Graz University of Technology
Institute of Electronics

Bachelors/Master thesis

Thin sheet absorber material Investigation

Motivation

Electromagnetic (EM) wave absorbers are widely used to prevent electromagnetic wave interference between electronic devices and equipment. They can be easily cut into any shape, are freely spaced, and provide effective Electromagnetic Interference (EMI) suppression over a wide range of frequencies. Thin and flexible absorbing materials usually include soft rubber and flexible metal or ferrite sheet with higher permittivity and permeability. Thin sheet EMC suppression material is often manufactured in multiple layers. These artificial materials are made by mixing magnetic metal flakes into plastic sheets. This leads to anisotropic behavior in the electromagnetic properties of the material.

Research topic

Isotropic materials such as plastic, water and air behave exactly the same regardless of the direction of the wave propagation axis, because their permittivity and permeability are the same in all directions. In contrast, in anisotropic materials, such as wood have different electromagnetic properties in different directions. Previously proposed methods for determining permittivity and permeability mostly use the transmission line method to extract the parameters of a magnetolectric material. For thin anisotropic material, since the electric field in the direction of wave propagation (here assumed to be the z-direction) is too small, the transmission line methods can only extract the transverse permittivity components. For thin sheet materials, ε_z can't be easily extracted using conventional waveguide structure methods.

Your Profile

You are eager to learn. Prior knowledge and experience in the field of Electromagnetics or materials is highly appreciated. You will learn about intrinsic characteristic of absorber materials and different method to characterize complex materials. You will learn how to use full wave simulation to reproduce, verify or falsify measurement data.

Organizational matters

- Start: as soon as possible
- Workplace: at the institute

Contact/Supervision

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