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A special hearing aid with high directivity: the hearing glasses

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It has been a challenge for many years to develop and design a hearing aid that has such a high directivity that a considerable improvement of the speech intelligibility is reached under noisy or reverberant situations. It has been widely acknowledged that the best way to improve the speech intelligibility under these conditions is indeed by making the hearing aid directive, but a problem with normal hearing aids is that they do not have space enough for a sufficient number of microphones over a length that is needed to make such a design possible.

For that reason a special hearing aid has been developed in which the arms of a pair of spectacles are used to house the microphones and based on this idea an optimized acoustic beam forming method has been developed. Normally this method is applied separately for both ears.

It has taken a long time before these ideas could be realized because high speed and low energy DSP techniques are required for these beam formers.

At present the hearing glasses have been realized and are on the Dutch market now for about a year.

In this paper results are presented where theoretical directivity patterns of the hearing glasses are compared with physical measurements under anechoic and reverberant conditions. The influence of the human head has also been investigated, both in the far field and in the near field. The near field response is especially important in relation to feedback problems that may occur due to sound that is radiated back from the venting of the ear piece to the microphones.

Our results show that a high average directivity index of 8 dB is reached in combination with a low noise sensitivity. This result is obtained under undisturbed free field conditions. The influence of the human head reduces the directivity index to 7 dB, which is still very high as compared to normal directive hearing aids.

Literatur:

I.L.D.M. Merks, \

