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Analysis and Design of Simultaneous Dual Band Harvesting System with Enhanced Efficiency

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Abstract : This paper presents an enhanced efficiency simultaneous dual band energy harvesting system for wireless body area network. A bulk biasing is used to enhance the efficiency of the adapted rectifier design to reduce V_{th} of MOSFET. The presented circuit harvests the radio frequency (RF) energy from two frequency bands: 1 GHz and 2.4 GHz. It is designed with TSMC 65-nm CMOS technology and high quality factor dual matching network to boost the input voltage. Full circuit analysis and modeling is demonstrated. The simulation results demonstrate a harvester with an efficiency of 23% at 1 GHz and 46% at 2.4 GHz at an input power as low as -30 dBm.

Keywords : energy harvester, simultaneous, dual band, CMOS, differential rectifier, voltage boosting, TSMC 65nm
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