FCC RADIO TEST REPORT

According to

47 CFR FCC Part 15 Subpart C § 15.247

Equipment	:	**Action Camera**
Brand Name	:	**JVCKENWOOD**
Model Name	:	**GC-XA1BU**
Marketing Name	:	**Action Camera**
Filing Type	:	**New Application**
Applicant	:	**JVC KENWOOD Corporation** 12, 3-chome, Moriya-cho, Kanagawa-ku,Yokohama-shi Kanagawa-ken Japan
FCC ID	:	**ASIP4C101**
Manufacturer	:	**Chicony Electronics Co., Ltd** No. 25, Wugong 6th Rd., Wugu Dist., New Taipei City 248, Taiwan (R.O.C.)
Received Date	:	Mar. 13, 2012
Final Test Date	:	Jul. 10, 2012

Statement

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

Testing Laboratory
1190

SPORTON International Inc.

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

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History of This Test Report

Original Issue Date: Jun. 21, 2012
Report No.: FR231233
□ No additional attachment.
■ Additional attachment were issued as following record:

Attachment No.	Issue Date	Description
FR231233	Jun. 21, 2012	Original.
FR231233	Jul. 11, 2012	Update Power Spectral Density test for FCC KDB 558074.

CERTIFICATE OF COMPLIANCE

According to

47 CFR FCC Part 15 Subpart C § 15.247

Equipment	:	Action Camera
Brand Name	:	JVCKENWOOD
Model No.	:	GC-XA1BU
Applicant	:	JVC KENWOOD Corporation 12, 3-chome, Moriya-cho, Kanagawa-ku,Yokohama-shi Kanagawa-ken Japan

Sporton International as requested by the applicant to evaluate the EMC performance of the product sample received on Mar. 13, 2012 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 / Assistant Manager

SPORTON International Inc.

No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan 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	9.16 dB
3.2	15.247(b)(3)	Maximum Peak Output Power	Complies	12.39 dB
3.3	15.247(e)	Power Spectral Density	Complies	22.03 dB
3.4	15.247(a)(2)	6dB Spectrum Bandwidth Measurement	Complies	-
3.5	15.247(d)	Radiated Emissions	Complies	4.65 dB
3.6	15.247(d)	Band Edge Emissions	Complies	4.45 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 Output Power	±0.8dB	Confidence levels of 95%
Power Spectral Density	±0.5dB	Confidence levels of 95%
6dB Spectrum Bandwidth Measurement	$\pm 8.5\times10^{-8}$	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 802.11b/g/n is shown in this report. For more detailed features description, please refer to the manufacturer's specifications or user's manual.

Items	Description
Power Type	Charging from USB or Lithium-ion rechargeable battery
Data Modulation Data Rate (Mbps)	DSSS for IEEE 802.11b (DBPSK / DQPSK / CCK) (1/2/ 5.5/11) OFDM for IEEE 802.11g (BPSK / QPSK / 16QAM / 64QAM) (6/9/12/18/24/36/48/54) See the below table for IEEE 802.11n
Frequency Range	2400 ~ 2483.5MHz
Channel Number	11b/g/n (20MHz): 11
Channel Band Width (99%)	802.11b/g : 11b: 13.40 MHz ; 11g: 16.48 MHz 802.11n : MCS 0 (20MHz) : 17.72 MHz
Peak Output Power	802.11b/g : 11b: 13.97 dBm; 11g: 17.61 dBm 802.11n : MCS 0 (20MHz) : 17.24 dBm

IEEE 802.11n Modulation Scheme

MCS	Spatial	Modulation	Coding Rate	Data rate(Mbps)
Index	Streams	Type	Type	20 MHz channel 800nsGI
0	1	BPSK	1/2	6.5
1	1	QPSK	1/2	13
2	1	QPSK	3/4	19.5
3	1	16-QAM	1/2	26
4	1	16-QAM	3/4	39
5	1	64-QAM	2/3	52
6	1	64-QAM	3/4	58.5
7	1	64-QAM	5/6	65

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

2.2 Accessories

Accessories Information				
Battery	Brand Name	JVC	Model Name	BN-VH105
	Power Rating	3.7 Vdc, 3.89Wh/1050mAh	Type	Lithium-ion
USB Cable	Signal Line	0.33 meter, double-shielded cable		

2.3 Table for Filed Antenna

Antenna Category (Ant. Cat.)	
☐	Equipment placed on the market without antennas
☒	Integral antenna (antenna permanently attached)
	☐ Temporary RF connector provided ; ☒ No temporary RF connector provided

Transmitter Outputs & Receiver Inputs Information			
Modulation	**Transmitter Outputs**	**Receiver Inputs**	**Transmitter Output Signals**
802.11b/g/n HT20	1	1	-

Antenna General Information							
Antenna Port (Total 1 Port)			1(TX/RX)				
Maximum RF Output Power Level (PL)			1				
Transmit Chains Power Distribution			☒ symmetrical distribution ☐ asymmetrical distribution				
Ant. No.	**PL**	**Ant. Port** [Ant No. *X* connect to Ant. Port *Y*]	**Ant. Cat.**	**Ant. Type**	**G_{ANT} (dBi)**	**DG (dBi)** [correlated] **N_{TX} = 1**	**DG (dBi)** [uncorrelated] **N_{TX} = 2**
1	1	1	Integral	PIFA	4.45	4.45	N/A
☒	The equipment is normally installed and point-to-point or point-to-multipoint systems: Ant. No. 1						

Note 1: For all transmitter outputs with equal antenna gains, directional gain is to be computed as follows:
Any transmit signals are correlated, Directional Gain (DG) = G_{ANT} + 10 log(N) dBi
All transmit signals are completely uncorrelated, Directional Gain (DG)= G_{ANT}

Note 2: For all transmitter outputs with unequal antenna gains, directional gain is to be computed as follows:
Any transmit signals are correlated, Directional Gain (DG) =
$10 \log[(10^{G1/20} + 10^{G2/20} + \ldots + 10^{GN/20})^2 / N]$ dBi
All transmit signals are completely uncorrelated, Directional Gain (DG) =
$10 \log[(10^{G1/10} + 10^{G2/10} + \ldots + 10^{GN/10}) / N]$ dBi

2.4 Table for Carrier Frequencies

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	-	-

2.5 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 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
AC Power Line Conducted Emissions Radiated Emissions Below 1GHz	Charge Mode	-	-
Maximum Peak Output Power Power Spectral Density	11b/CCK	11 Mbps	1/6/11
	11g/BPSK	6 Mbps	1/6/11
	MCS 0 (20MHz)	6.5 Mbps	1/6/11
6dB Spectrum Bandwidth	11b/CCK	11 Mbps	1/6/11
	11g/BPSK	6 Mbps	1/6/11
	MCS 0 (20MHz)	6.5 Mbps	1/6/11
Radiated Emissions Above 1GHz Fundamental Emissions	11b/CCK	11 Mbps	1/6/11
	11g/BPSK	6 Mbps	1/6/11
	MCS 0 (20MHz)	6.5 Mbps	1/6/11
Band Edge Emissions	11b/CCK	11 Mbps	1/11
	11g/BPSK	6 Mbps	1/11
	MCS 0 (20MHz)	6.5 Mbps	1/11

2.6 Table for Testing Locations

Test Site No.	Site Category	Location
CO01-LK	OATS	Lin Kou
TH01-HY	OVEN Room	Hwa Ya
03CH02-HY	SAC	Hwa Ya

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

2.7 Table for Supporting Units

Support Unit	Brand	Model	FCC ID
Personal Computer	DELL	T3500	DoC
Monitor	COMPAQ	S510	DoC
Modem	ACEXX	DM1414	IFAXDM1414
Printer	HP	DJ400	B94C2642X
(USB) Keyboard	DELL	SK-8175	DoC
(USB) Mouse	DELL	MOC5UO	DoC
SD Card (Insert into EUT)	SanDisk	4GB	---
Notebook (Remote Workstation)	DELL	E5520	DoC

** The EUT was tested alone for radiated emissions above 1GHz test.

2.8 Table for Parameters of Test Software Setting

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

Power Parameters of IEEE 802.11b/g/n

Test Software Version	Transmitter continuous		
Frequency	2412 MHz	2437 MHz	2462 MHz
IEEE 802.11b	18	18	18
IEEE 802.11g	18	18	18
IEEE 802.11n (20MHz)	18	18	18

2.9 EUT Operation during Test

Conducted and radiated emissions below 1GHz use:
Three executive programs, "EMITEST.exe", "EMCTEST.exe" and "EMIprogram.exe" under Win XP, which generates a complete line of continuously repeating "H" pattern was used as the test software.

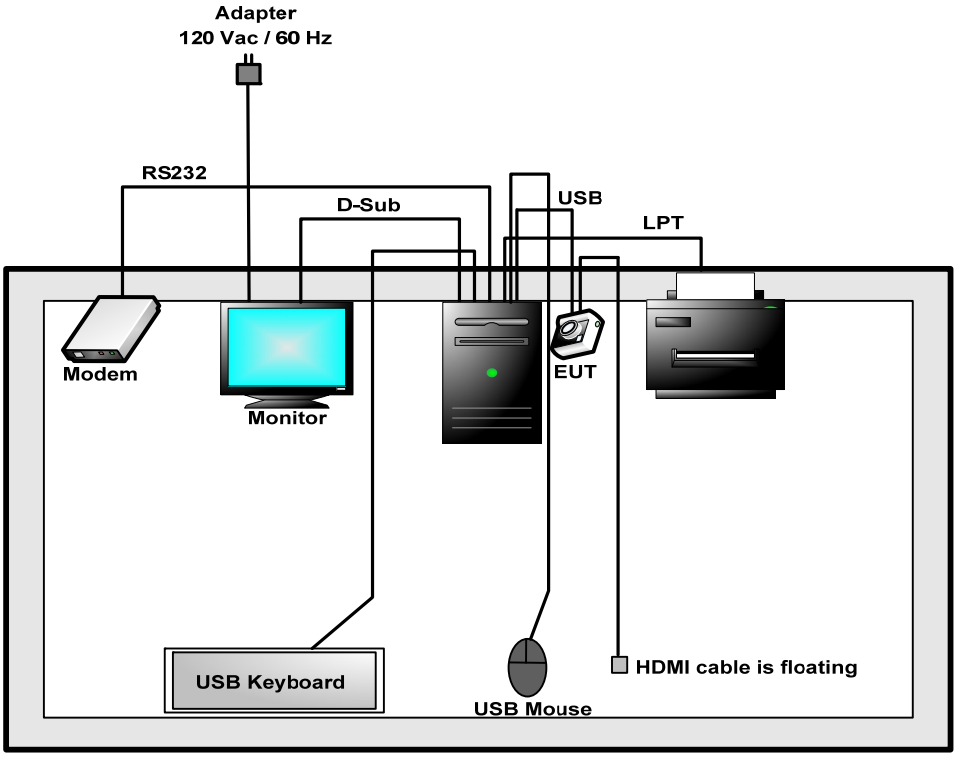
The program was executed as follows:
a. Turn on the power of all equipment.
b. The PC reads the messages from the hard disk drive and runs it.
c. The PC sends "H" messages to the monitor, and the monitor displays "H" patterns on the screen.
d. The PC sends “H“ messages to the printer, then the printer prints them on the paper.
e. The PC sends messages to the modem.
f. Repeat the steps from c to e.

At the same time, the following program was executed:
- The PC executed "Winthrax.exe" to read/write data from SD Card of EUT.

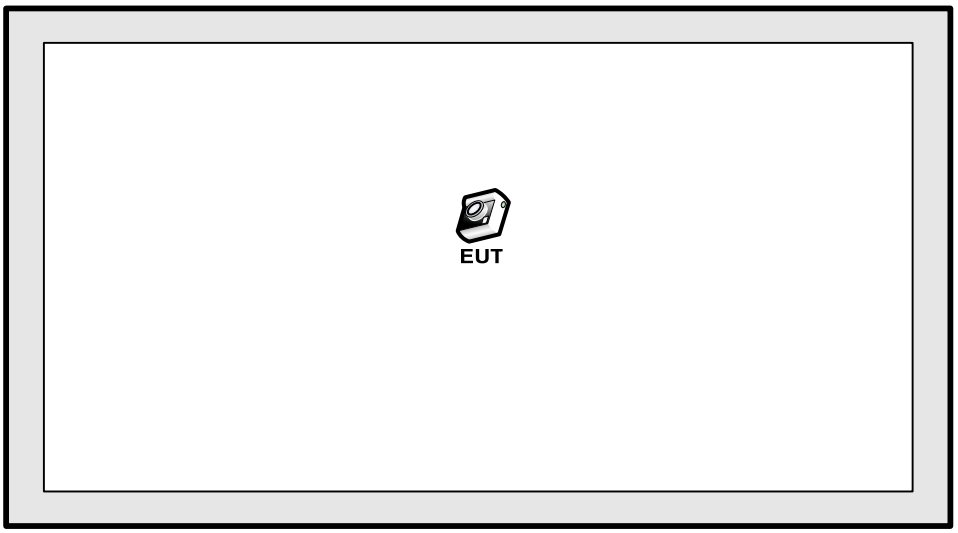
Radiated emissions above 1GHz use:
The EUT was tested alone and it executed “Transmitter continuous” to keep transmitting signals at fixed frequency.

2.10 Test Configuration

For conducted and radiated emissions 9kHz~1GHz



For radiated emissions above 1GHz



3 TEST RESULT

3.1 AC Power Line Conducted Emissions Measurement

3.1.1 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.

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

3.1.2 Measuring Instruments and Setting

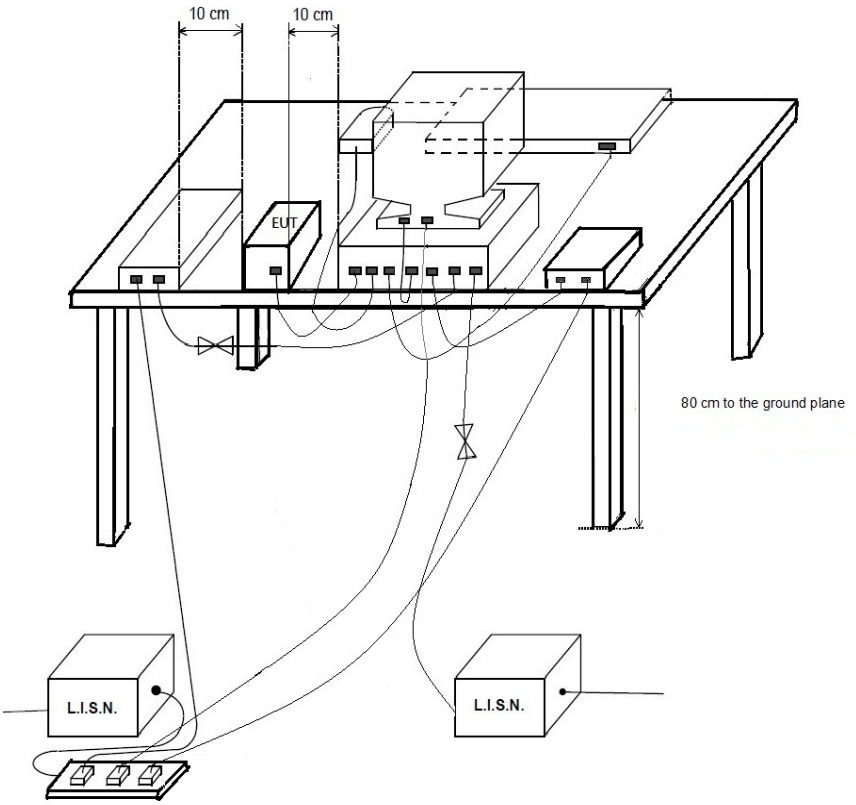
Please refer to section 4 of equipments list in this report. The following table is the setting of the receiver.

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

3.1.3 Test Procedures

1. The EUT was warmed up for 15 minutes before testing started.
2. The EUT was placed on a desk 0.8 meters height from the metal ground plane and 0.4 meter from the conducting wall of the shielding room and it was kept at least 0.8 meters from any other grounded conducting surface.
3. Connect EUT to the power mains through a line impedance stabilization network (LISN).
4. All the support units are connect to the other LISN.
5. The LISN provides 50 ohm coupling impedance for the measuring instrument.
6. The CISPR states that a 50 ohm, 50 microhenry LISN should be used.
7. Both sides of AC line were checked for maximum conducted interference.
8. The frequency range from 150 kHz to 30 MHz was searched.
9. Set the test-receiver system to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

3.1.4 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.

3.1.5 Test Deviation

There is no deviation with the original standard.

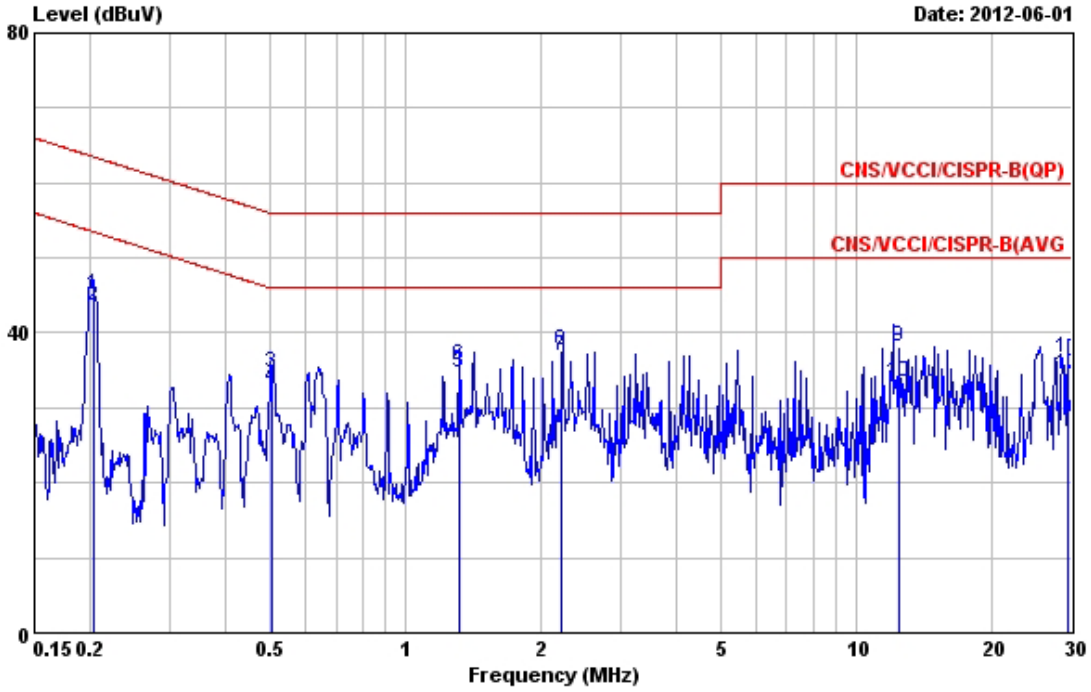
3.1.6 EUT Operation during Test

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

3.1.7 Results of AC Power Line Conducted Emissions Measurement

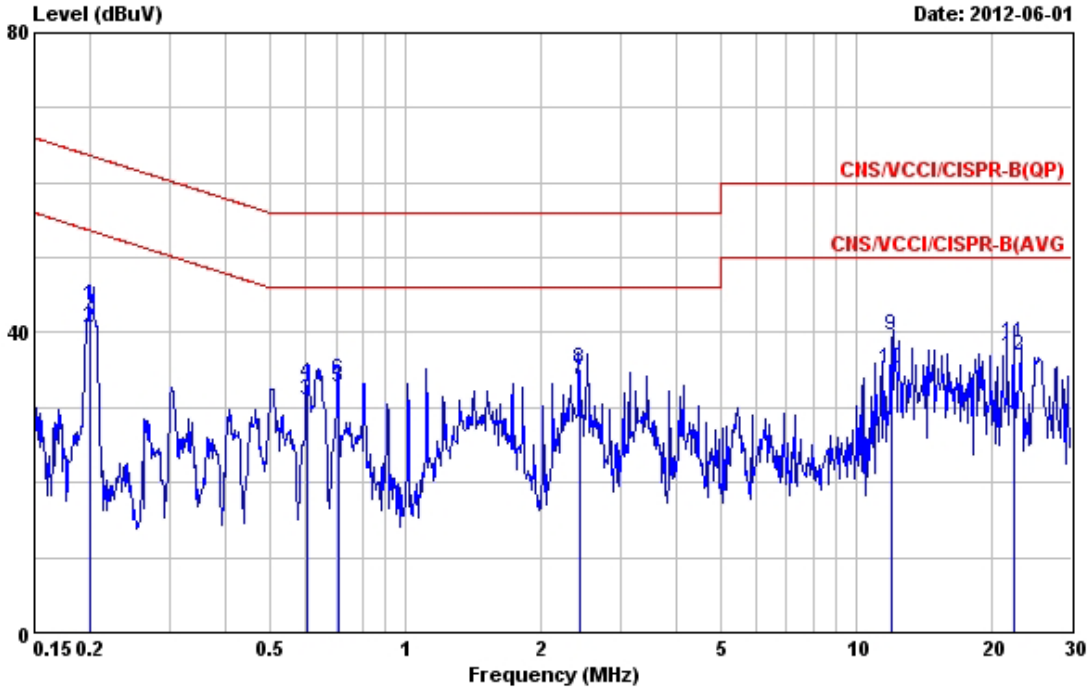
Final Test Date	Jun. 01, 2012	**Test Site No.**	CO01-LK
Temperature	22.4℃	**Humidity**	48%
Test Engineer	Peter	**Configuration**	Charge Mode

Line



		Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
		MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1		0.203	45.07	-18.42	63.49	44.91	0.14	0.02	QP
2	@	0.203	43.68	-9.81	53.49	43.52	0.14	0.02	Average
3		0.505	34.62	-21.38	56.00	34.41	0.16	0.05	QP
4		0.505	32.76	-13.24	46.00	32.55	0.16	0.05	Average
5	@	1.313	34.71	-11.29	46.00	34.43	0.18	0.10	Average
6		1.313	35.62	-20.38	56.00	35.34	0.18	0.10	QP
7	@	2.220	36.84	-9.16	46.00	36.51	0.20	0.13	Average
8		2.220	37.61	-18.39	56.00	37.28	0.20	0.13	QP
9		12.420	38.04	-21.96	60.00	37.33	0.37	0.34	QP
10		12.420	33.40	-16.60	50.00	32.69	0.37	0.34	Average
11		29.485	36.75	-23.25	60.00	35.74	0.54	0.47	QP
12		29.485	34.38	-15.62	50.00	33.37	0.54	0.47	Average

Neutral



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.200	43.67	-19.94	63.61	43.50	0.15	0.02	QP
2	0.200	40.74	-12.87	53.61	40.57	0.15	0.02	Average
3	0.604	31.07	-14.93	46.00	30.85	0.16	0.06	Average
4	0.604	33.26	-22.74	56.00	33.04	0.16	0.06	QP
5	0.708	32.61	-13.39	46.00	32.39	0.16	0.06	Average
6	0.708	33.73	-22.27	56.00	33.51	0.16	0.06	QP
7	2.423	33.61	-12.39	46.00	33.27	0.20	0.14	Average
8	2.423	35.10	-20.90	56.00	34.76	0.20	0.14	QP
9	12.018	39.51	-20.49	60.00	38.77	0.40	0.34	QP
10	12.018	35.05	-14.95	50.00	34.31	0.40	0.34	Average
11	22.315	38.54	-21.46	60.00	37.56	0.55	0.43	QP
12	22.315	36.83	-13.17	50.00	35.85	0.55	0.43	Average

Note:
Level = Read Level + LISN Factor + Cable Loss.

3.2 Maximum Peak 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-multipoint antenna reduction operation, the limit has to be reduced by 1dB for every dB that the directional gain of the antenna exceeds 6dBi.

3.2.2 Measuring Instruments and Setting

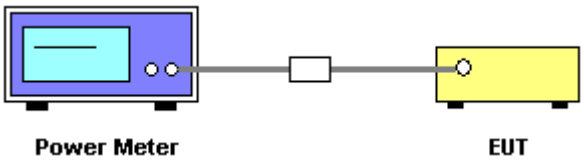
Please refer to section 4 of equipments list in this report. The following table is the setting of the power meter.

Power Meter Parameter	Setting
Filter No.	Auto
Measurement time	0.135 s ~ 26 s
Used Peak Sensor	MA2411B

3.2.3 Test Procedures

1. The transmitter output (antenna port) was connected to the power meter.
2. Turn on the EUT and power meter and then record the peak power value.
3. Repeat above procedures on all channels needed to be tested.

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 Peak Output Power

Final Test Date	Apr. 07, 2012	**Test Site No.**	TH01-HY
Temperature	26.8℃	**Humidity**	28%
Test Engineer	Ian	**Configurations**	802.11b/g/n

Configuration IEEE 802.11b

Channel	Frequency	Peak Output Power (dBm)	Max. Limit (dBm)	Result
1	2412 MHz	13.46	30.00	**Complies**
6	2437 MHz	13.35	30.00	**Complies**
11	2462 MHz	13.97	30.00	**Complies**

Configuration IEEE 802.11g

Channel	Frequency	Peak Output Power (dBm)	Max. Limit (dBm)	Result
1	2412 MHz	17.05	30.00	**Complies**
6	2437 MHz	17.61	30.00	**Complies**
11	2462 MHz	17.56	30.00	**Complies**

Configuration of IEEE 802.11n (20MHz)

Channel	Frequency	Peak Output Power (dBm)	Max. Limit (dBm)	Result
1	2412 MHz	16.57	30.00	**Complies**
6	2437 MHz	17.13	30.00	**Complies**
11	2462 MHz	17.24	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

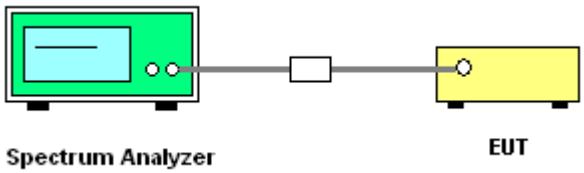
Please refer to section 4 of equipments list in this report. The following table is the setting of the spectrum analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	20MHz
RB	100 kHz
VB	300 kHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

3.3.3 Test Procedures

Measure and sum the spectra across the outputs. Refer as FCC KDB 662911, In-band power spectral density (PSD). Sample all transmit ports simultaneously using a spectrum analyzer for each transmit port. Where the trace bin-by-bin of each transmit port summing can be performed. (i.e., in the first spectral bin of output 1 is summed with that in the first spectral bin of output 2 and that from the first spectral bin of output 3, and so on up to the N_{TX} output to obtain the value for the first frequency bin of the summed spectrum.). Add up the amplitude (power) values for the different transmit chains and use this as the new data trace. The new data trace samples added 100 kHz segment and found the highest value of each 100 kHz segments. Add the bandwidth correction factor (BWCF) [-15.2 dB] adjusting in power spectral density per 3kHz.

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	Jul. 10, 2012	**Test Site No.**	TH01-HY
Temperature	25.2℃	**Humidity**	32%
Test Engineer	Ian	**Configurations**	802.11b/g/n

Configuration IEEE 802.11b

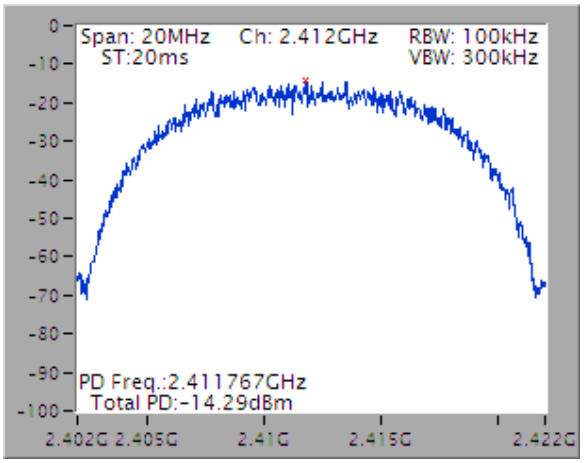
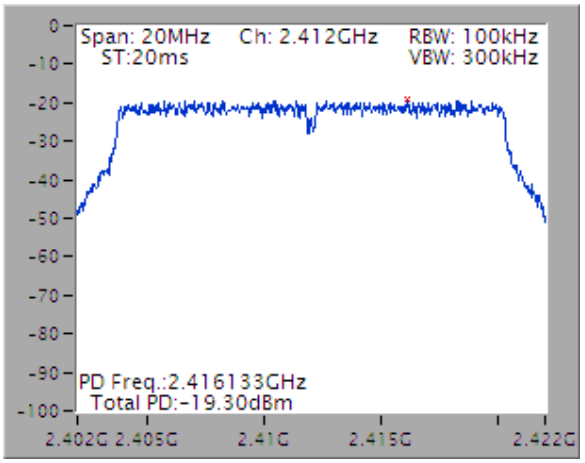
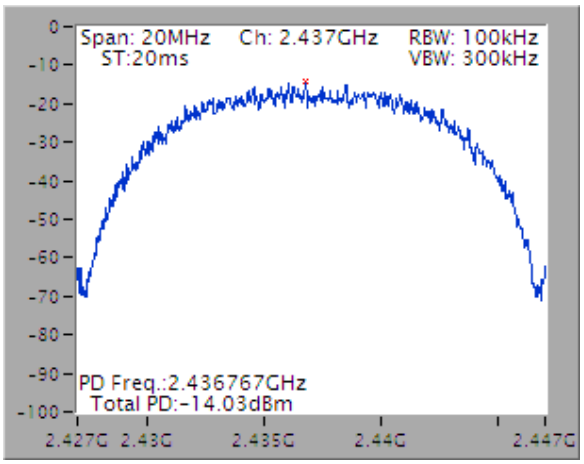
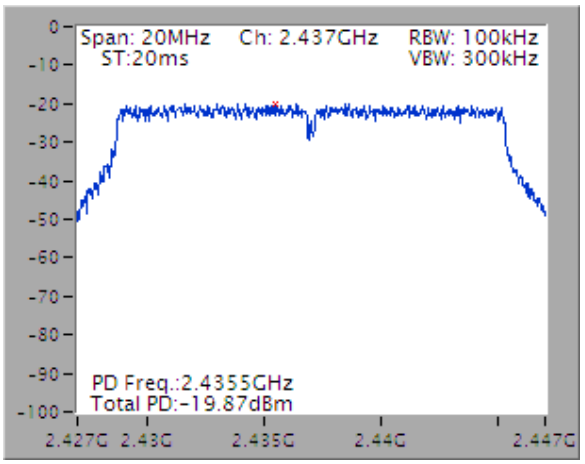
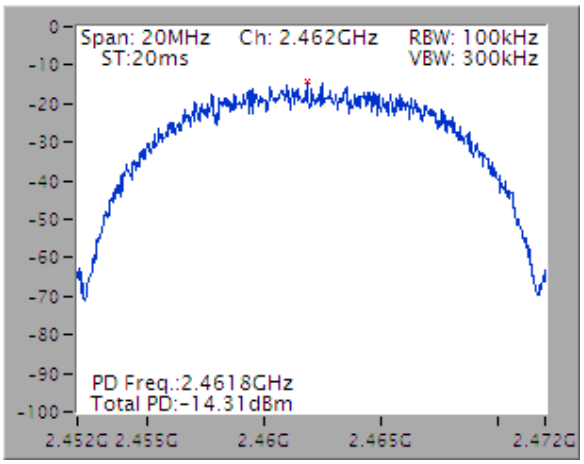
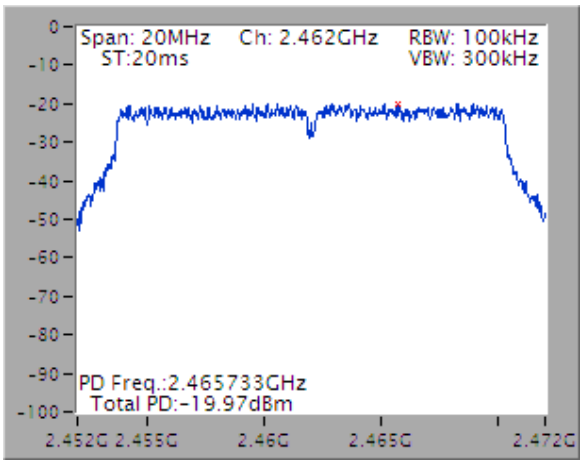
Channel	Frequency	Power Density (dBm)	Max. Limit (dBm)	Result
1	2412 MHz	-14.29	8.00	**Complies**
6	2437 MHz	-14.03	8.00	**Complies**
11	2462 MHz	-14.31	8.00	**Complies**

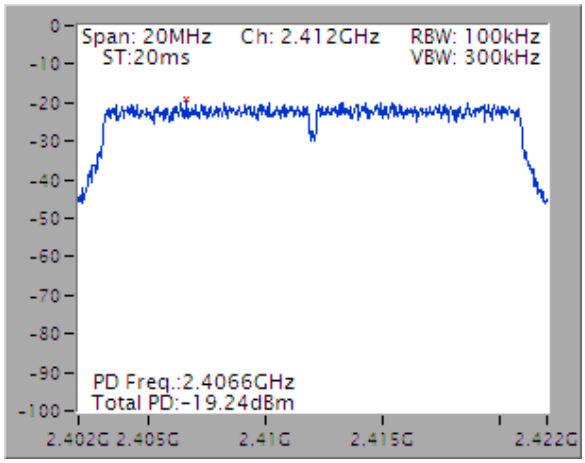
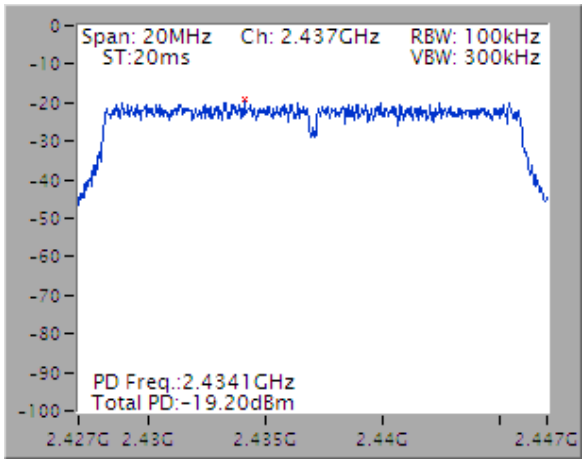
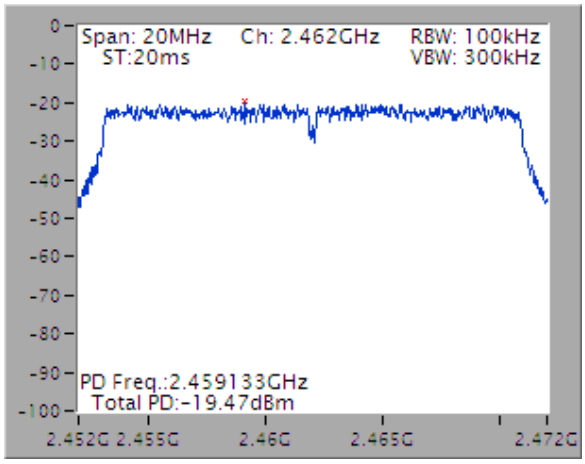
Configuration IEEE 802.11g

Channel	Frequency	Power Density (dBm)	Max. Limit (dBm)	Result
1	2412 MHz	-19.30	8.00	**Complies**
6	2437 MHz	-19.87	8.00	**Complies**
11	2462 MHz	-19.97	8.00	**Complies**

Configuration of IEEE 802.11n (20MHz)

Channel	Frequency	Power Density (dBm)	Max. Limit (dBm)	Result
1	2412 MHz	-19.24	8.00	**Complies**
6	2437 MHz	-19.20	8.00	**Complies**
11	2462 MHz	-19.47	8.00	**Complies**

Power Spectral Density Plots	
IEEE 802.11b – Ch. 1 [Sum All Chains]	**IEEE 802.11g – Ch. 1 [Sum All Chains]**
	
IEEE 802.11b – Ch. 6 [Sum All Chains]	**IEEE 802.11g – Ch. 6 [Sum All Chains]**
	
IEEE 802.11b – Ch. 11 [Sum All Chains]	**IEEE 802.11g – Ch. 11 [Sum All Chains]**
	

Power Spectral Density Plots
IEEE 802.11n (20MHz) – Ch. 1 [Sum All Chains]

IEEE 802.11n (20MHz) – Ch. 6 [Sum All Chains]

IEEE 802.11n (20MHz) – Ch. 11 [Sum All Chains]


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

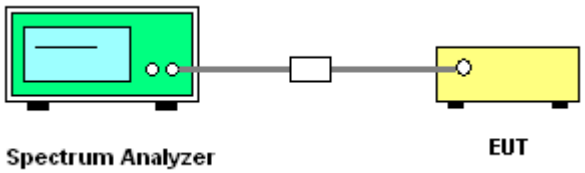
Please refer to section 4 of equipments list in this report. The following table is the setting of the spectrum analyzer.

Spectrum Parameters	Setting
Attenuation	Auto
Span Frequency	> 6dB Bandwidth
RB	100 kHz
VB	300 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. For 6dB Bandwidth the resolution bandwidth of 100 kHz and the video bandwidth of 300 kHz were used.
3. Measured the spectrum width with power higher than 6dB below carrier.
4. For 99% Occupied Bandwidth the resolution Bandwidth of 100 kHz and the video bandwidth of 300 kHz were used.

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	Apr. 07, 2012	**Test Site No.**	TH01-HY
Temperature	26.8℃	**Humidity**	28%
Test Engineer	Ian	**Configurations**	802.11b/g/n

Configuration IEEE 802.11b

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
1	2412 MHz	9.56	13.40	500	**Complies**
6	2437 MHz	9.56	13.40	500	**Complies**
11	2462 MHz	9.52	13.40	500	**Complies**

Configuration IEEE 802.11g

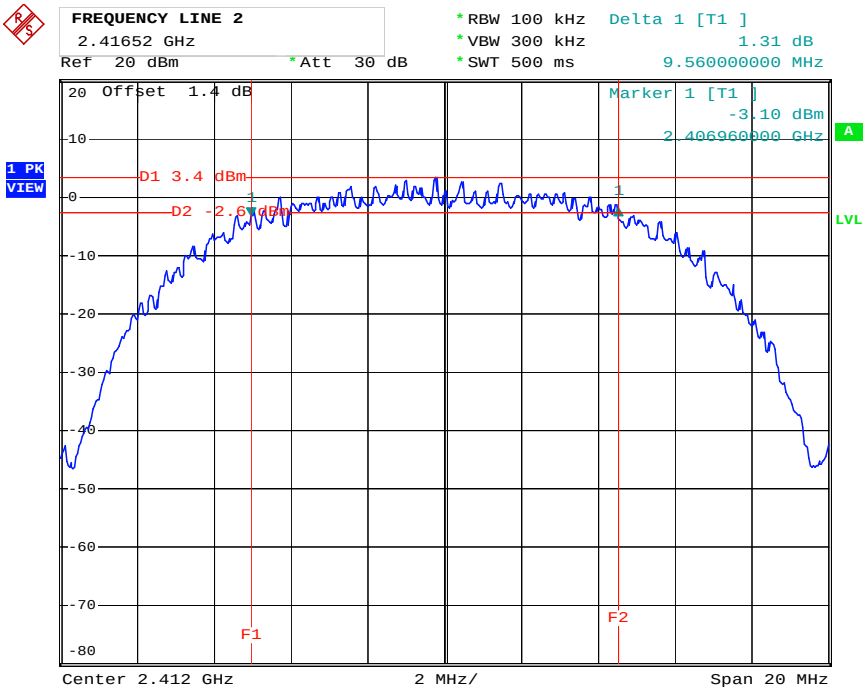
Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
1	2412 MHz	16.56	16.44	500	**Complies**
6	2437 MHz	16.48	16.48	500	**Complies**
11	2462 MHz	16.40	16.44	500	**Complies**

Configuration of IEEE 802.11n (20MHz)

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
1	2412 MHz	17.68	17.68	500	**Complies**
6	2437 MHz	17.76	17.72	500	**Complies**
11	2462 MHz	17.80	17.72	500	**Complies**

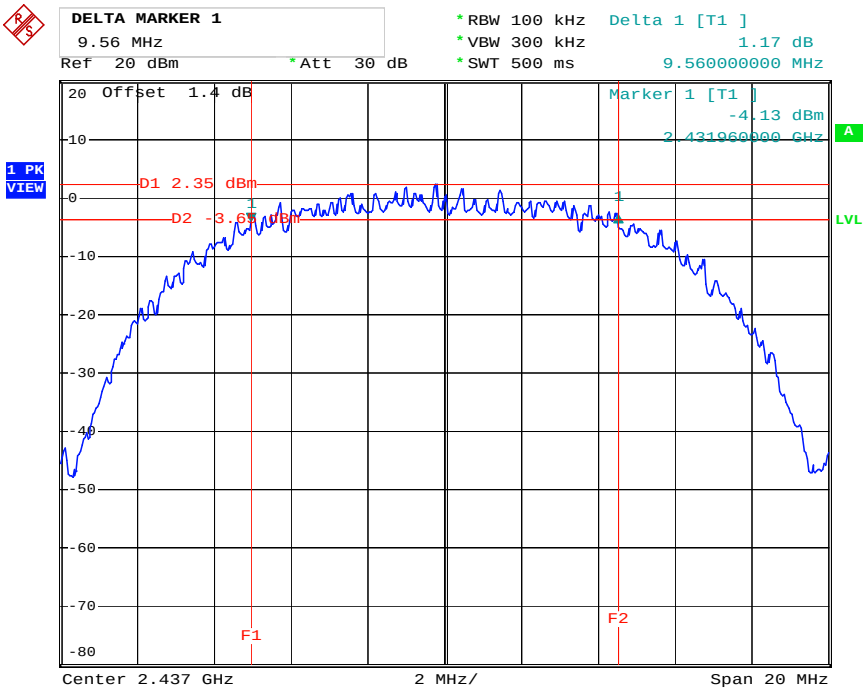
6 dB Bandwidth Plot

Configuration IEEE 802.11b 2412 MHz



Date: 7.APR.2012 18:59:36

Configuration IEEE 802.11b 2437 MHz



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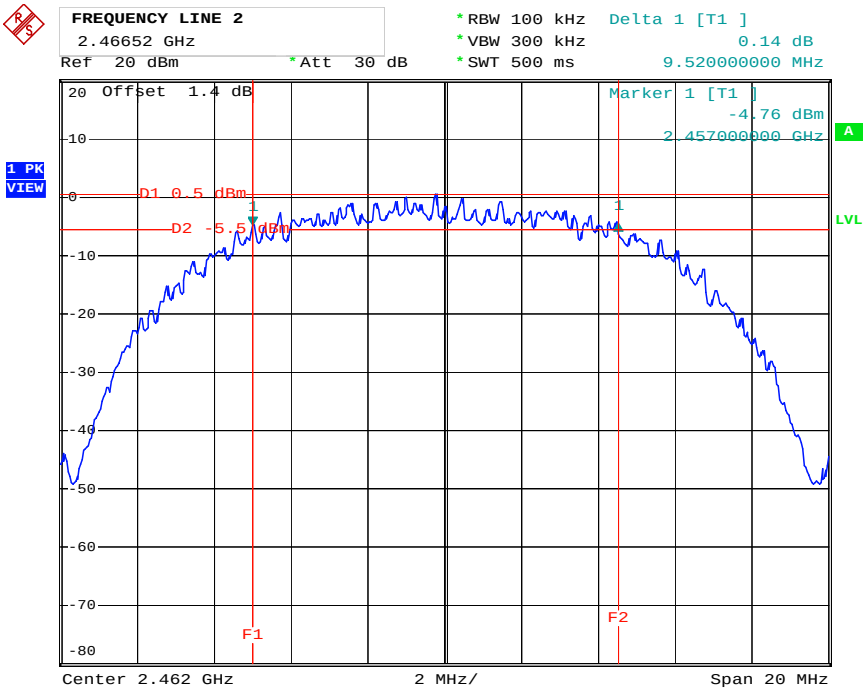
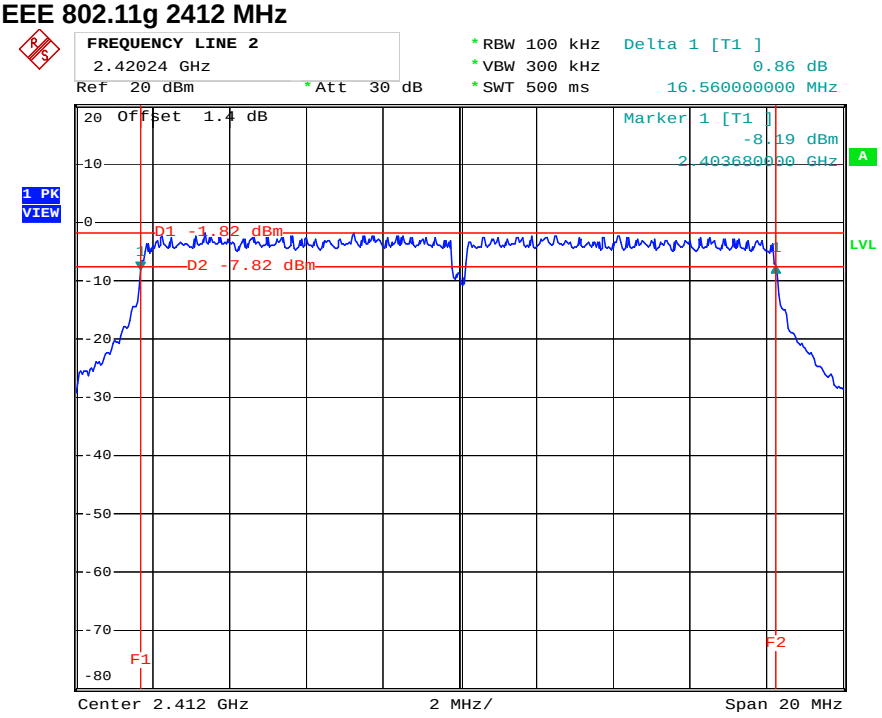
Configuration IEEE 802.11b 2462 MHz



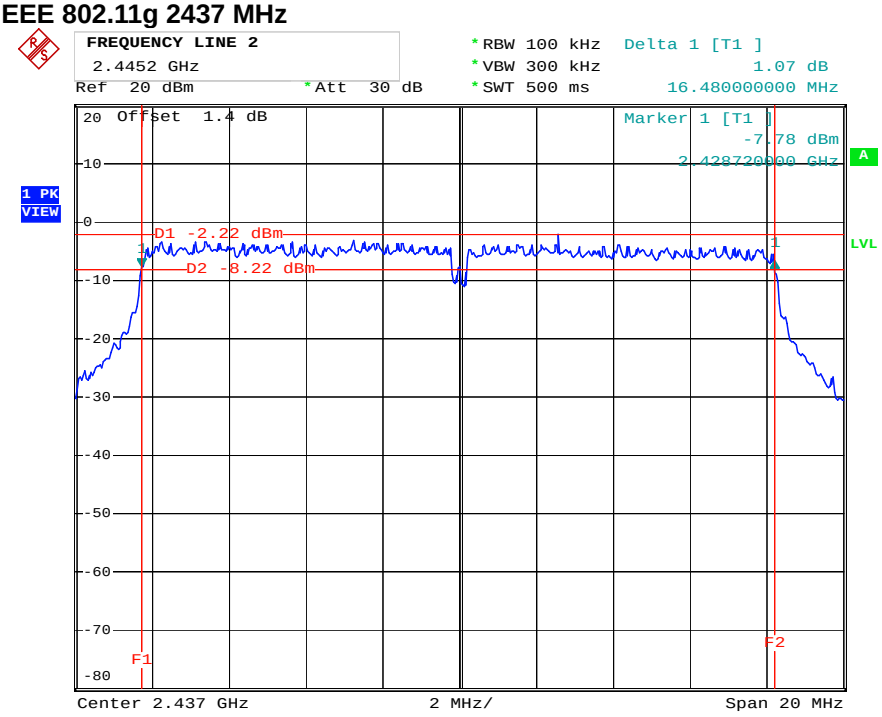
Date: 7.APR.2012 19:09:22

Configuration IEEE 802.11g 2412 MHz



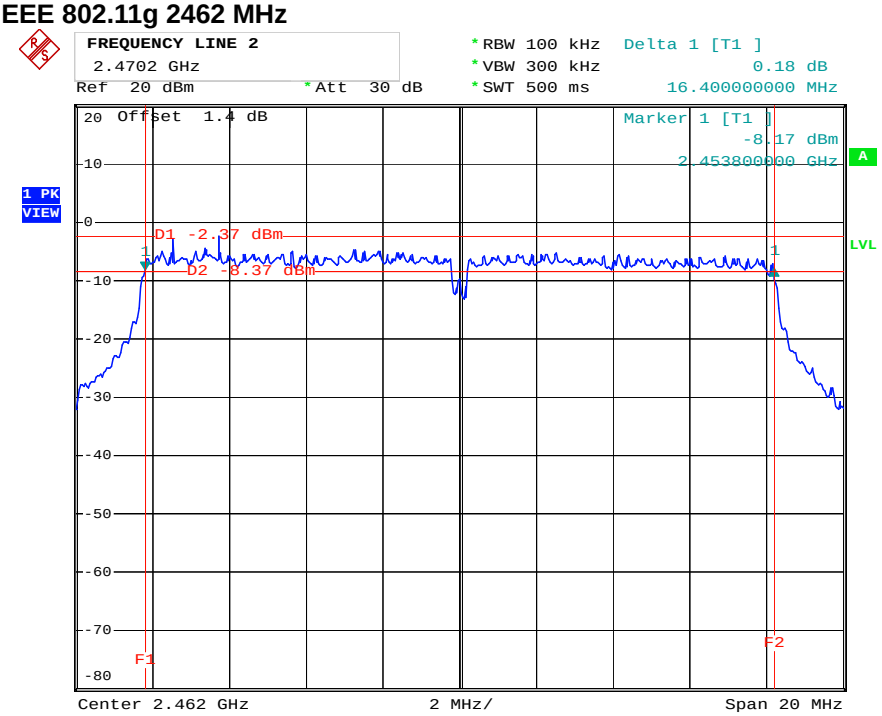
Date: 7.APR.2012 20:18:53

Configuration IEEE 802.11g 2437 MHz

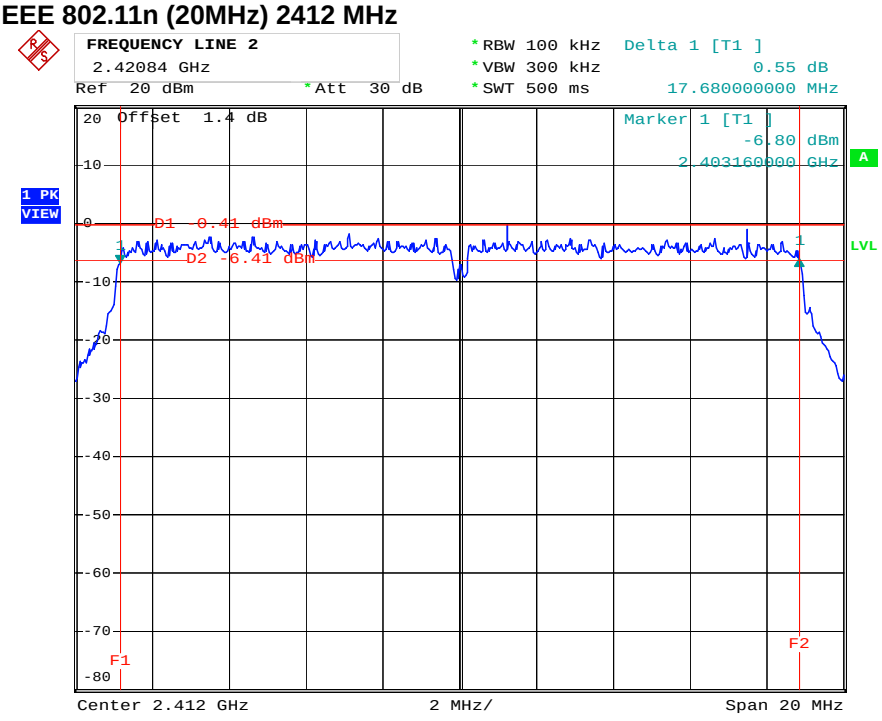


Date: 7.APR.2012 20:26:22

Configuration IEEE 802.11g 2462 MHz



Configuration IEEE 802.11n (20MHz) 2412 MHz



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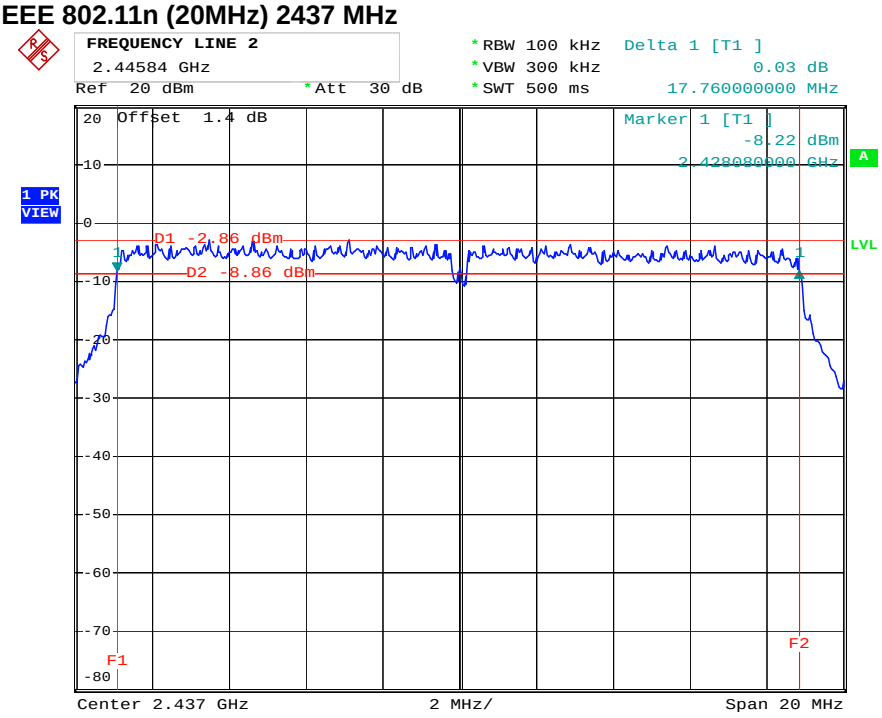
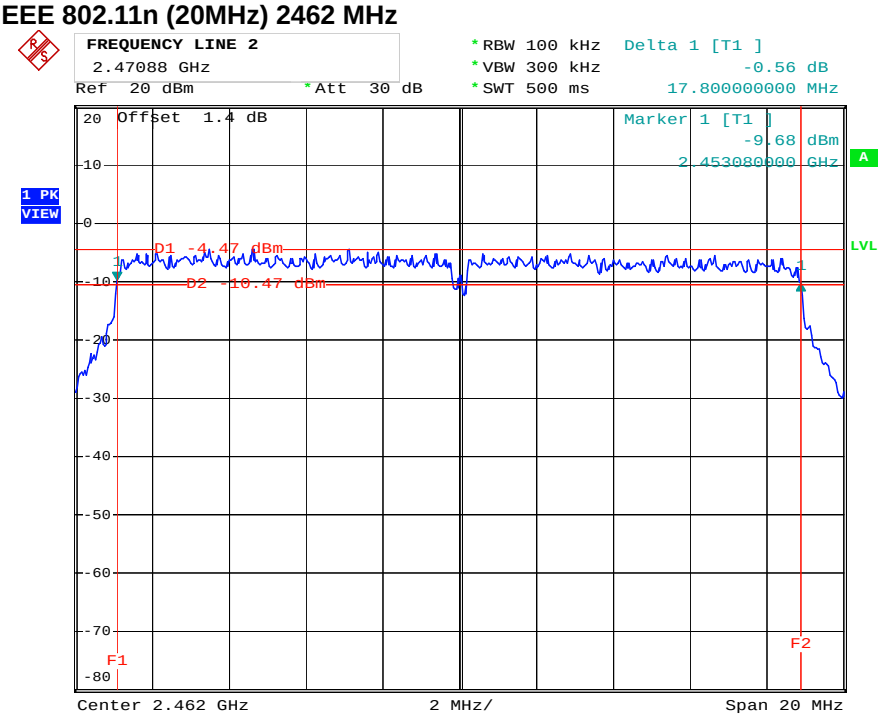
Configuration IEEE 802.11n (20MHz) 2437 MHz

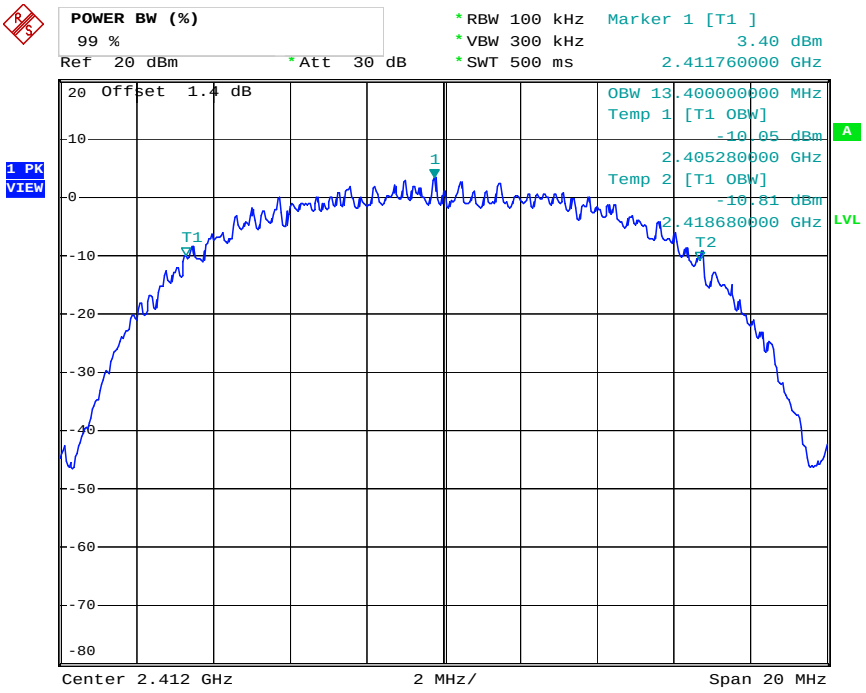


Date: 7.APR.2012 21:03:32

Configuration IEEE 802.11n (20MHz) 2462 MHz

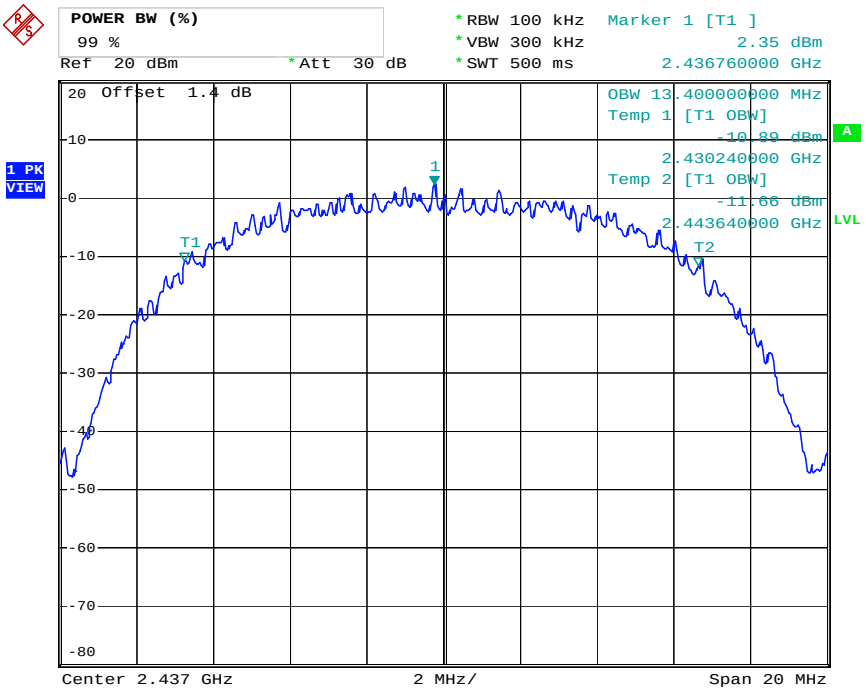


99% Occupied Bandwidth Plot
Configuration IEEE 802.11b 2412 MHz



Date: 7.APR.2012 18:59:47

Configuration IEEE 802.11b 2437 MHz



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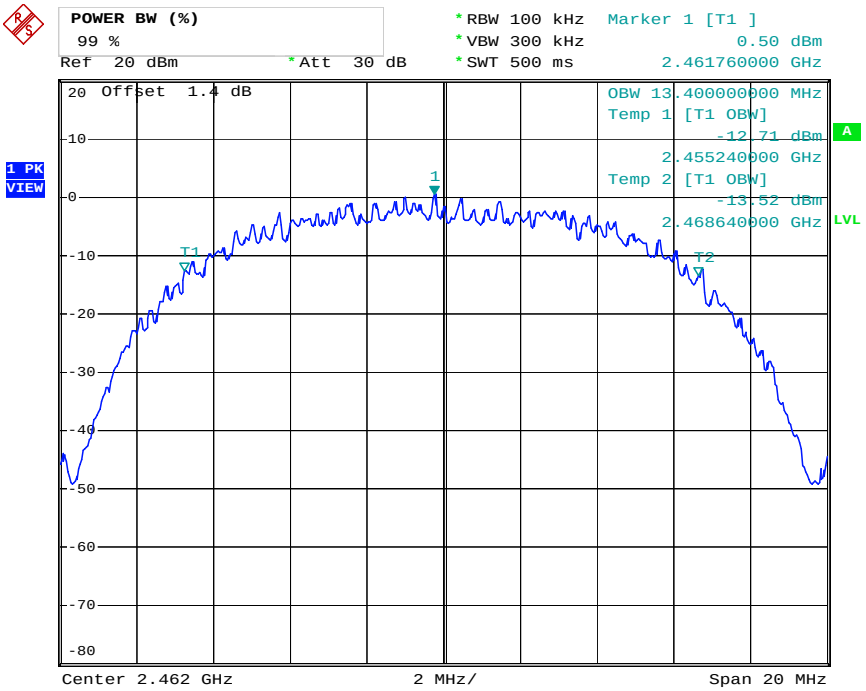
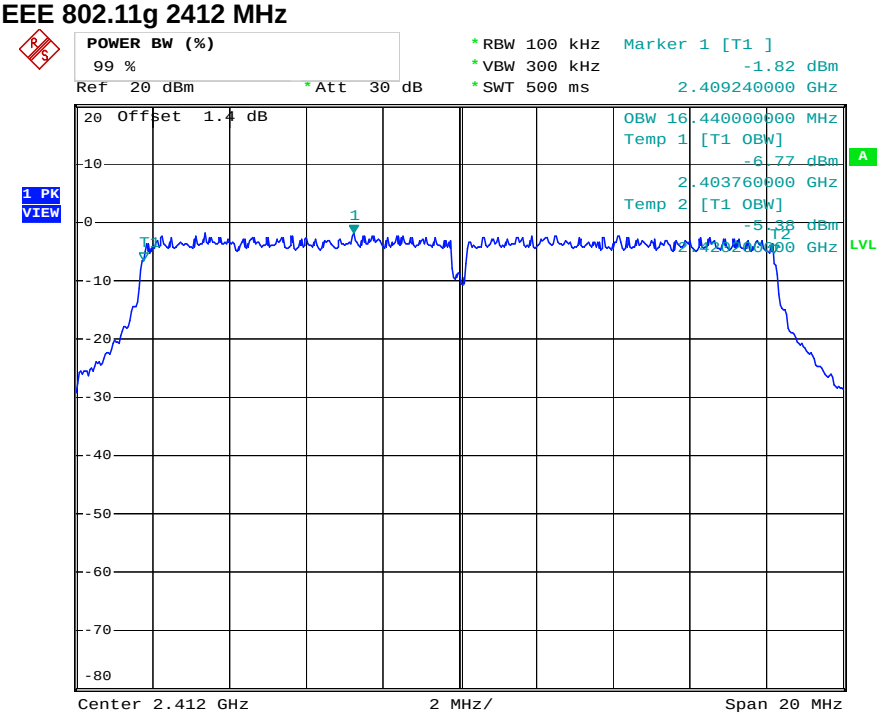
Configuration IEEE 802.11b 2462 MHz



Configuration IEEE 802.11g 2412 MHz



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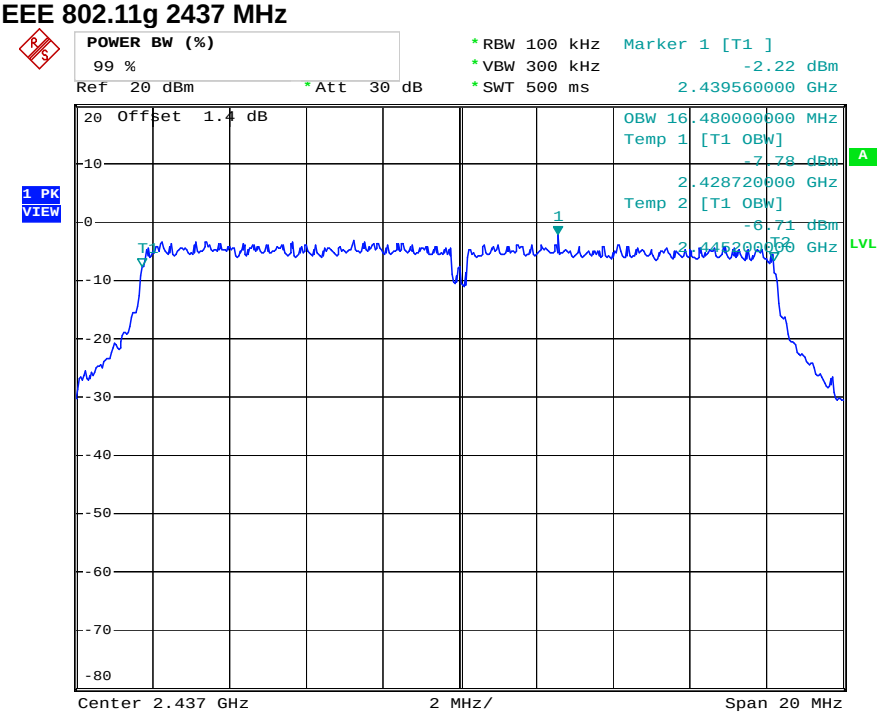
Configuration IEEE 802.11g 2437 MHz



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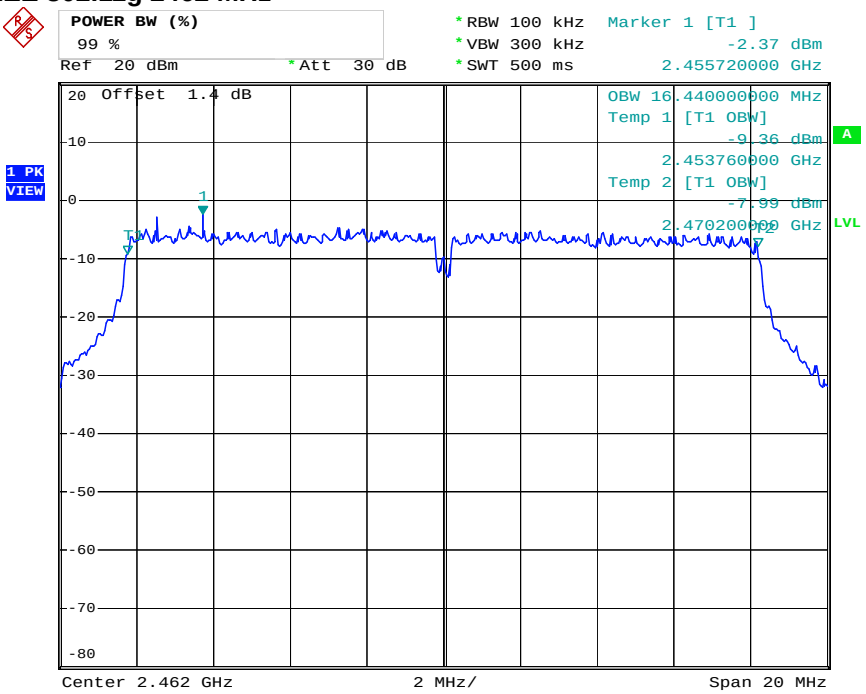
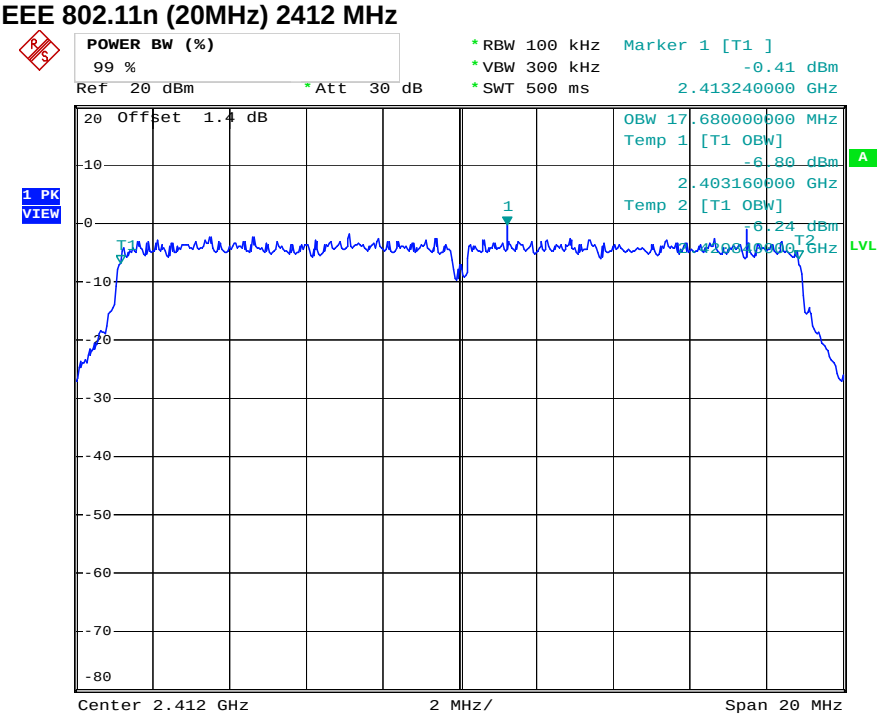
Configuration IEEE 802.11g 2462 MHz

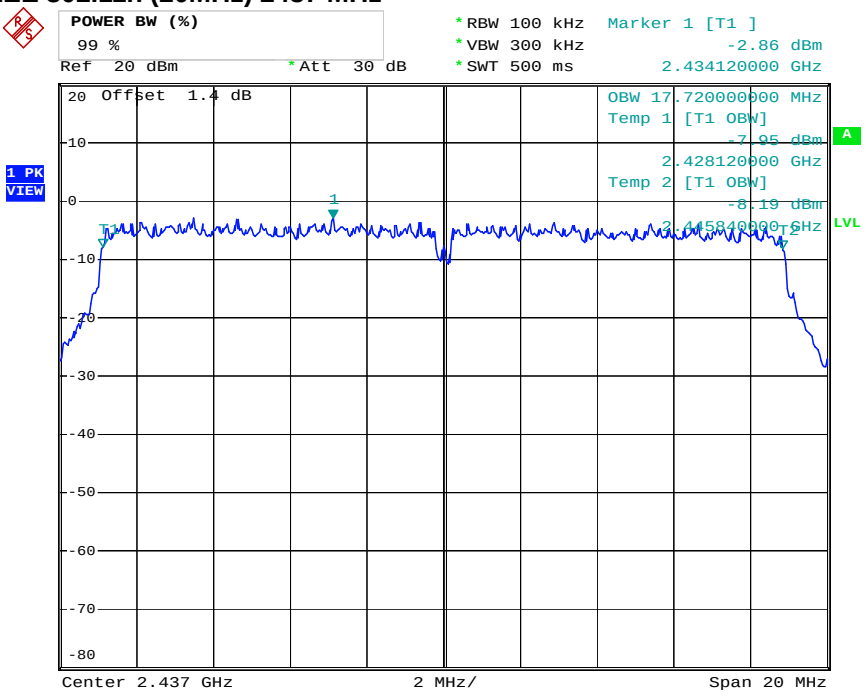


Configuration IEEE 802.11n (20MHz) 2412 MHz



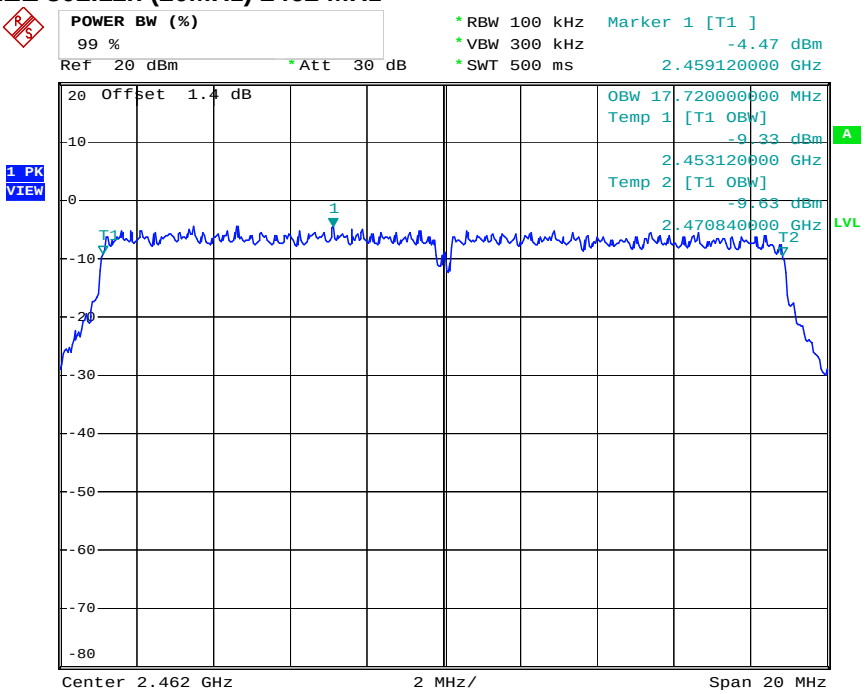
Date: 7.APR.2012 20:49:44

Configuration IEEE 802.11n (20MHz) 2437 MHz



Date: 7.APR.2012 21:03:47

Configuration IEEE 802.11n (20MHz) 2462 MHz



3.5 Radiated Emissions Measurement

3.5.1 Limit

In any 100kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. If the transmitter measurement is based on the maximum conducted output power, the attenuation required under this paragraph shall be 30dB instead of 20dB. In addition, radiated emissions which fall in section 15.205(a) the restricted bands must also comply with the radiated emission limit specified in section 15.209(a).

Frequencies (MHz)	Field Strength (microvolt/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

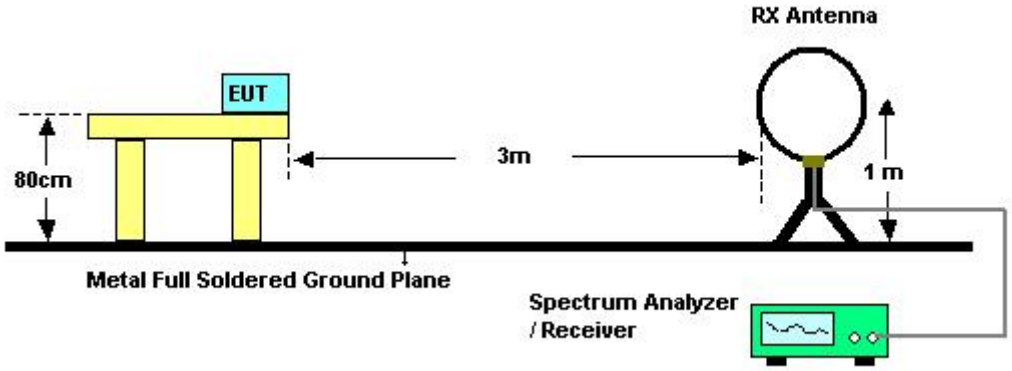
Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

3.5.3 Test Procedures

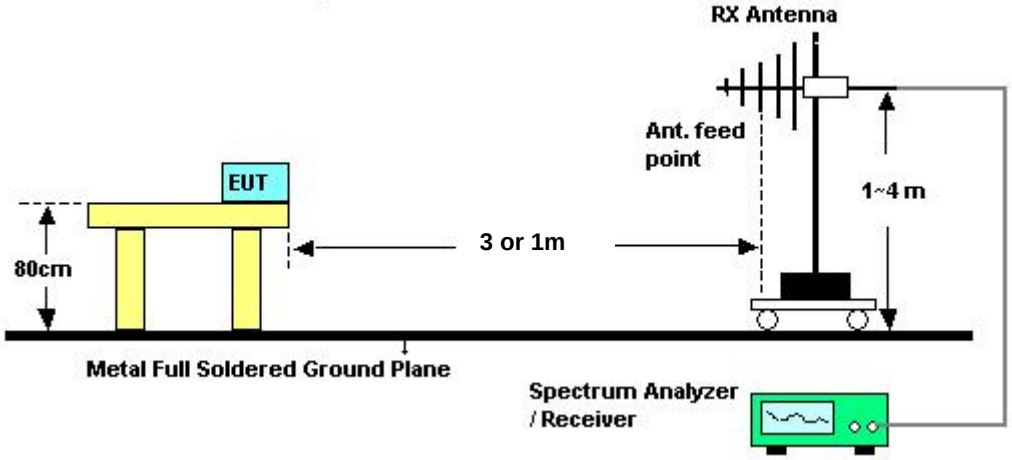
1. Configure the EUT according to ANSI C63.4. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting 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 (specific distance [3m] / 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	May 30, 2012	**Test Site No.**	03CH02-HY
Temperature	23℃	**Humidity**	58%
Test Engineer	Streak		

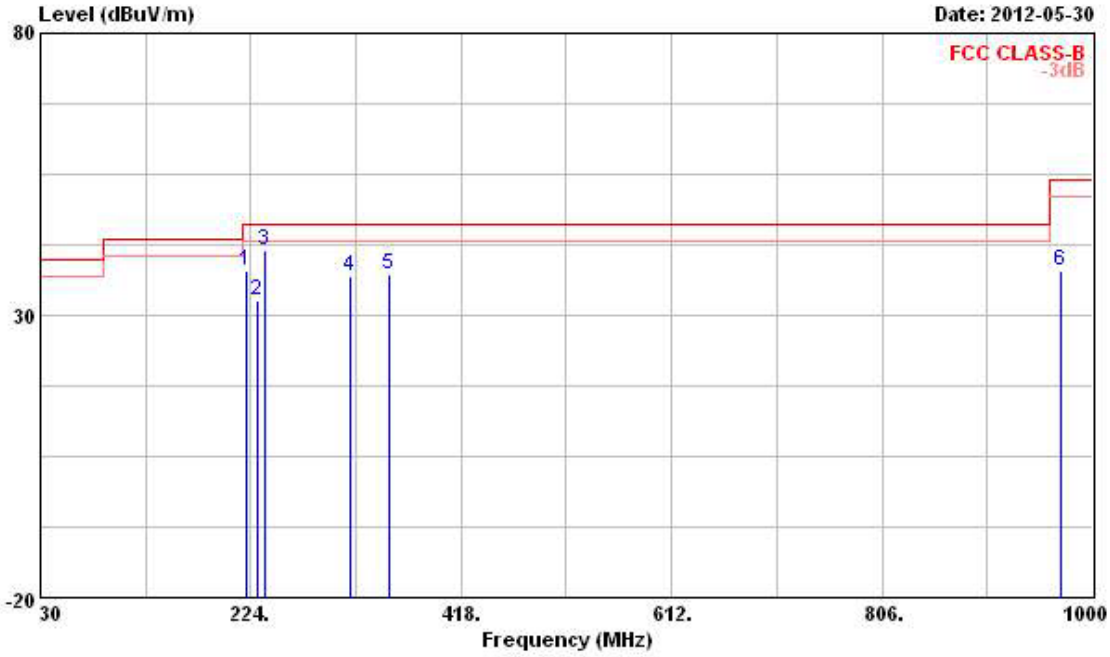
Freq. (MHz)	Level (dBuV)	Over Limit (dB)	Limit Line (dBuV)	Remark
-	-	-	-	See Note

Note:
The amplitude of spurious emissions that are attenuated by more than 20 dB below the permissible value has no need to be reported.
Distance extrapolation factor = 40 log (specific distance / test distance) (dB);
Limit line = specific limits (dBuV) + distance extrapolation factor.

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

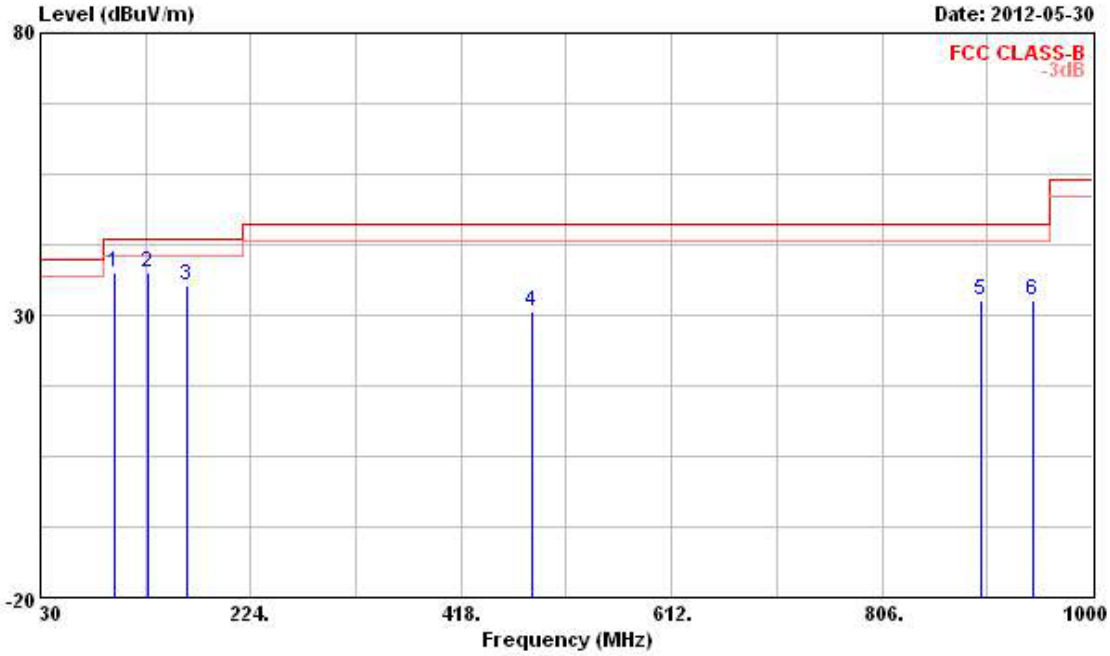
Final Test Date	May 30, 2012	**Test Site No.**	03CH02-HY
Temperature	23℃	**Humidity**	58%
Test Engineer	Streak	**Configuration**	Charge Mode

Horizontal



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	219.150	37.76	-8.24	46.00	50.58	11.98	2.56	27.36	Peak	---	---
2	229.820	32.75	-13.25	46.00	45.12	12.33	2.64	27.34	QP	---	---
3 @	237.580	41.35	-4.65	46.00	53.39	12.59	2.69	27.32	Peak	---	---
4	315.180	37.06	-8.94	46.00	47.36	13.94	3.03	27.27	Peak	---	---
5	351.070	37.17	-8.83	46.00	47.02	14.49	3.18	27.52	Peak	---	---
6	970.900	37.83	-16.17	54.00	37.80	21.78	5.59	27.34	Peak	---	---

Vertical



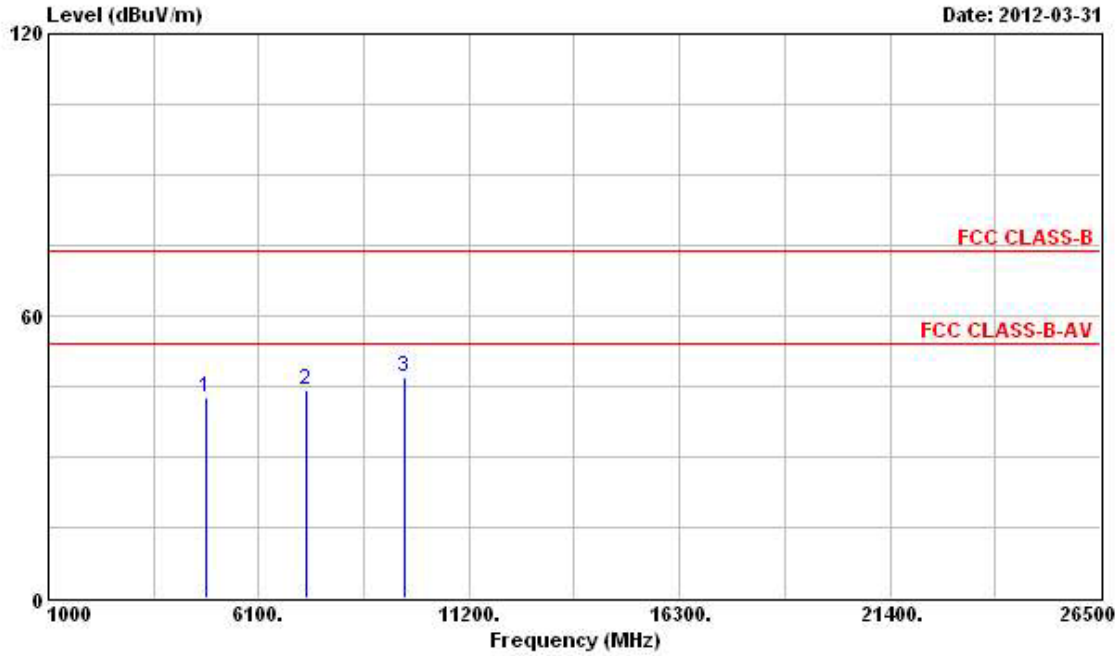
	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	98.870	37.70	-5.80	43.50	52.89	11.01	1.65	27.85	Peak	---	---
2	128.940	37.71	-5.79	43.50	50.68	12.87	1.88	27.72	Peak	---	---
3	164.830	35.14	-8.36	43.50	50.22	10.34	2.14	27.56	Peak	---	---
4	482.990	30.50	-15.50	46.00	38.11	16.94	3.74	28.29	Peak	---	---
5	897.180	32.63	-13.37	46.00	34.97	20.03	5.24	27.61	Peak	---	---
6	944.710	32.66	-13.34	46.00	33.46	21.13	5.50	27.43	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	Mar. 31, 2012	**Test Site No.**	03CH02-HY
Temperature	23℃	**Humidity**	58%
Test Engineer	Streak	**Configuration**	802.11b Ch. 1

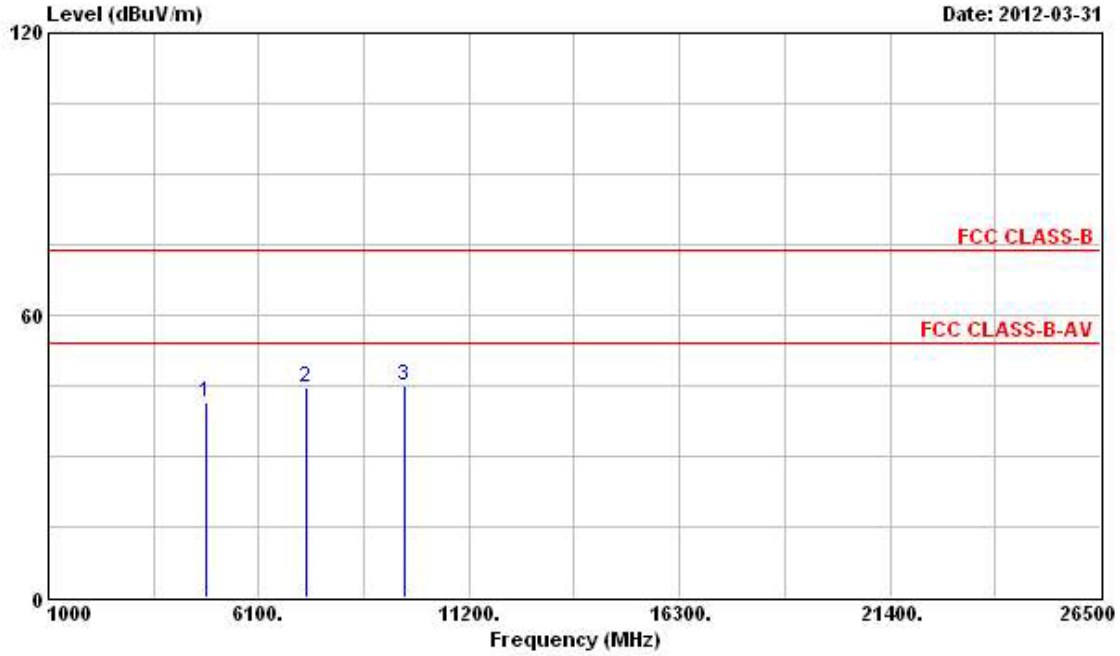
Horizontal



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	4824.000	42.74	-11.26	54.00	37.20	35.76	4.58	34.80	PK	---	---
2	7236.000	44.09			35.69	37.85	5.63	35.08	Peak	---	---
3	9648.000	47.14			36.88	39.39	6.34	35.47	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

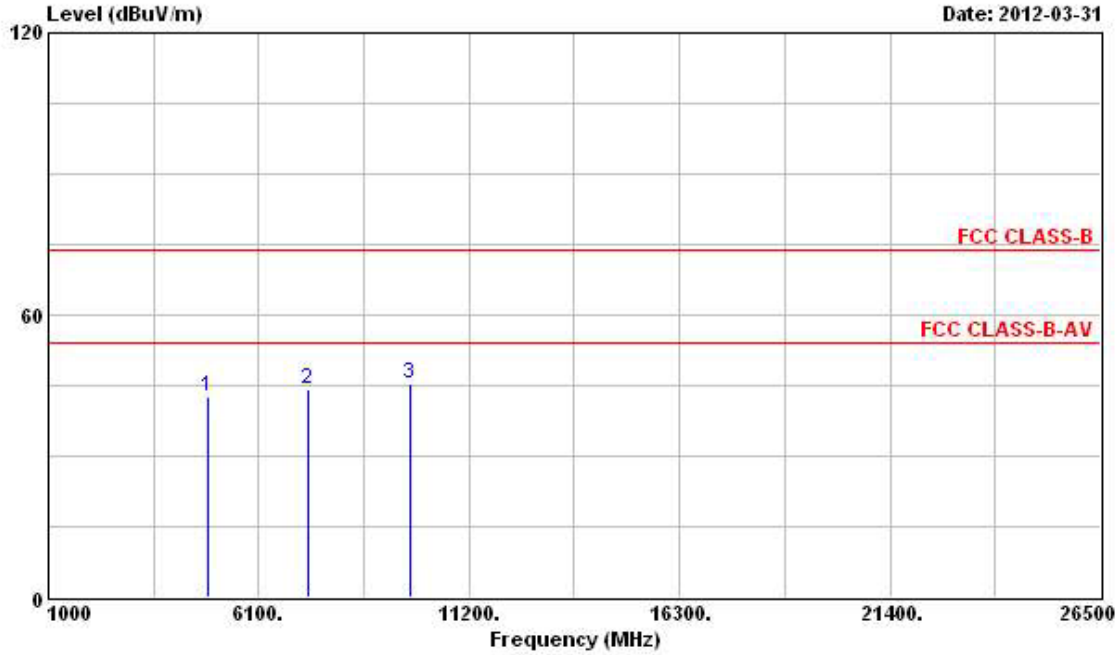


	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	4824.000	41.38	-12.62	54.00	36.47	35.13	4.58	34.80	PK	---	---
2	7236.000	44.56			37.11	36.90	5.63	35.08	Peak	---	---
3	9648.000	45.17			35.71	38.59	6.34	35.47	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	Mar. 31, 2012	**Test Site No.**	03CH02-HY
Temperature	23℃	**Humidity**	58%
Test Engineer	Streak	**Configuration**	802.11b Ch. 6

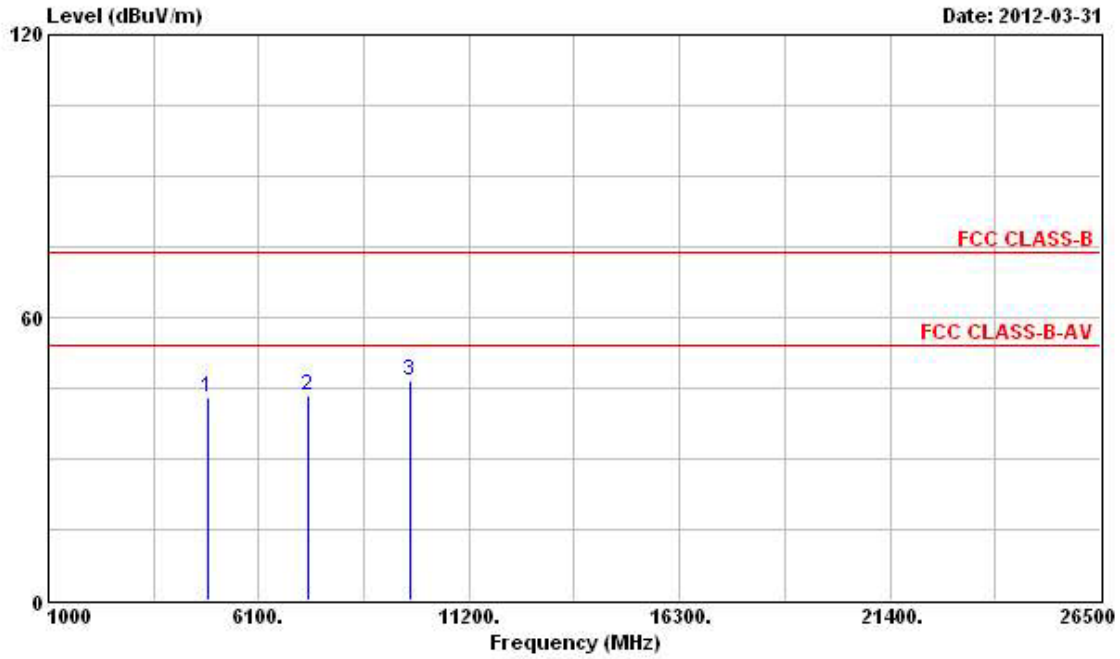
Horizontal



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	4874.000	42.71	-11.29	54.00	37.05	35.83	4.61	34.78	PK	---	---
2	7311.000	44.10	-9.90	54.00	35.70	37.86	5.64	35.10	PK	---	---
3	9748.000	45.53			35.14	39.51	6.36	35.48	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

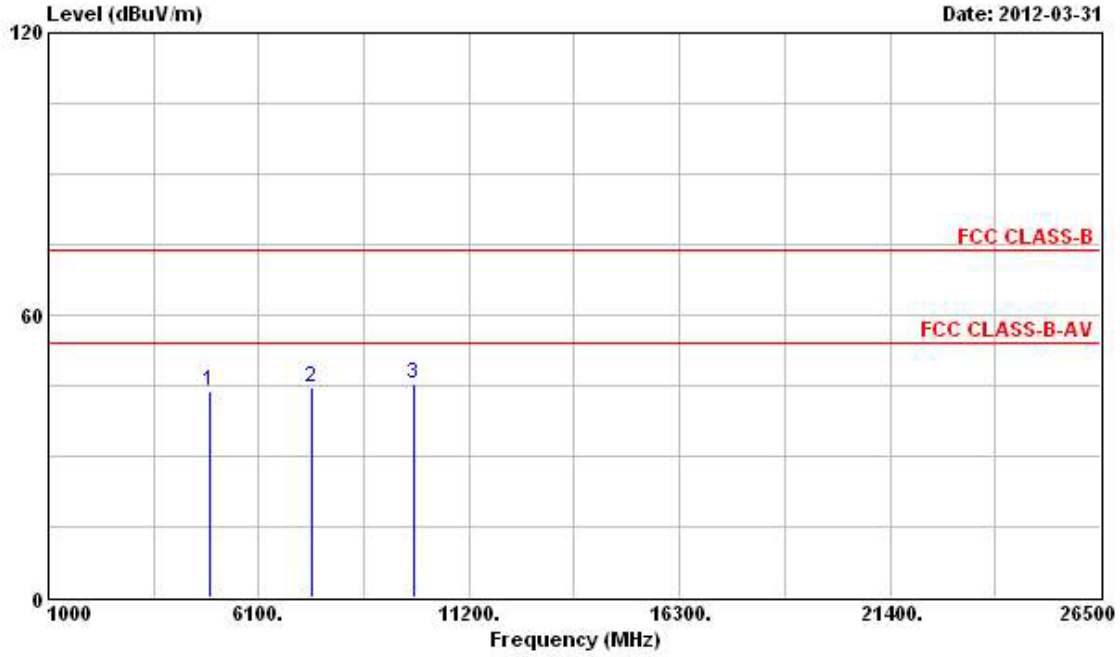


	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	4874.000	42.90	-11.10	54.00	37.89	35.18	4.61	34.78	PK	---	---
2	7311.000	43.50	-10.50	54.00	36.04	36.92	5.64	35.10	PK	---	---
3	9748.000	46.44			36.85	38.71	6.36	35.48	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	Mar. 31, 2012	**Test Site No.**	03CH02-HY
Temperature	23℃	**Humidity**	58%
Test Engineer	Streak	**Configuration**	802.11b Ch. 11

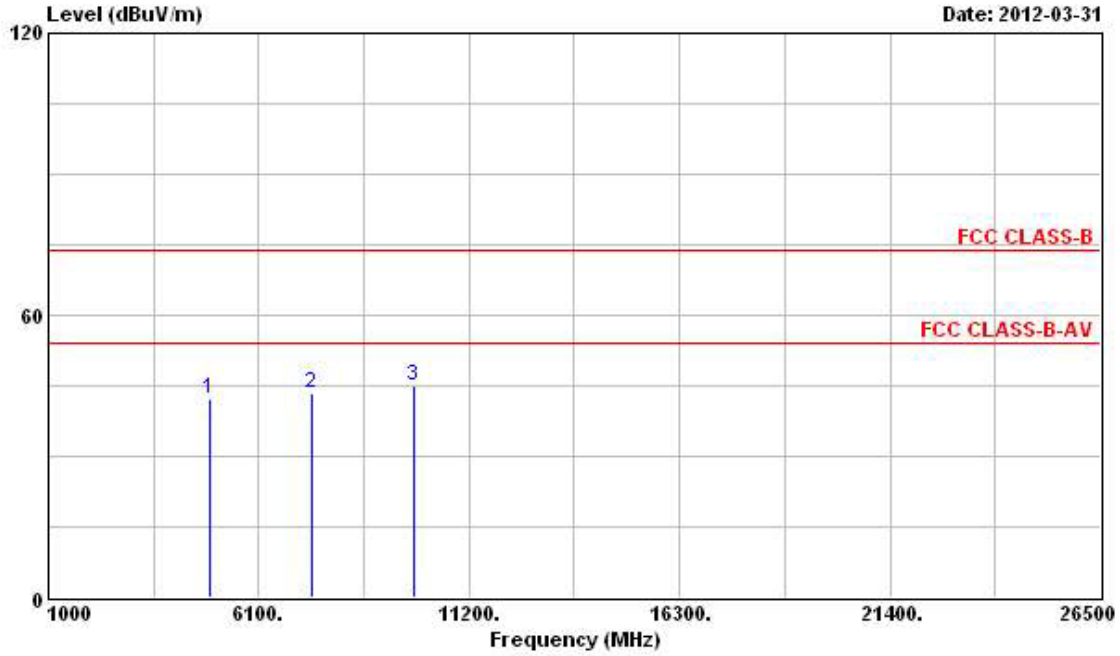
Horizontal



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	4924.000	43.72	-10.28	54.00	37.91	35.90	4.68	34.77	PK	---	---
2	7386.000	44.71	-9.29	54.00	36.30	37.88	5.65	35.12	PK	---	---
3	9848.000	45.25			34.75	39.61	6.38	35.49	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

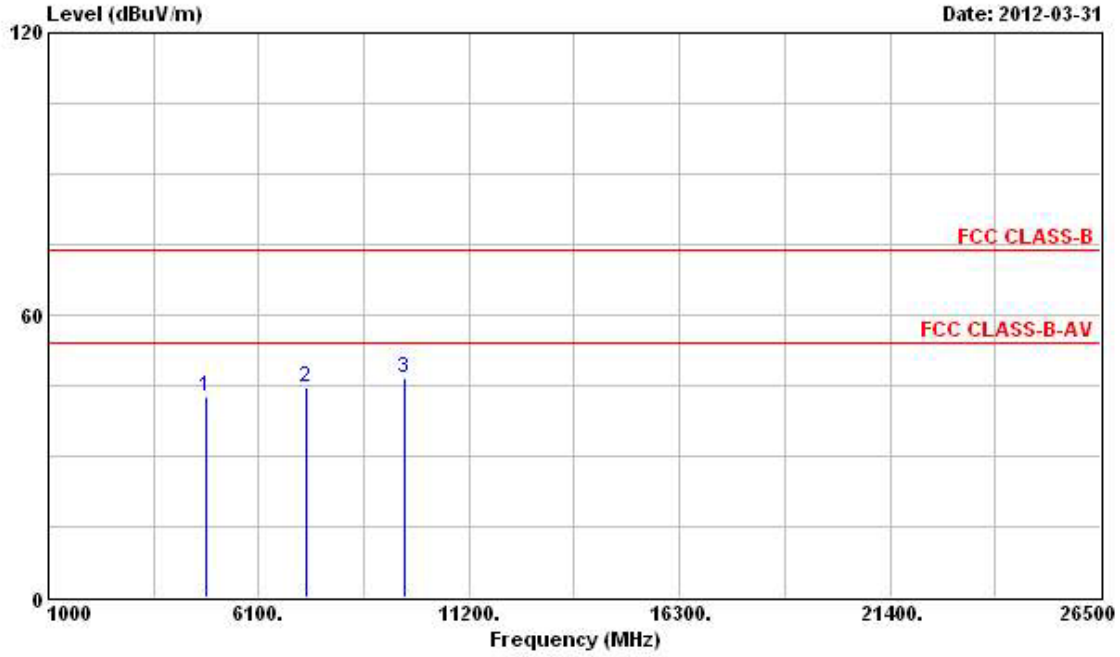


	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	4924.000	42.26	-11.74	54.00	37.12	35.23	4.68	34.77	PK	---	---
2	7386.000	43.32	-10.68	54.00	35.83	36.96	5.65	35.12	PK	---	---
3	9848.000	45.01			35.31	38.81	6.38	35.49	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	Mar. 31, 2012	**Test Site No.**	03CH02-HY
Temperature	23℃	**Humidity**	58%
Test Engineer	Streak	**Configuration**	802.11g Ch. 1

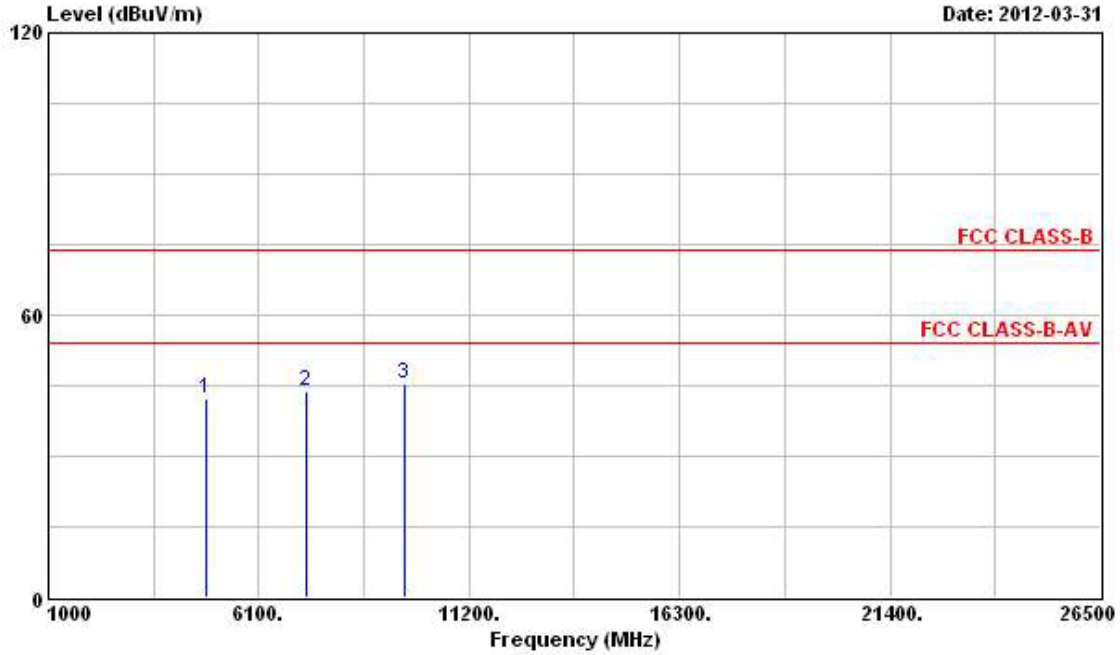
Horizontal



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	4824.000	42.51	-11.49	54.00	36.97	35.76	4.58	34.80	PK	---	---
2	7236.000	44.67			36.27	37.85	5.63	35.08	Peak	---	---
3	9648.000	46.53			36.27	39.39	6.34	35.47	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

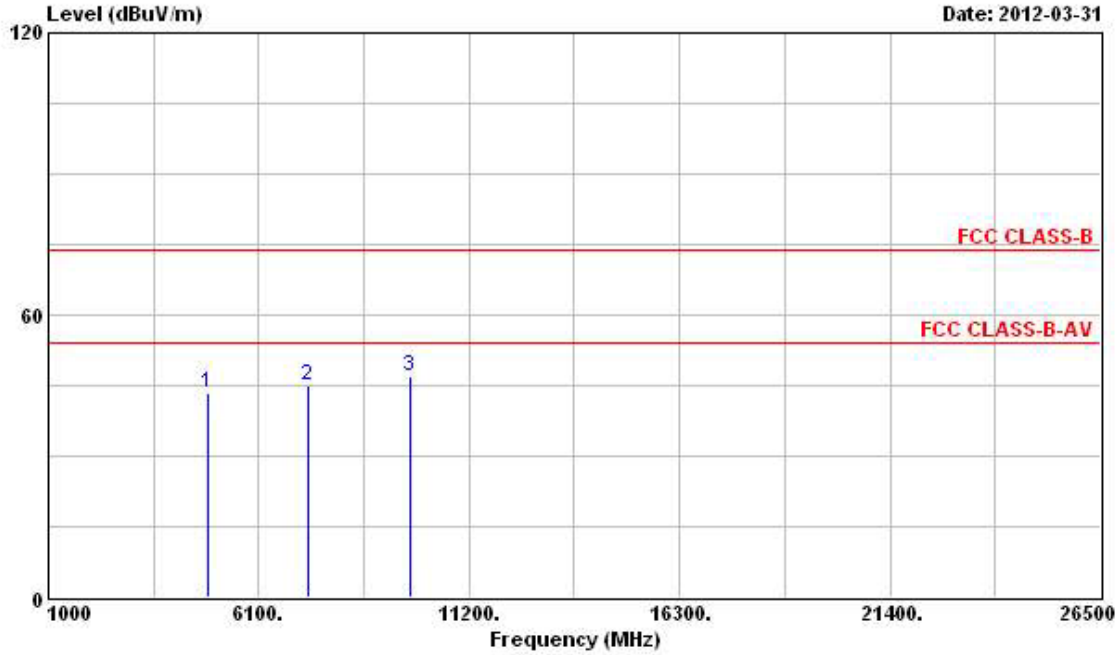


	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	4824.000	42.05	-11.95	54.00	37.14	35.13	4.58	34.80	PK	---	---
2	7236.000	43.87			36.42	36.90	5.63	35.08	Peak	---	---
3	9648.000	45.20			35.74	38.59	6.34	35.47	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	Mar. 31, 2012	**Test Site No.**	03CH02-HY
Temperature	23℃	**Humidity**	58%
Test Engineer	Streak	**Configuration**	802.11g Ch. 6

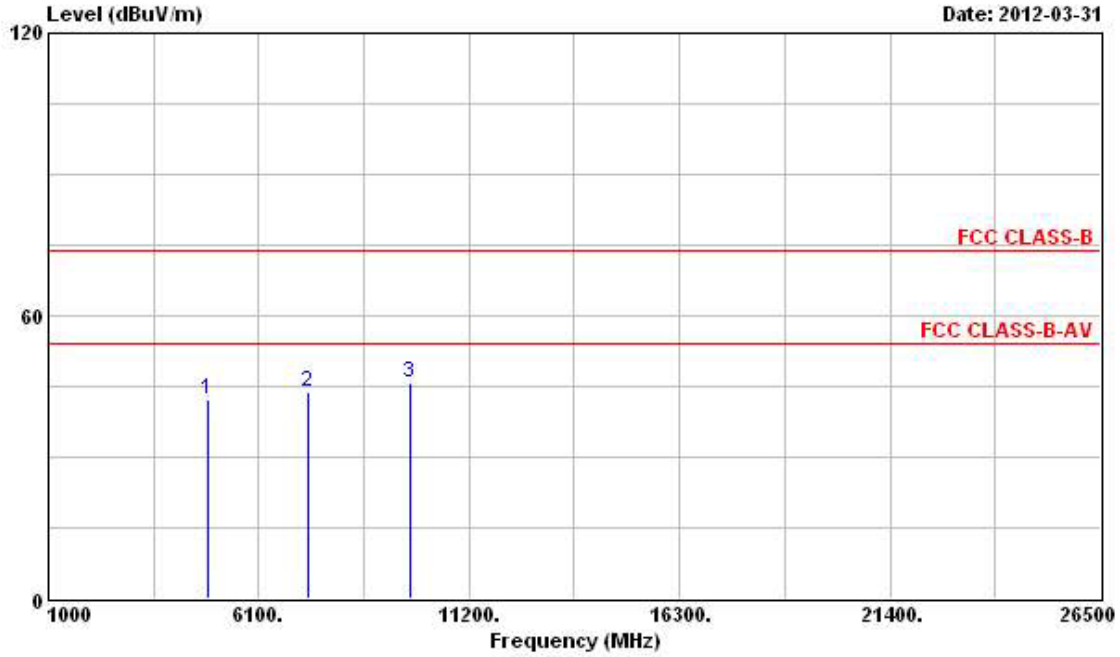
Horizontal



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	4874.000	43.43	-10.57	54.00	37.77	35.83	4.61	34.78	PK	---	---
2	7311.000	44.95	-9.05	54.00	36.55	37.86	5.64	35.10	PK	---	---
3	9748.000	46.82			36.43	39.51	6.36	35.48	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

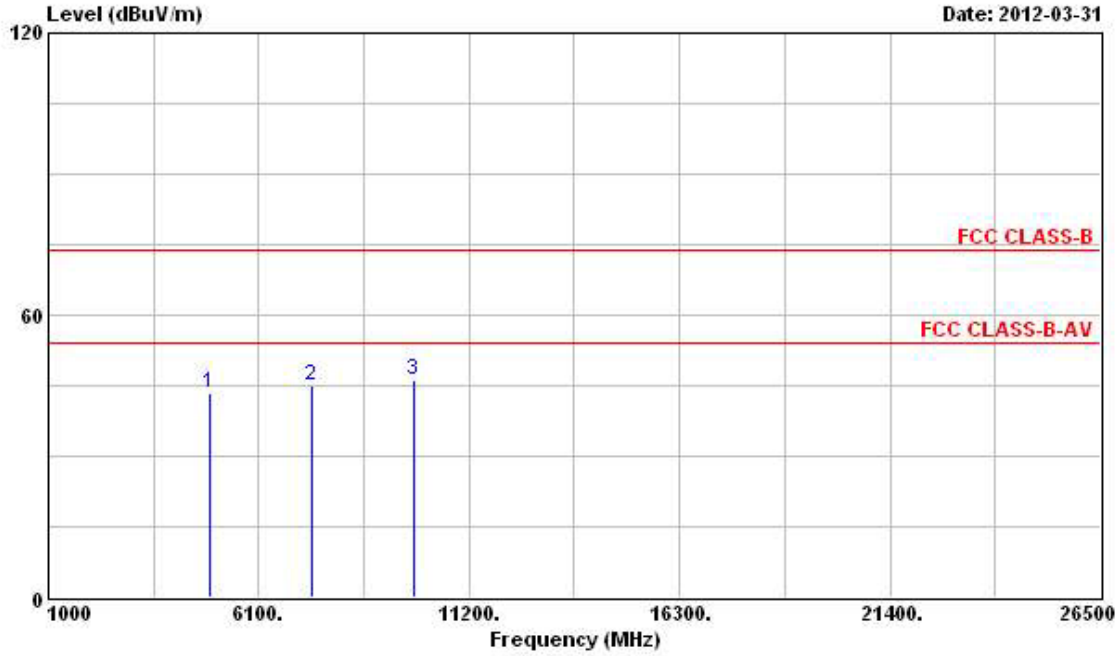


	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	4874.000	42.15	-11.85	54.00	37.14	35.18	4.61	34.78	PK	---	---
2	7311.000	43.66	-10.34	54.00	36.20	36.92	5.64	35.10	PK	---	---
3	9748.000	45.74			36.15	38.71	6.36	35.48	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	Mar. 31, 2012	**Test Site No.**	03CH02-HY
Temperature	23℃	**Humidity**	58%
Test Engineer	Streak	**Configuration**	802.11g Ch. 11

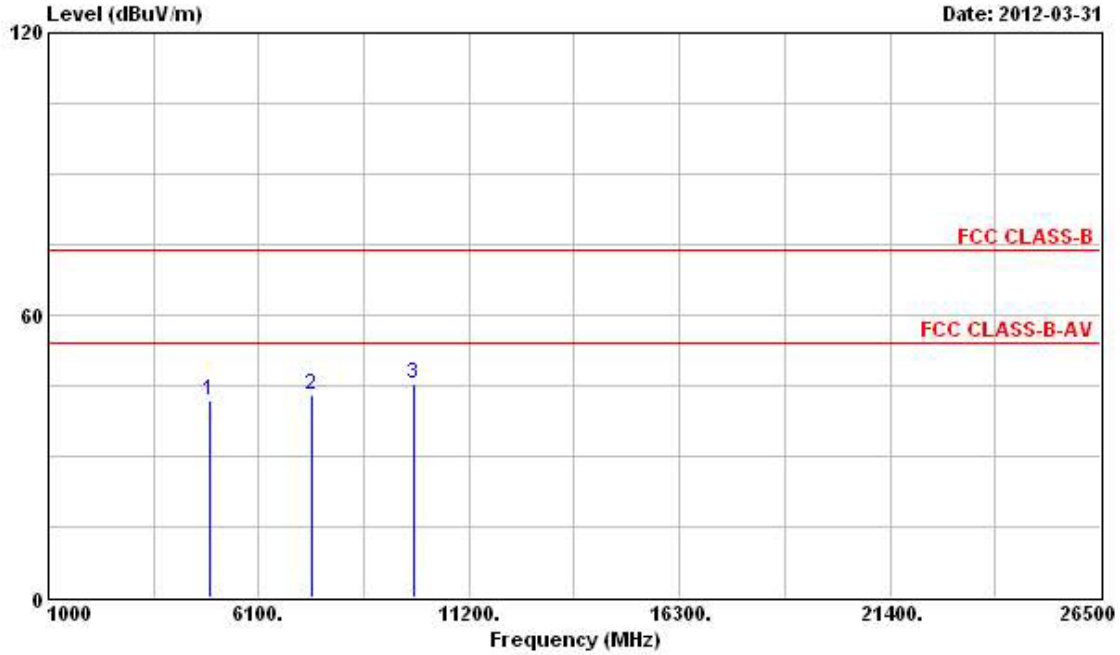
Horizontal



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	4924.000	43.26	-10.74	54.00	37.45	35.90	4.68	34.77	PK	---	---
2	7386.000	45.17	-8.83	54.00	36.76	37.88	5.65	35.12	PK	---	---
3	9848.000	46.00			35.50	39.61	6.38	35.49	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

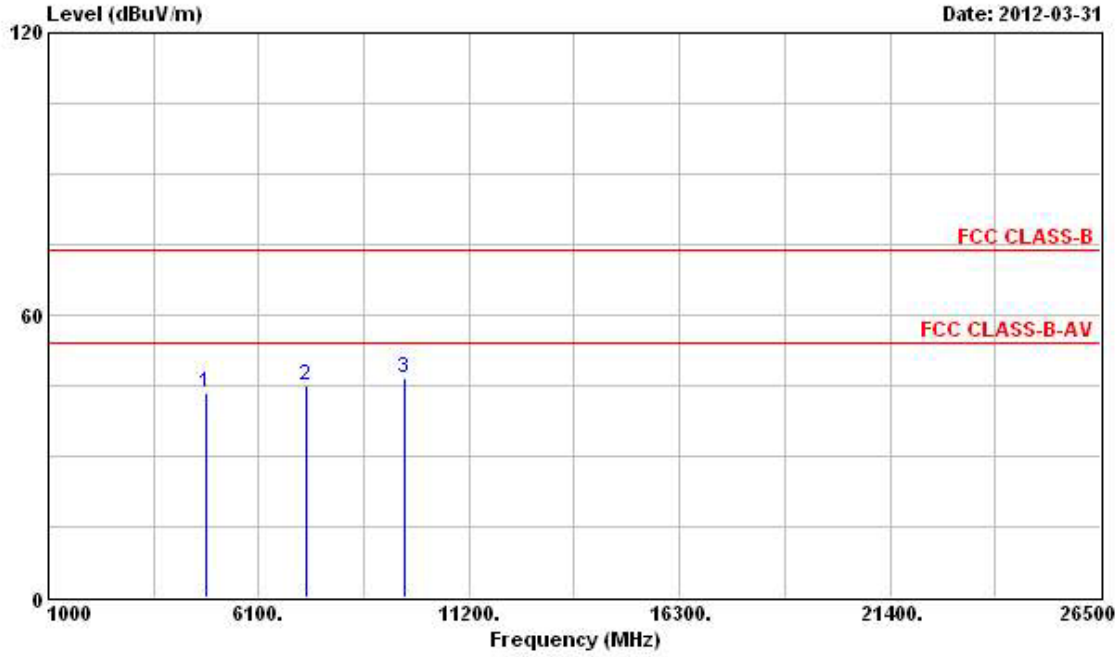


	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	4924.000	41.86	-12.14	54.00	36.72	35.23	4.68	34.77	PK	---	---
2	7386.000	42.85	-11.15	54.00	35.36	36.96	5.65	35.12	PK	---	---
3	9848.000	45.25			35.55	38.81	6.38	35.49	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	Mar. 31, 2012	**Test Site No.**	03CH02-HY
Temperature	23℃	**Humidity**	58%
Test Engineer	Streak	**Configuration**	802.11n (20MHz) Ch. 1

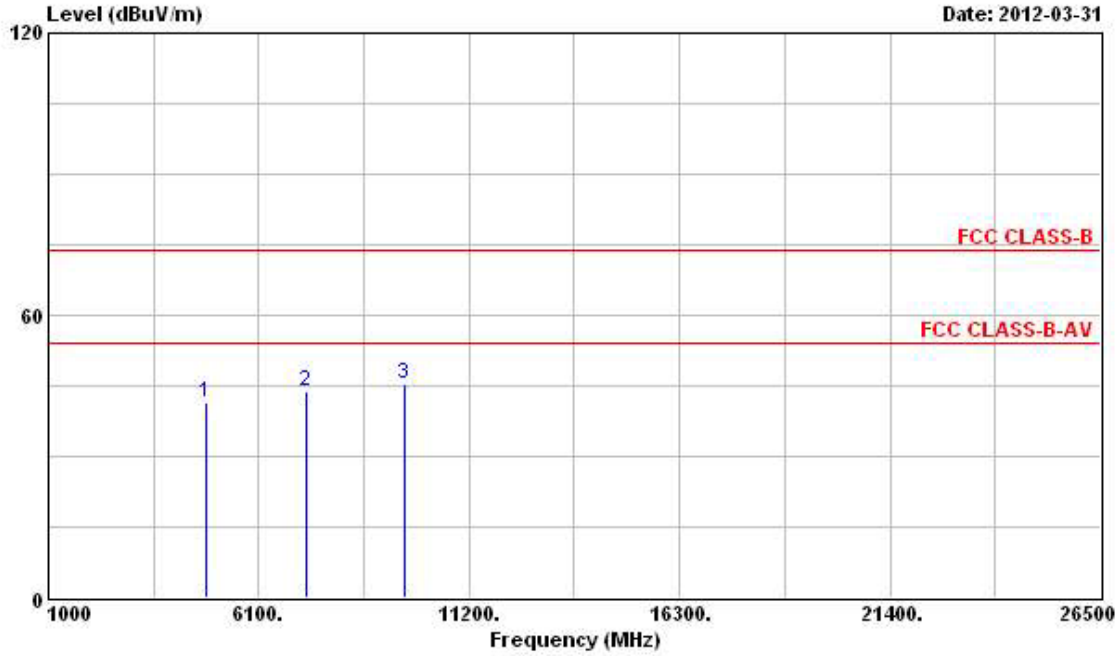
Horizontal



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	4824.000	43.32	-10.68	54.00	37.78	35.76	4.58	34.80	PK	---	---
2	7236.000	44.95			36.55	37.85	5.63	35.08	Peak	---	---
3	9648.000	46.75			36.49	39.39	6.34	35.47	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

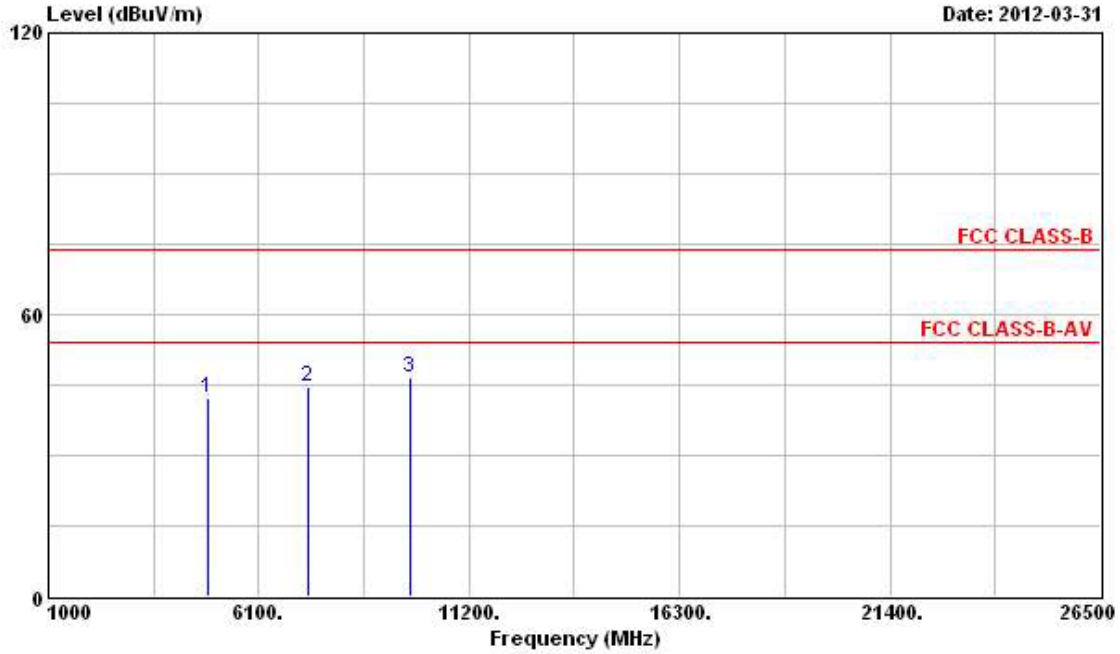


	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	4824.000	41.46	-12.54	54.00	36.55	35.13	4.58	34.80	PK	---	---
2	7236.000	43.87			36.42	36.90	5.63	35.08	Peak	---	---
3	9648.000	45.27			35.81	38.59	6.34	35.47	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	Mar. 31, 2012	**Test Site No.**	03CH02-HY
Temperature	23℃	**Humidity**	58%
Test Engineer	Streak	**Configuration**	802.11n (20MHz) Ch. 6

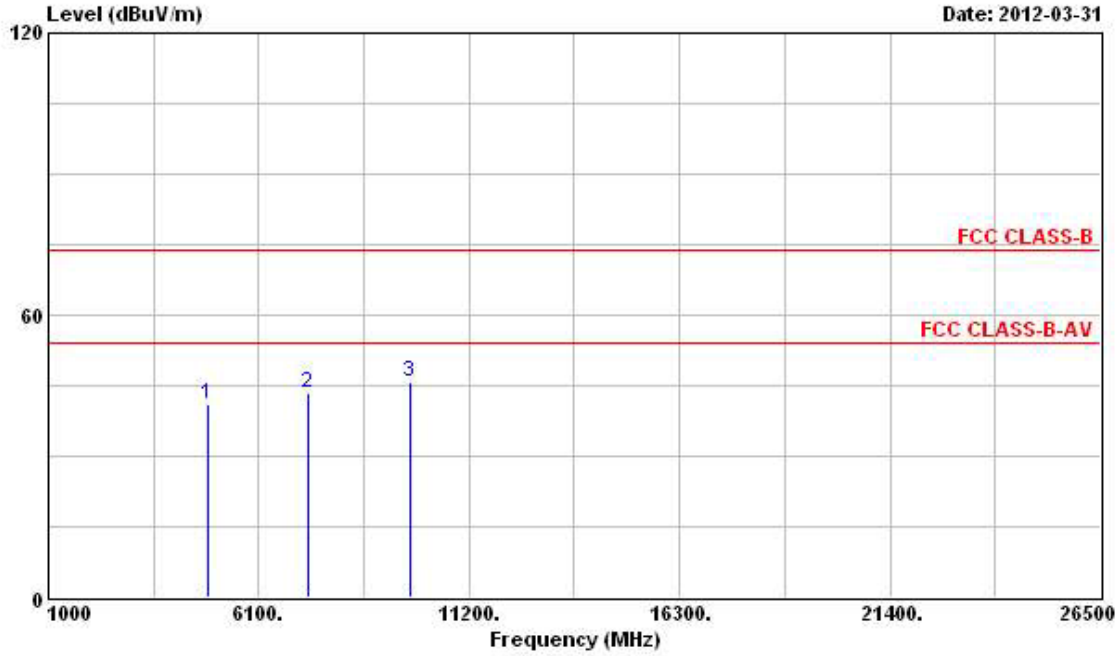
Horizontal



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	4874.000	42.34	-11.66	54.00	36.68	35.83	4.61	34.78	PK	---	---
2	7311.000	44.55	-9.45	54.00	36.15	37.86	5.64	35.10	PK	---	---
3	9748.000	46.75			36.36	39.51	6.36	35.48	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

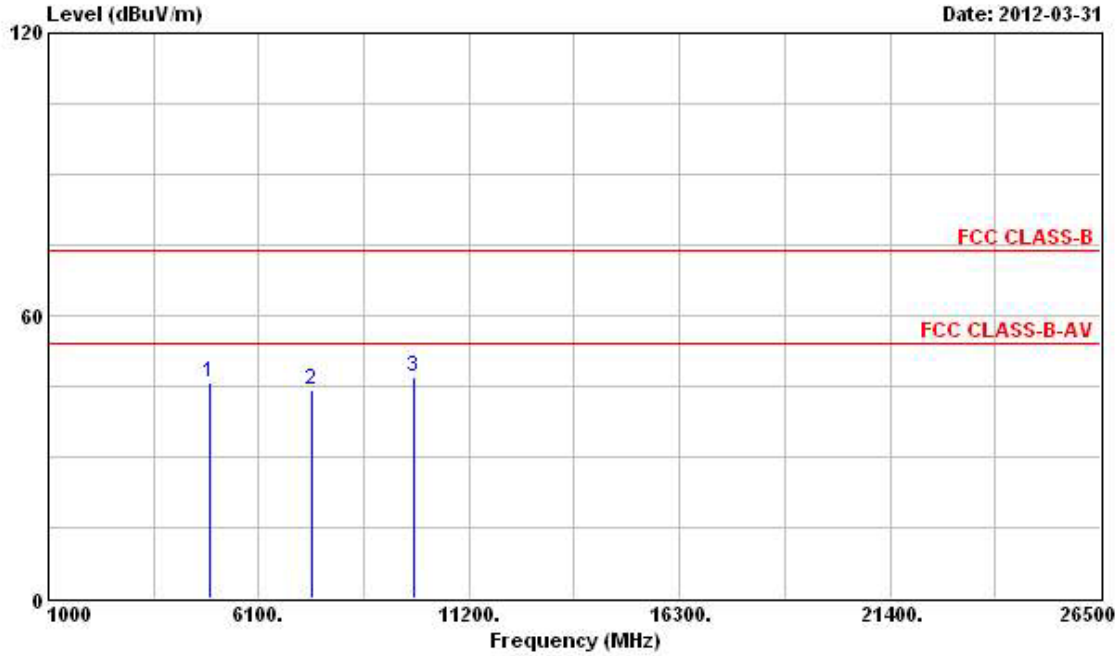


	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	4874.000	41.23	-12.77	54.00	36.22	35.18	4.61	34.78	PK	---	---
2	7311.000	43.42	-10.58	54.00	35.96	36.92	5.64	35.10	PK	---	---
3	9748.000	45.81			36.22	38.71	6.36	35.48	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	Mar. 31, 2012	**Test Site No.**	03CH02-HY
Temperature	23℃	**Humidity**	58%
Test Engineer	Streak	**Configuration**	802.11n (20MHz) Ch. 11

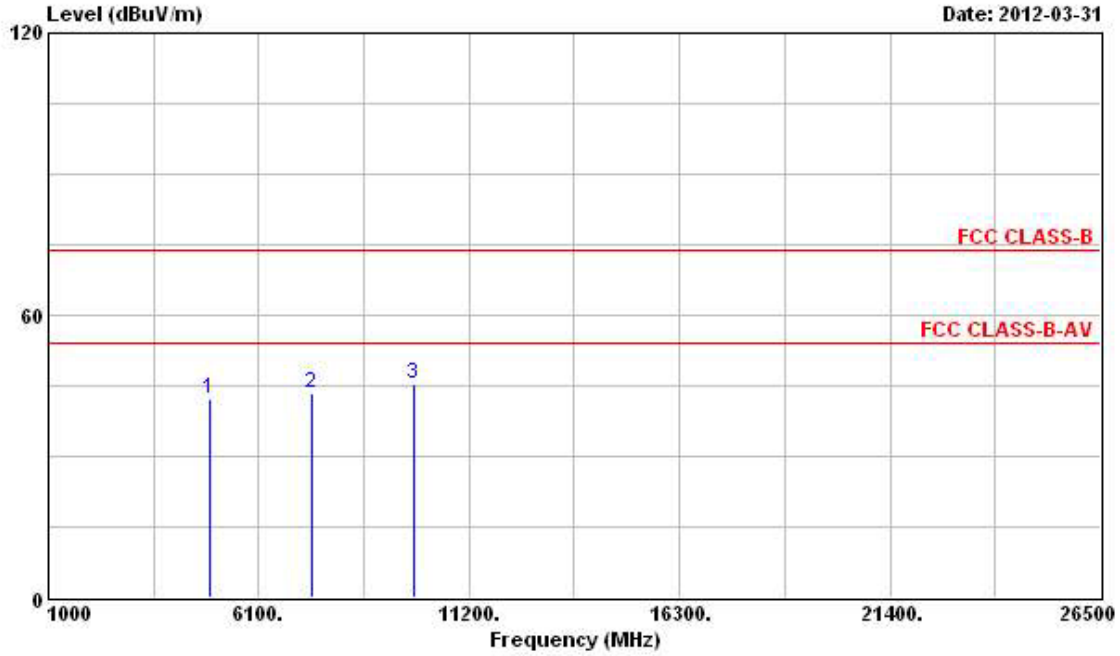
Horizontal



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	4924.000	45.71	-8.29	54.00	39.90	35.90	4.68	34.77	PK	---	---
2	7386.000	44.29	-9.71	54.00	35.88	37.88	5.65	35.12	PK	---	---
3	9848.000	47.00			36.50	39.61	6.38	35.49	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	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	4924.000	42.24	-11.76	54.00	37.10	35.23	4.68	34.77	PK	---	---
2	7386.000	43.51	-10.49	54.00	36.02	36.96	5.65	35.12	PK	---	---
3	9848.000	45.49			35.79	38.81	6.38	35.49	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).

3.6 Band Edge and Fundamental Emissions Measurement

3.6.1 Limit

In any 100kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. If the transmitter measurement is based on the maximum conducted output power, the attenuation required under this paragraph shall be 30dB instead of 20dB. In addition, radiated emissions which fall in section 15.205(a) the restricted bands must also comply with the radiated emission limit specified in section 15.209(a).

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	Mar. 30, 2012	Test Site No.	03CH02-HY
Temperature	23℃	Humidity	58%
Test Engineer	Streak	Configuration	802.11b Ch. 1, 6, 11

Channel 1

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	2386.380	43.82	-10.18	54.00	9.01	31.79	3.02	0.00	Average	---	---
2 @	2413.170	97.01			62.13	31.86	3.02	0.00	Average	---	---
1	2362.250	57.09	-16.91	74.00	22.45	31.65	2.99	0.00	Peak	---	---
2 @	2413.170	107.59			72.71	31.86	3.02	0.00	Peak	---	---

The item 2 is Fundamental Emissions.

Channel 6

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1 @	2438.250	98.00			62.96	31.99	3.05	0.00	Average	---	---
1 @	2438.250	107.04			72.00	31.99	3.05	0.00	Peak	---	---

The item 1 is Fundamental Emissions.

Channel 11

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1 @	2463.330	99.14			64.00	32.06	3.08	0.00	Average	---	---
2	2484.610	44.22	-9.78	54.00	9.01	32.13	3.08	0.00	Average	---	---
1 @	2463.330	108.21			73.07	32.06	3.08	0.00	Peak	---	---
2	2494.490	55.42	-18.58	74.00	20.14	32.20	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.

Final Test Date	Mar. 30, 2012	Test Site No.	03CH02-HY
Temperature	23℃	Humidity	58%
Test Engineer	Streak	Configuration	802.11g Ch.1, 6, 11

Channel 1

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	2390.000	46.76	-7.24	54.00	11.95	31.79	3.02	0.00	Average	---	---
2 @	2412.980	94.05			59.17	31.86	3.02	0.00	Average	---	---
1	2390.000	61.30	-12.70	74.00	26.49	31.79	3.02	0.00	Peak	---	---
2 @	2413.170	103.02			68.14	31.86	3.02	0.00	Peak	---	---

The item 2 is Fundamental Emissions.

Channel 6

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1 @	2434.260	95.09			60.12	31.92	3.05	0.00	Average	---	---
1 @	2444.140	104.37			69.33	31.99	3.05	0.00	Peak	---	---

The item 1 is Fundamental Emissions.

Channel 11

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1 @	2459.340	96.41			61.30	32.06	3.05	0.00	Average	---	---
2 @	2483.500	49.55	-4.45	54.00	14.34	32.13	3.08	0.00	Average	---	---
1 @	2461.050	105.26			70.15	32.06	3.05	0.00	Peak	---	---
2	2483.500	65.56	-8.44	74.00	30.35	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.

Final Test Date	Mar. 30, 2012	**Test Site No.**	03CH02-HY
Temperature	23℃	**Humidity**	58%
Test Engineer	Streak	**Configuration**	802.11n (20MHz) Ch.1, 6, 11

Channel 1

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	2390.000	48.17	-5.83	54.00	13.36	31.79	3.02	0.00	Average	---	---
2 @	2420.010	93.75			58.81	31.92	3.02	0.00	Average	---	---
1	2390.000	67.69	-6.31	74.00	32.88	31.79	3.02	0.00	Peak	---	---
2 @	2415.260	103.07			68.19	31.86	3.02	0.00	Peak	---	---

The item 2 is Fundamental Emissions.

Channel 6

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1 @	2435.210	94.78			59.81	31.92	3.05	0.00	Average	---	---
1 @	2434.450	104.46			69.49	31.92	3.05	0.00	Peak	---	---

The item 1 is Fundamental Emissions.

Channel 11

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1 @	2459.340	95.55			60.44	32.06	3.05	0.00	Peak	---	---
2	2483.500	49.88	-24.12	74.00	14.67	32.13	3.08	0.00	Peak	---	---
1 @	2461.050	105.58			70.47	32.06	3.05	0.00	Peak	---	---
2 @	2483.500	69.50	-4.50	74.00	34.29	32.13	3.08	0.00	Peak	---	---

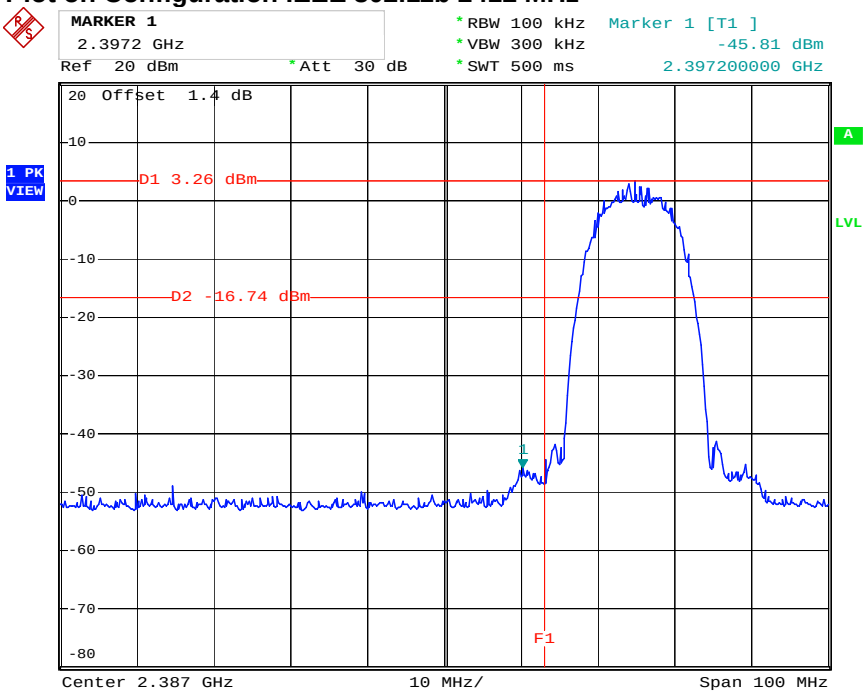
The item 1 is Fundamental Emissions.

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

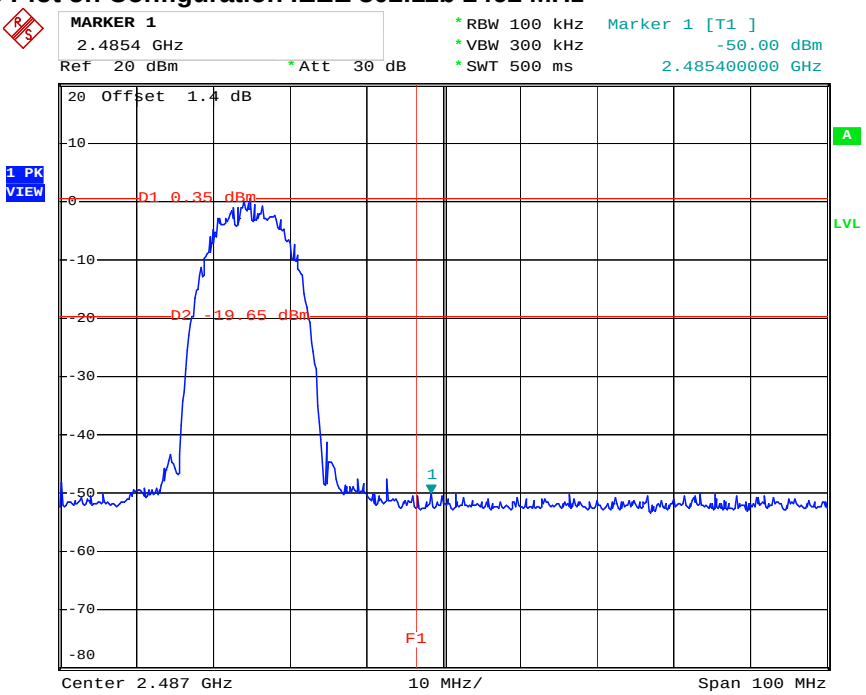
Final Test Date	Apr. 07, 2012	**Test Site No.**	TH01-HY
Temperature	26.8℃	**Humidity**	28%
Test Engineer	Ian	**Configurations**	802.11b/g/n

Low Band Edge Plot on Configuration IEEE 802.11b 2412 MHz



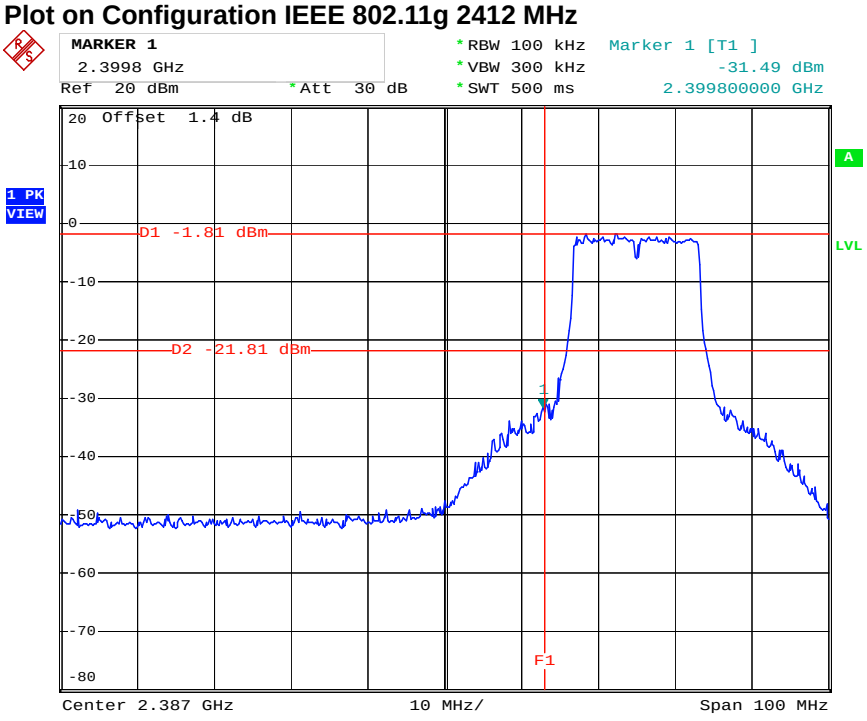
Date: 7.APR.2012 19:00:57

High Band Edge Plot on Configuration IEEE 802.11b 2462 MHz



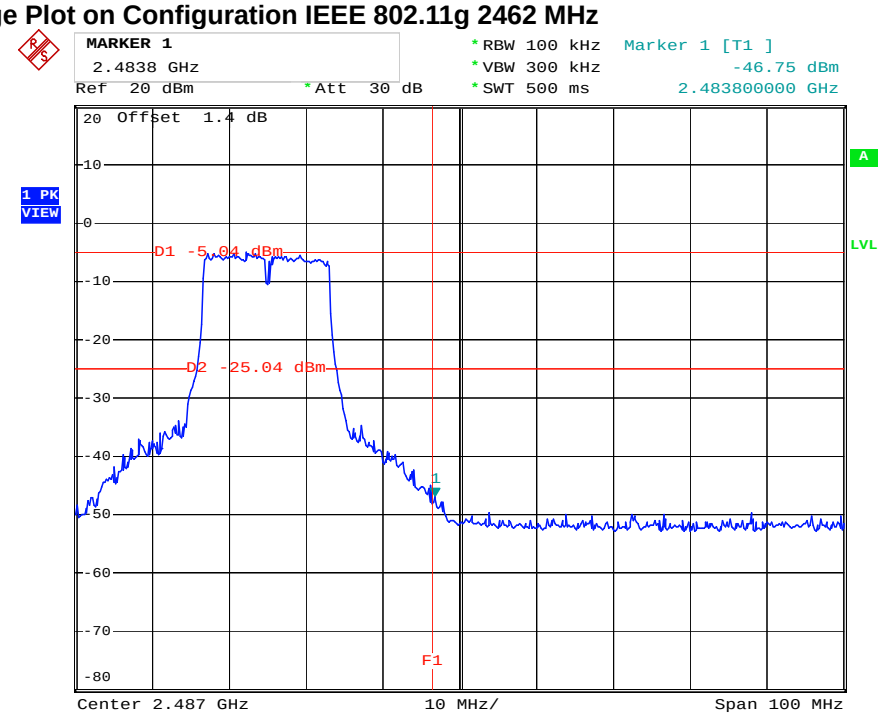
Date: 7.APR.2012 19:10:41

Low Band Edge Plot on Configuration IEEE 802.11g 2412 MHz



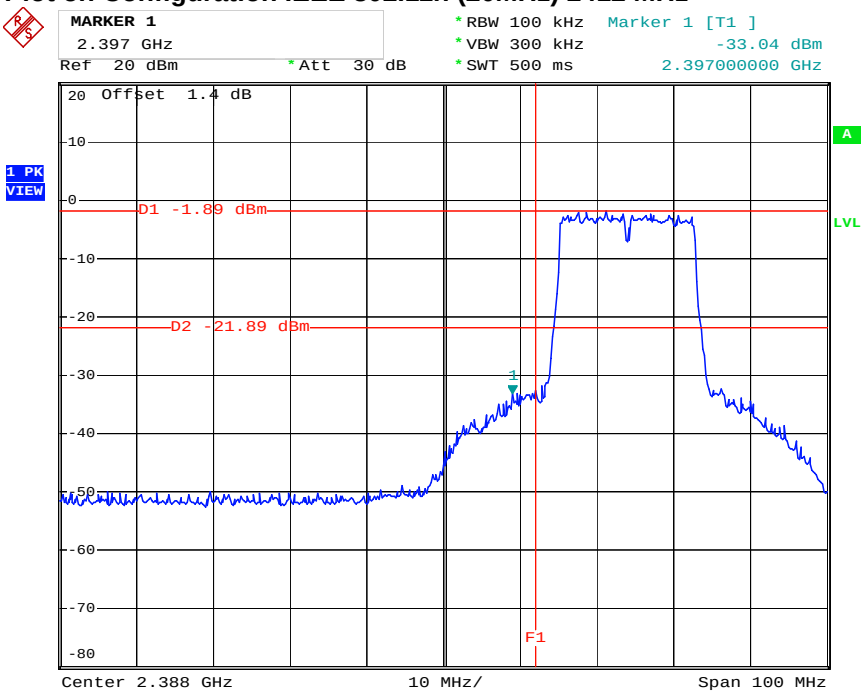
Date: 7.APR.2012 20:20:05

High Band Edge Plot on Configuration IEEE 802.11g 2462 MHz



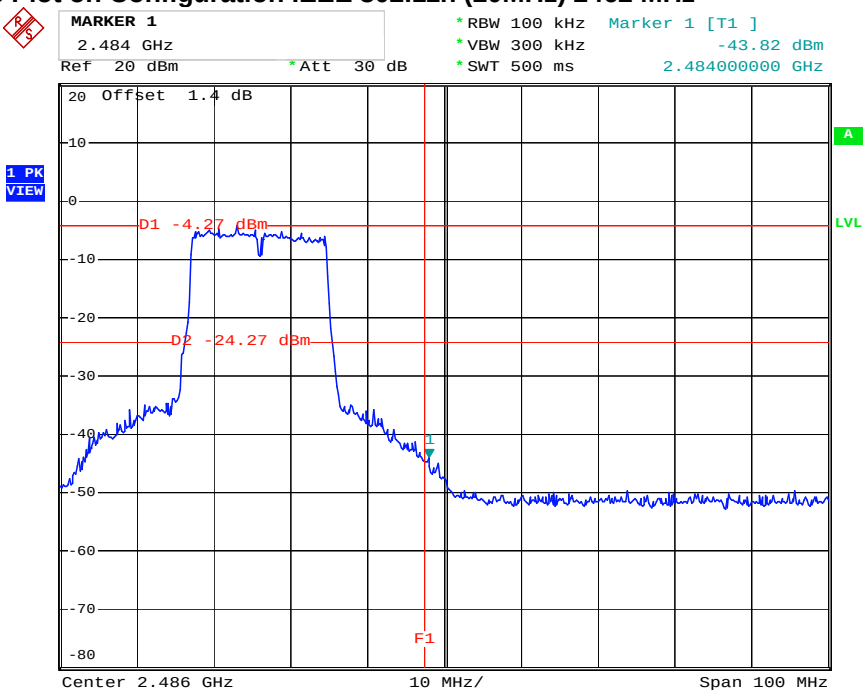
Date: 7.APR.2012 20:35:04

Low Band Edge Plot on Configuration IEEE 802.11n (20MHz) 2412 MHz



Date: 7.APR.2012 20:50:45

High Band Edge Plot on Configuration IEEE 802.11n (20MHz) 2462 MHz



Date: 7.APR.2012 21:11:22

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 2.3 in this test report; antenna connector complied with the requirements.

4 LIST OF MEASURING EQUIPMENTS

< Conducted Emission >

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Test Receiver	R&S	ESCS 30	838251/003	9kHz ~ 2.75GHz	Jul. 21, 2011	Conduction (CO01-LK)
LISN	R&S	NNB-2/16Z	99081	9kHz ~ 30MHz	Apr. 11, 2012	Conduction (CO01-LK)
RF Cable-CON	Suhner Switzerland	RG223/U	CB017	9kHz ~ 30MHz	Nov. 04, 2011	Conduction (CO01-LK)
PULSE LIMTER	R&S	ESH3-Z2	20-6120	9kHz ~ 30MHz	May 16. 2012	Conduction (CO01-LK)

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

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Spectrum Analyzer	R&S	FSP 40	100305	9 KHz ~ 40 GHz	Feb. 21, 2012	Conducted (TH01-HY)
DC Power Source	G.W.	GPC-6030D	C671845	DC 1V ~ 60V	Jun. 03, 2011	Conducted (TH01-HY)
Temp. and Humidity Chamber	Giant Force	GTH-225-20-SP-SD	MAA1112-007	-20~100℃	Dec. 07, 2011	Conducted (TH01-HY)
Signal Generator	R&S	SMR40	100116	10 MHz ~ 40 GHz	Jun. 07, 2011	Conducted (TH01-HY)
Power Sensor	Anritsu	MA2411B	1027452	300 MHz ~ 40 GHz	Jun. 16, 2011	Conducted (TH01-HY)
Power Meter	Anritsu	ML2495A	1124009	300 MHz ~ 40 GHz	Jun. 20, 2011	Conducted (TH01-HY)
RF Cable-1m	Jye Bao	RG142	CB034-1m	20 MHz ~ 7 GHz	Dec. 03, 2011	Conducted (TH01-HY)
RF Cable-2m	Jye Bao	RG142	CB035-2m	20 MHz ~ 1 GHz	Dec. 03, 2011	Conducted (TH01-HY)

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

Only for Power Spectral Density test use.

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Spectrum Analyzer	R&S	FSP 40	100305	9 KHz ~ 40 GHz	Feb. 21, 2012	Conducted (TH01-HY)
Signal Generator	R&S	SMR40	100302	10MHz ~ 40GHz	Nov. 22, 2011	Conducted (TH01-HY)

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

< Radiated Emission below 1GHz >

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Spectrum Analyzer	R&S	FSP40	100593	9kHz ~ 40GHz	Aug. 08, 2011	Radiation (03CH02-HY)
3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH02-HY	30MHz ~ 1GHz 3m	May 10, 2012	Radiation (03CH02-HY)
Amplifier	Agilent	8447D	2944A11146	100kHz ~ 1.3GHz	Jul. 25, 2011	Radiation (03CH02-HY)
RF Cable-R03m	Jye Bao	RG142	CB021	30MHz ~ 1GHz	Nov. 11, 2011	Radiation (03CH02-HY)
Bilog Antenna	SCHAFFNER	CBL61128	2723	30MHz ~ 2GHz	Oct. 22, 2011	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	9kHz - 30MHz	Jul. 29, 2010*	Radiation (03CH02-HY)

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

< Radiated Emission above 1GHz >

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Spectrum Analyzer	R&S	FSP40	100593	9kHz ~ 40GHz	Aug. 08, 2011	Radiation (03CH02-HY)
Amplifier	Agilent	8449B	3008A02373	1GHz ~ 26.5GHz	Jul. 25, 2011	Radiation (03CH02-HY)
Horn Antenna	ETS-LINDGREN	3117	00091920	1GHz ~ 18GHz	Nov. 15, 2011	Radiation (03CH02-HY)
RF Cable-high	SUHNER	SUCOFLEX106	03CH02-HY	1GHz ~ 40GHz	Mar. 06, 2012	Radiation (03CH02-HY)
Bilog Antenna	SCHAFFNER	CBL61128	2723	30MHz ~ 2GHz	Oct. 22, 2011	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.

5 TEST LOCATION

SHIJR	ADD	:	6Fl., No. 106, Sec. 1, Shintai 5th Rd., Shijr City, Taipei 221, Taiwan, 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	:	886-3-327-0973
LINKOU	ADD	:	No. 30-2, Dingfu Vil., Linkou Dist., New Taipei City 244, Taiwan, R.O.C.
	TEL	:	886-2-2601-1640
	FAX	:	886-2-2601-1695
DUNGHU	ADD	:	No. 3, Lane 238, Kangle St., Neihu Chiu, Taipei 114, Taiwan, R.O.C.
	TEL	:	886-2-2631-4739
	FAX	:	886-2-2631-9740
JUNGHE	ADD	:	7Fl., No. 758, Jungjeng Rd., Junghe City, Taipei 235, Taiwan, R.O.C.
	TEL	:	886-2-8227-2020
	FAX	:	886-2-8227-2626
NEIHU	ADD	:	4Fl., No. 339, Hsin Hu 2nd Rd., Taipei 114, Taiwan, R.O.C.
	TEL	:	886-2-2794-8886
	FAX	:	886-2-2794-9777
JHUBEI	ADD	:	No.8, Lane 724, Bo-ai St., Jhubei City, HsinChu County 302, Taiwan, R.O.C.
	TEL	:	886-3-656-9065
	FAX	:	886-3-656-9085

6 TAF CERTIFICATE OF ACCREDITATION

Certificate No. : L1190-111208

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, 2010 to January 09, 2013
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 Accreditation Program for BSMI Mutual Recognition Arrangment with Foreign Authorities

Jay-San Chen
President, Taiwan Accreditation Foundation
Date : December 08, 2011

P1, total 24 pages

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