



*Electrical Engineering Seminar Series &
Dallas Chapter of IEEE Signal Processing Society Present*

A Clinically Feasible Method for Estimating Sound Pressure Level at the Eardrum for Hearing Aids

**Dr. Tao Zhang
Starkey Laboratories, Inc.**

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ECSS 2.102 (TI Auditorium)**

For fitting hearing aids in a clinic, it is important to determine the delivered sound pressure level (SPL) at the eardrum over a wide frequency range. But it is unsafe and impractical to measure the SPL directly at the eardrum. An indirect estimate based on a SPL measurement away from the eardrum is often needed in practice. Furthermore, it is highly desirable that such a method doesn't require extra accessories and extra calibration steps in the clinic.

In this study, a method based on a lumped element model of the hearing aid, ear canal and middle ear was proposed. The model parameters were estimated based on the SPL measurement away from the eardrum. The SPL at the eardrum was estimated using the model. To evaluate this method, an in-the-canal hearing aid was built for each of nine participants. For each participant, the SPLs in the ear canal and the eardrum were measured simultaneously. The model prediction was compared with the measured SPL at the eardrum. The result was discussed with the implications for clinical applications.

Tao Zhang manages the signal processing group at Starkey Laboratories, Inc. He holds a B.S. degree in physics, a M.S. degree in electrical engineering and a Ph.D. degree in hearing science. His research interests include signal processing algorithms for hearing aid applications, ultra low power, real-time embedded systems, acoustics and psychoacoustics.

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