Abstracts

Ultra-Wide Band, High-Repetition Rate Single Channel Mobile Diagnostic System

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The problem of diagnosing transient electromagnetic signals with ultra-wideband, multioctave spectra extending into the microwave region occurs in a number of areas, including lightning phenomena, electrostatic discharge testing, laser and pulsed-power research, and electronic effects testing. While sometimes these phenomena can be diagnosed by standard single-shot means, they often occur at repetition rates in the kHz range and higher, and determining waveform time and frequency domain shot-to-shot reproducibility is often of major importance to the researcher. This paper describes a novel single-channel diagnostic system, the System Verification Apparatus (SVA), which is capable of measuring 100-ps risetime signals on a single-shot basis, while simultaneously measuring pulse-to-pulse variation. The SVA is a fully integrated system which includes a broadband sensor, signal and trigger conditioning electronics, multiple parallel digitizers with deep local storage, a fiber-optic data link to the controlling computer, and automated software for accurately reconstructing, archiving, and analyzing waveforms.

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