iJRASET
International Journal For Research in Applied Science and Engineering Technology



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 11 **Issue:** VI **Month of publication:** June 2023

DOI: https://doi.org/10.22214/ijraset.2023.54539

www.ijraset.com

Call: 08813907089 | E-mail ID: ijraset@gmail.com

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 11 Issue VI Jun 2023- Available at www.ijraset.com

Microstrip Patch Antenna for Modern Communication Applications

Srinivas Ramacharya
Department of Post Graduate Studies and Research in Applied Electronics, Gulbarga University, Kalaburagi

***Abstract:** In this communication the overview of Microstrip Patch Antenna for modern Communication applications. This paper illustrates the basic structure of the microstrip antenna. The excitation methods are presented. The simulation of these antennas using different software's is discussed. The applications of microstrip antennas with its modifications are presented.*
***Keywords:** Broadband, microstrip, rectangular, gain, bandwidth*

I. INTRODUCTION

Microstrip antenna is one of the most popular types of printed antenna. It plays a very significant role in today's world of modern communication systems. Microstrip antennas are very simple in construction using a conventional fabrication technique[1-2]. The MSAs are used in modern communication applications because of their inherent properties like light weight, planar configuration, ease of compatibility to MMICs, ruggedness etc. In this paper the various microstrip patches are introduced in one platform which can help the researcher to use them for desired applications[3-4].

II. BASIC STRUCTURE OF THE MSA

Microstrip patch antenna consists of a radiating patch on one side of a dielectric substrate that has a conducting ground plane on the opposite side as shown in Fig. 1.

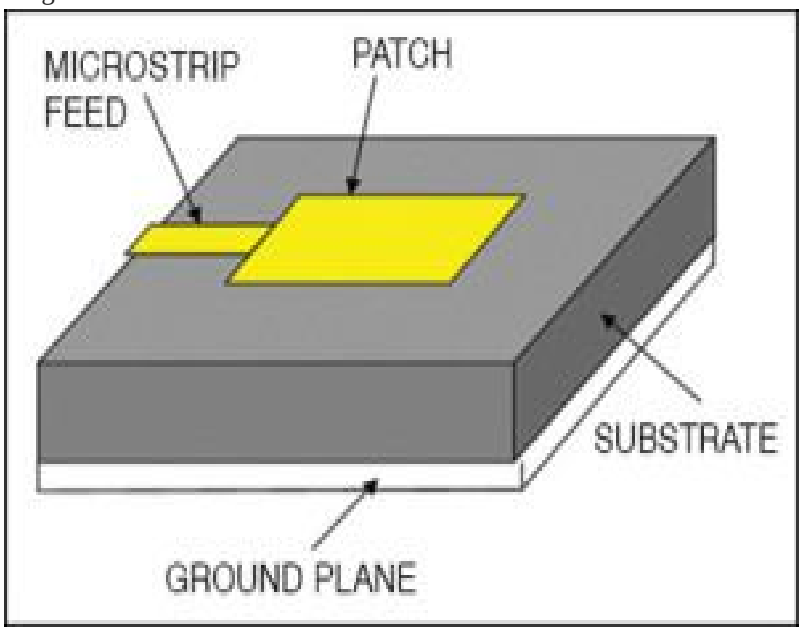


Figure 1: Basic structure of MSA

The patch is generally made up of a conducting material such as copper or gold and can take any possible shape like rectangular, circular, triangular, elliptical pentagon, disc, sector or some other common shape as shown in Fig. 2. The radiating patch and the feed methods are usually photo-etched on the dielectric substrate. The microstrip antennas can be excited using various techniques like microstrip feed line, coaxial feed technique, inset feed, CPW technique, monopole feed.etc [5]. These modifications such as incorporation of slots on radiating patch and ground planes, use of posts and pins, use of truncations, parasitic strips etc. are used to tune, enhance the gain and bandwidth of the antenna suitable for specific applications.

©IJRASET: All Rights are Reserved

Various Shapes of MSAs

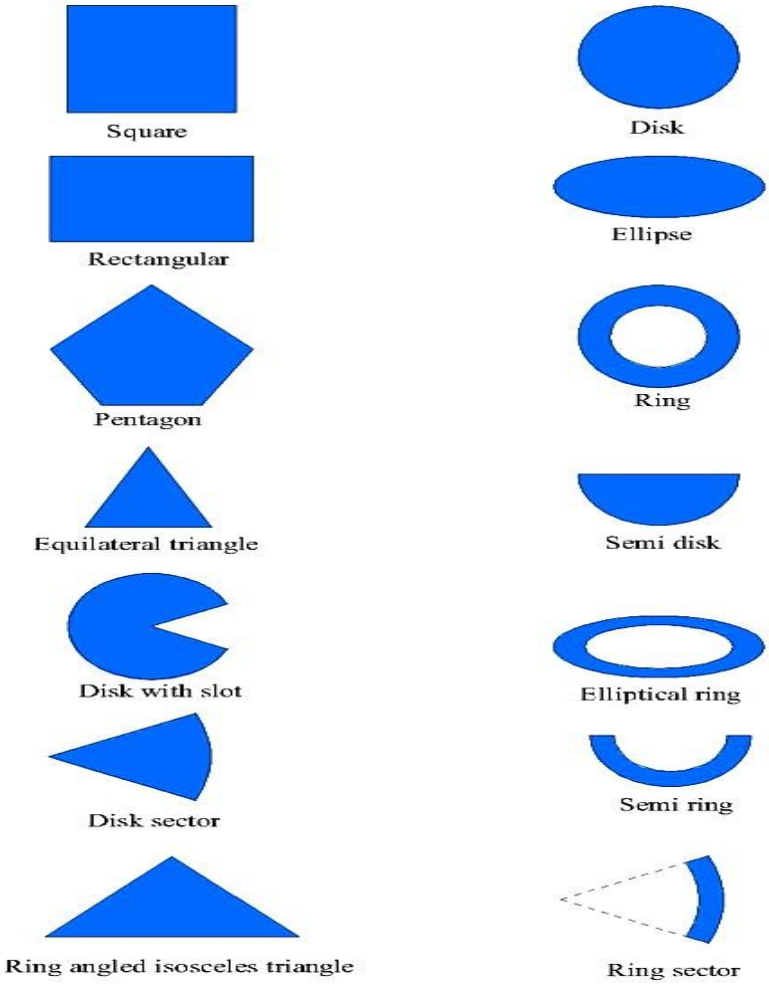


Figure 2 Various shapes of Microstrip antennas

III. RESULTS AND CONCLUSION

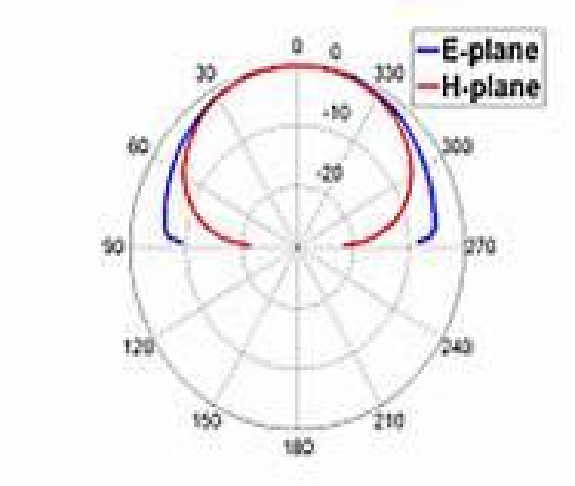


Figure 3. Typical Radiation pattern of Rectangular MSA.

The Fig. 3 shows the typical radiation pattern of RMSA in its operating band. It exhibits the broadside and linearly polarized radiation pattern. The gain of 4dB to 6dB can be easily achieved. The gain can be enhanced using various techniques like stacking and use of arrays.

The MSAs are simulated using simulation software's mentioned below.

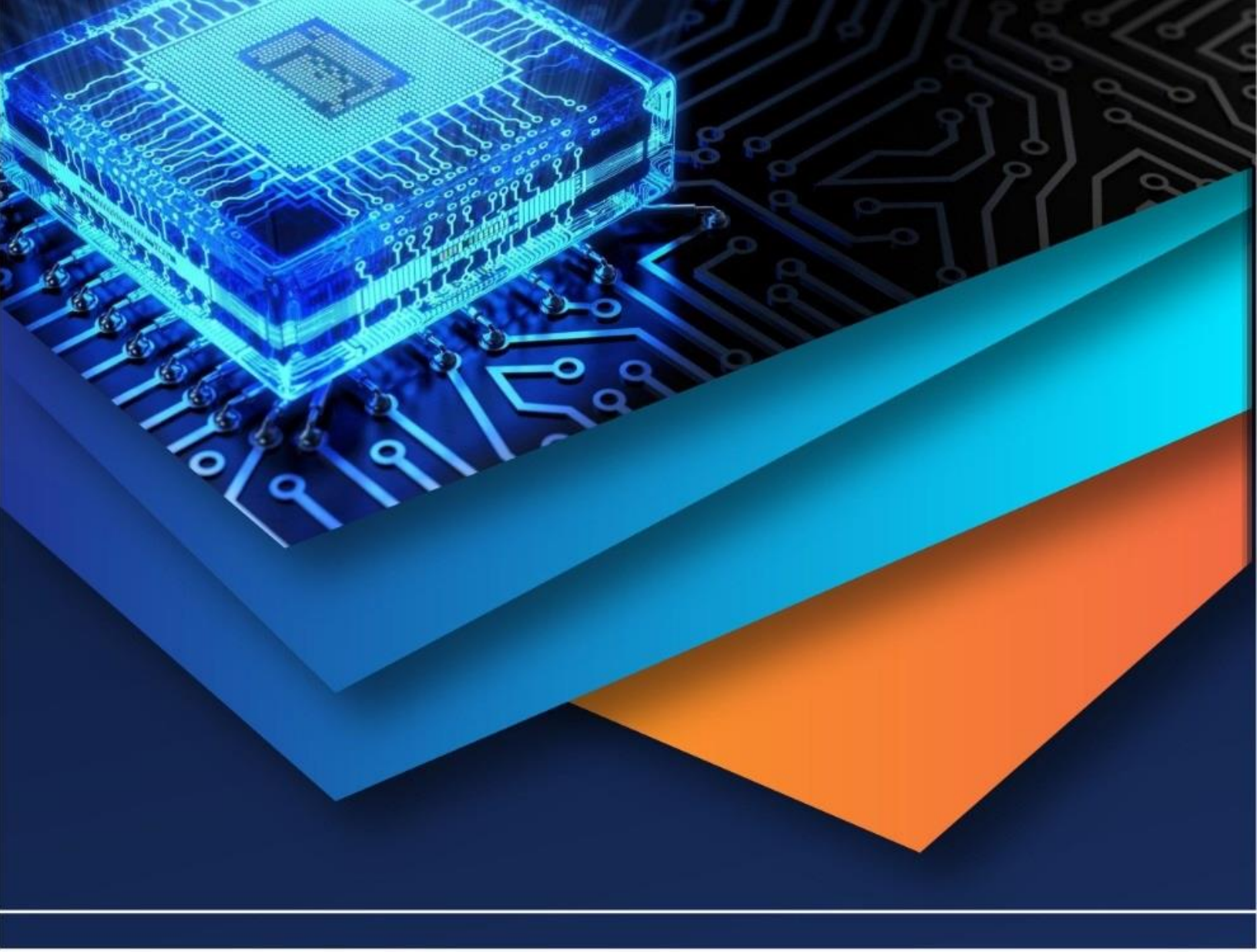
1) Ansoft High Frequency Structure Simulator(HFSS)
2) Zeland IE3D
3) CST Microwave Studio
4) Feko
5) Antenna Magus

These softwares are based on different analysis methods. The results obtained by these softwares ensure very close relation with experimental results.

From this over all study it can be concluded that, the microstrip patch antenna finds several applications in modern communication system like global positioning satellite (GPS), Radio frequency identification (RFID) devices, mobile communication and healthcare modules. The IEEE 802.16 standard Wi Max (worldwide interoperability for microwave access) and WLAN use these antennas for tuning the bands. The advent of its light weight is used in some communication-based applications such as radio altimeters and ATC, command and control systems, remote sensing and environmental instrumentation,. These antennas play a vital role as secondary antennas as a feed element in complex antennas. Due to its compactness the MSAs are used in satellite navigation receivers, mobile radio, biomedical radiators and intruder alarms. The exhibition of broadside radiation pattern by these antenna help in Doppler and SAR/CW radar communication units[6-8]. The MSAs have proved as a low cost tool in establishing better in modern communication systems.

REFERENCES

[1] Constantine A. Balanis, Antenna Theory - Analysis and Design, John Wiley & Sons, Inc., New York, 1982.
[2] David M. Pozar and Daniel H.Schaubert, Microstrip Antennas: The Analysis and Design of Microstrip Antennas and Arrays, IEEE Antennas and Propagation Society, Sponsor, IEEE Press, Inc., New York, 1995.
[3] I. J. Bhal and P. Bhartia, Microstrip Antennas, Dedham, MA: Artech House, 1981.
[4] G. A. Deschamps, "Microstrip microwave antennas," presented at the 3rd USAF, Symposium on Antennas, 1953.
[5] Robert E. Munson, "Conformal microstrip antennas and microstrip phased arrays," IEEE, Trans. Antennas Propagat., vol. AP-22, no. 1, pp. 74-78, Jan. 1974.
[6] John Q. Howell, "Microstrip Antennas," IEEE, Trans. Antennas Propagat., pp. 90-93, Jan. 1975.
[7] Girish Kumar and K. P. Ray, Broadband Microstrip Antennas, Norwood, MA: Artech House, 2003.
[8] David M. Pozar, Microwave Engineering, Addison



10.22214/IJRASET

45.98

IMPACT FACTOR: 7.129

IMPACT FACTOR: 7.429

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Call : 08813907089 (24*7 Support on Whatsapp)