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**TUNEABLE SPIRAL SHAPE
MULTILAYER MICROWAVE
ABSORBER**

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ABSTRACT

Microwave absorber is a material that attenuates energy in the electromagnetic wave. To cover a wideband of frequencies, a thick microwave absorber is needed. In this project, the effect of spiral shape on the microwave has been studied. A spiral shape which act as absorbent layer on the microwave absorber can give good absorption performance. The absorbent layer is made up from mixture of carbon black and paint. The absorption performance of the microwave absorber was measured using free space arch reflectivity method in the range between 8 GHz to 12 GHz. From the result, it can be said spiral shape of microwave absorber can enhance the absorption performance. Absorber with loop non painted shows the best absorption performance with its maximum absorption is -3.6 dB. The smaller size of loop gives the best absorption performance with average absorption of -3.4 dB.

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CHAPTER 1

INTRODUCTION

1.1 OVERVIEW OF STUDY

Absorbers are materials that attenuate the energy in an electromagnetic wave. It change the electromagnetic energy into heat energy[1]. It has always been a subject of interest in the military and nonmilitary sector[2]. Absorbers are used in a wide range of applications to eliminate stray or unwanted radiation that could interfere with a system's operation. Absorbers are used externally to reduce the reflection from or transmission to particular objects. They can also be used to recreate a free space environment by eliminating reflections in an anechoic chamber. Absorbers can take many different physical forms including flexible elastomers or foam or rigid epoxy or plastics. Absorbers are characterized by their electric permittivity and magnetic permeability. The permittivity is a measure of the material's effect on the electric field in the electromagnetic wave and the permeability is a measure of the material's effect on the magnetic component of the wave. The common shape of absorber is pyramidal shape which is used in the anechoic chamber. Pyramidal absorber attenuates signal by two effects which are scattering and absorption. Scattering can occur both coherently when reflected waves are in phase but directed away from the receiver or incoherently where waves are picked up by the receiver but are out of phase and thus have lower signal strength. One of the concepts used in absorber is the Jaumann layer. It is a resonant absorber which uses wave interfering to cancel the reflected wave. Carbon has a capability to absorb microwave signal. It is a very important feature in producing microwave absorber that can have good reflectivity. Carbon has been used since decades ago in radar absorbing material. Function of the carbon is to change the microwave energy into heat energy. Carbon also known as a semiconductor which it