

Horn Antenna Gain Enhancement using 3-D Printed Dielectric Lens for Dielectric Properties Measurement

Abstract

A 3-D printed dielectric lens for gain enhancement of horn antenna from 18 GHz to 40 GHz is presented in this paper. Fused deposition modelling (FDM) is used to fabricate the Acrylonitrile butadiene styrene (ABS) lens as it is one of the well-known 3-D printing techniques. The results with and without dielectric lens are analyzed and compared from the simulation. From simulation results with the dielectric lens, a maximum gain of 26.7 dBi was achieved. The dielectric lens of 21.72 mm thickness was able to provide a gain enhancement up to 26.7 dBi when compared to the simulation result without the dielectric lens. The proposed dielectric lens can improve the gain of the horn antenna as good agreement between literature, simulation and measurement was achieved.

Keywords

3-D Printing; ABS; Dielectric Lens; FDM