

Adaptive CF Reduction and Digital Pre-Distortion

bc013

Description

The bc013 Adaptive Joint Crest Factor Reduction and Digital Pre-Distortion core (A-CF-DPD) is specifically designed for digital modulation formats. It forces the cascade of DPD and PA to match one of the 7 provided selectable in-out curves. While the user is still responsible for setting the average desired PA output power, the A-CF-DPD adaptively sets the maximum achievable CF for the given input signal and output PA Power thus tracking PA drifts due to temperature and aging.

Key Features

- 33 linearly interpolated complex coefficient tabular pre-correction.
- Frequency, phase, delay and power alignment of the feedback signal.
- Optional feedback ADC impairments recovery (offset, quadrature, gain).
- Optional DAC impairments pre-correction (offset, quadrature, gain).
- 7 selectable target in-out curves.
- PA temperature and aging drifts tracking.

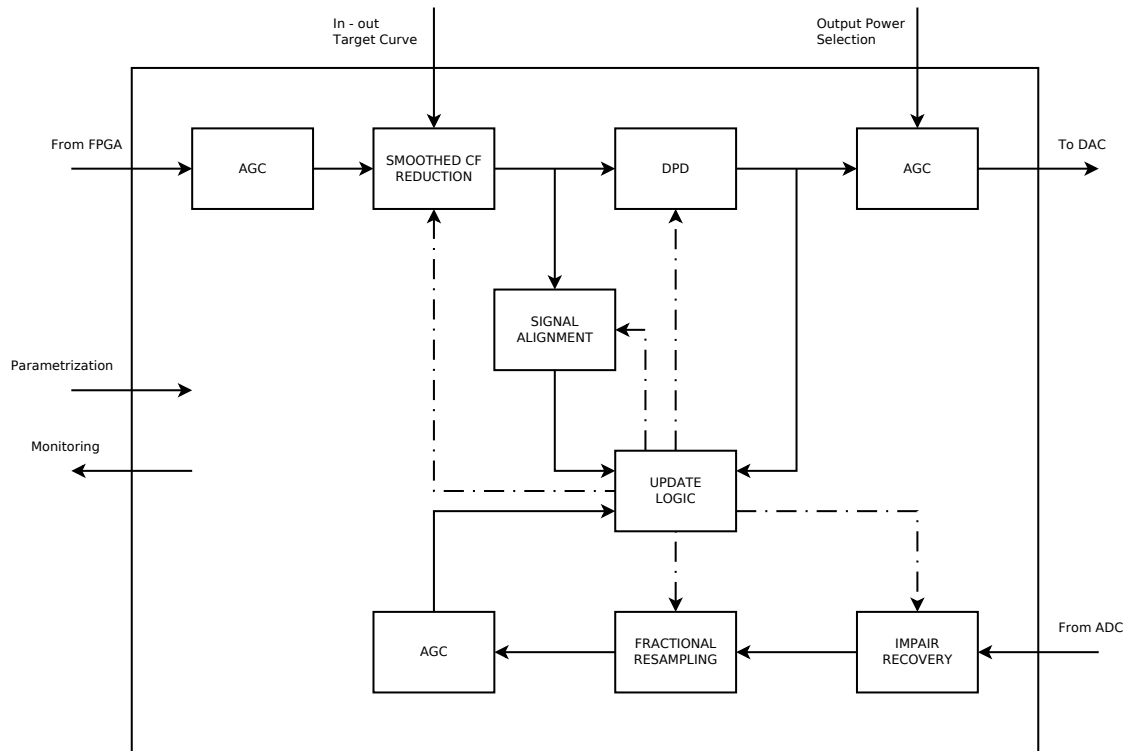


Figure 1: System block diagram

Main Advantages

- Automatic tracking of PA temperature and aging drifts.
- Highly parametrizable.
- Highly customizable to fit your specific needs.

Applications

- Point to Point microwave radiolinks.
- 4-G Radiobase.
- Audio and TV Digital broadcasting.

Performance Overview

The core has been tested with the simulated amplifier model presented in figure 2. The following setup has been used for performance evaluation:

- The test signal is approximately Gaussian with a peak to average power ratio of 12 dB and -3 dB single-sided bandwidth of 2.5 MHz.
- The PA output back-off from saturation has been set in the range from 6 to 9 dB.
- Target AM-AM curve: hard clipping.
- Adaptive CF reduction subsystem enabled.

The core performance is reported in figure 3.

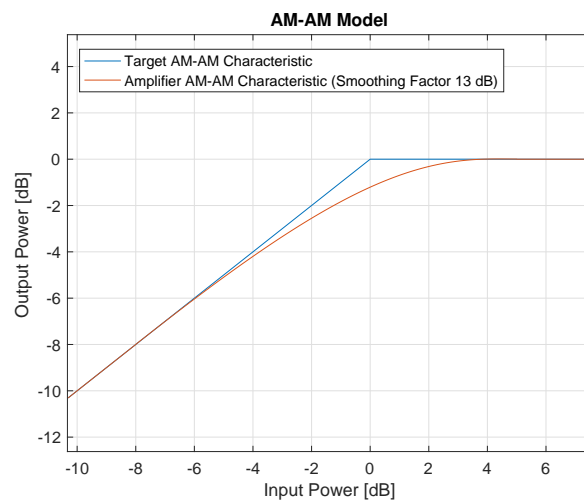


Figure 2: Amplifier Model, AM-AM curve

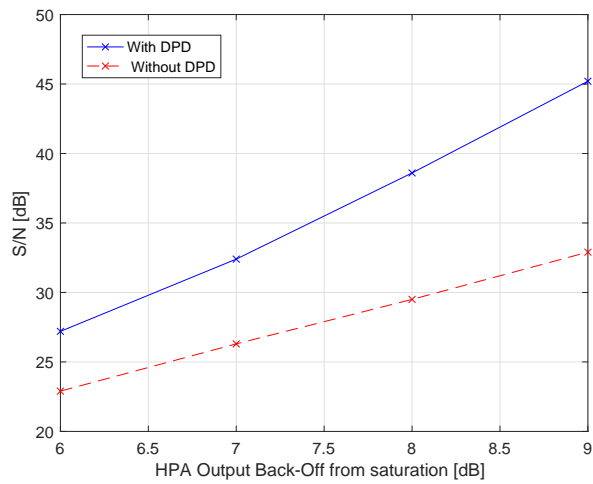


Figure 3: Performance of the DPD with different OBO setup.

Resources

The core has been implemented on an Xilinx Kintex 7 XC7K160tfbg484-2 device. The resources utilization is summarized in table 1.

Table 1: Resources utilization on Xilinx Kintex 7 device. Impairments recovery by-passed.

LUT	FF	Block RAM	DSP
16460	12399	11	115

Related Products

- bc005: Adaptive Modem "Manero".
- bc006: DVB-T2 Modulator.
- bc008: Multi-Standard Analog TV Modulator.
- bc011: Adaptive Modem for E-Band.
- bc012: DAB/T-DMB Modulator.