

# EduMic Verification Guide

Verifit1 and Verifit2



**oticon**  
PEOPLE FIRST

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# Guide for Transparency Measurements

## Introduction

Transparency measures for remote microphone systems (RMS) and hearing aids are a crucial part of obtaining optimal amplification for those with hearing loss.

This is a step-by-step verification guide to *test box* measurements for EduMic using the Audioscan Verifit1 and Verifit2 systems. Note that this guide is not appropriate for a verification of EduMic with open fittings. Open fittings require On-Ear measurements (see Connect Clip whitepaper: "Connect Clip: A Guide to Better Communication" (Gordey, 2019)).

The guide is based on the American Academy of Audiology's (AAA) clinical practice guidelines from 2008 (updated April 2011) for the use of RMS for children and youth from birth to 21 years with hearing loss.

The guide will take you through:

## Preparation in Genie 2

## Preparation in Audioscan, Verifit1 and Verifit2

## Verification of EduMic - Step 1-3



# Preparation in Genie 2

Connect and program hearing aids in Genie 2<sup>1</sup>

1. Ensure that all acoustic parameters in the Genie 2 software are selected to match with the patients current hearing aid fitting (e.g. ear mold, venting, ear hook damping)  
[In SELECTION → under Acoustics in drop-down menu] (figure 1)

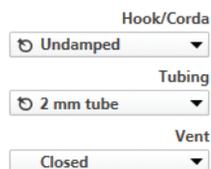


Figure 1: Example of acoustic parameters

2. Select adaptation step 3  
[In FITTING pane → under Fine-tuning in drop-down menu] (figure 2)

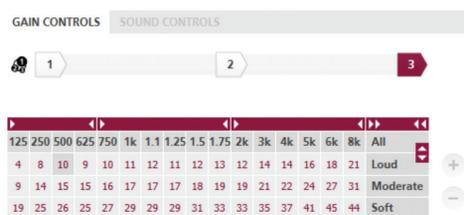


Figure 2: Adaptation step 3

3. Select directionality settings to Pinna Omni  
[In FITTING pane → under OpenSound Navigator in drop-down menu] (figure 3)

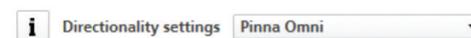


Figure 3: Directionality settings

4. Use EduMic default settings  
[In END FITTING pane → under Accessories in drop-down menu → TV Adapter/EduMic] (figure 4)

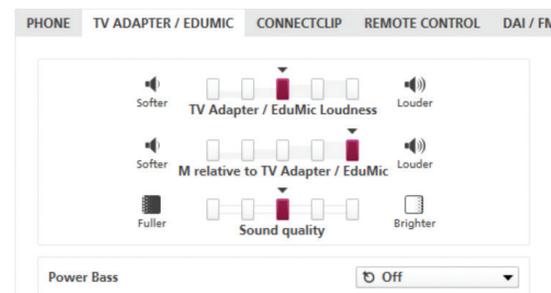


Figure 4: Example of Edumic default settings

<sup>1</sup> In this guide a moderate hearing loss was used (standard audiogram N3, Bisgaard et al. 2010, p.116)

# Preparation in Audioscan, Verifit1 and Verifit2

Connect and program hearing aids in Genie 2<sup>1</sup>

1. Select main menu in Verifit → Test box → Speechmap (figure 5/6)

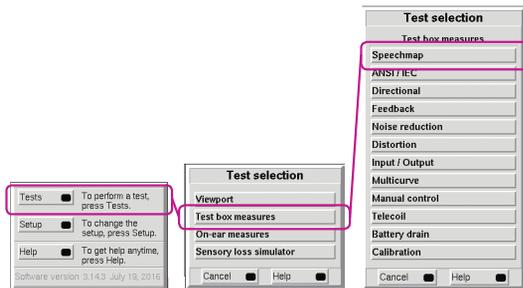


Figure 5: Verifit1 main menu



Figure 6: Verifit2 main menu

2. In the right upper corner of the Speechmap select the right hearing instrument type (if BTE, choose BTE + HA-2 in Verifit-1 or BTE + HA-4 in Verifit-2). Click the Single view tab to get Dual view if measuring two hearing aids at the same time (figure 7/8)

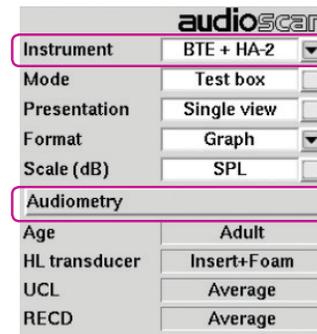


Figure 7: Verifit-1 Speechmap menu

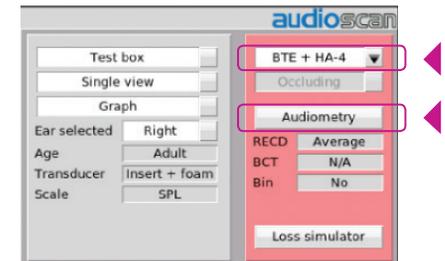


Figure 8: Verifit-2 Speechmap menu

3. In [Audiometry] (figure 7/8) select the target rationale matching the rationale in Genie 2, age and HL transducer used for audiometry. Enter threshold data in the Audiometric Entry window.

# Verification of EduMic

## Step 1-3

Before carrying out EduMic transparency measures:

- Hearing aids should be verified for optimal audibility and maximum output for the individual user, using real-ear measures or 2cc/4cc coupler plus individually measured RECDs (Real-Ear-to-Coupler Differences).
- Reference microphones in the Verifit test box should be calibrated.



## Step 1

Evaluate the hearing aid response without the EduMic connected:

1. Position the hearing aid(s) in the coupler and place reference microphone(s) 1-2 mm from HA microphones (figure 9/10). If using a Verifit2: be sure to place the reference microphone horizontal as shown in first picture in figure 10 - if placed vertically the microphone will be displaced when the test box is closed. Close the test box.
2. Click the button in the “1”-area in the Speechmap to start the test (figure 11/12). Here, choose speech stimuli<sup>2</sup>, select 65 dB as output level and and click the “continue” (Verifit 1) or “record” button (Verifit 2).



Figure 9: Position of hearing aid and microphone in Verifit-1

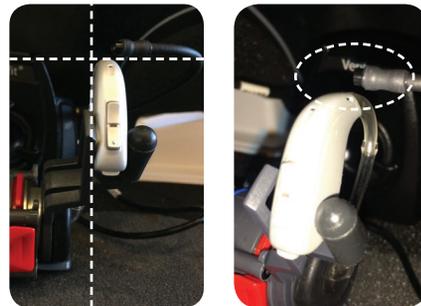


Figure 10: Position of hearing aid and microphone in Verifit-2

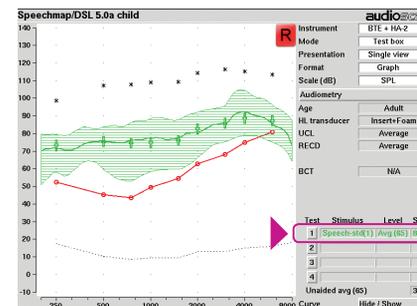


Figure 11: Verifit-1 Result of Step 1. Speech stimuli: Speech-std(1), speech level: 65 dB

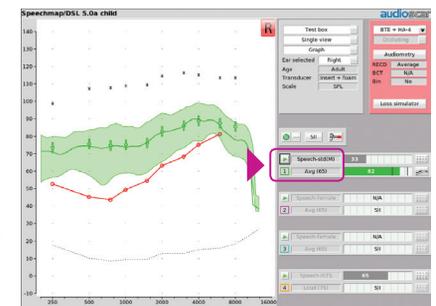


Figure 12: Verifit-2 Result of Step 1. Speech stimuli: Speech-std(M), speech level: 65 dB

<sup>2</sup> In this guide speech stimuli was recorded male speech – the use of a calibrated real speech signal is preferred over speech-weighted noise inputs according to the AAA's clinical practice guidelines (p.54)

## Step 2

Evaluate the hearing aid response with the EduMic connected:

1. Disconnect hearing aids in Genie 2 to be able to pair them with EduMic
2. Pair EduMic with hearing aid(s) and make sure EduMic is in microphone mode (steady green light) (figure 13)

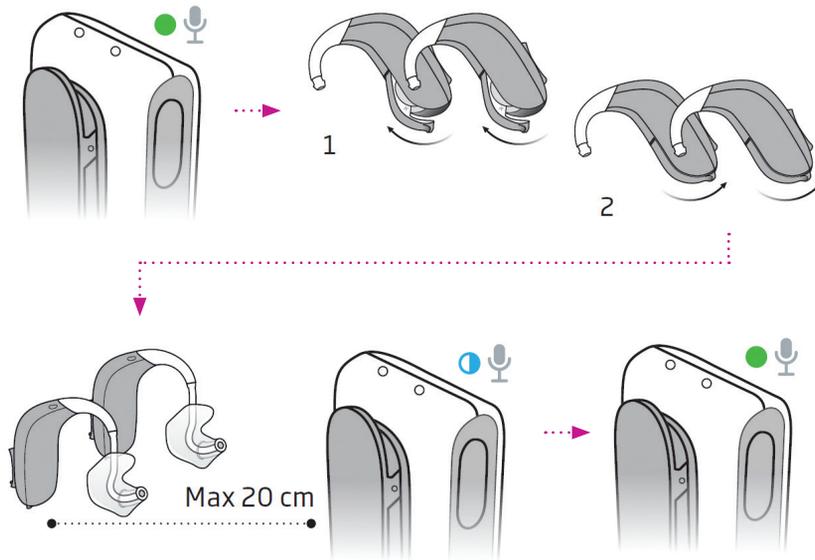


Figure 13: Pairing EduMic with hearing aids  
Turn ON EduMic by pressing the button for 2 seconds → Turn OFF the hearing aids by opening the battery drawer → Turn ON the hearing aids by closing the battery drawer → Place the hearing aids close to EduMic - status indicator will flash BLUE while pairing is in progress → Status indicator will stop flashing BLUE when pairing is complete and turn GREEN. EduMic is now ready for use with hearing aids.

3. Mute EduMic by pushing button briefly (status indicator is flashing green)
4. Put hearing aid(s) back on coupler and close the test box with the EduMic placed outside the test box
5. Click the button in the "2"-area in the Speechmap to start the second test. Again, choose speech stimuli, select 65 dB as output level and click the "continue" (Verifit 1) or "record" button (Verifit 2) (figure 14/15)

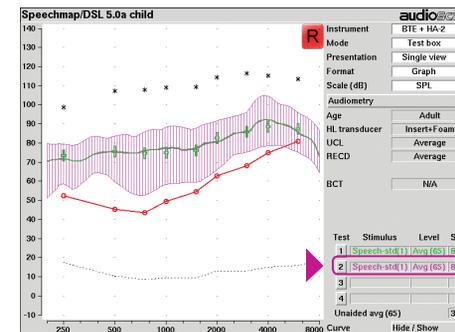


Figure 14: Verifit-1 Result of Step 2. Speech stimuli: Speech-std(1), speech level: 65 dB

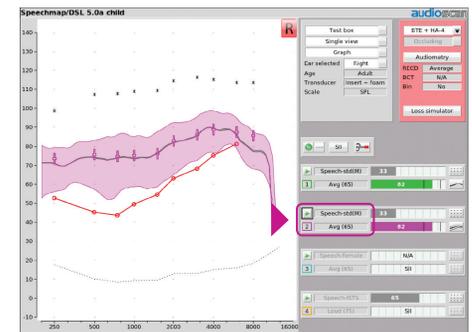


Figure 15: Verifit-2 Result of Step 2. Speech stimuli: Speech-std(M), speech level: 65 dB

6. Evaluate the result of Step 2 and compare to results of Step 1 to determine if there are impedance or program changes to the hearing aid response with the EduMic attached. The response curve in Step 2 should not differ from the response curve in Step 1 (figure 14/15 - green and purple curves are overlapping)

# Step 3

## Evaluate EduMic response:

1. With hearing aid(s) still attached to the 2cc/4cc coupler and test microphone, place the hearing aid(s) outside the test box (use extension cable from Audioscan<sup>3</sup>) (figure 16/17)

**ATTENTION:** The hearing aid microphone is still active. The test room should be quiet and hearing aid placed as far away as possible from any sound source (e.g. noisy computer)



Figure 16: EduMic and hearing aid position in Verifit-1



Figure 17: EduMic and hearing aid position in Verifit-2



2. Unmute the EduMic by pushing button briefly (steady green light is shown), and place it in the test box with the reference microphone 1-2 mm from EduMic microphone as shown in figure 16/17 + 18/19. Close the test box.



Figure 18: Position of EduMic, Verifit-1



Figure 19: Position of EduMic, Verifit-2



<sup>3</sup> If using the Verifit2 with no extension cable available, it is possible to place the hearing aids right behind the test box using a short cord

1. Click the button in the "3"-area of the Speechmap to start the third and last test. Again, choose speech stimuli, select 65 dB as output level and click the "continue" (Verifit 1) or "record" button (Verifit 2). (figure 20/21)

Click on 'Graph' to see the table in Speechmap. Calculate a 3-frequency average of the differences between the hearing aid response in Step 2 and the EduMic response in Step 3 from the frequencies 750, 1000 and 2000 Hz -  $[(\text{Test 3}_{@.75\text{kHz}} - \text{Test 2}_{@.75\text{kHz}}) + (\text{Test 3}_{@1\text{kHz}} - \text{Test 2}_{@1\text{kHz}}) + (\text{Test 3}_{@2\text{kHz}} - \text{Test 2}_{@2\text{kHz}})] / 3$ . Numbers are marked in figure 22/23.

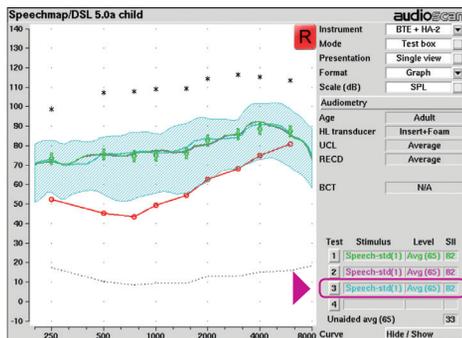


Figure 20: Verifit-1 Result of Step 3. Speech stimuli: Speech-std(1), speech level: 65 dB

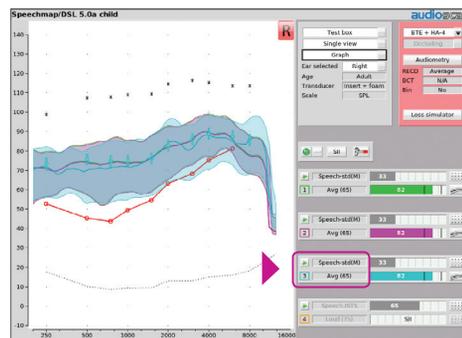


Figure 21: Verifit-2 Result of Step 3. Speech stimuli: Speech-std(M), speech level: 65 dB

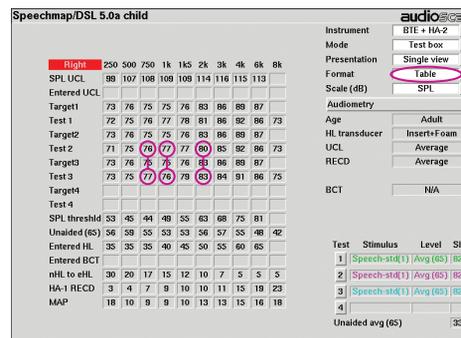


Figure 22: Table in Speechmap. Verifit-1

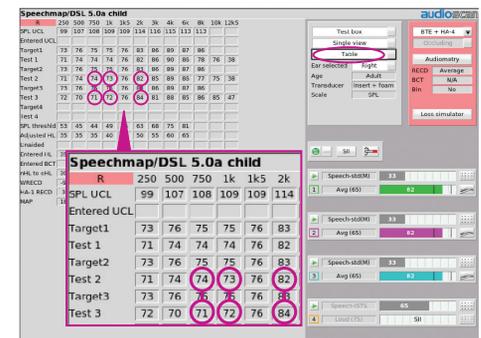


Figure 23: Table in Speechmap. Verifit-2

A calculation based on numbers in figure 22 would be:  $(77-76)=1$ ,  $(76-77)=-1$ ,  $(83-80)=3 \rightarrow (1 + -1 + 3)/3 = 1$ .

If the average difference is < 2 dB, single transparency is confirmed. If the difference is > 2dB, check positions of the hearing aid(s), EduMic and microphones and adjust the EduMic loudness, Sound quality, and Power Bass in the EduMic settings (figure 4) as required<sup>4</sup>. Re-evaluate to confirm transparency.

<sup>4</sup> To make changes in EduMic settings: 1) Turn OFF the EduMic 2) Connect hearing aids to Genie and make adjustments 3) Save changes in Genie 4) Turn on the EduMic and re-pair with hearing aids





