

2.4 GHz PCB SPIRAL ANTENNA

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ABSTRACT

This project looks into the design of a spiral PCB 2.4 GHz antenna using Agilent's Advanced Design System Software. The aim of the project is to achieve a VSWR of less than 2 and a directivity of at least 2dBi. The antenna design was optimized until the best possible outcomes were met. Hence the performance of the antenna was evaluated from the simulation results. The antenna design was optimized until the aims of this project were met. Hence performance of this antenna was evaluated from simulation results and practical implementation. These results showed a simulated reflection coefficient of 0.133 after optimization was made, indicating that almost none of the signal was reflected back. Furthermore the antenna value for its VSWR was achieved at 1.307. The directivity was achieved at 5.745 dBi which exceeded the project objective. Although the directivity produced was moderate the same could not be said about gain. Gain was significantly lower which resulted in a low efficiency antenna prototype. The input impedance of the prototype was $(70.35-j2.45)$ ohms which only presented a slight mismatch from the characteristic impedance of 50 ohms. Furthermore it was concluded that the practical results also presented almost the same value when viewed with a smith chart. This antenna was fabricated using an FR-4 UV photo resist board and was intended for use with a carrier frequency of 2.4 GHz. When tested with a vector network Analyzer tests showed the the VSWR was at 2.911 but with a slight mismatch in terms of matching impedance.