QUAD-BAND ANTENNA FOR WI-MAX APPLICATIONS

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Abstract

In today’s world communication plays a vital role in our daily 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 Microstrip 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 access 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: Microstrip Antenna, Patch Antenna, Quad-Band, WI-MAX, Alumina and RF5 material, Advanced Design System.
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
lamine is 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.

\[ \text{Gain} = 4\pi \times \text{Radiation Intensity/Antenna Input Power} \]

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.

\[ \text{Bandwidth (\%)} = \frac{f_v - f_1}{f_c} \times 100 \]
4. Antenna Structure

Here we have designed a microstrip patch antenna with center feeding, which results in optimized output and helps in increasing the data rates. Since patch antennas are very efficient, it is easy to obtain our specified data rates.

4.1 Simulation Output

![Fabricated Antenna Design](image1)

![Simulated Design of Antenna](image2)

![Antenna in 3D View](image3)
5. Application & Advantages

**Figure 4.1.3** Figure Radiation Pattern

**Figure 4.1.4** Figure Absolute Fields

**Figure 4.1.5** Polarizations
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


