

1. This document was created to support maximum accessibility for all learners. If you would like to print a hard copy of this document, please follow the general instructions below to print multiple slides on a single page or in black and white.
2. This handout is for reference only. Non-essential images have been removed for your convenience. Any links included in the handout are current at the time of the live webinar, but are subject to change and may not be current at a later date.
3. Copyright: Images used in this course are used in compliance with copyright laws and where required, permission has been secured to use the images in this course. All use of these images outside of this course may be in violation of copyright laws and is strictly prohibited.
4. Social Workers: For additional information regarding standards and indicators for cultural competence, please review the NASW resource: [Standards and Indicators for Cultural Competence in Social Work Practice](#)
5. Need Help? Select the “Help” option in the member dashboard to access FAQs or contact us.

How to print Handouts

On a Mac

- Open PDF in Preview
- Click File
- Click Print
- Click dropdown menu on the right “preview”
- Click layout
- Choose # of pages per sheet from dropdown menu
- Checkmark Black & White if wanted.

On a PC

- Open PDF
- Click Print
- Choose # of pages per sheet from dropdown menu
- Choose Black and White from “Color” dropdown

No part of the materials available through the continued.com site may be copied, photocopied, reproduced, translated or reduced to any electronic medium or machine-readable form, in whole or in part, without prior written consent of continued.com, LLC. Any other reproduction in any form without such written permission is prohibited. All materials contained on this site are protected by United States copyright law and may not be reproduced, distributed, transmitted, displayed, published or broadcast without the prior written permission of continued.com, LLC. Users must not access or use for any commercial purposes any part of the site or any services or materials available through the site.

A solid red square is located in the bottom left corner of the page.



Getting Real (Ear) with Fitting Protocols

Stephen A. Hallenbeck, AuD

Learning outcomes

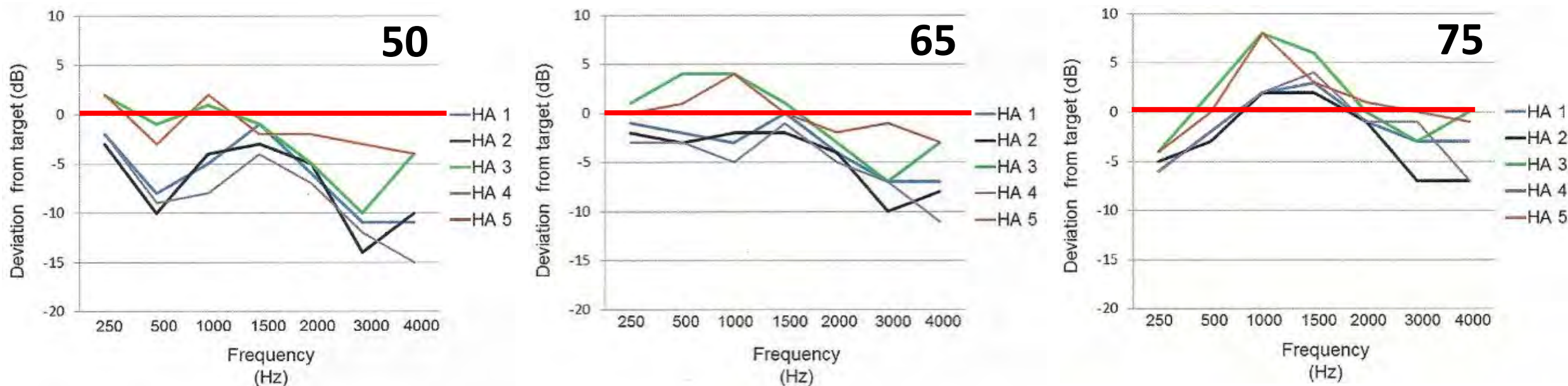
- *As a result of this activity, the participants will be able to:*
 - *Describe why real ear is an integral part of the fitting process*
 - *Explain how to choose hearing aids and options that appropriately balance comfort, intelligibility, sound quality and occlusion*
 - *Discuss how to apply software and hardware changes to hearing aids to match target*
 - *Describe how matching target can influence other factors of a successful fitting*

Why is verification so important?

- To account for Individual ear canal variations
- Actual instrument performance is ensured as compared to pre-calculated approximation
- The goals based on the prescriptive formula or algorithm are realized
 - both audibility and patient acceptance
- Provides objective guidance for 'fine-tuning' rather than guessing.



Variability in product performance



Difference between NAL-NL2 (0 dB line) and First-Fit REAR for 5 premium hearing aids @ 55, 65, and 75 dB SPL

Positive hearing healthcare experience for patients and HCPs when REMs are applied

Increased acceptance and adoption of hearing aids

Increase in perceived value of products and services

More likely to repurchase

Willingness to pay more for a service experience

How many visits do patients need to be satisfied with their hearing aids?

2.41

visits with both
verification
and validation

3.57

visits without
verification
and validation



**Save 1 more follow-up visit when using
both verification and validation**

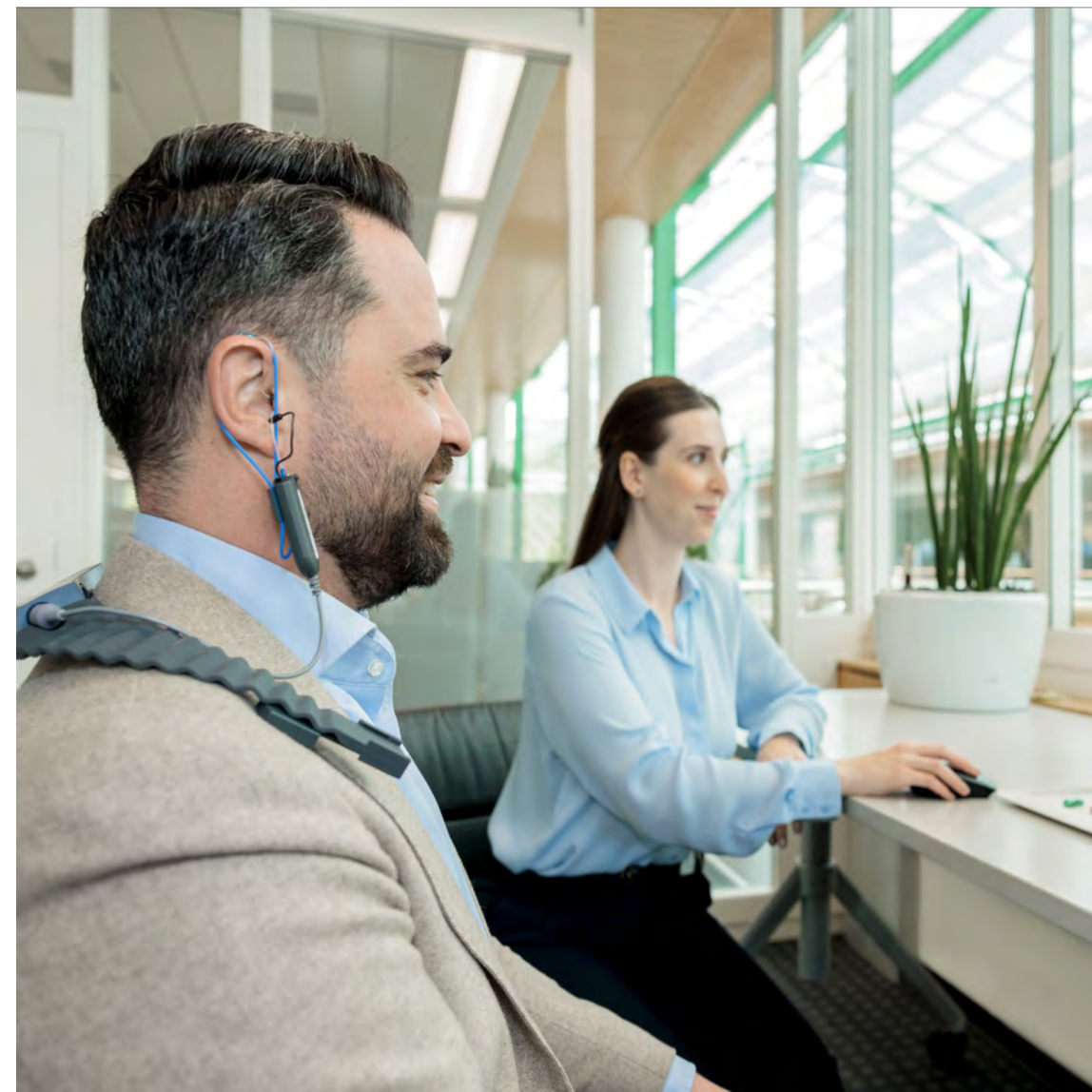


Purchasing a REM system

Example business flow for private practice

- 7-year equipment renewal cycle
- REM system cost ~€7,000*
- Annual calibration cost ~€600*
- 49 weeks a year
- 4 binaural fittings a week
- Cost of owning and using REM = €4.50 per hearing aid

* Prices are average prices of an Aurical PMM



TargetMatch Workflow

With manual REM



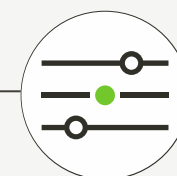
Data entry in
Phonak Target



Data entry in
REM software



Run measurements
in REM software



Manual fine tuning
in Phonak Target

With automated REM



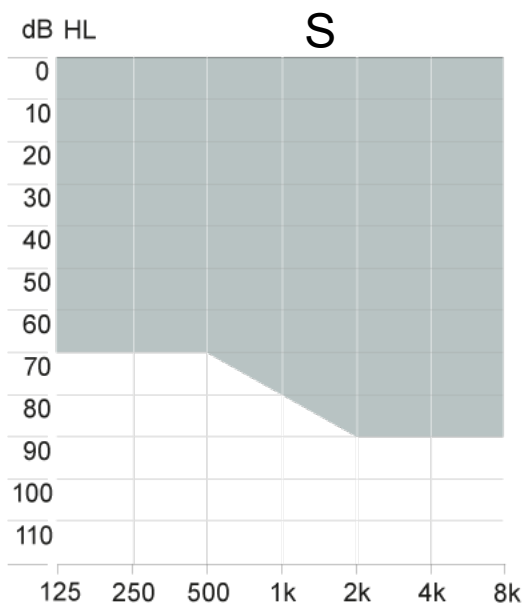
Data entry in
Phonak Target



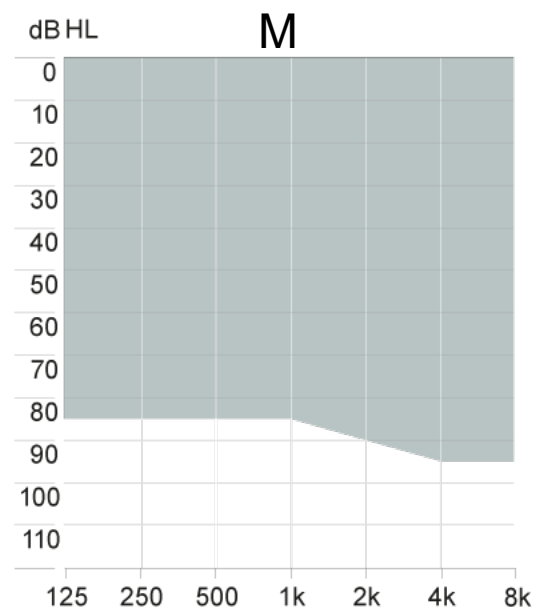
Automatic measure and match
to targets in Phonak Target

Choosing a Hearing Aid with a Focus on Audibility

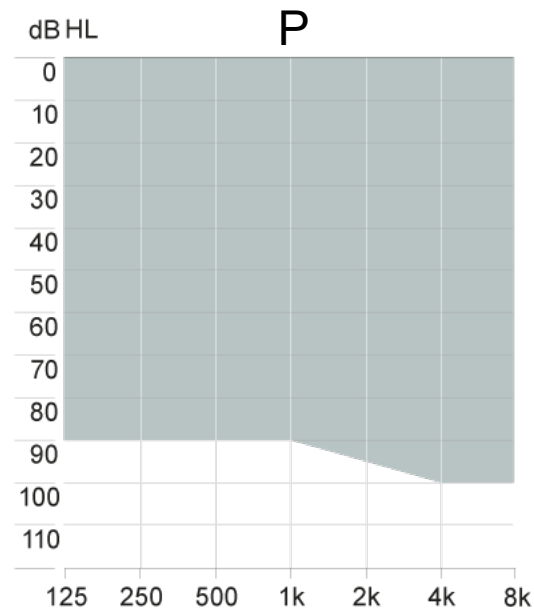
Fitting range



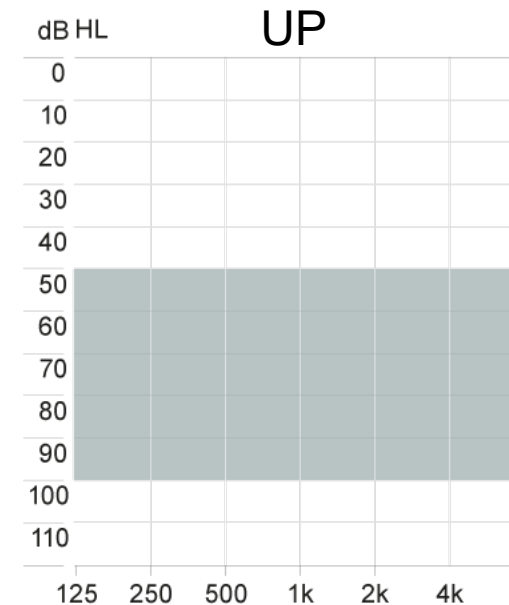
Mild to moderately-severe hearing loss.



Mild to severe hearing loss.

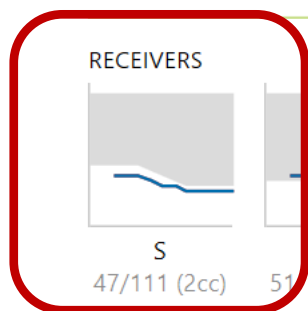


Mild to severe hearing loss.

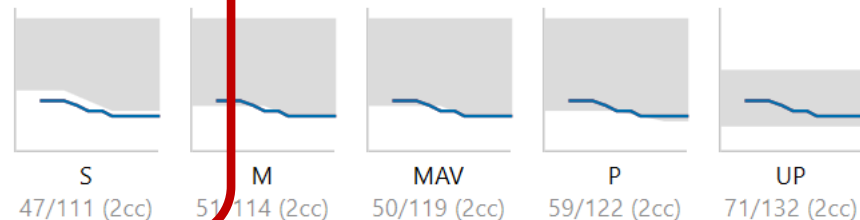


Moderate to profound hearing loss.

Visual example



RECEIVERS



DESCRIPTION

Premium WaterResistant external receiver instrument (rechargeable) for mild to profound hearing loss. Direct connectivity (Bluetooth®).

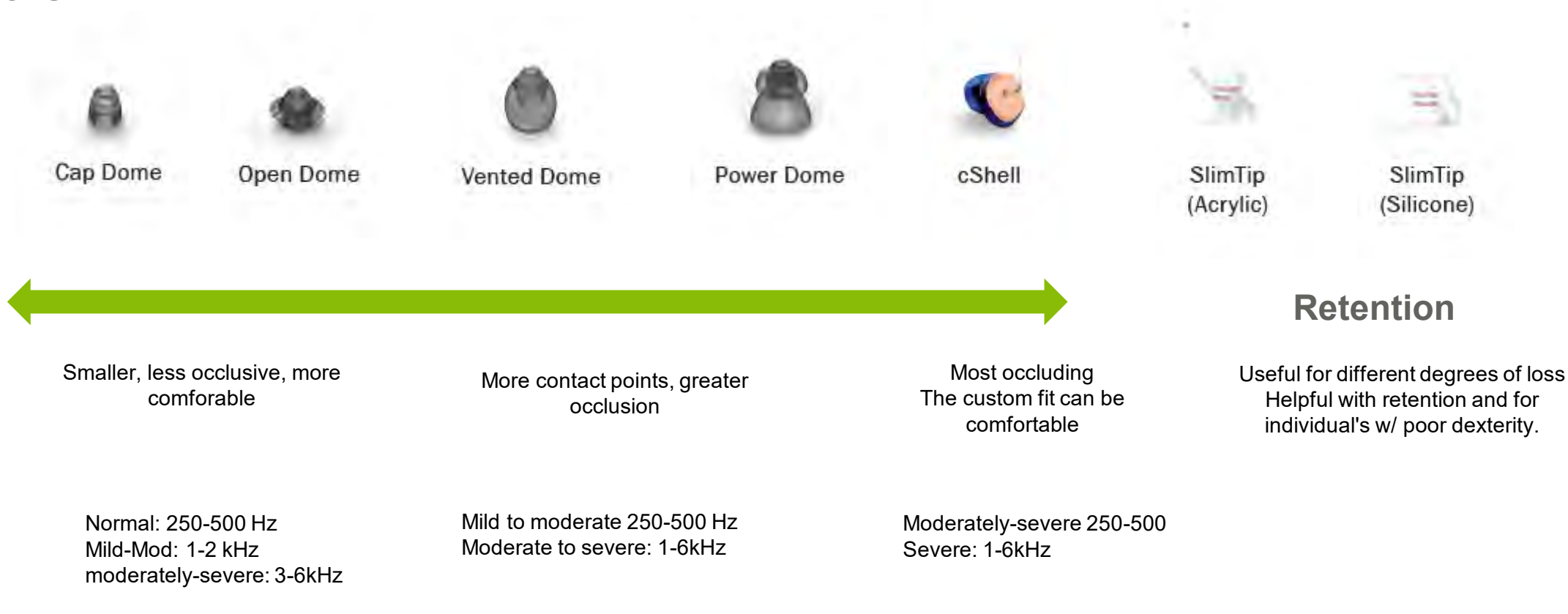
FEATURES

- Automatic 4.0 premium
- Speech boost
- Echo
- Rechargeable
- Own voice pick-up
- Dynamic noise manager
- Balance
- HiFrequency protect+
- Touch control
- Directional microphone premium
- Motion sense
- Narrow speech focus
- DuoTel

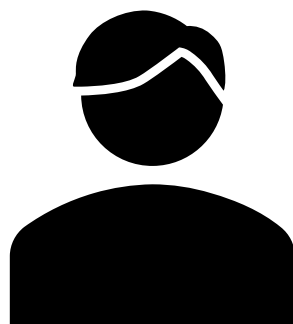


Coupling best practices: acoustics, comfort and retention

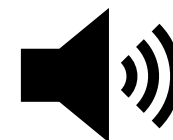
Coupling options



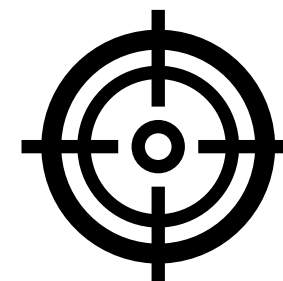
Striking the balance



Personal comfort
Occlusion



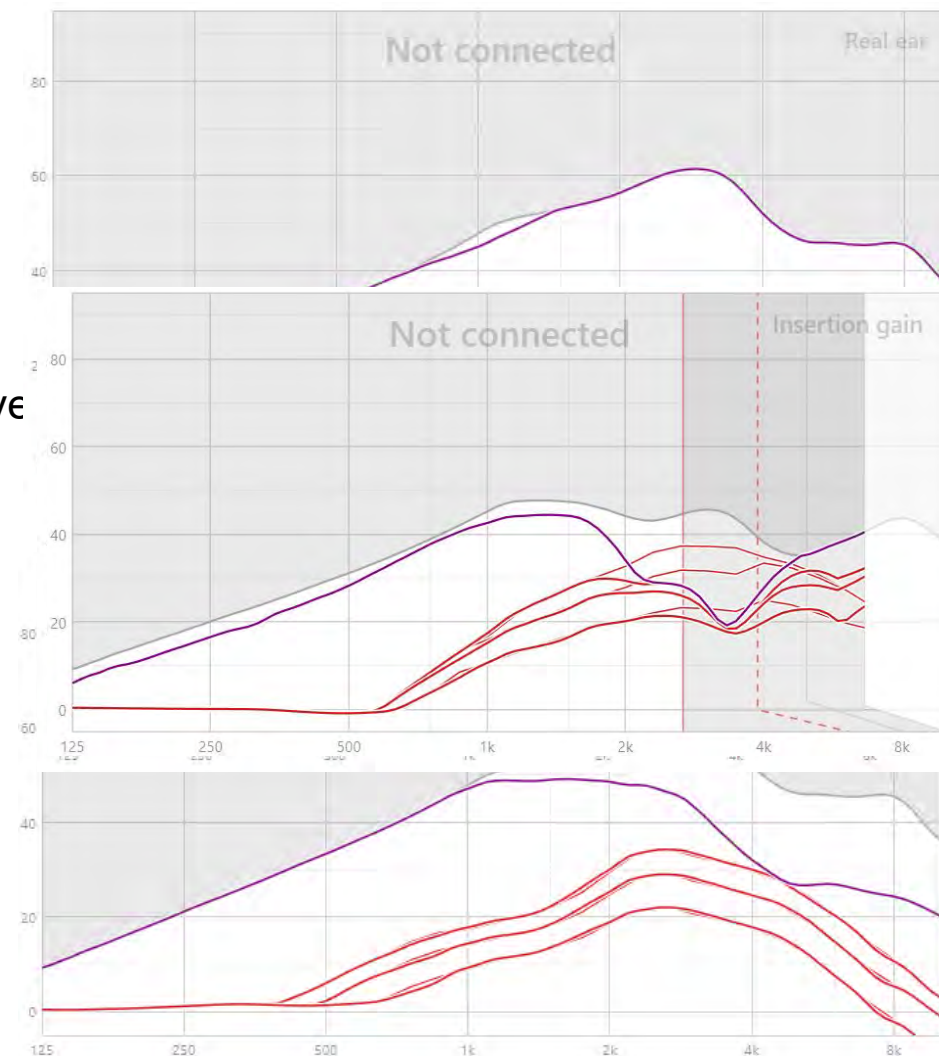
Sound quality
and occurrence
of feedback



Target and
speech
outcomes

Order of operations:

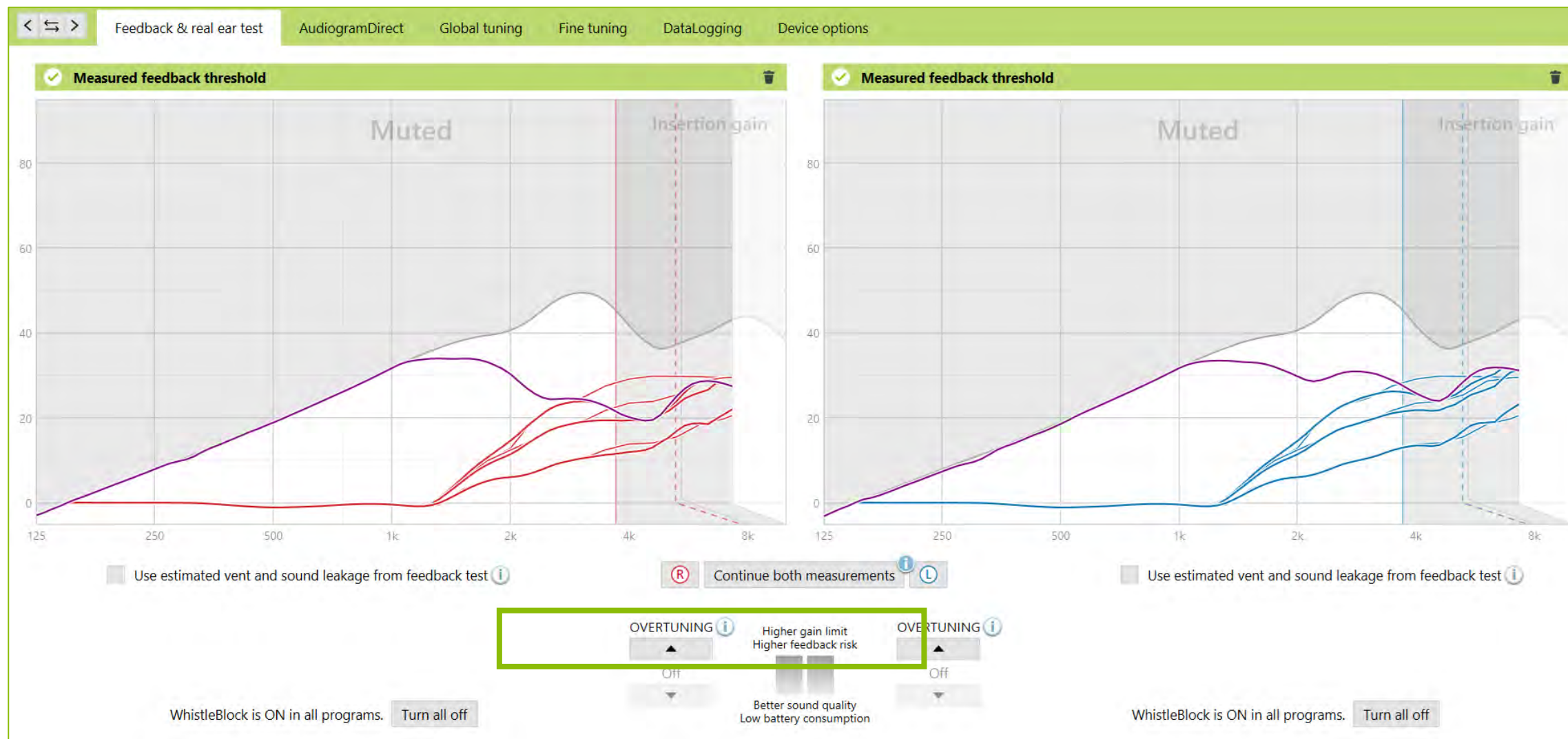
- Make your best choice for receiver and dome
- Set Adaptation to 100%
- Run the feedback test and check your results:
 - If the feedback test is above the gain curve, continue on
 - If the feedback test results significantly intersects with the gain curve
 - Choose a different acoustic coupling
 - Counsel speech understanding and sound quality
- Use Overtuning as needed
- Complete real ear verification



What if you *still* don't like what you see?

Apply Feedback Overtuning

Feedback Overtuning- getting started



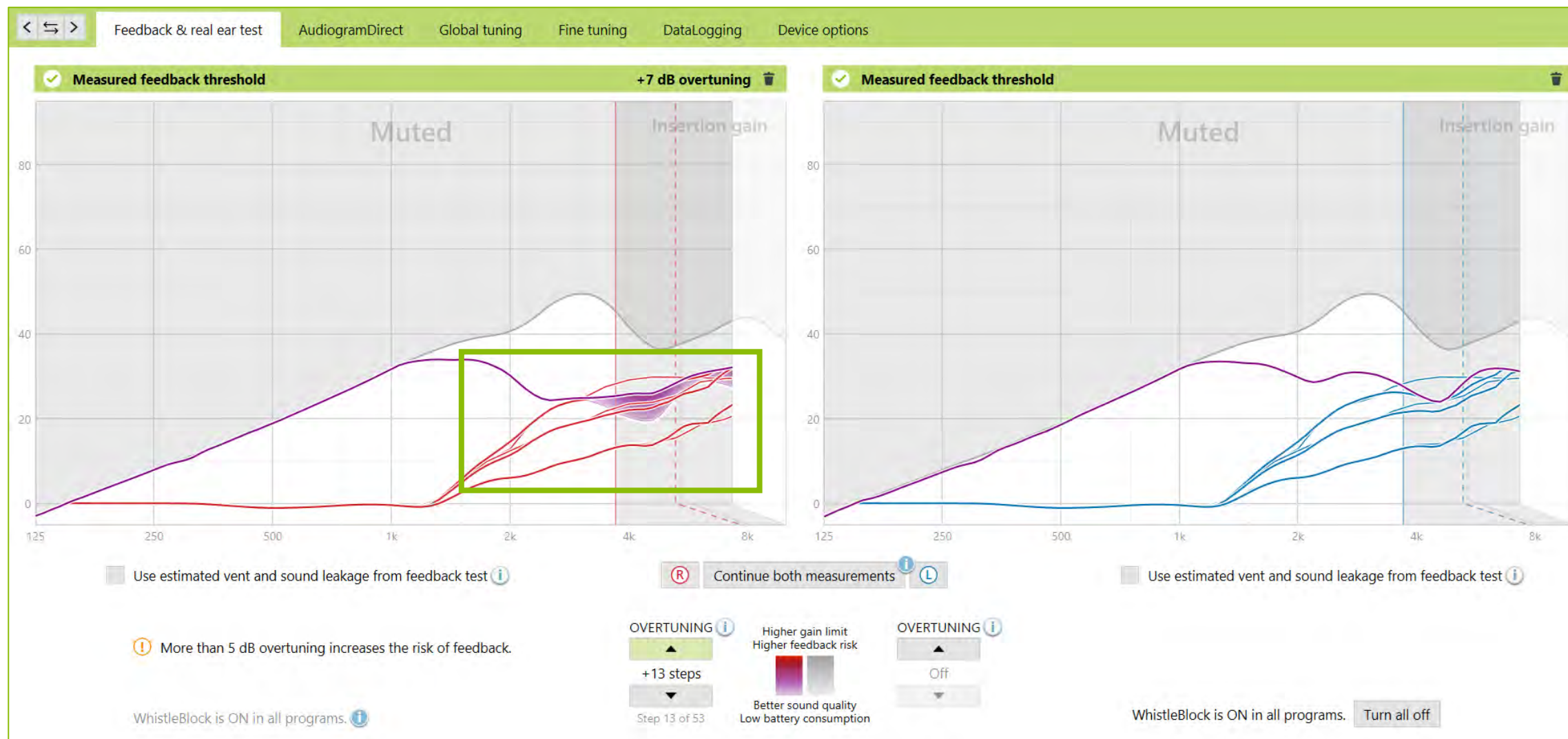
Feedback Overtuning- how it works



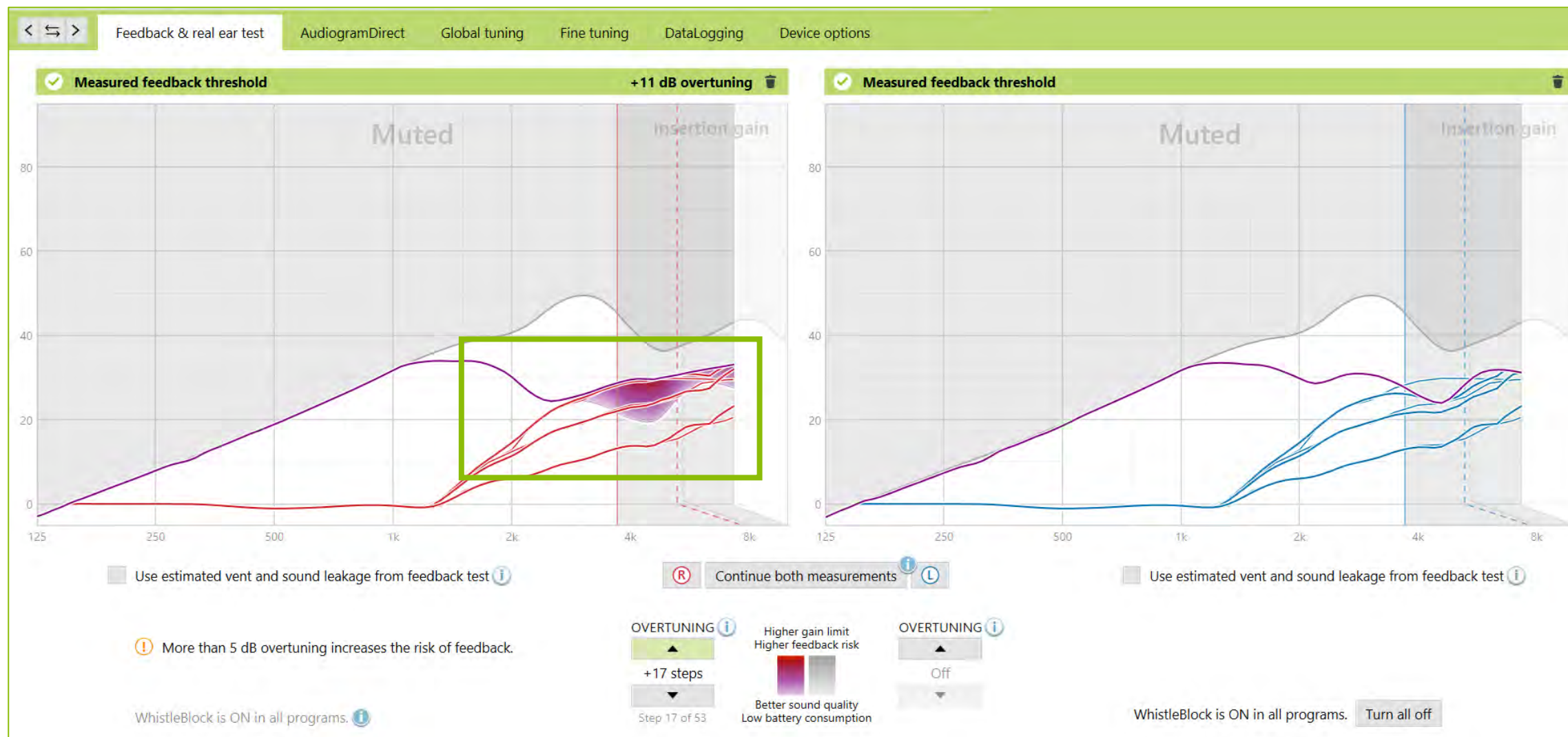
Feedback Overtuning- how it works



Feedback Overtuning- how it works



Feedback Overtuning- how it works



A solid green circle is located on the left side of the slide, partially cut off by the edge.

Feedback Overtuning-A Solution to Gain Limitation

- Ability to evaluate sound quality, gain, and feedback tendency at each step
- Can be done via Remote Support
- Can easily be increased/decreased as needed
- Offers full control, flexibility and security for you and your patients

PRO TIP: Run feedback test to ensure the best echo-cancelling experience using Own Voice Pickup

Phonak's approach to addressing feedback

Static Feedback

- Managed via Feedback Test



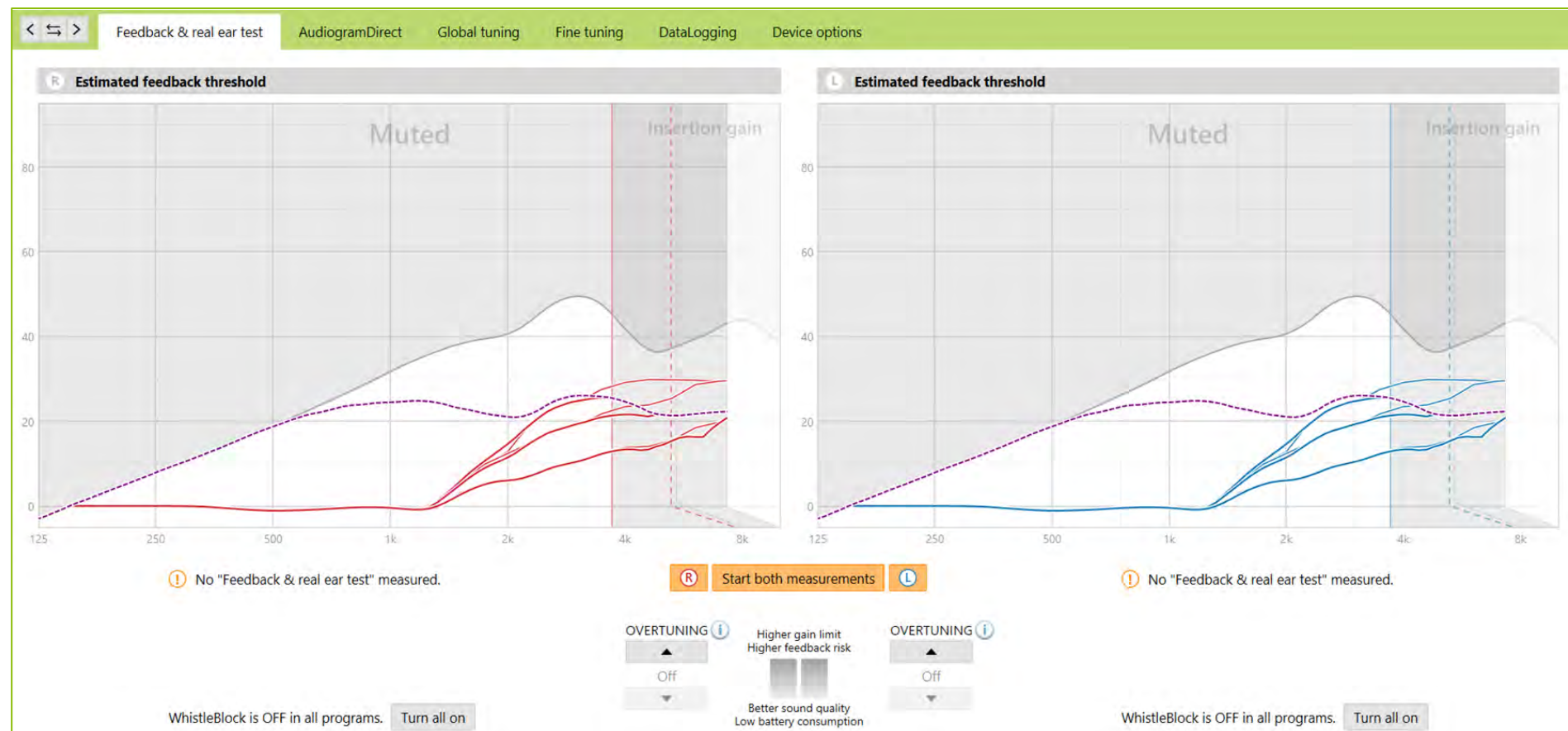
- Managed via Estimated Feedback Threshold

Adaptive Feedback

- Managed via WhistleBlock



Estimated Feedback Threshold-Overtuning Flexibility



Estimated Feedback Threshold-Overtuning Flexibility



Feedback Overtuning-How does it impact fitting?

- Adjusted gain applies to all programs EXCEPT (Acoustic) Music
- Feedback manager moves to 20 (strongest) in all programs EXCEPT (Acoustic) Music
- Overtuning will reset/disable after:
 - Recalculation
 - Changing the receiver power level
 - Deleting the measured test
 - Creating a new fitting
- May increase battery consumption

Feedback Overtuning-A Solution to Gain Limitation

- Ability to evaluate sound quality, gain, and feedback tendency at each step
- Can be done via Remote Support
- Can easily be increased/decreased as needed
- Offers full control, flexibility and security for you and your patients

Phonak's approach to addressing feedback

- Managed via Estimated Feedback Threshold
- **Static Feedback**
- Managed via Feedback Test



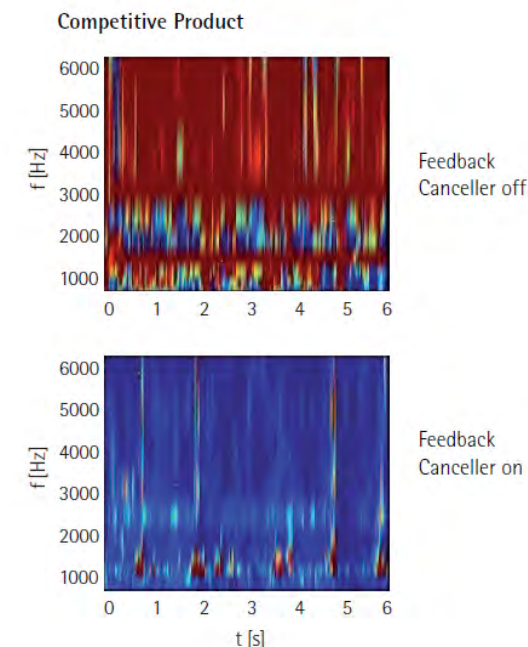
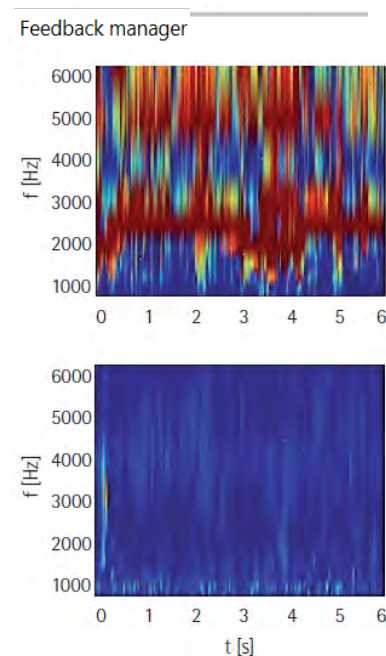
Adaptive Feedback

- Managed via WhitsleBlock



WhistleBlock-adaptive feedback system

- Phase cancellation and an adaptive notch filter
 - Self-adjusts according to acoustic feedback path between microphone and receiver
 - Identifies and tags feedback vs. naturally-occurring tones such as music
 - Flexibility to adjust strength independently in Automatic



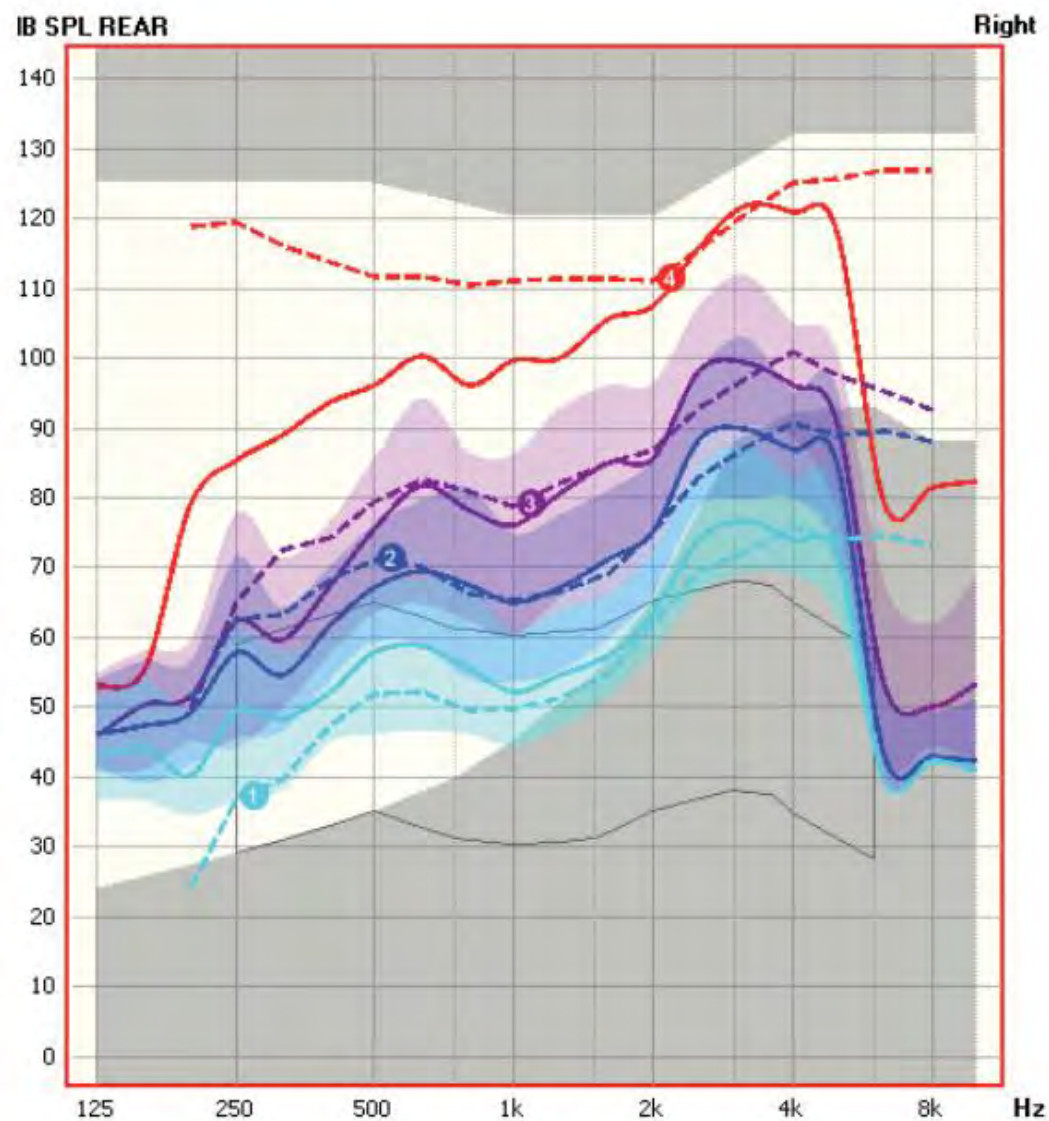
WhistleBlock is OFF in all programs.

Turn all on

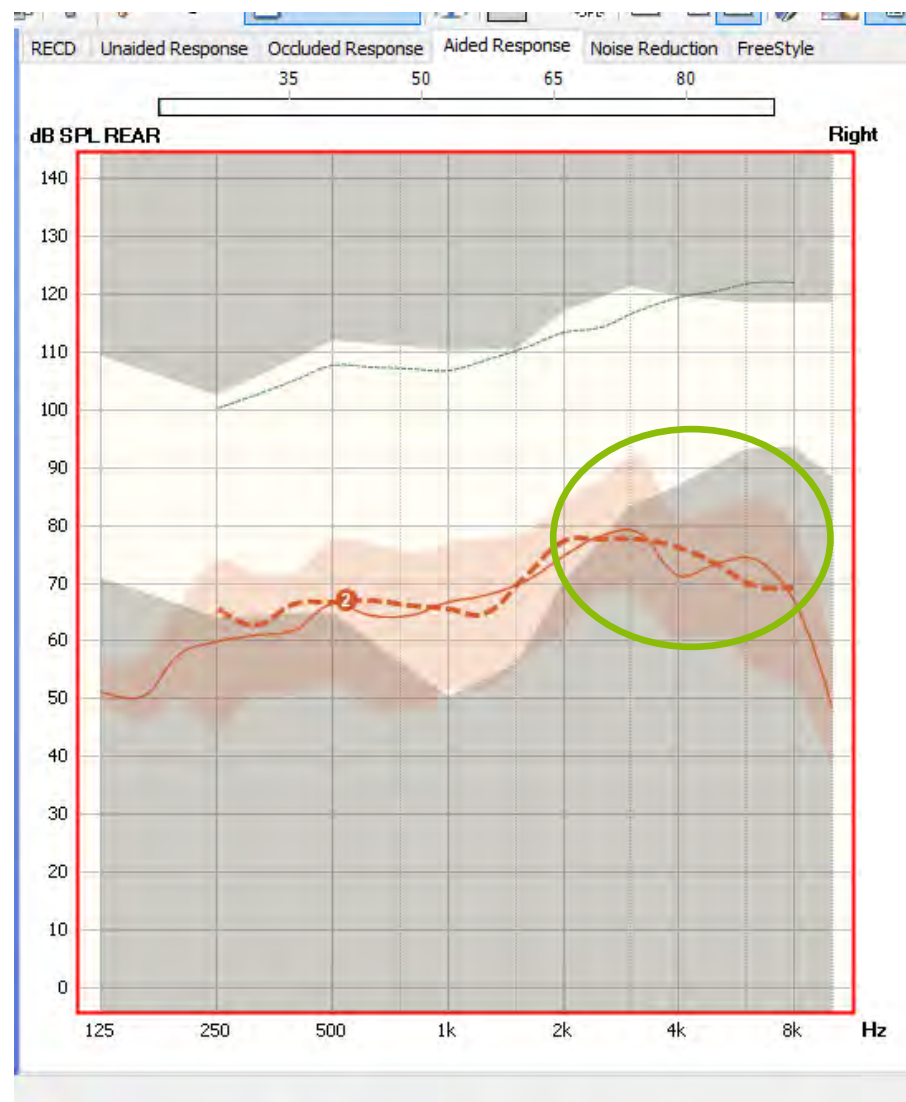
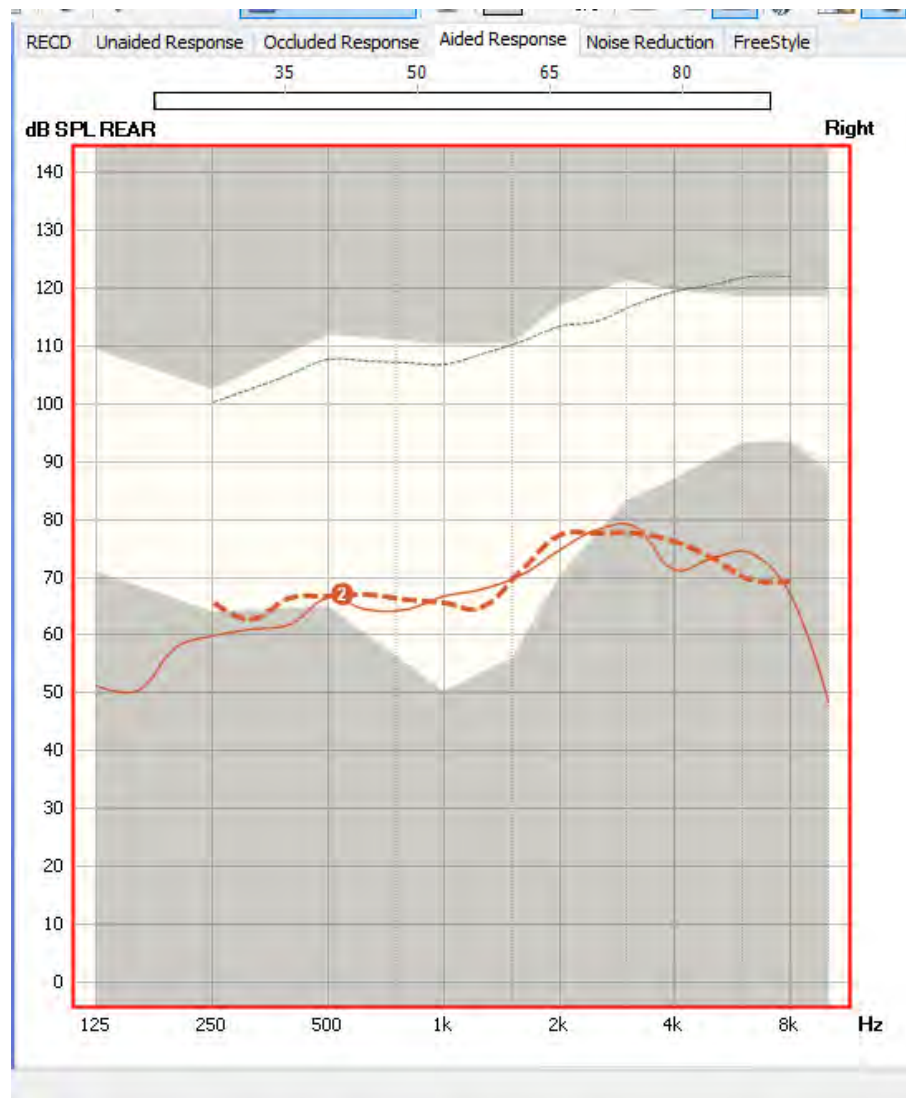
Real ear troubleshooting

Real ear 101

- The picture is the goal
- How do I get there?



A closer look



Step by step

- Probe tube placement
- Hearing aid placement
- Baseline measurement
- Counseling and/or adjustment/re-measure loop
- Move to the next steps in the fitting



Probe tube and hearing aid placement

Probe tube

Ear canal size and shape vary

Challenging to comfortably place in
the ear canal

Can cause significant variability in the
high frequencies

Probe tube and hearing aid placement

Probe tube

Ear canal size and shape vary

Challenging to comfortably place in the ear canal

Can cause significant variability in the high frequencies

Hearing aid

Challenging to place while keeping the probe location consistent

When placed through the vent, vent characteristics change

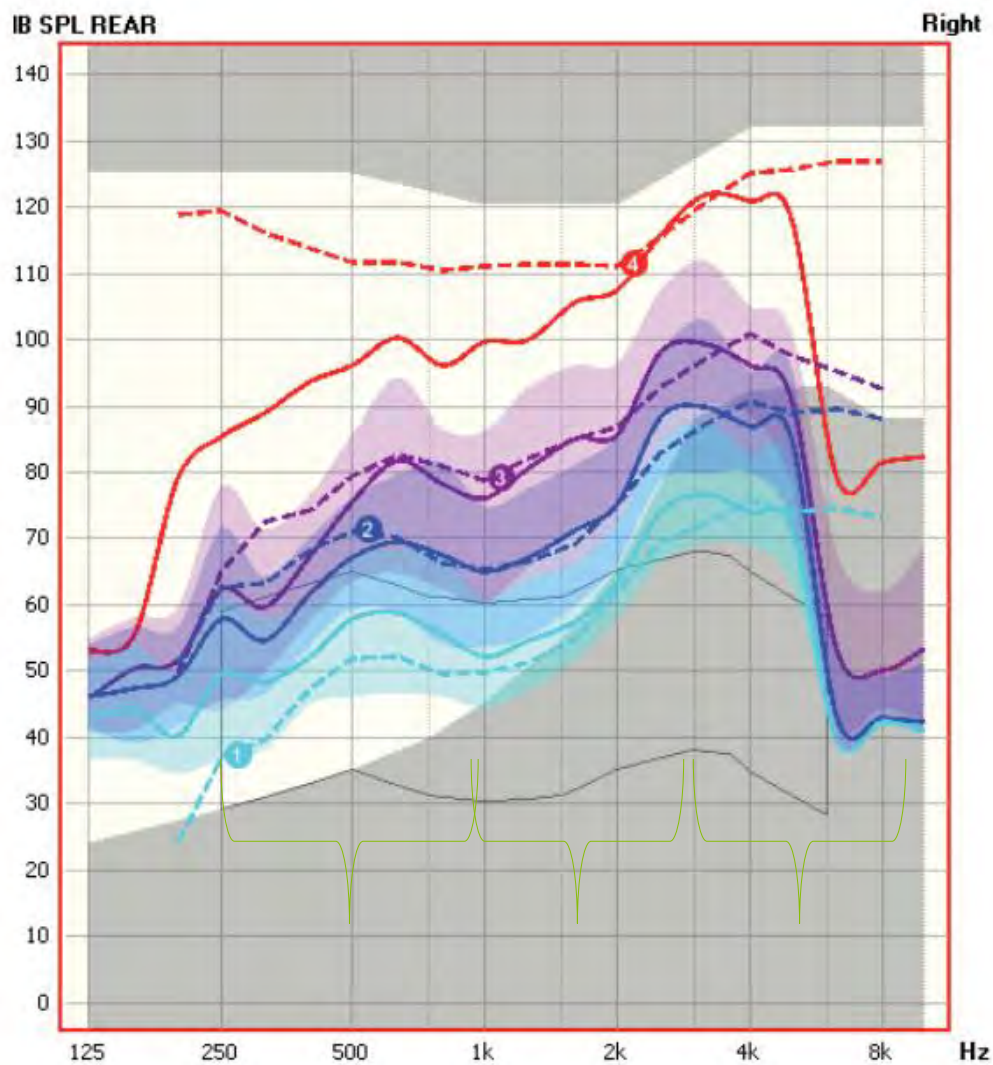
Can impact various in frequency regions

Step by step

- ✓ ~~Probe tube placement~~
- ✓ ~~Hearing aid placement~~
- ✓ ~~Baseline measurement~~
- Counseling and/or adjustment/re-measure loop
- Move to the next steps in the fitting



Troubleshooting per frequency region



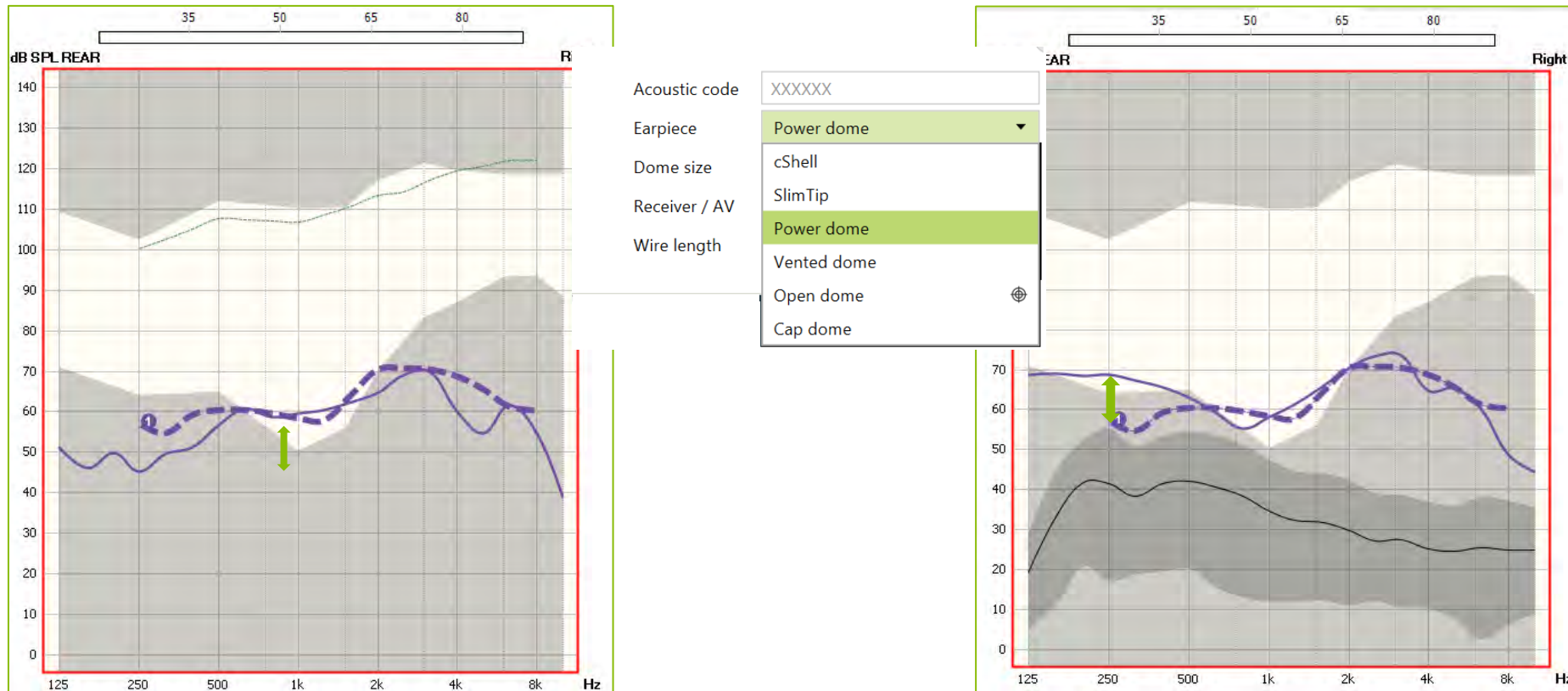
Low frequencies

Mid frequencies

High frequencies

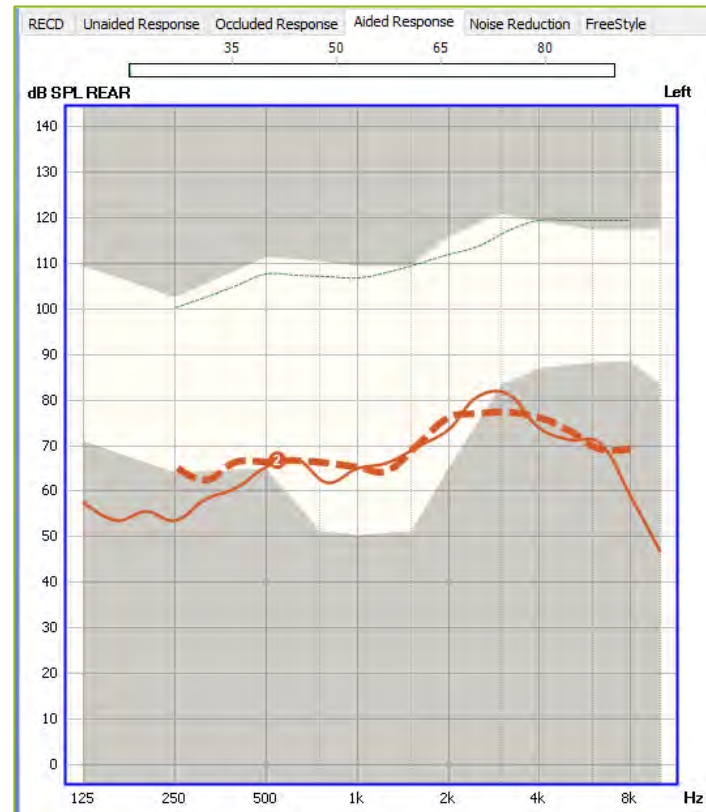
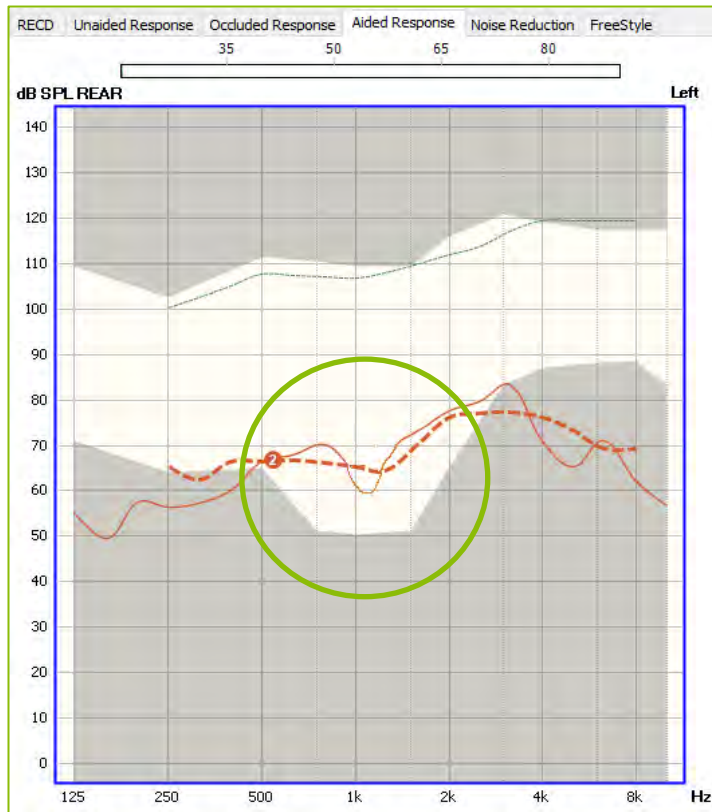
Low frequency troubleshooting

- Venting, gain and low frequency compensation
 - Pro-tip 1
 - Do the acoustic properties in the hearing aid match the actual setup?
 - Pro-tip 2
 - Confirm the presence/absence of ear canal middle ear pathologies



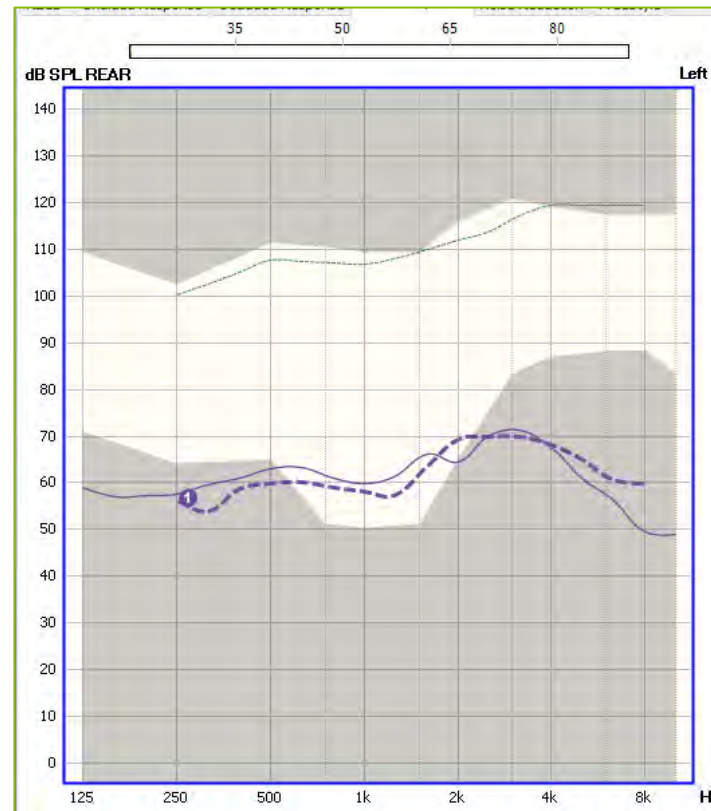
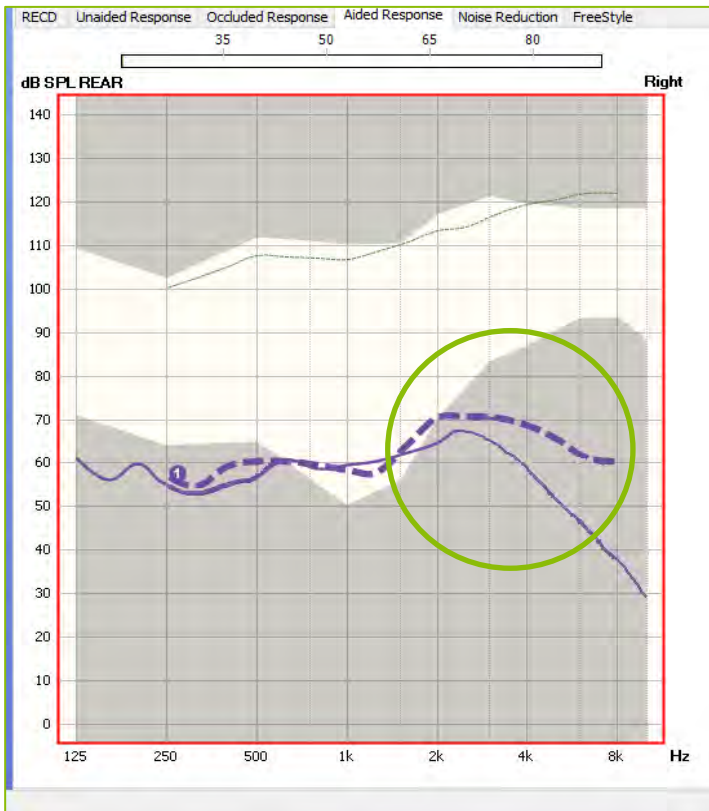
Mid frequency troubleshooting

- Venting can also affect this frequency region, check for crimped or debris in the tube
 - Pro-tip 1
 - Do the acoustic properties in the hearing aid match the actual setup?
 - Pro-tip 2
 - Did the tube move or did it get plugged with wax?



High frequency troubleshooting

- Probe tube placement and hearing properties (feedback cancellation, gain limitation etc.)
 - Pro-tip 1
 - Can I reach my target with this hearing aid/receiver/output
 - Pro-tip 2
 - Recalibrate, fine tune, reposition tube

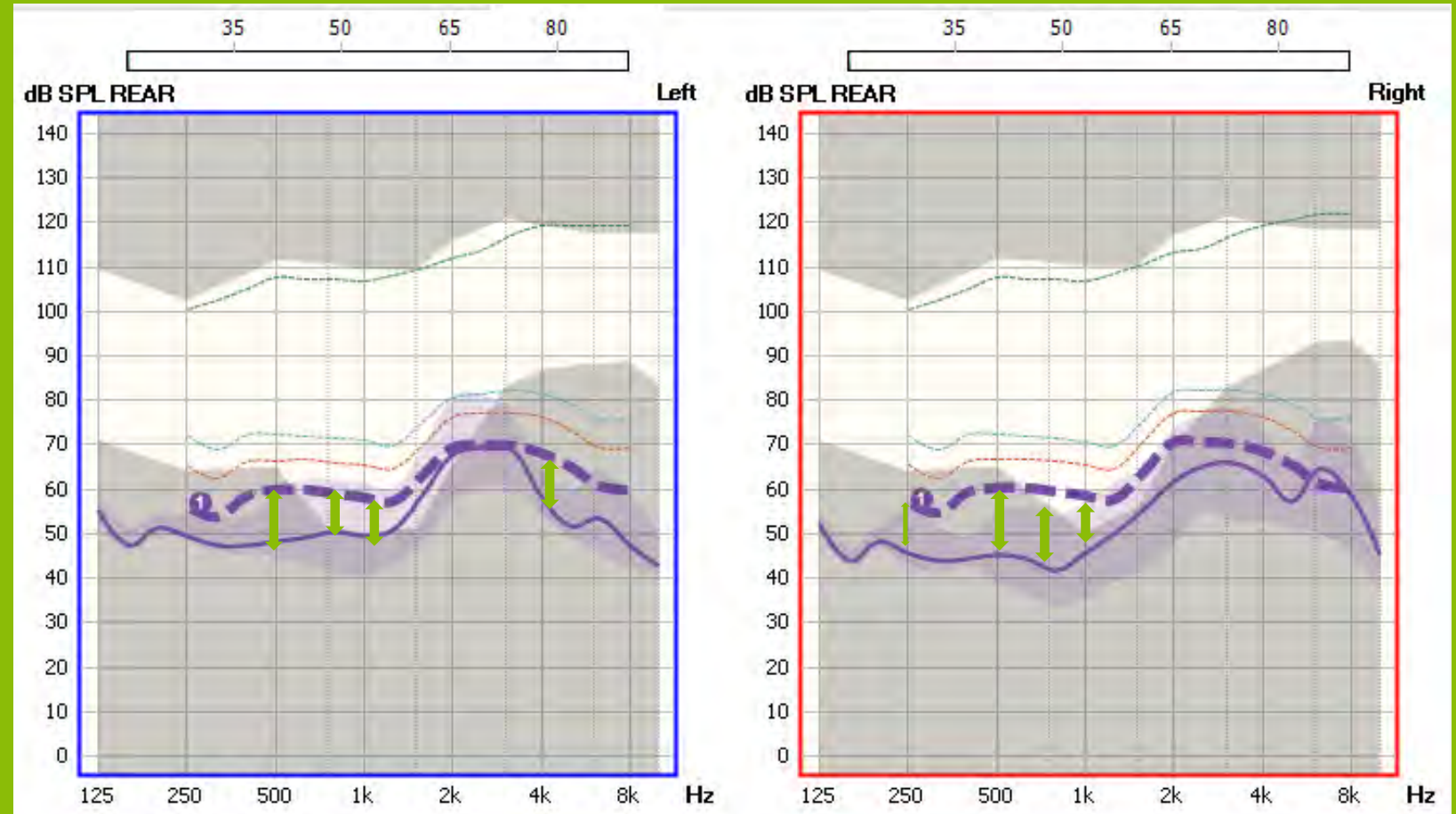


Case study

This is a test case measured on one of our test participants

What frequencies are outside of tolerance?

How would you troubleshoot?



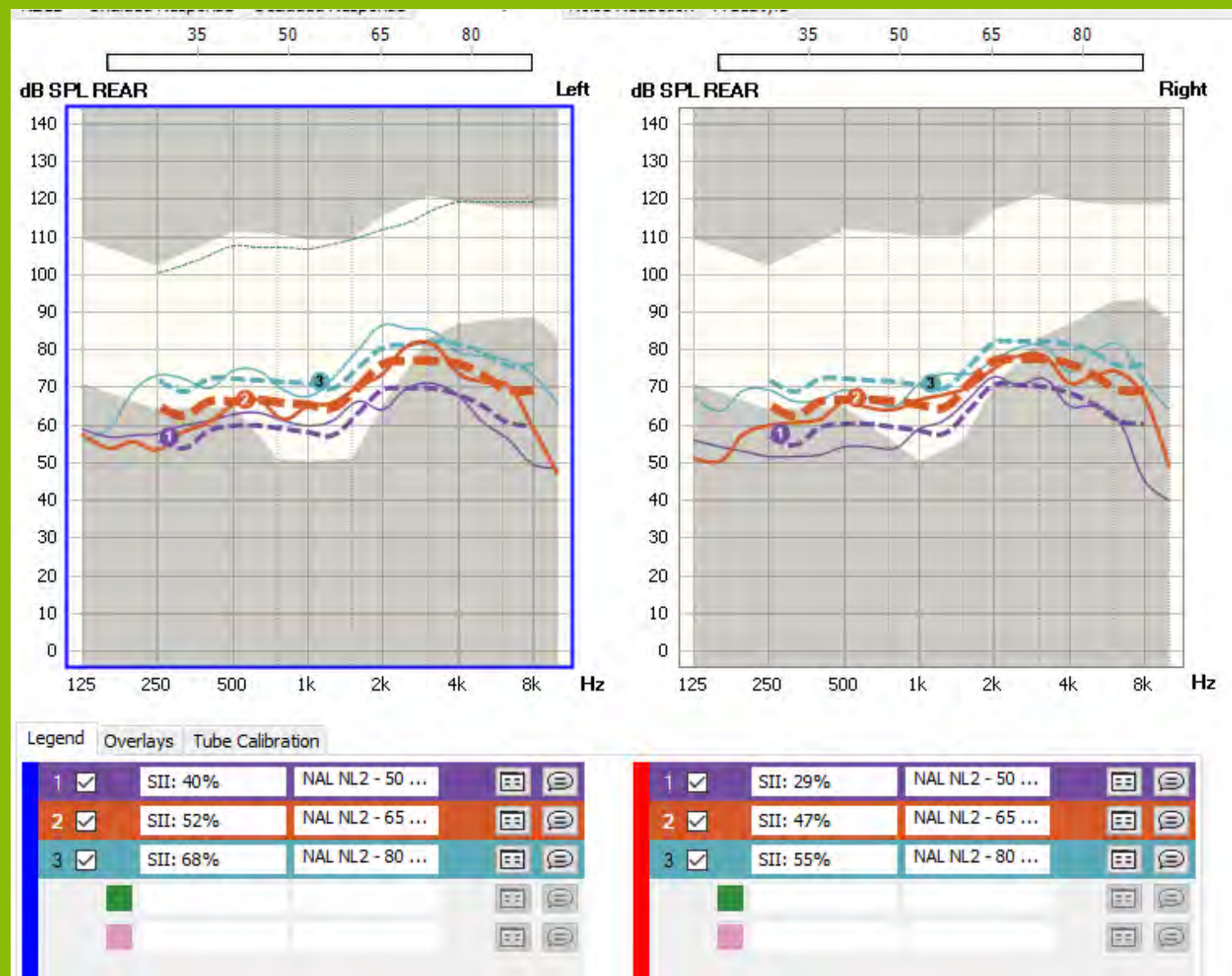
Checklist

- Device characteristics were accurate:
 - Dome selection aligned, proper output for the hearing loss and the feedback and real ear test showed proper headroom
- Test participant reported that it was a little tight in the left ear
 - Repositioning helped with both the low frequency response and the left ear. Right ear had good tube positioning
- Left ear required gain adjustments

Final output measurement

After adjusting for the right ear, 50 dB inputs matched target

Remaining inputs matched without further adjustments



TargetMatch 1.0 and 2.0

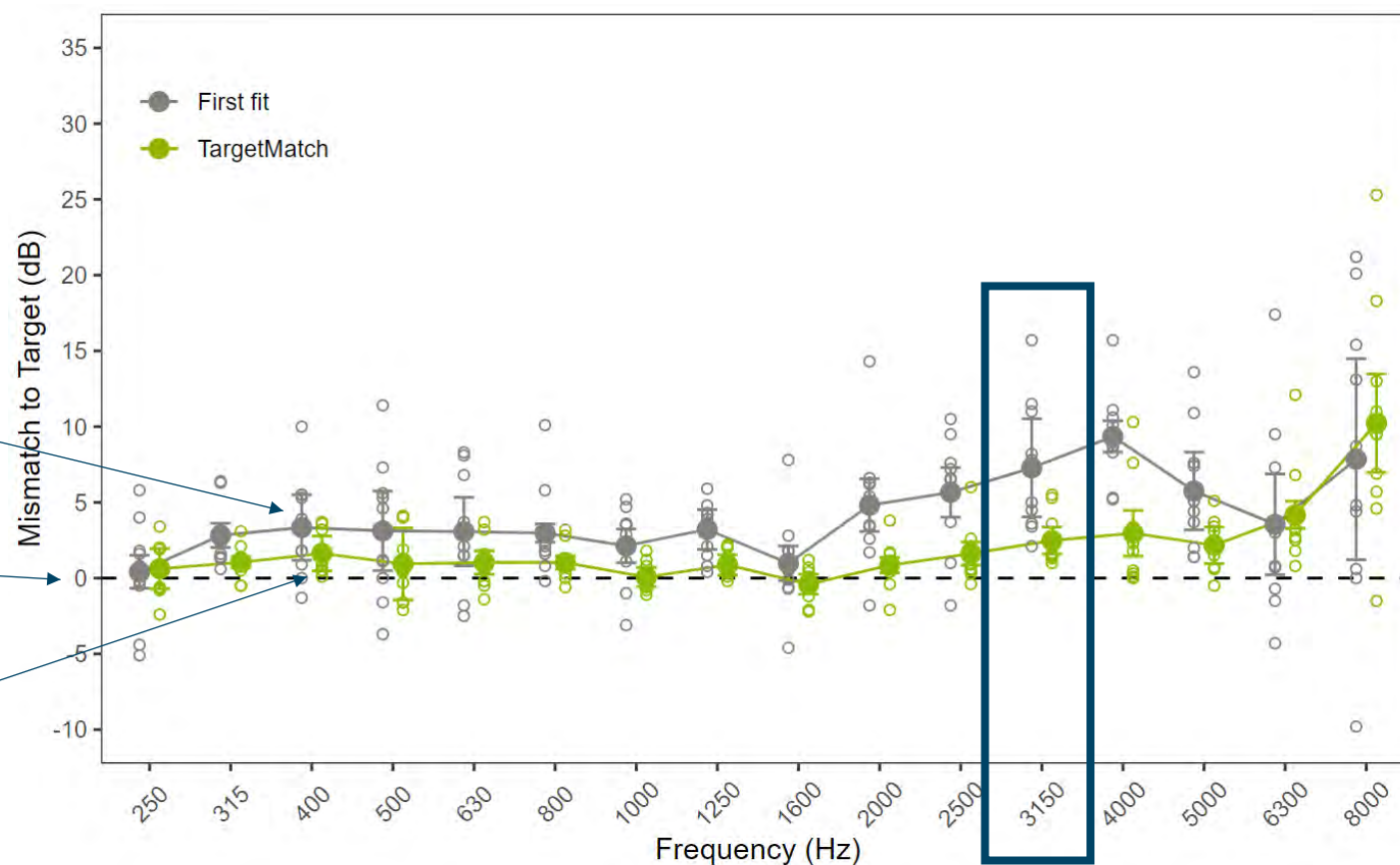


Predictions of targets

Gray = First fit with
NAL-NL2

Zero = a perfect match
to targets

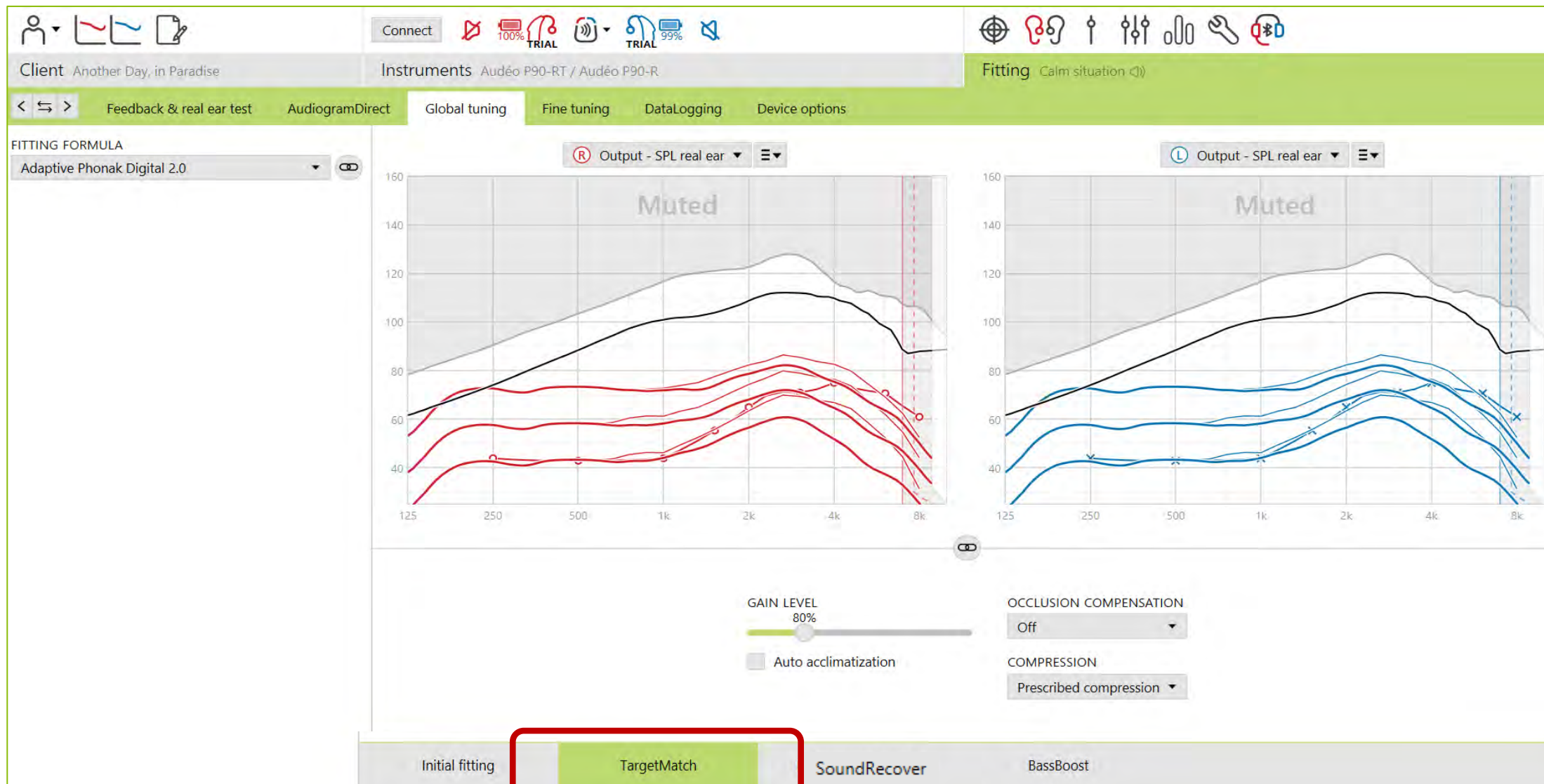
Green = TargetMatch
with NAL-NL2



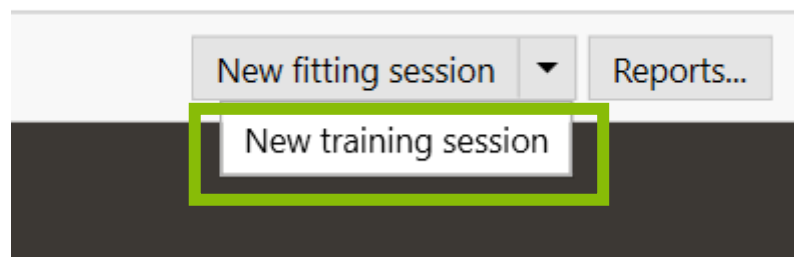
Feature	TargetMatch 1.0	TargetMatch 2.0
REM system support	Natus Aurical	• Auditdata Primus Pro • Interacoustics Affinity Suite • Signia Unity 3
Operation mode	• Automatic • Manual • Measure only	Automatic
Active program	Selectable	Calm situation (corrections applied to all programs)
Probe tube calibration	Mandatory	Optional
REUG measurement	Mandatory	Optional
Probe tube placement	Optional	Optional
Levels for aided measurements	50, 65 & 80 dB SPL (all mandatory)	• 65 dB SPL mandatory • 50 & 80 dB SPL optional
Target curves displayed	Original and individualized	Optional
Test box workflow	Yes	No

*TargetMatch is not compatible with CROS systems, bimodal systems and ActiveVent

TargetMatch, where is it?



Emulate TargetMatch 2.0 in training mode



TargetMatch
Connected
Connected

Preparation → Calibration → Unaided → Aided → Gain level → Save

The hearing aids will recalculate to 100% gain level. This can be readjusted to the client's preference after the measurement.
TargetMatch is not recommended for children under 10 years of age.

FITTING FORMULA

Adaptive Phonak Digital 2.0

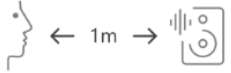
REM SYSTEM

Training device

Additional information

Before you start:

- Ensure the room is quiet
- Seat the client 1 meter (3 feet) away from the speaker of the REM system



- Instruct the client to face the loudspeaker and remain still

Continue
Cancel

Building the story

Real ear workflow 1: knowledge is power



Ensure
physical fit

Verify

Counsel
with limited
adjustments

Orientation
with verified
settings

Real ear workflow 2: match maker

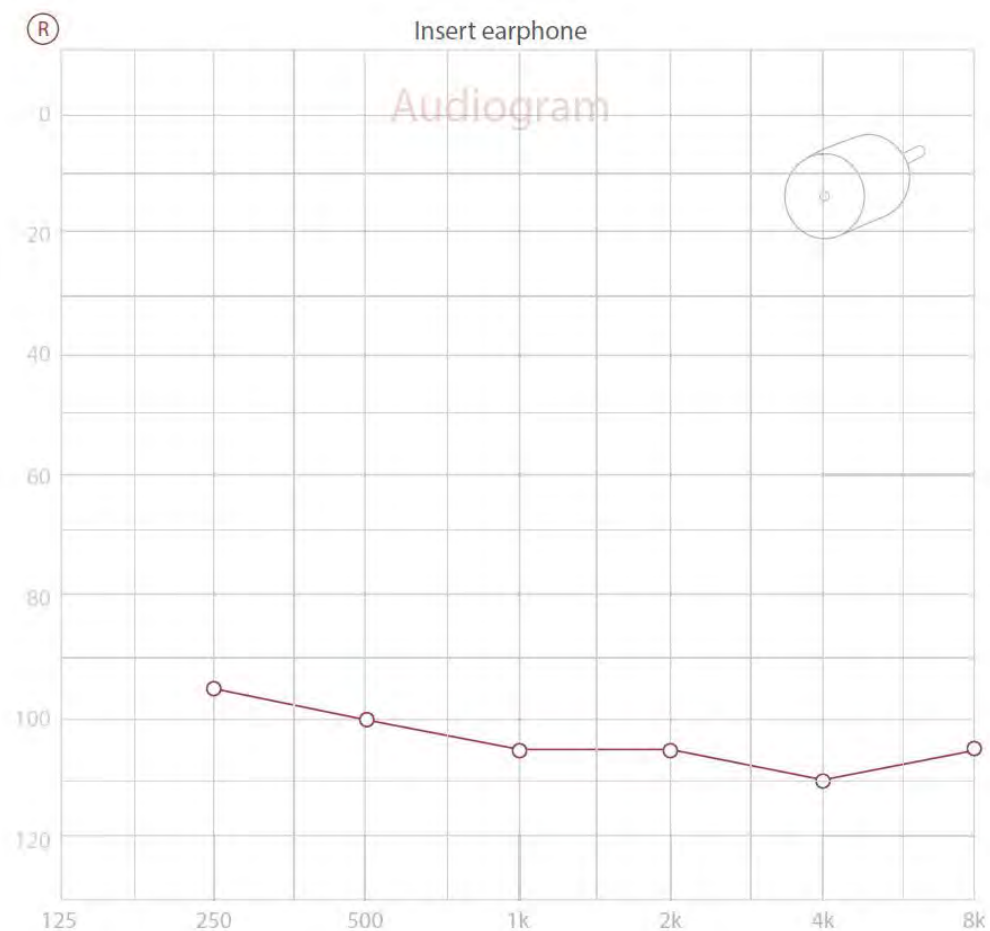
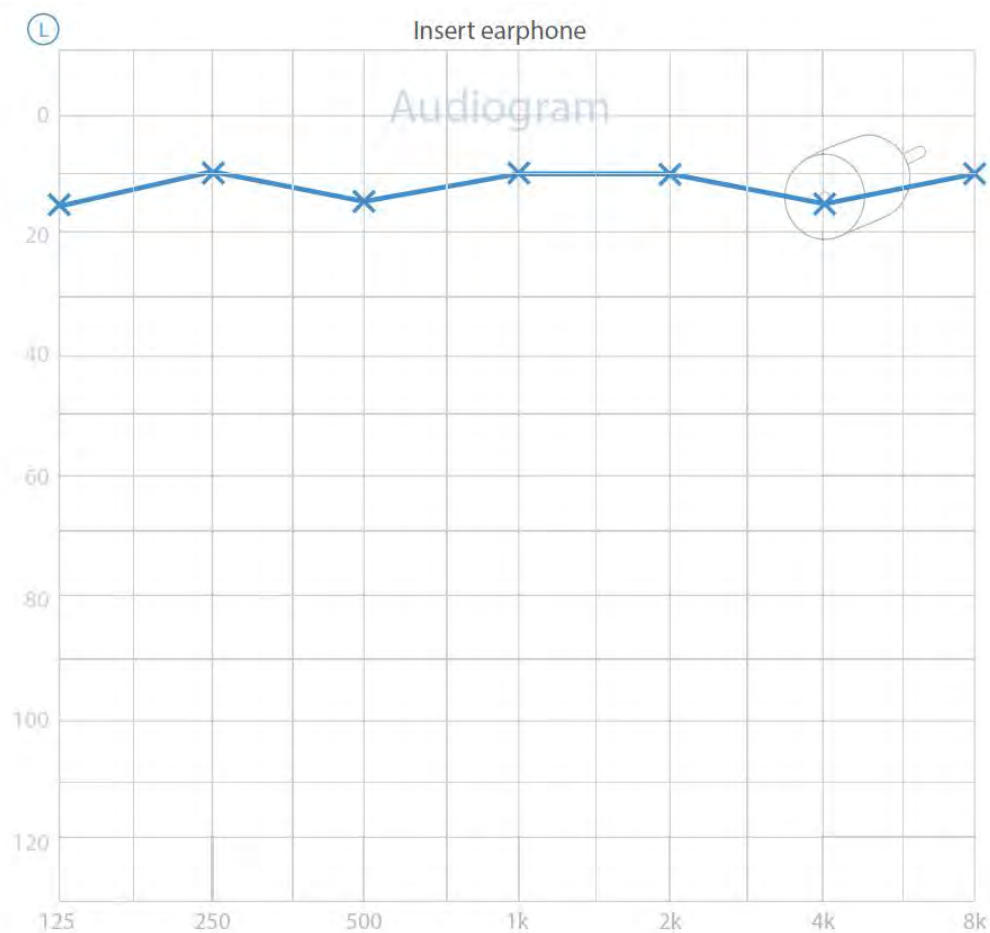


Real ear workflow 3: real world first

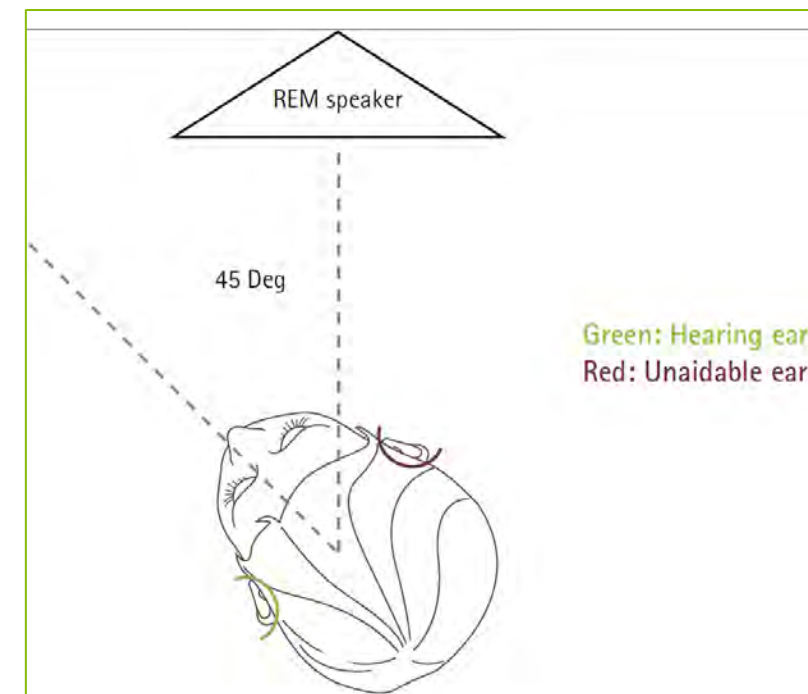
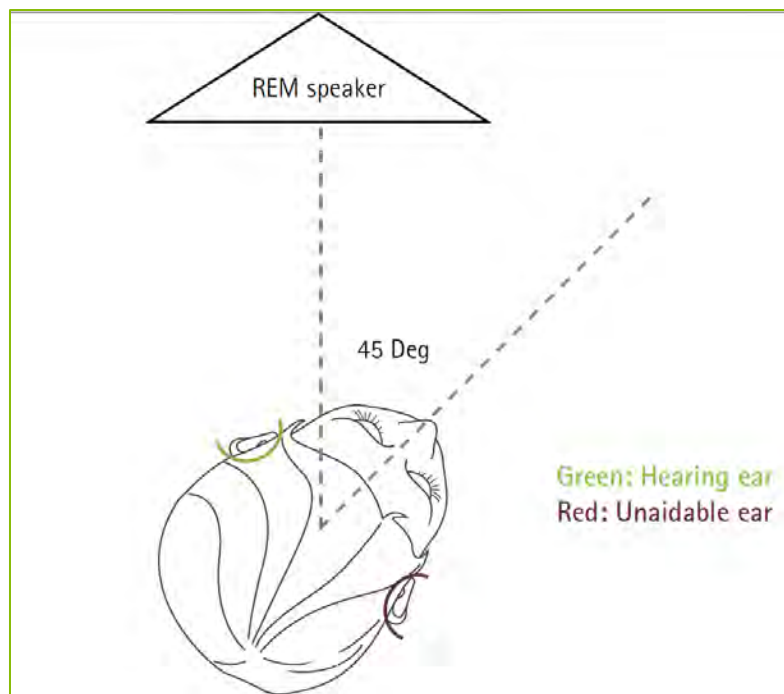
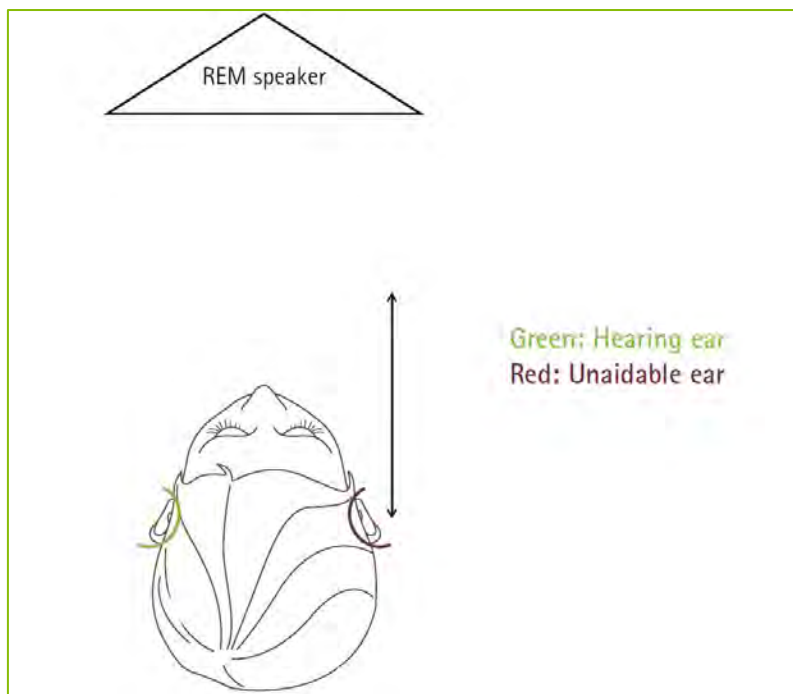


Verifying CROS and Remote Microphones

The typical CROS audiogram



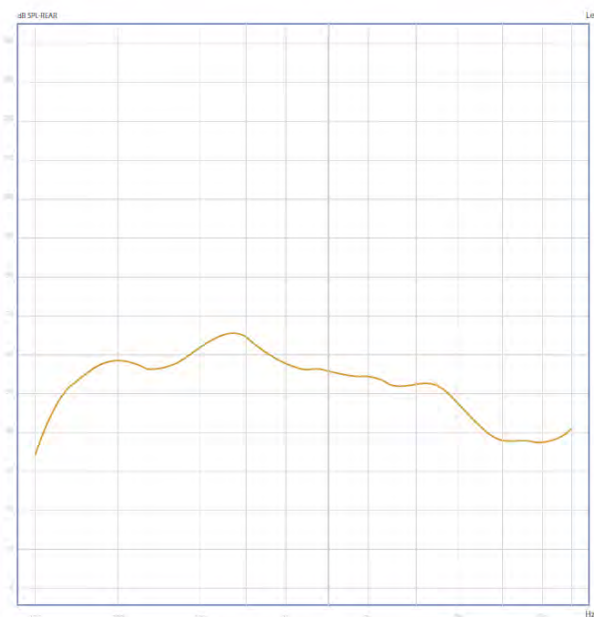
Orientation of the ear relative to the test speaker



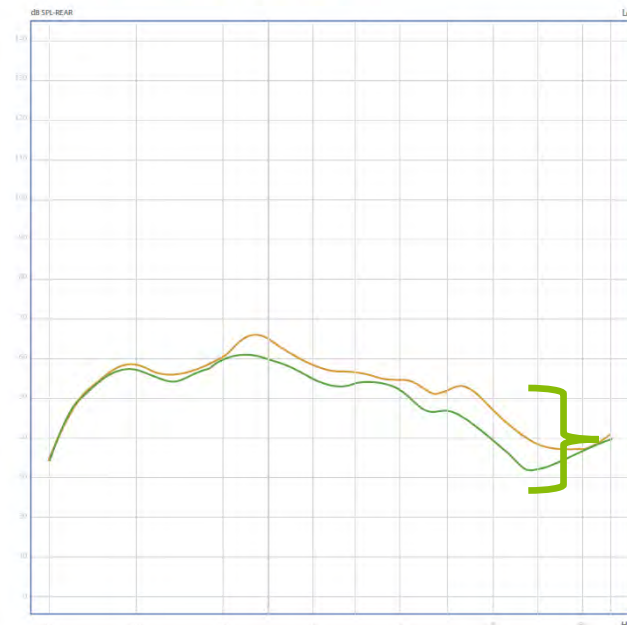
Probe measurement in
"Hearing ear"

Mute and unmute to demonstrate head shadow

REAR 1 (HA On)

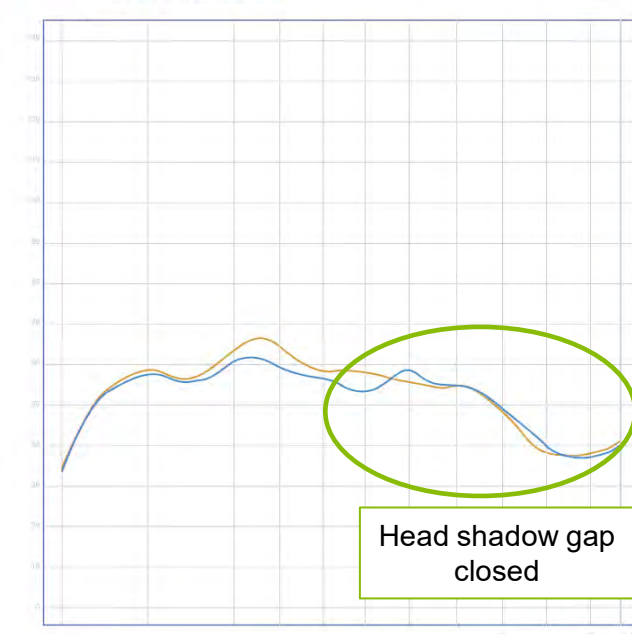


REAR 1 (HA On)
CROS (muted)

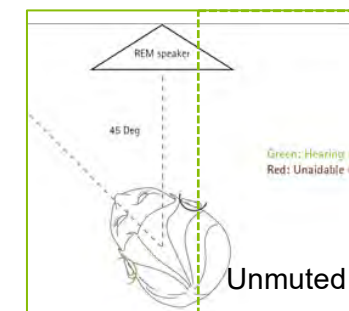
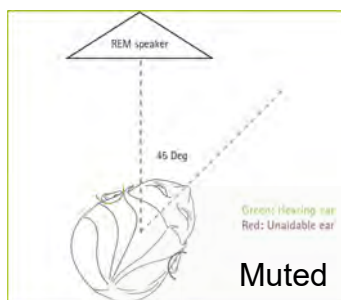


Gap demonstrates head shadow

REAR 1 (HA On)
REAR 2 (CROS On)

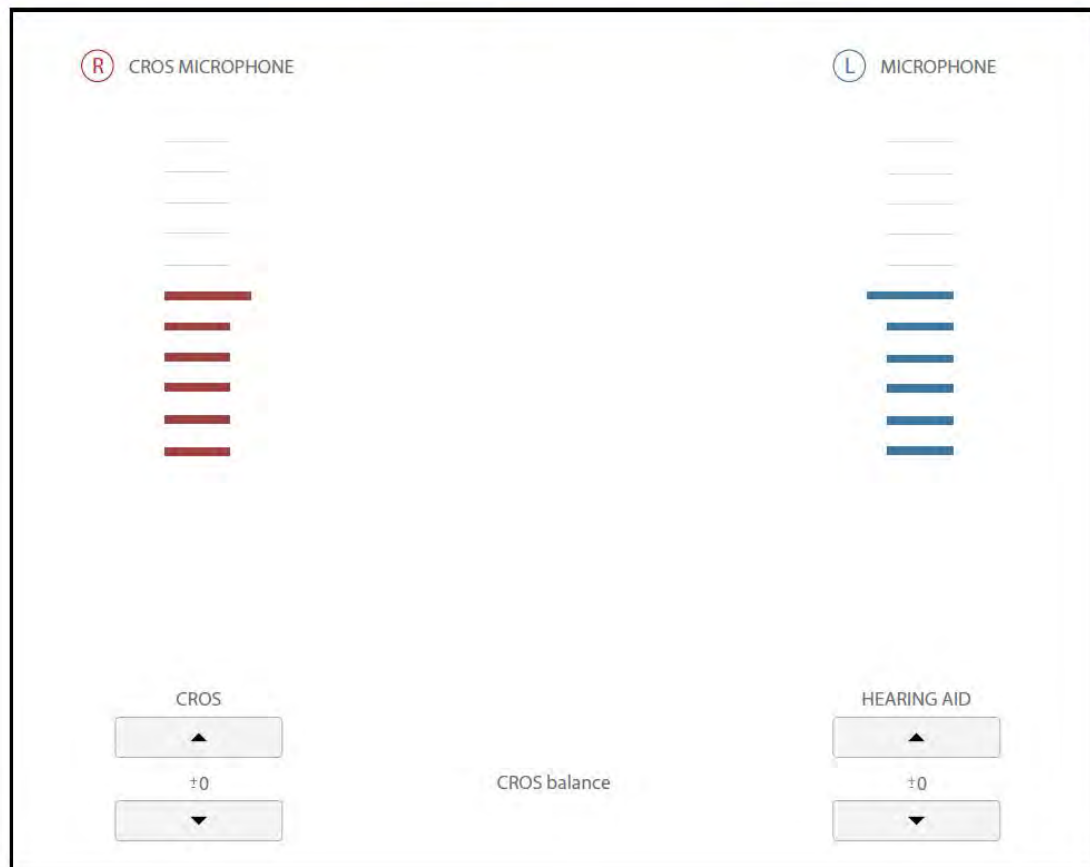


Head shadow gap closed



Software adjustments

Fitting Calm situation <=> Global tuning <=> CROS balance

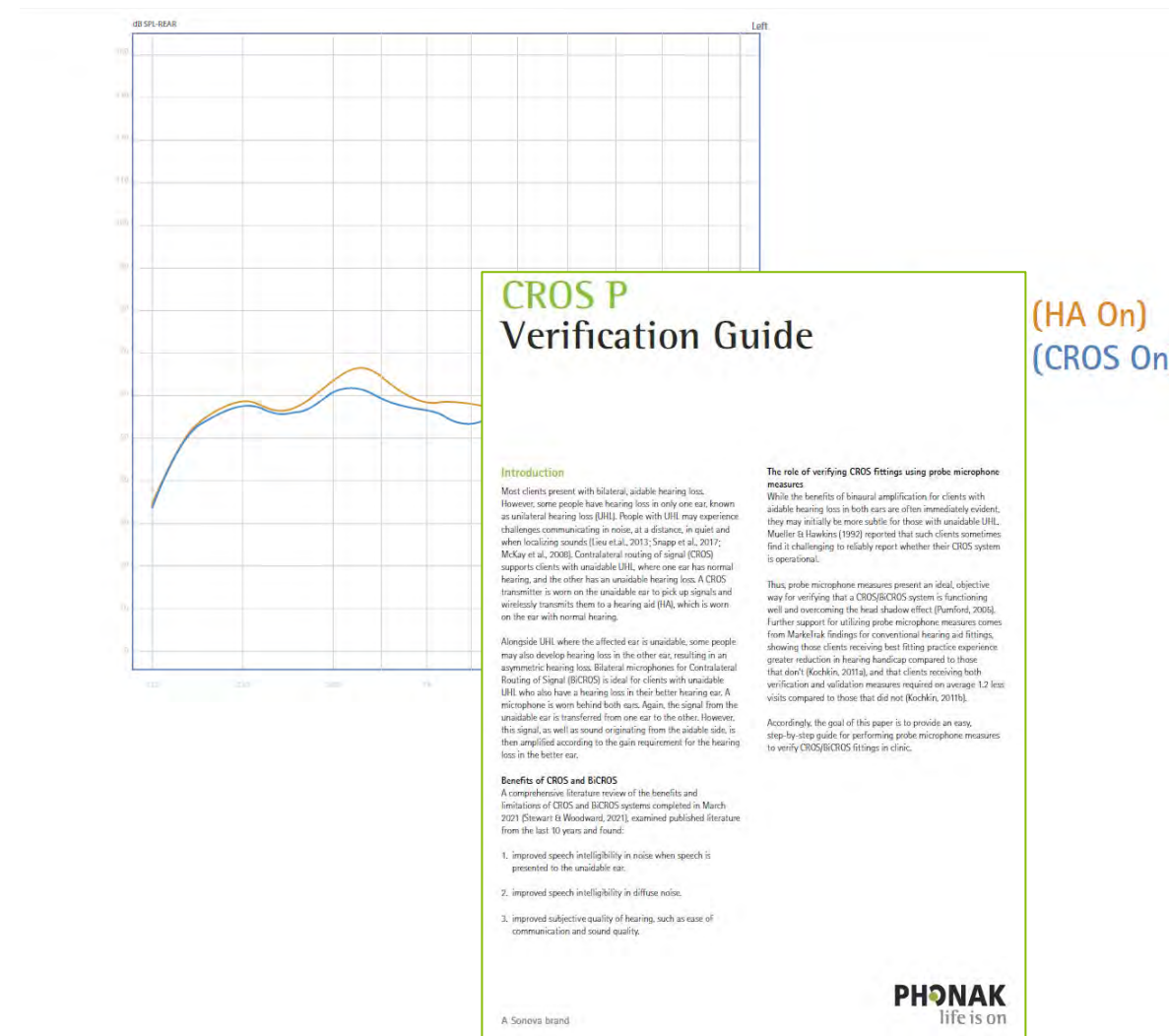


Fitting Calm situation <=> Fine tuning <=> Gain & MPO

MPO	75	90	98	101	102	106	108	105	99	89
ALL	250	500	750	1k	1,5k	2k	3k	4k	6k	8k
G80	1	1	3	8	13	18	22	20	14	5
G65	1	3	8	13	17	24	29	27	22	13
G50	1	2	11	16	21	29	35	33	28	20
CR	1	1	1,3	1	1,4	1,5	1,7	1,8	1,9	2,1

Key messages

- Seeing is believing
- Highlight the kinesthetic benefits
- The goal is “usually” naturalness



Remote microphone real ear tests

- A streaming microphone is easy to demonstrated
- Limited clinical utility of real ear measurement for remote mics in adults
- Pediatric applications and troubleshooting can be very useful

Phonak Roger™ verification guide

Phonak Offset Protocol (POP) for Roger (02) receivers

Contents

Contents	1
Description and background	1
Preparing the Roger microphone and hearing aid for verification	2
Connect the microphone and receivers	3
Measuring the responses – Roger Touchscreen Mic	3
Measuring the responses – Roger Select and Roger On	4
Checking transparency	5
Roger advantage worksheet	5
Adjusting receiver gain	5

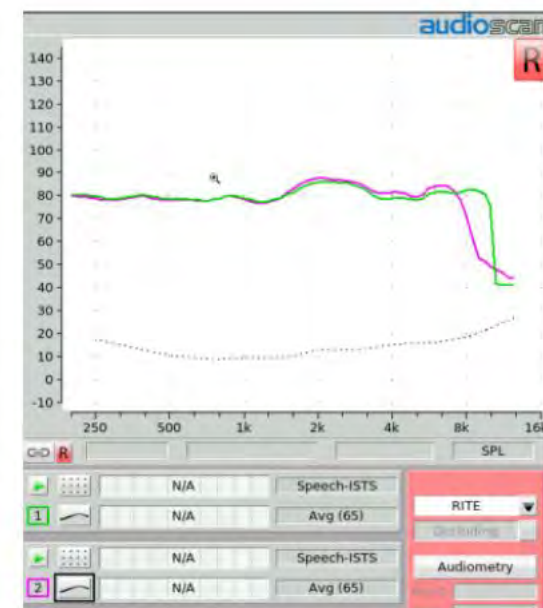
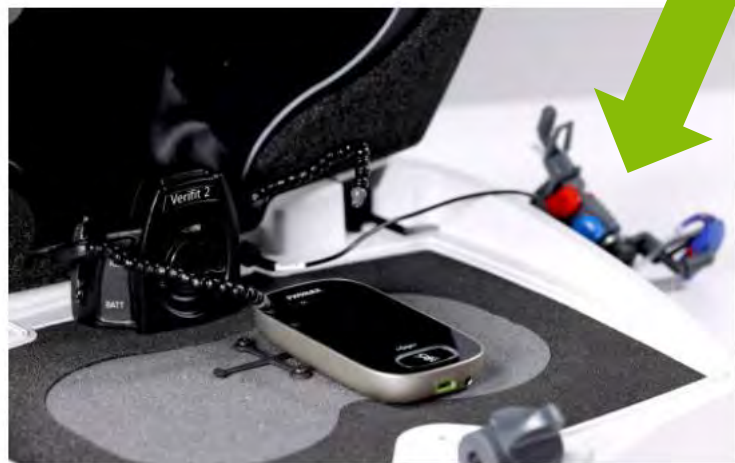
Description and background

This document describes how a Roger system can be verified in a hearing aid test box. The protocol is valid for all Roger microphones.

Gain adjustments can be done using the Roger Touchscreen Mic (TSM), Roger Select™, Roger Select™ (iN), Roger On™ or Roger On™ (iN).

The protocol is based on the fact that the Roger advantage setting of the Roger receiver results in a transparent behavior below the Roger transmitter kneepoint, i.e. below 75 dB SPL, ensuring users receive appropriate benefit from the Roger system.

Testing basics



Test 1: Hearing aid in test box – TSM muted

Test 2: Roger microphone in test box – unmuted

A solid green circle is located on the left side of the slide, partially cut off by the edge.

Summary: Getting real (ear) with Phonak hearing aids

- Why? To know what's happening in the ear
- How? Consider your pre-verification steps
- When and where does it fit into your process?
- What are some tools to make it easy
 - Verification assistant
 - TargetMatch

Together,
we change lives