

## **A NEW APPROACH OF BROADBAND ANTENNA USING METAMATERIAL**

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## ABSTRACT

This research has proposed a new generation of antenna that applies metamaterial as a based substrate to enhance the performance of the device and reduce the size of the circuit area. The current bulky size of conventional antenna on single layer can be easily replaced by the invented metamaterial from this research.

An omega structure was chosen from two combination materials; Flame Retardant 4 and Perfect Electric Conductor were used to produce the material that has negative permittivity. An investigation into the S-parameters has been carried out to prove the negative permittivity produced by the metamaterial.

This research is focusing on the simulation of the metamaterial antenna in order to enhance the bandwidth of the device and come out with a compact antenna. Another investigation is to use the metamaterial as a cover or reflector to the conventional transceiver device. The results from the investigation show that the metamaterial able to improve the bandwidth and directivity of the conventional antenna.

Results from the investigation show that the return loss of the metamaterial antenna and the conventional antenna that applied the new material as cover provide better responses in term of bandwidth, amplitude of the loss and directivity compared to the conventional antenna. The obvious feature is the size reduction of the device which can be reduced more than 50% of the conventional design. The antennas lead to the enhancement of the technology, hence provide an a sophisticated technology to the consumers by the advantages such as smaller in size, cheaper in cost and better in performance.

## **PENGHARGAAN**

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