

6. 6dB Bandwidth Measurement Data

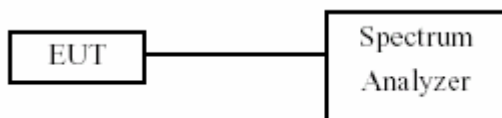
6.1. Test Limit

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

6.2. Test Procedures

1. The transmitter output was connected to the spectrum analyzer.
2. Set RBW of spectrum analyzer to 100 KHz and VBW to 100 KHz.
3. The 6 dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 6 dB.

6.3. Test Setup Layout



6.4. Measurement equipment

Instrument/Ancillary	Type	Manufacturer	Serial No.	Valid Date.
Spectrum Analyzer	FSP40	R&S	100047	2005/12/28

6.5. Test Result and Data

(1) Modulation Standard: IEEE 802.11b

Test Date: Apr. 15, 2005 Temperature: 26 Humidity: 65% Atmospheric pressure: 1038 mmHg

Channel	Frequency (MHz)	6dB Bandwidth (MHz)
01	2412	12.0
06	2437	12.0
11	2462	11.9

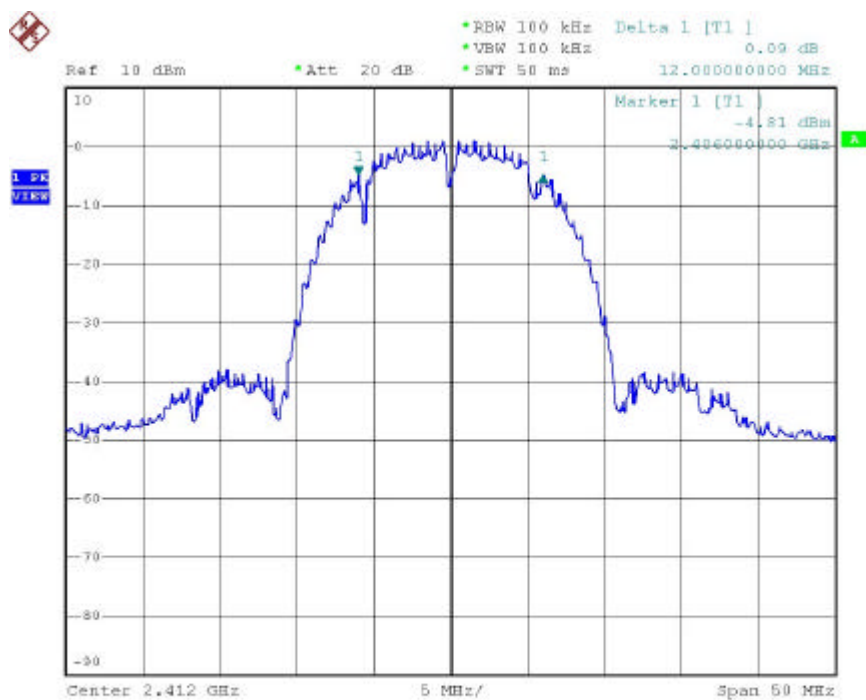
(2) Modulation Standard: IEEE 802.11g

Test Date: Apr. 15, 2005 Temperature: 26 Humidity: 65% Atmospheric pressure: 1038 mmHg

Channel	Frequency (MHz)	6dB Bandwidth (MHz)
01	2412	16.3
06	2437	16.4
11	2462	16.3

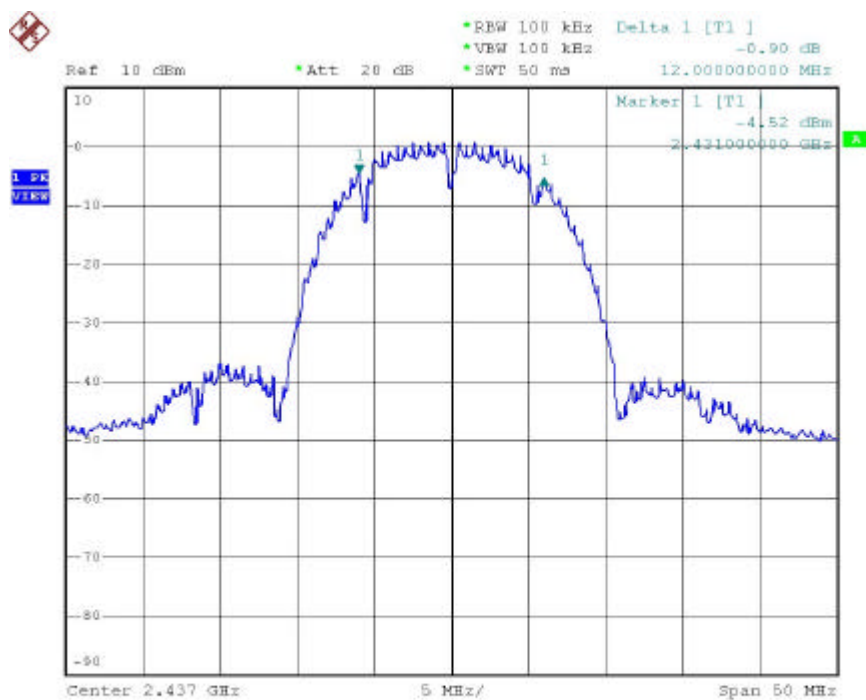
Modulation Standard:802.11b (11Mbps)

Channel:01



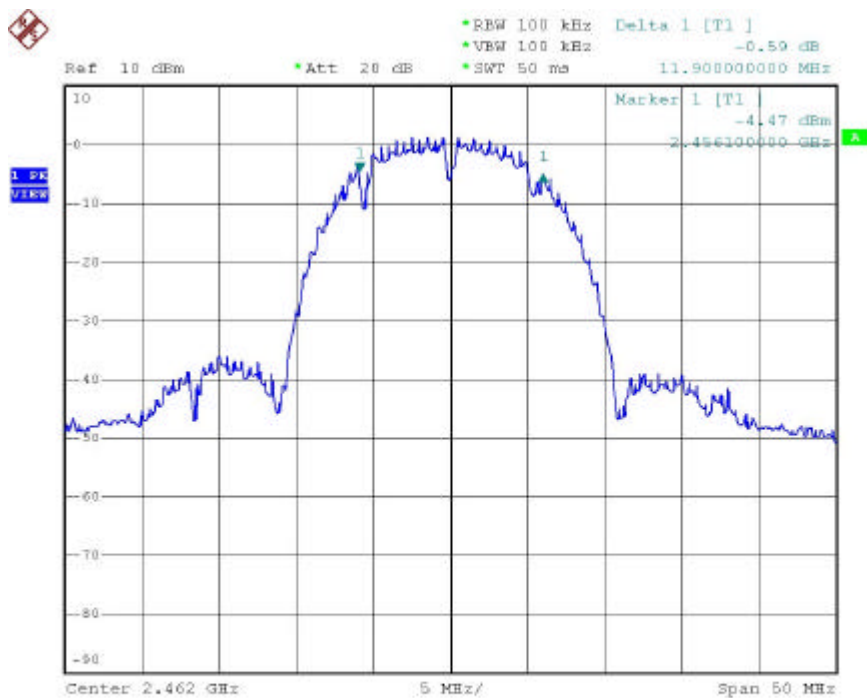
Date: 16.APR.2005 12:46:58

Channel:06



Date: 16.APR.2005 12:49:55

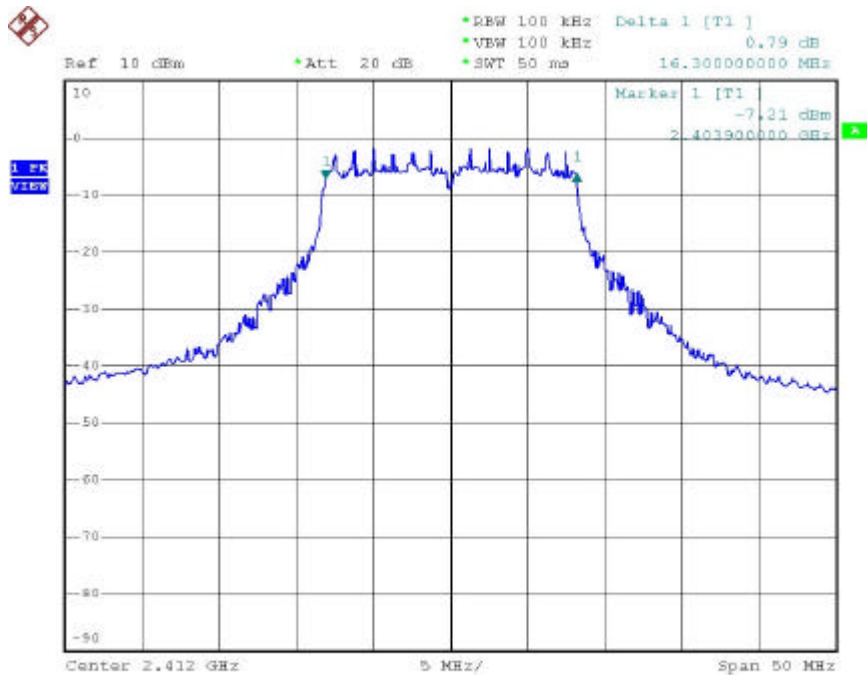
Channel:11



Date: 16.APR.2005 12:51:44

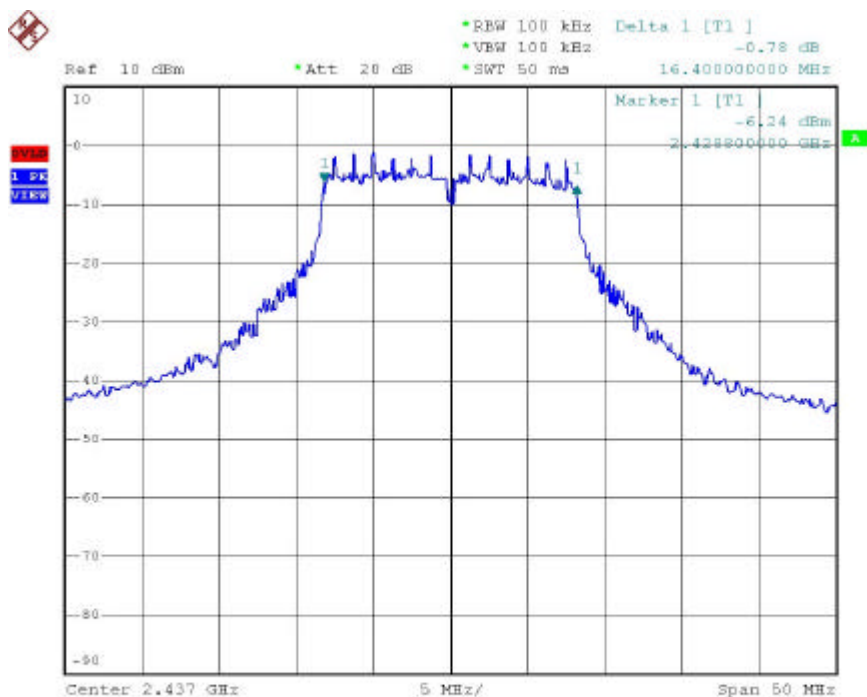
Modulation Standard:802.11g (54Mbps)

Channel:01



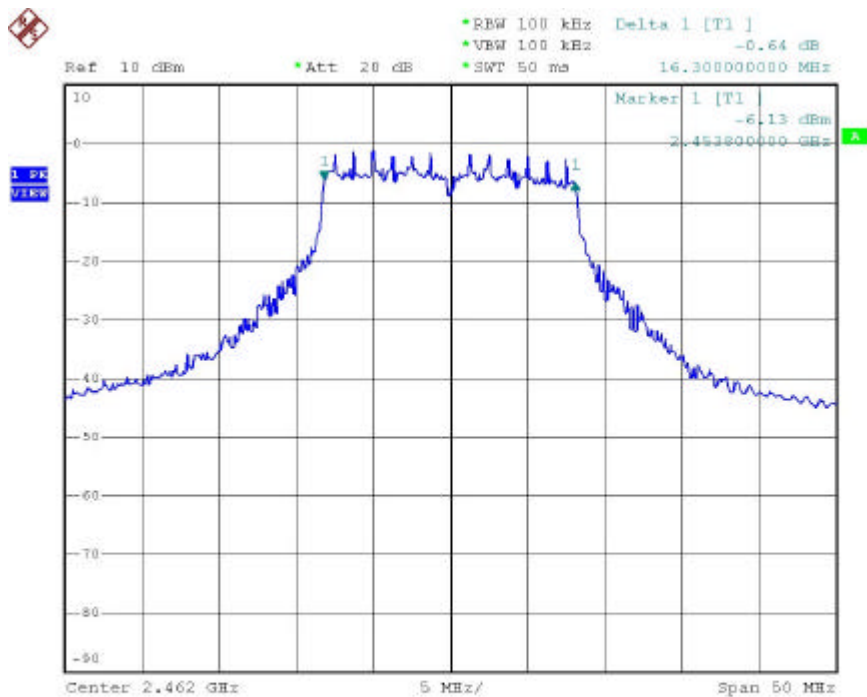
Date: 16.APR.2005 12:41:17

Channel:06



Date: 16.APR.2005 12:30:48

Channel:11



Date: 16.APR.2005 12:43:40

7. Maximum Peak Output Power

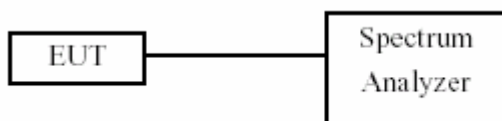
7.1. Test Limit

The Maximum Peak Output Power Measurement is 30dBm.

7.2. Test Procedures

The antenna port (RF output) of the EUT was connected to the input (RF input) of a power meter. Power was read directly from the meter and cable loss connection was added to the reading to obtain power at the EUT antenna terminal. The EUT Output Power was set to maximum to produce the worse case test result.

7.3. Test Setup Layout



7.4. List of Measuring Equipment Used

Instrument/Ancillary	Type	Manufacturer	Serial No.	Valid Date.
Spectrum Analyzer	FSP40	R&S	100047	2005/12/28

7.5. Test Result and Data

(1) Modulation Standard: IEEE 802.11b

Test Date: Apr. 15, 2005 Temperature: 26 Humidity: 65% Atmospheric pressure: 1038 mmHg

Channel	Frequency (MHz)	Peak Power Output (dBm)	Peak Power Output (mW)
01	2412	17.12	51.52
06	2437	17.29	53.58
11	2462	17.48	55.98

(2) Modulation Standard: IEEE 802.11g

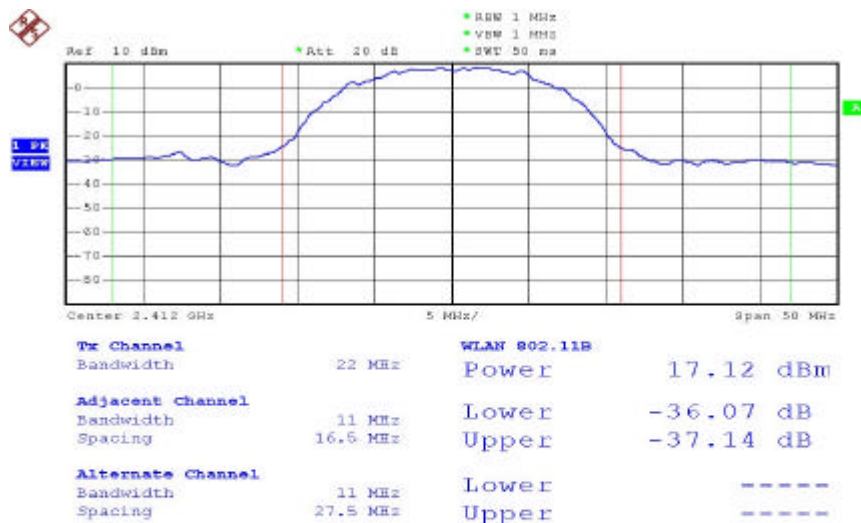
Test Date: Apr. 15, 2005 Temperature: 26 Humidity: 65% Atmospheric pressure: 1038 mmHg

Channel	Frequency (MHz)	Peak Power Output (dBm)	Peak Power Output (mW)
01	2412	17.22	52.72
06	2437	17.52	56.49
11	2462	17.42	55.21

Note: Conducted Power = Reading Value + Cable Loss

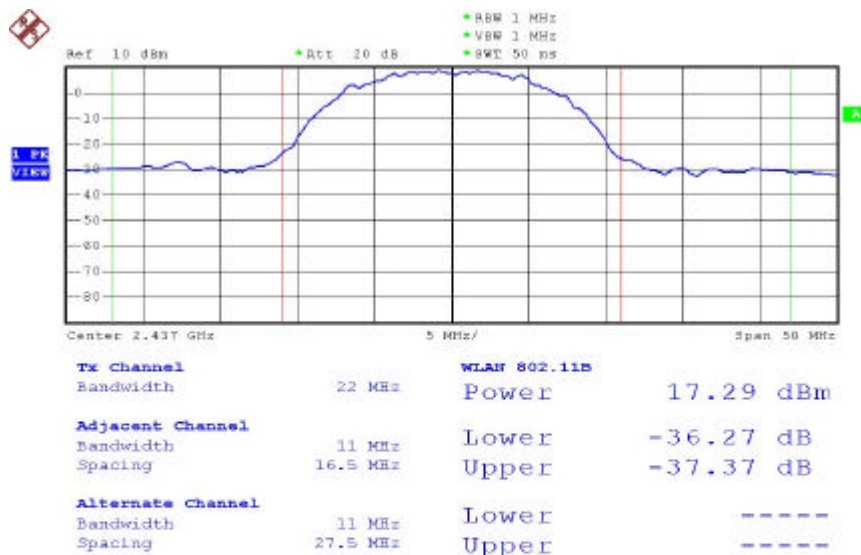
Modulation Standard:802.11b (11Mbps)

Channel:01



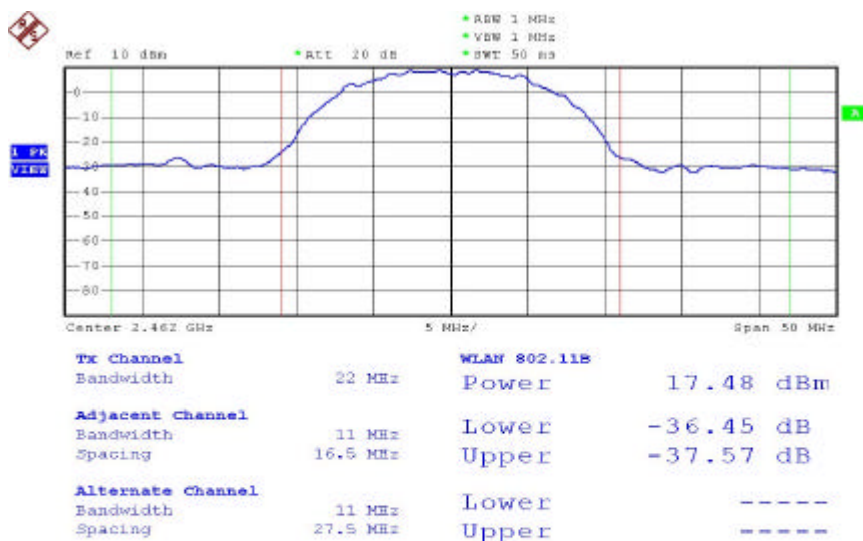
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Channel:06



Date: 16.APR.2005 12:00:56

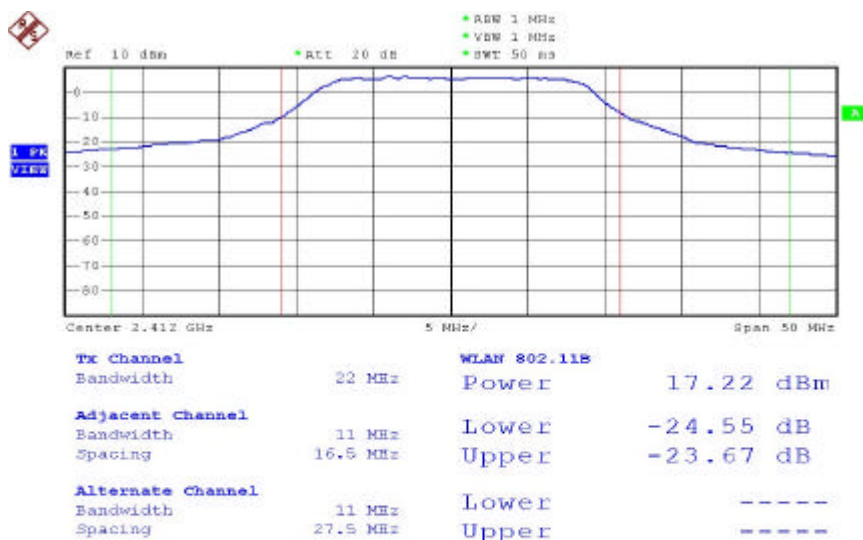
Channel:11



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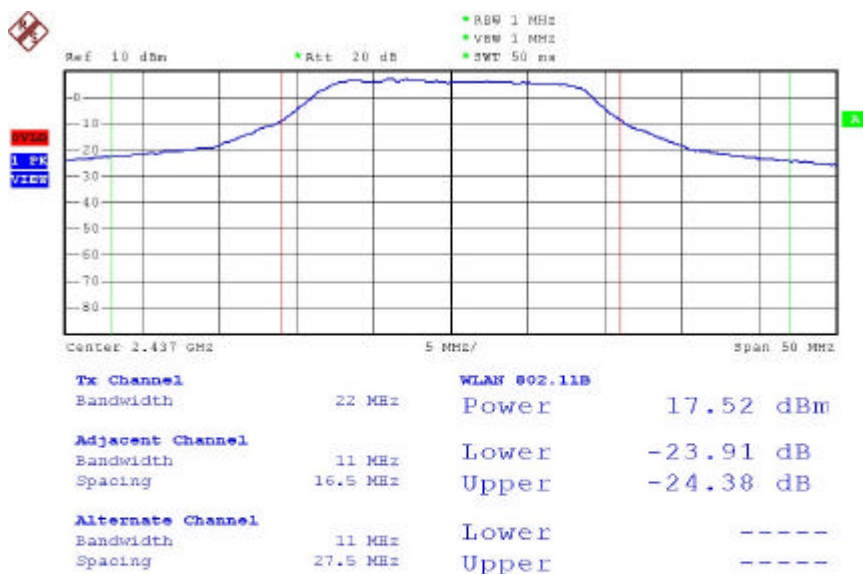
Modulation Standard:802.11g (54Mbps)

Channel:01



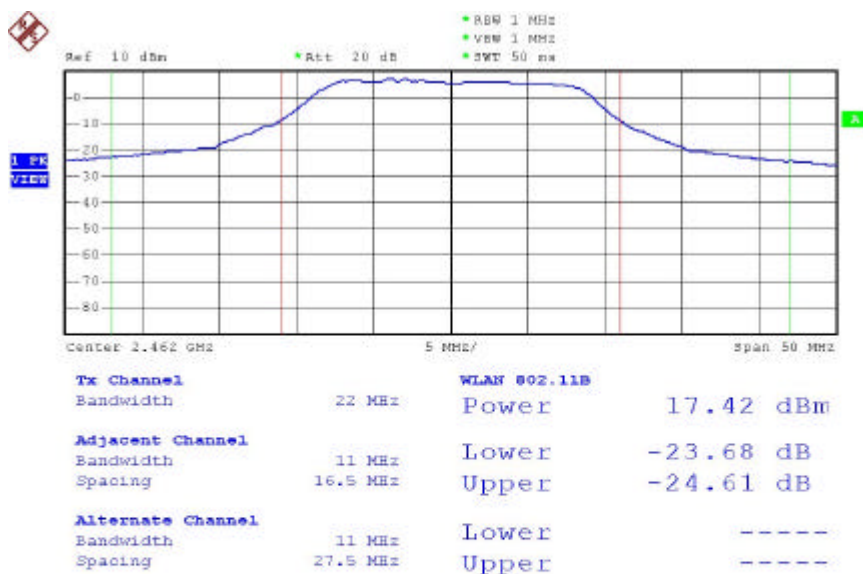
Date: 16.APR.2005 12:14:01

Channel:06



Date: 16.APR.2005 12:16:32

Channel:11



Date: 16.APR.2005 12:18:38

8. Band Edges Measurement

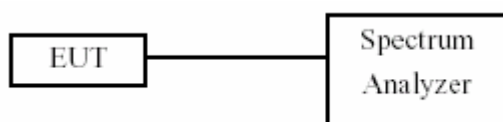
8.1. Test Limit

Below -20dB of the highest emission level of operating band
(in 100kHz Resolution Bandwidth).

8.2. Test Procedure :

1. The transmitter output was connected to the spectrum analyzer via a low lose cable.
2. Set both RBW and VBW of spectrum analyzer to 100 KHz with convenient frequency span including 100 KHz bandwidth from band edge.
3. The band edges was measured and recorded.

8.3. Test Setup Layout



8.3.1. List of Measuring Equipment Used

Instrument/Ancillary	Type	Manufacturer	Serial No.	Valid Date.
Spectrum Analyzer	FSP40	R&S	100047	2005/12/28

8.4. Test Result and Data

(1) Modulation Standard: IEEE 802.11b

Test Date: Apr. 15, 2005 Temperature: 26 Humidity: 65% Atmospheric pressure: 1038 mmHg

Channel	Frequency	maximum value in frequency (MHz)	maximum value is (dBm)
01	2412	2397.0	-38.49
11	2462	2680.0	-47.72

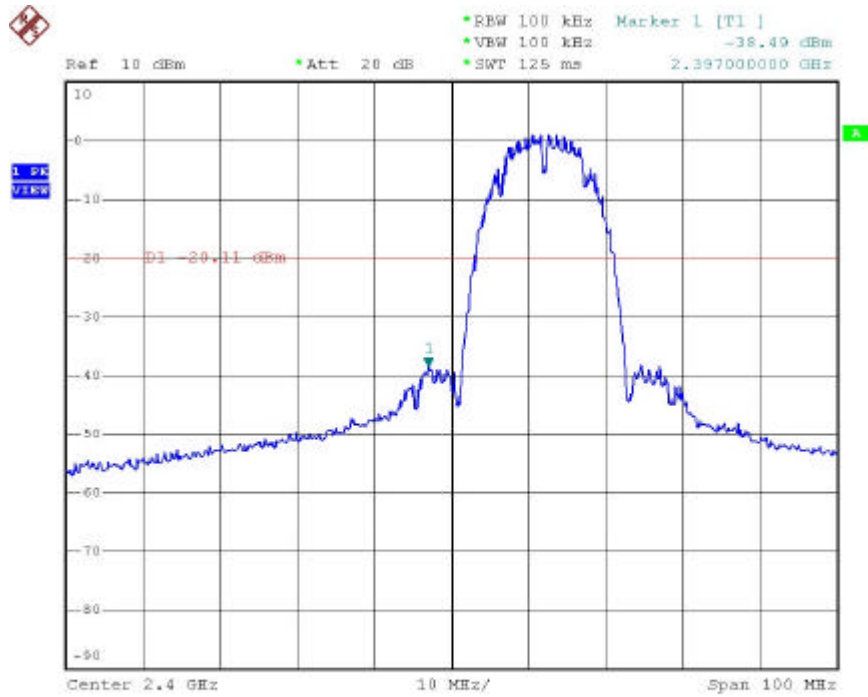
(2) Modulation Standard: IEEE 802.11g

Test Date: Apr. 15, 2005 Temperature: 26 Humidity: 65% Atmospheric pressure: 1038 mmHg

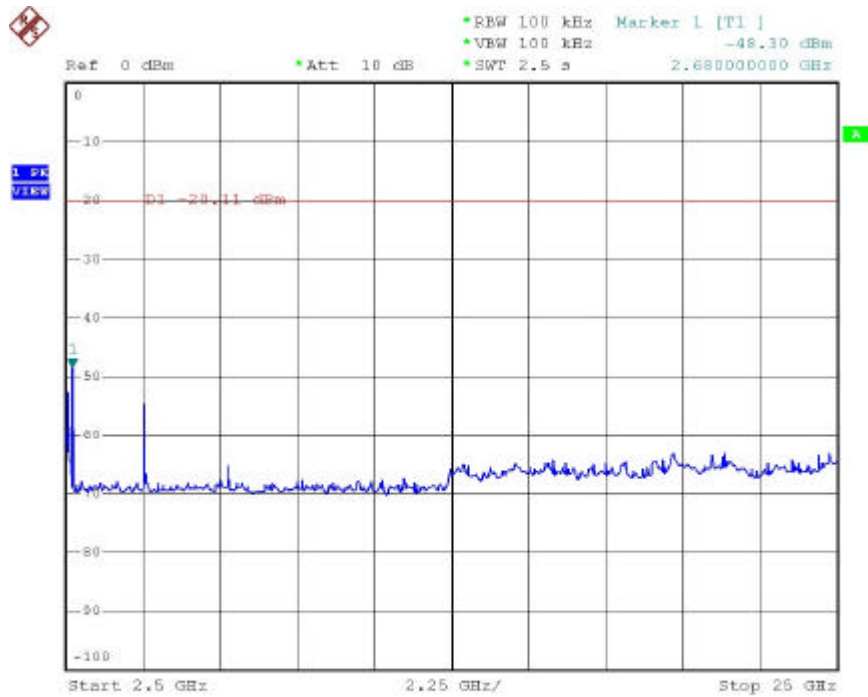
Channel	Frequency	maximum value in frequency (MHz)	maximum value is (dBm)
01	2412	2400.0	-27.64
11	2462	2484.9	-43.18

Modulation Standard:802.11b (11Mbps)

Channel:01

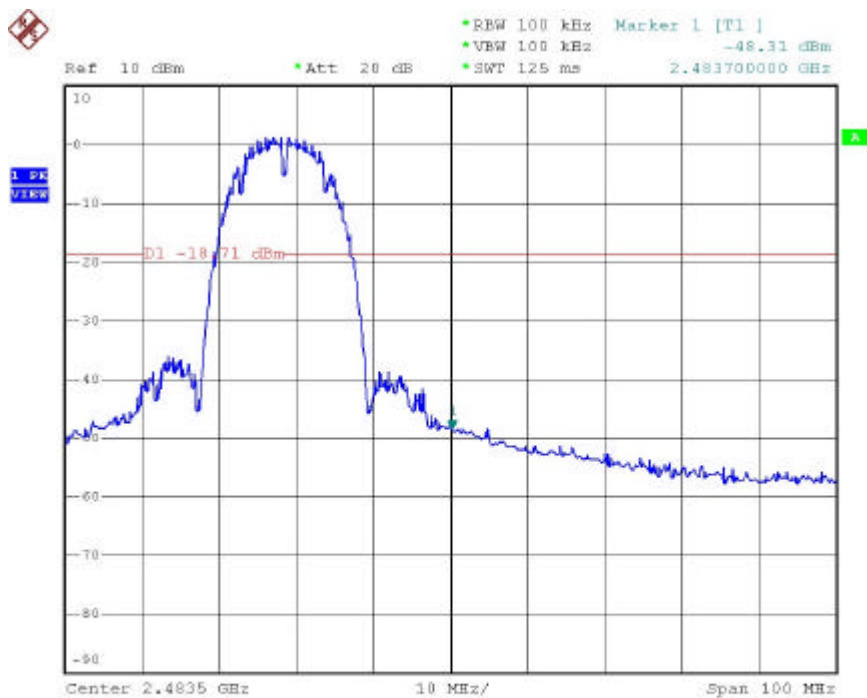


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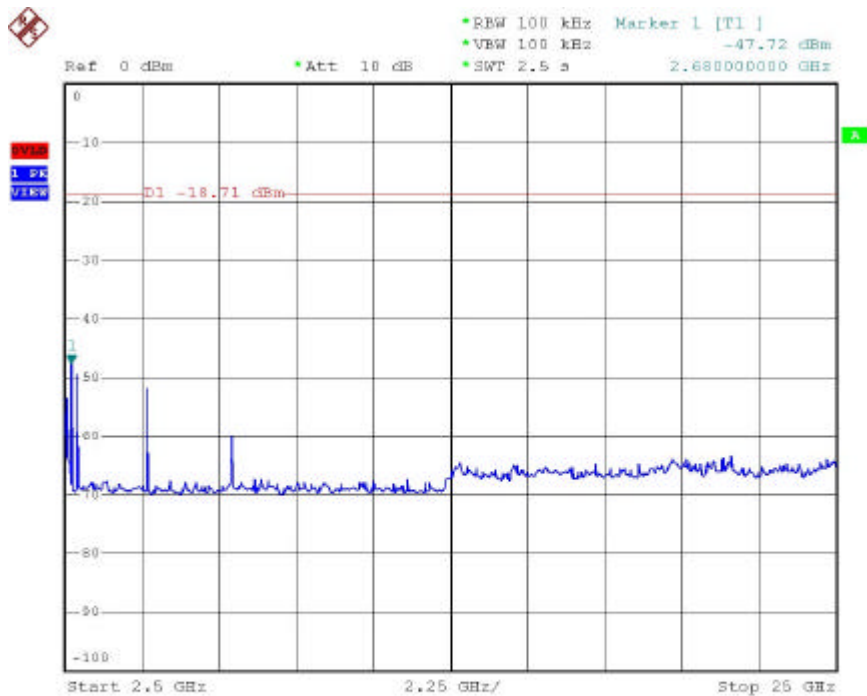


Date: 16.APR.2005 13:09:02

Channel:11



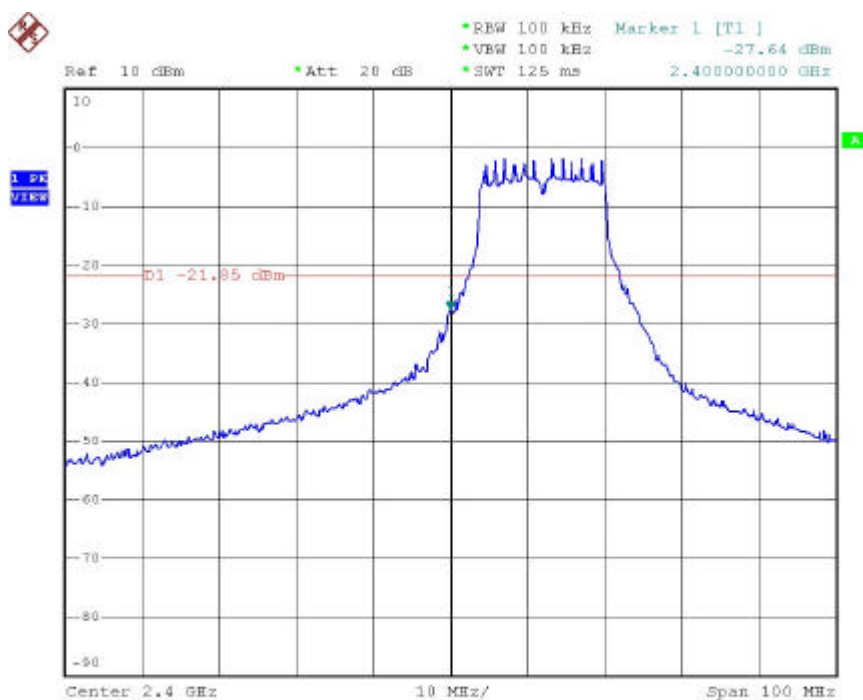
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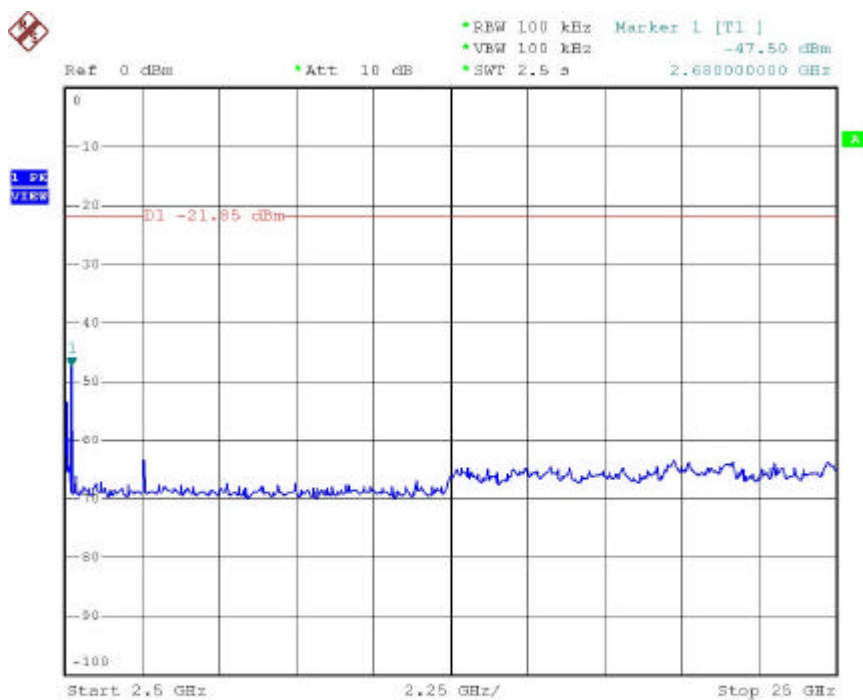
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Modulation Standard:802.11g (54Mbps)

Channel:01

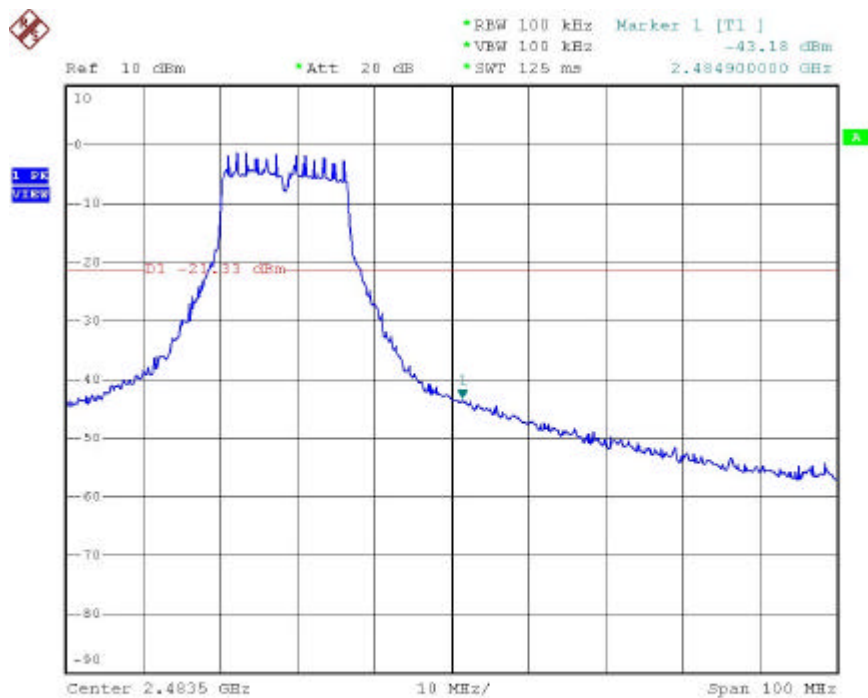


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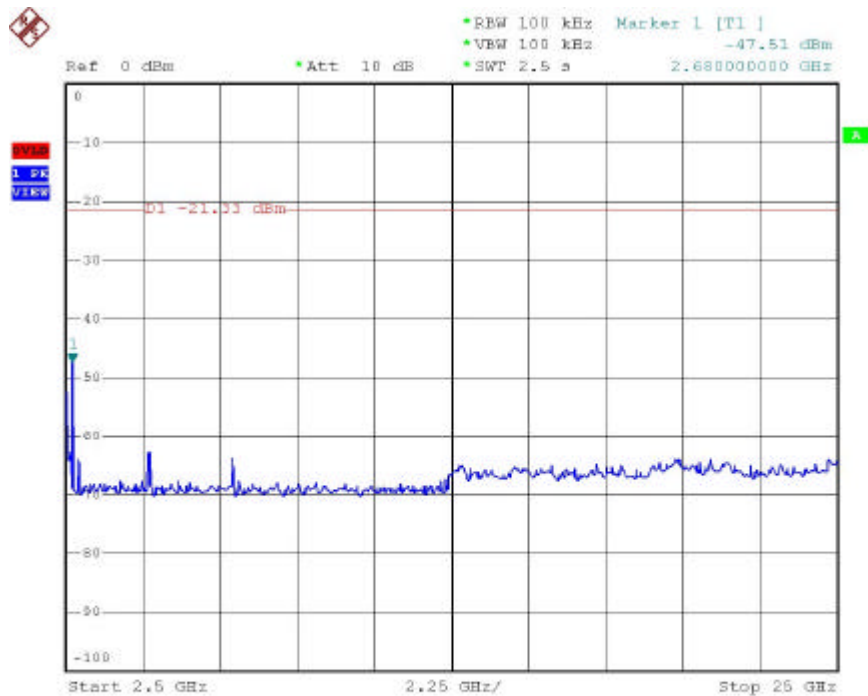


Date: 16.APR.2005 13:03:25

Channel:11



Date: 16.APR.2005 13:05:06



Date: 16.APR.2005 13:06:16

8.5. Restrict band emission Measurement Data

Antenna type 1: external Dipole Antenna.

Modulation Standard: IEEE 802.11b

Test Date: Apr. 20, 2005 Temperature: 24 Humidity: 65% Atmospheric pressure: 1038 mmHg

a) Channel 1

Frequency (MHz)	Ant-Pol H/V	Meter Reading	Corrected Factor	Result (dBuV/m)	Remark	Limit@3m (dBuV/m)		Margin (dB)	Table (Deg.)	Ant High (m)
						Peak	Ave.			
2389.356	H	45.40	0.55	45.95	Peak	74	54	-28.05	137	1.2
2389.764	H	30.14	0.55	30.69	Ave	74	54	-23.31	137	1.2
2389.764	V	57.62	0.55	58.17	Peak	74	54	-15.83	137	1.1
2389.968	V	32.42	0.55	32.97	Ave	74	54	-21.03	137	1.1

b) Channel 11

Frequency (MHz)	Ant-Pol H/V	Meter Reading	Corrected Factor	Result (dBuV/m)	Remark	Limit@3m (dBuV/m)		Margin (dB)	Table (Deg.)	Ant High (m)
						Peak	Ave.			
2483.888	H	47.34	0.87	48.21	Peak	74	54	-25.79	137	1.2
2483.792	H	31.41	0.87	32.29	Ave	74	54	-21.71	137	1.2
2483.496	V	54.44	0.87	55.31	Ave	74	54	-18.69	137	1.1
2483.880	V	31.37	0.87	32.25	Peak	74	54	-21.75	137	1.1

Modulation Standard: 802.11g (54Mbps)

Test Date: Apr. 20, 2005 Temperature: 24 Humidity: 65% Atmospheric pressure: 1038 mmHg

a) Channel 1

Frequency (MHz)	Ant-Pol H/V	Meter Reading	Corrected Factor	Result (dBuV/m)	Remark	Limit@3m (dBuV/m)		Margin (dB)	Table (Deg.)	Ant High (m)
						Peak	Ave.			
2389.968	H	56.54	0.55	57.09	Peak	74	54	-16.91	137	1.2
2389.968	H	33.58	0.55	34.13	Ave	74	54	-19.87	137	1.2
2389.968	V	63.00	0.55	63.55	Ave	74	54	-10.45	137	1.1
2389.968	V	33.98	0.55	34.53	Peak	74	54	-19.47	137	1.1

b) Channel 11

Frequency (MHz)	Ant-Pol H/V	Meter Reading	Corrected Factor	Result (dBuV/m)	Remark	Limit@3m (dBuV/m)		Margin (dB)	Table (Deg.)	Ant High (m)
						Peak	Ave.			
2483.964	H	52.43	0.87	53.30	Peak	74	54	-20.70	137	1.2
2483.584	H	31.59	0.87	32.46	Ave	74	54	-21.54	137	1.2
2483.508	V	59.01	0.87	59.88	Ave	74	54	-14.12	137	1.1
2483.508	V	33.80	0.87	34.67	Peak	74	54	-19.33	137	1.1

Notes:

1. Result = Meter Reading + Factor
2. Factor = Antenna Factor + Cable Loss – Amplifier
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and video bandwidth is 3 MHz for Peak detection at frequency above 1GHz.
4. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 10Hz for Average detection at frequency above 1GHz

Antenna type 2: external GP-Antenna

Modulation Standard: IEEE 802.11b

Test Date: Apr. 20, 2005 Temperature: 24 Humidity: 65% Atmospheric pressure: 1038 mmHg

c) Channel 1

Frequency (MHz)	Ant-Pol H/V	Meter Reading	Corrected Factor	Result (dBuV/m)	Remark	Limit@3m (dBuV/m)		Margin (dB)	Table (Deg.)	Ant High (m)
						Peak	Ave.			
2389.764	H	47.73	0.55	48.28	Peak	74	54	-25.72	137	1.2
2389.764	H	31.84	0.55	32.39	Ave	74	54	-21.61	137	1.2
2389.764	V	49.67	0.55	50.22	Peak	74	54	-23.78	137	1.1
2389.764	V	31.69	0.55	32.24	Ave	74	54	-21.76	137	1.1

d) Channel 11

Frequency (MHz)	Ant-Pol H/V	Meter Reading	Corrected Factor	Result (dBuV/m)	Remark	Limit@3m (dBuV/m)		Margin (dB)	Table (Deg.)	Ant High (m)
						Peak	Ave.			
2483.584	H	47.76	0.87	48.63	Peak	74	54	-25.37	137	1.2
2483.584	H	31.34	0.87	32.21	Ave	74	54	-21.79	137	1.2
2483.584	V	47.89	0.87	48.76	Ave	74	54	-25.24	137	1.1
2483.584	V	31.35	0.87	32.22	Peak	74	54	-21.78	137	1.1

Modulation Standard: 802.11g (54Mbps)

Test Date: Apr. 20, 2005 Temperature: 24 Humidity: 65% Atmospheric pressure: 1038 mmHg

c) Channel 1

Frequency (MHz)	Ant-Pol H/V	Meter Reading	Corrected Factor	Result (dBuV/m)	Remark	Limit@3m (dBuV/m)		Margin (dB)	Table (Deg.)	Ant High (m)
						Peak	Ave.			
2389.764	H	55.38	0.55	55.93	Peak	74	54	-18.07	137	1.2
2389.764	H	37.16	0.55	37.71	Ave	74	54	-16.29	137	1.2
2389.764	V	62.52	0.55	63.07	Ave	74	54	-10.93	137	1.1
2389.764	V	43.97	0.55	44.52	Peak	74	54	-9.48	137	1.1

d) Channel 11

Frequency (MHz)	Ant-Pol H/V	Meter Reading	Corrected Factor	Result (dBuV/m)	Remark	Limit@3m (dBuV/m)		Margin (dB)	Table (Deg.)	Ant High (m)
						Peak	Ave.			
2483.584	H	58.93	0.87	59.80	Peak	74	54	-14.20	137	1.2
2483.584	H	39.43	0.87	40.30	Ave	74	54	-13.70	137	1.2
2483.584	V	57.92	0.87	58.79	Ave	74	54	-15.21	137	1.1
2483.584	V	38.77	0.87	39.64	Peak	74	54	-14.36	137	1.1

Notes:

1. Result = Meter Reading + Factor
2. Factor = Antenna Factor + Cable Loss – Amplifier
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and video bandwidth is 3 MHz for Peak detection at frequency above 1GHz.
4. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 10Hz for Average detection at frequency above 1GHz

9. Power Spectral Density

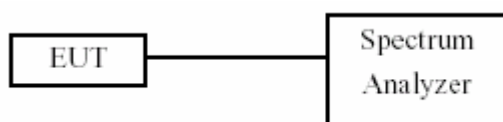
9.1. Test Limit

The Maximum of Power Spectral Density Measurement is 8dBm.

9.2. Test Procedures

1. The transmitter output was connected to spectrum analyzer.
2. The spectrum analyzer's resolution bandwidth were set at 3KHz RBW and 30KHz VBW as that of the fundamental frequency. Set the sweep time=span/3KHz.
3. The power spectral density was measured and recorded.
4. The Sweep time is allowed to be longer than span/3KHz for a full response of the mixer in the spectrum analyzer.

9.3. Test Setup Layout :



9.4. List of Measuring Equipment Used

Instrument/Ancillary	Type	Manufacturer	Serial No.	Valid Date.
Spectrum Analyzer	FSP40	R&S	100047	2005/12/28

9.5. Test Result and Data

(1) Modulation Standard: IEEE 802.11b

Test Date: Apr. 15, 2005 Temperature: 26 Humidity: 65% Atmospheric pressure: 1038 mmHg

Channel	Frequency	Maximum Power Density of 3 kHz Bandwidth (dBm)
01	2412	-10.50
06	2437	-10.73
11	2462	-10.59

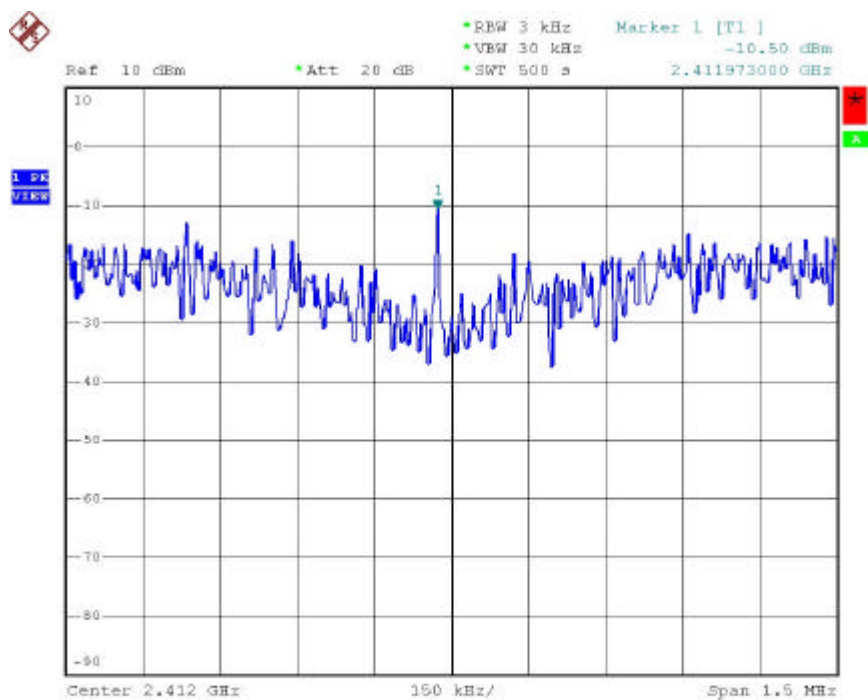
(2) Modulation Standard: IEEE 802.11g

Test Date: Apr. 15, 2005 Temperature: 26 Humidity: 65% Atmospheric pressure: 1038 mmHg

Channel	Frequency	Maximum Power Density of 3 kHz Bandwidth (dBm)
01	2412	-11.60
06	2437	-11.75
11	2462	-11.95

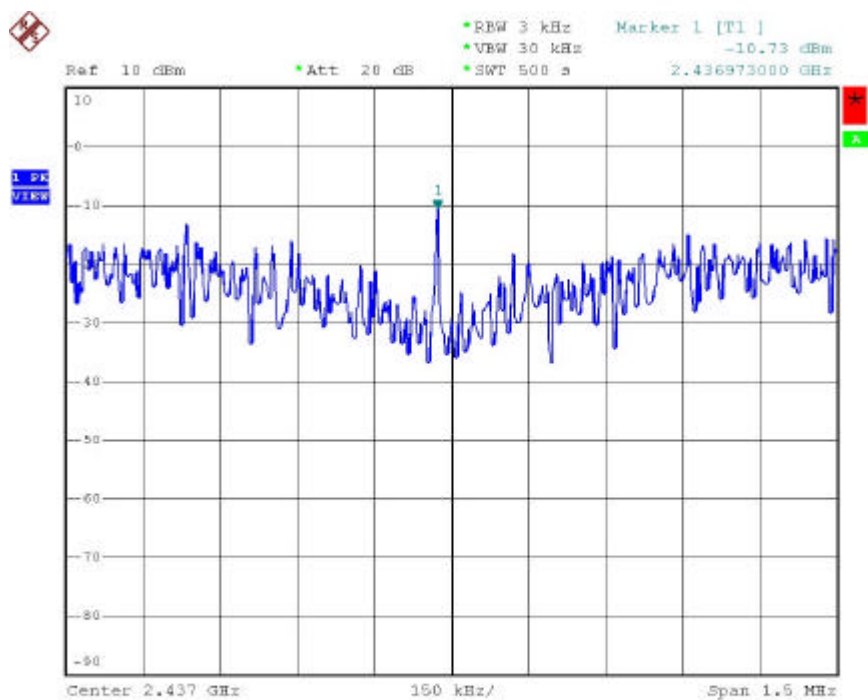
Modulation Standard:802.11b (11Mbps)

Channel:01



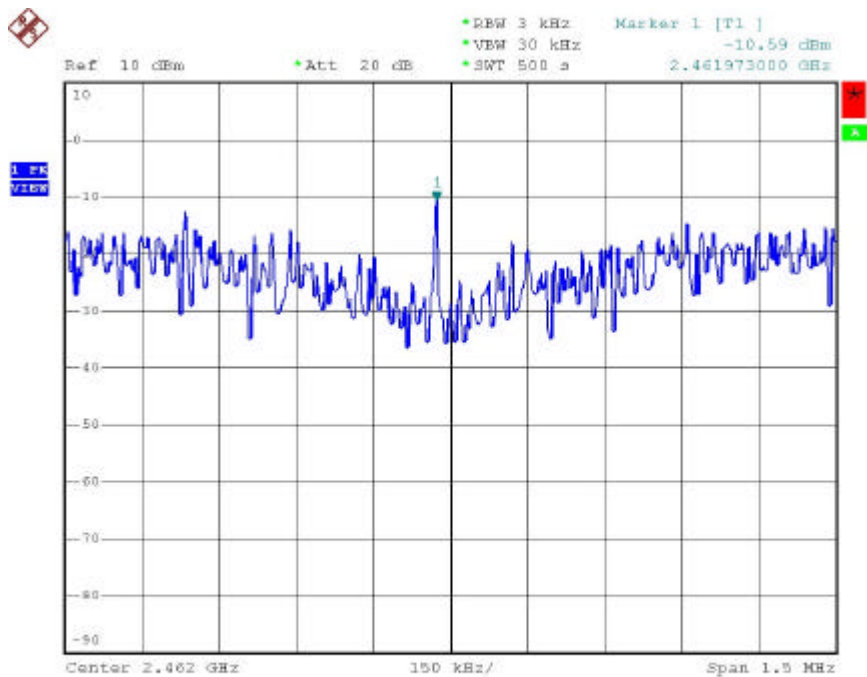
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Channel:06



Date: 16.APR.2005 12:54:50

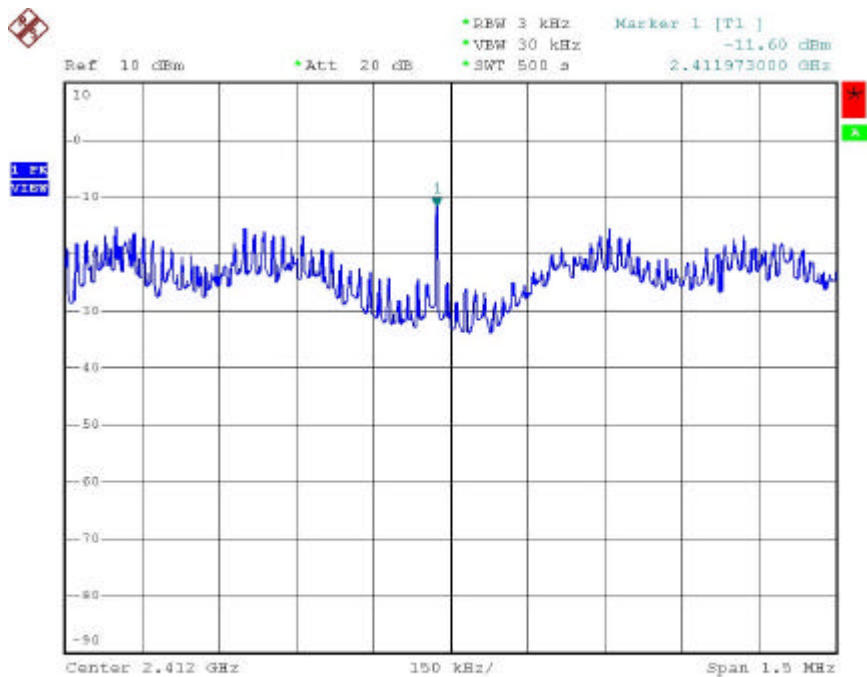
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Date: 16.APR.2005 12:53:42

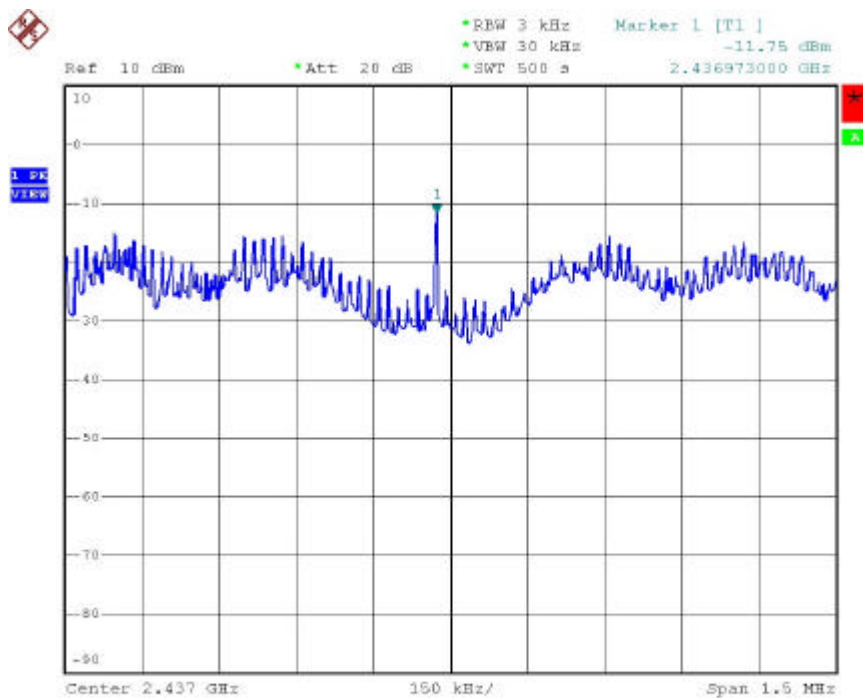
Modulation Standard:802.11g (54Mbps)

Channel:01



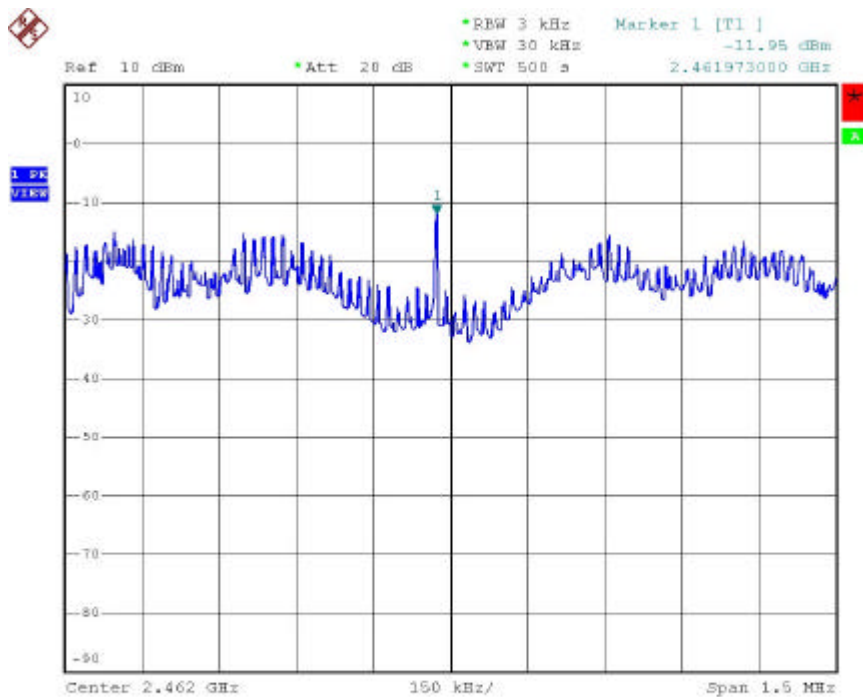
Date: 16.APR.2005 12:57:53

Channel: 06



Date: 16.APR.2005 12:59:07

Channel:11



Date: 16.APR.2005 13:00:21

10. Restricted Bands of Operation

Only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.09000 – 0.11000	16.42000 – 16.42300	399.9 – 410.0	4.500 – 5.250
0.49500 – 0.505**	16.69475 – 16.69525	608.0 – 614.0	5.350 – 5.460
2.17350 – 2.19050	16.80425 – 16.80475	960.0 – 1240.0	7.250 – 7.750
4.12500 – 4.12800	25.50000 – 25.67000	1300.0 – 1427.0	8.025 – 8.500
4.17725 – 4.17775	37.50000 – 38.25000	1435.0 – 1626.5	9.000 – 9.200
4.20725 – 4.20775	73.00000 – 74.60000	1645.5 – 1646.5	9.300 – 9.500
6.21500 – 6.21800	74.80000 – 75.20000	1660.0 – 1710.0	10.600 – 12.700
6.26775 – 6.26825	108.00000 – 121.94000	1718.8 – 1722.2	13.250 – 13.400
6.31175 – 6.31225	123.00000 – 138.00000	2200.0 – 2300.0	14.470 – 14.500
8.29100 – 8.29400	149.90000 – 150.05000	2310.0 – 2390.0	15.350 – 16.200
8.36200 – 8.36600	156.52475 – 156.52525	2483.5 – 2500.0	17.700 – 21.400
8.37625 – 8.38675	156.70000 – 156.90000	2655.0 – 2900.0	22.010 – 23.120
8.41425 – 8.41475	162.01250 – 167.17000	3260.0 – 3267.0	23.600 – 24.000
12.29000 – 12.29300	167.72000 – 173.20000	3332.0 – 3339.0	31.200 – 31.800
12.51975 – 12.52025	240.00000 – 285.00000	3345.8 – 3358.0	36.430 – 36.500
12.57675 – 12.57725	322.00000 – 335.40000	3600.0 – 4400.0	Above 38.6
13.36000 – 13.41000			

** : Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz

10.1. Labeling Requirement

The device shall bear the following statement in a conspicuous location on the device:

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

11. RF Exposure

FCC Rules and Regulations Part 1.1307, 1.1310, 2.1091, 2.1093:

RF Exposure Compliance

11.1. Limit For Maximum Permissible Exposure (MPE)

(A) Limits for Occupational / Controlled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/ cm ²)	Averaging Time E ² , H ² or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	(900/f)*	6
30-300	61.4	0.163	1.0	6
300-1500			F/300	6
1500-100,000			5	6

(B) Limits for General Population / Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm ²)	Averaging Time E ² , H ² or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f)*	30
30-300	27.5	0.073	0.2	30
300-1500			F/1500	30
1500-100,000			1.0	30

F=frequency in MHz

*Plane-wave equivalent power density

11.2. MPE Calculations

$$E \text{ (V/m)} = \frac{\sqrt{30 \cdot P \cdot G}}{d} \quad \text{Power Density: } Pd \text{ (mW/cm}^2\text{)} = \frac{E^2}{3770}$$

E = Electric field (V/m)

P = Peak output power (W)

G = Antenna numeric gain (numeric)

d = Separation distance (m)

Because the EUT is belong to General Population/ Uncontrolled Exposure. So the Limit of Power Density is 10 W/m². We can change the formula to:

$$d = \sqrt{\frac{30 \cdot P \cdot G}{3770}}$$

11.3. FCC Radiation Exposure Statement

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. In order to avoid the possibility of exceeding the FCC radio frequency exposure limits, human proximity to the antenna shall not be less than 20cm (8 inches) during normal operation. Proposed RF exposure safety information to include in User's Manual.