

玻璃纖維板螺旋型電感假性輻射之抑制

蔡凱元、邱政男

E-mail: 321365@mail.dyu.edu.tw

摘要

本論文旨在探討一個平面螺旋電感中插入一個縮小化帶拒結構頻率選擇面，來抑制平面螺旋電感的假性輻射。假性輻射在螺旋電感有寬頻的阻抗匹配時顯得特別嚴重，插入頻率選擇面在螺旋型電感下方，可以在不改變電感原有性質(串聯電感值、品質因素)之情況下，有效抑制假性輻射。本篇論文提出新型元件所組成之帶拒結構頻率選擇面，並與傳統的帶拒結構頻率選擇面做比較，不論模擬或實驗之結果皆能證明，此新型頻率選擇面更能達成設計之目標。

關鍵詞：平面螺旋型電感、頻率選擇面、帶拒結構、選擇面、平面、阻抗、目標、假性輻射

目錄

封面內頁 簽名頁 授權書	iii 中文摘要
iv 英文摘要	v 誌謝
vi 目錄	vii 圖目錄
ix 第一章 緒論 1.1 研究動機	
1.1.2 研究目的	2 第二章 平面螺旋型電感模型建立與電氣特性 2.1 電感基本原理
3 2.2 平面螺旋型電感建立模型	6 2.3 藉由插入平面金屬抑制螺旋型電感的假性輻射
11 2.4 插入平面金屬後螺旋型電感的電氣特性	12 2.5 結語
14 第三章 頻率選擇面 3.1 頻率選擇面設計背景	15 3.2 週期性結構分析
15 3.3 頻率選擇面性質概述	19 3.4 頻率選擇面元件型式
23 3.5 頻率選擇面元件模擬方式	26 3.6 頻率選擇面穿透率測試
32 3.7 結語	33 第四章 實驗結果與討論 4.1 插入頻率選擇面後螺旋型電感的輻射特性
34 4.2 插入頻率選擇面後螺旋型電感的電氣特性	36 第五章 總結
38 參考文獻	39

參考文獻

- [1] B. A. Munk, Frequency Selective Surfaces- Theory and Design, New York, NY: John Wiley & Sons, 2000.
- [2] Walker, C. S., Capacitance, Inductance and Crosstalk Analysis, Norwood, MA: Artech House, 1990.
- [3] Ballou, G., "Capacitors and Inductors," Electrical Engineering Handbook, R. C. Dorf, (Ed.), Boca Raton, FL: CRC Press, 1997.
- [4] I. J. Bahl, Lumped Elements for RF and Microwave Circuits, Artech House, June 2003.
- [5] Lopez-Villegas, J. M., et al., "Improvement of the Quality Factor of RF Integrated Inductors by Layout Optimization," IEEE RFIC Symp. Dig., 1998, pp. 169 – 172.
- [6] Park, J. Y., and M. G. Allen, "Packaging-Compatible High Q Microinductors and Microfilters for Wireless Applications," IEEE Trans. Advanced Packaging, Vol. 22, May 1999, pp. 207 – 213.
- [7] T. L. Wu, Y. H. Lin, T. K. Wang, C. C. Wang, and S. T. C., "Electromagnetic Bandgap Power/Ground Planes for Wideband Suppression of Ground Bounce Noise and Radiated Emission in High-Speed Circuits," IEEE Trans. Microwave Theory Tech., vol.53, no.9, pp.3398-3406, Sep 2005.
- [8] Pozar, D. M., Microwave Engineering, 2nd ed., New York: John Wiley, 1998.
- [9] C. N. Chiu and Y. F. Kuo, "A bandpass shielding enclosure for modern handheld communication devices," IEICE Trans. Commun., vol. E90-B, pp. 1562-1564, June 2007.
- [10] B. A. Munk, R. Kouyoumjian, and L. Peters, Jr., "Reflection properties of periodic surfaces of loaded dipoles," IEEE Trans. Antennas and Propag. vol. 19, pp. 612 – 617, Sep. 1971.
- [11] B. A. Munk, G. A. Burrell, "Plane-wave expansion for arrays of arbitrarily oriented piecewise linear elements and its application in determining the impedance of a single linear antenna in a lossy half-space" IEEE Trans. Antennas and Propag. vol. 27, pp. 331 – 343, May 1979.
- [12] Robert E. Collin, "Foundations for Microwave Engineering 2nd , " McGraw-Hill, 1992 [13] R. F. Harrington, Time-Harmonic Electromagnetic Fields, p.366 – 367.

- [14] F. R. Yang, K. P. Ma, Y. Qian, and T. Itoh, " A uniplanar compact photonic-bandgap (UC-PBG) structure and its applications for microwave circuits, " IEEE Trans. Microw. Theory Tech., vol. 47, pp. 1509-1514, Aug. 1999.
- [15] F. R. Yang, K. P. Ma, Y. Qian, and T. Itoh, " A novel TEM waveguide using uniplanar compact photonic-bandgap (UC-PGB) structure, " IEEE Trans. Microw. Theory Tech., vol. 47, pp. 2092-2098, Nov. 1999.
- [16] HFSS, User ' s Manual, Ansoft Corp., Pittsburgh, 2003.