

Swept CW Testing of Large Systems

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Abstract—Methods of using swept CW illumination to measure the penetration of electromagnetic waves into a large system have been greatly improved in recent years. The testing is low level, harmless to the system, and less costly than full threat-level EMP testing. Comparisons with measurements in full-scale EMP simulators is quite good with the CW measurements often revealing more detailed information than can be had from a pulsed EMP simulator and transient digitizers. This paper addresses the use of low-level swept CW testing as an engineering tool for measuring shielding design and also for hardness surveillance afterwards.

Keywords—EMP, CW, swept CW, system test

I. INTRODUCTION

With a correctly designed wideband antenna, low-level swept CW illumination can be used effectively to measure the integrity of the shielding protection on large systems such as aircraft. The CW measurement system can measure the magnitude and phase of cable currents on the aircraft normalized to the incident field so that the results can be extrapolated to an EMP threat or any other waveform within the bandwidth of the measurement.

II. CW MEASUREMENTS

The sensitivity of the CW system allows one to diagnose problems and understand the performance of a shielded system or a test site more clearly than is possible using a threat-level pulse system and transient digitizers.

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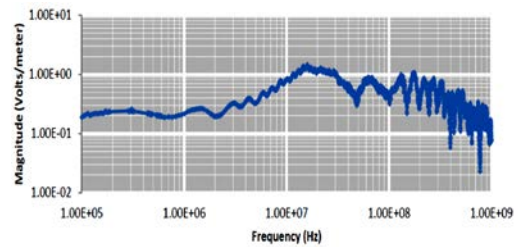


Fig. 1. Measured electric field.

III. CW-TO-PULSE COMPARISON

If the field pattern in the CW and pulse illuminations is uniform, and the CW radiated spectrum is flat, the final CW and pulse measurements on the aircraft will compare very well.

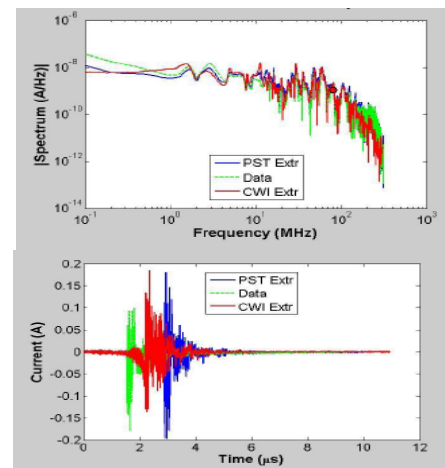


Fig. 2. CW-to-pulse comparison. Red = extrapolated CW. Blue = extrapolated pulse. Ignore the green (raw data).

REFERENCES

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