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Abstract
In this thesis, both coupler and filter operated at microwave and millimeter wave are investigated, designed and fabricated. The designed components can be used in the applications of the WLAN(Wireless Local Area Network) and UWB (ultra-wideband) communication system. First, a new type dual-band coupler that utilizes the open-stub to reduce a lot of area is proposed and applied in the 2.4 GHz/5.2 GHz WLAN system. A phase difference of 180 is observed at two output terminals. In addition, the 24 GHz and 24 GHz/77 GHz branch line couplers using TSMC 0.18 μm CMOS process are also investigated and designed. It is found to be used in auto radar applications. Since many of the existing WLAN devices use two different unlicensed bands, the 2.4 GHz/5.2 GHz and 2.4 GHz/5.7 GHz CPW dual-band bandpass filters are considered and fabricated for this aspect. The T-shape feeding line is used to form coupling structure. This parallel-coupled structure can be designed to resonate at the desired frequency. The compact microstrip resonant cell (CMRC) is integrated on the backside of the substrate to create another transmission band. Such a structure is also appreciable to the design of ultra-wide band (UWB) filter. Finally, a broadband (3-5 GHz) filter is demonstrated and fabricated. Simulation and measurement results of the designed UWB filter is presented and discussed.
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