應用於無線區域網路以及WiMAX之共平面天線

葉維軒、吳俊德

E-mail: 9806481@mail.dyu.edu.tw

摘 要

這篇論文主要探討共平面矩形槽孔天線(CoPlanar waveguide Antenna)的共振機制，改變天線參數並使用HFSS電磁場數值模擬軟體，探討其模擬結果。利用共振機制設計寬頻矩形槽孔天線，設計天線方面使用成本低廉的FR4印刷電路板，實作的天線經由量測，其寬頻帶特性與模擬結果近似，-10dB以下頻寬為5.1 GHz(2.2 GHz-7.3 GHz)，其頻帶能有效應用在WLAN和WiMAX等規範。寬頻帶相對之下也會產生電磁干擾問題，在本篇論文也探討頻帶抑制設計，用來抑制不必要頻帶，減少EMC的問題。

關鍵詞 : CPW、共平面波導天線、WLAN、WiMAX

目錄

封面內頁 簽名頁 授權書.....iii 中文摘要.....iv 英文摘要.....v 致謝.....vi 目錄.....vii 圖目錄.....iv 表目錄.....xi 第一章 緒論 1-1 研究動機.....1 1-2 研究目的.....2 第二章 共平面矩形開槽天線之探討 2-1 天線概述.....4 2-2 探討之共平面天線架構.....5 2-3 開槽參數探討.....7 2-3-1槽孔長度探討.....7 2-3-2槽孔寬度探討.....9 2-3-3槽孔周長探討.....11 2-4 探討矩形貼片與接地面距離.....15 2-5 矩形貼片的探討.....17 第三章 製作共平面矩形開槽天線 3-1 設計共平面矩形開槽天線.....23 3-2天線的實作與量測.....31 第四章 頻帶抑制 4-1 EMC概述.....36 4-2 頻帶抑制設計.....37 第五章 結論.....40 參考文獻.....41

參考文獻

[1] Federal Communications Commission, First report and order, revision of Part 15 of Commission ’s rule regarding ultra-wideband transmission system FCC 02-48, Apr. 22, 2002.

[2] T. G. Ma and S. K. Jeng,“ Planar miniature tapered-slot-fed annular slot antennas for ultra-wideband radios, ” IEEE Trans. Antennas Propag., vol. 53, pp. 1194 – 1202, Mar. 2005.

[3] N. Behdad and K. Sarabandi,“ A multiresonant single-element wideband slot antenna, ” IEEE Antennas Wireless Propag. Lett., vol. 3, pp.5 – 8, Jan. 2004.

[4] J. Y. Sze and K. L. Wong,“ Bandwidth enhancement of a microstripline-fed printed wide-slot antenna, ” IEEE Trans. Antennas Propag.,vol. 49, pp. 1020 – 1024, Jul. 2001.

[5] M. K. Kim, K. Kim, Y. H. Suh, and I. Park,“ A T-shaped microstripline-fed wide slot antenna, ” IEEE Antennas Propag. Soc., vol. 3, pp.1500 – 1503, Jul. 2000.

[6] Y. Liu, K. L. Lau, Q. Xue, and C. H. Chan,“ Experimental studies of printed wide-slot antenna for wide-band applications, ” IEEE Antennas Wireless Propag. Lett., vol. 3, pp. 273 – 275, Dec. 2004.

[7] G. Sorbello, F. Consoli, and S. Barbarino,“ Numerical and experimental analysis of a circular slot antenna for UWB communications, ” Microw.Opt. Technol. Lett., vol. 44, pp. 465 – 470, Mar. 2005.

[8] P. Li, J. Liang, and X. Chen,“ Ultra-wideband elliptical slot antenna fed by tapered microstrip line with U-shaped tuning stub, ” Microw. Opt.Technol. Lett., vol. 47, pp. 140 – 143, Oct. 2005.

[9] J. -Y. Sze and K. -L. Wong,“ Bandwidth enhancement of a microstripline-fed printed wide-slot antenna, ” IEEE Trans. Antennas Propag., vol.49, pp. 1020 – 1024, Jul. 2001.

[10] H. -D. Chen,“ Broadband CPW-fed square slot antennas with a widened tuning stub, ” IEEE Trans. Antennas Propag., vol. 51, pp. 1982 – 1986,Aug. 2003.

[11] J. -Y. Chiou, J. -Y. Sze, and K. -L.Wong,“ A broad-band CPW-fed striploaded square slot antenna, ” IEEE Trans. Antennas Propag., vol. 51, pp.719 – 721, Apr. 2003.

[12] J. -S. Chen,“ Dual-frequency annular-ring slot antennas fed by CPW feed and microstrip line feed, ” IEEE Trans. Antennas Propag., vol. 53,pp. 569 – 571, Jan. 2005.
[13] X. Ding and A. F. Jacob,“ CPW-fed slot antenna with wide radiating apertures, ” Inst. Elect. Eng. Proc. Microw. Antennas Propagat., vol. 145,pp. 104 – 108, Feb. 1998.
[14] E. A. Soliman, S. Brebels, E. Beyne, and G. A. E. Vandenbosch,“ CPW-fed cusp antenna, ” Microwave Opt. Technol. Lett., vol. 22, pp.288 – 290, Aug. 1999.
[15] M. Miao, B. L. Ooi, and P. S. Kooi,“ Broadband CPW-fed wide slot antenna, ” Microwave Opt. Technol. Lett., vol. 25, pp. 206 – 211, May 5,2000.
[16] A. U. Bhobe, C. L. Holloway, and M. Piket-May,“ CPW fed wide-band hybrid slot antenna, ” in Proc. 2000 IEEE Antennas Propagat. Soc. Int.Symp. Dig., pp. 636 – 639.
[17]鄧聖明,蔡慶龍,柏小松, ”天線設計與應用-使用Ansoft HFSS模擬器, ”鼎茂圖書出版有限公司,2009.