An 11 mm2, 70 mW Fully Programmable Baseband Processor for Mobile WiMAX and DVB-T/H in 0.12 um CMOS

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Abstract

With the rapid evolution of wireless standards and increasing demand for multi-standard products, the need for flexible RF and baseband solutions is growing. Flexibility is required to be able to adapt to unstable standards and requirements without costly hardware re-spins, and also to enable hardware reuse between products and between multiple wireless standards in the same device, ultimately saving both development cost and silicon area. In this paper a fully programmable baseband processor suitable for standards such as DVB-T/H and mobile WiMAX is presented. The processor is based on the SIMT architecture which utilizes a unique type of vector instructions to provide processing parallelism while minimizing the control complexity of the processor. The architecture has been demonstrated in a prototype chip which was proven in a complete DVB-T/H system demonstrator.

The chip occupies 11 mm in a 0.12 m CMOS process. It includes 1.5 Mbit of single port SRAM and 200 k logic gates. The measured power consumption for the highest DVB-T/H data rate (31.67 MBit/s) is 70 mW at 70 MHz. This outperforms both area and power figures of previously presented non-programmable DVB-T/H solutions.