



A High-Gain and High-Efficiency Amplifier Module for DC-RF Power Conversion in Wireless Power Transfer Systems

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A high-gain and high-efficiency power amplifier has been developed at 5.75-GHz as a DC-to-RF power converter for wireless power transfer systems. In order to obtain high-gain characteristics, a multi-stage amplifier was designed while maintaining a high-efficiency characteristic by adjusting the output level of each stage. The overall efficiency of the module is mainly affected by the efficiency of the final-stage amplifier circuit. Thus, a high-efficiency GaN HEMT amplifier was used for the final stage, and a GaAs HEMT amplifier MMIC was designed as a driver stage. A fabricated amplifier module exhibited a maximum power-added efficiency of 69% at 5.75 GHz (corresponding to DC-RF conversion efficiency), with a gain and output power of 32 dB and 33.8 dBm, respectively.