The Design and Application of Balun for High Frequency Antenna

E-mail: 9419608@ mail.dyu.edu.tw

ABSTRACT

The research of balun which of the term is an abbreviation of the words balance and unbalance is a classical study. It is a device that connects a balanced two-conductor line to an unbalanced coaxial line. In the early periods, people consider the antenna balun in the low frequency. Sometimes low frequency balun is too big to set up between antenna and coaxial line. So people use tuner to substitute for low frequency balun. Nowadays the trend of radio frequency is higher and higher. The dimensions of antenna are smaller and smaller. The new radio frequency of communications is a wide band system. The tuner is not suited to the new radio frequency of communications which is a wide band system. However, the antenna impedance will change by frequency. A ideal balun can match the antenna impedance with coaxial line impedance in all frequencies. It will increase the bandwidth of antenna. In the paper, we introduced how to design the embedded cavity balun and put in use the "wideband biconical antenna" and "The cylindrical monopole with cavity antenna". As long as design the antenna which introduced by the paper, you can made the good antenna that like a master worker did. After simulating the two antennas with HFSS and measuring by impulse time domain system, we proof both of antennas have quality operating.

Keywords: balun balance unbalance embedded cavity wide band cylindrical antenna biconical antenna sleeve antenna

Table of Contents

REFERENCES

[1] A. Balanis, Antenna Theory: Analysis and Design 2nded., 1997.

[2] John D. Kraus and Ronald J. Marhefka: Antennas For All Applications Third Edition, 1910.

[3] Reinhold Ludwin, Pavel Bretchko: RF Circuit Design Theory and Applications, 2000.

[4] Isamu Majsuxuka, Koji Nagasawa, Biconical Horn Antenna with Different Flare Angle, IEEE Trans. on Antennas and Propagation, Vol. 36, no. 9, pp.1306-1310, Sep 1988.

[5] M. Hamid, S.A. Saoudy, Input Admittance of a Biconical Antenna with Wide Feed Gap, IEEE Trans. on Antennas and Propagation, Vol. 38, no. 11, pp. 1784-1790, Nov 1990.

[6] King and R., " Measured Admittances of Electrically Thick Monopole", IEEE Trans. on Antennas and Propagation, vol 20, pp. 763-766, 1972.

[7] Wunsch and A.D., " Fourier series treatment of the sleeve monopole antenna", IEE Proceedings H. Microwaves. Antennas and Propagation, vol 135, pp217-225, 1988.

[8] Itoh K., Watanabe R. and Matsumoto T., " Slot-monopole antenna system for energy-density reception at UHF", IEEE Trans. on Antennas and Propagation, vol 27, pp. 485-489, 1979.

[9] Maloney J.G. and Smith G.S., " A study of transient radiation from the Wu-King resistive monopole-FDTD analysis and experimental measurements", IEEE Trans. on Antennas and Propagation, vol 41, pp. 668-676, 1993.

[10] Zhi Ning Chen, Hirasawa k. and Wu k., " A novel top-sleeve monopole in two parallel plates", IEEE Trans. on Antennas and Propagation, vol 49, pp. 438-443, 2001.

[11] Chang D., Harrison C. Jr. and Aronson E., " Tubular monopole of arbitrary dimensions: The radiation field", IEEE Trans. on Antennas and Propagation, vol 17, pp. 534-540, 1969.

[12] Zhongxiang Shen and MacPhie R.H, " Rigorous evaluation of the input impedance of a sleeve monopole by modal-expansion method", IEEE Trans. on Antennas and Propagation, vol 44, pp. 1584-1591, 1996.