Abstracts

Performance characterization of FPGA techniques for calibration and beamforming in smart antenna applications

A field-programmable gate array (FPGA) implementation is presented for a smart antenna application employing digital beamforming. The digital beamforming is performed at the RF signal carrier frequency by means of bandpass (IF) sampling, using high-speed 8-b analog-to-digital converters. The digital phased array receiver presented in this paper consists of an eight-channel system with back-end FPGAs for calibration and digital beamforming processing. The system operates in the L-band (1.8-2 GHz) with various bandwidths depending on the application and FPGA processing requirements. This paper focuses on two main topics, calibration methodologies and FPGA implementation for calibration and digital beamforming, and includes several performance trades. Results presented include real measured data that were collected with the system and processed via FPGAs.

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