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Design of Concurrent Dual-Band Rectifier with Harmonic Signal Control

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Abstract

This paper proposes and demonstrates a concurrent 2.45GHz/5.8GHz rectifier. The proposed concurrent dual-band rectifier drastically improves its RF-DC conversion efficiency with a harmonic signal control technique. The proposed rectifier employs two key designs. A microstrip spurline notch filter in the output section realizes high RF-DC conversion efficiencies at the dual bands. The quarter-wave length open stub of the 8.25 GHz connected at diode cathode effectively terminates the harmonic signal generated by mixing the input signals. The proposed configuration provides the high RF-DC conversion efficiency even when two-tone signals input the rectifier. The fabricated the dual-band rectifier achieves the RF-DC conversion efficiencies of 64.8 %, 62.2 %, and 67.9 % at 2.45 GHz, 5.8 GHz, and their two-tone input signals, respectively.

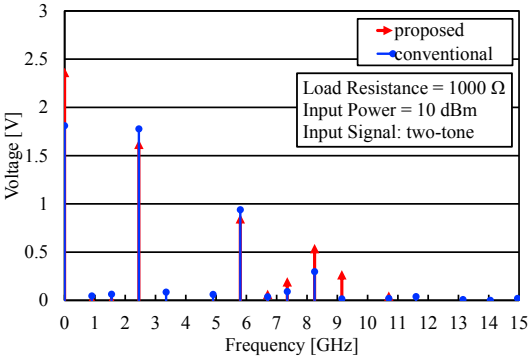

Fig. 1. Simulated frequency spectrum of voltage at diode cathode.

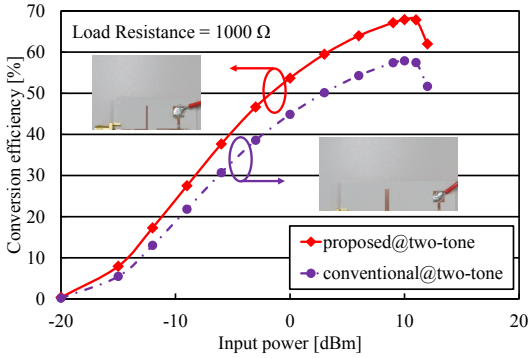

Fig. 2. Compared the proposed rectifier with the harmonic signal control to the conventional rectifier without the harmonic signal control.

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