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3P71 - High Power Microwave Pulse Testing of Electronic Devices using Reverberating Chambers

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As of yet no definitive standard for high-power microwave (HPM) testing of electronic systems exists and there is a need to investigate different methodologies. HPM-effects testing usually require access to several tunable HPM-sources in order to cover a large frequency spectrum. Although such testing facilities do exist, such as f.ex. the SUP.R.A in Germany or the ORION in USA, they are very expensive and not always practical for effects testing of smaller systems. Using a reverberating chamber (RC) it is possible to reach very high power densities using relatively modest input power. For this reason we focus on a methodology for HPM-effects testing based on the use of an RC. Since destructive testing requires the destruction of potentially expensive systems the aim of such a methodology should be to extract as much data as possible from a small number of tests. A twostep method for rationalizing destructive testing in an RC is proposed. The first step consists of measuring the coupling of electromagnetic energy into the Device Under Test (DUT), this step is similar to measuring the absorption cross section of the DUT. This information is then used to determine at what frequency, or frequencies, destructive testing should be performed. Comparison of coupling measurements and the energy needed to destroy simple objects as a function of frequency are presented. It is shown that, at least for simple objects, it is possible to perform high power testing at a few select frequencies and then use the absorption measurements to predict the energy needed at other frequencies. Thus reducing the testing time and the number of DUT's that need to be tested.

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