



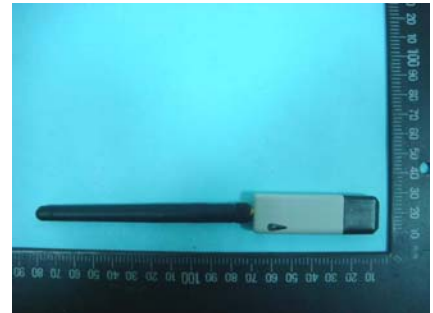
# SPORTON International Inc.

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## FCC RADIO TEST REPORT

Applicant's company	AboCom Systems, Inc
Applicant Address	No.77, Yu-Yih Rd., Chu-Nan, Miao-Lih County 35059, Taiwan R.O.C.
FCC ID	MQ4WU5214
Manufacturer's company	AboCom Systems, Inc
Manufacturer Address	No.77, Yu-Yih Rd., Chu-Nan, Miao-Lih County 35059, Taiwan R.O.C.

Product Name	802.11 b/g/n Mini Wireless LAN USB 2.0 Adapter
Brand Name	AboCom
Model Name	WU5214
Test Rule	47 CFR FCC Part 15 Subpart C § 15.247
Test Freq. Range	2400 ~ 2483.5MHz
Received Date	Jun. 06, 2008
Final Test Date	Nov. 11, 2008
Submission Type	Original Equipment



### Statement

**Test result included in this report is for the Draft n and 802.11b/g part 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.



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### History of This Test Report

Original Issue Date: Nov. 12, 2008

Report No.: FR860629-03

- No additional attachment.
- Additional attachment were issued as following record:

Attachment No.	Issue Date	Description



## 1. CERTIFICATE OF COMPLIANCE

Product Name : 802.11 b/g/n Mini Wireless LAN USB 2.0 Adapter  
Brand Name : AboCom  
Model Name : WU5214  
Applicant : AboCom Systems, Inc  
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 Jun. 06, 2008 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.

A handwritten signature in blue ink, appearing to read 'Wayne Hsu 11/12/08', is written over a horizontal line.

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	7.90 dB
4.2	15.247(b)(3)	Maximum Conducted Output Power	Complies	11.20 dB
4.3	15.247(e)	Power Spectral Density	Complies	19.68 dB
4.4	15.247(a)(2)	6dB Spectrum Bandwidth	Complies	-
4.5	15.247(d)	Radiated Emissions	Complies	0.24 dB
4.6	15.247(d)	Band Edge Emissions	Complies	0.19 dB
4.7	15.203	Antenna Requirements	Complies	-

Test Items	Uncertainty	Remark
AC Power Line Conducted Emissions	±2.3dB	Confidence levels of 95%
Maximum Conducted Output Power	±0.8dB	Confidence levels of 95%
Power Spectral Density	±0.5dB	Confidence levels of 95%
6dB Spectrum Bandwidth	±8.5×10 <sup>-8</sup>	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°C	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

##### Draft n

Items	Description
Product Type	WLAN (1TX, 1RX)
Radio Type	Intentional Transceiver
Power Type	From Host System
Modulation	see the below table for draft n
Data Modulation	OFDM (BPSK / QPSK / 16QAM / 64QAM)
Data Rate (Mbps)	see the below table for Draft n
Frequency Range	2400 ~ 2483.5MHz
Channel Number	11 for 20MHz bandwidth ; 7 for 40MHz bandwidth
Channel Band Width (99%)	MCS0 (20MHz) : 17.36 MHz ; MCS0 (40MHz) : 35.52 MHz
Conducted Output Power	MCS0 (20MHz) : 18.75 dBm ; MCS0 (40MHz) : 16.58 dBm
Carrier Frequencies	Please refer to section 3.4
Antenna	Please refer to section 3.3

##### 802.11b/g

Items	Description
Product Type	WLAN (1TX, 1RX)
Radio Type	Intentional Transceiver
Power Type	From Host System
Modulation	DSSS for IEEE 802.11b ; OFDM for IEEE 802.11g
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
Channel Number	11
Channel Band Width (99%)	11b: 14.64 MHz ; 11g: 16.36 MHz
Conducted Output Power	11b: 17.52 dBm ; 11g: 18.80 dBm
Carrier Frequencies	Please refer to section 3.4
Antenna	Please refer to section 3.3

**Antenna & Band width**

Antenna	Single (TX)	
Band width Mode	20 MHz	40 MHz
802.11b	V	X
802.11g	V	X
Draft n	V	V

**Draft n spec**

MCS Index	Nss	Modulation	R	NBPS	NCBPS		NDBPS		Datarate(Mbps)			
									800nsGI		400nsGI	
					20MHz	40MHz	20MHz	40MHz	20MHz	40MHz	20MHz	40MHz
0	1	BPSK	1/2	1	52	108	26	54	6.5	13.5	7.200	15
1	1	QPSK	1/2	2	104	216	52	108	13.0	27.0	14.400	30
2	1	QPSK	3/4	2	104	216	78	162	19.5	40.5	21.700	45
3	1	16-QAM	1/2	4	208	432	104	216	26.0	54.0	28.900	60
4	1	16-QAM	3/4	4	208	432	156	324	39.0	81.0	43.300	90
5	1	64-QAM	2/3	6	312	648	208	432	52.0	108.0	57.800	120
6	1	64-QAM	3/4	6	312	648	234	486	58.5	121.5	65.000	135
7	1	64-QAM	5/6	6	312	648	260	540	65.0	135.0	72.200	150

Symbol	Explanation
NSS	Number of spatial streams
R	Code rate
NBPS	Number of coded bits per single carrier
NCBPS	Number of coded bits per symbol
NDBPS	Number of data bits per symbol
GI	guard interval

**3.2. Accessories**

N/A

**3.3. Table for Filed Antenna**

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	CORTEC	R-AN2400-5701RS	Dipole Antenna	Reversed-SMA	2

### 3.4. Table for Carrier Frequencies

There are two bandwidth systems for draft n.

For both 20MHz bandwidth systems, use Channel 1~Channel 11.

For both 40MHz bandwidth systems, use Channel 3~Channel 9.

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		

### 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	-	-	-
Maximum Peak Conducted Output Power	MCS0/20MHz	6.5 Mbps	1/6/11	1
	MCS0/40MHz	13.5 Mbps	3/6/9	1
	11b/BPSK	1 Mbps	1/6/11	1
	11g/BPSK	6 Mbps	1/6/11	1
Power Spectral Density 6dB Spectrum Bandwidth	MCS0/20MHz	6.5 Mbps	1/6/11	1
	MCS0/40MHz	13.5 Mbps	3/6/9	1
	11b/BPSK	1 Mbps	1/6/11	1
	11g/BPSK	6 Mbps	1/6/11	1
Radiated Emissions 9kHz~1GHz	Normal Link	-	-	-
Radiated Emissions 1GHz~10 <sup>th</sup> Harmonic	MCS0/20MHz	6.5 Mbps	1/6/11	1
	MCS0/40MHz	13.5 Mbps	3/6/9	1
	11b/BPSK	1 Mbps	1/6/11	1
	11g/BPSK	6 Mbps	1/6/11	1
Band Edge Emissions	MCS0/20MHz	6.5 Mbps	1/11	1
	MCS0/40MHz	13.5 Mbps	3/9	1
	11b/BPSK	1 Mbps	1/11	1
	11g/BPSK	6 Mbps	1/11	1



### 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	101377	IC 4088	-
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
Mouse	HP	M-UAE96	DoC
Notebook	DELL	M1330	E2KWM3945ABG
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 Draft n

Test Software Version	RALINK QA		
Frequency	2412 MHz	2437 MHz	2462 MHz
MCS0 20MHz	17	1A	1A
Frequency	2422 MHz	2437 MHz	2452 MHz
MCS0 40MHz	16	18	18

#### Power Parameters of IEEE 802.11b/g

Test Software Version	RALINK QA		
Frequency	2422 MHz	2437 MHz	2452 MHz
802.11b	11	12	12
802.11g	17	19	16

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 :

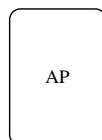
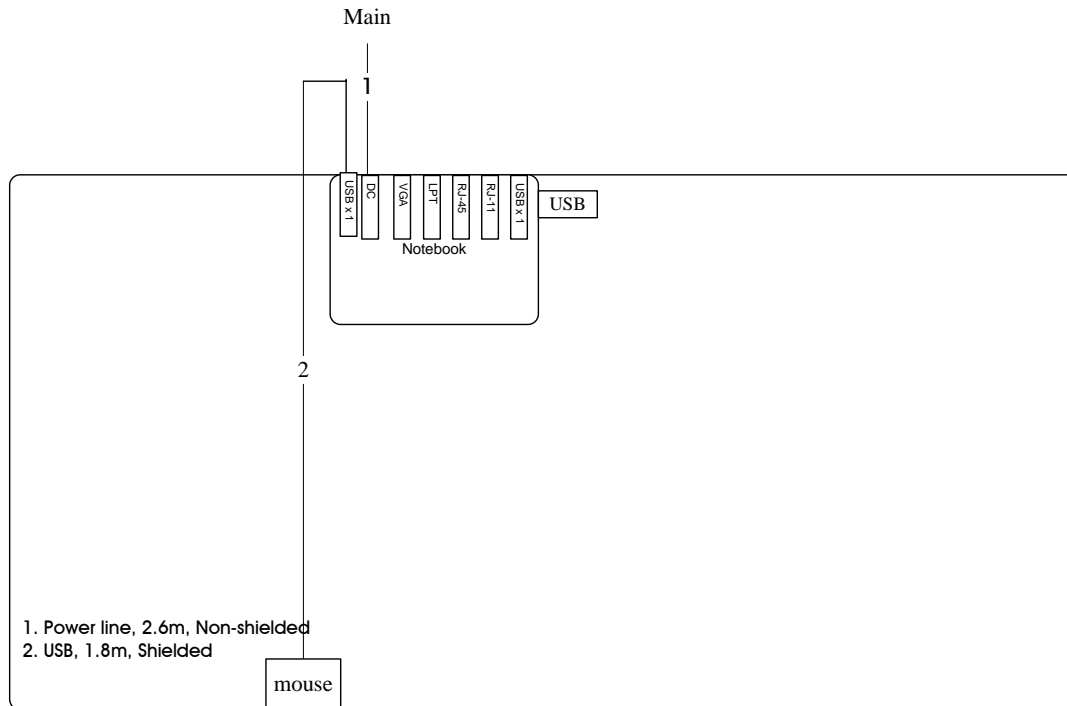
- a. Turn on the power of all equipment.
- b. The NB sends " H " messages to the monitor, and the monitor displays " H " patterns on the screen.
- c. Repeat the steps from b.

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

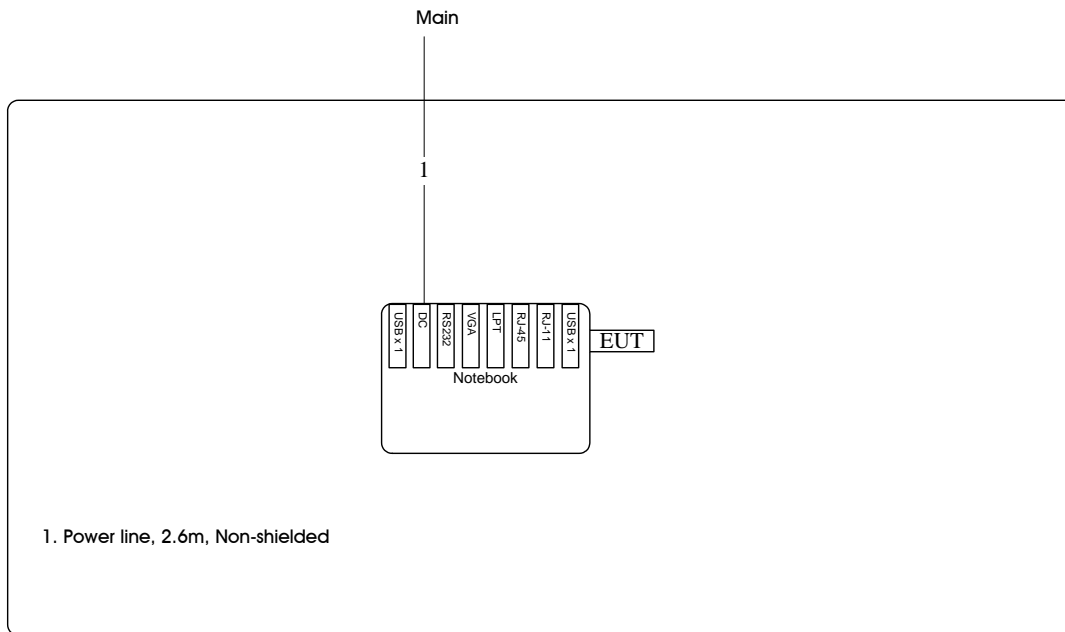
### 3.9. Test Configurations

#### 3.9.1. Radiation Emissions Test Configuration

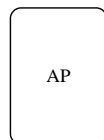
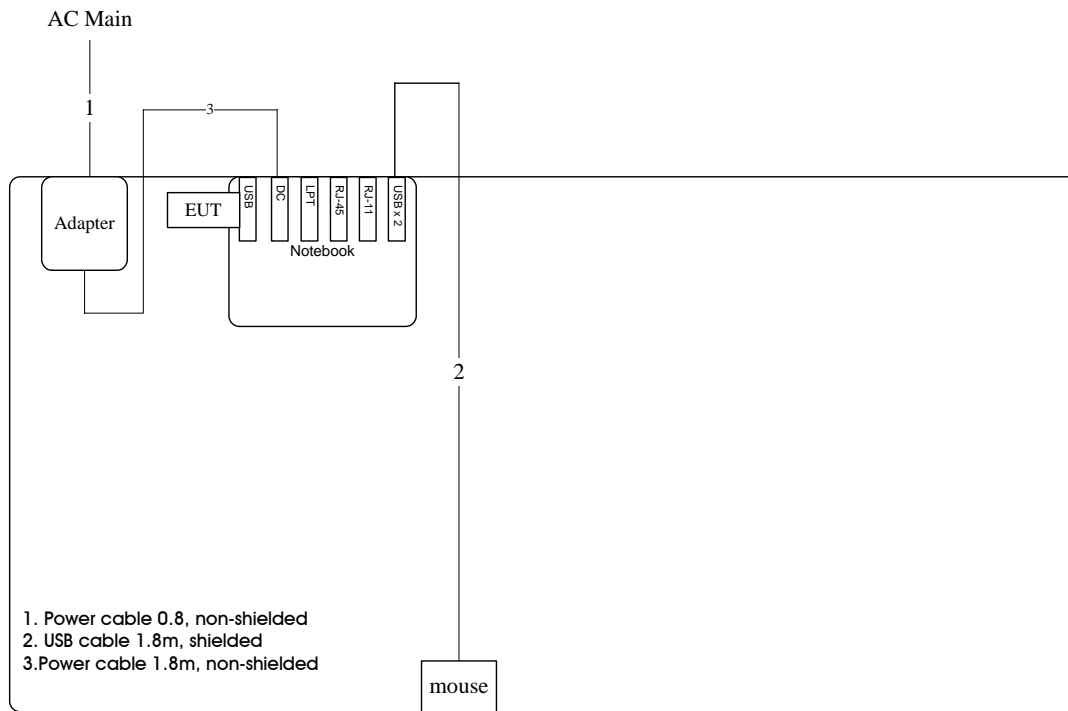
Test Configuration: 30MHz~1GHz



Test Configuration: above 1GHz



### 3.9.2. AC Power Line Conduction Emissions Test Configuration



## 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

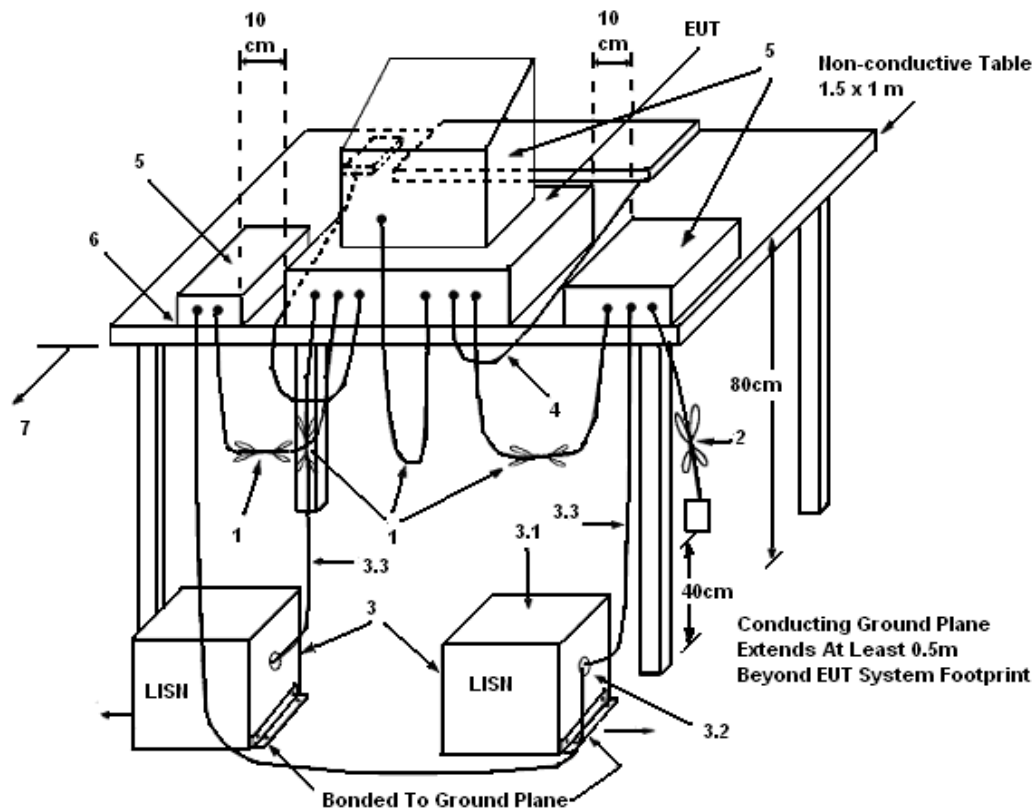
Please refer to section 5 of equipments list in this report. The following table is the setting of the receiver.

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

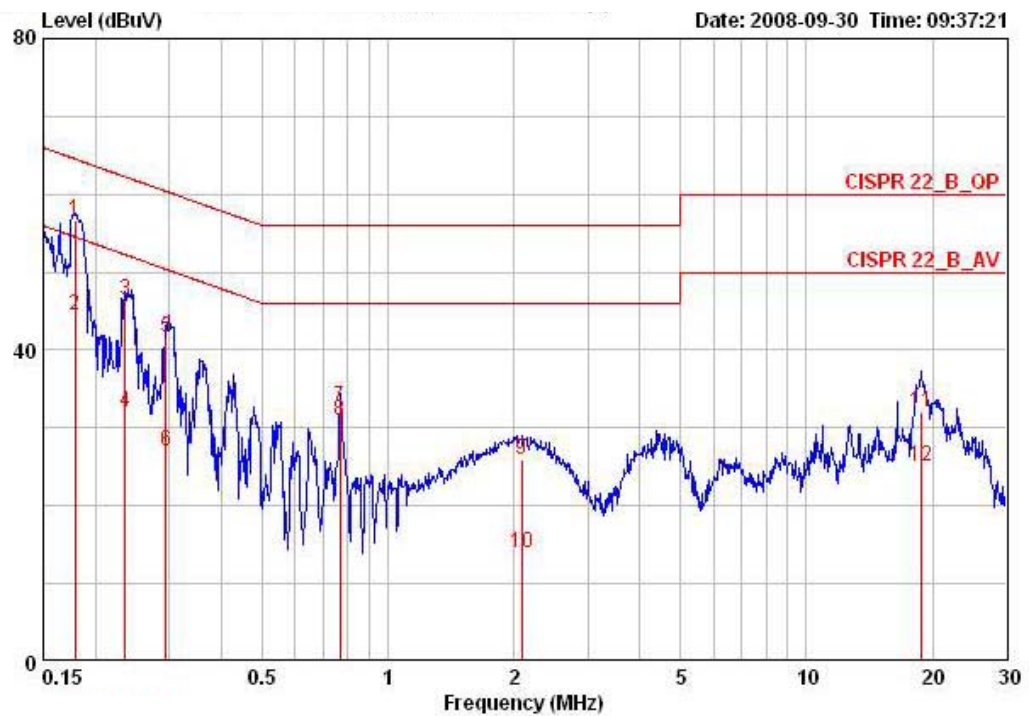
There is no deviation with the original standard.

#### 4.1.6. EUT Operation during Test

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

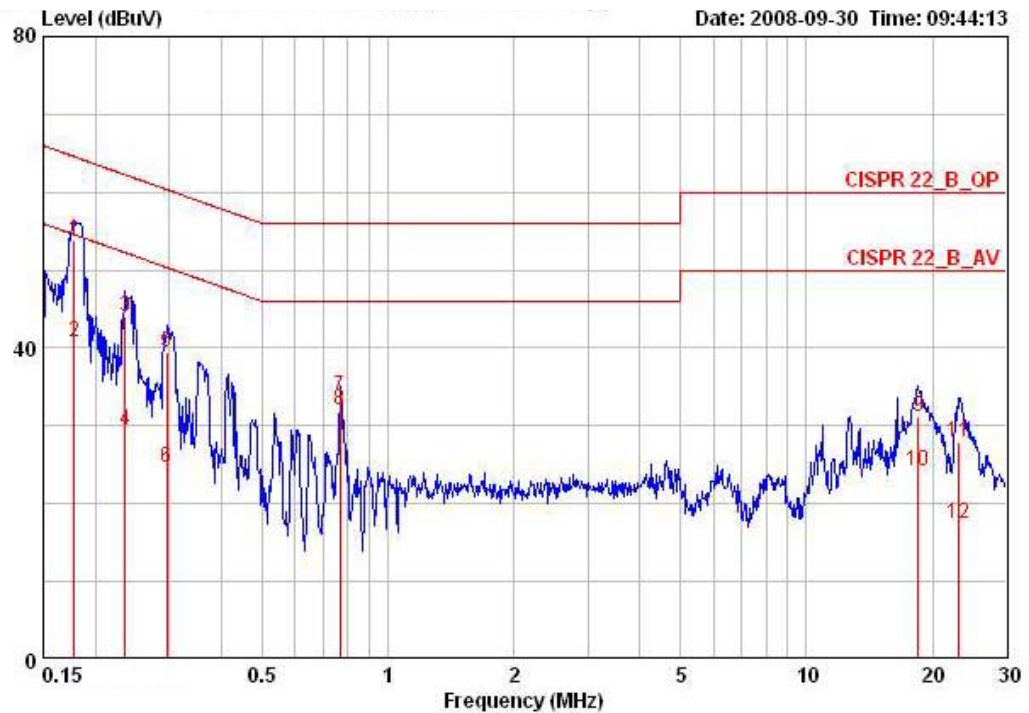
#### 4.1.7. Results of AC Power Line Conducted Emissions Measurement

Temperature	24.3°C	Humidity	56%
Test Engineer	Aric Li	Phase	Line
Configuration	Normal Link		



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.17866	56.65	-7.90	64.55	56.39	0.06	0.20	QP
2	0.17866	44.50	-10.05	54.55	44.24	0.06	0.20	AVERAGE
3	0.23533	46.42	-15.84	62.26	46.17	0.05	0.20	QP
4	0.23533	32.06	-20.20	52.26	31.81	0.05	0.20	AVERAGE
5	0.29398	41.62	-18.79	60.41	41.38	0.04	0.20	QP
6	0.29398	27.08	-23.33	50.41	26.84	0.04	0.20	AVERAGE
7	0.76702	32.79	-23.21	56.00	32.56	0.03	0.20	QP
8	0.76702	30.94	-15.06	46.00	30.71	0.03	0.20	AVERAGE
9	2.088	26.03	-29.97	56.00	25.78	0.05	0.20	QP
10	2.088	13.85	-32.15	46.00	13.60	0.05	0.20	AVERAGE
11	18.721	32.05	-27.95	60.00	30.79	0.76	0.50	QP
12	18.721	25.09	-24.91	50.00	23.83	0.76	0.50	AVERAGE

Temperature	24.3°C	Humidity	56%
Test Engineer	Aric Li	Phase	Neutral
Configuration	Normal Link		



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.17772	53.90	-10.69	64.59	53.61	0.09	0.20	QP
2	0.17772	40.74	-13.85	54.59	40.45	0.09	0.20	AVERAGE
3	0.23533	43.94	-18.32	62.26	43.66	0.08	0.20	QP
4	0.23533	29.43	-22.83	52.26	29.15	0.08	0.20	AVERAGE
5	0.29555	39.45	-20.91	60.37	39.18	0.07	0.20	QP
6	0.29555	24.56	-25.80	50.37	24.29	0.07	0.20	AVERAGE
7	0.76702	33.80	-22.20	56.00	33.53	0.07	0.20	QP
8	0.76702	32.00	-14.00	46.00	31.73	0.07	0.20	AVERAGE
9	18.524	31.13	-28.87	60.00	29.89	0.74	0.50	QP
10	18.524	24.13	-25.87	50.00	22.89	0.74	0.50	AVERAGE
11	23.018	27.96	-32.04	60.00	26.42	1.04	0.50	QP
12	23.018	17.40	-32.60	50.00	15.86	1.04	0.50	AVERAGE

Note:

Level = Read Level + LISN Factor + Cable Loss.



## 4.2. Maximum Conducted 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.

### 4.2.2. Measuring Instruments and Setting

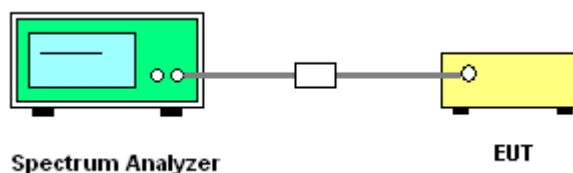
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	Encompass the entire emissions bandwidth (EBW) of the signal
RB	1000 kHz
VB	3000 kHz
Detector	RMS
Trace	Max Hold
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 Measurement of Digital Transmission Systems Operating under Section 15.247 March 23, 2005.
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 Conducted Output Power

<b>Temperature</b>	24°C	<b>Humidity</b>	53%
<b>Test Engineer</b>	Jacky Ho	<b>Configurations</b>	Draft n

##### Configuration Draft n MCS0 20MHz Ant. 1

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
1	2412 MHz	17.34	30.00	Complies
6	2437 MHz	18.75	30.00	Complies
11	2462 MHz	17.19	30.00	Complies

##### Configuration Draft n MCS0 40MHz Ant. 1

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
3	2422 MHz	16.05	30.00	Complies
6	2437 MHz	16.58	30.00	Complies
9	2452 MHz	15.81	30.00	Complies

<b>Temperature</b>	24°C	<b>Humidity</b>	53%
<b>Test Engineer</b>	Jacky Ho	<b>Configurations</b>	802.11b/g

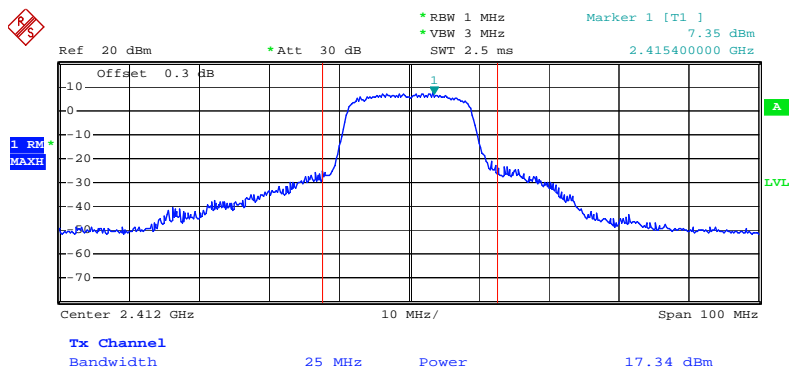
##### Configuration IEEE 802.11b Ant. 1

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
1	2412 MHz	17.07	30.00	Complies
6	2437 MHz	17.52	30.00	Complies
11	2462 MHz	16.41	30.00	Complies

##### Configuration IEEE 802.11g Ant. 1

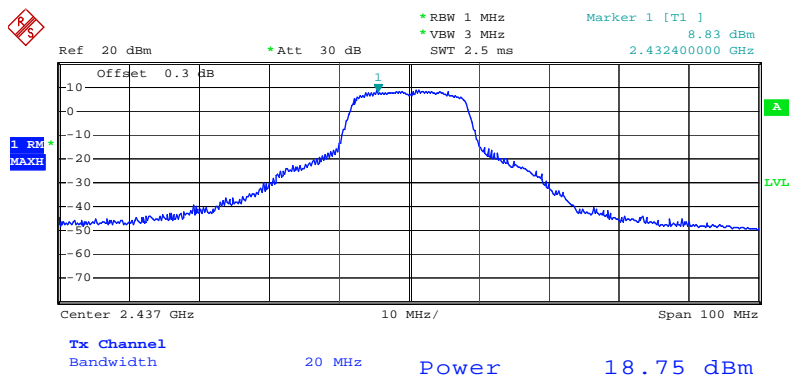
Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
1	2412 MHz	16.94	30.00	Complies
6	2437 MHz	18.80	30.00	Complies
11	2462 MHz	15.04	30.00	Complies

### Conducted Output Power Plot on Configuration Draft n MCS0 20MHz Ant. 1 / 2412 MHz



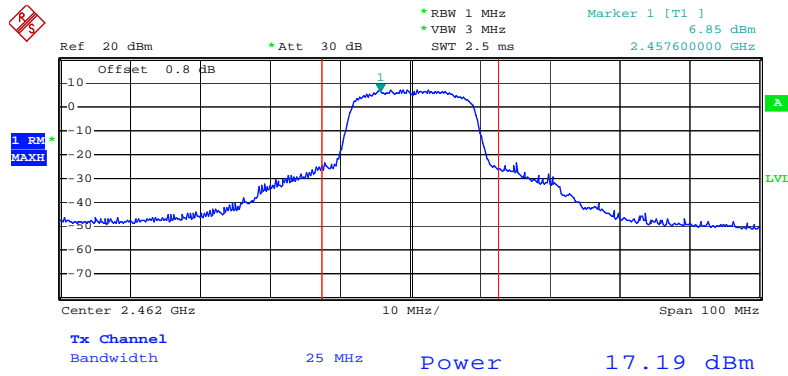
Date: 25.SEP.2008 17:02:23

### Conducted Output Power Plot on Configuration Draft n MCS0 20MHz Ant. 1 / 2437 MHz



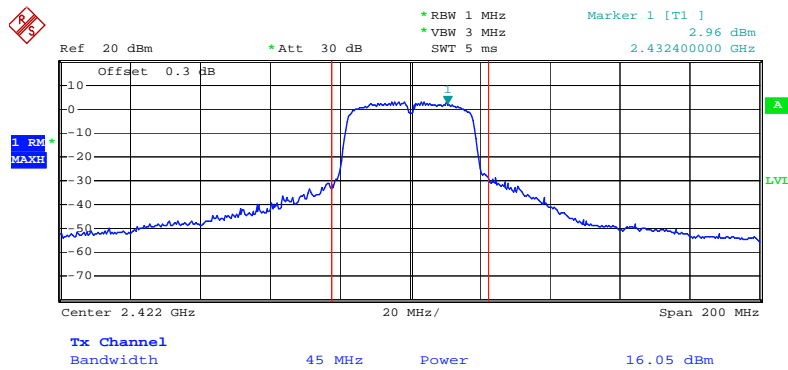
Date: 26.SEP.2008 23:13:54

Conducted Output Power Plot on Configuration Draft n MCS0 20MHz Ant. 1 / 2462 MHz



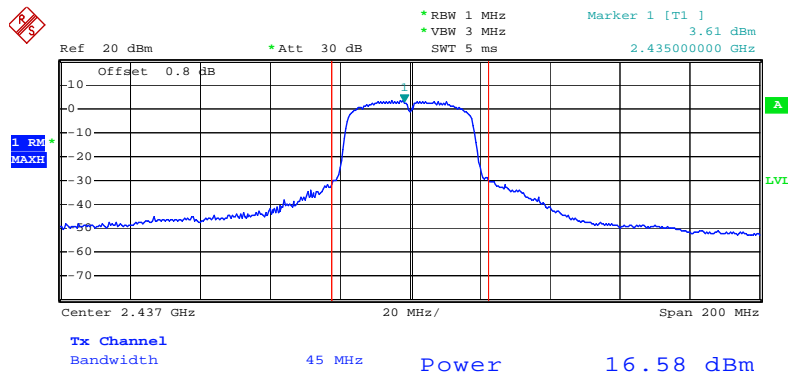
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Conducted Output Power Plot on Configuration Draft n MCS0 40MHz Ant. 1 / 2422 MHz



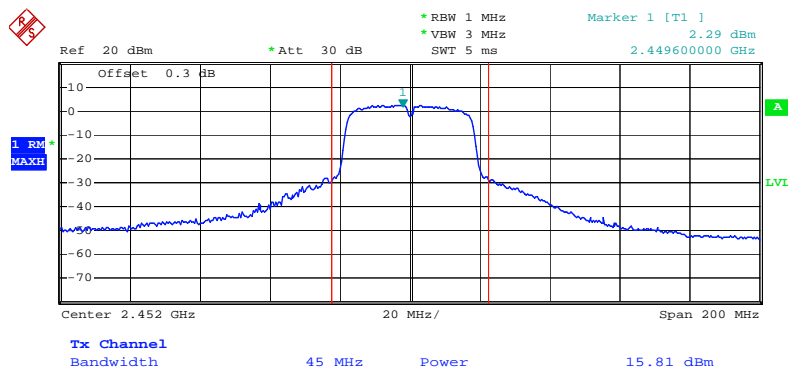
Date: 25.SEP.2008 17:08:10

Conducted Output Power Plot on Configuration Draft n MCS0 40MHz Ant. 1 / 2437 MHz



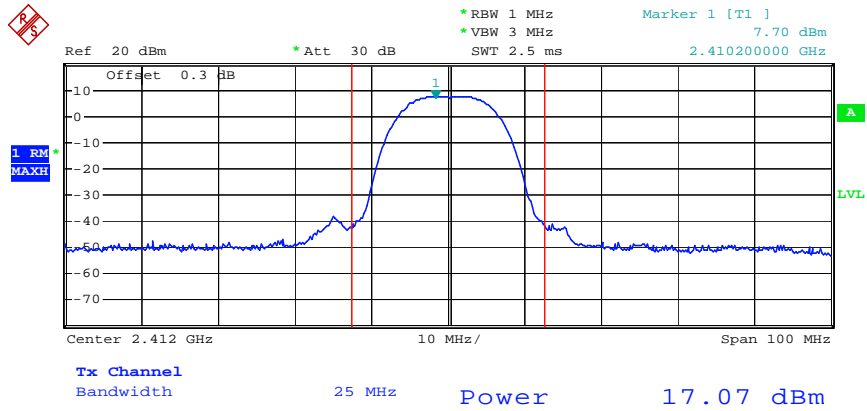
Date: 11.NOV.2008 13:40:32

Conducted Output Power Plot on Configuration Draft n MCS0 40MHz Ant. 1 / 2452 MHz



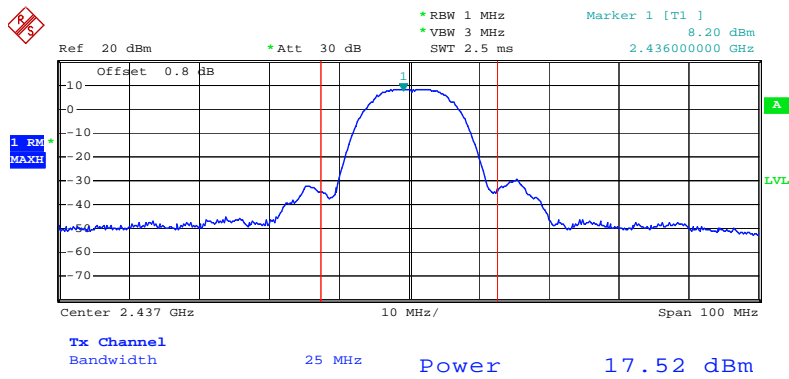
Date: 25.SEP.2008 18:31:11

Conducted Output Power Plot on Configuration IEEE 802.11b Ant. 1 / 2412 MHz



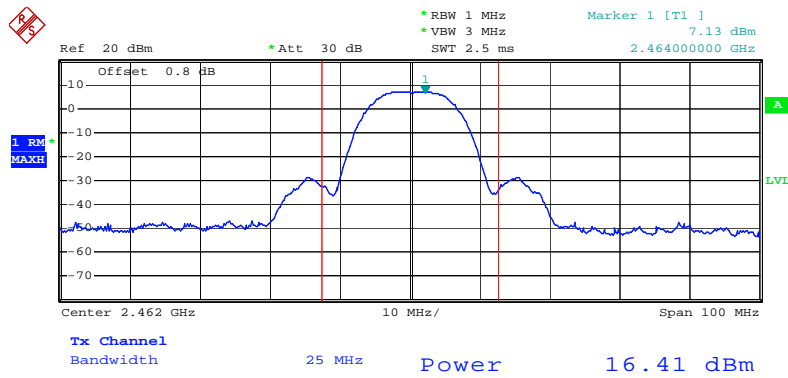
Date: 29.SEP.2008 12:32:53

Conducted Output Power Plot on Configuration IEEE 802.11b Ant. 1 / 2437 MHz



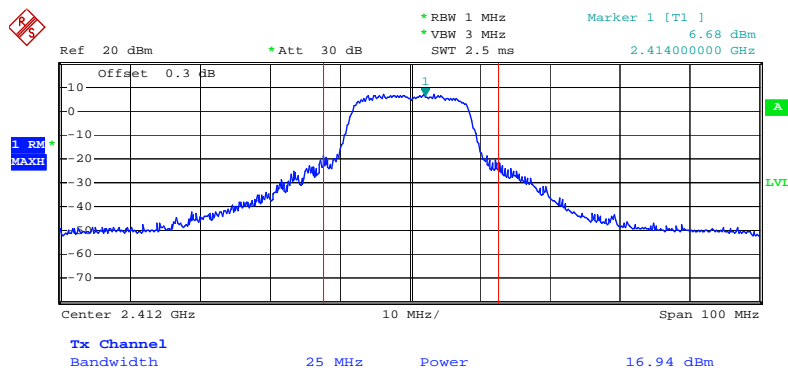
Date: 11.NOV.2008 13:29:33

### Conducted Output Power Plot on Configuration IEEE 802.11b Ant. 1 / 2462 MHz



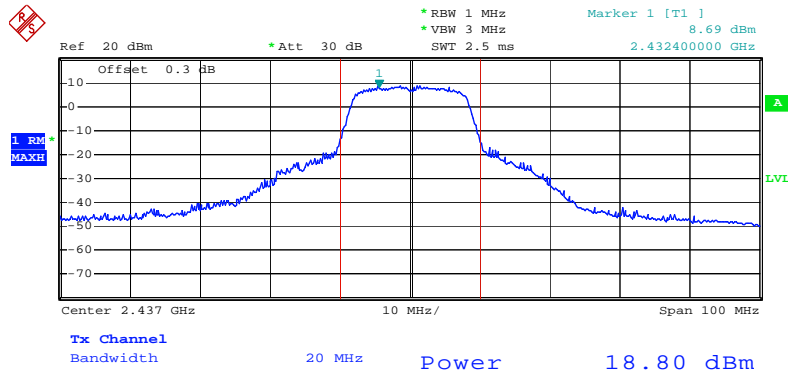
Date: 11.NOV.2008 13:30:14

### Conducted Output Power Plot on Configuration IEEE 802.11g Ant. 1 / 2412 MHz



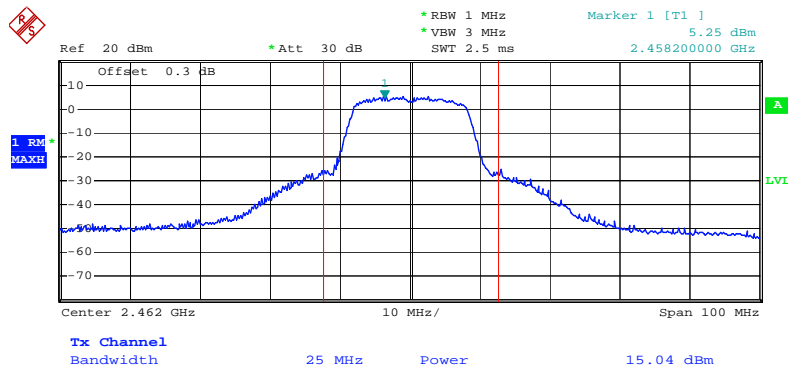
Date: 25.SEP.2008 18:26:49

Conducted Output Power Plot on Configuration IEEE 802.11g Ant. 1 / 2437 MHz



Date: 26.SEP.2008 22:01:00

Conducted Output Power Plot on Configuration IEEE 802.11g Ant. 1 / 2462 MHz



Date: 25.SEP.2008 18:27:50



### 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 8 dBm in any 3 kHz band during any time interval of continuous transmission.

#### 4.3.2. Measuring Instruments and Setting

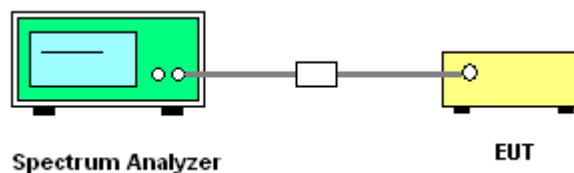
Please refer to section 5 of equipments list in this report. The following table is the setting of Spectrum Analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	30kHz
RB	3 kHz
VB	30 kHz
Detector	Peak
Trace	Max Hold
Sweep Time	10s

#### 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.
5. Measuring multiple antennas, the connector is required to link with spectrum analyser through a combiner.

#### 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

<b>Temperature</b>	24°C	<b>Humidity</b>	53%
<b>Test Engineer</b>	Jacky Ho	<b>Configurations</b>	Draft n

##### Configuration Draft n MCS0 20MHz Ant. 1

Channel	Frequency	Power Density (dBm)	Max. Limit (dBm)	Result
1	2412 MHz	-17.80	8.00	Complies
6	2437 MHz	-15.05	8.00	Complies
11	2462 MHz	-15.33	8.00	Complies

##### Configuration Draft n MCS0 40MHz Ant. 1

Channel	Frequency	Power Density (dBm)	Max. Limit (dBm)	Result
3	2422 MHz	-18.22	8.00	Complies
6	2437 MHz	-16.86	8.00	Complies
9	2452 MHz	-16.95	8.00	Complies

<b>Temperature</b>	24°C	<b>Humidity</b>	53%
<b>Test Engineer</b>	Jacky Ho	<b>Configurations</b>	802.11b/g

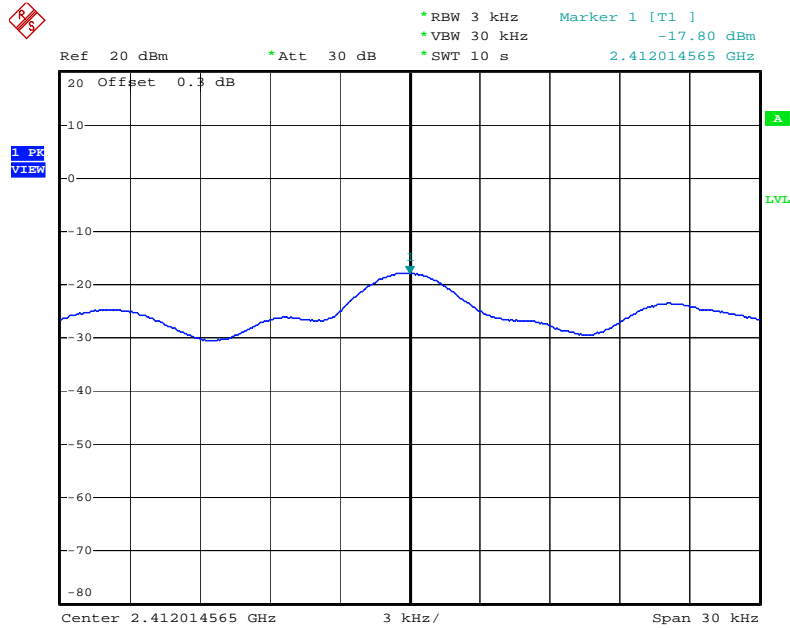
##### Configuration IEEE 802.11b Ant. 1

Channel	Frequency	Power Density (dBm)	Max. Limit (dBm)	Result
1	2412 MHz	-19.21	8.00	Complies
6	2437 MHz	-17.59	8.00	Complies
11	2462 MHz	-20.57	8.00	Complies

##### Configuration IEEE 802.11g Ant. 1

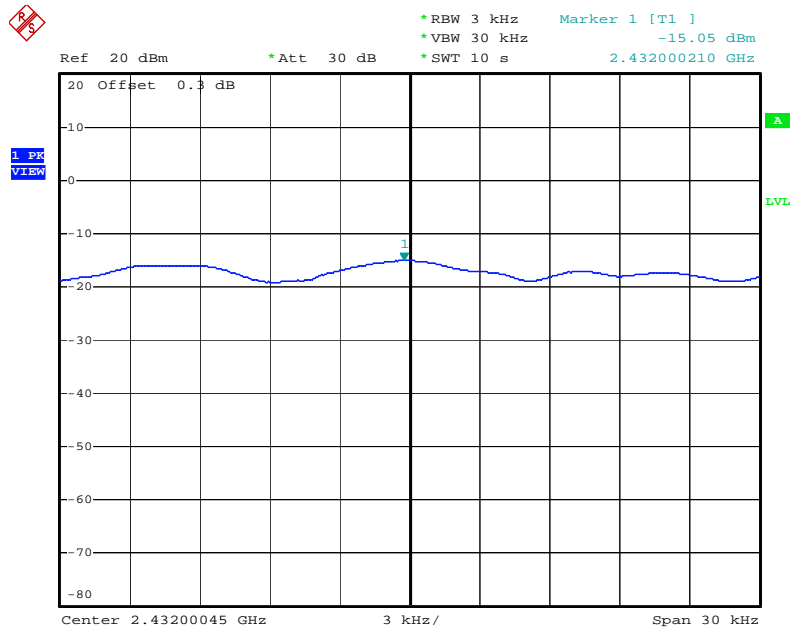
Channel	Frequency	Power Density (dBm)	Max. Limit (dBm)	Result
1	2412 MHz	-18.60	8.00	Complies
6	2437 MHz	-11.68	8.00	Complies
11	2462 MHz	-18.59	8.00	Complies

**Power Density Plot on Configuration Drafft n MCS0 20MHz Ant. 1 / 2412 MHz**



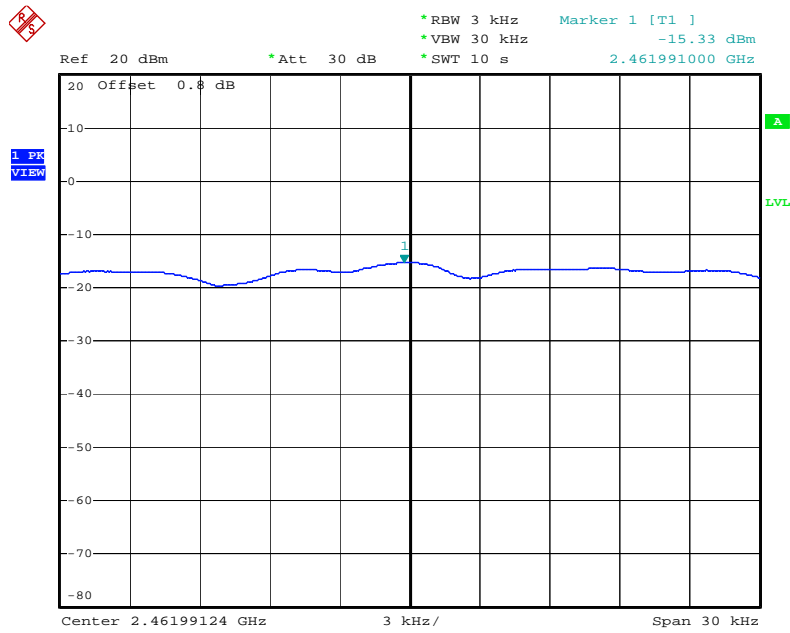
Date: 25.SEP.2008 19:02:33

**Power Density Plot on Configuration Drafft n MCS0 20MHz Ant. 1 / 2437 MHz**



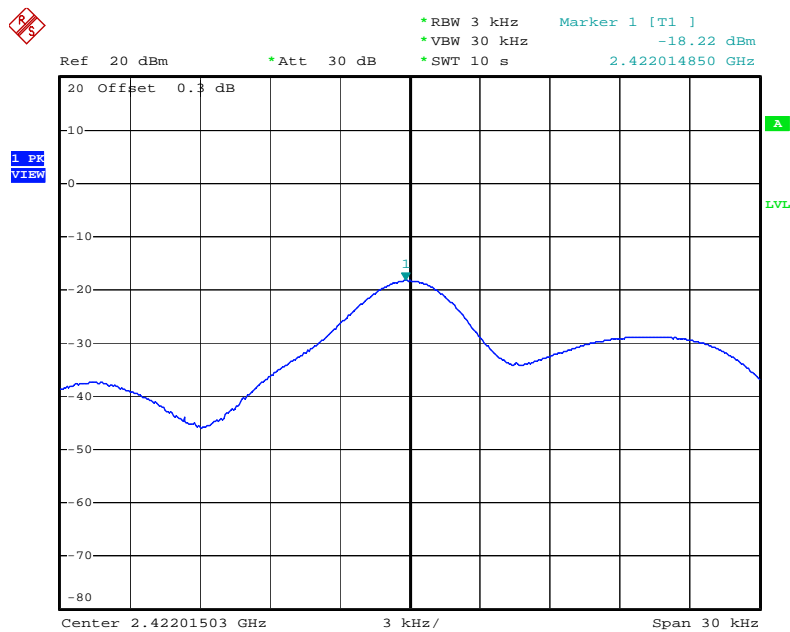
Date: 26.SEP.2008 22:16:11

### Power Density Plot on Configuration Drafft n MCS0 20MHz Ant. 1 / 2462 MHz



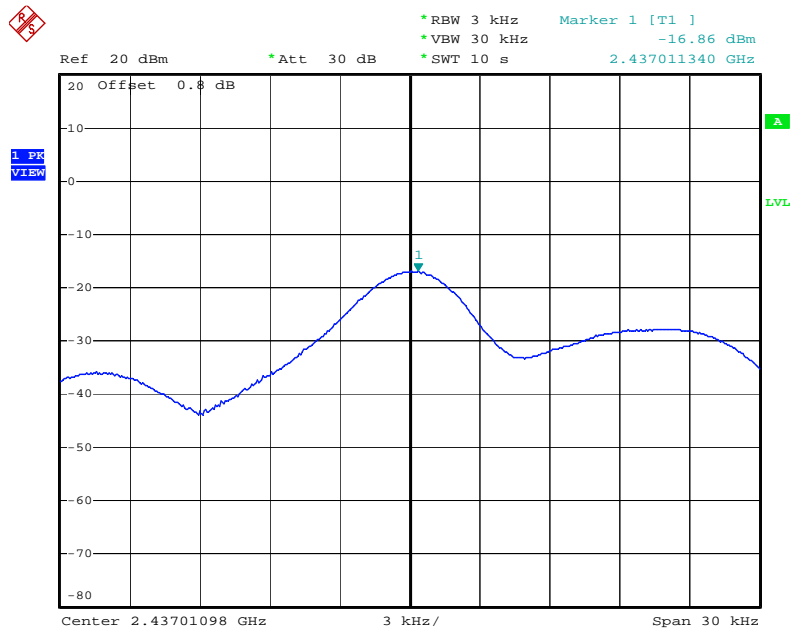
Date: 11.NOV.2008 14:15:55

### Power Density Plot on Configuration Drafft n MCS0 40MHz Ant. 1 / 2422 MHz



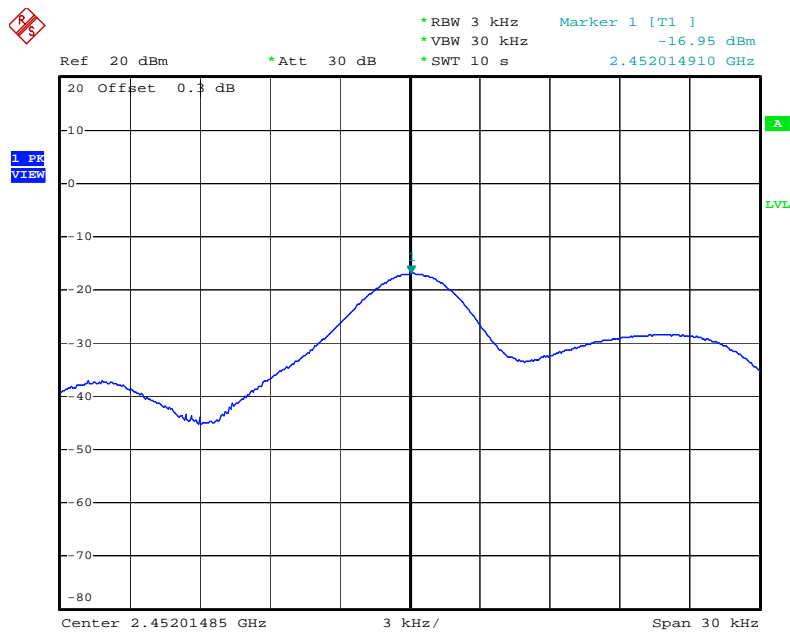
Date: 25.SEP.2008 19:06:07

Power Density Plot on Configuration Drafft n MCS0 40MHz Ant. 1 / 2437 MHz



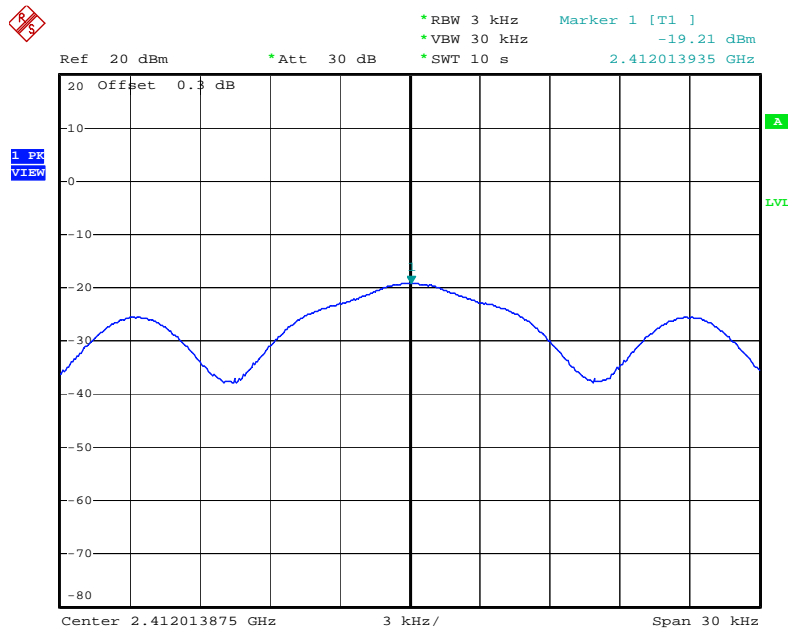
Date: 11.NOV.2008 14:20:19

Power Density Plot on Configuration Drafft n MCS0 40MHz Ant. 1 / 2452 MHz



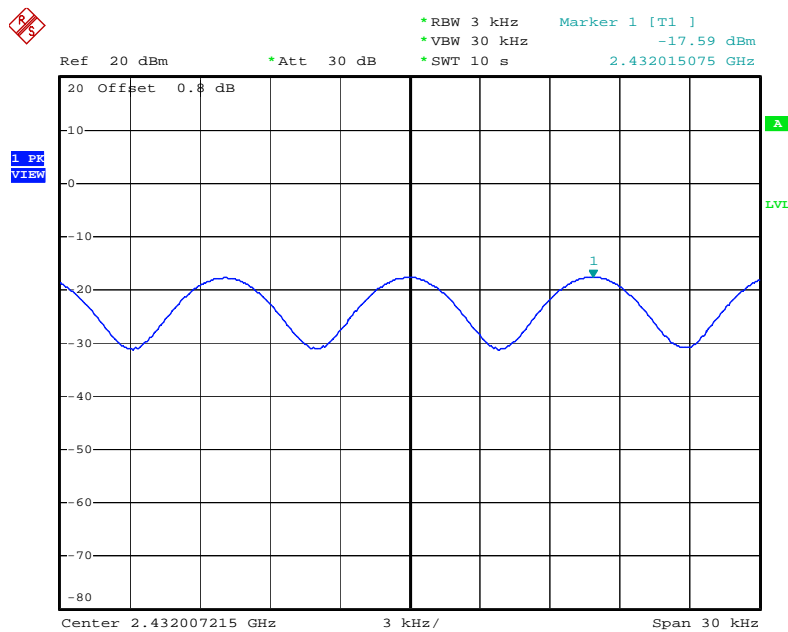
Date: 25.SEP.2008 19:10:14

**Power Density Plot on Configuration IEEE 802.11b Ant. 1 / 2412 MHz**



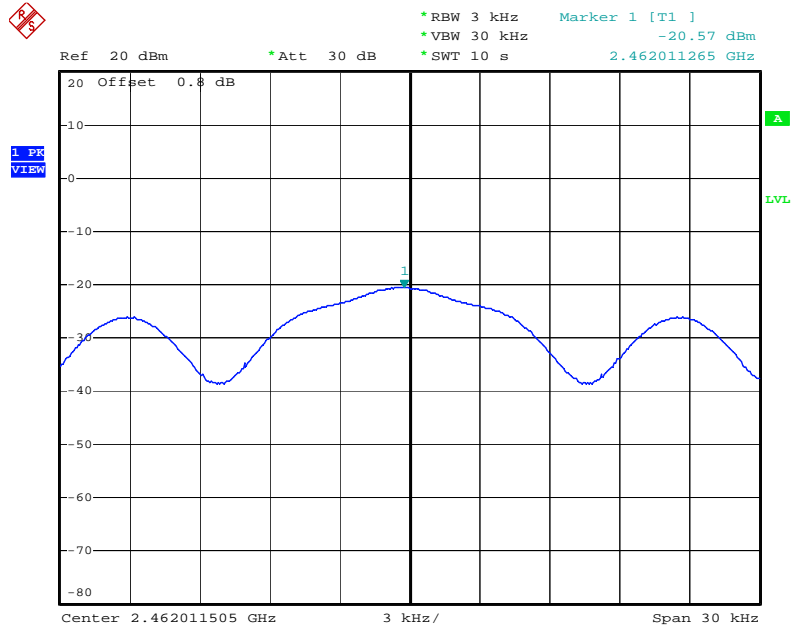
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**Power Density Plot on Configuration IEEE 802.11b Ant. 1 / 2437 MHz**



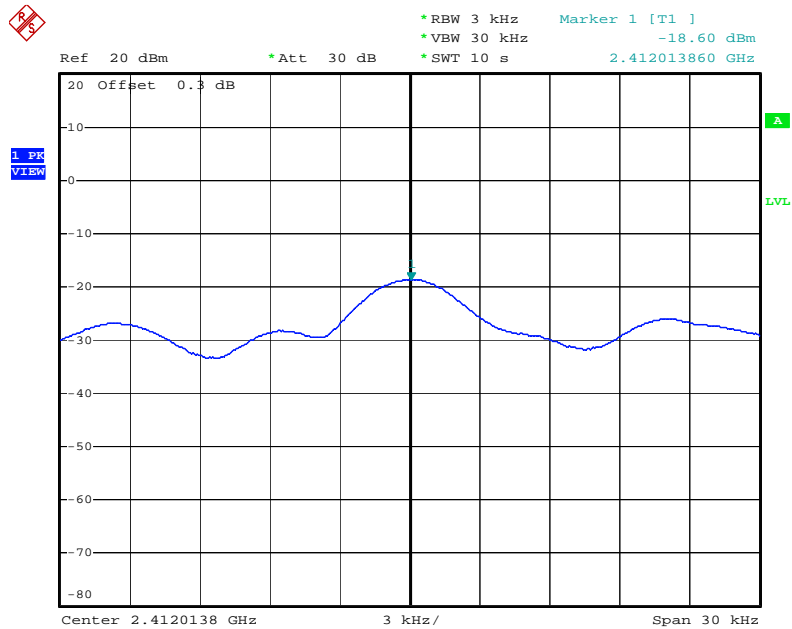
Date: 11.NOV.2008 13:59:49

**Power Density Plot on Configuration IEEE 802.11b Ant. 1 / 2462 MHz**



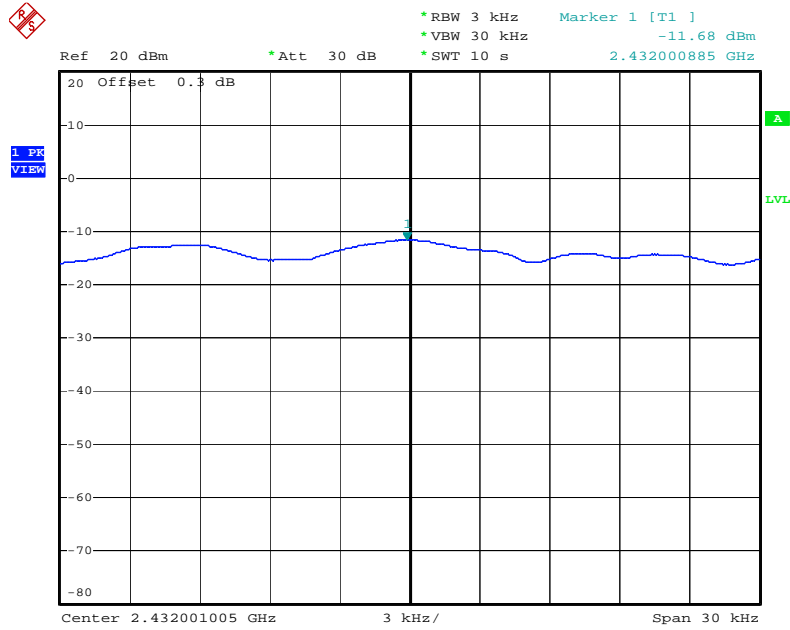
Date: 11.NOV.2008 14:03:05

**Power Density Plot on Configuration IEEE 802.11g Ant. 1 / 2412 MHz**



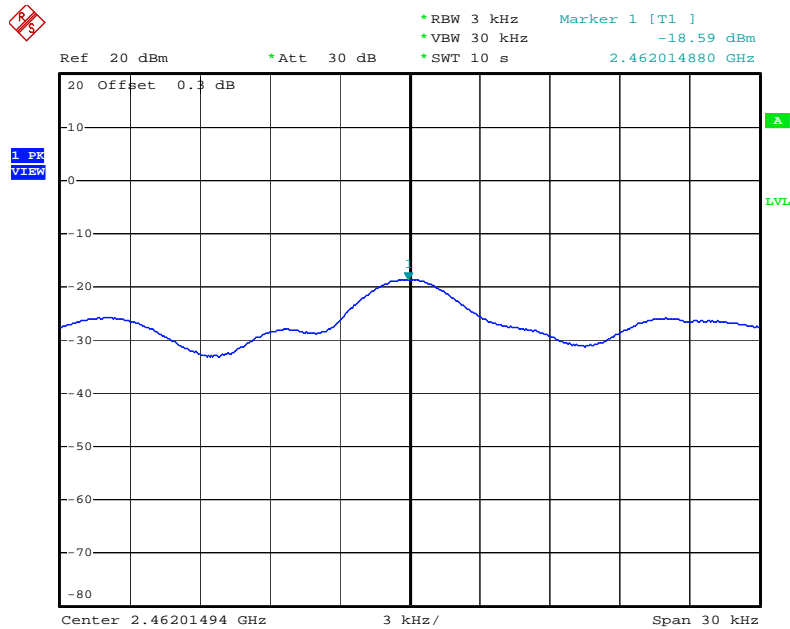
Date: 26.SEP.2008 22:18:49

**Power Density Plot on Configuration IEEE 802.11g Ant. 1 / 2437 MHz**



Date: 25.SEP.2008 18:53:58

**Power Density Plot on Configuration IEEE 802.11g Ant. 1 / 2462 MHz**



Date: 25.SEP.2008 18:56:06



#### 4.4. 6dB Spectrum Bandwidth Measurement

##### 4.4.1. Limit

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

##### 4.4.2. Measuring Instruments and Setting

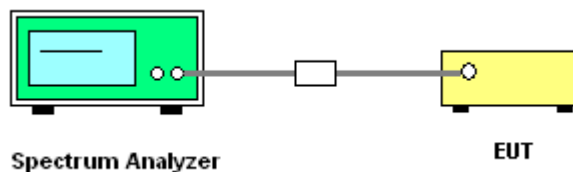
Please refer to section 5 of equipments list in this report. The following table is the setting of the Spectrum Analyzer.

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. Measuring multiple antennas, the connector is required to link with spectrum analyzer through a combiner.

##### 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

<b>Temperature</b>	24°C	<b>Humidity</b>	53%
<b>Test Engineer</b>	Jacky Ho	<b>Configurations</b>	Draft n

##### Configuration Draft n MCS0 20MHz Ant. 1

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
1	2412 MHz	16.36	16.36	500	Complies
6	2437 MHz	16.36	16.36	500	Complies
11	2462 MHz	16.92	17.36	500	Complies

##### Configuration Draft n MCS0 40MHz Ant. 1

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
3	2422 MHz	35.12	35.52	500	Complies
6	2437 MHz	33.60	35.20	500	Complies
9	2452 MHz	35.36	35.52	500	Complies

<b>Temperature</b>	24°C	<b>Humidity</b>	53%
<b>Test Engineer</b>	Jacky Ho	<b>Configurations</b>	802.11b/g

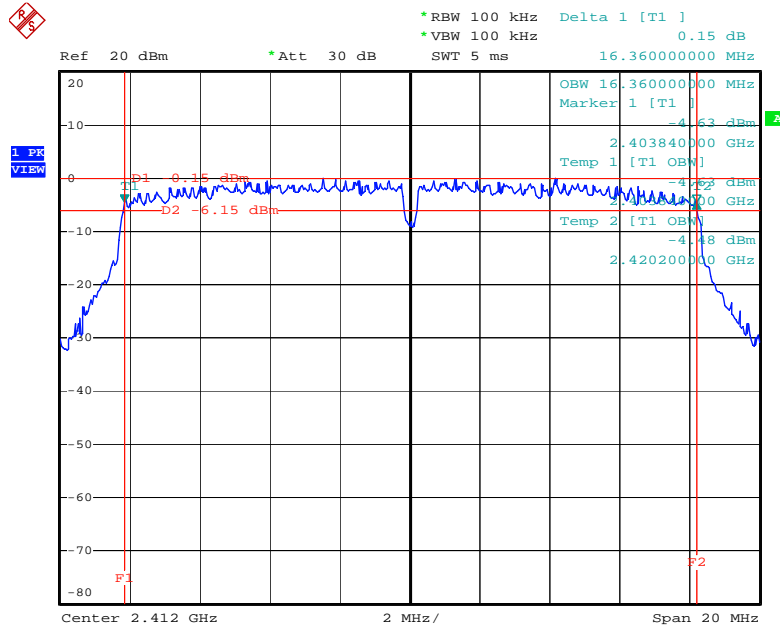
##### Configuration IEEE 802.11b Ant. 1

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
1	2412 MHz	12.12	14.64	500	Complies
6	2437 MHz	12.04	14.56	500	Complies
11	2462 MHz	12.08	14.56	500	Complies

##### Configuration IEEE 802.11g Ant. 1

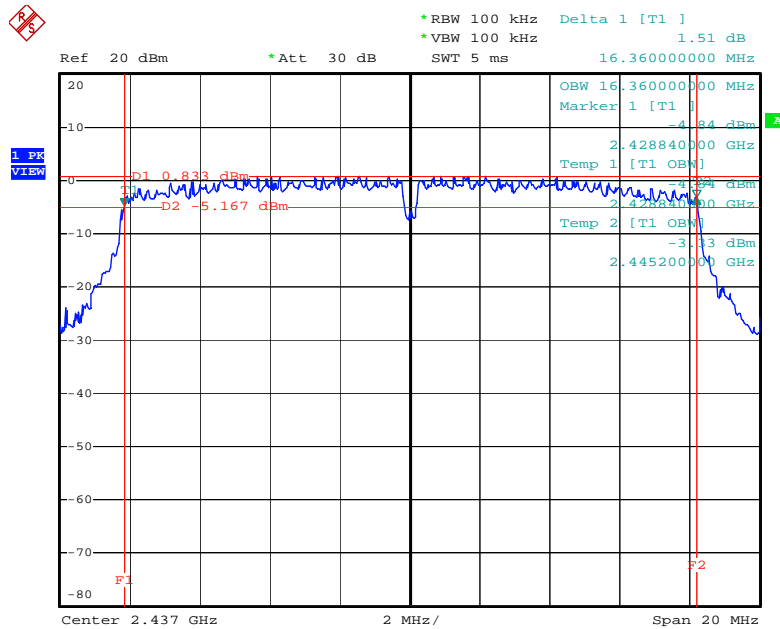
Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
1	2412 MHz	16.36	16.36	500	Complies
6	2437 MHz	16.36	16.36	500	Complies
11	2462 MHz	16.36	16.36	500	Complies

6 dB Bandwidth Plot on Configuration Draft n MCS0 20MHz Ant. 1 / 2412 MHz



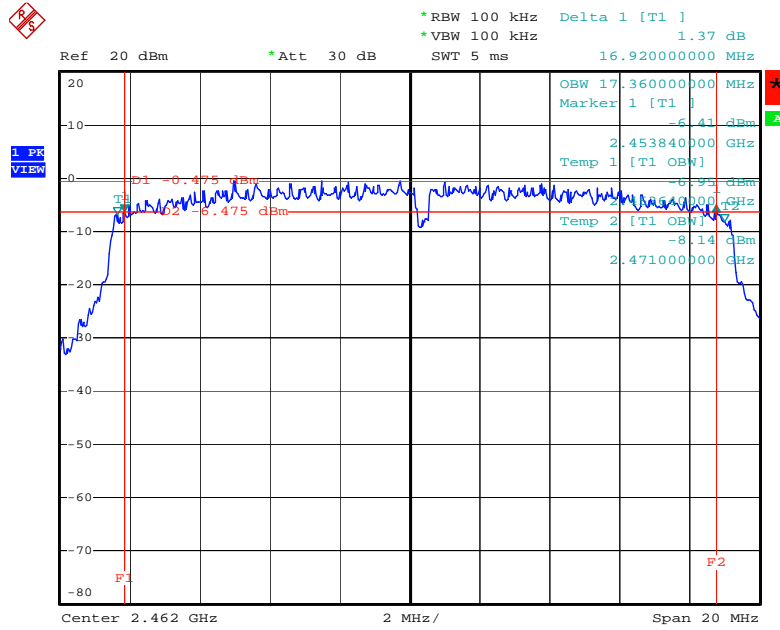
Date: 25.SEP.2008 19:01:06

6 dB Bandwidth Plot on Configuration Draft n MCS0 20MHz Ant. 1 / 2437 MHz



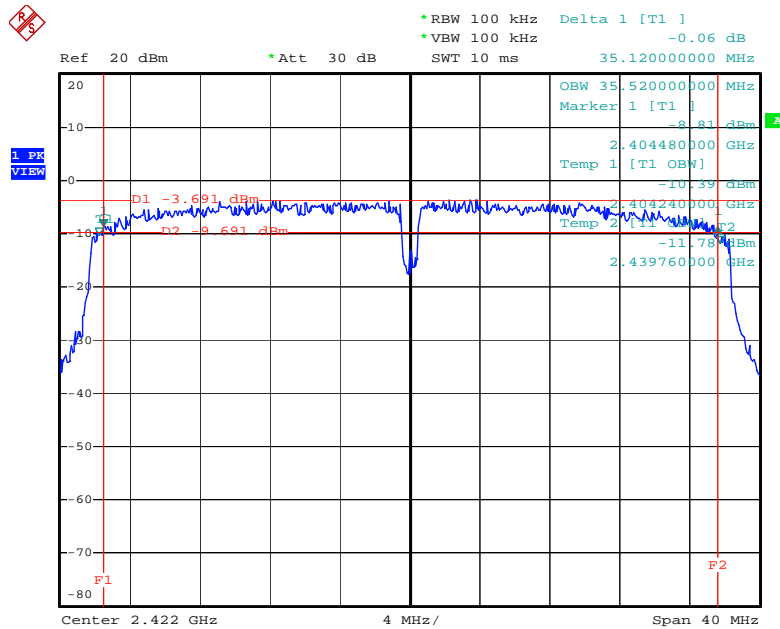
Date: 26.SEP.2008 22:14:42

6 dB Bandwidth Plot on Configuration Draft n MCS0 20MHz Ant. 1 / 2462 MHz



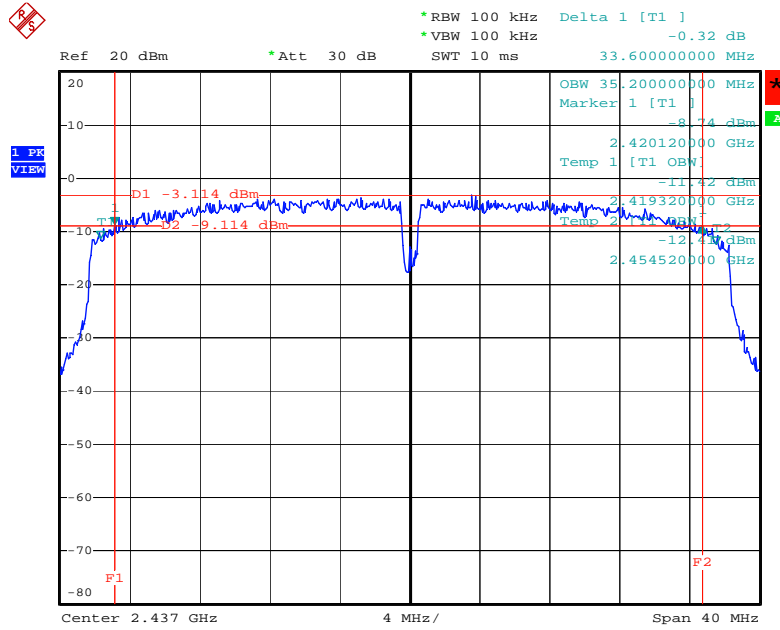
Date: 11.NOV.2008 14:14:28

6 dB Bandwidth Plot on Configuration Draft n MCS0 40MHz Ant. 1 / 2422 MHz



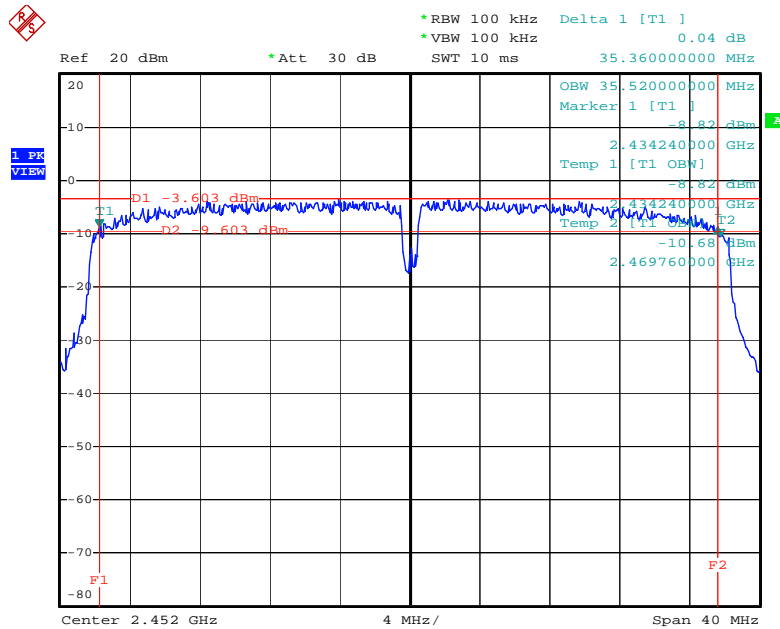
Date: 25.SEP.2008 19:04:40

6 dB Bandwidth Plot on Configuration Drafft n MCS0 40MHz Ant. 1 / 2437 MHz



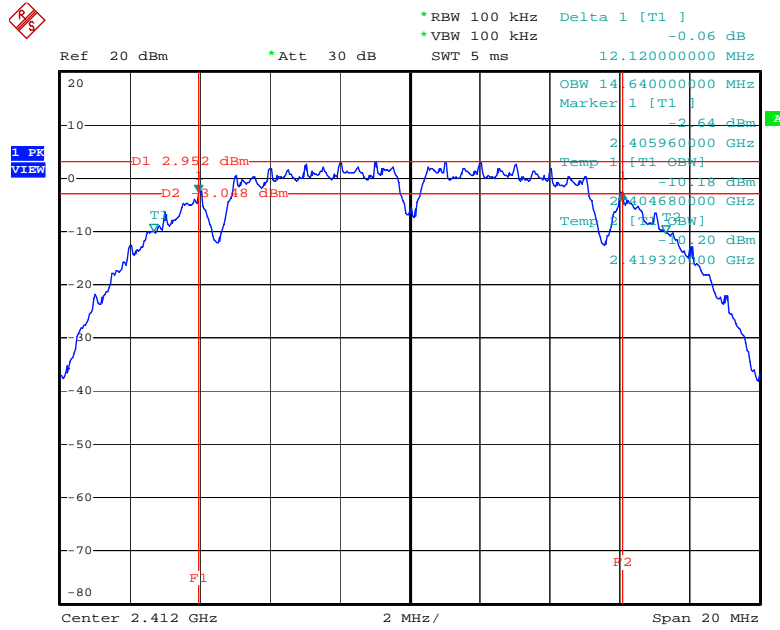
Date: 11.NOV.2008 14:18:52

6 dB Bandwidth Plot on Configuration Drafft n MCS0 40MHz Ant. 1 / 2452 MHz



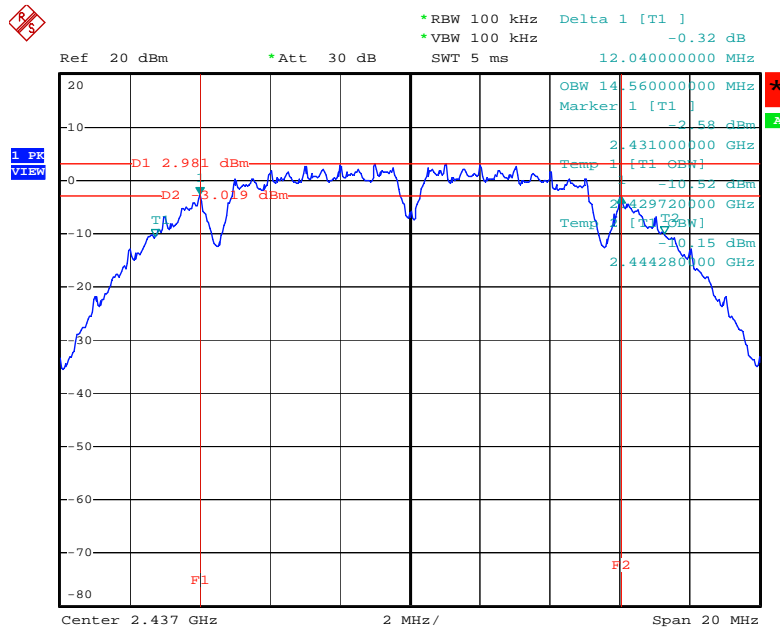
Date: 25.SEP.2008 19:08:47

6 dB Bandwidth Plot on Configuration IEEE 802.11b Ant. 1 / 2412 MHz



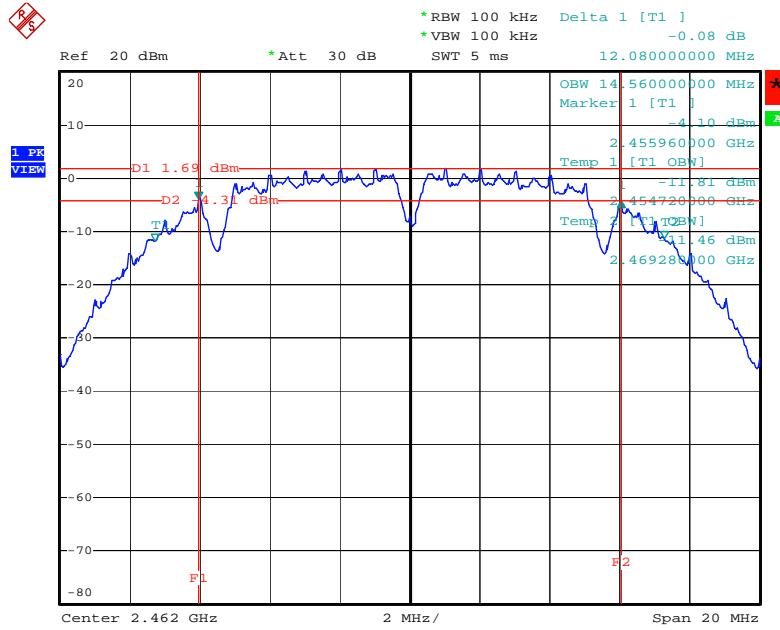
Date: 26.SEP.2008 22:19:50

6 dB Bandwidth Plot on Configuration IEEE 802.11b Ant. 1 / 2437 MHz



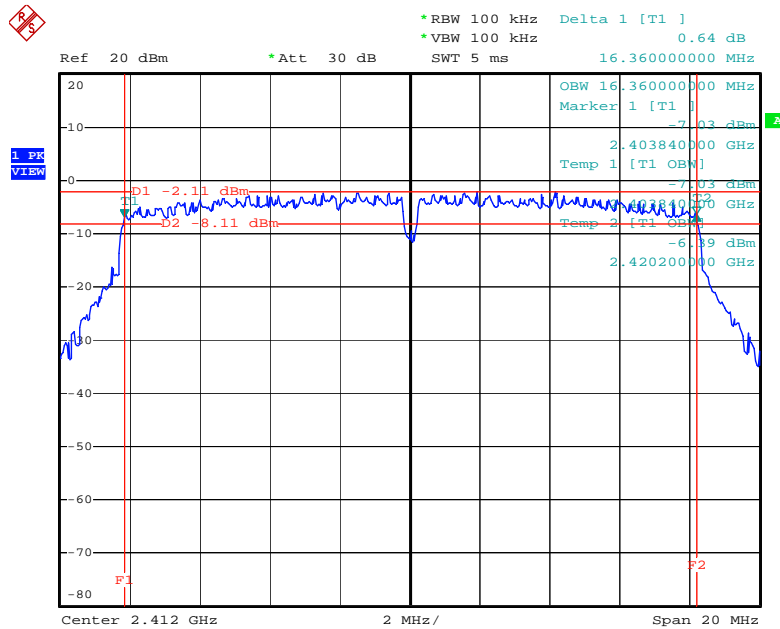
Date: 11.NOV.2008 13:58:20

6 dB Bandwidth Plot on Configuration IEEE 802.11b Ant. 1 / 2462 MHz



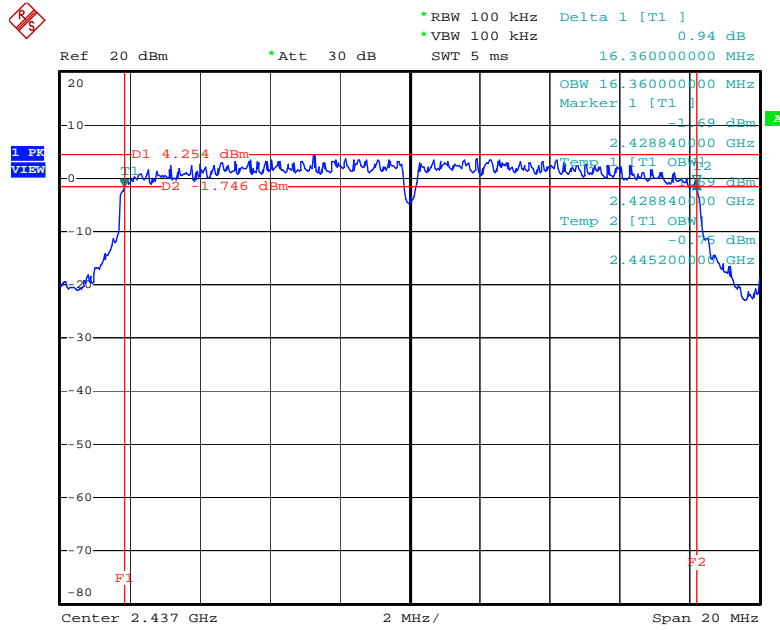
Date: 11.NOV.2008 14:01:38

6 dB Bandwidth Plot on Configuration IEEE 802.11g Ant. 1 / 2412 MHz



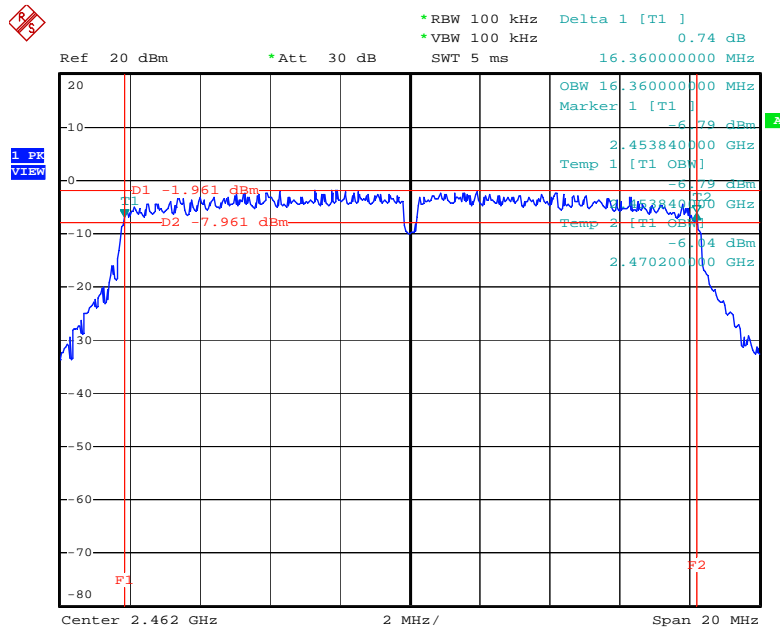
Date: 26.SEP.2008 22:17:22

6 dB Bandwidth Plot on Configuration IEEE 802.11g Ant. 1 / 2437 MHz



Date: 25.SEP.2008 18:52:30

6 dB Bandwidth Plot on Configuration IEEE 802.11g Ant. 1 / 2462 MHz



Date: 25.SEP.2008 18:54:39



## 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)	1000KHz / 1000KHz for peak

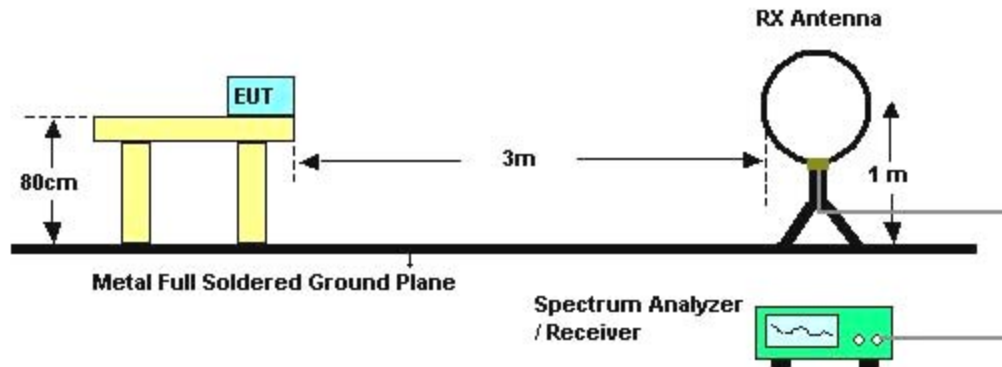
Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

#### 4.5.3. Test Procedures

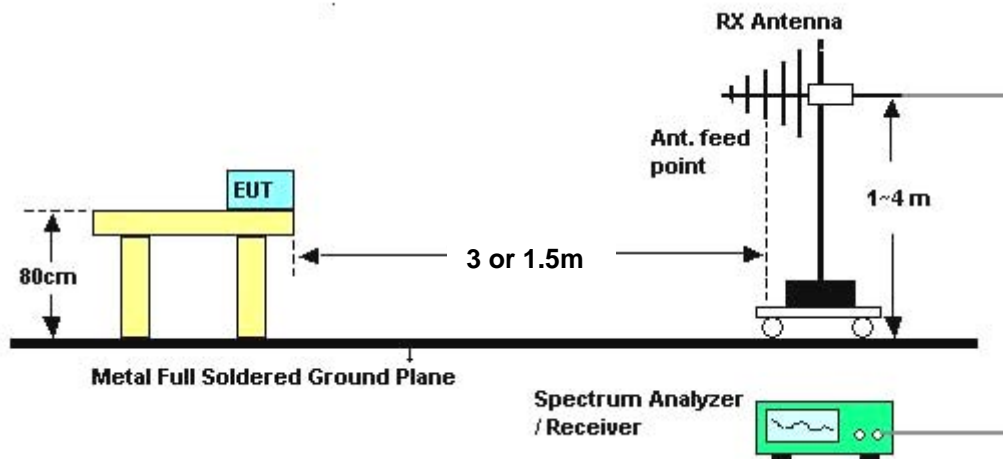
1. Configure the EUT according to ANSI C63.4. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting 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 from 3m to 1.5m.

Distance extrapolation factor =  $20 \log (\text{specific distance [3m]} / \text{test distance [1.5m]})$  (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)

<b>Temperature</b>	24.3°C	<b>Humidity</b>	56%
<b>Test Engineer</b>	Allen Liu	<b>Configurations</b>	Normal Link

<b>Freq. (MHz)</b>	<b>Level (dBuV)</b>	<b>Over Limit (dB)</b>	<b>Limit Line (dBuV)</b>	<b>Remark</b>
-	-	-	-	See Note

**Note:**

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

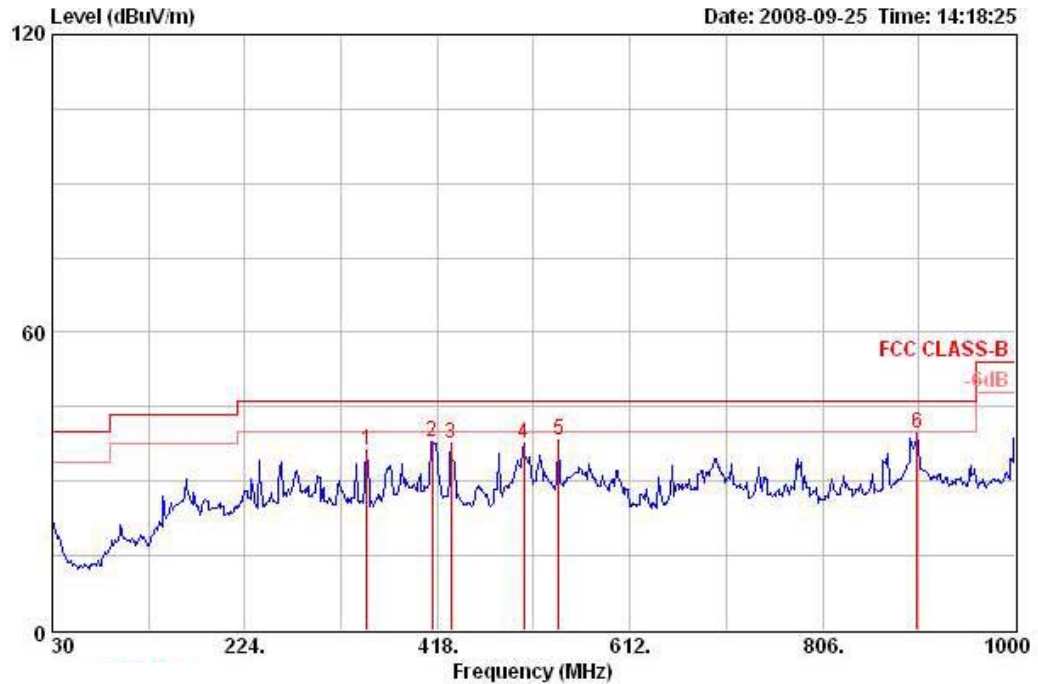
Distance extrapolation factor =  $40 \log(\text{specific distance} / \text{test distance})$  (dB);

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

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

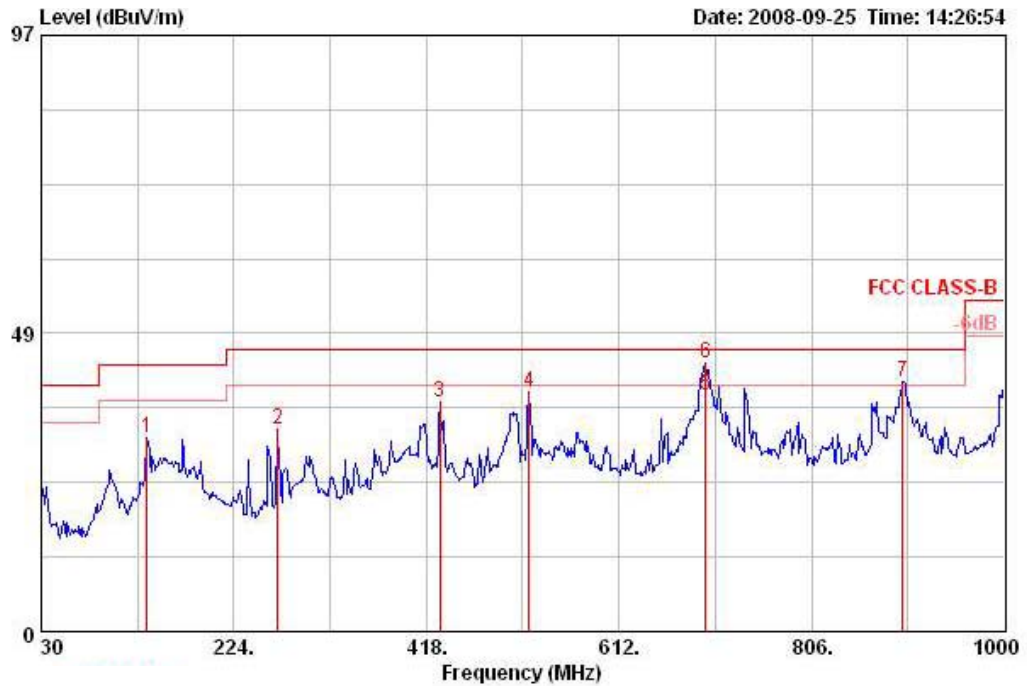
Temperature	24.3°C	Humidity	56%
Test Engineer	Allen Liu	Configurations	Normal Link

Horizontal



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Remark	Pol/Phase	Table Pos	Ant Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB			deg	cm
1	347.190	36.20	-9.80	46.00	46.60	14.64	27.23	2.19	Peak	HORIZONTAL	0	100
2	413.150	38.05	-7.95	46.00	47.06	16.27	27.66	2.38	Peak	HORIZONTAL	0	100
3	431.580	37.64	-8.36	46.00	46.35	16.56	27.76	2.49	Peak	HORIZONTAL	0	100
4	505.300	37.76	-8.24	46.00	45.47	17.69	28.10	2.71	Peak	HORIZONTAL	0	100
5	540.220	38.14	-7.86	46.00	45.38	18.08	28.10	2.78	Peak	HORIZONTAL	0	100
6	901.060	39.71	-6.29	46.00	42.97	20.54	27.39	3.60	Peak	HORIZONTAL	265	100

**Vertical**



	Freq	Level	Over Limit	Limit Line	ReadAntenna	Preamp	Cable	Remark	Pol/Phase	Table Pos	Ant Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB			deg	cm
1	136.700	31.51	-11.99	43.50	45.23	12.32	27.41	1.37 Peak	VERTICAL	0	400
2	268.620	33.00	-13.00	46.00	45.00	12.99	26.96	1.97 Peak	VERTICAL	0	400
3	431.580	37.43	-8.57	46.00	46.14	16.56	27.76	2.49 Peak	VERTICAL	0	400
4	521.790	38.83	-7.17	46.00	46.31	17.87	28.10	2.74 Peak	VERTICAL	0	400
5	699.300	38.39	-7.61	46.00	44.00	19.09	28.00	3.30 QP	VERTICAL	360	100
6	699.300	43.78	-2.22	46.00	49.39	19.09	28.00	3.30 Peak	VERTICAL	0	400
7	898.150	40.74	-5.26	46.00	44.03	20.52	27.40	3.59 Peak	VERTICAL	0	400

**Note:**

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

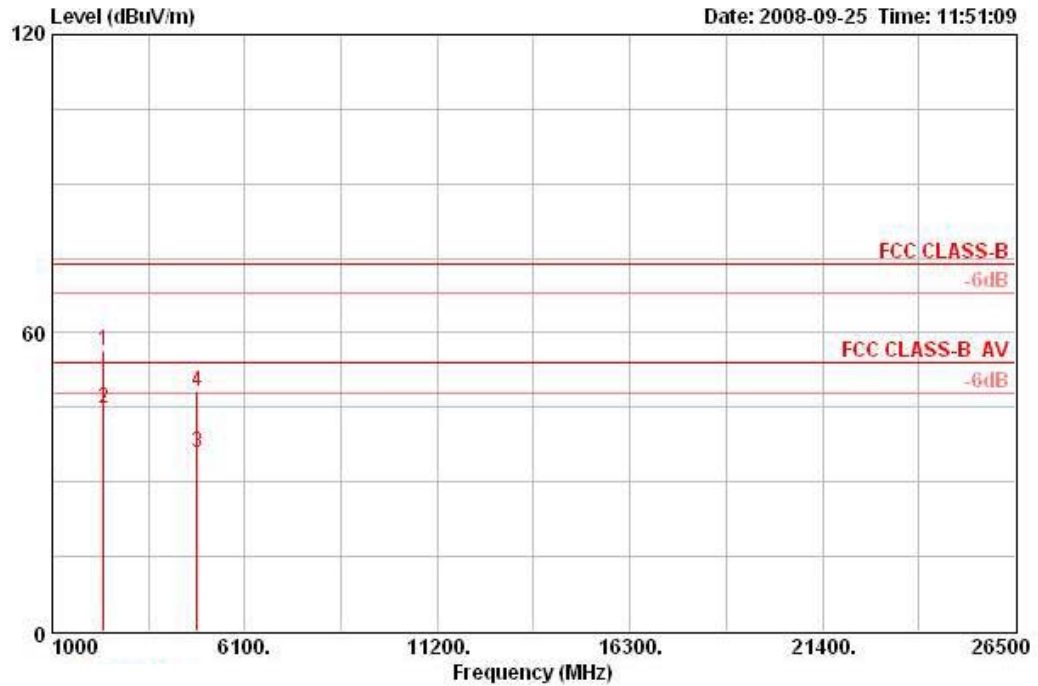
Emission level (dBuV/m) = 20 log Emission level (uV/m).

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

4.5.9. Results for Radiated Emissions (1GHz~10<sup>th</sup> Harmonic)

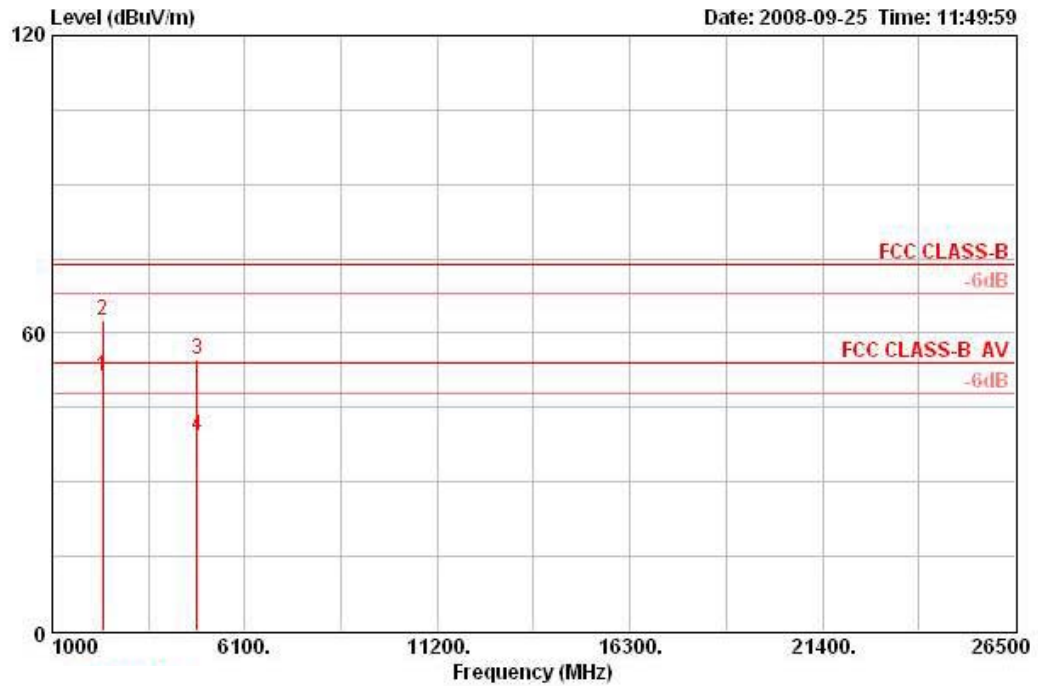
Temperature	24.3°C	Humidity	56%
Test Engineer	Allen Liu	Configurations	Draft n MCS0 20MHz Ch 1 Ant. 1

Horizontal



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Remark	Pol/Phase	Table Pos	Ant Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB			deg	cm
1	2359.320	56.39	-17.61	74.00	59.49	27.97	34.96	3.90	PEAK	HORIZONTAL	33	100
2	2360.040	44.90	-9.10	54.00	48.00	27.97	34.96	3.90	AVERAGE	HORIZONTAL	33	100
3	4823.260	35.98	-18.02	54.00	31.44	33.39	35.25	6.39	AVERAGE	HORIZONTAL	0	100
4	4828.080	48.15	-25.85	74.00	43.62	33.39	35.25	6.39	PEAK	HORIZONTAL	0	100

**Vertical**

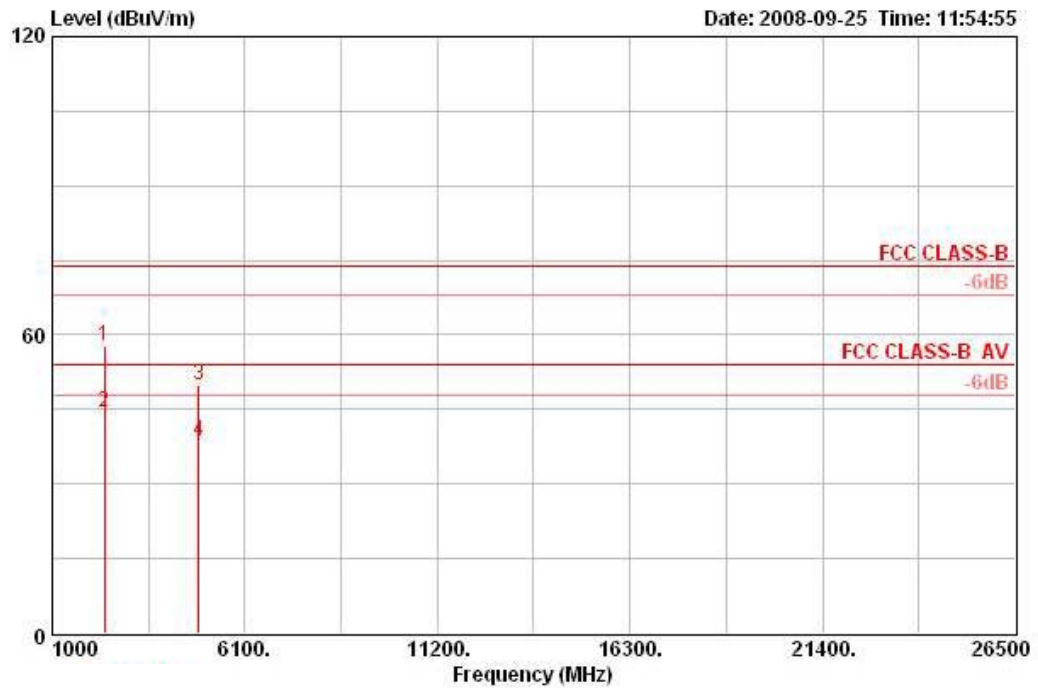


	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Remark	Pol/Phase	Table Pos	Ant Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB			deg	cm
1 !	2346.760	51.38	-2.62	54.00	54.52	27.93	34.96	3.90	AVERAGE	VERTICAL	100	100
2	2348.240	62.72	-11.28	74.00	65.86	27.93	34.96	3.90	PEAK	VERTICAL	100	100
3	4823.120	54.54	-19.46	74.00	50.01	33.39	35.25	6.39	PEAK	VERTICAL	288	100
4	4823.860	39.33	-14.67	54.00	34.80	33.39	35.25	6.39	AVERAGE	VERTICAL	288	100



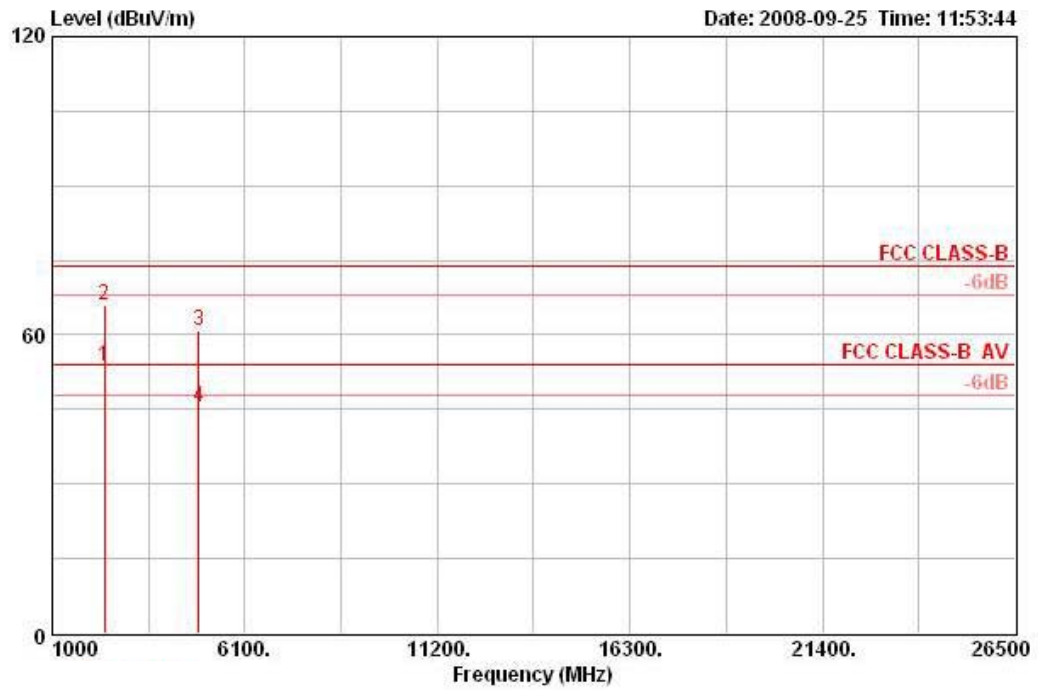
Temperature	24.3°C	Humidity	56%
Test Engineer	Allen Liu	Configurations	Draft n MCS0 20MHz Ch 6 Ant. 1

**Horizontal**



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Remark	Pol/Phase	Table Pos	Ant Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB			deg	cm
1	2372.160	57.84	-16.16	74.00	60.90	28.01	34.97	3.90	PEAK	HORIZONTAL	33	100
2	2373.760	44.45	-9.55	54.00	47.51	28.01	34.97	3.90	AVERAGE	HORIZONTAL	33	100
3	4875.460	50.08	-23.92	74.00	45.28	33.48	35.25	6.56	PEAK	HORIZONTAL	41	100
4	4879.000	38.51	-15.49	54.00	33.71	33.48	35.25	6.56	AVERAGE	HORIZONTAL	41	100

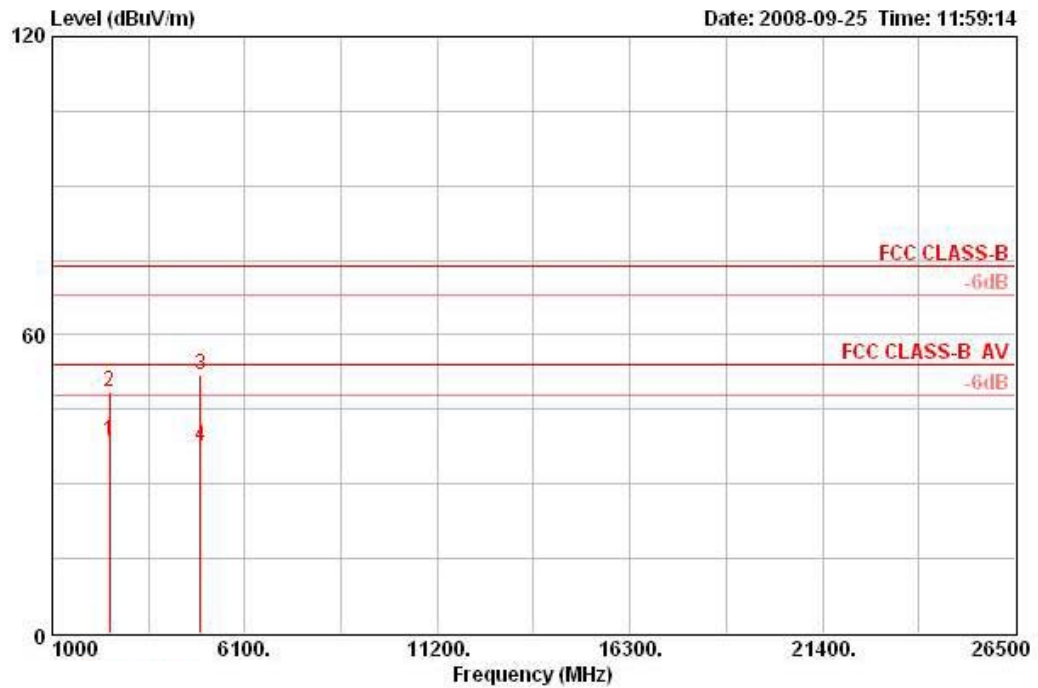
**Vertical**



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Remark	Pol/Phase	Table Pos	Ant Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB			deg	cm
1	2371.840	53.59	-0.41	54.00	56.64	28.01	34.97	3.90	AVERAGE	VERTICAL	162	100
2	2373.560	65.95	-8.05	74.00	69.01	28.01	34.97	3.90	PEAK	VERTICAL	162	100
3	4869.700	60.91	-13.09	74.00	56.11	33.48	35.25	6.56	PEAK	VERTICAL	280	118
4	4870.460	45.43	-8.57	54.00	40.64	33.48	35.25	6.56	AVERAGE	VERTICAL	280	118

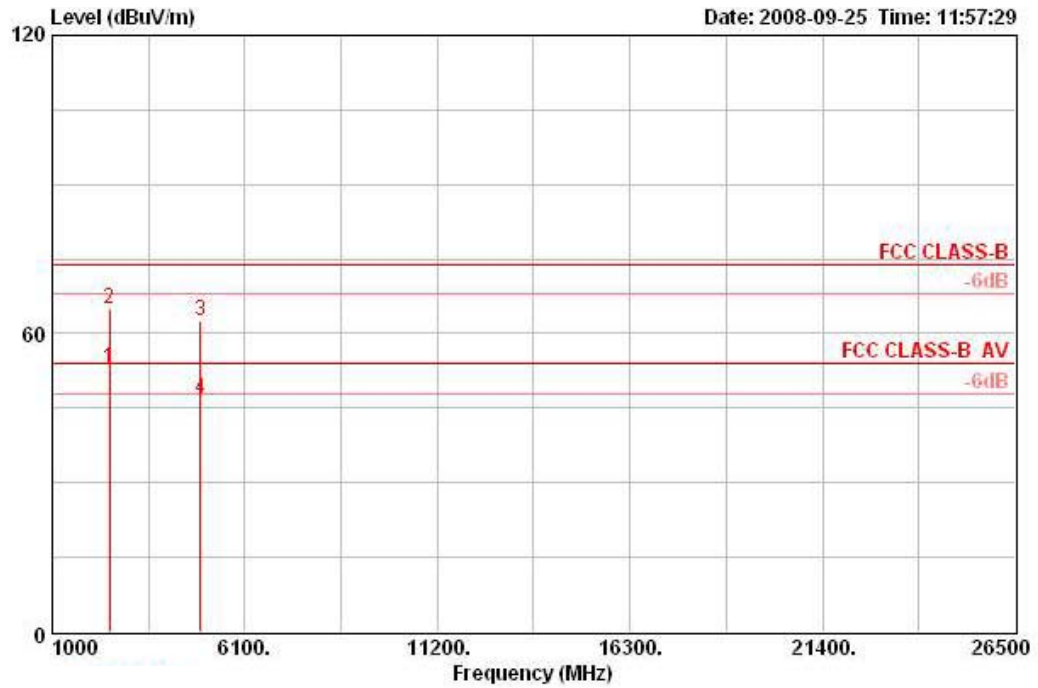
Temperature	24.3°C	Humidity	56%
Test Engineer	Allen Liu	Configurations	Draft n MCS0 20MHz Ch11 Ant. 1

**Horizontal**



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Remark	Pol/Phase	Table Pos	Ant Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB			deg	cm
1	2514.080	38.67	-15.33	54.00	41.26	28.35	35.02	4.08	AVERAGE	HORIZONTAL	245	100
2	2514.300	48.57	-25.43	74.00	51.17	28.35	35.02	4.08	PEAK	HORIZONTAL	245	100
3	4922.880	51.84	-22.16	74.00	46.78	33.58	35.24	6.73	PEAK	HORIZONTAL	115	100
4	4923.880	37.58	-16.42	54.00	32.52	33.58	35.24	6.73	AVERAGE	HORIZONTAL	115	100

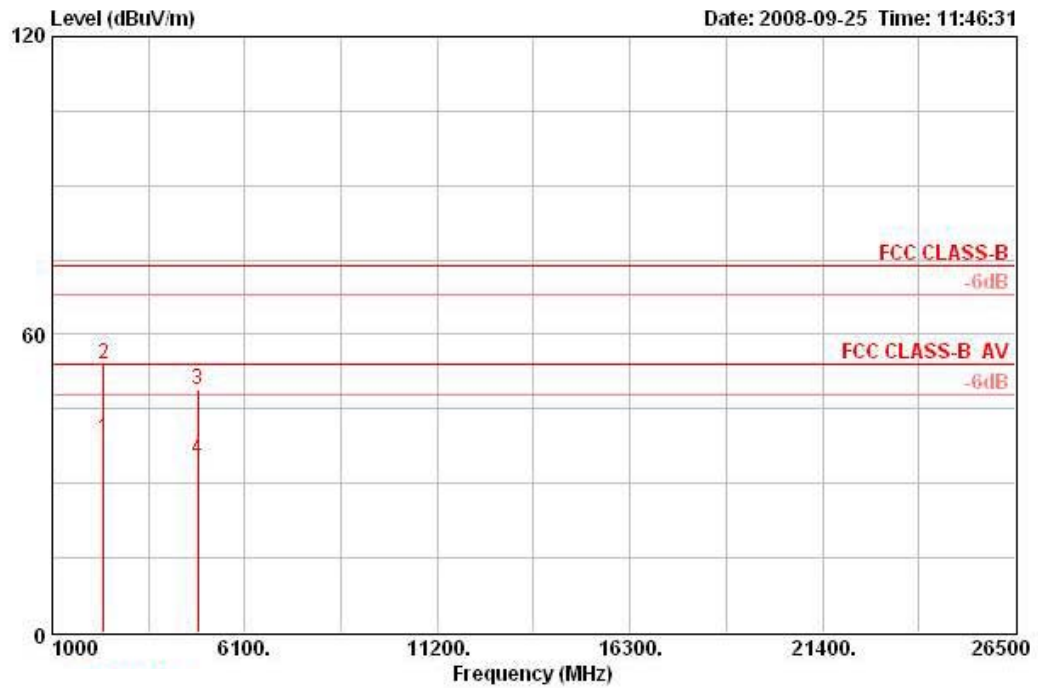
**Vertical**



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Remark	Pol/Phase	Table Pos	Ant Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB			deg	cm
1	2514.020	52.89	-1.11	54.00	55.48	28.35	35.02	4.08	AVERAGE	VERTICAL	98	100
2	2514.440	64.97	-9.03	74.00	67.56	28.35	35.02	4.08	PEAK	VERTICAL	98	100
3	4923.480	62.70	-11.30	74.00	57.63	33.58	35.24	6.73	PEAK	VERTICAL	271	103
4	4923.700	46.88	-7.12	54.00	41.81	33.58	35.24	6.73	AVERAGE	VERTICAL	271	103

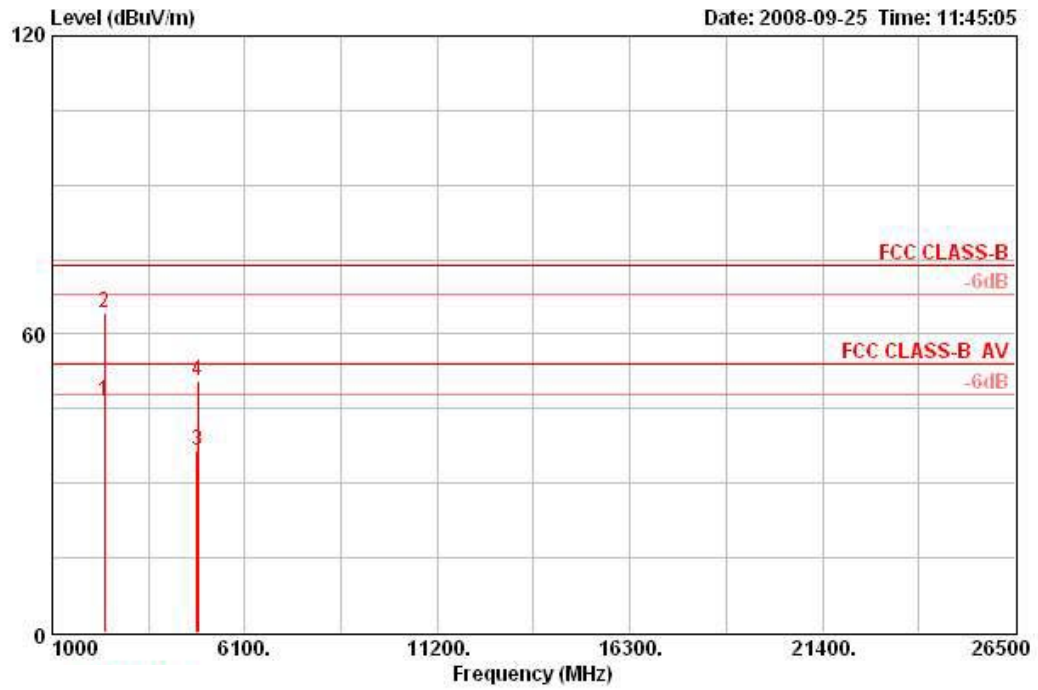
Temperature	24.3°C	Humidity	56%
Test Engineer	Allen Liu	Configurations	Draft n MCS0 40MHz Ch 3 Ant. 1

**Horizontal**



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Remark	Pol/Phase	Table Pos	Ant Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB			deg	cm
1	2366.560	39.11	-14.89	54.00	42.21	27.97	34.97	3.90	Average	HORIZONTAL	33	102
2	2367.160	53.96	-20.04	74.00	57.06	27.97	34.97	3.90	PEAK	HORIZONTAL	33	102
3	4847.920	48.96	-25.04	74.00	44.31	33.42	35.25	6.47	PEAK	HORIZONTAL	0	100
4	4848.980	34.88	-19.12	54.00	30.23	33.42	35.25	6.47	AVERAGE	HORIZONTAL	0	100

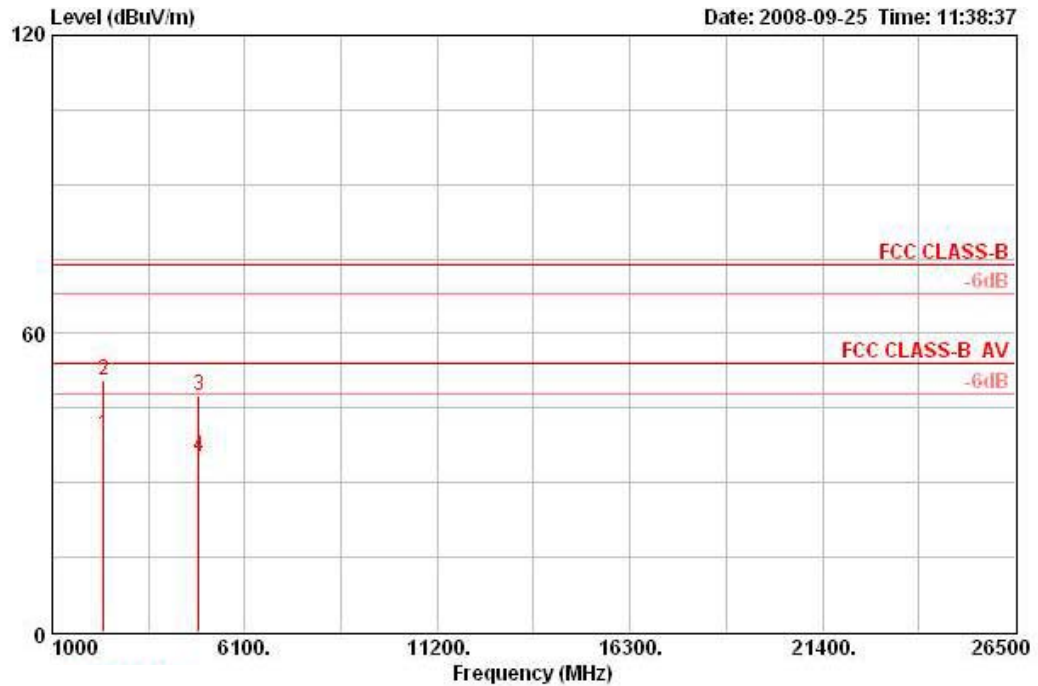
**Vertical**



	Freq	Level	Over	Limit	Read	Antenna	Preamp	Cable	Remark	Pol/Phase	Table	Ant
	MHz	dBuV/m	Limit	Line	Level	Factor	Factor	Loss			Pos	Pos
			dB	dBuV/m	dBuV	dB/m	dB	dB			deg	cm
1	2372.200	46.53	-7.47	54.00	49.59	28.01	34.97	3.90	AVERAGE	VERTICAL	164	100
2	2374.600	64.18	-9.82	74.00	67.24	28.01	34.97	3.90	Peak	VERTICAL	164	100
3	4843.960	36.67	-17.33	54.00	32.02	33.42	35.25	6.47	AVERAGE	VERTICAL	254	100
4	4845.240	50.76	-23.24	74.00	46.11	33.42	35.25	6.47	PEAK	VERTICAL	254	100

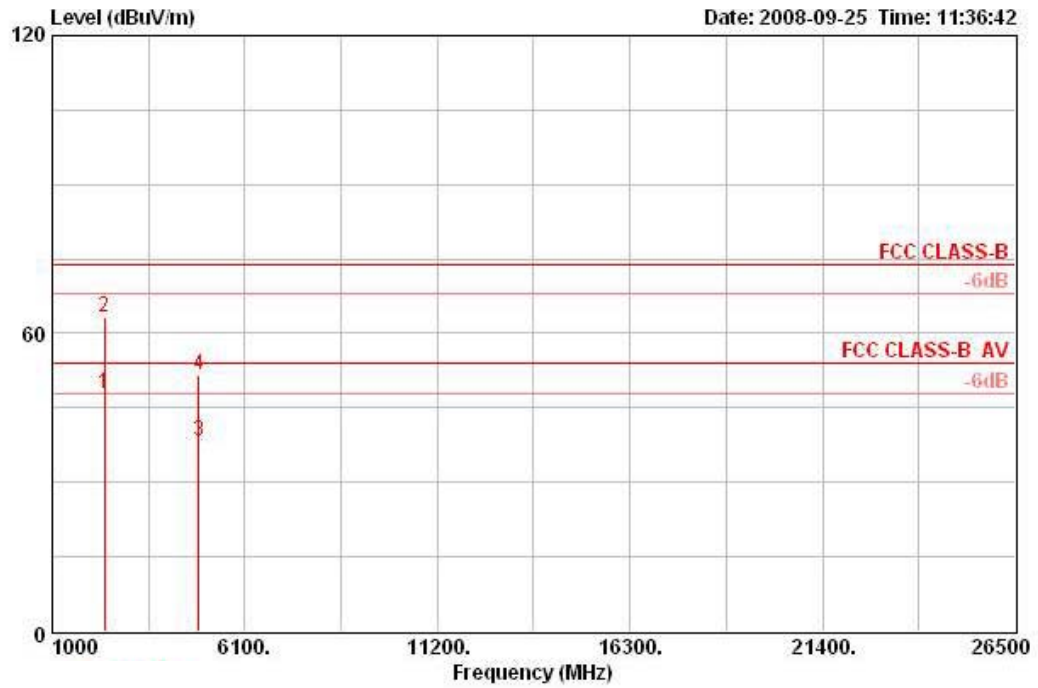
Temperature	24.3°C	Humidity	56%
Test Engineer	Allen Liu	Configurations	Draft n MCS0 40MHz Ch 6 Ant. 1

**Horizontal**



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Remark	Pol/Phase	Table Pos	Ant Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB			deg	cm
1	2365.200	39.52	-14.48	54.00	42.62	27.97	34.97	3.90	AVERAGE	HORIZONTAL	32	100
2	2368.400	50.77	-23.23	74.00	53.87	27.97	34.97	3.90	PEAK	HORIZONTAL	32	100
3	4875.200	47.43	-26.57	74.00	42.63	33.48	35.25	6.56	PEAK	HORIZONTAL	360	100
4	4877.940	35.24	-18.76	54.00	30.44	33.48	35.25	6.56	AVERAGE	HORIZONTAL	360	100

**Vertical**

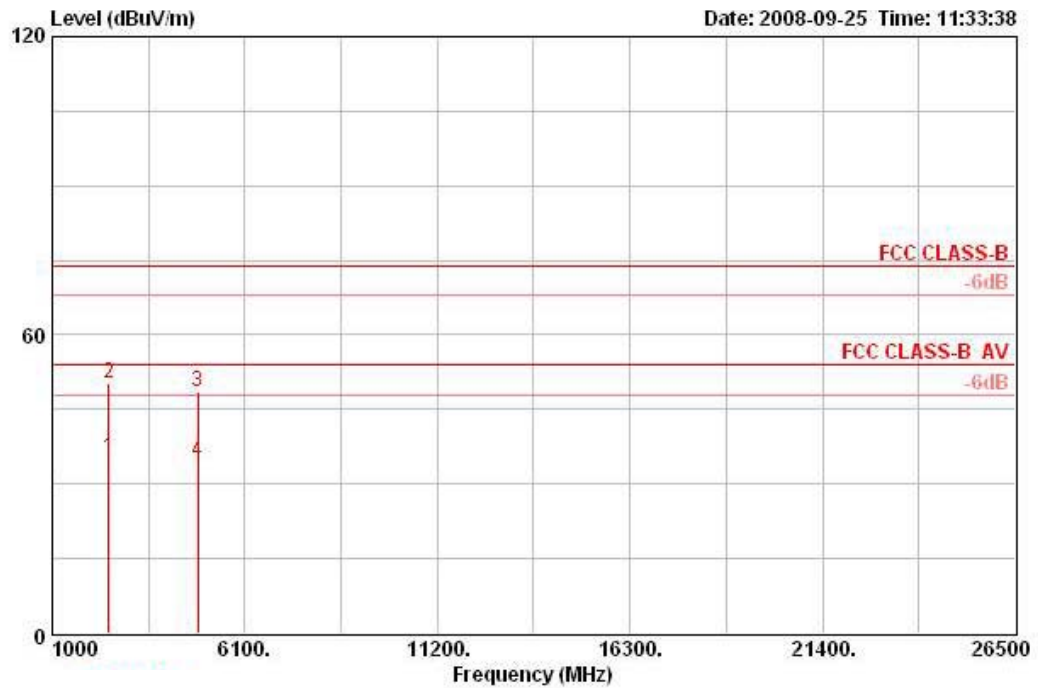


	Freq	Level	Over	Limit	Read	Antenna	Preamp	Cable	Remark	Pol/Phase	Table	Ant
	MHz	dBuV/m	Limit	Line	Level	Factor	Factor	Loss			Pos	Pos
			dB	dBuV/m	dBuV	dB/m	dB	dB			deg	cm
1	2373.600	47.87	-6.13	54.00	50.93	28.01	34.97	3.90	AVERAGE	VERTICAL	163	100
2	2375.760	63.08	-10.92	74.00	66.14	28.01	34.97	3.90	PEAK	VERTICAL	163	100
3	4874.000	38.16	-15.84	54.00	33.36	33.48	35.25	6.56	AVERAGE	VERTICAL	287	100
4	4874.200	51.49	-22.51	74.00	46.69	33.48	35.25	6.56	PEAK	VERTICAL	287	100



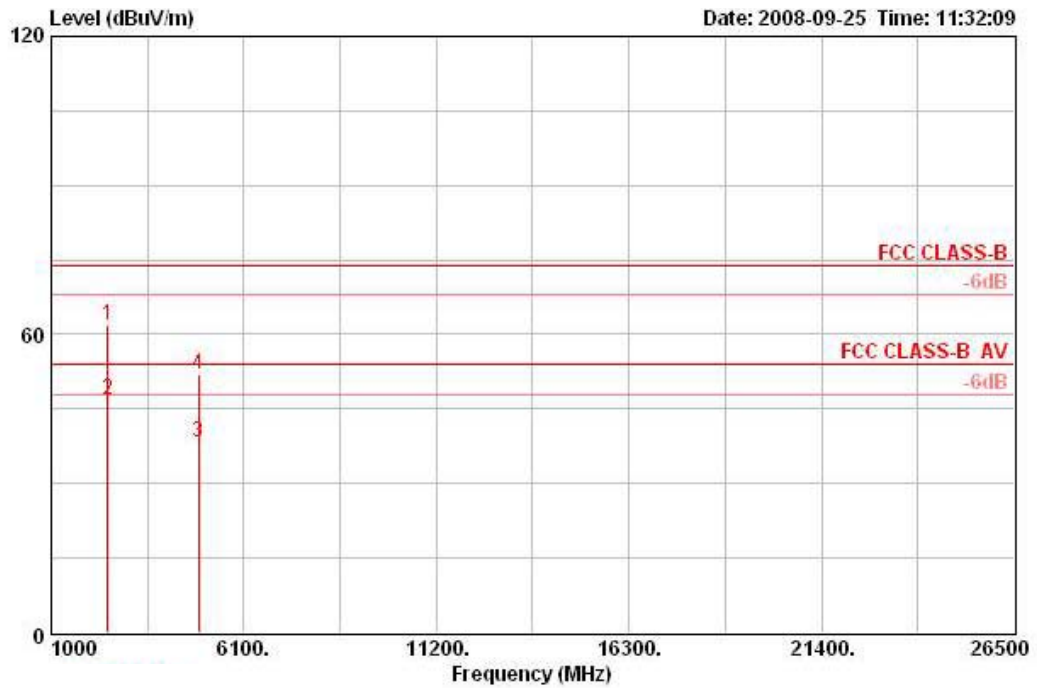
Temperature	24.3°C	Humidity	56%
Test Engineer	Allen Liu	Configurations	Draft n MCS0 40MHz Ch 9 Ant. 1

**Horizontal**



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Remark	Pol/Phase	Table Pos	Ant Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB			deg	cm
1	2502.560	35.37	-18.63	54.00	38.02	28.30	35.02	4.08	AVERAGE	HORIZONTAL	273	100
2	2505.520	50.42	-23.58	74.00	53.01	28.35	35.02	4.08	PEAK	HORIZONTAL	273	100
3	4847.340	48.45	-25.55	74.00	43.80	33.42	35.25	6.47	PEAK	HORIZONTAL	162	100
4	4848.880	34.38	-19.62	54.00	29.73	33.42	35.25	6.47	AVERAGE	HORIZONTAL	162	100

**Vertical**



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Remark	Pol/Phase	Table Pos	Ant Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB			deg	cm
1	2496.000	62.02	-11.98	74.00	64.66	28.30	35.02	4.08	PEAK	VERTICAL	146	100
2	2501.320	46.80	-7.20	54.00	49.45	28.30	35.02	4.08	AVERAGE	VERTICAL	146	100
3	4904.100	38.29	-15.71	54.00	33.34	33.54	35.24	6.65	AVERAGE	VERTICAL	287	100
4	4910.700	51.83	-22.17	74.00	46.88	33.54	35.24	6.65	PEAK	VERTICAL	287	100

**Note:**

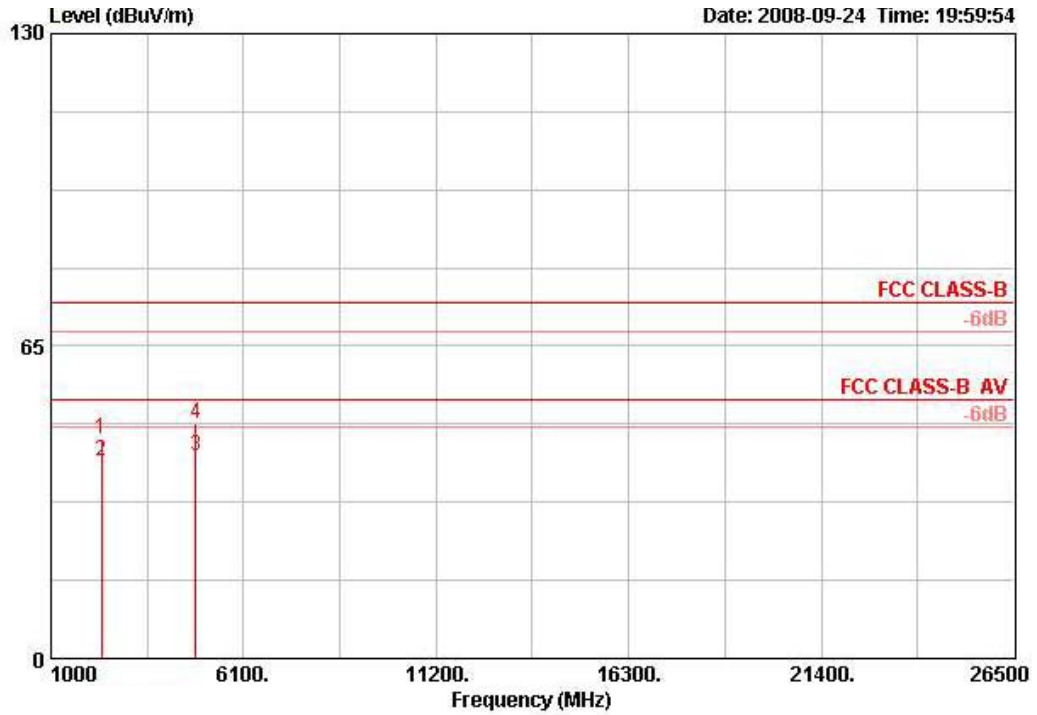
The amplitude of spurious emissions which are attenuated by more than 20 dB below the permissible value has no need to be reported.

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

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

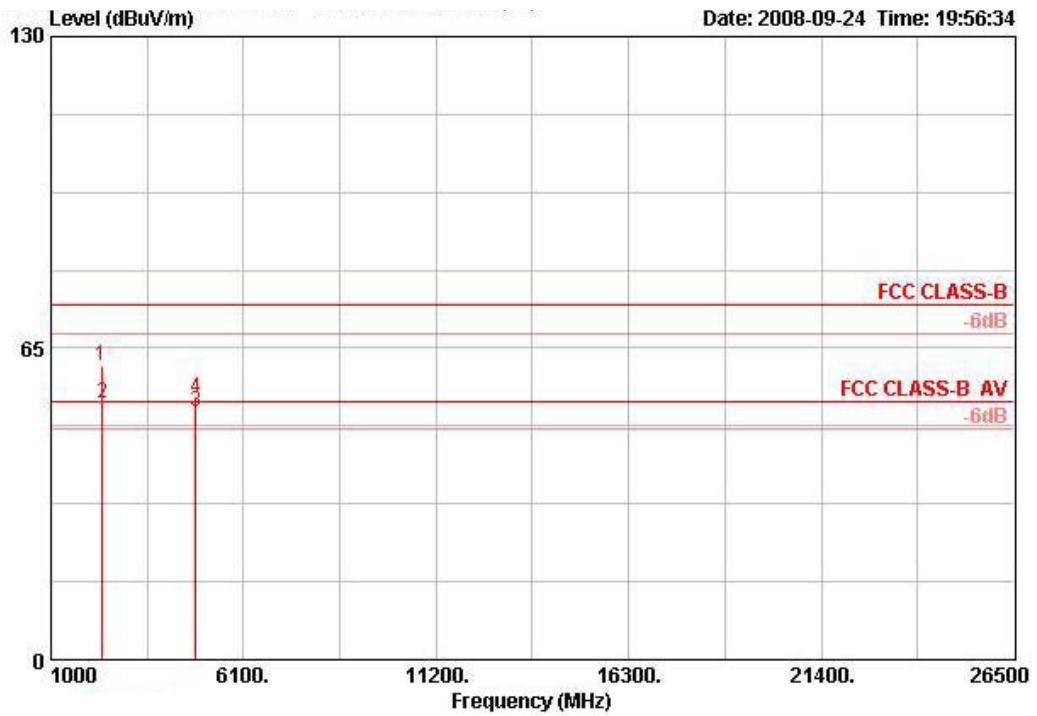
Temperature	24.3°C	Humidity	56%
Test Engineer	Allen Liu	Configurations	802.11b CH 1 Ant. 1

**Horizontal**



	Freq	Level	Over Limit	Limit Line	ReadAntenna 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	2348.040	45.85	-28.15	74.00	50.47	28.02	2.33	34.96	PEAK	100	178	HORIZONTAL
2	2348.930	41.25	-12.75	54.00	45.87	28.02	2.33	34.96	AVERAGE	100	178	HORIZONTAL
3	4824.070	42.33	-11.67	54.00	41.73	32.49	3.37	35.26	AVERAGE	104	35	HORIZONTAL
4	4824.180	49.03	-24.97	74.00	48.43	32.49	3.37	35.26	PEAK	104	35	HORIZONTAL

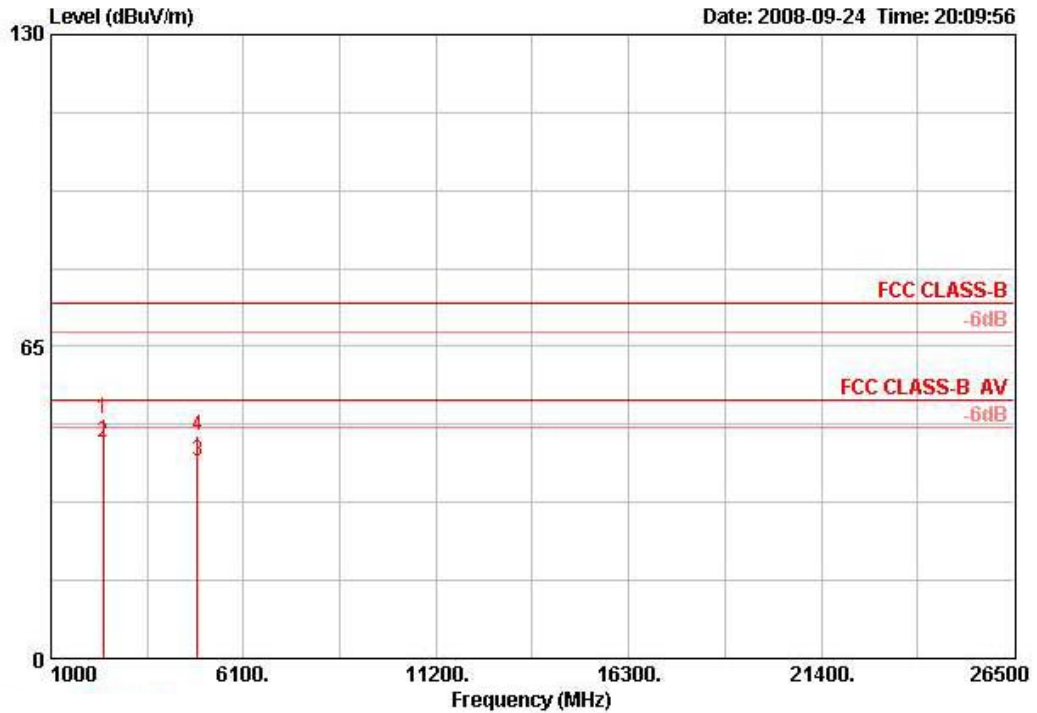
**Vertical**



	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	2348.800	61.20	-12.80	74.00	65.81	28.02	2.33	34.96	PEAK	100	166	VERTICAL
2 !	2349.320	53.64	-0.36	54.00	58.25	28.02	2.33	34.96	AVERAGE	100	166	VERTICAL
3 !	4824.050	51.79	-2.21	54.00	51.19	32.49	3.37	35.26	AVERAGE	100	284	VERTICAL
4	4824.100	54.49	-19.51	74.00	53.90	32.49	3.37	35.26	PEAK	100	284	VERTICAL

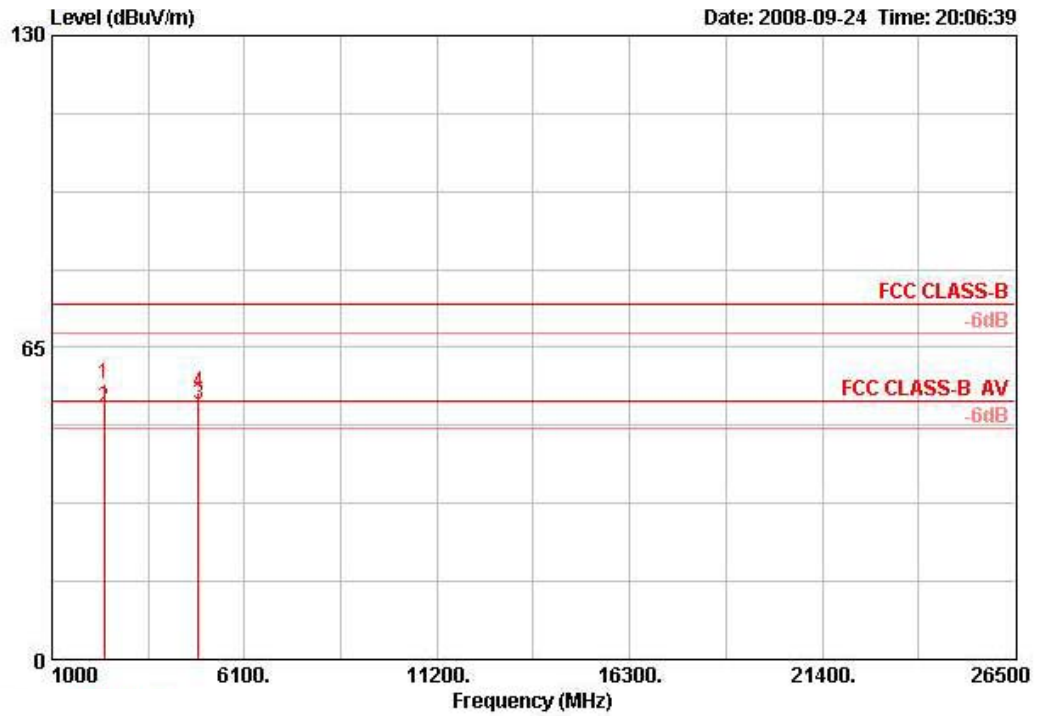
Temperature	24.3°C	Humidity	56%
Test Engineer	Allen Liu	Configurations	802.11b CH 6 Ant. 1

**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	2373.320	49.93	-24.07	74.00	54.62	27.97	2.35	35.01	PEAK	100	178	HORIZONTAL
2	2373.860	44.98	-9.02	54.00	49.67	27.97	2.35	35.01	AVERAGE	100	178	HORIZONTAL
3	4874.050	40.92	-13.08	54.00	40.10	32.58	3.38	35.15	AVERAGE	117	241	HORIZONTAL
4	4874.410	46.25	-27.75	74.00	45.42	32.58	3.38	35.15	PEAK	117	241	HORIZONTAL

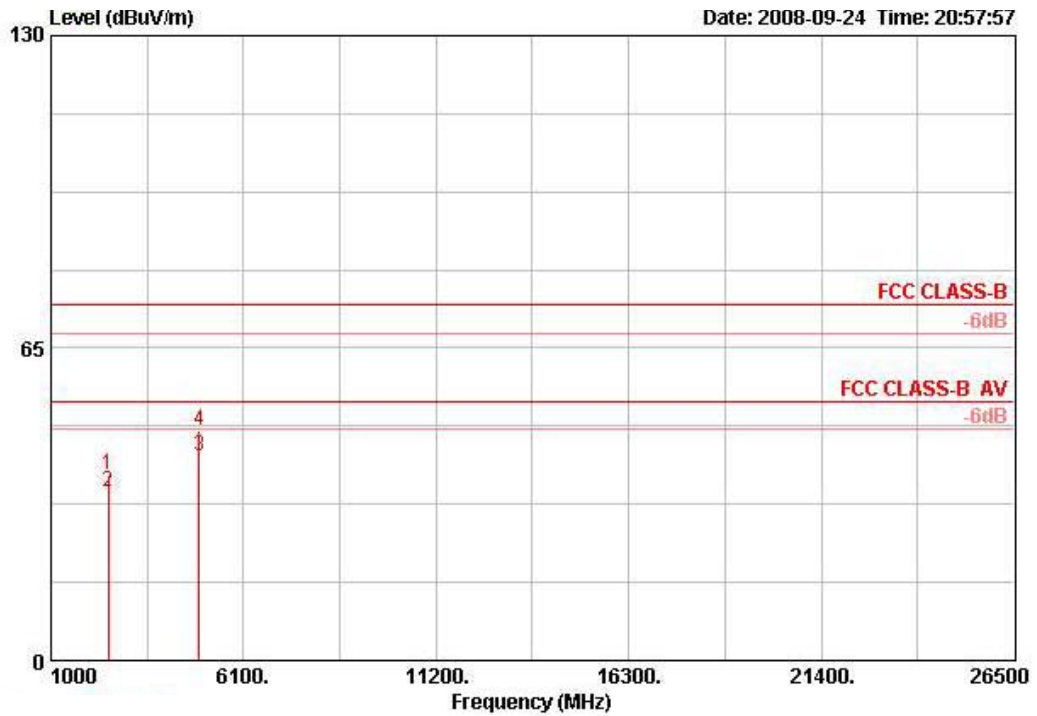
**Vertical**



	Freq	Level	Over Limit	Limit Line	ReadAntenna 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	2373.120	57.49	-16.51	74.00	62.17	27.97	2.35	35.01	PEAK	100	82	VERTICAL
2 !	2374.300	52.29	-1.71	54.00	56.98	27.97	2.35	35.01	AVERAGE	100	82	VERTICAL
3 !	4874.050	53.20	-0.80	54.00	52.38	32.58	3.38	35.15	AVERAGE	102	271	VERTICAL
4	4874.060	55.74	-18.26	74.00	54.92	32.58	3.38	35.15	PEAK	102	271	VERTICAL

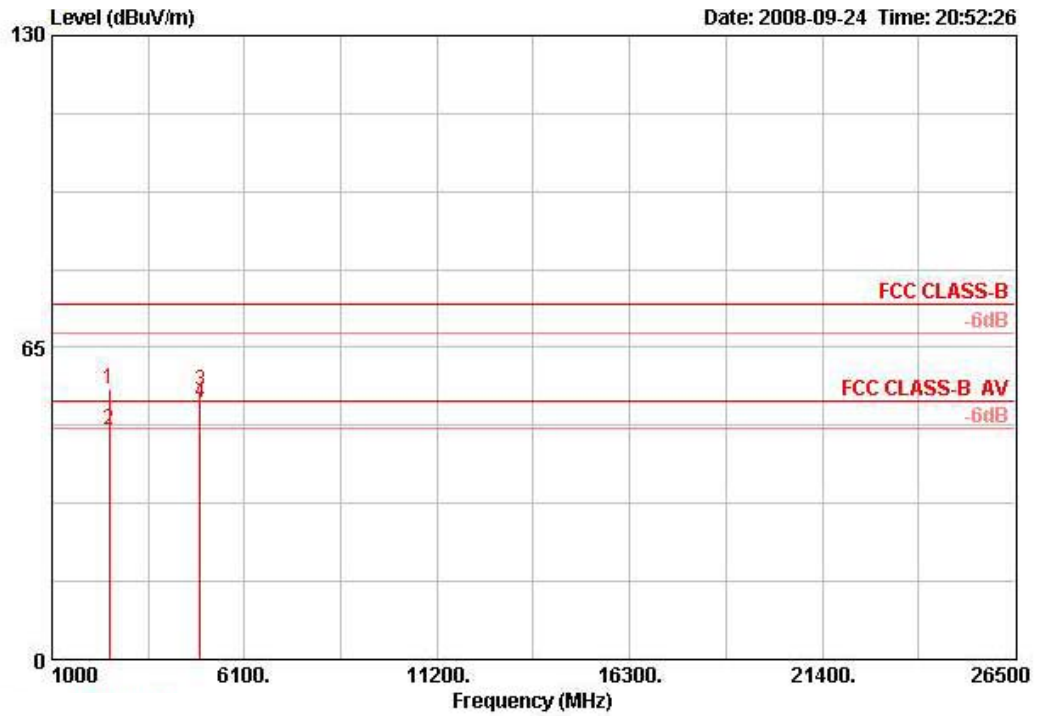
Temperature	24.3°C	Humidity	56%
Test Engineer	Allen Liu	Configurations	802.11b CH 11 Ant. 1

Horizontal



	Freq	Level	Over Limit	Limit Line	ReadAntenna 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	2521.060	38.71	-35.29	74.00	43.28	27.85	2.47	34.88	PEAK	100	184	HORIZONTAL
2	2521.260	35.06	-18.94	54.00	39.63	27.85	2.47	34.88	AVERAGE	100	184	HORIZONTAL
3	4924.030	42.64	-11.36	54.00	41.60	32.68	3.40	35.03	AVERAGE	116	241	HORIZONTAL
4	4924.170	47.72	-26.28	74.00	46.68	32.68	3.40	35.03	PEAK	116	241	HORIZONTAL

**Vertical**

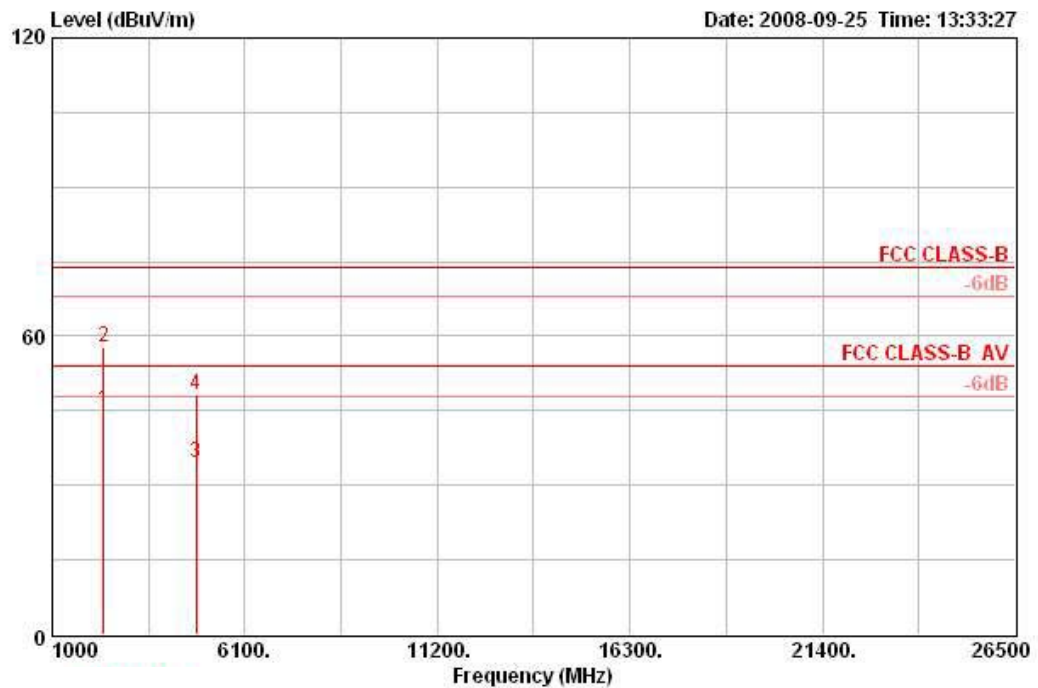


	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos	Pol/Phase
	MHz	dBUV/m	dB	dBUV/m	dBuV	dB/m	dB	dB		cm	deg	
1	2521.060	56.28	-17.72	74.00	60.85	27.85	2.47	34.88	PEAK	100	148	VERTICAL
2	2521.280	47.79	-6.21	54.00	52.35	27.85	2.47	34.88	AVERAGE	100	148	VERTICAL
3	4924.030	55.95	-18.05	74.00	54.91	32.68	3.40	35.03	PEAK	102	271	VERTICAL
4 !	4924.050	53.39	-0.61	54.00	52.35	32.68	3.40	35.03	AVERAGE	102	271	VERTICAL



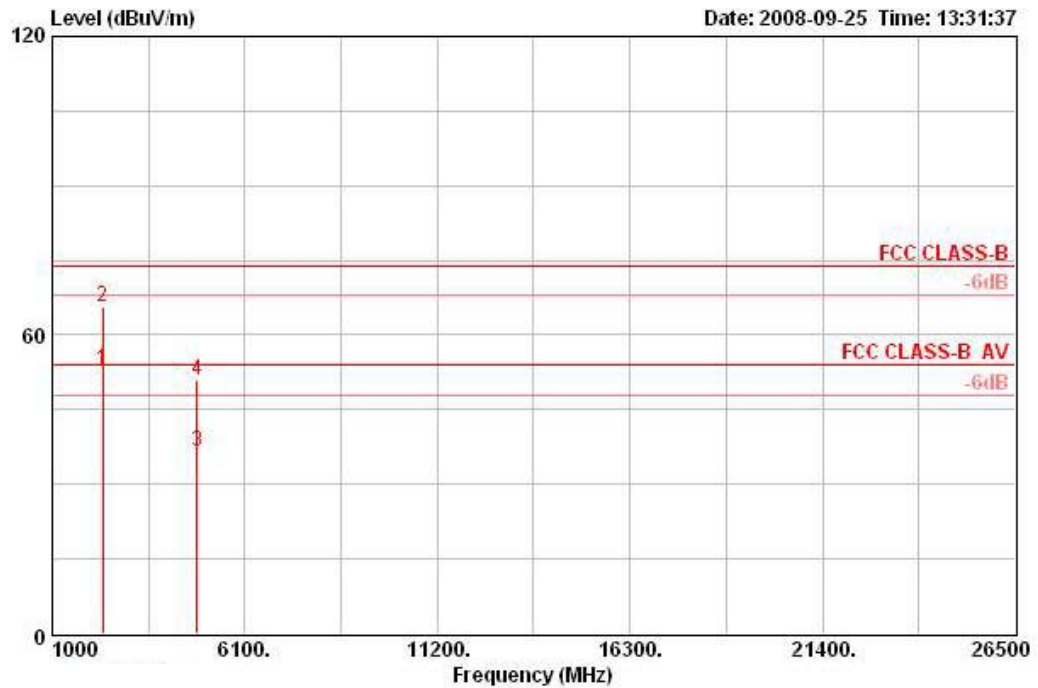
Temperature	24.3°C	Humidity	56%
Test Engineer	Allen Liu	Configurations	802.11g CH 1 Ant. 1

**Horizontal**



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Remark	Pol/Phase	Table Pos	Ant Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB			deg	cm
1	2350.120	45.27	-8.73	54.00	48.40	27.93	34.96	3.90	AVERAGE	HORIZONTAL	32	100
2	2350.920	57.62	-16.38	74.00	60.76	27.93	34.96	3.90	PEAK	HORIZONTAL	32	100
3	4820.700	34.37	-19.63	54.00	29.84	33.39	35.25	6.39	AVERAGE	HORIZONTAL	0	100
4	4822.020	48.25	-25.75	74.00	43.72	33.39	35.25	6.39	PEAK	HORIZONTAL	0	100

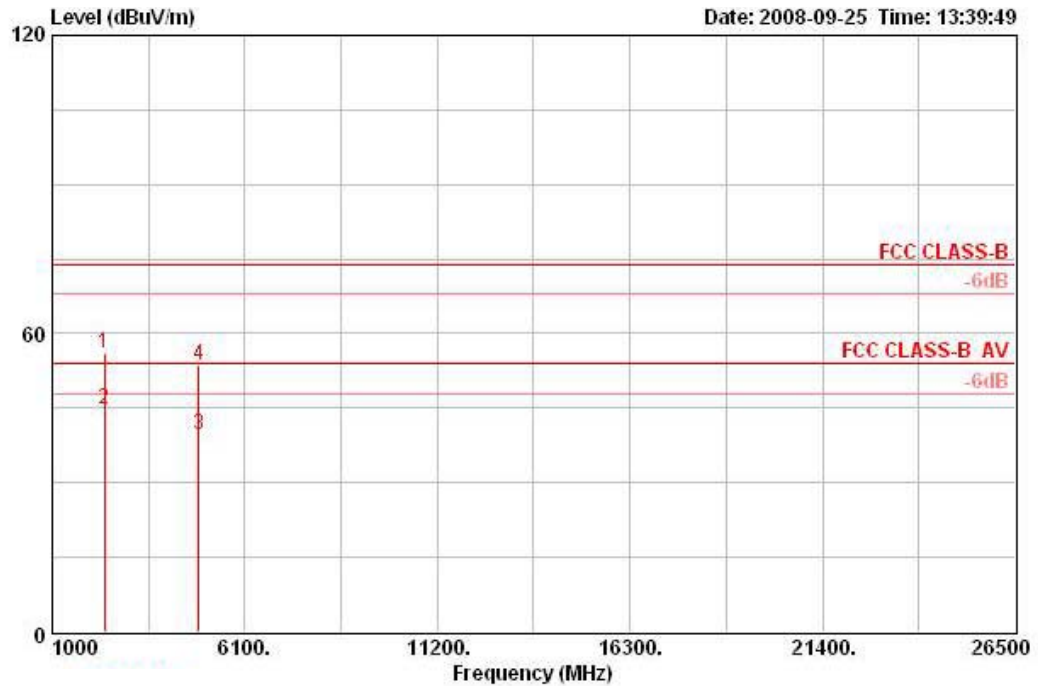
**Vertical**



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Remark	Pol/Phase	Table Pos	Ant Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB			deg	cm
1	2347.360	52.87	-1.13	54.00	56.00	27.93	34.96	3.90	AVERAGE	VERTICAL	174	100
2	2347.960	65.52	-8.48	74.00	68.66	27.93	34.96	3.90	PEAK	VERTICAL	174	100
3	4824.200	36.43	-17.57	54.00	31.90	33.39	35.25	6.39	AVERAGE	VERTICAL	318	137
4	4824.780	50.78	-23.22	74.00	46.25	33.39	35.25	6.39	PEAK	VERTICAL	318	137

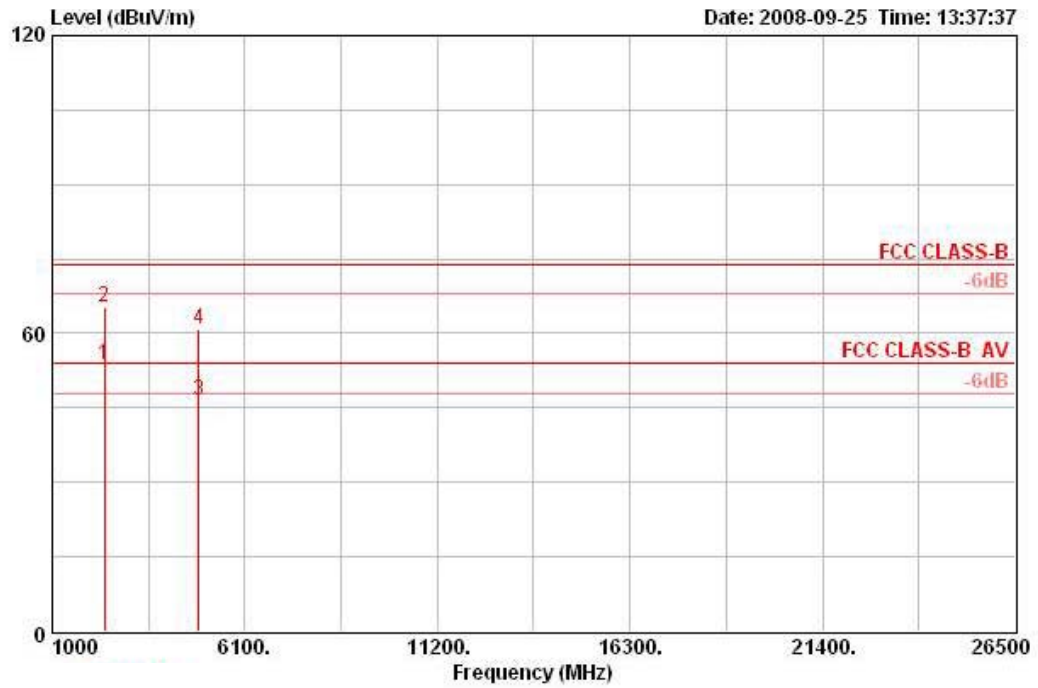
Temperature	24.3°C	Humidity	56%
Test Engineer	Allen Liu	Configurations	802.11g CH 6 Ant. 1

**Horizontal**



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Remark	Pol/Phase	Table Pos	Ant Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB			deg	cm
1	2372.360	56.04	-17.96	74.00	59.10	28.01	34.97	3.90	PEAK	HORIZONTAL	35	100
2	2372.400	44.81	-9.19	54.00	47.87	28.01	34.97	3.90	AVERAGE	HORIZONTAL	35	100
3	4871.920	39.49	-14.51	54.00	34.70	33.48	35.25	6.56	AVERAGE	HORIZONTAL	114	127
4	4874.900	53.80	-20.20	74.00	49.01	33.48	35.25	6.56	PEAK	HORIZONTAL	114	127

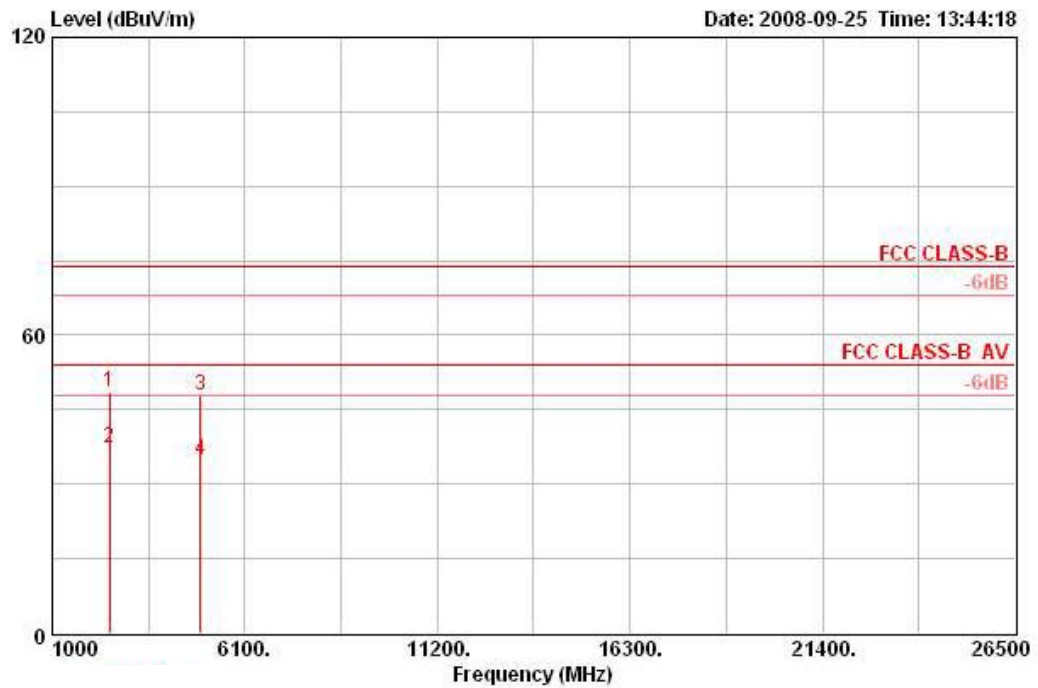
**Vertical**



	Ereq	Level	Over	Limit	Read	Antenna	Preamp	Cable	Remark	Pol/Phase	Table	Ant
	MHz	dBuV/m	dB	dBuV/m	Level	Factor	Factor	Loss			Pos	Pos
					dBuV	dB/m	dB	dB			deg	cm
1	2372.460	53.76	-0.24	54.00	56.81	28.01	34.97	3.90	AVERAGE	VERTICAL	174	100
2	2373.200	65.42	-8.58	74.00	68.48	28.01	34.97	3.90	PEAK	VERTICAL	174	100
3	4874.540	46.35	-7.65	54.00	41.55	33.48	35.25	6.56	AVERAGE	VERTICAL	288	118
4	4876.840	60.97	-13.03	74.00	56.17	33.48	35.25	6.56	PEAK	VERTICAL	288	118

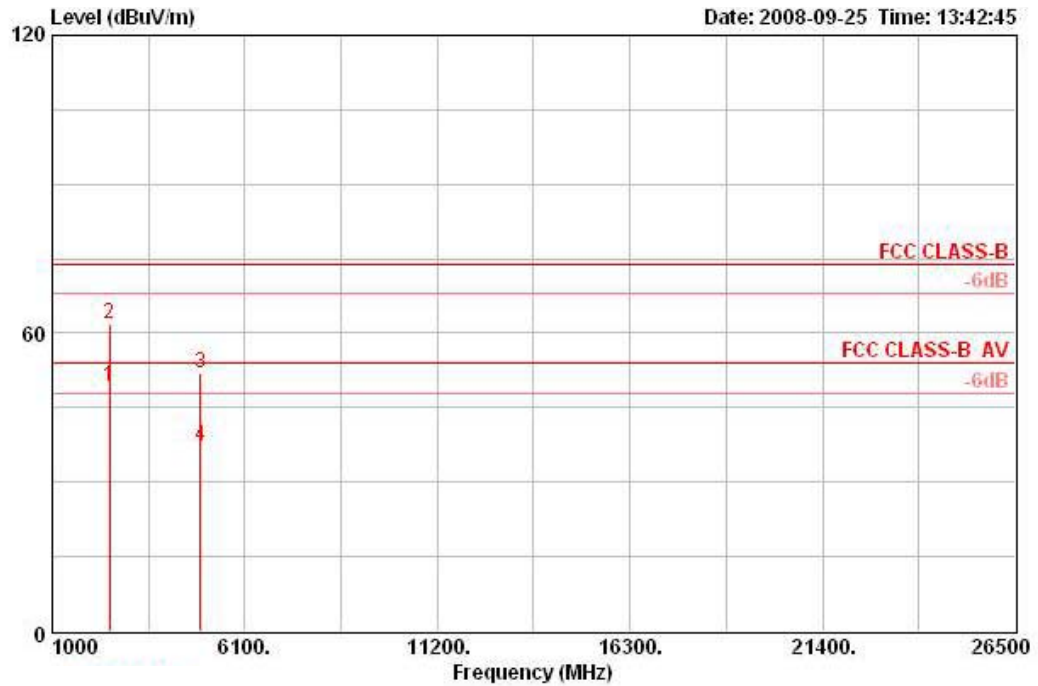
Temperature	24.3°C	Humidity	56%
Test Engineer	Allen Liu	Configurations	802.11g CH 11 Ant. 1

**Horizontal**



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Remark	Pol/Phase	Table Pos	Ant Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB			deg	cm
1	2523.120	48.64	-25.36	74.00	51.15	28.41	35.03	4.12	PEAK	HORIZONTAL	32	100
2	2523.240	37.18	-16.82	54.00	39.68	28.41	35.03	4.12	AVERAGE	HORIZONTAL	32	100
3	4921.120	47.83	-26.17	74.00	42.76	33.58	35.24	6.73	PEAK	HORIZONTAL	0	100
4	4923.740	34.80	-19.20	54.00	29.73	33.58	35.24	6.73	AVERAGE	HORIZONTAL	0	100

**Vertical**



	Freq	Level	Over	Limit	Read	Antenna	Preamp	Cable	Remark	Pol/Phase	Table	Ant
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB			deg	cm
1 !	2514.760	49.26	-4.74	54.00	51.86	28.35	35.02	4.08	AVERAGE	VERTICAL	147	100
2	2515.160	61.72	-12.28	74.00	64.31	28.35	35.02	4.08	PEAK	VERTICAL	147	100
3	4921.480	51.82	-22.18	74.00	46.75	33.58	35.24	6.73	PEAK	VERTICAL	282	113
4	4924.100	37.30	-16.70	54.00	32.23	33.58	35.24	6.73	AVERAGE	VERTICAL	282	113

**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)	1 MHz / 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	24.3°C	Humidity	56%
Test Engineer	Allen Liu	Configurations	Draft n MCS0 20MHz Ch 1, 6, 11 Ant. 1
Test Date	Aug. 25, 2008		

## Channel 1

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Preamp Factor	Cable Loss	Remark	Pol/Phase	Table Pos	Ant Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB			deg	cm
1 ☺	2389.800	73.25	-0.75	74.00	42.32	28.05	0.00	2.88	PEAK	VERTICAL	263	100
2 !	2390.000	51.61	-2.39	54.00	20.67	28.05	0.00	2.88	AVERAGE	VERTICAL	263	100
3 ☺	2409.600	112.44			81.47	28.09	0.00	2.88	PEAK	VERTICAL	263	100
4 ☺	2413.600	102.05			71.08	28.09	0.00	2.88	AVERAGE	VERTICAL	263	100

Item 3, 4 are the fundamental frequency at 2412 MHz

## Channel 6

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Preamp Factor	Cable Loss	Remark	Pol/Phase	Table Pos	Ant Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB			deg	cm
1	2387.200	63.82	-10.18	74.00	32.91	28.05	0.00	2.86	PEAK	VERTICAL	262	100
2 !	2390.000	49.01	-4.99	54.00	18.07	28.05	0.00	2.88	AVERAGE	VERTICAL	262	100
3 ☺	2438.400	115.20			84.13	28.18	0.00	2.90	PEAK	VERTICAL	262	100
4 ☺	2438.800	104.76			73.69	28.18	0.00	2.90	AVERAGE	VERTICAL	262	100
5 !	2483.500	48.47	-5.53	54.00	17.28	28.26	0.00	2.93	AVERAGE	VERTICAL	262	100
6	2483.900	64.86	-9.14	74.00	33.67	28.26	0.00	2.93	PEAK	VERTICAL	262	100

Item 3, 4 are the fundamental frequency at 2437MHz.

## Channel 11

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Preamp Factor	Cable Loss	Remark	Pol/Phase	Table Pos	Ant Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB			deg	cm
1 ☺	2465.000	111.98			80.85	28.22	0.00	2.91	PEAK	VERTICAL	327	100
2 ☺	2465.200	101.30			70.17	28.22	0.00	2.91	AVERAGE	VERTICAL	327	100
3 ☺	2483.500	53.48	-0.52	54.00	22.30	28.26	0.00	2.93	AVERAGE	VERTICAL	327	100
4 ☺	2484.500	72.38	-1.62	74.00	41.20	28.26	0.00	2.93	PEAK	VERTICAL	327	100

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



Temperature	24.3°C	Humidity	56%
Test Engineer	Allen Liu	Configurations	Draft n MCS0 40MHz Ch 3, 6, 9 Ant. 1
Test Date	Aug. 25, 2008		

**Channel 3**

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Preamp Factor	Cable Loss	Remark	Pol/Phase	Table Pos	Ant Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB			deg	cm
1 ☺	2385.600	73.73	-0.27	74.00	42.82	28.05	0.00	2.86	PEAK	VERTICAL	262	100
2 ☺	2390.000	53.09	-0.91	54.00	22.16	28.05	0.00	2.88	AVERAGE	VERTICAL	262	100
3 ☺	2418.800	108.84			77.85	28.09	0.00	2.90	PEAK	VERTICAL	262	100
4 ☺	2427.600	98.59			67.56	28.13	0.00	2.90	AVERAGE	VERTICAL	262	100

Item 3, 4 are the fundamental frequency at 2422 MHz.

**Channel 6**

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Preamp Factor	Cable Loss	Remark	Pol/Phase	Table Pos	Ant Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB			deg	cm
1 ☺	2389.600	71.79	-2.21	74.00	40.87	28.05	0.00	2.86	PEAK	VERTICAL	262	100
2 ☺	2390.000	53.52	-0.48	54.00	22.59	28.05	0.00	2.88	AVERAGE	VERTICAL	262	100
3 ☺	2429.400	99.65			68.62	28.13	0.00	2.90	AVERAGE	VERTICAL	262	100
4 ☺	2440.200	109.60			78.53	28.18	0.00	2.90	PEAK	VERTICAL	262	100
5 !	2483.500	51.36	-2.64	54.00	20.18	28.26	0.00	2.93	AVERAGE	VERTICAL	262	100
6 !	2485.100	68.42	-5.58	74.00	37.23	28.26	0.00	2.93	PEAK	VERTICAL	262	100

Item 3, 4 are the fundamental frequency at 2437MHz.

**Channel 9**

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Preamp Factor	Cable Loss	Remark	Pol/Phase	Table Pos	Ant Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB			deg	cm
1 ☺	2439.200	108.39			77.32	28.18	0.00	2.90	PEAK	VERTICAL	328	100
2 ☺	2441.600	97.86			66.78	28.18	0.00	2.91	AVERAGE	VERTICAL	328	100
3 ☺	2483.500	53.54	-0.46	54.00	22.36	28.26	0.00	2.93	AVERAGE	VERTICAL	328	100
4 !	2483.500	70.79	-3.21	74.00	39.61	28.26	0.00	2.93	PEAK	VERTICAL	328	100

Item 1, 2 are the fundamental frequency at 2452 MHz.

Note:

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

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

Temperature	24.3°C	Humidity	56%
Test Engineer	Allen Liu	Configurations	802.11b CH 1, 6, 11 Ant. 1
Test Date	Aug. 24, 2008		

**Channel 1**

	Freq	Level	Over Limit	Limit Line	ReadAntenna 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	53.30	-0.70	54.00	23.00	27.94	2.35	0.00	AVERAGE	100	198	VERTICAL
2	2386.800	63.40	-10.60	74.00	33.11	27.94	2.35	0.00	PEAK	100	198	VERTICAL
3 @	2412.800	108.81			78.53	27.92	2.36	0.00	AVERAGE	100	198	VERTICAL
4 over	2413.600	113.38			83.10	27.92	2.36	0.00	PEAK	100	198	VERTICAL

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

**Channel 6**

	Freq	Level	Over Limit	Limit Line	ReadAntenna 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	2389.000	55.64	-18.36	74.00	25.34	27.94	2.35	0.00	PEAK	100	203	VERTICAL
2	2390.000	45.93	-8.07	54.00	15.62	27.94	2.36	0.00	AVERAGE	100	203	VERTICAL
3 @	2434.400	106.94			76.66	27.90	2.38	0.00	AVERAGE	100	203	VERTICAL
4 over	2435.800	111.41			81.13	27.90	2.38	0.00	PEAK	100	203	VERTICAL
5	2483.500	44.97	-9.03	54.00	14.73	27.82	2.41	0.00	AVERAGE	100	203	VERTICAL
6	2483.500	54.75	-19.25	74.00	24.51	27.82	2.41	0.00	PEAK	100	203	VERTICAL

Item 3, 4 are the fundamental frequency at 2437MHz.

**Channel 11**

	Freq	Level	Over Limit	Limit Line	ReadAntenna 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	108.21			77.97	27.85	2.40	0.00	AVERAGE	100	35	VERTICAL
2 over	2460.800	112.79			82.55	27.85	2.40	0.00	PEAK	100	35	VERTICAL
3	2487.300	61.89	-12.11	74.00	31.65	27.82	2.41	0.00	PEAK	100	35	VERTICAL
4 !	2487.300	51.04	-2.96	54.00	20.80	27.82	2.41	0.00	AVERAGE	100	35	VERTICAL

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

Temperature	24.3°C	Humidity	56%
Test Engineer	Allen Liu	Configurations	802.11g CH 1, 6, 11 Ant. 1
Test Date	Aug. 25, 2008		

**Channel 1**

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Remark	Pol/Phase	Table Pos	Ant Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB			deg	cm
1 ☉	2388.400	73.11	-0.89	74.00	42.20	28.05	0.00	2.86	PEAK	VERTICAL	331	100
2 ☉	2390.000	53.81	-0.19	54.00	22.87	28.05	0.00	2.88	AVERAGE	VERTICAL	331	100
3 ☉	2413.800	113.32			82.35	28.09	0.00	2.88	PEAK	VERTICAL	331	100
4 ☉	2414.600	102.57			71.60	28.09	0.00	2.88	AVERAGE	VERTICAL	331	100

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

**Channel 6**

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Remark	Pol/Phase	Table Pos	Ant Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB			deg	cm
1 !	2389.400	70.04	-3.96	74.00	39.12	28.05	0.00	2.86	PEAK	VERTICAL	262	100
2 ☉	2390.000	53.11	-0.89	54.00	22.18	28.05	0.00	2.88	AVERAGE	VERTICAL	262	100
3 ☉	2439.800	108.19			77.12	28.18	0.00	2.90	AVERAGE	VERTICAL	262	100
4 ☉	2440.200	118.55			87.48	28.18	0.00	2.90	PEAK	VERTICAL	262	100
5 !	2483.500	51.51	-2.49	54.00	20.33	28.26	0.00	2.93	AVERAGE	VERTICAL	262	100
6	2487.000	67.77	-6.23	74.00	36.58	28.26	0.00	2.93	PEAK	VERTICAL	262	100

Item 3, 4 are the fundamental frequency at 2437 MHz.

**Channel 11**

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Remark	Pol/Phase	Table Pos	Ant Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB			deg	cm
1 ☉	2463.800	111.03			79.91	28.22	0.00	2.91	PEAK	VERTICAL	262	100
2 ☉	2464.800	100.37			69.25	28.22	0.00	2.91	AVERAGE	VERTICAL	262	100
3 ☉	2483.500	53.45	-0.55	54.00	22.26	28.26	0.00	2.93	AVERAGE	VERTICAL	262	100
4 !	2483.500	69.36	-4.64	74.00	38.18	28.26	0.00	2.93	PEAK	VERTICAL	262	100

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

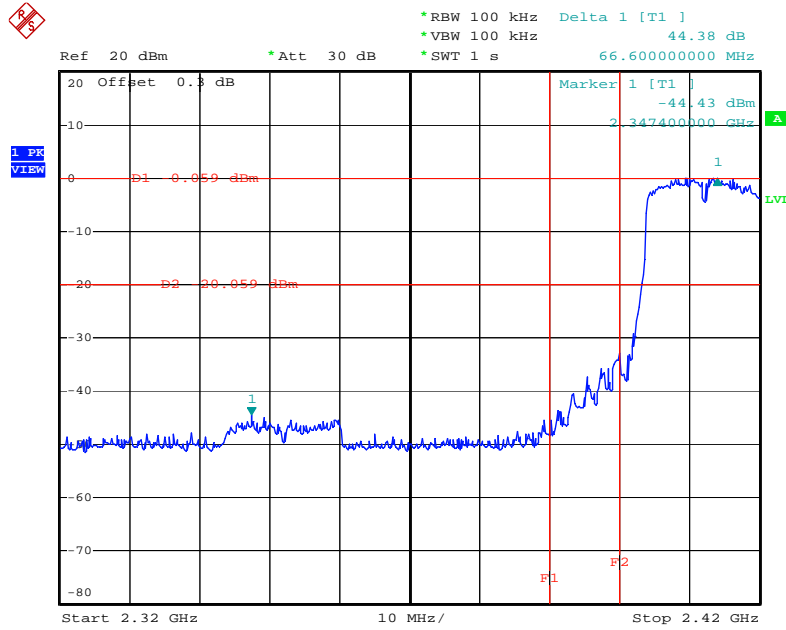
Note:

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

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

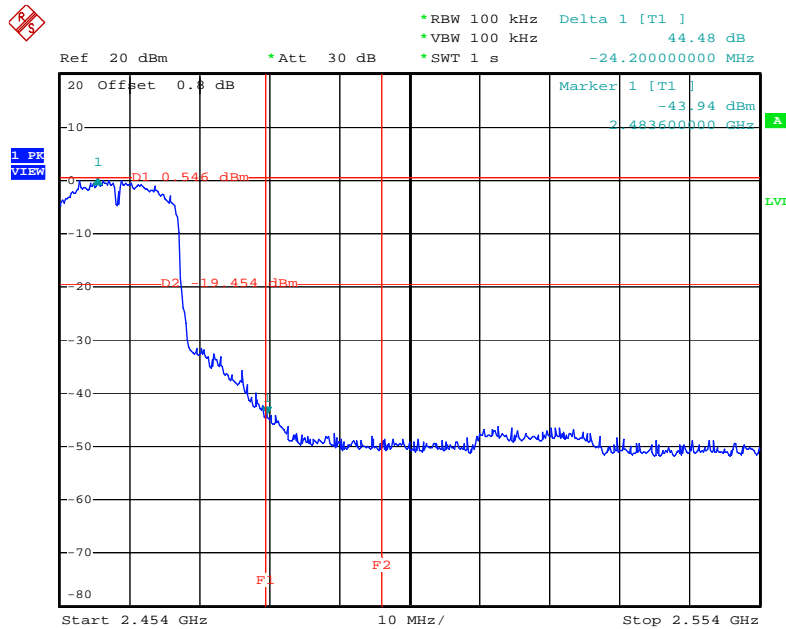
For Emission not in Restricted Band

Low Band Edge Plot on Configuration Drafft n MCS0 20MHz Ant. 1 / 2412 MHz



Date: 25.SEP.2008 19:02:41

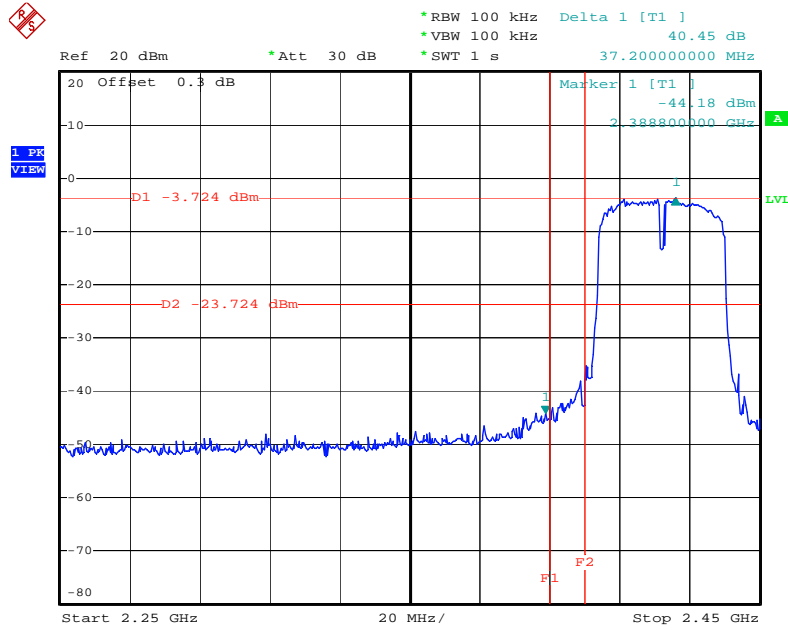
High Band Edge Plot on Configuration Drafft n MCS0 20MHz Ant. 1 / 2462 MHz



Date: 11.NOV.2008 14:16:03

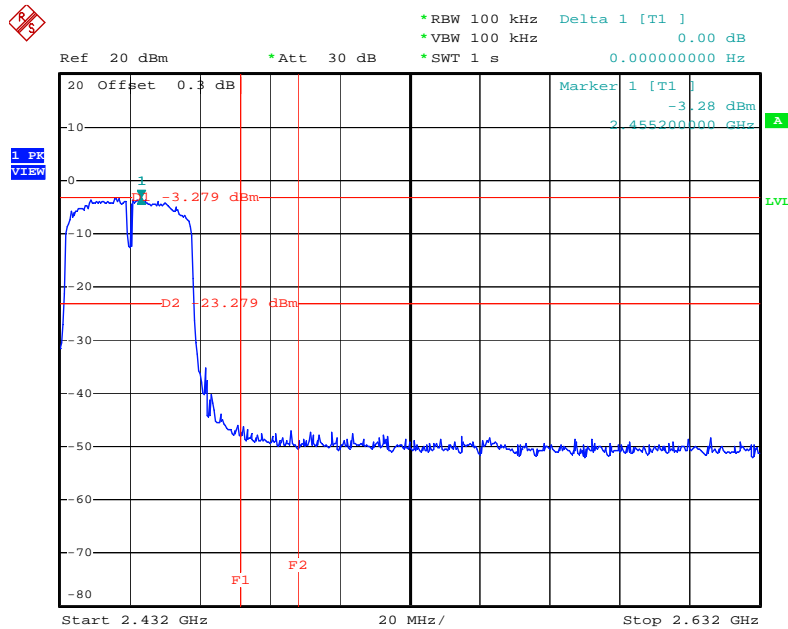
For Emission not in Restricted Band

Low Band Edge Plot on Configuration Drafft n MCS0 40MHz Ant. 1 / 2422 MHz



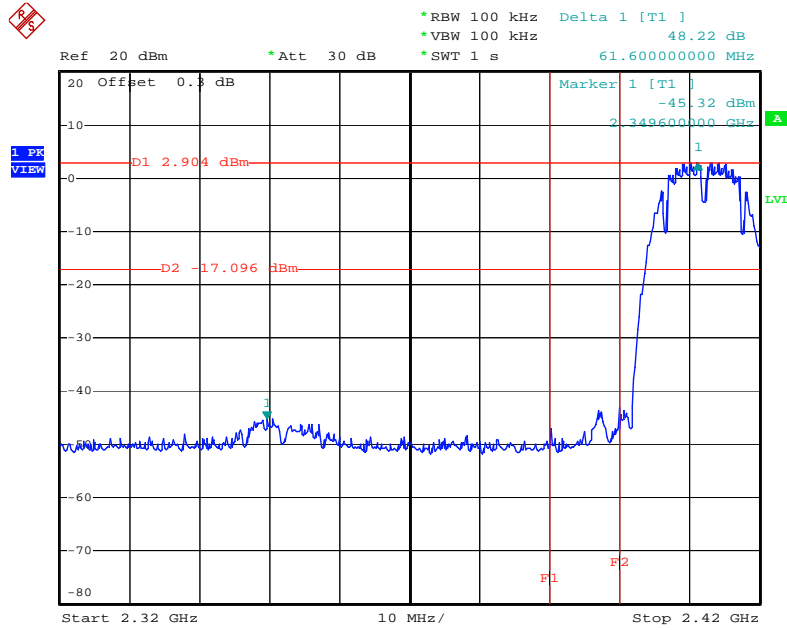
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High Band Edge Plot on Configuration Drafft n MCS0 40MHz Ant. 1 / 2452 MHz



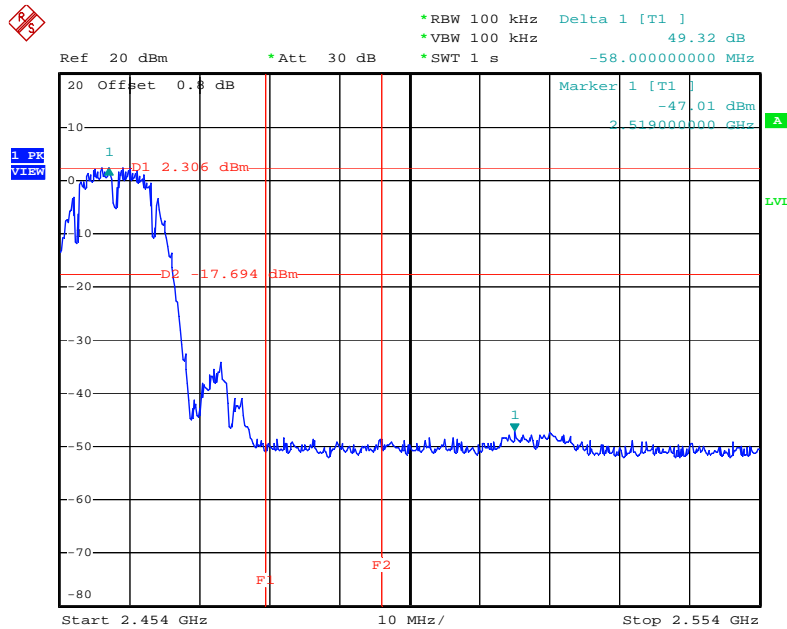
Date: 25.SEP.2008 19:10:22

**Low Band Edge Plot on Configuration IEEE 802.11b Ant. 1 / 2412 MHz**



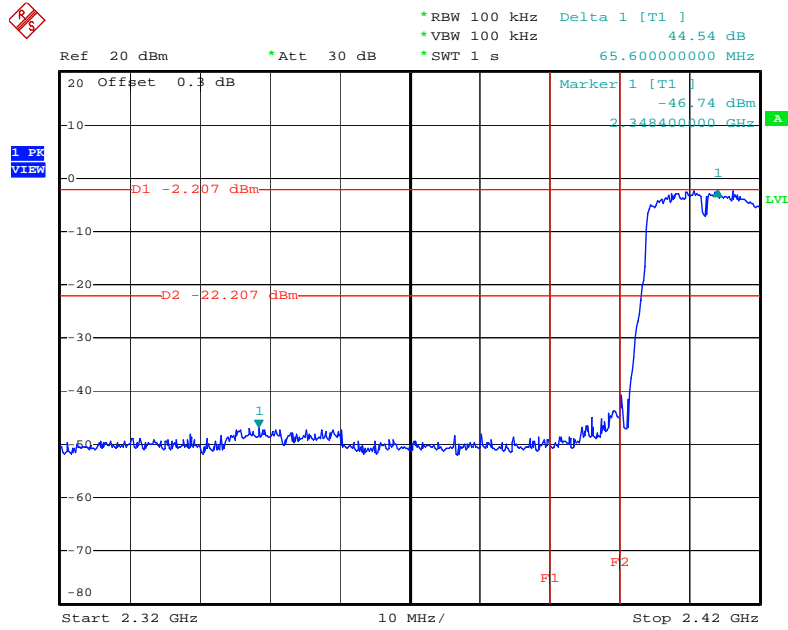
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**High Band Edge Plot on Configuration IEEE 802.11b Ant. 1 / 2462 MHz**



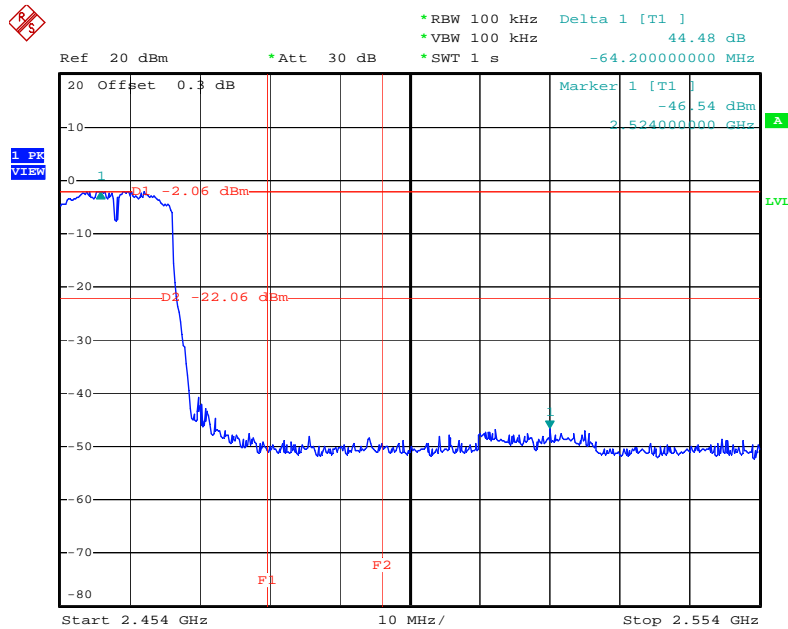
Date: 11.NOV.2008 14:03:13

### Low Band Edge Plot on Configuration IEEE 802.11g Ant. 1 / 2412 MHz



Date: 26.SEP.2008 22:18:57

### High Band Edge Plot on Configuration IEEE 802.11g Ant. 1 / 2462 MHz



Date: 25.SEP.2008 18:56:14

## 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, 2008	Conduction (CO04-HY)
LISN	MessTec	NNB-2/16Z	99079	9kHz – 30MHz	Mar. 31, 2008	Conduction (CO04-HY)
LISN (Support Unit)	EMCO	3810/2NM	9703-1839	9kHz – 30MHz	Mar. 22, 2008	Conduction (CO04-HY)
RF Cable-CON	UTIFLEX	3102-26886-4	CB049	9kHz – 30MHz	Apr. 20, 2008	Conduction (CO04-HY)
ISN	SCHAFFNER	ISN ST08	21653	9kHz – 30MHz	Mar. 27, 2008	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, 2008	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	Jul. 21, 2008	Radiation (03CH03-HY)
Amplifier	MITEQ	AMF-6F-260400	9121372	26.5 GHz - 40 GHz	Jan. 22, 2007*	Radiation (03CH03-HY)
Spectrum Analyzer	R&S	FSP30	100023	9 kHz - 30 GHz	Oct. 08, 2008	Radiation (03CH03-HY)
Loop Antenna	R&S	HFH2-Z2	860004/001	9 kHz - 30 MHz	May 23, 2007*	Radiation (03CH03-HY)
Bilog Antenna	SCHAFFNER	CBL 6112D	22237	30 MHz – 1 GHz	Jul. 12, 2008	Radiation (03CH03-HY)
Horn Antenna	EMCO	3115	6741	1GHz ~ 18GHz	Apr. 04, 2008	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	Jul. 11, 2008	Conducted (TH01-HY)
Power Sensor	R&S	NRV-Z51	100458	DC ~ 30GHz	Jul. 11, 2008	Conducted (TH01-HY)
Power Sensor	R&S	NRV-Z32	100057	30MHz ~ 6GHz	Jul. 11, 2008	Conducted (TH01-HY)
AC Power Source	HPC	HPA-500W	HPA-9100024	AC 0 ~ 300V	May 30, 2008*	Conducted (TH01-HY)
DC Power Source	G.W.	GPC-6030D	C671845	DC 1V ~ 60V	Mar. 13, 2008	Conducted (TH01-HY)
Temp. and Humidity Chamber	Giant Force	GTH-225-20-S	MAB0103-001	N/A	Jul. 18, 2008	Conducted (TH01-HY)
RF CABLE-1m	Jye Bao	RG142	CB034-1m	20MHz ~ 7GHz	Dec. 01, 2007	Conducted (TH01-HY)

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
RF CABLE-2m	Jye Bao	RG142	CB035-2m	20MHz ~ 1GHz	Dec. 01, 2007	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. 10, 2008	Conducted (TH01-HY)
Oscilloscope	Tektonix	TDS380	B016197	400MHz/ 2GS/s	Jun. 27, 2008	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 2 <sup>nd</sup> Rd., Taipei 114, Taiwan, R.O.C. TEL : 886-2-2794-8886 FAX : 886-2-2794-9777
JHUBEI	ADD : No.8, Lane 724, 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

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