

EMC TEST REPORT

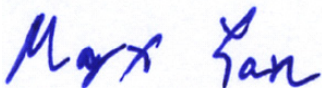
Report No. : EME-051204
Model No. : HWRG1, HWRG1A, HWRG1-CA,
HWRG1A-CA, HWR54G-CA, HWR54G
Issued Date : Nov. 7, 2005

Applicant : Hawking Technology, Inc.
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Test By : Intertek Testing Services Taiwan Ltd.
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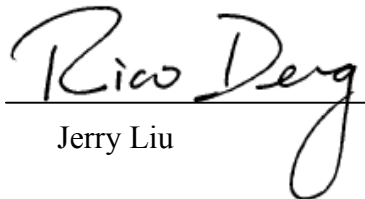
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Project Engineer



Marx Yan

Reviewed By



Jerry Liu

Table of Contents

Summary of Tests	3
1. General information	4
1.1 Identification of the EUT	4
1.2 Additional information about the EUT	4
1.3 Antenna description	5
1.4 Peripherals equipment	5
2. Test specifications	6
2.1 Test standard	6
2.2 Operation mode	6
2.3 Test equipment	7
3. Minimum 6dB Bandwidth test	8
3.1 Operating environment	8
3.2 Test setup & procedure	8
3.3 Measured data of Minimum 6dB Bandwidth test results	8
4. Maximum Output Power test	15
4.1 Operating environment	15
4.2 Test setup & procedure	15
4.3 Measured data of Maximum Output Power test results	15
5. Radiated Emission test	16
5.1 Operating environment	16
5.2 Test setup & procedure	16
5.3 Emission limits	17
5.4 Radiated spurious emission test data	18
5.4.1 Measurement results: frequencies equal to or less than 1 GHz	18
5.4.2 Measurement results: frequency above 1GHz	20
6. Power Spectrum Density test	26
6.1 Operating environment	26
6.2 Test setup & procedure	26
6.3 Measured data of Power Spectrum Density test results	26
7. Emission on the band edge §FCC 15.247(C)	33
7.1 Band-edge (Conducted method)	34
7.2 Band-edge (Radiated method)	38
8. Power Line Conducted Emission test §FCC 15.207	46
8.1 Operating environment	46
8.2 Test setup & procedure	46
8.3 Emission limit	47
8.4 Uncertainty of Conducted Emission	47
8.5 Power Line Conducted Emission test data	48

Summary of Tests**Wireless-G Router-Model: HWRG1
FCC ID: SOY-HWRG1**

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	: Hawking Technology, Inc.
Product	: Wireless-G Router
Model No.	: HWRG1
FCC ID.	: SOY-HWRG1
Frequency Range	: 2412 MHz to 2462MHz
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-G Router, and was defined as information technology equipment. The Wireless-G 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.

According to the hardware aspect, we verified the models listed as below are series model to HWRG1 (EUT), the difference please refer to the following table:

Model Number	Trade Name	Different
HWRG1	HARKING TECHNOLOGY	Hawking Housing color Silver
HWRG1A	HARKING TECHNOLOGY	Hawking Housing color Apple white
HWRG1-CA	HARKING TECHNOLOGY	Canada packaging with silver housing
HWRG1A-CA	HARKING TECHNOLOGY	Canada packaging with Apply white housing
HWR54G-CA	HARKING TECHNOLOGY	AboCom generic Housing with Canada packaging
HWR54G	HARKING TECHNOLOGY	AboCom generic Housing with US packaging

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	IBM	R51	99XML12	FCC DoC Approved
Notebook PC	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	04/13/2005
Pre-Amplifier	MITEQ	26GHz~40GHz	828825	EC374	01/27/2006
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)

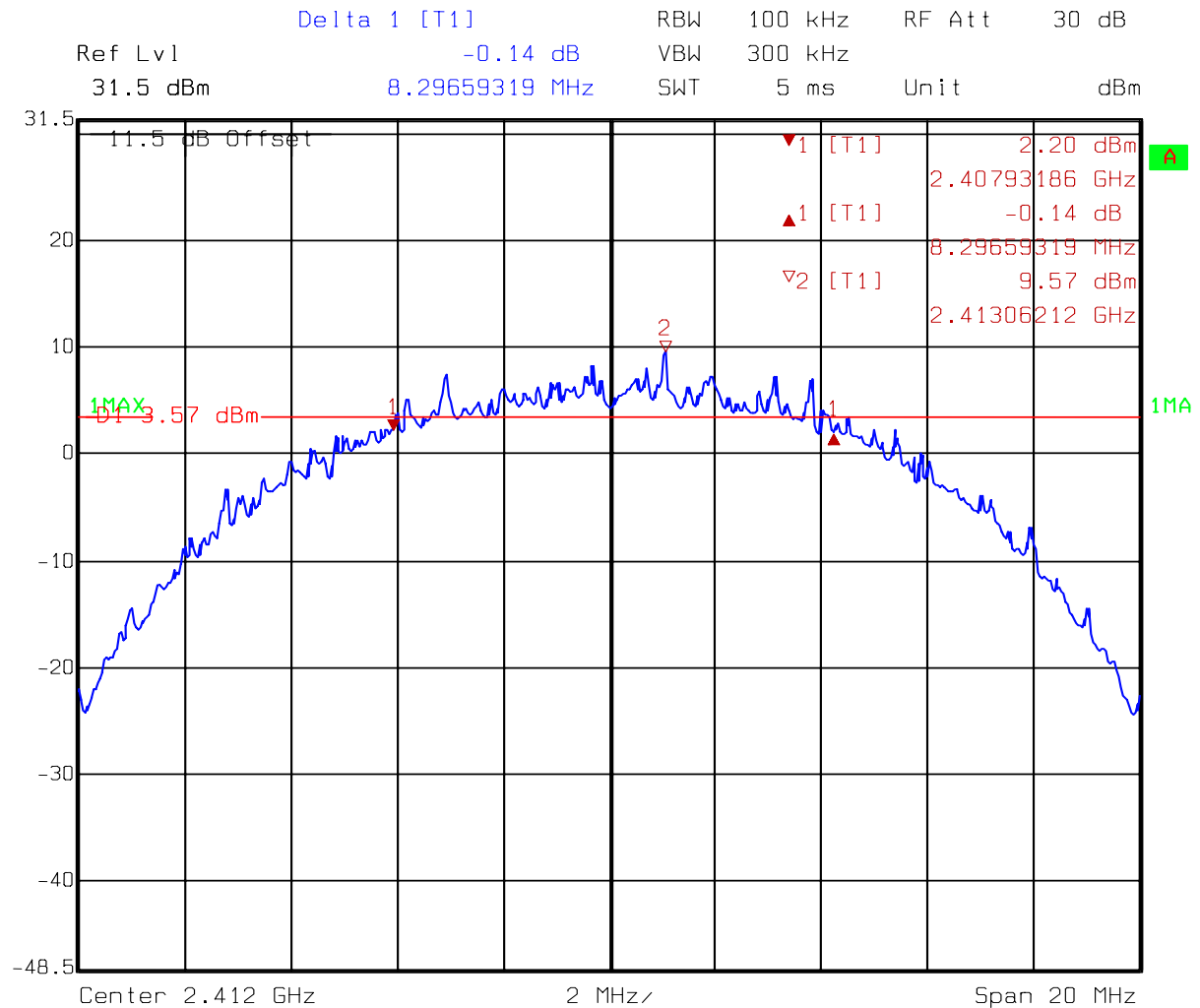
Channel	Frequency (MHz)	Bandwidth (MHz)	Limit
1	2412	8.29659	>500kHz
6	2437	8.61723	>500kHz
11	2462	8.25651	>500kHz

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

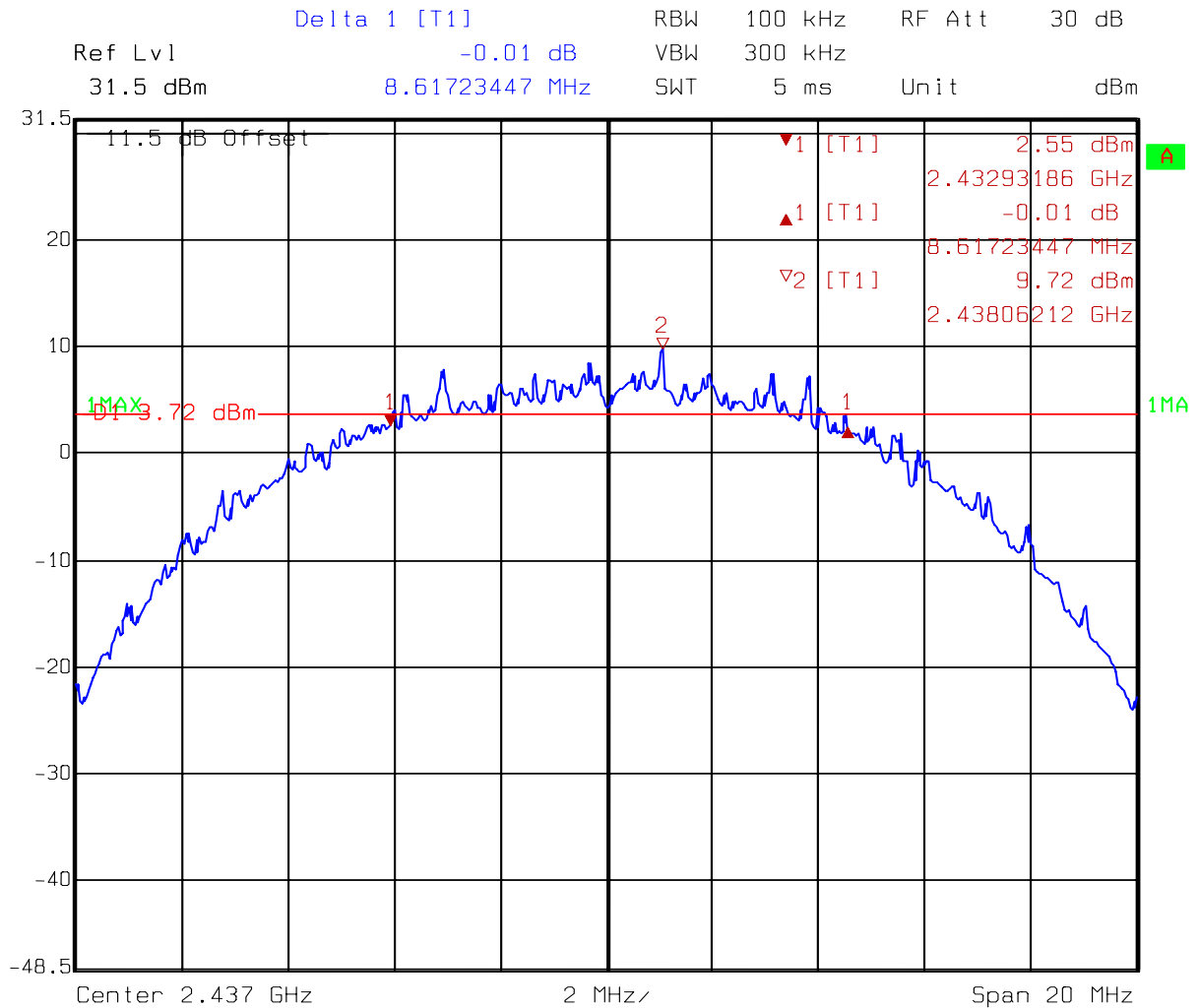
Please see the plot below.

Test Mode: 802.11b operating mode (DSSS Modulation)



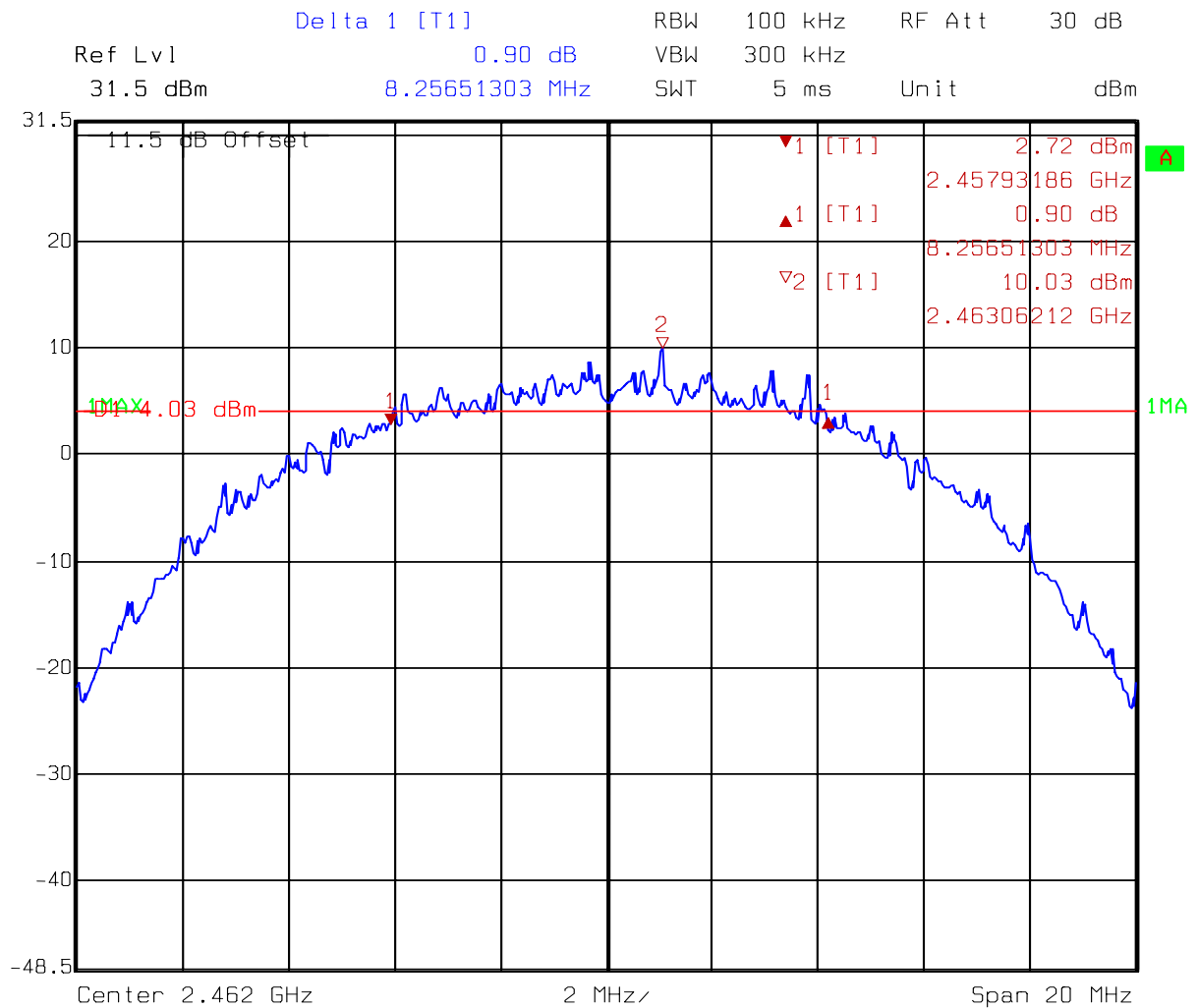
Comment A: 6dB bandwidth at channel 1 (EC365) 802.11b

Date: 15.FEB.2005 17:17:19



Comment A: 6dB bandwidth at channel 6 (EC365) 802.11b

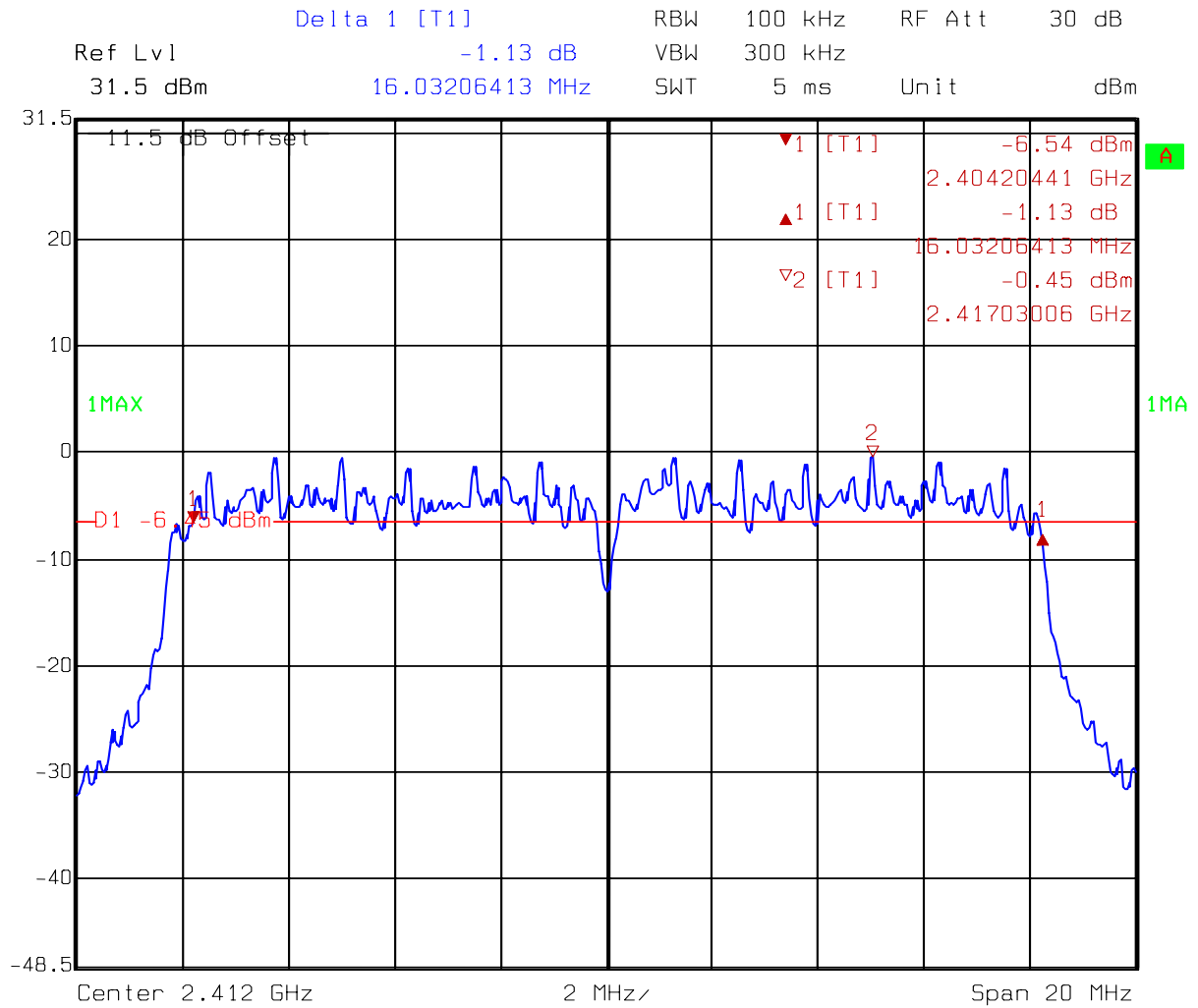
Date: 15.FEB.2005 17:14:42



Comment A: 6dB bandwidth at channel 11 (EC365) 802.11b

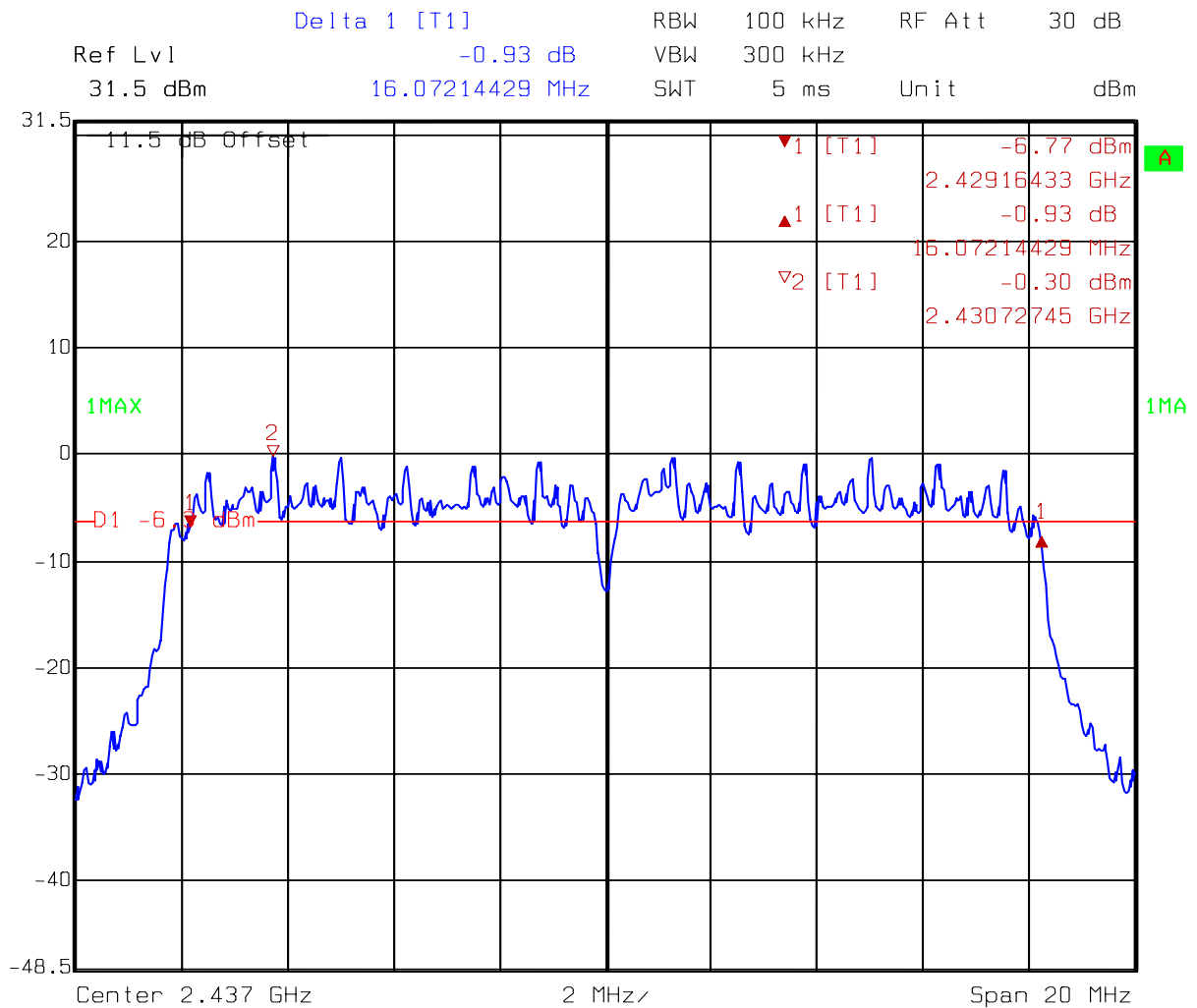
Date: 15.FEB.2005 17:16:03

Test Mode: 802.11g operating mode (OFDM Modulation)



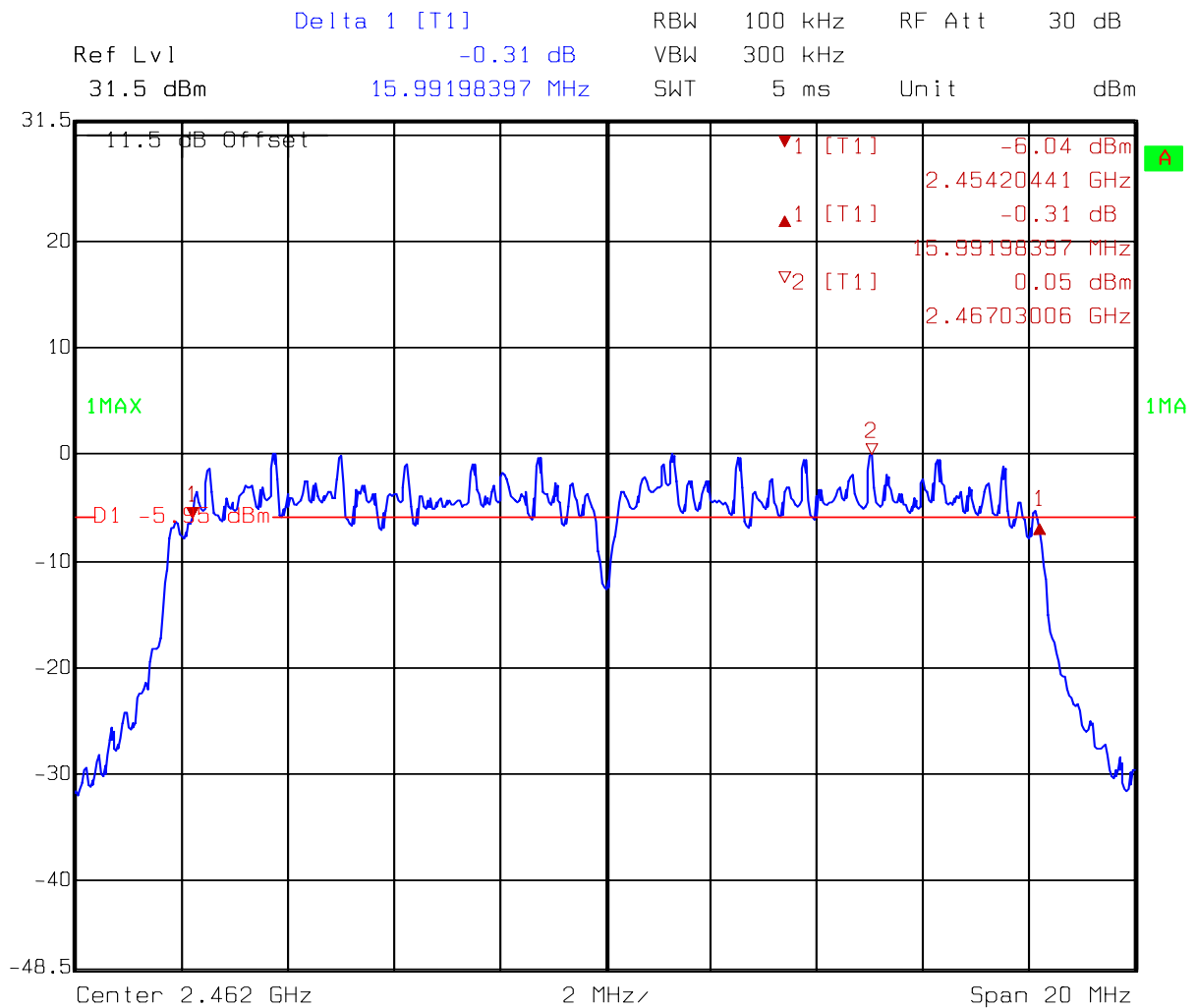
Comment A: 6dB bandwidth at channel 1 (EC365) 802.11g

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.

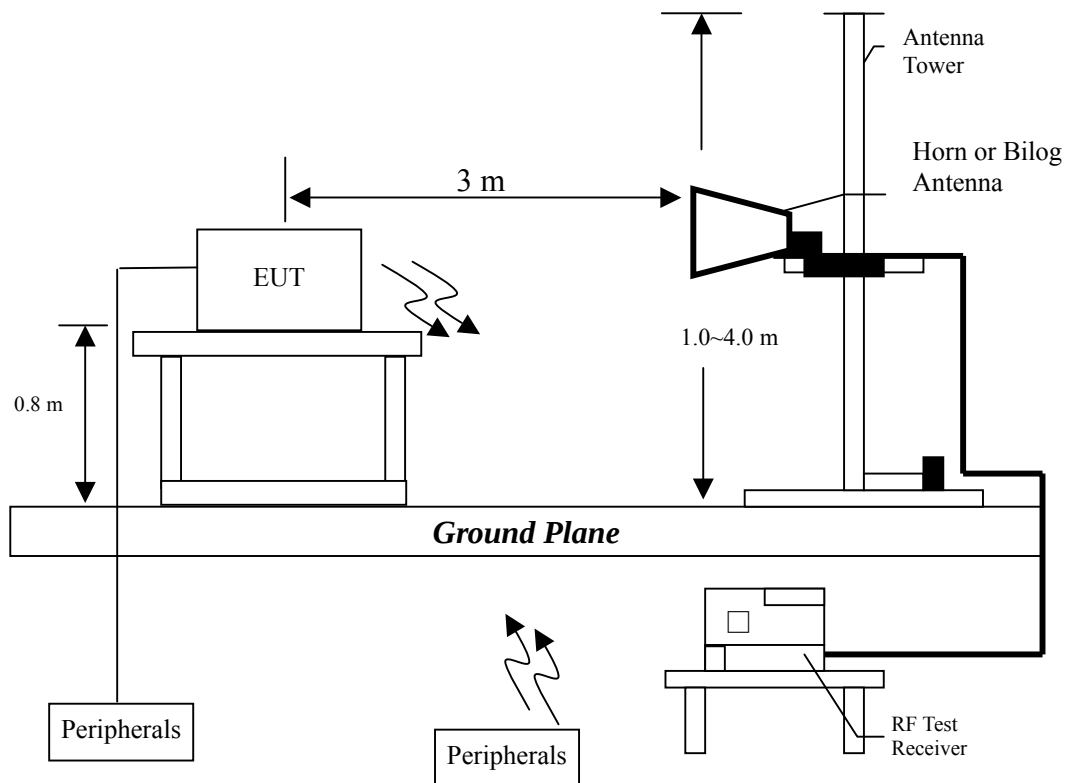
5. Radiated Emission test

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 μ 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 : HWRG1

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	117
57.230	QP	V	12.97	20.93	33.90	40.00	-6.10	159	222
103.700	QP	V	10.97	22.83	33.80	43.50	-9.70	126	109
115.100	QP	V	12.01	17.87	29.88	43.50	-13.62	130	262
171.630	QP	V	14.24	17.01	31.25	43.50	-12.25	169	351
575.160	QP	V	20.18	10.72	30.90	46.00	-15.10	185	210
103.720	QP	H	10.97	25.13	36.10	43.50	-7.40	385	103
171.630	QP	H	14.24	16.86	31.10	43.50	-12.40	320	163
198.800	QP	H	13.01	18.59	31.60	43.50	-11.90	219	187
264.700	QP	H	12.99	18.21	31.20	46.00	-14.80	184	99
460.780	QP	H	17.89	16.91	34.80	46.00	-11.20	200	259
575.100	QP	H	20.18	16.02	36.20	46.00	-9.80	193	117

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 : HWRG1

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	222
57.320	QP	V	12.97	20.43	33.40	40.00	-6.60	119	234
103.720	QP	V	10.97	22.73	33.70	43.50	-9.80	126	88
171.690	QP	V	14.24	16.76	31.00	43.50	-12.50	125	203
200.710	QP	V	12.91	16.29	29.20	43.50	-14.30	157	35
575.100	QP	V	20.18	10.92	31.10	46.00	-14.90	200	285
103.720	QP	H	10.97	24.43	35.40	43.50	-8.10	333	62
200.750	QP	H	12.91	18.79	31.70	43.50	-11.80	400	106
264.700	QP	H	12.99	19.21	32.20	46.00	-13.80	326	52
379.630	QP	H	15.92	16.58	32.50	46.00	-13.50	265	109
460.780	QP	H	17.89	16.41	34.30	46.00	-11.70	251	119
575.100	QP	H	20.18	17.88	38.06	46.00	-7.94	177	162

Remark:

1. Corrected Level = Reading Level + Correction Factor

2. Correction Factor = Antenna Factor + Cable Loss

5.4.2 Measurement results: frequency above 1GHz

EUT : HWRG1

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	334
7236.000	AV	V	34.17	39.97	33.97	39.77	54.00	-14.23	188	334
9648.000	PK	V	35.75	43.38	50.56	58.19	74.00	-15.81	154	26
9648.000	AV	V	35.75	43.38	44.70	52.33	54.00	-1.67	154	26

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 : HWRG1

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	29
7312.000	AV	V	34.17	39.97	47.31	53.11	54.00	-0.89	219	29
9748.000	PK	V	35.75	43.38	52.44	60.07	74.00	-13.93	142	358
9748.000	AV	V	35.75	43.38	45.75	53.38	54.00	-0.62	142	358
7312.000	PK	H	34.17	39.97	44.69	50.49	74.00	-23.51	164	304
7312.000	AV	H	34.17	39.97	32.40	38.20	54.00	-15.80	164	304

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 : HWRG1

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	80
7387.000	AV	V	34.17	39.97	40.04	45.84	54.00	-8.16	197	80
9848.000	PK	V	35.75	43.38	50.51	58.14	74.00	-15.86	143	301
9848.000	AV	V	35.75	43.38	43.83	51.46	54.00	-2.54	143	301

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 : HWRG1
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 : HWRG1

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 : HWRG1

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

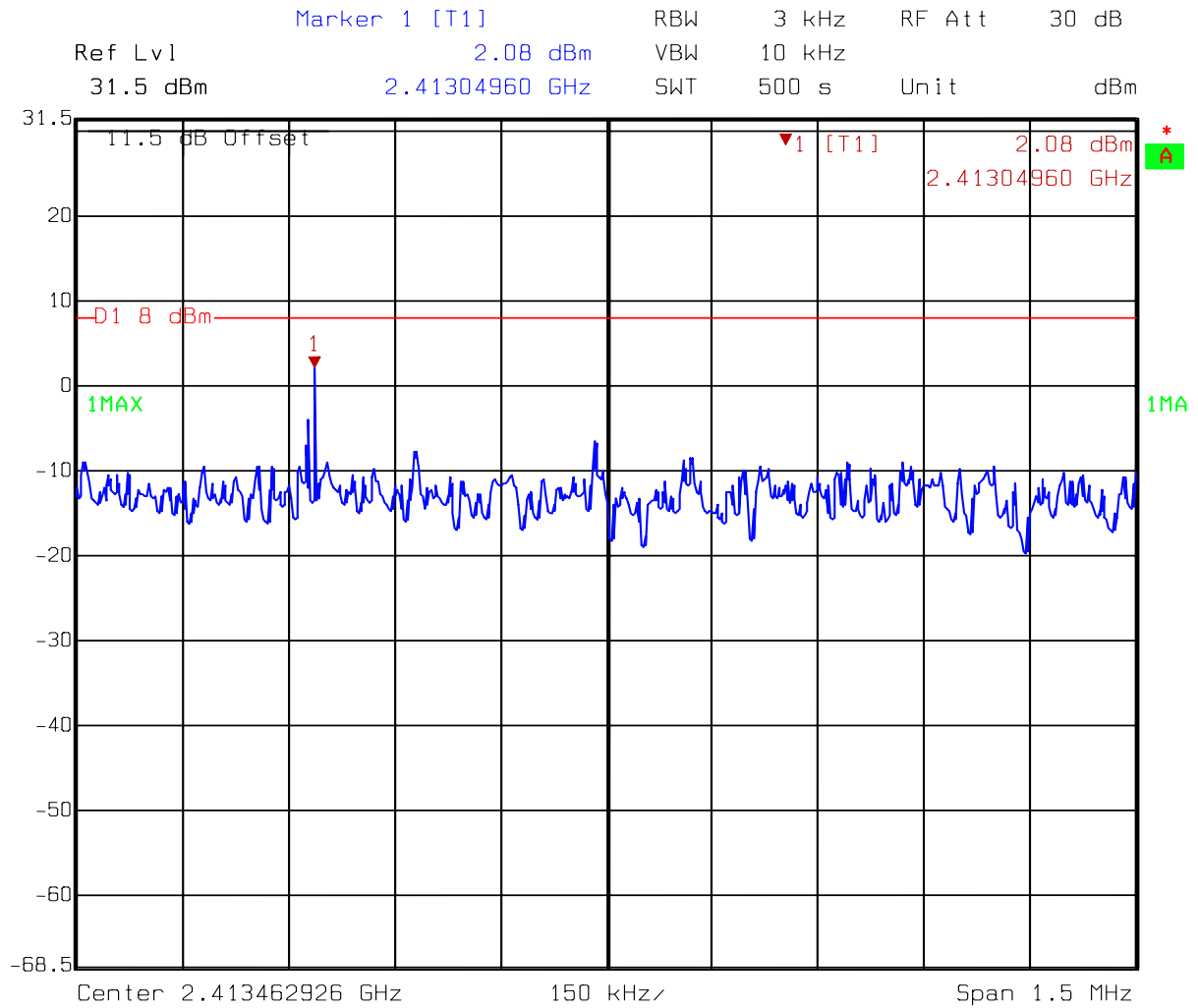
Channel	Frequency (MHz)	Measured level (dBm)	Limit (dBm)
1	2412	2.08	8
6	2437	-0.70	8
11	2462	6.18	8

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

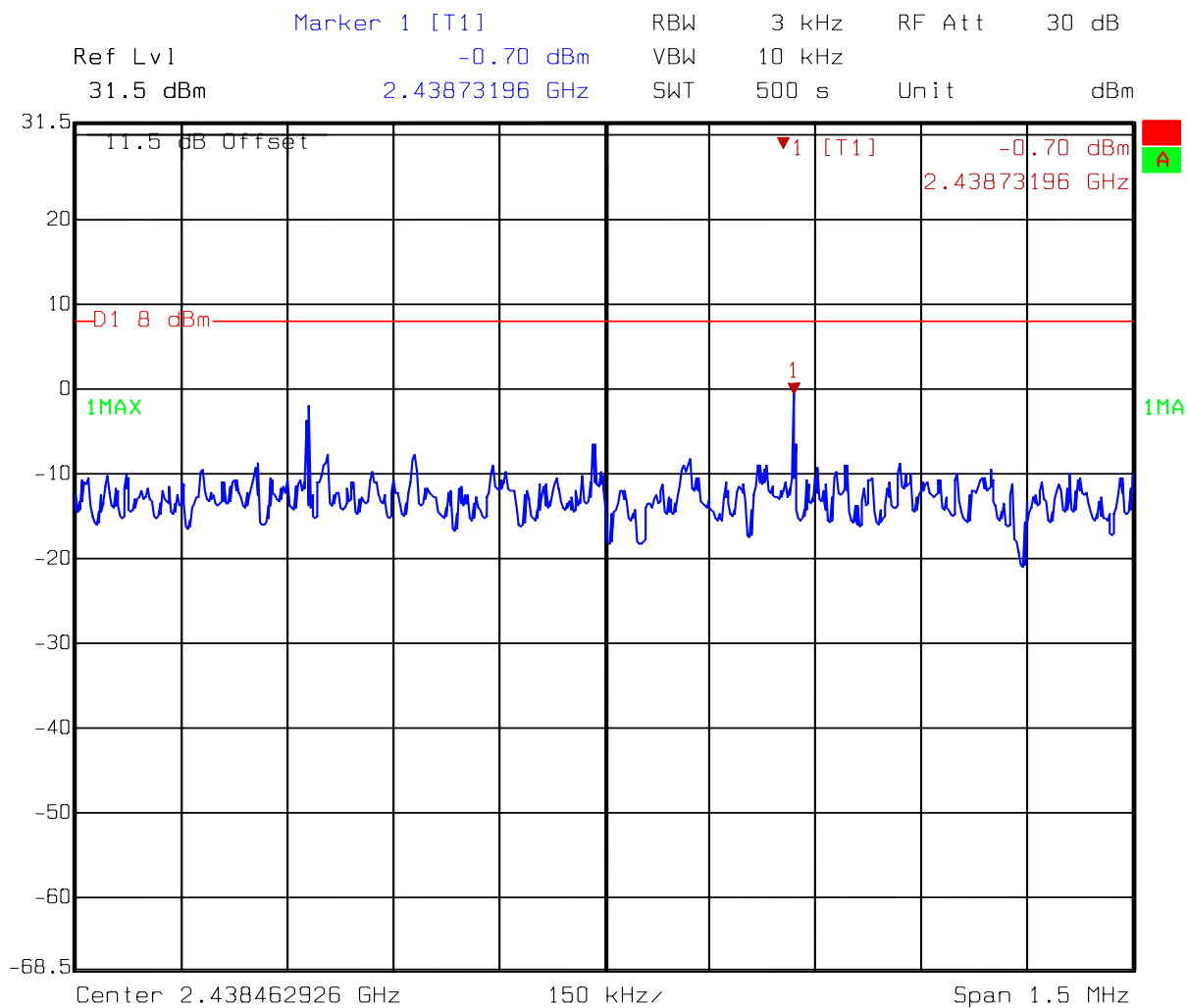
Please see the plot below.

Test Mode: 802.11b operating (DSSS Modulation) mode



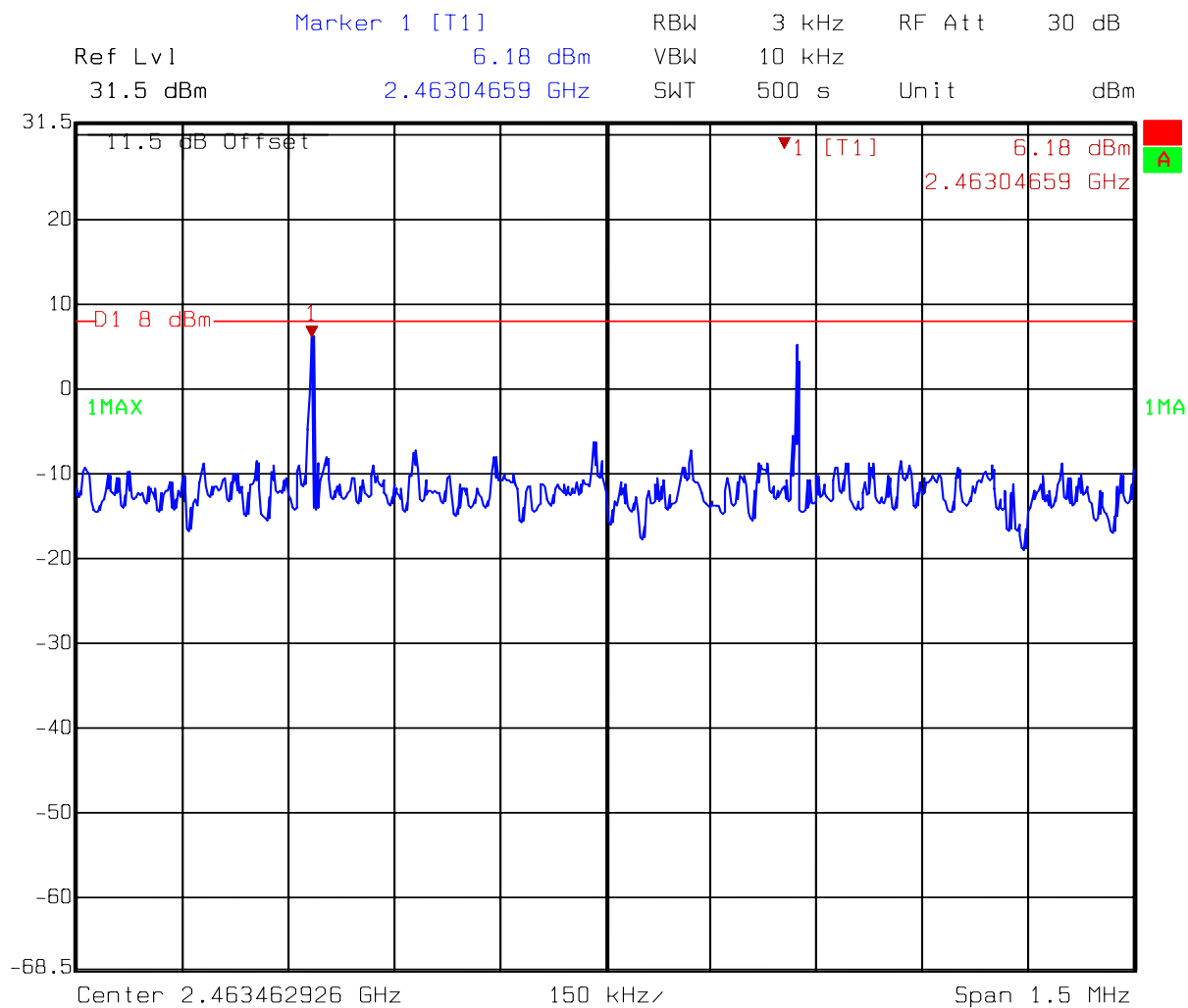
Comment A: Power spectrum density at channel 1 (EC365) 802.11b

Date: 15.FEB.2005 17:25:37



Comment A: Power spectrum density at channel 6 (EC365) 802.1b

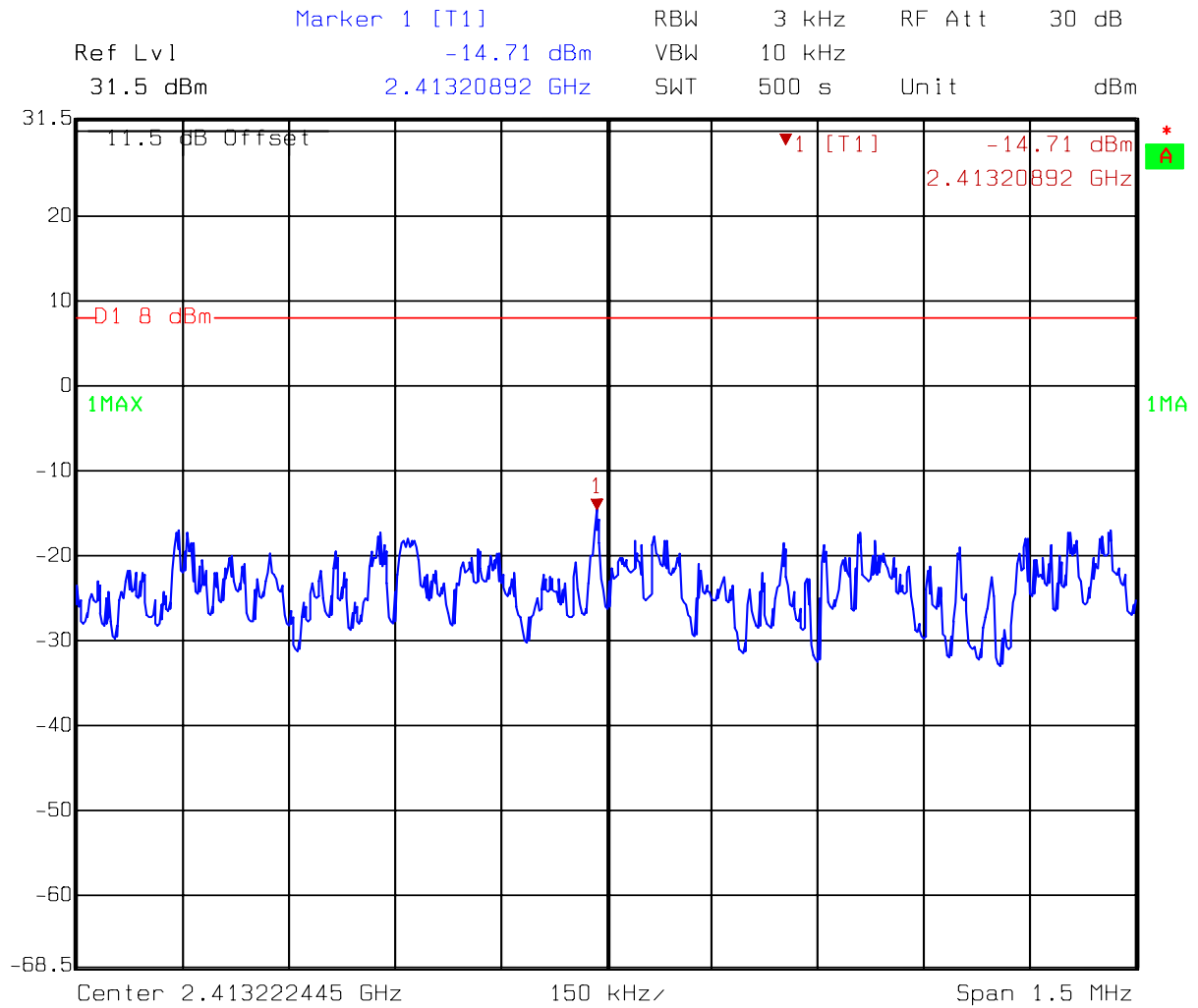
Date: 15.FEB.2005 17:22:17



Comment A: Power spectrum density at channel 11 (EC365) 802.1b

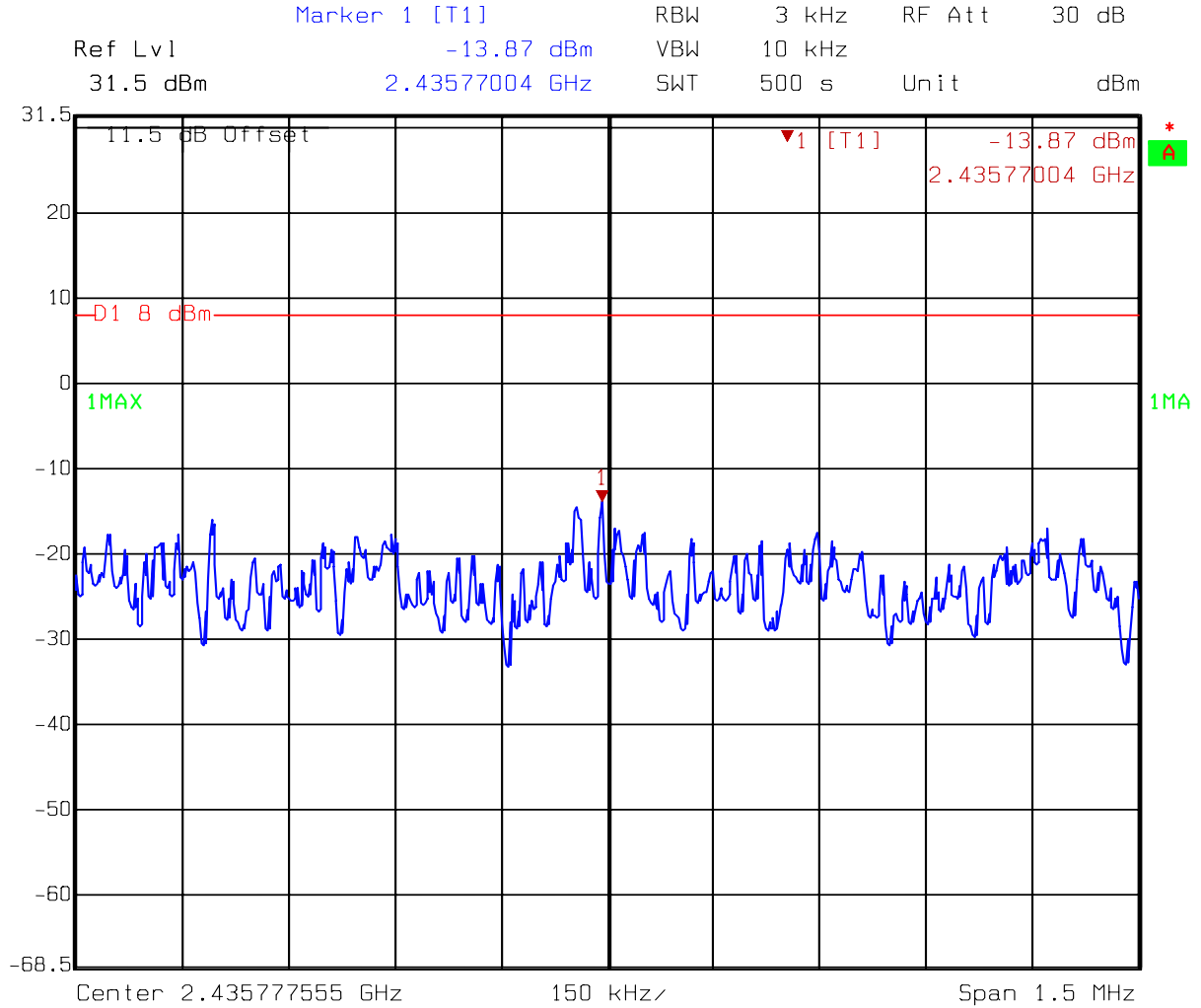
Date: 15.FEB.2005 17:23:52

Test Mode: 802.11g operating (OFDM Modulation) mode



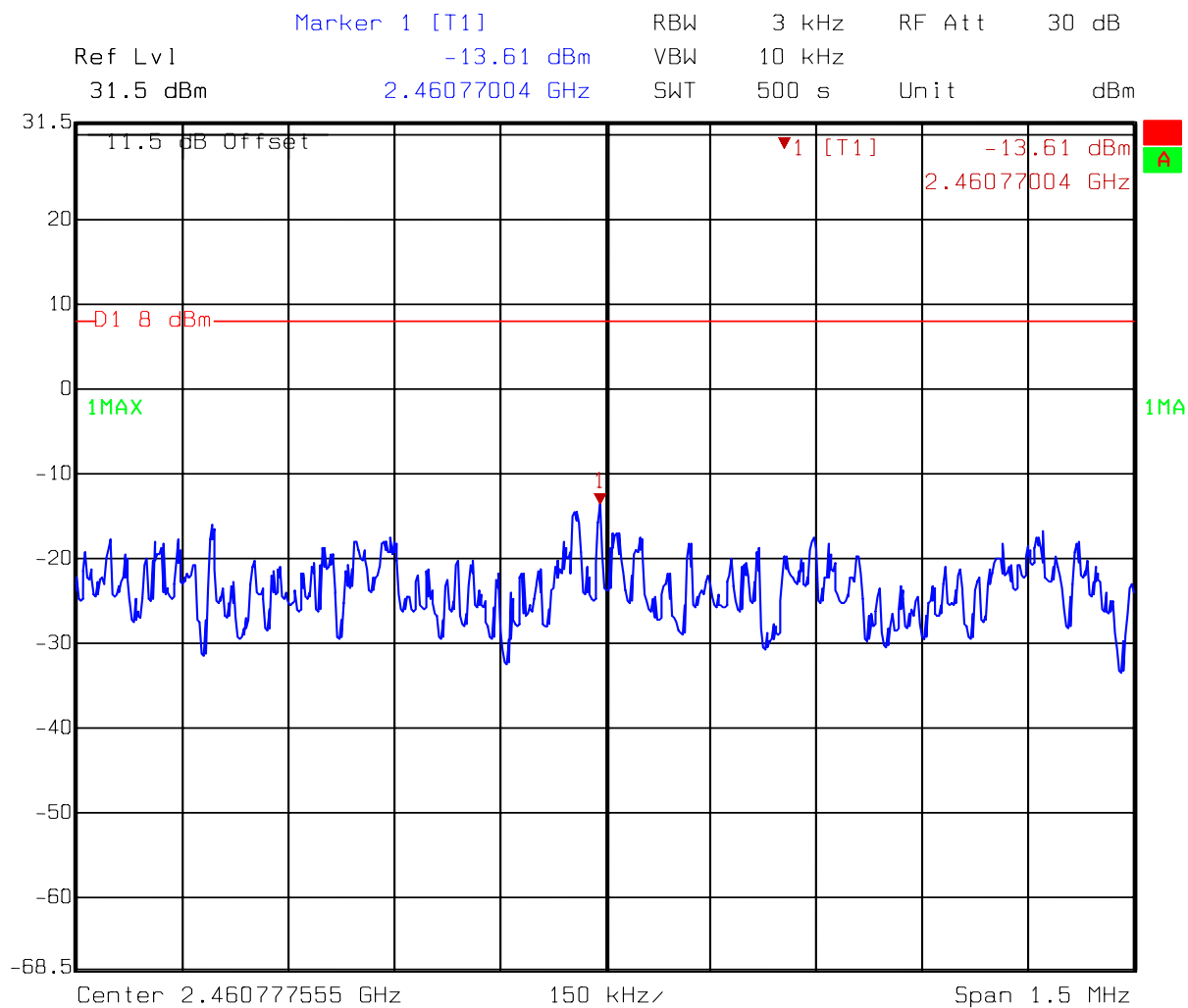
Comment A: Power spectrum density at channel 1 (EC365) 802.11g

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

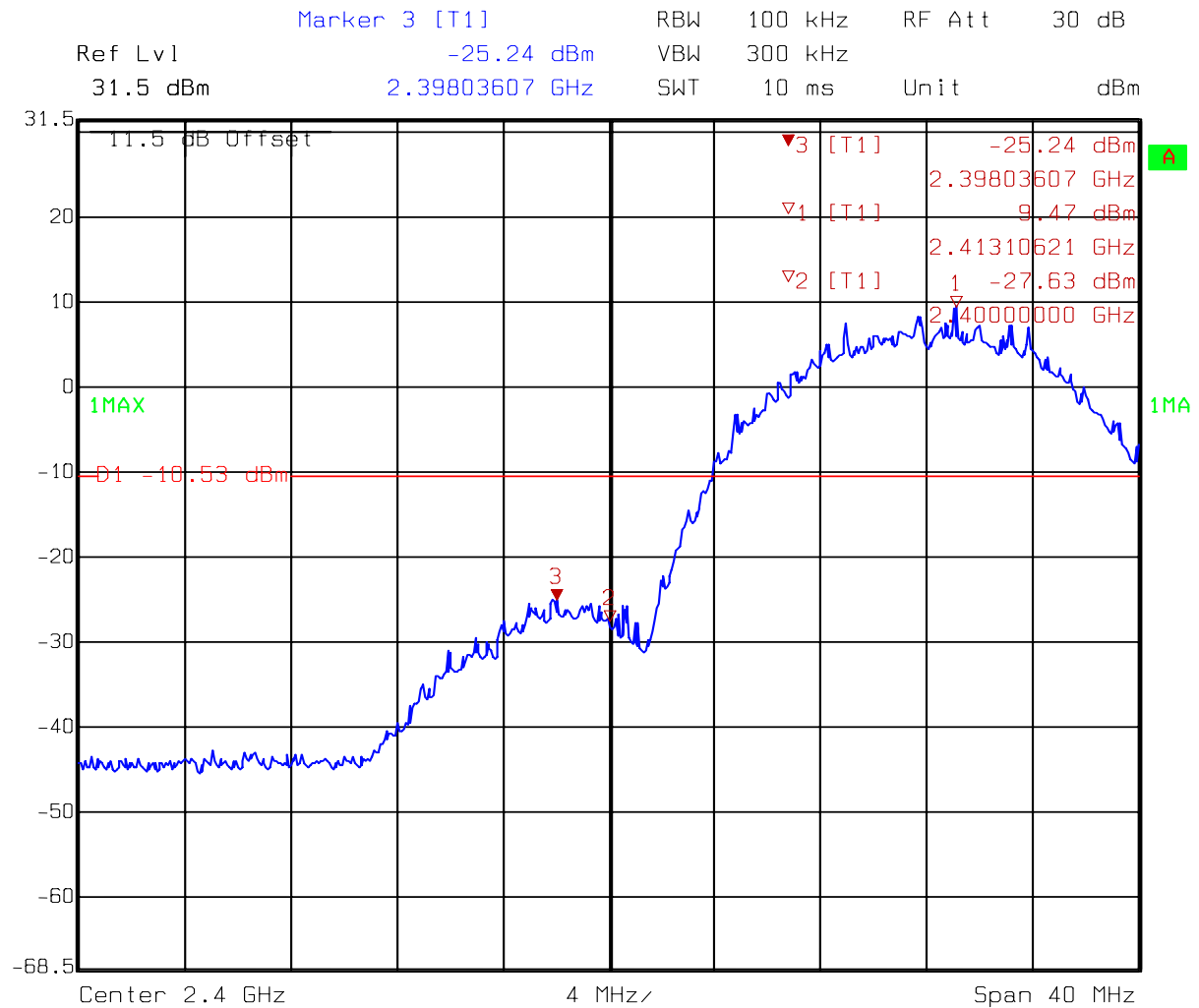
7. Emission on the band edge §FCC 15.247(C)

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.

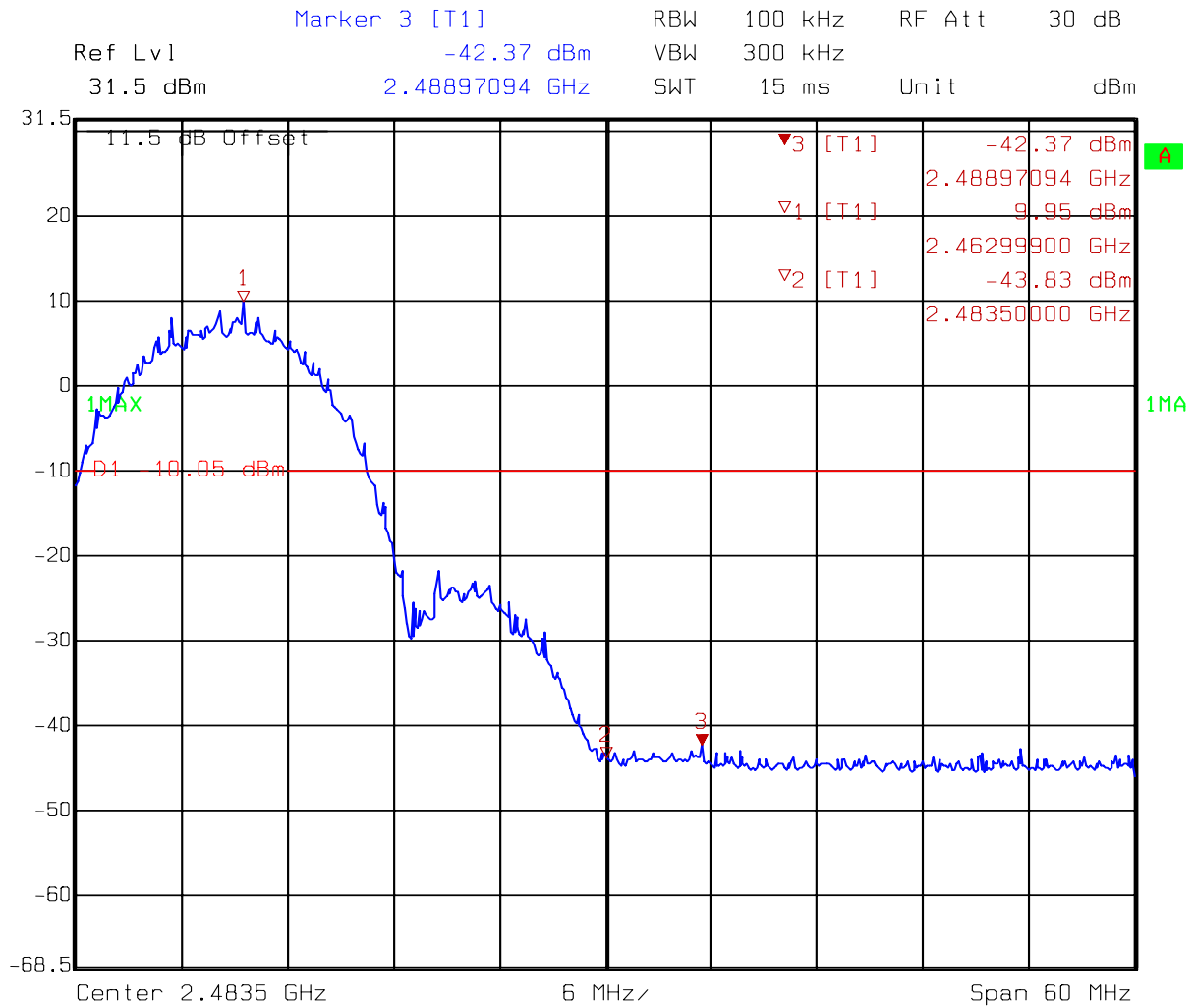
7.1 Band-edge (Conducted method)

Test Mode: 802.11b operating (DSSS Modulation) mode



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

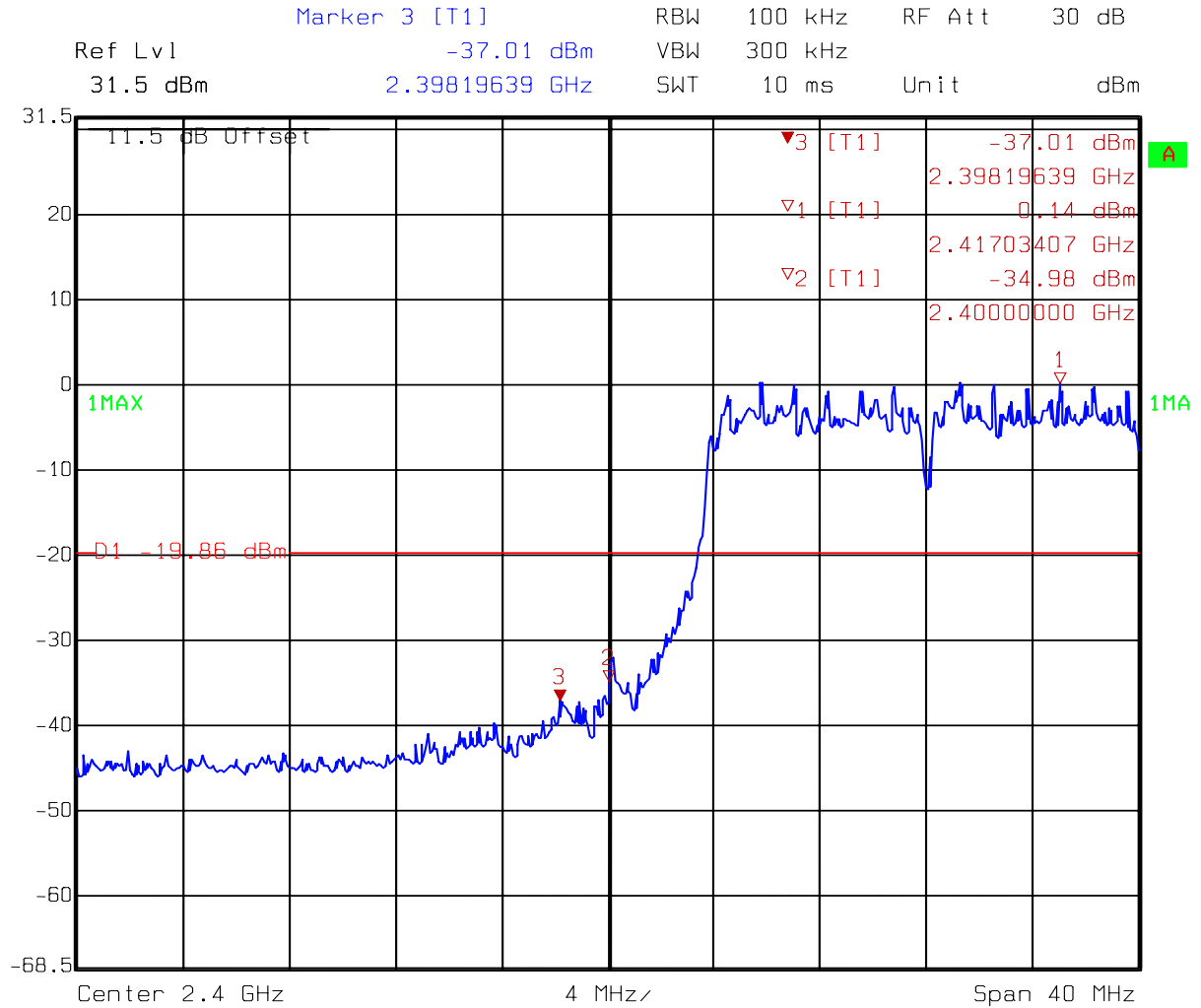
Date: 15.FEB.2005 17:36:50



Comment A: Band-edge at channel 11 (EC365) 802.11b

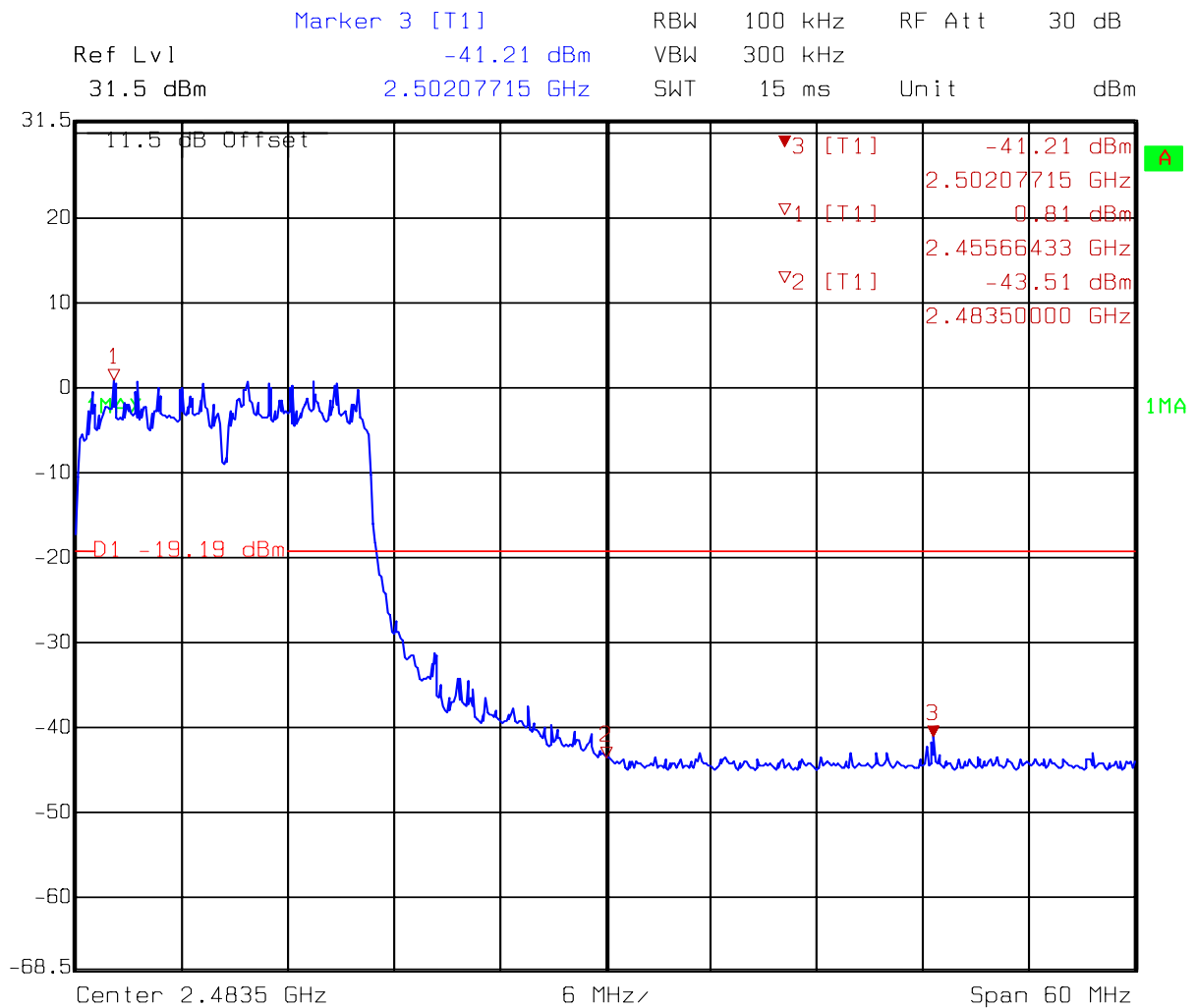
Date: 15.FEB.2005 17:33:50

Test Mode: 802.11g operating (OFDM Modulation) mode



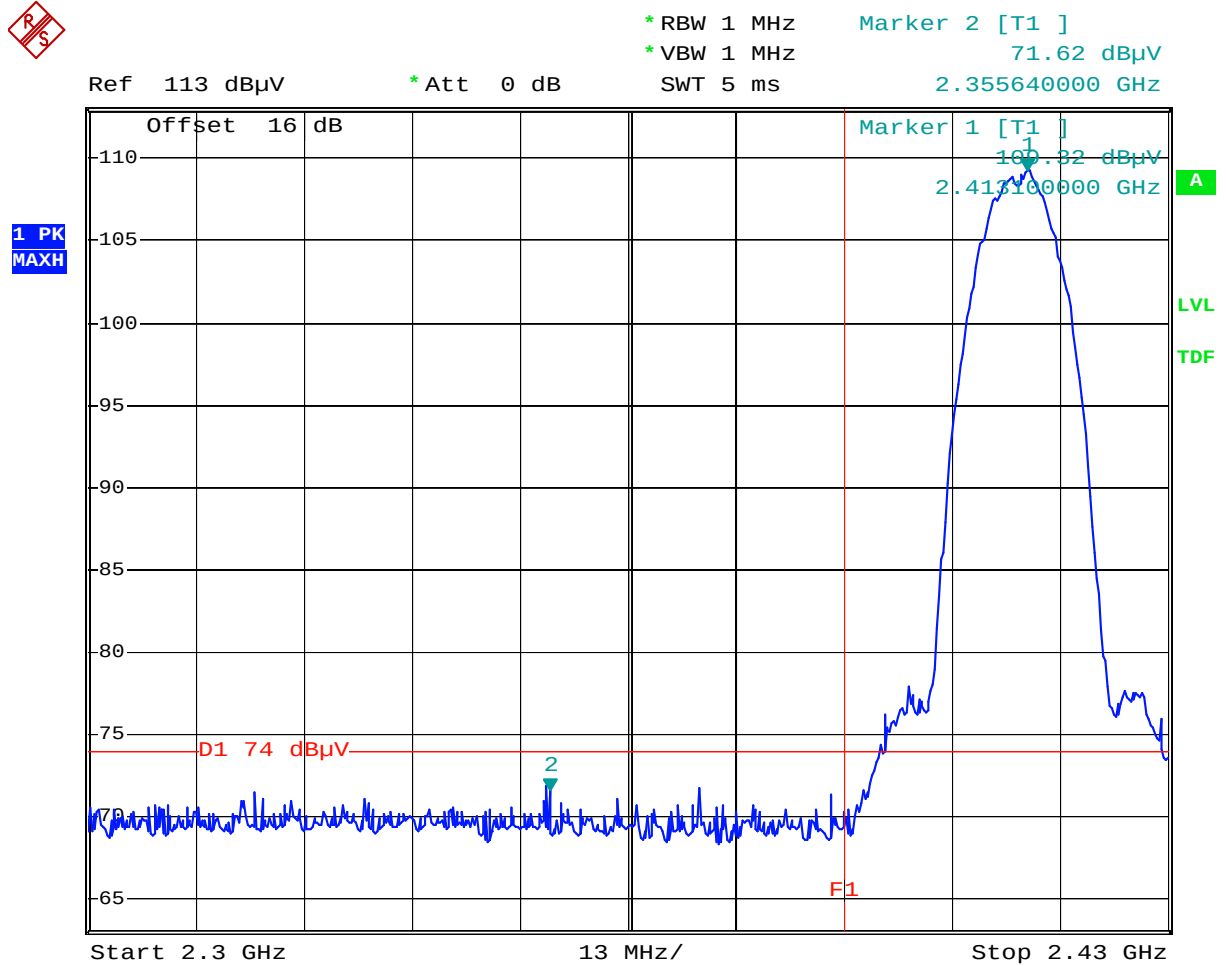
Comment A: Band-edge at channel 1 (EC365) 802.11g

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



7.2 Band-edge (Radiated method)

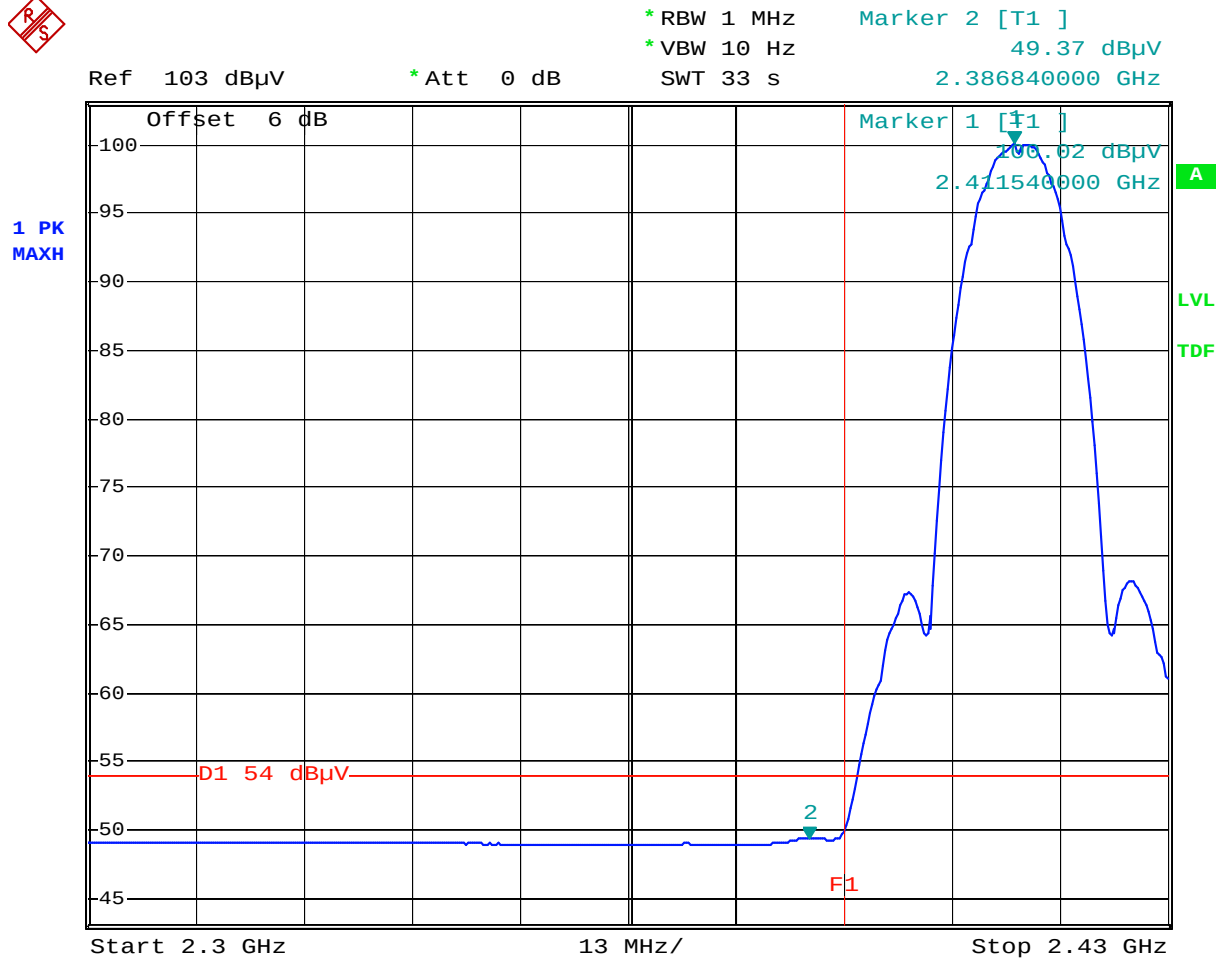
Test Mode: 802.11b operating (DSSS Modulation) mode



Comment: Band-edge Test at CH1

Comment: Peak. Detetor F1=2390MHz ATT=16dB 802.11b

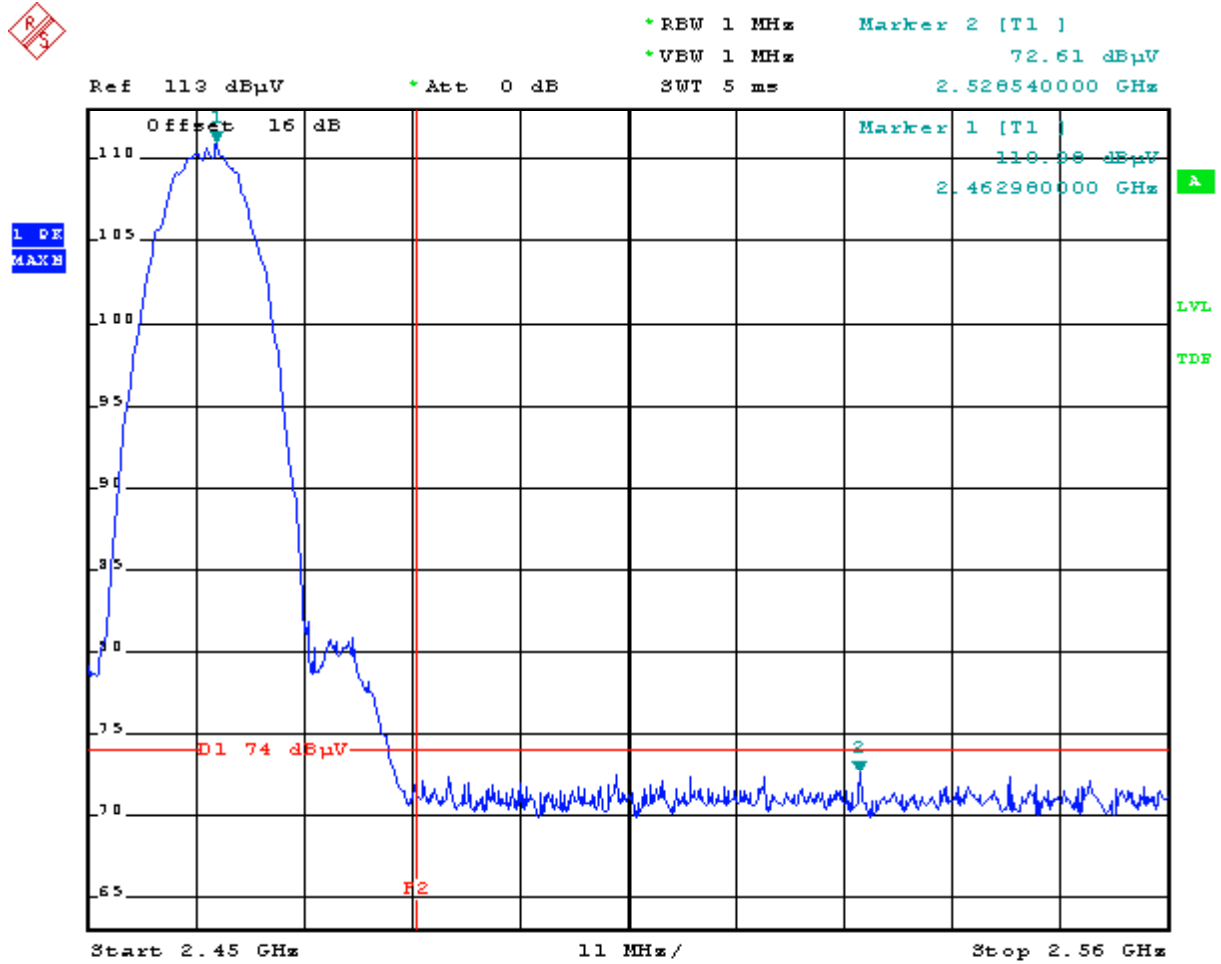
Date: 18.FEB.2005 11:15:36



Comment: Band-edge Test at CH1

Comment: Avg. Detetor F1=2390MHz ATT=6dB 802.11b

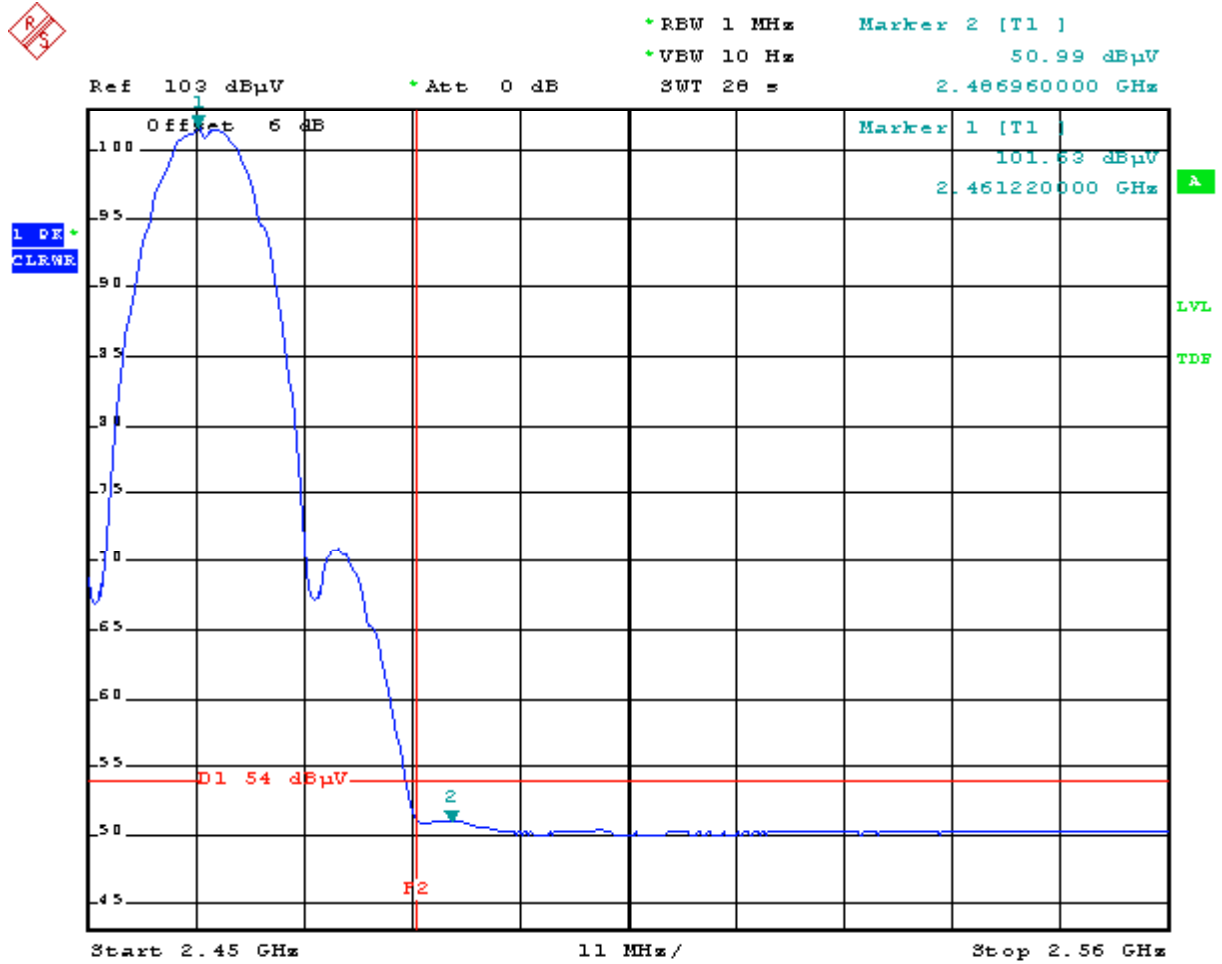
Date: 18.FEB.2005 11:12:13



Comment: Band-edge Test at CH11

Comment: Peak. Detector F2=2463.5MHz ATT=16dB 802.11b

Date: 18.FEB.2005 10:44:25

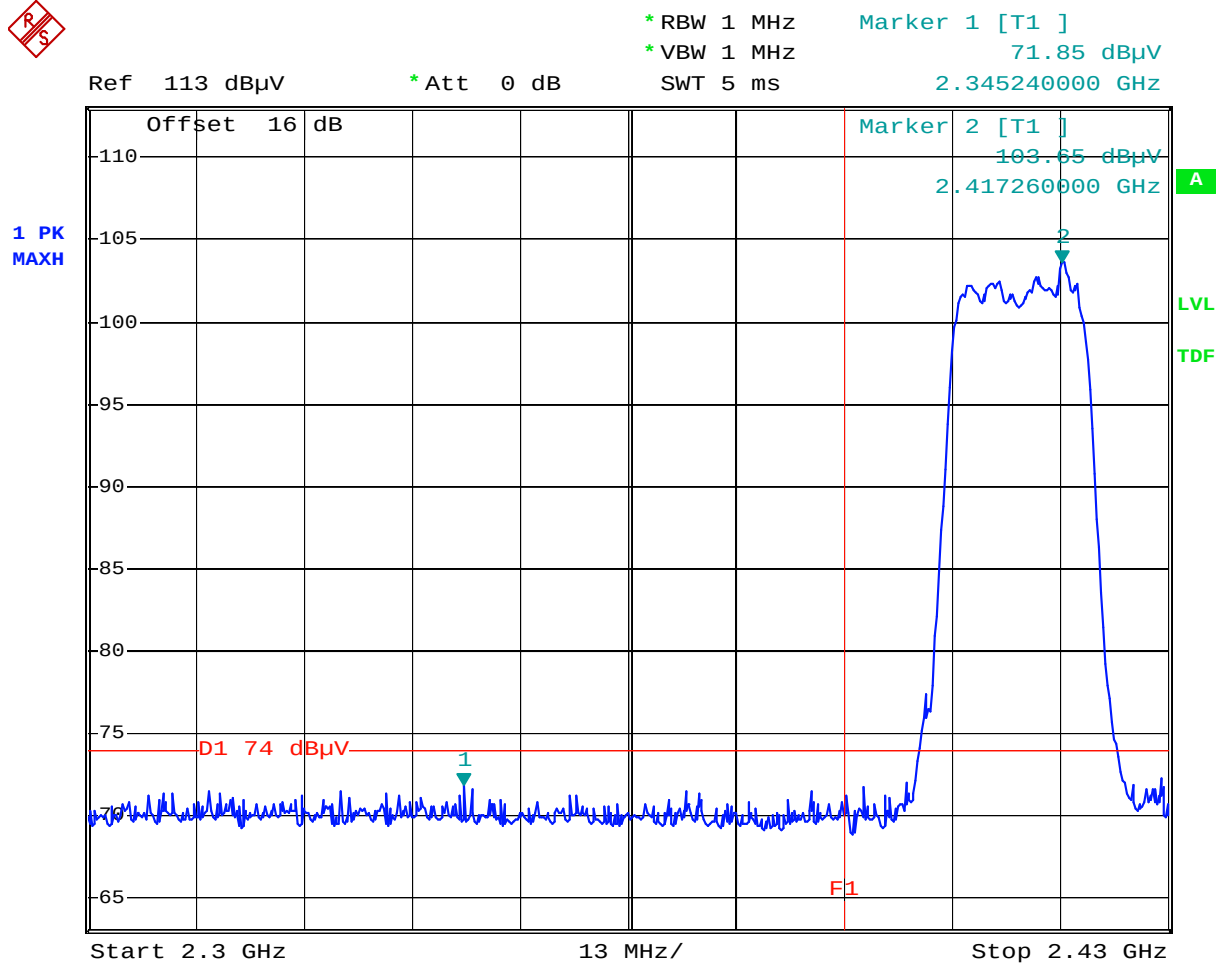


Comment: Band-edge Test at CH11

Comment: Avg. Detector F2=2463.5MHz ATT=6dB 602.11b

Date: 16.FEB.2005 10:52:06

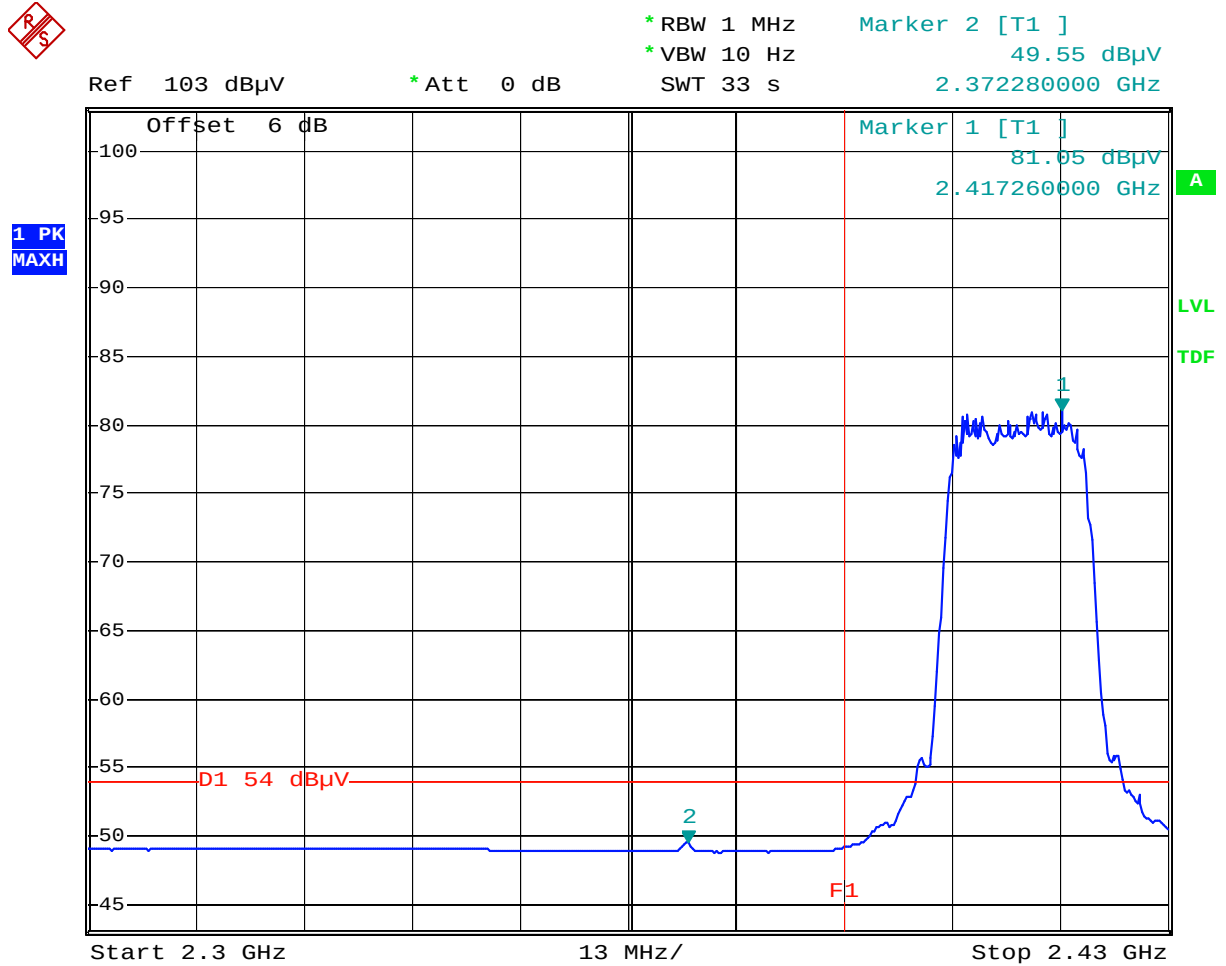
Test Mode: 802.11g operating (OFDM Modulation) mode



Comment: Band-edge Test at CH1

Comment: Peak. Detetor F1=2390MHz ATT=16dB 802.11g

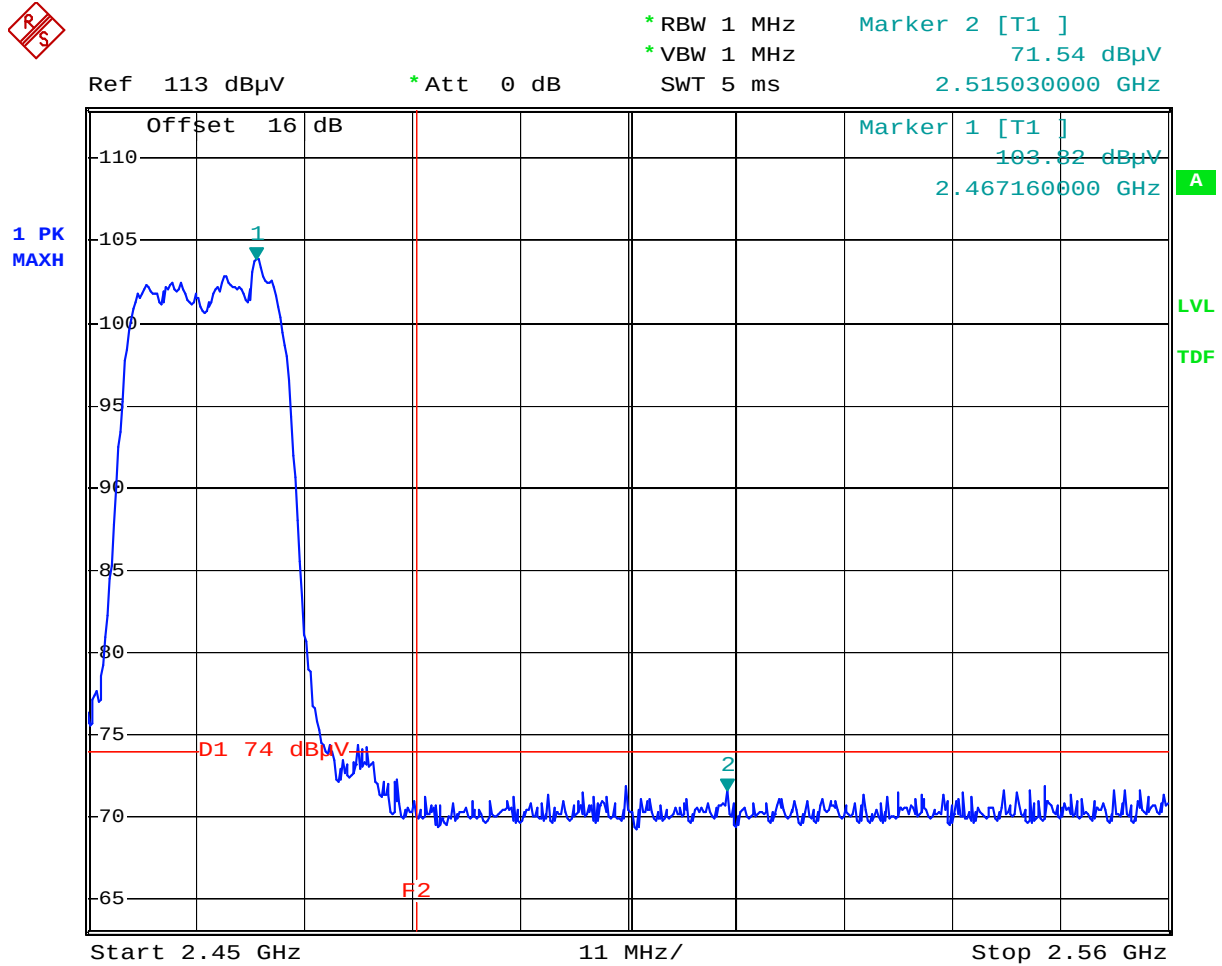
Date: 18.FEB.2005 11:05:54



Comment: Band-edge Test at CH1

Comment: Avg. Detetor F1=2390MHz ATT=6dB 802.11g

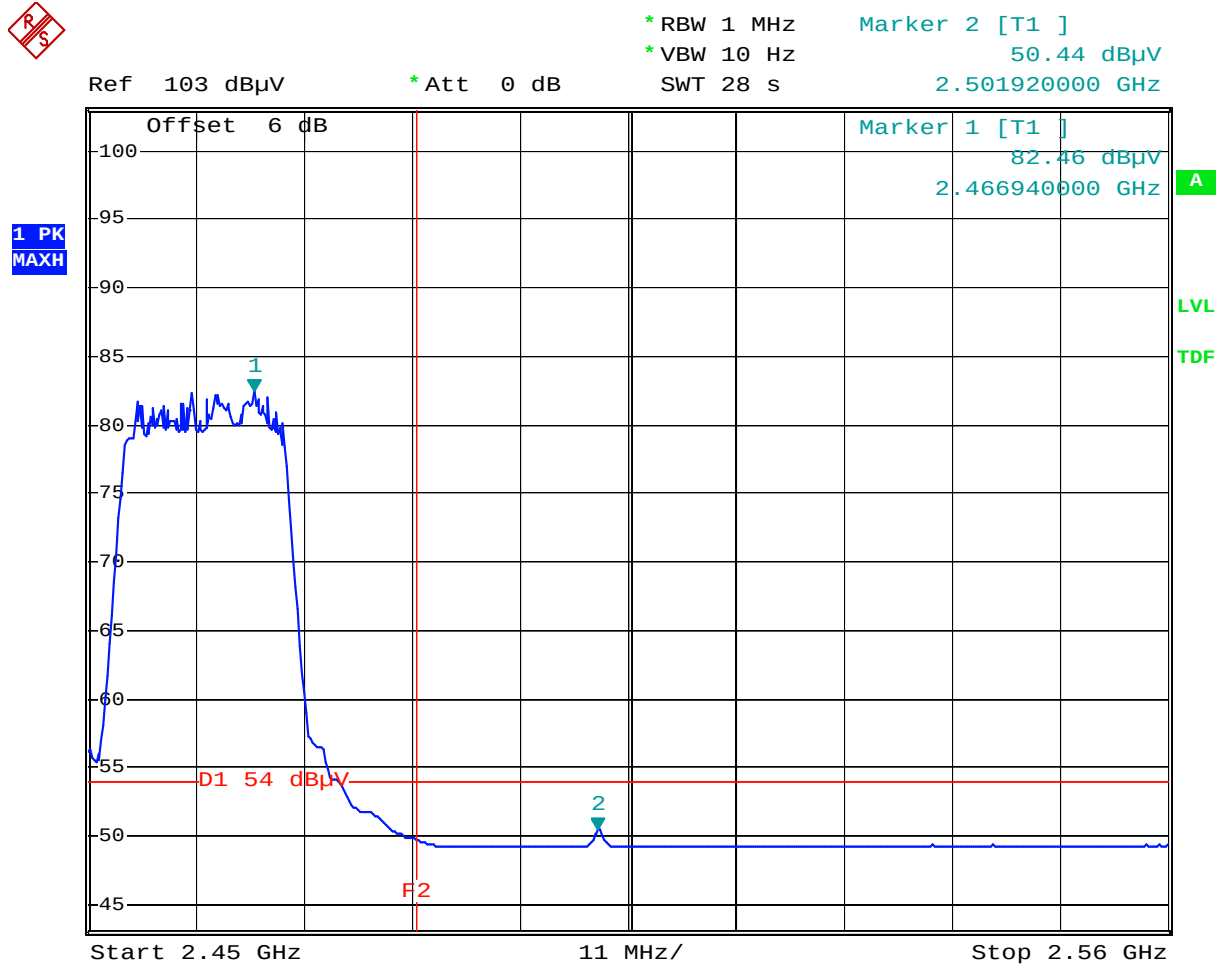
Date: 18.FEB.2005 11:09:16



Comment: Band-edge Test at CH11

Comment: Peak. Detetor F2=2483.5MHz ATT=16dB 802.11g

Date: 18.FEB.2005 10:57:53



Comment: Band-edge Test at CH11

Comment: Avg. Detetor F2=2483.5MHz ATT=6dB 802.11g

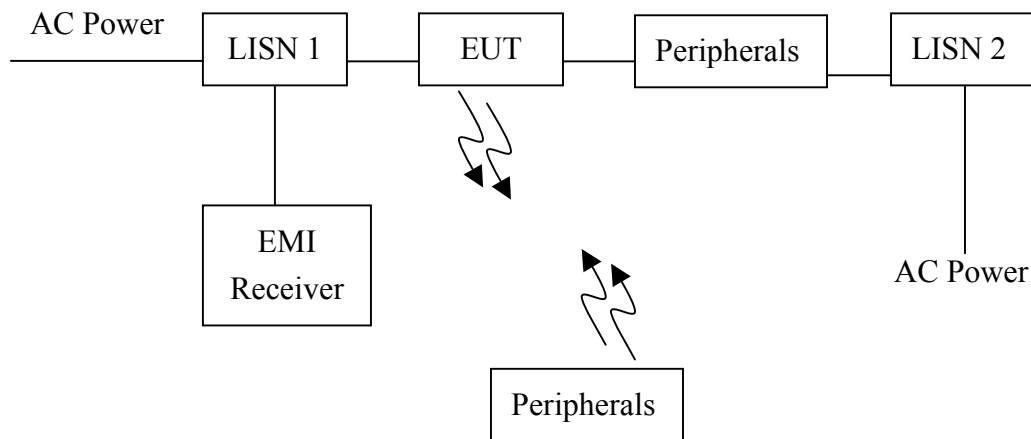
Date: 18.FEB.2005 11:01:22

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

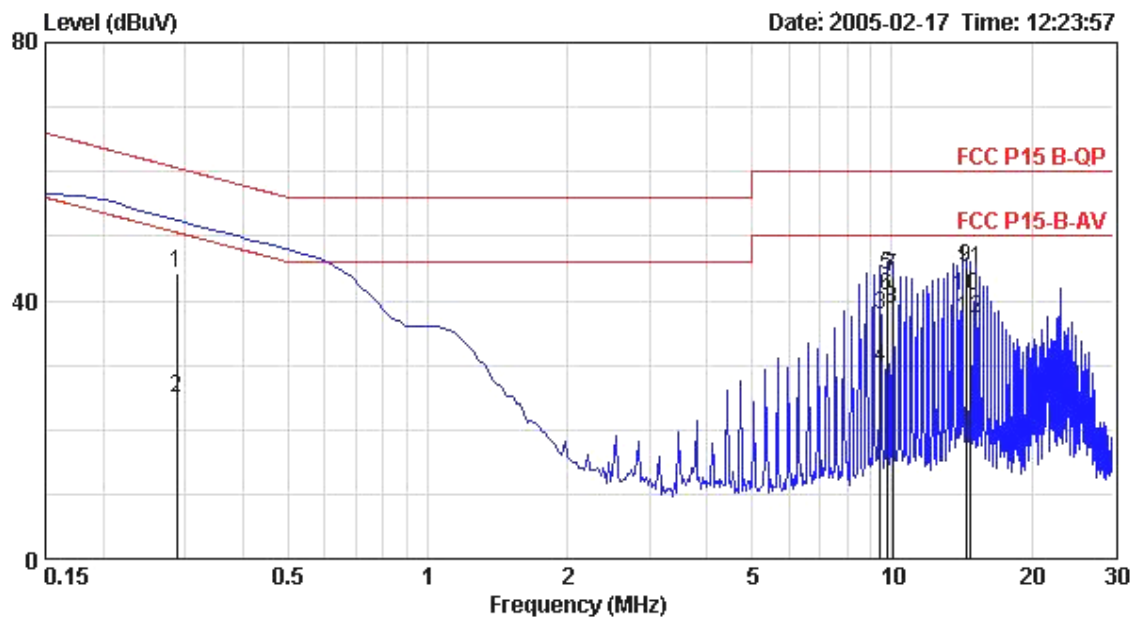
The test was performed the 802.11b and 802.11g normal operating modes, the worst case was occurred at 802.11g normal operating mode

Phase: Line
Model No.: HWRG1
Worst Case: 802.11g normal operating mode

Frequency (MHz)	Corr. Factor (dB)	Level Qp (dBuV)	Limit Qp (dBuV)	Level AV (dBuV)	Limit Av (dBuV)	Margin (dB)	
						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.: HWRG1
 Worst Case: 802.11g normal operating mode

Frequency (MHz)	Corr. Factor (dB)	Level	Limit	Level	Limit	Margin	
		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)

