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A review of microstrip antenna designs for TV white space applications

Chamath Kalanaka Vithanawasam, Yi Lung Then, Hieng Tiong Su
Department of Electrical and Electronic Engineering, Faculty of Engineering, Computing and Science, Swinburne University of Technology Sarawak Campus, Malaysia

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ABSTRACT

A review on prominent microstrip antennas fabricated for TV White Space applications is presented. This paper will delve into some of the most notable microstrip antenna designs in this frequency band that have come up in recent years. They will be analyzed to identify their strengths and weaknesses, and feedback is provided on their perceived usefulness. These antennas are designed with specific intentions, such as being placed in areas prone to harsh weather, or for long distance communications. One of the most recent antenna types to enter mainstream discussion is the microstrip patch antenna, which can easily be altered to fit various applications. Methods of connectivity such as TV White Space are enthusiastically used in various applications pertaining to connectivity and various microstrip antennas have been designed for this purpose. A conclusion was reached on the compact shorted printed monopole antenna being the most plausible choice from the antennas that have been considered and discussed.

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Corresponding Author:

Chamath Kalanaka Vithanawasam,
Department of Department of Electrical and Electronic Engineering,
Faculty of Engineering, Computing and Science,
Swinburne University of Technology Sarawak Campus, Malaysia.
Email: chamathkv@yahoo.com

1. INTRODUCTION

Microstrip antennas came into mainstream usage during the 1970s due to a multitude of reasons, such as the need to fit wireless communications antennas in smaller spaces, and the pursuit of discovering more affordable methods of designing antennas. The advantages are clearly visible ever since its introduction and therefore microstrip antennas can be found in mobile phones, laptops, and other devices in need of communication. Conventional antennas, such as the Yagi-Uda antenna tend to be costly and the cables used for connections will also contribute to costs that may be borne by the end user. Simpler antennas, such as monopole antennas or microstrip antennas have gained popularity due to this. Microstrip antennas in particular are very popular due to their ease of fabrication. These antennas are frequently used for WiFi and Bluetooth applications, where a small yet practical microstrip antenna is utilized. Recently, this approach is used for applications that require far smaller frequencies, such as in the case of TV White Space (TVWS), which will utilize the unused portions of the TV band spectrum (470 – 790 MHz) to transmit data. This has been very tempting for numerous areas of the world and therefore has been implemented in urban and rural scenarios and has been tested in communities in locations such as Maharashtra, India [1]. Other methods, such as the use of WiFi based long distance (WiLD), which propagates 2.4 and 5.8 GHz for long distances, has also been used in rural scenarios, sometimes in combination with TVWS [2]. Testing has also been carried out with LoRa, a chirp spread spectrum (CSS) based technology, for potential use in remote areas where healthcare can be improved [3]. This was done by creating a long-range transmission platform for communication at a lower data rate.