EMC
TEST REPORT

Report No. : TS08010067-EME
Model No. : H3C WA2220E-AG
Issued Date : Jul. 01, 2008

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

Test Method/ Standard: **CFR 47 FCC Part 15.247, 15.205, 15.207, 15.209, 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

This test report consists of 69 pages in total. It may be duplicated completely for legal use with the allowance of the applicant. It shall not be reproduced except in full, without the written approval of Intertek Laboratory. The test result(s) in this report only applies to the tested sample(s).

Report Engineer

Sunny Liu

Project Engineer

Rex Liao

Reviewed By

Jimmie Liu

Table of Contents

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 WA2220-AG
FCC ID.:	U6IH3CEWT0235A29F
Frequency Range:	1. 2412MHz ~ 2462MHz 2. 5745MHz ~ 5825MHz
Channel Number:	1. 11 channels for 2412MHz ~ 2462MHz 2. 5 channels for 5745MHz ~ 5825MHz
Rated Power:	100-240Vac, 50-60Hz with adapter (FSP025-1AD207A)
Power Cord:	N/A
Data Cable:	RJ-45 UTP Cat.5 3meter × 1
Sample Received:	Jan. 17, 2008
Test Date(s):	Jan. 17, 2008 ~ Jun. 30, 2008
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.

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

For 802.11b/g

The antenna is affixed to the EUT using a unique connector, which allows for replacement of a broken antenna, but DOES NOT use a standard antenna jack or electrical connector.

Antenna Gain:	2dBi max
Antenna Type:	Dipole antenna
Connector Type:	SAM Reverse

For 802.11a

The antenna is affixed to the EUT using a unique connector, which allows for replacement of a broken antenna, but DOES NOT use a standard antenna jack or electrical connector.

Antenna Gain:	3dBi max
Antenna Type:	Dipole antenna
Connector Type:	SAM Reverse

Operation mode

The EUT was supplied with 120Vac, 60Hz 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 1Mbps data rate for 802.11b mode and 6Mbps data rate for 802.11a/g mode. The final tests were executed under these conditions and recorded in this report individually.

11b (CH 6 2437MHz)	
	PK
1M	20.72
2M	20.61
5.5M	20.47
11M	20.31
11g (CH 6 2437MHz)	
	PK
6M	24.37
9M	24.11
12M	23.97
18M	23.82
24M	23.77
36M	23.51
48M	23.33
54M	23.07
11a (CH 157 5785MHz)	
	PK
6M	23.33
9M	23.07
12M	22.71
18M	22.54
24M	22.37
36M	22.17
48M	22.07
54M	21.91

3. Maximum 6dB Bandwidth

Name of Test	Maximum 6dB Bandwidth
Base Standard	FCC 15.247 (a)(2)

Tested By: Rex Liao
Test Date: Jan. 15, 2008

Test Equipment: EC1365

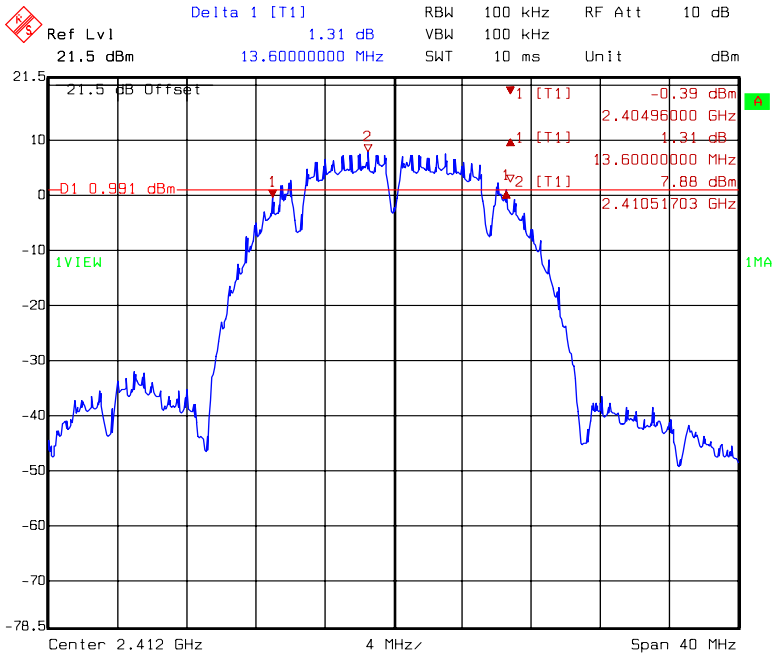
Test Result: Complies
Test Method: See Appendix B
Measurement Data: See Table & plots below

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.

Table1. Maximum 6dB Bandwidth

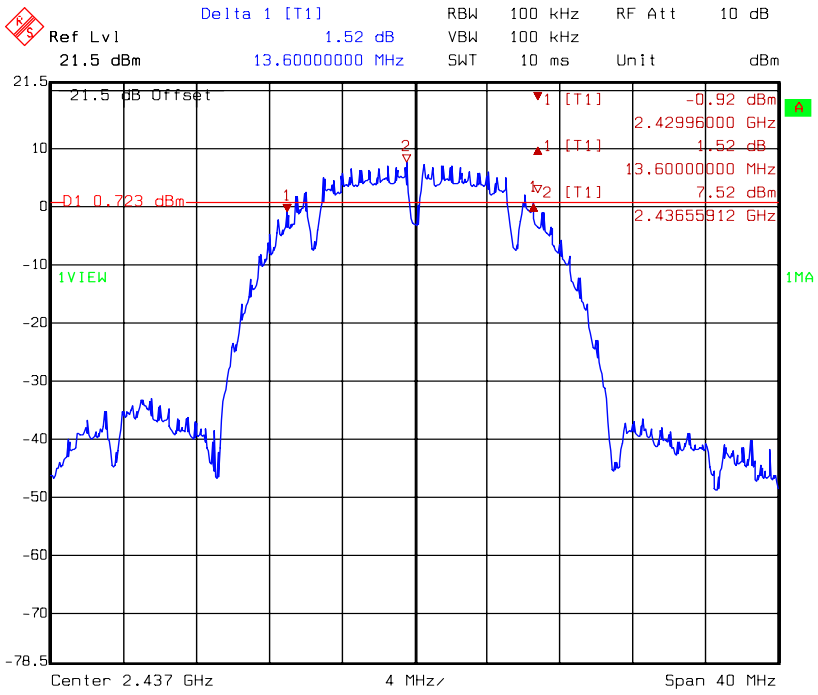
Mode	Channel	Frequency (MHz)	Bandwidth (MHz)	Min. Limit (MHz)	Pass/Fail
11b	1	2412	13.60	0.5	Pass
	6	2437	13.60	0.5	Pass
	11	2462	12.64	0.5	Pass
11g	1	2412	16.80	0.5	Pass
	6	2437	16.64	0.5	Pass
	11	2462	16.64	0.5	Pass
11a	149	5745	16.56	0.5	Pass
	157	5785	16.72	0.5	Pass
	165	5825	16.64	0.5	Pass

6dB Bandwidth @ 802.11b mode channel 1



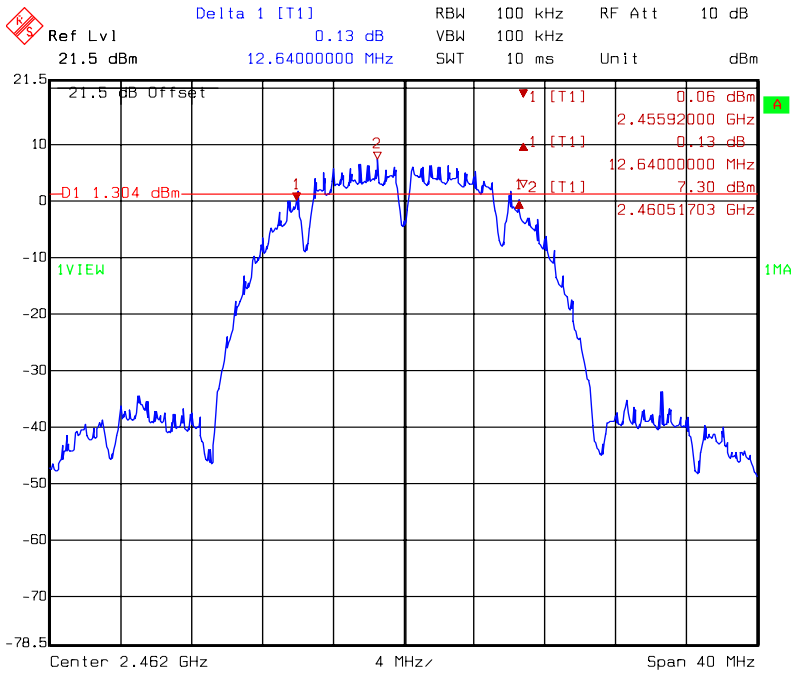
Title: 6dB Band-Width
Comment A: CH 1 at 802.11b mode
Date: 15.JAN.2008 14:43:51

6dB Bandwidth @ 802.11b mode channel 6



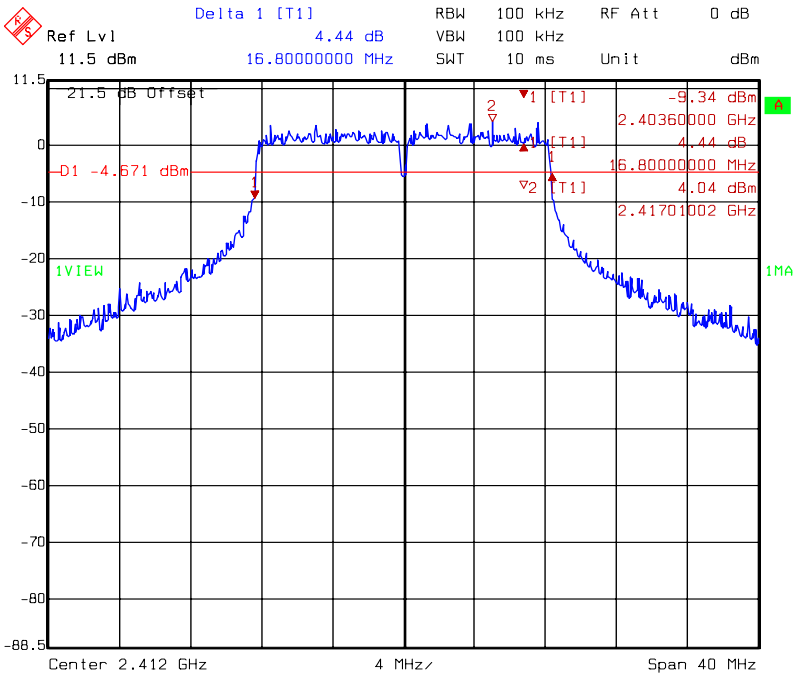
Title: 6dB Band-Width
Comment A: CH 6 at 802.11b mode
Date: 15.JAN.2008 14:47:12

6dB Bandwidth @ 802.11b mode channel 11



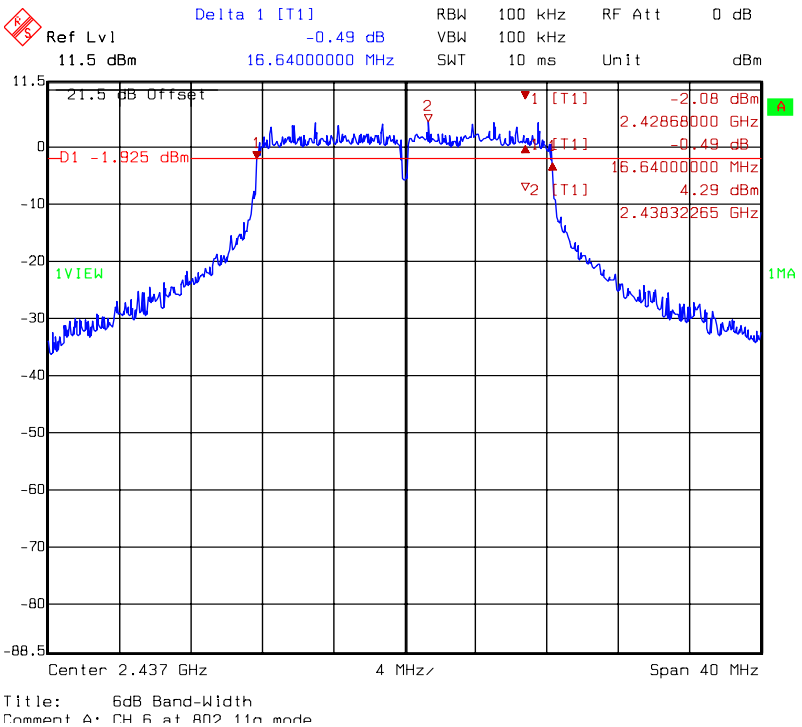
Title: 6dB Band-Width
Comment A: CH 11 at 802.11b mode

6dB Bandwidth @ 802.11g mode channel 1

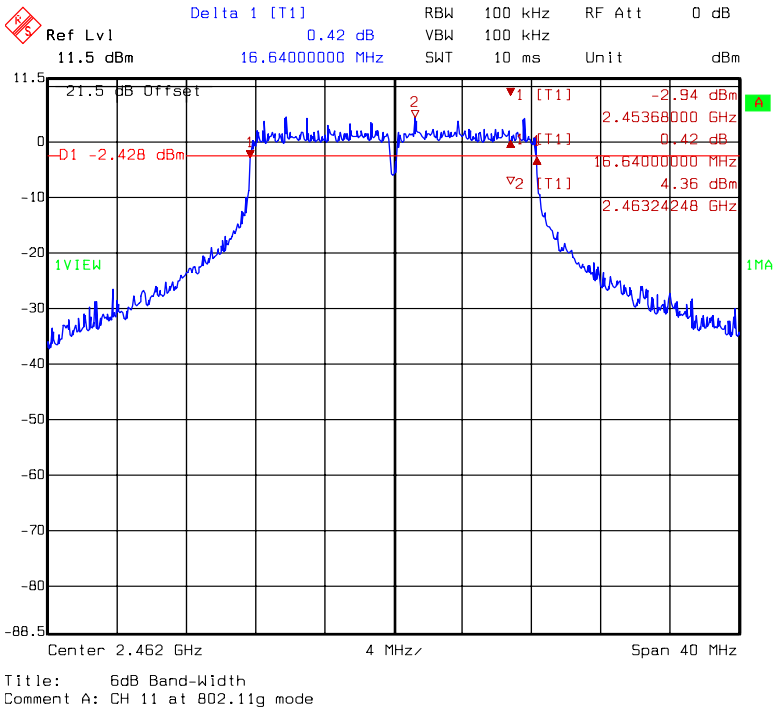


Title: 6dB Band-Width
Comment A: CH 1 at 802.11g mode

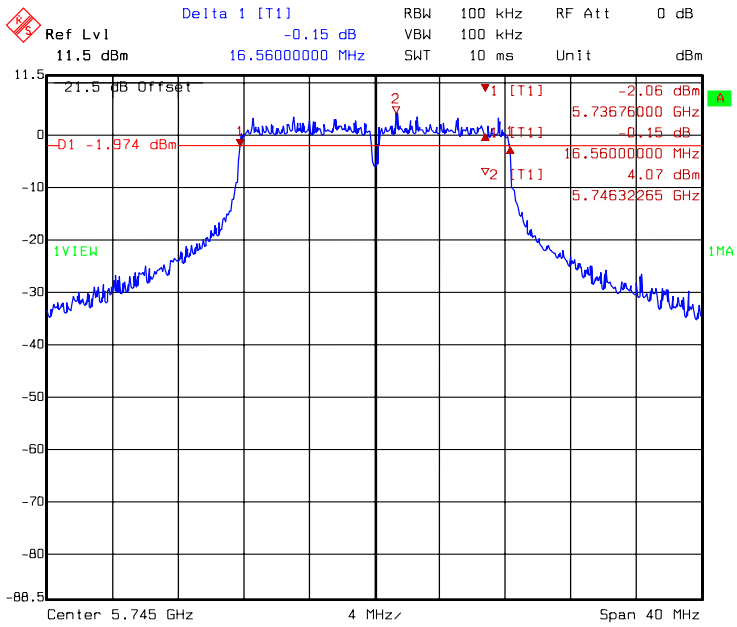
6dB Bandwidth @ 802.11g mode channel 6



6dB Bandwidth @ 802.11g mode channel 11

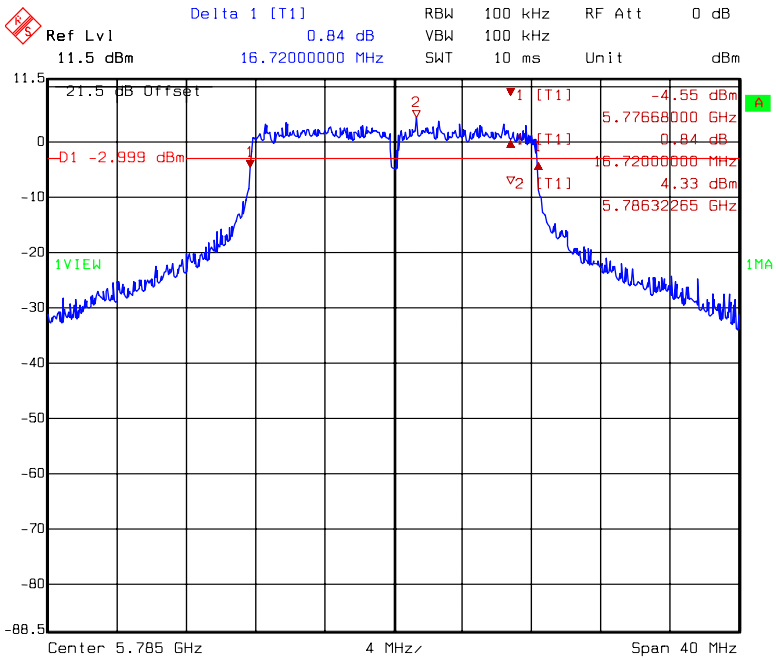


6dB Bandwidth @ 802.11a mode channel 149



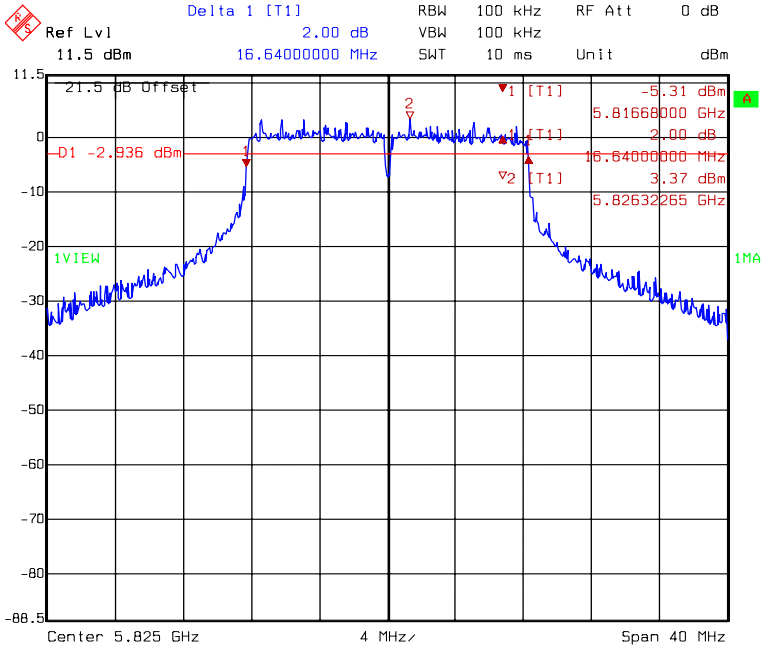
Title: 6dB Band-Width
Comment A: CH 149 at 802.11a mode
Date: 15.APR.2008 17:23:53

6dB Bandwidth @ 802.11a mode channel 157



Title: 6dB Band-Width
Comment A: CH 157 at 802.11a mode
Date: 15.APR.2008 17:53:52

6dB Bandwidth @ 802.11a mode channel 165



4. 99% Occupied Bandwidth

Name of Test	99% Occupied Bandwidth
Base Standard	None; for reporting purposes only

Tested By: Rex Liao
Test Date: Jan. 15, 2008

Test Equipment: EC1365

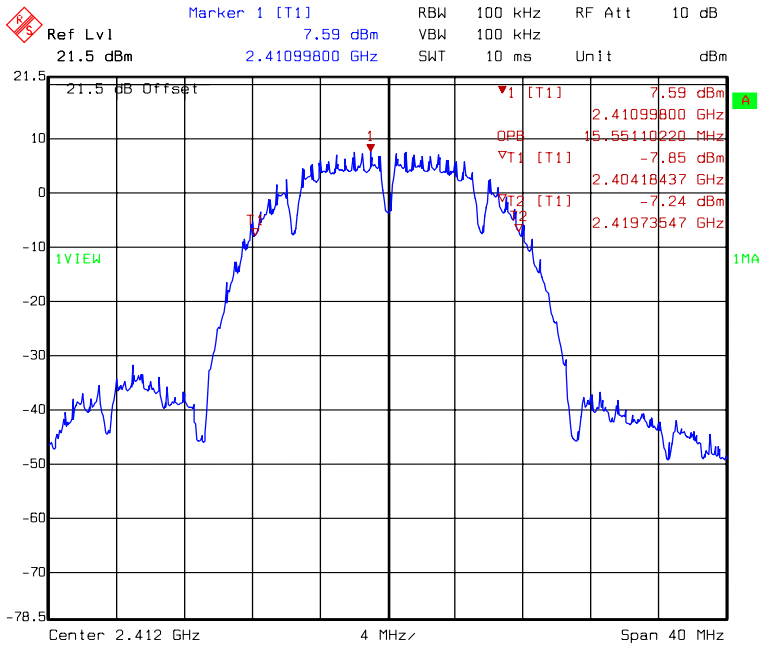
Test Result: Complies
Test Method: See Appendix B
Measurement Data: See Table & plots below

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

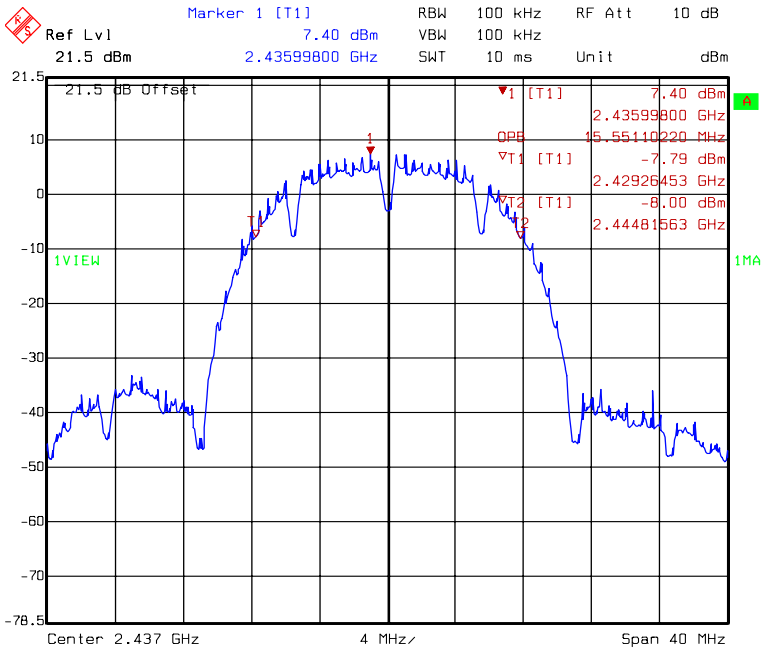
Mode	Channel	Frequency (MHz)	Occupied Bandwidth (MHz)
11b	1	2412	15.55
	6	2437	15.55
	11	2462	15.47
11g	1	2412	16.59
	6	2437	16.59
	11	2462	16.59
11a	149	5745	16.67
	157	5785	16.67
	165	5825	16.67

99% Occupied Bandwidth @ 802.11b mode channel 1



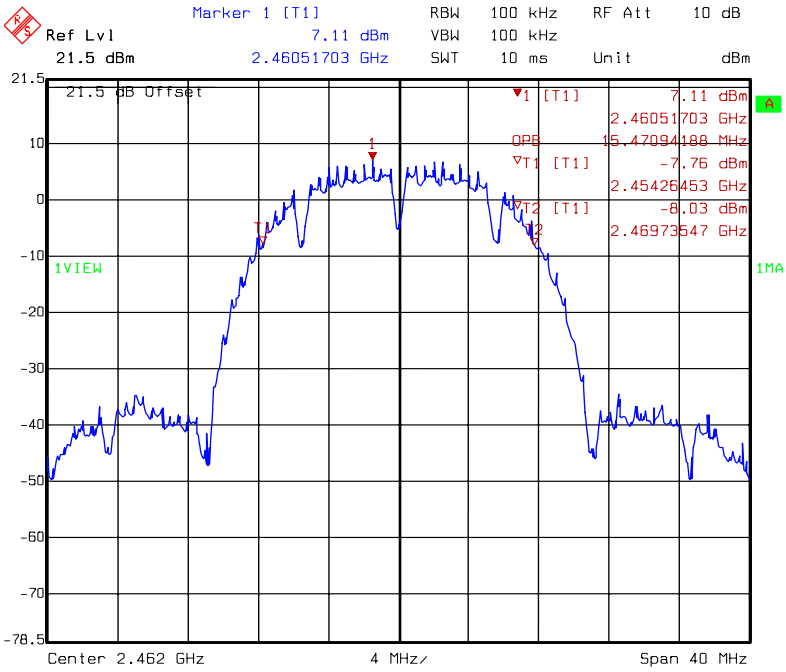
Title: Occupied Band-Width
Comment A: CH 1 at 802.11b mode
Date: 15.JAN.2008 14:45:51

99% Occupied Bandwidth @ 802.11b mode channel 6



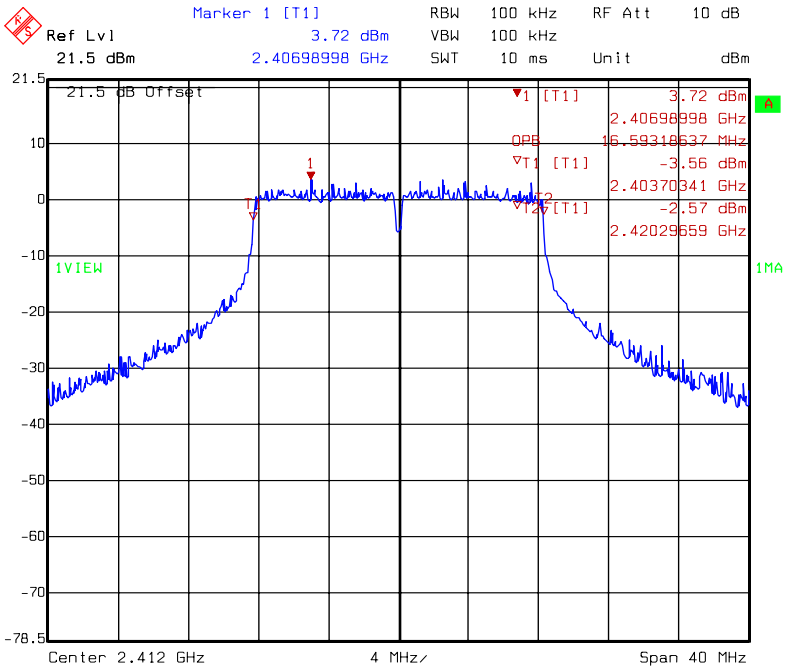
Title: Occupied Band-Width
Comment A: CH 6 at 802.11b mode
Date: 15.JAN.2008 14:49:09

99% Occupied Bandwidth @ 802.11b mode channel 11



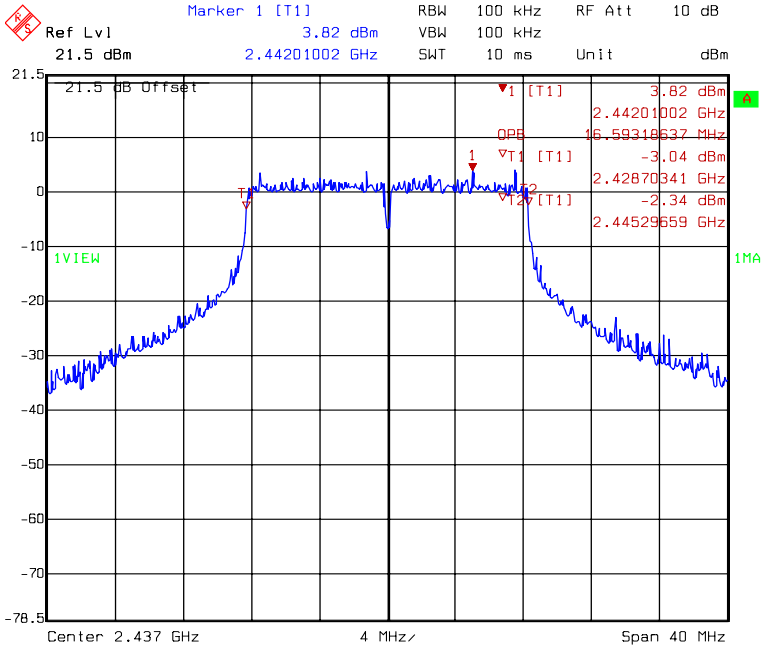
Title: Occupied Band-Width
Comment A: CH 11 at 802.11b mode

99% Occupied Bandwidth @ 802.11g mode channel 1



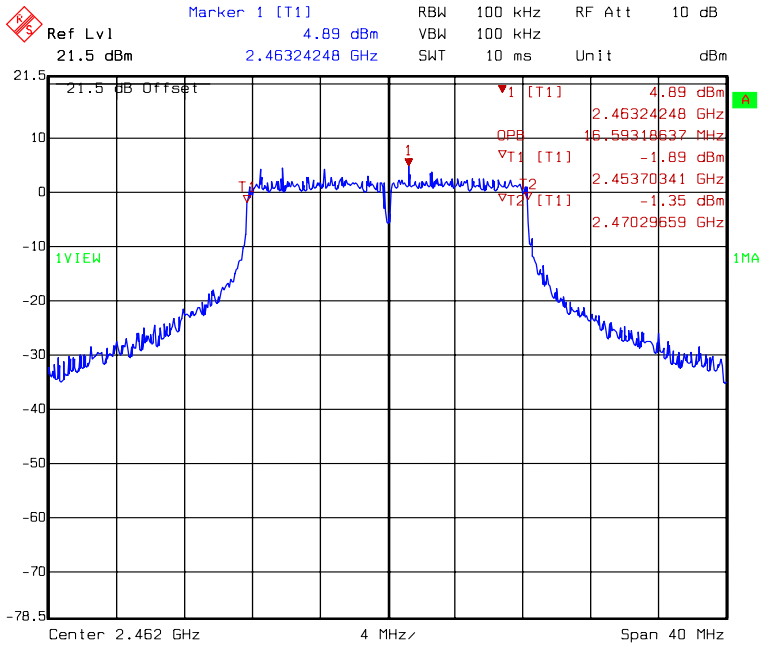
Title: Occupied Band-Width
Comment A: CH 1 at 802.11g mode

99% Occupied Bandwidth @ 802.11g mode channel 6



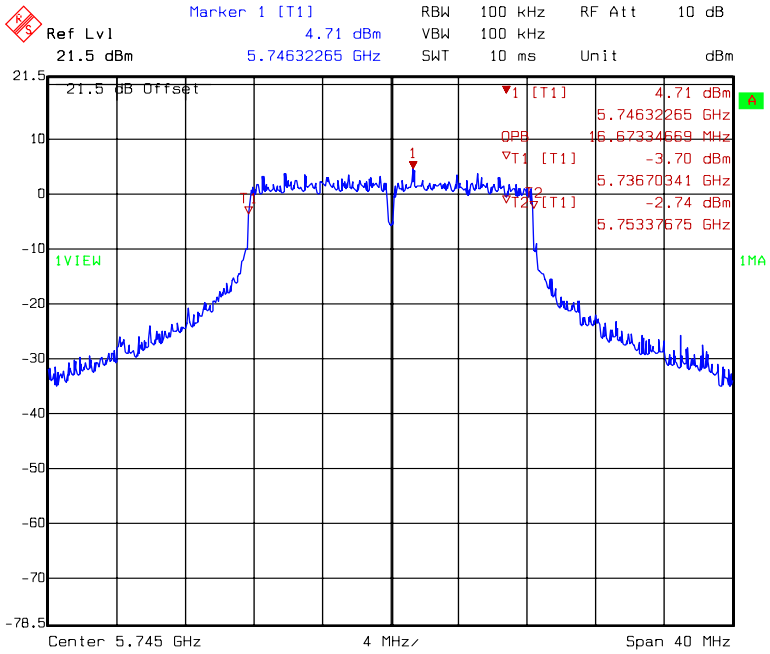
Title: Occupied Band-Width
Comment A: CH 6 at 802.11g mode
Date: 15.JAN.2008 14:32:54

99% Occupied Bandwidth @ 802.11g mode channel 11



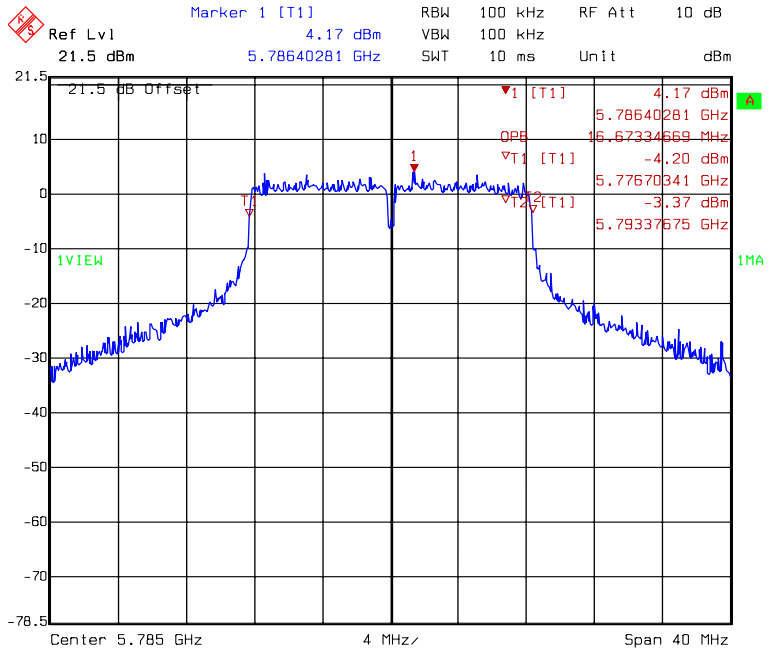
Title: Occupied Band-Width
Comment A: CH 11 at 802.11g mode
Date: 15.JAN.2008 14:29:14

99% Occupied Bandwidth @ 802.11a mode channel 149



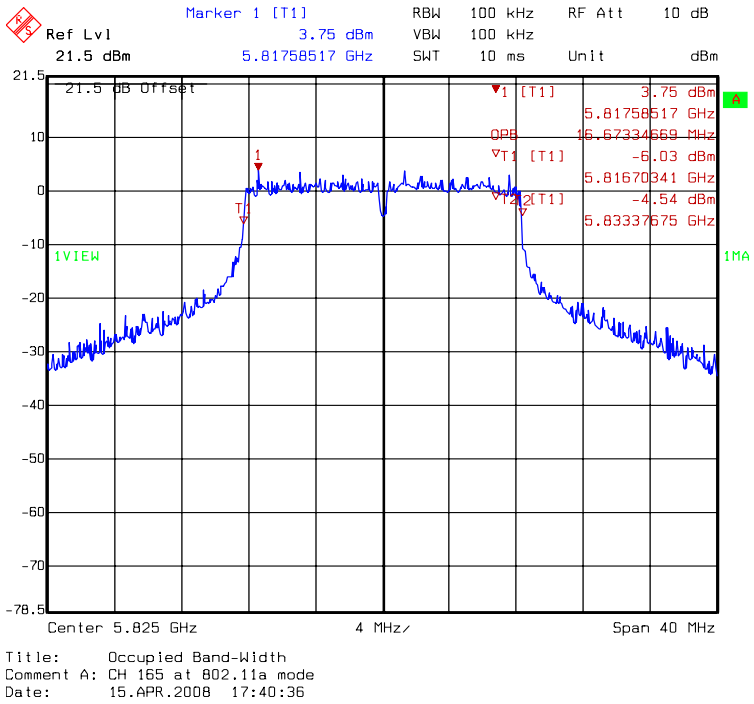
Title: Occupied Band-Width
Comment A: CH 149 at 802.11a mode
Date: 15.APR.2008 17:26:04

99% Occupied Bandwidth @ 802.11a mode channel 157



Title: Occupied Band-Width
Comment A: CH 157 at 802.11a mode
Date: 15.APR.2008 17:56:02

99% Occupied Bandwidth @ 802.11a mode channel 165



5. Maximum Output Power

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

Tested By: Rex Liao
Test Date: Jan. 16, 2008

Test Equipment: EC1396, EC1396-1
Measurement Uncertainty: ±2dB (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 1Mbps for 802.11b and 6Mbps 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)	(W)
11b	1	2412	2	18.42	20.42	110.1539	1
	6	2437	2	18.72	20.72	118.0321	1
	11	2462	2	18.18	20.18	104.2317	1
11g	1	2412	2	22.23	24.23	264.8500	1
	6	2437	2	22.37	24.37	273.5269	1
	11	2462	2	22.73	24.73	297.1666	1
11a	149	5745	2	21.99	23.99	250.6100	1
	157	5785	2	21.33	23.33	215.2800	1
	165	5825	2	22.05	24.05	254.1000	1

6. Power Spectral Density

Name of Test	Power Spectral Density
Base Standard	FCC 15.247(e)

Tested By: Rex Liao
Test Date: Jan. 15, 2008

Test Equipment: EC1365

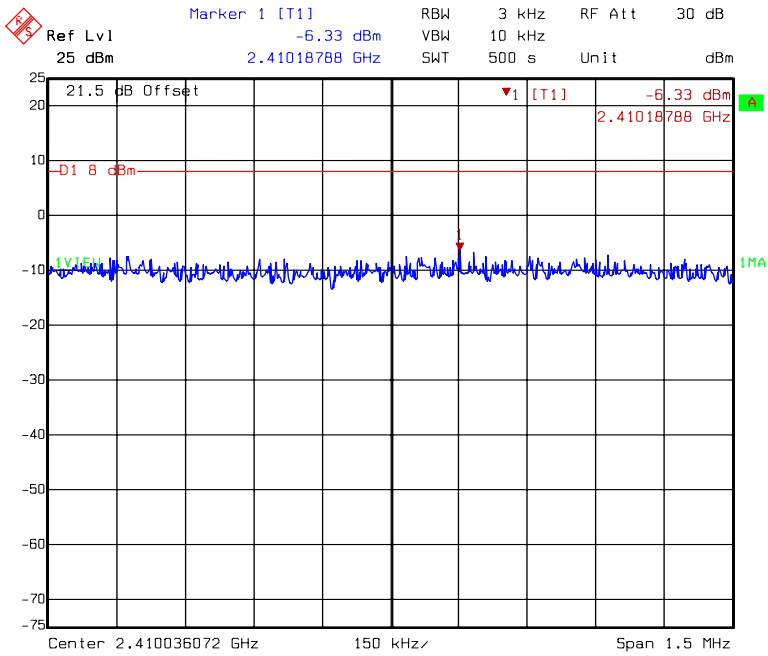
Test Result: Complies
Test Method: See Appendix B
Measurement Data: See Table & plots below

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.

Table4. Power Spectral Density

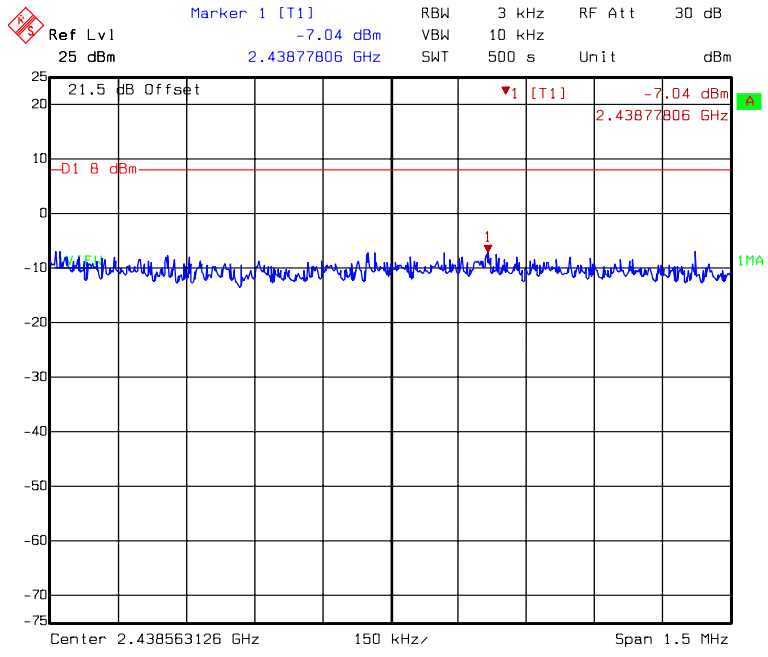
Mode	Channel	Frequency (MHz)	Total PSD (mW)	Limit (dBm)
11b	1	2412	-6.33	8
	6	2437	-7.04	8
	11	2462	-6.84	8
11g	1	2412	-9.45	8
	6	2437	-9.83	8
	11	2462	-8.78	8
11a	149	5745	-9.45	8
	157	5785	-9.83	8
	165	5825	-8.78	8

Power Spectral Density @ 802.11b mode channel 1



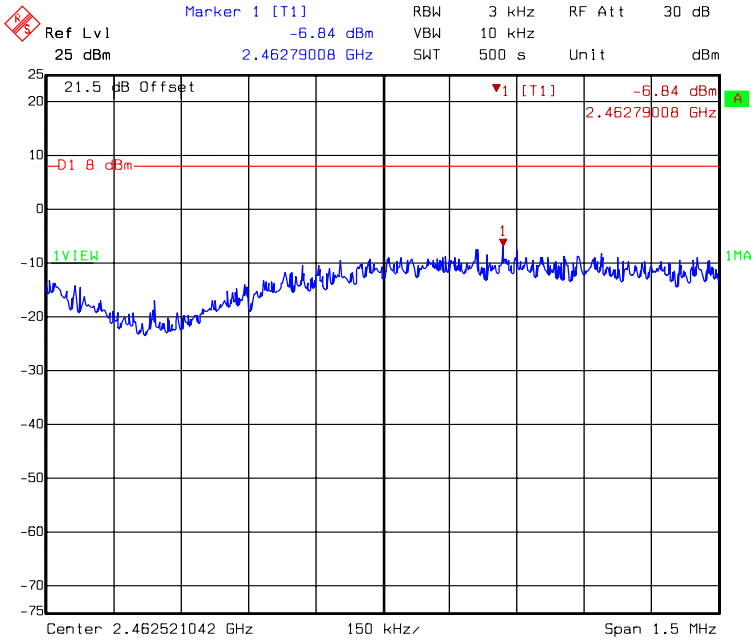
Title: Power density
Comment A: CH 1 at 802.11b mode
Date: 15.JAN.2008 14:44:09

Power Spectral Density @ 802.11b mode channel 6



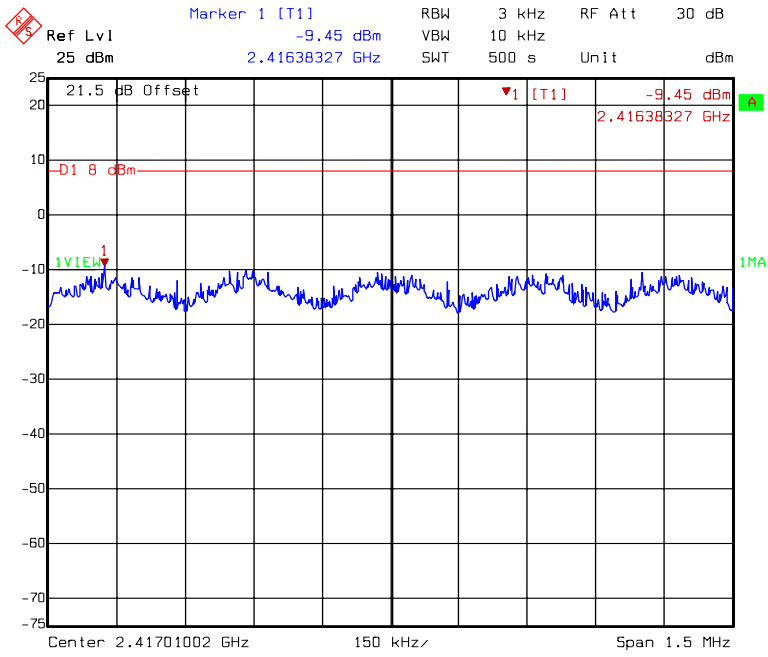
Title: Power density
Comment A: CH 6 at 802.11b mode
Date: 15.JAN.2008 14:47:29

Power Spectral Density @ 802.11b mode channel 11



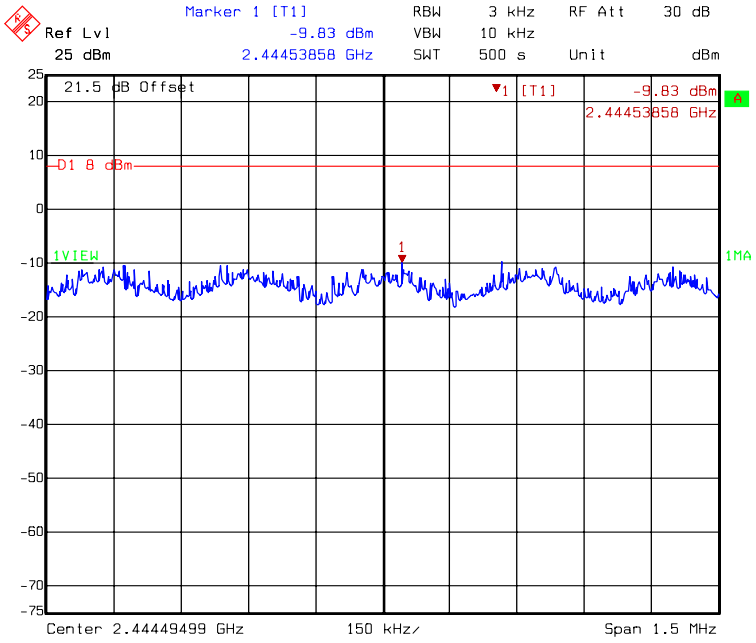
Title: Power density
Comment A: CH 11 at 802.11b mode
Date: 15.JAN.2008 14:54:49

Power Spectral Density @ 802.11g mode channel 1



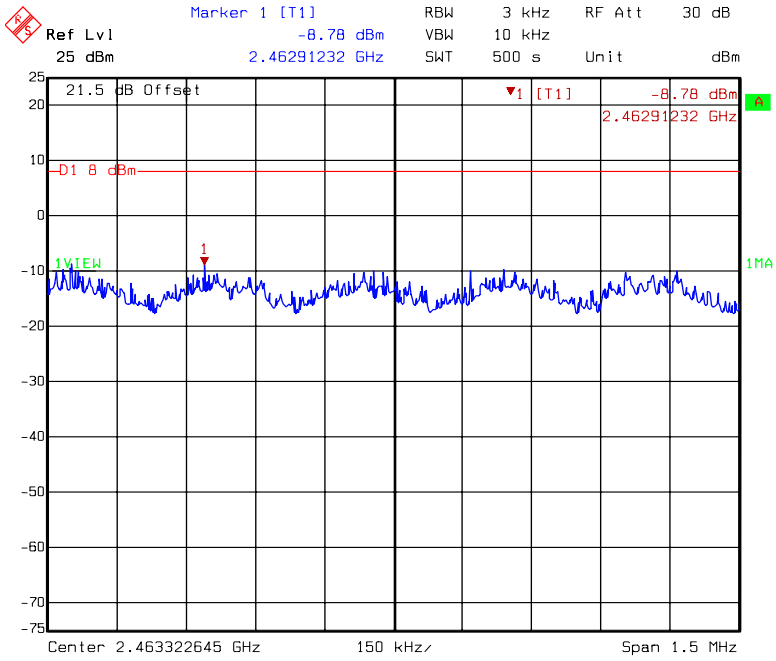
Title: Power density
Comment A: CH 1 at 802.11g mode
Date: 15.JAN.2008 14:38:33

Power Spectral Density @ 802.11g mode channel 6



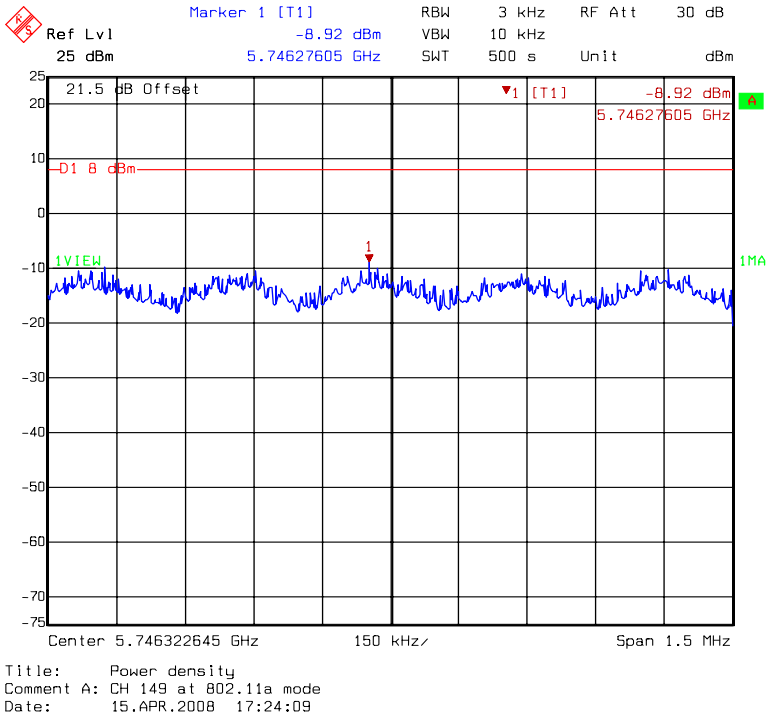
Title: Power density
Comment A: CH 6 at 802.11g mode
Date: 15.JAN.2008 14:31:04

Power Spectral Density @ 802.11g mode channel 11

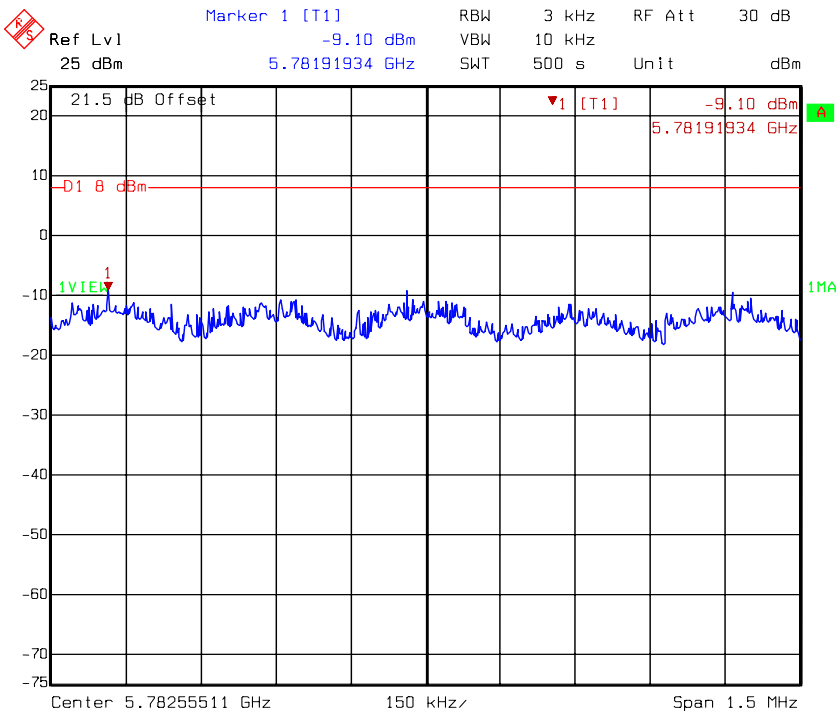


Title: Power density
Comment A: CH 11 at 802.11g mode
Date: 15.JAN.2008 14:27:37

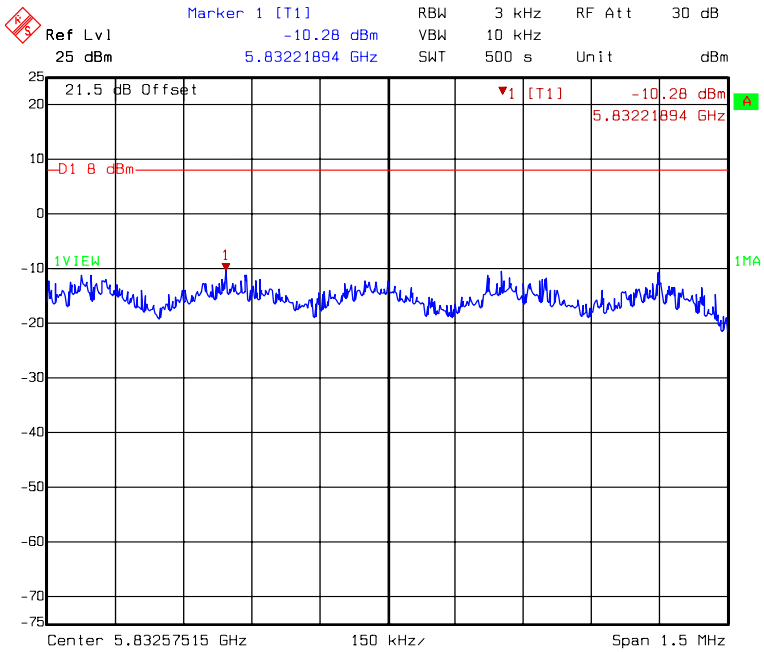
Power Spectral Density @ 802.11a mode channel 149



Power Spectral Density @ 802.11a mode channel 157



Power Spectral Density @ 802.11a mode channel 165



7. RF Antenna conducted Spurious

Name of Test	RF Antenna Conducted Spurious
Base Standard	FCC 15.247(d)

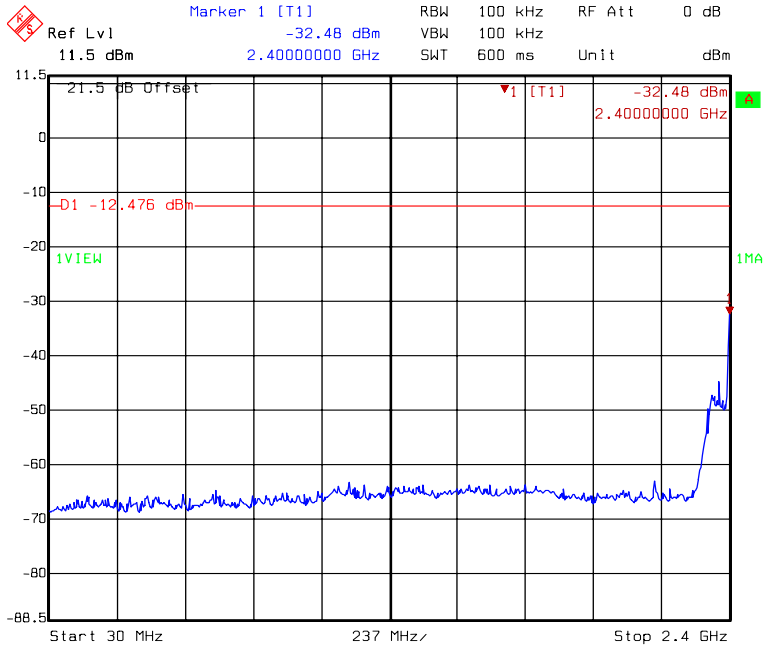
Tested By: Rex Liao
Test Date: Jan. 15, 2008

Test Equipment: EC1365

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

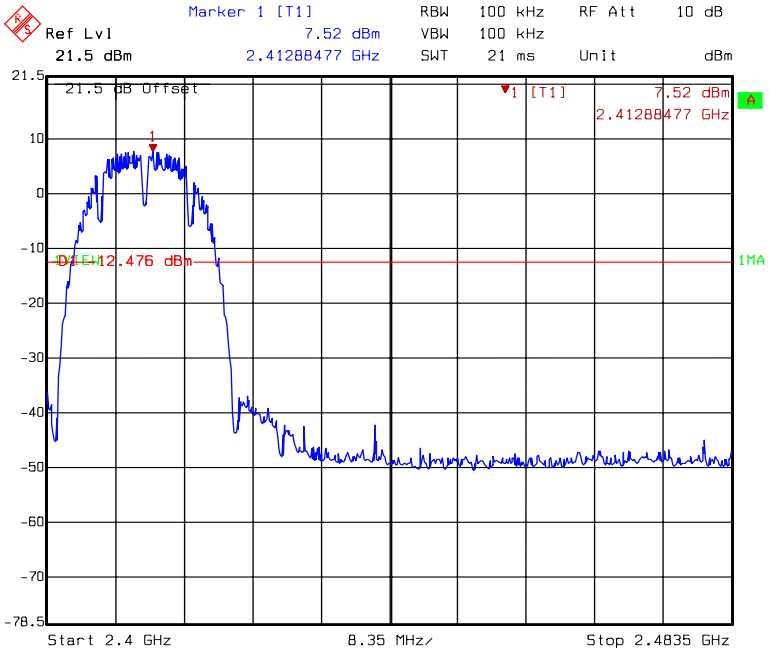
Note: (1) The EUT was tested while in a continuous transmit mode and the worst case data rates are 1Mbps for 802.11b and 6Mbps for 802.11a/ 11g. The EUT was tuned to a low, middle and high channel.
(2) The EUT operating at 2.4GHz ISM band. Frequency Range scanned from 30MHz to 25GHz.

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



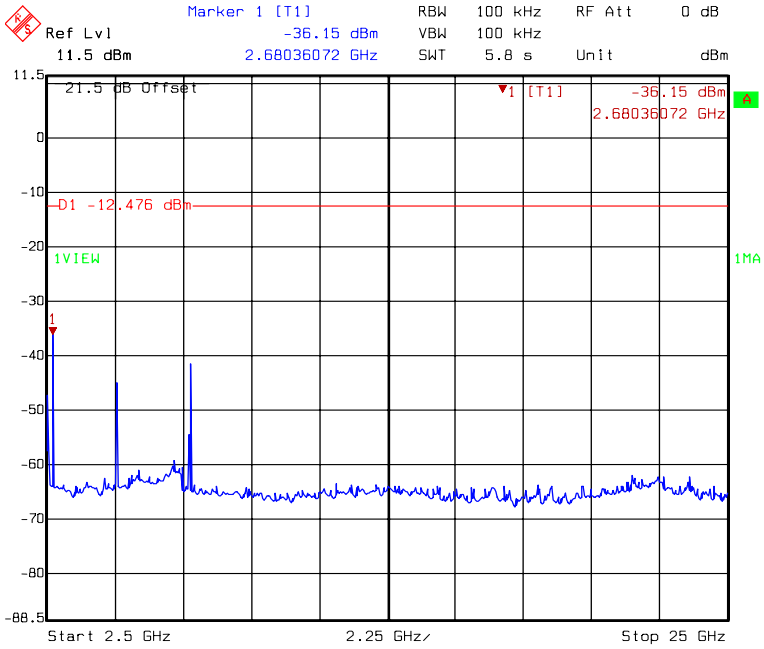
Title: Conductive-Spurious
Comment A: CH 1 at 802.11b mode 30MHz~2400MHz
Date: 15.JAN.2008 14:44:57

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



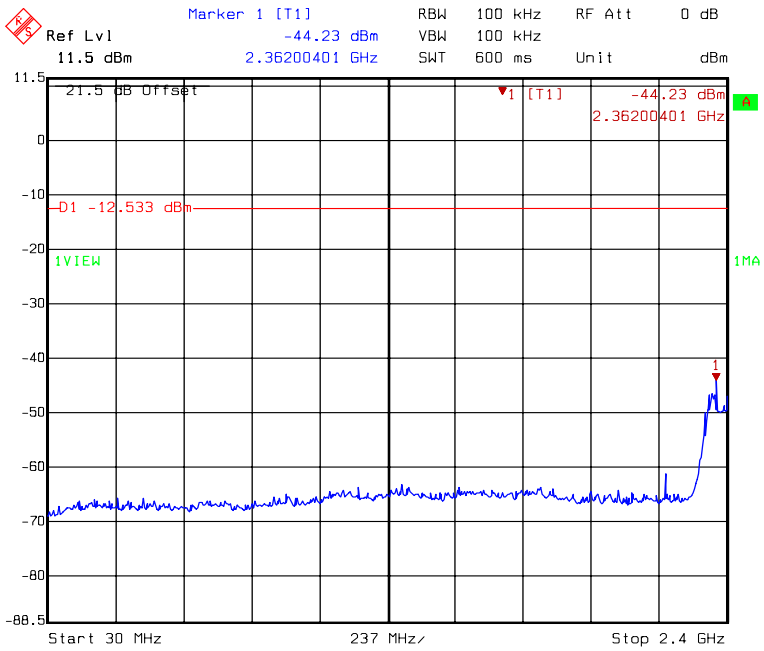
Title: Conductive-Spurious
Comment A: CH 1 at 802.11b mode 2400MHz~2483.5MHz
Date: 15.JAN.2008 14:44:35

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



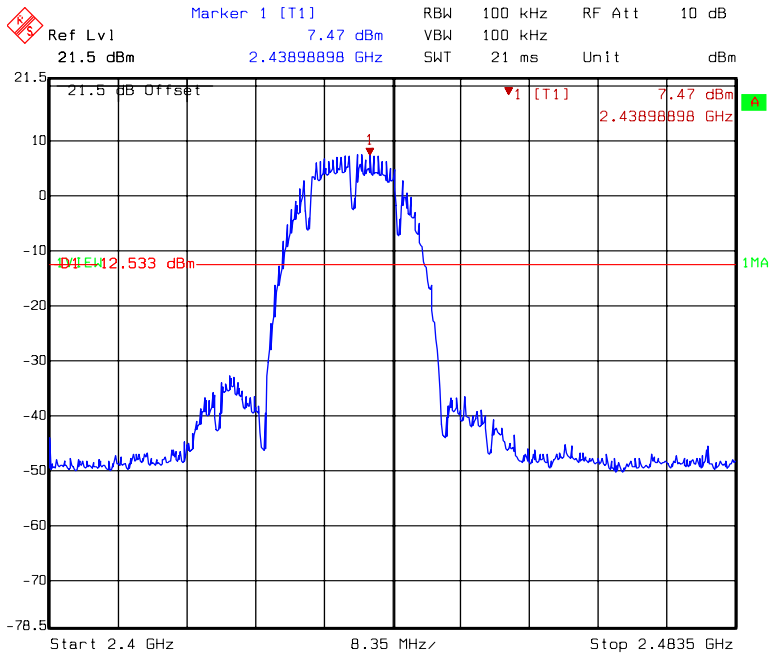
Title: Conductive-Spurious
Comment A: CH 1 at 802.11b mode 2483.5MHz~25GHz
Date: 15.JAN.2008 14:45:25

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



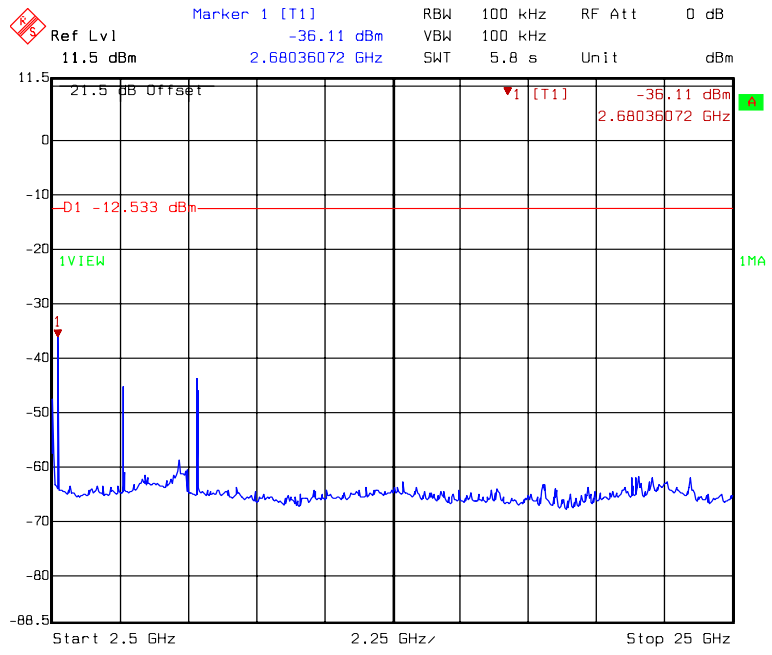
Title: Conductive-Spurious
Comment A: CH 6 at 802.11b mode 30MHz~2400MHz
Date: 15.JAN.2008 14:48:15

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



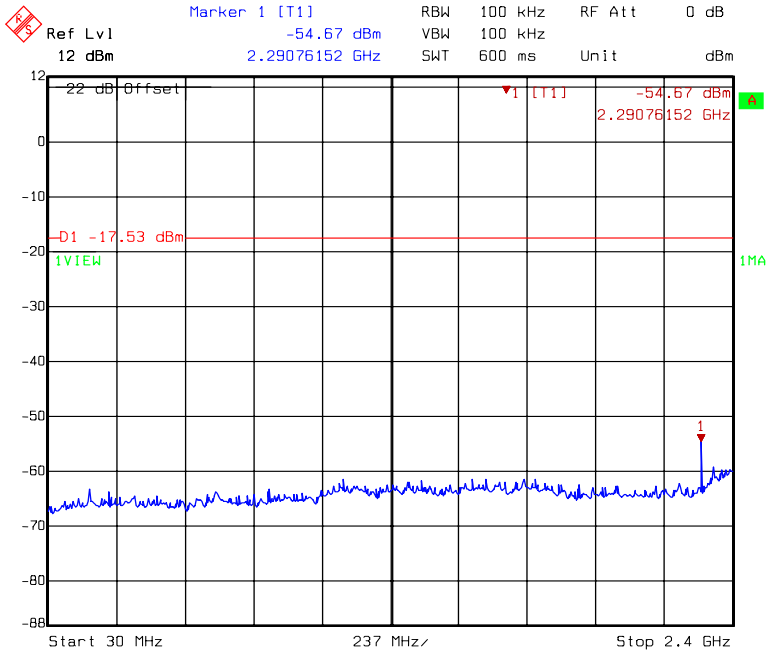
Title: Conductive-Spurious
Comment A: CH 6 at 802.11b mode 2400MHz~2483.5MHz
Date: 15.JAN.2008 14:47:53

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



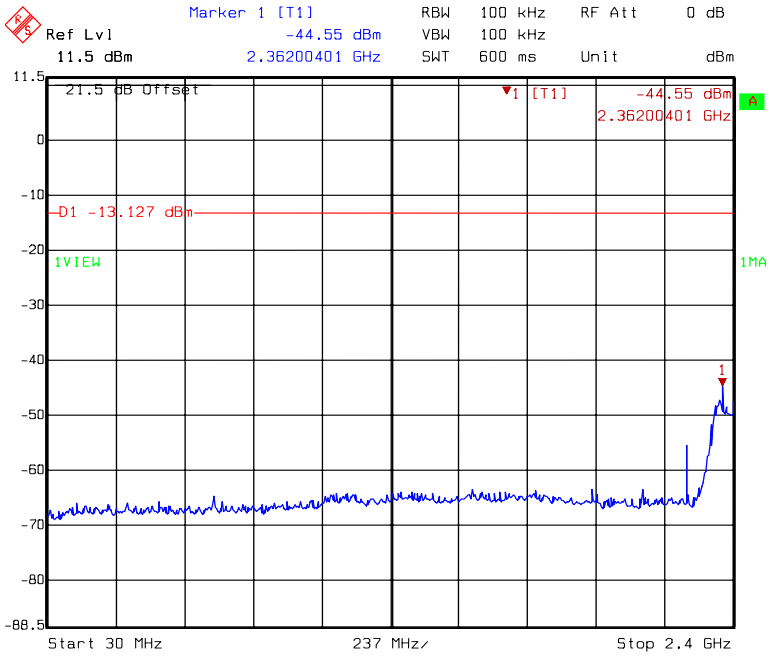
Title: Conductive-Spurious
Comment A: CH 6 at 802.11b mode 2483.5MHz~25GHz
Date: 15.JAN.2008 14:48:42

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



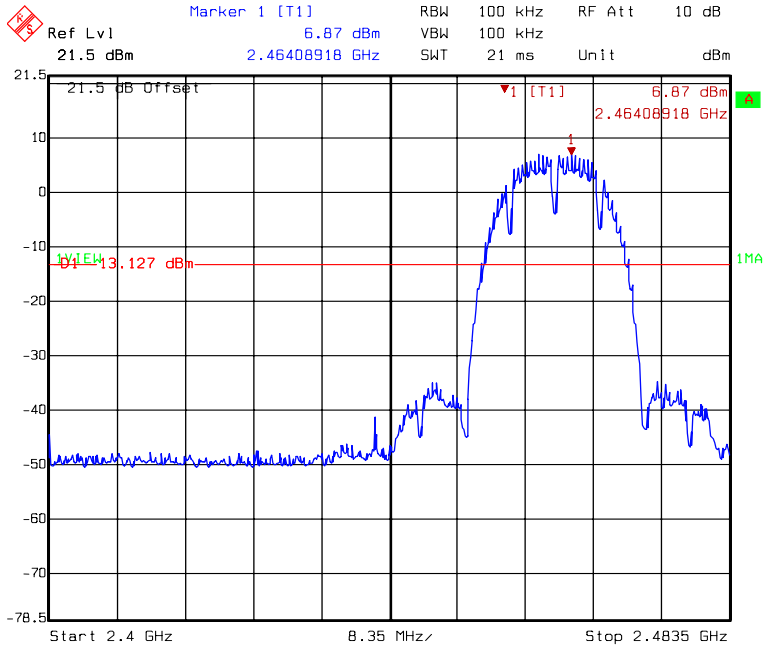
Title: Conductive-Spurious
Comment A: CH 11 at 802.11b mode 30MHz~2400MHzchain 0
Date: 31.MAY 2007 12:23:57

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



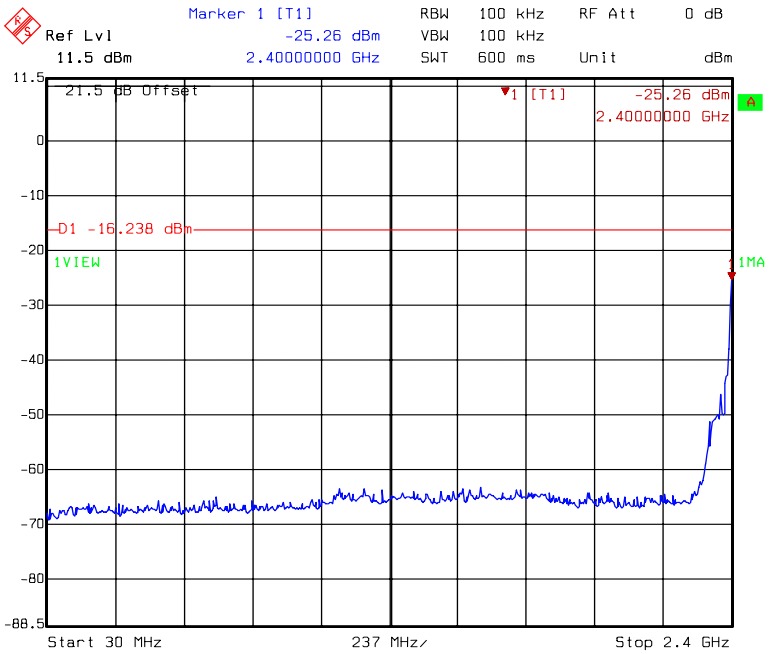
Title: Conductive-Spurious
Comment A: CH 11 at 802.11b mode 30MHz~2400MHz
Date: 15.JAN.2008 14:55:35

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



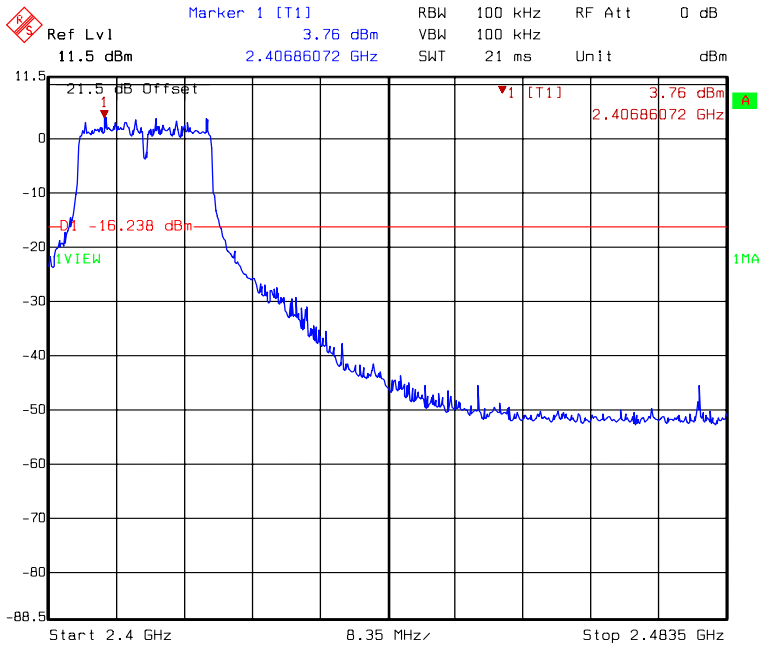
Title: Conductive-Spurious
Comment A: CH 11 at 802.11b mode 2400MHz~2483.5MHz
Date: 15.JAN.2008 14:55:13

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



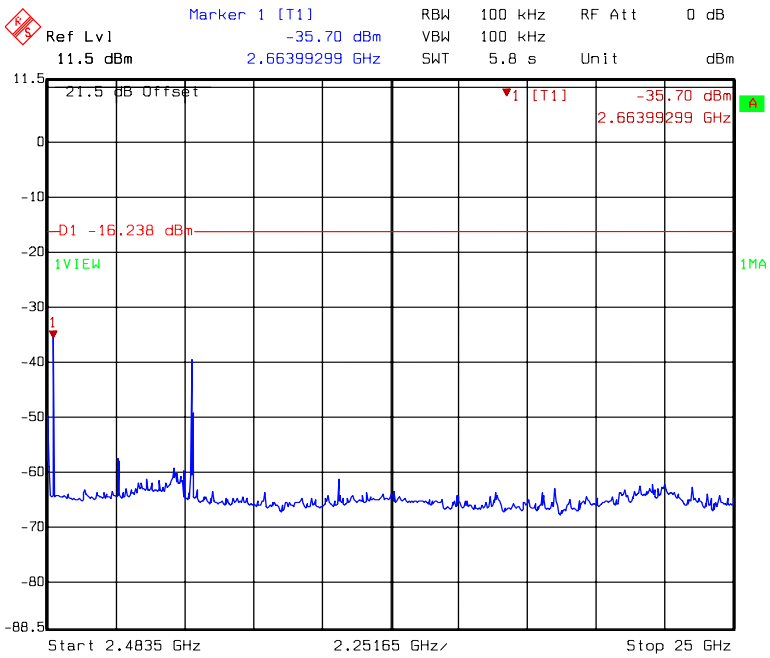
Title: Conductive-Spurious
Comment A: CH 1 at 802.11g mode 30MHz~2400MHz
Date: 15.JAN.2008 14:41:15

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



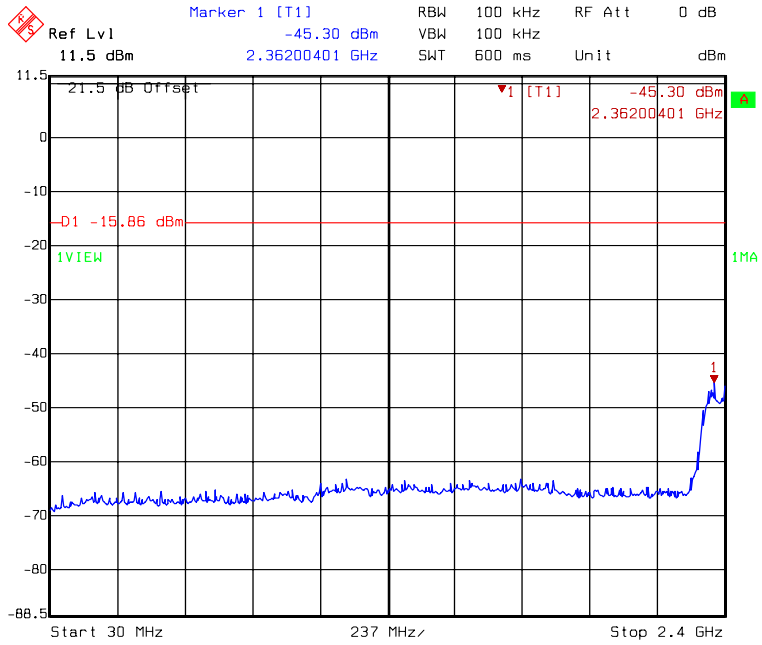
Title: Conductive-Spurious
Comment A: CH 1 at 802.11g mode 2400MHz~2483.5MHz
Date: 15.JAN.2008 14:40:53

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



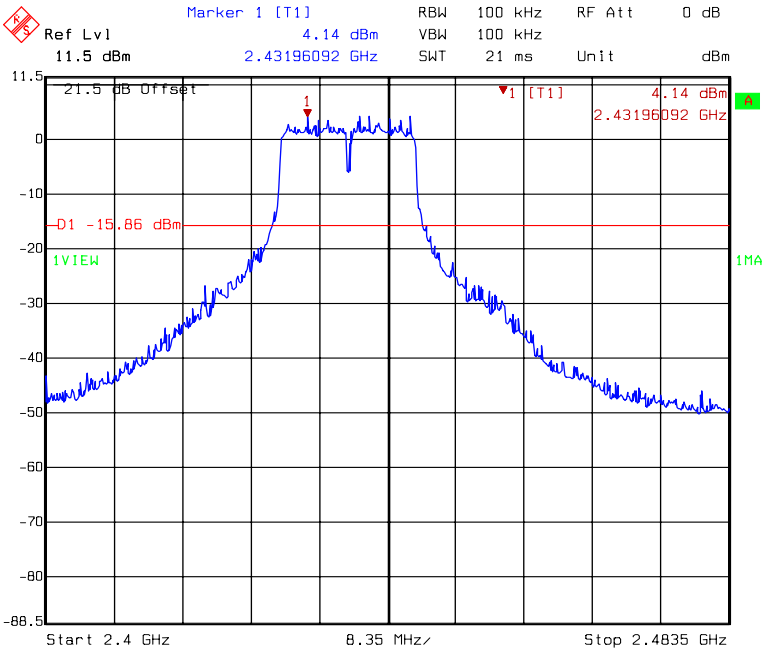
Title: Conductive-Spurious
Comment A: CH 1 at 802.11g mode 2483.5MHz~25000MHz
Date: 15.JAN.2008 14:41:43

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



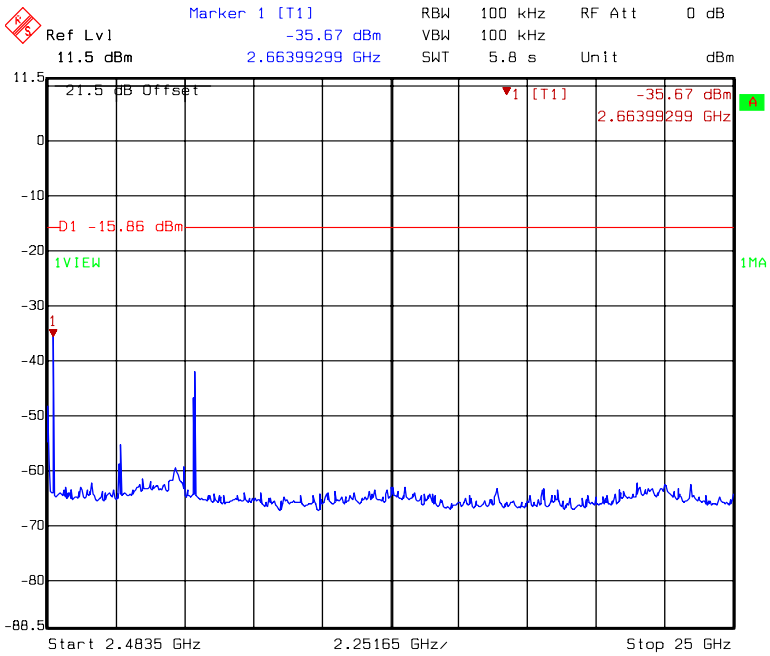
Title: Conductive-Spurious
Comment A: CH 6 at 802.11g mode 30MHz~2400MHz
Date: 15.JAN.2008 14:32:01

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



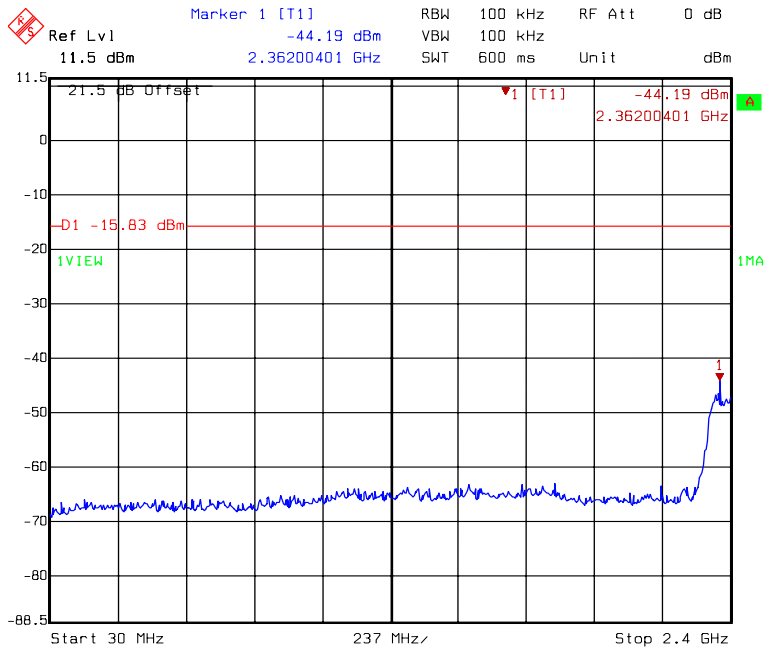
Title: Conductive-Spurious
Comment A: CH 6 at 802.11g mode 2400MHz~2483.5MHz
Date: 15.JAN.2008 14:31:38

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



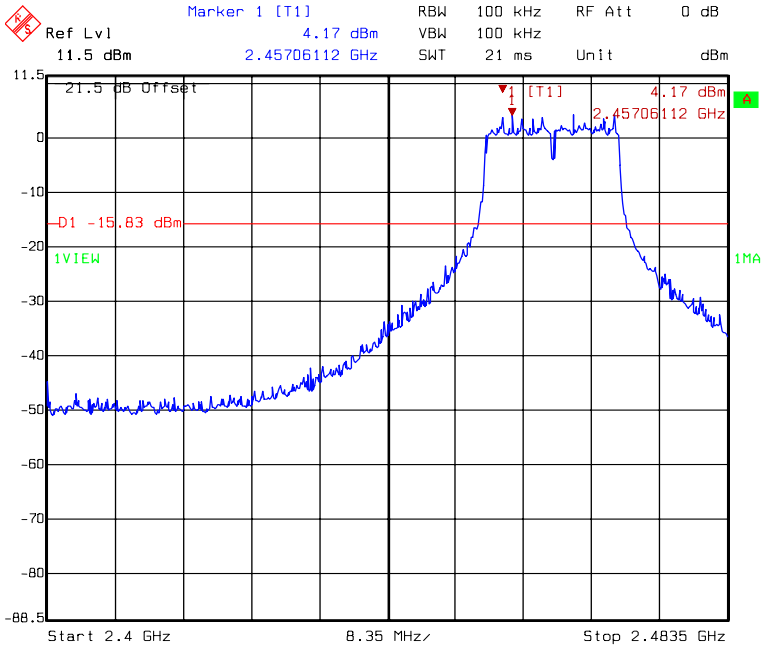
Title: Conductive-Spurious
Comment A: CH 6 at 802.11g mode 2483.5MHz~25000MHz
Date: 15.JAN.2008 14:32:28

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



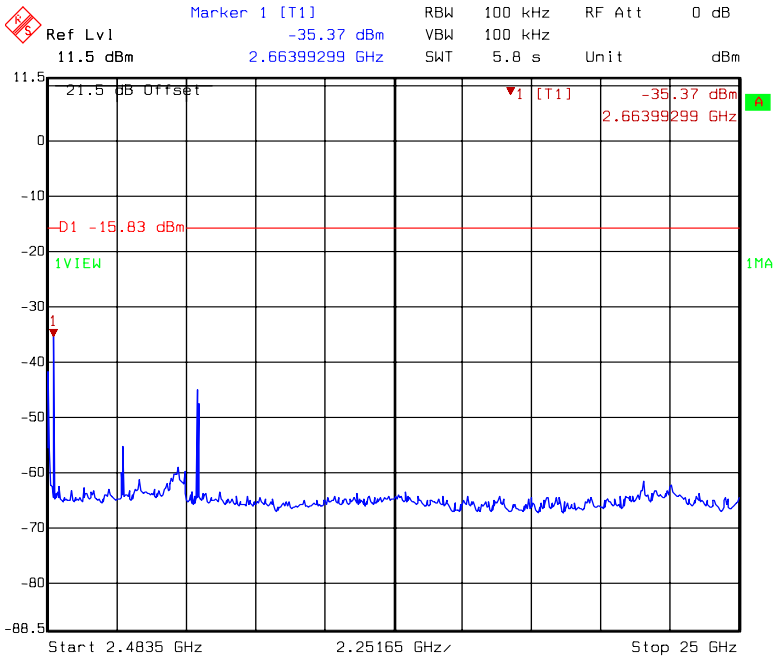
Title: Conductive-Spurious
Comment A: CH 11 at 802.11g mode 30MHz~2400MHz
Date: 15.JAN.2008 14:28:20

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



Title: Conductive-Spurious
Comment A: CH 11 at 802.11g mode 2400MHz~2483.5MHz
Date: 15.JAN.2008 14:27:58

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

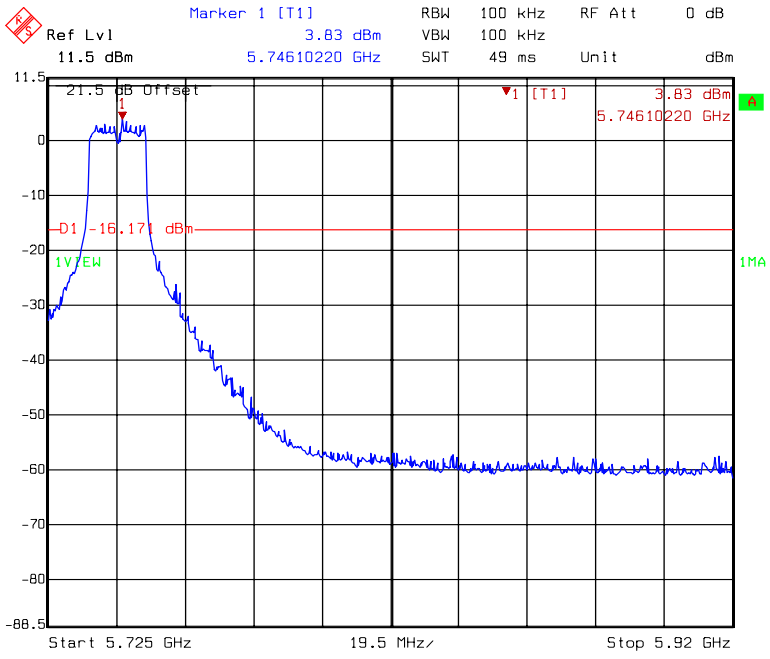


Title: Conductive-Spurious
Comment A: CH 11 at 802.11g mode 2483.5MHz~25000MHz
Date: 15.JAN.2008 14:28:47

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

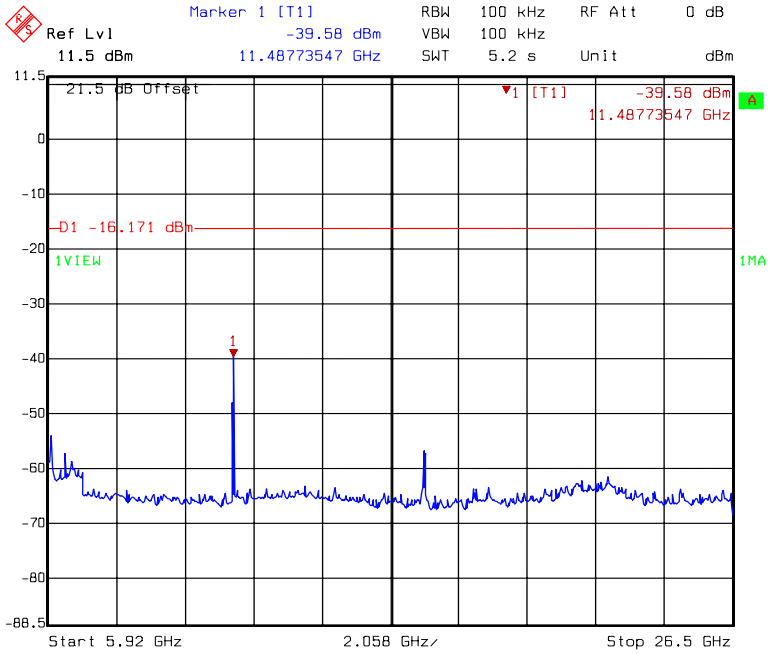
Title: Conductive-Spurious
Comment A: CH 149 at 802.11a mode 30MHz~5725MHz
Date: 15.APR.2008 17:24:50

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



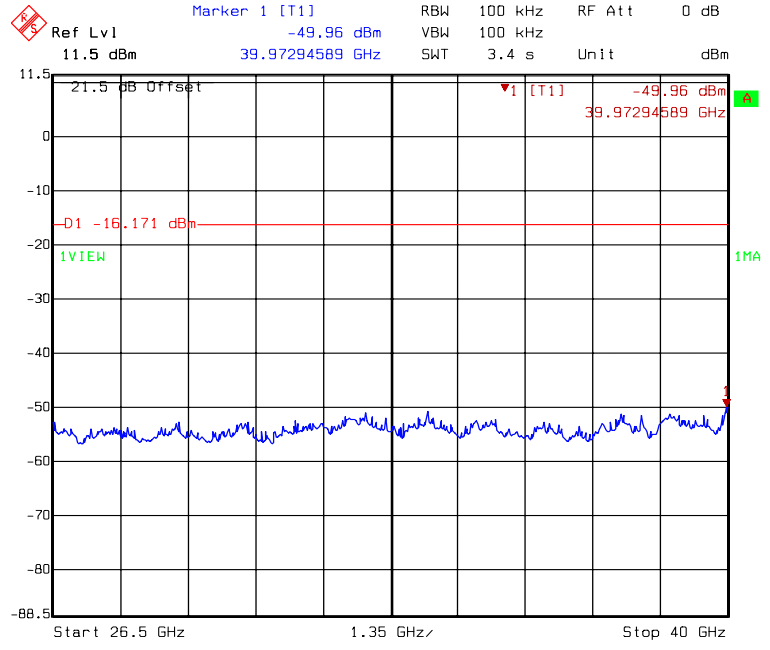
Title: Conductive-Spurious
Comment A: CH 149 at 802.11a mode 5725MHz~5920MHz
Date: 15.APR.2008 17:24:29

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



Title: Conductive-Spurious
Comment A: CH 149 at 802.11a mode 5925MHz~26500MHz
Date: 15.APR.2008 17:25:16

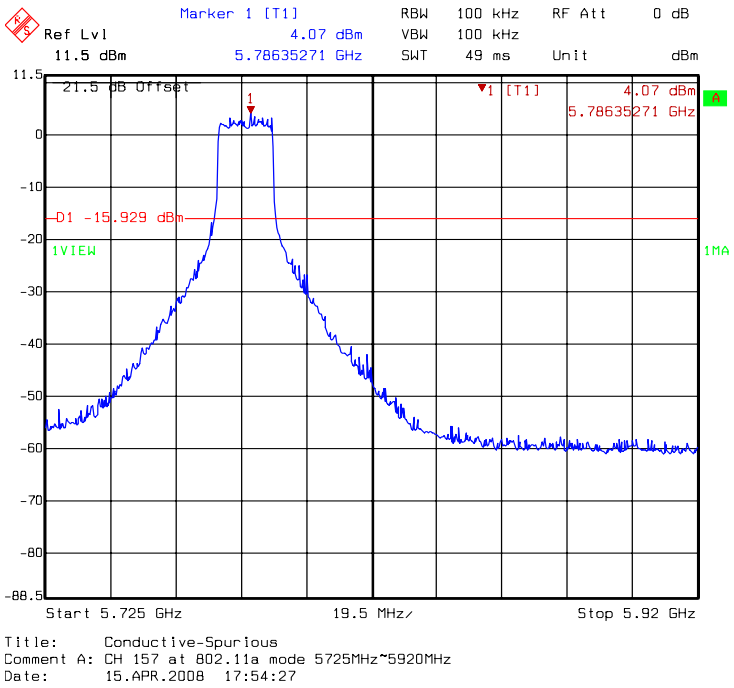
conducted spurious @ 802.11a mode channel 149 (4 of 4)



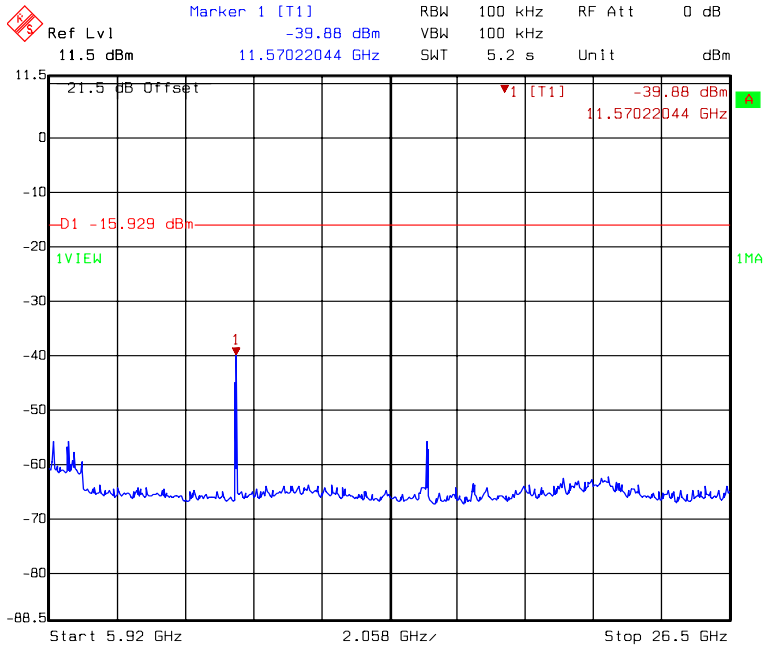
Title: Conductive-Spurious
Comment A: CH 149 at 802.11a mode 26500MHz~40000MHz
Date: 15.APR.2008 17:25:38

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

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

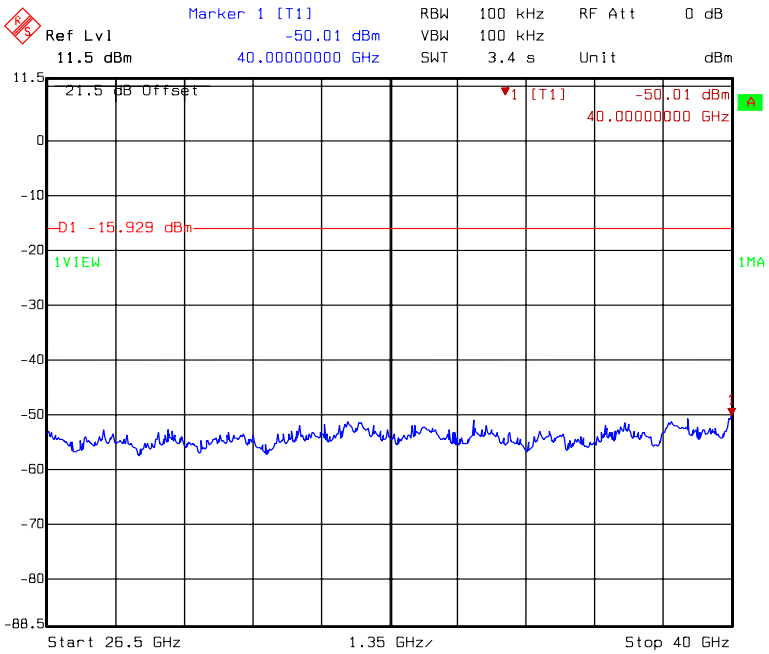


conducted spurious @ 802.11a mode channel 157 (3 of 4)



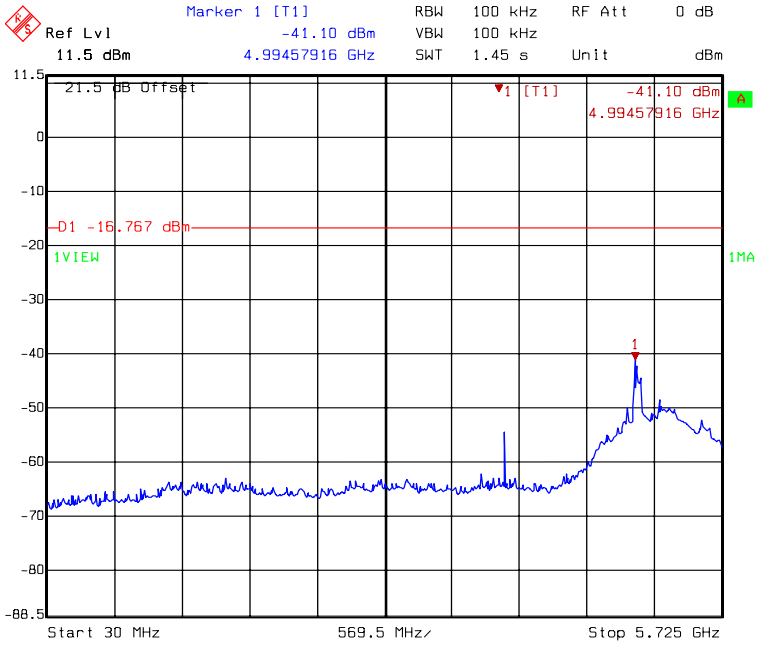
Title: Conductive-Spurious
Comment A: CH 157 at 802.11a mode 5925MHz~26500MHz
Date: 15.APR.2008 17:55:14

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



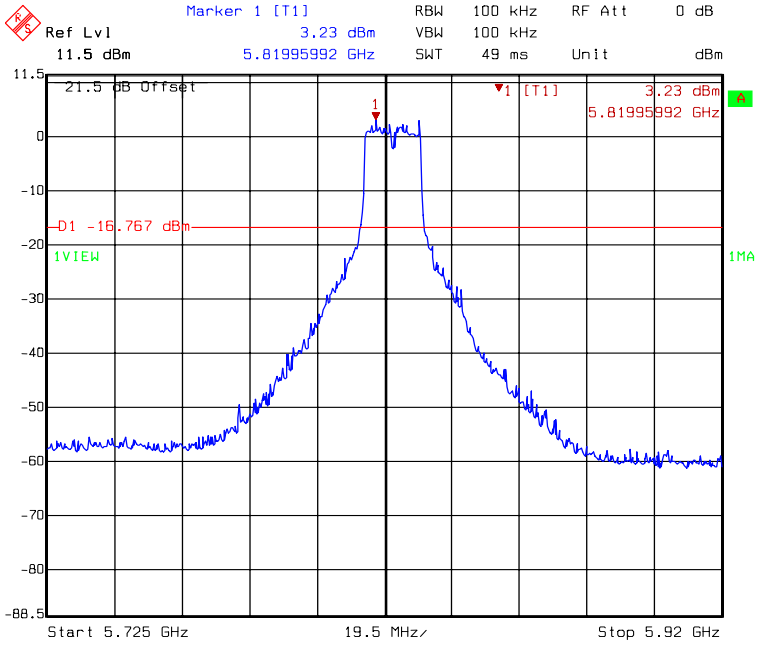
Title: Conductive-Spurious
Comment A: CH 157 at 802.11a mode 26500MHz~40000MHz
Date: 15.APR.2008 17:55:37

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



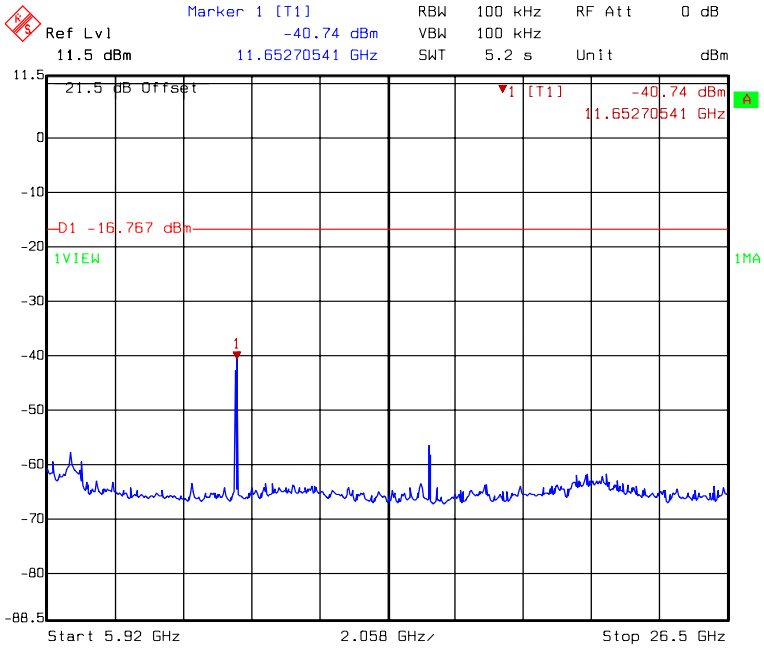
Title: Conductive-Spurious
Comment A: CH 165 at 802.11a mode 30MHz~5725MHz
Date: 15.APR.2008 17:39:22

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



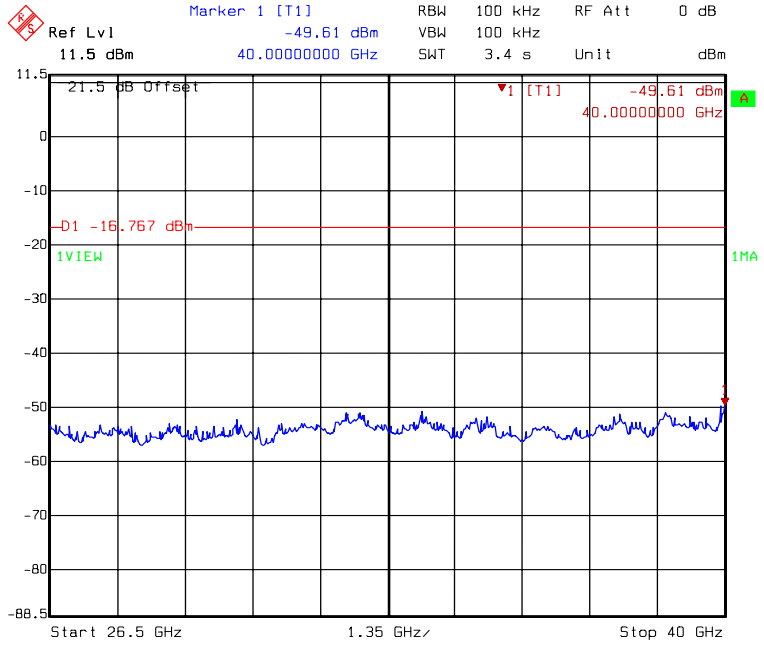
Title: Conductive-Spurious
Comment A: CH 165 at 802.11a mode 5725MHz~5920MHz
Date: 15.APR.2008 17:39:01

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



Title: Conductive-Spurious
Comment A: CH 165 at 802.11a mode 5925MHz~26500MHz
Date: 15.APR.2008 17:39:48

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



Title: Conductive-Spurious
Comment A: CH 165 at 802.11a mode 26500MHz~40000MHz
Date: 15.APR.2008 17:40:10

8. Radiated Spurious Emission

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

Tested By: Rex Liao
Test Date: Jan. 18, 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 1Mbps for 802.11b and 6Mbps for 802.11a/ 11g. The EUT was tuned to a low, middle and high channel.
(2) The EUT operating at 2.4GHz ISM band. Frequency Range scanned from 30MHz to 25GHz.

Measurement results: frequencies equal to or less than 1 GHz

The test was performed on EUT under802.11b, 802.11g and 802.11a continuously transmitting mode. The worst case occurred at 802.11b Tx channel 1.

EUT : H3C WA2220E-AG
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	58.130	QP	12.90	18.32	31.22	40.00	-8.79
V	140.580	QP	14.27	12.92	27.19	43.50	-16.31
V	197.810	QP	12.00	10.32	22.32	43.50	-21.18
V	230.790	QP	12.18	12.49	24.67	46.00	-21.33
V	499.480	QP	18.43	14.73	33.16	46.00	-12.85
V	659.530	QP	21.50	23.36	44.86	46.00	-1.14
H	140.580	QP	13.24	13.90	27.14	43.50	-16.37
H	197.810	QP	11.27	13.67	24.94	43.50	-18.57
H	263.770	QP	12.88	14.89	27.77	46.00	-18.23
H	499.480	QP	18.64	13.15	31.79	46.00	-14.21
H	659.530	QP	21.52	22.67	44.19	46.00	-1.82
H	725.490	QP	22.95	8.38	31.33	46.00	-14.67

Remark:

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

Measurement results: frequency above 1GHz

EUT : H3C WA2220E-AG
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)
7236.00	PK	V	36.18	43.97	44.53	52.32	54	-1.68
7236.00	PK	H	36.18	43.97	44.74	52.53	54	-1.47

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 system noise floor.

EUT : H3C WA2220E-AG
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)
7311.00	PK	V	36.18	43.97	42.78	50.57	54	-3.43
7311.00	PK	H	36.18	43.97	42.95	50.74	54	-3.26

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 system noise floor.

EUT : H3C WA2220E-AG
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)
7386.00	PK	V	36.18	43.97	42.55	50.34	54	-3.66
7386.00	PK	H	36.18	43.97	33.46	41.25	54	-12.75

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 system noise floor.

EUT : H3C WA2220E-AG
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)
7236.00	PK	V	36.18	43.97	55.2	62.99	74	-11.01
7236.00	AV	V	36.18	43.97	35.35	43.14	54	-10.86
7236.00	PK	H	36.18	43.97	53.52	61.31	74	-12.69
7236.00	AV	H	36.18	43.97	34.89	42.68	54	-11.32

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 system noise floor.

EUT : H3C WA2220E-AG
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)
7311.00	PK	V	36.18	43.97	52.56	60.35	74	-13.65
7311.00	AV	V	36.18	43.97	34.00	41.79	54	-12.21
7311.00	PK	H	36.18	43.97	43.65	51.44	54	-2.56

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 system noise floor.

EUT : H3C WA2220E-AG
Test Condition : 802.11a Tx at channel 149

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	50.3	66.73	74	-7.27
11490.00	AV	V	33.53	49.96	37.01	53.44	54	-0.56
11490.00	PK	H	33.53	49.96	41.25	57.68	74	-16.32
11490.00	AV	H	33.53	49.96	28.7	45.13	54	-8.87

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 system noise floor.

EUT : H3C WA2220E-AG
Test Condition : 802.11a Tx at channel 157

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	51.47	66.95	74	-7.05
11570.00	AV	V	34.55	50.03	37.24	52.72	54	-1.28
11570.00	PK	H	34.55	50.03	40.65	56.13	74	-17.87
11570.00	AV	H	34.55	50.03	30.63	46.11	54	-7.89

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 system noise floor.

EUT : H3C WA2220E-AG
Test Condition : 802.11a Tx at channel 165

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	50.57	66.05	74	-7.95
11650.00	AV	V	34.55	50.03	36.92	52.40	54	-1.60
11650.00	PK	H	34.55	50.03	42.40	57.88	74	-16.12
11650.00	AV	H	34.55	50.03	31.68	47.16	54	-6.84

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 system noise floor.

9. Emission on Band Edge

Name of Test	Emission Band Edge
Base Standard	FCC 15.247(d)

Tested By: Rex Liao
Test Date: Jan. 15, 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 1Mbps for 802.11b and 6Mbps for 802.11a/ 11g. The EUT was tuned to a low, middle and high channel.

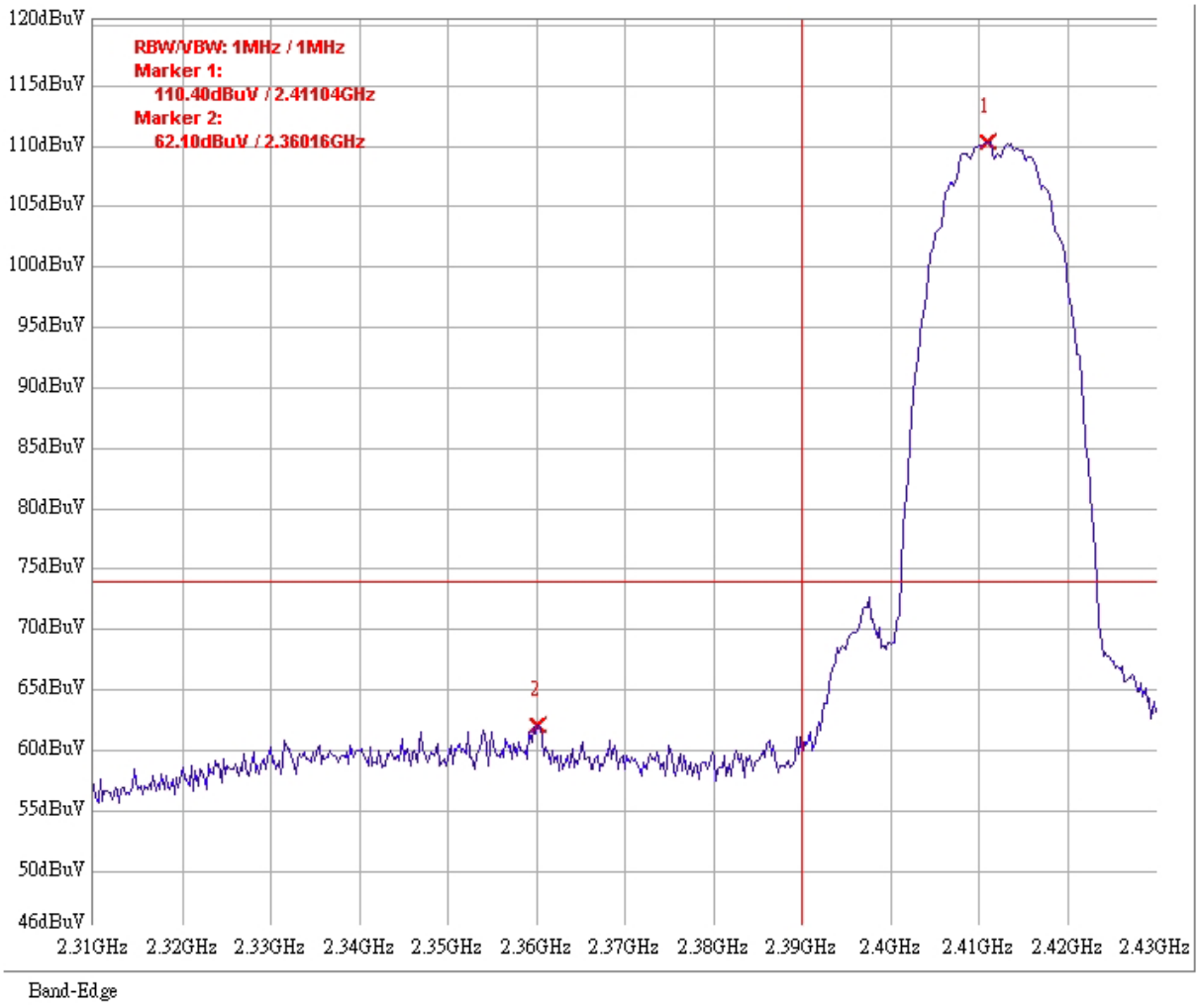
Test Mode: 802.11b

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	62.10	74	-11.90
		AV	51.83	54	-2.17
11 (highest)	2483.5-2500	PK	63.05	74	-10.95
		AV	51.40	54	-2.60

Test Mode: 802.11g

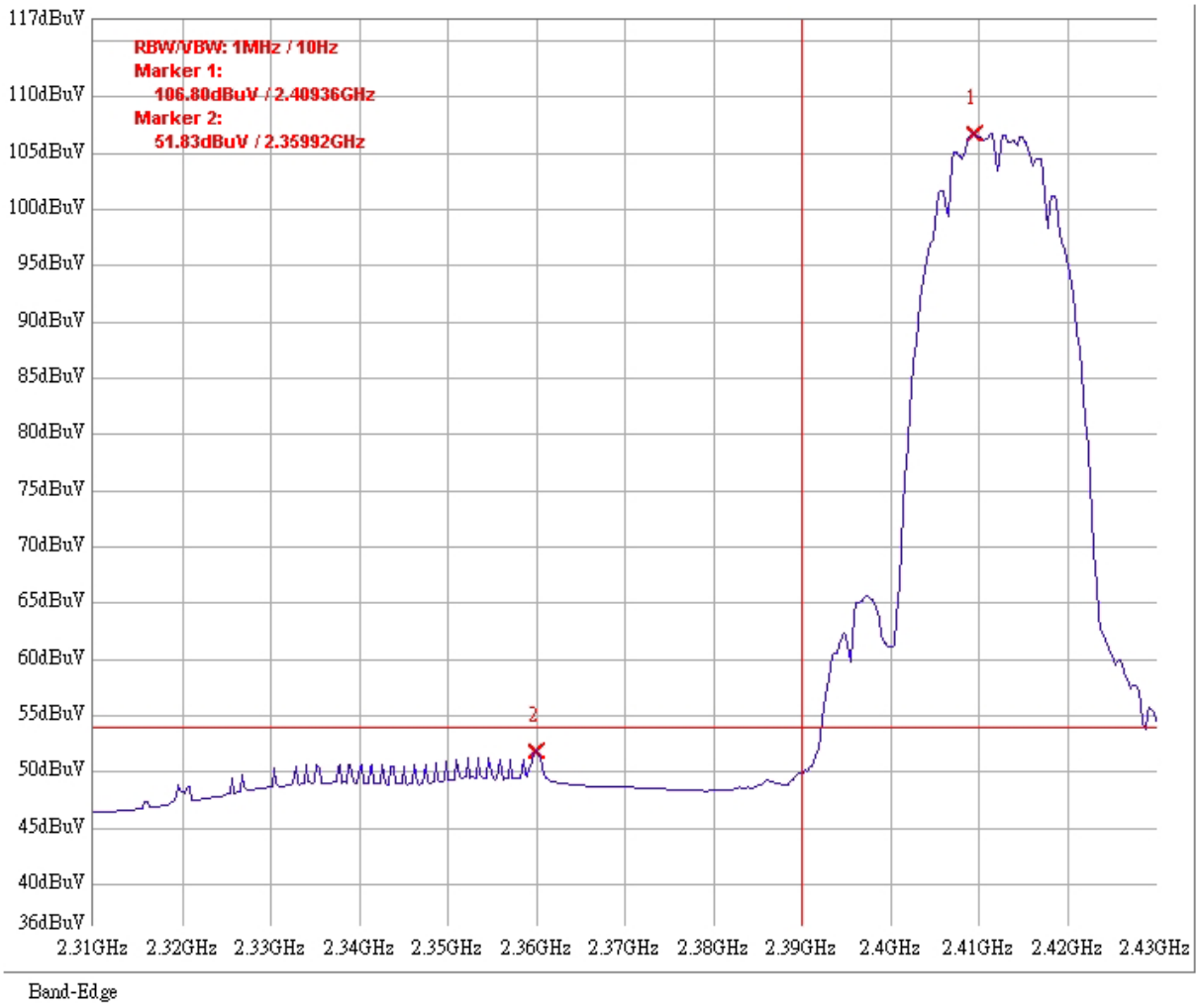
Channel	Measurement Freq.Band (MHz)	Detector	The Max. Field Strength in Restrict Band (dBuV/m)	Limit @ 3 m (dBuV/m)	Margin (dB)
1 (lowest)	2310-2390	PK	72.53	74	-1.47
		AV	53.68	54	-0.32
11 (highest)	2483.5-2500	PK	73.02	74	-0.98
		AV	53.23	54	-0.77

Test Mode: 802.11b mode (CH 1 PK)



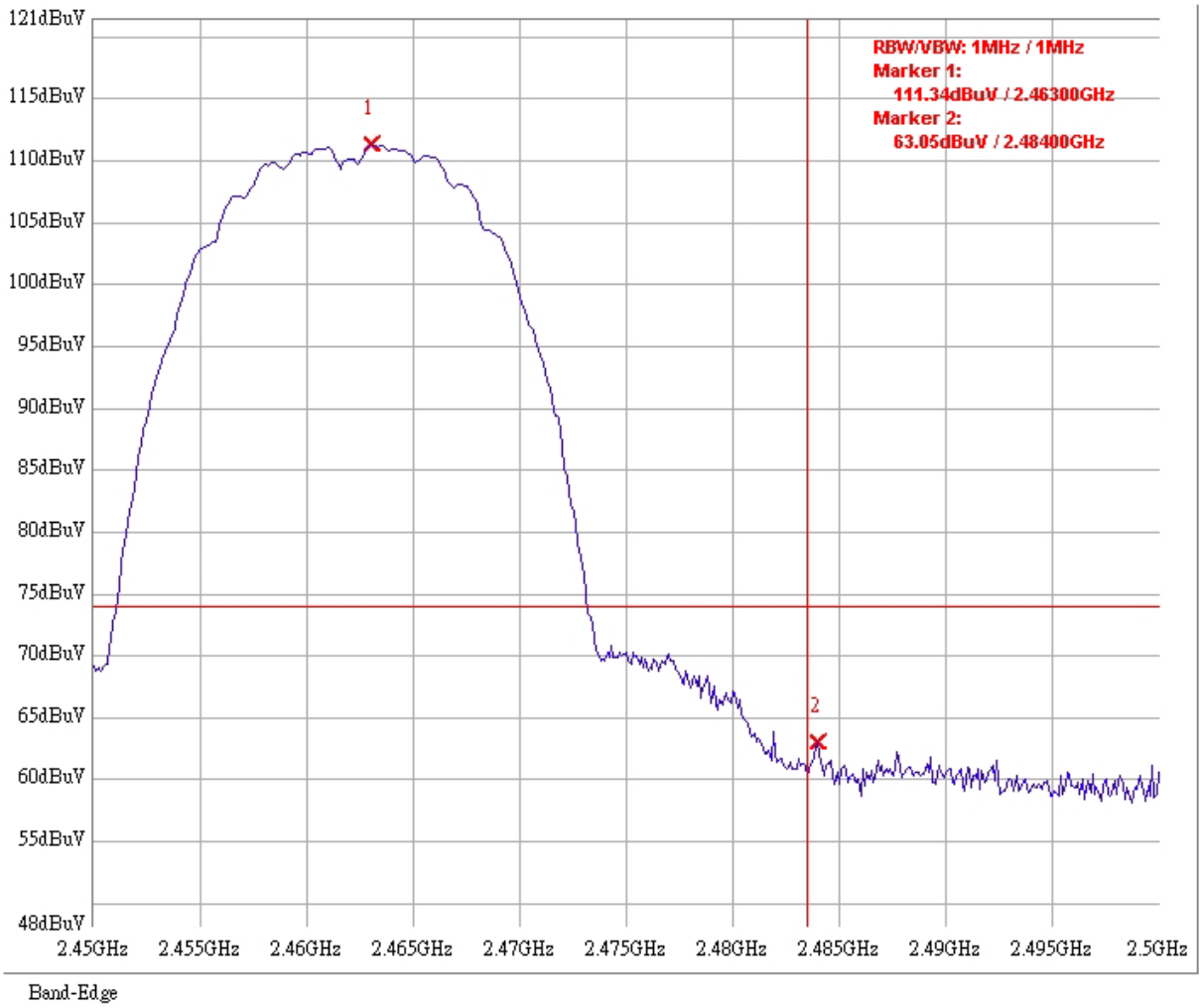
Band-Edge

Test Mode: 802.11b mode (CH 1 AV)

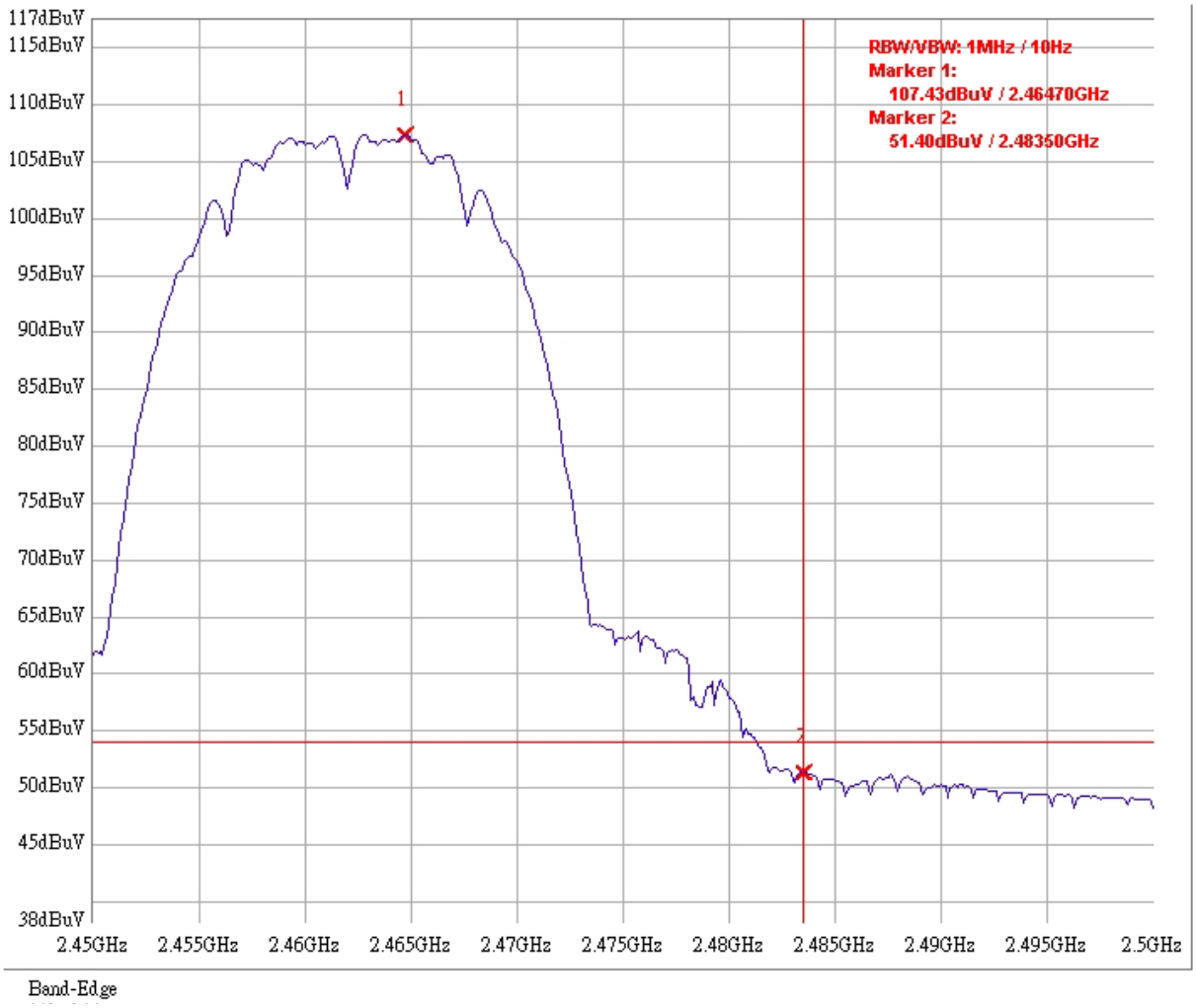


Band-Edge

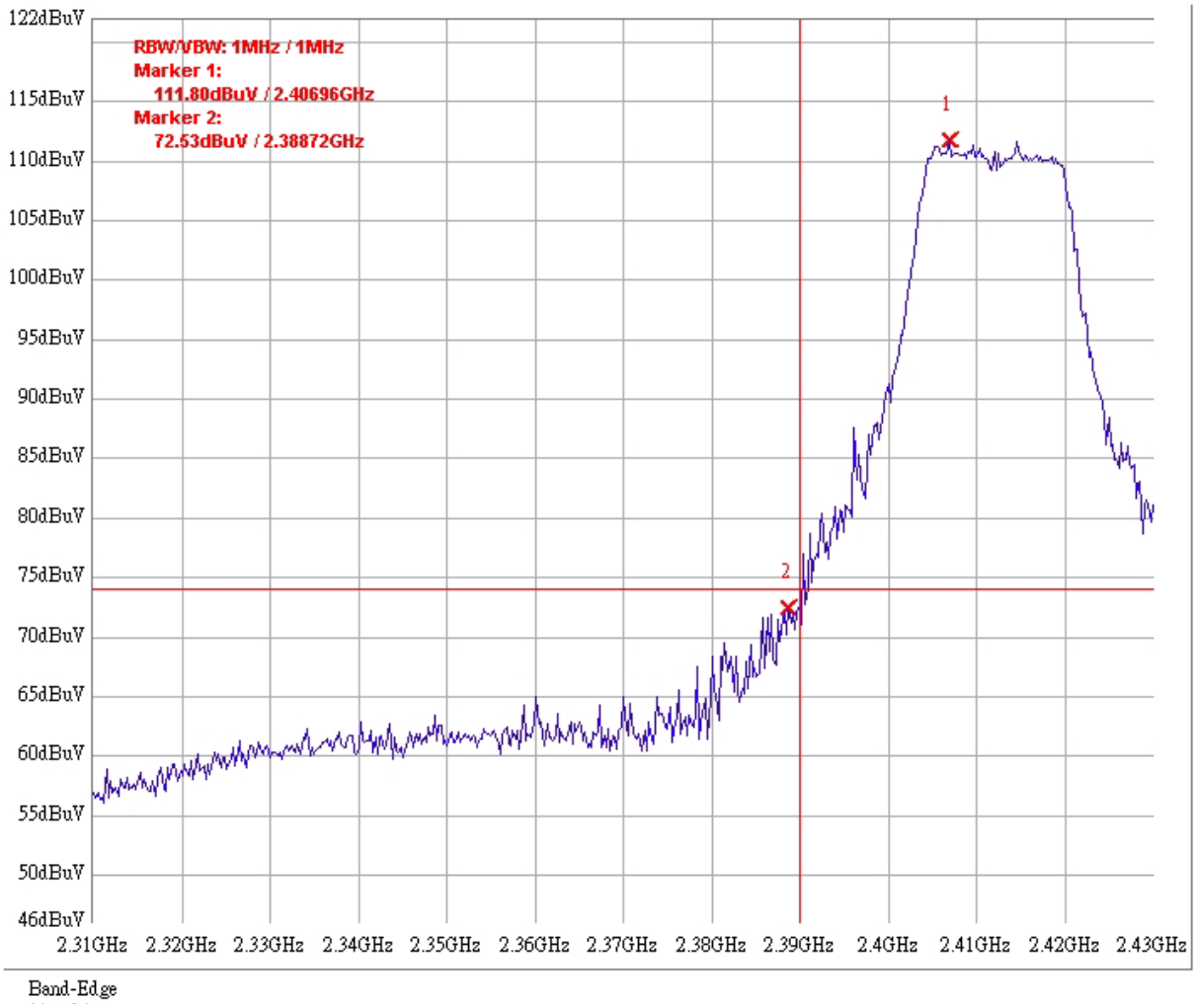
Test Mode: 802.11b mode (CH 11 PK)



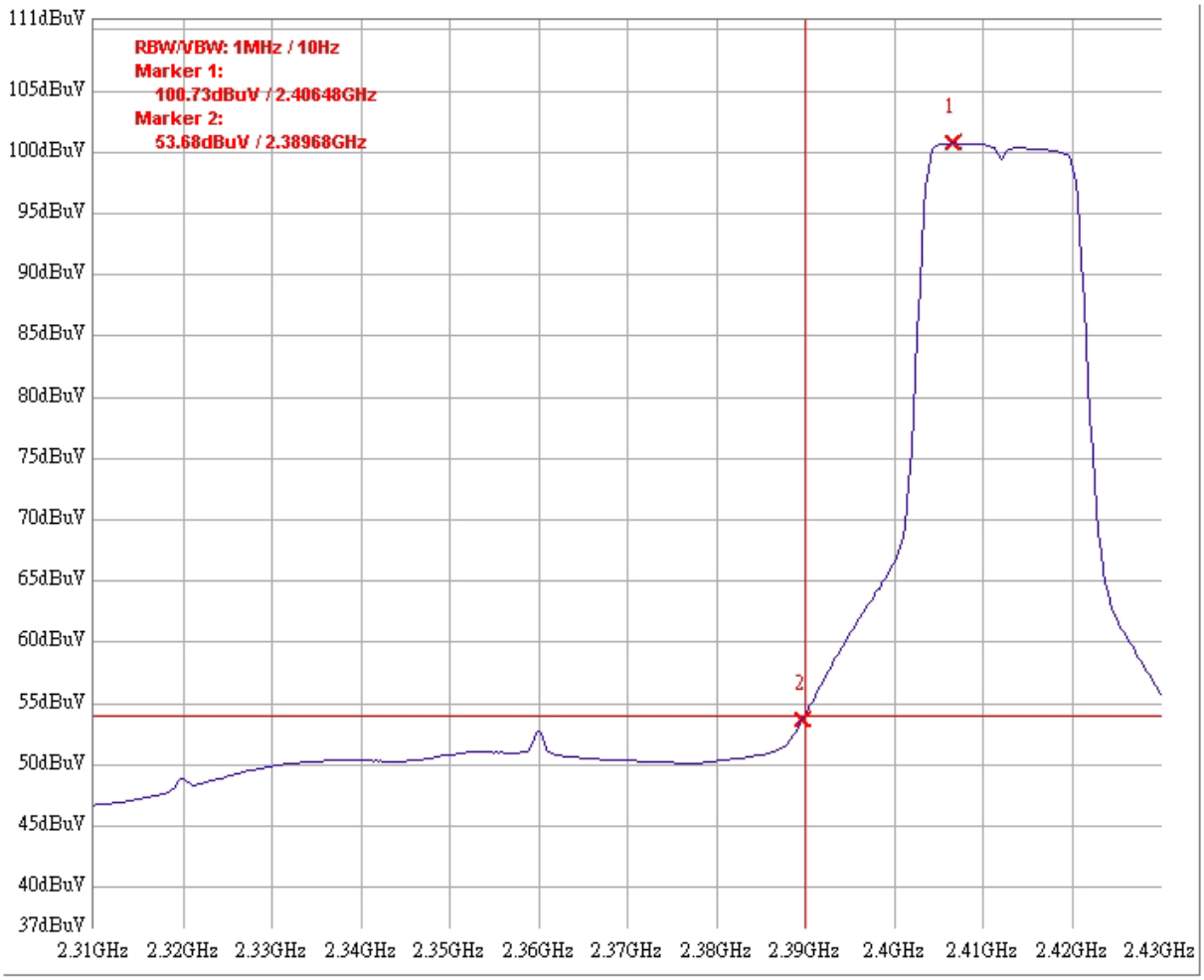
Test Mode: 802.11b mode (CH 11 AV)



Test Mode: 802.11g mode (CH 1 PK)

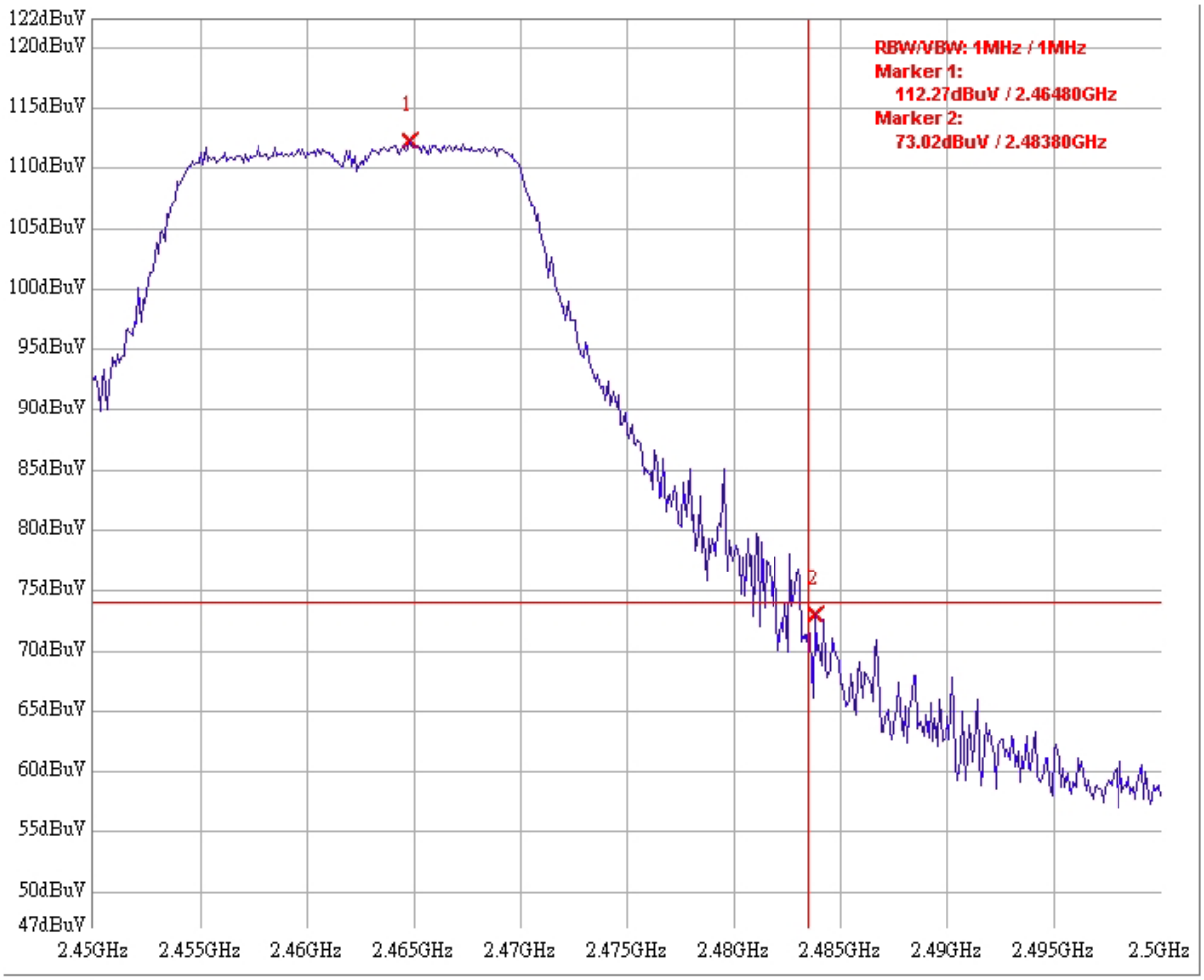


Test Mode: 802.11g mode (CH 1 AV)



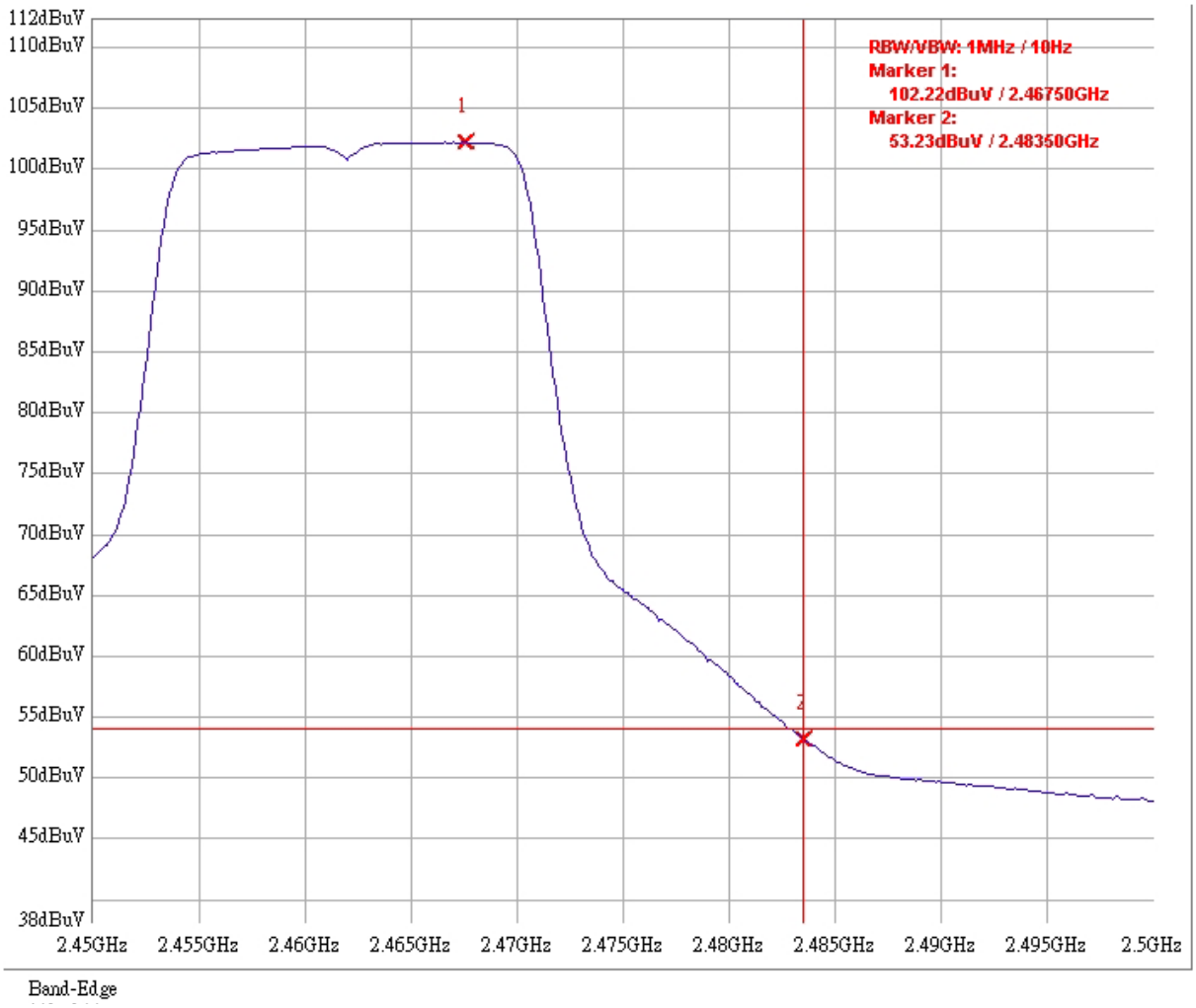
Band-Edge

Test Mode: 802.11g mode (CH 11 PK)



Band-Edge

Test Mode: 802.11g mode (CH 11 AV)



10. AC power line conducted emission

Name of Test	AC power line conducted emission
Base Standard	FCC 15.207

Tested By: Rex Liao
Test Date: Jan. 15, 2008

Test Equipment: EC1365

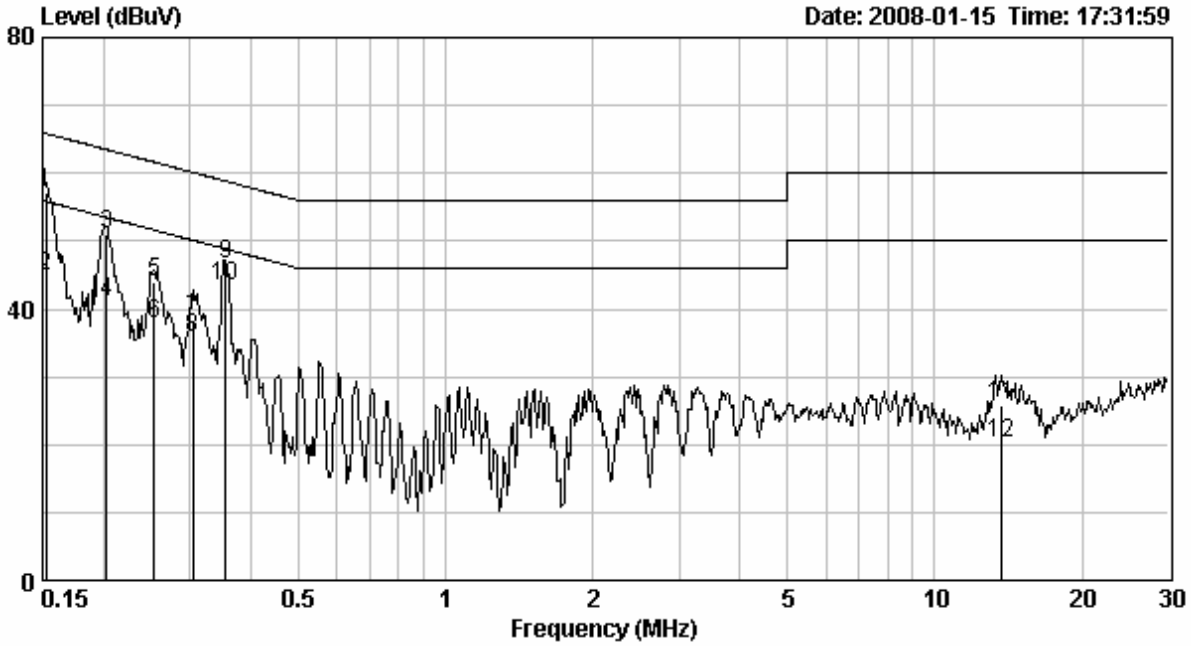
Test Result: Complies
Test Method: See Appendix E
Measurement Data: See Tables & plots below

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

Phase	: Line
EUT	: H3C WA2220E-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	Margin (dB) Av
0.153	0.80	57.13	65.85	44.93	55.85	-8.72	-10.92
0.203	0.78	50.96	63.48	40.88	53.48	-12.52	-12.60
0.254	0.56	43.84	61.63	37.78	51.63	-17.79	-13.85
0.305	0.37	38.49	60.11	35.68	50.11	-21.62	-14.43
0.355	0.22	46.61	58.85	43.37	48.85	-12.24	-5.48
13.638	0.73	25.89	60.00	20.24	50.00	-34.11	-29.76

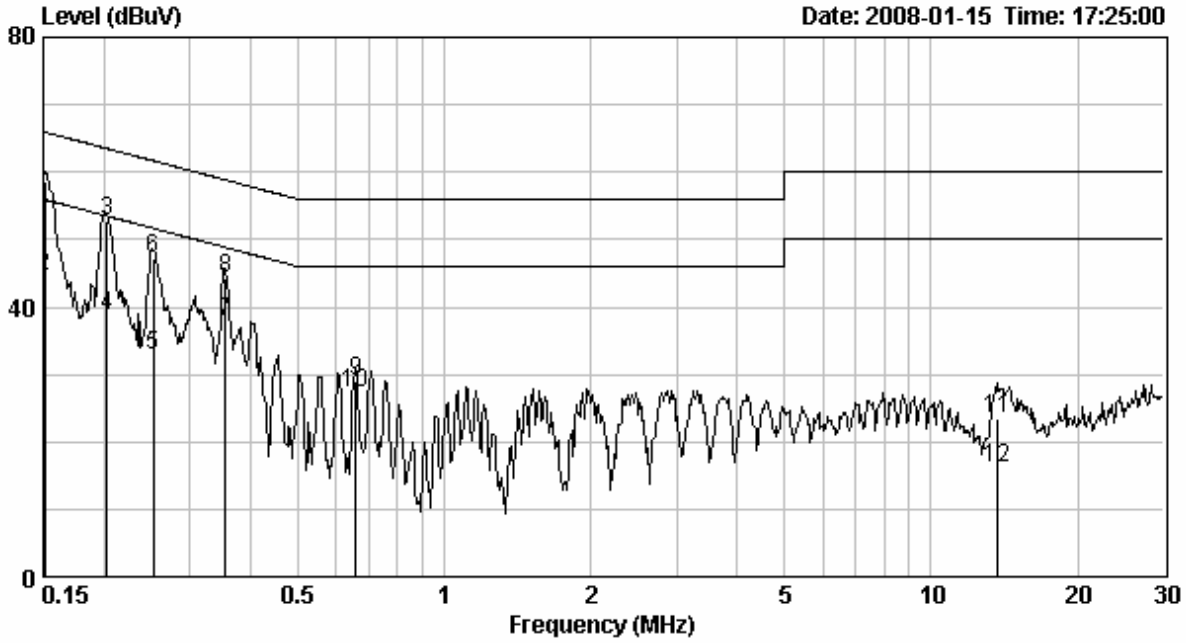
Remark:
1. Correction Factor (dB)= LISN Factor (dB) + Cable Loss (dB)
2. Margin (dB) = Level (dBuV) – Limit (dBuV)



Phase	: Neutral
EUT	: H3C WA2220E-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	Margin (dB) Av
0.151	0.10	58.59	65.93	44.41	55.93	-7.34	-11.52
0.203	0.10	52.85	63.49	38.66	53.49	-10.64	-14.83
0.253	0.10	47.32	61.67	32.87	51.67	-14.35	-18.80
0.355	0.10	44.29	58.84	37.87	48.84	-14.55	-10.97
0.659	0.10	29.00	56.00	27.23	46.00	-27.00	-18.77
13.638	0.48	23.37	60.00	16.24	50.00	-36.63	-33.76

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



APPENDICES

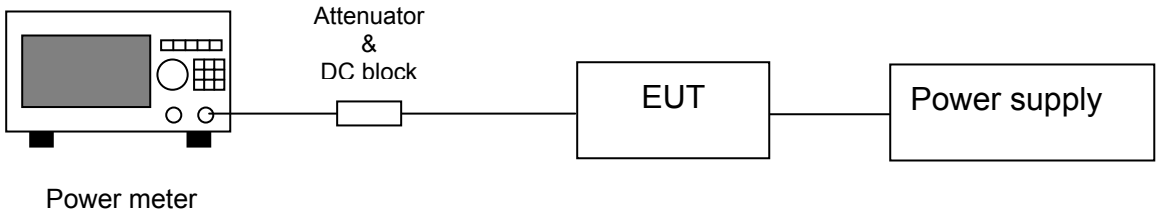
Appendix A: 2.1046 - RF Power Output

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:

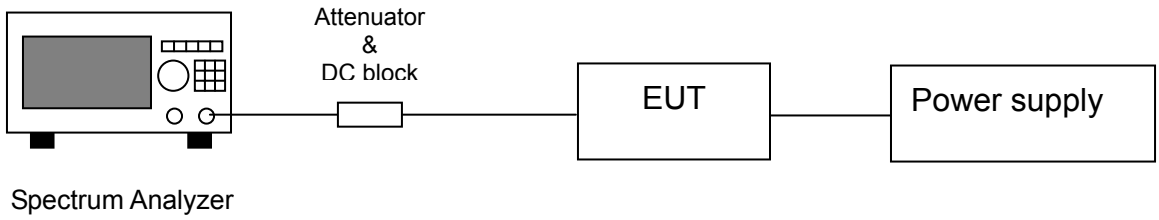


Appendix B: 2.1049 - Occupied Bandwidth

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:



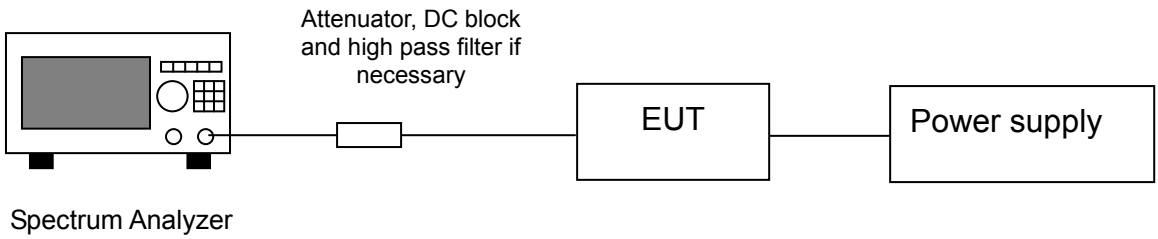
Appendix C: 2.1051 - Spurious Emission at Antenna Terminal

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:

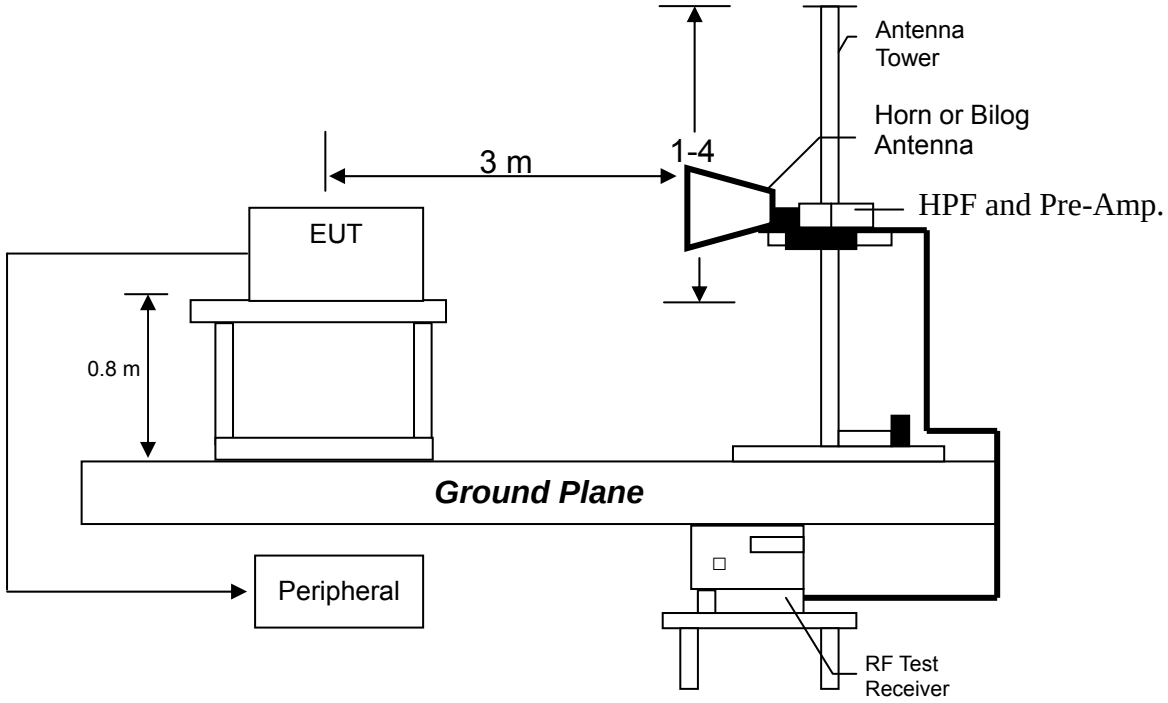
Reference FCC document: KDB558074, ANSI C63.4

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

Radiated emissions were invested 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 (dBμV/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:

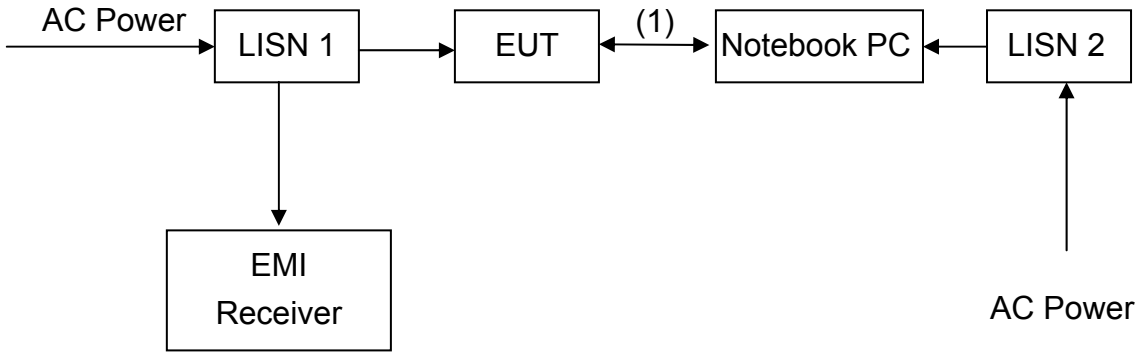
Reference FCC document: KDB558074, ANSI C63.4

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

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	±4.98 dB
Conducted Emission	±2.6 dB

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