

INVESTIGATIONS OF PLANAR DIPOLE ANTENNAS

詹家泓、許崇宜，毛紹綱

E-mail: 9019288@mail.dyu.edu.tw

ABSTRACT

IN THIS STUDY, THE PLANAR DIPOLE ANTENNAS WITH BROADBAND CHARACTERISTICS ARE PROPOSED. THE HALF-WAVELENGTH PHASE-REVERSING AND MARCHAND-TYPE BALUNS ARE ALSO INVESTIGATED FOR MICROSTRIP LINE-TO-COPLANAR STRIPLINE TRANSITIONS. THE MEASURED INSERTION LOSS OF THE BACK-TO-BACK TRANSITION IS SMALLER THAN 3DB IN THE DESIGNED BANDWIDTH. WITH THIS TRANSITION, THE PLANAR DIPOLE ANTENNAS HAVING THE CHARACTERISTICS OF 28%~45% BANDWIDTH (VSWR

Keywords : PLANAR DIPOLE ANTENNA, TRANSITION, WIRELESS COMMUNICATION SYSTEM

Table of Contents

第一章 簡介--P1 1.1 研究動機與目的--P1 1.2 研究方法--P2 第二章 MICROSTRIP TO CPS BALUN--P6 2.1 轉接結構的用途--P6 2.2 半波長反相BALUN--P8 2.3 MARCHAND BALUN--P10 第三章 平面八木天線--P32 3.1 DIPOLE ANTENNA 長度的影響--P33 3.2 DIPOLE ANTENNA 寬度的影響--P33 3.3 BOWTIE ANTENNA 幅角與阻抗關係--P33 3.4 DIPOLE ANTENNA REFLECTOR距離的影響--P34 3.5 DIRECTOR 長度的影響--P35 3.6 DIRECTOR 距離的影響--P36 3.7 SERIES-FED DIRECTOR 長度的影響--P37 3.8 SERIES-FED DIRECTOR 距離的影響--P38 3.9平面天線特性結論--P39 第四章 實作結果--P64 4.1將BALUN匹配到複數阻抗的方法--P64 4.2 QUASI-YAGI天線+半波長反相BALUN--P64 4.3串接DIRECTOR的YAGI天線+半波長反相天線--P65 4.2串接DIRECTOR的YAGI天線+MARCHAND BALUN--P66 第五章 結論--P77 參考文獻--P80

REFERENCES

- [1] C. H. TSAO, Y. M. HWANG, F. KILBURY, AND F. DIETRICH, "APERTURE-COUPLED PATCH ANTENNAS WITH WIDE-BANDWIDTH AND DUAL-POLARIZATION CAPABILITIES," IEEE AP-S INT. SYMP. DIG., NY, PP.936-939, JUNE 1988.
- [2] R. Q. LEE AND R. N. SIMONS, "MEASURED MUTUAL COUPLING BETWEEN LINEARLY TAPERED SLOT ANTENNAS," IEEE TRANS. ANTENNAS PROPAGAT., VOL. 45, PP. 1320-1322, AUG. 1997.
- [3] D. M. POZAR AND D. H. SCHAUBERT, "SCAN BLINDNESS IN INFINITE PHASED ARRAYS OF PRINTED DIPOLES," IEEE TRANS. ANTENNAS PROPAGAT., VOL. 32, PP. 602-610, JUNE 1984.
- [4] C. A. BALANIS, ANTENNA THEORY. 2ED, NEW YORK: WILEY, 1997.
- [5] F. TEFIKU, AND C. A. GRIMES, "DESIGN OF BROAD-BAND AND DUAL-BAND ANTENNAS COMPRISED OF SERIES-FED PRINTED-STRIP DIPOLE PAIRS," IEEE TRANS. ANTENNAS PROPAGAT., VOL. 48, PP.895-900, JUNE 2000.
- [6] W. R. DEAL, N. KANEDA, J. SOR, Y. QIAN, AND T. ITOH, "A NEW QUASI-YAGI ANTENNA FOR PLANAR ACTIVE ANTENNA ARRAYS," IEEE TRANS. MICROWAVE THEORY TECH., VOL. 48, PP. 910-918, JUNE 2000.
- [7] Y. QIAN AND T. ITOH, "A BROADBAND UNIPLANAR MICROSTRIP-TO-CPS TRANSITION," ASIA PACIFIC MICROWAVE CONFERENCE, PP.609-612, 1997.
- [8] R. MONGIA, I. BAHL, AND P. BHARTIA, RF AND MICROWAVE COUPLED-LINE CIRCUITS. BOSTON: ARTECH HOUSE, 1999.
- [9] B. EDWARD AND D. REES, "A BROADBAND PRINTED DIPOLE WITH INTEGRATED BALUN," MICROWAVE JOURNAL, PP.339-344, MAY 1987.
- [10] O. M. WOODWARD, "BALANCE MEASUREMENTS," ELECTRONICS, PP.188-191, SEPT. 1953.
- [11] N. MARCHAND, "TRANSMISSION-LINE CONVERSION," ELECTRONICS, PP.162-145, DEC. 1944.
- [12] W. K. ROBERTS, "A NEW WIDE-BAND BALUN," PROC. IRE, VOL. 45, PP.1628-1631, DEC. 1957.
- [13] G. OLTMAN, "THE COMPENSATED BALUN," IEEE TRANS. MICROWAVE THEORY TECH., VOL. MTT-14, PP.112-119, MAR. 1966.