Brief Explanations on Processing Gain Data

1. The formula of Processing Gain is: Gp = (S/N)o +Mj + Lsys

   Where Gp: Processing Gain;
   (S/N)o: the ratio of signal energy vs noise power density. Based on the data provided by the chip set manufacturer, it is 16.4dB @11Mb/s, 13.4dB @5.5Mb/s, 13.3dB @2.0Mb/s, 10.3dB @1.0Mb/s;
   Lsys: test system loss. The measurement result to our test set-up is 2.0dB;
   Mj: Jamming Margin. It is the ratio of jammer vs WLAN channel signal;

2. The purpose of the measurement here is to figure out Mj at different frequencies. Processing Gain will be gotten through calculation based on the above formula at different frequencies;

3. During the tests (see the Block Diagram of Test Set-up), the input signal to RX is about –60dBm (not exactly at –60dBm) and Mj (dB) = Jammer level (dBm) – Channel signal level (dBm);

4. The criteria we define the transmission link failure is: PER = 8%;

5. FCC defines that when testing the Processing Gain for a specific channel, if the frequency is fo, the jammer frequency has to scan from fo-8.5 MHz to fo+8.5MHz with 50 KHz per step. In another word, 340 data will be taken just for a single channel measurement;

6. Having calculated out 340 Processing Gains for a specific channel, use the percentile average function of Microsoft Excel to figure out the final result.

   Example: see the first row of 11Mb/s @ Channel 6
   Frequency—Jammer frequency = fo-8.5 =2437-8.5 = 2428.50 MHz;
   (S/N)o—16.4 dB @11 Mb/s (see Item 1);
   Lsys—2.0 dB (see Item 1);
   PER— 8.0%, which is the failure criteria;
   Jammer— -57.2dBm, which is the Jammer level @ PER=8.0%;
   Mj—Jamming Margin. 5.5 (dB) = -57.2 (dBm) – (-62.7) (dBm) (see Item 3). On here, also see the next page of spread sheet, which shows that XMIT level = -62.7 dBm);
   Gp—Processing Gain = (S/N)o + Mj + Lsys = 16.4 + 5.5 + 2.0 = 23.9 (dB).

After having calculated out 340 Gps, use the percentile function of Microsoft Excel, the final Gp of 11Mb/s @ Ch 6 is 12.9 dB. At the same time, incorporate those 340 data into f—Gp chart, you'll get a whole picture of it.

Chip/symbol rate, the symbol/bit rate and the Chip/bit

Bit rate	Chip/symbol rate	Bit/symbol rate	Chip/bit rate	Gp (dB)	Spec (dB)
1 Mbit/sec	11	1, DBPSK	11	13.2	10
2 Mbit/sec	11	2, DQPSK	5.5	12.6	10
5.5 Mbit/sec	8	4, CCK	2	13.4	10
11 Mbit/sec	8	8, CCK	1	12.9	10

Note: 1. Gp is Processing Gain;
2. Spec is Processing Gain specifications defined by FCC on DSSS systems.