A Contemporary Methodology of E shaped Antenna for Mobile Applications

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Abstract:

In present scenario, the channel capacity was increased with good quality of service (QoS) in multipath environment without increasing bandwidth and transmit power. By using multiple antennas for transmission, Spectral efficiency and reliability of the design will be improved. This paper proposes the analysis and design of E-shaped MIMO antenna with compact planar profile with operating range of 1-3GHz. The proposed design consists of two element MIMO antennas with various mechanisms and isolation structures to reduce the mutual coupling between the two elements. The proposed antenna design was simulated and high isolation of -40dB is achieved with 17 dB return loss from 1-3GHz range using High Frequency Simulation Software (HFSS).

Key words: MIMO, QoS, HFSS.

INTRODUCTION

In recent years, Multiple Input Multiple Output (MIMO) technology mostly used in wireless high speed data transfer applications. It gives high data rate, increases channel capacity with improved signal quality.A substantial increase in channel capacity is accomplished without the need of additional bandwidth or transmits power by using multiple antennas for transmission. A compact size and high decoupling between antenna portswas required in MIMO system. Due to the marvelous advantages like low weight, low cost and ease of fabrication the micro strip patch antenna it can be selected for wireless applications.

A.R.Mallahzadeh et al [2] introduces four E shaped patch antennas operating at 5.8 GHz. The patch antennas were designed based on Invasive Weed Optimization (IWO) algorithm with high degree of isolation. They proposed an antenna to operate in a bandwidth of 20 MHZ and the mutual coupling obtained from the antenna was -22dB for the separation of 0.13λ. The obtained results shows that the antenna polarization is having more important than the separation distance when the ground size is small and the two antennas are located in the array.

Weiye li et al [3] proposed a compact and low correlation MIMO antenna which covers 1710-2690 MHz bandwidth for wireless applications. Their design consists of coupled feeding plate and radiating strip elements with a volume of 24.5*15*1.2mm and mainly used for high band operation. 45% of bandwidth and -12db isolation, over 49% efficiency and less than 0.15 correlation coefficient are achieved in the frequency ranging from 1710-2690MHZ in their antenna structure.

M. Krairikshet al [4] proposed an antenna which uses MIMO Rayleigh channel and Gaussian azimuth spectrum was obtained with angular spread of 5◦ for both vertical and horizontal polarization, 0◦ and 180◦ are the main azimuth angles. The performance of this antenna provides 7.08bps/Hzand 6.20bps/Hz capacities when excited with two-probe with and without inductor coil.

H.-T. Chou etal[5] investigates various isolation improvement techniques for multiple antenna elements in a closely spaced area. While improving isolation, negative impact on the return loss of individual antennas was introduced, a combination of T-slot, ground strip and R-card has been applied in the design of three loop antennas for MIMO WLAN card bus applications in [5].