

# EMC TEST REPORT

**Report No. : EME-060497**

**Model No. : DSL-2640T,  
DSL-2540T**

**Issued Date : Jun. 16, 2006**

**Applicant : D-Link Corporation  
No. 289, Shinghu 3<sup>rd</sup> Rd., Neihu District, Taipei City 114,  
Taiwan, R.O.C.**

**Test By : Intertek Testing Services Taiwan Ltd.  
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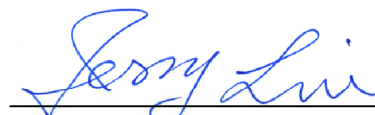
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Project Engineer



Kevin Chen

Reviewed By



Jerry Liu

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**Summary of Tests****Wireless ADSL2+ Router -Model: DSL-2640T  
FCC ID: KA2SL2640T**

Test	Reference	Results
Minimum 6dB Bandwidth test	15.247(a)(2)	Pass
Maximum Output Power test	15.247(b)	Pass
Radiated Spurious Emission test	15.205, 15.209	Pass
Power Spectrum Density test	15.247(e)	Pass
Emission on the Band Edge test	15.247(d)	Pass
AC Power Line Conducted Emission test	15.207	Pass

**1. General information**

**1.1 Identification of the EUT**

Applicant : D-Link Corporation  
 Product : Wireless ADSL2+ Router  
 Model No. : DSL-2640T  
 FCC ID. : KA2SL2640T  
 Frequency Range : 2400 MHz ~ 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 : 100-240Vac, 50-60Hz  
 Power Cord : N/A  
 Sample Received : Apr. 17, 2006  
 Test Date(s) : May 17, 2006 ~ Jun. 19, 2006

**1.2 Additional information about the EUT**

The EUT is an Wireless ADSL2+ Router, and was defined as information technology equipment.

The models listed below are identical to model DSL-2640T (EUT). Different brand serves as marking strategy.

Trade Name	Model Number	Difference
D-Link	DSL-2640T	802.11g Wireless Router Modem
	DSL-2540T	Ethernet Router Modem

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 : SMA Reverse

### 1.4 Peripherals equipment

Peripherals	Manufacturer	Product No.	Serial No.	FCC ID
Notebook PC	DELL	PP02X	8Y210A04	FCC DoC Approved

## **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**

Plug the EUT into Notebook PC via USB interface, then turn on the Notebook PC power and run the test program “Radio scpoe” under windows OS, which provide by manufacturer.

The EUT was operated under Tx, Rx and standby mode during all the tests.

### 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	04/16/2007
EMI Test Receiver	Rohde & Schwarz	20Hz~26.5GHz	ESMI	EC317	08/07/2006
Spectrum Analyzer	Rohde & Schwarz	9kHz~30GHz	FSP 30	EC353	07/24/2006
Spectrum Analyzer	Rohde & Schwarz	20Hz~40GHz	FSEK 30	EC365	11/01/2006
Horn Antenna	SCHWARZBECK	1GHz~18GHz	BBHA 9120 D	EC371	12/22/2007
Horn Antenna	SCHWARZBECK	14GHz~40GHz	BBHA 9170	EC351	07/08/2007
Bilog Antenna	SCHWARZBECK	25MHz~2GHz	VULB 9168	EC347	12/23/2007
Pre-Amplifier	MITEQ	100MHz~26.5GHz	919981	EC373	02/11/2007
Wideband Peak Power Meter/ Sensor	Anritsu	100MHz~18GHz	ML2497A/ MA2491A	EC396	11/10/2006
Controller	HDGmbH	N/A	CM 100	EP346	N/A
Antenna Tower	HDGmbH	N/A	MA 240	EP347	N/A
LISN	Rohde & Schwarz	9KHz~30MHz	ESH3-Z5	EC344	01/13/2007

Note: 1. The above equipments are within the valid calibration period.

2. The test antennas (receiving antenna) are calibration per 3 years.



### 3. Minimum 6dB Bandwidth test

#### 3.1 Operating environment

Temperature: 25  
 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 100kHz, 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 (DSSS Modulation) operating mode

Channel	Frequency (MHz)	Bandwidth (MHz)	Limit
1 (lowest)	2412	12.60	> 500kHz
6 (middle)	2437	13.12	> 500kHz
11 (highest)	2462	13.12	> 500kHz

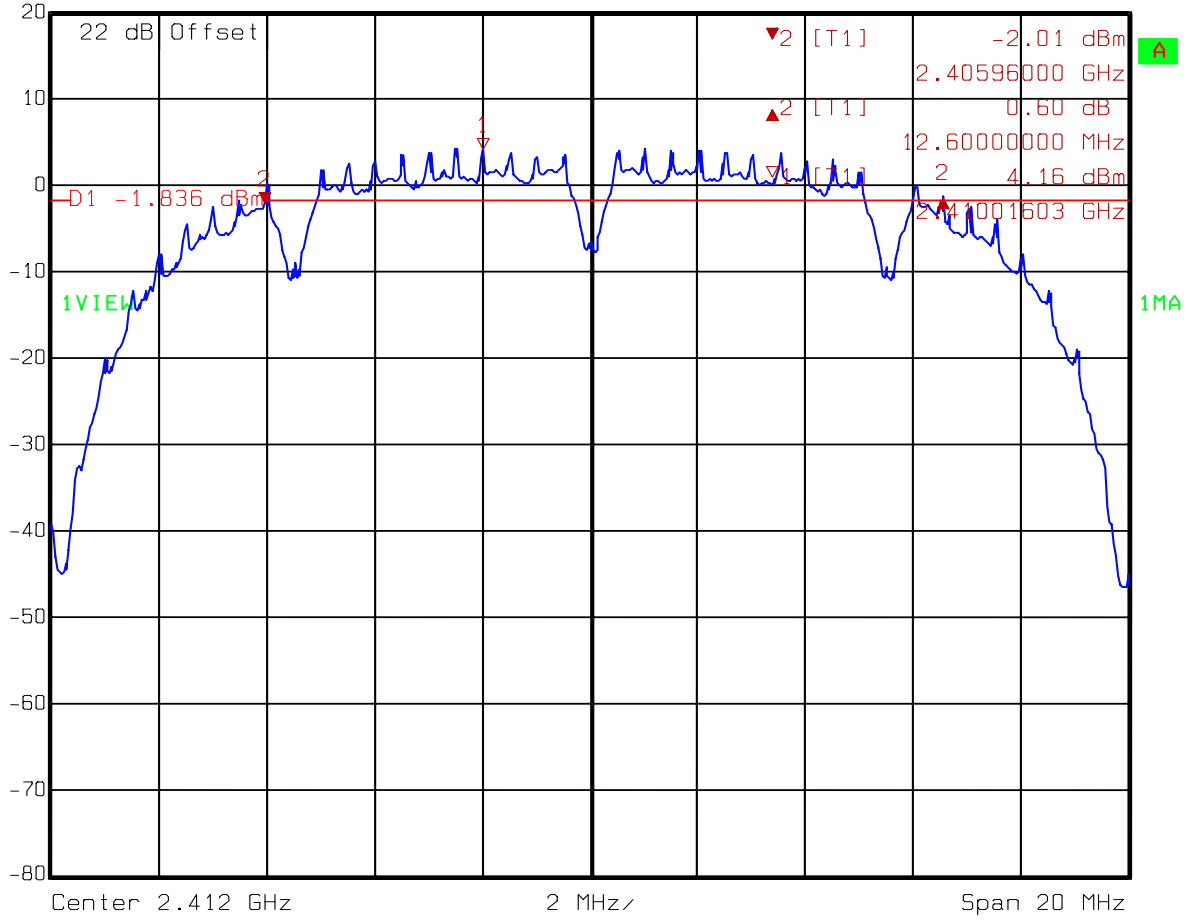
##### Test Mode: 802.11g (OFDM Modulation) operating mode

Channel	Frequency (MHz)	Bandwidth (MHz)	Limit
1 (lowest)	2412	16.56	> 500kHz
6 (middle)	2437	13.48	> 500kHz
11 (highest)	2462	16.52	> 500kHz

Please see the plot below.

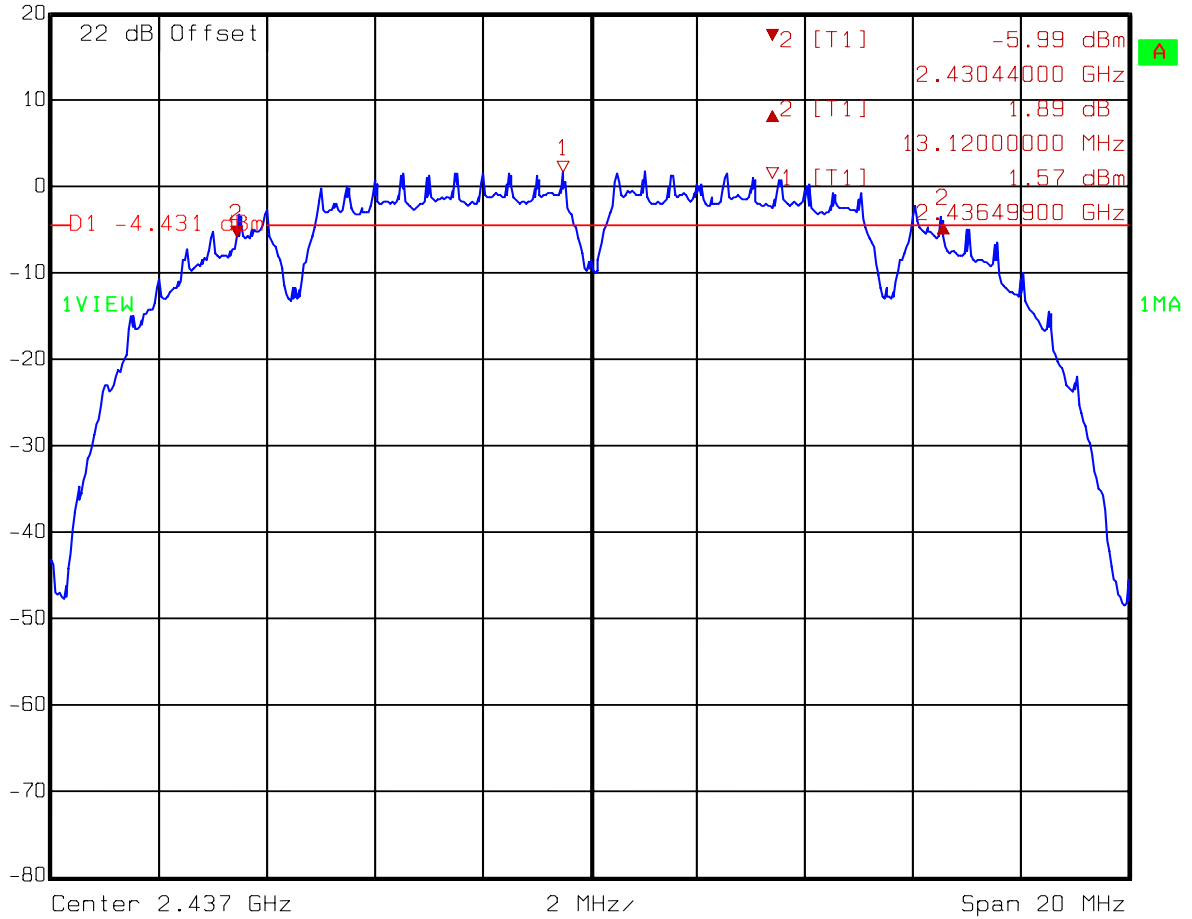
## Test Mode: 802.11b(DSSS Modulation) operating mode

	Max/Ref Lvl	Delta 2 [T1]	RBW	100 kHz	RF Att	10 dB
	20 dBm	0.60 dB	VBW	100 kHz		
	2 dBm	12.60000000 MHz	SWT	5 ms	Unit	dBm



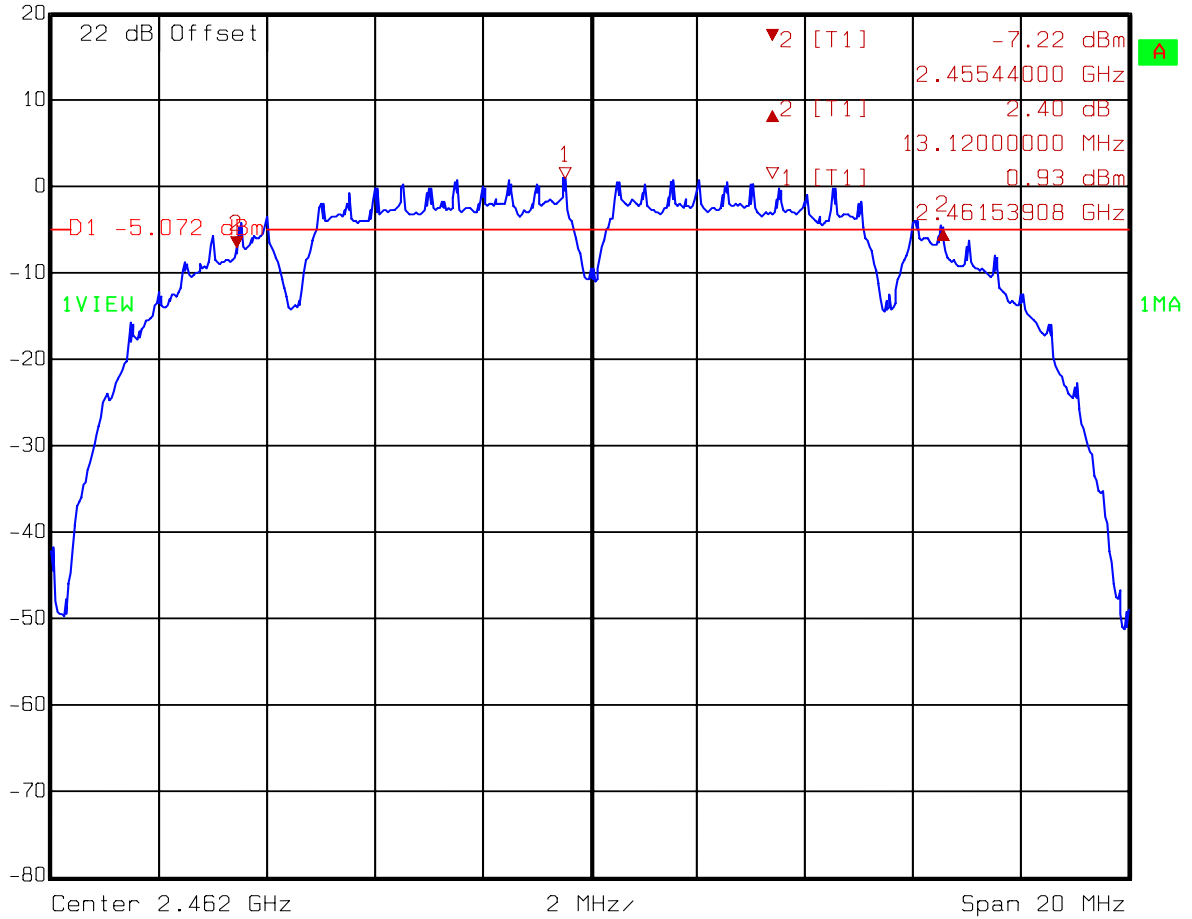
Title: 6dB Bandwidth  
 Comment A: Channel 01 at 802.11b mode  
 Date: 05.JUN.2006 14:48:51

	Max/Ref Lvl <span style="color: blue;">Delta 2 [T1]</span>	RBW    100 kHz	RF Att    10 dB
	20 dBm <span style="color: blue;">1.89 dB</span>	VBW    100 kHz	
	2 dBm <span style="color: blue;">13.1200000 MHz</span>	SWT    5 ms	Unit                                    dBm



Title:            6dB Bandwidth  
 Comment A: Channel 06 at 802.11b mode  
 Date:            05.JUN.2006 14:52:17

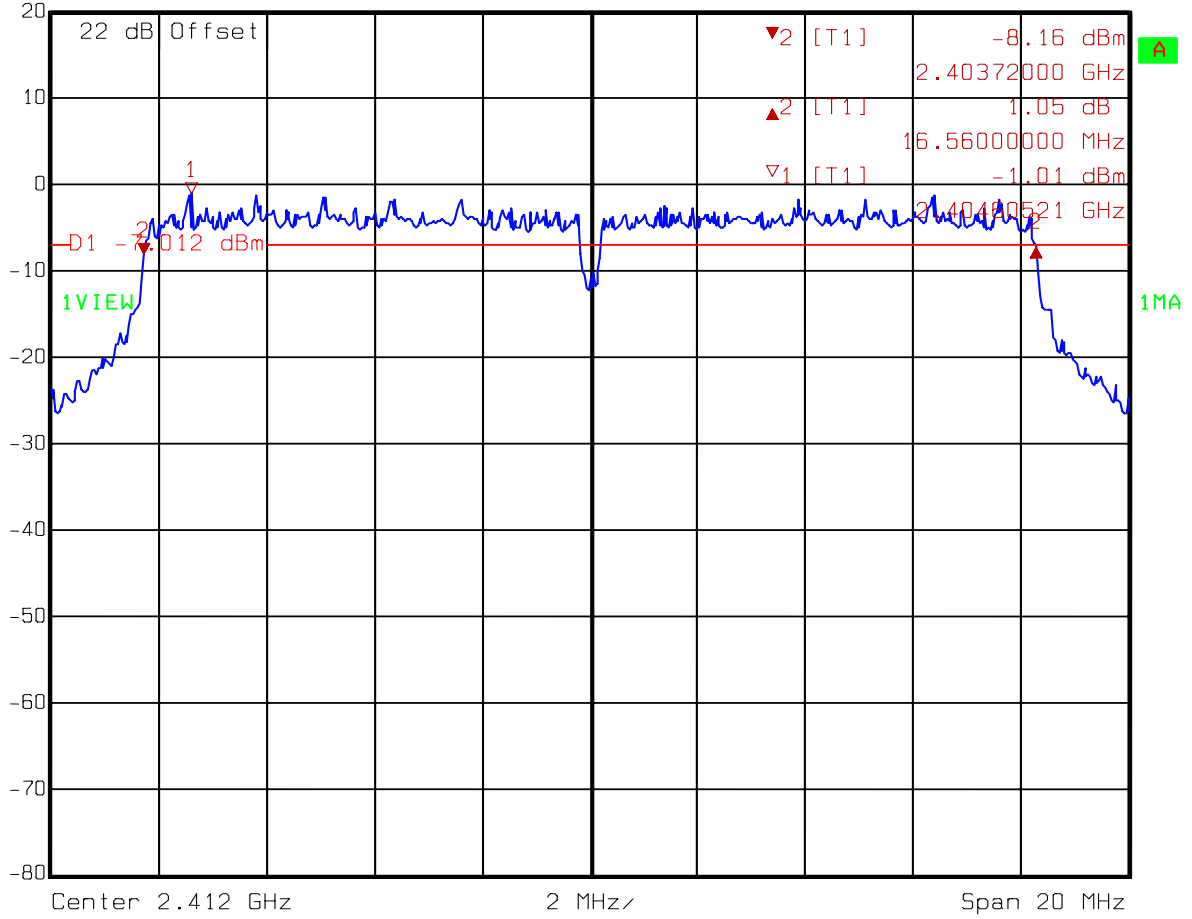
	Max/Ref Lvl	Delta 2 [T1]	RBW	100 kHz	RF Att	10 dB
	20 dBm	2.40 dB	VBW	100 kHz		
	2 dBm	13.1200000 MHz	SWT	5 ms	Unit	dBm



Title: 6dB Bandwidth  
 Comment A: Channel 11 at 802.11b mode  
 Date: 05.JUN.2006 14:53:37

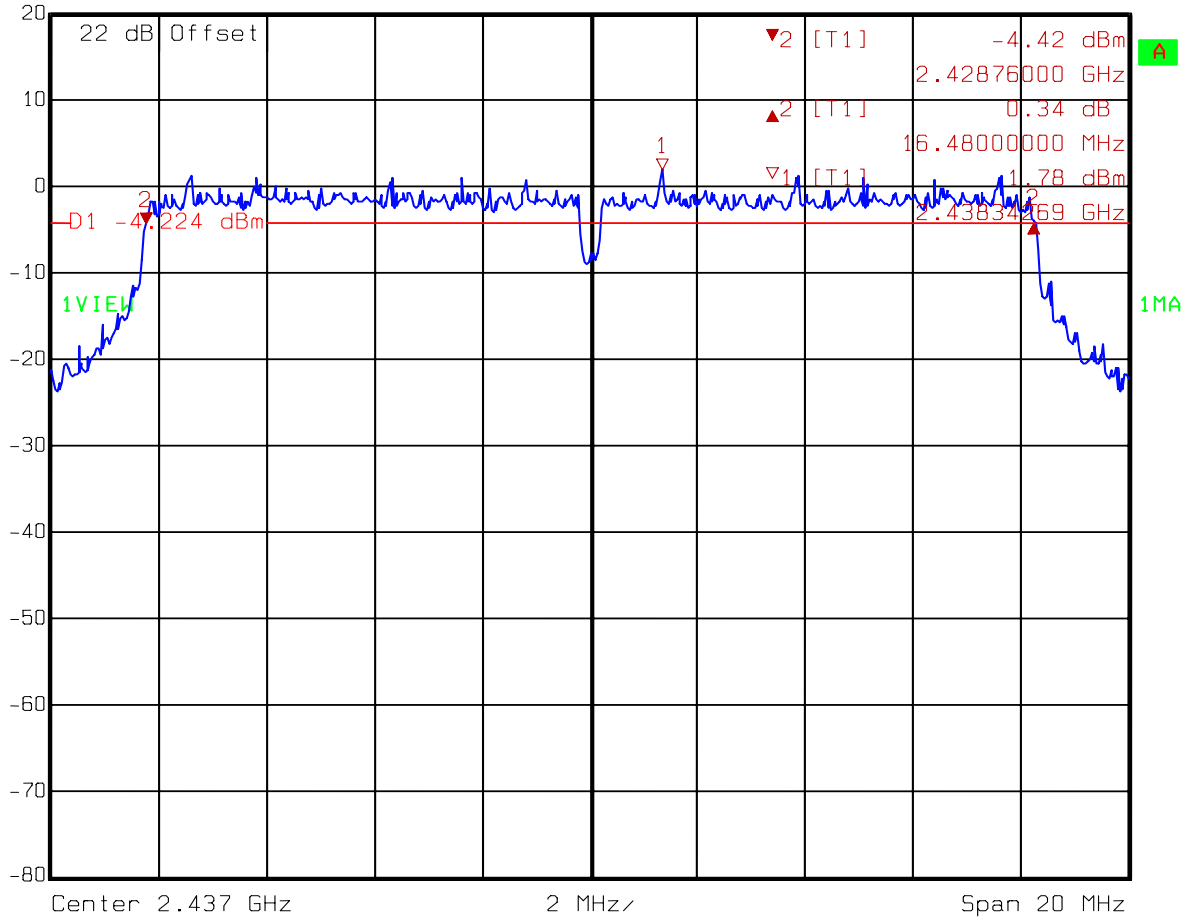
**Test Mode: 802.11g(OFDM Modulation) operating mode**

	Max/Ref Lvl	Delta 2 [T1]	RBW	100 kHz	RF Att	10 dB
	20 dBm	1.05 dB	VBW	100 kHz		
	2 dBm	16.56000000 MHz	SWT	5 ms	Unit	dBm



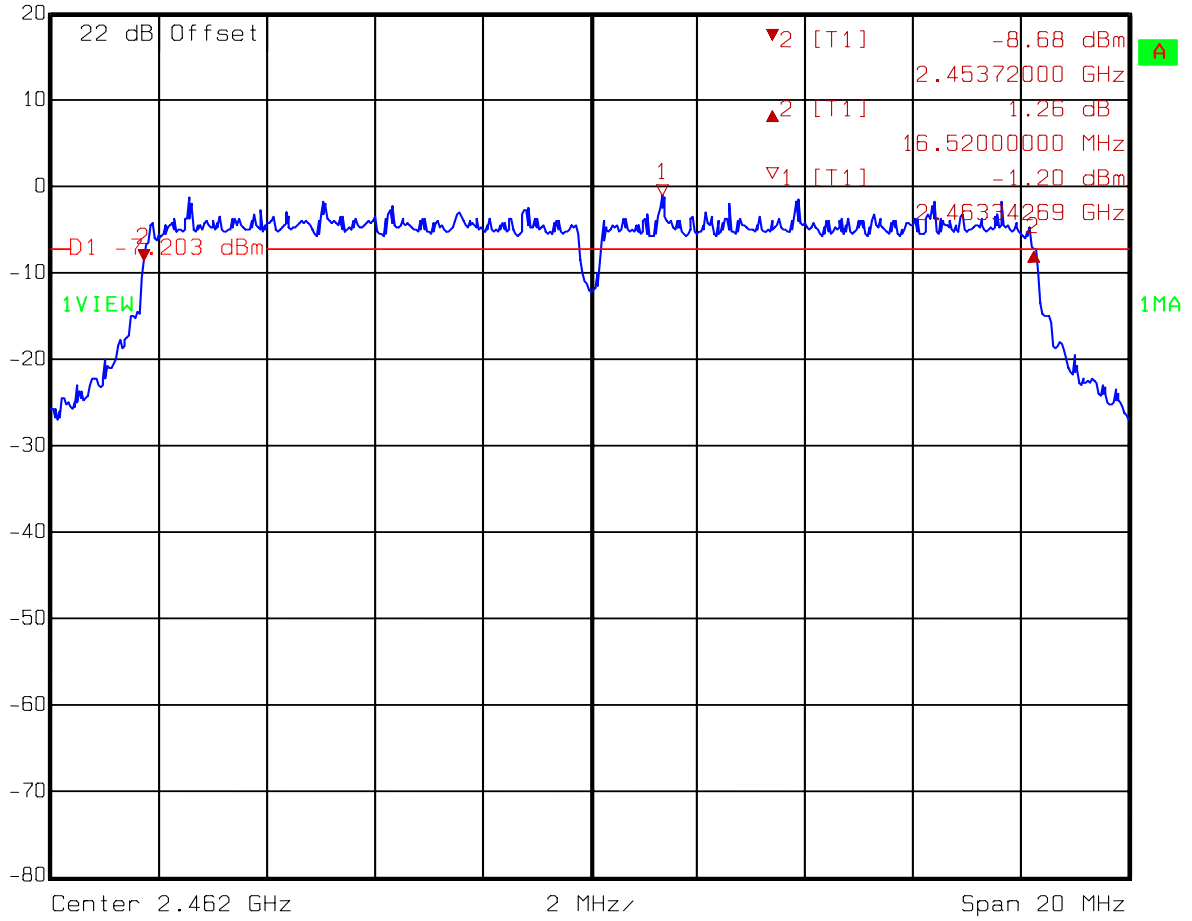
Title:            6dB Bandwidth  
 Comment A: Channel 01 at 802.11g mode  
 Date:            05.JUN.2006 14:57:20

	Max/Ref Lvl <span style="color: blue;">Delta 2 [T1]</span>	RBW    100 kHz	RF Att    10 dB
	20 dBm <span style="color: blue;">0.34 dB</span>	VBW    100 kHz	
	2 dBm <span style="color: blue;">16.48000000 MHz</span>	SWT    5 ms	Unit                                    dBm



Title:            6dB Bandwidth  
 Comment A: Channel 06 at 802.11g mode  
 Date:            05.JUN.2006 15:00:49

	Max/Ref Lvl	Delta 2 [T1]	RBW	100 kHz	RF Att	10 dB
	20 dBm	1.26 dB	VBW	100 kHz		
	2 dBm	16.52000000 MHz	SWT	5 ms	Unit	dBm



Title: 6dB Bandwidth  
 Comment A: Channel 11 at 802.11g mode  
 Date: 05.JUN.2006 15:02:09

#### 4. Maximum Output Power test

##### 4.1 Operating environment

Temperature: 24  
 Relative Humidity: 52 %  
 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 (2 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 (DSSS Modulation) operating mode

Channel	Freq. (MHz)	C.L. (dB)	Reading (dBm)	Conducted Peak Output Power		Limit (dBm)
				(dBm)	(mW)	
1 (lowest)	2412	2	15.92	17.92	61.94	30
6 (middle)	2437	2	16.75	18.75	74.99	30
11 (highest)	2462	2	15.63	17.63	57.94	30

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

Channel	Freq. (MHz)	C.L. (dB)	Reading (dBm)	Conducted Peak Output Power		Limit (dBm)
				(dBm)	(mW)	
1 (lowest)	2412	2	22.21	24.21	263.63	30
6 (middle)	2437	2	23.12	25.12	325.09	30
11 (highest)	2462	2	22.15	24.15	260.02	30

Remark:

Conducted Peak Output Power = Reading + C.L.



## **5. RF Antenna Conducted Spurious test**

### **5.1 Operating environment**

Temperature: 25  
Relative Humidity: 58 %

### **5.2 Test setup & procedure**

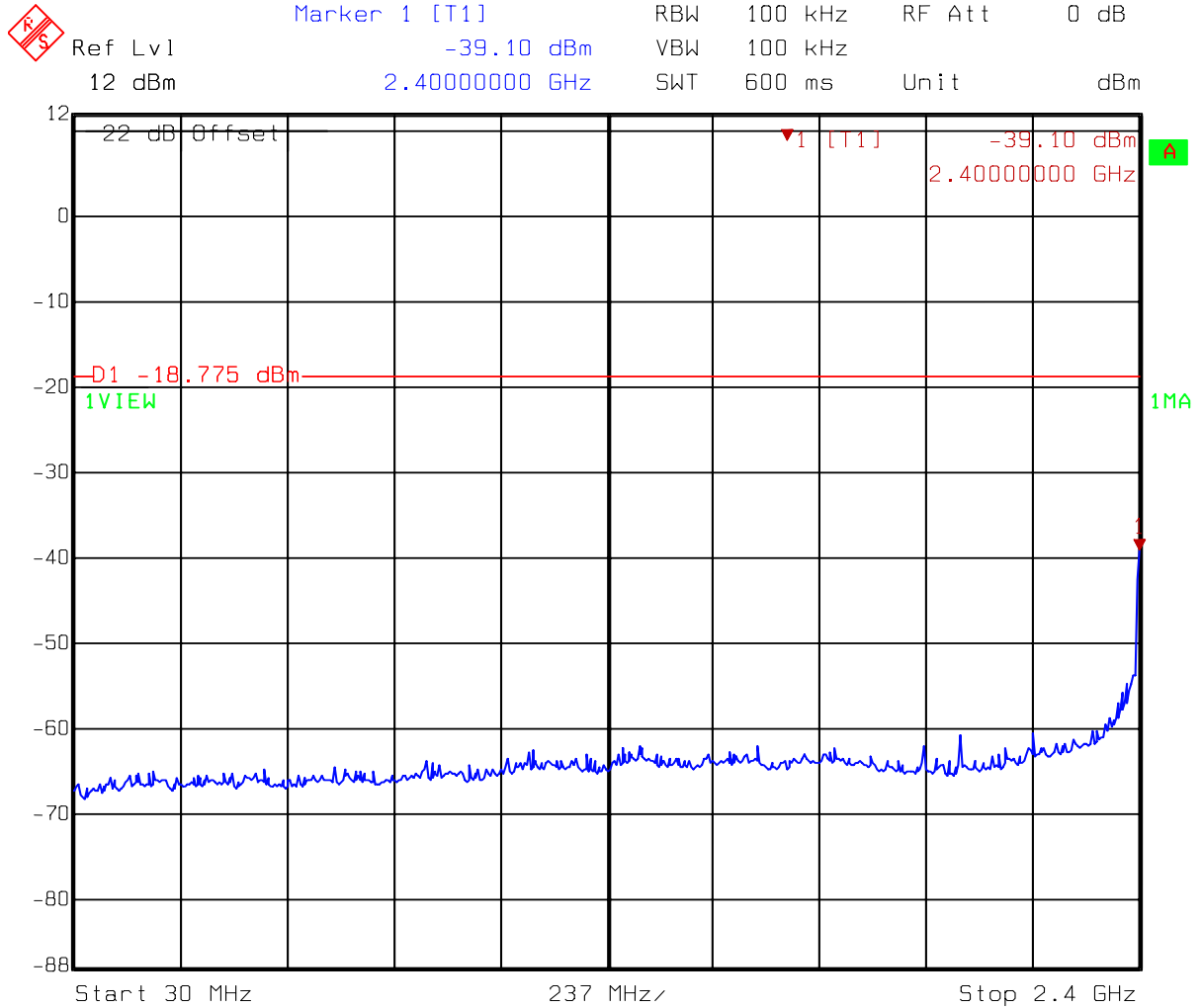
The measurements were performed from 30MHz to 25GHz RF antenna conducted per FCC 15.247 (c) was measured from the EUT antenna port using a 50ohm spectrum analyzer with the resolution bandwidth set at 100 kHz, and the video bandwidth set at 100 kHz.

Harmonics and spurious noise must be at least 20dB down from the highest emission level within the authorized band as measured with a 100 kHz RBW. The table below is the results from the highest emission for each channel within the authorized band. This table was used to determine the spurious limits for each channel.

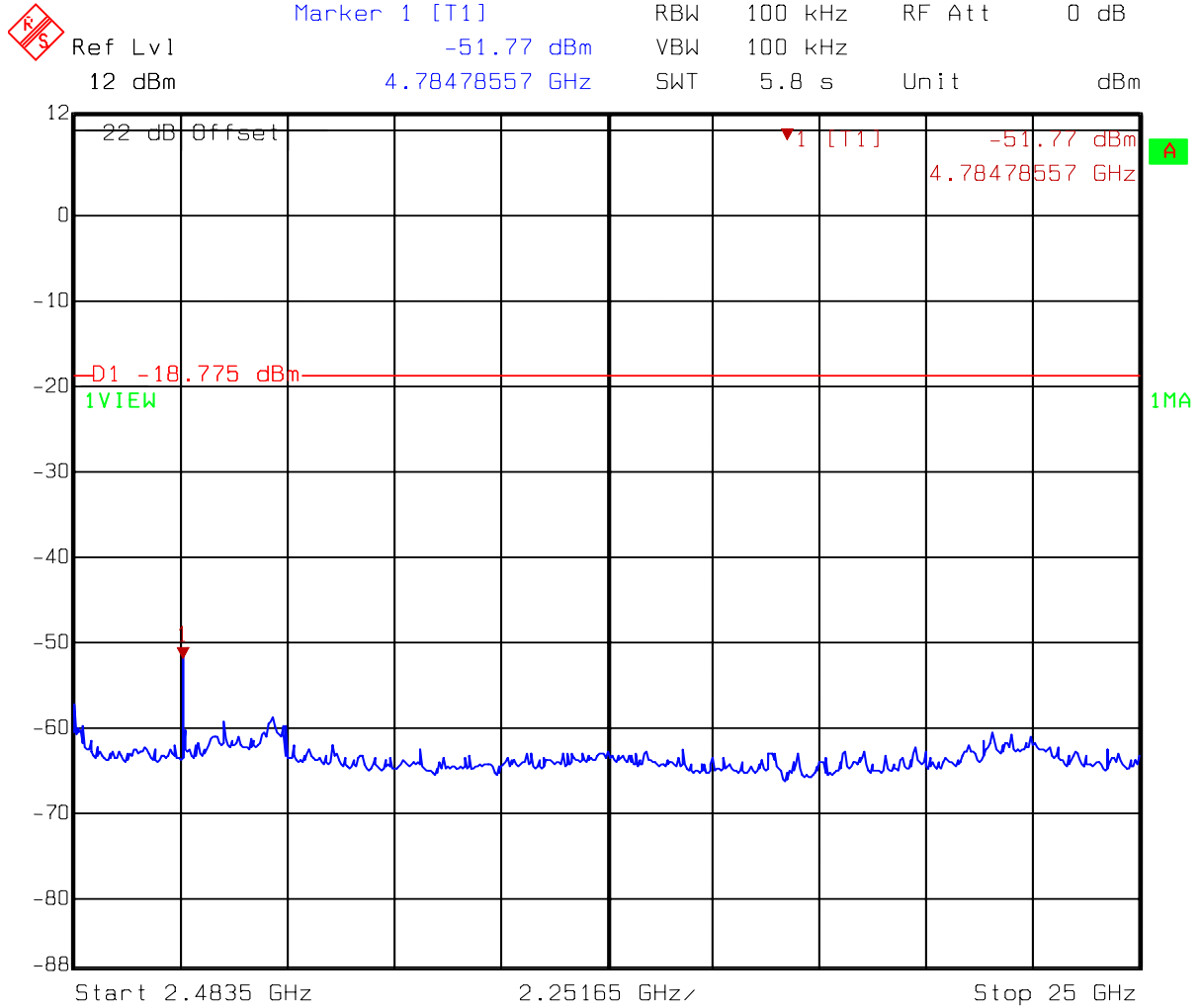
### **5.3 Measured data of the highest RF Antenna Conducted Spurious test result**

The test results please see the plot below.

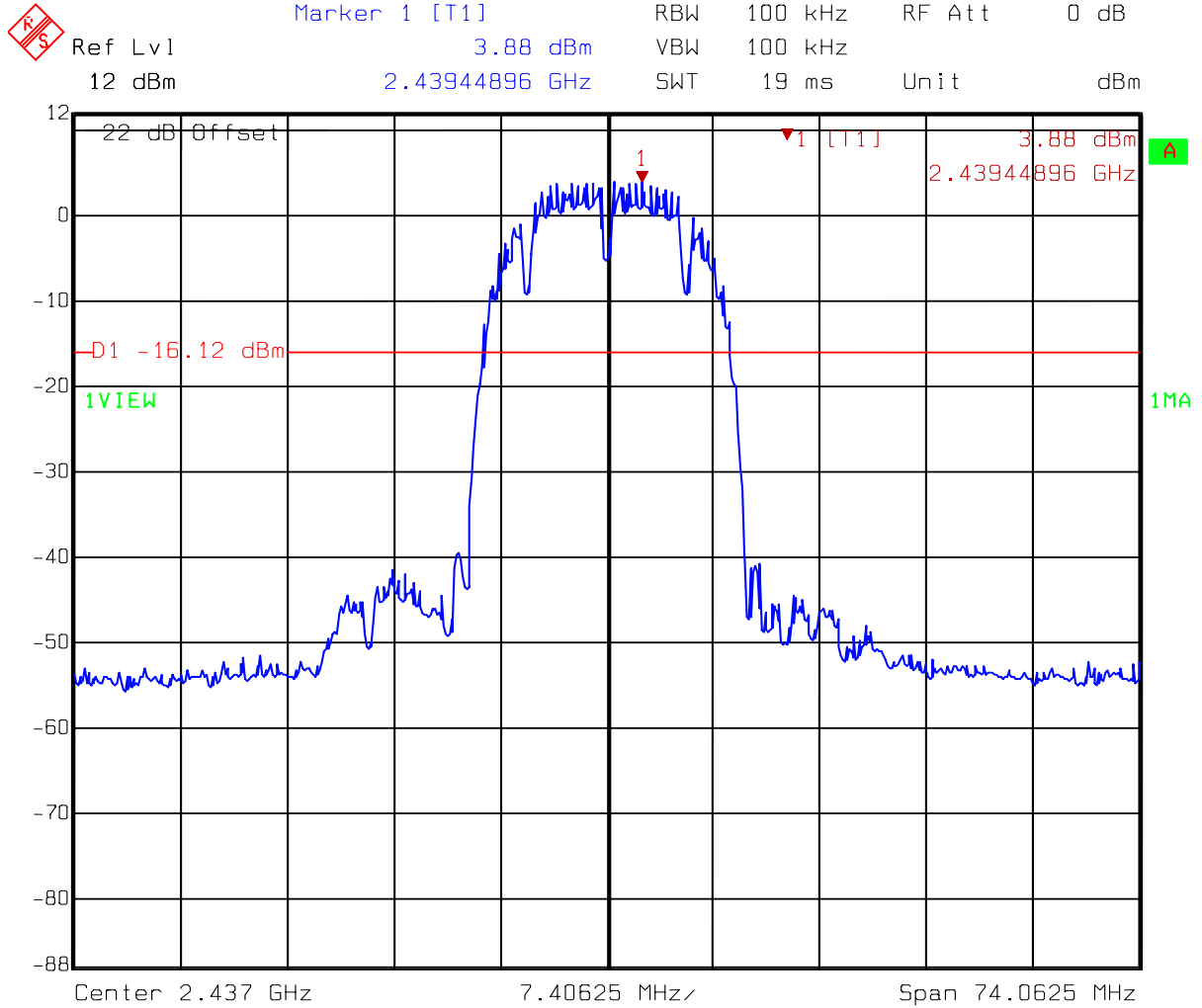
### Test Mode: 802.11b(DSSS Modulation) operating mode



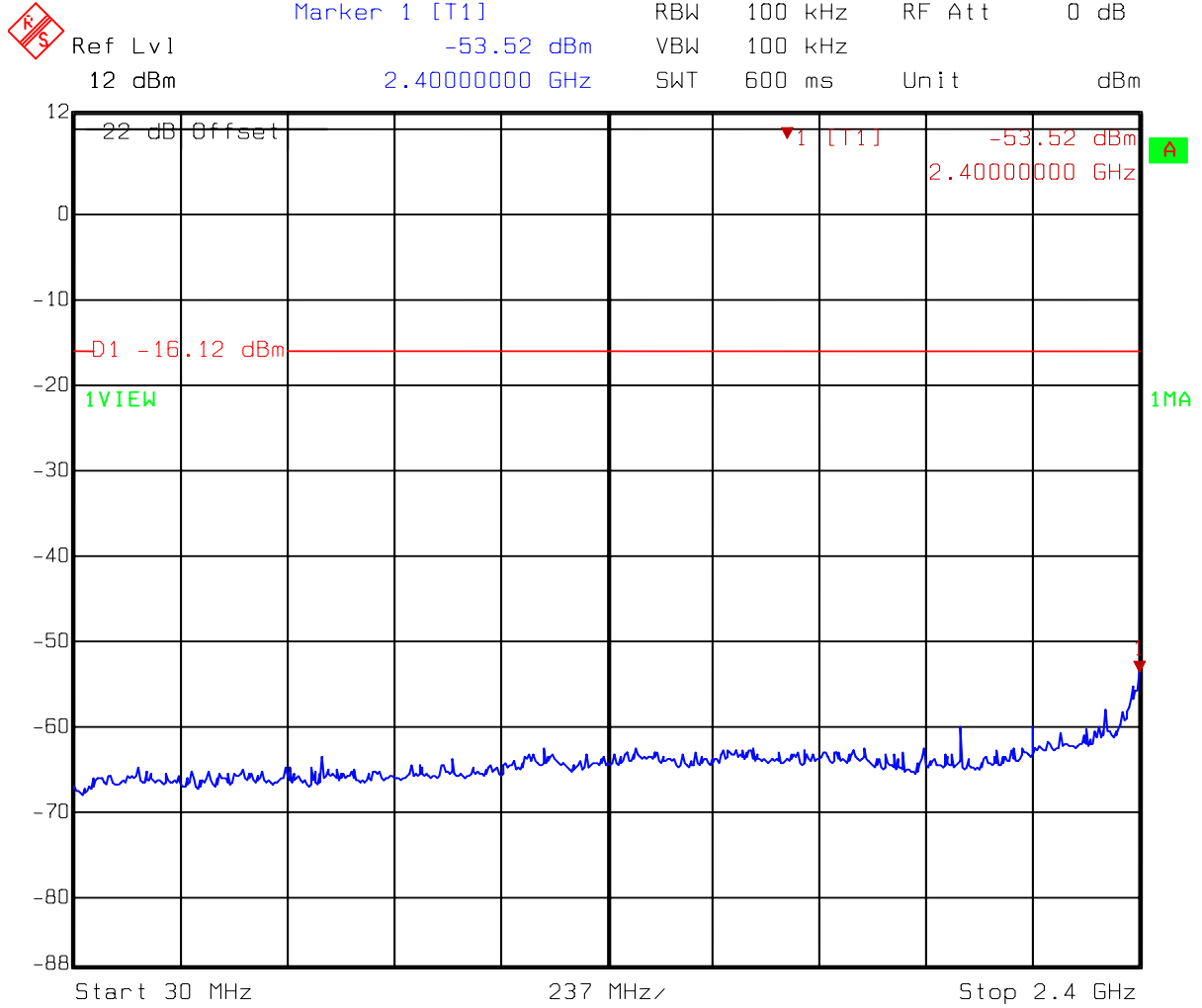
Title: Conductive Spurious  
 Comment A: 11b ch1 30MHz~2.4GHz  
 Date: 05.JUL.2006 14:33:08



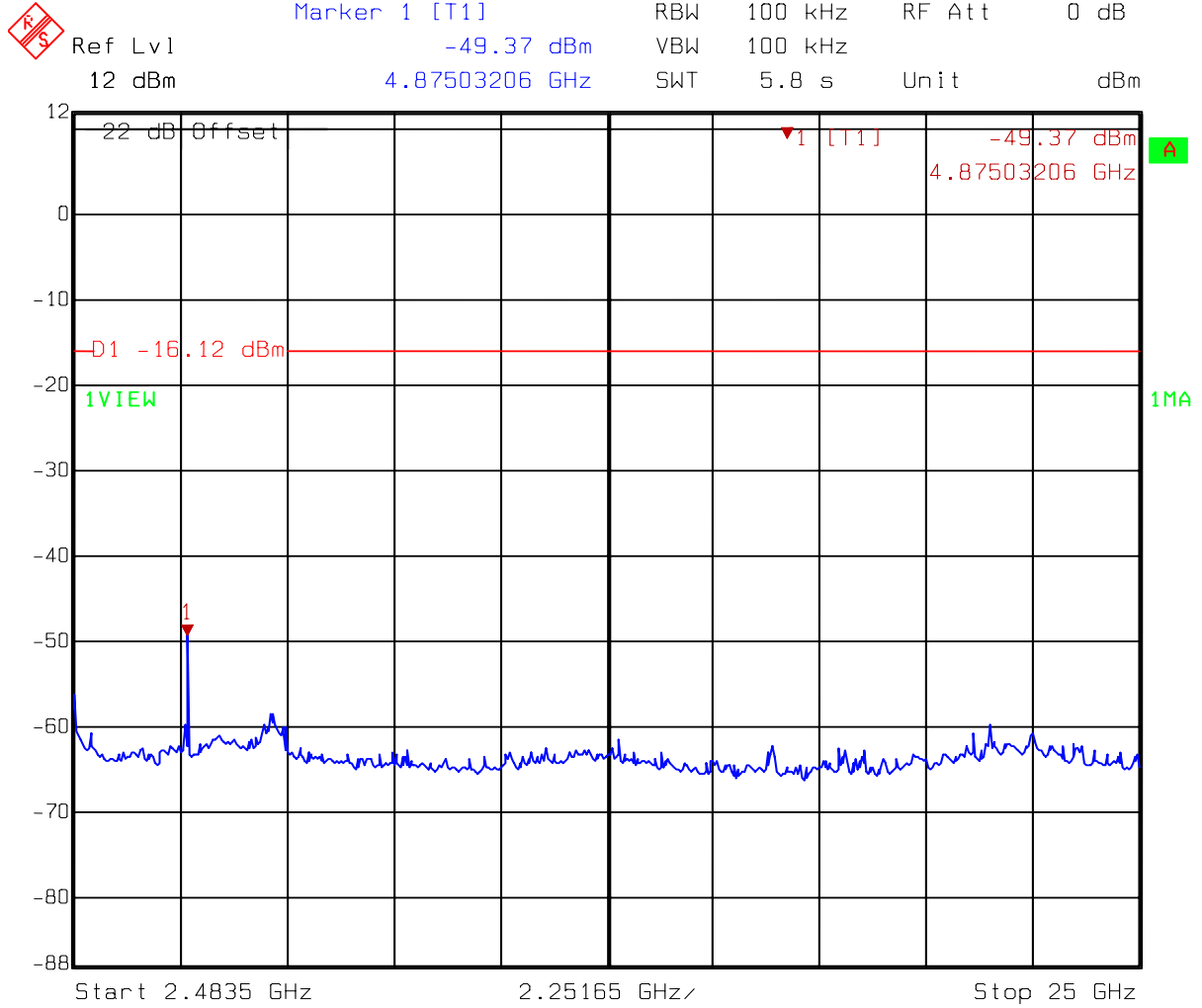
Title: Conductive Spurious  
 Comment A: 11b ch1 2483.5MHz~25GHz  
 Date: 05.JUL.2006 14:35:21



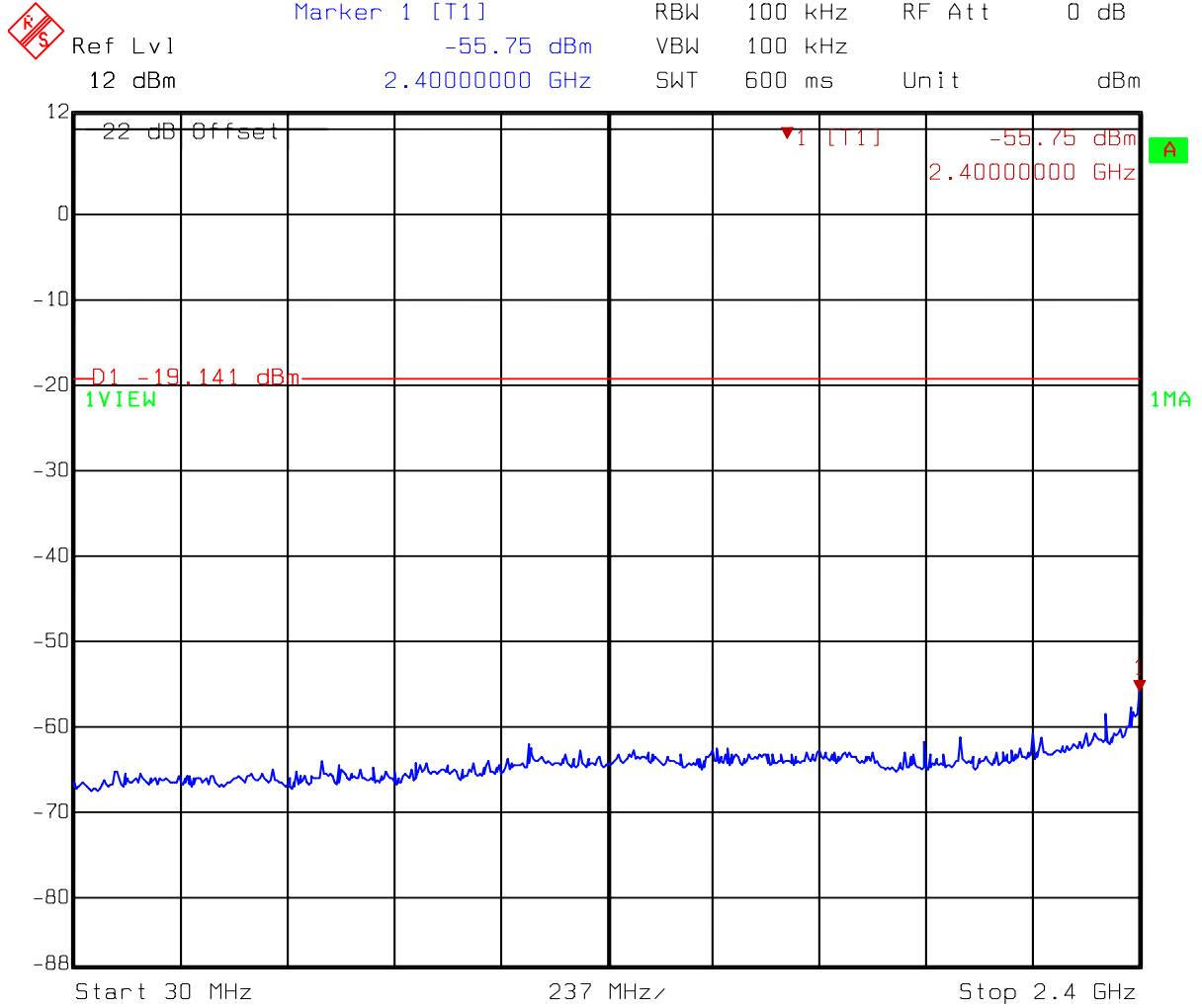
Title:            Conductive Spurious  
 Comment A:    11b ch6  
 Date:            05.JUL.2006 14:45:47



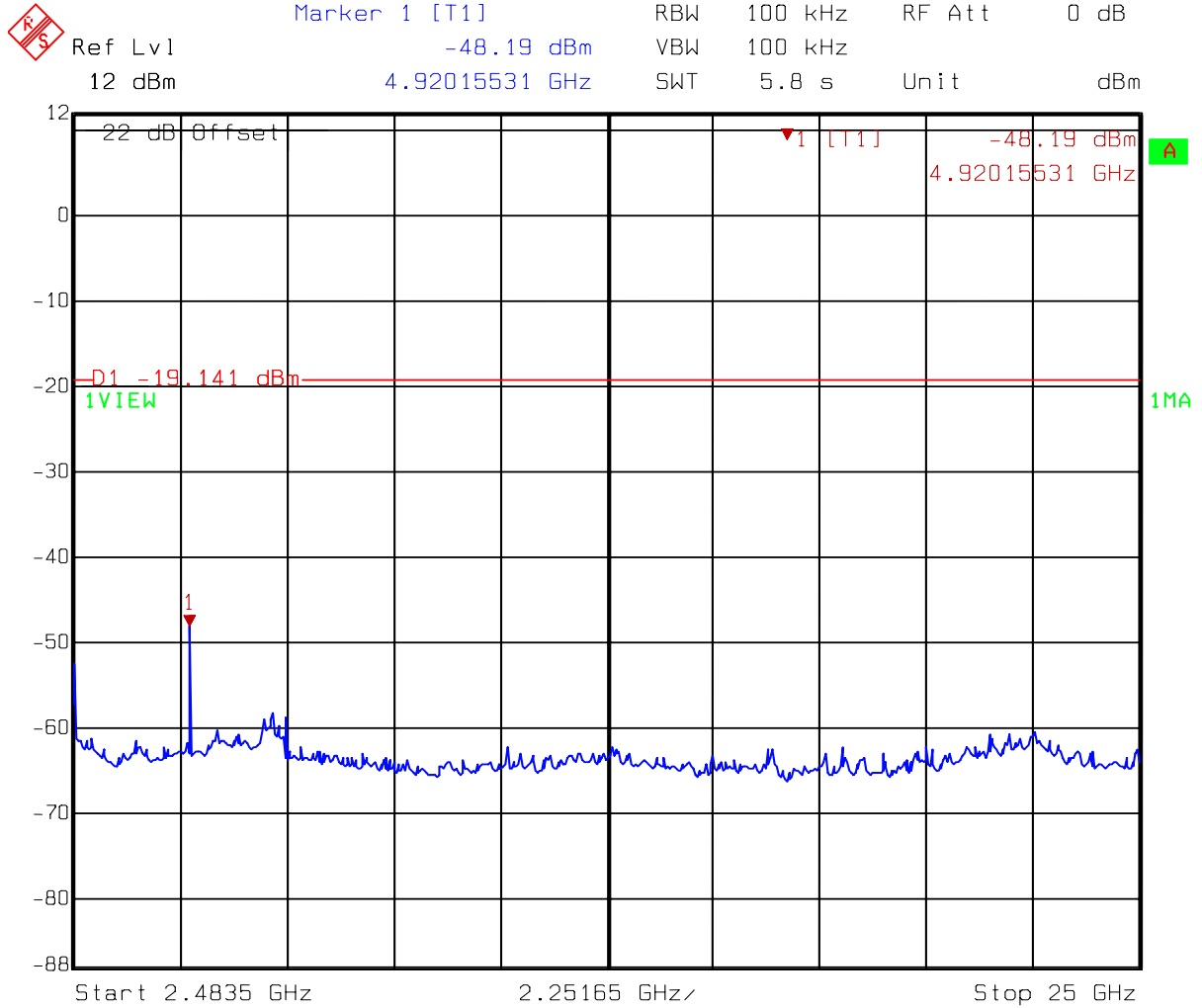
Title:            Conductive Spurious  
 Comment A:    11b ch6 30MHz~2.4GHz  
 Date:            05.JUL.2006 14:47:33



Title:      Conductive Spurious  
 Comment A: 11b ch6 2483.5MHz~25GHz  
 Date:      05.JUL.2006 14:49:41



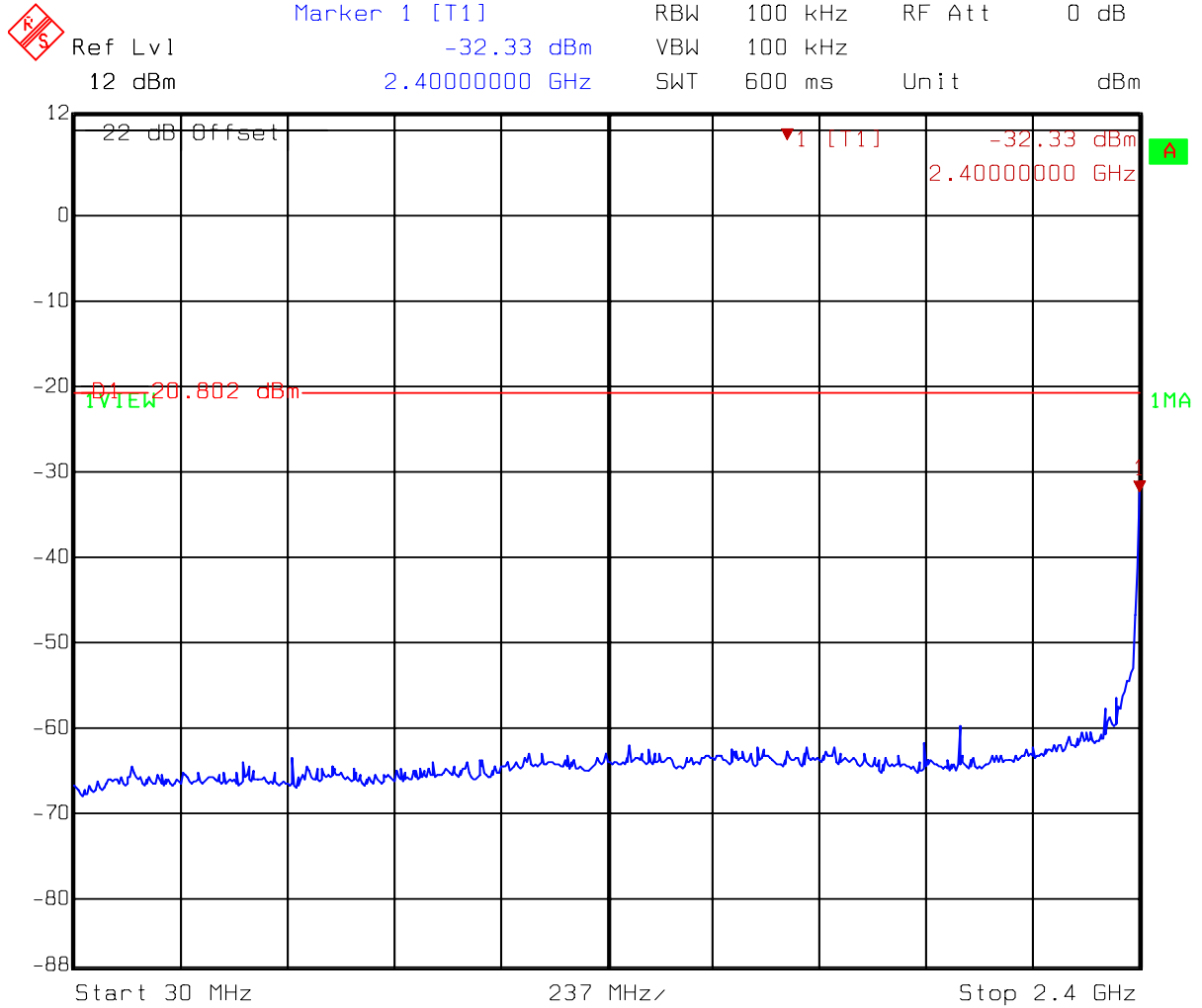
Title:      Conductive Spurious  
 Comment A: 11b ch11 30MHz~2.4GHz  
 Date:      05.JUL.2006 14:41:53



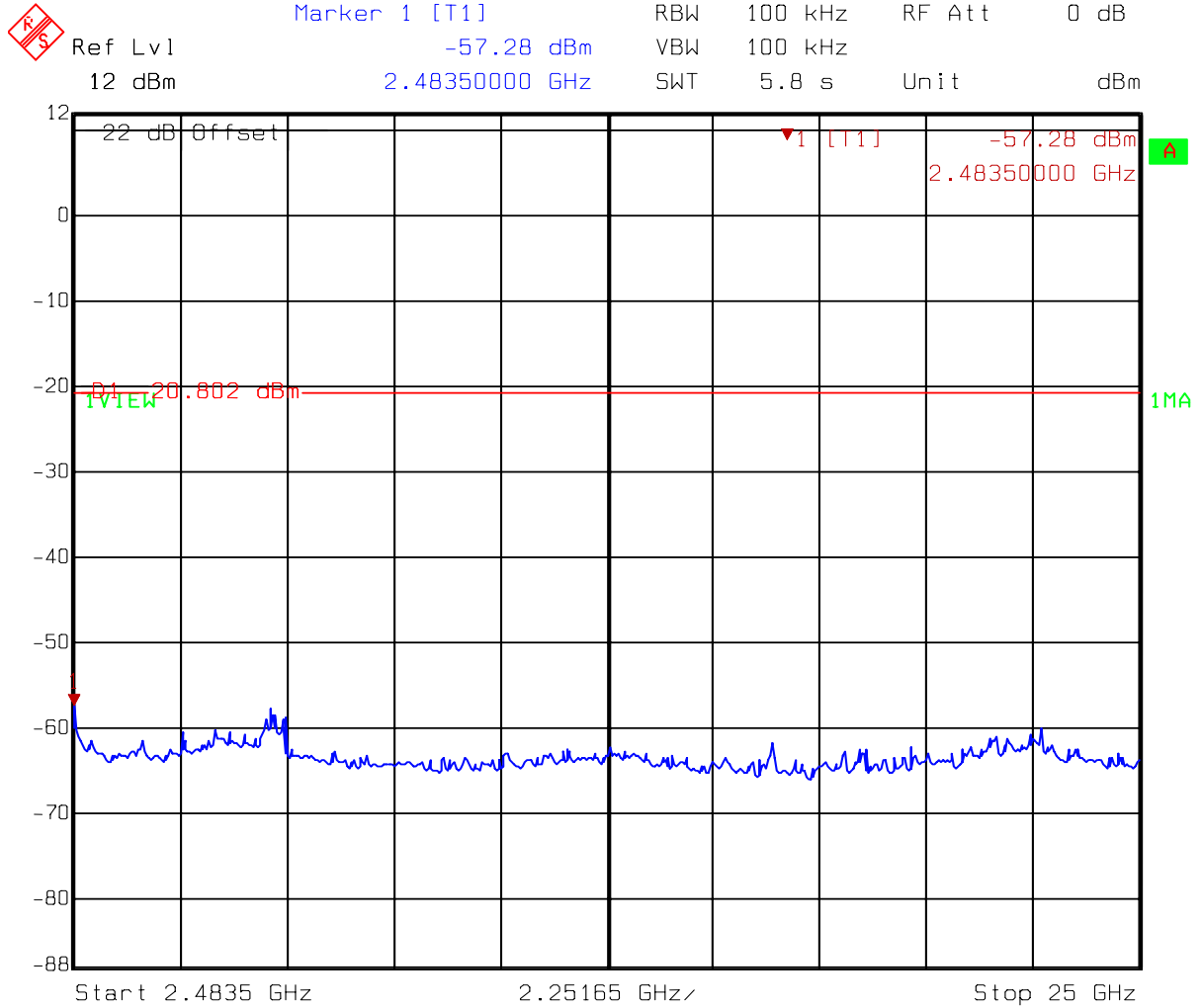
Title: Conductive Spurious  
 Comment A: 11b ch11 2483.5MHz~25GHz  
 Date: 05.JUL.2006 14:40:22



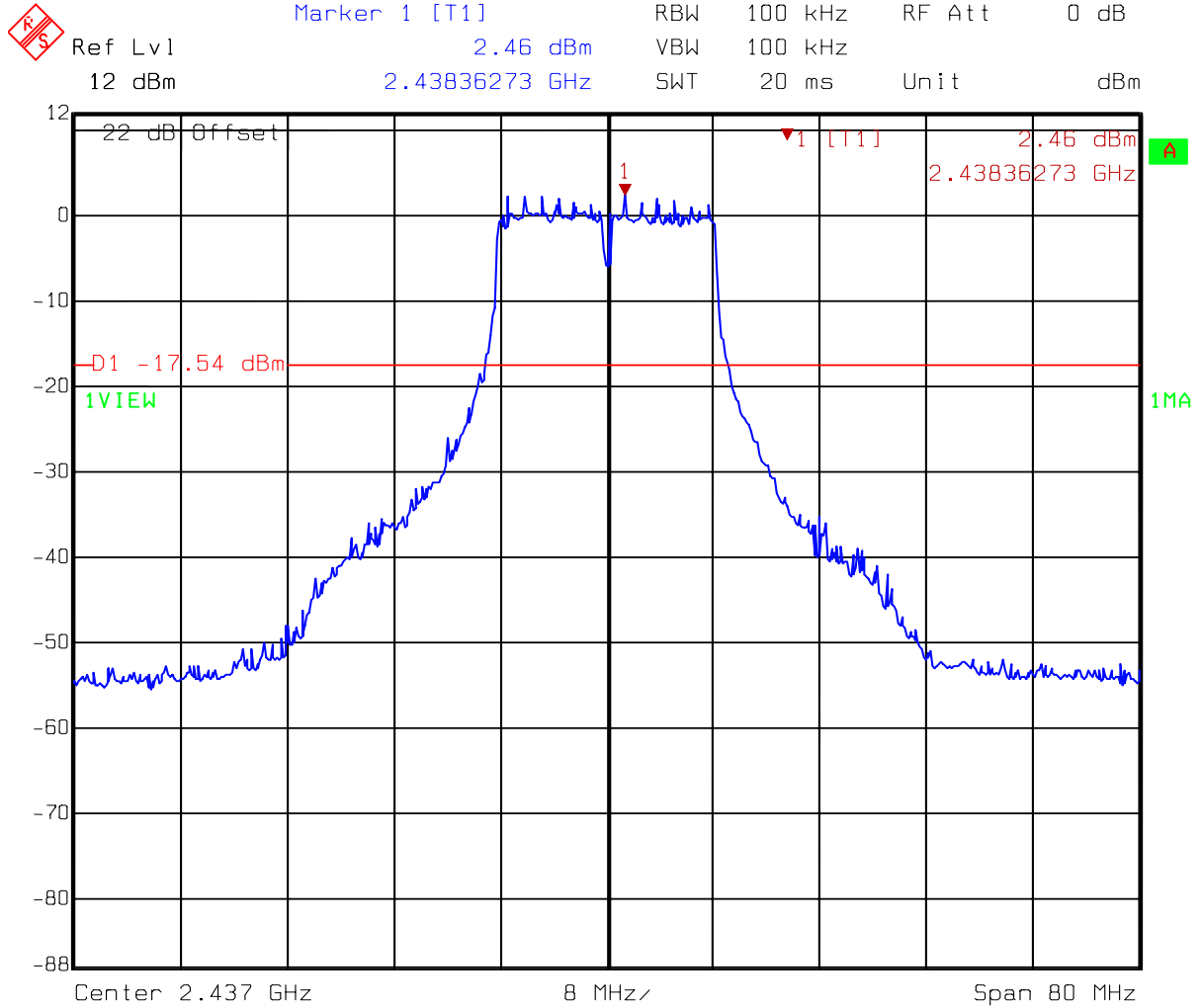
**Test Mode: 802.11g(OFDM Modulation) operating mode**



Title: Conductive Spurious  
 Comment A: 11g ch1 30MHz~2.4GHz  
 Date: 05.JUL.2006 14:52:33



Title:      Conductive Spurious  
 Comment A: 11g ch1 2483.5MHz~25GHz  
 Date:      05.JUL.2006 14:54:20



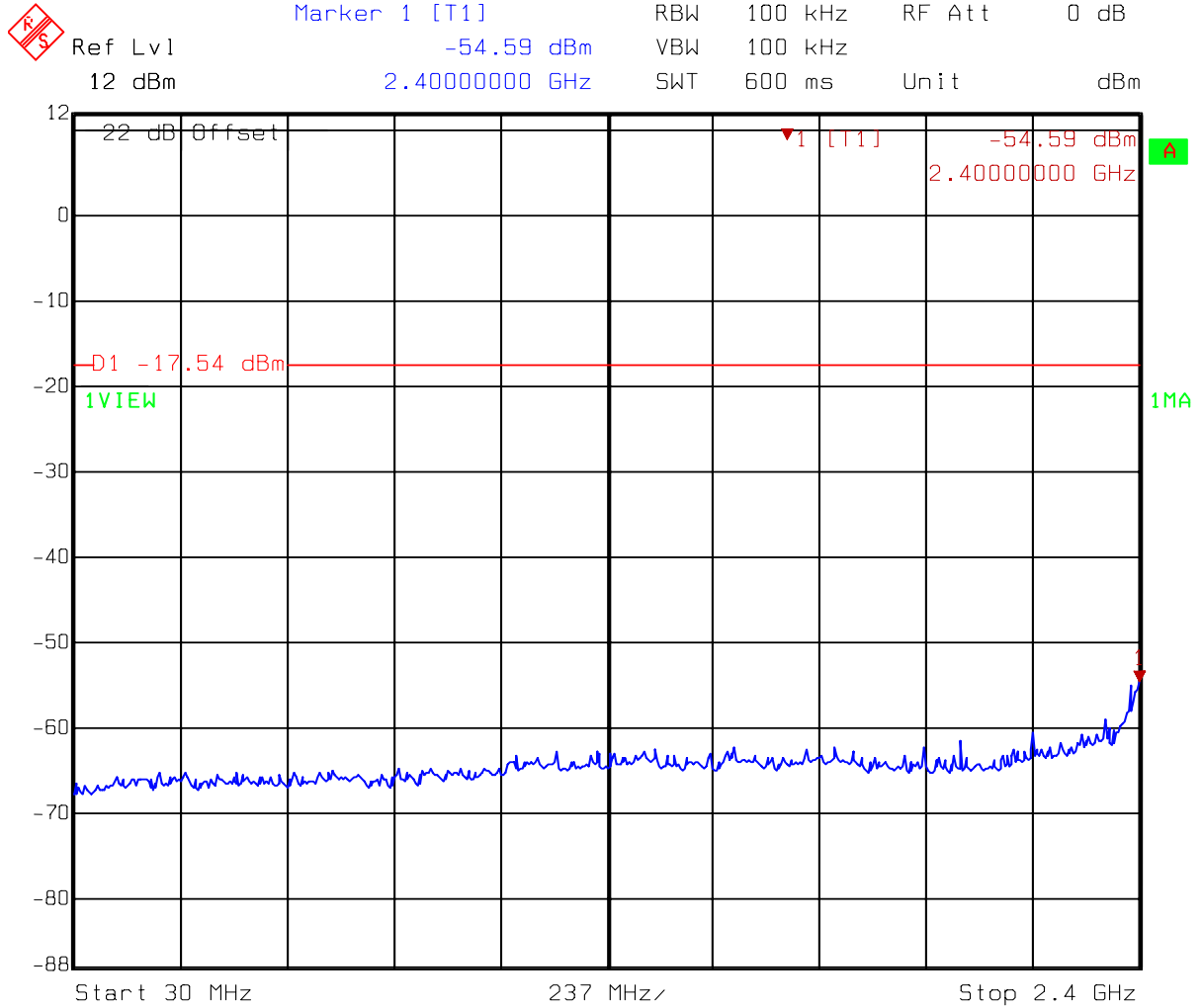
Title: Conductive Spurious  
 Comment A: 11g ch6  
 Date: 05.JUL.2006 15:02:00

# Intertek ETL SEMKO

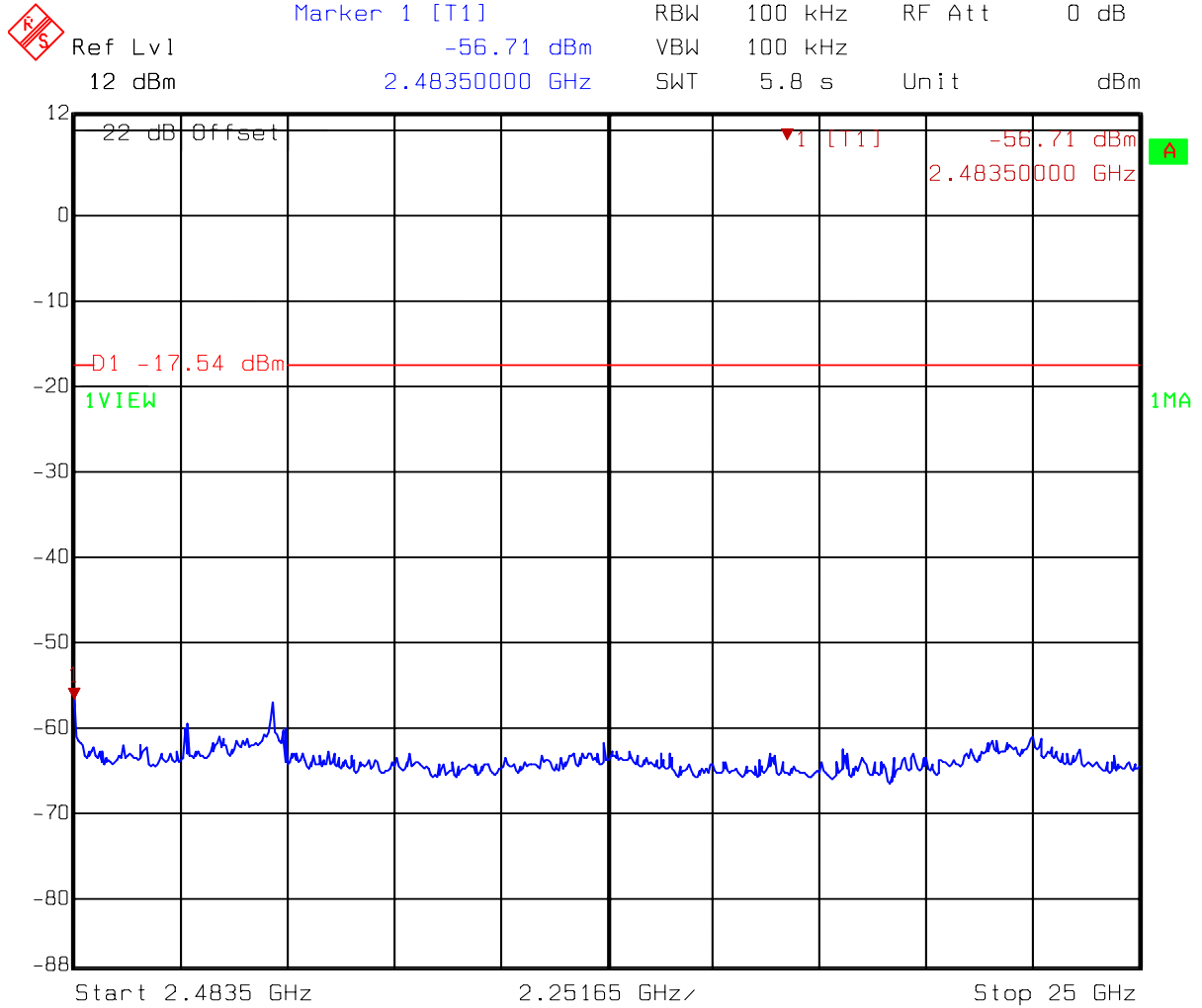
FCC ID.: KA2SL2640T

Report No.: EME-060497

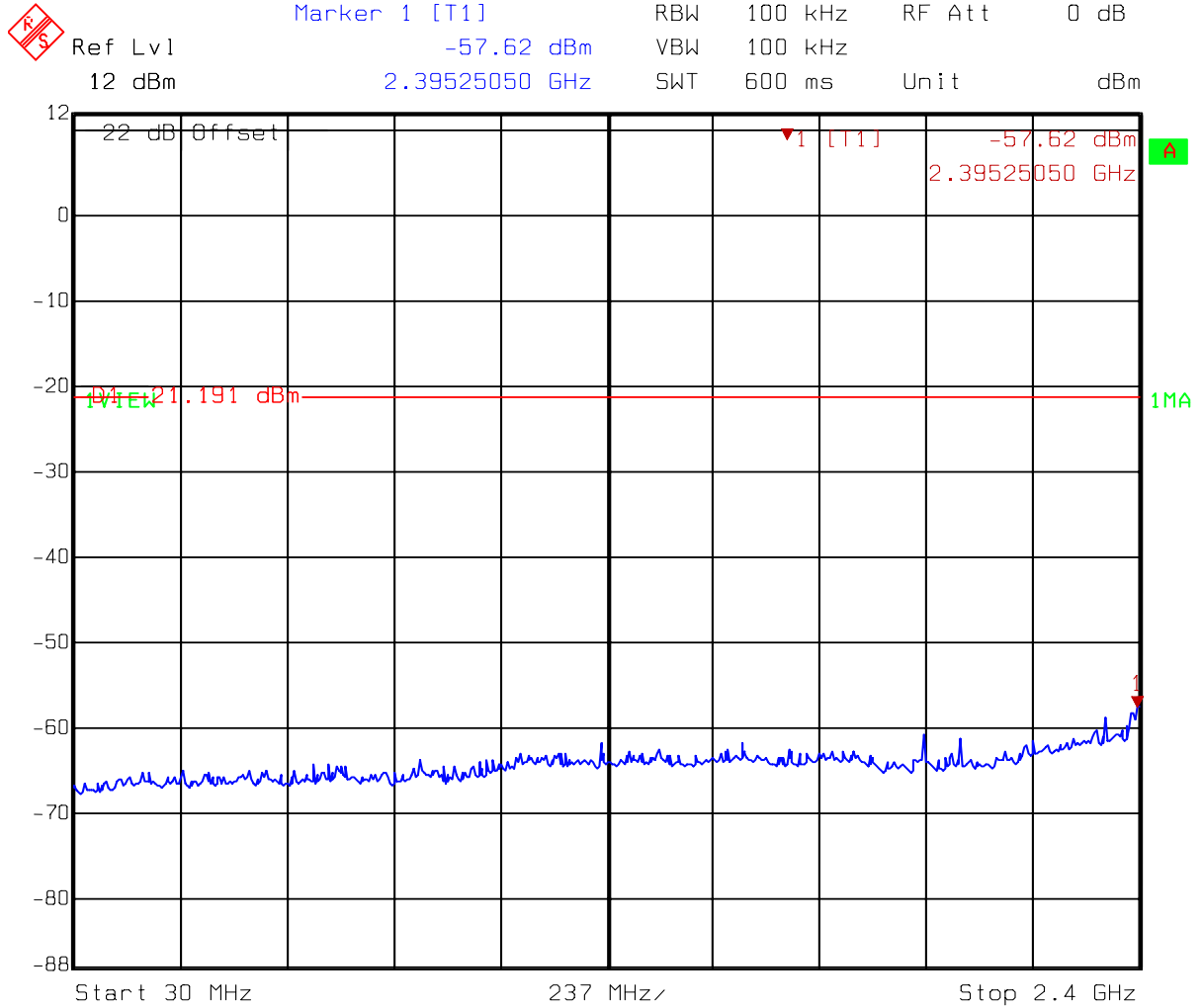
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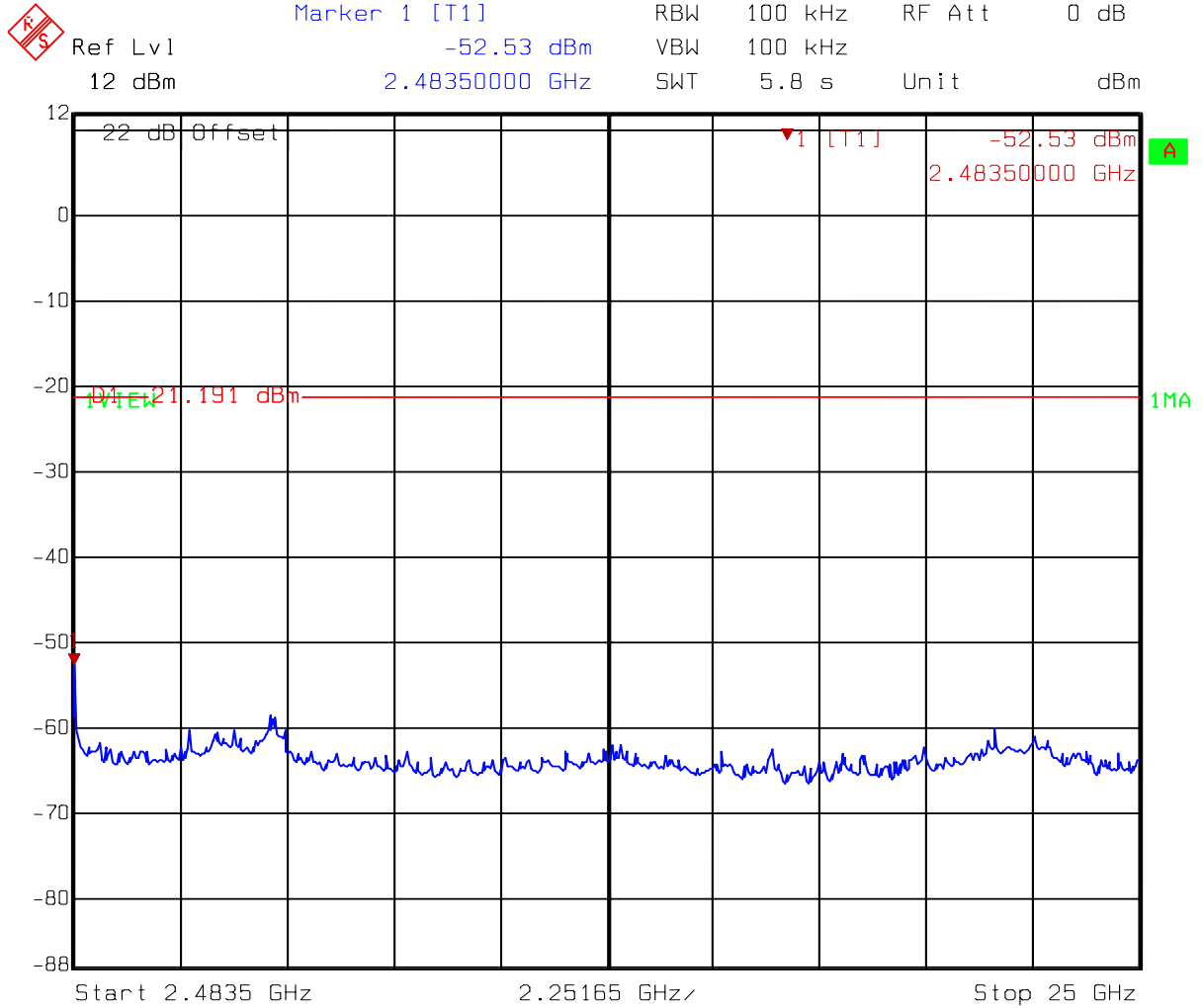
Title: Conductive Spurious  
Comment A: 11g ch6 30MHz~2.4GHz  
Date: 05.JUL.2006 15:03:06



Title: Conductive Spurious  
 Comment A: 11g ch6 2483.5MHz~25GHz  
 Date: 05.JUL.2006 15:04:17



Title: Conductive Spurious  
 Comment A: 11g ch11 30MHz~2.4GHz  
 Date: 05.JUL.2006 14:57:22



Title: Conductive Spurious  
 Comment A: 11g ch11 2483.5MHz~25GHz  
 Date: 05.JUL.2006 14:56:02

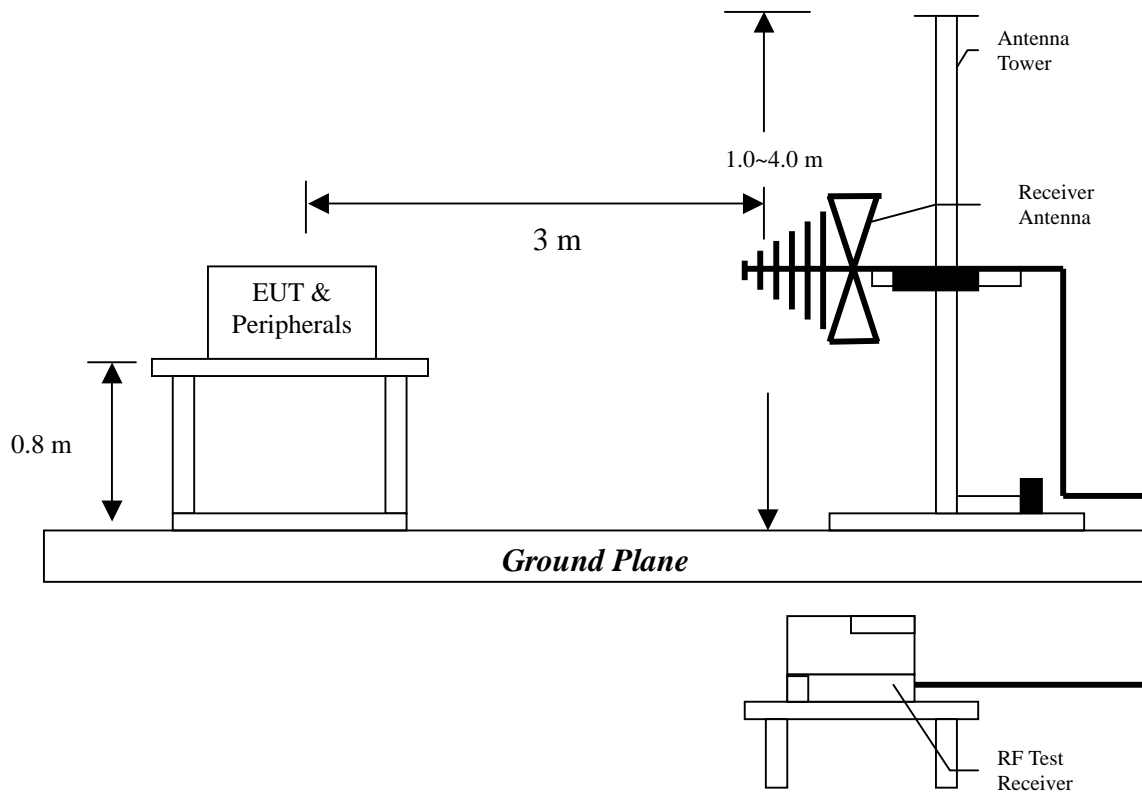
## 6. Radiated Emission test

### 6.1 Operating environment

Temperature: 24  
Relative Humidity: 52 %  
Atmospheric Pressure: 1023 hPa

### 6.2 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 3 meter reading using inverse scaling with distance.

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

### 6.3 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.

**6.4 Radiated spurious emission test data**

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

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

EUT : DSL-2640T  
 Worst Case : 802.11b Tx at channel 1

Antenna Polariz. (V/H)	Freq. (MHz)	Receiver Detector	Corr. Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)	Antenna high (cm)	Turn Table angle (degree)
V	60.07000	QP	12.23	22.55	34.78	40.00	-5.22	100	184
V	249.2200	QP	12.22	23.21	35.43	46.00	-10.58	100	155
V	374.3500	QP	15.06	23.44	38.50	46.00	-7.50	168	206
V	399.5700	QP	16.40	18.28	34.68	46.00	-11.32	195	302
V	624.6100	QP	20.75	16.72	37.47	46.00	-8.53	174	225
V	749.7400	QP	22.74	15.72	38.46	46.00	-7.54	123	95
H	249.2200	QP	12.36	26.96	39.32	46.00	-6.68	254	97
H	374.3500	QP	15.48	24.93	40.41	46.00	-5.60	198	118
H	399.5700	QP	16.74	19.21	35.95	46.00	-10.05	208	63
H	624.6100	QP	20.88	15.54	36.42	46.00	-9.59	154	308
H	749.7400	QP	22.95	17.11	40.06	46.00	-5.94	113	1
H	879.7200	QP	24.62	10.82	35.44	46.00	-10.57	105	58

Remark:

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

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

EUT : DSL-2640T

Test Condition : 802.11b Tx at channel 1

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)	Ant. high (cm)	Turn Table angle (degree)
4800.00	PK	V	36.07	37.77	46.43	48.13	54	-5.87	100.00	296.00

**Remark:**

1. Correction Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Correction Factor – Preamp. Gain
3. “-“ means the emission is below the noise floor.

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 : DSL-2640T  
Test Condition : 802.11b Tx at channel 6

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)	Ant. high (cm)	Turn Table angle (degree)
4860.00	PK	V	36.07	37.77	52.8	54.5	74	-19.5	100.00	118.00
4860.00	AV	V	36.07	37.77	50.77	52.47	54	-1.53	100.00	118.00
4860.00	PK	H	36.07	37.77	43.71	45.41	54	-8.59	120.00	229.00

**Remark:**

1. “\*”: Fundamental Frequency
2. Correction Factor = Antenna Factor + Cable Loss
3. Corrected Level = Reading + Correction Factor – Preamp. Gain
4. “-“ means the emission is below the noise floor.

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 : DSL-2640T  
Test Condition : 802.11b Tx at channel 11

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)	Ant. high (cm)	Turn Table angle (degree)
4920.00	PK	V	36.07	37.77	47.11	48.81	54	-5.19	105.00	163.00

**Remark:**

1. “\*”: Fundamental Frequency
2. Correction Factor = Antenna Factor + Cable Loss
3. Corrected Level = Reading + Correction Factor – Preamp. Gain
4. “-“ means the emission is below the noise floor.

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 : DSL-2640T  
 Test Condition : 802.11g Tx at channel 1

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)	Ant. high (cm)	Turn Table angle (degree)
4800.00	PK	V	36.07	37.77	46.64	48.34	54	-5.66	135.00	174.00

**Remark:**

1. “\*”: Fundamental Frequency
2. Correction Factor = Antenna Factor + Cable Loss
3. Corrected Level = Reading + Correction Factor – Preamp. Gain
4. “-“ means the emission is below the noise floor.

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 : DSL-2640T  
 Test Condition : 802.11g Tx at channel 6

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)	Ant. high (cm)	Turn Table angle (degree)
4860.00	PK	V	36.07	37.77	54.23	55.93	74	-18.07	108.00	25.00
4860.00	AV	V	36.07	37.77	40.65	42.35	54	-11.65	108.00	25.00
4860.00	PK	H	36.07	37.77	43.25	44.95	54	-9.05	112.00	293.00

**Remark:**

1. “\*”: Fundamental Frequency
2. Correction Factor = Antenna Factor + Cable Loss
3. Corrected Level = Reading + Correction Factor – Preamp. Gain
4. “-“ means the emission is below the noise floor.

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 : DSL-2640T  
 Test Condition : 802.11g Tx at channel 11

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp. Gain (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)	Ant. high (cm)	Turn Table angle (degree)
4920.00	PK	V	36.07	37.77	45.21	46.91	54	-7.09	113.00	152.00

**Remark:**

1. “\*”: Fundamental Frequency
2. Correction Factor = Antenna Factor + Cable Loss
3. Corrected Level = Reading + Correction Factor – Preamp. Gain
4. “-“ means the emission is below the noise floor.

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



## 7. Power Spectrum Density test

### 7.1 Operating environment

Temperature: 24  
 Relative Humidity: 52 %  
 Atmospheric Pressure 1023 hPa

### 7.2 Test setup & procedure

The power spectrum density per FCC §15.247(e) 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 300kHz, and the sweep time set at 100 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.

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

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

Channel	Frequency (MHz)	Power spectrum density (dBm)	Limit (dBm)
1 (lowest)	2412	2413.50	8
6 (middle)	2437	2434.00	8
11 (highest)	2462	2462.83	8

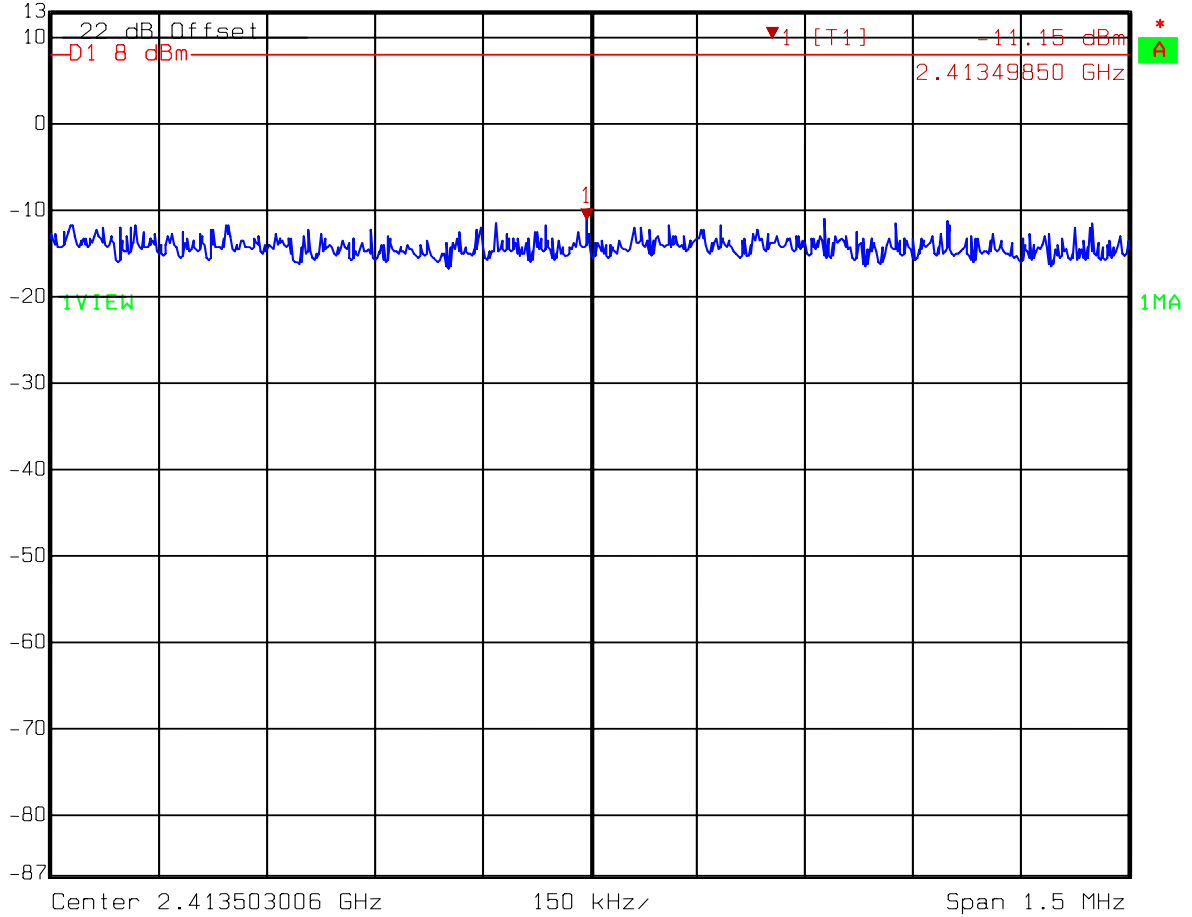
#### Test Mode: 802.11g (OFDM Modulation) operating mode

Channel	Frequency (MHz)	Power spectrum density (dBm)	Limit (dBm)
1 (lowest)	2412	2417.95	8
6 (middle)	2437	2438.23	8
11 (highest)	2462	2468.85	8

Please see the plot below.

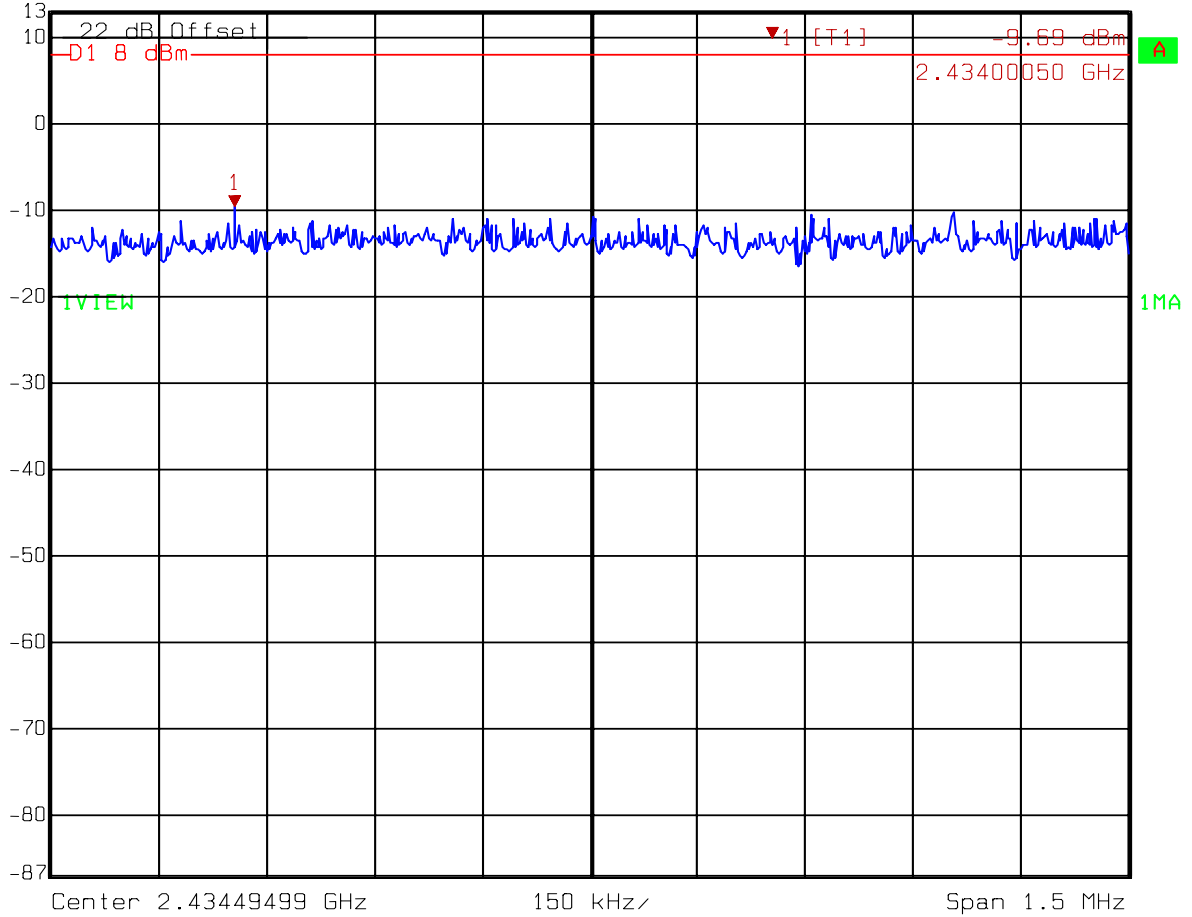
**Test Mode: 802.11b (DSSS Modulation) operating mode**

	Max/Ref Lvl	Marker 1 [T1]	RBW	3 kHz	RF Att	10 dB
	13 dBm	-11.15 dBm	VBW	10 kHz		
	2 dBm	2.41349850 GHz	SWT	500 s	Unit	dBm



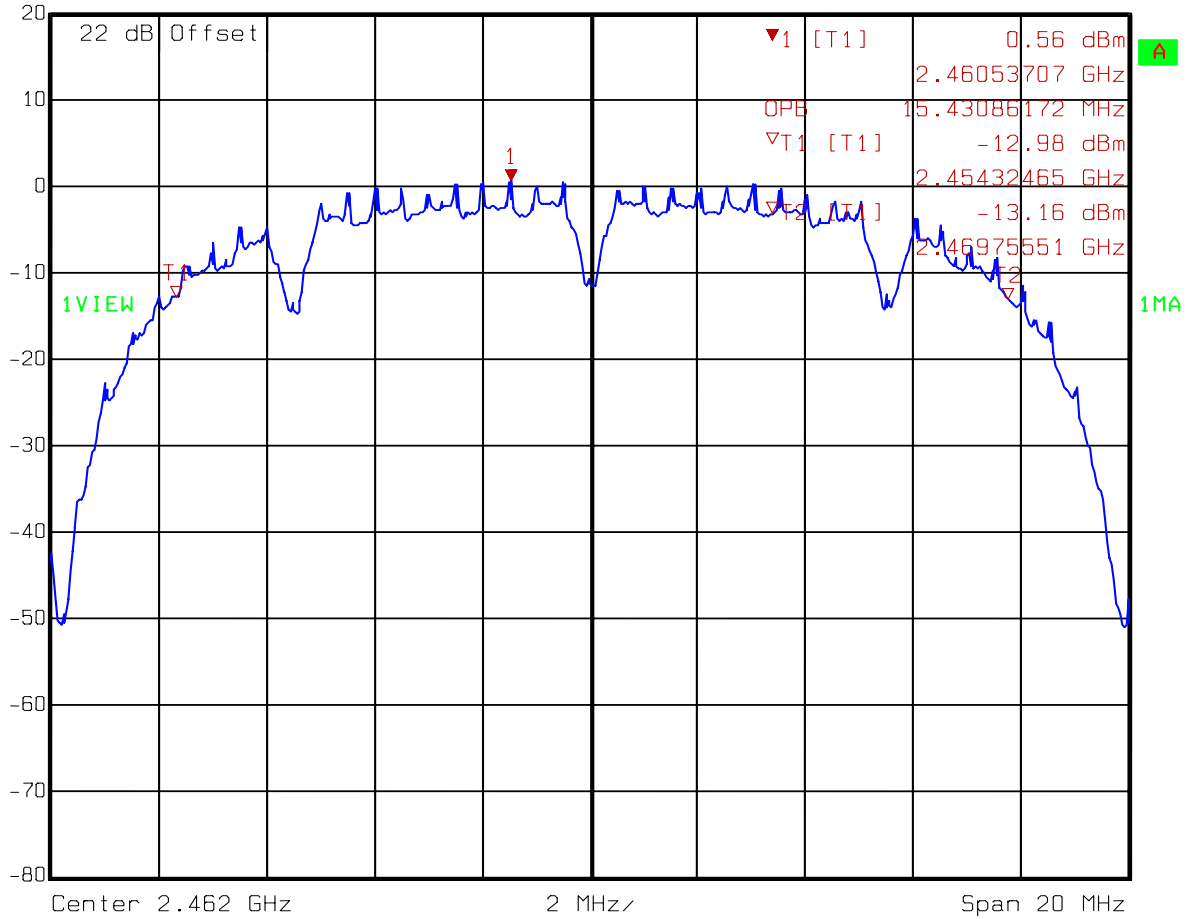
Title: Power Spectrum Density  
 Comment A: Channel 01 at 802.11b mode  
 Date: 19.JUN.2006 09:29:12

	Max/Ref Lvl	Marker 1 [T1]	RBW	3 kHz	RF Att	10 dB
	13 dBm	-9.69 dBm	VBW	10 kHz		
	2 dBm	2.43400050 GHz	SWT	500 s	Unit	dBm



Title:            Power Spectrum Density  
 Comment A: Channel 06 at 802.11b mode  
 Date:            19.JUN.2006 09:30:24

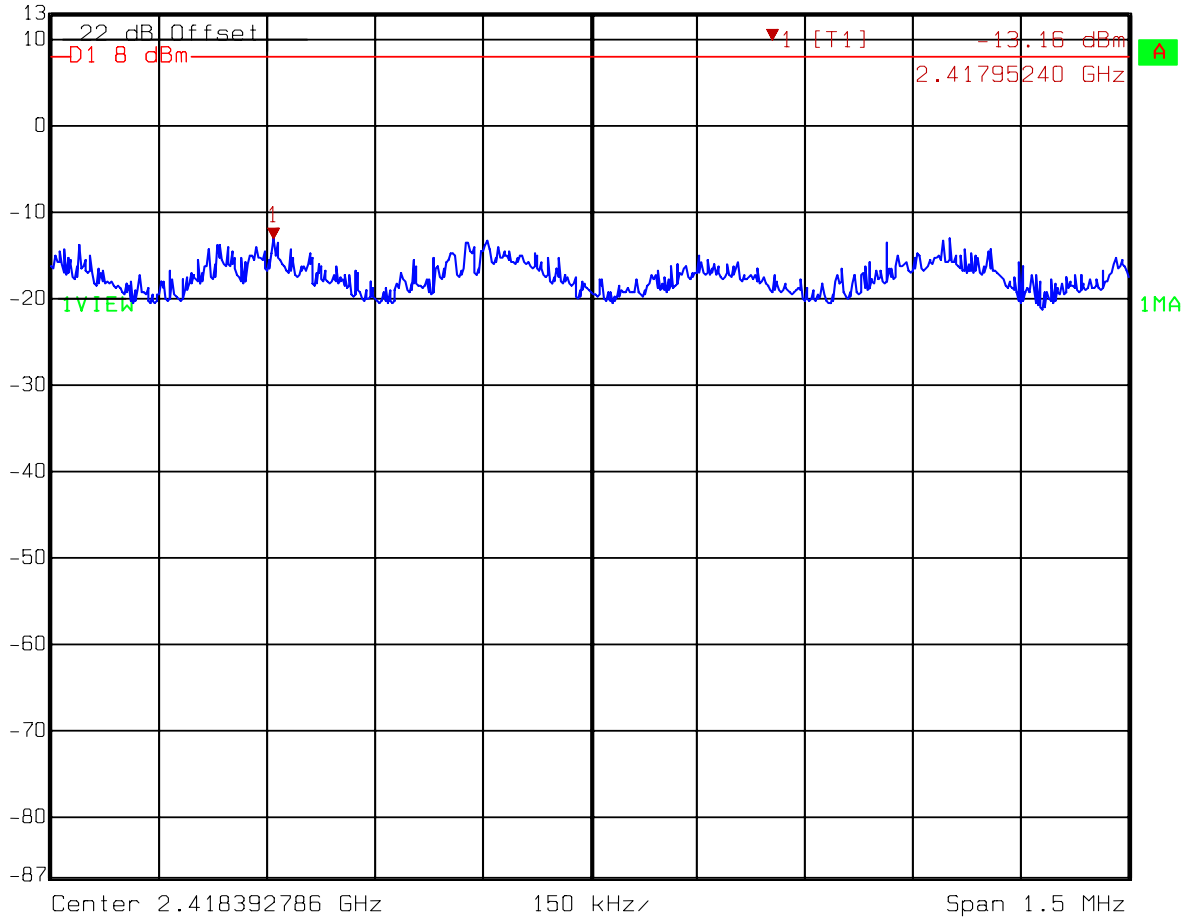
	Max/Ref Lvl	Marker 1 [T1]	RBW	100 kHz	RF Att	10 dB
	20 dBm	0.56 dBm	VBW	100 kHz		
	2 dBm	2.46053707 GHz	SWT	5 ms	Unit	dBm



Title: Occupied Bandwidth  
 Comment A: Channel 11 at 802.11b mode  
 Date: 05.JUN.2006 14:54:10

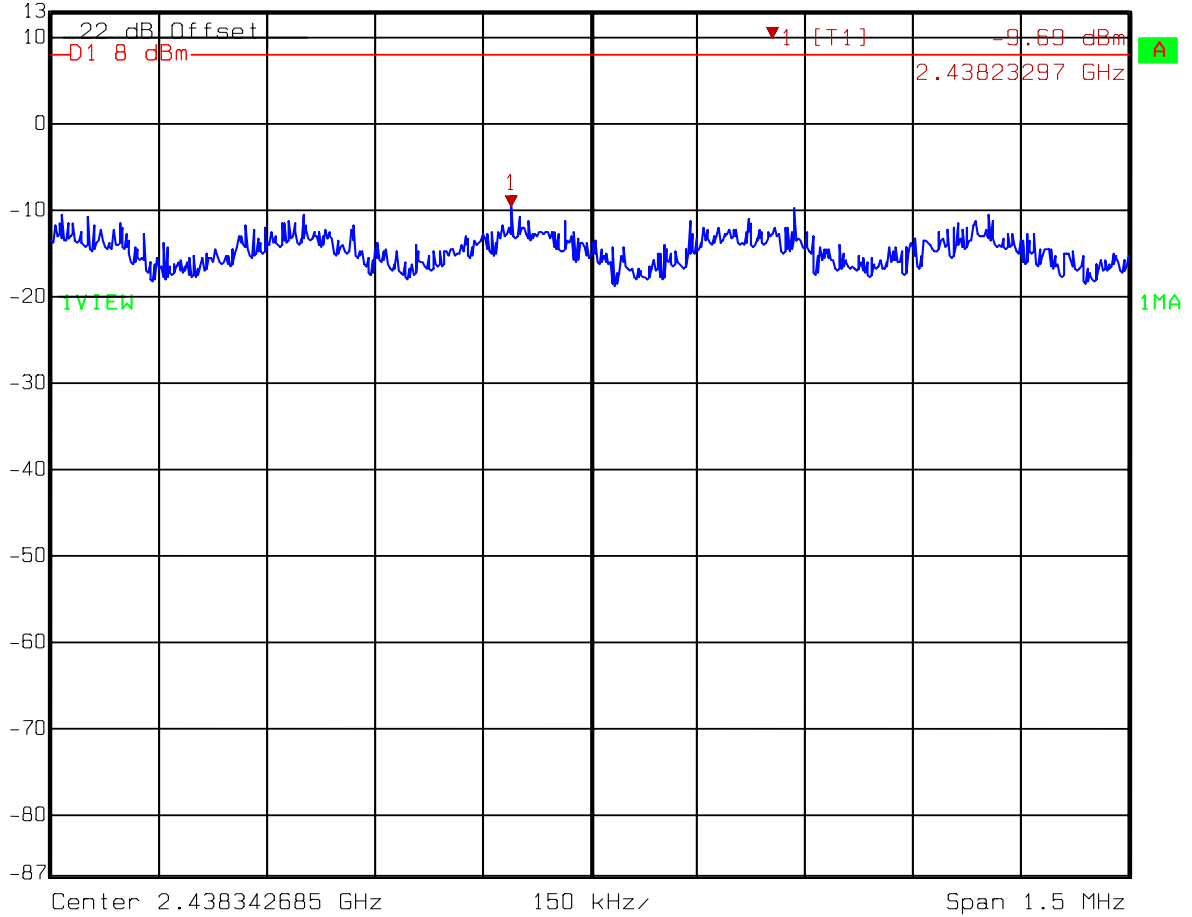
## Test Mode: 802.11g (OFDM Modulation) operating mode

	Max/Ref Lvl	Marker 1 [T1]	RBW	3 kHz	RF Att	10 dB
	13 dBm	-13.16 dBm	VBW	10 kHz		
	2 dBm	2.41795240 GHz	SWT	500 s	Unit	dBm



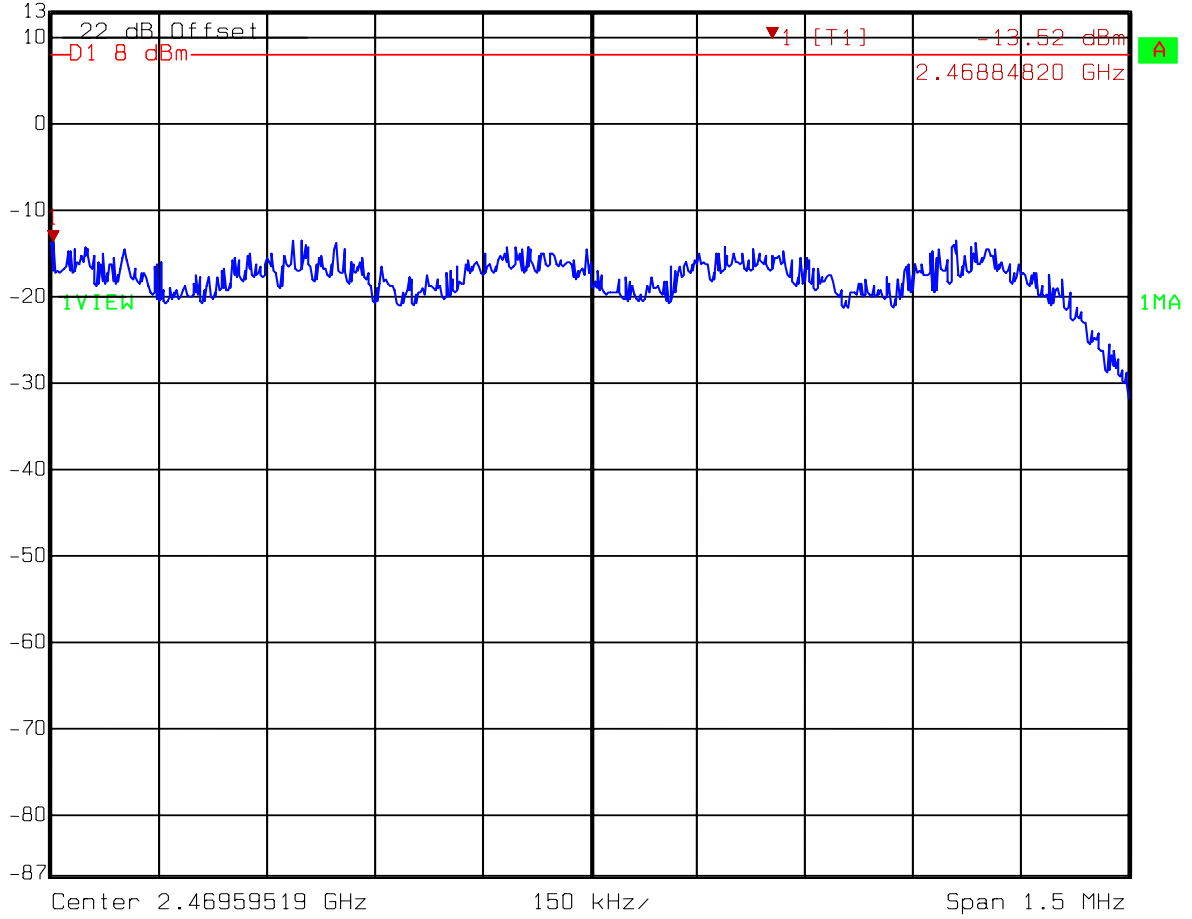
Title: Power Spectrum Density  
 Comment A: Channel 01 at 802.11g mode  
 Date: 19.JUN.2006 09:32:42

	Max/Ref Lvl	Marker 1 [T1]	RBW	3 kHz	RF Att	10 dB
	13 dBm	-9.69 dBm	VBW	10 kHz		
	2 dBm	2.43823297 GHz	SWT	500 s	Unit	dBm



Title:            Power Spectrum Density  
 Comment A: Channel 06 at 802.11g mode  
 Date:            19.JUN.2006 09:32:11

	Max/Ref Lvl	Marker 1 [T1]	RBW	3 kHz	RF Att	10 dB
	13 dBm	-13.52 dBm	VBW	10 kHz		
	2 dBm	2.46884820 GHz	SWT	500 s	Unit	dBm



Title: Power Spectrum Density  
 Comment A: Channel 11 at 802.11g mode  
 Date: 19.JUN.2006 09:31:35

## 8. Emission on the band edge

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.

### 8.1 Operating environment

Temperature:	24	
Relative Humidity:	52	%
Atmospheric Pressure	1023	hPa

### 8.2 Test setup & procedure

The output of EUT was connected to spectrum analyzer via a 50ohm cable.

The setting of spectrum analyzer is:

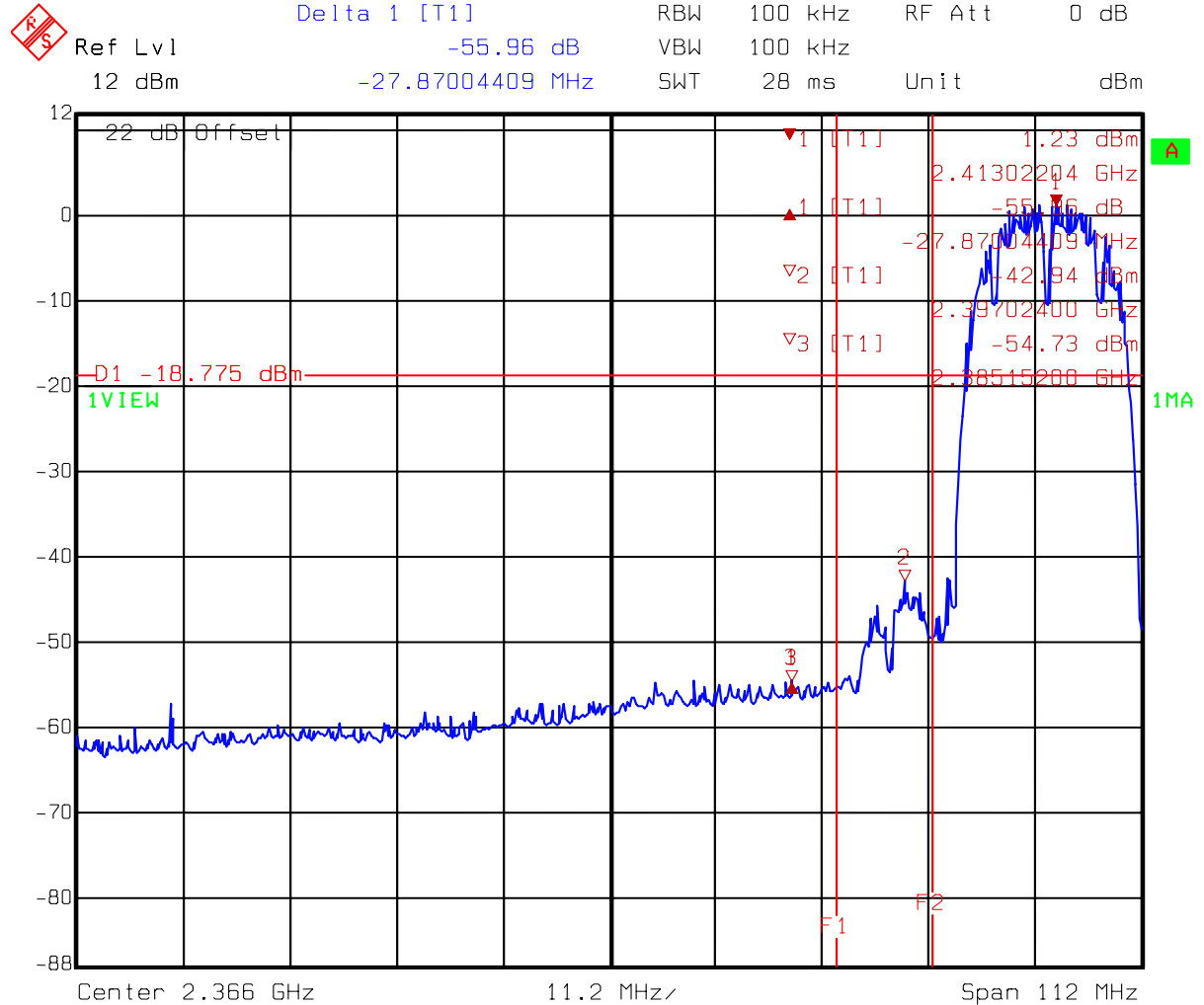
Peak:	RBW = 100kHz ;	VBW = 100kHz
Average:	RBW = 1MHz ;	VBW = 10Hz



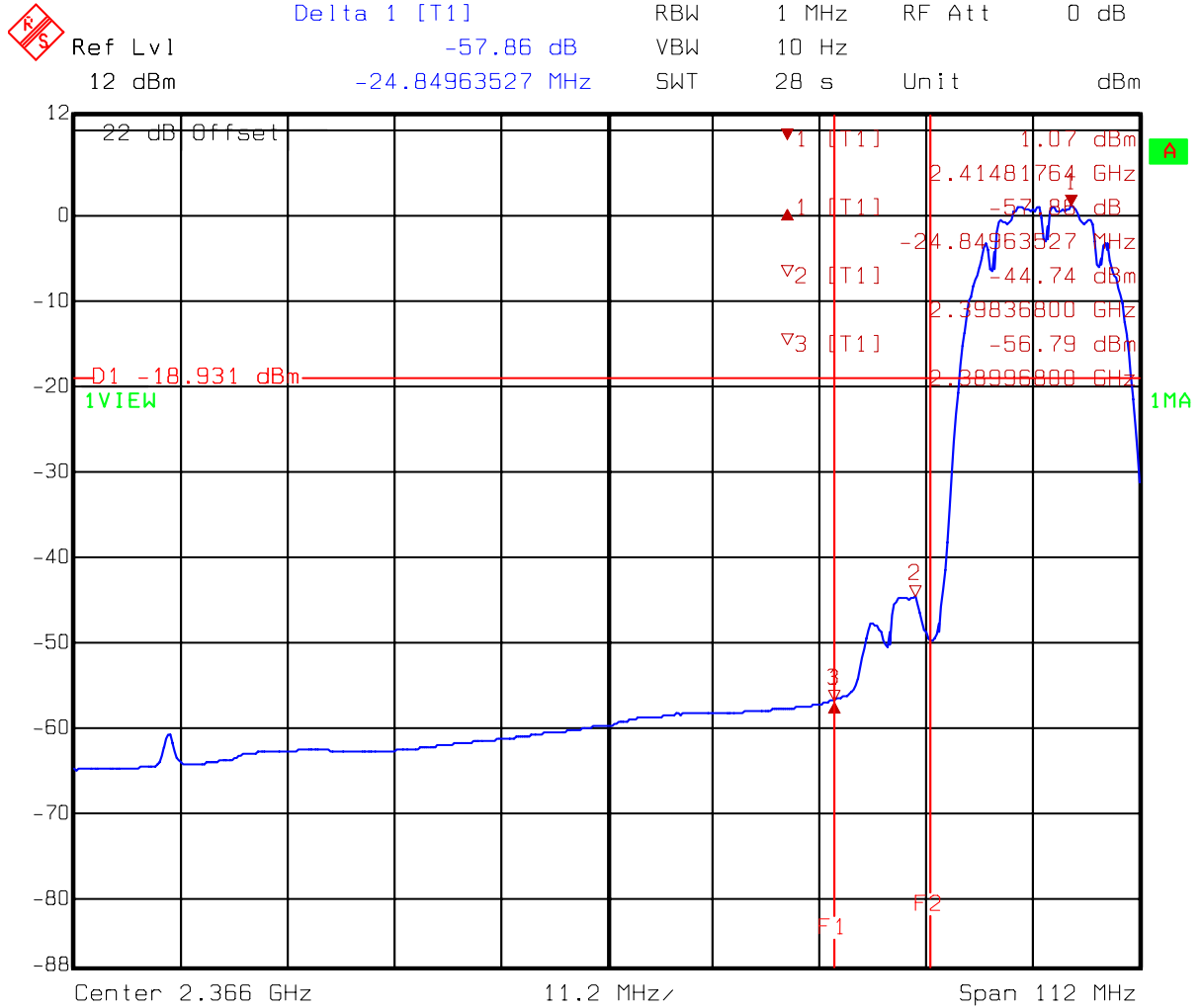
## 8.3 Test Result

### 8.3.1 Conducted Method

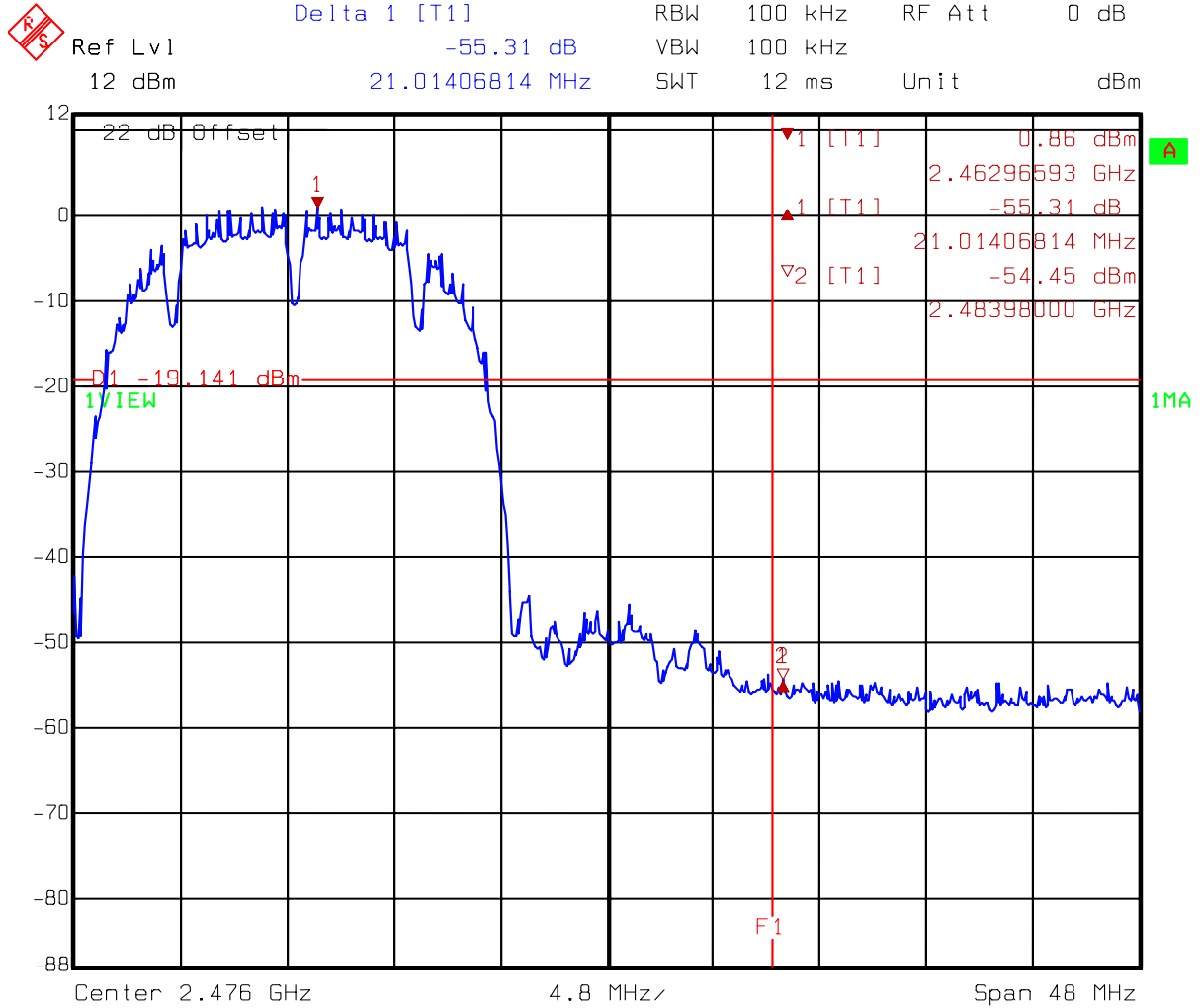
**Test Mode: 802.11b(DSSS Modulation) operating mode**



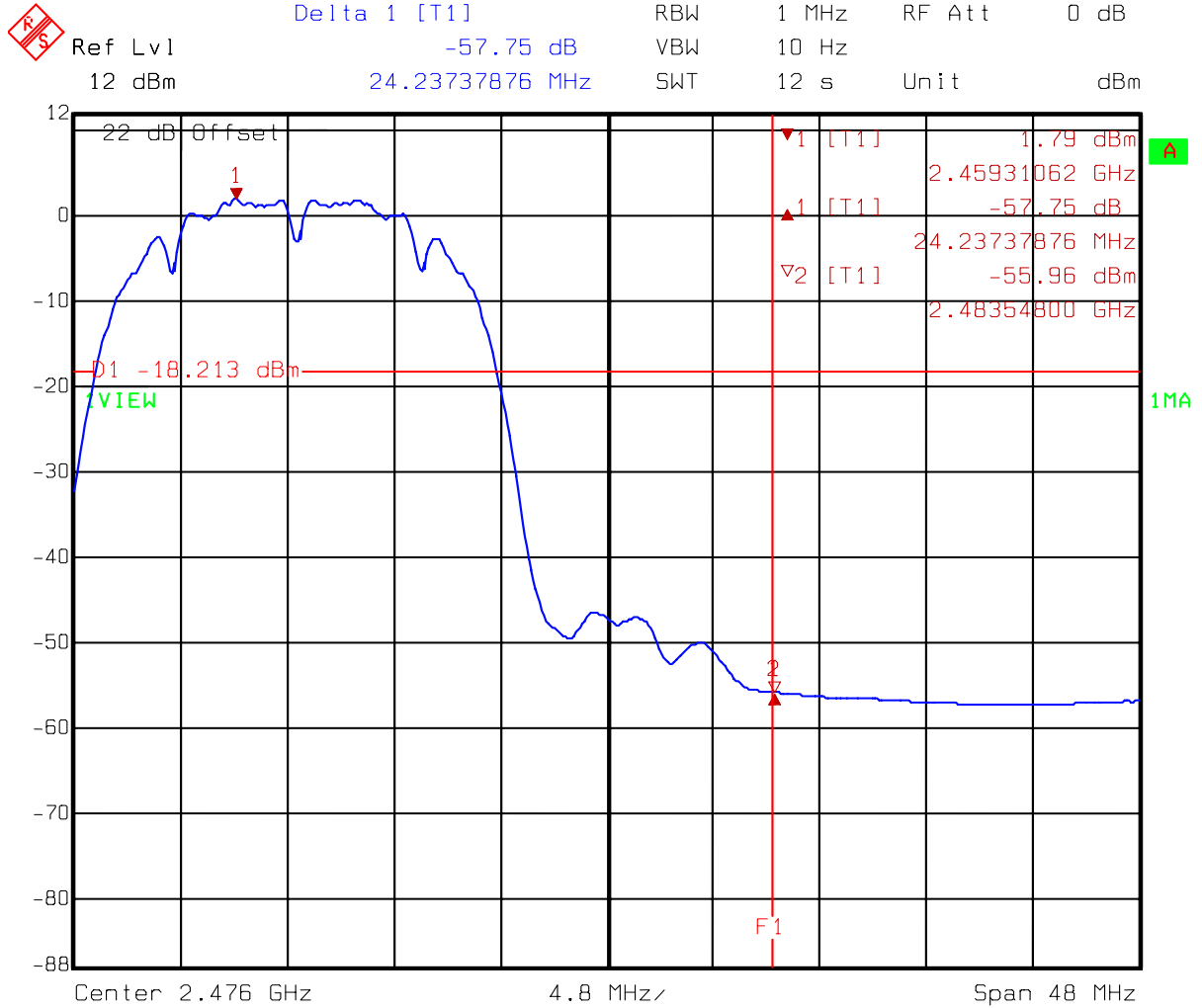
Title: Band Edge  
 Comment A: Channel 01 at 802.11b mode  
 F1=2390MHz F2=2400MHz (Peak Detect)  
 Date: 05.JUN.2006 14:49:49



Title:            Band Edge  
 Comment A:      Channel 01 at 802.11b mode  
                     F1=2390MHz F2=2400MHz (Average Detect)  
 Date:            05.JUN.2006 14:50:49



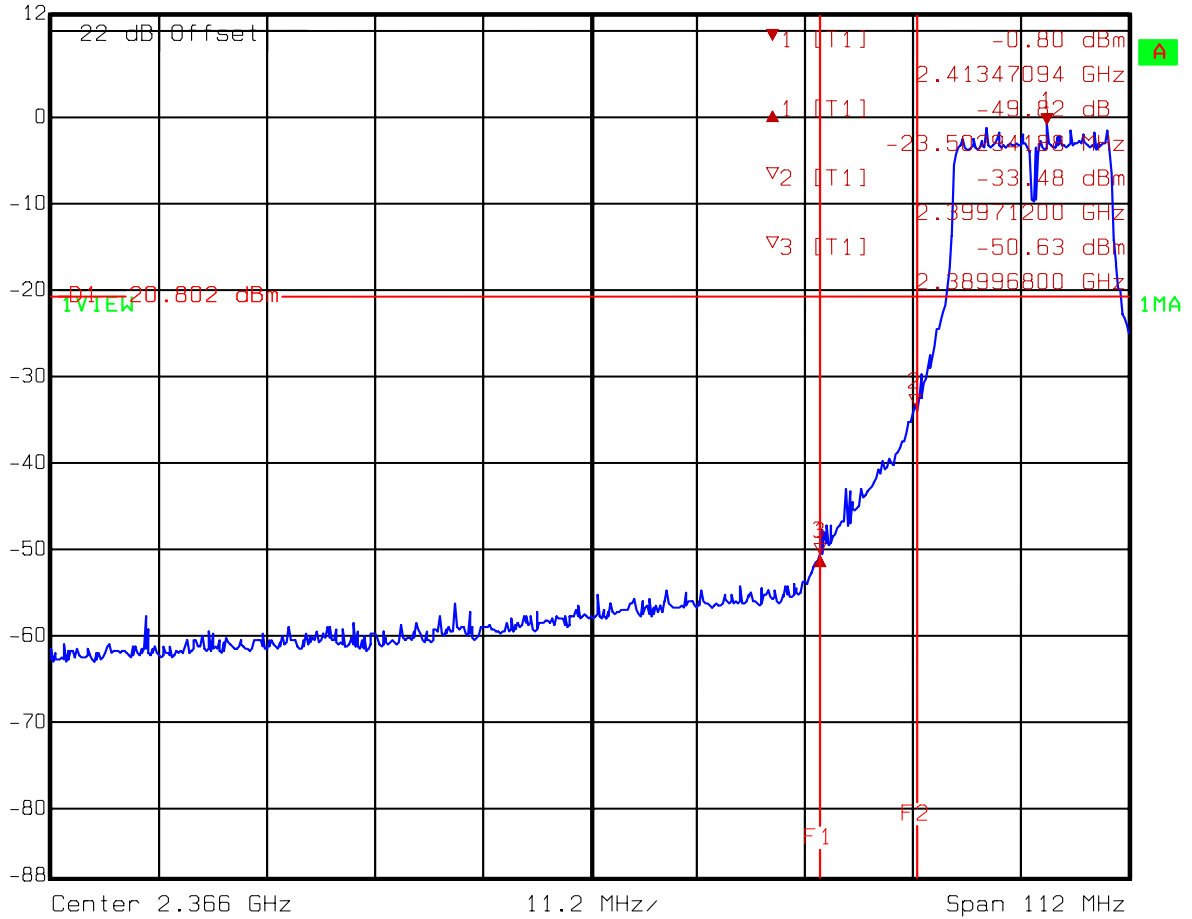
Title: Band Edge  
 Comment A: Channel 11 at 802.11b mode  
                  F1=2483.5MHz (Peak Detect)  
 Date: 05.JUN.2006 14:54:49



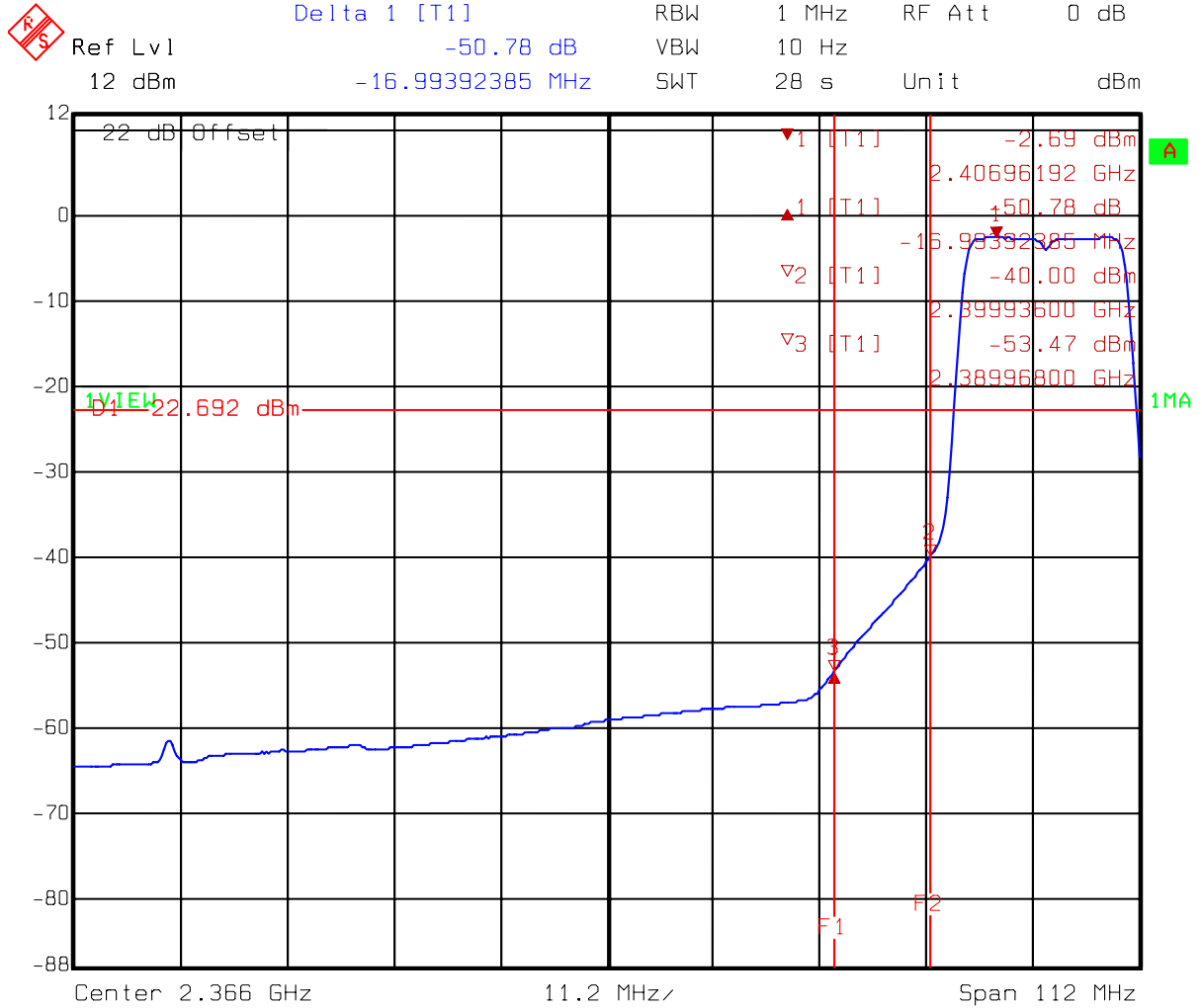
Title: Band Edge  
 Comment A: Channel 11 at 802.11b mode  
                   F1=2483.5MHz (Average Detect)  
 Date: 05.JUN.2006 14:55:42

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

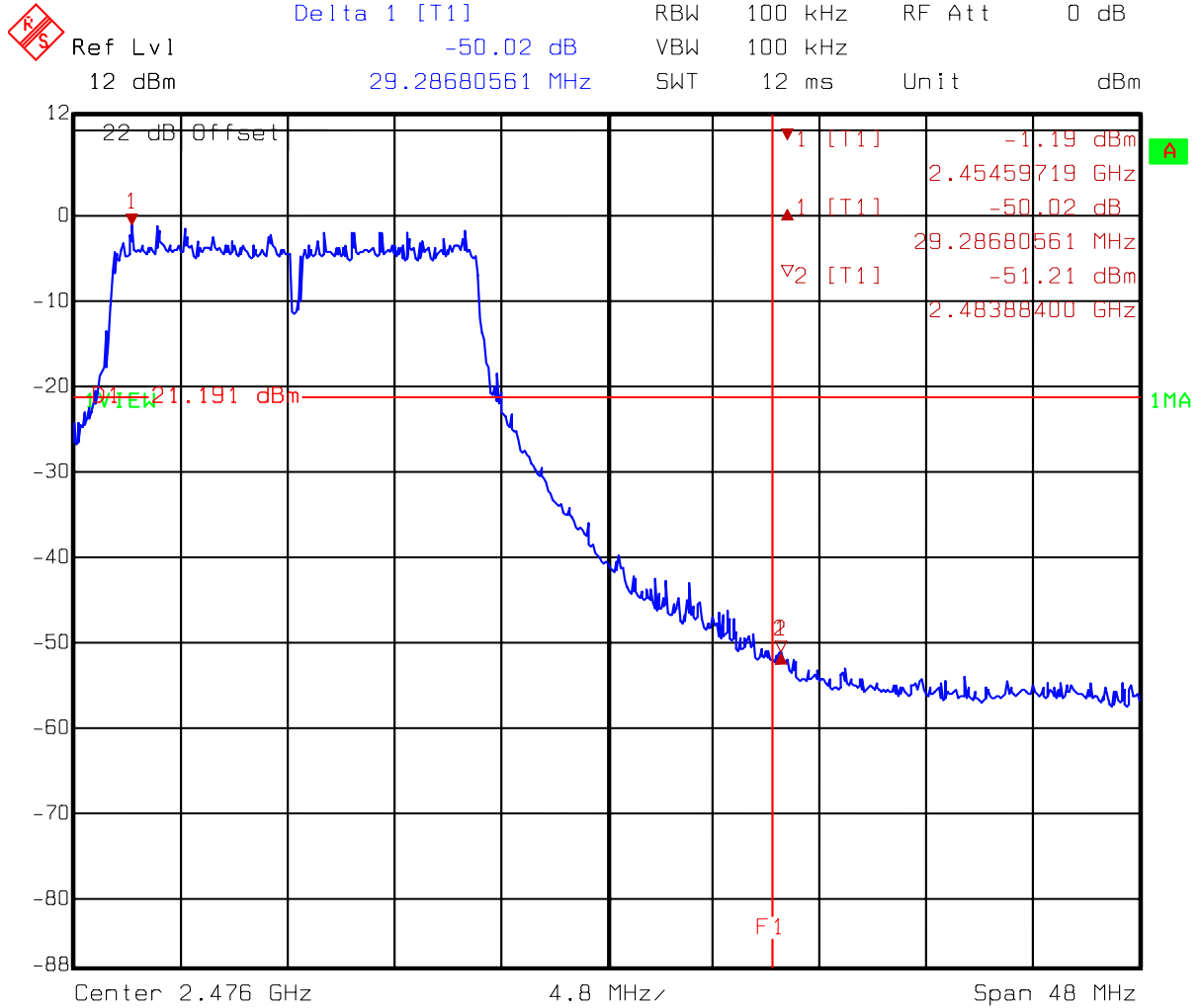
	<b>Delta 1 [T1]</b>	RBW	100 kHz	RF Att	0 dB
	Ref Lvl		-49.82 dB	VBW	100 kHz
	12 dBm		-23.50294188 MHz	SWT	28 ms
				Unit	dBm



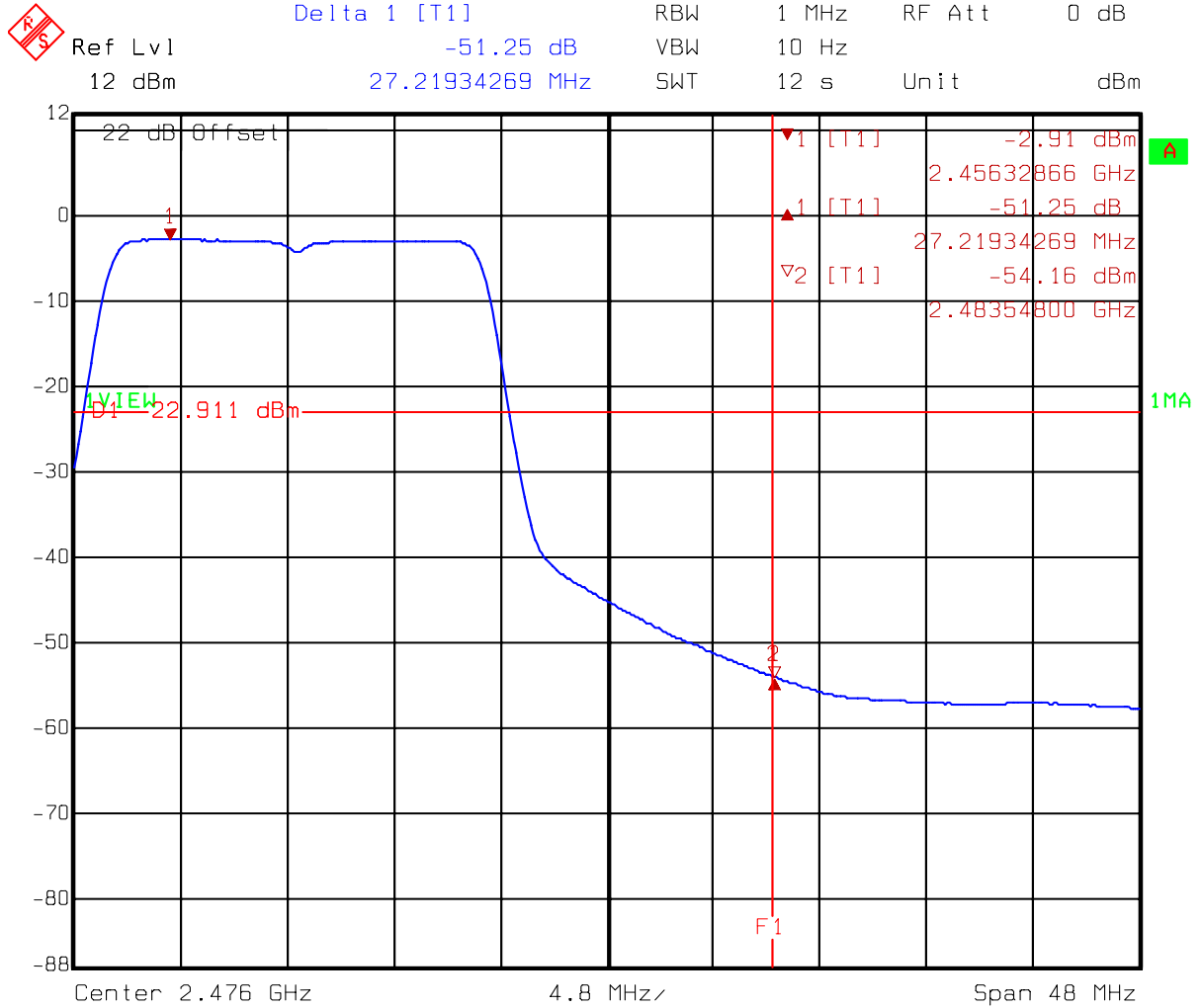
Title: Band Edge  
 Comment A: Channel 01 at 802.11g mode  
                   F1=2390MHz F2=2400MHz (Peak Detect)  
 Date: 05.JUN.2006 14:58:12



Title: Band Edge  
 Comment A: Channel 01 at 802.11g mode  
 F1=2390MHz F2=2400MHz (Average Detect)  
 Date: 05.JUN.2006 14:59:10



Title: Band Edge  
 Comment A: Channel 11 at 802.11g mode  
                   F1=2483.5MHz (Peak Detect)  
 Date: 05.JUN.2006 15:02:55



Title: Band Edge  
 Comment A: Channel 11 at 802.11g mode  
 F1=2483.5MHz (Average Detect)  
 Date: 05.JUN.2006 15:03:49



**8.3.2 Radiated Method**

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

Channel	Detector	Radiated Method	Conducted Method	The Max. Field Strength in Restrict Band (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
		Max. Field Strength of Fundamental @3m (dBuV/m)	Between Carrier Max. Power and Local Max. Emission in Restrict Band (dBc)			
		A	B			
1 (lowest)	PK	109.86	55.96	53.9	74	-20.1
	AV	105.8	57.86	47.94	54	-6.06
11 (highest)	PK	108.76	55.31	53.45	74	-20.55
	AV	104.7	57.75	46.95	54	-7.05

Remark: 1.  $C = A - B$

2.  $E = C - D$

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

Channel	Detector	Radiated Method	Conducted Method	The Max. Field Strength in Restrict Band (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
		Max. Field Strength of Fundamental @3m (dBuV/m)	Between Carrier Max. Power and Local Max. Emission in Restrict Band (dBc)			
		A	B			
1 (lowest)	PK	111.59	49.82	61.77	74	-12.23
	AV	102.05	50.78	51.27	54	-2.73
11 (highest)	PK	111.08	50.02	61.06	74	-12.94
	AV	101.21	51.25	49.96	54	-4.04

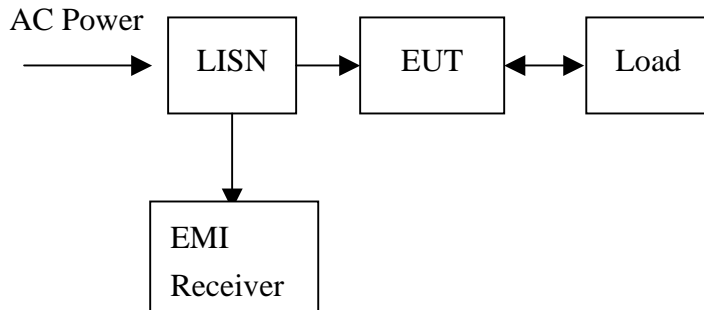
Remark: 1.  $C = A - B$   
2.  $E = C - D$

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

### 9.1 Operating environment

Temperature: 22  
Relative Humidity: 55 %  
Atmospheric Pressure 1023 hPa

### 9.2 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”.

**9.3 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.

**9.4 Uncertainty of Conducted Emission**

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

## 9.5 Power Line Conducted Emission test data

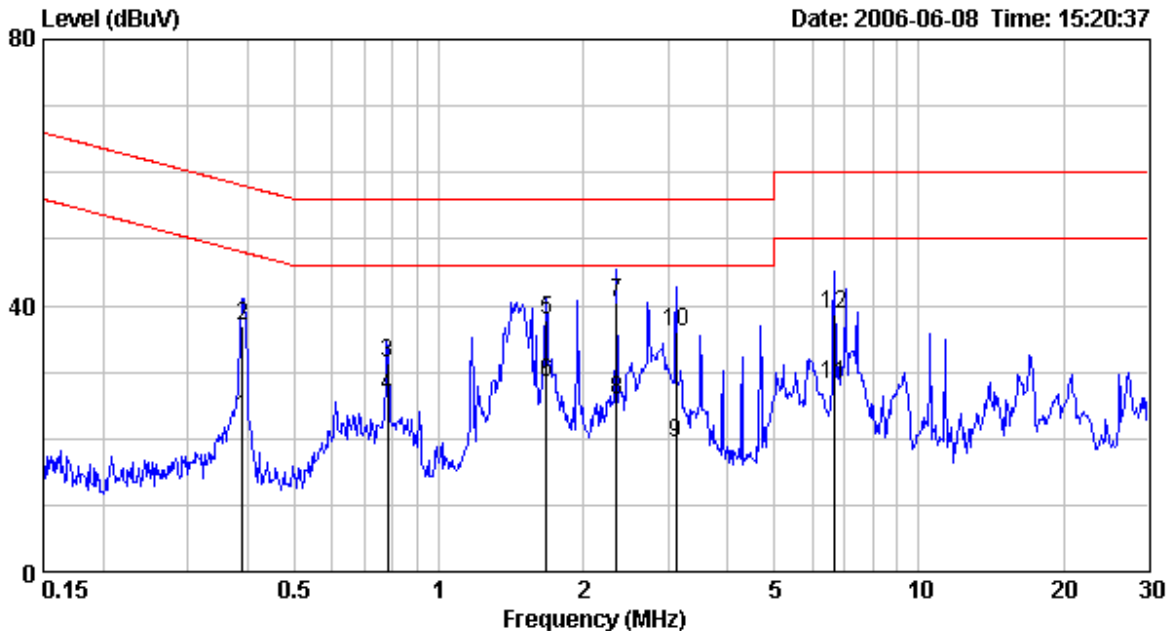
The test was performed the 802.11b and 802.11g normal operating modes, the worst case was occurred at 802.11g normal operating mode.

Phase : Line  
 EUT : DSL-2640T  
 Worst Case : Normal operating mode

Frequency (MHz)	Corr. Factor (dB)	Level Qp (dBuV)	Limit Qp (dBuV)	Level Av (dBuV)	Limit Av (dBuV)	Margin (dB)	
						Qp	Av
0.39	0.10	36.98	58.06	23.24	48.06	-21.08	-24.82
0.78	0.10	31.24	56.00	26.26	46.00	-24.76	-19.74
1.68	0.17	37.77	56.00	28.33	46.00	-18.23	-17.67
2.34	0.21	40.30	56.00	25.69	46.00	-15.70	-20.31
3.12	0.21	35.91	56.00	19.32	46.00	-20.09	-26.68
6.66	0.40	38.77	60.00	28.11	50.00	-21.23	-21.89

Remark:

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



Phase : Neutral  
 EUT : DSL-2640T  
 Worst Case : Normal operating mode

Frequency (MHz)	Corr. Factor (dB)	Level Qp (dBuV)	Limit Qp (dBuV)	Level AV (dBuV)	Limit Av (dBuV)	Margin (dB)	
						Qp	Av
2.34	0.13	42.51	56.00	28.75	46.00	-13.49	-17.25
3.90	0.22	46.27	56.00	31.42	46.00	-9.73	-14.58
4.30	0.24	48.86	56.00	36.21	46.00	-7.14	-9.79
4.69	0.26	47.44	56.00	38.90	46.00	-8.56	-7.10
5.86	0.32	47.11	60.00	39.37	50.00	-12.89	-10.63
9.38	0.43	44.75	60.00	41.38	50.00	-15.25	-8.62

**Remark:**

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

