DESIGN OF A BROADBAND SMART ANTENNA

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ABSTRACT

The purpose of this project is to design, simulate and fabricate a broadband microstrip smart antenna. The smart antenna is a combination of seven element log periodic antenna with two bandpass filters that operate at microwave frequencies. The log periodic antenna provides a wideband of 700 MHz. The filters operate at the best value of 5.3 GHz and 5.74 GHz given the value of return loss at these frequencies -24.43 dB and -27.864 dB meanwhile Voltage Standing Wave Ratio (VSWR) values at these two points are 1.112 and 1.224 respectively. The bandpass filters cover 10% of the bandwidth.

The microstrip antenna was designed and simulated using *GENESYS* and measured using Scalar Network Analyzer (SNA). In this design, RT Duroid has been used as a substrate with 0.5 mm height, relative dielectric constant, $\varepsilon_r = 2.33$ and dielectric loss tangent of 0.001. The measurement results agree well with the results of simulation.

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INTRODUCTION

1.1   Fundamental of Smart antenna

A smart antenna is an antenna that modifies it's received or transmit characteristic in order to enhance the antenna's performance. Commonly smart antenna is composed of two or more antennas. Smart antennas are important for reducing the deleterious effect of intentional jamming signal, unintentional co-channel interference and multipath.

Smart antenna and associated technologies are expected to play a significant role in enabling broadband wireless communication systems. The used of it can exploit space diversity to help provide high data rates, increased channel capacity and improved quality of service at an affordable cost.

The deployment of smart antennas at existing cellular base station installations has gained enormous interest because it has the potential to increase cellular system capacity, extend radio coverage and improve quality of services [1].

The upcoming wireless local area networks (WLAN) standards at 5GHz to 6GHz are interesting candidates to apply smart antenna principles. It is also required in radar and communications systems such as synthetic aperture radar (SAR), dual-band for Global System Mobile communications (GSM) and Global Positioning System (GPS) [2].

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