*App*Note

audioscan®

Fitting Widex Senso Hearing Aids using the RM500
with Software version 2.6

Senso's Speech Enhancement reduces gain for noise inputs; ambient noise can alter real-ear measurements made in a sound field. Audioscan's solution to this problem is Simulated Real-Ear Measurement (S-REM) mode, which positions the hearing aid in the controlled environment of the test box, while presenting results as if they were real-ear measurements obtained in a sound field. The accuracy of the simulation depends on the client assessment data provided. For fitting compression hearing aids, it is recommended that audiometric assessment include measurement of hearing with insert ear-phones, measurement of uncomfortable loudness levels and RECD measurements.

Testing sophisticated signal processing hearing aids, such as Senso, is a new and evolving process. Senso's band-specific gain is dependent on the temporal properties of the input signal. Meeting gain or MPO targets using steady pure tones or broad-band noise signals will frequently result in the 1/3 octave band levels of amplified speech not reaching expected levels and brief loud narrow-band signals greatly exceeding expected levels. Audioscan has dealt with these problems by using three unique time-varying signals in the SPEECHMAP® / DSL® fitting method – a swept burst-biased tone (SWEPT), a roving bilevel tone (DYNAMIC) and a high level swept tone burst (MPO). Test results conducted using these signals with the SENSO show that they provide excellent estimates of worst case MPO and both long-term average amplified speech spectra, and the peaks and minima of real speech.

PROCEDURE FOR VALIDATING A SENSO FITTING USING THE SPEECHMAP® / DSL® FITTING METHOD ON THE AUDIOSCAN RM500

Before performing any of the procedures in this protocol, calibrate both real-ear measurement (REM) and hearing aid test box (HAT) sections of the RM500.

In this procedure, you will use the ARROW KEYS in the center of the RM500 keyboard to highlight items in menus and lists, to display choices and to plot audiometric data. Their use will be indicated by ⇕ ⟨⇕⟩ symbols.

1. Select the RM500 REM mode.

2. Press <ADVANCED FEATURES> to display the menu bar

TESTS	TOOLKIT	SETUP	HARDWARE

Fitting the Senso with the RM500 is a 5 step process...

(continued over)

3. Highlight TESTS (⟨⇕⟩) and SPEECHMAP/DSL (⇕).

4. Press <CONTINUE>. The DSL method unaided SPL-O-GRAM is shown on-screen.

5. Press <AGRAM> to display the ASSESSMENT DATA POSTER.

6. Highlight the AGE window (⇕) and scroll (⟨⇕⟩) to your client's age.

7. Highlight the TRANSDUCER window (⇕) and scroll (⟨⇕⟩) to the transducer you used for hearing measurement.

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*The **first step** is to set the Senso for your client using either the Sensogram or HTL mode.*

Programming the Senso may be conveniently done in HTL mode with the hearing aid coupled to the appropriate 2cc coupler in the RM500 test box. It is suggested that the feedback manager be activated and show a 0 dB reduction in all bands
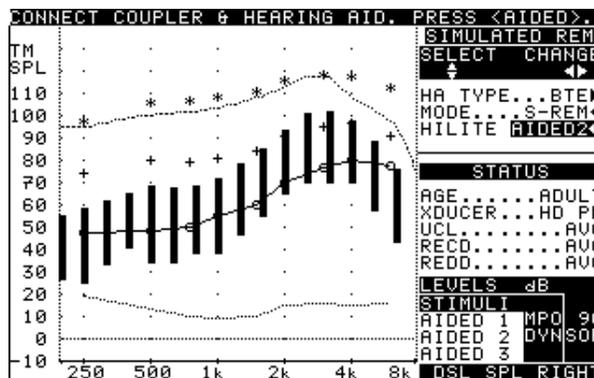
*The **second step** fine tunes the gain of the Senso for soft speech. This is done first because the HTL settings affect both the gain and the SSPL90 of the Senso.*

*The **third step** fine tunes the worst case output for brief loud sounds.*

*The **fourth step** verifies that the feedback manager is not excessively reducing gain for soft sounds when the aid is fitted to your client's ear.*

*The **fifth step** is a subjective verification of the fitting.*

8. For all other poster windows (⇕) scroll (⬌) to USE AVG for this basic level of DSL. (Advanced levels, providing greater accuracy, are described in the RM500 User's Guide.)
9. Press <CONTINUE>. The threshold entry screen appears.
10. Enter threshold information, using ⬌ keys to move across frequencies and ⇕ keys to move to desired dB HL levels. Pressing <CURSOR> stores threshold information at each frequency. When data entry is complete, press <CONTINUE>.
11. An SPL-O-GRAM is displayed for the client with target criteria for linearly amplified speech (+) and maximum hearing aid output (✳)
12. Attach the hearing aid to the appropriate 2cc coupler and position in the HAT box. For a BTE aid, it is suggested that the earmold, with vents sealed, be used with the HA-1 (ITE) coupler. Close and seal the HAT box.
13. At the upper right-hand portion of the SPL-O-GRAM screen, highlight the HA TYPE window (⇕) and scroll (⬌) to the appropriate hearing aid type (ITE, ITC, CIC, BTE). Highlight the MODE window (⇕) and scroll (⬌) to S-REM.
14. Press TEST <AIDED 1> to start the Quikscan® stimulus.
15. Highlight the STIMTYPE window (⇕) and scroll (⬌) to DYNAMIC. Highlight the STIMLEVEL window (⇕) and scroll (⬌) to SOFT. Because of the long adaptation ⬌time of the WIDEX SENSO (10 seconds), you will need to wait until the Quikscan® curve stabilizes before running the complete dynamic test.
16. If necessary, adjust the HTL of the programming unit so that the Quikscan® curve lies within ±5dB of threshold.
17. When this has been done, press <CONTINUE> to run the complete DYNAMIC test. 50% - 75% of the length of the dynamic range bars should be above the threshold curve between 500 and 4000 Hz.
18. Press <AIDED 2> to start the Quikscan® stimulus.
19. Highlight the STIMTYPE window (⇕) and scroll (⬌) to MPO.
20. If necessary, adjust the UCL of the hearing aid programming unit so that the measured output does not exceed the target criteria (✳) at any frequency.
21. Press <CONTINUE> to run the MPO test and verify that the measured output does not exceed the maximum output targets (✳) at any frequency.

Audioscan RM500 screen showing results of MPO and soft DYNAMIC tests.

22. Fit the hearing aid to your client's ear and run the feedback manager. The feedback manager should not reduce the gain more than 10 dB (3dB for HTL 75dB or over) in any band. See the Senso programming manual.
23. Widex recommends final adjustments of the aid be made from the user's subjective evaluation in regards to sound quality in various environments.

"This procedure has been developed by Etymonic Design Inc. and has not been sanctioned by the hearing aid manufacturer."