

An aligned-gap and centered-gap rectangular multiple split ring resonator for dielectric sensing applications

ABSTRACT

This paper presents the design and development of a planar Aligned-Gap and Centered-Gap Rectangular Multiple Split Ring Resonator (SRR) for microwave sensors that operates at a resonance frequency around 5 GHz. The sensor consists of a microstrip transmission line loaded with two elements of rectangular SRR on both sides. The proposed metamaterial sensors were designed and fabricated on Rogers RT5880 substrate having dielectric constant of 2.2 and thickness of 0.787 mm. The final dimension of the proposed sensor was measured at 35×14 mm². Measured results show good agreement with simulated ones as well as exhibiting high Q-factor for use in sensing application. A remarkably shift of resonance frequency is observed upon introduction of several sample with different dielectric value.

Keyword: Sensor; Metamaterial; Split ring resonator; Dielectric sensing