

DUAL BAND APERTURE COUPLED MICROSTRIP  
PATCH ANTENNA USING DIFFERENT APERTURE SHAPE  
FOR WIRELESS LAN APPLICATION

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*To my beloved family for their encouragement and support and to all my friends*

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## ABSTRACT

A wireless Local Area Network (WLAN) application nowadays has become more popular. Since it allows users to access network services without being tethered to a wired infrastructure. Point to point and point to multipoint communication brings a crucial responsibility to antennas since they are expected to provide the wireless transmission between those devices. In high performance point to point and point to multipoint application where size, weight, cost, performance, ease of installation are constraints, low profile antenna is very much required. To meet these requirements, microstrip antenna preferred. Microstrip antenna is currently one of the fastest growing segments in the telecommunications industry and promise to become the preferred medium of telecommunications in the future. Although microstrip antenna has several advantages, it also has several disadvantages such as low gain and narrow bandwidth. These disadvantages can however be overcome by constructing many patch antennas in array configuration. With the modern increase in the use of microwave frequencies in communication and radar applications, certain antenna performance requirements are needed and should be an integral part of the design process. For example, GPS (Global Positioning System), WLAN (Wireless Local area network) are all applications that share a common requirement in their antennas. They all require an antenna that is small in size and volume, low in cost and weight, easy to design, and can perform efficiently at two distinct frequencies that may be separated far apart. Two Dual band aperture coupled microstrip antennas using elliptical and triangular aperture shape operating at 2.45 GHz and 5.8 GHz was designed, fabricated and tested. These designs were simulated with Computer Simulation Technology and tested with Hand Held Spectrum Analyzer. Both, simulated and measured data were compared and contrasted.

## ABSTRAK

Aplikasi Rangkaian Kawasan Tempatan tanpa wayar (WLAN) telah menjadi popular pada hari ini. Ia membenarkan pengguna mengakses perkhidmatan-perkhidmatan rangkaian tanpa bergantung kepada infrastruktur berwayar. Titik ke titik dan komunikasi banyak titik memerlukan tanggungjawab penting daripada antena di mana ia diharapkan dapat membekalkan penghantaran tanpa wayar antara alat-alat berkenaan. Dalam aplikasi titik ke titik dan titik ke banyak titik di mana saiz, berat, kos, prestasi, kemudahan untuk pemasangan amat dititikberatkan, antena rendah profil amat diperlukan. Untuk memenuhi kelayakan tersebut, antena mikrostrip menjadi pilihan. Antena mikrostrip pada masa ini segmen yang paling pantas berkembang dalam industri telekomunikasi dan menjanjikan medium pilihan telekomunikasi pada masa hadapan. Walaupun antena mikrostrip memiliki beberapa kelebihan, ia juga memiliki beberapa kelemahan seperti gandaan rendah dan lebarjalur sempit. Kelemahan-kelemahan tersebut bagaimanapun boleh diatasi dengan membina konfigurasi antena-antena tampal secara tersusun. Dengan peningkatan penggunaan moden dalam aplikasi radar dan komunikasi frekuensi-frekuensi jalur mikro, kelayakan keupayaan antena tertentu diperlukan dan menjadi bahagian penting dalam proses rekabentuk. Contohnya, GPS (Sistem Kedudukan Global), WLAN (Rangkaian Kawasan Tempatan Tanpa Wayar) adalah aplikasi-aplikasi yang berkongsi kelayakan sama dalam antena. Semuanya memerlukan antena yang kecil dari segi saiz dan isipadu, rendah dari segi kos dan berat, senang direkabentuk, dan boleh berfungsi secara berkesan pada dua frekuensi berlainan yang jauh terpisah. Dua antena mikrostrip tergabung secara aperture dengan dua jalur menggunakan bentuk elips dan segitiga aperture beroperasi pada 2.45 GHz dan 5,8 GHz direkabentuk, difabrikasi dan diuji. Rekabentuk-rekabentuk tersebut disimulasi menggunakan Computer Simulation Technology dan diuji dengan Penganalisis Spektrum. Kedua-dua data simulasi dan pengukuran dibanding dan bertentangan.