

一种可靠的 OFDM 基带系统设计及 FPGA 实现

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摘 要：论文设计了一种可靠的 OFDM 基带系统，主要包括卷积编解码、交织和解交织、OFDM 调制和解调，并给出了系统方案及其在 FPGA 上的实现方法.设计中采用了一种基于延时相关和互相关联合判决的帧同步实现方案，并将帧同步的结果作用于丢帧补零模块和解交织模块，提高系统的可靠性.采用 FPGA 硬件实现该系统，分别对其在 AWGN 和单音干扰、部分频带干扰下的性能进行测试.测试结果表明，实现的 OFDM 基带系统在较大噪声和干扰的情况下能够实现数据的可靠传输.

关键词：可靠性；正交频分复用；现场可编程门阵列；帧同步

Design and implementation of a reliable OFDM

baseband system based on FPGA

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Abstract: In this paper, a reliable orthogonal frequency division multiplexing (OFDM) baseband system is designed, including convolution coding and decoding, interleaver and deinterleaver, OFDM modulation and demodulation. The system scheme and implementation methods of field programmable gate array (FPGA) are also provided. A frame synchronization scheme based on delay-correlation and cross-correlation is adopted, and the result of frame synchronization is used for both lost frame complement zero module and deinterleaver module in order to improve reliability. The performances of system implemented by FPGA are tested under the additive white Gaussian noise (AWGN) and the interference of single tone and partial band respectively. The results indicate that the system implemented can achieve reliable data transmission with large noise and interference.

Key words: reliability; OFDM; FPGA; frame synchronization

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