

EMC TEST REPORT

Report No. : EME-070488

Model No. :SAG3020

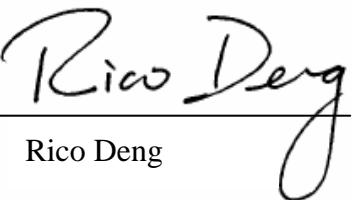
Issued Date : Jun. 28, 2007

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Project Engineer


Rico Deng

Reviewed By

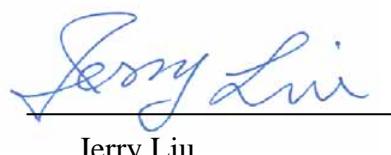

Jerry Liu

Table of Contents

Summary of Tests	4
1. General information	5
1.1 Identification of the EUT	5
1.2 Additional information about the EUT.....	5
1.3 Antenna description.....	6
1.4 Peripherals equipment	6
2. Test specifications	7
2.1 Test standard.....	7
2.2 Operation mode	7
2.3 Test equipment	8
3. Minimum 6dB Bandwidth test	9
3.1 Operating environment.....	9
3.2 Test setup & procedure	9
3.3 Measured data of Minimum 6dB Bandwidth test results	9
4. Maximum Output Power test	16
4.1 Operating environment.....	16
4.2 Test setup & procedure	16
4.3 Measured data of Maximum Output Power test results	16
5. RF Antenna Conducted Spurious test.....	17
5.1 Operating environment.....	17
5.2 Test setup & procedure	17
5.3 Measured data of the highest RF Antenna Conducted Spurious test result	17
6. Radiated Emission test	36
6.1 Operating environment.....	36
6.2 Test setup & procedure	36
6.3 Emission limits	37
6.4 Radiated spurious emission test data.....	38
6.4.1 Measurement results: frequencies equal to or less than 1 GHz.....	38
6.4.2 Measurement results: frequency above 1GHz	39
7. Power Spectrum Density test	45
7.1 Operating environment.....	45
7.2 Test setup & procedure	45

7.3 Measured data of Power Spectrum Density test results	45
8. Emission on the band edge.....	52
8.1 Operating environment.....	52
8.2 Test setup & procedure.....	52
8.3 Test Result	53
8.3.1 Conducted Method	54
9. Power Line Conducted Emission test §FCC 15.207	62
9.1 Operating environment.....	62
9.2 Test setup & procedure	62
9.3 Emission limit	63
9.4 Uncertainty of Conducted Emission	63
9.5 Power Line Conducted Emission test data.....	64

Summary of Tests

802.11b/g wireless card -Model: SAG3020
FCC ID: SFM-SAG3020

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 : SmartAnt Telecom Co., Ltd
Product : 802.11b/g wireless card
Model No. : SAG3020
FCC ID. : SFM-SAG3020
Frequency Range : 2412MHz ~ 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 : DC 5V
Power Cord : N/A
Sample Received : May 22, 2007
Test Date(s) : May 28, 2007 ~ Jun. 08, 2007

A FCC DoC report has been generated for the client.

1.2 Additional information about the EUT

The EUT is an 802.11b/g wireless card, and was defined as radio and telecommunications terminal equipment.

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: 5dBi max

Antenna Type: PCB Printed antenna

Connector Type: N/A

1.4 Peripherals equipment

Peripherals	Manufacturer	Product No.	Serial No.	FCC ID
Notebook PC	IBM	1860	L3WM796	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 5Vdc from Notebook PC and it was running in operating mode.

Plug the EUT into Notebook PC via USB interface, then turn on the Notebook PC power and run the test program “ZD1211B EVL Tool” under windows OS, which provide by manufacturer.

The EUT was transmitted continuously during the test.

With individual verifying, the maximum output power was found out 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	04/17/2008
Spectrum Analyzer	Rohde & Schwarz	9kHz~30GHz	FSP 30	EC353	07/24/2007
Spectrum Analyzer	Rohde & Schwarz	20Hz~40GHz	FSEK 30	EC365	11/01/2007
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	02/11/2008
Wideband Peak Power Meter/ Sensor	Anritsu	100MHz~18GHz	ML2497A/ MA2491A	EC396	11/10/2007
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	01/13/2008

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

3. Minimum 6dB Bandwidth test

3.1 Operating environment

Temperature: 23
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

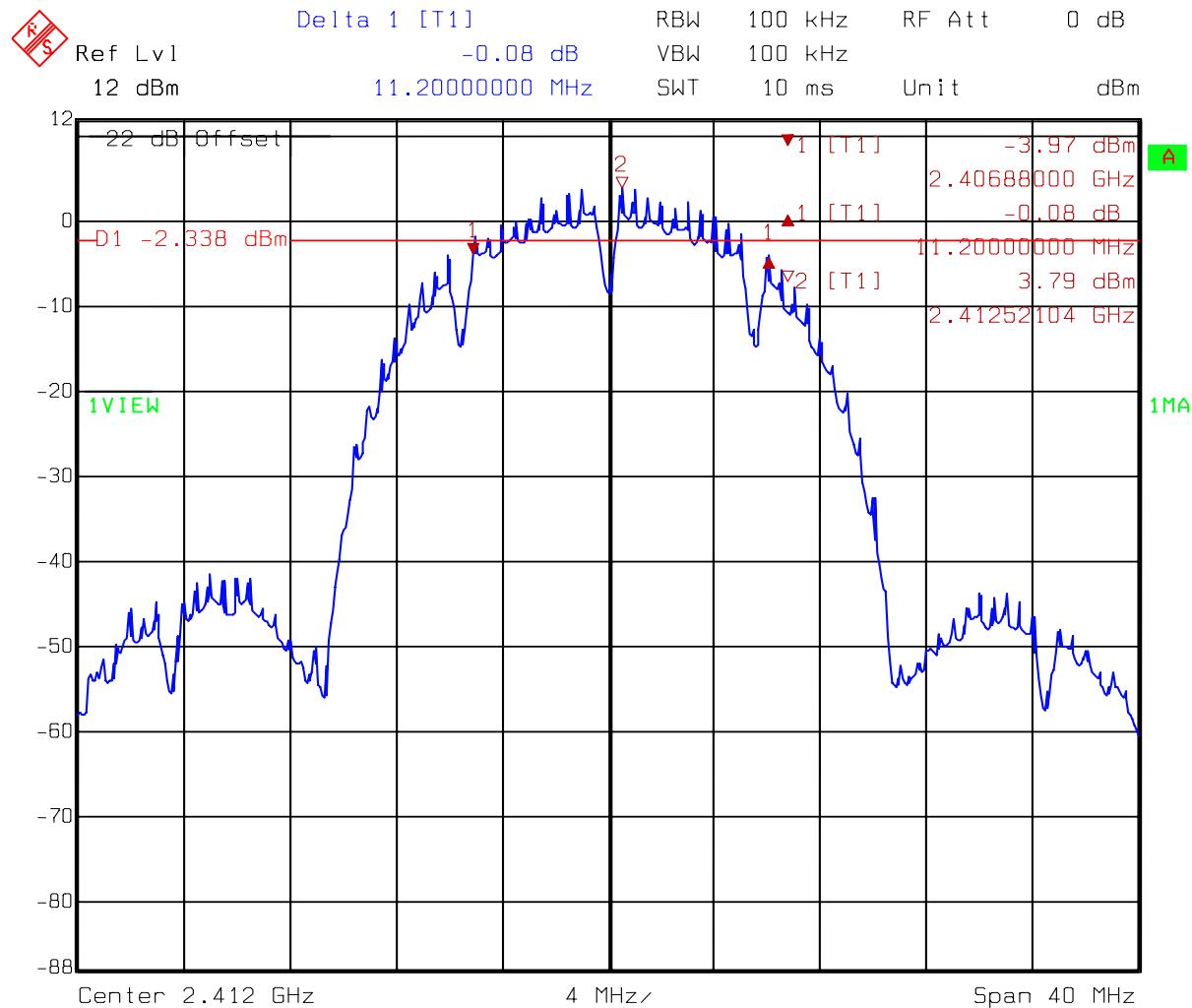
Test mode: 802.11b normal mode

Channel	Frequency (MHz)	Bandwidth (MHz)	Limit
1 (lowest)	2412	11.20	> 500kHz
6 (middle)	2437	11.12	> 500kHz
11 (highest)	2462	10.24	> 500kHz

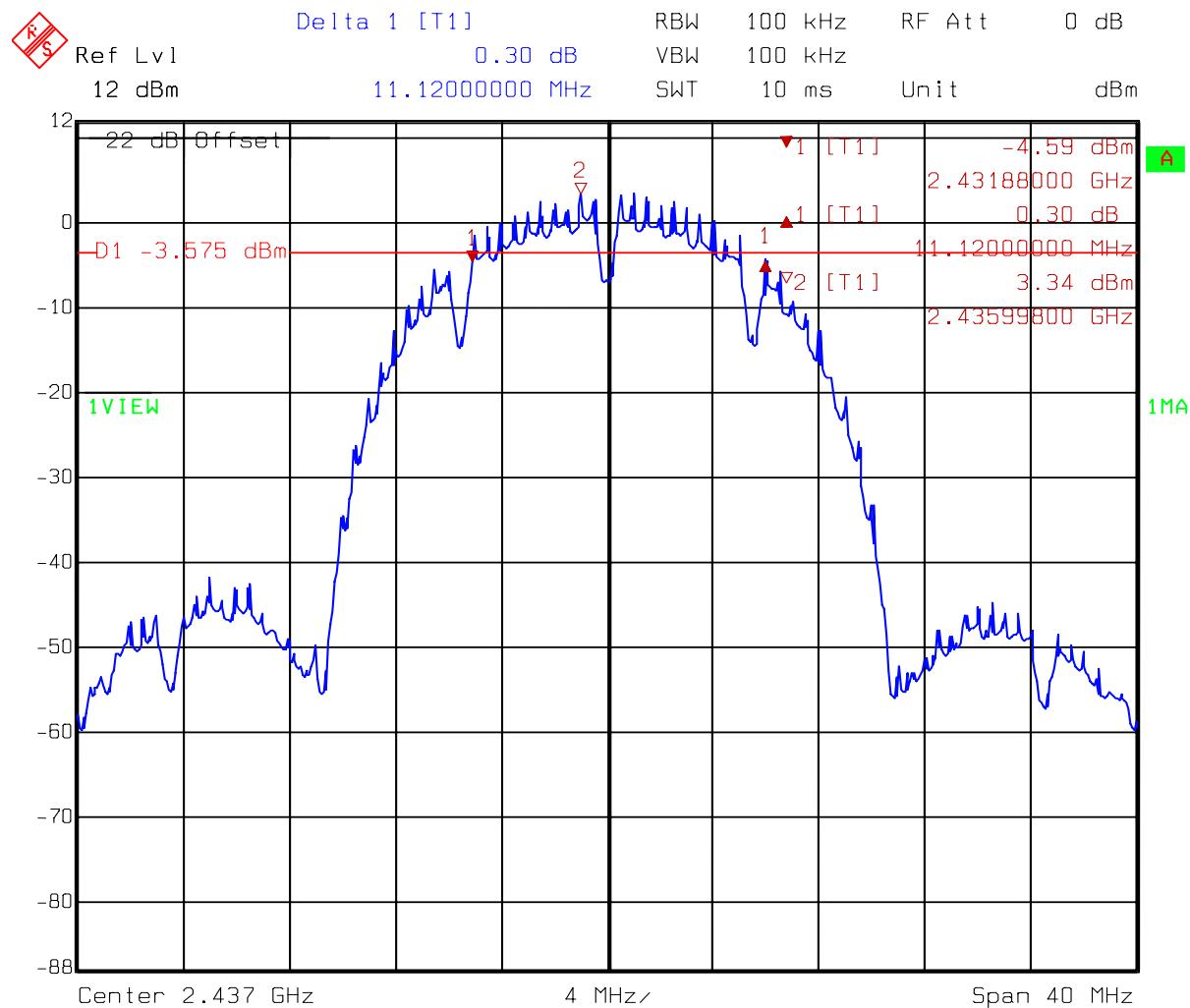
Test mode: 802.11g normal mode

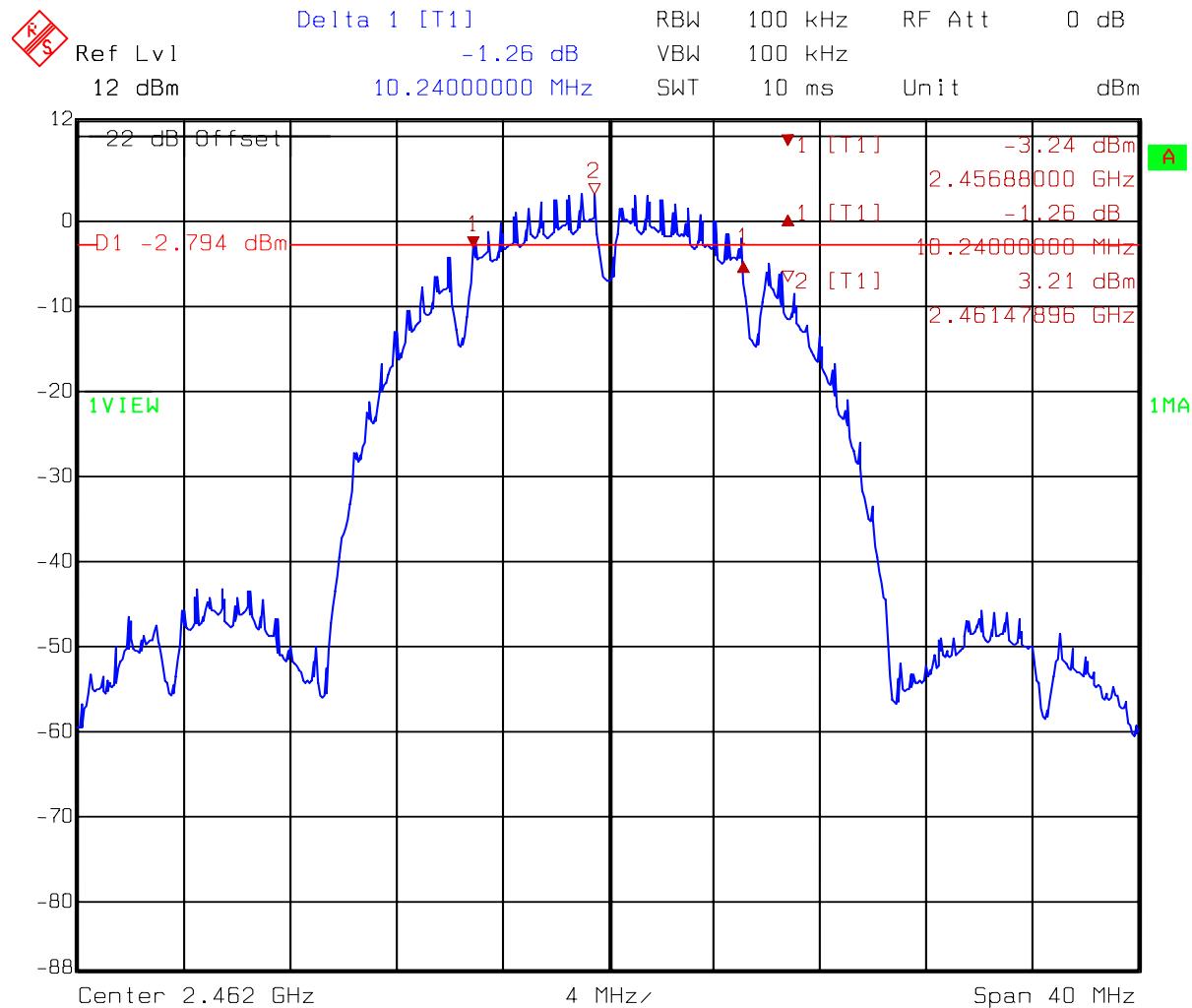
Channel	Frequency (MHz)	Bandwidth (MHz)	Limit
1 (lowest)	2412	16.64	> 500kHz
6 (middle)	2437	16.72	> 500kHz
11 (highest)	2462	16.72	> 500kHz

Please see the plot below.

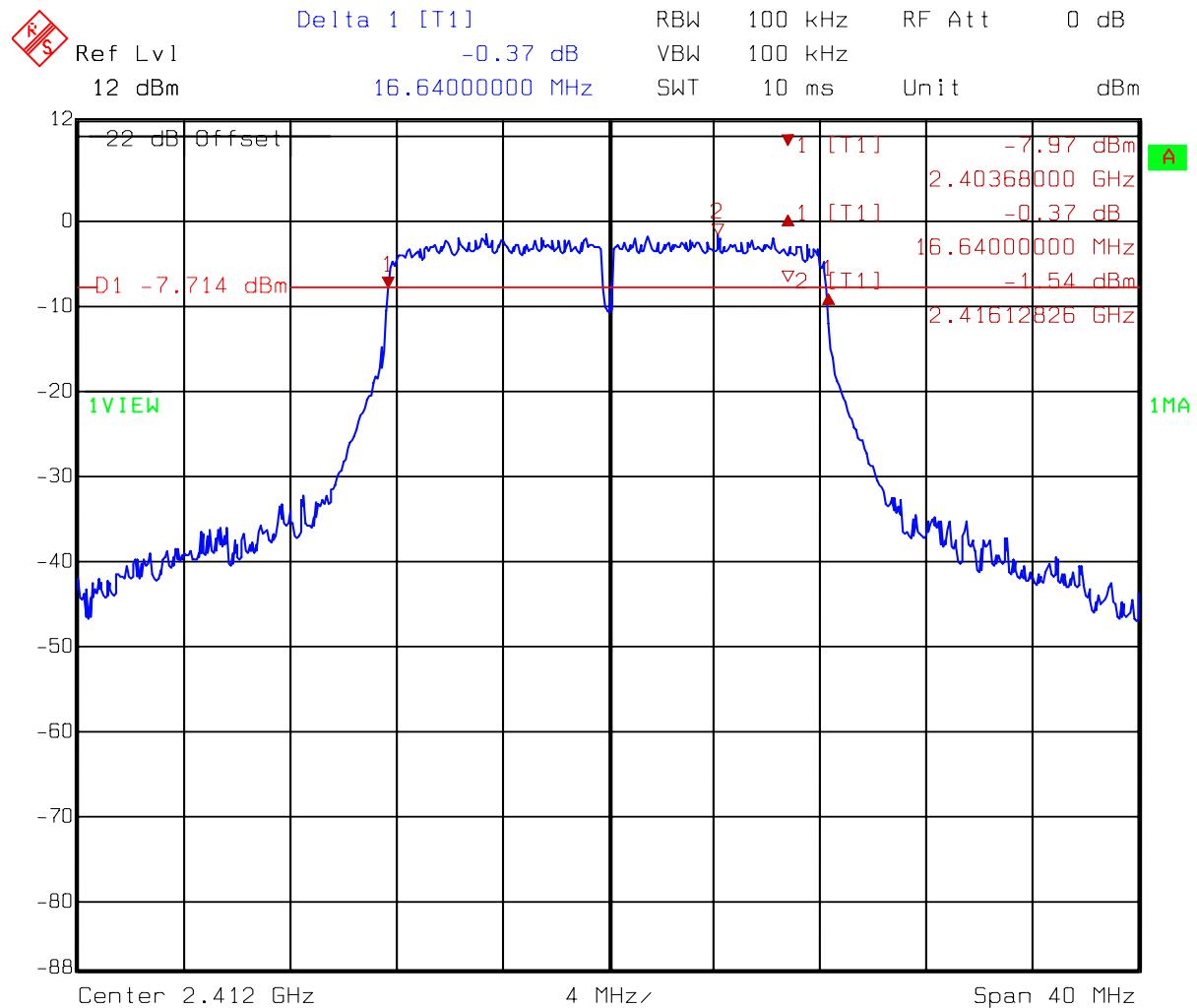
Test Mode: 802.11b mode (ch1)

Title: 6dB Band-Width
Comment A: CH 1 at 802.11b mode
Date: 28.MAY 2007 10:51:36

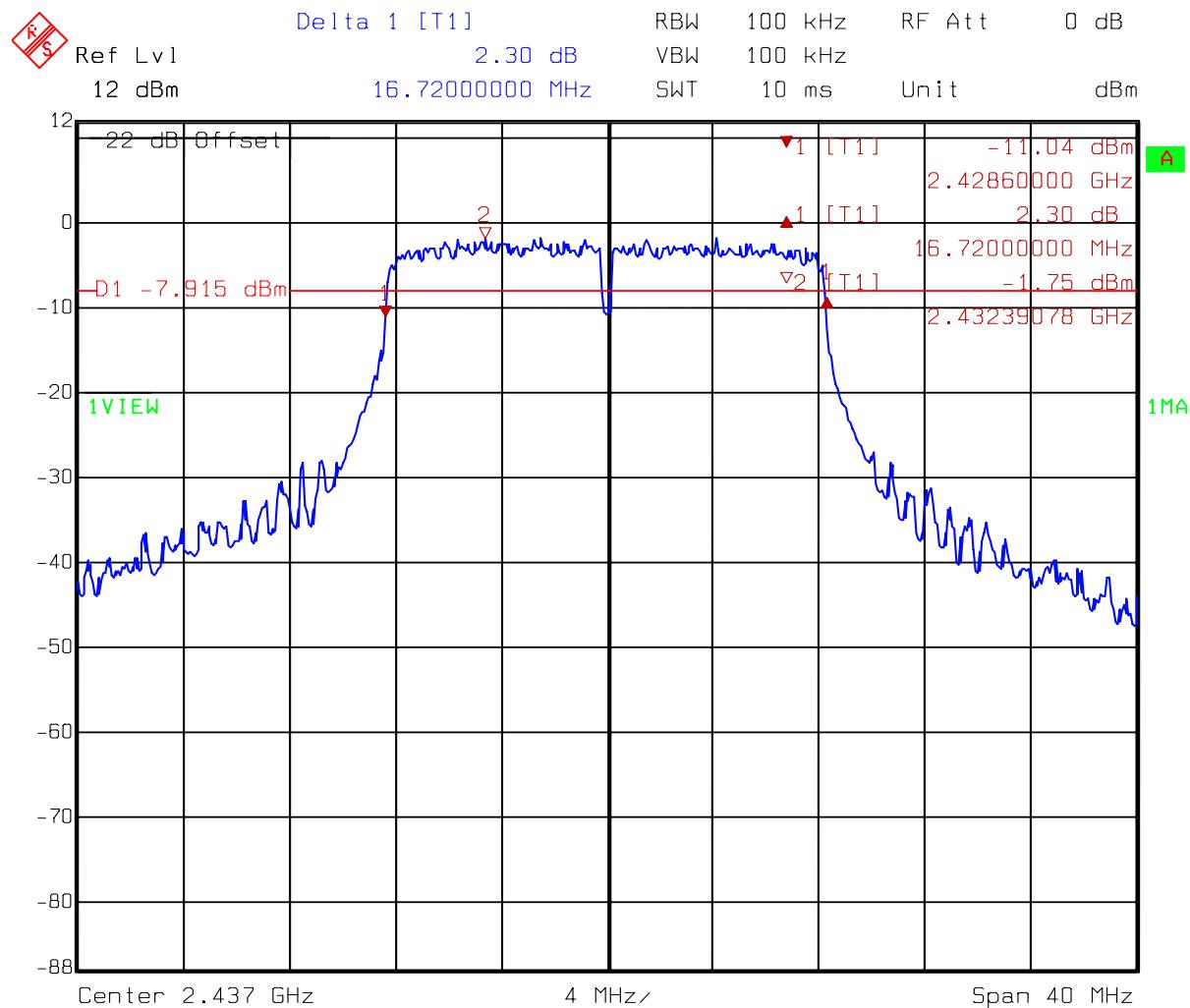
Test Mode: 802.11b mode (ch6)

Test Mode: 802.11b mode (ch11)

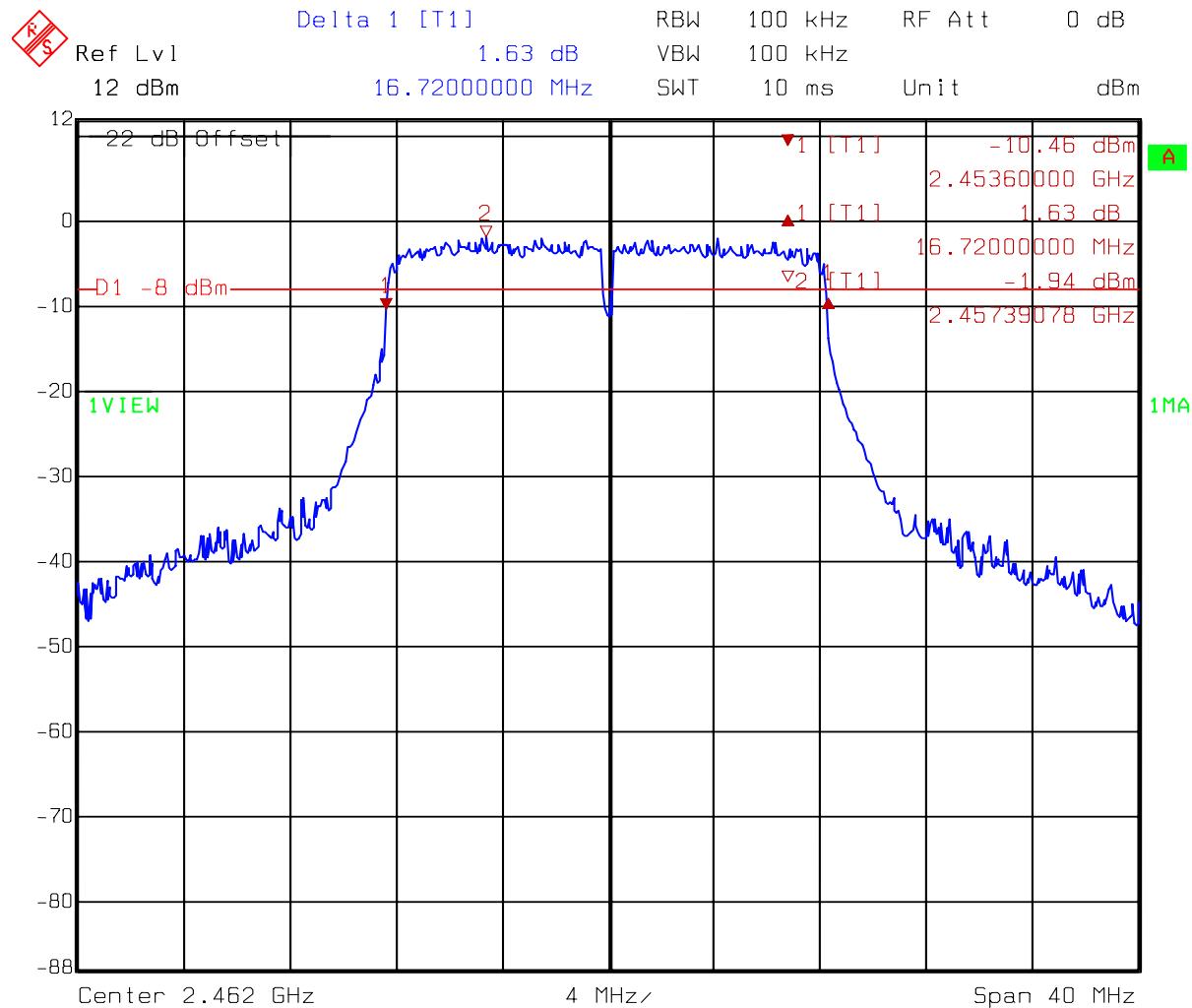
Test Mode: 802.11g mode (ch1)



Title: 6dB Band-Width
 Comment A: CH 1 at 802.11g mode
 Date: 28.MAY 2007 11:08:27

Test Mode: 802.11g mode (ch6)

Title: 6dB Band-Width
Comment A: CH 6 at 802.11g mode
Date: 28.MAY 2007 11:05:32

Test Mode: 802.11g mode (ch11)

Title: 6dB Band-Width
Comment A: CH 11 at 802.11g mode
Date: 28.MAY 2007 11:02:22

4. Maximum Output Power test

4.1 Operating environment

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

4.2 Test setup & procedure

The power output per FCC §15.247(b) was measured on the EUT using a 50 ohm SMA cable connected to peak power meter via power sensor. Power was read directly and cable loss correction (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	13.72	15.76	37.67	1
6 (middle)	2437	2	13.70	15.73	37.41	1
11 (highest)	2462	2	13.75	15.74	37.50	1

Test Mode: 802.11g mode

Channel	Freq. (MHz)	C.L. (dB)	Reading (dBm)	Conducted Peak Output Power		Limit (W)
				(dBm)	(mW)	
1 (lowest)	2412	2	19.87	21.50	141.25	1
6 (middle)	2437	2	19.75	21.74	149.28	1
11 (highest)	2462	2	19.87	21.51	141.58	1

Remark:

Conducted Peak Output Power = Reading + C.L.

5. RF Antenna Conducted Spurious test

5.1 Operating environment

Temperature: 25
Relative Humidity: 58 %

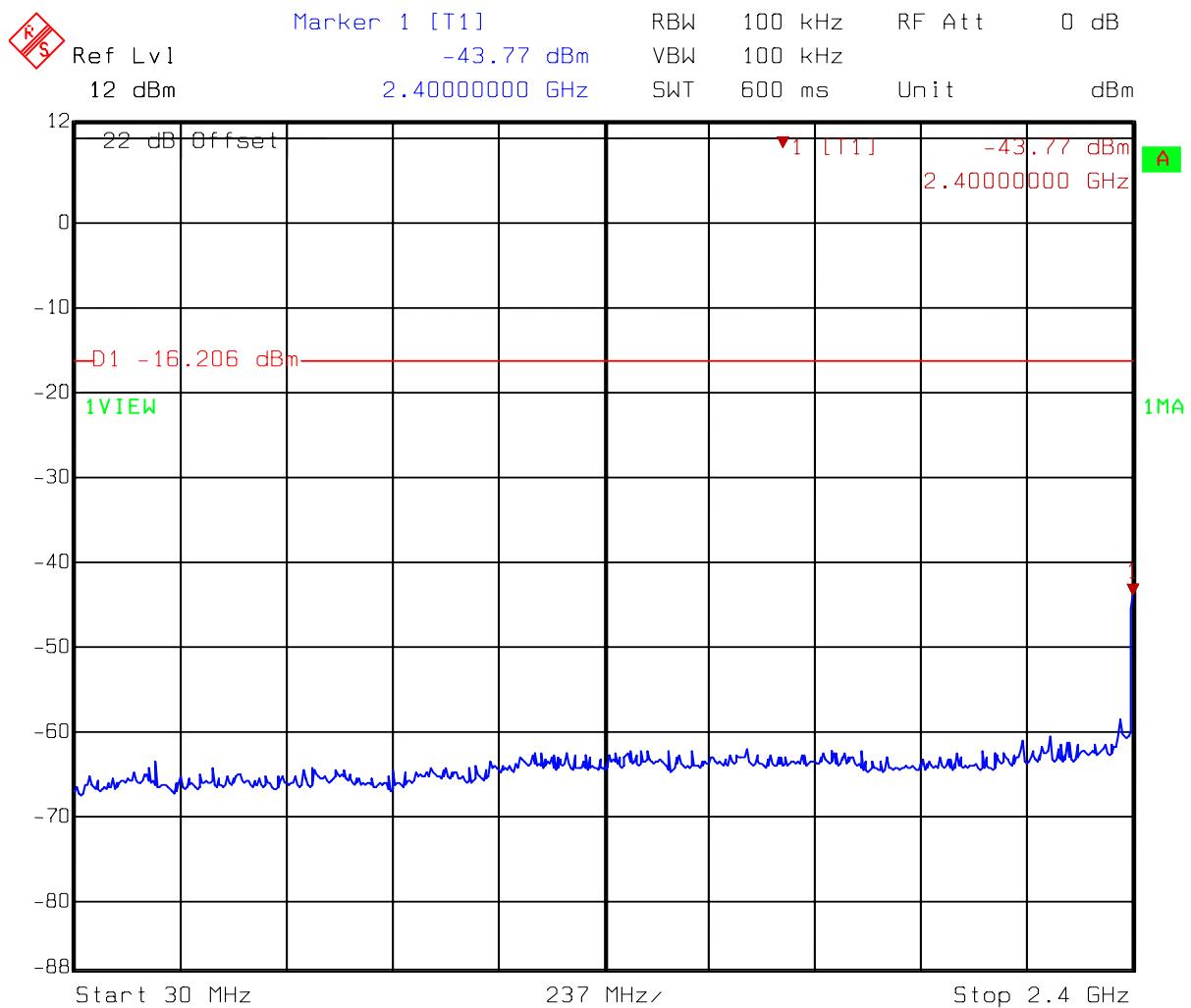
5.2 Test setup & procedure

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.

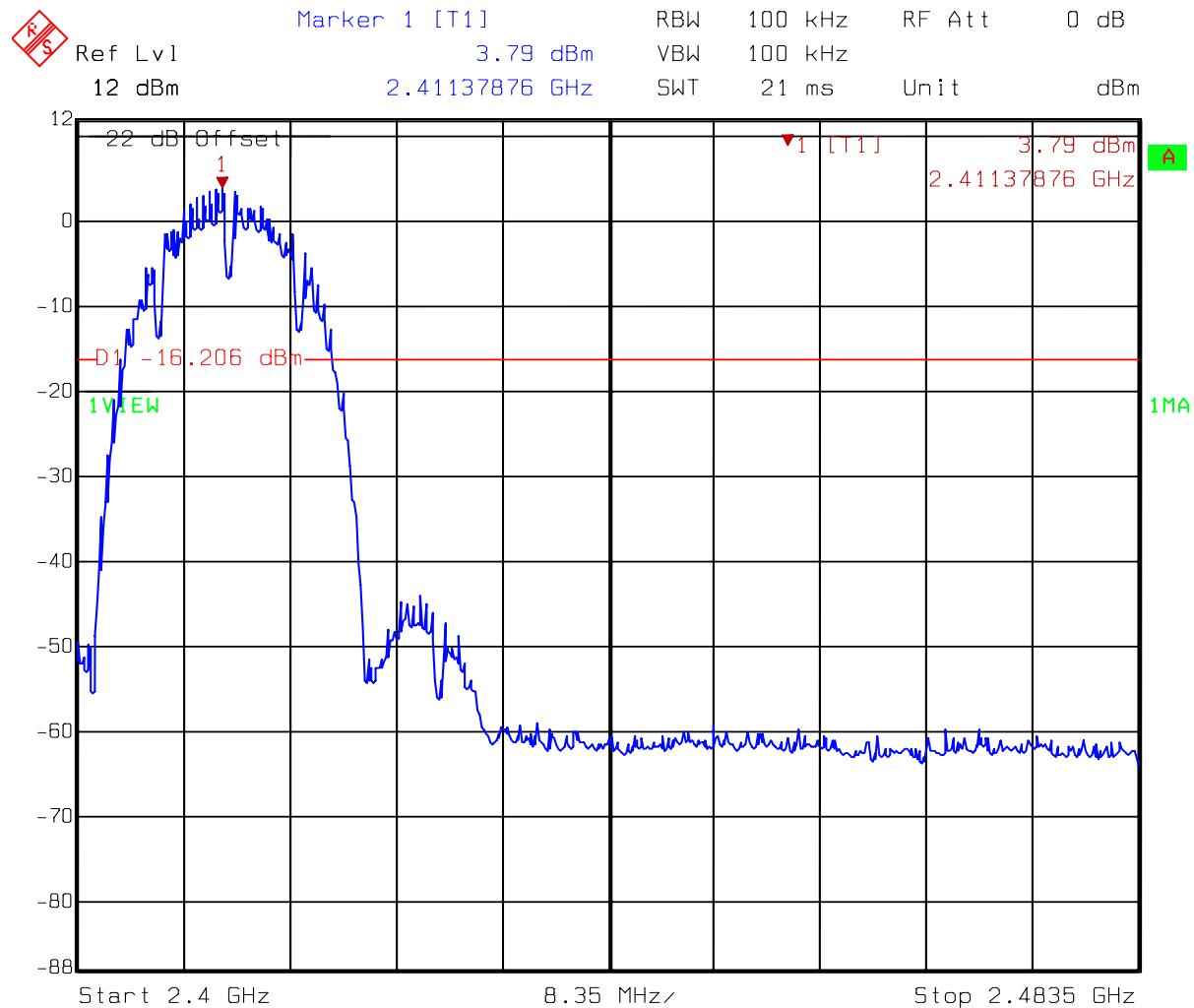
Harmonics and spurious noise must be at least 20dB down from the highest emission level within the authorized band as measured with a 100 kHz RBW. The table below is the results from the highest emission for each channel within the authorized band. This table was used to determine the spurious limits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

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

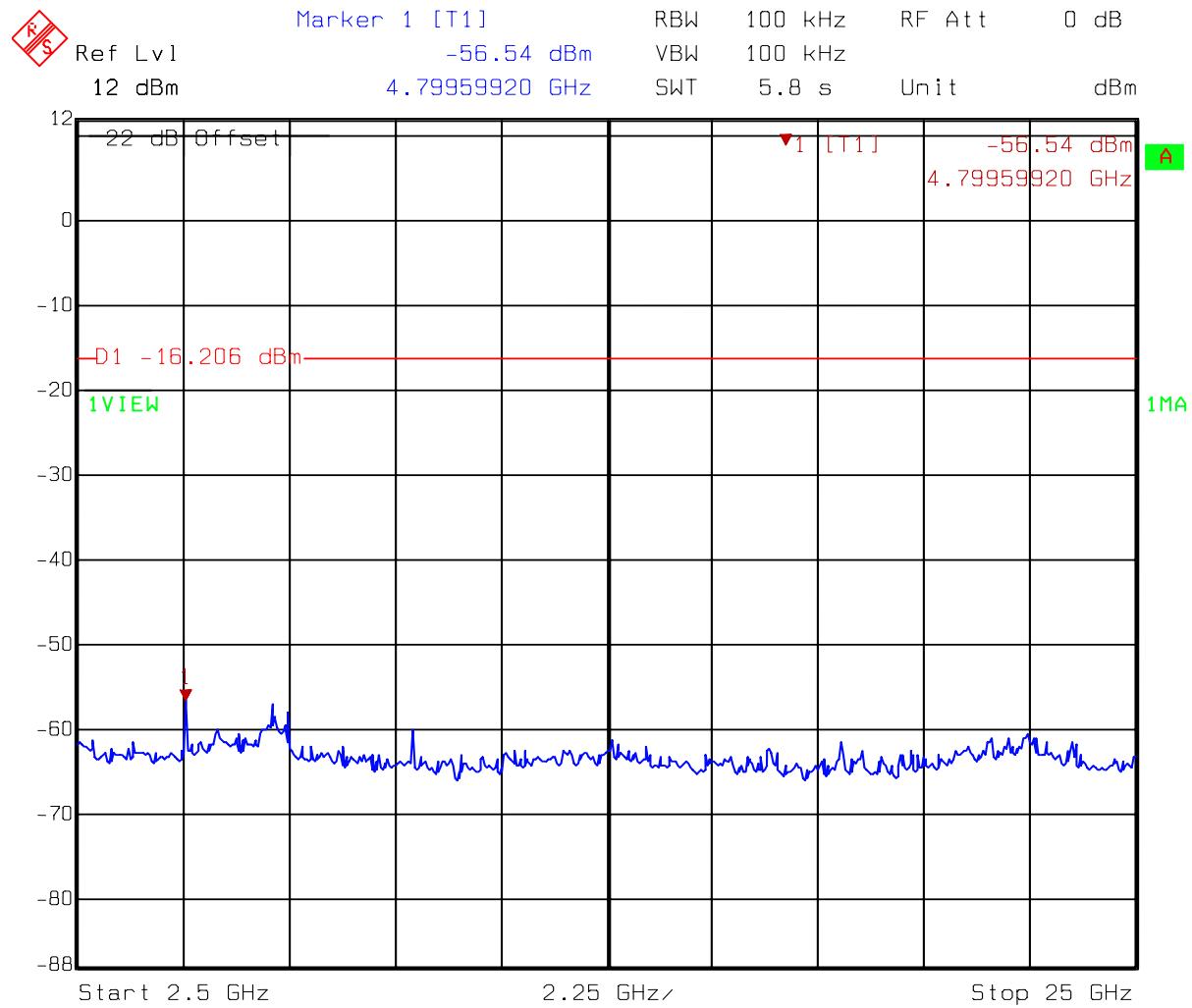
The test results please see the plot below.

Test Mode: 802.11b mode (ch1)

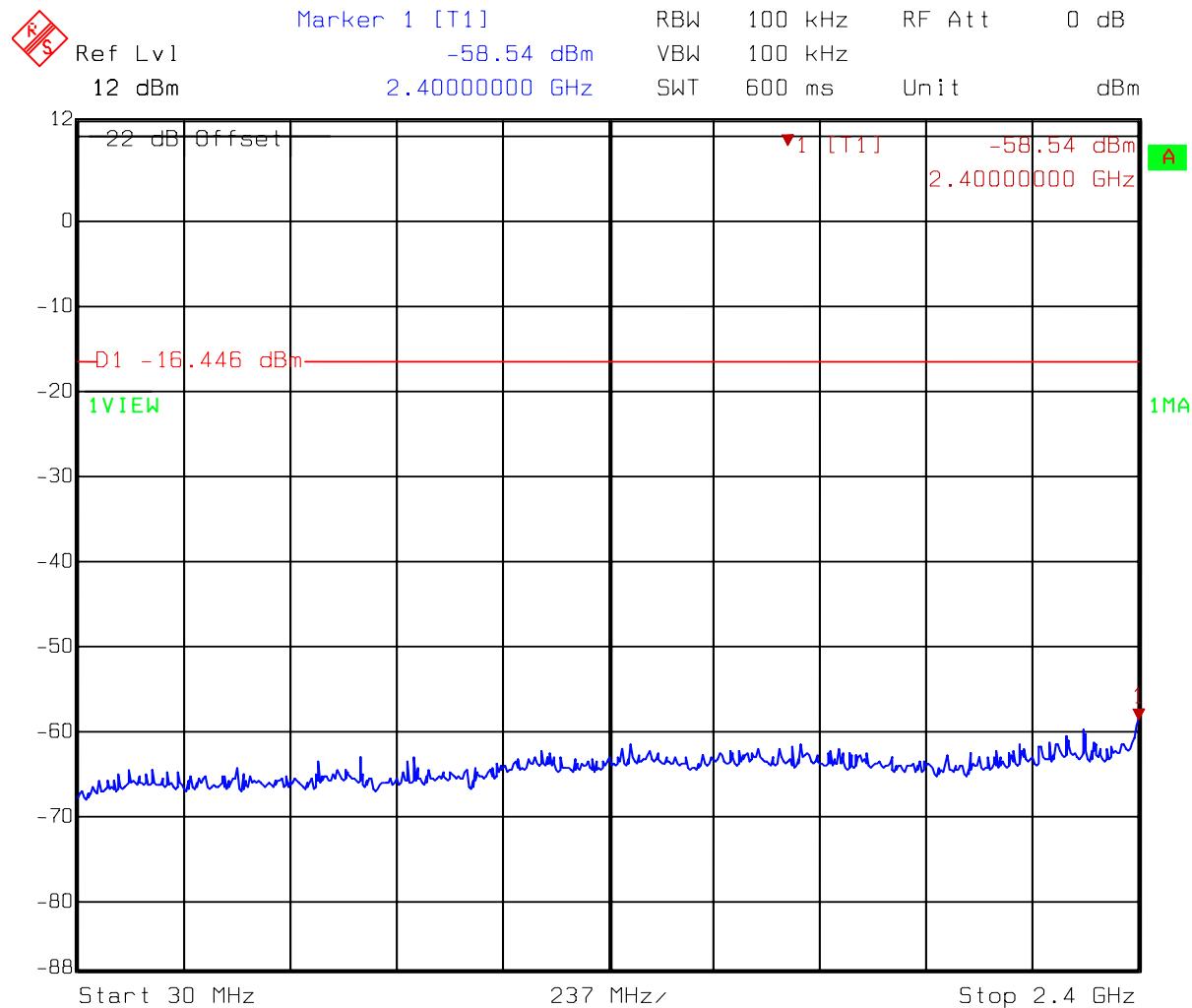
Title: Conductive-Spurious
Comment A: CH 1 at 802.11b mode 30MHz~2400MHz
Date: 28.MAY 2007 10:52:35

Test Mode: 802.11b mode (ch1)

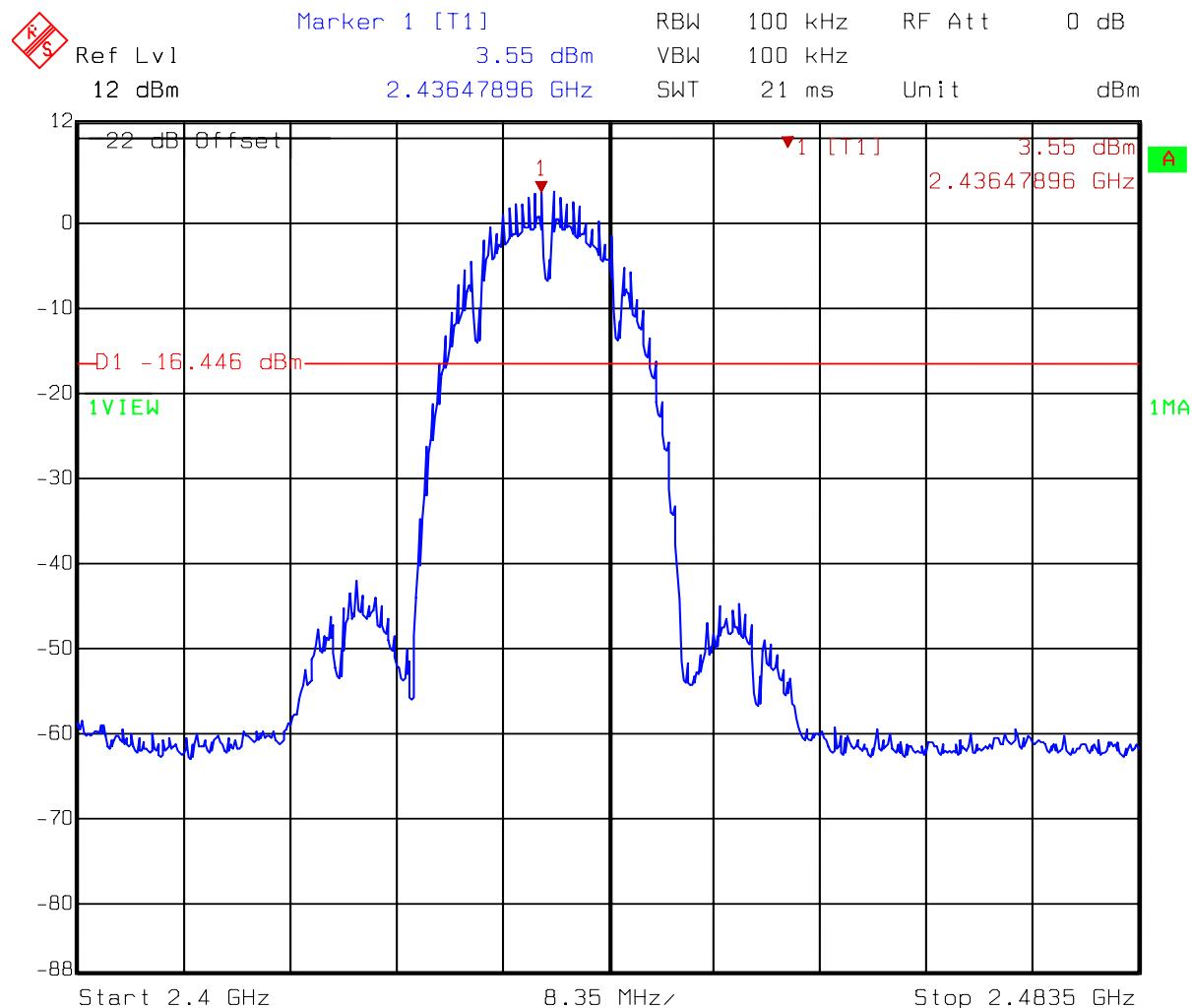
Title: Conductive-Spurious
Comment A: CH 1 at 802.11b mode 2400MHz~2483.5MHz
Date: 28.MAY 2007 10:52:13

Test Mode: 802.11b mode (ch1)

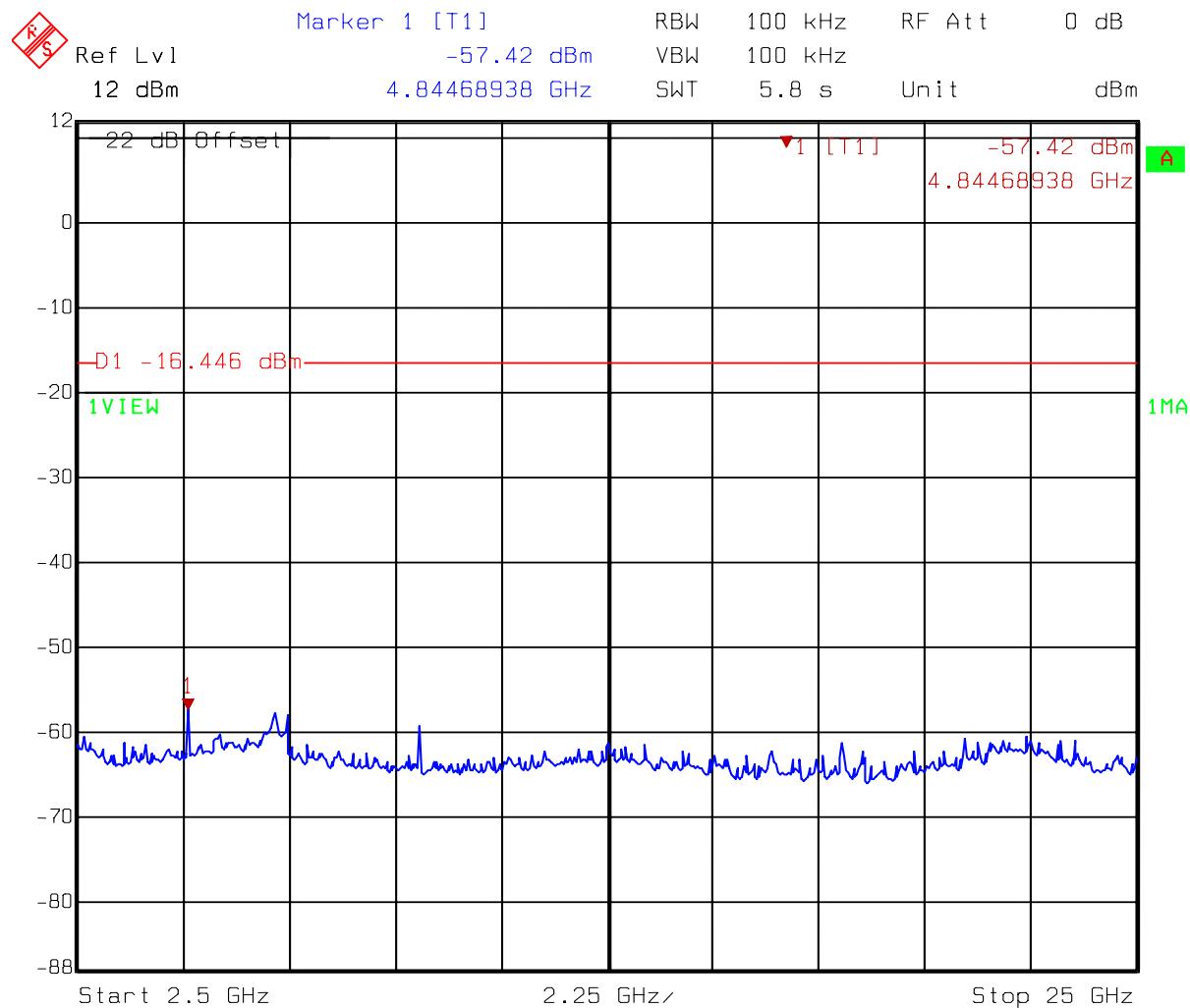
Title: Conductive-Spurious
Comment A: CH 1 at 802.11b mode 2483.5MHz~25GHz
Date: 28.MAY 2007 10:53:02

Test Mode: 802.11b mode (ch6)

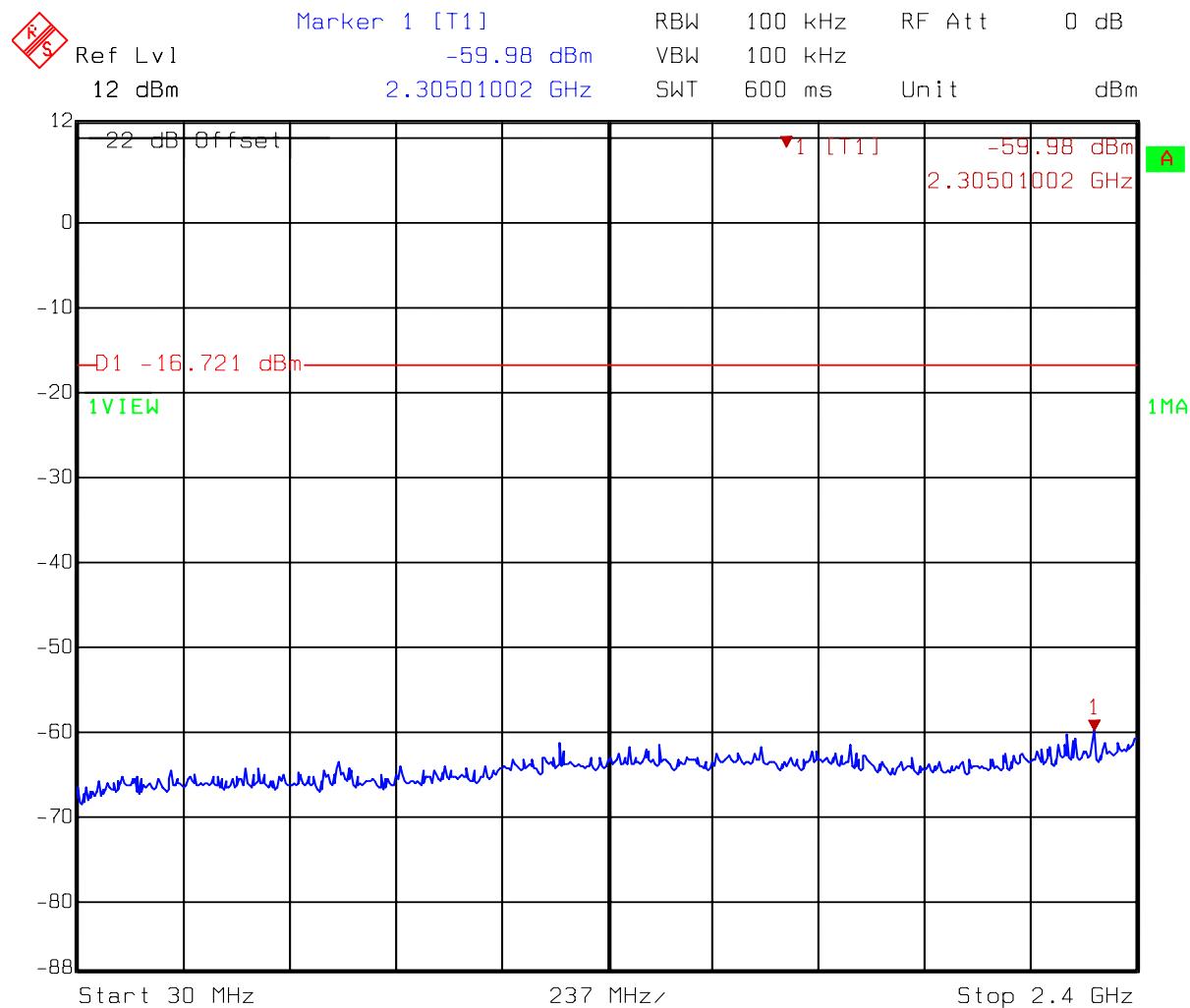
Title: Conductive-Spurious
Comment A: CH 6 at 802.11b mode 30MHz~2400MHz
Date: 28.MAY 2007 10:56:14

Test Mode: 802.11b mode (ch6)

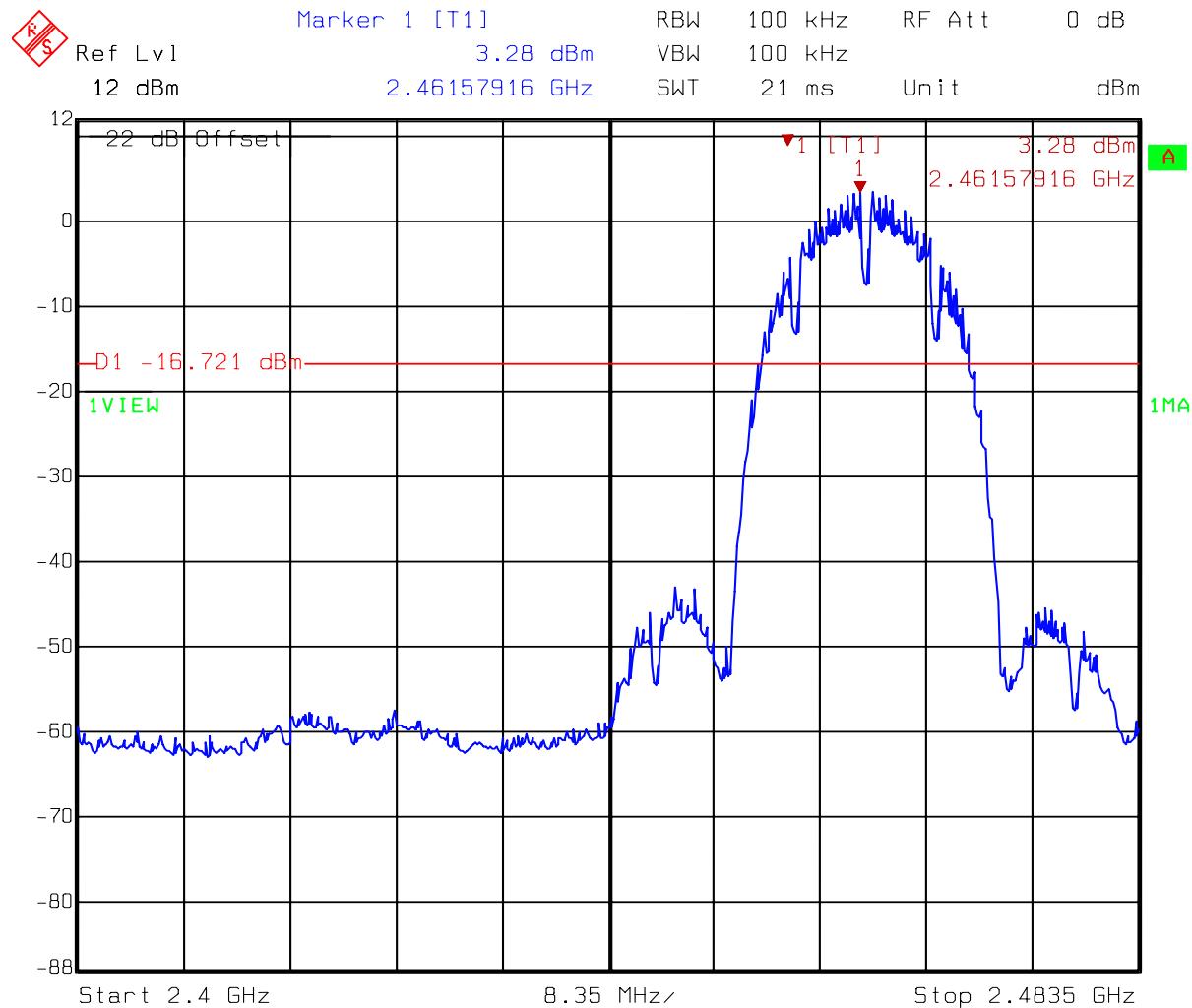
Title: Conductive-Spurious
Comment A: CH 6 at 802.11b mode 2400MHz~2483.5MHz
Date: 28.MAY 2007 10:55:53

Test Mode: 802.11b mode (ch6)

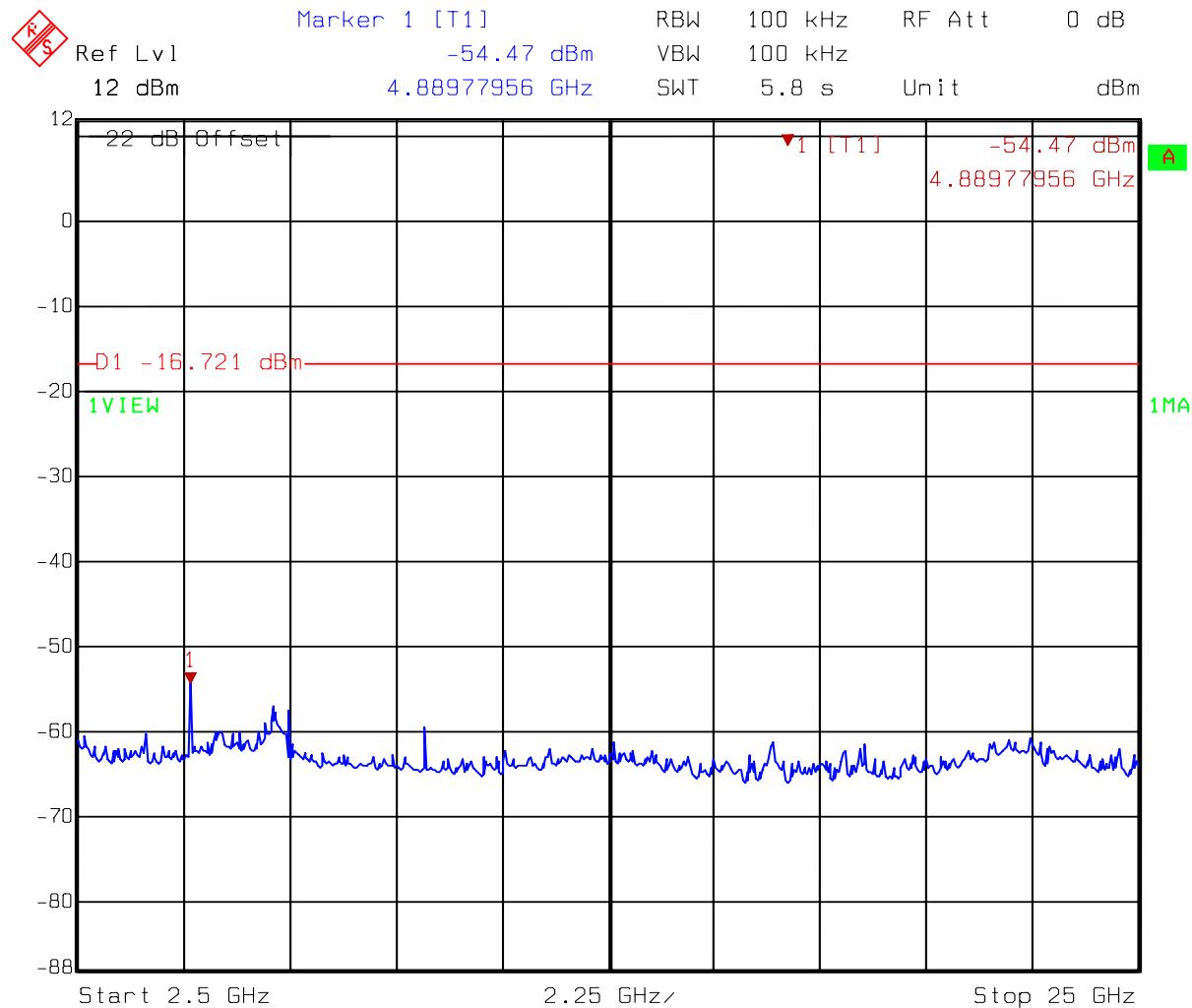
Title: Conductive-Spurious
Comment A: CH 6 at 802.11b mode 2483.5MHz~25GHz
Date: 28.MAY 2007 10:56:42

Test Mode: 802.11b mode (ch11)

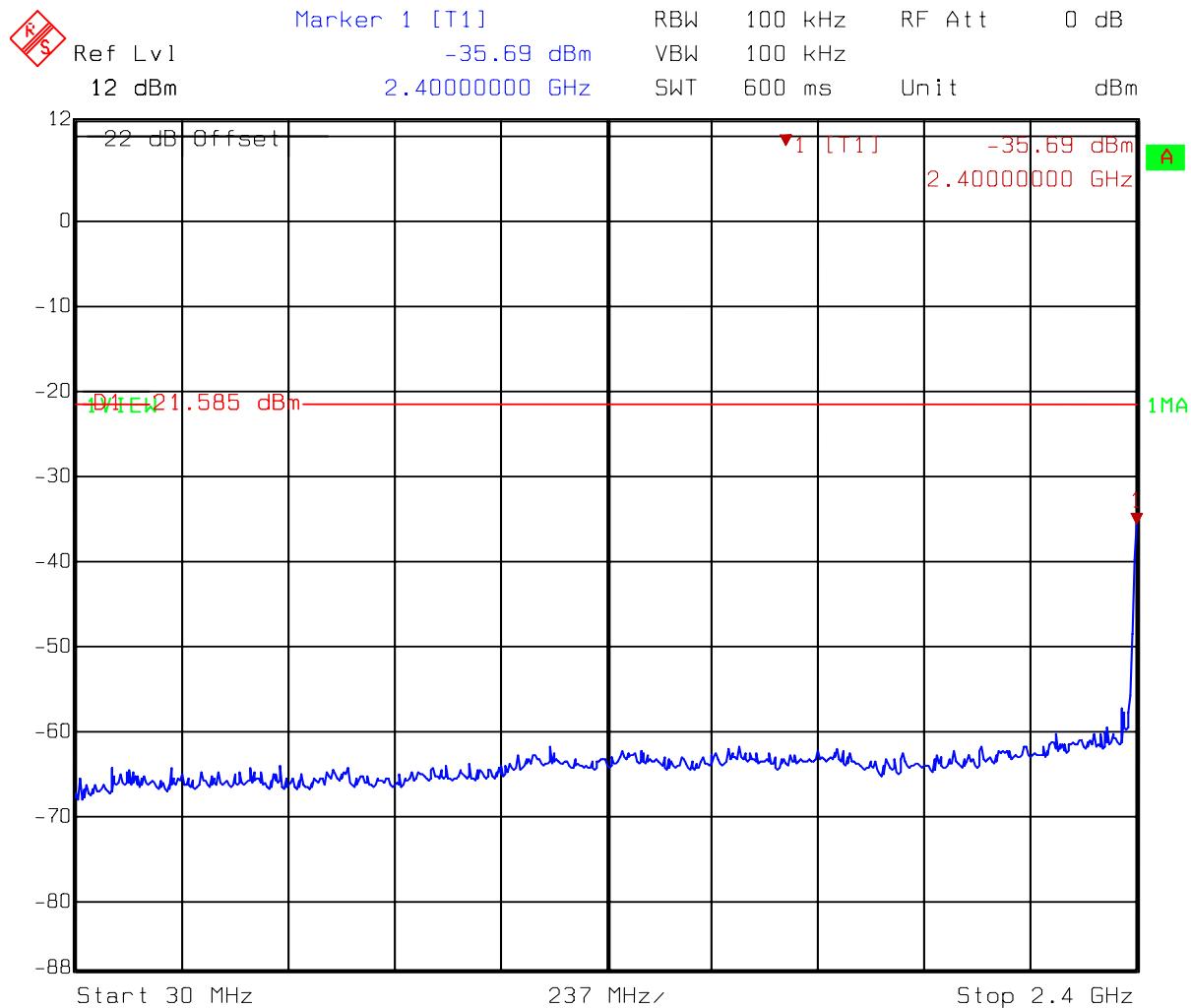
Title: Conductive-Spurious
Comment A: CH 11 at 802.11b mode 30MHz~2400MHz
Date: 28.MAY 2007 10:59:55

Test Mode: 802.11b mode (ch11)

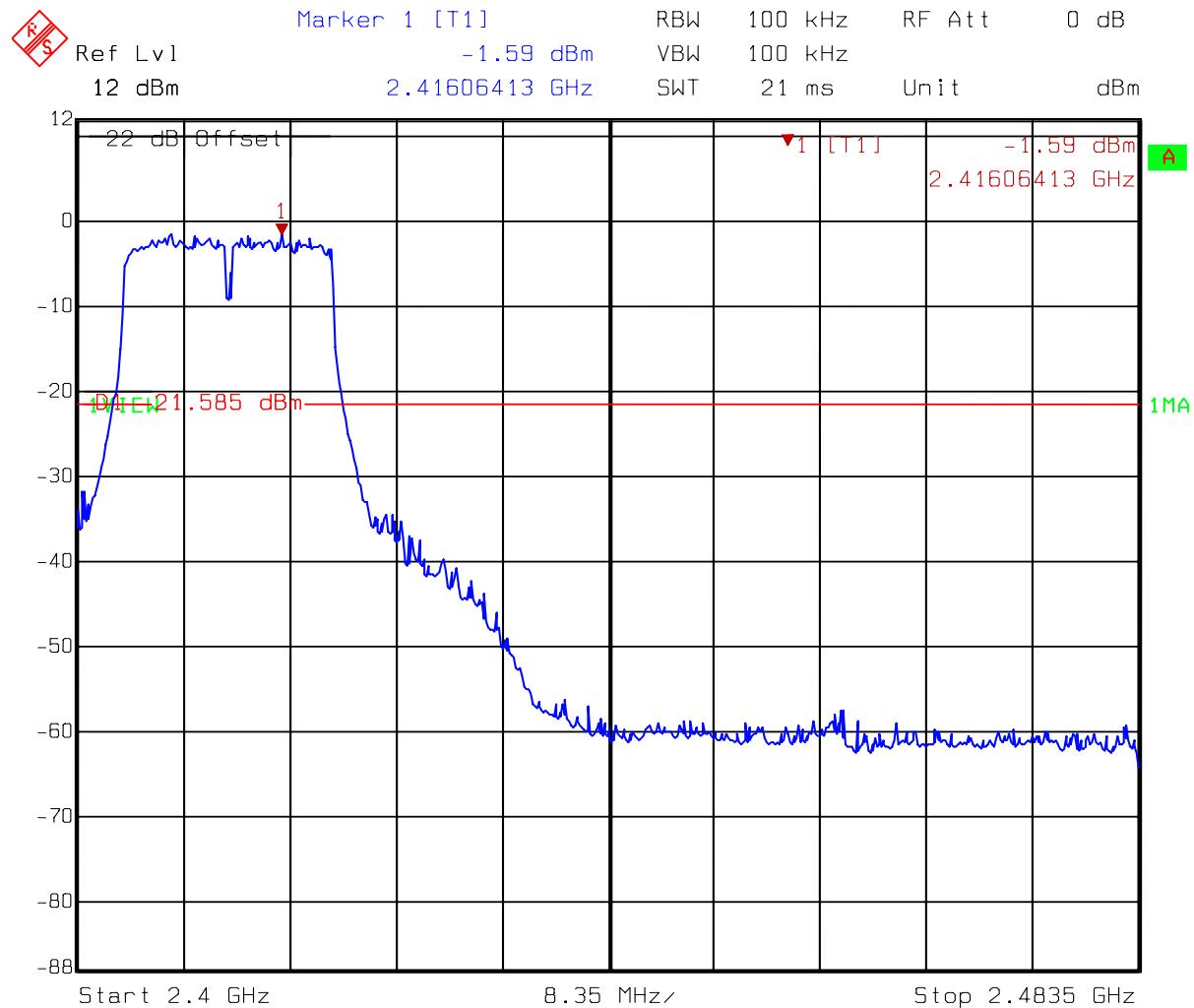
Title: Conductive-Spurious
Comment A: CH 11 at 802.11b mode 2400MHz~2483.5MHz
Date: 28.MAY 2007 10:59:31

Test Mode: 802.11b mode (ch11)

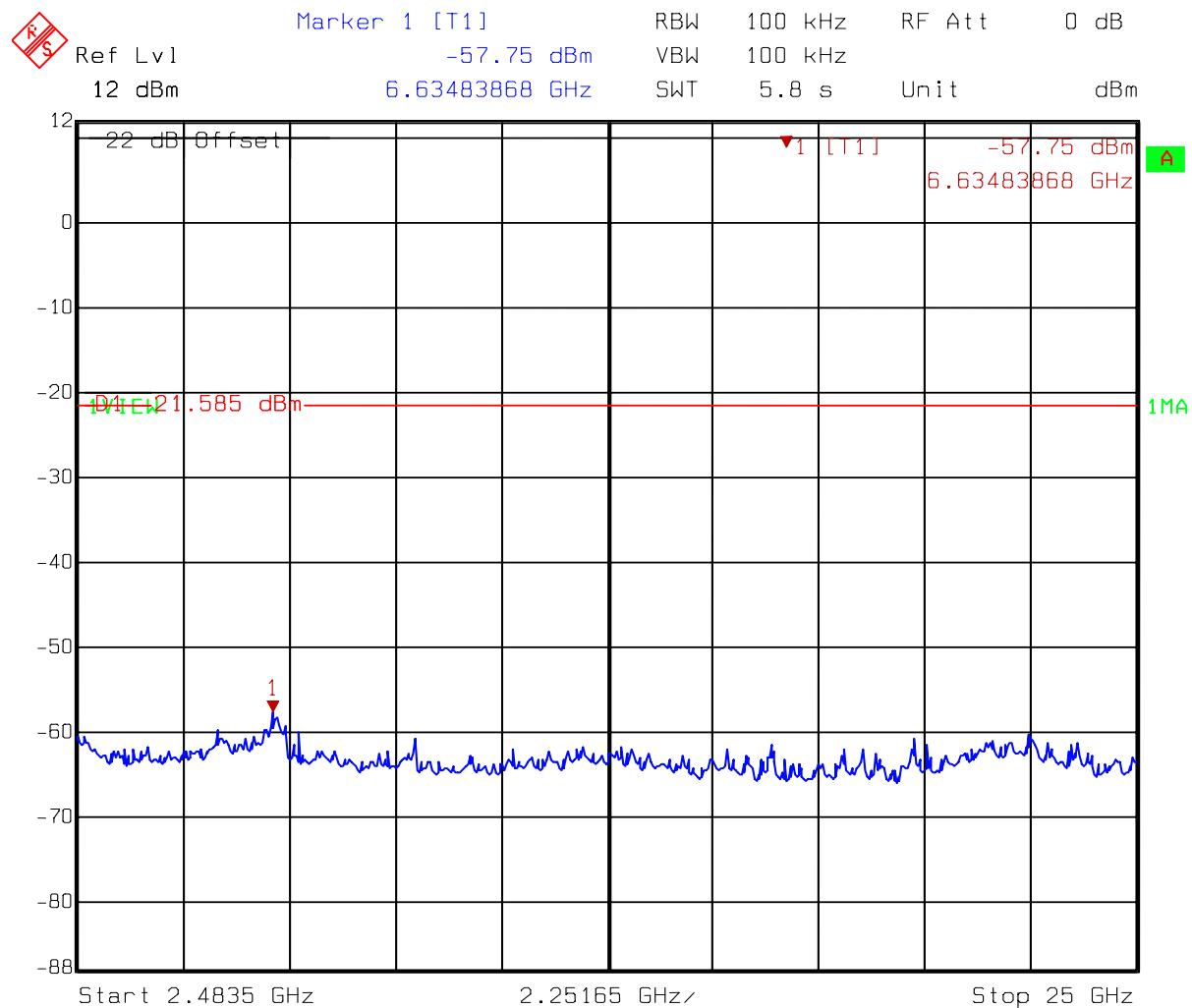
Title: Conductive-Spurious
Comment A: CH 11 at 802.11b mode 2483.5MHz~25GHz
Date: 28.MAY 2007 11:00:23

Test Mode: 802.11g mode (ch1)

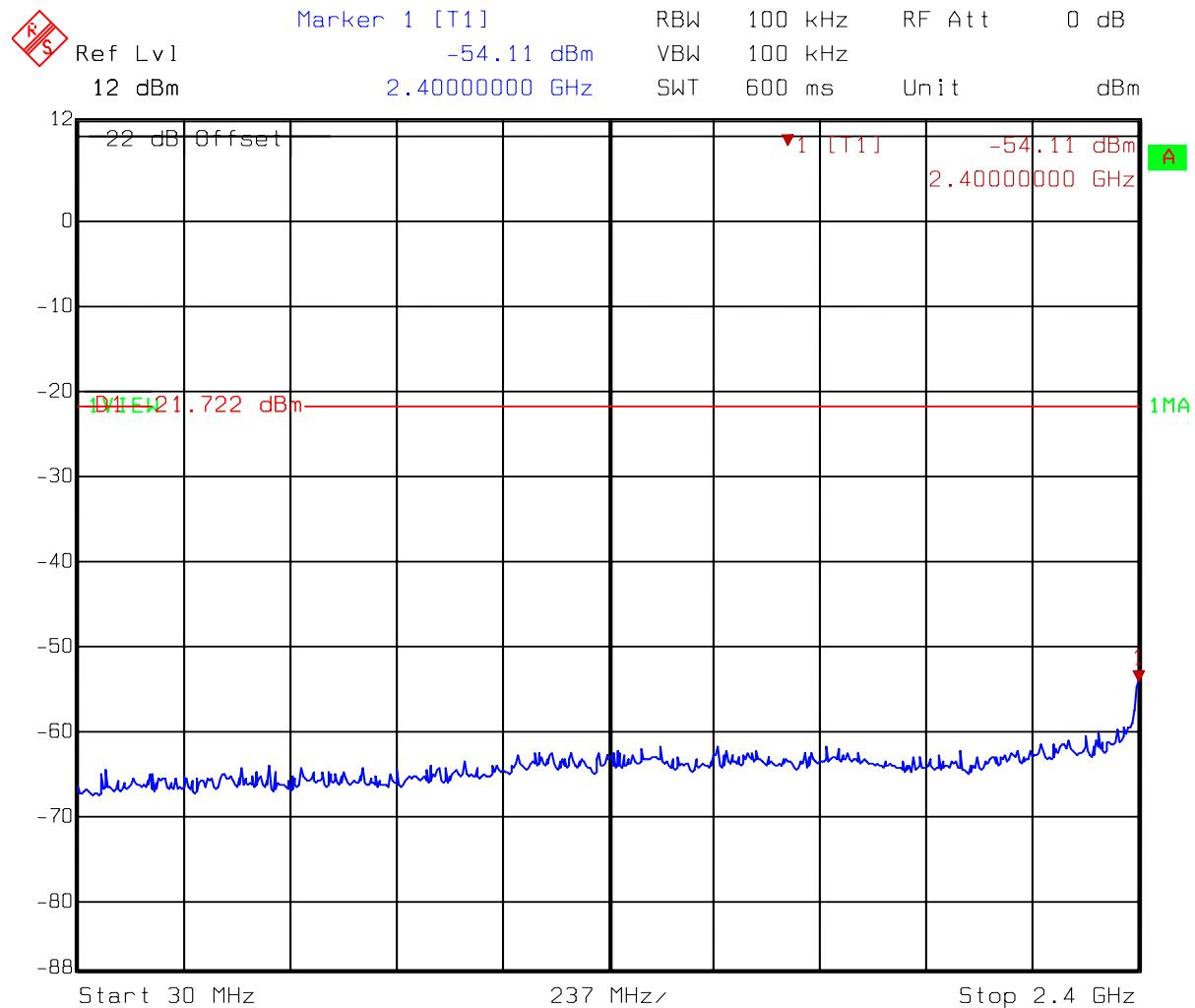
Title: Conductive-Spurious
Comment A: CH 1 at 802.11g mode 30MHz~2400MHz
Date: 28.MAY 2007 11:09:26

Test Mode: 802.11g mode (ch1)

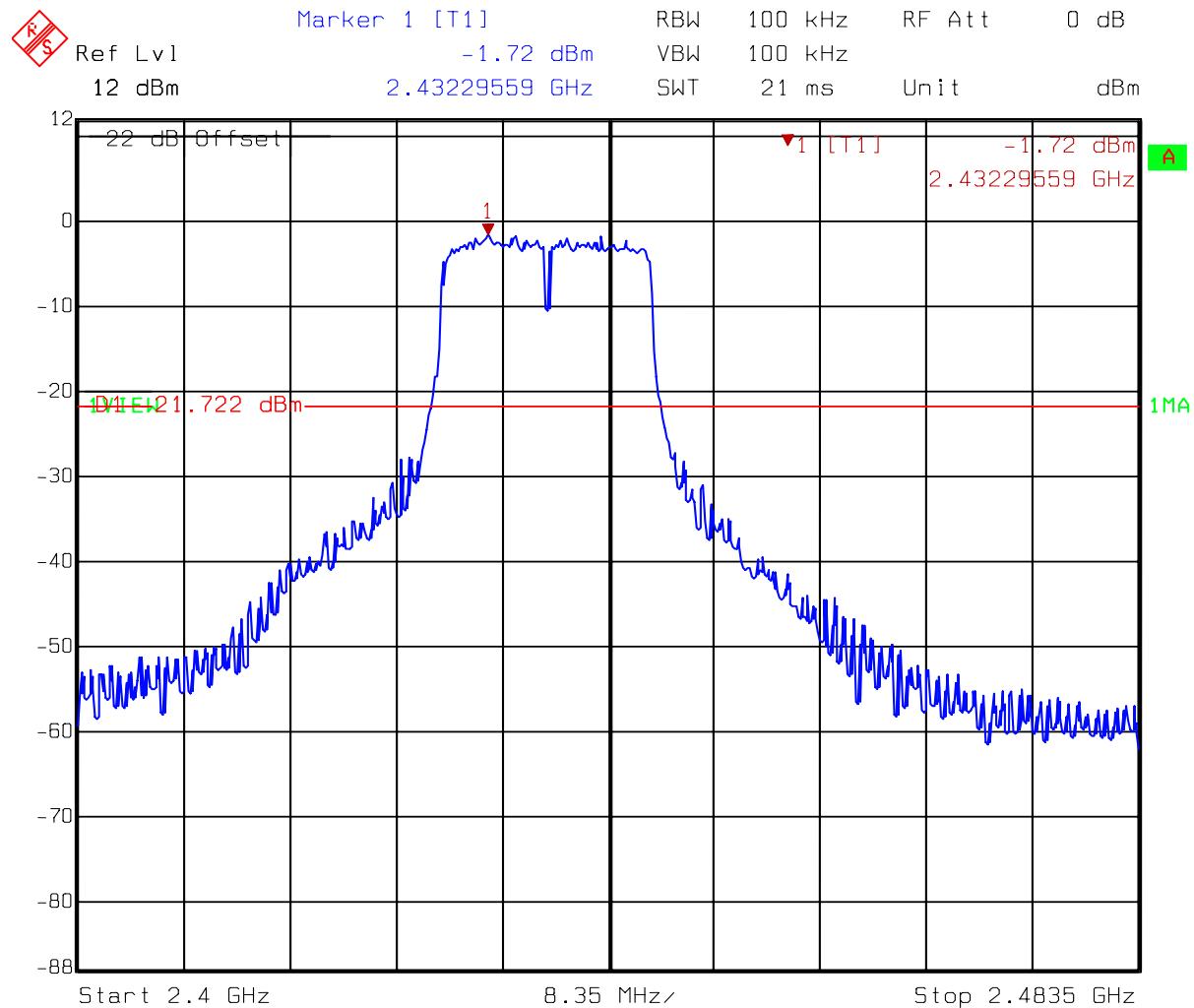
Title: Conductive-Spurious
Comment A: CH 1 at 802.11g mode 2400MHz~2483.5MHz
Date: 28.MAY 2007 11:09:04

Test Mode: 802.11g mode (ch1)

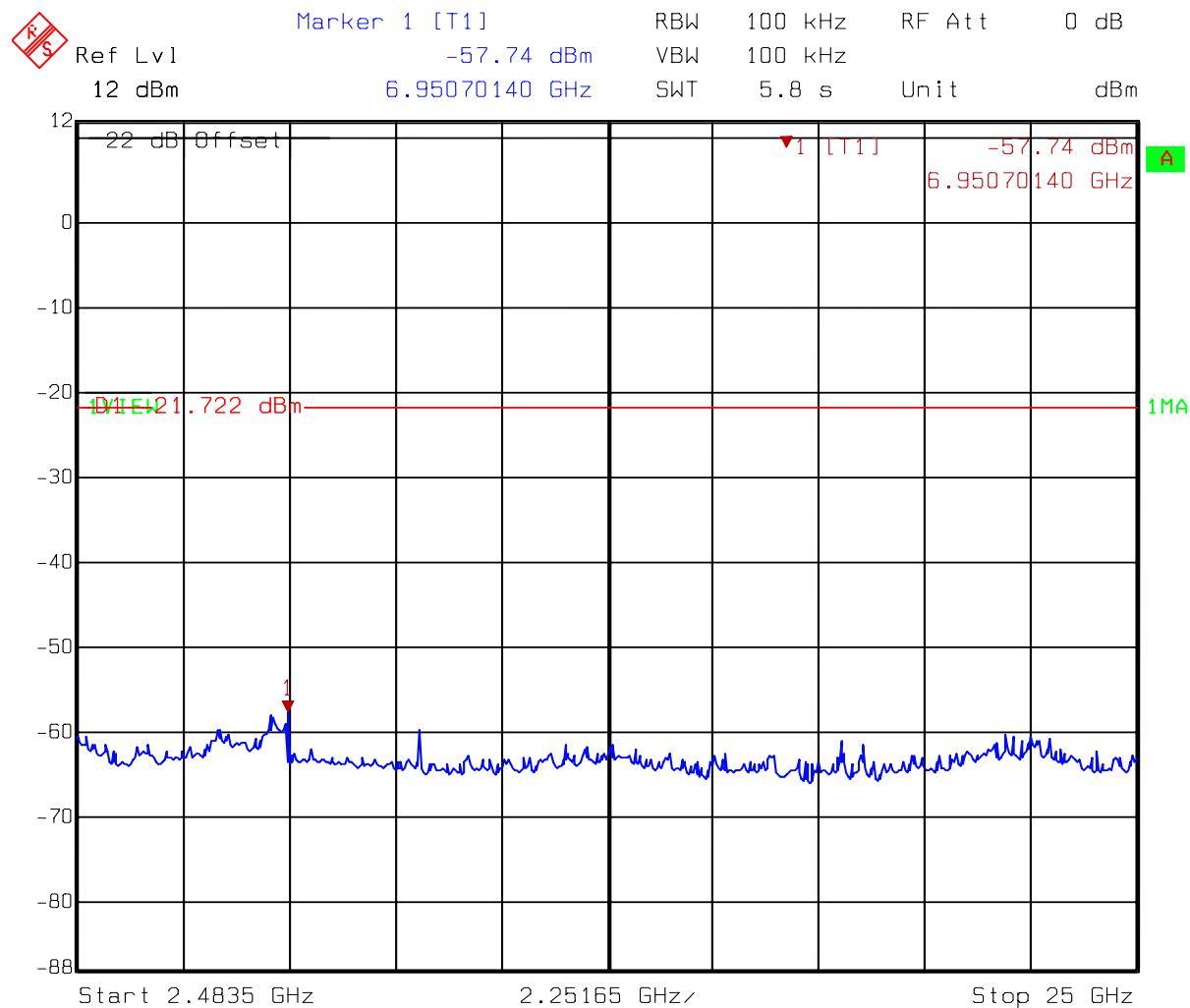
Title: Conductive-Spurious
Comment A: CH 1 at 802.11g mode 2483.5MHz~25000MHz
Date: 28.MAY 2007 11:09:53

Test Mode: 802.11g mode (ch6)

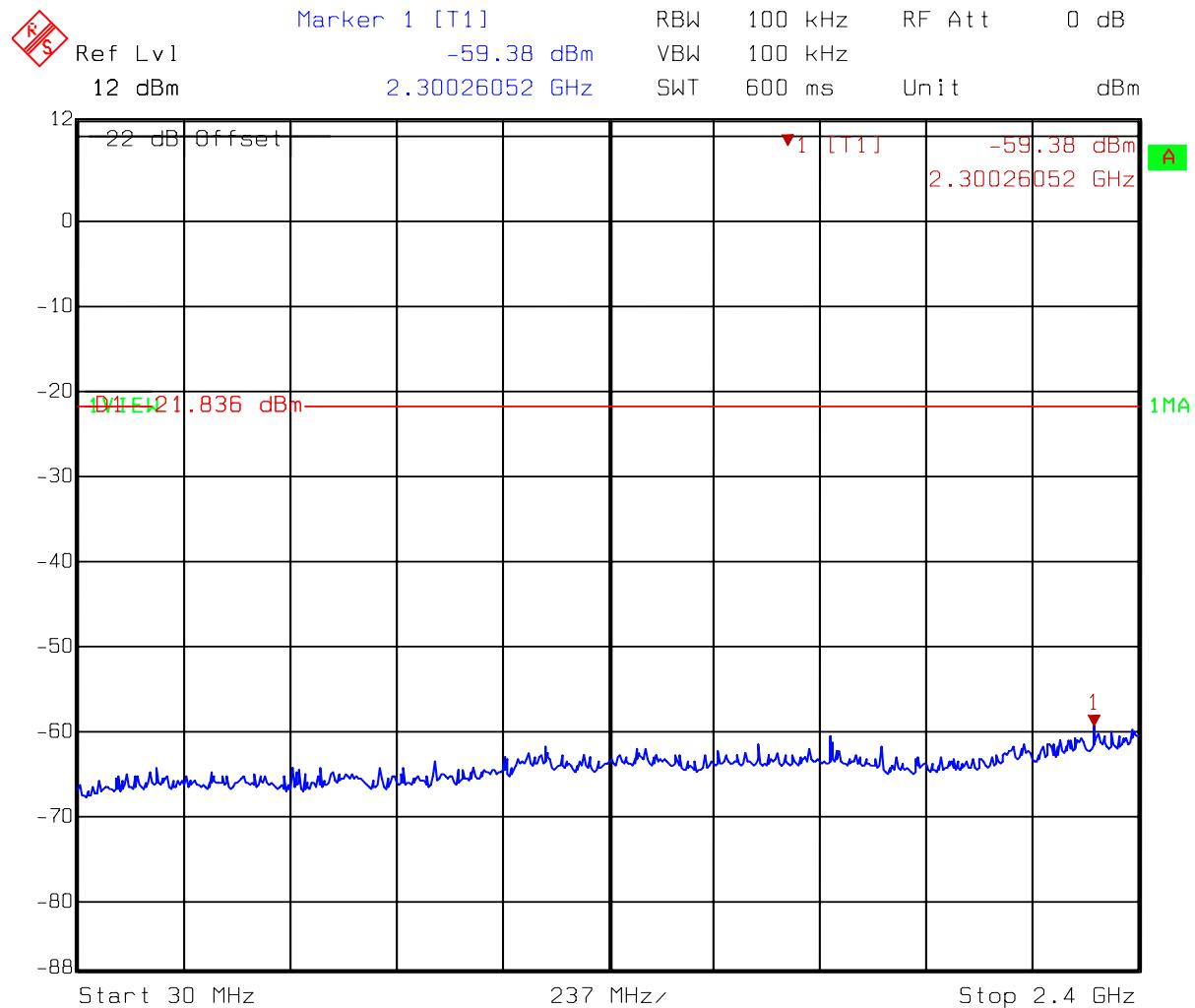
Title: Conductive-Spurious
Comment A: CH 6 at 802.11g mode 30MHz~2400MHz
Date: 28.MAY 2007 11:06:30

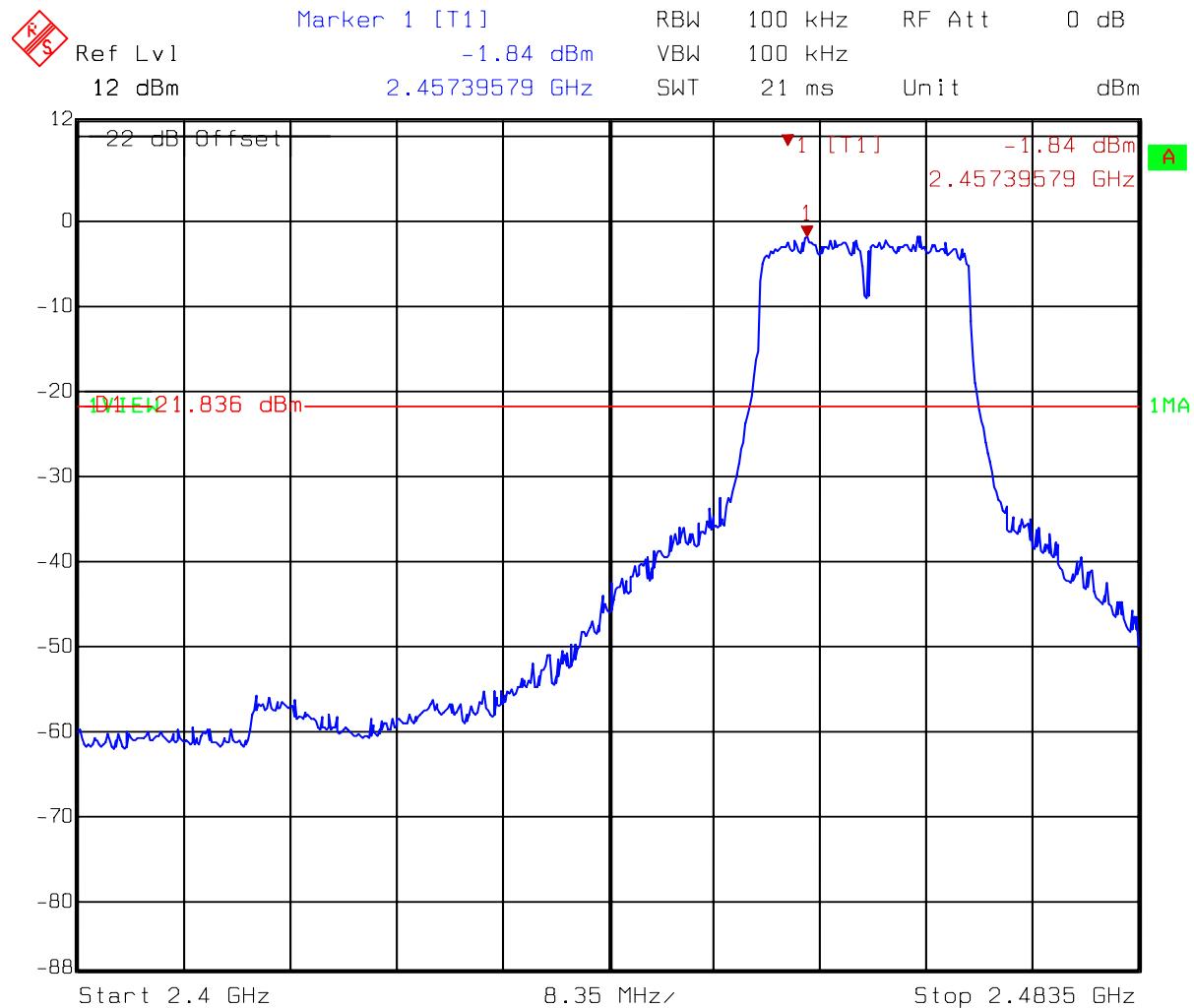
Test Mode: 802.11g mode (ch6)

Title: Conductive-Spurious
Comment A: CH 6 at 802.11g mode 2400MHz~2483.5MHz
Date: 28.MAY 2007 11:06:09

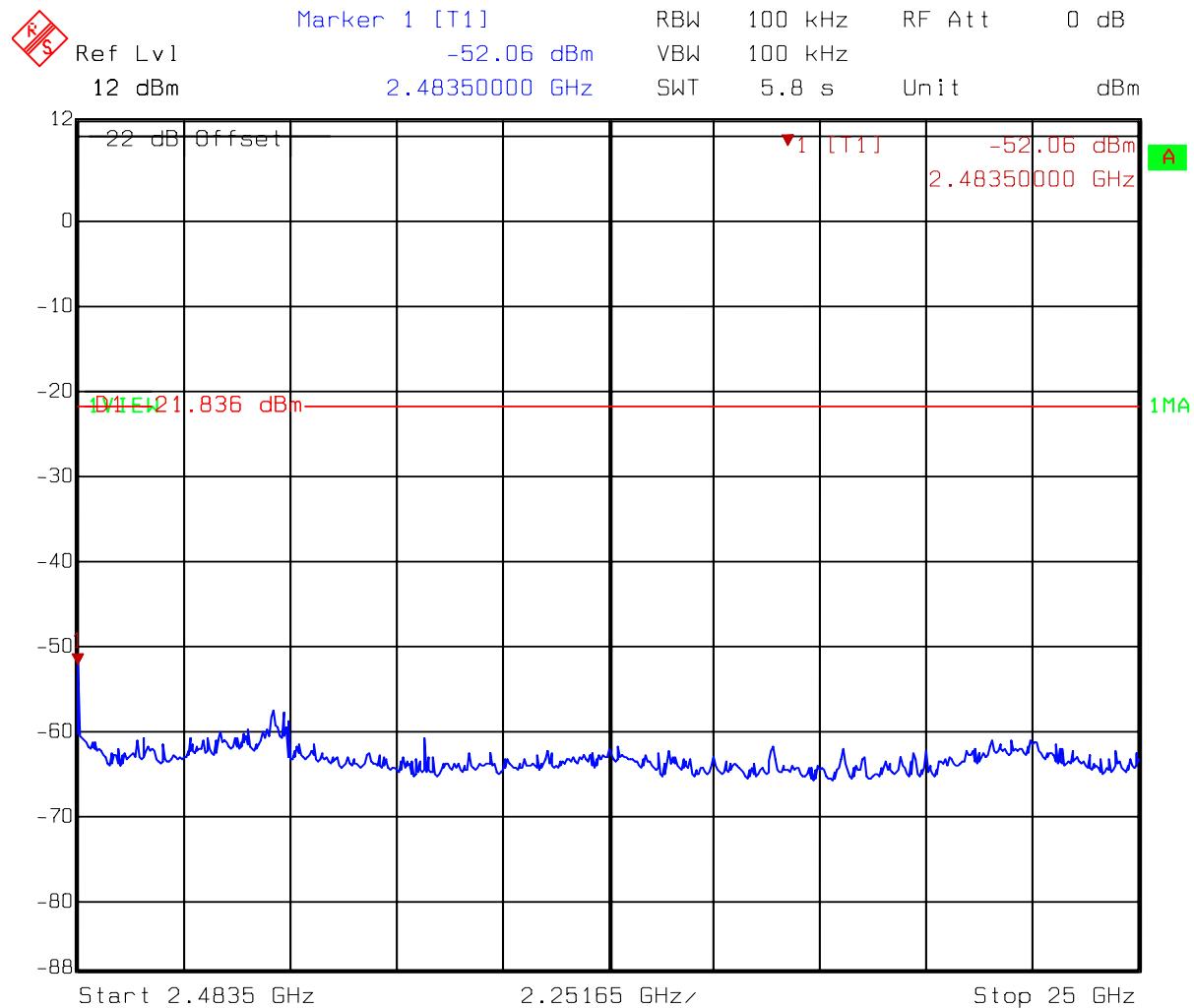
Test Mode: 802.11g mode (ch6)

Title: Conductive-Spurious
Comment A: CH 6 at 802.11g mode 2483.5MHz~25000MHz
Date: 28.MAY 2007 11:06:58

Test Mode: 802.11g mode (ch11)

Test Mode: 802.11g mode (ch11)

Title: Conductive-Spurious
Comment A: CH 11 at 802.11g mode 2400MHz~2483.5MHz
Date: 28.MAY 2007 11:02:59

Test Mode: 802.11g mode (ch11)

Title: Conductive-Spurious
Comment A: CH 11 at 802.11g mode 2483.5MHz~25000MHz
Date: 28.MAY 2007 11:03:48

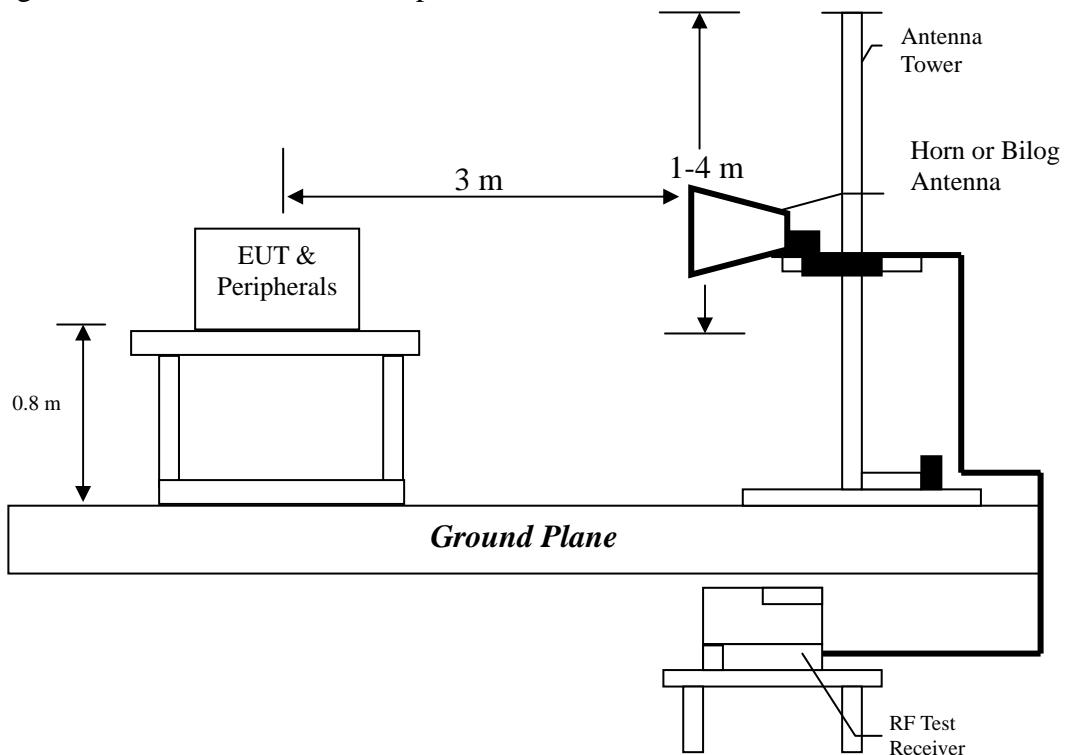
6. Radiated Emission test

6.1 Operating environment

Temperature: 22
Relative Humidity: 56 %
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.

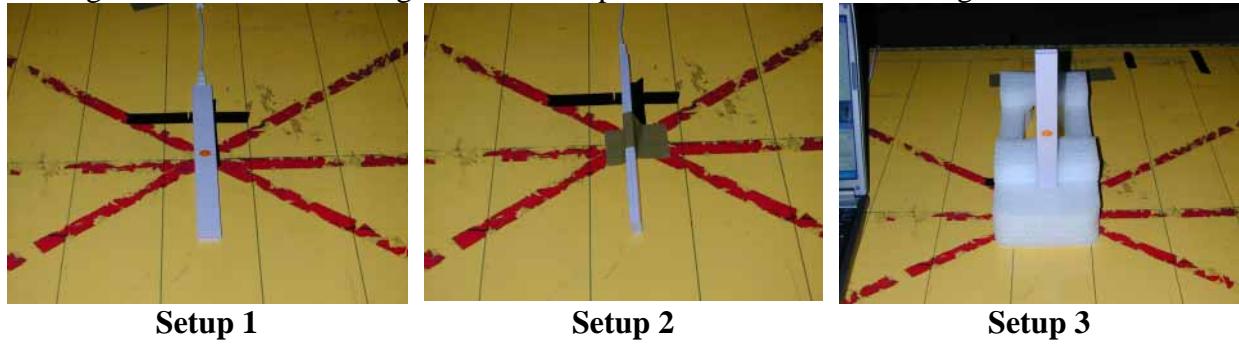
The signal is maximized through rotation and placement in the three orthogonal axes.

Radiated emissions were investigated over 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 signal is maximized through rotation and placement in the three orthogonal axes.



After verifying three axes, we found the maximum electromagnetic field was occurred at setup 2 configuration. The final test data was executed under this configuration.

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
-	-

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

EUT : SAG3020
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	53.280	QP	12.90	16.09	28.99	40.00	-11.02
V	94.020	QP	7.38	23.12	30.50	43.50	-13.01
V	182.290	QP	13.10	16.70	29.80	43.50	-13.71
V	239.520	QP	12.18	20.60	32.78	46.00	-13.22
V	399.570	QP	16.40	16.75	33.15	46.00	-12.85
V	815.700	QP	23.29	10.84	34.13	46.00	-11.87
H	183.260	QP	12.08	19.37	31.45	43.50	-12.05
H	239.520	QP	11.74	22.89	34.63	46.00	-11.37
H	299.660	QP	14.17	17.13	31.30	46.00	-14.71
H	399.570	QP	16.74	21.69	38.43	46.00	-7.57
H	630.430	QP	21.55	13.61	35.16	46.00	-10.85
H	799.210	QP	23.52	11.38	34.90	46.00	-11.10

Remark:

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

6.4.2 Measurement results: frequency above 1GHz

EUT : SAG3020

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	43.96	45.66	54	-8.34

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.

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 : SAG3020
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	44.83	46.53	54	-7.47

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 : SAG3020
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	45.08	46.78	54	-7.22

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 : SAG3020
Test Condition : 802.11g Tx at channel 1

The Radiated Emission was very low against the limit in the frequency.

Range 3GHz ~ 18GHz.

EUT : SAG3020
Test Condition : 802.11g Tx at channel 6

The Radiated Emission was very low against the limit in the frequency.

Range 3GHz ~ 18GHz.

EUT : SAG3020
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	42.48	44.18	54	-9.82

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: 23
Relative Humidity: 55 %
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

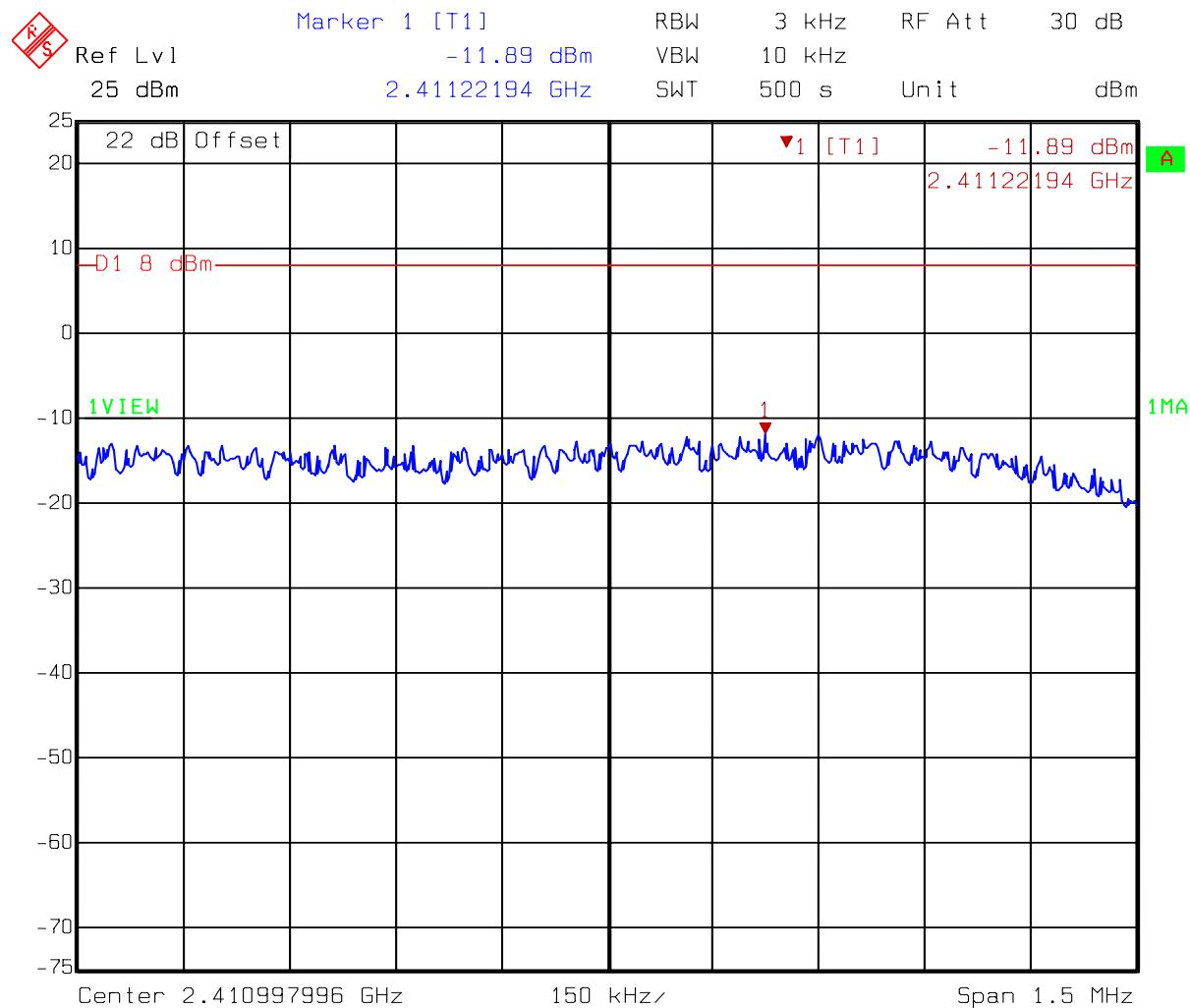
Test Mode: 802.11b mode

Channel	Frequency (MHz)	Cable loss (dB)	Power spectrum density (dBm)	Limit (dBm)
1 (lowest)	2412	2	-11.89	8
6 (middle)	2437	2	-12.13	8
11 (highest)	2462	2	-12.39	8

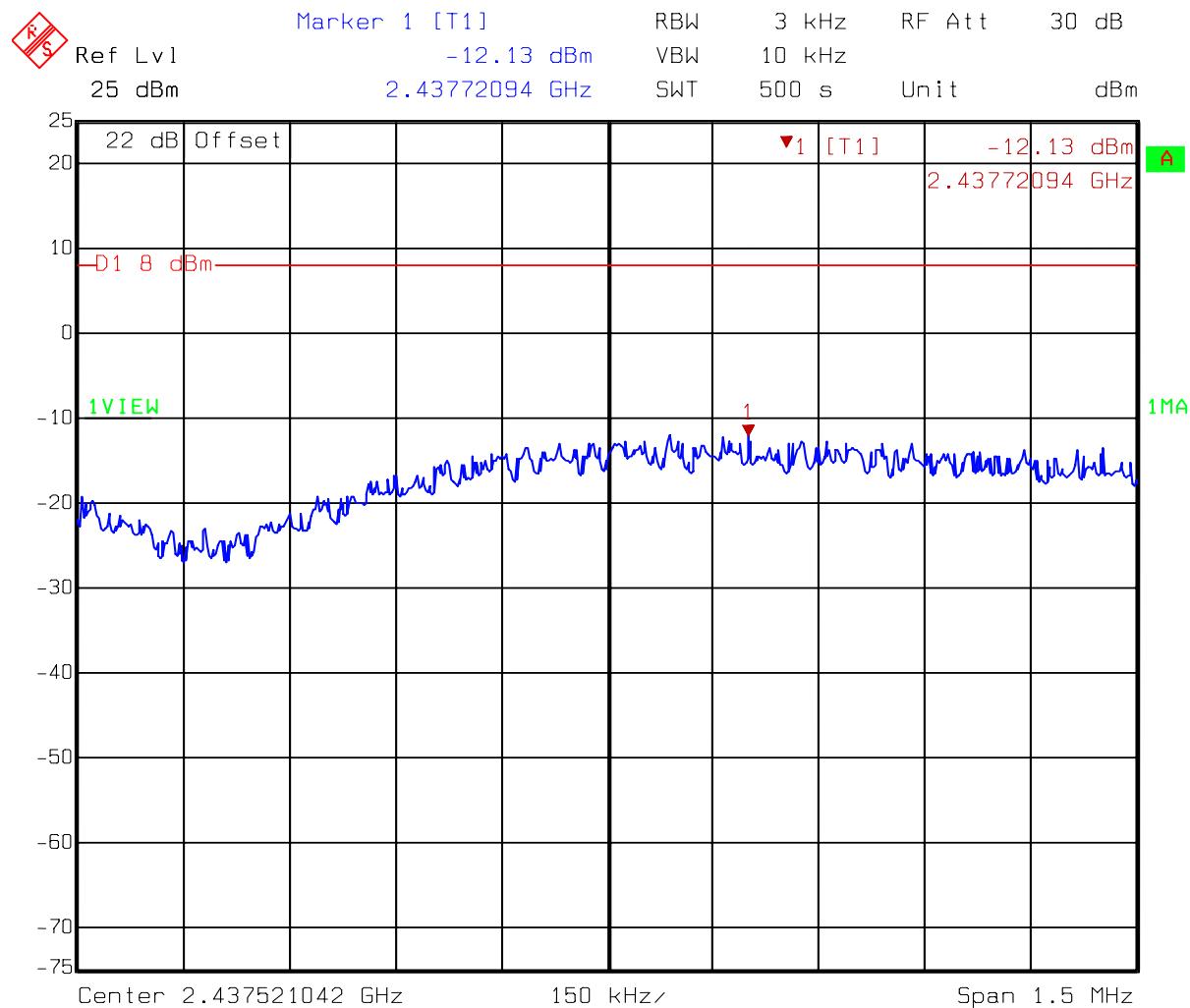
Test Mode: 802.11g mode

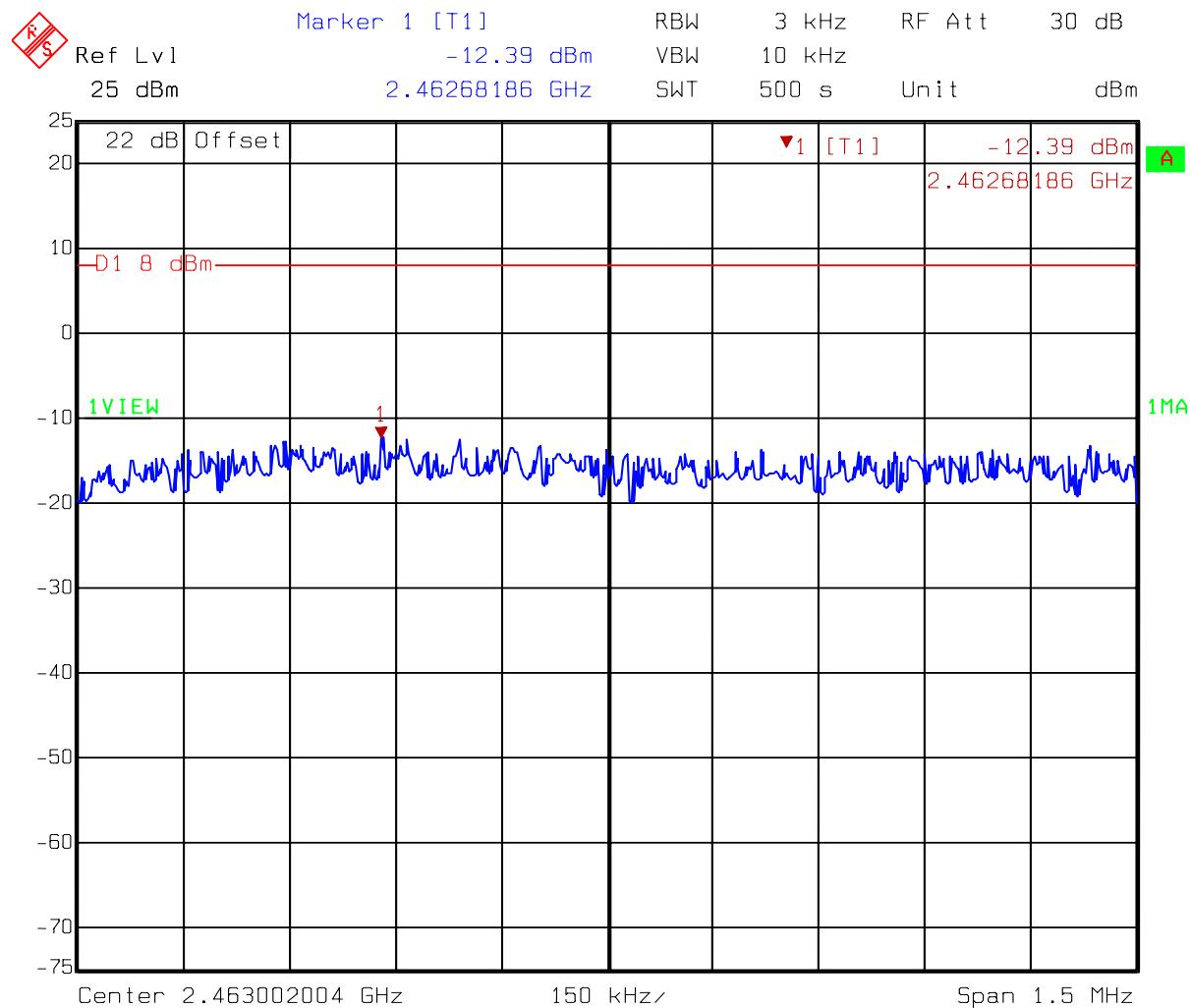
Channel	Frequency (MHz)	Cable loss (dB)	Power spectrum density (dBm)	Limit (dBm)
1 (lowest)	2412	2	-16.17	8
6 (middle)	2437	2	-16.23	8
11 (highest)	2462	2	-15.73	8

Please see the plot below.

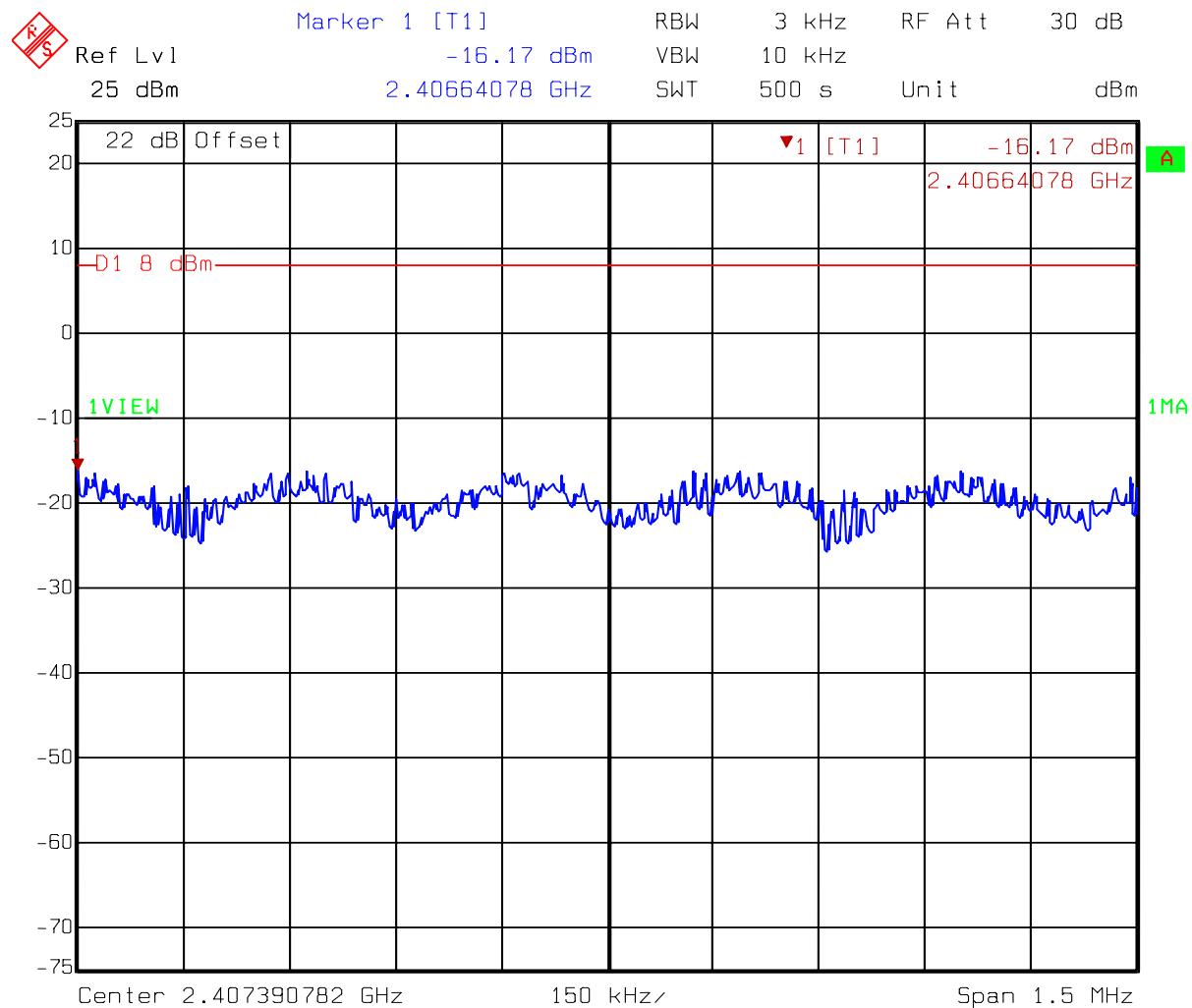
Test Mode: 802.11b mode (ch1)

Title: Power density
Comment A: CH 1 at 802.11b mode
Date: 28.MAY 2007 10:51:53

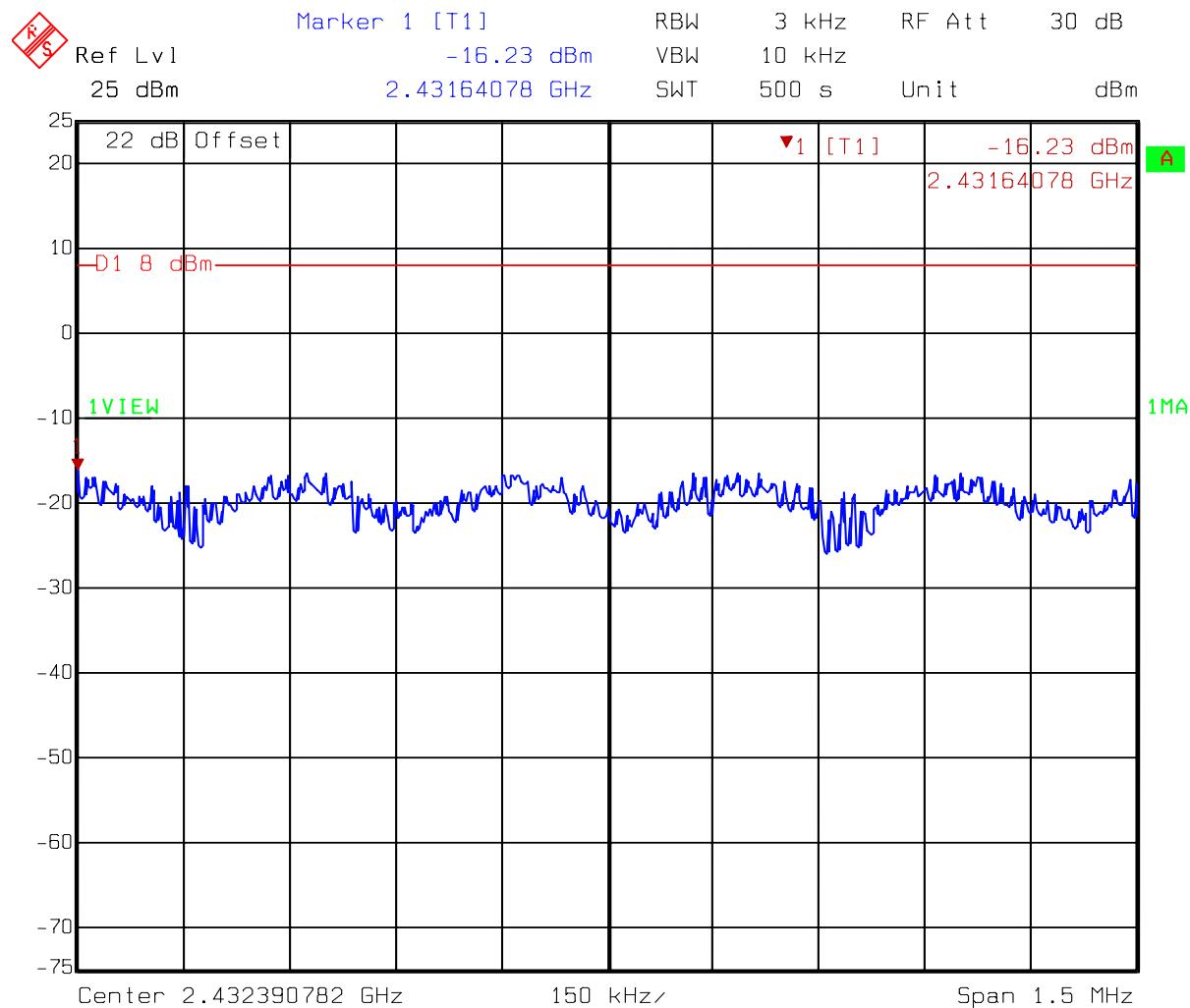
Test Mode: 802.11b mode (ch6)

Test Mode: 802.11b mode (ch11)

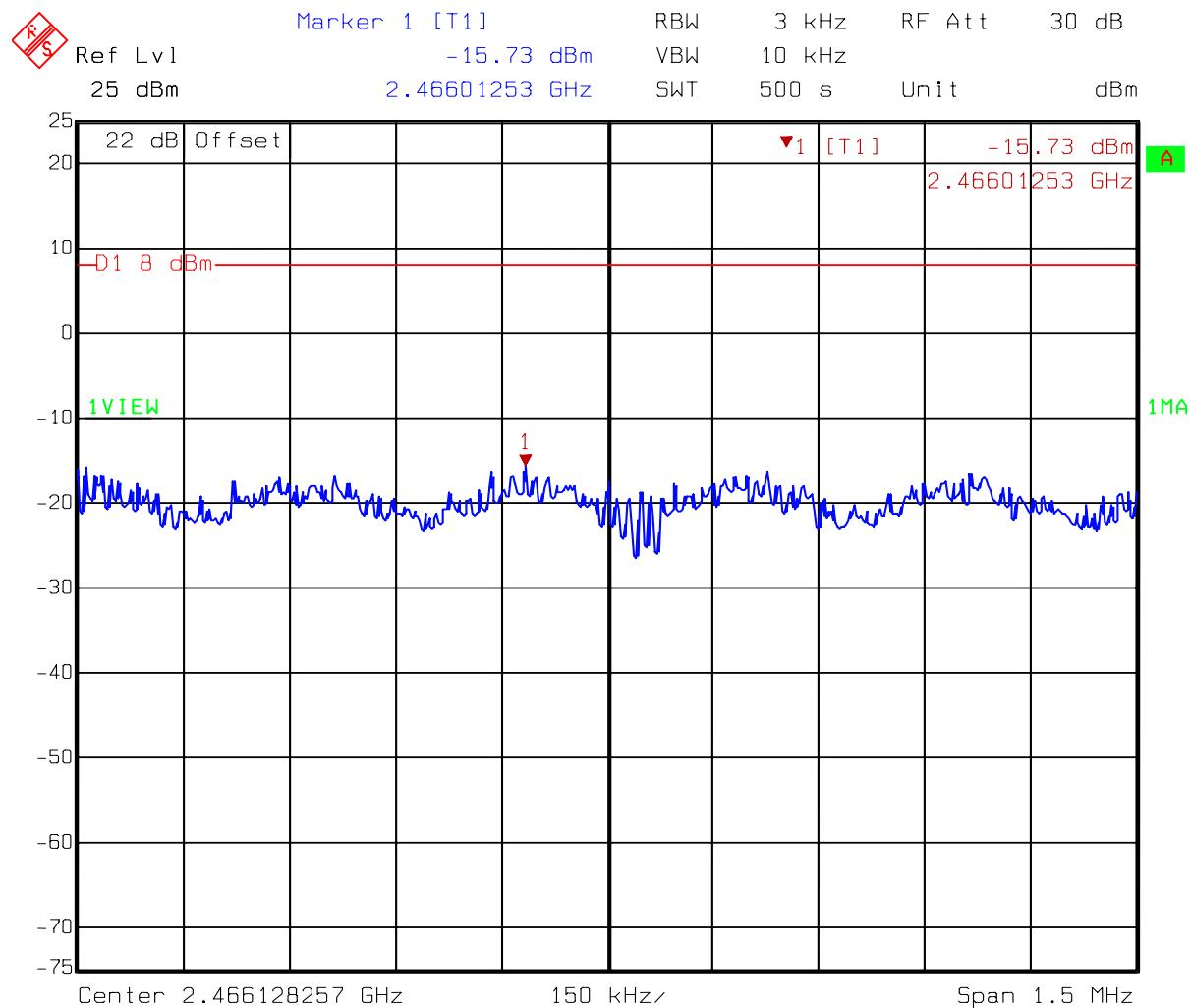
Title: Power density
Comment A: CH 11 at 802.11b mode
Date: 28.MAY 2007 10:59:09

Test Mode: 802.11g mode (ch1)

Title: Power density
Comment A: CH 1 at 802.11g mode
Date: 28.MAY 2007 11:08:43

Test Mode: 802.11g mode (ch6)

Title: Power density
Comment A: CH 6 at 802.11g mode
Date: 28.MAY 2007 11:05:48

Test Mode: 802.11g mode (ch11)

Title: Power density
Comment A: CH 11 at 802.11g mode
Date: 28.MAY 2007 11:02:38

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: 23
Relative Humidity: 55 %
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

The setting of spectrum analyzer is:

Conducted method:

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

Radiated method:

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

8.3 Test Result

Test Mode: 802.11b mode

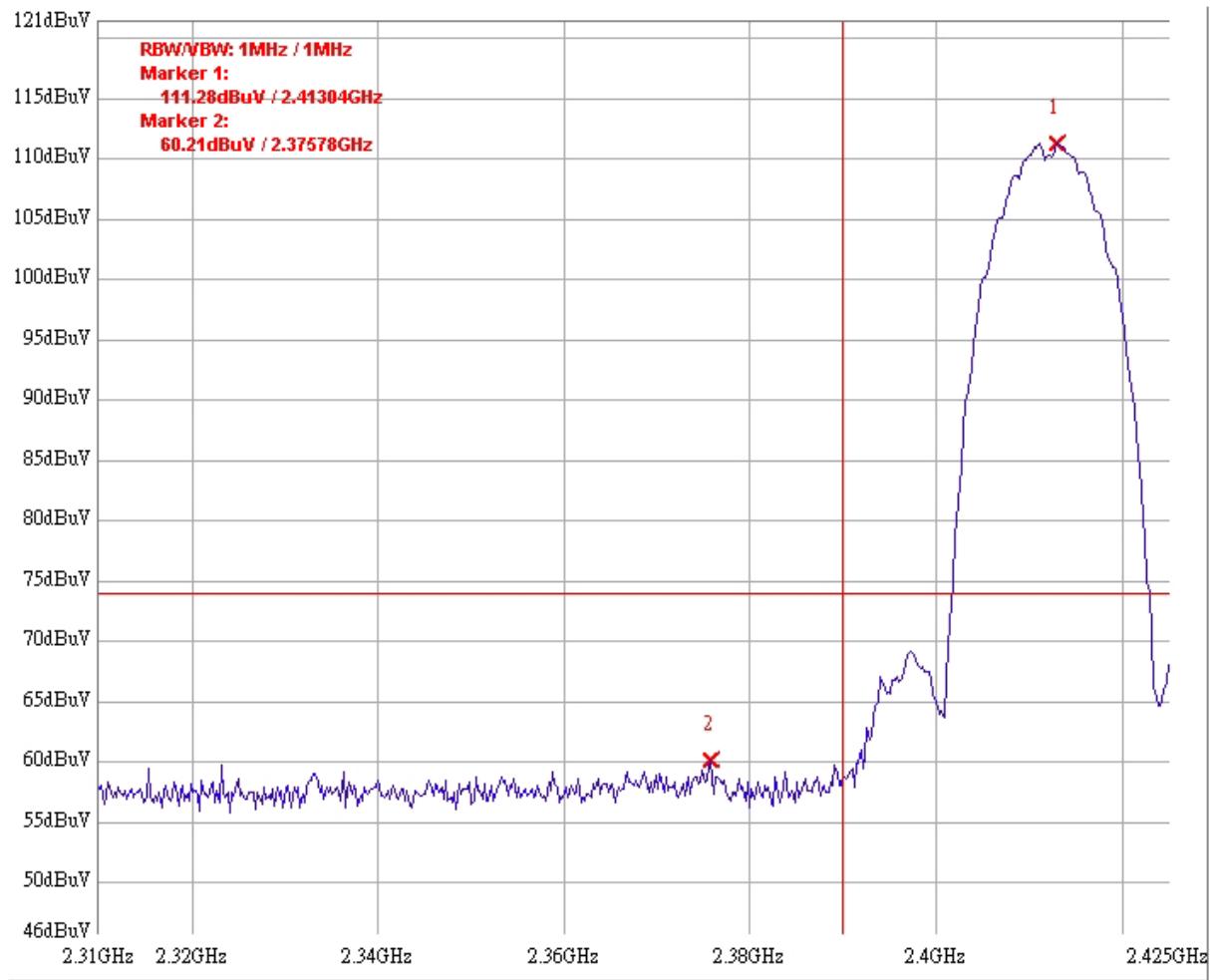
Channel	Measurement Freq.Band (MHz)	Detector	The Max. Field Strength in Restrict Band (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
1 (lowest)	2310-2390	PK	60.21	74	-13.79
		AV	48.68	54	-5.32
11 (highest)	2483.5-2500	PK	60.37	74	-13.63
		AV	48.57	54	-5.43

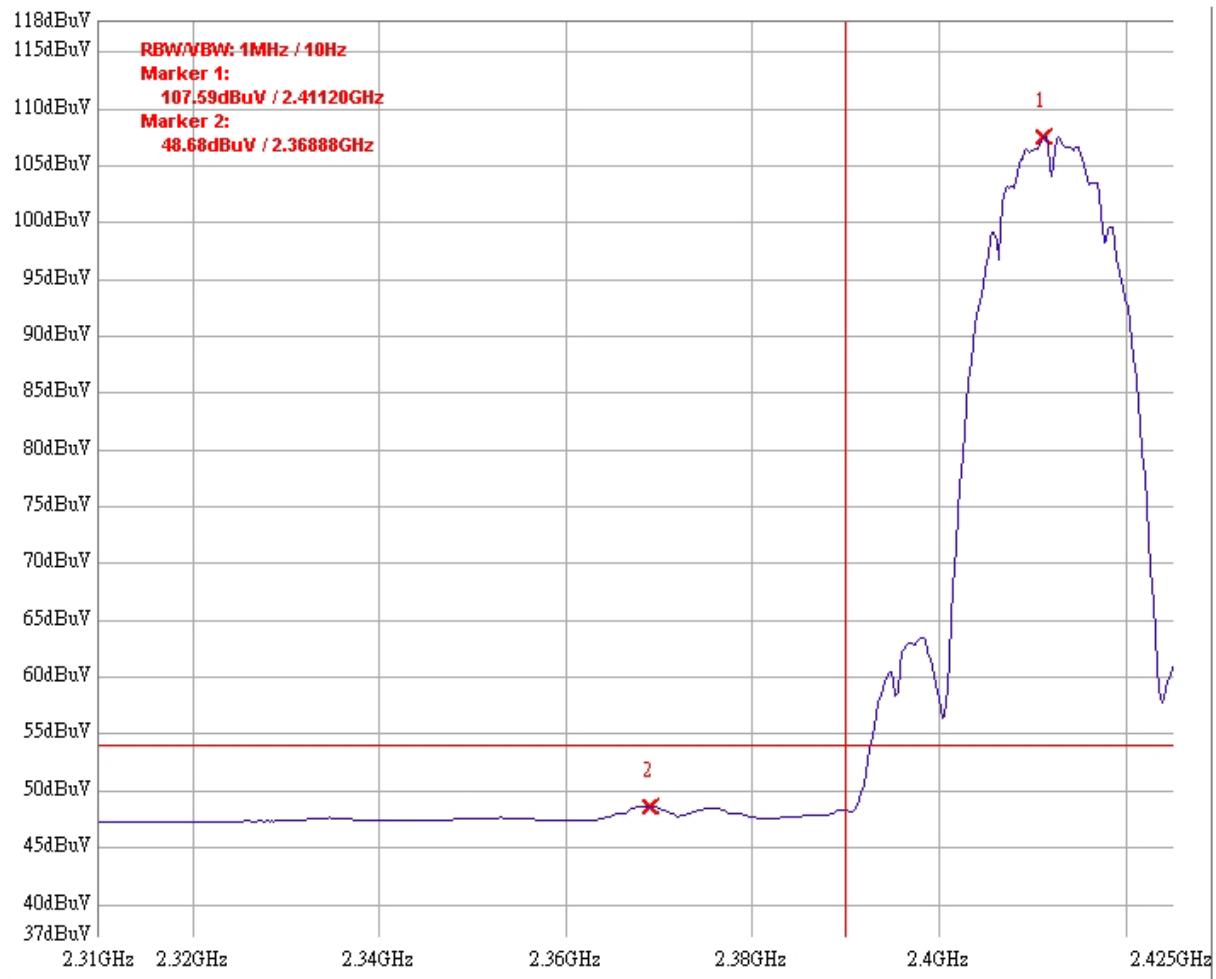
Test Mode: 802.11g mode

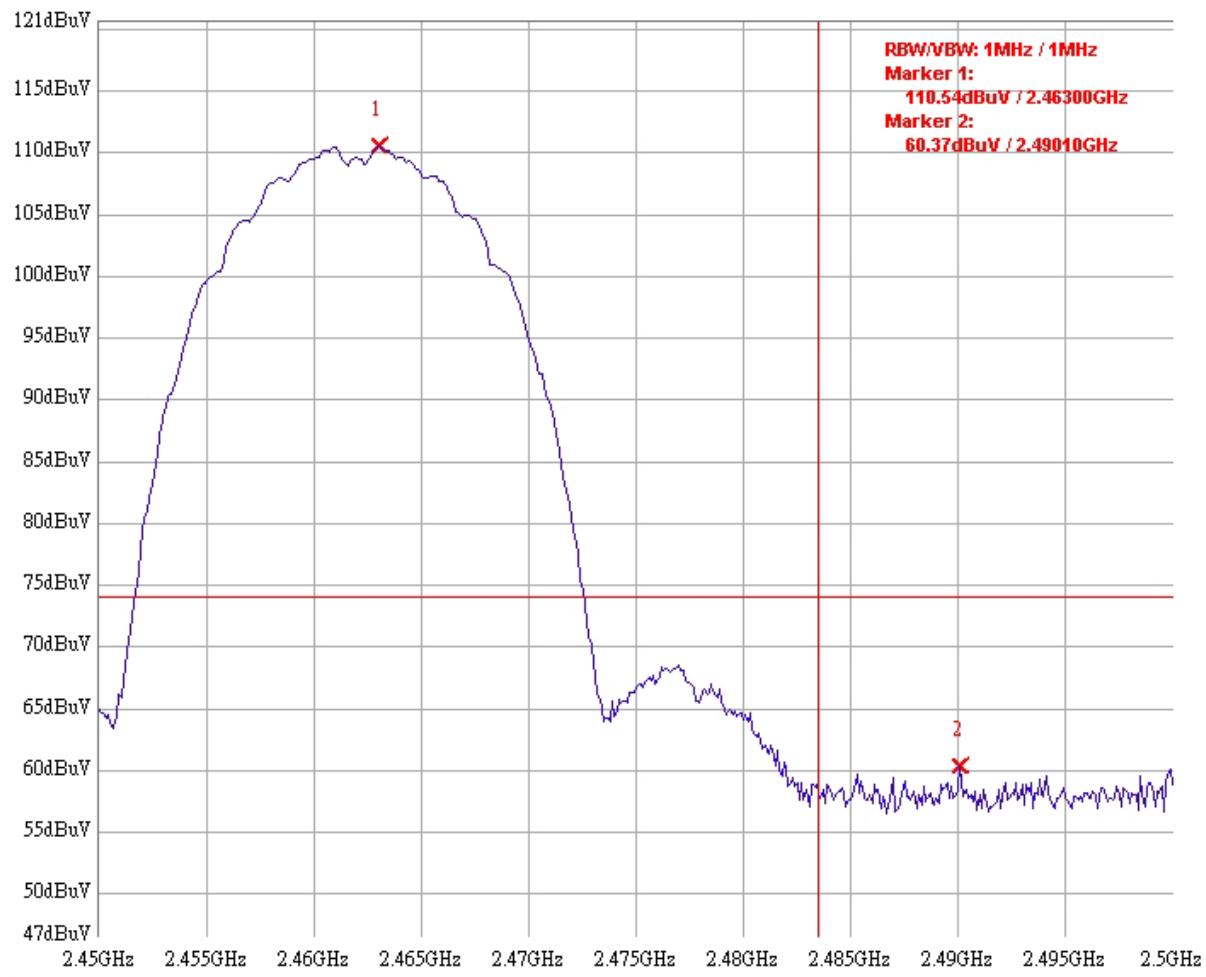
Channel	Measurement Freq.Band (MHz)	Detector	The Max. Field Strength in Restrict Band (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
1 (lowest)	2310-2390	PK	69.99	74	-4.01
		AV	53.20	54	-0.80
11 (highest)	2483.5-2500	PK	71.05	74	-2.95
		AV	53.73	54	-0.27

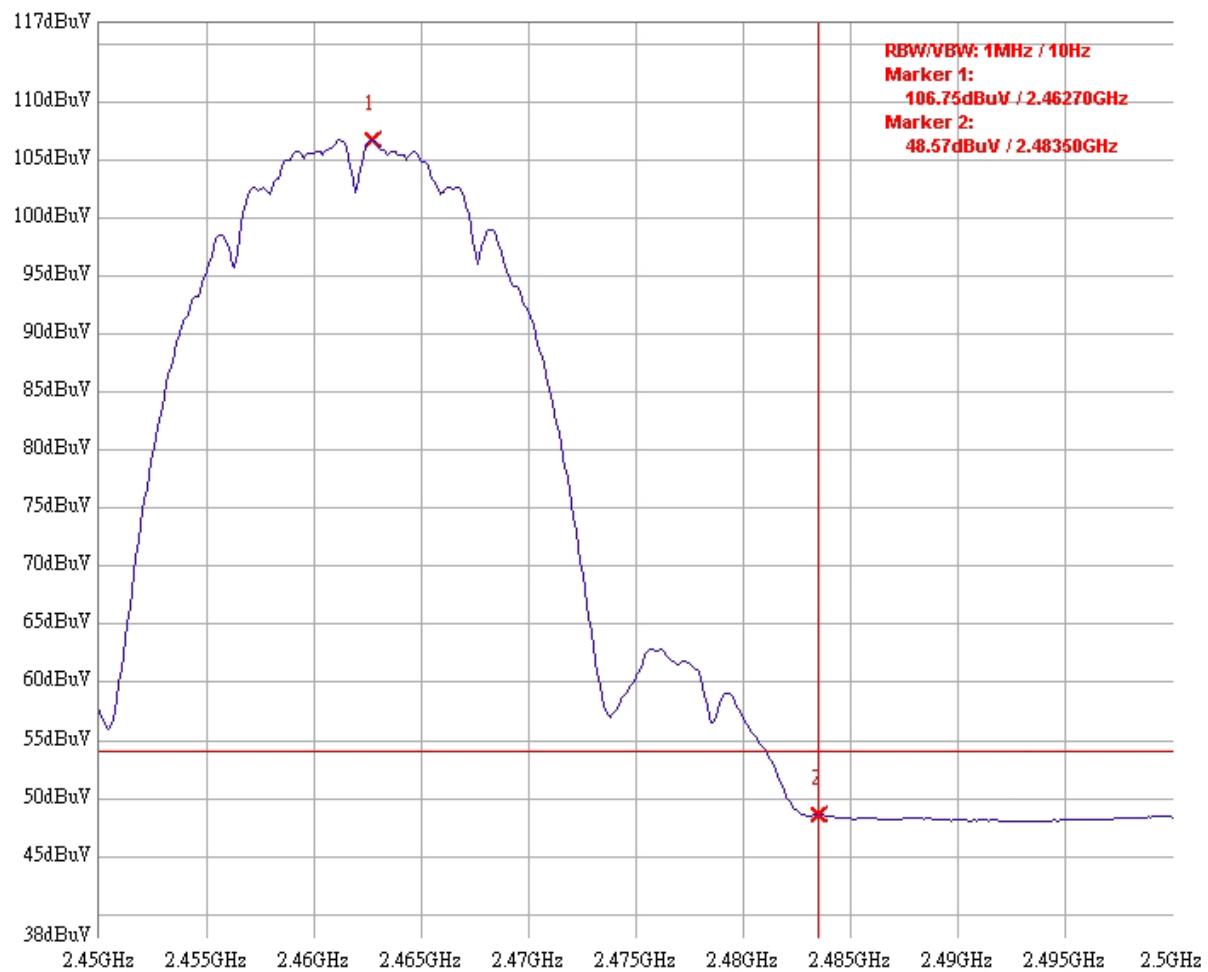
8.3.1 Conducted Method

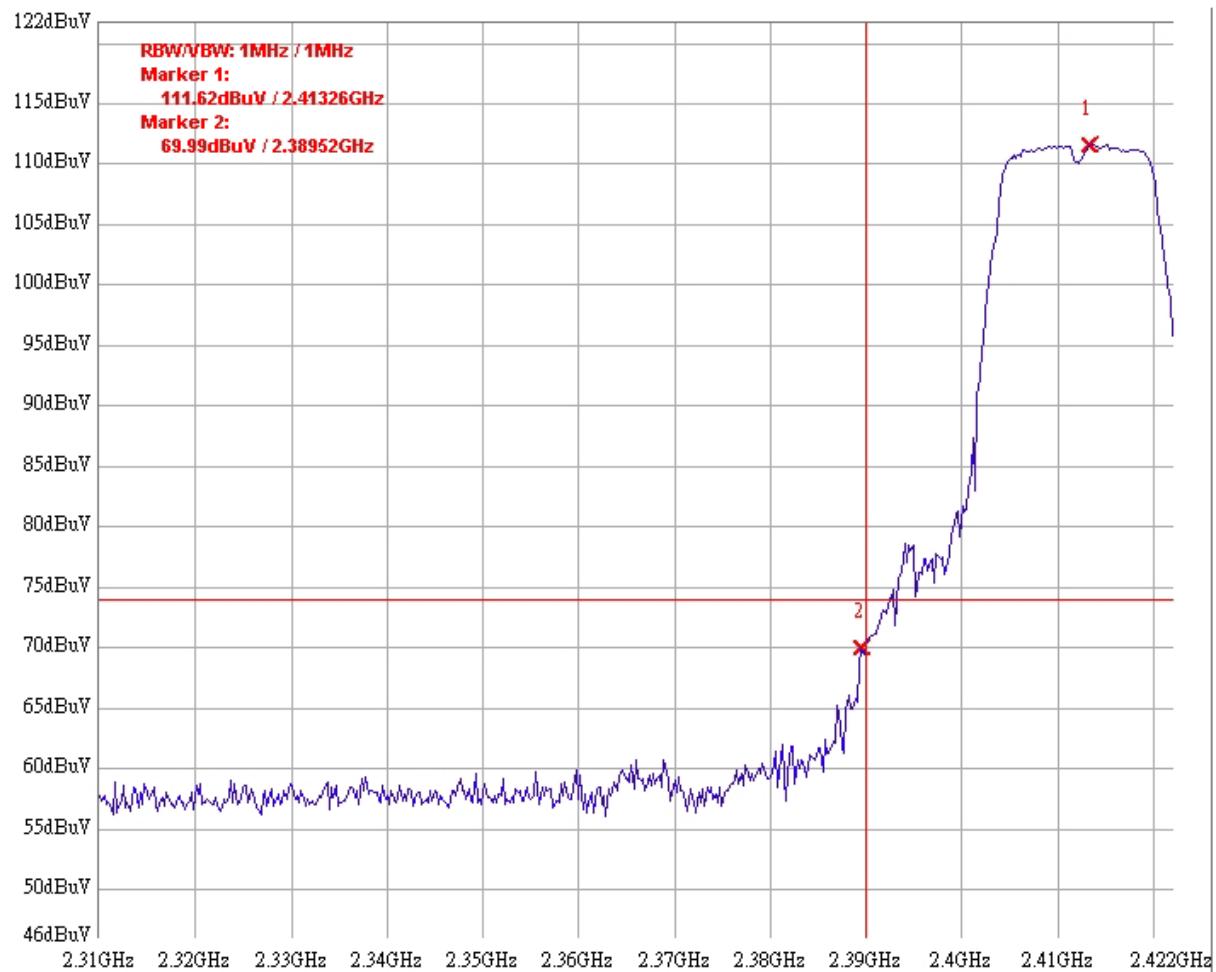
Test Mode: 802.11b mode ch 1 PK

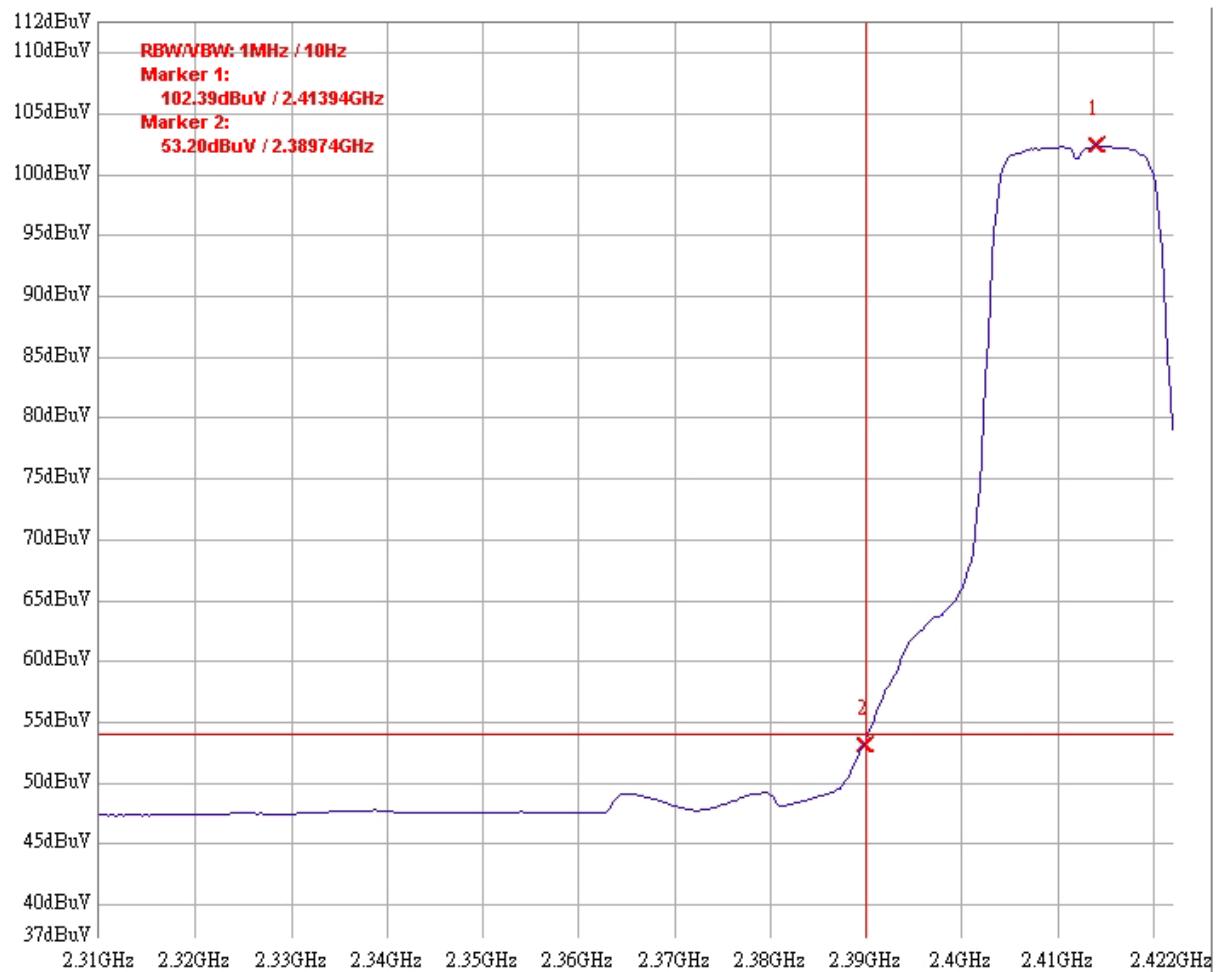


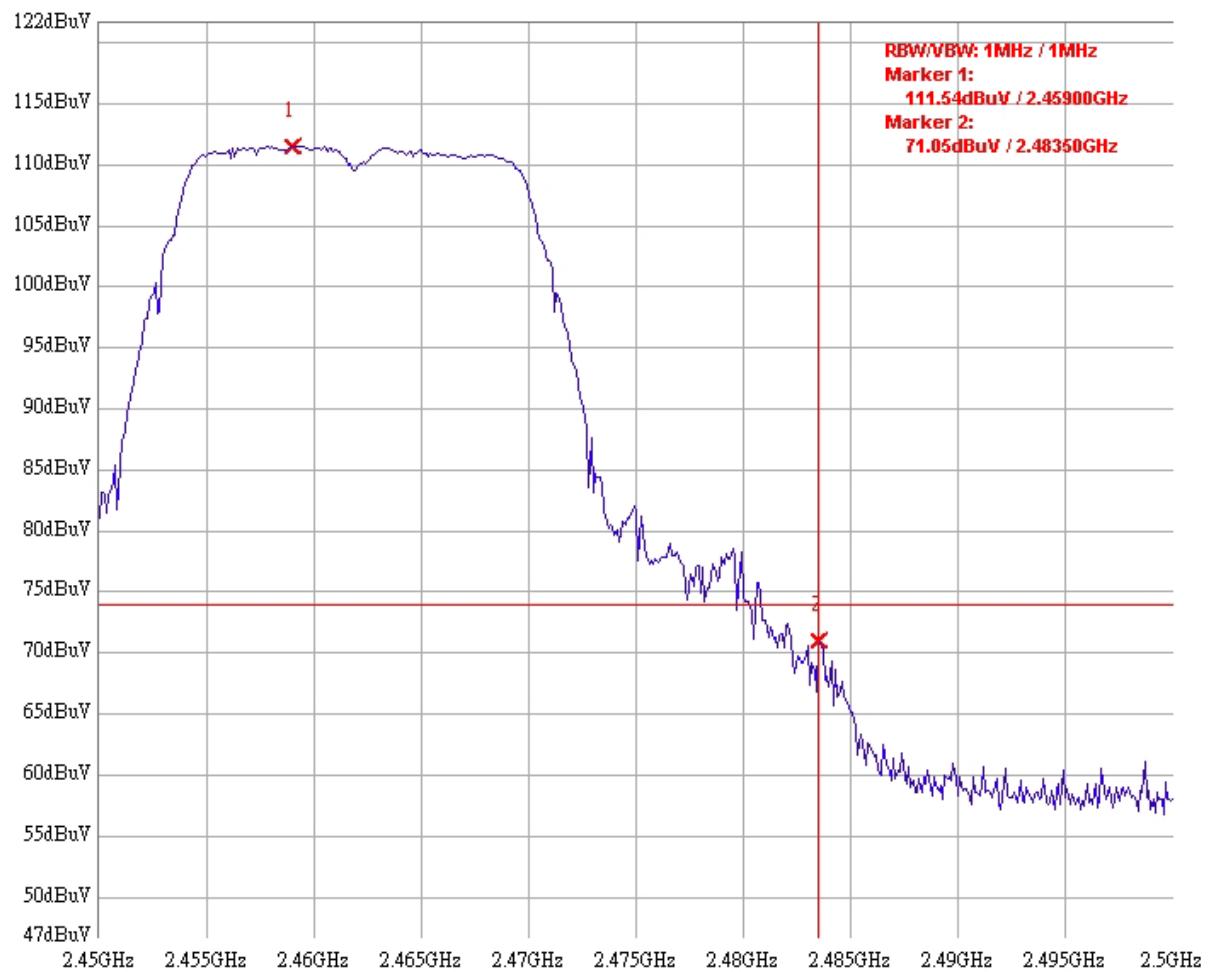
Test Mode: 802.11b mode ch 1 AV

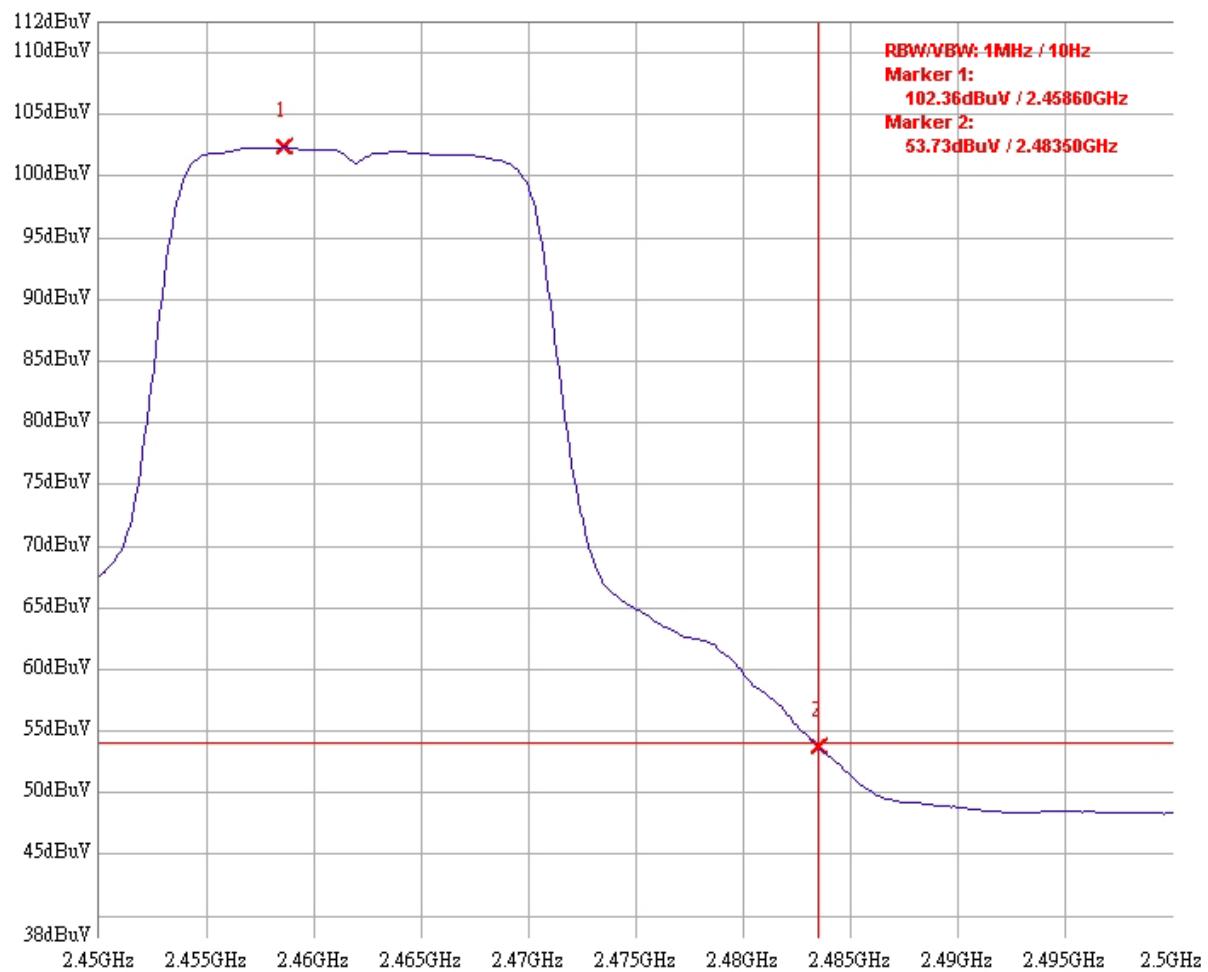
Test Mode: 802.11b mode ch 11 PK

Test Mode: 802.11b mode ch 11 AV

Test Mode: 802.11g mode ch 1 PK

Test Mode: 802.11g mode ch 1 AV

Test Mode: 802.11g mode ch 11 PK

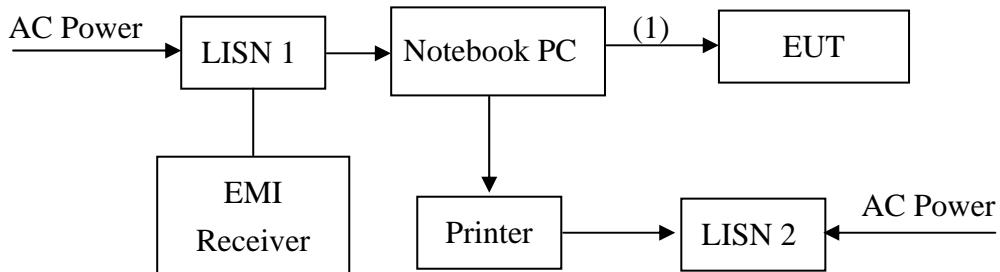
Test Mode: 802.11g mode ch 11 AV

9. Power Line Conducted Emission test §FCC 15.207

9.1 Operating environment

Temperature: 24
Relative Humidity: 54 %
Atmospheric Pressure 1023 hPa

9.2 Test setup & procedure



(1) USB shielded cable 4meter

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.

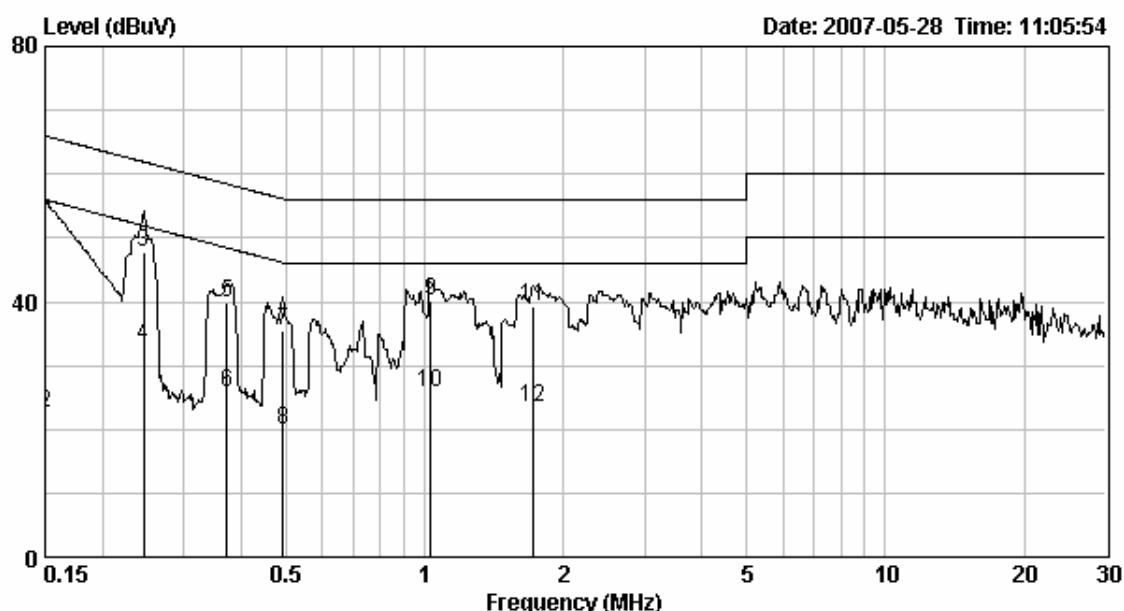
9.5 Power Line Conducted Emission test data

Phase: Line
Model No.: SAG3020
Test Condition: Normal operating mode

Frequency (MHz)	Corr. Factor (dB)	Level		Limit		Margin (dB)	
		Qp (dBuV)	Av (dBuV)	Qp (dBuV)	Av (dBuV)	Qp (dB)	Av (dB)
0.150	0.10	48.69	66.00	22.67	56.00	-17.31	-33.33
0.246	0.10	47.82	61.90	33.02	51.90	-14.08	-18.88
0.372	0.10	39.86	58.46	25.72	48.46	-18.60	-22.74
0.492	0.10	35.32	56.14	20.04	46.14	-20.82	-26.10
1.032	0.10	40.14	56.00	25.68	46.00	-15.86	-20.32
1.718	0.10	39.30	56.00	23.40	46.00	-16.70	-22.60

Remark:

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



Phase: Neutral
Model No.: SAG3020
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
0.150	0.10	54.68	66.00	29.37	56.00	-11.32	-26.63
0.240	0.10	55.22	62.10	43.57	52.10	-6.88	-8.53
0.349	0.10	39.82	58.98	27.08	48.98	-19.16	-21.90
0.458	0.10	43.92	56.73	31.10	46.73	-12.81	-15.63
0.568	0.10	36.52	56.00	25.65	46.00	-19.48	-20.35
1.065	0.10	38.17	56.00	20.43	46.00	-17.83	-25.57

Remark:

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

