uLearn series: Verification of Unitron's signature features with Otometrics Aurical Verification System

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Unitron
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Unitron
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Audiology Systems

unitron Hearing matters

Agenda

Introduction

Advantages and application of advanced features

Unitron fitting philosophy

Noise reduction verification

Speech Enhancement verification

Directionality verification

Conclusion

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Unitron's philosophy

Industry Standard Fitting Formulas

NAL and DSL are based on a combination of theory and empirical evidence and have been clinical standards for several decades.

The benefit of an evidence based approach is that it is proven to provide maximum speech intelligibility.

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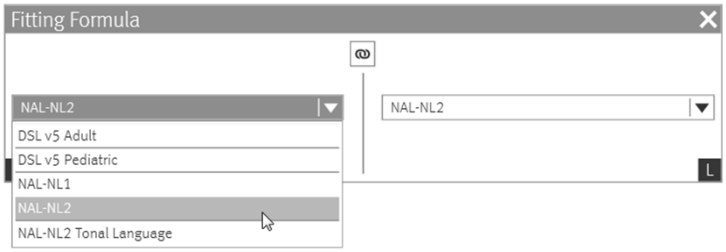
TrueFit 3.3 Default fitting formula



We default to NAL-NL2. Fitting formula defaults can be changed under preferences in the software.

We offer DSL adult and pediatric, NAL-NL1, and NAL-NL2 for tonal languages as other options.

Unitron's Feature philosophy

Based on a proven strategy
for providing the greatest improvement
in speech intelligibility

Balancing listening goals across 7 environments

Sound Conductor

Sound Conductor knows the listening **goals** across SoundNav's 7 environments.

Conversations
- Conversation in quiet
- Conversation in a small group
- Conversation in a crowd
- Conversation in noise

No conversation
- Quiet
- Noise

Music
- Music

Sound Conductor **goal** is understanding conversations

Sound Conductor **goal** is comfort with awareness

Sound Conductor **goal** is beautiful sound quality with enhanced lyrics

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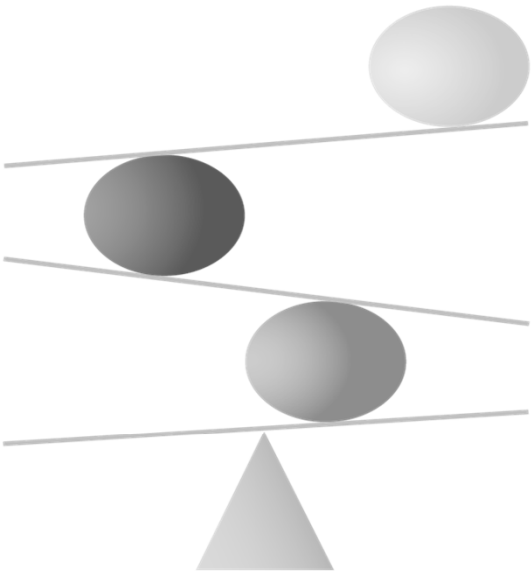

Sound Conductor

Goals:

Understanding conversations

Comfort with awareness

Natural Sound quality

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Three features have been optimized to work together

SC28

Verifying Advanced Features – Otometrics Aurical FreeFit PMM and HIT systems

Slide 12

SC28 Wendy Content
Advanced Features verification
-interactive- turn off certain features
Carls, Sarah, 1/30/2017

Verification using Aurical

Aurical PMM and Aurical 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.

Due to the interactive nature of adaptive features, it is helpful to turn off all features except for the one being evaluated.

Duration, level, and type of signals needed will vary. Keep this in mind especially if making comparisons between instruments.

While advanced features can be evaluated with both On-Ear (PMM) and Coupler (HIT) measurements, using HIT provides the following advantages:

- More consistent and acoustically isolated environment
- Multiple speaker sources for providing input from both front and rear directions

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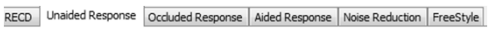
Verification using Aurical



Aurical is designed for advanced feature verification using both the Noise Reduction tab for NR, and the FreeStyle tab for all other features

- Offers access to 60+ input signals, including speech, noise, and common environmental sounds, including Speech + Noise pre-mixed options
- Also allows for mixing of multiple signals at varied SNR to replicate challenging listening environments

The customizable ‘User Tests’ are a valuable tool when performing these measurements. For copies of the User Tests used throughout the presentation today, please contact us.

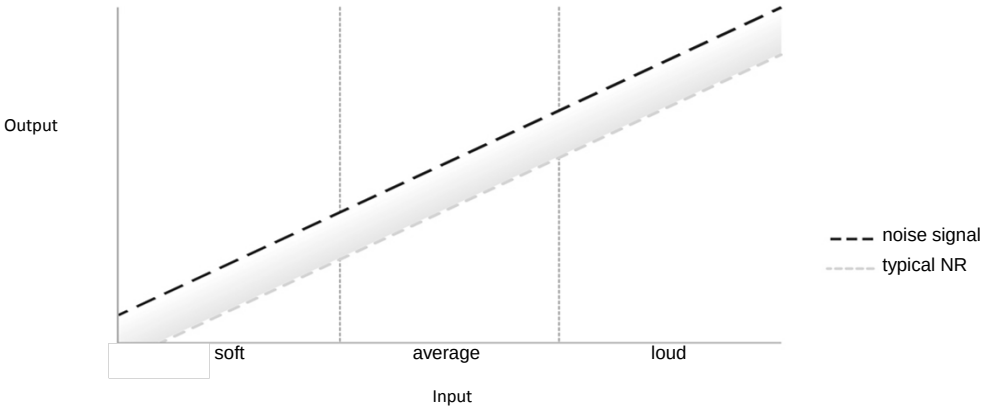
unitron

SC5
SC29

1. Noise reduction

SC6

Noise reduction (NR)



Slide 15

SC5 Josie explains noise reduction
Carls, Sarah, 1/5/2017

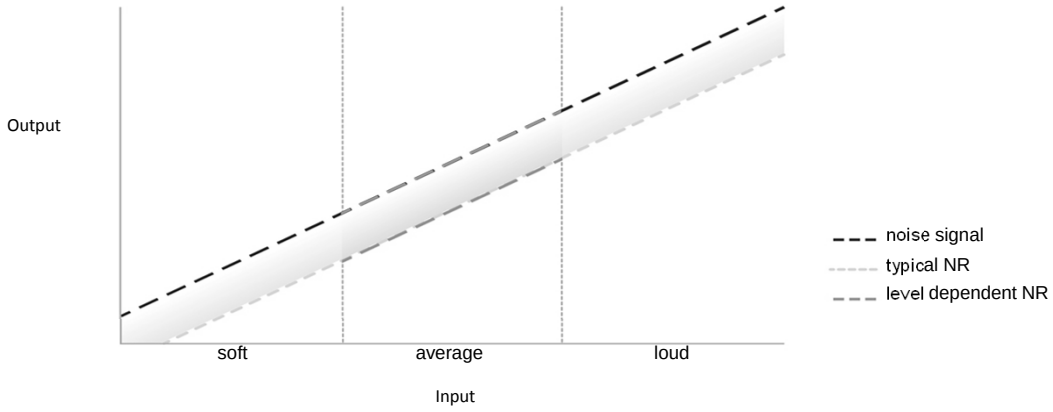
SC29 Sarah
Carls, Sarah, 1/30/2017

Slide 16

SC6 Josie
Carls, Sarah, 1/5/2017

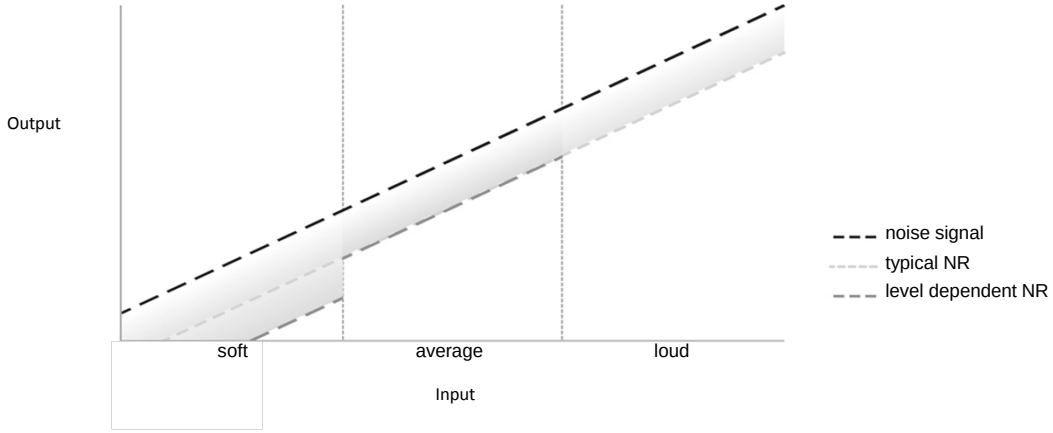
SC7

Noise reduction LD



SC8

Noise reduction LD



Slide 17

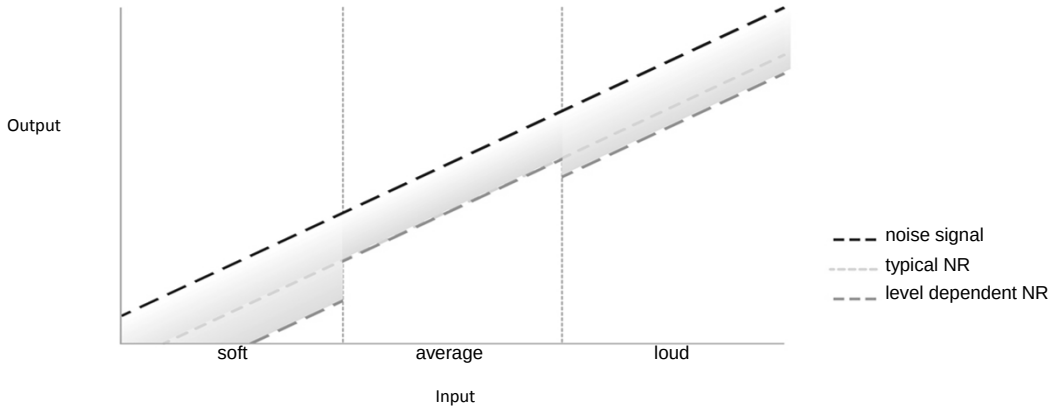
SC7 Josie
Carls, Sarah, 1/5/2017

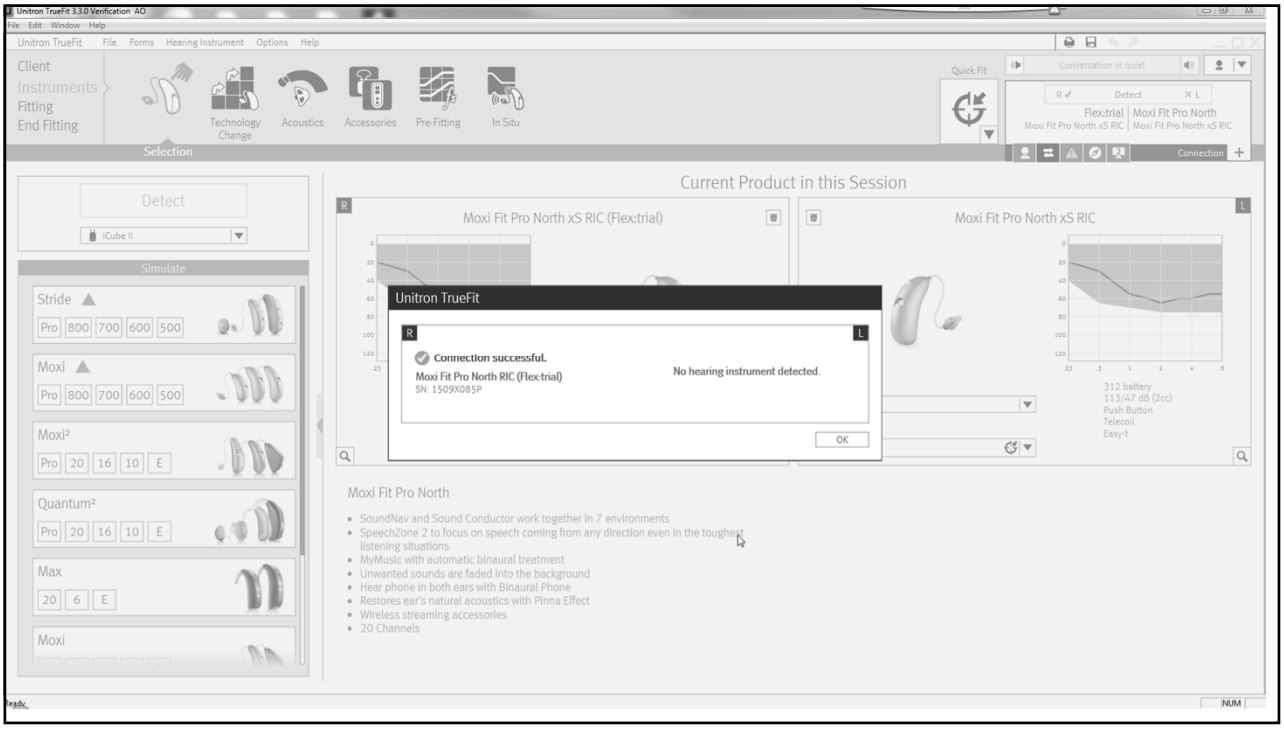
Slide 18

SC8 Josie
Carls, Sarah, 1/5/2017

SC30

Noise reduction LD

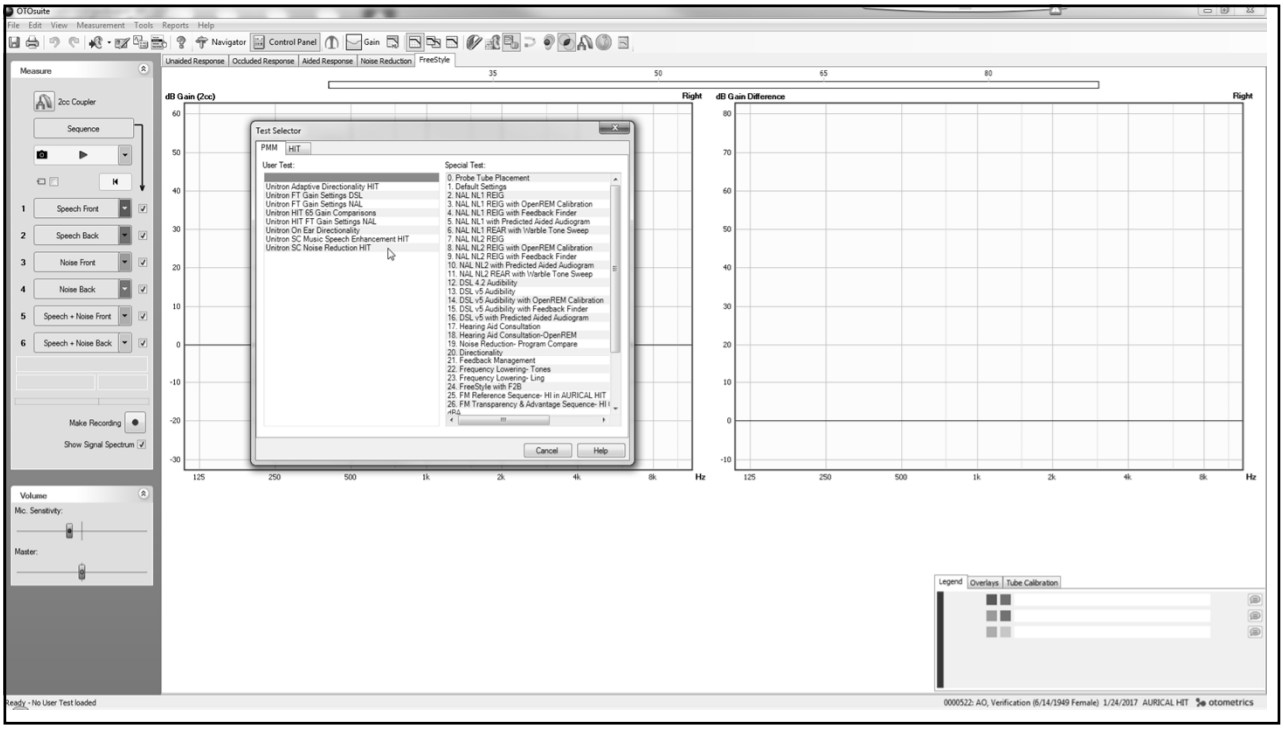


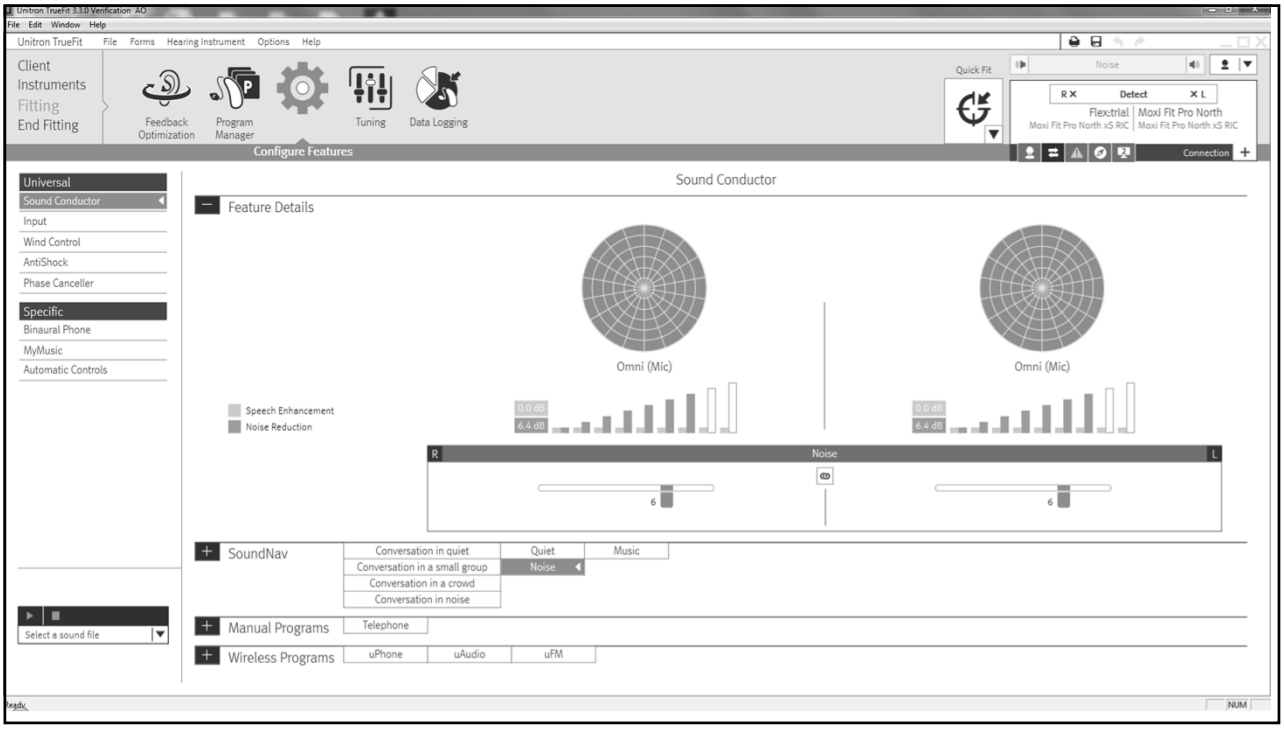


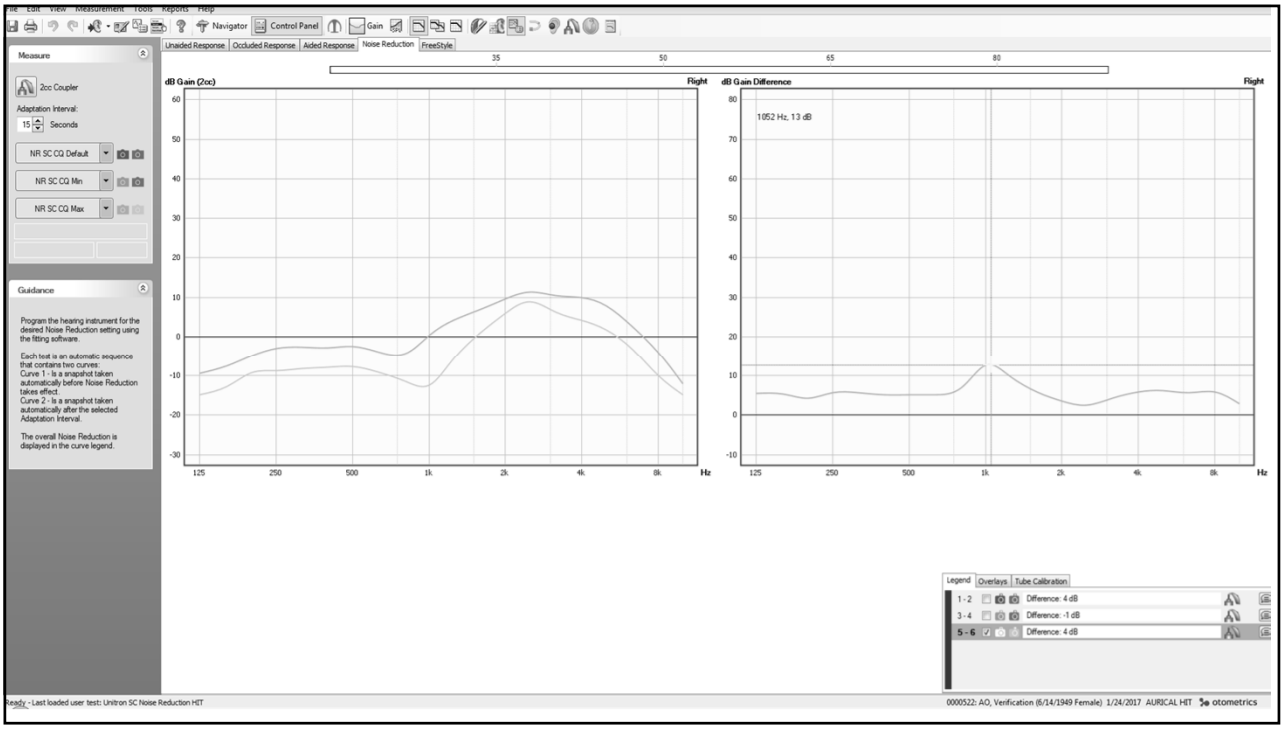
Slide 19

SC9 Josie
Carls, Sarah, 1/5/2017

SC30 Josie
Carls, Sarah, 1/30/2017


OTOsuite
Measure
2cc Coupler
Sequence
Speech Front
Speech Back
Noise Front
Noise Back
Speech + Noise Front
Speech + Noise Back
Make Recording
Show Signal Spectrum
Volume
Mic. Sensitivity:
Master:
Unaided Response
Occluded Response
Aided Response
Noise Reduction
FreeStyle
dB Gain (2cc)
dB Gain Difference
Test Selector
PMM
HIT
User Test:
Special Test:
Cancel
Help
Legend
Overlays
Tube Calibration
Ready - No User Test loaded
otometrics


Unitron TrueFit 3.3.0 Verification AO
Unitron TrueFit
File
Forms
Hearing Instrument
Options
Help
Client
Instruments
Fitting
End Fitting
Feedback Optimization
Program Manager
Tuning
Data Logging
Configure Features
Quick Fit
Noise
Detect
Flextrial
Moxi Fit Pro North
Connection
Universal
Sound Conductor
Input
Wind Control
AntiShock
Phase Canceller
Specific
Binaural Phone
MyMusic
Automatic Controls
Sound Conductor
Feature Details
Omni (Mic)
Omni (Mic)
Speech Enhancement
Noise Reduction
Noise
SoundNav
Conversation in quiet
Conversation in a small group
Conversation in a crowd
Conversation in noise
Quiet
Noise
Music
Manual Programs
Telephone
Wireless Programs
uPhone
uAudio
uFM
Select a sound file
Ready
NUM



Noise Reduction Video Capture

Wendy narration

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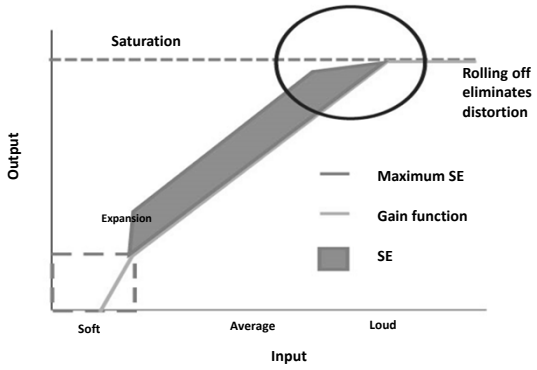
2. Speech enhancement

SC4

Speech enhancement

- Speech enhancement provides additional gain to speech sounds detected in each band
- Graph explanation:
  - SE is applied starting at the expansion kneepoint
  - SE applies the same amount of gain to soft and average inputs
  - SE gain is rolled off for loud inputs as it approaches saturation to avoid distortion and maintain excellent sound quality



(The Gain function shown here is linear for ease of understanding, however the gain function often also has compression.)

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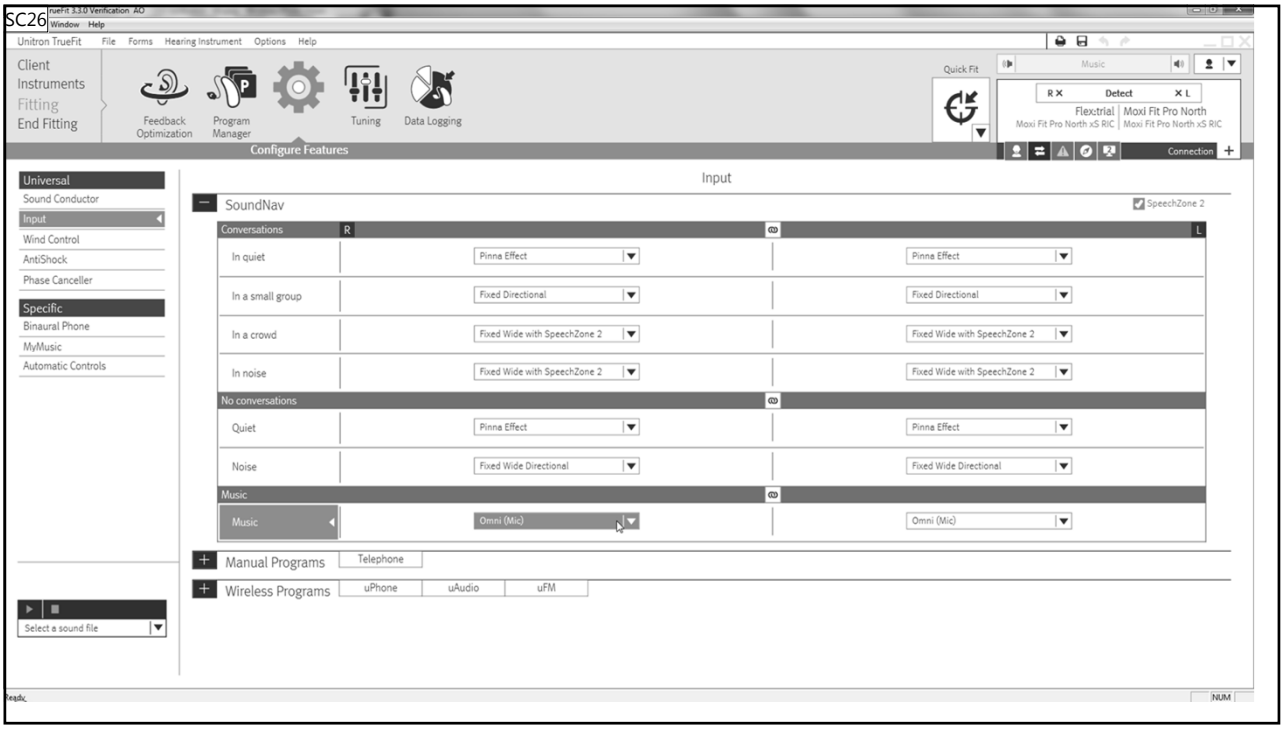
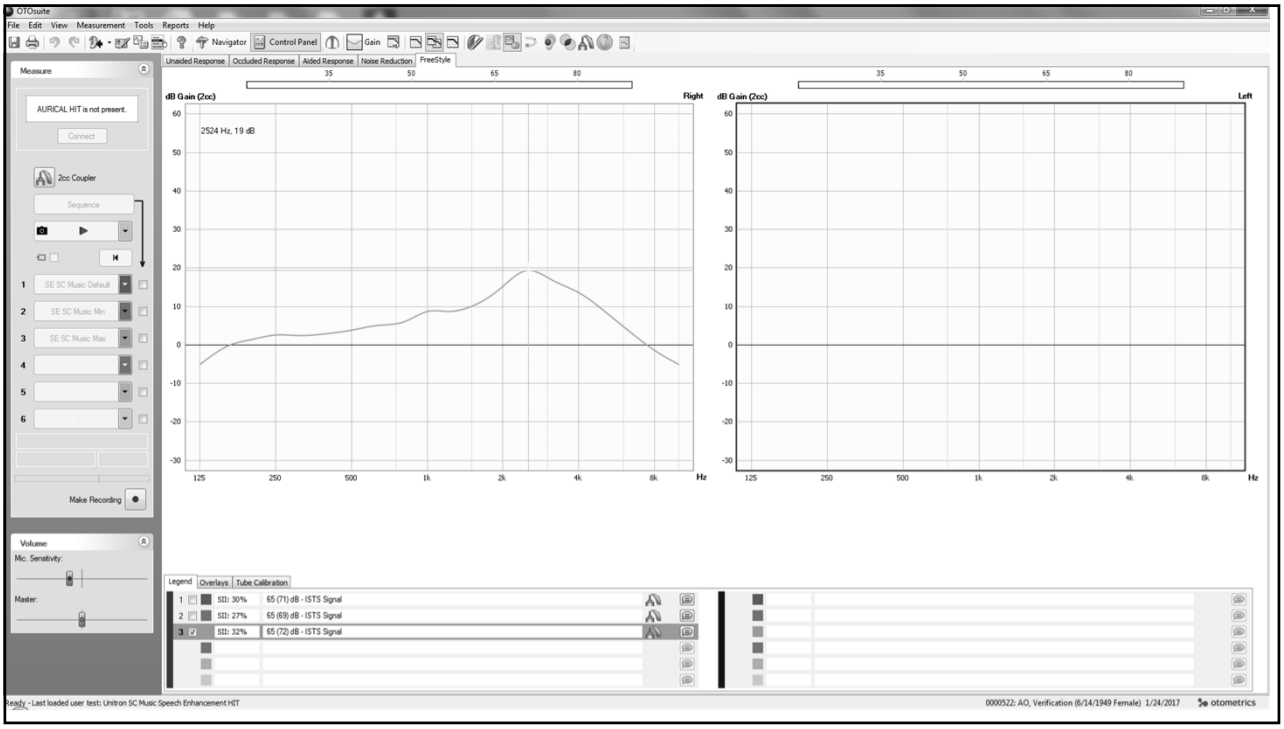
Slide 26

SC4 Josie explains speech enhansement
Carls, Sarah, 1/5/2017

SC26


TrueFit 3.3.0 Verification AO
Window Help
Unitron TrueFit File Forms Hearing Instrument Options Help
Client
Instruments
Fitting
End Fitting
Feedback Optimization
Program Manager
Tuning
Data Logging
Configure Features
Quick Fit
Music
Detect
Flextrial
Moxi Fit Pro North xS RIC
Moxi Fit Pro North xS RIC
Connection
Universal
Sound Conductor
Input
Wind Control
AntiShock
Phase Canceller
Specific
Binaural Phone
MyMusic
Automatic Controls
Input
SoundNav
SpeechZone 2
Conversations
In quiet
In a small group
In a crowd
In noise
No conversations
Quiet
Noise
Music
Music
Pinna Effect
Fixed Directional
Fixed Wide with SpeechZone 2
Fixed Wide Directional
Omni (Mic)
Manual Programs
Telephone
Wireless Programs
uPhone
uAudio
uFM
Select a sound file
NUM


OTOsuite
File Edit View Measurement Tools Reports Help
Navigator
Control Panel
Gain
Unaided Response
Occluded Response
Aided Response
Noise Reduction
FreeStyle
Measure
AURICAL HIT is not present.
Connect
2cc Coupler
Sequence
Make Recording
Volume
Mic. Sensitivity:
Master:
dB Gain (2cc)
Right
Left
2524 Hz, 19 dB
Hz
Legend
Overlays
Tube Calibration
SII: 30%
65 (71) dB - ISTS Signal
SII: 27%
65 (69) dB - ISTS Signal
SII: 32%
65 (72) dB - ISTS Signal
Ready - Last loaded user test: Unitron SC Music Speech Enhancement HIT
0000522: AO, Verification (6/14/1949 Female) 1/24/2017
otometrics

Slide 27

SC26 Wendy
Carls, Sarah, 1/19/2017

Speech Enhancement Video Capture

Wendy narration

unitron

SC11

3. Directional strength

Slide 30

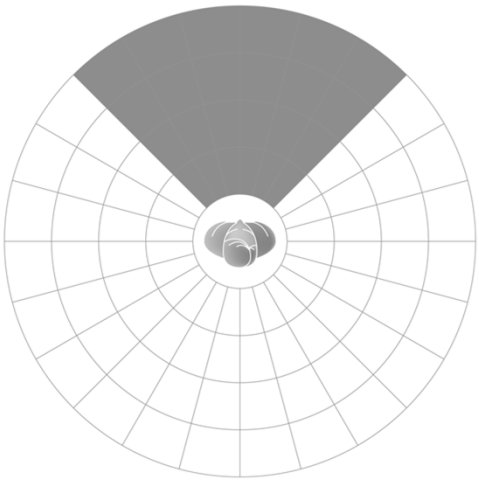
SC11 Josie explains directional microphones
Carls, Sarah, 1/5/2017

SC12

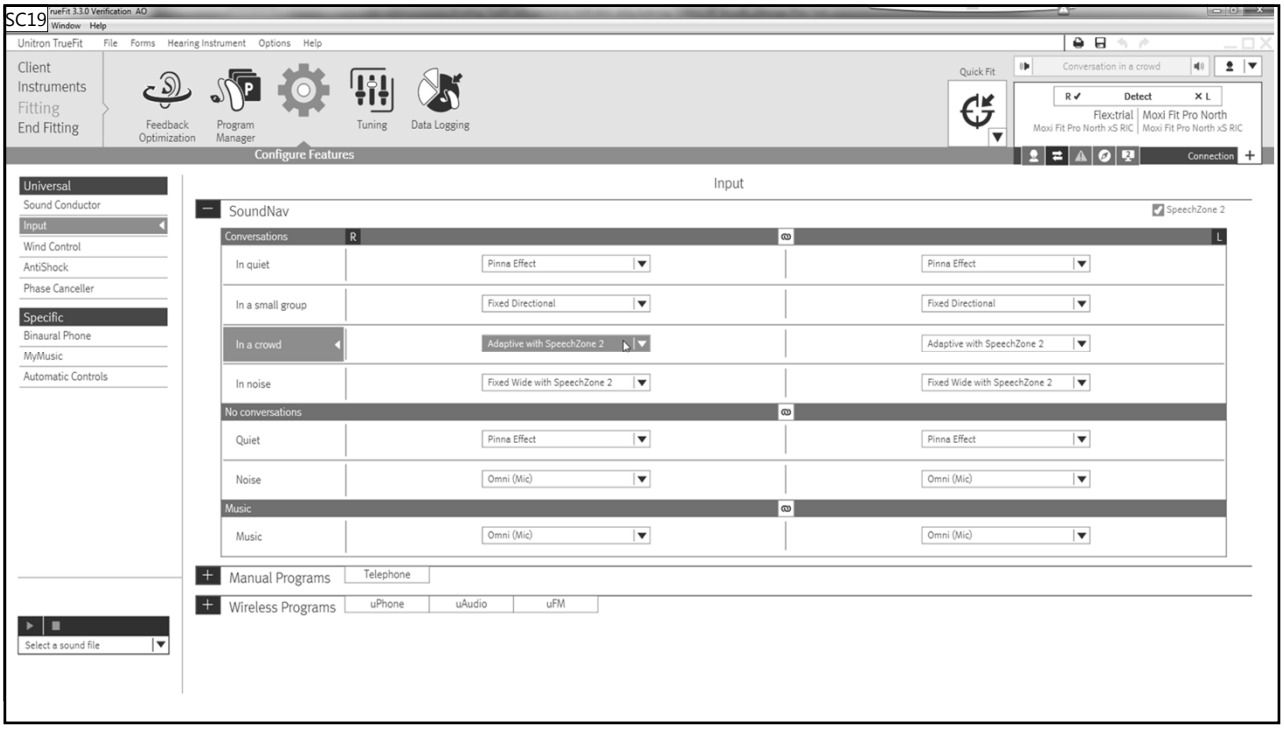
Directional input options

Available input options:

- Omni
- Pinna Effect
- Fixed Wide directional
- Fixed directional
- Adaptive directional



SC19



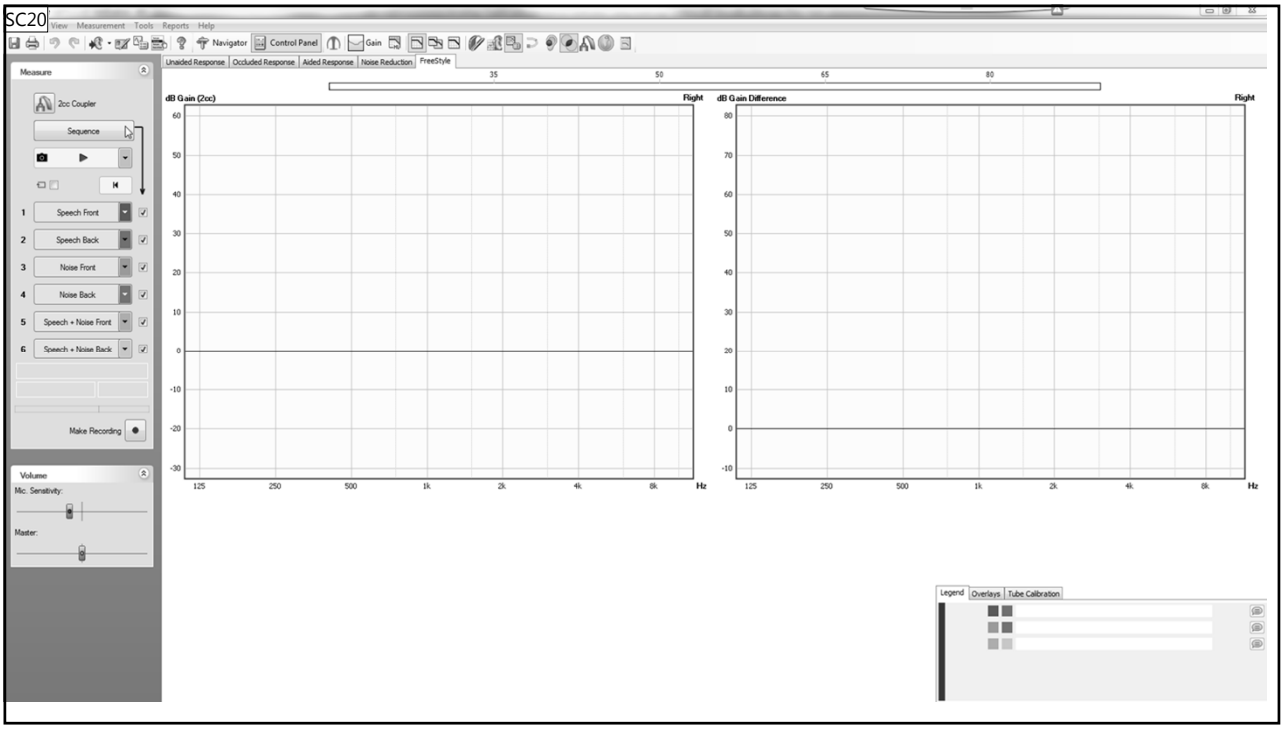
Slide 31

SC12 Josie
Carls, Sarah, 1/5/2017

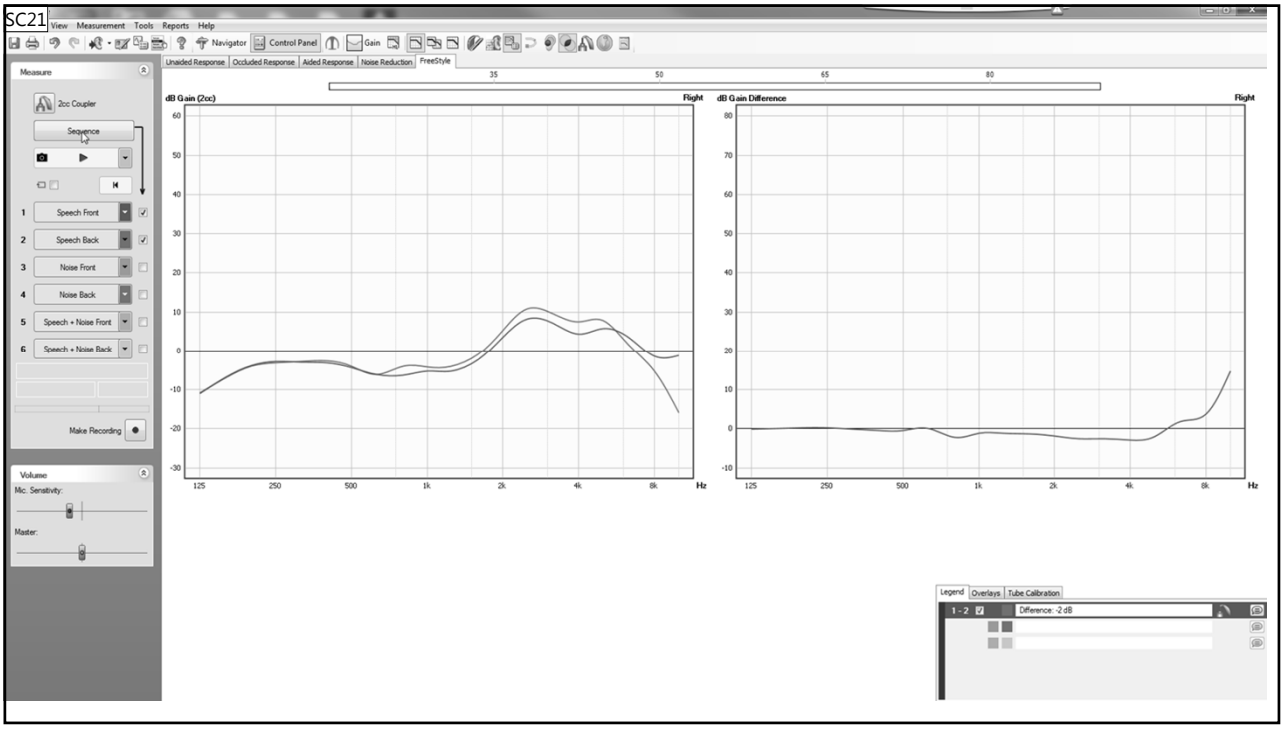
Slide 32

SC19 Wendy reviews video capture
Carls, Sarah, 1/5/2017

SC20


View Measurement Tools Reports Help
Navigator Control Panel Gain
Measure
2cc Coupler
Sequence
1 Speech Front
2 Speech Back
3 Noise Front
4 Noise Back
5 Speech + Noise Front
6 Speech + Noise Back
Make Recording
Volume
Mic. Sensitivity:
Master:
Unaided Response Occluded Response Aided Response Noise Reduction FreeStyle
dB Gain (2cc)
Right
dB Gain Difference
Right
125 250 500 1k 2k 4k 8k Hz
Legend Overlays Tube Calibration

SC21

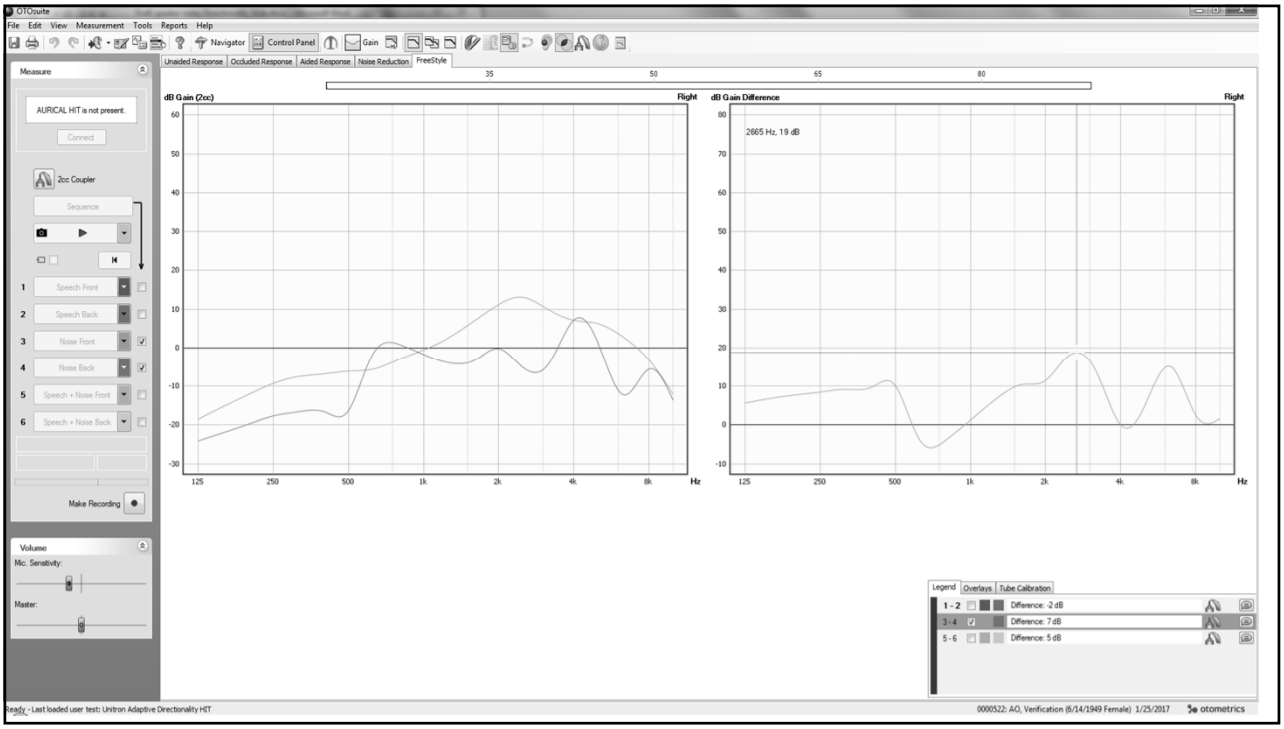

View Measurement Tools Reports Help
Navigator Control Panel Gain
Measure
2cc Coupler
Sequence
1 Speech Front
2 Speech Back
3 Noise Front
4 Noise Back
5 Speech + Noise Front
6 Speech + Noise Back
Make Recording
Volume
Mic. Sensitivity:
Master:
Unaided Response Occluded Response Aided Response Noise Reduction FreeStyle
dB Gain (2cc)
Right
dB Gain Difference
Right
125 250 500 1k 2k 4k 8k Hz
Legend Overlays Tube Calibration
1-2
Difference: -2 dB

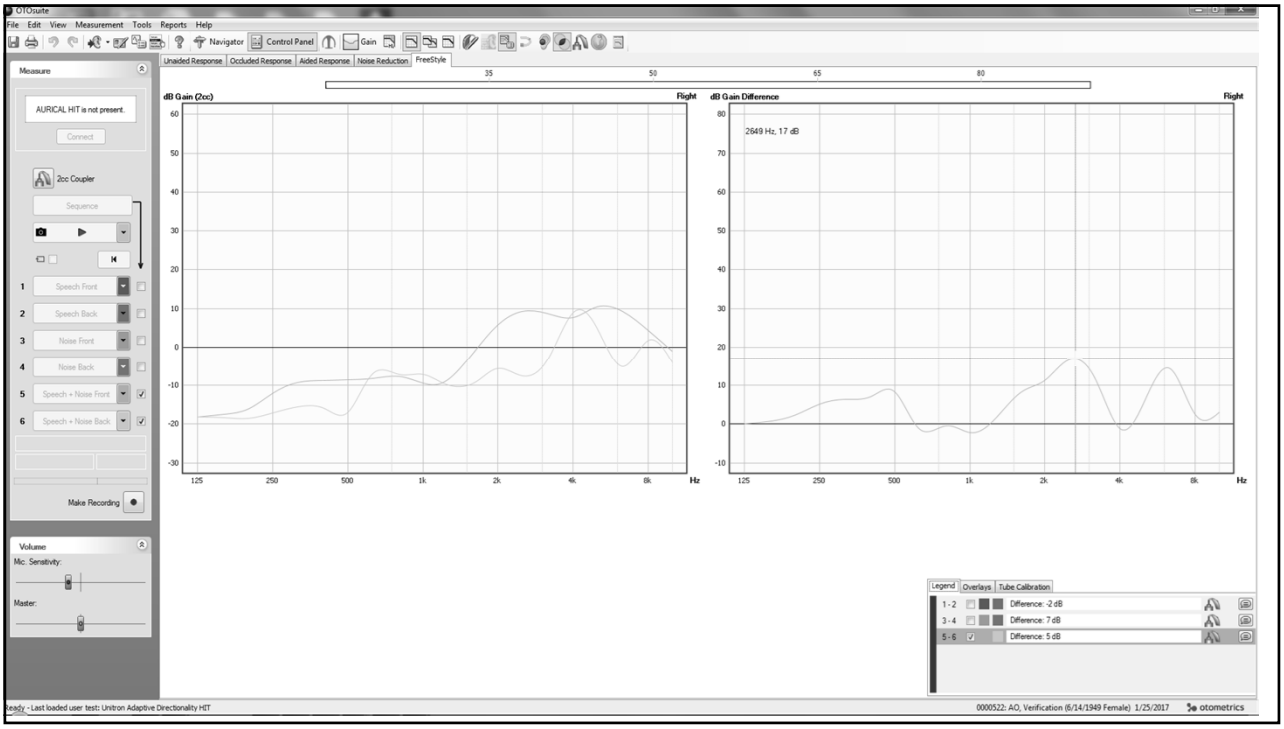
Slide 33

SC20 Josie show's set up through screenshots or video capture
Carls, Sarah, 1/5/2017

Slide 34

SC21 Wendy shows functionality via video capture
Carls, Sarah, 1/5/2017


OTOsuite
File Edit View Measurement Tools Reports Help
Navigator Control Panel Gain
Unaided Response Occluded Response Aided Response Noise Reduction FreeStyle
Measure
AURICAL HIT is not present.
Connect
2cc Coupler
Sequence
1 Speech Front
2 Speech Back
3 Noise Front
4 Noise Back
5 Speech + Noise Front
6 Speech + Noise Back
Make Recording
Volume
Mic. Sensitivity:
Master:
dB Gain (2cc)
Right
dB Gain Difference
Right
2665 Hz, 19 dB
Hz
Legend Overlays Tube Calibration
1 - 2 Difference: -2 dB
3 - 4 Difference: 7 dB
5 - 6 Difference: 5 dB
Ready - Last loaded user test: Unitron Adaptive Directionality HIT
0000522: AO, Verification (6/14/1949 Female) 1/25/2017
otometrics


OTOsuite
File Edit View Measurement Tools Reports Help
Navigator Control Panel Gain
Unaided Response Occluded Response Aided Response Noise Reduction FreeStyle
Measure
AURICAL HIT is not present.
Connect
2cc Coupler
Sequence
1 Speech Front
2 Speech Back
3 Noise Front
4 Noise Back
5 Speech + Noise Front
6 Speech + Noise Back
Make Recording
Volume
Mic. Sensitivity:
Master:
dB Gain (2cc)
Right
dB Gain Difference
Right
2649 Hz, 17 dB
Hz
Legend Overlays Tube Calibration
1 - 2 Difference: -2 dB
3 - 4 Difference: 7 dB
5 - 6 Difference: 5 dB
Ready - Last loaded user test: Unitron Adaptive Directionality HIT
0000522: AO, Verification (6/14/1949 Female) 1/25/2017
otometrics

Directionality Video Capture

Wendy narration

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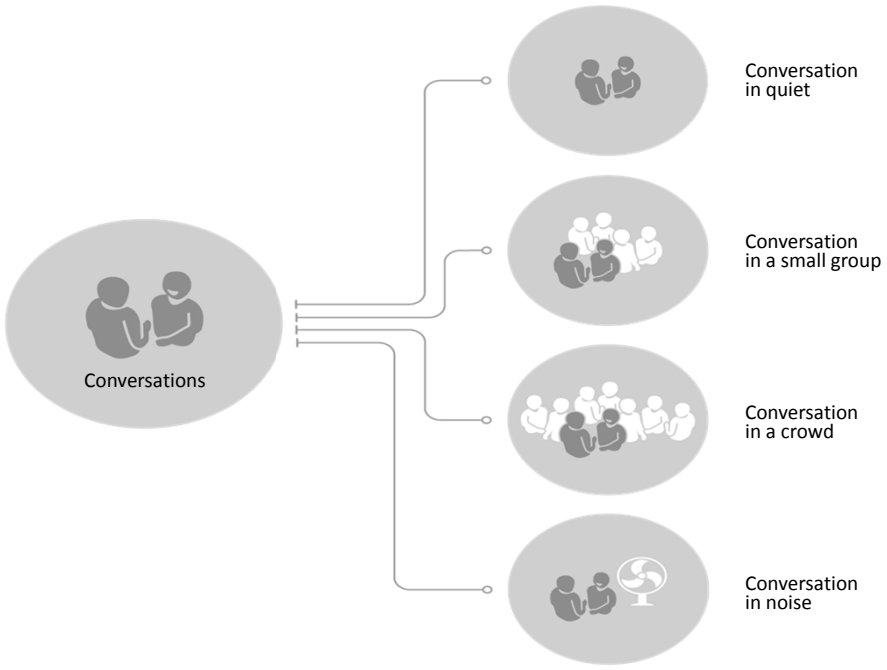
SC15

Conversations

Slide 38

SC15 Not sure if we want to use the following slides, but I left them in bc they show how much NR and SE we use.
Carls, Sarah, 1/5/2017

SC16



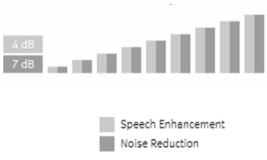
SC17

Conversations environments

Sound Conductor

Maximum strengths:

- Speech enhancement **4dB**
- Noise reduction **-7dB**
- Directionality independently configurable



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Slide 39

SC16 ?
Carls, Sarah, 1/5/2017

Slide 40

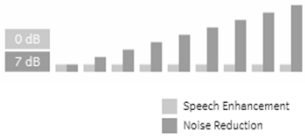
SC17 Carls, Sarah, 1/5/2017

Comfort with awareness: Quiet and Noise

Sound Conductor

Maximum strengths:

- Speech enhancement strength **0**
- Noise reduction strength **-7dB**
- Directionality independently configurable



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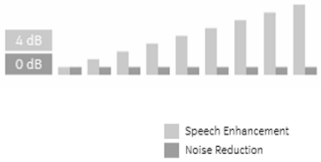
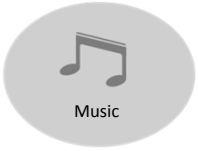
Music

Sound Conductor

Maximum strengths:

- Speech enhancement strength **4dB**
- Noise reduction strength **0dB**
- Directionality independently configurable





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Noise Reduction with Speech Added Video Capture

Wendy narration of noise reduction releasing when speech is present

Good place to answer question / address why is it preferred to verify features in isolation versus a more real world combine approach

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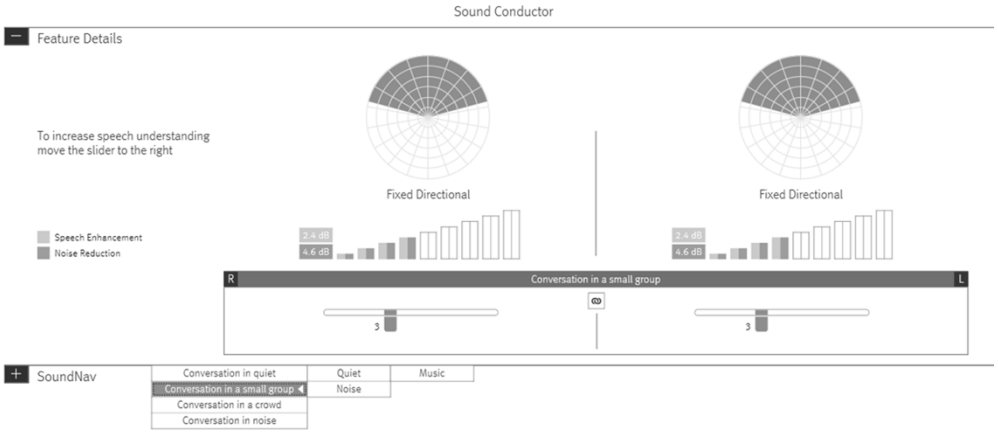
Personalization

Personalization
Sound Conductor

Sound Conductor can be adjusted independently in all programs



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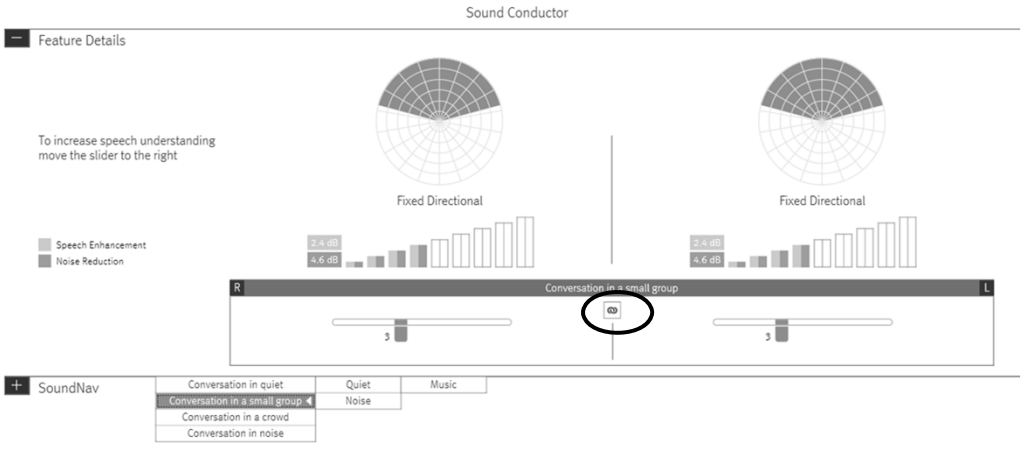
Personalization
Sound Conductor

Sound Conductor can be linked/unlinked in all programs



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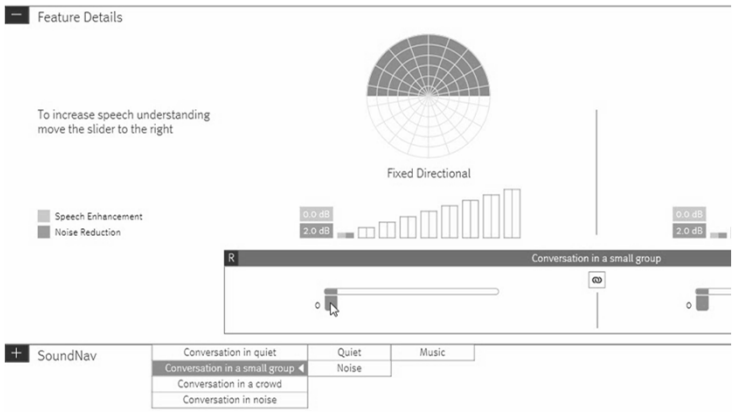
Personalization of Sound Conductor

Adjusting Sound Conductor will influence the strength of speech enhancement, noise reduction, as well as the strength of the directionality for **Fixed Directional and Adaptive Directional inputs** (Fixed directional shown here)



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Personalization of Sound Conductor

Directionality is independently configurable in all environments

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Conclusion

Questions?

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