

# Agilent E5611A/AN **Power Amplifier Design Guide**

Product Overview

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#### **Features At A Glance** Over 40 pre-defined simulations and corresponding displays

- DC and bias point simulations
- S-parameter simulations
- Noise, stability, and available power gain analysis, including circles
- Two-element and multi-element matching
- One- and two-tone harmonic • balance simulations

#### **Performance specifications**

- PAE, gain, stability, NF, TOI
- Spectrum, harmonics
- AM/AM and AM/PM

#### Advanced simulations

- Load-pull and source-pull contours
- Third- and fifth-order IMD contours
- Multi sweep parameter set-up

The Power Amplifier DesignGuide, one of a family of DesignGuides from Agilent EEsof EDA, provides you with rapid setup, analysis, and display to verify the most common performance specifications of power amps. It includes simulations that determine the linear and non-linear performance of the device under test with a variety of test conditions.

The Power Amplifier DesignGuide dramatically shortens design cycle time. More time allows for more testing, giving you greater insight into the circuit behavior and more confidence in your design's success.

The simulations are arranged to help you follow a logical design flow. Start with the DC tests to determine biasrelated performance. Linear S-parameter analysis is used to test the highfrequency performance of the active device. Lumped element matching circuits help with device match. Oneand two-tone harmonic balance is used to determine non-linear performance, such as gain, distortion, impedance, and stability. Advanced analyses provide load-pull and source-pull maps of PAE, output power, and gain compression circles.

#### **System Requirements**

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System Reference Impedance

PAE (thick) and Deliver

50.00

- Advanced Design System 1.3 or later version installed
- Agilent E8900A/AN Design Environment
- Agilent E8901A/AN Data Display
- Linear Simulator License
- Harmonic Balance License







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### **DC and Bias-Point Simulations**

- BJT I-V Curves
- BJT Fmax versus Bias
- · BJT Stability versus Bias
- BJT Noise Figure and S-Parameters versus Bias
- BJT Output Power & Distortion
  versus Load R
- FET I-V Curves
- FET Fmax versus Bias
- FET Stability versus Bias
- FET Noise Figure and S-Parameter versus Bias
- FET Output Power & Distortion versus Load R
- FET Ft versus Bias

### **S-Parameter Simulations**

- · Noise Figure, S-Parameters, and Stability
- · Feedback Network Optimization to Attain Stability
- · Gain, Noise Figure, and Stability versus Swept Parameters
- · Stability and S-Parameters versus Frequency and Input Power

#### **1-Tone Nonlinear Simulations**

- Spectrum, Gain, Harmonic Distortion
- · Spectrum, Gain, Harmonic Distortion (w/PAE)
- · Spectrum, Gain, Harmonic Distortion versus Power
- Spectrum, Gain, Harmonic Distortion versus Power (w/PAE)
- Spectrum, Gain, Harmonic Distortion versus Frequency
- Spectrum, Gain, Harmonic Distortion versus Frequency (w/PAE)
- · Spectrum, Gain, Harmonic Distortion versus Frequency and Power
- Spectrum, Gain, Harmonic Distortion versus Frequency and Power (w/PAE)
- Spectrum, Gain, Harmonic Distortion at X dB Gain Compression
- Spectrum, Gain, Harmonic Distortion at X dB Gain Compression versus Frequency
- Spectrum, Gain, Harmonic Distortion at X dB Gain Compression (w/PAE) versus 1 Parameter
- Spectrum, Gain, Harmonic Distortion at X dB Gain Compression (w/PAE) versus 2 Parameter
- Noise Figure, Spectrum, Gain, Harmonic Distortion
- Large-Signal Load Impedance Mapping
- Load-Pull PAE, Output Power Contours
- · Lod-Pull PAE, Output Power Contours at X dB Gain Compression
- Source-Pull PAE, Output Power Contours
- Harmonic Impedance Opt PAE, Output Power, and Gain
- Harmonic Gamma Opt. PAE, Output Power, and Gain

#### **2-Tone Nonlinear Simulations**

- Spectrum, Gain, TOI, and 5thOI Points
- Spectrum, Gain, TOI, and 5thOI Points (w/PAE)
- · Spectrum, Gain, TOI, and 5thOI Points versus Power
- Spectrum, Gain, TOI, and 5thOI Points versus Power (w/PAE)
- Spectrum, Gain, TOI, and 5thOI Points versus Frequency
- Spectrum, Gain, TOI, and 5thOI Points versus Frequency (w/PAE)
- Spectrum, Gain, TOI, and 5thOI Points versus 1 Parameter (w/PAE)
- Spectrum, Gain, TOI, and 5thOI Points versus 2 Parameter (w/PAE)
- Load-Pull PAE, Output Power, and IMD Contours
- · Source-Pull PAE, Output Power Contours
- · Harmonic Impedance Opt. PAE, Output Power, Gain, and IMD
- Harmonic Gamma Opt. PAE, Output Power, Gain, and IMD
- Lumped 2-Element Z-Y Matching Networks
- Lumped Multi-Element Z-Y Matching Networks



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#### Agilent Technologies' Test and Measurement Support, Services, and Assistance

Agilent Technologies aims to maximize the value you receive, while minimizing your risk and problems. We strive to ensure that you get the test and measurement capabilities you paid for and obtain the support you need. Our extensive support resources and services can help you choose the right Agilent products for your applications and apply them successfully. Every instrument and system we sell has a global warranty. Support is available for at least five years beyond the production life of the product. Two concepts underlie Agilent's overall support policy: "Our Promise" and "Your Advantage."

#### **Our Promise**

"Our Promise" means your Agilent test and measurement equipment will meet its advertised performance and functionality. When you are choosing new equipment, we will help you with product information, including realistic performance specifications and practical recommendations from experienced test engineers. When you use Agilent equipment, we can verify that it works properly, help with product operation, and provide basic measurement assistance for the use of specified capabilities, at no extra cost upon request. Many self-help tools are available.

#### Your Advantage

"Your Advantage" means that Agilent offers a wide range of additional expert test and measurement services, which you can purchase according to your unique technical and business needs. Solve problems efficiently and gain a competitive edge by contracting with us for calibration, extracost upgrades, out-of-warranty repairs, and on-site education and training, as well as design, system integration, project management, and other professional services. Experienced Agilent engineers and technicians worldwide can help you maximize your productivity, optimize the return on investment of your Agilent instruments and systems, and obtain dependable measurement accuracy for the life of those products.

#### Get assistance with all your test and measurement needs at: www.agilent.com/find/assist

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