Analysis of Reverberation Chamber’s Uniformity and Isotropy on Radiation Characteristics of Antenna

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ABSTRACT
In recent years, the electromagnetic compatibility (EMC) testing community is continually searching for more reliable, reproducible, and economical test techniques. Reverberation chamber (RC, also known as mode-stirred chamber) technique enjoys growing popularity as a complement or replacement to open area test site (OATS), (semi-) anechoic chambers (ACs), or transverse electromagnetic (TEM) cells for radiated interferences/susceptibility tests. A reverberation chamber is basically a metallic cavity containing several metallic stirrers. To excite a high intensity field in the cavity, we change the boundary conditions by continuously rotating metallic stirrers to break up the electromagnetic field distribution in specific space and generate enough numbers of effective resonance modes to produce a uniform and isotropic electromagnetic environment. The purpose of RC is to achieve statistically uniform, isotropic, and randomly polarized electromagnetic test environment inside the testing volume. When electronic devices under test have complex radiation patterns, RC tests are expected to produce more accurate and rigorous measurement results than the traditional OATS or (semi-) AC testing methods. In this thesis, we will first check the dimensions of useful test volume. We then use the transmitting/receiving antennas with known characteristics to investigate the effect of randomly polarized electromagnetic test environment on radiation characteristics of antennas inside the testing volume and the uniformity and isotropy of the test zone. A comparison between numerical simulation results and experimental measurements were analyzed and discussed.

Keywords: Reverberation Chamber; Radiated Interference/Susceptibility Tests; Isotropy; Field Uniformity

Table of Contents

第一章 緒論
1.1 研究動機
1.2 研究方法
1.3 論文大綱
第二章 電波迴響室介紹
2.1 何謂電波迴響室
2.2 電波迴響室基本理論
2.3 電波迴響室相關特性參數
2.4 電波迴響室與電波暗室之比較
2.5 模態調諧(mode-tuning)之迴響室校正方法介紹
2.6 電波迴響室的優點與應用
第三章 電波迴響室電磁數值模擬與分析
3.1 電磁數值模擬與參數設定
3.2 測試用之對數週期天線模擬分析
3.3 數值模擬結果與分析
第四章 電波迴響室之實際量測與分析
4.1 電波迴響室基本配置
4.2 實際量測結果與分析
4.3 量測與模擬結果之比較
第五章 結論

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