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RF Based Localization Antenna for Wireless Communication

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Abstract:-
The paper presents an researchon the development of RF based type of antenna. The genetic algorithm is used to optimize the two antenna architecture.The ground plane is taken as dimension 100.5×100.5×1.5. .On the other hand metal plate have dimension 16.71×1.5×110.52 mm. The main goal of the article is a comparison of directivity and bandwidth of the proposed antennas. In our analysis, the method of moments (MoM) is used to compute the currentdistribution and directivity of the yagi antenna. Microstrip technology is used for planar collinearmonopole antenna and simulation with ground plane has been performed using Ansoft HFSS 3Dsimulator. Prototypes have been realized and measured.

Keywords:Collinear, Monopole, HFSS, Return Loss, Gain

INTRODUCTION

Growing interest in 802.11b, 802.11g and 802.11a and other applications has precipitated the needfor omnidirectional antennas at 2.4-2.5 GHz, 5.15-5.35 GHz and for special applications in the Cband. A number of approaches for gained omnidirectional antennas researchers have taken inthe past. One of these most promising designs are the collinear dipole arrays built up from halfwavelength radiators. The radiators are connected to each others either using transmission lines ordirectly by insertion of 180 degree phase shift.

One of such solution uses half-wavelength sections of coaxial transmission line which have theirinner and outer conductor connections reversed at each junction. This reversal causes the currenton the outer conductor of each segment to be in phase and radiate an omnidirectional pattern.This type of antenna is often called coaxial collinear antenna (COCO).

A geometry for a planar microstrip omnidirectional antenna introduced by Bancroft and Bateman is presented [1]. The basic idea is to create alternating sets of 50- microstrip transmissionlines. Each section is approximately one-half wavelength long at the frequency of operation. Eachgroundplane section was initially set to be about 5 times the conductor width of the microstriptransmission line and later optimized for driving point impedance.

The circular YagiUda antenna geometry is started from the linear element antenna and byrotating of the elements we have a low profile omnidirectional antenna. The antenna is optimizedby varying the lengths and spacings of the circular elements.

As comparison the radiation pattern, gain, input reflection and bandwidth are compared for the two antennas.

The rest of the paper is organized as follows. Section II outlines the complete design of zero iteration star patch antenna. Measured and simulated results of the proposed antenna are discussed in Section III. The conclusions are given in Section IV.

RF Based Localization Antenna

An FR-4 substrate with 4.4 and thickness 1.5 mm was used in this design. A patch of area 16.7

1×1.5×110.52 mm was selected. Such a patch resonatedat 10.28 GHz in normal operating mode. To reduce theresonant frequency of the patch antenna, monopole wasetched out from its radiating patch at its center. After that it is compare with collinear which was etched out from its radiating patch .

In the design of the monopolepatch, the dimension was varied and the antenna was tuned to resonate at 10.28 GHz using the commercial software HFSS. The final design obtainedis shown in Fig. 1. The length of each side was 17 mm.The coaxial feedwhich givesa characteristic impedance of 50 Ω. The top view of patch antenna is as shown in the fig 1.

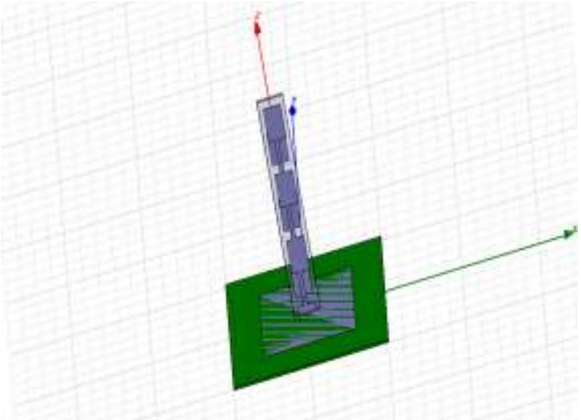

Fig 1. Front View of Proposed Antenna

The back patch is printed on Rogger metal plate . A copper sheet is etched on it with dimension 17 ×16.7 mm. On the other hand a short pin is attached to ground with dimension 17×2.2 mm.

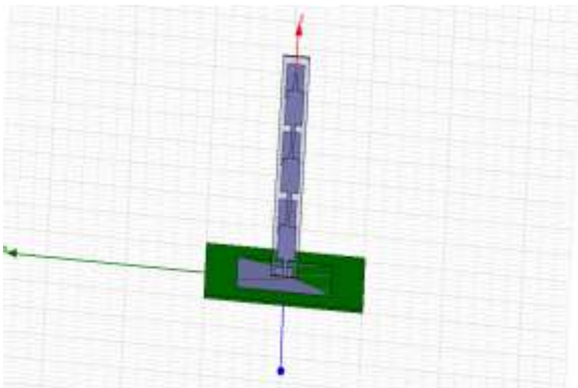

Fig 2. Back View of Proposed Antenna

Return Loss is important parameter for an antenna design. The ideal return loss is assumed to be -10db. Return loss should be minimum. The antenna is simulated in HFSS tool and return loss is measure. In case of monopole antenna return loss is -26.9273 db. The return loss of zero iteration is given by fig 3. This graphs shows that impedance matching of port to the antenna

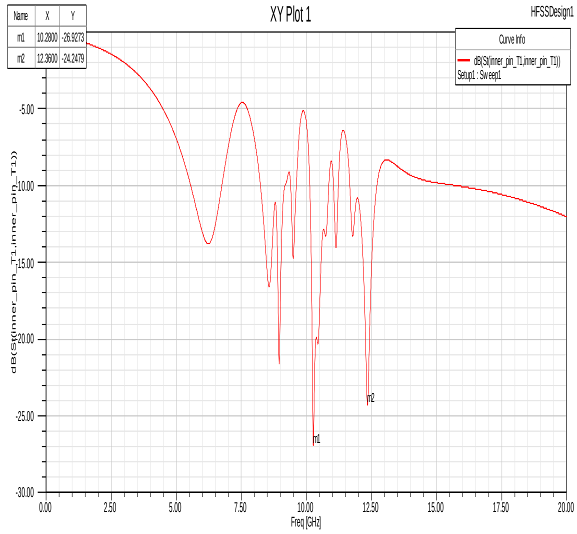

Fig 3. Return Loss of ProposedAntenna

The current distribution gives an idea to distribute a charge to the whole surface. The distributed current is gives in ampere per meter. In case of zero iteration current distribution is given as 2.144 ampere per m^2.Current distribution of Monopole is shown in fig 4.

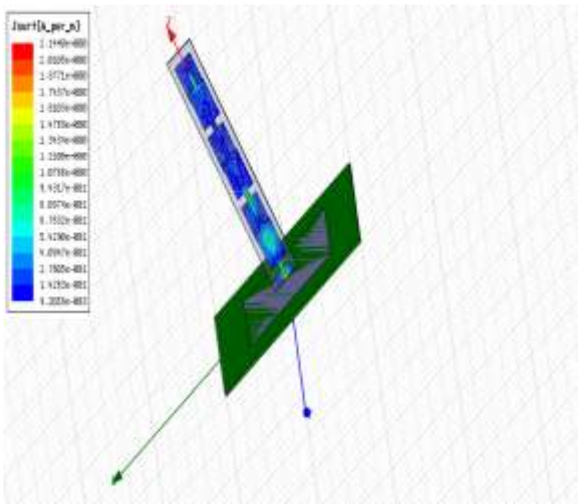

Fig 4. Current Distribution of ProposedAntenna

Gain is also an important parameter to design an antenna. The Gain enhanced by drawing different slots. Radiation pattern of gain given in fig 5. Gain of zeroth iteration antenna is 9.6638 db.

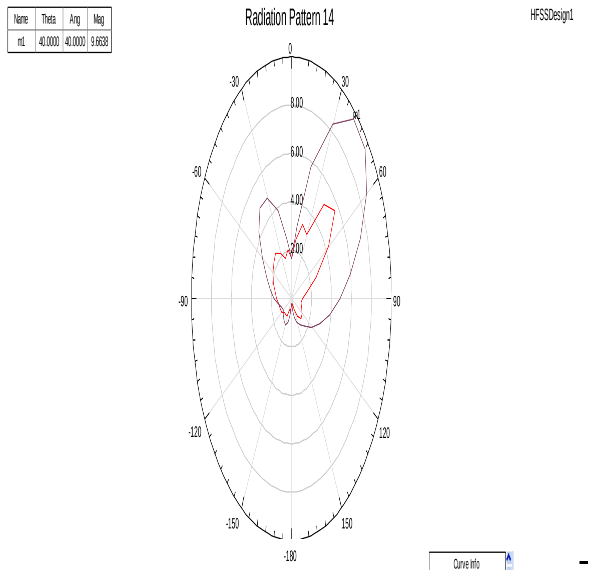

Fig 5. Radiation Pattern of Gain of Monopole Antenna

I. Measuring Parameter

Antenna	Return Loss	Gain	B.W
Monopole	-26.9273	9.6638	1.2 Ghz

Conclusion

After Simulation, it is found that simplepatchantenna has low return loss with high gain andbandwidth. Simulated return loss is -26.9273 with gain 19.6638 db and bandwidth 23% is obtained from monopole patch antenna

References

1. Judasz, T. J. and B. B. Balsley, \Improved theoretical and experimental models for the coaxial colinear antenna," *IEEE Transactions on Antennas and Propagation*, Vol. 37, No. 3, 289-296,Mar. 1989.
2. Bancroft, R. and B. Bateman, \An omnidirectional planar microstrip antenna," *IEEE Transactions on Antennas and Propagation*, Vol. 52, No. 11, 3151-3154, Nov. 2004.
3. Pozar, D., \Directivity of omnidirectional antennas," *IEEE Antennas and Propagation Maga-zine (Antenna Designer's Notebook)*, Vol. 35, No. 5, 50{51, Hal Shrank Ed., Oct. 1993.
4. Zheng, G., A. A. Kishk, A. W. Glisson, and A. B. Yakovlev, Simplified feed for modified printed Yagi antenna," *ElectronicsLetters*, Vol. 40, No. 8, 464-466, Apr. 2004.
5. Alhalabi, R. and G. Rebeiz, \High-gain Yagi-Uda antennasfor millimeter-wave switch-beam systems," *IEEE Transactionson Antennas and Propagations*, Vol. 57, No. 11, 3672-3676,Nov. 2009.
6. Bayderkhani, R. and H. R. Hassani, \Wideband and lowsidelobe linear series fed Yagi-like antenna array," *Progress InElectromagnetics Research B*, Vol. 17, 153-167, 2009.
7. Qu, S. W. and Q. Y. Chen, "Dual-antenna system composed ofpatch array and planar Yagi antenna for elimination of blindnessin cellular mobile communications," *Progress In Electromagnetics Research C*, Vol. 21, 87-97, 2011
8. Lin, S., "Novel printed Yagi-Uda antenna with high-gainand broadband," *Progress In Electromagnetics Research Letters*, Vol. 20, 107-117, 2011.
9. Kan, H. K., R. B. Waterhouse, A. M. Abbosh, and M. E. Bialkowski, "Simple broadband planar CPW-fedquasi-Yagi antenna," *IEEE Antennas Wireless and PropagationLetters*, Vol. 6, 18{20, 2007.
10. Ta, S. X., B. Kim, H. Choo, and I. Park, "Slot-line-fed quasi-Yagiantenna," *International Symposium on Antennas, Propagation,and EM Theory*, 307-310, Guangzhou, China, 2010.
11. Woo, D. S., Y. G. Kim, K. W. Kim, and Y. K. Cho, "Design of quasi-Yagi antennas using an ultra-wideband balun,"*Microwave and Optical Technology Letters*, Vol. 50, No. 8, 781- 784, Aug. 2008.
12. Ma, T., C. Wang, R. Hua, and J. Tsai, "A modified quasi-Yagi antenna with a new compact microstrip-to-coplanar striptransition using arti¯cial transmission lines," *IEEE Transactionson Antennas and*

Propagation, Vol. 57, No. 8, 2469-2474,Aug. 2009.

13. Sor, J., Y. Qian, and T. Itoh, “Coplanar waveguide fed Quasi-Yagiantenna," *Electronics Letters*, Vol. 36, No. 1, 1-2, Jan. 2000.
14. Truong, L. H., Y. H. Baek, M. K. Lee, S. W. Park, S. J. Lee, and J. K. Rhee, “A high-performance 94 GHz planar quasi-Yagiantenna on GaAssubstrate," *Microwave and Optical TechnologyLetters*, Vol. 51, No. 10, 2396-2400, Jul. 2009.
15. Chang, D., C. Chang, and J. Liu, “Modified planar quasi-Yagiantenna for WLAN dual-band operations," *Microwave and Optical Technology Letters*, Vol. 46, No. 8, 443-446, Sep. 2005.
16. Eldek, A. A., “Design of double dipole antenna with enhancedusable bandwidth for wideband phased array applications,"*Progress In Electromagnetics Research*, Vol. 59, 1-15, 2006.
17. Steyn, J. M., J. W. Odendaal, and J. Joubert, “Double dipolesantenna for dual-band wireless local area networks applications,"*Microwave and Optical Technology Letters*, Vol. 51, No. 9, 2034-784, Sep. 2008.
18. Xin, Q., F. S. Zhang, B. H. Sun, Y. L. Zou, and Q. Z. Liu, “Dual-band Yagi-Uda antenna for wireless communications," *Progress InElectromagnetics Research Letters*, Vol. 16, 119-129, 2010.
19. Wu, S. C. Kang, K. Chen, and J. Tarng, “A multiband quasi-Yagitype antenna," *IEEE Transactions on Antennas and Propagation*, Vol. 58, No. 2, 593-596, Feb. 2010.
20. Eldek, A. A., A. Z. Elsherbeni, and C. E. Smith, “Wide-band modified printed bow-tie antenna with single and dual polarizationfor C- and X-band applications," *IEEE Transactions on Antennasand Propagation*, Vol. 53, No. 9, 3067-3072, Sep. 2005.
21. Chen, K., X. Chen, and K. Huang, “A novel microstrip dipoleantenna with wideband and end-¯re properties," *Journal ofElectromagnetic Waves and Applications*, Vol. 21, No. 12, 1679-1688, 2007.