A Microstrip Magnetic Dipole Yagi-Uda Antenna Employing Vertical I-shaped Resonators as Parasitic Elements

ABSTRACT

A low profile planar Yagi-Uda antenna with exact endfire radiation and vertical polarization is presented in this paper. The concept is the combination of an aperture element and a novel vertical I-shaped resonator (VISR). The aperture acts as the driven antenna, which can be the equivalent of a virtual magnetic dipole. The VISR array constructed with VISR unit cell is employed as a director or a reflector element depending on the resonant frequency of the unit cell, which consists of two identical rectangular metal conductors printed on both sides of a substrate and their electrical connection using via hole. Two prototype antennas are then designed, fabricated and measured to test the validity of the operating principle. Antenna I with one director and one reflector achieves an end fire realized gain of 9.9-10.3 dBi and a front-to-back ration (FBR) of more than 17.4 dB across 6.36-6.70 GHz. With four directors and one reflector, an endfire realized gain of 12.9-13.6 dBi and a FBR of more than 17.9 dB are accomplished by antenna II across 6.38-6.71 GHz. Moreover, a sensitivity analysis is implemented for the proposed antennas. Simulated results show that the standard PCB process is a reliable method for antenna fabrication.

EXISTING SYSTEM

- The I-shaped resonator (ISR)] that generates higher effective refractive index than that of the substrate can make the electromagnetic energy congregate to the endfire direction, thus improving antenna gain.
- In metamaterials with non-resonant unit cells are proposed to enhance endfire gain of the antennas in a broad bandwidth.
- However, all these antennas with metamaterials loading can only generate linear polarizations parallel to the antenna surface.
- To increase the gain of the antenna with vertical polarization.

PROPOSED SYSTEM

- In this paper, a novel microstrip Yagi-Uda antenna with exact endfire radiation and vertical polarization is presented by combining an aperture and a metamaterial vertical ISR (VISR).
- The VISR array is utilized as the parasitic element (director or reflector), which can be well excited by the driven antenna.
- The magnetic dipole is used as the driven antenna to generate endfire radiation and vertical polarization.

SYSTEM REQUIREMENTS

HARDWARE REQUIREMENTS:

- Processor - intel core i3
- RAM - 2GB
- Hard Disk - 20 GB

SOFTWARE REQUIREMENTS:

- Ansoft HFSS(High Frequency Structure Stimulator)

REFERENCE

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