Test Report

Product Name	Industrial PDA
Model No.	DOLPHIN 7600
FCC ID	HD5760002

Applicant	Hand Held Products, Inc.
Address	700 Visions Drive P.O. Box 208 Skaneateles Falls, NY, 13153-0208 USA

Date of Receipt	Mar. 26, 2007
Issued Date	Sep. 28, 2007
Report No.	074L005-RFUSP05V01

Test Report Certification

Issued Date: Sep. 28, 2007
Report No.: 074L005-RFUSP05V01

Accredited by NIST (NVLAP)
NVLAP Lab Code: 200533-0

Product Name	Industrial PDA
Applicant	Hand Held Products, Inc.
Address	700 Visions Drive P.O. Box 208 Skaneateles Falls, NY, 13153-0208 USA
Manufacturer	E-TEN Information Systems Co., Ltd.
Model No.	DOLPHIN 7600
Rated Voltage	AC 120V/60Hz
Working Voltage	AC 120V/60Hz
Trade Name	Hand Held Products
Applicable Standard	FCC CFR Title 47 Part 15 Subpart C: 2006 ANSI C63.4: 2003
Test Result	Complied

NVLAP Lab Code: 200533-0

Test results relate only to the samples tested.
The test report shall not be reproduced except in full without the written approval of QuieTek Corporation.
This report must not be used to claim product endorsement by NVLAP any agency of the U.S. Government

Documented By : Rita Huang
(Engineering Adm. Specialist / Rita Huang)

Tested By : Tim Sung
(Engineer / T i m S u n g)

Approved By :
(Deputy Manager / Vincent Lin)

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1. GENERAL INFORMATION

1.1. EUT Description

Product Name	Industrial PDA
Trade Name	Hand Held Products
Model No.	DOLPHIN 7600
FCC ID	HD5760002
Frequency Range	2412 – 2462MHz
Channel Number	11
Data Speed	IEEE 802.11b – 1, 2, 5.5, 11Mbps IEEE 802.11g – 6, 9, 12, 18, 24, 36 48, 54Mbps
Type of Modulation	DSSS/ OFDM
Antenna Type	Connector
Antenna Gain	Refer to the table "Antenna List"
Channel Control	Auto
Power Adapter	MFR: PHIHONG M/N: PSA15R-050 Cable out: Non-Shielded, 1.8m with one ferrite core bonded.
Infineon	HYB25L256160A
Samsung	K4M561633G-R(B)N/G/L/F

Antenna List

No.	Manufacturer	Part No.	Peak Gain
1	E-TEN	Wlan Antenna, Brass / C2680R-H	0.218dBi in 2.4 GHz

Frequency of Each Channel:

Channel	Frequency	Channel	Frequency	Channel	Frequency
Channel 1:	2412 MHz	Channel 5:	2432 MHz	Channel 9:	2452 MHz
Channel 2:	2417 MHz	Channel 6:	2437 MHz	Channel 10:	2457 MHz
Channel 3:	2422 MHz	Channel 7:	2442 MHz	Channel 11:	2462 MHz
Channel 4:	2427 MHz	Channel 8:	2447 MHz		

Note:

1. The EUT is an Industrial PDA with a built-in 2.4GHz WLAN transceiver.
2. Regarding to the operation frequency, the lowest, middle and highest frequency are selected to perform the test.
3. Lowest and highest data rates are tested in each mode. Only worst case is shown in the report. (802.11b is 11Mbps and 802.11g is 54Mbps)
4. These tests are conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 15 Subpart C Paragraph 15.247 for spread spectrum devices.
5. The radiation measurements are performed in X, Y, Z axis positioning. Only the worst case is shown in the report.

1.2. Operational Description

The EUT is a Industrial PDA a built-in 2.4GHz WLAN and Bluetooth transceiver. This device provided four kinds of transmitting speed 1, 2, 5.5 and 11Mbps. The device of RF carrier is DBPSK, DQPSK and CCK (IEEE 802.11b) or eight kinds of transmitting speed 6, 9, 12, 18, 24, 36, 48 and 54Mbps. The device of RF carrier is OFDM (IEEE 802.11g).

The device adapts direct sequence spread spectrum modulation. The antenna provides diversity function to improve the receiving function.

This Industrial PDA, compliant with IEEE 802.11b and IEEE 802.11g, is a high-efficiency Wireless LAN adapter. It allows your computer to connect to a wireless network and to share resources, such as files or printers without being bound to the network wires. Operation in 2.4GHz Direst Sequence Spread Spectrum (DSSS) radio transmission, the Industrial PDA Wired Equivalent Protection (WEP) algorithm is used. In addition, its standard compliance ensures that it can communicate with any IEEE 802.11b and IEEE 802.11g network.

Test Mode	Mode 1: Transmitter 802.11b
	Mode 2: Transmitter 802.11g

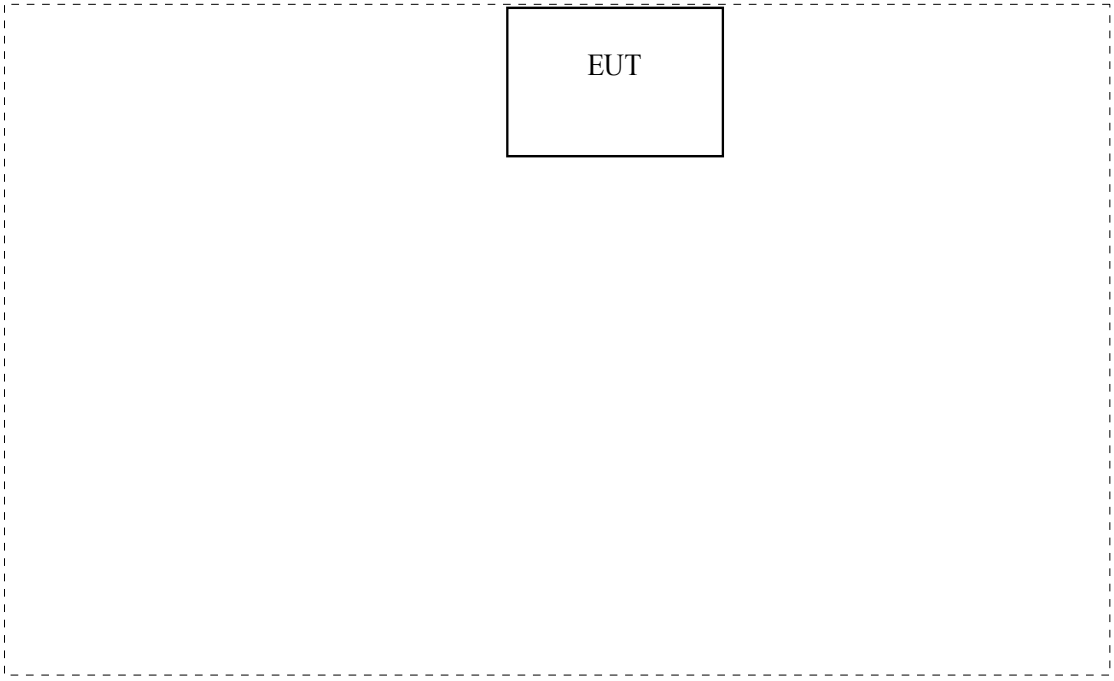
1.3. Tested System Datails

The types for all equipment, plus descriptions of all cables used in the tested system (including inserted cards) are:

Product		Manufacturer	Model No.	Serial No.	FCC ID	Power Cord
1.	N/A	N/A	N/A	N/A	N/A	N/A

Signal Cable Type		Signal cable Description
A.	N/A	N/A

1.4. Configuration of Test System



1.5. EUT Exercise Software

(1) Setup the EUT as shown in section 1.4

(2) Power on the EUT.

(3) Click the icon in the tool bar and select “Activate (TestMode)”.

(4) Double-click the icon “My Device” on the desktop.

(5) Double-click the file folder “IPSM”.

(6) Execute SEMRFTool_24XX_CE.

(7) Configure the test channel and the data rate.

(8) Click on “Start” to transmit continuously.

(9) Verify that the EUT works properly.

1.6. Test Facility

Ambient conditions in the laboratory:

Items	Required (IEC 68-1)	Actual
Temperature (°C)	15-35	20-35
Humidity (%RH)	25-75	50-65
Barometric pressure (mbar)	860-1060	950-1000

Site Description: File on
Federal Communications Commission
FCC Engineering Laboratory
7435 Oakland Mills Road
Columbia, MD 21046
Reference 31040/SIT1300F2

Accreditation on NVLAP
NVLAP Lab Code: 200533-0

Site Name: Quietek Corporation

Site Address: No. 5-22, Ruei-Shu Valley, Ruei-Ping Tsuen,
Lin-Kou Shiang, Taipei,
Taiwan, R.O.C.
TEL: 886-2-8601-3788 / FAX : 886-2-8601-3789
E-Mail : service@quietek.com

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FCC Accreditation Number: TW1014

2. Conducted Emission

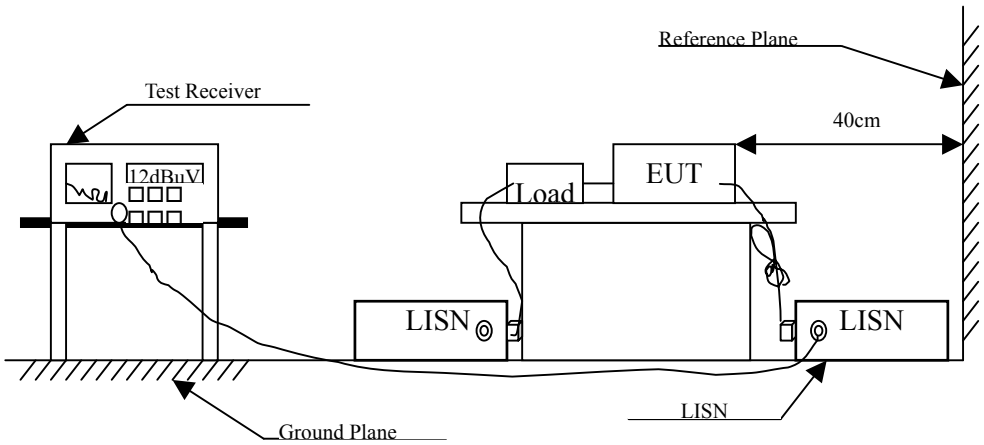
2.1. Test Equipment

The following test equipment are used during the conducted emission test:

Item	Instrument	Manufacturer	Type No./Serial No	Last Cal.	Remark
1	Test Receiver	R & S	ESCS 30/825442/17	May, 2007	
2	L.I.S.N.	R & S	ESH3-Z5/825016/6	May, 2007	EUT
3	L.I.S.N.	Kyoritsu	KNW-407/8-1420-3	May, 2007	Peripherals
4	Pulse Limiter	R & S	ESH3-Z2	May, 2007	
5	No.1 Shielded Room			N/A	

Note: All instruments are calibrated every one year.

2.2. Test Setup



2.3. Limits

FCC Part 15 Subpart C Paragraph 15.207 (dBuV) Limit		
Frequency MHz	Limits	
	uV	dBuV
0.15 - 0.50	66-56(注)	56-46(注)
0.50-5.0	56	46
5.0 - 30	60	50

2.4. Test Procedure

The EUT and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm /50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs.)

Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all the interface cables must be changed according to ANSI C63.4: 2003 on conducted measurement.

Conducted emissions were invested over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9kHz.

2.5. Uncertainty

± 2.26 dB

2.6. Test Result of Conducted Emission

Product : Industrial PDA
Test Item : Conducted Emission Test
Power Line : Line 1
Test Mode : Mode 1: Transmitter 802.11b (2437MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBuV	dBuV	dB	dBuV
LINE 1					
Quasi-Peak					
0.197	0.669	50.470	51.139	-13.518	64.657
0.259	0.324	35.740	36.064	-26.821	62.886
0.720	0.310	39.400	39.710	-16.290	56.000
1.677	0.330	34.160	34.490	-21.510	56.000
3.091	0.370	38.450	38.820	-17.180	56.000
7.986	0.530	35.720	36.250	-23.750	60.000
Average					
0.197	0.669	42.890	43.559	-11.098	54.657
0.259	0.324	29.970	30.294	-22.591	52.886
0.720	0.310	27.680	27.990	-18.010	46.000
1.677	0.330	30.620	30.950	-15.050	46.000
3.091	0.370	33.490	33.860	-12.140	46.000
7.986	0.530	33.500	34.030	-15.970	50.000

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. " " means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

Product : Industrial PDA
Test Item : Conducted Emission Test
Power Line : Line 2
Test Mode : Mode 1: Transmitter 802.11b (2437MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBuV	dBuV	dB	dBuV
LINE 2					
Quasi-Peak					
0.193	0.300	52.900	53.200	-11.571	64.771
0.709	0.310	37.830	38.140	-17.860	56.000
1.478	0.330	34.010	34.340	-21.660	56.000
2.963	0.370	37.020	37.390	-18.610	56.000
8.115	0.470	31.450	31.920	-28.080	60.000
19.377	0.900	29.950	30.850	-29.150	60.000
Average					
0.193	0.300	45.890	46.190	-8.581	54.771
0.709	0.310	30.490	30.800	-15.200	46.000
1.478	0.330	25.920	26.250	-19.750	46.000
2.963	0.370	32.900	33.270	-12.730	46.000
8.115	0.470	27.060	27.530	-22.470	50.000
19.377	0.900	26.730	27.630	-22.370	50.000

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. “ “ means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

Product : Industrial PDA
Test Item : Conducted Emission Test
Power Line : Line 1
Test Mode : Mode 2: Transmitter 802.11g (2437MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBuV	dBuV	dB	dBuV
LINE 1					
Quasi-Peak					
0.162	0.202	47.890	48.092	-17.565	65.657
0.220	0.202	42.690	42.892	-21.108	64.000
0.271	0.210	39.390	39.600	-22.943	62.543
0.321	0.214	32.790	33.004	-28.110	61.114
0.381	0.215	21.710	21.925	-37.475	59.400
1.232	0.246	21.190	21.436	-34.564	56.000
Average					
0.162	0.202	35.780	35.982	-19.675	55.657
0.220	0.202	34.940	35.142	-18.858	54.000
0.271	0.210	36.480	36.690	-15.853	52.543
0.321	0.214	30.390	30.604	-20.510	51.114
0.381	0.215	15.200	15.415	-33.985	49.400
1.232	0.246	14.800	15.046	-30.954	46.000

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. “ “ means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

Product : Industrial PDA
Test Item : Conducted Emission Test
Power Line : Line 2
Test Mode : Mode 2: Transmitter 802.11g (2437MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBuV	dBuV	dB	dBuV
LINE 2					
Quasi-Peak					
0.158	0.202	46.830	47.032	-18.739	65.771
0.212	0.202	45.530	45.732	-18.497	64.229
0.267	0.203	39.450	39.653	-23.004	62.657
0.317	0.214	31.990	32.204	-29.025	61.229
0.377	0.215	22.430	22.645	-36.869	59.514
0.970	0.232	24.890	25.122	-30.878	56.000
Average					
0.158	0.202	34.180	34.382	-21.389	55.771
0.212	0.202	39.470	39.672	-14.557	54.229
0.267	0.203	36.810	37.013	-15.644	52.657
0.317	0.214	28.670	28.884	-22.345	51.229
0.377	0.215	16.960	17.175	-32.339	49.514
0.970	0.232	16.550	16.782	-29.218	46.000

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. “ “ means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

3. Peak Power Output

3.1. Test Equipment

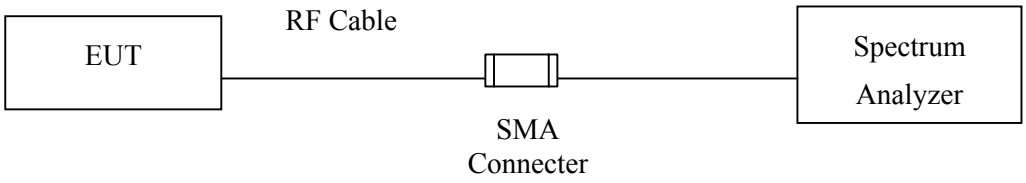
The following test equipments are used during the radiated emission tests:

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
X	Test Receiver	R & S	ESI 26 / 838786 / 004	May, 2007
X	Spectrum Analyzer	Agilent	E4407B / US39440758	May, 2007

Note: 1. All instruments are calibrated every one year.
2. The test instruments marked by "X" are used to measure the final test results.

3.2. Test Setup

Conducted Measurement



3.3. Limits

The maximum peak power shall be less 1 Watt.

3.4. Uncertainty

± 1.27 dB

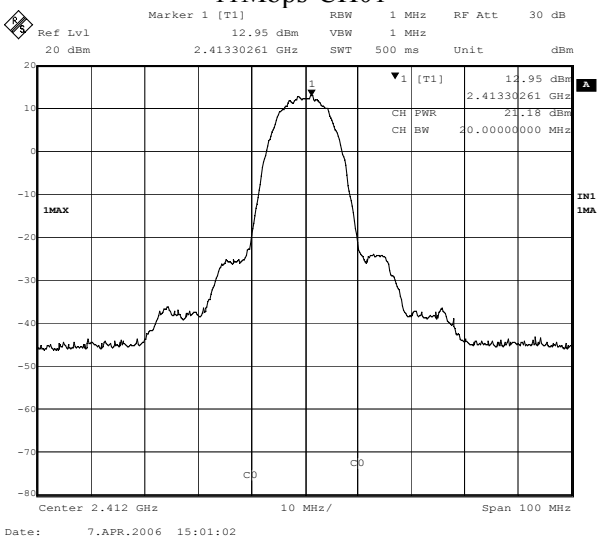
3.5. Test Result of Peak Power Output

Product : Industrial PDA
Test Item : Peak Power Output Data
Test Site : No.3 OATS
Test Mode : Mode 1: Transmitter 802.11b

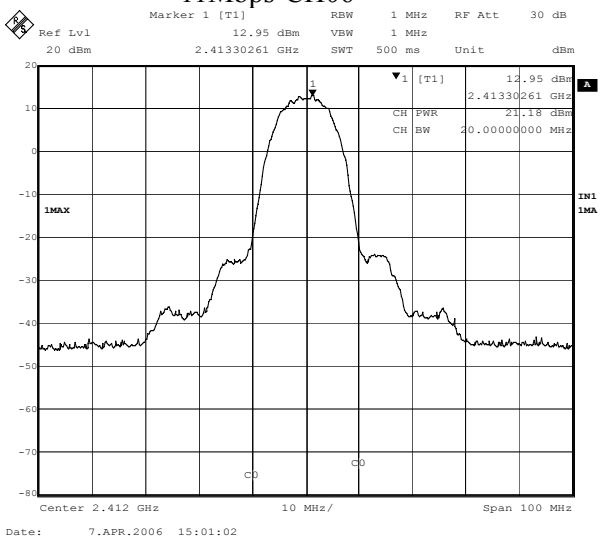
Data Speed: 11Mbps

Channel No.	Frequency (MHz)	Measurement	Required Limit	Result
1	2412.00	21.18dBm	1Watt= 30 dBm	Pass
6	2437.00	21.80dBm	1Watt= 30 dBm	Pass
11	2462.00	21.82dBm	1Watt= 30 dBm	Pass

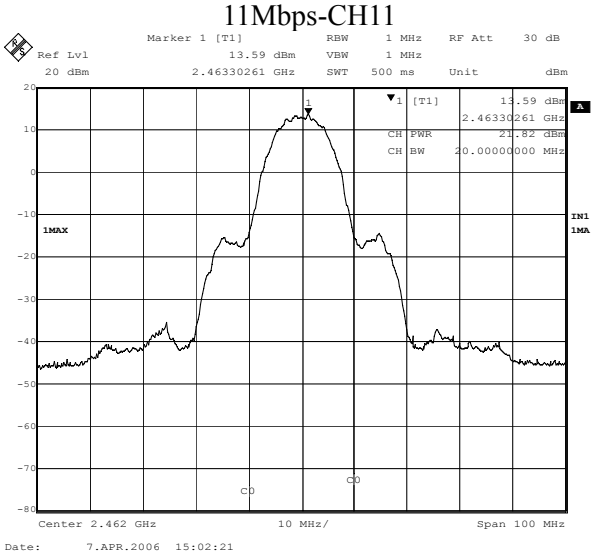
11Mbps-CH01



11Mbps-CH06



11Mbps-CH11

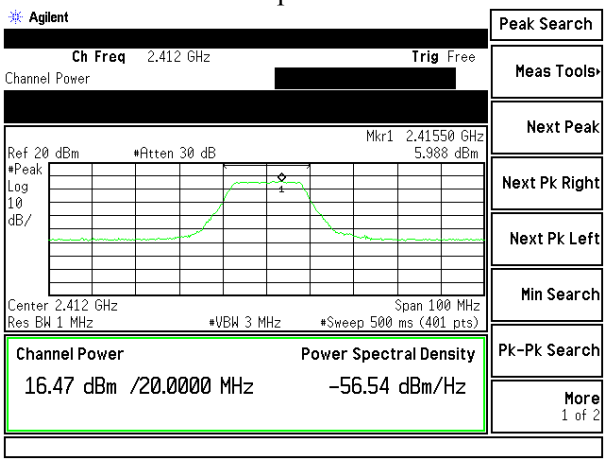


Product : Industrial PDA
Test Item : Peak Power Output Data
Test Site : No.3 OATS
Test Mode : Mode 2: Transmitter 802.11g

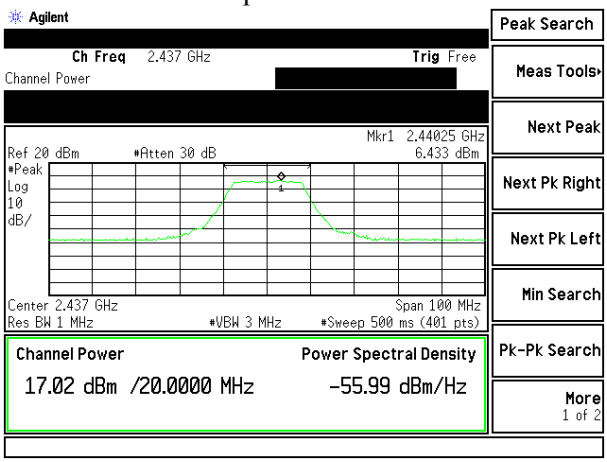
Data Speed: 54Mbps

Channel No.	Frequency (MHz)	Measurement	Required Limit	Result
1	2412.00	16.47dBm	1Watt= 30 dBm	Pass
6	2437.00	17.02dBm	1Watt= 30 dBm	Pass
11	2462.00	17.37dBm	1Watt= 30 dBm	Pass

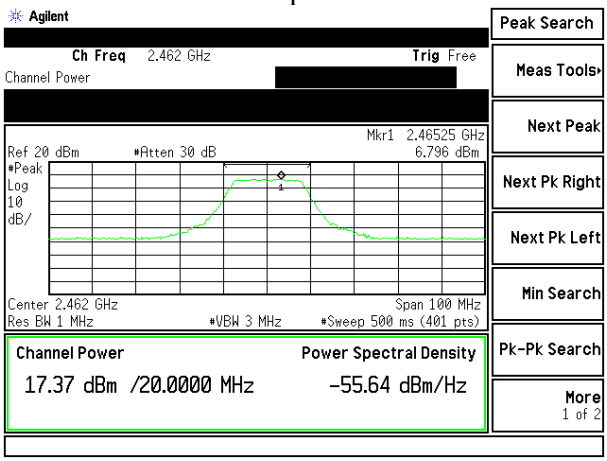
54Mbps-CH01



54Mbps-CH06



54Mbps-CH11



4. Radiated Emission

4.1. Test Equipment

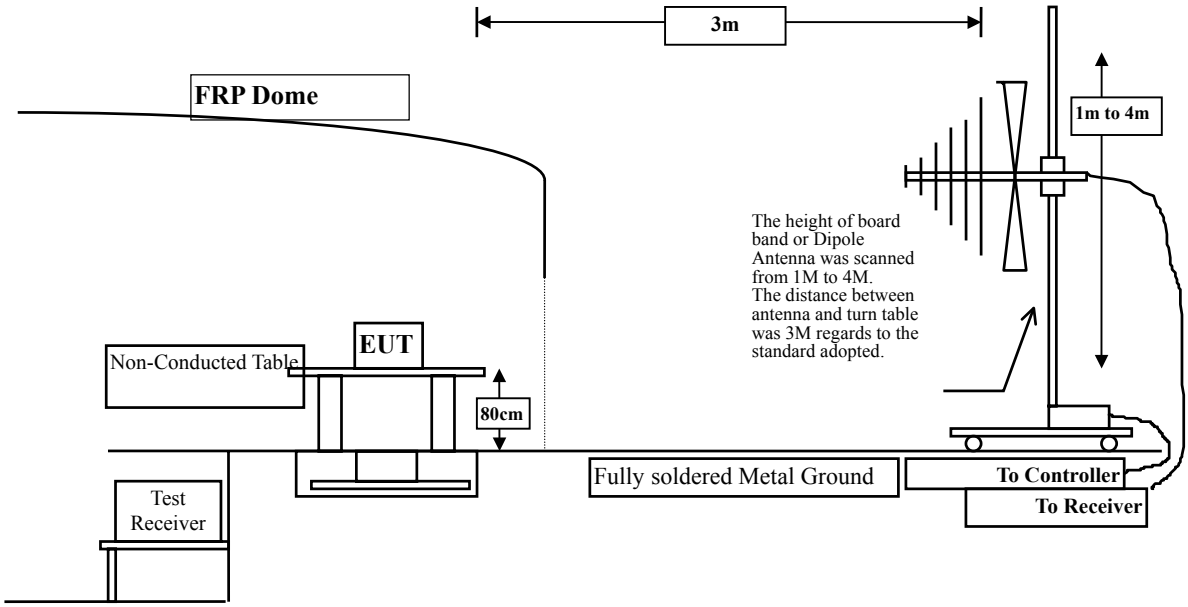
The following test equipment are used during the radiated emission test:

Test Site		Equipment	Manufacturer	Model No./Serial No.	Last Cal.
Site # 1		Test Receiver	R & S	ESCS 30 / 825442/14	May, 2007
		Spectrum Analyzer	Advantest	R3261C / 71720140	May, 2007
		Pre-Amplifier	HP	8447D/3307A01812	May, 2007
		Bilog Antenna	Chase	CBL6112B / 12452	Sep., 2007
		Horn Antenna	EM	EM6917 / 103325	May, 2007
Site # 2		Test Receiver	R & S	ESCS 30 / 825442/17	May, 2007
		Spectrum Analyzer	Advantest	R3261C / 71720609	May, 2007
		Pre-Amplifier	HP	8447D/3307A01814	May, 2007
		Bilog Antenna	Chase	CBL6112B / 2455	Sep., 2007
		Horn Antenna	EM	EM6917 / 103325	May, 2007
Site # 3	X	Test Receiver	R & S	ESI 26 / 838786 / 004	May, 2007
	X	Spectrum Analyzer	Agilent	E4407B / US39440758	May, 2007
	X	Bilog Antenna	SCHAFFNER	CBL6112B / 2697	May, 2007
	X	Horn Antenna	Schwarzbeck	BBHA9120D / 305, 306	July, 2007
	X	Horn Antenna	Schwarzbeck	BBHA9170 / 208, 209	July, 2007
	X	Pre-Amplifier	QTK	QTK-AMP-01 / 0001	July, 2007
	X	Pre-Amplifier	QTK	QTK-AMP-03 / 0003	May, 2007
	X	Pre-Amplifier	HP	8449B / 3008A01123	July, 2007

Note: 1. All instruments are calibrated every one year.

2. The test instruments marked by “X” are used to measure the final test results.

4.2. Test Setup



4.3. Limits

➢ **General Radiated Emission Limits**

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 20dB below the level of the fundamental or to the general radiated emission limits in paragraph 15.209, whichever is the lesser attenuation.

FCC Part 15 Subpart C Paragraph 15.209(a) Limits		
Frequency MHz	uV/m @3m	dBuV/m@3m
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

Remarks : 1. RF Voltage (dBuV) = 20 log RF Voltage (uV)

2. In the Above Table, the tighter limit applies at the band edges.

3. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

4.4. Test Procedure

The EUT and its simulators are placed on a turn table which is 0.8 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.
The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level.
Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.4: 2003 on radiated measurement.
The additional latch filter below 1GHz was used to measure the level of harmonics radiated emission during field dtrength of harmonics measurement.
The bandwidth below 1GHz setting on the field strength meter is 120 kHz, above 1GHz are 1 MHz.
The frequency range from 30MHz to 10th harminics is checked.

4.5. Uncertainty

± 3.9 dB above 1GHz
± 3.8 dB below 1GHz

4.6. Test Result of Radiated Emission

Product : Industrial PDA
Test Item : Harmonic Radiated Emission Data
Test Site : No.3 OATS
Test Mode : Mode 1: Transmitter 802.11b (2412MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal					
Peak Detector:					
4824.000	3.723	45.387	49.110	-24.890	74.000
7236.000	9.439	37.751	47.190	-26.810	74.000
9648.000	11.829	38.411	50.240	-23.760	74.000
Average Detector:					
--					
Vertical					
Peak Detector:					
4824.000	3.723	43.097	46.820	-27.180	74.000
7236.000	9.439	38.081	47.520	-26.480	74.000
9648.000	11.829	38.591	50.420	-23.580	74.000
Average Detector:					
--					

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Receiver setting (Peak Detector) : RBW:1MHz; VBW:1MHz; Span:100MHz。
3. Receiver setting (AVG Detector) : RBW:1MHz; VBW:30Hz; Span:20MHz。
4. Emission Level = Reading Level + Correct Factor.
5. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

Product : Industrial PDA
Test Item : Harmonic Radiated Emission Data
Test Site : No.3 OATS
Test Mode : Mode 1: Transmitter 802.11b (2437 MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal					
Peak Detector:					
4874.000	3.893	46.338	50.230	-23.770	74.000
7311.000	9.624	37.706	47.330	-26.670	74.000
9748.000	11.805	40.384	52.190	-21.810	74.000
Average Detector:					
--					
Vertical					
Peak Detector:					
4874.000	3.893	44.418	48.310	-25.690	74.000
7311.000	9.624	37.906	47.530	-26.470	74.000
9748.000	11.805	39.934	51.740	-22.260	74.000
Average Detector:					
--					

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Receiver setting (Peak Detector) : RBW:1MHz; VBW:1MHz; Span:100MHz。
3. Receiver setting (AVG Detector) : RBW:1MHz; VBW:30Hz; Span:20MHz。
4. Emission Level = Reading Level + Correct Factor.
5. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

Product : Industrial PDA
Test Item : Harmonic Radiated Emission Data
Test Site : No.3 OATS
Test Mode : Mode 1: Transmitter 802.11b (2462 MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal					
Peak Detector:					
4924.000	4.075	47.165	51.240	-22.760	74.000
7386.000	9.812	35.368	45.180	-28.820	74.000
9848.000	11.819	38.201	50.020	-23.980	74.000
Average Detector:					
--					
Vertical					
Peak Detector:					
4924.000	4.075	44.255	48.330	-25.670	74.000
7386.000	9.812	36.458	46.270	-27.730	74.000
9848.000	11.819	38.421	50.240	-23.760	74.000
Average Detector:					
--					

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Receiver setting (Peak Detector) : RBW:1MHz; VBW:1MHz; Span:100MHz。
3. Receiver setting (AVG Detector) : RBW:1MHz; VBW:30Hz; Span:20MHz。
4. Emission Level = Reading Level + Correct Factor.
5. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

Product : Industrial PDA
Test Item : Harmonic Radiated Emission Data
Test Site : No.3 OATS
Test Mode : Mode 2: Transmitter 802.11g (2412MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal					
Peak Detector:					
4824.000	-0.281	36.542	36.261	-37.739	74.000
7236.000	9.409	36.564	45.973	-28.027	74.000
9648.000	14.882	35.480	50.362	-23.638	74.000
Average Detector:					
--					
Vertical					
Peak Detector:					
4824.000	3.768	36.286	40.054	-33.946	74.000
7236.000	10.969	36.761	47.730	-26.270	74.000
9648.000	14.882	36.343	51.225	-22.775	74.000
Average Detector:					
--					

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Receiver setting (Peak Detector) : RBW:1MHz; VBW:1MHz; Span:100MHz。
3. Receiver setting (AVG Detector) : RBW:1MHz; VBW:30Hz; Span:20MHz。
4. Emission Level = Reading Level + Correct Factor.
5. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

Product : Industrial PDA
Test Item : Harmonic Radiated Emission Data
Test Site : No.3 OATS
Test Mode : Mode 2: Transmitter 802.11g (2437 MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal					
Peak Detector:					
4874.000	0.913	36.123	37.036	-36.964	74.000
7311.000	10.547	36.365	46.912	-27.088	74.000
9748.000	14.260	36.297	50.557	-23.443	74.000
Average					
Detector:					
--					
Vertical					
Peak Detector:					
4874.000	3.746	36.827	40.573	-33.427	74.000
7311.000	11.547	37.116	48.663	-25.337	74.000
9748.000	14.260	35.252	49.512	-24.488	74.000
Average					
Detector:					
--					

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Receiver setting (Peak Detector) : RBW:1MHz; VBW:1MHz; Span:100MHz。
3. Receiver setting (AVG Detector) : RBW:1MHz; VBW:30Hz; Span:20MHz。
4. Emission Level = Reading Level + Correct Factor.
5. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

Product : Industrial PDA
Test Item : Harmonic Radiated Emission Data
Test Site : No.3 OATS
Test Mode : Mode 2: Transmitter 802.11g (2462 MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal					
Peak Detector:					
4924.000	1.054	37.071	38.125	-35.875	74.000
7386.000	11.617	35.895	47.512	-26.488	74.000
9848.000	13.462	35.079	48.541	-25.459	74.000
Average Detector:					
--					
Vertical					
Peak Detector:					
4924.000	4.054	37.669	41.723	-32.277	74.000
7386.000	11.873	36.121	47.995	-26.005	74.000
9848.000	13.462	35.334	48.796	-25.204	74.000
Average Detector:					
--					

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Receiver setting (Peak Detector) : RBW:1MHz; VBW:1MHz; Span:100MHz。
3. Receiver setting (AVG Detector) : RBW:1MHz; VBW:30Hz; Span:20MHz。
4. Emission Level = Reading Level + Correct Factor.
5. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

Product : Industrial PDA
Test Item : General Radiated Emission Data
Test Site : No.3 OATS
Test Mode : Mode 1: Transmitter 802.11b (2437 MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal					
107.600	13.064	22.469	35.533	-7.967	43.500
199.750	9.716	24.144	33.860	-9.640	43.500
313.725	13.717	25.390	39.107	-6.893	46.000
333.125	14.272	24.507	38.779	-7.221	46.000
738.100	21.049	14.062	35.111	-10.889	46.000
866.625	22.072	15.299	37.371	-8.629	46.000
Vertical					
97.900	10.460	29.238	39.698	-3.802	43.500
313.725	13.995	22.917	36.911	-9.089	46.000
350.100	15.082	19.268	34.350	-11.650	46.000
801.150	21.828	13.622	35.450	-10.550	46.000
839.950	21.403	13.260	34.663	-11.337	46.000
864.200	21.968	16.479	38.447	-7.553	46.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. " " means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.
4. The radiated emissions below 1GHz of the lowest, middle, highest frequency are pretested. Only the worst case is shown on the report.

Product : Industrial PDA
Test Item : General Radiated Emission Data
Test Site : No.3 OATS
Test Mode : Mode 2: Transmitter 802.11g (2437 MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal					
102.750	12.784	23.374	36.158	-7.342	43.500
134.275	12.718	19.794	32.512	-10.988	43.500
311.300	13.820	24.235	38.055	-7.945	46.000
352.525	14.973	20.782	35.755	-10.245	46.000
468.925	18.778	16.517	35.296	-10.704	46.000
728.400	21.578	14.019	35.597	-10.403	46.000
Vertical					
110.025	11.933	22.881	34.814	-8.686	43.500
313.725	13.995	25.628	39.622	-6.378	46.000
350.100	15.082	19.364	34.446	-11.554	46.000
398.600	17.966	16.690	34.656	-11.344	46.000
599.875	21.898	14.662	36.560	-9.440	46.000
798.725	21.809	14.932	36.740	-9.260	46.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. " " means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.
4. The radiated emissions below 1GHz of the lowest, middle, highest frequency are pretested. Only the worst case is shown on the report.

5. Band Edge

5.1. Test Equipment

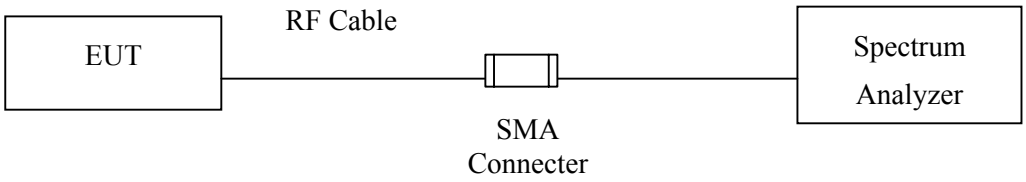
The following test equipments are used during the band edge tests:

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
X	Test Receiver	R & S	ESI 26 / 838786 / 004	May, 2007
X	Spectrum Analyzer	Agilent	E4407B / US39440758	May, 2007
X	Bilog Antenna	SCHAFFNER	CBL6112B / 2697	May, 2007
X	Horn Antenna	Schwarzbeck	BBHA9120D / 305, 306	July, 2007
X	Horn Antenna	Schwarzbeck	BBHA9170 / 208, 209	July, 2007
X	Pre-Amplifier	QTK	QTK-AMP-01 / 0001	July, 2007
X	Pre-Amplifier	QTK	QTK-AMP-03 / 0003	May, 2007
X	Pre-Amplifier	HP	8449B / 3008A01123	July, 2007

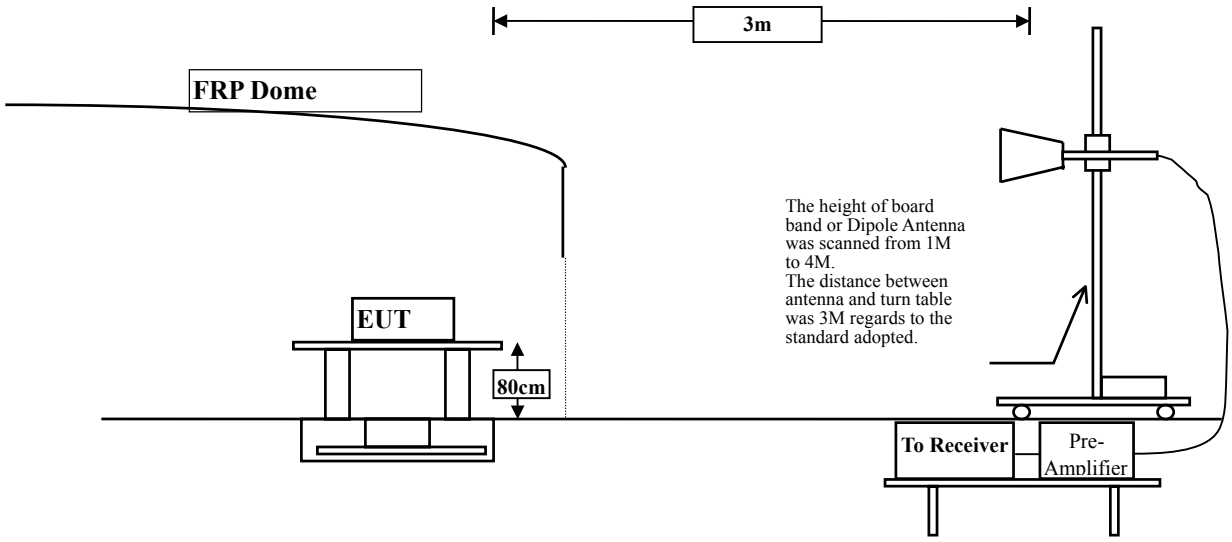
Note: 1. All instruments are calibrated every one year.
2. The test instruments marked by "X" are used to measure the final test results.

5.2. Test Setup

RF Conducted Measurement:



RF Radiated Measurement:



5.3. Limits

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

5.4. Test Procedure

The EUT and its simulators are placed on a turn table which is 0.8 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.
The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level.
Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.4: 2003 on radiated measurement.
The bandwidth below 1GHz setting on the field strength meter is 120 kHz, above 1GHz are 1 MHz.

5.5. Uncertainty

± 3.9 dB above 1GHz
± 3.8 dB below 1GHz

5.6. Test Result of Band Edge

Product : Industrial PDA
Test Item : Band Edge Data
Test Site : No.3 OATS
Test Mode : Mode 1: Transmitter 802.11b+Bluetooth CH00 RF on

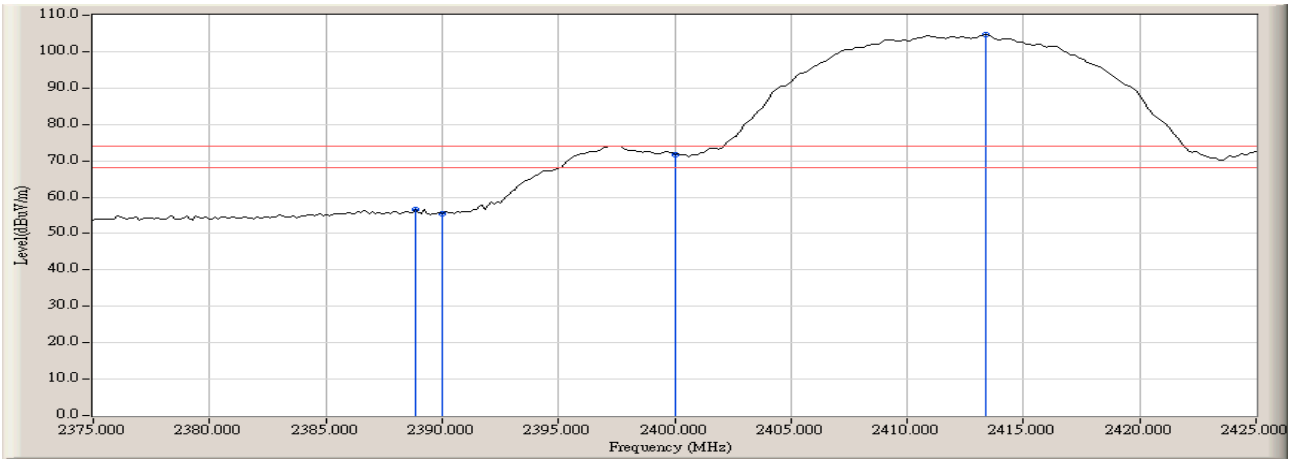
RF Radiated Measurement:

Channel No.	Frequency (MHz)	Required Limit (dBc)	Result
1 (Horizontal)	<2400	>20	Pass

RF Radiated Measurement (Horizontal):

Channel	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Arerage Limit (dBuV/m)	Result
1 (Peak)	2390.000	-2.378	47.346	44.969	74.00	54.00	Pass
1 (Peak)	2400.000	-2.328	51.355	49.027	74.00	54.00	Pass
1 (Peak)	2413.375	-2.261	94.450	92.189	74.00	54.00	Pass

Figure Channel 1: Horizontal (Peak)



Note:
RBW=1MHz, VBW=1MHz, Sweep Time=500ms.

Product : Industrial PDA
Test Item : Band Edge Data
Test Site : No.3 OATS
Test Mode : Mode 1: Transmitter 802.11b+Bluetooth CH00 RF on

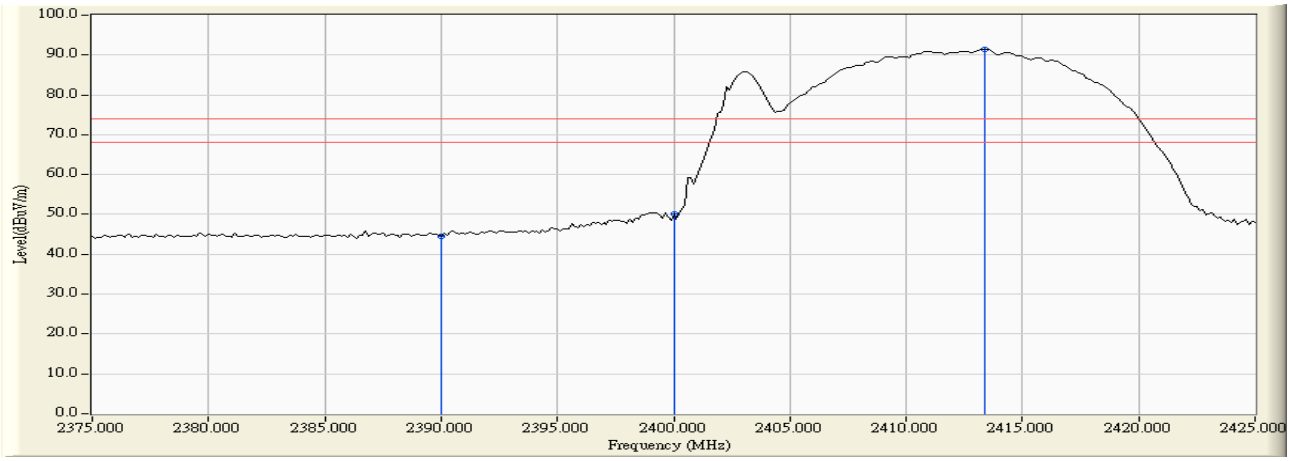
RF Radiated Measurement:

Channel No.	Frequency (MHz)	Required Limit (dBc)	Result
1 (Vertical)	<2400	>20	Pass

RF Radiated Measurement (Vertical):

Channel	Frequency (MHz)	Correct Fcator (dB)	Reading Level (dBuV)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Arerage Limit (dBuV/m)	Result
1 (Peak)	2390.000	-2.378	46.921	44.544	74.00	54.00	Pass
1 (Peak)	2400.000	-2.328	52.454	50.126	74.00	54.00	Pass
1 (Peak)	2413.375	-2.261	93.788	91.527	74.00	54.00	Pass

Figure Channel 1: Vertical (Peak)



Note:
RBW=1MHz, VBW=1MHz, Sweep Time=500ms.

Product : Industrial PDA
Test Item : Band Edge Data
Test Site : No.3 OATS
Test Mode : Mode 1: Transmitter 802.11b+Bluetooth CH78 RF on

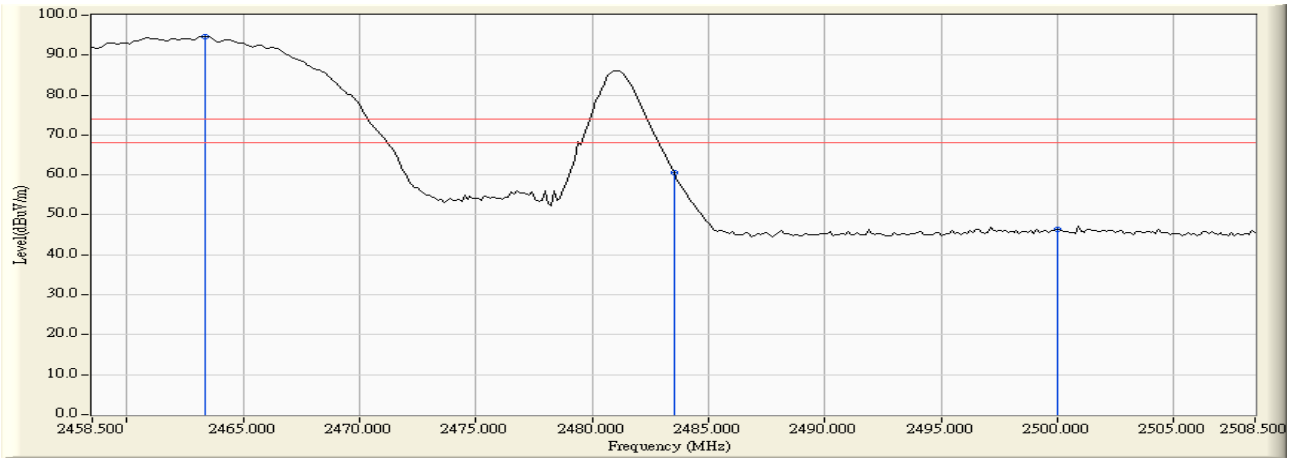
RF Radiated Measurement:

Channel No.	Frequency (MHz)	Required Limit (dBc)	Result
11 (Horizontal)	>2483.5	>20	Pass

RF Radiated Measurement (Horizontal):

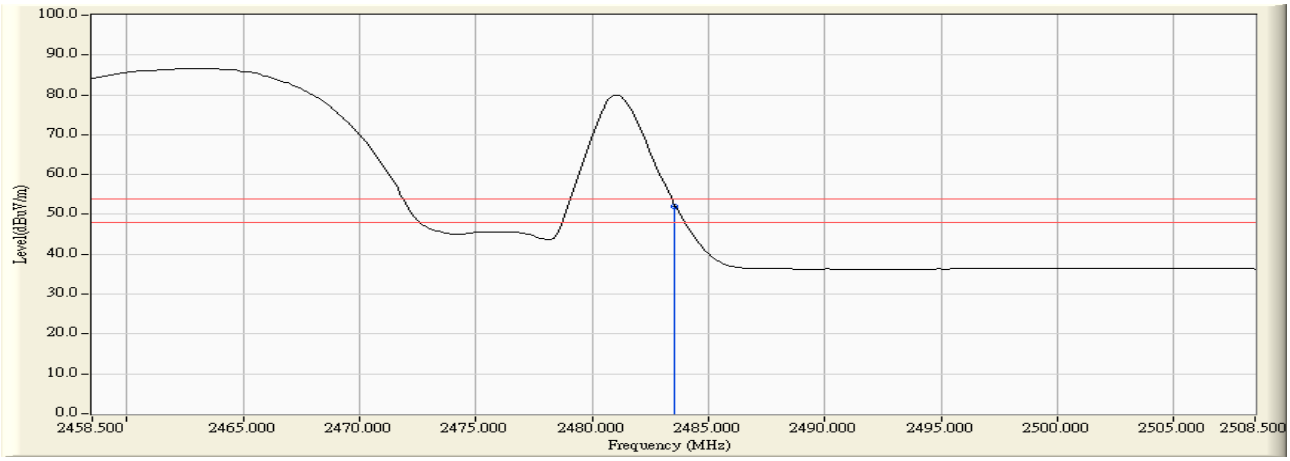
Channel	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Arerage Limit (dBuV/m)	Result
11(Peak)	2463.375	-2.027	96.788	94.761	74.00	54.00	Pass
11(Peak)	2483.500	-1.937	62.560	60.623	74.00	54.00	Pass
11(Peak)	2500.000	-1.886	48.175	46.289	74.00	54.00	Pass
11(Average)	2483.500	-1.937	53.985	52.048	74.00	54.00	Pass

Figure Channel 11: Horizontal (Peak)



Note:
RBW=1MHz, VBW=1MHz, Sweep Time=500ms

Figure Channel 11: **Horizontal (Average)**



Note:
RBW=1MHz, VBW=300Hz, Sweep Time=500ms

Product : Industrial PDA
Test Item : Band Edge Data
Test Site : No.3 OATS
Test Mode : Mode 1: Transmitter 802.11b+Bluetooth CH11 RF on

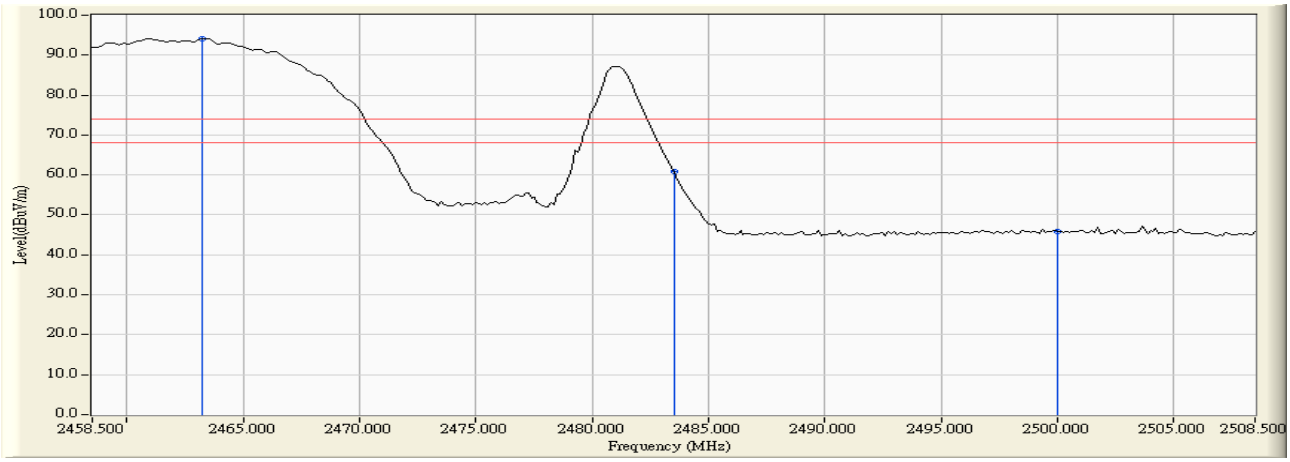
RF Radiated Measurement:

Channel No.	Frequency (MHz)	Required Limit (dBc)	Result
11 (Vertical)	>2483.5	>20	Pass

RF Radiated Measurement (Vertical):

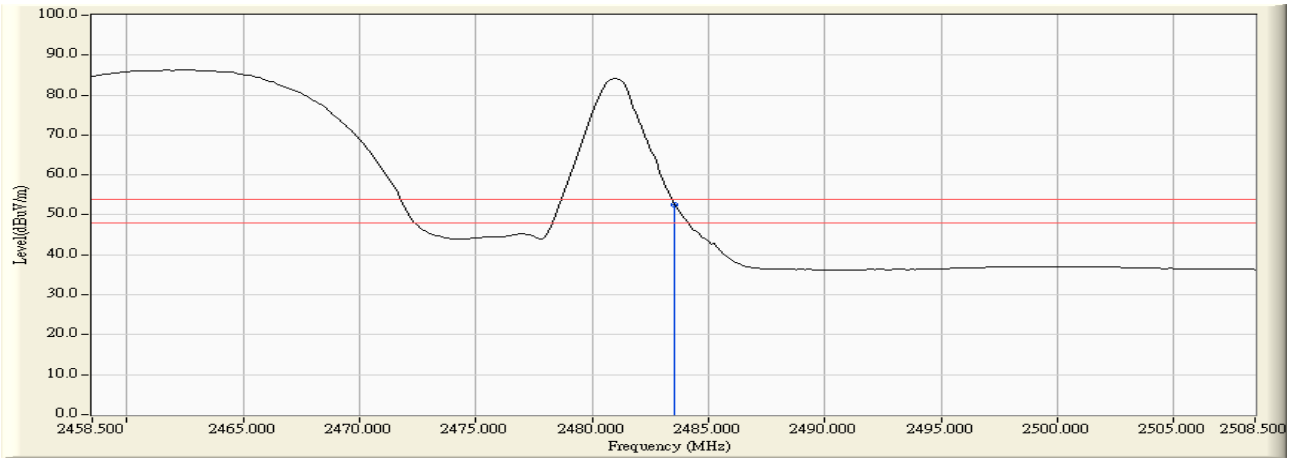
Channel	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Arerage Limit (dBuV/m)	Result
11(Peak)	2463.250	-2.027	96.176	94.149	74.00	54.00	Pass
11(Peak)	2483.500	-1.937	62.669	60.732	74.00	54.00	Pass
11(Peak)	2500.000	-1.886	47.671	45.785	74.00	54.00	Pass
11(Average)	2483.500	-1.937	54.390	52.453	74.00	54.00	Pass

Figure Channel 11: (Vertical) (Peak)



Note:
RBW=1MHz, VBW=1MHz, Sweep Time=500ms.

Figure Channel 11: **Vertical (Average)**



Note:
RBW=1MHz, VBW=300Hz, Sweep Time=500ms

Product : Industrial PDA
Test Item : Band Edge Data
Test Site : No.3 OATS
Test Mode : Mode 2: Transmitter 802.11g+Bluetooth CH00 RF on

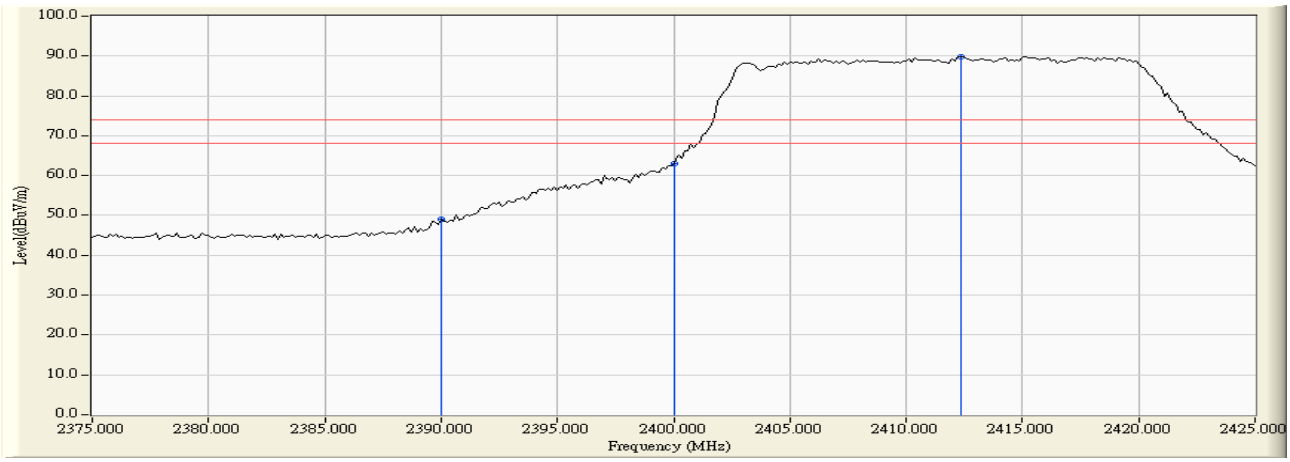
RF Radiated Measurement:

Channel No.	Frequency (MHz)	Required Limit (dBc)	Result
1 (Horizontal)	<2400	>20	Pass

RF Radiated Measurement (Horizontal):

Channel	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Arerage Limit (dBuV/m)	Result
1 (Peak)	2390.000	-2.378	51.404	49.027	74.00	54.00	Pass
1 (Peak)	2400.000	-2.328	65.272	62.944	74.00	54.00	Pass
1 (Peak)	2412.375	-2.266	92.131	89.865	74.00	54.00	Pass

Figure Channel 1: Horizontal (Peak)



Note:
RBW=1MHz, VBW=1MHz, Sweep Time=500ms.

Product : Industrial PDA
Test Item : Band Edge Data
Test Site : No.3 OATS
Test Mode : Mode 2: Transmitter 802.11g+Bluetooth CH00 RF on

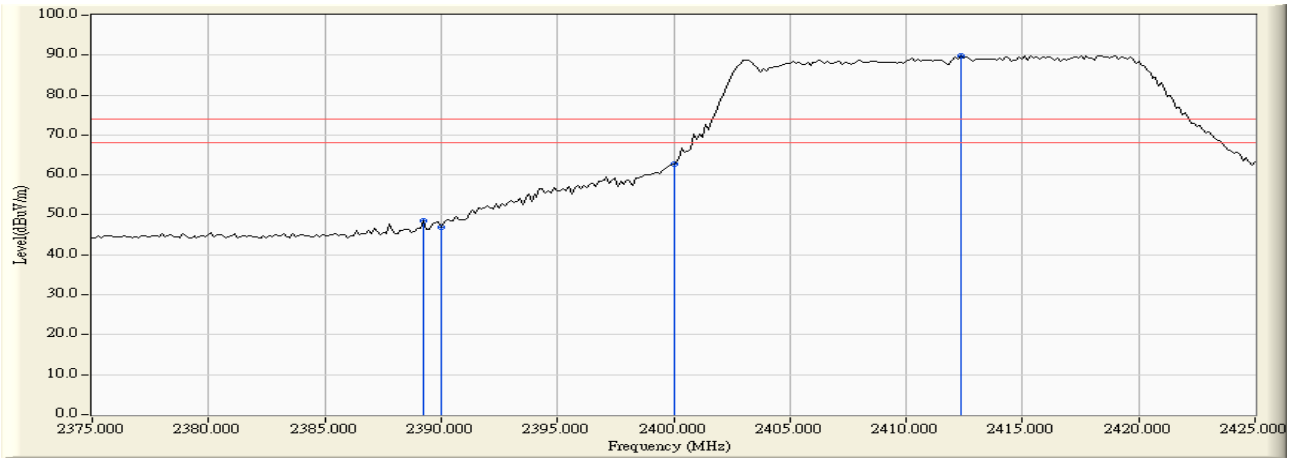
RF Radiated Measurement:

Channel No.	Frequency (MHz)	Required Limit (dBc)	Result
1 (Vertical)	<2400	>20	Pass

RF Radiated Measurement (Vertical):

Channel	Frequency (MHz)	Correct Fcator (dB)	Reading Level (dBuV)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Arerage Limit (dBuV/m)	Result
1 (Peak)	2389.250	-2.381	51.012	48.631	74.00	54.00	Pass
1 (Peak)	2390.000	-2.378	49.349	46.972	74.00	54.00	Pass
1 (Peak)	2400.000	-2.328	65.022	62.694	74.00	54.00	Pass
1 (Peak)	2412.375	-2.266	92.080	89.814	74.00	54.00	Pass

Figure Channel 1: Vertical (Peak)



Note:
RBW=1MHz, VBW=1MHz, Sweep Time=500ms.

Product : Industrial PDA
Test Item : Band Edge Data
Test Site : No.3 OATS
Test Mode : Mode 2: Transmitter 802.11g+Bluetooth CH11 RF on

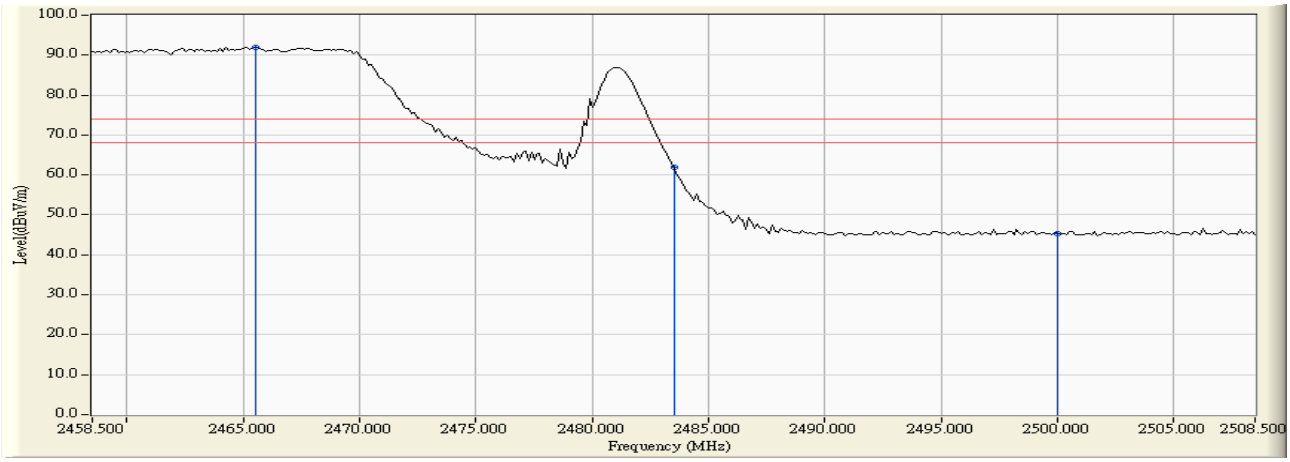
RF Radiated Measurement:

Channel No.	Frequency (MHz)	Required Limit (dBc)	Result
11 (Horizontal)	>2483.5	>20	Pass

RF Radiated Measurement (Horizontal):

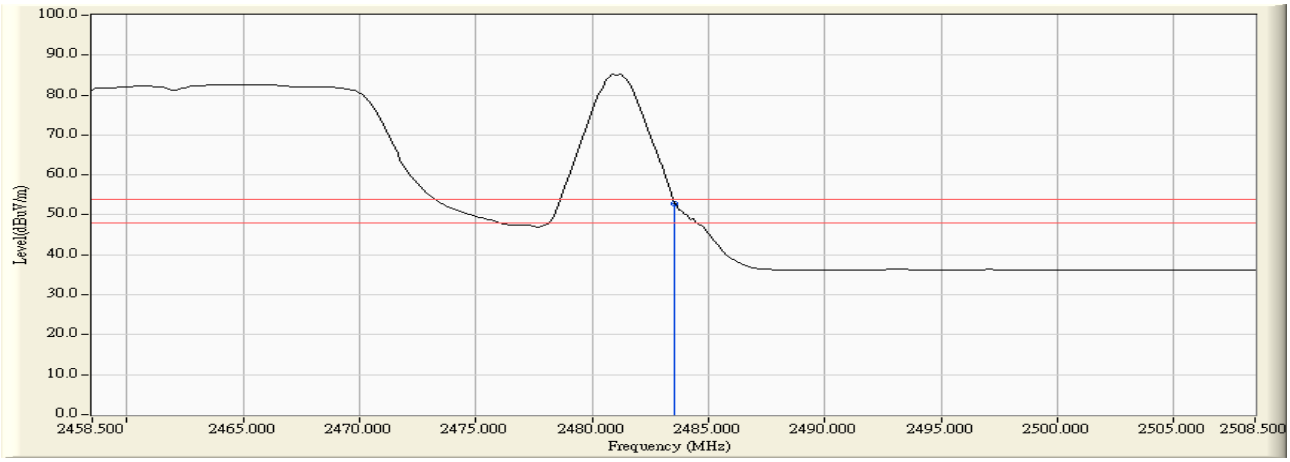
Channel	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Arerage Limit (dBuV/m)	Result
11(Peak)	2465.500	-2.017	93.946	91.929	74.00	54.00	Pass
11(Peak)	2483.500	-1.937	63.756	61.819	74.00	54.00	Pass
11(Peak)	2500.000	-1.886	47.309	45.423	74.00	54.00	Pass
11(Average)	2483.500	-1.937	54.658	52.721	74.00	54.00	Pass

Figure Channel 11: Horizontal (Peak)



Note:
RBW=1MHz, VBW=1MHz, Sweep Time=500ms

Figure Channel 11: **Horizontal (Average)**



Note:
RBW=1MHz, VBW=300Hz, Sweep Time=500ms

Product : Industrial PDA
Test Item : Band Edge Data
Test Site : No.3 OATS
Test Mode : Mode 2: Transmitter 802.11g+Bluetooth CH11 RF on

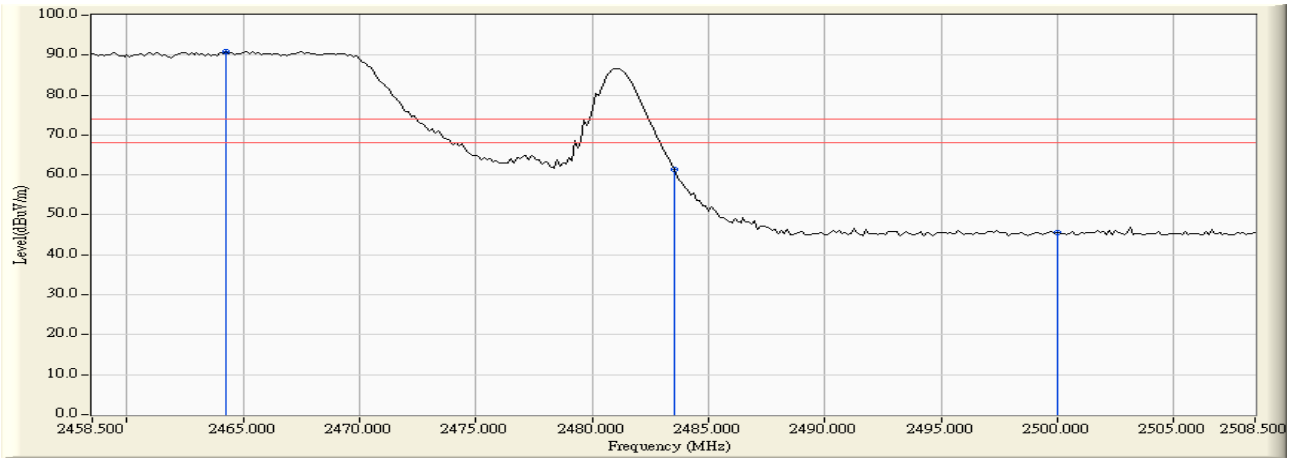
RF Radiated Measurement:

Channel No.	Frequency (MHz)	Required Limit (dBc)	Result
11 (Vertical)	>2483.5	>20	Pass

RF Radiated Measurement (Vertical):

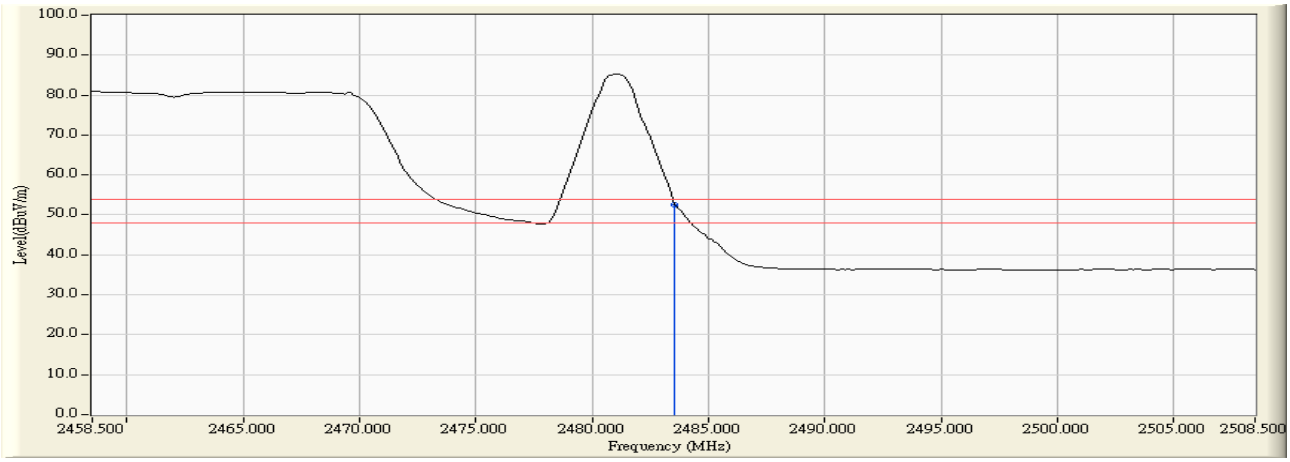
Channel	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Arerage Limit (dBuV/m)	Result
11(Peak)	2464.250	-2.023	92.902	90.879	74.00	54.00	Pass
11(Peak)	2483.500	-1.937	63.462	61.525	74.00	54.00	Pass
11(Peak)	2500.000	-1.886	47.353	45.467	74.00	54.00	Pass
11(Average)	2483.500	-1.937	54.490	52.553	74.00	54.00	Pass

Figure Channel 11: (Vertical) (Peak)



Note:
RBW=1MHz, VBW=1MHz, Sweep Time=500ms.

Figure Channel 11: **Vertical (Average)**



Note:
RBW=1MHz, VBW=300Hz, Sweep Time=500ms

Note: The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

6. Occupied Bandwidth

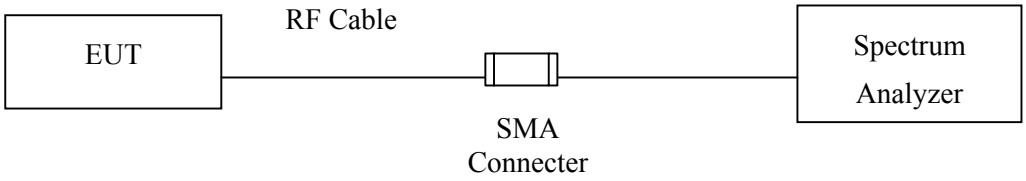
6.1. Test Equipment

The following test equipments are used during the radiated emission tests:

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
X	Test Receiver	R & S	ESI 26 / 838786 / 004	May, 2007
X	Spectrum Analyzer	Agilent	E4407B / US39440758	May, 2007

Note: 1. All instruments are calibrated every one year.
2. The test instruments marked by "X" are used to measure the final test results.

6.2. Test Setup



6.3. Limits

The minimum bandwidth shall be at least 500kHz.

6.4. Uncertainty

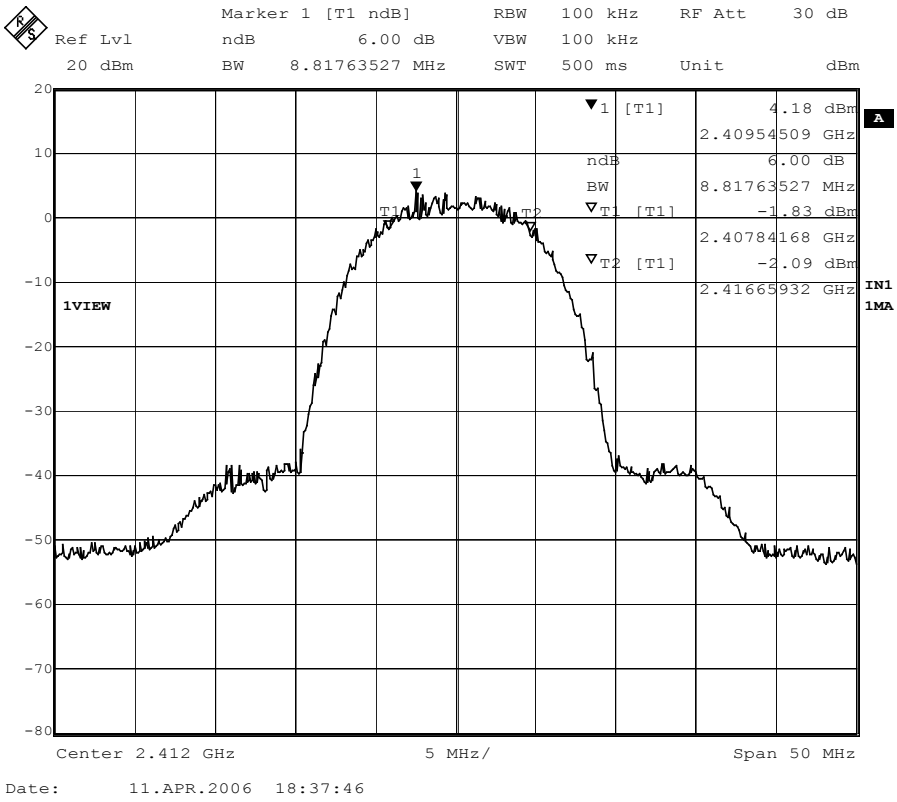
± 150Hz

6.5. Test Result of Occupied Bandwidth

Product : Industrial PDA
Test Item : Occupied Bandwidth Data
Test Site : No.3 OATS
Test Mode : Mode 1: Transmitter 802.11b (2412MHz)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
1 (11Mbps)	2412.00	8817	>500	Pass

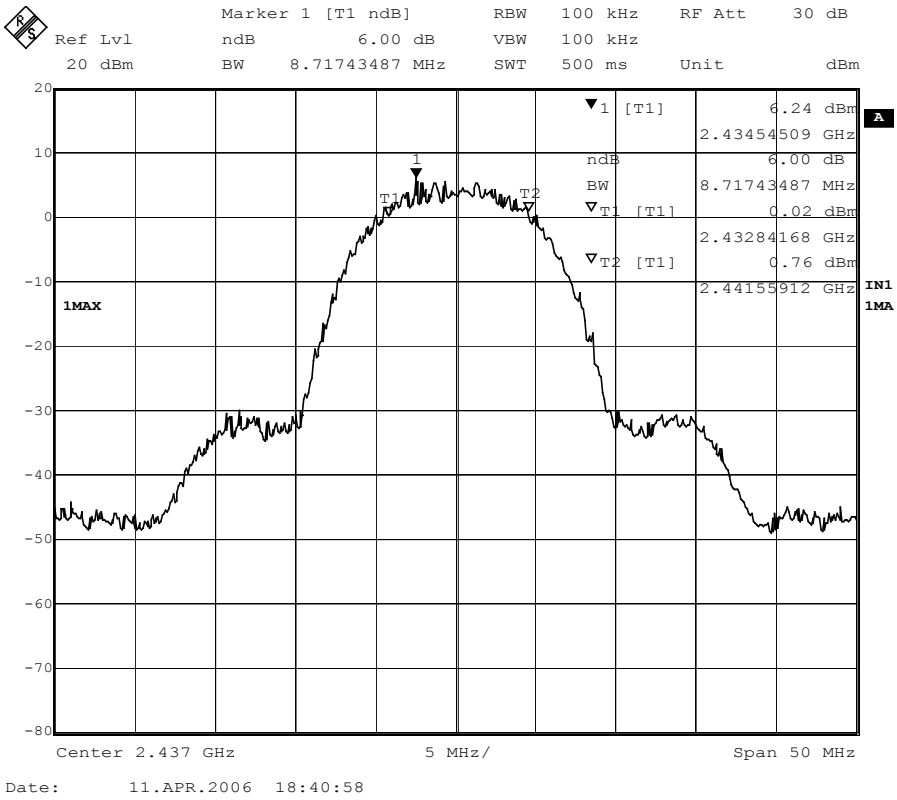
Figure Channel 1: 11Mbps



Product : Industrial PDA
Test Item : Occupied Bandwidth Data
Test Site : No.3 OATS
Test Mode : Mode 1: Transmitter 802.11b (2437MHz)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
6 (11Mbps)	2437.00	8717	>500	Pass

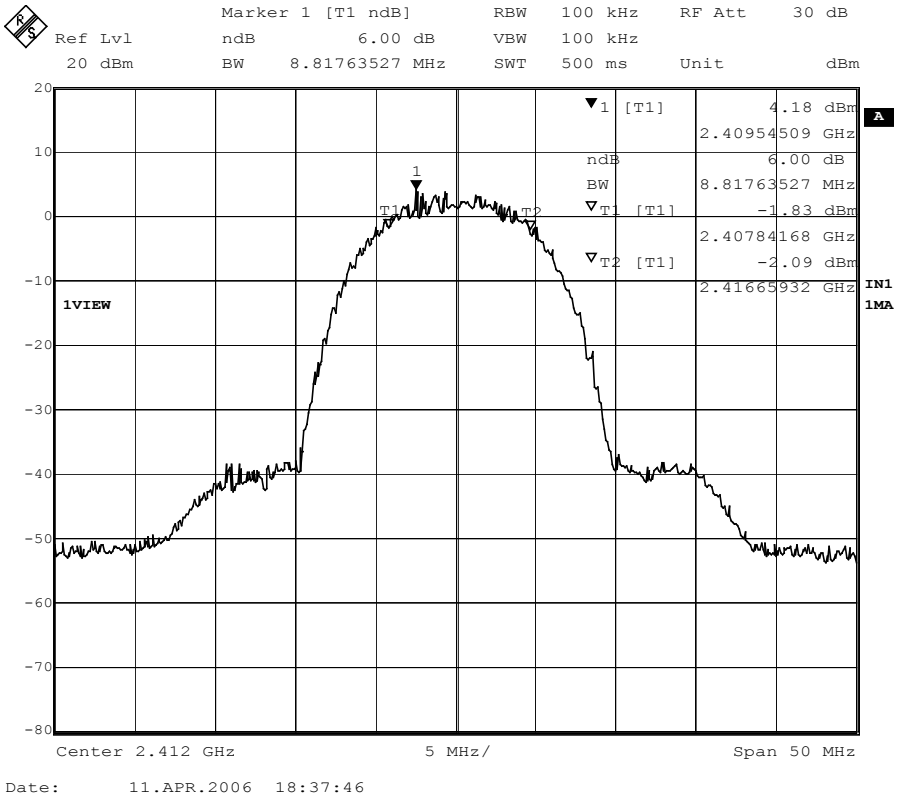
Figure Channel 6: 11Mbps



Product : Industrial PDA
Test Item : Occupied Bandwidth Data
Test Site : No.3 OATS
Test Mode : Mode 1: Transmitter 802.11b (2462MHz)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
11 (11Mbps)	2462.00	9619	>500	Pass

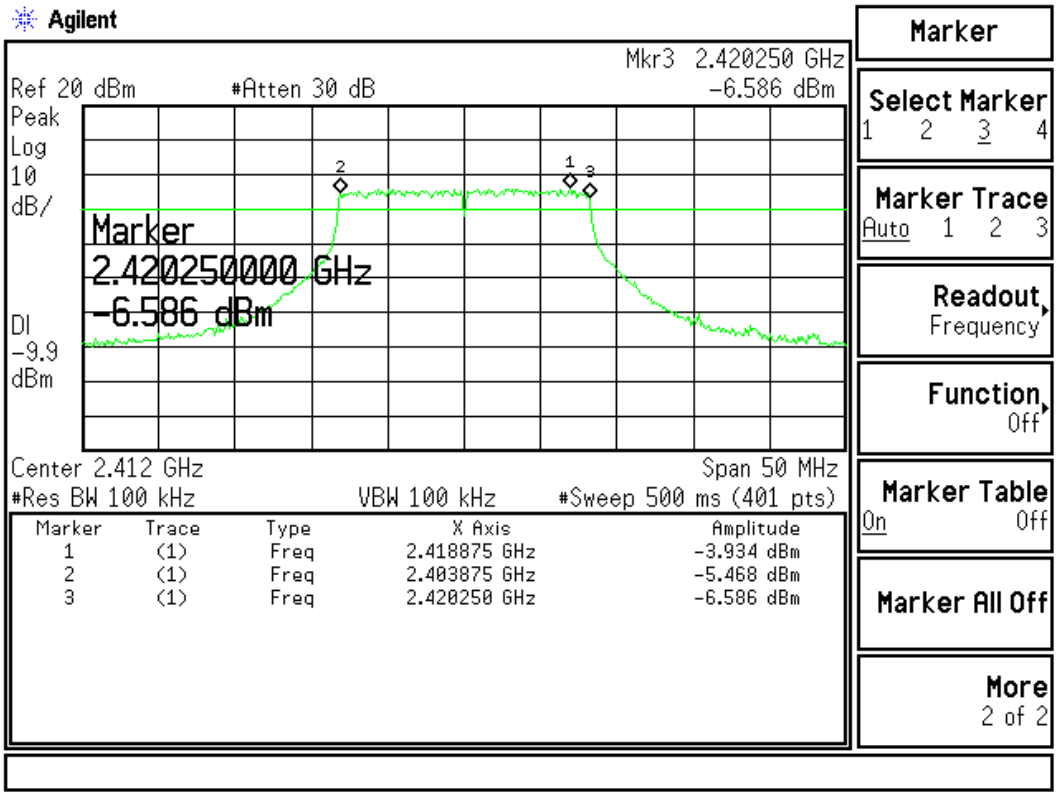
Figure Channel 11: 11Mbps



Product : Industrial PDA
Test Item : Occupied Bandwidth Data
Test Site : No.3 OATS
Test Mode : Mode 2: Transmitter 802.11g (2412MHz)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
1 (54Mbps)	2412.00	16375	>500	Pass

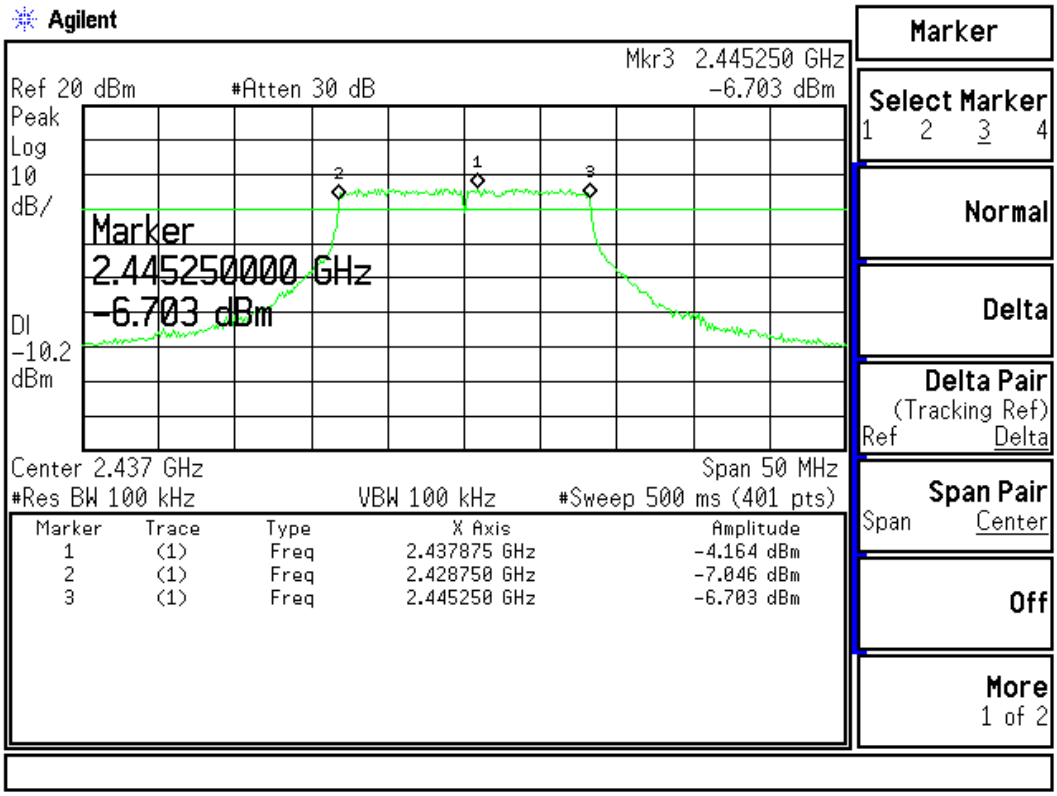
Figure Channel 1:



Product : Industrial PDA
Test Item : Occupied Bandwidth Data
Test Site : No.3 OATS
Test Mode : Mode 2: Transmitter 802.11g (2437MHz)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
6 (54Mbps)	2437.00	16500	>500	Pass

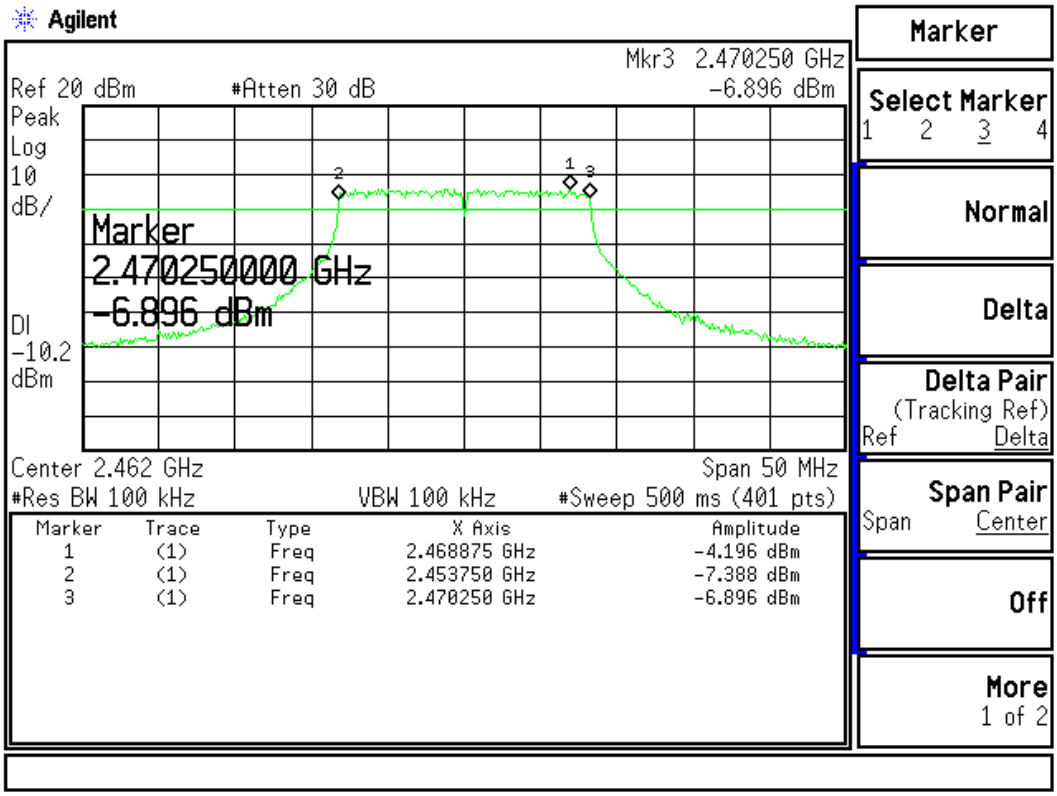
Figure Channel 6:



Product : Industrial PDA
Test Item : Occupied Bandwidth Data
Test Site : No.3 OATS
Test Mode : Mode 2: Transmitter 802.11g (2462MHz)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
11 (54Mbps)	2462.00	16500	>500	Pass

Figure Channel 11:



7. Power Density

7.1. Test Equipment

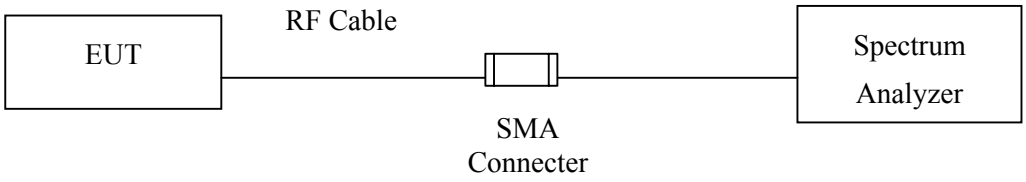
The following test equipments are used during the radiated emission tests:

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
X	Test Receiver	R & S	ESI 26 / 838786 / 004	May, 2007
X	Spectrum Analyzer	Agilent	E4407B / US39440758	May, 2007

Note: 1. All equipments are calibrated every one year.

2. The test instruments marked by "X" are used to measure the final test results.

7.2. Test Setup



7.3. Limits

The transmitted power density averaged over any 1 second interval shall not be greater +8dBm in any 3kHz bandwidth.

7.4. Uncertainty

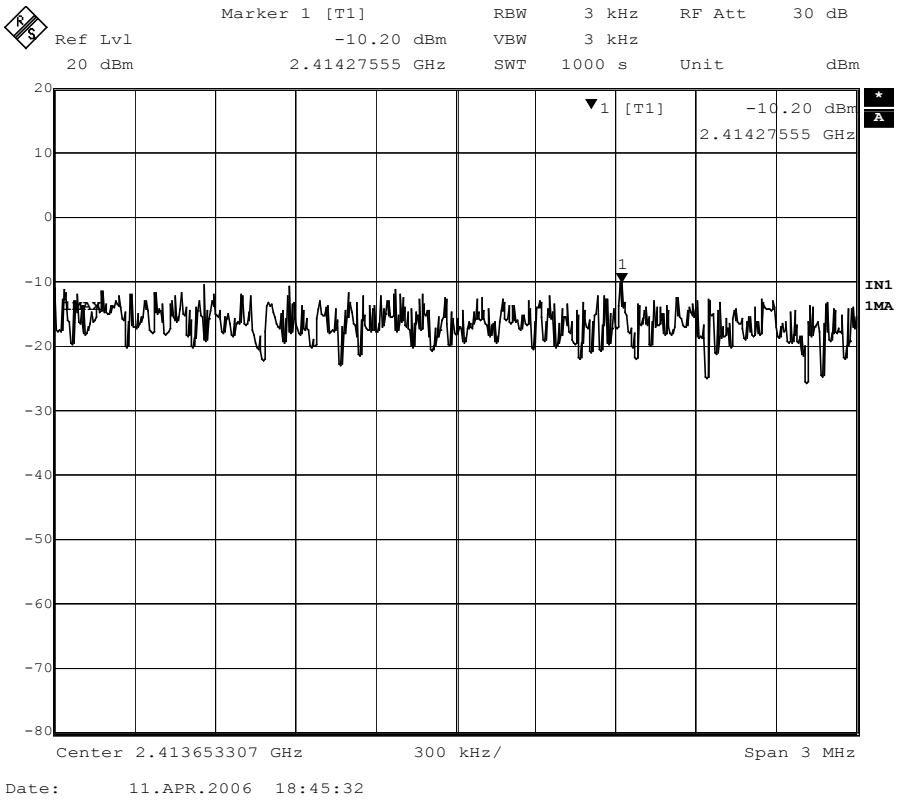
± 1.27 dB

7.5. Test Result of Power Density

Product : Industrial PDA
Test Item : Power Density Data
Test Site : No.3 OATS
Test Mode : Mode 1: Transmitter 802.11b (2412MHz)

Channel No.	Frequency (MHz)	Measure Level (dBm)	Limit (dBm)	Result
1 (11Mbps)	2412.00	-10.20	< 10dBm	Pass

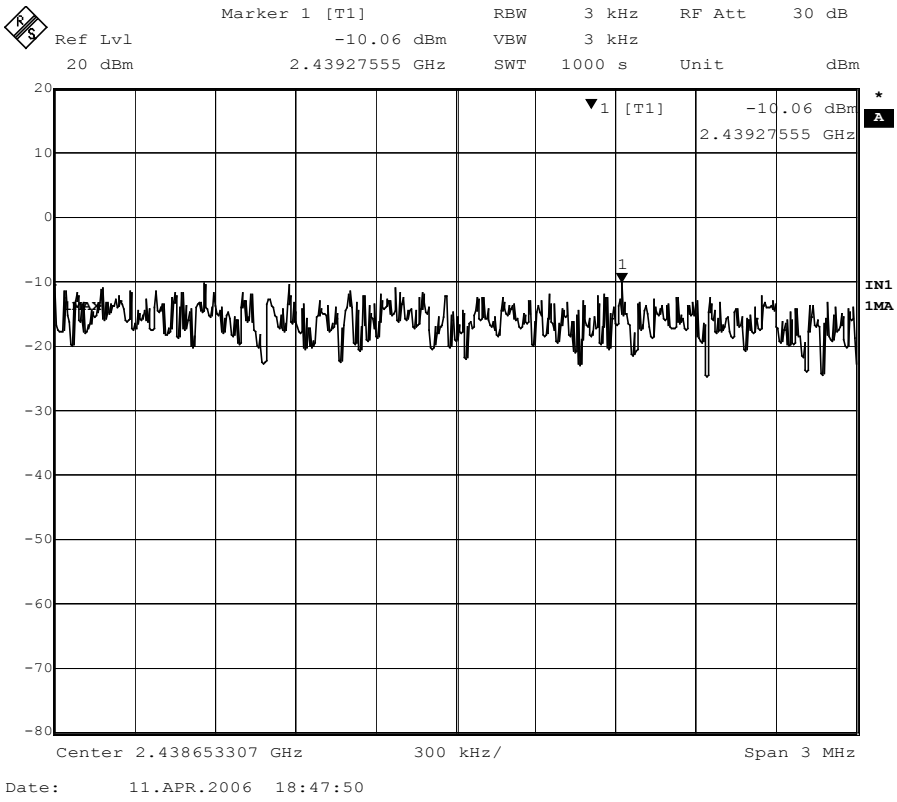
Figure Channel 1: 11Mbps



Product : Industrial PDA
Test Item : Power Density Data
Test Site : No.3OATS
Test Mode : Mode 1: Transmitter 802.11b (2437MHz)

Channel No.	Frequency (MHz)	Measurement Level (dBm)	Required Limit (dBm)	Result
6 (11Mbps)	2437.000	-10.06	< 10dBm	Pass

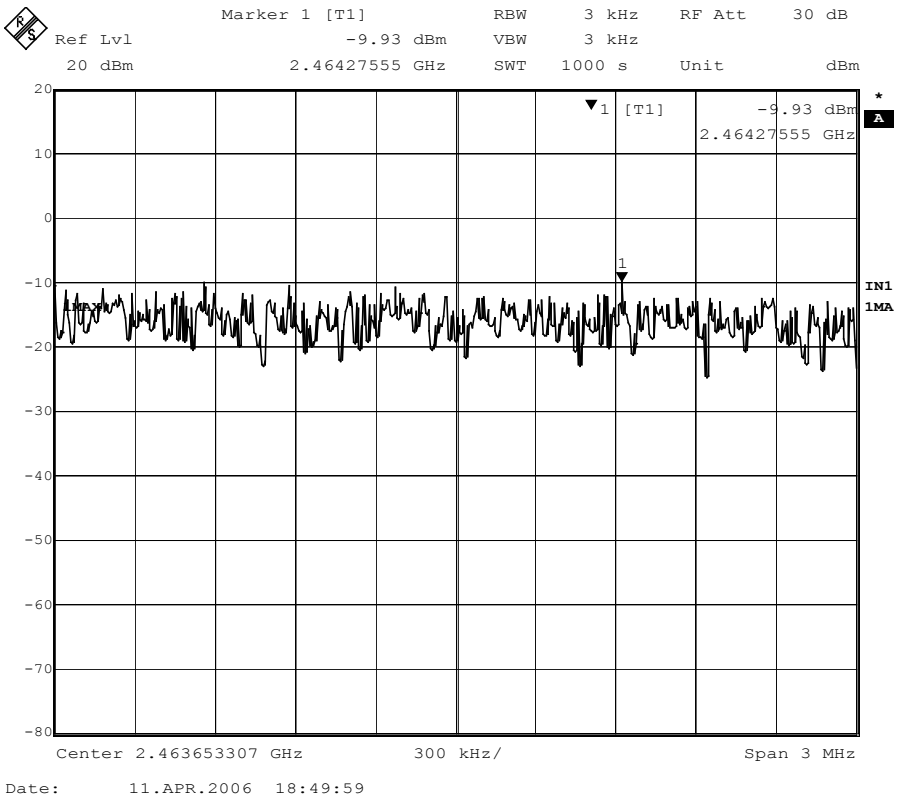
Figure Channel 6: 11Mbps



Product : Industrial PDA
Test Item : Power Density Data
Test Site : No.3 OATS
Test Mode : Mode 1: Transmitter 802.11b (2462MHz)

Channel No.	Frequency (MHz)	Measurement Level (dBm)	Required Limit (dBm)	Result
11 (11Mbps)	2462.00	-9.93	< 10dBm	Pass

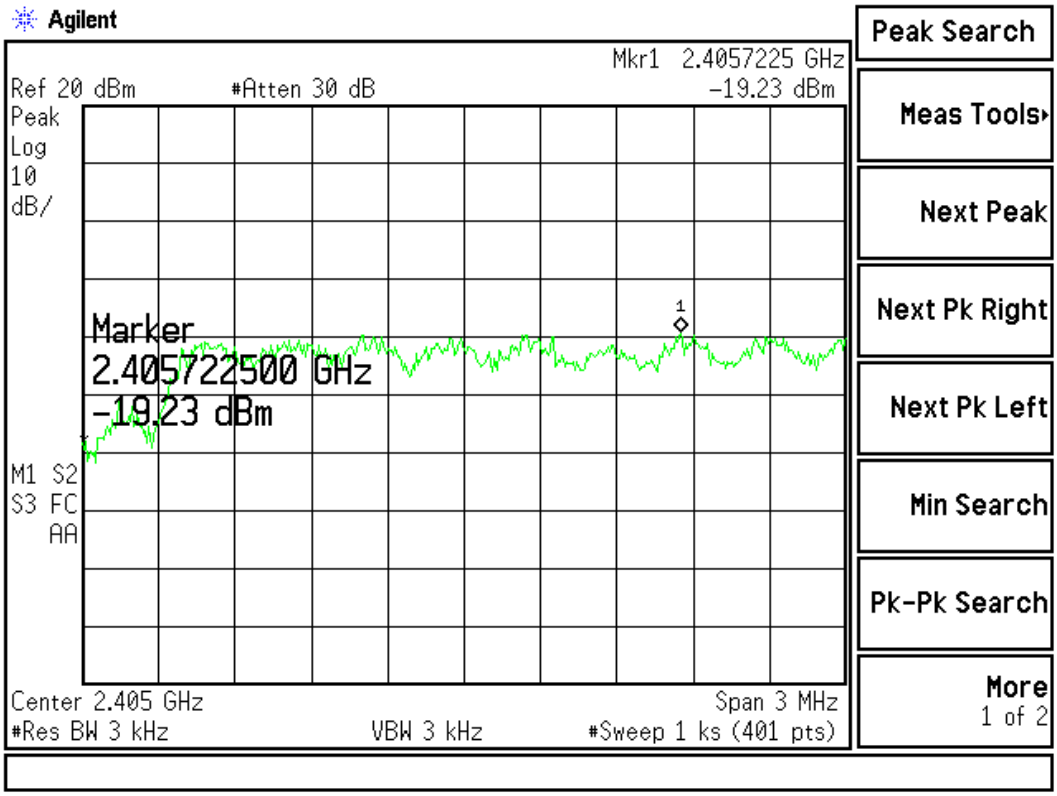
Figure Channel 11: 11Mbps



Product : Industrial PDA
Test Item : Power Density Data
Test Site : No.3 OATS
Test Mode : Mode 2: Transmitter 802.11g (2412MHz)

Channel No.	Frequency (MHz)	Measure Level (dBm)	Limit (dBm)	Result
1 (54Mbps)	2412.00	-19.23	< 10dBm	Pass

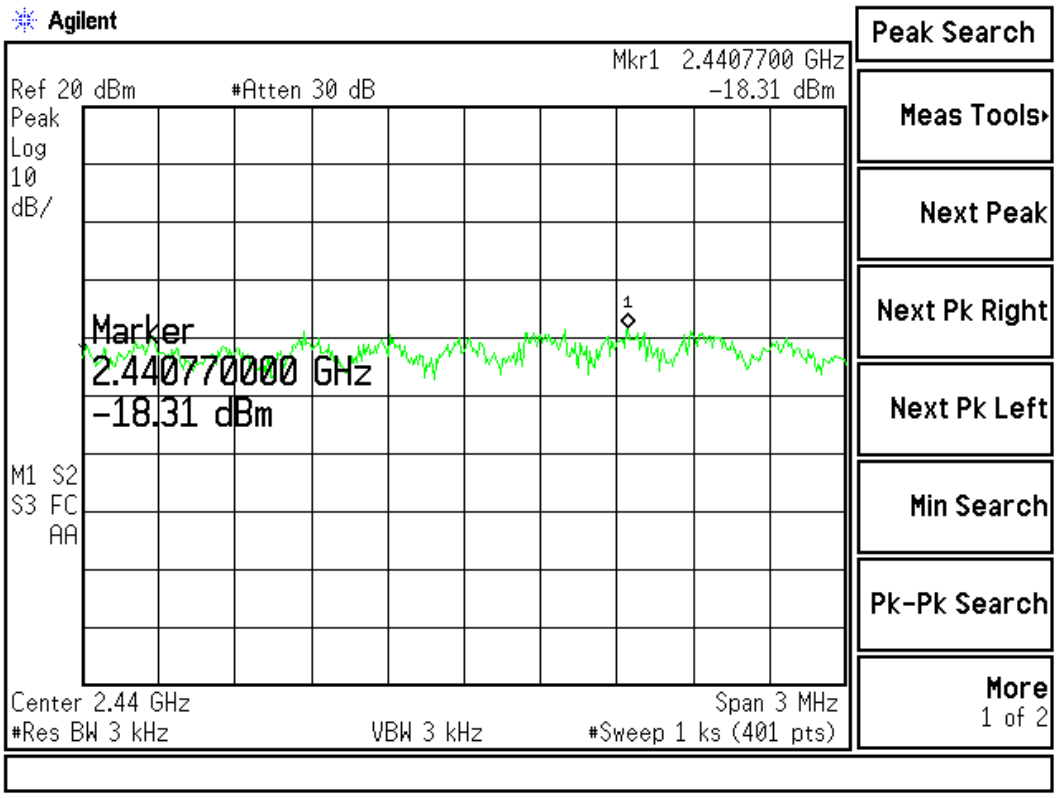
Figure Channel 1:



Product : Industrial PDA
Test Item : Power Density Data
Test Site : No.3OATS
Test Mode : Mode 2: Transmitter 802.11g (2437MHz)

Channel No.	Frequency (MHz)	Measurement Level (dBm)	Required Limit (dBm)	Result
6 (54Mbps)	2437.000	-18.31	< 10dBm	Pass

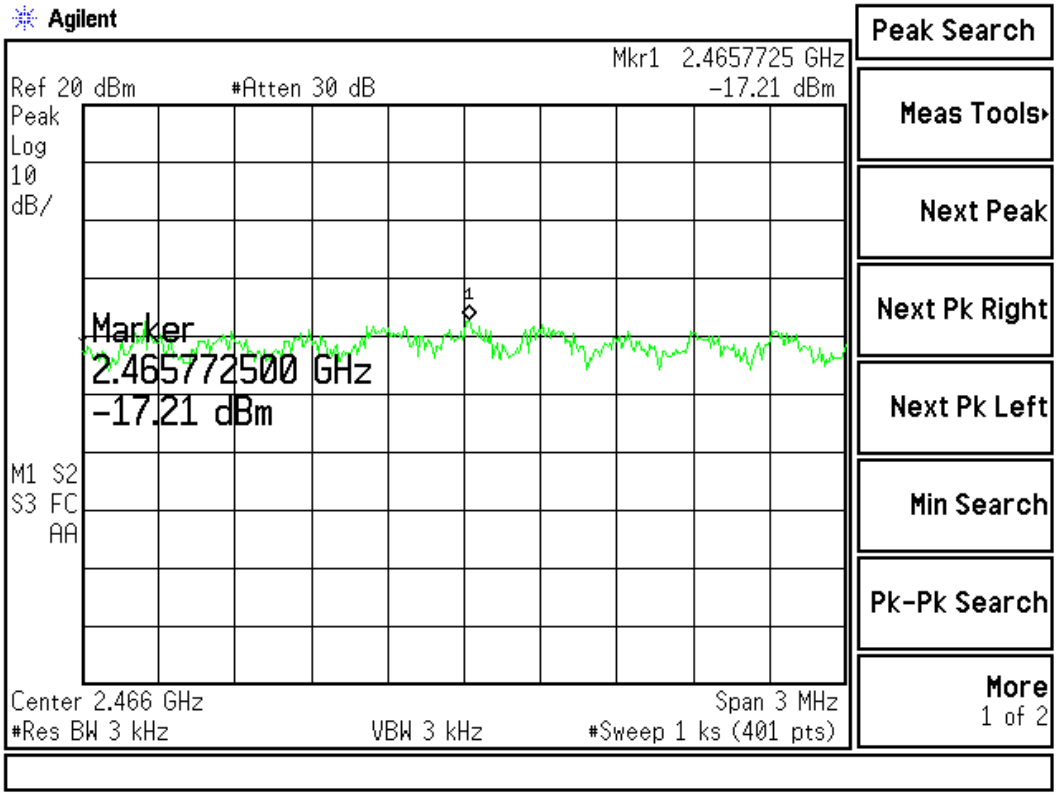
Figure Channel 6:



Product : Industrial PDA
Test Item : Power Density Data
Test Site : No.3 OATS
Test Mode : Mode 2: Transmitter 802.11g (2462MHz)

Channel No.	Frequency (MHz)	Measurement Level (dBm)	Required Limit (dBm)	Result
11 (54Mbps)	2462.00	-17.21	< 10dBm	Pass

Figure Channel 11:



8. EMI Reduction Method During Compliance Testing

No modification was made during testing.