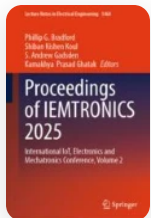


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Substrate-Integrated Waveguide (SIW) Antenna with Cavity-Backed Configuration and Integrated Connected C-Slot for Satellite Communication Applications

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Abstract

The research work explores the electromagnetic properties of a cavity-backed substrate-integrated waveguide (SIW) antenna, with emphasis on its frequency band features and performance metrics. The research presents a detailed investigation of the antenna design, fabrication process, and working principles. To make it more functional in its satellite communication application, a U-shaped slot is intentionally embedded in the structure of the antenna. This extension is an important factor in maximizing the antenna's performance in the specified satellite frequency range. In addition, the antenna also has a measured gain of 3.12 dBi, which proves that it can radiate efficiently within the desired frequency band. It is precisely tuned to resonate at a frequency of 8.6 GHz, which is within the operational band needed for applications in satellite communication. The study also examines the effects of these design options on overall system efficiency, radiation pattern stability, and impedance matching, offering a complete assessment of the antenna's applicability for real-world implementation in satellite-based communication systems.

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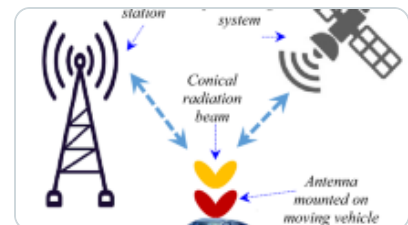
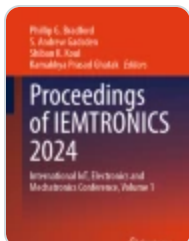
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