Design and Analysis of Flower Shaped Microstrip Antenna Using Metamaterial for Military Application

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Article Info
Article history:
Received 13 February 2015
Received in revised form
20 February 2015
Accepted 28 February 2015
Available online 6 March 2015

Keywords

Abstract

In this paper,we use microstrip patch antenna with metamaterial.The purpose of using metamaterial has improve the performance of antenna.when compared to other conventional material has negative permeability and permittivity.This simulation can be done by using HFSS software. This simulation results shows that performances are compared with respect to return loss v/s frequency and VSWR v/s frequency.MSA has certain advantages due to small size,lowweight,easy to fabricate and achieve high return loss.The frequency ranges of our design is from 8 to 12GHz.

1. Introduction

Microwave is a term used to identify electromagnetic waves above 103 megahertz (1 Gigahertz) up to 300 Gigahertz because of the short physical wavelengths of these frequencies. Short wavelength energy offers distinct advantages in many applications. For instance, sufficient directivity can be obtained using relatively small antennas and low-power transmitters. .

Microwave frequencies present special problems in transmission, generation, and circuit design that are not encountered at lower frequencies. Conventional circuit theory is based on voltages and currents while microwave theory is based on electromagnetic fields. Antenna is the primary component for the wireless system. This used to transmit the RF signal through the one conducter from another conducter through the free space. Performance of an antenna canbe defined by various parameters such as radiation pattern, input impedance, return loss, bandwidth, directivity and gain, beamwidth, side lobes, polarization etc.

In the recent years the development in communication sys-tems requires the development of low cost, minimal weight, low profile antennas that are capable of maintaining high performance over a wide spectrum of frequencies.In modern wireless communication systems, the microstrip patch antennas are commonly used in the wireless devices. The demand in commercial and military wireless systems is due to capabilities of proposed Antenna such as low weight, low profile, low cost, eassily combined with de-sign and technology, and relatively simple fabrication.

In this paper we are using a metamaterial substrate which is replaced by the normaly used FR4 substrate. To using this type of design will increase the performance of antenna. Our aim is to produce the microstrip antenna with the dual and more frequencies and application. these will be particularly used for MILLITARY APPLICATIONS which have the 8GHZ to 12GHZ.and also consider some other expensive wireless applications.

2. Proposed system

2.1 Microstrip Patch Antenna

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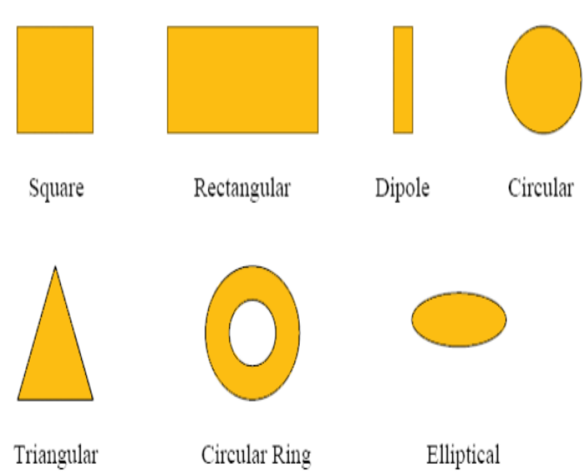
MSA is an simplest form of antenna.It has radiating pattern on one side and ground plane plane on opposite side.That radiating pattern is in form of square,rectancular,elliptical,dipole,circular and triangular.Themicrostrip patch antenna has low profile antenna and it can be fabricated using photolithographic.The most popular are microstripline,co axial probe and proximity coupling.when it attains maximum and minimum means if electric field is zero at the centre of patch.

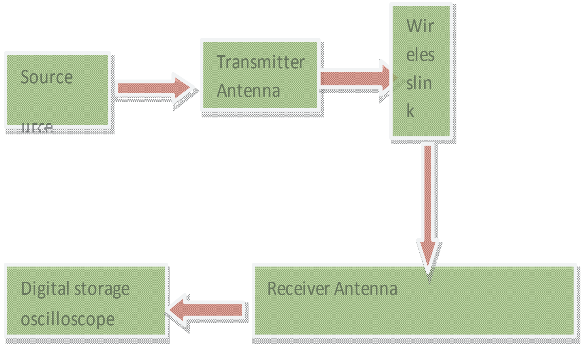
Metamaterial

Metamaterial is a artificial material assembles in multiple individual elements fashioned from conventional materials such as metals or plastic. It can be constructed into repeating pattern. Properties of these materials depends on the shape, size and arrangement. It is mainly used to increase the performance of the antenna. In conventional devices there has unavailable properties to meet the size miniaturize and high gain etc. Current research in this materials are able to reverse refractive index is called negative index metamaterials .It can interact at radio frequencies, microwave and optical frequencies.

Structure of Radiating Pattern

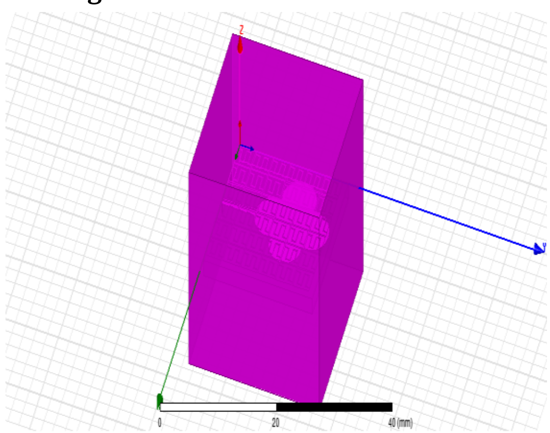


Block Diagram

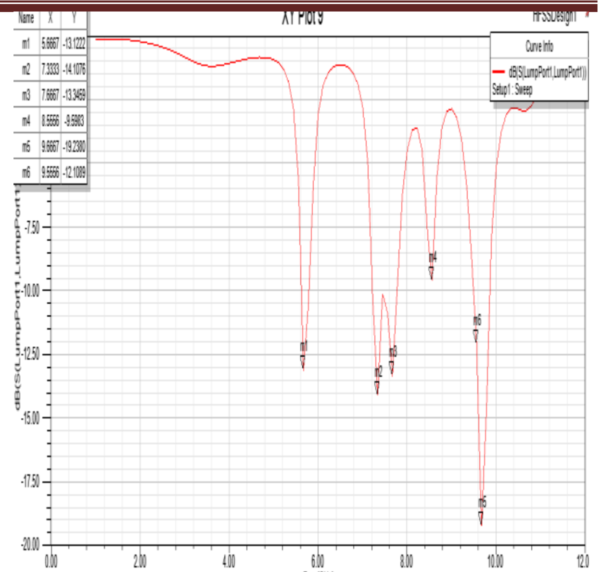


In this block diagram explain how the information travel from one to another. The informatiom is given to transmitter antenna. the transmitter antenna forward the information to receiver antenna through wireless link Finally the information is received by using digital storage oscilloscope

3. Design Process



4. Simulation Result



5. Conclusion

This paper has highlighted for further research direction in the field it will take collaborative efforts from researches in antenna physics optics through practical implementation. Some antenna miniaturisationis observed but the choice of metamaterial parameter could be further optimizein this respect.

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