

EMC TEST REPORT

Report No. : EME-070588

Model No. : XG-624

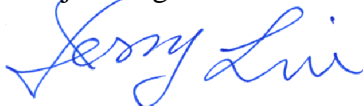
Issued Date : Jun. 27, 2007

Applicant : Z-Com, Inc.
7F-2, No. 9, Prosperity RD.I Science-Based Industrial,
Park Hsinchu, 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

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Project Engineer



Jerry Liu

Reviewed By



Kevin Chen

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Summary of Tests

802.11b/g Wireless MiniPCI Card-Model: XG-624 FCC ID: M4Y-XG624V02

Test	Reference	Results
Minimum 6dB Bandwidth test	15.247(a)(2)	Pass
Maximum Output Power test	15.247(b)	Pass
RF Antenna Conducted Spurious test	15.247(d)	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:	Z-Com, Inc.
Product:	802.11b/g Wireless MiniPCI Card
Model No.:	XG-624
FCC ID.:	M4Y-XG624V02
Frequency Range:	2412~2462MHz
Channel Number:	2412MHz to 2462MHz
Frequency of Each Channel:	11 channels
Type of Modulation:	2412MHz, 2417MHz, 2422MHz, 2427MHz, 2432MHz, 2437MHz, 2442MHz, 2447MHz, 2452MHz, 2457MHz, 2462MHz
Rated Power:	DC 3.3V
Power Cord:	N/A
Sample Received:	Jun. 15, 2007
Test Date(s):	Jun. 22, 2007 ~ Jun. 26, 2007

1.2 Additional information about the EUT

The EUT is an 802.11b/g Wireless MiniPCI Card, and was defined as information technology equipment.

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 Plug Reverse

1.4 Peripherals equipment

Peripherals	Manufacturer	Product No.	Serial No.	FCC ID
Notebook PC	DELL	PP05L	CN-5G5152-48643-498-6810	FCC DoC Approved
Modem	Dynalink	V1456VQE	00V230A00051494	FCC DoC Approved
Printer	HP	DeskJet 400	SG5CQ170C0	FCC DoC Approved
Wireless AP	SMC	SMC2655W	S25028NU05021	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

The EUT was supplied with 3.3Vdc from Notebook PC and it was running in operating mode.

Plug the EUT into Notebook PC via PCMCIA external card interface, then turn on the Notebook PC power and run the test program “ART” under windows OS, which provide by manufacturer.

With individual verifying, the maximum output power was found at 1Mbps data rate for 802.11b mode and 6Mbps data rate for 802.11g mode. The final tests were executed under these conditions 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	04/15/2008
Spectrum Analyzer	Rohde & Schwarz	9kHz~30GHz	FSP 30	EC353	07/23/2007
Spectrum Analyzer	Rohde & Schwarz	20Hz~40GHz	FSEK 30	EC365	10/31/2007
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	02/10/2008
Wideband Peak Power Meter/ Sensor	Anritsu	100MHz~18GHz	ML2497A/ MA2491A	EC396	11/09/2007
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	01/12/2008

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

3. Minimum 6dB Bandwidth test

3.1 Operating environment

Temperature: 24
Relative Humidity: 52 %
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 mode

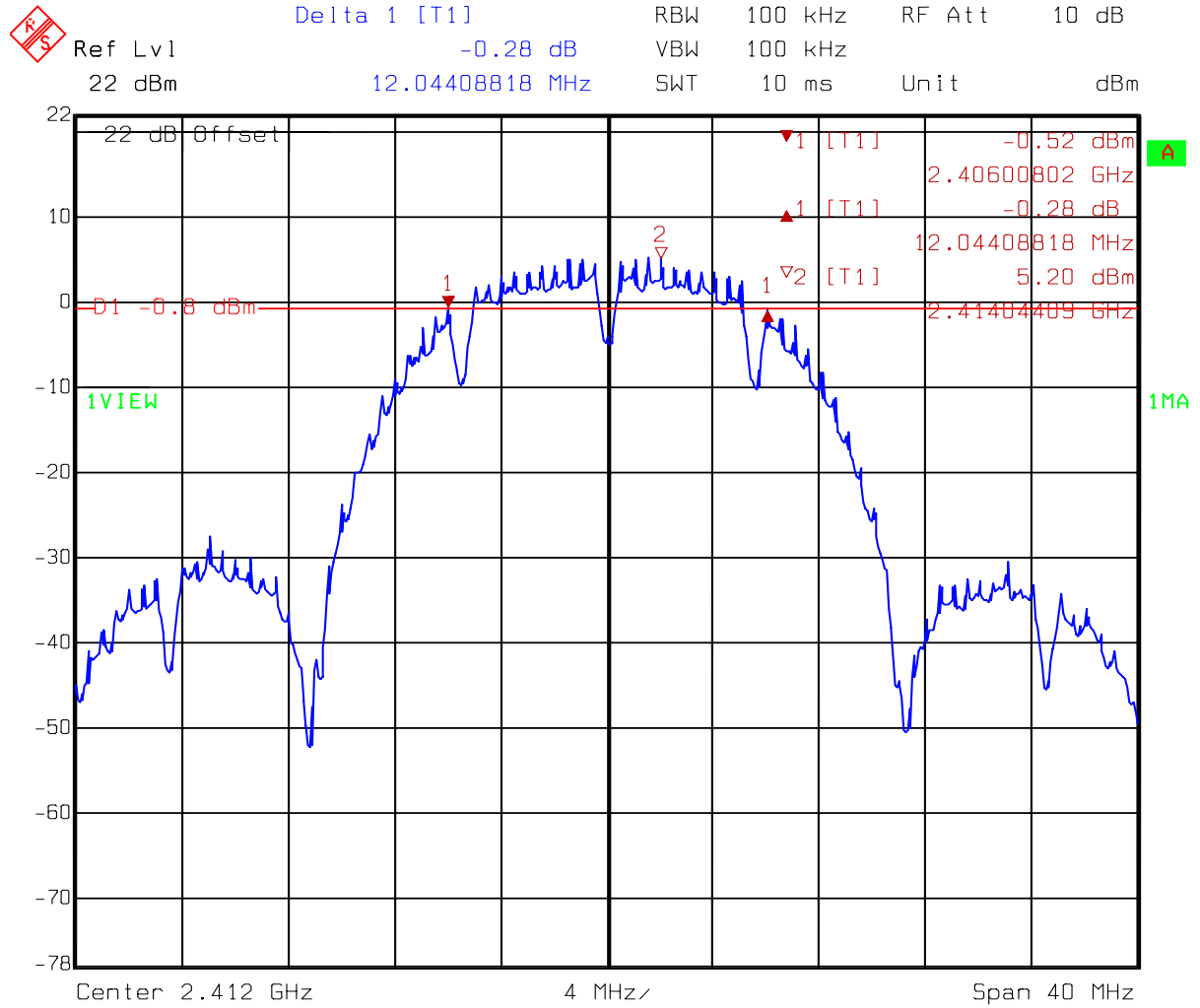
Channel	Frequency (MHz)	Bandwidth (MHz)	Limit
1 (lowest)	2412	12.04	> 500kHz
6 (middle)	2437	12.03	> 500kHz
11 (highest)	2462	11.96	> 500kHz

Test Mode: 802.11g Normal mode

Channel	Frequency (MHz)	Bandwidth (MHz)	Limit
1 (lowest)	2412	16.29	> 500kHz
6 (middle)	2437	16.36	> 500kHz
11 (highest)	2462	16.35	> 500kHz

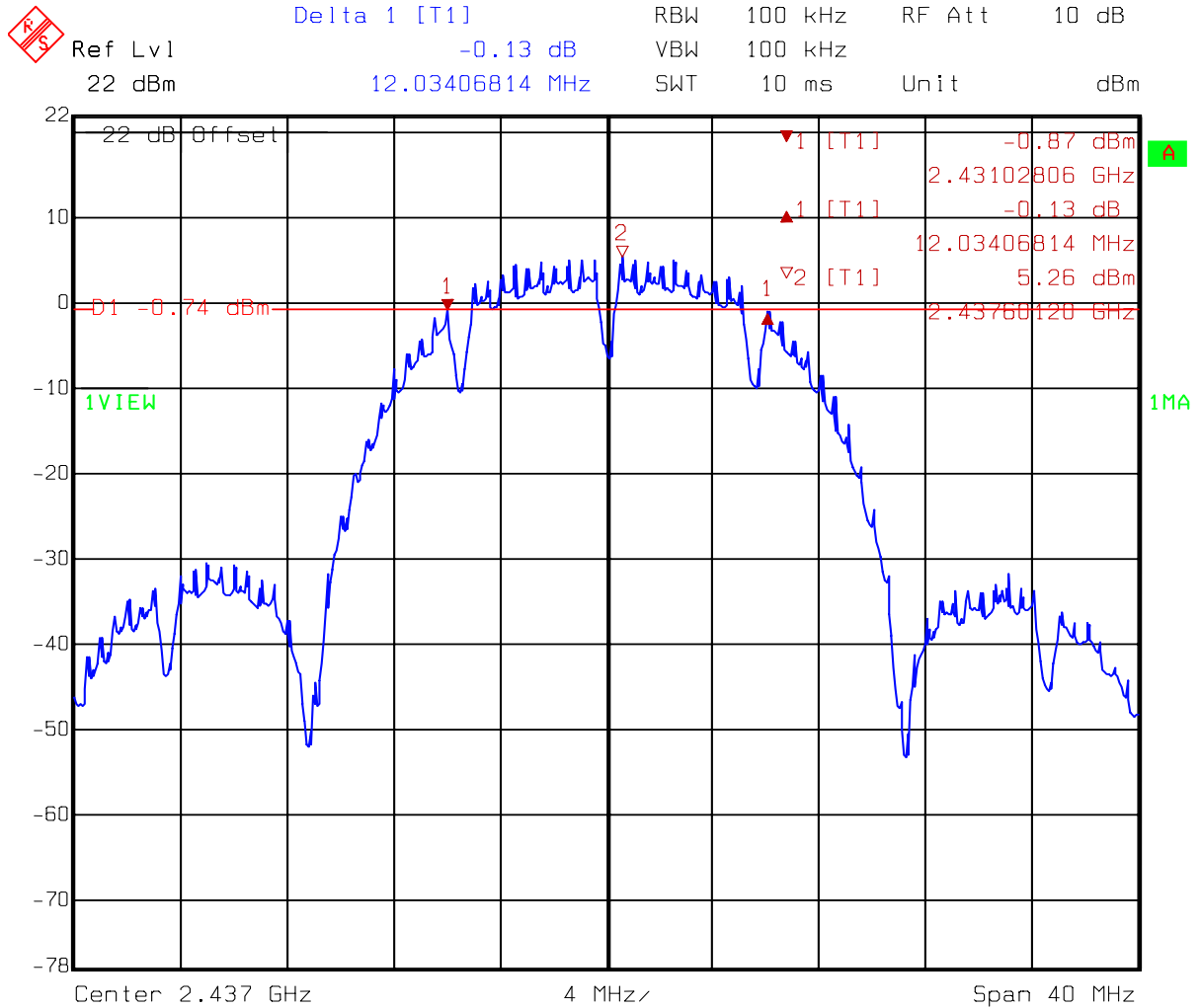
Please see the plot below.

Test Mode: 802.11b mode CH1



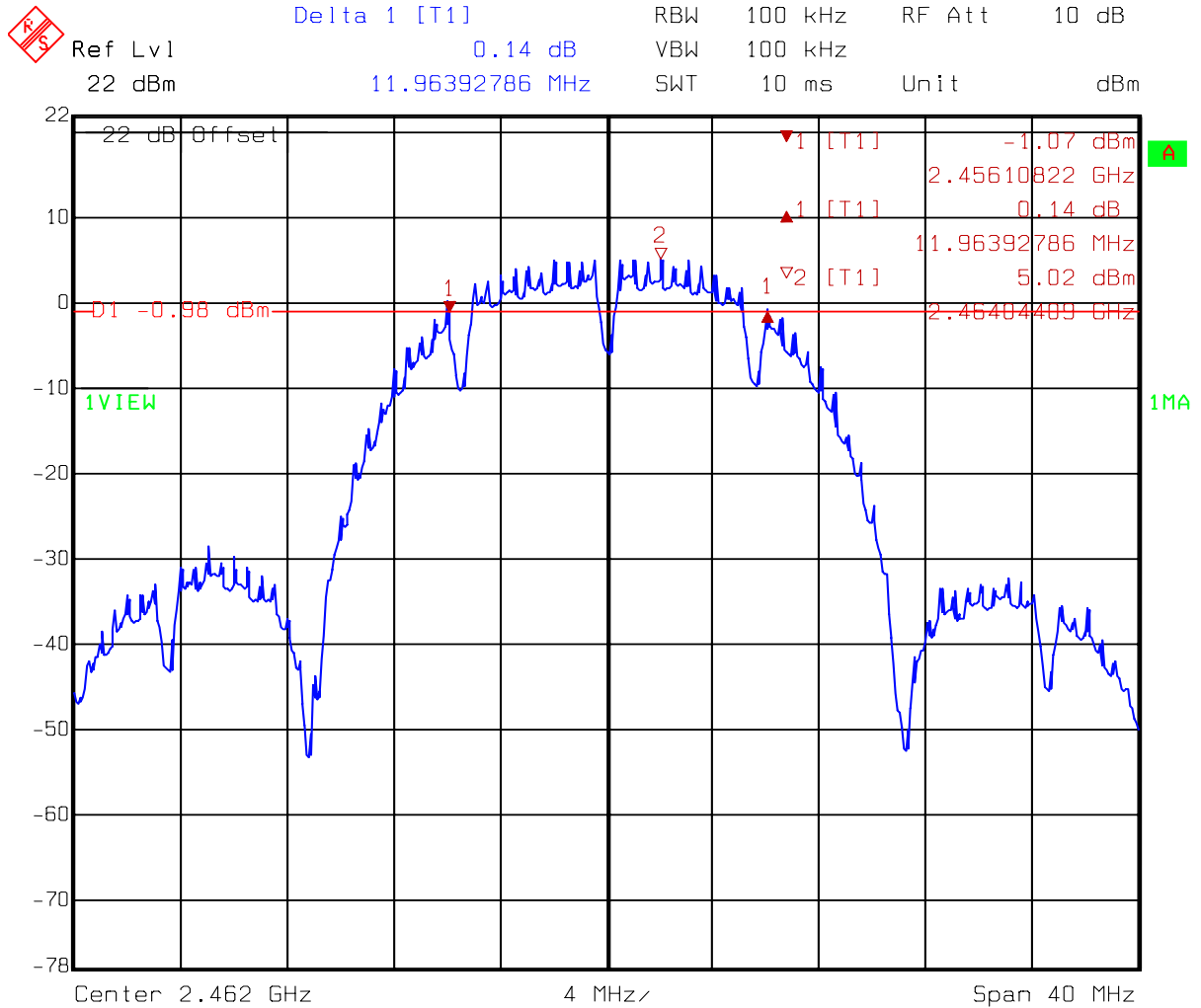
Title: Occupied Band-Width
 Comment A: 6dB BW 802.11b ch1
 Date: 22.JUN.2007 15:45:14

Test Mode: 802.11b mode CH6



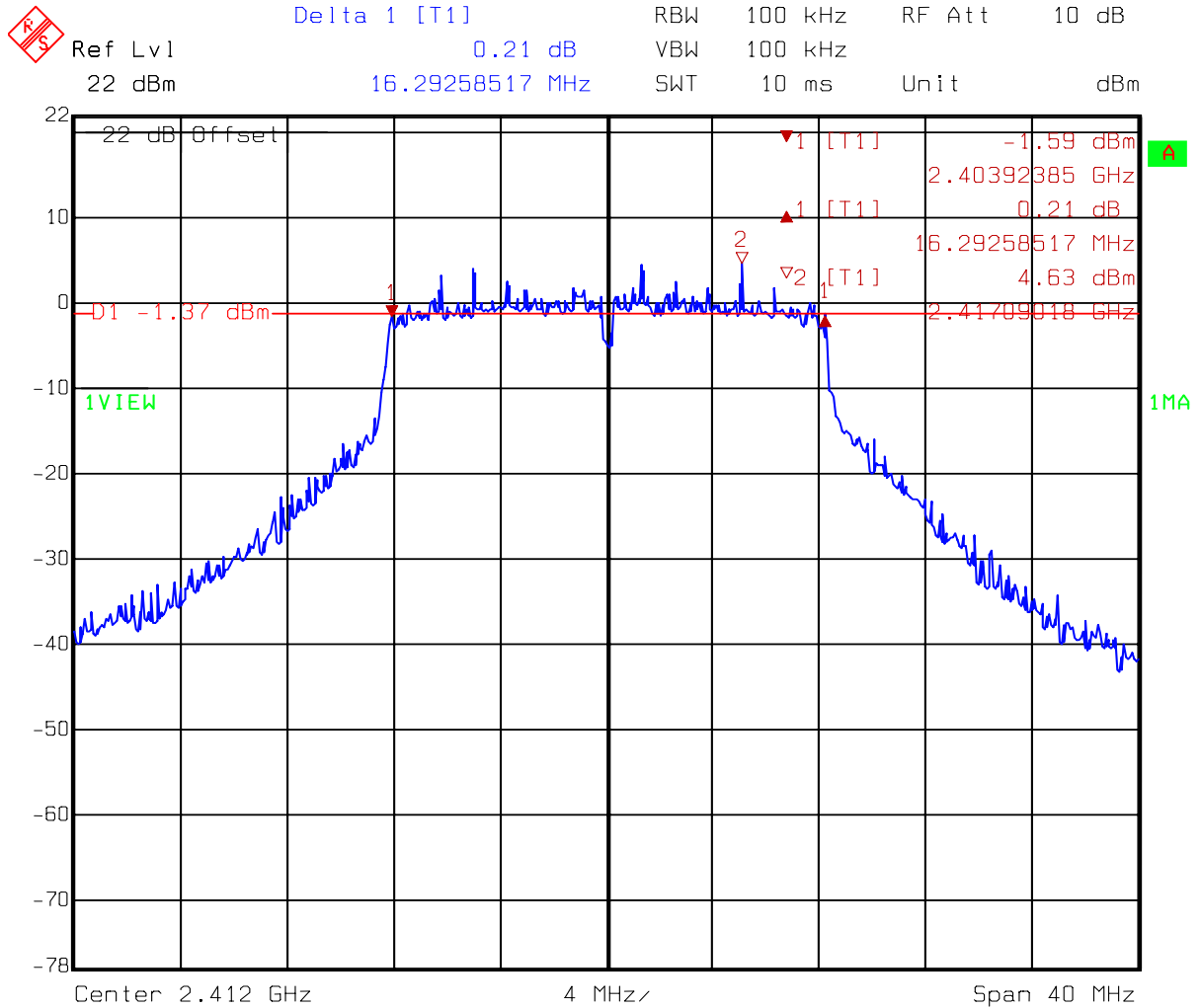
Title: Occupied Band-Width
 Comment A: 6dB BW 802.11b ch6
 Date: 22.JUN.2007 15:46:39

Test Mode: 802.11b mode CH11



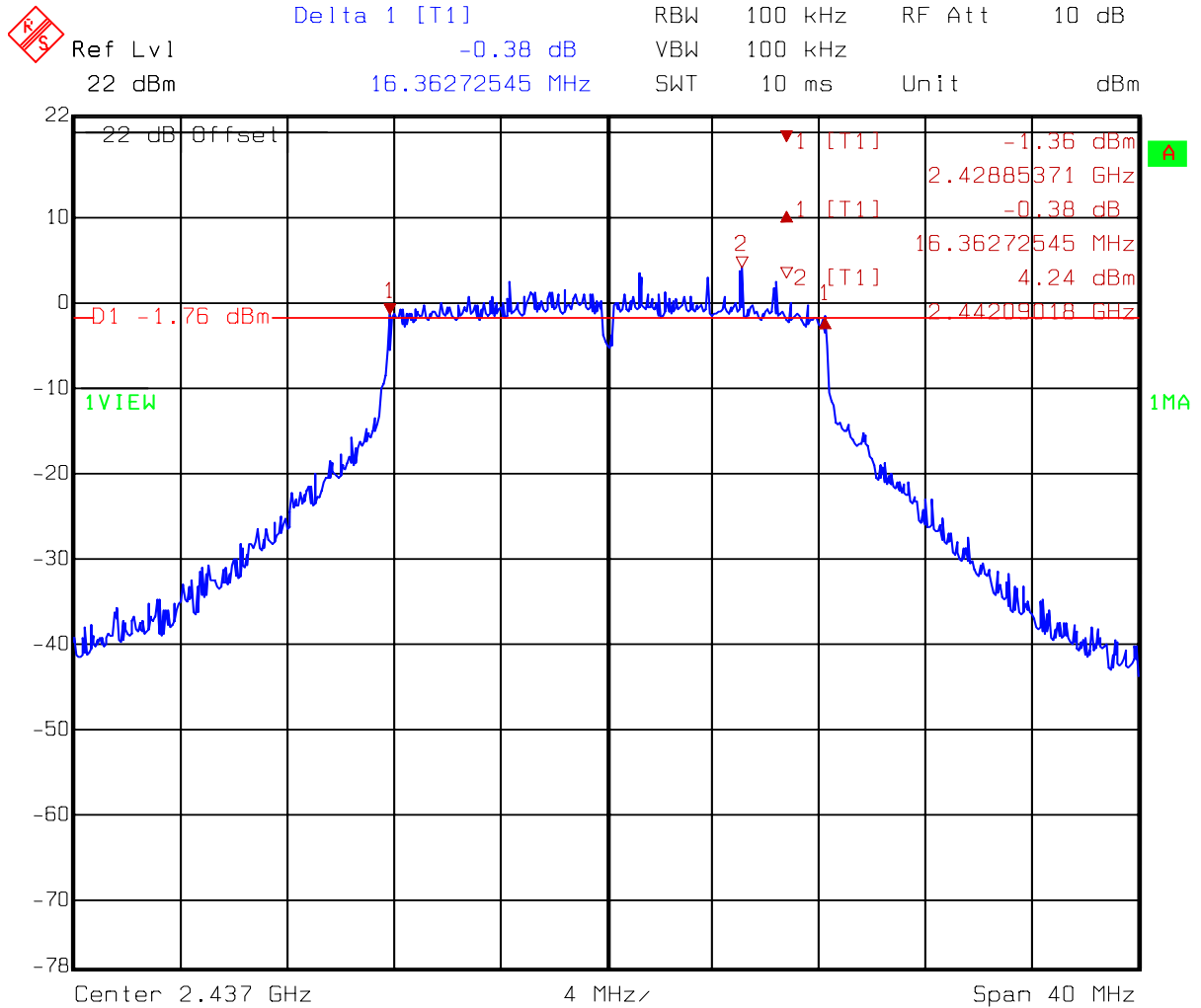
Title: Occupied Band-Width
 Comment A: 6dB BW 802.11b ch11
 Date: 22.JUN.2007 15:47:51

Test Mode: 802.11g Normal mode CH1



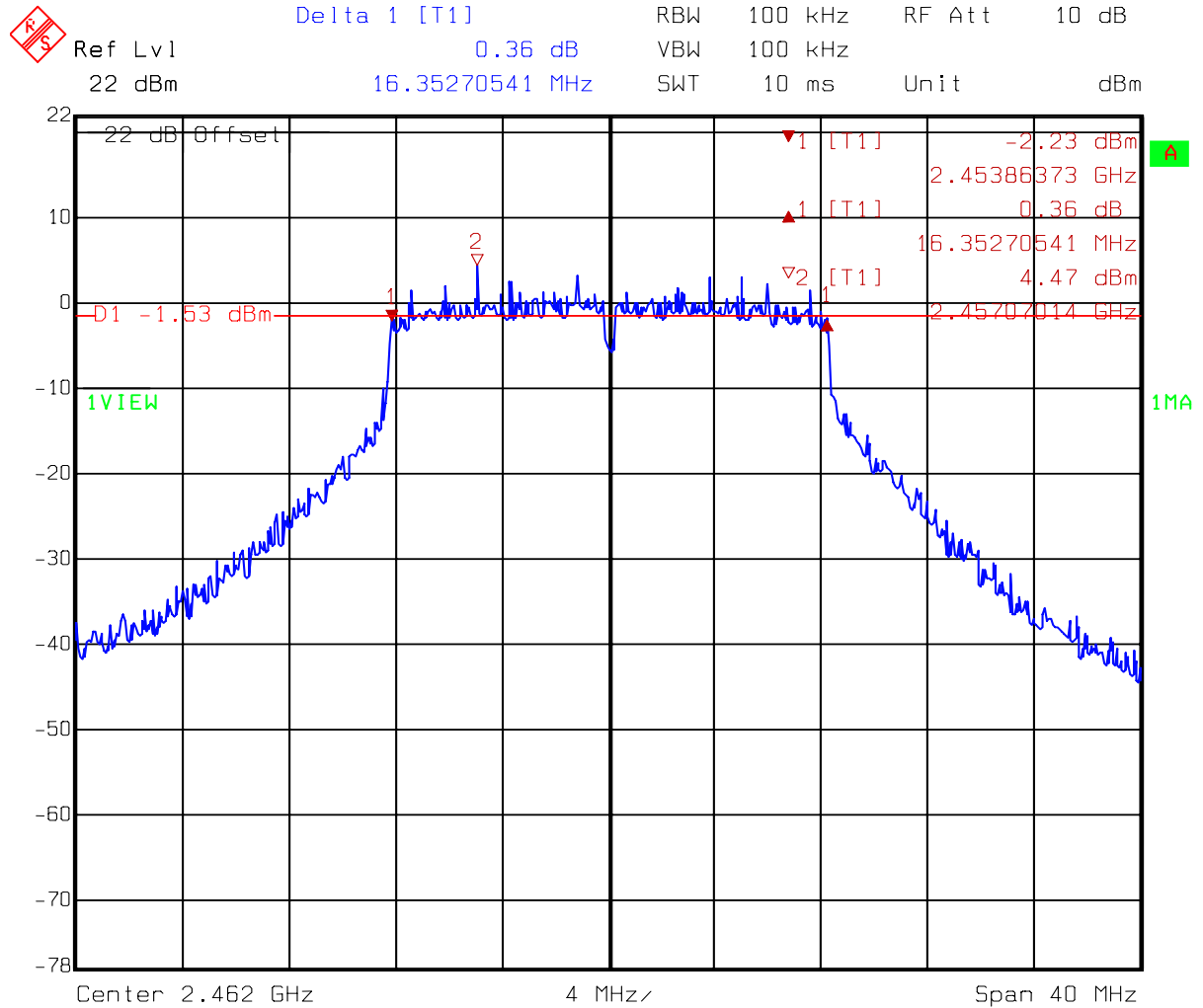
Title: Occupied Band-Width
 Comment A: 6dB BW 802.11g ch1
 Date: 22.JUN.2007 15:43:46

Test Mode: 802.11g Normal mode CH6



Title: Occupied Band-Width
 Comment A: 6dB BW 802.11g ch6
 Date: 22.JUN.2007 15:42:18

Test Mode: 802.11g Normal mode CH11



Title: Occupied Band-Width
 Comment A: 6dB BW 802.11g ch11
 Date: 22.JUN.2007 15:39:53

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 mode

Channel	Freq. (MHz)	C.L. (dB)	Reading (dBm)	Conducted Peak Output Power		Limit (W)
				(dBm)	(mW)	
1 (lowest)	2412	2	16.42	18.42	69.50	1
6 (middle)	2437	2	16.33	18.33	68.08	1
11 (highest)	2462	2	16.24	18.24	66.68	1

Test Mode: 802.11b mode

Channel	Freq. (MHz)	C.L. (dB)	Reading (dBm)	Conducted Peak Output Power		Limit (W)
				(dBm)	(mW)	
1 (lowest)	2412	2	17.11	19.11	81.47	1
6 (middle)	2437	2	17.26	19.26	84.33	1
11 (highest)	2462	2	17.22	19.22	83.56	1

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

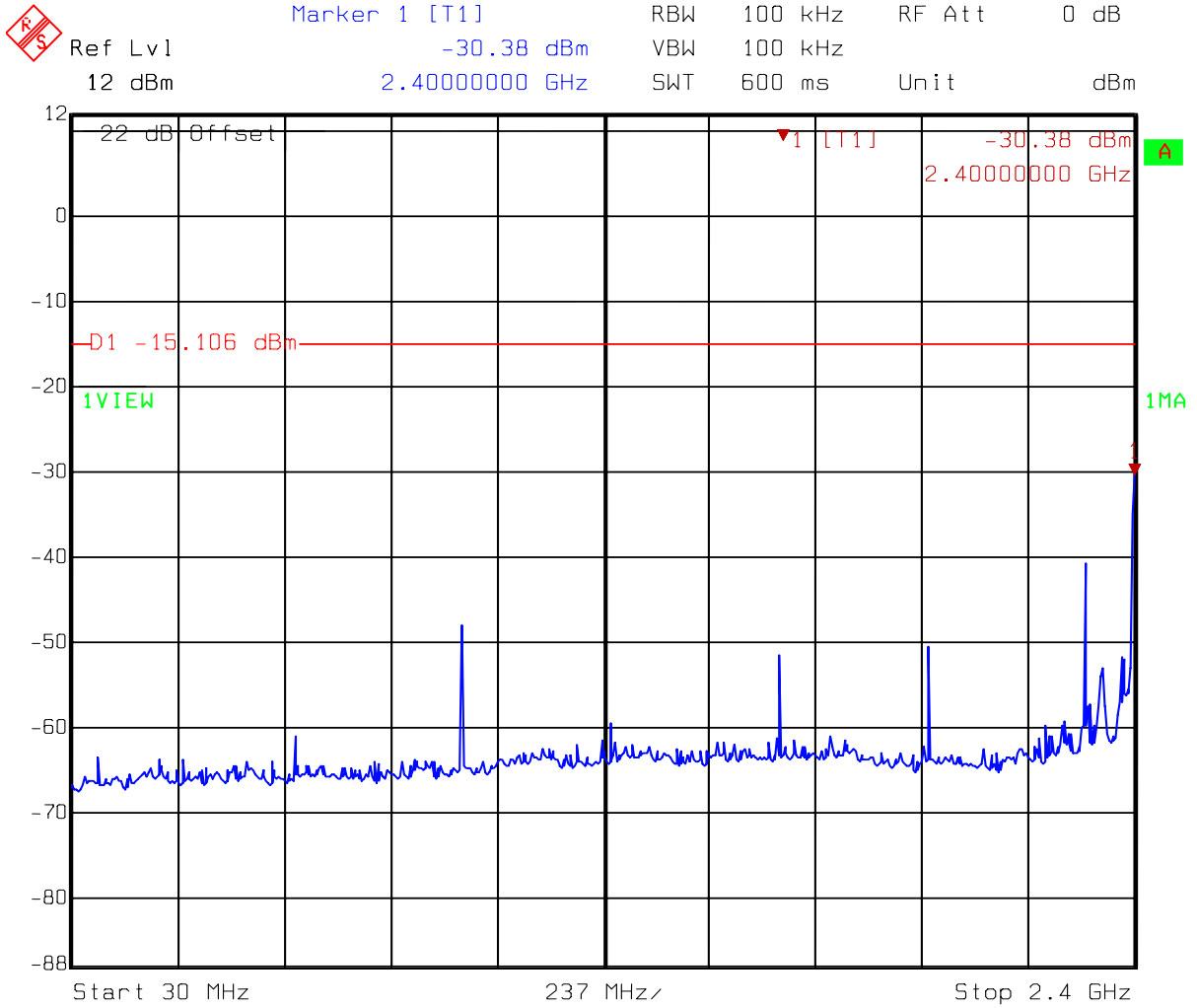
The measurements were performed from 30MHz to 25GHz RF antenna conducted per FCC 15.247 (d) was measured from the EUT antenna port using a 50ohm spectrum analyzer with the resolution bandwidth set at 100 kHz, and the video bandwidth set at 100 kHz.

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

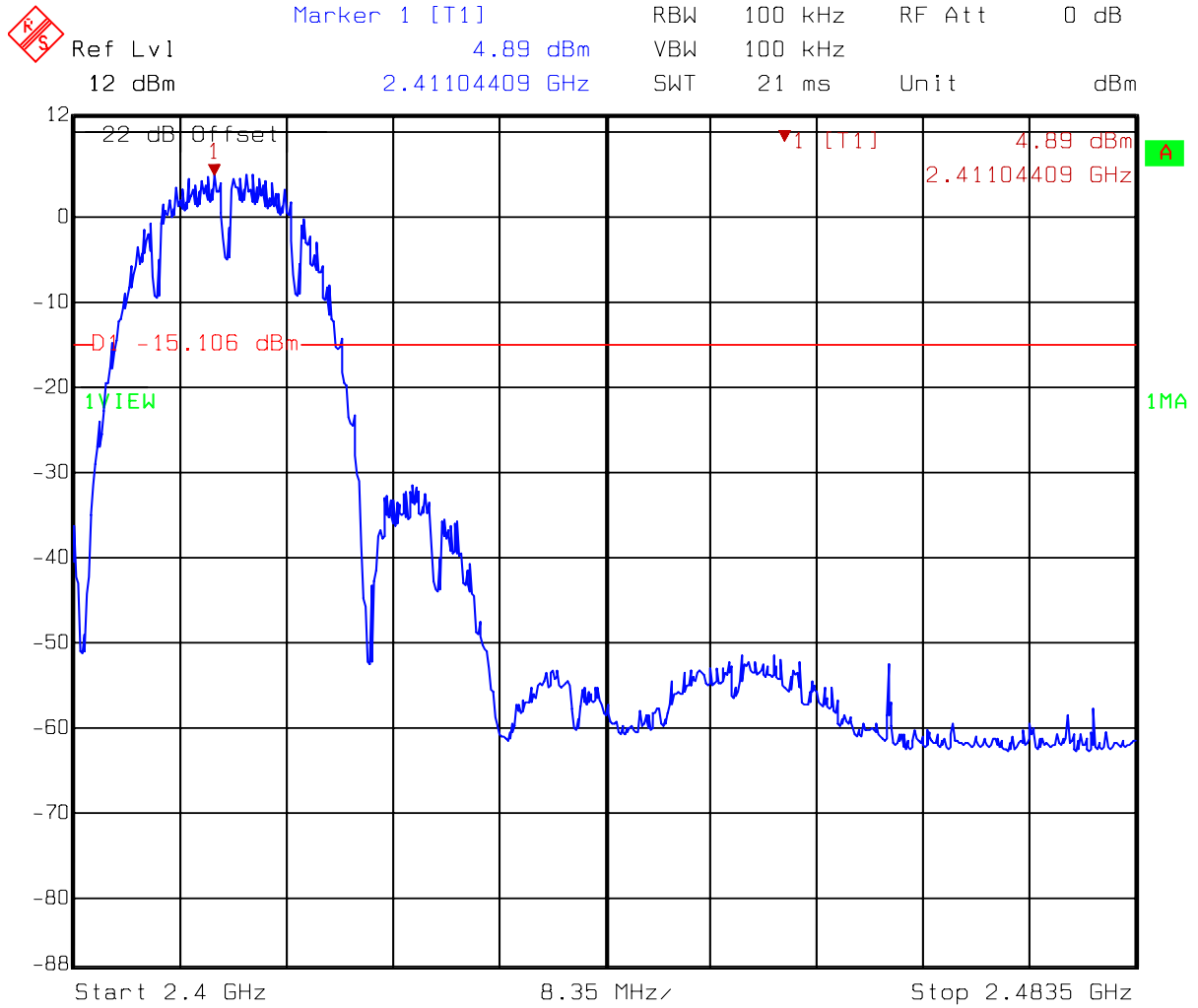
The test results please see the plot below.

Test Mode: 802.11b mode CH1



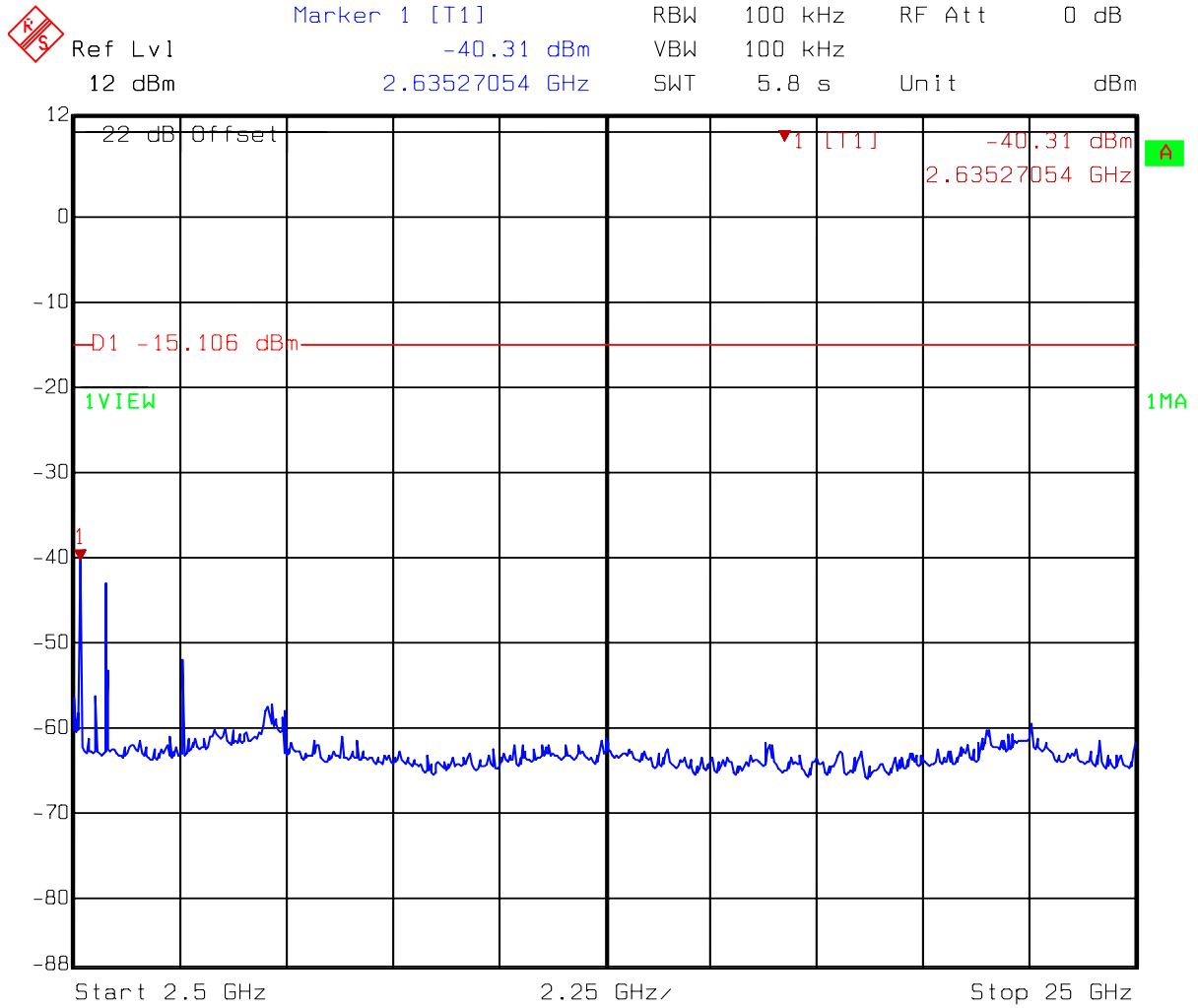
Title: Conductive-Spurious
 Comment A: CH 1 at 802.11b mode 30MHz~2400MHz
 Date: 22.JUN.2007 15:53:36

Test Mode: 802.11b mode CH1



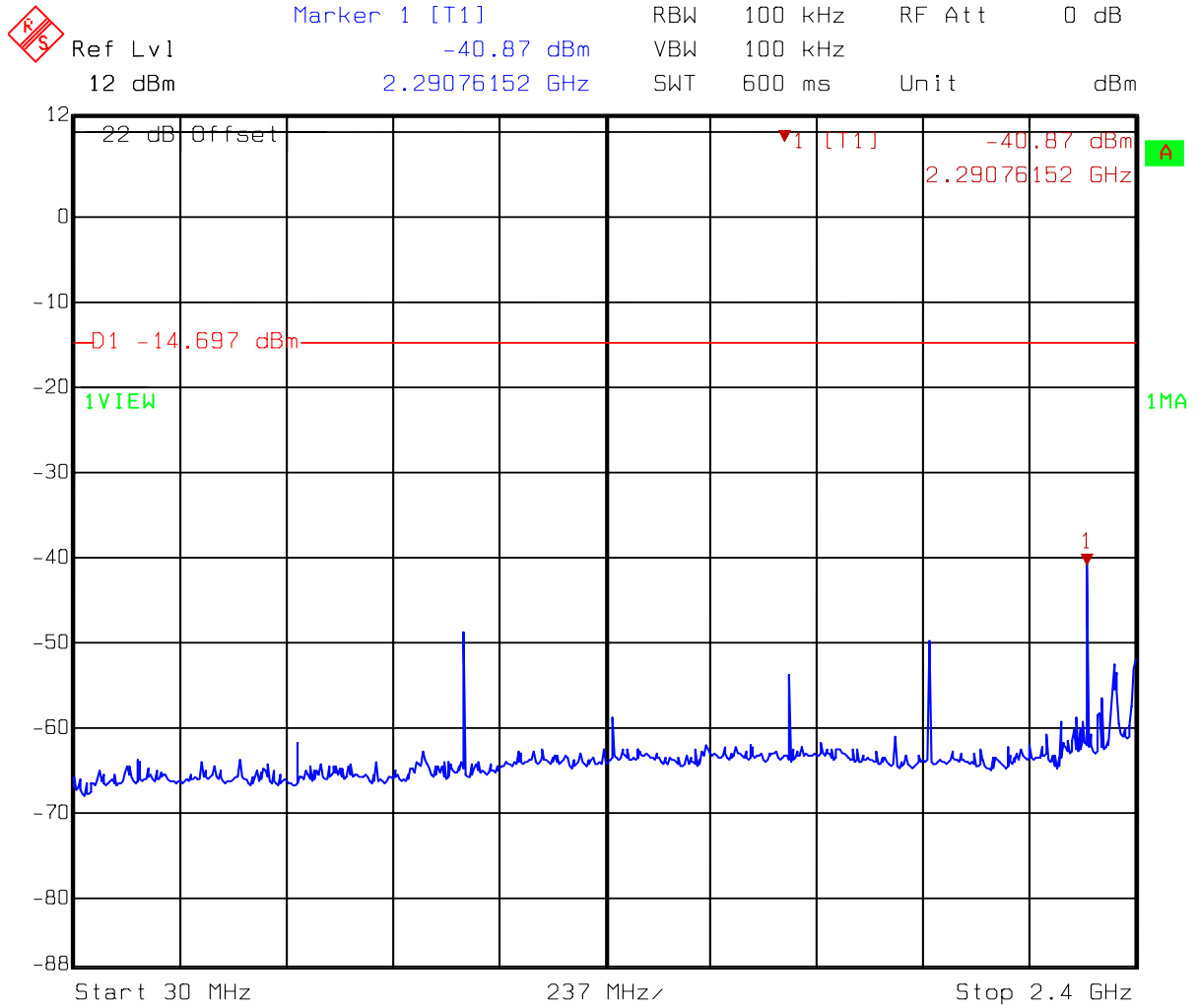
Title: Conductive-Spurious
 Comment A: CH 1 at 802.11b mode 2400MHz~2483.5MHz
 Date: 22.JUN.2007 15:53:14

Test Mode: 802.11b mode CH1



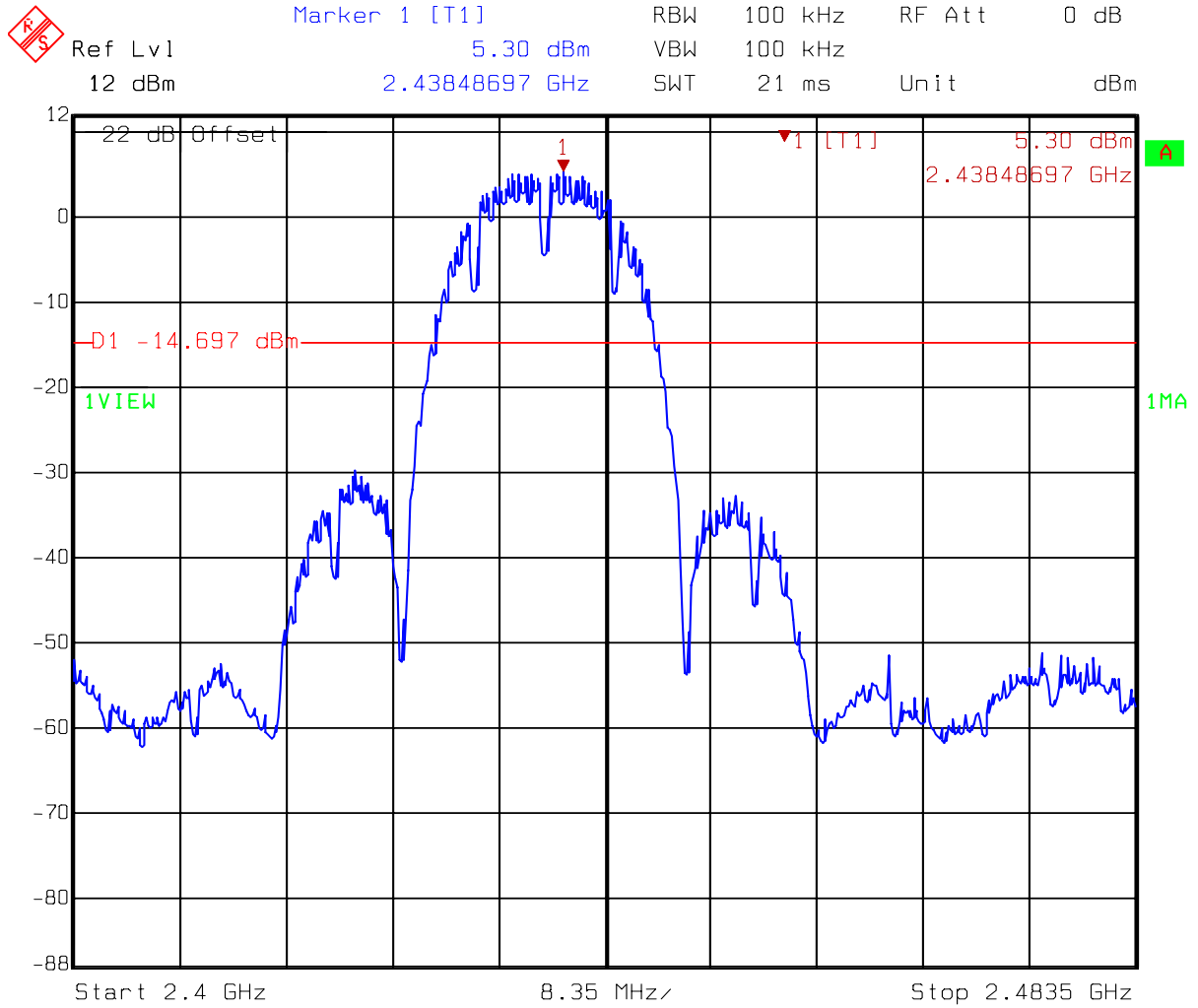
Title: Conductive-Spurious
 Comment A: CH 1 at 802.11b mode 2483.5MHz~25GHz
 Date: 22.JUN.2007 15:54:03

Test Mode: 802.11b mode CH6



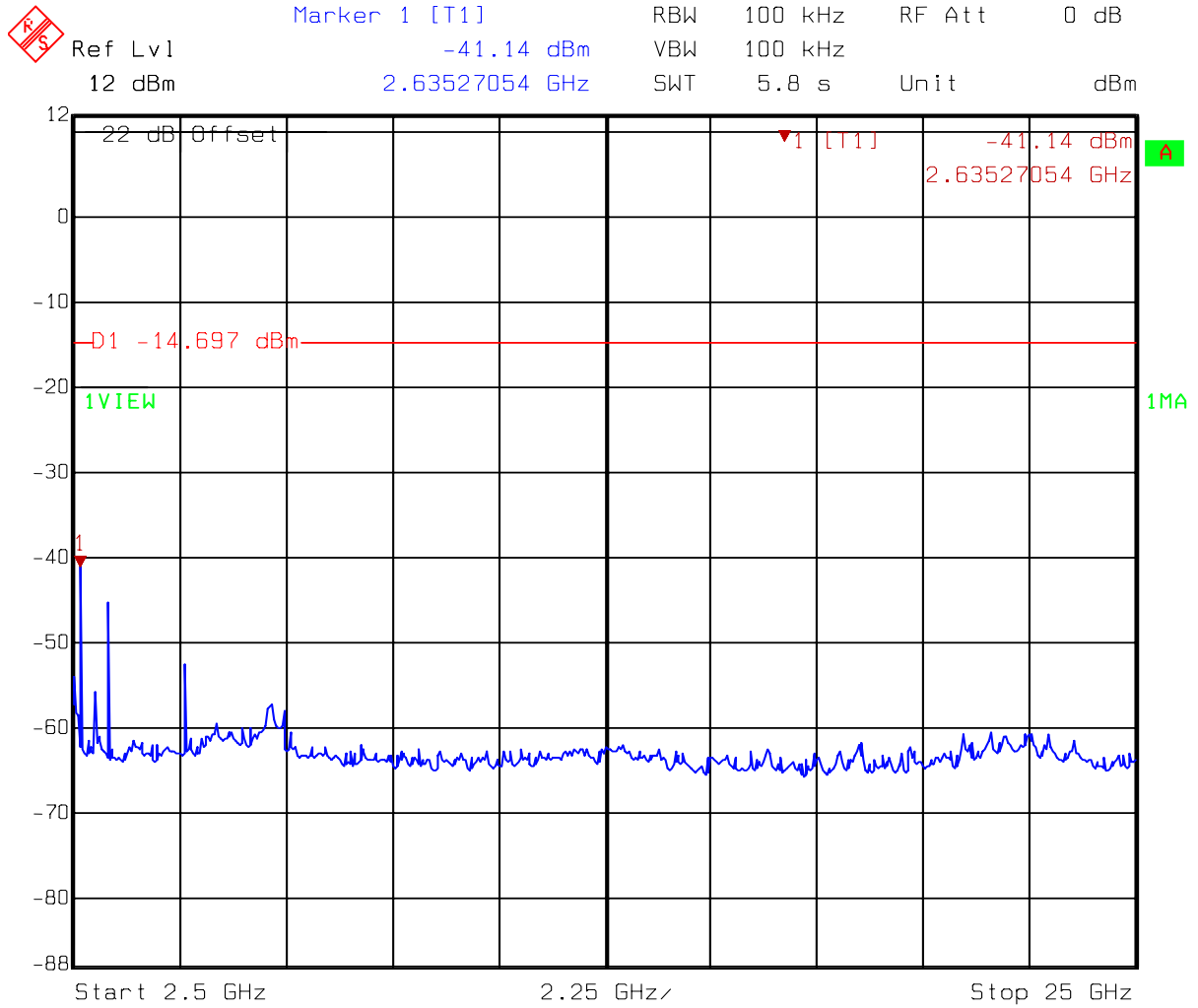
Title: Conductive-Spurious
 Comment A: CH 6 at 802.11b mode 30MHz~2400MHz
 Date: 22.JUN.2007 15:51:32

Test Mode: 802.11b mode CH6



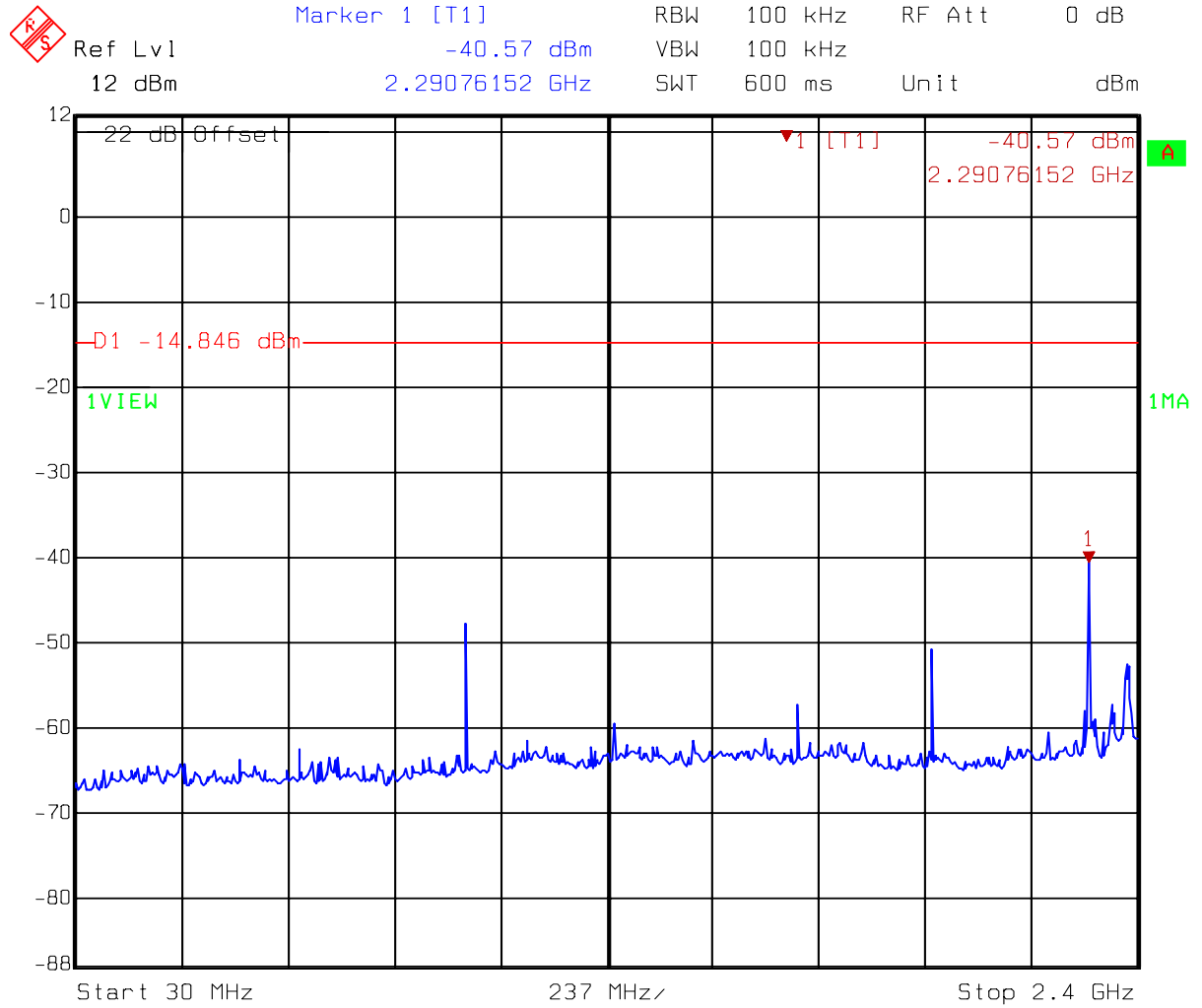
Title: Conductive-Spurious
 Comment A: CH 6 at 802.11b mode 2400MHz~2483.5MHz
 Date: 22.JUN.2007 15:51:11

Test Mode: 802.11b mode CH6



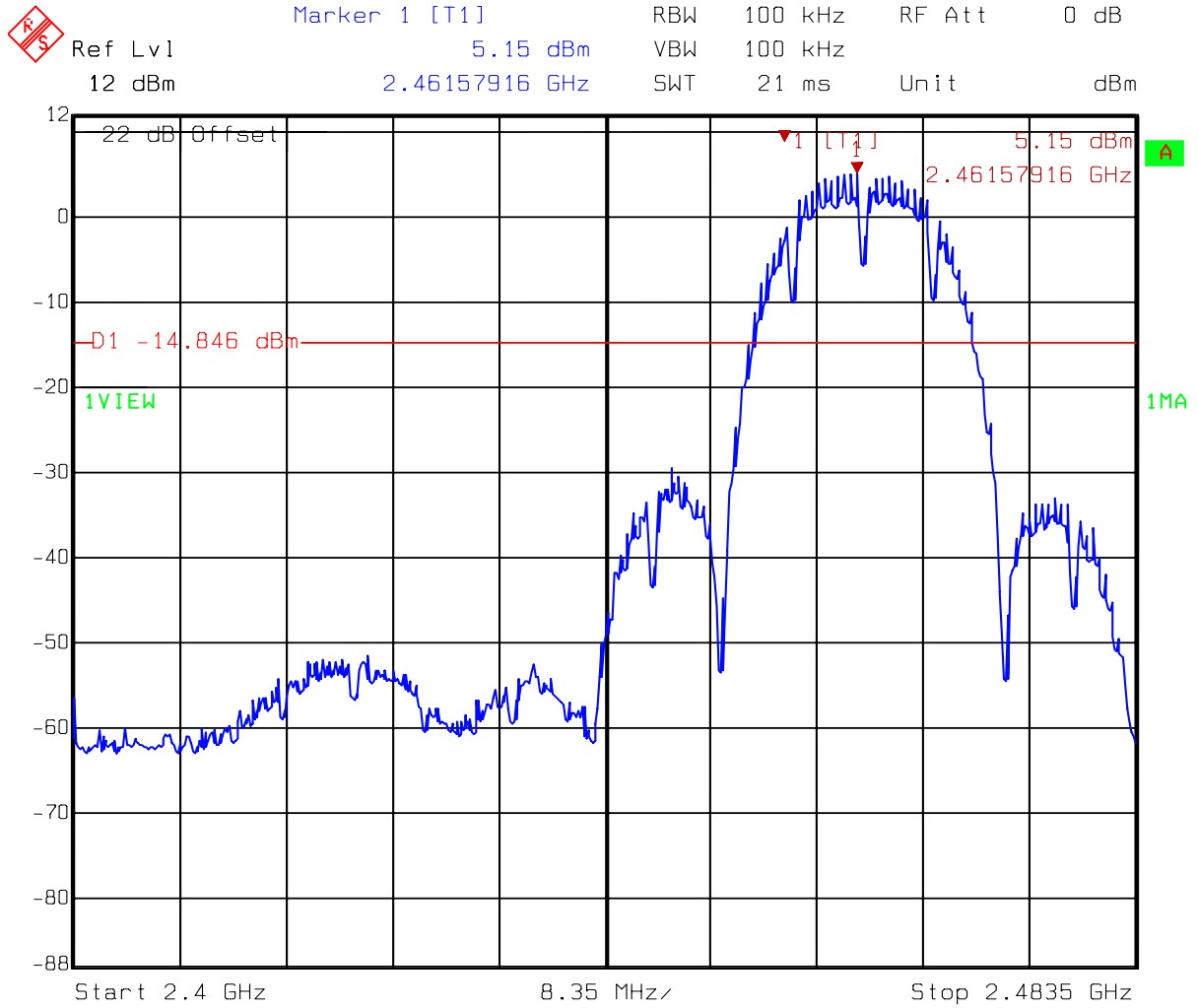
Title: Conductive-Spurious
 Comment A: CH 6 at 802.11b mode 2483.5MHz~25GHz
 Date: 22.JUN.2007 15:52:00

Test Mode: 802.11b mode CH11



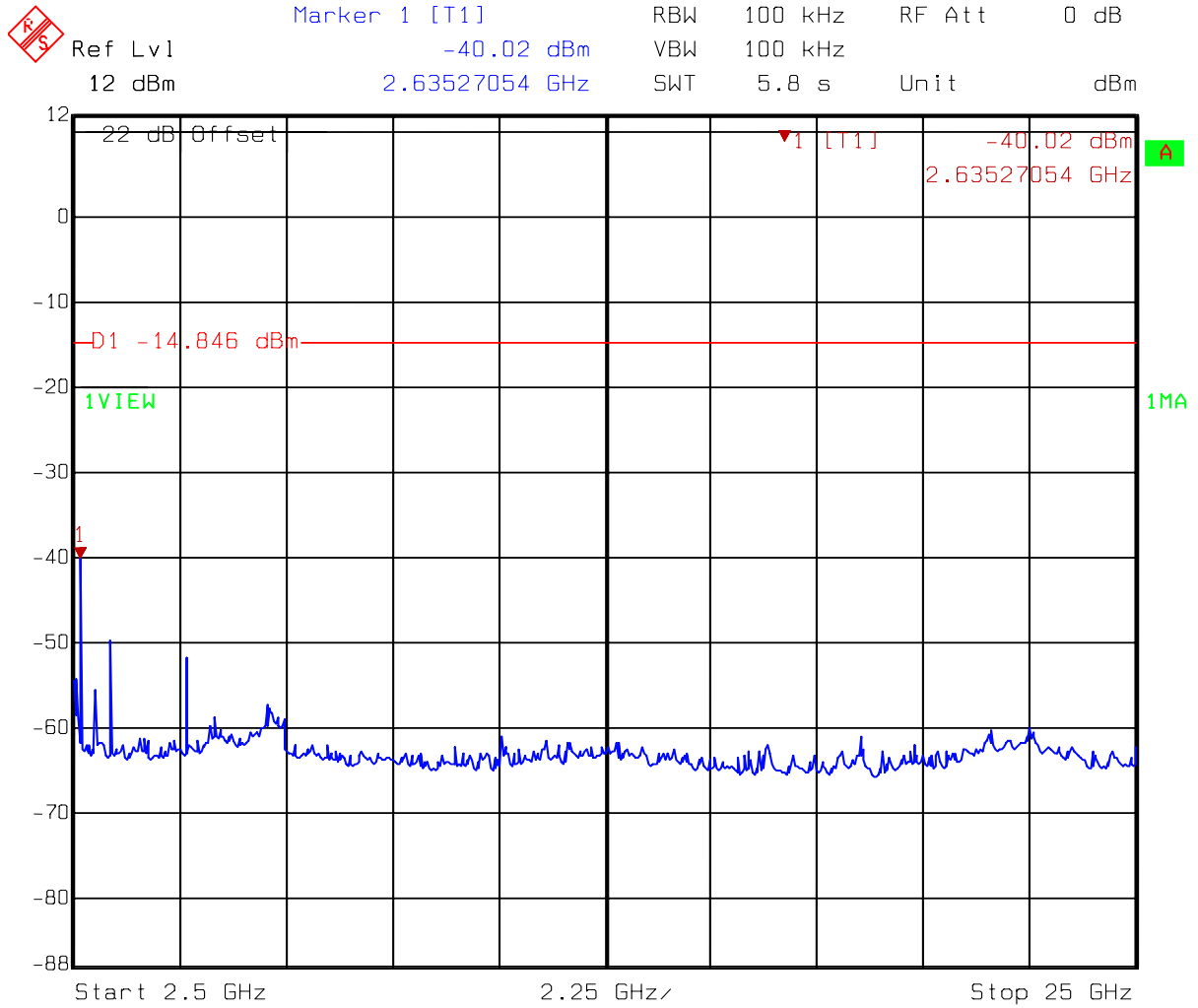
Title: Conductive-Spurious
Comment A: CH 11 at 802.11b mode 30MHz~2400MHz
Date: 22.JUN.2007 15:49:24

Test Mode: 802.11b mode CH11



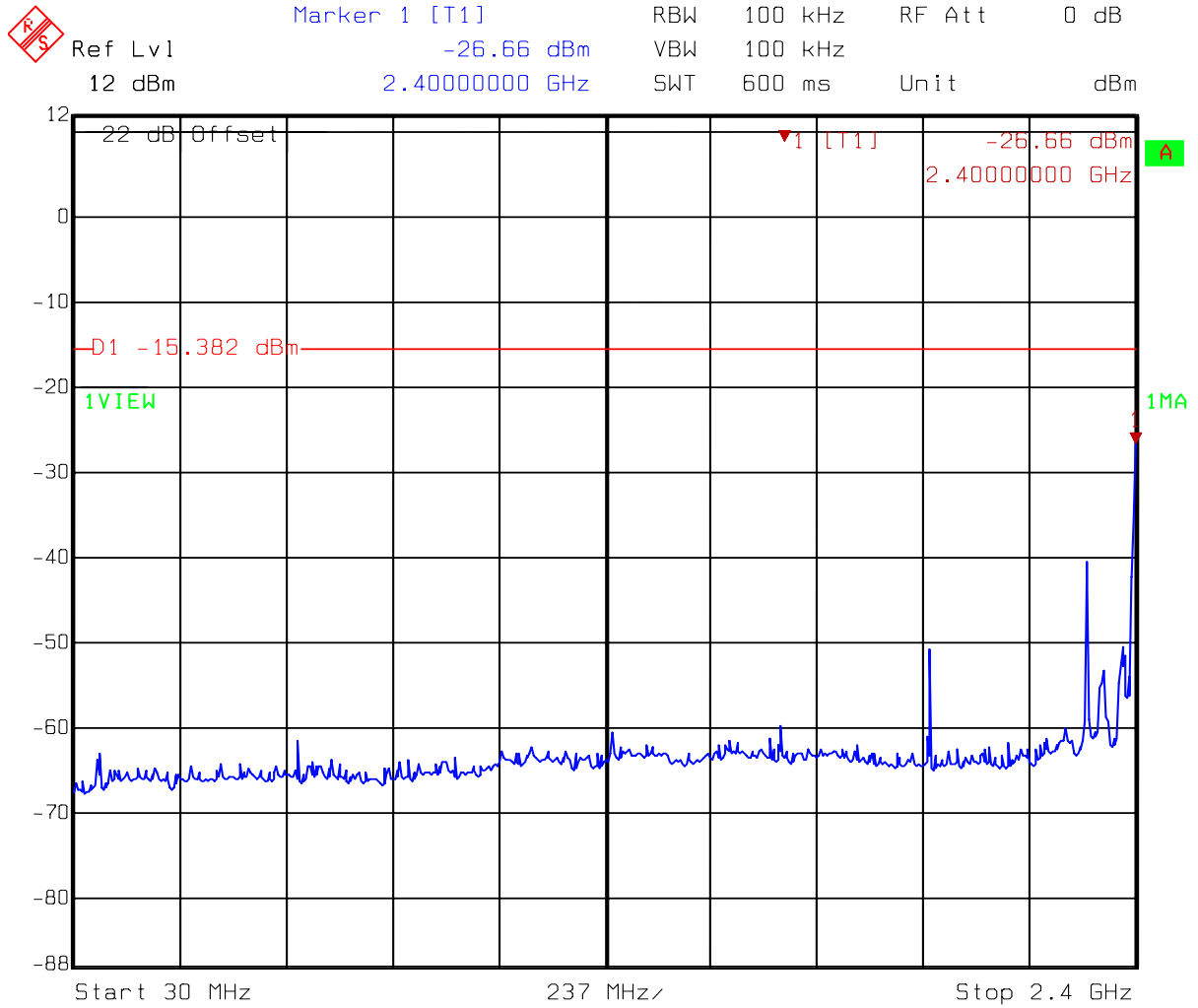
Title: Conductive-Spurious
Comment A: CH 11 at 802.11b mode 2400MHz~2483.5MHz
Date: 22.JUN.2007 15:49:02

Test Mode: 802.11b mode CH11



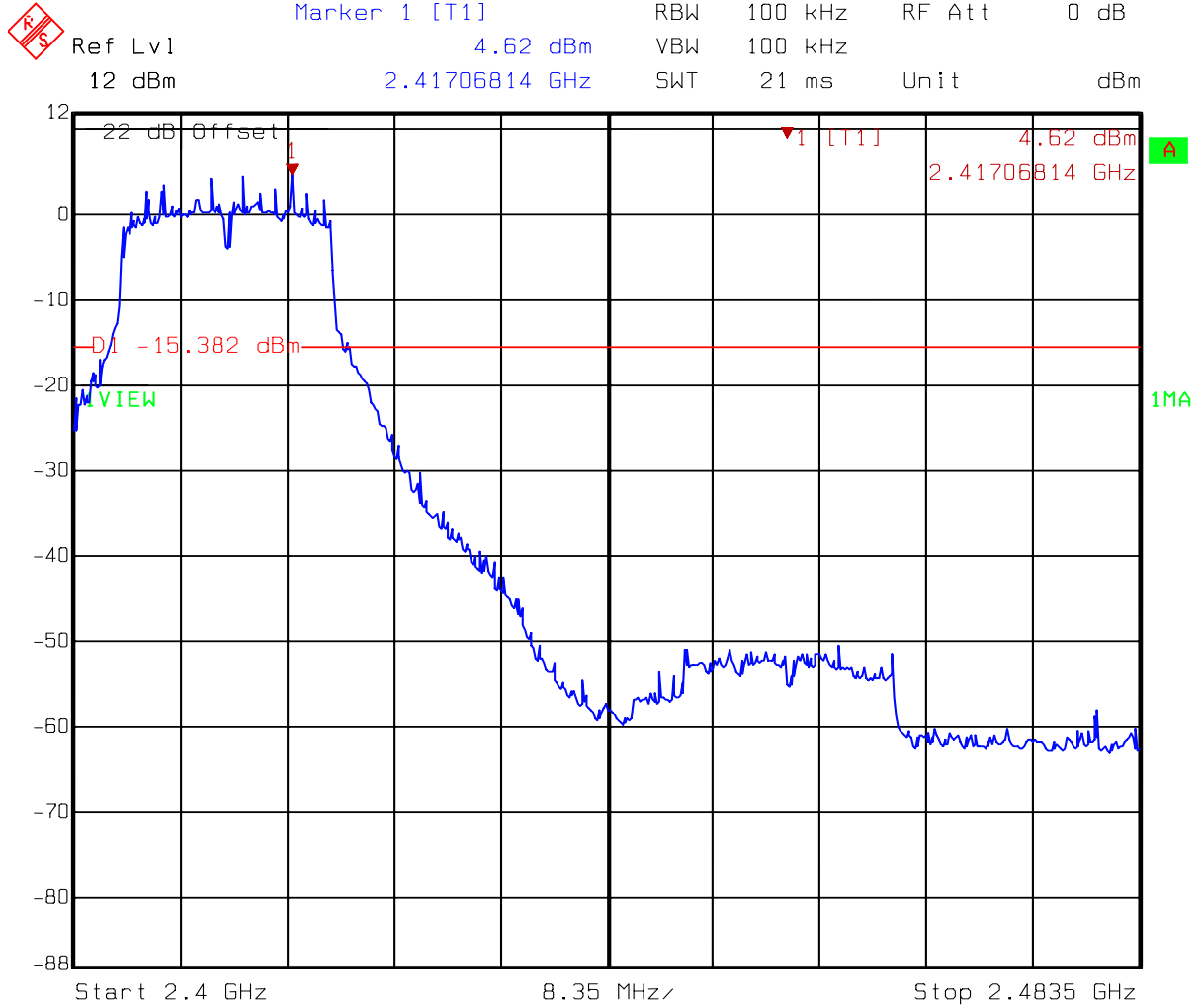
Title: Conductive-Spurious
 Comment A: CH 11 at 802.11b mode 2483.5MHz~25GHz
 Date: 22.JUN.2007 15:49:51

Test Mode: 802.11g Normal mode CH1



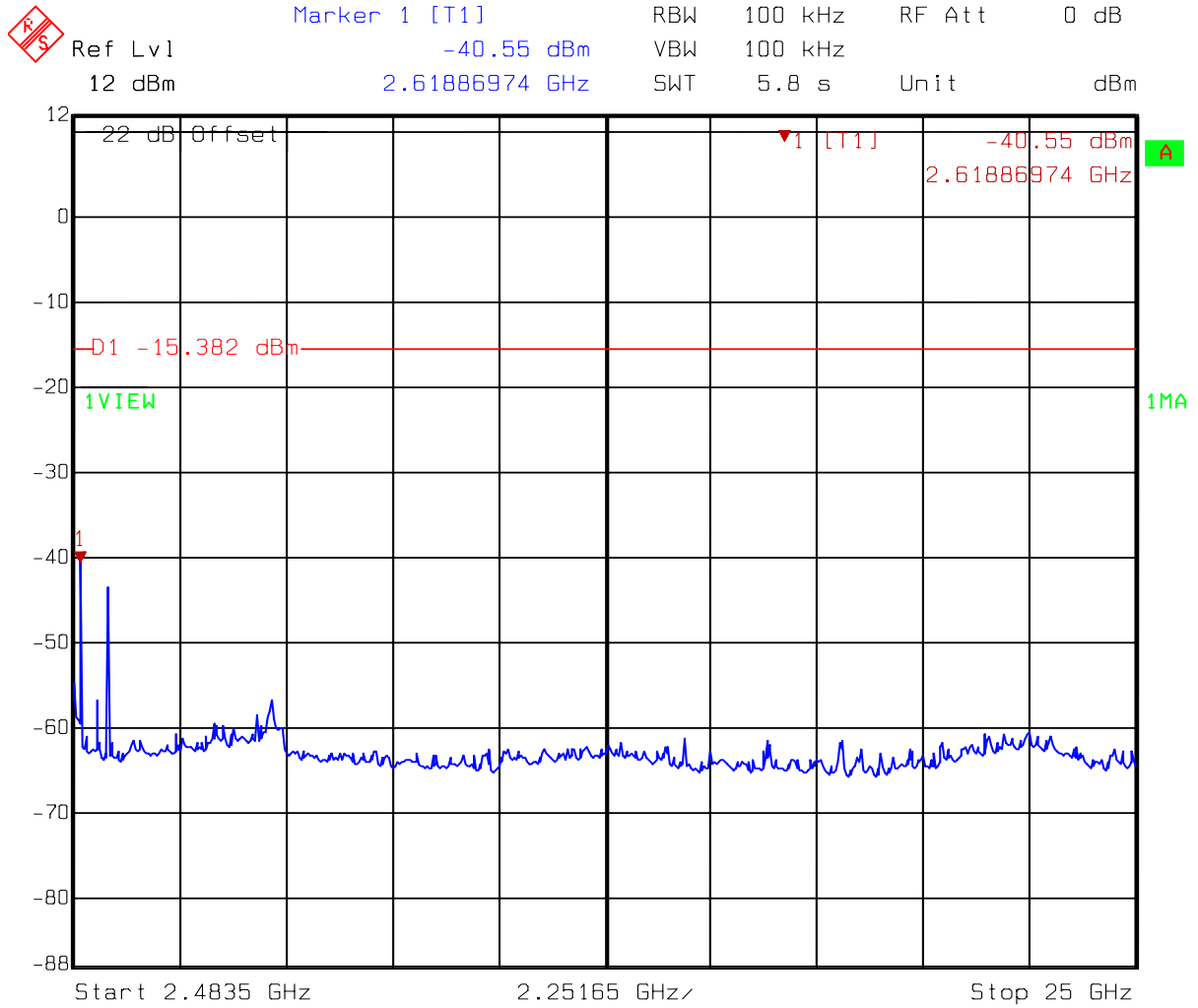
Title: Conductive-Spurious
 Comment A: CH 1 at 802.11g mode 30MHz~2400MHz
 Date: 22.JUN.2007 15:29:12

Test Mode: 802.11g Normal mode CH1



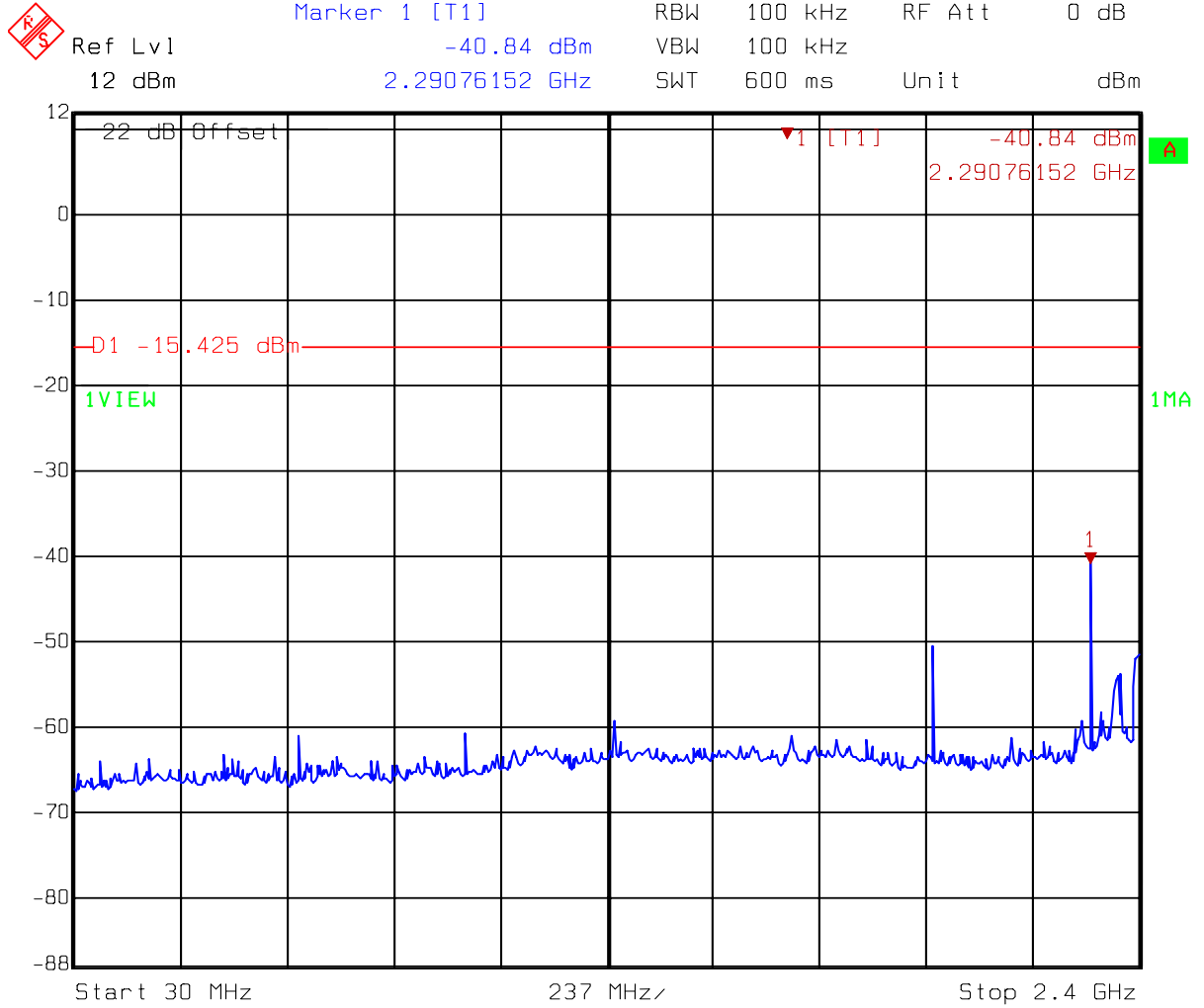
Title: Conductive-Spurious
 Comment A: CH 1 at 802.11g mode 2400MHz~2483.5MHz
 Date: 22.JUN.2007 15:28:50

Test Mode: 802.11g Normal mode CH1



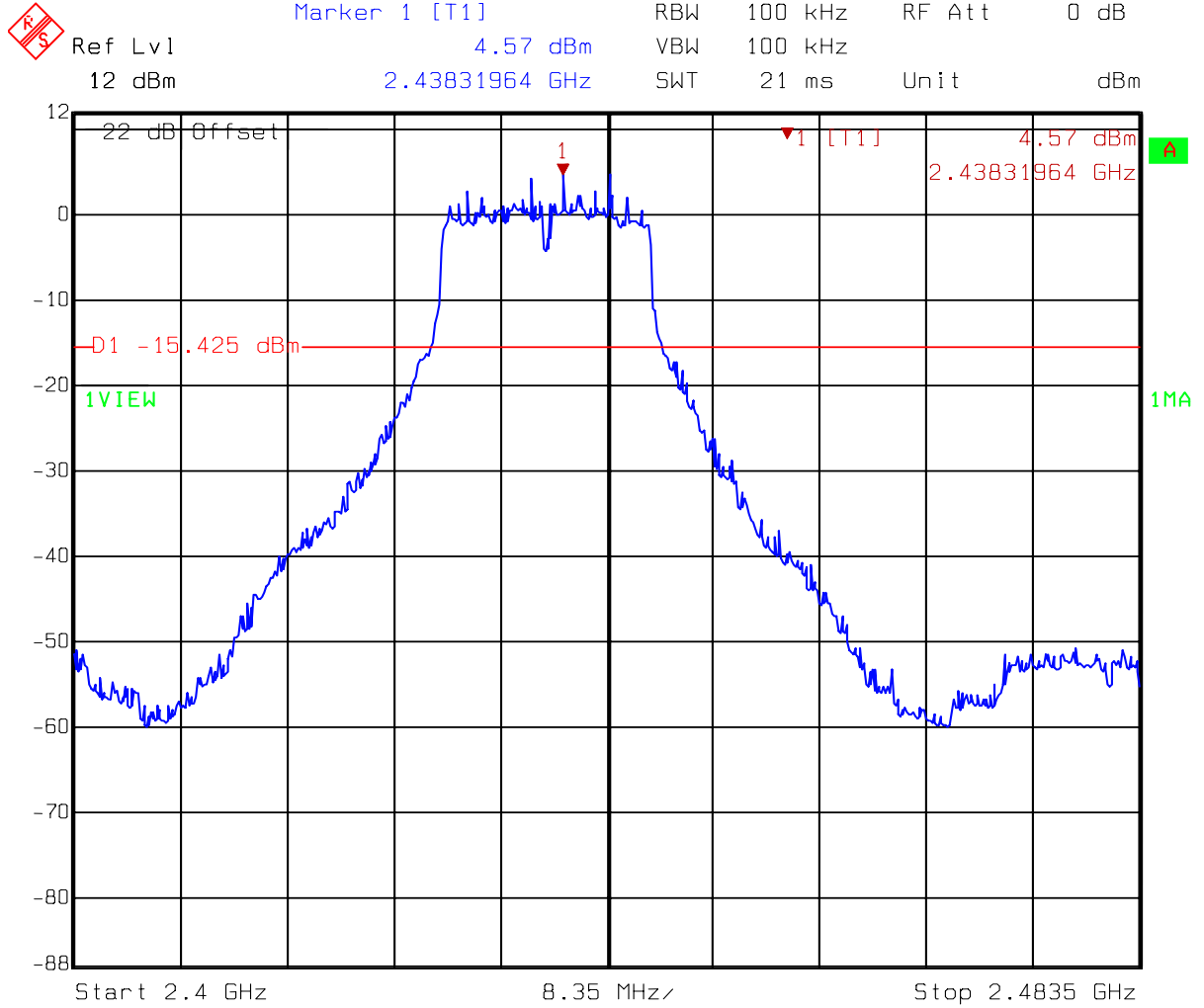
Title: Conductive-Spurious
 Comment A: CH 1 at 802.11g mode 2483.5MHz~25000MHz
 Date: 22.JUN.2007 15:29:39

Test Mode: 802.11g Normal mode CH6



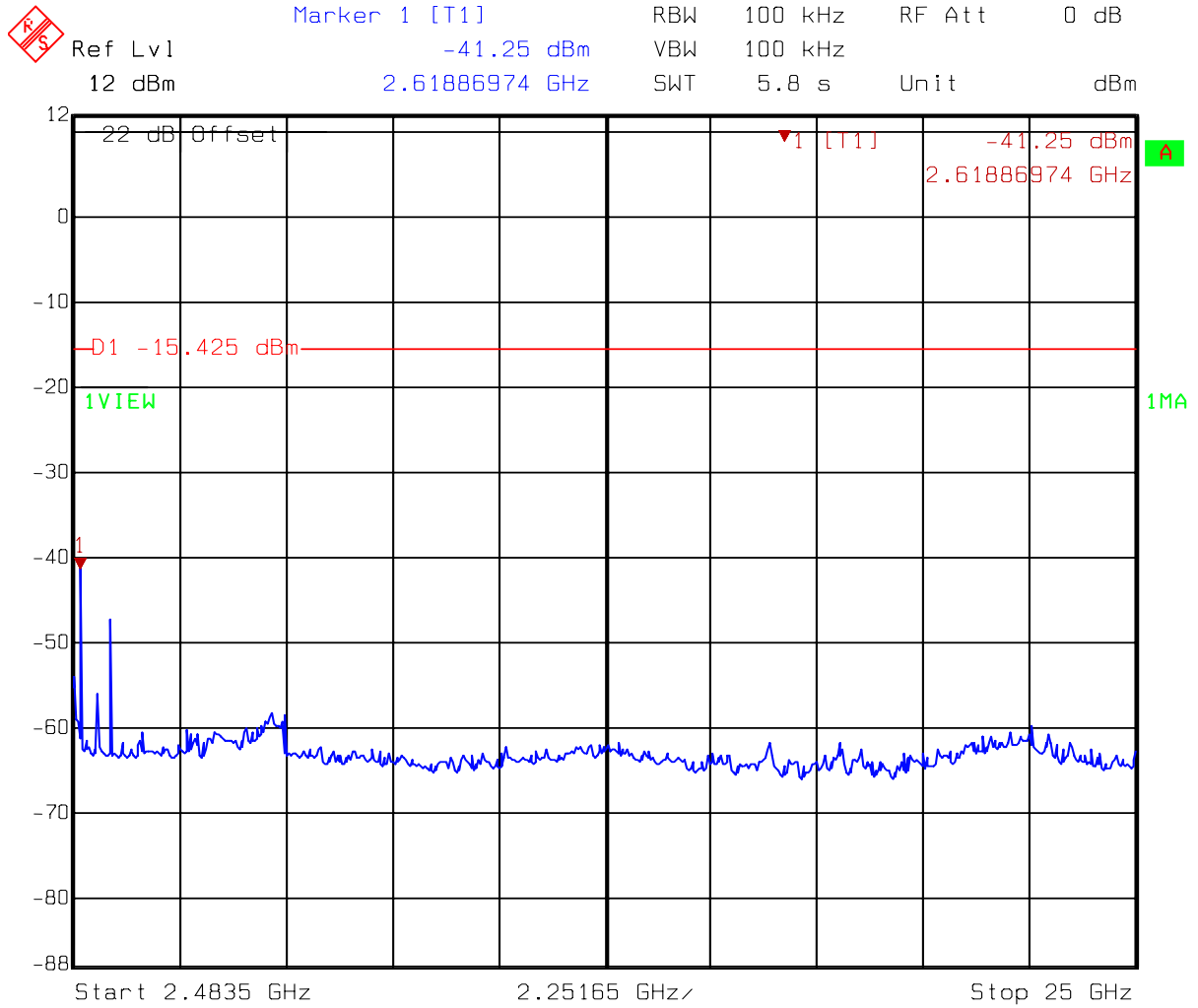
Title: Conductive-Spurious
 Comment A: CH 6 at 802.11g mode 30MHz~2400MHz
 Date: 22.JUN.2007 15:31:55

Test Mode: 802.11g Normal mode CH6



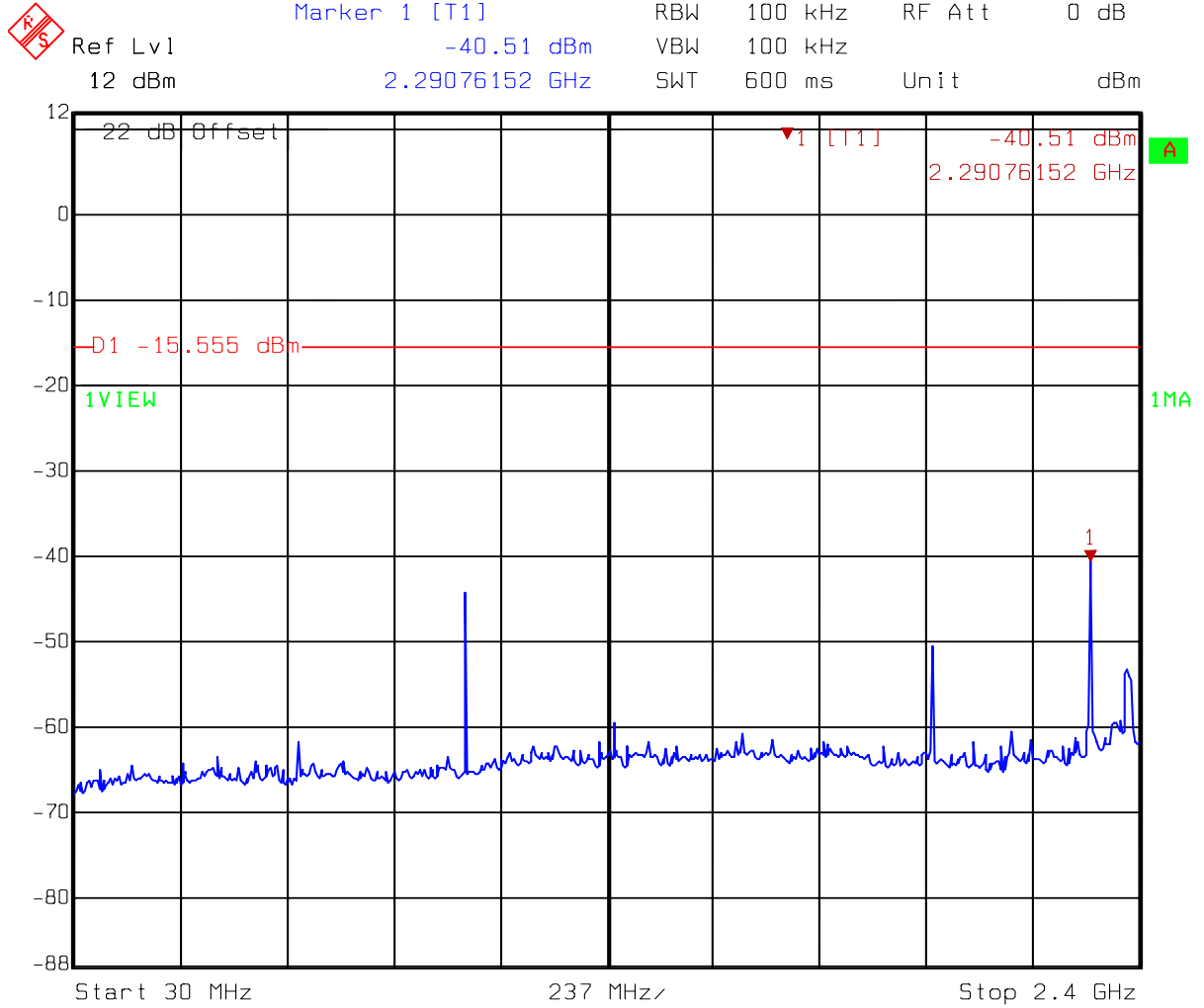
Title: Conductive-Spurious
 Comment A: CH 6 at 802.11g mode 2400MHz~2483.5MHz
 Date: 22.JUN.2007 15:31:33

Test Mode: 802.11g Normal mode CH6



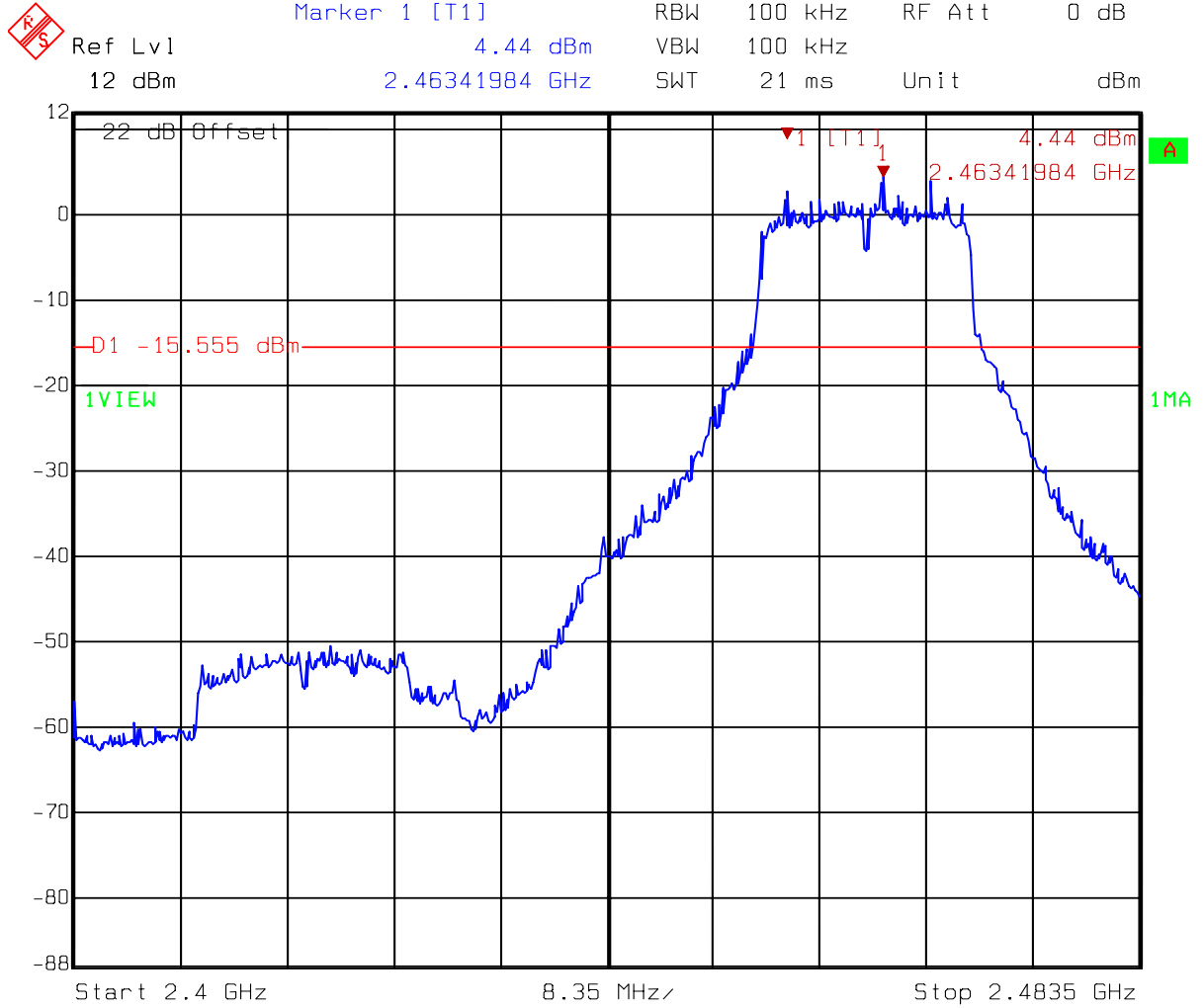
Title: Conductive-Spurious
 Comment A: CH 6 at 802.11g mode 2483.5MHz~25000MHz
 Date: 22.JUN.2007 15:32:22

Test Mode: 802.11g Normal mode CH11



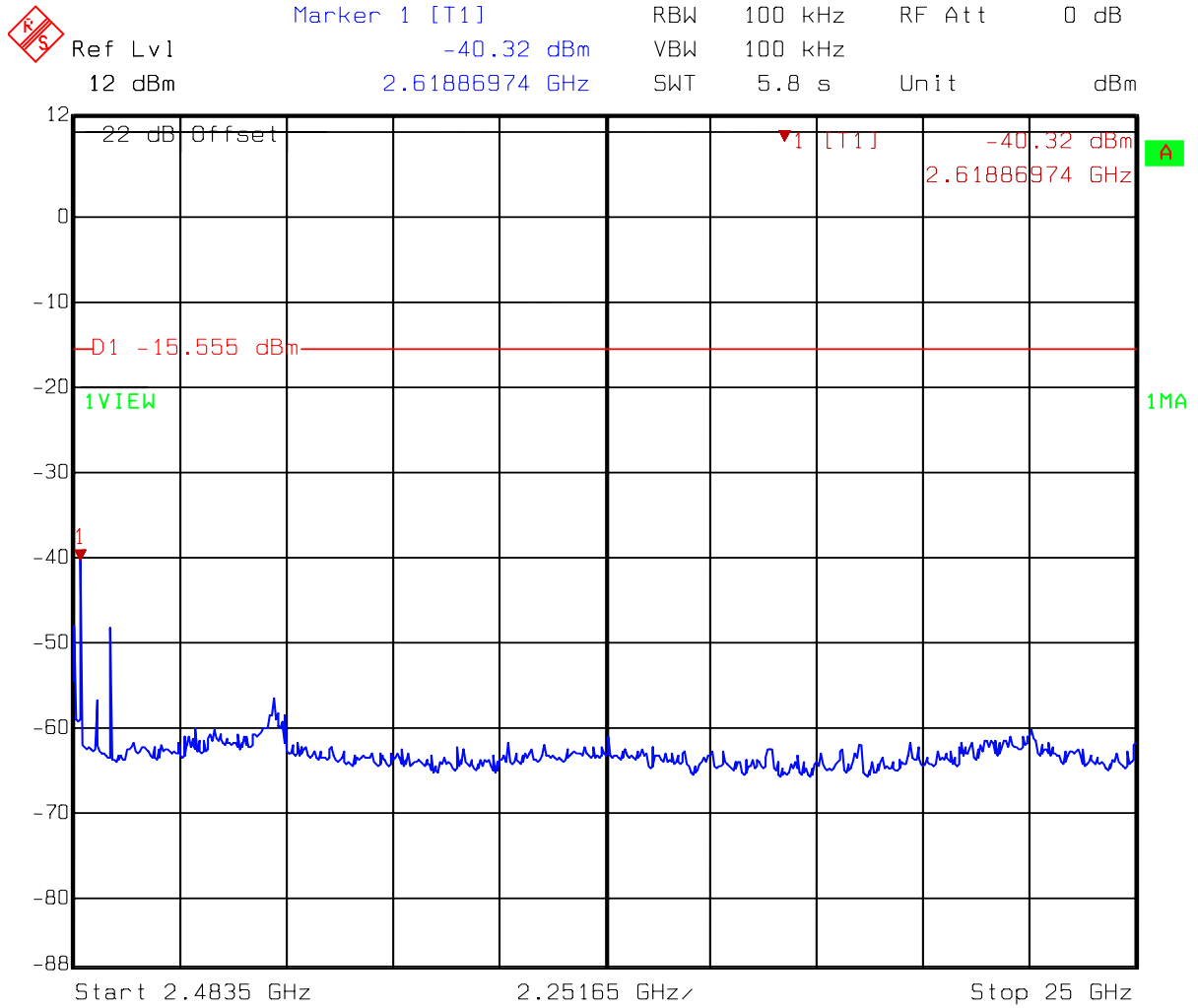
Title: Conductive-Spurious
 Comment A: CH 11 at 802.11g mode 30MHz~2400MHz
 Date: 22.JUN.2007 15:34:08

Test Mode: 802.11g Normal mode CH11



Title: Conductive-Spurious
 Comment A: CH 11 at 802.11g mode 2400MHz~2483.5MHz
 Date: 22.JUN.2007 15:33:46

Test Mode: 802.11g Normal mode CH11



Title: Conductive-Spurious
 Comment A: CH 11 at 802.11g mode 2483.5MHz~25000MHz
 Date: 22.JUN.2007 15:34:35

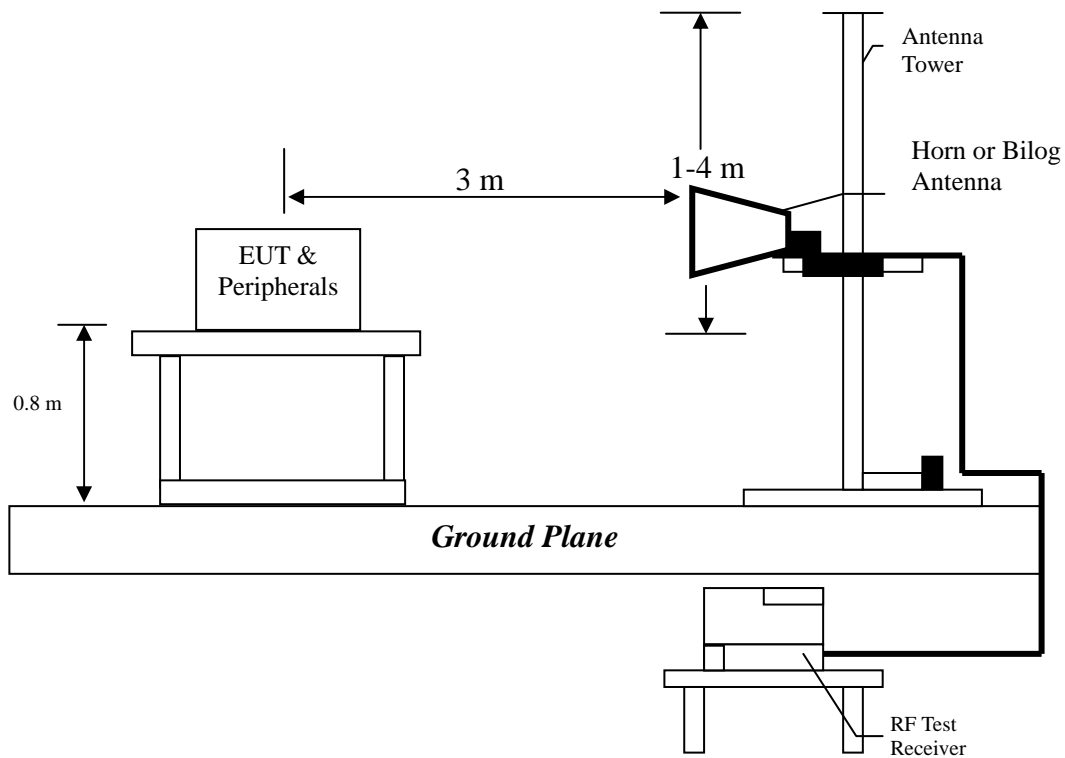
6. Radiated Emission test

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.



The frequency range from 30MHz to 1000MHz using Bilog Antenna.
 The frequency range over 1GHz using Horn Antenna.

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 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.

6.4 Radiated spurious emission test data

The radiated spurious emissions at

Frequency(MHz)	Margin
99.840	-4.23
198.780	-2.04

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

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

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

EUT : XG-624
 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)
V	99.840	QP	7.38	23.39	30.77	43.50	-12.74
V	132.820	QP	11.39	14.59	25.98	43.50	-17.52
V	165.800	QP	15.70	10.80	26.50	43.50	-17.00
V	199.750	QP	12.00	23.43	35.43	43.50	-8.07
V	232.730	QP	12.18	18.37	30.55	46.00	-15.45
V	603.270	QP	20.75	12.47	33.22	46.00	-12.78
H	99.840	QP	7.93	31.35	39.28	43.50	-4.23
H	130.880	QP	12.32	23.98	36.30	43.50	-7.20
H	198.780	QP	11.27	30.20	41.47	43.50	-2.04
H	236.610	QP	11.74	21.37	33.11	46.00	-12.89
H	265.710	QP	12.88	20.95	33.83	46.00	-12.17
H	331.670	QP	14.40	21.25	35.65	46.00	-10.36

Remark:

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

6.4.2 Measurement results: frequency above 1GHz

EUT : XG-624

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)
3210.00	PK	V	35.54	34.62	53.38	52.46	54	-1.54
3210.00	PK	H	35.54	34.62	47.8	46.88	54	-7.12

Remark:

1. Correction Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Correction Factor – Preamp. Gain
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 : XG-624
 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)
3240.00	PK	V	35.54	34.62	50.52	49.6	54	-4.4
3240.00	PK	H	35.54	34.62	45.79	44.87	54	-9.13

Remark:

1. Correction Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Correction Factor – Preamp. Gain
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 : XG-624
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)
3270.00	PK	V	35.54	34.62	50.01	49.09	54	-4.91

Remark:

1. Correction Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Correction Factor – Preamp. Gain
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 : XG-624

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)
3210.00	PK	V	35.54	34.62	50.5	49.58	54	-4.42
3210.00	PK	H	35.54	34.62	49.73	48.81	54	-5.19

Remark:

1. Correction Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Correction Factor – Preamp. Gain
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 : XG-624
 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)
3240.00	PK	V	35.54	34.62	57.72	56.8	74	-17.2
3240.00	AV	V	35.54	34.62	53.77	52.85	54	-1.15
3240.00	PK	H	35.54	34.62	47.61	46.69	54	-7.31

Remark:

1. Correction Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Correction Factor – Preamp. Gain
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 : XG-624
 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)
3270.00	PK	V	35.54	34.62	51.79	50.87	54	-3.13
3270.00	PK	H	35.54	34.62	45.99	45.07	54	-8.93

Remark:

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

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 1.5MHz, 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.

7.3 Measured data of Power Spectrum Density test results

Test Mode: 802.11b mode

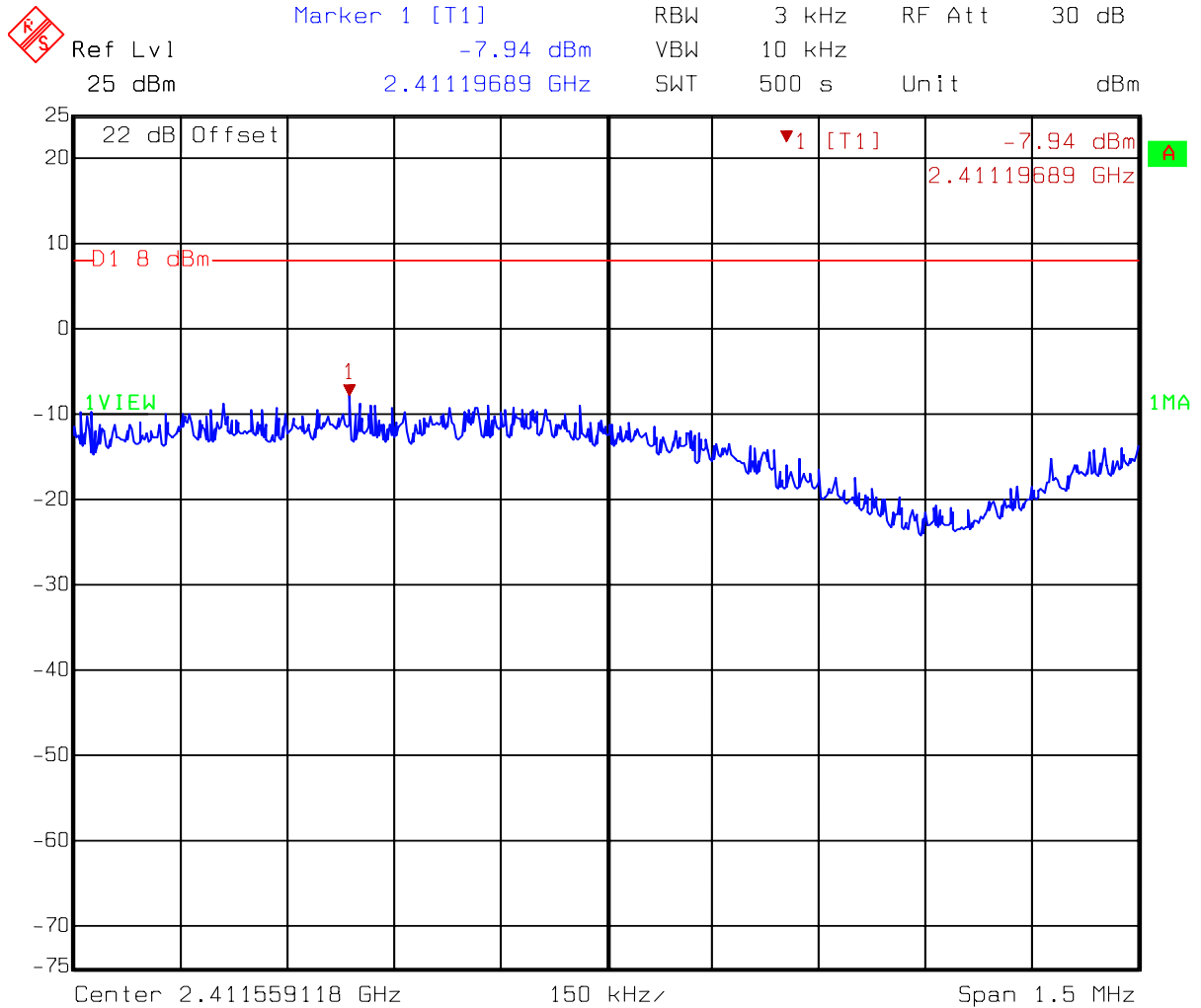
Channel	Frequency (MHz)	Cable loss (dB)	Power spectrum density (dBm)	Limit (dBm)
1 (lowest)	2412	2	-7.94	8
6 (middle)	2437	2	-8.68	8
11 (highest)	2462	2	-7.89	8

Test Mode: 802.11g Normal mode

Channel	Frequency (MHz)	Cable loss (dB)	Power spectrum density (dBm)	Limit (dBm)
1 (lowest)	2412	2	-10.83	8
6 (middle)	2437	2	-9.91	8
11 (highest)	2462	2	-9.87	8

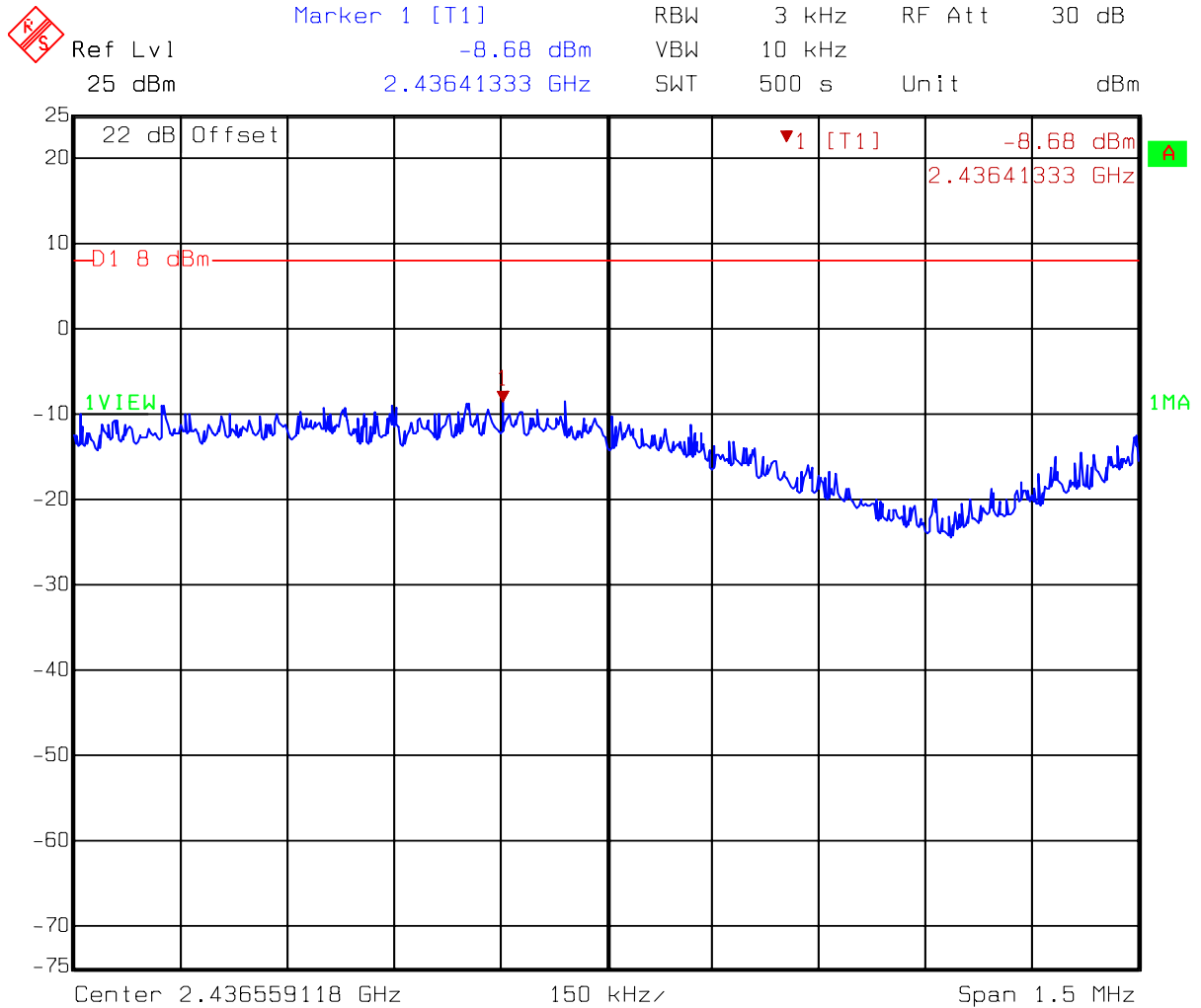
Please see the plot below.

Test Mode: 802.11b mode CH1




Title: Power density
Comment A: CH 1 at 802.11b mode
Date: 22.JUN.2007 15:52:53

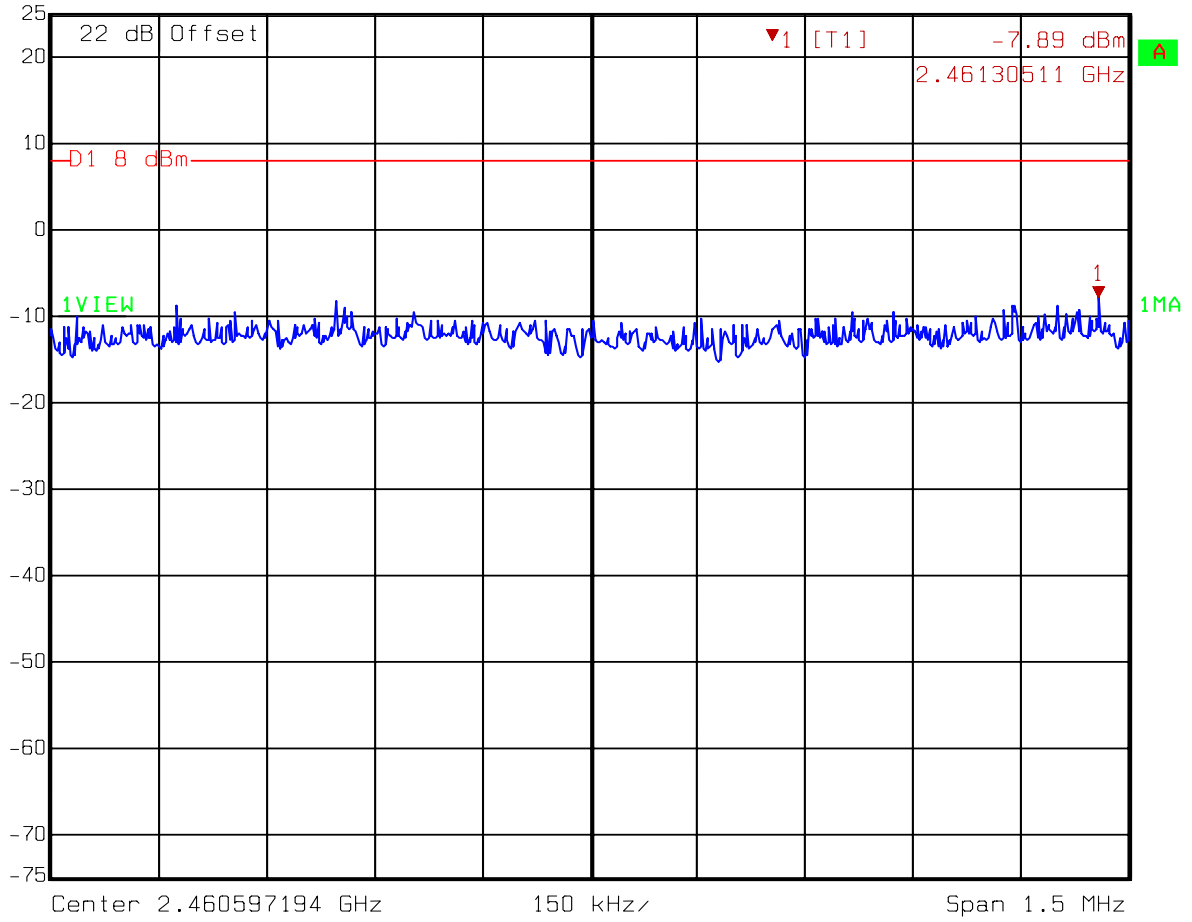
Test Mode: 802.11b mode CH6



Title: Power density
Comment A: CH 6 at 802.11b mode
Date: 22.JUN.2007 15:50:50

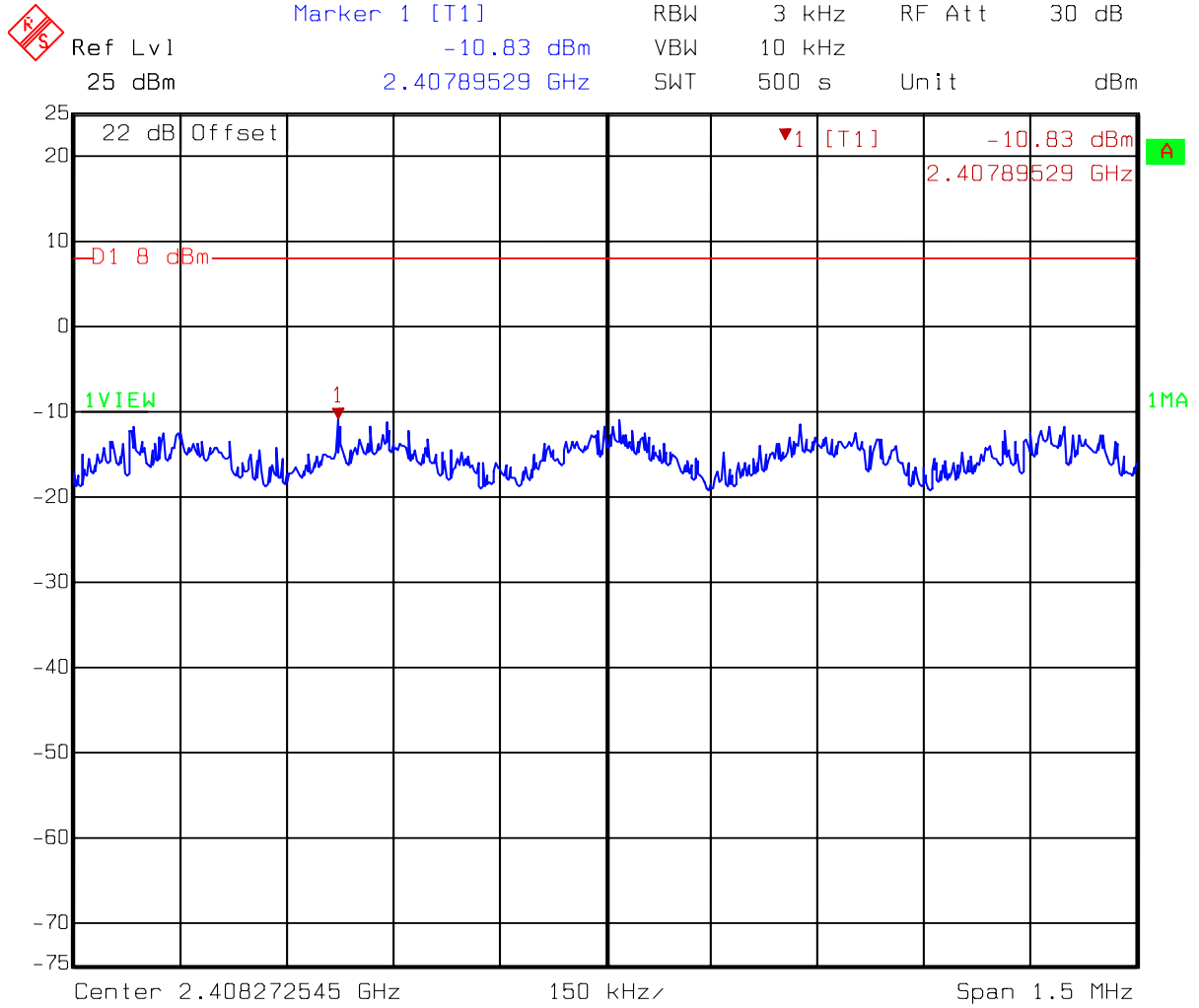
Test Mode: 802.11b mode CH11


 Ref Lvl 25 dBm Marker 1 [T1] 2.46130511 GHz RBW 3 kHz RF Att 30 dB
 -7.89 dBm VBW 10 kHz
 Unit dBm SWT 500 s




Title: Power density
 Comment A: CH 11 at 802.11b mode
 Date: 22.JUN.2007 15:48:41

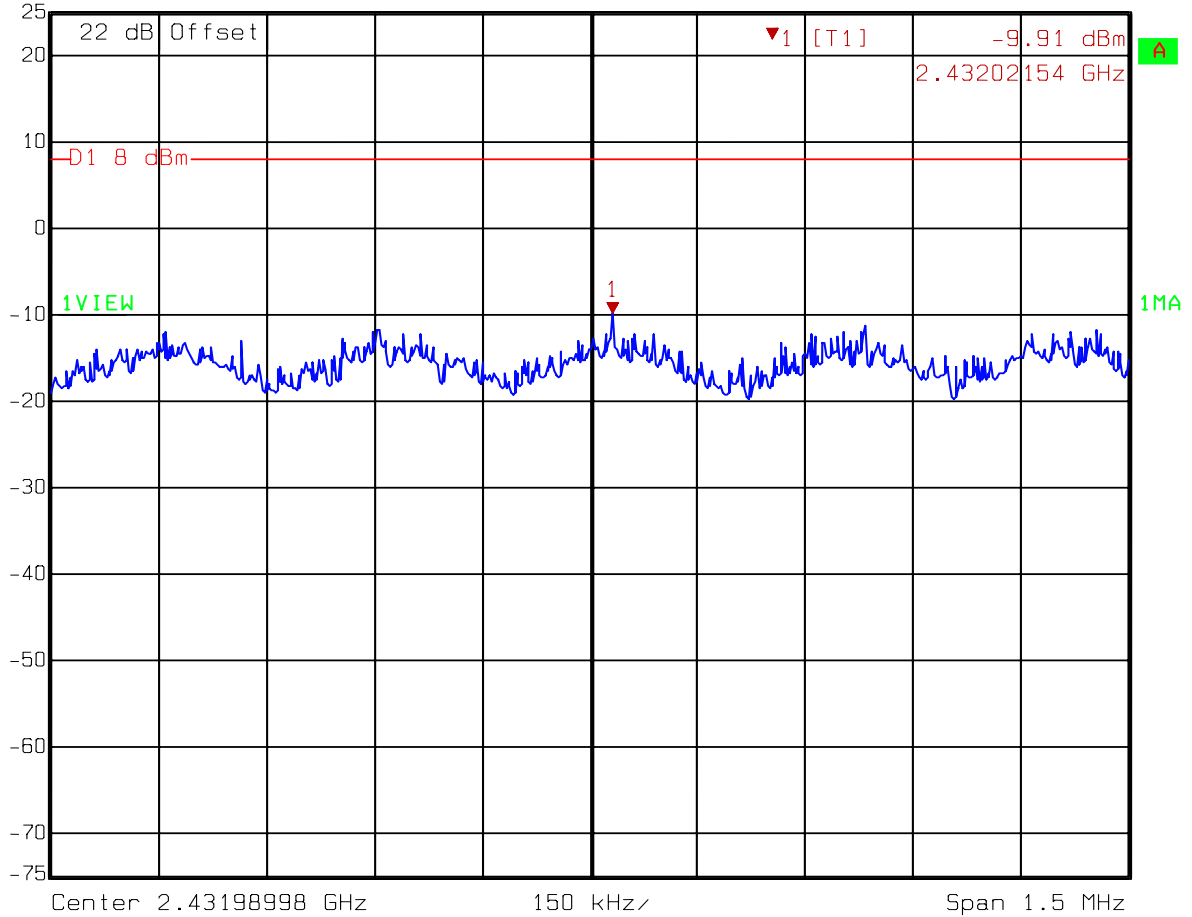
Test Mode: 802.11g Normal g mode CH1



Title: Power density
 Comment A: CH 1 at 802.11g mode
 Date: 22.JUN.2007 15:28:29

Test Mode: 802.11g Normal g mode CH6

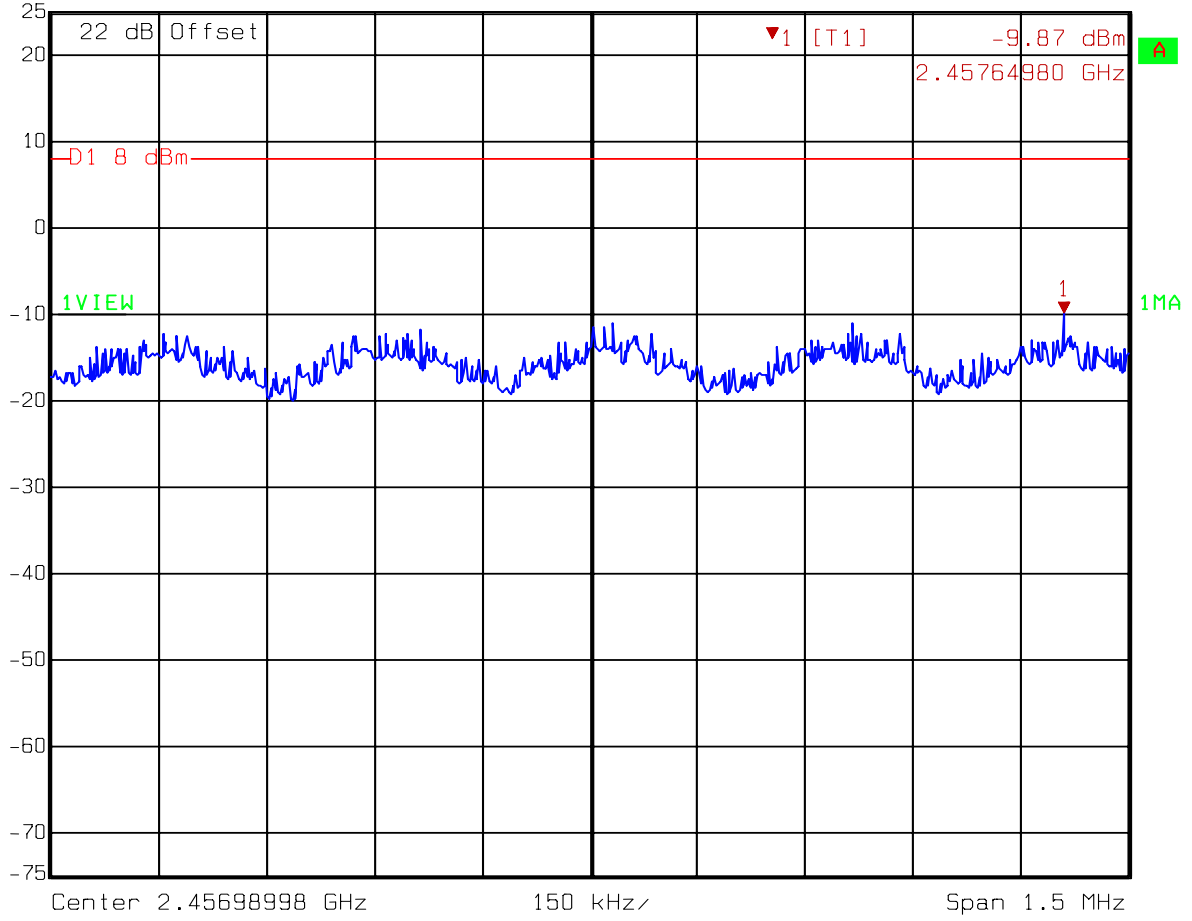

Marker 1 [T1]
RBW 3 kHz
RF Att 30 dB
Ref Lvl 25 dBm
-9.91 dBm
VBW 10 kHz
2.43202154 GHz
SWT 500 s
Unit dBm



Title: Power density
 Comment A: CH 6 at 802.11g mode
 Date: 22.JUN.2007 15:31:11

Test Mode: 802.11g Normal g mode CH11

⚠ Ref Lvl 25 dB Marker 1 [T1] RBW 3 kHz RF Att 30 dB
 -9.87 dBm VBW 10 kHz
 2.45764980 GHz SWT 500 s Unit dBm



Title: Power density
 Comment A: CH 11 at 802.11g mode
 Date: 22.JUN.2007 15:33:25

8. Emission on the band edge

In any 100kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated 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. Radiated emissions, which fall in the restricted band, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a).

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 by the conducted method measurement (between carrier max. power and local max. emission in restrict band (dBc)).

The radiated method is the max. field strength of fundamental at 3m

Radiated method:

Peak: RBW = 1MHz ; VBW = 1MHz

Average: RBW = 1MHz ; VBW = 10Hz

8.3 Test Result

Test Mode: 802.11b mode

Channel	Measurement Freq.Band (MHz)	Detector	The Max. Field Strength in Restrict Band (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
1 (lowest)	2310-2390	PK	61.48	74	-12.52
		AV	52.03	54	-1.97
11 (highest)	2483.5-2500	PK	60.41	74	-13.59
		AV	49.74	54	-4.26

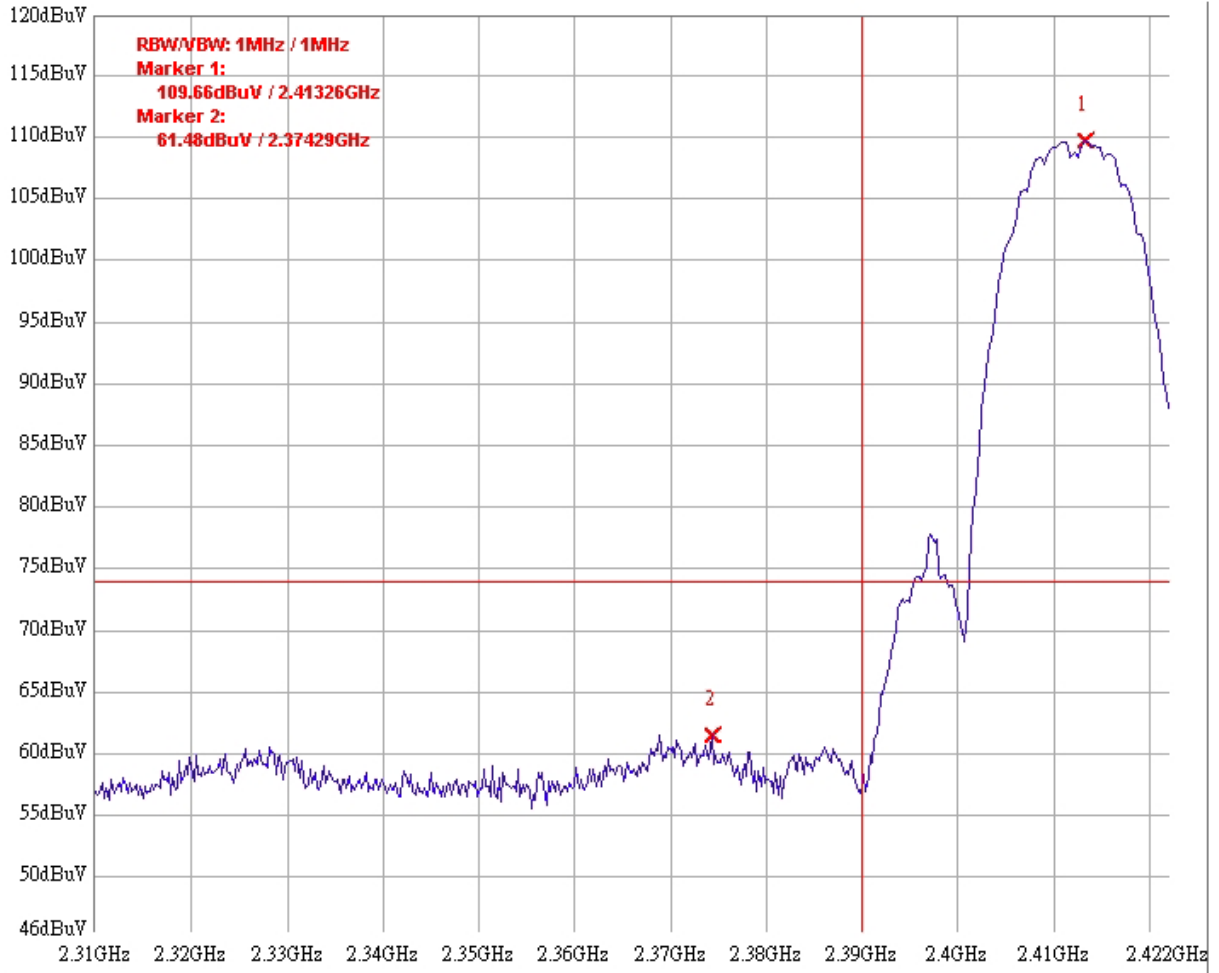
Note: Please see plots as below pages.

Test Mode: 802.11g Normal mode

Channel	Measurement Freq.Band (MHz)	Detector	The Max. Field Strength in Restrict Band (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
1 (lowest)	2310-2390	PK	67.66	74	-6.34
		AV	53.02	54	-0.98
11 (highest)	2483.5-2500	PK	67.36	74	-6.64
		AV	52.52	54	-1.48

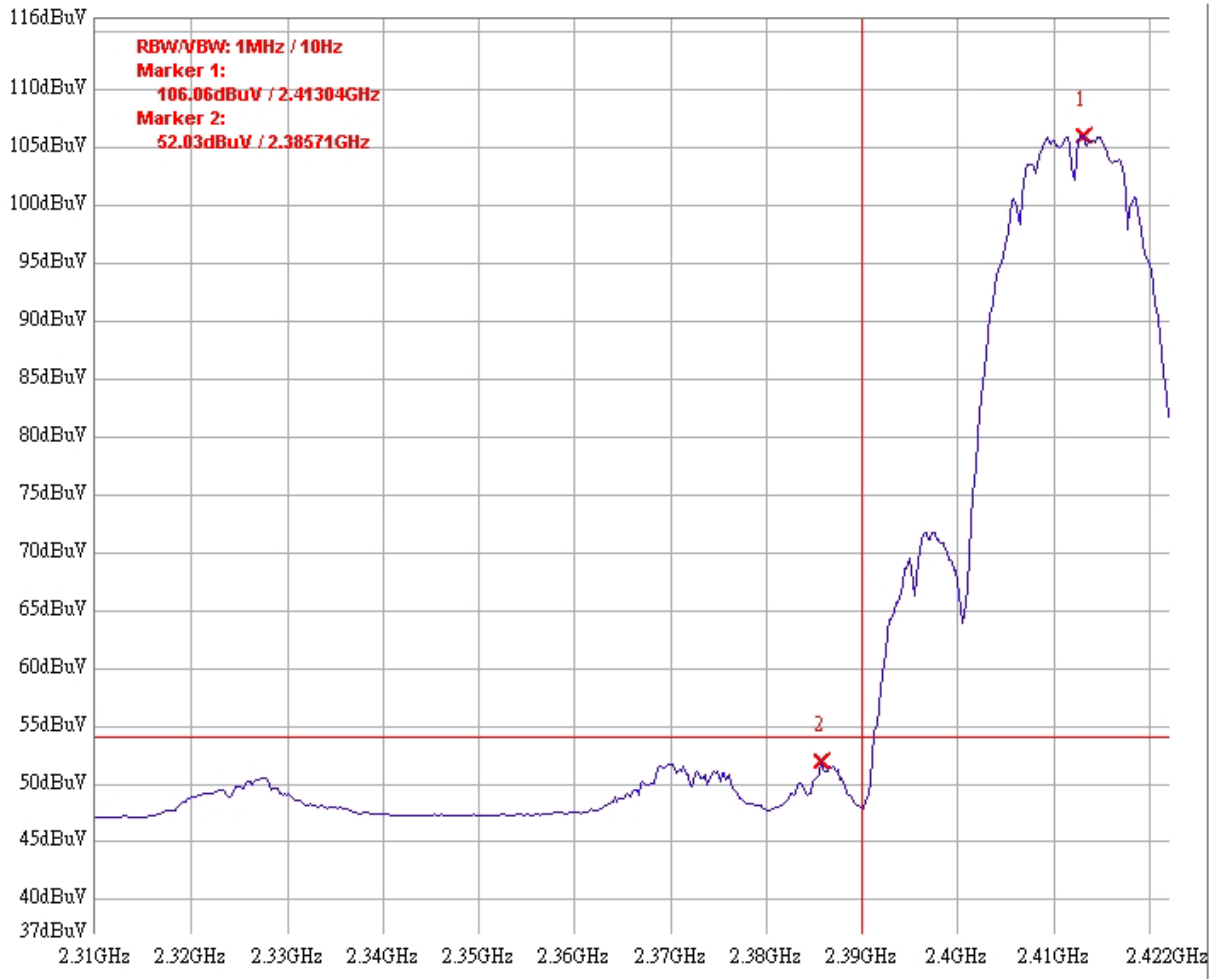
Note: Please see plots as below pages.

Test Mode: 802.11b mode CH1 PK delta



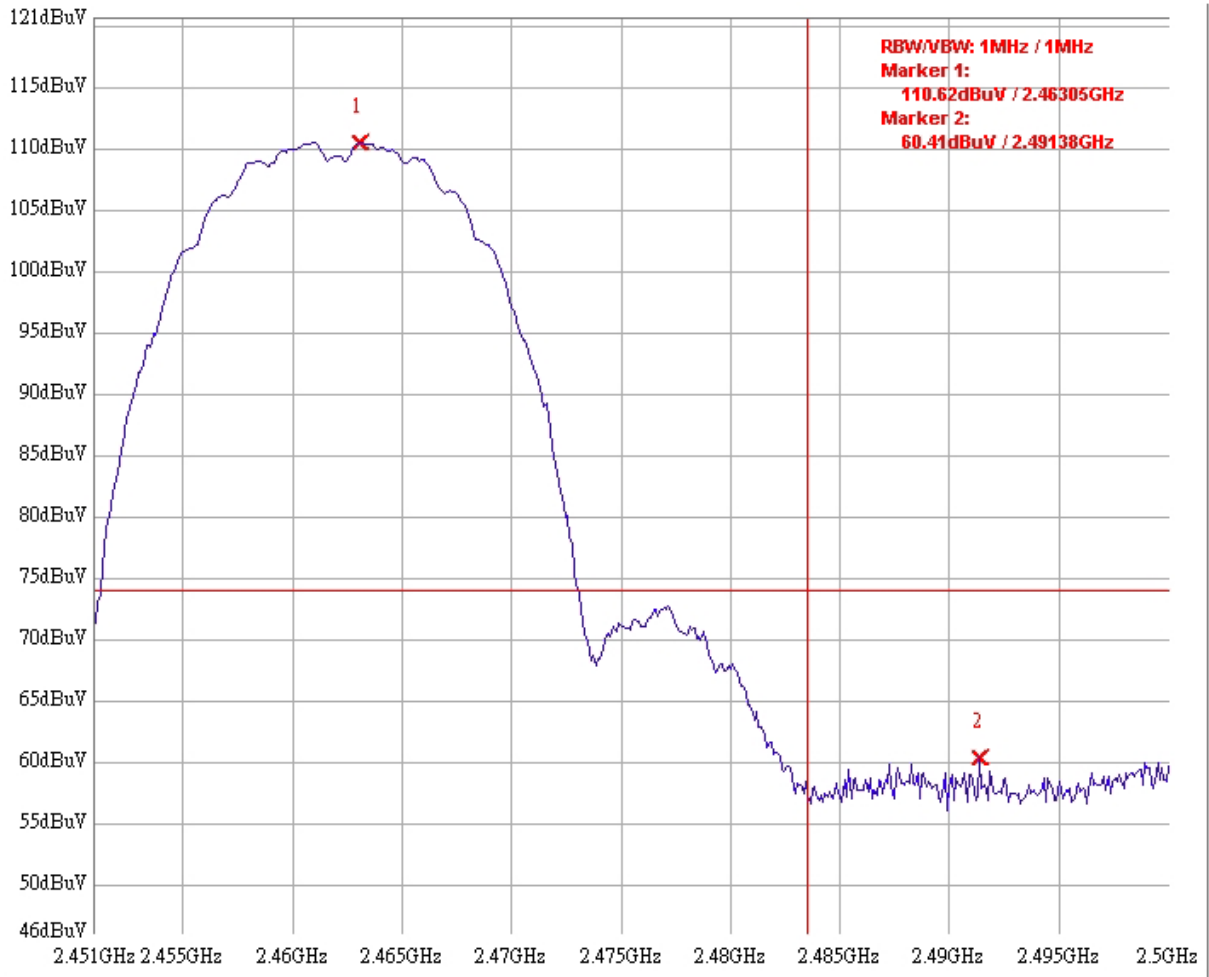
XG-624 B-E 11b ch1 PK

Test Mode: 802.11b mode CH1 AV delta



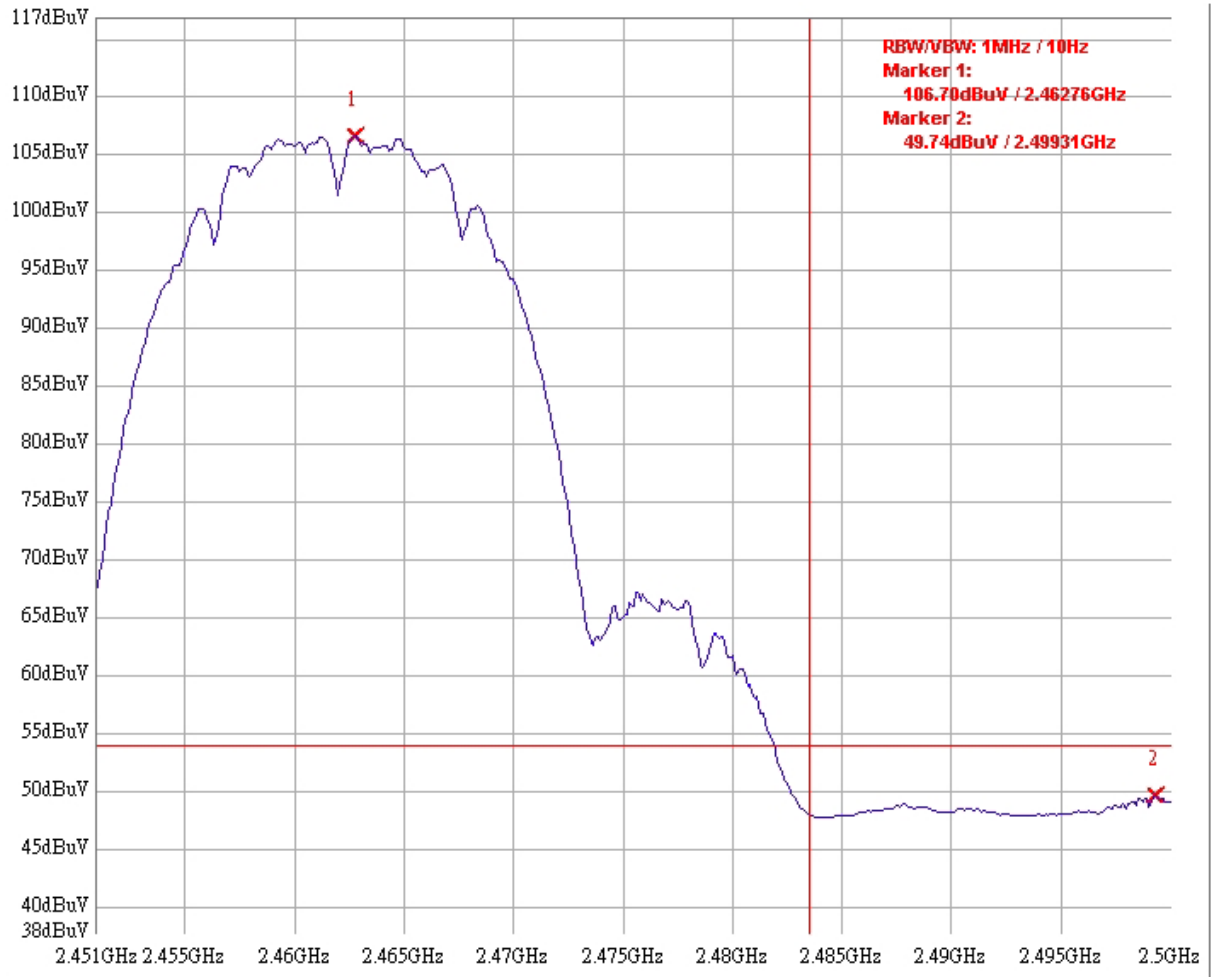
XG-624 B-E 11b ch1 AV

Test Mode: 802.11b mode CH11 PK delta



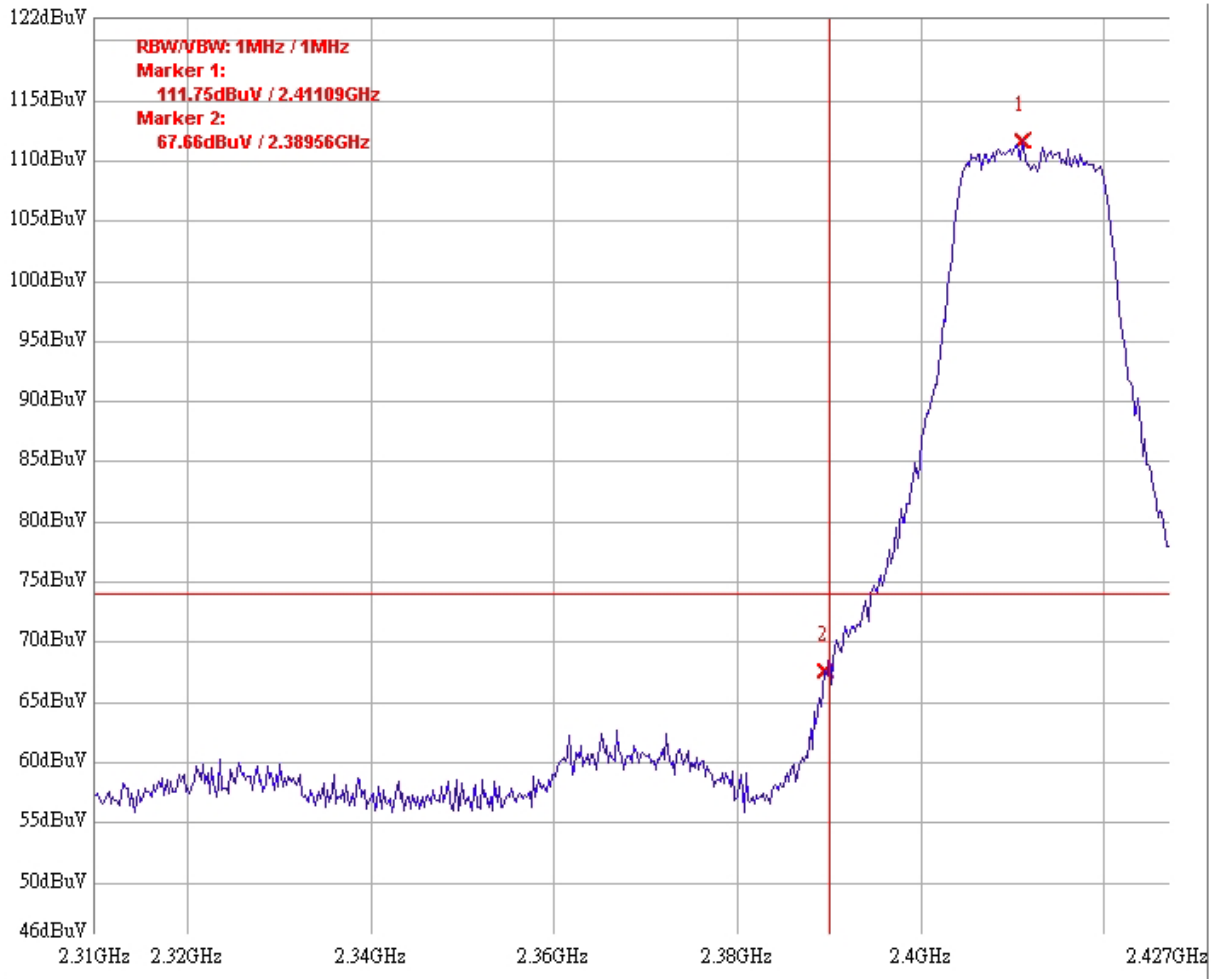
XG-624 B-E 11b ch11 PK

Test Mode: 802.11b mode CH11 AV delta



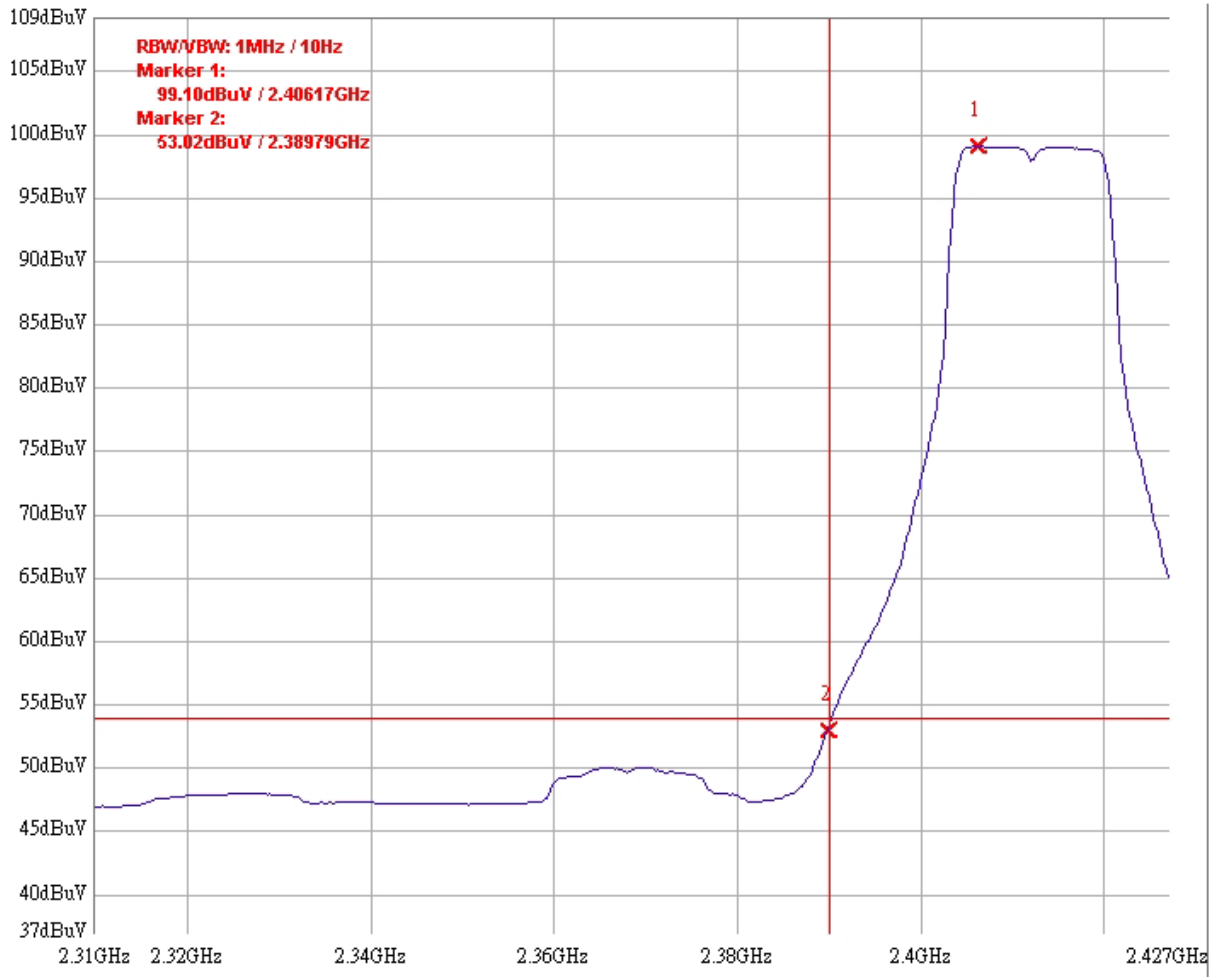
XG-624 B-E 11b ch11 AV

Test Mode: 802.11g Normal mode CH1 PK delta



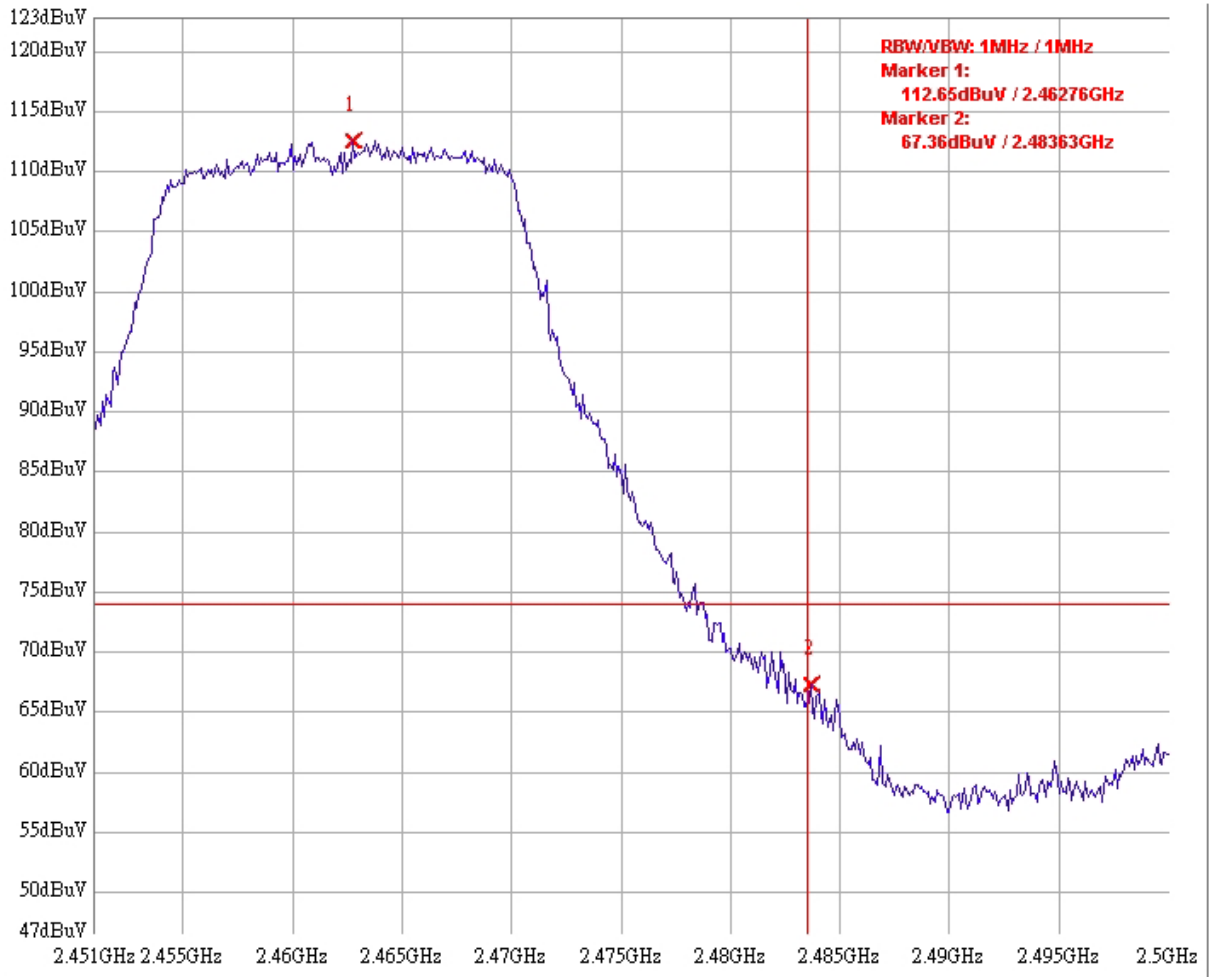
XG-624 B-E 11g chl PK

Test Mode: 802.11g Normal mode CH1 AV delta



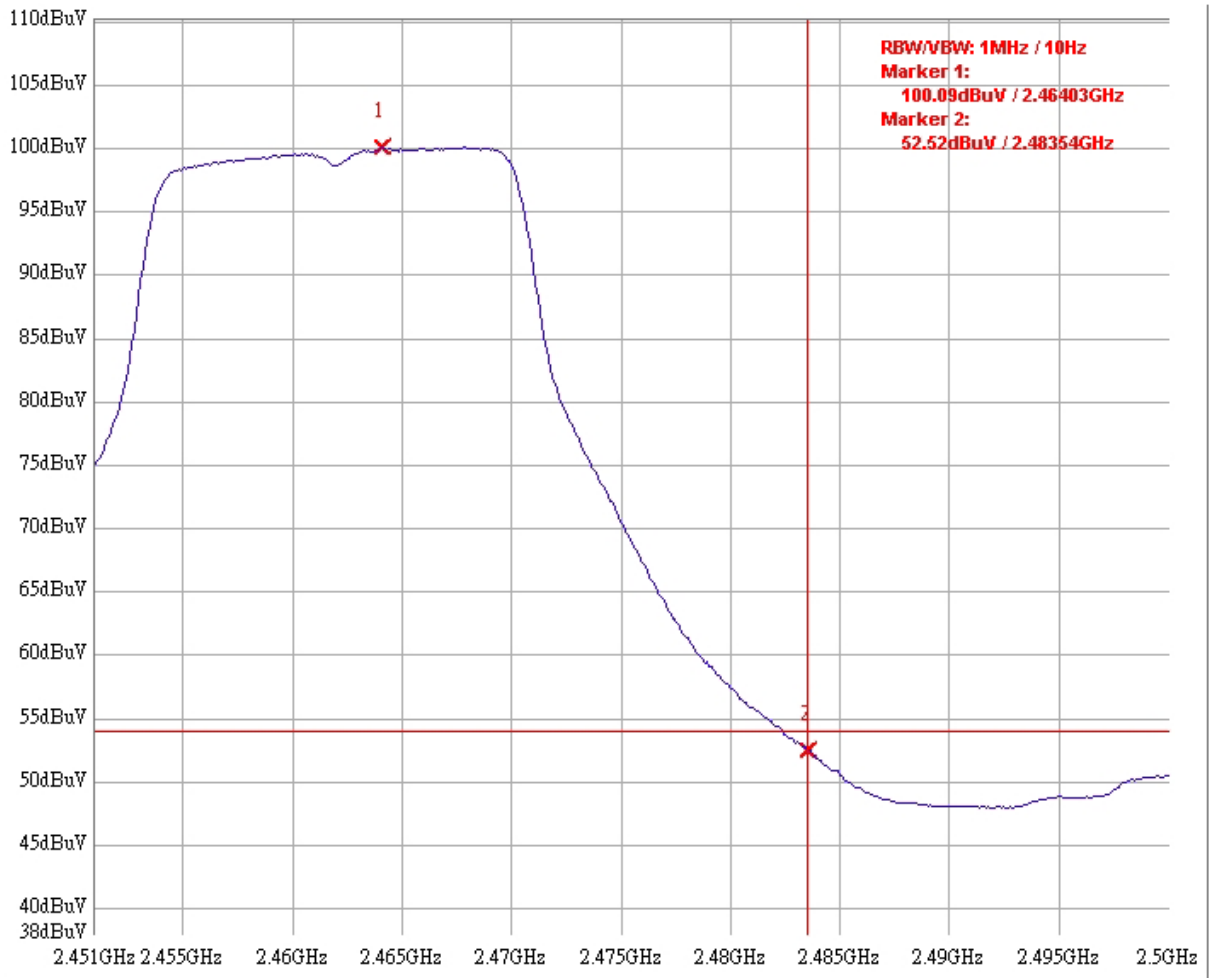
XG-624 B-E 11g chl AV

Test Mode: 802.11g Normal mode CH11 PK delta



XG-624 B-E 11g ch11 PK

Test Mode: 802.11g Normal mode CH11 AV delta



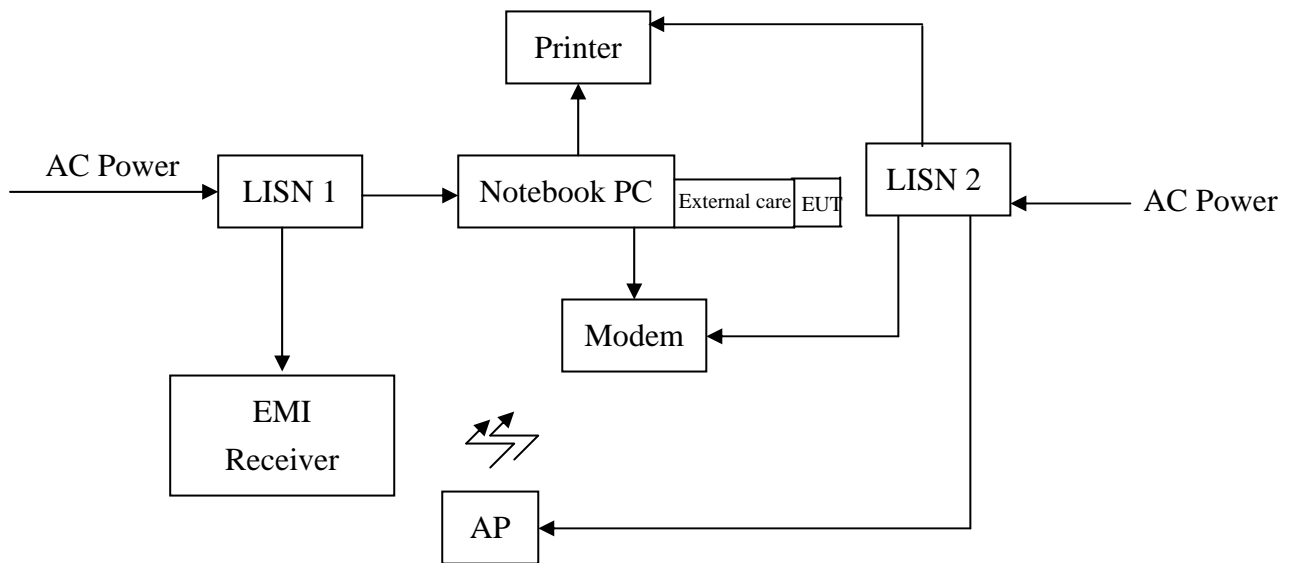
XG-624 B-E 11g ch11 AV

9. Power Line Conducted Emission test §FCC 15.207

9.1 Operating environment

Temperature: 24
 Relative Humidity: 52 %
 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 ± 2.26 dB.

9.5 Power Line Conducted Emission test data

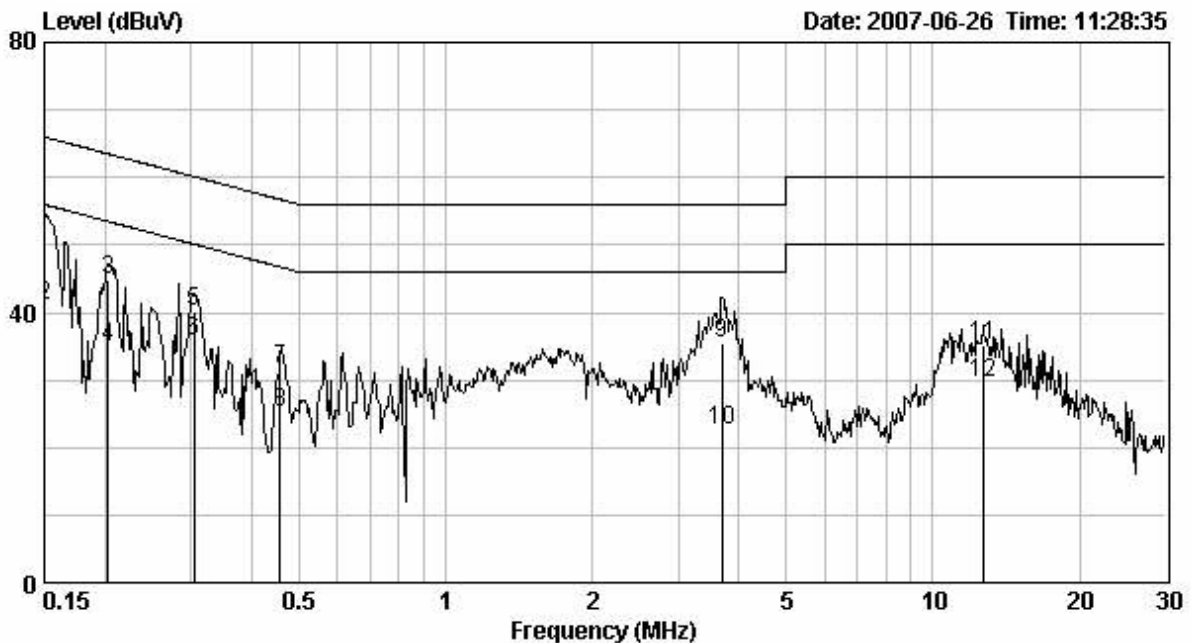
The test was performed the 802.11b and 802.11g normal operating modes, the worst case was occurred at 802.11b normal operating mode.

Phase : Line
 EUT : XG-624
 Worst Case : 802.11b normal operating mode

Frequency (MHz)	Corr. Factor (dB)	Level Qp (dBuV)	Limit Qp (dBuV)	Level AV (dBuV)	Limit Av (dBuV)	Margin (dB)	
						Qp	Av
0.150	0.10	52.84	66.00	41.13	56.00	-13.16	-14.87
0.203	0.10	44.83	63.49	34.86	53.49	-18.66	-18.63
0.305	0.10	40.17	60.11	35.73	50.11	-19.94	-14.38
0.458	0.10	31.79	56.73	25.16	46.73	-24.94	-21.57
3.692	0.19	35.48	56.00	22.49	46.00	-20.52	-23.51
12.694	0.56	35.26	60.00	29.68	50.00	-24.74	-20.32

Remark:

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



Phase : Neutral
 EUT : XG-624
 Worst Case : 802.11b normal operating mode

Frequency (MHz)	Corr. Factor (dB)	Level Qp (dBuV)	Limit Qp (dBuV)	Level AV (dBuV)	Limit Av (dBuV)	Margin (dB)	
						Qp	Av
0.150	0.10	52.38	66.00	40.54	56.00	-13.62	-15.46
0.201	0.10	43.92	63.55	33.48	53.55	-19.63	-20.07
0.254	0.10	39.43	61.64	36.03	51.64	-22.21	-15.61
0.305	0.10	38.51	60.11	34.28	50.11	-21.60	-15.83
3.692	0.19	34.57	56.00	22.91	46.00	-21.43	-23.09
12.694	0.31	34.65	60.00	29.18	50.00	-25.35	-20.82

Remark:

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

