International Journal of Latest Engineering and Management Research (IJLEMR)
ISSN: 2455-4847
www.ijlemr.com || Volume 02 - Issue 10 || October 2017 || PP. 01-04

Survey on Ultra Wide Band Antenna for Bio-Medical Applications

C. Jaya Priya[1], Dr. K. Meena alias Jeyanthi[2]
[1](ME Scholar, Department of Electronic and Communication Engineering, PSNA College of Engineering and Technology, Tamil nadu-624622, India)
[2](Professor, Department of Electronics and Communication Engineering, PSNA College of Engineering and Technology, Tamil nadu-624622, India)

Abstract: Ultra wideband transmission has recently received great attention in both academia and industry for applications in wireless communications. A novel design of a Microstrip Patch in Ultra wideband is proposed for microwave imaging in biomedical applications. Antenna is a key component for detection of abnormality in biological signals. The proposed structure is compared with conventional structure in terms of antenna parameters in wide range of frequency band. Performance analysis of the designed antenna is evaluated in terms of return loss, input impedance, fractional bandwidth, radiation pattern, and antenna efficiency. Breast cancer detection with mammography basically utilizes a low dose X-ray as the initial diagnostic tool. Frequent exposures to X-rays of any kind are really not recommended for young people.

Keywords: ADS software, Broadband, E-shape, GPS, Microstrip Patch Antenna.

I. INTRODUCTION

Wireless system has become a part of human life. Most of the electrical and electronics equipment around are using the wireless system. Microwave imaging in medical field is one of the important diagnosing mechanisms available. Microwave imaging can be defined as seeing the internal structure of an object by illuminating the object with low power electromagnetic fields at microwave frequencies. The Microstrip UWB antennas have much attention due to its various attracted applications. The Federal Communications Commission(FCC) in the United States intend to provide an efficient use of radio bandwidth by enabling Personal Area Network(PAN) ;longer range, low-data-rate-applications. The International Telecommunication Union Radiocommunication sector(ITU-R) define UWB as an antenna transmission for which emitted signal bandwidth exceeds the Centre frequency. Each pulse in a pulse-based UWB system covers the entire UWB bandwidth. The reduction in size is also a contemplation to be taken into account in the design of this antenna. UWB radar technology can contribute fine spatial resolution short-range sensing capabilities from ground-penetrating radar to medical imaging and diagnosis.

II. LITERATURE REVIEW

[1] S.Revathy, H.Umma Habiba, A.E.Ramanujan (2016),Widespread use of electronic circuits for various applications will increase the power demand in future. The rectenna model is simulated using ADS software. The designed rectenna is having the good return loss of 26dB at 2.45GHz and the size of the rectenna is 11mm x 17mm which is 50% reduction in size compared to conventional layouts. The antenna operates well at return loss of 26dB at 2.45GHz and the size is 11mm x 17mm which is very compact compared to other design. The narrow band and good return loss of the rectenna are achieved by proper matching between antenna and rectifier.

[2] W. Mazhar, M. A. Tarar, F. A. Tahir, Shan Ullah, and F. A. Bhatti (2013), In this paper a novel design of compact microstrip UWB antenna with step impedance microstrip line is proposed. The antenna with dimension of 34mm × 36mm (L×W) is fabricated on FR-4 epoxy dielectric with relative permittivity of 4.4. The designed antenna has the capability of operating between 3GHz to 10.26GHz with a 7.26GHz bandwidth (fh-fl). The proposed antenna is analyzed in both frequency and time domain to check its appropriateness for UWB applications. SMA female connector is used for feeding. Antenna parameters such as return loss and radiation pattern show reasonable agreement with the simulated results. In this paper the presented UWB antenna which is capable of supporting large bandwidth.

[3] Ngo Hoai Nguyen, KieuTrungLiem, Nguyen DinhUyen, Doan Phuong Duy (2014), A small Patch Antenna is developed specifically for 2G digital cellular networks and automatic GPS tracking applications. It covers three bands: GSM - 850 MHz, GSM900 MHz and GSM 1.8 GHz. The antenna has a small size (34 mm x 26 mm) and is designed on a substrate FR-4 with the radiation patch. The small GSM patch antenna has been designed specifically for automatic GPS tracking system with the ability to communicate at GSM 850/90011800

applications. As the results, the return losses for the fabricated antenna at 850MHz, 900MHz, and 1800MHz are -11.18dB, -12.02dB, and -11.31dB, respectively.

[4] S.Kannadhasan, Dr.A.C.Shagar (2017),This paper presents a U Shaped micro strip antennas with improved bandwidth operate at 3.8GHz. U shaped antenna is used for military, wireless and civil applications. ADS software is used to compute the gain, power, radiation pattern, and S11 of the antenna. The gain of the designed antenna is 7.74 dB and antenna efficiency of 99.6%.In this paper a microstrip U shaped antenna is successfully designed at a resonant frequency of 3.8 GHz. A compact U-shaped microstrip patch antenna is designed for Wireless communication applications like Wi-Fi and Bluetooth. The impedance bandwidth of the designed U shaped antenna is 20 MHz, antenna gain is 7.74 dB, directivity is 7.46, and the radiation Efficiency at 3.8 GHz is about 99.60 %. The gain and bandwidth of single element patch shows the various arrays antennas using dual polarization.

[5] J.-Y. Sze and Y.-F. Wu (2010), A planar hexa-band internal antenna designed for mobile phone applications is presented. The antenna occupying a small area of 45×12mm2 is placed on the top no-ground portion of the system circuit board with a ground-plane size of 45×100mm2.Two wide impedance bands can be generated by the designed antenna to support GSM 850, GSM 900, DCS,PCS,UMTS,and2.4-GHzWLANoperations. The structurallysimple antenna not only occupies a small area of only 45×12mm2 but also has two VSWR ≤ 3 impedance bands of 810– 1010MHz and 1705–2515MHz, which can cover the desired operating bands required for GSM 850, GSM 900, DCS, PCS, UMTS, and 2.4GHz WLAN operations. The peak antenna gains in the lower and upper operating bands are as high as 1.5 and 3dBi, respectively, making the antenna valuable for practical applications.

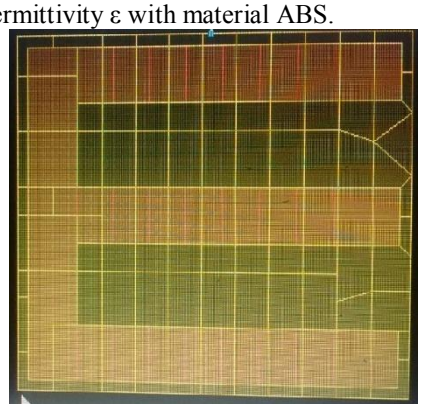
[6]Nader Behdad, and Kamal Sarabandi (2003), A novel approach is presented to improve the bandwidth of slot antennas. The technique is based on manipulating the field distribution along an ordinary resonant slot structure using the feed line and creating a dual resonance behavior. By proper choice of the slot width, feed location, and microstrip feed line a fictitious second resonance can be created by establishing a null in the electric field distribution along the slot near the feed line. A prototype is designed and tested at the centre frequency 3.4 GHz. A large bandwidth of 37% is achieved without any constraints on impedance matching or complexity in the antenna structure. Also bandwidth enhancement of a miniaturized slot antenna using parasitic coupling is presented. The antenna occupies up to 3% bandwidth. Two different methods to enhance the bandwidth of slot antennas were introduced. This can be exploited to achieve a high bandwidth or a dual band antenna with similar radiation patterns for both bands. Bandwidth of up to 3% can be achieved.

III. PROPOSED WORK

In the above papers, the different types of antenna are designed. My proposed work isbased on Microstrip E-patch Antenna for GPS(Global Positioning System).

1.1 PROPOSED MICROSTRIP PATCH ANTENNA

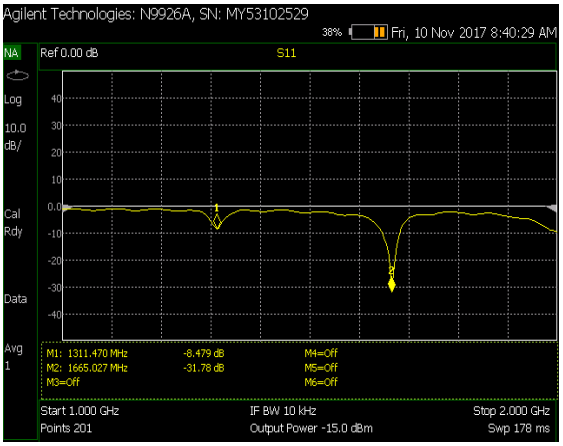
A microstrip patch antenna consists of a dielectric substrate, with a ground plane on the other side. Due to its advantages such as low weight, low profile planar configuration, low fabrication costs and capability to integrate with microwave integrated circuits technology, the microstrip patch antenna is very well suited for applications such as wireless communications system, GPS, cellular phones, pagers, radar systems, and satellite communications systems.The rectangular patch, with dimensions of 60 mm ×72mm is supported by a low dielectric substrate with dielectric permittivity ε with material ABS.



IV. RESULT

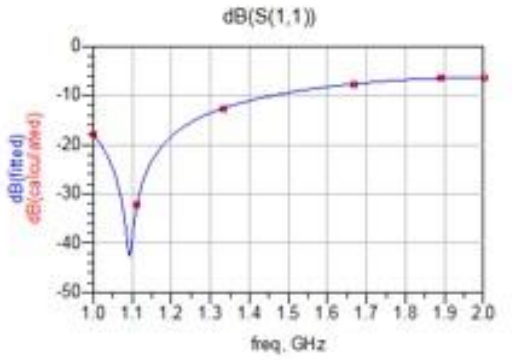
The hardware setup for the estimated E-shaped Patch Antenna is shown below.

The Screenshot of Microstrip patch antenna parameter measurement using On-field network analyzer.



SIMULATED RESULT

Return loss graph (S11)



COMPARISON OF SIMULATED AND MERASURED RESULT OF THE PROPOSED ANTENNA

	Simulated values of the proposed antenna	**Measured values of the proposed antenna**
S11(dB)	**42**	**-32**

V. CONCLUSION

Microstrip antennas have become a rapidly growing area of research. Their potential applications are limitless, because of their light weight, compact size, and ease of manufacturing. The low profile E-shape patch is presented in this paper. Simulations and results of the E-shape microstrip patch antenna have provided a useful design for an antenna operating at the frequency of 1.176 GHz for the GPS applications. The reflection coefficient is below −10dB from 1.171 GHz to 1.181 GHz. At the same time, the antenna is thin and compact with the use of low dielectric constant substrate material. This thesis describes different Microstrip Patch Antenna designs with different shapes. New techniques should be explored to reduce the size of the UWB antennas to suit more practical applications Future work can be carried out for the development of an UWB Antenna array with high gain for high- quality communication link. Moreover, the UWB Antenna find application in Wireless Personal Communication systems and Bio-Medical applications. Hence, it becomes imperative study of Antenna radiation on the Human body.

VI. REFERENCES

[1]. S.Revathy, H.Umma Habiba, A.E.Ramanujan*"Low Profile HMSIW Rectenna for Wireless PowerTransmission", 978-1-4673-9338-6/16/$31.00 c 2016 IEEE.*

[2]. W. Mazhar, M. A. Tarar, F. A. Tahir, Shan Ullah, and F. A. Bhatti *"Compact Microstrip Patch Antenna for Ultra-wideband Applications", Progress In Electromagnetics Research Symposium Proceedings, Stockholm, Sweden, Aug. 12-15, 2013 1101.*

[3]. Ngo Hoai Nguyen, KieuTrungLiem, Nguyen DinhUyen, Doan Phuong Duy*"A Small Patch Antenna for GSM Applications", 978-1-4799-5051-5/14/$31.00 ©2014 IEEE.*

[4]. S.Kannadhasan, Dr.A.C.Shagar*"Design and Analysis of U-Shaped Microstrip Patch Antenna", 3rd International Conference on Advances in Electrical, Electronics, Information, Communication and Bio-Informatics (AEEICB17).*

[5]. J.-Y. Sze and Y.-F. Wu *"A COMPACT PLANAR HEXA-BAND INTERNAL ANTENNA FOR MOBILE PHONE", Progress In Electromagnetics Research, Vol. 107, 413–425, 2010.*

[6]. Nader Behdad, and Kamal Sarabandi*"A NOVEL APPROACH FOR BANDWIDTH ENHANCEMENT OF SLOT ANTENNAS", Proceedings of the 2003 Antenna Applications Symposium [27th] Held in Monticello, Illinois on 17-19 September 2003. Volume 1.*