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Department of Information Technology and Electrical Engineering

Mixed Radix FFT Core Generator

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Abstract

The Discrete Fourier Transform (DFT) processor is a key component in Orthogonal Frequency-Division Multiplexing (OFDM) communication systems and often needs to support different input sample sizes. To reduce the development effort when experimenting with new mobile standards, a Fast Fourier Transform (FFT) Core Generator was implemented which can generate a FFT Core for a specific application. Even though our core generator is focused on OFDM, it can also be used for many different applications. It was designed to achieve a reasonable throughput and latency on the smallest area possible while being configurable in terms of FFT point sizes and word widths.

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1.2 60 GHz

- huge bandwidth possible
- Big delay spread
- Phase noise
- Big freespace attenuation
- almost no interferer at the moment (and later)

Chapter 2

Theory

The proposed 60 GHz receiver in theory

2.1 Frequencies

- RX and TX-LO offset to make sure LSB part is out of band
- Frequency space pictures of Baseband, TX-IF, 60G, RX-IF, Baseband
- Sub-nyquist sampling because of component restrictions

2.2 Frame strucutre

- ZEROS FES CES FIRST_PES DATA PES DATA PES ... ZEROS
- Explain reason of all fields
- Explain cyclic properties

2.3 Frequency offset estimation and correction

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- general simulation flow
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