CALIFORNIA STATE SCIENCE FAIR
2015 PROJECT SUMMARY

Name(s)

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Project Number

35895

Project Title

Radio Microwaves and Cell Phone Use

Abstract

Objectives/Goals

My goal was to determine if different generations of smart phones are affected by different functions.

Methods/Materials

Materials: iPhone 3, iPhone 4, iPhone 4s, iPhone 5, iPhone 6, iPad 2, iPad 3, iPad Mini, TriField Meter Model 100XE EMF detector, DIY template so that the EMF detection meter is 2.5, 7.6, 15.2 cm away from the device antenna.

Take EMF reading on Airplane Mode, on a non-metallic surface to detect any radio frequency field. Place the cellular phone in a standardized position 2.5, 7.6, or 15.2 cm away from the EMF detector on Airplane Mode to determine any activity in the absence of cellular transmission.

Calling: Place a call from the cellular device to a nearby landline. Count the number of spikes that the meter detects over a period of five minutes and record results.

FaceTime# : Place a call from the cellular device to a nearby landline.

Count the number of spikes that the meter detects over a period of 5 minutes of the FaceTime# and record results.

Loading a browser on the web: Place a call from the cellular device to a nearby landline.Count the number of spikes while it loads the page.

Record results and analyze data.

The plan was to do 15 trials per device per activity; this was overwhelming. So, I kept the trials that had been completed and reduced the number of trials from 15 to 3 for the distances 2.5 cm and 7.6 cm.

Results

I wanted to test which functions of the smartphones emitted the most EMFs. I tested different generations of iPhones and measured the emissions at different distances and emissions for different tasks. There was a trend of low activity while web surfing in all phones. For calling, the amount of EMF microwaves was low compared to FaceTime#. There were times using both FaceTime# and calls when the phone emitted frequent and intense microwave activity. The iPhone 6 (1) emitted a long and intense period of spiking during our trials, lasting 20 min. I did the most trials at 15.2 cm and a long period of intense and sustained spiking of microwaves was detected. During the 2.5 cm trials I saw only one brief intense period. In the 7.6 cm trials, there were no intense periods of spiking. The isolated and infrequent long spiking may be explained by the cell phone transmitting to the cell tower.

Conclusions/Discussion

This data supported my hypothesis when it came to Calling, Airplane Mode, and Web surfing. It did not

Summary Statement

Electromagnetic fields from different generations of cell phones with different activities at different distances were the highest for FaceTime# and lowest for Airplane Mode.

Help Received

Mom helped set-up board; Dad helped edit and supervise and purchased meter;My science teachers helped edit and improve my writing; Mrs. Takata helped with this application

Preliminary