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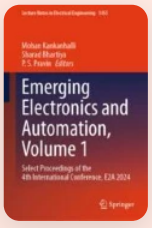

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Abstract

Today, the entire world is connected by invisible wires. So, the importance of wireless communication is increasing drastically in the field of vehicular communication. Along with modern communication technology, the world is shifting toward miniaturization of every model so that they become portable and require less power to operate. In view of this demand, a metamaterial-embedded low-profile stacked rectangular microstrip antenna system is proposed to guarantee system quality in the field of vehicular communication. The proposed antenna has an overall size of $\mathbf{30.2 \times 30 \times 9.6mm^3}$. The antenna provides maximum efficiency at 5.8GHz and operational bands of (5.8–5.9) GHz to cover the desired Dedicated Short-Range Communication service of vehicular communication applications. Moreover, this antenna aims to achieve high gain and high directivity due to the use of a Hexagonal split-ring resonator as a metamaterial lens on the top of the second substrate material. Here, FR4 is used for both the top and bottom substrates. Fundamental parameters of the proposed antenna are optimized through the Ansys HFSS^{TM} simulation software and then compared with the measured results. It is found that the antenna shows good agreement between simulated and measured results, which is suitable to use the antenna for the vehicular communication applications.

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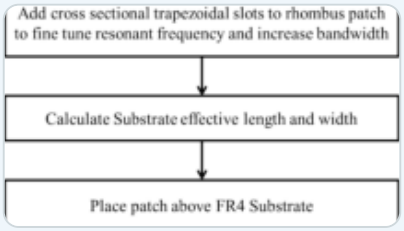

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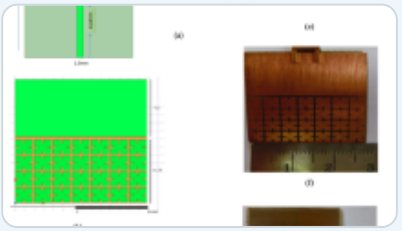

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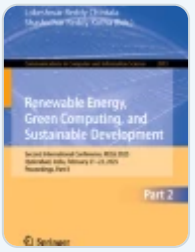

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