

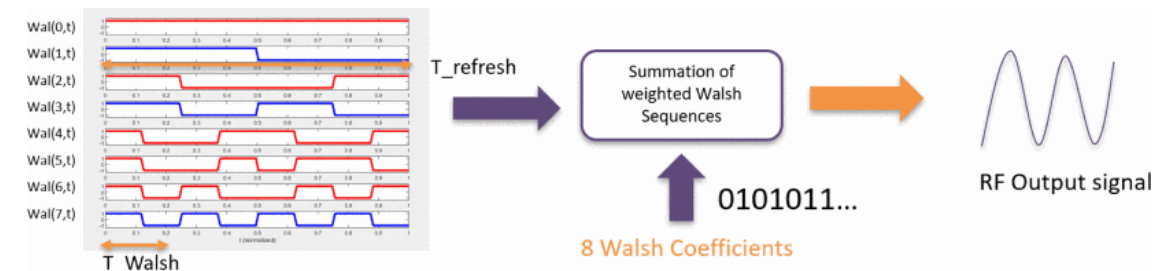
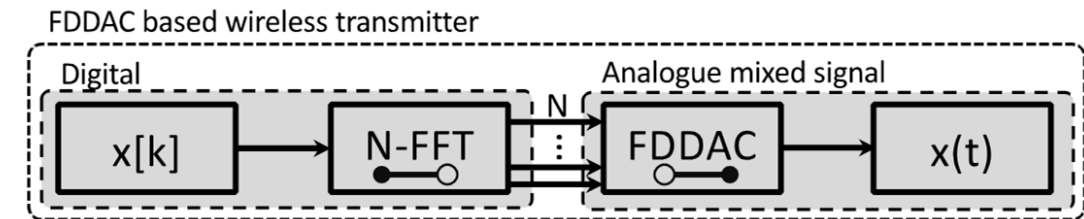
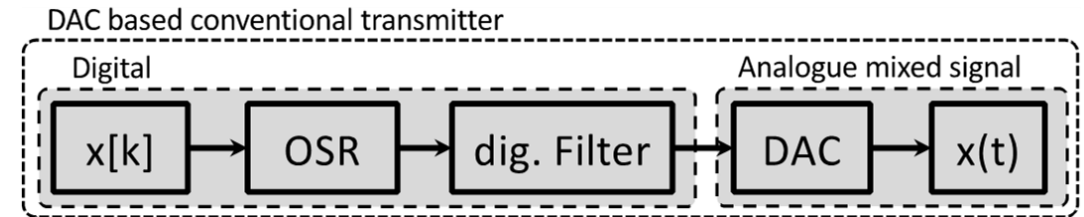
Master Thesis: Design and Analysis of an Integrated Software Defined Radio in 22nm FD-SOI

• Background

- Design of conventional RF-DAC based transmitters has the bottle-neck in the required oversampling and digital filtering at high switching speeds. Scaling in CMOS technologies enabled the evolution of the conventional implementation at the expenses of high power consumption.
- The FD-DAC concept solves the problem of oversampling together with the consequent high switching speeds and enables wideband operation with significantly lower power consumption by utilizing low-speed DACs and frequency generation blocks to realise frequency bins
- One solution to implement the frequency bins is by utilising Walsh transform

• Tasks (Three milestones)

- **Literature survey (8 weeks)**
 - Full system analysis of the wideband transmitters and the FD-DAC concept
 - The implementation of arbitrary waveform generator using Walsh-Transform (WT)
- **Design and Implementation (10 weeks)**
 - The implementation of the FD-DAC utilising WT-based DACs using:
 - Off-the-shelf components
 - Integrated in Fully-Depleted SOI 22nm
- **Documentation (6 weeks)**
 - Thesis
 - Publication/Patent/...etc.



Contact: Dr.-Ing. Mohamed Elsayed
mohamed.elsayed@hfe.rwth-aachen.de