

EMC TEST REPORT

Report No. : TS08030131-EME

Model No. : 3100-4g v2

Issued Date : Apr. 07, 2008

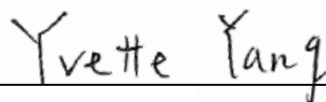
Applicant : Arcadyan Technology Corporation
4F, No. 9, Park Avenue II, Science-based Industrial Park,
Hsinchu 300, Taiwan

Test Method/Standard : FCC Part 15 Subpart C Section §15.205 、 §15.207 、 §15.209 、 §15.247 and ANSI C63.4/2003.

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Report Engineer



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Reviewed By



Jimmie Liu



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Summary of Tests

**ADSL Router with 4-Port LAN Switch and 802.11g WLAN
-Model: 3100-4g v2
FCC ID: RAXAR4505NWB**

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	: Arcadyan Technology Corporation
Product	: ADSL Router with 4-Port LAN Switch and 802.11g WLAN
Model No.	: 3100-4g v2
FCC ID.	: RAXAR4505NWB
Frequency Range	: 2412 MHz ~ 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	1. 120Vac, 60Hz with adapter (DVE, DV-1280-3) 2. 120Vac, 60Hz with adapter (LEI, 481210003CT)
Power Cord	: N/A
Data Cable:	1. RJ-45 UTP Cat.5 10meter × 1 2. RJ-45 UTP Cat.5 1.8meter × 3 3. RJ-11 unshielded cable 1.8meter × 1
Sample Received	: Feb. 24, 2006
Test Date(s)	: Feb. 24, 2006 ~ Apr. 7, 2006
Note 1:	: This report is for the exclusive use of Intertek's Client and is provided pursuant to the agreement between Intertek and its Client. Intertek's responsibility and liability are limited to the terms and conditions of the agreement. Intertek assumes no liability to any party, other than to the Client in accordance with the agreement, for any loss, expense or damage occasioned by the use of this report. Only the Client is authorized to permit copying or distribution of this report and then only in its entirety. Any use of the Intertek name or one of its marks for the sale or advertisement of the tested material, product or service must first be approved in writing by Intertek. The observations and test results in this report are relevant only to the sample tested. This report by itself does not imply that the material, product, or service is or has ever been under an Intertek certification program.
Note 2:	: When determining the test conclusion, the Measurement Uncertainty of test has been considered.



1.2 Additional information about the EUT

The EUT is a ADSL Router with 4-Port LAN Switch and 802.11g WLAN, and was defined as information technology equipment.

The model listed below is identical to model 3100-4g v2 (EUT).
 Different brand serves as marketing strategy.

Trade Name	Model Number
SMC Networks	3100-4g v2
Alpha Telecom	

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

1.3 Antenna description

The EUT uses a permanently connected antenna.

Antenna Gain : 2dBi max

Antenna Type : Dipole antenna

Connector Type : N/A

1.4 Peripherals equipment

Peripherals	Manufacturer	Product No.	Serial No.	FCC ID
Notebook PC	DELL	Latitude D610	5YWZK1S	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 was supplied with adapter and run the test program “Radio Scope.exe” under windows OS, which provide by manufacturer.

During conducted emission test, the EUT was in normal mode communicating with Notebook PC. While in other test, it worked in the status of continuously transmitting.

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	EC1303	08/07/2008
Spectrum Analyzer	Rohde & Schwarz	9kHz~30GHz	FSP 30	EC1353	08/15/2008
Spectrum Analyzer	Rohde & Schwarz	20Hz~40GHz	FSEK 30	EC1365	11/12/2008
Horn Antenna	SCHWARZBECK	1GHz~18GHz	BBHA 9120 D	EC1371	03/04/2009
Horn Antenna	SCHWARZBECK	14GHz~40GHz	BBHA 9170	EC1351	08/08/2008
Bilog Antenna	SCHWARZBECK	25MHz~2GHz	VULB 9168	EC1347	08/19/2008
Pre-Amplifier	MITEQ	100MHz~26.5GHz	919981	EC1373	03/18/2009
Wideband Peak Power Meter/ Sensor	Anritsu	100MHz~18GHz	ML2497A/ MA2491A	EC1396	11/15/2008
Controller	HDGmbH	N/A	CM 100	EP1346	N/A
Antenna Tower	HDGmbH	N/A	MA 240	EP1347	N/A
LISN	Rohde & Schwarz	9KHz~30MHz	ESH3-Z5	EC1344	03/30/2009

- 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 °C
 Relative Humidity: 60 %
 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	14.12	> 500kHz
6 (middle)	2437	14.08	> 500kHz
11 (highest)	2462	13.64	> 500kHz

Test Mode: 802.11g mode

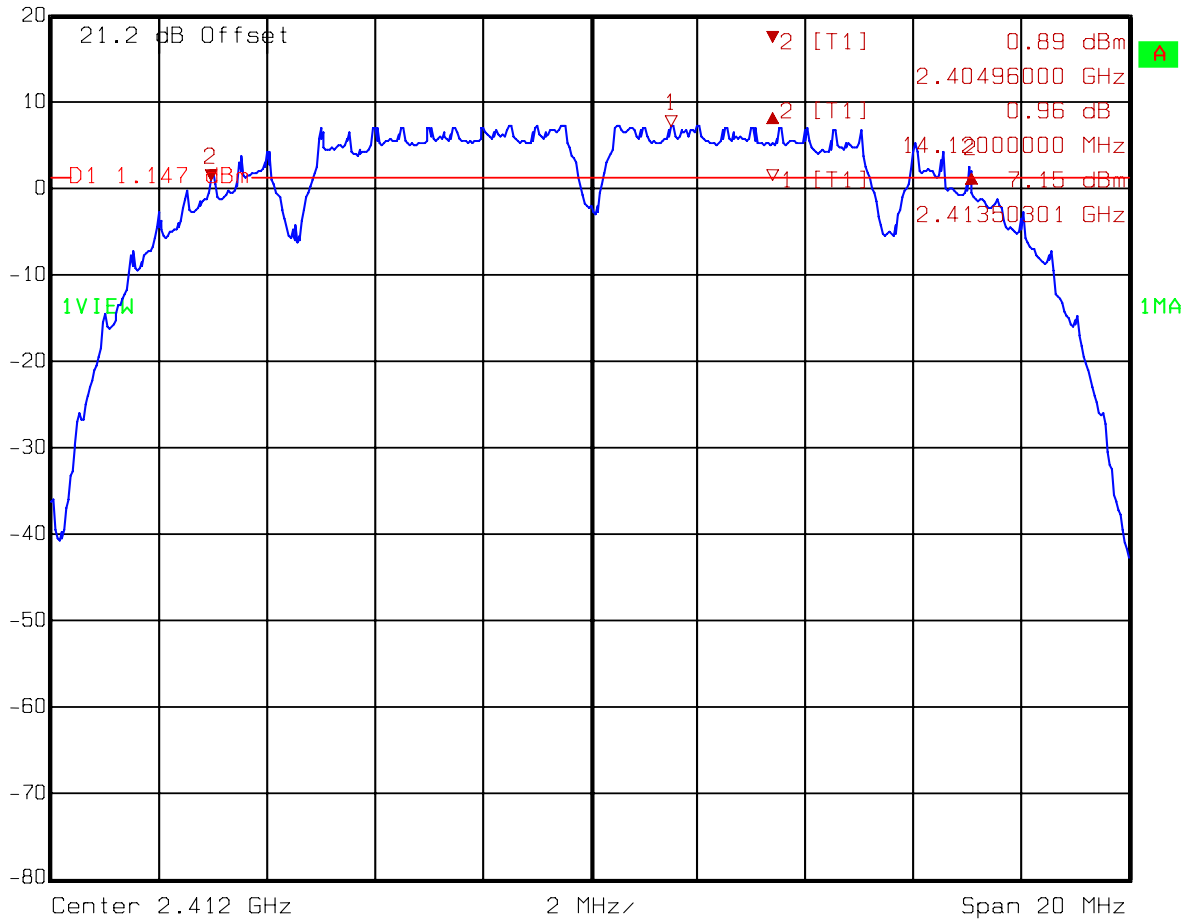
Channel	Frequency (MHz)	Bandwidth (MHz)	Limit
1 (lowest)	2412	16.56	> 500kHz
6 (middle)	2437	16.52	> 500kHz
11 (highest)	2462	16.52	> 500kHz

Please see the plot below.



Test Mode: 802.11b mode CH1

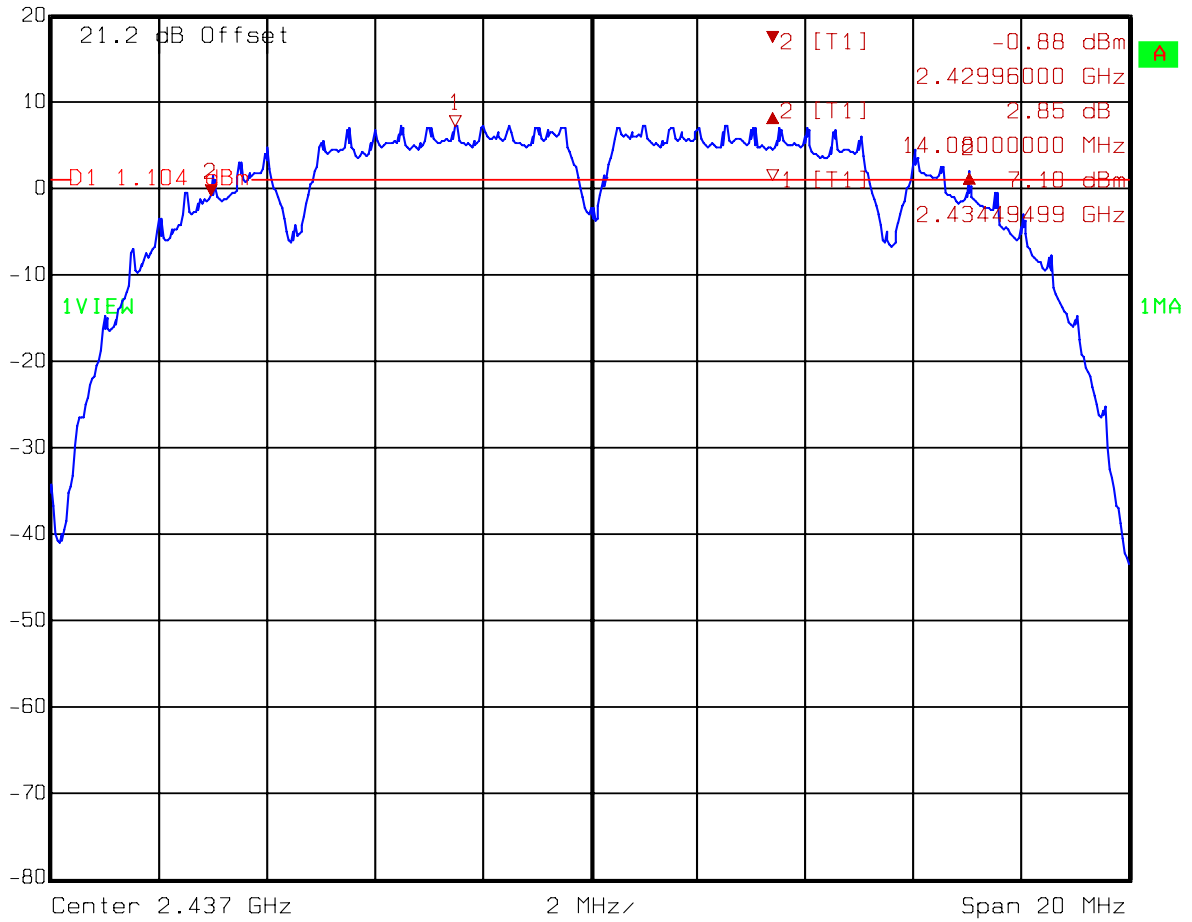
	Max/Ref Lvl	Delta 2 [T1]	RBW	100 kHz	RF Att	10 dB
	20 dBm	0.96 dB	VBW	100 kHz		
	1.2 dBm	14.1200000 MHz	SWT	5 ms	Unit	dBm



Title: 6dB Bandwidth
Comment A: Channel 1 at 802.11b mode
Date: 14.MAR.2006 17:04:12

Test Mode: 802.11b mode CH6

	Max/Ref Lvl	Delta 2 [T1]	RBW	100 kHz	RF Att	10 dB
	20 dBm	2.85 dB	VBW	100 kHz		
	1.2 dBm	14.08000000 MHz	SWT	5 ms	Unit	dBm

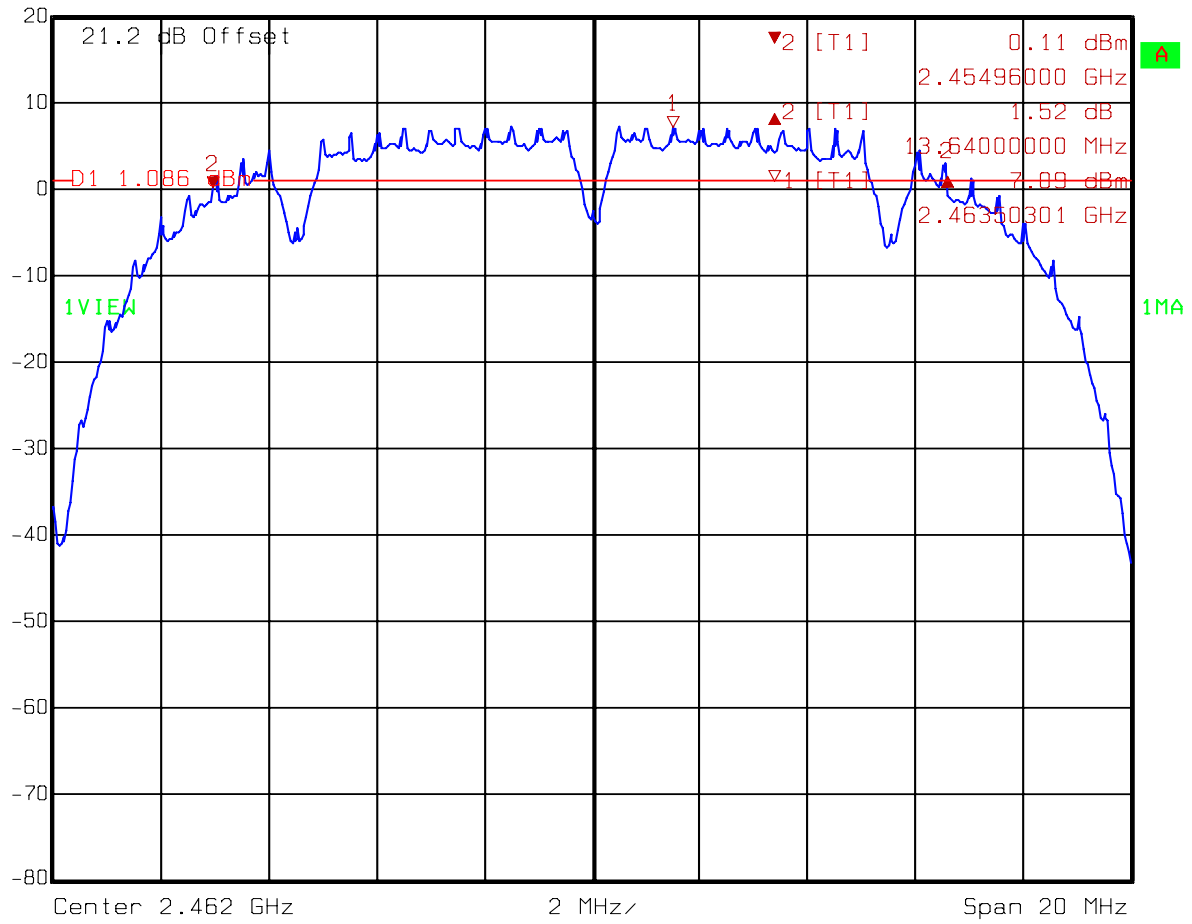


Title: 6dB Bandwidth
 Comment A: Channel 6 at 802.11b mode
 Date: 14.MAR.2006 17:13:15




Test Mode: 802.11b mode CH11

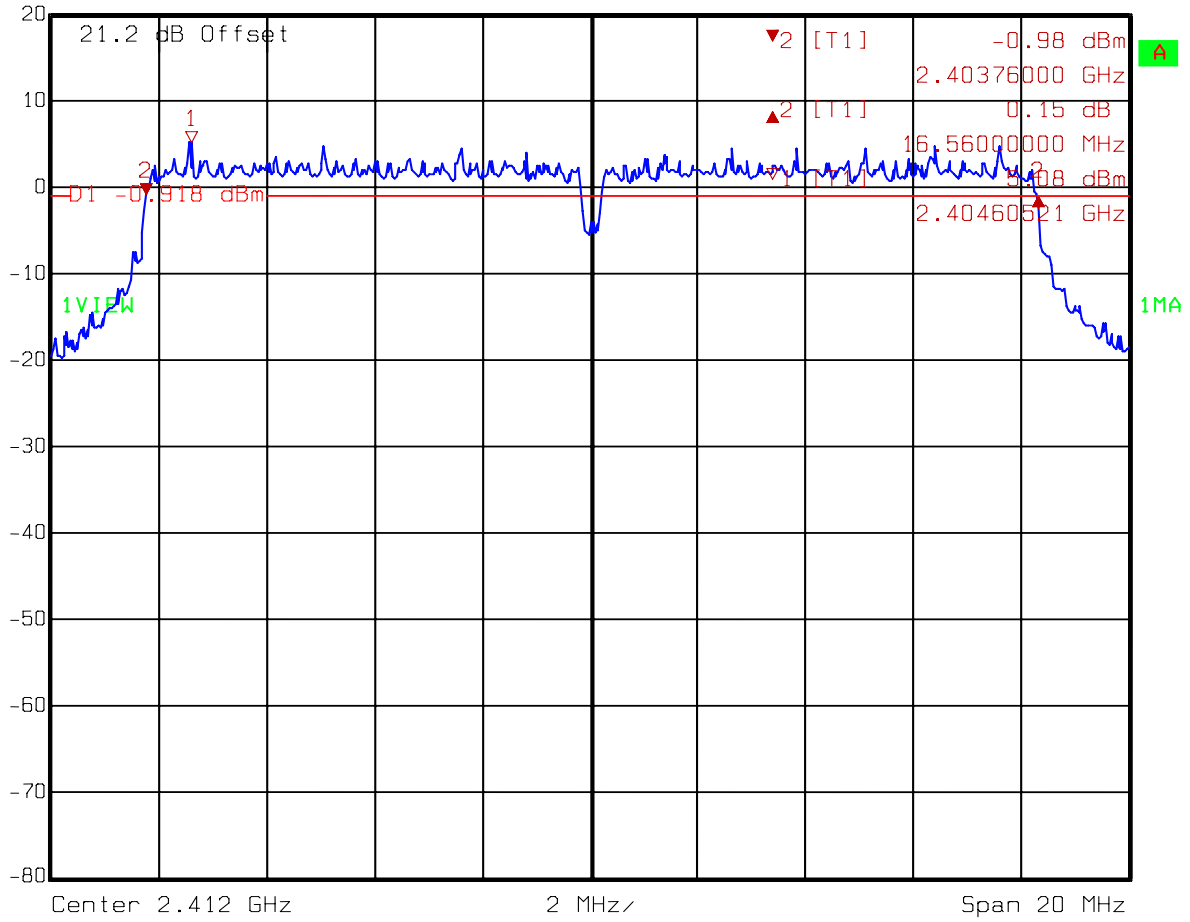
Max/Ref Lvl Delta 2 [T1] RBW 100 kHz RF Att 10 dB
20 dBm 1.52 dB VBW 100 kHz
1.2 dBm 13.64000000 MHz SWT 5 ms Unit dBm



Title: 6dB Bandwidth
Comment A: Channel 11 at 802.11b mode
Date: 14.MAR.2006 17:07:46

Test Mode: 802.11g mode CH1


 Max/Ref Lvl Delta 2 [T1] RBW 100 kHz RF Att 10 dB
 20 dBm 0.15 dB VBW 100 kHz
 1.2 dBm 16.56000000 MHz SWT 5 ms Unit dBm

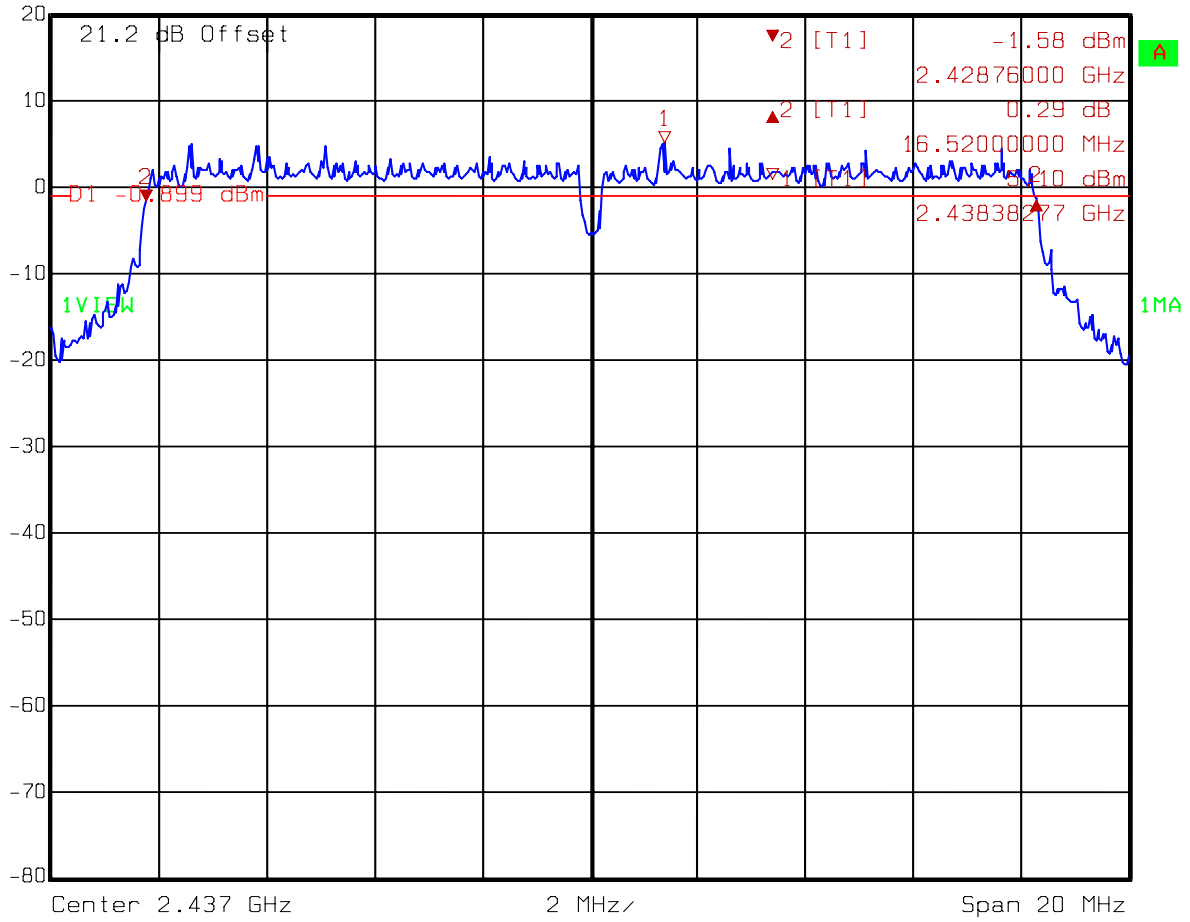


Title: 6dB Bandwidth
 Comment A: Channel 1 at 802.11g mode
 Date: 14.MAR.2006 16:45:23



Test Mode: 802.11g mode CH6

	Max/Ref Lvl	Delta 2 [T1]	RBW	100 kHz	RF Att	10 dB
	20 dBm	0.29 dB	VBW	100 kHz		
	1.2 dBm	16.52000000 MHz	SWT	5 ms	Unit	dBm

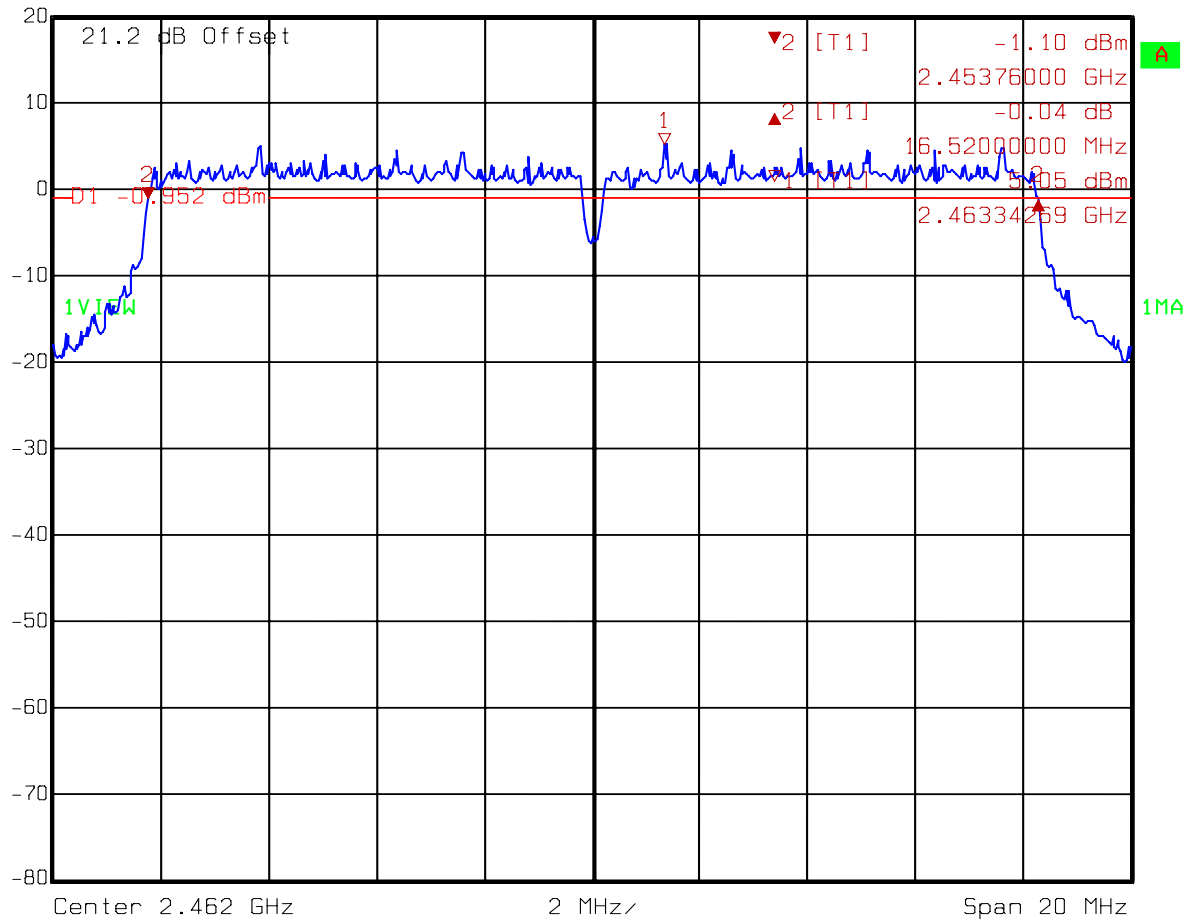


Title: 6dB Bandwidth
 Comment A: Channel 6 at 802.11g mode
 Date: 14.MAR.2006 16:59:11



Test Mode: 802.11g mode CH11

Max/Ref Lvl Delta 2 [T1] RBW 100 kHz RF Att 10 dB
20 dBm -0.04 dB VBW 100 kHz
1.2 dBm 16.52000000 MHz SWT 5 ms Unit dBm



Title: 6dB Bandwidth
Comment A: Channel 11 at 802.11g mode
Date: 14.MAR.2006 16:48:53



4. Maximum Output Power test

4.1 Operating environment

Temperature: 24 °C
 Relative Humidity: 56 %
 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 (1.2 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	1.2	20.22	21.42	138.68	1
6 (middle)	2437	1.2	20.18	21.38	137.40	1
11 (highest)	2462	1.2	20.32	21.52	141.91	1

Remark:

Conducted Peak Output Power = Reading + C.L.

Test Mode: 802.11g mode

Channel	Freq. (MHz)	C.L. (dB)	Reading (dBm)	Conducted Peak Output Power		Limit (W)
				(dBm)	(mW)	
1 (lowest)	2412	1.2	24.19	25.39	345.94	1
6 (middle)	2437	1.2	24.22	25.42	348.34	1
11 (highest)	2462	1.2	24.17	25.37	344.35	1

Remark:

Conducted Peak Output Power = Reading + C.L.



5. RF Antenna Conducted Spurious test

5.1 Operating environment

Temperature: 25 °C
Relative Humidity: 58 %

5.2 Test setup & procedure

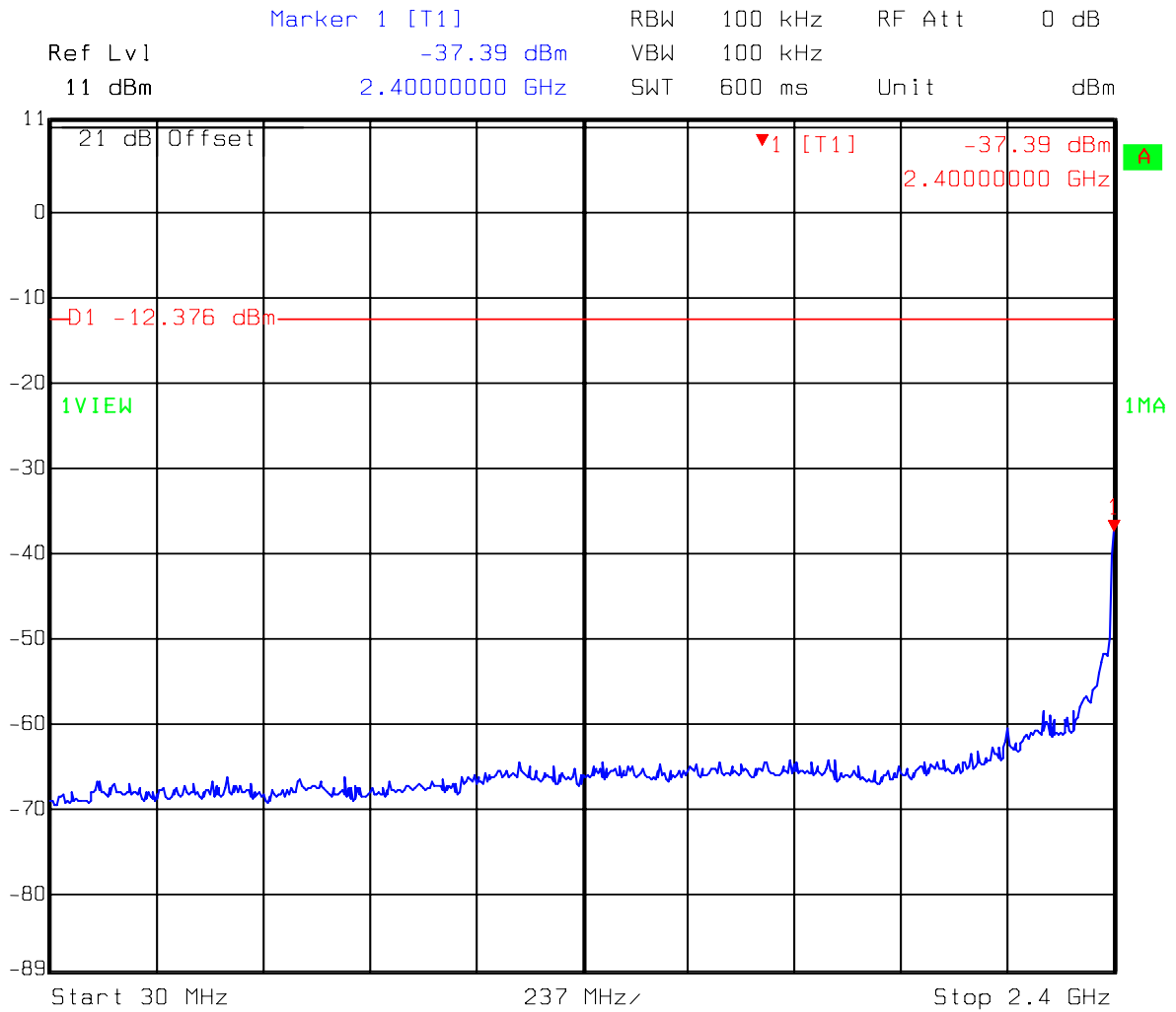
The measurements were performed from 30MHz to 25GHz RF antenna conducted per FCC 15.247 (d) was measured from the EUT antenna port using a 50ohm spectrum analyzer with the resolution bandwidth set at 100 kHz, and the video bandwidth set at 100 kHz. Harmonics and spurious noise must be at least 20dB down 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.



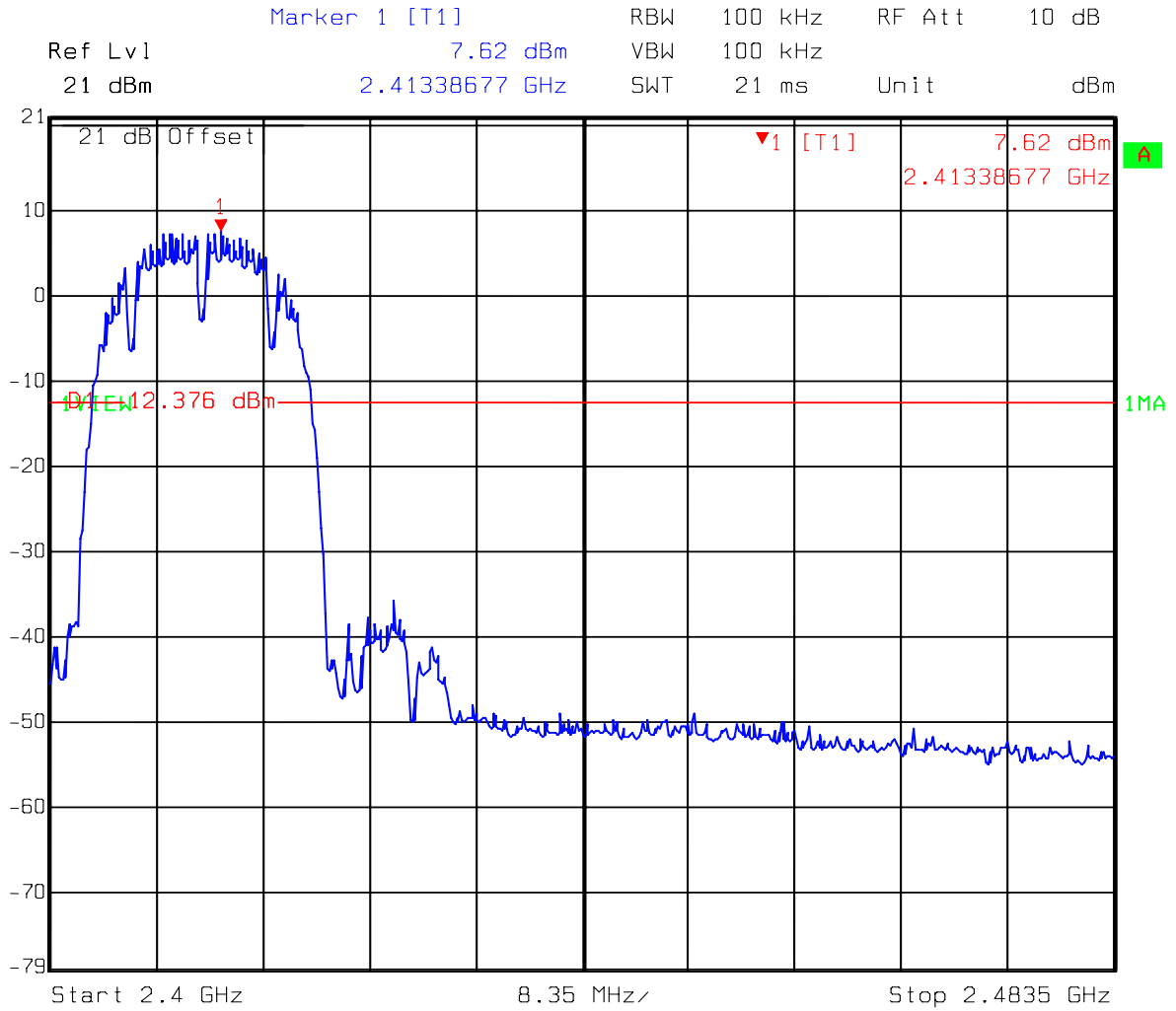
Test Mode: 802.11b mode CH1



Title: Conductive-Spurious
Comment A: CH 1 at 802.11b mode 30MHz~2400MHz
Date: 07.APR.2008 14:26:51



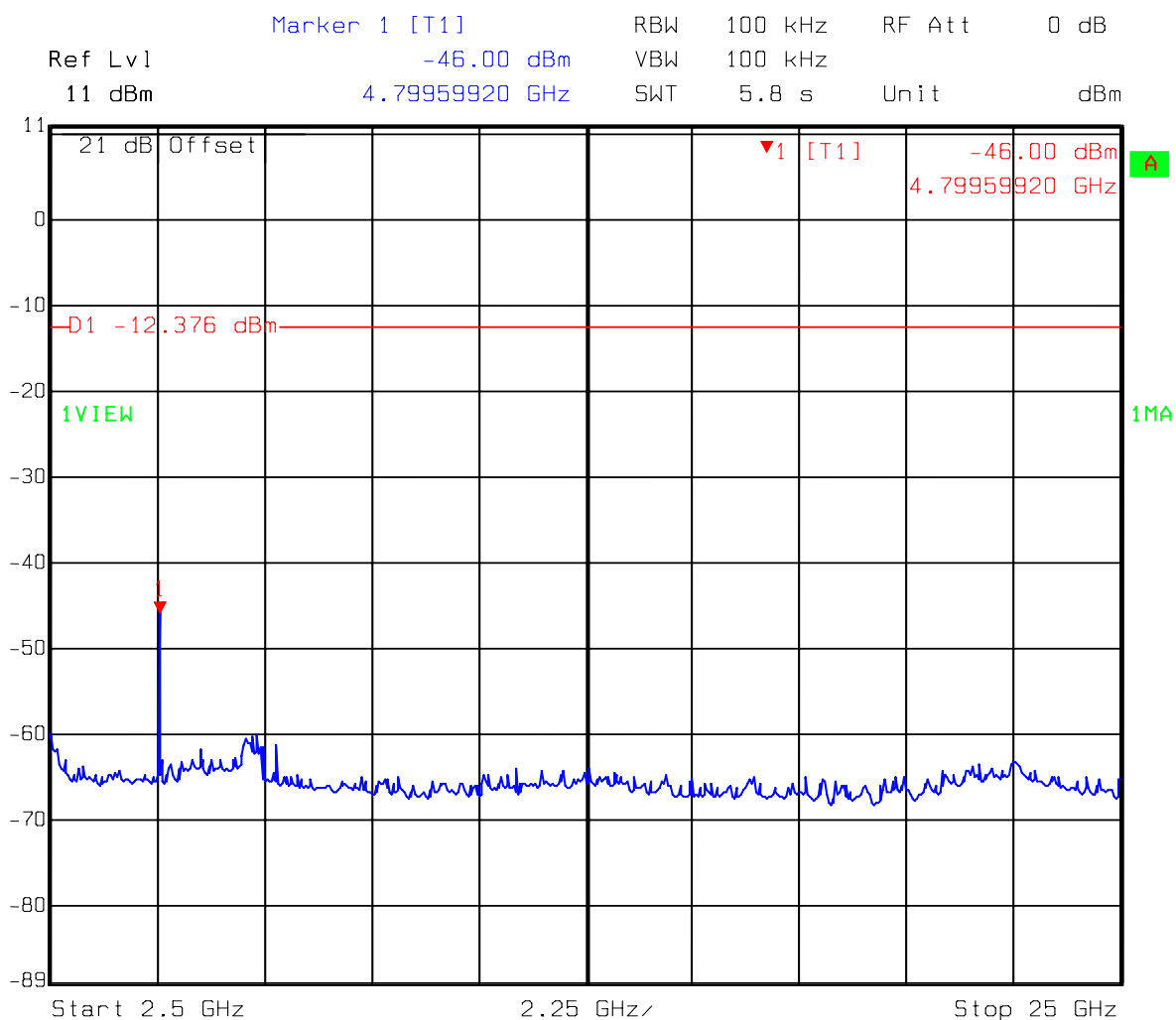
Test Mode: 802.11b mode CH1



Title: Conductive-Spurious
 Comment A: CH 1 at 802.11b mode 2400MHz~2483.5MHz
 Date: 07.APR.2008 14:26:30

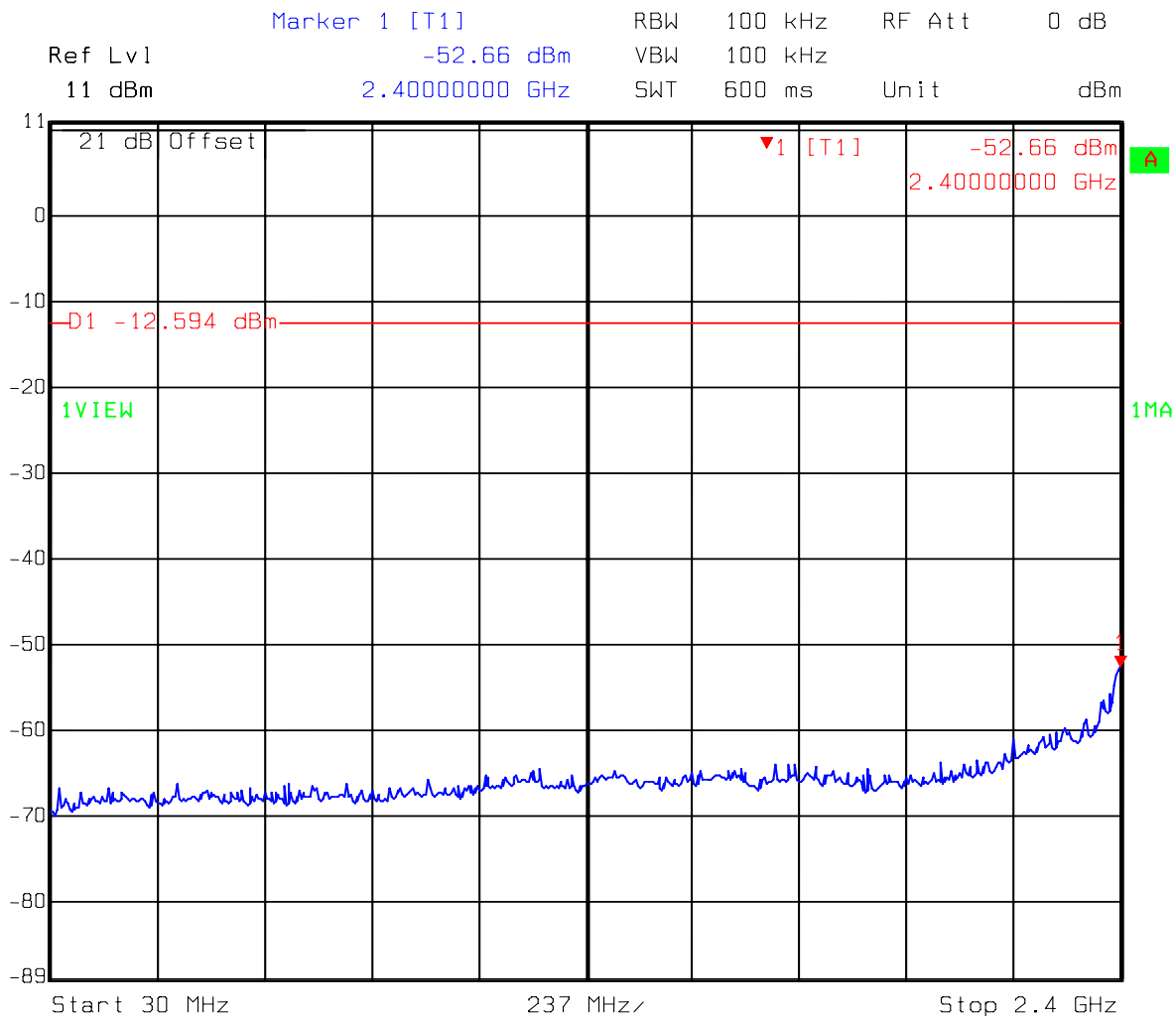


Test Mode: 802.11b mode CH1



Title: Conductive-Spurious
Comment A: CH 1 at 802.11b mode 2483.5MHz~25GHz
Date: 07.APR.2008 14:27:18

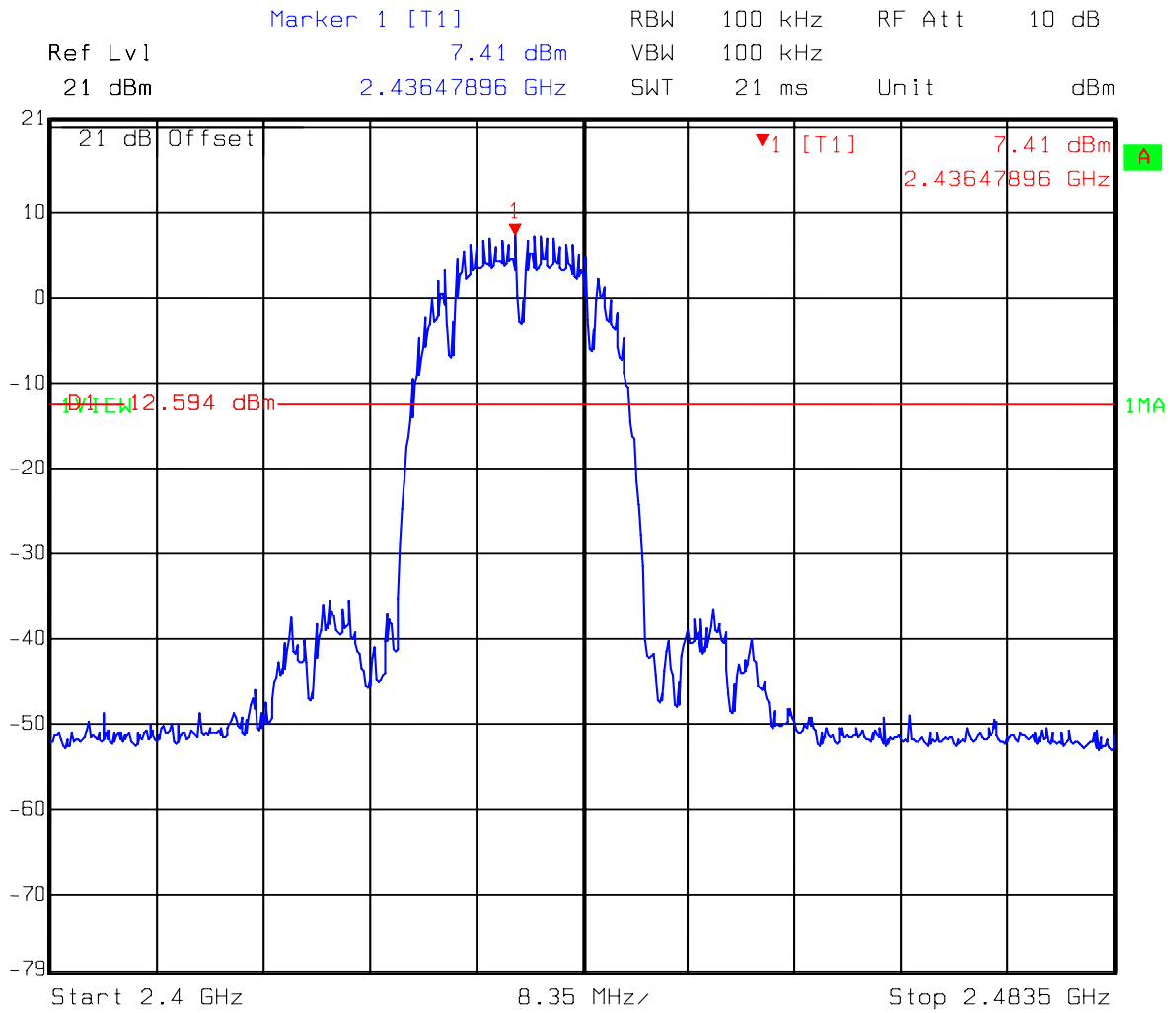
Test Mode: 802.11b mode CH6



Title: Conductive-Spurious
 Comment A: CH 6 at 802.11b mode 30MHz~2400MHz
 Date: 07.APR.2008 14:31:53



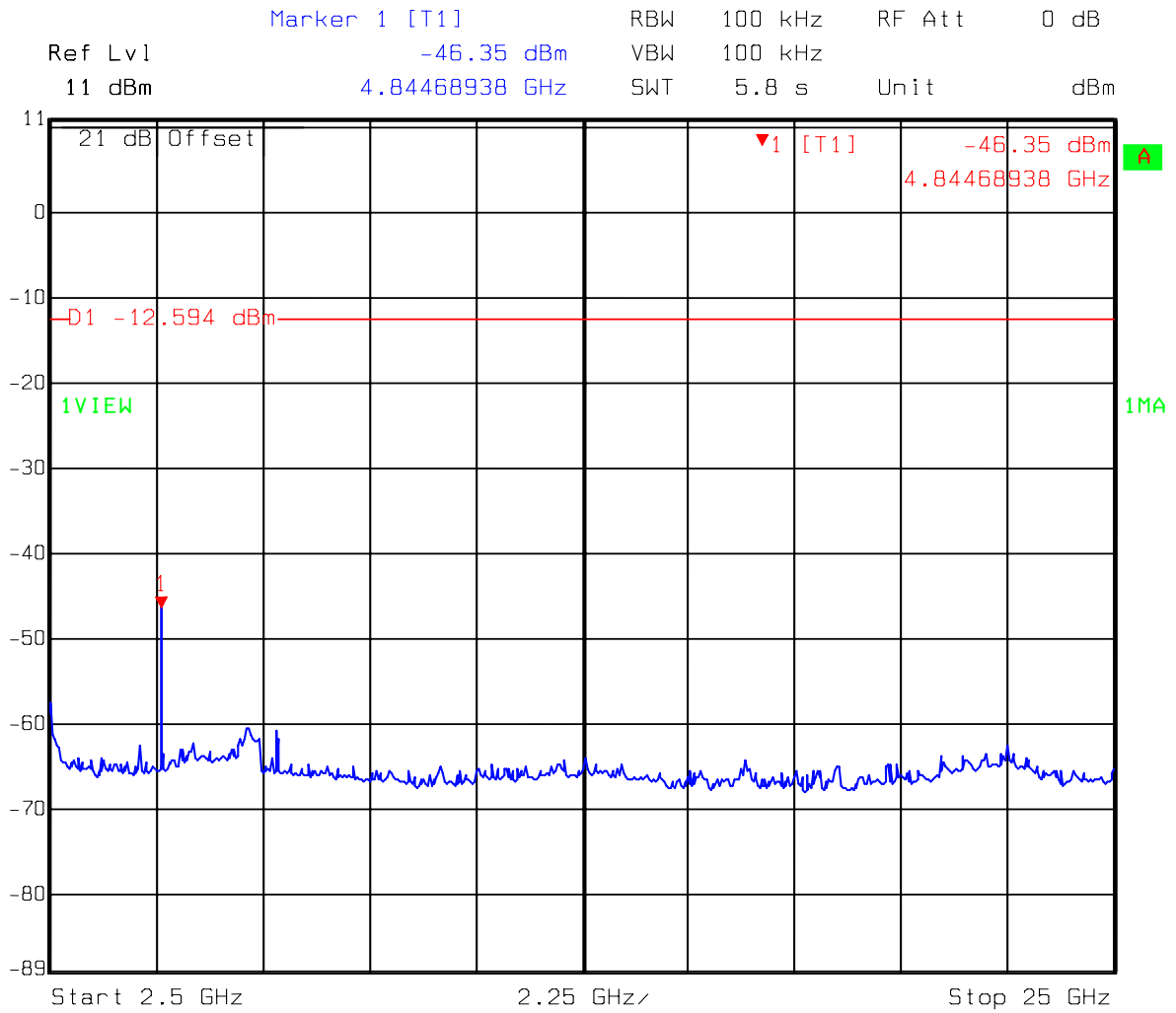
Test Mode: 802.11b mode CH6



Title: Conductive-Spurious
Comment A: CH 6 at 802.11b mode 2400MHz~2483.5MHz
Date: 07.APR.2008 14:31:31



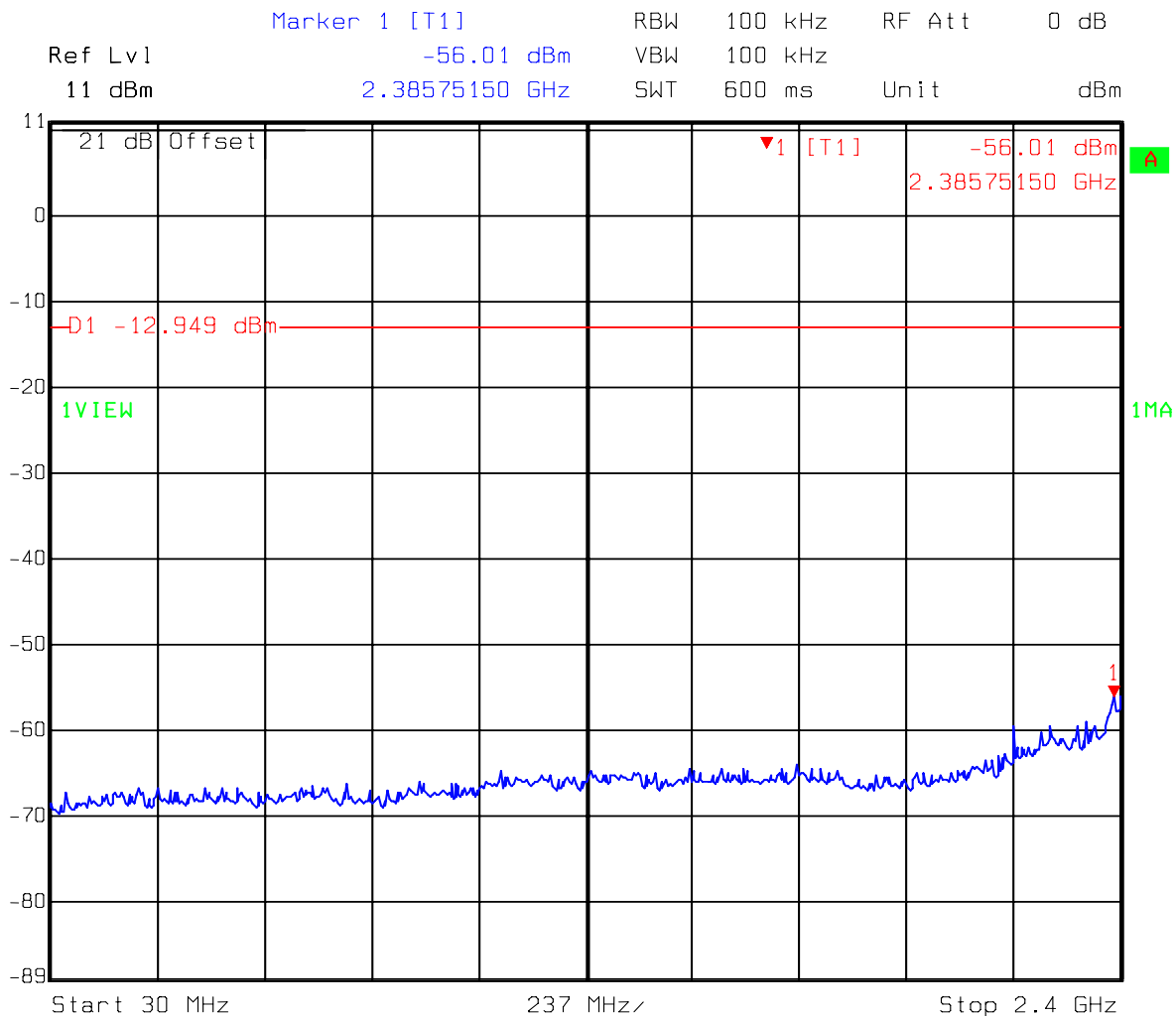
Test Mode: 802.11b mode CH6



Title: Conductive-Spurious
Comment A: CH 6 at 802.11b mode 2483.5MHz~25GHz
Date: 07.APR.2008 14:32:20



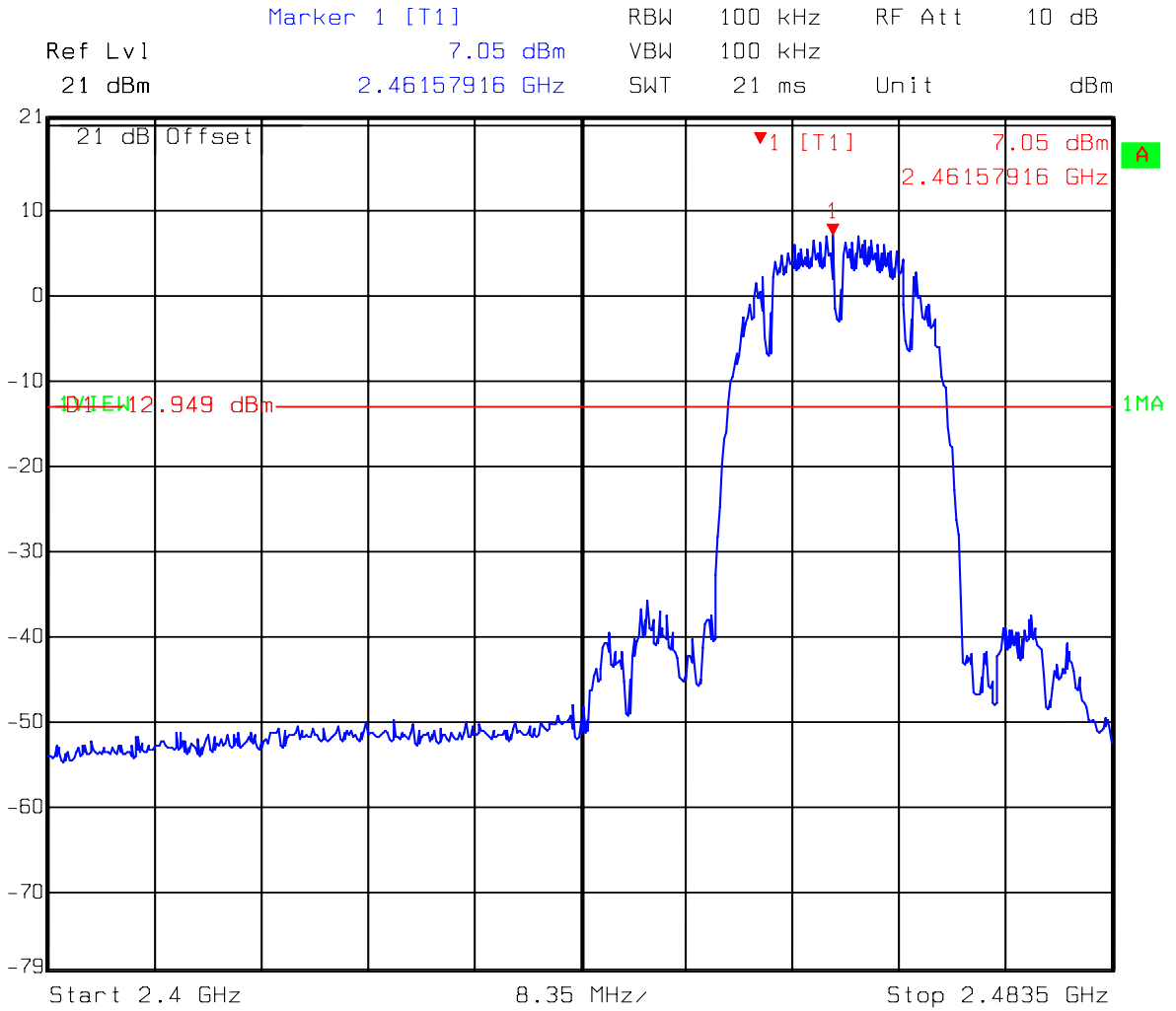
Test Mode: 802.11b mode CH11



Title: Conductive-Spurious
Comment A: CH 11 at 802.11b mode 30MHz~2400MHz
Date: 07.APR.2008 14:33:57



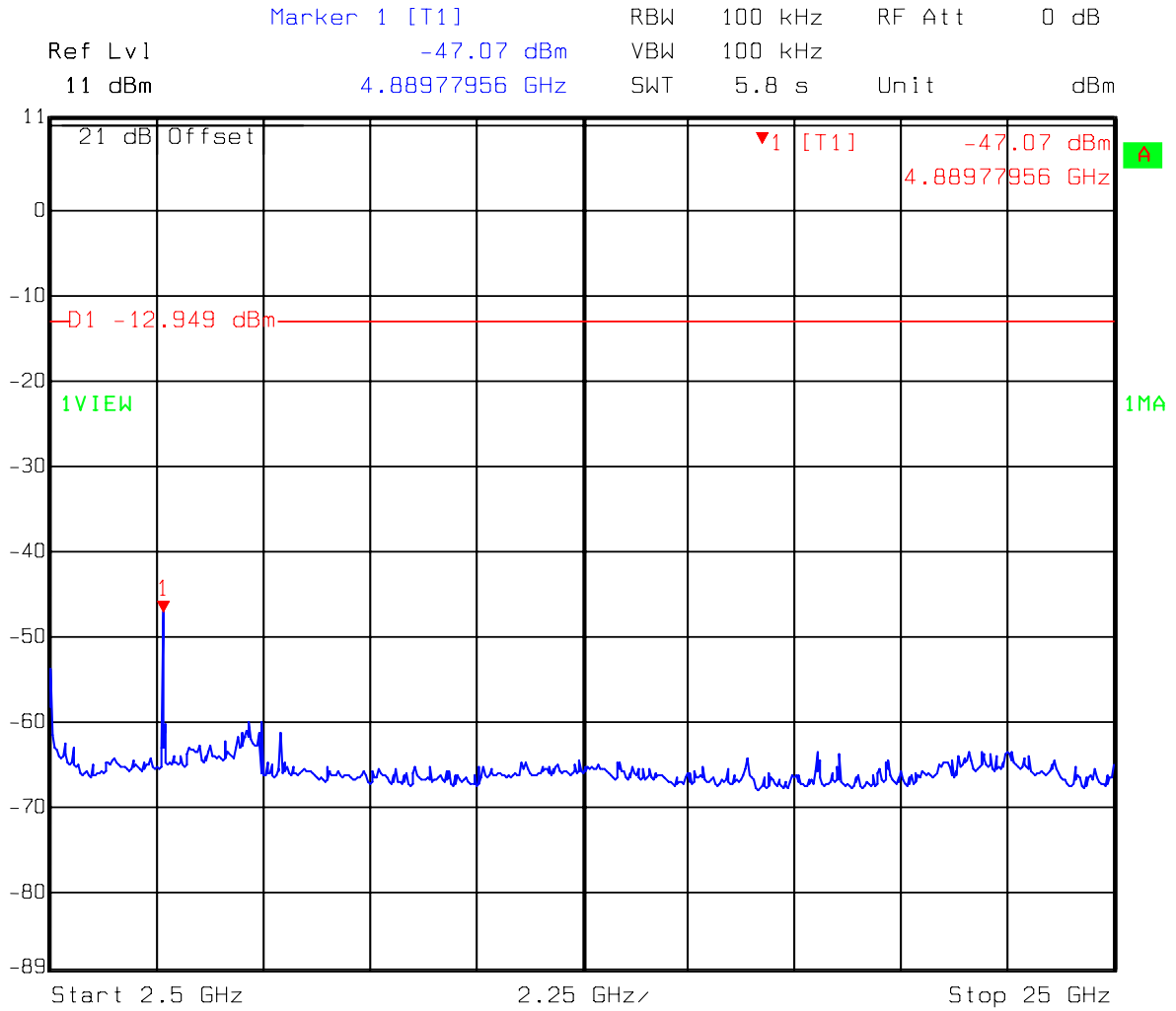
Test Mode: 802.11b mode CH11



Title: Conductive-Spurious
Comment A: CH 11 at 802.11b mode 2400MHz~2483.5MHz
Date: 07.APR.2008 14:33:35



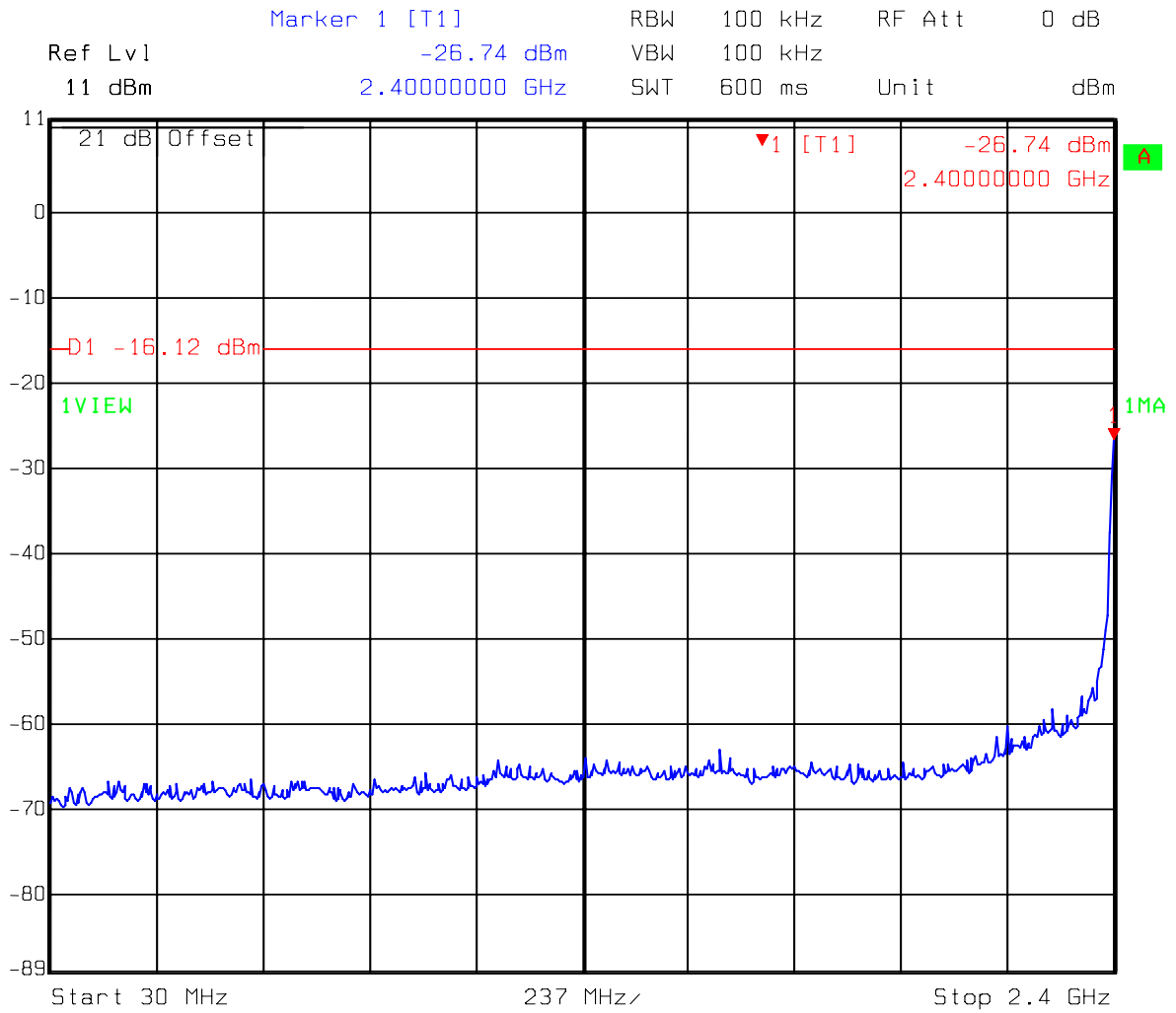
Test Mode: 802.11b mode CH11



Title: Conductive-Spurious
Comment A: CH 11 at 802.11b mode 2483.5MHz~25GHz
Date: 07.APR.2008 14:34:24



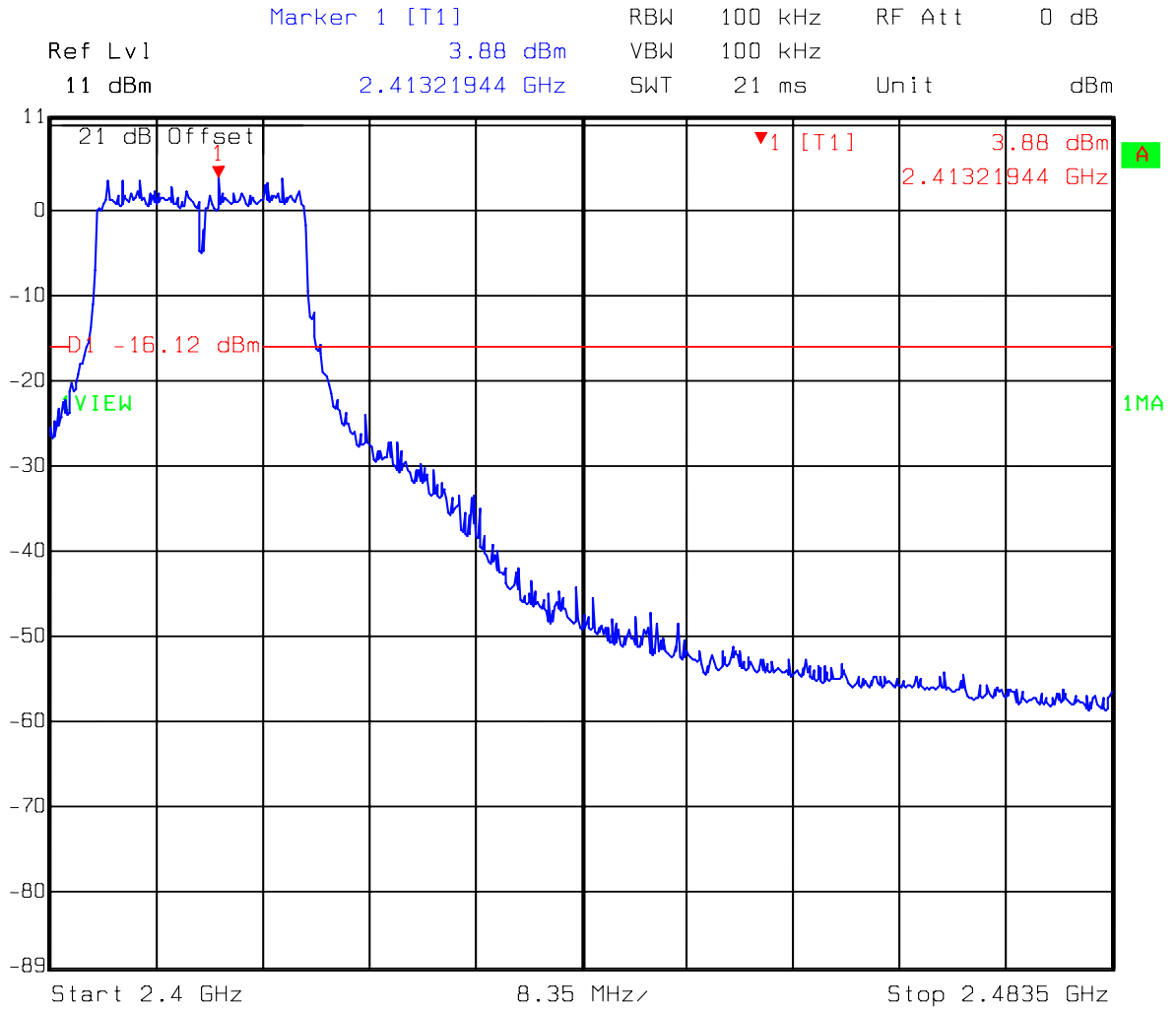
Test Mode: 802.11g mode CH1



Title: Conductive-Spurious
Comment A: CH 1 at 802.11g mode 30MHz~2400MHz
Date: 07.APR.2008 14:36:06



Test Mode: 802.11g mode CH1

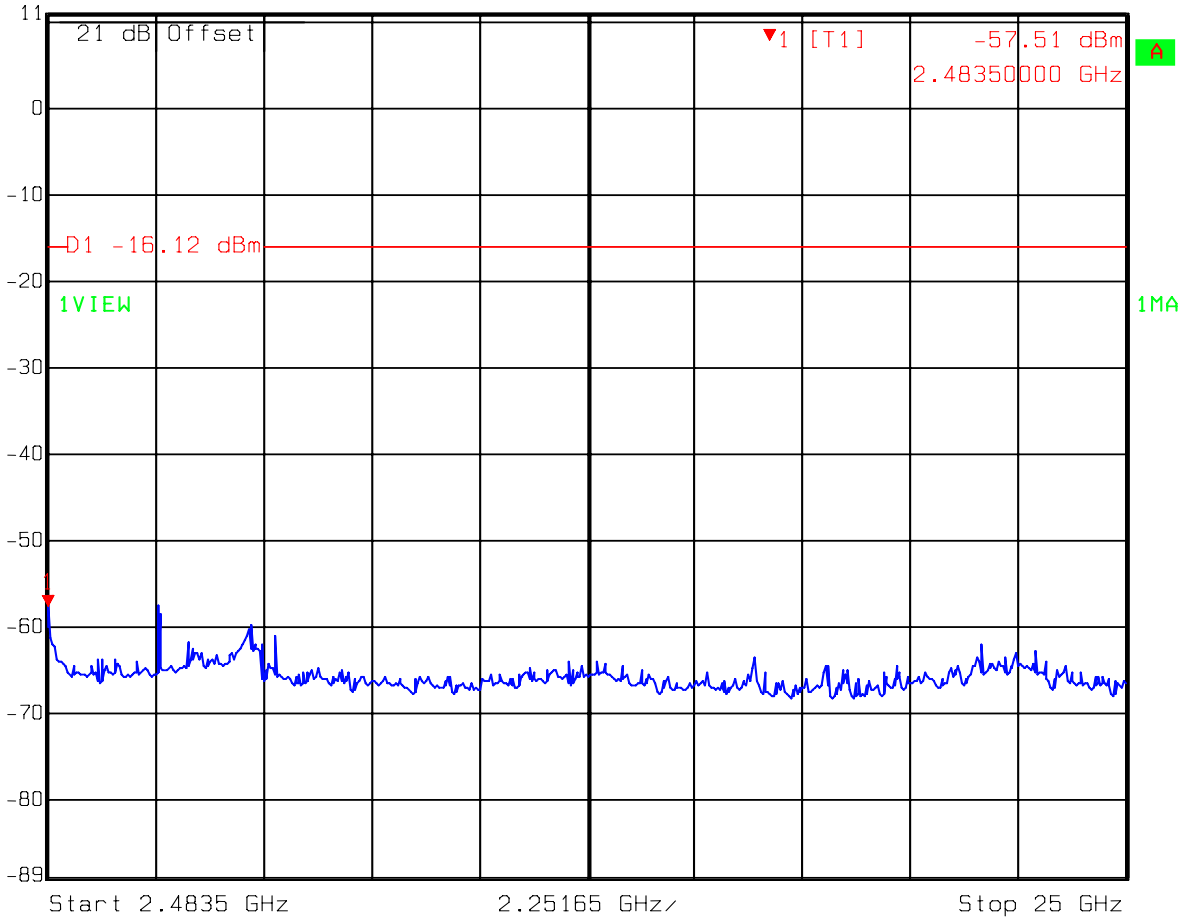


Title: Conductive-Spurious
Comment A: CH 1 at 802.11g mode 2400MHz~2483.5MHz
Date: 07.APR.2008 14:35:45



Test Mode: 802.11g mode CH1

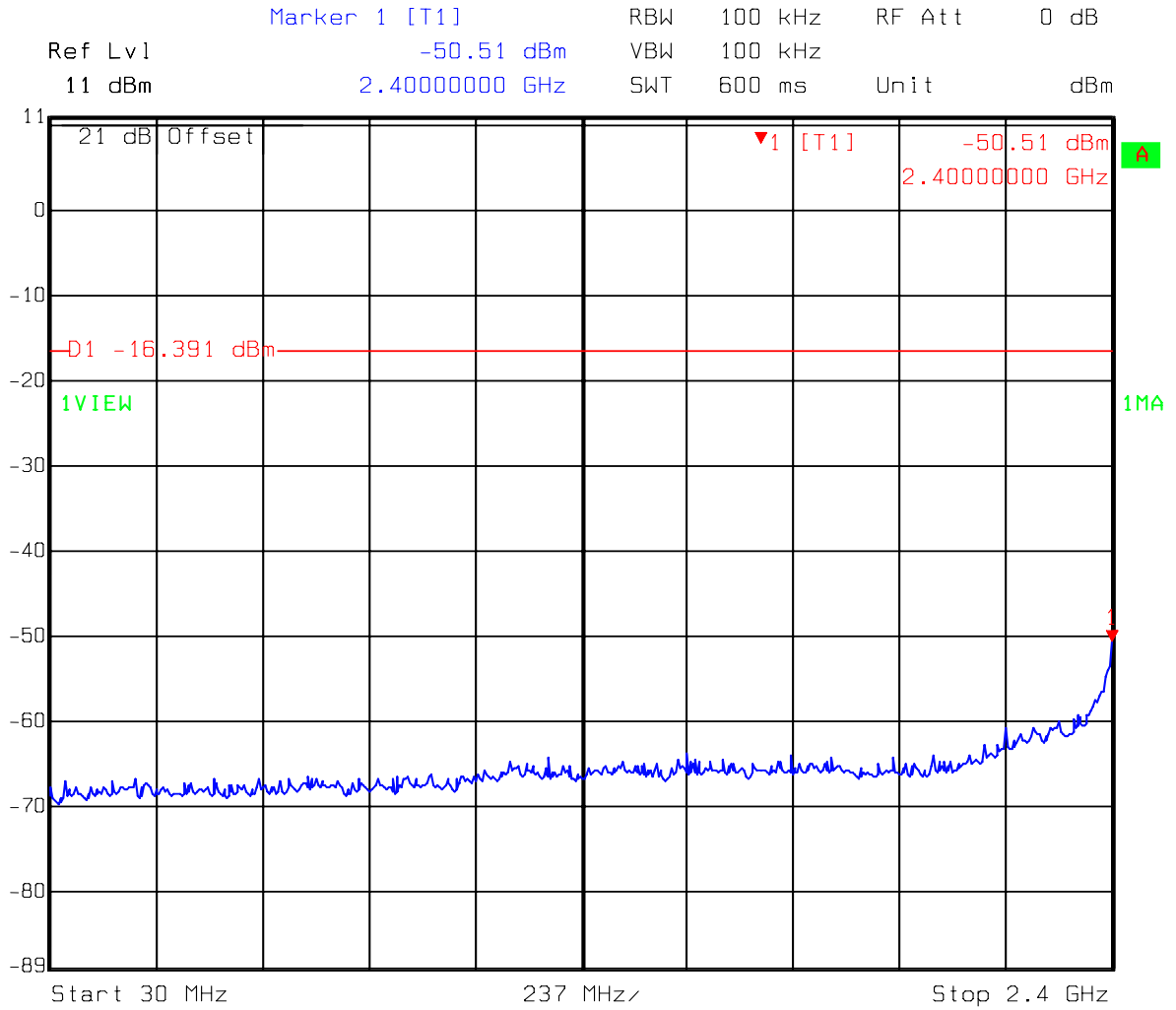
Marker 1 [T1] RBW 100 kHz RF Att 0 dB
Ref Lvl -57.51 dBm VBW 100 kHz
11 dBm 2.48350000 GHz SWT 5.8 s Unit dBm



Title: Conductive-Spurious
Comment A: CH 1 at 802.11g mode 2483.5MHz~25000MHz
Date: 07.APR.2008 14:36:34



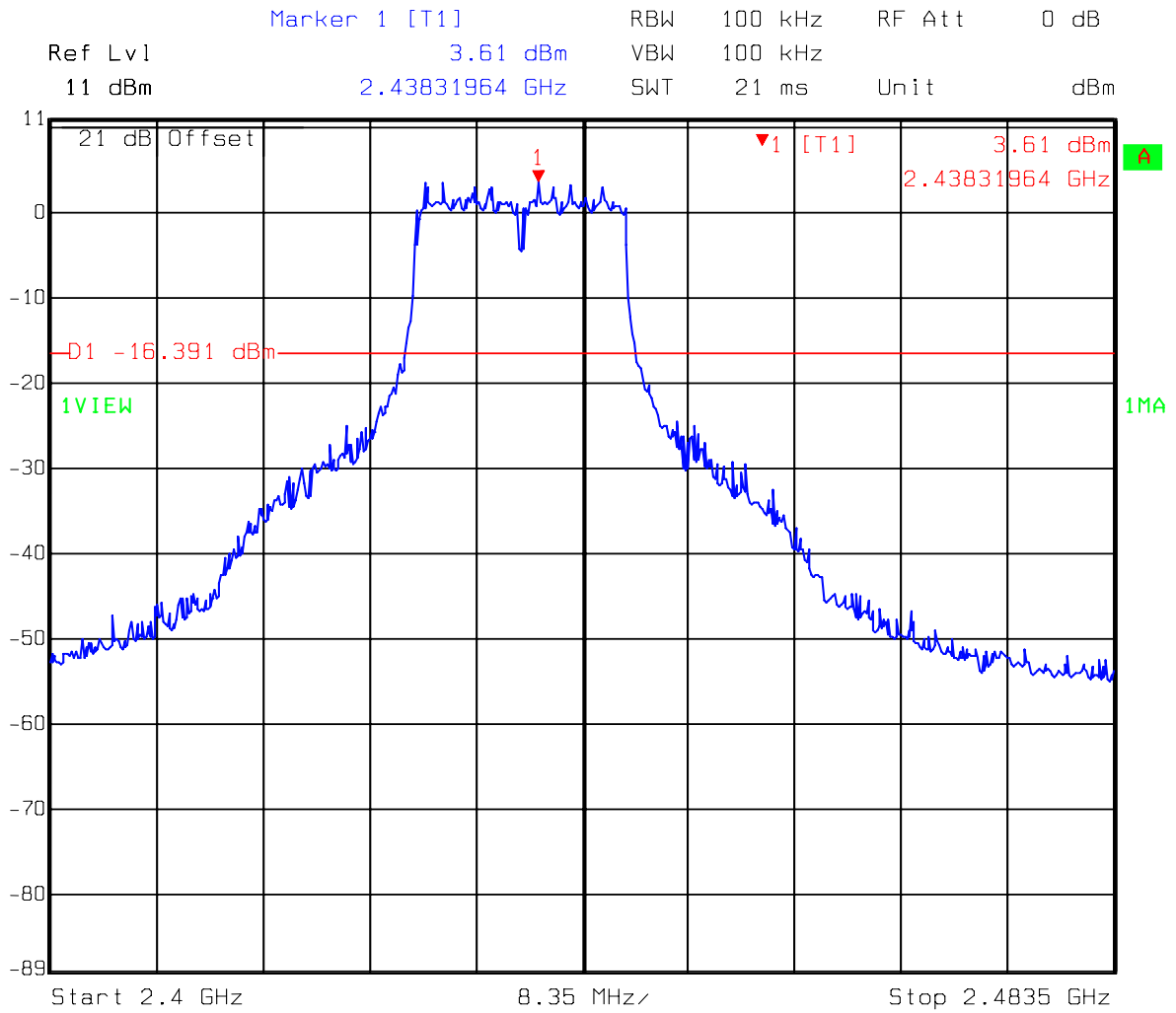
Test Mode: 802.11g mode CH6



Title: Conductive-Spurious
Comment A: CH 6 at 802.11g mode 30MHz~2400MHz
Date: 07.APR.2008 14:38:07



Test Mode: 802.11g mode CH6

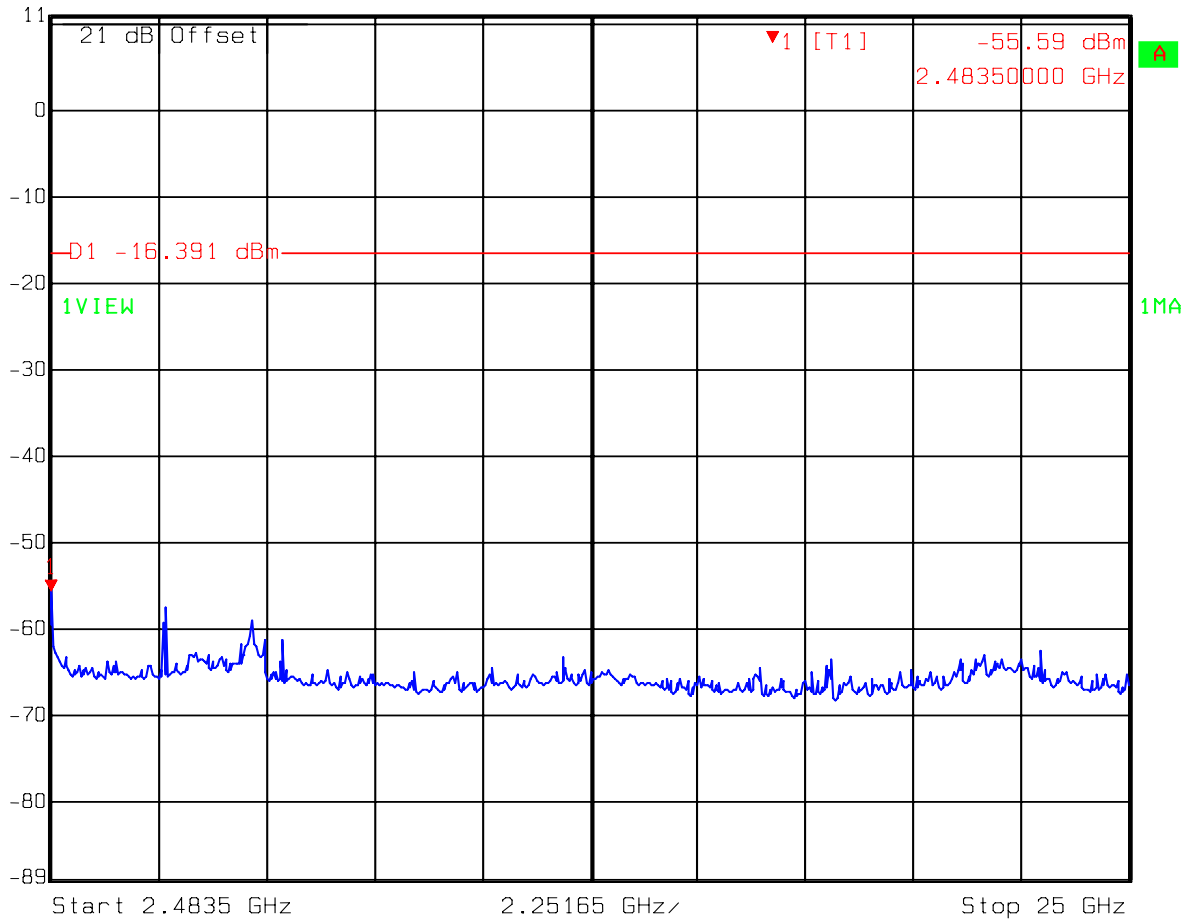


Title: Conductive-Spurious
Comment A: CH 6 at 802.11g mode 2400MHz~2483.5MHz
Date: 07.APR.2008 14:37:46



Test Mode: 802.11g mode CH6

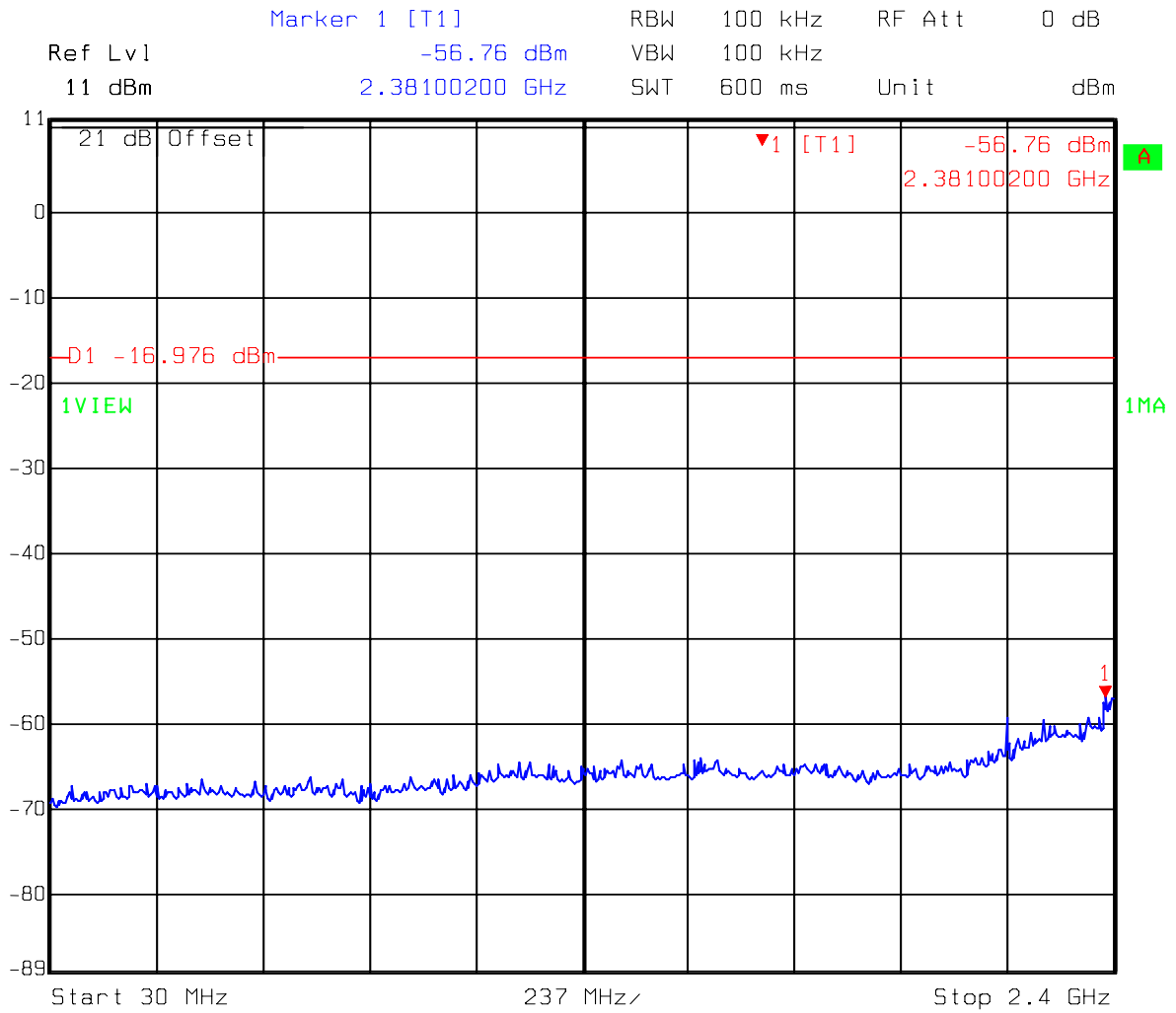
Marker 1 [T1] RBW 100 kHz RF Att 0 dB
 Ref Lvl -55.59 dBm VBW 100 kHz
 11 dBm 2.48350000 GHz SWT 5.8 s Unit dBm



Title: Conductive-Spurious
 Comment A: CH 6 at 802.11g mode 2483.5MHz~25000MHz
 Date: 07.APR.2008 14:38:34



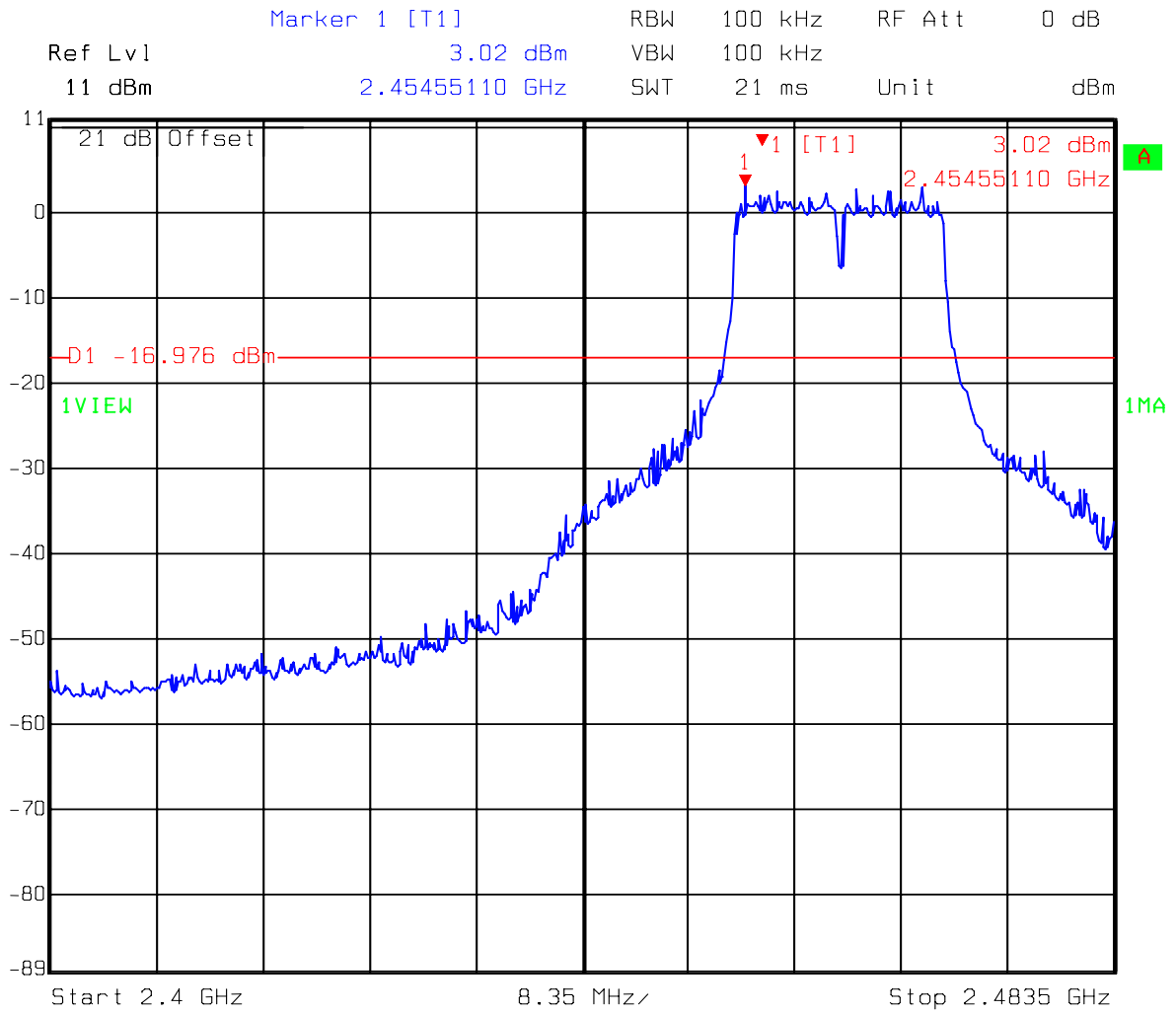
Test Mode: 802.11g mode CH11



Title: Conductive-Spurious
Comment A: CH 11 at 802.11g mode 30MHz~2400MHz
Date: 07.APR.2008 14:41:02



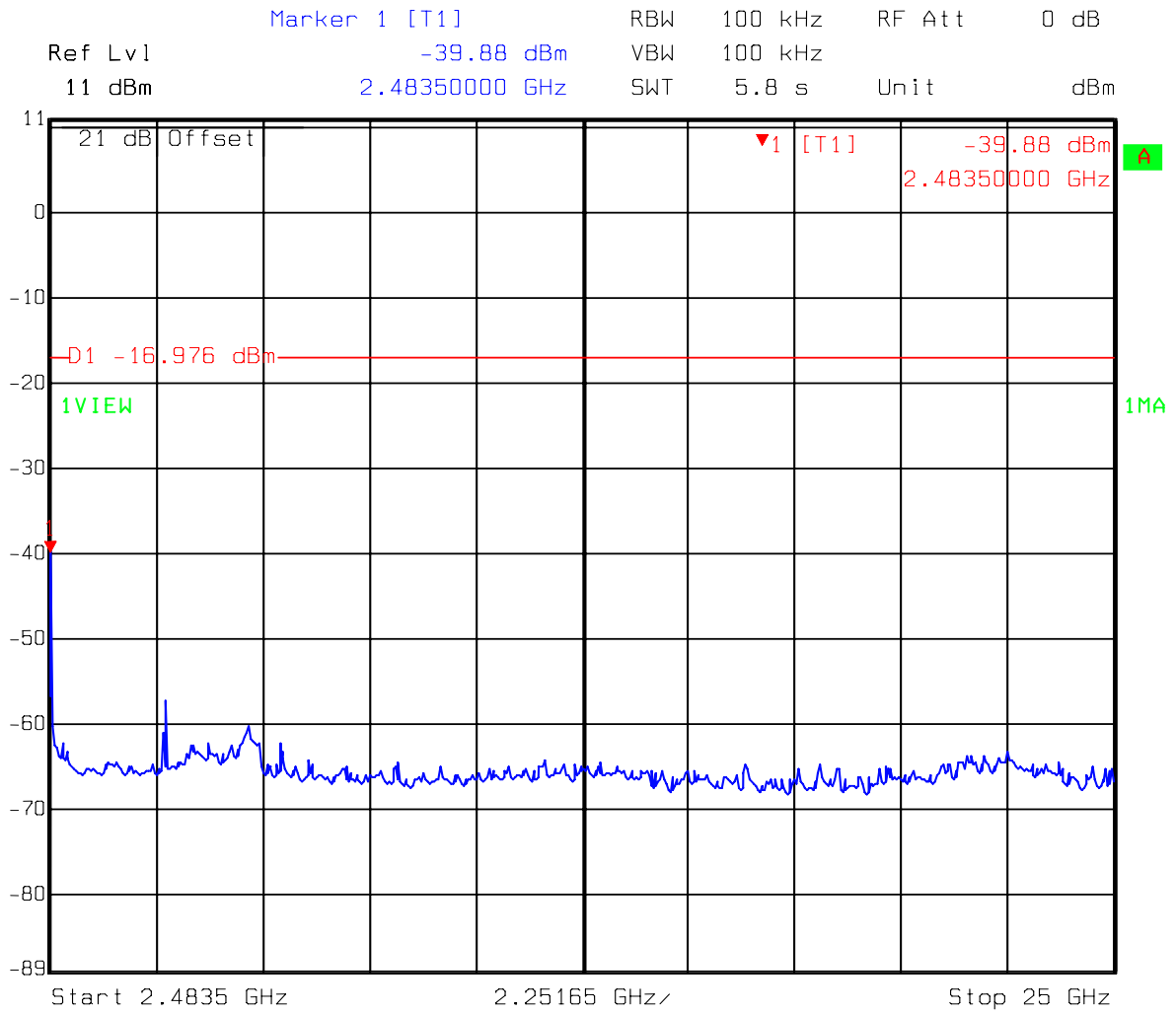
Test Mode: 802.11g mode CH11



Title: Conductive-Spurious
Comment A: CH 11 at 802.11g mode 2400MHz~2483.5MHz
Date: 07.APR.2008 14:40:41



Test Mode: 802.11g mode CH11



Title: Conductive-Spurious
Comment A: CH 11 at 802.11g mode 2483.5MHz~25000MHz
Date: 07.APR.2008 14:41:29

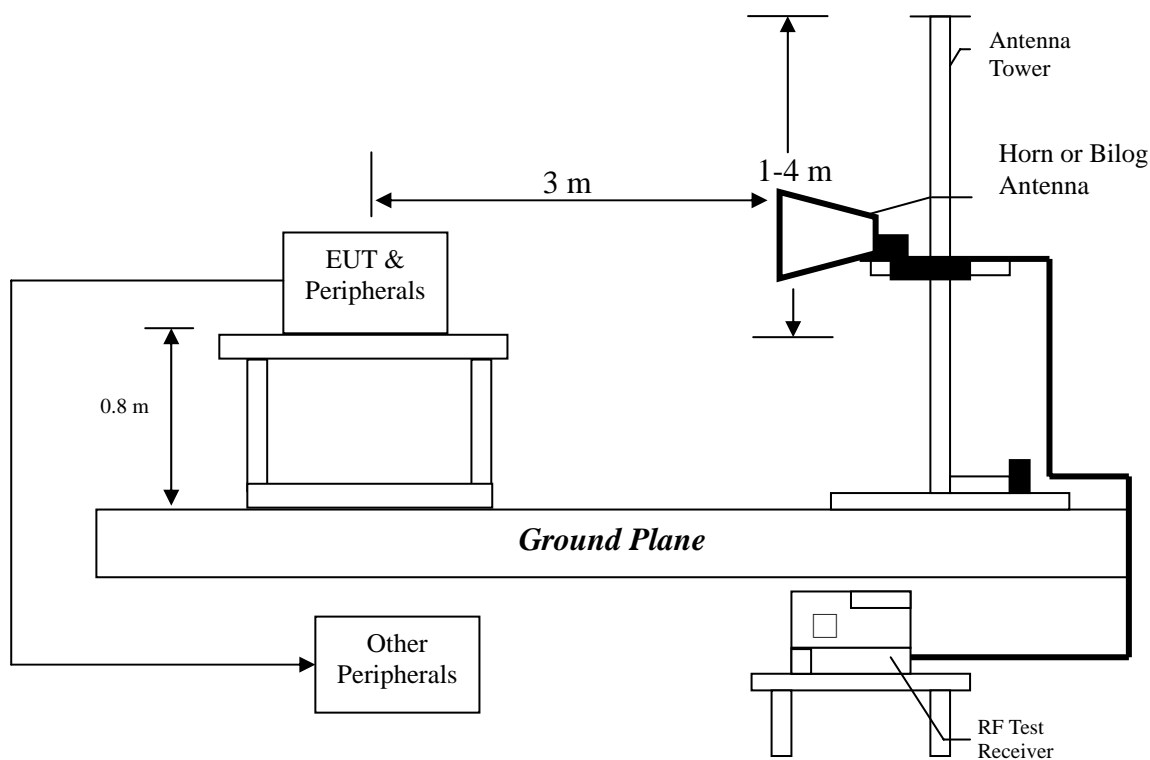
6. Radiated Emission test

6.1 Operating environment

Temperature: 22 °C
 Relative Humidity: 65 %
 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 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

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 : 3100-4g v2
 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	125.060	QP	9.47	23.47	32.94	43.50	-10.57
V	249.220	QP	12.22	16.27	28.49	46.00	-17.52
V	374.350	QP	15.06	16.97	32.03	46.00	-13.97
V	399.570	QP	16.40	15.96	32.36	46.00	-13.64
V	480.080	QP	18.43	13.06	31.49	46.00	-14.52
V	624.610	QP	20.75	10.48	31.23	46.00	-14.77
H	125.060	QP	11.62	21.45	33.07	43.50	-10.44
H	249.220	QP	12.36	22.38	34.74	46.00	-11.26
H	374.350	QP	15.48	22.03	37.51	46.00	-8.50
H	399.570	QP	16.74	17.51	34.25	46.00	-11.75
H	480.080	QP	18.64	13.85	32.49	46.00	-13.51
H	624.610	QP	20.88	13.94	34.82	46.00	-11.19

Remark:

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



6.4.2 Measurement results: frequency above 1GHz

EUT : 3100-4g v2
 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)
4824.00	PK	V	36.07	37.77	40.52	42.22	54	-11.78
4824.00	PK	H	36.07	37.77	38.53	40.23	54	-13.77

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.



EUT : 3100-4g v2
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)
4874.00	PK	V	36.07	37.77	42.36	44.06	54	-9.94
4874.00	PK	H	36.07	37.77	39.35	41.05	54	-12.95

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.



EUT : 3100-4g v2
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)
4924.00	PK	V	36.07	37.77	40.23	41.93	54	-12.07
4924.00	PK	H	36.07	37.77	39.13	40.83	54	-13.17

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.



EUT : 3100-4g v2
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)
4824.00	PK	V	36.07	37.77	39.33	41.03	54	-12.97
4824.00	PK	H	36.07	37.77	38.21	39.91	54	-14.09

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.



EUT : 3100-4g v2
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)
4874.00	PK	V	36.07	37.77	39.88	41.58	54	-12.42
4874.00	PK	H	36.07	37.77	38.44	40.14	54	-13.86

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.



EUT : 3100-4g v2
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)
4924.00	PK	V	36.07	37.77	39.54	41.24	54	-12.76
4924.00	PK	H	36.07	37.77	37.96	39.66	54	-14.34

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.



7. Power Spectrum Density test

7.1 Operating environment

Temperature: 26 °C
 Relative Humidity: 53 %
 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 mode

Channel	Frequency (MHz)	Power spectrum density (dBm)	Limit (dBm)
1 (lowest)	2412	-5.79	8.00
6 (middle)	2437	-4.67	8.00
11 (highest)	2462	-5.57	8.00

Test Mode: 802.11g mode

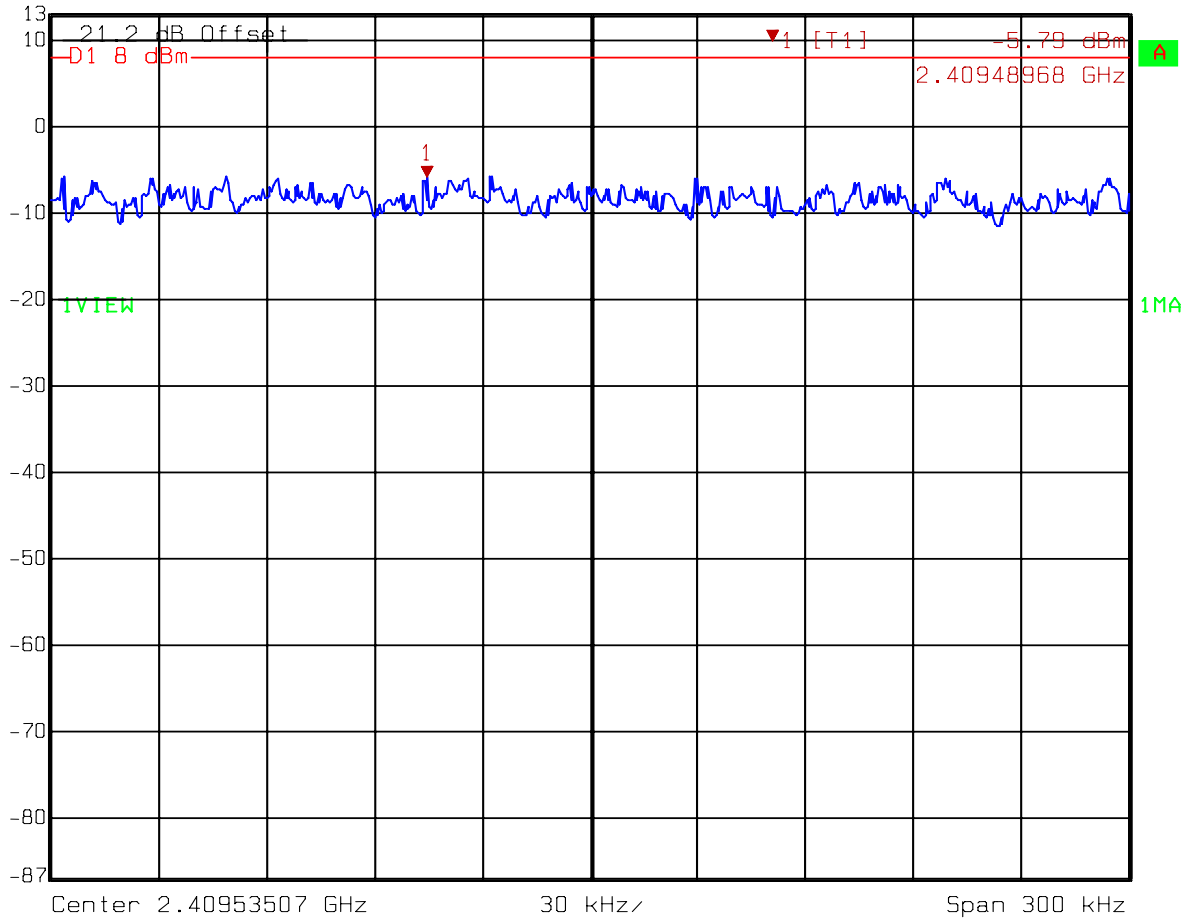
Channel	Frequency (MHz)	Power spectrum density (dBm)	Limit (dBm)
1 (lowest)	2412	-7.15	8.00
6 (middle)	2437	-7.55	8.00
11 (highest)	2462	-7.07	8.00

Please see the plot below.



Test Mode: 802.11b mode CH1


	Max/Ref Lvl	Marker 1 [T1]	RBW	3 kHz	RF Att	10 dB
	13 dBm	-5.79 dBm	VBW	10 kHz		
	1.2 dBm	2.40948968 GHz	SWT	100 s	Unit	dBm

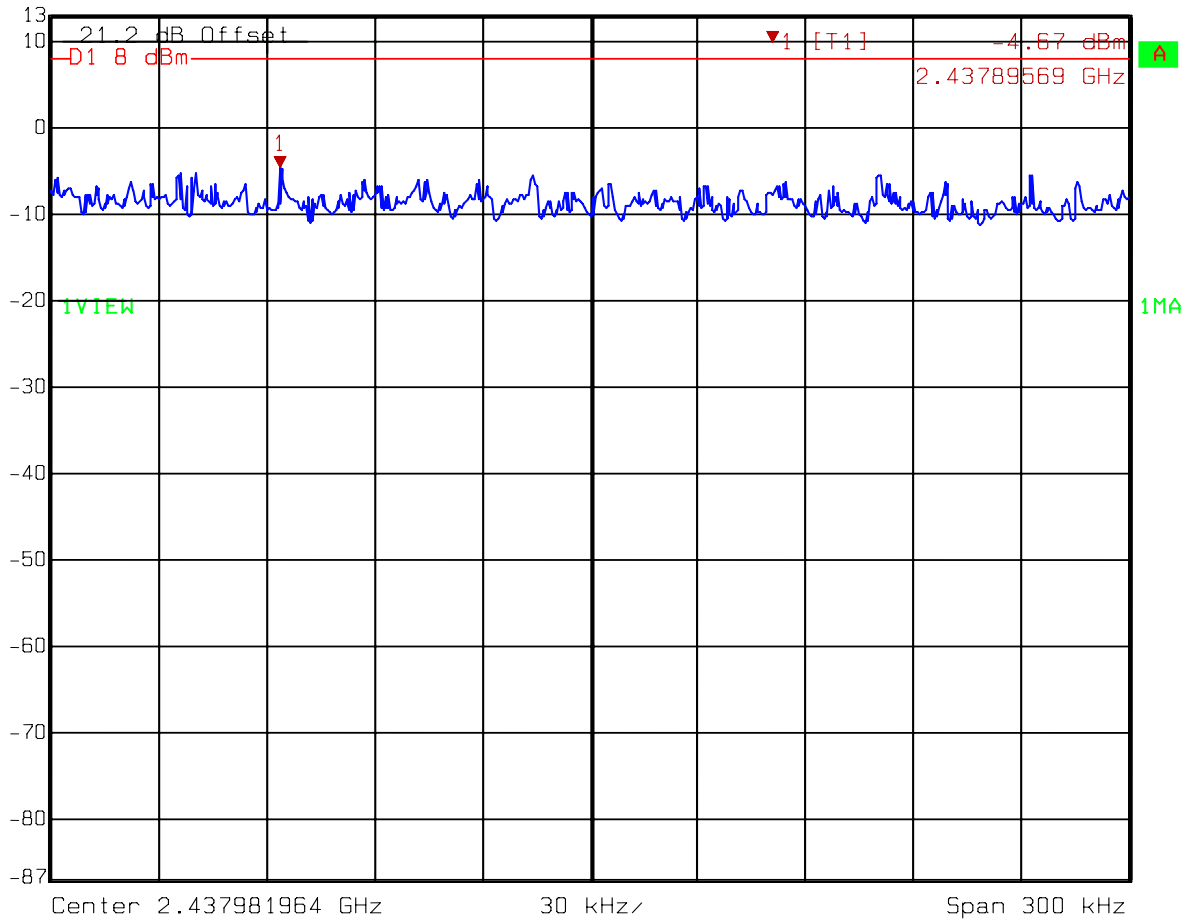


Title: Power Spectrum Density
 Comment A: Channel 1 at 802.11b mode
 Date: 14.MAR.2006 17:04:31



Test Mode: 802.11b mode CH6


 Max/Ref Lvl Marker 1 [T1] RBW 3 kHz RF Att 10 dB
13 dBm -4.67 dBm VBW 10 kHz
1.2 dBm 2.43789569 GHz SWT 100 s Unit dBm

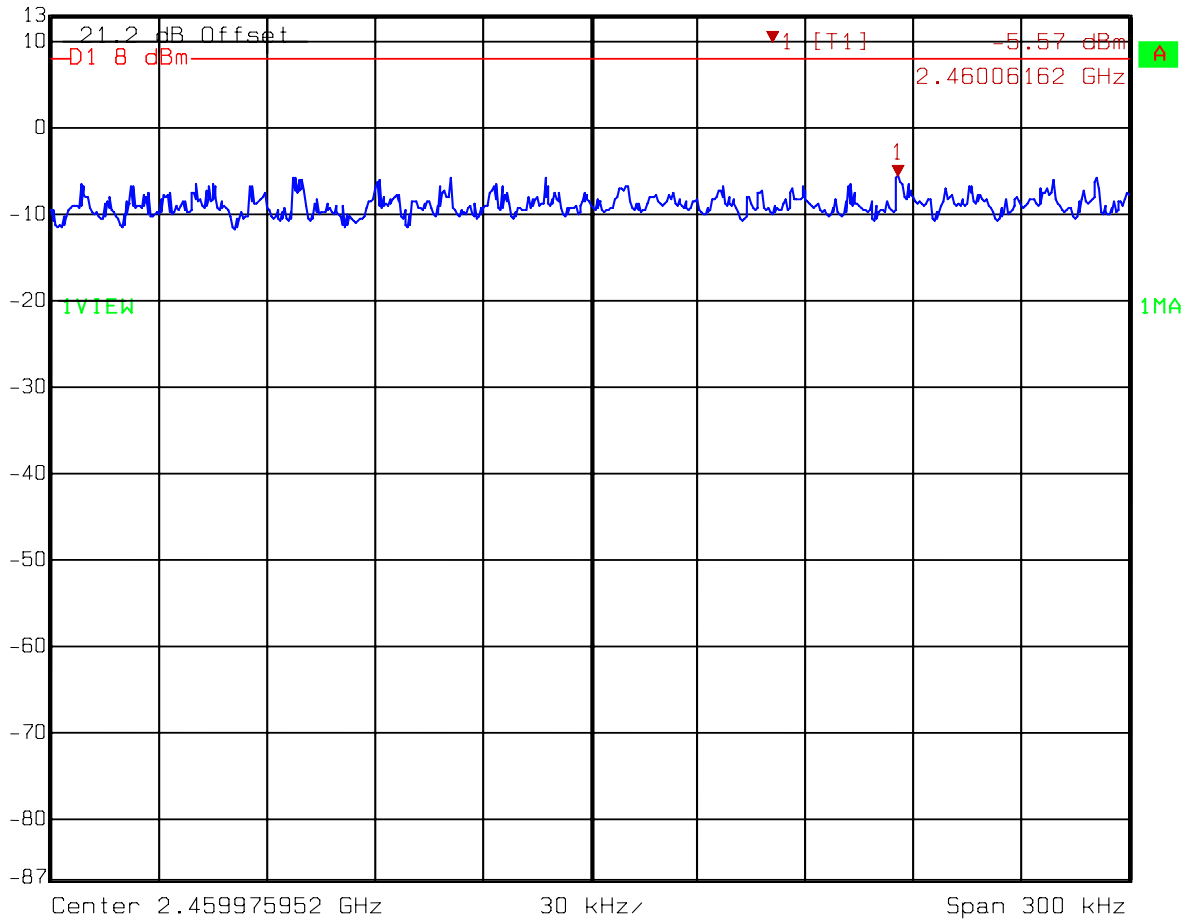


Title: Power Spectrum Density
Comment A: Channel 6 at 802.11b mode
Date: 14.MAR.2006 17:13:34



Test Mode: 802.11b mode CH11

 Max/Ref Lvl Marker 1 [T1] RBW 3 kHz RF Att 10 dB
13 dBm -5.57 dBm VBW 10 kHz
1.2 dBm 2.46006162 GHz SWT 100 s Unit dBm

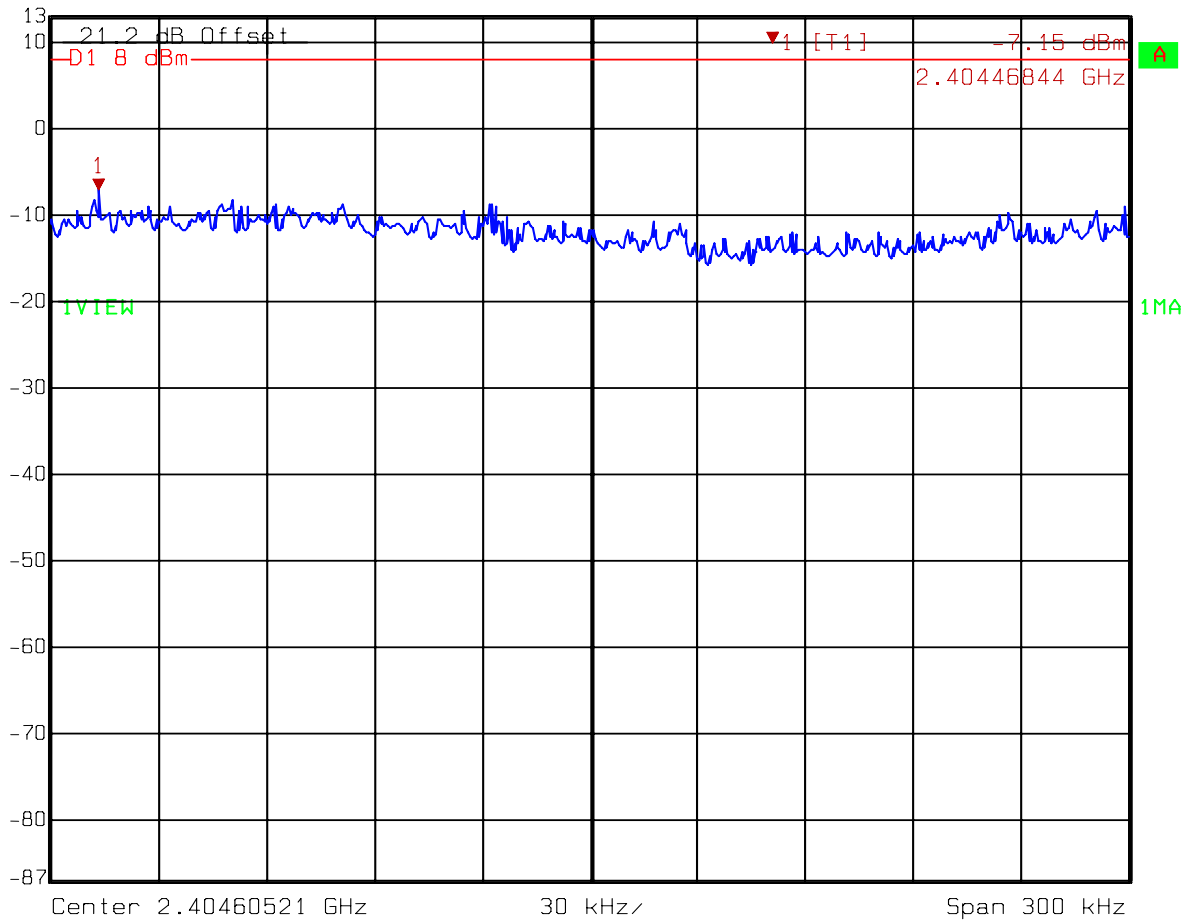


Title: Power Spectrum Density
Comment A: Channel 11 at 802.11b mode
Date: 14.MAR.2006 17:08:05



Test Mode: 802.11g mode CH1

	Max/Ref Lvl	Marker 1 [T1]	RBW	3 kHz	RF Att	10 dB
	13 dBm	-7.15 dBm	VBW	10 kHz		
	1.2 dBm	2.40446844 GHz	SWT	100 s	Unit	dBm

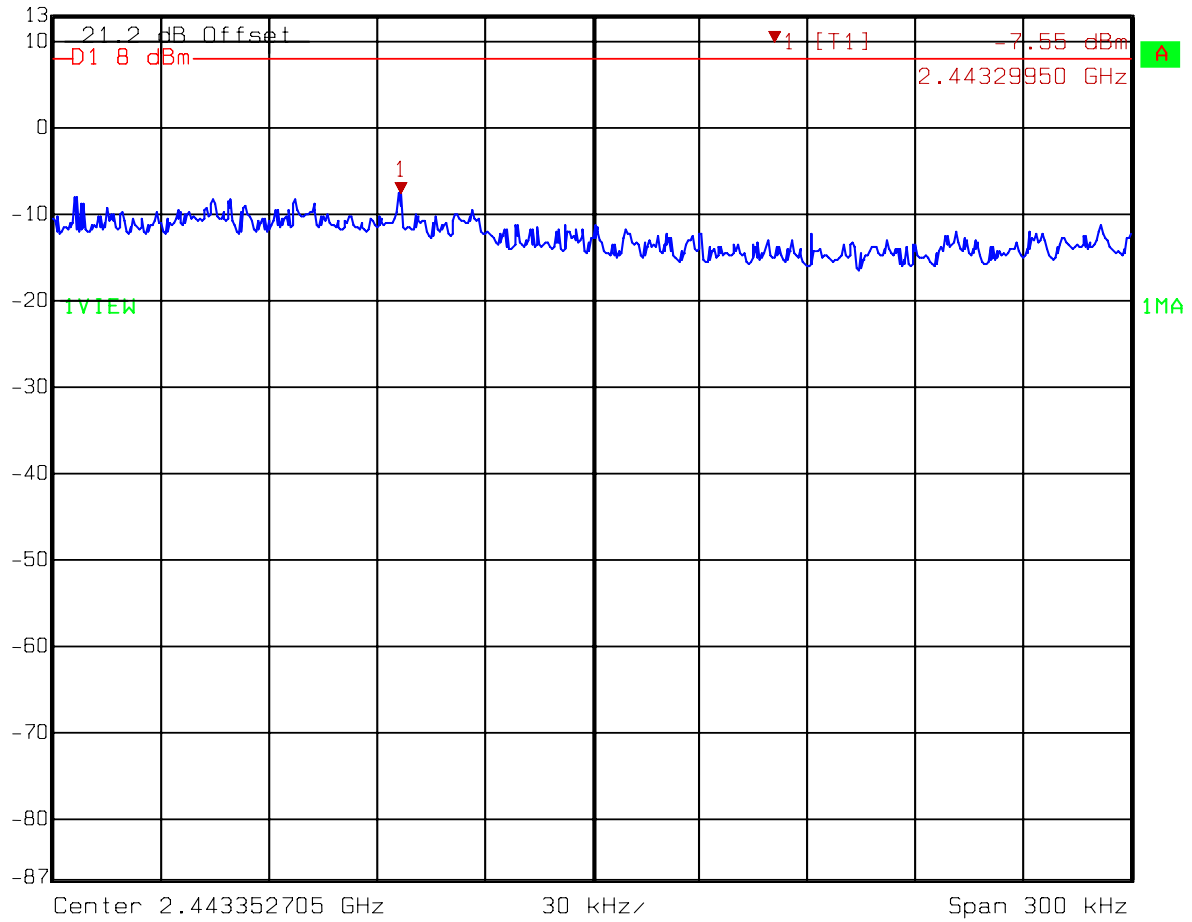


Title: Power Spectrum Density
 Comment A: Channel 1 at 802.11g mode
 Date: 14.MAR.2006 16:45:42



Test Mode: 802.11g mode CH6

	Max/Ref Lvl	Marker 1 [T1]	RBW	3 kHz	RF Att	10 dB
	13 dBm	-7.55 dBm	VBW	10 kHz		
	1.2 dBm	2.44329950 GHz	SWT	100 s	Unit	dBm

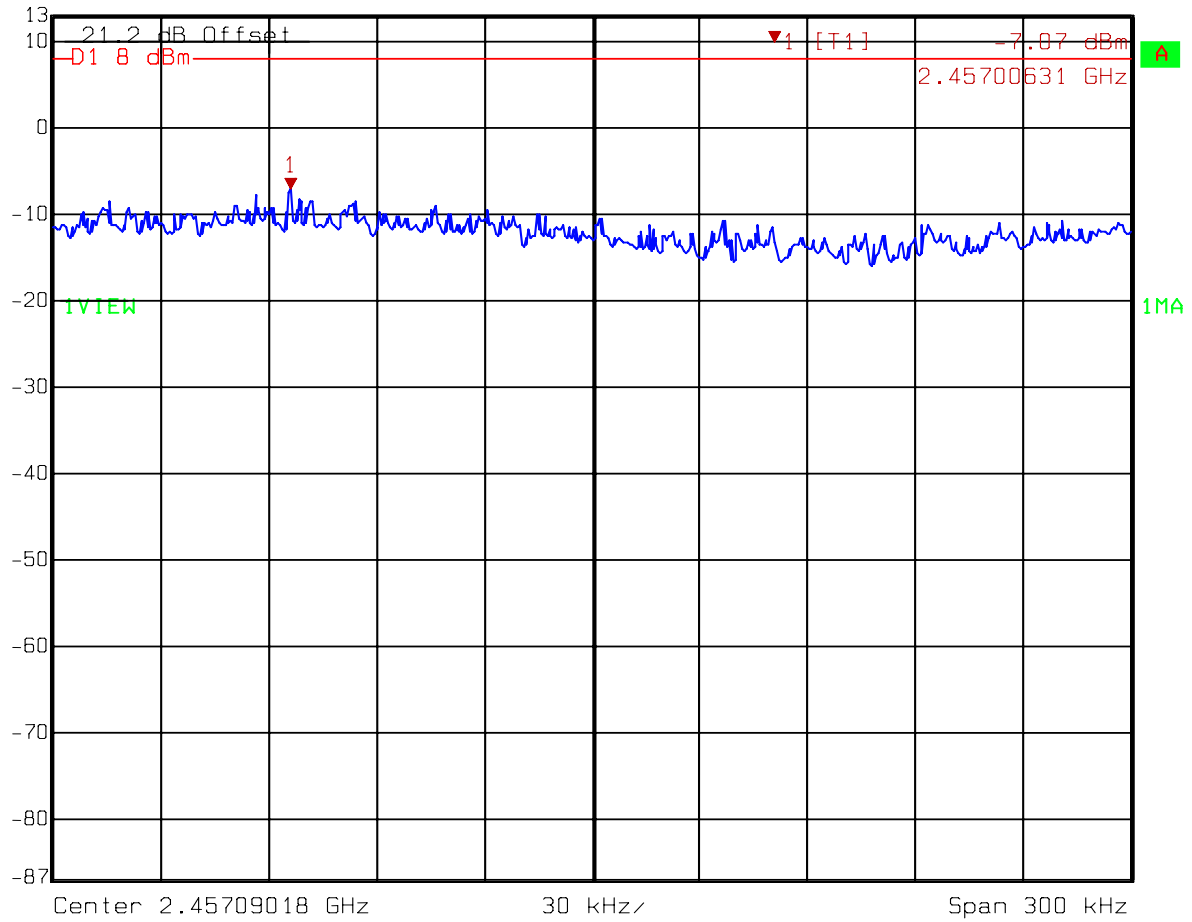


Title: Power Spectrum Density
Comment A: Channel 6 at 802.11g mode
Date: 14.MAR.2006 16:59:30



Test Mode: 802.11g mode CH11

	Max/Ref Lvl	Marker 1 [T1]	RBW	3 kHz	RF Att	10 dB
	13 dBm	-7.07 dBm	VBW	10 kHz		
	1.2 dBm	2.45700631 GHz	SWT	100 s	Unit	dBm



Title: Power Spectrum Density
Comment A: Channel 11 at 802.11g mode
Date: 14.MAR.2006 16:49:12



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:	20	°C
Relative Humidity:	70	%
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

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	60.68	74	-13.32
		AV	49.49	54	-4.51
11 (highest)	2483.5-2500	PK	60.04	74	-13.96
		AV	48.25	54	-5.75



Test Mode: 802.11g mode

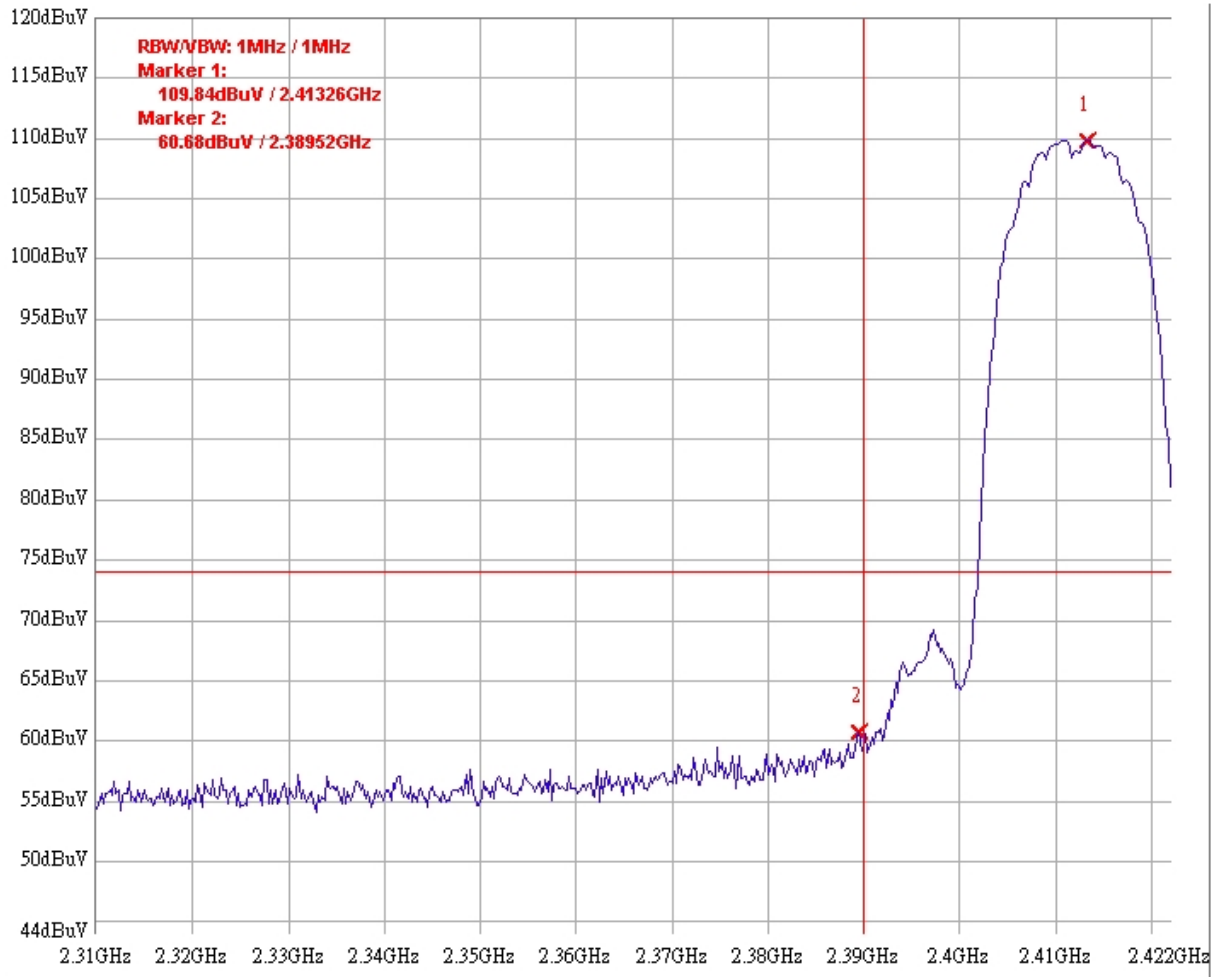
Channel	Measurement Freq.Band (MHz)	Detector	The Max. Field Strength in Restrict Band (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
1 (lowest)	2310-2390	PK	72.60	74	-1.40
		AV	52.35	54	-1.65
11 (highest)	2483.5-2500	PK	72.97	74	-1.03
		AV	50.60	54	-3.40

Remark: 1. C = A – B

2. E = C – D

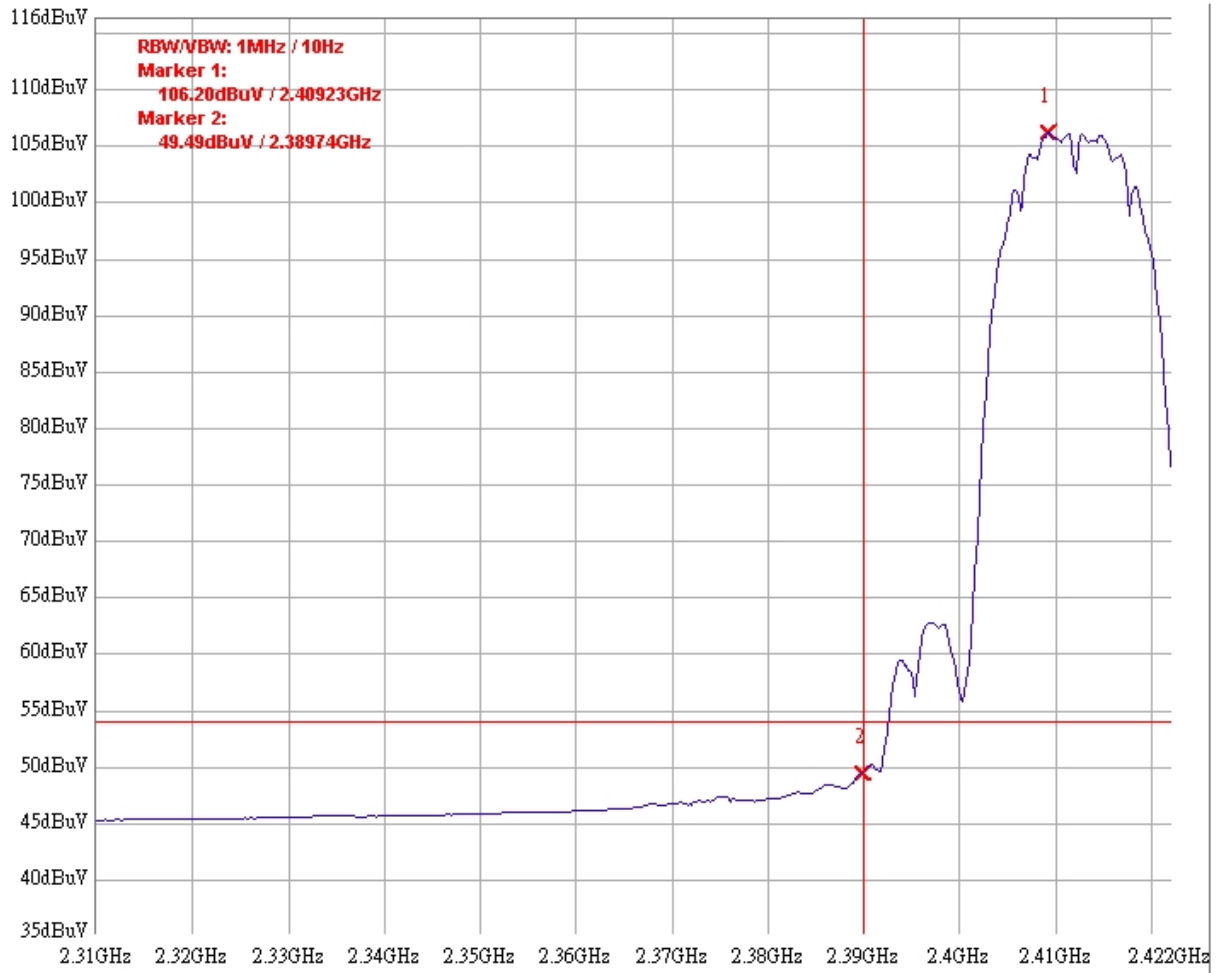


Test Mode: 802.11b mode CH1 PK



bandedge
11b ch1
PK

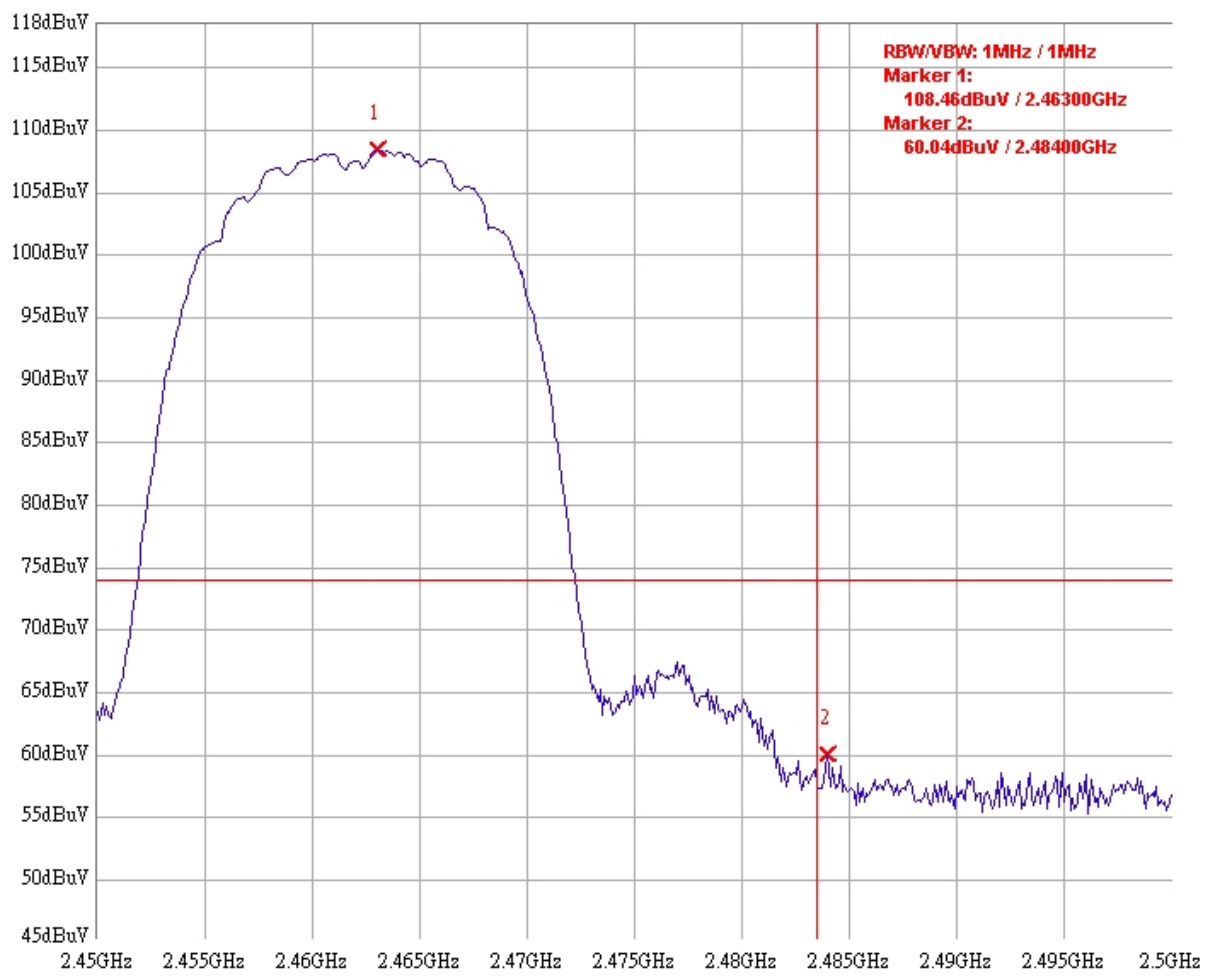
Test Mode: 802.11b mode CH1 AV



bandedge
11b ch1
AV

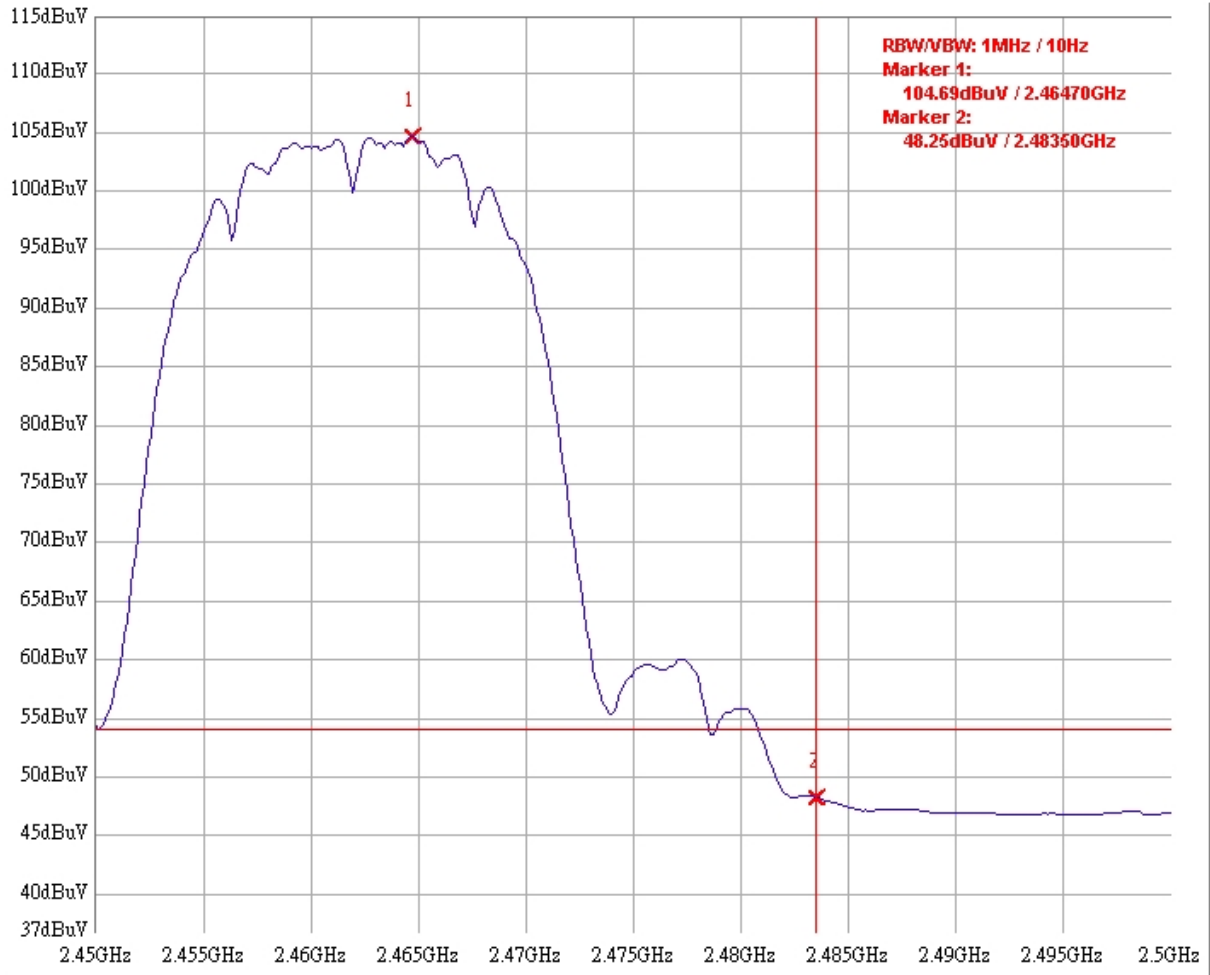


Test Mode: 802.11b mode CH11 PK



bandedge
11b ch11
PK

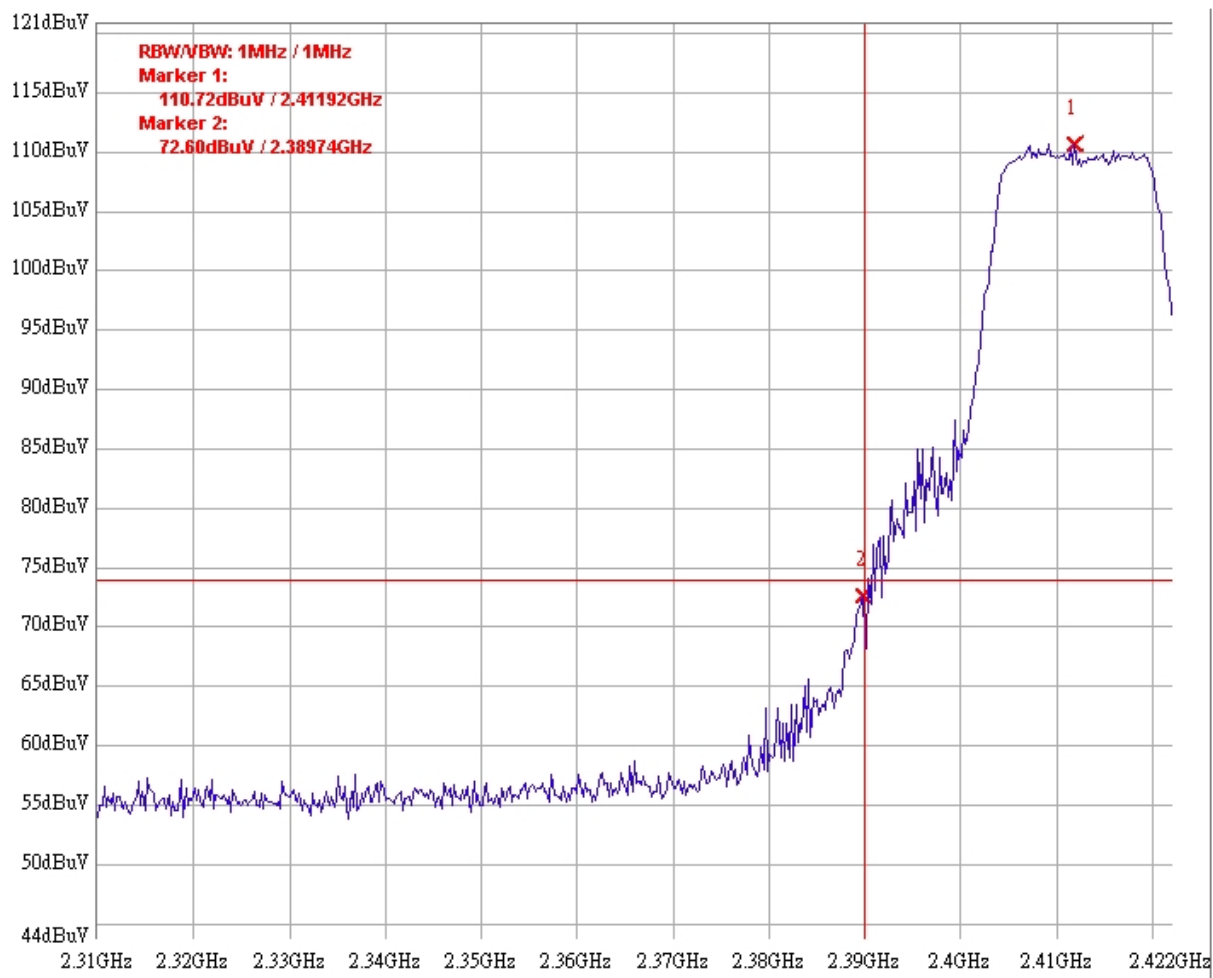
Test Mode: 802.11b mode CH11 AV



bandedge
11b ch11
AV



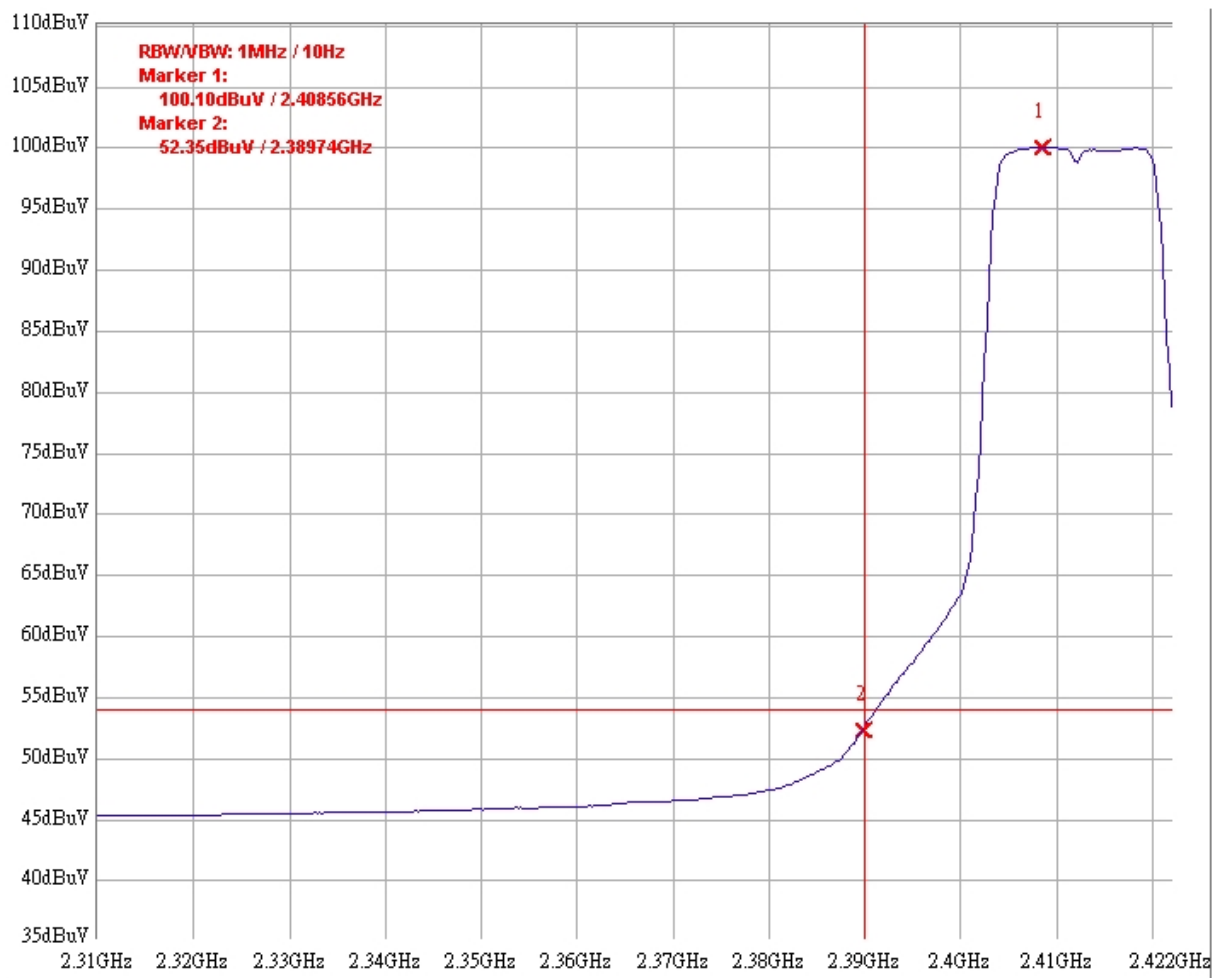
Test Mode: 802.11g mode CH1 PK



bandedge
11g chl
PK



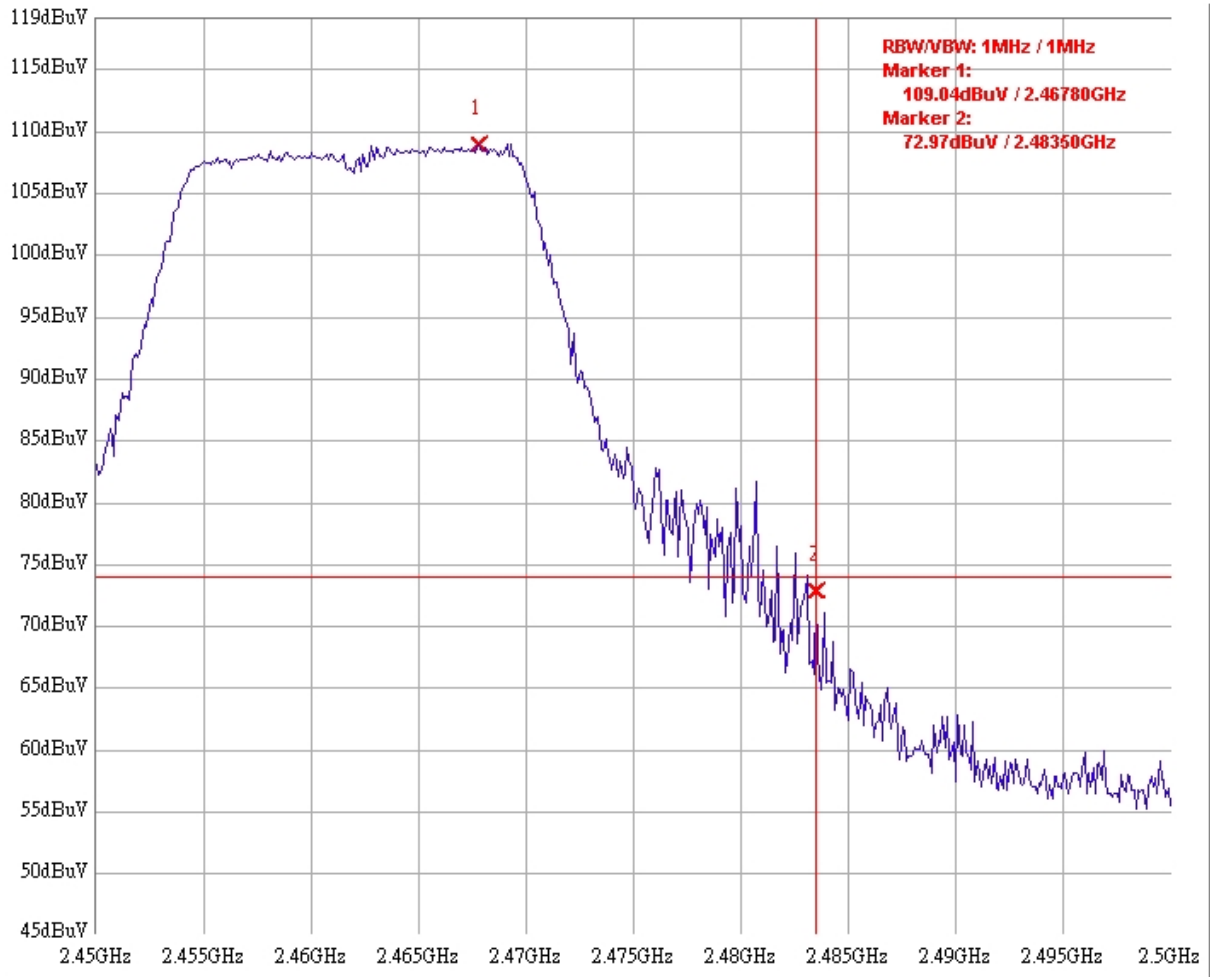
Test Mode: 802.11g mode CH1 AV



bandedge
11g chl
AV



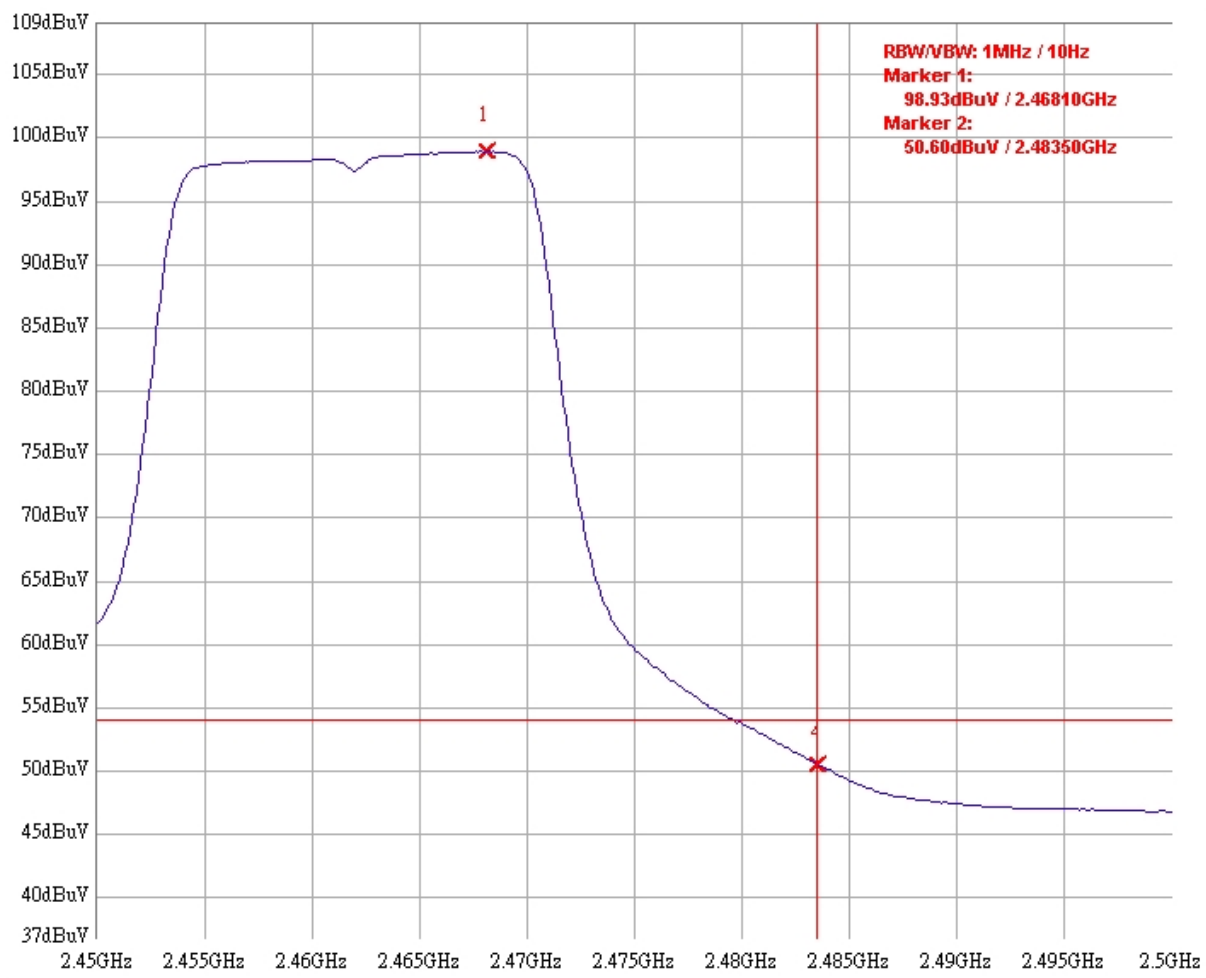
Test Mode: 802.11g mode CH11 PK



bandedge
11g ch11
PK



Test Mode: 802.11g mode CH11 AV



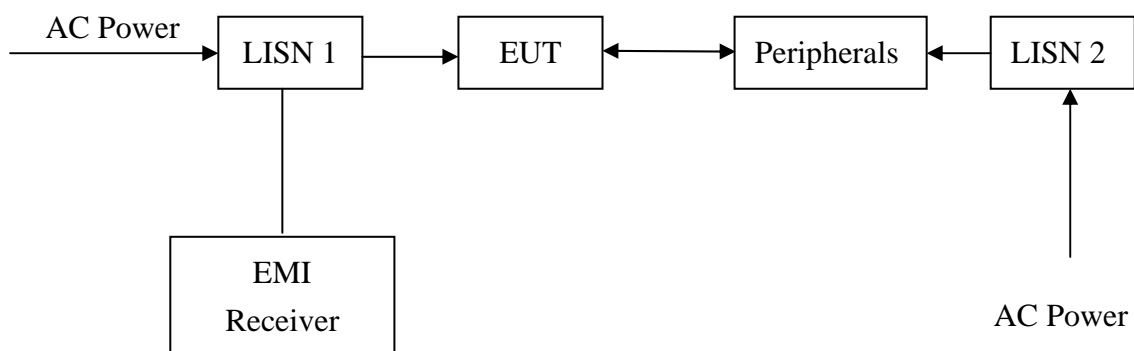
bandedge
11g ch11
AV

9. Power Line Conducted Emission test §FCC 15.207

9.1 Operating environment

Temperature: 23 °C
 Relative Humidity: 51 %
 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.



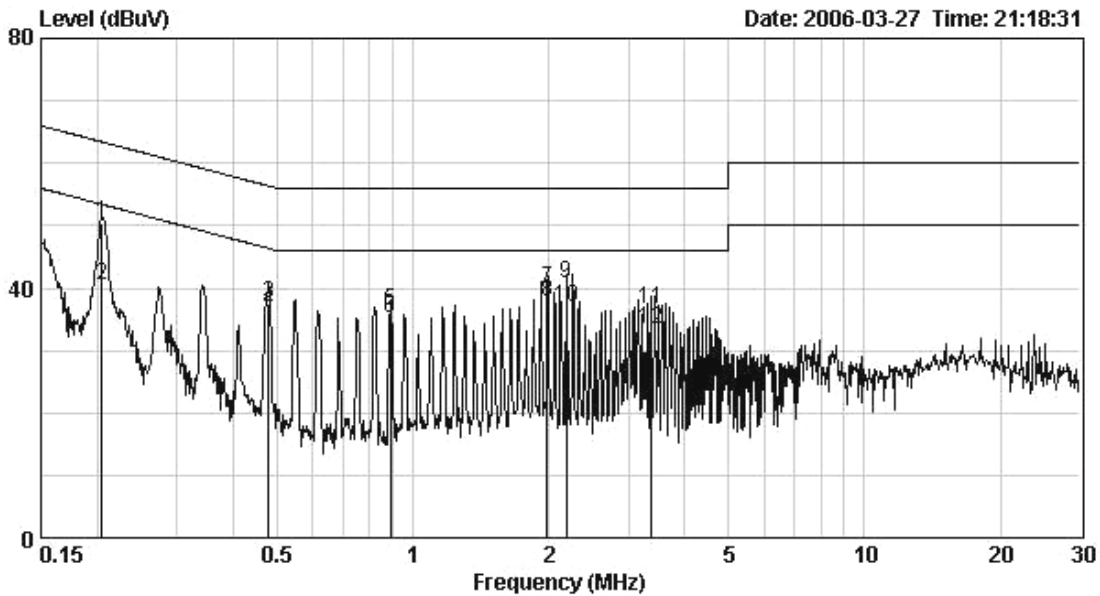
9.5 Power Line Conducted Emission test data

Phase: Line
 Model No.: 3100-4g v2
 Test Condition: Normal operating mode

Frequency (MHz)	Corr. Factor (dB)	Level Qp (dBuV)	Limit Qp (dBuV)	Level AV (dBuV)	Limit Av (dBuV)	Margin (dB)	
						Qp	Av
0.205	0.10	50.32	63.41	40.30	53.41	-13.09	-13.11
0.480	0.10	37.57	56.35	36.39	46.35	-18.78	-9.96
0.890	0.10	36.37	56.00	35.03	46.00	-19.63	-10.97
1.985	0.10	39.74	56.00	37.76	46.00	-16.26	-8.24
2.189	0.11	40.74	56.00	36.90	46.00	-15.26	-9.10
3.354	0.17	36.49	56.00	33.29	46.00	-19.51	-12.71

Remark:

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





Phase: Neutral
 Model No.: 3100-4g v2
 Test Condition: Normal operating mode

Frequency (MHz)	Corr. Factor (dB)	Level Qp (dBuV)	Limit Qp (dBuV)	Level AV (dBuV)	Limit Av (dBuV)	Margin (dB)	
						Qp	Av
0.205	0.10	50.02	63.40	41.07	53.40	-13.38	-12.33
0.479	0.10	34.23	56.35	32.03	46.35	-22.12	-14.32
0.959	0.10	35.22	56.00	33.56	46.00	-20.78	-12.44
1.301	0.10	35.90	56.00	34.18	46.00	-20.10	-11.82
1.985	0.10	37.49	56.00	34.48	46.00	-18.51	-11.52
2.260	0.11	40.49	56.00	37.61	46.00	-15.51	-8.39

Remark:

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

