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ELECTROMAGNETIC CHARACTERIZATION OF PYRAMIDAL KENAF MICROWAVE ABSORBER

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AUTHOR'S DECLARATION

I acknowledge that the research in this thesis was completed in compliance with the Universiti Teknologi MARA standards. It is genuine and is the result of my own research, unless otherwise specified or recognized as referenced work.

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ABSTRACT

Microwave absorber is designed to absorb radiation and reduce it. The anechoic chamber RF is surrounded by absorbers which would eliminate unnecessary signals of reflection. The objective of this paper is to investigate new materials and techniques for the absorption performance of electromagnetic waves in order to develop differentiate the characteristic pyramidal microwave absorbers with commercial absorber using kenaf with a certain size. There are two designs introduced which are solid and hollow pyramidal microwave absorbers. For solid pyramidal consist of 10.2 cm long X 10.2 cm wide with base height of 5.7 cm and 10.2 cm long X 10.2 cm wide with pyramid height of 25.4 cm. The absorber's fabrication cannot be continued because of the pandemic problem. Therefore, the design process is carried out using the CST software program in the frequency spectrum from 1 to 12GHz for 16 simulation with different properties which are consider with 3 different height, 3 different value of dielectric constant and 2 different value of Zpos for both of solid and hollow pyramid. Kenaf is an advancement in improving the design of the anechoic chamber pyramidal microwave radio frequency absorber (RF). The pyramidal microwave absorber is designed to use the kenaf, as this advanced research mixture will be investigated to determine the best pyramidal microwave absorber reflectivity or reflection loss efficiency. Carbon was the most critical element which really helped the absorber absorb completely unacceptable microwave signals. A mixed material is designed to evaluate the performance of reflective loss in the frequency range from 1GHz to 12GHz of microwave absorber. Overall , based on all measurements, the best minimum absorption output design is -30 dB and below which the solid pyramid design means just -20 dB for absorption efficiency compared with the hollow achievement. This project's design would concentrate on improving the absorption performance and whether it can replace the industrial-based commercial absorber.

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TABLE OF CONTENTS