

Test Site Services, Inc.



NVLAP Lab Code 100419-0

EMI Test Report

Pepper Computer Inc.

Pepper Wireless PAD

Model PP20624

Intentional Radiator (Bluetooth)

FCC, Part 15 Subpart C

Section 15.247

Test # B05143A

Test Site Services, Inc.
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Revision History

REV. #	CHANGES of CONTENT	SECTION AFFECTED	REVIEWED BY	DATE
0	Original Release	All	RLW	12-Jul-05
1	Additional Information	Pages 4, 27, 35, 36 & 37	RLW	18-Jul-05

EMI Test Report for Pepper Computer Inc.

Test Number : B05143

Product Name : Pepper Wireless PAD

Date : 21~29-June-2005

**Report Reviewed
& Accepted by:**

Pepper Computer Inc.
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Suite 221
Lexington, MA 02421
Phone:1-781-862-2500
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Report Issued By:



Richard L. Wiedeman, Laboratory Director

Tested By:

T Charron, Test Engineer
B Farrell, Test Engineer
Radiated & Conducted Emissions

This test report is not valid without the signatures of Test Site Services, Inc. personnel.

Administrative Data

Regulation : FCC Part 15, Subpart C, Section 15.247 (a), (b), (c), (f)
: FCC Part 15, Subpart C, Section 15.205, 15.207, 15.209 (2002)

Level : Per 15.247

Test Method : ANSI C63.4- (2003)
: OET/FCC Guidance Documents

Test Type : Qualification / Intentional Radiator
: Portion of Composite Device (Bluetooth)

Manufacturer : Pepper Computer Inc.

EUT Type/Model # : Pepper Wireless PAD / PP20624

Date(s) of Test : 21~29-June-2005

Customer Personnel : Andy DeAngelis Design Engineer

TSS Personnel : R. Wiedeman EMC Engineer
: T. Charron Test Engineer
: B. Farrell Test Engineer

Test Location(s) **Test Site Services, Inc.**
30 Birch St
Milford, MA 01757
U.S.A.

EUT Returned Via: Customer Pickup

NOTICE : FCC Rule 2.955 requires that a Verification Report for a Class B Computing Device must be signed by “an Official of the Company responsible for the device”. A signature block has been provided on the first page for this purpose.

EUT Description

The EUT (Pepper Wireless PAD / Model PP20624). The Pepper Wireless Pad from Pepper Computer is a portable device designed to support broadband activities such as browsing the Web, e-mail, Instant Messaging, listening to music, watching videos, sharing photos and creating personal journals .It has both Wi-Fi and Bluetooth capability integral to the device. It is a composite device in a single enclosure with unintentional and intentional radiator sections.

A complete description of the EUT may be found on Block Identifier 1.

The tests were run in a typical configuration including the following equipment:

- 1) Pepper Wireless PAD / Model PP20624 (EUT)
- 2) Scan Disk Card Reader / (USB Interface)
- 3) Microphone
- 4) Headphones
- 5) Video Monitor

REASON FOR TEST:

Qualification of the Intentional Radiator Portion of a composite device (Bluetooth). As this device is also a Class B computing device, it has been tested separately for compliance to FCC Part 15b as an unintentional radiator.

CHANGES MADE DURING TEST:

None

DEVIATIONS FROM STANDARD TEST METHOD:

None

Test Summary

Standard Section	Test Type	Limit	Result	Comments
15.247 (a) (1)	Hopping Channel Bandwidth	25 KHz (min.)	Pass	
15.247 (a) (1)	Hopping Channel Separation	25 KHz or 20dB Bandwidth (min.)	Pass	
15.247 (b) (1)	Number of Hopping Channel Frequencies	75 (min.)	Pass	
15.247 (a) (1) (iii)	Dwell Time Each Frequency	.4 sec. (max.)	Pass	
15.247 (c)	Band Edges	20 dB lower than fundamental Peak (max.)	Pass	
15.207	AC Power Line Conducted Emissions	Table 15.207	Pass	
15.247 (c)	Radiated Emissions	Table 15.209	Pass	
15.247 (b) (1)	Max. Peak Output Power	30 dBm	Pass	EIRP

EUT Characteristics (Manufacturers Declaration)

Product: Pepper Wireless Pad, Portable PC type computing device with integral intentional radiator.

Model: PP20624

Power: 5 VDC from wall mounted power supply module/internal battery

Class: 2, v1.1

Modulation type: GFSK

Radio technology: FHSS

Transfer rate: 1 Mb/s; DH1=172 kb/s

Frequency range: 2402-2480 MHz.

Output power: +1dBm typical (-4dBm min., +4dBm max).

Antenna type: mounted on internal pcb

Antenna port: No accessible antenna port; antenna integral to device

I/O ports: Microphone, headset, USB, video

Associated devices: n/a

Operational Frequencies:

Channel	Frequency	Channel	Frequency	Channel	Frequency
0	2402	27	2429	54	2456
1	2403	28	2430	55	2457
2	2404	29	2431	56	2458
3	2405	30	2432	57	2459
4	2406	31	2433	58	2460
5	2407	32	2434	59	2461
6	2408	33	2435	60	2462
7	2409	34	2436	61	2463
8	2410	35	2437	62	2464
9	2411	36	2438	63	2465
10	2412	37	2439	64	2466
11	2413	38	2440	65	2467
12	2414	39	2441	66	2468
13	2415	40	2442	67	2469
14	2416	41	2443	68	2470
15	2417	42	2444	69	2471
16	2418	43	2445	70	2472
17	2419	44	2446	71	2473
18	2420	45	2447	72	2474
19	2421	46	2448	73	2475
20	2422	47	2449	74	2476
21	2423	48	2450	75	2477
22	2424	49	2451	76	2478
23	2425	50	2452	77	2479
24	2426	51	2453	78	2480
25	2427	52	2454		
26	2428	53	2455		

Test Data Summary

Part 1. Hopping Channel Bandwidth FCC 15.247 (a) (1)

Test Procedure:

Radiated measurement @ 3m.

EUT placed on 80cm. table and emission maximized for height and rotation.

Test Equipment:

R&S receiver/analyzer

HP pre-amp

Dual-Ridged Guide Antenna

Plotter

Test Parameters:

RBW=30KHz

VBW=100KHz

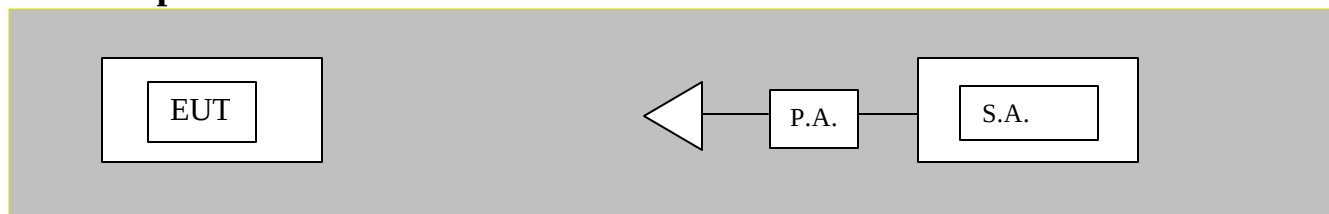
Sweep=Auto

Detector=Peak

Atten= Auto

Span=As required, see graphs

Test Setup:



Refer to Appendix A for photograph(s) of the actual test setup.

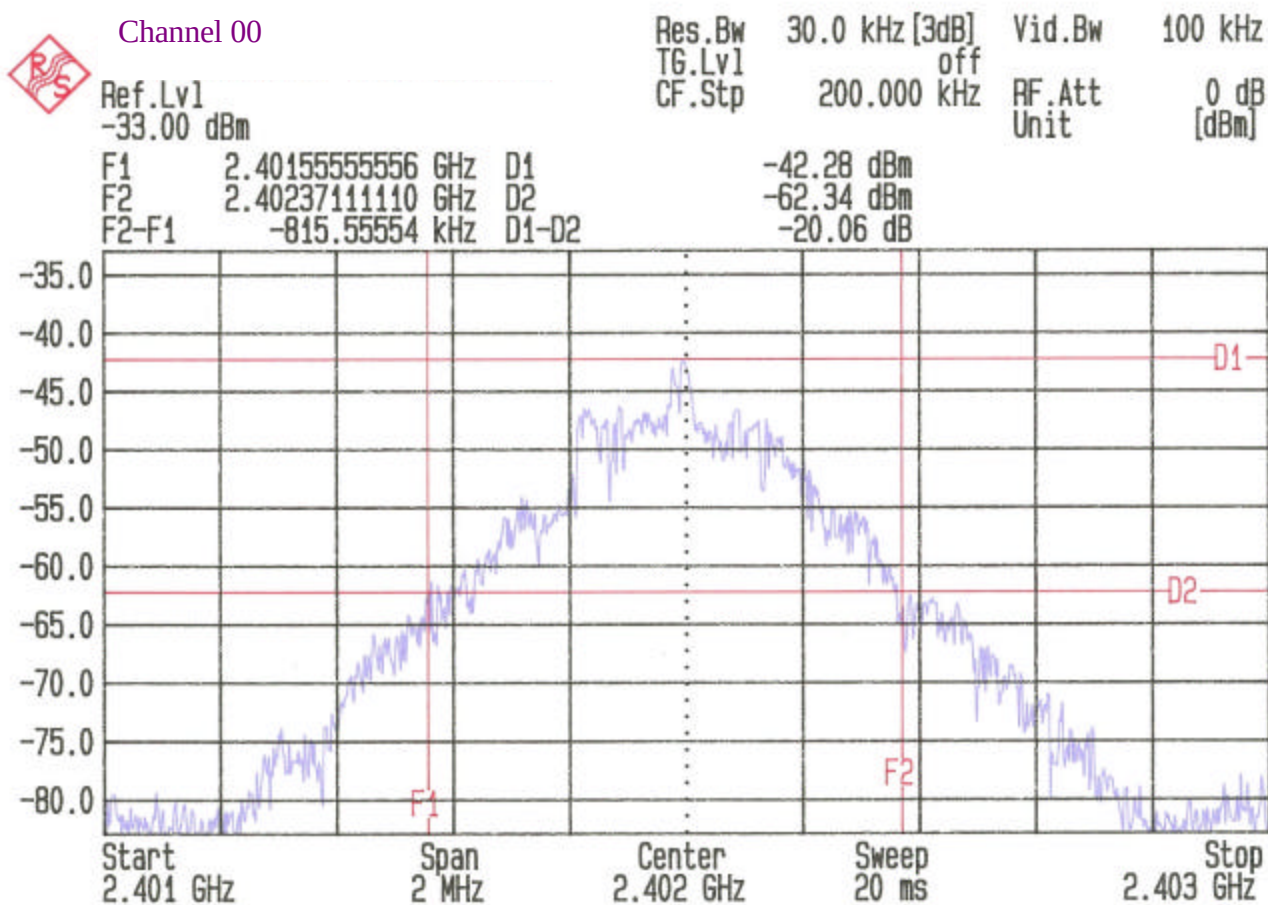
EUT Operating Conditions:

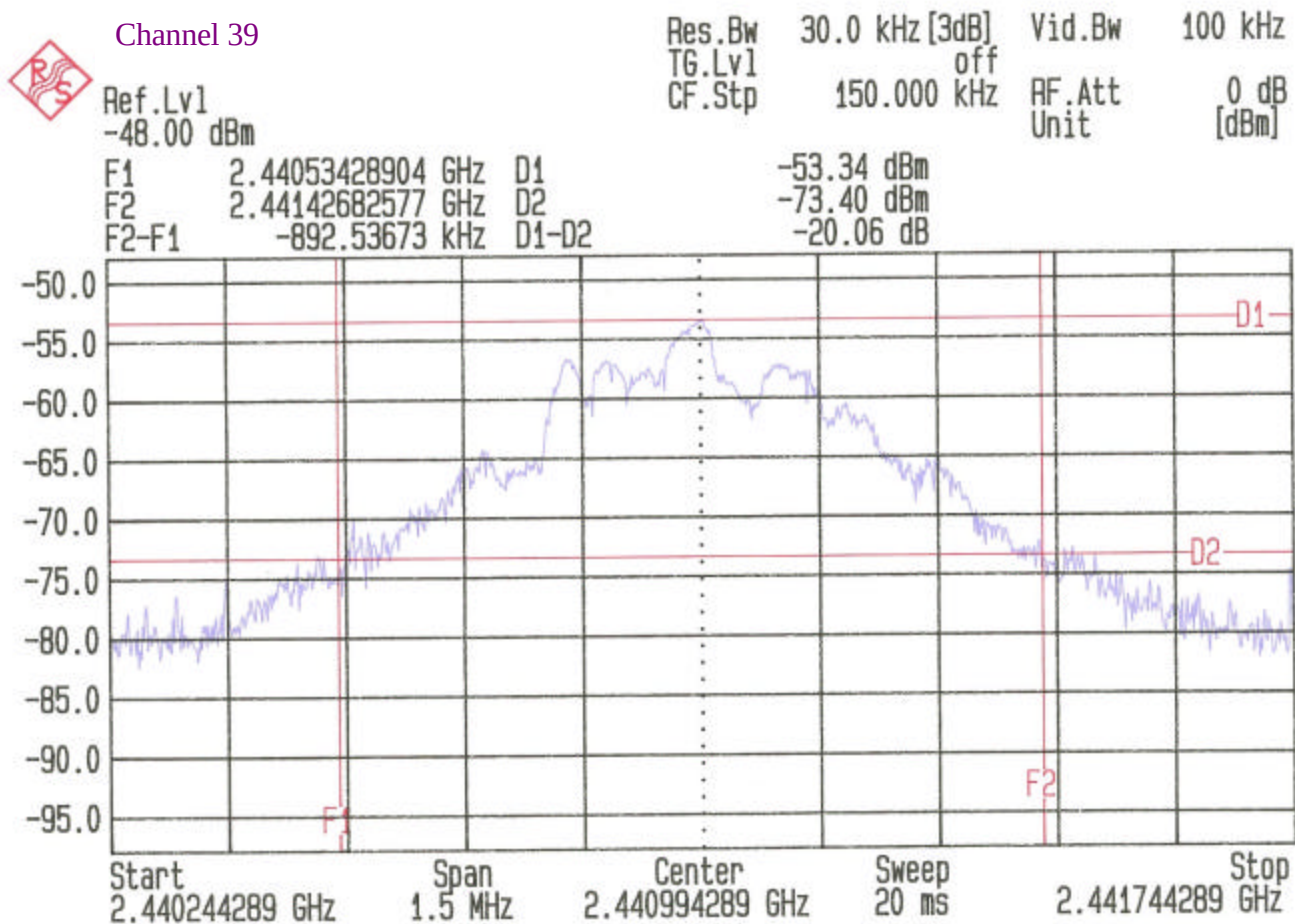
Software was provided by client to activate and maintain EUT transmitting continuously with max. power at the lowest, middle and highest channel frequencies individually. DH1 packet. Modulation is GFSK. 802.11b disabled.

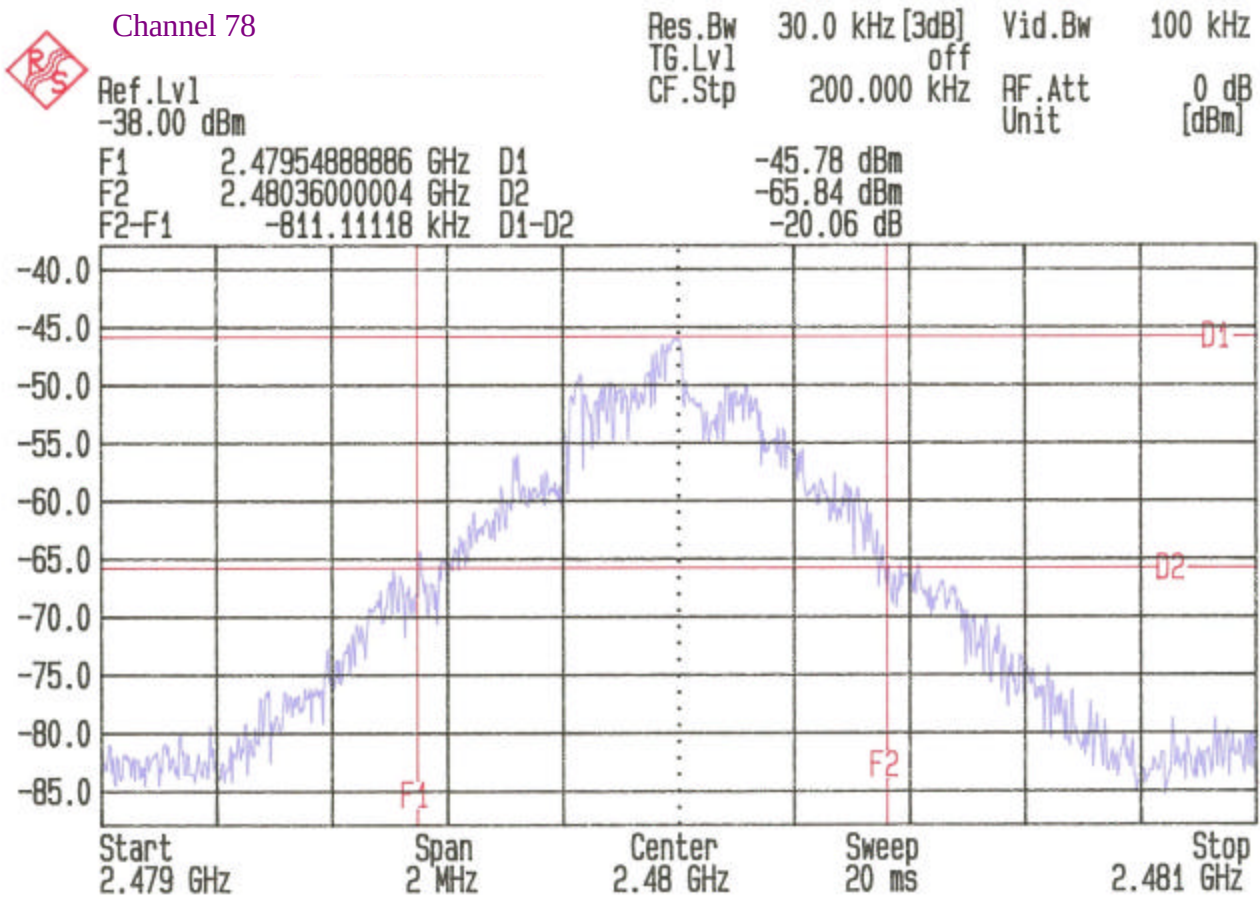
Test Results:

Channel	Channel Frequency (MHz)	20dB Bandwidth (MHz)	Minimum Limit (KHz)	Pass / Fail
00	2402	815.55	25	Pass
39	2441	892.53	25	Pass
78	2448	811.11	25	Pass

Test Data: Refer to the following plots







Part 2. Hopping Channel Separation FCC 15.247 (a) (1)

Test Procedure:

Radiated measurement @ 3m.

EUT placed on 80cm. table and emission maximized for height and rotation.

Test Equipment:

R&S receiver/analyzer

HP pre-amp

Dual-Ridged Guide Antenna

Plotter

Test Parameters:

RBW=100KHz

VBW=300KHz

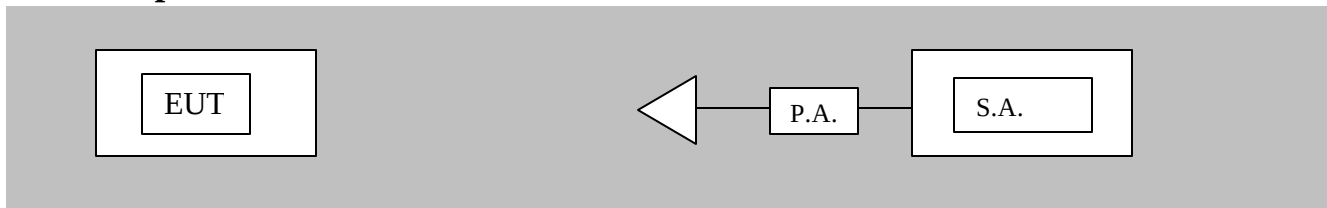
Sweep=Auto

Detector=Peak

Atten= Auto

Span=As required, see graphs

Test Setup:



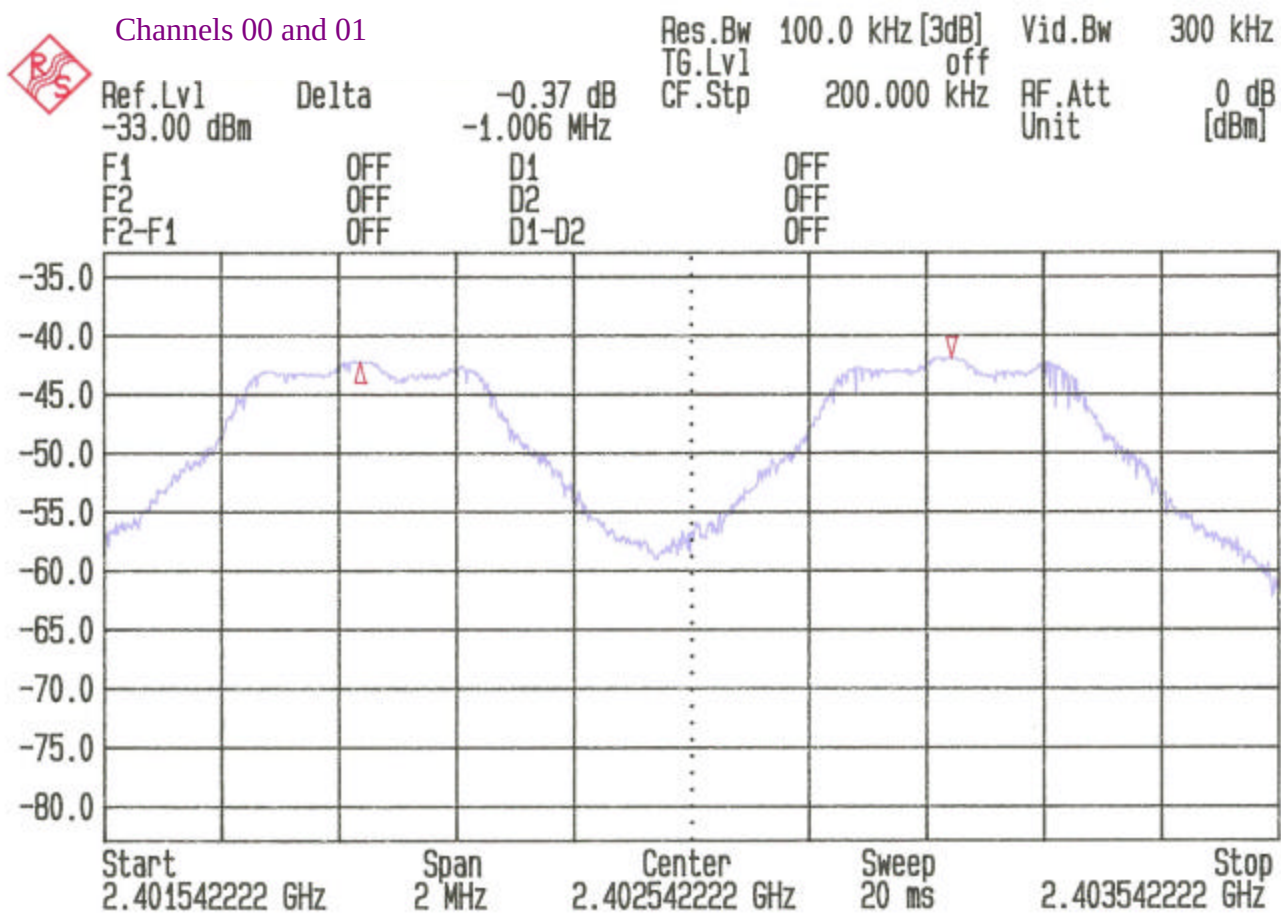
Refer to Appendix A for photograph(s) of the actual test setup.

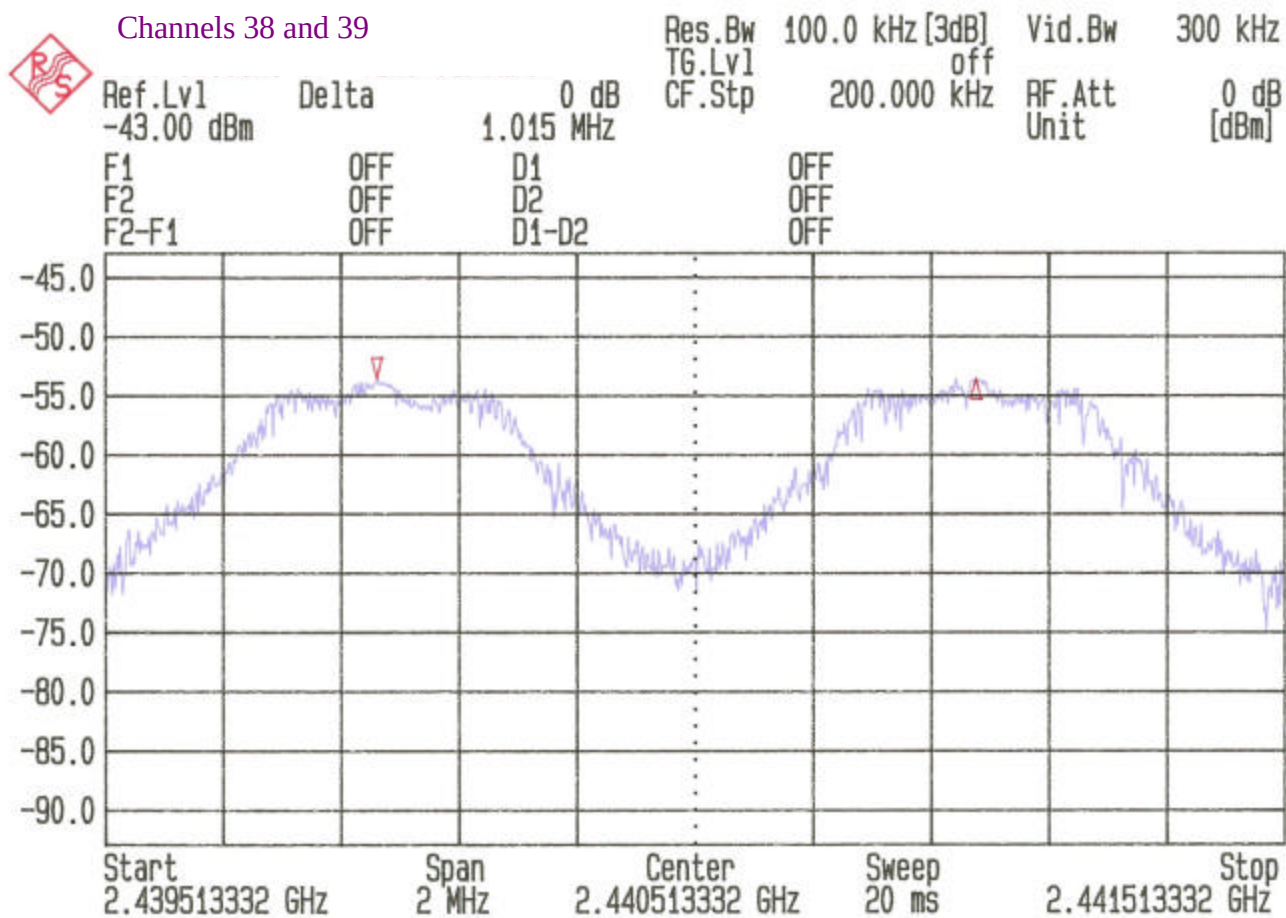
EUT Operating Conditions:

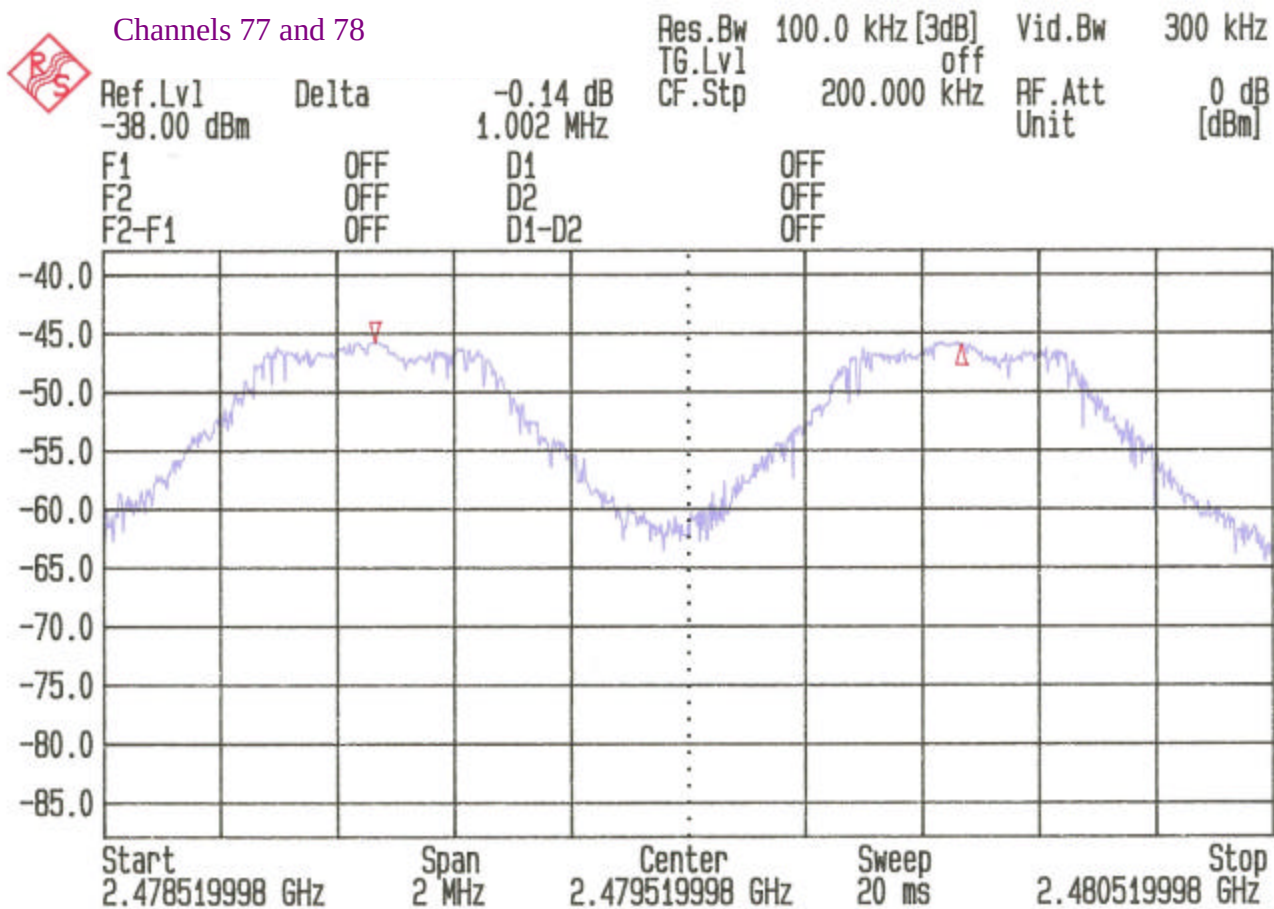
Software was provided by client to activate and maintain EUT transmitting continuously with max. power at the lowest, middle and highest channel frequencies individually. DH1 Packet Modulation is GFSK. 802.11b disabled.

Test Results:

Channel	Channel Frequency (MHz)	Channel Separation	Min. Limit (KHz)	Pass/Fail
00	2402	1006	815.55	Pass
39	2441	1015	892.53	Pass
78	2480	1002	811.11	Pass







Part 3. Number of Hopping Frequencies FCC 15.247 (b) (1)

Test Procedure:

Radiated measurement @ 3m.

EUT placed on 80cm. table and emission maximized for height and rotation.

Test Equipment:

R&S receiver/analyzer

HP pre-amp

Dual-Ridged Guide Antenna

Plotter

Test Parameters:

RBW=100KHz

VBW=100KHz

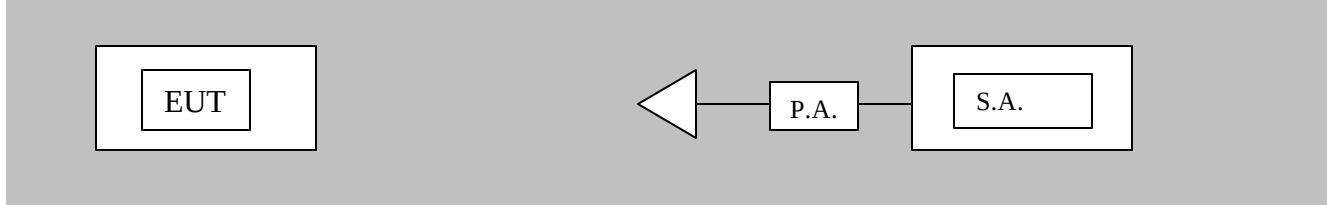
Sweep=Auto

Detector=Peak

Atten= Auto

Span=85 MHz

Test Setup:

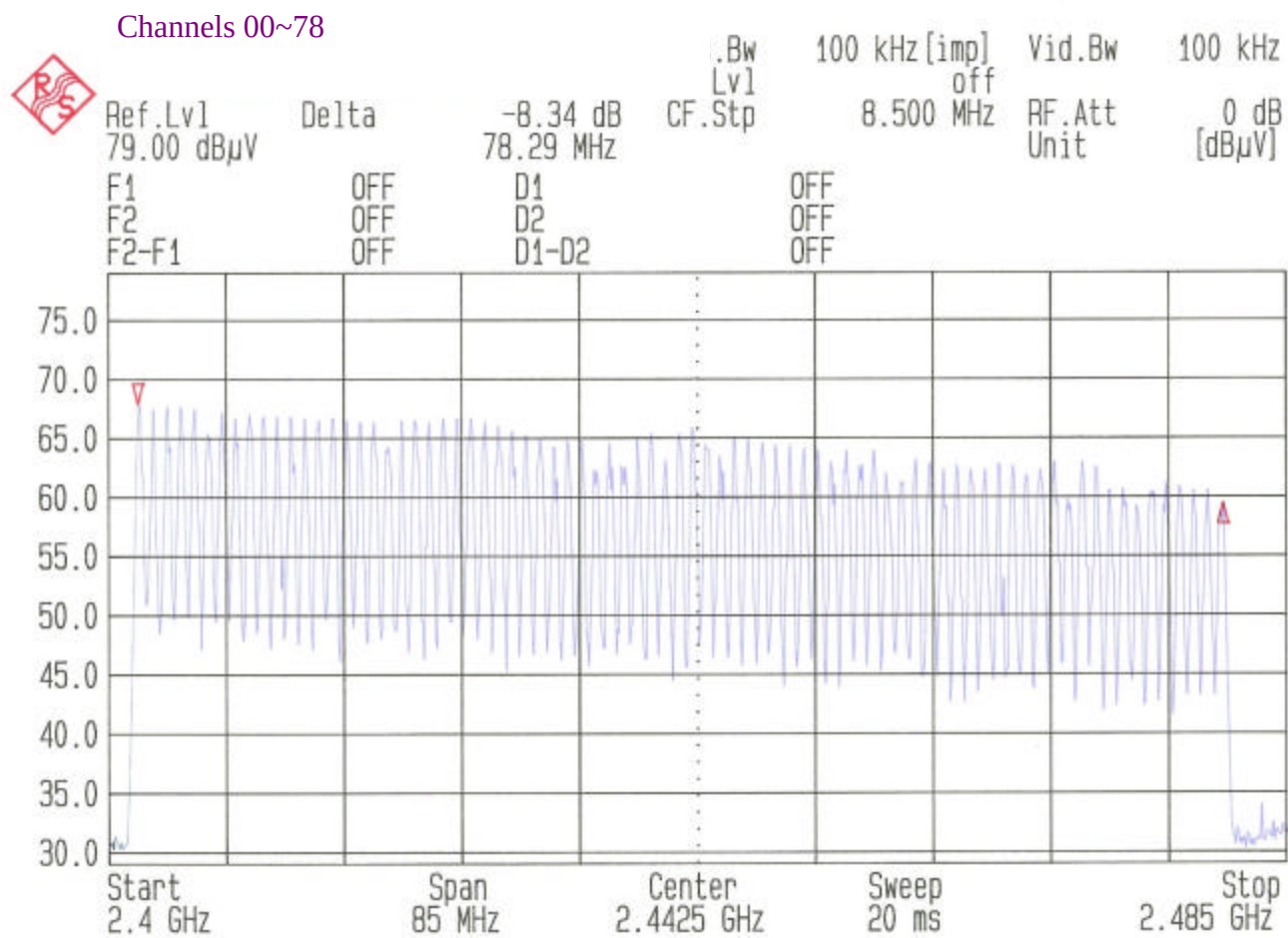


Refer to Appendix A for photograph(s) of the actual test setup.

EUT Operating Conditions:

Software was provided by client to activate and maintain EUT transmitting continuously with max. power at the lowest, middle and highest channel frequencies individually. DH1 Packet Modulation is GFSK. 802.11b disabled. With Hopping (all channels) enabled.

Channel	Channel Frequency (MHz)	Number of hopping channels	Min. Limit (channels)	Pass/Fail
00-78	2402-2480	79	75	Pass



Part 4. Dwell Time Each Frequency FCC 15.247 (b) (1) (iii)

Test Procedure

Radiated measurement @ 3m.

EUT placed on 80 cm. table and emission maximized for height and rotation.

The time period for the measurement is calculated based on the number of channels(79) x .4=31.6 seconds.

DH1 Packets permit a maximum of 10.12 hops per second for each channel.

The number of hops within the 31.6 second period is 10.12 x 31.6=320.

The dwell time is determined by multiplying the duration of the pulse by 320.

Test Equipment:

R&S receiver/analyzer

HP pre-amp

Dual-Ridged Guide Antenna

Plotter

Test Parameters:

RBW=1 MHz

VBW=1 MHz

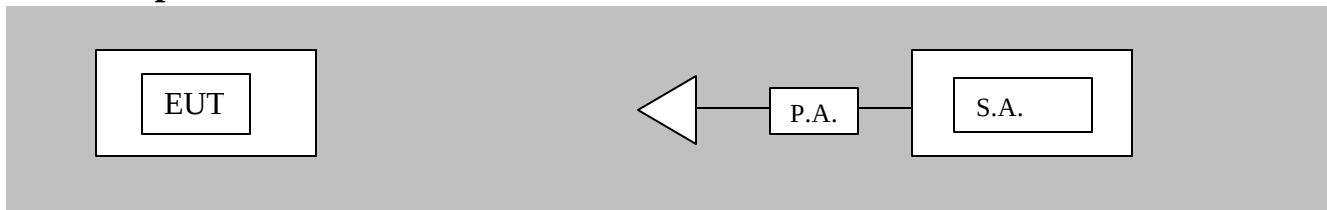
Sweep=Set to produce at least one full data cycle (see plot)

Detector=Peak

Atten= Auto

Span=0 hz

Test Setup:

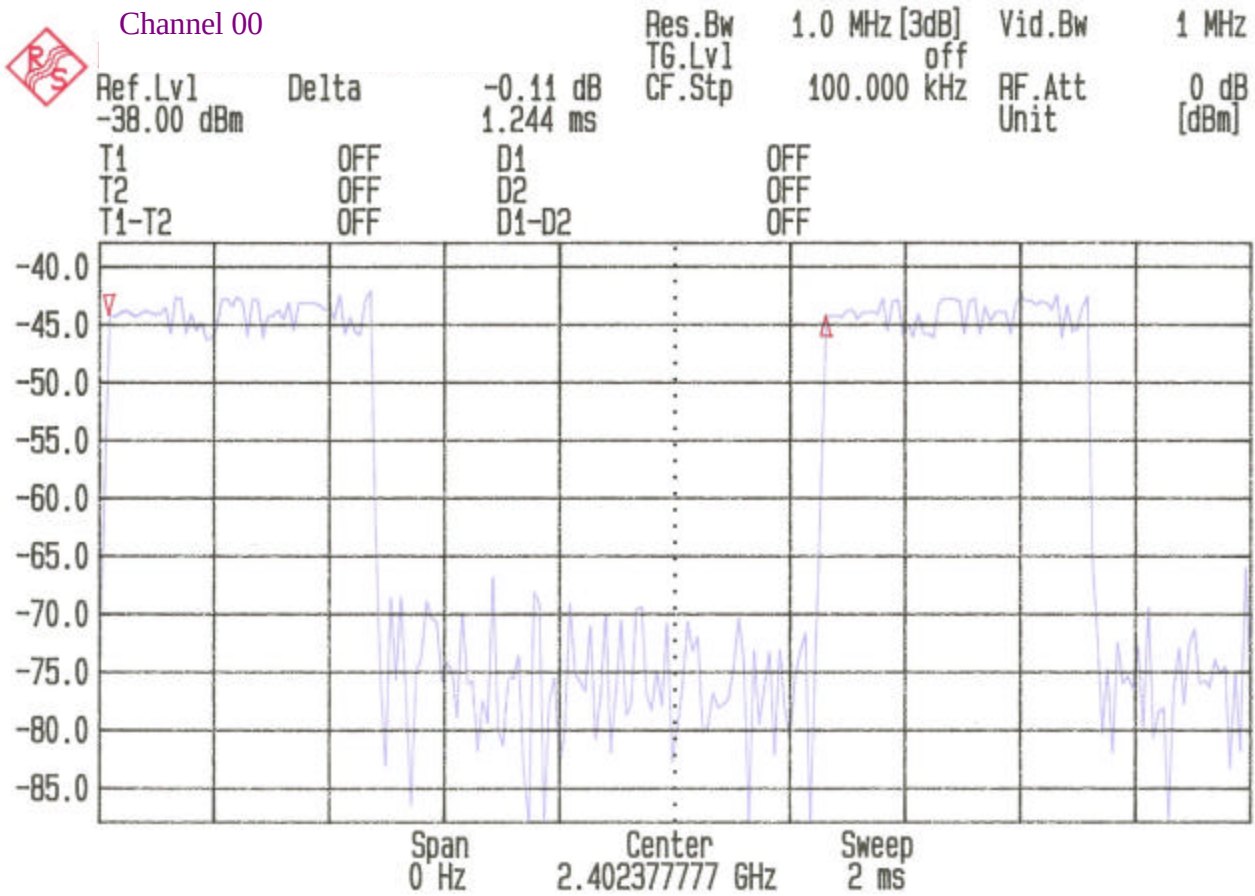


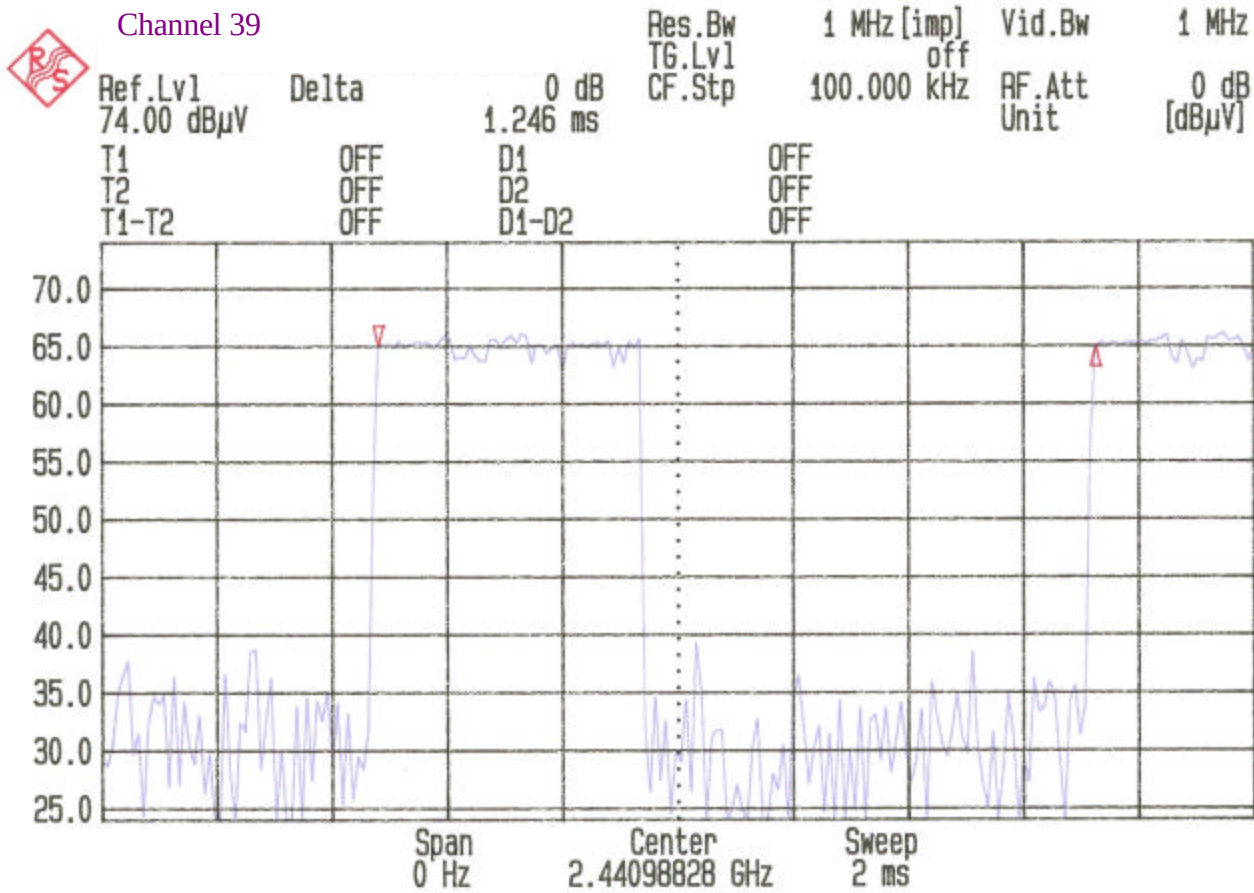
Refer to Appendix A for photograph(s) of the actual test setup.

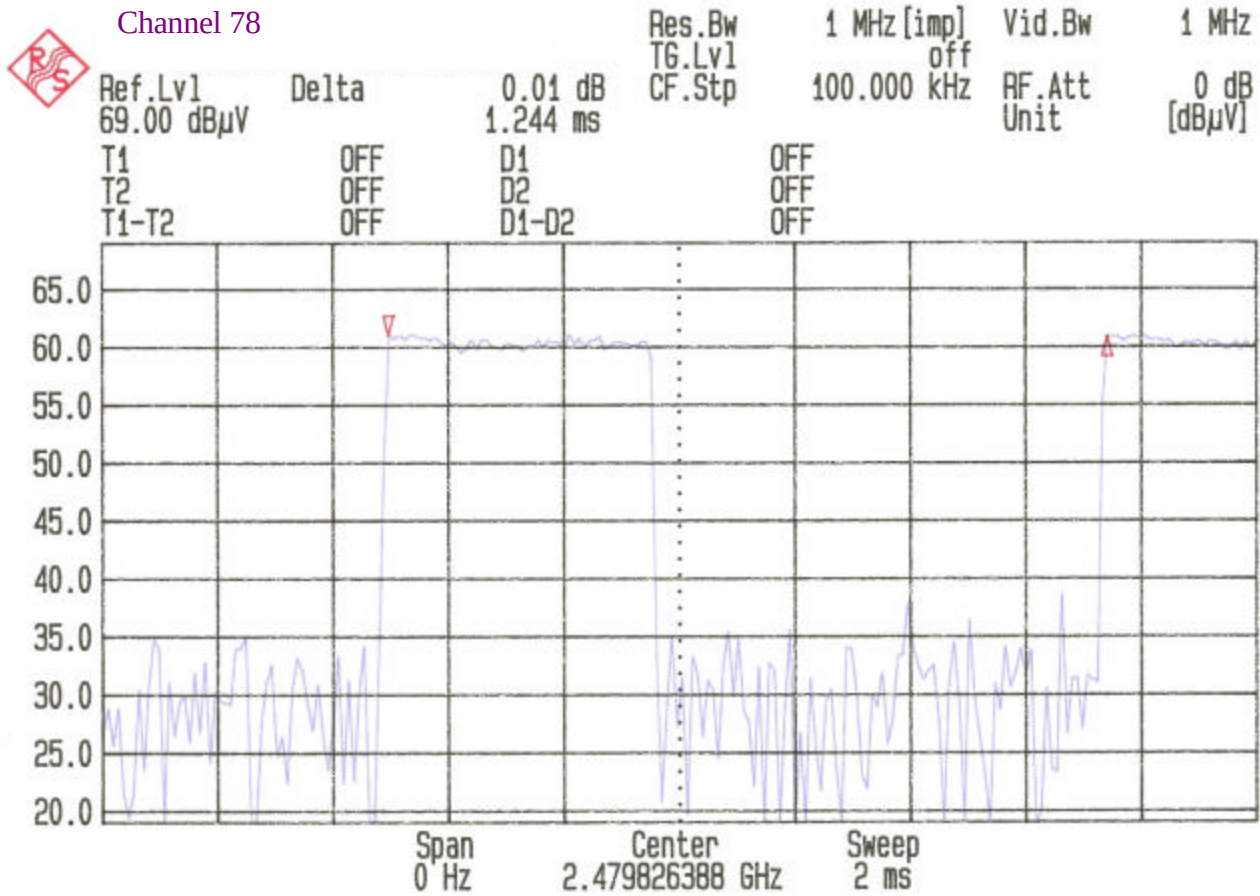
EUT Operating Conditions:

Software was provided by client to activate and maintain EUT transmitting continuously with max. power at the lowest, middle and highest channel frequencies individually. DH1 Packet Modulation is GFSK. 802.11b disabled. Hopping (all channels) enabled.

Channel	Frequency (MHz)	Pulse Duration (ms)	Dwell Time (s)	Limit (s)
00	2402	1.244 ms	.3981	0.4
39	2441	1.246 ms	.3987	0.4
78	2480	1.244 ms	.3981	0.4







Part 5. Maximum Peak Output Power Measurement FCC 15.247 (b) (1)**Test Procedure:**

Since the EUT antenna port was not accessible, peak power output data was obtained using the radiated substitution method to determine EIRP:

The maximum radiated emission (reference value) at each frequency was determined with the EUT on an 80 cm. table and at a test distance of 3m. Antenna was scanned 1-4m. and the table rotated 360 deg. The maximum reference value at each frequency was recorded.

The EUT was replaced with the substitution antenna at the same height (80cm.) and in line with the receive antenna. The receive antenna was set to the same height as it was for determining the reference value.

The substitution antenna was driven by a signal generator set to the same frequency used to determine the reference value. The power output of the signal generator was then increased until the reference value determined above was measured by the spectrum analyzer. This power value was recorded and is the uncorrected EIRP.

Corrections for cable loss, antenna gain and bandwidth are then made and the final value for EIRP recorded (see table below).

Test Equipment:

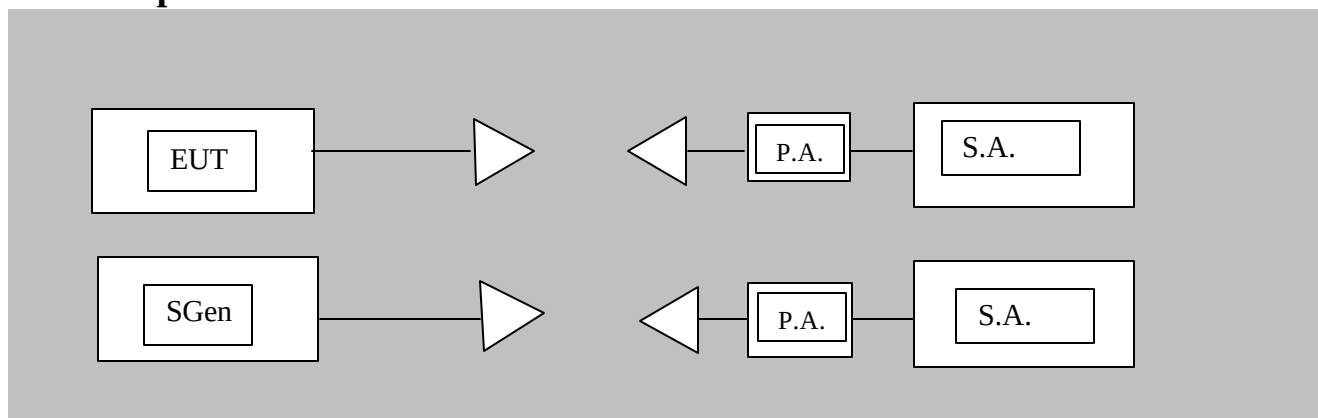
- HP spectrum analyzer
- HP pre-amp
- HP Signal Generator
- (2) Dual-Ridged Guide Antennas (receive + substitution)
- Plotter

Test Parameters:

- RBW=1 MHz
- VBW=1 MHz.
- Sweep=Auto
- Detector=Peak
- Atten= Auto
- Span=0

Part 5. Maximum Peak Output Power Measurement FCC 15.247 (b) (1) (continued)

Test Setup:



EUT Operating Conditions:

Software was provided by client to activate and maintain EUT transmitting continuously with max. power at the lowest, middle and highest channel frequencies individually. DH1 Packet. Modulation is GFSK. 802.11b disabled.

Test Results:

Channel	Channel Frequency (MHz)	Peak Power EIRP (dBm)	Peak Power Limit (dBm)	Pass / Fail
00	2402	-26.3	30	Pass
39	2441	-30.0	30	Pass
78	2480	-33.7	30	Pass

Test Data:

Channel	Channel Freq (MHz)	SA Reference (dBuV)	Signal Gen (dBm)	Cable Loss (dB)	Antenna Gain (dBi)l	Band Width Correction (dB)	Peak Pwr EIRP (dBm)
00	2401.98	68.0	-31.6	5.1	9.9	.5	-26.3
39	2440.96	64.9	-35.2	5.2	9.9	.5	-30.0
78	2479.99	61.8	-38.9	5.2	9.9	.5	-33.7

**Part 5. Maximum Peak Output Power Measurement FCC 15.247 (b) (1)
(continued)****Sample Calculations:**

$EIRP(dBm) = \text{Sig. Gen.}(dBm) - \text{Cable Loss}(dB) + \text{Antenna Gain}(dBi) + \text{BandWidth Correction}(dB)$

$\text{Bandwidth Correction Factor} = 10 \log (26 \text{ dB bandwidth of channel})$

(Bandwidth(26dB) of 1.13 MHz. for channel 00 was used for calculation; no significant variation noted for all three channels. This method is worst case as it assumes a rectangular power distribution within the 26 dB bandwidth)

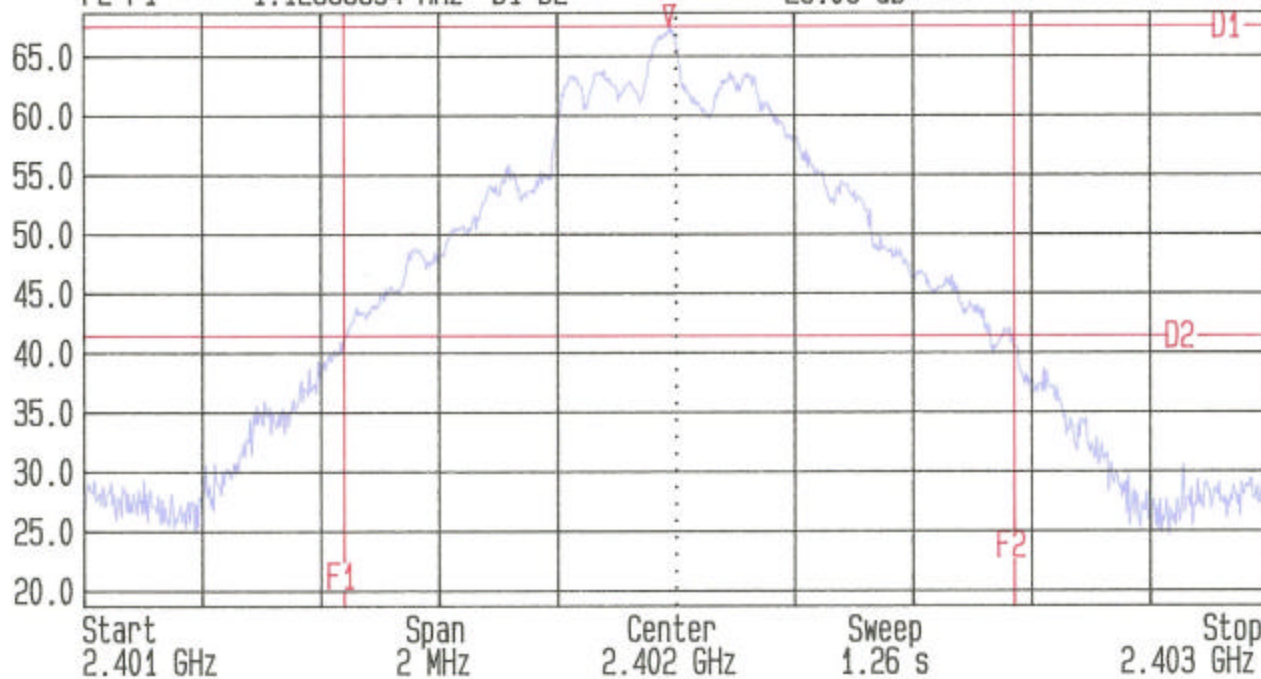
Note: The following three graphs illustrate the -26 dB bandwidths for each channel

Maximum Peak Output Power

, Channel 00 Date: 23-June-2005,



Ref.Lvl	68.60 dBμV	Marker	67.49 dBμV	Res.Bw	30.0 kHz [3dB]	Vid.Bw	100 kHz
			2.401991 GHz	TG.Lvl	off		
				CF.Stp	200.000 kHz	RF.Att	0 dB
						Unit	[dBμV]
F1	2.4014422221 GHz	D1	67.48 dBμV				
F2	2.40257111115 GHz	D2	41.42 dBμV				
F2-F1	-1.12888894 MHz	D1-D2	-26.06 dB				

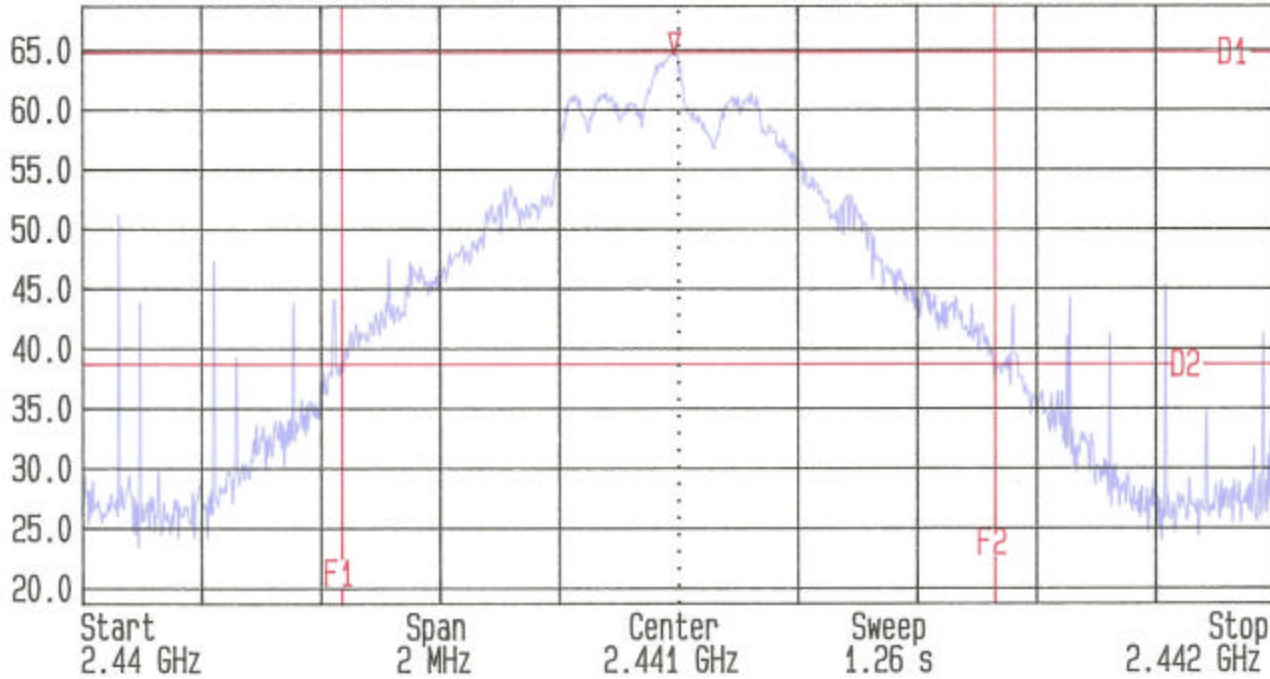


Maximum Peak Output Power

, Channel 39 Date: 23-June-2005,



Ref.Lvl	Marker	64.67 dBμV	Res.Bw	30.0 kHz [3dB]	Vid.Bw	100 kHz
68.60 dBμV	2.440995 GHz		TG.Lvl	off		
			CF.Stp	200.000 kHz	RF.Att	0 dB
					Unit	[dBμV]
F1	2.44043777776 GHz	D1		64.82 dBμV		
F2	2.44153111112 GHz	D2		38.76 dBμV		
F2-F1	-1.09333336 MHz	D1-D2		-26.06 dB		

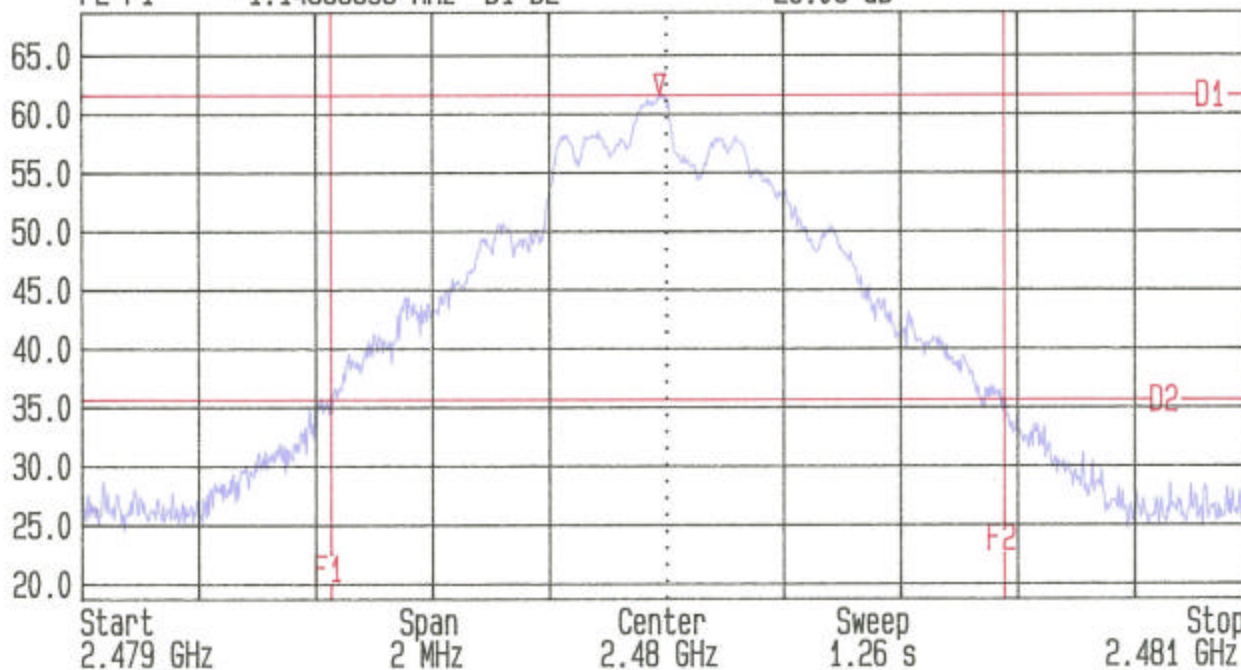


Maximum Peak Output Power

, Channel 78 Date: 23-June-2005,



Ref.Lvl	Marker	61.65 dBμV	Res.Bw	30.0 kHz [3dB]	Vid.Bw	100 kHz
68.60 dBμV		2.479991 GHz	TG.Lvl	off		
			CF.Stp	200.000 kHz	RF.Att	0 dB
					Unit	[dBμV]
F1	2.47942888886 GHz	D1	61.60 dBμV			
F2	2.48057777779 GHz	D2	35.54 dBμV			
F2-F1	-1.14888893 MHz	D1-D2	-26.06 dB			



Part 6. Band Edges FCC 15.247 (c) 15.205/15.209

Test Procedure:

Radiated measurement @ 3m.

EUT placed on 80cm. table and emission maximized for height and rotation.

Marker delta method used for band edge emissions.

Test Equipment:

R&S receiver/analyzer

HP pre-amp

Dual-Ridged Guide Antenna

Plotter

Test Parameters:

RBW=100kHz

VBW=100kHz

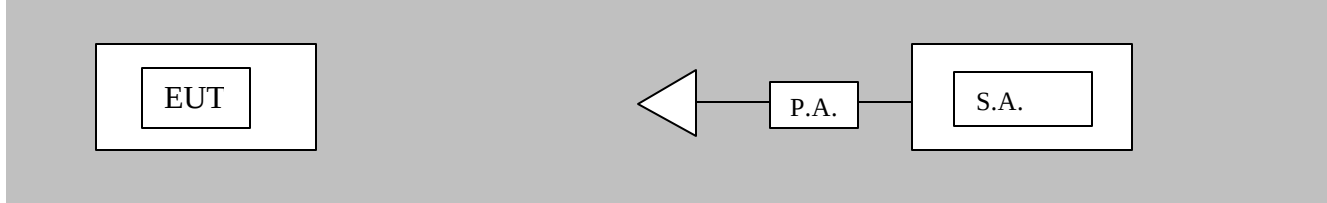
Sweep=Auto

Detector=Peak

Atten= Auto

Span=As required, see graphs

Test Setup:



Refer to Appendix A for photograph(s) of the actual test setup.

EUT Operating Conditions:

Software was provided by client to activate and maintain EUT transmitting continuously with max. power at the lowest, middle and highest channel frequencies individually. DH1 Packet. Modulation is GFSK. 802.11b disabled.

Test Results:

Channel	Channel Frequency (MHz)	Pass / Fail
00	2402	Pass
78	2480	Pass

Part 6. Band Edges Measurement FCC 15.247 (c), 15.205/15.209 (Continued)

Test Results (continued):

1. Meets -20 dB relative to peak band edge requirement.
2. Closest emission at lower band edge is 33 dB below carrier peak; this correlates to a field strength of 29.1 dBuV/m at 2.399 GHz. and is below the required level of 54 dBuV/m (ave.) and 74 dBuV/m (peak) as required in the restricted band (15.205). See page 35 for the corrected peak value of the carrier (62.1 dBuV/m).

Sample calc.:

$$62.1\text{dBuV/m}-33=29.1\text{dBuV/m(peak)}$$

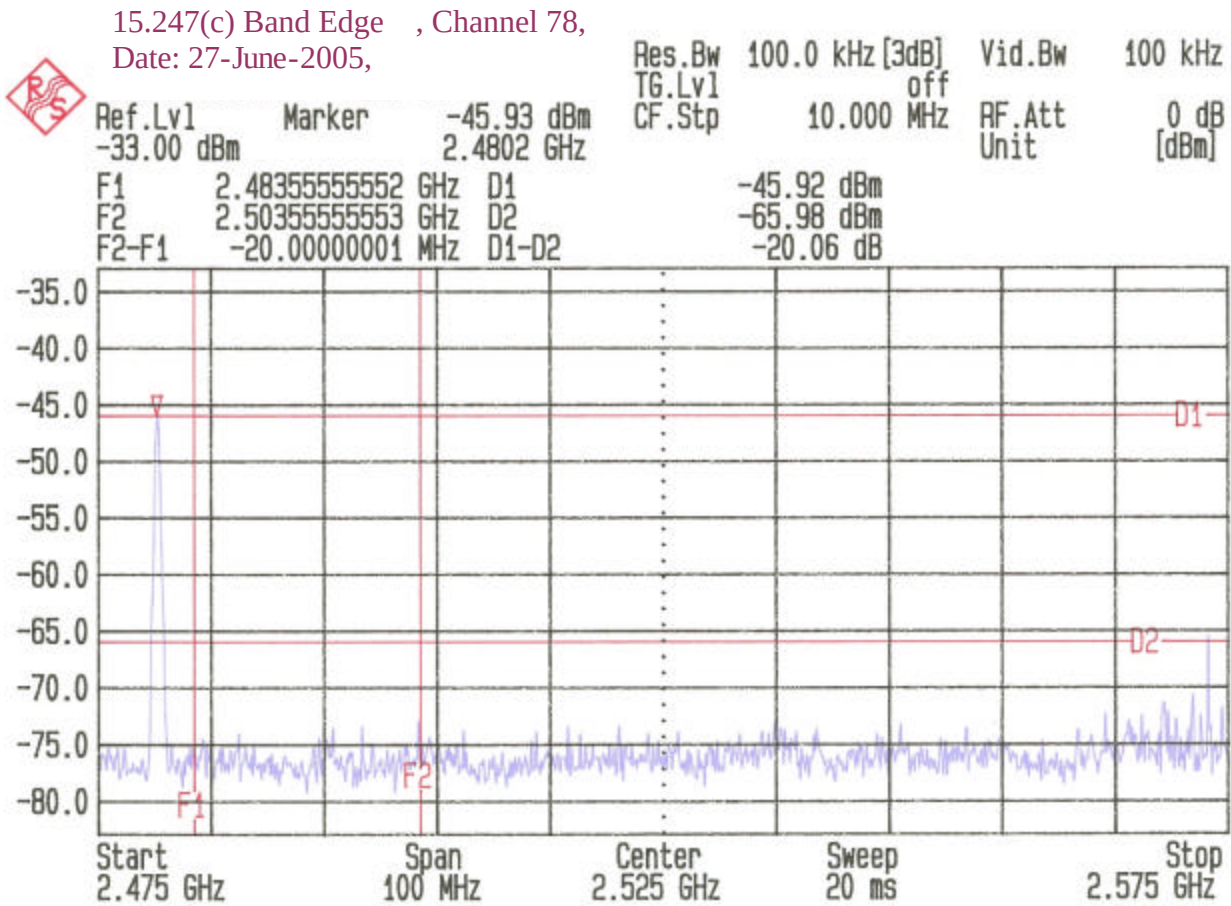
3. Closest emission at upper band edge is 29 dB below carrier peak; this correlates to a field strength of 32.6 dBuV/m at 2.484 GHz. and is below the required level of 54 dBuV/m (ave.) and 74 dBuV/m (peak) as required in the restricted band (15.205). See page 37 for the corrected peak value of the carrier (61.6 dBuV/m).

Sample calc.:

$$61.6\text{dBuV/m}-29=32.6\text{dBuV/m(peak)}$$

Test Data:

Refer to the following plots and radiated emission data (1-25GHz.)



Part 7. Radiated Emissions FCC 15.247 (c)

Test Procedure:

Radiated emission data was taken at test distances of 10m (30-1000 MHz.) and 3m.(over 1000 MHz.). The EUT was placed on an 80 cm. table. The antenna scan height was varied from 1-4m and the turntable was rotated through 360 deg.; the maximum emission values were recorded as appropriate. Procedures per FCC Part 15 for unintentional radiators and ANSI C63.4 were followed. The emission values were compared against FCC Class B (and 15.209) limits.

Test Equipment:

HP spectrum analyzer.

HP pre-amp

Bicon , log periodic and tuned dipole antennas (30-1000MHz.)

Dual-ridged guide antenna (over 1000 MHz.)

Test Parameters:

RBW=1 MHz.(over 1000 MHz.); 120 kHz.(30-1000MHz.)

VBW=1 MHz.(over 1000 MHz.); 1 MHz. (30-1000 MHz.)

Sweep=Auto

Detector=Peak, QP, Ave. (as appropriate)

Atten= Auto

Span=0 for QP and Ave.; as necessary for Peak

Test Setup:

Refer to Appendix A for photograph(s) of the actual test setup.

EUT Operating Conditions:

Software was provided by client to activate and maintain EUT transmitting continuously with max. power at the selected channels. Data rate for 802.11b was set at 11 Mb/s. and modulation was CCK. 802.11b was disabled above 1000 MHz.; enabled below 1000 MHz. Bluetooth was set at DH1 packet and GFSK modulation. EUT was also running its normal operational functions during these tests.

Below 1000 MHz., channels 11 (802.11b) and 78 (Bluetooth) were selected simultaneously as worst case. Above 1000 MHz., each Bluetooth channel (low, mid and high) was selected individually and 802.11b was disabled.

Test Results:

30-1000 MHz.:

The highest emissions noted were -3.1 dB to the Class B (15.209) limit:
118.95 MHz., 142.99 MHz., 168.99MHz., 436.13 MHz

1-25 GHz.:

The highest emissions noted were:

Ch. 00: -5.6 dB @ 14412.26 MHz. to the Class B (15.209) limit

Ch. 39: -7.1 dB @ 14646.00 “

Ch. 78: -6.2 dB @ 17359.70 “

Test Data :

Refer to the following pages

EUT : **Bay Computer Pepper**
: **30 MHz – 1 GHz**
:
:

Receiver BW : 120 KHz, 30-1000 MHz
Receiver BW : 1 MHz, 1-40 GHz

Engineer : R Wiedeman
Technician : T Charron

Antenna Ht : 1-4 Meters
Antenna Sep : 10 Meters, 30-1000 MHz
Antenna Sep : 3 Meters, 1-40 GHz
Temperature: 70F
Rel. Humidity: 50%

Ambient Check:

96.1 MHz 55.1
525.25 MHz 26.95
1938.42 MHz 71.65

Test: B05143R
Date: 5/17/2005
Power: 230Vac50Hz
Spec: CISPR
Class B

Antennas Used:
Horn_A
Biconical_A
Log Periodic_A
Tuned Dipole

Freq	Signal Level	Antenna Polariz	Antenna Height	Table Azimuth	Detector	Antenna Factor	Cable Loss	Amp. Factor	Product Level	Limit CISPR B	Margin CISPR B	Limit FCC B	Margin FCC B
MHz	dBuV	H/V	cm	Degrees	P/QP	dB	dB	dB	dBuV/M	dBuV/M	dB	dBuV/M	dB
33.87	5.9	V	100	138	PK	16.9	0.7	0.0	23.5	30.0	-6.6	29.5	-6.1
42.06	8.6	V	100	0	PK	15.0	0.7	0.0	24.3	30.0	-5.8	29.5	-5.3
45.16	10.0	V	100	239	PK	14.4	0.8	0.0	25.2	30.0	-4.9	29.5	-4.4
45.16	6.8	V	100	239	QP	14.4	0.8	0.0	22.0	30.0	-8.0	29.5	-7.5
48.01	11.2	V	100	351	PK	13.5	0.8	0.0	25.5	30.0	-4.5	29.5	-4.0
48.01	8.3	V	100	351	QP	13.5	0.8	0.0	22.6	30.0	-7.4	29.5	-6.9
64.98	18.1	V	100	180	PK	7.4	0.9	0.0	26.4	30.0	-3.6	29.5	-3.1
64.98	16.2	V	100	180	QP	7.4	0.9	0.0	24.5	30.0	-5.5	29.5	-5.0
115.63	15.5	V	100	157	PK	12.1	1.2	0.0	28.8	30.0	-1.2	33.1	-4.3
115.63	12.9	V	100	157	QP	12.1	1.2	0.0	26.2	30.0	-3.8	33.1	-6.9
118.95	15.3	V	100	130	PK	12.7	1.2	0.0	29.2	30.0	-0.9	33.1	-4.0
118.95	13.1	V	100	130	QP	12.7	1.2	0.0	27.0	30.0	-3.1	33.1	-6.2
129.99	10.8	V	100	117	PK	13.7	1.3	0.0	25.8	30.0	-4.3	33.1	-7.4
129.99	8.5	V	100	117	QP	13.7	1.3	0.0	23.5	30.0	-6.5	33.1	-9.6
142.99	14.4	V	100	334	PK	14.5	1.4	0.0	30.3	30.0	0.3	33.1	-2.8
142.99	11.0	V	100	334	QP	14.5	1.4	0.0	26.9	30.0	-3.1	33.1	-6.2
150.04	14.5	V	100	123	PK	14.8	1.4	0.0	30.7	30.0	0.6	33.1	-2.5
150.04	9.8	V	100	123	QP	14.8	1.4	0.0	26.0	30.0	-4.0	33.1	-7.1
156.00	15.6	V	100	130	PK	14.9	1.4	0.0	31.9	30.0	1.9	33.1	-1.3
156.00	10.3	V	100	130	QP	14.9	1.4	0.0	26.6	30.0	-3.4	33.1	-6.5

Freq	Signal	Antenna	Antenna	Table	Detector	Antenna	Cable	Amp.	Product	Limit	Margin	Limit	Margin
	Level	Polariz	Height	Azimuth		Factor	Loss	Factor	Level	CISPR	CISPR	FCC	FCC
										B	B	B	B
MHz	dBuV	H/V	cm	Degrees	P/QP	dB	dB	dB	dBuV/M	dBuV/M	dB	dBuV/M	dB
168.99	14.1	V	100	362	PK	15.4	1.5	0.0	31.0	30.0	1.0	33.1	-2.2
168.99	10.0	V	100	362	QP	15.4	1.5	0.0	26.9	30.0	-3.1	33.1	-6.2
194.98	12.0	V	100	332	PK	16.7	1.6	0.0	30.3	30.0	0.3	33.1	-2.8
194.98	8.4	V	100	332	QP	16.7	1.6	0.0	26.7	30.0	-3.3	33.1	-6.4
207.98	9.1	V	100	316	PK	17.0	1.7	0.0	27.8	30.0	-2.2	33.1	-5.3
207.98	7.8	V	100	316	QP	17.0	1.7	0.0	26.5	30.0	-3.5	33.1	-6.6
246.98	11.8	V	100	48	PK	17.7	1.9	0.0	31.4	37.0	-5.6	35.6	-4.2
259.90	9.8	V	100	48	PK	17.9	1.9	0.0	29.6	37.0	-7.4	35.6	-6.0
272.98	12.2	V	100	413	PK	18.2	1.9	0.0	32.3	37.0	-4.8	35.6	-3.4
272.98	8.4	V	100	413	QP	18.2	1.9	0.0	28.5	37.0	-8.5	35.6	-7.1
277.54	12.1	V	118	413	PK	18.4	2.0	0.0	32.5	37.0	-4.5	35.6	-3.1
277.54	8.6	V	118	413	QP	18.4	2.0	0.0	29.0	37.0	-8.0	35.6	-6.6
285.98	9.2	V	118	1	PK	17.6	2.0	0.0	28.8	37.0	-8.3	35.6	-6.9
299.89	13.2	H	402	169	PK	16.2	2.0	0.0	31.4	37.0	-5.7	35.6	-4.3
311.98	18.5	H	233	144	PK	16.1	2.1	0.0	36.7	37.0	-0.3	35.6	1.1
311.98	14.9	H	233	144	QP	16.1	2.1	0.0	33.1	37.0	-3.9	35.6	-2.5
317.19	16.3	H	238	134	PK	16.1	2.1	0.0	34.5	37.0	-2.5	35.6	-1.1
317.19	12.1	H	238	134	QP	16.1	2.1	0.0	30.3	37.0	-6.7	35.6	-5.3
337.01	13.0	H	238	250	PK	15.9	2.2	0.0	31.1	37.0	-6.0	35.6	-4.6
350.98	11.4	H	245	36	PK	15.8	2.2	0.0	29.4	37.0	-7.6	35.6	-6.2
368.65	13.8	H	212	67	PK	15.7	2.3	0.0	31.8	37.0	-5.2	35.6	-3.8
398.65	14.45	H	200	0	PK	15.5	2.4	0.0	32.4	37.0	-4.7	35.6	-3.3
398.65	10.35	H	200	0	QP	15.5	2.4	0.0	28.3	37.0	-8.8	35.6	-7.4
415.97	14.85	H	172	191	PK	16.0	2.4	0.0	33.3	37.0	-3.8	35.6	-2.4
415.97	9.69	H	172	191	QP	16.0	2.4	0.0	28.1	37.0	-8.9	35.6	-7.5
436.13	17.85	H	161	370	PK	16.7	2.5	0.0	37.1	37.0	0.0	35.6	1.5
436.13	14.73	H	161	370	QP	16.7	2.5	0.0	33.9	37.0	-3.1	35.6	-1.7
455.95	13.45	H	117	394	PK	17.3	2.5	0.0	33.3	37.0	-3.8	35.6	-2.4
455.95	8.1	H	117	394	QP	17.3	2.5	0.0	27.9	37.0	-9.1	35.6	-7.7
493.96	10.3	H	100	348	PK	18.3	2.5	0.0	31.1	37.0	-5.9	35.6	-4.5
498.31	15.25	H	134	168	PK	18.5	2.5	0.0	36.3	37.0	-0.8	35.6	0.6
498.31	12.43	H	134	168	QP	18.5	2.5	0.0	33.4	37.0	-3.6	35.6	-2.2

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TestType **Qualification****RADIATED EMISSIONS E FIELD**

Data by Test Site Services Co

Ambient Check:

EUT : **Bay Computer**
 : **Pepper**
 :
 : **Blue-Tooth**
 : **Fcc Part 15**

Engineer : R Wiedeman
 Technician : T Charron

1938.42 MHz 73.55

Antenna Ht : 1-4 Meters

Antenna Sep : 3 Meters, 1-40 GHz

Temperature: 74F

Rel. Humidity: 55%

Test: B05143A
 Date: 6/29/2005
 Power: 120Vac60Hz
 Spec: CISPR
 Class B
 Antennas Used:
 Horn_A

Receiver BW : 1 MHz, 1-40 GHz

No signals observed above: 17359.7 MHz

Freq	Signal Level	Antenna Polariz	Antenna Height	Table Azimuth	Detector	Antenna Factor	Cable Loss	Amp. Factor	Product Level	Limit CISPR B	Margin CISPR B	Limit FCC B	Margin FCC B	Video BW	RES BW
MHz	dBuV	H/V	cm	Degrees	P/QP	dB	dB	dB	dBuV/M	dBuV/M	dB	dBuV/M	dB	Freq.	Freq.
	Channel 00														
1143.92	44.8	H	100	218	PK	24.9	3.0	-36.2	36.5			54.0	-17.5	1 MHz	1 MHz
1195.94	44.0	V	113	248	PK	25.0	3.1	-36.1	36.0			54.0	-18.1	1 MHz	1 MHz
1201.00	34.9	V	100	52	PK	25.0	3.1	-36.1	26.9			54.0	-27.1	1 MHz	1 MHz
1268.74	40.9	V	122	249	PK	25.0	3.2	-36.0	33.1			54.0	-20.9	1 MHz	1 MHz
1395.26	43.0	V	116	118	PK	25.1	3.4	-35.8	35.7			54.0	-18.4	1 MHz	1 MHz
2333.88	42.0	V	100	232	PK	28.3	4.6	-35.3	39.6			54.0	-14.4	1 MHz	1 MHz
2343.68	43.2	V	100	371	PK	28.3	4.6	-35.3	40.8			54.0	-13.2	1 MHz	1 MHz
2399.90	32.8	V	100	338	PK	28.4	4.7	-35.3	30.6	Band-Edge		54.0	-23.4	1 MHz	1 MHz
2399.90	21.3	V	100	338	AV	28.4	4.7	-35.3	19.1	Band-Edge		54.0	-34.9	10 Hz	1 MHz
2401.99	64.3	V	100	124	PK	28.4	4.7	-35.3	62.1			54.0	8.1	1 MHz	1 MHz
2401.95	52.5	V	100	124	AV	28.4	4.7	-35.3	50.3			54.0	-3.7	10 Hz	1 MHz
2484.00	31.4	V	100	138	PK	28.5	4.9	-35.3	29.5	Band-Edge		54.0	-24.5	1 MHz	1 MHz
2484.00	22.3	V	100	138	AV	28.5	4.9	-35.3	20.4	Band-Edge		54.0	-33.6	10 Hz	1 MHz
4803.98	36.3	V	100	28	PK	32.9	6.3	-34.9	40.6			54.0	-13.5	1 MHz	1 MHz
7208.01	29.2	V	100	186	PK	35.8	8.0	-35.2	37.8			54.0	-16.3	1 MHz	1 MHz
9611.60	29.6	V	100	168	PK	38.1	8.9	-35.7	40.9			54.0	-13.1	1 MHz	1 MHz
12010.04	29.4	V	100	142	PK	39.5	10.2	-34.5	44.6			54.0	-9.4	1 MHz	1 MHz
14412.26	29.5	V	100	190	PK	42.0	10.9	-34.0	48.4			54.0	-5.6	1 MHz	1 MHz
16814.00	29.3	V	100	154	PK	39.9	12.2	-35.6	45.8			54.0	-8.2	1 MHz	1 MHz

[illegible]

Channel 78											
1030.85	45.55	V	100	154	PK	24.8	2.8	-36.4	36.8		
1189.44	41.95	V	100	177	PK	25.0	3.1	-36.1	34.0		
1240.00	32.3	V	100	337	PK	25.0	3.2	-36.0	24.5		
1268.73	42.7	V	100	186	PK	25.0	3.2	-36.0	34.9		
1395.26	42.9	V	107	115	PK	25.1	3.4	-35.8	35.6		
1494.92	39.95	V	104	249	PK	25.2	3.6	-35.6	33.2		
1594.58	38.65	V	100	223	PK	25.8	3.7	-35.5	32.7		
2333.84	37.4	V	100	407	PK	28.3	4.6	-35.3	35.0		
2343.84	42.8	V	100	68	PK	28.3	4.6	-35.3	40.4		
2399.99	31.2	V	100	219	PK	28.4	4.7	-35.3	29.0	Band-Edge	
2399.99	21.13	V	100	219	AV	28.4	4.7	-35.3	18.9	Band-Edge	
2479.99	63.45	V	106	92	PK	28.5	4.9	-35.3	61.6		
2479.97	50.27	V	106	92	AV	28.5	4.9	-35.3	48.4		
2484.00	32.45	V	100	230	PK	28.5	4.9	-35.3	30.6	Band-Edge	
2484.00	22.96	V	100	230	AV	28.5	4.9	-35.3	21.1	Band-Edge	
4799.98	34.55	V	100	30	PK	32.9	6.3	-34.9	38.9		
4959.98	33	V	100	296	PK	33.2	6.4	-34.9	37.7		
7440.00	28.35	V	100	348	PK	36.4	8.2	-35.3	37.7		
9920.00	29.8	V	100	261	PK	38.2	9.0	-35.8	41.2		
12400.00	26.15	V	100	201	PK	39.0	10.1	-34.5	40.8		
14880.00	27.1	V	100	177	PK	40.6	11.4	-34.5	44.6		
17359.70	28.05	V	100	209	PK	42.8	12.4	-35.4	47.9		
54.0	-17.3									1 MHz	1 MHz
54.0	-20.1									1 MHz	1 MHz
54.0	-29.5									1 MHz	3 MHz
54.0	-19.1									1 MHz	1 MHz
54.0	-18.4									1 MHz	1 MHz
54.0	-20.9									1 MHz	1 MHz
54.0	-21.4									1 MHz	1 MHz
54.0	-19.0									1 MHz	1 MHz
54.0	-13.6									1 MHz	1 MHz
54.0	-25.0									1 MHz	1 MHz
54.0	-35.1									10 Hz	1 MHz
54.0	7.6									1 MHz	1 MHz
54.0	-5.6									10 Hz	1 MHz
54.0	-23.5									1 MHz	1 MHz
54.0	-32.9									10 Hz	1 MHz
54.0	-15.2									1 MHz	1 MHz
54.0	-16.3									1 MHz	1 MHz
54.0	-16.4									1 MHz	1 MHz
54.0	-12.8									1 MHz	1 MHz
54.0	-13.3									1 MHz	1 MHz
54.0	-9.4									1 MHz	1 MHz
54.0	-6.2									1 MHz	1 MHz

Part 8. Conducted Emissions FCC 15.207

Test Procedure:

Conducted Emission data was obtained using a spectrum analyzer connected to a Line Impedance Network (LISN) via an RF Cable.

Both power leads to the EUT were measured and data recorded for undesirable emissions over the frequency range of 150 KHz to 30 MHz. Levels detected that were at least 20 dB below the Class A Limit were not recorded.

Test Equipment:

HP spectrum analyzer.
LISN

Test Parameters:

RBW= 9 KHz
VBW= 100 KHz
Sweep=Auto
Detector=Peak, QP, Ave. (as appropriate)
Atten= Auto
Span=0 for QP and Ave.; as necessary for Peak

Test Setup:

The EUT was placed 40 cm from a conductive wall of a shielded enclosure and connected to the AC power mains (120 VAC /60 Hz) via a LISN which meets the requirements of ANSI 63.4 (50 Ohm and 50 uH impedance). The EUT was on an 80 cm. table.

Refer to Appendix A for photograph(s) of the actual test setup.

EUT Operating Conditions:

Software was provided by client to activate and maintain EUT transmitting continuously with max. power at the selected channels. Data rate for 802.11b was set at 11 Mb/s. and modulation was CCK. Bluetooth was set at DH1 packet and GFSK modulation. EUT was running its normal operational functions during these tests.

Channels 11 (802.11b) and 78 (Bluetooth) were selected simultaneously as worst case.

Test Results:

The highest emission noted was:-10.4 dB to the Class B (15.207) limit.

Test Data:

Refer to the following page:

Test Type: **Qualification** Note : FCC and CISPR Margins Reflect Data Taken With
.....Reference Distance = 40cm from Vertical Wall

CONDUCTED EMISSIONS (LISN)

Data by Test Site Services Co

EUT : Bay Computer
: Pepper
:
:

Engineer : R. Wiedeman
Tech : T Charron

Test : B05143FC
Date : 5/19/2005
Power : 120Vac60Hz
Spec : CISPR
Class B

Receiver BW : 200 Hz from 10 kHz - 150 kHz
: 9 kHz from 150 kHz - 30 MHz

Temperature: 70F
Relative Humidity: 45%

LISN : Schwarzbeck
8120

Freq MHz	Detector P/QP Ave	Hot Lead dBuV	Neut Lead dBuV	Cable Loss dB	Corr Fact dB	Product Level dBuV	Limit CISPR B dBuV	Margin CISPR B AVEdB
0.1831	PK	42.0	39.8	0.1	0.0	42.1	54.3	-12.3
0.2537	PK	39.2	38.5	0.1	0.0	39.3	51.6	-12.4
0.4448	PK	35.7	36.5	0.1	0.0	36.6	47.0	-10.4
1.2320	PK	33.9	33.7	0.2	0.1	34.2	46.0	-11.9
3.5880	PK	34.6	33.0	0.4	0.1	35.1	46.0	-10.9
4.8600	PK	35.0	32.1	0.4	0.1	35.5	46.0	-10.6
5.0200	PK	33.8	32.0	0.5	0.1	34.4	50.0	-15.6
7.3230	PK	31.8	24.3	0.6	0.2	32.6	50.0	-17.5
9.3040	PK	29.4	25.2	0.7	0.3	30.4	50.0	-19.7
12.0000	PK	22.4	19.2	0.8	0.4	23.6	50.0	-26.5
14.7100	PK	25.0	20.1	0.9	0.5	26.4	50.0	-23.7
17.3900	PK	23.3	23.2	1.0	0.6	24.9	50.0	-25.2
21.7000	PK	23.7	23.6	1.1	0.9	25.7	50.0	-24.4
23.1300	PK	24.1	21.7	1.1	1.1	26.3	50.0	-23.7
26.5400	PK	16.4	15.2	1.2	1.1	18.7	50.0	-31.4

[illegible][illegible]

Part 9. Antenna Requirement FCC 15.203 and FCC 15. 247 (b)

An intentional radiator must be designed such that no antenna other than that furnished by the responsible party (manufacturer) shall be used with the device.

If a transmitting antenna having directional gain greater than 6 dBi is used, the transmit power shall be reduced by the dB amount that the directional gain exceeds 6dBi.

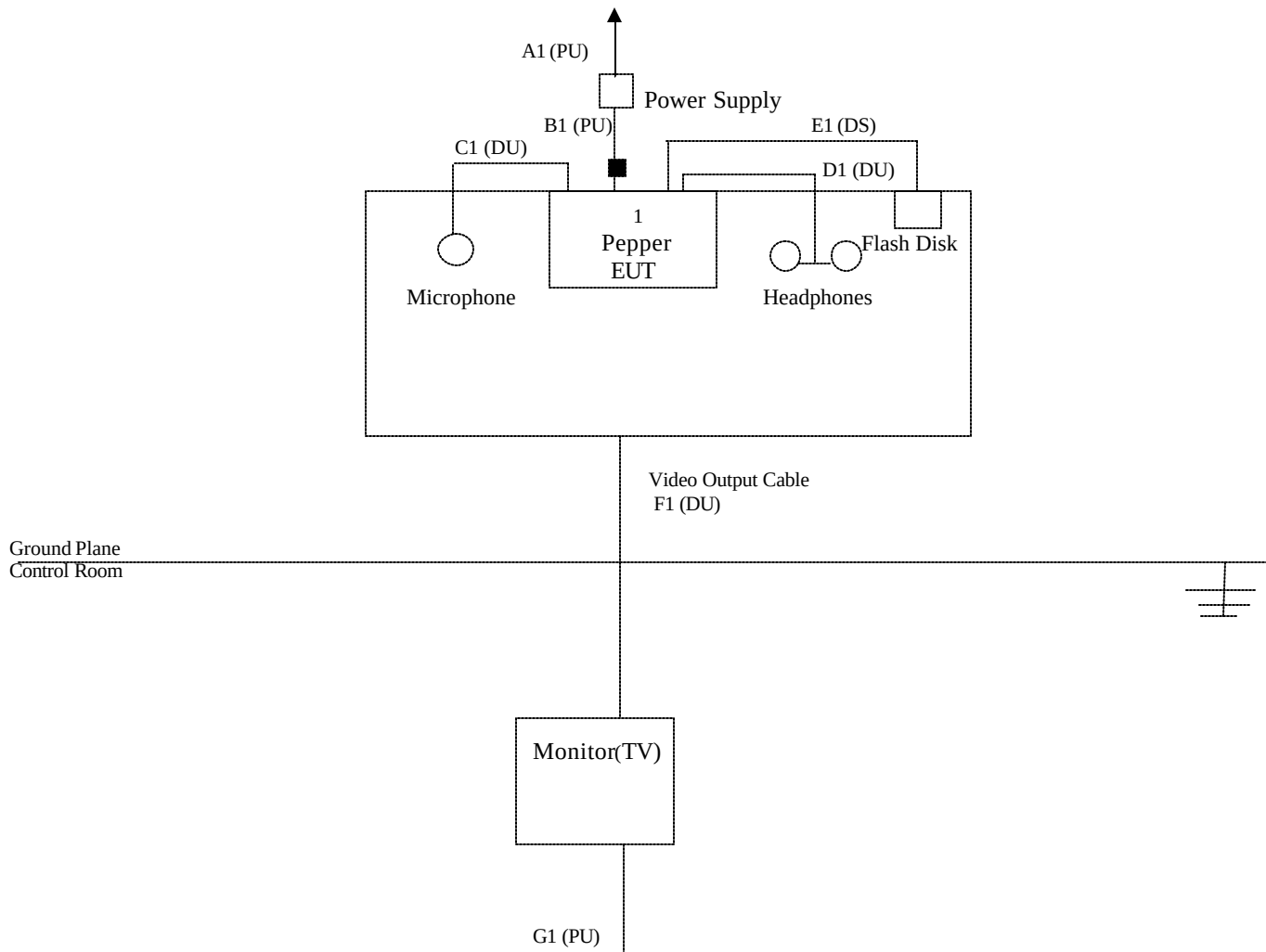
The antenna used in this product is internally connected to the transmitter module such that its input terminals are inaccessible. The maximum gain of this antenna is __n/a__ dBi

(EIRP measurements were taken and are within the limit, therefore no gain correction is necessary.)

Part 10 Intermodulation

As the EUT is a composite device with integral 802.11b and Bluetooth functionality, preliminary tests were run with selected combinations of the 802.11b and the Bluetooth functions set at different frequency combinations. No significant intermodulation products were detected. Full scans were performed with Ch. 6 (802.11b) plus Ch. 78(Bluetooth) and also with Ch.11(802.11b) plus Ch. 78 (Bluetooth). The highest level observed during these tests was -1.7 dB to the Class B (15.209) limit at 9847.96 MHz.

Block Diagram for Pepper Wireless PAD



PS = Power Cord Shielded DS = Data Cable Shielded CX = Coaxial Cable PU = Power Cord Unshielded
 DU = Data Cable Unshielded FL = Fiber Link ■ = Ferrite Bead □ = Connector □ = Terminator

EUT Technical Data – Block Identifier 1

Description : Portable PC with Wireless Capability

Manufacturer : Pepper Computer Inc.

Model Number : PP20624

Part#/Rev :

Serial # : P27

FCC Identifier : FCC ID: S5Y1234

Power (Rated) : 5 VDC **Current** : 3 A

Power (Tested) : 5 VDC **Current** : 3 A

Internal Options:

Description	Manufacturer	Model Number	Serial Number	Part Number
11 MBPS Wireless LAN CF Card. 802.11b compliant.	Gemtek	WL-672	FCC ID:MXF-F910131	14AAJ
Bluetooth Chipset.	Infineon	ROK104001 module		ROK_104_001
Bluetooth chip Antenna	Murata	LDA31		LDA312G7313F-237
LCD	Toshiba	LTM08C3555		
Hard Disk	Toshiba	HDD1422	24CF0428S	MK2004GAL

External Options:

Description	Manufacturer	Model Number	Serial Number	Part Number
AC Adapter (1)	CUI INC	KSAFD0500300 W1US		
Headset				
Microphone				

Frequencies Generated:

32.768 kHz 13 MHz 14.31818 MHz 24.5760 MHz 39.65 MHz 624 MHz
2400-2483.5 MHz.(Wi-Fi, Bluetooth)

Comments: With clamp-on ferrite (Fair-Rite part # 0443167251) on Power Cable (EUT end)

Additional Items for Pepper Wireless PAD

- ? 8.4 inch color display with touch screen
- ? Intel XScale PXA270 (624 MHz) Processor
- ? 20 GB disk drive
- ? Two rechargeable lithium batteries
- ? QWERTY keypad
- ? 20-bit stereo CODEC
- ? SD/MMC Card
- ? Instant-on capabilities
- ? Intuitive Pepper software and applications
- ? 802.11b
- ? Bluetooth device support
- ? Only 2.3 lbs

Support Equipment Data – Block Identifier 2

Description : Flashdisk Carrier

Manufacturer : SanDisk

Model Number : ImageMate SD/MMC

Part#/Rev : 20-90-00093

Serial # : 165052

FCC Identifier :

Power (Rated) : 5 VDC

Current :

Power (Tested) : 5 VDC

Current :

Internal Options:

Description	Manufacturer	Model Number	Serial Number	Part Number
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External Options:

Description	Manufacturer	Model Number	Serial Number	Part Number
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Frequencies Generated:

Comments:

Support Equipment Data – Block Identifier 3

Description : 13” Television

Manufacturer : Sylvania

Model Number : SRT139

Part#/Rev : n/a

Serial # : J30927933

FCC Identifier : n/a

Power (Rated) : 120 VDC

Current :

Power (Tested) : 120 VDC

Current :

Internal Options:

Description	Manufacturer	Model Number	Serial Number	Part Number
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External Options:

Description	Manufacturer	Model Number	Serial Number	Part Number
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Frequencies Generated:

Comments:

Cable Descriptions

Cable ID	Number of Cables	Function	Type Shielded Y/N	Length	Number of Conductors	Connector Shell Shielded Y/N	Part Number	Miscellaneous
A1	1	AC power	N	6 ft	2	No	Model KSAFD0500300W1U S	CUI Inc AC Adapter.
B1	1	DC power	N	7 ft	2	N		
C1	1	Microphone	Y	7 ft	2	N	Desk Mic 524	Labtec
D1	1	Headset	Y	3 meters	3	N	HD 497	Sennheiser Headset
E1	1	Data	Y	7 feet	5	Y	F3u133-7-G-STV	USB (Staples)
F1	1	Video Splitter	Y	8 ft	3	Y	Radio Shack	
G1	1	AC power	N	6 feet	3	N		

Test Software Description

Title: Uboot Build Date May 2nd 2005

Hard Drive—Linux (none) 2.4.20_mvlcee31-pepperpad2 #691 Wed Apr 27 13:58:39 EDT 2005

Part # / Rev.:

Function: Provide necessary test sequences/settings

Repeat Time: Continuous

Operational Mode(s) Available:

1. Continuously playing a video on LCD display or video monitor
 2. Transferring data to/from SanDisk via USB interface & accessing hard drive
 3. Playing stored music or audio from Video over Headset
 4. Recording audio via internal or external mic
 5. Operating on Battery or DC power
 6. Wi-Fi Interface
 7. Bluetooth Interface
-

Mode(s) Tested:

1. Continuous playing video on LCD display (worst case)
 2. Transferring data to/from SanDisk via USB interface & accessing hard drive
 3. Playing music from Video over Headset.
 4. External mic plugged in
 5. Operating on DC power
 6. Bluetooth enabled (all tests)
 7. Wi-Fi Interface enabled as necessary(selected tests)
-

Rationale:

Exercises all functions of the EUT and provides individual selection of 802.11b (Bluetooth) Channels for test purposes.

Run Instructions

```
Let pepper keeper finish booting.  
Ctrl+1 [brings up xterm window]  
/etc/init.d/pad-sleep stop [ensures the pad will not go to sleep mid test]  
cd /sys/devices/pxasys  
insmod /usbhd/emitest  
echo "suspend powerdown 0" > codec_clock/power [ensures an unused clock is off]  
echo "resume poweron" > pepper_kpl/power [turns on keypad backlights]  
cd /usbhd  
./testcopyloop.sh [runs an infinite copy loop back and forth over the USB]  
Ctrl+1 [brings up xterm window]  
cd /home/emitest  
./testcopyloop.sh [runs an infinite copy loop on the hard drive.  
Ctrl+1 [brings up xterm window]  
mplayer -fs -loop 5000 opt/Video/Alien.mpeg [plays a full screen video with sound 5000 times]
```

Run individual WiFi Channels

Note: ^=space

```
Ctrl+1 [brings up xterm window]  
/opt/hostap-utils/prism2_parm^wifi0^antssel_tx^ox1=ch1, ox6=ch6, oxB=ch11.
```

Disable Bluetooth

```
Ctrl+1 /etc/init.d/obextool^stop  
Insmod^pepper^modpwr  
Echo "suspend powerdown 0" ^/sys/bus/pxasys/devices/Bluetooth/power
```

Run individual Bluetooth Channels

```
Transmit continuous @ 2402 MHz fixed (RX 2480)  
hcidtool cmd 0X3f 0X0019 0Xe9 0X81 0X67 0Xeb 0X04 0X00 0X00  
0X4e 0X00 0X04 0X16 0X00  
Transmit continuous @ 2441 MHz fixed (RX 240A)  
hcidtool cmd 0X3f 0X0019 0Xe9 0X81 0X67 0Xeb 0X04 0X00 0X4e  
0X00 0X00 0X04 0X1b 0X00  
Transmit continuous @ 2480 MHz (RX 2402)  
hcidtool cmd 0X3f 0X0019 0Xe9 0X81 0X67 0Xeb 0X04 0X00 0X4e  
0X00 0X00 0X04 0X1b 0X00  
Transmit Frequency Hopping  
hcidtool cmd 0X3f 0X0019 0Xe9 0X81 0X67 0Xeb 0X04 0X00 0X4e  
0X00 0X00 0X04 0X1b 0X00  
hci reset:  
hcidtool cmd 0X03 0X0003  
hCI_Enable_Device_Under_Test_Mode  
hcidtool cmd 0X06 0X0003
```

EUT I/O Ports – Cable Configuration

All testing was performed with the following cables/terminators connected to the EUT I/O ports:

EUT I/O Ports (All available by type)	Cable Attached (Yes/No)
Video Splitter	Y
Headset	Y
Microphone	Y
Data	Y

NOTE: FCC Tests : ONE of each TYPE of PORT must be cabled.
CISPR Tests : ONE of each TYPE of PORT must be cabled.

Test Equipment List

Equipment Type	Manufacturer	Model #	Serial #	Cal Due	Used
Radiated/Conducted Emissions					
Spectrum Analyzer	Hewlett-Packard	8568B	2207A01917	18-Apr-06	X
Quasi-Peak Adapter	Hewlett-Packard	85650A	2043A00249	18-Apr-06	X
RF Pre-Selector	Hewlett-Packard	85685A	2648A00500	18-Apr-06	X
Spectrum Analyzer	Hewlett-Packard	8566B	2532A02250	13-Aug-05	X
Quasi-Peak Adapter	Hewlett-Packard	85650A	2521A00665	24-Nov-05	X
RF Pre-Selector	Hewlett-Packard	85685A	2510A00186	24-Nov-05	X
Pre-Amplifier	Hewlett-Packard	8449B	3008A00952	26-May-06	X
Biconical Antenna	Schwarzbeck	BBA9106	0101	23-Dec-05	X
Log Periodic Antenna	Schwarzbeck	UHALP9107	9107718	24-Dec-05	X
Horn Antenna(Tx)	EMCO	3115	9308-4132	16-Mar-06	X
Horn Antenna(Rx)	EMCO	3115	9604-4783	28-Oct-05	X
Receiver	Rhode & Schwarz	ESBI	827061/005	18-Jul-05	X
Display	Rhode & Schwarz	ESAI	285316/018	18-Jul-05	X
Antenna Mast	EMCO			Daily	X
Mast Controller	EMCO	1050	1267	Daily	X
Turntable	Macton			Daily	X
Analyzer	Hewlett Packard	E7405A with Opt 1AX, A41	US39440170	07-Apr-06	
LISN 4 x 25 A	Schwarzbeck	NNLA8120	8120458A	24-Mar-06	X

Measurement Uncertainty:

Type		Freq Range Hz		Uncertainty dB
Radiated Emissions	Horiz	30M-200M	3m	3.6
			10m	3.6
	Vert		3m	4.1
			10m	4.1
	Horiz	200M-1000M	3m	4.6
			10m	4.6
	Vert		3m	4.3
			10m	4.3

				Uncertainty dB
Conducted Emissions		9KHz-150KHz		3.9
		150KHz-30MHz		3.6

Environmental Conditions

If not otherwise specified, note the following environmental conditions during test:

Temperature: 70-75 °F.

Relative Humidity: 45-55%

Appendix A Test Procedures

TEST PROCEDURES

Test Procedures - EMI Operational Description

GENERAL

For each emission signal, maximum level is achieved for both horizontal and vertical polarizations as well as (0-360) degrees turntable rotation.

Antenna Test Distances are selected at either 3, 10 or 30 meters separation from the EUT in accordance with applicable specification requirements.

Antenna Scan Heights are varied from 1-4 meters at Antenna Test Distances of 3, 10 and 30 meters.

FCC RADIATED EMISSIONS (E-FIELD)

EMI test procedures are performed in accordance with the requirements of ANSI C63.4. Measurements are initially obtained using broad band antennas and PEAK detection. In addition, cables are manipulated to maximize emissions within constraints of a typical system configuration. All measured data within 3 db of the Radiated Limits are retaken using Tuned Dipole Antennas (Roberts Type) and QUASI-PEAK (CISPR) Detection. Each EUT is powered from a 60Hz AC source except a 50 Hz source is used when CISPR Limits are applicable.

FCC CONDUCTED EMISSIONS

EMI test procedures are performed in accordance with the requirements ANSI C63.4 Measurements are initially obtained with PEAK Detection. In addition, cables are manipulated to maximize emissions within constraints of a typical system configuration. All measured data within 3 db of the Conducted Limits are retaken using QUASI-PEAK (CISPR) Detection. Each EUT is powered from a 60Hz AC source.

CISPR22/EN55022 RADIATED EMISSIONS (E FIELD)

EMI test procedures are operated in accordance with the requirements of the CISPR22 and EN55022 Documents. Measurements are initially obtained with PEAK Detection. In addition, cables are manipulated to maximize emissions within constraints of a typical system configuration. All measured data within 3 db of the Radiated Limits are retaken using QUASI-PEAK (CISPR) detection. Each EUT is powered from a 50Hz AC source.

CISPR22/EN55022 CONDUCTED EMISSIONS

EMI test procedures are operated in accordance with the requirements of the CISPR22 and EN55022 Documents. Measurements are initially obtained with PEAK Detection. In addition, cables are arranged per the specification within constraints of a typical system configuration. All measured data exceeding 3 db below the Conducted QP Limit are retaken using QUASI-PEAK (CISPR) Detection. All measured data exceeding 2 db below the Conducted AVERAGE Limit are retaken using AVERAGE (CISPR) Detection. Each EUT is powered from a 50Hz AC source.

Appendix B Measurement Facilities Information

MEASUREMENT FACILITIES INFORMATION

DESCRIPTION of MEASUREMENT FACILITIES

The Open Area Test Site (OATS) is composed of a building and associated ground screen with a control room underneath.

The building is a TUFF-SPAN enclosure constructed of fiberglass reinforced plastic materials which provide above-ground weather protection. These materials are non conductive, non magnetic and RF transparent. They do not impact the surrounding electromagnetic environment and are corrosion resistant. The enclosure size permits Ten Meter Radiated Measurements within its confines and utilizes a remote controlled Macton Turntable Assembly. The conductive turntable is 16 feet in diameter and capable of moving a 10,000 pound load a full 360 degrees of rotation. It is flush-mounted to the ground screen and edge bonded circumferentially to the ground screen with beryllium copper "fingers". The ground screen is constructed of welded wire mesh lying directly on top of a concrete-over-steel foundation. The screen is extended beyond the building itself to provide 30 meter measurement capability when needed. There are no reflecting objects within the required obstruction free oval area.

The control room is located beneath the ground screen level with stairwell access to the ground plane area. An elevator is located beyond the ground screen and provides access to the control room, shipping dock and ground screen areas for large sized EUT's. Primary power cabling to the EUT is fed through a hole in the center of the table along with necessary EUT/Support Equipment interface cabling. A remote controlled EMCO Antenna Mast Assembly is located on the ground screen. It provides the operator with adjustable antenna height over the 1 meter through 4 meter range as well as allowing both horizontal and vertical polarizations at any height.

A conducted emissions measurement area is located in a shielded room and consists of a conductive (galvanized sheet metal) wall 20' wide x 8' high with a metal floor bonded to the wall. AC Power is supplied through receptacles located on the vertical wall. Each receptacle is adequately filtered using Shielded Room EMI Power Line Filters (Rayproof 1B42 Units) which provide 100 db attenuation over the 14KHz to 10GHz frequency range. The shielded room itself is bonded directly to earth ground.

Additionally, both the control room/shielded rooms and ground plane area have heating, air conditioning and relative humidity controlled environments.

Capability

Test Site Service's open area Test Sites have been evaluated in accordance with ANSI C63.4 procedures and found to be in compliance with ANSI C63.4 Site Attenuation and LISN requirements.

In addition, Test Site Services is Assessed and Approved annually by a European Competent Body to assure competence in testing products for CE Mark Compliance (Emissions and Immunity).

All of Test Site Service's measurement facilities meet the technical requirements for qualification testing of products to FCC, CISPR, IEC, VCCI, BSMI and other International Standards.

Accreditation / Approval

- ? FCC Registered (Registration # 91007 & #91008)
- ? Industry Canada RSS-212 (File # IC4276)
- ? VCCI Registered (Registration # R-1145, C-1205)
- ? BSMI Accreditation (Reference # SL2-IN-E-1018)
- ? NVLAP Accredited (Lab Code # 100419-0)
- ? Australia (ACA), MRA / NVLAP
- ? New Zealand (Ministry of Commerce), MRA / NVLAP
- ? U.S. Conformity Assessment Body (CAB), EMC Directive 89/336/EEC
- ? Competent Body Assessment / Approval (Technology International, UK) (File# TSS-031899)
- ? Competent Body Assessment / Approval (Nemko AS, Norway) (Aut. # ELA174)
- ? Competent Body Assessment / Approval (TUV Rheinland)
- ? NCC-OCD / Anatel (Brazil / Latin America)
- ? NARTE certified EMC Technicians & Engineers (ATL-0122T, ATL-0025T, EMC-001677NE, EMC-000142NE)

NOTE: Certificates upon request.

EMC Facility Client Satisfaction Questionnaire

Thank you for choosing to use the Test Site Services EMC test facilities to test your product. Client satisfaction is very important to Test Site Services. To help serve you fully and continue to make improvements in our service, we need your feedback and comments on the service we performed for you today. We would appreciate your taking a few moments to complete this questionnaire.

1. Did scheduling meet your needs ____
2. Test operator support _____
3. Personnel attitude ____
4. Efficiency of test process ____
5. Work completed in a timely manner _____
6. Report received in a timely manner _
7. Report content and clarity ____
8. Overall rating _____
9. Additional Comments: _____

Test Date: / / Completed By: _____

Please return to: Lab Manager or Richard L. Wiedeman
(At Test Site) President
Test Site Services, Inc.
PO Box 766

Marlboro, MA 01752