

# CROS System Verification Protocol

Our wireless CROS System takes audio from an ear-level microphone and wirelessly transmits it to the opposite ear via Near-Field Magnetic Induction (NFMI) technology, optimizing patients' hearing experience. Real ear verification is an important step in the fitting process as it ensures the CROS system is providing adequate gain for optimal performance.

## Recommended process for measuring the head-shadow effect:

**Step One:** Measure the real-ear unaided response (REUR) for the better ear: [Fig. 1]

- 1 Position the speaker at 45° to the ear.
- 2 Position the reference microphone at the better ear (i.e. same side as speaker).
- 3 Insert the probe tube into the better ear.
- 4 Measure the better ear only.

**Step Two:** Measure the REUR with sound directed towards the poorer ear: [Fig. 2]

- 1 Position the speaker at 45° to the poorer ear.
- 2 Position the reference microphone at the poorer ear (i.e. same side as speaker).
- 3 The probe tube remains in the better ear (i.e. opposite side as speaker).
- 4 Collect the real ear measurement for sound on the poorer ear side.

The difference between the two measures (for the same input level) obtained in steps 1 and 2 represents an estimate of the head shadow effect for this patient. [Fig. 3]

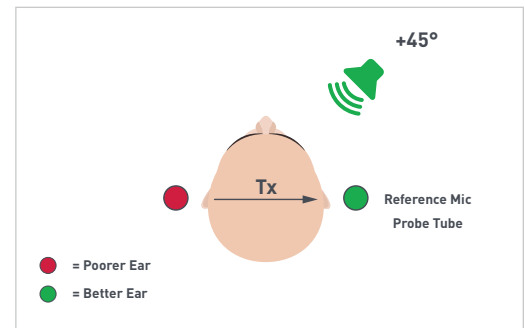


Figure 1

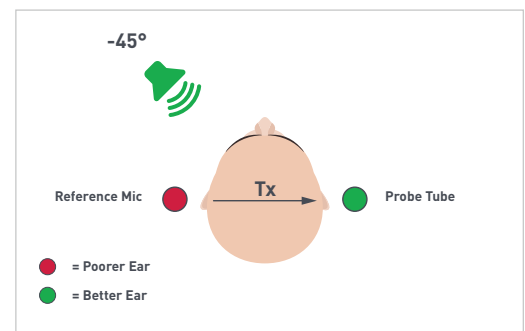


Figure 2

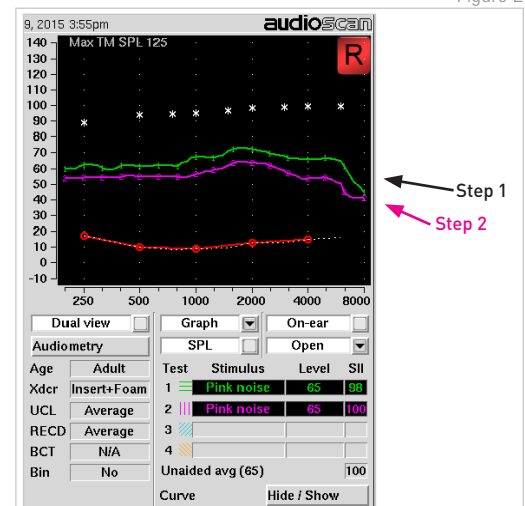


Figure 3

# Recommended steps for verifying CROS hearing aids:

**Step One:** Measure the real-ear aided response (REAR) for the better ear: [Fig. 4]

- 1 Position the speaker at 45° azimuth to the better ear.
- 2 Position the reference microphone and probe tube at the better ear (i.e. same side as speaker).
- 3 Position the CROS instruments (receiver/ transmitter) in the ears and turn them on.
- 4 Measure the better ear only.

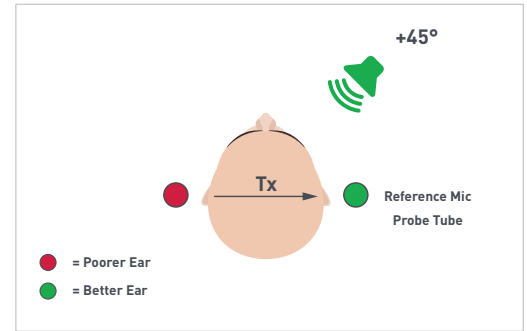


Figure 4

**Step Two:** Measure the response for signal on the poorer ear side (REAR): [Fig. 5]

- 1 Position the speaker at 45° azimuth to the poorer ear.
- 2 Position the reference microphone at the poorer ear (i.e. same side as speaker).
- 3 The probe tube remains in the better ear.
- 4 The response measured in step 2 should match that obtained in step 1 for the same input level.

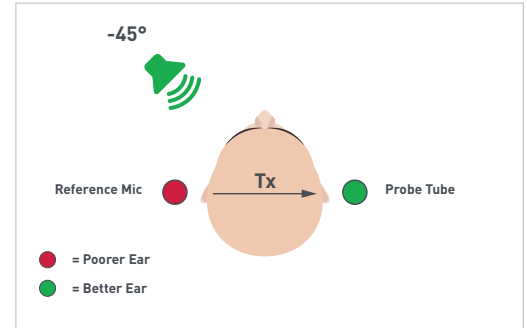


Figure 5

**Step Three:** Measure the REAR at 0° azimuth: [Fig. 6]

- 1 Position the speaker at 0° azimuth.
- 2 Position the reference microphone at the poorer ear or at the better ear.
- 3 The probe tube remains in the better ear.
- 4 The response measured in step 2 should match that obtained in step 1 for the same input level.

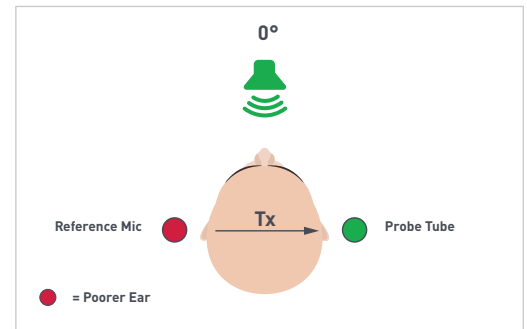


Figure 6

All measurements should be conducted with the same stimulus at the same level. Step 1 and step 2 curves should be close. If not, adjust the CROS response until the poorer side REAR matches the better side REAR. Step 3 should be consistent with other measures. [Fig. 7]

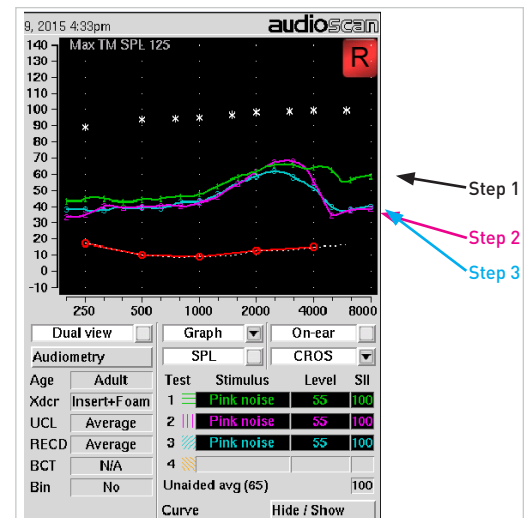


Figure 7

## Recommended steps for verifying BiCROS hearing aids:

**Step One:** Measure the REAR response for the better ear side: [Fig. 8]

- 1 Position the speaker at 45° azimuth to the better ear.
- 2 Position the reference microphone at the better ear side (i.e. same side as speaker).
- 3 Insert the probe tube into the better ear.
- 4 Position the BiCROS instruments (both receiver and transmitter) on the ears and turn them on.

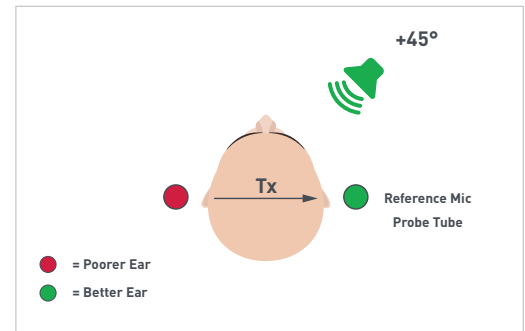


Figure 8

**Step Two:** Measure the response for the poorer ear: [Fig. 9]

- 1 Position the speaker at 45° azimuth to the poorer ear side.
- 2 Position the reference microphone at the poorer ear side.
- 3 The probe tube remains in the better ear.
- 4 The response measured in step 2 should match that obtained in step 1 for the same input level.

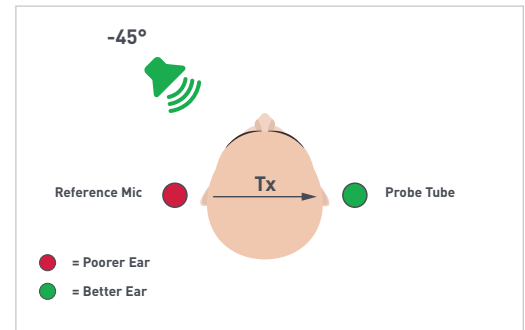


Figure 9

Step 1 illustrates the REAR of the hearing aid fit to the better ear and adjusted to target, or preferred level. Step 2 representing sound incident on the poorer ear side should approximate the levels determined for step 1. [Fig. 10]

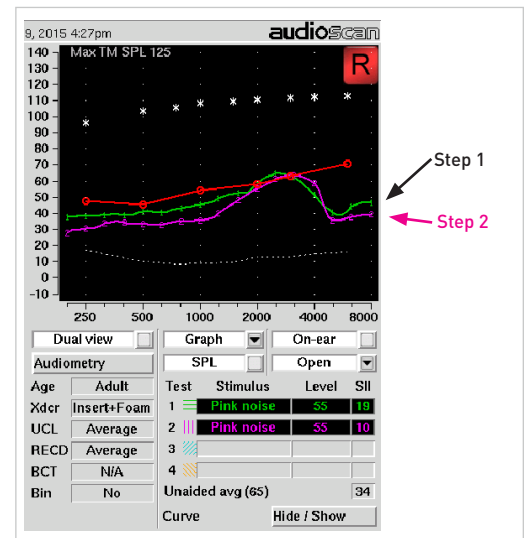


Figure 10