Increasing Wifi Signal Strength Using a Phased Array Helical Antenna System

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This experiment was conducted to investigate the feasibility of utilizing a phased array that is able to focus its signal strength on a specific location. In the 21st century, where robust internet is a vital necessity, consumer requirements drive the need to investigate methods to enhance WiFi signal strength. A 5 GHz phased array with helical antennas was constructed, and a circuit board was designed. Many different physics formulas were applied to calculate dimensions. The board incorporated phase shifters, shift registers, 0.1 uF capacitors, 28-pin connecters and 1:2 Wilkinson dividers. An Arduino Uno was programmed to shift the beam to a specific location, and the time was delayed between each element. The phased array antenna system was tested and optimized using a Keysight Fieldfox Microwave Analyzer. The phased array antenna system was able to ameliorate the wifi signal strength significantly. The antenna gain of a phased array was calculated: Ga = 4pAN/ ?^2 The phase shift between two elements: ? = 2p(d/?) . sin ? The hypothesis, “A stationary array of helical antennas could be digitally controlled using phase shifters, in order to form a focused beam that could be steered to a specific target location.” was accepted. The phased array board was created to shift beams in certain locations to allow a higher concentration of energy to be placed within a smaller area. This also shows why an original router would not be as effective, considering the fact that the classic router sends out signal isotropically.

Awards Won:

Third Award of $1,000