Abstracts

Digital beamforming and calibration for smart antennas using real-time FPGA processing

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A real-time field programmable gate array (FPGA) implementation is presented for a smart antenna application employing digital beamforming (DBF). The DBF is performed at the RF signal carrier frequency by means of bandpass (IF) sampling, using high-speed 8-bit analog-to-digital (A/D) converters. The digital phased array receiver presented in this paper consists of an 8-channel system with back-end FPGAs for real-time calibration and DBF processing. The system operates in the L-band (1.8 GHz to 2 GHz) with various bandwidths depending on the application and FPGA processing requirements. Two main topics are discussed in this paper: (1) calibration methodologies and (2) FPGA implementation for calibration and DBF. Results presented include real measured data that was collected with the system and processed via FPGAs.

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