

2.11 20 dB Bandwidth per FCC Section 15.247(a)(1)(ii)

The antenna port was connected to a spectrum analyzer that was set for a 50 Ω impedance with the RBW = approximately 1/100 of the manufacturers claimed RBW & VBW > RBW. The results of this test are given in Table 6 and Figure 6a through 6c.

TABLE 6
20 dB Bandwidth

Frequency (MHz)	20 dB Bandwidth (MHz)	MAXIMUM FCC LIMIT (MHz)
903.1345	0.095	1.0
910.3350	0.085	1.0
917.8350	0.08625	1.0

Test Date: **February 17, 2005**

Tester
Signature:  **Name:** **David Blethen**

Figure 6a.
20 dB Bandwidth per FCC Section 15.247(a)(1)(ii) (Low Channel)

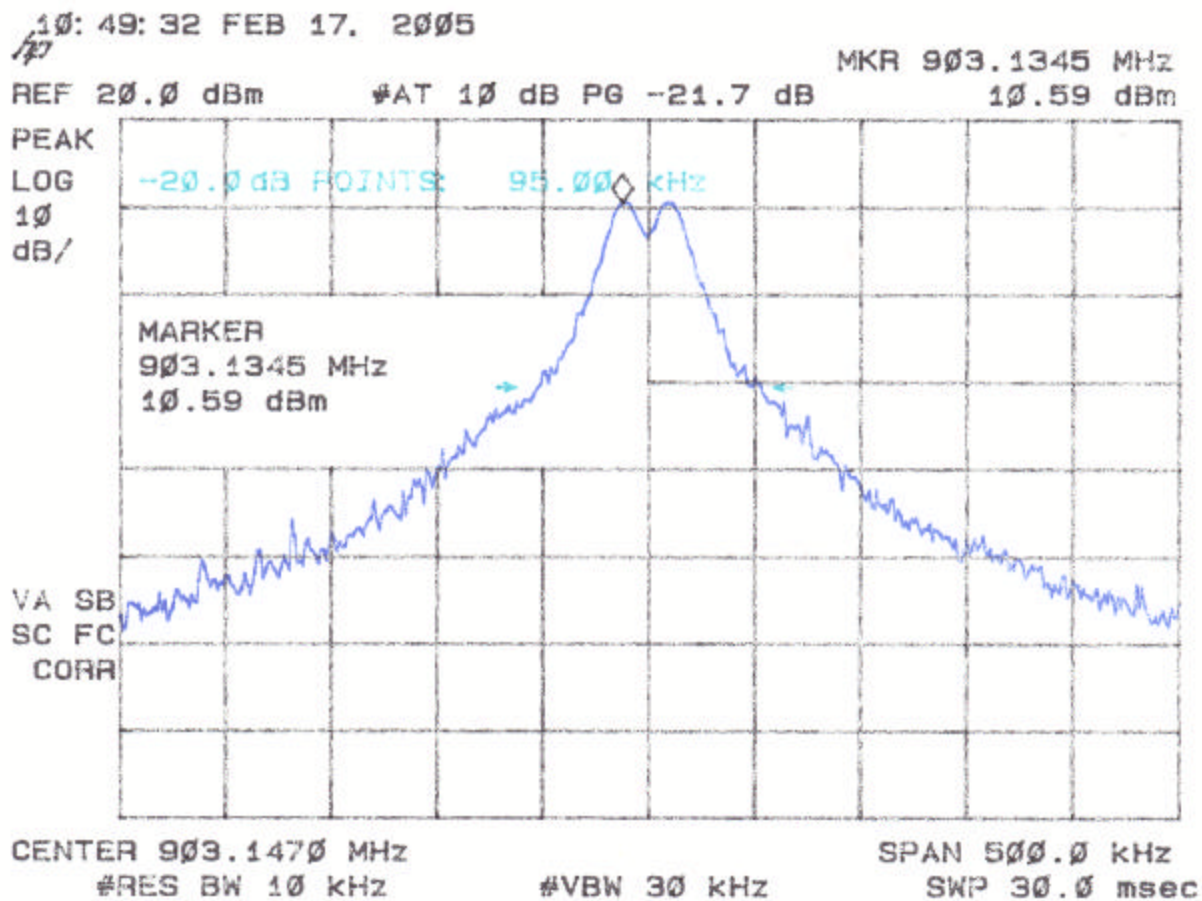


Figure 6b.
20 dB Bandwidth per FCC Section 15.247(a)(1)(ii) (Mid Channel)

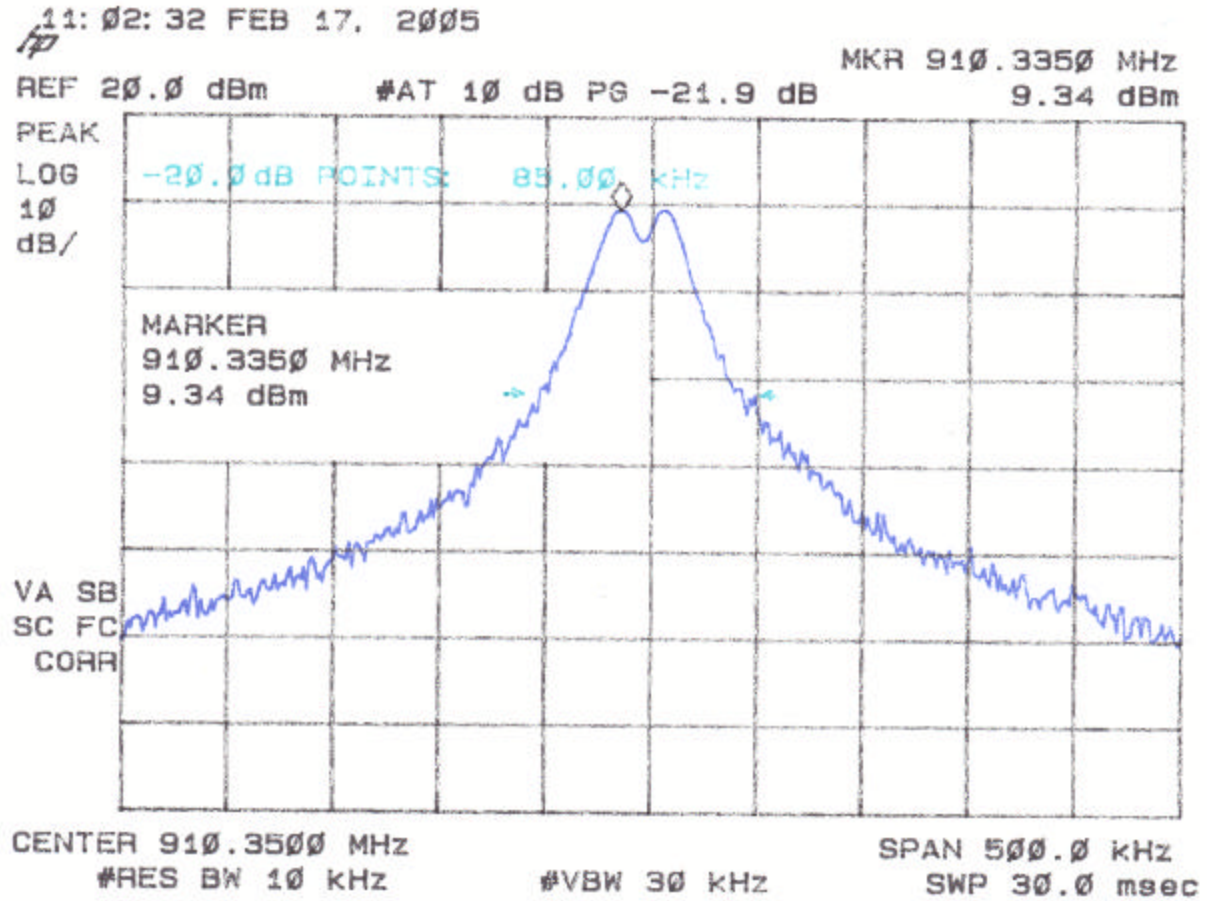
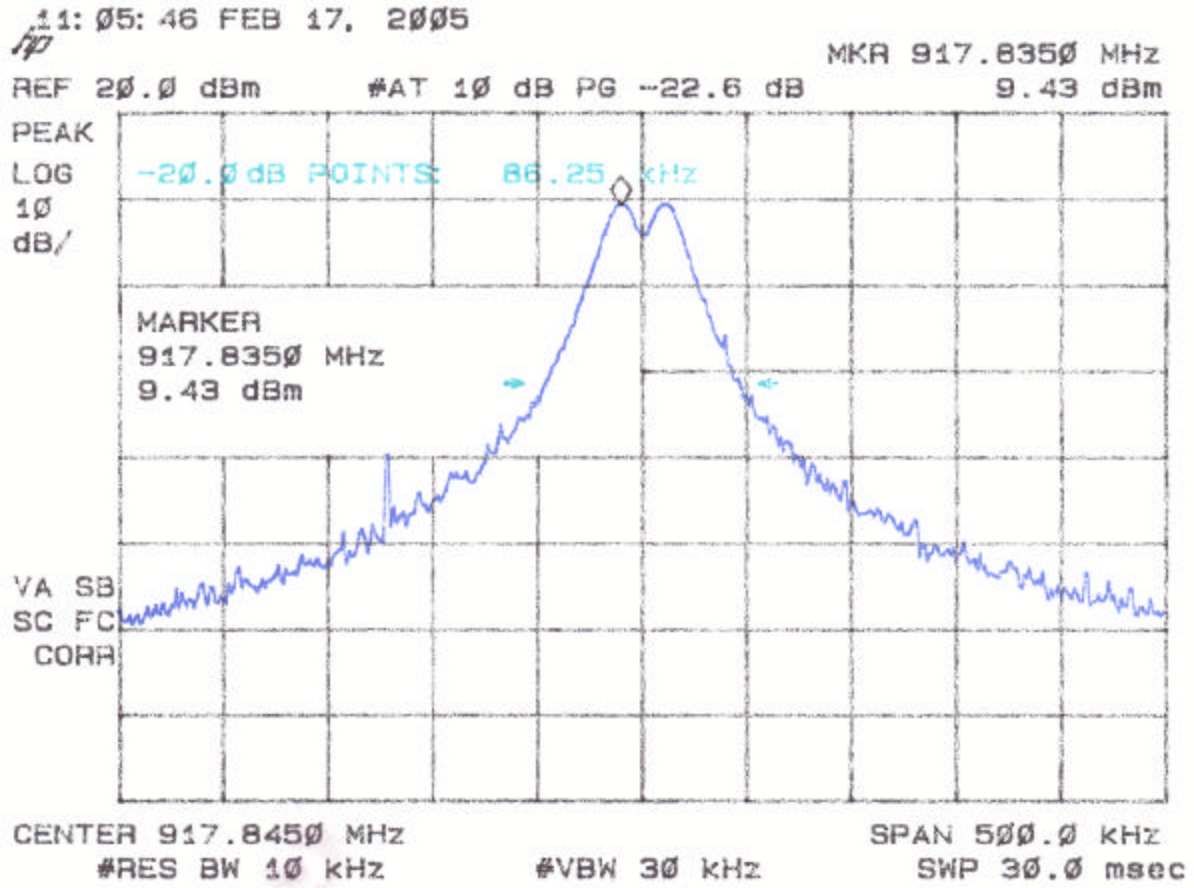


Figure 6c.
20 dB Bandwidth per FCC Section 15.247(a)(1)(ii) (High Channel)



2.12 Number of Hopping Channels FCC Section 15.247(a)(1)(ii)

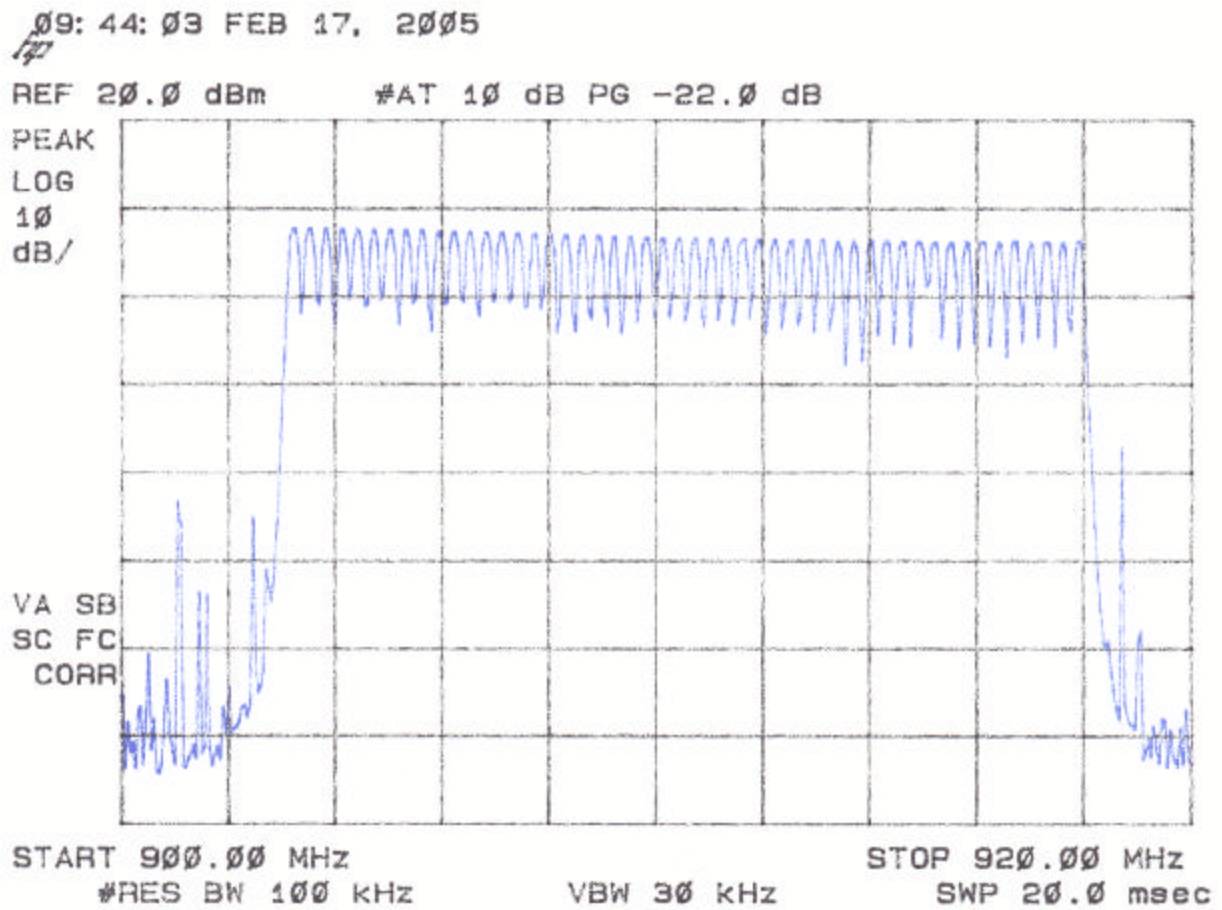
The transmitter was placed into a typical frequency hopping mode of operation. The 902-928 MHz band was centered on the screen and the RBW and VBW chosen such that the individual channels could be discerned. The trace capture time was a minimum of 5 minutes.

The results of this test are given in Table 7 and Figure 7.

TABLE 7
NUMBER OF HOPPING CHANNELS

Number of Hopping Frequencies Measured	FCC Limit (Minimum Number of Channels)
50	50

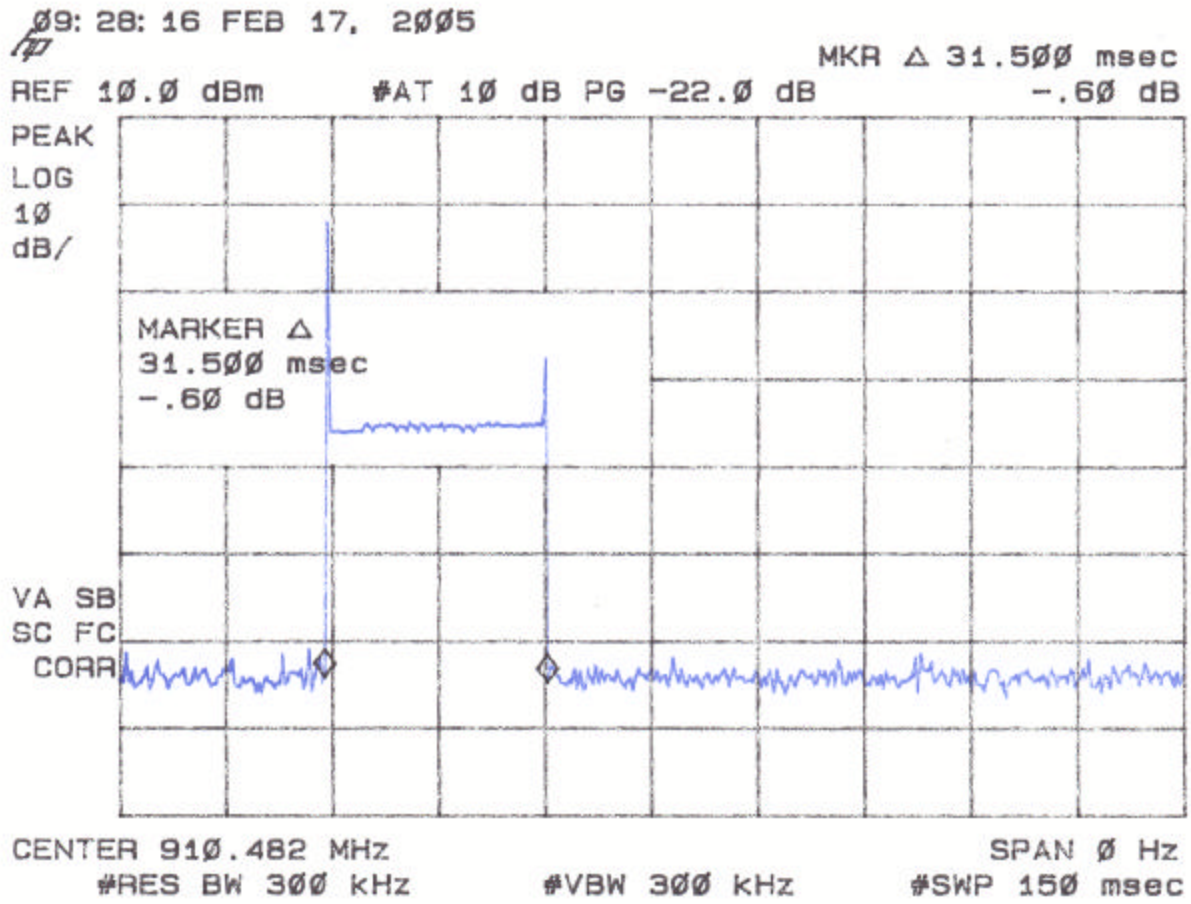
Figure 7
Number of Hopping Channels FCC Section 15.247(a)(1)(ii)



2.13 Average Time of Occupancy per Channel FCC Section 15.247(a)(1)(ii)

The maximum transmit time of the EUT, based upon software and firmware settings, is 32 ms average time of occupancy.

Figure 8
Average Time of Occupancy per Channel FCC Section 15.247(a)(1)(ii)



2.14 Power Line Conducted Emissions for Transmitter FCC Section 15.207

The conducted voltage measurements have been carried out in accordance with FCC Section 15.207, with a spectrum analyzer connected to a LISN and the EUT placed into a continuous mode of transmit. The results are given in Tables 8a-8b.

TABLE 8a. CONDUCTED EMISSIONS DATA

CLASS B

(Peak-Quasi Peak Measurements vs Average Limits) PHASE DATA

Line Conducted Emissions								
Test By:	Test:	Part 15 Certification / Phase/ AVG limits			Client:	The Bodine Company		
DPB	Project:	05-0069	Class:	A	Model:	FEBnet Node		
Frequency	Test Data	AF	Test Data	AF+CA-AMP	Results	Limits	Margin	PK = n
(MHz)	(dBm)	Table	(dBuV)	(dB)	(dBuV)	(dBuV)	(dB)	/ QP
0.16	-65.4	LISNP	41.6	0.2	41.8	66.0	24.2	PK
0.245	-65.7	LISNP	41.3	0.2	41.5	66.0	24.5	PK
0.273	-76.2	LISNP	30.8	0.2	31.0	66.0	35.0	QP, PK=-63
4.455	-77.3	LISNP	29.7	0.6	30.3	60.0	29.7	PK
8.015	-80.4	LISNP	26.6	0.7	27.3	60.0	32.7	PK
15.18	-70.7	LISNP	36.3	0.9	37.2	60.0	22.8	PK

SAMPLE CALCULATIONS: 41.6 + 0.2 = 41.8 dBuV

Test Date: February 1, 2005

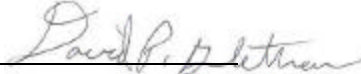
Tested by
Signature:  Name: David Blethen

TABLE 8b. CONDUCTED EMISSIONS DATA

CLASS B

(Peak-Quasi Peak Measurements vs Average Limits) NEUTRAL DATA

Line Conducted Emissions								
Test By:	Test:	Part 15 Certification / Neutral / AVG limits			Client:	The Bodine Company		
DPB	Project:	05-0069	Class:	A	Model:	FEBnet Node		
Frequency	Test Data	AF	Test Data	AF+CA-AMP	Results	Limits	Margin	PK = n
(MHz)	(dBm)	Table	(dBuV)	(dB)	(dBuV)	(dBuV)	(dB)	/ QP
0.21	-65.2	LISNN	41.8	0.3	42.1	66.0	23.9	PK
0.245	-63.5	LISNN	43.5	0.2	43.7	66.0	22.3	PK
0.273	-65.6	LISNN	41.4	0.2	41.6	66.0	24.4	PK
4.455	-76.2	LISNN	30.8	0.6	31.4	60.0	28.6	PK
7.895	-77.2	LISNN	29.8	0.7	30.5	60.0	29.5	PK
15.18	-70.1	LISNN	36.9	0.9	37.8	60.0	22.2	PK

SAMPLE CALCULATIONS: $41.8 + 0.2 = 42.1$ dBuV

Test Date: February 2, 2005

Tested by
Signature: David P. Blethen Name: David Blethen

2.15 Radiated Emissions for Digital Device & Receiver (47 CFR 15.109a)

Radiated emissions were evaluated from 30 to 14500 MHz while the EUT was placed into a Receive mode of operation. Measurements were made with the analyzer's bandwidth set to 120 kHz measurements made less than 1 GHz and 1 MHz for measurements made greater than or equal to 1 GHz. The results for less than 1 GHz are shown in Table 9.

**TABLE 9a. RADIATED EMISSIONS DATA
(Digital Device & Receiver)**

CLASS B

Measurements 30 MHz – 1 GHz

Radiated Emissions								
Test By:	Test:	FCC Part 15.109				Client:	The Bodine Company	
DPB	Project:	05-0069	Class:		NA	Model:	FEBnet node	
Frequency	Test Data	Test Data	AF+CA-AMP	Results	Limits	Distance /	Margin	PK = n
(MHz)	(dBm)	(dBuV)	(dB)	(uV/m)	(uV/m)	Polarity	(dB)	/ QP
43.00	-94.0	13.0	11.6	17.0	100.0	3m./VERT	15.4	PK
109.6	-94.0	13.0	13.3	20.8	150.0	3m./VERT	17.2	PK
123.2	-84.0	23.0	15.1	80.4	150.0	3m./VERT	5.4	QP, PK=-84
229	-92.0	15.0	14.7	30.5	200.0	3m./VERT	16.3	PK
346	-91.0	16.0	18.9	55.8	200.0	3m./VERT	11.1	PK
375	-87.0	20.0	19.4	93.1	200.0	3m./VERT	6.6	PK

SAMPLE CALCULATIONS:

RESULTS uV/m @ 3m

Antilog $((-94.0 + 13.0 + 107)/20) = 17.0$

CONVERSION FROM dBm TO dBuV = 107 dB

Margin in dB = $20 / \log (43.3 / 200.0) = 13.0$ dB

Test Date: February 15, 2005

Tested by

Signature:



Name: David Blethen

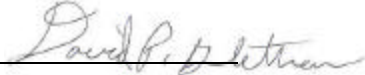
TABLE 9b. RADIATED EMISSIONS DATA
(Digital Device & Receiver)

CLASS B

Measurements 1 GHz – 5 GHz (PEAK)

Frequency (MHz)	Receiver Reading (dBm) @3m	Correction Factor (dB)	Corrected Reading (uV/m)	FCC Limit (uV/m) @3m	Margin Below FCC Limit (dB) @3m
No emissions seen within 20dB of the FCC Limit					

Test Date: February 15, 2005

Tested by
Signature: 

Name: David Blethen

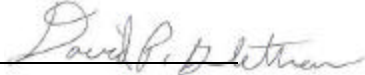
TABLE 9b. RADIATED EMISSIONS DATA
(Digital Device & Receiver)

CLASS B

Measurements 1 GHz – 5 GHz (AVERAGE)

Frequency (MHz)	Receiver Reading (dBm) @3m	Correction Factor (dB)	Corrected Reading (uV/m)	FCC Limit (uV/m) @3m	Margin Below FCC Limit (dB) @3m
No emissions seen within 20dB of the FCC Limit					

Test Date: February 15, 2005

Tested by
Signature: _____ 

Name: David Blethen

2.16 Power Line Conducted Emissions for Digital Device and Receiver FCC Section 15.107

The conducted voltage measurements have been carried out in accordance with FCC Section 15.107, with a spectrum analyzer connected to a LISN and the EUT placed into an idle condition or a continuous mode of receive. Similar results were seen as compared to the EUT in a transmit mode of operation. **Therefore, please refer to the results as shown in Table 8.**

2.17 Channel Separation

The transmitter was placed into a typical frequency hopping mode of operation. Using an RBW and UBW of 30 kHz, the delta between 2 peaks was measured and the distance between them was noted. Characteristics of the time of occupancy are shown in Figure 9 and Table 10.

TABLE 10
CHANNEL SEPARTAION

Channel Separation	FCC Limit (Minimum)
335 kHz	25 kHz, 20 dB Bandwidth

Figure 9
Channel Separation FCC Section 15.247(a)(1)(ii)

