

# EMC TEST REPORT

**Report No.** : TS08030092-EME  
**Model No.** : H3C WA2220X-AG  
**Issued Date** : Jul. 23, 2008

**Applicant:** Hangzhou H3C Technologies Co., Ltd.  
310 Liuhe Road, Zhijiang Science Park, Hangzhou  
310053, P.R.China

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

**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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Report Engineer

Sammi Liu

Sammi Liu

Project Engineer

Rex Liao

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Reviewed By

Jimmie Liu

Jimmie Liu

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## 1. Summary of Test Data

Test/Requirement Description	Applicable Rule	Result
Minimum 6dB Bandwidth	15.247(a)(2)	Pass
Maximum Output Power	15.247(b)	Pass
Power Spectral Density	15.247(e)	Pass
RF Antenna Conducted Spurious	15.247(d)	Pass
Radiated Spurious Emission	15.247(d), 15.205, 15.209	Pass
Emission on the Band Edge	15.247(d)	Pass
AC Power Line Conducted Emission	15.207	Pass

## 2. General Information

### Identification of the EUT

Applicant: Hangzhou H3C Technologies Co., Ltd.

Product: Wireless LAN Access Point

Model No.: H3C WA2220X-AG

FCC ID.: U6IH3CEWT0235A29G

Frequency Range: 1. 2412 MHz ~ 2462 MHz  
2. 5745 MHz ~ 5825 MHz

Channel Number: 1. 11 channels for 2412 MHz ~ 2462 MHz  
2. 5 channels for 5745 MHz ~ 5825 MHz

Rated Power: 100-240 Vac, 50-60 Hz with adapter (FSP025-1AD207A)

Power Cord: N/A

Data Cable: 1. RJ-45 UTP Cat.5 10 meter × 2  
2. Shielded cable with N-type connector 1.5 meter × 2

Sample Received: Mar. 14, 2008

Test Date(s): Jul. 01, 2008 ~ Jul. 09, 2008

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Note 2: When determining the test conclusion, the Measurement Uncertainty of test has been considered.

**Description of EUT**

The EUT is a Wireless LAN Access Point, and was defined as information technology equipment.

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

**Antenna description****Antenna 1**

For 802.11b/g

The EUT requires professional installation.

Antenna Gain: 5 dBi max  
Antenna Type: Dipole antenna  
Connector Type: SAM Reverse  
Antenna model No.: SL13090A

**Antenna 2**

For 802.11a

The EUT requires professional installation.

Antenna Gain: 5 dBi max  
Antenna Type: Dipole antenna  
Connector Type: SAM Reverse  
Antenna model No.: SL13089A

**Antenna 3**

For 802.11 b/g

The EUT requires professional installation.

Antenna Gain: 2.5 dBi max  
Antenna Type: Dipole antenna  
Connector Type: SAM Reverse  
Antenna model No.: TQJ-24/58XTJI

#### **Antenna 4**

For 802.11a

The EUT requires professional installation.

Antenna Gain: 4.5 dBi max  
Antenna Type: Dipole antenna  
Connector Type: SAM Reverse  
Antenna model No.: TQJ-24/58XTJI

## Operation mode

The EUT was supplied with 120 Vac, 60 Hz and it was running in operating mode.

The EUT was transmitted continuously during the test.

With individual verifying, the maximum output power was found at 1 Mbps data rate for 802.11b mode and 6 Mbps data rate for 802.11a/g mode. The final tests were executed under these conditions and recorded in this report individually.

11b (CH 6 2437 MHz)	
	PK
1 M	18.08
2 M	18.06
5.5 M	17.79
11 M	17.90
11g (CH 6 2462 MHz)	
	PK
6 M	24.56
9 M	24.50
12 M	24.43
18 M	24.40
24 M	24.34
36 M	24.21
48 M	24.12
54 M	23.90
11a (CH 157 5785 MHz)	
	PK
6 M	22.51
9 M	22.39
12 M	22.35
18 M	22.30
24 M	22.15
36 M	22.10
48 M	21.90
54 M	21.85

### 3. Maximum 6 dB Bandwidth

<b>Name of Test</b>	Maximum 6 dB Bandwidth
<b>Base Standard</b>	FCC 15.247 (a)(2)

**Tested By:** Rex Liao  
**Test Date:** Jul. 03, 2008

**Test Equipment:** EC1365

**Test Result:** Complies  
**Test Method:** See Appendix B  
**Measurement Data:** See Table & plots below

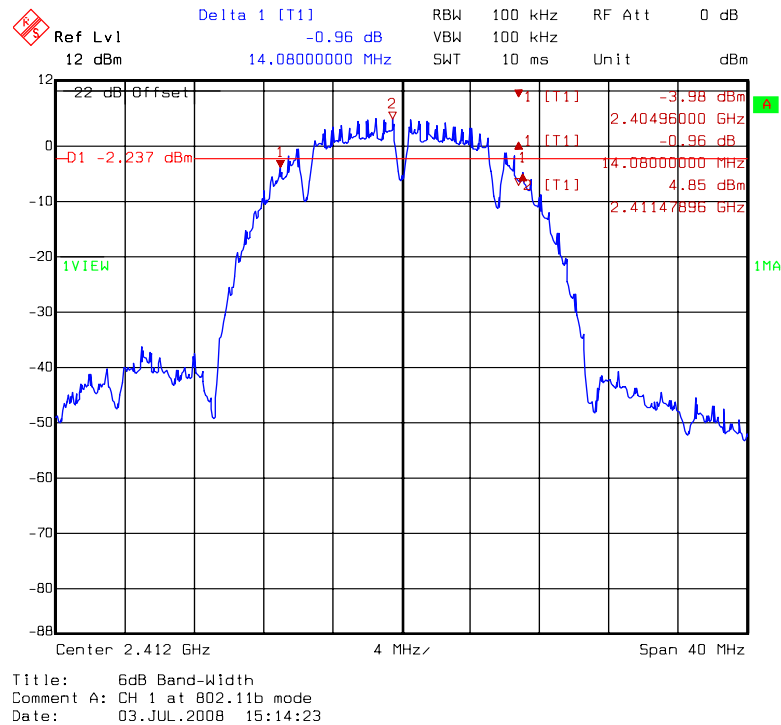
**Note:** The EUT was tested while in a continuous transmit mode and the worst case data rates are 1 Mbps for 802.11b and 6 Mbps for 802.11a/ 11g. The EUT was tuned to a low, middle and high channel.

Table1. Maximum 6dB Bandwidth

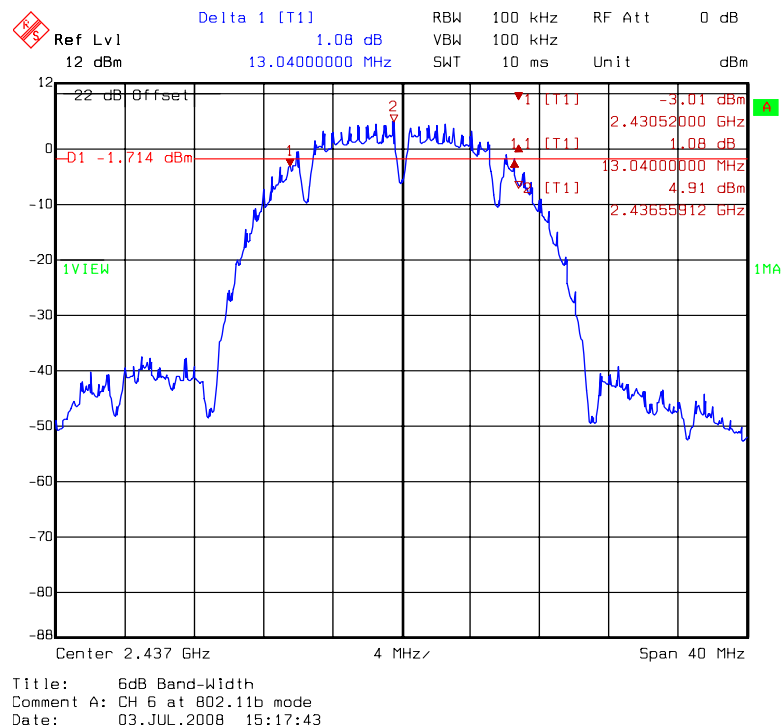
Mode	Channel	Frequency (MHz)	Bandwidth (MHz)	Min. Limit (MHz)	Pass/Fail
11b	1	2412	14.08	0.5	Pass
	6	2437	13.04	0.5	Pass
	11	2462	13.04	0.5	Pass
11g	1	2412	16.72	0.5	Pass
	6	2437	16.64	0.5	Pass
	11	2462	16.64	0.5	Pass
11a	149	5745	16.80	0.5	Pass
	157	5785	16.72	0.5	Pass
	165	5825	16.80	0.5	Pass



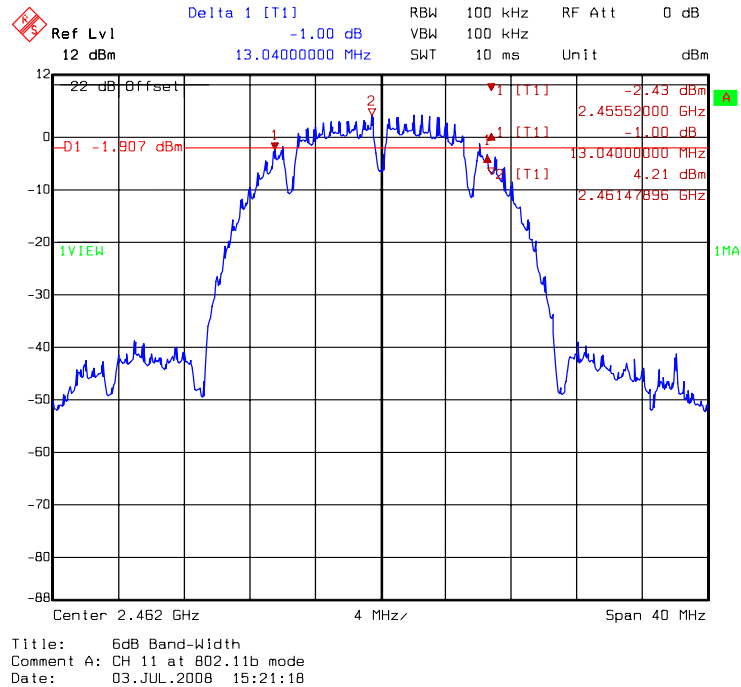
### 6 dB Bandwidth @ 802.11b mode channel 1



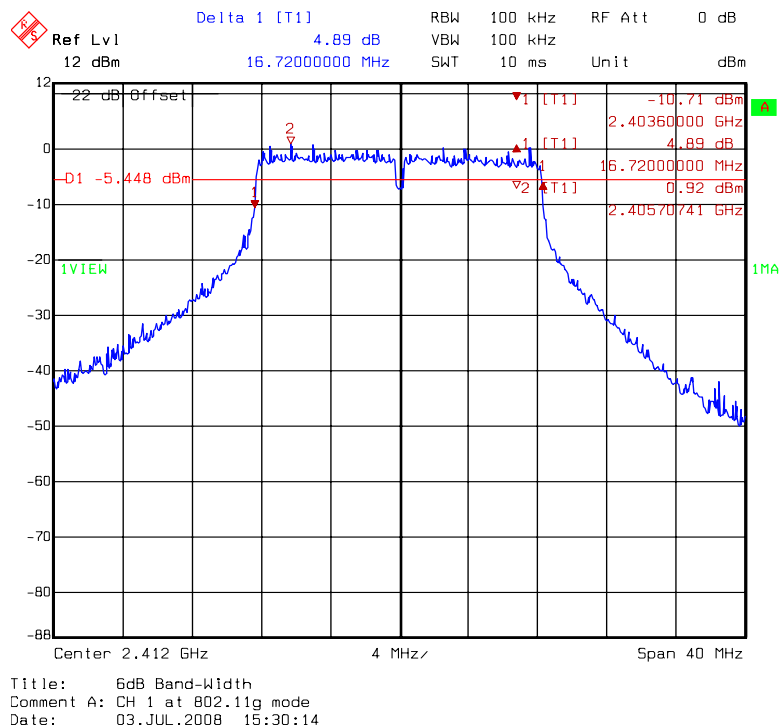
### 6 dB Bandwidth @ 802.11b mode channel 6



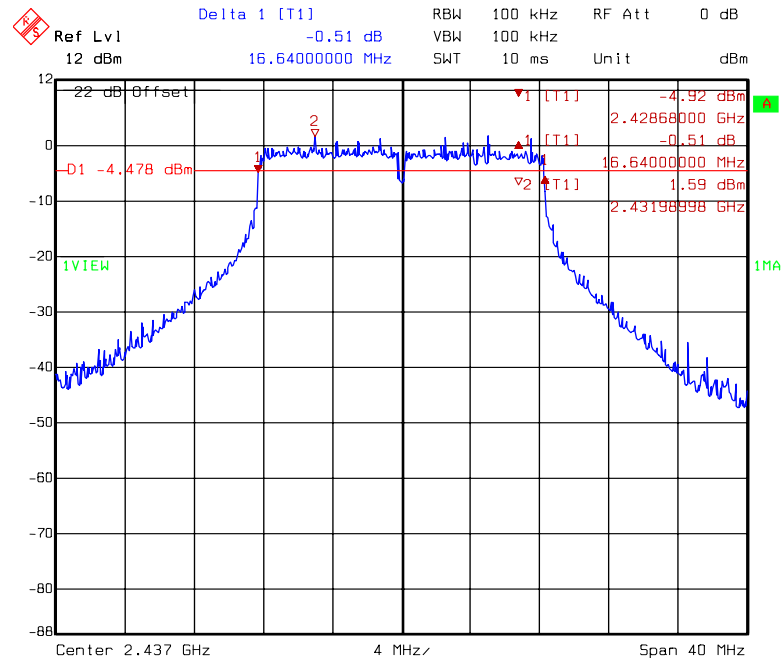
### 6 dB Bandwidth @ 802.11b mode channel 11



### 6 dB Bandwidth @ 802.11g mode channel 1

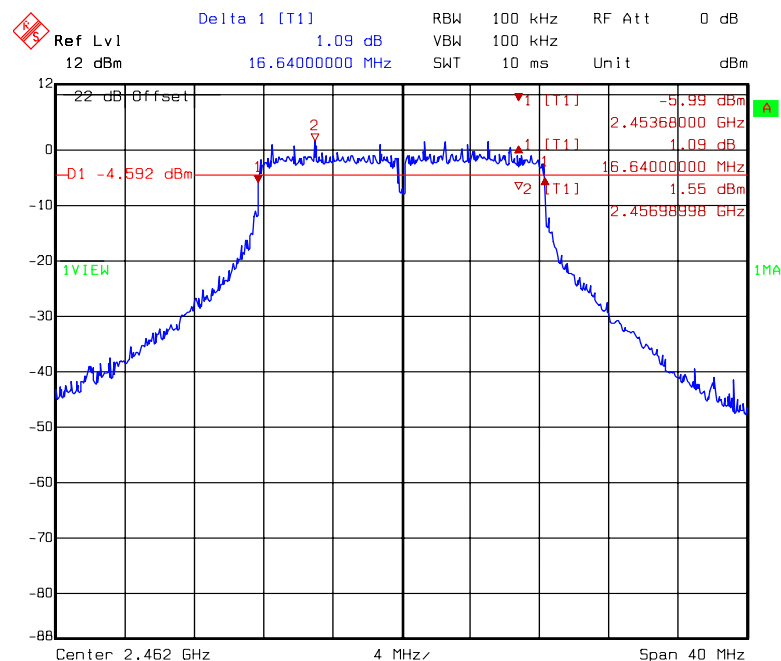


### 6 dB Bandwidth @ 802.11g mode channel 6



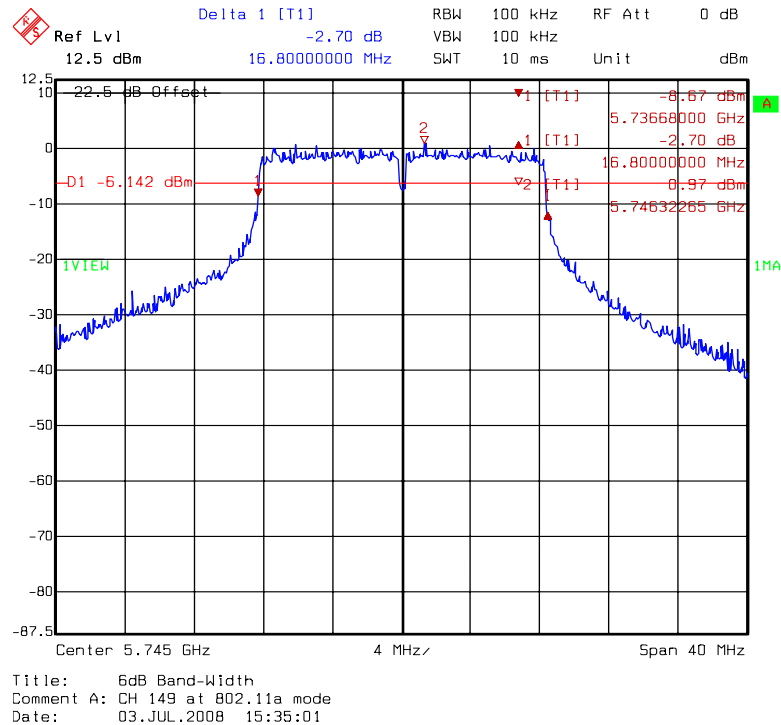
Title: 6dB Band-Width  
Comment A: CH 6 at 802.11g mode  
Date: 03.JUL.2008 15:27:22

### 6 dB Bandwidth @ 802.11g mode channel 11

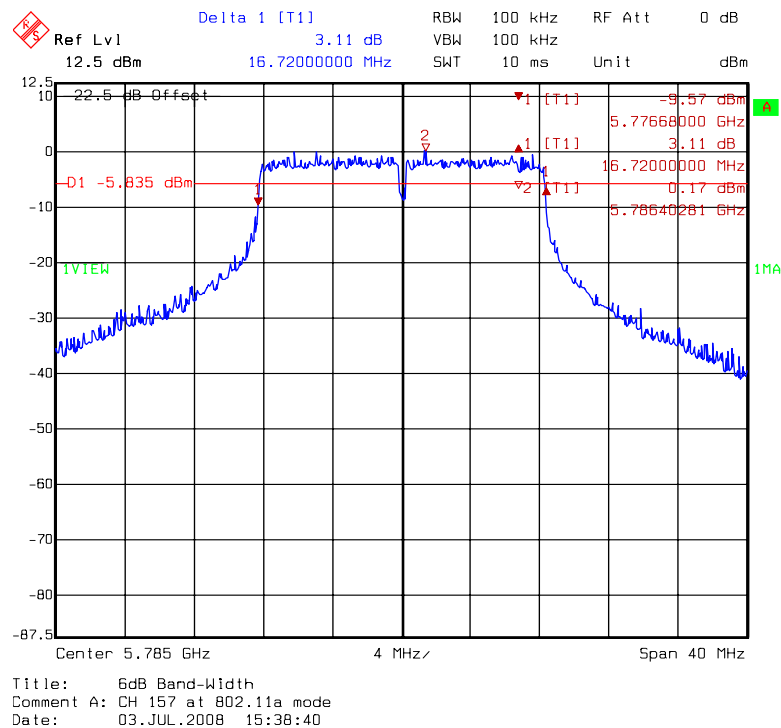


Title: 6dB Band-Width  
Comment A: CH 11 at 802.11g mode  
Date: 03.JUL.2008 15:24:28

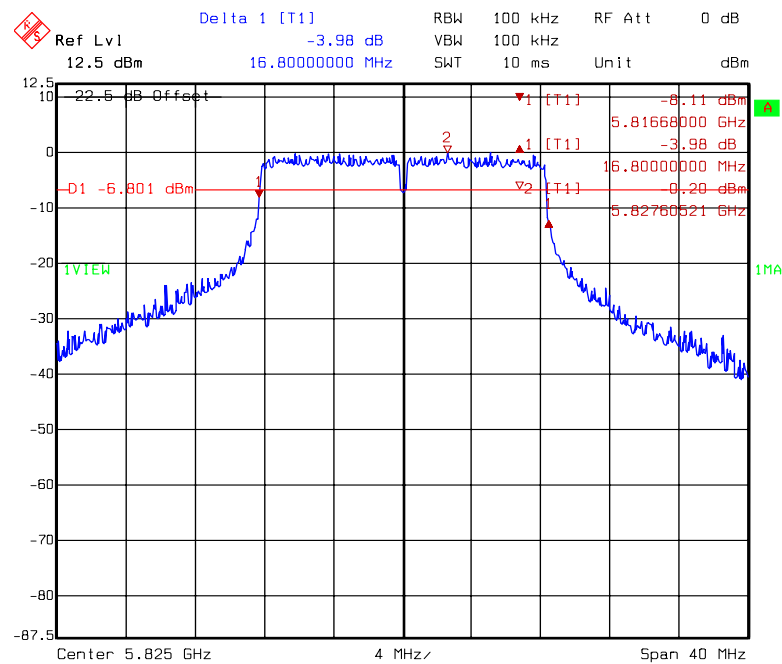
### 6 dB Bandwidth @ 802.11a mode channel 149



### 6 dB Bandwidth @ 802.11a mode channel 157



## 6 dB Bandwidth @ 802.11a mode channel 165



Title: 6dB Band-Width  
Comment A: CH 165 at 802.11a mode  
Date: 03.JUL.2008 15:41:50

#### 4. 99 % Occupied Bandwidth

<b>Name of Test</b>	99 % Occupied Bandwidth
<b>Base Standard</b>	None; for reporting purposes only

**Tested By:** Rex Liao  
**Test Date:** Jul. 03, 2008

**Test Equipment:** EC1365

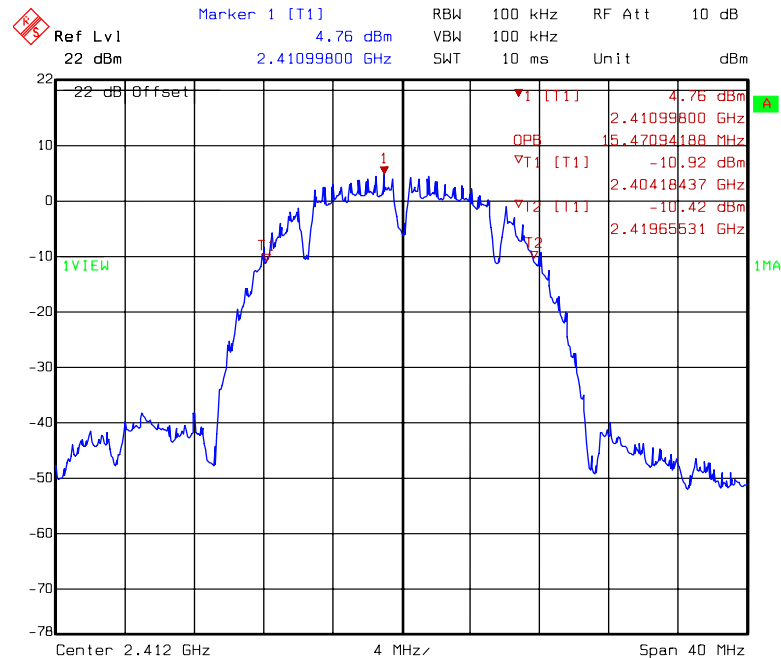
**Test Result:** Complies  
**Test Method:** See Appendix B  
**Measurement Data:** See Table & plots below

**Note:** The EUT was tested while in a continuous transmit mode and the worst case data rates are 1Mbps for 802.11b and 6Mbps for 802.11a/ 11g. The EUT was tuned to a low, middle and high channel.

Table2. 99 % Occupied Bandwidth

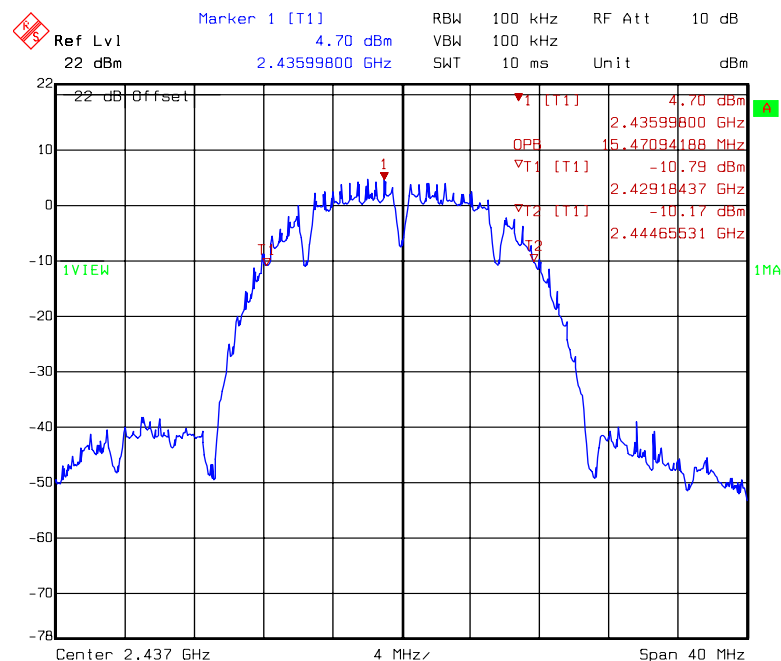
Mode	Channel	Frequency (MHz)	Occupied Bandwidth (MHz)
11b	1	2412	15.47
	6	2437	15.47
	11	2462	15.55
11g	1	2412	16.59
	6	2437	16.59
	11	2462	16.59
11a	149	5745	16.67
	157	5785	16.67
	165	5825	16.59

### 99 % Occupied Bandwidth @ 802.11b mode channel 1



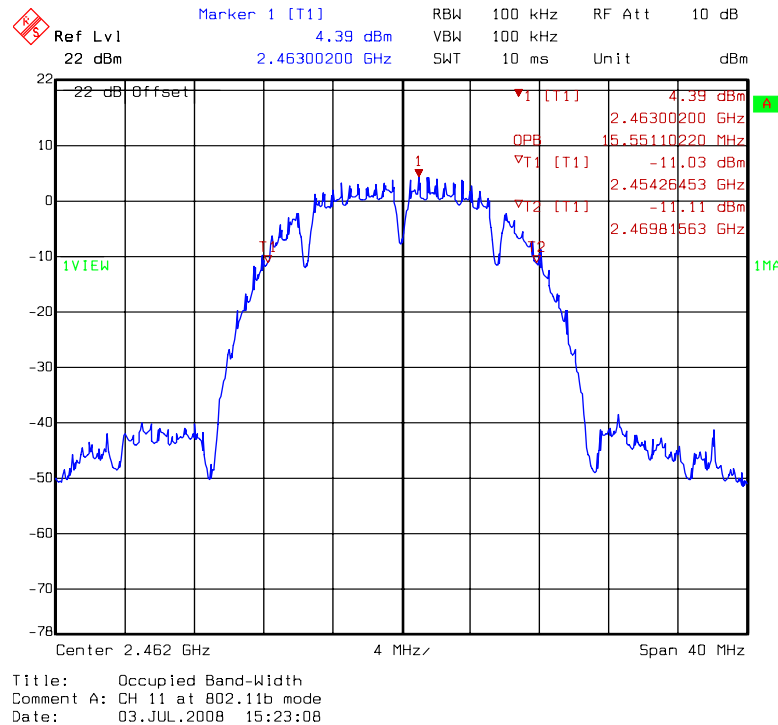
Title: Occupied Band-Width  
Comment A: CH 1 at 802.11b mode  
Date: 03.JUL.2008 15:16:13

### 99 % Occupied Bandwidth @ 802.11b mode channel 6

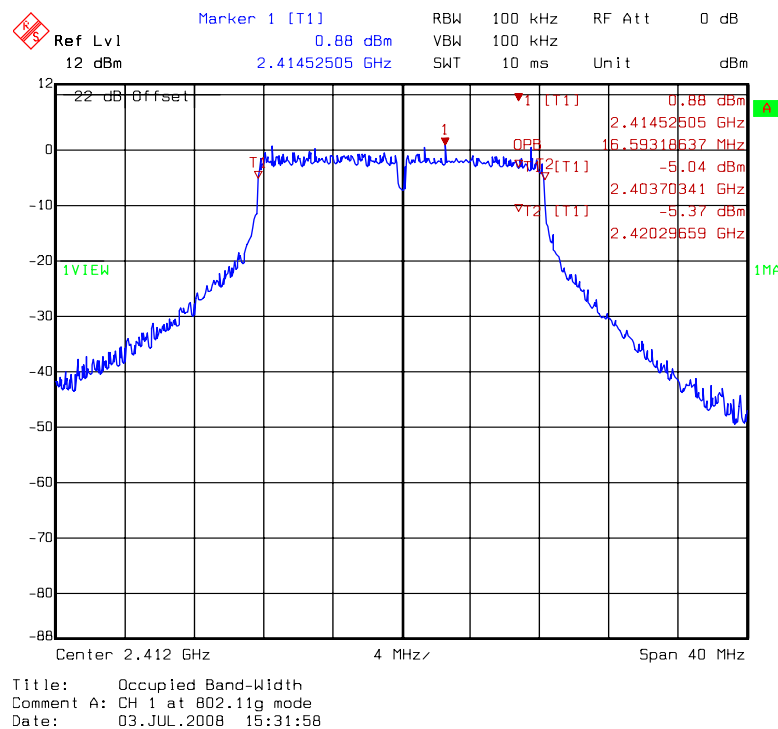


Title: Occupied Band-Width  
Comment A: CH 6 at 802.11b mode  
Date: 03.JUL.2008 15:19:33

### 99 % Occupied Bandwidth @ 802.11b mode channel 11

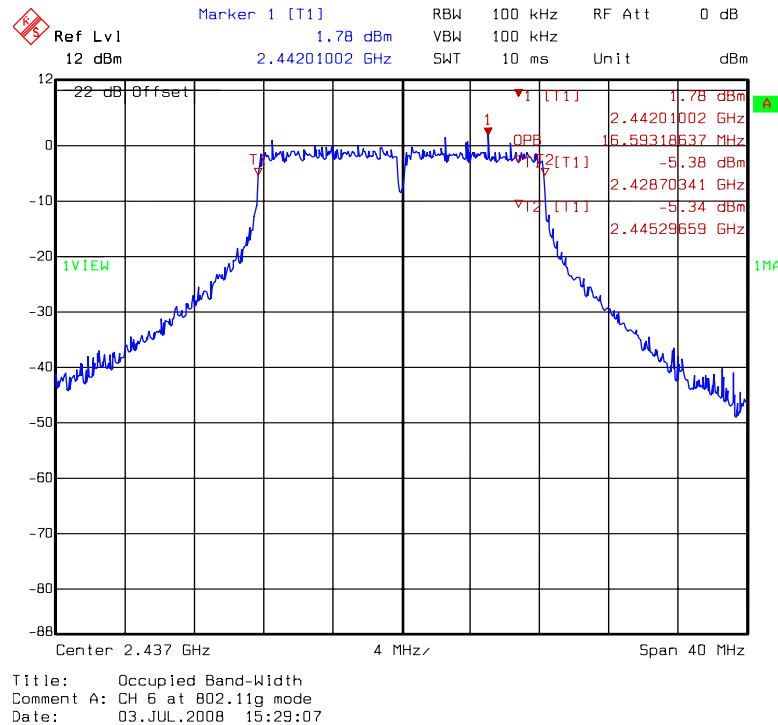


### 99 % Occupied Bandwidth @ 802.11g mode channel 1

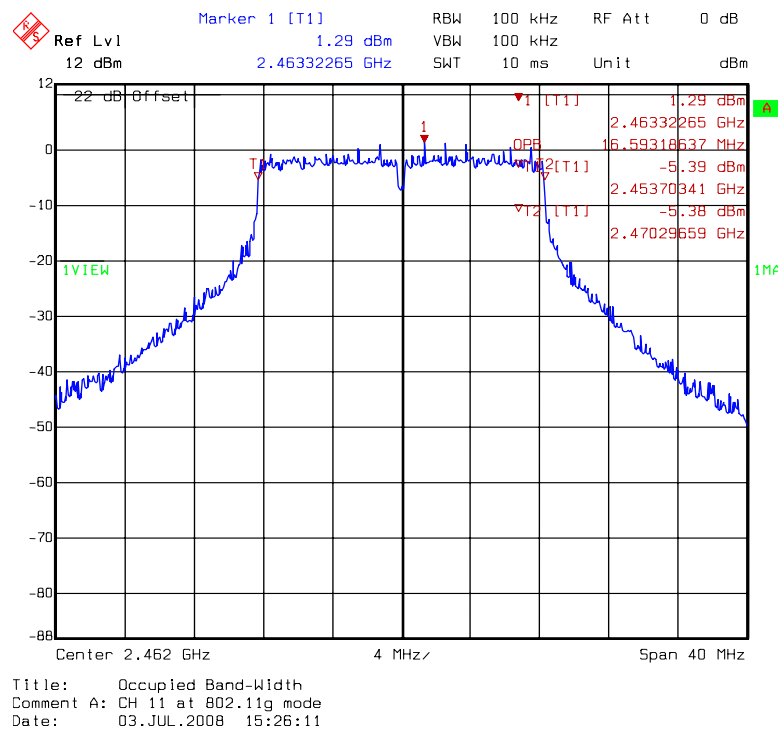




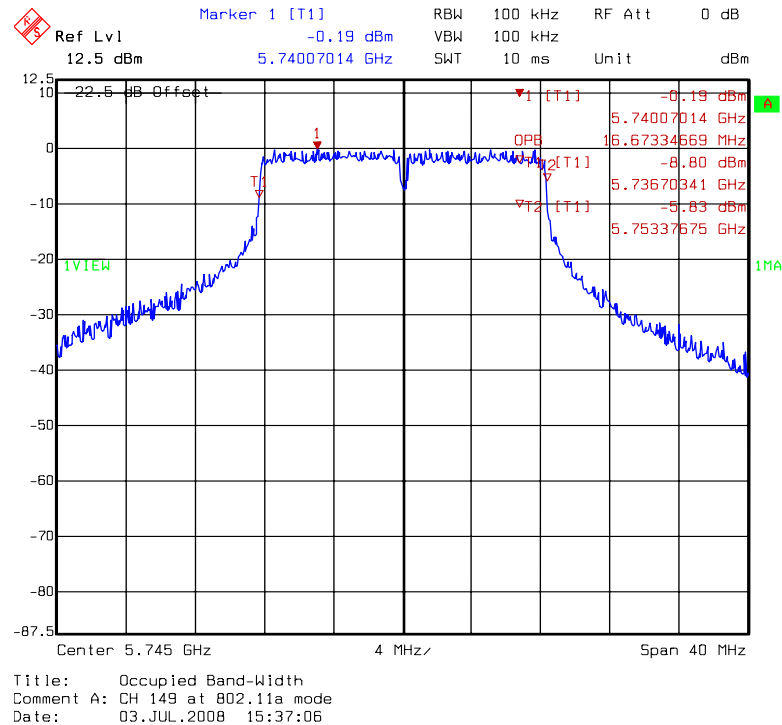
### 99 % Occupied Bandwidth @ 802.11g mode channel 6



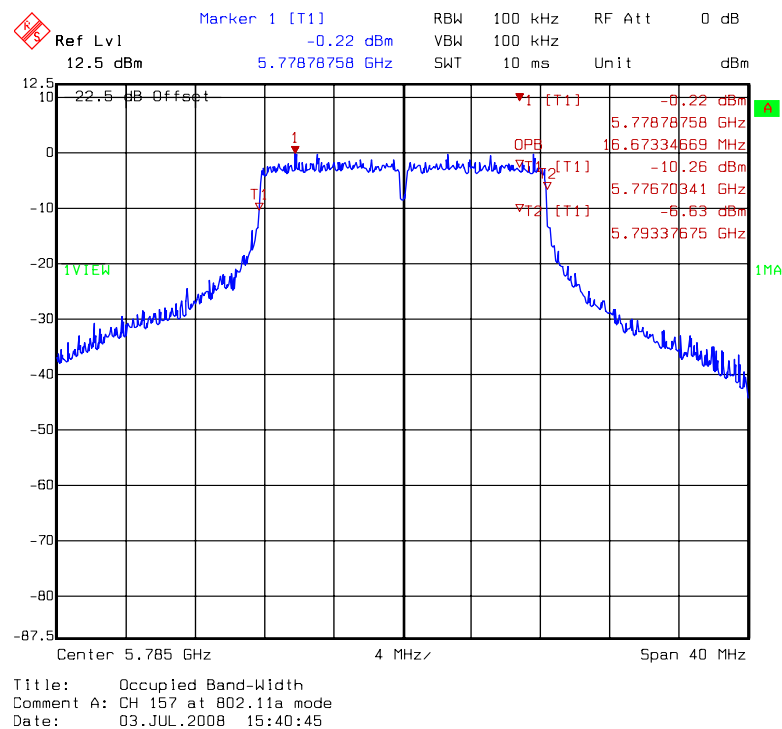
### 99 % Occupied Bandwidth @ 802.11g mode channel 11



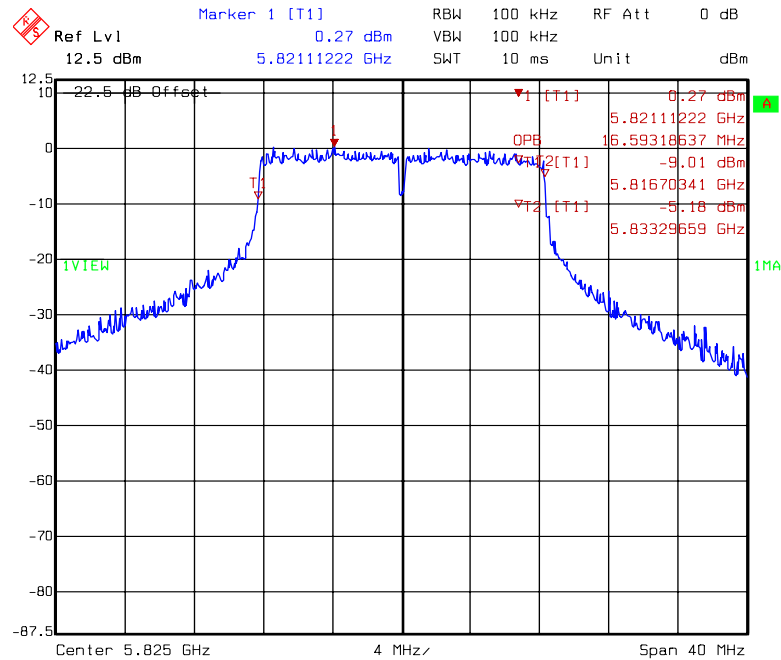
# 99 % Occupied Bandwidth @ 802.11a mode channel 149



# 99 % Occupied Bandwidth @ 802.11a mode channel 157



# 99 % Occupied Bandwidth @ 802.11a mode channel 165



Title: Occupied Band-Width  
Comment A: CH 165 at 802.11a mode  
Date: 03.JUL.2008 15:43:55

## 5. Maximum Output Power

<b>Name of Test</b>	Maximum output power
<b>Base Standard</b>	FCC 15.247(b)

**Tested By:** Rex Liao  
**Test Date:** Jul. 03, 2008

**Test Equipment:** EC1396, EC1396-1  
**Measurement Uncertainty:**  $\pm 2\text{dB}$  (k=2)

**Test Result:** Complies  
**Test Method:** See Appendix A  
**Measurement Data:** See Table below

**Note:** The EUT was tested while in a continuous transmit mode and the worst case data rates are 1 Mbps for 802.11b and 6 Mbps for 802.11a/ 11g. The EUT was tuned to a low, middle and high channel.

Table3. Maximum output power

Mode	Channel	Frequency (MHz)	C.L. (dB)	Reading (dBm)	Conducted Peak Output Power		Limit
					(dBm)	(mW)	
11b	1	2412	2	15.80	17.80	60.26	1
	6	2437	2	16.08	18.08	64.27	1
	11	2462	2	15.96	17.96	62.52	1
11g	1	2412	2	21.92	23.92	246.60	1
	6	2437	2	22.56	24.56	285.76	1
	11	2462	2	22.50	24.50	281.84	1
11a	149	5745	2	20.63	22.63	183.23	1
	157	5785	2	20.51	22.51	178.24	1
	165	5825	2	21.10	23.10	204.17	1

## 6. Power Spectral Density

<b>Name of Test</b>	Power Spectral Density
<b>Base Standard</b>	FCC 15.247(e)

**Tested By:** Rex Liao  
**Test Date:** Jul. 01, 2008

**Test Equipment:** EC1365

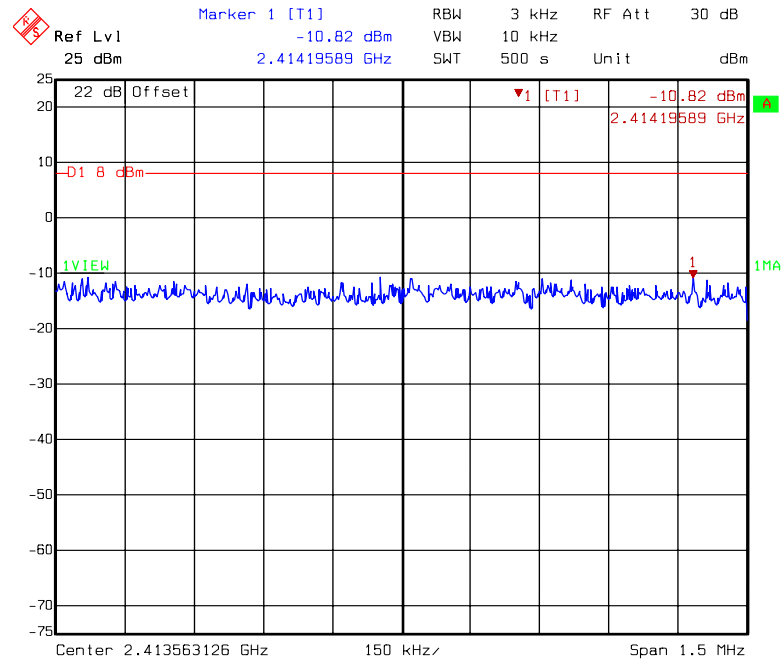
**Test Result:** Complies  
**Test Method:** See Appendix B  
**Measurement Data:** See Table & plots below

**Note:** The EUT was tested while in a continuous transmit mode and the worst case data rates are 1 Mbps for 802.11b and 6 Mbps for 802.11a/ 11g. The EUT was tuned to a low, middle and high channel.

Table4. Power Spectral Density

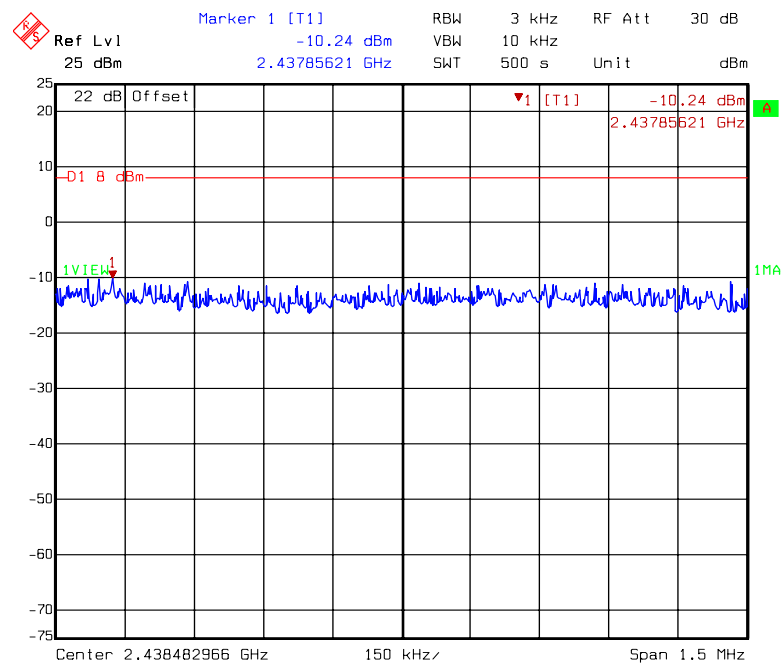
Mode	Channel	Frequency (MHz)	Total PSD (dBm)	Limit (dBm)
11b	1	2412	-10.82	8
	6	2437	-10.24	8
	11	2462	-11.03	8
11g	1	2412	-13.06	8
	6	2437	-12.33	8
	11	2462	-12.94	8
11a	149	5745	-11.75	8
	157	5785	-12.96	8
	165	5825	-12.05	8

## Power Spectral Density @ 802.11b mode channel 1



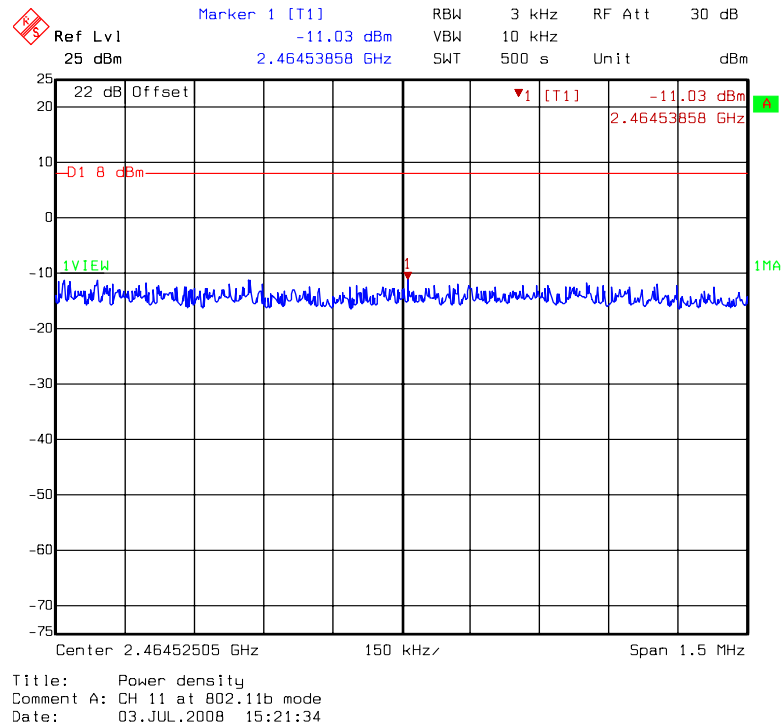
Title: Power density  
Comment A: CH 1 at 802.11b mode  
Date: 03.JUL.2008 15:14:39

## Power Spectral Density @ 802.11b mode channel 6

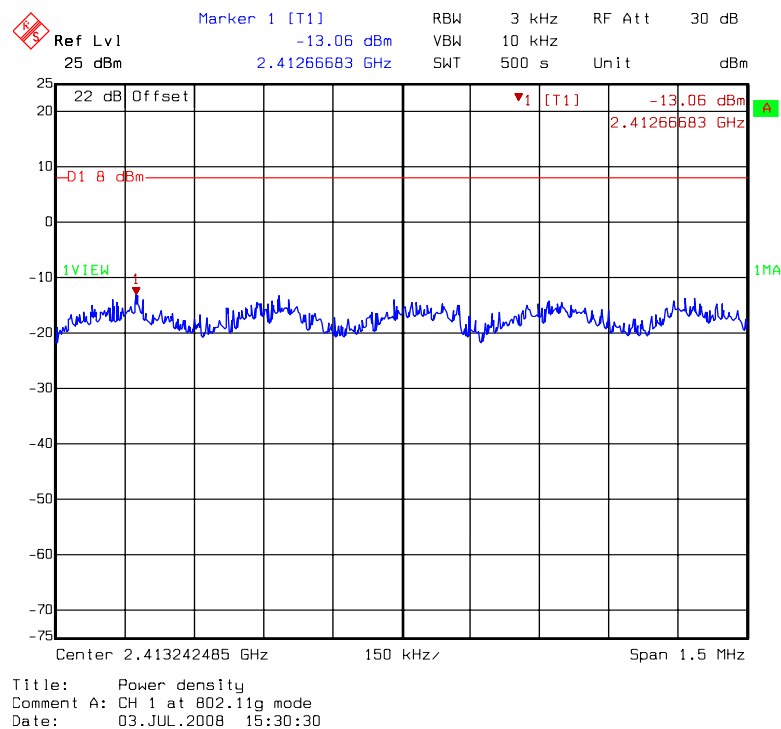


Title: Power density  
Comment A: CH 6 at 802.11b mode  
Date: 03.JUL.2008 15:17:59

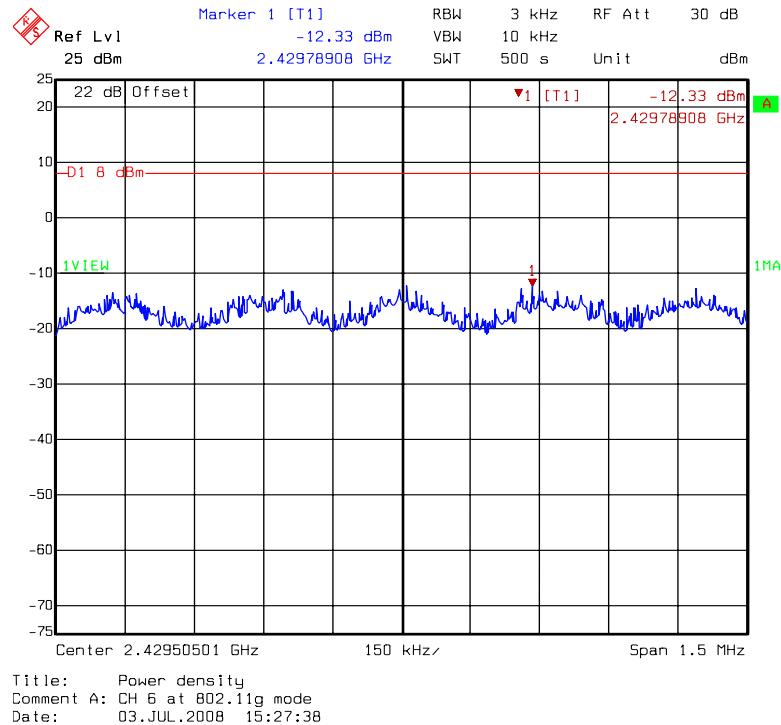
## Power Spectral Density @ 802.11b mode channel 11



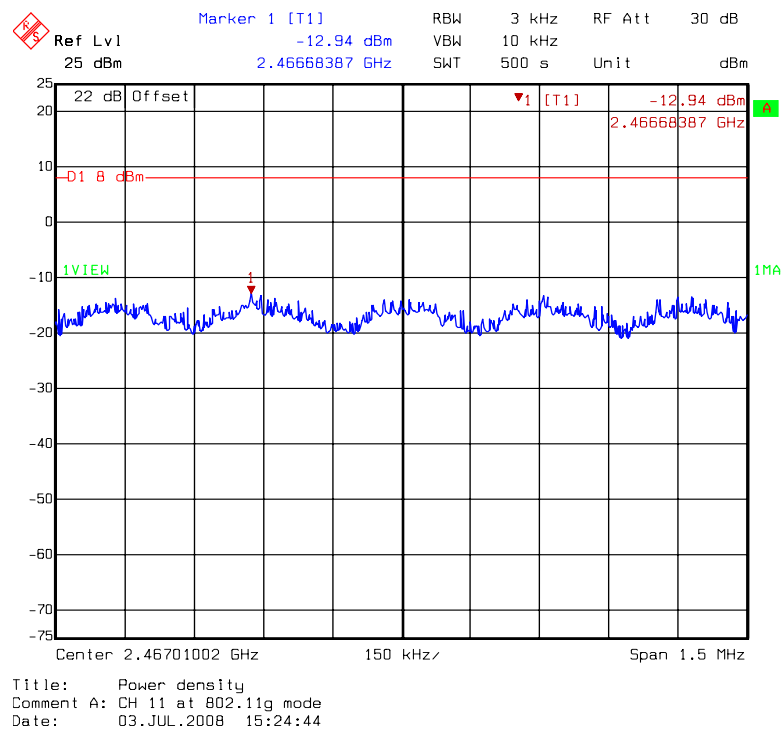
## Power Spectral Density @ 802.11g mode channel 1



## Power Spectral Density @ 802.11g mode channel 6

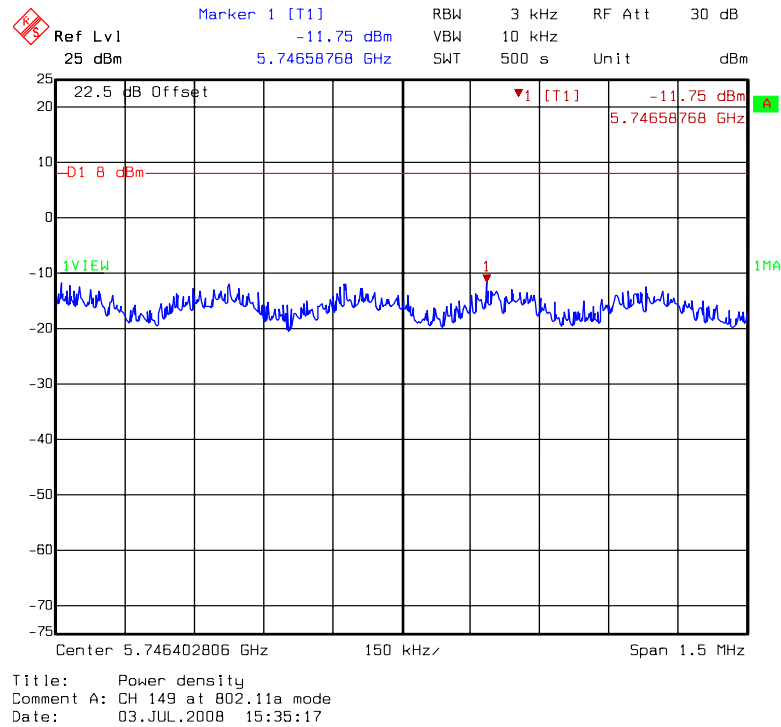


## Power Spectral Density @ 802.11g mode channel 11

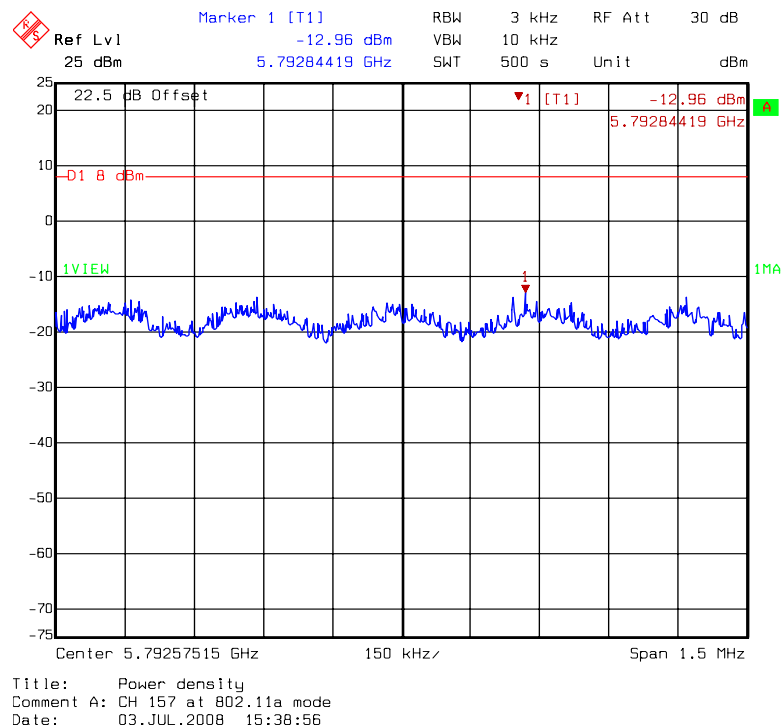




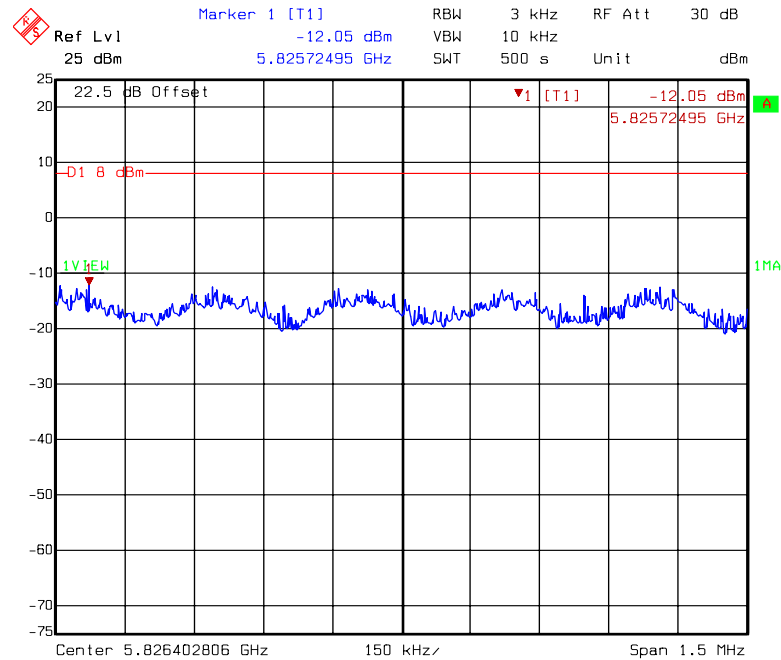
## Power Spectral Density @ 802.11a mode channel 149



## Power Spectral Density @ 802.11a mode channel 157



Power Spectral Density @ 802.11a mode channel 165



Title: Power density  
Comment A: CH 165 at 802.11a mode  
Date: 03.JUL.2008 15:42:06

## 7. RF Antenna conducted Spurious

<b>Name of Test</b>	RF Antenna Conducted Spurious
<b>Base Standard</b>	FCC 15.247(d)

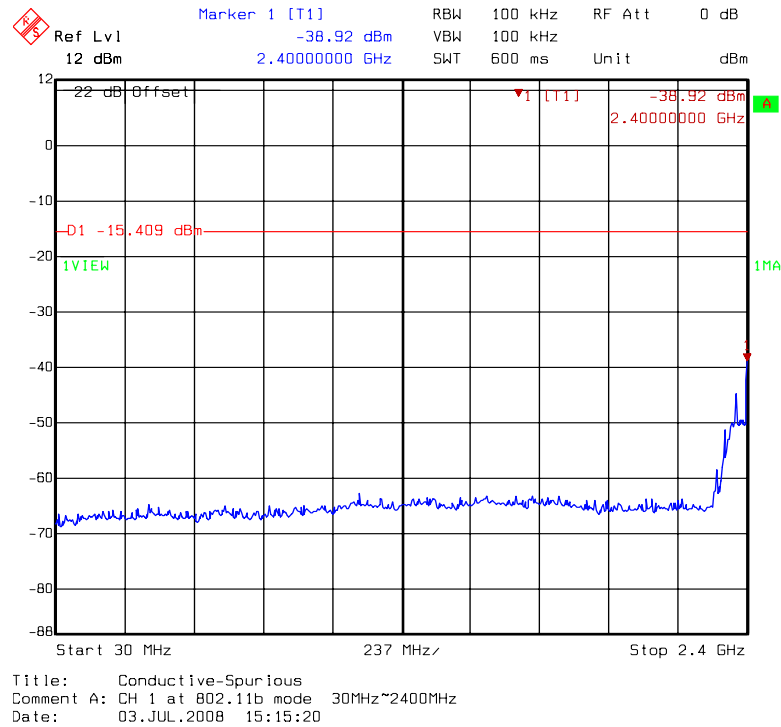
**Tested By:** Rex Liao  
**Test Date:** Jul. 03, 2008

**Test Equipment:** EC1365

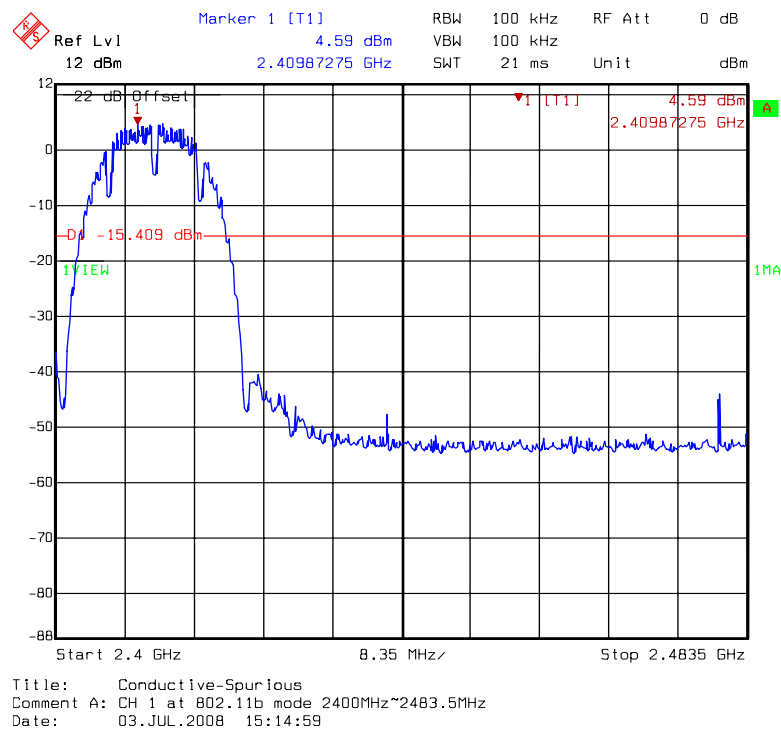
**Test Result:** Complies  
**Test Method:** See Appendix C  
**Measurement Data:** See plots below

**Note:** (1) The EUT was tested while in a continuous transmit mode and the worst case data rates are 1 Mbps for 802.11b and 6 Mbps for 802.11a/ 11g. The EUT was tuned to a low, middle and high channel.  
(2) The EUT operating at 2.4 GHz ISM band. Frequency Range scanned from 30 MHz to 25 GHz.

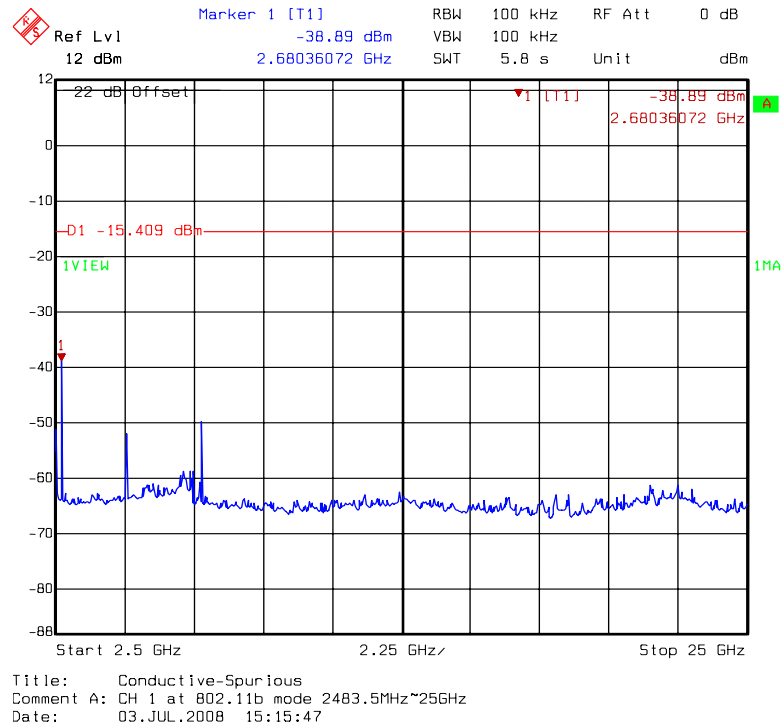
conducted spurious @ 802.11b mode channel 1 (1 of 3)



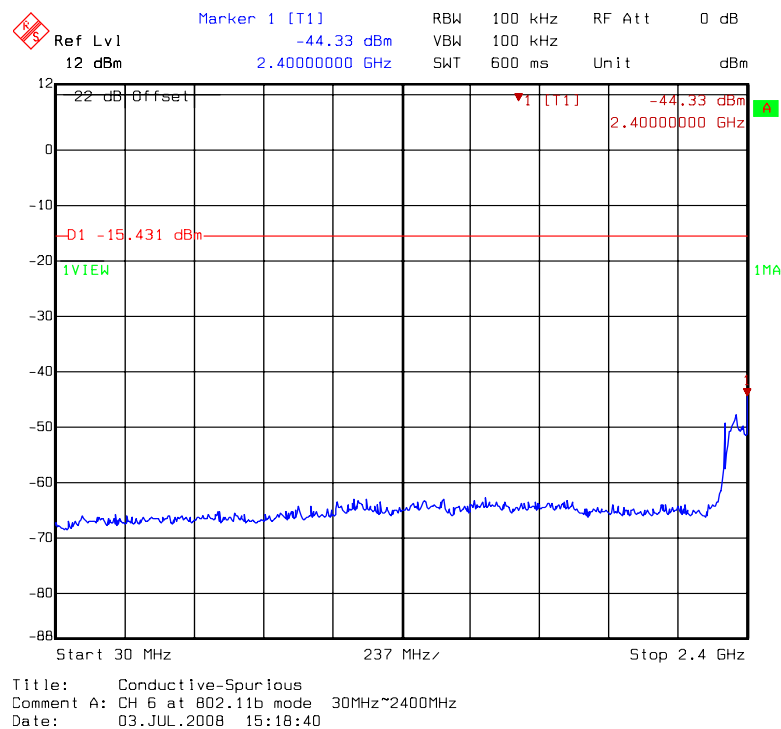
conducted spurious @ 802.11b mode channel 1 (2 of 3)



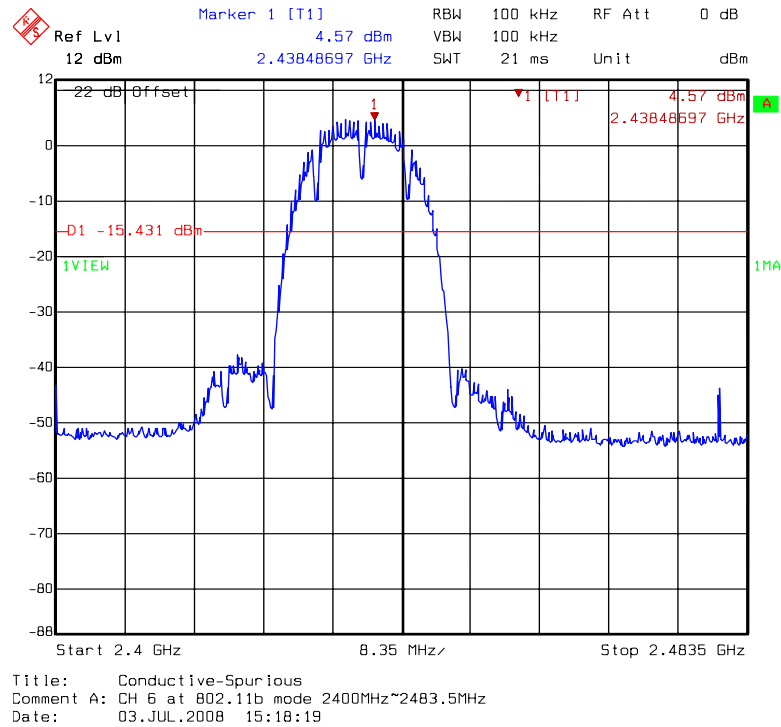
conducted spurious @ 802.11b mode channel 1 (3 of 3)



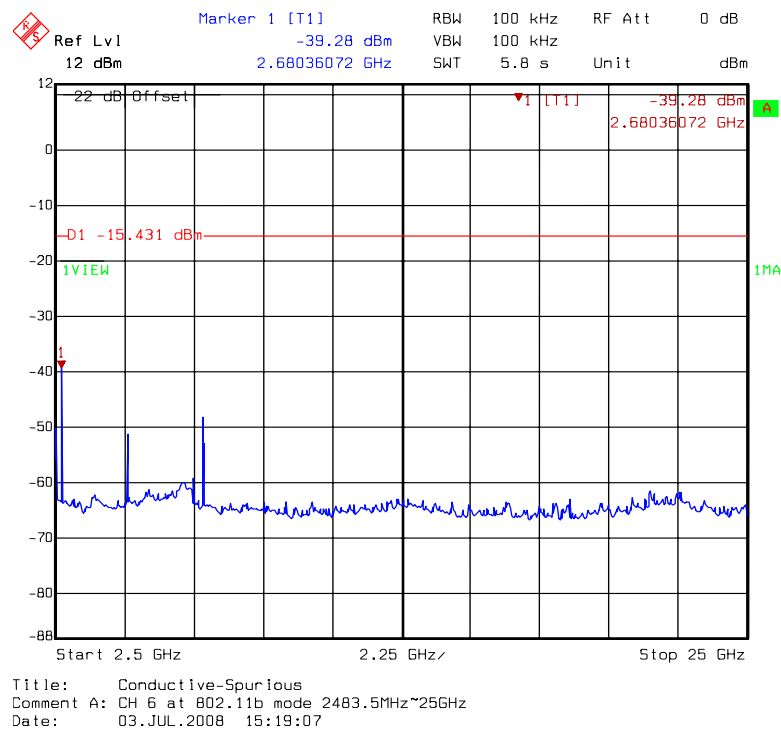
conducted spurious @ 802.11b mode channel 6 (1 of 3)



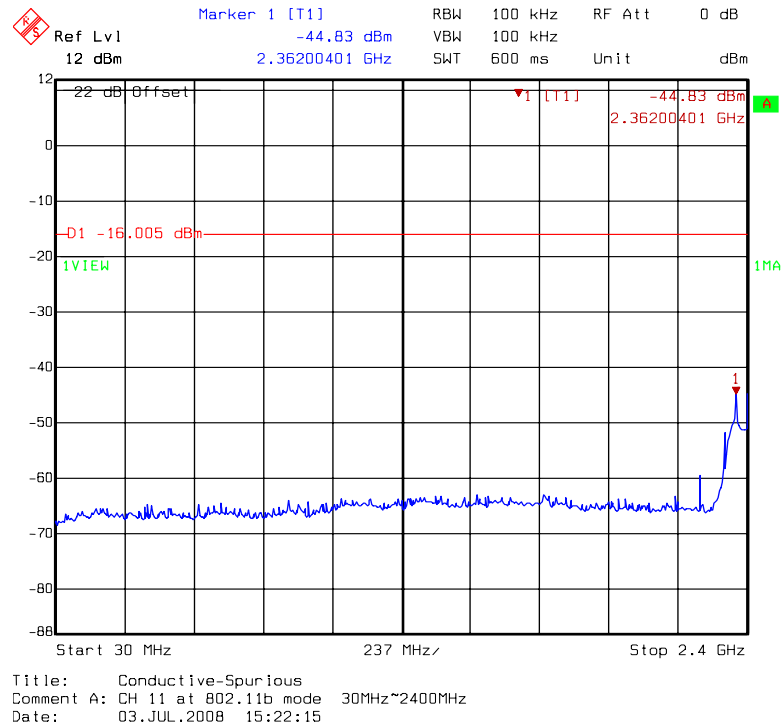
## conducted spurious @ 802.11b mode channel 6 (2 of 3)



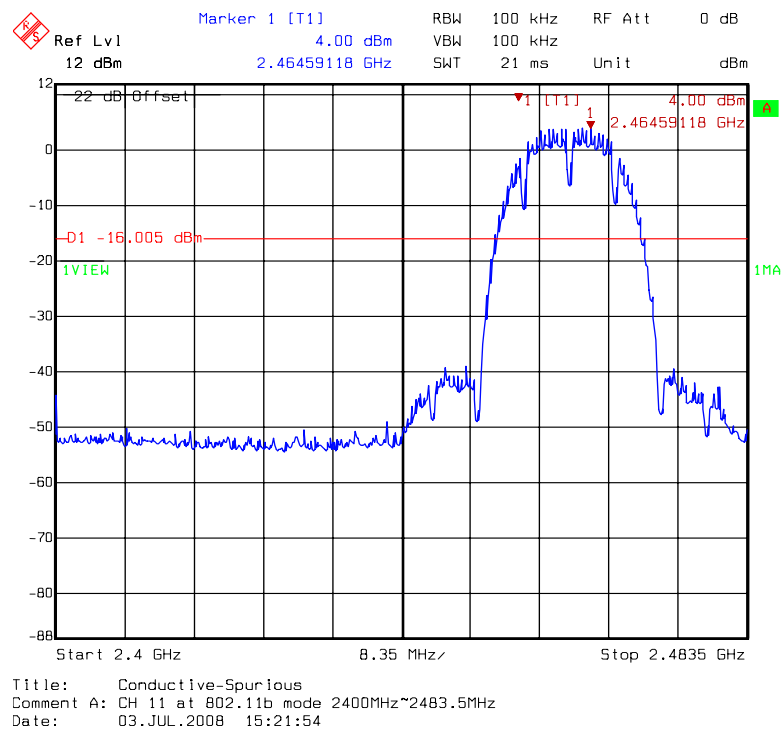
## conducted spurious @ 802.11b mode channel 6 (3 of 3)



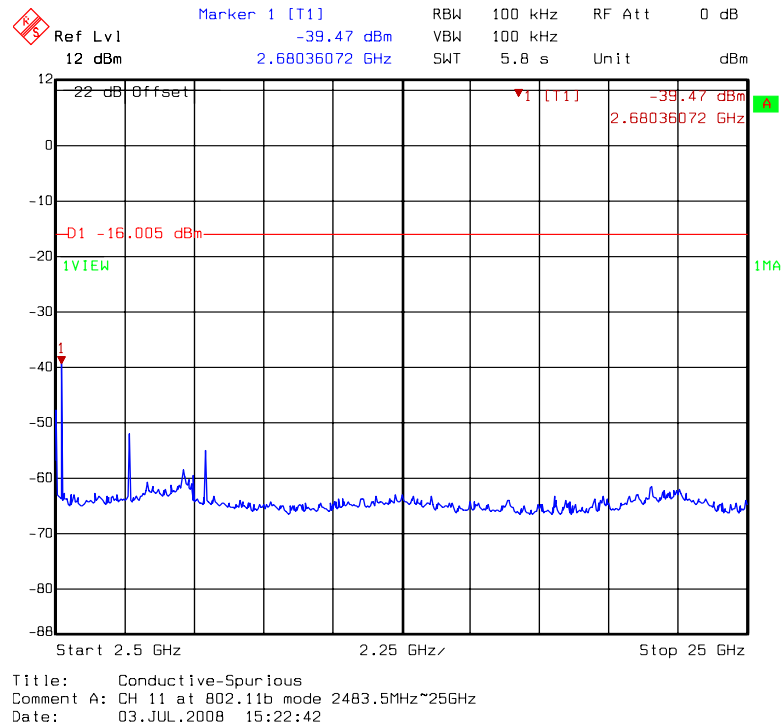
conducted spurious @ 802.11b mode channel 11 (1 of 3)



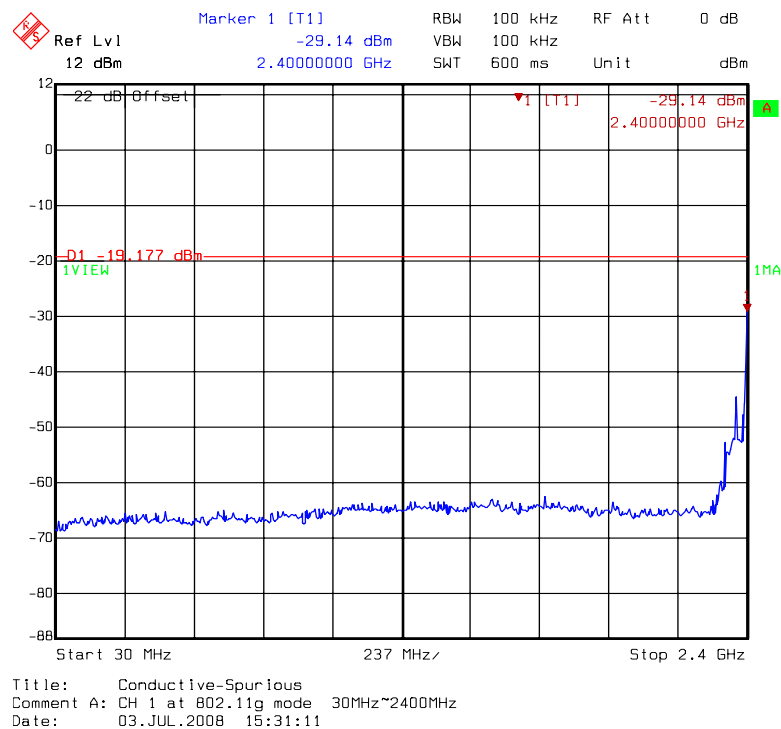
conducted spurious @ 802.11b mode channel 11 (2 of 3)



## conducted spurious @ 802.11b mode channel 11 (3 of 3)

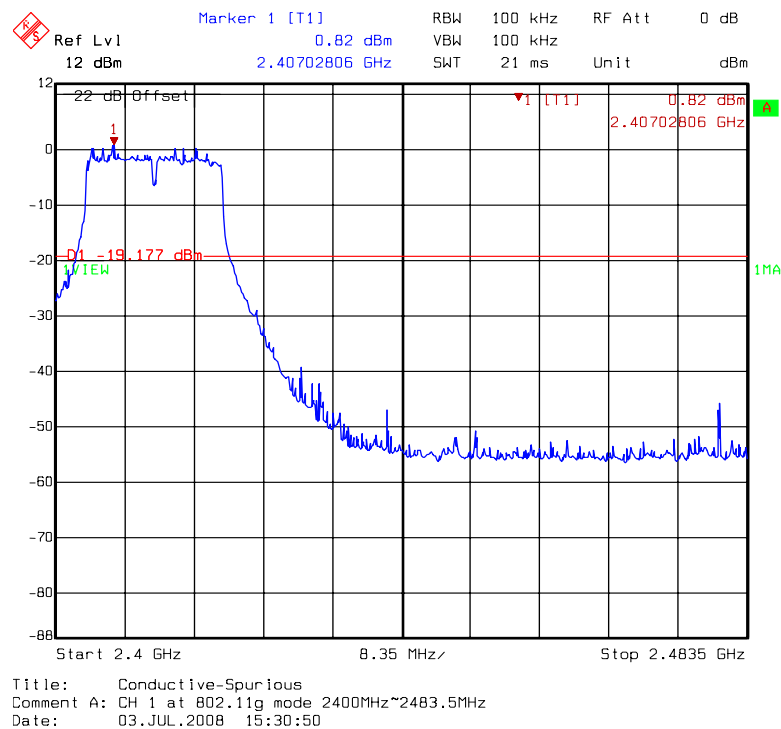


## conducted spurious @ 802.11g mode channel 1 (1 of 3)

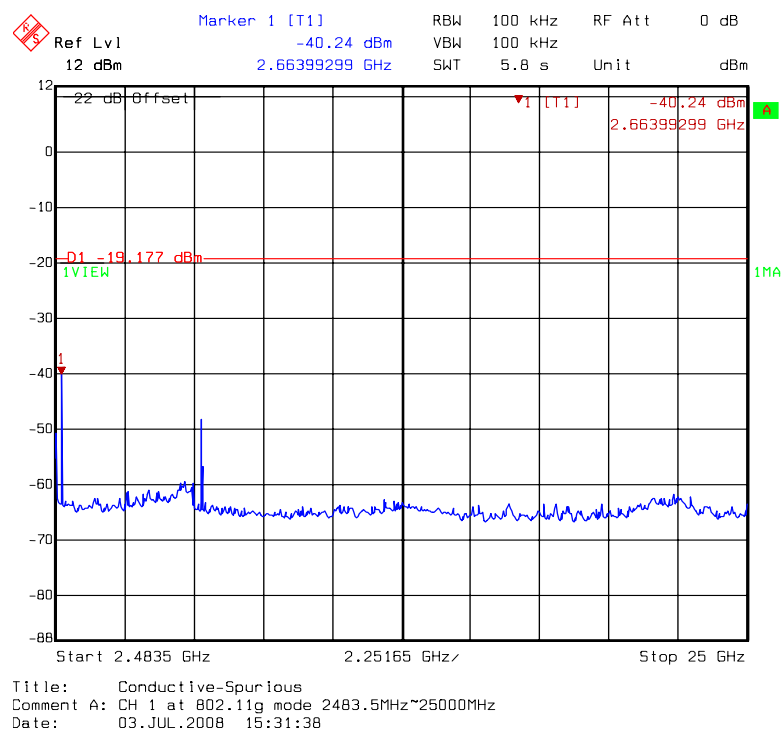




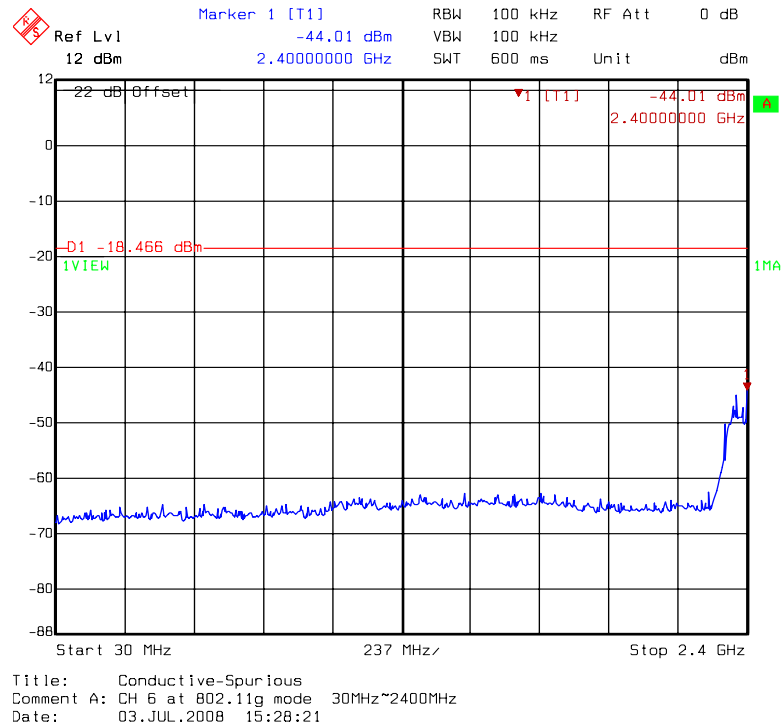
conducted spurious @ 802.11g mode channel 1 (2 of 3)



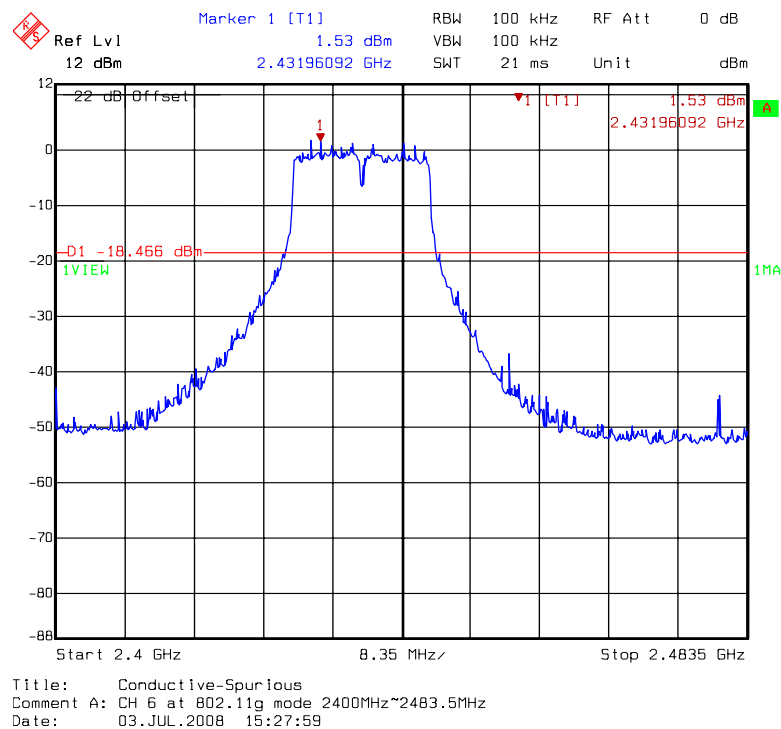
conducted spurious @ 802.11g mode channel 1 (3 of 3)



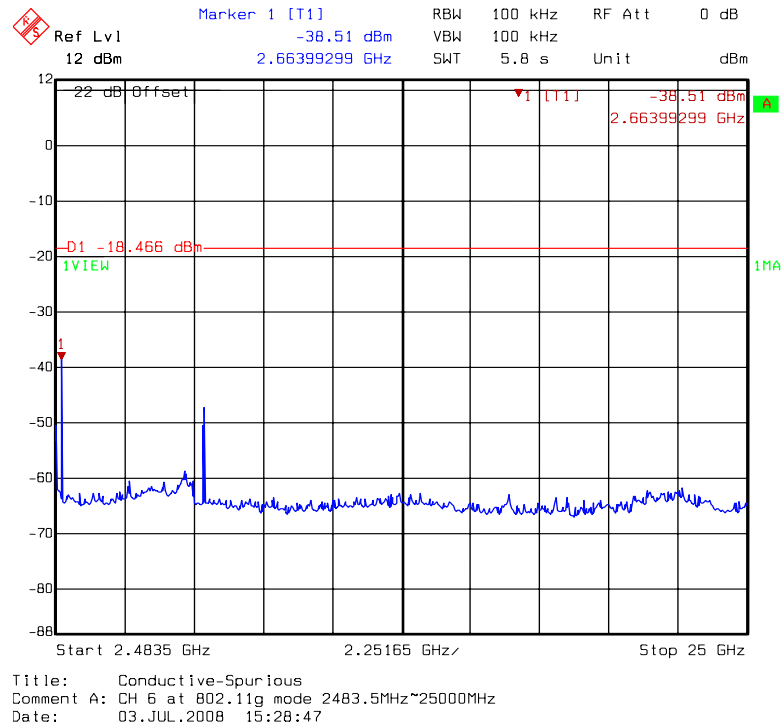
## conducted spurious @ 802.11g mode channel 6 (1 of 3)



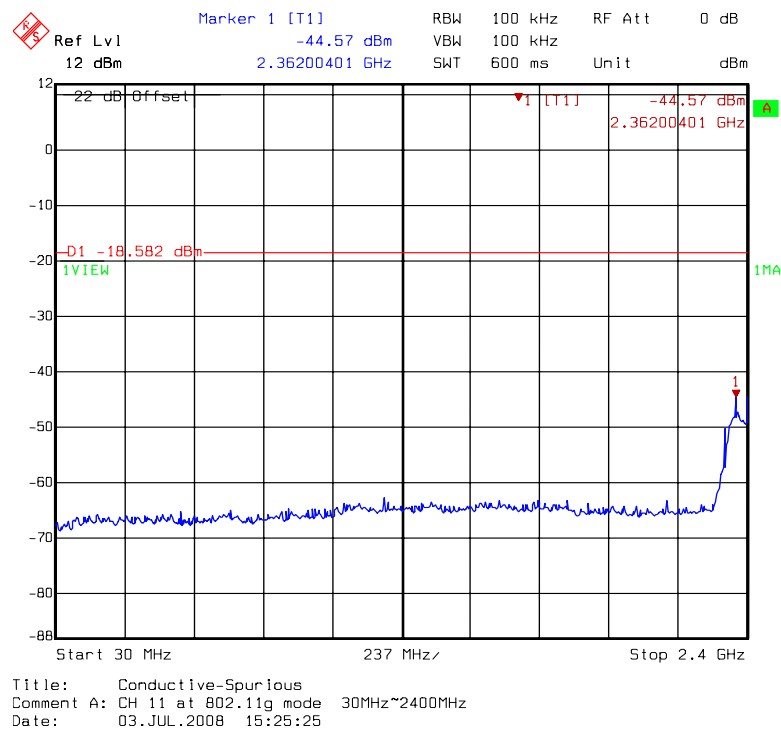
## conducted spurious @ 802.11g mode channel 6 (2 of 3)



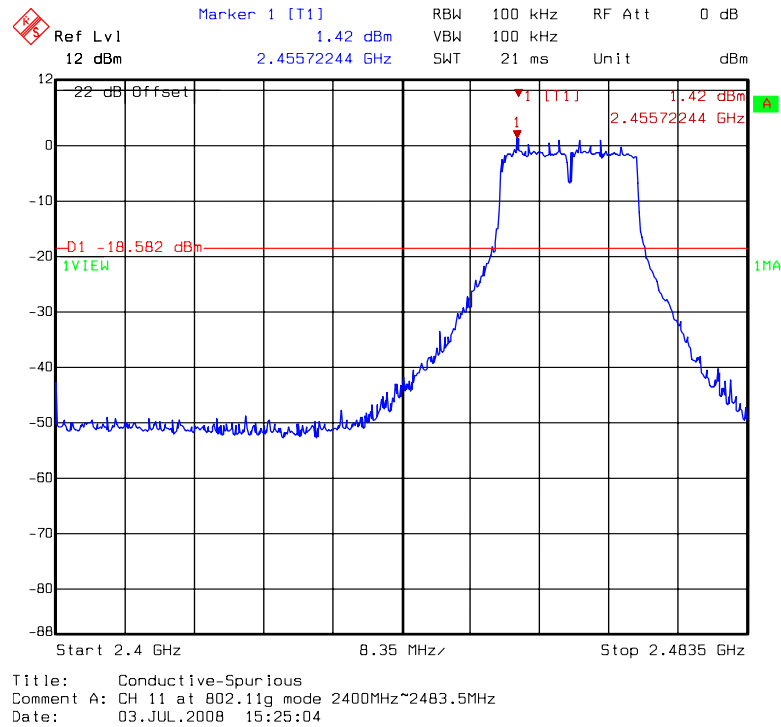
conducted spurious @ 802.11g mode channel 6 (3 of 3)



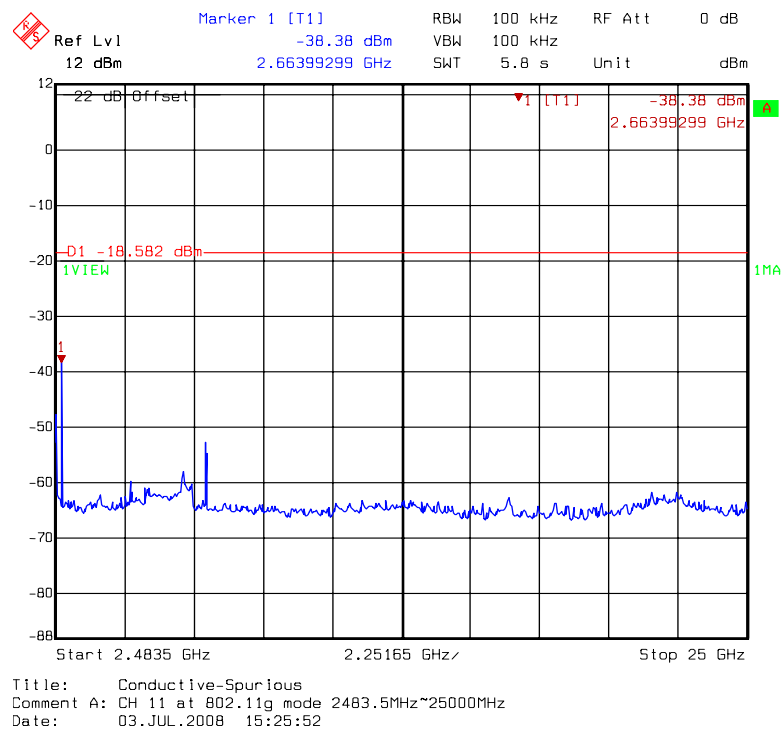
conducted spurious @ 802.11g mode channel 11 (1 of 3)



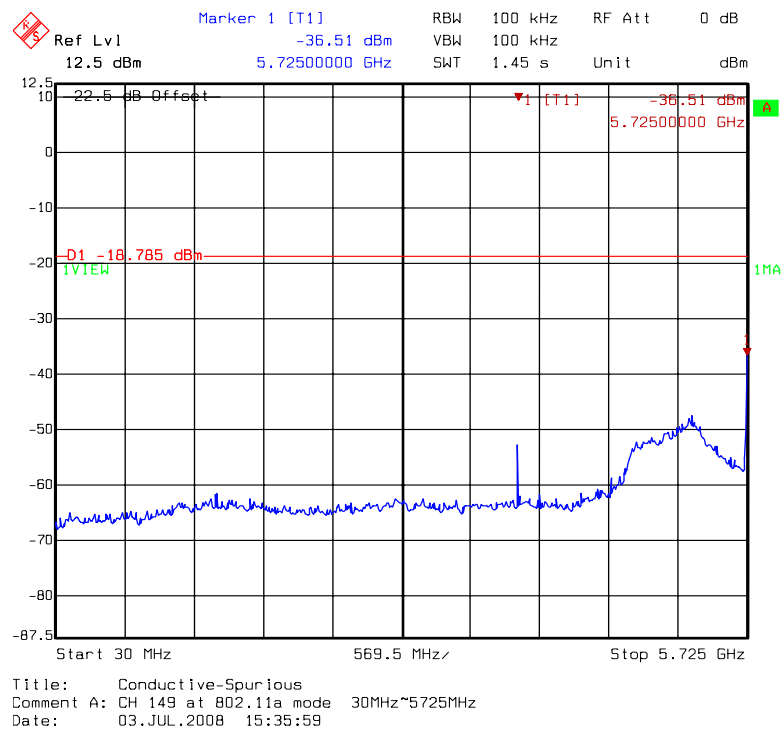
conducted spurious @ 802.11g mode channel 11 (2 of 3)



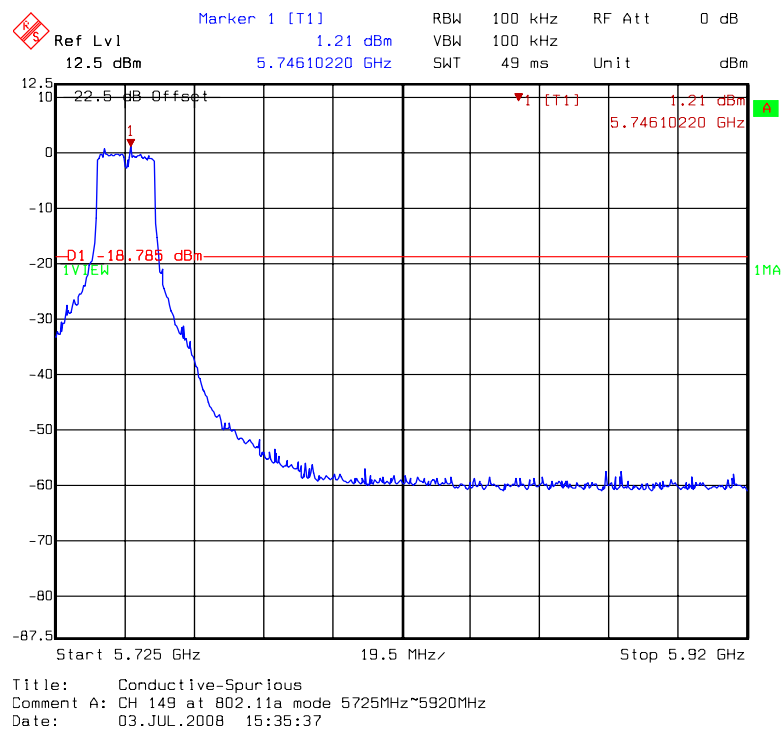
conducted spurious @ 802.11g mode channel 11 (3 of 3)



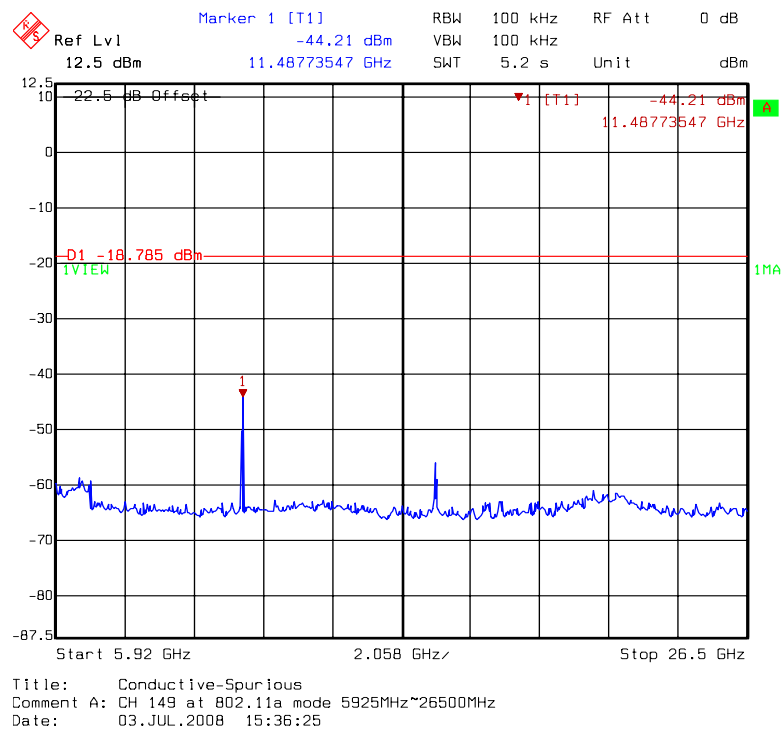
conducted spurious @ 802.11a mode channel 149 (1 of 4)



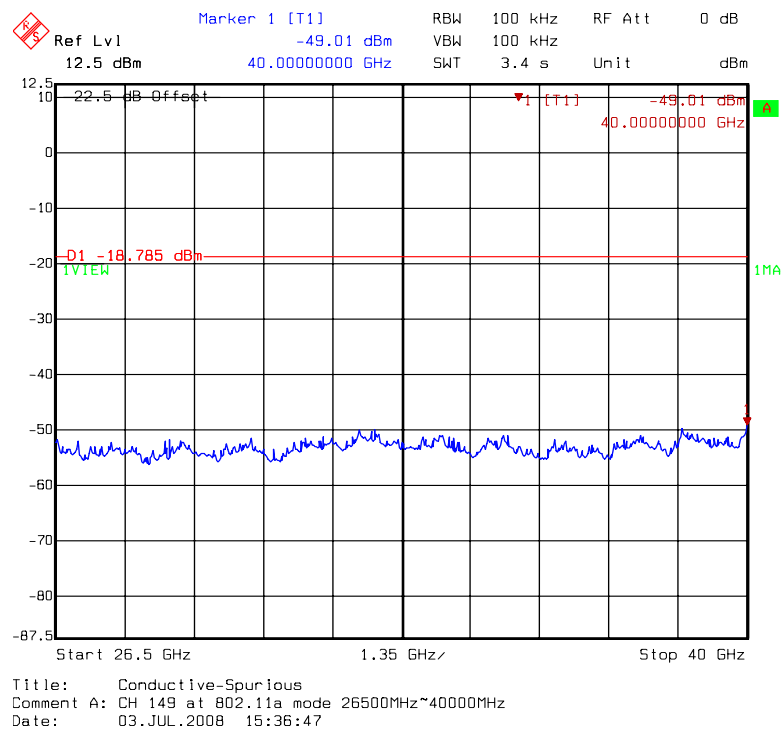
conducted spurious @ 802.11a mode channel 149 (2 of 4)



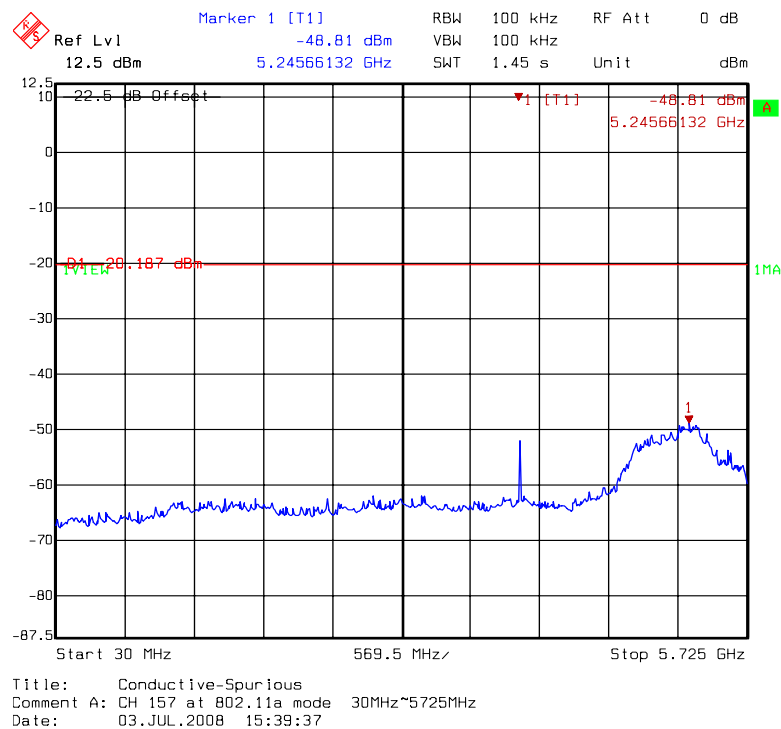
conducted spurious @ 802.11a mode channel 149 (3 of 4)



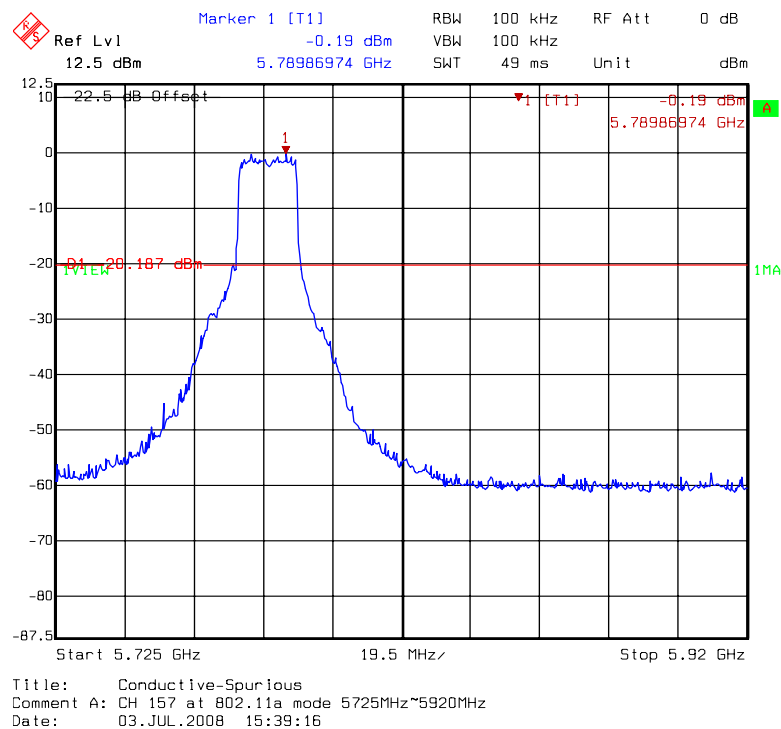
conducted spurious @ 802.11a mode channel 149 (4 of 4)



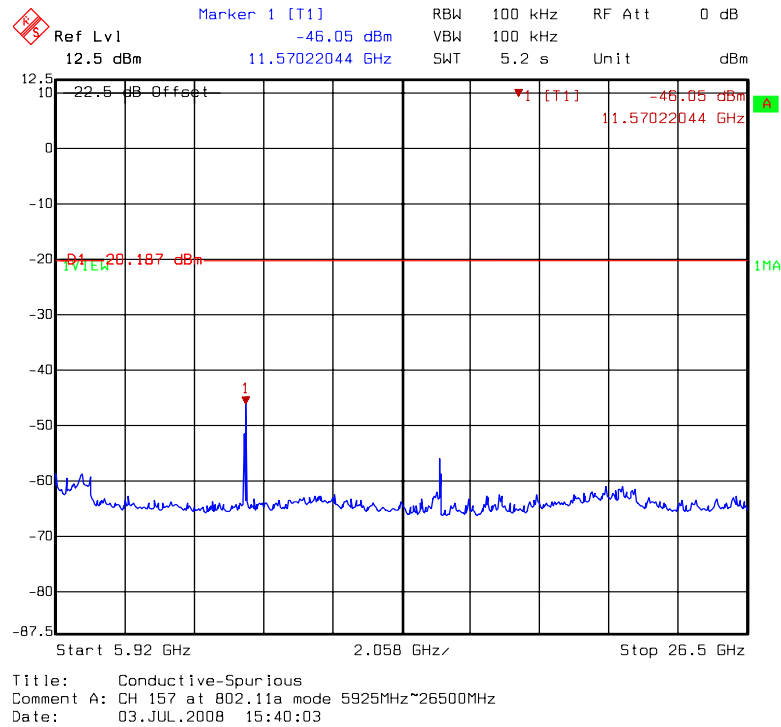
conducted spurious @ 802.11a mode channel 157 (1 of 4)



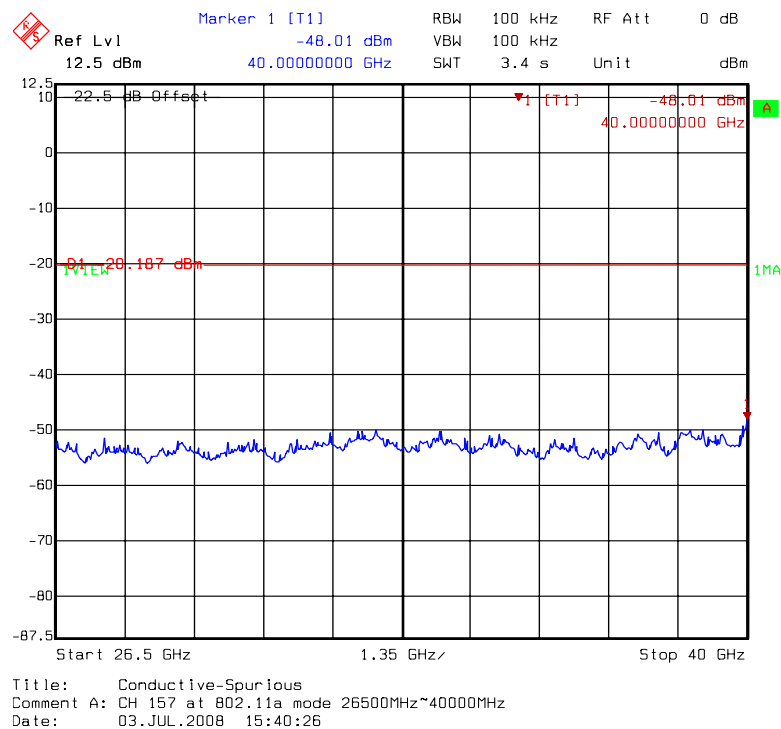
conducted spurious @ 802.11a mode channel 157 (2 of 4)



conducted spurious @ 802.11a mode channel 157 (3 of 4)

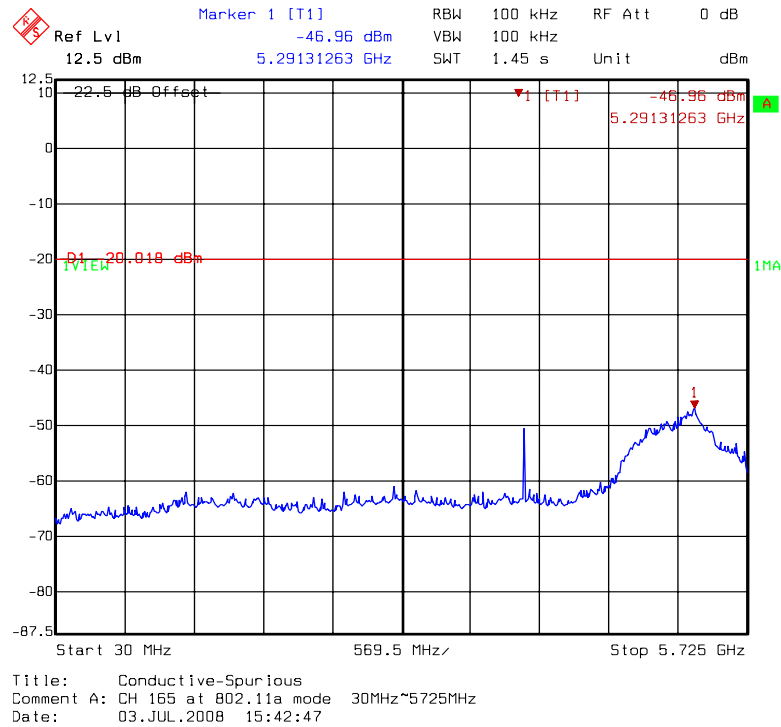


conducted spurious @ 802.11a mode channel 157 (4 of 4)

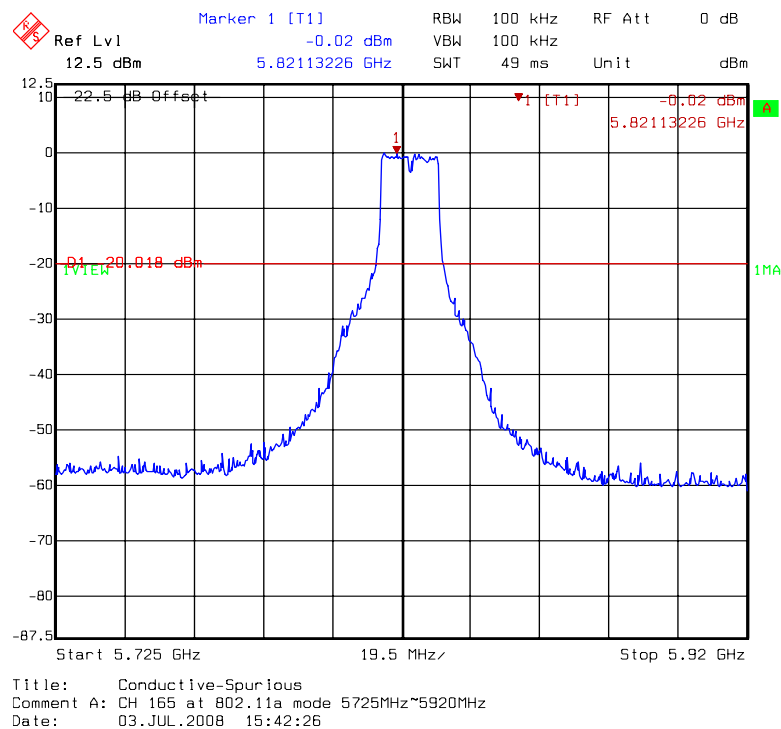




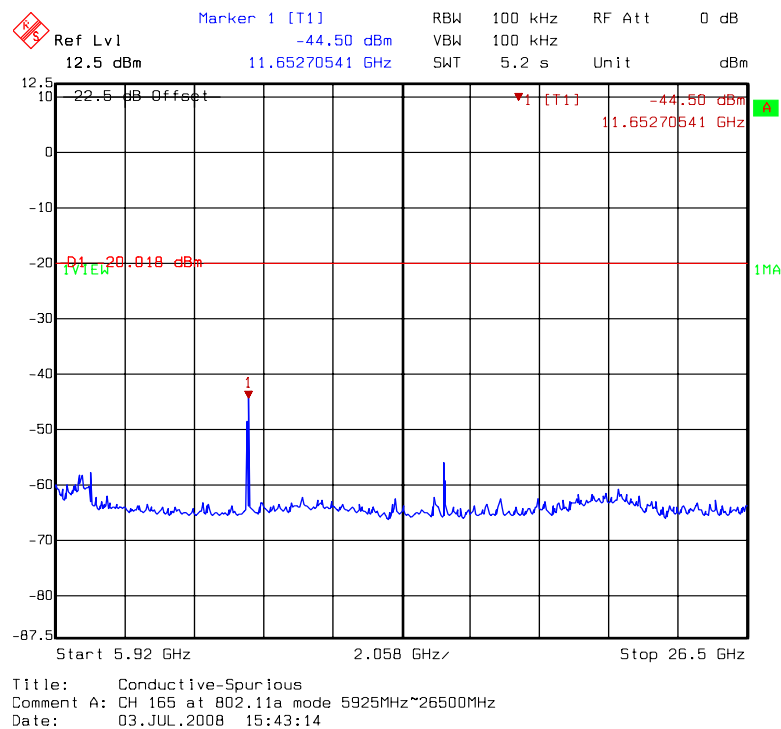
conducted spurious @ 802.11a mode channel 165 (1 of 4)



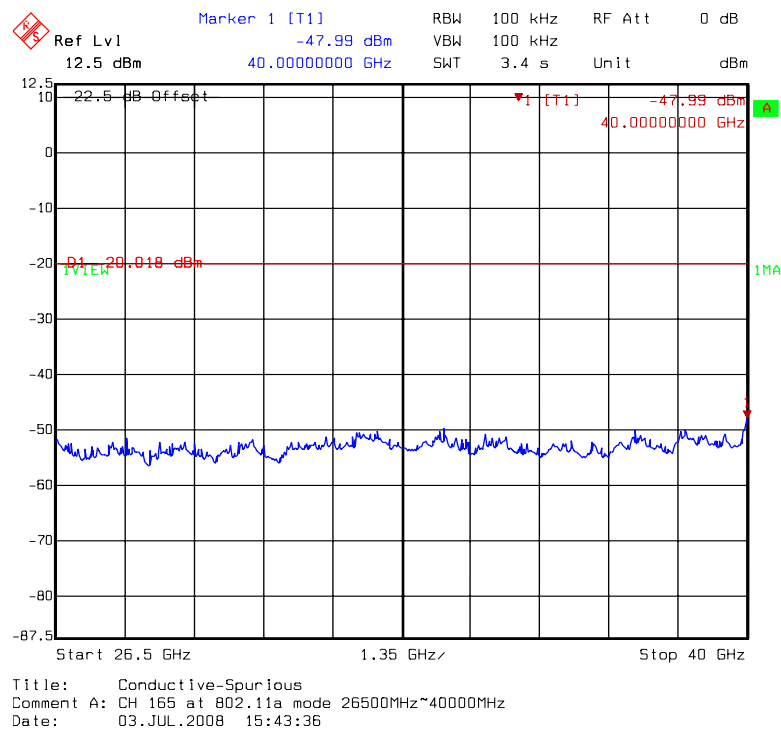
conducted spurious @ 802.11a mode channel 165 (2 of 4)



conducted spurious @ 802.11a mode channel 165 (3 of 4)



conducted spurious @ 802.11a mode channel 165 (4 of 4)



## 8. Radiated Spurious Emission

<b>Name of Test</b>	Radiated Spurious Emission
<b>Base Standard</b>	FCC 15.247(d), 15.209, 15.205

**Tested By:** Rex Liao  
**Test Date:** Jul. 03, 2008

**Test Equipment:** EC1365

**Test Result:** Complies  
**Test Method:** See Appendix D  
**Measurement Data:** See Tables below

**Note:** (1) The EUT was tested while in a continuous transmit mode and the worst case data rates are 1 Mbps for 802.11b and 6 Mbps for 802.11a/ 11g. The EUT was tuned to a low, middle and high channel.  
(2) The EUT operating at 2.4 GHz ISM band. Frequency Range scanned from 30 MHz to 25 GHz.

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

All antennas were verified, the worst case occurred at antenna 3 model No.: TQJ-24/58XTJI 2.5dBi.

The test was performed on EUT under 802.11b, 802.11g and 802.11a continuously transmitting mode. The worst case occurred at 802.11a Tx channel 149.

EUT : H3C WA2220X-AG  
Worst Case : 802.11a Tx at channel 149  
With Antenna 3 : TQJ-24/58XTJI 2.5dBi

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	30.000	QP	12.60	26.78	39.38	40.00	-0.62
V	55.220	QP	12.86	20.50	33.36	40.00	-6.64
V	63.950	QP	11.52	22.85	34.37	40.00	-5.63
V	71.710	QP	10.27	23.12	33.39	40.00	-6.61
V	97.900	QP	7.51	27.97	35.48	43.50	-8.02
V	108.570	QP	8.11	31.88	39.99	43.50	-3.51
H	45.520	QP	14.30	15.13	29.43	40.00	-10.57
H	97.900	QP	8.68	26.50	35.18	43.50	-8.32
H	108.570	QP	10.32	27.35	37.67	43.50	-5.83
H	132.820	QP	12.58	16.17	28.75	43.50	-14.75
H	147.370	QP	13.50	14.50	28.00	43.50	-15.50
H	263.770	QP	13.00	14.65	27.65	46.00	-18.35

Remark:

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

### Measurement results: frequency above 1 GHz

EUT : H3C WA2220X-AG  
Test Condition : 802.11b Tx at channel 1  
With Antenna 1 : SL13090A

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)
7236.00	PK	V	36.18	43.97	43.00	50.79	54	-3.21
7236.00	PK	H	36.18	43.97	40.25	48.04	54	-5.96

#### Remark:

1. Correction Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Correction Factor – Preamp. Gain
3. The frequency measured ranges from 1 GHz to 25 GHz.The data value listed above which is higher than the system noise floor.

EUT : H3C WA2220X-AG  
Test Condition : 802.11b Tx at channel 6  
With Antenna 1 : SL13090A

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)
7311.00	PK	V	36.18	43.97	43.38	51.17	54	-2.83
7311.00	PK	H	36.18	43.97	39.74	47.53	54	-6.47

#### Remark:

1. Correction Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Correction Factor – Preamp. Gain
3. The frequency measured ranges from 1 GHz to 25 GHz.The data value listed above which is higher than the system noise floor.

EUT : H3C WA2220X-AG  
Test Condition : 802.11b Tx at channel 11  
With Antenna 1 : SL13090A

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)
7386.00	PK	V	36.18	43.97	43.09	50.88	54	-3.12
7386.00	PK	H	36.18	43.97	39.75	47.54	54	-6.46

Remark:

1. Correction Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Correction Factor – Preamp. Gain
3. The frequency measured ranges from 1 GHz to 25 GHz.The data value listed above which is higher than the system noise floor.

EUT : H3C WA2220X-AG  
Test Condition : 802.11g Tx at channel 1  
With Antenna 1 : SL13090A

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)
7236.00	PK	V	36.18	43.97	54.88	62.67	74	-11.33
7236.00	AV	V	36.18	43.97	35.26	43.05	54	-10.95
7236.00	PK	H	36.18	43.97	41.9	49.69	54	-4.31

Remark:

1. Correction Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Correction Factor – Preamp. Gain
3. The frequency measured ranges from 1 GHz to 25 GHz.The data value listed above which is higher than the system noise floor.

EUT : H3C WA2220X-AG  
Test Condition : 802.11g Tx at channel 6  
With Antenna 1 : SL13090A

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)
7311.00	PK	V	36.18	43.97	56.42	64.21	74	-9.79
7311.00	AV	V	36.18	43.97	36.47	44.26	54	-9.74
7311.00	PK	H	36.18	43.97	40.48	48.27	54	-5.73

Remark:

1. Correction Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Correction Factor – Preamp. Gain
3. The frequency measured ranges from 1 GHz to 25 GHz.The data value listed above which is higher than the system noise floor.

EUT : H3C WA2220X-AG  
Test Condition : 802.11g Tx at channel 11  
With Antenna 1 : SL13090A

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)
7386.00	PK	V	36.18	43.97	44.82	52.61	54	-1.39
4924.00	PK	H	36.07	37.77	37.97	39.67	54	-14.33

Remark:

1. Correction Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Correction Factor – Preamp. Gain
3. The frequency measured ranges from 1 GHz to 25 GHz.The data value listed above which is higher than the system noise floor.

EUT : H3C WA2220X-AG  
Test Condition : 802.11a Tx at channel 149  
With Antenna 2 : SL13089A

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)
11490.00	PK	V	33.53	49.96	48.78	65.21	74	-8.79
11490.00	AV	V	33.53	49.96	34.99	51.42	54	-2.58
11490.00	PK	H	33.53	49.96	38.89	55.32	74	-18.68
11490.00	AV	H	33.53	49.96	30.83	47.26	54	-6.74

Remark:

1. Correction Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Correction Factor – Preamp. Gain
3. The frequency measured ranges from 1 GHz to 25 GHz.The data value listed above which is higher than the system noise floor.

EUT : H3C WA2220X-AG  
Test Condition : 802.11a Tx at channel 157  
With Antenna 2 : SL13089A

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)
11570.00	PK	V	34.55	50.03	48.37	63.85	74	-10.15
11570.00	AV	V	34.55	50.03	34.57	50.05	54	-3.95
11570.00	PK	H	34.55	50.03	40.27	55.75	74	-18.25
11570.00	AV	H	34.55	50.03	30.82	46.30	54	-7.70

Remark:

1. Correction Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Correction Factor – Preamp. Gain
3. The frequency measured ranges from 1 GHz to 25 GHz.The data value listed above which is higher than the system noise floor.



EUT : H3C WA2220X-AG  
Test Condition : 802.11a Tx at channel 165  
With Antenna 2 : SL13089A

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)
11650.00	PK	V	34.55	50.03	48.59	64.07	74	-9.93
11650.00	AV	V	34.55	50.03	35.58	51.06	54	-2.94
11650.00	PK	H	34.55	50.03	42.15	57.63	74	-16.37
11650.00	AV	H	34.55	50.03	31.76	47.24	54	-6.76

Remark:

1. Correction Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Correction Factor – Preamp. Gain
3. The frequency measured ranges from 1 GHz to 25 GHz.The data value listed above which is higher than the system noise floor.

EUT : H3C WA2220X-AG  
Test Condition : 802.11b Tx at channel 1  
With Antenna 3 : TQJ-24/58XTJI 2.5 dBi

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)
7236.00	PK	V	36.18	43.97	45.36	53.15	54	-0.85
4824.00	PK	H	36.07	37.77	38.01	39.71	54	-14.29

Remark:

1. Correction Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Correction Factor – Preamp. Gain
3. The frequency measured ranges from 1 GHz to 25 GHz.The data value listed above which is higher than the system noise floor.

EUT : H3C WA2220X-AG  
Test Condition : 802.11b Tx at channel 6  
With Antenna 3 : TQJ-24/58XTJI 2.5 dBi

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)
7311.00	PK	V	36.18	43.97	59.77	67.56	74	-6.44
7311.00	AV	V	36.18	43.97	44.96	52.75	54	-1.25
7311.00	PK	H	36.18	43.97	44.44	52.23	54	-1.77

Remark:

1. Correction Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Correction Factor – Preamp. Gain
3. The frequency measured ranges from 1 GHz to 25 GHz.The data value listed above which is higher than the system noise floor.

EUT : H3C WA2220X-AG  
Test Condition : 802.11b Tx at channel 11  
With Antenna 3 : TQJ-24/58XTJI 2.5 dBi

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)
7386.00	PK	V	36.18	43.97	45.09	52.88	54	-1.12
7386.00	PK	H	36.18	43.97	40.80	48.59	54	-5.41

Remark:

1. Correction Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Correction Factor – Preamp. Gain
3. The frequency measured ranges from 1 GHz to 25 GHz.The data value listed above which is higher than the system noise floor.

EUT : H3C WA2220X-AG  
Test Condition : 802.11g Tx at channel 1  
With Antenna 3 : TQJ-24/58XTJI 2.5 dBi

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)
7236.00	PK	V	36.18	43.97	59.02	66.81	74	-7.19
7236.00	AV	V	36.18	43.97	38.99	46.78	54	-7.22
7236.00	PK	H	36.18	43.97	42.78	50.57	54	-3.43

Remark:

1. Correction Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Correction Factor – Preamp. Gain
3. The frequency measured ranges from 1 GHz to 25 GHz.The data value listed above which is higher than the system noise floor.

EUT : H3C WA2220X-AG  
Test Condition : 802.11g Tx at channel 6  
With Antenna 3 : TQJ-24/58XTJI 2.5 dBi

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)
7311.00	PK	V	36.18	43.97	57.60	65.39	74	-8.61
7311.00	AV	V	36.18	43.97	36.22	44.01	54	-9.99
7311.00	PK	H	36.18	43.97	54.31	62.1	74	-11.90
7311.00	AV	H	36.18	43.97	34.24	42.03	54	-11.97

Remark:

1. Correction Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Correction Factor – Preamp. Gain
3. The frequency measured ranges from 1 GHz to 25 GHz.The data value listed above which is higher than the system noise floor.

EUT : H3C WA2220X-AG  
Test Condition : 802.11g Tx at channel 11  
With Antenna 3 : TQJ-24/58XTJI 2.5 dBi

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)
7386.00	PK	V	36.18	43.97	60.27	68.06	74	-5.94
7386.00	AV	V	36.18	43.97	40.01	47.80	54	-6.20
7386.00	PK	H	36.18	43.97	45.26	53.05	54	-0.95

Remark:

1. Correction Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Correction Factor – Preamp. Gain
3. The frequency measured ranges from 1 GHz to 25 GHz.The data value listed above which is higher than the system noise floor.

EUT : H3C WA2220X-AG  
Test Condition : 802.11a Tx at channel 149  
With Antenna 4 : TQJ-24/58XTJI 4.5 dBi

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)
11490.00	PK	V	33.53	49.96	50.17	66.60	74	-7.40
11490.00	AV	V	33.53	49.96	37.09	53.52	54	-0.48
11490.00	PK	H	33.53	49.96	45.92	62.35	74	-11.65
11490.00	AV	H	33.53	49.96	36.47	52.90	54	-1.10

Remark:

1. Correction Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Correction Factor – Preamp. Gain
3. The frequency measured ranges from 1 GHz to 25 GHz.The data value listed above which is higher than the system noise floor.

EUT : H3C WA2220X-AG  
Test Condition : 802.11a Tx at channel 157  
With Antenna 4 : TQJ-24/58XTJl 4.5 dBi

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)
11570.00	PK	V	34.55	50.03	52.43	67.91	74	-6.09
11570.00	AV	V	34.55	50.03	37.77	53.25	54	-0.75
11570.00	PK	H	34.55	50.03	50.83	66.31	74	-7.69
11570.00	AV	H	34.55	50.03	36.97	52.45	54	-1.55

Remark:

1. Correction Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Correction Factor – Preamp. Gain
3. The frequency measured ranges from 1 GHz to 25 GHz.The data value listed above which is higher than the system noise floor.

EUT : H3C WA2220X-AG  
Test Condition : 802.11a Tx at channel 165  
With Antenna 4 : TQJ-24/58XTJl 4.5 dBi

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)
11650.00	PK	V	34.55	50.03	46.32	61.80	74	-12.20
11650.00	AV	V	34.55	50.03	33.19	48.67	54	-5.33
11650.00	PK	H	34.55	50.03	43.42	58.90	74	-15.10
11650.00	AV	H	34.55	50.03	30.02	45.50	54	-8.50

Remark:

1. Correction Factor = Antenna Factor + Cable Loss
2. Corrected Level = Reading + Correction Factor – Preamp. Gain
3. The frequency measured ranges from 1 GHz to 25 GHz.The data value listed above which is higher than the system noise floor.

## 9. Emission on Band Edge

<b>Name of Test</b>	Emission Band Edge
<b>Base Standard</b>	FCC 15.247(d)

**Tested By:** Rex Liao  
**Test Date:** Jul. 03, 2008

**Test Equipment:** EC1365

**Test Result:** Complies  
**Test Method:** See Appendix D  
**Measurement Data:** See Tables & plots below

**Note:** The EUT was tested while in a continuous transmit mode and the worst case data rates are 1 Mbps for 802.11b and 6Mbps for 802.11a/ 11g. The EUT was tuned to a low, middle and high channel.

EUT : H3C WA2220X-AG  
With Antenna 1 : SL13090A

### Test Mode: 802.11b

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	71.24	74	-2.76
		AV	52.92	54	-1.08
11 (highest)	2483.5-2500	PK	64.15	74	-9.85
		AV	53.45	54	-0.55

### Test Mode: 802.11g

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	71.87	74	-2.13
		AV	53.21	54	-0.79
11 (highest)	2483.5-2500	PK	69.89	74	-4.11
		AV	51.72	54	-2.28

EUT : H3C WA2220X-AG  
With Antenna 3 : TQJ-24/58XTJI 2.5 dBi

**Test Mode: 802.11b**

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	63.27	74	-10.73
		AV	53.16	54	-0.84
11 (highest)	2483.5-2500	PK	63.02	74	-10.98
		AV	52.41	54	-1.59

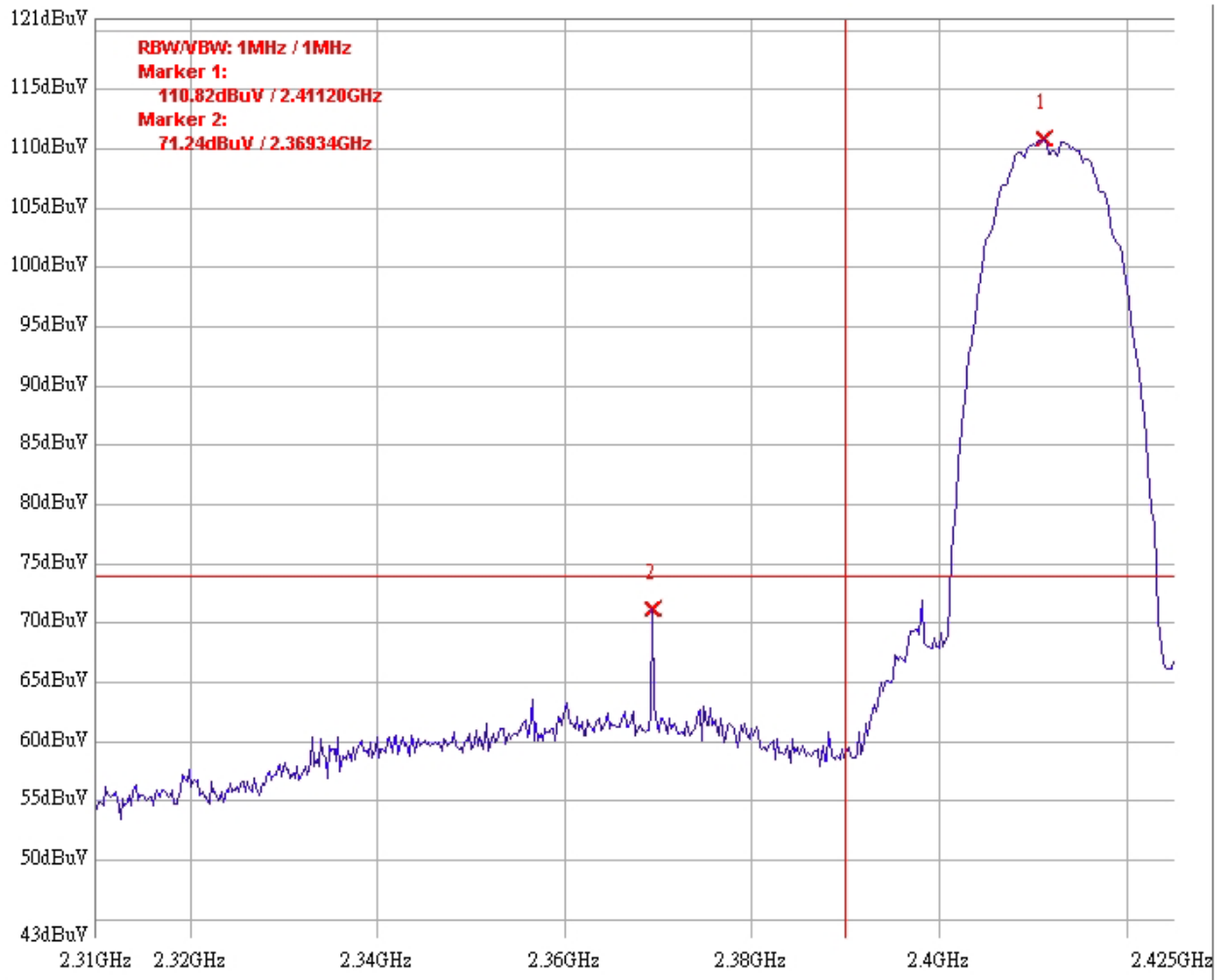
**Test Mode: 802.11g**

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	69.22	74	-4.78
		AV	52.62	54	-1.38
11 (highest)	2483.5-2500	PK	69.81	74	-4.19
		AV	52.78	54	-1.22



EUT : H3C WA2220X-AG  
With Antenna 1 : SL13090A

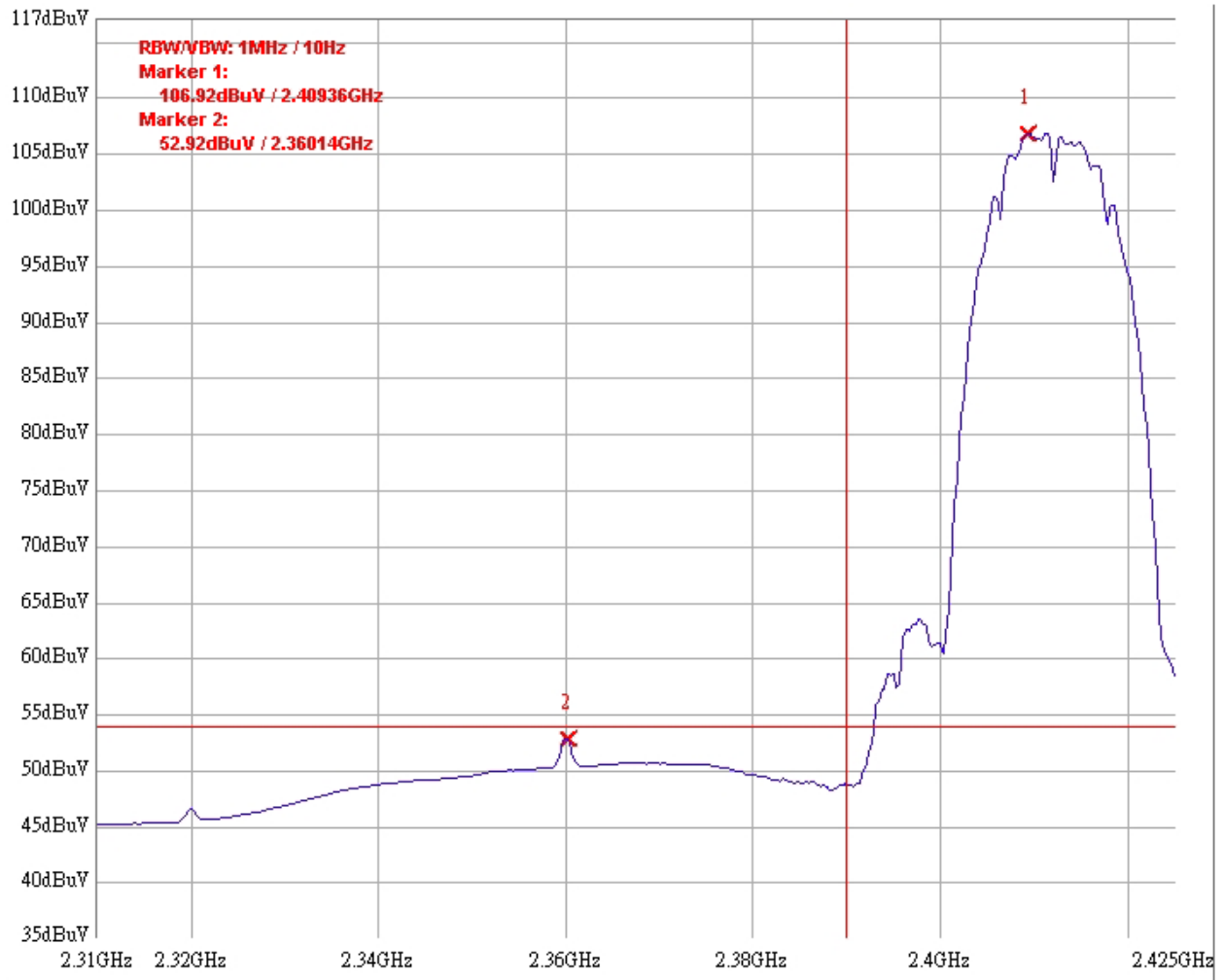
## Test Mode: 802.11b mode (CH 1 PK)



Band-Edge  
11b ch1 antenna gain:5dBi(art:16)  
PK

EUT : H3C WA2220X-AG  
With Antenna 1 : SL13090A

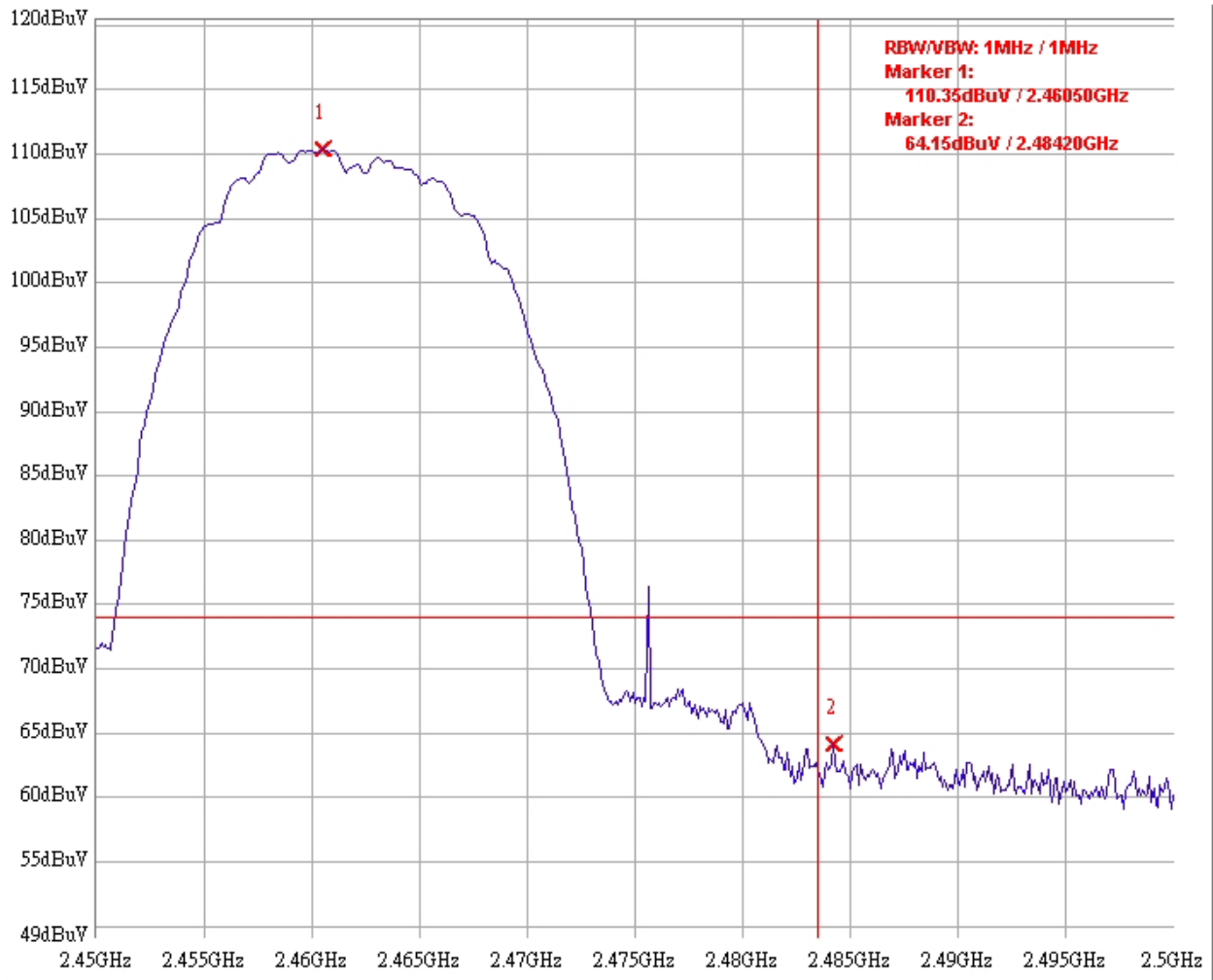
## Test Mode: 802.11b mode (CH 1 AV)



Band-Edge  
11b chl antenna gain:5dBi(art:16)  
AV

EUT : H3C WA2220X-AG  
With Antenna 1 : SL13090A

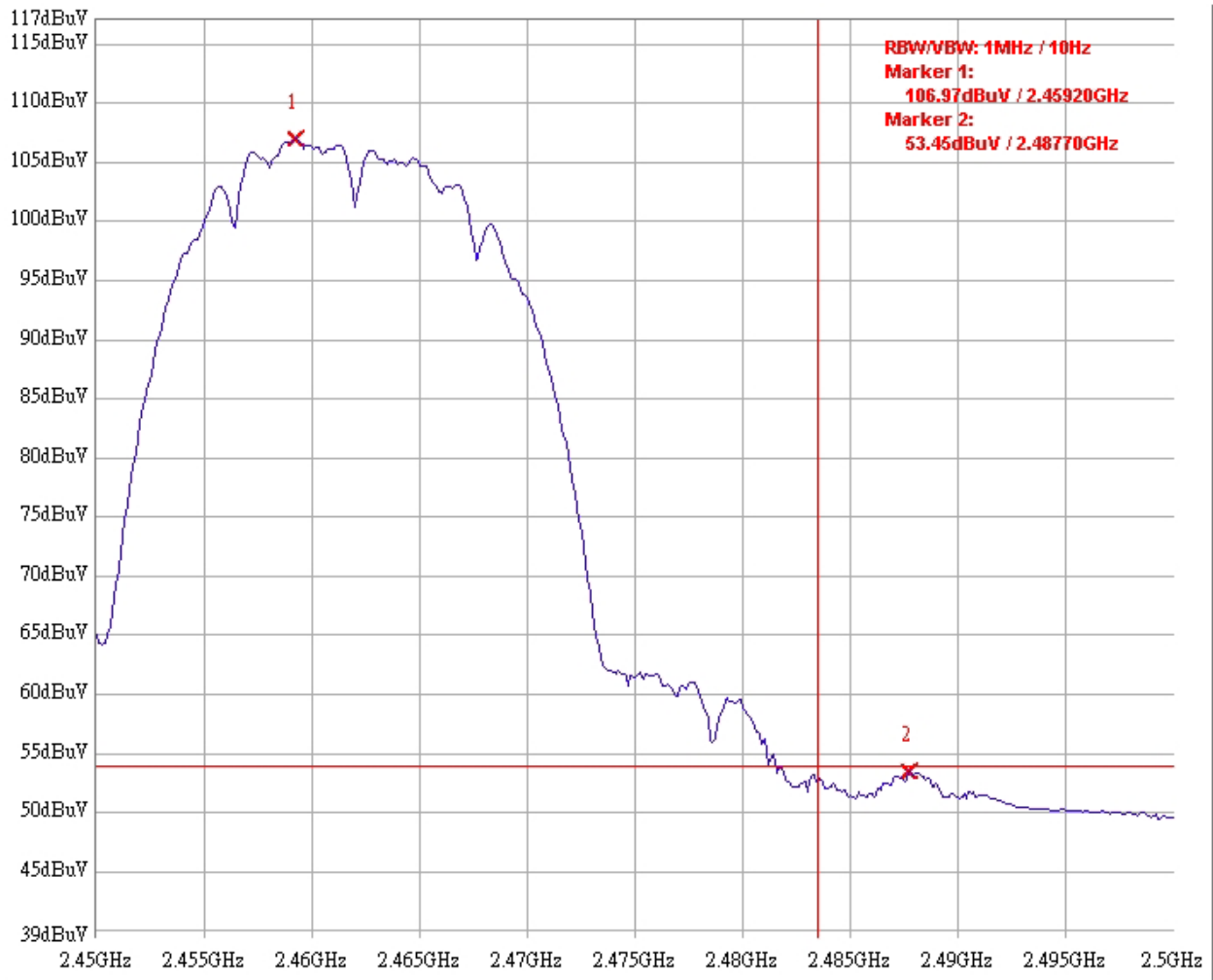
## Test Mode: 802.11b mode (CH 11 PK)



Band-Edge  
11b ch11 antenna gain:5dBi (art:19)  
PK

EUT : H3C WA2220X-AG  
With Antenna 1 : SL13090A

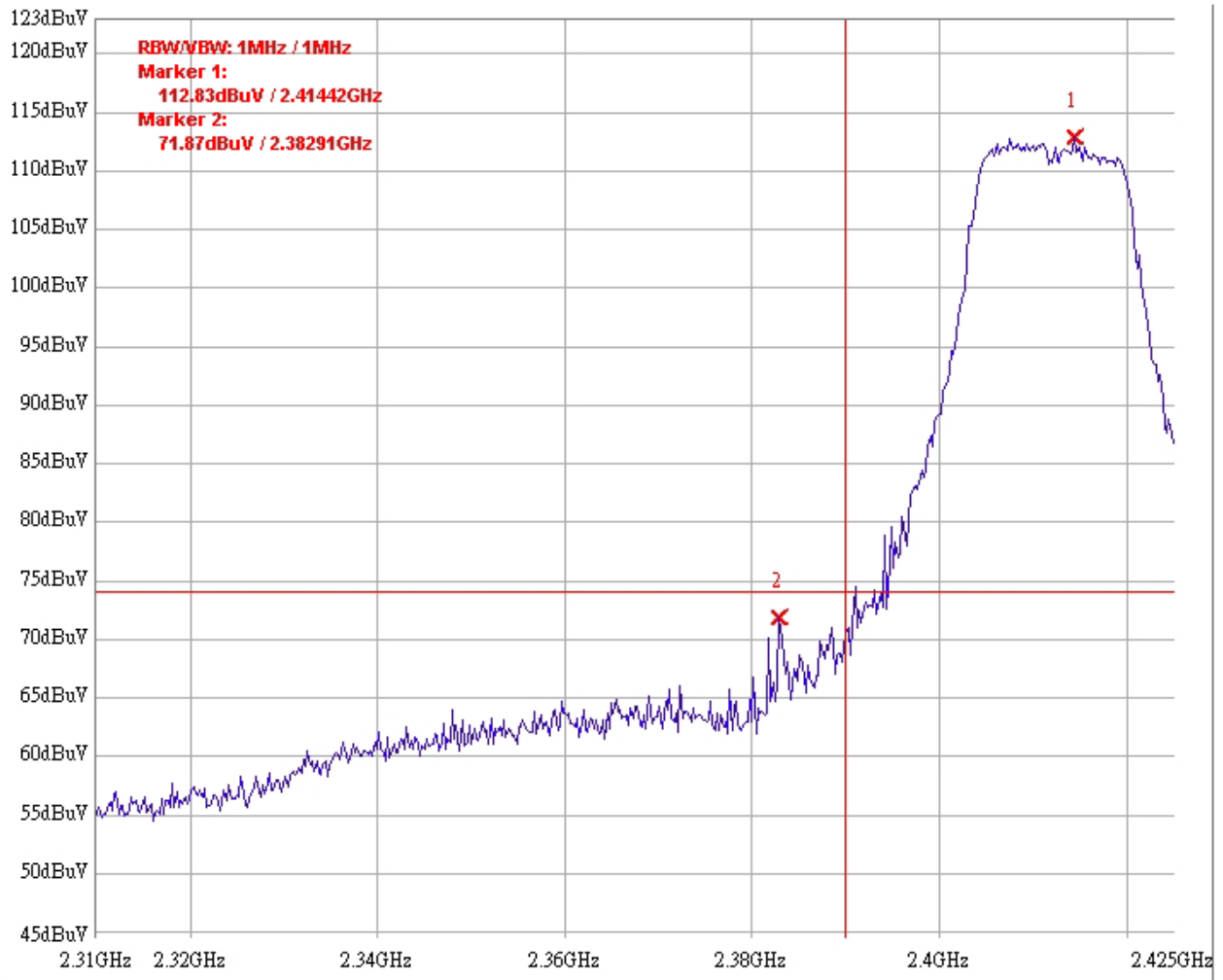
## Test Mode: 802.11b mode (CH 11 AV)



Band-Edge  
11b ch11 antenna gain:5dBi (art:19)  
AV

EUT : H3C WA2220X-AG  
With Antenna 1 : SL13090A

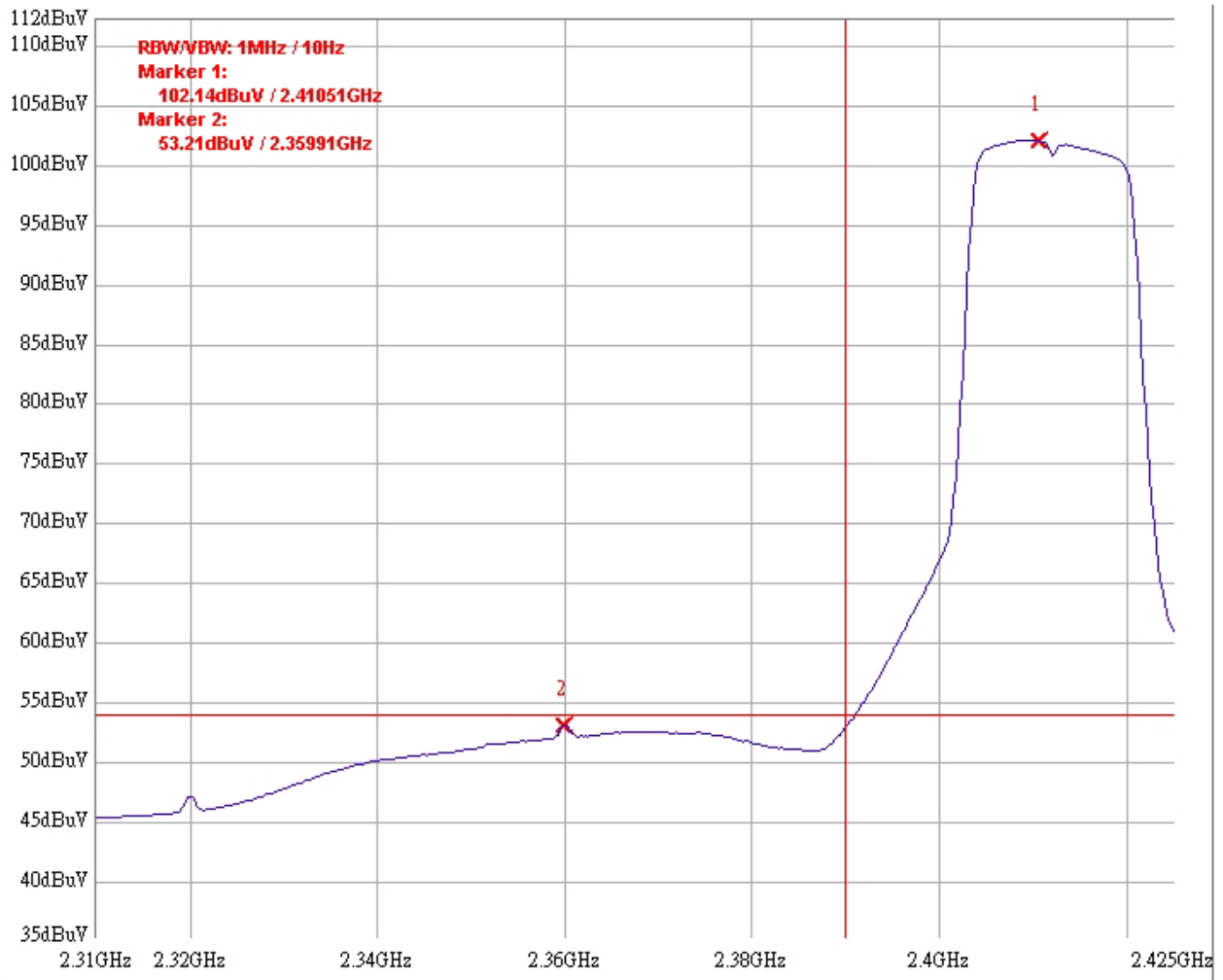
## Test Mode: 802.11g mode (CH 1 PK)



Band-Edge  
11g chl antenna gain:5dBi(art:16)  
PK

EUT : H3C WA2220X-AG  
With Antenna 1 : SL13090A

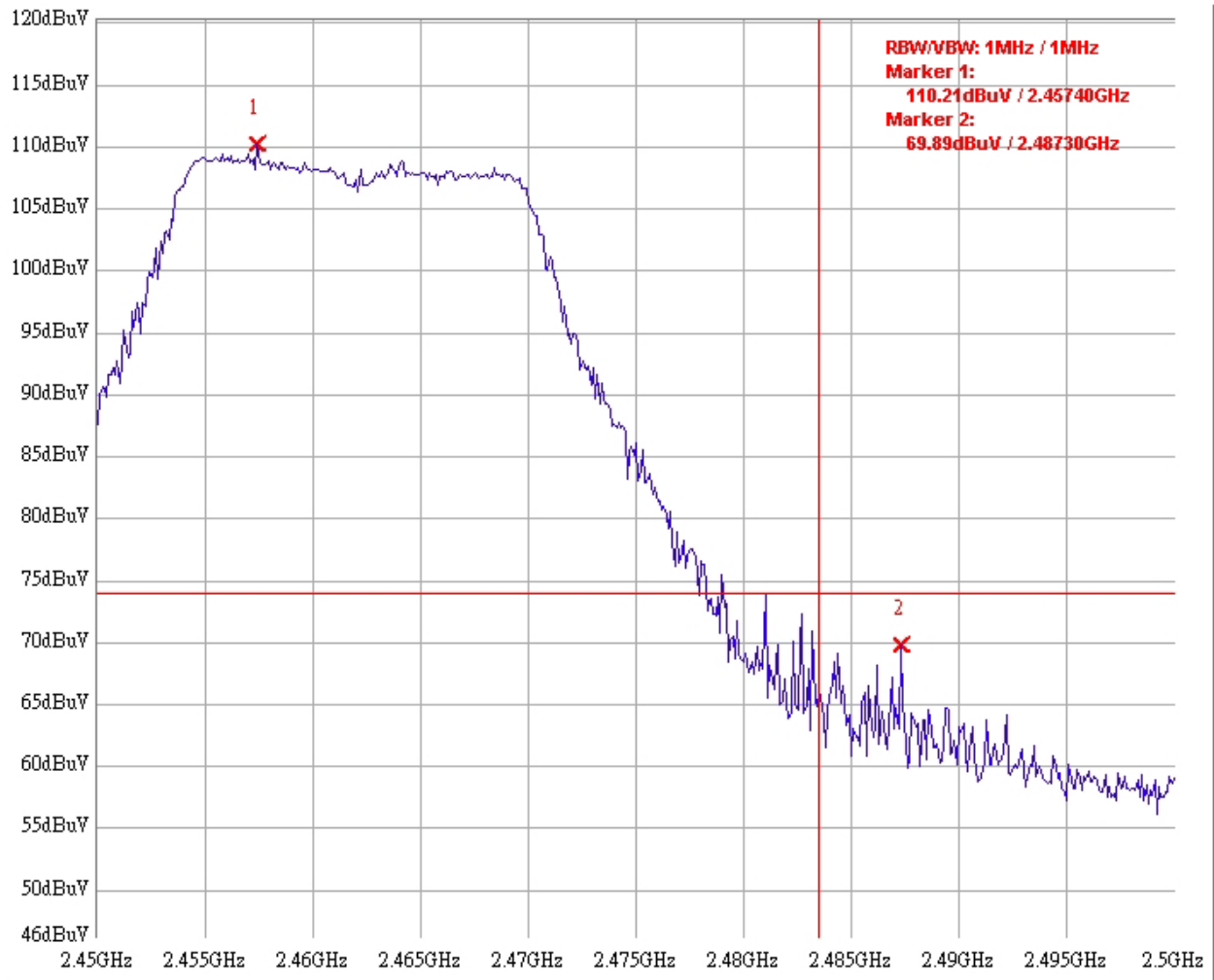
## Test Mode: 802.11g mode (CH 1 AV)



Band-Edge  
11g chl antenna gain:5dBi(art:16)  
AV

EUT : H3C WA2220X-AG  
With Antenna 1 : SL13090A

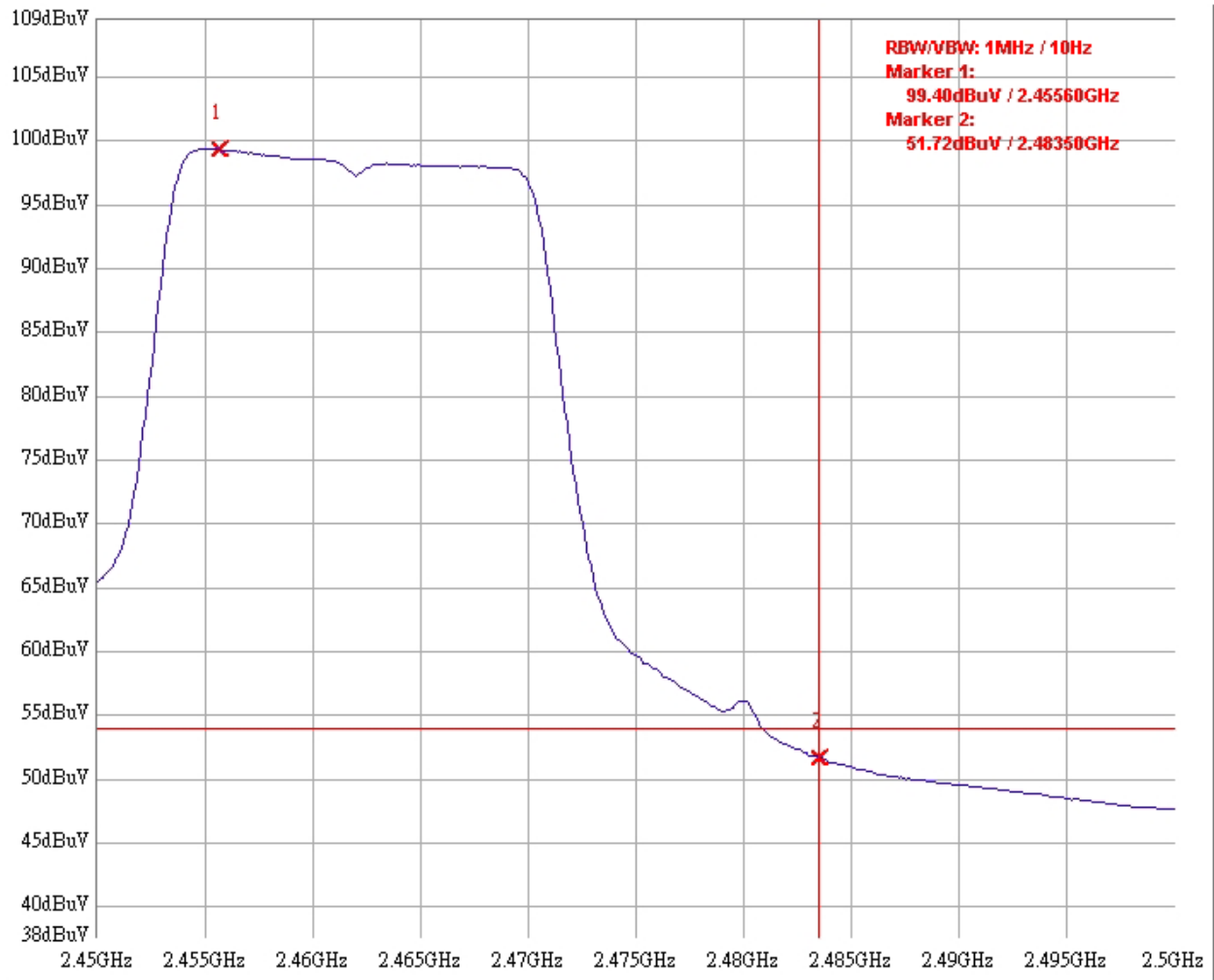
**Test Mode: 802.11g mode (CH 11 PK)**



Band-Edge  
11g ch11 antenna gain:5dBi(art:16)  
PK

EUT : H3C WA2220X-AG  
With Antenna 1 : SL13090A

## Test Mode: 802.11g mode (CH 11 AV)

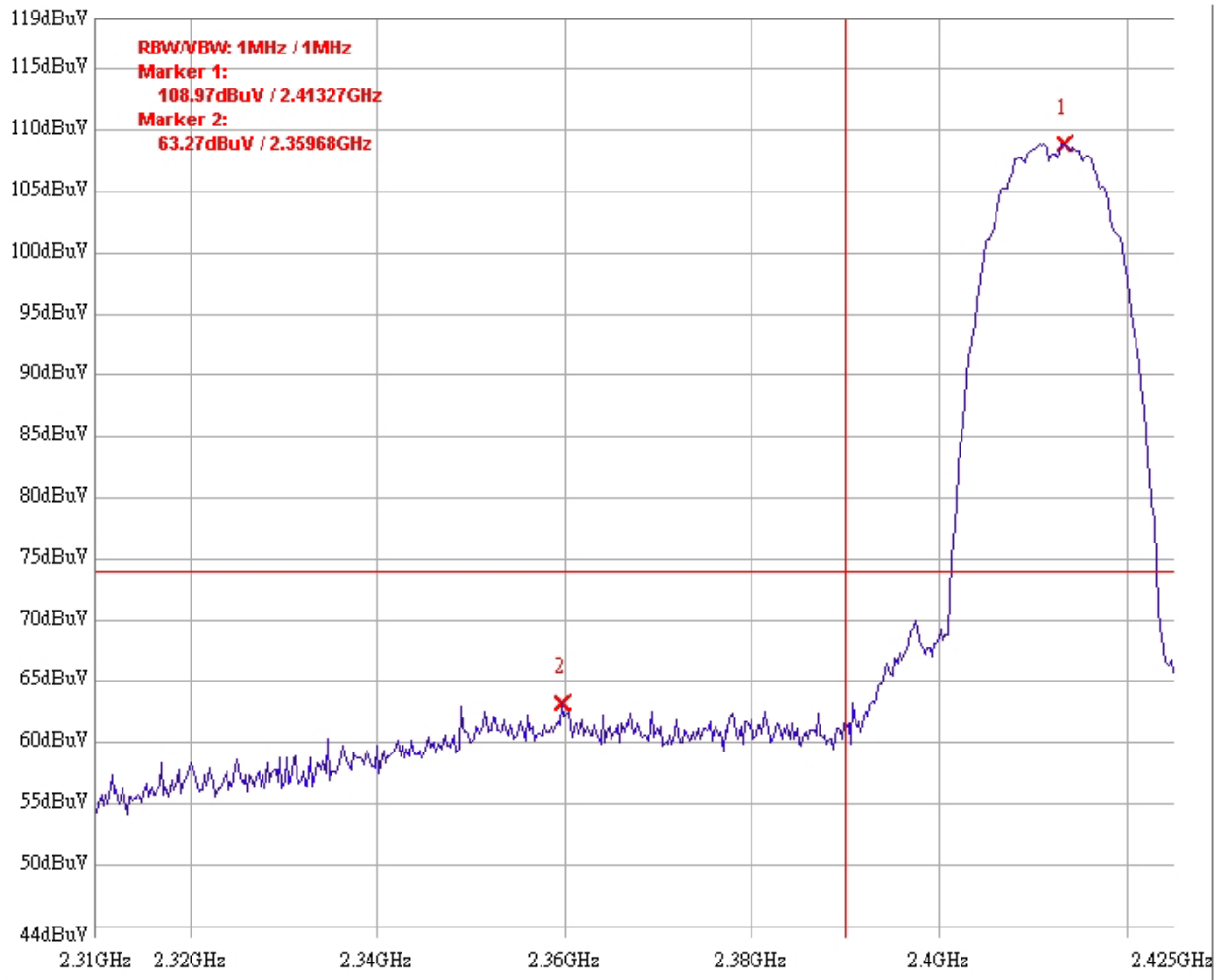


Band-Edge  
11g ch11 antenna gain:5dBi(art:16)  
AV



EUT : H3C WA2220X-AG  
With Antenna 3 : TQJ-24/58XTJI 2.5 dBi

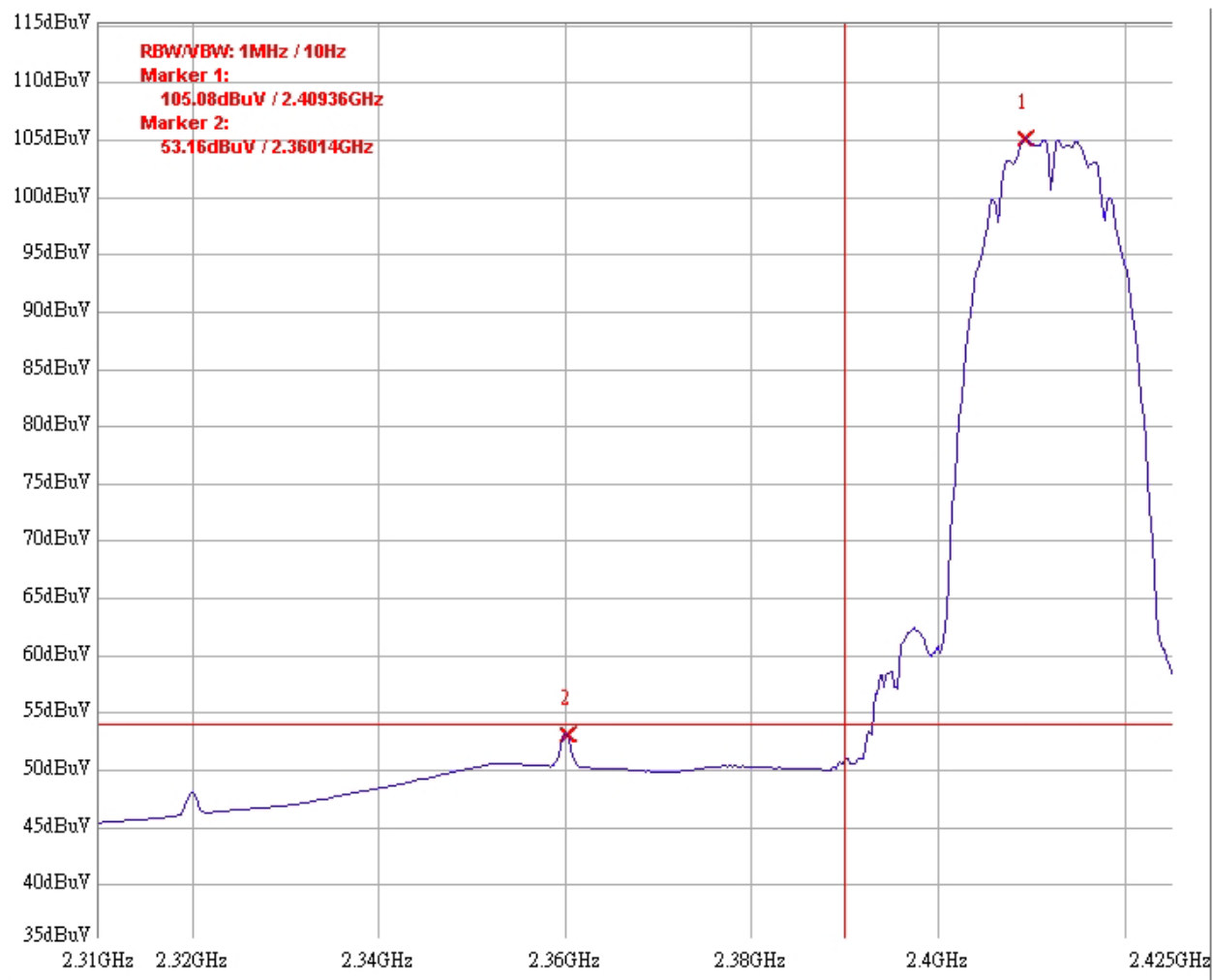
## Test Mode: 802.11b mode (CH 1 PK)



bandedge  
WA2220X-AG with TQJ-2458XTJI 2.5dBi antenna  
11b chl  
PK

EUT : H3C WA2220X-AG  
With Antenna 3 : TQJ-24/58XTJI 2.5 dBi

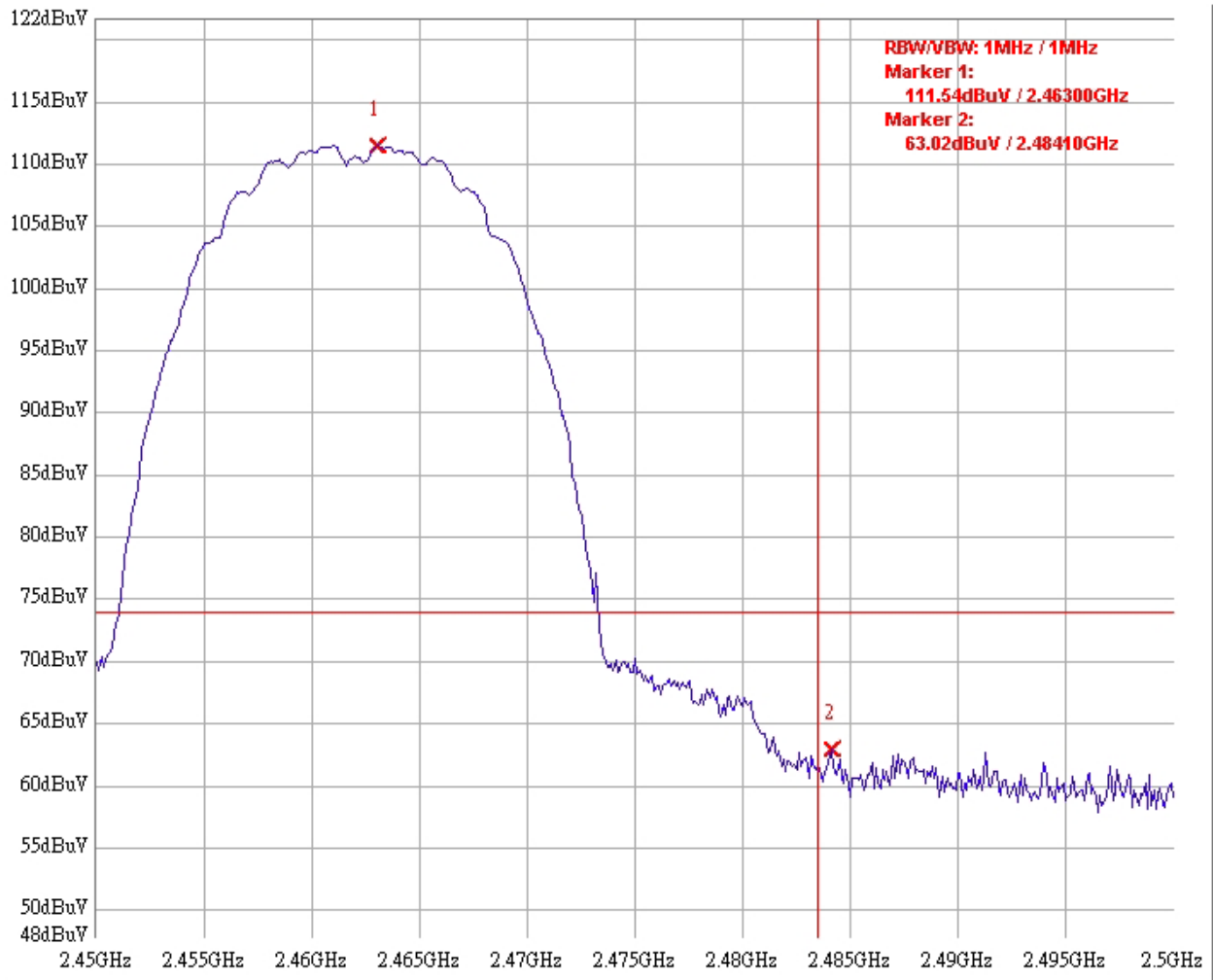
**Test Mode: 802.11b mode (CH 1 AV)**



bandedge  
WA2220X-AG with TQJ-2458XTJI 2.5dBi antenna  
11b chl  
AV

EUT : H3C WA2220X-AG  
With Antenna 3 : TQJ-24/58XTJI 2.5 dBi

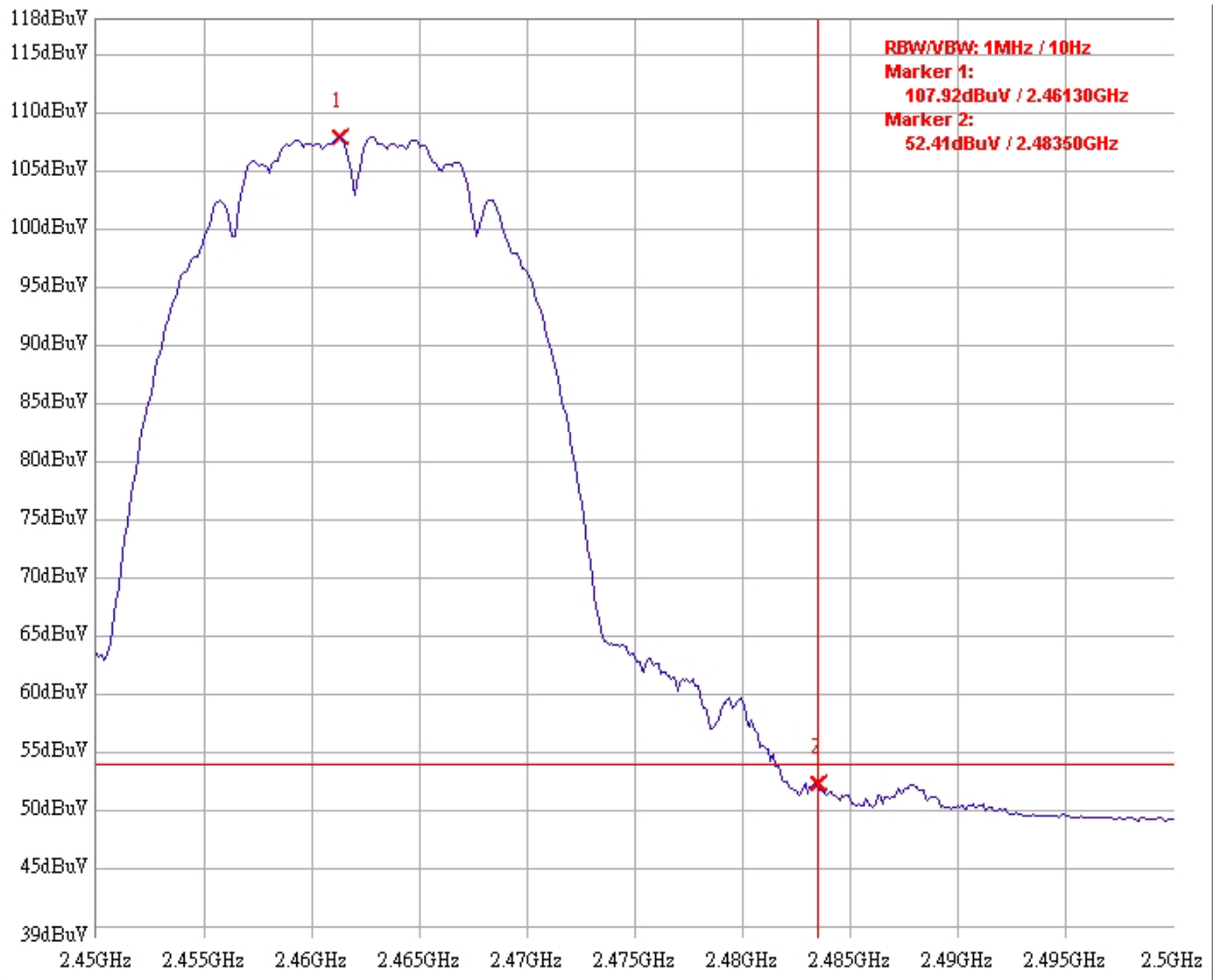
**Test Mode: 802.11b mode (CH 11 PK)**



bandedge  
WA2220X-AG with TQJ-2458XTJI 2.5dBi antenna  
11b ch11  
PK

EUT : H3C WA2220X-AG  
With Antenna 3 : TQJ-24/58XTJI 2.5 dBi

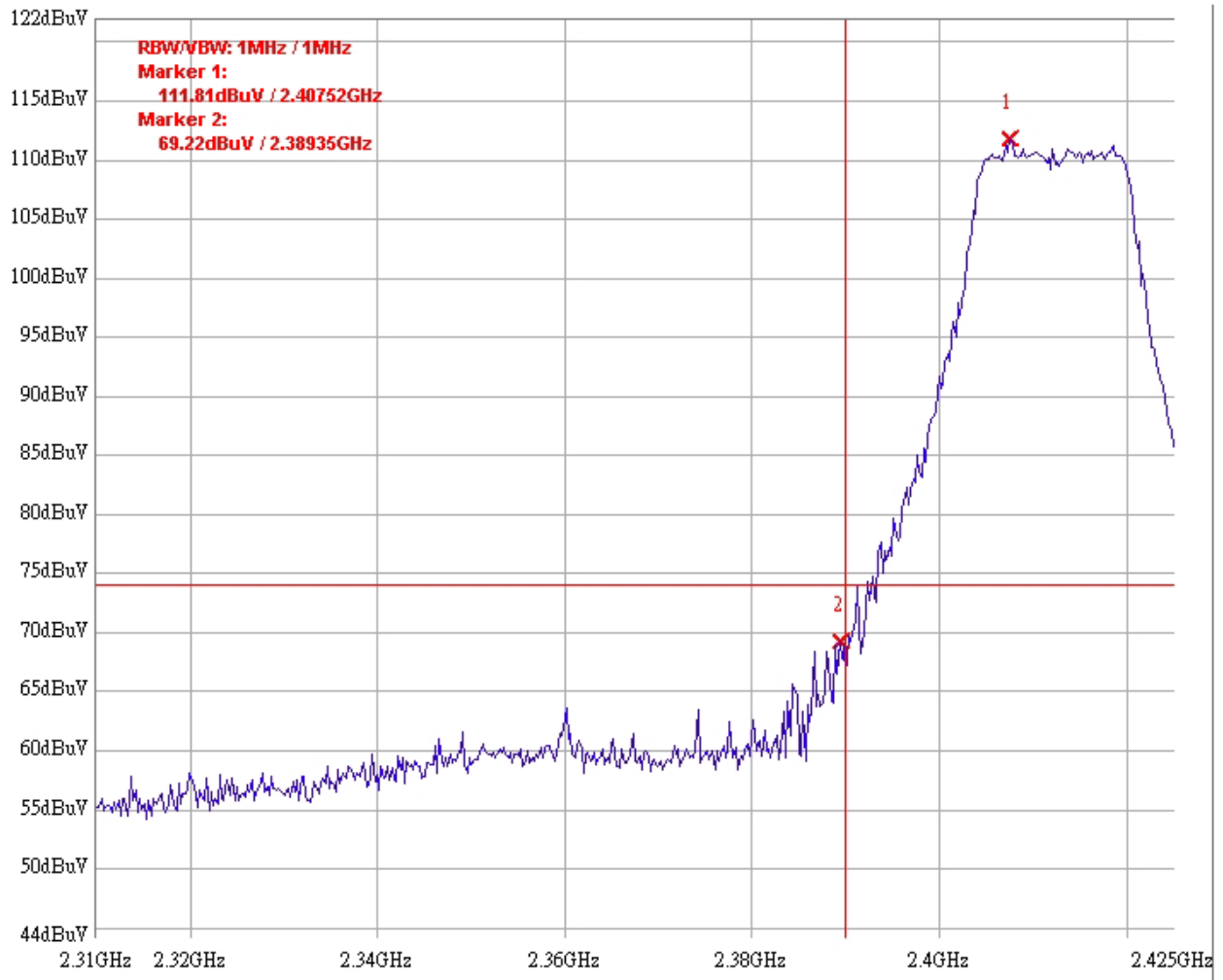
**Test Mode: 802.11b mode (CH 11 AV)**



bandedge  
WA2220X-AG with TQJ-2458XTJI 2.5dBi antenna  
11b ch11  
AV

EUT : H3C WA2220X-AG  
With Antenna 3 : TQJ-24/58XTJI 2.5 dBi

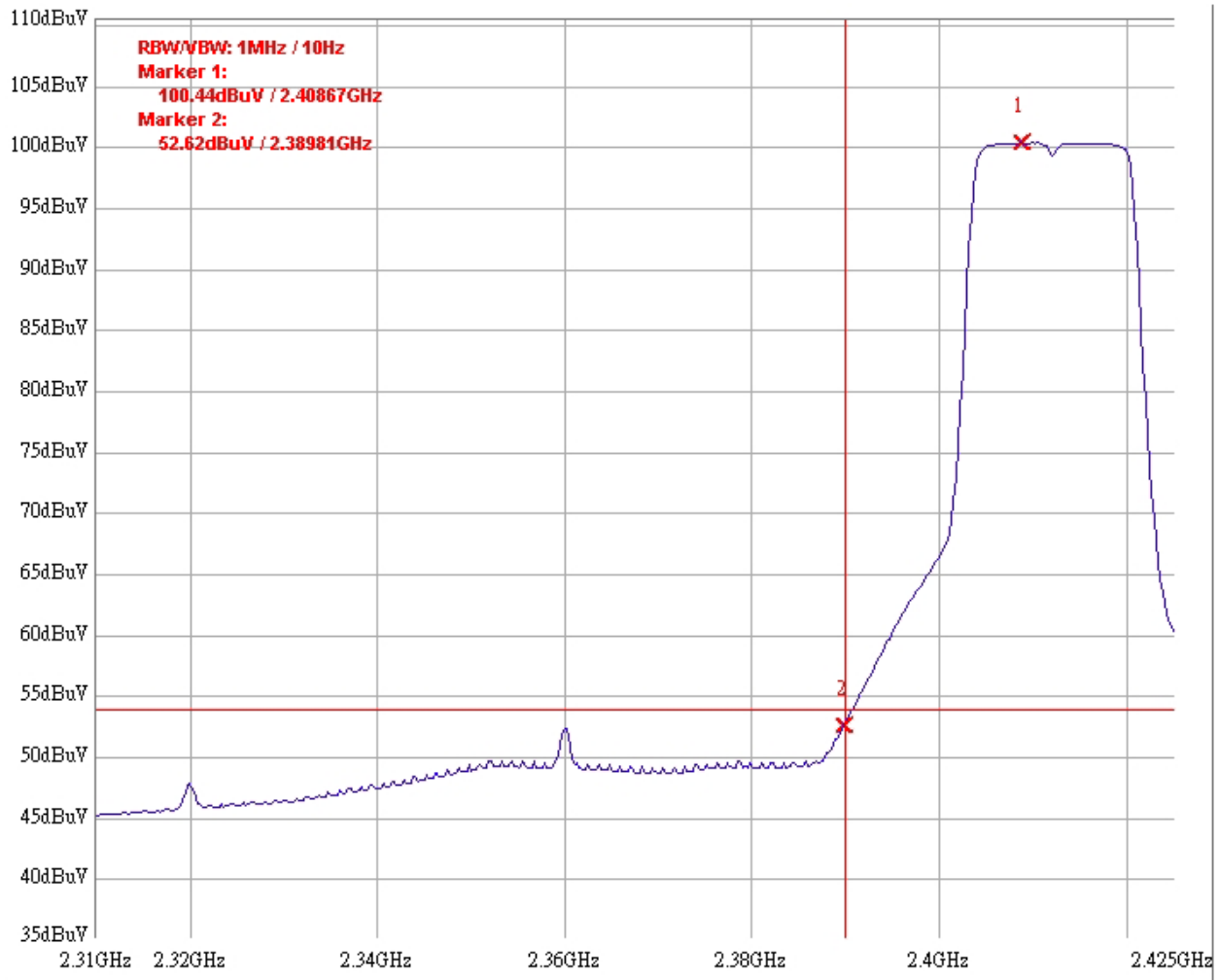
**Test Mode: 802.11g mode (CH 1 PK)**



bandedge  
WA2220X-AG with TQJ-2458XTJI 2.5dBi antenna  
11g chl  
PK

EUT : H3C WA2220X-AG  
With Antenna 3 : TQJ-24/58XTJI 2.5 dBi

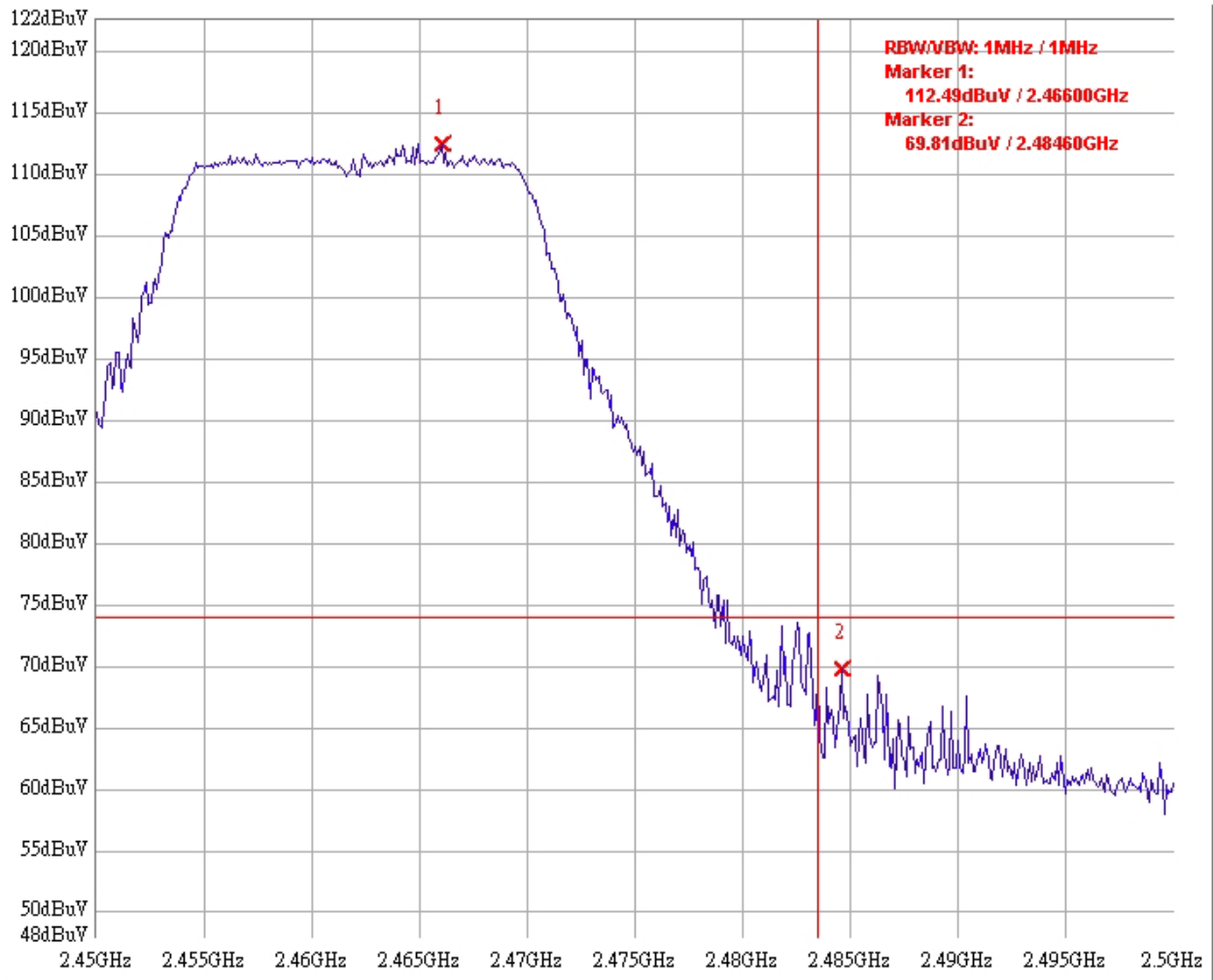
**Test Mode: 802.11g mode (CH 1 AV)**



bandedge  
WA2220X-AG with TQJ-2458XTJI 2.5dBi antenna  
11g chl  
AV

EUT : H3C WA2220X-AG  
With Antenna 3 : TQJ-24/58XTJI 2.5 dBi

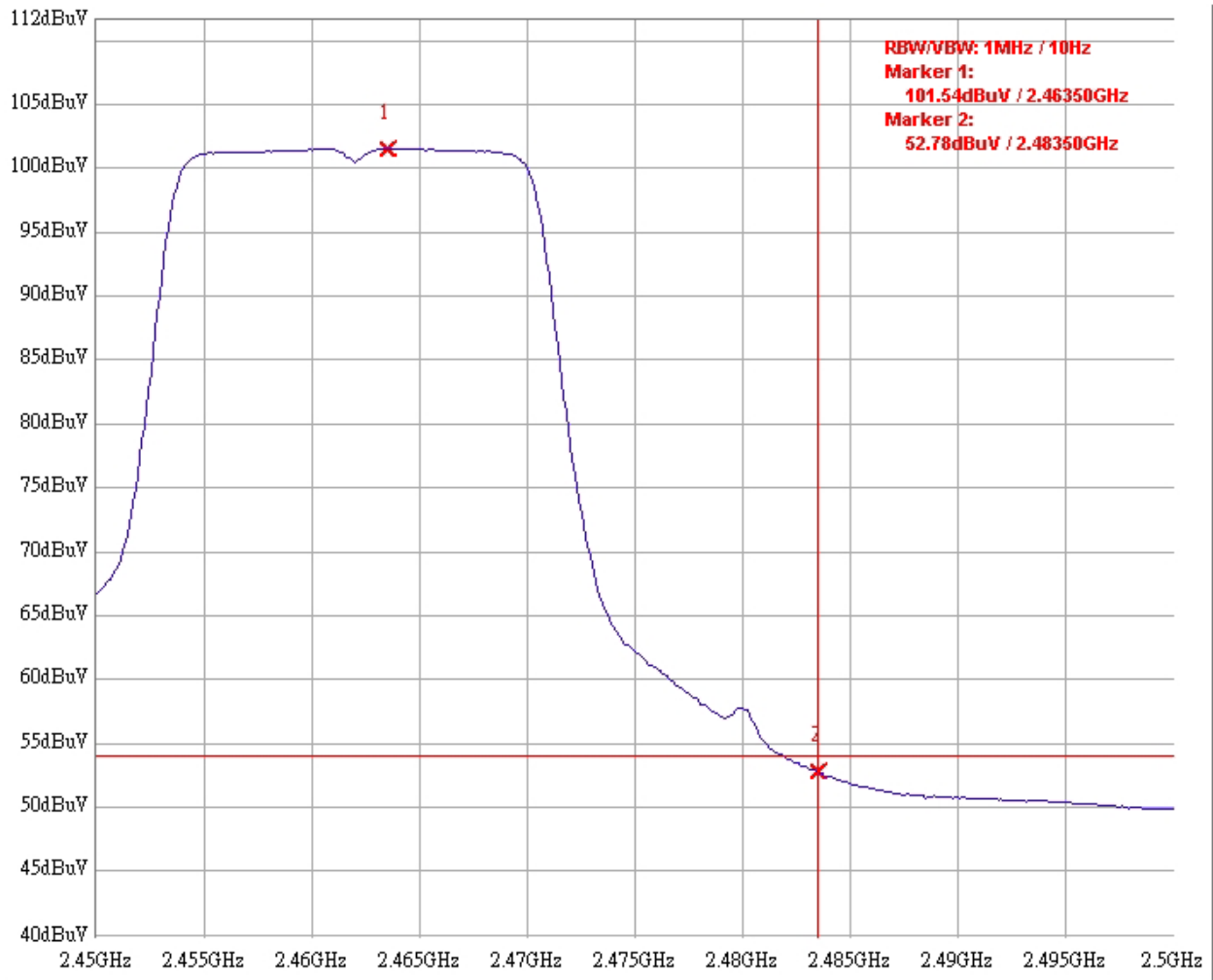
**Test Mode: 802.11g mode (CH 11 PK)**



bandedge  
WA2220X-AG with TQJ-2458XTJI 2.5dBi antenna  
11g ch11  
PK

EUT : H3C WA2220X-AG  
With Antenna 3 : TQJ-24/58XTJI 2.5 dBi

**Test Mode: 802.11g mode (CH 11 AV)**



bandedge  
WA2220X-AG with TQJ-2458XTJI 2.5dBi antenna  
11g ch11  
AV



## 10. AC power line conducted emission

<b>Name of Test</b>	AC power line conducted emission
<b>Base Standard</b>	FCC 15.207

**Tested By:** Rex Liao  
**Test Date:** Jul. 04, 2008

**Test Equipment:** EC1365

**Test Result:** Complies  
**Test Method:** See Appendix E  
**Measurement Data:** See Tables & plots below

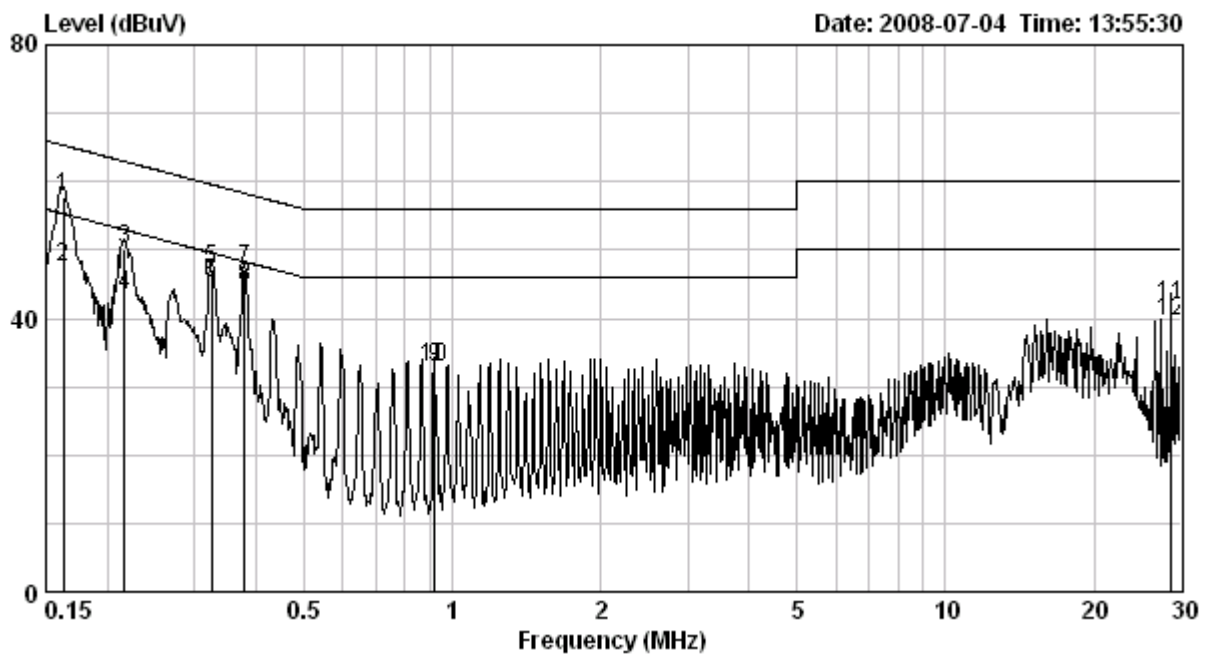
**Note:** The EUT was tested while in normal communication mode.

Phase : Line  
EUT : H3C WA2220X-AG  
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
0.16	0.81	57.87	65.33	47.35	55.33	-7.46	-7.98
0.22	0.73	50.24	62.95	43.35	52.95	-12.71	-9.60
0.32	0.32	47.11	59.58	45.22	49.58	-12.47	-4.36
0.38	0.16	47.15	58.31	44.60	48.31	-11.16	-3.71
0.92	0.11	32.92	56.00	32.85	46.00	-23.08	-13.15
28.69	1.25	42.01	60.00	39.69	50.00	-17.99	-10.31

Remark:

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

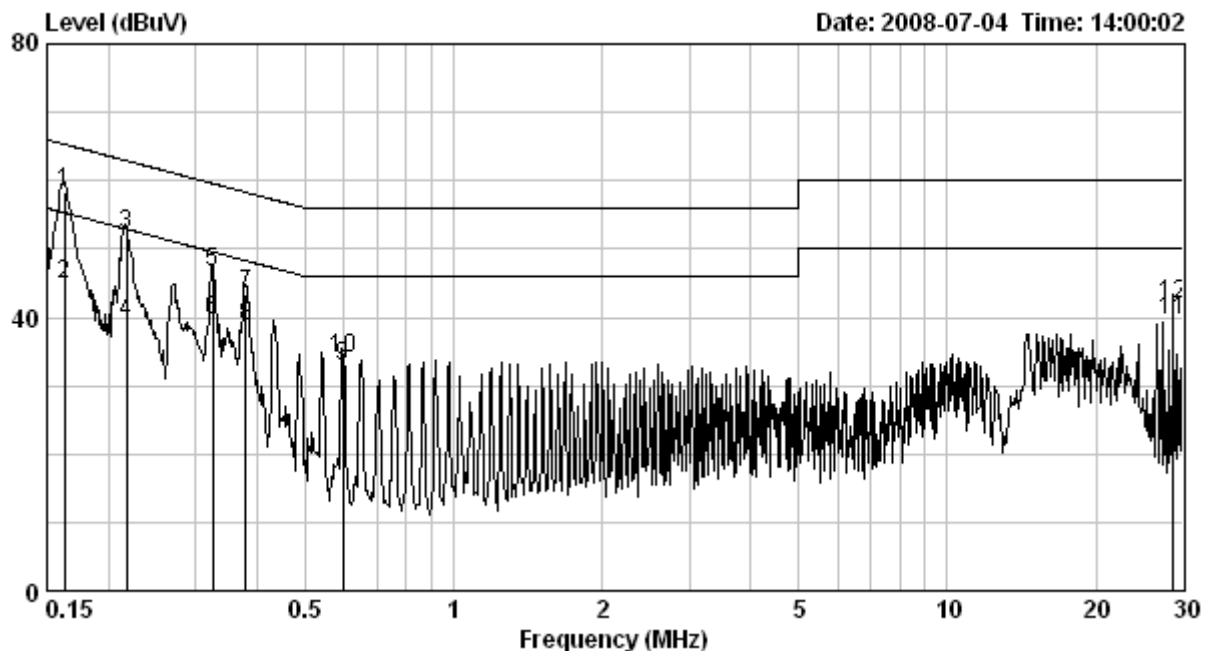


Phase : Neutral  
EUT : H3C WA2220X-AG  
Test Condition : Normal operating mode

Frequency (MHz)	Corr. Factor (dB)	Level Qp (dBuV)	Limit Qp (dBuV)	Level Av (dBuV)	Limit Av (dBuV)	Margin (dB)	
						Qp	Av
0.16	0.11	58.41	65.33	44.96	55.33	-6.93	-10.38
0.22	0.11	52.08	62.93	39.37	52.93	-10.85	-13.56
0.33	0.11	46.68	59.58	39.52	49.58	-12.90	-10.06
0.38	0.11	43.41	58.29	38.80	48.29	-14.89	-9.50
0.60	0.11	33.98	56.00	32.81	46.00	-22.02	-13.19
28.69	0.67	41.88	60.00	39.57	50.00	-18.12	-10.43

Remark:

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



## APPENDICES

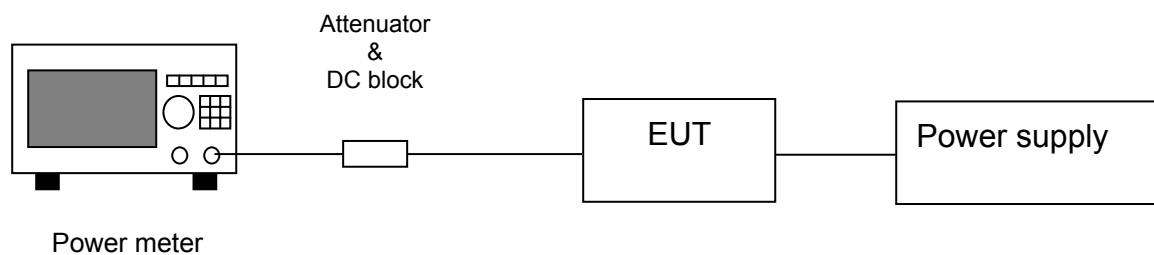
## Appendix A: 2.1046 - RF Power Output

### A1. Method of Measurement:

Reference FCC document: KDB558074

The peak power at antenna terminals is measured using a Wideband Peak Power Meter. Power output is measured with the maximum rated input level.

### A2. Test Diagram:



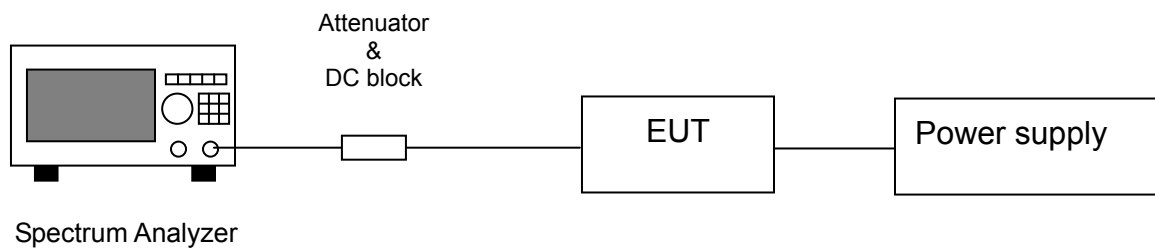
## **Appendix B: 2.1049 - Occupied Bandwidth**

### **B1. Method of Measurement:**

**Reference FCC document: KDB558074**

A portion of the transmitted signal is coupled to a Spectrum Analyzer with a resolution bandwidth of at least 1% of the bandwidth of the transmitted signal. The resolution bandwidth is chosen so as not to reduce the peak level of the measured waveform. The appropriate bandwidth mask is applied to the output waveform to verify compliance.

### **B1. Test Diagram:**



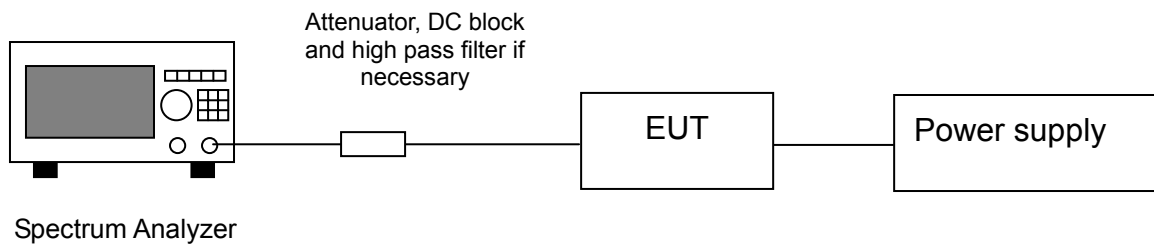
## Appendix C: 2.1051 - Spurious Emission at Antenna Terminal

### C1. Method of Measurement:

Reference FCC document: KDB558074

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.

### C2. Test Diagram:



## Appendix D: 2.1053 – Field Strength of Spurious Radiation

### D1. Method of Measurement:

**Reference FCC document: KDB558074, ANSI C63.4**

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

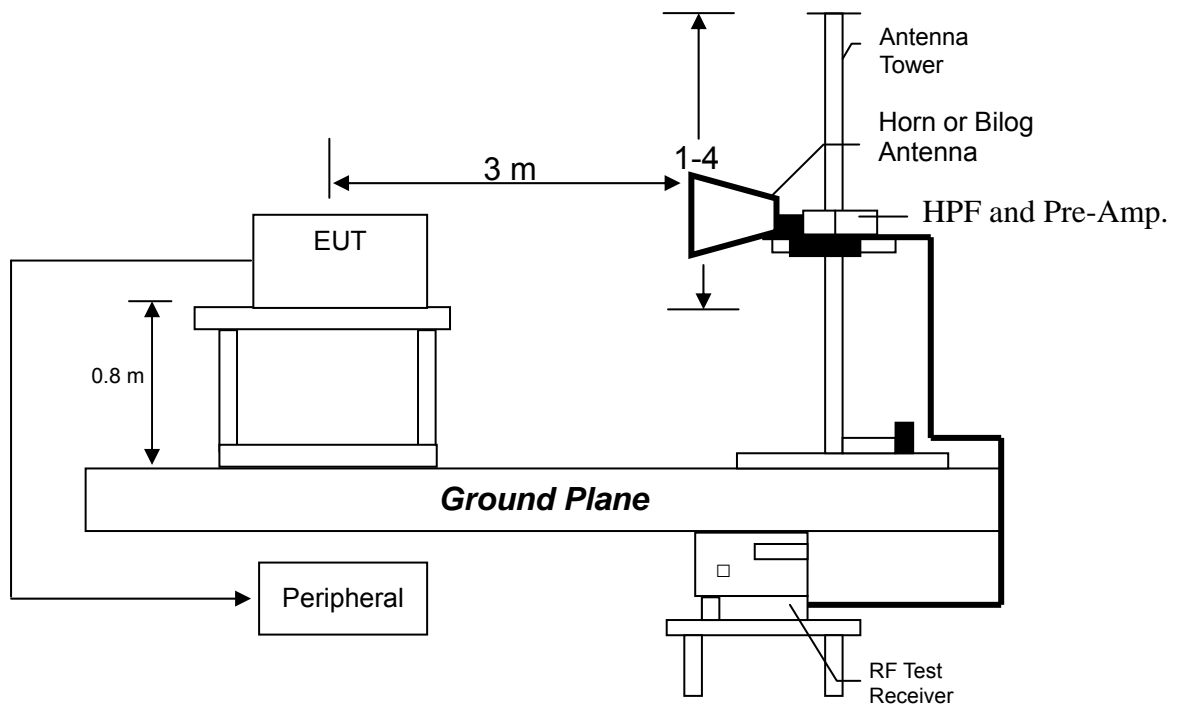
Radiated emissions were investigated cover the frequency range from 30MHz to 1000MHz using a receiver RBW of 120kHz record QP reading, and the frequency over 1GHz using a spectrum analyzer RBW of 1MHz and 10Hz VBW record Average reading. (15.209 paragraph), the Peak reading (1MHz RBW/VBW) recorded also 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”.



## D2. Test Diagram:



## D3. Emission Limit:

The spurious Emission shall test through the 10th harmonic. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a).

Frequency (MHz)	Limits (dB $\mu$ V/m@3m)
30-88	40
88-216	43.5
216-960	46
Above 960	54

### Remark:

1. In the above table, the tighter limit applies at the band edges.
2. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system

## Appendix E: 15.207 – AC power line conducted emission

### E1. Method of Measurement:

**Reference FCC document: KDB558074, ANSI C63.4**

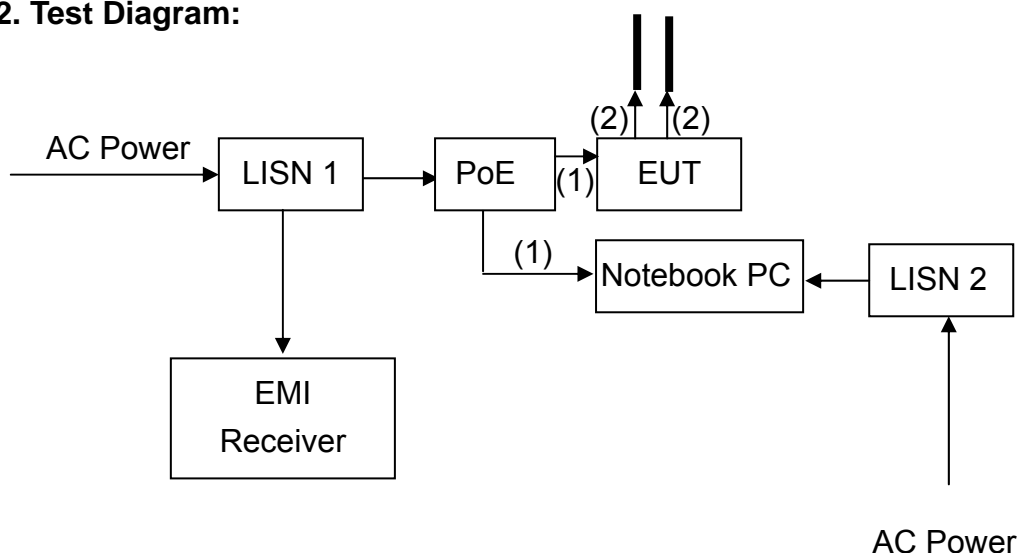
The EUT are connected to the main power through a line impedance stabilization network (LISN). This provides a 50 ohm/50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm 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”.

### E2. Test Diagram:



(1) RJ-45 UTP Cat.5 10meter

(2) Shielded cable with N-type connector 1.5meter

### E3. 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.

## Appendix F: Test Equipment List

Equipment	Brand	Model No.
EMI Test Receiver	Rohde & Schwarz	ESCS 30
Spectrum Analyzer	Rohde & Schwarz	FSP 30
Spectrum Analyzer	Rohde & Schwarz	FSEK 30
Signal Generator	Rohde & Schwarz	SMR27
Horn Antenna	SCHWARZBECK	BBHA 9120 D
Horn Antenna	SCHWARZBECK	BBHA 9170
Bilog Antenna	SCHWARZBECK	VULB 9168
Pre-Amplifier	MITEQ	919981
Pre-Amplifier	MITEQ	828825
Controller	HDGmbH	CM 100
Antenna Tower	HDGmbH	MA 2400
LISN	Rohde & Schwarz	ESH3-Z5
Wideband Peak Power Meter/ Sensor	Anritsu	ML2487A/ MA2491A
Temperature Humidity Test Chamber	Juror	TR-4010

Note: 1. The above equipments are within the valid calibration period.  
2. The test antennas (receiving antenna) are calibration per 3 years.

### Measurement Uncertainty:

Measurement uncertainty was calculated in accordance with NAMAS NIS 81.

Parameter	Uncertainty
Radiated Emission	$\pm 4.98$ dB
Conducted Emission	$\pm 2.6$ dB

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of  $k=2$ .