

Design of H Shaped Patch Antenna for Biomedical Devices

M.Paranthaman, S.Palanivel Rajan

Abstract: *With the reconciliation of innovative advancement and medicinal types of gear lead to the usability implantable bio devices for the checking of patients. These implantable gadgets lessen the hospitalization time of the patient. The implantable gadgets speak with nature by means of receiving wires. Thus planning of radio wires for an implantable gadget assumes a noteworthy job. The Microstrip feed rectangular fix double band radio wire which works in the 2GHz, 2.45GHz and 4.5GHz MICS Band and ISM Band is displayed for the implantable gadgets. The planned radio wire offers better return loss and gain values.*

Index Terms: *patch antennas, H shape, biomedical devices, MICs band*

I. INTRODUCTION

Since the presentation of central X-beam investigation, the electromagnetism finds more prominent application in the medicinal field. The height in the field of electromagnetic waves offers more noteworthy examination and treatment of illnesses. The microwave, EM waves finds broad application for the treatment of malignant growth, imaging of influenced cells, wound recognizable proof. Related to this, the remote correspondence improvement additionally helps in improving the solace rendered to the influenced individuals for example by diminishing the obtrusiveness of electromagnetic (EM) medicinal instruments. The innovation of pacemakers and the pills which can be gulped by the influenced individuals with the detecting capacities took medicinal field to another dimension. Therefore the implantable gadgets in human body for the finding of maladies and observing rose with the headway in remote correspondence. The implantable gadgets make utilization of the remote advances and permit the observing of patients from home. A few precedents are observing of glucose substance, heart beat rate.

Implantable reception apparatuses inside the human body have two sorts of biomedical applications. They are Biotelemetry and Biomedical treatment. Biotelemetry can create a remote correspondence associate between human body and outside condition. Biomedical treatment joins treatment of various illnesses and permits the supervision over physical strength of the treated people groups. These applications decline the hospitalization time of the patient.

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Remote Body Area Network (WBAN) is the human body watching system which businesses implantable contraption inside the human body. This structure gives home human administrations seeing of the patient. The primary thought with the implantable radio wires is the plan which ought to be perfect with the human body conditions, the nearness of characteristic tissues which now and again may change the execution of the transmitting component. The inserts in human body need to speak with the outer gadget which requires the utilization of radio wires in the inserts. The structuring of a specific radiator is the key piece of an implantable device working in a WBAN of two or three meters broaden. At the end of the day the implantable receiving wires with decreased zone occupation with expanded diagnosing ability are required. This paper gives the point by point data on examination and structure of implantable reception apparatuses.

The radio wires Implanted must be biocompatible with a particular true objective to spare relentless prosperity of the patients who have been installed with the inserts. The human tissues are in addition conductive, and on occasion receiving wires embedded will be short circuited if they were allowed to be in organizing contact with the reception apparatus material. Biocompatibility and neutralizing activity of appalling short circuits assumes a fundamental job in the plan contemplations of implantable receiving wires for upgrading the life expectancy of inserts. The most comprehensively used methodology for sparing the biocompatibility of the reception apparatus contraption. The other strategy is creation of receiving wire with the biocompatible material.

II. ANTENNA DESIGN

The radio wire planned is a rectangular fix and is mimicked utilizing ADS Electromagnetic test system. The substrate favored for the structure is Rogers 3010 with the dielectric consistent is 10.2. The receiving wire is sustained with the Microstrip feed line. The stature of the radio wire is about 1.6 mm and it is intended to work in 2.45GHz recurrence groups in the wake up mode and the width is 31.8 mm and the length is 23 mm. The reception apparatus stays in ISM Band when it is in rest mode. The double band task of the reception apparatus is accomplished with the assistance of PIN Diodes. For fundamental confirmation of ideas copper plates are utilized to ON and OFF State of Switch. The fix receiving wire if necessary to work in the distinctive recurrence groups to be specific the widths and lengths of the reception apparatus is arranged. The proposed receiving wire structure is reproduced utilizing the ADS Simulation stage.

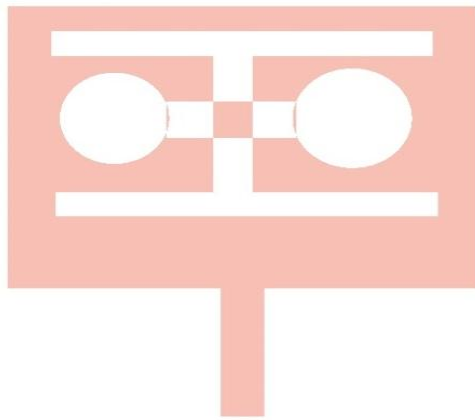


Fig.1. Proposed H Shaped patch antenna

III. RESULTS AND DISCUSSION

The three critical parameters in particular VSWR, Return misfortune and Radiation design are dissected. The Voltage Standing Wave Ration for a receiving wire is constantly positive and ought to be a genuine number.

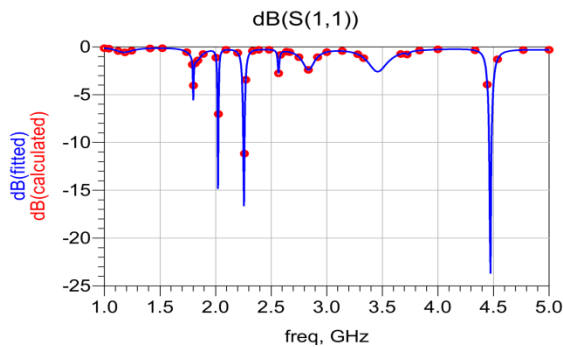


Fig.2. Return loss

Litter the gain esteems guarantee better coordinating of radio wire with the transmission lines and offers most extreme power exchange. The structured fix has VSWR values under 2 for the planned MICS Band.

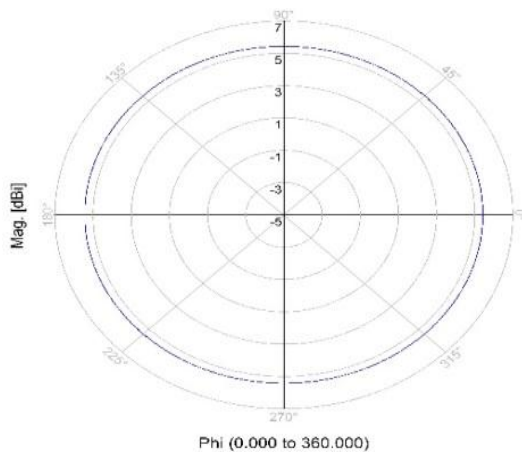


Fig.3. Gain

The radiation designs characterize the heading of greatest electromagnetic radiation of reception apparatus. The acquired radiation design is Omni directional. The arrival loss ought to be not exactly - 10 DB. The mimicked return loss is not exactly - 10 DB.

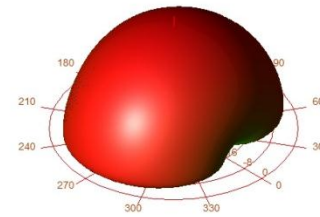


Fig.4. omni directional radiation pattern

IV. CONCLUSION

The receiving wire structured offers better return misfortune and VSWR values. The reception apparatus is structured with the Rogers 3210 Substrate as it is Biocompatible with the Human tissues. The radio wire is planned as a position of safety and conservative, can be created effectively with the Microstrip feed. The proposed plan isn't tried under the ordinary tissue conditions which is the future extent of this paper.

REFERENCES

1. Annakamatchi M, Keralshalini V (2018) Design of Spiral Shaped Patch Antenna for Bio-Medical Applications. International Journal of Pure and Applied Mathematics 118(11): Pages 131-135.
2. S.Palanivel Rajan, C.Vivek, "Analysis and design of microstrip patch antenna for radar communication", Journal of Electrical Engineering & Technology, Online ISSN No.: 2093-7423, Print ISSN No.: 1975-0102, Volume 14, Issue 2, pp 923-929, DOI : <https://doi.org/10.1007/s42835-018-00072-y>, 2019.
3. Dinesh T, Palanivel S (2015) Statistical Investigation of EEG Based Abnormal Fatigue Detection using LabVIEW. International Journal of Applied Engineering Research 10(43): Pages 30426-30431.
4. Dinesh T, Palanivel S (2015) Systematic Review on Wearable Driver Vigilance System with Future Research Directions. International Journal of Applied Engineering Research 2(2): Pages 627-632.
5. Kavitha V, Palanivel Rajan S (2017) Diagnosis of Cardiovascular Diseases using Retinal Images through Vessel Segmentation Graph. Current Medical Imaging Reviews 13(4).
6. T. Karacolak, A. Z. Hood, and E. Topsakal, "Design of a dual-band implantable antenna and development of skin mimicking gels for continuous glucose monitoring," IEEE Trans. Microw. Theory Tech., vol. 56, no. 4, pp. 1001-1008, Apr. 2008.
7. Keerthi S, Dhivya S (2017) Comparison of RVM and SVM Classifier Performance in Analysing the Tuberculosis in Chest X Ray. International Journal of Control theory and Applications 10(36): Pages 269-276.
8. Manikandan M, Andrews N V, Kavitha V (2018) Investigation On Micro Calcification Of Breast Cancer From Mammogram Image Sequence. International Journal of Pure and Applied Mathematics 118(20): Pages 645-649.
9. Mohanapriya S, Vadivel M (2013) Automatic retrieval of MRI brain image using multiqueries system. International Conference on Information Communication and Embedded Systems (ICICES): Pages 1099-1103.
10. Palanivel Rajan S (2015) Review and Investigations on Future Research Directions of Mobile Based Tele care System for Cardiac Surveillance. Journal of Applied Research and Technology 13(4): Pages 454-460.
11. Rajan S P, Vivek C, Paranthaman M (2016) Feasibility Analysis of Portable Electroencephalography Based Abnormal Fatigue Detection and Tele-Surveillance System. International Journal of Computer Science and Information Security 14(8): Pages 711-722.



12. Ribana K, Pradeep S (2018) Contrast Enhancement Techniques for Medical Images. International Journal of Pure and Applied Mathematics 118: Pages 695-700.
13. M Paranthaman, A Berlin "Design of Adaptive Changing Structures with Bandwidth Control for Wideband Applications" International Journal of Innovative Research in Electrical, Electronics, Instrumentation and Control Engineering, Vol. 5, Issue 2, February 2017 pp. 26-28.
14. S.Vijayprasath, S.Palanivel Rajan, "Performance Investigation of an Implicit Instrumentation Tool for Deadened Patients Using Common Eye Developments as a Paradigm", International Journal of Applied Engineering Research, ISSN No.: 0973-4562, Vol. 10, Issue No.1, pp. 925-929, 2015.
15. S.Palanivel Rajan, R.Sukanesh, S.Vijayprasath, "Analysis and Effective Implementation of Mobile Based Tele-Alert System for Enhancing Remote Health-Care Scenario", HealthMED Journal, ISSN No. : 1840-2291, Vol. No. 6, Issue 7, pp. 2370–2377, 2012.