Characterizing High-power Microwave Performance for Mission Readiness

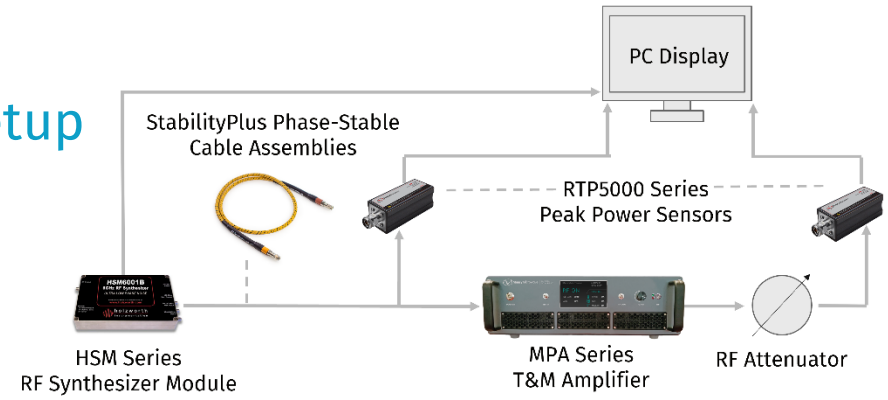
High power microwaves (HPM) emit beams of energy over a broad spectrum to incapacitate targeted systems. At the Directed Energy Symposium 2025, this demonstration shows how Maury Microwave solutions address critical HPM design and development challenges, enabling engineers to analyze and validate performance effectively.

The HSM series RF synthesizer generates a pulsed or CW signal with precise control over phase and signal timing. The ability to generate short or long pulses with high signal quality and fine phase management provides the flexibility needed to simulate realistic conditions for effective testing. The signal is then delivered to the demo's DUT – the MPA series amplifier, which delivers high output power, linearity, and broadband performance to drive antennas to required field strengths and operate in multi-target engagement missions.

Two RTP5000 series peak power sensors capture data at the amplifier input and output to evaluate performance. Accurate power measurements help determine key metrics such as return loss and antenna gain, validating that power is delivered and focused efficiently. In addition, load pull and device characterization reveal the maximum deliverable power to optimize amplifier design. Throughout the setup, StabilityPlus phase-stable cables preserve measurement accuracy with excellent amplitude and phase stability under flexure.

From signal generation and amplification to power analysis, device characterization, and interconnects, Maury solutions ensure HPM systems achieve reliable, battlefield-ready performance.

Demo Setup



Target Users

Target users include defense system designers, test engineers, and researchers developing, designing, and validating HPM technologies.

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Product Overview

MPA Series Test & Measurement Amplifiers

The MPA series amplifiers deliver high reliability, outstanding wideband ranges, and linear performance. All units support full CW, pulsed, AM, PM, FM, or complex modulation such as OFDM. The user-friendly remote-control features, integrated couplers, and power detection enable close positioning to the radiating object for minimal cable insertion loss.

KEY SPECIFICATIONS AND FEATURES:

- State-of-the-art solid-state GaN Pas; broadband design for modulated signals
- Psat from 10W to KW; integrated protection circuitry and coupler
- Remote control; TTL and LVTTL options

RTP5000 Series Real-Time USB Peak Power Sensors

The RTP5000 Real-Time Peak USB Power Sensors address challenges faced by engineers and technicians who design, verify, and maintain systems utilizing pulsed signals. sensors incorporate Real-Time Power Processing™ and offer faster rise times; better time resolution; the fastest measurements; and a complementary, simple, intuitive, and powerful GUI.

KEY SPECIFICATIONS AND FEATURES:

- Automated pulse measurements; crest factor, CCDF, and statistical measurements
- Industry-leading video bandwidth (195 MHz), rise time (3 ns), measurement speed (100,000 per second), and time resolution (100 ps)
- Synchronized multi-channel measurements

HSM Series RF Synthesizer Modules

The HSM Series of RF synthesizer modules utilize proprietary non-PLL technology to offer the ultimate mix of fast switching speed and low phase noise. The compact form factor and multiple control interfaces make the module ideal for system integration.

StabilityPlus Phase-Stable Cable Assemblies

StabilityPlus (SP-series) sets the standard for high-performance ruggedized microwave/RF cable assemblies. Designed specifically for phase-stable and amplitude-stable applications, the SP-series offer excellent measurement repeatability even after cable flexure.

More Resources

Visit maurymw.com/info/directed-energy-symposium-2025 to learn more about Maury Microwave solutions.

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