

High-Power On-Wafer Load Pull Measurements

Agilent Technologies and bsw TestSystems

Impedance match your high power gallium nitride HFETs with on-wafer load pull measurements

Impedance matching gallium nitride (GaN) HFETs is essential to ensure that your high-power amplifier designs operate at the highest efficiency. By performing high power, high frequency, on-wafer load pull measurements on your GaN HFETs you can design the optimum impedance matching circuits for your amplifiers.

The bsw OWLP-2 test system combines an Agilent PNA-X network analyzer

with tuners from Maury Microwave, high-power amplifiers and a wafer prober from Cascade to create a fully integrated system for on-wafer, high-power load pull measurements of GaN HFETs up to 26.5 GHz. The system can be used to measure S-parameters and intermodulation across the entire frequency range.

In order to place the tuners next to the wafer probes, bsw TestSystems builds special adaptations of the Cascade positioners so that the tuners move in synchronism with the probes. As a result of this, the cable lengths between the device-under-test (DUT) and tuners can be minimized to ensure optimum



- *On-wafer load pull measurements for accurate impedance matching*
- *Characterizes high-power gallium nitride HFETs*
- *Optimize the performance of high-power, high-efficiency amplifiers*
- *Fully integrated solution based on Agilent PNA-X network analyzer*
- *Combines PNA-X with Maury tuners and Cascade wafer prober*
- *Test system integration optimizes DUT signal paths*
- *Measurement & control software provides overall control*
- *Load pull and intermodulation measurements with same set-up*



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stability of the high frequency measurements. The cables from the tuners to the PNA-X are ruggedized and designed to minimize losses in order to maintain the high quality signal path.

Additional measurement and control software ensure a fully integrated solution. After the initial setup of the PNA-X, tuners and wafer prober, the software runs the entire test routine, controlling the measurements and the probe position and writing the results to a user-specified file location.

The system incorporates an RF switching unit to route the signals to and from the DUT during the measurements. The Agilent PNA-X provides the source and measurement capabilities, which are routed via the high-power amplifiers and the Maury tuners to the DUT mounted on the Cascade wafer prober. Since the PNA-X can include dual sources both the high-power load pull and the intermodulation measurements can be accomplished with the same instrumentation setup eliminating the need to re-configure the system for the different tests.

The bsw OWLP-2 provides a fully integrated solution that allows you to make on-wafer, high-power load pull and intermodulation measurements. With the OWLP-2 you can achieve high efficiency in your amplifier designs by accurately impedance matching your high power GaN HFETs circuits.

System Components

Agilent Technologies

N524xA	PNA-X microwave network analyzer
N6734A	Power supply
34411A	Digital multimeter

Maury

MT982AU02	Tuners
ATS	Software

Cascade

Summit 12K	Probing station with bridge
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MM module positioners

bsw TestSystems

Special tuner package for Cascade prober
Software
Customized RF switching unit
High power amplifiers

To learn how this solution can address your specific needs please contact Agilent's solutions partner, bsw TestSystems & Consulting.

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bsw TestSystems & Consulting, with a core competency in on-wafer-characterisation of RF parameters and signal integrity applications, provides test solutions for the semiconductor, electronics and telecommunications industry as well as related universities and research facilities. www.bsw-ag.com

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