Document details

Back to results | 1 of 1

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A modified PEC-backed spiral antenna with improved pattern symmetry (Review)

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Abstract

View references (7)

This paper discussed the pattern symmetry of a two-arm Archimedean spiral antenna which is designed to operate over the Ultra-Wide band (UWB) frequency range of 3.1 GHz to 10.6 GHz. The geometrical design of the spiral antenna is simulated and executed using CST Microwave Studio (CST MWS) software. The simulated radiation performances such as radiation pattern, maximum and minimum 3 dB beamwidth, current distribution and gain have been analyzed. The results are compared in three conditions; in free space (with no ground plane), above a solid PEC ground plane, and above a modified PEC ground plane (with circular patterns). Both the PEC reflectors are placed below the spiral antenna with a separation distance of λ/4 at lower frequency f_{low} = 3.1 GHz, center frequency f_{center} = 6.85 GHz, and higher frequency f_{high} = 10.6 GHz of UWB. It is shown that the spiral antenna above the modified PEC backing provides an overall better performance, giving a unidirectional radiation pattern with high gain and improved pattern symmetry compared to the other two configurations.

Author keywords

Archimedean spiral antennas | Frequency independent antennas | Pattern symmetry | PEC reflector | Spiral antennas | Ultra-Wide band (UWB)

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