Chapter 4

Measurement of the variable gain PA

4.1 Measurement setup

I use HP 83752B high power synthesized sweeper and add a driver amplifier. The Agilent 83752B sweeper provides superior accuracy and stability while maintaining the speed of an analog source. The power sweeps from –20dBm to 25dBm.

The Output power is measured by using HP-8563E spectrum analyzers. The 8563E combines outstanding phase noise, sensitivity, 1 Hz resolution bandwidth, synthesized tuning and wide dynamic range. The setting is shown in Figure 4.1.

For measurement, supply voltage of 6V is used and the gate bias voltage is adjusted 0.1 V step from –0.5V to –1.5V.

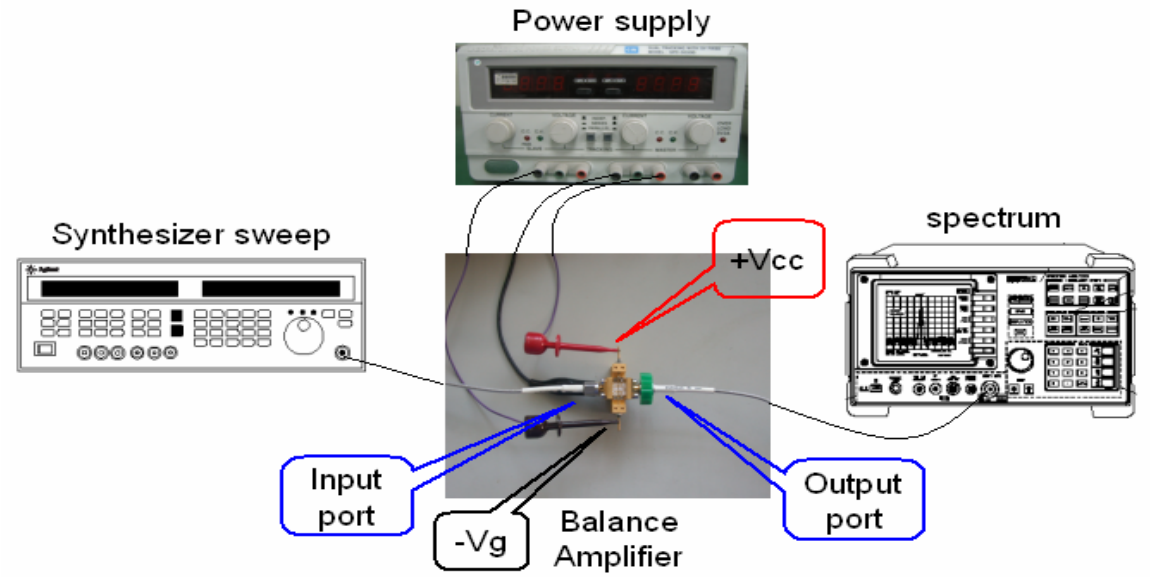

Figure 4.1 Testing setup

4.2 **Measurement result**

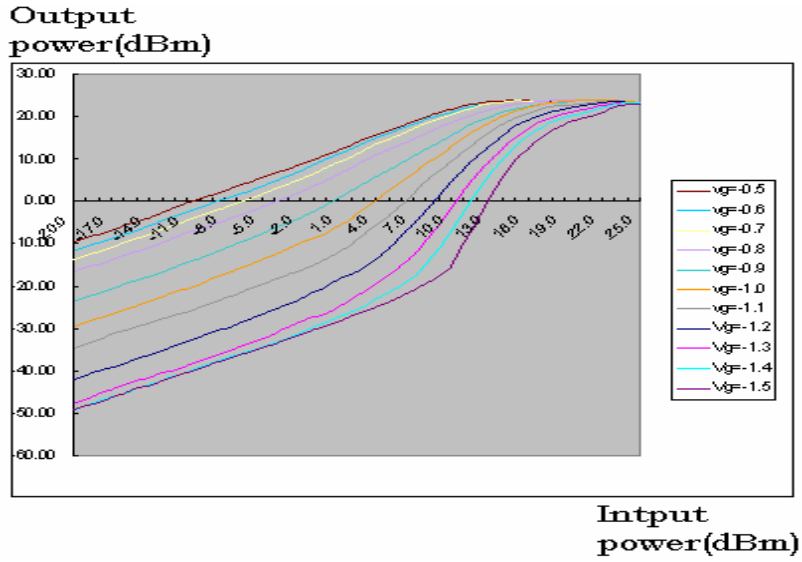

Figure 4.2 PA input power V.S. output power@gate Vg bias

The power curve is shown in figure 4.2. The X-coordinates is input power and the Y-coordinates is output power. When the device is bias at –0.5 gate voltage, the slope of the power curve is fixed. With the increase of RF input power, the slope increases obviously when the device is bias at low gate voltage.

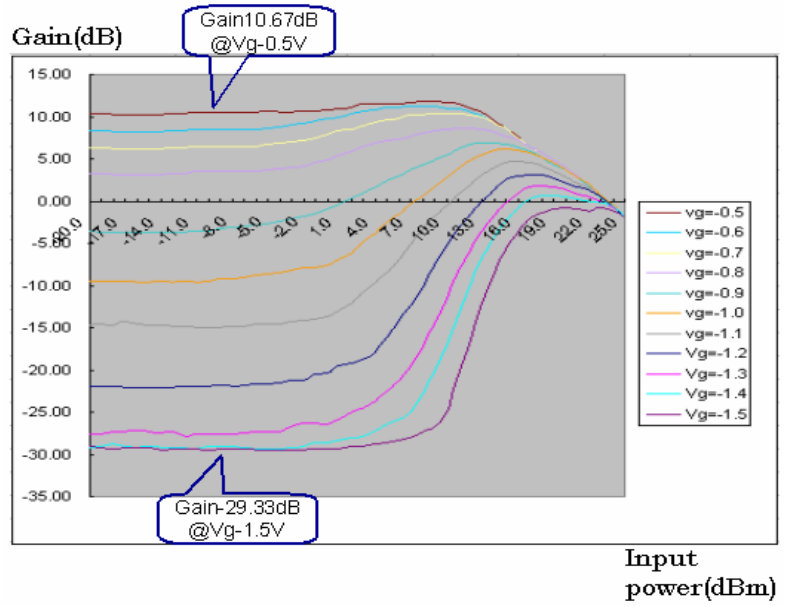

Figure 4.3 PA input power V.S. power gain@gate Vg bias

Figure 4.3 shows the PA input power v.s. output power gain at gate bias. The X-coordinates is input power and the Y-coordinates is output power gain. In the linear region, The power gain curve is a straight line. The gain is from –29.33dB @Vg-1.5V to 10.67dB @Vg-0.5V.

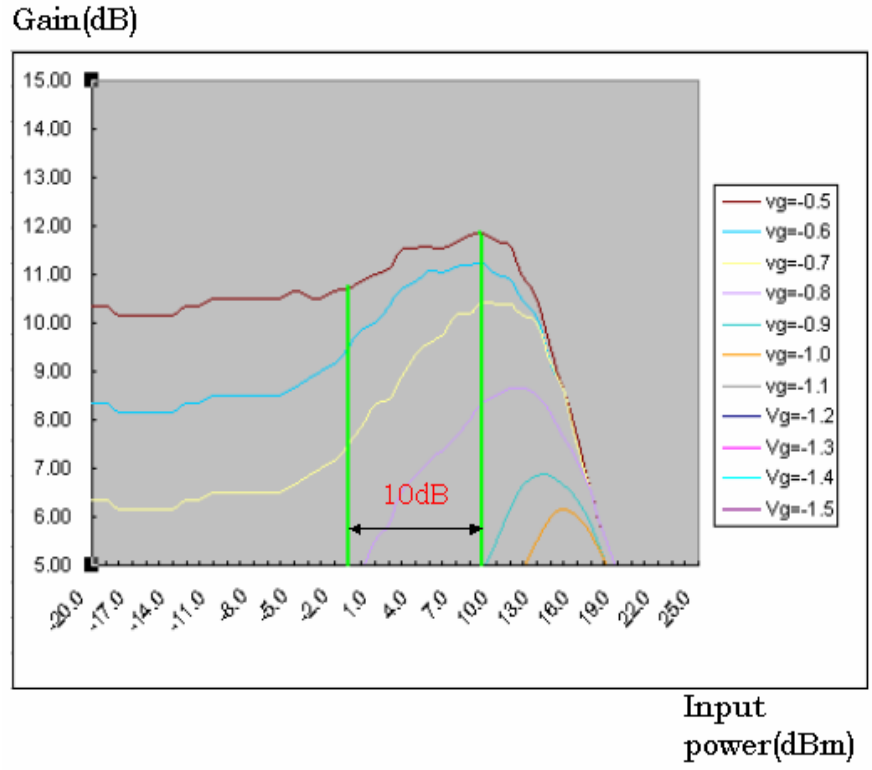

Figure 4.4 linear improvement

Figure 4.3 shows the linear improvement. The X-coordinates is input power and the Y-coordinates is output power gain. The curve of Vg-0.5v is bias point under class A operation.

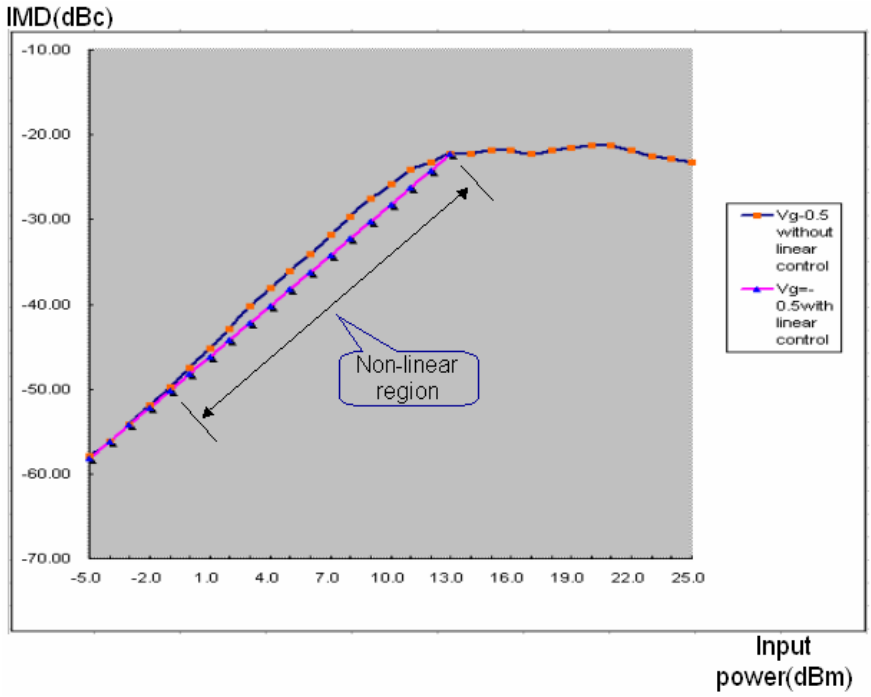

Figure 4.5 IMD V.S. input power

To demonstrate the capability of the linearizer, IMD of the power amplifier with the linearizer is measured. Fig. 4.5 shows measured IMD of the power amplifier with the linearizer and without the linearizer. An improvement of IMD of 3dBc has been achieved at 20.83dBm output power.