



UNIVERSITI TEKNOLOGI MARA

**FINAL REPORT :
HIGH LOSS FLAT ABSORBER**

**NURHANIS BINTI SHUAILI
NUR HASMIZA BINTI ADNAN**

**FACULTY OF ELECTRICAL ENGINEERING
UNIVERSITI TEKNOLOGI MARA
PULAU PINANG**

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ABSTRACT

Microwave absorber is used widely in anechoic chamber room for antenna measurements, emulating the free space. It is also used to suppress unwanted radiation in consumer electronics products (so that they are present in accordance with the existing rules) and other applications. Their characterization is usually indicates the amount of damping in certain frequency ranges, and it depends on the materials used in the mixture.

Besides, there are many usages of microwave signal to human daily life such as mobile phones, television, radio and a lot more. Too much exposure to microwave radiation can also affect the human health. So, the idea of making the flat absorber is to overcome the problem and decrease the potential for human to be affected by the radiation. Flat absorber is designed using green biomass materials such as carbon. It is produced from carbon combustion process. The main objective of this project is to design a flat absorber using biomaterials to analyze green and reflection measurements of biomass. Frequency range used to measure the reflectance is 8GHz to 12GHz, which is located on the X-band. Absorber pattern 02 was designed and simulated using CST microwave studio simulation. Calculated parameters were optimized using computer software Simulation Technology (CST).

Experiments conducted to determine the performance of the green reflection absorber biomass. The prototype was designed to measure the NRL arch consisting of transmitter and receiver antenna and the output was measured using a Vector Network Analyzer (VNA). Therefore, the results so far have shown that carbon is an appropriate source that has great potential to be used as the material for making microwave flat absorbers with return loss less than -20 dB.

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CHAPTER 1 INTRODUCTION

1.1 Background of Study

The microwave stands from two words. Micro means extremely small and wave means a periodic disturbance of a particle of a substance which may be propagated without net movement of the particles, as in the passage of undulating motion or sound. Combining these two words, will result the “microwave” that given meaning of an electromagnetic wave. The electromagnetic wave is daily use in our daily life from watch television, sent text message and so on [1].

Nowadays, electromagnetic wave radiation is increased resulting from rapid growth in electromagnetic wave application reaching into the radio frequency (RF) spectrum [2]. Thus, radar absorbing materials (RAM) is one of suitable solution to reduce the radiated electromagnetic wave. Furthermore, most of the devices around us were electronic implementation, from the simple device to the complex one. While designing the new electronic devices, the designer always relies on the specifications and requirements to produce a new product. One of the requirements is the customer safety.

Once the device is an electronic implementation, the device could be having attenuation on frequencies. So, before the device was marketed, it has to undergo many tests in the laboratory. One of the purposes of the test is to determine the reliability of the product when the product was in various frequencies area. Some of product might be failed when through this area. The laboratory that used to test the product is the anechoic chamber. Every electronic device manufacturer should have the anechoic chamber. The usage of anechoic chamber is not just to check the reliability of a device or product, but it can determine the noise the coming from the engine as well as for automotive.