

FCC RADIO TEST REPORT

according to

47 CFR FCC Part 15 Subpart C § 15.247

Equipment : **Wireless module**
Model No. : **WL-227N_MII_V2**
Brand Name : **PEGATRON**
Filing Type : **New Application**
Applicant : **PEGATRON CORPORATION**
5F., NO. 76, LIGONG ST., BEITOU DISTRICT,
TAIPEI CITY 112 Taiwan
FCC ID : **VUI-WL227NMIIV2**
Manufacturer : **PEGATRON CORPORATION**
5F., NO. 76, LIGONG ST., BEITOU DISTRICT,
TAIPEI CITY 112 Taiwan
Received Date : Jan. 15, 2010
Final Test Date : Mar. 01, 2010

Statement

Test result included is only for the 802.11b/g 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.



SPORTON International Inc.

No.52 Hwa Ya 1st Rd, Hwa Ya Technology Park, Kwei-Shan Hsiang, Taoyuan Hsien, Taiwan, R.O.C.

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History of This Test Report

Original Issue Date: Mar. 19, 2010

Report No.: FR011109AB

■ No additional attachment.

Additional attachment were issued as following record:

Attachment No.	Issue Date	Description

CERTIFICATE OF COMPLIANCE

according to

47 CFR FCC Part 15 Subpart C § 15.247

Equipment : Wireless module
Model No. : WL-227N_MII_V2
Brand Name : PEGATRON
Applicant : PEGATRON CORPORATION
5F., NO. 76, LIGONG ST., BEITOU DISTRICT,
TAIPEI CITY 112 Taiwan

Sporton International as requested by the applicant to evaluate the EMC performance of the product sample received on Jan. 15, 2010 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.

No.52 Hwa Ya 1st Rd, Hwa Ya Technology Park, Kwei-Shan Hsiang, Taoyuan Hsien, Taiwan, R.O.C.

1 SUMMARY OF THE TEST RESULT

Applied Standard: 47 CFR FCC Part 15 Subpart C				
Part	Rule Section	Description of Test	Result	Under Limit
3.1	15.207	AC Power Line Conducted Emissions	Complies	9.76 dB
3.2	15.247(b)(3)	Maximum Conducted Output Power	Complies	5.11 dB
3.3	15.247(e)	Power Spectral Density	Complies	13.71 dB
3.4	15.247(a)(2)	6dB Spectrum Bandwidth	Complies	-
3.5	15.247(d)	Radiated Emissions	Complies	1.00 dB
3.6	15.247(d)	Band Edge Emissions	Complies	1.03 dB
3.7	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	±8.5×10 ⁻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%

2 GENERAL INFORMATION

2.1 Product Details

Only the radio detail of IEEE 802.11a/b/g is shown in the table below. For more detailed features description, please refer to the manufacturer’s specifications or user’s manual.

Items	Description
Modulation	DSSS for IEEE 802.11b ; OFDM for IEEE 802.11a/g
Data Modulation	DSSS (DBPSK / DQPSK / 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	11a: 5 ; 11b/g: 11
Channel Band Width (99%)	11a: 16.41 MHz ; 11b: 15.16 MHz ; 11g: 16.41 MHz
Conducted Output Power	11a: 24.21 dBm ; 11b: 21.43 dBm ; 11g: 24.17 dBm

2.2 Table for Filed Antenna

Antenna Mode	Single Chain		Two Chain	
	20 MHz	40 MHz	20 MHz	40 MHz
Bandwidth Mode				
802.11b	V	X	X	X
802.11g	V	X	X	X
802.11n(2.4GHz)	V	V	V	V
802.11a (5150~5250MHz)	V	X	X	X
802.11a (5725~5850MHz)	V	X	X	X
802.11n (5150~5250MHz)	V	V	V	V
802.11n (5725~5850MHz)	V	V	V	V

Ant.	Antenna Type	Model Name	Product description	Gain (dBi)		Tx/Rx mode	REMARK
				2.4G	5G		
1	PCB Antenna	HD Media Antenna	2.4/5GHz Dual-Band Antenna	3.07	6.68	2T3R	Main Ant. for test
2	PCB Antenna	WHDMI-MM	5GHz Single-Band Antenna	-	6.59	2T3R	N/A
3	PCB Antenna	HD-FLY	5GHz Single-Band Antenna	-	6.28	2T3R	N/A

Ant . Port	Antenna Type	Connector	Gain (dBi)		Remark
			2.4G	5G	
A	PCB Antenna	U.FL	3.07	6.68	TX / RX
B	PCB Antenna	U.FL	3.07	6.68	TX / RX
C	PCB Antenna	U.FL	3.07	6.68	RX

Antenna note: This antenna system has three antenna elements in this EUT. Three antenna elements used in the same band have 2T3R concurrent spatial multiplexing MIMO configuration.

2.3 Table for Carrier Frequencies

Frequency Allocation for 802.11a

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

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	-	-

2.4 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 the entire possible Configuration 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 Mode	Auto	-	-
Max. Peak Conducted Output Power Power Spectral Density 6dB Spectrum Bandwidth	11a/BPSK	6 Mbps	149/157/165	A
	11b/CCK	11 Mbps	1/6/11	A
	11g/BPSK	6 Mbps	1/6/11	A
Radiated Emissions Below 1GHz	11a/BPSK	6 Mbps	157	A
	11g/BPSK	6 Mbps	6	A
Radiated Emissions Above 1GHz Fundamental Emissions	11a/BPSK	6 Mbps	149/157/165	A
	11b/CCK	11 Mbps	1/6/11	A
	11g/BPSK	6 Mbps	1/6/11	A
Band Edge Emissions	11a/BPSK	6 Mbps	149/165	A
	11b/CCK	11 Mbps	1/11	A
	11g/BPSK	6 Mbps	1/11	A

2.5 Table for Testing Locations

Test Site No.	Site Category	Location	FCC Reg. No.	IC File No.
CO04-HY	Conduction	Hwa Ya	643075	IC 4086B-1
TH01-HY	OVEN Room	Hwa Ya	-	-
03CH02-HY	SAC	Hwa Ya	643075	IC 4086B-1

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

2.6 Table for Supporting Units

Support Unit	Brand	Model	FCC ID
Notebook (Remote Workstation)	DELL	D505	N/A
Test Fixture	-	-	-

2.7 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.

For Two Chain:

Power Parameters of IEEE 802.11a

Test Software Version	RT2880QA		
Frequency	5745 MHz	5785 MHz	5825 MHz
IEEE 802.11a	06	06	05

Power Parameters of IEEE 802.11b/g

Test Software Version	RT2880QA		
Frequency	2412 MHz	2437 MHz	2462 MHz
IEEE 802.11b	0A	0A	09
IEEE 802.11g	09	0A	0A

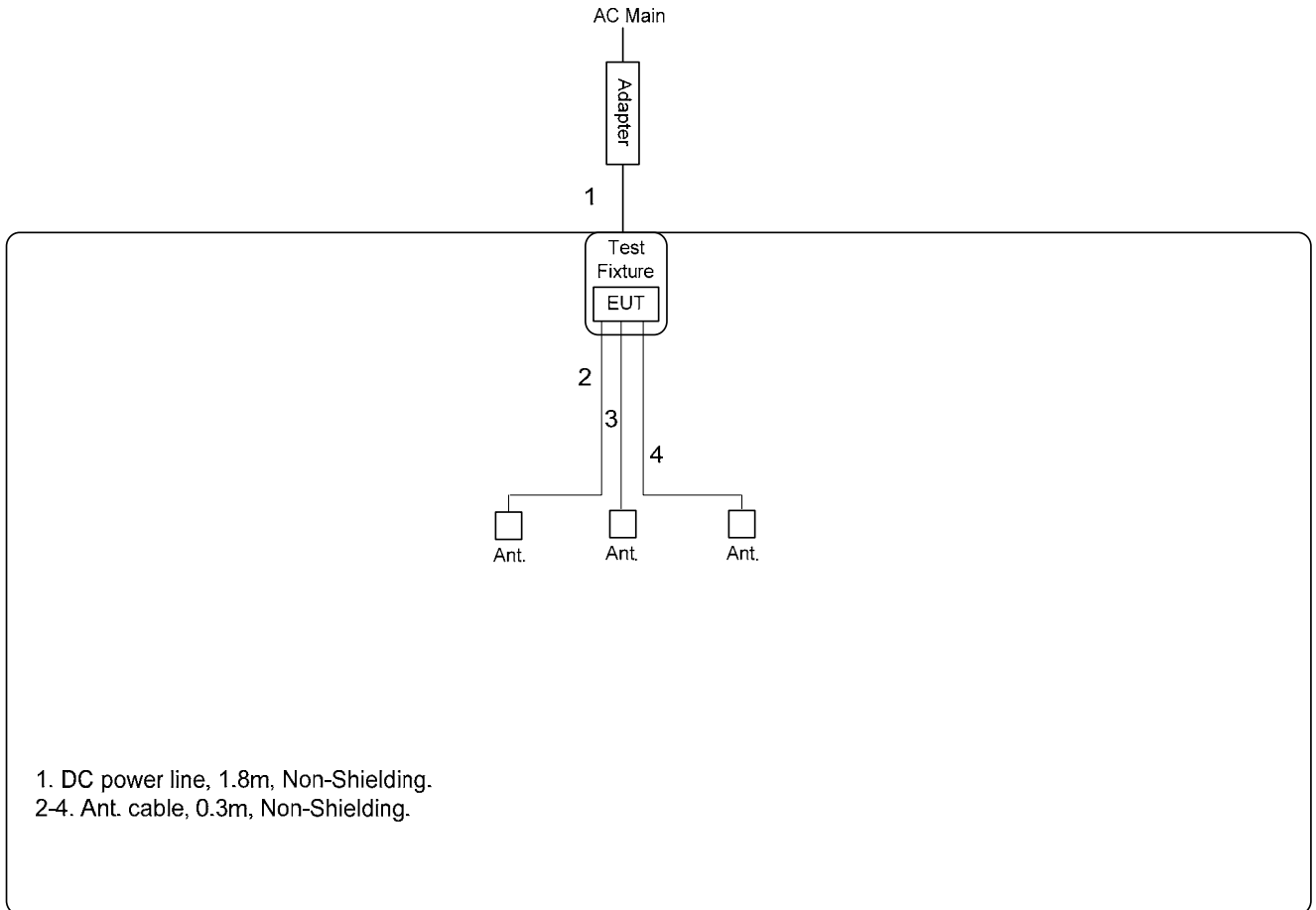
2.8 EUT Operation during Test

An executive program under WIN XP, then NB sends messages to the internal Hard Disk, and the Hard Disk reads and writes the message.

- Executed "ping.exe" to link with the remote workstation to receive and transmit data by LAN and WLAN.
- Executed "RT2880QA" to keep transmitting signals at fixed frequency.

2.9 Test Configuration

2.9.1 Radiation Emissions Test Configuration



3 TEST RESULT

3.1 AC Power Line Conducted Emissions Measurement

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.

Class B

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

3.1.1 Measuring Instruments and Setting

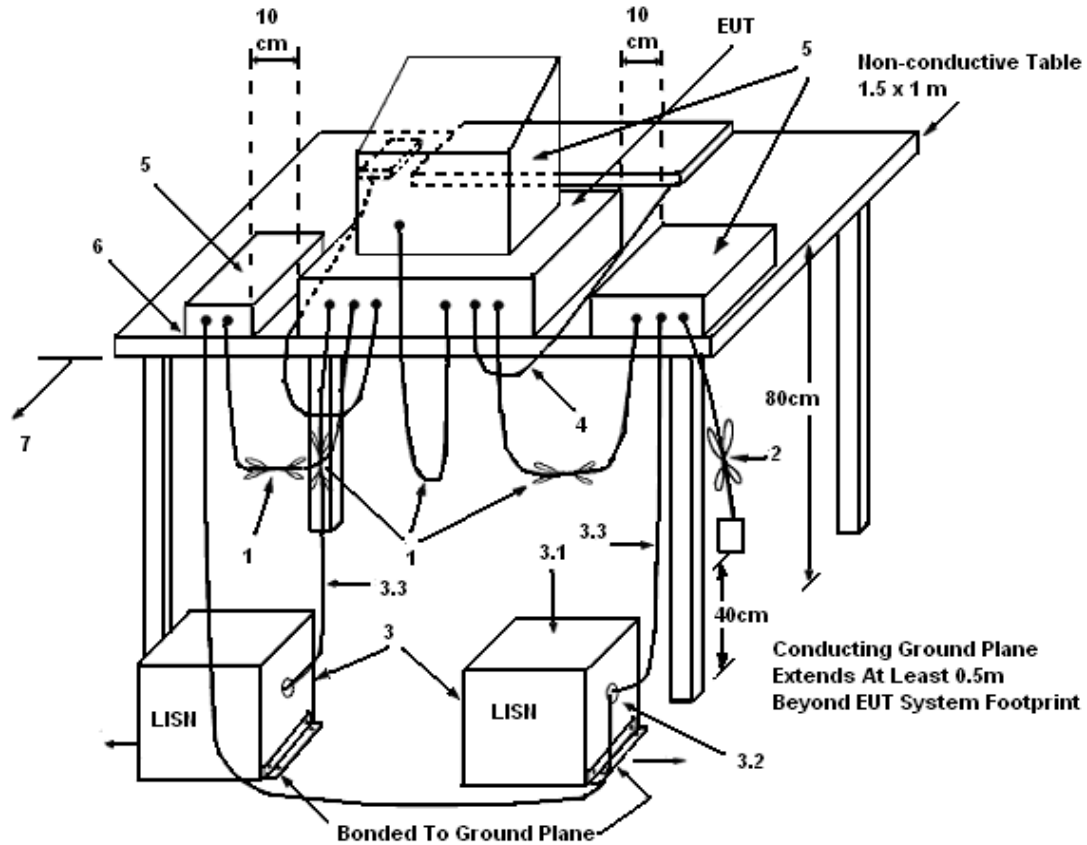
Please refer to section 4 of equipments list in this report. The following table is the setting of the receiver.

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

3.1.2 Test Procedures

1. The EUT warm up about 15 minutes then start test.
2. 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.
3. Connect EUT or host of EUT to the power mains through a line impedance stabilization network (LISN).
4. All the support units are connected to the other LISNs. The LISN should provide 50uH/50ohms coupling impedance.
5. The frequency range from 150 KHz to 30 MHz was searched.
6. Set the test-receiver system to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
7. The measurement has to be done between each power line and ground at the power terminal.

3.1.3 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.

3.1.4 Test Deviation

There is no deviation with the original standard.

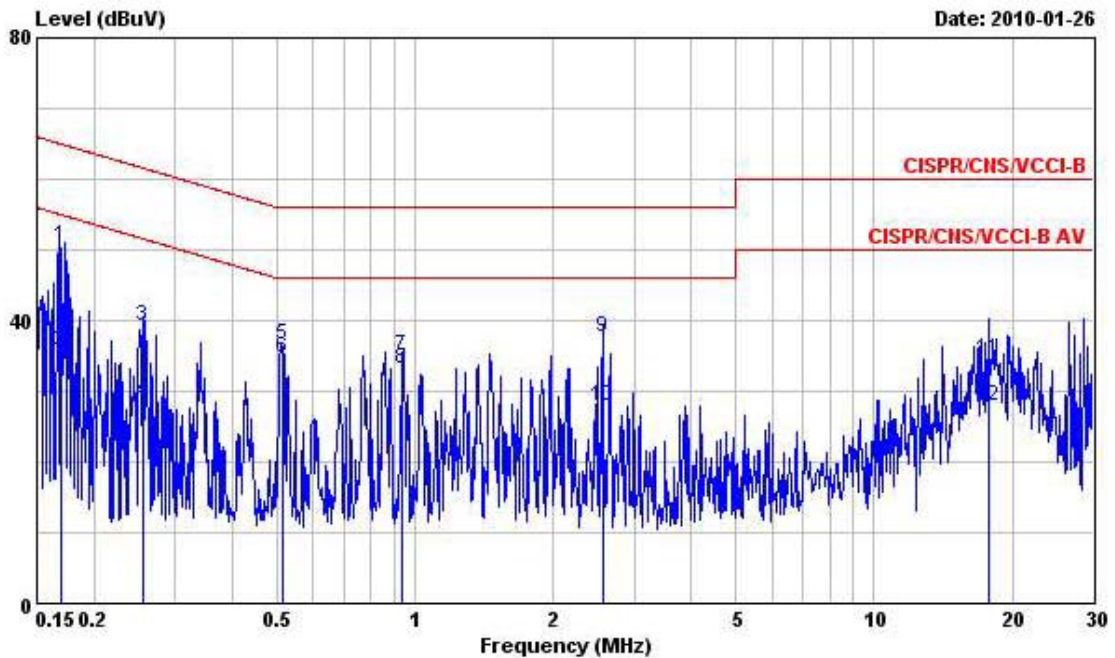
3.1.5 EUT Operation during Test

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

3.1.6 Results of AC Power Line Conducted Emissions Measurement

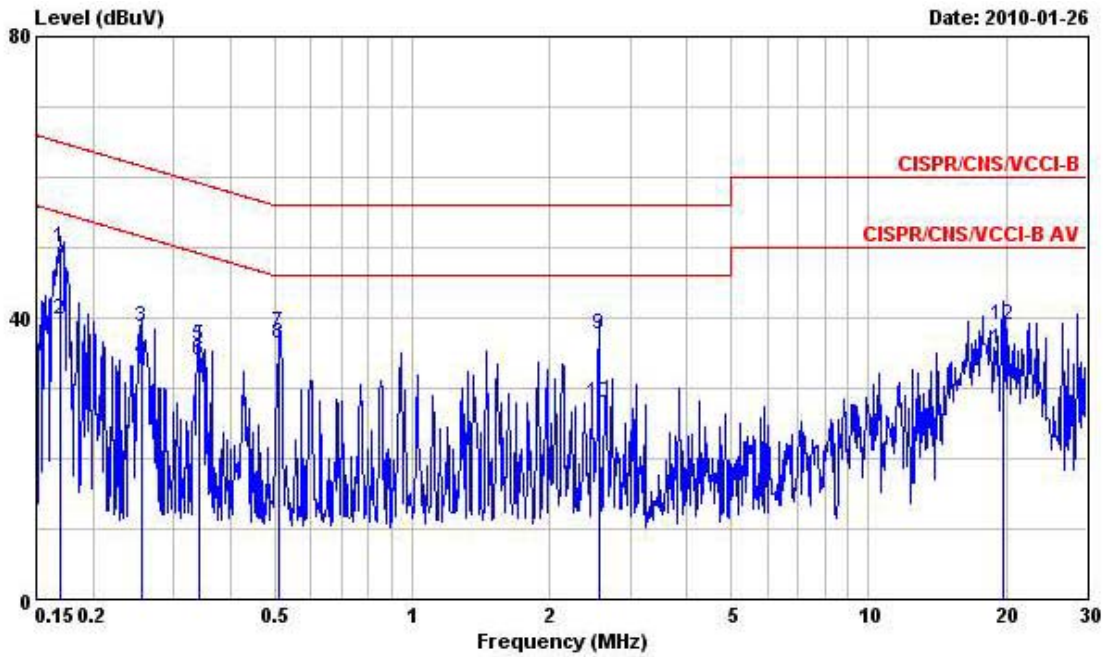
Final Test Date	Jan. 26, 2010	Test Site No.	CO04-HY
Temperature	23	Humidity	48%
Test Engineer	Angus	Configuration	Normal Mode

Line



	Freq	Level	Over	Limit	Read	LISN	Cable	Remark
	MHz	dBuV	Limit	Line	Level	Factor	Loss	
			dB	dBuV	dBuV	dB	dB	
1	0.1695440	50.56	-14.42	64.98	50.33	0.08	0.15	QP
2	0.1695440	35.91	-19.07	54.98	35.68	0.08	0.15	Average
3	0.2548710	39.34	-22.26	61.60	39.22	0.08	0.04	QP
4	0.2548710	28.37	-23.23	51.60	28.25	0.08	0.04	Average
5	0.5128790	36.58	-19.42	56.00	36.40	0.10	0.08	QP
6	0.5128790	34.86	-11.14	46.00	34.68	0.10	0.08	Average
7	0.9399850	35.03	-20.97	56.00	34.83	0.11	0.09	QP
8	0.9399850	33.05	-12.95	46.00	32.85	0.11	0.09	Average
9	2.565	37.58	-18.42	56.00	37.07	0.14	0.37	QP
10	2.565	27.80	-18.20	46.00	27.29	0.14	0.37	Average
11	17.756	34.45	-25.55	60.00	33.61	0.37	0.47	QP
12	17.756	27.82	-22.18	50.00	26.98	0.37	0.47	Average

Neutral



	Freq	Level	Over	Limit	Read	LISN	Cable	
	MHz	dBuV	Limit	Line	Level	Factor	Loss	Remark
			dB	dBuV	dBuV	dB	dB	
1	0.1698150	49.92	-15.05	64.97	49.69	0.08	0.15	QP
2	0.1698150	39.84	-15.13	54.97	39.61	0.08	0.15	Average
3	0.2561510	38.57	-22.99	61.56	38.45	0.08	0.04	QP
4	0.2561510	33.97	-17.59	51.56	33.85	0.08	0.04	Average
5	0.3407670	36.09	-23.09	59.18	35.95	0.08	0.06	QP
6	0.3407670	34.03	-15.15	49.18	33.89	0.08	0.06	Average
7	0.5116940	37.83	-18.17	56.00	37.66	0.09	0.08	QP
8	0.5116940	36.24	-9.76	46.00	36.07	0.09	0.08	Average
9	2.564	37.70	-18.30	56.00	37.21	0.12	0.37	QP
10	2.564	28.02	-17.98	46.00	27.53	0.12	0.37	Average
11	19.711	35.59	-14.41	50.00	34.62	0.40	0.57	Average
12	19.711	38.86	-21.14	60.00	37.89	0.40	0.57	QP

Note:

Level = Read Level + LISN Factor + Cable Loss.

3.2 Maximum Conducted Output Power Measurement

3.2.1 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.

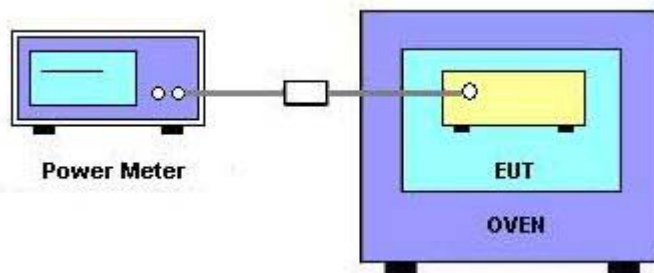
3.2.2 Measuring Instruments and Setting

Please refer to section 4 of equipments list in this report. The following table is the setting of the spectrum analyzer.

3.2.3 Test Procedures

1. The transmitter output (antenna port) was connected to the power meter.
2. Test was performed in accordance with Measurement of Digital Transmission Systems Operating under Section 15.247.

3.2.4 Test Setup Layout



3.2.5 Test Deviation

There is no deviation with the original standard.

3.2.6 EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

3.2.7 Test Result of Maximum Conducted Output Power

Final Test Date	Mar. 01, 2010	Test Site No.	TH01-HY
Temperature	25	Humidity	54%
Test Engineer	Duncan	Configuration	802.11a/b/g

Configuration IEEE 802.11a

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
149	5745 MHz	24.21	29.32	Complies
157	5785 MHz	23.43	29.32	Complies
165	5825 MHz	22.07	29.32	Complies

Configuration IEEE 802.11b

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
1	2412 MHz	20.85	30.00	Complies
6	2437 MHz	20.83	30.00	Complies
11	2462 MHz	21.43	30.00	Complies

Configuration IEEE 802.11g

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
1	2412 MHz	23.75	30.00	Complies
6	2437 MHz	24.11	30.00	Complies
11	2462 MHz	24.17	30.00	Complies

3.3 Power Spectral Density Measurement

3.3.1 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.

3.3.2 Measuring Instruments and Setting

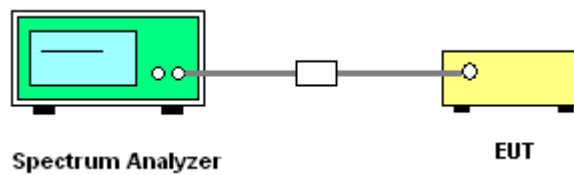
Please refer to section 4 of equipments list in this report. The following table is the setting of the spectrum analyzer.

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

3.3.3 Test Procedures

1. The transmitter output (antenna port) was connected to the spectrum analyzer.
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.

3.3.4 Test Setup Layout



3.3.5 Test Deviation

There is no deviation with the original standard.

3.3.6 EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

3.3.7 Test Result of Power Spectral Density

Final Test Date	Mar. 01, 2010	Test Site No.	TH01-HY
Temperature	25	Humidity	54%
Test Engineer	Duncan	Configuration	802.11a/b/g

Configuration IEEE 802.11a

Channel	Frequency	Power Density (dBm)	Max. Limit (dBm)	Result
149	5745 MHz	-14.79	8.00	Complies
157	5785 MHz	-15.00	8.00	Complies
165	5825 MHz	-17.35	8.00	Complies

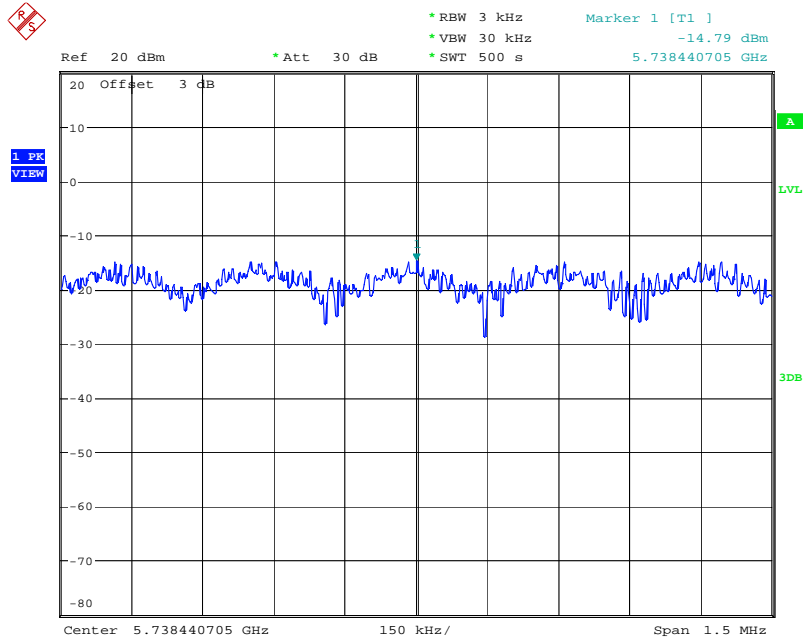
Configuration IEEE 802.11b

Channel	Frequency	Power Density (dBm)	Max. Limit (dBm)	Result
1	2412 MHz	-7.63	8.00	Complies
6	2437 MHz	-5.81	8.00	Complies
11	2462 MHz	-5.71	8.00	Complies

Configuration IEEE 802.11g

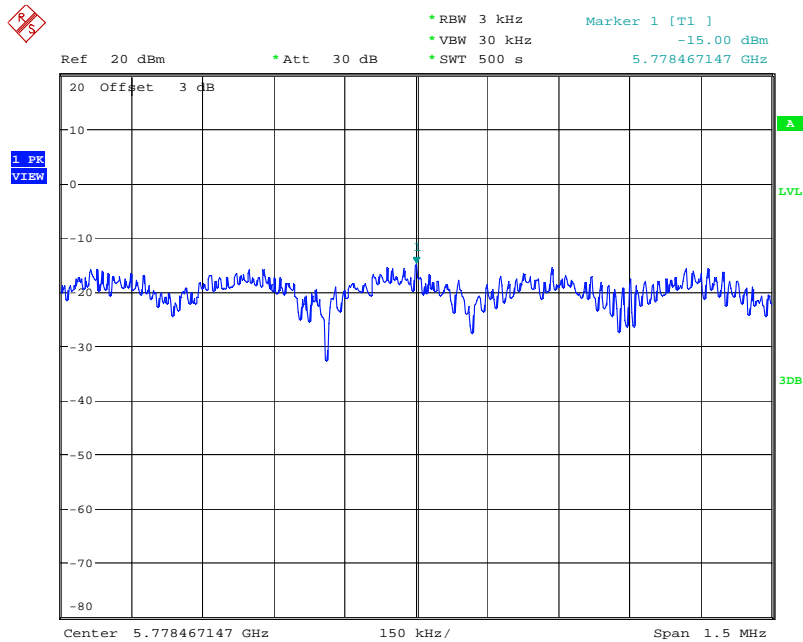
Channel	Frequency	Power Density (dBm)	Max. Limit (dBm)	Result
1	2412 MHz	-13.35	8.00	Complies
6	2437 MHz	-13.50	8.00	Complies
11	2462 MHz	-12.85	8.00	Complies

Power Density Plot on Configuration IEEE 802.11a-5G / 5745 MHz



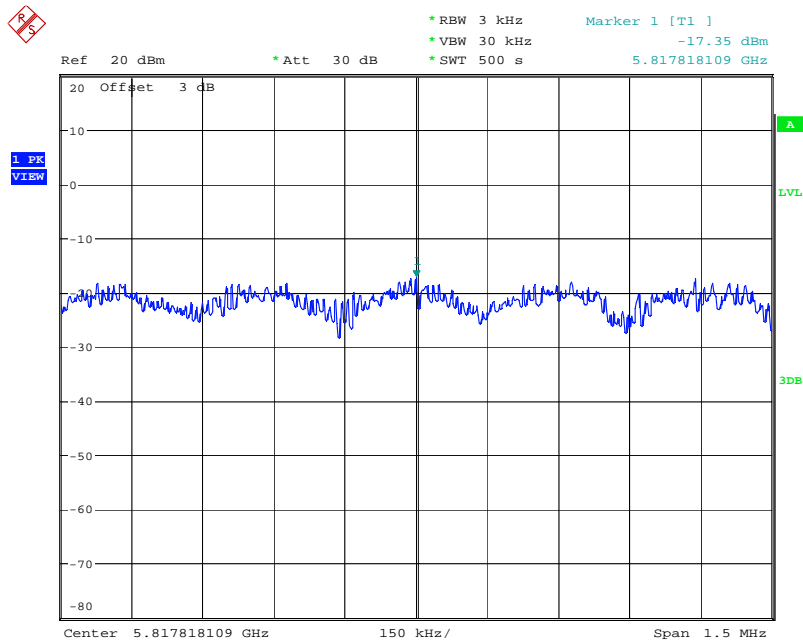
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Power Density Plot on Configuration IEEE 802.11a-5G / 5785 MHz



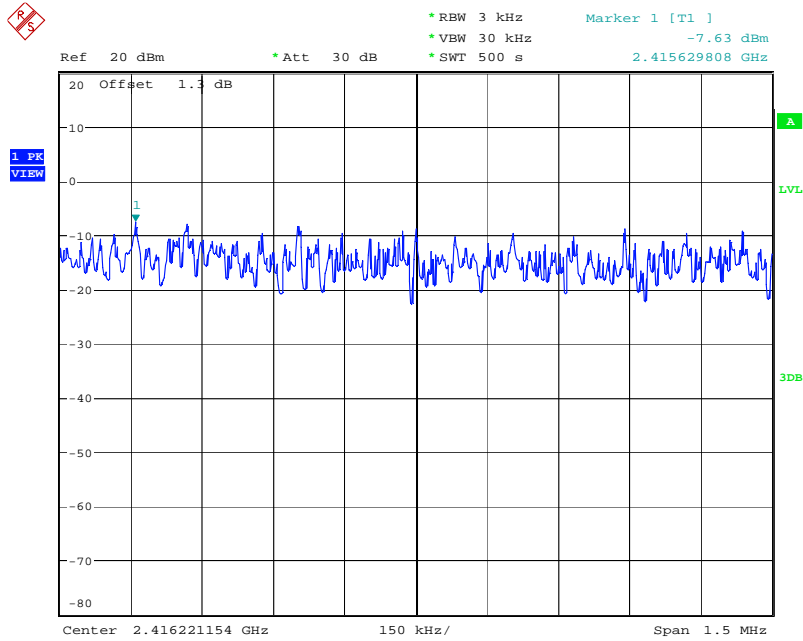
Date: 1.MAR.2010 09:36:35

Power Density Plot on Configuration IEEE 802.11a-5G / 5825 MHz



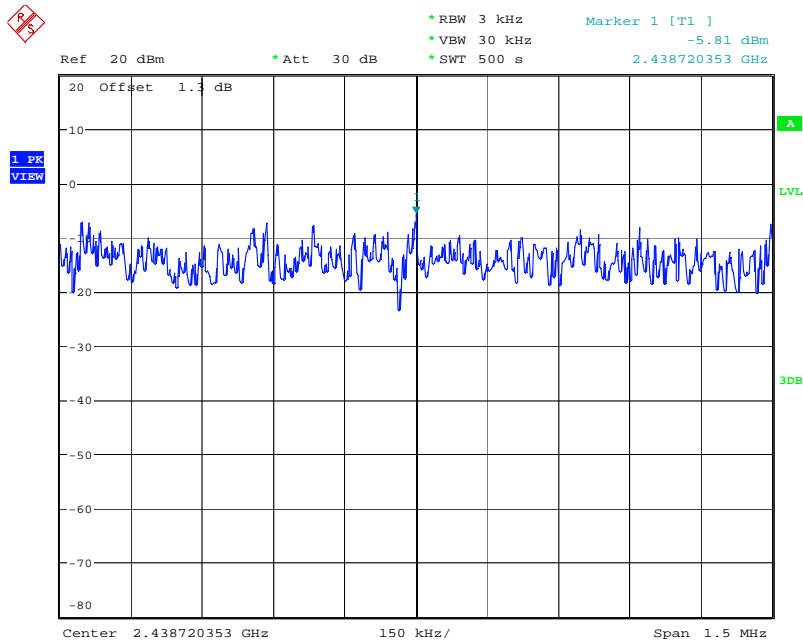
Date: 1.MAR.2010 09:37:24

Power Density Plot on Configuration IEEE 802.11b-2.4G / 2412 MHz



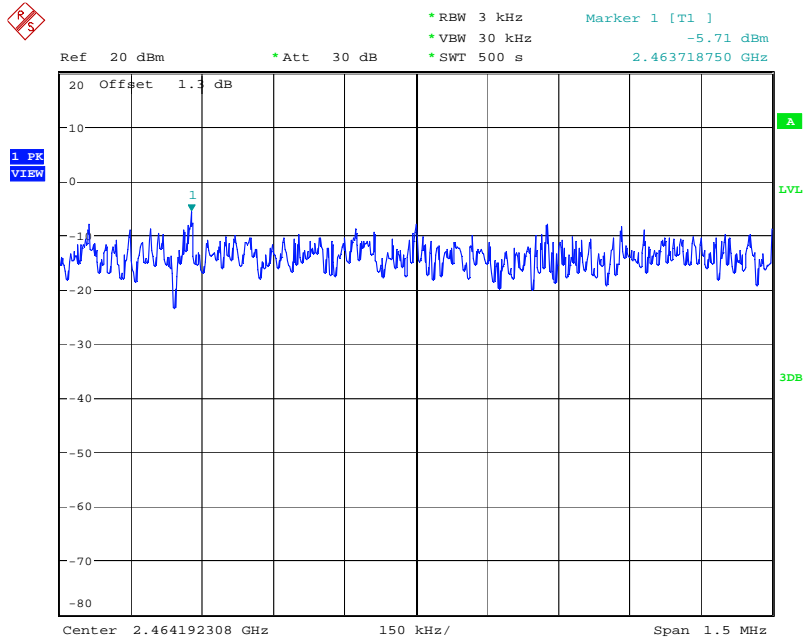
Date: 15.JAN.2010 10:24:38

Power Density Plot on Configuration IEEE 802.11b-2.4G / 2437 MHz



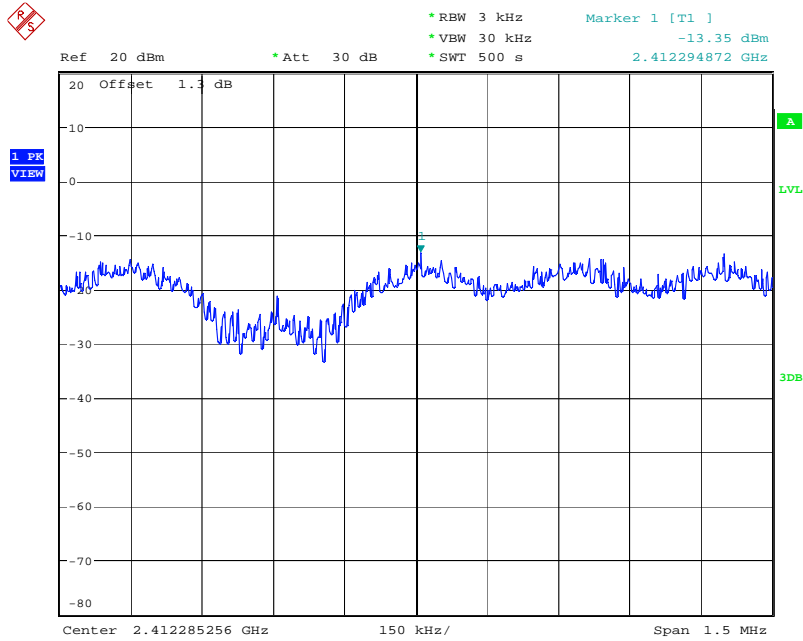
Date: 15.JAN.2010 10:33:56

Power Density Plot on Configuration IEEE 802.11b-2.4G / 2462 MHz



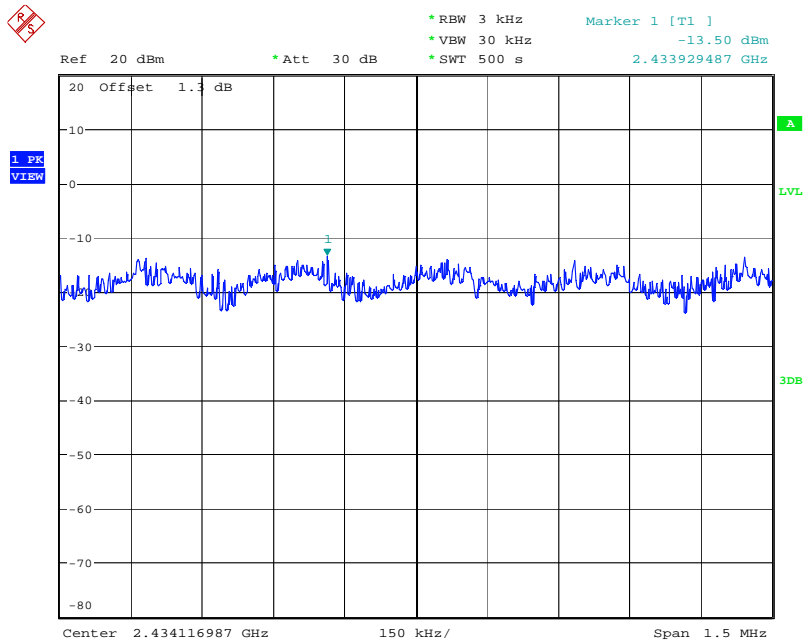
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Power Density Plot on Configuration IEEE 802.11g-2.4G / 2412 MHz



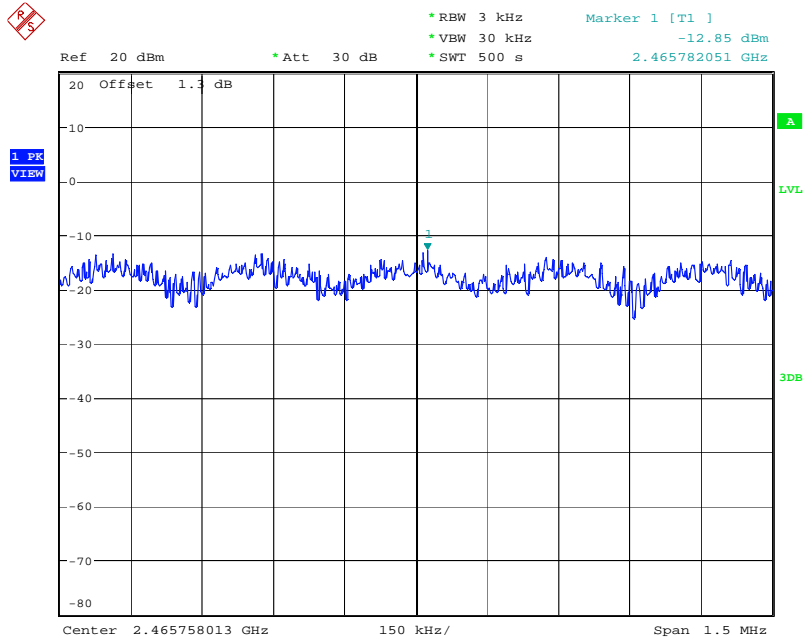
Date: 15.JAN.2010 10:36:40

Power Density Plot on Configuration IEEE 802.11g-2.4G / 2437 MHz



Date: 15.JAN.2010 10:38:16

Power Density Plot on Configuration IEEE 802.11g-2.4G / 2462 MHz



Date: 15.JAN.2010 10:39:09

3.4 6dB Spectrum Bandwidth Measurement

3.4.1 Limit

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

3.4.2 Measuring Instruments and Setting

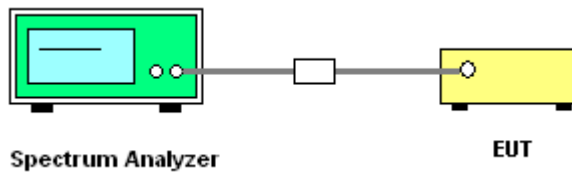
Please refer to section 4 of equipments list in this report. The following table is the setting of the spectrum analyzer.

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

3.4.3 Test Procedures

1. The transmitter output (antenna port) was connected to the spectrum analyzer 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.

3.4.4 Test Setup Layout



3.4.5 Test Deviation

There is no deviation with the original standard.

3.4.6 EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

3.4.7 Test Result of 6dB Spectrum Bandwidth

Final Test Date	Jan. 15, 2010	Test Site No.	TH01-HY
Temperature	25	Humidity	54%
Test Engineer	Duncan	Configuration	802.11a/b/g

Configuration IEEE 802.11a

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
149	5745 MHz	16.35	16.41	500	Complies
157	5785 MHz	16.35	16.41	500	Complies
165	5825 MHz	16.31	16.41	500	Complies

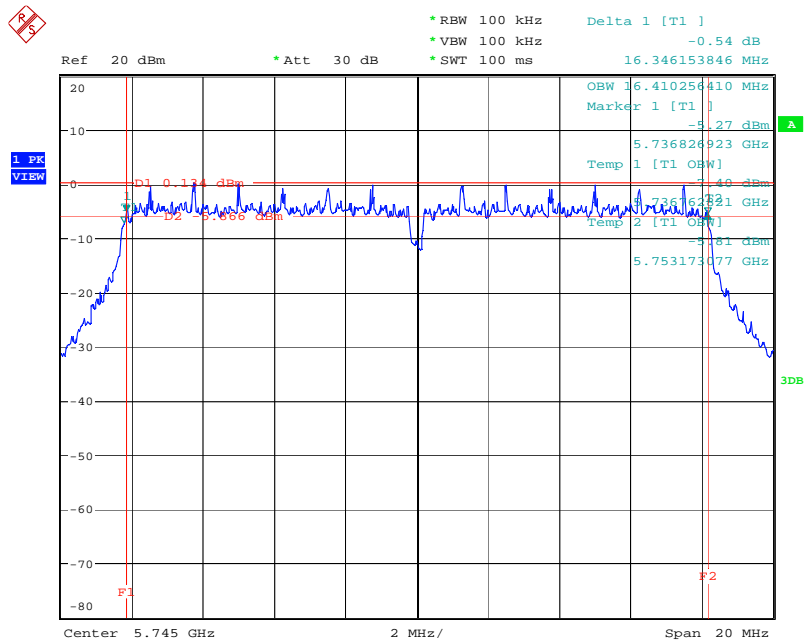
Configuration IEEE 802.11b

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
1	2412 MHz	12.02	15.16	500	Complies
6	2437 MHz	12.08	15.16	500	Complies
11	2462 MHz	12.95	15.16	500	Complies

Configuration IEEE 802.11g

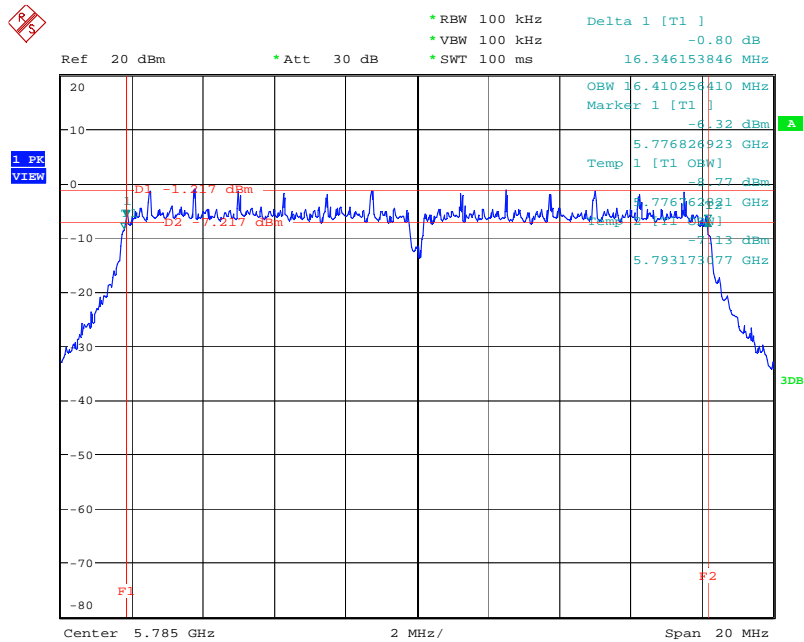
Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
1	2412 MHz	16.31	16.41	500	Complies
6	2437 MHz	16.35	16.41	500	Complies
11	2462 MHz	16.31	16.41	500	Complies

6 dB Bandwidth Plot on Configuration IEEE 802.11a-5G / 5745 MHz



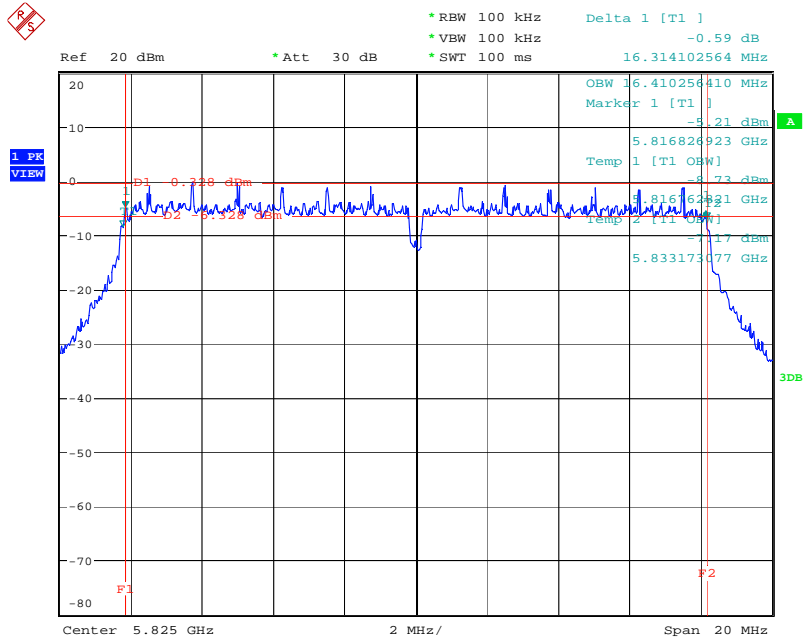
Date: 15.JAN.2010 14:12:26

6 dB Bandwidth Plot on Configuration IEEE 802.11a -5G / 5785 MHz



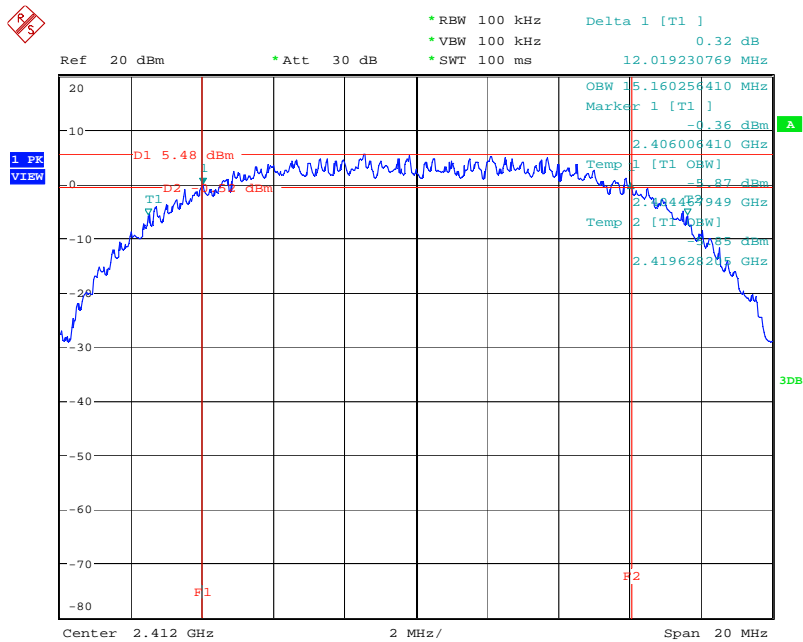
Date: 15.JAN.2010 14:14:32

6 dB Bandwidth Plot on Configuration IEEE 802.11a-5G / 5825 MHz



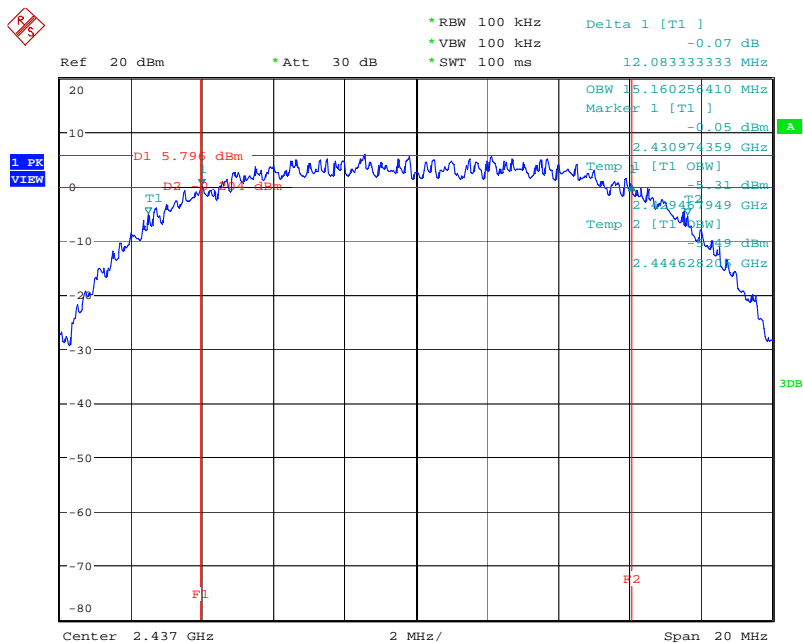
Date: 15.JAN.2010 14:15:36

6 dB Bandwidth Plot on Configuration IEEE 802.11b-2.4G / 2412 MHz



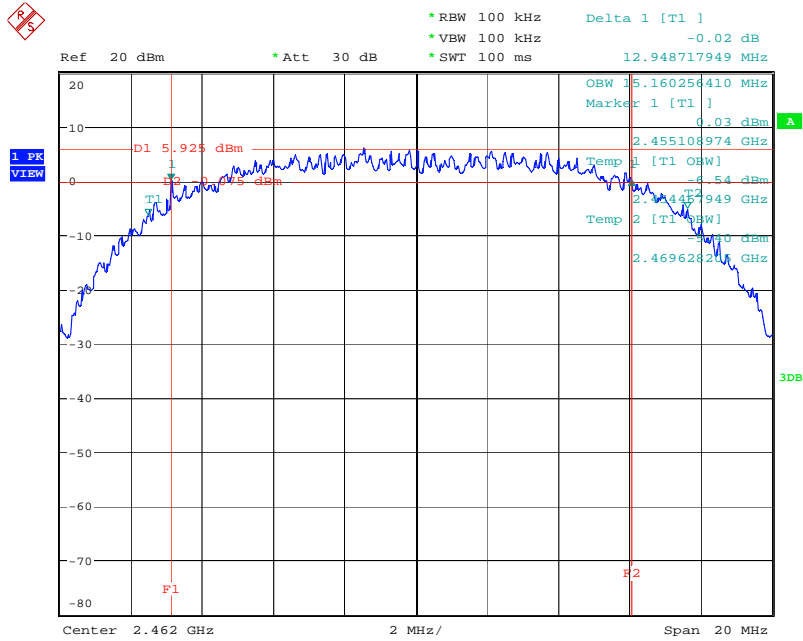
Date: 15.JAN.2010 10:24:49

6 dB Bandwidth Plot on Configuration IEEE 802.11b-2.4G / 2437 MHz



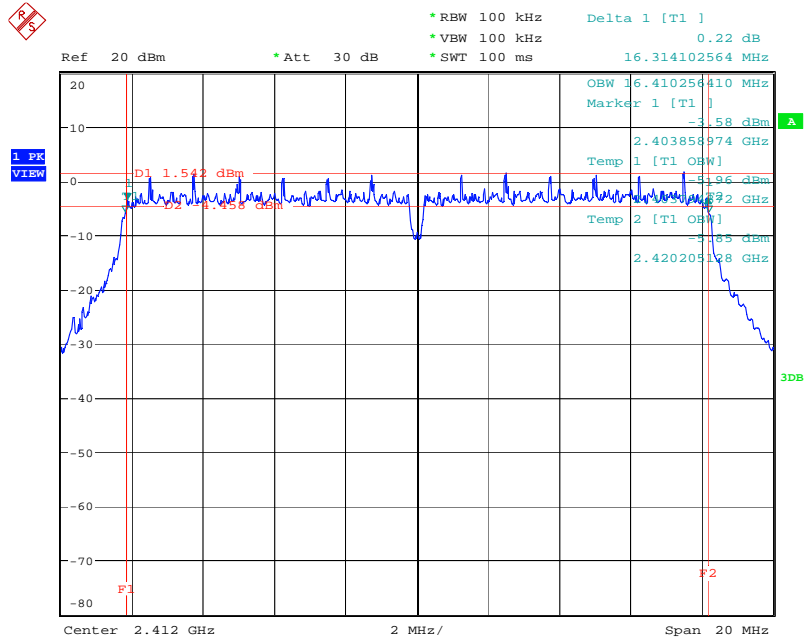
Date: 15.JAN.2010 10:34:06

6 dB Bandwidth Plot on Configuration IEEE 802.11 b -2.4G / 2462 MHz



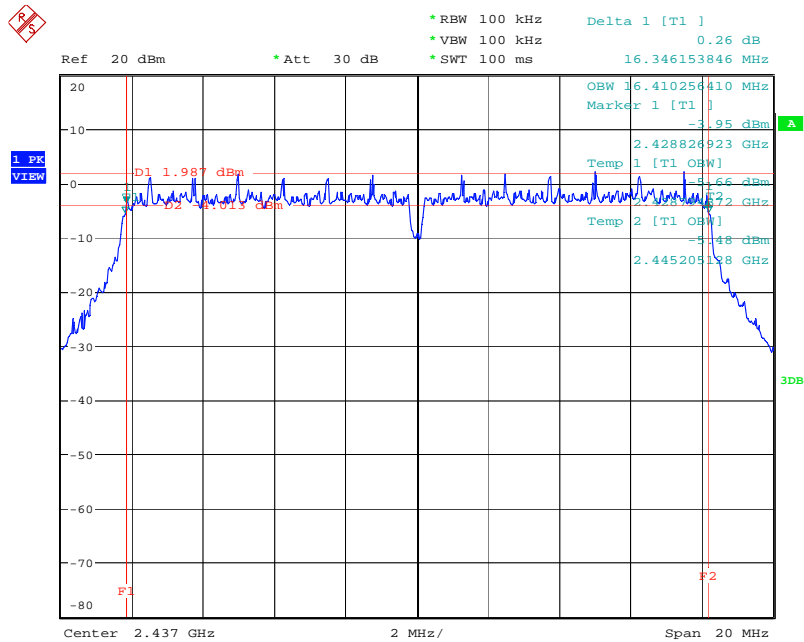
Date: 15.JAN.2010 10:34:57

6 dB Bandwidth Plot on Configuration IEEE 802.11g-2.4G / 2412 MHz



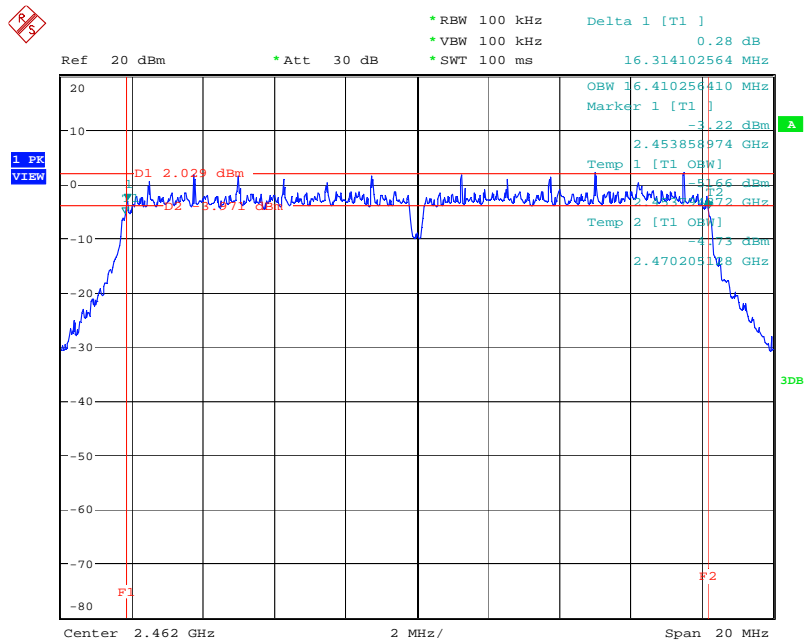
Date: 15.JAN.2010 10:36:51

6 dB Bandwidth Plot on Configuration IEEE 802.11g-2.4G / 2437 MHz



Date: 15.JAN.2010 10:38:26

6 dB Bandwidth Plot on Configuration IEEE 802.11g-2.4G / 2462 MHz



Date: 15.JAN.2010 10:39:20

3.5 Radiated Emissions Measurement

3.5.1 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 (microrvolts/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

3.5.2 Measuring Instruments and Setting

Please refer to section 4 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)	1MHz / 1MHz for peak

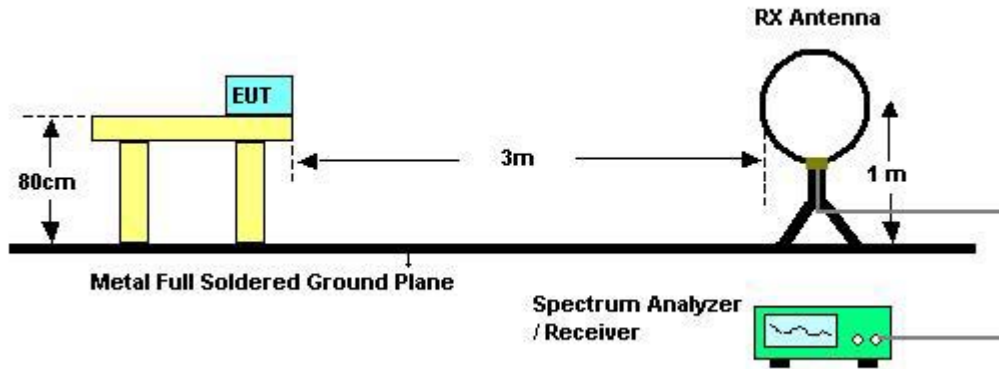
Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

3.5.3 Test Procedures

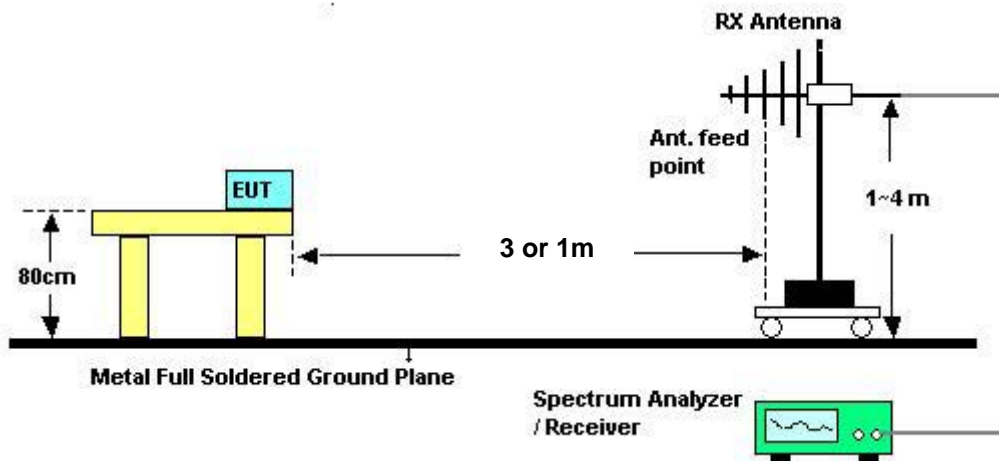
1. Configure the EUT according to ANSI C63.4. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting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

3.5.4 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 1m.

Distance extrapolation factor = $20 \log (\text{specific distance [3m]} / \text{test distance [1m]})$ (dB);

Limit line = specific limits (dBuV) + distance extrapolation factor [9.54 dB].

3.5.5 Test Deviation

There is no deviation with the original standard.

3.5.6 EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

3.5.7 Results of Radiated Emissions (9kHz~30MHz)

Final Test Date	Feb. 23, 2010	Test Site No.	03CH02-HY
Temperature	20	Humidity	50%
Test Engineer	Steven		

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

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

3.5.8 Results of Radiated Emissions (30MHz~1GHz)

Final Test Date	Feb. 23, 2010	Test Site No.	03CH02-HY
Temperature	20	Humidity	50%
Test Engineer	Steven	Configuration	5G 802.11a Ch. 157

Horizontal

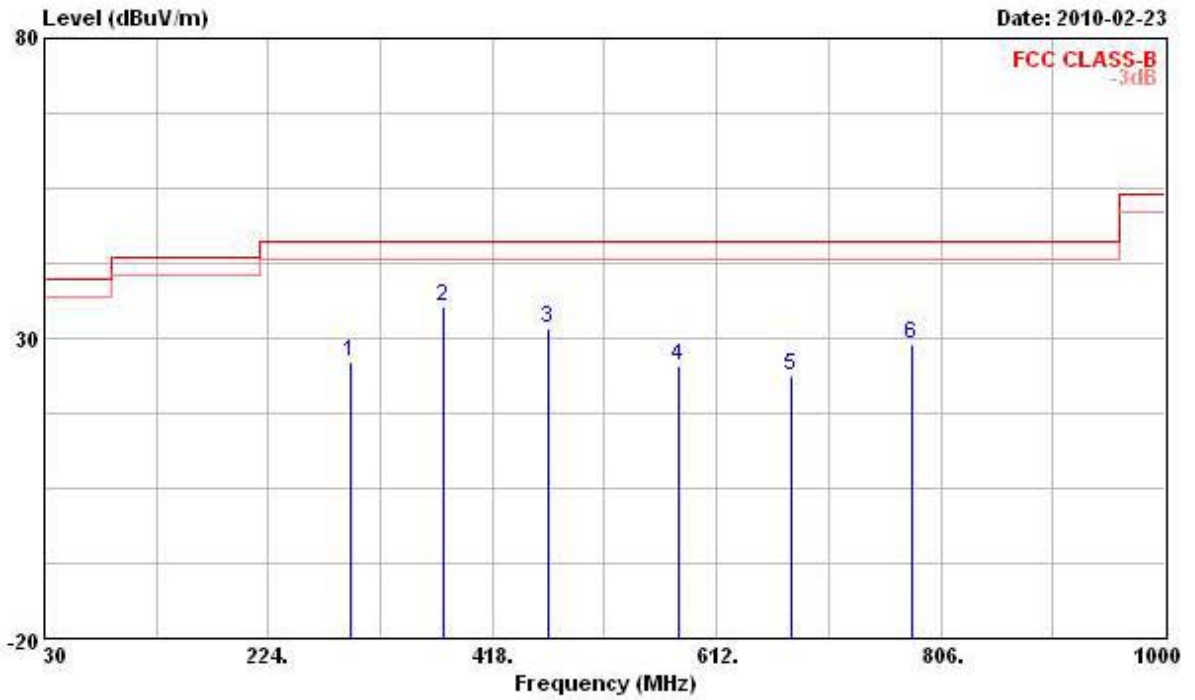
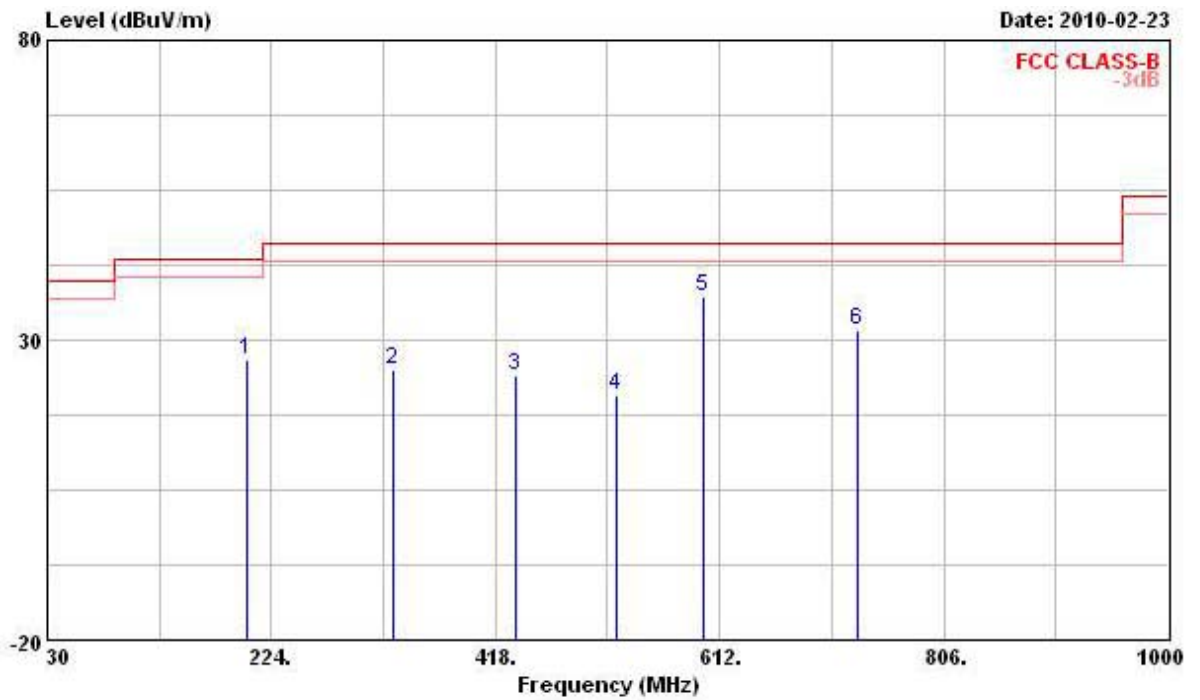


TABLE 20

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	294.810	26.07	-19.93	46.00	35.81	13.63	3.43	26.80	Peak
2	375.320	35.23	-10.77	46.00	43.89	14.87	3.89	27.42	Peak
3	466.500	31.65	-14.35	46.00	38.77	16.61	4.28	28.01	Peak
4	579.020	25.43	-20.57	46.00	29.25	19.56	4.78	28.16	Peak
5	676.990	23.62	-22.38	46.00	27.25	19.15	5.26	28.04	Peak
6	780.780	28.90	-17.10	46.00	31.14	19.99	5.55	27.78	Peak

Vertical



Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	202.660	26.77	-16.73	43.50	39.43	11.45	2.94	27.05 Peak
2	329.730	25.08	-20.92	46.00	34.28	14.17	3.65	27.02 Peak
3	435.460	23.97	-22.03	46.00	31.69	15.98	4.15	27.85 Peak
4	522.760	20.66	-25.34	46.00	26.40	17.96	4.48	28.18 Peak
5 @	598.420	37.16	-8.84	46.00	40.27	20.12	4.94	28.17 Peak
6	731.310	31.75	-14.25	46.00	35.02	19.29	5.36	27.92 Peak

Note:

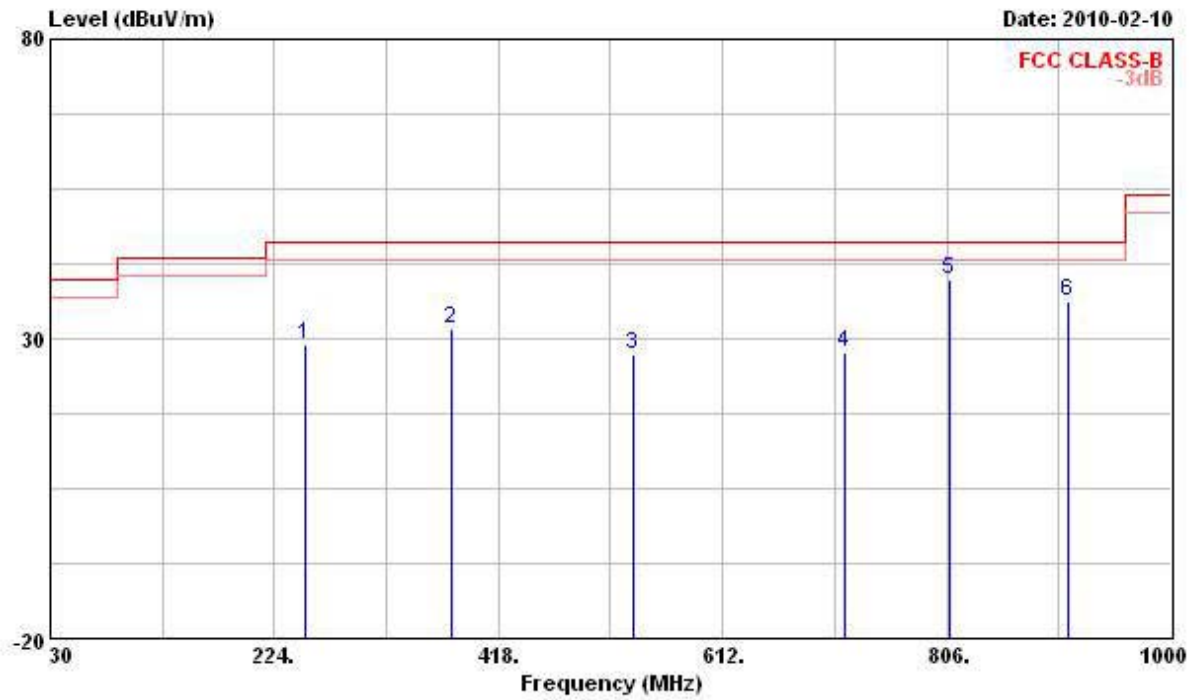
The amplitude of spurious emissions that are attenuated by more than 20dB below the permissible value has no need to be reported.

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

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

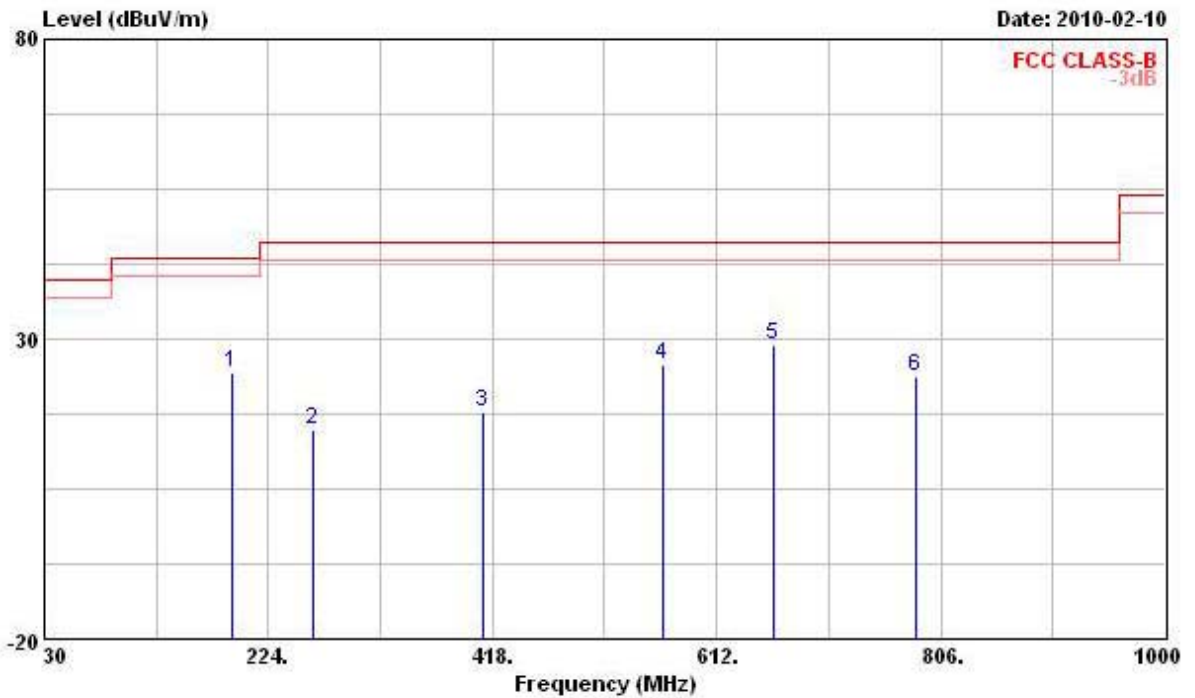
Final Test Date	Feb. 10, 2010	Test Site No.	03CH02-HY
Temperature	20	Humidity	50%
Test Engineer	Steven	Configuration	2.4G 802.11g Ch. 6

Horizontal



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	251.160	28.88	-17.12	46.00	39.39	13.01	3.29	26.81	Peak
2	377.260	31.60	-14.40	46.00	40.24	14.90	3.90	27.44	Peak
3	534.400	27.21	-18.79	46.00	32.61	18.27	4.50	28.17	Peak
4	717.730	27.64	-18.36	46.00	31.20	19.10	5.29	27.95	Peak
5	807.940	39.89	-6.11	46.00	41.68	20.25	5.65	27.69	Peak
6	910.760	36.15	-9.85	46.00	37.11	20.29	6.07	27.32	Peak

Vertical



Peak	Freq MHz	Level dBuV/m	Over Limit dB	Limit Line dBuV/m	ReadAntenna Level dBuV	Antenna Factor dB/m	Cable Loss dB	Preamp Factor dB	Remark
1	192.960	24.29	-19.21	43.50	37.72	10.84	2.86	27.13	Peak
2	262.800	15.01	-30.99	46.00	25.31	13.18	3.33	26.81	Peak
3	410.240	17.97	-28.03	46.00	26.18	15.47	4.04	27.72	Peak
4	565.440	25.76	-20.24	46.00	30.08	19.17	4.67	28.16	Peak
5	661.470	29.16	-16.84	46.00	32.58	19.36	5.30	28.08	Peak
6	784.660	23.89	-22.11	46.00	26.04	20.05	5.57	27.77	Peak

Note:

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

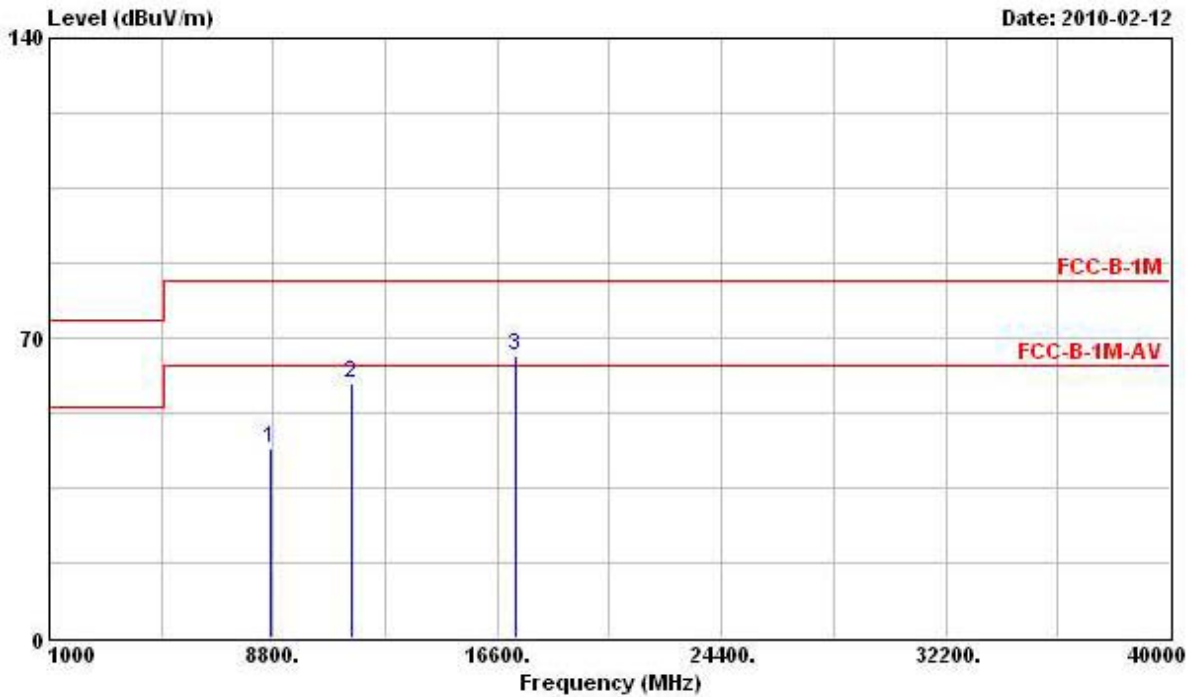
Emission level (dBuV/m) = 20 log Emission level (uV/m).

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

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

Final Test Date	Feb. 12, 2010	Test Site No.	03CH02-HY
Temperature	20	Humidity	50%
Test Engineer	Steven	Configuration	802.11a Ch. 149

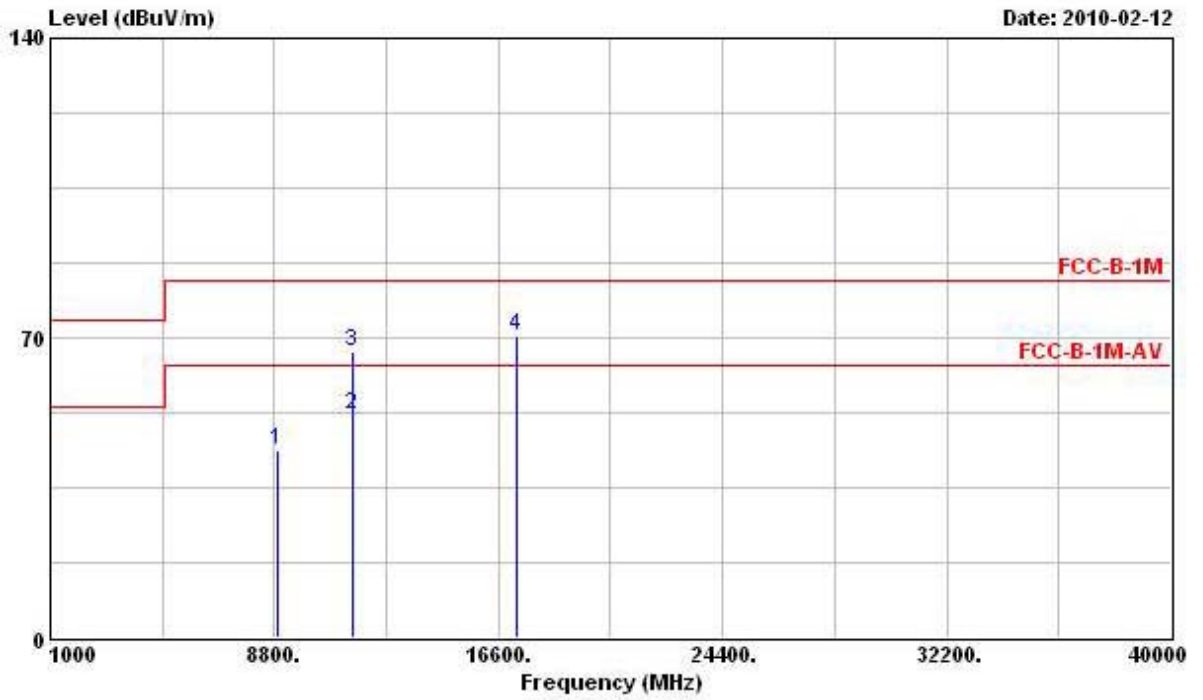
Horizontal



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	8696.000	44.04			34.10	38.34	6.02	34.42	Peak
2	11490.000	59.43	-24.11	83.54	45.85	40.59	6.63	33.64	Peak
3	17235.000	65.90			46.02	43.56	8.55	32.23	Peak

Note: The items 1 and 2 are on un-restricted band, so the limit is -20dB for the field strength of the fundamental emissions (see section 3.6.7).

Vertical

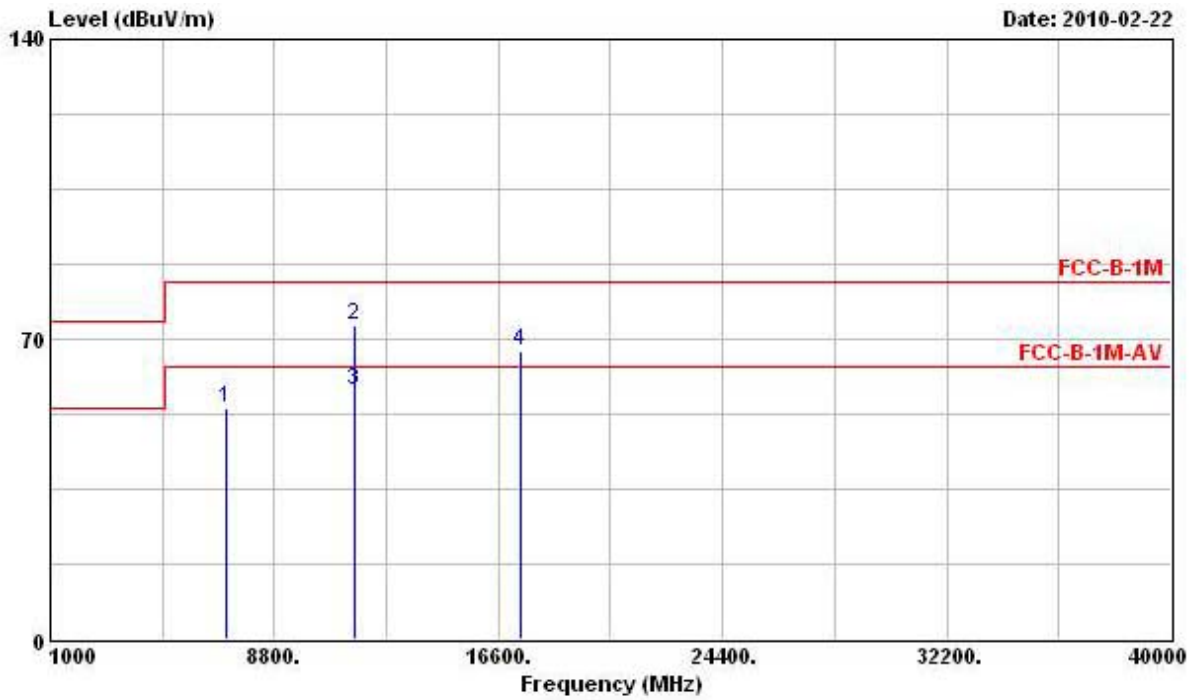


	Freq	Level	Over	Limit	ReadAntenna	Cable	Preamp	Remark
	MHz	dBuV/m	Limit	Line	Level	Loss	Factor	
			dB	dBuV/m	dBuV	dB	dB	
1	8932.000	43.96			34.34	38.15	6.13	34.66 Peak
2	11490.000	52.24	-11.30	63.54	38.66	40.59	6.63	33.64 Average
3	11490.000	66.93	-16.61	83.54	53.35	40.59	6.63	33.64 Peak
4	17234.000	70.33			50.45	43.56	8.55	32.23 Peak

Note: The items 1 and 4 are on un-restricted band, so the limit is -20dB for the field strength of the fundamental emissions (see section 3.6.7).

Final Test Date	Feb. 22, 2010	Test Site No.	03CH02-HY
Temperature	20	Humidity	50%
Test Engineer	Steven	Configuration	802.11a Ch. 157

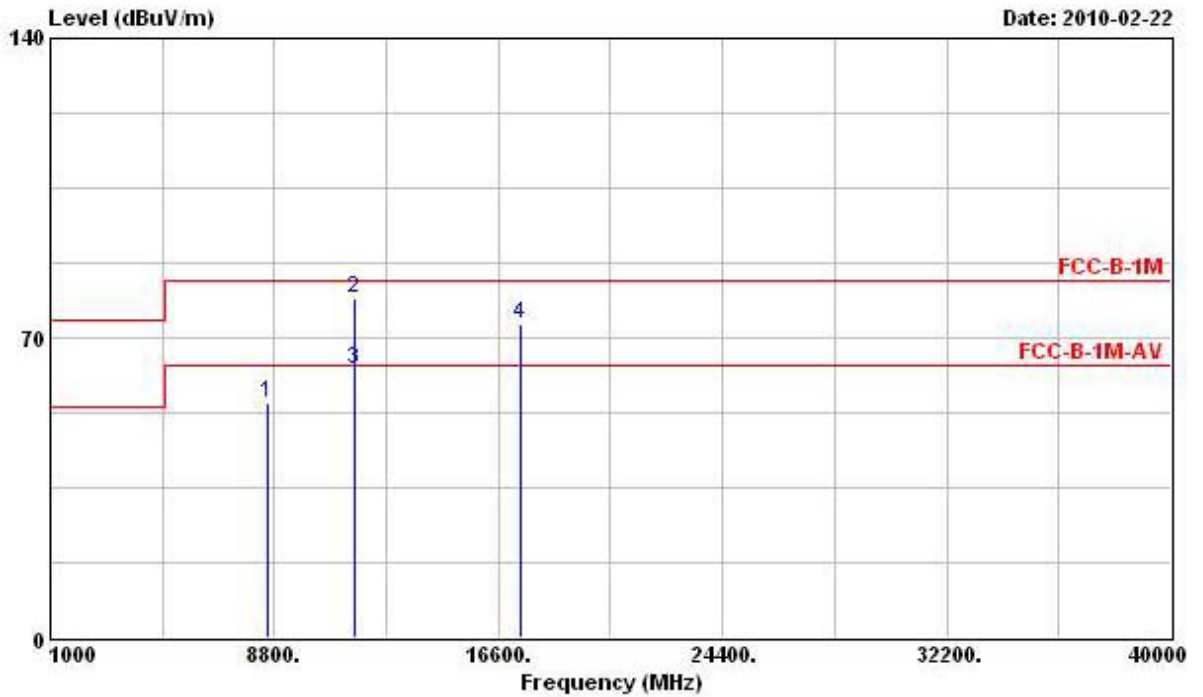
Horizontal



Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
MHz	dBUV/m	dB	dBUV/m	dBuV	dB/m	dB	dB	
1	7132.000	54.02		44.86	37.83	5.61	34.28	Peak
2	11570.000	73.31	-10.23	83.54	59.68	40.63	6.63	33.63 Peak
3	@11570.000	58.15	-5.39	63.54	44.52	40.63	6.63	33.63 Average
4	17355.000	67.40		47.61	43.49	8.50	32.20	Peak

Note: The items 1 and 4 are on un-restricted band, so the limit is -20dB for the field strength of the fundamental emissions (see section 3.6.7).

Vertical

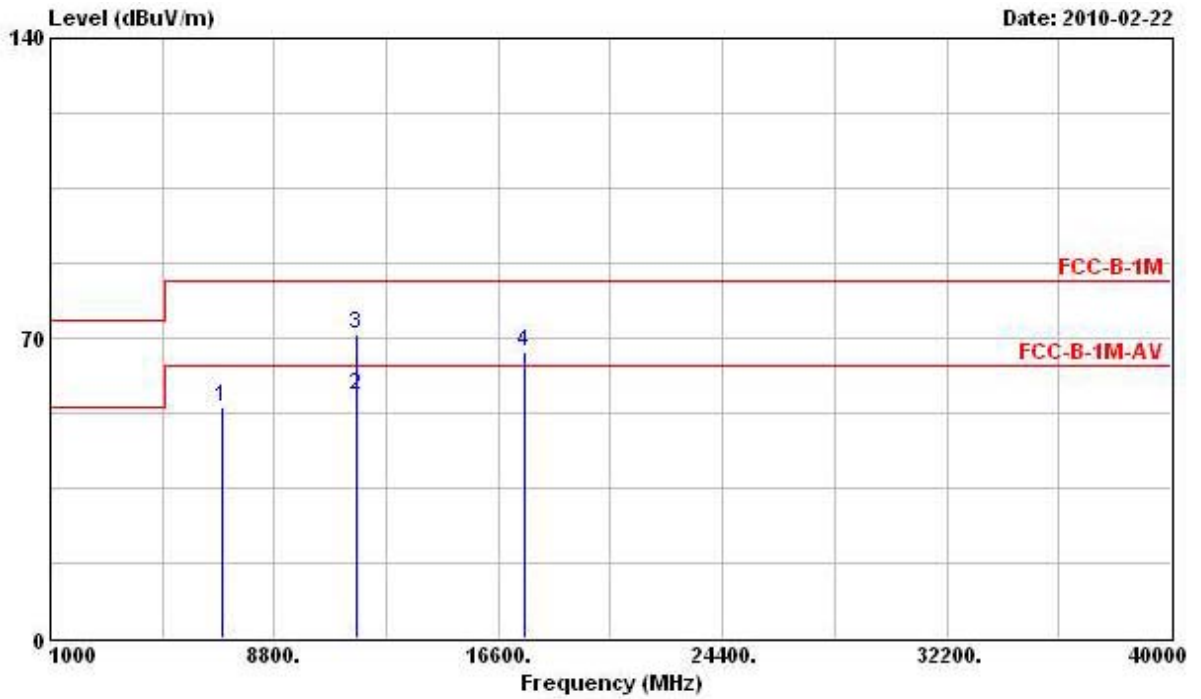


Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	8548.000	54.85		44.68	38.46	5.97	34.26	Peak
2	@11570.000	79.41	-4.13	83.54	65.78	40.63	6.63	33.63 Peak
3	@11570.000	62.54	-1.00	63.54	48.91	40.63	6.63	33.63 Average
4	17355.000	73.35		53.56	43.49	8.50	32.20	Peak

Note: The items 1 and 4 are on un-restricted band, so the limit is -20dB for the field strength of the fundamental emissions (see section 3.6.7).

Final Test Date	Feb. 22, 2010	Test Site No.	03CH02-HY
Temperature	20	Humidity	50%
Test Engineer	Steven	Configuration	802.11a Ch. 165

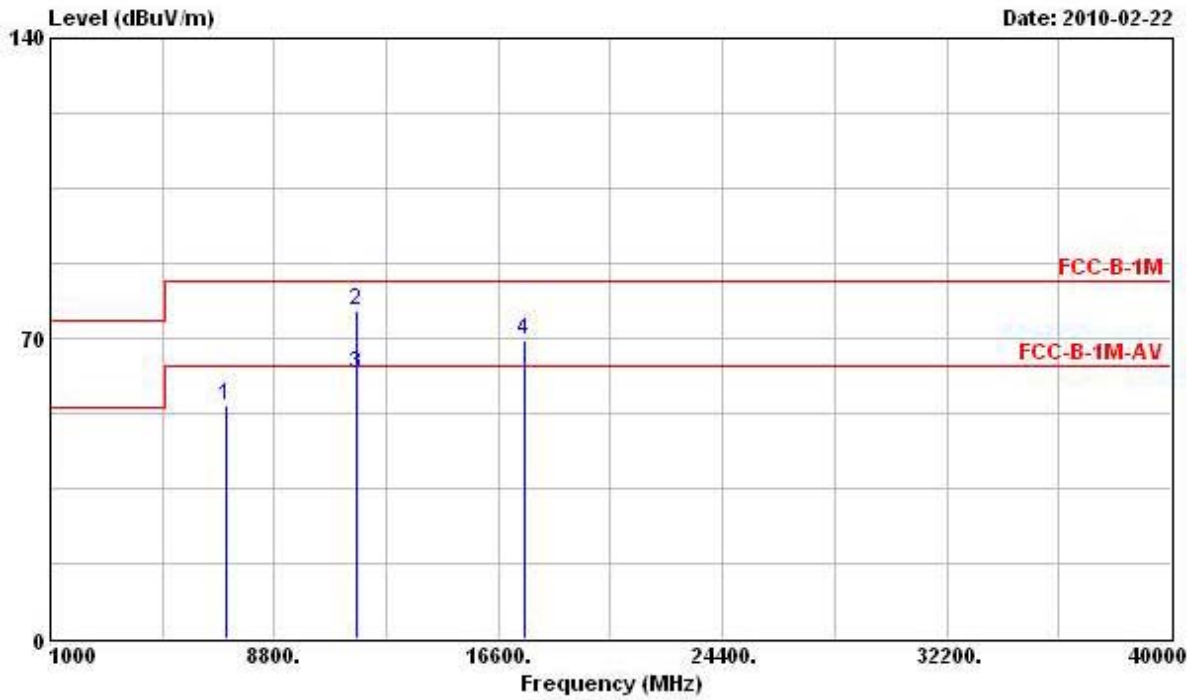
Horizontal



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBUV/m	dB	dBUV/m	dBuV	dB/m	dB	dB	
1	7006.000	53.83			44.71	37.80	5.60	34.28	Peak
2	@11650.000	56.60	-6.94	63.54	42.90	40.66	6.64	33.60	Average
3	11650.000	71.09	-12.45	83.54	57.39	40.66	6.64	33.60	Peak
4	17475.000	66.91			47.21	43.42	8.44	32.16	Peak

Note: The items 1 and 4 are on un-restricted band, so the limit is -20dB for the field strength of the fundamental emissions (see section 3.6.7).

Vertical

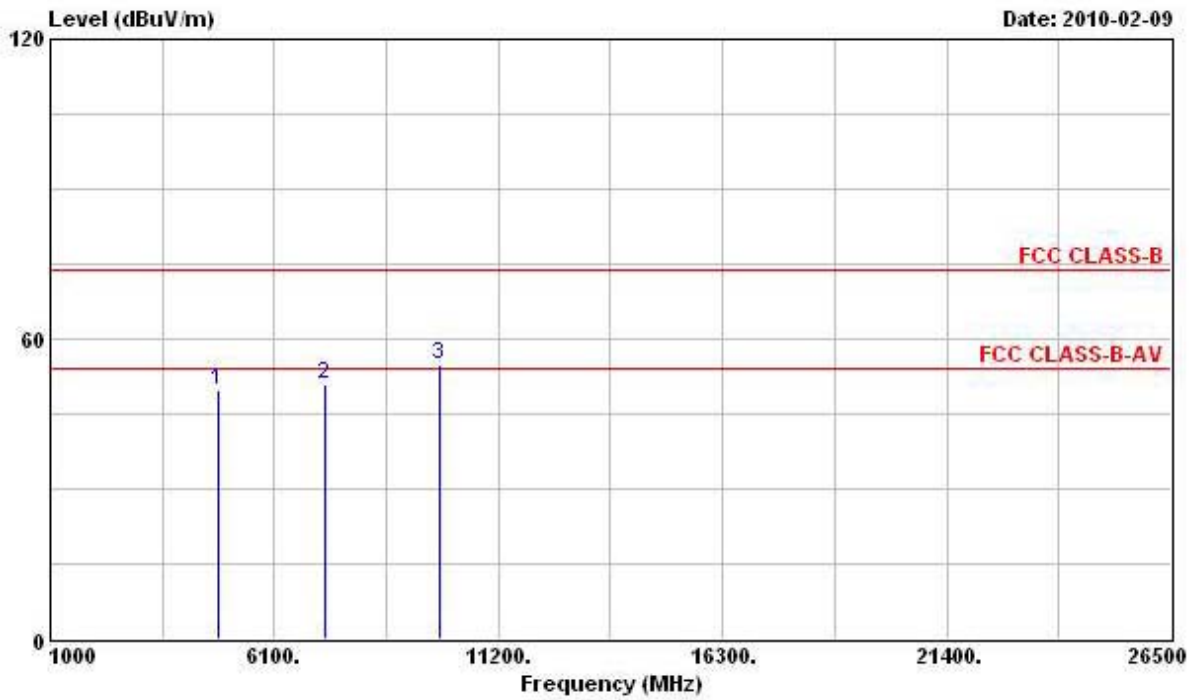


Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	7132.000	54.39		45.23	37.83	5.61	34.28	Peak
2	@11650.000	76.41	-7.13	83.54	62.71	40.66	6.64	33.60 Peak
3	@11650.000	61.86	-1.68	63.54	48.16	40.66	6.64	33.60 Average
4	17475.000	69.65		49.95	43.42	8.44	32.16	Peak

Note: The items 1 and 4 are on un-restricted band, so the limit is -20dB for the field strength of the fundamental emissions (see section 3.6.7).

Final Test Date	Feb. 09, 2010	Test Site No.	03CH02-HY
Temperature	20	Humidity	50%
Test Engineer	Steven	Configuration	802.11b Ch. 1

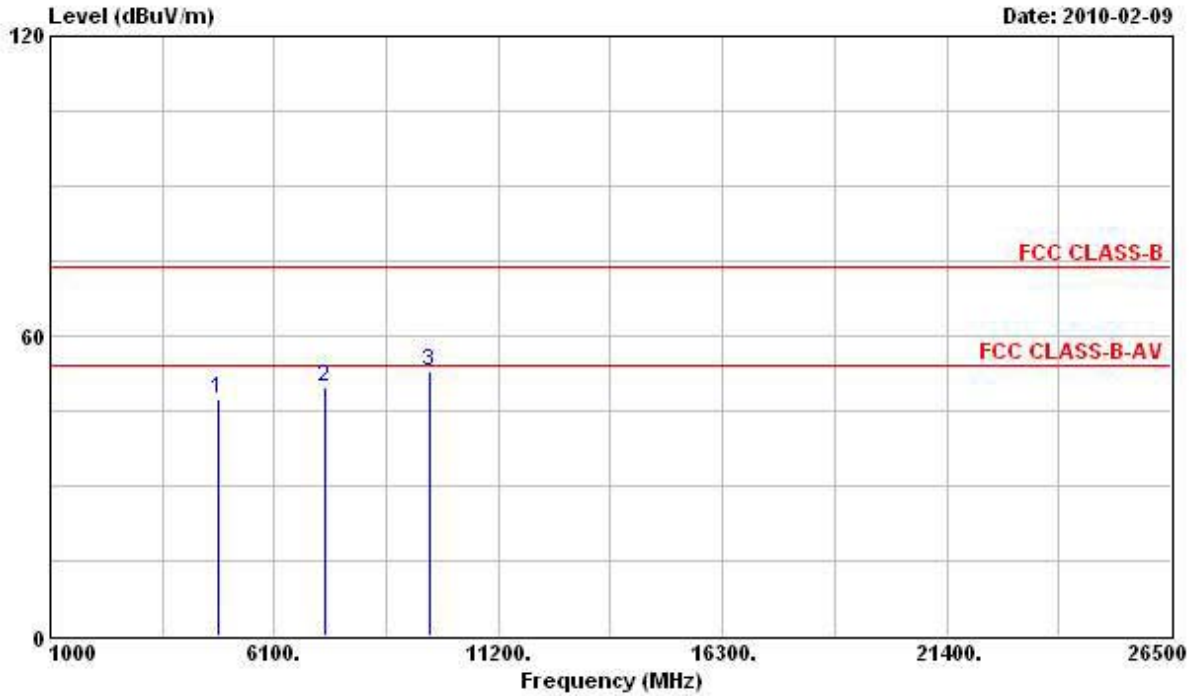
Horizontal



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	4824.000	49.55	-4.45	54.00	43.72	35.76	4.58	34.51	pk
2	7236.000	51.10			41.91	37.85	5.63	34.29	Peak
3	9848.000	54.70			43.25	39.61	6.38	34.54	Peak

Note: The items 2 and 3 are on un-restricted band, so the limit is -20dB for the field strength of the fundamental emissions (see section 3.6.7).

Vertical

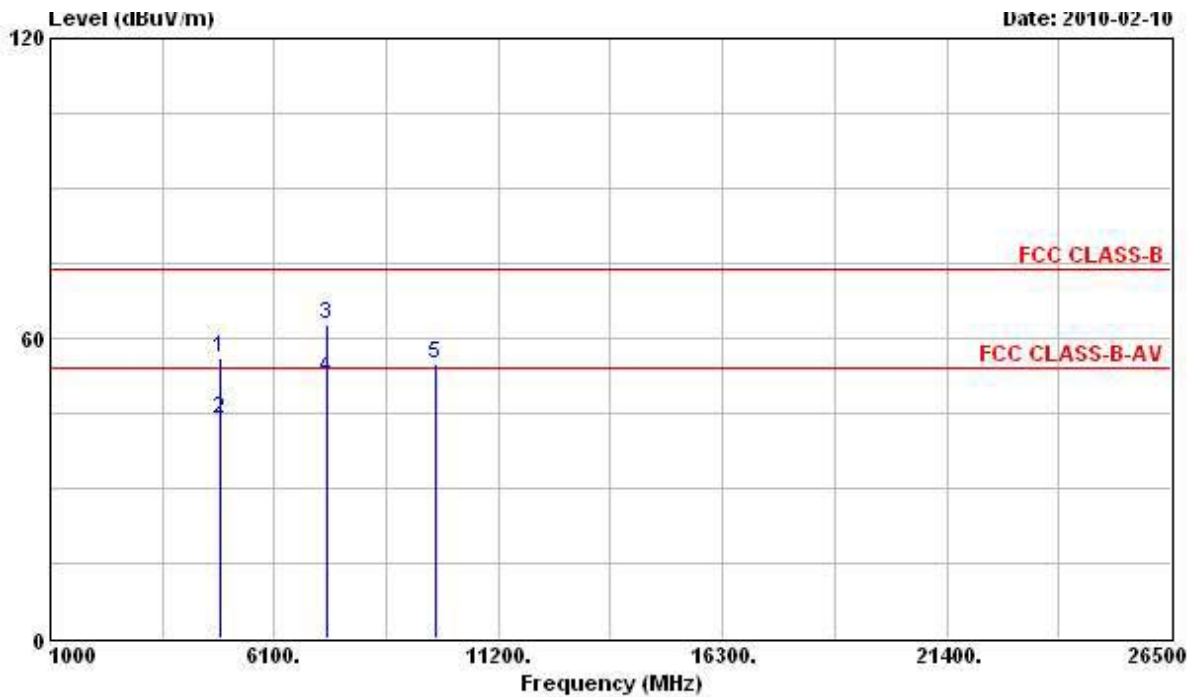


Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	4824.000	47.42	-6.58	54.00	42.22	35.13	4.58	34.51 pk
2	7236.000	49.55			41.31	36.90	5.63	34.29 Peak
3	9648.000	52.92			42.62	38.59	6.34	34.63 Peak

Note: The items 2 and 3 are on un-restricted band, so the limit is -20dB for the field strength of the fundamental emissions (see section 3.6.7).

Final Test Date	Feb. 10, 2010	Test Site No.	03CH02-HY
Temperature	20	Humidity	50%
Test Engineer	Steven	Configuration	802.11b Ch. 6

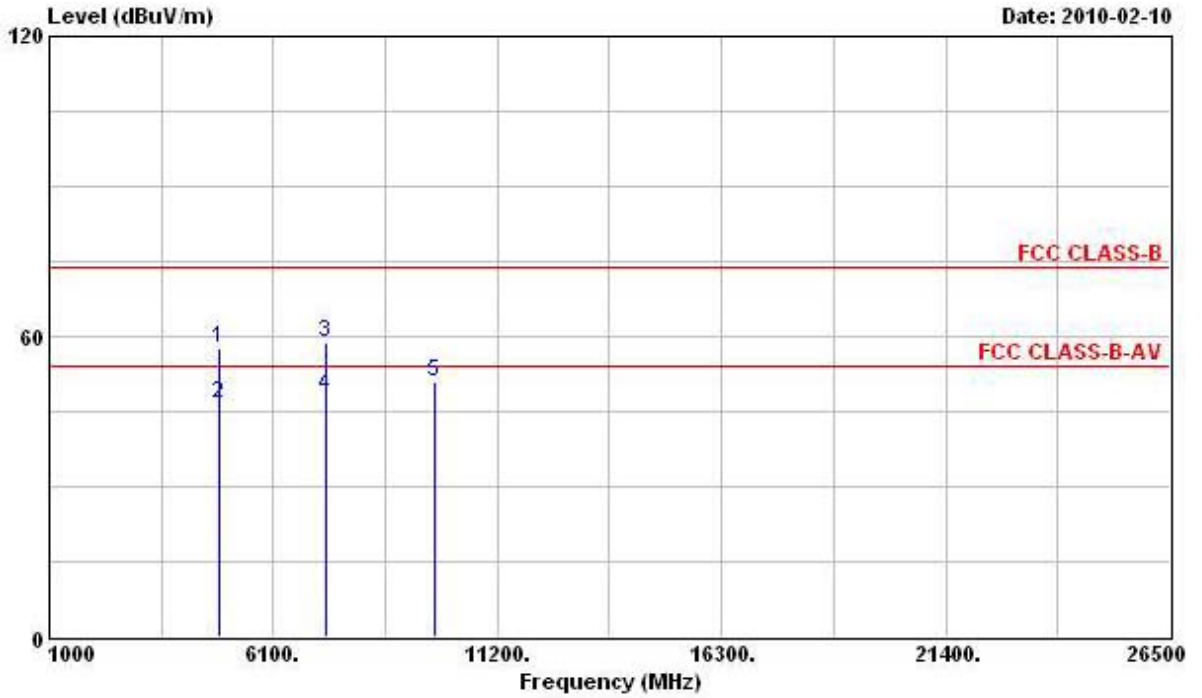
Horizontal



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	4874.000	56.05	-17.95	74.00	50.06	35.83	4.61	34.45	Peak
2	4874.000	44.00	-10.00	54.00	38.01	35.83	4.61	34.45	Average
3	7311.000	62.64	-11.36	74.00	53.43	37.86	5.64	34.29	Peak
4	7311.000	52.04	-1.96	54.00	42.83	37.86	5.64	34.29	Average
5	9748.000	54.95			43.66	39.51	6.36	34.58	Peak

Note: The item 5 is on un-restricted band, so the limit is -20dB for the field strength of the fundamental emissions (see section 3.6.7).

Vertical

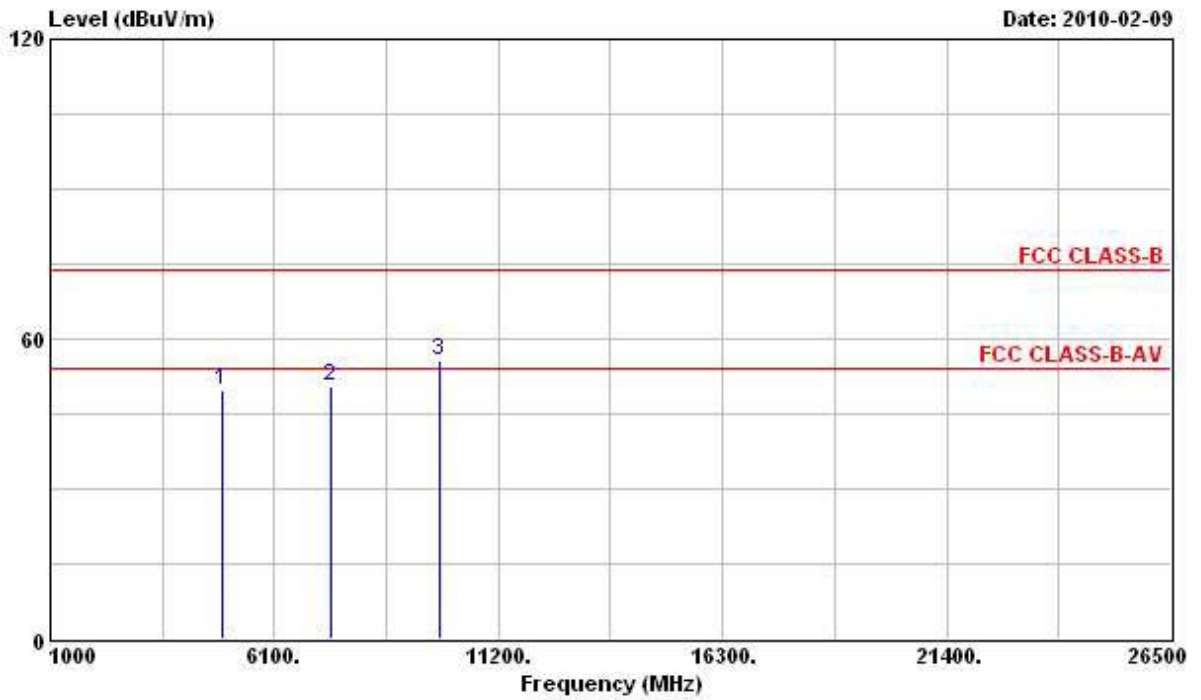


	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	4874.000	57.59	-16.41	74.00	52.25	35.18	4.61	34.45	Peak
2	4874.000	46.66	-7.34	54.00	41.32	35.18	4.61	34.45	Average
3	7311.000	58.64	-15.36	74.00	50.37	36.92	5.64	34.29	Peak
4	7311.000	48.35	-5.65	54.00	40.08	36.92	5.64	34.29	Average
5	9748.000	51.09			40.60	38.71	6.36	34.58	Peak

Note: The item 5 is on un-restricted band, so the limit is -20dB for the field strength of the fundamental emissions (see section 3.6.7).

Final Test Date	Feb. 09, 2010	Test Site No.	03CH02-HY
Temperature	20	Humidity	50%
Test Engineer	Steven	Configuration	802.11b Ch. 11

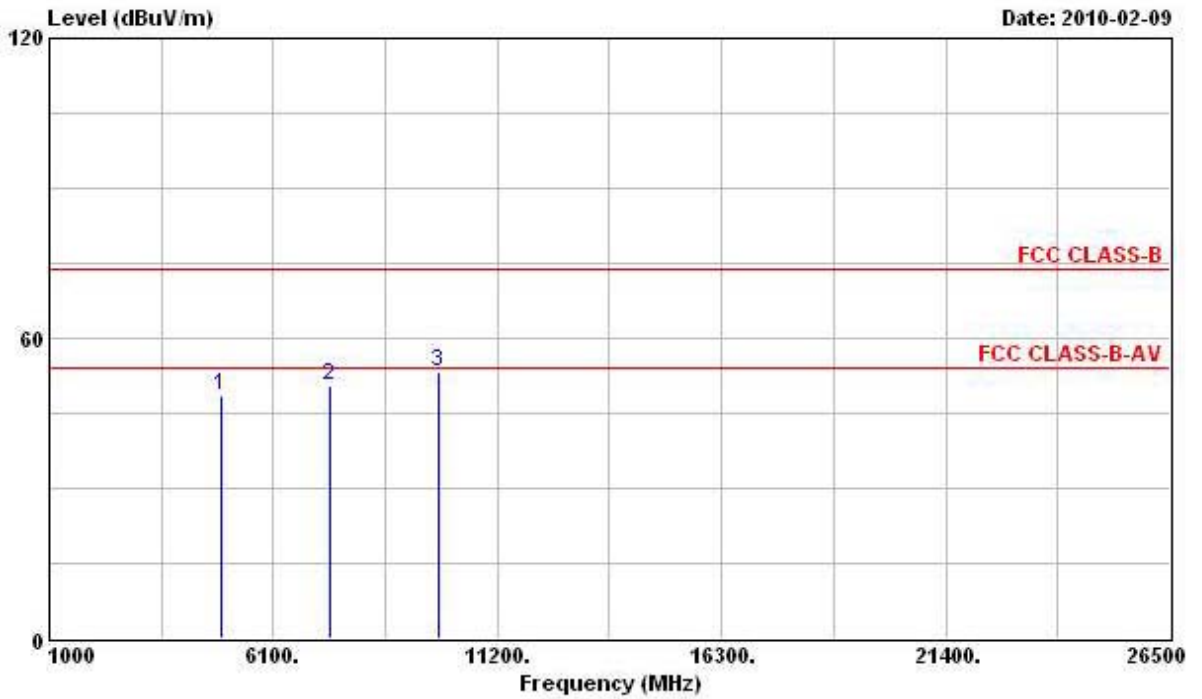
Horizontal



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	4924.000	49.64	-4.36	54.00	43.44	35.90	4.68	34.38	pk
2	7386.000	50.48	-3.52	54.00	41.24	37.88	5.65	34.29	pk
3	9848.000	55.85			44.40	39.61	6.38	34.54	Peak

Note: The item 3 is on un-restricted band, so the limit is -20dB for the field strength of the fundamental emissions (see section 3.6.7).

Vertical

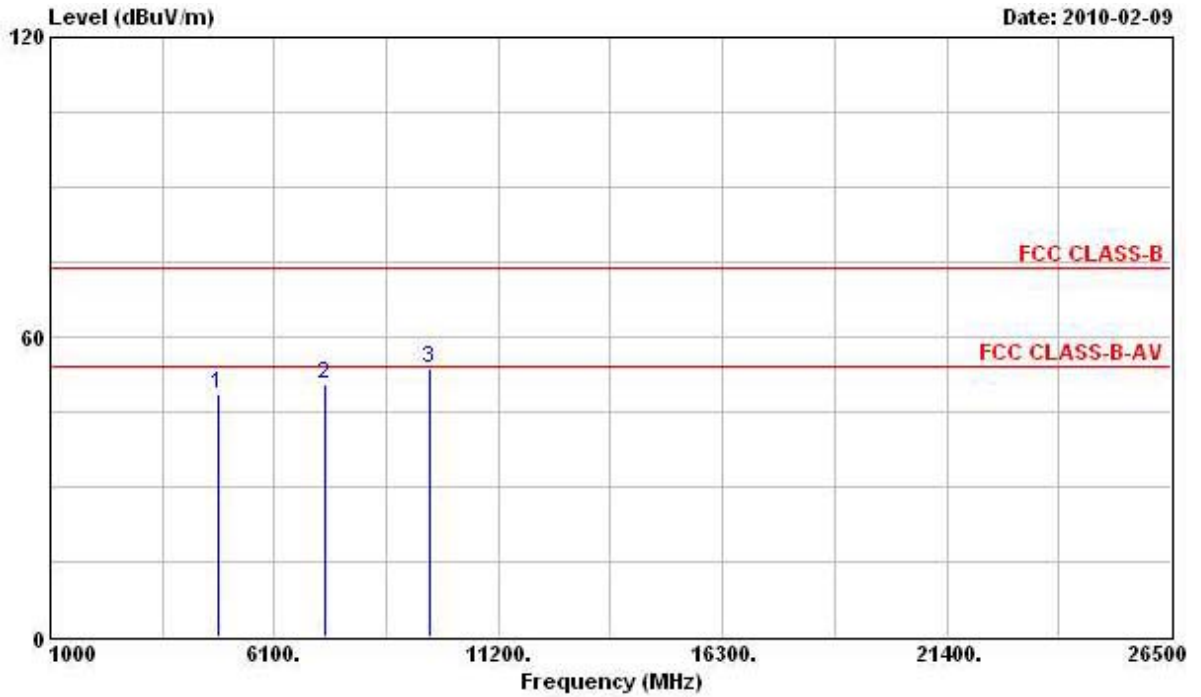


Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	4924.000	48.42	-5.58	54.00	42.89	35.23	4.68	34.38 pk
2	7386.000	50.45	-3.55	54.00	42.13	36.96	5.65	34.29 pk
3	9848.000	53.40			42.75	38.81	6.38	34.54 Peak

Note: The item 3 is on un-restricted band, so the limit is -20dB for the field strength of the fundamental emissions (see section 3.6.7).

Final Test Date	Feb. 09, 2010	Test Site No.	03CH02-HY
Temperature	20	Humidity	50%
Test Engineer	Steven	Configuration	802.11g Ch. 1

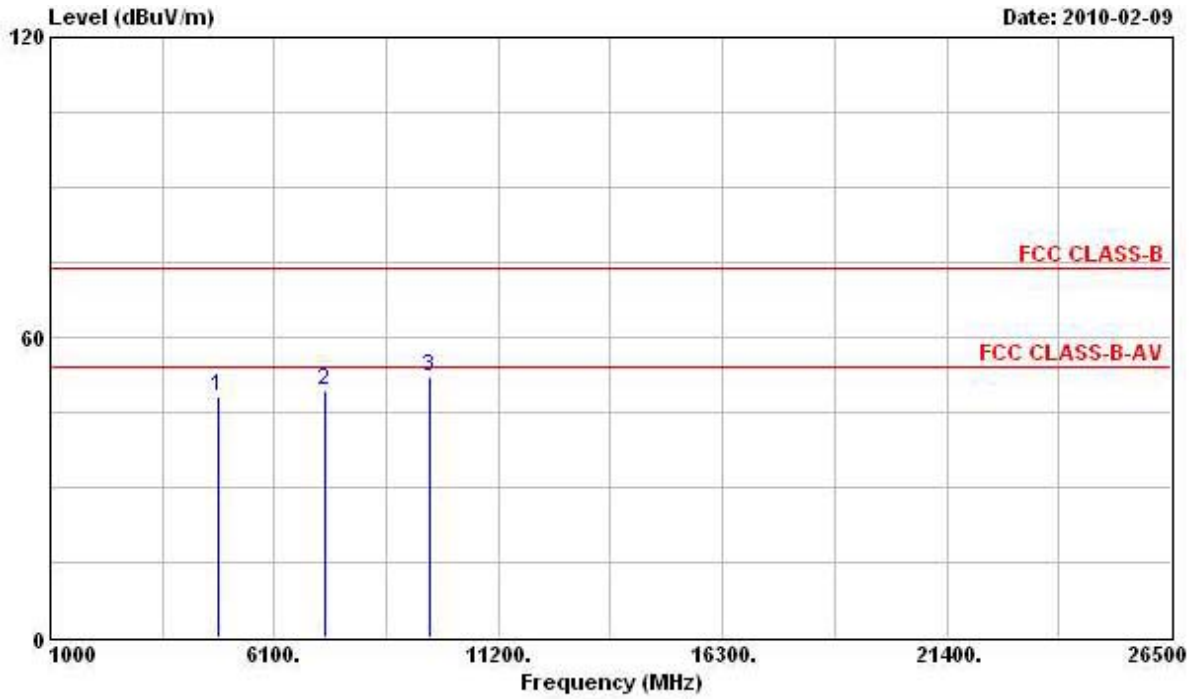
Horizontal



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	4824.000	48.70	-5.30	54.00	42.87	35.76	4.58	34.51	pk
2	7236.000	50.41			41.22	37.85	5.63	34.29	Peak
3	9648.000	53.55			42.45	39.39	6.34	34.63	Peak

Note: The items 2 and 3 are on un-restricted band, so the limit is -20dB for the field strength of the fundamental emissions (see section 3.6.7).

Vertical

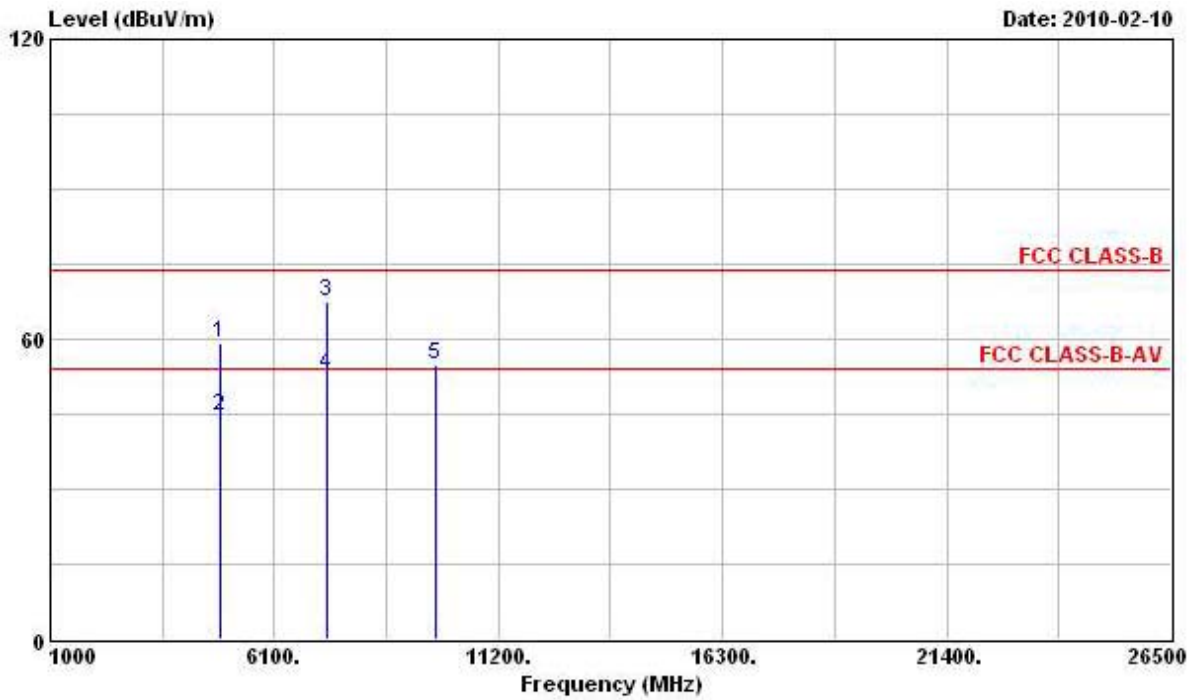


	Freq	Level	Over	Limit	ReadAntenna	Cable	Preamp	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB
1	4824.000	48.15	-5.85	54.00	42.95	35.13	4.58	34.51 pk
2	7236.000	49.47			41.23	36.90	5.63	34.29 Peak
3	9648.000	51.96			41.66	38.59	6.34	34.63 Peak

Note: The items 2 and 3 are on un-restricted band, so the limit is -20dB for the field strength of the fundamental emissions (see section 3.6.7).

Final Test Date	Feb. 10, 2010	Test Site No.	03CH02-HY
Temperature	20	Humidity	50%
Test Engineer	Steven	Configuration	802.11g Ch. 6

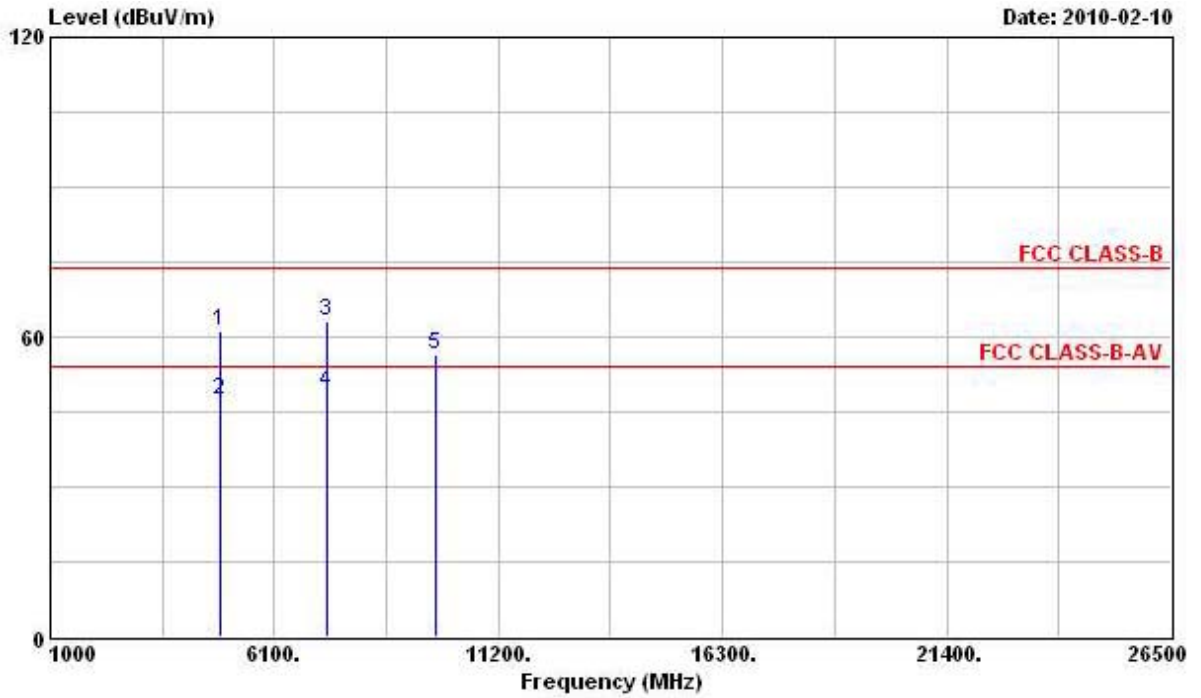
Horizontal



Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	4874.000	59.27	-14.73	74.00	53.28	35.83	4.61	34.45 Peak
2	4874.000	44.50	-9.50	54.00	38.51	35.83	4.61	34.45 Average
3	7311.000	67.47	-6.53	74.00	58.26	37.86	5.64	34.29 Peak
4 @	7311.000	52.83	-1.17	54.00	43.62	37.86	5.64	34.29 Average
5	9748.000	54.87			43.58	39.51	6.36	34.58 Peak

Note: The item 5 is on un-restricted band, so the limit is -20dB for the field strength of the fundamental emissions (see section 3.6.7).

Vertical

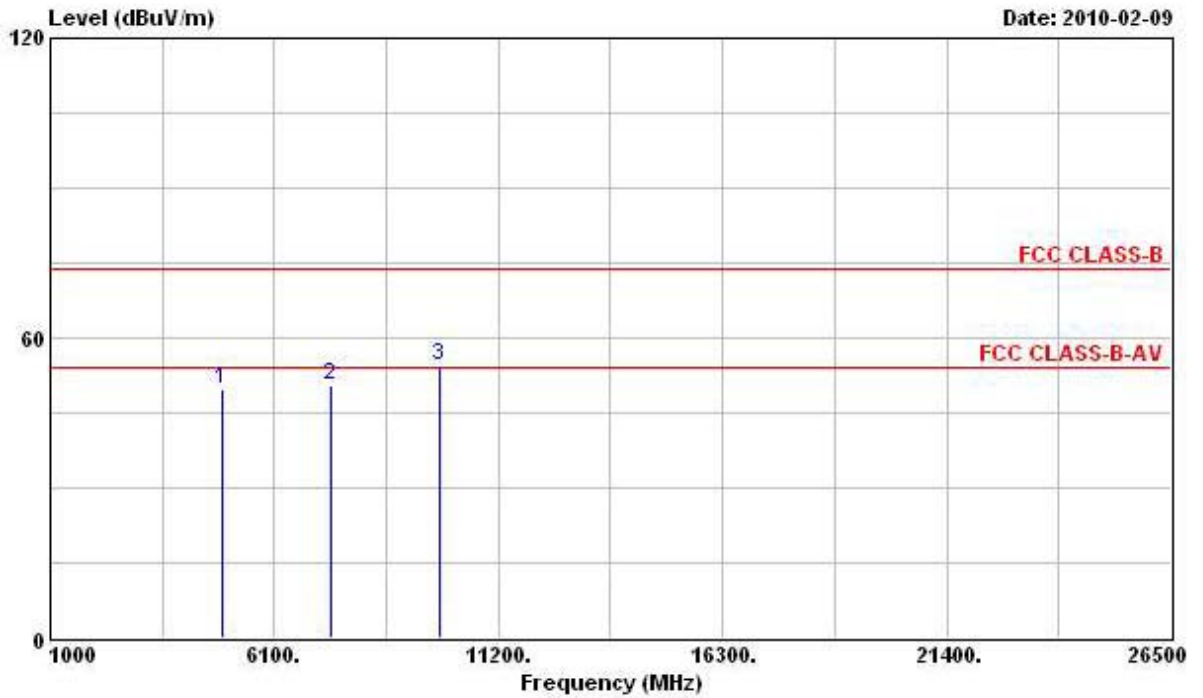


	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	4874.000	61.18	-12.82	74.00	55.84	35.18	4.61	34.45	Peak
2	4874.000	47.34	-6.66	54.00	42.00	35.18	4.61	34.45	Average
3	7311.000	63.05	-10.95	74.00	54.78	36.92	5.64	34.29	Peak
4	7311.000	48.93	-5.07	54.00	40.66	36.92	5.64	34.29	Average
5	9748.000	56.27			45.78	38.71	6.36	34.58	Peak

Note: The item 5 is on un-restricted band, so the limit is -20dB for the field strength of the fundamental emissions (see section 3.6.7).

Final Test Date	Feb. 09, 2010	Test Site No.	03CH02-HY
Temperature	20	Humidity	50%
Test Engineer	Steven	Configuration	802.11g Ch. 11

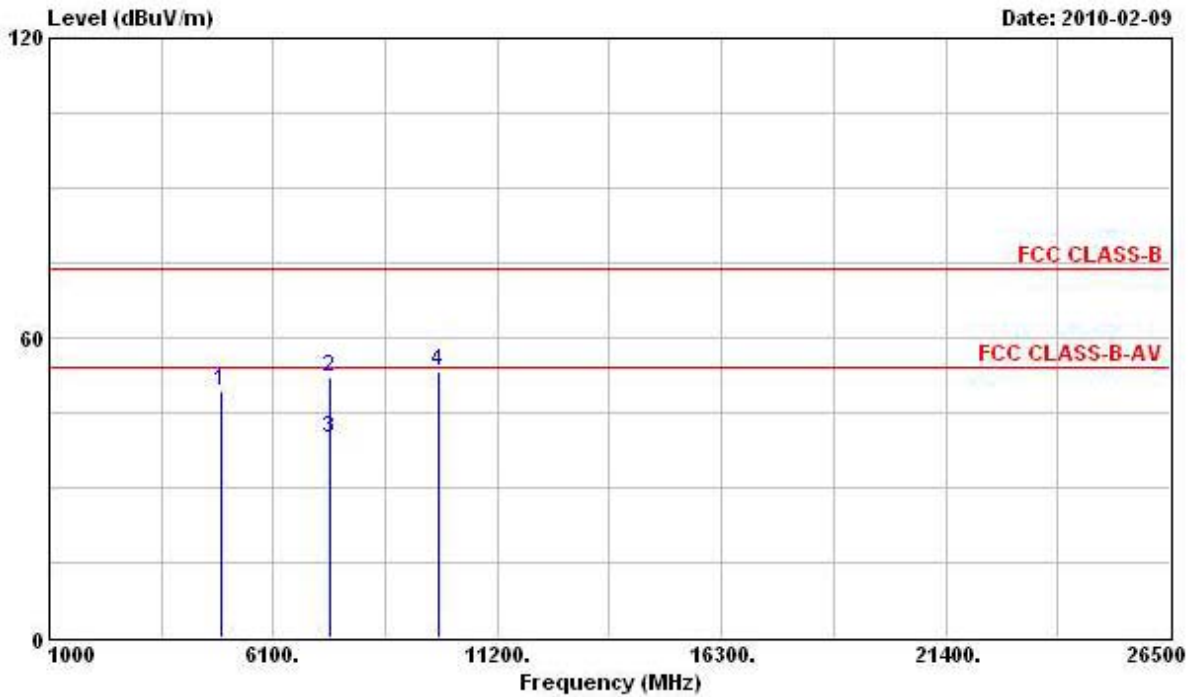
Horizontal



Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	4924.000	49.54	-4.46	54.00	43.34	35.90	4.68	34.38 pk
2	7386.000	50.52	-3.48	54.00	41.28	37.88	5.65	34.29 pk
3	9848.000	54.55			43.10	39.61	6.38	34.54 Peak

Note: The item 3 is on un-restricted band, so the limit is -20dB for the field strength of the fundamental emissions (see section 3.6.7).

Vertical



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	4924.000	49.33	-4.67	54.00	43.80	35.23	4.68	34.38	pk
2	7386.000	52.20	-21.80	74.00	43.88	36.96	5.65	34.29	Peak
3	7386.000	39.88	-14.12	54.00	31.56	36.96	5.65	34.29	Average
4	9848.000	53.38			42.73	38.81	6.38	34.54	Peak

Note: The item 4 is on un-restricted band, so the limit is -20dB for the field strength of the fundamental emissions (see section 3.6.7).

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.

3.6 Band Edge and Fundamental Emissions Measurement

3.6.1 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

3.6.2 Measuring Instruments and Setting

Please refer to section 4 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)	1MHz / 1MHz for Peak

3.6.3 Test Procedures

1. The test procedure is the same as section 3.5.3; only the frequency range investigated is limited to 100MHz around band edges.
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.

3.6.4 Test Setup Layout

This test setup layout is the same as that shown in section 3.5.4.

3.6.5 Test Deviation

There is no deviation with the original standard.

3.6.6 EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

3.6.7 Test Result of Band Edge and Fundamental Emissions

Final Test Date	Feb. 23, 2010	Test Site No.	03CH02-HY
Temperature	20	Humidity	50%
Test Engineer	Steven	Configuration	5G 802.11a Ch. 149, 157, 165

Channel 149

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1 @	5723.780	77.13	-6.41	83.54	35.12	36.97	5.04	0.00	Peak
2 @	5739.460	110.42			68.36	36.99	5.07	0.00	Peak
1 @	5725.000	61.11	-2.43	63.54	19.10	36.97	5.04	0.00	Average
2 @	5737.780	99.94			57.91	36.99	5.04	0.00	Average

The item 2 is Fundamental Emissions.

Channel 157

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1 @	5777.540	107.37			65.25	37.03	5.09	0.00	Peak
1 @	5778.100	96.76			54.64	37.03	5.09	0.00	Average

The item 1 is Fundamental Emissions.

Channel 165

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1 @	5832.280	104.09			61.89	37.09	5.11	0.00	Peak
2 @	5850.000	72.77	-10.77	83.54	30.55	37.11	5.11	0.00	Peak
1 @	5829.060	92.14			49.94	37.09	5.11	0.00	Average
2 @	5850.000	59.97	-3.57	63.54	17.75	37.11	5.11	0.00	Average

The item 1 is Fundamental Emissions.

Final Test Date	Feb. 10, 2010	Test Site No.	03CH02-HY
Temperature	20	Humidity	50%
Test Engineer	Steven	Configuration	802.11b Ch. 1, 6, 11

Channel 1

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1 @	2390.000	52.97	-1.03	54.00	18.16	31.79	3.02	0.00	Average
2 @	2414.500	104.23			69.35	31.86	3.02	0.00	Average
1 @	2390.000	64.82	-9.18	74.00	30.01	31.79	3.02	0.00	Peak
2 @	2412.980	112.22			77.34	31.86	3.02	0.00	Peak

The item 2 is Fundamental Emissions.

Channel 6

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1 @	2438.060	118.81			83.77	31.99	3.05	0.00	Peak
1 @	2435.020	110.70			75.73	31.92	3.05	0.00	Average

The item 1 is Fundamental Emissions.

Channel 11

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1 @	2464.090	103.38			68.24	32.06	3.08	0.00	Average
2 @	2483.500	52.84	-1.16	54.00	17.63	32.13	3.08	0.00	Average
1 @	2463.140	111.27			76.13	32.06	3.08	0.00	Peak
2 @	2483.500	64.32	-9.68	74.00	29.11	32.13	3.08	0.00	Peak

The item 1 is Fundamental Emissions.

Final Test Date	Feb. 10, 2010	Test Site No.	03CH02-HY
Temperature	20	Humidity	50%
Test Engineer	Steven	Configuration	802.11g Ch. 1, 6, 11

Channel 1

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1 @	2390.000	52.66	-1.34	54.00	17.85	31.79	3.02	0.00	Average
2 @	2417.540	101.52			66.64	31.86	3.02	0.00	Average
1	2390.000	68.19	-5.81	74.00	33.38	31.79	3.02	0.00	Peak
2 @	2418.490	111.61			76.73	31.86	3.02	0.00	Peak

The item 2 is Fundamental Emissions.

Channel 6

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1 @	2439.770	120.79			85.75	31.99	3.05	0.00	Peak
1 @	2433.690	109.94			74.97	31.92	3.05	0.00	Average

The item 1 is Fundamental Emissions.

Channel 11

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1 @	2465.420	102.82			67.68	32.06	3.08	0.00	Average
2 @	2483.500	52.51	-1.49	54.00	17.30	32.13	3.08	0.00	Average
1 @	2463.330	112.94			77.80	32.06	3.08	0.00	Peak
2	2483.500	70.64	-3.36	74.00	35.43	32.13	3.08	0.00	Peak

The item 1 is Fundamental Emissions.

Note:

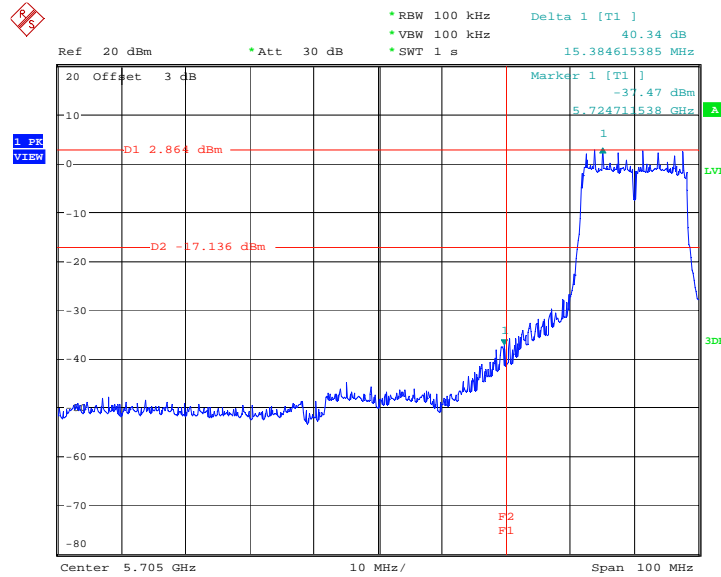
Emission level (dBuV/m) = 20 log Emission level (uV/m).

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

For Emission not in Restricted Band

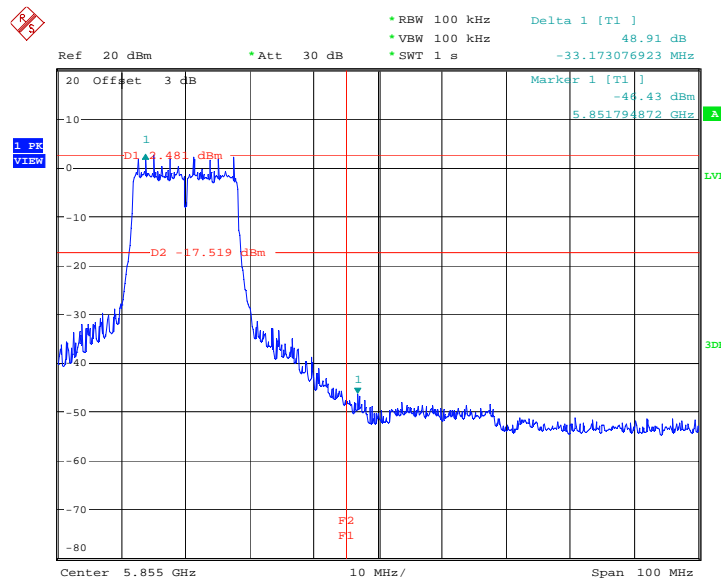
Final Test Date	Jan. 15, 2010	Test Site No.	TH01-HY
Temperature	25	Humidity	54%
Test Engineer	Duncan	Configuration	802.11n

Low Band Edge Plot on Configuration IEEE 802.11a-5G / 5745 MHz



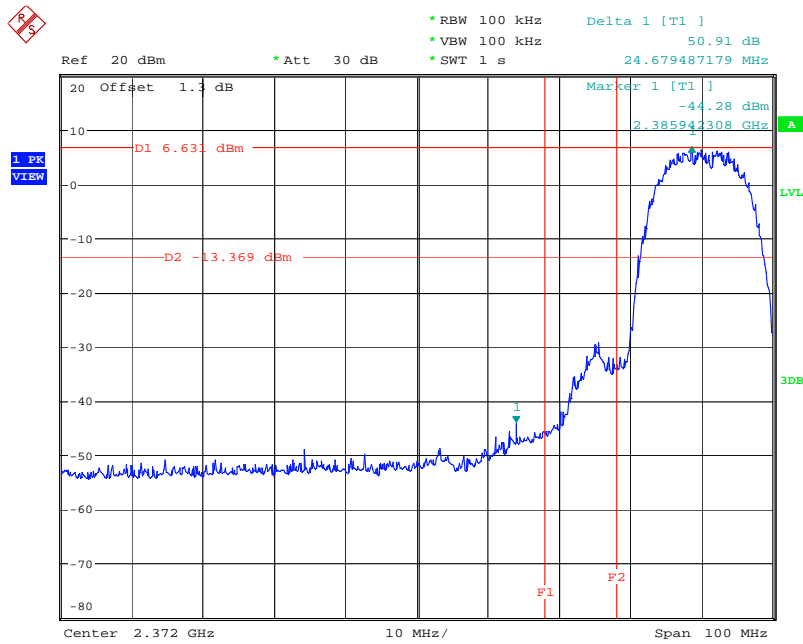
Date: 15.JAN.2010 14:13:10

High Band Edge Plot on Configuration IEEE 802.11a-5G / 5825 MHz



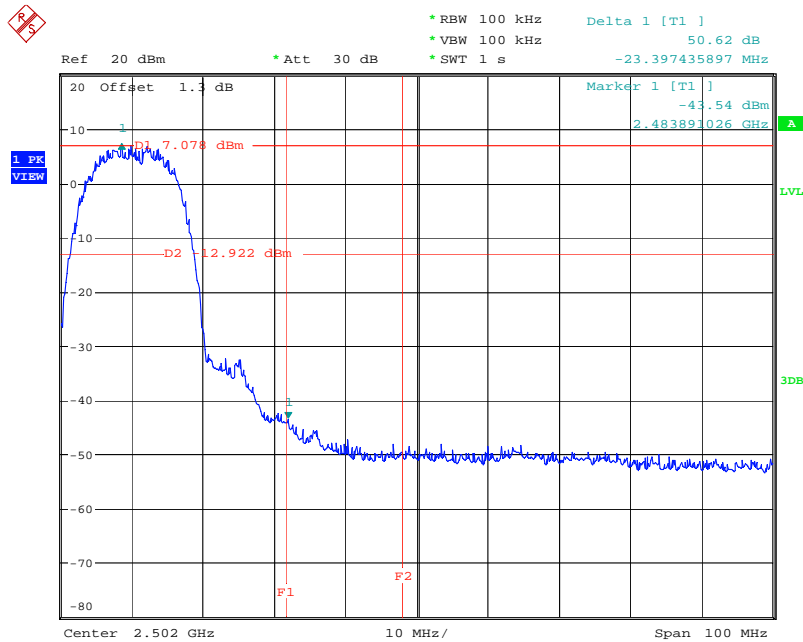
Date: 15.JAN.2010 14:15:59

Low Band Edge Plot on Configuration IEEE 802.11b-2.4G / 2412 MHz



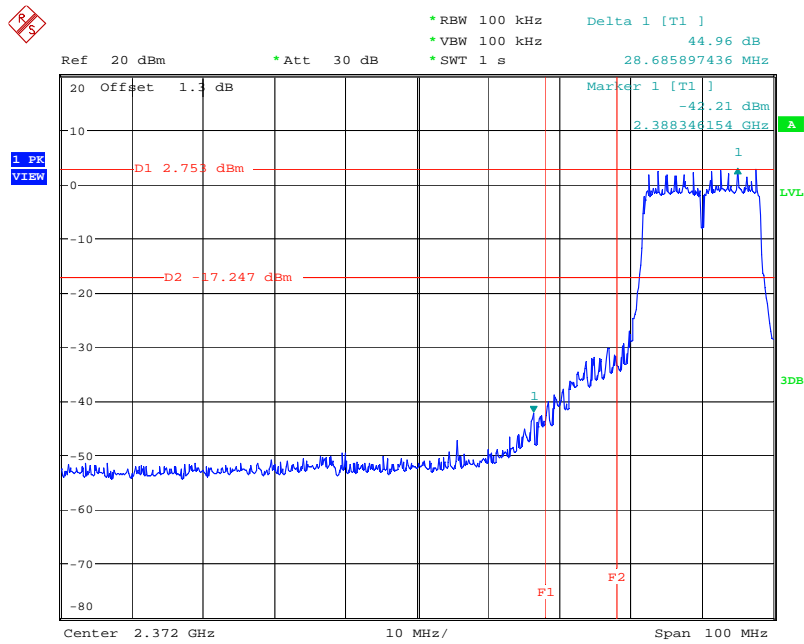
Date: 15.JAN.2010 11:52:33

High Band Edge Plot on Configuration IEEE 802.11b-2.4G / 2462 MHz



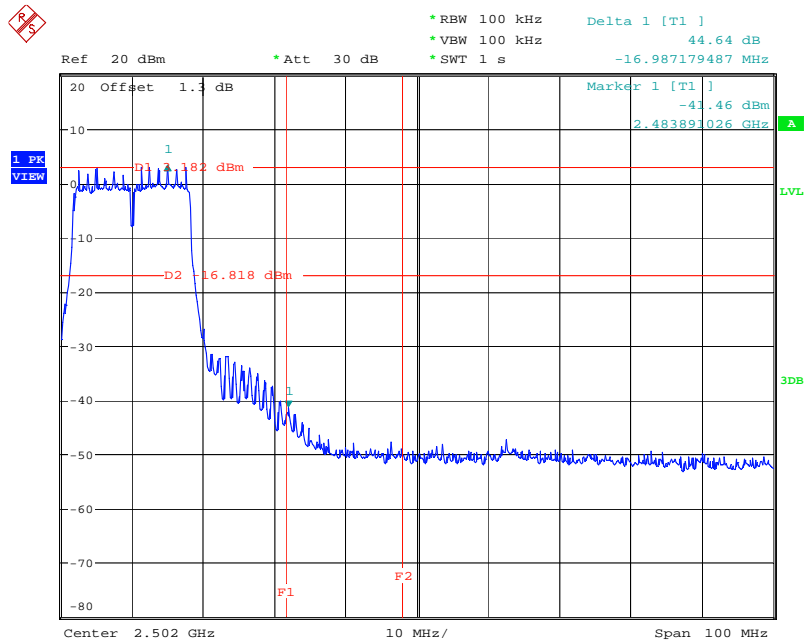
Date: 15.JAN.2010 11:53:40

Low Band Edge Plot on Configuration IEEE 802.11g-2.4G / 2412 MHz



Date: 15.JAN.2010 11:54:26

High Band Edge Plot on Configuration IEEE 802.11g-2.4G / 2462 MHz



Date: 15.JAN.2010 11:55:16

3.7 Antenna Requirements

3.7.1 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.

3.7.2 Antenna Connector Construction

Please refer to section 2.2 in this test report; antenna connector complied with the requirements.

4 LIST OF MEASURING EQUIPMENTS

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
EMC Receiver	R&S	ESCS 30	100174	9kHz – 2.75GHz	Apr. 15, 2009	Conduction (CO04-HY)
LISN	MessTec	NNB-2/16Z	99079	9kHz – 30MHz	Mar. 23, 2009	Conduction (CO04-HY)
LISN (Support Unit)	EMCO	3810/2NM	9703-1839	9kHz – 30MHz	Mar. 22, 2009	Conduction (CO04-HY)
RF Cable-CON	UTIFLEX	3102-26886-4	CB049	9kHz – 30MHz	Apr. 20, 2009	Conduction (CO04-HY)
EMI Filter	LINDGREN	LRE-2030	2651	< 450 Hz	N/A	Conduction (CO04-HY)

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

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Spectrum Analyzer	R&S	FSU26.5	100015	20Hz ~ 26.5GHz	Oct. 29, 2009	Conducted (TH01-HY)
Power Sensor	Anritsu	MA2411B	0917017	300MHz~40GHz	Dec. 03, 2009	Conducted (TH01-HY)
Power Meter	Anritsu	ML2495A	0949003	300MHz~40GHz	Dec. 03, 2009	Conducted (TH01-HY)
Power Sensor	R&S	NRV-Z32	100057	30MHz ~ 6GHz	Jul. 31, 2009	Conducted (TH01-HY)
DC Power Source	G.W.	GPC-6030D	C671845	DC 1V ~ 60V	Mar. 13, 2009	Conducted (TH01-HY)
Temp. and Humidity Chamber	Giant Force	GTH-225-20-S	MAB0103-001	N/A	Aug. 06, 2009	Conducted (TH01-HY)
RF CABLE-1m	Jye Bao	RG142	CB034-1m	20MHz ~ 7GHz	Dec. 02, 2009	Conducted (TH01-HY)
RF CABLE-2m	Jye Bao	RG142	CB035-2m	20MHz ~ 1GHz	Dec. 02, 2009	Conducted (TH01-HY)

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

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
AC Power Source	HPC	HPA-500W	HPA-9100024	AC 0 ~ 300V	Jul. 12, 2009*	Conducted (TH01-HY)

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

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Spectrum Analyzer	R&S	FSP40	100305/040	9 kHz - 40GHz	Feb. 02, 2010	Radiation (03CH02-HY)
3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH02-HY	30 MHz - 1 GHz 3m	May 11, 2009	Radiation (03CH02-HY)
Amplifier	Agilent	8447D	2944A11146	100 kHz – 1.3 GHz	Jul. 07, 2009	Radiation (03CH02-HY)
Amplifier	Agilent	8449B	3008A02373	1GHz – 26.5 GHz	Jul. 16, 2009	Radiation (03CH02-HY)
Horn Antenna	ETS-LINDGREN	3117	00091920	1GHz~18GHz	Oct. 22, 2009	Radiation (03CH02-HY)
RF Cable-R03m	Jye Bao	RG142	CB021	30MHz ~ 1GHz	Feb. 26, 2010	Radiation (03CH02-HY)
RF Cable-HIGH	SUHNER	SUCOFLEX106	03CH02-HY	1GHz~40GHz	Feb. 26, 2010	Radiation (03CH02-HY)
Bilog Antenna	SCHAFFNER	CBL61128	2723	30 MHz - 2 GHz	Nov. 30, 2009	Radiation (03CH02-HY)
Turn Table	HD	DS 420	420/649/00	0 - 360 degree	N/A	Radiation (03CH02-HY)
Antenna Mast	HD	MA 240	240/559/00	1 m - 4 m	N/A	Radiation (03CH02-HY)

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

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Loop Antenna	R&S	HFH2-Z2	860004/001	9 kHz - 30 MHz	Jul. 28, 2008*	Radiation (03CH02-HY)

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

5 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 nd Rd., Taipei 114, Taiwan, R.O.C. TEL : 886-2-2794-8886 FAX : 886-2-2794-9777
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6 TAF CERTIFICATE OF ACCREDITATION

