

Abstract:

This paper presents a design of a compact antenna applicator for a microwave colonoscopy system. Although colonoscopy is the most effective method for colorectal cancer detection, it suffers from important visualization restrictions that limit its performance. We recently reported that the contrast between healthy mucosa and cancer was 30-100% for the relative permittivity and conductivity respectively at 8 GHz, and the complex permittivity increased proportionally to the degeneration rate of polyps (cancer precursors). The applicator is designed as a compact cylindrical array of eight antennas attached at the tip of a conventional colonoscope. The design presented here is a proof-of-concept applicator composed by one transmitting and one receiving cavity backed U-shaped slot antenna elements fed by an L-shaped microstrip line. The antennas are low profile and present a high isolation at 8 GHz. The antenna performance is assessed with simulations and experimentally with a phantom composed by different liquids.