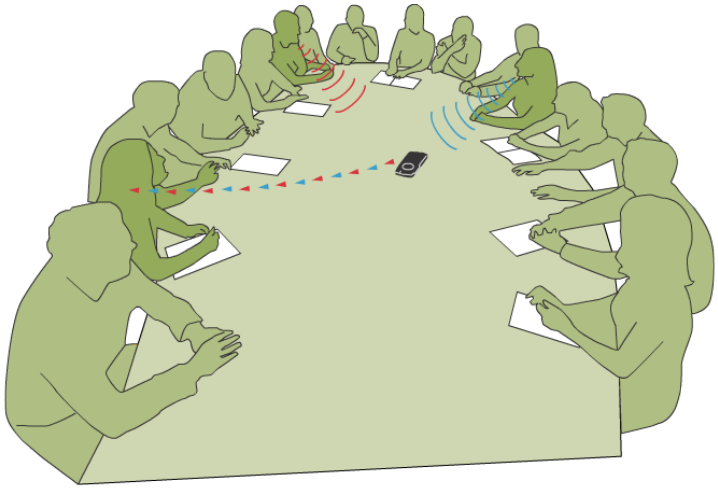
Comfort Audio
HEAR THE FUTURE

Description of "Distance" sound demo set up:



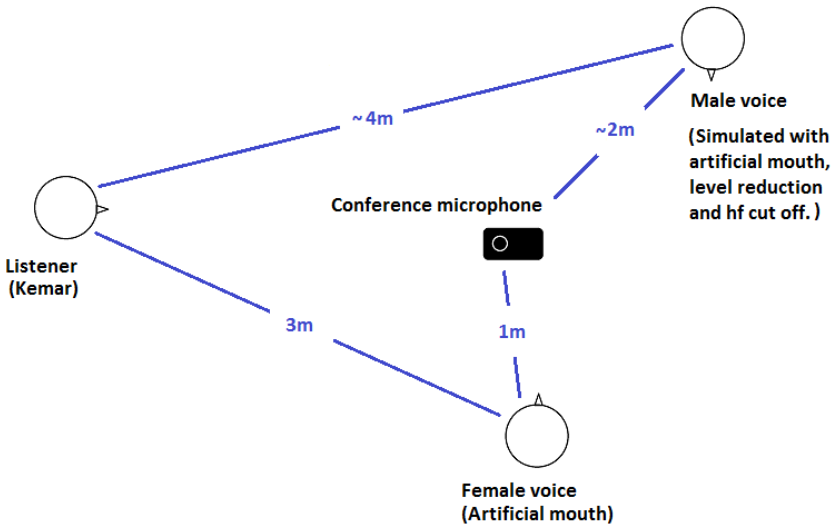
The recordings have been made with the exact products presented in the demo.

To show the effects of acoustical environment in this situation the recordings have been made in an environment with some acoustical reverb but with low background noise. The background noise level was approximately 25dBA during recordings.

For the recordings Kemar head and torso have been used to create the most natural pick up of sound.

In the cases hearing have been used it has been fitted to Kemar and recorded and the output has been recorded this way.

Positioning of products, sound sources and microphones during recording:



The voice level for the female person has been set to 65dBA at all tests.

The male voice has been presented using the same artificial mouth as the Female voice but with reduced level and a high frequency cut off from 5 kHz by 20dB/ octave.
This is done to represent 4meters distance and a slightly more turned head that you would expect to commonly happen in this situation.

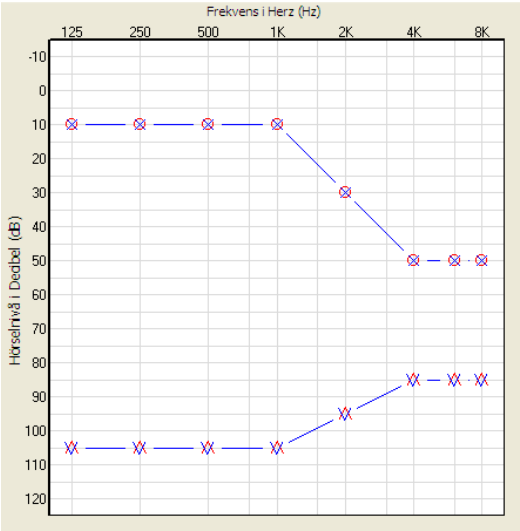
Conference microphone settings: Large omni mode with PSE (Perceptual speech enhancement) and PSE compensation level set to zero.

For recording normal hearing with Conference Microphone, closed headphones have been used covering the Pinna on Kemar.

After recording all recorded sounds have been adjusted for microphone correction level for the used Kemar microphones.

The same sound filtering has been used for recordings with and without Conference Microphone.

For the possibility to listen with hearing aids and a simulated hearing loss two equal standard model hearing aids of good quality have been fitted according to the audiogram below.



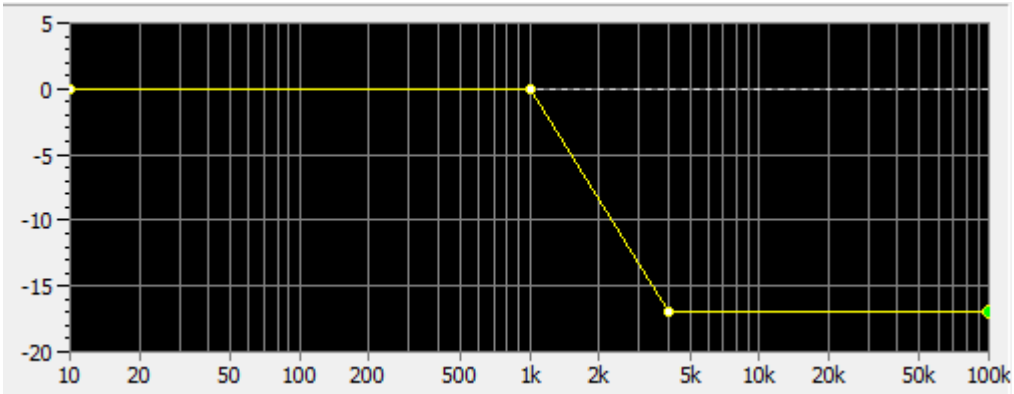
The manufacturers recommended occluded fitting with experience level set to maximum for user have been used, resulting in the following gain settings:

Alla	250	500	1k	1.5k	2.5k	5k
MPO	79	88	94	97	97	102
Stark	1	2	1	1	0	0
Måttlig	1	2	1	1	0	0
Svag	1	2	2	6	11	15

Stark = Loud
Måttlig = Moderate
Svag = Weak

The sound demo have been created only to show the effects of using a conference microphone, and because it is impossible to create a true simulated hearing loss we made a compromise to make it possible for a person with normal hearing to get a hint of the great possibilities of using Conference Microphone DC10 or DC20 together with hearing aids.

The recordings have been processed with correction data for the Kemar microphones and then adjusted for a hearing loss simulation only by adjusting the frequency response with the filter below:



The same signal adjustments of signal have been made for all recordings with hearing aids.

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Equipment listing:

Comfort Digisystem product: Conference Microphone DC20
Comfort Digisystem product: Receiver DT10
Headphones: Sennheiser HD280 Pro
Hearing aids: Oticon Ino Pro RITE
Recording microphones: Kemar, G.R.A.S 45BM
Soundcard: RME Fireface UCX
Recording and filtering software: Goldwave 6.57
Artificial mouth: G.R.A.S 44AB