

**Nom et Prénom : EL HABCHI MOURAD**

**Date de soutenance : 25/12/2020**

**Directeur de Thèse : R. TOUAHNI**

***Sujet de Thèse :***

**Metamaterial Inspired Antennas for wireless and mobile Technologies**

***Abstract :***

The demand for integration of many operations and miniaturization of device sizes in telecommunication equipment is great more attention in recent years, especially devices that are widely required and used in life such as smart phones, mobile communication systems, GPS receivers, handheld tablets, wireless Internet devices, radars etc. To satisfy this requirement, compact size, multifunction, multifrequency band functions must be added to the mobile device components. An antenna is an essential component of them, it should be capable to operate at multiple frequencies reduced in size and conformal to the body of the device. Nowadays, there are several methods applied in the antenna design and realization to satisfy of those demands. There are microstrip antenna technology miniaturized by means some deformation, as the fractal geometry, using shorting wall, high-permittivity dielectric substrate, shorting pins, and others. However, these techniques have many disadvantages such as low gain, narrow bandwidth, problem of interference with the existing systems and so on. A new solution to the designers that is of great interest is the use of electromagnetic metamaterials for antenna conception. The use of metamaterials in antenna can modify the antenna performance, such, gain improvement, bandwidth enhancement, generating multiband frequencies, antenna size miniaturization, avoid interference with the licenced bands using notched band techniques.