

Technology Transmission Range

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INTRODUCTION

Wireless Assistive Listening Devices (ALDs) have helped individuals improve word recognition by increasing the signal-to-noise ratio (SNR).¹ However, the sound transmission can be dependent on variables affecting antenna strength. The Phonak digital wireless transmitters known as the Roger Pen and Roger Clip-On Mic have sensitive microphone arrays that are designed to improve the SNR in noisy environments. Manufacturer specifications state that the typical transmission range for a Roger Pen and a Roger Clip-On Mic is 10 meters/33 feet. However, if the Roger microphone and receivers are in a direct line of sight, the range may be up to 20 meters/66 feet.² Verification of the ranges can help improve functionality of the devices in many settings, including restaurants and classrooms.

PURPOSE

The purpose of this study was to evaluate the transmission range of the Roger Pen and the Roger Clip-On Microphones in two conditions: inside and outside.

HEARING AID FITTING

- A participant with normal hearing was fit with a pair of Phonak Audeo V90 receiver-in-the-ear hearing aid (RITE HAs) with local microphones disabled for streaming.
- NAL-NL1 gain and output targets were met within 3 dB of a flat 10-dB HL representation of normal hearing as verified with a Verifit Audioscan Hearing Instrument Fitting System.
- Electroacoustic measures using the Verifit confirmed HAs within expectations for normal function based on ANSI S3.22 measurements.

EQUIPMENT

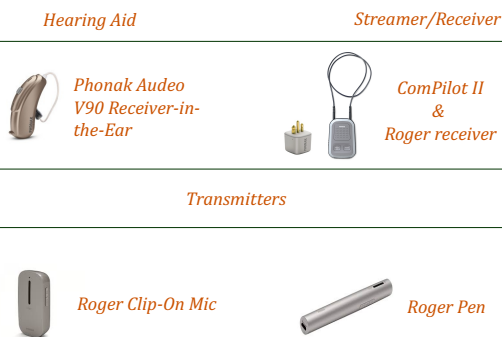


Figure 1. Hearing Aid, Streamer/Receiver, and Transmitters.

PROCEDURES

- Antenna transmission range was evaluated indoors and outdoors with two researchers (R1 and R2) and Phonak wireless technology.
- As shown in Figure 2, R1 wore HAs paired with a Phonak ComPilot II and a Roger X (02) receiver.
- R2 wore the transmitters and walked backwards facing R1 as she delivered cold running speech.
- Three sets of two microphone types, Roger Pen and Roger Clip-On, were each evaluated on three trials for a total of 18 measurements in each condition.
- R2 stopped walking backwards when R1 indicated the sound transmission quality changed. The criteria for determining range was when the sound transmission quality changed from continuous and clear to interrupted and distorted.
- The distance between R1 and R2 when sound quality changed was recorded as the transmission range.

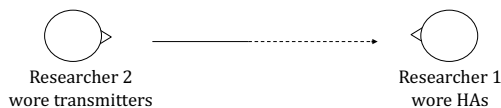


Figure 2. Set up for testing Roger technology transmission range.

RESULTS

Transmission range for the Roger Pen and Roger Clip-On Microphones for indoor and outdoor conditions is shown in Figure 3. The average transmission range was greater for the Roger Pens compared to the Clip-On Microphones by factor of 2.36 (outside) and 1.94 (inside). Within each microphone type, the transmission range was greater inside compared to outside for the Pen (1.51 times) and Clip-On (1.82 times).

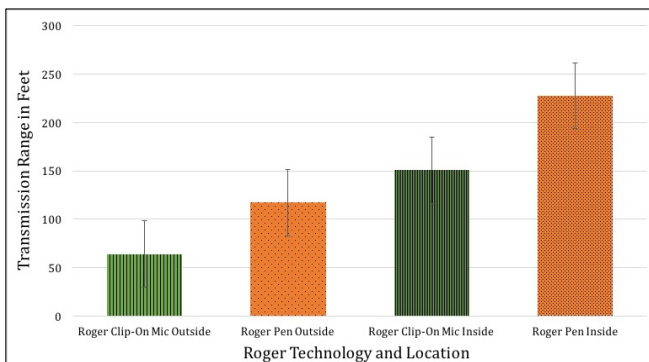


Figure 3. Average transmission range for Roger technology for inside and outside trials.

RESULTS

As shown in Figure 4, transmission range measured indoors varied across three trials for the wireless technology. The transmission range for the Clip-On Mic ranged from 101 feet to 137 feet and the Pen varied from 210 feet to 234 feet. The variability trends were similar for the outside condition.

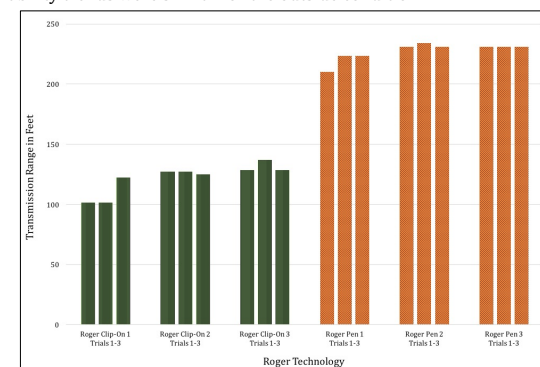


Figure 4. Variability in transmission range across three trials for three Clip-On and three Pen microphones for inside trials.

SUMMARY AND DISCUSSION

Clinically significant differences in transmission range were found as a function of microphone type and the test environment (inside or outside). The greatest transmission range (234 feet) was obtained with the Roger Pen in the inside measurement condition. For comparison, the reported transmission range for a Roger inspiro is approximately 15 meters/50 feet for indoors and 50 meters/170 feet for outdoors.³ It is possible that the transmission range is impacted by obstructions between the transmitter and receiver when separated by more than approximately 20 feet. According to Phonak, this may be the result of their proprietary 2.4GHz protocol which affects transmission through human bodies or other obstacles.⁴ It was observed that obstructions between the transmitter and receiver, such as a hand or having one's back turned, impacted the transmission range of the Clip-On Mic more than the Pen.

REFERENCES

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