

ABSTRACT

Communication performance can't be separated from the use of antennas as the sender and receiver of media, one of antenna that works in the microwave. In the design and manufacture of antennas, one important aspect is that the reference value of the relative permittivity. Permittivity of the dielectric constant is a value that describes a material's ability to store and reflect electromagnetic energy. Generally, the relative permittivity value specified in the form of a complex number consisting of two parts, real and imaginary. In reality, many thesis about the antenna's operating frequency values obtained deviating from the true value and the value of the simulation results due to inaccuracy of the relative permittivity value with the selection of frequencies used in the design of the antenna.

In this final measured value relative permittivity of the substrate Printed Circuit Board (PCB) at microwave frequencies. PCB were used there are two types, PCB substrate pertinak (FR2) and epoxy PCB substrate (FR4). Measurement was done by using a method of Transmission/Reflection at Dielectric Rectangular techniques Waveguide (RDWG) using measurement tools that Vector Network Analyzer (VNA), then calculated with the equation of the transmission coefficient and reflection coefficient.

Based on measurements using a Vector Network Analyzer (VNA), the value of the relative permittivity substrate epoxy PCB substrate (FR4) in the frequency range 3-8 GHz and 0.16 cm substrate thickness for single layer and double layer are respectively 3.8481 and 3.8552 and the average value relative permittivity at a frequency of 3-8 GHz is 4.5396 - 4.5393. While the value of the relative permittivity of PCB substrate pertinak (FR2) in the frequency range and the same thickness, respectively, 3.8438 and 3.8515 with an average value of the relative permittivity at a frequency of 3-8 GHz is 4.5351 - 4.5398.

Keywords: *Relative permittivity, PCB Substrate, Transmission/Reflection, Dielectric Rectangular Waveguide (RDWG), Vector Network Analyzer (VNA)*