Ground effect analysis of open field test site for EMI

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ABSTRACT

The thesis is dedicated to the analysis of electromagnetic effects caused by the metal grounding of open area test site (OATS) for EMI measurement. Due to the strong relationship between the normal site attenuation (NSA) performance versus electromagnetic reflection and diffraction effects introduced by the dimension and discontinuous edges of metal ground, therefore the thesis is focused on the investigation of ground plane configuration effect and the comparison of numerical analysis and experimental measurements. To analyze the influences of ground plane dimension and its edge diffraction on the NSA, and therefore the compensation techniques (such as extending metal plane at some locations, adding metal meshes on edges with slant angles), we utilized the numerical methods FDTD and GTD to establish the diffraction models for 30- 200 MHz and 200-1000 MHz frequency ranges respectively. With the investigation of numerical model for OATS with finite ground plane and verification by the measured data, we can further improve the NSA performance to meet the stringent requirement of international standards and regulations for the EMI open area test sites.

Keywords : Electromagnetic Interference (EMI) ; Open Area Test Site (OATS) ; Edge Diffraction ; Normalized Site Attenuation (NSA) ; Finite-Difference Time- Domain (FDTD) ; High Frequency Technique

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