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	Oct. 09, 2007
Issued Date	Oct. 16, 2007
Report No.	077257R-RFUSP05V01

Test Report Certification

Issued Date: Oct. 16, 2007
Report No.: 077257R-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 with 11 channels. 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

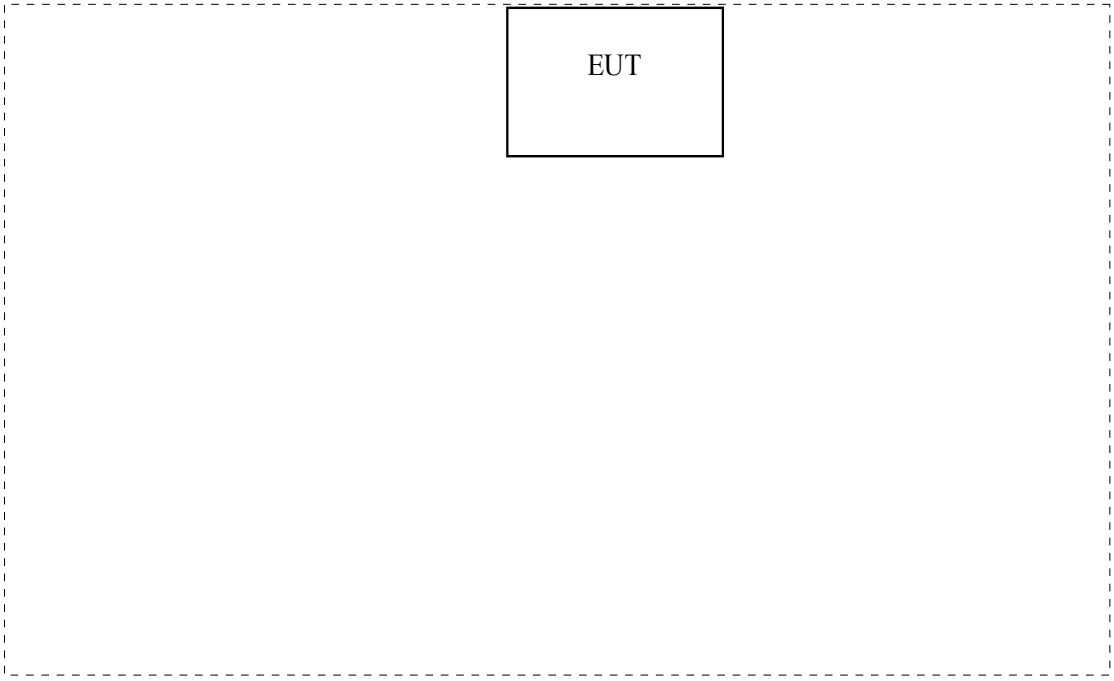
1.3. Tested System Datails

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

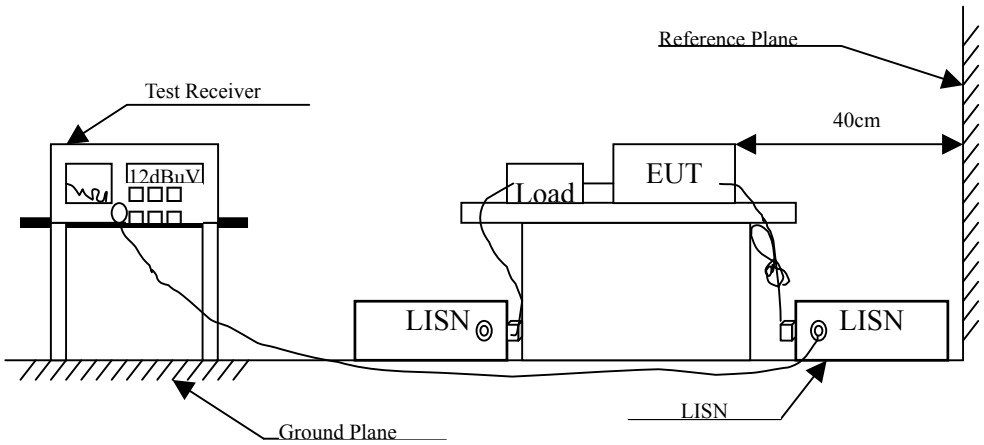
2.1. Test Equipment

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					
0.205	0.615	43.110	43.725	-20.704	64.429
0.270	0.300	38.330	38.630	-23.941	62.571
0.340	0.300	29.450	29.750	-30.821	60.571
0.540	0.300	27.790	28.090	-27.910	56.000
1.892	0.340	32.670	33.010	-22.990	56.000
3.038	0.370	32.080	32.450	-23.550	56.000
Average					
0.205	0.615	32.500	33.115	-21.314	54.429
0.270	0.300	34.350	34.650	-17.921	52.571
0.340	0.300	25.440	25.740	-24.831	50.571
0.540	0.300	24.620	24.920	-21.080	46.000
1.892	0.340	30.360	30.700	-15.300	46.000
3.038	0.370	25.970	26.340	-19.660	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 1: Transmitter 802.11b (2437MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBuV	dBuV	dB	dBuV
LINE 2					
Quasi-Peak					
0.201	0.300	43.110	43.410	-21.133	64.543
0.271	0.300	38.090	38.390	-24.153	62.543
0.341	0.304	28.510	28.814	-31.729	60.543
2.029	0.350	32.450	32.800	-23.200	56.000
3.045	0.370	35.410	35.780	-20.220	56.000
7.775	0.460	32.950	33.410	-26.590	60.000
Average					
0.201	0.300	32.390	32.690	-21.853	54.543
0.271	0.300	33.910	34.210	-18.333	52.543
0.341	0.304	24.800	25.104	-25.439	50.543
2.029	0.350	29.950	30.300	-15.700	46.000
3.045	0.370	30.490	30.860	-15.140	46.000
7.775	0.460	27.760	28.220	-21.780	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					
0.205	0.615	43.480	44.095	-20.334	64.429
0.275	0.300	33.880	34.180	-28.249	62.429
0.335	0.300	26.060	26.360	-34.354	60.714
0.405	0.300	26.090	26.390	-32.324	58.714
1.826	0.340	33.260	33.600	-22.400	56.000
2.978	0.370	34.140	34.510	-21.490	56.000
Average					
0.205	0.615	32.640	33.255	-21.174	54.429
0.275	0.300	29.160	29.460	-22.969	52.429
0.335	0.300	23.610	23.910	-26.804	50.714
0.405	0.300	24.550	24.850	-23.864	48.714
1.826	0.340	30.700	31.040	-14.960	46.000
2.978	0.370	29.430	29.800	-16.200	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					
0.205	0.300	43.580	43.880	-20.549	64.429
0.275	0.300	33.760	34.060	-28.369	62.429
0.335	0.302	26.140	26.442	-34.272	60.714
0.405	0.310	26.030	26.340	-32.374	58.714
1.623	0.340	33.530	33.870	-22.130	56.000
3.111	0.380	35.790	36.170	-19.830	56.000
Average					
0.205	0.300	32.910	33.210	-21.219	54.429
0.275	0.300	28.920	29.220	-23.209	52.429
0.335	0.302	23.690	23.992	-26.722	50.714
0.405	0.310	24.420	24.730	-23.984	48.714
1.623	0.340	30.520	30.860	-15.140	46.000
3.111	0.380	30.720	31.100	-14.900	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

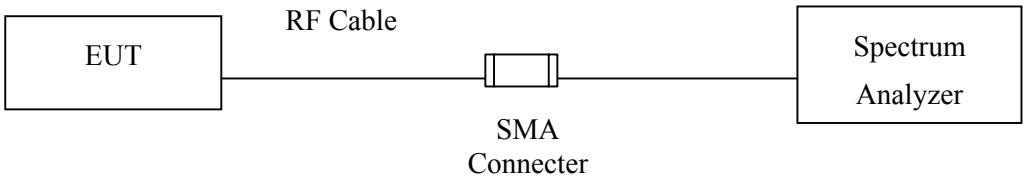
The following test equipments are used during the radiated emission tests:

	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

Peak Power Output						
Channel No.	Frequency (MHz)	Data Rate				Required Limit
		1	2	5.5	11	
1	2412.00	--	--	--	21.27	1Watt= 30 dBm
6	2437.00	21.47	21.52	21.58	21.75	1Watt= 30 dBm
11	2462.00	--	--	--	21.91	1Watt= 30 dBm

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

Data Speed: 54Mbps

Peak Power Output									
Channel No.	Frequency (MHz)	Data Rate							Required Limit
		6	9	12	18	24	36	48	54	
1	2412.00	--	--	--	--	--	--	--	16.55	1Watt= 30 dBm
6	2437.00	16.75	16.79	16.85	16.87	16.94	17.11	17.12	17.33	1Watt= 30 dBm
11	2462.00	--	--	--	--	--	--	--	17.48	1Watt= 30 dBm

4. Radiated Emission

4.1. Test Equipment

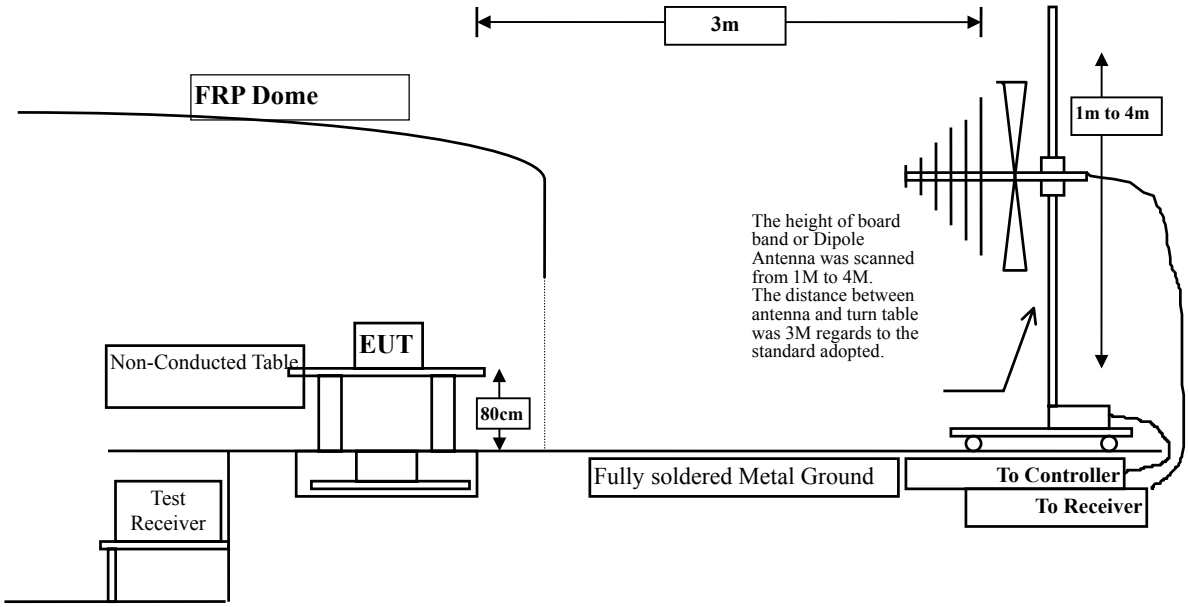
The following test equipment are used during the radiated emission test:

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	46.478	50.201	-23.799	74.000
7236.000	9.439	38.922	48.361	-25.639	74.000
9648.000	11.829	39.498	51.327	-22.673	74.000
Average Detector:					
--					
Vertical					
Peak Detector:					
4824.000	3.723	41.974	45.697	-28.303	74.000
7236.000	9.439	36.945	46.384	-27.616	74.000
9648.000	11.829	39.518	51.347	-22.653	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	47.502	51.394	-22.606	74.000
7311.000	9.624	37.018	46.642	-27.358	74.000
9748.000	11.805	40.182	51.987	-22.013	74.000
Average Detector:					
--					
Vertical					
Peak Detector:					
4874.000	3.893	45.730	49.622	-24.378	74.000
7311.000	9.624	36.703	46.327	-27.673	74.000
9748.000	11.805	40.506	52.312	-21.688	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	48.548	52.623	-21.377	74.000
7386.000	9.812	36.519	46.331	-27.669	74.000
9848.000	11.819	39.563	51.382	-22.618	74.000
Average Detector:					
--					
Vertical					
Peak Detector:					
4924.000	4.075	43.293	47.368	-26.632	74.000
7386.000	9.812	35.395	45.207	-28.793	74.000
9848.000	11.819	37.509	49.328	-24.672	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	3.723	31.566	35.289	-38.711	74.000
7236.000	9.439	35.768	45.207	-28.793	74.000
9648.000	11.829	37.803	49.632	-24.368	74.000
Average Detector:					
--					
Vertical					
Peak Detector:					
4824.000	3.723	37.606	41.329	-32.671	74.000
7236.000	9.439	32.335	41.774	-32.226	74.000
9648.000	11.829	40.476	52.305	-21.695	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	3.893	32.688	36.580	-37.420	74.000
7311.000	9.624	38.197	47.821	-26.179	74.000
9748.000	11.805	39.526	51.332	-22.668	74.000
Average Detector:					
--					
Vertical					
Peak Detector:					
4874.000	3.893	37.473	41.365	-32.635	74.000
7311.000	9.624	39.817	49.441	-24.559	74.000
9748.000	11.805	36.533	48.339	-25.661	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	4.075	33.606	37.681	-36.319	74.000
7386.000	9.812	36.443	46.255	-27.745	74.000
9848.000	11.819	36.063	47.882	-26.118	74.000
Average Detector:					
--					
Vertical					
Peak Detector:					
4924.000	4.075	36.287	40.362	-33.638	74.000
7386.000	9.812	37.283	47.095	-26.905	74.000
9848.000	11.819	35.506	47.325	-26.675	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					
90.625	11.127	16.575	27.701	-15.799	43.500
313.725	13.717	23.103	36.820	-9.180	46.000
352.525	14.973	25.120	40.093	-5.907	46.000
468.925	18.778	12.361	31.140	-14.860	46.000
534.400	18.780	15.296	34.076	-11.924	46.000
607.150	20.225	11.612	31.837	-14.163	46.000
Vertical					
313.725	13.995	18.202	32.196	-13.804	46.000
335.550	14.360	19.383	33.743	-12.257	46.000
352.525	15.427	24.111	39.538	-6.462	46.000
398.600	17.966	19.020	36.986	-9.014	46.000
522.275	18.746	13.601	32.347	-13.653	46.000
934.525	24.106	9.660	33.767	-12.233	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					
267.250	13.717	19.460	33.177	-12.823	46.000
316.150	13.704	18.288	31.992	-14.008	46.000
352.525	14.973	17.403	32.376	-13.624	46.000
398.600	16.458	15.554	32.012	-13.988	46.000
534.400	18.780	15.123	33.903	-12.097	46.000
604.425	20.207	12.100	32.307	-13.693	46.000
Vertical					
110.025	11.933	19.637	31.570	-11.930	43.500
352.525	15.427	23.366	38.793	-7.207	46.000
401.025	18.298	15.528	33.826	-12.174	46.000
534.400	19.448	10.799	30.247	-15.753	46.000
599.857	21.896	8.210	30.106	-15.894	46.000
752.650	23.201	9.199	32.400	-13.600	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

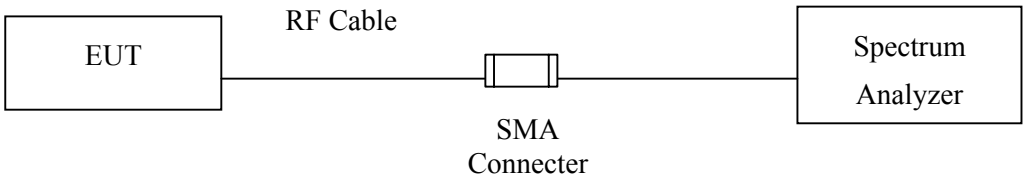
The following test equipments are used during the band edge tests:

	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

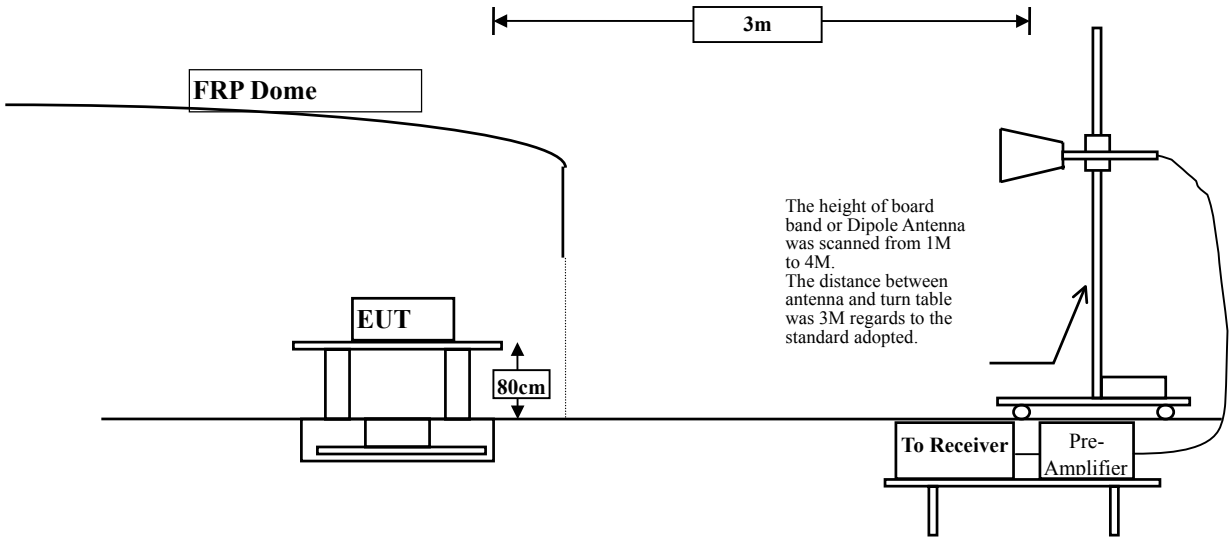
Note: 1. All instruments are calibrated every one year.
2. The test instruments marked by "X" are used to measure the final test results.

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

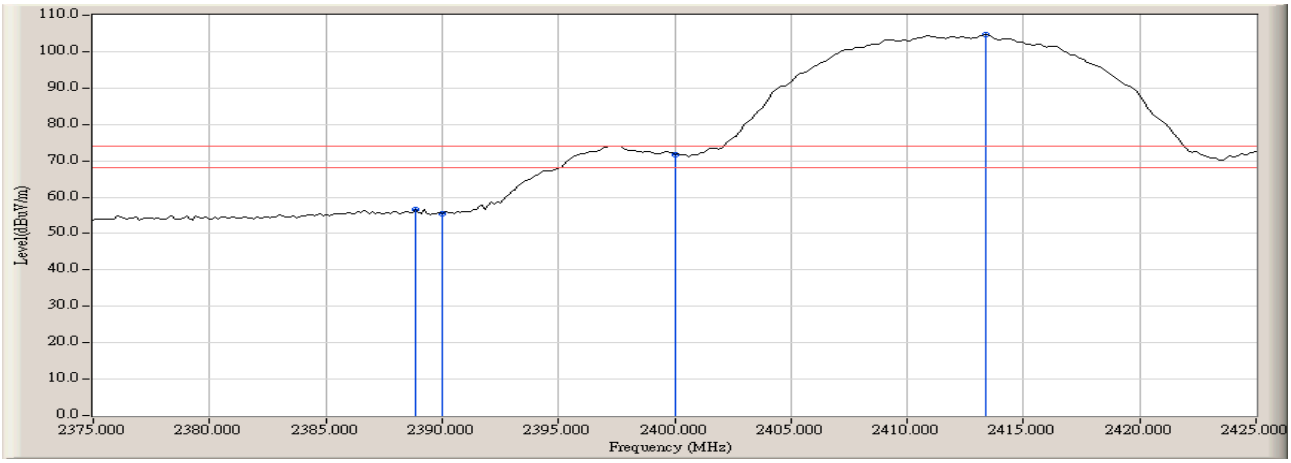
RF Radiated Measurement:

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

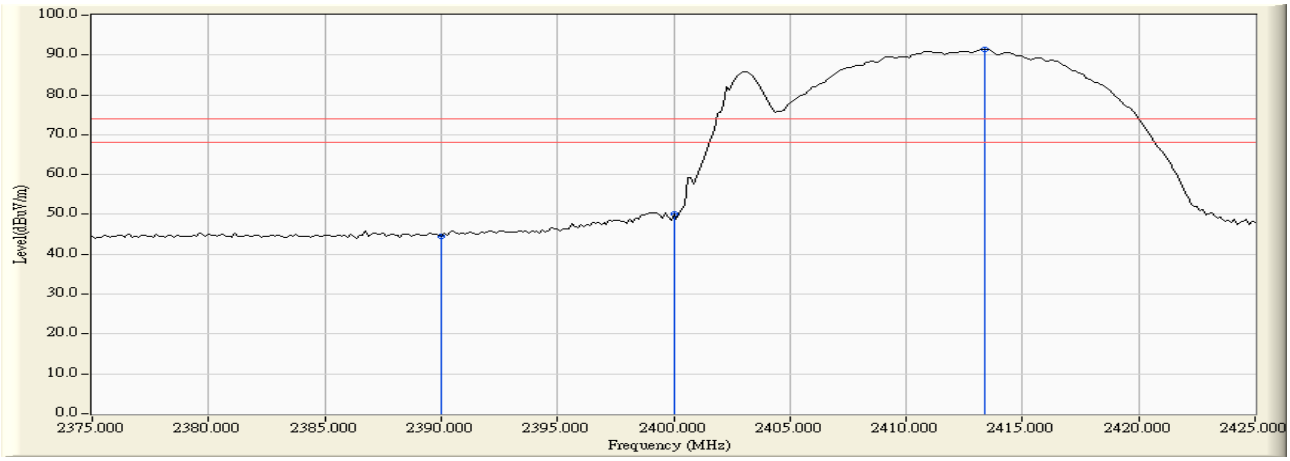
RF Radiated Measurement:

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

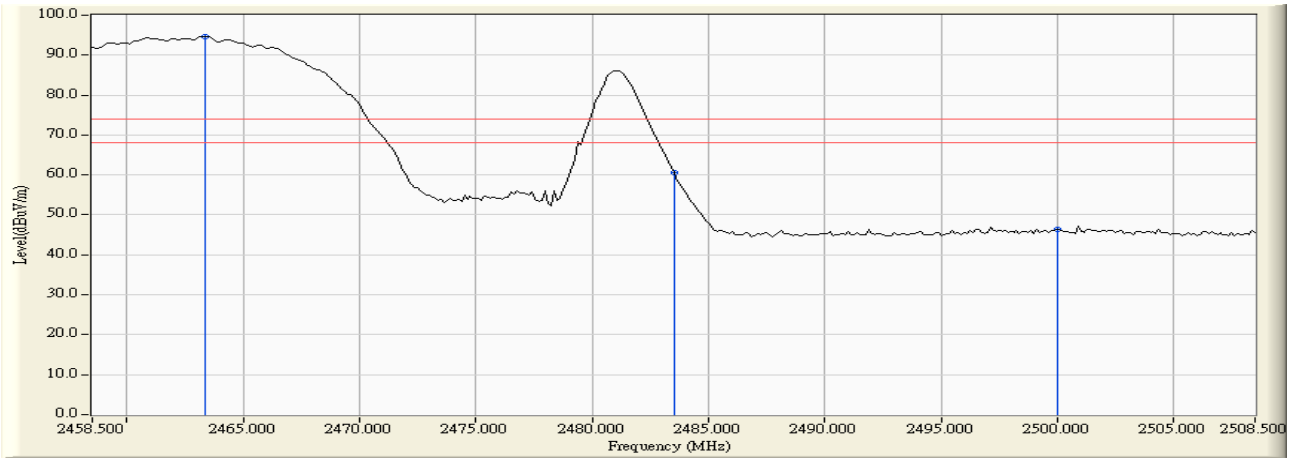
RF Radiated Measurement:

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

RF Radiated Measurement (Horizontal):

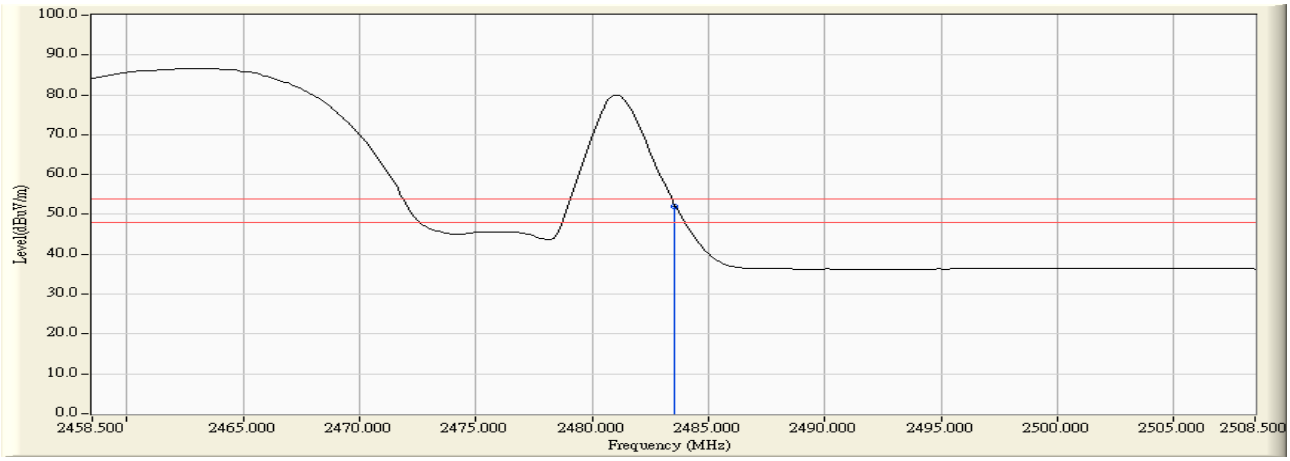
Channel	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Arerage Limit (dBuV/m)	Result
11(Peak)	2463.375	-2.027	96.788	94.761	74.00	54.00	Pass
11(Peak)	2483.500	-1.937	62.560	60.623	74.00	54.00	Pass
11(Peak)	2500.000	-1.886	48.175	46.289	74.00	54.00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

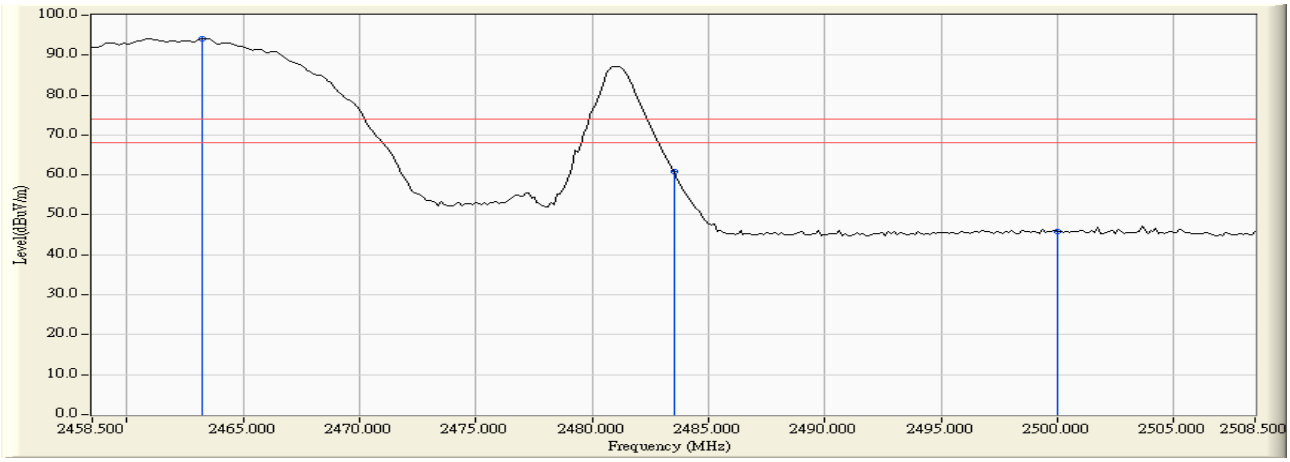
RF Radiated Measurement:

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

RF Radiated Measurement (Vertical):

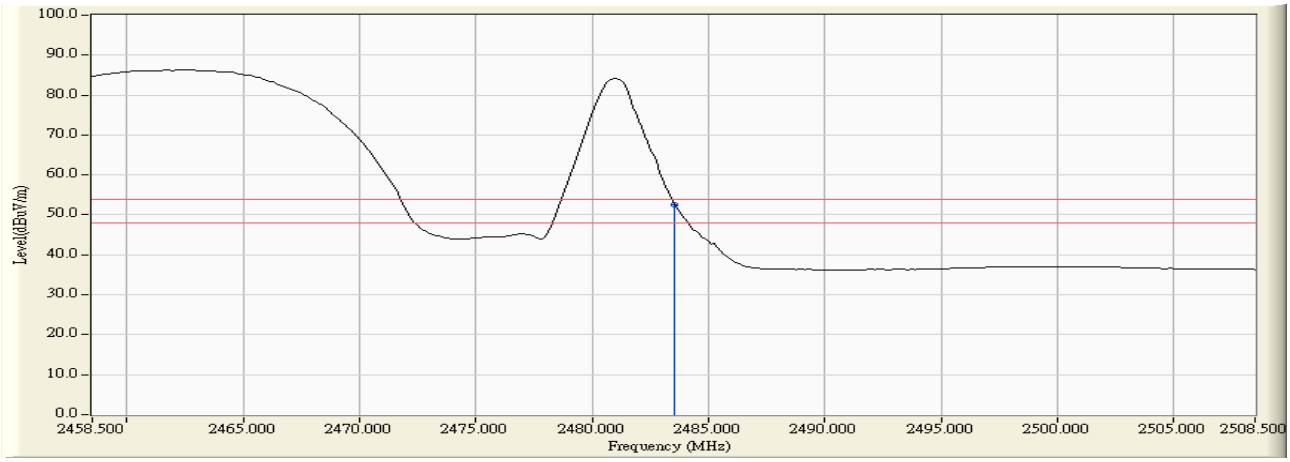
Channel	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Arerage Limit (dBuV/m)	Result
11(Peak)	2463.250	-2.027	96.176	94.149	74.00	54.00	Pass
11(Peak)	2483.500	-1.937	62.669	60.732	74.00	54.00	Pass
11(Peak)	2500.000	-1.886	47.671	45.785	74.00	54.00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

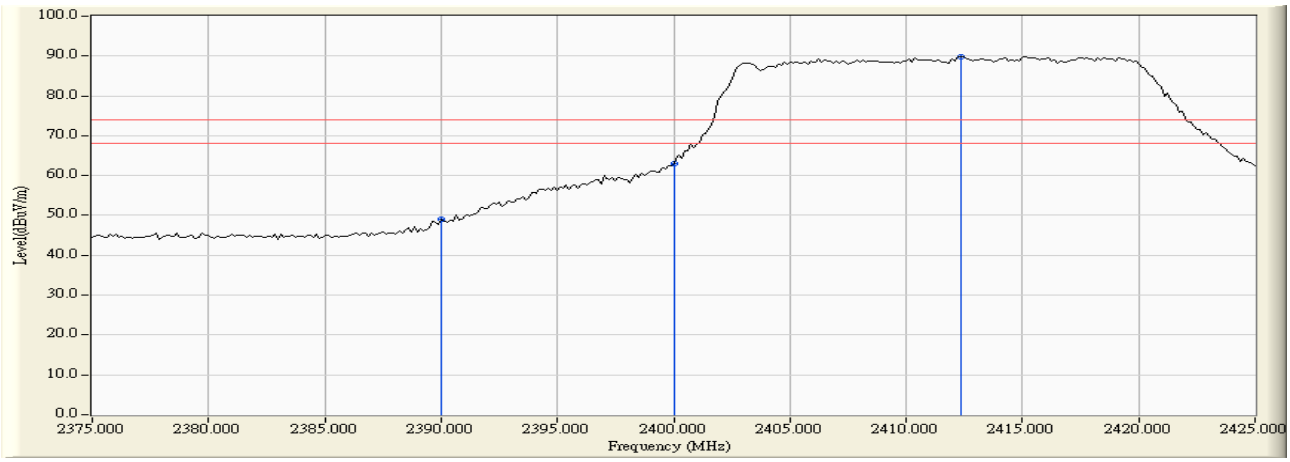
RF Radiated Measurement:

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

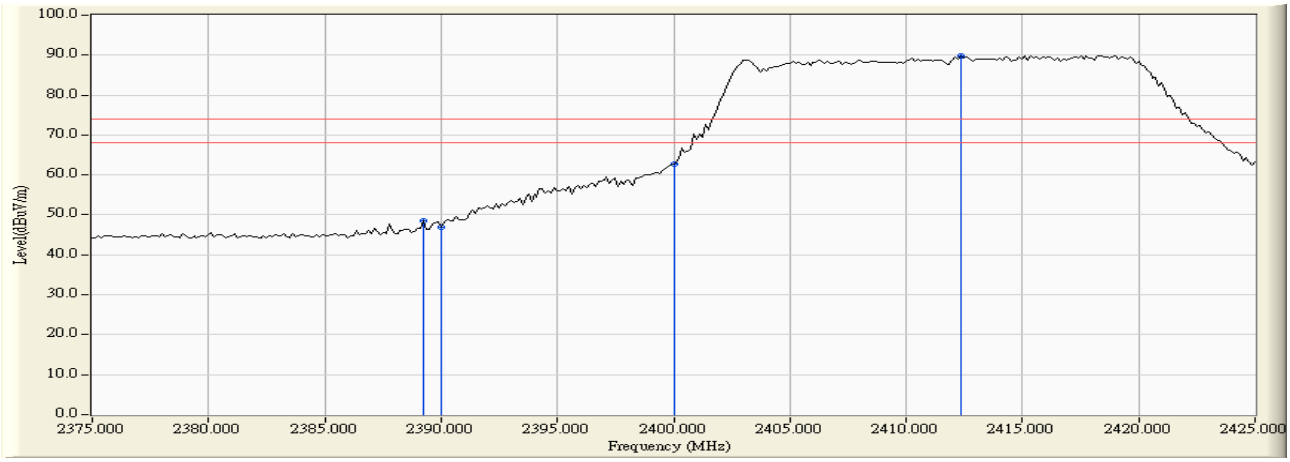
RF Radiated Measurement:

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

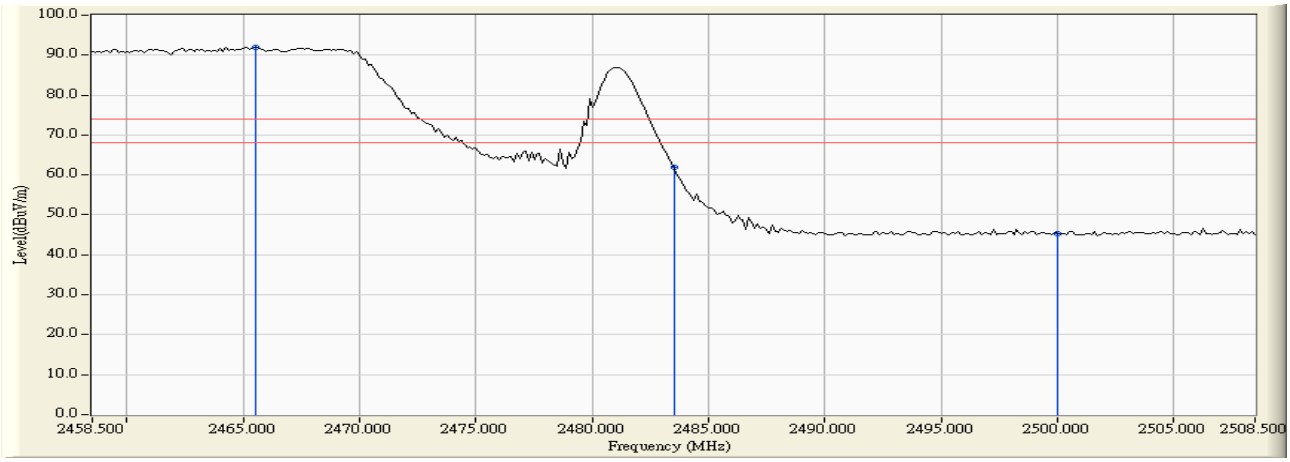
RF Radiated Measurement:

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

RF Radiated Measurement (Horizontal):

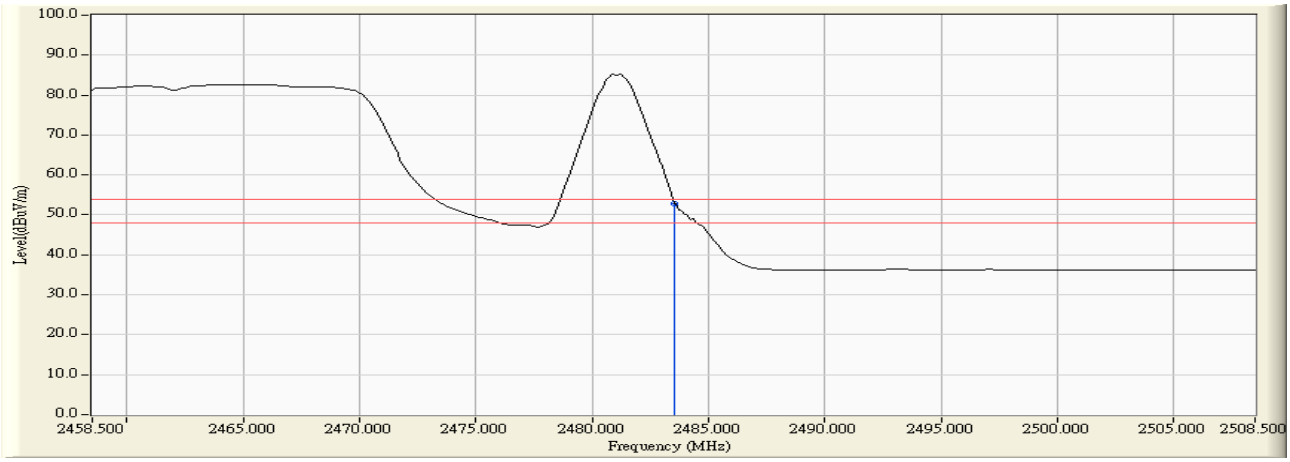
Channel	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Arerage Limit (dBuV/m)	Result
11(Peak)	2465.500	-2.017	93.946	91.929	74.00	54.00	Pass
11(Peak)	2483.500	-1.937	63.756	61.819	74.00	54.00	Pass
11(Peak)	2500.000	-1.886	47.309	45.423	74.00	54.00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

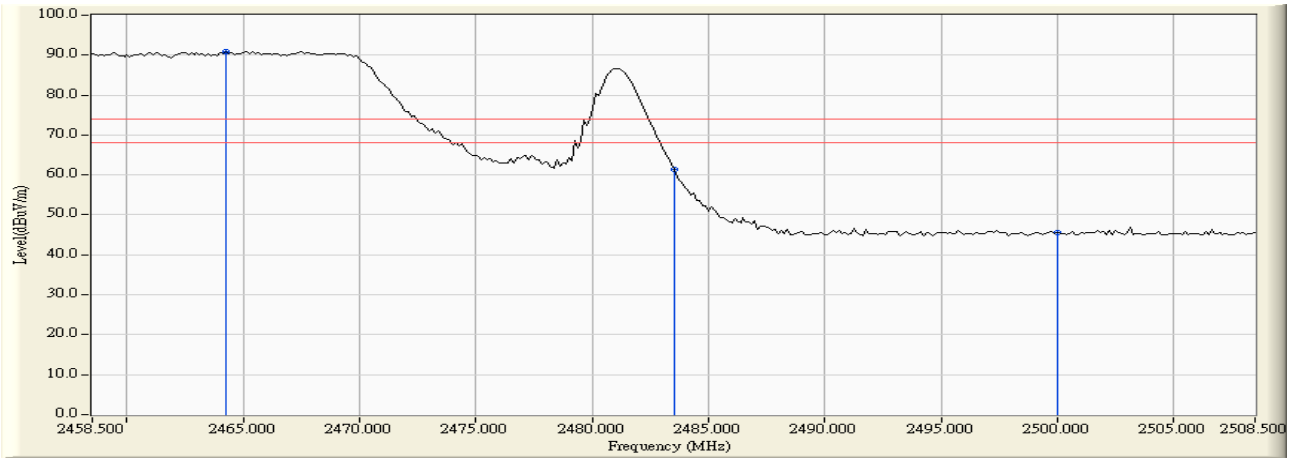
RF Radiated Measurement:

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

RF Radiated Measurement (Vertical):

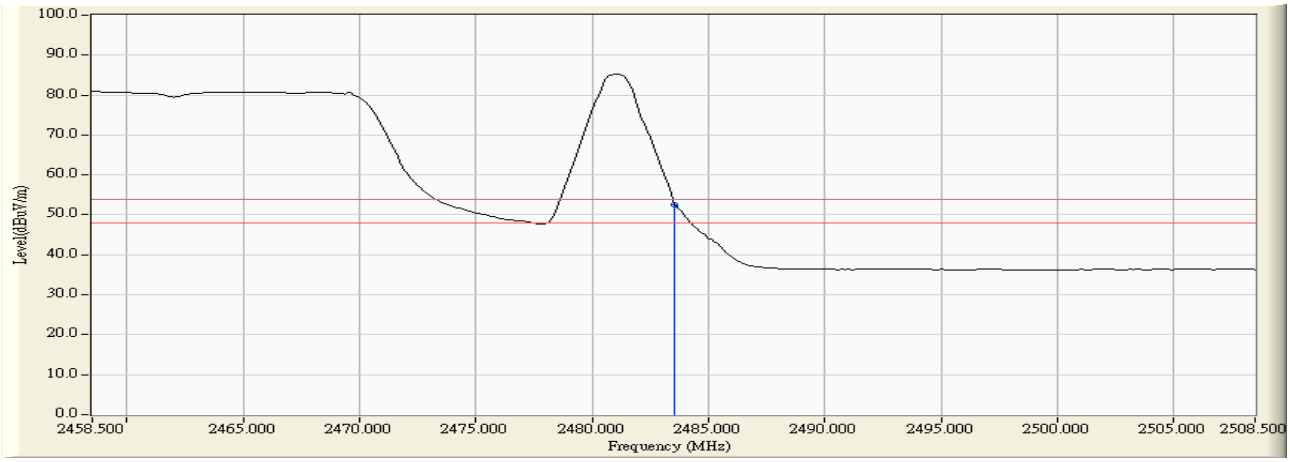
Channel	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Arerage Limit (dBuV/m)	Result
11(Peak)	2464.250	-2.023	92.902	90.879	74.00	54.00	Pass
11(Peak)	2483.500	-1.937	63.462	61.525	74.00	54.00	Pass
11(Peak)	2500.000	-1.886	47.353	45.467	74.00	54.00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

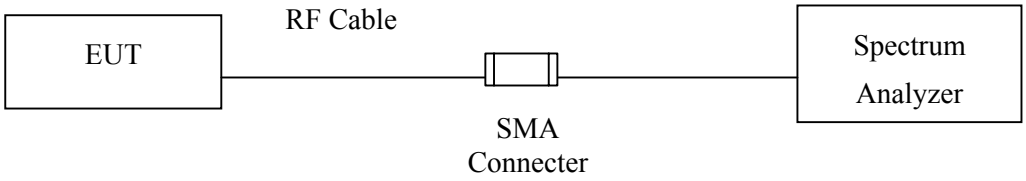
6.1. Test Equipment

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

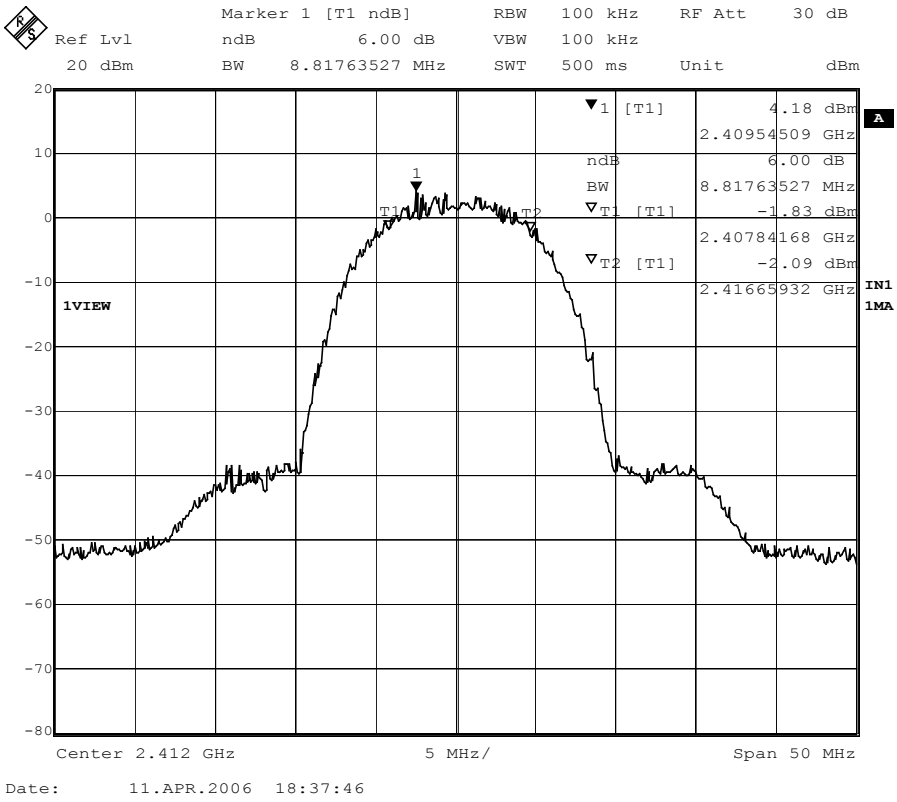
± 150Hz

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

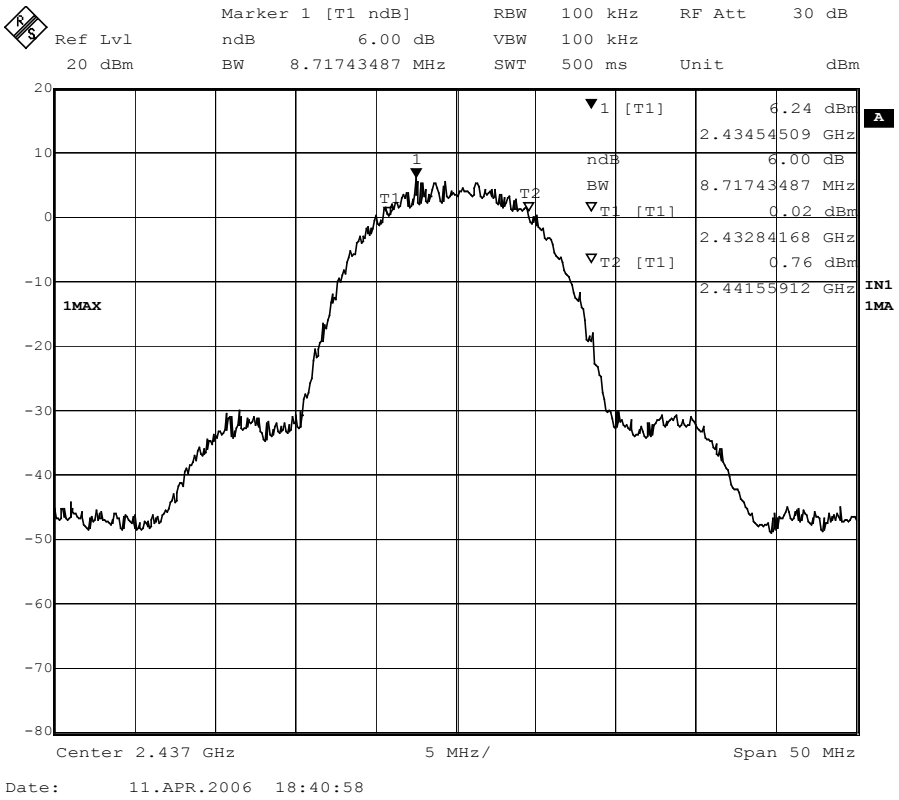
Figure Channel 1: 11Mbps



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

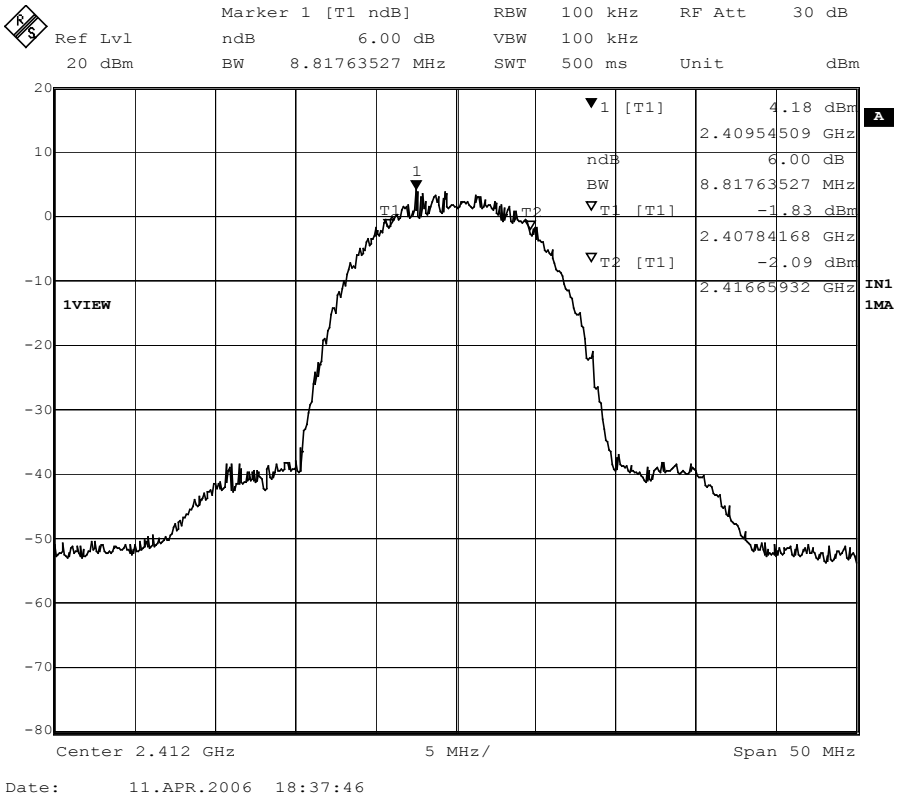
Figure Channel 6: 11Mbps



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

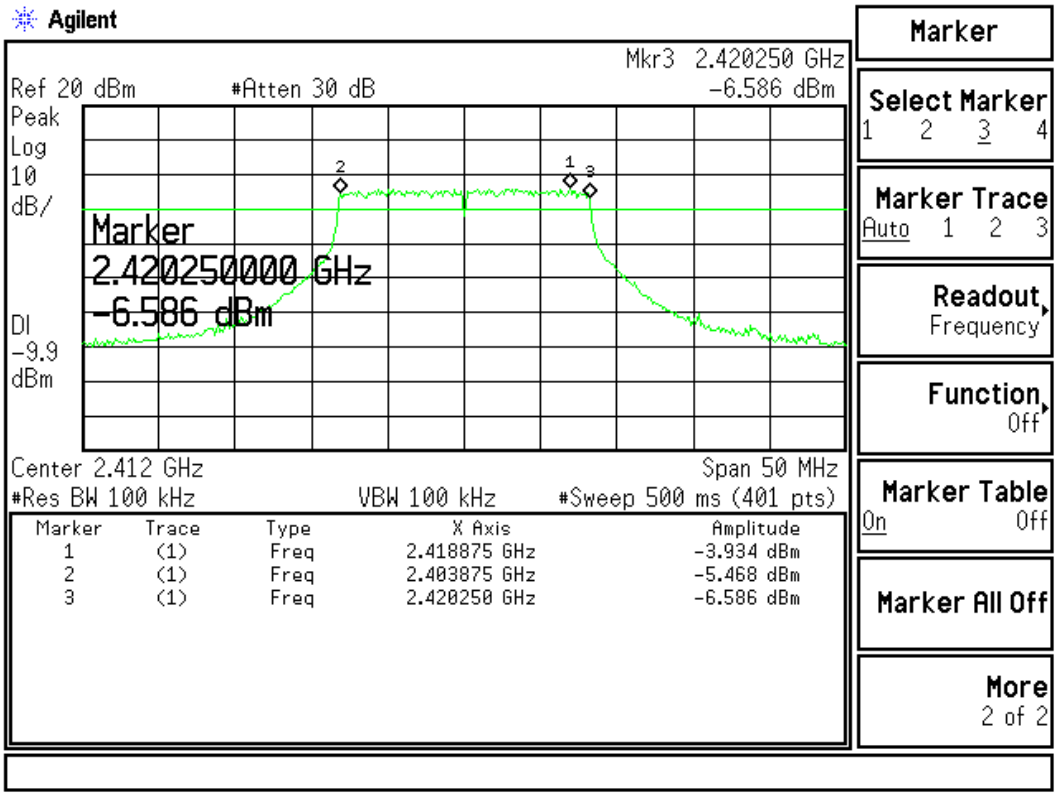
Figure Channel 11: 11Mbps



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

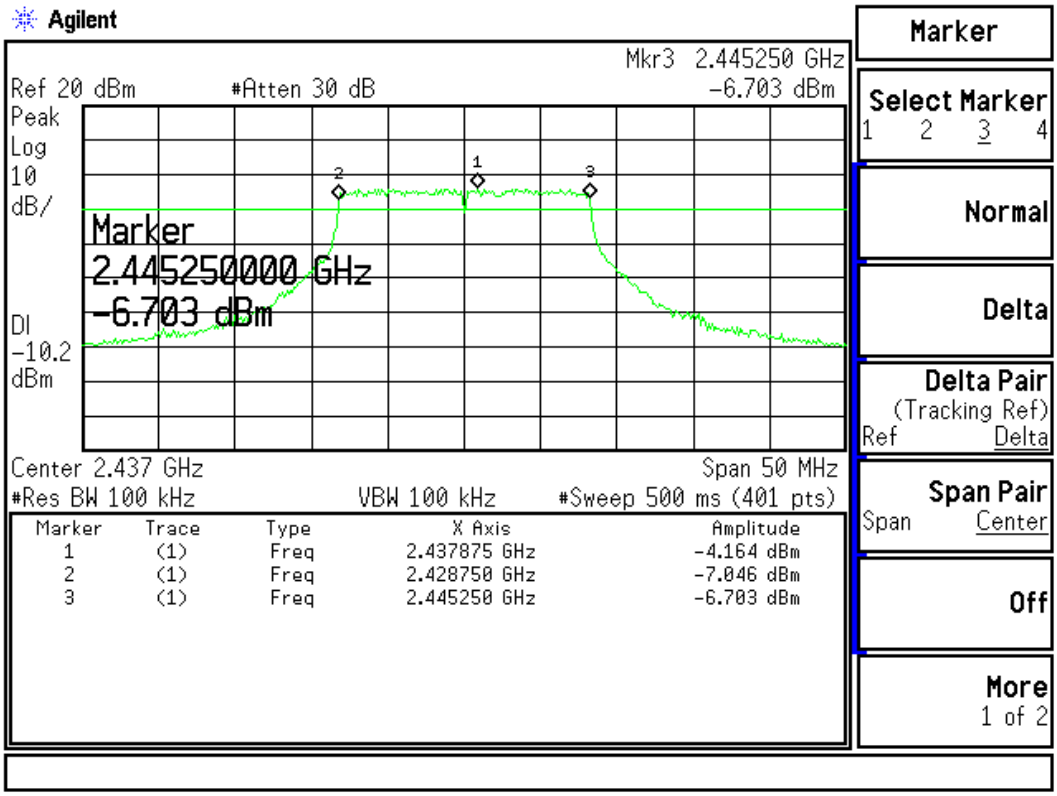
Figure Channel 1:



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

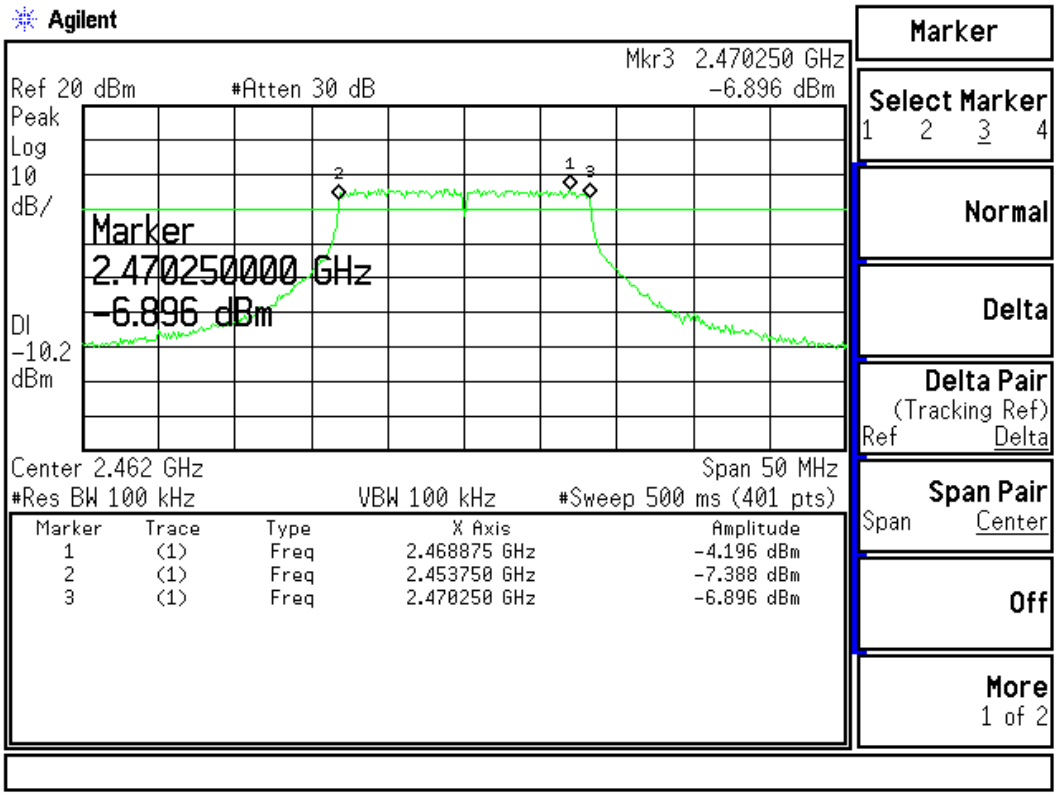
Figure Channel 6:



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

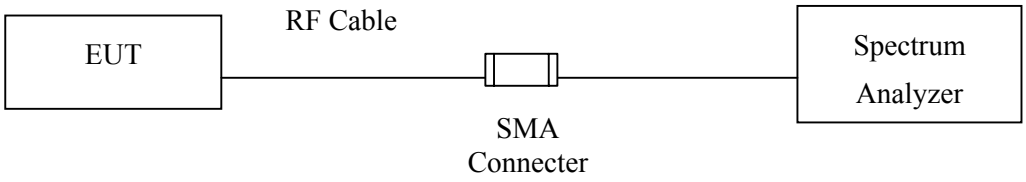
The following test equipments are used during the radiated emission tests:

	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

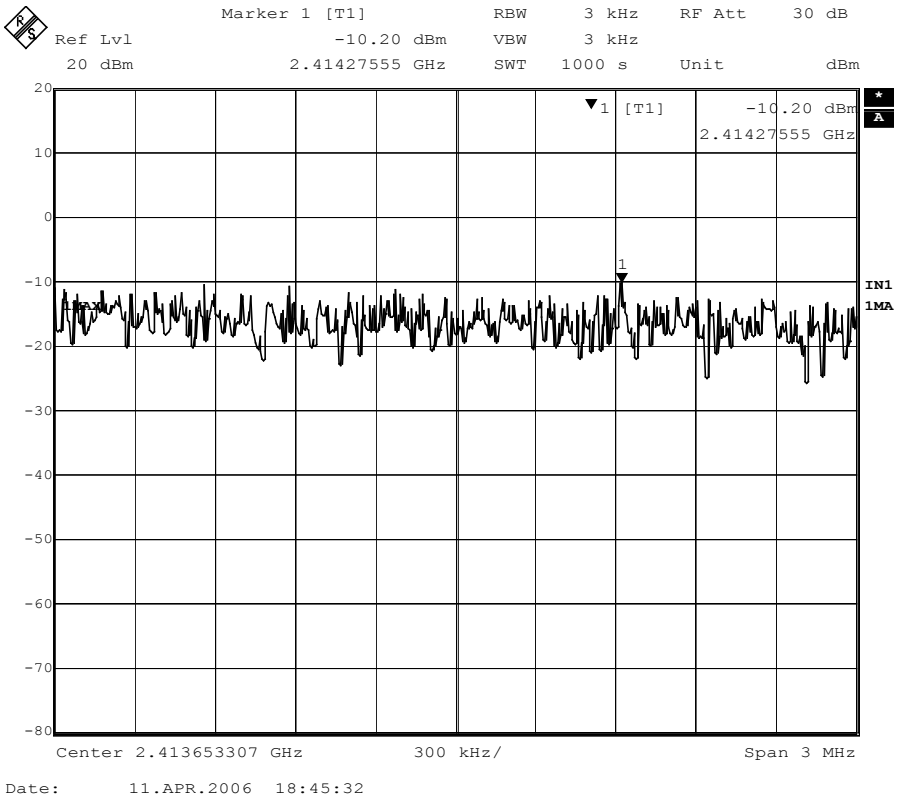
± 1.27 dB

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

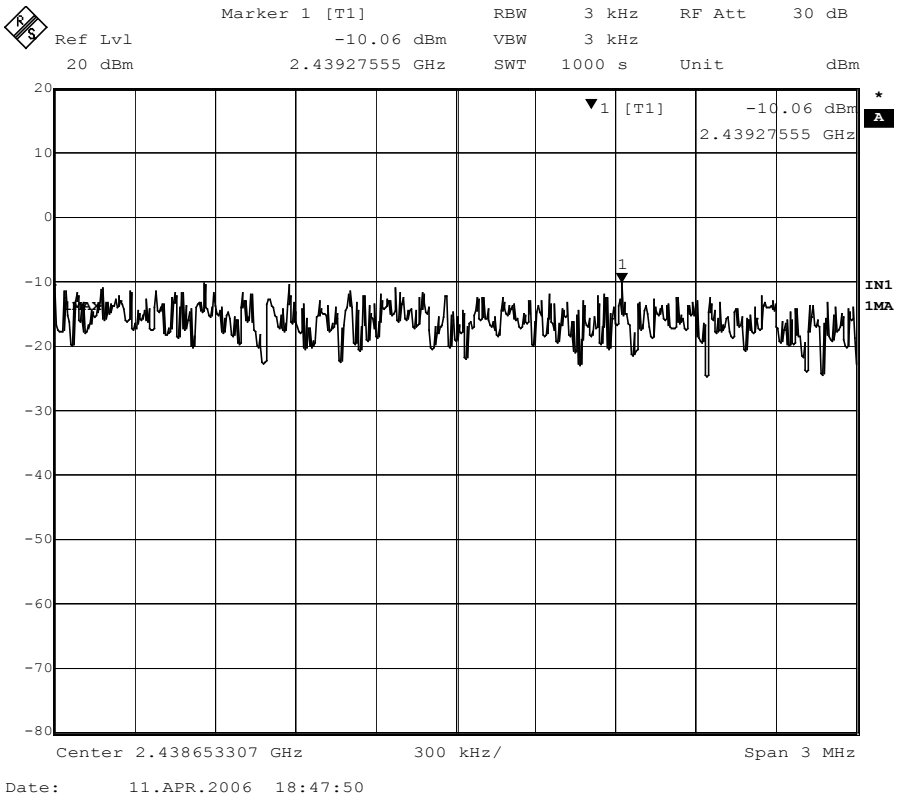
Figure Channel 1: 11Mbps



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

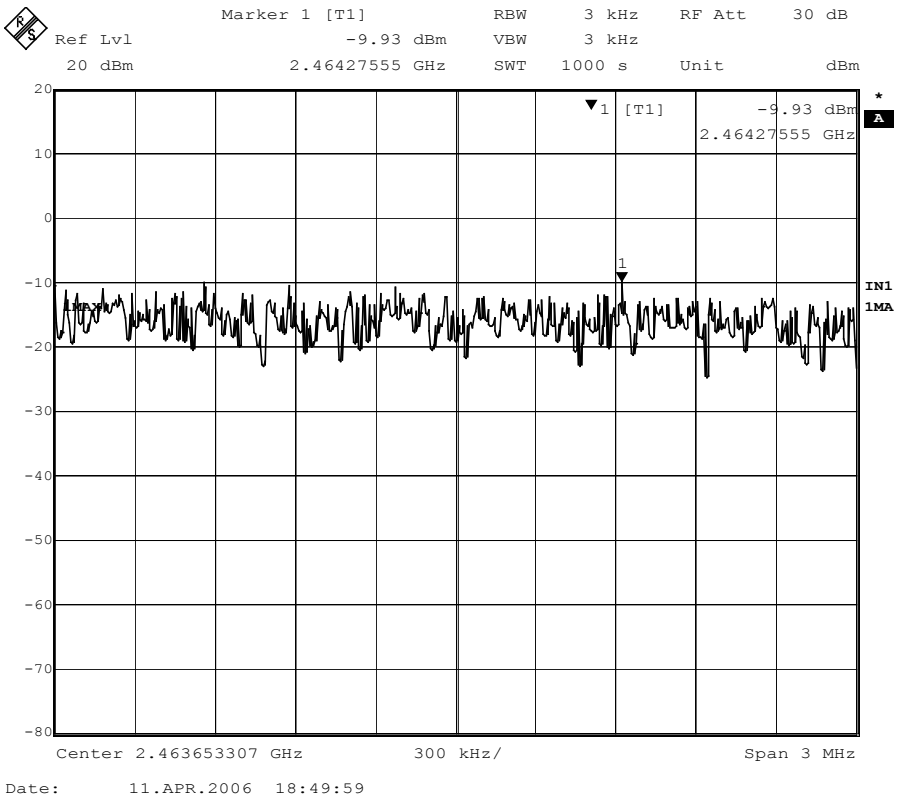
Figure Channel 6: 11Mbps



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

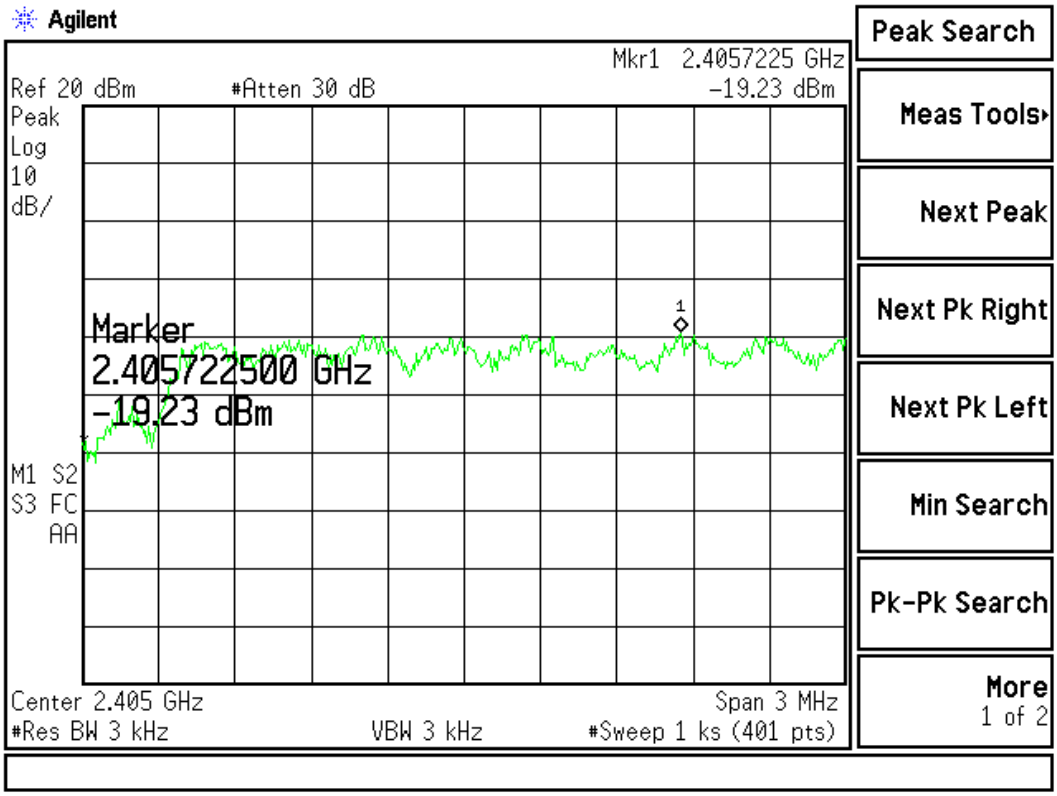
Figure Channel 11: 11Mbps



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

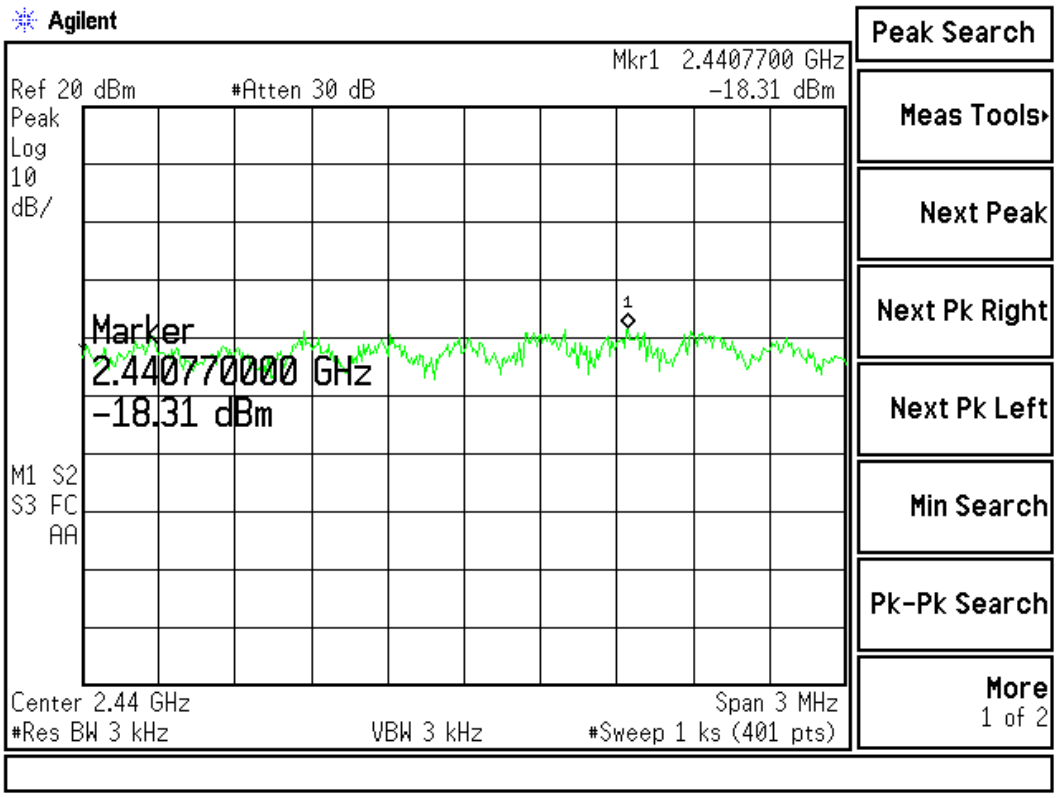
Figure Channel 1:



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

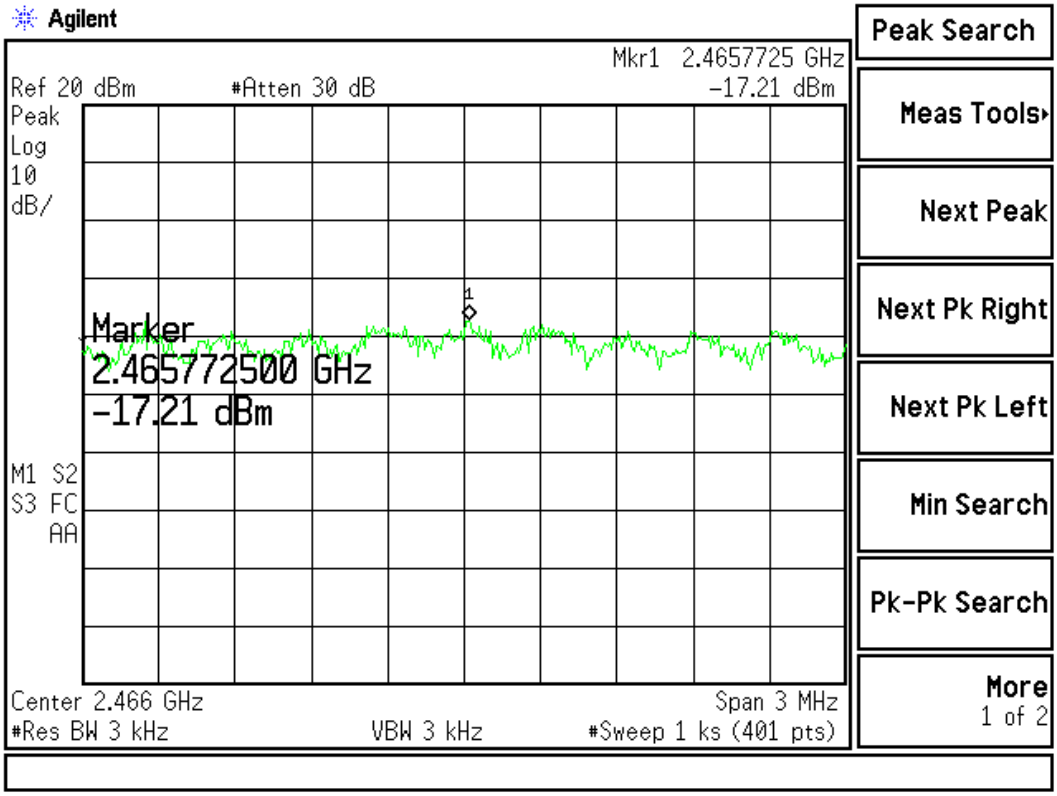
Figure Channel 6:



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.