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Thermally tunable dielectric resonator filter

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Abstract

A simple dielectric resonator filter with thermally tunable performance is investigated. The ceramic dielectric resonator (DR) has a dielectric constant that decreases with the increase of the temperature, which plays a critical role in the proposed filter. The electromagnetic field distribution reveals the electric resonance and magnetic resonance mechanisms of the DR at the resonance frequency. Further, the effect of temperature on the filtering characteristics of the proposed filter is analyzed by means of experimental measurements and numerical simulations. The measured and simulated results have the same change tendency, which shows an acceptable agreement between each other. Based on these results, the feasibility of the proposed filter opens a new way for the design of tunable filter.

Keywords: Dielectric resonator filter; Resonance frequency; Tunable filter

1. Introduction

The development of modern wireless communication system has motivated the research and practical interests of microwave filters with compact size [1], simple fabrication process, and high-performance frequency response [2]. Two typical types of microwave filters are band-pass and band-stop filters [3,4]. Band-pass filters allow

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