance.

%THD+noise @ 90dB and 100dB

30 Hz Square Wave

300 Hz Square Wave

Impulse Response

Volts RMS required to reach 90dB SPL: 0.032 Vrms
Impedance @ 1kHz: 18 Ohms
Power Needed for 90dB SPL: 0.06 mW
Broadband Isolation in dB (100Hz to 1kHz): -33 dB
Headphone Measurements:  
Shure SE315

**Headphone Measurements:**

- **Volts RMS required to reach 90dB SPL:** 0.013 Vrms
- **Impedance @ 1kHz:** 27 Ohms
- **Power Needed for 90d BSPL:** 0.01 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -33 dB

---

**Frequency Response**

- Top - Compensated and Averaged
- Bottom - Raw Measured Data

**Electrical Impedance and Phase**

- Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

- **30 Hz Square Wave**
- **300 Hz Square Wave**

**Impulse Response**

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**Headphone Measurements: Shure SE425**

**Frequency Response**
Top - Compensated and Averaged  
Bottom - Raw Measured Data

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

Volts RMS required to reach 90dB SPL: 0.020 Vrms  
Impedance @ 1kHz: 22 Ohms  
Power Needed for 90dB SPL: 0.02 mW  
Broadband Isolation in dB (100Hz to 10kHz): -36 dB
Headphone Measurements:

**Shure SE535**

- **Volts RMS required to reach 90dB SPL:** 0.012 Vrms
- **Impedance @ 1kHz:** 36 Ohms
- **Power Needed for 90dB SPL:** 0.00 mW
- **Broadband Isolation in dB (100Hz to 1kHz):** -36 dB
Headphone Measurements:  Shure SE530

**Volts RMS required to reach 90dB SPL:** 0.011 Vrms
**Impedance @ 1kHz:** 35 Ohms
**Power Needed for 90d BSPL** 0.00 mW
**Broadband Isolation in dB (100Hz to 10kHz):** -33 dB
Headphone Measurements:  Shure SE846 Black Filter Sample B

**Headphone Measurements:**

- **Volts RMS required to reach 90dB SPL:** 0.015 Vrms
- **Impedance @ 1kHz:** 10 Ohms
- **Power Needed for 90dB SPL:** 0.02 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -36 dB

---

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Measured Data

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

---

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Headphone Measurements: Shure SE846 Blue Filter Sample 2

- **Volts RMS required to reach 90dB SPL:** 0.014 Vrms
- **Impedance @ 1kHz:** 10 Ohms
- **Power Needed for 90dB SPL:** 0.02 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -34 dB

---

**Frequency Response**
- Top - Compensated and Averaged
- Bottom - Raw Measured Data

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**30 Hz Square Wave**

**%THD+noise @ 90dB and 100dB**

**300 Hz Square Wave**

**Impulse Response**

---

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**Headphone Measurements: Shure SE846 White Filter Sample 2**

- **Volts RMS required to reach 90dB SPL:** 0.012 Vrms
- **Impedance @ 1kHz:** 10 Ohms
- **Power Needed for 90dB SPL:** 0.01 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -34 dB

---

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Measured Data

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**Impulse Response**

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Headphone Measurements: Signature Acoustics Elements C12

- **Volts RMS required to reach 90dB SPL:** 0.058 Vrms
- **Impedance @ 1kHz:** 19 Ohms
- **Power Needed for 90d BSPL:** 0.17 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -19 dB
Headphone Measurements:

Skullcandy Holua

---

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Measured Data

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

VoTs RMS required to reach 90dB SPL: 0.035 Vrms
Impedance @ 1kHz: 17 Ohms
Power Needed for 90d BSPL: 0.08 mW
Broadband Isolation in dB (100Hz to 10kHz): -28 dB

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Headphone Measurements: Sony MDR-7550

- **Volts RMS required to reach 90dB SPL:** 0.018 Vrms
- **Impedance @ 1kHz:** 17 Ohms
- **Power Needed for 90dB SPL:** 0.02 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -14 dB
Headphone Measurements: Sony MDR-EX600

Volts RMS required to reach 90dB SPL: 0.027 Vrms
Impedance @ 1kHz: 34 Ohms
Power Needed for 90dB SPL: 0.02 mW
Broadband Isolation in dB (100Hz to 10kHz): -14 dB
Headphone Measurements: 

Sony MDR-EX1000

Volts RMS required to reach 90dB SPL: 0.032 Vrms
Impedance @ 1kHz: 31 Ohms
Power Needed for 90d BSPL 0.03 mW
Broadband Isolation in dB (100Hz to 10kHz): -14 dB

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Headphone Measurements: Sony MH1C

- Volts RMS required to reach 90dB SPL: 0.047 Vrms
- Impedance @ 1kHz: 16 Ohms
- Power Needed for 90d BSPL: 0.14 mW
- Broadband Isolation in dB (100Hz to 10kHz): -33 dB
Headphone Measurements:  Sony XBA-3iP

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Measured Data

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

Volts RMS required to reach 90dB SPL: 0.058 Vrms
Impedance @ 1kHz: 13 Ohms
Power Needed for 90dB SPL: 0.27 mW
Broadband Isolation in dB (100Hz to 10kHz): -36 dB
Headphone Measurements: Sony XBA-Z5

- **Volts RMS required to reach 90dB SPL**: 0.044 Vrms
- **Impedance @ 1kHz**: 32 Ohms
- **Power Needed for 90dB SPL**: 0.06 mW
- **Broadband Isolation in dB (100Hz to 10kHz)**: -20 dBr

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Measured Data

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

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Soundmagic E10

**Headphone Measurements:**

- **Volts RMS required to reach 90dB SPL:** 0.019 Vrms
- **Impedance @ 1kHz:** 18 Ohms
- **Power Needed for 90dB SPL:** 0.02 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -15 dB
Headphone Measurements: Spider realvoice

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Measured Data

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

Volts RMS required to reach 90dB SPL: 0.024 Vrms
Impedance @ 1kHz: 19 Ohms
Power Needed for 90d BSPL: 0.03 mW
Broadband Isolation in dB (100Hz to 10kHz): -23 dB
Headphone Measurements: Stax SR-003 SA-1993

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**30 Hz Square Wave**

**%THD+noise @ 90dB and 100dB**

**300 Hz Square Wave**

**Impulse Response**

Electrical impedance and phase measurements unavailable for Electrostatic headphones.

Broadband Isolation in dB (100Hz to 10kHz): -3 dBf

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Headphone Measurements: Steelseries Flux InEar Pro

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Measured Data

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

---

Volts RMS required to reach 90dB SPL: 0.023 Vrms
Impedance @ 1kHz: 45 Ohms
Power Needed for 90dB SPL: 0.01 mW
Broadband Isolation in dB (100Hz to 10kHz): -28 dB

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Headphone Measurements:

Steelseries Flux In-Ear

Volts RMS required to reach 90dB SPL: 0.052 Vrms
Impedance @ 1kHz: 19 Ohms
Power Needed for 90d BSPL: 0.14 mW
Broadband Isolation in dB (100Hz to 10kHz): -33 dB

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Headphone Measurements: Syun ME1 Gold

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Measured Data

**Isolation**
Attenuation of External Sound vs. Frequency

**Impulse Response**

**Volts RMS required to reach 90dB SPL:** 0.024 Vrms
**Impedance @ 1kHz:** 18 Ohms
**Power Needed for 90dB SPL:** 0.03 mW
**Broadband Isolation in dB (100Hz to 10kHz):** -18 dB
Headphone Measurements: Syun Mix1 Gold

Frequency Response
Bottom - Raw Measured Data

Impedance and Phase
Measured with 600 Ohm output impedance.

30 Hz Square Wave

300 Hz Square Wave

Impulse Response

Volts RMS required to reach 90dB SPL: 0.028 Vrms
Impedance @ 1kHz: 19 Ohms
Power Needed for 90d BSPL: 0.04 mW
Broadband Isolation in dB (100Hz to 10kHz): -14 dB
**Headphone Measurements:**

**TDK BA200**

**Impulse Response**

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Volts</th>
<th>Time in Seconds</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.05</td>
<td>0.04</td>
<td>0.00</td>
</tr>
<tr>
<td>0.04</td>
<td>0.04</td>
<td>0.01</td>
</tr>
<tr>
<td>0.03</td>
<td>0.04</td>
<td>0.02</td>
</tr>
<tr>
<td>0.02</td>
<td>0.04</td>
<td>0.03</td>
</tr>
<tr>
<td>0.01</td>
<td>0.04</td>
<td>0.04</td>
</tr>
</tbody>
</table>

**Frequency Response**

- **Top - Compensated and Averaged**
- **Bottom - Raw Measured Data**

**Isolation**

Attenuation of External Sound vs. Frequency

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Reduction in dB</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>-80</td>
</tr>
<tr>
<td>100</td>
<td>-75</td>
</tr>
<tr>
<td>1000</td>
<td>-70</td>
</tr>
<tr>
<td>10000</td>
<td>-65</td>
</tr>
<tr>
<td>100000</td>
<td>-60</td>
</tr>
</tbody>
</table>

**Impedance and Phase**

- Measured with 600 Ohm output impedance.
- Impedance in Ohms
- Phase in Degrees

**%THD+noise @ 90dB and 100dB**

<table>
<thead>
<tr>
<th>Frequency</th>
<th>%THD+noise</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>0.05</td>
</tr>
<tr>
<td>100</td>
<td>0.04</td>
</tr>
<tr>
<td>1000</td>
<td>0.03</td>
</tr>
<tr>
<td>10000</td>
<td>0.02</td>
</tr>
<tr>
<td>100000</td>
<td>0.01</td>
</tr>
</tbody>
</table>

**30 Hz Square Wave**

<table>
<thead>
<tr>
<th>Time in Seconds</th>
<th>Volts</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.00</td>
<td>-0.05</td>
</tr>
<tr>
<td>0.01</td>
<td>-0.04</td>
</tr>
<tr>
<td>0.02</td>
<td>-0.03</td>
</tr>
<tr>
<td>0.03</td>
<td>-0.02</td>
</tr>
<tr>
<td>0.04</td>
<td>-0.01</td>
</tr>
<tr>
<td>0.05</td>
<td>0.00</td>
</tr>
</tbody>
</table>

**300 Hz Square Wave**

<table>
<thead>
<tr>
<th>Time in Seconds</th>
<th>Volts</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.00</td>
<td>-0.04</td>
</tr>
<tr>
<td>0.01</td>
<td>-0.03</td>
</tr>
<tr>
<td>0.02</td>
<td>-0.02</td>
</tr>
<tr>
<td>0.03</td>
<td>-0.01</td>
</tr>
<tr>
<td>0.04</td>
<td>0.00</td>
</tr>
</tbody>
</table>

**Volts RMS required to reach 90dB SPL:** 0.036 Vrms
**Impedance @ 1kHz:** 33 Ohms
**Power Needed for 90d BSPL:** 0.04 mW
**Broadband Isolation in dB (100Hz to 10kHz):** -28 dB

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Headphone Measurements:  
TDK MT300

**Headphone Measurements:**

- **Volts RMS required to reach 90dB SPL:** 0.031 Vrms
- **Impedance @ 1kHz:** 31 Ohms
- **Power Needed for 90dB SPL:** 0.03 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -25 dB

---

**Frequency Response**

*Top - Compensated and Averaged  
Bottom - Raw Measured Data*

- **Amplitude (dB):** 20
- **Phase in Degrees:** 60

**Electrical Impedance and Phase**

Measured with 600 Ohm output impedance.

- **Impedance in Ohms:** 35
- **Phase in Degrees:** 60

**%THD+noise @ 90dB and 100dB**

- **%THD+noise:** 100

**30 Hz Square Wave**

- **Volts:** 0.05
- **Time in Seconds:** 0.10

**300 Hz Square Wave**

- **Volts:** 0.04
- **Time in Seconds:** 0.01

**Impulse Response**

- **Time in Seconds:** 0.003

---

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Headphone Measurements:  
Techfusion Ecoofers

**Volts RMS required to reach 90dB SPL:** 0.044 Vrms  
**Impedance @ 1kHz:** 17 Ohms  
**Power Needed for 90dB SPL:** 0.12 mW  
**Broadband Isolation in dB (100Hz to 10kHz):** -27 dB
Headphone Measurements: Tekfusion Twinwoofers

**Headphone Measurements:**

Volts RMS required to reach 90dB SPL: 0.026 Vrms
Impedance @ 1kHz: 17 Ohms
Power Needed for 90dBSPL: 0.04 mW
Broadband Isolation in dB (100Hz to 10kHz): -30 dB

---

**Graphs and Data:**

- **Frequency Response**:
  - Top - Compensated and Averaged
  - Bottom - Raw Measured Data

- **Isolation**
  - Attenuation of External Sound vs. Frequency

- **Impedance and Phase**: Measured with 600 Ohm output impedance.

- **%THD+noise @ 90dB and 100dB**

- **30 Hz Square Wave**

- **300 Hz Square Wave**

- **Impulse Response**

---

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**Headphone Measurements:**

**Thermaltake Isurus**

- **Volts RMS required to reach 90dB SPL:** 0.034 Vrms
- **Impedance @ 1kHz:** 18 Ohms
- **Power Needed for 90dB SPL:** 0.06 mW
- **Broadband Isolation in dB (100Hz to 1kHz):** -7 dBr

---

**Frequency Response**

Top - Compensated and Averaged  
Bottom - Raw Measured Data

- **Amplitude (dB)**
  - Top: 20 dB
  - Bottom: 20 dB
- **Frequency Range:** 10 Hz to 100 kHz

**Electrical Impedance and Phase**

Measured with 600 Ohm output impedance.

- **Impedance in Ohms**
  - Maximum: 25 Ohms
  - Minimum: 0 Ohms
- **Phase in Degrees**
  - Maximum: 60 degrees
  - Minimum: -60 degrees

**%THD+noise @ 90dB and 100dB**

- **%THD+noise**
  - Maximum: 100%
  - Minimum: 0.01%
- **Frequency Range:** 10 Hz to 100 kHz

**30 Hz Square Wave**

- **Time in Seconds**
  - Maximum: 0.1 seconds
  - Minimum: 0 seconds
- **Volts**
  - Maximum: 0.1 V
  - Minimum: -0.1 V

**300 Hz Square Wave**

- **Time in Seconds**
  - Maximum: 0.1 seconds
  - Minimum: 0 seconds
- **Volts**
  - Maximum: 0.1 V
  - Minimum: -0.1 V

**Impulse Response**

- **Time in Seconds**
  - Maximum: 0.03 seconds
  - Minimum: 0 seconds
- **Volts**
  - Maximum: 0.03 V
  - Minimum: -0.03 V

---

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**Headphone Measurements: Thinksound Rain2**

- **Volts RMS required to reach 90dB SPL:** 0.055 Vrms
- **Impedance @ 1kHz:** 18 Ohms
- **Power Needed for 90dB SPL:** 0.17 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -27 dB

---

**Frequency Response**
- Top: Compensated and Averaged
- Bottom: Raw Measured Data

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**Isolation**
- Attenuation of External Sound vs. Frequency

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

---

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Headphone Measurements:  thinksound ts01

**Headphone Measurements:**

- **Volts RMS required to reach 90dB SPL:** 0.026 Vrms
- **Impedance @ 1kHz:** 19 Ohms
- **Power Needed for 90d BSPL:** 0.04 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -20 dB

---

**Frequency Response**

Top - Compensated and Averaged

Bottom - Raw Measured Data

**Isolation**

Attenuation of External Sound vs. Frequency

---

**Electrical Impedance and Phase**

Measured with 600 Ohm output impedance.

---

**%THD+noise @ 90dB and 100dB**

---

**30 Hz Square Wave**

---

**300 Hz Square Wave**

---

**Impulse Response**
Headphone Measurements:

**Volts RMS required to reach 90dB SPL:** 0.022 Vrms

**Impedance @ 1kHz:** 16 Ohms

**Power Needed for 90dB SPL:** 0.03 mW

**Broadband Isolation in dB (100Hz to 10kHz):** -15 dB

---

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Measured Data

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**30 Hz Square Wave**

**%THD+noise @ 90dB and 100dB**

**300 Hz Square Wave**

**Impulse Response**

---

Copyright © SOURCE INTERLINK MEDIA All rights reserved.
Headphone Measurements: Torque t103z Deep

Volts RMS required to reach 90dB SPL: 0.021 Vrms
Impedance @ 1kHz: 16 Ohms
Power Needed for 90dB SPL: 0.03 mW
Broadband Isolation in dB (100Hz to 10kHz): -21 dB
Headphone Measurements: Torque t103z Clear

Headphone Measurements:

- **Volts RMS required to reach 90dB SPL:** 0.023 Vrms
- **Impedance @ 1kHz:** 16 Ohms
- **Power Needed for 90d BSPL:** 0.03 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -17 dB

### Frequency Response
Top - Compensated and Averaged
Bottom - Raw Measured Data

### Isolation
Attenuation of External Sound vs. Frequency

### Electrical Impedance and Phase
Measured with 600 Ohm output impedance.

### %THD+noise @ 90dB and 100dB

### 30 Hz Square Wave

### 300 Hz Square Wave

### Impulse Response

---

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Headphone Measurements:

- **Volts RMS required to reach 90dB SPL**: 0.051 Vrms
- **Impedance @ 1kHz**: 18 Ohms
- **Power Needed for 90dB SPL**: 0.14 mW
- **Broadband Isolation in dB (100Hz to 10kHz)**: -23 dBr

---

**Frequency Response**
- Top - Compensated and Averaged
- Bottom - Raw Measured Data

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

---

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Headphone Measurements: Torque t096z Bass Boost Filter

**Volts RMS required to reach 90dB SPL:** 0.049 Vrms
**Impedance @ 1kHz:** 18 Ohms
**Power Needed for 90dB SPL:** 0.14 mW
**Broadband Isolation in dB (100Hz to 10kHz):** -29 dB

---

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Measured Data

**Isolation**
Attenuation of External Sound vs. Frequency

**Impulse Response**

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

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**Headphone Measurements:**

**Torque t096z Midcentric Filter**

**Volts RMS required to reach 90dB SPL:** 0.071 Vrms

**Impedance @ 1kHz:** 18 Ohms

**Power Needed for 90dB SPL:** 0.29 mW

**Broadband Isolation in dB (100Hz to 10kHz):** -22 dBr

---

**Frequency Response**

*Top - Compensated and Averaged*

*Bottom - Raw Measured Data*

---

**Electrical Impedance and Phase**

Measured with 600 Ohm output impedance.

---

**%THD+noise @ 90dB and 100dB**

---

**30 Hz Square Wave**

---

**300 Hz Square Wave**

---

**Impulse Response**

---

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Headphone Measurements:

**Headphone Measurements:**

- **Volts RMS required to reach 90dB SPL:** 0.053 Vrms
- **Impedance @ 1kHz:** 18 Ohms
- **Power Needed for 90d BSPL:** 0.16 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -21 dBr

---

**Torque t096z Treble Boost Filter**

---

**Frequency Response**

*Top - Compensated and Averaged*

*Bottom - Raw Measured Data*

---

**Isolation**

*Attenuation of External Sound vs. Frequency*

---

**Electrical Impedance and Phase**

*Measured with 600 Ohm output impedance.*

---

**%THD+noise @ 90dB and 100dB**

---

**30 Hz Square Wave**

---

**300 Hz Square Wave**

---

**Impulse Response**

---

Copyright © SOURCE INTERLINK MEDIA All rights reserved.
Headphone Measurements:

Torque t096z Ushaped Filter

**Volts RMS required to reach 90dB SPL:** 0.053 Vrms

**Impedance @ 1kHz:** 18 Ohms

**Power Needed for 90dB SPL:** 0.16 mW

**Broadband Isolation in dB (100Hz to 10kHz):** -28 dBr

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

**Isolation**

Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**

Measured with 600 Ohm output impedance.
Headphone Measurements:

Torque T096z Warm Tilt Filter

Volts RMS required to reach 90dB SPL: 0.007 Vrms
Impedance @ 1kHz: 18 Ohms
Power Needed for 90dB SPL: 0.00 mW
Broadband Isolation in dB (100Hz to 10kHz): -23 dB
**Headphone Measurements:**

**T-Peos Altone 200 2014**

**Headphone Measurements:**

- **Volts RMS required to reach 90dB SPL:** 0.034 Vrms
- **Impedance @ 1kHz:** 30 Ohms
- **Power Needed for 90dB SPL:** 0.04 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -26 dB

**Frequency Response**

- Top - Compensated and Averaged
- Bottom - Raw Measured Data

**Isolation**

Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**

Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**
Headphone Measurements: T-Peos H-100

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Measured Data

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Impedance measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

Volts RMS required to reach 90dB SPL: 0.037 Vrms
Impedance @ 1kHz: 30 Ohms
Power Needed for 90d BSPL: 0.05 mW
Broadband Isolation in dB (100Hz to 10kHz): -36 dB
**Headphone Measurements:**

- **T Peos Popular**

### Frequency Response
- **Top:** Compensated and Averaged
- **Bottom:** Raw Measured Data

### Isolation
- Attenuation of External Sound vs. Frequency

### Electrical Impedance and Phase
- Measured with 600 Ohm output impedance.

### Time Domain Response
- 30 Hz Square Wave
- 300 Hz Square Wave
- Impulse Response

### THD+noise @ 90dB and 100dB

### Amplitude (dB)
- Top - Compensated and Averaged
- Bottom - Raw Measured Data

### Volts RMS required to reach 90dB SPL:
- 0.042 Vrms

### Impedance @ 1kHz:
- 32 Ohms

### Power Needed for 90d BSPL:
- 0.06 mW

### Broadband Isolation in dB (100Hz to 10kHz):
- -25 dB

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**Headphone Measurements:**

**T Peos Rich 200**

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Measured Data

**Impedance @ 1kHz:** 32 Ohms

**Power Needed for 90dB SPL:** 0.06 mW

**Broadband Isolation in dB (100Hz to 10kHz):** -56 dBr

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

**Volts RMS required to reach 90dB SPL:** 0.043 Vrms

**Impedance @ 1kHz:** 32 Ohms

**Power Needed for 90dB SPL:** 0.06 mW

**Broadband Isolation in dB (100Hz to 10kHz):** -56 dBr

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Headphone Measurements:  T Peos Spider

Volts RMS required to reach 90dB SPL: 0.039 Vrms
Impedance @ 1kHz: 33 Ohms
Power Needed for 90d BSPL: 0.05 mW
Broadband Isolation in dB (100Hz to 10kHz): -28 dB
**Headphone Measurements: T Peos Tank**

**Frequency Response**
- Top: Compensated and Averaged
- Bottom: Raw Measured Data

**Isolation**
- Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

**Volts RMS required to reach 90dB SPL:** 0.041 Vrms

**Impedance @ 1kHz:** 35 Ohms

**Power Needed for 90d BSPL:** 0.05 mW

**Broadband Isolation in dB (100Hz to 10kHz):** -56 dB
Headphone Measurements: T Peos U200R

Volts RMS required to reach 90dB SPL: 0.032 Vrms
Impedance @ 1kHz: 34 Ohms
Power Needed for 90dB SPL: 0.03 mW
Broadband Isolation in dB (100Hz to 10kHz): -56 dB
Headphone Measurements: UBSound Fighter

Volts RMS required to reach 90dB SPL: 0.030 Vrms
Impedance @ 1kHz: 34 Ohms
Power Needed for 90dB SPL: 0.03 mW
Broadband Isolation in dB (100Hz to 10kHz): -31 dB
Headphone Measurements: Ultimate Ears U350

Volts RMS required to reach 90dB SPL: 0.027 Vrms
Impedance @ 1kHz: 18 Ohms
Power Needed for 90dB SPL: 0.04 mW
Broadband Isolation in dB (100Hz to 10kHz): -19 dB
Headphone Measurements: Ultimate Ear UE500

- **Volts RMS required to reach 90dB SPL**: 0.037 Vrms
- **Impedance @ 1kHz**: 16 Ohms
- **Power Needed for 90dB SPL**: 0.09 mW
- **Broadband Isolation in dB (100Hz to 10kHz)**: -37 dB
Headphone Measurements: Ultimate Ear UE700

Volts RMS required to reach 90dB SPL: 0.024 Vrms

Impedance @ 1kHz: 46 Ohms

Power Needed for 90dB SPL: 0.01 mW

Broadband Isolation in dB (100Hz to 10kHz): -32 dB

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Headphone Measurements: 

**UE TF10**

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Measured Data

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

Volts RMS required to reach 90dB SPL: 0.015 Vrms
Impedance @ 1kHz: 57 Ohms
Power Needed for 90dB SPL: 0.05 mW
Broadband Isolation in dB (100Hz to 10kHz): -32 dB
Headphone Measurements:

Umi Voix

Volts RMS required to reach 90dB SPL: 0.009 Vrms
Impedance @ 1kHz: 17 Ohms
Power Needed for 90dB SPL: 0.01 mW
Broadband Isolation in dB (100Hz to 10kHz): -26 dB

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Headphone Measurements: Unique Melody 3X

**Volts RMS required to reach 90dB SPL:** 0.029 Vrms
**Impedance @ 1kHz:** 16 Ohms
**Power Needed for 90dB SPL:** 0.05 mW
**Broadband Isolation in dB (100Hz to 10kHz):** -35 dB
Headphone Measurements:

**Venture Electronics Duke**

**Frequency Response**
- Top - Compensated and Averaged
- Bottom - Raw Measured Data

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**Isolation**
- Attenuation of External Sound vs. Frequency

**30 Hz Square Wave**

**300 Hz Square Wave**

**%THD+noise @ 90dB and 100dB**

**Impulse Response**

- Volts RMS required to reach 90dB SPL: 0.053 Vrms
- Impedance @ 1kHz: 18 Ohms
- Power Needed for 90dBSPL: 0.15 mW
- Broadband Isolation in dB (100Hz to 10KHz): -31 dB
Headphone Measurements: ViSang VS-K1

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Measured Data

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**30 Hz Square Wave**

**%THD+noise @ 90dB and 100dB**

**300 Hz Square Wave**

**Impulse Response**

Volts RMS required to reach 90dB SPL: 0.021 Vrms
Impedance @ 1kHz: 40 Ohms
Power Needed for 90dB SPL: 0.01 mW
Broadband Isolation in dB (100Hz to 1kHz): -18 dB
Headphone Measurements:  
V Sonic GR07

**Volts RMS required to reach 90dB SPL:** 0.033 Vrms
**Impedance @ 1kHz:** 43 Ohms
**Power Needed for 90dB SPL:** 0.03 mW
**Broadband Isolation in dB (100Hz to 10kHz):** -19 dB
Headphone Measurements: Vsonic GR07 Classic

**Volts RMS required to reach 90dB SPL:** 0.027 Vrms

**Impedance @ 1kHz:** 46 Ohms

**Power Needed for 90d BSPL:** 0.02 mW

**Broadband Isolation in dB (100Hz to 10kHz):** -21 dB
Headphone Measurements: Vsonic GR07 Bass Edition

Headphone Measurements:

- Volts RMS required to reach 90dB SPL: 0.034 Vrms
- Impedance @ 1kHz: 44 Ohms
- Power Needed for 90dB SPL: 0.03 mW
- Broadband Isolation in dB (100Hz to 10kHz): -24 dB
Headphone Measurements: VSonics GR02 Bass Edition

- **Frequency Response**
  - Top: Compensated and Averaged
  - Bottom: Raw Measured Data

- **Impedance @ 1kHz**: 25 Ohms

- **Power Needed for 90dB SPL**: 0.01 mW

- **Broadband Isolation in dB**: -24 dBr

- **%THD+noise @ 90dB and 100dB**

- **30 Hz Square Wave**

- **300 Hz Square Wave**

- **Impulse Response**

- **Volts RMS required to reach 90dB SPL**: 0.017 Vrms

- **Impedance @ 1kHz**: 25 Ohms

- **Power Needed for 90dB SPL**: 0.01 mW

- **Broadband Isolation in dB (100Hz to 1kHz)**: -24 dB
Headphone Measurements: Vsonic VC1000

**Headphone Measurements:**

- **Volts RMS required to reach 90dB SPL:** 0.031 Vrms
- **Impedance @ 1kHz:** 49 Ohms
- **Power Needed for 90dB SPL:** 0.02 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -35 dB

**Frequency Response**

- Top: Compensated and Averaged
- Bottom: Raw Measured Data

**Isolation**

Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**

Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

Volts RMS required to reach 90dB SPL: 0.031 Vrms
Impedance @ 1kHz: 49 Ohms
Power Needed for 90dB SPL: 0.02 mW
Broadband Isolation in dB (100Hz to 10kHz): -35 dB

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**Headphone Measurements:**

**VSonic VCO2**

**Frequency Response**
- Top - Compensated and Averaged
- Bottom - Raw Measured Data

**Isolation**
- Attenuation of External Sound vs. Frequency

**Impulse Response**

- Volts RMS required to reach 90dB SPL: 0.036 Vrms
- Impedance @ 1kHz: 19 Ohms
- Power Needed for 90dB SPL: 0.07 mW
- Broadband Isolation in dB (100Hz to 10kHz): -21 dB
Headphone Measurements: Vsonic VSD1

- **Volts RMS required to reach 90dB SPL:** 0.025 Vrms
- **Impedance @ 1kHz:** 32 Ohms
- **Power Needed for 90dB SPL:** 0.02 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -19 dB

---

**Frequency Response**
- **Top:** Compensated and Averaged
- **Bottom:** Raw Measured Data

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

---

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Headphone Measurements: Vsonic VSD1S

- **Volts RMS required to reach 90dB SPL:** 0.020 Vrms
- **Impedance @ 1kHz:** 32 Ohms
- **Power Needed for 90dB SPL:** 0.01 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -18 dB
Headphone Measurements:  
**VSONIC VSD3**

**Frequency Response**  
Top - Compensated and Averaged  
Bottom - Raw Measured Data

**Isolation**  
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**  
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**Impulse Response**

---

Volts RMS required to reach 90dB SPL:  
Power Needed for 90dBSPL:  
Broadband Isolation in dB (100Hz to 1kHz):  

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Headphone Measurements: VSonic VSD3S

- Volts RMS required to reach 90dB SPL: 0.026 Vrms
- Impedance @ 1kHz: 39 Ohms
- Power Needed for 90dB SPL: 0.02 mW
- Broadband Isolation in dB (100Hz to 10kHz): -21 dB
Headphone Measurements: VSONIC VSD3S w/ Replaceable Cable

**Headphone Measurements**

- **Volts RMS required to reach 90dB SPL:** 0.026 Vrms
- **Impedance @ 1kHz:** 39 Ohms
- **Power Needed for 90dB SPL:** 0.02 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -23 dB

---

**Frequency Response**

- Top - Compensated and Averaged
- Bottom - Raw Measured Data

**Electrical Impedance and Phase**

Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

- Volts RMS required to reach 90dB SPL: 0.026 Vrms
- Impedance @ 1kHz: 39 Ohms
- Power Needed for 90dB SPL: 0.02 mW
- Broadband Isolation in dB (100Hz to 10kHz): -23 dB
**Headphone Measurements: VSONIC VS05**

- **Volts RMS required to reach 90dB SPL:** 0.026 Vrms
- **Impedance @ 1kHz:** 39 Ohms
- **Power Needed for 90dB SPL:** 0.02 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -20 dB

---

**Frequency Response**
- Top: Compensated and Averaged
- Bottom: Raw Measured Data

**Impedance**
- Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

---

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Headphone Measurements:

**Westone ADV Alpha**

- **Volts RMS required to reach 90dB SPL:** 0.054 Vrms
- **Impedance @ 1kHz:** 20 Ohms
- **Power Needed for 90dB SPL:** 0.14 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -28 dB

---

**Frequency Response**

Top: Compensated and Averaged

Bottom: Raw Measured Data

---

**Isolation**

Attenuation of External Sound vs. Frequency

---

**Impulse Response**

---

**Electrical Impedance and Phase**

Measured with 600 Ohm output impedance.

---

**%THD+noise @ 90dB and 100dB**

---

**30 Hz Square Wave**

---

**300 Hz Square Wave**

---

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Headphone Measurements: Westone UM1

- Volts RMS required to reach 90dB SPL: 0.013 Vrms
- Impedance @ 1kHz: 20 Ohms
- Power Needed for 90dB SPL: 0.01 mW
- Broadband Isolation in dB (100Hz to 10kHz): -32 dB
**Headphone Measurements: Westone W2**

- **Volts RMS required to reach 90dB SPL:** 0.015 Vrms
- **Impedance @ 1kHz:** 38 Ohms
- **Power Needed for 90dB SPL:** 0.01 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -30 dB

---

**Frequency Response**
- Top - Compensated and Averaged
- Bottom - Raw Measured Data

**Isolation**
- Attenuation of External Sound vs. Frequency

**Impulse Response**

---

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

---

**%THD+noise @ 90dB and 100dB**

---

**30 Hz Square Wave**

---

**300 Hz Square Wave**

---

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Headphone Measurements: Westone W10

- Volts RMS required to reach 90dB SPL: 0.018 Vrms
- Impedance @ 1kHz: 21 Ohms
- Power Needed for 90dB SPL: 0.02 mW
- Broadband Isolation in dB (100Hz to 10kHz): -28 dB
Headphone Measurements:  
**Westone W20**

**Frequency Response**
- Top: Compensated and Averaged
- Bottom: Raw Measured Data

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**Isolation**
- Attenuation of External Sound vs. Frequency

**Impulse Response**

Volts RMS required to reach 90dB SPL: 0.016 Vrms
Impedance @ 1kHz: 36 Ohms
Power Needed for 90dBSPL: 0.01 mW
Broadband Isolation in dB (100Hz to 1kHz): -38 dB

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**Headphone Measurements: Westone W40**

**Frequency Response**
- Top - Compensated and Averaged
- Bottom - Raw Measured Data

**Isolation**
- Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**30 Hz Square Wave**

**%THD+noise @ 90dB and 100dB**

**300 Hz Square Wave**

**Impulse Response**

**Volts RMS required to reach 90dB SPL:** 0.022 Vrms
**Impedance @ 1kHz:** 25 Ohms
**Power Needed for 90d BSPL:** 0.02 mW
**Broadband Isolation in dB (100Hz to 1kHz):** -29 dBb
Headphone Measurements: Westone W60

**Headphone Measurements:**

- **Volts RMS required to reach 90dB SPL:** 0.015 Vrms
- **Impedance @ 1kHz:** 24 Ohms
- **Power Needed for 90dB SPL:** 0.01 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -31 dB

---

**Frequency Response**

- **Top - Compensated and Averaged**
- **Bottom - Raw Measured Data**

**Isolation**

- **Attenuation of External Sound vs. Frequency**

**Electrical Impedance and Phase**

- Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

- **Volts RMS required to reach 90dB SPL:** 0.015 Vrms
- **Impedance @ 1kHz:** 24 Ohms
- **Power Needed for 90dB SPL:** 0.01 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -31 dB
Headphone Measurements: Westone UM3X RC

Volts RMS required to reach 90dB SPL: 0.011 Vrms
Impedance @ 1kHz: 98 Ohms
Power Needed for 90dB SPL: 0.00 mW
Broadband Isolation in dB (100Hz to 10kHz): -27 dB

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**Headphone Measurements: Westone 4R**

- Volts RMS required to reach 90dB SPL: 0.024 Vrms
- Impedance @ 1kHz: 25 Ohms
- Power Needed for 90dB SPL: 0.02 mW
- Broadband Isolation in dB (100Hz to 10kHz): -30 dB

---

### Frequency Response
- Top: Compensated and Averaged
- Bottom: Raw Measured Data

### Electrical Impedance and Phase
- Measured with 600 Ohm output impedance

### Isolation
- Attenuation of External Sound vs. Frequency

### Impulse Response
- Time in Seconds: 0.0000 - 0.0030

---

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Headphone Measurements:  Wicked Audio Deuce

Volts RMS required to reach 90dB SPL: 0.051 Vrms
Impedance @ 1kHz: 18 Ohms
Power Needed for 90dB SPL: 0.15 mW
Broadband Isolation in dB (100Hz to 10kHz): -26 dB

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**Headphone Measurements:**

**Woodees Classic**

- **Volts RMS required to reach 90dB SPL:** 0.036 Vrms
- **Impedance @ 1kHz:** 18 Ohms
- **Power Needed for 90dB SPL:** 0.07 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -31 dB

**Frequency Response**
- Top - Compensated and Averaged
- Bottom - Raw Measured Data

**Isolation**
- Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

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**Headphone Measurements: Xiaomi Crystal**

- **Volts RMS required to reach 90dB SPL:** 0.044 Vrms
- **Impedance @ 1kHz:** 19 Ohms
- **Power Needed for 90dB SPL:** 0.10 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -23 dB

---

**Frequency Response**
- **Top:** Compensated and Averaged
- **Bottom:** Raw Measured Data

**Electrical Impedance and Phase**
- Impedance: Measured with 600 Ohm output impedance.

**Isolation**
- Attenuation of External Sound vs. Frequency

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

---

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Headphone Measurements:  Xiaomi Hybrid

- **Volts RMS required to reach 90dB SPL:** 0.039 Vrms
- **Impedance @ 1kHz:** 37 Ohms
- **Power Needed for 90dB SPL:** 0.04 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -25 dBr

---

**Frequency Response**
- Top: Compensated and Averaged
- Bottom: Raw Measured Data

**Isolation**
- Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

---

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Headphone Measurements:  Xiaomi Piston 2

**Headphone Measurements:**

- **Volts RMS required to reach 90dB SPL:** 0.041 Vrms
- **Impedance @ 1kHz:** 19 Ohms
- **Power Needed for 90dB SPL:** 0.09 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -22 dB

---

**Isolation**

- **Attenuation of External Sound vs. Frequency**

---

**30 Hz Square Wave**

---

**300 Hz Square Wave**

---

**Impulse Response**

---

**%THD+noise @ 90dB and 100dB**

---

**Frequency Response**

- **Top - Compensated and Averaged**
- **Bottom - Raw Measured Data**

---

**Electrical Impedance and Phase**

- Measured with 600 Ohm output impedance.

---

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Headphone Measurements: Xiaomi Piston 3

Frequency Response
Top - Compensated and Averaged
Bottom - Raw Measured Data

Isolation
Attenuation of External Sound vs. Frequency

Electrical Impedance and Phase
Measured with 600 Ohm output impedance.

%THD+noise @ 90dB and 100dB

30 Hz Square Wave

300 Hz Square Wave

Impulse Response

Volts RMS required to reach 90dB SPL: 0.054 Vrms
Impedance @ 1kHz: 32 Ohms
Power Needed for 90dB SPL: 0.09 mW
Broadband Isolation in dB (100Hz to 10kHz): -17 dB

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Headphone Measurements: Xaiomi Piston 3 Youth Edition

Volts RMS required to reach 90dB SPL: 0.057 Vrms
Impedance @ 1kHz: 32 Ohms
Power Needed for 90dB SPL: 0.10 mW
Broadband Isolation in dB (100Hz to 10kHz): -16 dB
Headphone Measurements:  
XTZ EarPhone-12

**Headphone Measurements**

- **Volts RMS required to reach 90dB SPL:** 0.045 Vrms
- **Impedance @ 1kHz:** 20 Ohms
- **Power Needed for 90dB SPL:** 0.10 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -16 dBr

---

**Frequency Response**

*Top - Compensated and Averaged*  
*Bottom - Raw Measured Data*

**Isolation**  
*Attenuation of External Sound vs. Frequency*

**Electrical Impedance and Phase**  
*Measured with 600 Ohm output impedance.*

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

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Headphone Measurements: Yamaha YH 5M

**Volts RMS required to reach 90dB SPL:** 0.013 Vrms

**Impedance @ 1kHz:** 20 Ohms

**Power Needed for 90dB SPL:** 0.01 mW

**Broadband Isolation in dB (100Hz to 10kHz):** -15 dB

---

**Frequency Response**
- **Top:** Compensated and Averaged
- **Bottom:** Raw Measured Data

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

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Headphone Measurements: Yutai BAS02

- Volts RMS required to reach 90dB SPL: 3.319 Vrms
- Impedance @ 1kHz: 45 Ohms
- Power Needed for 90dB SPL: 246.38 mW
- Broadband Isolation in dB (100Hz to 10kHz): -16 dB

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**Headphone Measurements:**

**Zipbuds Pro Mic**

**Frequency Response**

*Top - Compensated and Averaged*

*Bottom - Raw Measured Data*

**Isolation**

*Attenuation of External Sound vs. Frequency*

**Electrical Impedance and Phase**

*Measured with 600 Ohm output impedance.*

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

<table>
<thead>
<tr>
<th>Volts RMS required to reach 90dB SPL:</th>
<th>0.034 Vrms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impedance @ 1kHz:</td>
<td>18 Ohms</td>
</tr>
<tr>
<td>Power Needed for 90dB SPL:</td>
<td>0.07 mW</td>
</tr>
<tr>
<td>Broadband Isolation in dB (100Hz to 10kHz):</td>
<td>-12 dBf</td>
</tr>
</tbody>
</table>
Headphone Measurements:  
Zoukbox ZDY10 Bass  

**Headphone Measurements:**

- **Volts RMS required to reach 90dB SPL:** 0.058 Vrms
- **Impedance @ 1kHz:** 19 Ohms
- **Power Needed for 90dB SPL:** 0.18 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -18 dB

---

**Frequency Response**

- **Top - Compensated and Averaged**
- **Bottom - Raw Measured Data**

**Isolation**

- **Attenuation of External Sound vs. Frequency**

**Electrical Impedance and Phase**

- Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

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Headphone Measurements:  Zoukbox ZLX30

**Volts RMS required to reach 90dB SPL:** 0.027 Vrms

**Impedance @ 1kHz:** 12 Ohms

**Power Needed for 90dB SPL:** 0.06 mW

**Broadband Isolation in dB (100Hz to 10kHz):** -28 dB

---

**Frequency Response**
- Top - Compensated and Averaged
- Bottom - Raw Measured Data

**Impulse Response**

---

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

---

**Isolation**
- Attenuation of External Sound vs. Frequency

---

**%THD+noise @ 90dB and 100dB**

---

**30 Hz Square Wave**

---

**300 Hz Square Wave**

---

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Headphone Measurements: Apple EarPods

- **Volts RMS required to reach 90dB SPL**: 0.091 Vrms
- **Impedance @ 1kHz**: 43 Ohms
- **Power Needed for 90dB SPL**: 0.19 mW
- **Broadband Isolation in dB (100Hz to 10kHz)**: -1 dBr

- **%THD+noise @ 90dB and 100dB**
  - 30 Hz Square Wave
  - 300 Hz Square Wave

- **Impulse Response**

---

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Headphone Measurements: Apple iPod Ear Buds sample A

- **Volts RMS required to reach 90dB SPL:** 0.086 Vrms
- **Impedance @ 1kHz:** 35 Ohms
- **Power Needed for 90d BSPL:** 0.21 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** 0 dB
**Headphone Measurements:**

**Apple iPod Ear Bud sample B**

- **Volts RMS required to reach 90dB SPL:** 0.077 Vrms
- **Impedance @ 1kHz:** 34 Ohms
- **Power Needed for 90dB SPL:** 0.17 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** 0 dB

---

**Frequency Response**

- **Top - Compensated and Averaged**
- **Bottom - Raw Data for Five Headphone Positions**

**Electrical Impedance and Phase**

- Measured with 600 Ohm output impedance.

**Isolation**

- Attenuation of External Sound vs. Frequency

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

- Volts RMS required to reach 90dB SPL: 0.077 Vrms
- Impedance @ 1kHz: 34 Ohms
- Power Needed for 90dB SPL: 0.17 mW
- Broadband Isolation in dB (100Hz to 10kHz): 0 dB

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**Headphone Measurements:**

**Comradz NW-STUDIO**

- **Volts RMS required to reach 90dB SPL:** 0.298 Vrms
- **Impedance @ 1kHz:** 33 Ohms
- **Power Needed for 90dB SPL:** 2.66 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** 0 dB
Headphone Measurements: Comradz NW-STUDIO PRO

**Impulse Response**
- Time in Seconds
- Amplitude (dB)
- %THD+noise @ 90dB and 100dB
- Voltage RMS required to reach 90dB SPL: 0.121 Vrms
- Impedance @ 1kHz: 33 Ohms
- Power Needed for 90d BSPL: 0.44 mW
- Broadband Isolation in dB (100Hz to 10kHz): -2 dB

**Isolation**
- Attenuation of External Sound vs. Frequency

**Frequency Response**
- Top - Compensated and Averaged
- Bottom - Raw Data for Five Headphone Positions

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance

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**Headphone Measurements:** Edifier P180

**Volts RMS required to reach 90dB SPL:** 0.188 Vrms

**Impedance @ 1kHz:** 36 Ohms

**Power Needed for 90d BSPL:** 0.99 mW

**Broadband Isolation in dB (100Hz to 10kHz):** -3 dB

---

**Frequency Response**
- Top - Compensated and Averaged
- Bottom - Raw Data for Five Headphone Positions

**Isolation**
- Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

---

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Headphone Measurements: Polk Ultrafit 1000

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Measured Data

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

Volts RMS required to reach 90dB SPL: 0.033 Vrms
Impedance @ 1kHz: 8 Ohms
Power Needed for 90d BSPL: 0.14 mW
Broadband Isolation in dB (100Hz to 10kHz): -3 dB
Headphone Measurements: Polk Ultrafit 500

Volts RMS required to reach 90dB SPL: 0.013 Vrms
Impedance @ 1kHz: 8 Ohms
Power Needed for 90dB SPL: 0.02 mW
Broadband Isolation in dB (100Hz to 10kHz): -4 dB
Headphone Measurements: Sennheiser MX 560

Volts RMS required to reach 90dB SPL: 0.140 Vrms
Impedance @ 1kHz: 36 Ohms
Power Needed for 90dB SPL: 0.54 mW
Broadband Isolation in dB (100Hz to 10kHz): 0 dB
Headphone Measurements:  Sennheiser MX 680

**Headphone Measurements:**

- **Volts RMS required to reach 90dB SPL:** 0.105 Vrms
- **Impedance @ 1kHz:** 21 Ohms
- **Power Needed for 90dB SPL:** 0.52 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -1 dB

---

**Frequency Response**
- Top - Compensated and Averaged
- Bottom - Raw Data for Five Headphone Positions

**Isolation**
- Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**
Headphone Measurements:  Venture Electronics Monk Plus

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**Impulse Response**

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Volts RMS required to reach 90dB SPL:** 7.588 Vrms
**Impedance @ 1kHz:** 70 Ohms
**Power Needed for 90dB SPL:** 824.63 mW
**Broadband Isolation in dB (100Hz to 10kHz):** -2 dB

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**Headphone Measurements:**

**WalMart Three Donald Buds**

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**Impulse Response**

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Volts RMS required to reach 90dB SPL:** 0.130 Vrms

**Impedance @ 1kHz:** 34 Ohms

**Power Needed for 90dB SPL:** 0.55 mW

**Broadband Isolation in dB (100Hz to 1kHz):** -1 dBr

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**Headphone Measurements: Yuin PK-1**

### Frequency Response

- **Top - Compensated and Averaged**
- **Bottom - Raw Data for Five Headphone Positions**

### Impulse Response

### Electrical Impedance and Phase

- Measured with 600 Ohm output impedance.

### Isolation

- **Attenuation of External Sound vs. Frequency**

### THD+noise @ 90dB and 100dB

### 30 Hz Square Wave

### 300 Hz Square Wave

### Impedance and Phase

- Measured with 600 Ohm output impedance.

---

**Headphone Measurements: Yuin PK-1**

- Volts RMS required to reach 90dB SPL: 0.167 Vrms
- Impedance @ 1kHz: 149 Ohms
- Power Needed for 90dB SPL: 0.19 mW
- Broadband Isolation in dB (100Hz to 10kHz): -2 dB

---

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Headphone Measurements: Yuin PK2

Volts RMS required to reach 90dB SPL: 0.144 Vrms
Impedance @ 1kHz: 16 Ohms
Power Needed for 90dB SPL: 1.25 mW
Broadband Isolation in dB (100Hz to 10kHz): 0 dB
Headphone Measurements:  
A Audio Elite Passive

---

**Frequency Response**
Top - Compensated and Averaged  
Bottom - Raw Data for Five Headphone Positions

**Isolation**  
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**  
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

Volts RMS required to reach 90dB SPL: 0.035 Vrms  
Impedance @ 1kHz: 30 Ohms  
Power Needed for 90dBSPL: 0.04 mW  
Broadband Isolation in dB (100Hz to 10kHz): -18 dB

---

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Headphone Measurements: A Audio Elite NC Active

**Headphone Measurements:**

- **Volts RMS required to reach 90dB SPL:** 0.019 Vrms
- **Impedance @ 1kHz:** 102 Ohms
- **Power Needed for 90dB SPL:** 0.00 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -17 dB

---

**Frequency Response**

- Top - Compensated and Averaged
- Bottom - Raw Data for Five Headphone Positions

**Electrical Impedance and Phase**

- Measured with 600 Ohm output impedance.

**30 Hz Square Wave**

**300 Hz Square Wave**

**%THD+noise @ 90dB and 100dB**

**Impulse Response**

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**Headphone Measurements:**

**A Audio Elite Bass Mode**

---

**Frequency Response**

Top - Compensated and Averaged

Bottom - Raw Data for Five Headphone Positions

**Isolation**

Attenuation of External Sound vs. Frequency

**Impulse Response**

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

---

Volts RMS required to reach 90dB SPL: 0.010 Vrms

Impedance @ 1kHz: 102 Ohms

Power Needed for 90dB SPL: 0.00 mW

Broadband Isolation in dB (100Hz to 1kHz): -13 dB

---

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Headphone Measurements: AKG N90Q Nominal

Headphone Measurements:

- **Volts RMS required to reach 90dB SPL**: 0.171 Vrms
- **Impedance @ 1kHz**: 67 Ohms
- **Power Needed for 90dB SPL**: 0.44 mW
- **Broadband Isolation in dB (100Hz to 10kHz)**: -27 dB

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

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Headphone Measurements: Audio Technica ATH-MSR7NC
Passive

Volts RMS required to reach 90dB SPL: 0.037 Vrms
Impedance @ 1kHz: 32 Ohms
Power Needed for 90dB SPL: 0.04 mW
Broadband Isolation in dB (100Hz to 10kHz): -17 dBdR

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Headphone Measurements: Audio Technica ATH-MSR7NC
ANC Active

- Volts RMS required to reach 90dB SPL: 0.031 Vrms
- Impedance @ 1kHz: 149 Ohms
- Power Needed for 90dB SPL: 0.01 mW
- Broadband Isolation in dB (100Hz to 10kHz): -17 dBr

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Headphone Measurements: Audio Technica ATH-ANC50iS Passive

- Volts RMS required to reach 90dB SPL: 0.095 Vrms
- Impedance @ 1kHz: 40 Ohms
- Power Needed for 90dB SPL: 0.23 mW
- Broadband Isolation in dB (100Hz to 10kHz): -15 dBr

Audio Measurements:

- %THD+noise @ 90dB and 100dB
- 30 Hz Square Wave
- 300 Hz Square Wave
- Impulse Response

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Headphone Measurements: Audio Technica ATH-ANC50iS
ANC Active

Frequency Response
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

Electrical Impedance and Phase
Measured with 600 Ohm output impedance.

%THD+noise @ 90dB and 100dB

Impulse Response

Isolation
Attenuation of External Sound vs. Frequency

---

Volts RMS required to reach 90dB SPL: 0.033 Vrms
Impedance @ 1kHz: 45 Ohms
Power Needed for 90dB SPL: 0.02 mW
Broadband Isolation in dB (100Hz to 10kHz): -22 dBr

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Headphone Measurements: Audio Technica ATH-ANC7b

- **Volts RMS required to reach 90dB SPL:** 0.025 Vrms
- **Impedance @ 1kHz:** 295 Ohms
- **Power Needed for 90dB SPL:** 0.00 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -24 dB

**Frequency Response**
- Top - Compensated and Averaged
- Bottom - Raw Data for Five Headphone Positions

**Isolation**
- Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

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Headphone Measurements: Audio Technica ATH-ANC9

Headphone Measurements:

Volts RMS required to reach 90dB SPL: 0.072 Vrms
Impedance @ 1kHz: 99 Ohms
Power Needed for 90d BSPL: 0.05 mW
Broadband Isolation in dB (100Hz to 10kHz): -20 dB

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Headphone Measurements: Beats Studio 2 2014

**Headphone Measurements:**

- **Volts RMS required to reach 90dB SPL:** 0.024 Vrms
- **Impedance @ 1kHz:** 139 Ohms
- **Power Needed for 90d BSPL:** 0.00 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -26 dB

---

**Frequency Response**

Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**

Attenuation of External Sound vs. Frequency

---

**Electrical Impedance and Phase**

Measured with 600 Ohm output impedance.

---

**%THD+noise @ 90dB and 100dB**

---

**30 Hz Square Wave**

---

**300 Hz Square Wave**

---

**Impulse Response**

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**Headphone Measurements:**

**Bose Quiet Comfort 35 Wired Passive**

**Headphone Measurements:**

**Frequency Response**
- Top - Compensated and Averaged
- Bottom - Raw Data for Five Headphone Positions

**Isolation**
- Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**Impulse Response**

Volts RMS required to reach 90dB SPL: 0.064 Vrms
Impedance @ 1kHz: 47 Ohms
Power Needed for 90dB SPL: 0.09 mW
Broadband Isolation in dB (100Hz to 10kHz): -24 dB
Headphone Measurements: Bose Quiet Comfort 35 Wired Active

- Volts RMS required to reach 90dB SPL: 0.121 Vrms
- Impedance @ 1kHz: 488 Ohms
- Power Needed for 90dB SPL: 0.03 mW
- Broadband Isolation in dB (100Hz to 10kHz): -28 dBr

---

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**Impulse Response**

---

Vt RMS required to reach 90dB SPL: 0.121 Vrms
Impedance @ 1kHz: 488 Ohms
Power Needed for 90dB SPL: 0.03 mW
Broadband Isolation in dB (100Hz to 10kHz): -28 dBr
Electrical Impedance and phase measurements unavailable for electrostatic and wireless headphones.

Broadband Isolation in dB (100Hz to 10kHz): -28 dBr

Impulse response unavailable for Bluetooth headphones due to latency synchronization problems.

Bose Quiet Comfort 35 Wireless Active

%THD+noise @ 90dB and 100dB

30 Hz Square Wave

300 Hz Square Wave
Headphone Measurements: Bose Quiet Comfort 25

Headphone Measurements:

**Volts RMS required to reach 90dB SPL**: 0.063 Vrms

**Impedance @ 1kHz**: 818 Ohms

**Power Needed for 90dB SPL**: 0.00 mW

**Broadband Isolation in dB (100Hz to 10kHz)**: -27 dB

---

**Frequency Response**

Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**

Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**

Measured with 600 Ohm output impedance.

**30 Hz Square Wave**

**300 Hz Square Wave**

**%THD+noise @ 90dB and 100dB**

**Impulse Response**
Headphone Measurements:  Bose Quiet Comfort 25 Passive

**Frequency Response**
- Top - Compensated and Averaged
- Bottom - Raw Data for Five Headphone Positions

**Isolation**
- Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

Volts RMS required to reach 90dB SPL: 0.065 Vrms
Impedance @ 1kHz: 53 Ohms
Power Needed for 90dB SPL: 0.08 mW
Broadband Isolation in dB (100Hz to 10kHz): -22 dB
**Headphone Measurements:**

**Bose Quiet Comfort 20**

\[ \text{Volts RMS required to reach 90dB SPL: } 0.093 \text{ Vrms} \]

\[ \text{Impedance @ 1kHz: } 2834 \text{ Ohms} \]

\[ \text{Power Needed for 90dB SPL: } 0.00 \text{ mW} \]

\[ \text{Broadband Isolation in dB (100Hz to 10kHz): } -26 \text{ dBr} \]
Headphone Measurements: Bose Quiet Comfort 20 Passive

- **Volts RMS required to reach 90dB SPL:** 0.090 Vrms
- **Impedance @ 1kHz:** 71 Ohms
- **Power Needed for 90dB SPL:** 0.11 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -15 dB

---

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Headphone Measurements: Bose Quiet Comfort 20 Aware mod

**Headphone Measurements**

- **Volts RMS required to reach 90dB SPL**: 0.078 Vrms
- **Impedance @ 1kHz**: 2841 Ohms
- **Power Needed for 90dB SPL**: 0.00 mW
- **Broadband Isolation in dB (100Hz to 10kHz)**: -7 dBr

---

**Frequency Response**

*Top - Compensated and Averaged, Bottom - Raw Measured Data*

**Isolation**

*Attenuation of External Sound vs. Frequency*

**Electrical Impedance and Phase**

*Measured with 600 Ohm output impedance.*

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

*Volts RMS required to reach 90dB SPL: 0.078 Vrms*

*Impedance @ 1kHz: 2841 Ohms*

*Power Needed for 90dB SPL: 0.00 mW*

*Broadband Isolation in dB (100Hz to 10kHz): -7 dB*
Headphone Measurements: Bose Quiet Comfort 15

- Volts RMS required to reach 90dB SPL: 0.074 Vrms
- Impedance @ 1kHz: 2001 Ohms
- Power Needed for 90dB SPL: 0.00 mW
- Broadband Isolation in dB (100Hz to 10kHz): -26 dB
Headphone Measurements:  
Fanny Wang Custom 3000 Passive

Volts RMS required to reach 90dB SPL: 0.057 Vrms
Impedance @ 1kHz: 60 Ohms
Power Needed for 90dB SPL: 0.05 mW
Broadband Isolation in dB (100Hz to 10kHz): -13 dB

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Headphone Measurements:  Fanny Wang Custom 3000 Noise Canceling On

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**Impulse Response**

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

Volts RMS required to reach 90dB SPL: 0.049 Vrms
Impedance @ 1kHz: 2175 Ohms
Power Needed for 90d BSPL: 0.05 mW
Broadband Isolation in dB (100Hz to 10kHz): -14 dB

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Headphone Measurements:
Fanny Wang Custom 3000 Bass
Boost On

- **Volts RMS required to reach 90dB SPL:** 0.045 Vrms
- **Impedance @ 1kHz:** 2772 Ohms
- **Power Needed for 90dB SPL:** 0.00 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -15 dB
Headphone Measurements: JBL Everest Elite 700 Wireless
Active

**Electrical Impedance and phase measurements unavailable for electrostatic and wireless headphones.**

**Broadband Isolation in dB (100Hz to 10kHz):** -29 dBr

**Impulse response unavailable for Bluetooth headphones due to latency synchronization problems.**
Headphone Measurements: 

JBL Everest Elite 700 Wired Passive

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Impulse Response**

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Isolation**
Attenuation of External Sound vs. Frequency

Volts RMS required to reach 90dB SPL: 0.010 Vrms
Impedance @ 1kHz: 25 Ohms
Power Needed for 90dB SPL: 0.00 mW
Broadband Isolation in dB (100Hz to 10kHz): -18 dB
Headphone Measurements: JBL Everest Elite 700 Wired Active

**Volts RMS required to reach 90dB SPL**: 0.078 Vrms

**Impedance @ 1kHz**: 5017 Ohms

**Power Needed for 90dB SPL**: 0.00 mW

**Broadband Isolation in dB (100Hz to 10kHz)**: -28 dB

---

**Frequency Response**
- Top - Compensated and Averaged
- Bottom - Raw Data for Five Headphone Positions

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**30 Hz Square Wave**

**300 Hz Square Wave**

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

---

Volts RMS required to reach 90dB SPL: 0.078 Vrms
Impedance @ 1kHz: 5017 Ohms
Power Needed for 90dB SPL: 0.00 mW
Broadband Isolation in dB (100Hz to 10kHz): -28 dB
Headphone Measurements: Klipsch Mode M40

- Volts RMS required to reach 90dB SPL: 0.018 Vrms
- Impedance @ 1kHz: 149 Ohms
- Power Needed for 90dB SPL: 0.00 mW
- Broadband Isolation in dB (100Hz to 10kHz): -22 dB
**Headphone Measurements: Monster Beats Studio**

**Volts RMS required to reach 90dB SPL:** 0.047 Vrms

**Impedance @ 1kHz:** 220 Ohms

**Power Needed for 90dB SPL:** 0.01 mW

**Broadband Isolation in dB (100Hz to 10kHz):** -15 dB

---

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

---

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Headphone Measurements: Phiaton Chord MS530 NC on

Headphone Measurements:

**Volts RMS required to reach 90dB SPL:** 0.011 Vrms

**Impedance @ 1kHz:** 100 Ohms

**Power Needed for 90dB SPL:** 0.00 mW

**Broadband Isolation in dB (100Hz to 10kHz):** -6 dB

---

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

---

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Headphone Measurements:  Polk Ultrafocus 8000

- **Volts RMS required to reach 90dB SPL**: 0.041 Vrms
- **Impedance @ 1kHz**: 102 Ohms
- **Power Needed for 90d BSPL**: 0.02 mW
- **Broadband Isolation in dB (100Hz to 1kHz)**: -14 dB

---

**Frequency Response**

- Top - Compensated and Averaged
- Bottom - Raw Data for Five Headphone Positions

---

**Isolation**

Attenuation of External Sound vs. Frequency

---

**Electrical Impedance and Phase**

Measured with 600 Ohm output impedance.

---

**%THD+noise @ 90dB and 100dB**

---

**30 Hz Square Wave**

---

**300 Hz Square Wave**

---

**Impulse Response**

---

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Headphone Measurements: PSB M4U 2

**Headphone Measurements:**

- **Volts RMS required to reach 90dB SPL:** 0.021 Vrms
- **Impedance @ 1kHz:** 11061 Ohms
- **Power Needed for 90dB SPL:** 0.00 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -17 dB

---

**Frequency Response**

Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

![Frequency Response Graph](image)

**Isolation**

Attenuation of External Sound vs. Frequency

![Isolation Graph](image)

**Electrical Impedance and Phase**

Measured with 600 Ohm output impedance.

![Impedance and Phase Graph](image)

**%THD+noise @ 90dB and 100dB**

![THD+noise Graph](image)

**30 Hz Square Wave**

![30 Hz Wave Graph](image)

**300 Hz Square Wave**

![300 Hz Wave Graph](image)

**Impulse Response**

![Impulse Response Graph](image)

---

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Headphone Measurements: PSB M4U 2 passive

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

![Graph showing frequency response with compensated and averaged data.](image)

**Impedance** and Phase
Measured with 600 Ohm output impedance.

![Graph showing impedance and phase with 600 Ohm output impedance.](image)

**%THD+noise @ 90dB and 100dB**

![Graph showing %THD+noise for 90dB and 100dB.](image)

**30 Hz Square Wave**

![Graph showing 30 Hz square wave response.](image)

**300 Hz Square Wave**

![Graph showing 300 Hz square wave response.](image)

**Impulse Response**

![Graph showing impulse response.](image)

- Volts RMS required to reach 90dB SPL: 0.040 Vrms
- Impedance at 1kHz: 39 Ohms
- Power Needed for 90dBSPL: 0.04 mW
- Broadband Isolation in dB (100Hz to 10kHz): -16 dB
Headphone Measurements: Sennheiser PXC 550 Wires ANC
Active

- Volts RMS required to reach 90dB SPL: 0.468 Vrms
- Impedance @ 1kHz: 469 Ohms
- Power Needed for 90dB SPL: 0.47 mW
- Broadband Isolation in dB (100Hz to 10kHz): -23 dB

---

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Impulse Response**

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**Isolation**
Attenuation of External Sound vs. Frequency

---

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

---

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**Headphone Measurements:**

**Sennheiser Momentum Wireless**

- **Wired Active**

---

**Frequency Response**

- Top - Compensated and Averaged
- Bottom - Raw Data for Five Headphone Positions

**Isolation**

- Attenuation of External Sound vs. Frequency

---

**Electrical Impedance and Phase**

- Measured with 600 Ohm output impedance.

---

**%THD+noise @ 90dB and 100dB**

---

**Impulse Response**

---

**30 Hz Square Wave**

---

**300 Hz Square Wave**

---

- Volts RMS required to reach 90dB SPL: 0.036 Vrms
- Impedance @ 1kHz: 477 Ohms
- Power Needed for 90dB SPL: 0.00 mW
- Broadband Isolation in dB (100Hz to 10kHz): -24 dB
Headphone Measurements:

Sony MDR 1000X Wireless NC
Active

Electrical Impedance and phase measurements unavailable for electrostatic and wireless headphones

Broadband Isolation in dB (100Hz to 10kHz): -24 dB

Impulse response unavailable for Bluetooth headphones due to latency synchronization problems.

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Headphone Measurements:  Sony MDR 1000X Wireless NC

Off

Electrical Impedance and phase measurements unavailable for electrostatic and wireless headphones.

Impulse response unavailable for Bluetooth headphones due to latency synchronization problems.

Broadband Isolation in dB (100Hz to 10kHz):  -20 dB

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Headphone Measurements: Sony MDR 1000X Wired NC

Active

**Frequency Response**
- Top - Compensated and Averaged
- Bottom - Raw Data for Five Headphone Positions

**Isolation**
- Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**Impulse Response**

- Volts RMS required to reach 90dB SPL: 0.008 Vrms
- Impedance @ 1kHz: 49 Ohms
- Power Needed for 90dB SPL: 0.00 mW
- Broadband Isolation in dB (100Hz to 10kHz): -23 dB

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**Headphone Measurements:**  
Sony MDR-1000X Wired Passive

**Volts RMS required to reach 90dB SPL:** 0.110 Vrms

**Impedance @ 1kHz:** 16 Ohms

**Power Needed for 90dB SPL:** 0.77 mW

**Broadband Isolation in dB (100Hz to 10kHz):** -19 dB

---

### Frequency Response

- **Top - Compensated and Averaged**
- **Bottom - Raw Data for Five Headphone Positions**

### Isolation

Attenuation of External Sound vs. Frequency

### Electrical Impedance and Phase

Measured with 600 Ohm output impedance.

### %THD+noise @ 90dB and 100dB

### 30 Hz Square Wave

### 300 Hz Square Wave

### Impulse Response

Volts RMS required to reach 90dB SPL: 0.110 Vrms
Impedance @ 1kHz: 16 Ohms
Power Needed for 90dB SPL: 0.77 mW
Broadband Isolation in dB (100Hz to 10kHz): -19 dB

---

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Headphone Measurements: Soul by Ludacris SL300

Headphone Measurements:

- Volts RMS required to reach 90dB SPL: 0.032 Vrms
- Impedance @ 1kHz: 4230 Ohms
- Power Needed for 90dB SPL: 0.00 mW
- Broadband Isolation in dB (100Hz to 10kHz): -15 dB

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Headphone Measurements: Soul Jet Pro ANC On

### Headphone Measurements:

**Volts RMS required to reach 90dB SPL:** 0.121 Vrms

**Impedance @ 1kHz:** 192 Ohms

**Power Needed for 90dB SPL:** 0.08 mW

**Broadband Isolation in dB (100Hz to 10kHz):** -25 dB

---

### Frequency Response

**Top - Compensated and Averaged**

**Bottom - Raw Data for Five Headphone Positions**

---

### Isolation

Attenuation of External Sound vs. Frequency

---

### Electrical Impedance and Phase

Measured with 600 Ohm output impedance.

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### %THD+noise @ 90dB and 100dB

---

### 30 Hz Square Wave

---

### 300 Hz Square Wave

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### Impulse Response

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Headphone Measurements: Soul Jet Pro ANC Off

Volts RMS required to reach 90dB SPL: 0.206 Vrms
Impedance @ 1kHz: 82 Ohms
Power Needed for 90d BSPL: 0.52 mW
Broadband Isolation in dB (100Hz to 10kHz): -19 dB
**Headphone Measurements:**  
**SMS Over Ear ANC**

- **Volts RMS required to reach 90dB SPL:** 0.057 Vrms
- **Impedance @ 1kHz:** 46 Ohms
- **Power Needed for 90dB SPL:** 0.07 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -23 dB
Headphone Measurement Datasheets

Wireless
Headphone Measurements: Beats Studio 2 Bluetooth

Electrical impedance and phase measurements unavailable for electrostatic and wireless headphones.

Broadband Isolation in dB (100Hz to 10kHz): -23 dBr

Impulse response unavailable for Bluetooth headphones due to latency synchronization problems.
Headphone Measurements: Beats Powerbeats2 Bluetooth

Electrical impedance and phase measurements unavailable for electrostatic and wireless headphones.

Impulse response unavailable for Bluetooth headphones due to latency synchronization problems.

Broadband isolation in dB (100Hz to 1kHz): -10 dB
Headphone Measurements: Beats Solo3 Bluetooth

Electrical Impedance and phase measurements unavailable for electrostatic and wireless headphones.

Broadband Isolation in dB (100Hz to 10kHz): -16 dBr

Impulse response unavailable for Bluetooth headphones due to latency synchronization problems.

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**Headphone Measurements:**

**Bowers & Wilkins P7 Wireless Wired Passive**

**Frequency Response**
- Top - Compensated and Averaged
- Bottom - Raw Data for Five Headphone Positions

**Isolation**
- Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

**Impedance Required to Reach 90dB SPL:** 0.037 Vrms

**Impedance @ 1kHz:** 25 Ohms

**Power Needed for 90dB SPL:** 0.06 mW

**Broadband Isolation in dB (100Hz to 10kHz):** -13 dB

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**Headphone Measurements:**

**Bowers Wilkins P7 Wireless Bluetooth**

**Electrical Impedance and phase measurements unavailable for electrostatic and wireless headphones.**

**Broadband Isolation in dB (100Hz to 10kHz): -16 dBr**

**Impulse response unavailable for Bluetooth headphones due to latency synchronization problems.**

**Broadband Isolation in dB (100Hz to 10kHz): -16 dBr**

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**Headphone Measurements:**

**House of Marley Liberate XLBT Wired**

- **Volts RMS required to reach 90dB SPL:** 0.016 Vrms
- **Impedance @ 1kHz:** 41 Ohms
- **Power Needed for 90dB SPL:** 0.01 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -15 dB

---

**Frequency Response**

Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**

Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**

Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

Volts RMS required to reach 90dB SPL: 0.016 Vrms
Impedance @ 1kHz: 41 Ohms
Power Needed for 90dB SPL: 0.01 mW
Broadband Isolation in dB (100Hz to 10kHz): -15 dB

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Headphone Measurements: Koss BT540i Bluetooth

Electrical impedance and phase measurements unavailable for electrostatic and wireless headphones.

Broadband Isolation in dB (100Hz to 10kHz): -17 dB

Impulse response unavailable for Bluetooth headphones due to latency synchronization problems.
**Headphone Measurements:**

**Meelectronics Air-Fi Matrix2 AF62 Bluetooth**

- **Electrical Impedance and phase measurements unavailable for electrostatic and wireless headphones.**

- **Broadband Isolation in dB (100Hz to 10kHz):** -10 dBr

- **Impulse response unavailable for Bluetooth headphones due to latency synchronization problems.**

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**Headphone Measurements:**

Meeelectronics Air-Fi Matrix2 AF62

**Wired**

---

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

Volts RMS required to reach 90dB SPL: 0.031 Vrms
Impedance @ 1kHz: 37 Ohms
Power Needed for 90dB SPL: 0.03 mW
Broadband Isolation in dB (100Hz to 10kHz): -12 dB

---

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**Headphone Measurements:**  
Noontec Zoro II Wireless Active

### Frequency Response

**Top -** Compensated and Averaged  
**Bottom -** Raw Data for Five Headphone Positions

- Electrical Impedance and phase measurements unavailable for electrostatic and wireless headphones

### Isolation

**Attenuation of External Sound vs. Frequency**

- Broadband Isolation in dB (100Hz to 10kHz): -16 dBr

### %THD+noise @ 90dB and 100dB

- Impulse response unavailable for Bluetooth headphones due to latency synchronization problems.

### 30 Hz Square Wave

### 300 Hz Square Wave
Headphone Measurements: Parrot Zik2 Bluetooth

Electrical impedance and phase measurements unavailable for electrostatic and wireless headphones.

Broadband isolation in dB (100Hz to 10kHz): -27 dB

Impulse response unavailable for Bluetooth headphones due to latency synchronization problems.
**Headphone Measurements:**

**Pendulumic Stance S1 Bluetooth**

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

Electrical impedance and phase measurements unavailable for electrostatic and wireless headphones.

**Isolation**
Attenuation of External Sound vs. Frequency

Impulse response unavailable for Bluetooth headphones due to latency synchronization problems.

**Broadband Isolation in dB (100Hz to 10kHz):** -9 dBr

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Headphone Measurements: Phiaton Chord MS530 Bluetooth

**Headphone Measurements:**

- **Frequency Response**
  - Top - Compensated and Averaged
  - Bottom - Raw Data for Five Headphone Positions

- **Isolation**
  - Attenuation of External Sound vs. Frequency

- **30 Hz Square Wave**

- **%THD+noise @ 90dB and 100dB**

- **300 Hz Square Wave**

**Electrical Impedance and phase measurements unavailable for electrostatic and wireless headphones.**

**Impulse response unavailable for Bluetooth headphones due to latency synchronization problems.**

**Broadband Isolation in dB (100Hz to 10kHz):** -18 dBr
Headphone Measurements: Scosche RH1060 Bluetooth

**Electrical Impedance and phase measurements unavailable for electrostatic and wireless headphones.**

**Broadband Isolation in dB (100Hz to 10kHz):** -16 dBr

Impulse response unavailable for Bluetooth headphones due to latency synchronization problems.

---

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**30 Hz Square Wave**

**%THD+noise @ 90dB and 100dB**

**300 Hz Square Wave**

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Headphone Measurements: Sennheiser PXC 550 Bluetooth
ANC Active

- Electrical Impedance and phase measurements unavailable for electrostatic and wireless headphones.

- Broadband Isolation in dB (100Hz to 10kHz): -22 dBr

- Impulse response unavailable for Bluetooth headphones due to latency synchronization problems.

- Broadband Isolation in dB (100Hz to 10kHz): -22 dBr
Headphone Measurements: Sennheiser Momentum Wireless Bluetooth

**Frequency Response**

*Top - Compensated and Averaged*

*Bottom - Raw Data for Five Headphone Positions*

Electrical impedance and phase measurements unavailable for electrostatic and wireless headphones.

**Isolation**

Attenuation of External Sound vs. Frequency

**30 Hz Square Wave**

**%THD+noise @ 90dB and 100dB**

**300 Hz Square Wave**

Impulse response unavailable for Bluetooth headphones due to latency synchronization problems.

Broadband Isolation in dB (100Hz to 10kHz): -23 dB
Electrical impedance and phase measurements unavailable for Electrostatic and Wireless headphones.
Sony MDR-1RBT

**Headphone Measurements:**

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

Electrical impedance and phase measurements unavailable for electrostatic and wireless headphones.

**Isolation**
Attenuation of External Sound vs. Frequency

Impulse response unavailable for Bluetooth headphones due to latency synchronization problems.

**Broadband Isolation in dB (100Hz to 10kHz):**
-16 dB

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Headphone Measurements:

**Volts RMS required to reach 90dB SPL:** 0.047 Vrms

**Impedance @ 1kHz:** 33 Ohms

**Power Needed for 90dB SPL:** 0.07 mW

**Broadband Isolation in dB (100Hz to 10kHz):** -9 dB
Electrical Impedance and phase measurements unavailable for electrostatic and wireless headphones.

Impulse response unavailable for Bluetooth headphones due to latency synchronization problems.

Broadband Isolation in dB (100Hz to 10kHz): -14 dB
Headphone Measurements:
Aiwa HP-500 DIY - DIY Modified - Kabeer

**Headphone Measurements:**
- **Volts RMS required to reach 90dB SPL:** 0.154 Vrms
- **Impedance @ 1kHz:** 23 Ohms
- **Power Needed for 90d BSPL 1.04 mW**
- **Broadband Isolation in dB (100Hz to 10kHz):** -5 dBr

---

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**Impulse Response**

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

For detailed analysis and graphs, please refer to the provided document images.
Headphone Measurements:  AKG K340 - DIY Modified - Morphs

Volts RMS required to reach 90dB SPL: 0.850 Vrms
Impedance @ 1kHz: 361 Ohms
Power Needed for 90d BSPL: 2.00 mW
Broadband Isolation in dB (100Hz to 10kHz): -10 dB
Headphone Measurements: AKG K340 - Morphsi B

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

Volts RMS required to reach 90dB SPL: 1.072 Vrms
Impedance @ 1kHz: 364 Ohms
Power Needed for 90d BSPL: 3.16 mW
Broadband Isolation in dB (100Hz to 10kHz): -13 dB

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Headphone Measurements:
AKG Q701 DIY Modified MarcoGV
Bass Mod

Volts RMS required to reach 90dB SPL: 0.393 Vrms
Impedance @ 1kHz: 65 Ohms
Power Needed for 90dB SPL: 2.37 mW
Broadband Isolation in dB (100Hz to 10kHz): -6 dB
Headphone Measurements:
Audio Technica ATH-ES10 DIY
Modified BillIP

- Volts RMS required to reach 90dB SPL: 0.027 Vrms
- Impedance @ 1kHz: 44 Ohms
- Power Needed for 90dB SPL: 0.02 mW
- Broadband Isolation in dB (100Hz to 10kHz): -12 dB
Headphone Measurements:

Chinsettaawong Orpheus Clone
DIY

Frequency Response
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

Isolation
Attenuation of External Sound vs. Frequency

Electrical impedance and phase measurements unavailable for electrostatic and wireless headphones

%THD+noise @ 90dB and 100dB

30 Hz Square Wave

300 Hz Square Wave

Impulse Response

Amplitude (dB)

Broadband Isolation in dB (100Hz to 10kHz): -1 dBr
Headphone Measurements: Chinsettawong Omega Clone DIY

**Frequency Response**
- Top - Compensated and Averaged
- Bottom - Raw Data for Five Headphone Positions

**Isolation**
- Attenuation of External Sound vs. Frequency

**30 Hz Square Wave**

**%THD+noise @ 90dB and 100dB**

**300 Hz Square Wave**

**Impulse Response**
- Broadband Isolation in dB (100Hz to 10kHz): -1 dBr

Electrical impedance and phase measurements unavailable for electrostatic and wireless headphones.
Headphone Measurements:

**Denon AH-D2000 - DIY Modified - Hans030390**

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

**Isolation**
Attenuation of External Sound vs. Frequency

Voits RMS required to reach 90dB SPL: 0.048 Vrms
Impedance @ 1kHz: 25 Ohms
Power Needed for 90d BSPL: 0.09 mW
Broadband Isolation in dB (100Hz to 10kHz): -3 dB
Headphone Measurements:  
Denon D7000 - DIY Modified - Imswjm

**Volts RMS required to reach 90dB SPL:** 0.082 Vrms  
**Impedance @ 1kHz:** 24 Ohms  
**Power Needed for 90dB SPL:** 0.27 mW  
**Broadband Isolation in dB (100Hz to 10kHz):** -4 dB
Headphone Measurements:  Fostex T10 - DIY Ortho - dBel84HP!

**Headphone Measurements:**

**Volts RMS required to reach 90dB SPL:** 0.271 Vrms

**Impedance @ 1kHz:** 58 Ohms

**Power Needed for 90dB SPL:** 1.27 mW

**Broadband Isolation in dB (100Hz to 10kHz):** -7 dBr

---

**Frequency Response**

Top - Compensated and Averaged

Bottom - Raw Data for Five Headphone Positions

**Isolation**

Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**

Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

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Headphone Measurements:  
Fostex T20RP - DIY Modified - sco

Volts RMS required to reach 90dB SPL: 0.130 Vrms
Impedance @ 1kHz: 55 Ohms
Power Needed for 90dB SPL: 0.31 mW
Broadband Isolation in dB (100Hz to 10kHz): -8 dB

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**Headphone Measurements:**

**Volts RMS required to reach 90dB SPL:** 0.572 Vrms

**Impedance @ 1kHz:** 58 Ohms

**Power Needed for 90dB SPL:** 5.67 mW

**Broadband Isolation in dB (100Hz to 10kHz):** -7 dBr
Headphone Measurements: Fostex T40RP - DIY Modified - scor

Electrical Impedance and Phase
Measured with 600 Ohm output impedance.

%THD+noise @ 90dB and 100dB

30 Hz Square Wave

300 Hz Square Wave

Impulse Response

Volts RMS required to reach 90dB SPL: 0.172 Vrms
Impedance @ 1kHz: 52 Ohms
Power Needed for 90dB SPL: 0.57 mW
Broadband Isolation in dB (100Hz to 10kHz): -8 dB
Headphone Measurements: Fostex T50RP - DIY Modified - Teej

- Volts RMS required to reach 90dB SPL: 0.001 Vrms
- Impedance @ 1kHz: 58 Ohms
- Power Needed for 90dB SPL: 0.00 mW
- Broadband Isolation in dB (100Hz to 10kHz): -10 dB
Headphone Measurements: Fostex T50RP- Smeggy Thunderpa

**Headphone Measurements**

- **Volts RMS required to reach 90dB SPL**: 0.261 Vrms
- **Impedance @ 1kHz**: 55 Ohms
- **Power Needed for 90dB SPL**: 1.23 mW
- **Broadband Isolation in dB (100Hz to 10kHz)**: -17 dB

**Frequency Response**

Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**30 Hz Square Wave**

**300 Hz Square Wave**

**%THD+noise @ 90dB and 100dB**

**Impulse Response**

Volts RMS required to reach 90dB SPL: 0.261 Vrms
Impedance @ 1kHz: 55 Ohms
Power Needed for 90dB SPL: 1.23 mW
Broadband Isolation in dB (100Hz to 10kHz): -17 dB

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Headphone Measurements: Fostex T50RP - DIY Modifies - Kneel Jung

- **Volts RMS required to reach 90dB SPL:** 0.098 Vrms
- **Impedance @ 1kHz:** 54 Ohms
- **Power Needed for 90dB SPL:** 0.18 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -10 dB
Headphone Measurements: Fostex T50RP - DIY Modified - LFF Paradox

**Headphone Measurements:**
- Volts RMS required to reach 90dB SPL: 0.260 Vrms
- Impedance @ 1kHz: 57 Ohms
- Power Needed for 90dB SPL: 1.17 mW
- Broadband Isolation in dB (100Hz to 10kHz): -12 dB
Headphone Measurements: Fostex T50RP - DIY Modified - lokesen

**Headphone Measurements:**
- **Volts RMS required to reach 90dB SPL:** 0.105 Vrms
- **Impedance @ 1kHz:** 48 Ohms
- **Power Needed for 90dB SPL:** 0.23 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -15 dBr

---

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

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Headphone Measurements: Fostex T50RP - DIY Modified - Magicman

Volts RMS required to reach 90dB SPL: 0.164 Vrms
Impedance @ 1kHz: 50 Ohms
Power Needed for 90dB SPL: 0.54 mW
Broadband Isolation in dB (100Hz to 10kHz): -18 dBr
Headphone Measurements: Fostex T50RP DIY Modified
ThomasS

**Headphone Measurements:**

- **Volts RMS required to reach 90dB SPL:** 0.252 Vrms
- **Impedance @ 1kHz:** 54 Ohms
- **Power Needed for 90dB SPL:** 1.19 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -22 dB
Headphone Measurements:

Volts RMS required to reach 90dB SPL: 0.405 Vrms
Impedance @ 1kHz: 47 Ohms
Power Needed for 90dB SPL: 3.53 mW
Broadband Isolation in dB (100Hz to 10kHz): -8 dB
Headphone Measurements:

Grado SR60 - DIY Modified - Kneel Jung

Volts RMS required to reach 90dB SPL: 0.109 Vrms
Impedance @ 1kHz: 33 Ohms
Power Needed for 90d BSPL: 0.36 mW
Broadband Isolation in dB (100Hz to 10kHz): 0 dB
Headphone Measurements: Grado Magnum V3 - Marty Cocobolo cups - pbandstephanwich

Volts RMS required to reach 90dB SPL: 0.120 Vrms
Impedance @ 1kHz: 36 Ohms
Power Needed for 90dB SPL: 0.41 mW
Broadband Isolation in dB (100Hz to 10kHz): 0 dB
Headphone Measurements:

- **Grado Symphones Magnum v25**

**Headphone Measurements:**

- **Volts RMS required to reach 90dB SPL:** 0.094 Vrms
- **Impedance @ 1kHz:** 34 Ohms
- **Power Needed for 90dB SPL:** 0.25 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** 0 dB

**Frequency Response**

- Top - Compensated and Averaged
- Bottom - Raw Data for Five Headphone Positions

**Isolation**

- Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**

- Measured with 600 Ohm output impedance

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

- Time in Seconds
- Volts

**300 Hz Square Wave**

- Time in Seconds
- Volts

**Impulse Response**

- Time in Seconds
- Volts

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**Headphone Measurements:**
Grado PS-1 with HP1000 drivers - DIY modified - LFF

- **Volts RMS required to reach 90dB SPL:** 0.142 Vrms
- **Impedance @ 1kHz:** 45 Ohms
- **Power Needed for 90dB SPL:** 0.45 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -1 dBr

**Frequency Response**
- Top - Compensated and Averaged
- Bottom - Raw Data for Five Headphone Positions

**Isolation**
- Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

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**Headphone Measurements:**

**SennGrado DIY Modified JoeDoe**

Volts RMS required to reach 90dB SPL: 0.049 Vrms
Impedance @ 1kHz: 34 Ohms
Power Needed for 90dB SPL: 0.67 mW
Broadband Isolation in dB (100Hz to 10kHz): -2 dB

---

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**30 Hz Square Wave**

**%THD+noise @ 90dB and 100dB**

**300 Hz Square Wave**

**Impulse Response**
Headphone Measurements: Koss KPH7 - DIY Modified - Obobskivich

Volts RMS required to reach 90dB SPL: 0.149 Vrms
Impedance @ 1kHz: 18 Ohms
Power Needed for 90d BSPL: 1.19 mW
Broadband Isolation in dB (100Hz to 10kHz): -1 dBr

Impulse Response

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Headphone Measurements:

- Leak Isodynamic - DIY Modified

**Headphone Measurements:**

- **Volts RMS required to reach 90dB SPL:** 0.160 Vrms
- **Impedance @ 1kHz:** 62 Ohms
- **Power Needed for 90dBSPL:** 0.42 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -7 dBr

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Headphone Measurements: DIYMarkSorando

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

Volts RMS required to reach 90dB SPL: 0.128 Vrms
Impedance @ 1kHz: 55 Ohms
Power Needed for 90dB SPL: 0.30 mW
Broadband Isolation in dB (100Hz to 1kHz): -16 dB
Headphone Measurements:  
Pioneer SE500 DIY Modified  
Takato14  

**Volts RMS required to reach 90dB SPL:** 1.940 Vrms  
**Impedance @ 1kHz:** 12546 Ohms  
**Power Needed for 90dB SPL:** 0.30 mW  
**Broadband Isolation in dB (100Hz to 10kHz):** -19 dB
**Headphone Measurements:**

- **Oppo PM2 DIY Modified**
- **hans030390**

**Volts RMS required to reach 90dB SPL:** 0.080 Vrms

**Impedance @ 1kHz:** 33 Ohms

**Power Needed for 90dB SPL:** 0.19 mW

**Broadband Isolation in dB (100Hz to 10kHz):** -6 dB

---

**Frequency Response**

- **Top - Compensated and Averaged**
- **Bottom - Raw Data for Five Headphone Positions**

**Electrical Impedance and Phase**

- Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

---

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Headphone Measurements: Sansui SS100 DIY Modified
Takato14

- **Volts RMS required to reach 90dB SPL:** 0.152 Vrms
- **Impedance @ 1kHz:** 59 Ohms
- **Power Needed for 90dB SPL:** 0.39 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -4 dB

---

**Electrical Impedance and Phase**

Measured with 600 Ohm output impedance.

**Frequency Response**

Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**

Attenuation of External Sound vs. Frequency

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

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Headphone Measurements: Sennheiser HD 650 DIY Mod

Hands

Headphone Measurements:

- Volts RMS required to reach 90dB SPL: 0.156 Vrms
- Impedance @ 1kHz: 342 Ohms
- Power Needed for 90dB SPL: 0.07 mW
- Broadband Isolation in dB (100Hz to 10kHz): -4 dB

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Headphone Measurements: Sennheiser HD 700 DIY Modified
Takato14 Damping Filter 1 and 2

- **Volts RMS required to reach 90dB SPL:** 0.210 Vrms
- **Impedance @ 1kHz:** 179 Ohms
- **Power Needed for 90dB SPL:** 0.25 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -5 dBr

---

**Impulse Response**

**30 Hz Square Wave**

**300 Hz Square Wave**

---

**%THD+noise @ 90dB and 100dB**

**%THD+noise**

---

**Electrical Impedance and Phase**

Measured with 600 Ohm output impedance.

**30 Hz Square Wave**

**300 Hz Square Wave**

---

**Frequency Response**

Top - Compensated and Averaged
Bottom - Raw Measured Data

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**Isolation**

Attenuation of External Sound vs. Frequency

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**Isolation**

Attenuation of External Sound vs. Frequency

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Headphone Measurements: Sennheiser HD 700 DIY Modified
Takato14

Volts RMS required to reach 90dB SPL: 0.262 Vrms
Impedance @ 1kHz: 180 Ohms
Power Needed for 90dB SPL: 0.38 mW
Broadband Isolation in dB (100Hz to 10kHz): -5 dBVR

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Headphone Measurements: Sennheiser HD 800 sn 15001
Superdupont Resonator

Volts RMS required to reach 90dB SPL: 0.257 Vrms
Impedance @ 1kHz: 370 Ohms
Power Needed for 90dB SPL: 0.18 mW
Broadband Isolation in dB (100Hz to 10kHz): -4 dBr
Headphone Measurements:

**Sennheiser HD 800 sn 15001**

SuperDupont and SuperBAF mods

**Frequency Response**
- Top - Compensated and Averaged
- Bottom - Raw Data for Five Headphone Positions

**Impedance**
- Measured with 600 Ohm output impedance.

**ThD+noise @ 90dB and 100dB**

**Isolation**
- Attenuation of External Sound vs. Frequency

**Impulse Response**

**Impedance and Phase**

**Amplitude (dB)**

**Electrical Impedance and Phase**

**Volts RMS required to reach 90dB SPL:** 0.165 Vrms

**Impedance @ 1kHz:** 369 Ohms

**Power Needed for 90dB SPL:** 0.07 mW

**Broadband Isolation in dB (100Hz to 10kHz):** -5 dBr

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Headphone Measurements: Sony MDR-Z7 DIY Modified BillP

- **Volts RMS required to reach 90dB SPL**: 0.095 Vrms
- **Impedance @ 1kHz**: 77 Ohms
- **Power Needed for 90dB SPL**: 0.12 mW
- **Broadband Isolation in dB (100Hz to 10kHz)**: -18 dB

**Isolation**

- Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**

- Measured with 600 Ohm output impedance.

**%THD+noise @ 90dB and 100dB**

- %THD+noise at 30 Hz and 300 Hz Square Waves

**Impulse Response**

- Time in Seconds
- Volts

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**Headphone Measurements:**

**Smeggy Pucks**

**Headphone Measurements:**

- **Volts RMS required to reach 90dB SPL:** 0.426 Vrms
- **Impedance @ 1kHz:** 123 Ohms
- **Power Needed for 90d BSPL:** 1.47 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -19 dB

**Frequency Response**

*Top - Compensated and Averaged*

*Bottom - Raw Data for Five Headphone Positions*

**Electrical Impedance and Phase**

Measured with 600 Ohm output impedance.

**Isolation**

Attenuation of External Sound vs. Frequency

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

**Impulse Response**

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Headphone Measurements: Smeggy Thunderpants TP1 2012
Tari

Volts RMS required to reach 90dB SPL: 0.333 Vrms
Impedance @ 1kHz: 54 Ohms
Power Needed for 90d BSPL: 2.06 mW
Broadband Isolation in dB (100Hz to 10kHz): -17 dB
Headphone Measurements:

**Smeggy Thunderpants TP1 2012**

**Draygon**

### Frequency Response

**Top - Compensated and Averaged**

**Bottom - Raw Data for Five Headphone Positions**

### Isolation

**Attenuation of External Sound vs. Frequency**

### Electrical Impedance and Phase

**Measured with 600 Ohm output impedance.**

### 30 Hz Square Wave

### %THD+noise @ 90dB and 100dB

### 300 Hz Square Wave

### Impulse Response

Volts RMS required to reach 90dB SPL: 0.242 Vrms

Impedance @ 1kHz: 55 Ohms

Power Needed for 90dB SPL: 1.07 mW

Broadband Isolation in dB (100Hz to 10kHz): -17 dB

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Headphone Measurements:

**Smeggy Thuderpants TP1**
Draygon with reduced hole size

- **Volts RMS required to reach 90dB SPL:** 0.269 Vrms
- **Impedance @ 1kHz:** 55 Ohms
- **Power Needed for 90dBSPL:** 1.31 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -19 dB

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**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

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**%THD+noise @ 90dB and 100dB**

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**30 Hz Square Wave**

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**300 Hz Square Wave**

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**Impulse Response**

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Headphone Measurements: The Empiric DIY Headphone by Feilb

- **Volts RMS required to reach 90dB SPL**: 0.140 Vrms
- **Impedance @ 1kHz**: 31 Ohms
- **Power Needed for 90dB SPL**: 0.63 mW
- **Broadband Isolation in dB (100Hz to 10kHz)**: -11 dB

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**Frequency Response**
- Top - Compensated and Averaged
- Bottom - Raw Data for Five Headphone Positions

**Isolation**
- Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
- Measured with 600 Ohm output impedance.

**30 Hz Square Wave**

**300 Hz Square Wave**

**%THD+noise @ 90dB and 100dB**

**Impulse Response**

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Headphone Measurements: Quadraflex Q-35 - DIY Modified - Magicman

**Headphone Measurements:**

- **Volts RMS required to reach 90dB SPL:** 0.024 Vrms
- **Impedance @ 1kHz:** 11 Ohms
- **Power Needed for 90dB SPL:** 0.05 mW
- **Broadband Isolation in dB (100Hz to 10kHz):** -6 dB

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**Frequency Response**

- **Compensated and Averaged**
- **Raw Data for Five Headphone Positions**

**Electrical Impedance and Phase**

- **Measured with 600 Ohm output impedance.**

**30 Hz Square Wave**

**300 Hz Square Wave**

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**%THD+noise @ 90dB and 100dB**

**Impulse Response**

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**Isolation**

- **Attenuation of External Sound vs. Frequency**

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Headphone Measurements:

**Volts RMS required to reach 90dB SPL:** 0.346 Vrms

**Impedance @ 1kHz:** 130 Ohms

**Power Needed for 90dB SPL:** 0.92 mW

**Broadband Isolation in dB (100Hz to 10kHz):** -6 dB

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Headphone Measurements: Yamaha YHD2 - DIY Modified - dBe

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Impulse Response**

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**Isolation**
Attenuation of External Sound vs. Frequency

**%THD+noise @ 90dB and 100dB**

**30 Hz Square Wave**

**300 Hz Square Wave**

Volts RMS required to reach 90dB SPL: 0.233 Vrms
Impedance @ 1kHz: 129 Ohms
Power Needed for 90dB SPL: 0.42 mW
Broadband Isolation in dB (100Hz to 10kHz): -9 dB

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Headphone Measurements: Yamaha HP-50A - DIY Modified - dE

- Volts RMS required to reach 90dB SPL: 0.440 Vrms
- Impedance @ 1kHz: 128 Ohms
- Power Needed for 90dB SPL: 1.52 mW
- Broadband Isolation in dB (100Hz to 10kHz): -5 dB

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**Impulse Response**

**Frequency Response**

Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**

Attenuation of External Sound vs. Frequency

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**30 Hz Square Wave**

- Time in Seconds
- Volts

**300 Hz Square Wave**

- Time in Seconds
- Volts

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**%THD+noise @ 90dB and 100dB**

**Frequency Response**

Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

---

**Electrical Impedance and Phase**

Measured with 600 Ohm output impedance.

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**30 Hz Square Wave**

- Time in Seconds
- Volts

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**%THD+noise @ 90dB and 100dB**

- Time in Seconds
- Volts

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Headphone Measurements: Wharfedale - DIY Modified - dBel84

**Frequency Response**
Top - Compensated and Averaged
Bottom - Raw Data for Five Headphone Positions

**Isolation**
Attenuation of External Sound vs. Frequency

**Electrical Impedance and Phase**
Measured with 600 Ohm output impedance.

**30 Hz Square Wave**

**%THD+noise @ 90dB and 100dB**

**300 Hz Square Wave**

**Impulse Response**

Volts RMS required to reach 90dB SPL: 0.894 Vrms
Impedance @ 1kHz: 71 Ohms
Power Needed for 90dB SPL: 11.19 mW
Broadband Isolation in dB (100Hz to 10kHz): -10 dB