Abstracts

Numerical simulation using ADI-FDTD method to estimate shielding effectiveness of thin conductive enclosures

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Numerical simulations were run using the alternating-direction implicit-finite-difference time-domain (ADI-FDTD) method to calculate the shielding effectiveness of various enclosures. The enclosures were composed of very thin conductive sheets, which are generally fabricated using conductive paints or electroless plating techniques on plastic surfaces. In this case, very fine cells must be used for finite-difference time-domain (FDTD) modeling. In the conventional FDTD method, fine cells reduce the time-step size because of the Courant-Friedrich-Levy (CFL) stability condition, which results in an increase in computational effort, such as the central processing unit (CPU) time. In the ADT-FDTD method, on the other hand, a larger time-step size than allowed by the CFL stability condition limitation can be set because the algorithm of this method is unconditionally stable. Consequently, an increase in computational efforts caused by fine cells can be prevented. The results from the ADI-FDTD method were compared with results from the conventional FDTD method, analytical solutions, and experimental data. These results clearly agree quite well, and the required CPU time for the ADI-FDTD method can be much shorter than that for the FDTD method.

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