FCC RADIO TEST REPORT

according to

47 CFR FCC Part 15 Subpart C § 15.247

Equipment	:	**150N Wireless LAN Broadband Router**
Model No.	:	**BR-6228GNS / GR-228GNS / EW-7218APN / EW-7228APn / BR-6228nC / BR-6228nS**
Brand Name	:	**EDIMAX**
Filing Type	:	**New Application**
Applicant	:	**EDIMAX TECHNOLOGY CO., LTD.**
Manufacturer		No.3, Wu Chuan 3rd Road, Wu-Ku Industrial Park, Taipei Hsien, Taiwan
FCC ID	:	**NDD9562281018**
Received Date	:	Oct. 06, 2010
Final Test Date	:	Aug. 09, 2011

Statement

Test result included is only for the 802.11n 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, Tao Yuan Hsien, Taiwan, R.O.C.

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History of This Test Report

Original Issue Date: Aug. 11, 2011
Report No.: FR070629-02AI
□ 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	:	150N Wireless LAN Broadband Router
Model No.	:	BR-6228GNS / GR-228GNS / EW-7218APN / EW-7228APn / BR-6228nC / BR-6228nS
Brand Name	:	EDIMAX
Applicant	:	EDIMAX TECHNOLOGY CO., LTD. No.3, Wu Chuan 3rd Road, Wu-Ku Industrial Park, Taipei Hsien, Taiwan

Sporton International as requested by the applicant to evaluate the EMC performance of the product sample received on Oct. 06, 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 / Vice 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	4.49 dB
3.2	15.247(b)(3)	Maximum Conducted Output Power	Complies	14.42 dB
3.3	15.247(e)	Power Spectral Density	Complies	30.06 dB
3.4	15.247(a)(2)	6dB Spectrum Bandwidth	Complies	-
3.5	15.247(d)	Radiated Emissions	Complies	1.36 dB
3.6	15.247(d)	Band Edge Emissions	Complies	1.27 dB
3.7	15.203	Antenna Requirements	Complies	-

Test Items	Uncertainty	Remark
AC Power Line Conducted Emissions	±2.3dB	Confidence levels of 95%
Maximum Conducted Output Power	±0.8dB	Confidence levels of 95%
Power Spectral Density	±0.5dB	Confidence levels of 95%
6dB Spectrum Bandwidth	$\pm 8.5\times10^{-8}$	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

There are two difference appearance of product. Only the radio detail of IEEE 802.11n is shown in the table below. For more detailed features description, please refer to the manufacturer's specifications or user's manual.

Items	Description
Power Type	+5Vdc from adapter
Modulation	See the below table for IEEE 802.11n
Data Modulation	OFDM (BPSK / QPSK / 16QAM / 64QAM)
Data Rate (Mbps)	See the below table for IEEE 802.11n
Frequency Range	2400 ~ 2483.5MHz
Channel Number	11 for 20MHz bandwidth ; 7 for 40MHz bandwidth
Channel Band Width (99%)	MCS 0 (20MHz) : 17.66 MHz ; MCS 0 (40MHz) : 36.03 MHz
Conducted Output Power	MCS 0 (20MHz) : 15.57 dBm ; MCS 0 (40MHz) : 15.58 dBm

2.2 Accessories

Power	Brand	Model	Rating
Switching Adapter	DVE	DSC-6PFA-05 FUS 050100	Input: 100-240V~ 50/60Hz 0.2A Output: +5V 1A

2.3 Table for Filed Antenna

Ant.	Antenna Type	Model	Connector	Gain (dBi)	Remark
A	Dipole Antenna (white)	RFA-02-5-C15M3-B32	Reversed-SMA	5.00	TX / RX

Ant.	Antenna Type	Model	Connector	Gain (dBi)	Remark
B	Dipole Antenna (black)	RFA-02-3-C52M3-B32	Reversed-SMA	3.00	TX / RX

Note: IEEE 802.11n the antennas is 1T1R Spatial Multiplexing MIMO configuration. One antenna is for signal transmitting and receiving.

EUT may match the three antennas use. Performed the worst configuration for higher gain was test in final test report.

IEEE 802.11n Modulation Scheme

MCS Index	Nss	Modulation	R	NBPSC	NCBPS		NDBPS		Data rate(Mbps) 800nsGI	
					20MHz	40MHz	20MHz	40MHz	20MHz	40MHz
0	1	BPSK	1/2	1	52	108	26	54	6.5	13.5
1	1	QPSK	1/2	2	104	216	52	108	13.0	27.0
2	1	QPSK	3/4	2	104	216	78	162	19.5	40.5
3	1	16-QAM	1/2	4	208	432	104	216	26.0	54.0
4	1	16-QAM	3/4	4	208	432	156	324	39.0	81.0
5	1	64-QAM	2/3	6	312	648	208	432	52.0	108.0
6	1	64-QAM	3/4	6	312	648	234	486	58.5	121.5
7	1	64-QAM	5/6	6	312	648	260	540	65.0	135.0

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

2.4 Table for Carrier Frequencies

There are two bandwidth systems for IEEE 802.11n.
For 20MHz bandwidth systems, use Channel 1~Channel 11.
For 40MHz bandwidth systems, use Channel 3~Channel 9.

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

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	Normal Mode	Auto	-
Maximum Conducted Output Power Power Spectral Density 6dB Spectrum Bandwidth Radiated Emissions Above 1GHz Fundamental Emissions	MCS 0 (20MHz)	6.5 Mbps	1/6/11
	MCS 0 (40MHz)	13.5 Mbps	3/6/9
Band Edge Emissions	MCS 0 (20MHz)	6.5 Mbps	1/11
	MCS 0 (40MHz)	13.5 Mbps	3/9

2.6 Table for Testing Locations

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

Semi Anechoic Chamber (SAC).

2.7 Table for Supporting Units

Support Unit	Brand	Model	FCC ID	Remark
Notebook	DELL	PP01L	DoC	Conducted
(USB)Mouse	Microsoft	1004	DoC	
Modem	ACEEX	DM1414	DoC	
Personal Computer (Remote Workstation)	HP	DC579AV	DoC	
Notebook (Remote Workstation)	DELL	E5510	DoC	
LCD Monitor (Remote Workstation)	DELL	2408WFPb	DoC	
(PS2)Keyboard (Remote Workstation)	HP	KB-0133	DoC	
(PS2)Mouse (Remote Workstation)	LOGITECH	M-S69	DoC	
Notebook	DELL	E5500	N/A	Radiated

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 802.11n

Test Software Version	MP N TEST*		
Frequency	2412 MHz	2437 MHz	2462 MHz
IEEE 802.11n(20MHz)	29	30	31
Frequency	2422 MHz	2437 MHz	2452 MHz
IEEE 802.11n(40MHz)	30	30	31

2.9 EUT Operation during Test

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

The program was executed as follows :

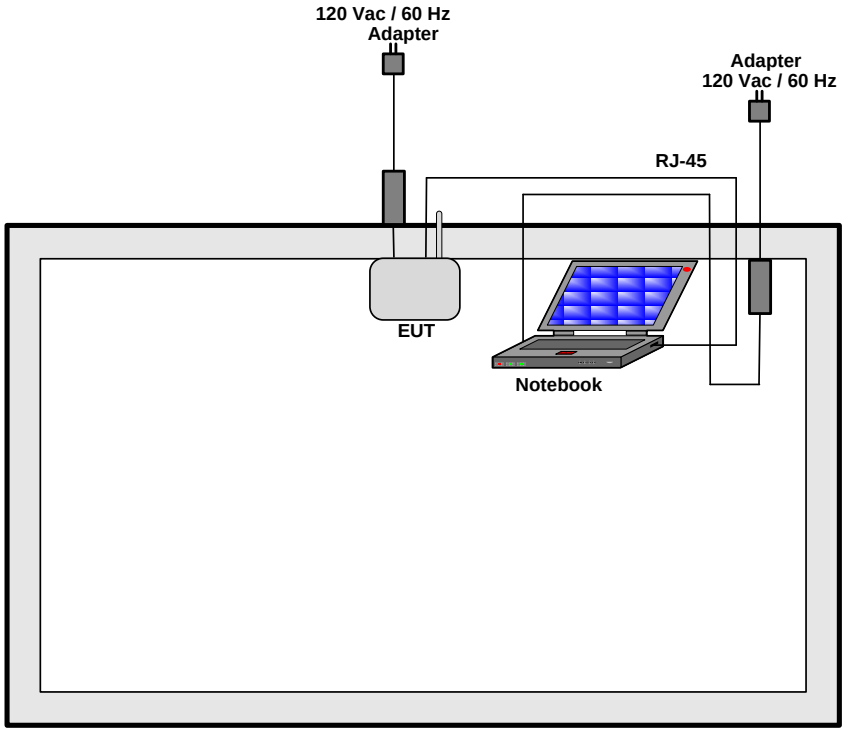
a. Turn on the power of all equipment.
b. The NB reads the test program from the hard disk drive and runs it.
c. The NB sends "H" messages to the panel and displays "H" patterns on the screen.
d. The NB sends messages to the modem.
e. Repeat the steps from c to d.

-Executed "ping.exe" to link with the remote workstation to receive and transmit data by LAN.

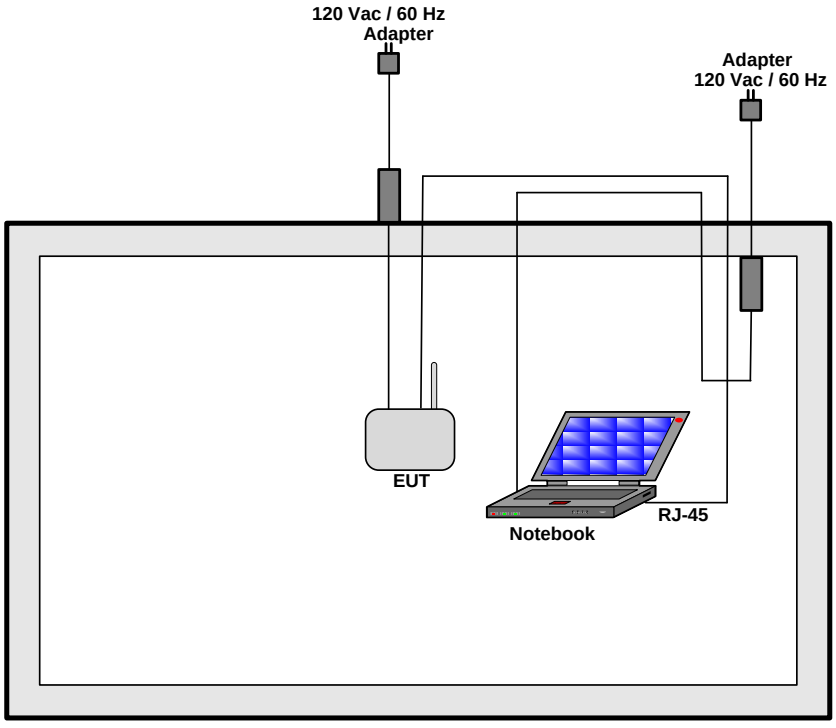
Only Radiated used:
- Executed “MP N TEST*” to keep transmitting signals at fixed frequency.

2.10 Test Configuration

Radiation Emissions Test Configuration
For radiated emissions 9kHz~1GHz



For radiated emissions above 1GHz



3 TEST RESULT

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

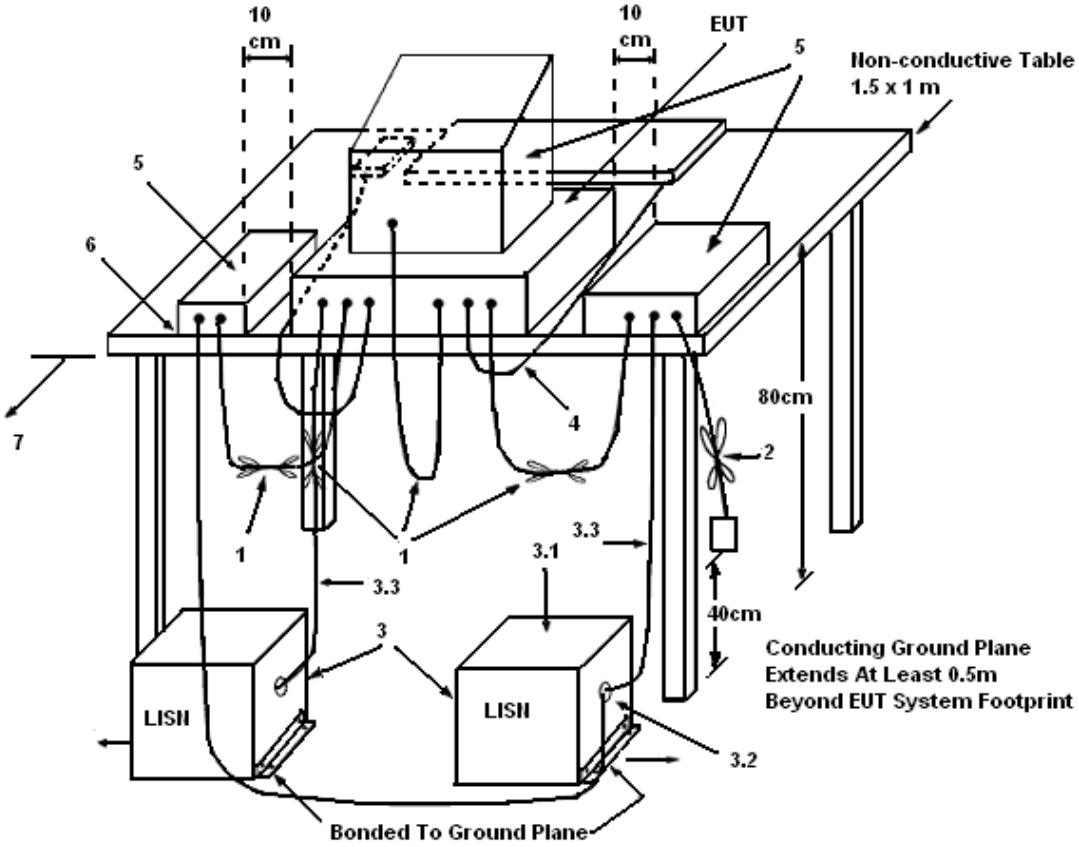
Please refer to section 4 of equipments list in this report. The following table is the setting of the receiver.

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

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.

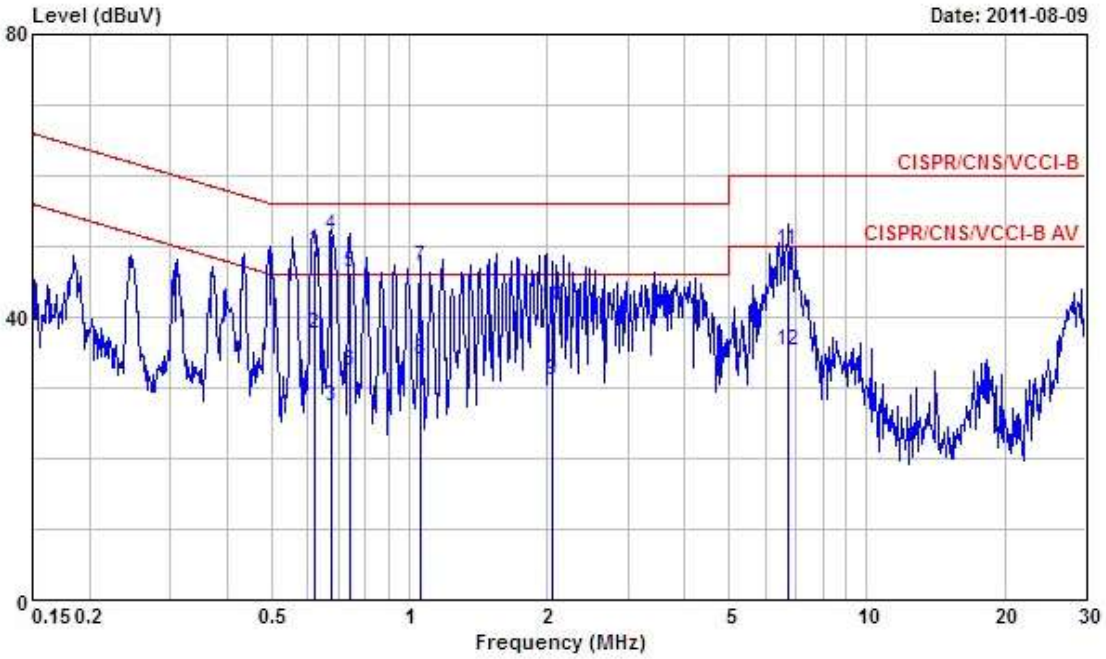
3.1.5 Test Deviation

There is no deviation with the original standard.

3.1.6 Results of AC Power Line Conducted Emissions Measurement

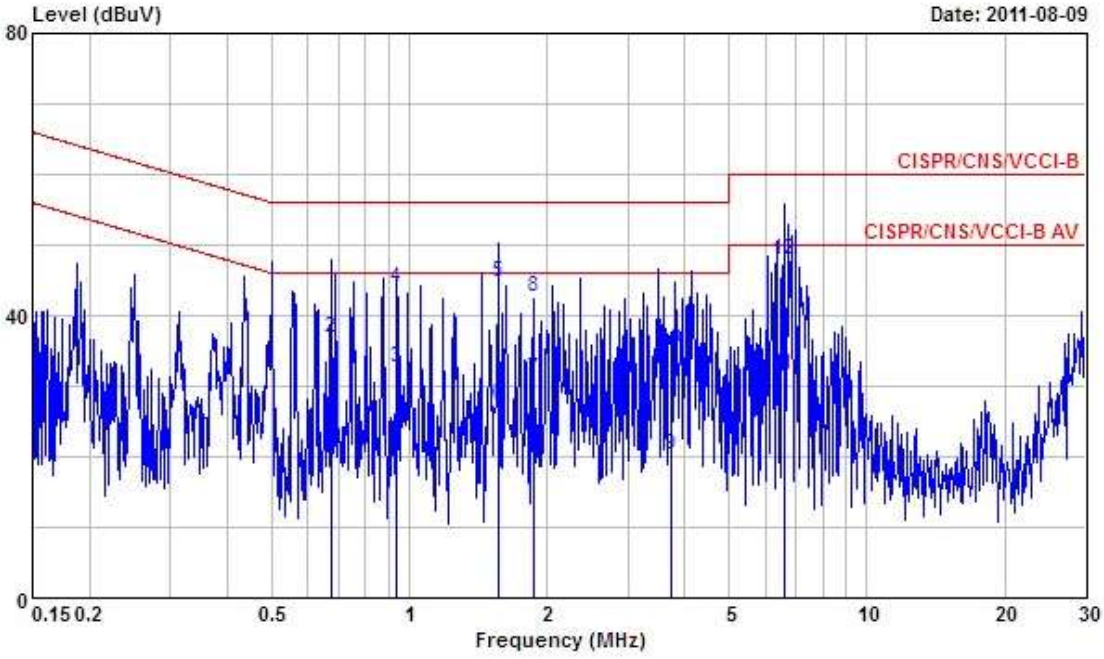
Final Test date	Aug. 09, 2011	**Test Site No.**	CO04-HY
Temperature	24.7℃	**Humidity**	57.3%
Test Engineer	Jason	**Configuration**	Normal Mode

Line



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	@0.6205370	49.46	-6.54	56.00	48.96	0.10	0.40	QP
2	@0.6205370	37.65	-8.35	46.00	37.15	0.10	0.40	Average
3	0.6754350	27.33	-18.67	46.00	26.82	0.10	0.41	Average
4	@0.6754350	51.51	-4.49	56.00	51.00	0.10	0.41	QP
5	@0.7390970	46.20	-9.80	56.00	45.67	0.10	0.43	QP
6	0.7390970	32.29	-13.71	46.00	31.76	0.10	0.43	Average
7	@ 1.060	47.19	-8.81	56.00	46.58	0.11	0.50	QP
8	1.060	34.00	-12.00	46.00	33.39	0.11	0.50	Average
9	2.056	30.93	-15.07	46.00	30.30	0.13	0.50	Average
10	2.056	41.67	-14.33	56.00	41.04	0.13	0.50	QP
11	@ 6.700	49.49	-10.51	60.00	48.77	0.22	0.50	QP
12	6.700	35.30	-14.70	50.00	34.58	0.22	0.50	Average

Neutral



		Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
		MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1		0.6754350	20.71	-25.29	46.00	20.21	0.09	0.41	Average
2		0.6754350	36.77	-19.23	56.00	36.27	0.09	0.41	QP
3		0.9380970	32.56	-13.44	46.00	31.97	0.10	0.49	Average
4		0.9380970	43.88	-12.12	56.00	43.29	0.10	0.49	QP
5	@	1.560	44.81	-11.19	56.00	44.20	0.11	0.50	QP
6		1.560	27.50	-18.50	46.00	26.89	0.11	0.50	Average
7		1.875	31.01	-14.99	46.00	30.40	0.11	0.50	Average
8		1.875	42.51	-13.49	56.00	41.90	0.11	0.50	QP
9		3.725	20.14	-25.86	46.00	19.49	0.15	0.50	Average
10		3.725	35.34	-20.66	56.00	34.69	0.15	0.50	QP
11		6.600	31.65	-18.35	50.00	30.94	0.21	0.50	Average
12		6.600	47.88	-12.12	60.00	47.17	0.21	0.50	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

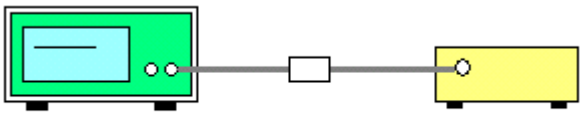
Please refer to section 4 of equipments list in this report. The following table is the setting of the spectrum analyzer.

Power Meter Parameter	Setting
Attenuation	Auto
Span Frequency	0.135 s ~ 26 s
RB	1000 kHz
VB	3000 kHz
Detector	rms
Trace	Max Hold
Sweep Time	Auto

3.2.3 Test Procedures

1. The transmitter output (antenna port) was connected to the spectrum analyzer.
2. Test was performed in accordance with Measurement of Digital Transmission Systems Operating under Section 15.247.
3. When measuring maximum conducted output power within multiple antenna systems, add every result of the values by mathematic formula.

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	Oct. 13, 2010	**Test Site No.**	TH01-HY
Temperature	25℃	**Humidity**	62%
Test Engineer	Ian	**Configurations**	802.11n

Configuration of IEEE 802.11n (20MHz)

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
1	2412 MHz	15.57	30.00	**Complies**
6	2437 MHz	15.23	30.00	**Complies**
11	2462 MHz	15.14	30.00	**Complies**

Configuration of IEEE 802.11n (40MHz)

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
3	2422 MHz	15.58	30.00	**Complies**
6	2437 MHz	15.47	30.00	**Complies**
9	2452 MHz	15.32	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

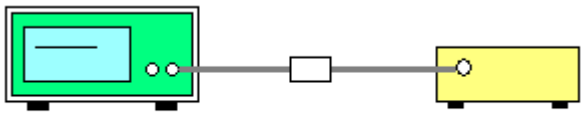
Please refer to section 4 of equipments list in this report. The following table is the setting of the spectrum analyzer.

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.
5. Measuring multiple antennas, the connectors are required to link with Spectrum Analyzer through a combiner.

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	Oct. 13, 2010	**Test Site No.**	TH01-HY
Temperature	25℃	**Humidity**	62%
Test Engineer	Ian	**Configurations**	802.11n

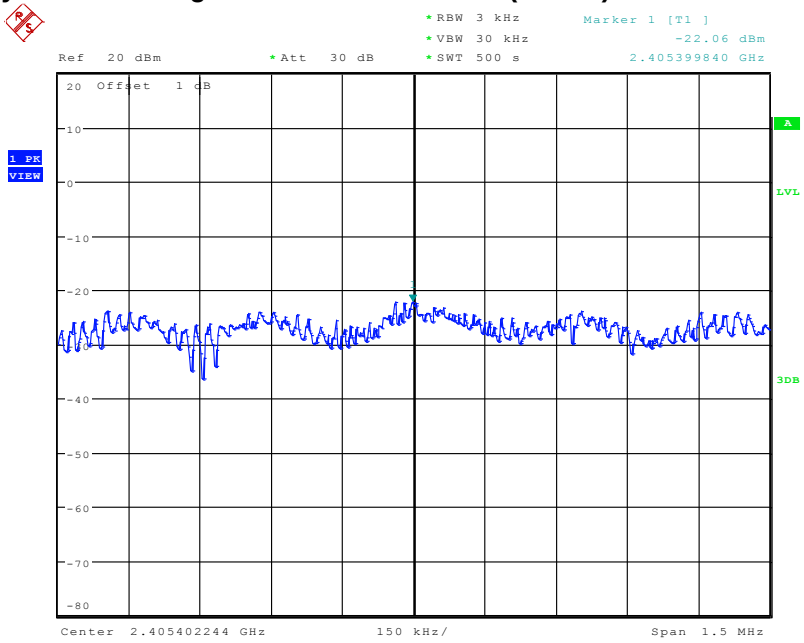
Configuration of IEEE 802.11n (20MHz)

Channel	Frequency	Power Density (dBm)	Max. Limit (dBm)	Result
1	2412 MHz	-22.06	8.00	**Complies**
6	2437 MHz	-22.86	8.00	**Complies**
11	2462 MHz	-22.48	8.00	**Complies**

Configuration of IEEE 802.11n (40MHz)

Channel	Frequency	Power Density (dBm)	Max. Limit (dBm)	Result
3	2422 MHz	-23.13	8.00	**Complies**
6	2437 MHz	-23.18	8.00	**Complies**
9	2452 MHz	-25.03	8.00	**Complies**

Power Density Plot on Configuration of IEEE 802.11n (20MHz) / 2412 MHz



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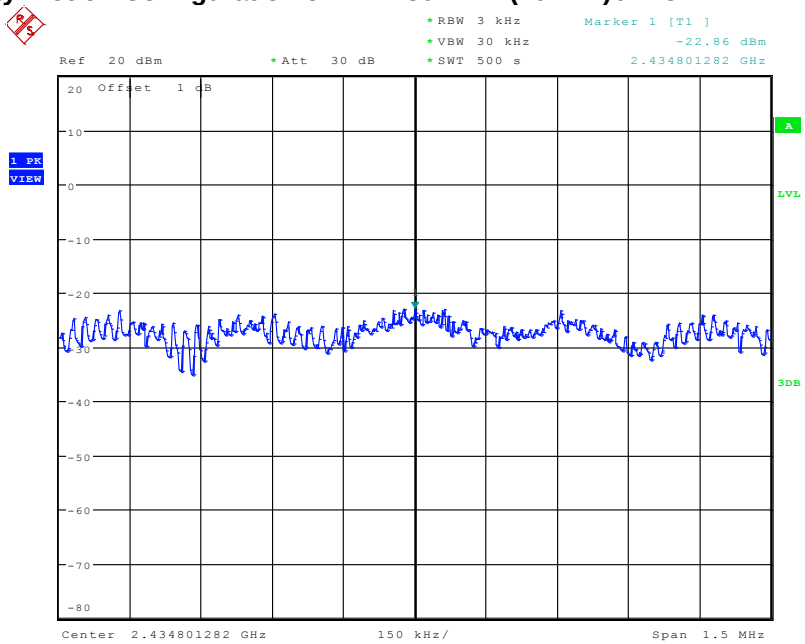
Power Density Plot on Configuration of IEEE 802.11n (20MHz) / 2437 MHz



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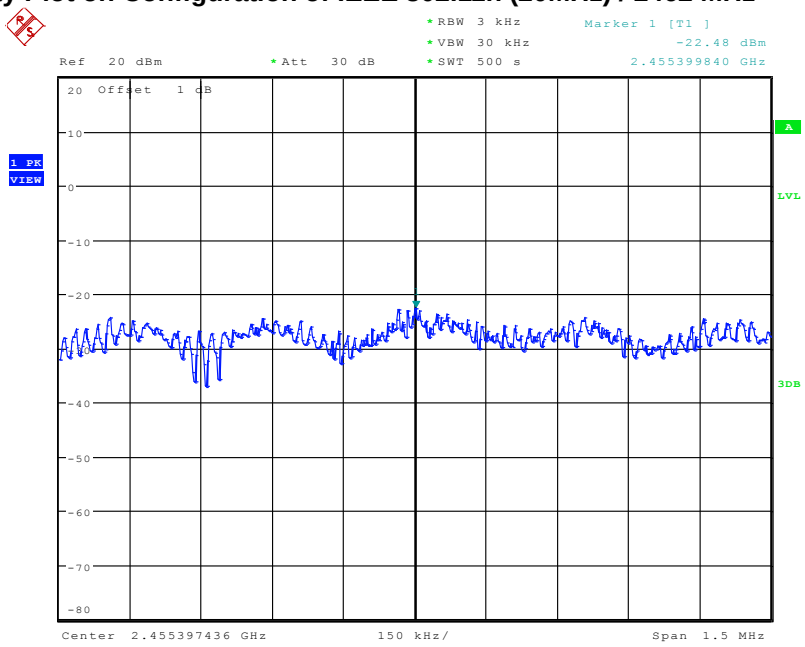
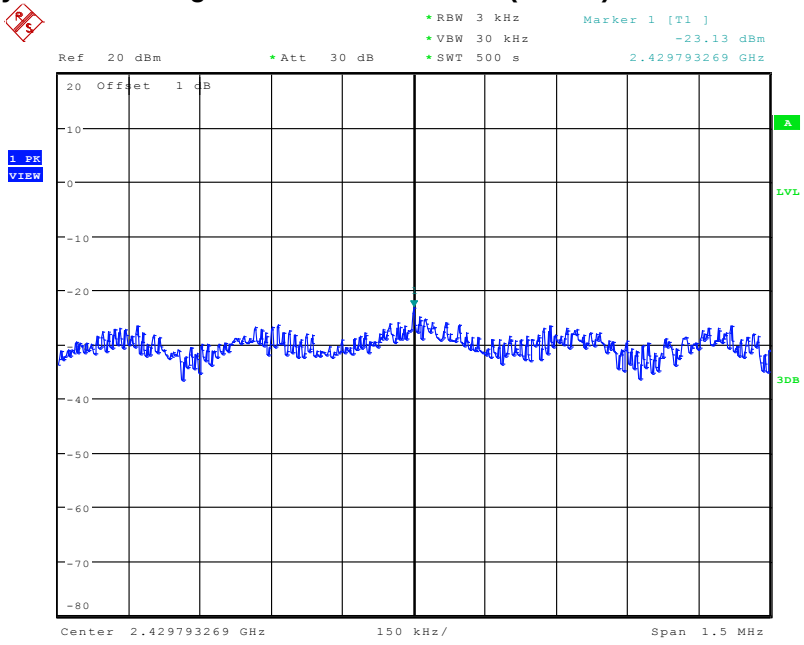
Power Density Plot on Configuration of IEEE 802.11n (20MHz) / 2462 MHz

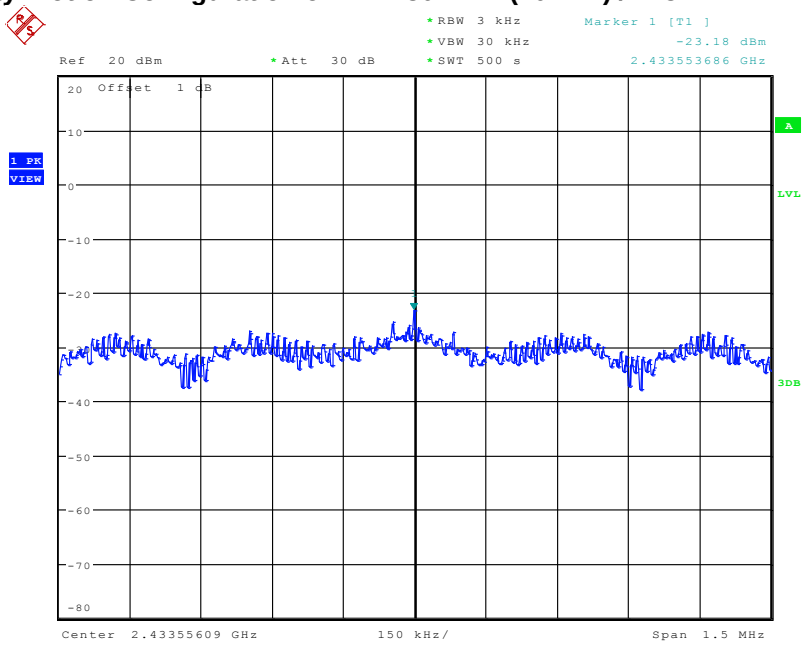


Power Density Plot on Configuration of IEEE 802.11n (40MHz) / 2422 MHz



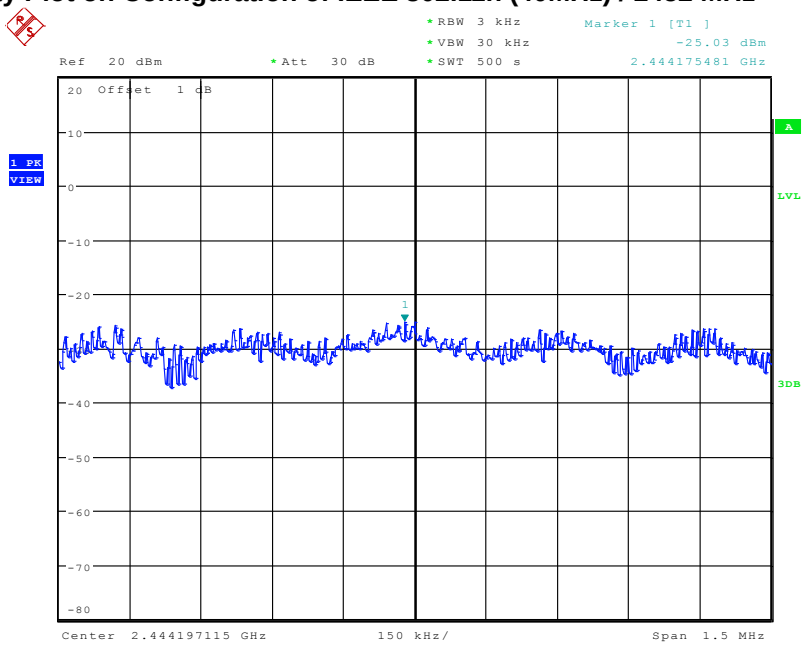
Date: 13.OCT.2010 16:57:33

Power Density Plot on Configuration of IEEE 802.11n (40MHz) / 2437 MHz



Date: 13.OCT.2010 17:06:43

Power Density Plot on Configuration of IEEE 802.11n (40MHz) / 2452 MHz



Date: 13.OCT.2010 17:11:41

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

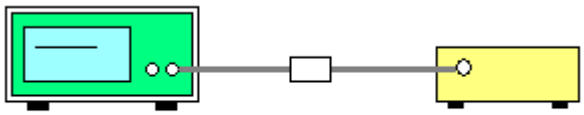
Please refer to section 4 of equipments list in this report. The following table is the setting of the spectrum analyzer.

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.
4. Measuring multiple antennas, the connectors are required to link with Spectrum Analyzer through a combiner.

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	Oct. 13, 2010	**Test Site No.**	TH01-HY
Temperature	25℃	**Humidity**	62%
Test Engineer	Ian	**Configurations**	802.11n

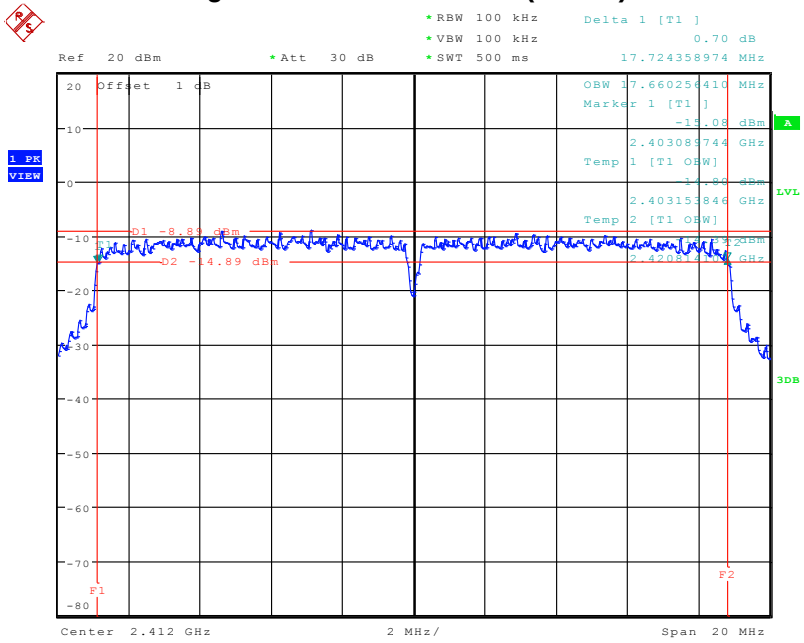
Configuration IEEE 802.11n (20MHz)

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
1	2412 MHz	17.72	17.66	500	**Complies**
6	2437 MHz	17.72	17.66	500	**Complies**
11	2462 MHz	17.72	17.66	500	**Complies**

Configuration of IEEE 802.11n (40MHz)

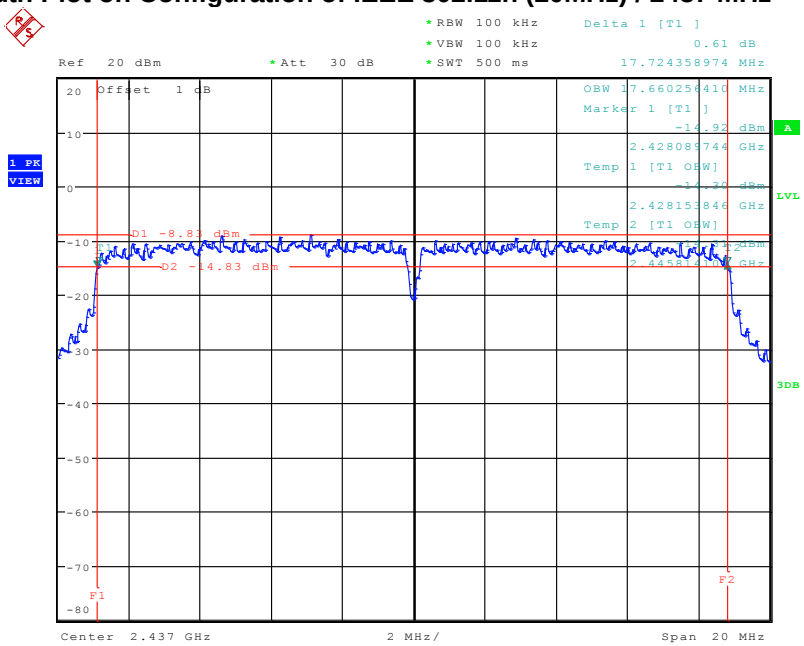
Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
3	2422 MHz	36.47	35.96	500	**Complies**
6	2437 MHz	36.47	36.03	500	**Complies**
9	2452 MHz	36.47	36.03	500	**Complies**

6 dB Bandwidth Plot on Configuration of IEEE 802.11n (20MHz) / 2412 MHz



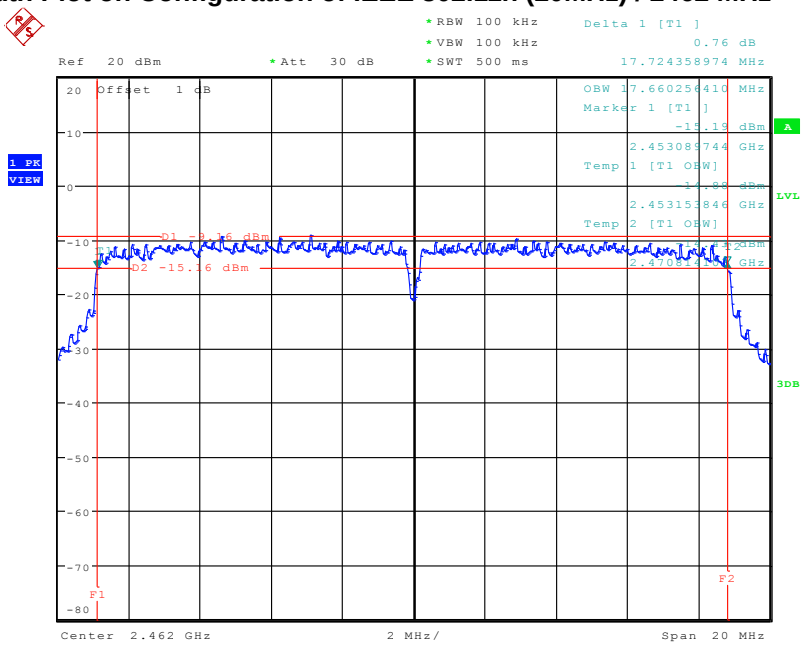
Date: 13.OCT.2010 16:35:53

6 dB Bandwidth Plot on Configuration of IEEE 802.11n (20MHz) / 2437 MHz



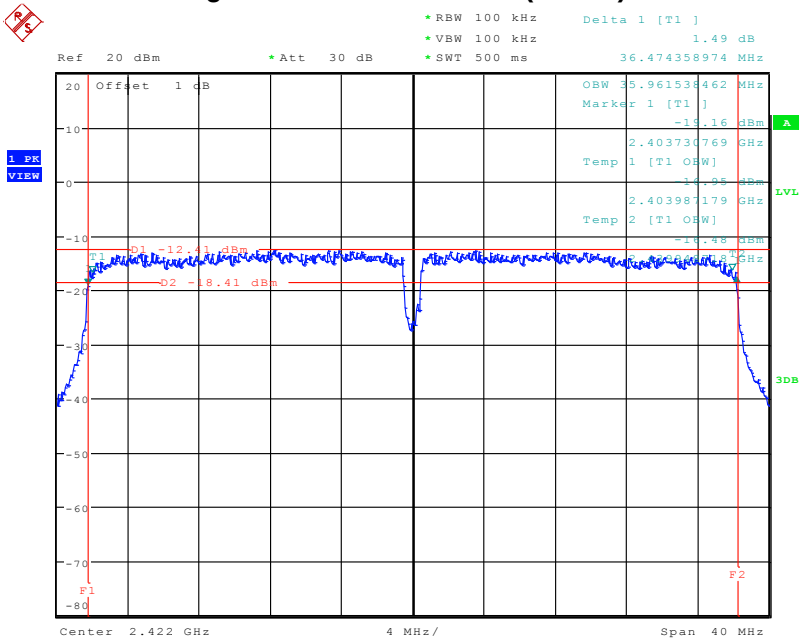
Date: 13.OCT.2010 16:40:10

6 dB Bandwidth Plot on Configuration of IEEE 802.11n (20MHz) / 2462 MHz



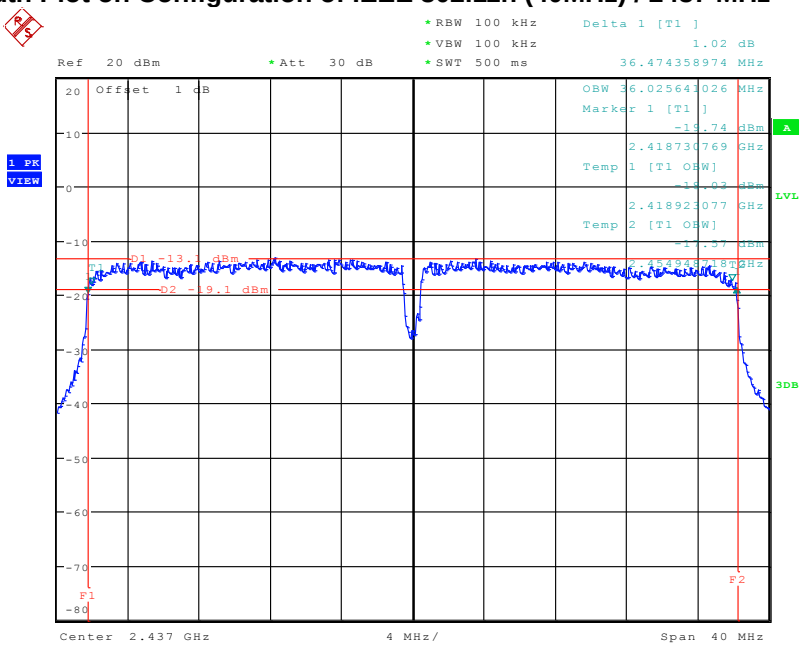
Date: 13.OCT.2010 16:45:58

6 dB Bandwidth Plot on Configuration of IEEE 802.11n (40MHz) / 2422 MHz



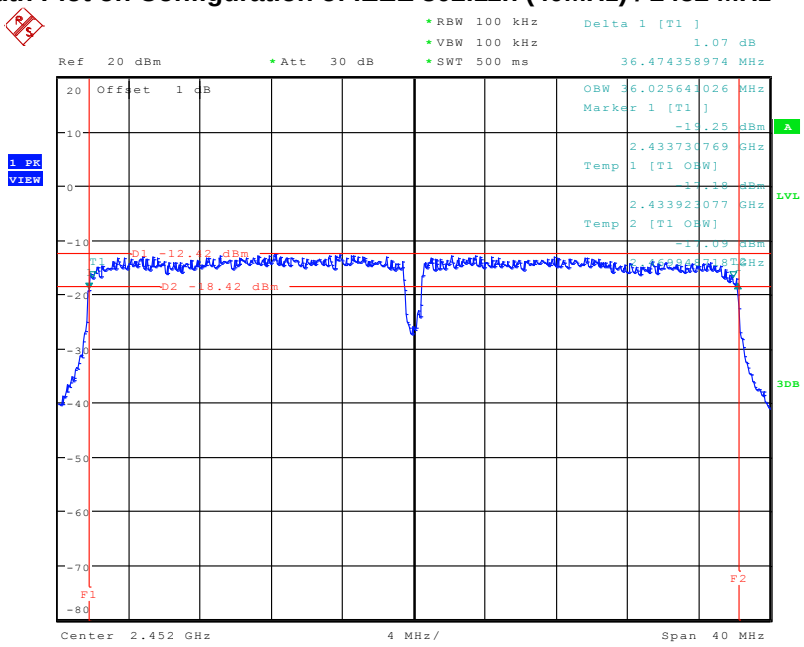
Date: 13.OCT.2010 16:53:14

6 dB Bandwidth Plot on Configuration of IEEE 802.11n (40MHz) / 2437 MHz



Date: 13.OCT.2010 17:05:35

6 dB Bandwidth Plot on Configuration of IEEE 802.11n (40MHz) / 2452 MHz



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 (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

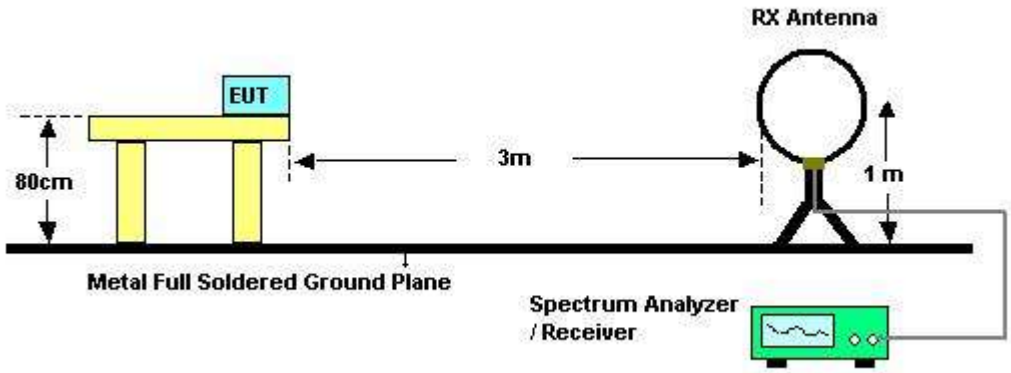
Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

3.5.3 Test Procedures

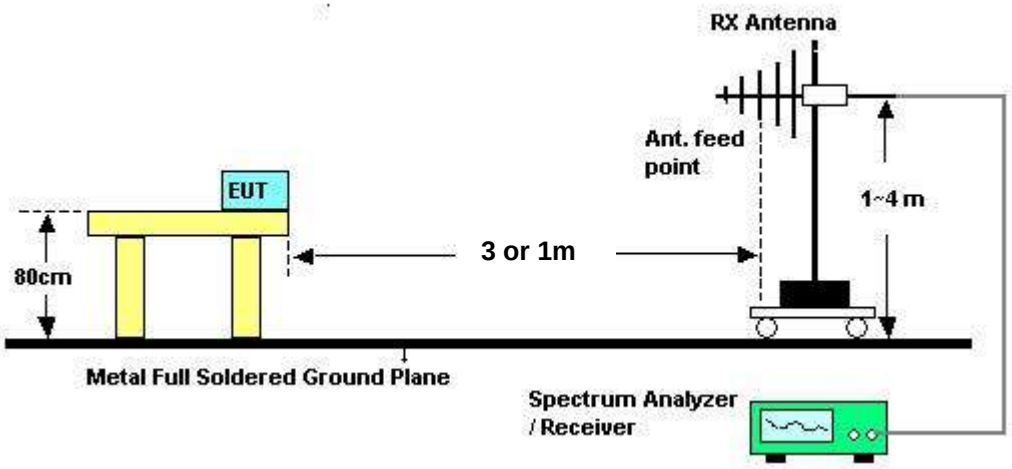
1. Configure the EUT according to ANSI C63.4. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting 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 form 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	Oct. 08, 2010	**Test Site No.**	03CH02-HY
Temperature	20℃	**Humidity**	50%
Test Engineer	Chris		

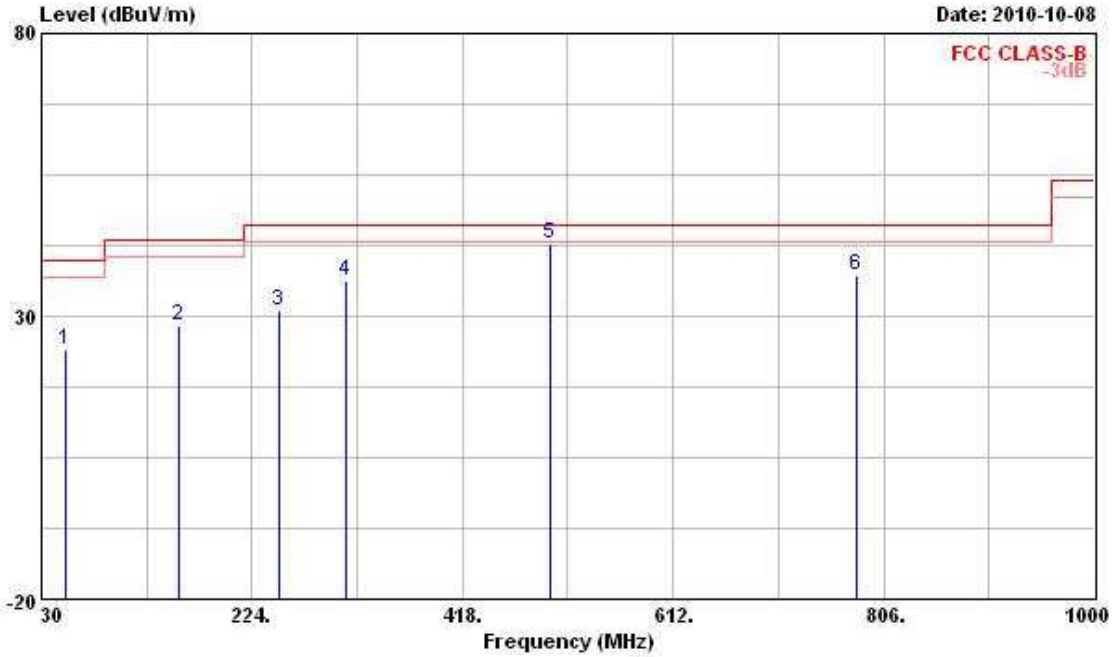
Freq. (MHz)	Level (dBuV)	Over Limit (dB)	Limit Line (dBuV)	Remark
-	-	-	-	See Note

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)

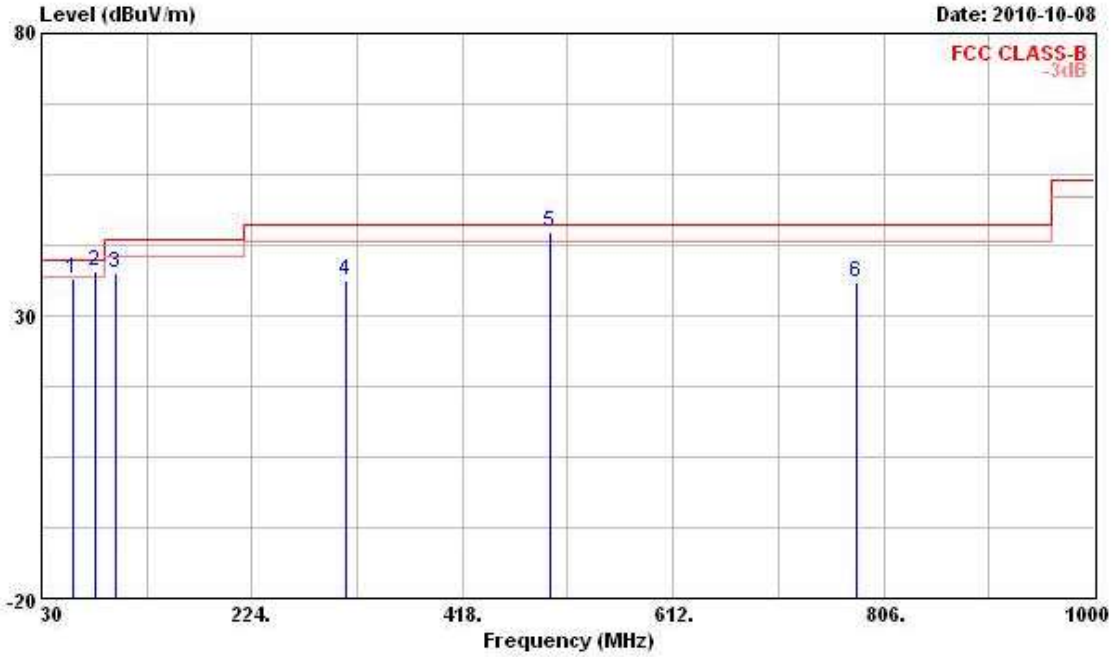
Final Test date	Oct. 08, 2010	**Test Site No.**	03CH02-HY
Temperature	20℃	**Humidity**	50%
Test Engineer	Daniel	**Configurations**	Normal Mode

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	52.310	24.18	-15.82	40.00	41.87	8.94	1.15	27.78	Peak	---	---
2	156.100	28.26	-15.24	43.50	42.94	10.64	2.07	27.39	Peak	---	---
3	249.220	31.08	-14.92	46.00	42.25	12.97	2.68	26.82	Peak	---	---
4	311.300	36.24	-9.76	46.00	46.31	13.88	2.93	26.88	Peak	---	---
5	498.510	42.74	-3.26	46.00	49.88	17.26	3.78	28.18	QP	---	---
6	781.750	37.16	-8.84	46.00	40.23	20.01	4.70	27.78	Peak	---	---

Vertical



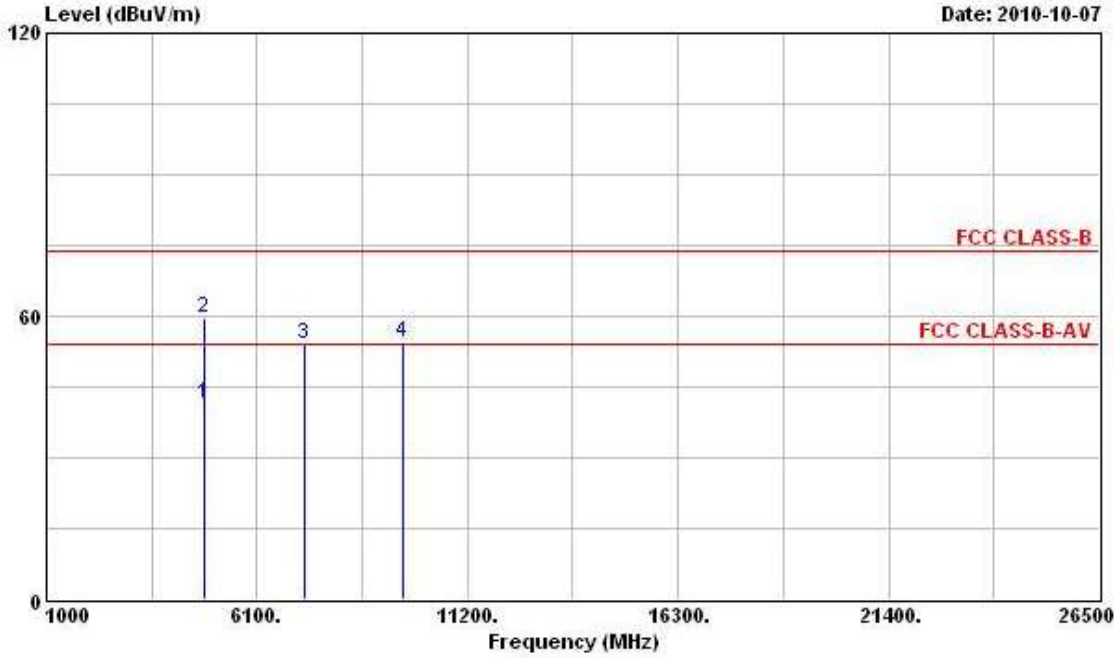
	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	59.100	36.52	-3.48	40.00	55.66	7.38	1.24	27.76	QP	---	---
2 !	79.470	37.81	-2.19	40.00	56.74	7.37	1.41	27.71	QP	---	---
3	97.900	37.43	-6.07	43.50	52.62	10.84	1.58	27.61	QP	---	---
4	311.300	36.14	-9.86	46.00	46.21	13.88	2.93	26.88	Peak	---	---
5 !	498.510	44.64	-1.36	46.00	51.78	17.26	3.78	28.18	QP	---	---
6	781.750	35.97	-10.03	46.00	39.04	20.01	4.70	27.78	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	Oct. 07, 2010	**Test Site No.**	03CH02-HY
Temperature	20℃	**Humidity**	50%
Test Engineer	Chris	**Configuration**	802.11n Ch. 1 (20MHz)

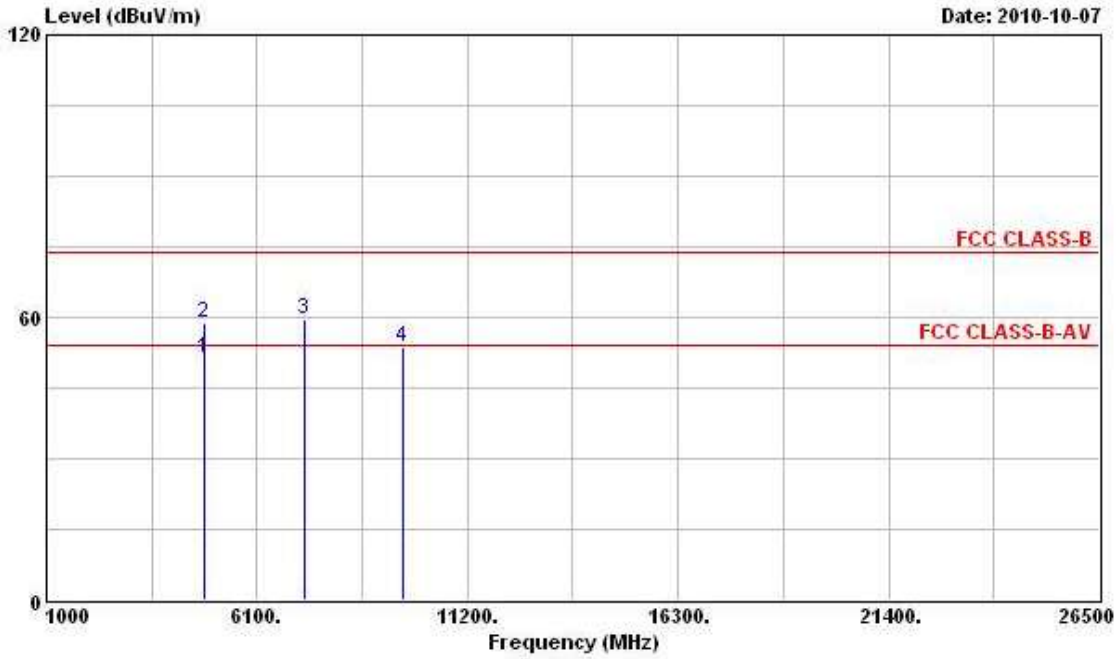
Horizontal



	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	41.38	-12.62	54.00	35.55	35.76	4.58	34.51	Average	---	---
2	4824.000	59.51	-14.49	74.00	53.68	35.76	4.58	34.51	Peak	---	---
3	7236.000	54.08			44.89	37.85	5.63	34.29	Peak	---	---
4	9648.000	54.57			43.47	39.39	6.34	34.63	Peak	---	---

Note: The items 3 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

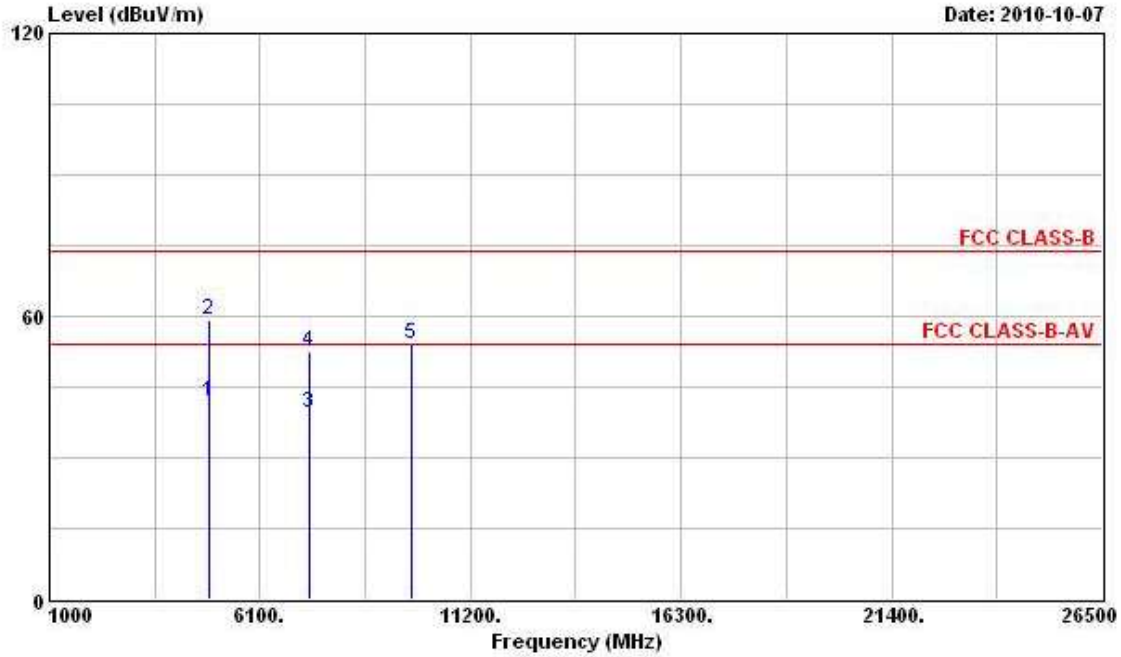


	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	4824.000	51.22	-2.78	54.00	46.02	35.13	4.58	34.51	Average	---	---
2	4824.000	58.89	-15.11	74.00	53.69	35.13	4.58	34.51	Peak	---	---
3	7236.000	59.78			51.54	36.90	5.63	34.29	Peak	---	---
4	9648.000	53.80			43.50	38.59	6.34	34.63	Peak	---	---

Note: The items 3 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	Oct. 07, 2010	**Test Site No.**	03CH02-HY
Temperature	20℃	**Humidity**	50%
Test Engineer	Chris	**Configuration**	802.11n Ch. 6 (20MHz)

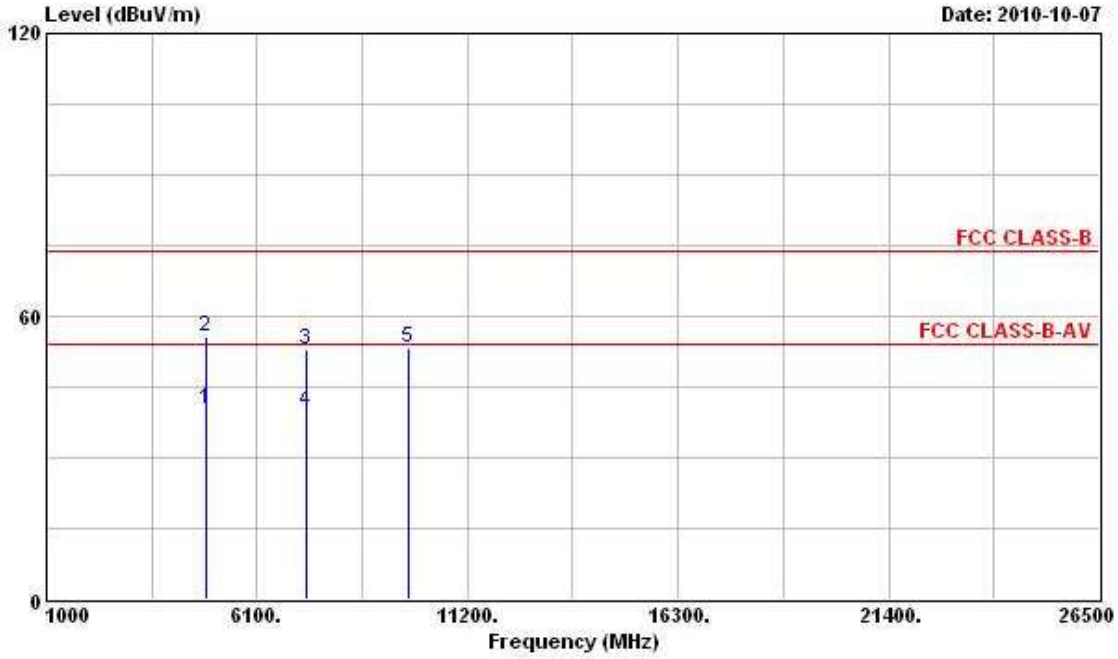
Horizontal



	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	41.78	-12.22	54.00	35.79	35.83	4.61	34.45	Average	---	---
2	4874.000	59.20	-14.80	74.00	53.21	35.83	4.61	34.45	Peak	---	---
3	7311.000	39.65	-14.35	54.00	30.44	37.86	5.64	34.29	Average	---	---
4	7311.000	52.37	-21.63	74.00	43.16	37.86	5.64	34.29	Peak	---	---
5	9748.000	54.25			42.96	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

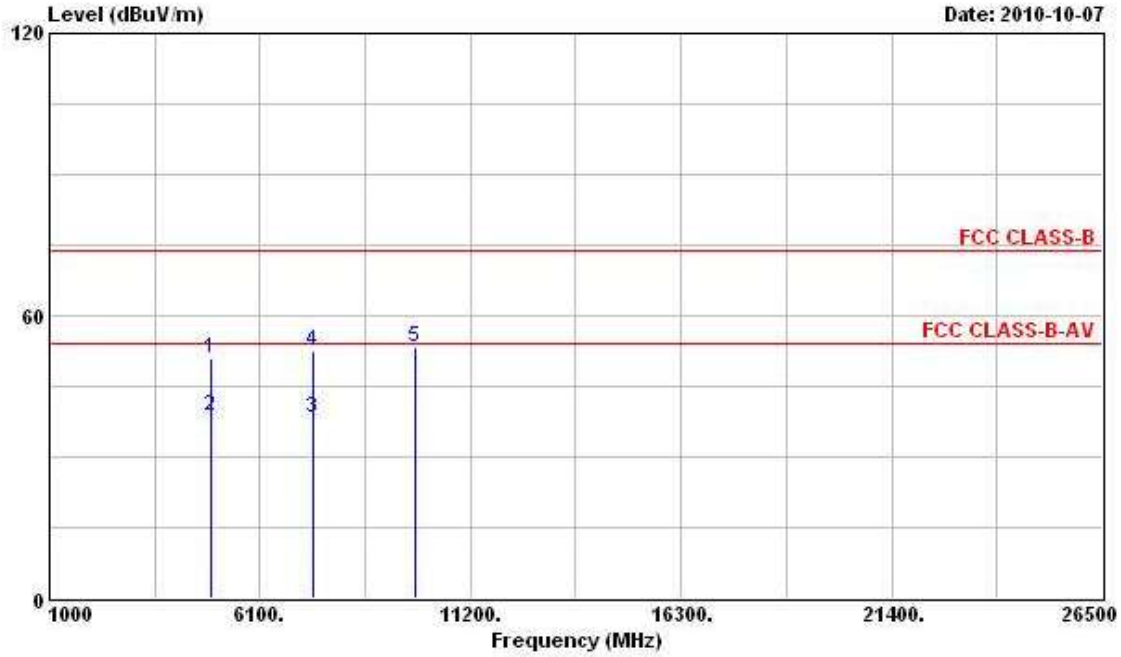


	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	4874.000	40.17	-13.83	54.00	34.83	35.18	4.61	34.45	Average	---	---
2	4874.000	55.59	-18.41	74.00	50.25	35.18	4.61	34.45	Peak	---	---
3	7311.000	52.83	-21.17	74.00	44.56	36.92	5.64	34.29	Peak	---	---
4	7311.000	39.86	-14.14	54.00	31.59	36.92	5.64	34.29	Average	---	---
5	9748.000	53.13			42.64	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	Oct. 07, 2010	**Test Site No.**	03CH02-HY
Temperature	20℃	**Humidity**	50%
Test Engineer	Chris	**Configuration**	802.11n Ch. 11 (20MHz)

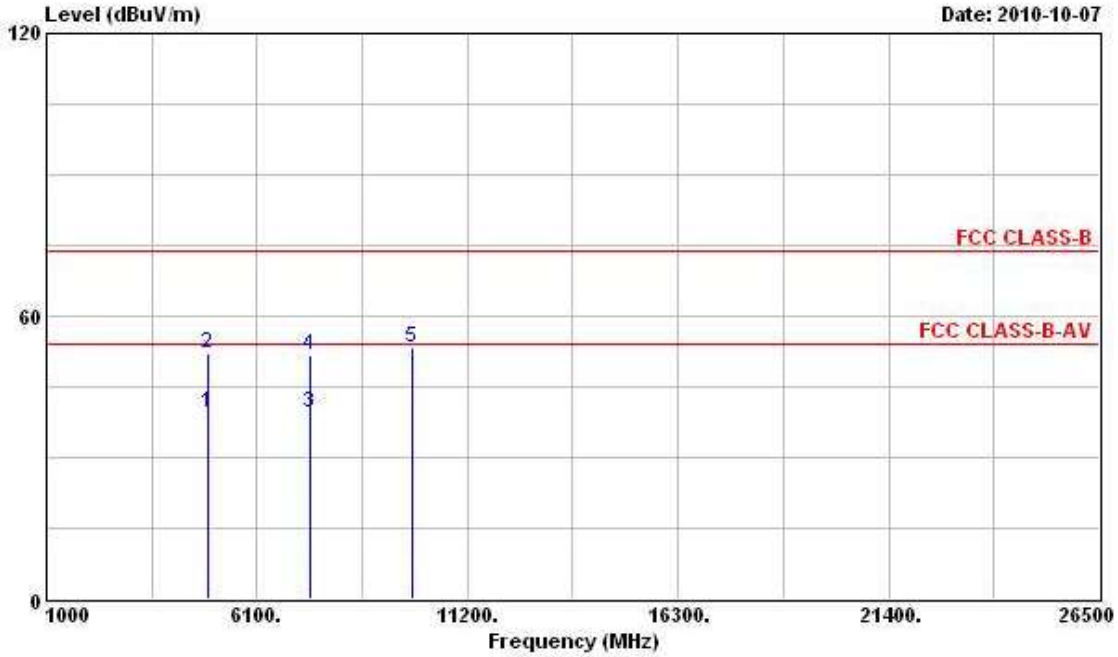
Horizontal



	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	51.12	-22.88	74.00	44.92	35.90	4.68	34.38	Peak	---	---
2	4924.000	38.65	-15.35	54.00	32.45	35.90	4.68	34.38	Average	---	---
3	7386.000	38.48	-15.52	54.00	29.24	37.88	5.65	34.29	Average	---	---
4	7386.000	52.57	-21.43	74.00	43.33	37.88	5.65	34.29	Peak	---	---
5	9848.000	53.45			42.00	39.61	6.38	34.54	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

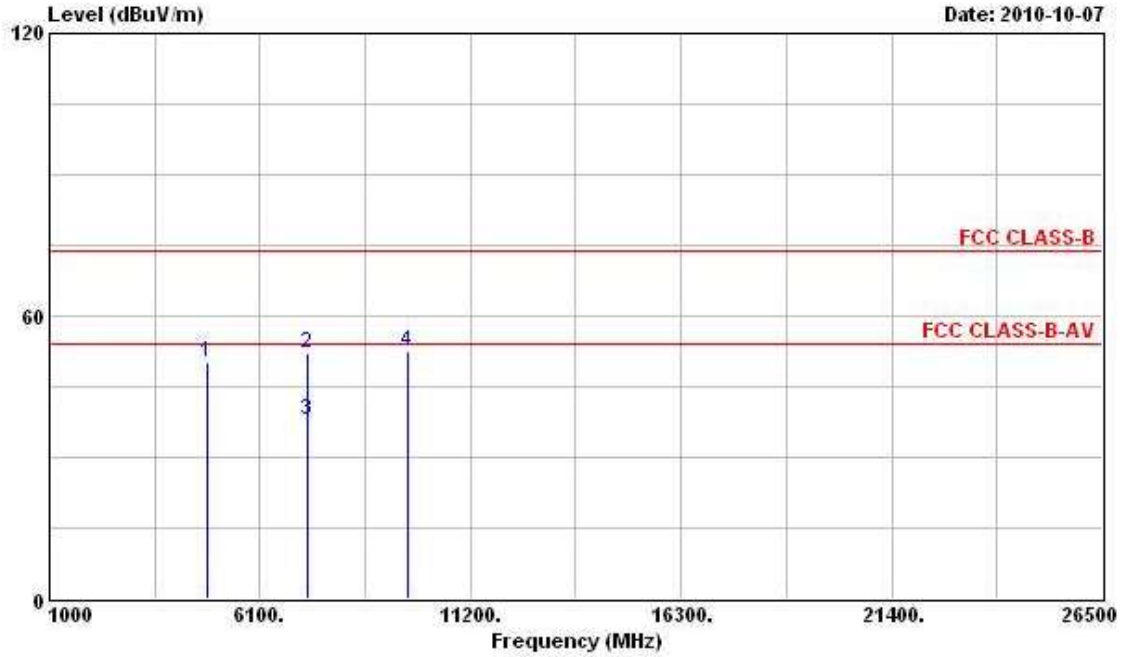


	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	4924.000	39.45	-14.55	54.00	33.92	35.23	4.68	34.38	Average	---	---
2	4924.000	52.20	-21.80	74.00	46.67	35.23	4.68	34.38	Peak	---	---
3	7386.000	39.53	-14.47	54.00	31.21	36.96	5.65	34.29	Average	---	---
4	7386.000	51.75	-22.25	74.00	43.43	36.96	5.65	34.29	Peak	---	---
5	9848.000	53.27			42.62	38.81	6.38	34.54	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	Oct. 07, 2010	**Test Site No.**	03CH02-HY
Temperature	20℃	**Humidity**	50%
Test Engineer	Chris	**Configuration**	802.11n Ch. 3 (40MHz)

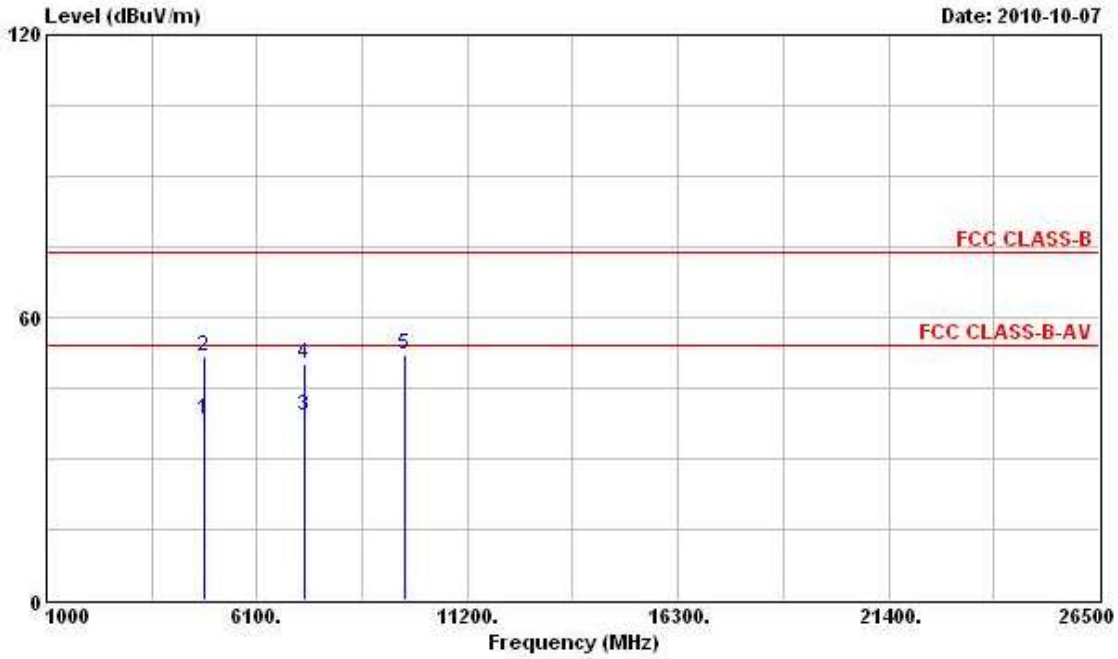
Horizontal



	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	4844.000	50.26	-3.74	54.00	44.35	35.78	4.61	34.48	PK	---	---
2	7266.000	52.05	-21.95	74.00	42.85	37.86	5.63	34.29	Peak	---	---
3	7266.000	38.04	-15.96	54.00	28.84	37.86	5.63	34.29	Average	---	---
4	9688.000	52.65			41.47	39.43	6.35	34.60	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).

Vertical

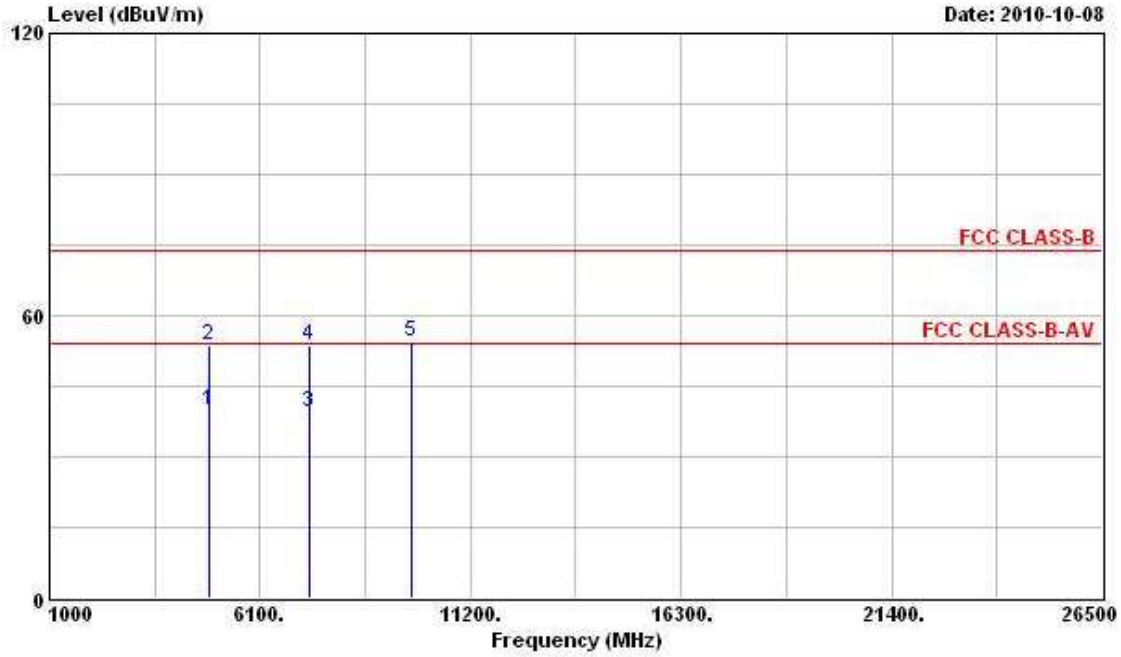


	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	4844.000	38.35	-15.65	54.00	33.08	35.14	4.61	34.48	Average	---	---
2	4844.000	51.68	-22.32	74.00	46.41	35.14	4.61	34.48	Peak	---	---
3	7266.000	39.06	-14.94	54.00	30.81	36.91	5.63	34.29	Average	---	---
4	7266.000	50.14	-23.86	74.00	41.89	36.91	5.63	34.29	Peak	---	---
5	9688.000	51.94			41.56	38.63	6.35	34.60	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	Oct. 07, 2010	**Test Site No.**	03CH02-HY
Temperature	20℃	**Humidity**	50%
Test Engineer	Chris	**Configuration**	802.11n Ch. 6 (40MHz)

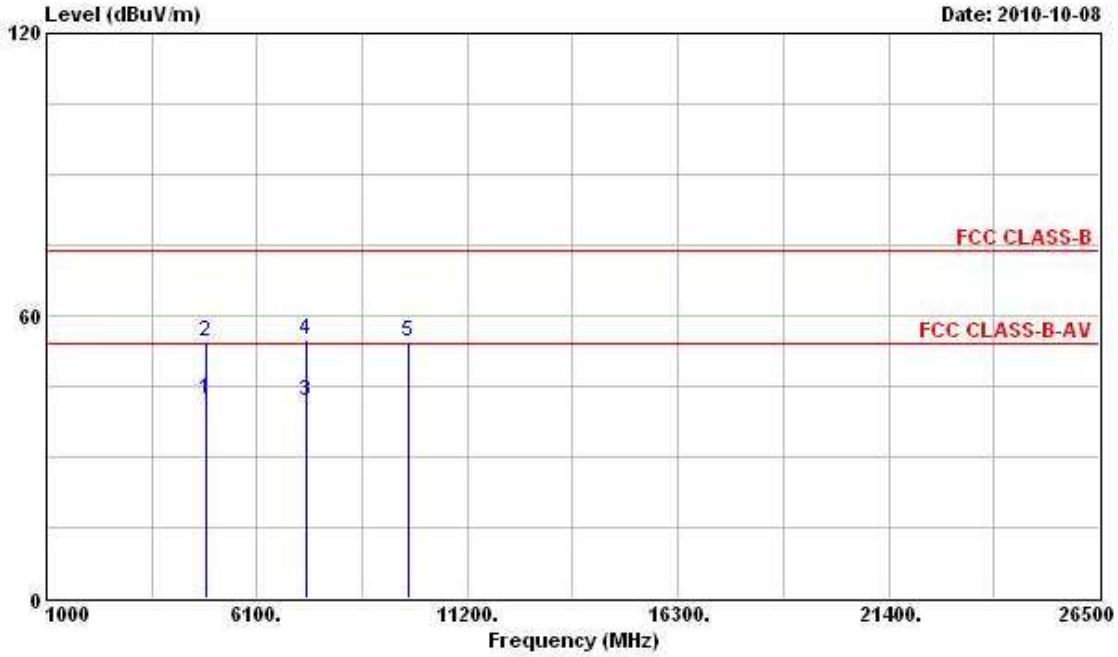
Horizontal



	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	39.78	-14.22	54.00	33.79	35.83	4.61	34.45	Average	---	---
2	4874.000	53.77	-20.23	74.00	47.78	35.83	4.61	34.45	Peak	---	---
3	7311.000	39.43	-14.57	54.00	30.22	37.86	5.64	34.29	Average	---	---
4	7311.000	53.78	-20.22	74.00	44.57	37.86	5.64	34.29	Peak	---	---
5	9748.000	54.34			43.05	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

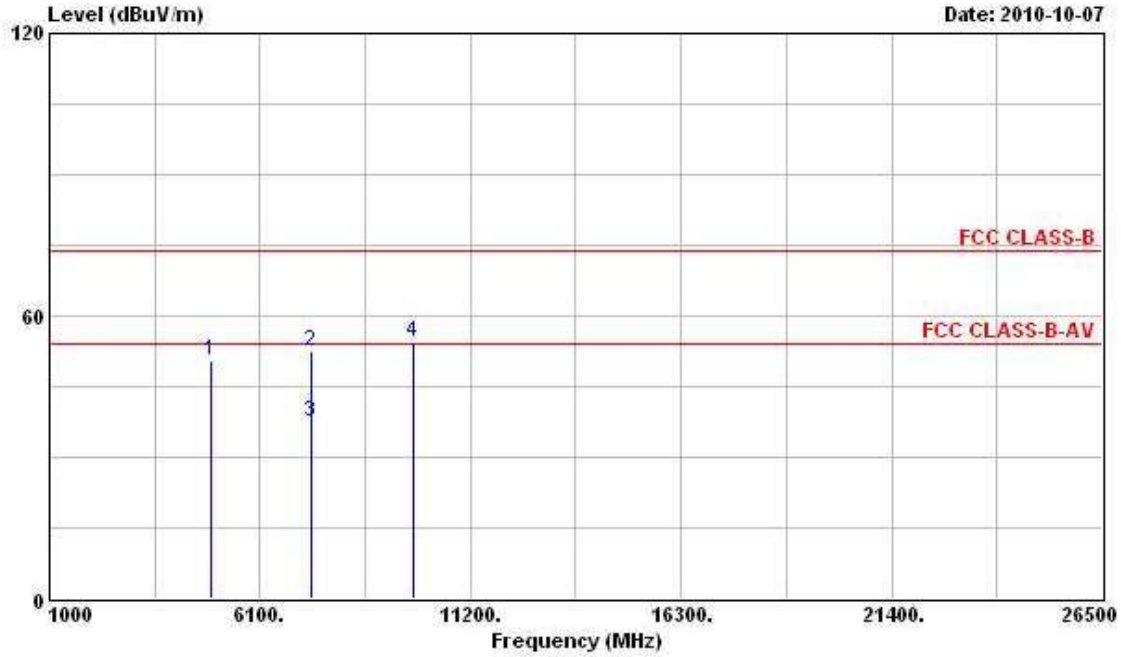


	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	4874.000	42.38	-11.62	54.00	37.04	35.18	4.61	34.45	Average	---	---
2	4874.000	54.53	-19.47	74.00	49.19	35.18	4.61	34.45	Peak	---	---
3	7311.000	41.82	-12.18	54.00	33.55	36.92	5.64	34.29	Average	---	---
4	7311.000	55.06	-18.94	74.00	46.79	36.92	5.64	34.29	Peak	---	---
5	9748.000	54.41			43.92	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	Oct. 07, 2010	**Test Site No.**	03CH02-HY
Temperature	20℃	**Humidity**	50%
Test Engineer	Chris	**Configuration**	802.11n Ch. 9 (40MHz)

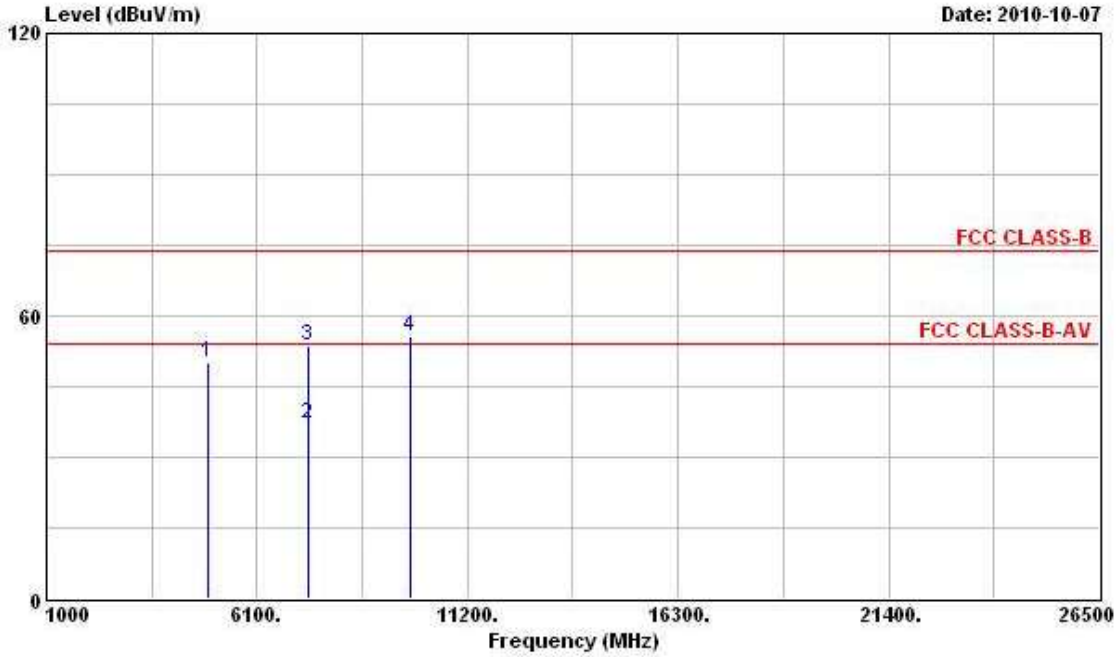
Horizontal



	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	4904.000	50.44	-3.56	54.00	44.34	35.88	4.64	34.42	PK	---	---
2	7356.000	52.53	-21.47	74.00	43.31	37.87	5.64	34.29	Peak	---	---
3	7356.000	37.35	-16.65	54.00	28.13	37.87	5.64	34.29	Average	---	---
4	9808.000	54.55			43.17	39.57	6.37	34.56	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).

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	50.10	-3.90	54.00	44.57	35.23	4.68	34.38	PK	---	---
2	7356.000	36.94	-17.06	54.00	28.65	36.94	5.64	34.29	Average	---	---
3	7356.000	53.88	-20.12	74.00	45.59	36.94	5.64	34.29	Peak	---	---
4	9808.000	55.50			44.92	38.77	6.37	34.56	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).
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)	100 KHz /100 KHz 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	Oct. 07, 2010	**Test Site No.**	03CH02-HY
Temperature	20℃	**Humidity**	50%
Test Engineer	Chris	**Configuration**	802.11n Ch. 1, 6, 11 (20MHz)

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	2389.610	72.44	-1.56	74.00	37.39	32.03	3.02	0.00	Peak	---	---
2 @	2415.450	113.55			78.44	32.09	3.02	0.00	Peak	---	---
1	2390.000	52.48	-1.52	54.00	17.43	32.03	3.02	0.00	Average	---	---
2 @	2415.260	102.00			66.89	32.09	3.02	0.00	Average	---	---

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 @	2418.300	116.50			81.39	32.09	3.02	0.00	Peak	---	---
1 @	2406.330	104.85			69.74	32.09	3.02	0.00	Average	---	---

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 @	2468.460	111.53			76.17	32.28	3.08	0.00	Peak	---	---
2	2483.500	70.42	-3.58	74.00	35.00	32.34	3.08	0.00	Peak	---	---
1 @	2464.850	99.78			64.42	32.28	3.08	0.00	Average	---	---
2 @	2483.500	52.73	-1.27	54.00	17.31	32.34	3.08	0.00	Average	---	---

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	Oct. 07, 2010	**Test Site No.**	03CH02-HY
Temperature	20℃	**Humidity**	50%
Test Engineer	Chris	**Configuration**	802.11n Ch. 3, 6, 9 (40MHz)

Channel 3

	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	2387.330	68.36	-5.64	74.00	33.31	32.03	3.02	0.00	Peak	---	---
2 @	2426.660	110.12			74.92	32.15	3.05	0.00	Peak	---	---
1	2389.990	52.52	-1.48	54.00	17.47	32.03	3.02	0.00	Average	---	---
2 @	2429.890	99.09			63.89	32.15	3.05	0.00	Average	---	---

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 @	2441.860	112.45			77.19	32.21	3.05	0.00	Peak	---	---
1 @	2440.340	101.18			65.92	32.21	3.05	0.00	Average	---	---

The item 1 is Fundamental Emissions.

Channel 9

	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 @	2444.140	106.73			71.47	32.21	3.05	0.00	Peak	---	---
2	2488.220	65.41	-8.59	74.00	29.93	32.40	3.08	0.00	Peak	---	---
1 @	2443.380	95.49			60.23	32.21	3.05	0.00	Average	---	---
2	2484.610	51.40	-2.60	54.00	15.98	32.34	3.08	0.00	Average	---	---

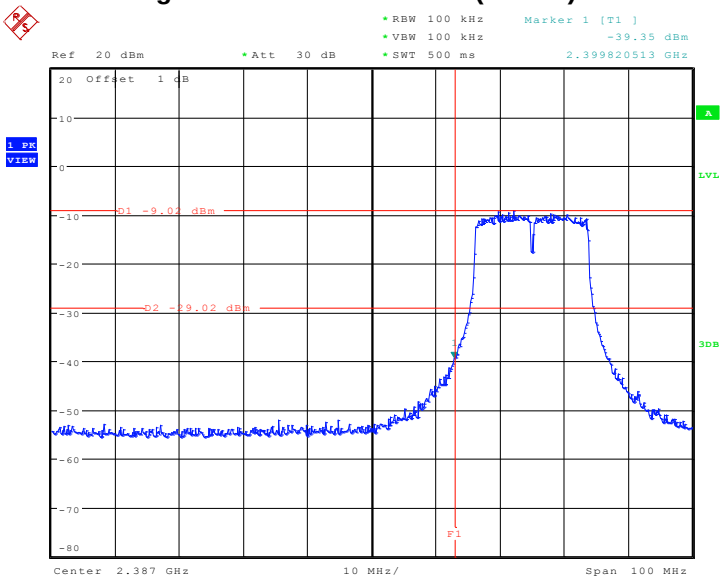
The item 1 is Fundamental Emissions.

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

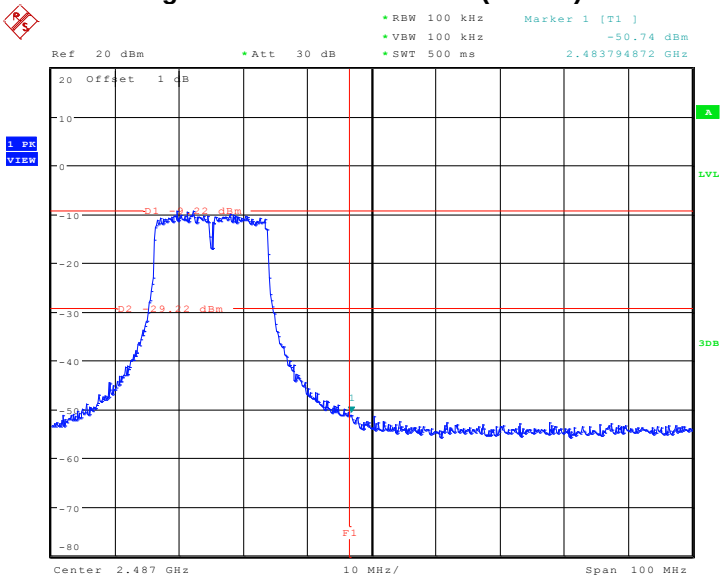
Final Test Date	Oct. 13, 2010	**Test Site No.**	TH01-HY
Temperature	25℃	**Humidity**	62%
Test Engineer	Ian	**Configurations**	802.11n

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



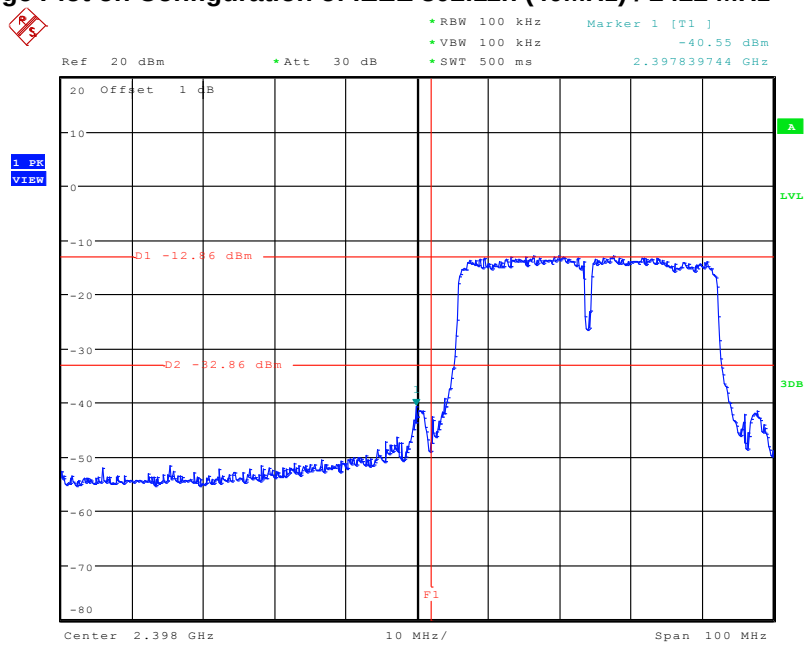
Date: 13.OCT.2010 16:34:40

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



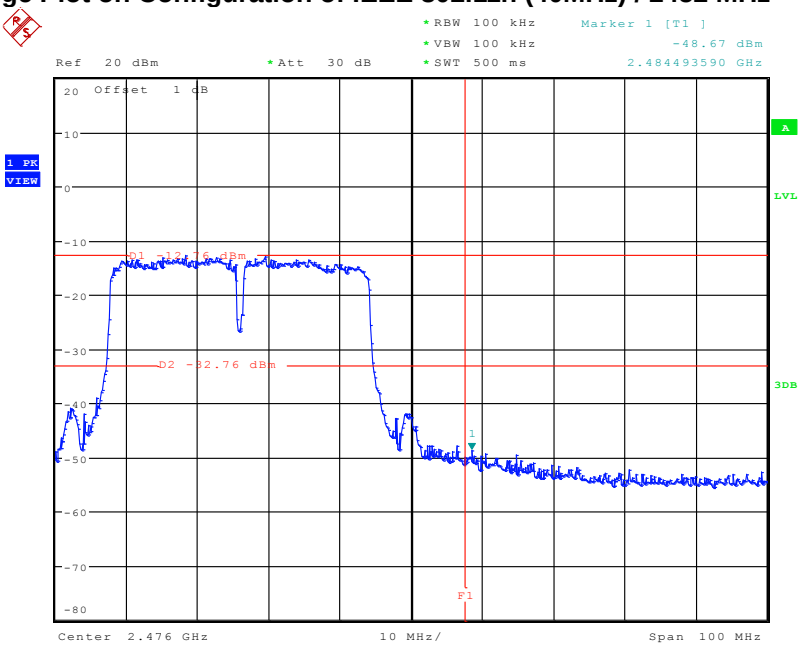
Date: 13.OCT.2010 16:44:45

Low Band Edge Plot on Configuration of IEEE 802.11n (40MHz) / 2422 MHz



Date: 13.OCT.2010 16:52:07

High Band Edge Plot on Configuration of IEEE 802.11n (40MHz) / 2452 MHz



Date: 13.OCT.2010 17:09:09

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

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
EMC Receiver	R&S	ESCS 30	100174	9 kHz ~ 2.75 GHz	Apr. 20, 2011	Conduction (CO04-HY)
LISN	MessTec	NNB-2/16Z	99041	9 kHz ~ 30 MHz	Mar. 10, 2011	Conduction (CO04-HY)
LISN (Support Unit)	EMCO	3810/2NM	9703-1839	9 kHz ~ 30 MHz	May 04, 2011	Conduction (CO04-HY)
RF Cable-CON	HUBER+SUHNER	RG213/U	CB049	9 kHz ~ 30 MHz	Apr. 21, 2011	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	R&S	NRV-Z32	100057	30MHz ~ 6GHz	Jul. 25, 2010	Conducted (TH01-HY)
DC Power Source	G.W.	GPC-6030D	C671845	DC 1V ~ 60V	Apr. 16, 2010	Conducted (TH01-HY)
Temp. and Humidity Chamber	Giant Force	GTH-225-20-S	MAB0103-001	N/A	Aug. 05, 2010	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)
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)

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. 26, 2010*	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 01, 2010	Radiation (03CH02-HY)
Amplifier	Agilent	8447D	2944A11146	100 kHz – 1.3 GHz	Jul. 23, 2010	Radiation (03CH02-HY)
Amplifier	Agilent	8449B	3008A02373	1GHz – 26.5 GHz	Jul. 23, 2010	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. 29, 2010*	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 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. : L1190-110111

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 : January 11, 2011

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