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International Journal of Digital Multimedia Broadcasting
Volume 2009 (2009), Article ID 503130, 13 pages
doi:10.1155/2009/503130

Research Article

3G Long Term Evolution Baseband Processing with Application-Specific Processors

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Received 13 November 2008; Accepted 6 January 2009

Academic Editor: Daniel Iancu

Abstract

Data rates in the upcoming 3G long term evolution (LTE) standard will be manifold when compared to the current universal mobile telecommunications system. Implementing receivers conforming with the high-capacity transmission techniques is challenging due to the complexity and computational requirements of algorithms. In this study, the software defined radio (SDR) is targeted and the four essential baseband functions of the 3G LTE receiver, namely, list sphere decoding, fast Fourier transform, QR decomposition, and turbo decoding, are addressed and the functions are implemented as application specific processors (ASPs). As a result, the design space that describes the essential computational challenges of 3G LTE receivers is clarified and estimates of area, power, and interprocessor communication buffer requirements are presented.

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