

Precision Measurements and Models You Trust

Reduce your Design Cycle using Real Nonlinear Data: X-Parameters*

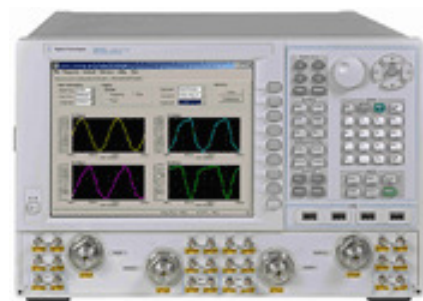
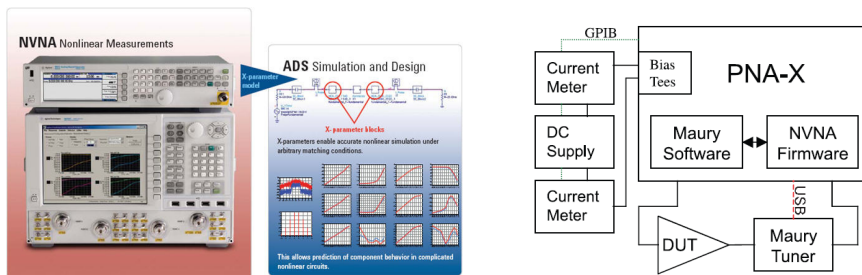
X-parameter is a registered trademark of Agilent Technologies

Modelithics X-Parameter Measurement and Modeling Services

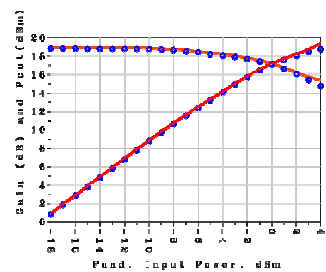
Through cooperation with Agilent Technologies, Modelithics is now very pleased to offer our customers non-linear X-parameter measurement services.

Nonlinear X-parameters:

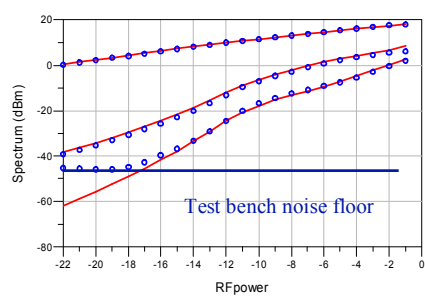
- Are mathematically correct extensions of S-parameters to large-signal conditions. They are a fully nonlinear framework that provides both the magnitude and phase of the fundamental
- Are applicable to both large-signal and small-signal conditions, and for linear and nonlinear components
- Characterize the amplitudes and relative phase of harmonics generated by components under large input power levels at all ports
- Correctly characterize impedance mismatches and frequency mixing behavior to allow accurate simulation of cascaded nonlinear x-parameter blocks, such as amplifiers and mixers in wireless design.
- Can also be applied to individual transistor modeling as an alternative to, supplement to, or validation of traditional compact equivalent modeling.
- Can be measured using a non-linear vector network analyzer, such as a suitably optioned Agilent's PNA-X series instrument.
- Can be also measured as a function of bias as well as source/load conditions.



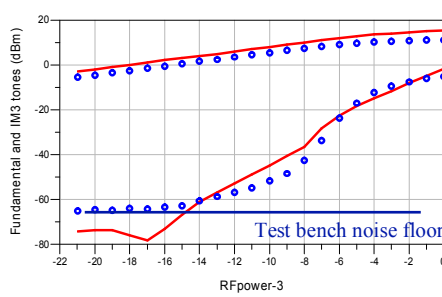
PNA-X Series Nonlinear Vector Network Analyzer (NVNA)



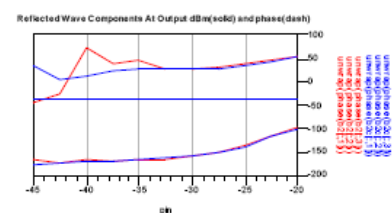
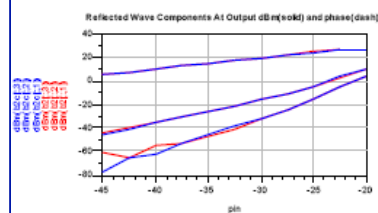
Comparison of X-parameter model simulation to conventional power bench measurement results for a surface mount amplifier at 50 ohm source/load conditions.



Comparison of X-parameter model simulation to conventional load-pull measurement results for a surface mount amplifier for fundamental, 2nd and 3rd harmonic. Source and load-tuned for optimal power.



Comparison of X-parameter model simulation to conventional load-pull measurement results for a surface mount amplifier for fundamental and IM3 tones. Source and load-tuned for optimal IP3.



Output (B2) wave amplitudes and phase of 2 Cascaded amplifiers measured directly and predicted from individual amplifier X-parameters.