

Abstract

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An FPGA Based 1-Bit all Digital Trasmmitter Employing Delta-Sigma Modulation With RF Output For SDR

Software defined radio (SDR) is a rapidly evolving technology that is receiving enormous recognition and generating widespread interest in the telecommunication industry. In this paper, we present the architecture of an all-digital transmitter with radio frequency output targeting FPGA devices due to their reconfigurability and programmability. The all-digital transmitter directly synthesizes RF signal in the digital domain using low pass delta sigma modulation (LPDSM). This eliminates the need for most of the analog and RF components. The all digital transmitter consists of one cascaded integrator comb (CIC) filter, one LPDSM modulator and digital upconverter (DUC). The binary output waveform from the RF-DeltaSigma modulator is centered at 800 MHz with bit rate of 1.6 Gbps. The proposed architecture has been simulated and proved to have a satisfactory performance. Finally, a VHDL code is written for the LPDSM to demonstrate its implementation and verifying the simulation results.