

Comfort Audio: *HearYou*

Wireless FM/DM Solutions



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- CEU Disclosure:

I am an employee of Comfort Audio Inc. I am compensated financially by salary. I have no other financial relationships to disclose.

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Agenda

- Introduction (0-5)
- Comfort Audio History (0-5)
- Why wireless technology? (5-10)
- (SST) SecureStreamTechnology **DM vs. FM** (10-20)
- Why HearYou? (20-30)
- HearYou User Testing (30-40)
- HearYou vs Contego (40-50)
- Questions (50-60)

It all started in 1994

Our four market segments

Working life



School



Private use



Public places



Let's Review:

Why Wireless or FM technology?

- Hearing Aids alone cannot effectively overcome:
 1. Noise
 2. Distance
 3. Reverberation

Noise

- Background noise negatively impacts signal to noise ratio; masking important speech information necessary for understanding
- Adds a extra layer of difficulty in sound localization

Distance

- The greater the distance the poorer the sound quality
- With greater distance the lower the dB SPL reaching the ear
 - Inverse square law: with each doubling of distance there is a 6 dB SPL decrease

Reverberation

- Reflection of sound (especially late reverberation) from hard surfaces in a room can increase the background noise = lower signal to noise ratio
- Examples
 - 1: Brick walls
 2. High ceilings
 3. Bare or tile floors
 4. Chairs with no dampening

Noise + Distance + Reverberation = huh?

- With conversational speech in 60 dB of noise the SNR degrades to 0 dB after only 2 meters.



...Why wireless technology?

- Hearing aids alone cannot effectively solve all issues!
- What can improve SNR?
 - FM/wireless
 - Directional Microphones



SST – SecureStream Technology

SecureStream Technology – what's unique?

- **Our own developed digital radio transmission**
Specially designed and optimized for good speech quality
- **Wide dynamic range (over 60 dB)**
Better speech intelligibility
Ensuring audibility for all speech sounds
- **Digital sound processing and digital transmission**
Steady and robust. Less drop-outs. Eavesdrop secure.



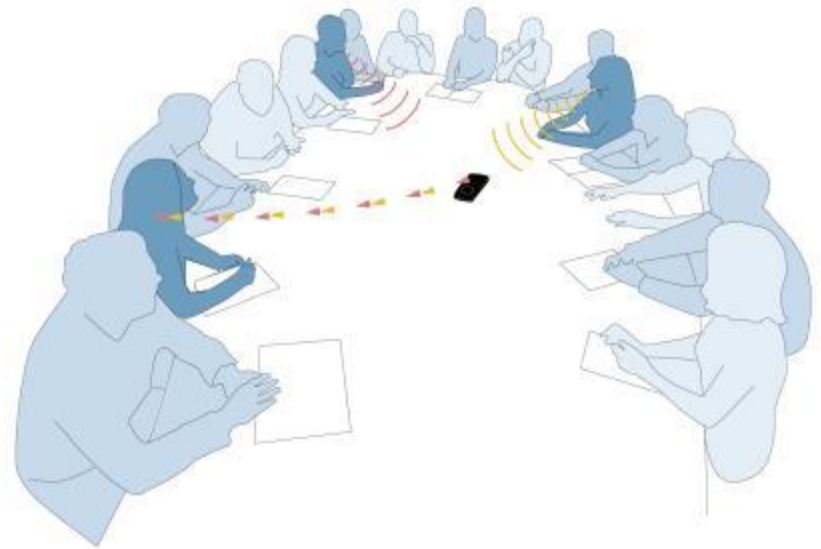
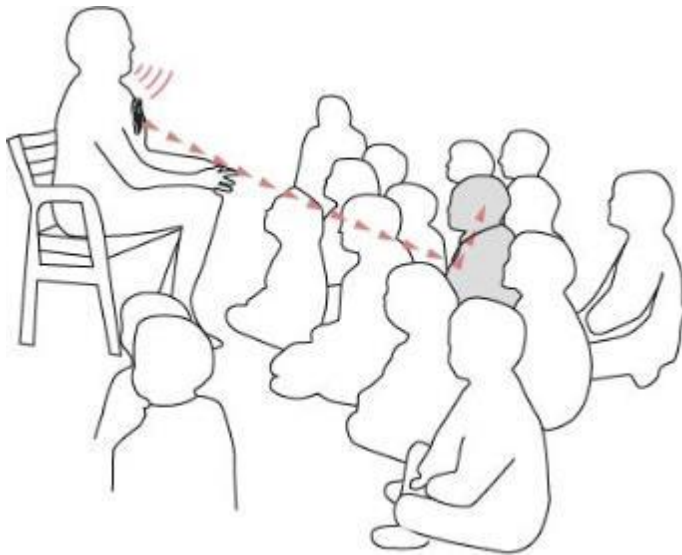
SecureStream
Technology



Comfort Audio
HEAR THE FUTURE

SST, where is it used?

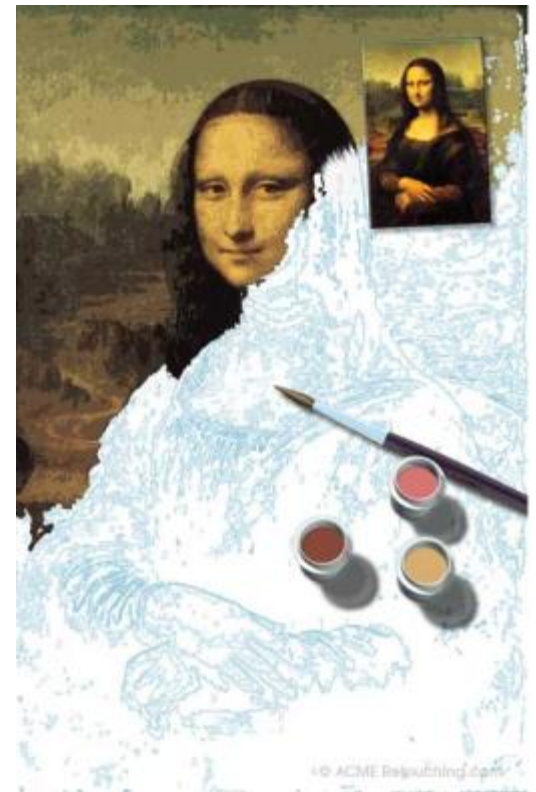
- SST is used in all products in Comfort Digisystem
- Link between the transmitter and the receiver





Digital Modulation

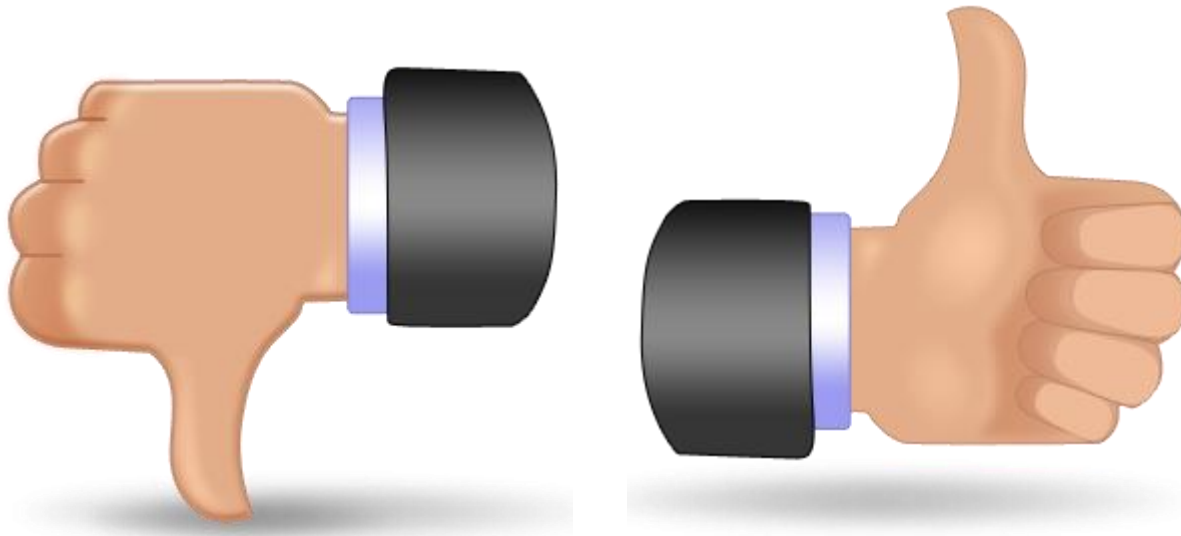
The power of instructions



The power of instructions

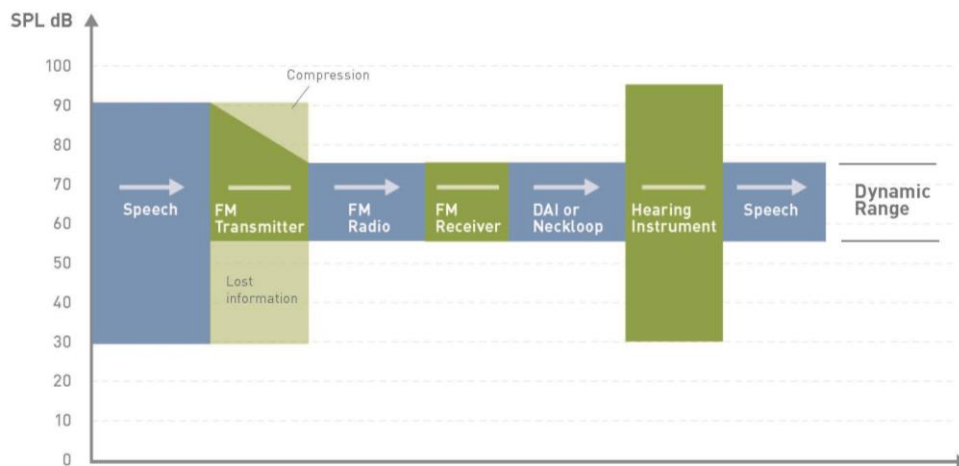


All or nothing

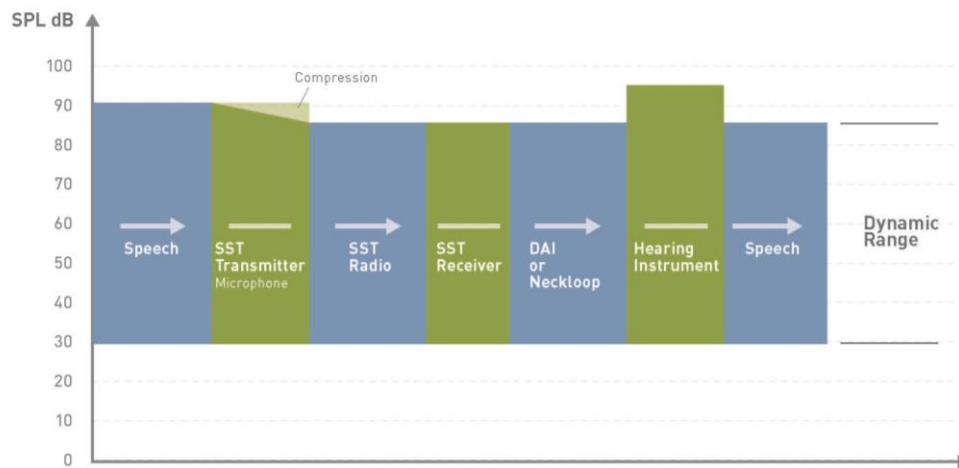


Lost in transmission

FM

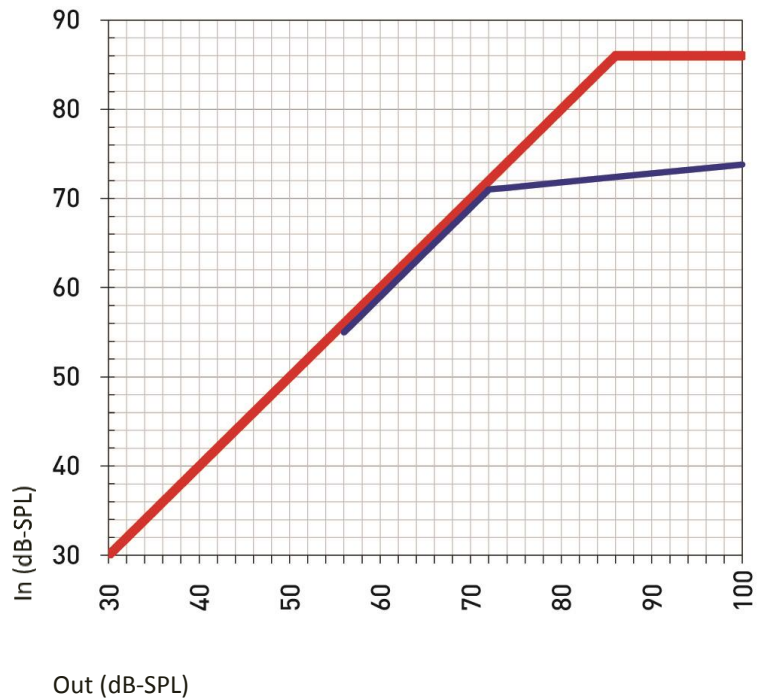


DM

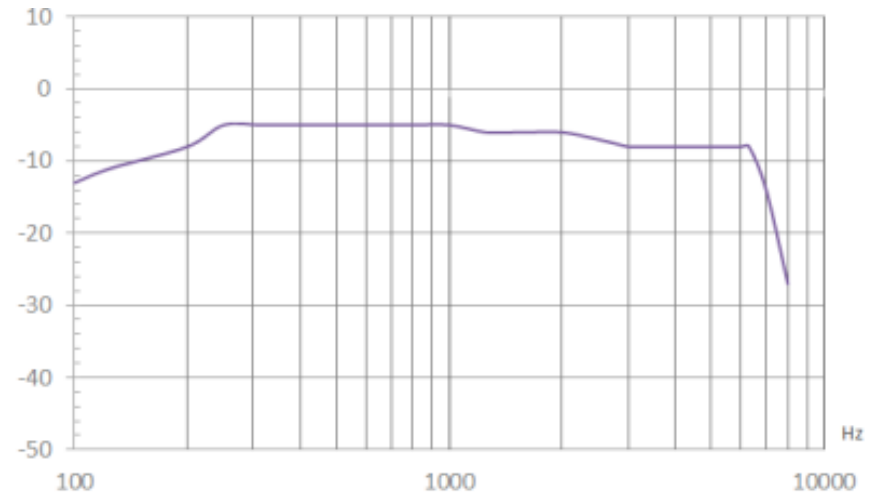


SST

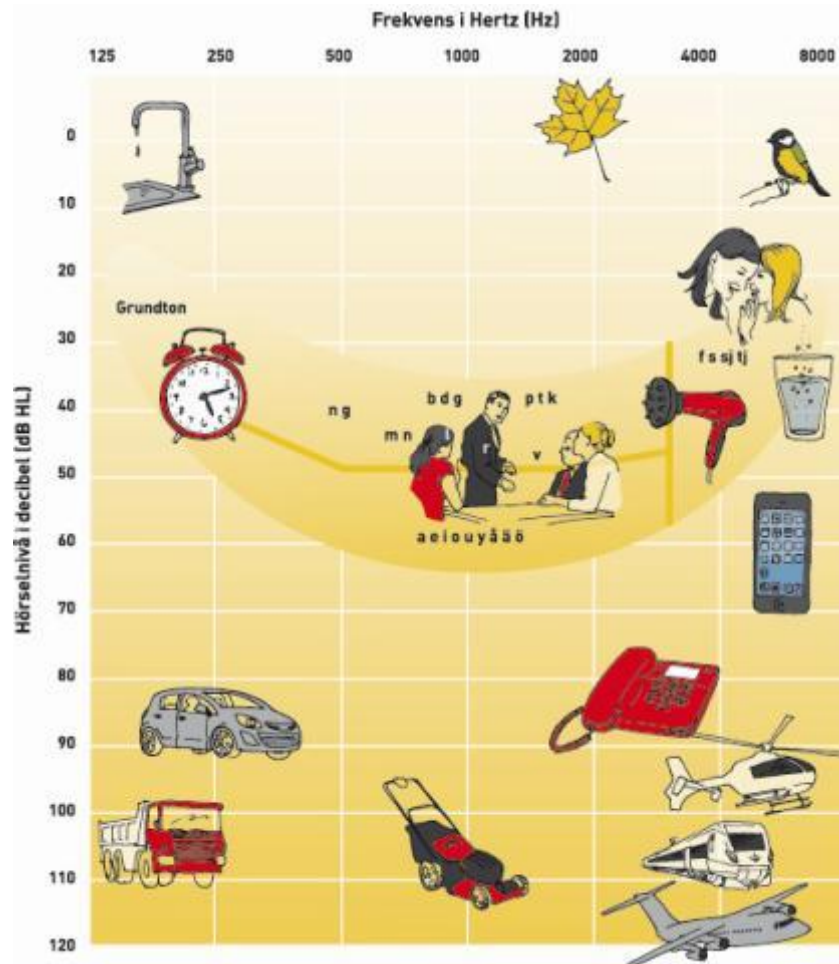
Have it all



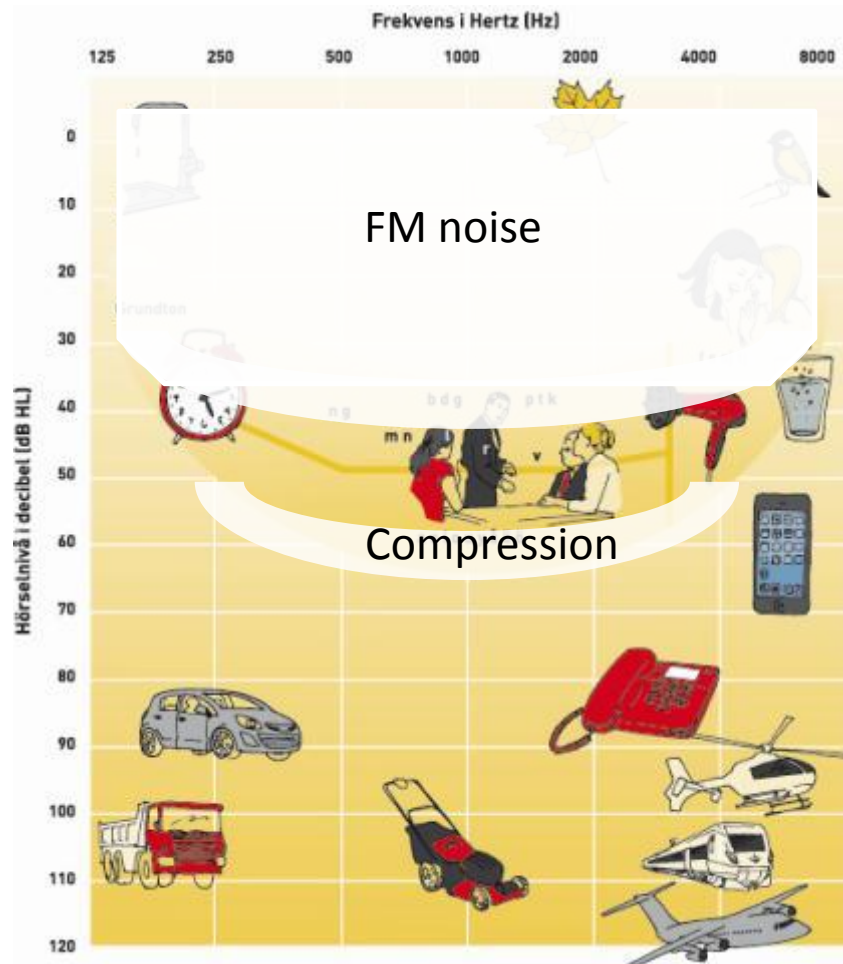
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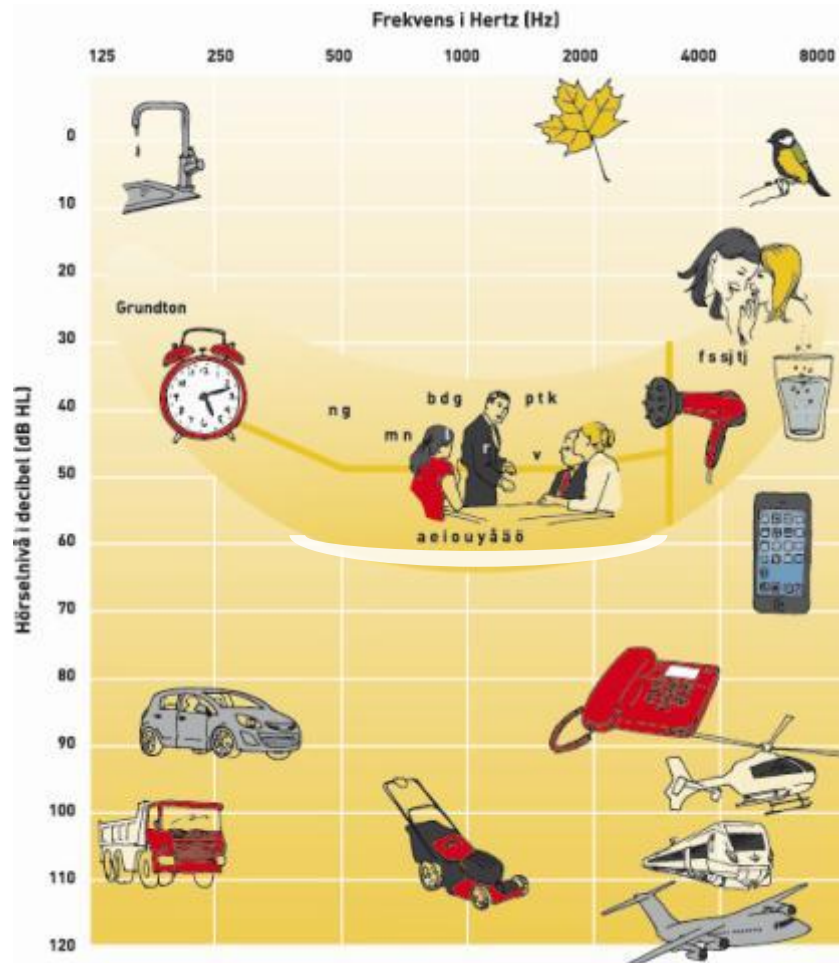
Effects on the speech banana



Effects on the speech banana



Effects on the speech banana



Overview: SST

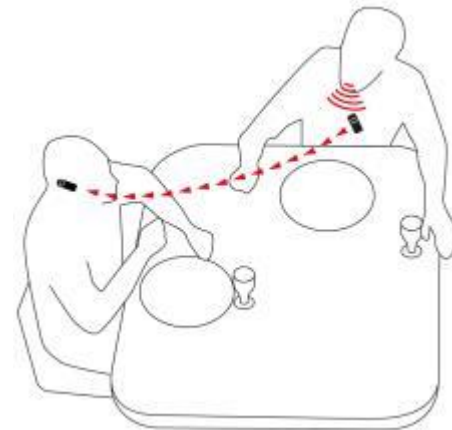
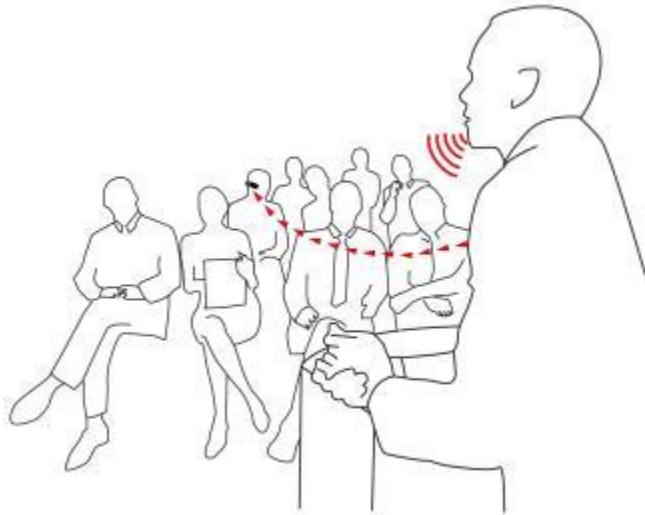
- SNR is crucial!
- Close range = +25 dB SNR
- FM = noise & compression
- SST = low noise and wide dynamic range

HearYou Hearing Set



Why a new hearing product?

HearYou: User Situations



HearYou: Features

Easy to use

- Simple and intuitive

Small & discreet

- Without hearing aid - first step to using hearing products
- “Looks like a Bluetooth headset ”

Unique design



Features continued

- SST, SecureStreamTechnology

Digital radio transmission technology patented by Comfort Audio.

- Wide Dynamic Range
- Large Audio Bandwidth
- Ultra low radio transmission time delay
- Secure against eavesdropping
- Automatic device pairing
- FCS, Free Channel Select
- Very high immunity against EMI, Electromagnetic interference

Technical Specifications

- Transmission range: approx. 30 m (100 ft)
- Frequency range : 904 - 927 MHz (USA)
- Dimensions: 58 x 27 x 14 mm / 57 x 24 x 20 mm
- Weight: 16 g
- Operating time: Up to 6 hours.
- Charging time: approx. 2 hours.
- Batteries: Rechargeable Lithium Polymer 3.7 V DC



Transmitter

Receiver

Volume Control

on/off
button

On/off button



User tests

User demographics:

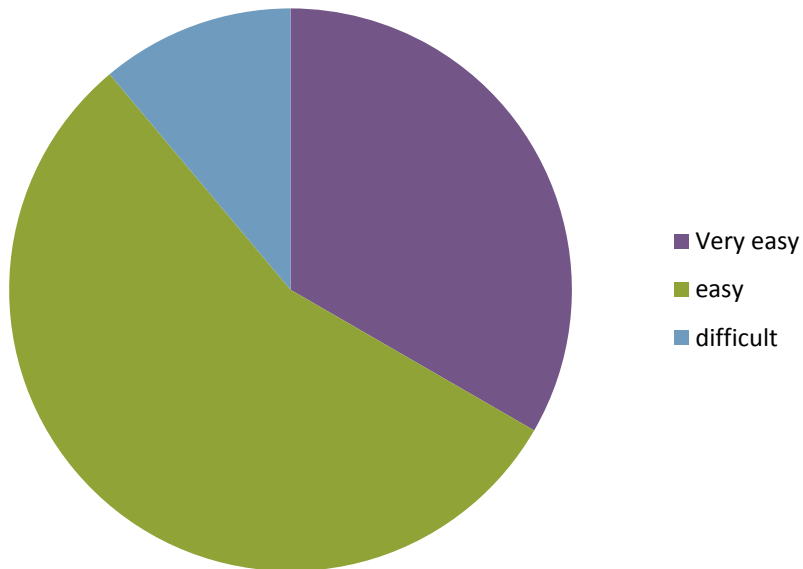
Test person	Age	Occupation	Hearing status, according to themselves
P	60-65		<ul style="list-style-type: none"> • Conductive hearing loss for more than 10 years • never acclimated to hearing aids • candidate for BAHA
K	60-65	Child minder/Nanny	<ul style="list-style-type: none"> • Waiting for a hearing check up, arranged by the union • Three years ago, I noticed that I could not hear as well as my husband
R	65-70	Retired; doing some carpeting work	<ul style="list-style-type: none"> • Last hearing check up: 25-30 years ago • One ear is worse than the other • At my work place, everybody has a hearing loss
J	50-55		<ul style="list-style-type: none"> • Has been told that it seems like he does not hear • Hearing test at work confirms a hearing loss
L	65-70	Retired, voluntary work at a fitness studio	<ul style="list-style-type: none"> • I know that I do not hear everything, but it is not that bad yet
S-Å	60-65	One of the owners of a color shop	<ul style="list-style-type: none"> • I suffer from tinnitus and neurogenic hearing loss, I learned to live with it • Made a try with hearing aids 5 years ago, did not work out at all!
H	60-65	Carpenter	<ul style="list-style-type: none"> • My audiogram from 1978 showed a hearing loss • I got my first pair of hearing aids 2001 • Can't live without my hearing aids but there are still situations where I can not hear
Jo	25-30	Bank clerk, on maternity leave	<ul style="list-style-type: none"> • I am "deaf" on my left ear, and the right one is not so good either • My boss told me to "fix it", to make my work easier; when my husband also told me to do something about it, I forced myself to get hearing aids, best decision this year!

Trial Design:

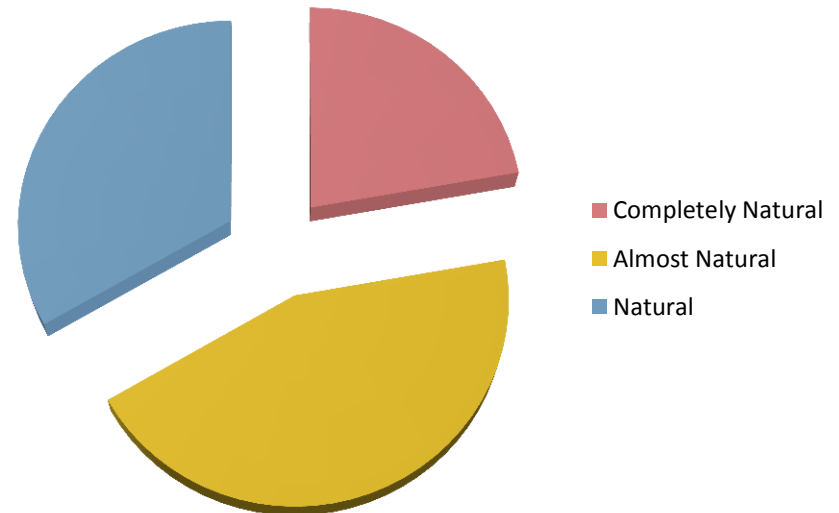
- Interview
- Basic instructions
- Written questionnaire
 - Sound experience
 - Practical issues
 - General concerns
- 7-10 days of testing

Questionnaire: Sound Experience

Is it easy to find the right volume using HearYou hearing set?



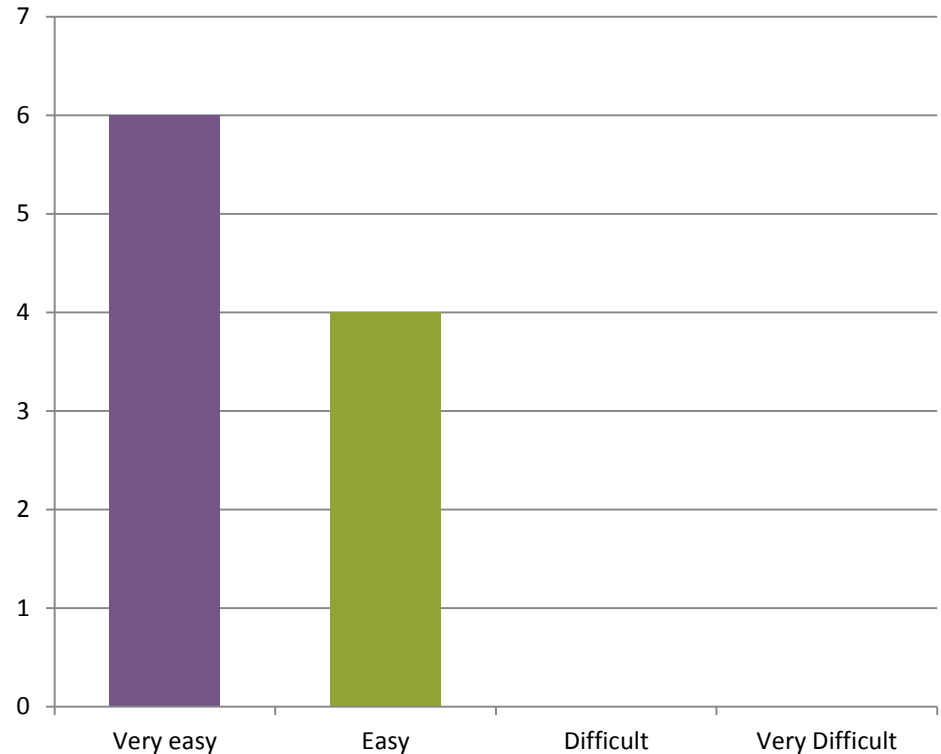
Is the sound natural when using HearYou hearing set?



Questionnaire: Practical Use

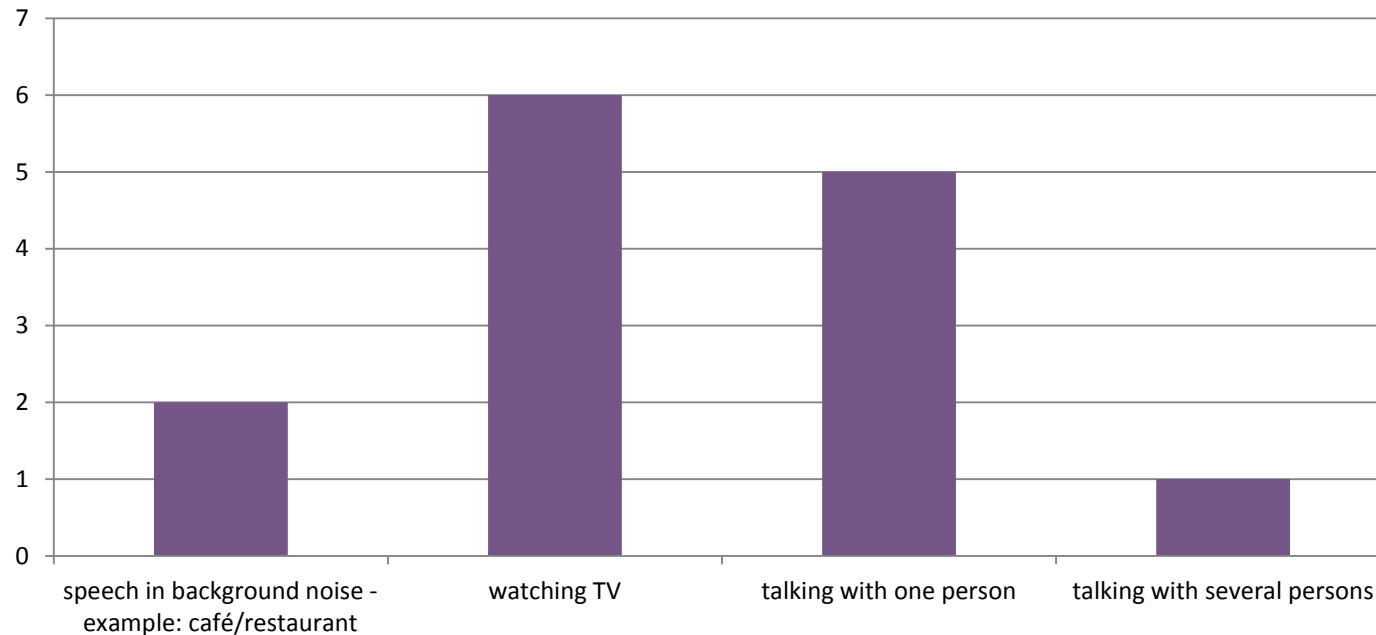
Recharging the products:

No difference in recharging the receiver and the microphone



Questionnaire: Areas of Benefit

In which situations did you have most benefit when using HearYou hearing set?



Questionnaire: User Comments

- I put it on the table and I could hear better when we had dinner with friends
- It was a new life, both for me and my wife watching TV, I did not need to have the volume as loud as before.
- Best way of using it is to put in the baby cradle. I could very fast hear that my son was making noise or waking up.
- I use to sit right next to my son when he sleeps. Using only hearing aids, I don't have a chance to hear him when I leave the room; now it is nice to sit just outside in the sun when he sleeps.
- The ear piece was too big for me, but I still liked it.
- I have used it at work in a shop: I put the microphone on the sleeve of my t-shirt, very easy to hear the customers. Customers thought that my HearYou was a Bluetooth device.
- I do not like the angry green flashing light.
- As a baby watch it is brilliant: I work as a child minder and the small children sleep outside. I put the microphone in the pram and could easily hear from inside when they woke up.

WHAT PRODUCT IS RIGHT FOR MY PATIENT?

Contego vs. HearYou



Comfort Contego:

Digital FM system for an active lifestyle



Use Contego in everyday situations



At a lecture



Talking on the phone



At a meeting



Watching TV

Functions - Receiver



Functions - Transmitter



Comfort Contego: Technical Specifications

Transmission:	Digital modulation with encryption.	Charging time:	Four (4) hours.
Range:	One hundred (100) feet.	Operating time:	Up to twenty (20) hours.
Size:	0.87 x 1.77 x 3.86 inches	Microphones:	Built in - directional and omni-directional.
Weight:	Weight: 2.1 oz.	Frequency range:	904-926 MHz.
Antenna:	Built-in.	Input:	Line in/Microphone.
Channels:	38	Max Output:	<130 dB SPL
Battery:	Rechargeable Li-ion.	Max Gain:	<50 dB

Bill Gates – 29 years old

- Moderate to severe SNHL bilaterally
- Wears Siemens Insio 5 mi ITE with a Telecoil
- Wants to hear kids in backseat of car
- Limited budget
- Wants to hear better in church and work meetings
- Wants a secure connection

Bill Gates

What product should Bill use?

- Easy to use
- Can be utilized with his hearing aid telecoil
- Relatively inexpensive
- Can function in a multitude of environments

Answer:

Comfort Contego



Warren Buffet – age 29

- Normal to mild high frequency SNHL bilaterally
- Refuses to try hearing aids
- Needs to hear better in noisy restaurants and his limousine
- Wants something easy to use
- Very cosmetic conscious
- Needs to hear better at board meetings

Warren Buffet

What product should Warren use?

- No hearing aid connectivity necessary
- Bluetooth-like appearance
- Easy to use, wireless design
- Improved SNR in difficult environments

Answer:
HearYou



Thank you!

Questions?

