CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY

Name(s)

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Project Number

34809

Project Title

What Are the Maximum Functional Ranges of Two Brands of Two-Way Radios in Preparation for Emergency Communications?

Abstract

Objectives/Goals

My project was to determine the effect of distance, user location, and position, on signal strength of two different commercially available sets of Motorola Two-Way Radios in preparation of an emergency event.

Methods/Materials

Two sets of commercially available Motorola Two-Way Radios, with different signal strengths were evaluated. A channel and privacy code were established on the radios. Location of person A was established and maintained as a constant. Person B then went to different locations. Exact distances between radios were established using the odometer on the vehicle traveling from the fixed location of person A to the various locations of person B. Location was evaluated with respect to all obstructions that might reduce signal strength. Lastly, position with respect to open spaces between radios was evaluated.

Results

The signal strength of the MT351R was strong over an approximately 50% longer distance than the MG163A when there were geographic obstructions between users. The signal strengths of both radios could be improved by both parties being outside, rather that inside a house or car. Clear reception quality could be heard approximately 70% farther on the northern route of the testing, where there were significantly less obstructions. The overall reception quality increasingly improved as the fixed location changed from inside the house, to outside the house, to an open field, to the top of a small hill.

Conclusions/Discussion

During an emergency event or natural disaster, cell phones and land line telephones will likely not be available due to damage or overloaded systems. Families will need alternative communication tools during these events. Commercially available Two-Way Radios offer an alternative. The MT351R ($69.99) provided a stronger and better quality reception over a longer distance than the MG163A ($24.99). Obstructions played a significant role in reception quality, particularly concrete/steel overpasses and solid land. Families with a plan in place to get to open spaces, utilizing an established channel and privacy code, will be able to communicate over pre-determined distances, which may save lives and help keep children safe.

Summary Statement

My goal was to inform families about the capabilities of an alternative communication device that can be used for kids to communicate with their parents during an emergency event.

Help Received

My mother, father, and brother helped by driving to the various locations to test signal strength, and ensure I was safe at all locations.