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**Test Report of
SkyWay
FCC Processing Gain Measurement**

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Revision List

Revision.....	Date
Original Draft	December 8, 1999
Addendum A	March 7, 2000
Addendum B	March 15, 2000

1 CW Jamming Margin Test Method

1.1 Theory of test and processing gain formula

The processing gain is measured using the continuous wave (CW) jamming margin method, performed under the guidance of the FCC rules, Part 15.247(e). A signal generator is used to inject a jammer into an established unidirectional system link. The test consists of stepping the signal generator across the passband of the system in 50kHz increments. At each point the jammer power required to degrade the system to a 1×10^{-5} Bit Error Rate (BER) is recorded as the Jammer signal level (J). The output power of the system transmitter is measured and recorded as the desired Signal level (S). The Jammer to Signal ratio (J/S) is then calculated at each interval within the passband. 20% of the worst (lowest) data points are discarded as permitted by the FCC. The lowest remaining J/S ratio is used to calculate the processing gain (G_p) using the following formula:

$$G_p = \frac{E_s}{N_0} + M_J + L_{SYS}$$

E_s/N_0 = Required energy per symbol - to - noise ratio

M_J = Jamming margin, or J/S ratio

L_{SYS} = System implementation loss

The minimum required processing gain required by the FCC is **10dB**.

1.2 E_s/N_0 requirement

The SkyWay transceiver implements the Prism II chipset from Intersil. At the 11Mbit/s data rate M-ary Bi-orthogonal Keying (MBOK) or Complementary Code Keying (CCK) modulation is used. Intersil's datasheet for the Prism II baseband processor details its implementation of the higher data rate modulation schemes (Part number HFA3860B, File Number 4594). Figure 1 shows the theoretical (THY) and practical (BER) curves for MBOK/CCK modulation modes at 5.5 and 11Mbit/s. These performance curves are referenced from Intersil's documented specifications.

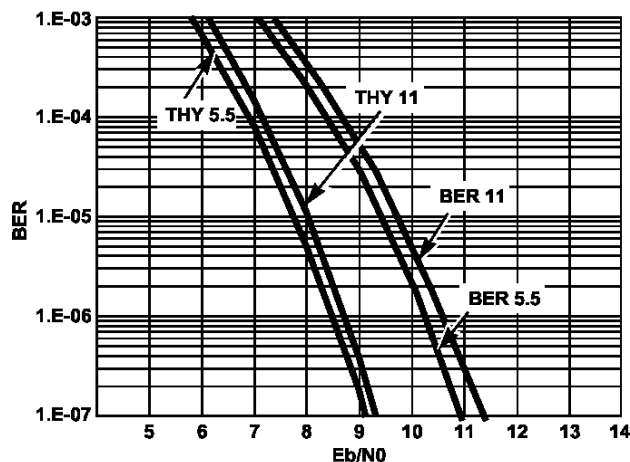


Figure 1 - BER vs. E_b/N_0 Performance for MBOK/CCK Modulation

The required theoretical E_B/N_0 is 8dB for a 1×10^{-5} reference BER. Each symbol codes 8 bits in both MBOK and CCK modulation at 11Mbit/s. Therefore the corresponding E_S/N_0 is 8 times higher than the E_B/N_0 for a desired BER:

$$\frac{E_S}{N_0} (dB) = \frac{E_B}{N_0} (dB) + 10 \log(n_{bits})$$

$$E_B/N_0 = 8dB \text{ (for MBOK/CCK modulation at } 1 \times 10^{-5} \text{ BER)}$$

$$n_{bits} = 8 \text{ (bits per coded symbol)}$$

The required E_S/N_0 for a BER of 1×10^{-5} is 17dB.

1.3 Permitted system implementation loss

The FCC allows for 2dB of system implementation loss (L_{SYS}) for practical limitations that degrade the performance below that of an optimum theoretical system.

1.4 Minimum allowable J/S ratio

Given the above requirements, the minimum allowable jamming margin (M_J) for the system is calculated:

$$G_P = 17dB + M_J + 2dB \geq 10dB$$

$$\Rightarrow M_J \geq -9dB$$

The minimum allowable Jamming to Signal level (J/S) is -9dB.

2 Test Setup

2.1 List of test equipment

Description	Brand	Part Number
Synthesized Signal Generator, 10MHz – 20GHz	Hewlett Packard	83732A
Peak Power Sensor, 100MHz – 18GHz	Hewlett Packard	84811A
Peak Power Meter	Hewlett Packard	8900D
Spectrum Analyzer, 9KHz – 6.5GHz	Hewlett Packard	8595E
2-Way Reactive Power Splitter/Combiner	Mini-Circuits	ZFSC-2-10G
4-Way Reactive Power Splitter/Combiner	Mini-Circuits	ZA4PD-2
11dB/1W Adjustable Attenuator, DC – 4GHz	Hewlett Packard	8494A
110dB/1W Adjustable Attenuator, DC – 4GHz	Hewlett Packard	8496A
10dB/2W Power Attenuator (x3)	Mini-Circuits	MCLBW-S10W2
10dB/2W Power Attenuator (x4)	Alan Microwave	50SP10
50Ω/2W Termination	Pasternack	PE6009

2.2 Setup diagram and description

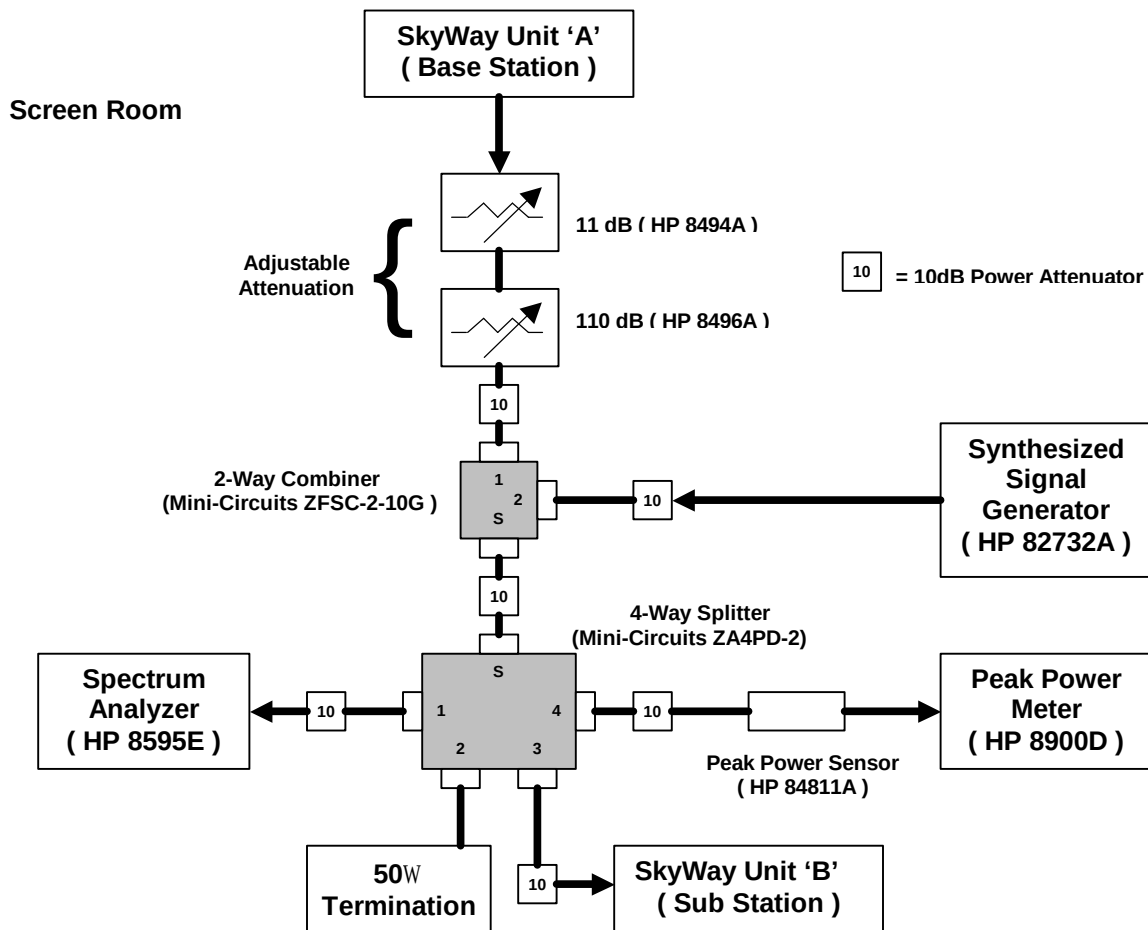


Figure 2 – Equipment Setup

Two identical SkyWay units are used. SkyWay unit 'A' is configured by software to act as the Base station, while unit 'B' is configured as the Sub station. Both units will be running RF-Data Link Control diagnostic software in continuous single frame transmit/receive mode. In this mode, the Base will be continuously transmitting 1530 byte frames at 11Mbit/s. The Sub will receive and process these frames, using counters to display the number of frames and bytes received without error. The software will also keep track of the number and types of errors it finds in the received data. All the equipment except the Base station is contained within a screen room during the test.

The CW jammer is injected into the link using a reactive combiner. The combined signals are then distributed equally between the Sub station, Spectrum Analyzer, and Peak Power Meter. Any differences in the actual power presented at the input ports of the three devices are noted across the system passband. These calibration factors are taken into account when actual measurements are made.

The output power of the Base station is adjusted to a nominal value of 20dBm. The adjustable attenuators are then set so that the power of the desired signal at the Sub station input port is -60dBm.

10dB attenuating pads are placed on all ports of the reactive splitters/combiners. This provides a good VSWR to each port and minimizes component interaction within the test setup.

Appropriate low-loss, shielded coaxial cables are used to interconnect the components of the test setup.

2.3 Measurement procedure

The maximum 6dB bandwidth of the system is 12MHz. At each 50kHz interval within this band, a measurement is made to determine the Jamming signal to desired Signal ratio (J/S). An error free link is first established with the power of the desired signal calibrated to -60dBm at the Sub station input port. The jammer signal is then introduced at a level low enough such that no receive errors result from it. The jamming signal is then increased at 0.1dB intervals until the Bit Error Rate (BER) degrades to 1×10^{-5} . This is determined by monitoring the counters for received bytes and errors. For greater accuracy, 1000 frames are sampled, with 1530 bytes constituting one frame. 1.53 million bytes received with 122 errors or less corresponds to a minimum BER of 1×10^{-5} :

$$BER = \frac{n_{errors}}{1000 \text{ frames} \times 1530 \text{ bytes} \times 8 \text{ bits}} \times 10^{-5}$$

$$122 \leq n_{errors} \leq 122.4$$

Once the minimum BER is achieved, the desired signal is momentarily disabled and the power of the Jamming signal at the Sub station input port is measured. The measurements have been tabulated in Section 0.

2.4 Photographs of test setup



Figure 3 - Base station setup
(PC & Skyway unit)

Figure 4 - Sub station setup
(PC & SkyWay unit)
with test equipment



Figure 5 - Setup of attenuators,
splitter, and
combiner

3 Test Results

3.1 Data tables

System Bandwidth = $f_{\text{center}} \pm 6\text{MHz}$ (6000kHz = 120 x 50kHz)
System Channel = 2442MHz
System Data Rate = 11Mbit/s

2436.00	-120 x 50	-66.3	-60.1	-6.2
2436.05	-119 x 50	-66.3	-60.1	-6.2
2436.10	-118 x 50	-66.4	-60.1	-6.3
2436.15	-117 x 50	-66.8	-60.1	-6.7
2436.20	-116 x 50	-66.4	-60.1	-6.3
2436.25	-115 x 50	-66.5	-60.1	-6.4
2436.30	-114 x 50	-66.6	-60.1	-6.5
2436.35	-113 x 50	-67.0	-60.1	-6.9
2436.40	-112 x 50	-66.8	-60.1	-6.7
2436.45	-111 x 50	-66.8	-60.1	-6.7
2436.50	-110 x 50	-66.7	-60.1	-6.6
2436.55	-109 x 50	-66.6	-60.1	-6.5
2436.60	-108 x 50	-66.9	-60.1	-6.8
2436.65	-107 x 50	-66.8	-60.1	-6.7
2436.70	-106 x 50	-66.6	-60.1	-6.5
2436.75	-105 x 50	-66.7	-60.1	-6.6
2436.80	-104 x 50	-66.8	-60.1	-6.7
2436.85	-103 x 50	-66.6	-60.1	-6.5
2436.90	-102 x 50	-66.5	-60.1	-6.4
2436.95	-101 x 50	-66.4	-60.1	-6.3
2437.00	-100 x 50	-66.4	-60.1	-6.3
2437.05	-99 x 50	-66.5	-60.1	-6.4
2437.10	-98 x 50	-66.5	-60.1	-6.4
2437.15	-97 x 50	-66.4	-60.1	-6.3
2437.20	-96 x 50	-66.2	-60.1	-6.1
2437.25	-95 x 50	-66.2	-60.1	-6.1
2437.30	-94 x 50	-66.2	-60.1	-6.1
2437.35	-93 x 50	-66.3	-60.1	-6.2
2437.40	-92 x 50	-66.2	-60.1	-6.1
2437.45	-91 x 50	-66.2	-60.1	-6.1
2437.50	-90 x 50	-66.0	-60.1	-5.9
2437.55	-89 x 50	-65.8	-60.1	-5.7
2437.60	-88 x 50	-66.1	-60.1	-6.0
2437.65	-87 x 50	-65.9	-60.1	-5.8
2437.70	-86 x 50	-65.7	-60.1	-5.6
2437.75	-85 x 50	-65.7	-60.1	-5.6
2437.80	-84 x 50	-65.7	-60.1	-5.6
2437.85	-83 x 50	-65.7	-60.1	-5.6
2437.90	-82 x 50	-65.7	-60.1	-5.6
2437.95	-81 x 50	-65.7	-60.1	-5.6
2438.00	-80 x 50	-65.7	-60.1	-5.6

Table 1.1 - J/S values for ($f_{\text{center}} - 120 \times 50\text{kHz}$) to ($f_{\text{center}} - 80 \times 50\text{kHz}$)

System Bandwidth = $f_{\text{center}} \pm 6\text{MHz}$ (6000kHz = 120 x 50kHz)
System Channel = 2442MHz
System Data Rate = 11Mbit/s

2438.00	-80 x 50	-65.7	-60.1	-5.6
2438.05	-79 x 50	-65.7	-60.1	-5.6
2438.10	-78 x 50	-65.7	-60.1	-5.6
2438.15	-77 x 50	-65.6	-60.1	-5.5
2438.20	-76 x 50	-65.7	-60.1	-5.6
2438.25	-75 x 50	-65.8	-60.1	-5.7
2438.30	-74 x 50	-66.0	-60.1	-5.9
2438.35	-73 x 50	-65.8	-60.1	-5.7
2438.40	-72 x 50	-65.9	-60.1	-5.8
2438.45	-71 x 50	-65.7	-60.1	-5.6
2438.50	-70 x 50	-65.8	-60.1	-5.7
2438.55	-69 x 50	-65.8	-60.1	-5.7
2438.60	-68 x 50	-65.8	-60.1	-5.7
2438.65	-67 x 50	-65.7	-60.1	-5.6
2438.70	-66 x 50	-65.8	-60.1	-5.7
2438.75	-65 x 50	-65.7	-60.1	-5.6
2438.80	-64 x 50	-65.7	-60.1	-5.6
2438.85	-63 x 50	-65.8	-60.1	-5.7
2438.90	-62 x 50	-65.6	-60.1	-5.5
2438.95	-61 x 50	-65.8	-60.1	-5.7
2439.00	-60 x 50	-65.8	-60.1	-5.7
2439.05	-59 x 50	-65.8	-60.1	-5.7
2439.10	-58 x 50	-65.8	-60.1	-5.7
2439.15	-57 x 50	-65.7	-60.1	-5.6
2439.20	-56 x 50	-65.9	-60.1	-5.8
2439.25	-55 x 50	-65.9	-60.1	-5.8
2439.30	-54 x 50	-65.8	-60.1	-5.7
2439.35	-53 x 50	-65.8	-60.1	-5.7
2439.40	-52 x 50	-65.7	-60.1	-5.6
2439.45	-51 x 50	-65.7	-60.1	-5.6
2439.50	-50 x 50	-65.7	-60.1	-5.6
2439.55	-49 x 50	-65.7	-60.1	-5.6
2439.60	-48 x 50	-65.8	-60.1	-5.7
2439.65	-47 x 50	-65.9	-60.1	-5.8
2439.70	-46 x 50	-65.9	-60.1	-5.8
2439.75	-45 x 50	-65.9	-60.1	-5.8
2439.80	-44 x 50	-65.8	-60.1	-5.7
2439.85	-43 x 50	-65.7	-60.1	-5.6
2439.90	-42 x 50	-65.9	-60.1	-5.8
2439.95	-41 x 50	-65.9	-60.1	-5.8
2440.00	-40 x 50	-66.0	-60.1	-5.9

Table 1.2 - J/S values for ($f_{\text{center}} - 80 \times 50\text{kHz}$) to ($f_{\text{center}} - 40 \times 50\text{kHz}$)

System Bandwidth = $f_{\text{center}} \pm 6\text{MHz}$ (6000kHz = 120 x 50kHz)
System Channel = 2442MHz
System Data Rate = 11Mbit/s

2440.00	-40 x 50	-66.0	-60.1	-5.9
2440.05	-39 x 50	-66.0	-60.1	-5.9
2440.10	-38 x 50	-66.0	-60.1	-5.9
2440.15	-37 x 50	-65.9	-60.1	-5.8
2440.20	-36 x 50	-66.0	-60.1	-5.9
2440.25	-35 x 50	-66.0	-60.1	-5.9
2440.30	-34 x 50	-65.8	-60.1	-5.7
2440.35	-33 x 50	-65.6	-60.1	-5.5
2440.40	-32 x 50	-65.5	-60.1	-5.4
2440.45	-31 x 50	-65.5	-60.1	-5.4
2440.50	-30 x 50	-65.5	-60.1	-5.4
2440.55	-29 x 50	-65.6	-60.1	-5.5
2440.60	-28 x 50	-65.5	-60.1	-5.4
2440.65	-27 x 50	-65.8	-60.1	-5.7
2440.70	-26 x 50	-65.7	-60.1	-5.6
2440.75	-25 x 50	-65.6	-60.1	-5.5
2440.80	-24 x 50	-65.5	-60.1	-5.4
2440.85	-23 x 50	-65.6	-60.1	-5.5
2440.90	-22 x 50	-65.7	-60.1	-5.6
2440.95	-21 x 50	-65.6	-60.1	-5.5
2441.00	-20 x 50	-65.8	-60.1	-5.7
2441.05	-19 x 50	-65.6	-60.1	-5.5
2441.10	-18 x 50	-65.6	-60.1	-5.5
2441.15	-17 x 50	-65.6	-60.1	-5.5
2441.20	-16 x 50	-65.7	-60.1	-5.6
2441.25	-15 x 50	-65.9	-60.1	-5.8
2441.30	-14 x 50	-65.6	-60.1	-5.5
2441.35	-13 x 50	-65.4	-60.1	-5.3
2441.40	-12 x 50	-65.4	-60.1	-5.3
2441.45	-11 x 50	-65.5	-60.1	-5.4
2441.50	-10 x 50	-65.5	-60.1	-5.4
2441.55	-9 x 50	-65.6	-60.1	-5.5
2441.60	-8 x 50	-65.6	-60.1	-5.5
2441.65	-7 x 50	-65.9	-60.1	-5.8
2441.70	-6 x 50	-65.9	-60.1	-5.8
2441.75	-5 x 50	-65.9	-60.1	-5.8
2441.80	-4 x 50	-65.9	-60.1	-5.8
2441.85	-3 x 50	-65.8	-60.1	-5.7
2441.90	-2 x 50	-65.8	-60.1	-5.7
2441.95	-1 x 50	-65.8	-60.1	-5.7
2442.00	0 x 50	-66.0	-60.1	-5.9

Table 1.3 - J/S values for ($f_{\text{center}} - 40 \times 50\text{kHz}$) to ($f_{\text{center}} - 0 \times 50\text{kHz}$)

System Bandwidth = $f_{\text{center}} \pm 6\text{MHz}$ (6000kHz = 120 x 50kHz)
System Channel = 2442MHz
System Data Rate = 11Mbit/s

2442.00	0 x 50	-66.0	-59.6	-6.4
2442.05	+1 x 50	-65.9	-59.6	-6.3
2442.10	+2 x 50	-65.8	-59.6	-6.2
2442.15	+3 x 50	-65.8	-59.6	-6.2
2442.20	+4 x 50	-65.5	-59.6	-5.9
2442.25	+5 x 50	-65.8	-59.6	-6.2
2442.30	+6 x 50	-65.7	-59.6	-6.1
2442.35	+7 x 50	-65.6	-59.6	-6.0
2442.40	+8 x 50	-65.3	-59.6	-5.7
2442.45	+9 x 50	-65.3	-59.6	-5.7
2442.50	+10 x 50	-65.2	-59.6	-5.6
2442.55	+11 x 50	-65.1	-59.6	-5.5
2442.60	+12 x 50	-65.1	-59.6	-5.5
2442.65	+13 x 50	-65.1	-59.6	-5.5
2442.70	+14 x 50	-65.3	-59.6	-5.7
2442.75	+15 x 50	-65.2	-59.6	-5.6
2442.80	+16 x 50	-64.9	-59.6	-5.3
2442.85	+17 x 50	-65.0	-59.6	-5.4
2442.90	+18 x 50	-65.0	-59.6	-5.4
2442.95	+19 x 50	-65.0	-59.6	-5.4
2443.00	+20 x 50	-64.8	-59.6	-5.2
2443.05	+21 x 50	-64.8	-59.6	-5.2
2443.10	+22 x 50	-64.8	-59.6	-5.2
2443.15	+23 x 50	-64.8	-59.6	-5.2
2443.20	+24 x 50	-64.9	-59.6	-5.3
2443.25	+25 x 50	-64.9	-59.6	-5.3
2443.30	+26 x 50	-64.9	-59.6	-5.3
2443.35	+27 x 50	-64.8	-59.6	-5.2
2443.40	+28 x 50	-64.8	-59.6	-5.2
2443.45	+29 x 50	-64.7	-59.6	-5.1
2443.50	+30 x 50	-64.8	-59.6	-5.2
2443.55	+31 x 50	-64.8	-59.6	-5.2
2443.60	+32 x 50	-64.7	-59.6	-5.1
2443.65	+33 x 50	-64.8	-59.6	-5.2
2443.70	+34 x 50	-64.8	-59.6	-5.2
2443.75	+35 x 50	-64.8	-59.6	-5.2
2443.80	+36 x 50	-64.7	-59.6	-5.1
2443.85	+37 x 50	-64.6	-59.6	-5.0
2443.90	+38 x 50	-64.8	-59.6	-5.2
2443.95	+39 x 50	-64.8	-59.6	-5.2
2444.00	+40 x 50	-64.8	-59.0	-5.8

Table 1.4 - J/S values for ($f_{\text{center}} + 0 \times 50\text{kHz}$) to ($f_{\text{center}} + 40 \times 50\text{kHz}$)

System Bandwidth = $f_{\text{center}} \pm 6\text{MHz}$ (6000kHz = 120 x 50kHz)
System Channel = 2442MHz
System Data Rate = 11Mbit/s

2444.00	+40 x 50	-64.8	-59.0	-5.8
2444.05	+41 x 50	-64.6	-59.0	-5.6
2444.10	+42 x 50	-64.7	-59.0	-5.7
2444.15	+43 x 50	-64.6	-59.0	-5.6
2444.20	+44 x 50	-64.6	-59.0	-5.6
2444.25	+45 x 50	-64.5	-59.0	-5.5
2444.30	+46 x 50	-65.4	-59.0	-6.4
2444.35	+47 x 50	-64.4	-59.0	-5.4
2444.40	+48 x 50	-64.5	-59.0	-5.5
2444.45	+49 x 50	-64.3	-59.0	-5.3
2444.50	+50 x 50	-64.4	-59.0	-5.4
2444.55	+51 x 50	-64.3	-59.0	-5.3
2444.60	+52 x 50	-64.4	-59.0	-5.4
2444.65	+53 x 50	-64.5	-59.0	-5.5
2444.70	+54 x 50	-64.6	-59.0	-5.6
2444.75	+55 x 50	-64.3	-59.0	-5.3
2444.80	+56 x 50	-64.3	-59.0	-5.3
2444.85	+57 x 50	-64.2	-59.0	-5.2
2444.90	+58 x 50	-64.2	-59.0	-5.2
2444.95	+59 x 50	-64.2	-59.0	-5.2
2445.00	+60 x 50	-65.8	-59.0	-6.8
2445.05	+61 x 50	-65.6	-59.0	-6.6
2445.10	+62 x 50	-65.6	-59.0	-6.6
2445.15	+63 x 50	-65.6	-59.0	-6.6
2445.20	+64 x 50	-65.7	-59.0	-6.7
2445.25	+65 x 50	-65.9	-59.0	-6.9
2445.30	+66 x 50	-65.6	-59.0	-6.6
2445.35	+67 x 50	-65.4	-59.0	-6.4
2445.40	+68 x 50	-65.4	-59.0	-6.4
2445.45	+69 x 50	-65.5	-59.0	-6.5
2445.50	+70 x 50	-65.5	-59.0	-6.5
2445.55	+71 x 50	-65.6	-59.0	-6.6
2445.60	+72 x 50	-65.6	-59.0	-6.6
2445.65	+73 x 50	-65.9	-59.0	-6.9
2445.70	+74 x 50	-65.9	-59.0	-6.9
2445.75	+75 x 50	-65.9	-59.0	-6.9
2445.80	+76 x 50	-65.9	-59.0	-6.9
2445.85	+77 x 50	-65.8	-59.0	-6.8
2445.90	+78 x 50	-65.8	-59.0	-6.8
2445.95	+79 x 50	-65.9	-59.0	-6.9
2446.00	+80 x 50	-63.6	-58.8	-4.8

Table 1.5 - J/S values for ($f_{\text{center}} + 40 \times 50\text{kHz}$) to ($f_{\text{center}} + 80 \times 50\text{kHz}$)

System Bandwidth = $f_{\text{center}} \pm 6\text{MHz}$ (6000kHz = 120 x 50kHz)
System Channel = 2442MHz
System Data Rate = 11Mbit/s

2446.00	+80 x 50	-63.6	-58.8	-4.8
2446.05	+81 x 50	-63.6	-58.8	-4.8
2446.10	+82 x 50	-63.6	-58.8	-4.8
2446.15	+83 x 50	-63.7	-58.8	-4.9
2446.20	+84 x 50	-63.6	-58.8	-4.8
2446.25	+85 x 50	-63.6	-58.8	-4.8
2446.30	+86 x 50	-63.6	-58.8	-4.8
2446.35	+87 x 50	-63.7	-58.8	-4.9
2446.40	+88 x 50	-63.7	-58.8	-4.9
2446.45	+89 x 50	-63.7	-58.8	-4.9
2446.50	+90 x 50	-63.7	-58.8	-4.9
2446.55	+91 x 50	-63.6	-58.8	-4.8
2446.60	+92 x 50	-63.6	-58.8	-4.8
2446.65	+93 x 50	-63.6	-58.8	-4.8
2446.70	+94 x 50	-63.4	-58.8	-4.6
2446.75	+95 x 50	-63.4	-58.8	-4.6
2446.80	+96 x 50	-63.4	-58.8	-4.6
2446.85	+97 x 50	-63.3	-58.8	-4.5
2446.90	+98 x 50	-63.3	-58.8	-4.5
2446.95	+99 x 50	-63.2	-58.8	-4.4
2447.00	+100 x 50	-63.6	-58.8	-4.8
2447.05	+101 x 50	-63.2	-58.8	-4.4
2447.10	+102 x 50	-63.1	-58.8	-4.3
2447.15	+103 x 50	-63.4	-58.8	-4.6
2447.20	+104 x 50	-63.3	-58.8	-4.5
2447.25	+105 x 50	-63.5	-58.8	-4.7
2447.30	+106 x 50	-63.5	-58.8	-4.7
2447.35	+107 x 50	-63.4	-58.8	-4.6
2447.40	+108 x 50	-63.5	-58.8	-4.7
2447.45	+109 x 50	-63.5	-58.8	-4.7
2447.50	+110 x 50	-63.5	-58.8	-4.7
2447.55	+111 x 50	-63.6	-58.8	-4.8
2447.60	+112 x 50	-63.5	-58.8	-4.7
2447.65	+113 x 50	-63.5	-58.8	-4.7
2447.70	+114 x 50	-63.5	-58.8	-4.7
2447.75	+115 x 50	-63.5	-58.8	-4.7
2447.80	+116 x 50	-63.4	-58.8	-4.6
2447.85	+117 x 50	-63.6	-58.8	-4.8
2447.90	+118 x 50	-63.2	-58.8	-4.4
2447.95	+119 x 50	-63.2	-58.8	-4.4
2448.00	+120 x 50	-63.0	-58.8	-4.2

Table 1.6 - J/S values for ($f_{\text{center}} + 80 \times 50\text{kHz}$) to ($f_{\text{center}} + 120 \times 50\text{kHz}$)

3.2 Summary J/S values

All the J/S values measured at the 11Mbit/s data rate are collected in Table 2 and sorted in ascending order. The lowest 20% of the points are then discarded.

The remaining lowest J/S measurement is **-6.6dB**.

Table 1	Table 2	Table 3	Table 4	Table 5	Table 6
-6.9	-5.9	-6.4	-6.4	-6.9	-4.9
-6.8	-5.9	-5.9	-6.3	-6.9	-4.9
-6.7	-5.8	-5.9	-6.2	-6.9	-4.9
-6.7	-5.8	-5.9	-6.2	-6.9	-4.9
-6.7	-5.8	-5.9	-6.2	-6.9	-4.9
-6.7	-5.8	-5.9	-6.1	-6.9	-4.8
-6.7	-5.8	-5.8	-6.0	-6.8	-4.8
-6.6	-5.8	-5.8	-5.9	-6.8	-4.8
-6.6	-5.8	-5.8	-5.8	-6.8	-4.8
-6.5	-5.8	-5.8	-5.7	-6.7	-4.8
-6.5	-5.7	-5.8	-5.7	-6.6	-4.8
-6.5	-5.7	-5.8	-5.7	-6.6	-4.8
-6.5	-5.7	-5.7	-5.6	-6.6	-4.8
-6.4	-5.7	-5.7	-5.6	-6.6	-4.8
-6.4	-5.7	-5.7	-5.5	-6.6	-4.8
-6.4	-5.7	-5.7	-5.5		-4.8
-6.4	-5.7	-5.7	-5.5	-6.5	-4.8
-6.3	-5.7	-5.7	-5.4	-6.5	-4.7
-6.3	-5.7	-5.6	-5.4	-6.4	-4.7
-6.3	-5.7	-5.6	-5.4	-6.4	-4.7
-6.3	-5.7	-5.6	-5.3	-6.4	-4.7
-6.3	-5.7	-5.5	-5.3	-5.8	-4.7
-6.2	-5.7	-5.5	-5.3	-5.7	-4.7
-6.2	-5.7	-5.5	-5.3	-5.6	-4.7
-6.2	-5.7	-5.5	-5.2	-5.6	-4.7
-6.1	-5.6	-5.5	-5.2	-5.6	-4.7
-6.1	-5.6	-5.5	-5.2	-5.6	-4.6
-6.1	-5.6	-5.5	-5.2	-5.5	-4.6
-6.1	-5.6	-5.5	-5.2	-5.5	-4.6
-6.1	-5.6	-5.5	-5.2	-5.5	-4.6
-6.0	-5.6	-5.5	-5.2	-5.4	-4.6
-5.9	-5.6	-5.5	-5.2	-5.4	-4.6
-5.8	-5.6	-5.4	-5.2	-5.4	-4.5
-5.7	-5.6	-5.4	-5.2	-5.3	-4.5
-5.6	-5.6	-5.4	-5.2	-5.3	-4.5
-5.6	-5.6	-5.4	-5.2	-5.3	-4.4
-5.6	-5.6	-5.4	-5.2	-5.3	-4.4
-5.6	-5.6	-5.4	-5.1	-5.2	-4.4
-5.6	-5.6	-5.4	-5.1	-5.2	-4.4
-5.6	-5.5	-5.3	-5.1	-5.2	-4.3
-5.6	-5.5	-5.3	-5.0	-4.8	-4.2

Table 2 - J/S Values sorted in ascending order

3.3 Measured processing gain

Summary of processing gain figures:

$$E_s/N_0 = 17\text{dB} \text{ (Required energy per symbol - to - noise ratio)}$$

$$M_j = -6.6\text{dB} \text{ (Jamming margin, or J/S ratio)}$$

$$L_{\text{SYS}} = 2\text{dB} \text{ (System implementation loss)}$$

These values are used to determine the processing gain:

$$\begin{aligned} G_p &= 17\text{dB} + (-6.6\text{dB}) + 2\text{dB} \\ &= 12.4\text{dB} \end{aligned}$$

12.4dB of processing gain falls within the acceptable FCC limits required under part 15.247(e) rules.

A. Processing gain at alternate data rates

A.1 Theoretical processing gains and Jammer to Signal (J/S) ratios

The following table details the parameters used to calculate the processing gains and J/S ratios for the three data rates and corresponding modulation schemes supported by the SkyWay transceiver.

Data rate (Mbit/s)		2		11
Modulation scheme		QPSK		CCK
Symbol rate (Msymbols/s) R_S		1		1.375
Chipping rate (Mchips/s) R_C		11		11
Processing gain (dB) = $10 \log(R_C/R_S)$ G_P		10.4		9.0
Energy per bit-to-noise ratio (dB) E_B/N_0^*		10.25		8
Bits per symbol n_{bits}		2		8
Energy per symbol-to-noise ratio (dB) = $E_B/N_0 + 10 \log(n_{bits})$ E_S/N_0		13.3		17.0
Modulation-inherent coding gain (dB) G_C^{**}		0		2.2
FCC allowable implementation loss (dB) L_{SYS}		2		2
Calculated J/S (dB) = $G_P + G_C - E_S/N_0 - L_{SYS}$ J/S		-4.8		-7.8
FCC allowable J/S (dB) = $10\text{dB} - E_S/N_0 - L_{SYS}$ J/S_{MIN}^{***}		-5.3		-9.0

Table A.1 – Theoretical G_P and J/S for alternate data rates

* E_B/N_0 values taken from Intersil specified BER curves and correspond to a 10^{-5} BER

** Coding gain inherent to M-orthogonal Keying (MBOK & CCK)

*** Calculated J/S using the minimum allowable processing gain of 10dB

B. Processing gain measurement at 2Mbit/s data rate

B.1 Minimum allowable J/S ratio

As detailed in Addendum B, the minimum allowable jamming margin (M_J) for the system is re-calculated below:

$$\begin{aligned}
 G_P &= \frac{E_s}{N_0} + M_J + L_{SYS} \geq 10\text{dB} \\
 &= 13.3\text{dB} + M_J + 2\text{dB} \geq 10\text{dB} \\
 &\quad M_J \geq -5.3\text{dB}
 \end{aligned}$$

The minimum allowable Jamming to Signal ratio (J/S) is **-5.3dB** when measured during a 2Mbit/s link.

B.2 Test Setup

The test setup is identical to the 11Mbit/s Processing gain test detailed in Section 2 of the document "Test Report of SkyWay FCC Processing Gain Measurement". The desired link will be comprised of 1530 byte frames at a data rate of 2Mbit/s.

B.3 Test result data tables

System Bandwidth = $f_{\text{center}} \pm 6\text{MHz}$ (6000kHz = 120 x 50kHz)
 System Channel = 2442MHz
 System Data Rate = 2Mbit/s

Frequency (MHz)	Frequency Offset (kHz)	J (dBm)	S (dBm)	J/S (dB)
2436.00	-120x 50	-60.0	-60.0	0.0
2436.05	-119x 50	-60.0	-60.0	0.0
2436.10	-118x 50	-59.9	-60.0	0.1
2436.15	-117x 50	-60.0	-60.0	0.0
2436.20	-116x 50	-60.0	-60.0	0.0
2436.25	-115x 50	-60.0	-60.0	0.0
2436.30	-114x 50	-59.9	-60.0	0.1
2436.35	-113x 50	-59.8	-60.0	0.2
2436.40	-112x 50	-59.5	-60.0	0.5
2436.45	-111x 50	-59.7	-60.0	0.3
2436.50	-110x 50	-59.5	-60.0	0.5
2436.55	-109x 50	-59.5	-60.0	0.5
2436.60	-108x 50	-59.6	-60.0	0.4
2436.65	-107x 50	-59.7	-60.0	0.3
2436.70	-106x 50	-59.7	-60.0	0.3
2436.75	-105x 50	-59.8	-60.0	0.2
2436.80	-104x 50	-59.9	-60.0	0.1
2436.85	-103x 50	-59.9	-60.0	0.1
2436.90	-102x 50	-60.2	-60.0	-0.2
2436.95	-101x 50	-60.2	-60.0	-0.2
2437.00	-100x 50	-60.9	-60.0	-0.9
2437.05	-99x 50	-61.1	-60.0	-1.1
2437.10	-98x 50	-61.2	-60.0	-1.2
2437.15	-97x 50	-61.4	-60.0	-1.4
2437.20	-96x 50	-61.5	-60.0	-1.5
2437.25	-95x 50	-61.6	-60.0	-1.6
2437.30	-94x 50	-61.6	-60.0	-1.6
2437.35	-93x 50	-61.4	-60.0	-1.4
2437.40	-92x 50	-61.3	-60.0	-1.3
2437.45	-91x 50	-61.2	-60.0	-1.2
2437.50	-90x 50	-60.9	-60.0	-0.9
2437.55	-89x 50	-61.0	-60.0	-1.0
2437.60	-88x 50	-61.0	-60.0	-1.0
2437.65	-87x 50	-60.9	-60.0	-0.9
2437.70	-86x 50	-61.0	-60.0	-1.0
2437.75	-85x 50	-60.9	-60.0	-0.9
2437.80	-84x 50	-60.9	-60.0	-0.9
2437.85	-83x 50	-60.9	-60.0	-0.9
2437.90	-82x 50	-61.0	-60.0	-1.0
2437.95	-81x 50	-61.2	-60.0	-1.2
2438.00	-80x 50	-61.2	-60.0	-1.2

Table B.1.1 - J/S values for ($f_{\text{center}} - 120 \times 50\text{kHz}$) to ($f_{\text{center}} - 80 \times 50\text{kHz}$)

System Bandwidth = $f_{\text{center}} \pm 6\text{MHz}$ (6000kHz = 120 x 50kHz)
 System Channel = 2442MHz
 System Data Rate = 2Mbit/s

2438.00	-80x 50	-61.1	-60.0	-1.1
2438.05	-79x 50	-61.3	-60.0	-1.3
2438.10	-78x 50	-61.4	-60.0	-1.4
2438.15	-77x 50	-61.4	-60.0	-1.4
2438.20	-76x 50	-61.3	-60.0	-1.3
2438.25	-75x 50	-61.4	-60.0	-1.4
2438.30	-74x 50	-61.4	-60.0	-1.4
2438.35	-73x 50	-61.4	-60.0	-1.4
2438.40	-72x 50	-61.4	-60.0	-1.4
2438.45	-71x 50	-61.4	-60.0	-1.4
2438.50	-70x 50	-61.2	-60.0	-1.2
2438.55	-69x 50	-61.2	-60.0	-1.2
2438.60	-68x 50	-61.2	-60.0	-1.2
2438.65	-67x 50	-60.8	-60.0	-0.8
2438.70	-66x 50	-60.9	-60.0	-0.9
2438.75	-65x 50	-60.9	-60.0	-0.9
2438.80	-64x 50	-60.9	-60.0	-0.9
2438.85	-63x 50	-60.9	-60.0	-0.9
2438.90	-62x 50	-61.1	-60.0	-1.1
2438.95	-61x 50	-61.3	-60.0	-1.3
2439.00	-60x 50	-61.3	-60.1	-1.2
2439.05	-59x 50	-61.3	-60.1	-1.2
2439.10	-58x 50	-61.4	-60.1	-1.3
2439.15	-57x 50	-61.5	-60.1	-1.4
2439.20	-56x 50	-61.8	-60.1	-1.7
2439.25	-55x 50	-61.8	-60.1	-1.7
2439.30	-54x 50	-61.7	-60.1	-1.6
2439.35	-53x 50	-61.5	-60.1	-1.4
2439.40	-52x 50	-61.5	-60.1	-1.4
2439.45	-51x 50	-61.9	-60.1	-1.8
2439.50	-50x 50	-62.0	-60.1	-1.9
2439.55	-49x 50	-61.8	-60.1	-1.7
2439.60	-48x 50	-61.5	-60.1	-1.4
2439.65	-47x 50	-61.1	-60.1	-1.0
2439.70	-46x 50	-60.6	-60.1	-0.5
2439.75	-45x 50	-60.7	-60.1	-0.6
2439.80	-44x 50	-60.9	-60.1	-0.8
2439.85	-43x 50	-61.2	-60.1	-1.1
2439.90	-42x 50	-61.5	-60.1	-1.4
2439.95	-41x 50	-61.7	-60.1	-1.6
2440.00	-40x 50	-61.7	-60.1	-1.6

Table B.1.2 - J/S values for ($f_{\text{center}} - 80 \times 50\text{kHz}$) to ($f_{\text{center}} - 40 \times 50\text{kHz}$)

System Bandwidth = $f_{\text{center}} \pm 6\text{MHz}$ (6000kHz = 120 x 50kHz)
 System Channel = 2442MHz
 System Data Rate = 2Mbit/s

2440.00	-40x 50	-61.7	-60.1	-1.6
2440.05	-39x 50	-61.9	-60.1	-1.8
2440.10	-38x 50	-62.2	-60.1	-2.1
2440.15	-37x 50	-62.2	-60.1	-2.1
2440.20	-36x 50	-62.2	-60.1	-2.1
2440.25	-35x 50	-62.3	-60.1	-2.2
2440.30	-34x 50	-62.2	-60.1	-2.1
2440.35	-33x 50	-62.0	-60.1	-1.9
2440.40	-32x 50	-61.9	-60.1	-1.8
2440.45	-31x 50	-61.8	-60.1	-1.7
2440.50	-30x 50	-61.4	-60.1	-1.3
2440.55	-29x 50	-61.4	-60.1	-1.3
2440.60	-28x 50	-61.0	-60.1	-0.9
2440.65	-27x 50	-60.9	-60.1	-0.8
2440.70	-26x 50	-60.9	-60.1	-0.8
2440.75	-25x 50	-61.0	-60.1	-0.9
2440.80	-24x 50	-61.2	-60.1	-1.1
2440.85	-23x 50	-61.3	-60.1	-1.2
2440.90	-22x 50	-61.5	-60.1	-1.4
2440.95	-21x 50	-61.7	-60.1	-1.6
2441.00	-20x 50	-61.8	-60.1	-1.7
2441.05	-19x 50	-61.7	-60.1	-1.6
2441.10	-18x 50	-61.6	-60.1	-1.5
2441.15	-17x 50	-61.5	-60.1	-1.4
2441.20	-16x 50	-61.7	-60.1	-1.6
2441.25	-15x 50	-62.1	-60.1	-2.0
2441.30	-14x 50	-62.2	-60.1	-2.1
2441.35	-13x 50	-62.0	-60.1	-1.9
2441.40	-12x 50	-61.9	-60.1	-1.8
2441.45	-11x 50	-61.7	-60.1	-1.6
2441.50	-10x 50	-61.4	-60.1	-1.3
2441.55	-9x 50	-61.6	-60.1	-1.5
2441.60	-8x 50	-61.7	-60.1	-1.6
2441.65	-7x 50	-61.9	-60.1	-1.8
2441.70	-6x 50	-62.0	-60.1	-1.9
2441.75	-5x 50	-62.1	-60.1	-2.0
2441.80	-4x 50	-62.3	-60.1	-2.2
2441.85	-3x 50	-62.4	-60.1	-2.3
2441.90	-2x 50	-62.3	-60.1	-2.2
2441.95	-1x 50	-63.1	-60.1	-3.0
2442.00	0x 50	-62.4	-60.1	-2.3

Table B.1.3 - J/S values for ($f_{\text{center}} - 40 \times 50\text{kHz}$) to ($f_{\text{center}} - 0 \times 50\text{kHz}$)

System Bandwidth = $f_{\text{center}} \pm 6\text{MHz}$ (6000kHz = 120 x 50kHz)
 System Channel = 2442MHz
 System Data Rate = 2Mbit/s

2442.00	0 x 50	-62.4	-60.1	-2.3
2442.05	+1 x 50	-62.3	-60.1	-2.2
2442.10	+2 x 50	-62.2	-60.1	-2.1
2442.15	+3 x 50	-62.1	-60.1	-2.0
2442.20	+4 x 50	-61.9	-60.1	-1.8
2442.25	+5 x 50	-61.6	-60.1	-1.5
2442.30	+6 x 50	-61.4	-60.1	-1.3
2442.35	+7 x 50	-61.2	-60.1	-1.1
2442.40	+8 x 50	-61.1	-60.1	-1.0
2442.45	+9 x 50	-61.0	-60.1	-0.9
2442.50	+10 x 50	-61.2	-60.1	-1.1
2442.55	+11 x 50	-61.8	-60.1	-1.7
2442.60	+12 x 50	-62.0	-60.1	-1.9
2442.65	+13 x 50	-62.2	-60.1	-2.1
2442.70	+14 x 50	-61.9	-60.1	-1.8
2442.75	+15 x 50	-61.7	-60.1	-1.6
2442.80	+16 x 50	-61.5	-60.1	-1.4
2442.85	+17 x 50	-61.5	-60.1	-1.4
2442.90	+18 x 50	-61.5	-60.1	-1.4
2442.95	+19 x 50	-61.3	-60.1	-1.2
2443.00	+20 x 50	-61.0	-60.2	-0.8
2443.05	+21 x 50	-60.8	-60.2	-0.6
2443.10	+22 x 50	-60.8	-60.2	-0.6
2443.15	+23 x 50	-60.7	-60.2	-0.5
2443.20	+24 x 50	-60.7	-60.2	-0.5
2443.25	+25 x 50	-60.6	-60.2	-0.4
2443.30	+26 x 50	-60.7	-60.2	-0.5
2443.35	+27 x 50	-60.7	-60.2	-0.5
2443.40	+28 x 50	-60.9	-60.2	-0.7
2443.45	+29 x 50	-61.2	-60.2	-1.0
2443.50	+30 x 50	-61.2	-60.2	-1.0
2443.55	+31 x 50	-61.5	-60.2	-1.3
2443.60	+32 x 50	-61.5	-60.2	-1.3
2443.65	+33 x 50	-61.5	-60.2	-1.3
2443.70	+34 x 50	-61.6	-60.2	-1.4
2443.75	+35 x 50	-61.6	-60.2	-1.4
2443.80	+36 x 50	-61.4	-60.2	-1.2
2443.85	+37 x 50	-61.5	-60.2	-1.3
2443.90	+38 x 50	-61.4	-60.2	-1.2
2443.95	+39 x 50	-61.2	-60.2	-1.0
2444.00	+40 x 50	-61.1	-60.2	-0.9

Table B.1.4 - J/S values for ($f_{\text{center}} + 0 \times 50\text{kHz}$) to ($f_{\text{center}} + 40 \times 50\text{kHz}$)

System Bandwidth = $f_{\text{center}} \pm 6\text{MHz}$ (6000kHz = 120 x 50kHz)
 System Channel = 2442MHz
 System Data Rate = 2Mbit/s

2444.00	+40 x 50	-61.1	-60.2	-0.9
2444.05	+41 x 50	-61.7	-60.2	-1.5
2444.10	+42 x 50	-60.7	-60.2	-0.5
2444.15	+43 x 50	-60.5	-60.2	-0.3
2444.20	+44 x 50	-60.3	-60.2	-0.1
2444.25	+45 x 50	-60.3	-60.2	-0.1
2444.30	+46 x 50	-60.4	-60.2	-0.2
2444.35	+47 x 50	-60.6	-60.2	-0.4
2444.40	+48 x 50	-60.9	-60.2	-0.7
2444.45	+49 x 50	-61.2	-60.2	-1.0
2444.50	+50 x 50	-61.0	-60.2	-0.8
2444.55	+51 x 50	-61.0	-60.2	-0.8
2444.60	+52 x 50	-61.1	-60.2	-0.9
2444.65	+53 x 50	-61.1	-60.2	-0.9
2444.70	+54 x 50	-61.4	-60.2	-1.2
2444.75	+55 x 50	-61.4	-60.2	-1.2
2444.80	+56 x 50	-61.4	-60.2	-1.2
2444.85	+57 x 50	-60.9	-60.2	-0.7
2444.90	+58 x 50	-60.9	-60.2	-0.7
2444.95	+59 x 50	-60.9	-60.2	-0.7
2445.00	+60 x 50	-60.9	-60.2	-0.7
2445.05	+61 x 50	-60.7	-60.2	-0.5
2445.10	+62 x 50	-60.7	-60.2	-0.5
2445.15	+63 x 50	-60.6	-60.2	-0.4
2445.20	+64 x 50	-60.6	-60.2	-0.4
2445.25	+65 x 50	-60.5	-60.2	-0.3
2445.30	+66 x 50	-60.5	-60.2	-0.3
2445.35	+67 x 50	-60.7	-60.2	-0.5
2445.40	+68 x 50	-60.8	-60.2	-0.6
2445.45	+69 x 50	-60.8	-60.2	-0.6
2445.50	+70 x 50	-60.8	-60.2	-0.6
2445.55	+71 x 50	-60.9	-60.2	-0.7
2445.60	+72 x 50	-60.9	-60.2	-0.7
2445.65	+73 x 50	-60.9	-60.2	-0.7
2445.70	+74 x 50	-60.8	-60.2	-0.6
2445.75	+75 x 50	-60.8	-60.2	-0.6
2445.80	+76 x 50	-60.7	-60.2	-0.5
2445.85	+77 x 50	-60.7	-60.2	-0.5
2445.90	+78 x 50	-60.7	-60.2	-0.5
2445.95	+79 x 50	-60.6	-60.2	-0.4
2446.00	+80 x 50	-60.3	-60.2	-0.1

Table B.1.5 - J/S values for ($f_{\text{center}} + 40 \times 50\text{kHz}$) to ($f_{\text{center}} + 80 \times 50\text{kHz}$)

System Bandwidth = $f_{\text{center}} \pm 6\text{MHz}$ (6000kHz = 120 x 50kHz)
 System Channel = 2442MHz
 System Data Rate = 2Mbit/s

2446.00	+80 x 50	-60.3	-60.2	-0.1
2446.05	+81 x 50	-60.3	-60.2	-0.1
2446.10	+82 x 50	-60.2	-60.2	0.0
2446.15	+83 x 50	-60.2	-60.2	0.0
2446.20	+84 x 50	-60.3	-60.2	-0.1
2446.25	+85 x 50	-60.5	-60.2	-0.3
2446.30	+86 x 50	-60.5	-60.2	-0.3
2446.35	+87 x 50	-60.6	-60.2	-0.4
2446.40	+88 x 50	-60.6	-60.2	-0.4
2446.45	+89 x 50	-60.7	-60.2	-0.5
2446.50	+90 x 50	-60.8	-60.2	-0.6
2446.55	+91 x 50	-61.2	-60.2	-1.0
2446.60	+92 x 50	-61.2	-60.2	-1.0
2446.65	+93 x 50	-61.3	-60.2	-1.1
2446.70	+94 x 50	-61.3	-60.2	-1.1
2446.75	+95 x 50	-61.4	-60.2	-1.2
2446.80	+96 x 50	-61.2	-60.2	-1.0
2446.85	+97 x 50	-61.1	-60.2	-0.9
2446.90	+98 x 50	-61.0	-60.2	-0.8
2446.95	+99 x 50	-60.8	-60.2	-0.6
2447.00	+100 x 50	-60.5	-60.3	-0.2
2447.05	+101 x 50	-60.0	-60.3	0.3
2447.10	+102 x 50	-59.6	-60.3	0.7
2447.15	+103 x 50	-59.4	-60.3	0.9
2447.20	+104 x 50	-59.3	-60.3	1.0
2447.25	+105 x 50	-59.2	-60.3	1.1
2447.30	+106 x 50	-59.2	-60.3	1.1
2447.35	+107 x 50	-59.1	-60.3	1.2
2447.40	+108 x 50	-59.1	-60.3	1.2
2447.45	+109 x 50	-59.4	-60.3	0.9
2447.50	+110 x 50	-59.2	-60.3	1.1
2447.55	+111 x 50	-59.3	-60.3	1.0
2447.60	+112 x 50	-59.4	-60.3	0.9
2447.65	+113 x 50	-59.4	-60.3	0.9
2447.70	+114 x 50	-59.5	-60.3	0.8
2447.75	+115 x 50	-59.7	-60.3	0.6
2447.80	+116 x 50	-59.8	-60.3	0.5
2447.85	+117 x 50	-59.8	-60.3	0.5
2447.90	+118 x 50	-59.8	-60.3	0.5
2447.95	+119 x 50	-59.9	-60.3	0.4
2448.00	+120 x 50	-60.0	-60.3	0.3

Table B.1.6 - J/S values for ($f_{\text{center}} + 80 \times 50\text{kHz}$) to ($f_{\text{center}} + 120 \times 50\text{kHz}$)

B.4 Summary J/S values

All the J/S values measured at the 2Mbit/s data rate are collected in Table B.2 and sorted in ascending order. The lowest 20% of the points are then discarded.

The remaining lowest J/S measurement is **-1.8dB**.

					Table 6
-1.6	-1.9	-3.0	-2.3	-1.5	-1.2
-1.6	-1.8	-2.3	-2.2	-1.2	-1.1
-1.5	-1.7	-2.3	-2.1	-1.2	-1.1
-1.4	-1.7	-2.2	-2.1	-1.2	-1.0
-1.4	-1.7	-2.2	-2.0	-1.0	-1.0
-1.3	-1.6	-2.2	-1.9	-0.9	-1.0
-1.2	-1.6	-2.1	-1.8	-0.9	-0.9
-1.2	-1.6	-2.1	-1.8	-0.9	-0.8
-1.2	-1.4	-2.1	-1.7	-0.8	-0.6
-1.2	-1.4	-2.1	-1.6	-0.8	-0.6
-1.1	-1.4	-2.1	-1.5	-0.7	-0.5
-1.0	-1.4	-2.0	-1.4	-0.7	-0.4
-1.0	-1.4	-2.0	-1.4	-0.7	-0.4
-1.0	-1.4	-1.9	-1.4	-0.7	-0.3
-1.0	-1.4	-1.9	-1.4	-0.7	-0.3
-0.9	-1.4	-1.9	-1.4	-0.7	-0.2
-0.9	-1.4	-1.8	-1.3	-0.7	-0.1
-0.9	-1.4	-1.8	-1.3	-0.7	-0.1
-0.9	-1.4	-1.8	-1.3	-0.6	-0.1
-0.9	-1.4	-1.8	-1.3	-0.6	0.0
-0.9	-1.3	-1.7	-1.3	-0.6	0.0
-0.2	-1.3	-1.7	-1.2	-0.6	0.3
-0.2	-1.3	-1.6	-1.2	-0.6	0.3
0.0	-1.3	-1.6	-1.2	-0.5	0.4
0.0	-1.2	-1.6	-1.1	-0.5	0.5
0.0	-1.2	-1.6	-1.1	-0.5	0.5
0.0	-1.2	-1.6	-1.0	-0.5	0.5
0.0	-1.2	-1.6	-1.0	-0.5	0.6
0.1	-1.2	-1.5	-1.0	-0.5	0.7
0.1	-1.1	-1.5	-1.0	-0.5	0.8
0.1	-1.1	-1.4	-0.9	-0.4	0.9
0.1	-1.1	-1.4	-0.9	-0.4	0.9
0.2	-1.0	-1.3	-0.8	-0.4	0.9
0.2	-0.9	-1.3	-0.7	-0.4	0.9
0.3	-0.9	-1.3	-0.6	-0.3	1.0
0.3	-0.9	-1.2	-0.6	-0.3	1.0
0.3	-0.9	-1.1	-0.5	-0.3	1.1
0.4	-0.8	-0.9	-0.5	-0.2	1.1
0.5	-0.8	-0.9	-0.5	-0.1	1.1
0.5	-0.6	-0.8	-0.5	-0.1	1.2
0.5	-0.5	-0.8	-0.4	-0.1	1.2

Table B.2 - J/S Values sorted in ascending order

B.5 Measured processing gain

Summary of processing gain figures:

$$E_s/N_0 = 13.3\text{dB} \text{ (Required energy per symbol - to - noise ratio)}$$

$$M_J = -1.8\text{dB} \text{ (Jamming margin, or J/S ratio)}$$

$$L_{\text{SYS}} = 2\text{dB} \text{ (System implementation loss)}$$

These values are used to determine the processing gain:

$$\begin{aligned} G_p &= 13.3\text{dB} + (-1.8\text{dB}) + 2\text{dB} \\ &= 13.5\text{dB} \end{aligned}$$

13.5dB of processing gain falls within the acceptable FCC limits required under part 15.247(e) rules.