

## **Project Title: (Microstrip antennas for WI-Max communication)**

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WiMAX technologies have emerged as a solution for low cost solutions for high-performance, long distance connectivity increase. WiMAX is a standards-based technology that delivers last mile broadband wireless access as an alternative for cable and DSL. WiMax can work at different microwave frequencies licensed (700 MHz, 2.5, 3.5 and 3.65 GHz) and license-free (2.4 and 5 GHz). At a fraction of the cost, WiMAX can provide up to 75Mbps over long distances – eliminating the difficulties often associated with running wires to both rural areas as well as dense metropolitan areas. As a result, service provider/telecommunications customers are able to deploy and extend wireless networks to connect offices, hospitals, schools, or entire towns and cities. WiMAX technology is the ideal cost-effective alternative for:

- Last mile connectivity to rural areas
- Extending high-speed connectivity to buildings in dense metropolitan areas
- Fixed or mobile connectivity for public safety networks and first responders
- High-performance backhaul for data, voice and video applications

Low profile antennas with small cost, ease of installation are required for many modern applications. To meet such requirements, microstrip antennas have been widely used. These antennas are simple and non expensive in manufacturing, low profile, and suitable to be connected to planar or non planar surfaces.

Thanks to these advantages, many modern applications such as GPS, satellite communications, and mobile communications are using microstrip antennas.

The project presents the design, realize, and measurement of microstrip patch antenna for WIMAX. The project is scheduled to the following stages:

- 1- Theoretical analysis of planar microstrip antennas.
- 2- Understanding of the different microwave transmission lines and matching techniques.
- 3- Design of a rectangular patch microstrip antenna by the aid of the computer aided design software (Both of circuit simulator and electromagnetic full wave simulations).
- 4- Practical realization of the antenna in microstrip technology.
- 5- Experimental measurements of the antenna radiation properties.

اسم المشروع: تصميم هوائى باستخدام تقنية الدوائر الشريطية لأنظمة الاتصالات اللاسلكية  
(WIMAX)

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يقدم المشروع تصميم وتحليل هوائى يعمل لأنظمة الاتصالات اللاسلكية (WIMAX).  
الهوائى يتم تصميمه بواسطة الدوائر الشريطية عند ترددات أنظمة الاتصالات اللاسلكية (WIMAX)  
(Licensed (700 MHz, 2.5, 3.5 and 3.65 GHz) and license-free (2.4 and 5 GHz) WiMAX)

خلال المشروع سوف يقوم الطلبة بالآتى:

- دراسة نظرية للهوائيات و بالتفصيل هوائى الدوائر الشريطية.
- فهم الأنواع المختلفة لانواع خطوط النقل العاملة فى الحيز الترددى ميكروويف وكذا أساليب الموائمة المختلفة.
- دراسة مصفوفات التثتيت لتحليل دوائر الميكروويف متعددة المخارج.
- تصميم هوائى دوائر شريطية يعمل عند ترددات أنظمة الاتصالات اللاسلكية (WIMAX) باستخدام باقات تحليل الموجات الكهرومغناطسية من خلال اسلوبين مختلفين.
- التنفيذ العملى للدوائر المصممة
- قياس معاملات أداء الهوائى المصمم.