MONOPOLE ANTENNA WITH ELECTROMAGNETIC BAND GAP (EBG) FOR WIRELESS LAN APPLICATION

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ABSTRACT

This paper provides a study on designing Monopole Antenna with and without Electromagnetic Band Gap (EBG) technique. The antennas were designed and simulated using the Computer Simulation Technology (CST) microwave studio. The substrate of the antenna was fabricated using a substrate of FR4 with dielectric constant and height of 4.30 and 1.6 mm respectively. The conventional monopole antenna is added with 3X3 array matrices squares which is size is 3 mm x 3 mm stands with electromagnetic band gap (EBG) structures. The results show that the monopole antenna with EBG structures has better performance. The constructions of electromagnetic band gap (EBG) structures contribute better basic parameter of the monopole antenna such as return loss, bandwidth and size reducing. The minimum specification of return loss from simulated result is -10dB cutoff.

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CHAPTER 1

INTRODUCTION

1.1 INRODUCTION

The method of electromagnetic band gap (EBG) was found in late 1980's and became one of the most advancing sectors in the electromagnetic arena. This method allows manipulating the propagation of electromagnetic waves to next stage that cannot be achieved before. Besides, it promises the other way to overcome the limitation of current technology of electromagnetic and it is estimated that many new structures will be evolved based on this electromagnetic band gap concept [1, 2].

Monopole antenna has been discovered by Oliver Lodge on 1898 [3]. It was the apparently the first in the history of radio engineering. This antenna was used for a long time in all transceiver. However, recently this antenna is no longer acting outside of the body of receiving and transmitting [4]. A monopole antenna is actually a radio antenna which is one half of a dipole antenna and it is combined with right angle ground plane with considerable length in place of its another half. In other word, a dipole antenna has two halves, but the monopole antenna used one of the halves as electrically conductive surfaces known as ground plane. The ground plane act like the other halve of a dipole antenna as shown in figure 1 below [3, 4].