

## VERIFIT REM FITTING TIP

### REAL EAR MEASUREMENT PROTOCOL USING VERIFIT

Real Ear Measurement (REM) equipment can be used to verify and validate the performance of Starkey hearing aids and various signal processing features. The procedures below outline the general steps required to perform verification tasks using Audioscan Verifit equipment (running software version 3.12) but can be applied to other REM equipment, given they offer similar functionality and can generate similar signals. The detailed steps may vary depending on how the equipment is operated (as a Noah® module or direct use).

### MATCHING TARGETS ON-EAR:

#### EQUIPMENT SETUP

1. Calibrate probe tubes per manufacturer instructions prior to running any REM test.
2. Position speaker at ear level directly in front and 18 to 36 inches away from the patient.
3. Choose **Speechmap** from the On-Ear test menu, then select **Audiometry** to enter the patient's audiogram.
4. Select the target rule to be used.
  - » Using e-STAT in Inspire, choose NAL-NL2 as target.

**NOTE:** e-STAT is Starkey's proprietary fitting formula. It is based on an average of targets from two published (non-proprietary) formulas, NAL-R and NAL-NL1. e-STAT is tailored to Starkey's own compression architecture, with target gains defined precisely at soft, moderate, and loud speech input levels. e-STAT is intended to provide a good starting point for a first fit. Further fine tuning adjustments may be needed if matching to NAL-NL2 targets. Adjustments will vary depending on the degree and configuration of hearing loss and the acoustic configuration of the hearing aid. In general, e-STAT gain may need to be increased 2-6 dB SPL in the high frequencies to most accurately match NAL-NL2 targets.

- » Using NAL-NL2 in Inspire, choose NAL-NL2 as target.

**NOTE:** Professionals may change the fitting formula to NAL-NL2 in Inspire to recalculate the frequency response. Professionals may also request to have hearing devices shipped with NAL-NL2 as the default fitting formula.

5. Insert the probe tube into the patient's ear canal with placement of approximately 2-5mm from the eardrum.
6. On the Speechmap screen, select the hearing aid style.

**NOTE:** If you have chosen Open as your hearing aid style, you will be required to equalize the sound field separately while the hearing aid is muted. It is important that once this separate equalization process is complete, the patient does not move during the Speechmap test.

7. Choose a calibrated stimulus (Speech STD 1, Speech STD 2, or ISTS) and the desired stimulus level.

## INSPIRE SETUP

1. Connect and detect the hearing aids in Inspire.
2. If you are not testing in a quiet room, turn off adaptive features.

**NOTE:** While the current Verifit system is compatible with all forms of hearing aid processing, it is recommended to limit signal processing during testing. The Hearing Aid Test tool in Inspire allows for easy adjustments of gain settings and adaptive features for the purpose of verification.

3. Turn off frequency lowering.

## TEST INSTRUCTIONS

1. In **Speechmap** on the Verifit equipment, run separate tests at 50, 65, and 75 dB SPL input levels (these levels are the closest match to the Predicted Real Ear response curves in Inspire).
2. Make adjustments to the hearing aids in Inspire, as needed.
3. Re-run test, as needed.

## TESTING ADAPTIVE DIRECTIONAL MICROPHONES

Verifit equipment can be used to test directional microphones in a multiple-input stimulus environment. This produces a unique directional microphone frequency response curve display rather than a single-frequency polar plot. This directional mic test can be done either on the patient's ear or in the test box.

The on-ear directional test measures directional performance in real time using speech as a stimulus. It presents speech at selectable levels from the front speaker and noise, at a selectable signal-to-noise ratio, from the rear speaker. At periodic intervals, the level of the speech and noise is momentarily reduced and an additional burst is played from either the front or rear speaker to measure the response from that direction.

Please refer to the *On-Ear Directionality Verification* document for additional information.

## TESTING FREQUENCY LOWERING

Verification of frequency lowering both on-ear and in the test box has not been systematically evaluated. Due to the behavior of Starkey's frequency lowering technique, which dynamically captures and recreates high-frequency speech cues in real time, the averaging of level that occurs in REM verification systems makes traditional REM an inaccurate representation of the feature. Do not be concerned about meeting audibility via the audiogram values or matching targets using real ear measurements with frequency lowering engaged. Making adjustments to frequency lowering based upon response curves obtained from verification equipment may lead to an over-prescription of the feature.

The recommended process for validating frequency lowering is through the use of a simple behavioral technique. Please refer to the *Frequency Lowering Validation* document for additional information.