



CALIFORNIA STATE SCIENCE FAIR 2010 PROJECT SUMMARY

Name(s) Peter S. Manohar	Project Number J2217
Project Title Impact of Interference on Wireless Networks	
Abstract Objectives/Goals The purpose of my project was to measure the signal strength and data transfer rate for a household wireless computer network set up with an Apple WiFi (Airport) router. I wanted to determine how the wireless signal was affected by obstacles such as walls, and by interference from devices such as a conventional oven or microwave oven. Methods/Materials For this project I used a PowerBook Laptop , an Airport Express WiFi router, an Airport Extreme WiFi router, and an Airport 802.11n WiFi router. I measured the signal strength of the WiFi signal for each router at different distances with no obstacles between the computer and WiFi router. I repeated each measurement several times to get a more accurate result. I then repeated the measurements with one, two, or three walls between the computer and WiFi router as well as with one or two doors. I compared the measurements with other ones at the same distance, but without any obstacles. I also took measurements near a conventional oven and a microwave oven, and compared the results with the appliances off and on, keeping everything else the same. I took a total of 216 different measurements. Results The Airport Express WiFi router had a higher Signal to Noise ratio on average than the Airport Extreme, but it was also affected more by interfering devices and by the presence of walls. I found that one or two walls did not change the data transfer rate, but that the data transfer rate dropped from 54 Mb/s to 11 Mb/s if there were three walls between the WiFi router and computer. Adding two doors between the computer and the WiFi router did not affect the signal strength or the data transfer rate. I found that a conventional oven did not affect the data transfer rate, but turning on a microwave oven caused the transfer rate to drop from 54 Mb/s to 24 Mb/s. The new 802.11n WiFi router provided a much higher transfer rate than the older WiFi routers which used 802.11g, and was not affected by the microwave oven. Conclusions/Discussion According to my findings, the Airport Express works well in an open area, but the Airport Extreme (which is more expensive) is more effective in an area with more interference. I also found that a microwave oven sharply decreases the WiFi network data transfer rate. The newer 802.11n routers provide a better signal and higher transfer rate than the older 802.11g routers.	
Summary Statement The purpose of my project was to determine how wireless signals of wifi routers were affected by obstacles such as walls and interference from a microwave oven.	
Help Received None	