ABSTRACT

Information on the characteristic properties of dielectric materials is one of the important things to design absorbers that can be used like clothing or attached to the body (wearable). Data from this experiment can be used as a reference for the use of dielectric properties such as channel impedance and reflection values. Then the dielectric material can be further investigated and can be used to determine which material is better for the use of antenna, reflector, or absorber. Dielectric material has electromagnetic properties such as relative permittivity, relative permeability, and conductivity. Permitivity is a value of the dielectric constant of a material indicating the ability to store or reflect electromagnetic waves.

In this final project, an experimental measurement of dielectric material will be carried out, especially on relative permittivity using the cavity reflection / transmission perturbation method. The method is predicted to have a high level of accuracy compared with the reflection/transmission method. Measurements were carried out by the method using the 2-3 GHz frequency range. The measurement results are carried out with simulations using 3D software and measurement directly using Vector Network Analyzer.

In this final project, is obtained relative permittivity measurement results data using 3D simulation software and direct measurement using VNA for Epoxy FR4 and Duroid RT5880 materials. The relative permitivity of the simulation results using 3D simulation software for Epoxy FR4 material is 4.85 and Duroid RT5880 is 2.66. Then the relative permittivity of the measurement results using VNA for Epoxy FR4 material is 5.08 and Duroid RT5880 is 2.75. And the relative permittivity of the measurement of textile materials using VNA obtained the permittivity value of the drill, flannel, and jeans material respectively are 8.22; 5,49; and 3.01 in the 2-3 GHz frequency range.

Key Word: Rectangular Waveguide, Vector Network Analizer (VNA), Cavity Perturbation, Reflection/Transmission.

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