



**CALIFORNIA STATE SCIENCE FAIR
2012 PROJECT SUMMARY**

Name(s) Utkarsh Tandon	Project Number J0934
Project Title Minimizing Microwave Radiation Disruption on Wireless Signal Using Reflection and Absorption Methods	
Objectives/Goals The purpose of this engineering project was to design a cage apparatus for minimizing microwave radiation leakages that could potentially affect wireless signal, using methods such as reflection and absorption. Such a cage could be used on household microwave ovens to decrease any disruption on wireless signals. Goals: 1. The cage cost should be under \$15 dollars including all materials. 2. The cage should be reusable. 3. The design should increase wireless signal strength by 75% from when the cage is not used. 4. The cage should be very thin taking only some area like a jacket. 5. The radiation that leaks from the microwave should be absorbed, reflected, and absorbed again for less radiation disruptions.	
Abstract I had two cage designs, #1 had just aluminum foil around a cardboard base and was made to a cage with masking tape, and #2 had added water tubes to the design. The general materials are put below. # Cardboard, Vinyl Tubes, Aluminum Foil, Wooden dowels, Match Sticks, Water, Water Mister, Scissors, Glue, Tape, Hammer, Wi-Fi Analyzer Android app, Wireless Router, Microwave. Procedure: 1. Put either cage on the microwave oven and turn on Wi-Fi app on phone. 2. Place phone 50 inches from the microwave oven. 3. Place a cup of water in the microwave oven and set to 60 seconds. 4. Wait till meter stabilizes and then take reading in dBm. 5. Write readings into notebook. 6. Repeat steps 1-5, four more times for 5 trials.	
Methods/Materials Analyzing the data there was a large reduction in wireless strength when turning the microwave on. To see the difference between both the designs I compared the percentage reduction in the signal drop. Getting 46.4 % reduction in signal drop for the design #1, and 78.6 % reduction in signal drop for the design #2. This shows that design #2 reduced the drop greater than design #1.	
Results Looking back at my engineering goals it is seen that design #2 satisfied all the goals. In design #1, only 3 of the 5 goals were satisfied making design #2 my better design. The design constructed has the ability to absorb and reflect external radiation emitted from a microwave device, making sure that the surrounding wireless devices are not affected by any radiation leakage.	
Conclusions/Discussion This project attempted to reduce microwave radiation disruption that could affect Wi-Fi using Reflection and Absorption methods.	
Summary Statement My brother for assisting me with the research portion of my project, and my parents for driving me everywhere to get my materials	
Help Received	