

## DUAL BAND FREQUENCY SELECTIVE SURFACE FOR STABLE ELECTROMAGNETIC ISOLATION IN MODERN COMPUTING AND COMMUNICATION PLATFORMS

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### ABSTRACT

The paper describes a dual band frequency selective surface that is capable of providing electromagnetic shielding in the ranges of 4.92 to 9.14 GHz and 11.70 to 12.79 GHz. The mentioned bands cover some of the most common frequencies such as C, X, and the lower Ku bands that are exceptionally used in radar, satellite, and high-frequency communication systems. The stopband behavior of the surface is very pronounced with the stable transmission response and the strong attenuation in both bands. It is a compact geometry that allows the surface to be easily integrated into the computing platforms and embedded systems that are operating in complex electromagnetic environments. The design enhances isolation for the devices that are placed next to the radar sensors, satellite modules, and wireless units. The structure offers a simple and efficient means of selective electromagnetic protection for the modern communication and computing applications.

**Keyword:** *frequency selective surface, wideband suppression, electromagnetic shielding, wideband suppression, computing and communication systems.*

### 1. INTRODUCTION

The emergence of contemporary computing and communication technologies has greatly increased the necessity for good electromagnetic (EM) isolation to ensure the proper functioning of devices and to reduce interference [1]. Conventional shielding approaches like metal covers and absorbing materials usually offer no selectivity and often interfere with the transmission of signals that are needed thus causing loss of performance in sophisticated systems [2]. Frequency selective surfaces (FSSs) have landed as the most beneficial alternative providing complete blocking or transmitting of certain frequency bands without compromising on volume, cost and integration simplicity [3]. In particular dual band FSSs are conceived for providing steady and high quality EM isolation covering two different frequency ranges, which is suitable for multi band wireless and computing applications [4]. To achieve this these structures usually resort to the use of periodic arrays of resonators that have the said properties of being polarization insensitive and stable to angles of incidence which truly are the main aspects for a strong performance in changing operational conditions [5]. Recently, researchers have come up with very tiny, single and multilayer FSS designs that not only provide better selectivity but also are tunable and able to be made on flexible substrates thus their use in next generation communication and computing systems is also assured [6]. The real world applicability of dual band FSSs for reliable electromagnetic isolation is underlined by the excellent agreement between the results of simulations and measurements which has been consistently verified by experimental validations [7]. In their research Chatterjee et al. [8] created a layer of FSS that not only provides wideband shielding but also exhibits clear out-of-band isolation