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DESIGN OF MEANDER SHAPED ANTENNA FOR BODY CENTRIC COMMUNICATION

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Absract

A highly efficient meander shaped antenna is designed in this paper. This antenna designed for the medical purpose. It is designed in the range of 2.45 GHz frequency. Mainly it is placed in less space required applications. The antenna is using Body centric wireless communication technology. The technology is a short-range communication network. The meander line antenna is designed on the surface. The antenna is designed with the size of 27.3 mm× 38 mm× 3.6 mm. The resulted output should be in the value of less than -10 dB. It is implanted in human body. The resulted value of the antenna is getting 2.45 GHz gain. The result is simulated on HFSS software.

INTRODUTION

In this designing of the antenna is processed. For that there are some kind of communication is used. First the basic of the wireless antenna is Wireless technologies. The usage of the antenna technologies are increased enormously there is some kind of characteristics like multi Band and integrated function are notable performance in antenna.Another important part of the antenna is it has to develop with new innovations and it will useful for the future application also the innovation should be constant. According to the growth of the technologies the antenna most importantly the reconfigurable antennas are having more attention in recent years. We are classifying the antenna performance in some types according to the separate performance value of those classifications types the performance of the antenna can be calculated. In this the first parameter calculated is Radiation pattern and then directivity, gain, VSWR, polarization like these kinds of parameters are calculated. In the reconfigurable antenna the important characteristics is it can change its frequency without affecting the nature of the product. The reconfigurable antenna is gained unusual recognition when compare to another antenna with their ability to handle the operating frequency based on the spectrum availability. Another important one is the antenna can adapt themselves to the environment that were rapidly changing. The antenna is controlling all of this characteristic with the increasing congestion of electromagnetic spectrum. This reconfigurable antennas are providing narrow band wide band operations with the addition advantages like it is having the compact size and the cost is low and the process of using very simple integration it can give the activation to single band or multi band are arrangements and it can reduce the co-site interference for the frequency selectivity capacity and also making them fit for all future applications of wireless communication. In the reconfigurable antenna the frequency can be achieved with the help of switches either it can be achieved by the radiating elements or it can be the micro strip feed line. For achieving the great diversity in the antenna, the reconfigurable antennas are used for that we are need the help of feed line. In this we are using body centric wireless communication (BCWN). This technology is a wireless

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emerging 4G technology. It is a short-Range communication system which having high potential for the applications of our day to day life like medical health care delivery system and in the form of entertainment for noticing the illegal activities and some other services. This body centric wireless communication network is the connection of two systems the systems are wearable computer system and another one is sensors. Through these systems the trans receiver sends the space wave to the telecommunication. In this communication processes the technique used is using the human body as the medium of transmission or it can be used as a path for sending the electromagnetic waves. Body centric wireless networks can be divided into three main domains the three domains are arranged as on or in body environments for this type of antenna is should have conformal immune for reducing the polarization efficiency. The antenna we are using for the medical purpose are having some trouble. The implantable antenna on the human body has to be tested more than hundred times because of the changing environments it can affect the humans. For this kind of problems only we are using small range antenna for the Implantable applications. The communication data rate is determined by the bandwidth of the antenna. The antenna should not be sensitive.Thisantenna is designed between a certain frequency level. By the communication systems signals can be clearly get by the antenna. The literature review is done by the analyzing the many base papers. In the year of 2012 by the author Harish Rajagopalan aantenna which connected to the particular subject performance evaluation is performed the radius of the antenna would be 0.75 mm in this it has characteristics of tuning the antenna in a simple process and the antenna size can be reduced. In the year of 2013 by the authors R. Alrawashdeh, Huang and by cao a flexible meandered antenna were designed. The med radio band of the antenna is 433-434 MHz. The characteristics are light weight and compact size. The antenna was checked by the different people by the author Van Thuan Nguyen and Chang Won Jung the antenna with Med radio band is designed and it is also vitro tested by this the frequency of the antenna is high and then in the Rogers and FR4 substrate are used. The gain measured in this 10 dB. In the same year by the authors Yei Hwzn Jung, Yijie Qiu, Subin Lee a flexible praline coated antenna is designed. It is designed with good electrical performance and the frequency of WLAN also be presented. In this small compact size with 0.6 mm is used. In the year of 2017 by the authors of Zhu Duan, Li-jie Xu a dual band antenna is designed with better performance by this the antenna is optimizingthe small space in the capsule. In the same year another paper is published on the ultra wide band conformal antenna the frequency range of the antenna is 1.64 to 5.95 GHz. Another paper is published on 2017 by the authors Yan Li, Yong-Xin, Shaoqiu Xiao ithe antenna is designed for 2.4 GHz. This is simulated by the high speed simulator. By this the papers are analyzed. The disadvantages of the antenna designing are overcome by this literature review. Mainly the antenna is designed for giving gain and work in a certain frequency level. There are different substrates are used for antenna design. And then in this FR4 substrate are used tom design the antenna. The data rate can be analyzed with all the results of another paper results.

ANTENNA GEOMENTRY

The antenna is designed with meander shape. Meander line antenna is a slow wave circuit. It consists of horizontal and vertical lines with space and connected with each other. MLA are mainly used in less space required applications. When the number of turns increases the efficiency also increased.

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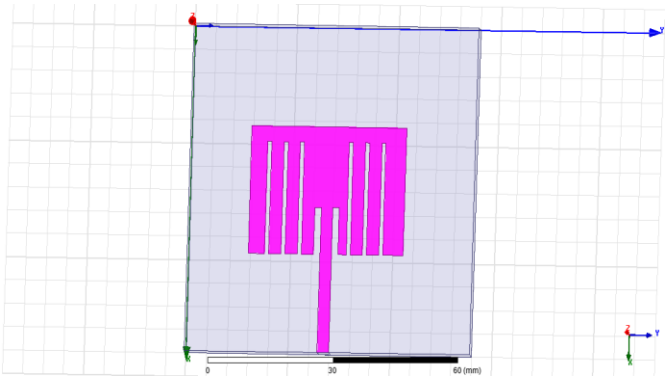

The groundplane is designed with the size of 70 mm × 70 mm. Size of the antenna is consisting of 27.3 mm × 38 mm× 3.6 mm. The feed line is designed with the size of 33 mm × 2.8 mm and the terminal of then antenna is designed with 2.8 mm × - 3.6 mm after this meander line is designed on the patch of the antenna with the size of -24 mm × 1 mm.A Radiation box is created around the antenna. The meander line is designed with same space with same size. The positions of antenna are changed according to the meander line shape. The antenna is designed in x, y and z axis it gives the 3D view of the antenna. In this we are using FR4 substrate. The substrate is with the size of 3.6 mm. The output is simulated with Ansoft HFSS software

TABLE FOR MLA ANTENNA SIZE WITH PARAMETERS

Parameter	size
w1	27.3 mm
h1	38 mm
w2	2.8 mm
h2	33 mm
g	3.6 mm
x	2.8 mm
y	-3.6 mm
m1	-24 mm
m2	1 mm

The wave is simulated with required frequency 2.45 GHz and in this Return loss, VSWR, Total gain all are got from the simulated results.

RESULT

From the simulated wave there are Return loss, VSWR and Total gain are calculated then simulated with the frequency of 2.45 GHz. The result for the return loss is,

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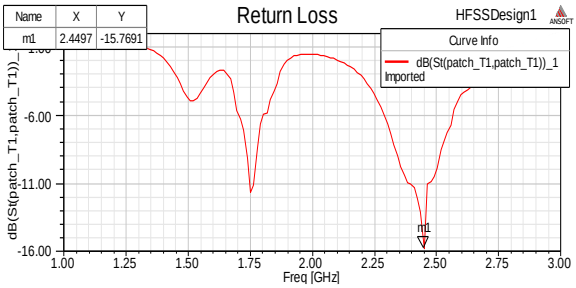
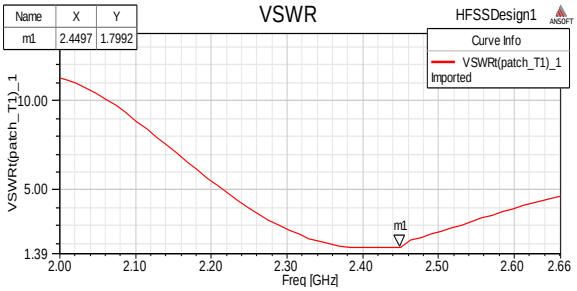
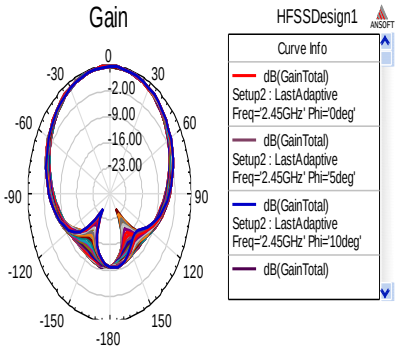


In this simulated return loss wave nearly, we are getting the value as 2.449 dB and then the range should be lesser then -10 dB value. The x axis is consisting of frequency in GHz and we are getting the return loss in the frequency range of less than 3 GHz.

Then VSWR value is been calculated for this VSWR value we are getting same as the return loss. Approximately we are getting the expected result value. In this the x axis is consist of frequency. The x axis value is 2.449 and the y axis value is 1.799. The resulted value is got from particular frequency value between 1 GHz to 3 GHz



.From the resulted output getting 2.45 GHz gain is the important process. The graph shows the resulted gain that we are got from the simulated output. The gain value is defined as the power produced from the far field source like this statement theoretically gain value is calculated. Practically the generated output is,



The gain is simulated in the format of smith chart from this we can get the resulted gain value as 2.45 GHz. The directivity of the antenna is also calculated from the gain,

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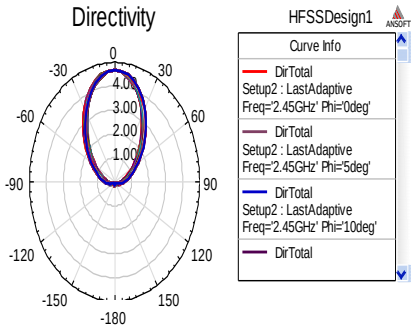
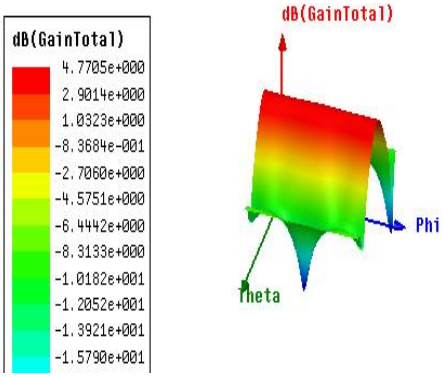


After this total gain is calculated in the 3D format. The gain is gradually increased.



The Gain values are having incrementation on the frequency values. The gain value is calculate using dB. From these resulted outputs theabove values are calculated. The expected output is getting 2.45 GHz frequency value the simulate and the expected results are same. In future the proposed structure to be measured and experimented.

CONCLUSION

The main motive of the antenna design is getting the 2.45 GHz gain in the simulated result with the proposed antenna structure. The antenna is designed with meander line structure. With the simulated output Return loss, VSWR, Gain and total gain also calculated. From the simulated output we got the expected gain. The return loss value is also achieved with 2.45 GHz value. The antenna is used in medical applications. The antenna is giving the expected gain value. The antenna can improve the performance.

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