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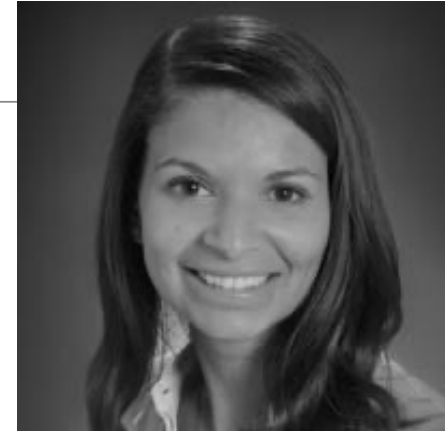




Advanced Hearing Aid Programming: Applications to the Pediatric Population

Brittany Cuevas, Au.D, F-AAA, CCC-A

Brittany Cuevas, AuD, F-AAA, CCC-A



Dr. Brittany Cuevas completed her Doctorate of Audiology in 2017 and currently is a pediatric audiologist at Children's Wisconsin. Dr. Cuevas has always enjoyed working with hearing aids but her passion for it evolved when she became the lead for the Hearing Aid Committee at Children's Wisconsin. This afforded her the opportunity to work closely with the manufacturer representatives, ensuring she and her colleagues remained up to date on new technology and software features. Dr. Cuevas was diagnosed with bilateral hearing loss at the age of 5 and understands and appreciates the importance of quality technology and effective hearing aid programming, particularly for the pediatric population.

Disclosures

- **Presenter Disclosure:** Financial: Brittany Cuevas is employed by Children's Wisconsin. She received an honorarium for this presentation. Non-financial: Brittany Cuevas has no relevant non-financial relationships to disclose.
- **Content Disclosure:** This learning event focuses exclusively on the programming of Oticon and Phonak hearing aids for pediatrics.
- **Sponsor Disclosure:** There is no external sponsor for this course.

Learning Outcomes

After this course, participants will be able to:

- Explain the advanced features within Phonak and Oticon software for pediatric hearing aids and state their importance.
- Explain the similarities and differences of the advanced features for each manufacturer software.
- Discuss how to appropriately and effectively apply the advanced features when programming pediatric hearing aids.

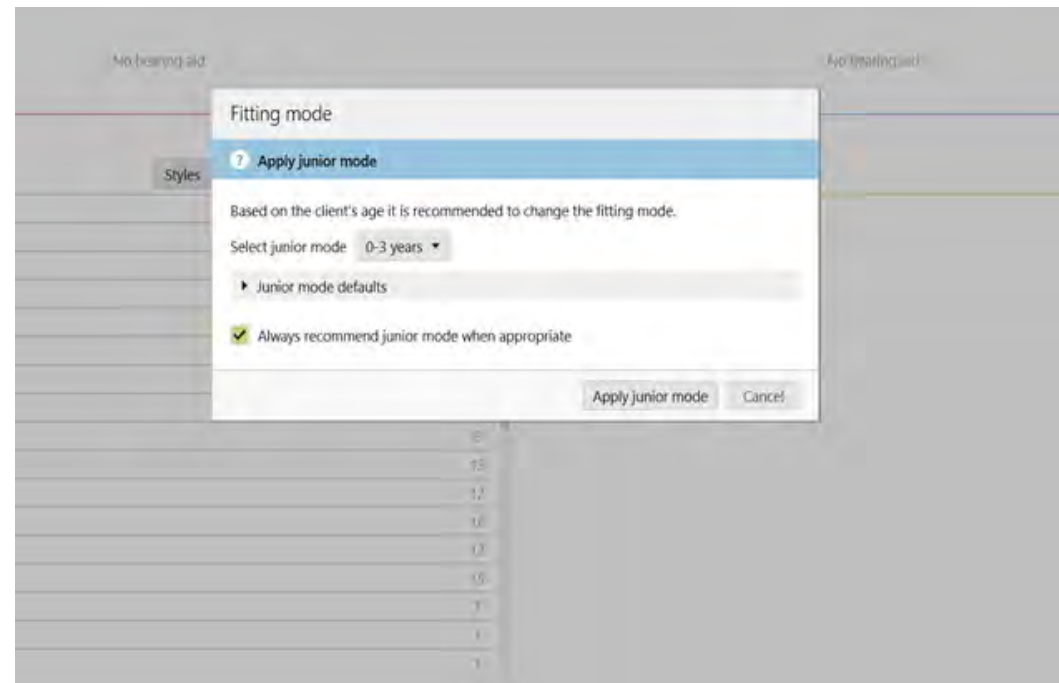
Agenda

- Default Pediatric Settings
- Feedback Manager
- Noise Reduction Management
- Verification
- Additional Advanced Features

DEFAULT PEDIATRIC SETTINGS

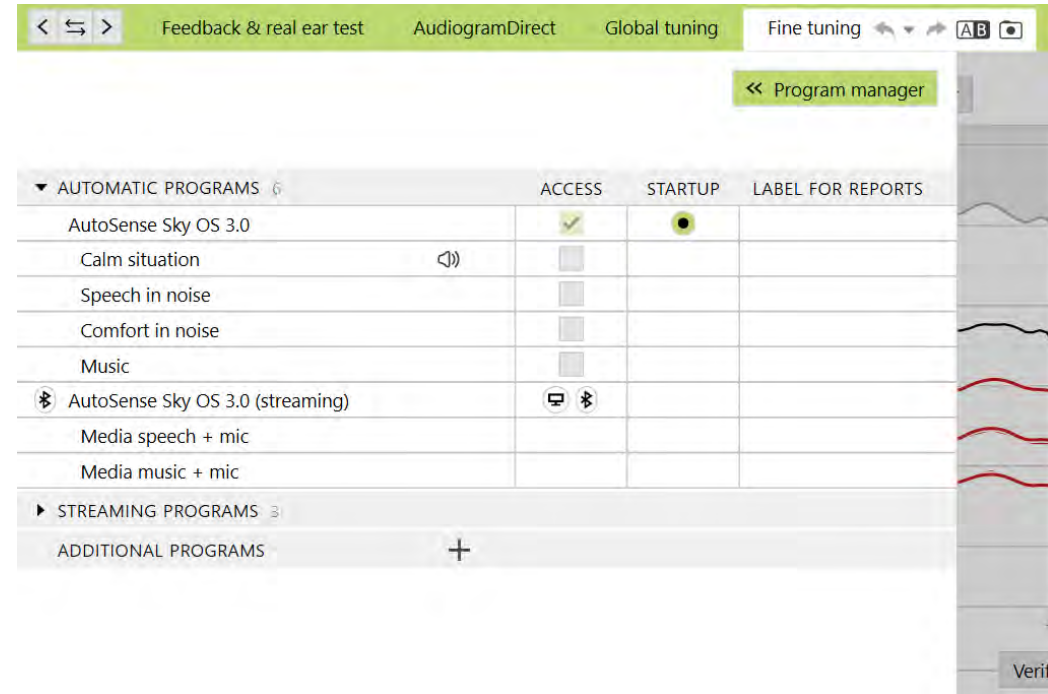
PHONAK-JUNIOR MODE

- Junior mode consists of the defaults set for certain age ranges
- Should apply junior mode to the age range that applies to your patient



PHONAK-JUNIOR MODE

- Autosense OS or Sky OS (directional microphone) is the startup program in any junior mode for Marvel and Paradise. *Venture and Belong, will start up in Roger.*
 - Automatic operational system that will allow the blending of programs for optimal listening environment.
 - Always active and adjusting
 - Calm/Quiet-goes omnidirectional
 - Speech/Noise present-goes directional



PHONAK-JUNIOR MODE

- Omnidirectional is recommended for patients 0-3 years of age to give them access to all sounds for incidental learning.
- If want omnidirectional, would make adjustments to Hearing Aid Microphone under Fine Tuning, Program Options.

Navigation: < ↺ > Feedback & real ear test AudiogramDirect Global tuning **Fine tuning** ↶ ↷ A B DataLogging Device options

Program manager >>

ALL PROGRAMS

▼ AUTOMATIC PROGRAMS 6

- AutoSense Sky OS 3.0
- Calm situation** 🔊
- Speech in noise
- Comfort in noise
- Music
- AutoSense Sky OS 3.0 (streaming)
- Media speech + mic
- Media music + mic

▶ STREAMING PROGRAMS 3

ADDITIONAL PROGRAMS +

Hearing aid microphone

Real ear sound 4

SoundRelax 7 Weak

NoiseBlock 0 Off

WindBlock 0 Off

WhistleBlock 17 Strong

Navigation: < ↺ > Feedback & real ear test AudiogramDirect Global tuning **Fine tuning** ↶ ↷ A B DataLogging Device options

Program manager >>

ALL PROGRAMS

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▶ STREAMING PROGRAMS 3

ADDITIONAL PROGRAMS +

Hearing aid microphone

Omni directional 0

SoundRelax 7 Weak

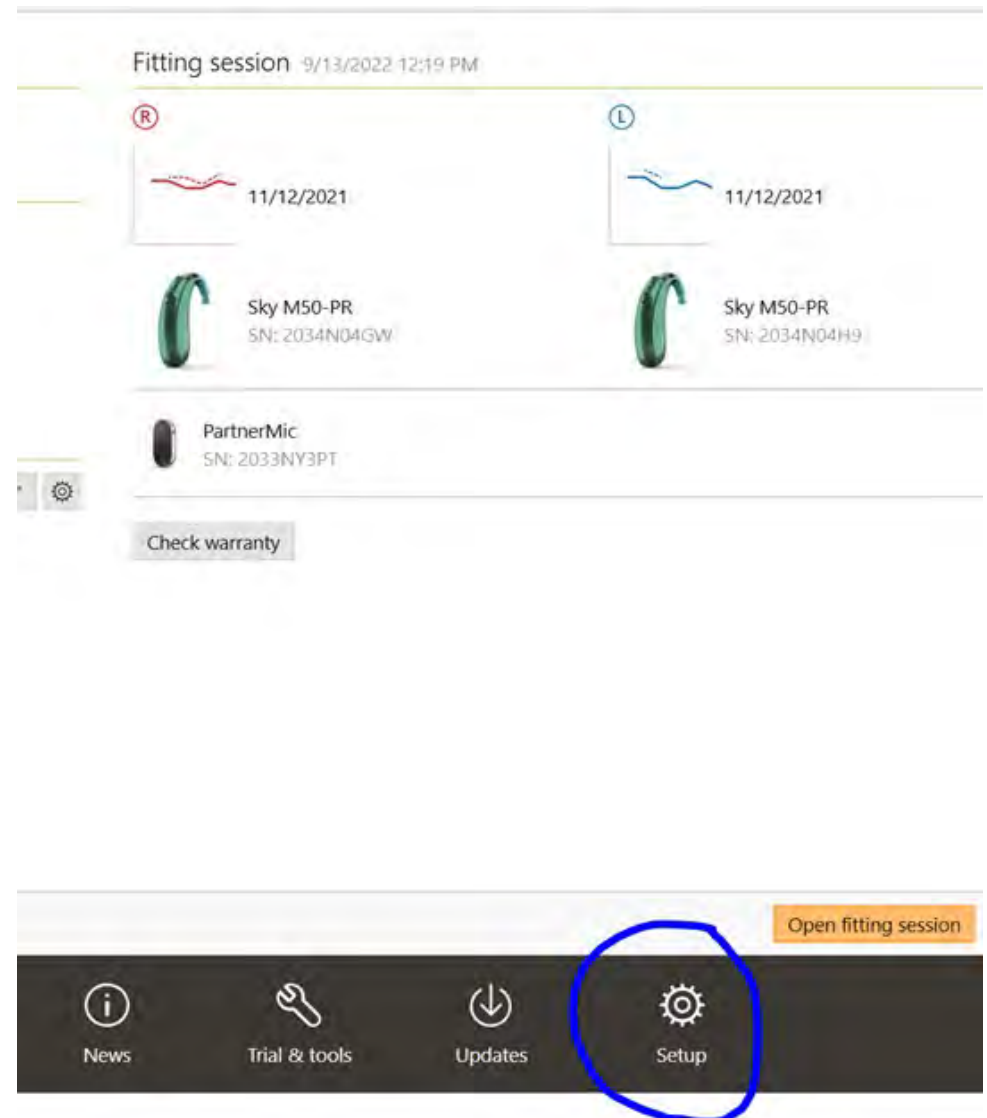
NoiseBlock 0 Off

WindBlock 0 Off

WhistleBlock 17 Strong

PHONAK-JUNIOR MODE

- Can make changes to default settings for Junior mode in Set Up
 - Note the changes you make apply to all patients in Noah, not just to your patient if in Target mode
 - Otherwise make the changes in Program Manager by adding a program



Setup

General My profile Fitting session **Junior mode** Reports Fitting device Sound system Internet

Defaults 0-3 years 4-8 years 9-12 years 13-18 years

- ▶ Acoustic parameters
- ▶ Fitting formula
- ▶ Program manager
- ▶ Device options
- ▶ Program options
- ▶ DataLogging

Setup

General My profile Fitting session **Junior mode** Reports Fitting device Sound system Internet

Defaults 0-3 years 4-8 years 9-12 years 13-18 years

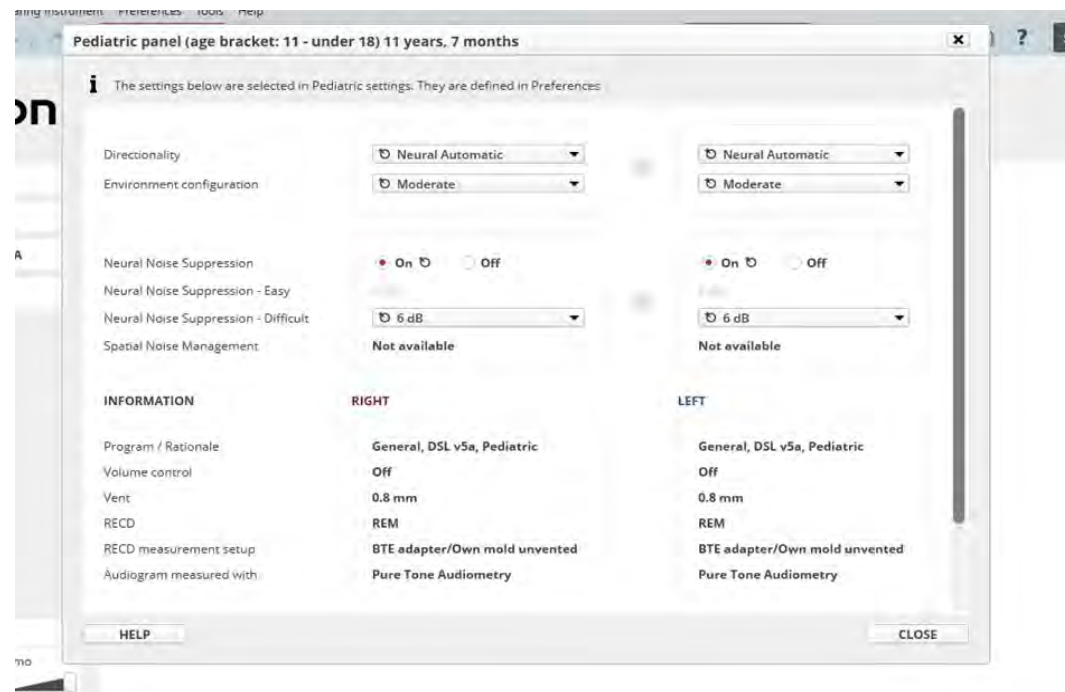
- ▶ Acoustic parameters
- ▼ Fitting formula

	0-3 years	4-8 years	9-12 years	13-18 years
Default fitting formula	DSL v5a Pediatric	DSL v5a Pediatric	DSL v5a Pediatric	DSL v5a Pediatric
- ▼ Program manager

	0-3 years	4-8 years	9-12 years	13-18 years
Startup	Startup	Startup	Startup	Startup
Automatic programs	Enabled	Enabled	Enabled	Enabled
1 First priority	Roger/DAI + mic	Roger/DAI + mic	Roger/DAI + mic	Roger/DAI + mic
2 Second priority	None	None	None	None
3 Third priority	None	None	None	None
RogerReady	Roger/DAI + mic	Roger/DAI + mic	Roger/DAI + mic	Roger/DAI + mic
EasyPhone	None	Phone	Phone	Phone
Mute program	Disabled	Disabled	Disabled	Disabled
- ▶ Device options
- ▶ Program options
- ▶ DataLogging

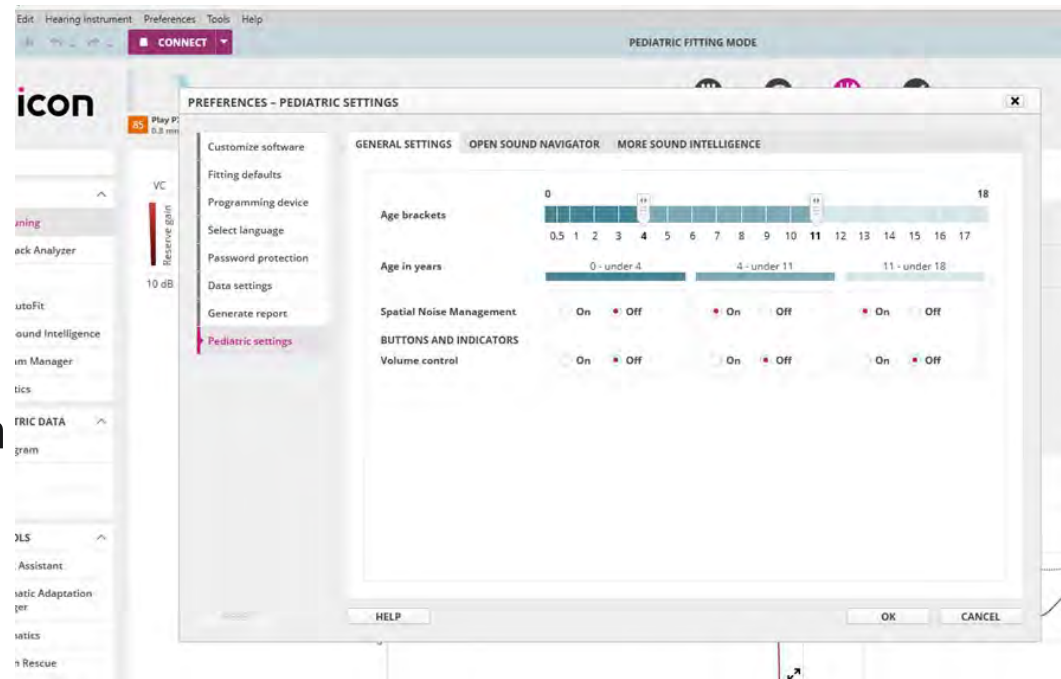
OTICON-PEDIATRIC PANEL

- When open the software, the Pediatric Panel will always populate.
- Based on the age of the child, Oticon has default settings they will apply.



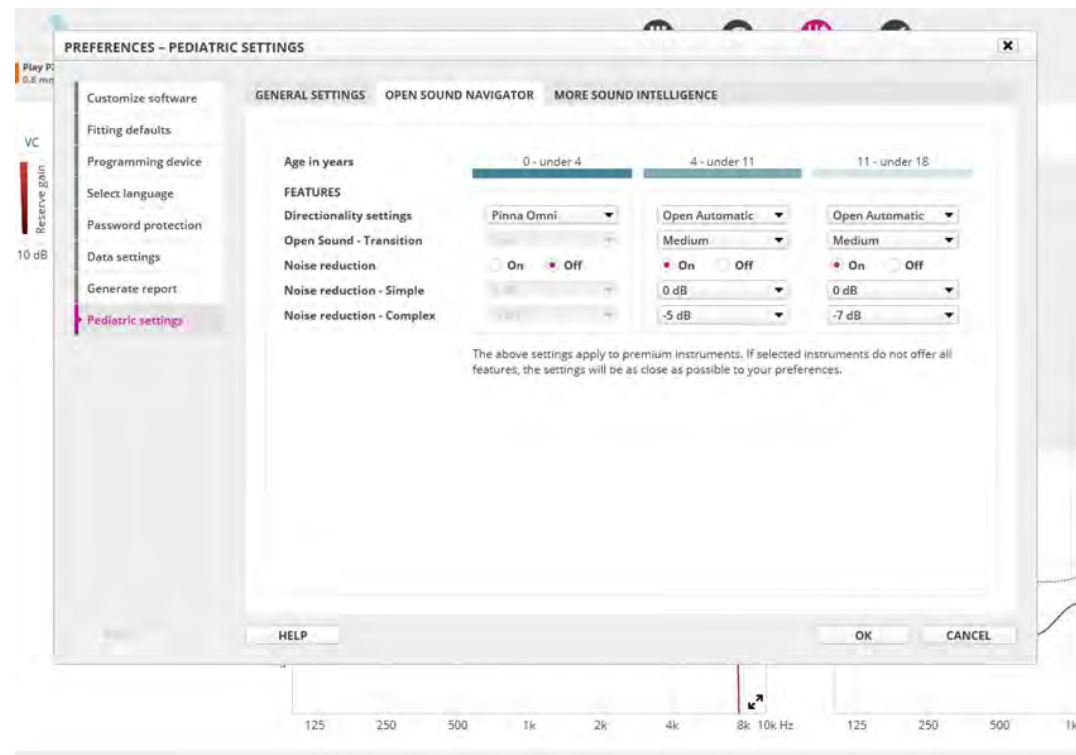
OTICON-PEDIATRIC PANEL

- The default settings can be adjusted under Preferences, Pediatric Settings
 - If you make changes to the default settings, it applies to all patients in NOAH
 - If want to apply just to the patient, can make changes in the Pediatric Panel and also under Program Manager or More Sound Intelligence, for example, based on the concerns



OTICON-PEDIATRIC PANEL

- Open Automatic
 - Simply Open Sound Navigator
- Pinna Omni
 - Microphone in omnidirectional mode at all times with a little bit of pinna affect which allows for more focus



FEEDBACK MANAGER

PHONAK

- Recommend to run for new fittings, following program adjustments and new earmold fittings
- Recommend to run for own voice pick up via Bluetooth (stream calls)
- WhistleBlock-cancels out momentary feedback
 - Wearing a hat or giving a hug
 - Can adjust under Fine Tuning, Program Options

PHONAK

- The curves represent the available gain for a 50 dB speech input
- The purple line is the feedback threshold line
- The red and blue curves are the feedback measurements from the hearing aids and we want there to be space from the threshold line and the red and blue curves



OTICON

- Run feedback manager as needed
 - Have automatic feedback management features
- Believe other adjustments can be made to alleviate feedback prior to running feedback manager

OTICON

OPN Play

- Open Sound Optimizer
 - Proactively detects and prevents feedback (even before it occurs)
 - Uses “ultra-fast” signal processing
 - Can provide more gain and allow for more open fittings without compromising sound quality or audibility
- Feedback Shield LX
 - Dual-microphone feedback system for reducing and suppressing feedback
 - Stable adaptive system
- Open Sound Optimizer and Feedback Shield LX work together, to avoid false detections, allowing for greater flexibility in the fitting process

Play PX and More

- MoreSound Optimizer
 - Proactively detects and prevents feedback (even before it occurs)
 - Uses “ultra-fast” signal processing
 - Gives access to speech details with “more natural sound, increased comfort, and improved speech understanding
- Feedback Shield
 - Dual-microphone feedback system for reducing and suppressing feedback
 - Stable adaptive system
- MoreSound Optimizer and Feedback Shield work together, to avoid false detections, allowing for greater flexibility in the fitting process

P1 P2

FITTING

Fine-tuning

Feedback Analyzer

REM

REM AutoFit

MoreSound Intelligence

Program Manager

Acoustics

AUDIOMETRIC DATA

Audiogram

RECD

REUG

MORE TOOLS

Fitting Assistant

Automatic Adaptation Manager

Automatics

TRANSIENT NOISE MANAGEMENT

Transient Noise Management removes the discomfort of sudden, loud sounds without sacrificing the audibility of speech.

OFF

LOW

MEDIUM

SPATIAL NOISE MANAGEMENT

Spatial noise management uses the spatial information shared between ears via binaural wireless technology. It allows the client to focus attention on the ear with the best signal-to-noise ratio. The audibility of speech is maximized on this ear.

OFF

ON

BINAURAL BROADBAND

Binaural Broadband controls all wireless binaural communication between hearing instruments. This includes binaural synchronization and binaural coordination of features and controls such as VC, mute and programs. If you turn Binaural Broadband off, all binaural processing will be off.

OFF

ON

FEEDBACK MANAGEMENT

NORMAL is the default setting. It compensates for acoustic feedback across the entire frequency range. LOW provides a reduced level of feedback margin and may be suitable in listening situations in which the client complains about compromised sound quality. If you turn this feature off, feedback may occur.

RIGHT SIDE

OFF

LOW

NORMAL

LEFT SIDE

OFF

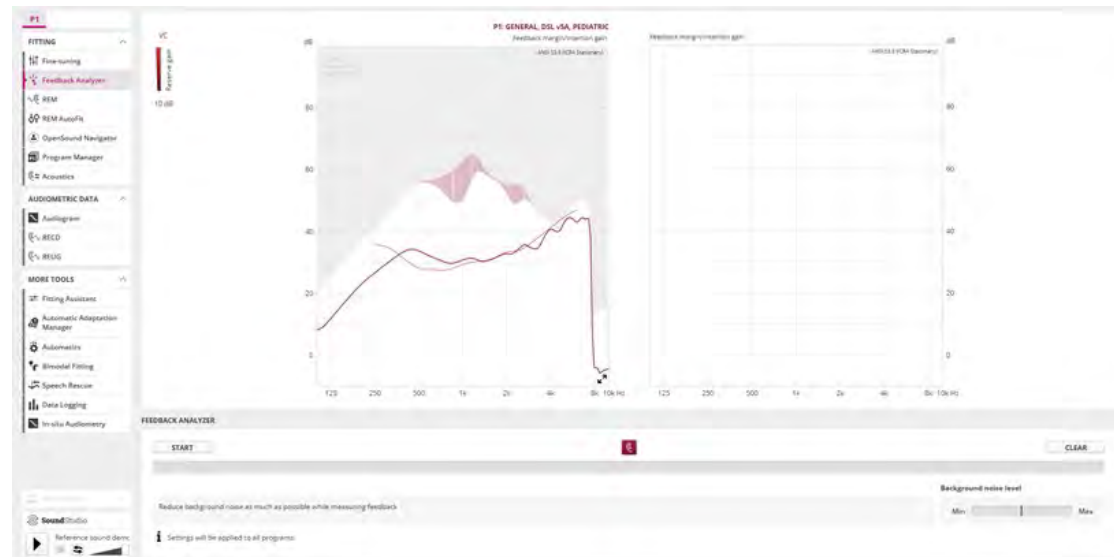
LOW

NORMAL

20

OTICON-FEEDBACK ANALYER

- Shaded area is the area of feedback risk
- The solid and dotted lines are stimulated (coupler or RECD) and target insertion gain, respectively
 - Typically will overlap but the solid line will change based on RECD input or gain adjustments
- Want there to be space from shaded area and the solid line



OTICON-FEEDBACK ANALYZER

- Where see a dip from the dotted line, is where there was feedback and the feedback analyzer decreased the gain automatically to eliminate the feedback



NOISE REDUCTION MANAGEMENT

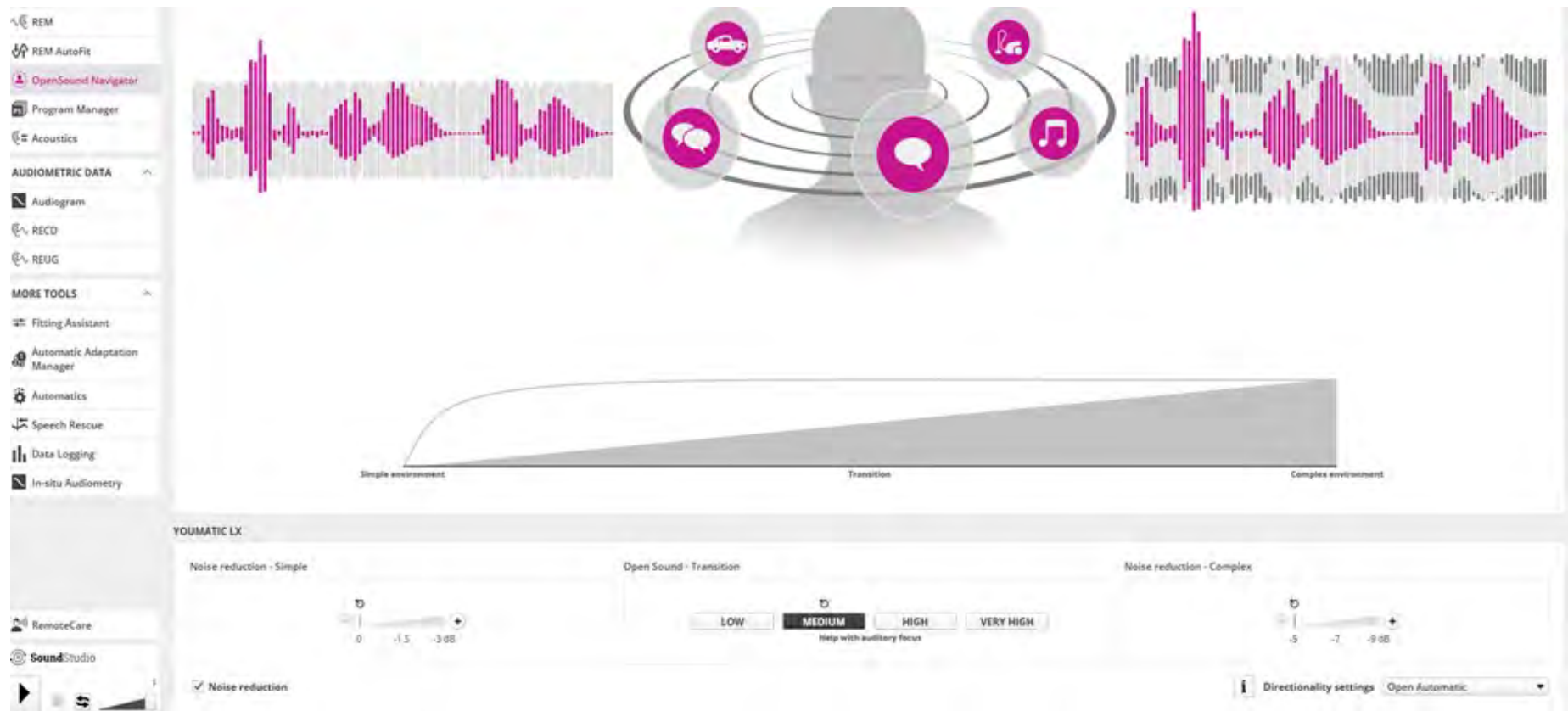
PHONAK

- Program Manager
 - Speech in Noise
 - Improved speech intelligibility and comfort in noisy environments
 - Comfort in Noise
 - Improved listening comfort in noisy environments
- Fine Tuning
 - Audibility and Automatic Fine Tuning
 - Program Options
 - NoiseBlock-reduces uncomfortable environmental noise while maintaining optimal sound quality

OTICON

OPN Play

- Open Sound Navigator
 - Open Sound Transition
 - Amount of help with auditory focus
- Noise Reduction
 - Amount of noise reduction applied to minimize background noise



OTICON

Play PX and More

- More Sound Intelligence
 - Neural automatic = Open automatic
 - Neural noise suppression
 - Suppresses noise
 - When box is checked, on and active
- Virtual Outer Ear
 - Compensates for loss of pinna effect
 - Essentially provides frontal focus to awareness of surrounding sounds
- Sound Enhancer
 - Enhances speech sounds, primarily 1000-4000 Hz

P1

FITTING

Fine-tuning

Feedback Analyzer

REM

REM AutoFit

MoreSound Intelligence

Program Manager

Acoustics

AUDIOMETRIC DATA

Audiogram

RECD

REUG

MORE TOOLS

Fitting Assistant

Automatic Adaptation Manager

Automatics

Speech Rescue

ENVIRONMENT CONFIGURATION

Which situations are Easy or Difficult for your client?

EASY

Simple

Moderate

Complex

DIFFICULT

EASY ENVIRONMENT

Virtual Outer Ear

Balanced

Not adjustable

Neural Noise Suppression - Easy

0 dB

Not adjustable

DIFFICULT ENVIRONMENT

Neural Noise Suppression - Difficult

4

6 dB

Sound Enhancer

Comfort

Not adjustable

Directionality settings

Neural Automatic

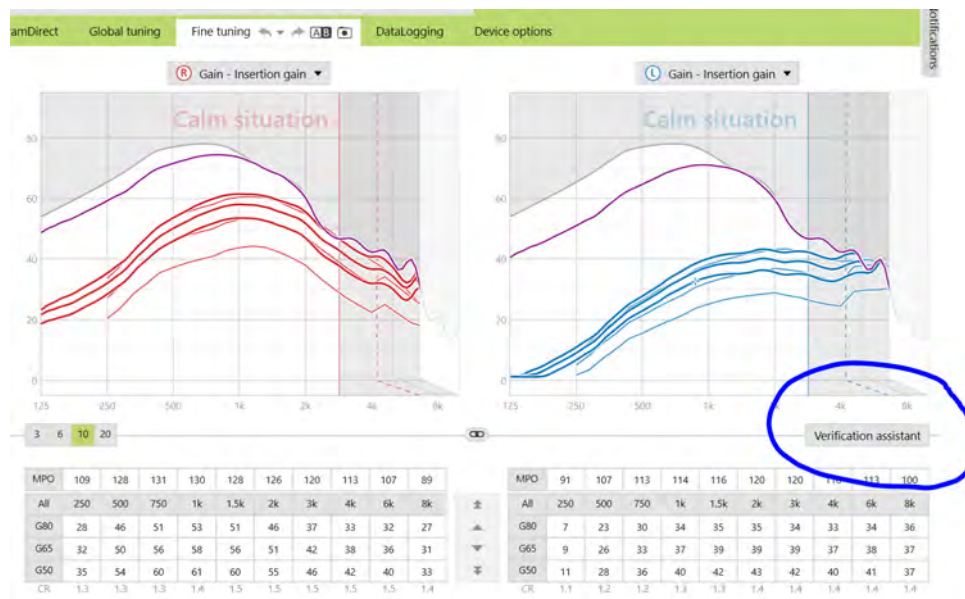
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VERIFICATION

PHONAK

Verification Assistant

- Step by step process/guide for verifying hearing aids if you do not have your own protocol
 - Want verification assistant to guide you through hearing aid verification
- Turns off all extra features and confirms gain targets without those features
 - Allows for ability to easily follow University of Western Ontario (UWO)'s recommended protocol for verifying frequency lowering devices
- When verifying hearing aids with the Verifit, can make gain adjustments to meet targets through verification assistant



Verification assistant

1 Preparation 2 Type 3 Program 4 Verification

Fitting is based on following acoustic parameters:

- Tube Standard

Earpiece Ear mold

Vent AOV

Hook Damped

Tubing option Standard
- Tube Standard

Earpiece Ear mold

Vent AOV

Hook Damped

Tubing option Standard

Use the following values in the test equipment:

</

Important information

- All adaptive features will be turned off during verification.
- Use a modulated speech input (i.e. ISTS, ICRA) during verification.
- Fitting formula: Adaptive Phonak Digital

Continue Cancel

Verification assistant

1 Preparation 2 Type 3 Program 4 Verification

VERIFICATION TYPE

- ☒ Test box verification
- ☐ REM verification

Back

Continue Cancel

Verification assistant

1 Preparation 2 Type 3 Program 4 Verification

ACTIVE PROGRAM

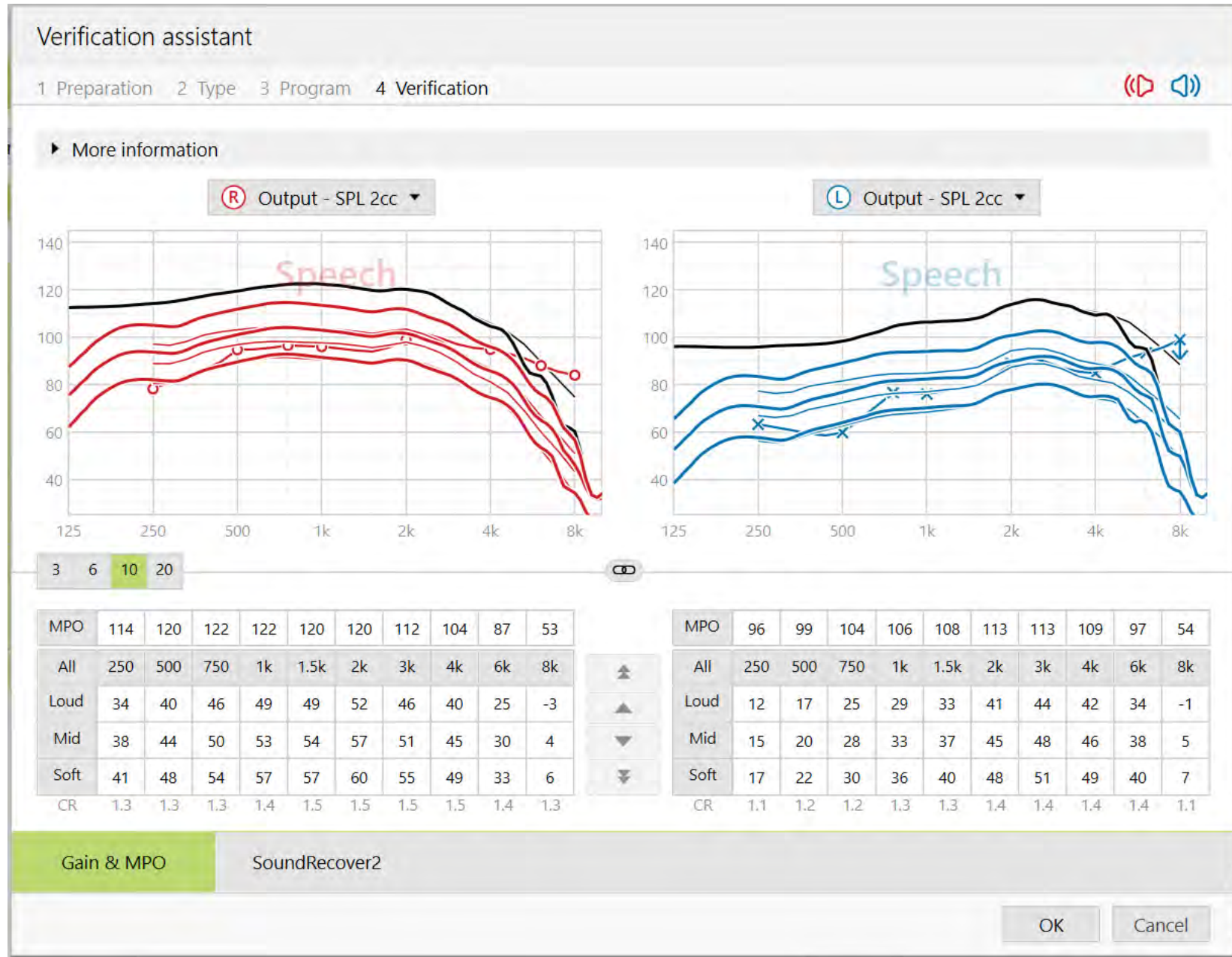
- ☒ Startup program
- ☐ Other program

AFFECTED PROGRAMS

- ☒ All programs
- ☐ Selected program only

Back

Continue Cancel



OTICON

REM Autofit

- Performs hearing aid verification for you
- It will verify the hearing aids once through then will automatically adjust the gain to match the prescribed targets
- You have the option to manually adjust the gain as well
- Have to manually run MPO because of loud sound input and stop it quickly if need too
- Can print the Verification report under File, Generate report
- If you do measured RECDs, those results will transfer as well
- Cannot do for speech rescue verification

P1

FITTING

- Fine-tuning
- Feedback Analyzer
- REM
- REM AutoFit**
- OpenSound Navigator
- Program Manager
- Acoustics

AUDIOMETRIC DATA

- Audiogram
- RECD
- REUG

MORE TOOLS

- Fitting Assistant
- Automatic Adaptation

BEFORE YOU START

1 Make sure that the acoustics and fitting levels in Genie 2 match the instruments.
Use the prescribed acoustics where possible.

ACOUSTICS

2 Make a feedback analysis.

RIGHT
Not measured

FEEDBACK ANALYZER

LEFT
Not measured

REM AutoFit measures the current instrument gain

REM AutoFit automatically adjusts gain to match the prescribed target.

You can also fine-tune manually.

Verifit[®] LINK

REM AutoFit with Verifit[®] LINK

1
SETUP

2
MEASURE

3
FINISH

Make your selection

Measurement method
Test Box

Fitting rationale
DSL child

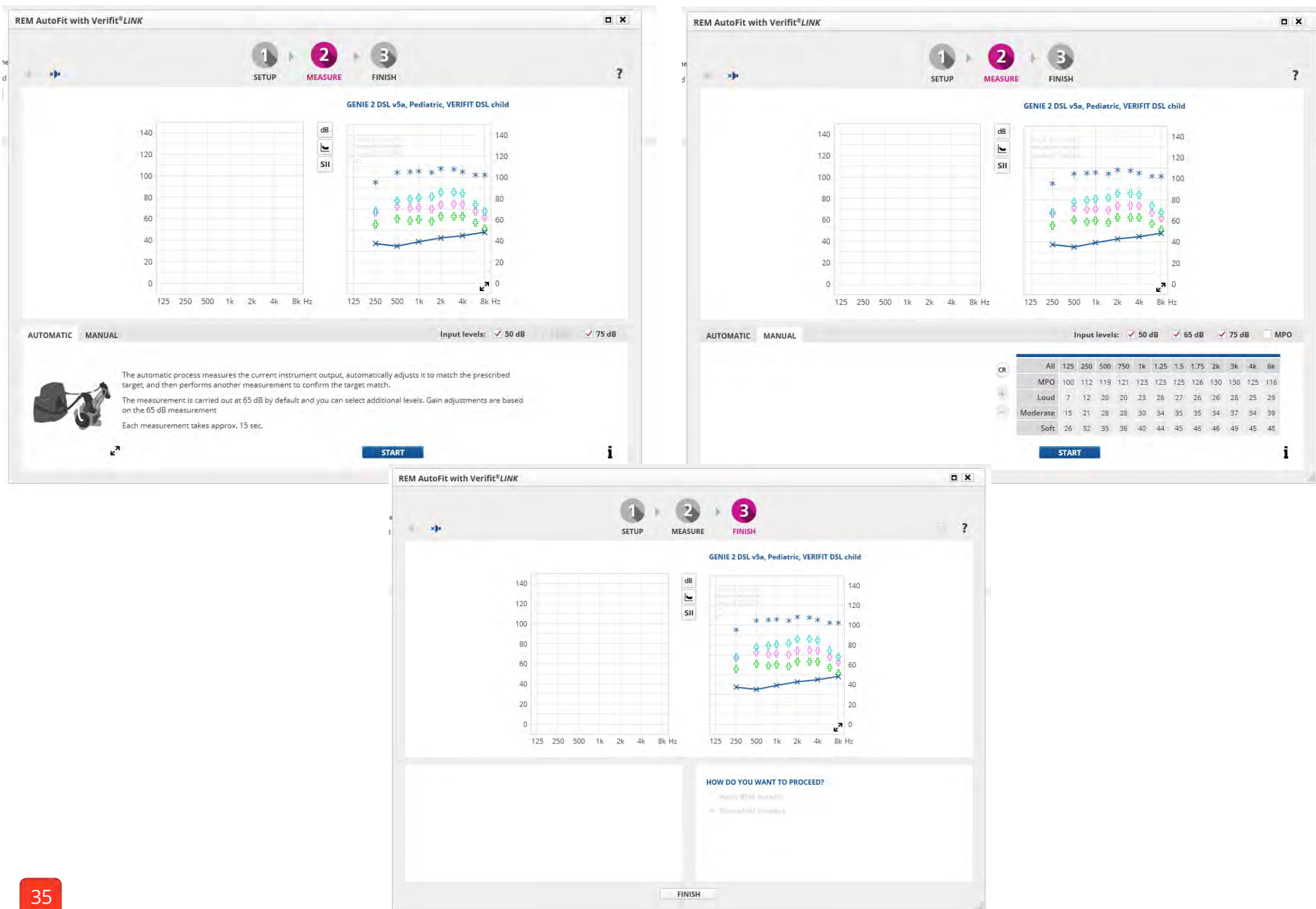
Signal type
Speech-std(F)

RECD source
Verifit average

Prepare test box

1. Make sure that you have selected the desired RECD source.
2. Attach the hearing instrument to the coupler using the appropriate coupling. See the Verifit User Guide for instructions.
3. Position the coupler and hearing instrument as shown.
4. Position the reference microphone next to the hearing instrument's front-facing microphone as shown.
5. Proceed to step 2: Measure

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SOUND RECOVER 2 AND SPEECH RESCUE

PHONAK

Sound Recover 2

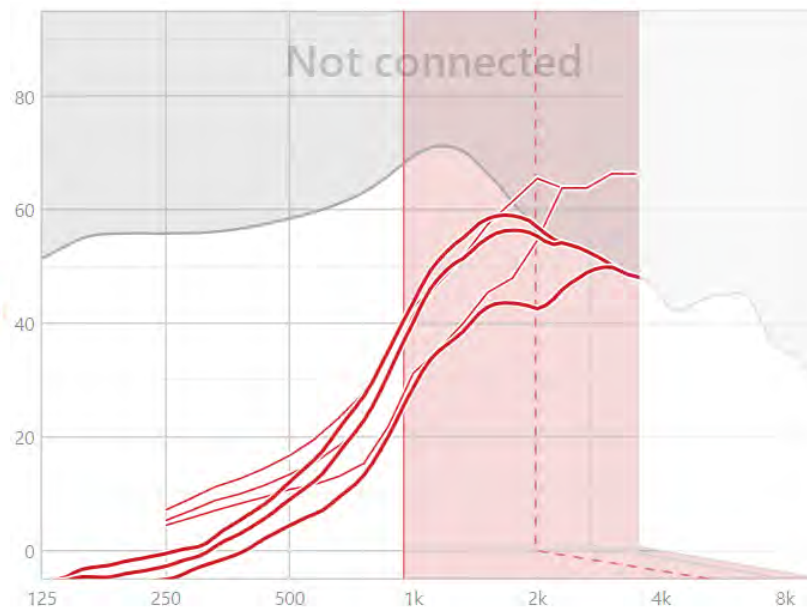
- Frequency lowering signal processing
- Purpose is “to lower high-frequency sounds into an audible range if these high frequency sounds cannot be made audible via conventional hearing aid processing”
 - Determined through verification when high frequency targets are not met
- It is adaptive meaning it carefully applies frequency compression to vowels versus consonants in running speech
 - Keeps low frequency vowel sounds clear, not muddy

PHONAK

Sound Recover 2

- When Enable, adjustments to Sound Recover 2 are automatically set as software sees fit
- Audibility-Distinction Slider
 - Adjust the frequency location and strength of compression ratio
 - “More frequency lowering is applied as the slider is moved to the left and less is applied as the slider moves to the right.”
 - Towards audibility, shift more to low frequency range
 - Towards distinction, distinguishing more between high frequencies like s vs. sh
- Clarity-Comfort Slider
 - Fine-tunes the adaptive Sound Recover 2 settings
 - “As the slider is moved to the right, the overall strength of Sound Recover 2 is made weaker.”
 - Do not recommend adjusting unless patient can provide feedback





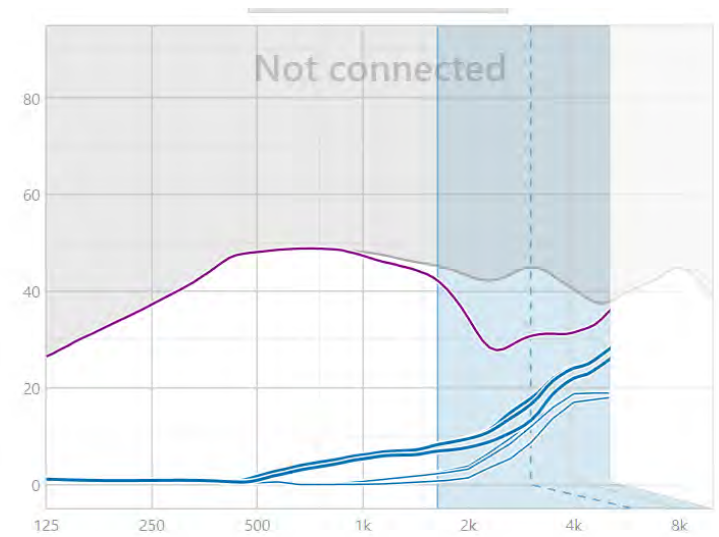
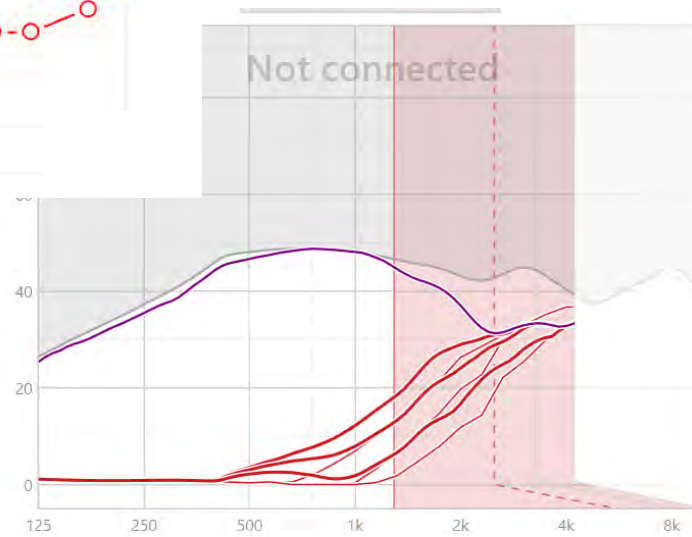
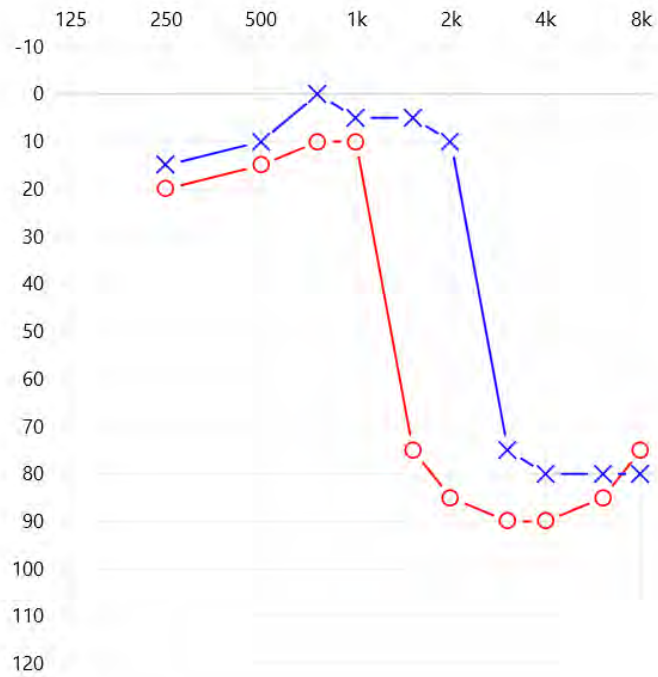
Select type Speech component - "SH-S-SH-S" ▼

☒ Enable SoundRecover2 (0.9 kHz CR 1.4)

Audibility 6 ⊗ Distinction

Clarity a ⊗ Comfort

Nk



Select type Speech component - "SH-S-SH-S"

✓ Enable SoundRecover2 (1.3 kHz CR 1.3)

Audibility 10 Distinction

Clarity a Comfort

✓ Enable SoundRecover2 (1.6 kHz CR 1.2)

Audibility 13 Distinction

Clarity a Comfort

OTICON

Speech Rescue

- Helps increase speech understanding “by ‘rescuing’ speech cues that might otherwise be lost”
 - Giving access to inaudible high frequency sounds
- ‘Copy and keep’ method
- Copies inaudible high frequency sounds, places them on the edge of the MAOF range, while preserving low frequencies so that vowel information and sound quality are maintained

OTICON

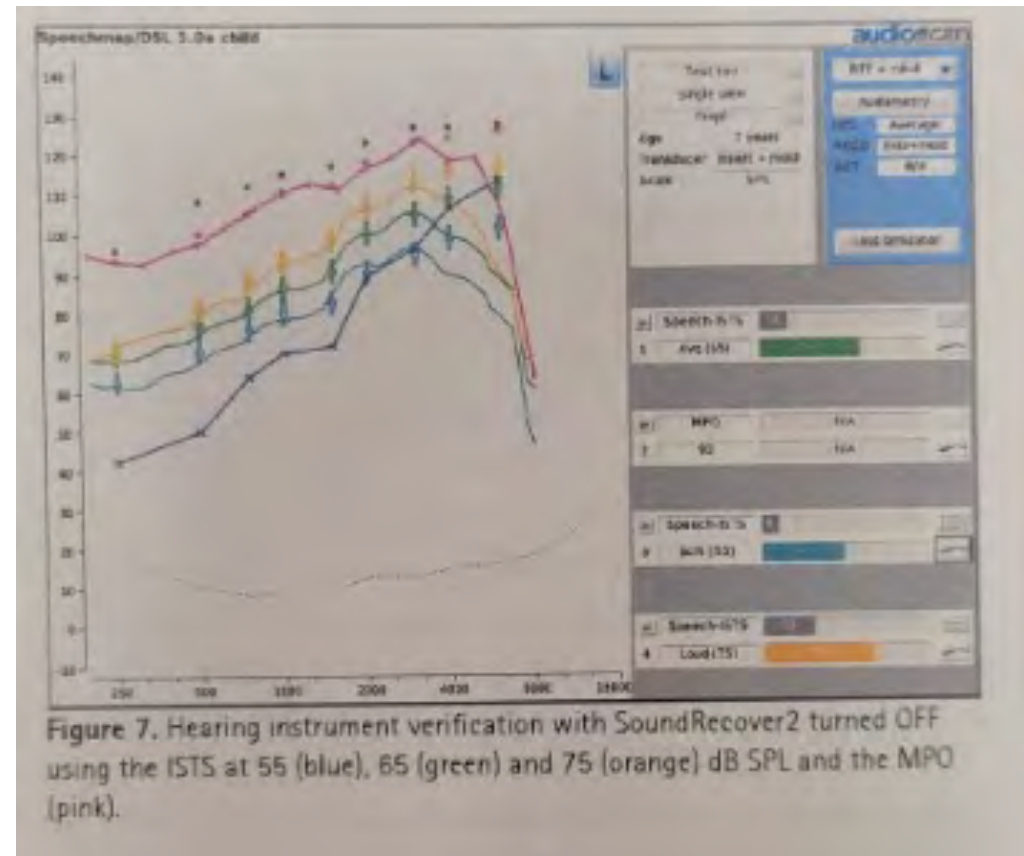
Speech Rescue

- When Enable, adjustments to Speech Rescue are automatically set as software sees fit
- Configuration Slider
 - Adjusts audibility of the /s/ stimulus
 - At default is where understanding of /s/ is going to kick in (knee point)
- Strength Slider
 - Applies increased gain to where /s/ stimulus is located within the frequency transposition range while maintaining its frequency location within the MAOF range
 - Increases the volume of the /s/ stimulus
- High Frequency Bands
 - Leaving gain on for high frequencies past the shaded region
 - Gives some clues to help patient differentiate certain high frequency sounds
 - Turning it off removes the gain for those frequencies
 - If have feedback issues and exhausted all other options, turn this off



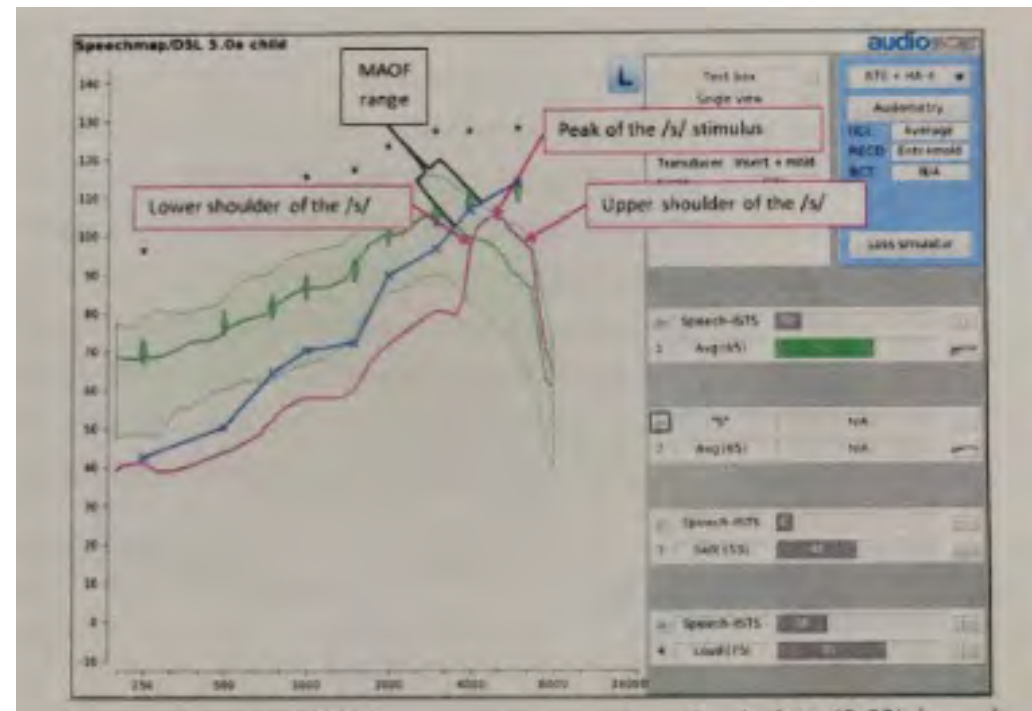
SOUND RECOVER 2 AND SPEECH RESCUE VERIFICATION

- It is recommended to verify Sound Recover 2 and Speech Rescue to check and confirm that targets are being met and patient has access to all the important speech frequencies
- Recommendations:
 - 1. Verify the hearing aid(s) with Sound Recover 2 and Speech Rescue turned off



SOUND RECOVER 2 AND SPEECH RESCUE VERIFICATION

- 2. Run and measure the /s/ stimulus using 65 dB SPL with Sound Recover 2 and Speech Rescue OFF



SOUND RECOVER 2 AND SPEECH RESCUE VERIFICATION

- 3. Run and measure the /s/ stimulus using 65 dB SPL with Sound Recover 2 and Speech Rescue ON

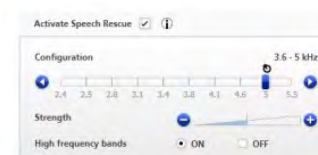
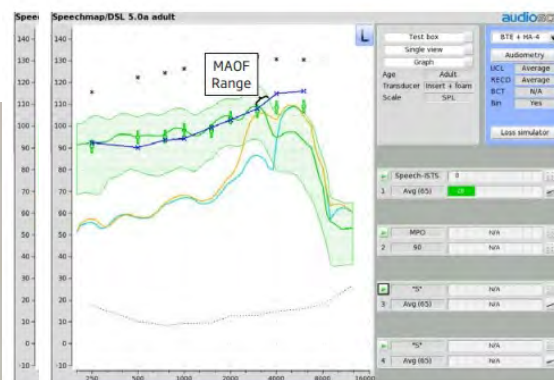
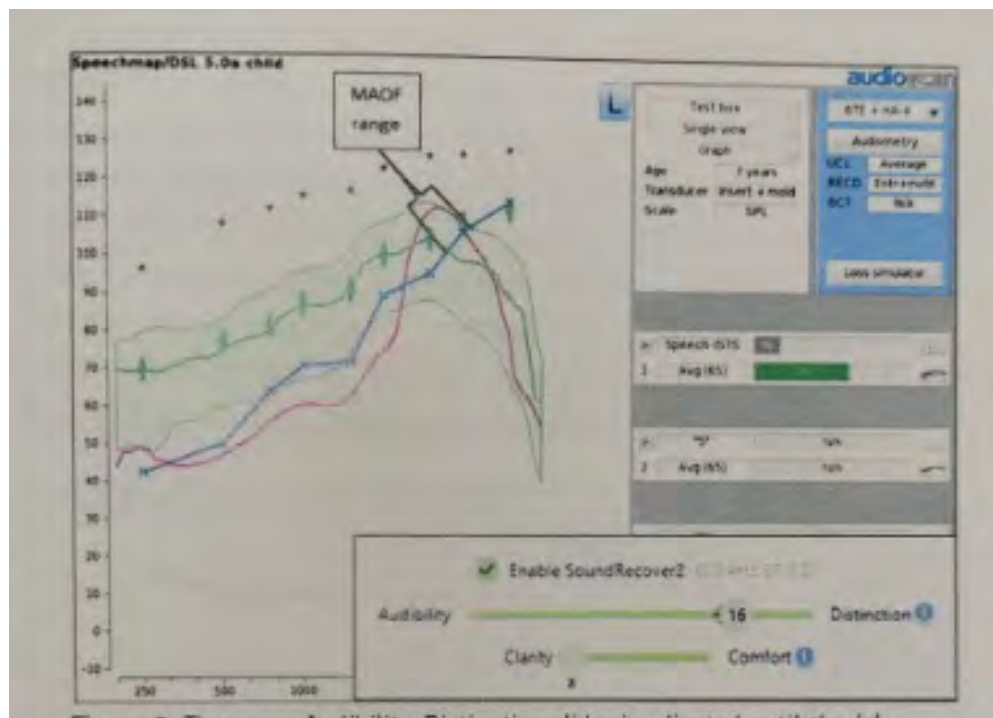


Figure 3: Verification of a fitting for the audiogram using the ISTS speech passage (green) and the /s/ stimulus with Speech Rescue turned OFF (blue) and ON at the default setting (orange). Note that there are two bumps on the orange curve because the Speech Rescue Processor uses a "Copy and Keep" approach i.e. the original high frequency /s/ is preserved. To the right the Speech Rescue tool in Genie shows the default speech configuration setting, as indicated by the sign , and default strength setting.

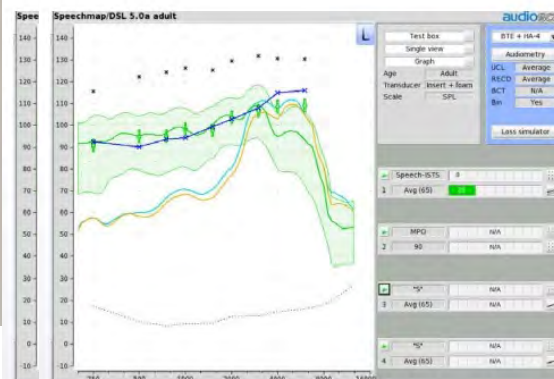


Figure 4: The default setting (orange) was fine-tuned by increasing the strength of Speech Rescue to maximize audibility of the /s/ stimuli (blue).

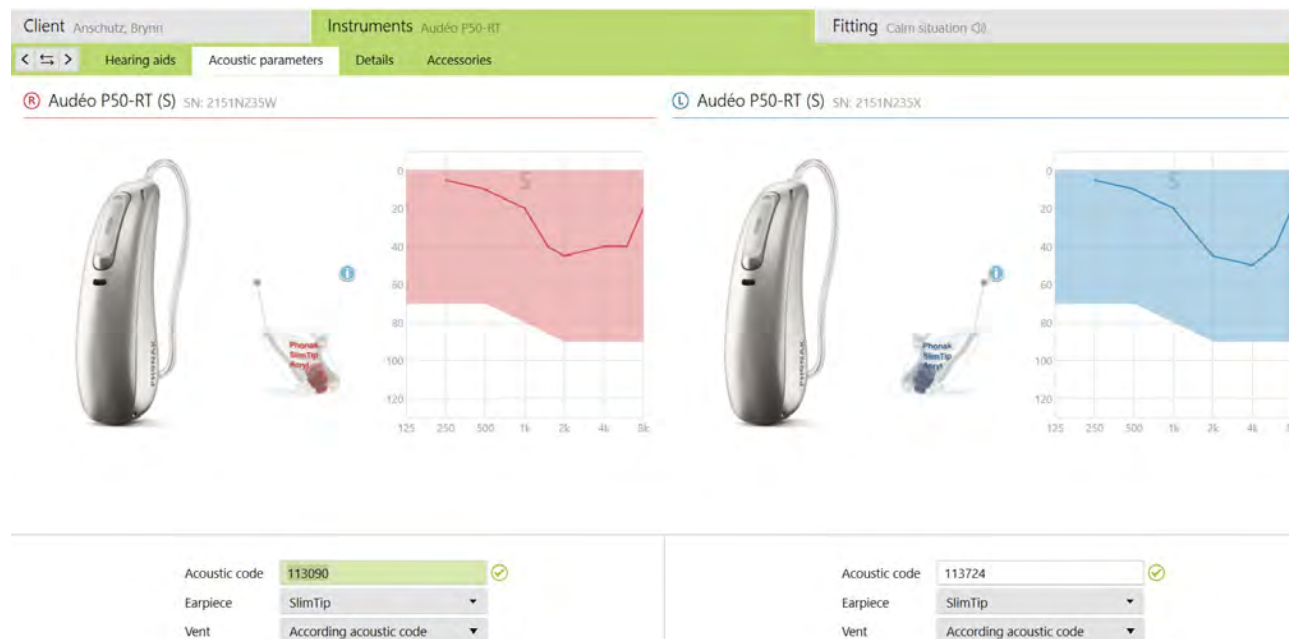
ADDITIONAL ADVANCED FEATURES

TO SUPPORT YOUR PATIENT

PHONAK

Acoustic code

- When order earmolds with venting from Phonak, the invoice has acoustic codes you can input in the acoustic parameters within the software
- Purpose
 - Ensures earmold(s) are specifically tailored to the patient and parameters are appropriately set/accurate



OTICON

Rechargeability

- End fitting screen, Batteries
- Tells you health of the lithium ion battery
- 85% or lower, want to replace the battery
- BTE: has to be sent in
- RITE: can request new battery
 - Need to input new serial number for the battery in the same place/tab

105

Opn Play 2

Small 1.0mm

WELCOME

SELECTION

FITTING

END FITTING

END FITTING

✓ Save and Exit

Buttons and Indicators

Batteries

Accessories

Generate Report

MORE TOOLS

ELF

CHILD

CHILD Family Member

PEACH Rating Scale

PEACH Score Sheet

LINKS

Technical Data

Instruction Videos

CURRENT BATTERY LEVEL

100%

CURRENT BATTERY LEVEL

BATTERY HEALTH

The battery is in good condition.

Replaceable battery

BATTERY HEALTH

BATTERY REPLACEMENT AND RESET

REPLACEMENT HISTORY

1 Replace batteries and connect

WATCH VIDEO

2 Select new batteries

RIGHT

3 Fill in new battery serial number

ADD NUMBER

4 Reset battery statistics

RESET YOUR BATTERY

This guarantees accurate daily usage beeps.

END FITTING

✓ Save and Exit

Buttons and Indicators

Batteries

Accessories

Generate Report

MORE TOOLS

ELF

CHILD

CHILD Family Member

PEACH Rating Scale

PEACH Score Sheet

LINKS

Technical Data

Instruction Videos

CURRENT BATTERY LEVEL

99%

CURRENT BATTERY LEVEL

BATTERY HEALTH

You might consider replacing the battery depending on your client's streaming behavior.

Replaceable battery

BATTERY HEALTH

BATTERY REPLACEMENT AND RESET

REPLACEMENT HISTORY

1 Replace batteries and connect

WATCH VIDEO

2 Select new batteries

LEFT

3 Fill in new battery serial number

ADD NUMBER

4 Reset battery statistics

RESET YOUR BATTERY

This guarantees accurate daily usage beeps.

CONCLUSION

REFERENCES

Phonak. (April 2016). Best Practice Protocol: Pediatric Verification for Sound Recover 2.

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Oticon OPN Play Product Guide

Oticon Play PX Product Guide

Oticon More Product Guide

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THANK YOU!

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QUESTIONS?