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A Thin and Flexible UWB Rectangular Array of Vivaldi Antenna with Increased Bandwidth

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Abstract - **An Omni-directional ultra wide band Vivaldi array antenna is designed in this paper. The UWB Technology provides wide band wireless communications using vary narrow pulses and at very low spectral densities. The Federal Commission of Communications allocates the bandwidth of UWB from 2.1GHZ to 10.3GHZ for unlicensed radio applications.. The return loss responses and radiation patterns are considered in the parametric study. The results of simulations realized using Ansoft HFSS, a high frequency electromagnetic field simulation program, are shown and discussed.**

Keywords: Omni directional antenna, Ultra wide band, Rectangular array, Line feed, WBAN

I INTRODUCTION

Rapid developing technology of satellite, wireless communication, remote sensing and radio detection and ranging has LED to the radical wide band (UWB) electronic systems. Any radio technology using signals with a spectrum occupying a bandwidth either greater than 20% of the centre frequency or a bandwidth greater than 500MHz is defined as UWB technology [1].

UWB technology needs antennas with broad information measure and minimum distortion of received and radiated pulses. Moreover, UWB mobile applications have strict needs on the scale of antenna arrays to be used because of the restricted house.

The tapered slot antennas (TSA) are the best candidates for use in UWB technology. These antennas offer a wide bandwidth, significant gain and symmetric patterns in both co-polarization and cross-polarization. TSAs are efficient and lightweight. In addition, TSAs are appreciably simple in geometry making them more advantageous. The most commonly used class of TSA in UWB technology is Vivaldi antenna. Vivaldi antenna, first introduced by Gibson [2] in 1979, has an exponentially tapered slot line. As a member of the class of TSA, the Vivaldi antenna provides broad bandwidth, low cross polarization and directive propagation at microwave frequencies. Vivaldi antennas are low cost, easy to fabricate and insensitive to dimensional tolerances in fabrication process due to printed circuit technology used for the construction of these antennas. Moreover, Vivaldi arrays are small size and low weight enabling compact arrays. It shall be also noted that the beam-width and directivity of a Vivaldi antenna might be considerably improved varying the design parameters.

This paper deals with small size Vivaldi antennas and arrays. The parameters affecting antenna and array designs are studied comprehensively. The design of Vivaldi antenna and array with the requirements given in following chapters are realized as well, based on this parametric study.

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