

AppNote

USING THE RE740 TELEPHONE MAGNETIC FIELD SIMULATOR (TMFS) AND TELECOIL TEST LOOP

The RE740 is a compact device that produces magnetic fields for use in testing the performance of hearing instruments that have a telephone pickup coil. It has a large test loop that simulates the field produced in a wired room and it also contains an internal coil that produces a field similar to that produced by the handset of a telephone. The configuration of this telephone magnetic field simulator (TMFS) is specified in ANSI S3.22-1996. The top (labeled) surface of the RE740 corresponds to the part of the telephone that lies against the ear.

The magnetic field produced by either the TMFS or the test loop depends on the software in the RM500 to which the RE740 is connected. Software 2.6 (ANSI S3.22-1987) and 2.7 (ANSI S3.22-1996) both produce a 10 mA/m field at the center of the test loop and operate the TMFS as required by ANSI S3.22-1996. Software 3.2 (IEC) produces 1, 10, 31.6 and 100 mA/m fields at the center of the test loop but operates the TMFS properly only when a 10 mA/m field has been selected.

Note: When performing tests with the RE740, keep well away from video monitors and other sources of magnetic fields.

Etymonic Design Incorporated
41 Byron Avenue
Dorchester, Ontario
Canada N0L 1G0
1-800-265-2093 (USA)
Phone (519) 268-3313
Fax (519) 268-3256
www.audioscan.com

The model RE740 is a telephone magnetic field simulator (TMFS) meeting the requirements of ANSI S3.22-1996 and a telecoil test loop meeting the requirements of ANSI S3.22-1987, 1996 and IEC 60118-1. It is used with the Audioscan RM500 real-ear hearing aid analyzer to measure coupler SPL produced by a hearing instrument equipped with a telephone pickup coil.

CONNECTING THE RE740

1. Assemble the RE740 as shown in Figure 1:
 - i. Remove the back cover from the RE740.
 - ii. Plug the modular connector into the microphone jack in the RM500's test box.
 - iii. Plug the RCA connector into the auxiliary speaker jack located near the left rear corner of the paper tray. (On older RM500's you will have to disconnect the test box speaker to access the speaker jack.)
 - iv. Plug the coupler microphone assembly, with the hearing instrument attached, into the microphone jack on the RE740.

Note: The metal band is connected only for test loop measurements. It must not be connected for TMFS measurements.

MEASURING TEST LOOP SENSITIVITY

1. Calibrate the hearing aid test (HAT) box of the RM500 (see RM500 User's Guide for details) and assemble the RE740 with the hearing instrument to be tested as shown in Figure 1.
2. Press the <ADVANCED FEATURES> key and, using the ARROW keys, select TELECOIL from the menu under TESTS.
3. Press the <CONTINUE> key.
4. Adjust the hearing instrument gain control to the reference test position (RTP) and set the mode to 'T' (telecoil input). (The RTP can be determined by first conducting a Linear or AGC test of the hearing instrument as described in the RM500 User's guide.)
5. Position the hearing instrument in the center of the test loop and orient it to maximize the number shown in the upper right hand corner of the screen.
6. Without changing the position of the hearing instrument, press the <CONTINUE> key.

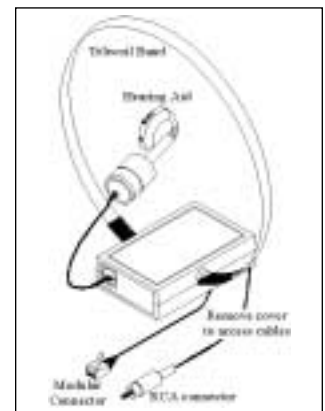


Figure 1. Setup for test loop measurements.

MEASURING HFA (SPA) SPLITS AND STS

ANSI S3.22-1996

Terminology

TMFS

- Telephone magnetic field simulator is a 38.4 mm diameter coil spaced 16.5 mm below a test surface driven by a specified test signal.

SPLITS

- Coupler SPL for an inductive telephone simulator.
- SPL developed in a 2cc coupler by a hearing aid with the gain control in the RTP when the input is the magnetic field generated by a TMFS

HFA-SPLITS

- Average of the SPLITS at 1000, 1600 and 2500 Hz.

SPA-SPLITS

- Average of the SPLITS at the special purpose average frequencies selected by the manufacturer.

STS

- Simulated telephone sensitivity
- Difference in dB between the HFA-SPLITS (or SPA-SPLITS) and the HFA (or SPA) coupler SPL produced at reference test gain (RTG) by a 60 dB SPL input in the 'M' (microphone) mode.

$$STS = HFA \text{ SPLITS} - RTG - 60$$

$$STS = SPA \text{ SPLITS} - RTG - 60$$

Warranty: The RE740 is warranted against defects for one year from the date of purchase. During this period, it will be repaired without charge for parts or labour when returned prepaid to Etymonic Design Incorporated.

1. Calibrate the hearing aid test (HAT) box of the RM500 (see RM500 User's Guide for details) and assemble the RE740 with the hearing instrument to be tested as shown in Figure 2.
2. Set the hearing instrument volume control to the Reference Test Position (RTP), by first running a Linear or AGC test, and set the mode to 'T' (telecoil input).
3. Press the <ADVANCED FEATURES> key and, using the ARROW keys, select TELECOIL from the menu under TESTS.
4. Press the <CONTINUE> key.
5. Position the hearing instrument on the test surface of the TMFS as shown in Figure 3. BTE instruments should lie as flat as possible on the test surface, while ITE/ITC instruments should be oriented with their faceplate parallel to the top surface (if possible) and touching it.
6. Orient the hearing instrument to maximize the number seen in the upper right hand corner of the screen.
7. Without moving the hearing instrument, press the <CONTINUE> key. This freezes the number in the upper right hand corner and runs the SPLITS curve.

Software 2.7 displays the maximum HFA or SPA SPLITS value (Figure 4) and will automatically calculate and display the STS if you have previously run a Linear or AGC test to establish the Reference Test Gain. Using software 2.6, you can calculate the HFA or SPA SPLITS by averaging the values of the SPLITS curve at the HFA (1 kHz, 1.6 kHz, 2.5 kHz) or SPA frequencies. You can then calculate the STS by subtracting the RTG and then subtracting 60 dB.

The HFA-SPLITS or SPA-SPLITS value should be within +/- 6 dB of the manufacturer's specified value.

Note: The SPLITS (and STS) may depend on which side of a BTE hearing aid rests on the test surface.



Figure 2. RE740 TMFS setup.



Figure 3. Hearing instrument positioning for TMFS testing with BTE (top) and ITE/ITC (bottom) instruments.

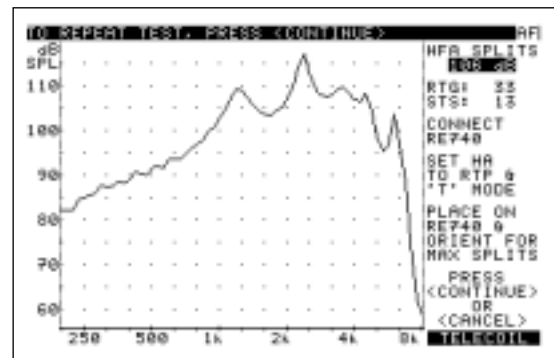


Figure 4. Telecoil test screen from software 2.7