**Indonesian Journal of Electrical Engineering and Computer Science**
Vol. 13, No. 2, February 2019, pp. 737~743
ISSN: 2502-4752, DOI: 10.11591/ijeecs.v13.i2.pp737-743


# Single-layer performance of sugarcane bagasse-and rubber tire dust microwave absorber in narrow band frequency of 3.85 GHz to 8.2 GHz

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**Article Info**

***Article history:***

Received Nov 14, 2018
Revised Dec 15, 2018
Accepted Dec 29, 2018

***Keywords:***

Absorption
Dielectric Properties
Microwave Absorber
Reflectivity

**ABSTRACT**

In this paper, the single and flat layer of microwave absorber has been fabricated with different weight percentage of sugarcane bagasse (SCB) and rubber tire dust (RTD). The dielectric properties and wave propagation have been investigated in this work. There are two different designs in developing this layer of microwave absorber. In this work, the targeted frequency is within 3.85 GHz to 8.2 GHz. The preference was based on the fact that our goal was to achieve minimum backward reflections, and the sugarcane bagasse material, with its low dielectric constant, high loss factor, large attenuation per unit length, and ease of fabrication, provided a better opportunity to achieve that goal which is better than -10dB (90 % of absorption).



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## 1. INTRODUCTION

The requirement of the electromagnetic compatibility (EMC) applications such as microwave absorbing material in the range of frequencies from kilohertz (kHz) to gigahertz (GHz) of microwave signals have incredibly extended the applications in GHz range for mobile phone, local area network, radar system and others [1, 2]. Absorbers in the RF/microwave realm are materials that attenuate the energy in an electromagnetic wave. The electromagnetic interference is the degradation in the performance of a device, or equipment, or a system caused by an electromagnetic disturbance. The electromagnetic disturbance can be in the nature of an electromagnetic noise, or an unwanted signal, or a change in the propagation medium itself [3]. The effects of EMI include the malfunction, or even the permanent damage to the electronic devices which can lead to the failure [4-10].Absorbers are used in a wide range of applications to eliminate stray or unwanted radiations that could interfere with a system's operation. Absorbers can be used externally to reduce the reflection and transmission to particular objects and can also be used internally to reduce oscillations caused by cavity resonance [11]. They can also be used to recreate a free space environment by eliminating reflections in an anechoic chamber. A single layer of lossy rice husk (RH) or scrap rubber (SR) with any of the adhesives (Glue or UPR) is efficient in suppressing EM echoes only at multiple discrete frequencies in multiple bands. However, this single layer design is impractical to solve the broadband EMC problems. Many of the communication devices uses the L, S and C frequency bands, hence a lot of EMI noises can be expected in the shared frequency spectrum of 1 to 10 GHz. That's why the need of a single