適用於無線通訊ISM頻帶2.4GHz低雜訊放大器與電壓控制振盪器

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摘 要

本篇論文我們提出操作在2.5V 供應電壓的射頻低雜訊放大器和射頻電壓控制振盪器，均適用於ISM (Industrial Scientific and Medical)頻帶之外差式通訊接收器上。我們使用Advanced Design System (ADS) 模擬軟體載入TSMC CMOS 0.25μm的製程參數作為模擬電路。 文中的射頻低雜訊放大器的工作頻率為2.4GHz，由於它是接收器的第一級，其增益與雜訊指數將主宰整個接收系統的雜訊性能，因此所要的設計目標為高電壓增益和低雜訊的低雜訊放大器。主要的電路架構是由串疊放大器和共源放大器串接而成，其模擬結果顯示了21.083dB的高電壓增益及2.74dB的低雜訊指數效能，另外也得到好的輸入輸出阻抗匹配。 而在射頻電壓控制振盪器設計，我們採用LC tank電路架構。在2.5V工作電壓下，振盪頻率的調控從2.156GHz到2.377GHz，有9.8%的調頻範圍。相位雜訊在1MHz的頻率位移下有-120.3dBc/Hz。

關鍵詞 : 低雜訊放大器 ; 電壓控制振盪器 ; 外差式通訊接收器 ; 高電壓增益 ; 低雜訊 ; 串疊放大器 ; 共源放大器 ; 相位雜訊

目錄

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