



QUAD-BAND ANTENNA FOR WI-MAX APPLICATIONS

¹ Kaki Sai Krishna, ² Nirujogi Mohan, ³ Purushothaman K, ⁴ A. Mohammed Abbas

^{1,2,3,4} Department Of Electronics and Communication Engineering.

^{1,2,3,4} VelTech Multi Tech Dr. Rangarajan Dr. Sagunthala Engineering College.

Abstract

In today's world communication plays a vital role in our day to day life by using wireless technology we can improve it widely and it is most researched area. The study of communication is incomplete without understanding the operations and techniques used in the antenna. Of the many techniques we are opting to Micro strip Patch antenna for improving the performance in communication and patch antenna is more reliable and simpler. Here our main objective is to increase data rate speed comparing to previous which is restricted between 2-6GHz, here we are providing beyond 6GHz and also utilizing frequencies between 0-2GHz. Key factor is usage of Quad-Band which supports different bands using around the world so we can able access to any kind of device which have been processed with Quad-Band at any location and the main application is for Wi-MAX. Here we are using Alumina and RF5 material as substrate and software used is Advance Design System(ADS).

Keywords: Micro strip Antenna, Patch Antenna, Quad-Band, WI-MAX, Alumina and Rf5 material, Advanced Design System

1. Introduction

In the modern methods of communication framework utilization of antenna is on higher scale. An antenna is a device which is used as a transducer between a guided wave and a radiated wave. Of the antennas Micro strip antenna is most utilized as a part of the communication area, in that we are utilizing patch antenna. There are numerous procedures have been utilized as a part of small

scale strip patch antenna, for example, Edge feeding and insert feeding techniques.

In this paper our primary point is to increase the information transmission speed over the existing one. In the previous system the short waves used by S-Band is a piece of electromagnetic spectrum characterized by IEEE

inside frequency scope of 2-6GHz and it has the traditional limit at 3GHz between Ultrahigh frequency (UHF) and Super-High Frequency(SHF).

By a large patch antenna is some course of action of various patch antennas that are altogether determined by a similar source. Often, this course of action comprises of patches masterminded in efficient lines and sections. The purpose behind these kinds of plans is higher gain. Higher gain usually suggests a smaller beam width and that is, for sure, the case with patch clusters.

There are numerous techniques that have been utilized to feed micro strip patch antennas. Edge feeding and inset feeding are the two among those techniques. We are looked at edge feed and inset feed because of the favorable position that it can be effectively manufactured and Straightforwardness in demonstrating and impedance matching. The utilitarian qualities and yield parameters like VSWR Return loss, Radiation pattern of these Micro strip Patch Antennas shifts relying on the system utilized.

Correlation of previously mentioned parameters have been made based on feeding on Micro strip Patch Antennas with their reproduced execution attributes. The two models have been designed and recreated in Advanced Design System (ADS) which is an electronic design automation software system.

2. Literature survey

In the past existing frameworks we have a few methods been utilized on four element dual band MIMO configuration converges with one

SRRinduced antenna source. A review of close field UHF RFID is introduced. This innovation as of late got consideration on account of its conceivable use for thing level labeling where LF/HF RFID has customarily been utilized. We survey the pertinent writing, talk about fundamental hypothesis of close and far field antenna coupling in application to RFID, and present some test estimations.

In this paper, reduced course discovering frameworks utilizing a scattered of a high dielectric constant in the middle of neighboring firmly dispersed electrically little radio wires are analyzed. By including a high-permittivity scattered, the directional sensitivity can be improved. In any case, because of restricted physical measurement, an electrically little radio wire has exceptionally receptive impedance.

2.1 Fabrication Process

The initial phase in the fabrication process is to produce the work of art from illustrations. Accuracy is fundamental at this stage and relying upon the complexity and measurements of the antenna; either full or broadened scale artwork to be set up on Stabilizes or Rubilith film.

Augmented work of art ought to be photo lessened utilizing high precision camera to create a high resolution negative, which is later utilized for uncovering the photo resist. The laminate ought to be cleaned utilizing the substrate maker prescribed technique to guarantee legitimate adhesion of the photo resist and the fundamental resolution in the photo improvement process. The photo resist is currently connected to the two sides of the laminate utilizing laminator. A short time later, the

laminates are permitted to remain to standardize to room temperature preceding introduction and advancement.

2.2 Quad Band

Quad band is a gadget highlight that backings four distinctive recurrence bands utilized as a part of correspondence: 850 MHz, 900 MHz, 1800 MHz and 1,900 MHz. A quad antenna is a kind of directional wire radio antenna used on the HF and VHF bands.

2.3 Wi-MAX

Wi-MAX (Worldwide Interoperability for Microwave Access) is a group of wireless communication gauges in light of the IEEE 802.16 arrangement of measures, which give different physical layer (PHY) and Media Access Control (MAC) alternatives.

Wi-MAX was at first intended to give 30 to 40 megabit-per-second information rates, with the 2011 refresh giving up to 1 Gbit/s for settled stations.

2.4 Micro Strip Antenna

In superior aircrafts, space crafts, satellites, missiles and other aerospace applications where size, weight, execution, simplicity of establishment and aerodynamics profile are the requirements. Basic micro strip antenna shapes are square, rectangular, roundabout and circular, yet any ceaseless shape is conceivable. Some fix antennas don't utilize a dielectric substrate and rather are made of a metal fix mounted over a ground plane utilizing dielectric spacers; the subsequent

structure is less tough yet has a more extensive data transfer capacity.

3. Antenna Characteristics

3.1 Radiation Pattern

Radiation pattern of an antenna demonstrates the circulation of vitality radiated by the antenna in the free space. For all intents and purposes any antenna can't transmit vitality with

same quality consistently every which way. The radiation from antenna toward any path is estimated as far as field quality at a point situated at a specific separation from antenna.

3.2 VSWR

VSWR is the proportion of the greatest to least estimations of the standing wave pattern that is made when signals are thought about a transmission line.

3.3 Gain

Antenna gain relates the intensity of an antenna in a provided guidance to the intensity.

$$\text{Gain} = 4\pi * \frac{\text{Radiation Intensity}}{\text{Antenna Input Power}}$$

3.4 Bandwidth

The bandwidth is characterized as the scope of frequencies inside which the execution of the antenna concerning a few qualities complies with a particular standard.

$$\text{Bandwidth (\%)} = (f_v - f_1) * 100 / f_c$$

4. Antenna Structure

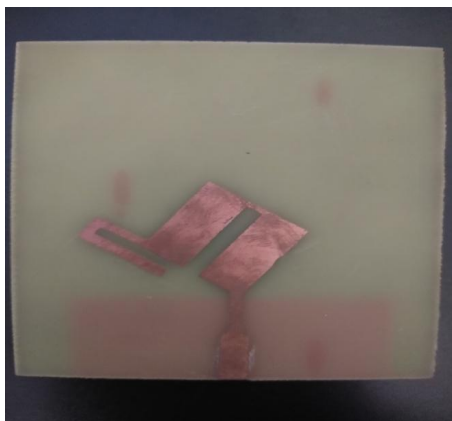


Figure 4.0.1 Fabricated Antenna Design

Here we have been designed micro strip patch antenna with centre feeding which getting very optimized output and helps in increasing speed of

the data rates. Since patch antennas are very efficient it is easy to obtain our specified data rates.

4.1 Simulation Output

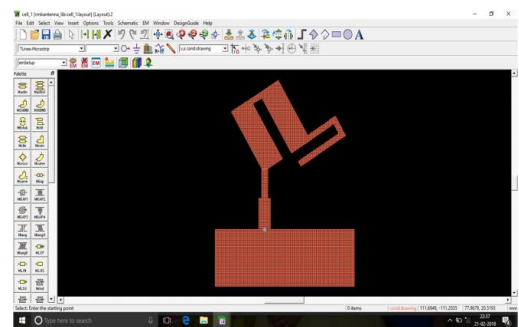


Figure 4.1.1 Simulated Design of Antenna

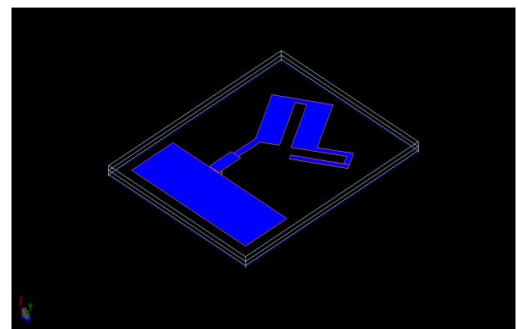


Figure 4.1.2 Antenna in 3D View

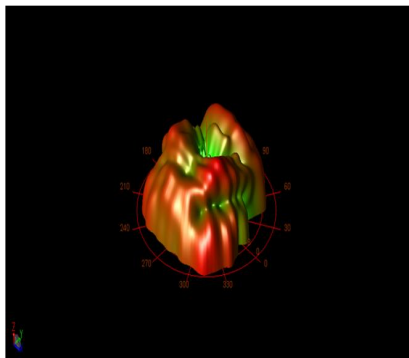


Figure 4.1.3 Figure Radiation Pattern

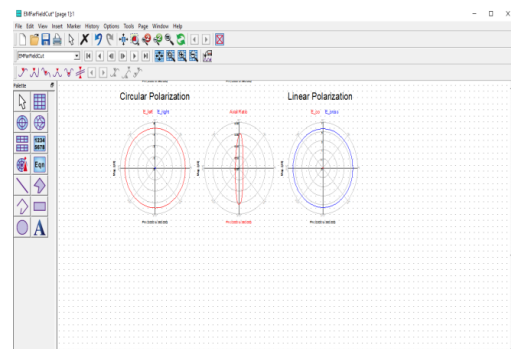


Figure 4.1.5 Polarizations

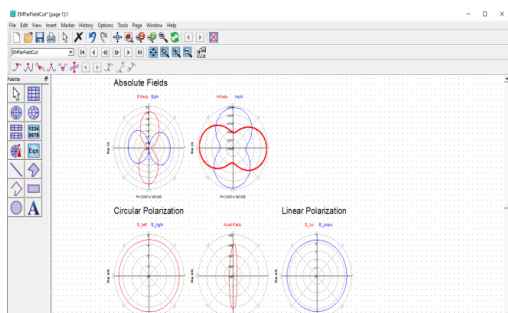


Figure 4.1.4 Figure Absolute Fields

Antenna Parameters		
Power radiated (Watts)		0.42203
Effective angle (Steradians)		1.48521
Directivity(dBi)		9.27421
Gain (dBi)		9.31252
Maximim intensity (Watts/Steradian)		0.284155
Angle of U Max (theta, phi)	31	335
E(theta) max (mag,phase)	14.575	48.3474
E(phi) max (mag,phase)	1.29134	-154.673
E(x) max (mag,phase)	10.8225	49.4774
E(y) max (mag,phase)	6.37348	-135.77
E(z) max (mag,phase)	7.5067	-131.653

5. Application& Advantages

It is most widely applicable to develop Broad band services all over the world, which in turn helps to increase the speed of data rate communication.

Coming to advantages of this it helps to serve over long distance and at a time provide communication to hundreds of users. Antenna Fabrication is very simple while comparing to remaining types of antennas.

6. Conclusion

As the demand of communication is increasingly day by day it is needed to improve the speed of data communication. In this paper we are updating speed to 1Gbps In the range of frequency above 8Ghz. Quad Band which supports four different frequencies and widely applicable over the world with the frequencies 850Mhz, 900Mhz, 1800Mhz, and 1900Mhz. Microstrip antenna is more efficient one which is more reliable and produce efficient output in that patch antenna has high efficiency. The entire antenna is performed in and obtained output in Advanced Design System(ADS 2011).

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8. References

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