A NOVEL PROTOTYPE FOR UWB MIMO VECTOR ANTENNA

Rajagopalan, A., Lazzi, G.
Department of Electrical and Computer Engineering, North Carolina State University, Raleigh, NC 27695-7914, USA

Since the 3.1-10.6 GHz frequency spectrum has been allotted for UWB applications considerable efforts have been expended in developing Ultra-Wideband antennas. Most of these antennas have been broadband dipoles such as bowties, disc monopoles and Vivaldi antennas. This talk presents a new prototype for a co-located UWB MIMO vector antenna system. A vector antenna is a system where each individual component of the electromagnetic signal is sensed. As such, all available degrees of freedom are utilized. These antennas are to be employed as ultra wideband counterparts to narrow band vector antennas and find applications in wireless communications and biomedicial imaging.

Co-located loops and dipoles with low coupling between them have been shown to provide an increase in capacity as compared to single antennas. The current research was motivated by the extension of this principle to ultra-wideband systems. The antenna system consists of a wideband loop antenna operating from 2-7 GHz and two copolanar bowtie patches that operate in the same frequency range. All the antennas are fabricated on a single substrate with relative permittivity 2.6. The loop antenna is similar to a clover leaf structure fed at the center. This ensures constant phase of the current in each individual sector which preserves the radiation pattern of the loop as a magnetic dipole. The two bowties are two sided patch antennas that are placed orthogonal to each other and coplanar with the loop. The performance of each individual antenna with respect to return loss, radiation pattern and impulse radation will be discussed. It was found from experiments that the coupling was below -10dB in the frequency range 2-7 GHz indicating good isolation between individual antennas. This ensures that maxiumum energy is transmitted from each individual antenna and hence diversity between antennas can be exploited.

Abstract Submission Form

2006 National Radio Science Meeting

Abstract: gianluca6055

Date Received: November 1, 2005

1. (a) Gianluca Lazzi
   2410, Campus Shore Drive
   Room No. 322-B, Montieth
   Campus Box 7914
   Raleigh, NC
   27695-7914 USA
   lazzi@eos.ncsu.edu
   (b) 919-513-3685
   (c) 919-515-2285
2. B - Fields and Waves
3. (a)
4. P, Program chair: David Jackson
5. No special instructions