复旦大學　　学术报告

A Compact Dual-Band Array Design Using Printed Dipoles

Speaker： Krishna Naishadham, Ph.D., Research Professor

School of Electrical and Computer Engineering

Georgia Institute of Technology, Atlanta, USA

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Abstract：

Antenna size is the dominant limiting factor in miniaturizing electronics and RF front ends. Optimizing the antenna aperture in moderately small physical space is a challenge facing the design of antenna arrays for wireless and satellite communications. There is an increasing trend in achieving multiple functions such as communication in different wireless bands, video streaming, geolocation, etc. using antenna elements and arrays with a small footprint normally dictated by package size, weight and power constraints. This seminar reviews some of the challenges behind antenna design and integration and discusses a solution involving the design of planar multi-band arrays by stacking the feed circuitry and antenna elements vertically in multiple layers of a substrate, a concept known as shared aperture [e.g., Pozar et al., IEEE AP Trans. Feb. 2001]. This concept was originally developed in early 1980s for multi-band synthetic aperture radar on satellites, but has recently gained interest for mobile wireless communications. A major problem with vertical integration of antenna elements into tightly packed substrates is to ensure adequate isolation between the antennas in different bands. We present a novel antenna element design for a dual-band array, comprising interleaved printed dipoles spaced to avoid grating lobes in each band. The folded dipoles are designed to be resonant at octave-separated frequency bands (1 GHz and 2 GHz), and each dipole is gap-fed by voltage induced electromagnetically from a microstrip line on the other side of the substrate. This nested element configuration shows excellent corroboration between simulated and measured data, with 10-dB return loss bandwidth of at least 5% for each band and inter-channel isolation better than 15 dB. Measurements on the array reveal broadside gain of 12 to 17 dBi in each band with low cross-polarization.

Bio：

Krishna Naishadham received M.S. from Syracuse University and the Ph.D. from the University of Mississippi, both in Electrical Engineering, in 1982 and 1986, respectively. He served on the faculty of Electrical Engineering for 15 years at the University of Kentucky and Wright State University in the US. He worked as a researcher in RF circuit design at Philips Broadband Networks from 1999-2002. From 2002-2008, he worked as a Research Scientist at Massachusetts Institute of Technology, where he contributed innovative hybrid computational EM methods and state space spectral estimation methods for electromagnetic analysis and design. In 2008, he joined Georgia Institute of Technology, where he is a Research Professor with ongoing research on low-power wireless sensors, computational EM for biomedical problems, and on novel multifunctional antenna design. Dr. Naishadham published four Book Chapters and over 150 papers in professional journals and conference proceedings, and spent invited research collaboration visits at several universities, including Polytechnic University of New York (with Prof. Leo Felsen), the Indian Institute of Science, Ghent University (in Belgium) and Ecole Polytechnic in Lausanne, Switzerland (Prof. Juan Mosig). He is Chair of the Joint IEEE AP/MTT Chapter at Atlanta and serves on the Technical Program Committee for the International Microwave Symposium. He serves as an Associate editor of the International Journal of Microwave Science and Technology