

Octagon fractal microstrip Yagi antenna with a combined DNG and DPS layer structure

ABSTRACT

A high gain octagon fractal microstrip Yagi antenna (OFMYA) at 5.8 GHz industrial, scientific and medical band is presented in this letter. The OFMYA utilizes Cross Snow fractal concept as its director elements. A double-negative (DNG) and double-positive (DPS) layers are placed above the OFMYA in order to attain more gain. A prototype of the OFMYA has been etched on Arlon CuClad 217 which has dielectric permittivity of 2.2 and thickness of 0.787 mm. Meanwhile, DNG and DPS are made of Arlon AD1000 having dielectric permittivity of 10.2 and thickness of 0.787. The proposed antenna was simulated and measured. Experimental result shows that the OFMYA with a combined DNG and DPS layer yields a gain of 15.9 dB. It indicates that the proposed antenna in this article is capable to provide a higher gain with a smaller surface size compared to other microstrip Yagi antennas.

Keyword: High gain; Octagon microstrip Yagi antenna; Fractal; Metamaterial; Super-strate layer; Low data rate application; Narrowband antenna