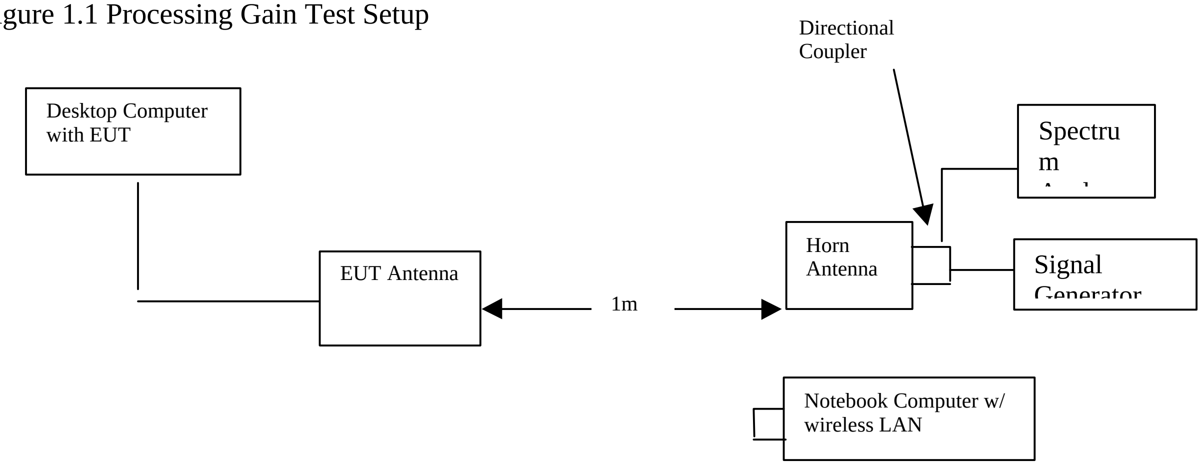
3.9 PROCESSING GAIN:

The Processing Gain was measured using the CW jamming margin method. Figure 1.1 shows the test configuration.

The test consists of stepping a signal generator in 50 kHz increments across the passband of the system. At each frequency, the generator level required to produce the recommended Bit Error Rate (BER) is recorded. This level is the jammer level. The output power of the transmitting unit is measured at the same point. The Jammer to Signal (J/S) ratio is then calculated. The worst 20% of the J/S data points were Discard. The lowest remaining J/S ratio is used when calculating the Processing Gain.

Since the spreading/despreading function of the EUT remains constant at all channels, the measurement was performed at a mid point within the operating band. Implementation losses of the system are limited to 2dB Max as permitted by the FCC guidelines.

Figure 1.1 Processing Gain Test Setup



The Notebook computer was sending data. The desktop computer was receiving information using wireless communications and continuously monitoring the Bit Error Rate. Since a radiated test was performed, the effective radiated peak power from an equivalent isotropic source was calculated using the following equation:

Equation #1: $$P=\frac{(Ed)^2}{30}$$

Where: E= measured maximum field strength in V/m using a wide band peak power meter.
G= the numeric gain of the notebook transmitting antenna over isotropic.
D= 3.0 meters is the distance in meters from which the field strength was measured.
P= Power in watts.

(Processing gain (Gp) is thus defined by the following equation:

$Gp=(S/N)_0+Mj+Lsys$

Where $(S/N)_0$=signal/noise ratio=21.64dB

Mj=J/S ration, selected as described = 22dB for the following frequency:

Freq. (GHz)	J Level EIRP	S. EIRP	J/S (dB)
2.44166	0.189	2.41E5	25.73

Lsys = System losses (dB) with Lsys = 2dB

The signal to noise ratio, $(S/N)_0$, is related to the receivers bit error rate. Although the precise relationship will vary with the demodulation scheme used, for an ideal non-coherent receiver, the probability of error (bit error rate) is related to $(S/N)_0$ by:

Probability of bit error = .5 x e(-5 x $(S/N)_0$

Conclusion: Processing gain = 49.37 dB

See processing gain plot at 2.44166 GHz

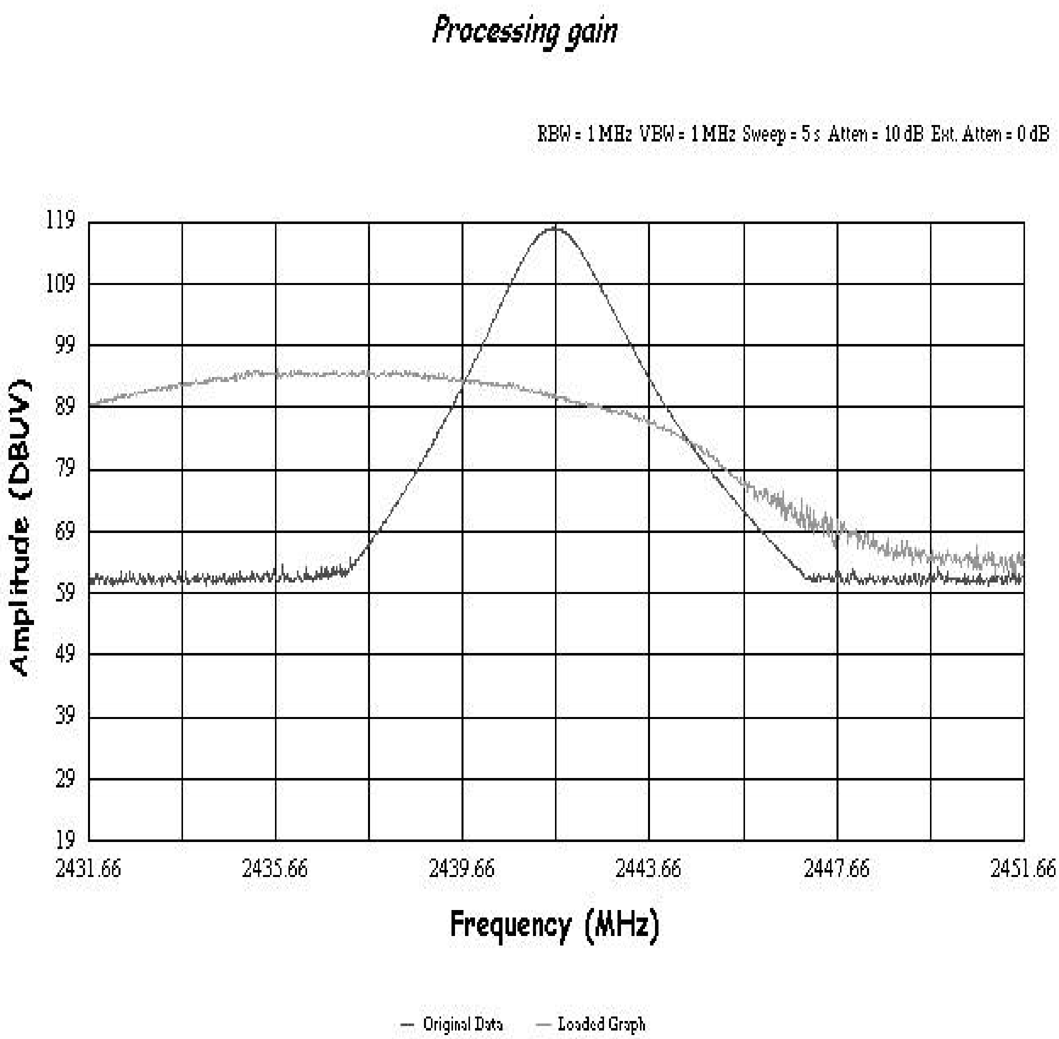


FIGURE 2: Processing Gain Plot