

CHAPTER 4

Performance of Active Balance Switching Mixer

4.1 Noise measurement of active balanced switching mixer

The noise figure of Active balanced switching mixer was measured by HP-8970B Noise Figure Meter and 346C noise source with setup as shown in Figure 4.1. The LO signal was provide by HP 83752B Synthesized sweeper and isolators were used in the RF and LO input ports to reduce signal reflection. Settings for the noise figure meter are as follow:

1.4 Band conversion: SSB

2.2 Upper side band conversion.

3.1 Local frequency is 10000MHz

34.1 Compensation turn on

34.2 Before DUT loss: 0.15dB (mainly contributed by isolator)

34.3 Room temperature: 298°K

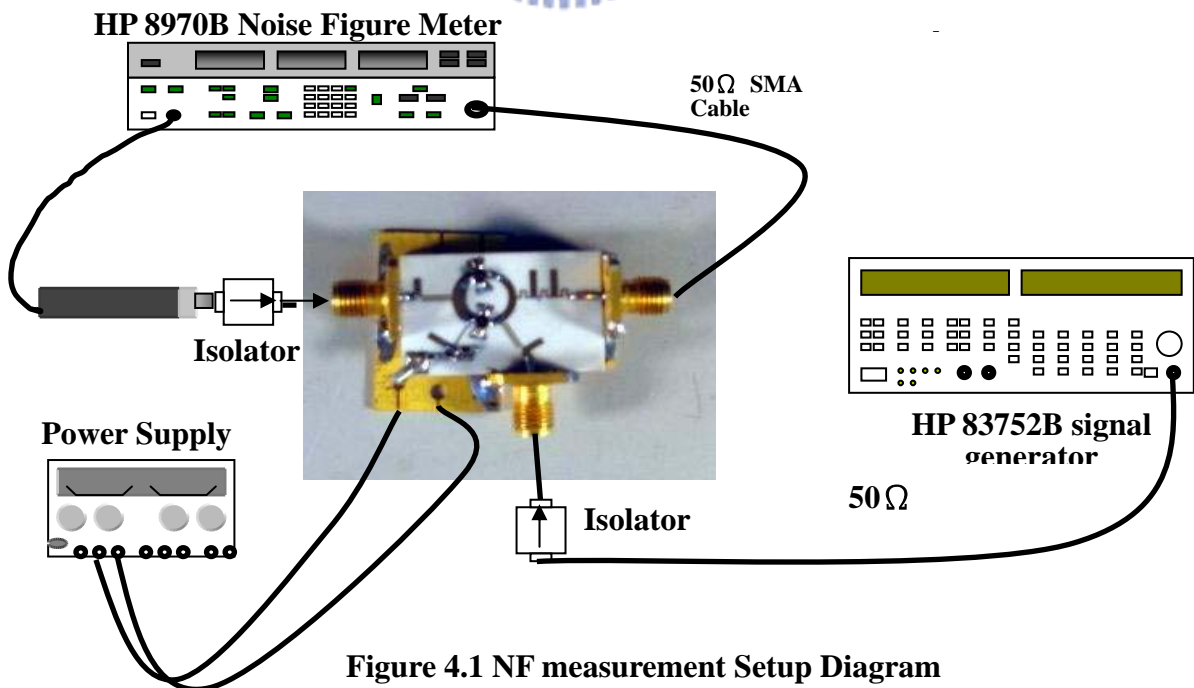


Figure 4.1 NF measurement Setup Diagram

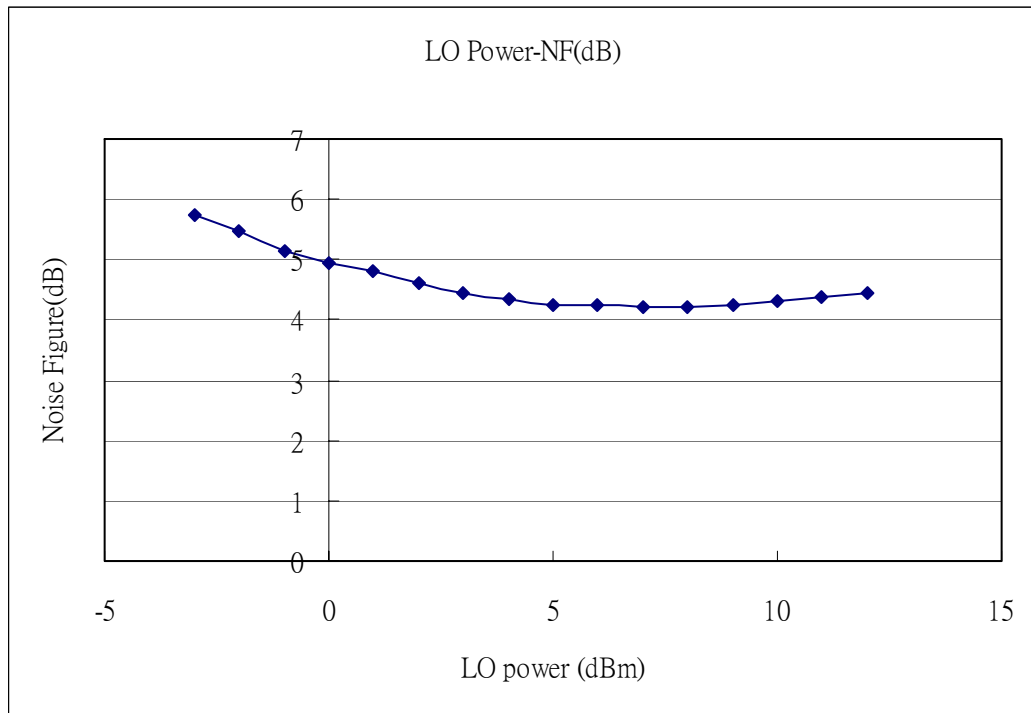


Figure 4.2 Measured Noise Figure of active balanced switching mixer

The measure curve of noise figure versus local power was as shown in the Figure 4.4. When the local power is exciting at the level of 5 ~10 dBm, the noise figure is 4.3dB as a result, including RF coupling loss.

4.2 Input return loss and Conversion gain measurement of active balanced switching mixer

Input return loss and conversion gain are measured by using HP 8757 system and HP83752B Synthesized sweeper to generate LO signal. The photo of setting up is as the figure 4.2. HP 8757 system's setting data is as follows:

RF power level: -20dBm

Frequency start: 11GHz

Frequency stop: 13GHz

Pulse mode: Scalar

System AC mode

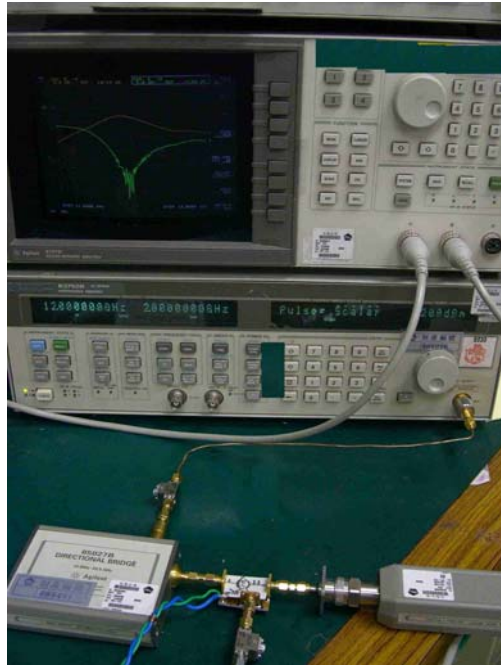


Figure 4.3 The Conversion gain and input return loss setup photo

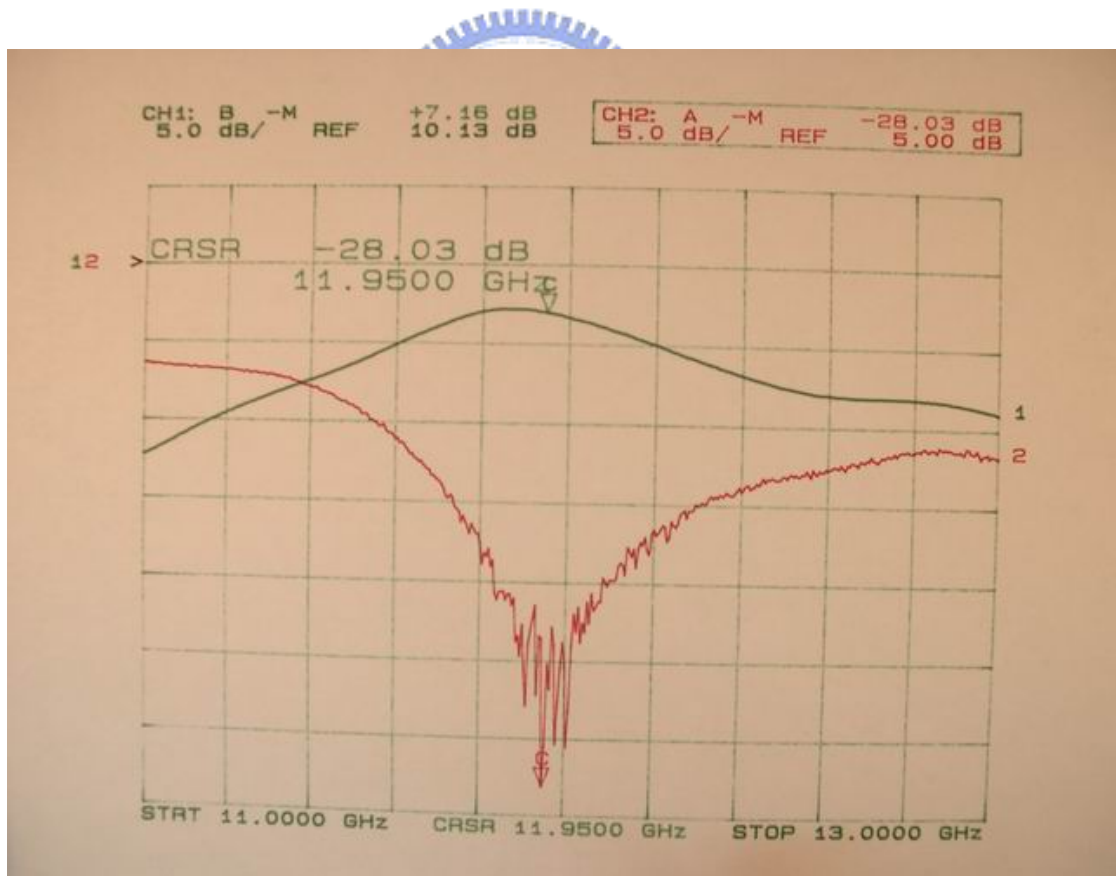


Figure 4.4 Measured conversion gain and input return Loss of the active balanced switching mixer (LO power:10dBm)

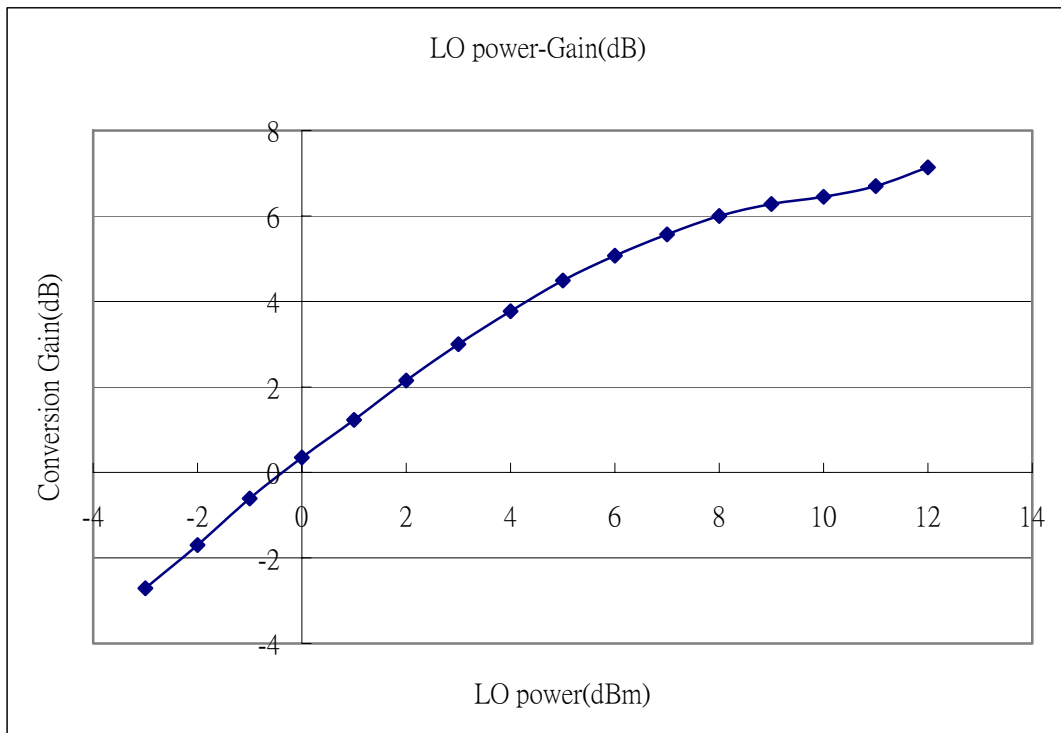
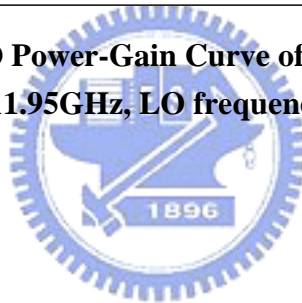


Figure 4.5 Measured LO Power-Gain Curve of the active balanced switching mixer (RF frequency : 11.95GHz, LO frequency : 10GHz)



The measured result and performance of the active balanced switching mixer were as shown in Figure 4.4 and 4.5. In Figure 4.4, the conversion gain and the RF port input return loss curve of the mixer were measured at the input power level of -27dBm (Bridge loss: 7dB). Figure 4.5 shows the conversion gain curve versus local power. From the result the conversion gain is 6.45dB at a local power level of 10dBm ,