

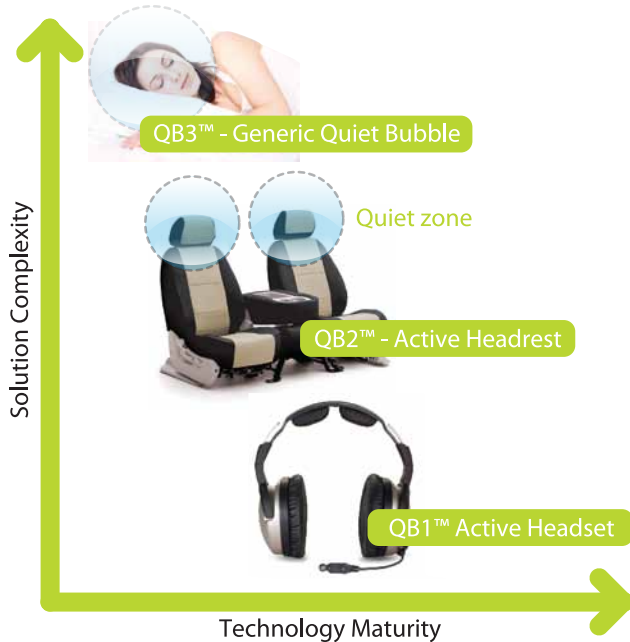
Quiet Bubble™ Technology



Every Sound Counts

 **Silentium**
Silence in a Chip

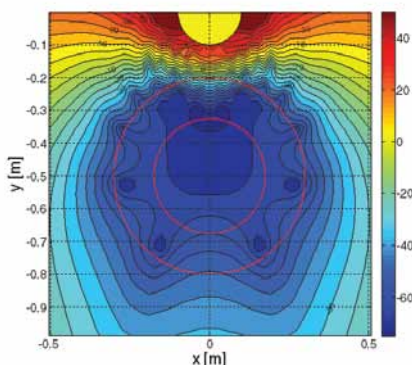
Quiet Bubble™



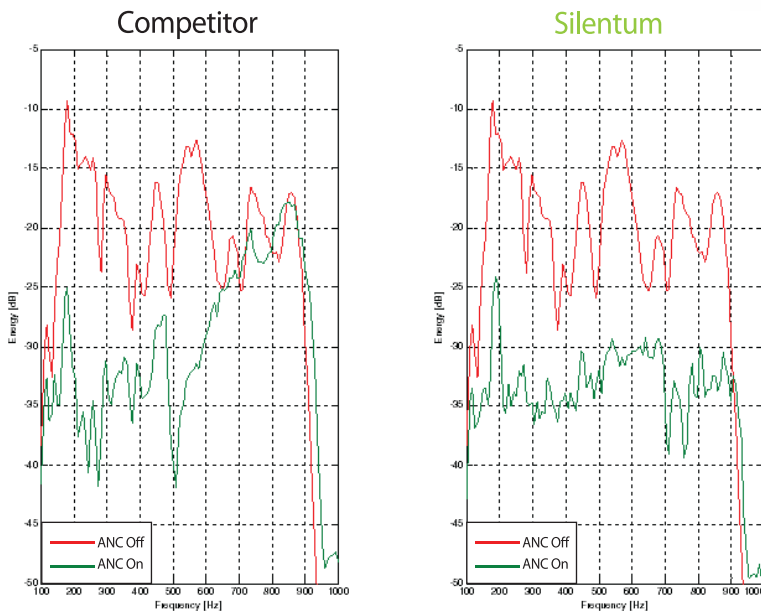
Silentium is a leading innovator in the field of embedded Active Noise Control (ANC). Silentium's "Silence in a Chip" (the S-Chip™) ANC solutions - contain unique cutting edge technologies that are embedded by product makers (OEMs & ODMs) through design, in a wide range of Noisy products. Silentium is also introducing its Quiet-Bubble™ (a Zone of Silence), while addressing a variety of huge markets. Silentium is for Acoustics what Intel® is in the world of Computing.

Recently Silentium introduced the Quiet-Bubble™ family, a concept that was developed at Silentium in the last few years. Quiet-Bubble™ technology belongs to a field of Zone-to-Zone ANC applications. Quiet-Bubble™ technology reduces the disturbing noise no matter what the sources are. The idea is to capture the ambient noise of your environment and creating a quiet zone. The method is to synthesize the physical characteristics of the unwanted noise field in desired zone of quiet, this is achieved by a multichannel algorithm allows controlling the sound field produced by loudspeakers array.

QB3™ is a compact acoustic source that capable of creating spatial noise reduction in a significant zone, independent of the noise sources spectrum and direction, while it is located at a certain location in the



room. The figure on the left presenting a quiet zone (defined by two dashed red circles) created by a compact multi input acoustical source while the unwanted sound field arriving from 50 different directions. The effectiveness of QB3™ was already evaluated by spatial ANC experiments, as well as by acoustic pattern simulations. A noise reduction of 10 dB(A) was measured at a 60 cm by 50 cm zone, at an experiment of attenuating noise.



QB1™ is Active Noise Reduction system for headset, it consist of two loudspeakers, 2-4 microphones and a DSP based controller.

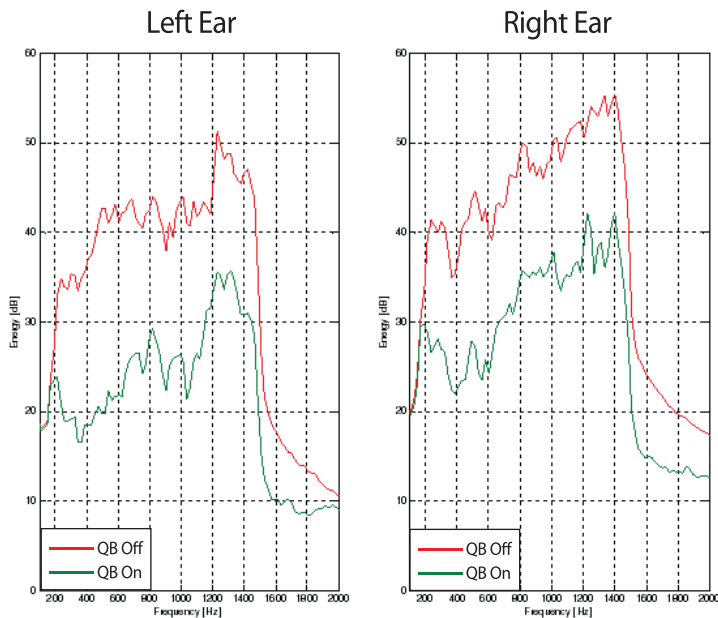
The QB1™ system is designed to serve as a building block for a wide range of applications, including aerospace and military ones.

The superior of QB1™ technology vs. competitors embodied in a noise reduction of high frequencies as can be seen on the figure. While it is typical for ANR headsets to reduce noise effectively up to 500Hz , QB1 technology introducing noise reduction up to 1KHz. When measuring the ANR performance using 100-1000Hz noise source the following noise reduction can be reported:

~14 dB(A) by applying QB1™.

~6dB(A) by applying a competitor technology.

QB2™



QB2™ is a headrest embedded with Active Noise Reduction system. it consist of 2-4loudspeakers, 4- 8 microphones and a DSP based controller.

The QB2™ is an noise reduction solution introducing a personal quiet zone around passenger's head. The system can be integrated within the headrest and seat back to allow quieter interior environment including airplane, vehicle, train seats as well as home armchair.

QB2™ technology delivers active noise reduction in a range of 100-1500Hz, which enables the user to benefit from a same noise reduction achieved by wearing an active headset but with out the need wear a headset.

Typical performance achieved by QB2™ are demonstrated in the figure, 14 dB(A) of Noise reduction were achieved at the passenger's ear , while about 10dB(A) of noise reduction archived with reasonable spatial variability in a frequency range up 1500Hz.

