

ABSTRACT

Telemedicine is a technological innovation that use wireless communication within the human body to facilitate the provision of health care over large distances. The utilization of wireless communications for remote monitoring can offer advantageous outcomes for wearable antenna systems. Wearable antennas have the potential to be employed in Wireless Body Area Networks (WBANs), facilitating the transmission of health-related information and addressing telemedicine requirements. The wearable antenna under consideration employs a microstrip antenna, which possesses several noteworthy attributes like compact size, low weight, flexibility, cost-effective manufacturing, and the ability to operate within specific frequency ranges. Hence, the author formulated the title with the objective of facilitating the utilization of this antenna in health-related contexts.

In this study, the antenna is affixed to the arm's surface and functions at a frequency of 2.4 GHz, specifically within the Industrial, Scientific, and Medical (ISM) range. The antenna design employed in this final project incorporates the insertfeed method, which is anticipated to enhance the return loss and VSWR values. Additionally, the Defected Ground Structure (DGS) method is utilized to improve the gain and bandwidth values, thereby enabling the antenna to operate within the ISM frequency range. The chosen material for this application is CORDURA, which possesses a thickness of 0.5mm. The supply of the Microstrip feedline is utilized in this context.

The objective of this final research project was to build a microstrip antenna with a circular patch. The performance of the antenna was evaluated by software simulation, yielding the provided results. At a frequency of 2.4 GHz, the measured return loss value is -30,923 dB. The bandwidth of the system is determined to be 775 MHz. The Voltage Standing Wave Ratio (VSWR) is calculated to be 1.058. The gain of the system is determined to be 2,239 dBi. The resulting radiation pattern is observed to be bidirectional. The findings of the measurement conducted are as follows. At a frequency of 2.4 GHz, the measured return loss was -16,019 dB. The bandwidth of the system was found to be 296.7 MHz. The Voltage Standing Wave Ratio (VSWR) was determined to be 1,376. Additionally, the antenna exhibited a gain of 2.0887 dBi and a bidirectional radiation pattern.

Keywords: Telemedicine, Microstrip, Wearable Antenna, Cordura, WBAN, DGS, ISM