

# EMC TEST REPORT

**Report No. : EME-050128**

**Model No. : WR254**

**Issued Date : May 2, 2005**

**Applicant : AboCom Systems, Inc.**  
**1F, No. 21, Yanfa 2<sup>nd</sup> Rd., SBIP, HsinChu City 300,**  
**Taiwan**

**Test By : Intertek Testing Services Taiwan Ltd.**  
**No. 11, Lane 275, Ko-Nan 1 Street, Chia-Tung Li,**  
**Shiang-Shan District, Hsinchu City, Taiwan**


This test report consists of 50 pages in total. It may be duplicated completely for legal use with the allowance of the applicant. It shall not be reproduced except in full, without the written approval of Intertek Laboratory. The test result(s) in this report only applies to the tested sample(s).

Project Engineer



Jackey Chiu

Reviewed By



Jerry Liu

## Table of Contents

Summary of Tests.....	4
1. General information .....	5
1.1 Identification of the EUT .....	5
1.2 Additional information about the EUT .....	5
1.3 Antenna description .....	6
1.4 Peripherals equipment.....	6
2. Test specifications .....	7
2.1 Test standard.....	7
2.2 Operation mode .....	7
2.3 Test equipment.....	8
3. Minimum 6dB Bandwidth test.....	9
3.1 Operating environment .....	9
3.2 Test setup & procedure .....	9
3.3 Measured data of Minimum 6dB Bandwidth test results .....	9
4. Maximum Output Power test.....	16
4.1 Operating environment .....	16
4.2 Test setup & procedure .....	16
4.3 Measured data of Maximum Output Power test results.....	16
5. Radiated Emission test.....	17
5.1 Operating environment .....	17
5.2 Test setup & procedure .....	17
5.3 Emission limits.....	18
5.4 Radiated spurious emission test data.....	19
5.4.1 Measurement results: frequencies equal to or less than 1 GHz.....	19
5.4.2 Measurement results: frequency above 1GHz .....	21
6. Power Spectrum Density test .....	27
6.1 Operating environment .....	27
6.2 Test setup & procedure .....	27
6.3 Measured data of Power Spectrum Density test results.....	27
7. Emission on the band edge §FCC 15.247(C).....	34
7.1 Band-edge (Conducted method).....	35
7.2 Band-edge (Radiated method).....	39

8. Power Line Conducted Emission test §FCC 15.207 .....47

    8.1 Operating environment .....47

    8.2 Test setup & procedure .....47

    8.3 Emission limit .....48

    8.4 Uncertainty of Conducted Emission.....48

    8.5 Power Line Conducted Emission test data.....49

**Summary of Tests****Wireless Router-Model: WR254  
FCC ID: MQ4WR254**

Test	Reference	Results
Minimum 6dB Bandwidth test	15.247(a)(2)	Complies
Maximum Output Power test	15.247(b)	Complies
Radiated Spurious Emission test	15.205, 15.209	Complies
Power Spectrum Density test	15.247(d)	Complies
Power Line Conducted Emission test	15.207	Complies

## 1. General information

### 1.1 Identification of the EUT

Applicant	: AboCom Systems, Inc.
Product	: Wireless Router
Model No.	: WR254
FCC ID.	: MQ4WR254
Frequency Range	: 2400 MHz to 2483.5MHz
Channel Number	: 11 Channels
Frequency of Each Channel	: 2412MHz, 2417MHz, 2422MHz, 2427MHz, 2432MHz, 2437MHz, 2442MHz, 2447MHz, 2452MHz, 2457MHz, 2462MHz
Type of Modulation	: DSSS, OFDM
Rated Power	: 120Vac, 60Hz with adapter (MW48-1200800)
Power Cord	: N/A
Sample Received	: Feb. 14, 2005
Test Date(s)	: Feb. 14, 2005 ~ Feb. 23, 2005

A FCC DoC report has been generated for the client.

### 1.2 Additional information about the EUT

The EUT is a Wireless Router, and was defined as information technology equipment.

The Wireless Router is a multi-function device providing the following services:

- **Shared Broadband Internet Access** for all LAN users.
- **4-Port Switching Hub** for 10BaseT or 100BaseT connections.
- **Wireless Access Point** for 802.11b and 802.11g Wireless Stations.

For more detail features, please refer to User's manual as file name "Installation guide.pdf"

**1.3 Antenna description**

The antenna is affixed to the EUT using a unique connector, which allows for replacement of a broken antenna, but DOES NOT use a standard antenna jack or electrical connector.

Antenna Gain: 2dBi max

Antenna Type: Dipole antenna

Connector Type: Reverse

**1.4 Peripherals equipment**

Peripherals	Manufacturer	Product No.	Serial No.	FCC ID
Notebook PC 1	IBM	R51	99XML12	FCC DoC Approved
Notebook PC 2	DELL	PP05L	CN-0G5152-48643-498-6810	FCC DoC Approved

Dummy Load: 100Ω

## **2. Test specifications**

### **2.1 Test standard**

The EUT was performed according to the procedures in FCC Part 15 Subpart C Section § 15.205 、 §15.207 、 §15.209 、 §15.247 and ANSI C63.4/2003.

The test of radiated measurements according to FCC Part15 Section 15.33(a) had been conducted and the field strength of this frequency band were all meet limit requirement, thus we evaluate the EUT pass the specified test.

### **2.2 Operation mode**

The EUT was supplied with 120Vac, 60Hz with adapter and run the test program “nfjrom.exe” under windows OS, which provide by manufacturer.

During conducted emission test, the EUT was in normal operating mode communication with AP. While in other test, it worked in the status of continuously transmitting.

Verifying, the maximum output power; we found the maximum output power was occurred at 11Mbps data rate in 802.11b and at 54Mbps data rated in 802.11g. The final test was executed under this condition and recorded in this report individually.

**2.3 Test equipment**

Equipment	Brand	Frequency range	Model No.	Intertek ID No.	Next Cal. Date
EMI Test Receiver	Rohde & Schwarz	9kHz~2.75GHz	ESCS 30	EC303	04/13/2005
EMI Test Receiver	Rohde & Schwarz	20Hz~26.5GHz	ESMI	EC317	07/14/2005
Spectrum Analyzer	Rohde & Schwarz	9kHz~30GHz	FSP 30	EC353	07/13/2005
Spectrum Analyzer	Rohde & Schwarz	20Hz~40GHz	FSEK 30	EC365	10/18/2005
Horn Antenna	EMCO	1GHz~18GHz	3115	EC338	08/16/2005
Horn Antenna	SCHWARZBECK	14GHz~40GHz	BBHA 9170	EC351	07/08/2005
Bilog Antenna	SCHWARZBECK	25MHz~1.7GHz	VULB 9160	EC368	05/20/2005
Pre-Amplifier	MITEQ	100MHz~26.5GHz	919981	EC373	4/13/2005
Pre-Amplifier	MITEQ	26GHz~40GHz	828825	EC374	1/27/2006
Wideband Peak Power Meter/ Sensor	Anritsu	100MHz~18GHz	ML2497A/ MA2491A	EC396	10/18/2005
Controller	HDGmbH	N/A	HD 100	EP317-1	N/A
Antenna Tower	HDGmbH	N/A	MA 240	EP317-2	N/A
Turn Table	HDGmbH	N/A	DS 420S	EP317-3	N/A
LISN	Rohde & Schwarz	9KHz~30MHz	ESH3-Z5	EC344	01/13/2006

Note: The above equipments are within the valid calibration period.



### 3. Minimum 6dB Bandwidth test

#### 3.1 Operating environment

Temperature: 23 °C  
 Relative Humidity: 55 %  
 Atmospheric Pressure: 1023 hPa

#### 3.2 Test setup & procedure

The minimum 6dB bandwidth per FCC §15.247(a)(2) was measured using a 50 ohm spectrum analyzer with the resolutions bandwidth set at 100kHz, the video bandwidth set at 300kHz, and the SPAN>>RBW. The test was performed at 3 channels (lowest, middle and highest channel). The minimum 6-dB modulation bandwidth is in the following Table.

#### 3.3 Measured data of Minimum 6dB Bandwidth test results

##### Test Mode: 802.11b operating mode (DSSS Modulation)

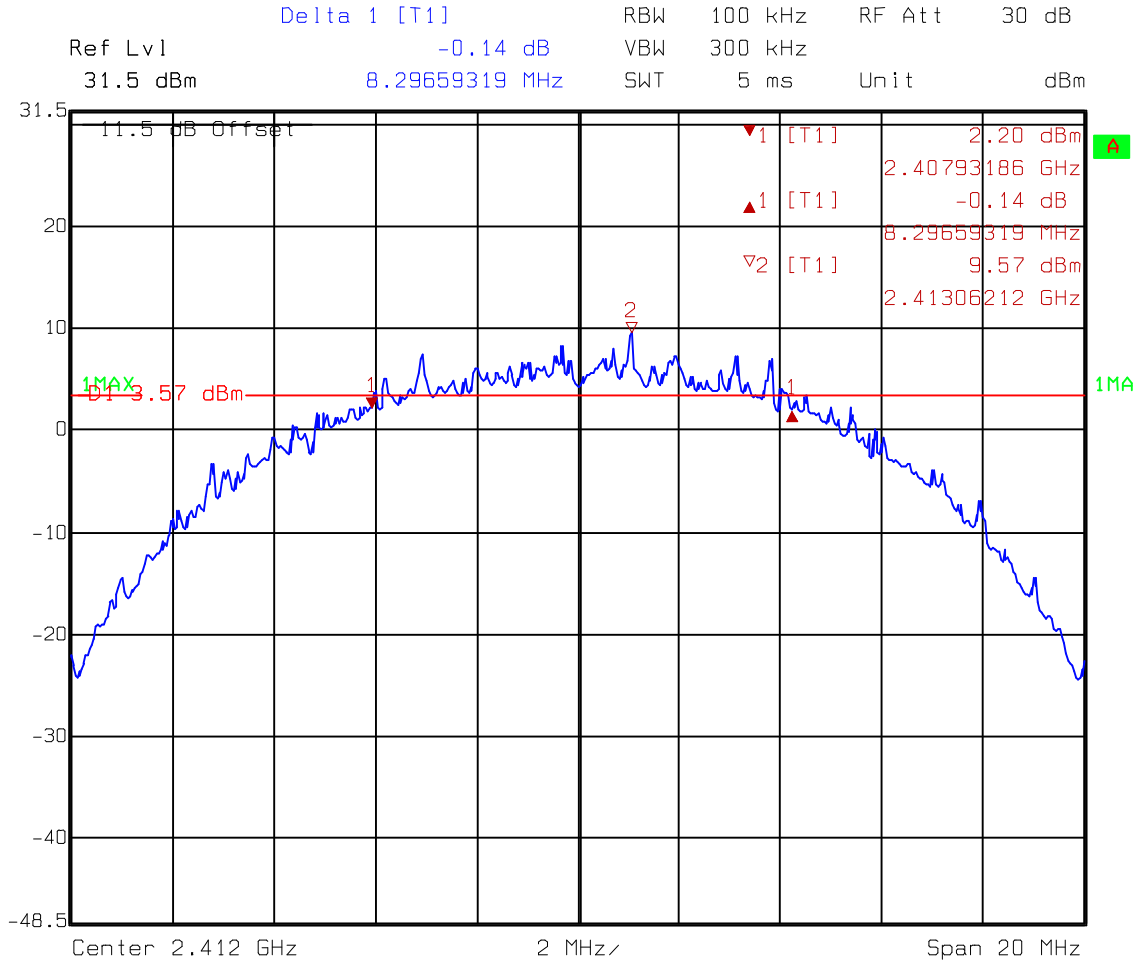
Channel	Frequency (MHz)	Bandwidth (MHz)	Limit
1	2412	8.29659	> 500kHz
6	2437	8.61723	> 500kHz
11	2462	8.25651	> 500kHz

##### Test Mode: 802.11g operating mode (OFDM Modulation)

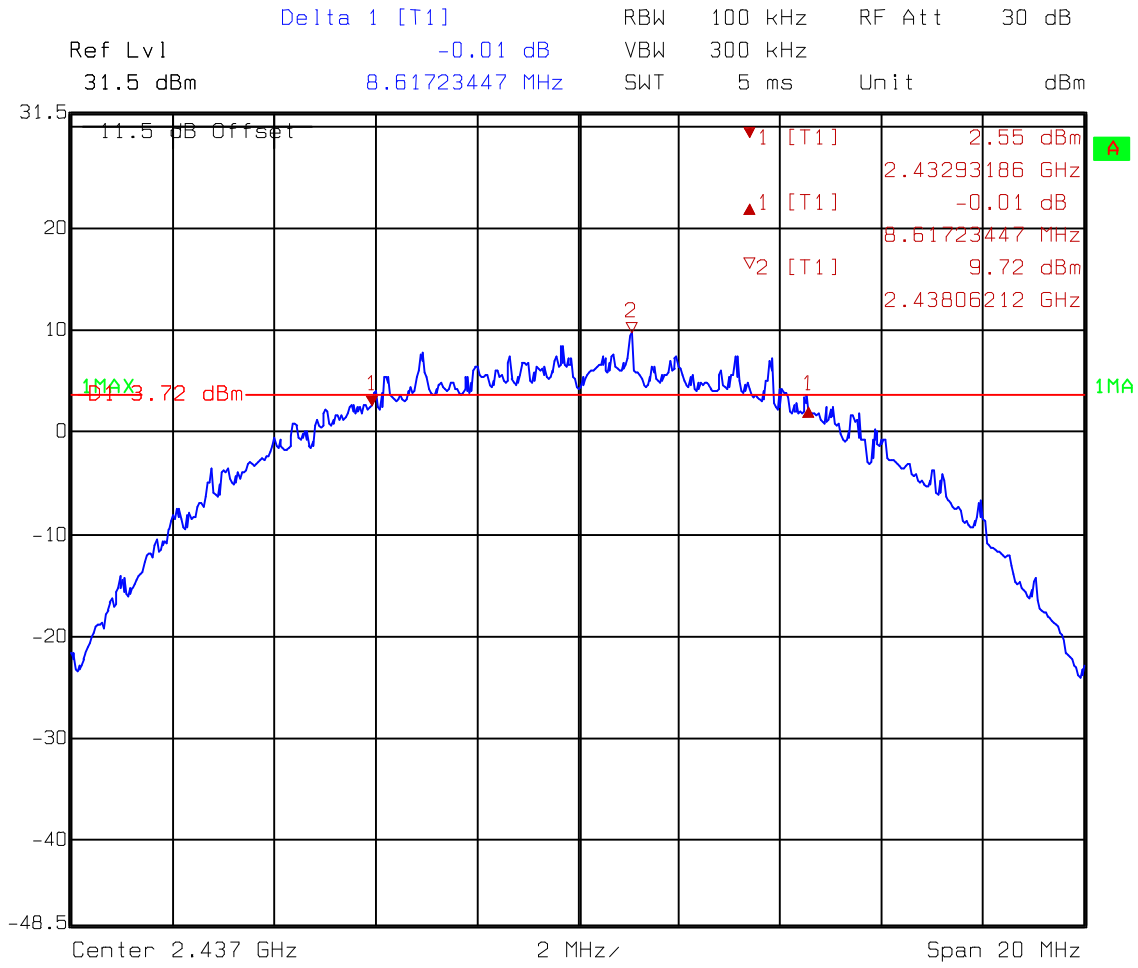
Channel	Frequency (MHz)	Bandwidth (MHz)	Limit
1	2412	16.03206	> 500kHz
6	2437	16.07214	> 500kHz
11	2462	15.99198	> 500kHz

Please see the plot below.

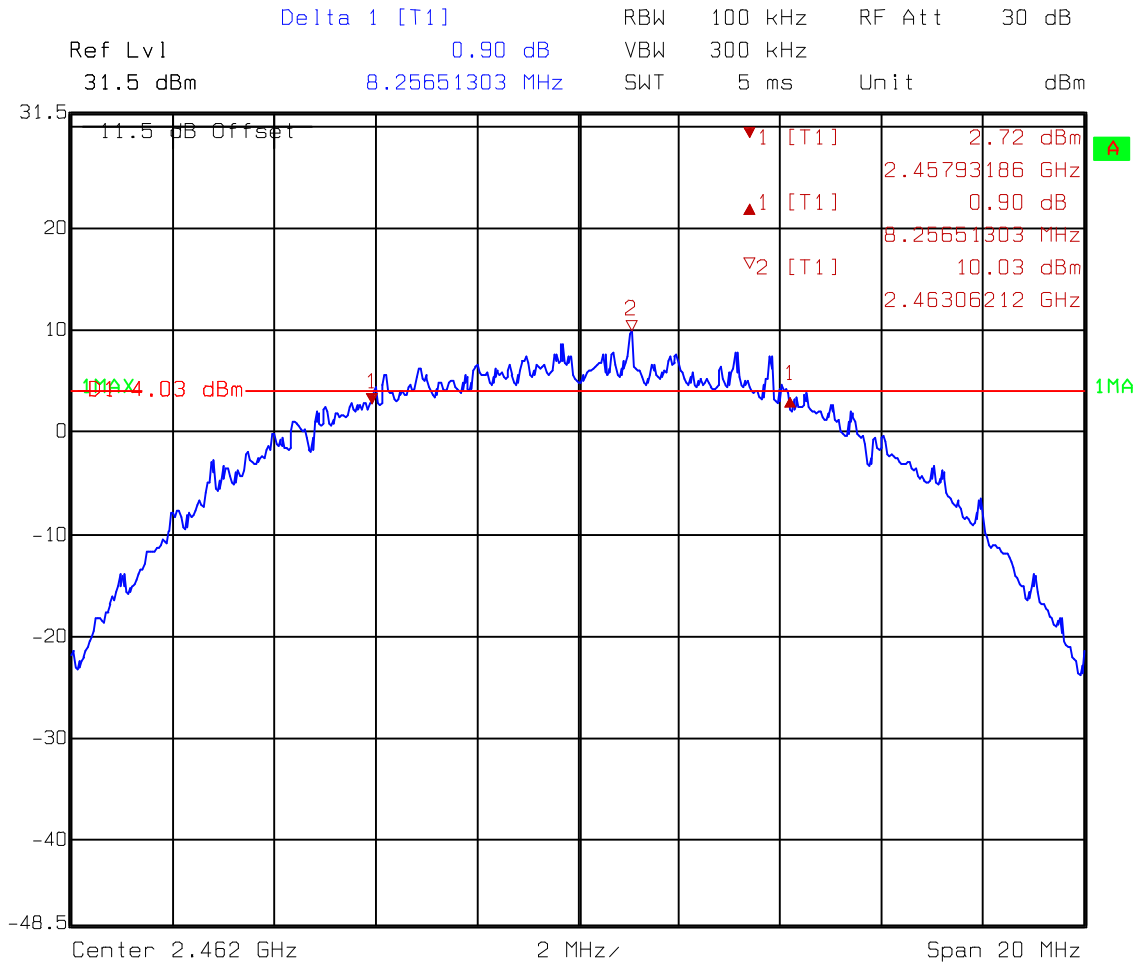
**Test Mode: 802.11b operating mode (DSSS Modulation)**



Comment A: 6dB bandwidth at channel 1 (EC365) 802.11b  
 Date: 15.FEB.2005 17:17:19

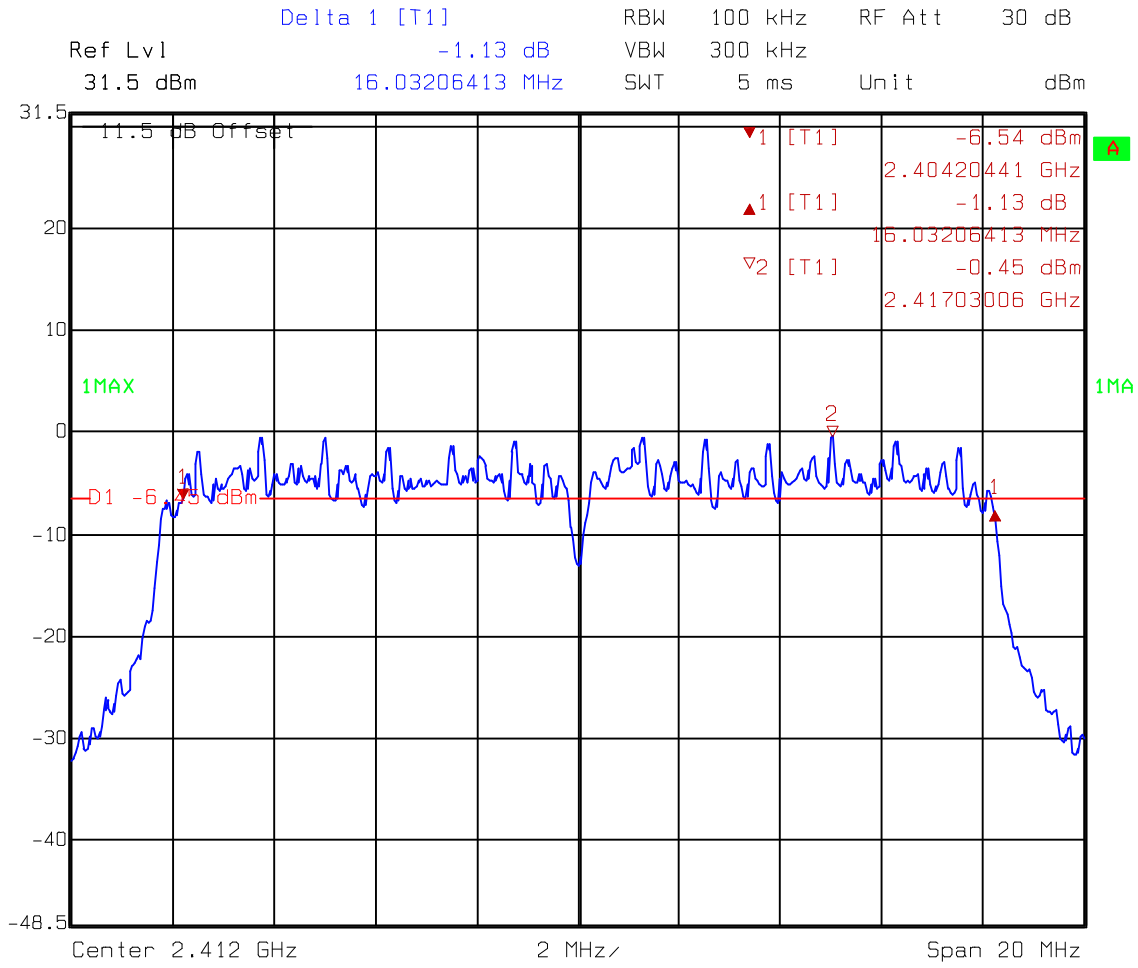


Comment A: 6dB bandwidth at channel 6 (EC365) 802.11b  
 Date: 15.FEB.2005 17:14:42

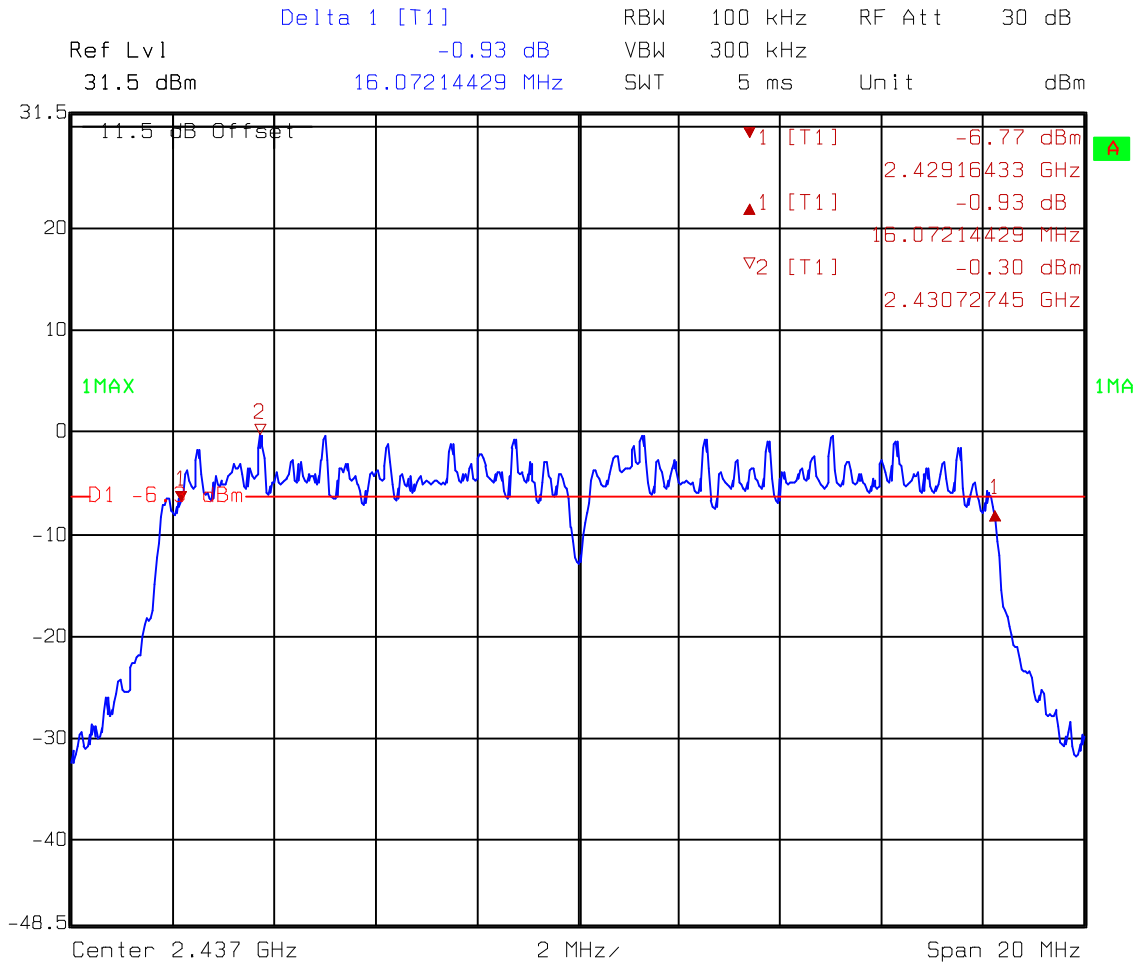


Comment A: 6dB bandwidth at channel 11 (EC365) 802.11b  
 Date: 15.FEB.2005 17:16:03

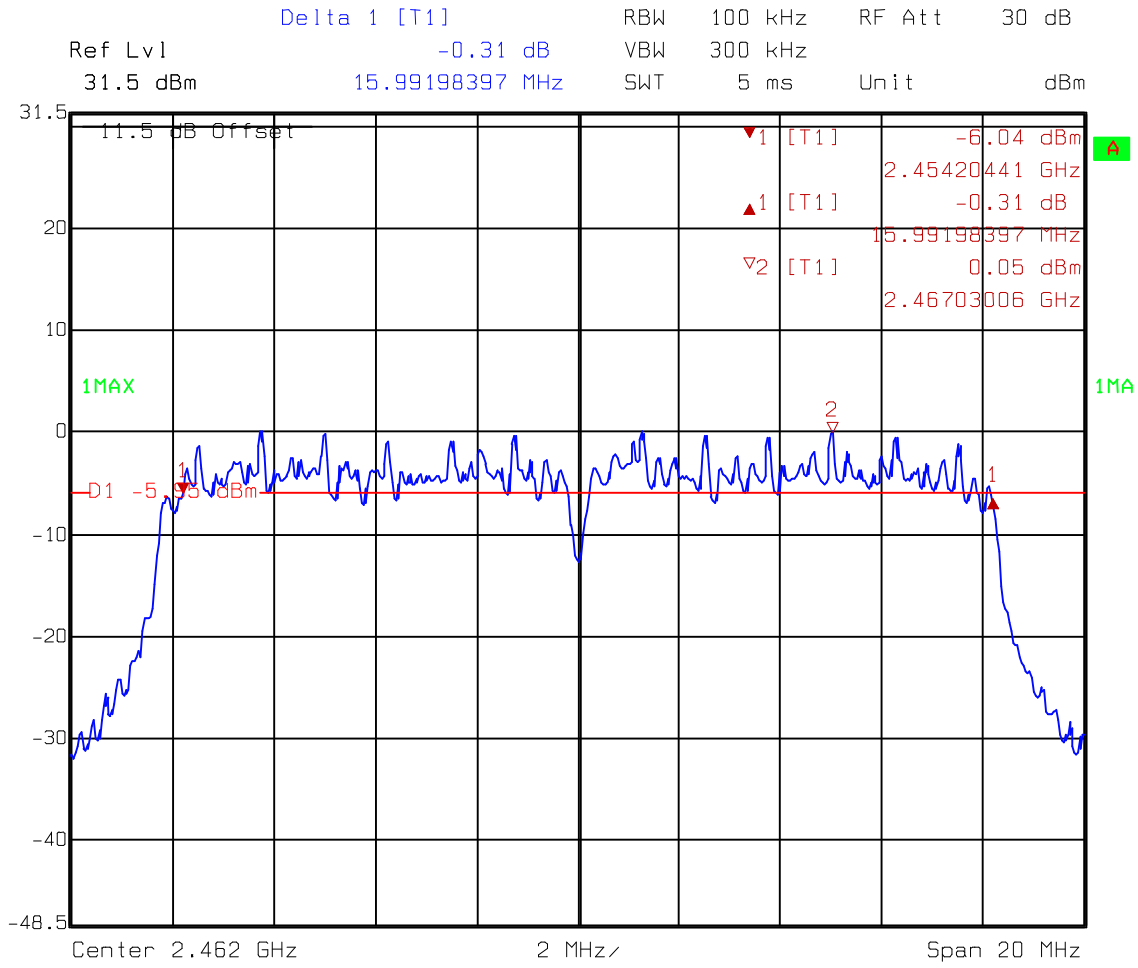
**Test Mode: 802.11g operating mode (OFDM Modulation)**



Comment A: 6dB bandwidth at channel 1 (EC365) 802.11g  
 Date: 15.FEB.2005 17:03:43



Comment A: 6dB bandwidth at channel 6 (EC365) 802.11g  
 Date: 15.FEB.2005 17:06:30



Comment A: 6dB bandwidth at channel 11 (EC365) 802.11g  
 Date: 15.FEB.2005 17:08:35

**4. Maximum Output Power test**

**4.1 Operating environment**

Temperature: 23 °C  
 Relative Humidity: 55 %  
 Atmospheric Pressure: 1023 hPa

**4.2 Test setup & procedure**

The power output per FCC §15.247(b) was measured on the EUT using a 50 ohm SMA cable connected to peak power meter via power sensor. Power was read directly and cable loss correction (1.5 dB) was added to the reading to obtain power at the EUT antenna terminals. The test was performed at 3 channels (lowest, middle and highest channel).

**4.3 Measured data of Maximum Output Power test results**

**Test Mode: 802.11b operating mode (DSSS Modulation)**

Channel	Freq. (MHz)	C.L. (dB)	Reading (dBm)	Conducted Peak Output Power		Limit (W)
				(dBm)	(mW)	
1	2412	1.5	16.48	17.98	62.81	1
6	2437	1.5	16.72	18.22	66.37	1
11	2462	1.5	16.56	18.06	63.97	1

Remark:

Conducted Peak Output Power = Reading + C.L.

**Test Mode: 802.11g operating mode (OFDM Modulation)**

Channel	Freq. (MHz)	C.L. (dB)	Reading (dBm)	Conducted Peak Output Power		Limit (W)
				(dBm)	(mW)	
1	2412	1.5	19.83	21.33	135.83	1
6	2437	1.5	19.87	21.37	137.09	1
11	2462	1.5	19.92	21.42	138.68	1

Remark:

Conducted Peak Output Power = Reading + C.L.



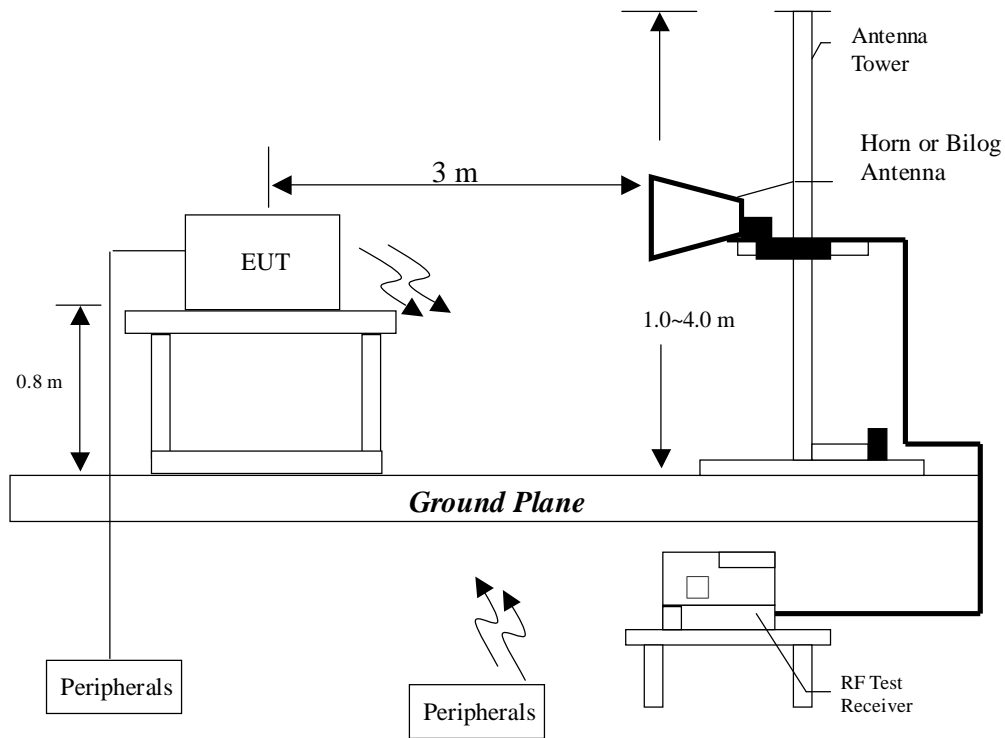
**5. Radiated Emission test**

**5.1 Operating environment**

Temperature: 25 °C  
 Relative Humidity: 55 %  
 Atmospheric Pressure: 1023 hPa

**5.2 Test setup & procedure**

The Diagram below shows the test setup, which is utilized to make these measurements.



Radiated emissions were investigated cover the frequency range from 30MHz to 1000MHz using a receiver RBW of 120kHz record QP reading, and the frequency over 1GHz using a spectrum analyzer RBW of 1MHz and 10Hz VBW record Average reading. (15.209 paragraph), the Peak reading (1MHz RBW/VBW) recorded also on the report.

The EUT for testing is arranged on a wooden turntable. If some peripherals apply to the EUT, the peripherals will be connected to EUT and the whole system. During the test, all cables were arranged to produce worst-case emissions. The signal is maximized through rotation. The height of antenna and polarization is changing constantly for exploring for maximum signal level. The height of antenna can be up to 4 meters and down to 1 meter.

The measurement for radiated emission will be done at the distance of three meters unless the signal level is too low to measure at that distance. In the case of the reading under noise floor, a pre-amplifier is used and/or the test is conducted at a closer distance. And then all readings are extrapolated back to the equivalent three-meter reading using inverse scaling with distance.

The EUT configuration please refer to the “Spurious set-up photo.pdf”.

### 5.3 Emission limits

The spurious Emission shall test through the 10th harmonic. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a).

Frequency (MHz)	Limits (dB $\mu$ V/m@3m)
30-88	40
88-216	43.5
216-960	46
Above 960	54

Remark:

1. In the above table, the tighter limit applies at the band edges.
2. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system

Uncertainty was calculated in accordance with NAMAS NIS 81.

Expanded uncertainty (k=2) of radiated emission measurement is 4.98 dB.

**5.4 Radiated spurious emission test data**

The radiated spurious emissions at

Frequency(MHz)	Margin
39.700	-1.80
39.700	-2.10

are less than uncertainty. This is within the stated measurement uncertainty, this may affect compliance determined in other test arrangements.

**5.4.1 Measurement results: frequencies equal to or less than 1 GHz**

The test was performed on EUT under 802.11b continuously transmitting mode. Channel 1, 6, 11 were verified. The worst case occurred at 802.11b Tx channel 1.

EUT : WR254  
 Worst Case Condition : 802.11b Tx at channel 1

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV)	Limit @ 3 m (dBuV)	Margin (dB)	Antenna high (cm)	Turn Table angle (degree)
39.700	QP	V	12.74	25.46	38.20	40.00	-1.80	101.00	117.00
57.230	QP	V	12.97	20.93	33.90	40.00	-6.10	159.00	222.00
103.700	QP	V	10.97	22.83	33.80	43.50	-9.70	126.00	109.00
115.100	QP	V	12.01	17.87	29.88	43.50	-13.62	130.00	262.00
171.630	QP	V	14.24	17.01	31.25	43.50	-12.25	169.00	351.00
575.160	QP	V	20.18	10.72	30.90	46.00	-15.10	185.00	210.00
103.720	QP	H	10.97	25.13	36.10	43.50	-7.40	385.00	103.00
171.630	QP	H	14.24	16.86	31.10	43.50	-12.40	320.00	163.00
198.800	QP	H	13.01	18.59	31.60	43.50	-11.90	219.00	187.00
264.700	QP	H	12.99	18.21	31.20	46.00	-14.80	184.00	99.00
460.780	QP	H	17.89	16.91	34.80	46.00	-11.20	200.00	259.00
575.100	QP	H	20.18	16.02	36.20	46.00	-9.80	193.00	117.00

Remark:

1. Corrected Level = Reading Level + Correction Factor
2. Correction Factor = Antenna Factor + Cable Loss

The test was performed on EUT under 802.11g continuously transmitting mode. Channel 1, 6, 11 were verified. The worst case occurred at 802.11g Tx channel 1.

EUT : WR254  
 Worst Case Condition : 802.11g Tx at channel 1

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV)	Limit @ 3 m (dBuV)	Margin (dB)	Antenna high (cm)	Turn Table angle (degree)
39.700	QP	V	12.74	25.16	37.90	40.00	-2.10	105.00	222.00
57.320	QP	V	12.97	20.43	33.40	40.00	-6.60	119.00	234.00
103.720	QP	V	10.97	22.73	33.70	43.50	-9.80	126.00	88.00
171.690	QP	V	14.24	16.76	31.00	43.50	-12.50	125.00	203.00
200.710	QP	V	12.91	16.29	29.20	43.50	-14.30	157.00	35.00
575.100	QP	V	20.18	10.92	31.10	46.00	-14.90	200.00	285.00
103.720	QP	H	10.97	24.43	35.40	43.50	-8.10	333.00	62.00
200.750	QP	H	12.91	18.79	31.70	43.50	-11.80	400.00	106.00
264.700	QP	H	12.99	19.21	32.20	46.00	-13.80	326.00	52.00
379.630	QP	H	15.92	16.58	32.50	46.00	-13.50	265.00	109.00
460.780	QP	H	17.89	16.41	34.30	46.00	-11.70	251.00	119.00
575.100	QP	H	20.18	17.88	38.06	46.00	-7.94	177.00	162.00

Remark:

1. Corrected Level = Reading Level + Correction Factor
2. Correction Factor = Antenna Factor + Cable Loss

**5.4.2 Measurement results: frequency above 1GHz**

EUT : WR254  
 Test Condition : 802.11b Tx at channel 1

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV)	Limit @ 3 m (dBuV)	Margin (dB)	Antenna high (cm)	Turn Table angle (degree)
7236.000	PK	V	34.17	39.97	45.81	51.61	74.00	-22.39	188.00	334.00
7236.000	AV	V	34.17	39.97	33.97	39.77	54.00	-14.23	188.00	334.00
9648.000	PK	V	35.75	43.38	50.56	58.19	74.00	-15.81	154.00	26.00
9648.000	AV	V	35.75	43.38	44.70	52.33	54.00	-1.67	154.00	26.00

**Remark:**

1. Corrected Level = Reading + Correction Factor – Preamp
2. Correction Factor = Antenna Factor + Cable Loss
3. The frequency measured ranges from 1GHz to 25GHz. The data value listed above which is higher than the noise floor, the others please refer to noise floor level.

Noise floor level is :

For PK:

- 1GHz-3GHz: 20dBuV
- 3GHz-14GHz: 27dBuV
- 14GHz-26.5GHz: 39dBuV

For AV:

- 1GHz-3GHz: 10dBuV
- 3GHz-14GHz: 16dBuV
- 14GHz-26.5GHz: 28dBuV

EUT : WR254

Test Condition : 802.11b Tx at channel 6

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV)	Limit @ 3 m (dBuV)	Margin (dB)	Antenna high (cm)	Turn Table angle (degree)
7312.000	PK	V	34.17	39.97	53.25	59.05	74.00	-14.95	219.00	29.00
7312.000	AV	V	34.17	39.97	47.31	53.11	54.00	-0.89	219.00	29.00
9748.000	PK	V	35.75	43.38	52.44	60.07	74.00	-13.93	142.00	358.00
9748.000	AV	V	35.75	43.38	45.75	53.38	54.00	-0.62	142.00	358.00
7312.000	PK	H	34.17	39.97	44.69	50.49	74.00	-23.51	164.00	304.00
7312.000	AV	H	34.17	39.97	32.40	38.20	54.00	-15.80	164.00	304.00

**Remark:**

1. Corrected Level = Reading Level + Correction Factor – Preamp
2. Correction Factor = Antenna Factor + Cable Loss
3. The frequency measured ranges from 1GHz to 25GHz. The data value listed above which is higher than the noise floor, the others please refer to noise floor level.

Noise floor level is:

For PK:

- 1GHz-3GHz: 20dBuV
- 3GHz-14GHz: 27dBuV
- 14GHz-26.5GHz: 39dBuV

For AV:

- 1GHz-3GHz: 10dBuV
- 3GHz-14GHz: 16dBuV
- 14GHz-26.5GHz: 28dBuV

EUT : WR254

Test Condition : 802.11b Tx at channel 11

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV)	Limit @ 3 m (dBuV)	Margin (dB)	Antenna high (cm)	Turn Table angle (degree)
7387.000	PK	V	34.17	39.97	50.58	56.38	74.00	-17.62	197.00	80.00
7387.000	AV	V	34.17	39.97	40.04	45.84	54.00	-8.16	197.00	80.00
9848.000	PK	V	35.75	43.38	50.51	58.14	74.00	-15.86	143.00	301.00
9848.000	AV	V	35.75	43.38	43.83	51.46	54.00	-2.54	143.00	301.00

**Remark:**

1. Corrected Level = Reading Level + Correction Factor – Preamp
2. Correction Factor = Antenna Factor + Cable Loss
3. The frequency measured ranges from 1GHz to 25GHz. The data value listed above which is higher than the noise floor, the others please refer to noise floor level.

Noise floor level is:

For PK:

- 1GHz-3GHz: 20dBuV
- 3GHz-14GHz: 27dBuV
- 14GHz-26.5GHz: 39dBuV

For AV:

- 1GHz-3GHz: 10dBuV
- 3GHz-14GHz: 16dBuV
- 14GHz-26.5GHz: 28dBuV

EUT : WR254  
Test Condition : 802.11g Tx at channel 1

**Test Result:**

No spurious emission was found above the spectrum analyzer's noise floor.

The noise floor are listed as below:

Noise floor level

For PK:

1GHz-3GHz: 20dBuV

3GHz-14GHz: 27dBuV

14GHz-26.5GHz: 39dBuV

For AV:

1GHz-3GHz: 10dBuV

3GHz-14GHz: 16dBuV

14GHz-26.5GHz: 28dBuV



EUT : WR254

Test Condition : 802.11g Tx at channel 6

**Test Result:**

No spurious emission was found above the spectrum analyzer's noise floor.

The noise floor are listed as below:

Noise floor level

For PK:

1GHz-3GHz: 20dBuV

3GHz-14GHz: 27dBuV

14GHz-26.5GHz: 39dBuV

For AV:

1GHz-3GHz: 10dBuV

3GHz-14GHz: 16dBuV

14GHz-26.5GHz: 28dBuV

EUT : WR254

Test Condition : 802.11g Tx at channel 11

**Test Result:**

No spurious emission was found above the spectrum analyzer's noise floor.

The noise floor are listed as below:

Noise floor level

For PK:

1GHz-3GHz: 20dBuV

3GHz-14GHz: 27dBuV

14GHz-26.5GHz: 39dBuV

For AV:

1GHz-3GHz: 10dBuV

3GHz-14GHz: 16dBuV

14GHz-26.5GHz: 28dBuV

## 6. Power Spectrum Density test

### 6.1 Operating environment

Temperature: 23 °C  
 Relative Humidity: 55 %  
 Atmospheric Pressure 1023 hPa

### 6.2 Test setup & procedure

The power spectrum density per FCC §15.247(d) was measured from the antenna port of the EUT using a 50ohm spectrum analyzer with the resolution bandwidth set at 3kHz, the video bandwidth set at 10kHz, a span of 1.5 MHz, and the sweep time set at 500 seconds. Power Density was read directly correction was added to the reading to obtain power at the EUT antenna terminals. The test was performed at 3 channels (lowest, middle and highest channel). The Power Spectral Density measured result is in the following table.

### 6.3 Measured data of Power Spectrum Density test results

#### Test Mode: 802.11b operating (DSSS Modulation) mode

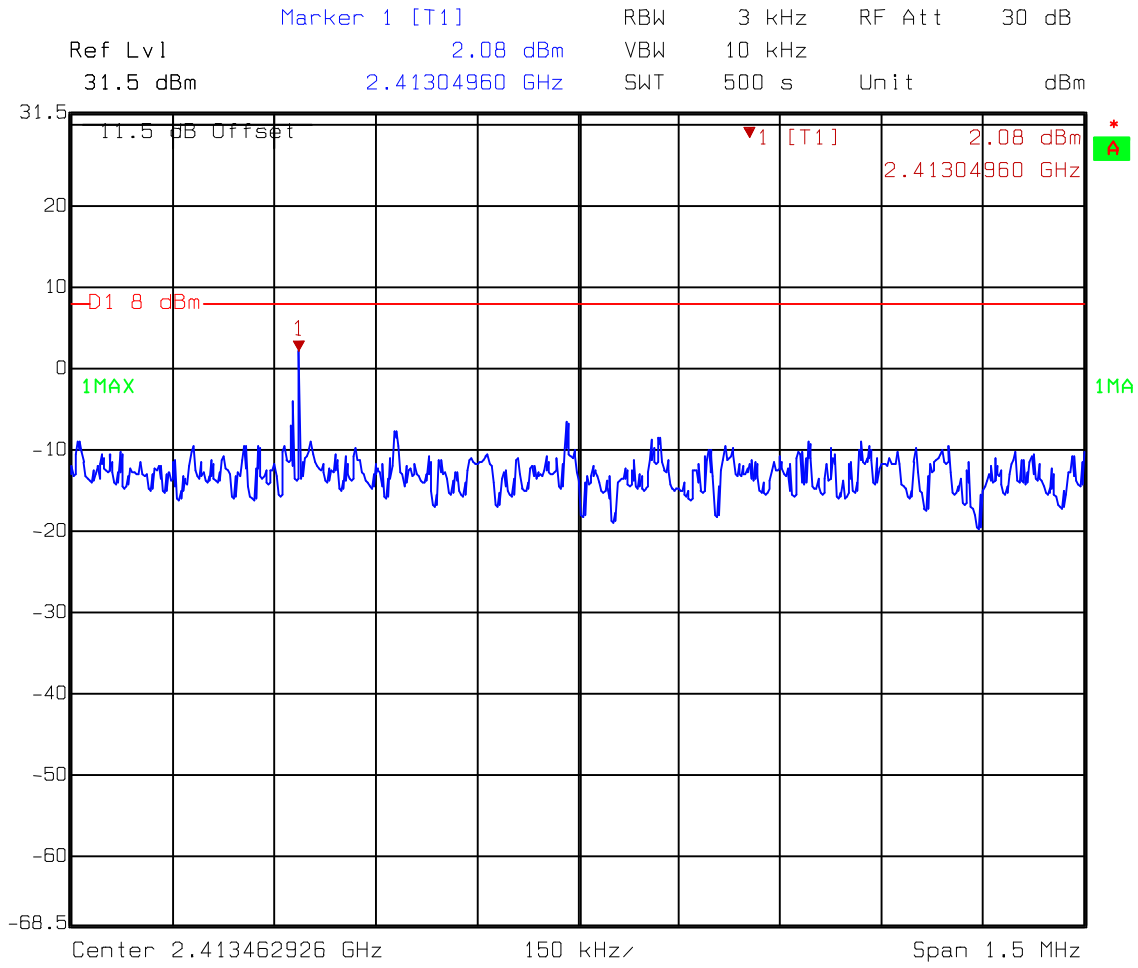
Channel	Frequency (MHz)	Measured level (dBm)	Limit (dBm)
1	2412	2.08	8
6	2437	-0.70	8
11	2462	6.18	8

#### Test Mode: 802.11g operating (OFDM Modulation) mode

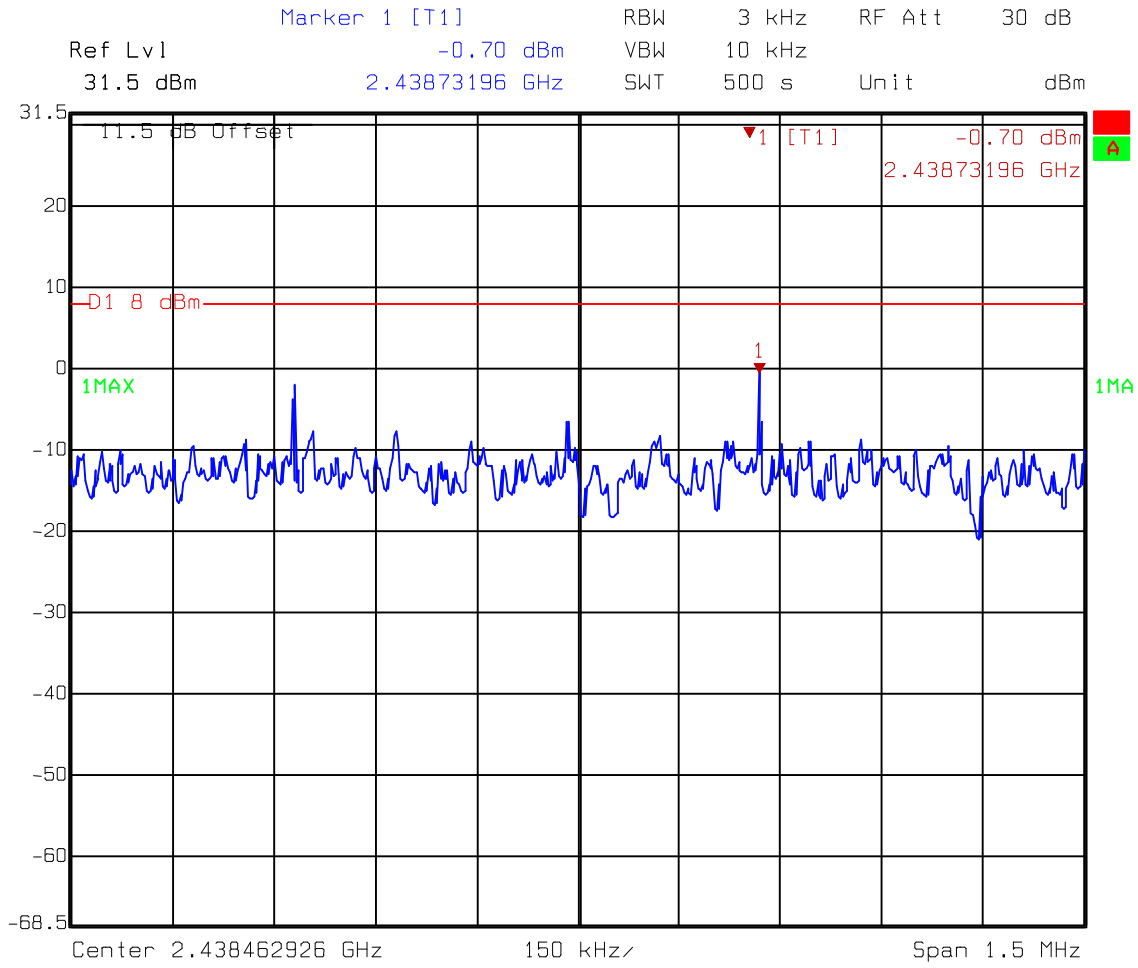
Channel	Frequency (MHz)	Measured level (dBm)	Limit (dBm)
1	2412	-14.71	8
6	2437	-13.87	8
11	2462	-13.61	8

Please see the plot below.

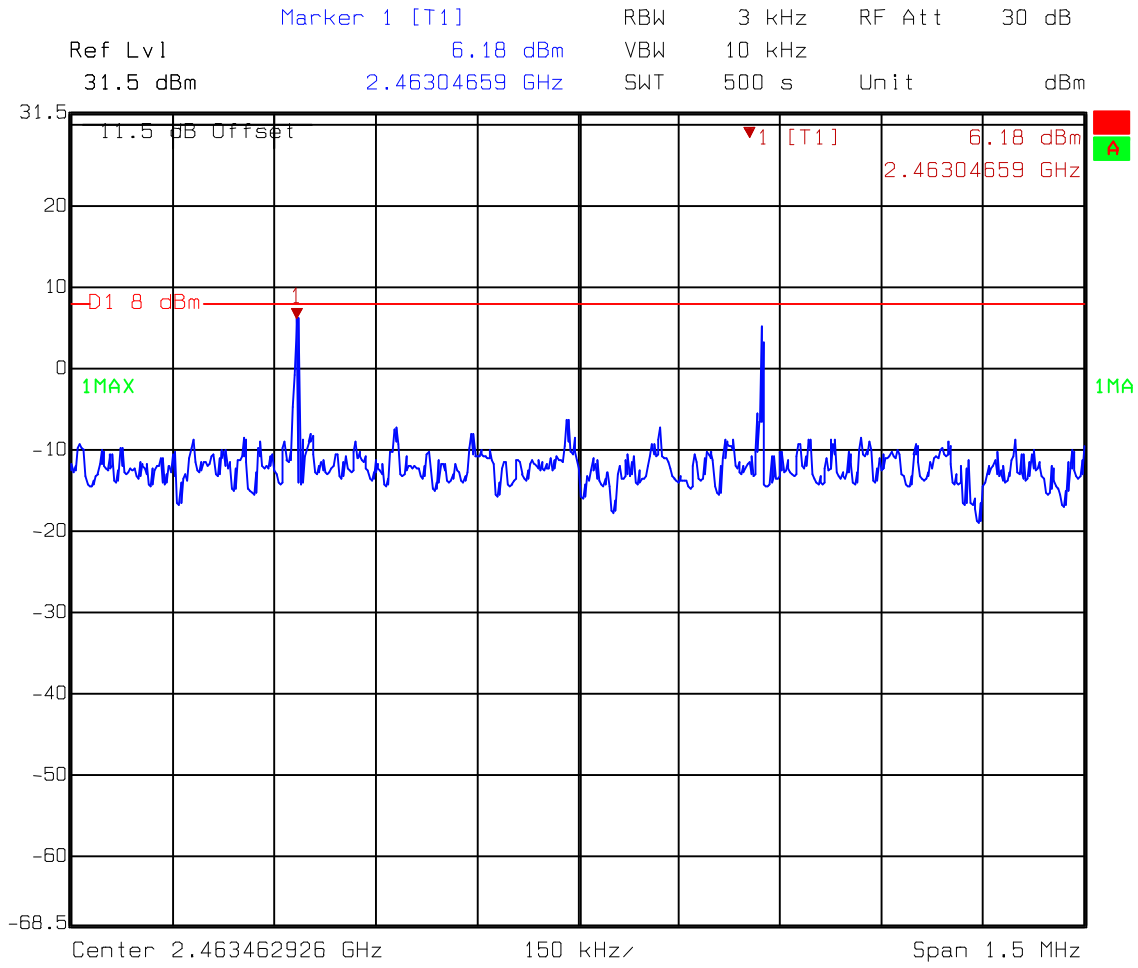
**Test Mode: 802.11b operating (DSSS Modulation) mode**



Comment A: Power spectrum density at channel 1 (EC365) 802.11b  
 Date: 15.FEB.2005 17:25:37

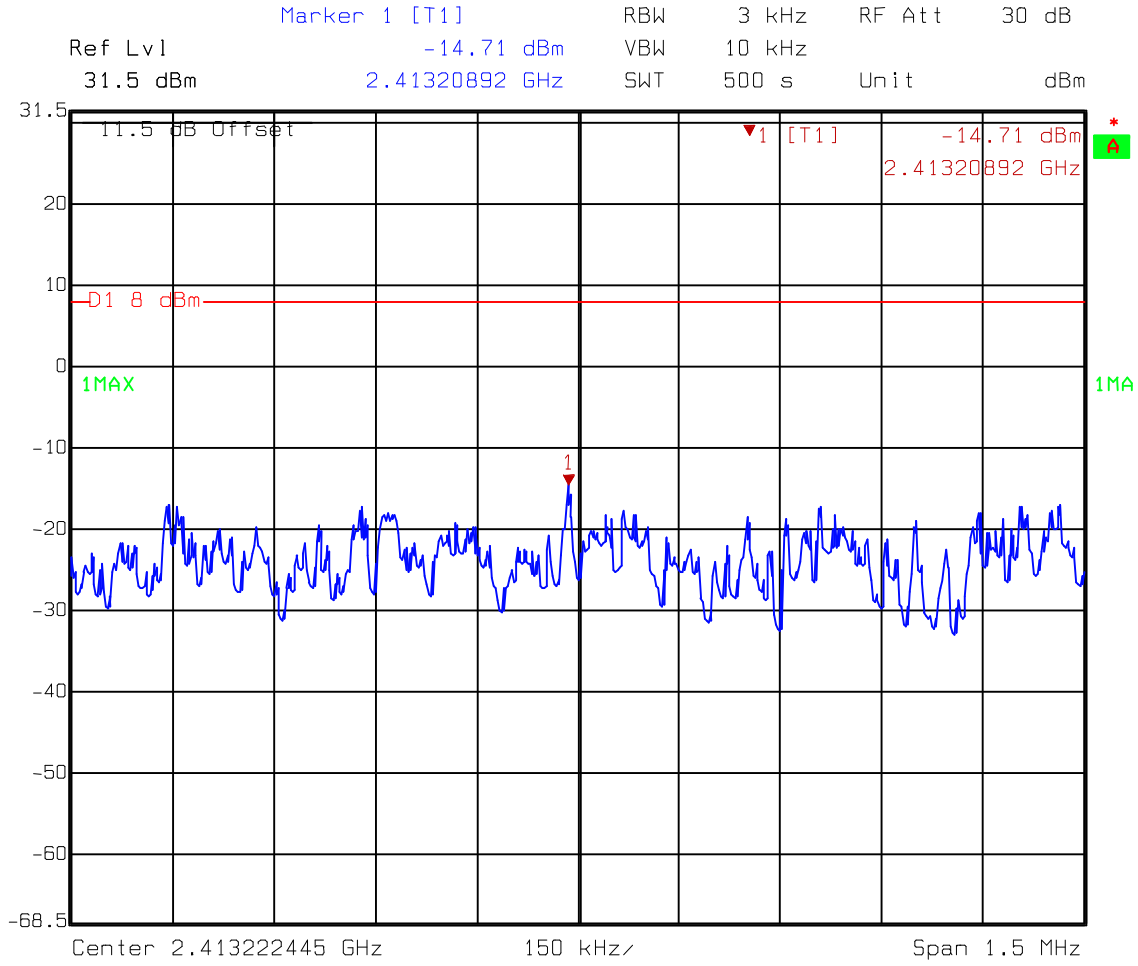


Comment A: Power spectrum density at channel 6 (EC365) 802.1b  
 Date: 15.FEB.2005 17:22:17

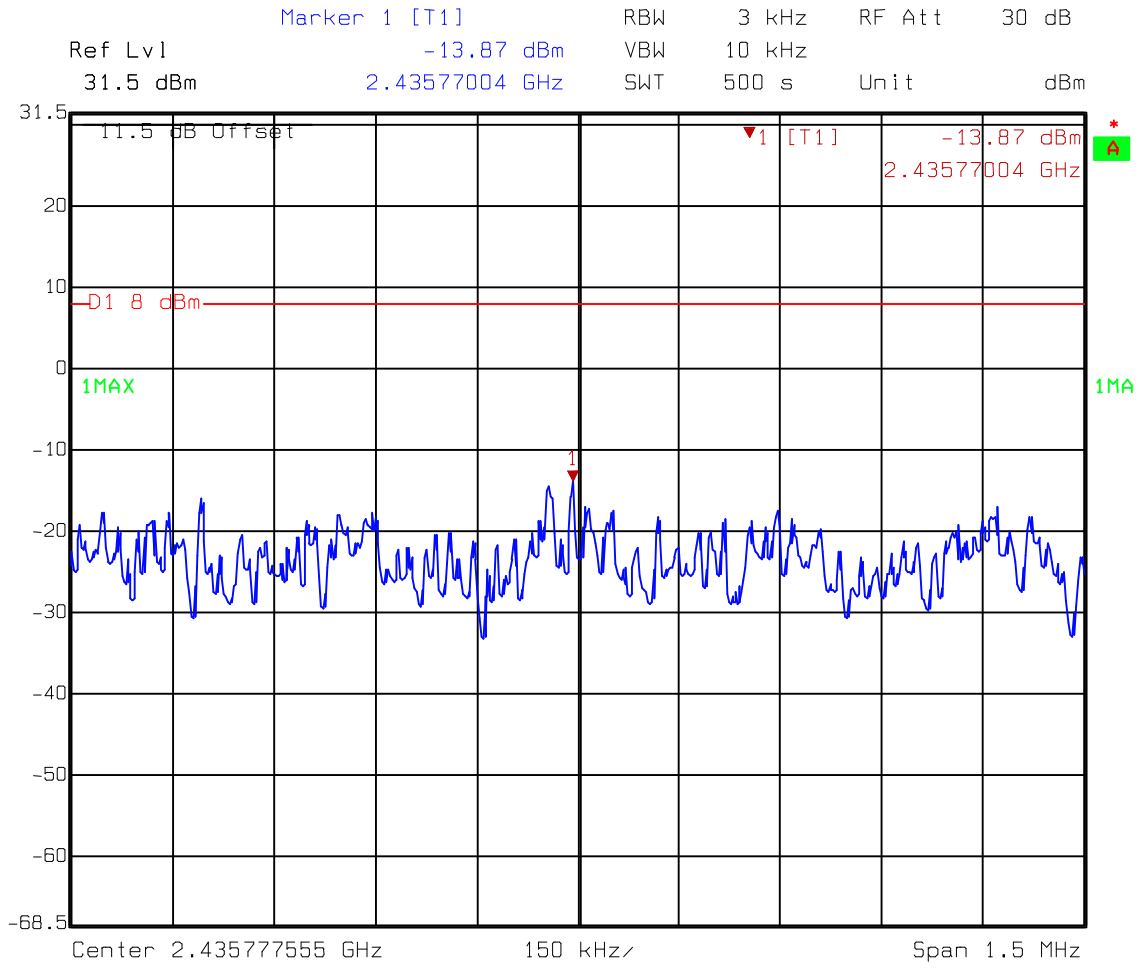


Comment A: Power spectrum density at channel 11 (EC365) 802.1b  
 Date: 15.FEB.2005 17:23:52

**Test Mode: 802.11g operating (OFDM Modulation) mode**

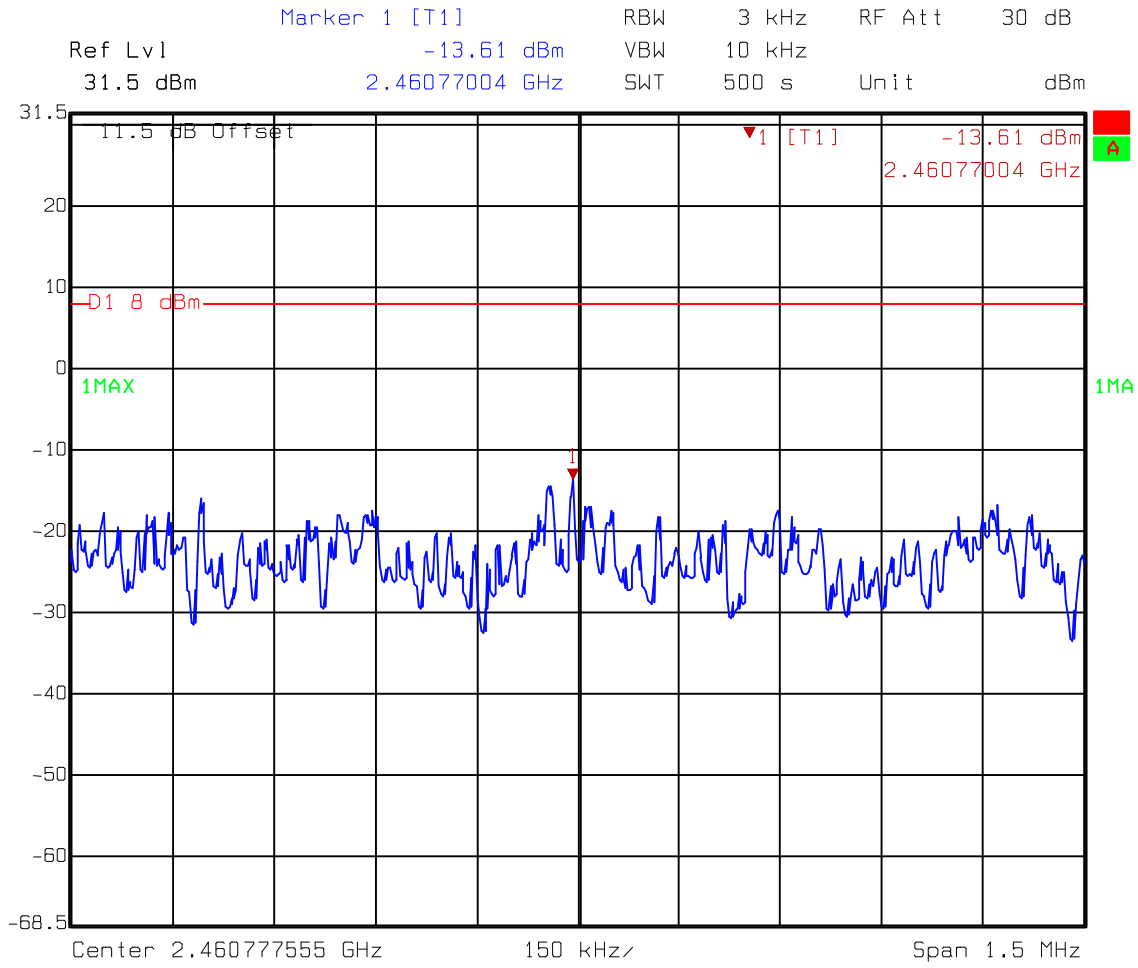


Comment A: Power spectrum density at channel 1 (EC365) 802.11g  
 Date: 15.FEB.2005 17:26:44



Comment A: Power spectrum density at channel 6 (EC365) 802.11g  
 Date: 15.FEB.2005 17:28:01





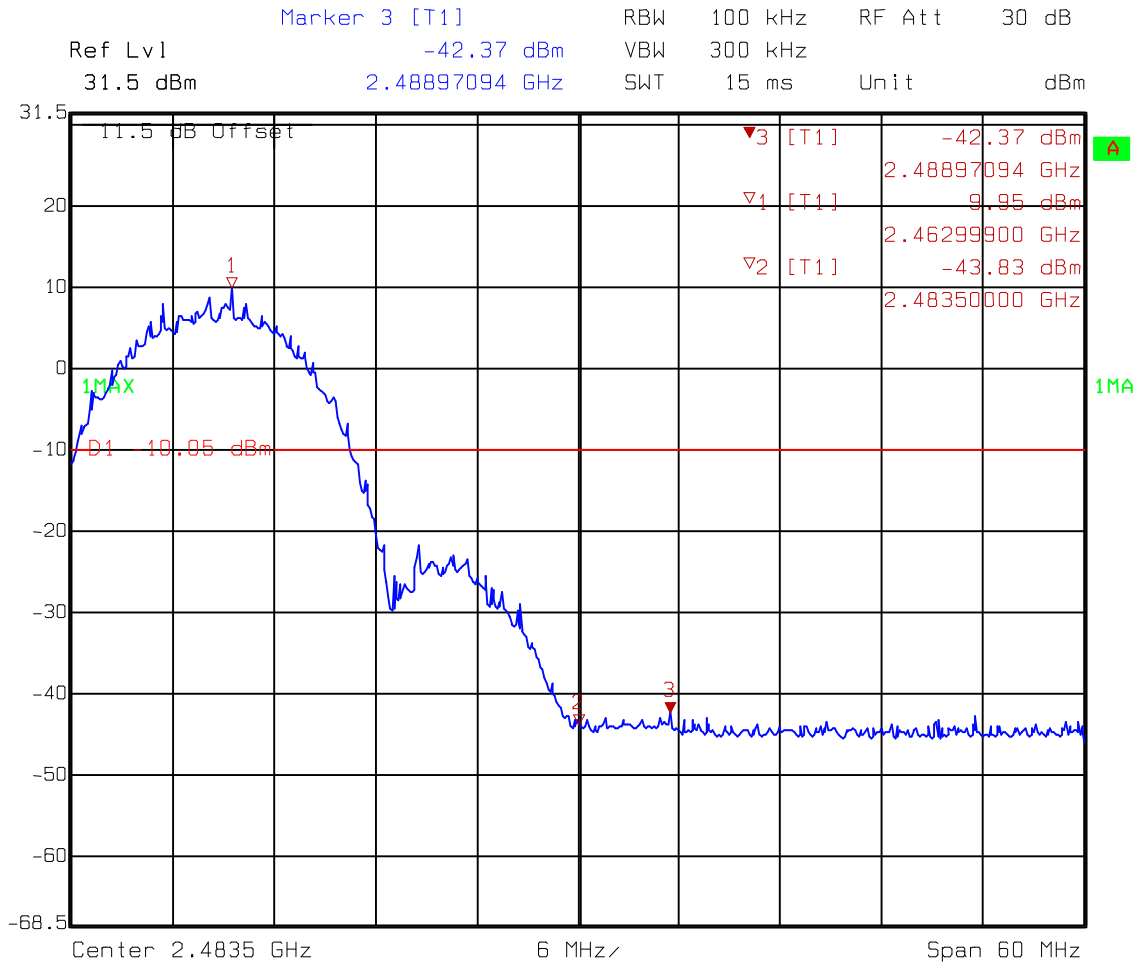
Comment A: Power spectrum density at channel 11 (EC365) 802.11g  
 Date: 15.FEB.2005 17:29:12

**7. Emission on the band edge §FCC 15.247(C)**

In any 100kHz 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.

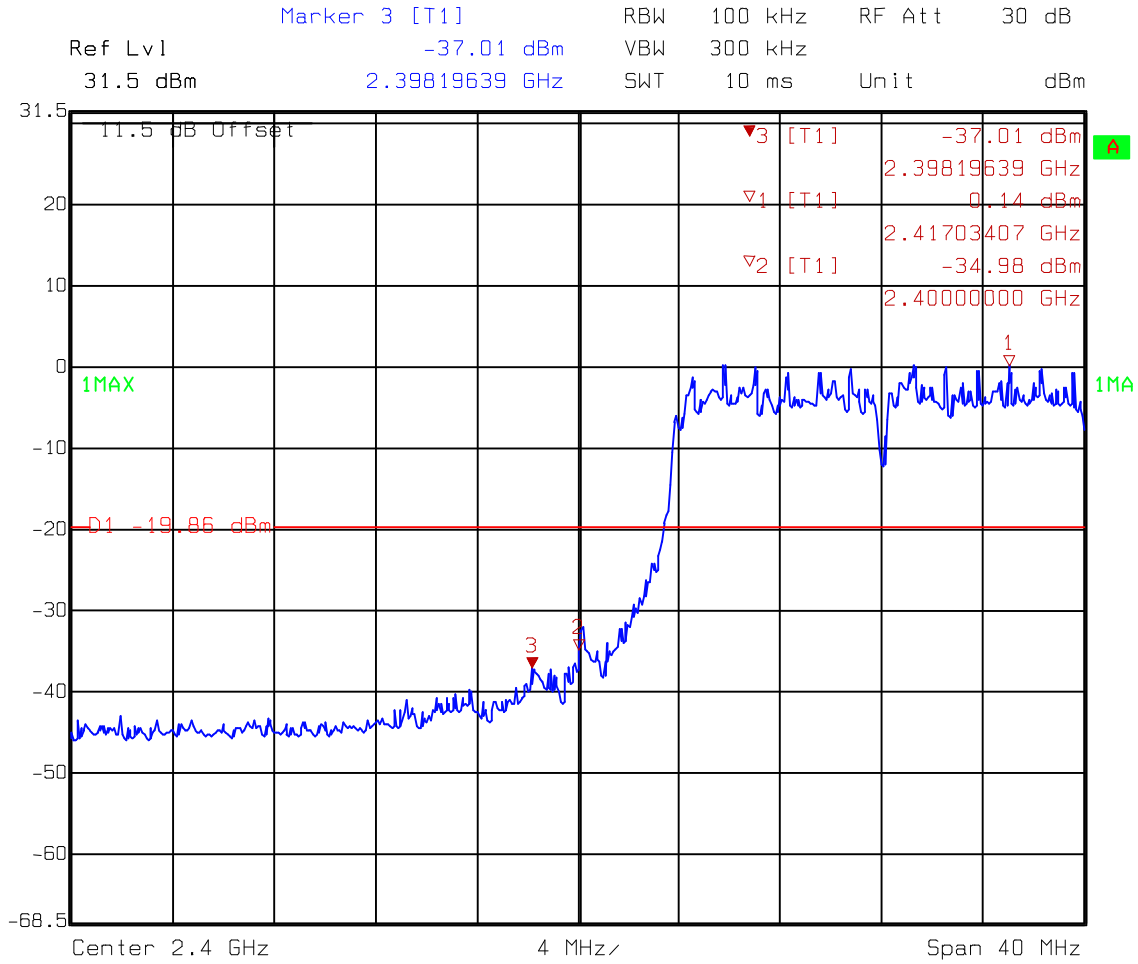
Please see the plot below.





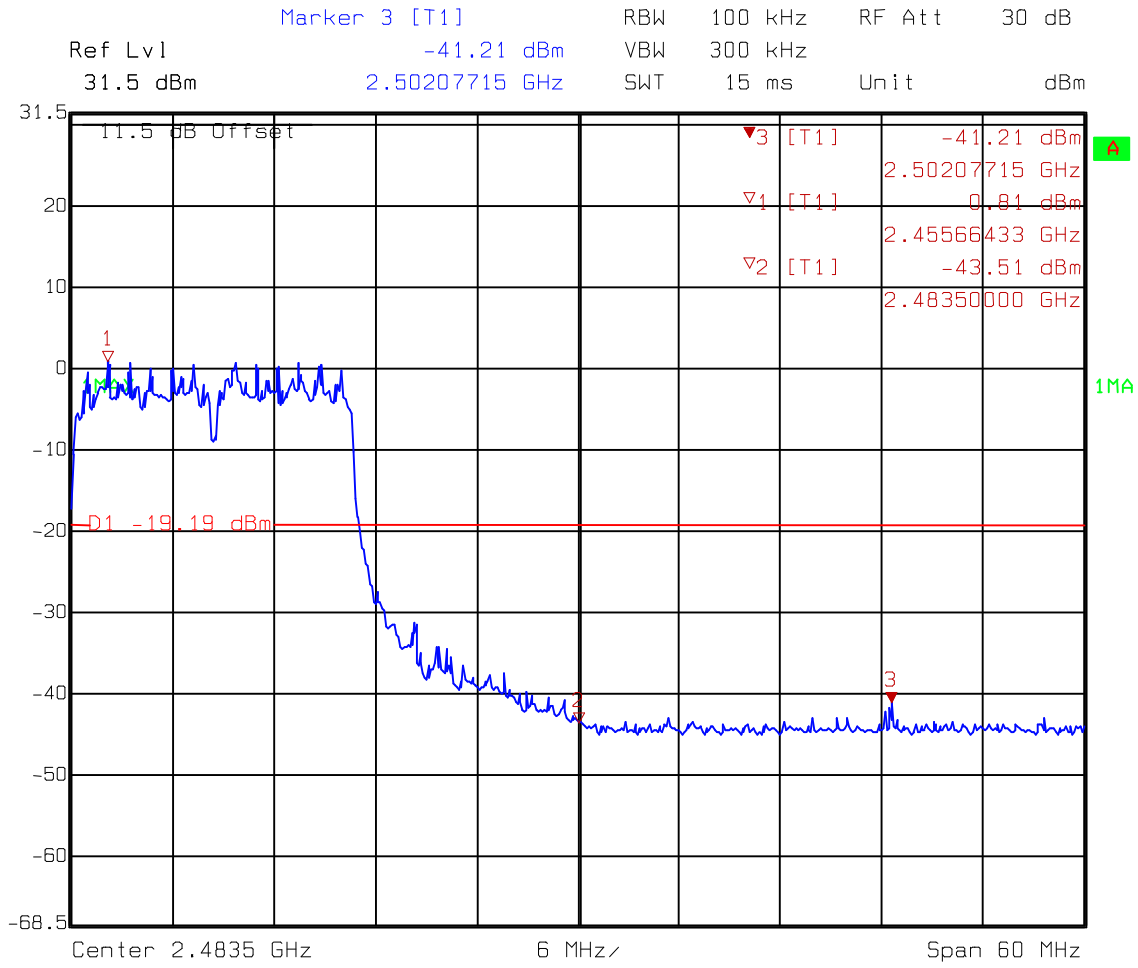
Comment A: Band-edge at channel 11 (EC365) 802.11b  
 Date: 15.FEB.2005 17:33:50

**Test Mode: 802.11g operating (OFDM Modulation) mode**



Comment A: Band-edge at channel 1 (EC365) 802.11g

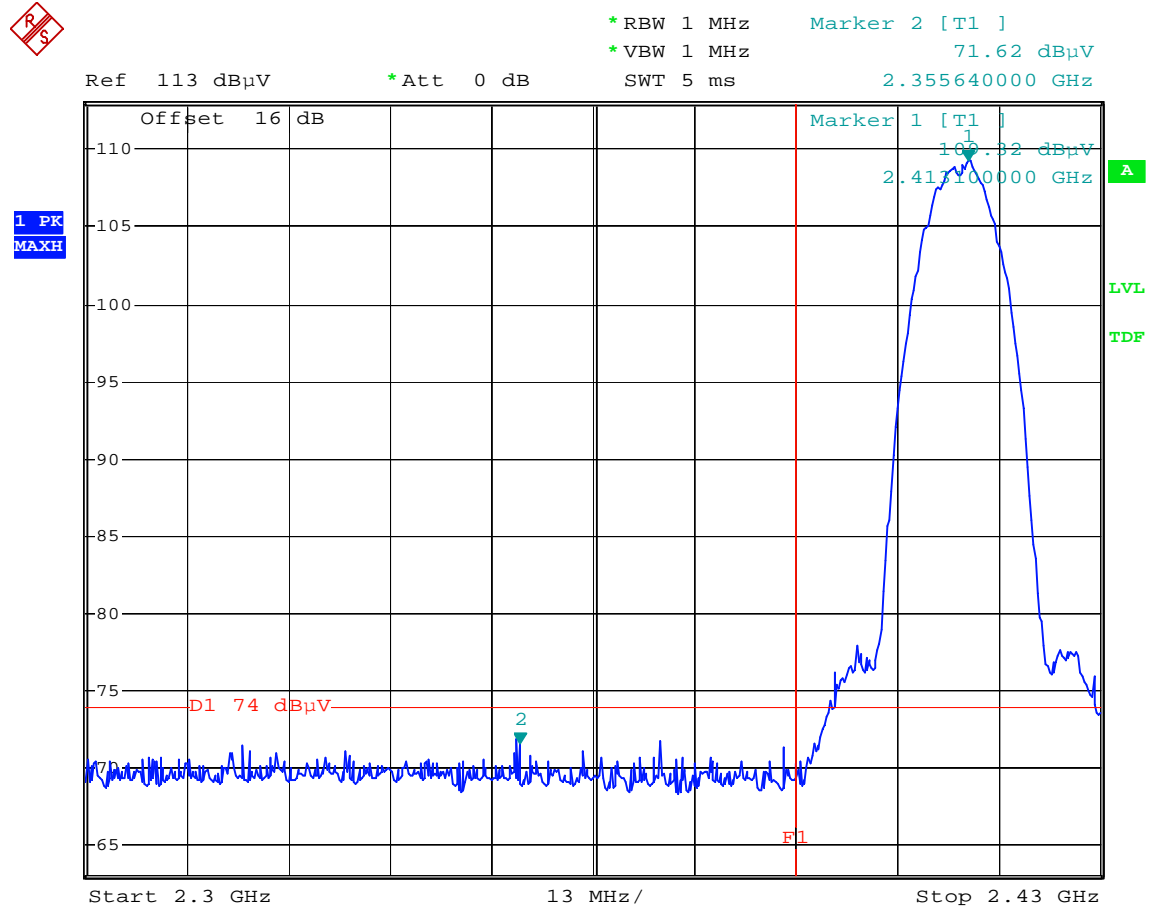
Date: 15.FEB.2005 17:38:09



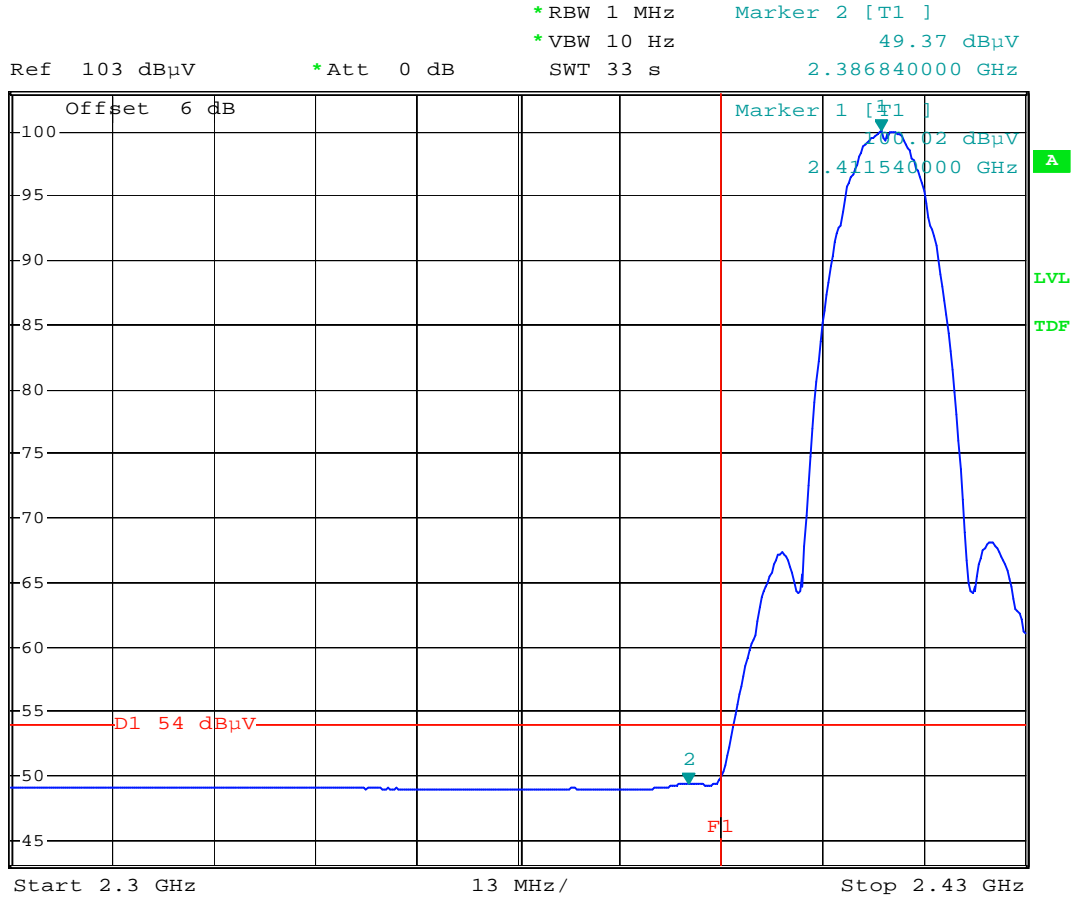
Comment A: Band-edge at channel 11 (EC365) 802.11g  
 Date: 15.FEB.2005 17:32:20

## 7.2 Band-edge (Radiated method)

**Test Mode: 802.11b operating (DSSS Modulation) mode**



Comment: Band-edge Test at CH1  
 Comment: Peak. Detetor F1=2390MHz ATT=16dB 802.11b  
 Date: 18.FEB.2005 11:15:36



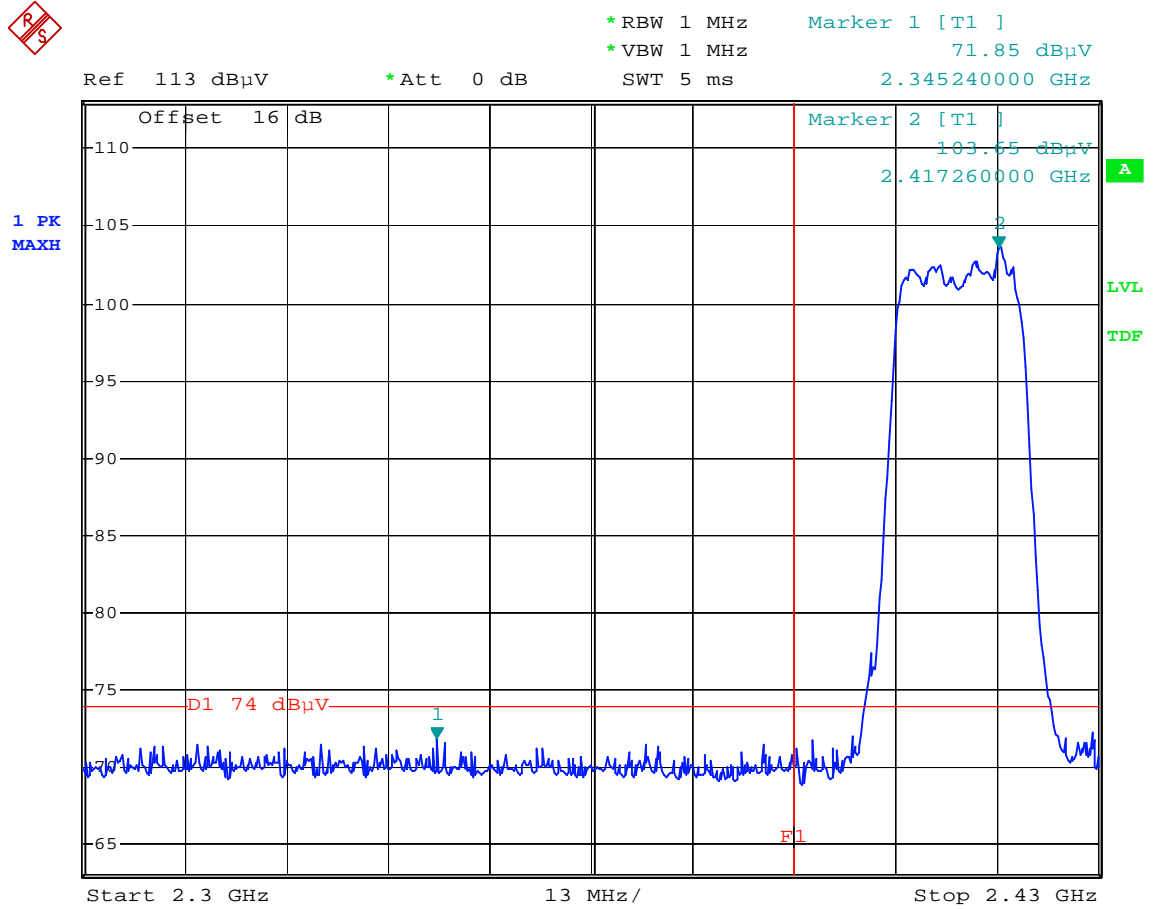
Comment: Band-edge Test at CH1  
 Comment: Avg. Detetor F1=2390MHz ATT=6dB 802.11b  
 Date: 18.FEB.2005 11:12:13







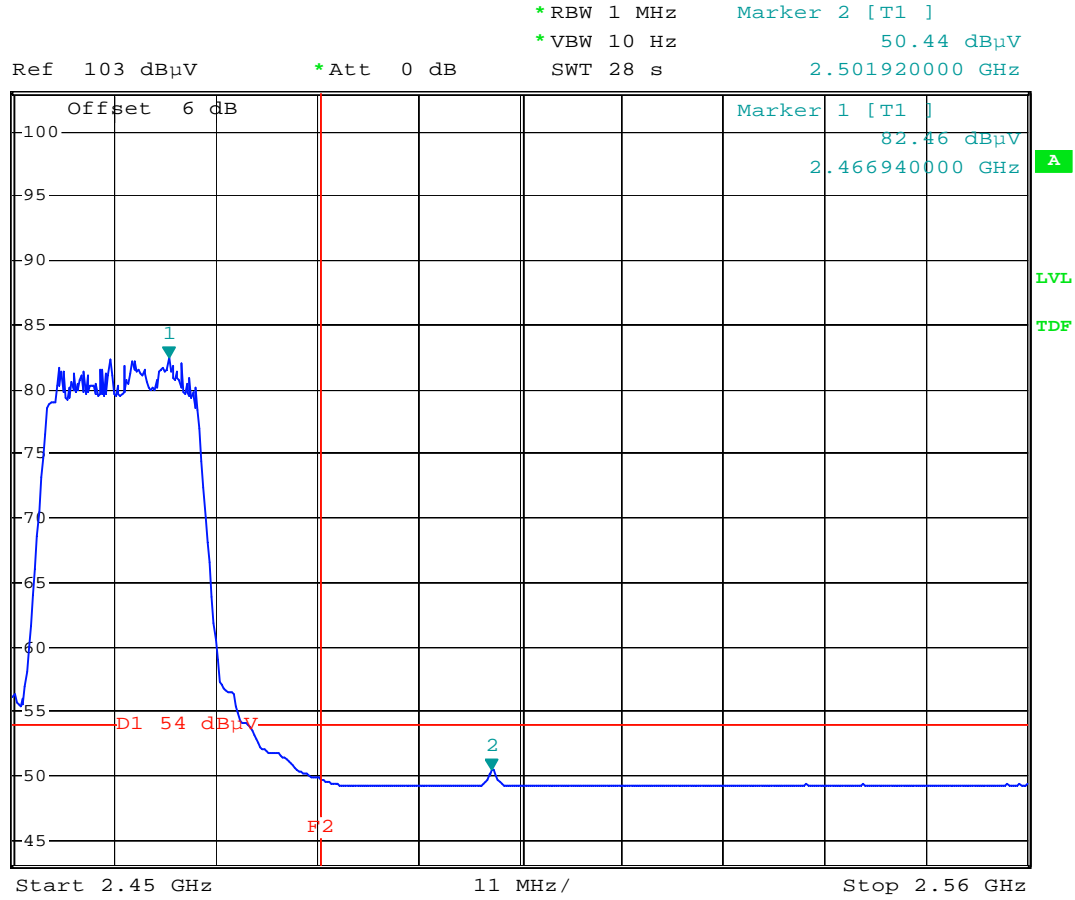
**Test Mode: 802.11g operating (OFDM Modulation) mode**



Comment: Band-edge Test at CH1  
 Comment: Peak. Detetor F1=2390MHz ATT=16dB 802.11g  
 Date: 18.FEB.2005 11:05:54







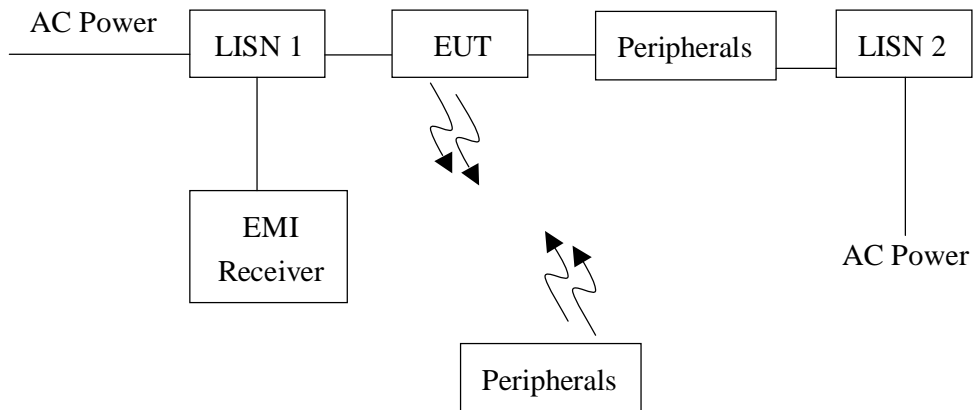
Comment: Band-edge Test at CH11  
 Comment: Avg. Detector F2=2483.5MHz ATT=6dB 802.11g  
 Date: 18.FEB.2005 11:01:22

## 8. Power Line Conducted Emission test §FCC 15.207

### 8.1 Operating environment

Temperature:	23	°C
Relative Humidity:	55	%
Atmospheric Pressure	1023	hPa

### 8.2 Test setup & procedure



The EUT are connected to the main power through a line impedance stabilization network (LISN). 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.

Both sides (Line and Neutral) of AC line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4/2003 on conducted measurement. The bandwidth of the field strength meter (R & S Test Receiver ESCS 30) is set at 9kHz.

The EUT configuration please refer to the “Conducted set-up photo.pdf”.

**8.3 Emission limit**

Freq. (MHz)	Conducted Limit (dBuV)	
	Q.P.	Ave.
0.15~0.50	66 – 56*	56 – 46*
0.50~5.00	56	46
5.00~30.0	60	50

\*Decreases with the logarithm of the frequency.

**8.4 Uncertainty of Conducted Emission**

Expanded uncertainty (k=2) of conducted emission measurement is 2.6 dB.



## 8.5 Power Line Conducted Emission test data

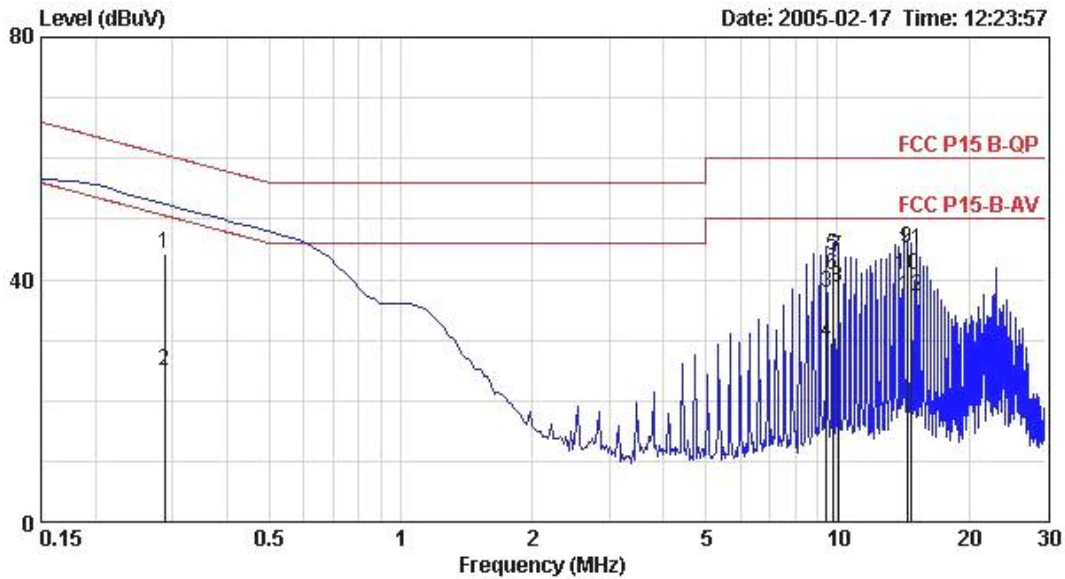
The test was performed the 802.11b and 802.11g normal operating modes, the worst case was occurred at 802.11g normal operating mode

Phase: Line  
 Model No.: WR254  
 Worst Case: 802.11g normal operating mode

Frequency (MHz)	Corr. Factor (dB)	Level	Limit	Level	Limit	Margin (dB)	
		Qp (dBuV)	Qp (dBuV)	AV (dBuV)	Av (dBuV)	Qp	Av
0.288	0.10	44.27	60.60	24.87	50.60	-16.33	-25.73
9.429	0.48	37.72	60.00	29.61	50.00	-22.28	-20.39
9.739	0.49	43.84	60.00	40.77	50.00	-16.16	-9.23
10.047	0.50	43.59	60.00	38.60	50.00	-16.41	-11.40
14.446	0.78	45.16	60.00	40.76	50.00	-14.84	-9.24
14.761	0.80	44.74	60.00	37.34	50.00	-15.26	-12.66

Remark:

1. Corr. Factor (dB)= LISN Factor (dB) + Cable Loss (dB)
2. Margin (dB) = Level (dBuV) – Limit (dBuV)



Phase: Neutral  
 Model No.: WR254  
 Worst Case: 802.11g normal operating mode

Frequency (MHz)	Corr. Factor (dB)	Level	Limit	Level	Limit	Margin (dB)	
		Qp (dBuV)	Qp (dBuV)	AV (dBuV)	Av (dBuV)	Qp	Av
0.285	0.10	44.29	60.67	24.11	50.67	-16.38	-26.56
9.420	0.29	42.84	60.00	36.80	50.00	-17.16	-13.20
9.735	0.30	41.95	60.00	37.57	50.00	-18.05	-12.43
10.044	0.30	46.03	60.00	40.43	50.00	-13.97	-9.57
14.436	0.50	47.11	60.00	42.78	50.00	-12.89	-7.22
14.749	0.51	47.09	60.00	41.51	50.00	-12.91	-8.49

**Remark:**

1. Corr. Factor (dB)= LISN Factor (dB) + Cable Loss (dB)
2. Margin (dB) = Level (dBuV) – Limit (dBuV)

