International Journal for Innovative Engineering and Management Research
A Peer Revieved Open Access International Journal
www.ijiemr.org

IJIEMR Transactions, online available on 18th Aug 2017. Link :http://www.ijiemr.org/downloads.php?vol=Volume-6&issue=ISSUE-7

Title: **DESIGN OF MULTIBAND FRACTAL ANTENNA FOR WIRELESS APPLICATIONS**

Volume 06, Issue 07, Pages: 278 – 281.

Paper Authors

[1]GOPU.MALLIKARJUNARAO,[2]A.RAMESH

[1]Eswar College Of Engg, Narasaraopet, Guntur Dt.

[2]PSCMRCET,Kothapet,Vijayawada

USE THIS BARCODE TO ACCESS YOUR ONLINE PAPER

To Secure Your Paper As Per UGC Guidelines We Are Providing A Electronic Bar Code

International Journal for Innovative Engineering and Management Research
A Peer Revieved Open Access International Journal
www.ijiemr.org

DESIGN OF MULTIBAND FRACTAL ANTENNA FOR WIRELESS APPLICATIONS

[1]GOPU.MALLIKARJUNARAO,[2]A.RAMESH

[1]PG Student,Eswar College of Engineering ,Kesunapalli,Narasaraopet
[2]Assistant Professor,PSCMRCET,Kothapet,Vijayawada

ABSTRACT— In this project, an altered fractal Sierpinski Antenna is proposed for remote applications. The recieving wire under scrutiny is bolstered by a 50 ohm microstrip line. The essential state of the fractal reception apparatus is a triangle which is altered with a hexagon opening and cycle of self comparable outline. Wide transmission capacity of 3.05 GHz and 2.4 GHz is acquired between 2.85-5.9 GHz and 9.5-11.9 GHz individually. Different parameters of the proposed reception apparatus is contemplated completely and introduced.

Index Terms— Fractal Antenna, microstrip feed line, return loss, wide bandwidth.

1. INTRODUCTION

As of late, remote correspondence has supplanted wired correspondence and radio wires assume a fundamental part in this move. Microstip fix recieving wires are dependably a conspicuous decision because of its natural preferences of low profile, light weight and minimal effort. In any case, they generally experience the ill effects of restricted data transfer capacity issue. With a specific end goal to defeat this deficiency a few methodologies are taken after viz. making spaces in the fix or stacking two patches and so forth. In any case, this renders the limit conditions and depression show invalid for outline and investigation.

2. THE BASIC CONCEPT

A fractal antenna is designed using fractal geometry which follows a self similar pattern built from the repetition of a simple shape. This enables the generation of high performance antennas that are typically 50 to 75 percent smaller than traditional antennas. Fractal antennas have an added advantage of being cost effective also. Fractal antennas also allow for similar surface current distribution is obtained for different frequencies, i.e. it leads to multiband characteristics. The space filling property, when applied to an antenna element, leads to an i ncrease in electrical length. The construction of proposed fractal geometry is carried out by applying a finite number of iterative processes performed on a microstrip antenna structure.

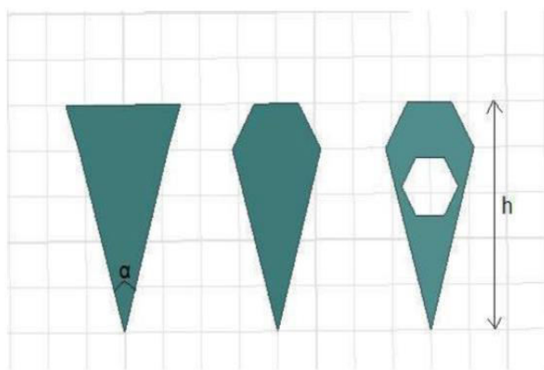


Fig. 1. *Basic concept of iteration of the proposed antenna*

International Journal for Innovative Engineering and Management Research
A Peer Revieved Open Access International Journal
www.ijiemr.org

3. DESIGN OF THE PROPOSED ANTENNA

Fig.1 depicts the iterative process followed for designing the proposed fractal antenna. First a triangle having an initial angle α = 300 is designed. Then a hexagon structure is etched inside having appropriate dimension based on the initial triangle. The distance from the vertex of the triangle to its base, h is taken as 5mm. FR4 is chosen as the dielectric material having thickness 1.6 mm. The dimension of the 50 ohm microstrip feed line is taken as 24 x 1.5 mm2.

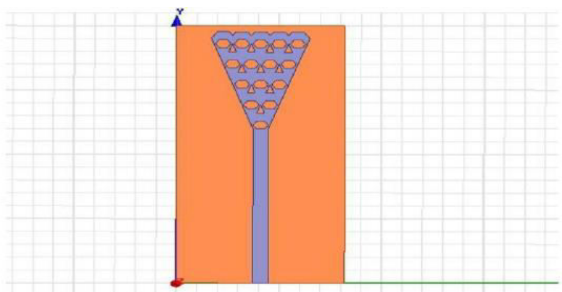


Fig. 2 Front View of the proposed antenna

A thin sheet of length 24mm is used as ground. In order to achieve wide bandwidth a slot of dimension 2.6 x 4.8 is etched on the ground. Fig. 2 shows the detailed design of the antenna in HFSS 2014. Fig. 3 shows the back side of the antenna having the slot in the centre.

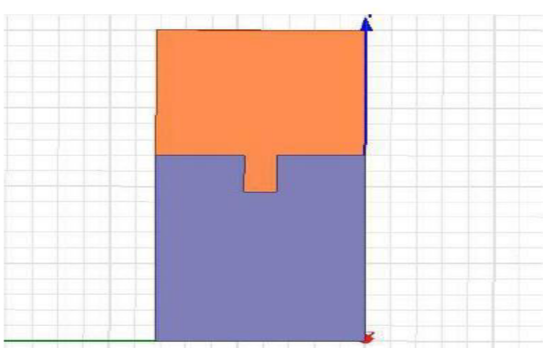
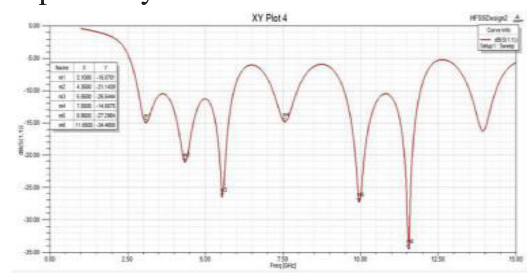


Fig. 3 Back side view of the proposed antenna

4. SIMULATION RESULTS

Fig. 4 shows the return loss vs frequency plot of the proposed antenna. It can be seen from the graph that the antenna resonates at 3.1 GHz, 4.35 GHz, 5.55GHz, 7.55 GHz, 9.95 GHz and 11.55 GHz having return loss of - 15.07 dB, - 21.14 dB, -26.54 dB, -14.88dB, -27.29 dB and -34.46 dB respectively.



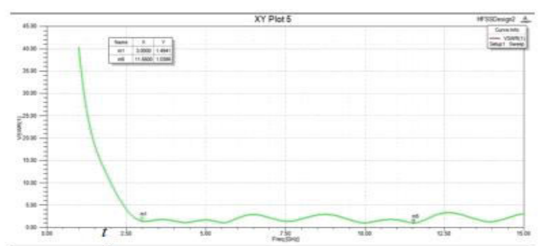


Fig. 5 VSWR plot of the proposed antenna

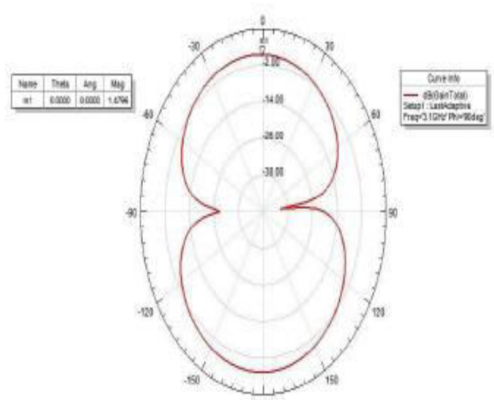


Fig. 6 Radiation pattern of the antenna at 3.1 GHz

International Journal for Innovative Engineering and Management Research
A Peer Revieved Open Access International Journal
www.ijiemr.org

TABLE I OBTAINED BANDWIDTH

Operating Frequency (GHz)	Bandwidth (GHz)	Return Loss (dB)
4.1	4.05	-16.07
8.95	3.4	-28.29

CONCLUSION

The proposed reception apparatus has resounded in different recurrence groups between 2.85GHz to 11.90GHz and indicated wide transfer speed in their separate groups. From above outcomes, it is inferred that altered sierpinski fractal reception apparatus with hexagon space gives better radiation attributes and vswr. Changed sierpinski fractal geometry is utilized to lessen size of proposed radio wire. Along these lines, the proposed configuration has indicated minimization and can be consolidated for short and long range correspondence frameworks. In addition, it can be favored for UWB applications with fitting changes in recieving wire parameters.

REFERENCES

[1] G. Kumar, K.C. Gupta, “Non-radiating Edges and Four Edges Gap-Coupled Multiple Resonator Broad-Band Microstrip Antenna”. IEEE Trans. on Antennas & Propagation AP-33, pp. 173-178, 1985.

[2] W. F. Richards, S. R. Davidson and S.A. Long, “Dual-band reactively loaded microstrip antenna”, IEEE Trans. On Antennas & Propagation AP-33, pp. 556-561, 1985.

[3] J. P Gianvittorio and Y Rahmat-Sarnii, "Fractal antenna: A novelantenna miniaturization technique and applications", IEEE Trans. On Antennas & Propagation, Vol. 44, No. I, February 2002.

[4] S.R . Best, “On the significance of self-similar fractal geometry in determining the multiband behavior of the sierpinski gasket antenna”, IEEE Antennas and Wireless Propagation Letters, Vol.1, no, 1, pp.22-25, 2002.

[5] C. Puente, J. Romeu, R. Pous, J. Ramis and A. Hijazo, “Small but longkoch fractal monopole.” Electronics Letters, Vol. 34, no. 1, pp. 9-10,January 1998.

[6] C. Botja, I. Romeo, "Multiband sierpinsld fractal patch antenna”,Antennas and Propagation Society International Symposium, Vol.3,pp.1708 - 1711, July 2000.

[7] B. B. Mandelbrot, The fractal geometry of nature., W.H. Freeman andCompany, New York, 1983.

[8]J. R. James and P. S. e. Hall, “Handbook of Microstrip antennas, peter peregrinus”, 1989.

[9]D. M. Pozar and D. H. Schaubert, “Microstrip Antennas, the analysis and design of microstrip antennas and arrays,” 1995.

[10]G. Kumar and K. Ray, “Broadband microstrip antennas,” 2003.

[11]A. Sappan, “ A new broadband stacked two layered microstrip antenna,” IEEE Trans. Antenna Propag., vol. 49, pp. 1094-1100,2001.

[12]H Chen and H. Chen, “A CPW fed dual-frequency monopole antenna,” IEEE Trans. Antenna Propag., vol. 52, pp. 978-982, Apr. 2004.

[13]A. J. Crilly, R. A. Eamshaw, H. Jones, “Fractals and chaos,” 1990.

International Journal for Innovative Engineering and Management Research
A Peer Revieved Open Access International Journal
www.ijiemr.org

[14]Yogesh Kumar Choukiker, Sujeet Rai and S. K. Behera,“Modified Fractal Shape Antenna for Wideband Application,” IEEE International Conference on Devices and Communication.

[15]D. Upadhyay, R.P. Dwivedi, “Antenna miniaturization techniques for wireless applications”, Eleventh International Conference on Wireless and Optical Communications Networks-IEEE, September, 2014.