Aurical HIT Applications Part I

Applications for Hearing Instrument Fittings and Beyond

otometrics & audiologysystems

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audiologysystems otometrics

National partnership of industry professionals, audiologists and local audiology & vestibular experts who work together to distribute products, educate and serve as a resource to our customers

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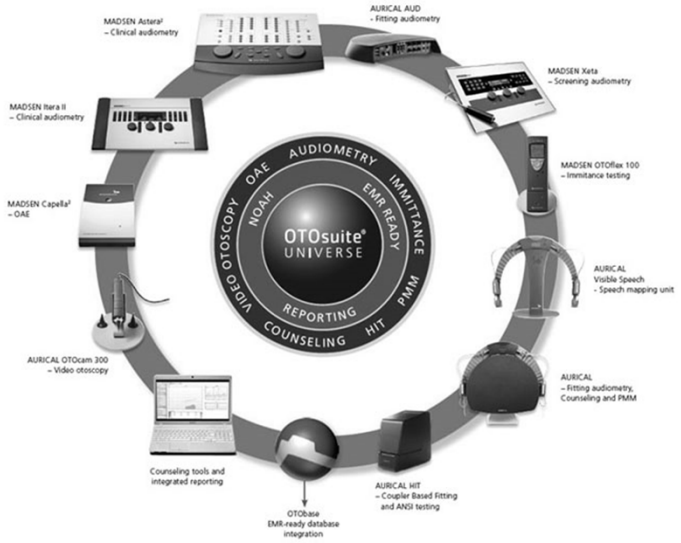
Our Product Line



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Snapshot of the Next Hour

- Introduction
- Overview of AURICAL HIT and OTOsuite
- Applications of HIT systems
  - Programming/pre-programming instrument ga… and output
  - Verifying advanced features
  - Assessing electroacoustic performance

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Our Fitting Product Line

- Product solutions for:
  - **Fitting**
    - Video Otoscope
      - OTOcam 300
    - Audiometer
      - AURICAL Aud
    - Probe Microphone Measures
      - AURICAL PMM
  - **Hearing Instrument Test Box**
    - **AURICAL HIT**

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Benefits of OTOsuite

- Improves workflow
  - One easy to use interface for different test modules
  - Provides counseling opportunities
  - Can facilitate testing protocols across clinics or even treatment rooms while still allowing for customized user tests
  - PC integration reduces time spent entering information and reduces errors
- Ensures that equipment stays relevant
  - Hardware can be updated/upgraded via software updates

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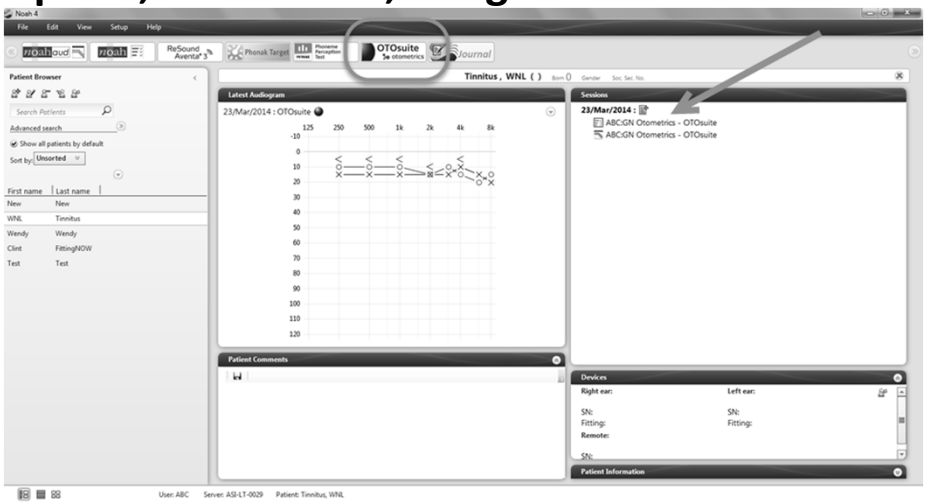
OTOsuite within Noah – on top mode point, ease of use, integration



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The AURICAL HIT

The AURICAL HIT

- The HIT box operates **independently** of the PMM, and requires only a **USB** connection to the computer
- User tests allow both **partial** and **full test sequences**
- It provides a **consistent picture** of every hearing instrument, regardless of manufacturer or type.
- **Intuitive** coupler based fitting with **RECD**, and pre-programming, and pre-fitting without the client's presence
- The **unique design** makes it easy to access the hearing instruments in the test chamber during the testing
- Data is stored in **Noah**

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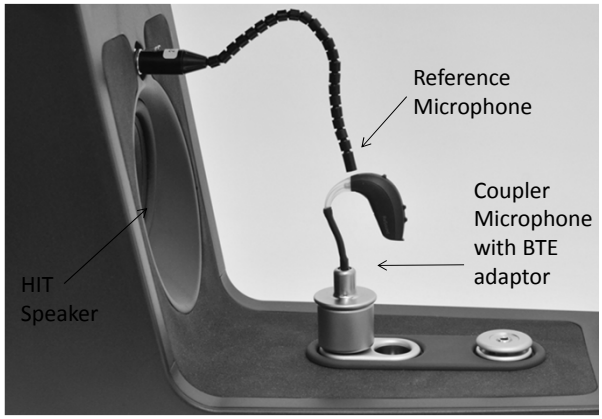
Aurical HIT Elements



Relating Aurical HIT to on-ear measures:

- Probe Microphone = Coupler Microphone
- Reference Microphone = Reference Microphone
- FreeField Speaker = HIT Speaker

- With appropriate acoustic conversions, the HIT coupler can serve as a convenient substitute for most measurements.

Aurical HIT within OTOsuite

- Aurical HIT is used in 2 modules:
- PMM – for fitting-related measurements (aka Coupler Fitting)
- HIT – for quality measurements

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Attaching HI to Aurical HIT Couplers Standard BTE devices

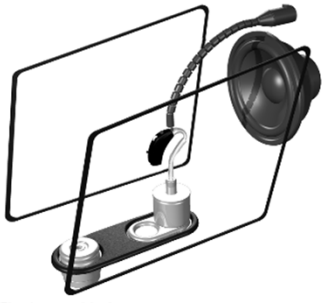

Fig. 1BTE positioning

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Attaching HI to Aurical HIT RIC/RITE and Custom devices

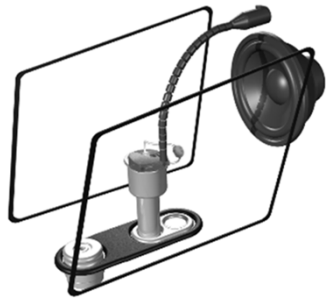

Fig. 2Thin tube positioning

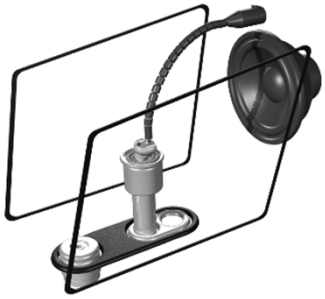

Fig. 3ITE positioning

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A note on programming devices….

- For programmers requiring a hardwire connection, loop programming cable around the groove of battery pill connector to keep it in place when Aurical HIT is closed.
- For wireless programmers using a patient-worn neckloop, place the loop around device and close Aurical HIT. Latch-free closure will not crimp or harm the programming coil.
- For wireless and wire-free programmers, the signal will travel through Aurical HIT without any interruption.

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Aurical HIT…what is it used for?

- Coupler-Based Fitting
  - Everything done on ear can be done in the test box
  - Especially important for pediatrics and others who won't tolerate fitting

  ****Accessed through PMM module by selecting the COUPLER button****
- Advanced Features
  - Verification and quantification of features without patient present
  - Can be done pre-fitting, dropped-off, or returned from repair
  - Especially important for pediatrics and others who won't tolerate fitting

  ****Accessed through PMM module by selecting the COUPLER button****
- ANSI Measures – (American National Standards Institute)
  - Rarely done now….why? Good question!
  - Relies on the manufacturer's software to change hearing aid settings

  ****Accessed through HIT module****

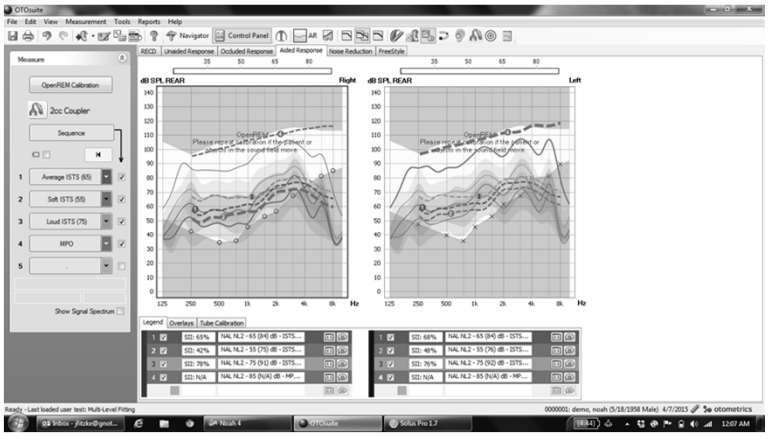
Coupler Based Fitting - Why for adults?

- Pre-programming HI streamlines the fitting and frees up appointment time for counseling and instruction

  2 to 5 minutes at the assessment to measure the RECD (or use average) and then 5 to 10 minutes pre-programming the HI

  … can result in a huge time savings at the fitting, and beyond!
- Programming HI when patient cannot be present at clinic due to geographical, health, or other reasons.
- Great method of evaluating HI settings - even if you cannot access programming
- Learn new fitting software without an audience

Coupler Fitting in Aurical HIT – Aided Response



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Coupler Fitting in Aurical HIT Step-by-Step

1. Access patient's NOAH file.
2. Launch HI programming software and connect devices.
3. Attach HI to appropriate HIT coupler.
4. Launch OTOsuite and select PMM Module. *(Note: PMM Module is used for verifying all fittings, both coupler (HIT) and on-ear (PMM).*
5. Select 'Aided Response' tab, choose 2cc Coupler option, and choose relevant Fitting Details.
6. Using On Top mode, run measurement curves and adjust HI settings as needed.

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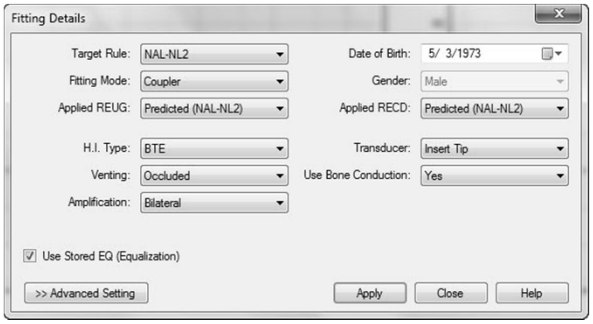
Customizing the Fitting Details

- Select 'Fitting Details' using F5 or with toolbar icon.
- These selections ensure that the appropriate targets are generated. The same settings should also be selected in the HI programming software for fitting efficiency.



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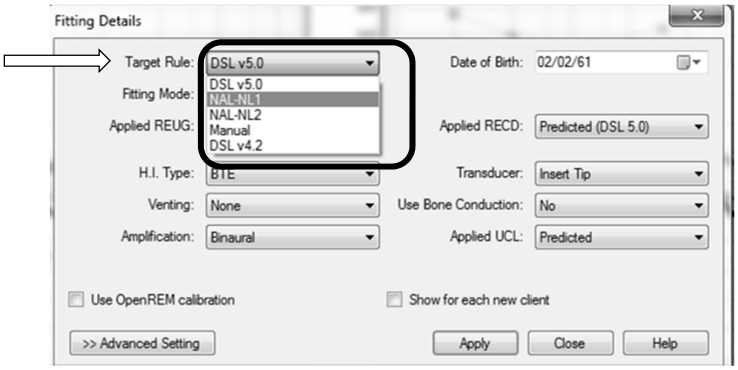
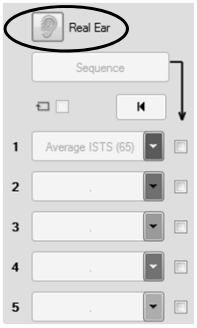
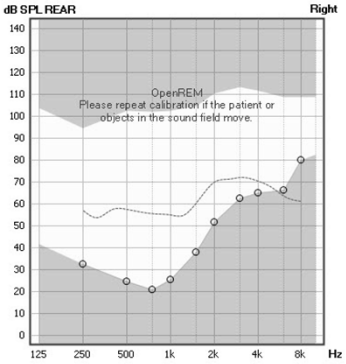
Targets Available



Within PMM Module: Toggle between Real Ear and 2cc Coupler

- Easily toggle between Real Ear verification and 2cc Coupler verification by a click of a button





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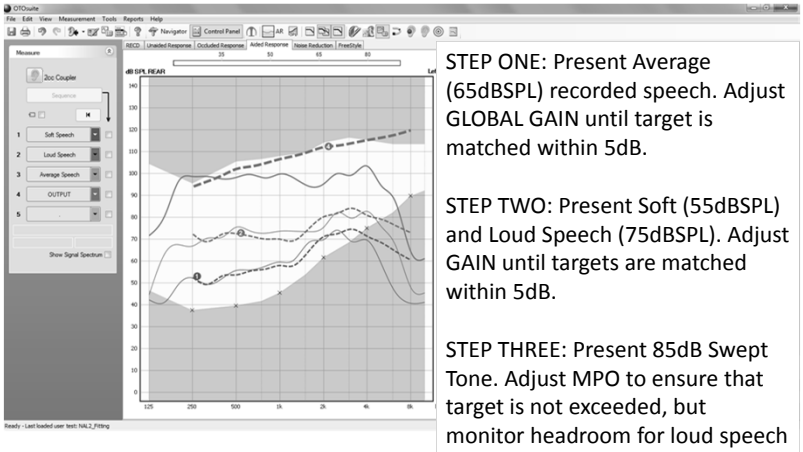
What are the steps? As easy as 1, 2, 3.



STEP ONE: Present Average (65dBSPL) recorded speech. Adjust GLOBAL GAIN until target is matched within 5dB.

STEP TWO: Present Soft (55dBSPL) and Loud Speech (75dBSPL). Adjust GAIN until targets are matched within 5dB.

STEP THREE: Present 85dB Swept Tone. Adjust MPO to ensure that target is not exceeded, but monitor headroom for loud speech peaks.

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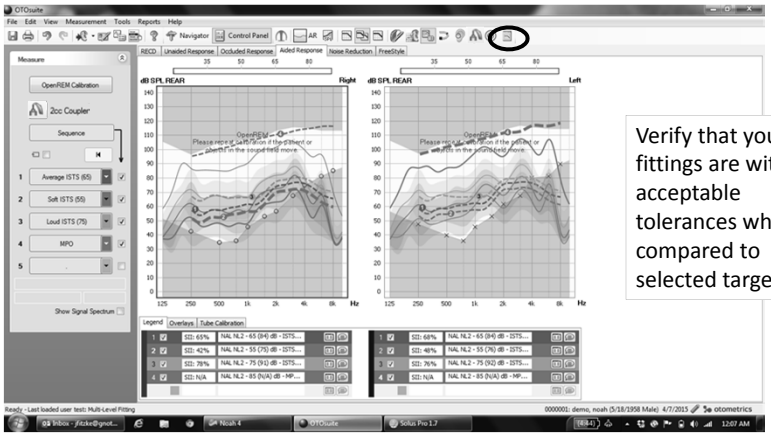
Guides settings for appropriate/optimized gain and output



Verify that your fittings are within acceptable tolerances when compared to selected target.

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The PMM Unit– On Top Mode

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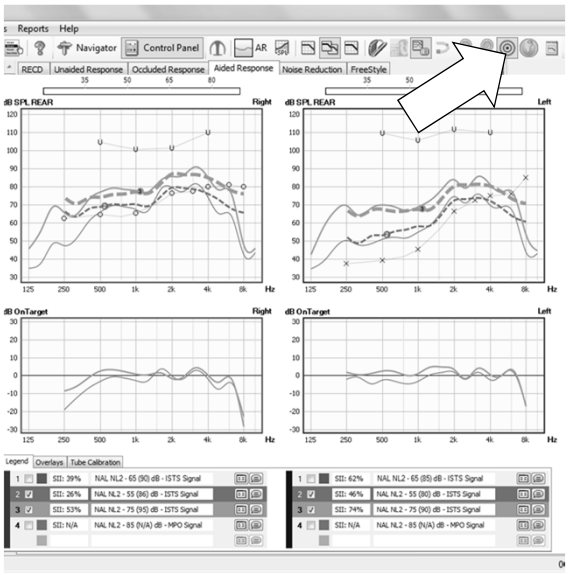
The PMM Unit – "On Target" Mode



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Advanced Feature Assessment

- HIT can be used to confirm that advanced features are working and also to quantify the how the HI reacts in response to various signals.

- Important considerations:
  - Due to the interactive nature of adaptive features, it is usually necessary to turn off all features except for the one being evaluated.
  - Duration, level, and type of signals needed will vary by HI. Keep this in mind if comparing features across HI's.
  - Consult with manufacturer for further guidance and recommendations.

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Advanced Feature Assessment: Noise Reduction

- Can easily be evaluated in approximately 30 seconds for a single setting, a bit longer when comparing different settings.
- With DNR active, present a 65 dB noise input signal for up to 25 or 30 seconds.
- An initial short term average curve is taken immediately after the signal is started continue stimulus presentation until DNR kicks in, taking another snapshot curve. This can range anywhere from 5-25 seconds.
- Compare the two curves. If DNR is working the 2nd curve will demonstrate less gain and output than the curve initiated before DNR is engaged.

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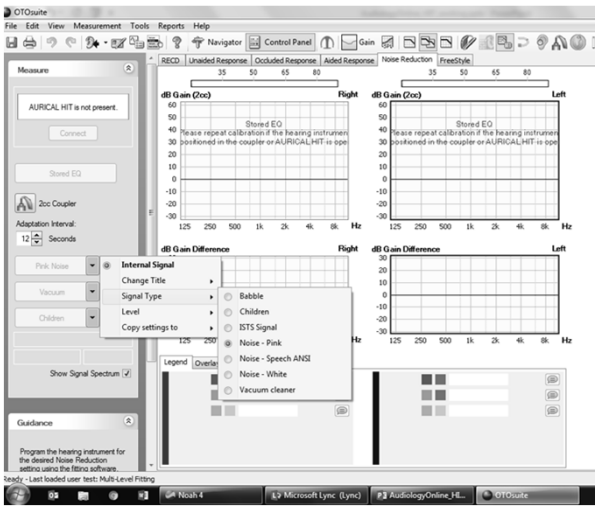
Noise Reduction in Aurical HIT



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Noise Reduction in Aurical HIT Step-by-Step

- Using the fitting software, program the hearing instrument for the desired Noise Reduction setting.
- Configure the measurement buttons to compare the conditions you prefer (i.e., Off vs. On; or Mild vs. Strong).
- Select the time difference between the two measurements (ex: Second measurement after 14 seconds of noise).
- Click a measurement button in the control panel.
- The snapshot curves are displayed in the graph and the overall noise reduction is displayed in the curve legend.
- The F2B view gives you the opportunity to see and show the gain difference in an easy to understand graph.

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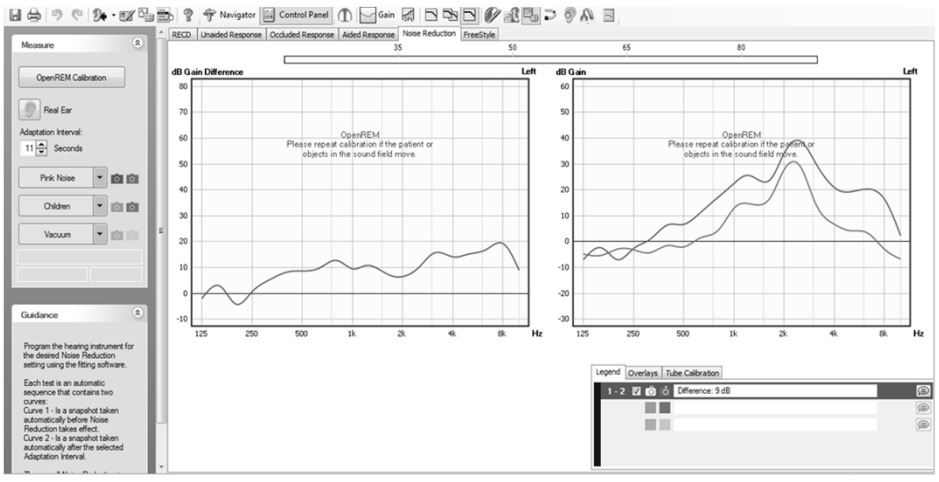
Noise Reduction in Aurical HIT



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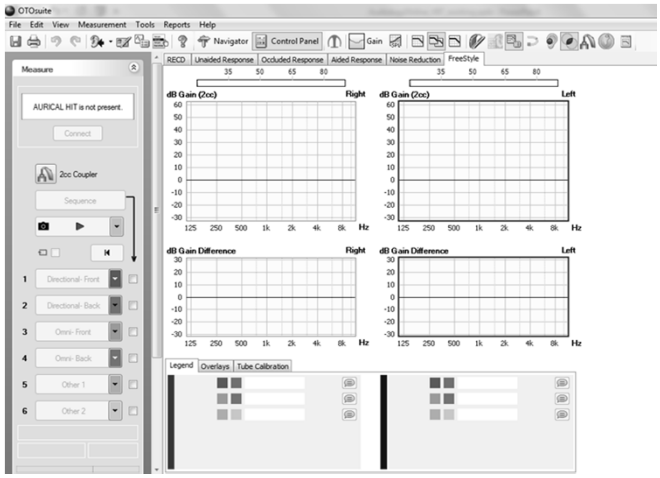
Directionality in Aurical HIT (FreeStyle Mode)



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Fixed Directionality in Aurical HIT Step-by-Step

- Face the hearing aid away from the speaker, or use rear HIT speaker.
- Make an initial measurement for a 65 dB speech or noise signal with the HI in omni-directional mode.
- Make a second measurement with fixed-directionality engaged.
- Make sure adaptive features are OFF (ex: NR).
- Expect to see a difference between the curves, with less gain when HI is in fixed-directional mode.

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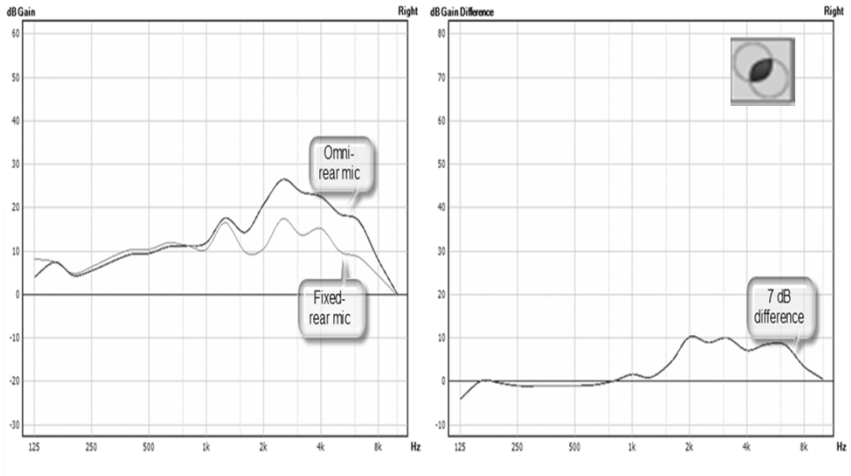
Fixed Directionality in Aurical HIT



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Adaptive Directionality in Aurical HIT Step-by-Step

- Position HI towards front speaker and set Adaptive Directionality feature to maximum strength
- Present speech signal from the front HIT speaker, followed by the same signal from the back HIT speaker. Expect to see little to no difference between these curves. (ex: Rainbow Passage)
- Repeat this process with a noise-only signal at an intensity high enough to trigger the directionality effect. Expect to see a difference between these curves, i.e. 'directionality effect.' (ex: Pink Noise)
- Again repeat process with speech-and-noise combined signal. Expect to see a result in between the previous curves, demonstrating that in the presence of speech directional effect is less stringent to allow audibility of speech. (ex: Scene – Station)
- *Duration and type of signals needed may vary by HI. Please consult with manufacturer for further guidance and recommendations.*

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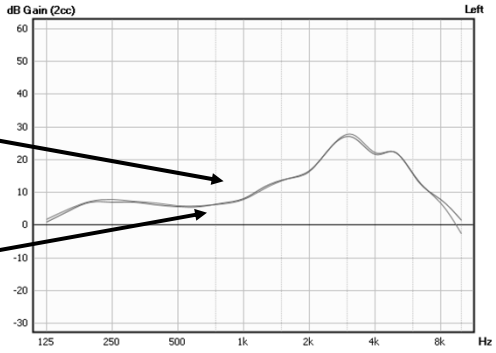
Adaptive Directionality in Aurical HIT

Rainbow Passage

Speech from the Front

Speech from the Back



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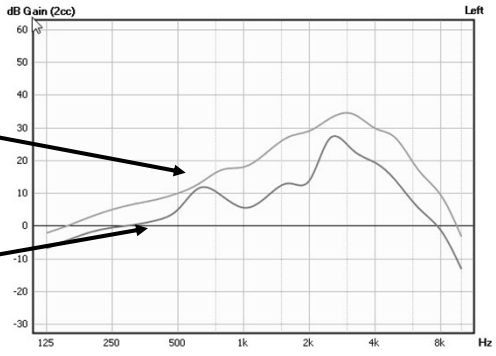
Adaptive Directionality in Aurical HIT

Pink Noise

Noise from the Front

Noise from the Back



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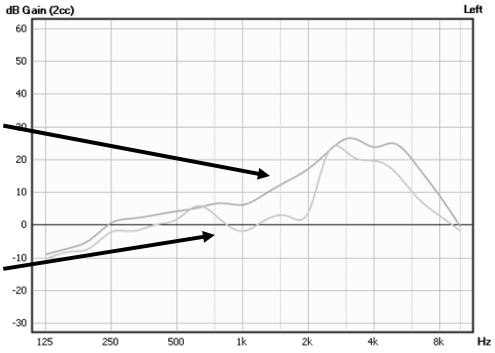
Adaptive Directionality in Aurical HIT

Scene - Station

Speech + Noise from the Front

Speech + Noise from the Back



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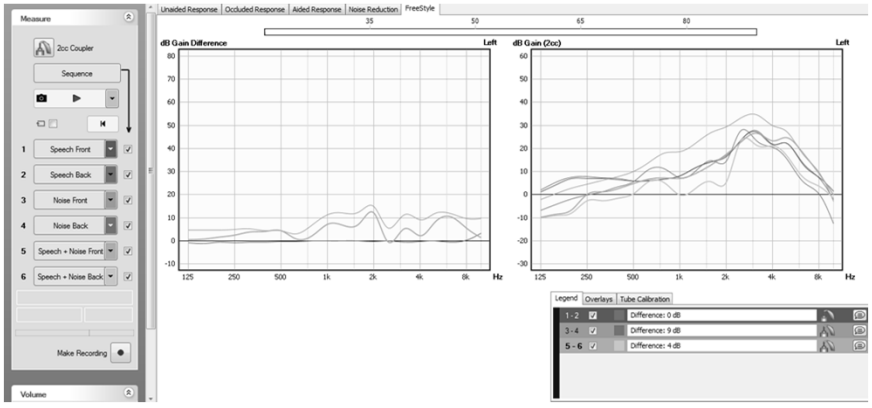
Adaptive Directionality in Aurical HIT



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Electroacoustic Analysis (EAA) – still needed?

- EAA (aka 'ANSI testing') used to be common clinical practice to ensure that both new and in-use hearing aids were performing to manufacturer specifications.
- Holder et al (2016) found that analysis of 73 new BTE devices from four manufacturers showed that 7% were out of acceptable tolerances, suggesting quality control issues.

J Am Acad Audiol. 2016 Sep;27(8):619-27

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EAA – still needed? Cont…

- The relevance remains, even if use patterns don't suggest that:
  - Patient reports make it difficult to discriminate between programming/fit issues and mechanical problems.
  - Automatic and adaptive features add still another layer of complexity.
- Clinics can realize greater efficiency and provide more timely and thorough follow-up care by incorporating EAA into their practice.
- Where allowed, consider utilizing support staff for procedures.

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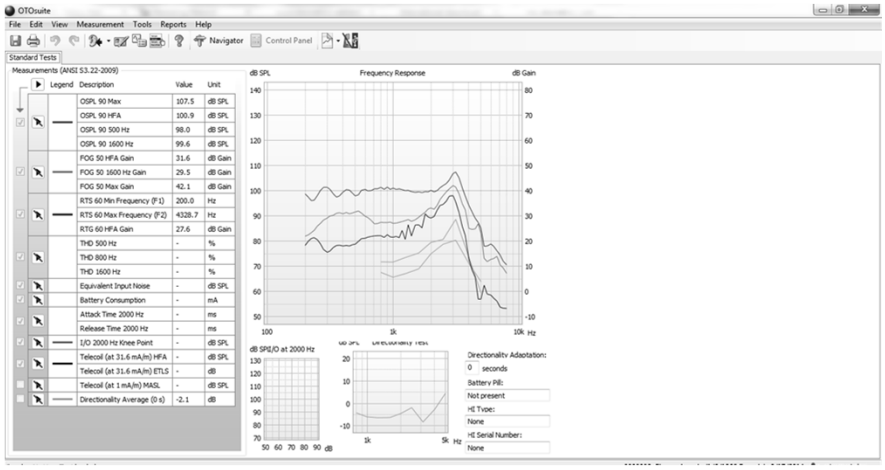
EAA in Aurical HIT



EAA in Aurical HIT
Step-by-Step

1. Launch Noah and select patient file
2. Launch OTOsuite software and select HIT module.
3. Launch HI programming software and access ‘Test Mode’ – check with manufacturer for additional information.
4. Attach HI to appropriate coupler and plug in battery pill (optional).
5. Run selected tests individually, or as a sequence.
6. Compare to manufacturer’s specifications, or to previously obtained results. Focus on OSPL 90, FOG, THD, and Battery Drain.

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EAA - Tolerances

Do Modern Hearing Aids Meet ANSI Standards?
Authors: Holder, Jourdan T.; Picou, Erin M.; Gruenwald, Jill M.; Ricketts, Todd A.
Source: Journal of the American Academy of Audiology, Volume 27, Number 8, September 2016, pp. 619-627(9)

• Max OSPL 90	+/- 3dB	Measure at FOG
• HFA OSPL 90	+/- 4dB	Measure at FOG
• HFA FOG	+/- 5dB	Measure at FOG
• THD	+3%	Measure at RTS
• EIN	+3dB	Measure at RTS
• Battery Drain	within 20%	Measure at RTS

Fonix ANSI 2009 Workbook

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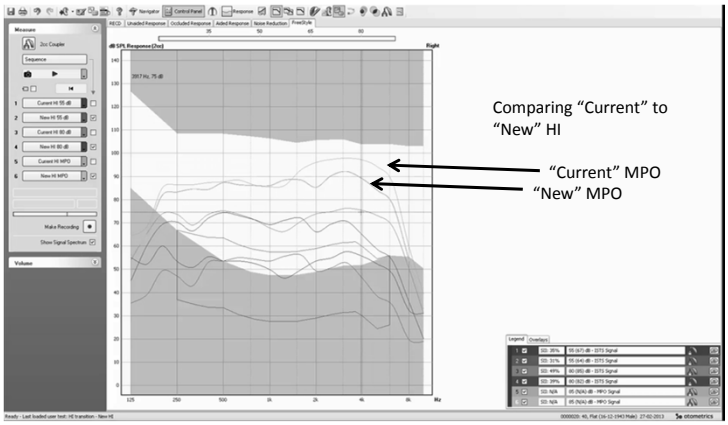
HI Transition

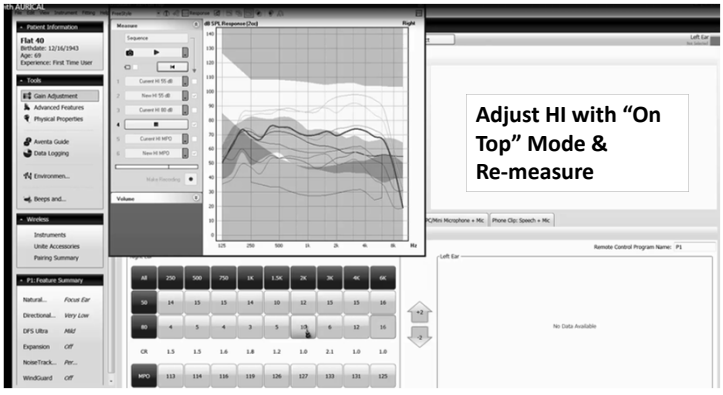
- Ever had a client who doesn't want to change technology?
- When a "new" HI doesn't "sound like" what they are used to, particularly for severe-to profoundly impaired listeners, the adaptation period can be prolonged.*
- Procedure to use the current HI as "target" for fitting. *Can be done using CBF or PMM.*
- HI Transition

* Convery, E. & Keidser, G. 2011

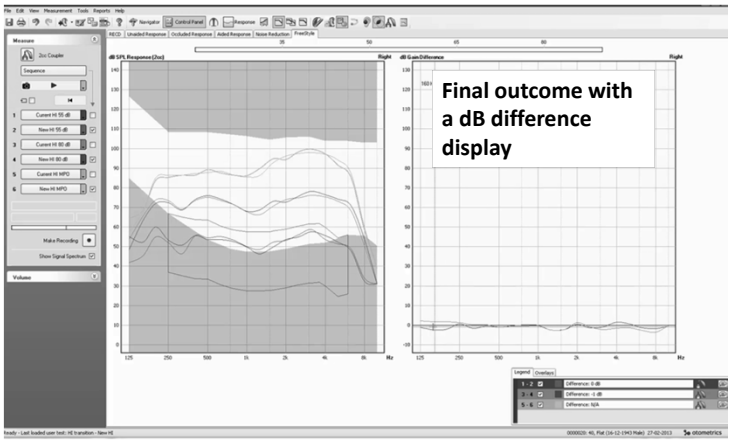
Hearing Instrument Transition



Hearing Instrument Transition



Hearing Instrument Transition



Thank you!

For more information, please see:

www.otometrics.com/fitting

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