

Analysis of Rectangular Micro-Strip Patch Antenna for Wi-Fi Applications

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Abstract: The Objective of this Rectangular Micro-Strip Patch antenna Design for the Purpose of Wi-Fi applications. The Purpose of this research Paper is to Design, Simulate, Test and Analyze new type of Rectangular Micro-Strip Patch Antenna with Substrate as RT Duroid and also with two-Feed Line. The Proposed Model Consisting of Method of Moments with Linear Polarization.. The analytical study of the current design is simulation using HFSS Tool and the experimental validation is performed on ZNB20 vector network analyzer (VNA).

Keywords: - Linear Polarization (LP), RT Duroid, Wireless Network (Wi-Fi), MOM (Method Of Moments)

INTRODUCTION

Wi-Fi technology provides its users with the liberty of connecting to the Internet from any place such as their home, office or a public place without the hassles of plugging in the wires, by now you should be quite aware of that at least. It is quicker than the conventional modem for accessing information over a large network. With the help of different amplifiers, the users can easily change their location without a disruption in their network access. Wi-Fi enabled devices are compliant with each other to grant efficient access of information to the user. Wi-Fi location where the users can connect to the wireless network is called a Wi-Fi hotspot. Through the Wi-Fi hotspot, the users can even enhance their home business, as Accessing information through Wi-Fi is simple. Accessing a wireless network (Wi-Fi) through a Hotspot in some cases is cost-free while in some it may carry additional charges. Many standard Wi-Fi chips such as PCI, mini-PCI, USB, Card-bus and PC card, Express Card make the Wi-Fi experience convenient and pleasurable for the users. These small devices are normal plug and play and can be easily used if your device does not provide in build Wi-Fi. But now every single thing comes with Wi-Fi including lowest end mobile phones, tablets.

DESIGN AND ANALYSIS OF PROPOSED ANTENNA FOR WI-FI

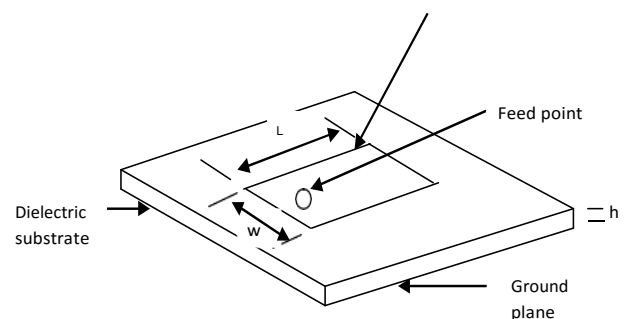
The proposed antenna is the rectangular Micro-strip patch antenna and after theoretical calculation for the rectangular Micro-strip patch antenna the optimization

technique is used for the desired output. To fulfill, our application, of the designing of the Micro-strip patch An approach to design and optimization of WLAN patch antennas for Wi-Fi these are: a. Two-Line fed rectangular micro-strip patch antenna b. Inset fed rectangular micro-strip patch antenna

Micro-strip Patch Antennas

A Micro-strip patch antenna is a thin square patch on one side of a dielectric substrate and the other side having a plane to the ground. The patch in the antenna is made of a conducting material Cu (Copper) or Au (Gold) and this can be in any shape, rectangular, circular, triangular, and elliptical or some other common shape. The basic antenna element is a strip conductor of length L and width W on a dielectric substrate with constant thickness or height of the patch being h with a height and thickness t is supported by a ground plane. The rectangular patch antenna is designed so as it can operate at the resonance frequency. The length that is for the patch does depend on the height, width of the patch and the dielectric substrate.

Geometrical configuration of Rectangular Micro strip Antenna



Dimensions of the Rectangular Patch

The dimensions, bandwidth and gain of the microstrip patch antenna are determined by the operating frequency of the antenna, the relative dielectric constant, and thickness of the substrate material.

RESULTS AND ANALYSIS

The Following results are obtained with an Innovative and Creative Design of Rectangular Shaped Micro-Strip Patch antenna by the Proper selection of Dimensions such as Length and Width of the Radiating Patch, Proper thickness of the substrate, Clear Geometry of the Ground Plane, Proper Boundaries, Excitations of the rectangular Wave Guide and also Permittivity of the substrate is also important thing in the Design consideration.

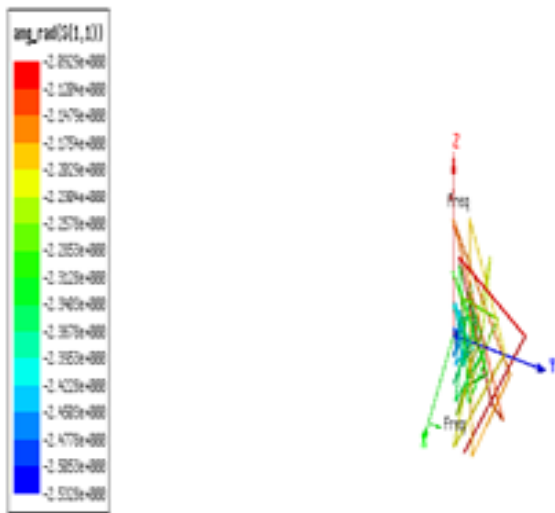


Figure 1: Rectangular Micro-Strip Patch antenna 3D Polar Plot

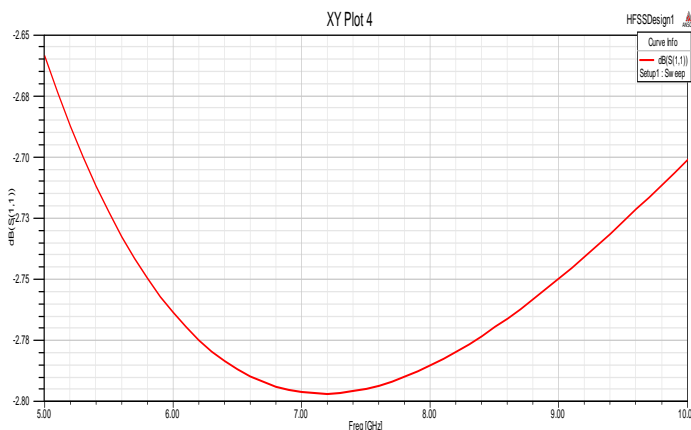


Fig 2 shows the antenna 3 dimensional radiation pattern

Conclusion:

The purposed inset feed rectangular patch antenna is a more conventional approach for the implementation of a Wi-Fi application and it's a good choice to replace commercially available Dipole antenna. Initially, edge feed rectangular micro-strip patch antenna is designed to operate at frequency 7.5 GHz. And then, the Two-Line feed rectangular micro-strip antenna is designed to resonate at

frequency range 7.5 GHz. The proposed antenna design optimization done with a standard electromagnetic simulator (HFSS). The accuracy, robustness and ease of fabrication of purposed antenna validate its potential application in Wi-Fi systems.

Future Work based on this Research:

Based on gathered observations while completing this paper; topics were identified which would benefit for further investigation .Using the variation in Two- feed length introducing the slots in this patch and also Defected Ground Structure to develop the New Research concept at Ku-Band.

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