微小化高溫超導釔鋇銅氧雙頻帶濾波器之製作與特性研究 : 使用四分之－波長步階阻抗諧振器

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摘 要

本研究主要是利用四分之－波長步階阻抗諧振器(SIR)之結構來達到微小化，並根據四分之－波長步階阻抗諧振器之阻抗比值來控制二次諧波之位置的特性，使得二次諧波可往高頻或低頻移動。藉此特性設計符合無線區域網路(WLAN)之雙頻帶通濾波器，其工作於 2.4 ~ 2.48 GHz、5.15 ~ 5.35 GHz等兩個頻段，前者為IEEE 802.11b/g通訊使用之頻段，後者為IEEE 802.11a通訊使用之頻段。並以RF磁控濺鍍技術在鋁酸鑭(LAO)基座上成長雙面高溫超導釔鋇銅氧(YBCO)薄膜。再透過電磁模擬軟體Sonnet模擬分析其頻率響應，則第一中心頻率為2.4 GHz、頻寬為14 MHz，而第二中心頻率為5.2 GHz、頻寬為24 MHz，且兩頻帶之插入損失均為0.02 dB。其所設計的雙頻帶濾波器是以四分之－波長步階阻抗結構與交錯耦合的方式來產生傳輸零點，使得頻帶外擁有較寬的抑制效果，除了可以有效縮小濾波器之尺寸，同時也能達到雙頻之功用，並具有高選擇性、低插入損耗之特性。

關鍵詞 : 四分之－波長 ; 步階阻抗諧振器 ; 雙頻帶 ; 濾波器 ; 高溫超導 ; 釔鋇銅氧

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