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Development of a CDMA system with RAKE receiver for the third generation wireless communication systems

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Abstract:

The main constituent of the third generation (3G) digital cellular mobile communication systems is a CDMA transceiver. The transmitter includes complex scrambling code generation, channelization code generation, and the spreading operation with both. The receiver involves RAKE reception, code synchronization, descrambling code and channelization code generation and the despreading operations. The RAKE receiver is used to mitigate the fading introduced by the wireless channel by maximally combining the delayed replicas of the signal. Its output may be used for further baseband processing for detection. With the present state-of-art VLSI technology, an ASIC solution is essential for a miniaturized full specification 3G air interface development. Therefore, in this paper, we present the development of an ASIC solution, which has been fabricated using the 0.25 /spl mu/ CMOS technology, for a RAKE receiver based 3G CDMA system.

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1 Introduction

As the number of wireless handheld devices designed to access the Internet increases, there is a serious need for a faster and better wireless communications technology. The third generation wireless technology will provide superior wireless voice quality and data services, supporting video and multimedia content sent without wireline cost, in handheld smart phones, and potentially many other electronic devices. The 3G wireless access and mobility will be merged with the Internet to create essential new business opportunities and new services. Therefore it has the potential to be the nucleus of new services for the end users.

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