

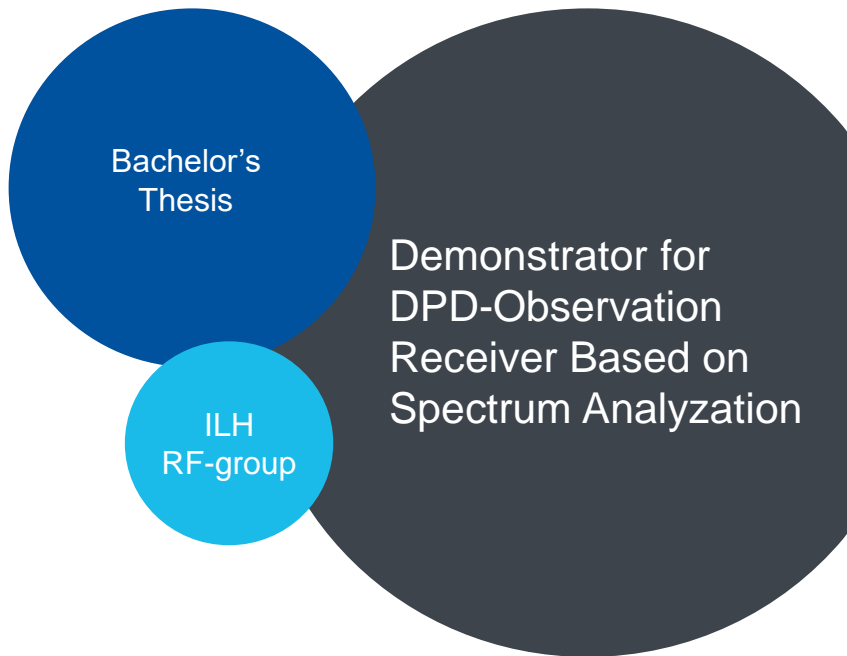
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Motivation:

Signal linearity in communication systems is strongly influenced by Power amplifiers (PA). Nonlinearities in the PA decrease the signal quality and leads to unwanted spectral regrowth. This behavior can be addressed by linearization techniques such as predistorting the signal in the digital domain (DPD).

In order to implement a realtime DPD for future broadband communications like backhaul or satellite communication, the signal has to be sampled with a high precision over a large bandwidth.

For this scenario, a low-cost observation receiver, based on a spectrum analyzation technique should be implemented and reviewed.

Goals:

The goal is to develop a low-cost spectrum analysis in E-band with existing hardware. Observation of a signal with a minimum bandwidth of 2.5 GHz should be demonstrated.

A theoretical analysis of how to use the concept in future applications is required.

The thesis includes the redesign or reuse of an already developed observation receiver (OR) with commercial of the shelf components and low-cost ADCs.

Your Tasks:

- Experiments on low-cost Spectrum analysis in E-Band (60 ... 90 GHz)
- Demonstrating the concept in simulation and measurements
- Summarize and quantize the requirements for an OR based on spectrum analyzation

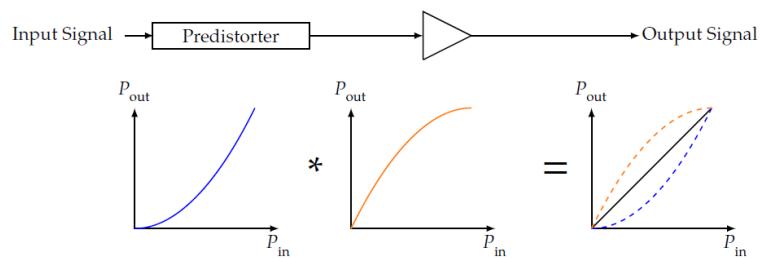


Fig.1 illustrates the predistortion principle.

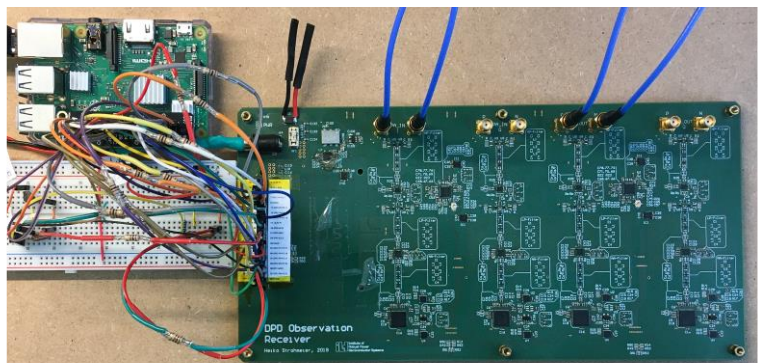


Fig.2 Photo of a previous implementation of the observation receiver PCB with a Raspberry Pi for controlling the observation receiver via SPI.

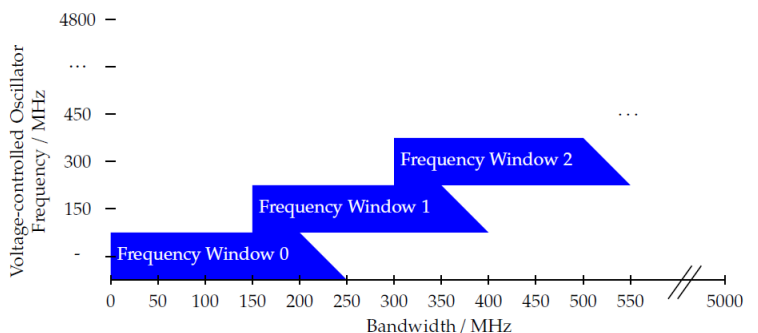


Fig.3 shows the first three observation receivers frequency windows of a previous implementation

