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Master Thesis

ILH RF Group

Design of Class B/C Single-Stage Amplifier Breakouts

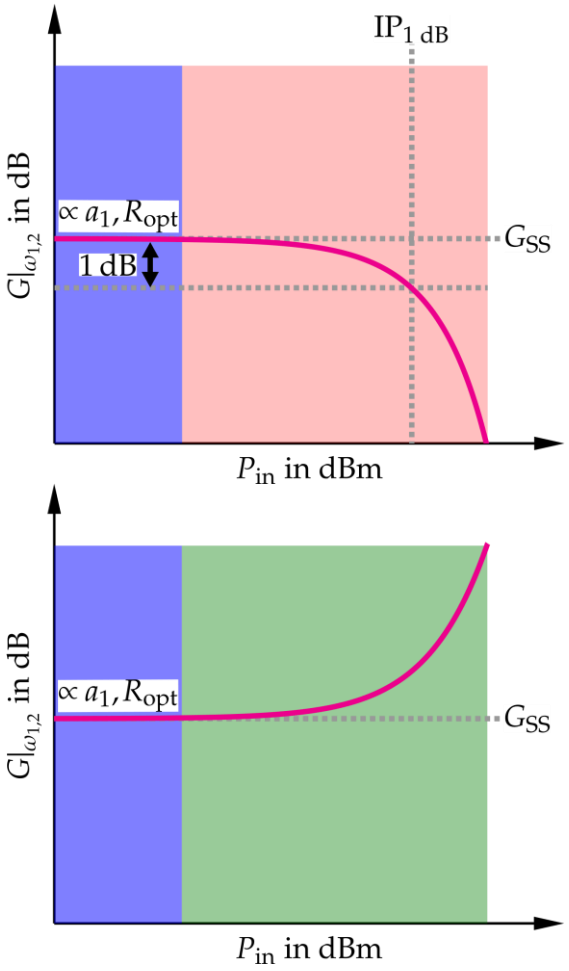
Our research group develops analog frontends for THz wireless communication systems operating in H-band (220-325 GHz).

In scope of the SOLITONIC project, an analog pre-distortion operating at a center frequency of 300 GHz will be developed. One approach for the realization of the analog pre-distortion is to exploit the complementary properties of expanding and compressing amplifier classes.

For compressing amplifier classes (class A/AB) we have valid simulation models for the transistors available. Expanding amplifier classes (class B/C) are not modeled accurately, because these nonlinear expanding amplifiers can not be used independently for communication purposes. In order to get insights, we need measurements of the class B/C biased amplifiers.

The goal of this thesis is to design and create a production-ready layout of a single-stage class B/C amplifier operating at a center frequency of 300 GHz. For that, circuit simulations and electro-magnetic simulations need to be conducted.

You will use the state-of-the-art 35 nm InGaAs HEMT technology from the Fraunhofer Institute of Applied Solid-State Physics, which has cutting-edge high frequency and low noise performance and achieves cutoff frequencies (f_max) of well beyond 1 THz.



Complementary gain characteristics of a compressing amplifier (top) and an expanding amplifier (bottom), which can in combination enhance the linearity of a power amplifier.

SOLITONIC

Fraunhofer IAF