

Chapter 1

Introduction

1.1 Motivation

There are increasing demands for highly efficient and linear microwave power amplifier as a key component in mobile and satellite communication system [1] , [2].

Also to accommodate the demand of the power control function for the system. This thesis illustrates the 15GHz linear RF power control system. The architecture is distinct from the circuit that RF attenuation and linearizer are separated. I control the gate DC voltage of the PHEMT amplifier to compensate the movement of bias point when large AC signal input the device. And utilize the different gate bias voltage to change the gain of device to achieve attenuation.



Normally, the dynamic range of the pin diode RF attenuation is only 20 dB in a microwave component. And the RF attenuation value is from 0dB to the negative gain. A variable gain amplifier is employed to achieve 40dB power control range. With adjusting the gate voltage, improvement of linear region of 10 dB have been achieved simultaneously for communication system.

1.2 Overview

The following chapters of the thesis will describe in review 、 simulation 、 fabrication and measurement. Chapter 2 the power control architecture and the

linearizer fundamental theory. Chapter 3 is dedicated to component design 、 simulation & fabrication (MMIC 、 balance amplifier 、 zig-zag coupler circuit). Chapter 4 the PA measurement result. Chapter 5 is the conclusion.

