Fabrication and Characteristics of Miniaturized Dual-Band High-Tc Superconducting YBa2Cu3Oy Filters: Using Quarter-Wavel

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ABSTRACT

A step-impedance microstrip band-pass filter is presented for the applications of IEEE 802.11b/g (2.4 GHz ~ 2.48 GHz) and IEEE 802.11a (5.15 GHz ~ 5.35 GHz) on the multimode wireless local area networks (WLAN). The designed filter can be miniaturized by using quarter-wavelength stepped-impedance resonators (SIR) and shows a dual-passband response. Furthermore, the cross-coupled configuration makes the rejection slop sharp by producing a single pair of transmission zeros at finite frequencies near the pass band. The simulation results show the dual-band feature of two pass bands at 2.4 and 5.2 GHz with an insertion loss of 0.02 dB and bandwidths of 14 and 24 MHz, respectively. For fabrication, high-Tc superconducting YBa2Cu3Oy (YBCO) films were deposited on double-side-polished 0.5-mm-thick LaAlO3 (LAO) (100) substrates by a radio-frequency sputtering system. The filter was fabricated by double-sided depositing patterned YBCO films on a 10×15 mm2 LAO substrate and by putting it in a gold-coated copper housing. The measured results show a good performance of high-Tc superconducting dual-passband filter. The temperature-dependent microwave properties are also discussed.

Keywords : Quarter-wavelength ; Stepped-impedance resonators (SIR) ; Dual-band ; Filter ; High-Tc superconducting ; YBa2Cu3Oy (YBCO)

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