



Technology Transfer in Computing Systems

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TETRACOM D3.11: LTE-IP

A Turbo-Code Decoder IP for the next generation of mobile devices (5G)

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The fourth generation (4G) wireless systems partnership project Long Term Evolution (LTE-Advanced), based on radio access technology is taking momentum and continuing to grow at an accelerated pace. However, it is necessary to further develop current mobile communication systems to handle future demands for mobile broadband services through higher data rates, shorter delays (latencies), and even greater capacity. In parallel to these activities related to the evolution of current wireless technologies, there is also an increased research effort on future radio access technologies. These are anticipated to take the performance and service provisioning of wireless systems a step further, providing data rates greater than 1Gbps. To meet the challenges of such future high throughput wireless systems a LTE Turbo-Code Decoder (Forward Error Correction – FEC) is required that has the capabilities to deliver this very high data rates and is validated against the mobile broadband standard specifications (e.g. 3GPP release 13).

Creation of the LTE Turbo-Code Decoder IP

The University of Kaiserslautern has within the Microelectronic Systems Research Group more than 200MY experience in designing and verifying high throughput channels decoders (FEC), especially for Turbo-Code and LDPC codes. Creonic designs and delivers IP cores for the integration in ASICs and FPGAs. The focus is on complex signal processing functions for communication systems ranging from DVB to LTE-A. Moreover, Creonic developed an advanced decoder template, which makes it feasible to import foreign decoders into their development framework. To create now an IP suitable to Creonic's requirements, it is recommended to take their decoder template while inserting and adapting the appropriate RTL code. Due to the close cooperation and the established know-how exchange it was possible to generate a high quality LTE Turbo-Code Decoder IP, which fits to the needs of Creonic. This IP was validated against a C/C++ reference model and a FPGA and ASIC prototype were implemented. Due to the transfer of the LTE Turbo-Code Decoder IP, Creonic will benefit from its competitive advantages, such as the very high throughput (>1Gbps), the near ideal communications performance, and a highly scalable architecture. Additionally, by the availability of the Turbo-Code Decoder IP for LTE-Advanced it is expected that Creonic will grow in the number of employers and revenue.