



# On some findings on Micro-strip Patch antenna for Bio-medical applications

Arpita Santra<sup>1</sup>, Arnima Das<sup>2</sup>, Maitreyi Ray Kanjilal<sup>3</sup> and Moumita Mukherjee<sup>4</sup>

<sup>1,2,3</sup> Department of Electronics and Communication Engineering, Narula Institute of Technology, 81, Nilgunj Road, Agarpara, Kolkata- 700109

<sup>4</sup>Department of Physics, Adamas University, Adamas Knowledge City, Barasat - Barrackpore Road, P.O. - Jagannathpur, District - 24 Parganas (North), Kolkata-700126

{Corresponding author's email: [arpita.santra@nit.ac.in](mailto:arpita.santra@nit.ac.in), [arnima.das@nit.ac.in](mailto:arnima.das@nit.ac.in), [mr.kanjilal@gmail.com](mailto:mr.kanjilal@gmail.com), [mm.adamasuniv@gmail.com](mailto:mm.adamasuniv@gmail.com)}

**Abstract** - The author aims to find the possibilities of using Micro-strip Patch antenna [1, 2] in the fields of Bio-Medical applications. Due to the advancements in the medical technologies the requirements of miniaturized and compact devices has been increasing which leads to the technological developments in this area. The work is dedicated for finding the gateway of antenna technology [3, 4] in this field. The simulations are carried over by the HFSS software.

**Keywords** - Micro-strip; Bio-Medical; radiation pattern.

## INTRODUCTION

The microwave/ millimeter wave [5,6] signal generation, detection and radiation by the antenna has become an interesting application area. The applications include the spectroscopy, secure communication, bio-medical engineering, wireless communication etc. As it is known that the silicon technology offers its applications in the high -density signal processing with its scaling capacity consisting of the diverse size variations. The recent developments are finding way to the silicon-on chip products worldwide. Due to the increase in high level of integration the size reduction become noticeable.

### A. Micro-strip Patch antenna

The micro-strip patch antenna is having a lot of applications in the field of transmission, detection/sensing and radiation with its wide variety of usage as per the selection of frequency [7]. The author here tries to find the application in the field of bi-medical engineering. The simulated results also confirm the capability of the proposed antenna in the mentioned field [8].

### B. Proximity Coupled Feeding

The Micro-strip patch antenna may contain different type of feeding by which the excitation is applied to the antenna. The author has taken the Proximity coupling method for the feeding to the antenna. The figure 1 here represents a proximity coupling technique.

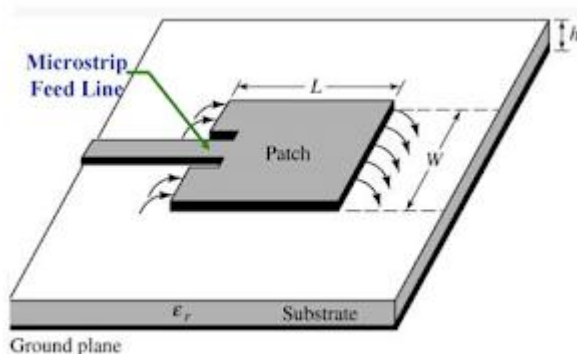


Fig. 1 Proximity coupling technique in Micro-strip patch antenna

## RESULTS

The simulation has been carried out in HFSS software and the following results have been noted. The figure 2 shows the simulated antenna in the software.

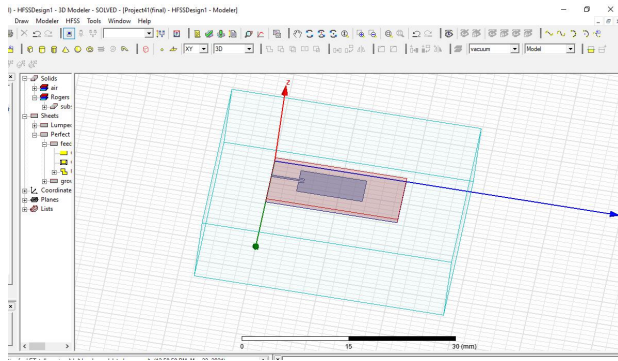


Fig. 2 Simulated antenna in HFSS software

The S11 plot is shown in the Figure 3 where the results show a considerable response of the antenna for the Bio-medical applications.

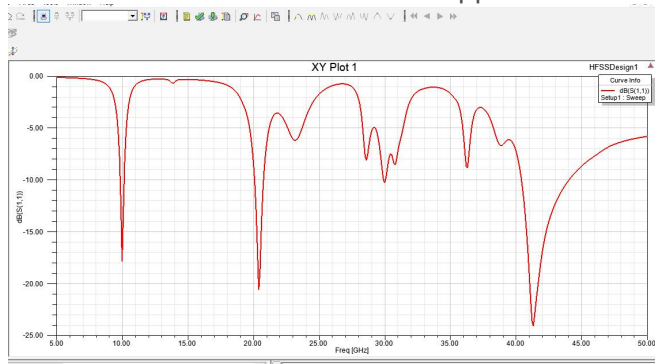


Fig. 3 S11 plot

The radiation pattern is shown in the Figure 4 where the results also show the response to be taken for the Bio-medical applications.

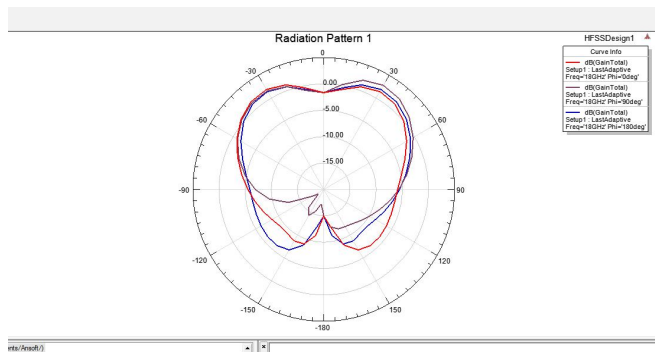


Fig. 4 Radiation Pattern of the simulated antenna

## CONCLUSION

The simulated results show that the proposed antenna can be considered for Bio-medical applications. The frequency response, radiation

pattern is compatible with the Bio-medical environments.

## REFERENCES

- [1]Constantine A, Balanis, 'Antenna Theory- Analysis and Design', Second Edition, John Wiley and Sons,Inc.,1997.
- [2] J.R. James, P.S. Hall. Handbook of microstrip antennas, I.E.E. Electromagnetic Waves Series 28- Peter Peregrinus LTD, 1989.
- [3] R.J. Mailloux, J.F. Mcllvanna and N.P. Kemweis-Microstrip Array Technology IEEE Transactions on Antennas and Propagation,Vol.29,No.1,January 1981 .
- [4] H. Pues, A. Van de capelle, Accurate transmission line model for the rectangular microstrip antenna, IEEE Microwave, Antenna and Propagation Proceedings, Vol.131,Pt.December 1984.
- [5] Ansoft Corporation, HFSS User's Guide, version 10 &12,Ansoft Corporation,Pittsburgh,CA,20
- [6] Mahdi Ali, Abdennacer Kachouri and Mounir Samet "Novel method for planar microstrip antenna matching impedance", Journal Of Telecommunications, May 2010.
- [7] Garg, R and Ittipiboon, A; "Micro strip Antenna Design Handbook", Artech House, 2001.
- [8] D.M. Pozar, —Microstrip Antennas||, Proc.IEEE, vol.80, No.1, January 1992.