

October 24, 2019

Breaking a Law of Physics

Benefits of
OpenSound
Optimizer™

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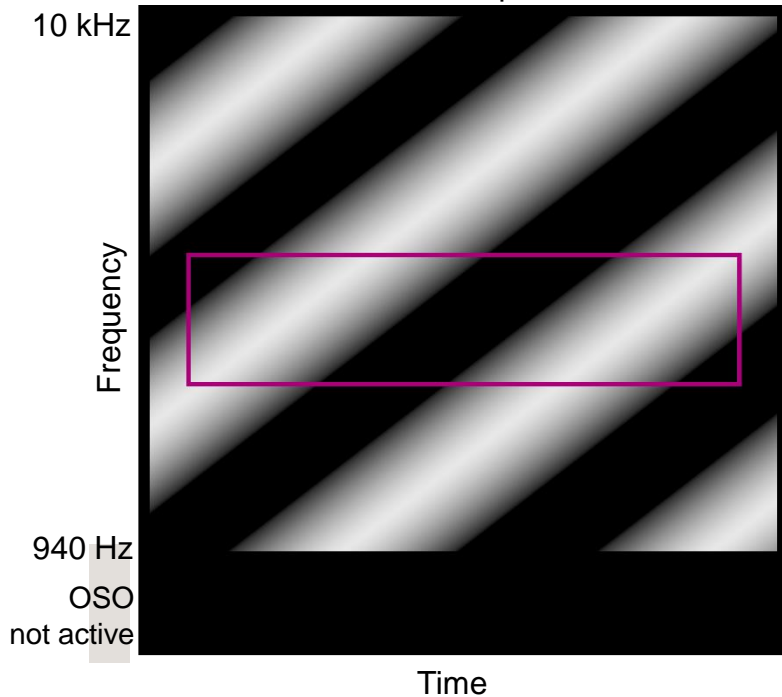
oticon
PEOPLE FIRST

Spectro Temporal Modulations

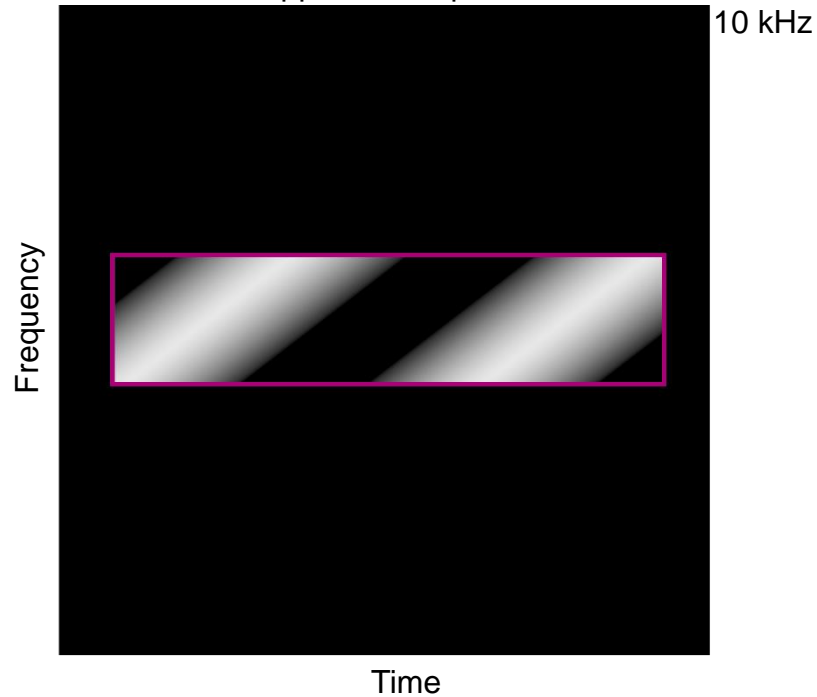
In theory



Basic STM pattern



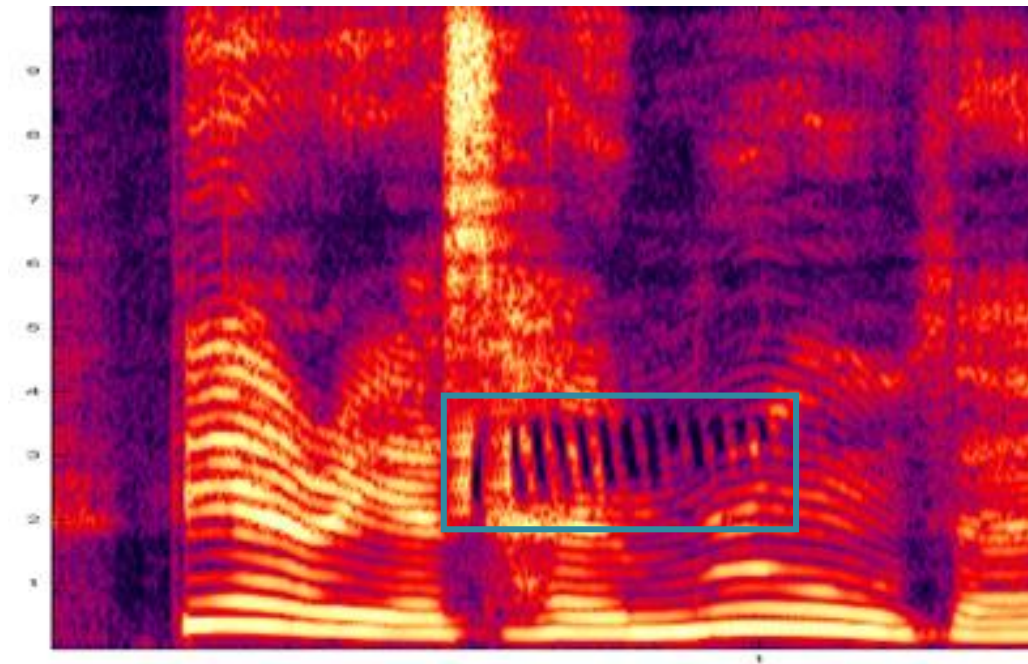
Applied STM pattern



Spectro Temporal Modulation

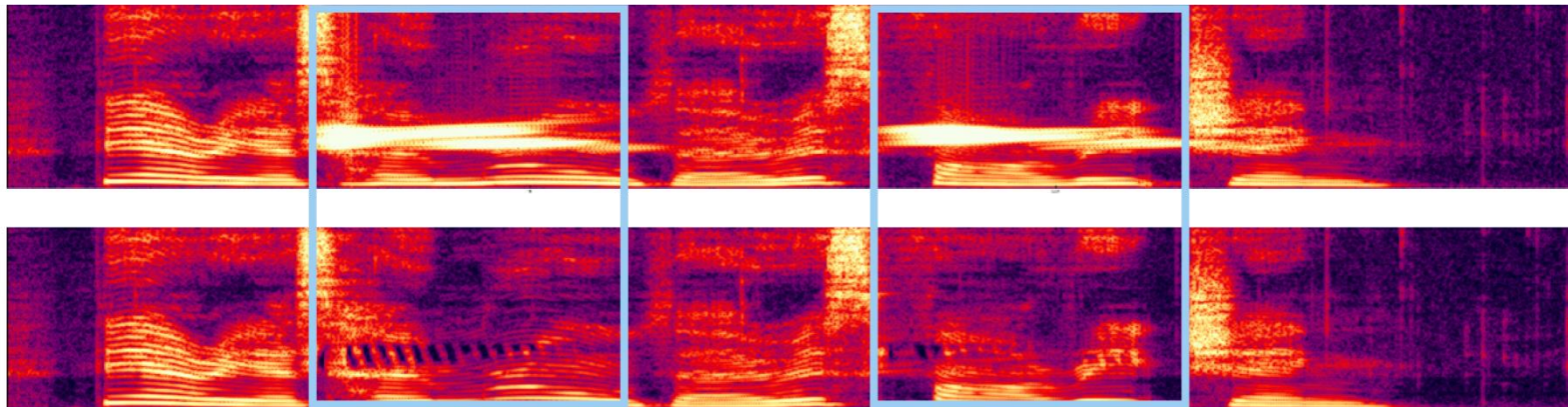


- ▶ Altering between low energy and fully restored gain
 - ▶ Rapidly
 - ▶ Only in affected frequency bands
- ▶ 0 dB loop gain = stable sound
- ▶ 60 ms to detect and prevent audible feedback



OpenSound Optimizer

Live



The area's home-rule,

though, is far-

reaching

How do you test benefit? 1



Optimal gain in static environments

No activity around the hearing aids & no movement in the body



Optimal gain in dynamic environments

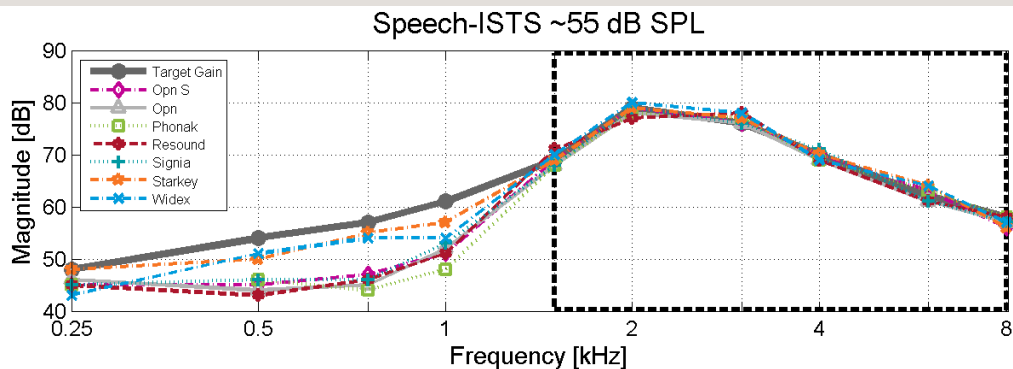
Activity around the hearing aids and/or inside head and neck



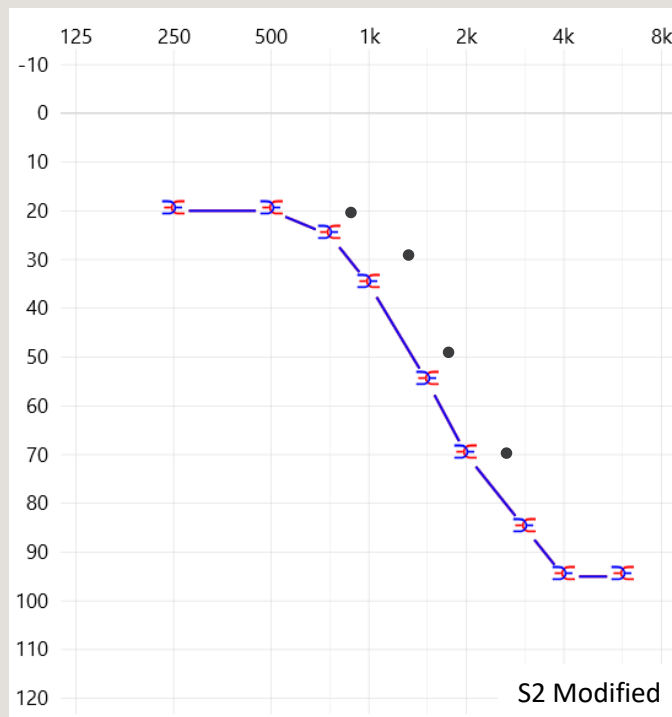
Comparing different hearing aids

What is an accurate way?

- ▶ "Matched gain, matched acoustics" approach
 - ▶ Same openness of ear
 - ▶ Same gain at relevant frequencies



Audiometric configuration



Is the OSO sound annoying?

Internal competitor investigation

- ▶ 5 manipulations
- ▶ FB yes/no?
- ▶ Soft/medium/loud
- ▶ Other disturbing sounds (OSO?)
- ▶ Rate annoyance on scale

Test Device Code: 1

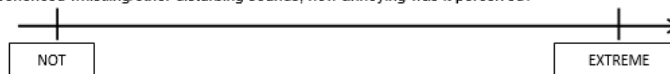
Test Person: _____

1. Put the hearing aid on the ear

- Experienced:

- Whistling sounds (if so: soft, medium, loud)
- Other disturbing sounds
- No whistling/other disturbing sounds

- If you experienced whistling/other disturbing sounds, how annoying was it perceived?

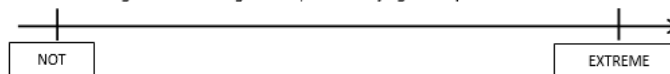


2. Cover the ear with your hand

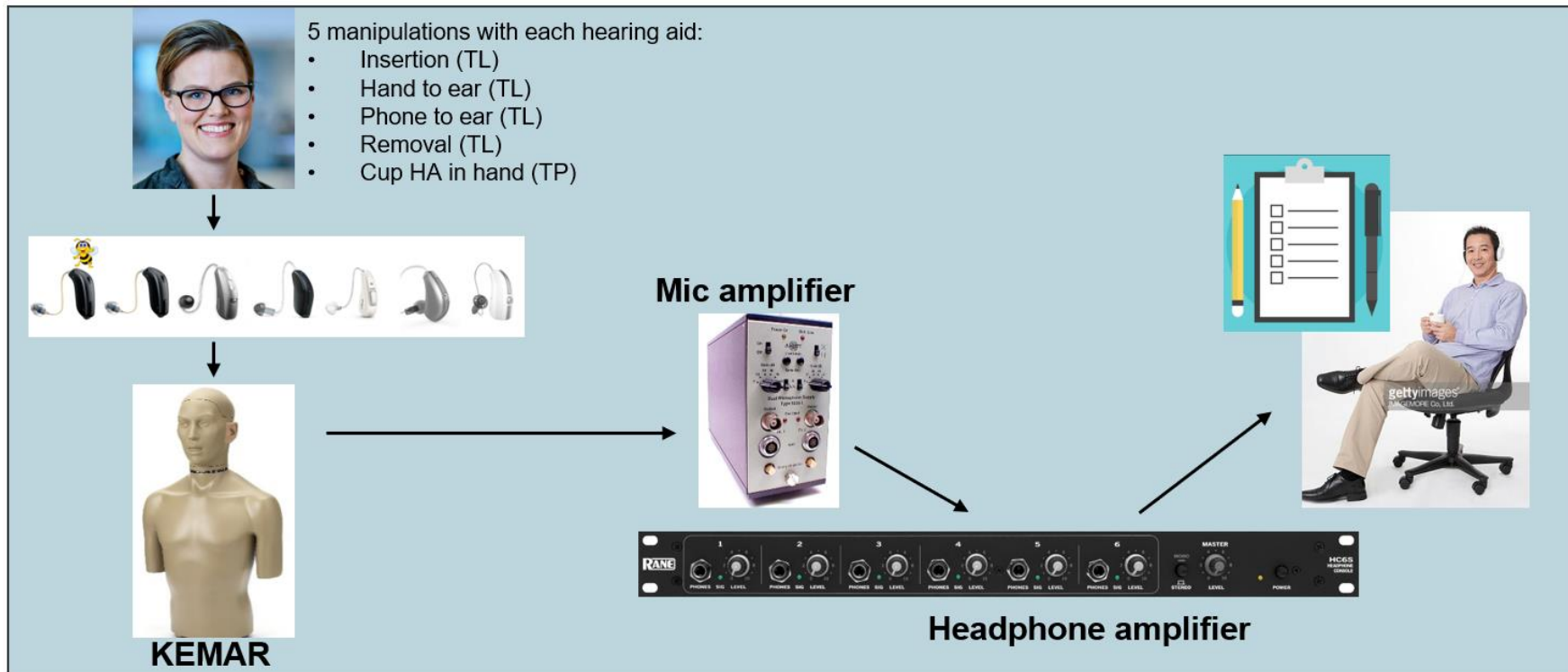
- Experienced:

- Whistling sounds (if so: soft, medium, loud)
- Other disturbing sounds
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- If you experienced whistling/other disturbing sounds, how annoying was it perceived?

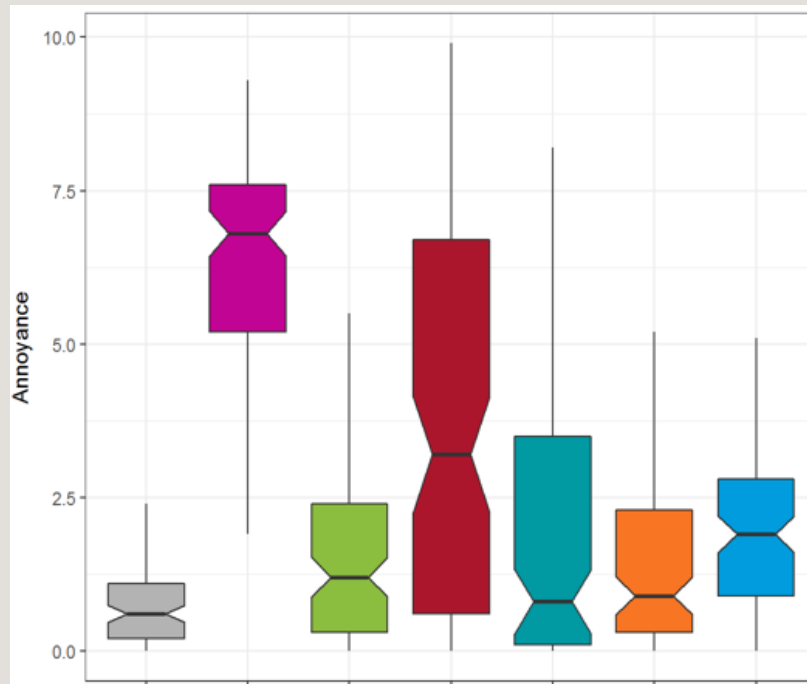


Live feedback performance test



Annoyance

- ▶ Compared to 5 competitors and Oticon Opn, Oticon Opn S had best (lowest) overall annoyance score
- ▶ Oticon Opn vs. Oticon Opn S annoyance rating shows how people perceive traditional feedback versus OSO
- ▶ Take-away: STM can be audible when HA is provoked, but it is not annoying

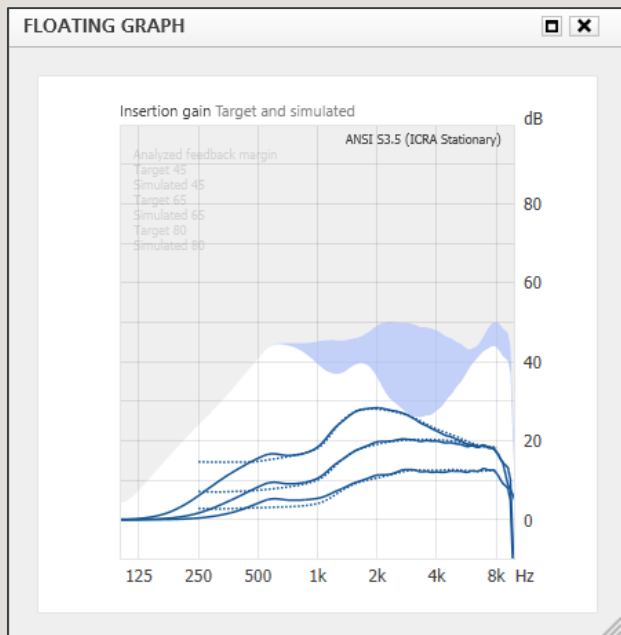


How do you test benefit? 2

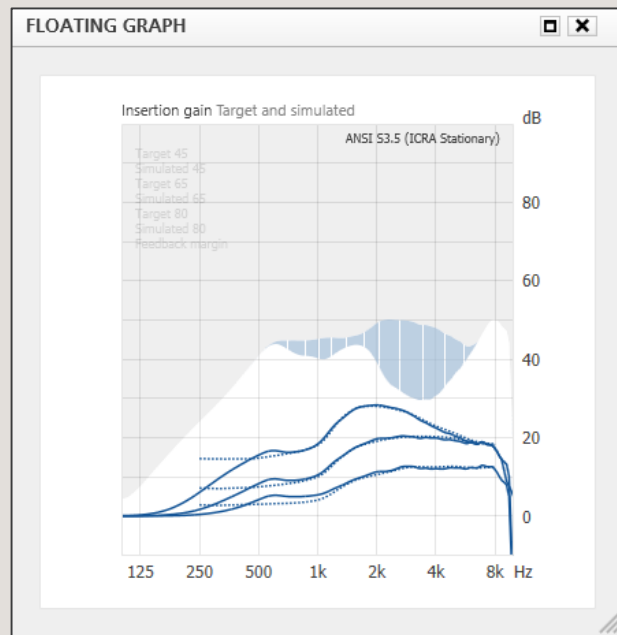
Gain reduction by feedback system

Static situation – no provocation

Oticon Opn



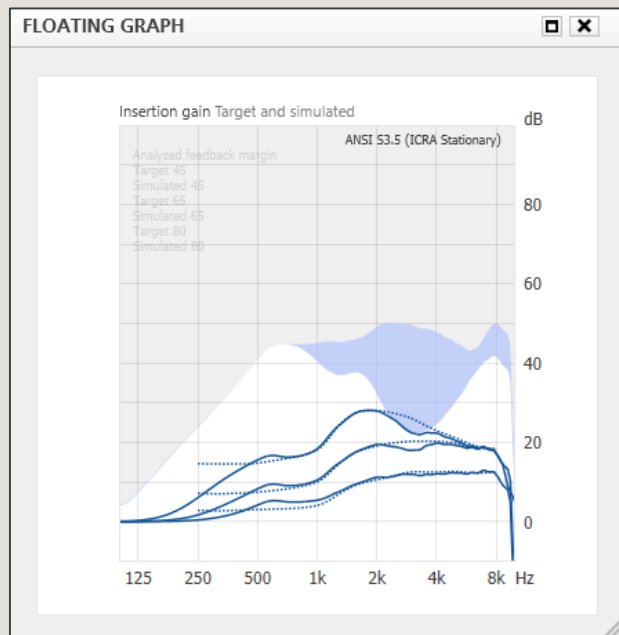
Oticon Opn S



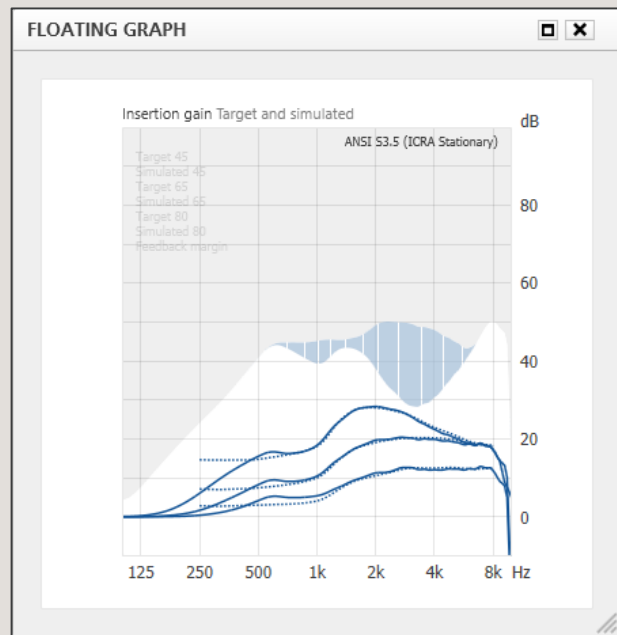
Gain reduction by feedback system

Dynamic situation - biting an apple

Oticon Opn



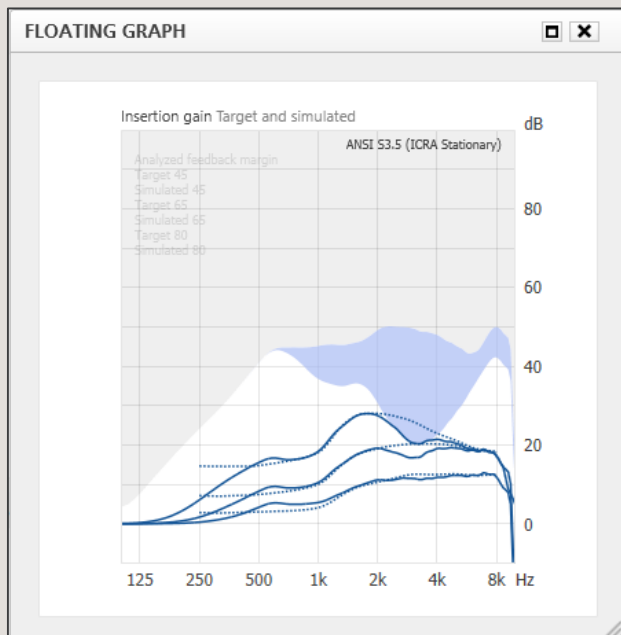
Oticon Opn S



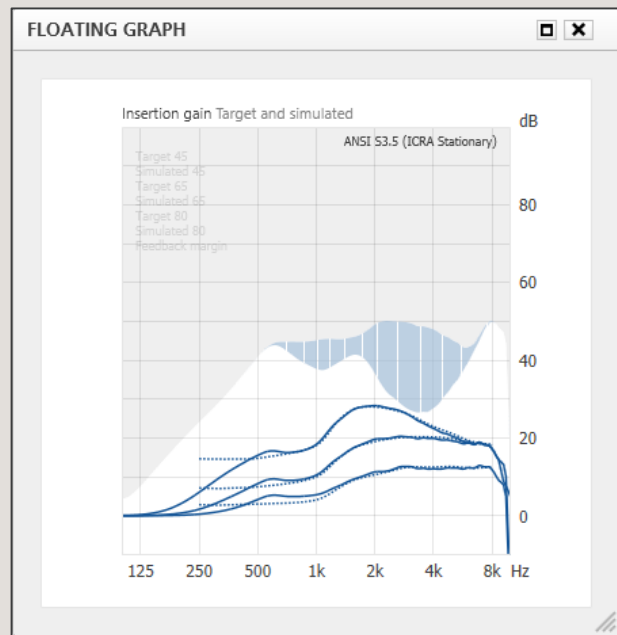
Gain reduction by feedback system

Dynamic situation - wearing a hat

Oticon Opn



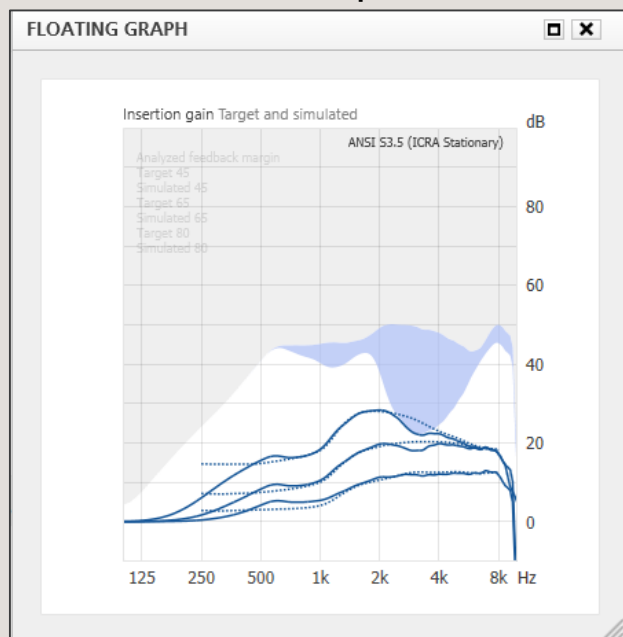
Oticon Opn S



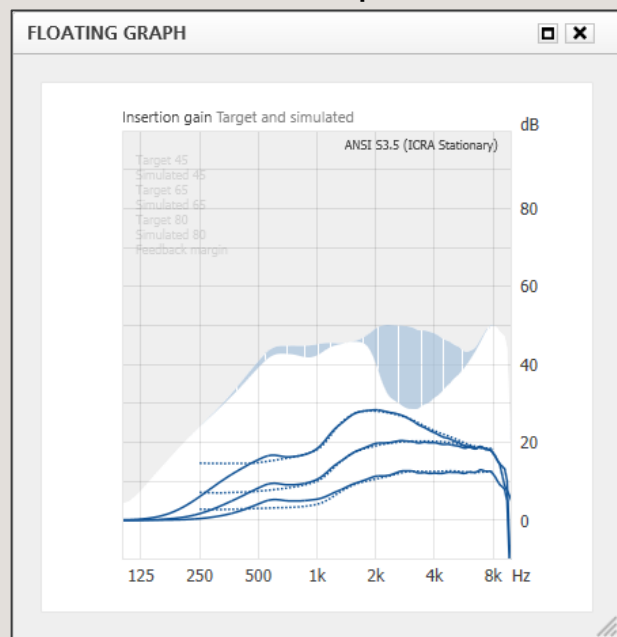
Gain reduction by feedback system

Dynamic situation - standing close to a glass door

Oticon Opn



Oticon Opn S



How do you test benefit? 3



Testing noise, speech & feedback performance at once

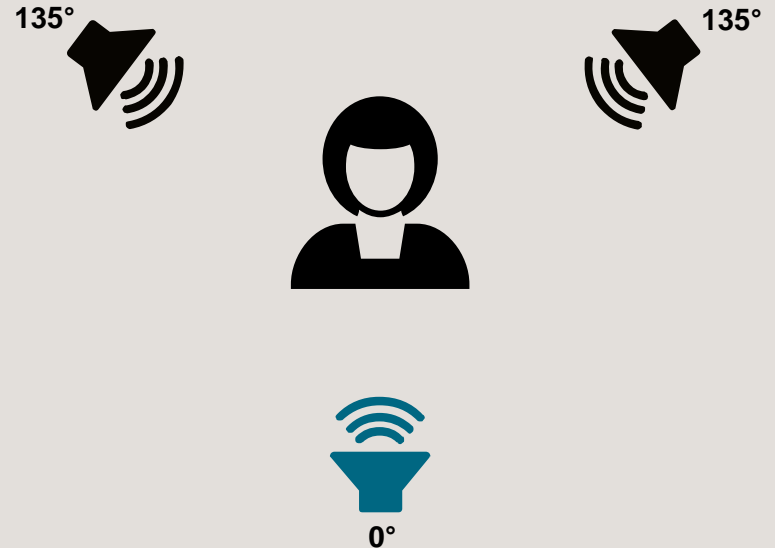
Methods

Test conditions:

- ▶ Front: 70 dB speech
- ▶ Back: 70 dB speech-shaped noise

Hearing aid fitting:

- ▶ Modified S2 audiogram
- ▶ Open domes
- ▶ Feedback Analyser run
- ▶ All hearing aids were gain matched with REM

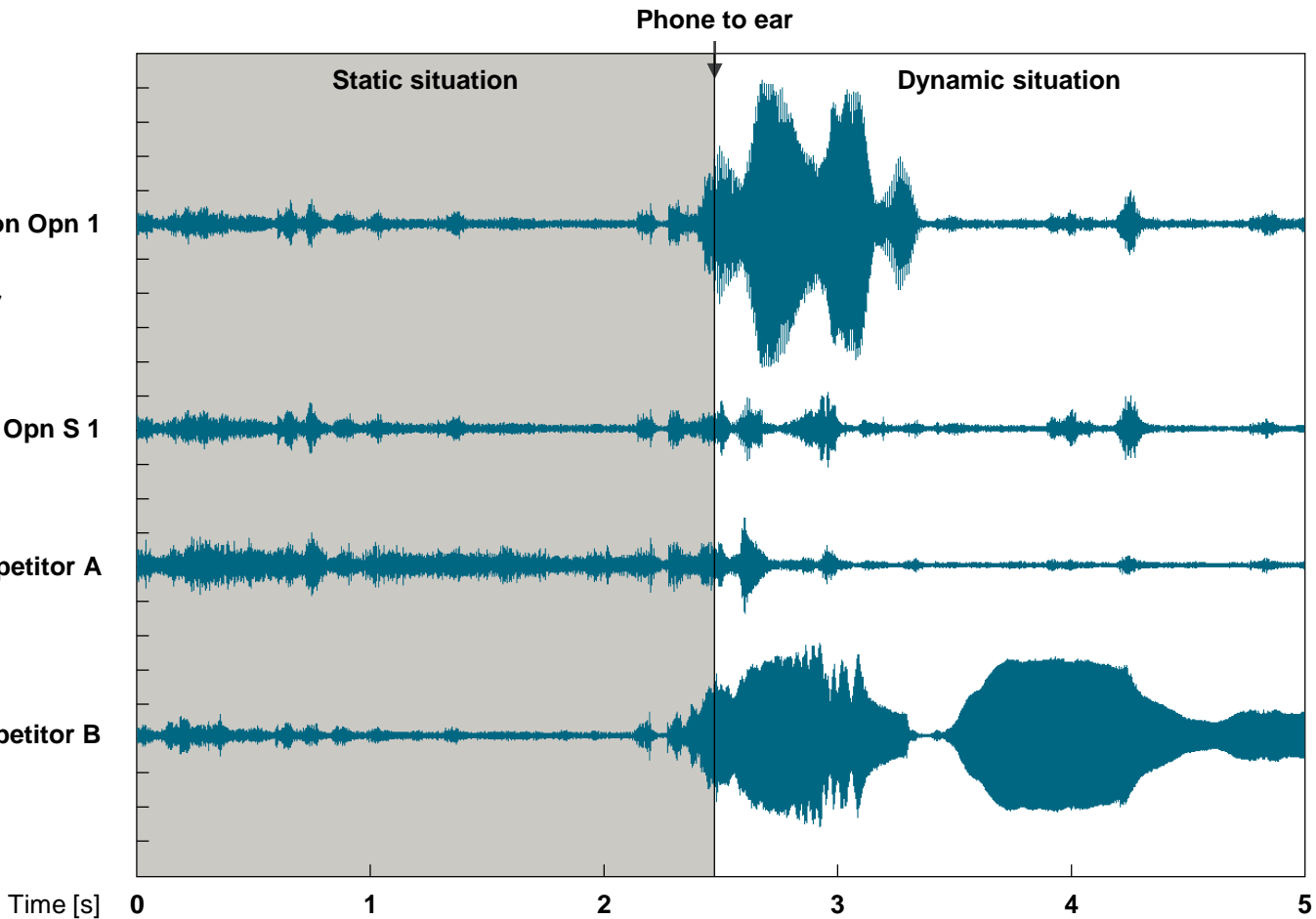


Feedback handling

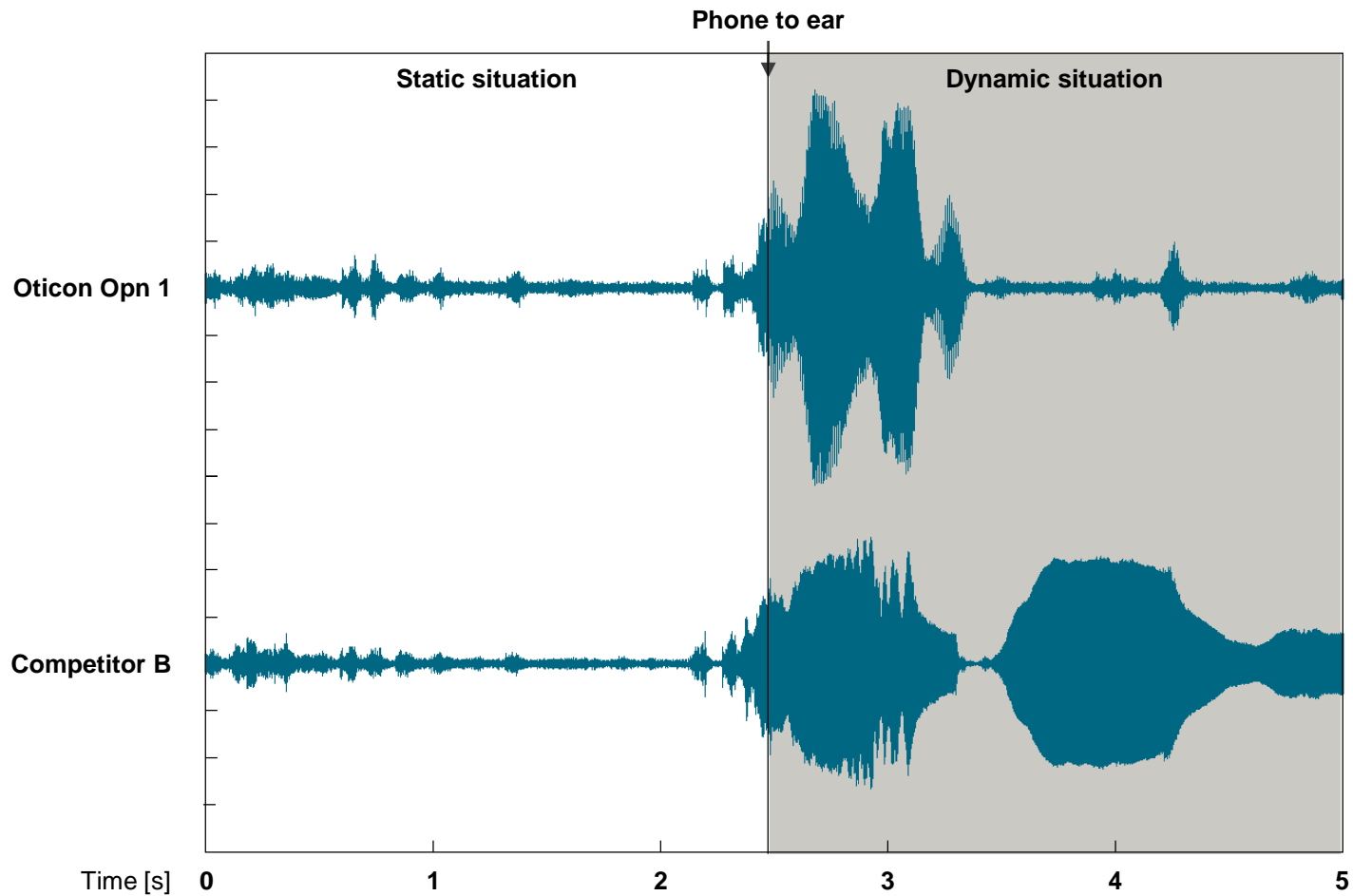
OpenSound Navigator
reduces noise

Noisy signal

Good noise handling



Audible feedback



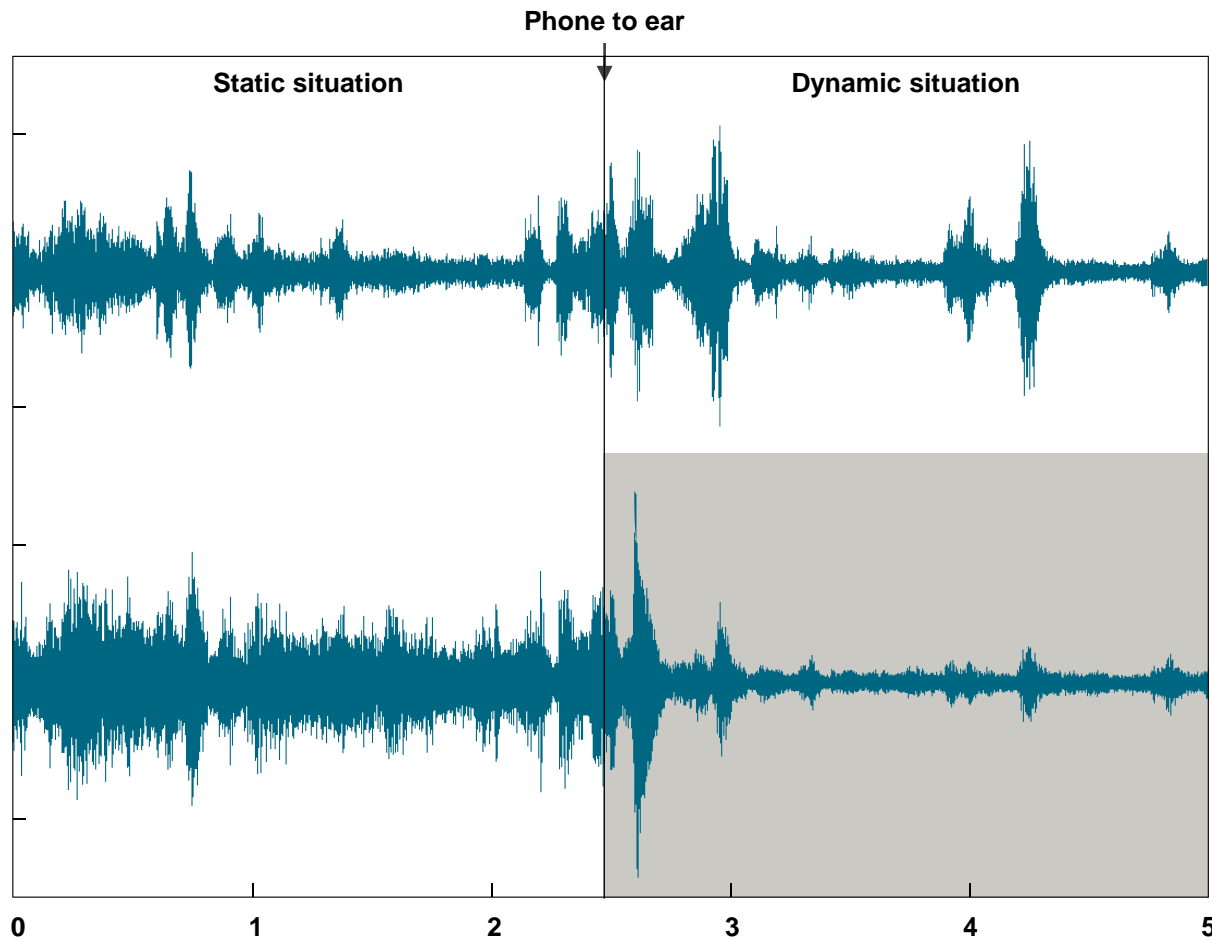
OSO + OSN

Best speech
preservation in noise

Oticon Opn S 1

Competitor A

Time [s]



“No feedback”,
but lack of gain

OSO + OSN

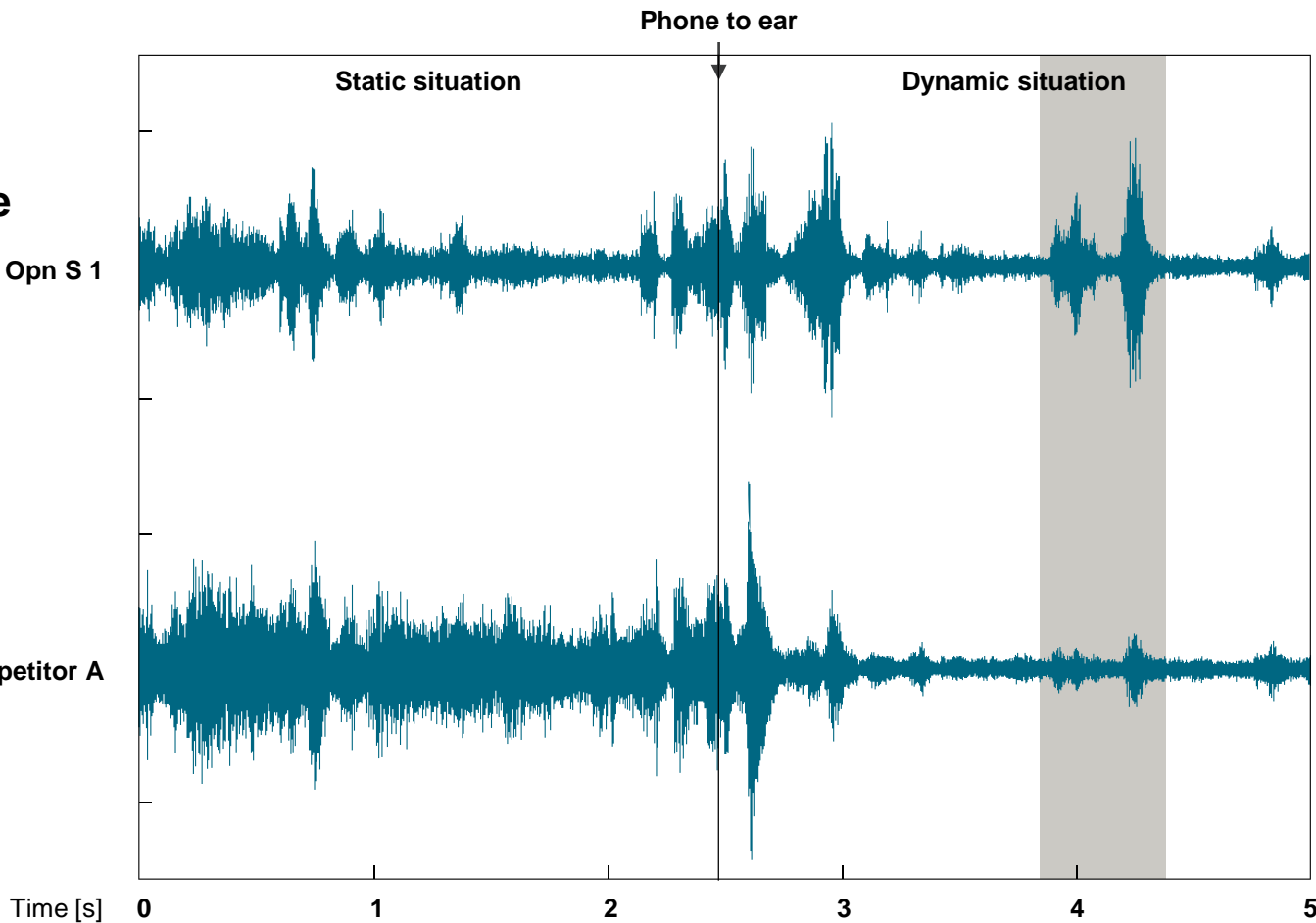
Best speech
preservation in noise

Oticon Opn S 1

No feedback,
speech preserved

Competitor A

“No feedback”,
but lack of gain



OpenSound Optimizer

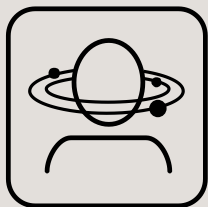
Improving Speech Guard LX and OpenSound Navigator for higher signal integrity



Open Sound Optimizer



Speech Guard LX



OpenSound Navigator



Higher signal integrity



Thank You!