AMCAD Engineering
Advanced Modeling for Computer-Aided Design

Technical Note

Behavioral Model of High Power GaN HEMTS for RF Doherty Amplifier

Products:

MT930C IVCAD Vector Receiver Load Pull
MT930G IVCAD Time Domain waveforms
MT930R IVCAD Behavioral Model Extraction

Problematic

Doherty Power Amplifier (DPA) architecture is used in modern telecommunication systems to optimize Power Added Efficiency (PAE). DPA is based on a principle of dynamic Load impedance modulation driven by the input level sent to both peak and main amplifier branches. Amplifier designers are using transistor models to create advanced designs with first-pass success. However, the accuracy of the model is a key point in this process.

The problematic of package transistor in the design of DPA is the difficulty to extract an accurate model that will enable a good prediction of the transistor behavior under different conditions of load impedance modulation. One can assume that it is simple for foundries to extract compact models for their transistors; they control their technology and they put the time and effort in it as an added value compared to other suppliers. On the other hand, PA designers don't have the luxury to spend weeks to extract a model before starting their design. AMCAD Engineering developed a behavioral model that will help designer obtain a robust and accurate model to design their DPA in a very short time, using time domain load pull measurements. Designers will then concentrate on designing the best DPA.

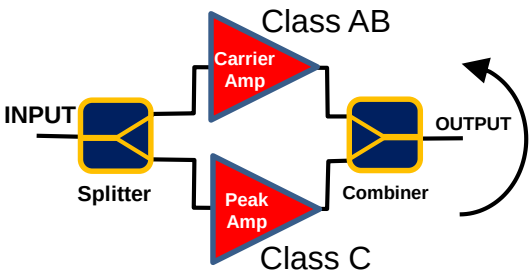

Fig:1 Hybrid Doherty Amplifier Design

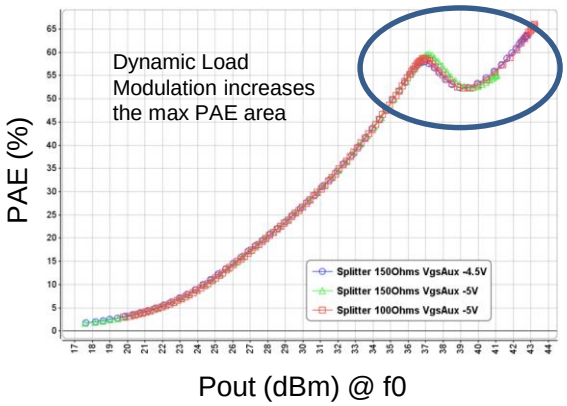

Fig:2 Power Added Efficiency of a DPA

This document features:

1. Problematic
2. Transistor Models
3. Experimental and Simulated Results
4. Doherty Power Amplifier Design
5. Conclusion

If you want to get more details

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