

**UNIVERSITI TEKNOLOGI MARA**

**INVESTIGATION INTO THE EFFECT OF PARASITIC  
ELEMENT FOR UWB ANTENNA USED IN MEDICAL IMAGING  
AND WIRELESS APPLICATION**

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## DECLARATION

It is declared that all the materials in this report are the results of my own work and all materials which are not the result of my own work have been clearly acknowledged in this report.

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## ABSTRACT

Antenna radiator is an important element to determine the resonant bandwidth and directivity that is suitable for many applications. In medical imaging, UWB antenna have been proposed, but never with the application of magnetic resonator that is achievable through insertion of ground slot. The project will investigate its feasibility for medical imaging application that required UWB resonant and high directivity antenna, and finally propose the design to antenna community worldwide.

In imaging, diagnosis, and treatment of medical application, Ultra Wide-Band (UWB) microstrip antenna is well-known due to its fine resolution and high power efficiency advantages on most applications. This project describes the design of (UWB) antenna embedded with ground slot resonator for used in microwave imaging system in medical application. The range of bandwidth it covers is about 850 MHz up to 10 GHz at 6 dB return loss hence this proposed antenna covers applications such as licensed UWB frequency for several medical imaging applications and can also access other applications such as WiMAX, WLAN, Military, Location Tracking application, IEEE 802.11a, IEEE 802.11b/g, AMPS, GSM, GPS, DCS, PCS and UMTS. The radiation pattern of the antenna is nearly omnidirectional at all frequencies and the simulated far field gain varies from 1 to 8 dBi.

Its initial design is a microstrip-fed planar monopole antenna of quarter-elliptical shape designed on the FR-4 substrate of  $60 \times 120$  mm. It is complemented by ground plane with dimension of  $60 \times 90$  mm. In order to cover wide bandwidth, the antenna design is modified by adding a micro strip stub at the front and a parasitic element at the back of the antenna. By using CST software, the proposed antenna is designed and modified.

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