

RESOUND LINX²: BETTER SPEECH INTELLIGIBILITY AND MOST ACCURATE NOISE REDUCTION

ReSound LiNX² is proven to deliver as much as 30% better speech intelligibility than other premium hearing aids

- Hearing impaired individuals require better signal-to-noise ratios (SNR) to understand speech in noise than normal hearing. The worse the hearing loss, the more improvement in SNR is required¹.
- Some premium hearing aids, like ReSound LiNX², use bandsplit directional processing to improve sound quality and situational awareness when in directional. At ReSound we call this “Directional Mix” as we are mixing omnidirectional and directional.
- ReSound is the only manufacturer to individually prescribe the Directional Mix bandsplit frequency.
- It has been shown that increasing the Directional Mix incrementally improves directional benefit – on average, a 2 dB boost in directional benefit was observed for the highest Directional Mix compared to the bandsplit frequency used in other premium hearing aids². A 2 dB improvement translates to 30% better performance. Higher Directional Mix settings are prescribed for individuals with more severe losses – those who need the most help!

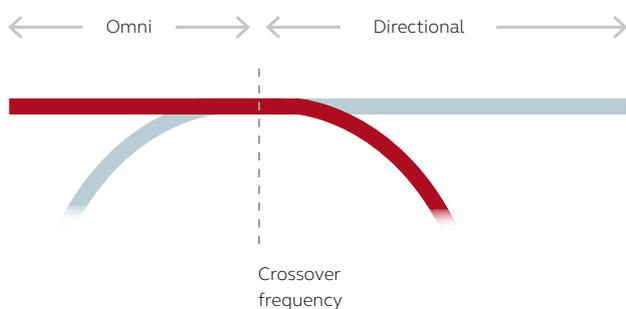


Figure 1. Directional Mix applies omnidirectional processing to low frequencies and directional processing to high frequencies. This provides sound quality that is equivalent to the sound quality of an omnidirectional response. The crossover frequency is individually prescribed.

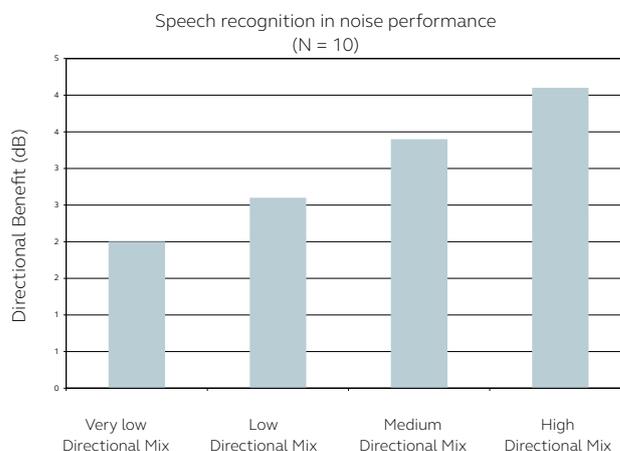


Figure 2. Directional benefit increases as the Directional Mix setting is increased. Up to 30% better speech recognition in noise is possible compared to bandsplit directional systems which do not customize the crossover frequency. This is important for those with more severe hearing losses.

Since 2007, ReSound has applied directionality in a unique way that opens up sound and avoids “tunnel hearing”

- Directionality is shown to be beneficial in the lab, but users have traditionally not experienced these benefits to the same degree in real life.
- ReSound introduced a strategy for fitting directionality that supports binaural processing and reduces technical and perceptual drawbacks of directionality.
- ReSound has continued to follow this path, while others have focused on maximizing directional performance in artificial test situations³.
- The benefits of the ReSound approach are improved hearing in noise, maintained ability to hear sounds in the environment (situational awareness), and superior sound quality⁴.

The industry's most accurate noise reduction

- Digital noise reduction lowers gain in frequency areas with poor SNR. It has the potential to make listening less effortful. However, it has been shown that noise reduction systems differ in their perceptual effects on such dimensions as sound quality and reduction of annoyance^{5,6}.
- Noise reduction systems in hearing aids are very different in how fast they work, when they turn on, and how they affect different signals, including speech and speech babble.
- “Accuracy” means that the noise reduction can reduce the background noise spectrum in real time with minimal impact on speech. The pattern of noise reduction should match the background noise to be accurate.
- NoiseTracker II has been shown to be the most fast-acting compared to other premium hearing aids, and to be effective even in the presence of speech babble consisting of as few as 2 speakers⁷.
- ReSound measured the accuracy of the noise reduction of four premium hearing aids, as well as the NoiseTracker II system by subtracting recordings of speech in cafeteria noise with noise reduction off and on. Results were compared visually and mathematically to the original background noise spectrogram, which captures the dynamic behavior. ReSound showed the greatest similarity in the noise reduction pattern to the actual background noise⁸.

- In a study aimed at defining metrics to describe noise reduction systems, Connor⁹ also compared noise reduction in four premium hearing aids with NoiseTracker II. Speech-in-noise at a positive SNR was presented, and it was observed that NoiseTracker II more closely followed the waveform of the input signal in its noise reduction pattern than other systems.

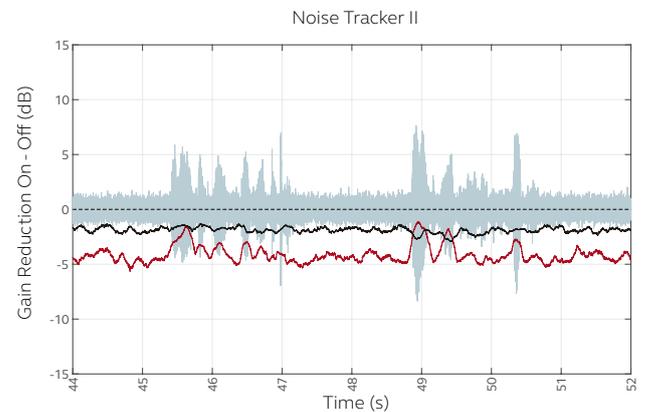


Figure 3. The noise reduction pattern (red line) of NoiseTracker II closely and accurately follows the speech and noise input. Less noise reduction is applied for speech peaks, and more is applied during pauses in the speech. Other noise reduction systems are less accurate in reducing noise. For example, the blue line shows the effect of another system on speech and noise. Virtually no noise reduction is applied at all when speech is present in the signal⁷.

References

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