

Design of Reconfigurable Wideband Antenna with Efficient Polarization Diversity

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Abstract

A novel single-fed micro strip antenna with switchable polarization for four states by using presently two PIN diodes were planned. This antenna is apposite for WLAN systems. The improvement of this antenna is its simple arrangement, it contains a radiating circular patch, two switches (PIN diode), and a 50Ω micro strip feed line. It can be switched among four different states: two states of linear polarization (LP), one state of left hand circular polarization (LHCP) and one for right hand circular polarization (RHCP). Reconfigurable wideband antennas with efficient polarization diversity are proposed. This antenna is suitable for wireless local area network (WLAN) systems. Linear and circular polarizations are formed in four states by using two pin diodes. This design is simulated in HFSS software. In the proposed system, designed a circular patch U - slot antenna with switchable polarization and a circular patch O - slot antenna with efficient polarization diversity. Achieved a wide band antenna in O- slot design. The design of this antenna operates at 2.4GHz.

Keywords: Reconfigurable Antenna, polarization diversity, U - slot, O - Slot

INTRODUCTION

The fringing fields between the patch edge and the ground plane cause the micro strip patch antennas to radiate. A better performance in the antenna calls for a thick dielectric substrate having low dielectric constant which provides better efficiency, larger bandwidth and better radiation [11]. However, such a configuration results in large size of antenna. The design of a compact micro strip patch antenna demands higher dielectric constants, which are less efficient and result in narrower bandwidth. Therefore an optimization is to be achieved between antenna dimensions and antenna performance. The methods by which micro strip patch antennas are fed can be classified into two categories, namely contacting and non-contacting. In the first method, the RF power is directly fed to the radiating patch using a connecting element such as a micro strip line. In the latter method, electromagnetic field coupling is done to transfer power between the micro strip line and the radiating patch [11]. The most popular feed techniques used are the micro strip line, coaxial probe (both contacting schemes), aperture coupling and proximity coupling (both non-conducting schemes).

LITERATURE SURVEY

A new reconfigurable micro strip patch antenna allowing switching between two circular polarizations is proposed. It consists of a square radiating patch and a 3 dB hybrid coupler. Using only single-polar-double-throw (SPDT) switch, the polarization switching can be achieved. This design of the dc-bias network is extremely simple. From experimental results, the proposed antenna avoids the frequency offset phenomena which often happened to antennas with switchable polarization, the recently proposed patch antenna with switchable slot (PASS) concept is implemented to design a novel reconfigurable antenna with both frequency and polarization diversities. Using only one switch and a single patch, the antenna operates at 4.20 GHz with right-handed circular polarization and at 4.55 GHz with left-handed circular polarization. The fabricated antenna has both an acceptable return loss and a broadside axial ratio (AR) lower than 2 dB at each operation frequency. The frequency and polarization diversities of this design could potentially improve the reliability of wireless communication systems.

PLAN OF PROPOSED SYSTEM

Proposed U - Slot Antenna with Efficient Polarization Diversity

The circular patch is implemented on 1.5 mm-thick FR4 epoxy substrate of relative permittivity 4.4. Inserting impedance transformer is used approximately in antenna feed line leads to have an appropriate impedance matching for four states.

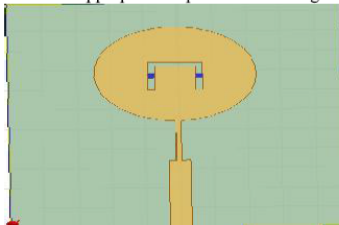


Fig: 1 layout diagram of proposed circular patch U - slot antenna