CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY

Name(s)

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Project Number

34599

Project Title

YAGI and BowTie Antenna to Capture Free UHF and VHF HDTV Channels

Abstract

Objectives/Goals

To determine which UHF/VHF antenna design works best in capturing HDTV signals in Bay Area. We want to cut expensive cable TV and use free over-the-air HDTV. Purpose was to capture maximum UHF and VHF HDTV channels by varying Antenna type, antenna elements, placement and direction

Methods/Materials

Yagi-Uday Array antenna and the Bow Tie (based on Gray Hoverman deign) were two popular HDTV antennas we chose. Antennas were built using easy and cheap material from Home Depot. Both antennas cost less than $20. Antenna placement was varied from Inside the house, Outside the house and finally the attic of the house. Antenna direction was varied between 325 degrees North West to point to Sutro Tower in San Francisco and 105 degrees east to point to Fremont Peaks tower. Antenna elements length was varied based on HDTV channel frequency.

Results

HDTV reception was measured in dB signal strength on TV signal meter. The Bow Tie antenna was able to capture the most channels (86),when in the attic. The Yagi antenna had the strongest signal strength. TV reception when antenna was placed outside was better than inside. HDTV reception was excellent quality with no snowing when antenna was placed in the attic.

Conclusions/Discussion

All major network channel (FOX, CBS. NBC, PBS, KQED and NBC) were received. Setting the direction was more important for YAGI whereas as the BowTie antenna did not see significant changes in reception with minor direction changes. Placing antenna higher was very important with attic providing best results.Directional antenna such as a YAGI was best in capturing low VHF channels such as FOX.

Summary Statement

Vary antenna design, height, direction, and spacing to get 50+ HDTV Channels for $0/Month with an antenna costing less than $20.

Help Received

Dad drilled holes and soldered antenna to TV cable wires. Helped me reach the attic.