International Journal of Intelligent Computing and Technology

IJICT

ISSN: 2457-0249 (Online)

Website: https://www.ijict.com **June (2019) - Vol.3, Iss.1 Pages:20-24**

Ultrawide band antenna for Cognitive Radio

Shanmugha Priya P R

UG Student, Department of Electronics & Communication Engineering

Bannari Amman Institute of Technology, Tamilnadu, India

Article History- Received: May 2019; Published: June 2019

Abstract

Cognitive radio applications are emerging as the effective use of spectrum has got its importance in the field of communication. As the cognitive radios are concerned, design of antenna for its purpose with wide range of bandwidth is really a challenging task. One such antenna with UWB is approached and their return loss is justified for its usage in cognitive radio.

Keywords: Cognitive radio, UWB, return loss, antenna

1. INTRODUCTION

The key enabling technology of dynamic spectrum access is cognitive radio has emerged as one of the keys that can help addressing the inefficient usage of the radio spectrum. It exploits unused licensed radio frequencies, often designated as spectrum holes or white spaces. Cognitive radio aims to enable secondary users to autonomously access spectrum holes in the entire spectrum to increase performance, as long as they do not harmfully interfere with primary users. Basically, at a given time and location. To achieve the basic aims of cognitive radio efficient transmitting and receiving antennas are required with UWB.

2. UWB ANTENNAS

UWB antennas are required for underlay CR, and for sensing in overlay CR. [1] UWB antennas were originally meant to radiate very short pulses over short distances. They have been used in medical applications, GPRs, and other short-range communications requiring high throughputs. The literature is rich with articles pertaining to the design of UWB antenna. For example, the authors in present a UWB knight's helm shape antenna fabricated on an FR4 board with a double slotted rectangular patch tapered from a 50-Ω feed line, and a partial ground plane flushed with the feed line [2]. Three techniques are applied for good impedance matching over the UWB range: 1) The dual slots on the rectangular patch. 2) The tapered connection between the rectangular patch and the feed line. 3) A partial ground plane flushed with the feed line. Consistent omnidirectional radiation patterns and a small group delay characterize this UWB antenna.

In general, the guidelines to design UWB antennas includes the proper selection of the patch shape. Round shapes and round edges lead to smoother current flow, and as a result to better wideband characteristics. The good design of the ground plane. Partial ground planes, and ground planes with specially designed slots, play a major role in obtaining UWB response. The matching between the feed line and the patch. This is achieved using either tapered connections, inset feed, or slits under the feed in the ground plane. The use of fractal shapes, which are known for their self-repetitive characteristic, used to obtain multi- and wide-band operation, and their space-filling property, which leads to increasing the electrical length of the antenna without tampering with its overall physical size.

3. DESIGN OF UWB ANTENNA

An Ultra wide band antenna is designed using HFSS. Its layout produces desired UWB with bandwidth from 5 Ghz to 11Ghz with return loss less than -10db. Design methods includes partial ground plane flushed with feed line for the betterment of achieving bandwidth.

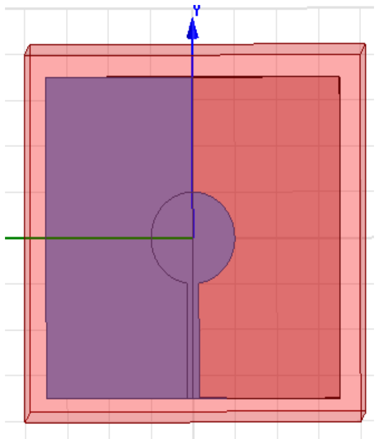

Fig.1 Design of UWB using HFSS

4. ANALYSIS OF RESULT

Result can be analyzed in by Return Loss and Radiation Pattern. The design stimulated using HFSS produced the following result in case of return loss. It produces return loss less than -10db for frequencies 5Ghz - 11Ghz which is the acceptable range as per fcc.

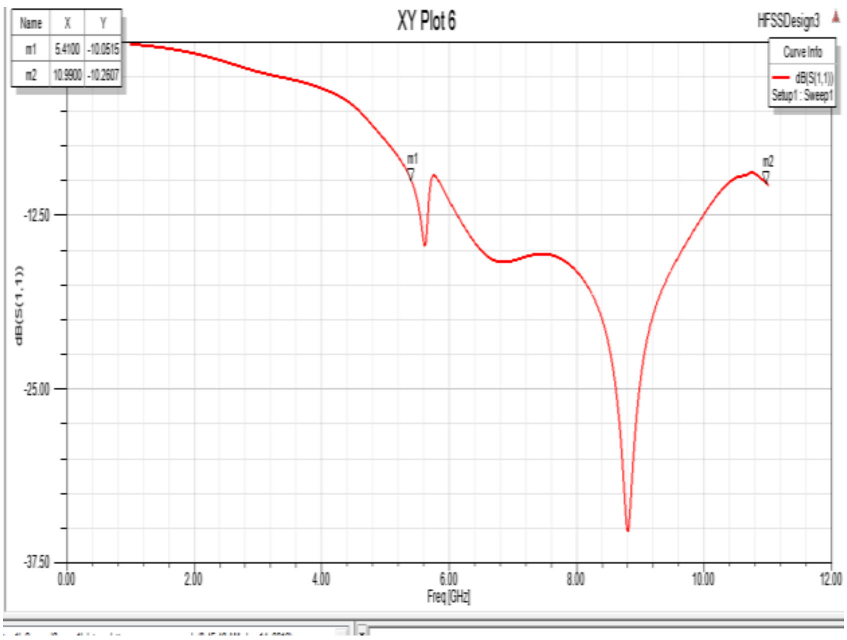

Fig.2 Return loss plot-parameter S(1,1)

Radiation pattern obtained from the stimulation shows that the design gives omnidirectional pattern and can be applied in cognitive radio antennas.

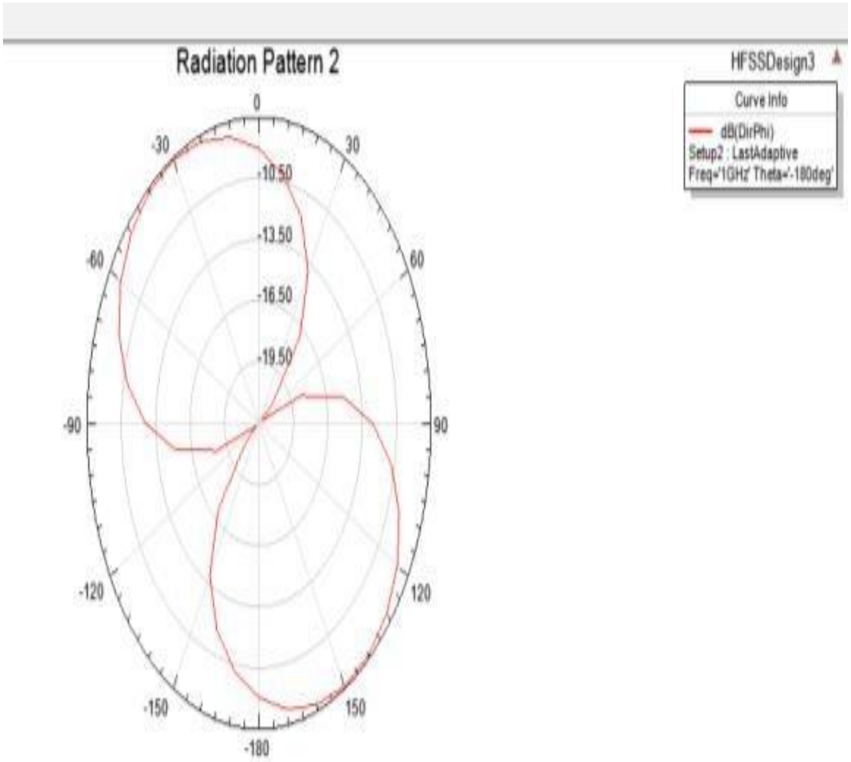

Fig.3 Radiation Pattern Directivity

5. FUTURE EVOLUTION

Designing an antenna with specifications and a good directivity satisfying its need will be getting an eminent place in its application. Further antennas with even more UWB can be designed for the application of cognitive radio.

6. CONCLUSION

The antenna design and its specifications and results justify that it satisfies all the properties to be used as an antenna for cognitive radio. It can be used to operate at frequencies 5Ghz to 11Ghz effectively.

REFERENCES

1. Al-Husseini M, Tawk Y, Christodoulou C.G, El-Hajj A and Kabalan K.Y (2010), A Reconfigurable Cognitive Radio Antenna Design. Proceedings of the 2010 IEEE AP-S International Symposium on Antennas and Propagation (IEEE AP-S 2010), Toronto, ON, Canada.
2. Abu Tarboush H. F, Khan S, NilavalanR, Al- Raweshidy H.S, Budimir D (2009) Reconfigurable Wideband Patch Antenna for Cognitive Radio. Proceedings of the 2009 Loughborough antennas and propagation conference (LAPC 2009), Loughborough, UK. pp.141–144.

How to cite this article:
Shanmugha Priya P R, "Ultrawide band antenna for Cognitive Radio", International Journal of Intelligent Computing and Technology (IJICT), Vol.3, Iss.1,pp.14-19, 2019