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DESIGN AND IMPLEMENTATION OF MODIFIED F-SLOT ELLIPTICAL PATCH ANTENNA FOR 5G APPLICATIONS

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ABSTRACT:

In this paper, design and analysis of Modified F-slot Elliptical patch antenna for 5G applications is presented. The antenna has a dimension of $40 \times 35.4 \times 2.7244 \text{ mm}^3$ and less space occupation suitable for 5G mobile application. The proposed antenna designed and simulated on FR-4 lossy substrate and capable of operating at different set of frequency regions. By designing a simple structure, we have achieved multiple bands. The proposed antenna has six resonant frequencies of 2.43GHz, 3.01GHz, 5.2GHz, 5.9GHz, 7.45GHz, 8.1GHz, with corresponding return loss of -11.4dB, -29dB, -19.86dB, -15.55dB, -25.9dB and -23.3dB. Radiation Efficiency of antenna is 47.86% with operating frequency of 5GHz to 10GHz. The antenna simulation is carried out using CST microwave studio version 2019.

Keywords: Modified F-slot elliptical patch antenna, 5G applications, CST software.

I. INTRODUCTION:

Multiband antenna is an antenna which is designed to operate in multiple bands of frequencies it use design in which one part of antenna is active for one band while another part is active for different frequencies. Microstrip patch antenna have become an unavoidable choice for the present and future wireless communication system. Because of their lowprofile structure, compactness, robustness and easily fabrication in a Printed Circuit Board (PCB). Microstrip patch antenna used for communication systems because of their compact size, light weight, easy process of fabrication. Microstrip patch antenna is made of copper material or perfect electric conductor. Increasing substrate dielectric constant leads to lower size of antenna [13-14]. Multiband antennas are used for different applications like Global system for mobile communication (GSM), Wireless Local Area Network (WLAN) and World wide Interoperability for microwave access (Wi-max). The F-slot elliptical patch is designed to obtain multiple bands for 5G wireless applications. The design idea of the microstrip patch antenna is based on combination of F-slot and elliptical patch antenna. The design is simulated using CST software. The CST simulated result exposes that the proposed microstrip antennas are designed to guarantee the best performance results. In terms of resonant frequency bands and directional patterns as well as high gains, improvement impedance bandwidth, and total radiations efficiencies. The rest content of this work is orderly as follows. In section II, discuss the comparison of proposed model with some reference paper. Section III discuss about the Existing model, Section IV and V are discussing the design of proposed antenna and it simulated results. Future Scope and Conclusions are drawn in Section VI and VII.