Ray Analysis of EMC Fully Anechoic Chamber

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ABSTRACT

As a consequence of the continuing growth of high speed electronic systems and high frequency communications equipment in the marketplace and the associated problems of electromagnetic compatibility (EMC), recent national and international regulatory acts have been aggressively established. For many years there has been the promise of full EMC conformance testing in small anechoic chambers. For most laboratories, such chambers are mainly used for pre-compliance testing. The main problem in the past with the use of indoor rooms was the effectiveness of RF absorbing material. Due to the compact enclosure of $7m \times 3m \times 3m$ fully anechoic chamber, the ferrite-tiles have frequently been implemented to dominate reflected field absorption by testing laboratory. However, the compact range of distances between side-walls and also top-bottom planes make reflected field contributions significant to the test-zone, and thus usually leads to the failure in compliance with EN-61000-4-3 requirement for field uniformity. This thesis employed the empirical method and utilized the first-approach ray-tracing technique to improve the performance by compensating the field uniformity to excellently meet the regulation requirement with minimum additional absorber and triangular ferrite-pillars.

Keywords : electromagnetic interference ; electromagnetic capability (EMC) ; Fully Anechoic Chamber (FAC) ; first-approach ray-tracing ; absorber ; triangular ferrite-pillars

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