Abstracts

Design and experiments of a high-conversion-efficiency 5.8-GHz rectenna

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A high-efficiency rectenna element has been designed and tested at 5.8 GHz for applications involving microwave-power transmission. The dipole antenna and filtering circuitry are printed on a thin duroid substrate. A silicon Schottky-barrier mixer diode with a low breakdown voltage is used as the rectifying device. The rectenna element is tested inside a waveguide simulator and achieves an RF-to-DC conversion efficiency of 82% at an input power level of 50 mW and 327 /spl Omega/ load. Closed-form equations are given for the diode efficiency and input impedance as a function of input RF power. Measured and calculated efficiency results are in good agreement. The antenna and circuit design are based on a full-wave electromagnetic simulator. Second harmonic power levels are 21 dB down from the fundamental input power.

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