

Power BTEs: Separating Myth from Fact

Myth: Power BTEs are all the same.

Fact: There are no explicit labeling requirements for what defines a Power BTE—a manufacturer can label a BTE product however it chooses. Typically, Power BTEs have a Max Output above 132 dB SPL, use either size 13 or 675 batteries, and almost always include a Telecoil and Direct Audio Input capabilities. See figure 1.

Myth: The most important specification for a Power BTE is its Maximum Output.

Fact: Per the ANSI S3.22 standard, Maximum Output is a safety specification—a maximum sound pressure level (SPL) that the device will not exceed. Some manufacturers choose to report both the Maximum Output safety limit and a Nominal Output value. The Nominal Output is the average measured output peak of the device, and thus a better indicator of actual device capability.

The problem with using Maximum Output as the sole indicator of Power BTE performance is that this value reflects the performance at only one frequency—a frequency that will vary from device to device. This makes comparisons between Power BTE products very difficult; two different devices may report the same Maximum Output value, but without examining Output frequency responses, you cannot determine if the device is appropriate for your patient’s hearing loss.

A better performance indicator for a Power BTE is its High Frequency Average (HFA) OSPL90 value. This specification averages the output of the device at three determined frequencies—1000 Hz, 1600 Hz, and 2500 Hz. Since these frequencies are the same for all products, you can make effective comparisons. However, HFA OSPL90 is a limited comparison. Because there are only three frequencies measured, manufacturers can specifically tune performance to achieve a high HFA OSPL90 value, but still not provide a high level of output across all frequencies.

The only way to really understand if a Power BTE—or any other device for that matter—will fit your patient’s output needs is to examine the Output frequency response of the device.

(continued)



Power BTE Sub Categories	Maximum Output Range
Power	132–135 dB SPL
Super Power	136–139 dB SPL
Ultra Power	≥140 dB SPL

Figure 1: Power BTE Categories

Maximum Output OSPL90
Power/Super Power BTEs

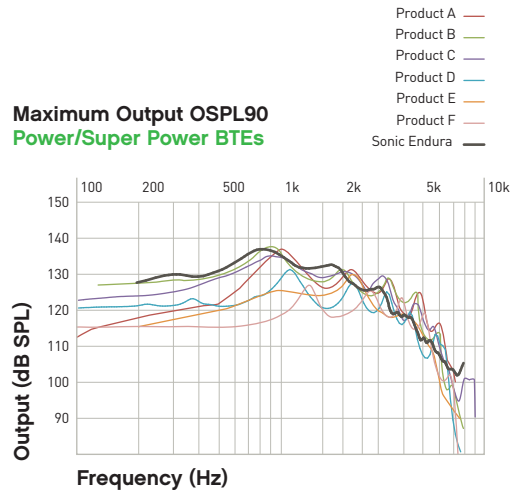


Figure 2: Output Curves—Power/Super Power BTEs. Notice the variability across frequencies in the output of the Maximum Output frequency responses.

Myth: A linear fitting is most appropriate for severe-to-profound hearing losses.

Fact: Compression is not just for mild losses anymore. The goal for fitting any type of loss—including severe-to-profound hearing losses—is to deliver as much sound as possible to the patient’s residual dynamic range. That is exactly what modern compression systems do. In a 1999 study, “Improving speech audibility with wide dynamic range compression in listeners with severe sensorineural loss,” Souza and Bishop demonstrate that many patients with this type of hearing loss can benefit from multi-channel compression¹. Since then, additional research continues to support this finding. In fact, even the industry-standard fitting algorithms, NAL-NL1 and DSL m[i/o], no longer prescribe linear amplification for severe-to-profound hearing losses.

The goal of compression is to amplify soft sounds until audible while preventing loud sounds from becoming uncomfortable. Because Power BTEs have enough output to overdrive even an ear with a severe hearing loss, careful measurement and control of output is critical.

Myth: Sound quality is not important in a Power BTE—you just need to ‘boom.’

Fact: Sound quality always matters. Even patients with severe-to-profound hearing loss can hear the difference between a device that distorts easily and one that does not. A smooth frequency response is associated with improved sound quality and can be delivered in devices that are designed for severe-to-profound hearing losses.

Myth: For severe-to-profound hearing losses, directionality isn’t useful.

Fact: Directionality has been shown to provide the same benefit to patients regardless of their amount of hearing loss². Modern directional systems can fully equalize a directional response, making the system loud enough for severe-to-profound listeners without the increased noise floor interfering.

Sonic Endura Power BTE



Reference

1. Souza, P., & Bishop, R. (1999). Improving speech audibility with wide dynamic range compression in listeners with severe sensorineural loss. *Ear and Hearing*, 20:6, 461-470.
2. Bray, V., Nilsson, M., & Ghent, B. (2006). A Model of Hearing Aid Benefit Based on Performance Measures with Hearing Aid Users. Presented at IHCON, Tahoe City, CA.

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