ISSN 2395-695X (Print)
ISSN 2395-695X (Online)
International Journal of Advanced Research in Biology Engineering Science and Technology (IJARBEST)
Vol. 2, Special Issue 10, March 2016

DESIGN AND ANALYSIS OF MINIATURE YAGI-UDA ANTENNA AT C BAND

Mr.K.Narasimham, M.S., AP/ECE, SNS College Of Engineering
S.Manoj Kumar, G.L.Sivanesh, S.Vinodhkumar, Sheldon Shannan Houlder
DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING
UG Scholar, SNS College of Engineering
Email id: naras.shree@gmail.com, manojkmr1995@gmail.com, sivanesh1994@gmail.com, vinodh.sns@gmail.com, shelshan03@gmail.com

ABSTRACT:

The antennas has been more competent in today's technologies in terms of size and cost. The ease of using such devices makes it a merit in many applications. The Yagi-Uda antenna has been chosen for its frequency specific operation. The planar Yagi-Uda antenna operates at WLAN (IEEE 802.11) of 5.2GHz. Due to its reduced size and weight it has become easier to use them in electronic devices. The result shows that the antenna maintained the WLAN (5150-5350 MHz) matching bandwidth required under wide range of angles. This eventually makes it relatively ease to fabricate and use in real time applications of varied fields.

Keywords: 1) WLAN

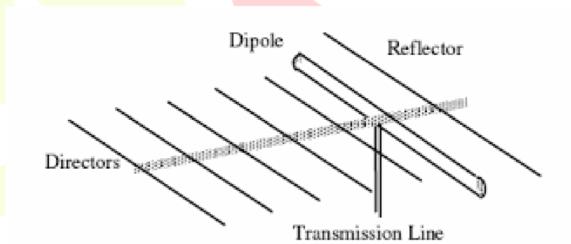
2) Matching Bandwidth

1. INTRODUCTION:

Recent advances in substrates and printed circuit boards added another dimension to the manufacturability of miniature antenas. The need for mechanically rigid and wireless devices arises in many applications including electronic and implantable devices for health monitoring systems as well as wireless devices used in our daily life such as cell phones, tablets and others. The planar Yagi-Uda antenna has been extensively studied in the past. Several printed Yagi-Uda antennas were presented with different techniques such as coplanar waveguide (CPW), CPW-fed coplanar strip (CPS) and conductor backed coplanar waveguide CB-CPW. A bottom shaped microstrip Yagi array was reported. Due to the benefits that the Yagi-Uda antenna offers, such as high gain, end fire pattern, high directivity and low cost, this antenna model is a good candidate for wireless devices. This paper presents a study of the effect of performance of Yagi-Uda antenna including bandwidth, matching, and radiation pattern. The antenna is based on the classical planer Yagi-Uda dipole type.

2. EXISTING SYSTEM

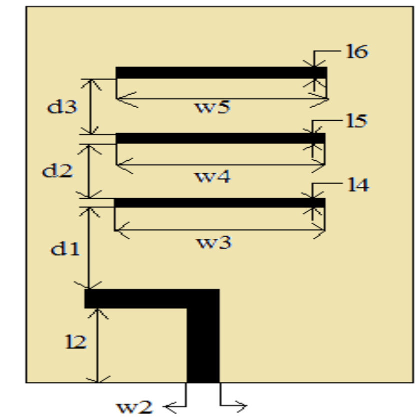
.



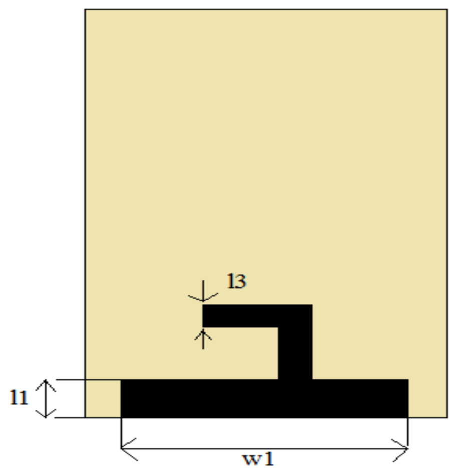
Yagi-uda antenna is a VHF antenna which consists of directors, reflectors and driven elements. It is a directional antennaconsisting of multiple parallel elements ina line usually made of metal rods. The existing system proposed the design of miniature yagi-uda antenna at 4.5GHz with a operating bandwidth of 17% in WLAN IEEE (4525-4725)MHz matching bandwidth. the front and back view of the antenna having The following dimensions measured in millimeters: $L1 = 6.5$, $W1 = 30$, $L2 = 16$, $W2 = 2$, $L3 = 2$, $W3 = 12.4$, $L4 = L5 = L6 = 1$, $W4 = W5 = 17$, $W6 = 18$ and $d1 = d2 = 11.5$. Here thick vinyl substratre has been used which has a relative permittivity of 2.5. The gain of the existing system is 8.1dBm which cannot be used in many applications.

ISSN 2395-695X (Print)
ISSN 2395-695X (Online)
International Journal of Advanced Research in Biology Engineering Science and Technology (IJARBEST)

Vol. 2, Special Issue 10, March 2016



FRONT VIEW



BACK VIEW

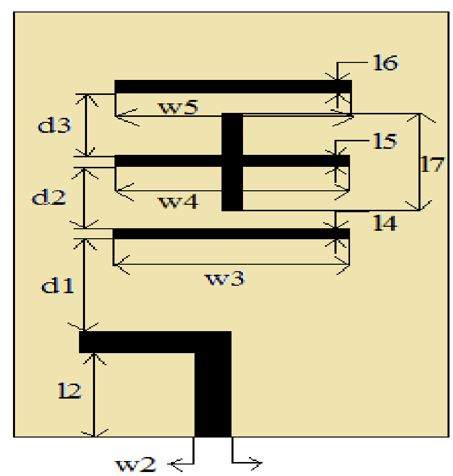
Disadvantages:

- Gain of the antenna is low.
- Not applicable is some appilcations.

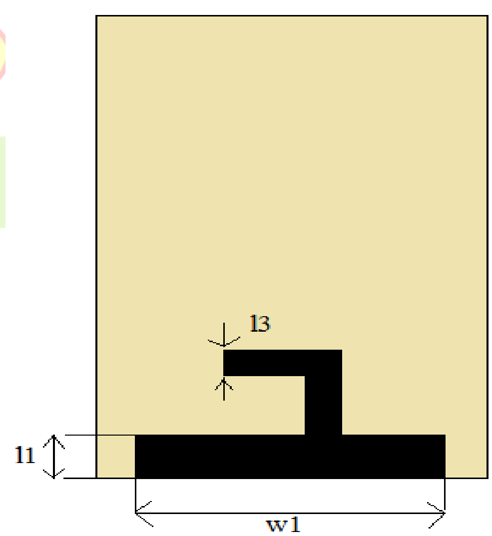
3. PROPOSED SYSTEM:

The antenna is printed on a 0.55 mm Rogers Ulralam 2000 substrate, 60 mm in length and 34 mm in width with relative permittivity, εr of 2.5. The CB-CPW feed has been selected to achieve an input impedance of 50Ω at WLAN (5.15 - 5.35) MHz bandwidth. The upper and lower parts of the dipole are designed to operate at 5.2 GHz with a -10 dB bandwidth of 13% (4.89 - 5.56) GHz. The partial ground acts as a reflector as in traditional Yagi-Uda, which provides reduction of back radiation [3]. In order to increase the gain, three directors have been added. The length and width of the directors, and the separation between the directors, as well as between the directors and dipole, are selected using a parametric study to increase the realized gain. The drawback of adding directors, however, is the reduction in bandwidth depicts the front and back view of the antenna having the following dimensions measured in millimeters: $L1 = 6.5$, $W1 = 30$, $L2 = 16$, $W2 = 2$, $L3 = 2$, $W3 = 12.4$, $L4 = L5 = L6 = 1$, $W4 = W5 = 17$, $W6 = 18$ and $d1 = d2 = 11.5$.

The length of L7=W=17 is cut between the slot with the centre of axis 8.5mm. When a slot is introduced between the existing system the design increases the antennas gain.

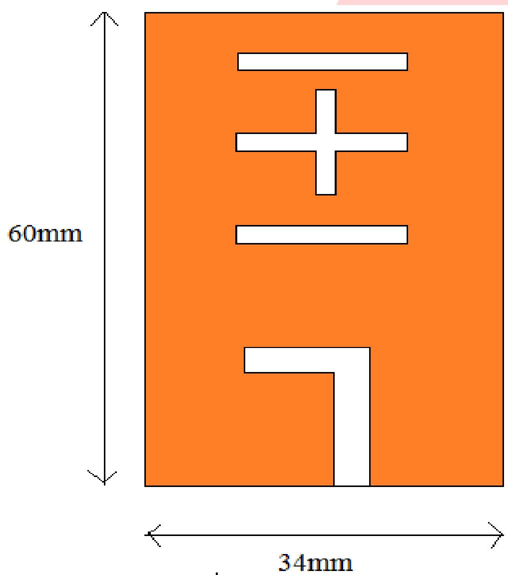


FRONT VIEW



BACK VIEW

The back view of both the system are consider to be same where the feed is given.The length and width of the substrate differs at proportionally smaller values.By increasing the width and length of the slots it results in higher bandwidth with 13% and operating bandwidth of (5150 – 5350)MHz. Rogers Ultralam 2000 is the substrate has a relative permittivity of 2.3



3.1 Output:

In this paper, a Yagi-Uda antenna designed on a Rogers ultralam 2000 substrate is presented. The antenna maintains the WLAN 5.2 GHz resonance and operating bandwidth (5150-5350) MHz. It give a realized gain of 15.2 dBm with a relative permittivity of $\mathcal{E}_{r}$=2.3.

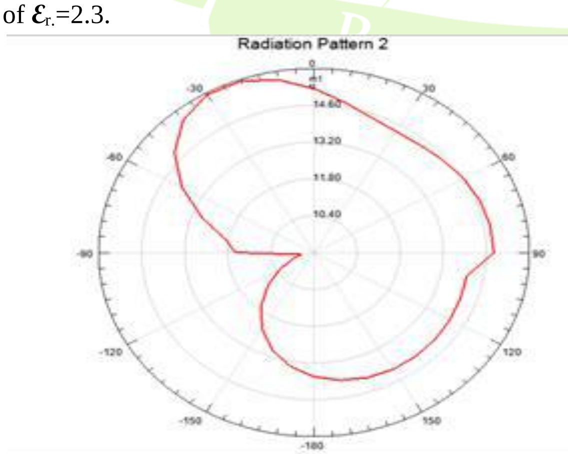


Figure 3.4 Final output

Advantages:

- Gain is increased.
- Applicable in applications of higher banwidth.

RESULTS

The expected result has been achieved The analysed design of miniature yagi-uda antenna has a high gain and can be used in various applications such as transmission and reception in electronic devices, distance communicatrion. By introducing flexibility to the Yagi-Uda antenna it is more usefull in medical applications.

REFERENCES

1. H. Khaleel, H. Al-Rizzo and D. Rucker, "Compact Polyimide-Based Antennas for Flexible Displays," Journal of Display Technology, vol. 8, no. 2, pp. 91-97, 2012.
2. K. Leong, Y. Qian and T. Itoh, "First demonstration of a conductor backed coplanar waveguide fed quasi-Yagi antenna," in Antennas and Propagation Society International Symposium, IEEE , 2000.
3. Y. Qian, W. Deal, N. Kaneda and T. Itoh, "A uniplanar quasi-Yagi antenna with wide bandwidth and low mutual coupling characteristics," in Antennas and Propagation Society International Symposium, IEEE, 1999.
4. G. Zheng, A. Kishk, A. Glisson and A. Yakovlev, "Simplified feed for modified printed Yagi antenna," Electronics Letters , vol. 40, no. 8, pp. 464-466, 2004.
5. H. K. Kan, R. B. Waterhouse, A. M. Abbosh and M. E. Bialkowski, "Simple Broadband Planar CPW-Fed Quasi-Yagi Antenna," Antennas and Wireless Propagation Letters, IEEE , vol. 6, pp. 18-20, 2007.
6. H. Khaleel, H. Al-Rizzo, D. Rucker and T. Elwi, "Wearable Yagi microstrip antenna for telemedicine applications," in Radio and Wireless Symposium (RWS), IEEE, 2010.