Spectrum Defender®

US Navy Uses Spectrum Defender to Test New M-Code GPS Signals

The Challenge:

New jam-resistant GPS signals have different testing requirements than previous technology. The new test protocols require testing GPS signals in a contested electromagnetic environment. The required test equipment is expensive, hard to use, and is available from very few vendors.

The Solution:

Using proprietary software from Spectra Lab and NI PXI hardware, **Spectrum Defender** Model 3836 (a 2-channel GPS L1/L2 Record System) allowed technicians to use the instrument effectively with only a few minutes of familiarization—at less than half the cost of viable competitors, and magnitudes above the fidelity and dynamic range available in less expensive options.

Key Engineering Requirements:

To continuously record and reproduce multiple channels of GPS signals, the instrument architecture must support a robust multi-channel synchronization capability and sufficient data bandwidth to transport a continuous stream of raw IQ data.

Problem Background and Solution:

Facing increased sophistication of adversarial Electronic Warfare efforts and the consequential threat of GPS signal denial and spoofing, the US military created M-Code, a GPS technology using jam-resistant waveforms. To ensure performance in contested environments, the USAF GPS Directorate has created tightly-controlled testing procedures for M-Code-enabled equipment.

The US Navy received a variety of candidate M-Code GPS receivers from defense contractors, and needed to validate performance prior to combat deployment in a mission-critical environment, but with limited resources.

Other possible testing solutions were far too expensive and required a factory-trained operator. The Navy needed a less-expensive tool that could be used by technicians—who were not engineers or GPS domain experts—to reliably test the candidate equipment.

Spectra Lab answered that challenge with **Spectrum Defender** Model 3836, designed and built specifically to meet the US Navy requirement for GPS testing, that technicians could employ effectively with only a few minutes of familiarization—at less than half the cost of viable competitors, and magnitudes above the fidelity and dynamic range available in less expensive options.

Results:

Not only did the GPS Directorate give the US Navy permission to use Spectrum Defender as an authorized test platform for M-Code, the DoD has indicated their intent to expand the use of Spectrum Defender across multiple development labs.

Authors:

Spectra Lab designs RF and microwave instruments for niche applications in wireless test and measurement. Our typical customer has a specialized test need which cannot be met by high-volume RF instruments.

Spectrum Defender®

Spectra Lab, LLC
17873 Main Street, Suite C Dumfries, VA 22026 USA

Phone 703-634-5290

Email info@spectralab.com

Web spectrumdefender.com

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Spectra Lab, LLC
17873 Main Street, Suite C
Dumfries, VA 22026 USA