
**AIN SHAMS UNIVERSITY**

**FACULTY OF ENGINEERING**

**Electronics and Communications Engineering Department**

# Multi-Giga Microstrip Wireless Transceiver Design

**A Thesis**

Submitted in partial fulfillment of the requirements of the degree of

Master of Science in Electrical Engineering

Submitted by

**Mohamed Aly Mahmoud Elkhouly**

B.Sc. of Electrical Engineering

(Electronics and Communications Engineering)

Ain Shams University, 2003

Supervised By

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Cairo, 2008

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# STATEMENT

This dissertation is submitted to Ain Shams University for the degree of Master of Science in Electrical Engineering (Electronics and Communications Engineering).

The work included in this thesis was carried out by the author at the Electronics and Communications Engineering Department, Faculty of Engineering, Ain Shams University, Cairo, Egypt.

No part of this thesis was submitted for a degree or a qualification at any other university or institution.

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# ABSTRACT

*Mohamed Aly Mahmoud Elkhuoly, Multi-Giga Microstrip Wireless Transceiver Design,Master of Science dissertation, Ain Shams University, 2008.*

This dissertation demonstrates the design of multi Giga wireless transceiver using microstrip technology. It begins by introduction in microwave active devices like; Metal Semiconductor Field Effect Transistor (MESFET) and High Electron Mobility Transistor (HEMT) then a survey on some basic microwave circuits concepts like different power definitions, stability and S parameter microwave amplifier design techniques.Next it presents the system analysis and design of the transceiver, from architecture selection to determination of the transceiver components specifications, so the system achieves the desired performance. It concentrates in our application which is 7 GHz microwave point to point link for digital radios and wireless network backhaul.The design of complete transmitter and receiver circuits is then presented; the designed blocks will be fabricated and measured. The dissertation shows a comparison between the simulation and measurement results of each block like Low Noise Amplifier (LNA), Gain Stage, down conversion Mixer, Up Conversion Mixer, Power Amplifier (PA).

**Key Words:** MESFET, HEMT, Microstrip, Microwave Point to Point, LNA, Mixer, Driver Amplifier, gain, Noise Figure, Linearity

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