SPORTON International Inc.
No. 52, Hwa Ya 1st Rd., Kwei-Shan Hsiang, TaoYuan Hsien, Taiwan, R.O.C.
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FCC RADIO TEST REPORT

Applicant's company	**D-Link Co.**
Applicant Address	No.289, Shinhu 3rd Rd., Neihu District, Taipei City 114, Taiwan, R.O.C.
FCC ID	**KA2WA160B1**
Manufacturer's company	**Alpha Networks Inc.**
Manufacturer Address	1.No.8 Li-shing 7th Rd., Science-based Industrial Park, Hsinchu, Taiwan, R.O.C. 2.Jiekou Administration Zone, Canghan Town, Dongguan City, Guangdong Province, China

Product Name	Xtreme N Dual Band USB Adapter
Brand Name	D-Link
Model Name	DWA-160
Test Rule Part(s)	47 CFR FCC Part 15 Subpart C § 15.247
Test Freq. Range	2400 ~ 2483.5MHz / 5725 ~ 5850MHz
Received Date	Nov. 26, 2007
Final Test Date	Feb. 02, 2008
Submission Type	Original Equipment
Operating Mode	Client (without radar detection function)

Statement

Test result included is only for the 802.11b/g part and 802.11a (5725 ~ 5850MHz) of the product.
The test result in this report refers exclusively to the presented test model / sample.
Without written approval of SPORTON International Inc., the test report shall not be reproduced except in full.
The measurements and test results shown in this test report were made in accordance with the procedures and found in compliance with the limit given in **ANSI C63.4-2003** and **47 CFR FCC Part 15 Subpart C**.
The test equipment used to perform the test is calibrated and traceable to NML/ROC.

Testing Laboratory
1190

Table of Contents

History of This Test Report

Original Issue Date: Feb. 25, 2008

Report No.: FR7D1705AD

■ No additional attachment.

☐ Additional attachment were issued as following record:

Attachment No.	Issue Date	Description

Certificate No.: CB9701073

1. CERTIFICATE OF COMPLIANCE

Product Name	:	Xtreme N Dual Band USB Adapter
Brand Name	:	D-Link
Model Name	:	DWA-160
Applicant	:	D-Link Co.
Test Rule Part(s)	:	47 CFR FCC Part 15 Subpart C § 15.247

Sporton International as requested by the applicant to evaluate the EMC performance of the product sample received on Nov. 26, 2007 would like to declare that the tested sample has been evaluated and found to be in compliance with the tested rule parts. The data recorded as well as the test configuration specified is true and accurate for showing the sample's EMC nature.

Wayne Hsu

SPORTON INTERNATIONAL INC.

2. SUMMARY OF THE TEST RESULT

Applied Standard: 47 CFR FCC Part 15 Subpart C				
Part	**Rule Section**	**Description of Test**	**Result**	**Under Limit**
4.1	15.207	AC Power Line Conducted Emissions	Complies	6.24 dB
4.2	15.247(b)(3)	Maximum Peak Conducted Output Power	Complies	13.10 dB
4.3	15.247(e)	Power Spectral Density	Complies	17.87 dB
4.4	15.247(a)(2)	6dB Spectrum Bandwidth	Complies	-
4.5	15.247(d)	Radiated Emissions	Complies	0.17 dB
4.6	15.247(d)	Band Edge Emissions	Complies	0.32 dB
4.7	15.203	Antenna Requirements	Complies	-

Test Items	Uncertainty	Remark
AC Power Line Conducted Emissions	±2.3dB	Confidence levels of 95%
Maximum Peak Conducted Output Power	±0.8dB	Confidence levels of 95%
Power Spectral Density	±0.5dB	Confidence levels of 95%
6dB Spectrum Bandwidth	$\pm 8.5 \times 10^{-8}$	Confidence levels of 95%
Radiated Emissions (9kHz~30MHz)	±0.8dB	Confidence levels of 95%
Radiated Emissions (30MHz~1000MHz)	±1.9dB	Confidence levels of 95%
Radiated / Band Edge Emissions (1GHz~18GHz)	±1.9dB	Confidence levels of 95%
Radiated Emissions (18GHz~40GHz)	±1.9dB	Confidence levels of 95%
Temperature	±0.7℃	Confidence levels of 95%
Humidity	±3.2%	Confidence levels of 95%
DC / AC Power Source	±1.4%	Confidence levels of 95%

3. GENERAL INFORMATION

3.1. Product Details

Items	Description
Product Type	WLAN (1TX, 2RX)
Radio Type	Intentional Transceiver
Power Type	From Host System
Modulation	DSSS for IEEE 802.11b ; OFDM for IEEE 802.11a/g
Data Modulation	DSSS (BPSK / QPSK / CCK) ; OFDM (BPSK / QPSK / 16QAM / 64QAM)
Data Rate (Mbps)	DSSS (1/ 2/ 5.5/11) ; OFDM (6/9/12/18/24/36/48/54)
Frequency Range	2400 ~ 2483.5MHz / 5725 ~ 5850MHz
Channel Number	11b/g: 11 ; 11a: 5
Channel Band Width (99%)	11b: 14.96 MHz ; 11g: 16.50 MHz ; 11a: 16.53 MHz
Conducted Output Power	11b: 16.90 dBm ; 11g: 16.51 dBm ; 11a: 15.39 dBm
Carrier Frequencies	Please refer to section 3.4
Antenna	Please refer to section 3.3

3.2. Accessories

Others
USB Cable: 1.4m, Shielded

3.3. Table for Filed Antenna

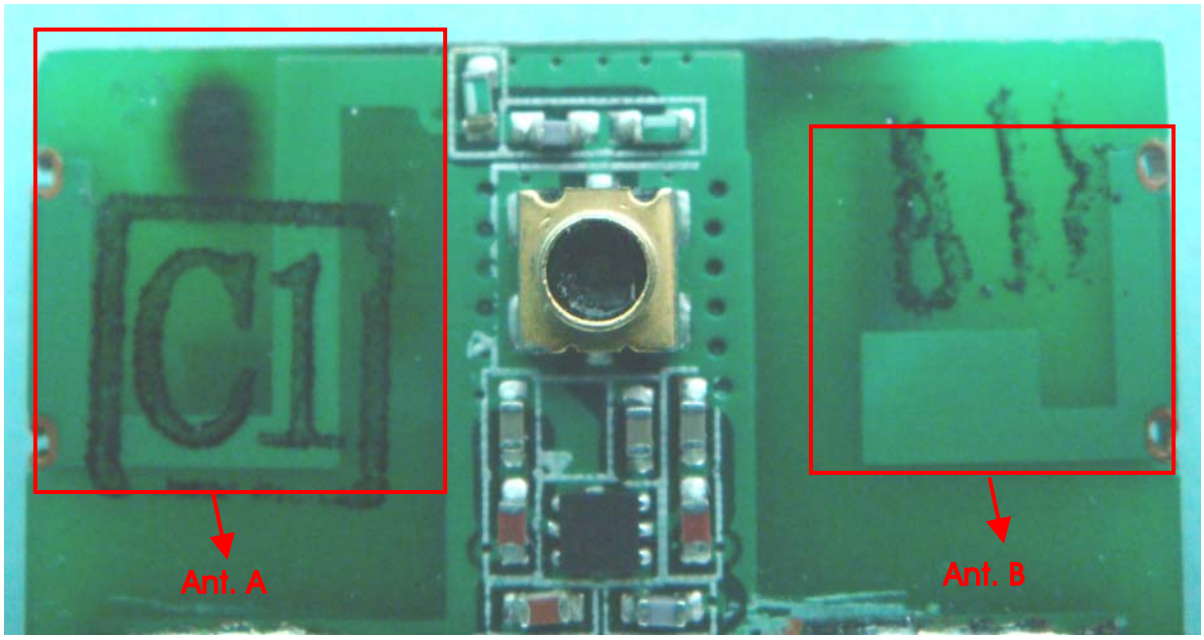
For 2.4GHz Band

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)	Remark
A	Wha Yu	N/A	Printed Antenna	N/A	2.27	TX / RX Ant.
B	Wha Yu	N/A	Printed Antenna	N/A	2.27	RX Ant.

For 5GHz Band

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)	Remark
A	Wha Yu	N/A	Printed Antenna	N/A	3.88	TX / RX Ant.
B	Wha Yu	N/A	Printed Antenna	N/A	3.88	RX Ant.

Note : The EUT has two antennas.



3.4. Table for Carrier Frequencies

Frequency Allocation for 802.11b/g

Frequency Band	Channel No.	Frequency	Channel No.	Frequency
2400~2483.5MHz	1	2412 MHz	7	2442 MHz
	2	2417 MHz	8	2447 MHz
	3	2422 MHz	9	2452 MHz
	4	2427 MHz	10	2457 MHz
	5	2432 MHz	11	2462 MHz
	6	2437 MHz		

Frequency Allocation for 802.11a

Frequency Band	Channel No.	Frequency	Channel No.	Frequency
5725~5850 MHz	149	5745 MHz	161	5805 MHz
	153	5765 MHz	165	5825 MHz
	157	5785 MHz		

3.5. Table for Test Modes

Preliminary tests were performed in different data rate to find the worst radiated emission. The data rate shown in the table below is the worst-case rate with respect to the specific test item. Investigation has been done on all the possible configurations for searching the worst cases. The following table is a list of the test modes shown in this test report.

Test Items	Mode	Data Rate	Channel	Antenna
AC Power Line Conducted Emissions	Normal Link / Mode 2	Auto	-	-
Max. Peak Conducted Output Power Power Spectral Density 6dB Spectrum Bandwidth	11b/BPSK	1 Mbps	1/6/11	A
	11g/BPSK	6 Mbps	1/6/11	A
	11a/BPSK	6 Mbps	149/157/165	A
Radiated Emissions Below 1GHz	Normal Link / Mode 2	Auto	-	-
Radiated Emissions Above 1GHz	11b/BPSK	1 Mbps	1/6/11	A
	11g/BPSK	6 Mbps	1/6/11	A
	11a/BPSK	6 Mbps	149/157/165	A
Band Edge Emissions	11b/BPSK	1 Mbps	1/11	A
	11g/BPSK	6 Mbps	1/11	A
	11a/BPSK	6 Mbps	149/165	A

The following test modes were performed for all tests:

Mode 1: Dongle mode

Mode 2: Dongle +USB Cable mode

Cause "mode 2"generated the worst test result, it was reported as final data.

3.6. Table for Testing Locations

Test Site No.	Site Category	Location	FCC Reg. No.	IC File No.	VCCI Reg. No
03CH03-HY	SAC	Hwa Ya	101377	IC 4088	-
CO04-HY	Conduction	Hwa Ya	-	-	-
TH01-HY	OVEN Room	Hwa Ya	-	-	-

Open Area Test Site (OATS); Semi Anechoic Chamber (SAC); Fully Anechoic Chamber (FAC).

Please refer section 6 for Test Site Address.

3.7. Table for Supporting Units

Support Unit	Brand	Model	FCC ID
Notebook	DELL	D400	E2K24GBRL
Mouse	QSKY	Lx-619B	DoC
Modem	ACEEX	DM1414	IFAXDM1414
Printer	EPSON	LQ-300	DoC
Wireless AP	Planex	GW-AP54SGX	DoC

3.8. Table for Parameters of Test Software Setting

During testing, Channel & Power Controlling Software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product.

Power Parameters of IEEE 802.11b/g

Test Software Version	QA		
Frequency	2412 MHz	2437 MHz	2462 MHz
IEEE 802.11b	0C	0C	0C
IEEE 802.11g	0E	0F	0D

Power Parameters of IEEE 802.11a

Test Software Version	QA		
Frequency	5745 MHz	5785 MHz	5825 MHz
IEEE 802.11a	0A	0A	0A

An executive program, EMCTEST.EXE under WIN XP, which generates a complete line of continuously repeating " H " pattern was used as the test software.

The program was executed as follows :

a. Turn on the power of all equipment.

b. The NB sends " H" messages to the panel, and the panel displays " H " patterns on the screen.

c. The NB sends " H " messages to the printer, then the printer prints them on the paper.

d. The NB sends " H " messages to the modem.

e. Repeat the steps from b to d.

At the same time, "QA" was executed to control the EUT continuously transmit RF signal.

Executed "ping.exe" to link with the remote workstation to receive and transmit signal by WLAN.

An executive program, EMCTEST.EXE under WIN XP, which generates a complete line of continuously repeating " H " pattern was used as the test software.

The program was executed as follows :

f. Turn on the power of all equipment.

g. The NB sends " H" messages to the panel, and the panel displays " H " patterns on the screen.

h. The NB sends " H " messages to the printer, then the printer prints them on the paper.

i. The NB sends " H " messages to the modem.

j. Repeat the steps from b to d.

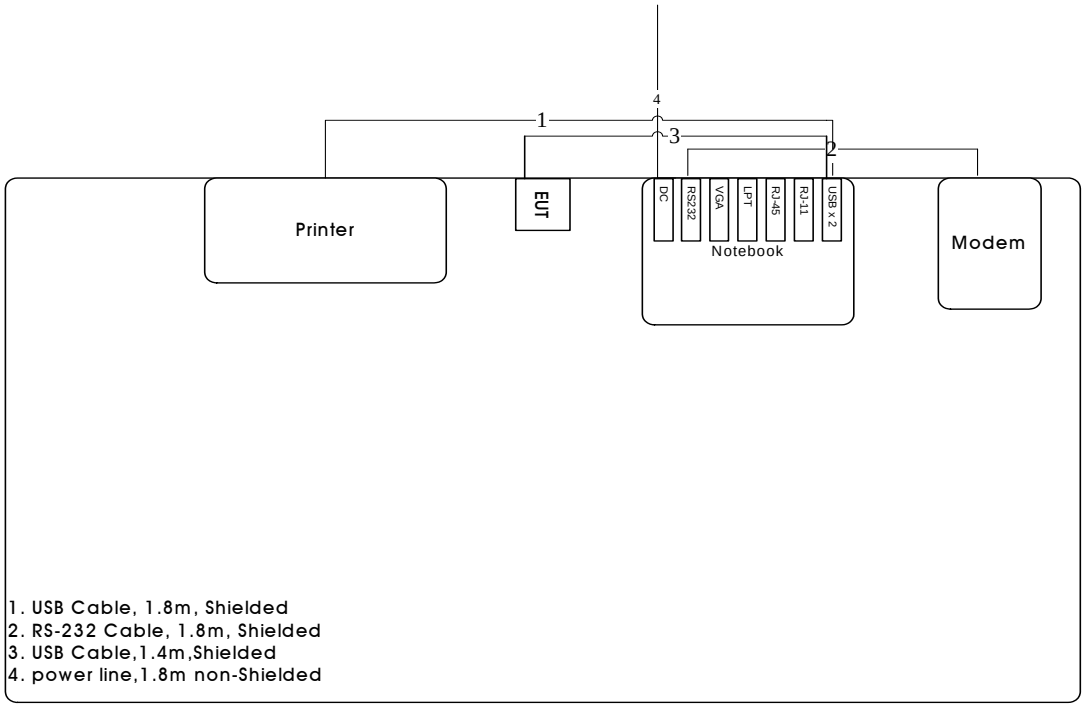
At the same time, "QA" was executed to control the EUT continuously transmit RF signal.

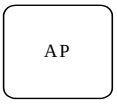
Executed "ping.exe" to link with the remote workstation to receive and transmit signal by WLAN.

3.9. Test Configurations

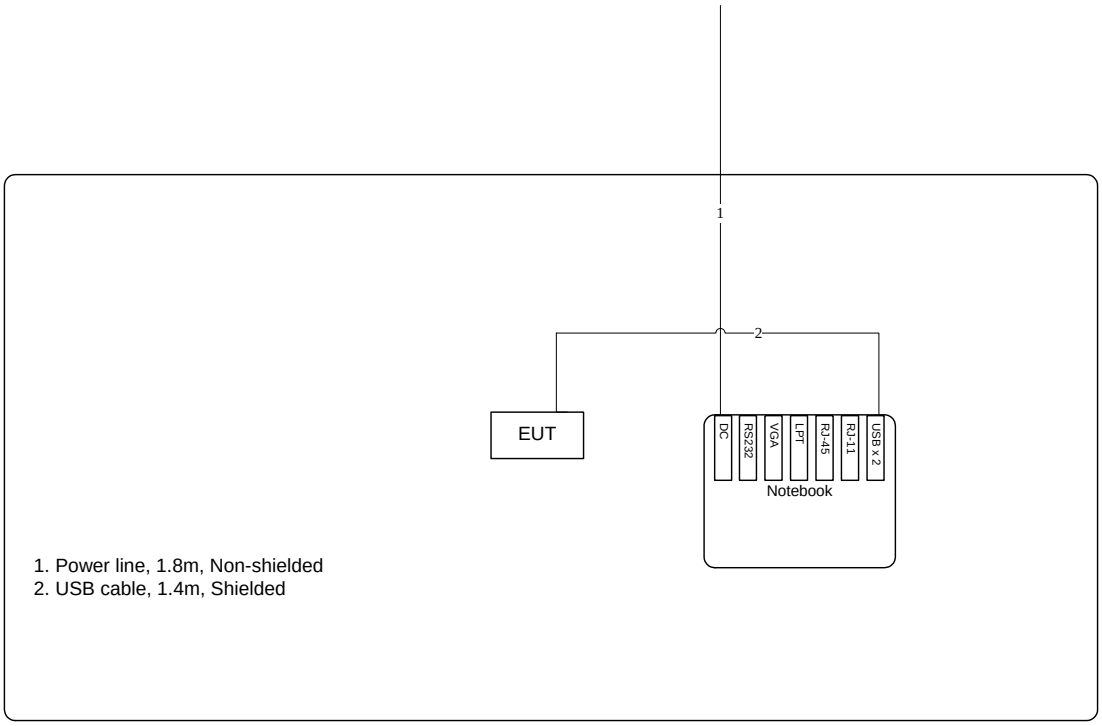
3.9.1. Radiation Emissions Test Configuration

Test Configuration: 9KHz~1GHz

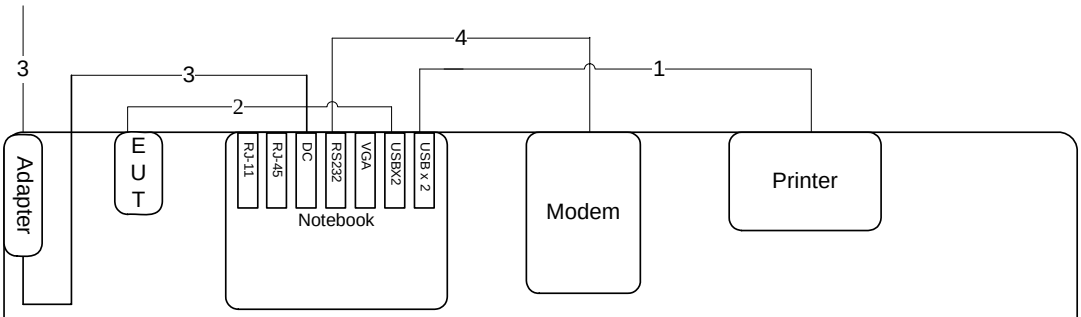




Test Configuration: above 1GHz



3.9.2. AC Power Line Conduction Emissions Test Configuration



1. USB cable*2, 1.8m, shielded
2. USB cable, 1.4m, shielded
3. Power cable*2, 1.8m, non-shielded
4. RS232 CABLE 1.8m , shielded

AP

4. TEST RESULT

4.1. AC Power Line Conducted Emissions Measurement

4.1.1. Limit

For this product which is designed to be connected to the AC power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed below limits table.

Frequency (MHz)	QP Limit (dBuV)	AV Limit (dBuV)
0.15~0.5	66~56	56~46
0.5~5	56	46
5~30	60	50

4.1.2. Measuring Instruments and Setting

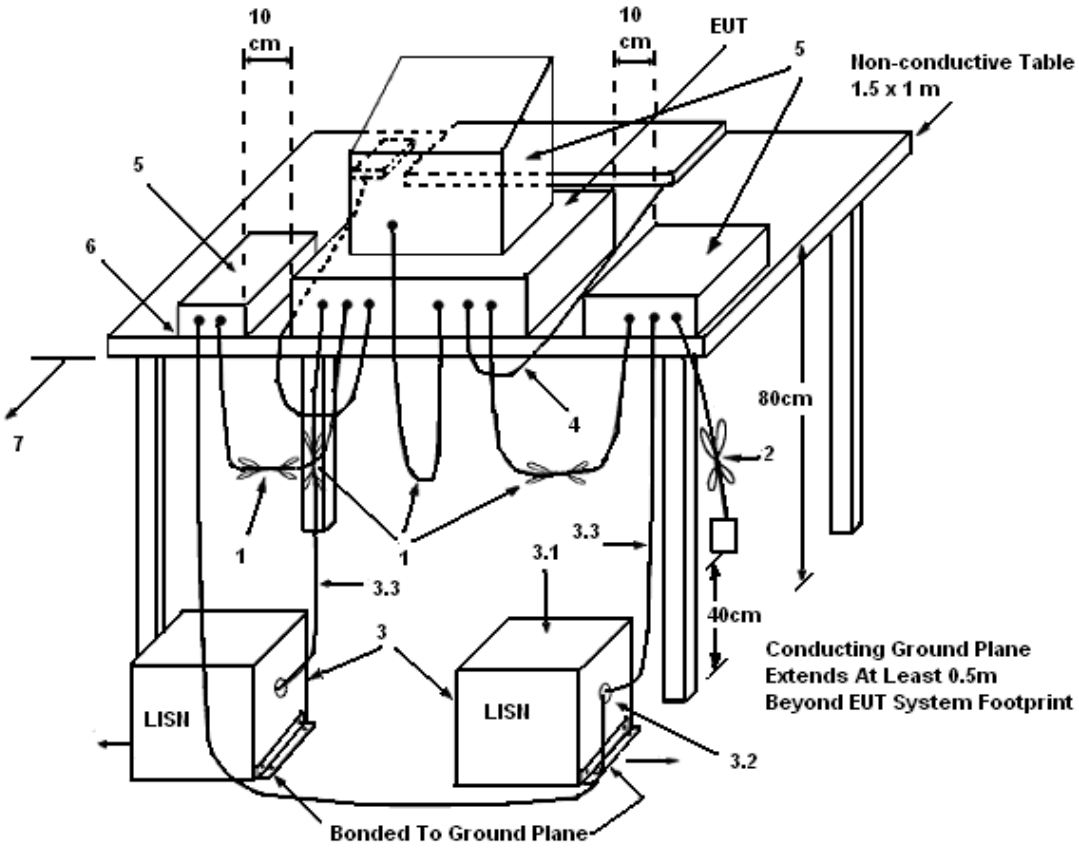
Please refer to section 5 of equipments list in this report. The following table is the setting of the receiver.

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 KHz

4.1.3. Test Procedures

1. Configure the EUT according to ANSI C63.4. The EUT or host of EUT has to be placed 0.4 meter far from the conducting wall of the shielding room and at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT or host of EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connected to the other LISNs. The LISN should provide 50uH/50ohms coupling impedance.
4. The frequency range from 150 KHz to 30 MHz was searched.
5. Set the test-receiver system to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
6. The measurement has to be done between each power line and ground at the power terminal.

4.1.4. Test Setup Layout



LEGEND:

(1) Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.

(2) I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.

(3) EUT connected to one LISN. Unused LISN measuring port connectors shall be terminated in 50 Ω. LISN can be placed on top of, or immediately beneath, reference ground plane.

(3.1) All other equipment powered from additional LISN(s).

(3.2) Multiple outlet strip can be used for multiple power cords of non-EUT equipment.

(3.3) LISN at least 80 cm from nearest part of EUT chassis.

(4) Cables of hand-operated devices, such as keyboards, mice, etc., shall be placed as for normal use.

(5) Non-EUT components of EUT system being tested.

(6) Rear of EUT, including peripherals, shall all be aligned and flush with rear of tabletop.

(7) Rear of tabletop shall be 40 cm removed from a vertical conducting plane that is bonded to the ground plane.

4.1.5. Test Deviation

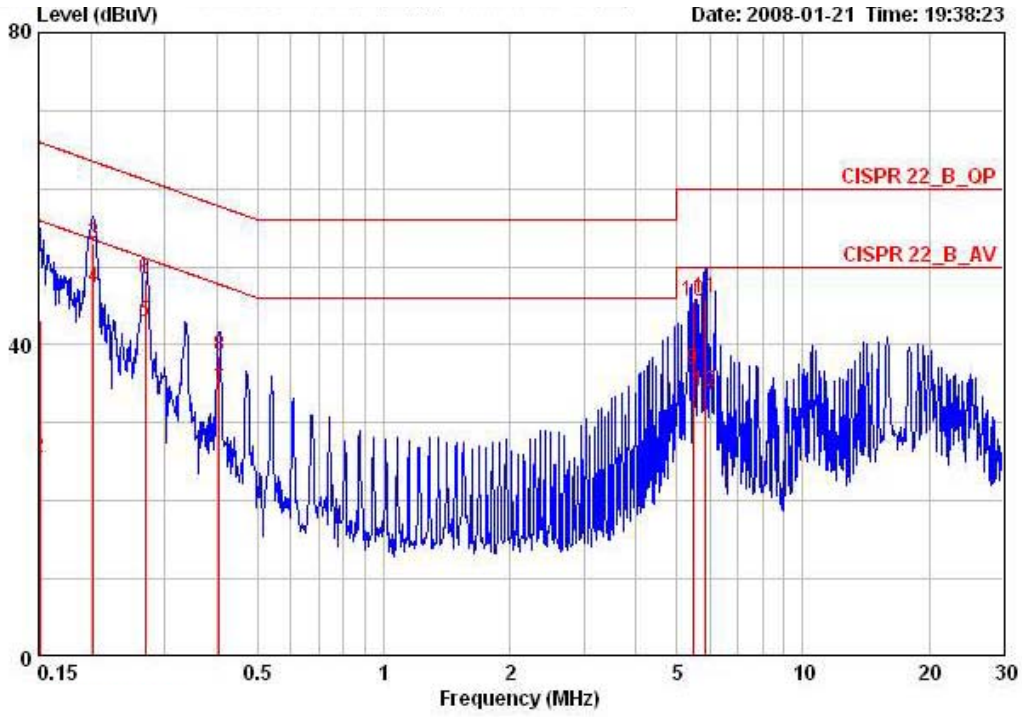
There is no deviation with the original standard.

4.1.6. EUT Operation during Test

The EUT was placed on the test table and programmed in normal function.

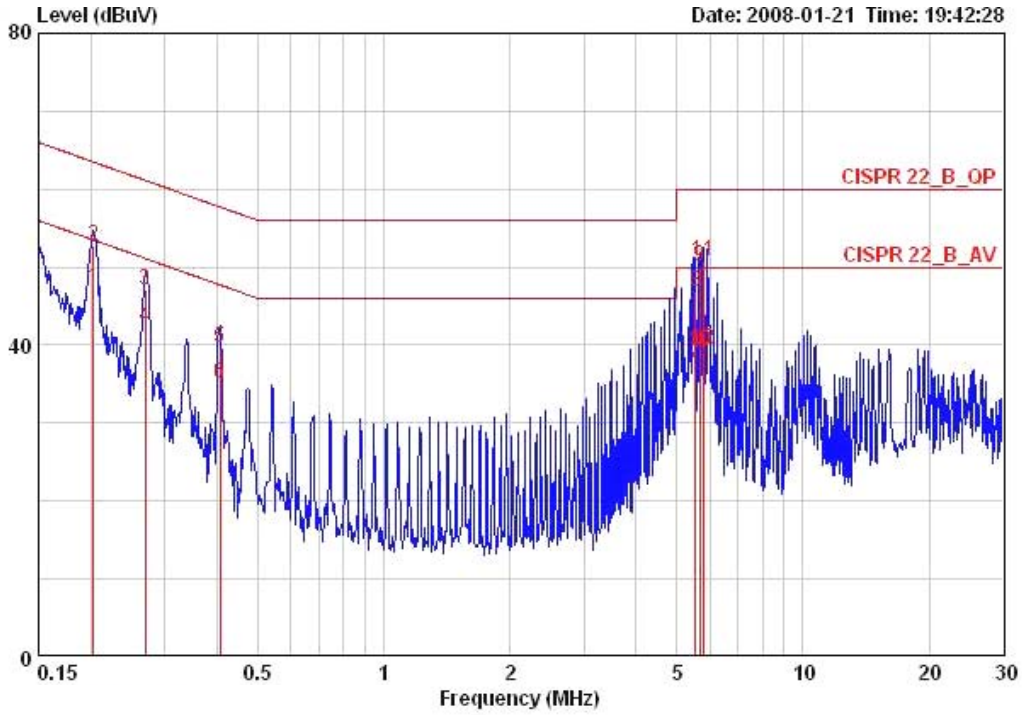
4.1.7. Results of AC Power Line Conducted Emissions Measurement

Temperature	23℃	Humidity	54%
Test Engineer	Cloud Peng	Phase	Line
Configuration	Mode 2		



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark	Pol/Phase
	MHz	dBuV	dB	dBuV	dBuV	dB	dB		
1	0.15080	43.16	-22.80	65.96	42.76	0.20	0.20	QP	LINE
2	0.15080	25.44	-30.52	55.96	25.04	0.20	0.20	AVERAGE	LINE
3	0.20289	52.89	-10.60	63.49	52.59	0.10	0.20	QP	LINE
4 @	0.20289	47.25	-6.24	53.49	46.95	0.10	0.20	AVERAGE	LINE
5	0.27009	43.02	-8.10	51.12	42.72	0.10	0.20	AVERAGE	LINE
6	0.27009	48.48	-12.64	61.12	48.18	0.10	0.20	QP	LINE
7	0.40400	34.15	-13.63	47.77	33.85	0.10	0.20	AVERAGE	LINE
8	0.40400	38.68	-19.10	57.77	38.38	0.10	0.20	QP	LINE
9	5.467	36.80	-13.20	50.00	36.48	0.02	0.30	AVERAGE	LINE
10	5.467	45.60	-14.40	60.00	45.28	0.02	0.30	QP	LINE
11	5.867	45.95	-14.05	60.00	45.62	0.03	0.30	QP	LINE
12	5.867	33.96	-16.04	50.00	33.63	0.03	0.30	AVERAGE	LINE

Temperature	23℃	Humidity	54%
Test Engineer	Cloud Peng	Phase	Neutral
Configuration	Mode 2		



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark	Pol/Phase
	MHz	dBuV	dB	dBuV	dBuV	dB	dB		
1 @	0.20289	47.23	-6.26	53.49	46.83	0.20	0.20	AVERAGE	NEUTRAL
2	0.20289	52.68	-10.81	63.49	52.28	0.20	0.20	QP	NEUTRAL
3	0.27009	47.17	-13.95	61.12	46.80	0.17	0.20	QP	NEUTRAL
4	0.27009	42.33	-8.79	51.12	41.96	0.17	0.20	AVERAGE	NEUTRAL
5	0.40615	39.77	-17.96	57.73	39.47	0.10	0.20	QP	NEUTRAL
6	0.40615	35.07	-12.66	47.73	34.77	0.10	0.20	AVERAGE	NEUTRAL
7	5.551	37.82	-12.18	50.00	37.42	0.10	0.30	AVERAGE	NEUTRAL
8	5.551	46.96	-13.04	60.00	46.56	0.10	0.30	QP	NEUTRAL
9	5.683	50.08	-9.92	60.00	49.68	0.10	0.30	QP	NEUTRAL
10	5.683	39.31	-10.69	50.00	38.91	0.10	0.30	AVERAGE	NEUTRAL
11	5.813	50.87	-9.13	60.00	50.47	0.10	0.30	QP	NEUTRAL
12	5.813	39.43	-10.57	50.00	39.03	0.10	0.30	AVERAGE	NEUTRAL

Note:

Level = Read Level + LISN Factor + Cable Loss

4.2. Maximum Peak Output Power Measurement

4.2.1. Limit

For systems using digital modulation in the 2400-2483.5MHz, the limit for peak output power is 30dBm. The limited has to be reduced by the amount in dB that the gain of the antenna exceed 6dBi. In case of point-to-point operation, the limit has to be reduced by 1dB for every 3dB that the directional gain of the antenna exceeds 6dBi. Systems operating in the 5725-5850 MHz band that are used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted output power.

4.2.2. Measuring Instruments and Setting

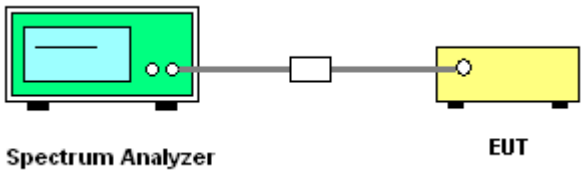
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	Encompass the entire emissions bandwidth (EBW) of the signal
RB	1000 kHz
VB	3000 kHz
Detector	Sample
Trace	Average
Sweep Time	Auto

4.2.3. Test Procedures

1. The transmitter output (antenna port) was connected to the spectrum analyzer.
2. Test was performed in accordance with FCC Conference Call, June 10, 2003.
3. When measuring maximum conducted output power with multiple antenna systems, add every result of the values by mathematic formula.

4.2.4. Test Setup Layout



4.2.5. Test Deviation

There is no deviation with the original standard.

4.2.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.2.7. Test Result of Maximum Peak Output Power

Temperature	24℃	Humidity	56%
Test Engineer	Jacky Ho	Configurations	802.11a/b/g

Configuration IEEE 802.11b

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
1	2412 MHz	16.40	30.00	Complies
6	2437 MHz	16.67	30.00	Complies
11	2462 MHz	16.90	30.00	Complies

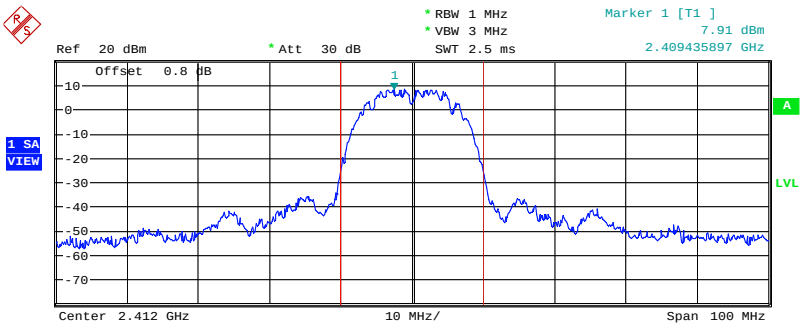
Configuration IEEE 802.11g

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
1	2412 MHz	15.88	30.00	Complies
6	2437 MHz	16.51	30.00	Complies
11	2462 MHz	15.96	30.00	Complies

Configuration IEEE 802.11a

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
149	5745 MHz	15.39	30.00	Complies
157	5785 MHz	15.36	30.00	Complies
165	5825 MHz	14.72	30.00	Complies

Channel Output Power Plot on Configuration IEEE 802.11b / 2412 MHz



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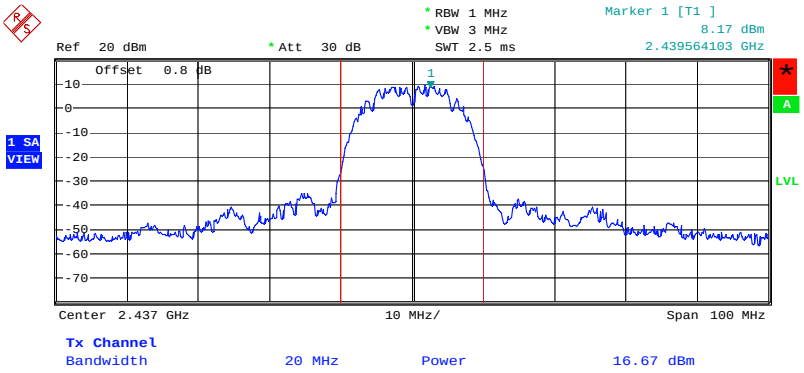
Channel Output Power Plot on Configuration IEEE 802.11b / 2437 MHz



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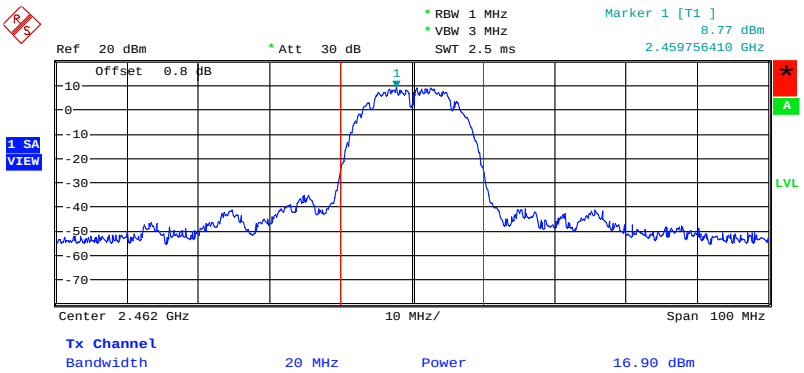
Channel Output Power Plot on Configuration IEEE 802.11b / 2462 MHz



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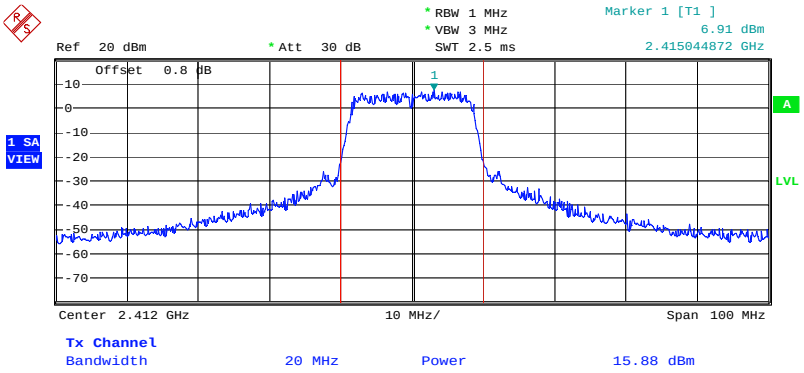
Channel Output Power Plot on Configuration IEEE 802.11g / 2412 MHz



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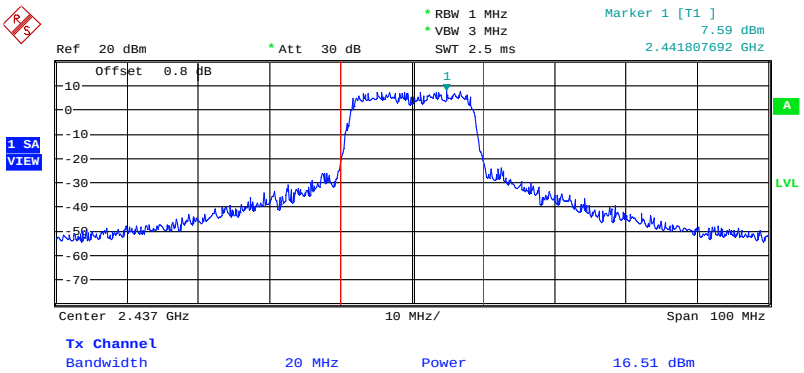

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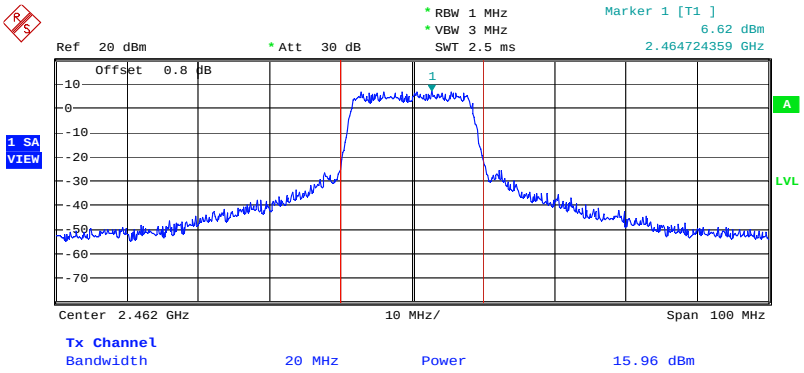
Channel Output Power Plot on Configuration IEEE 802.11g / 2462 MHz



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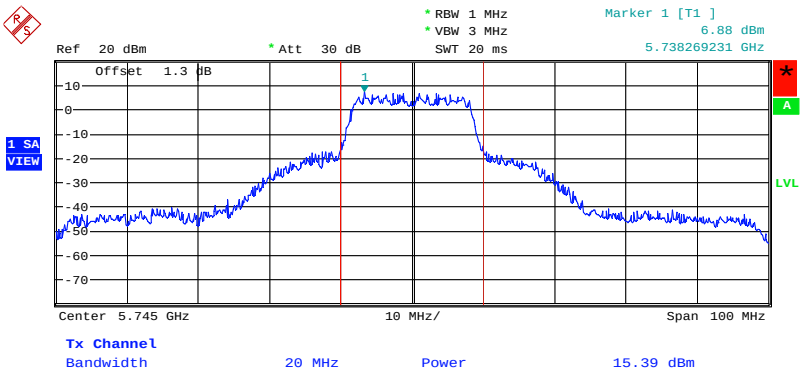
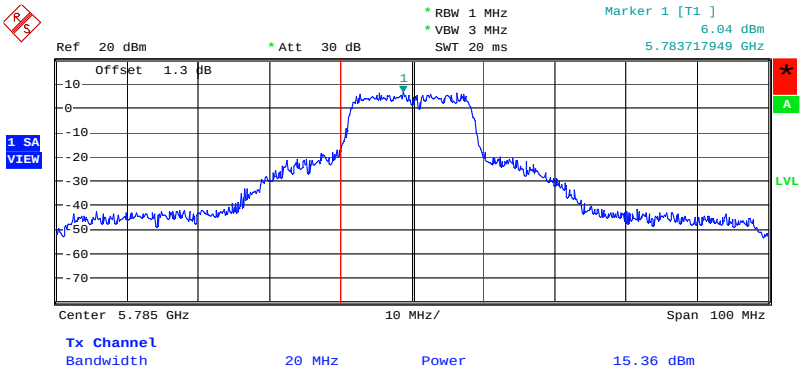
Channel Output Power Plot on Configuration IEEE 802.11a / 5745 MHz



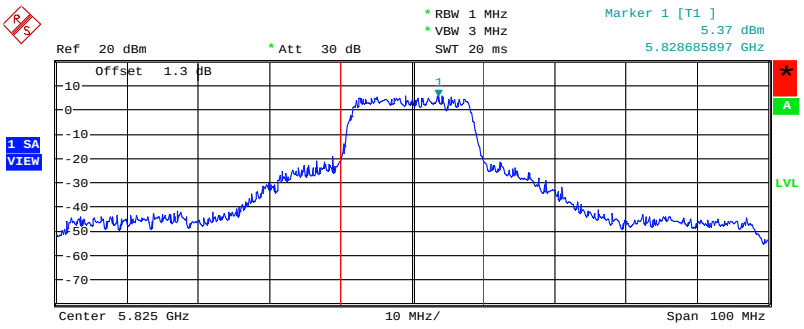
Date: 2.FEB.2008 08:16:23

Channel Output Power Plot on Configuration IEEE 802.11a / 5785 MHz



Date: 2.FEB.2008 08:17:21

Channel Output Power Plot on Configuration IEEE 802.11a / 5825 MHz



Date: 2.FEB.2008 08:18:07

4.3. Power Spectral Density Measurement

4.3.1. Limit

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3 kHz band during any time interval of continuous transmission.

4.3.2. Measuring Instruments and Setting

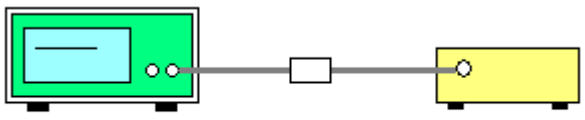
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	1.5MHz
RB	3 kHz
VB	30 kHz
Detector	Peak
Trace	Max Hold
Sweep Time	500s

4.3.3. Test Procedures

1. The transmitter output (antenna port) was connected to the spectrum analyser.
2. Set RBW of spectrum analyzer to 3kHz and VBW to 30kHz. Set Detector to Peak, Trace to Max Hold.
3. Mark the frequency with maximum peak power as the center of the display of the spectrum.
4. Set the span to 1.5MHz and the sweep time to 500s and record the maximum peak value.

4.3.4. Test Setup Layout



4.3.5. Test Deviation

There is no deviation with the original standard.

4.3.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.3.7. Test Result of Power Spectral Density

Temperature	24℃	Humidity	56%
Test Engineer	Jacky Ho	Configurations	802.11a/b/g

Configuration IEEE 802.11b

Channel	Frequency	Power Density (dBm)	Max. Limit (dBm)	Result
1	2412 MHz	-12.48	8.00	Complies
6	2437 MHz	-12.11	8.00	Complies
11	2462 MHz	-11.88	8.00	Complies

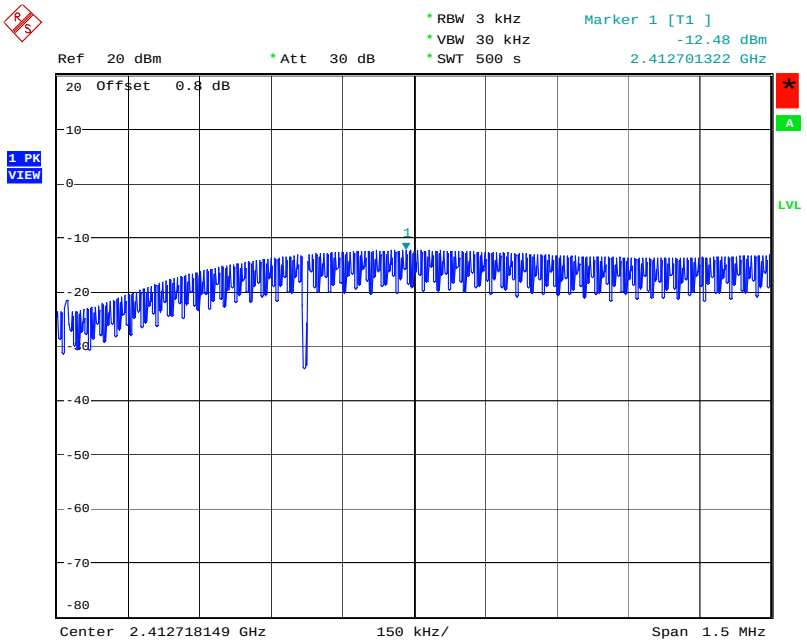
Configuration IEEE 802.11g

Channel	Frequency	Power Density (dBm)	Max. Limit (dBm)	Result
1	2412 MHz	-11.17	8.00	Complies
6	2437 MHz	-9.87	8.00	Complies
11	2462 MHz	-11.16	8.00	Complies

Configuration IEEE 802.11a

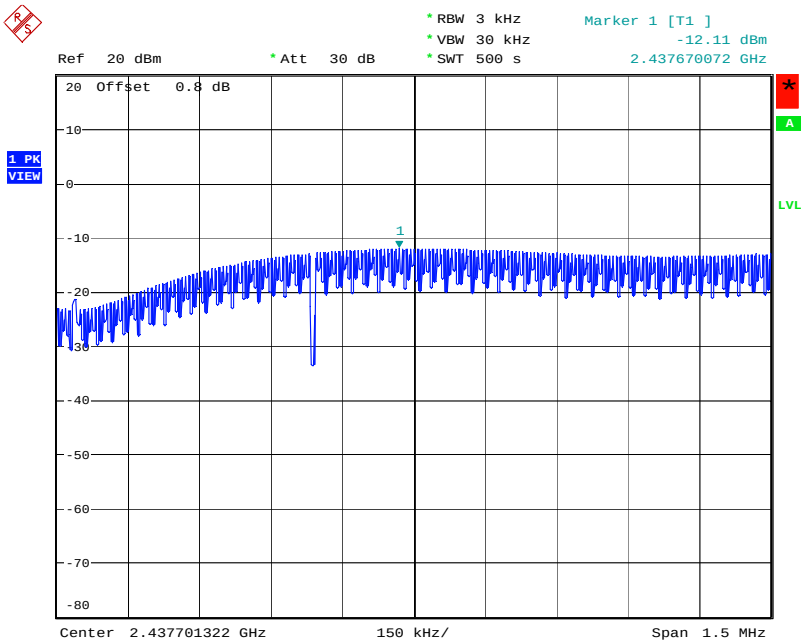
Channel	Frequency	Power Density (dBm)	Max. Limit (dBm)	Result
149	5745 MHz	-22.69	8.00	Complies
157	5785 MHz	-16.61	8.00	Complies
165	5825 MHz	-17.64	8.00	Complies

Power Density Plot on Configuration IEEE 802.11b / 2412 MHz



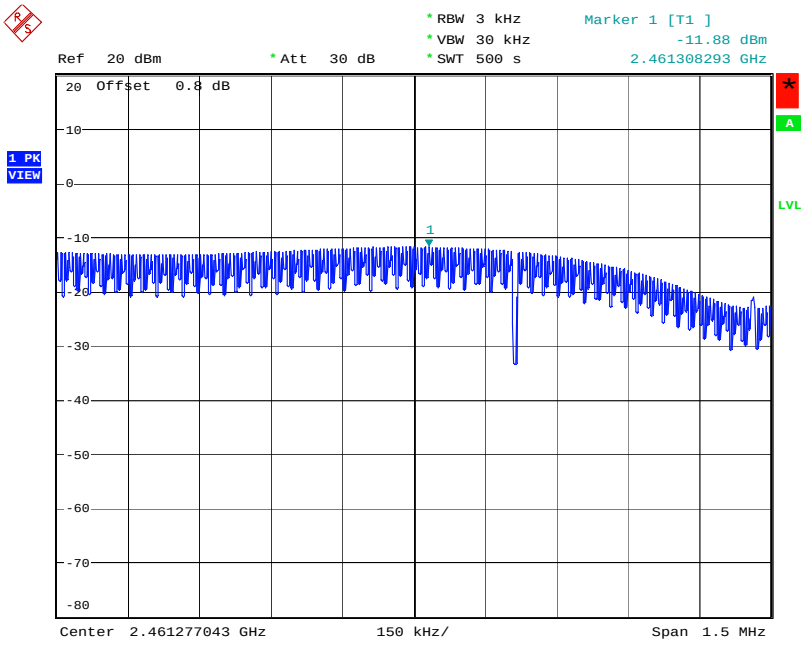
Date: 2.FEB.2008 13:27:37

Power Density Plot on Configuration IEEE 802.11b / 2437 MHz



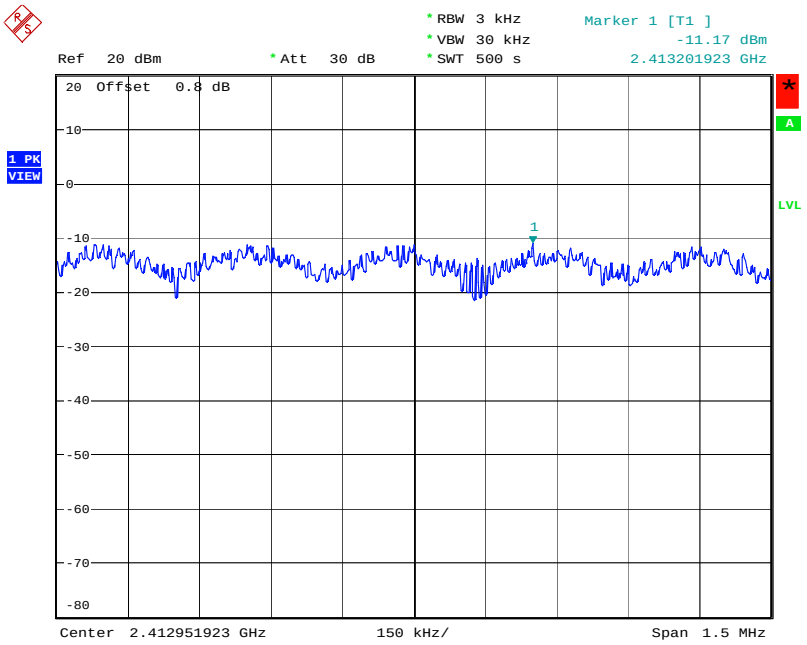
Date: 2.FEB.2008 13:28:33

Power Density Plot on Configuration IEEE 802.11b / 2462 MHz



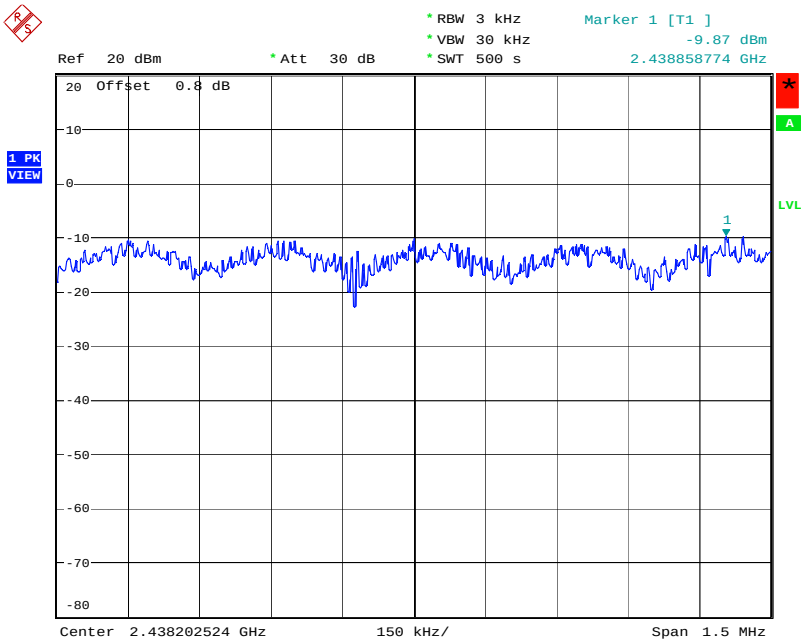
Date: 2.FEB.2008 13:29:14

Power Density Plot on Configuration IEEE 802.11g / 2412 MHz



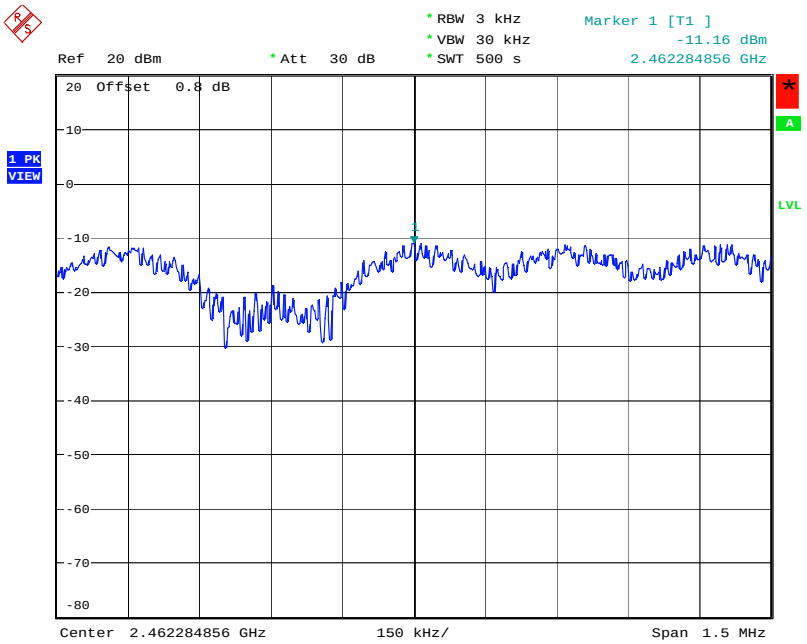
Date: 2.FEB.2008 13:24:30

Power Density Plot on Configuration IEEE 802.11g / 2437 MHz



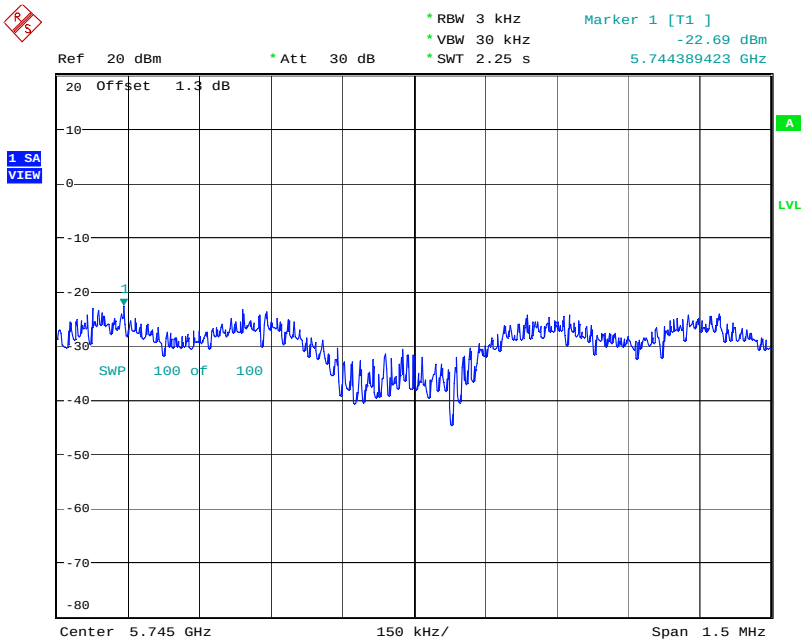
Date: 2.FEB.2008 13:25:35

Power Density Plot on Configuration IEEE 802.11g / 2462 MHz



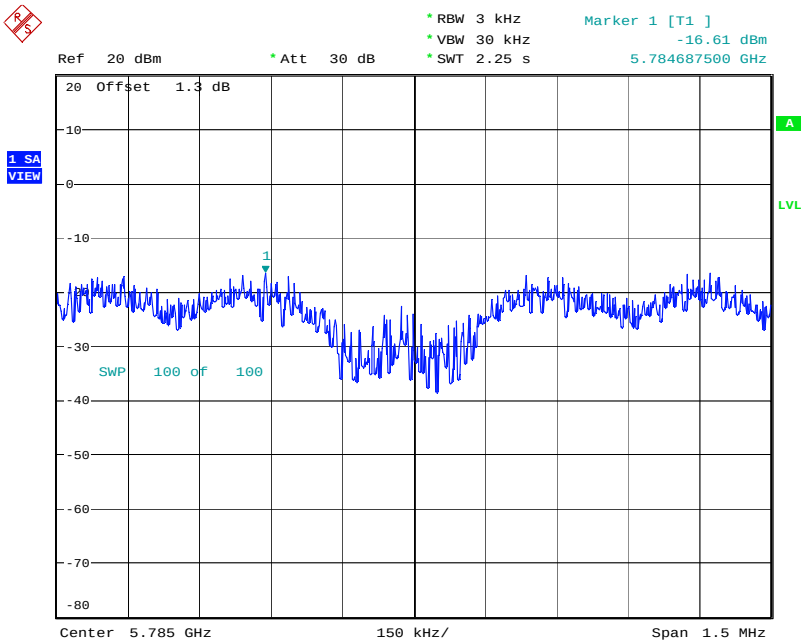
Date: 2.FEB.2008 13:26:21

Power Density Plot on Configuration IEEE 802.11a / 5745 MHz



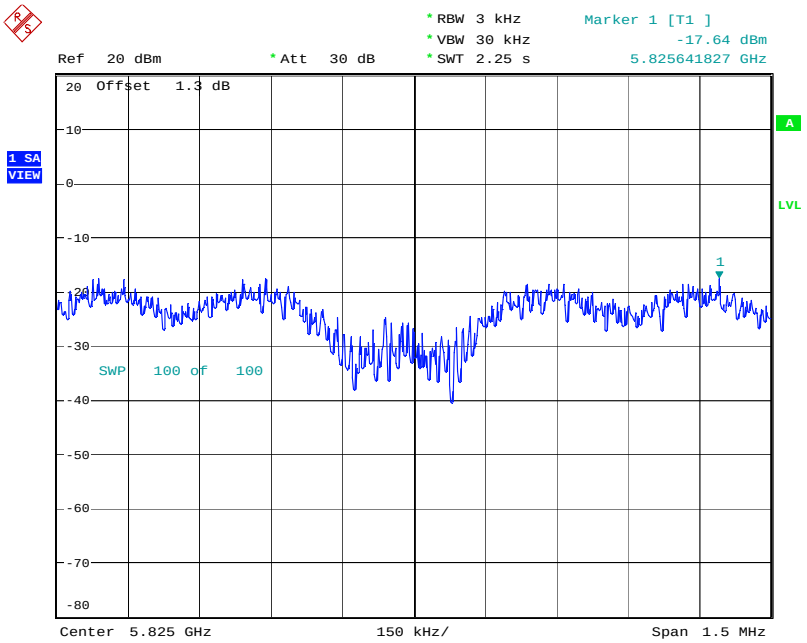
Date: 2.FEB.2008 12:49:07

Power Density Plot on Configuration IEEE 802.11a / 5785 MHz



Date: 2.FEB.2008 12:57:53

Power Density Plot on Configuration IEEE 802.11a / 5825 MHz



Date: 2.FEB.2008 13:02:11

4.4. 6dB Spectrum Bandwidth Measurement

4.4.1. Limit

For digital modulation systems, the minimum 6dB bandwidth shall be at least 500 kHz.

4.4.2. Measuring Instruments and Setting

Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

Spectrum Parameters	Setting
Attenuation	Auto
Span Frequency	> 6dB Bandwidth
RB	100 kHz
VB	100 kHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

4.4.3. Test Procedures

1. The transmitter output (antenna port) was connected to the spectrum analyser in peak hold mode.
2. The resolution bandwidth of 100 kHz and the video bandwidth of 100 kHz were used.
3. Measured the spectrum width with power higher than 6dB below carrier.

4.4.4. Test Setup Layout

4.4.5. Test Deviation

There is no deviation with the original standard.

4.4.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.4.7. Test Result of 6dB Spectrum Bandwidth

Temperature	24℃	Humidity	56%
Test Engineer	Jacky Ho	Configurations	802.11a/b/g

Configuration IEEE 802.11b

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
1	2412 MHz	12.24	14.96	500	Complies
6	2437 MHz	12.30	14.96	500	Complies
11	2462 MHz	12.24	14.90	500	Complies

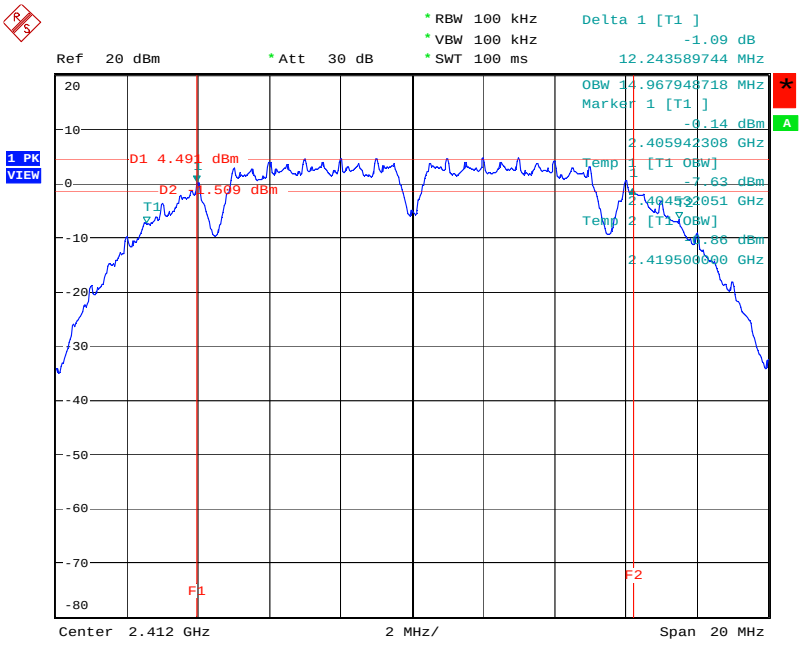
Configuration IEEE 802.11g

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
1	2412 MHz	16.57	16.50	500	Complies
6	2437 MHz	16.60	16.50	500	Complies
11	2462 MHz	16.50	16.44	500	Complies

Configuration IEEE 802.11a

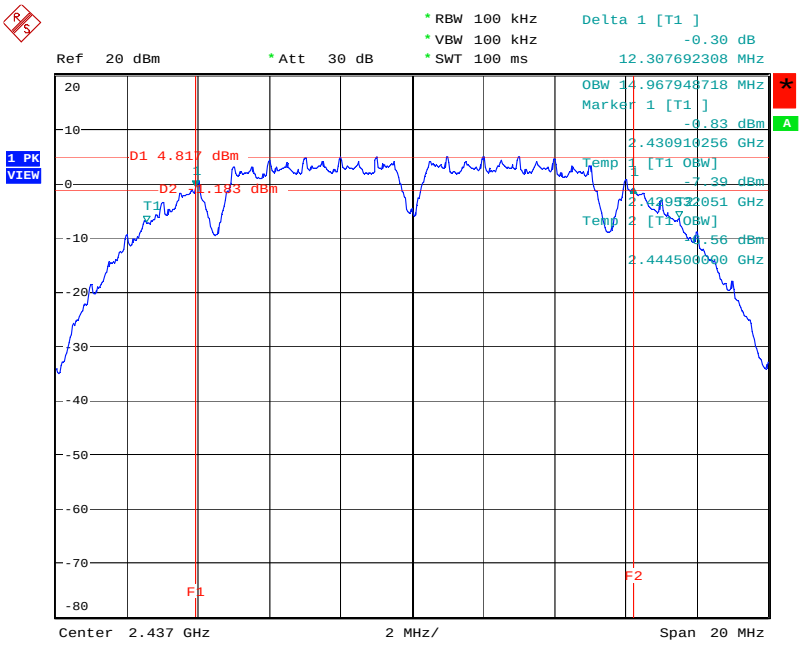
Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
149	5745 MHz	16.53	16.53	500	Complies
157	5785 MHz	16.57	16.53	500	Complies
165	5825 MHz	16.60	16.50	500	Complies

6 dB Bandwidth Plot on Configuration IEEE 802.11b / 2412 MHz



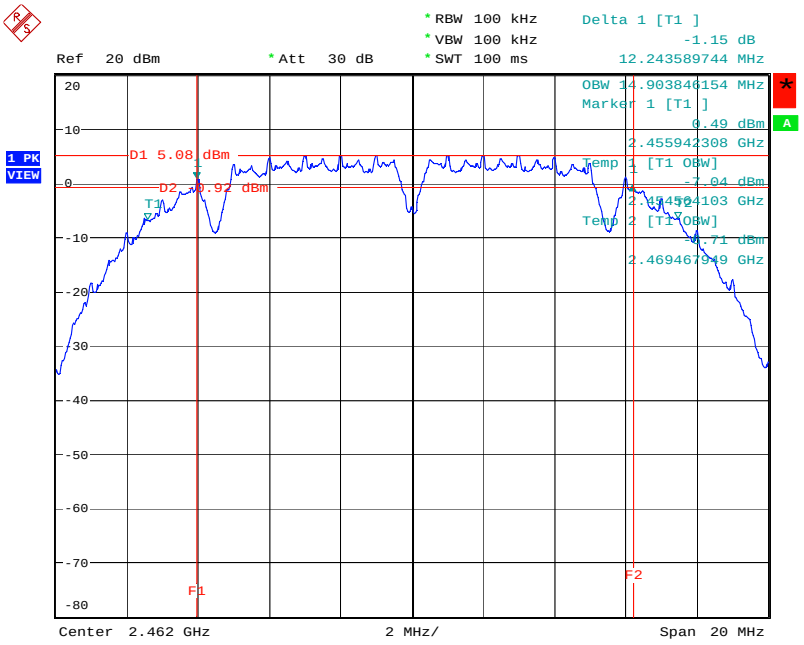
Date: 2.FEB.2008 13:27:11

6 dB Bandwidth Plot on Configuration IEEE 802.11b / 2437 MHz



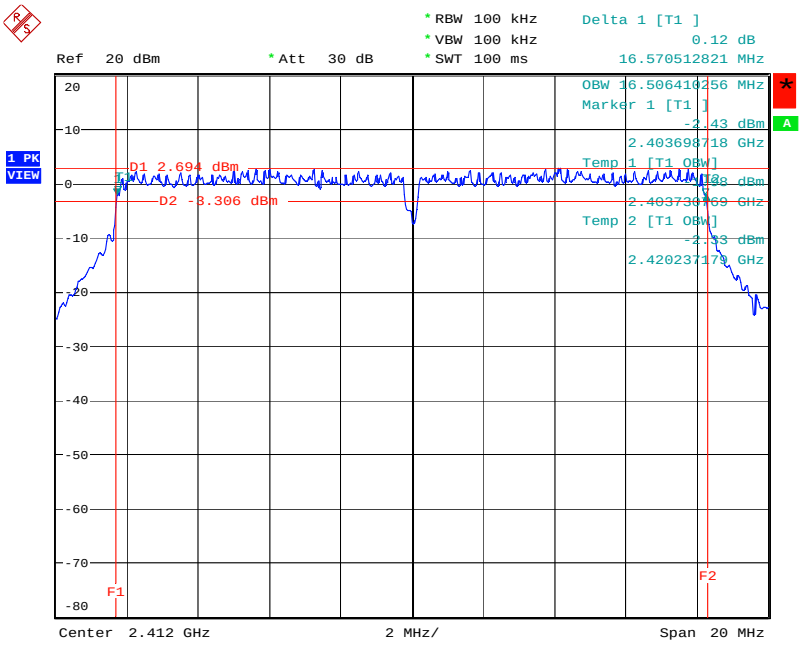
Date: 2.FEB.2008 13:28:17

6 dB Bandwidth Plot on Configuration IEEE 802.11b / 2462 MHz



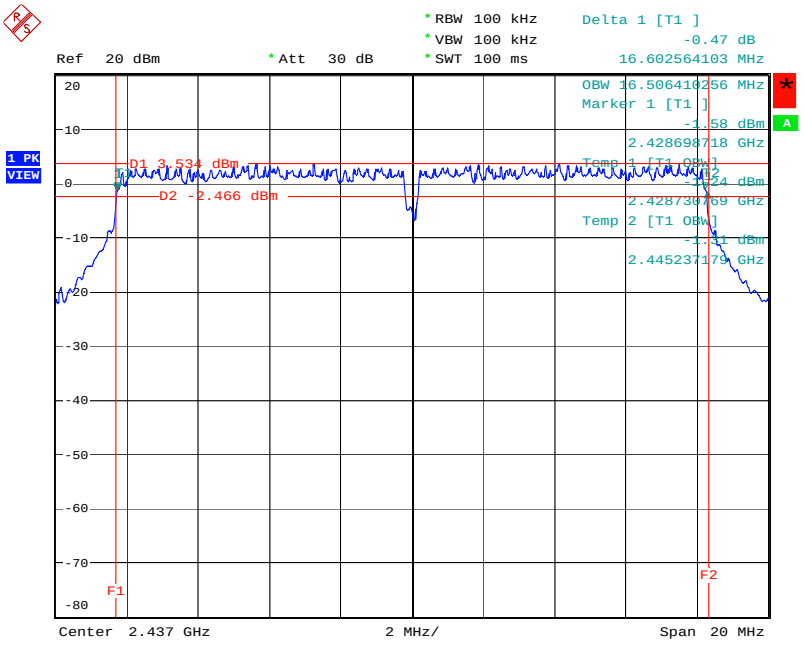
Date: 2.FEB.2008 13:28:58

6 dB Bandwidth Plot on Configuration IEEE 802.11g / 2412 MHz

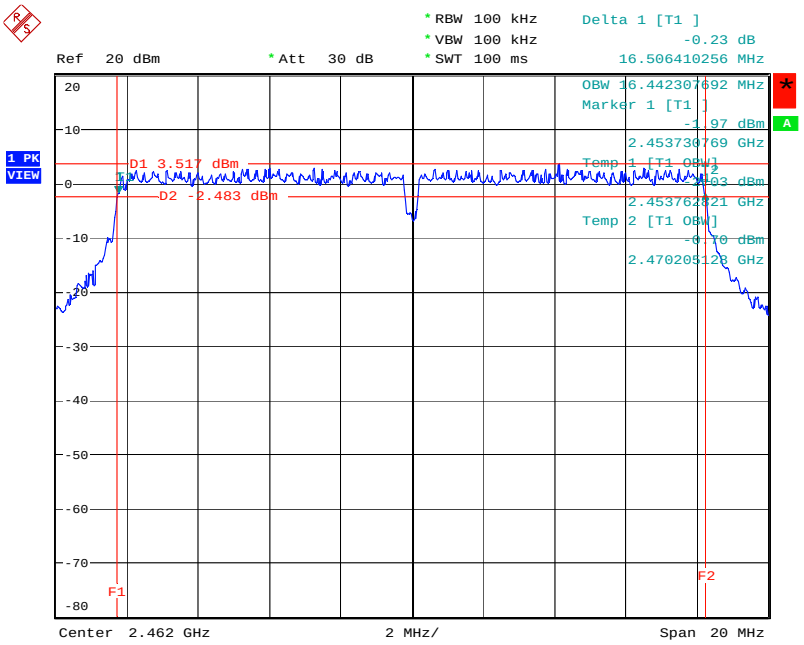


Date: 2.FEB.2008 13:24:04

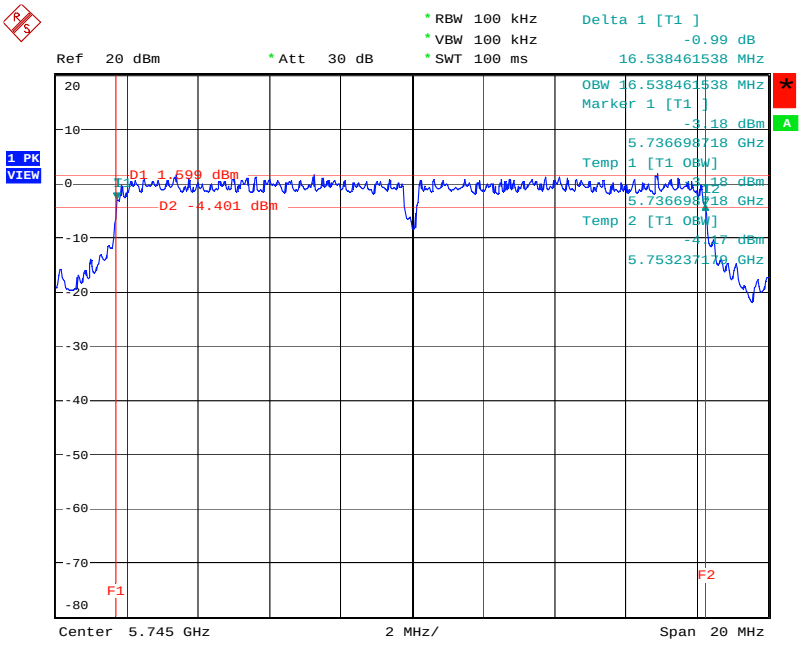
6 dB Bandwidth Plot on Configuration IEEE 802.11g / 2437 MHz



6 dB Bandwidth Plot on Configuration IEEE 802.11g / 2462 MHz

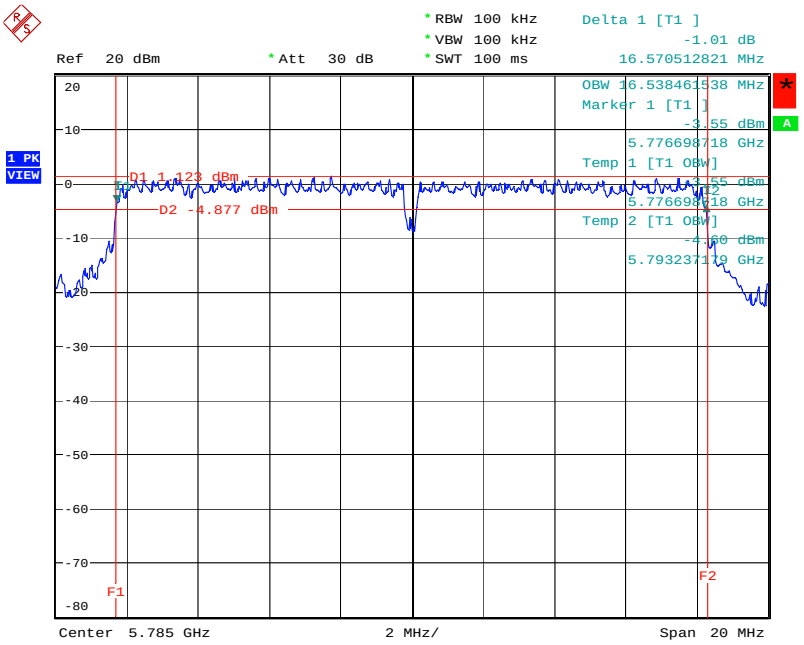


6 dB Bandwidth Plot on Configuration IEEE 802.11a / 5745 MHz



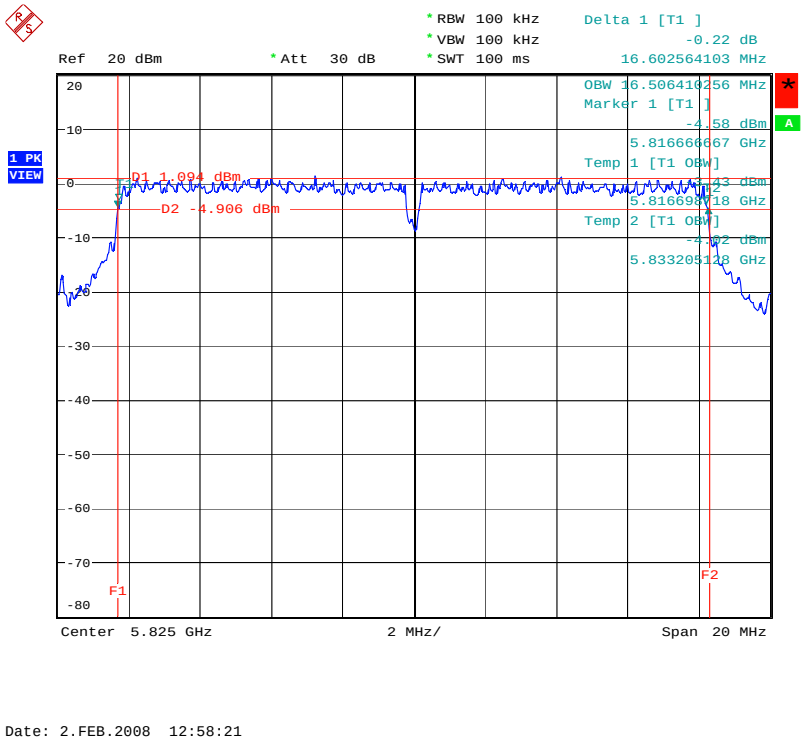
Date: 2.FEB.2008 12:45:17

6 dB Bandwidth Plot on Configuration IEEE 802.11a / 5785 MHz



Date: 2.FEB.2008 12:54:03

6 dB Bandwidth Plot on Configuration IEEE 802.11a / 5825 MHz



4.5. Radiated Emissions Measurement

4.5.1. Limit

20dBc in any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

Frequencies (MHz)	Field Strength (micorvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

4.5.2. Measuring Instruments and Setting

Please refer to section 5 of equipments list in this report. The following table is the setting of spectrum analyzer and receiver.

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	10th carrier harmonic
RB / VB (Emission in restricted band)	1MHz / 1MHz for Peak, 1 MHz / 10Hz for Average
RB / VB (Emission in non-restricted band)	100KHz / 100KHz for peak

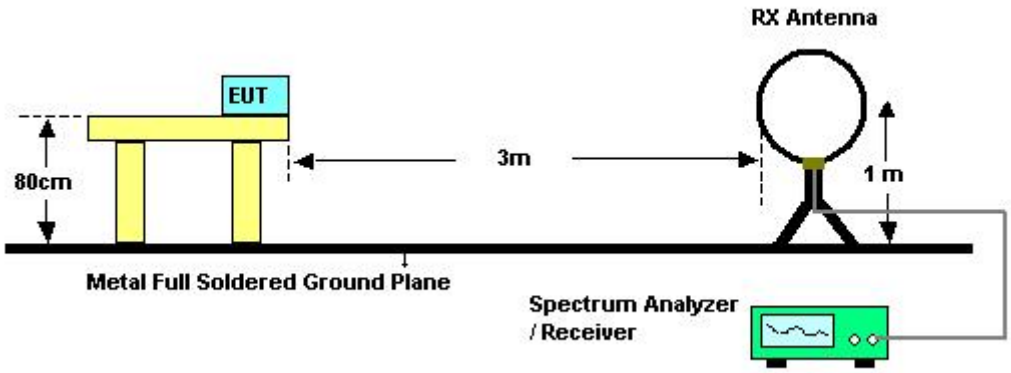
Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

4.5.3. Test Procedures

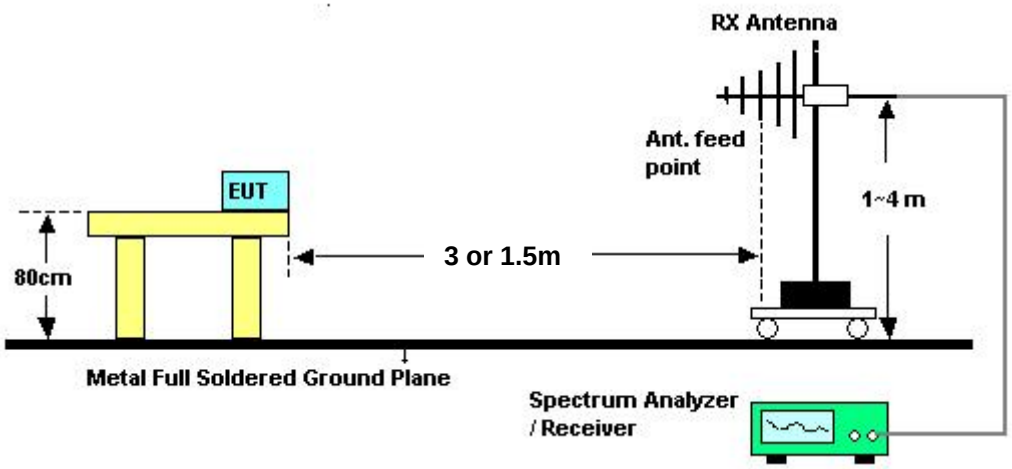
1. Configure the EUT according to ANSI C63.4. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
4. For each suspected emissions, the antenna tower was scan (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
5. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
6. For emissions above 1GHz, use 1MHz VBW and RBW for peak reading. Then 1MHz RBW and 10Hz VBW for average reading in spectrum analyzer.
7. When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum value.
8. If the emissions level of the EUT in peak mode was 3 dB lower than the average limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method for below 1GHz.
9. For testing above 1GHz, the emissions level of the EUT in peak mode was lower than average limit (that means the emissions level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
10. In case the emission is lower than 30MHz, loop antenna has to be used for measurement and the recorded data should be QP measured by receiver. High – Low scan is not required in this case.

4.5.4. Test Setup Layout

For radiated emissions below 30MHz



For radiated emissions above 30MHz



Above 10 GHz shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade form 3m to 1.5m.

Distance extrapolation factor = 20 log (specific distance [3m] / test distance [1.5m]) (dB);

Limit line = specific limits (dBuV) + distance extrapolation factor [6 dB].

4.5.5. Test Deviation

There is no deviation with the original standard.

4.5.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.5.7. Results of Radiated Emissions (9kHz~30MHz)

Temperature	24℃	Humidity	56%
Test Engineer	Jax Chen		

Freq. (MHz)	Level (dBuV)	Over Limit (dB)	Limit Line (dBuV)	Remark
-	-	-	-	See Note

Note:

The amplitude of spurious emissions that are attenuated by more than 20 dB below the permissible value has no need to be reported.

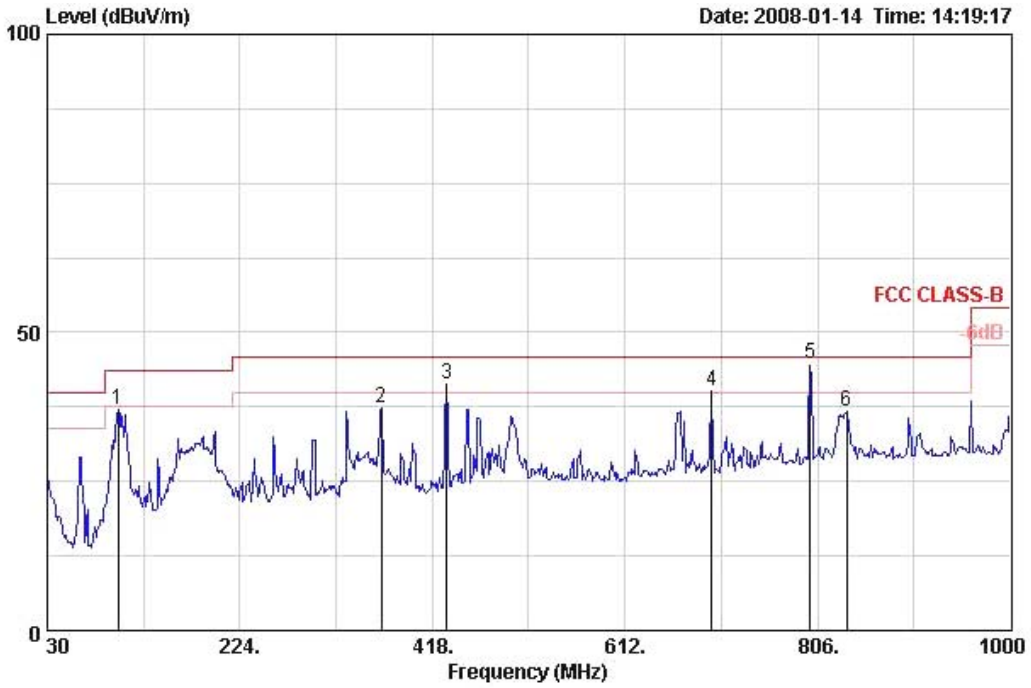
Distance extrapolation factor = 40 log (specific distance / test distance) (dB);

Limit line = specific limits (dBuV) + distance extrapolation factor.

4.5.8. Results of Radiated Emissions (30MHz~1GHz)

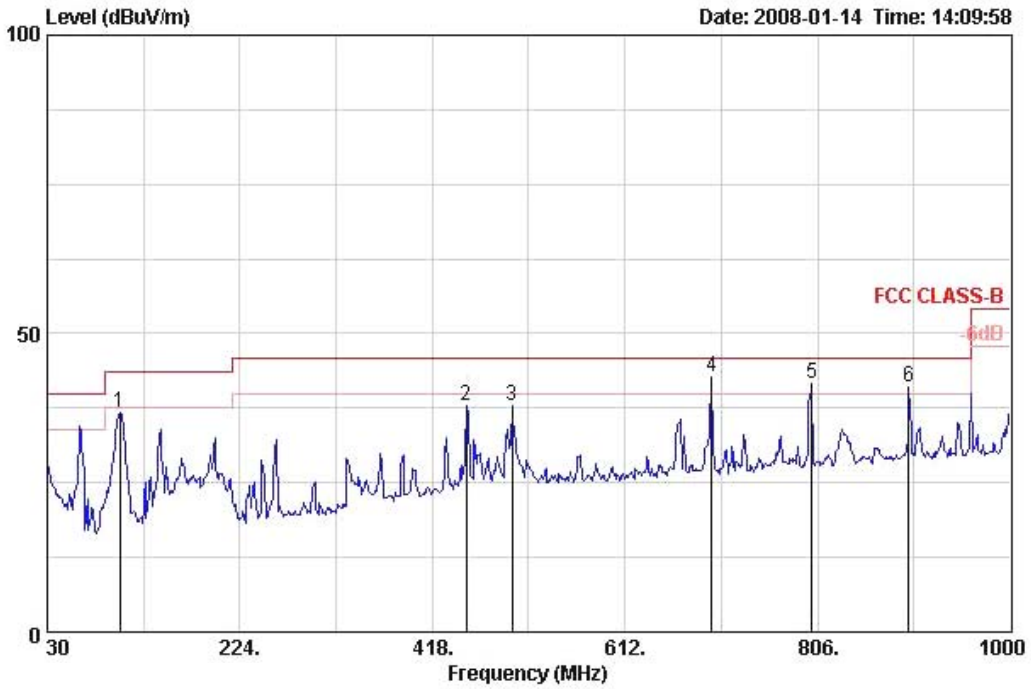
Temperature	24℃	Humidity	56%
Test Engineer	Jax Chen	Configurations	Normal Link / Mode 2

Horizontal



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos	Pol/Phase
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg	
1 @	101.780	37.05	-6.45	43.50	55.74	11.52	1.50	31.71	Peak	400	-1	HORIZONTAL
2 @	366.590	37.35	-8.65	46.00	50.22	15.80	2.50	31.17	Peak	400	-1	HORIZONTAL
3 @	432.550	41.30	-4.70	46.00	52.44	16.99	2.83	30.96	Peak	400	-1	HORIZONTAL
4 @	699.300	40.10	-5.90	46.00	47.22	19.80	3.60	30.52	Peak	400	-1	HORIZONTAL
5 @	798.710	44.81	-1.20	46.00	50.50	20.68	3.80	30.18	QP	128	86	HORIZONTAL
6 @	835.100	36.74	-9.26	46.00	41.81	21.12	3.94	30.14	Peak	400	-1	HORIZONTAL

Vertical



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos	Pol/Phase
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg	
1 @	102.750	36.74	-6.76	43.50	55.27	11.68	1.50	31.72	Peak	400	-4	VERTICAL
2 @	451.950	37.91	-8.09	46.00	48.69	17.23	2.92	30.92	Peak	400	-4	VERTICAL
3 @	498.510	37.88	-8.12	46.00	47.66	17.87	3.28	30.94	Peak	400	-4	VERTICAL
4 @	699.300	42.76	-3.24	46.00	49.88	19.80	3.60	30.52	Peak	400	-4	VERTICAL
5 @	800.180	41.58	-4.42	46.00	47.26	20.70	3.80	30.18	Peak	400	-4	VERTICAL
6 @	898.150	41.00	-5.00	46.00	45.03	21.59	4.10	29.71	Peak	400	-4	VERTICAL

Note:

The amplitude of spurious emissions that are attenuated by more than 20dB below the permissible value has no need to be reported.

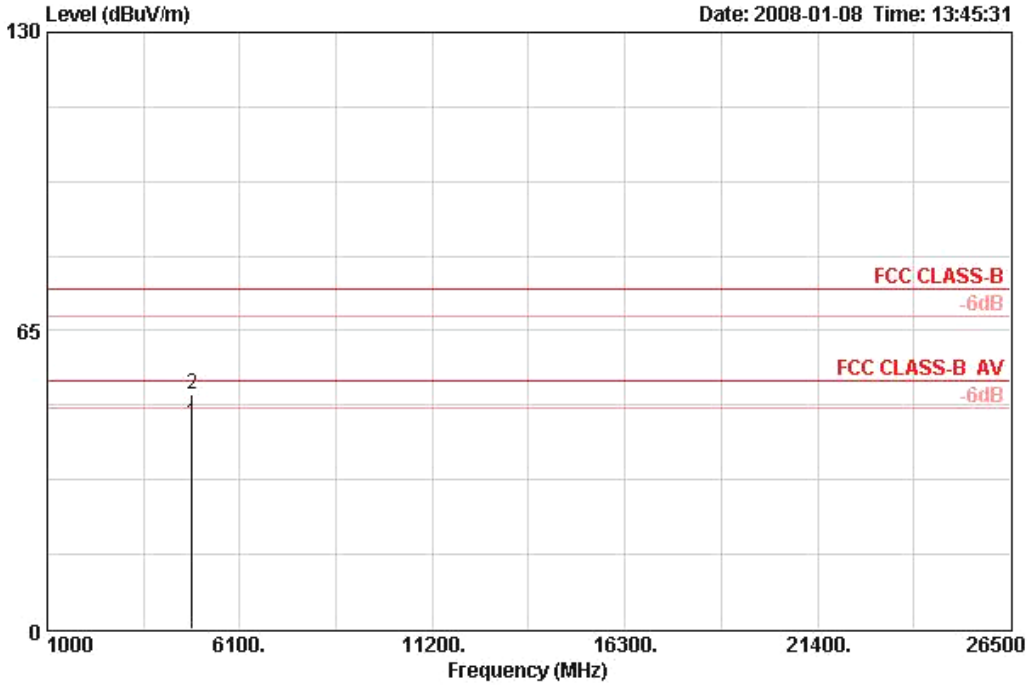
Emission level (dBuV/m) = 20 log Emission level (uV/m).

Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

4.5.9. Results for Radiated Emissions (1GHz~10th Harmonic)

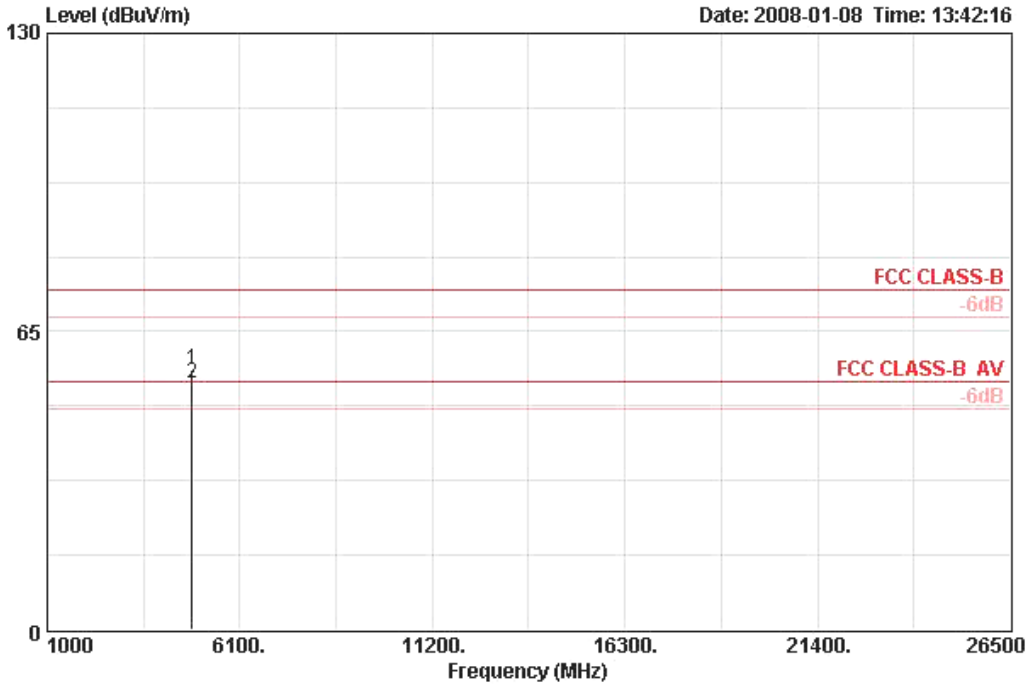
Temperature	24℃	Humidity	56%
Test Engineer	Jax Chen	Configurations	802.11b CH 1

Horizontal



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos	Pol/Phase
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg	
1 @	4824.010	44.86	-9.14	54.00	40.58	33.06	6.40	35.16	AVERAGE	100	90	HORIZONTAL
2	4824.120	51.04	-22.96	74.00	46.75	33.06	6.40	35.16	PEAK	100	90	HORIZONTAL

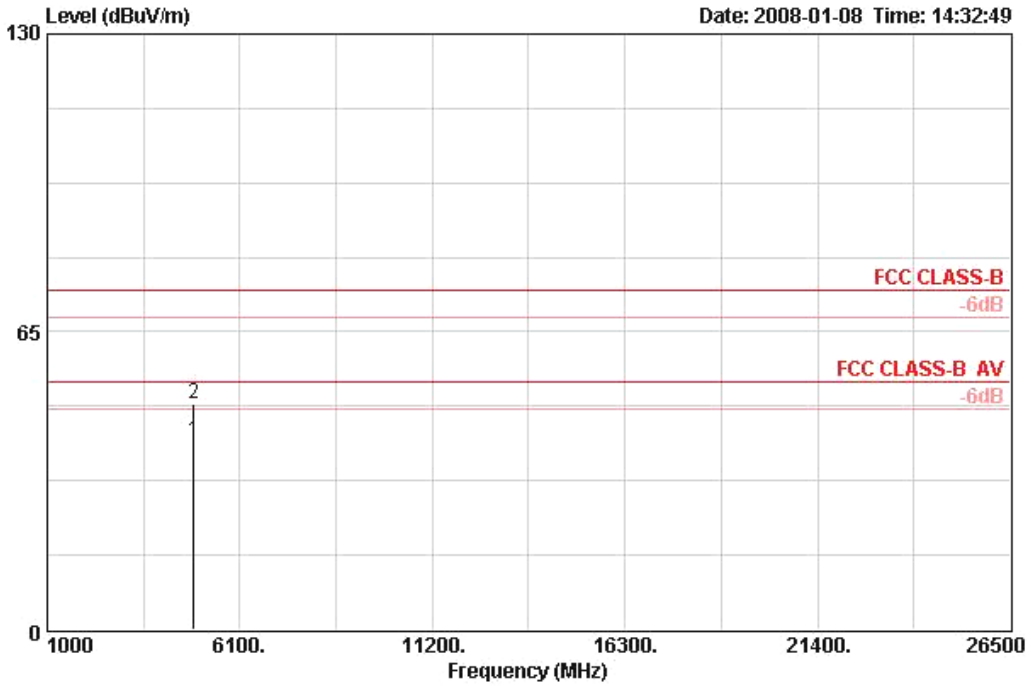
Vertical



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos	Pol/Phase
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg	
1 @	4823.990	56.61	-17.39	74.00	52.33	33.06	6.40	35.16	PEAK	103	72	VERTICAL
2 @	4824.010	53.78	-0.22	54.00	49.50	33.06	6.40	35.16	AVERAGE	103	72	VERTICAL

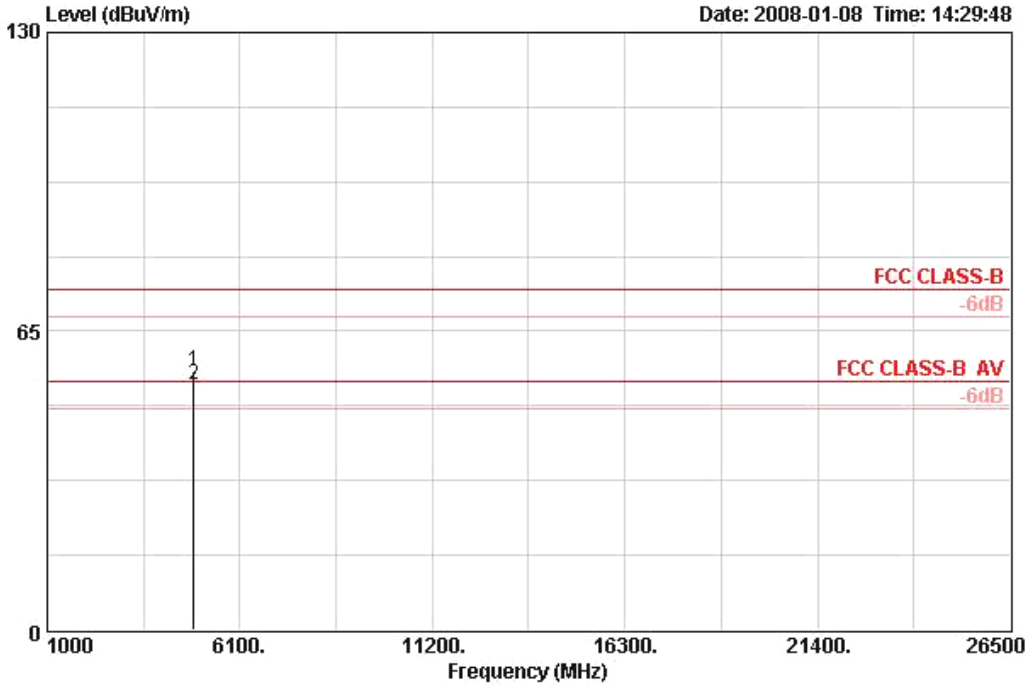
Temperature	24℃	Humidity	56%
Test Engineer	Jax Chen	Configurations	802.11b CH 6

Horizontal



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos	Pol/Phase
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg	
1 @	4874.010	41.28	-12.72	54.00	36.86	33.16	6.42	35.15	AVERAGE	112	327	HORIZONTAL
2	4874.030	49.23	-24.77	74.00	44.81	33.16	6.42	35.15	PEAK	112	327	HORIZONTAL

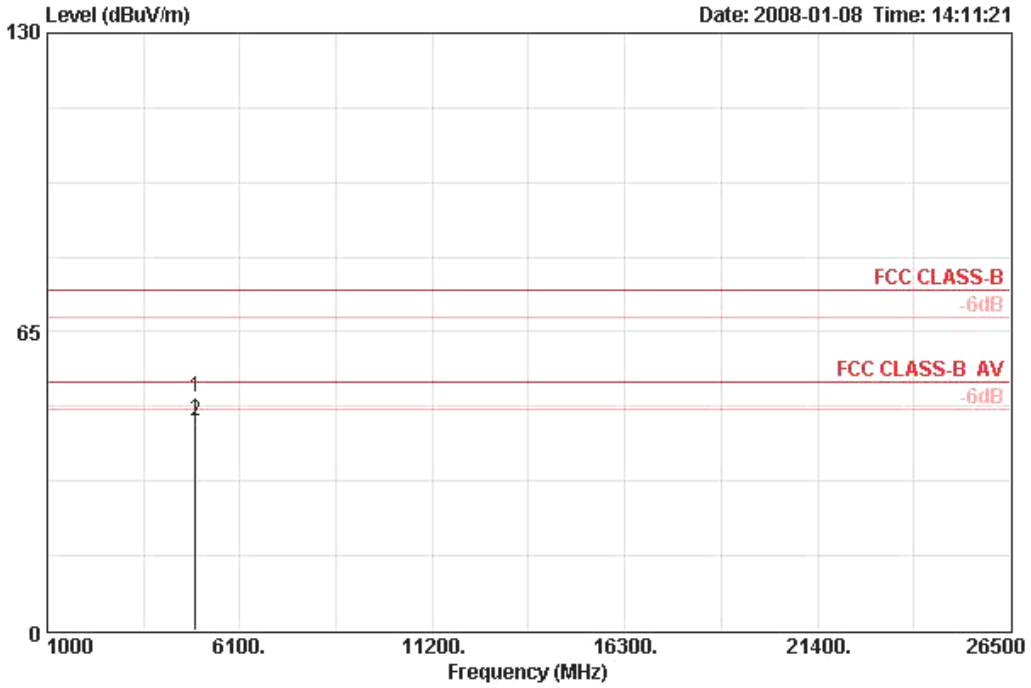
Vertical



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos	Pol/Phase
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg	
1 @	4873.960	56.25	-17.75	74.00	51.83	33.16	6.42	35.15	PEAK	100	116	VERTICAL
2 @	4873.990	53.39	-0.61	54.00	48.96	33.16	6.42	35.15	AVERAGE	100	116	VERTICAL

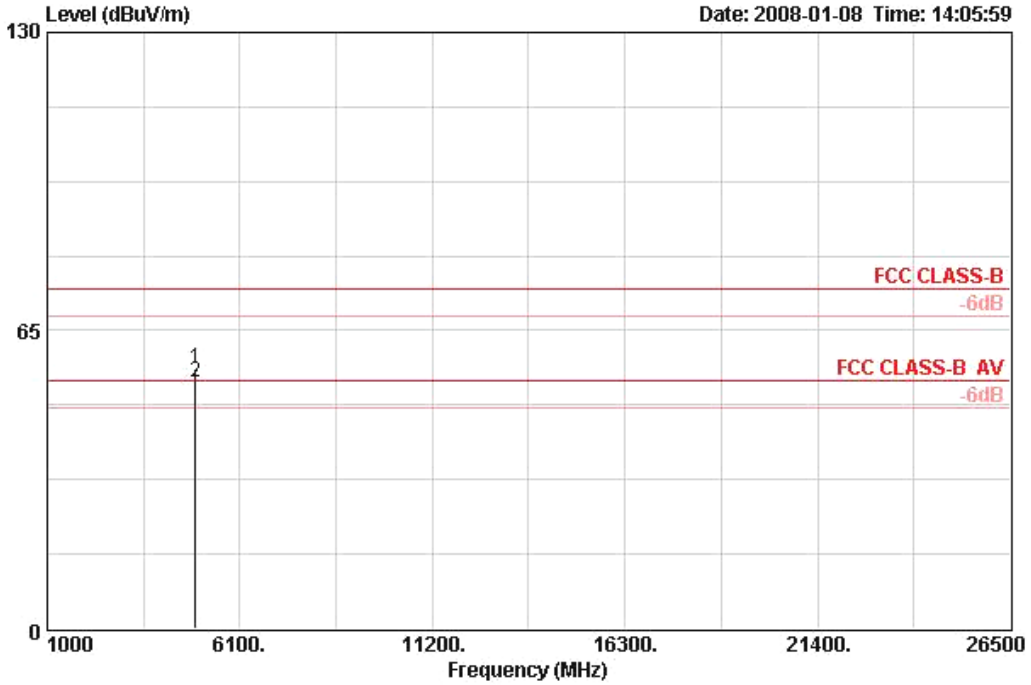
Temperature	24℃	Humidity	56%
Test Engineer	Jax Chen	Configurations	802.11b CH 11

Horizontal



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos	Pol/Phase
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg	
1	4923.920	50.73	-23.27	74.00	46.17	33.26	6.44	35.14	PEAK	180	281	HORIZONTAL
2 @	4924.050	45.73	-8.27	54.00	41.17	33.26	6.44	35.14	AVERAGE	180	281	HORIZONTAL

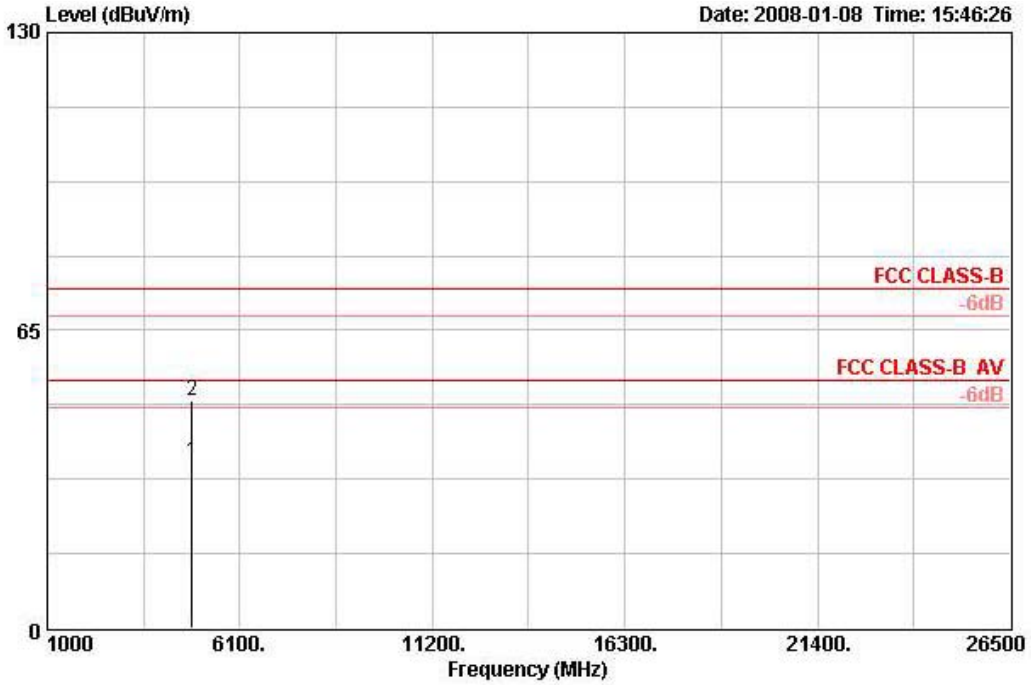
Vertical



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos	Pol/Phase
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg	
1 @	4923.960	56.58	-17.42	74.00	52.02	33.26	6.44	35.14	PEAK	113	73	VERTICAL
2 @	4924.010	53.83	-0.17	54.00	49.27	33.26	6.44	35.14	AVERAGE	113	73	VERTICAL

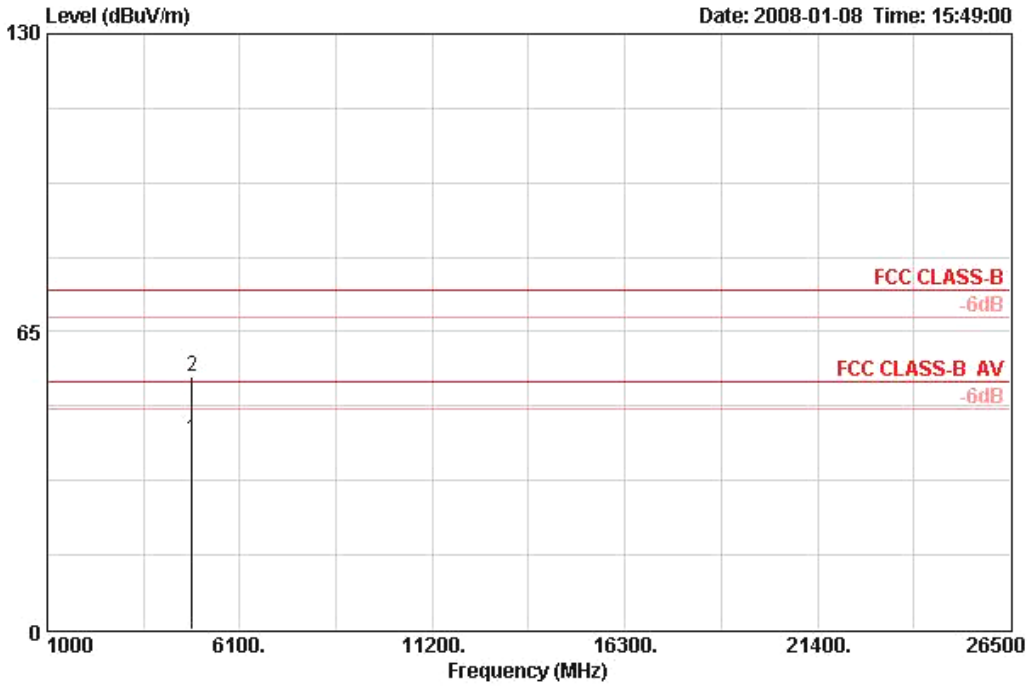
Temperature	24℃	Humidity	56%
Test Engineer	Jax Chen	Configurations	802.11g CH 1

Horizontal



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos	Pol/Phase
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg	
1 @	4824.330	36.27	-17.73	54.00	31.98	33.06	6.40	35.16	AVERAGE	153	323	HORIZONTAL
2	4824.700	49.68	-24.32	74.00	45.39	33.06	6.40	35.16	PEAK	153	323	HORIZONTAL

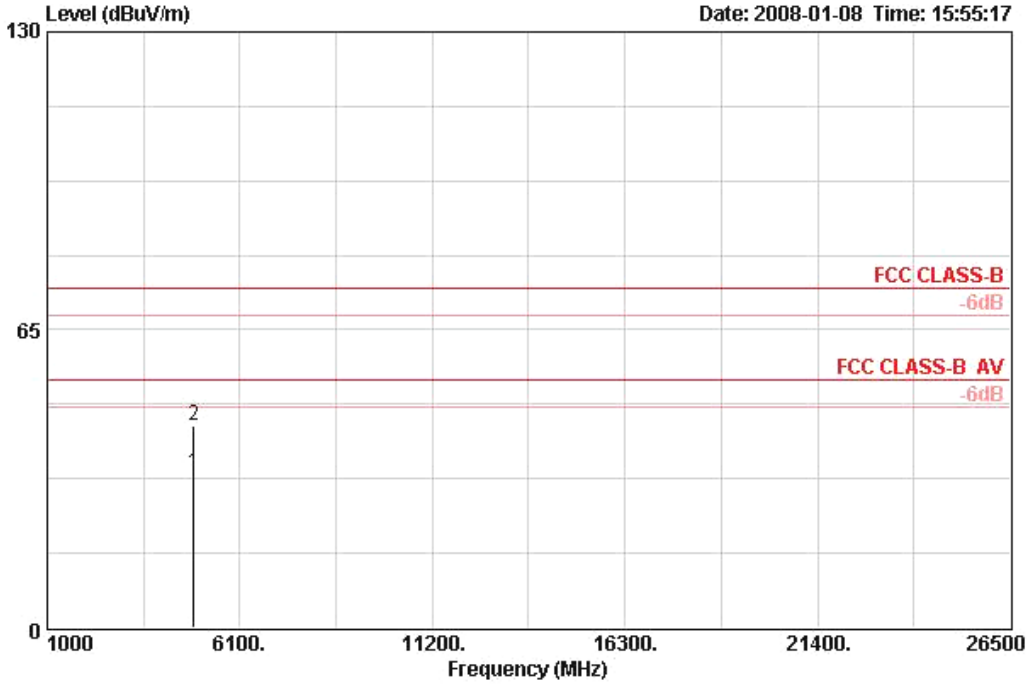
Vertical



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos	Pol/Phase
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg	
1 @	4824.170	41.33	-12.67	54.00	37.05	33.06	6.40	35.16	AVERAGE	116	87	VERTICAL
2 @	4824.990	55.12	-18.88	74.00	50.83	33.06	6.40	35.16	PEAK	116	87	VERTICAL

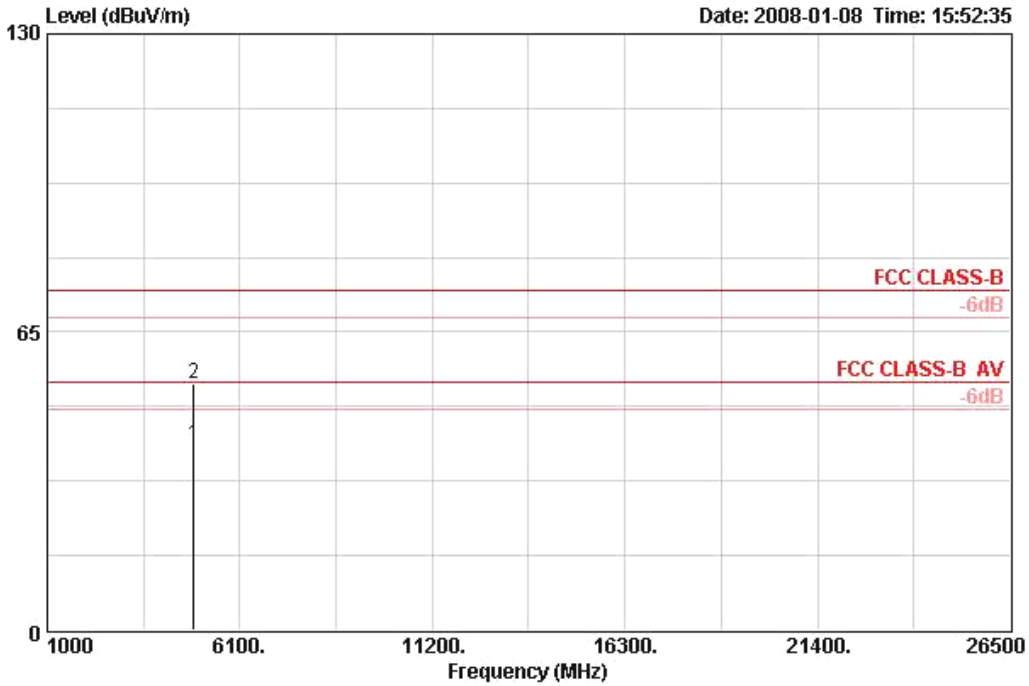
Temperature	24℃	Humidity	56%
Test Engineer	Jax Chen	Configurations	802.11g CH 6

Horizontal



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos	Pol/Phase
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg	
1	4873.760	33.84	-20.16	54.00	29.42	33.16	6.42	35.15	AVERAGE	115	340	HORIZONTAL
2	4874.550	44.00	-30.00	74.00	39.58	33.16	6.42	35.15	PEAK	115	340	HORIZONTAL

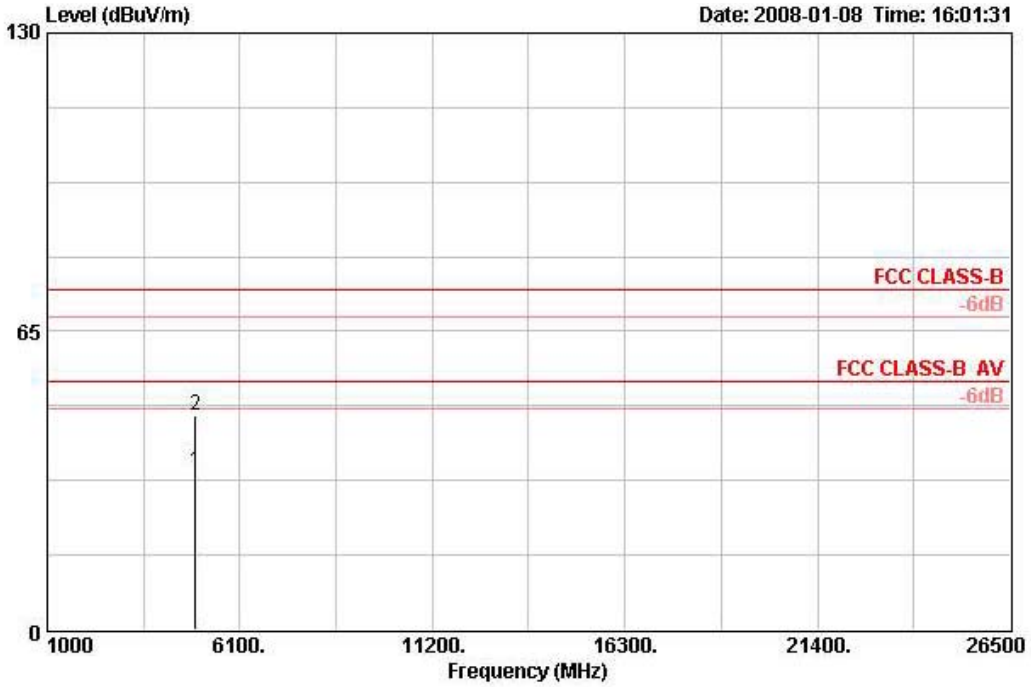
Vertical



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos	Pol/Phase
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg	
1 @	4873.750	40.31	-13.69	54.00	35.89	33.16	6.42	35.15	AVERAGE	100	128	VERTICAL
2	4874.650	53.83	-20.17	74.00	49.41	33.16	6.42	35.15	PEAK	100	128	VERTICAL

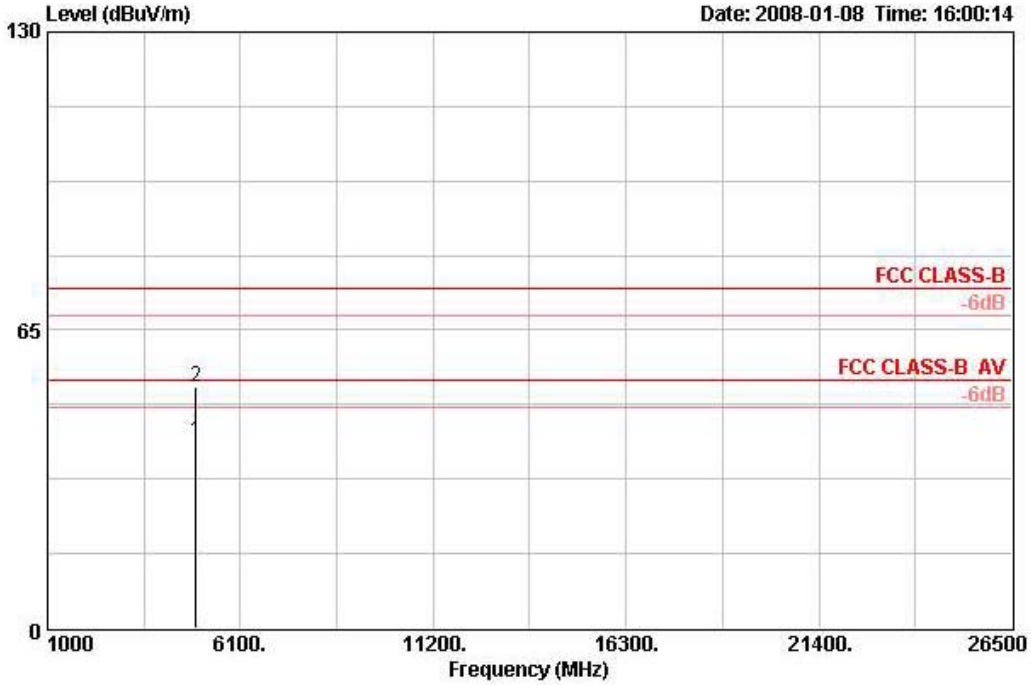
Temperature	24℃	Humidity	56%
Test Engineer	Jax Chen	Configurations	802.11g CH 11

Horizontal



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos	Pol/Phase
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg	
1 @	4926.960	34.56	-19.44	54.00	30.00	33.26	6.44	35.14	AVERAGE	100	359	HORIZONTAL
2	4930.000	46.58	-27.42	74.00	42.02	33.26	6.44	35.14	PEAK	100	359	HORIZONTAL

Vertical



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos	Pol/Phase
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg	
1 @	4924.120	40.76	-13.24	54.00	36.20	33.26	6.44	35.14	AVERAGE	126	83	VERTICAL
2	4924.440	52.49	-21.51	74.00	47.93	33.26	6.44	35.14	PEAK	126	83	VERTICAL

Note:

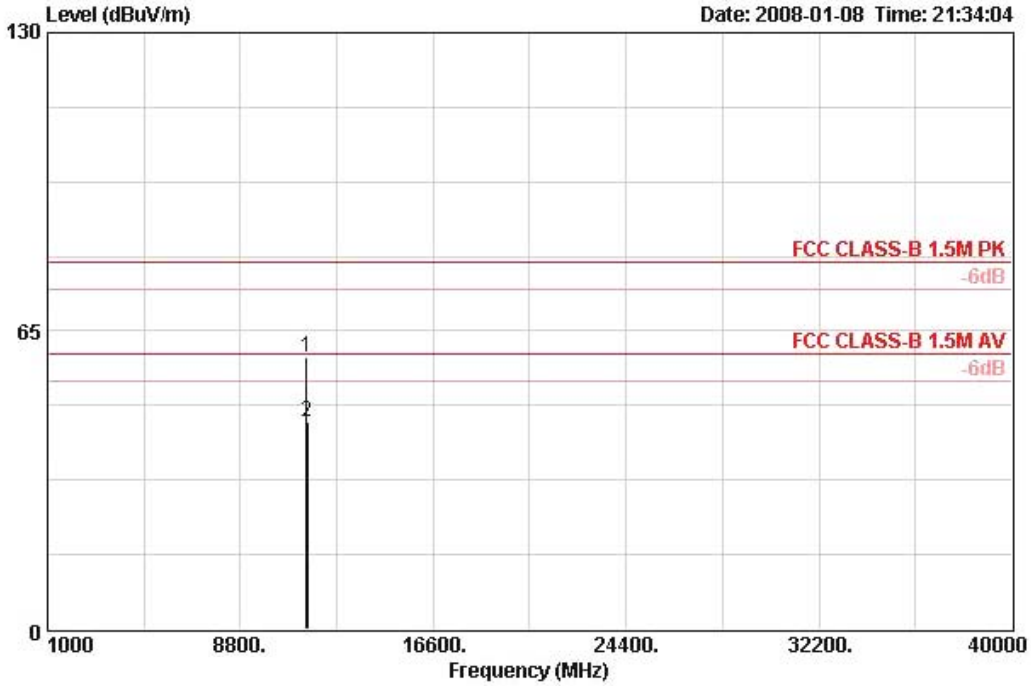
The amplitude of spurious emissions that are attenuated by more than 20dB below the permissible value has no need to be reported.

Emission level (dBuV/m) = 20 log Emission level (uV/m).

Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

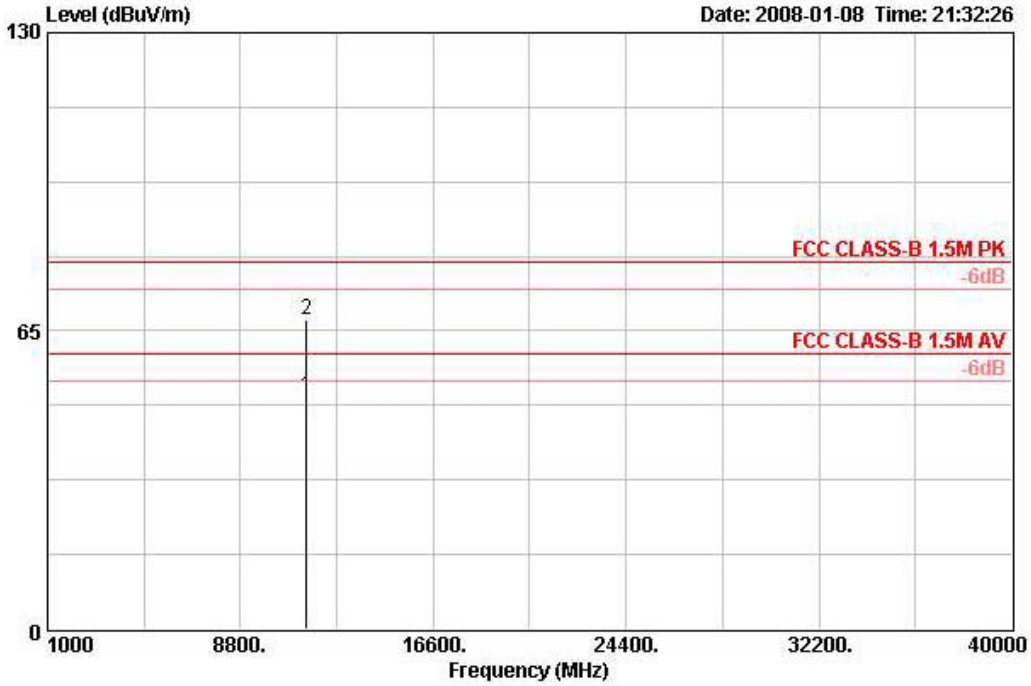
Temperature	24℃	Humidity	56%
Test Engineer	Jax Chen	Configurations	802.11a CH 149

Horizontal



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos	Pol/Phase
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg	
1	11489.160	59.37	-20.63	80.00	45.79	38.78	9.78	34.98	PEAK	126	316	HORIZONTAL
2 @	11490.270	45.30	-14.70	60.00	31.73	38.78	9.78	34.98	AVERAGE	126	316	HORIZONTAL

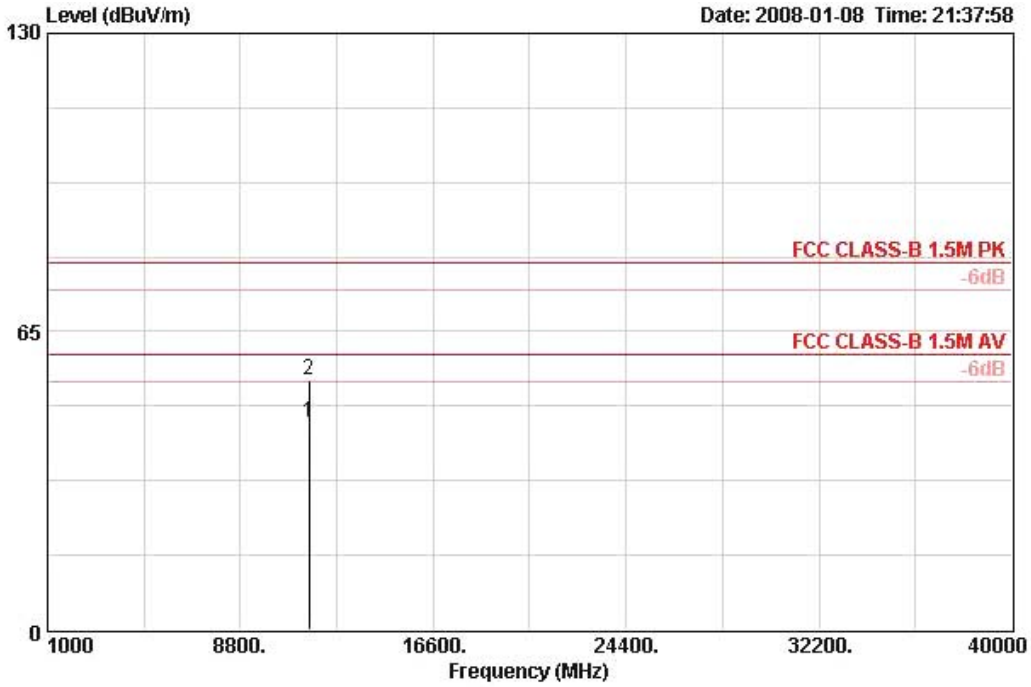
Vertical



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos	Pol/Phase
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg	
1 @	11487.720	50.76	-9.24	60.00	37.18	38.78	9.78	34.98	AVERAGE	116	139	VERTICAL
2 @	11487.720	67.35	-12.65	80.00	53.78	38.78	9.78	34.98	PEAK	116	139	VERTICAL

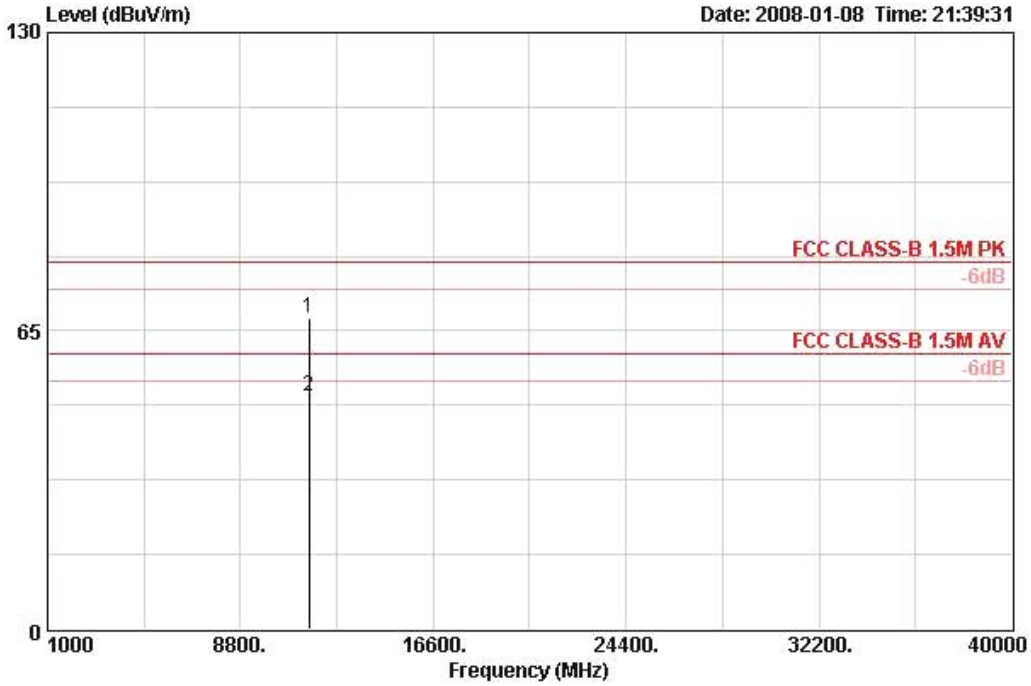
Temperature	24℃	Humidity	56%
Test Engineer	Jax Chen	Configurations	802.11a CH 157

Horizontal



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos	Pol/Phase
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg	
1 @	11570.210	45.30	-14.70	60.00	31.67	38.83	9.80	35.00	AVERAGE	121	118	HORIZONTAL
2	11571.010	54.37	-25.63	80.00	40.74	38.83	9.80	35.00	PEAK	121	118	HORIZONTAL

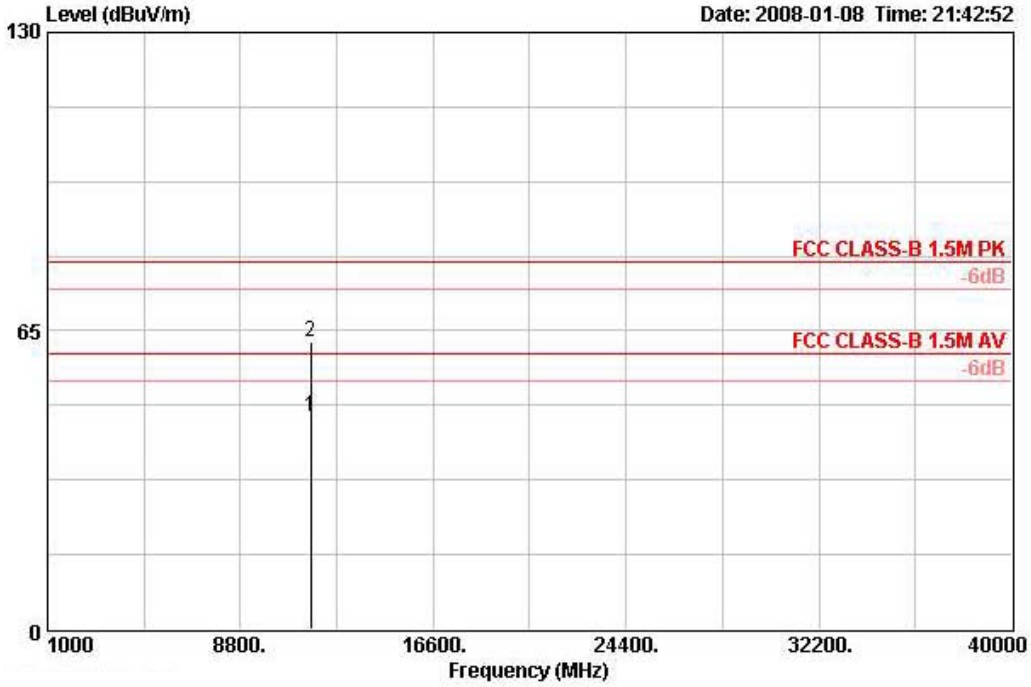
Vertical



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos	Pol/Phase
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg	
1 @	11567.540	67.94	-12.06	80.00	54.32	38.83	9.79	35.00	PEAK	113	133	VERTICAL
2 @	11570.210	50.69	-9.31	60.00	37.07	38.83	9.80	35.00	AVERAGE	113	133	VERTICAL

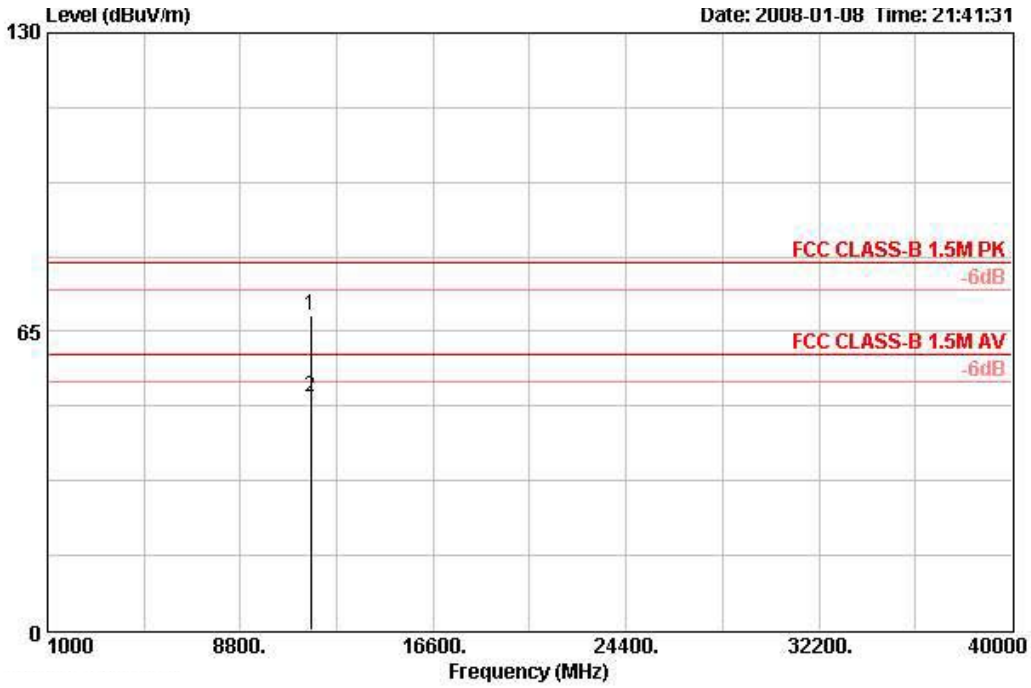
Temperature	24℃	Humidity	56%
Test Engineer	Jax Chen	Configurations	802.11a CH 165

Horizontal



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos	Pol/Phase
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg	
1 @	11650.210	46.42	-13.58	60.00	32.76	38.86	9.82	35.01	AVERAGE	126	135	HORIZONTAL
2 @	11651.020	62.43	-17.57	80.00	48.76	38.86	9.82	35.01	PEAK	126	135	HORIZONTAL

Vertical



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos	Pol/Phase
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg	
1 @	11647.850	68.53	-11.47	80.00	54.86	38.86	9.82	35.01	PEAK	115	117	VERTICAL
2 @	11650.110	50.66	-9.34	60.00	37.00	38.86	9.82	35.01	AVERAGE	115	117	VERTICAL

Note:

The amplitude of spurious emissions that are attenuated by more than 20dB below the permissible value has no need to be reported.

Emission level (dBuV/m) = 20 log Emission level (uV/m).

Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

4.6. Band Edge Emissions Measurement

4.6.1. Limit

20dBc in any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

Frequencies (MHz)	Field Strength (micorvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

4.6.2. Measuring Instruments and Setting

Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	100 MHz
RB / VB (Emission in restricted band)	1MHz / 1MHz for Peak, 1 MHz / 10Hz for Average
RB / VB (Emission in non-restricted band)	100 KHz /100 KHz for Peak

4.6.3. Test Procedures

1. The test procedure is the same as section 4.5.3, only the frequency range investigated is limited to 100MHz around bandedges.
2. In case the emission is fail due to the used RB/VB is too wide, marker-delta method of FCC Public Notice DA00-705 will be followed.

4.6.4. Test Setup Layout

This test setup layout is the same as that shown in section 4.5.4.

4.6.5. Test Deviation

There is no deviation with the original standard.

4.6.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.6.7. Test Result of Band Edge and Fundamental Emissions

Temperature	24℃	Humidity	56%
Test Engineer	Jax Chen	Configurations	802.11b CH 1, 6, 11

Channel 1

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos	Pol/Phase
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg	
1 @	2386.200	50.70	-3.30	54.00	18.39	28.17	4.13	0.00	AVERAGE	100	361	VERTICAL
2 @	2386.200	59.64	-14.36	74.00	27.33	28.17	4.13	0.00	PEAK	100	361	VERTICAL
3 @	2413.200	102.75			70.39	28.21	4.15	0.00	PEAK	100	361	VERTICAL
4 @	2414.800	99.31			66.94	28.21	4.15	0.00	AVERAGE	100	361	VERTICAL

Item 3, 4 are the fundamental frequency at 2412 MHz.

Channel 6

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos	Pol/Phase
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg	
1 @	4873.960	56.25			51.83	33.16	6.42	35.15	PEAK	100	116	VERTICAL
2 @	4873.990	53.39			48.96	33.16	6.42	35.15	AVERAGE	100	116	VERTICAL

Item 1, 2 are the fundamental frequency at 2437 MHz.

Channel 11

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos	Pol/Phase
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg	
1 @	2459.400	102.37			69.84	28.32	4.20	0.00	AVERAGE	120	355	VERTICAL
2 @	2460.600	105.65			73.12	28.32	4.20	0.00	PEAK	120	355	VERTICAL
3 @	2487.700	53.68	-0.32	54.00	21.05	28.40	4.23	0.00	AVERAGE	120	355	VERTICAL
4 @	2487.900	62.31	-11.69	74.00	29.69	28.40	4.23	0.00	PEAK	120	355	VERTICAL

Item 1, 2 are the fundamental frequency at 2462 MHz.

Temperature	24℃	Humidity	56%
Test Engineer	Jax Chen	Configurations	802.11g CH 1, 6, 11

Channel 1

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos	Pol/Phase
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg	
1 @	2390.000	53.07	-0.93	54.00	20.74	28.17	4.15	0.00	AVERAGE	120	4	VERTICAL
2 @	2390.000	71.09	-2.91	74.00	38.77	28.17	4.15	0.00	PEAK	120	4	VERTICAL
3 @	2409.000	109.87			77.50	28.21	4.15	0.00	PEAK	120	4	VERTICAL
4 @	2419.000	100.73			68.34	28.21	4.18	0.00	AVERAGE	120	4	VERTICAL

Item 3, 4 are the fundamental frequency at 2412 MHz.

Channel 6

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos	Pol/Phase
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg	
1 @	2439.800	99.61			67.14	28.29	4.18	0.00	AVERAGE	100	358	VERTICAL
2 @	2440.200	108.94			76.48	28.29	4.18	0.00	PEAK	100	358	VERTICAL

Item 1, 2 are the fundamental frequency at 2437 MHz.

Channel 11

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos	Pol/Phase
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg	
1 @	2469.000	108.48			75.93	28.32	4.23	0.00	PEAK	119	356	VERTICAL
2 @	2469.400	98.98			66.43	28.32	4.23	0.00	AVERAGE	119	356	VERTICAL
3 @	2483.500	53.51	-0.49	54.00	20.93	28.36	4.23	0.00	AVERAGE	119	356	VERTICAL
4 @	2483.500	73.04	-0.96	74.00	40.45	28.36	4.23	0.00	PEAK	119	356	VERTICAL

Item 1, 2 are the fundamental frequency at 2462 MHz.

Temperature	24℃	Humidity	56%
Test Engineer	Jax Chen	Configurations	802.11a CH 149, 157, 165

Channel 149

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos	Pol/Phase
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg	
1 @	5737.800	97.32			56.13	34.35	6.84	0.00	AVERAGE	135	178	VERTICAL
2 @	5737.800	106.37			65.19	34.35	6.84	0.00	PEAK	135	178	VERTICAL

Item 1, 2 are the fundamental frequency at 5745 MHz.

Channel 157

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos	Pol/Phase
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg	
1 @	5788.200	100.08			58.86	34.36	6.86	0.00	PEAK	100	308	VERTICAL
2 @	5789.000	90.95			49.73	34.36	6.86	0.00	AVERAGE	100	308	VERTICAL

Item 1, 2 are the fundamental frequency at 5785 MHz.

Channel 165

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos	Pol/Phase
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg	
1 @	5818.000	89.86			48.62	34.36	6.88	0.00	AVERAGE	100	107	VERTICAL
2 @	5822.000	98.77			57.53	34.37	6.88	0.00	PEAK	100	107	VERTICAL

Item 1, 2 are the fundamental frequency at 5825 MHz.

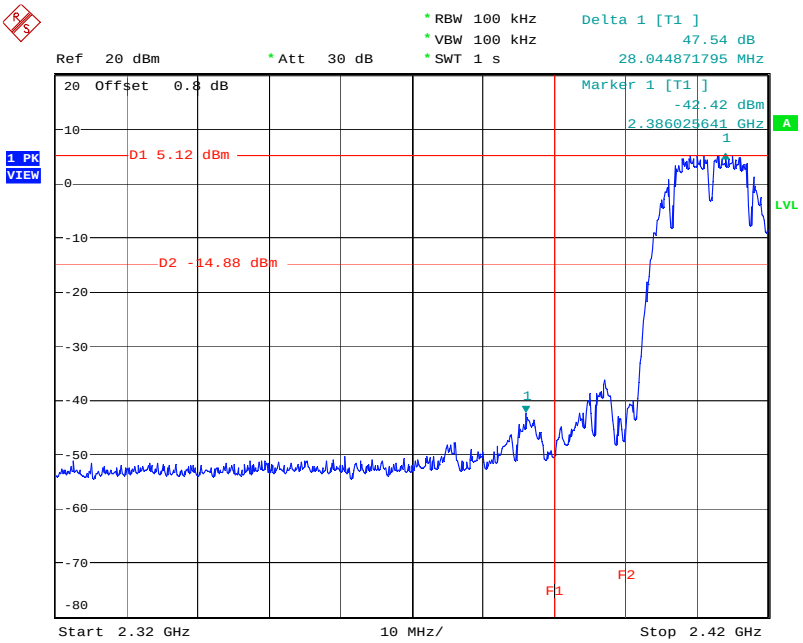
Note:

Emission level (dBuV/m) = 20 log Emission level (uV/m).

Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

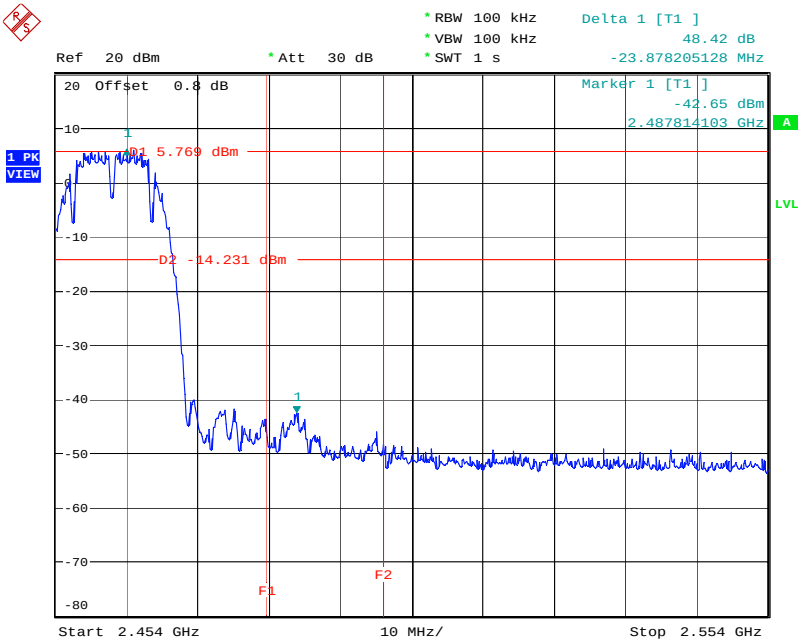
For Emission not in Restricted Band

Low Band Edge Plot on Configuration IEEE 802.11b / 2412 MHz



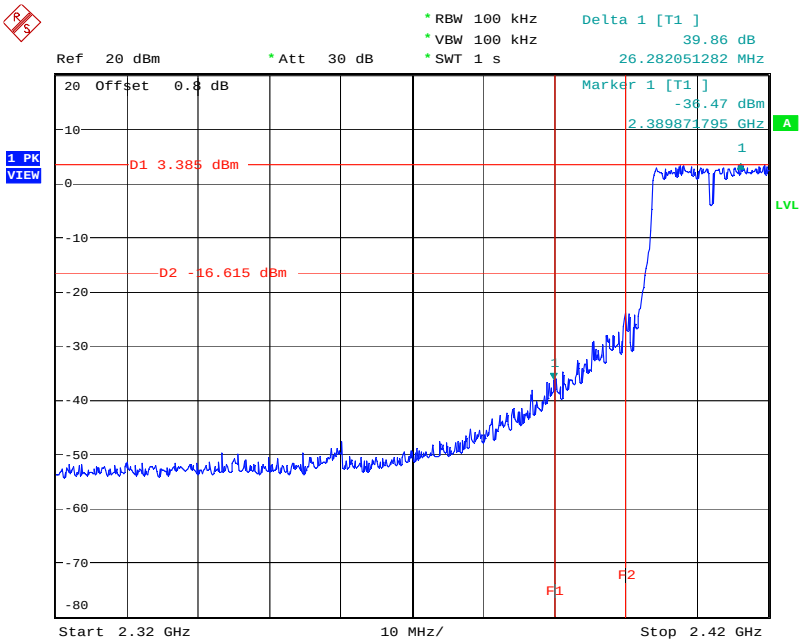
Date: 2.FEB.2008 13:27:46

High Band Edge Plot on Configuration IEEE 802.11b / 2462 MHz



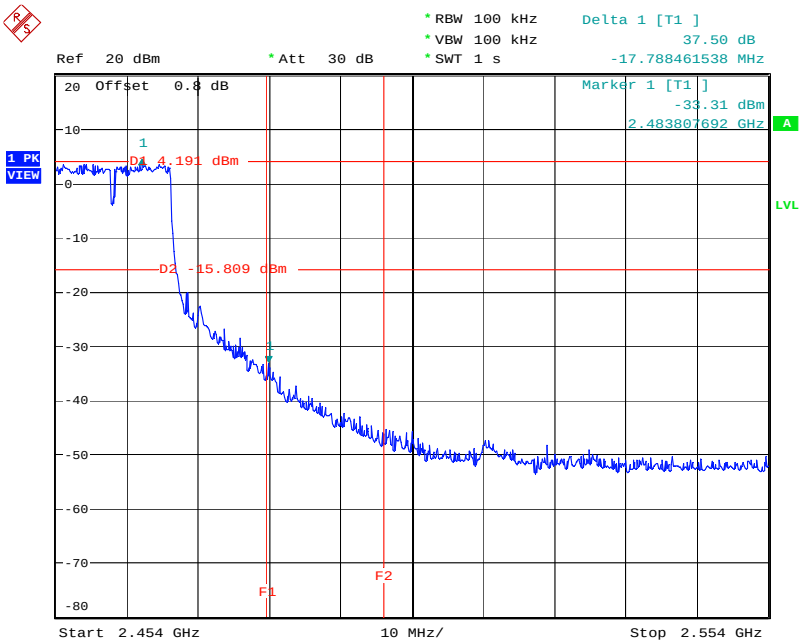
Date: 2.FEB.2008 13:29:23

Low Band Edge Plot on Configuration IEEE 802.11g / 2412 MHz



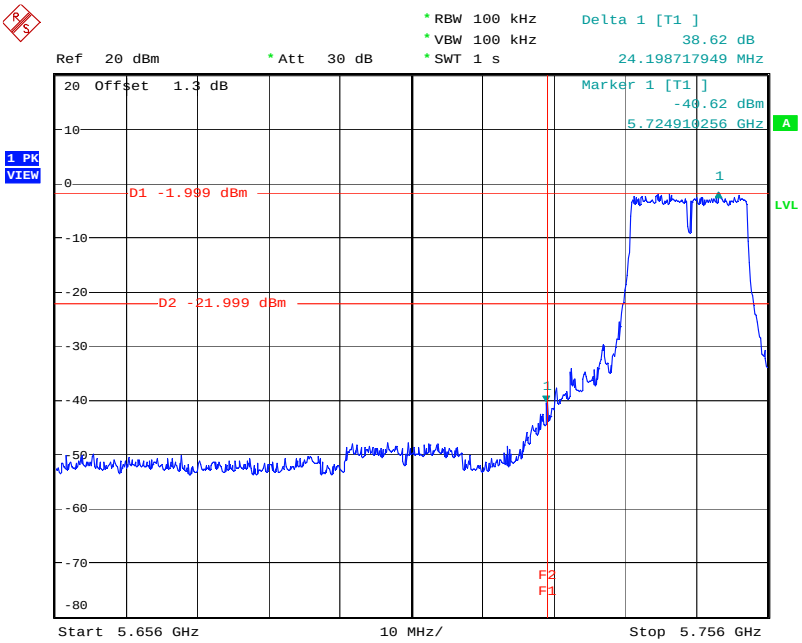
Date: 2.FEB.2008 13:24:39

High Band Edge Plot on Configuration IEEE 802.11g / 2462 MHz



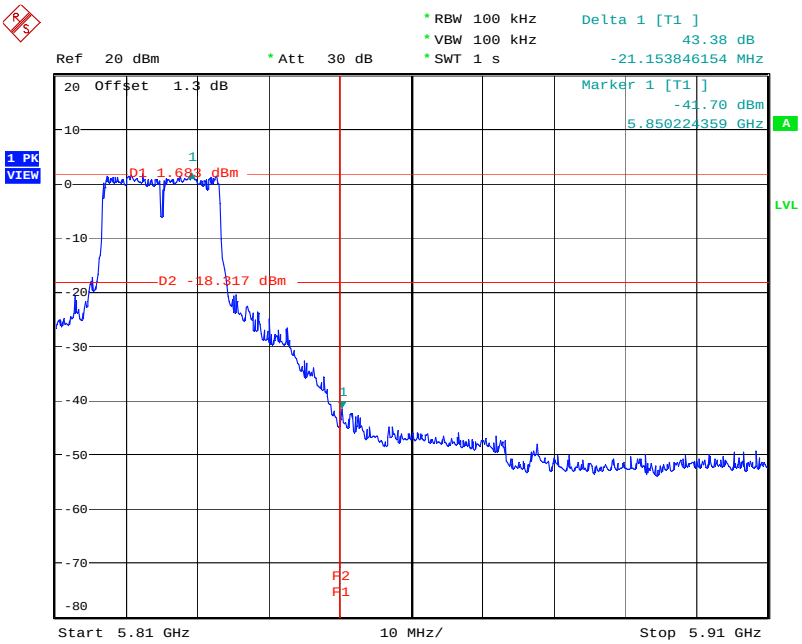
Date: 2.FEB.2008 13:26:30

Low Band Edge Plot on Configuration IEEE 802.11a / 5745 MHz



Date: 2.FEB.2008 12:49:17

High Band Edge Plot on Configuration IEEE 802.11a / 5825 MHz



Date: 2.FEB.2008 13:02:20

4.7. Antenna Requirements

4.7.1. Limit

Except for special regulations, the Low-power Radio-frequency Devices must not be equipped with any jacket for installing an antenna with extension cable. An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that the user can replace a broken antenna, but the use of a standard antenna jack or electrical connector is prohibited. Further, this requirement does not apply to intentional radiators that must be professionally installed.

4.7.2. Antenna Connector Construction

Please refer to section 3.3 in this test report; antenna connector complied with the requirements.

5. LIST OF MEASURING EQUIPMENTS

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
EMC Receiver	R&S	ESCS 30	100174	9kHz – 2.75GHz	Mar. 03, 2007	Conduction (CO04-HY)
LISN	MessTec	NNB-2/16Z	99079	9kHz – 30MHz	Mar. 31, 2007	Conduction (CO04-HY)
LISN (Support Unit)	EMCO	3810/2NM	9703-1839	9kHz – 30MHz	Mar. 22, 2007	Conduction (CO04-HY)
RF Cable-CON	UTIFLEX	3102-26886-4	CB049	9kHz – 30MHz	Apr. 20, 2007	Conduction (CO04-HY)
ISN	SCHAFFNER	ISN T400	21653	9kHz –30MHz	Mar. 27, 2007	Conduction (CO04-HY)
EMI Filter	LINDGREN	LRE-2030	2651	< 450 Hz	N/A	Conduction (CO04-HY)
3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH03-HY	30 MHz - 1 GHz 3m	Jun. 14, 2007	Radiation (03CH03-HY)
Amplifier	SCHAFFNER	COA9231A	18667	9 kHz - 2 GHz	Jan. 14, 2008	Radiation (03CH03-HY)
Amplifier	Agilent	8449B	3008A02120	1 GHz - 26.5 GHz	Jun. 07, 2007	Radiation (03CH03-HY)
Amplifier	MITEQ	AMF-6F-260400	9121372	26.5 GHz - 40 GHz	Jan. 22, 2007*	Radiation (03CH03-HY)
Spectrum Analyzer	R&S	FSP40	100305	9 kHz - 40 GHz	Sep. 27, 2007	Radiation (03CH03-HY)
Loop Antenna	R&S	HFH2-Z2	860004/001	9 kHz - 30 MHz	May 23, 2006*	Radiation (03CH03-HY)
Bilog Antenna	SCHAFFNER	CBL 6112D	22237	30 MHz – 1 GHz	Jul. 21, 2007	Radiation (03CH03-HY)
Horn Antenna	EMCO	3115	6741	1GHz ~ 18GHz	May 04, 2007	Radiation (03CH03-HY)
Horn Antenna	SCHWARZBECK	BBHA9170	BBHA9170154	15 GHz - 40 GHz	Jan. 18, 2008	Radiation (03CH03-HY)
RF Cable-R03m	Jye Bao	RG142	CB021	30 MHz - 1 GHz	Dec. 03, 2007	Radiation (03CH03-HY)
RF Cable-HIGH	SUHNER	SUCOFLEX 106	03CH03-HY	1 GHz - 40 GHz	Dec. 03, 2007	Radiation (03CH03-HY)
Turn Table	HD	DS 420	420/650/00	0 – 360 degree	N/A	Radiation (03CH03-HY)
Antenna Mast	HD	MA 240	240/560/00	1 m - 4 m	N/A	Radiation (03CH03-HY)
Spectrum Analyzer	R&S	FSP30	100023	9kHz ~ 30GHz	Jan. 10, 2008	Conducted (TH01-HY)
Power Meter	R&S	NRVS	100444	DC ~ 40GHz	Jun. 27, 2007	Conducted (TH01-HY)
Power Sensor	R&S	NRV-Z51	100458	DC ~ 30GHz	Jun. 27, 2007	Conducted (TH01-HY)
Power Sensor	R&S	NRV-Z32	100057	30MHz ~ 6GHz	Jun. 27, 2007	Conducted (TH01-HY)
AC Power Source	HPC	HPA-500W	HPA-9100024	AC 0 ~ 300V	May 04, 2007*	Conducted (TH01-HY)
DC Power Source	G.W.	GPC-6030D	C671845	DC 1V ~ 60V	Mar. 03, 2007	Conducted (TH01-HY)
Temp. and Humidity Chamber	KSON	THS-C3L	612	N/A	Jan. 14, 2008	Conducted (TH01-HY)
RF CABLE-1m	Jye Bao	RG142	CB034-1m	20MHz ~ 7GHz	Jan. 04, 2008	Conducted (TH01-HY)
RF CABLE-2m	Jye Bao	RG142	CB035-2m	20MHz ~ 1GHz	Jan. 04, 2008	Conducted (TH01-HY)
Vector Signal Generator	R&S	SMU200A	102098	100kHz ~ 6GHz	Nov. 14, 2007	Conducted (TH01-HY)
Signal Generator	R&S	SMR40	100116	10MHz ~ 40GHz	Mar. 07, 2007	Conducted (TH01-HY)

Note: Calibration Interval of instruments listed above is one year.

Note: Calibration Interval of instruments listed above is two year.

6. TEST LOCATION

SHIJR	ADD	:	6Fl., No. 106, Sec. 1, Shintai 5th Rd., Shijr City, Taipei, Taiwan 221, R.O.C.
	TEL	:	886-2-2696-2468
	FAX	:	886-2-2696-2255
HWA YA	ADD	:	No. 52, Hwa Ya 1st Rd., Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.
	TEL	:	886-3-327-3456
	FAX	:	886-3-318-0055
LINKOU	ADD	:	No. 30-2, Dingfu Tsuen, Linkou Shiang, Taipei, Taiwan 244, R.O.C
	TEL	:	886-2-2601-1640
	FAX	:	886-2-2601-1695
DUNGHU	ADD	:	No. 3, Lane 238, Kangle St., Neihu Chiu, Taipei, Taiwan 114, R.O.C.
	TEL	:	886-2-2631-4739
	FAX	:	886-2-2631-9740
JUNGHE	ADD	:	7Fl., No. 758, Jungjeng Rd., Junghe City, Taipei, Taiwan 235, R.O.C.
	TEL	:	886-2-8227-2020
	FAX	:	886-2-8227-2626
NEIHU	ADD	:	4Fl., No. 339, Hsin Hu 2nd Rd., Taipei 114, Taiwan, R.O.C.
	TEL	:	886-2-2794-8886
	FAX	:	886-2-2794-9777
JHUBEI	ADD	:	No.8, Lane 728, Bo-ai St., Jhubei City, HsinChu County 302, Taiwan, R.O.C.
	TEL	:	886-3-656-9065
	FAX	:	886-3-656-9085

7. TAF CERTIFICATE OF ACCREDITATION

Certificate No. : L1190-070110

財團法人全國認證基金會
Taiwan Accreditation Foundation

Certificate of Accreditation

This is to certify that

Sporton International Inc.
EMC & Wireless Communications Laboratory
No.52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.

is accredited in respect of laboratory

Accreditation Criteria	:	ISO/IEC 17025:2005
Accreditation Number	:	1190
Originally Accredited	:	December 15, 2003
Effective Period	:	January 10, 2007 to January 09, 2010
Accredited Scope	:	Testing Field, see described in the Appendix
Specific Accreditation Program	:	Accreditation Program for Designated Testing Laboratory for Commodities Inspection Accreditation Program for Telecommunication Equipment Testing Laboratory

Jay-San Chen
President, Taiwan Accreditation Foundation
Date : January 10, 2007

P1, total 9 pages

The Appendix forms an integral part of this Certificate, which shall be invalid when used without the Appendix.