RADIO TEST REPORT

According to

47 CFR FCC Part 15 Subpart C § 15.247

Equipment	: **TG670**	**DSLBBB670 PA**
	TG670	**DSLBBB670 US**
Brand Name	: **THOMSON**	
Filing Type	: **New Application**	
Applicant	: **Thomson Telecom Belgium** Prins Boudewijnlaan 47 B-2650 Edegem Belgium	
FCC ID	: RSE-TG670	
Received Date	: Jan. 07, 2010	
Final Test Date	: Aug. 24, 2010	

Statement

This report is only covering the 802.11b/g/n modes of operation 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.

Wayne Hsu 2010.9.24

Wayne Hsu / Vice Manager

Testing Laboratory 1190

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History of This Test Report

Report No.	Issue Date	Description
FR9D3125	Feb. 22, 2010	Original report
FR9D3125-03	Aug. 30, 2010	Additional measurements on the modem, TG670 and the power supply unit– FRIWO (FW7582/US/22). Other results remained from FR9D3125 with different gain in this report.

1. SUMMARY OF THE TEST RESULTS

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	14.09 dB
3.2	15.247(b)(3)	Maximum Peak Conducted Output Power	Complies	12.39 dB
3.3	15.247(e)	Power Spectral Density	Complies	13.83 dB
3.4	15.247(a)(2)	6dB Spectrum Bandwidth	Complies	-
3.5	15.247(d)	Radiated Emissions	Complies	0.86 dB
3.6	15.247(d)	Band Edge Emissions	Complies	0.46 dB
3.7	15.203	Antenna Requirements	Complies	-

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

Trade Name : THOMSON
Hardware Version : PEM2

2.1. Interface Ports

The table below shows the interface ports that are equipped on the models:

Equipment	Product code	POWER	DSL	PSTN	VoIP	Ethernet 1000 base-T (GbE)	Ethernet 10/100 base-T	USB (Host)	Wireless LAN IEEE802.11n	Console Port
TG670	DSLBBB670 PA	☒	☒	☒	☒ (2-ports)	☒	☒ (4-ports)	☒ (2-ports)	☒	☒
TG670	DSLBBB670 US	☒	☒	☒	☒ (2-ports)	☒	☒ (4-ports)	☒ (2-ports)	☒	☒

☒: Equipped ☐: Not equipped

The equipment has both ADSL and VDSL2 functions which share with the same RJ11 connector.

TG670 are the DSL modems used over POTS – Plain Old Telephone Service.

2.2. Information of the Power Supply Unit:

Trade Name	Product Number	Input Rating	Output Rating	Type	Company Info
FRIWO	FW7582/US/22	100Vac ~ 240Vac	22 Vdc / 1230m A	Switched / Wall mount	FRIWO Gerätebau GmbH / FRIWO Mobile Power GmbH P.O. Box 1164 Von-Liebig-Straße 11D-48346 Ostbevern

2.3. Information of the Radio Interface

The EUT is with IEEE 802.11b/g/n radio functions.

IEEE 802.11b/g

Items	Description
Power Type	22Vdc from adapter
Modulation	DSSS for IEEE 802.11b; OFDM for IEEE 802.11g
Data Modulation	DSSS (DBPSK / DQPSK / CCK) ; OFDM (BPSK / QPSK / 16QAM / 64QAM)
Data Rate (Mbps)	DSSS (1/ 2/ 5.5/11); OFDM (6/9/12/18/24/36/48/54)
Frequency Band	2400 ~ 2483.5MHz
Total Amount of Channels	11

IEEE 802.11n

Items	Description
Data Modulation	OFDM (BPSK / QPSK / 16QAM / 64QAM)
Frequency Band	2400 ~ 2483.5MHz
Total Amount of Channels	11

The table below is the general spec of IEEE 802.11n. However, the radio is operated only in 800nsGI mode with Occupied Band Width (OBW) of 20 MHz.

MCS Index	Nss	Modulation	R	NBPSC	NCBPS		NDBPS		Datarate(Mbps)			
									800nsGI		400nsGI	
					20MHz	40MHz	20MHz	40MHz	20MHz	40MHz	20MHz	40MHz
0	1	BPSK	1/2	1	52	108	26	54	6.5	13.5	7.200	15
1	1	QPSK	1/2	2	104	216	52	108	13.0	27.0	14.400	30
2	1	QPSK	3/4	2	104	216	78	162	19.5	40.5	21.700	45
3	1	16-QAM	1/2	4	208	432	104	216	26.0	54.0	28.900	60
4	1	16-QAM	3/4	4	208	432	156	324	39.0	81.0	43.300	90
5	1	64-QAM	2/3	6	312	648	208	432	52.0	108.0	57.800	120
6	1	64-QAM	3/4	6	312	648	234	486	58.5	121.5	65.000	135
7	1	64-QAM	5/6	6	312	648	260	540	65.0	135.0	72.200	150
8	2	BPSK	1/2	1	104	216	52	108	13.0	27.0	14.444	30
9	2	QPSK	1/2	2	208	432	104	216	26.0	54.0	28.889	60
10	2	QPSK	3/4	2	208	432	156	324	39.0	81.0	43.333	90
11	2	16-QAM	1/2	4	416	864	208	432	52.0	108.0	57.778	120
12	2	16-QAM	3/4	4	416	864	312	648	78.0	162.0	86.667	180
13	2	64-QAM	2/3	6	624	1296	416	864	104.0	216.0	115.556	240
14	2	64-QAM	3/4	6	624	1296	468	972	117.0	243.0	130.000	270
15	2	64-QAM	5/6	6	624	1296	520	1080	130.0	270.0	144.444	300

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 Filed Antenna

The table below shows the maximum antenna gain of each antenna equipped inside the EUT.

Ant. No.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	YAGEO	-	CHIP Antenna	NA	2.94
2	YAGEO	-	CHIP Antenna	NA	2.77

2.5. Table for Carrier Frequencies

The table below is the mapping between the carrier frequencies and the channel numbers.

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	-	-

2.6. 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 data rate with respect to the specific test item. Investigation has been done on all the possible configurations for searching the worst cases. The following table is a list of the test modes shown in this test report. (All the test results are for 110V /60Hz)

Test Items	Mode	Data Rate	Channel
AC Power Line Conducted Emissions	See Note	-	-
Maximum Peak Conducted Output Power Power Spectral Density 6dB Spectrum Bandwidth	11b/BPSK	1 Mbps	1/6/11
	11g/BPSK	6 Mbps	1/6/11
	11n/MCS0	6.5 Mbps	1/6/11
	11n/MCS8	13 Mbps	1/6/11
Radiated Emissions 9kHz~1GHz	11g/BPSK	6 Mbps	6
Radiated Emissions 1GHz~10th Harmonic	11b/BPSK	1 Mbps	1/6/11
	11g/BPSK	6 Mbps	1/6/11
	11n/MCS0	6.5 Mbps	1/6/11
	11n/MCS8	13 Mbps	1/6/11
Band Edge Emissions	11b/BPSK	1 Mbps	1/6/11
	11g/BPSK	6 Mbps	1/6/11
	11n/MCS0	6.5 Mbps	1/6/11
	11n/MCS8	13 Mbps	1/6/11

Note :

1. The table above showed the test modes of TG670 in this report. (Additional measurements on the modem, TG670 and the power supply unit– FRIWO (FW7582/US/22). Other results remained from FR9D3125 with different gain in this report.)
2. The followings are the modes for Conducted Emissions:
   Mode 1. Measured on AC port –VDSL2 Annex B band plan : 998E

2.7. Testing Locations

Test Site No.	Site Category	Location
03CH02-HY	SAC	Hwa Ya
CO04-HY	Conduction	Hwa Ya
TH01-HY	OVEN Room	Hwa Ya

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

Please refer section 5 for Test Site Addresses.

2.8. Supporting Units

Support Unit	Brand	Model	FCC ID
Telephone x2	HTT	HTT-806	-
Flash	Transcend	D33193	
Central Office (Remote Workstation)	VIDAR-SMS	PX-4	-
ADSL CO. (Remote Workstation)	ALCATEL	7300UD	-
VDSL CO. (Remote Workstation)	IKANOS	CO5	-
Notebook (Remote Workstation)	DELL	PP25L	DoC

2.9. Test Software

The testing software/command was provided by the manufacturer and was used to control the operating channel and the proper data rate for the testing.

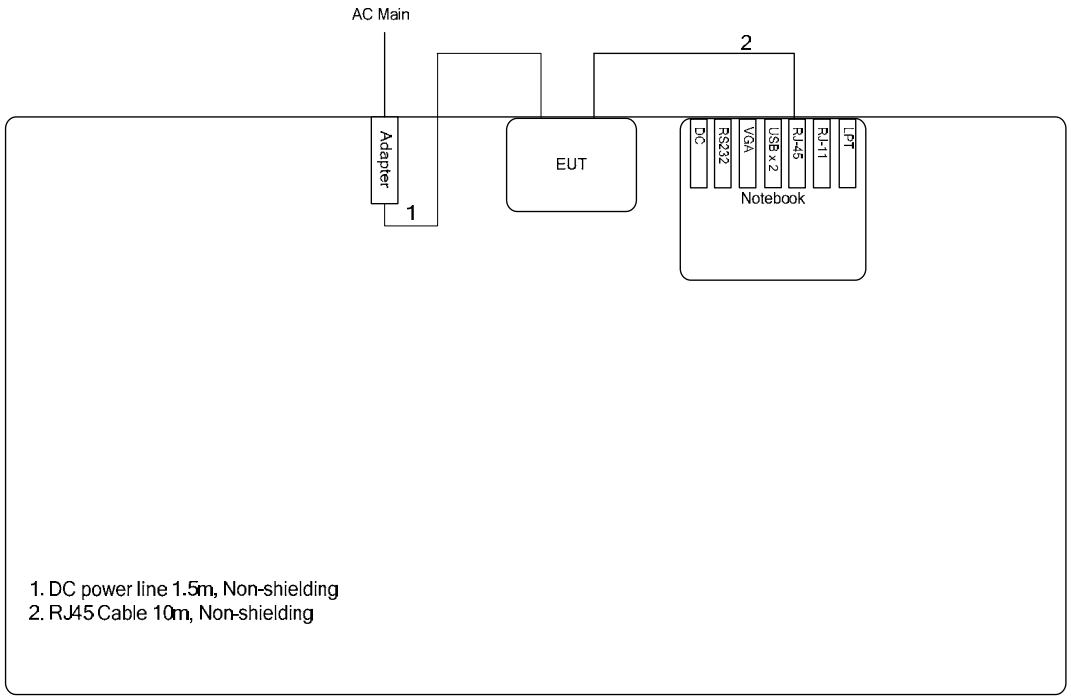
Power Parameters of IEEE 802.11b/g/n

Test Software Version	TTERMPRO		
Frequency	2412 MHz	2437 MHz	2462 MHz
IEEE 802.11b	DEFAULT	DEFAULT	DEFAULT
IEEE 802.11g	DEFAULT	DEFAULT	DEFAULT
IEEE 802.11n (MCS0)	DEFAULT	DEFAULT	DEFAULT
IEEE 802.11n (MCS8)	DEFAULT	DEFAULT	DEFAULT

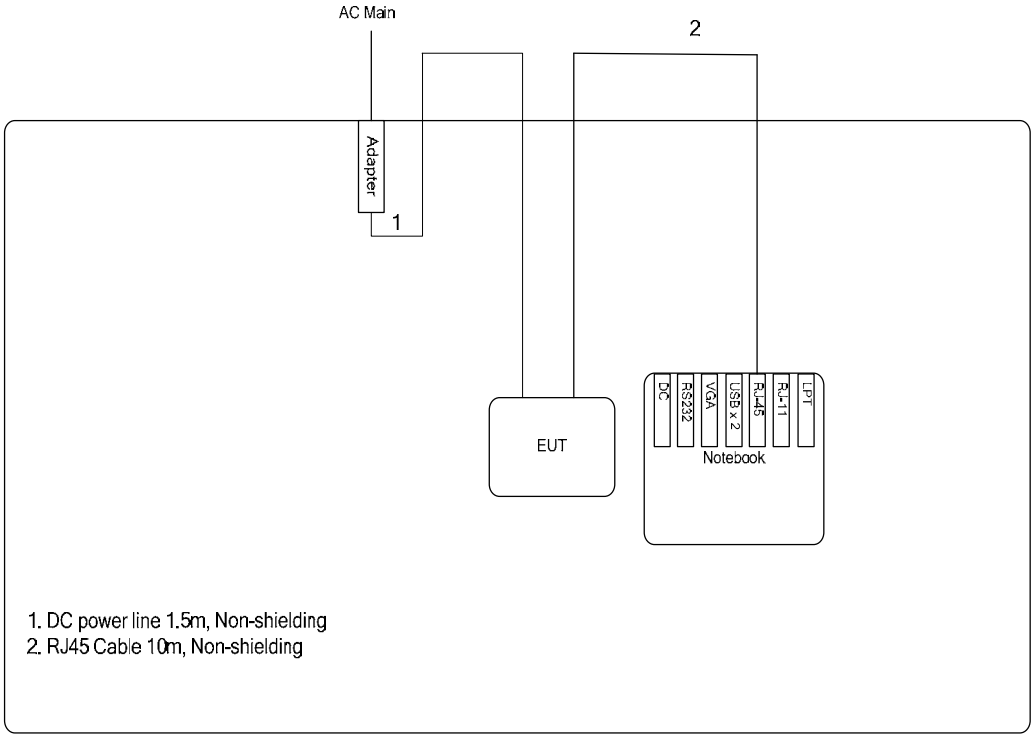
2.10. Test Configurations

2.10.1. Radiation Emissions Test Configuration

<For radiated emissions 9KHz ~ 1GHz test>



<For radiated emissions above 1GHz test>



3. TEST RESULTS

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.

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

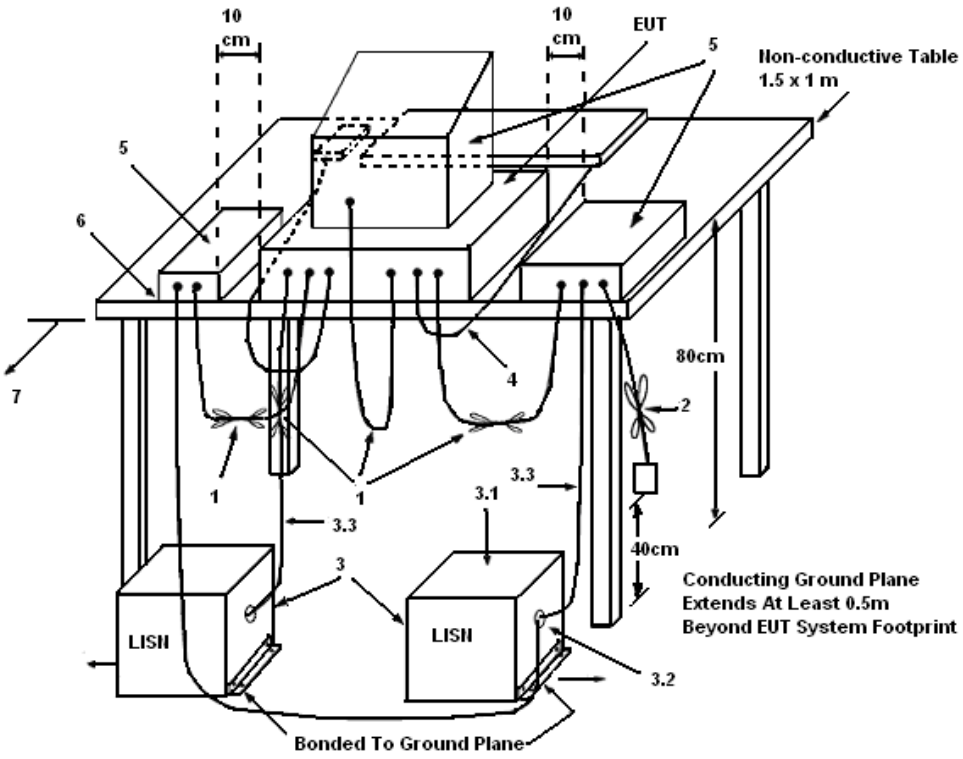
Please refer to section 4 of equipments list in this report. The following table is the setting of the receiver.

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.

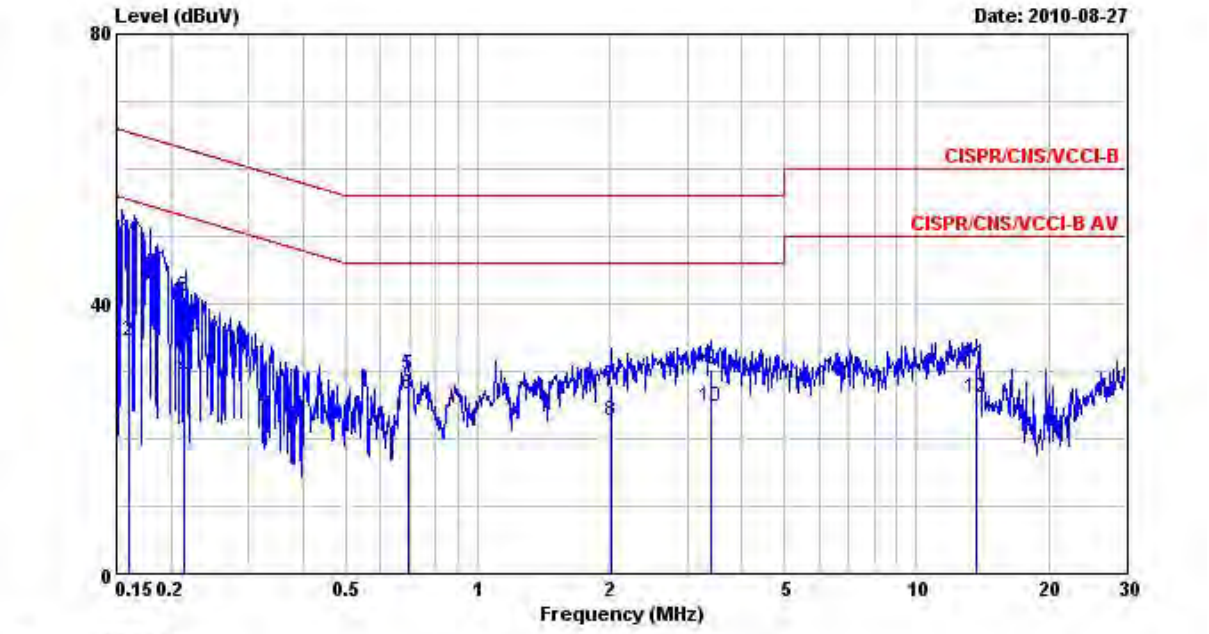
3.1.6. EUT Operation during Test

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

3.1.7. Results of AC Power Line Conducted Emissions Measurement

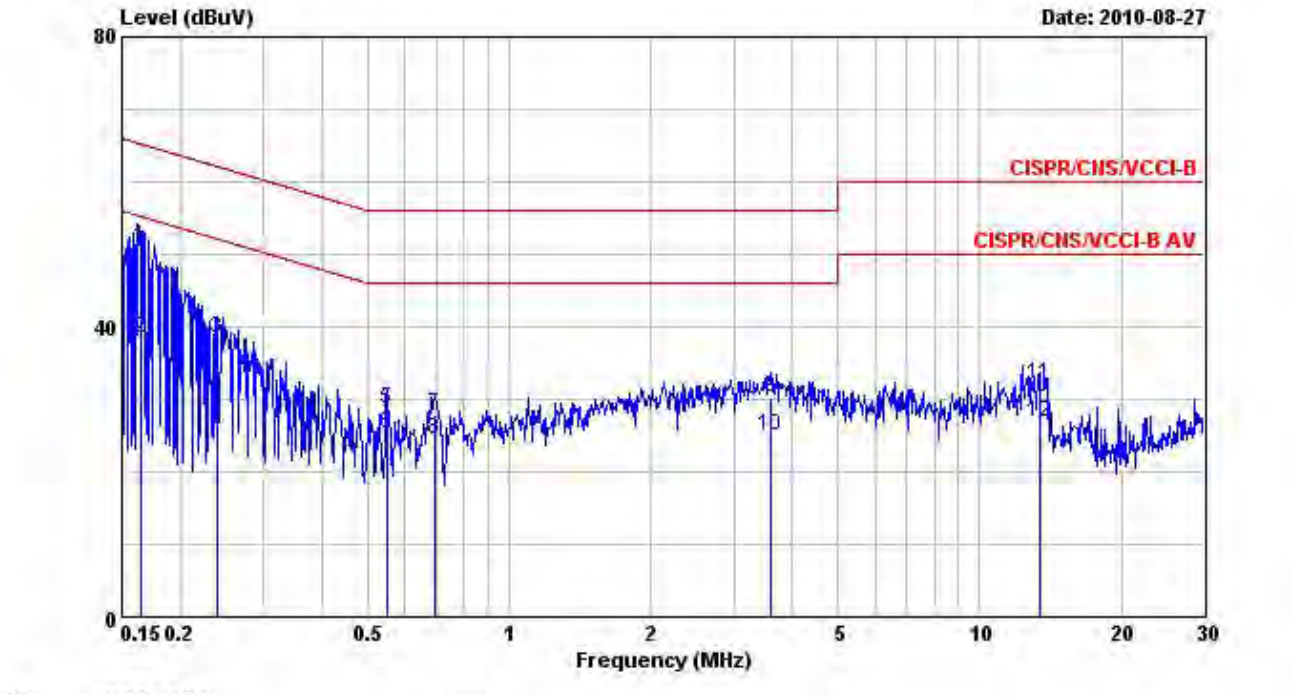
Test Date	Aug. 27, 2010	**Test Site No.**	CO04-HY
Temperature	25℃	**Humidity**	55%
Test Engineer	Teeary Hsu		
Configuration	Mode 1		

Line



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.1604370	49.41	-16.03	65.44	48.92	0.30	0.19	QP
2	0.1604370	34.57	-20.87	55.44	34.08	0.30	0.19	Average
3	0.2141780	41.17	-21.87	63.04	40.84	0.30	0.03	QP
4	0.2141780	28.85	-24.19	53.04	28.52	0.30	0.03	Average
5	0.6924530	29.56	-26.44	56.00	29.19	0.29	0.08	QP
6	0.6924530	26.66	-19.34	46.00	26.29	0.29	0.08	Average
7	2.022	27.79	-28.21	56.00	27.14	0.31	0.34	QP
8	2.022	22.73	-23.27	46.00	22.08	0.31	0.34	Average
9	3.400	30.15	-25.85	56.00	29.42	0.33	0.40	QP
10	3.400	24.61	-21.39	46.00	23.88	0.33	0.40	Average
11	13.700	30.93	-29.07	60.00	30.10	0.51	0.32	QP
12	13.700	25.97	-24.03	50.00	25.14	0.51	0.32	Average

Neutral



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.1648500	51.13	-14.09	65.22	50.69	0.26	0.18	QP
2	0.1648500	38.52	-16.70	55.22	38.08	0.26	0.18	Average
3	0.2403700	38.49	-23.59	62.08	38.20	0.25	0.04	QP
4	0.2403700	26.98	-25.10	52.08	26.69	0.25	0.04	Average
5	0.5493430	28.81	-27.19	56.00	28.49	0.24	0.08	QP
6	0.5493430	25.25	-20.75	46.00	24.93	0.24	0.08	Average
7	0.6972520	27.91	-28.09	56.00	27.58	0.25	0.08	QP
8	0.6972520	24.44	-21.56	46.00	24.11	0.25	0.08	Average
9	3.601	30.38	-25.62	56.00	29.68	0.29	0.41	QP
10	3.601	25.01	-20.99	46.00	24.31	0.29	0.41	Average
11	13.421	32.04	-27.96	60.00	31.29	0.43	0.32	QP
12	13.421	26.89	-23.11	50.00	26.14	0.43	0.32	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 limit 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

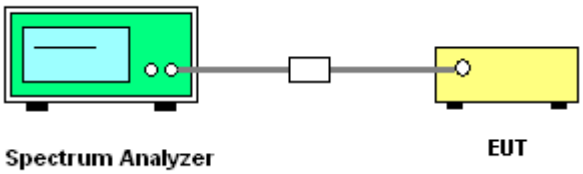
Please refer to section 4 of equipments list in this report. The following table is the setting of the Spectrum Analyzer.

Spectrum Analyzer Parameter	Setting
Attenuation	Auto
Span Frequency	50MHz
RB	1 MHz
VB	3 MHz
Detector	r.m.s.
Trace	Max Hold
Sweep Time	Auto
Channel Bandwidth	40 MHz

3.2.3. Test Procedures

1. The transmitter output (antenna port) was connected to the Spectrum Analyzer.
2. Turn on the EUT and Spectrum Analyzer and then record the peak power value.
3. Repeat above procedures on all channels needed to be tested.
4. As two antenna that we use in the test, we measured the individual antenna data and plus two data together.

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

Test Date	Mar. 09, 2010	**Test Site No.**	TH01-HY
Temperature	22℃	**Humidity**	59%
Test Engineer	Duncan	**Configurations**	802.11b/g

Configuration IEEE 802.11b

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
1	2412 MHz	16.22	30.00	**Complies**
6	2437 MHz	16.38	30.00	**Complies**
11	2462 MHz	16.42	30.00	**Complies**

Configuration IEEE 802.11g

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
1	2412 MHz	15.13	30.00	**Complies**
6	2437 MHz	15.08	30.00	**Complies**
11	2462 MHz	15.05	30.00	**Complies**

Test Date	Mar. 09, 2010	**Test Site No.**	TH01-HY
Temperature	22℃	**Humidity**	59%
Test Engineer	Duncan	**Configurations**	802.11n

For Single Chain

Configuration IEEE 802.11n MCS0 20MHz Ant. 1

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
1	2412 MHz	16.81	30.00	**Complies**
6	2437 MHz	16.94	30.00	**Complies**
11	2462 MHz	16.90	30.00	**Complies**

For Two Chain

Configuration IEEE 802.11n MCS8 20MHz Ant. 1

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
1	2412 MHz	14.31	30.00	**Complies**
6	2437 MHz	14.10	30.00	**Complies**
11	2462 MHz	14.04	30.00	**Complies**

Configuration IEEE 802.11n MCS8 20MHz Ant. 2

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
1	2412 MHz	14.63	30.00	**Complies**
6	2437 MHz	15.04	30.00	**Complies**
11	2462 MHz	14.80	30.00	**Complies**

Configuration IEEE 802.11n MCS8 20MHz Ant. 1 + Ant. 2

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
1	2412 MHz	17.48	30.00	**Complies**
6	2437 MHz	17.61	30.00	**Complies**
11	2462 MHz	17.45	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

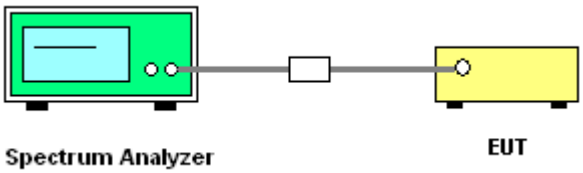
Please refer to section 4 of equipments list in this report. The following table is the setting of the spectrum analyzer.

Spectrum Analyzer 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 analyser.
2. Set RBW of spectrum analyzer to 3kHz and VBW to 30kHz. Set Detector to Peak, Trace to Max Hold.
3. Mark the frequency with maximum peak power as the center of the display of the spectrum.
4. Set the span to 1.5MHz and the sweep time to 500s and record the maximum peak value.
5. Measuring multiple antennas, the 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

Test Date	Jan. 07, 2010	**Test Site No.**	TH01-HY
Temperature	22℃	**Humidity**	59%
Test Engineer	Duncan	**Configurations**	802.11b/g

Configuration IEEE 802.11b

Channel	Frequency	Power Density (dBm)	Max. Limit (dBm)	Result
1	2412 MHz	-7.96	8.00	**Complies**
6	2437 MHz	-6.18	8.00	**Complies**
11	2462 MHz	-5.83	8.00	**Complies**

Configuration IEEE 802.11g

Channel	Frequency	Power Density (dBm)	Max. Limit (dBm)	Result
1	2412 MHz	-7.26	8.00	**Complies**
6	2437 MHz	-9.11	8.00	**Complies**
11	2462 MHz	-6.89	8.00	**Complies**

Test Date	Jan. 07, 2010	**Test Site No.**	TH01-HY
Temperature	22℃	**Humidity**	59%
Test Engineer	Duncan	**Configurations**	802.11n (MCS0)

For Single Chain

Configuration IEEE 802.11n MCS0 20MHz

Channel	Frequency	Power Density (dBm)	Max. Limit (dBm)	Result
1	2412 MHz	-8.13	8.00	**Complies**
6	2437 MHz	-9.10	8.00	**Complies**
11	2462 MHz	-8.60	8.00	**Complies**

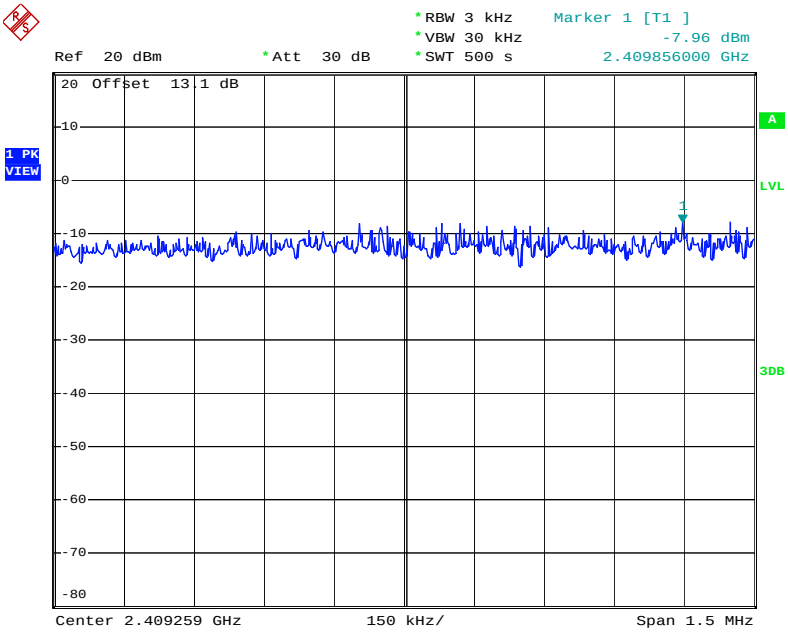
Test Date	Jan. 07, 2010	**Test Site No.**	TH01-HY
Temperature	22℃	**Humidity**	59%
Test Engineer	Duncan	**Configurations**	802.11n (MCS8)

For Two Chain

Configuration IEEE 802.11n MCS8 20MHz Ant. 1 + Ant. 2

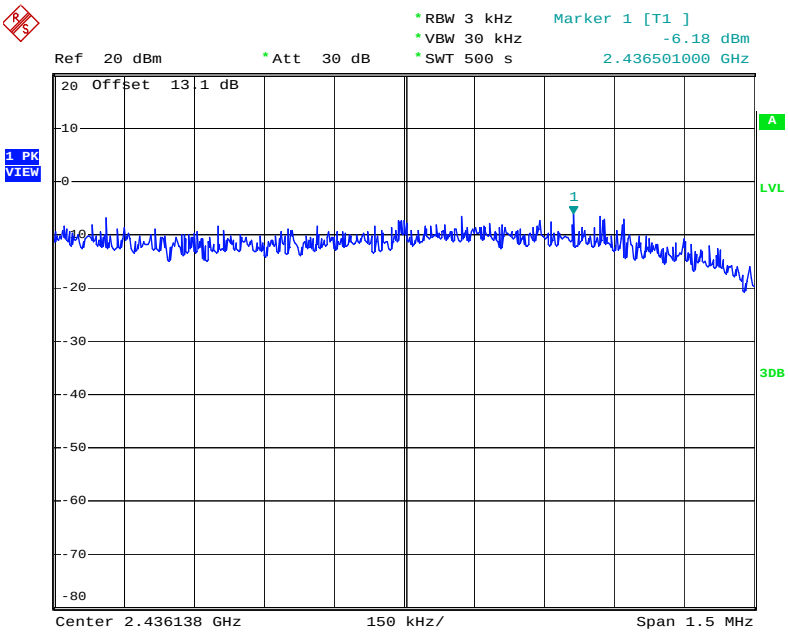
Channel	Frequency	Power Density (dBm)	Max. Limit (dBm)	Result
1	2412 MHz	-7.16	8.00	**Complies**
6	2437 MHz	-8.08	8.00	**Complies**
11	2462 MHz	-7.83	8.00	**Complies**

Power Density Plot on Configuration IEEE 802.11b / 2412 MHz



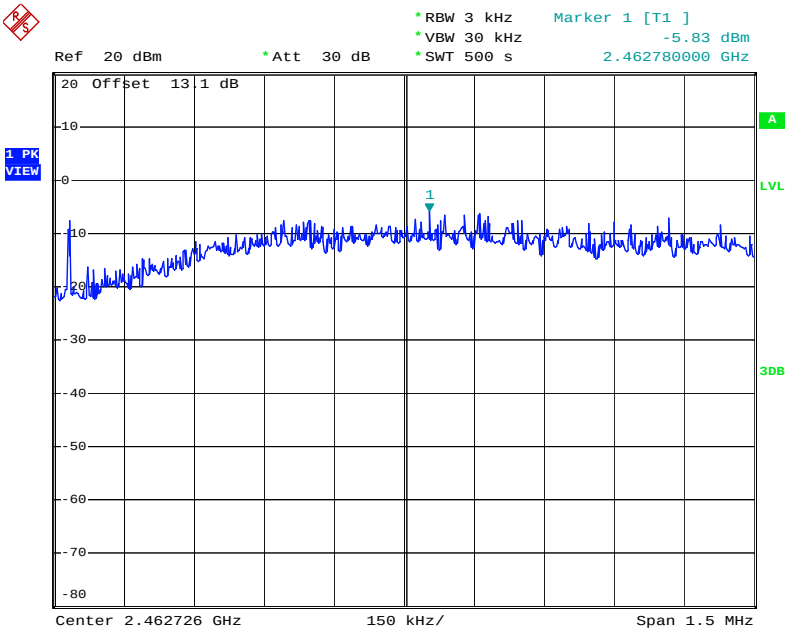
Date: 7.JAN.2010 05:06:24

Power Density Plot on Configuration IEEE 802.11b / 2437 MHz



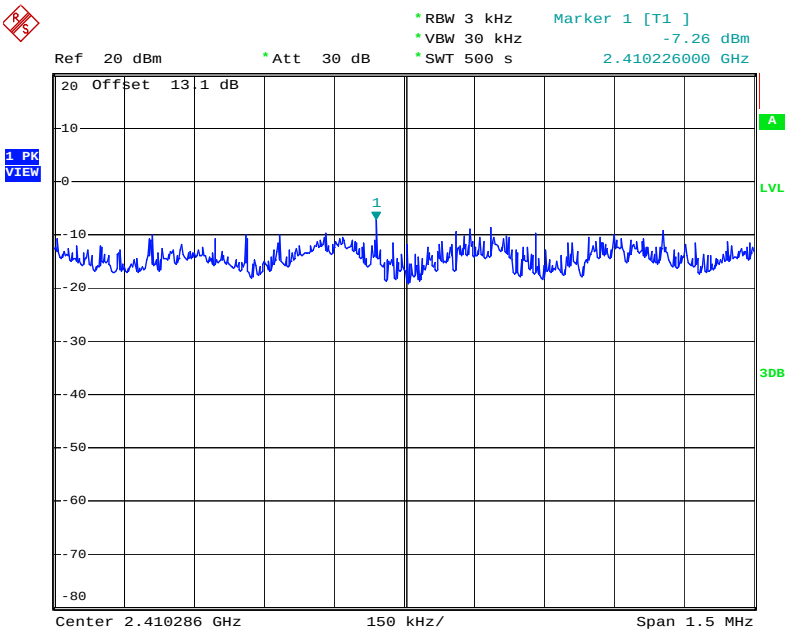
Date: 7.JAN.2010 05:15:35

Power Density Plot on Configuration IEEE 802.11b / 2462 MHz



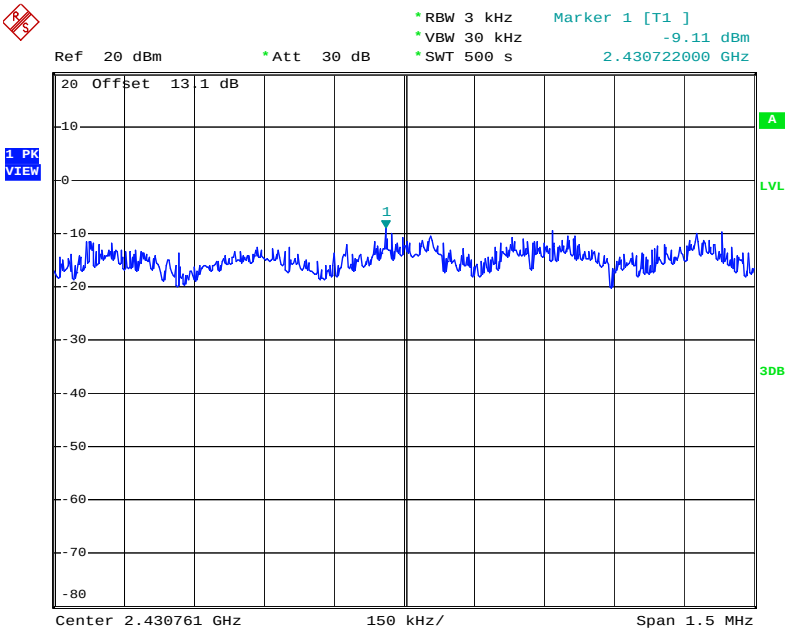
Date: 7.JAN.2010 05:18:00

Power Density Plot on Configuration IEEE 802.11g / 2412 MHz



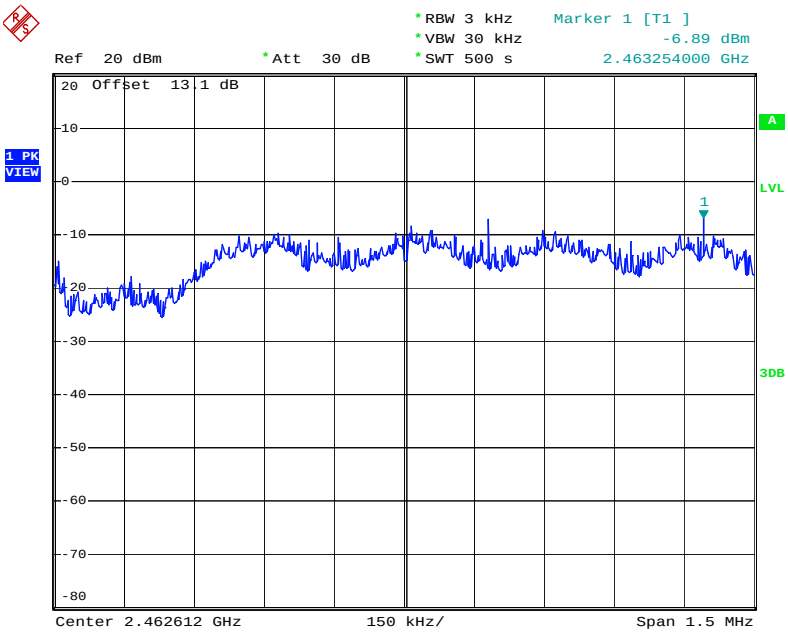
Date: 8.JAN.2010 05:07:53

Power Density Plot on Configuration IEEE 802.11g / 2437 MHz



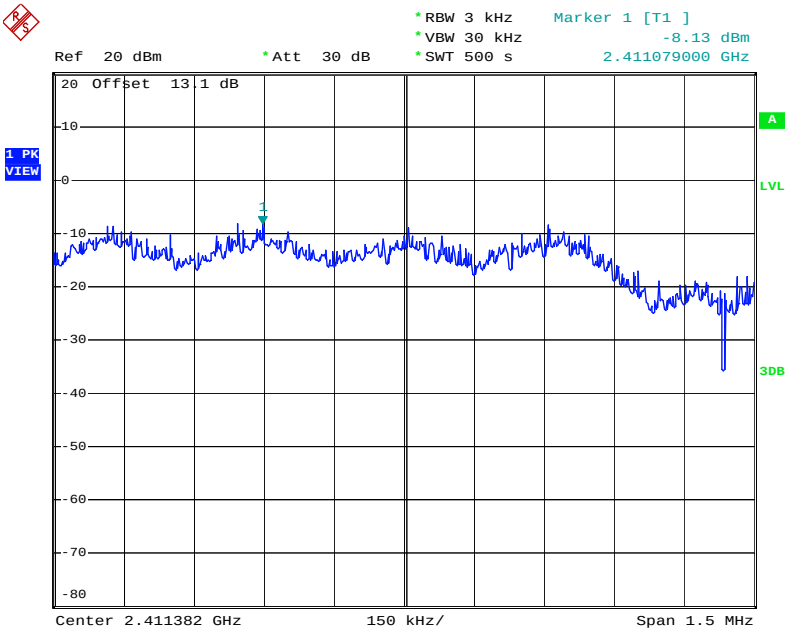
Date: 8.JAN.2010 05:12:01

Power Density Plot on Configuration IEEE 802.11g / 2462 MHz



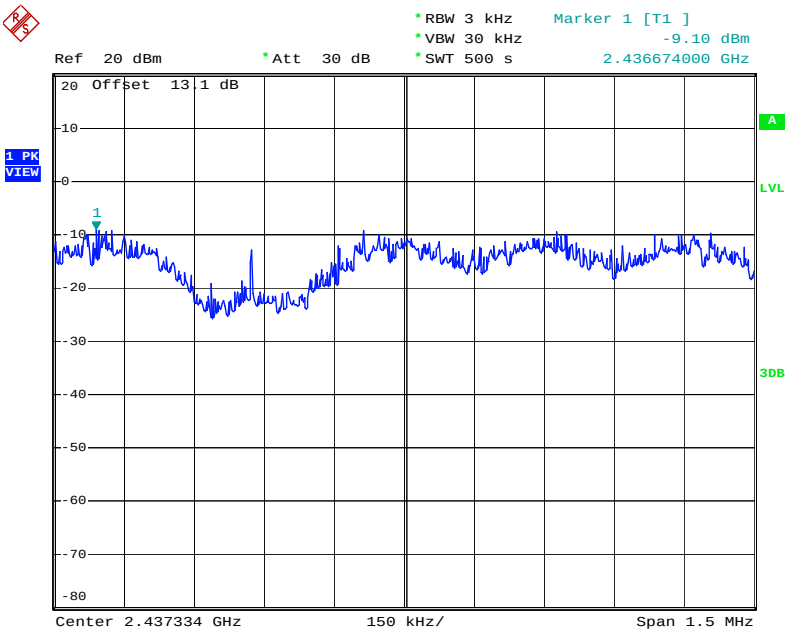
Date: 8.JAN.2010 05:14:47

Power Density Plot on Configuration IEEE 802.11n MCS0 20MHz / 2412 MHz



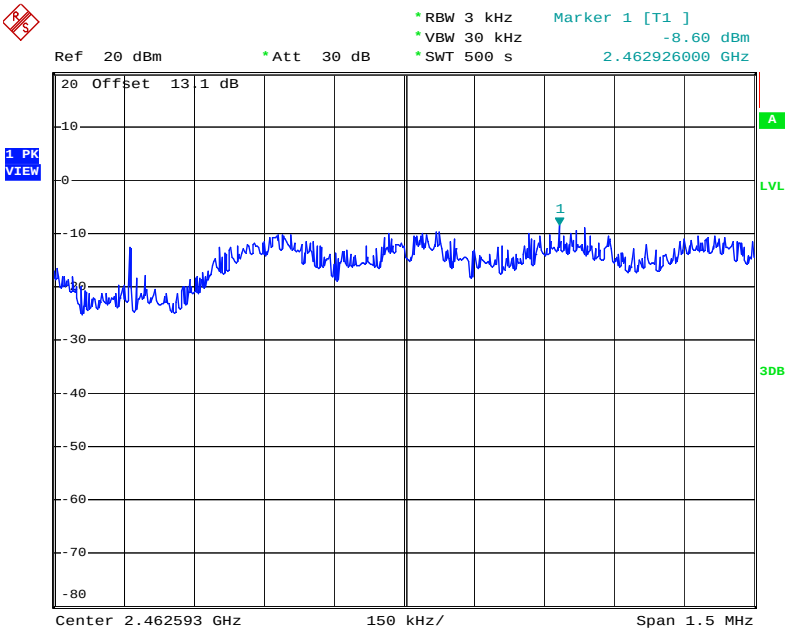
Date: 7.JAN.2010 07:20:58

Power Density Plot on Configuration IEEE 802.11n MCS0 20MHz / 2437 MHz



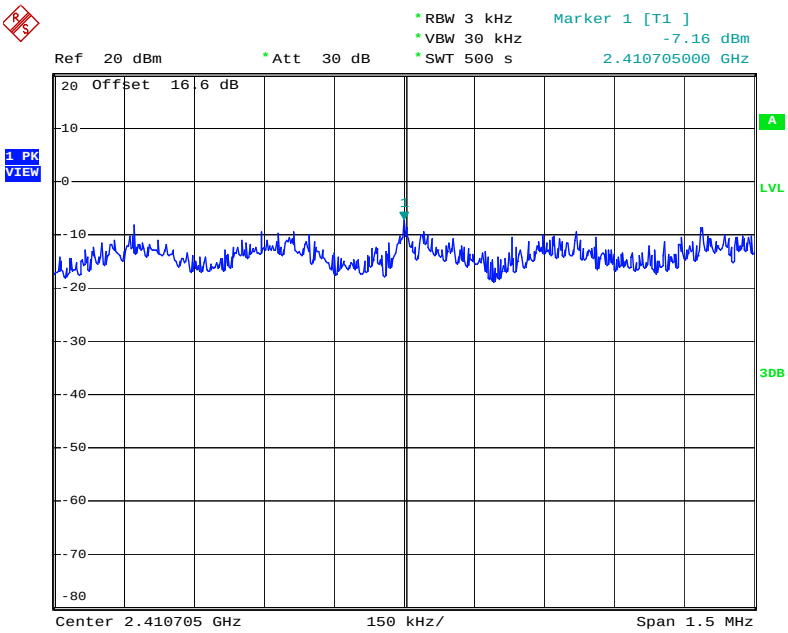
Date: 7.JAN.2010 07:23:49

Power Density Plot on Configuration IEEE 802.11n MCS0 20MHz / 2462 MHz



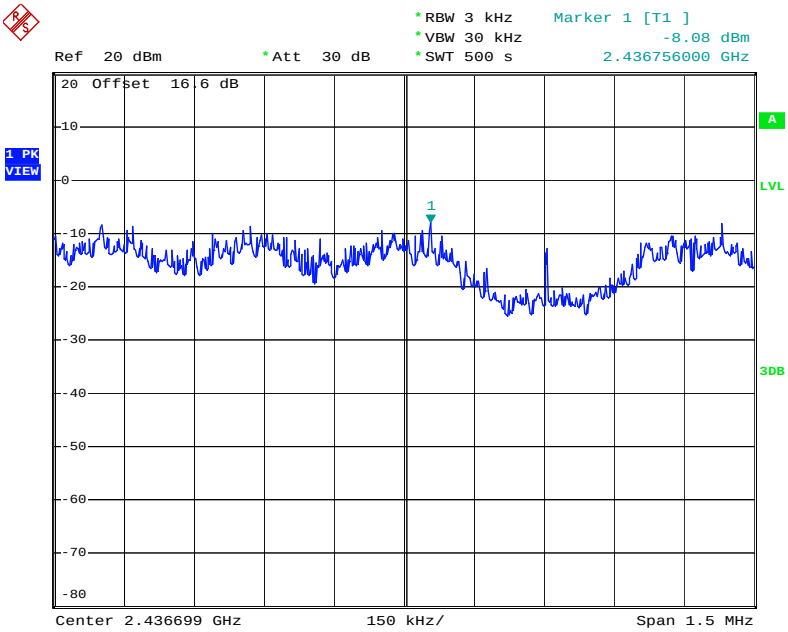
Date: 7.JAN.2010 07:26:07

Power Density Plot on Configuration IEEE 802.11n MCS8 20MHz Ant. 1 + Ant. 2 / 2412 MHz



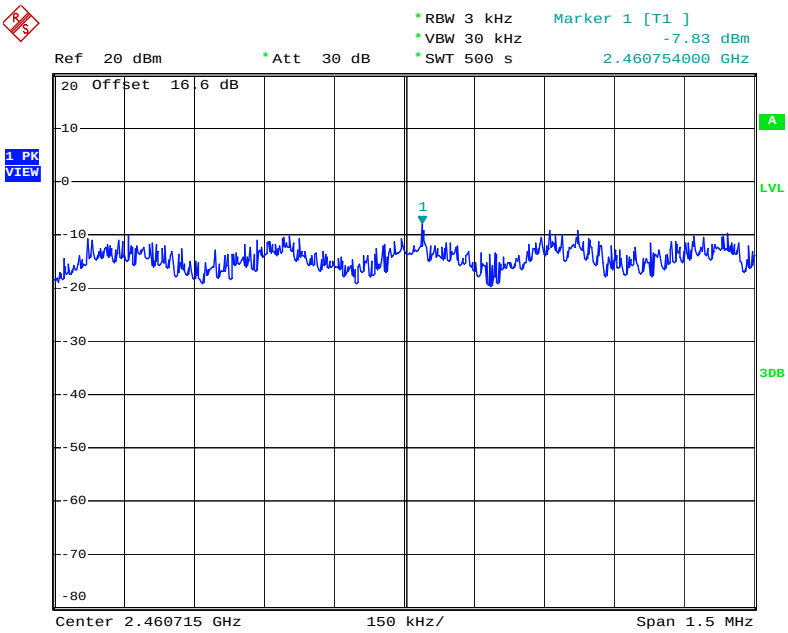
Date: 7.JAN.2010 07:33:18

Power Density Plot on Configuration IEEE 802.11n MCS8 20MHz Ant. 1 + Ant. 2 / 2437 MHz



Date: 7.JAN.2010 07:36:14

Power Density Plot on Configuration IEEE 802.11n MCS8 20MHz Ant. 1 + Ant. 2 / 2462 MHz



Date: 7.JAN.2010 07:48:28

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

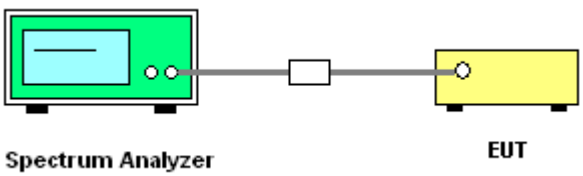
Please refer to section 4 of equipments list in this report. The following table is the setting of the spectrum analyzer.

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

5. The transmitter output (antenna port) was connected to the spectrum analyser in peak hold mode.
6. The resolution bandwidth of 100 kHz and the video bandwidth of 100 kHz were used.
7. Measured the spectrum width with power higher than 6dB below carrier.
8. In case of conducted measurements on smart antenna systems (devices with multiple transmit chains) a power splitter/combiner shall be used to combine all the transmit chains (antenna outputs) into a single test point. The insertion loss of the power splitter/combiner shall be taken into account.

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

Test Date	Jan. 07, 2010	**Test Site No.**	TH01-HY
Temperature	22℃	**Humidity**	59%
Test Engineer	Duncan	**Configurations**	802.11b/g

Configuration IEEE 802.11b

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
1	2412 MHz	8.08	10.08	500	**Complies**
6	2437 MHz	8.04	10.08	500	**Complies**
11	2462 MHz	8.08	10.12	500	**Complies**

Configuration IEEE 802.11g

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
1	2412 MHz	13.88	16.28	500	**Complies**
6	2437 MHz	12.80	16.24	500	**Complies**
11	2462 MHz	14.04	16.24	500	**Complies**

Test Date	Jan. 07, 2010	**Test Site No.**	TH01-HY
Temperature	22℃	**Humidity**	59%
Test Engineer	Duncan	**Configurations**	802.11n (MCS0)

For Single Chain

Configuration IEEE 802.11n MCS0 20MHz

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
1	2412 MHz	15.92	17.48	500	**Complies**
6	2437 MHz	16.08	17.48	500	**Complies**
11	2462 MHz	16.08	17.48	500	**Complies**

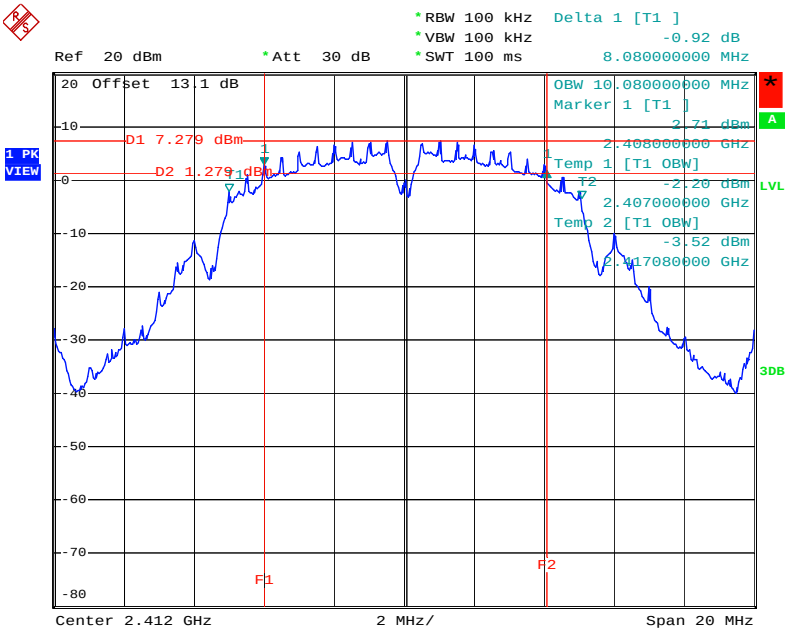
Test Date	Jan. 07, 2010	**Test Site No.**	TH01-HY
Temperature	22℃	**Humidity**	59%
Test Engineer	Duncan	**Configurations**	802.11n (MCS8)

For Two Chain

Configuration IEEE 802.11n MCS8 20MHz Ant. 1 + Ant. 2

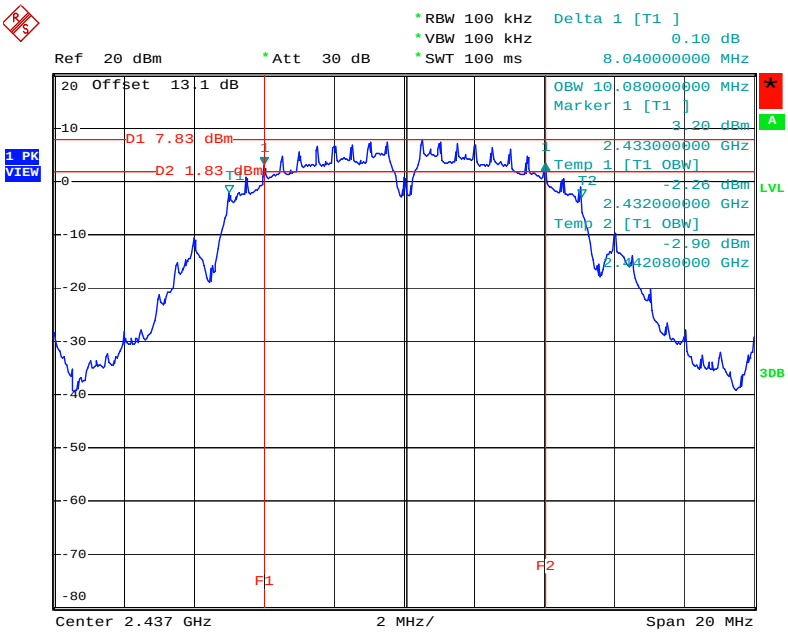
Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
1	2412 MHz	14.20	17.44	500	**Complies**
6	2437 MHz	16.72	17.48	500	**Complies**
11	2462 MHz	17.04	17.40	500	**Complies**

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



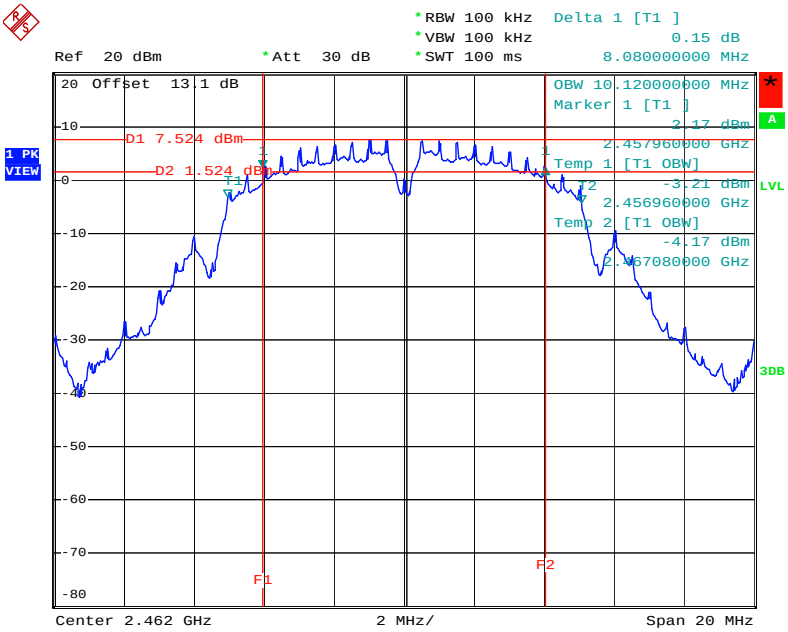
Date: 7.JAN.2010 05:04:34

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



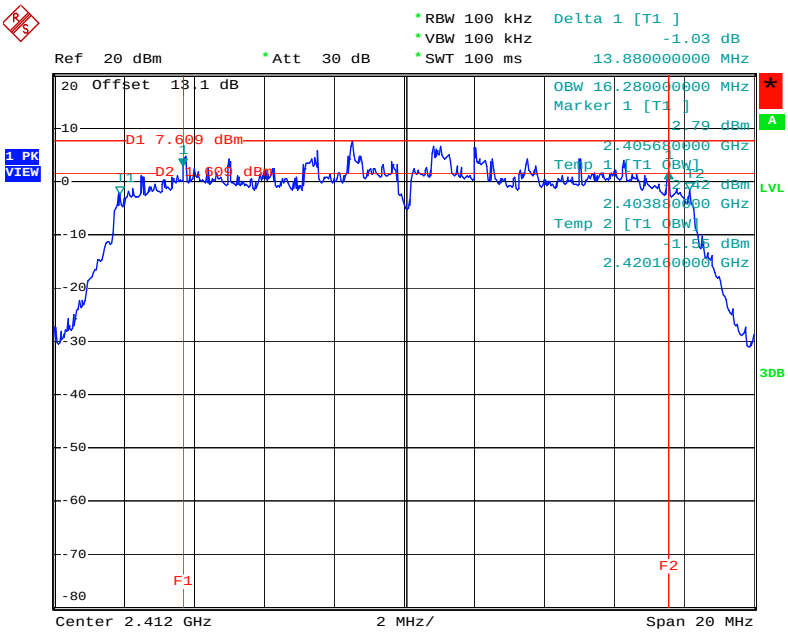
Date: 7.JAN.2010 05:14:26

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



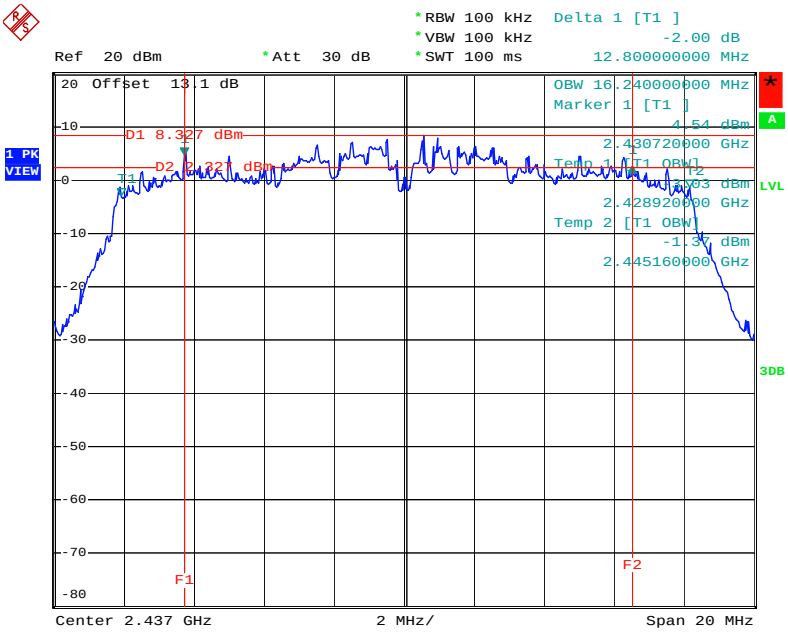
Date: 7.JAN.2010 05:18:41

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



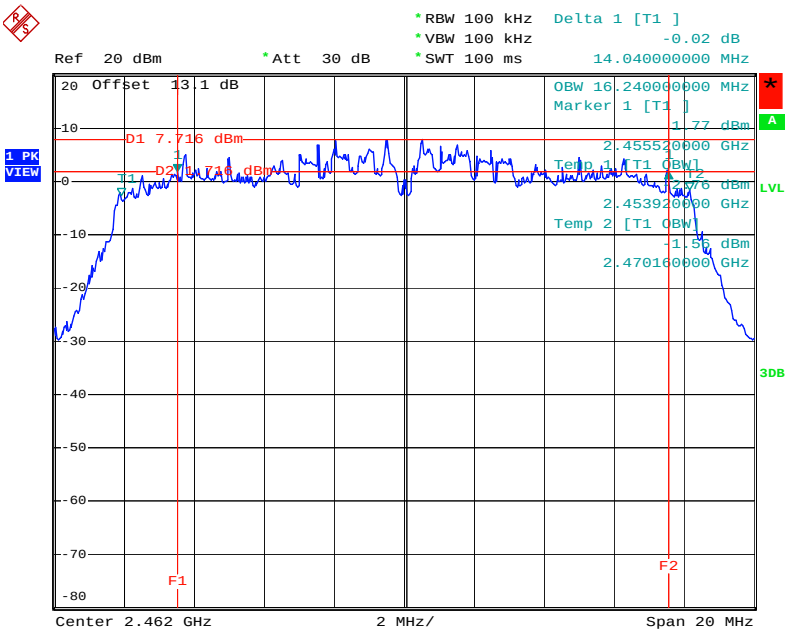
Date: 8.JAN.2010 05:06:10

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



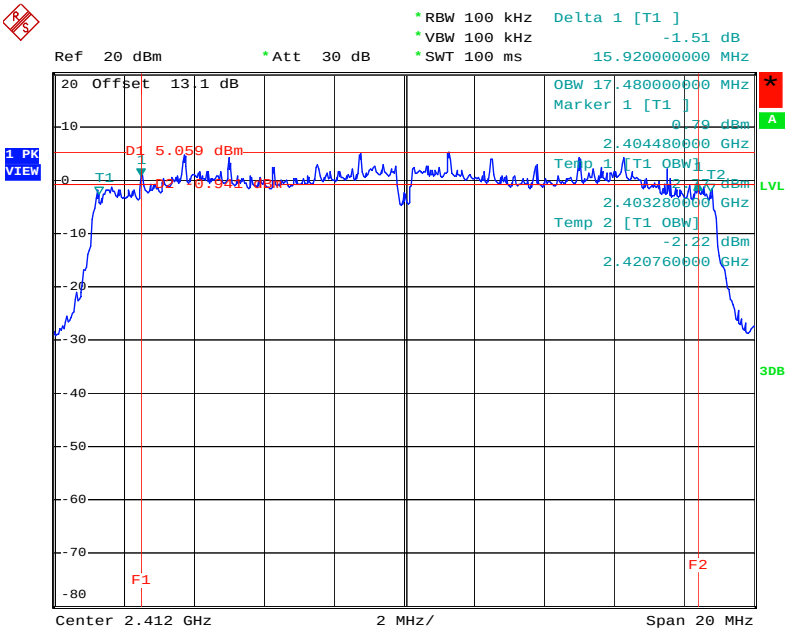
Date: 8.JAN.2010 05:11:10

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



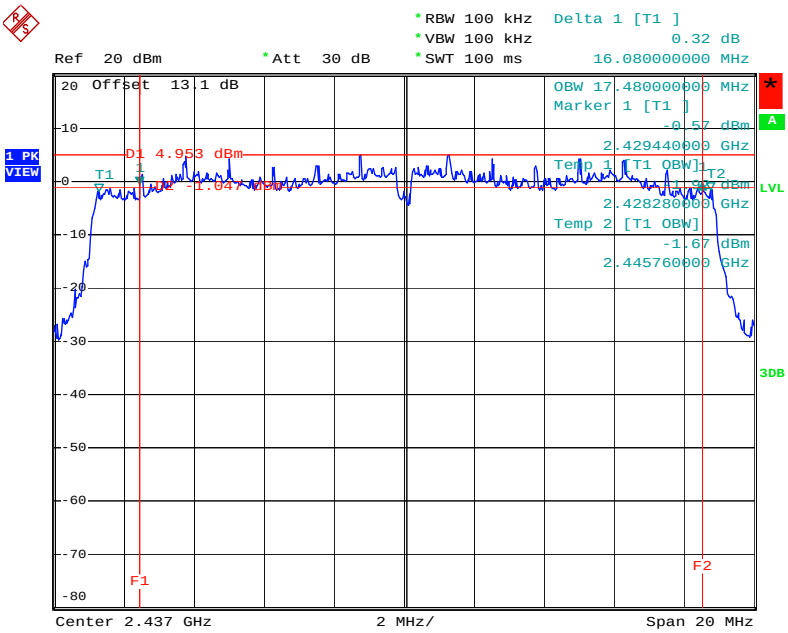
Date: 8.JAN.2010 05:13:57

6 dB Bandwidth Plot on Configuration IEEE 802.11n MCS0 20MHz Ant. 1 / 2412 MHz



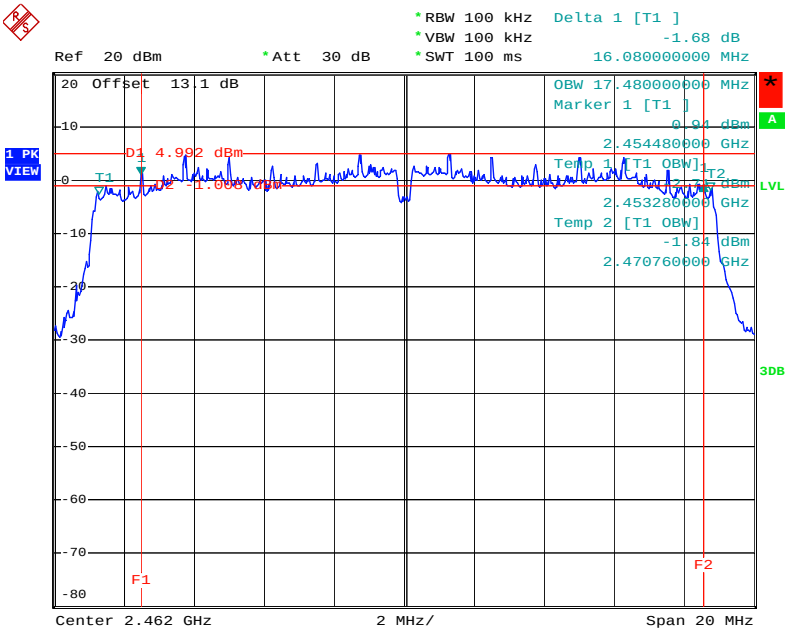
Date: 7.JAN.2010 07:20:17

6 dB Bandwidth Plot on Configuration IEEE 802.11n MCS0 20MHz Ant. 1 / 2437 MHz



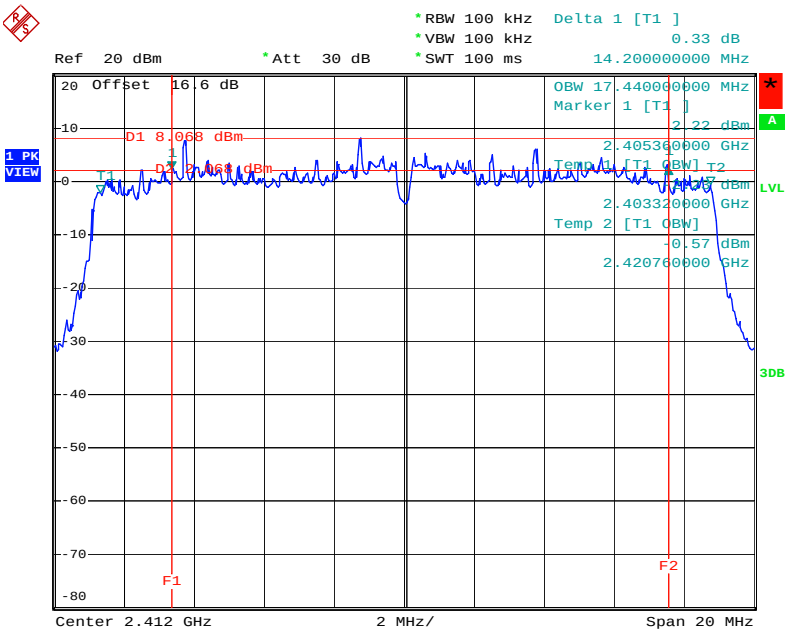
Date: 7.JAN.2010 07:23:09

6 dB Bandwidth Plot on Configuration IEEE 802.11n MCS0 20MHz Ant. 1 / 2462 MHz



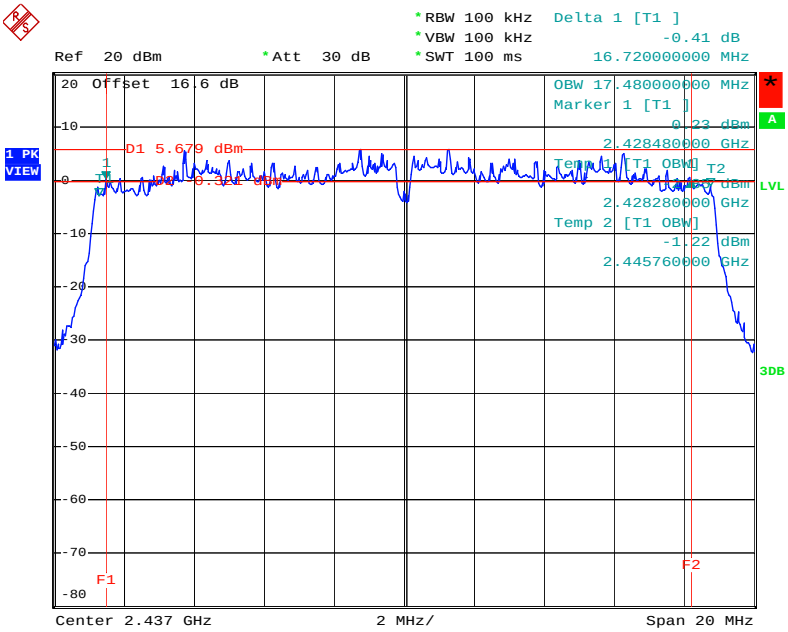
Date: 7.JAN.2010 07:25:15

6 dB Bandwidth Plot on Configuration IEEE 802.11n MCS8 20MHz Ant. 1 + Ant. 2 / 2412 MHz



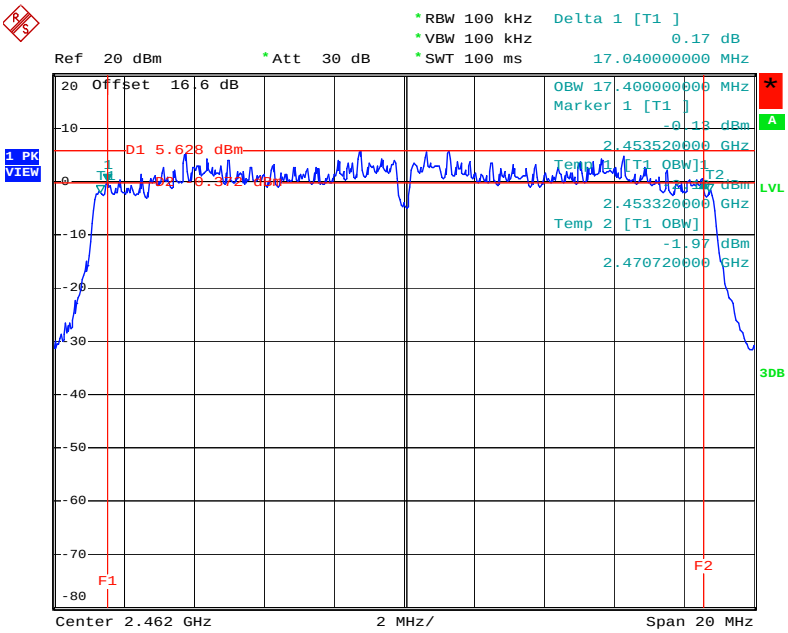
Date: 7.JAN.2010 07:32:39

6 dB Bandwidth Plot on Configuration IEEE 802.11n MCS8 20MHz Ant. 1 + Ant. 2 / 2437 MHz



Date: 7.JAN.2010 07:36:52

6 dB Bandwidth Plot on Configuration IEEE 802.11n MCS8 20MHz Ant. 1 + Ant. 2 / 2462 MHz



Date: 7.JAN.2010 07:47:52

3.5. Radiated Emissions Measurement

3.5.1. Limit

20dBc in any 100 kHz bandwidth outside the operating frequency band. In case the emissions 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

3.5.2. Measuring Instruments and Settings

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)	100KHz / 100KHz for peak

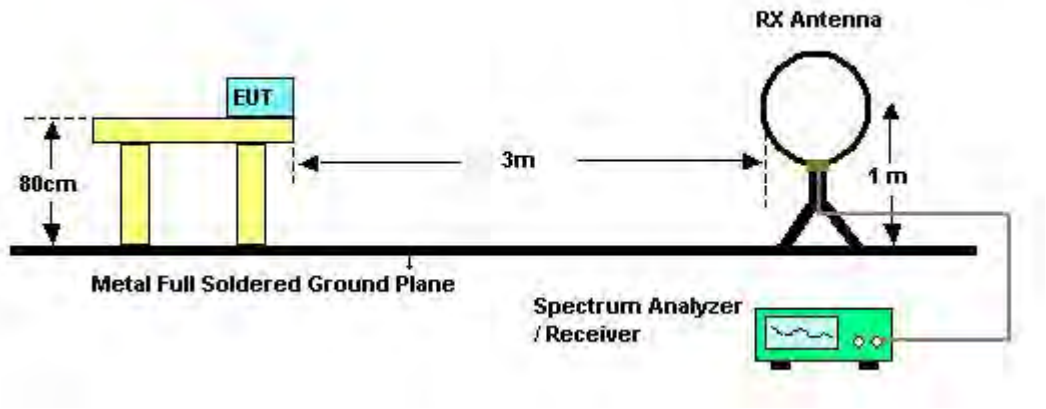
Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

3.5.3. Test Procedures

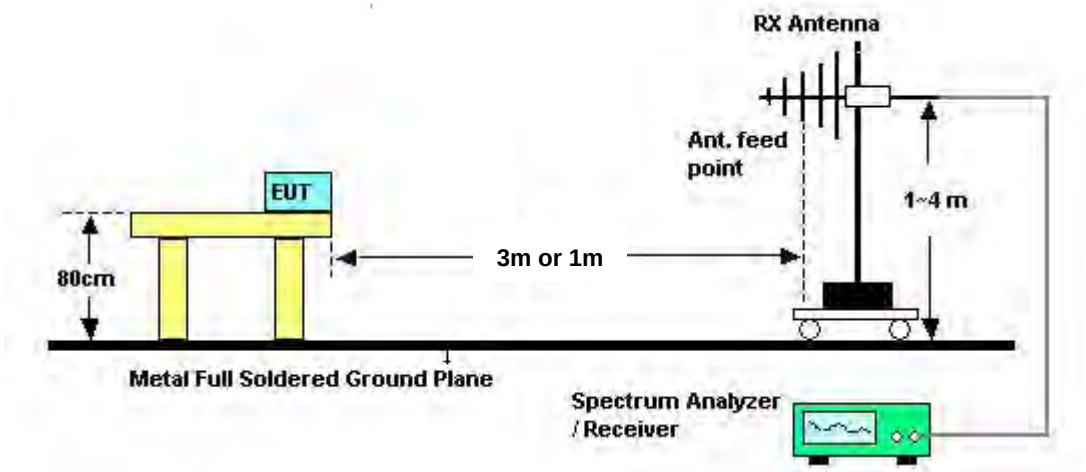
1. Configure the EUT according to ANSI C63.4. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting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

Test Date	Aug. 24, 2010	**Test Site No.**	03CH02-HY
Temperature	25℃	**Humidity**	54%
Test Engineer	Daniel		

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

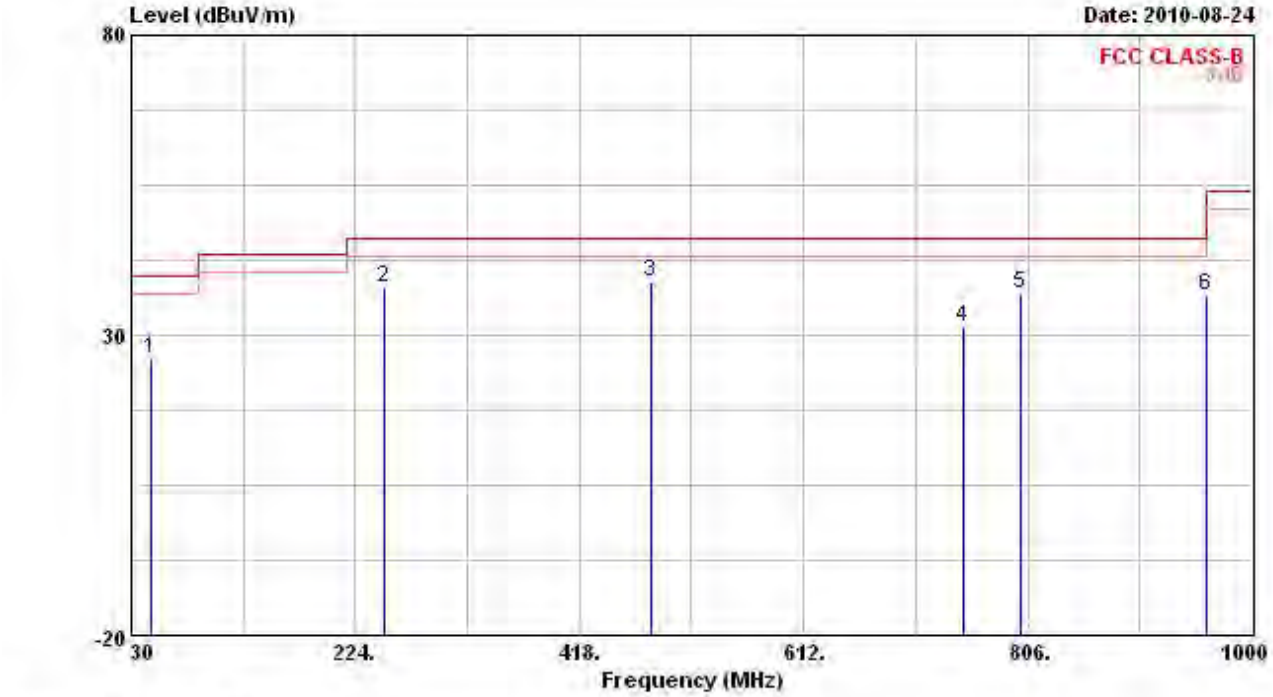
Note:

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

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

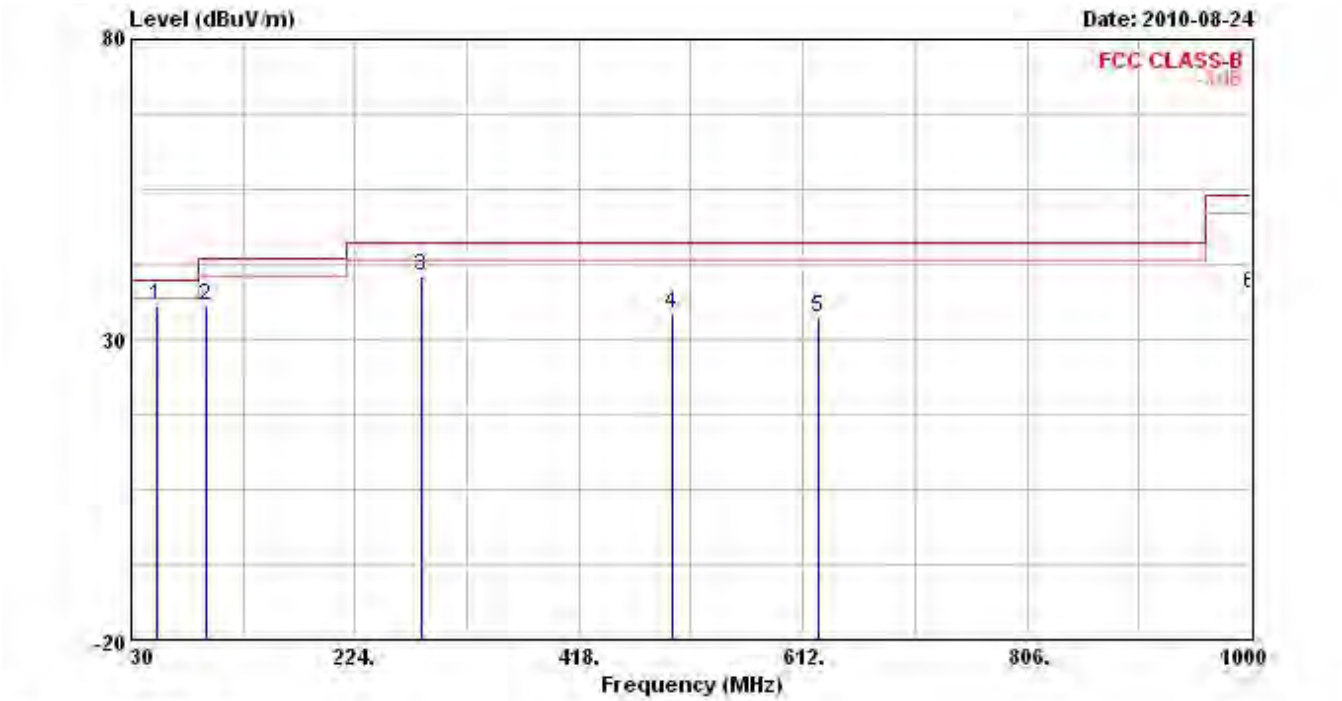
Test Date	Aug. 24, 2010	**Test Site No.**	03CH02-HY
Temperature	25℃	**Humidity**	54%
Test Engineer	Daniel	**Configurations**	802.11g CH 6 (Ant. 1)

Horizontal



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	47.460	26.07	-13.93	40.00	41.94	10.82	1.09	27.78	Peak
2	249.220	37.88	-8.12	46.00	49.05	12.97	2.68	26.82	Peak
3	479.110	38.92	-7.08	46.00	46.47	16.87	3.66	28.08	Peak
4	749.740	31.29	-14.71	46.00	35.05	19.55	4.57	27.88	Peak
5	800.180	37.00	-9.00	46.00	39.68	20.27	4.77	27.72	Peak
6	960.230	36.47	-17.53	54.00	36.83	21.52	5.29	27.17	Peak

Vertical



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1 @	52.310	35.53	-4.47	40.00	53.22	8.94	1.15	27.78	QP
2	94.990	35.65	-7.85	43.50	51.39	10.34	1.54	27.62	Peak
3	281.000	40.47	-5.53	46.00	51.00	13.44	2.83	26.80	Peak
4	498.510	34.29	-11.71	46.00	41.43	17.26	3.78	28.18	Peak
5	625.580	33.74	-12.26	46.00	37.89	19.84	4.14	28.13	Peak
6	1000.000	37.42	-36.58	74.00	36.49	22.50	5.47	27.04	Peak

Note:

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

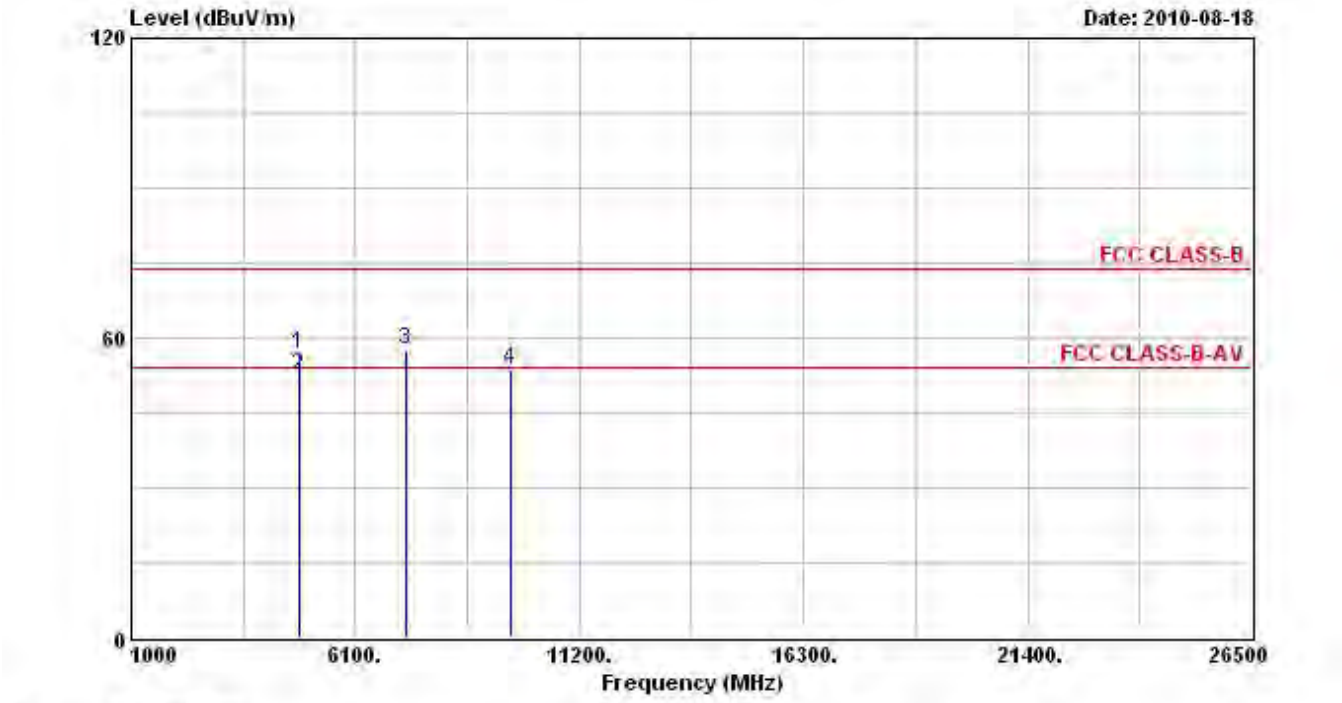
Emission level (dBuV/m) = 20 log Emission level (uV/m).

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

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

Test Date	Aug. 18, 2010	**Test Site No.**	03CH02-HY
Temperature	25℃	**Humidity**	54%
Test Engineer	Daniel	**Configurations**	802.11b CH 1 (Ant. 1)

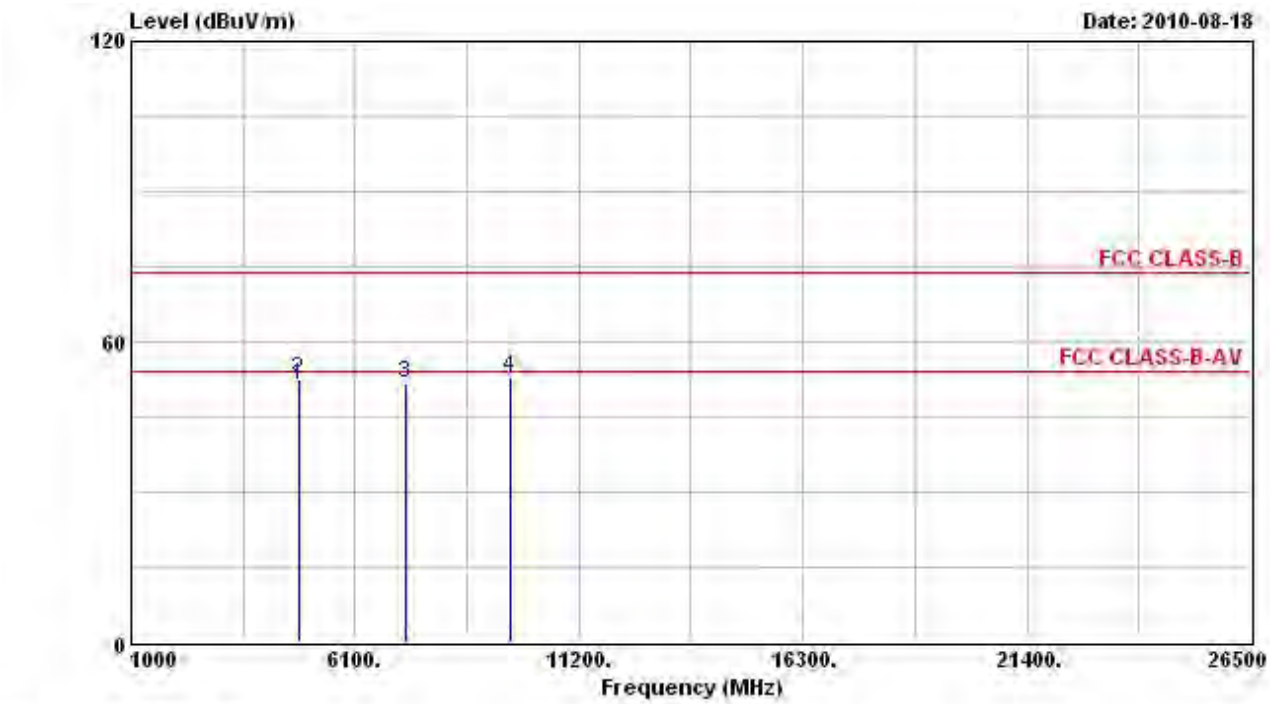
Horizontal



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	4824.000	56.90	-17.10	74.00	51.07	35.76	4.58	34.51	Peak
2	4824.000	52.32	-1.68	54.00	46.49	35.76	4.58	34.51	Average
3	7236.000	57.51			48.32	37.85	5.63	34.29	Peak
4	9648.000	53.72			42.62	39.39	6.34	34.63	Peak

Note: Item 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

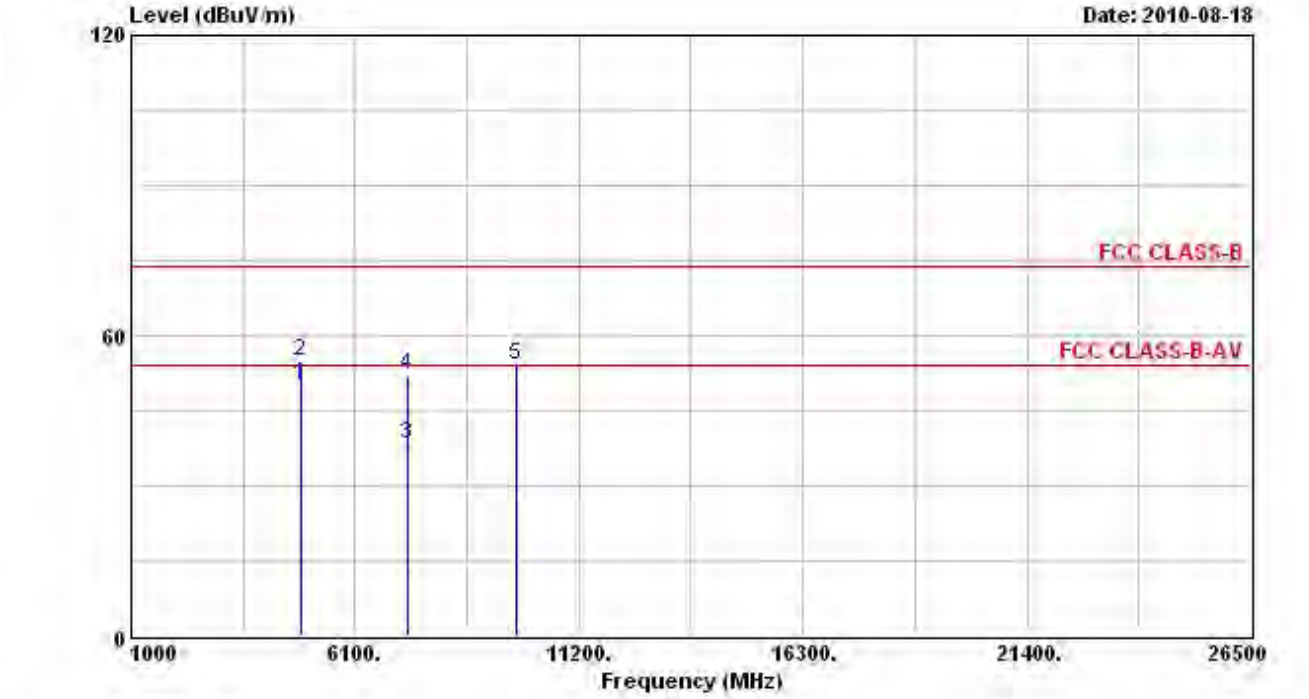


	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	4824.000	51.34	-2.66	54.00	46.14	35.13	4.58	34.51	Average
2	4824.000	52.67	-21.33	74.00	47.47	35.13	4.58	34.51	Peak
3	7236.000	51.75			43.51	36.90	5.63	34.29	Peak
4	9648.000	52.98			42.68	38.59	6.34	34.63	Peak

Note: Item 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).

Test Date	Aug. 18, 2010	**Test Site No.**	03CH02-HY
Temperature	25℃	**Humidity**	54%
Test Engineer	Daniel	**Configurations**	802.11b CH 6 (Ant. 1)

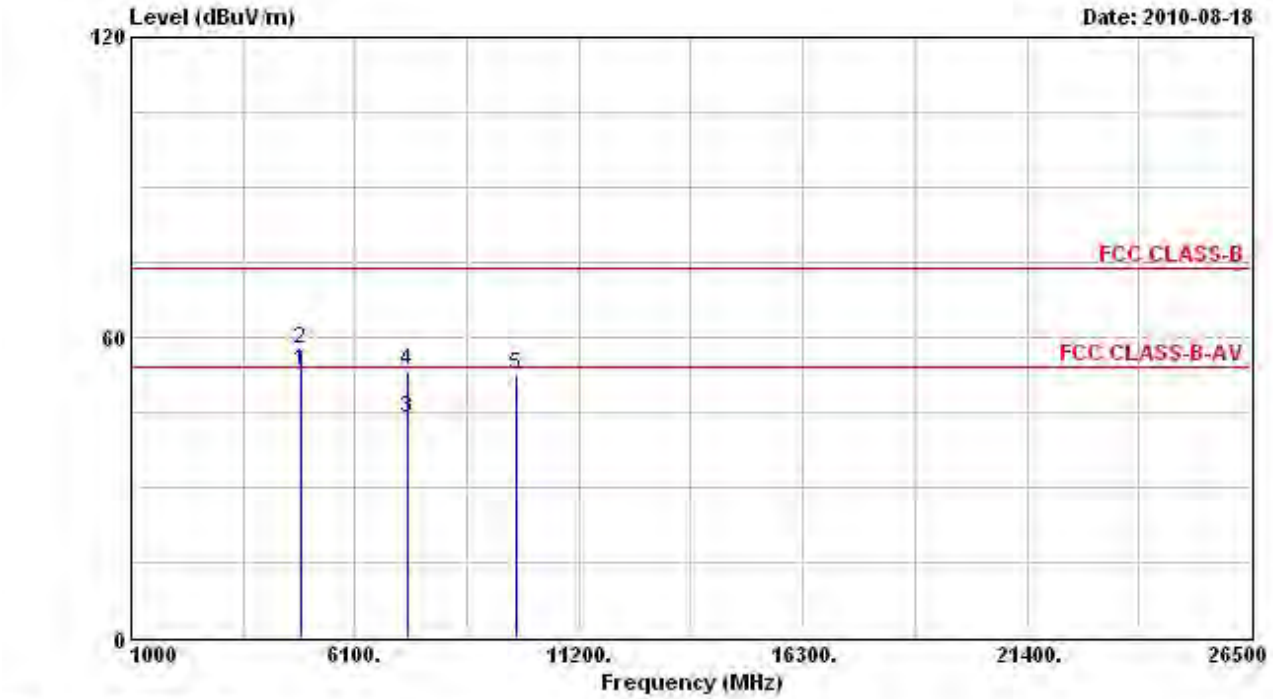
Horizontal



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	4874.000	50.07	-3.93	54.00	44.08	35.83	4.61	34.45	Average
2	4874.000	55.04	-18.96	74.00	49.05	35.83	4.61	34.45	Peak
3	7311.000	38.39	-15.61	54.00	29.18	37.86	5.64	34.29	Average
4	7311.000	52.17	-21.83	74.00	42.96	37.86	5.64	34.29	Peak
5	9748.000	54.09			42.80	39.51	6.36	34.58	Peak

Note: An 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

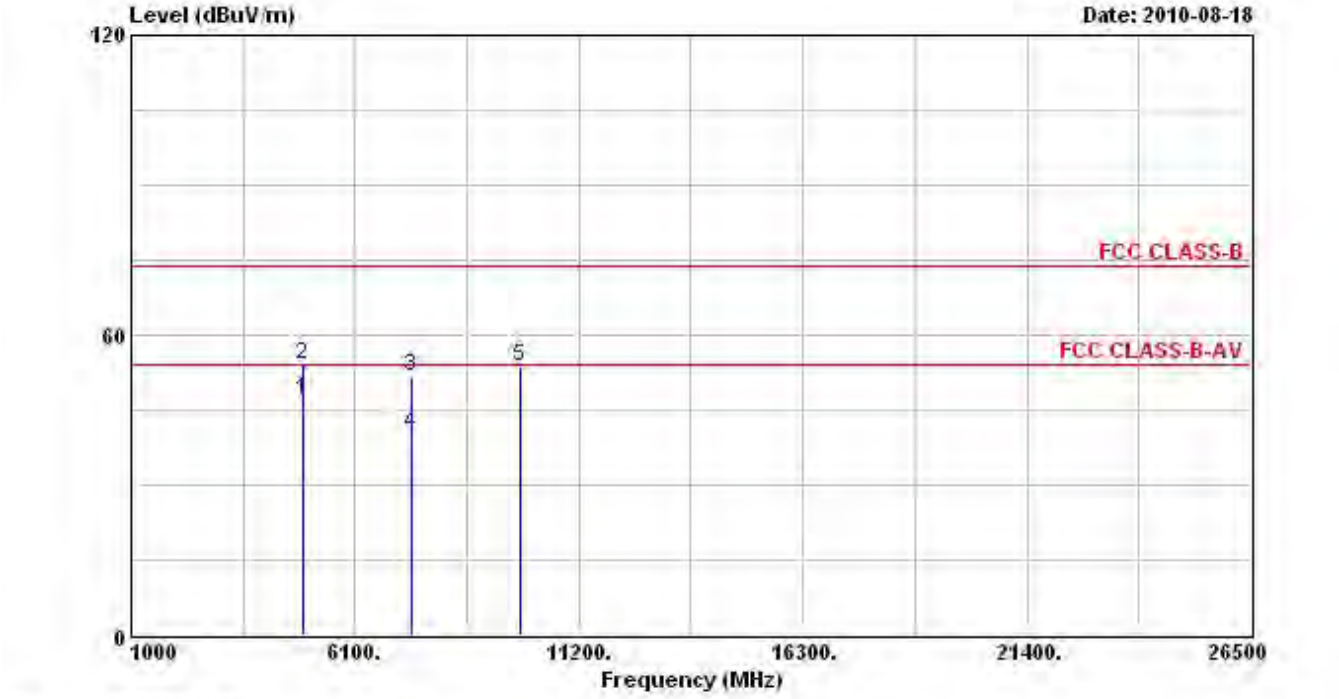


	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	4874.000	53.14	-0.86	54.00	47.80	35.18	4.61	34.45	Average
2	4874.000	57.65	-16.35	74.00	52.31	35.18	4.61	34.45	Peak
3	7311.000	43.80	-10.20	54.00	35.53	36.92	5.64	34.29	Average
4	7311.000	53.36	-20.64	74.00	45.09	36.92	5.64	34.29	Peak
5	9748.000	52.48			41.99	38.71	6.36	34.58	Peak

Note: An 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).

Test Date	Aug. 18, 2010	**Test Site No.**	03CH02-HY
Temperature	25℃	**Humidity**	54%
Test Engineer	Daniel	**Configurations**	802.11b CH 11 (Ant. 1)

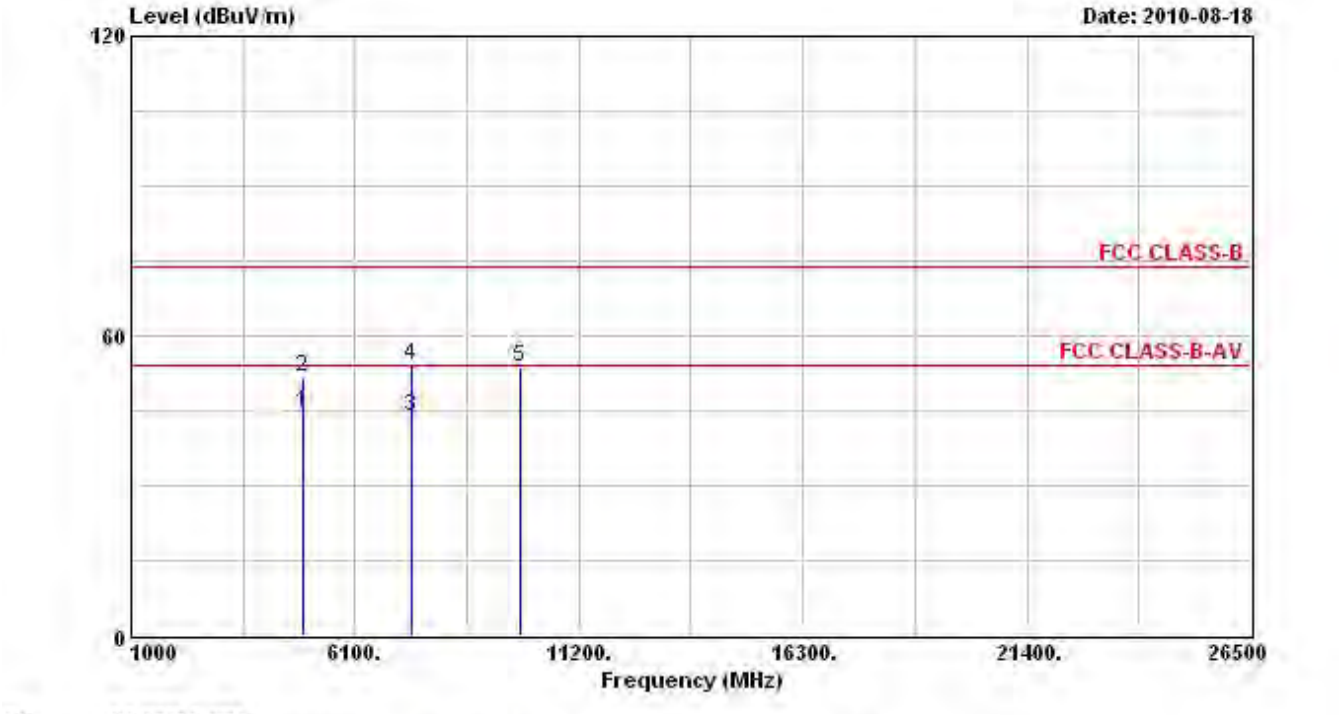
Horizontal



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	4924.000	47.03	-6.97	54.00	40.83	35.90	4.68	34.38	Average
2	4924.000	53.99	-20.01	74.00	47.79	35.90	4.68	34.38	Peak
3	7386.000	51.66	-22.34	74.00	42.42	37.88	5.65	34.29	Peak
4	7386.000	40.13	-13.87	54.00	30.89	37.88	5.65	34.29	Average
5	9848.000	53.81			42.36	39.61	6.38	34.54	Peak

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

Vertical

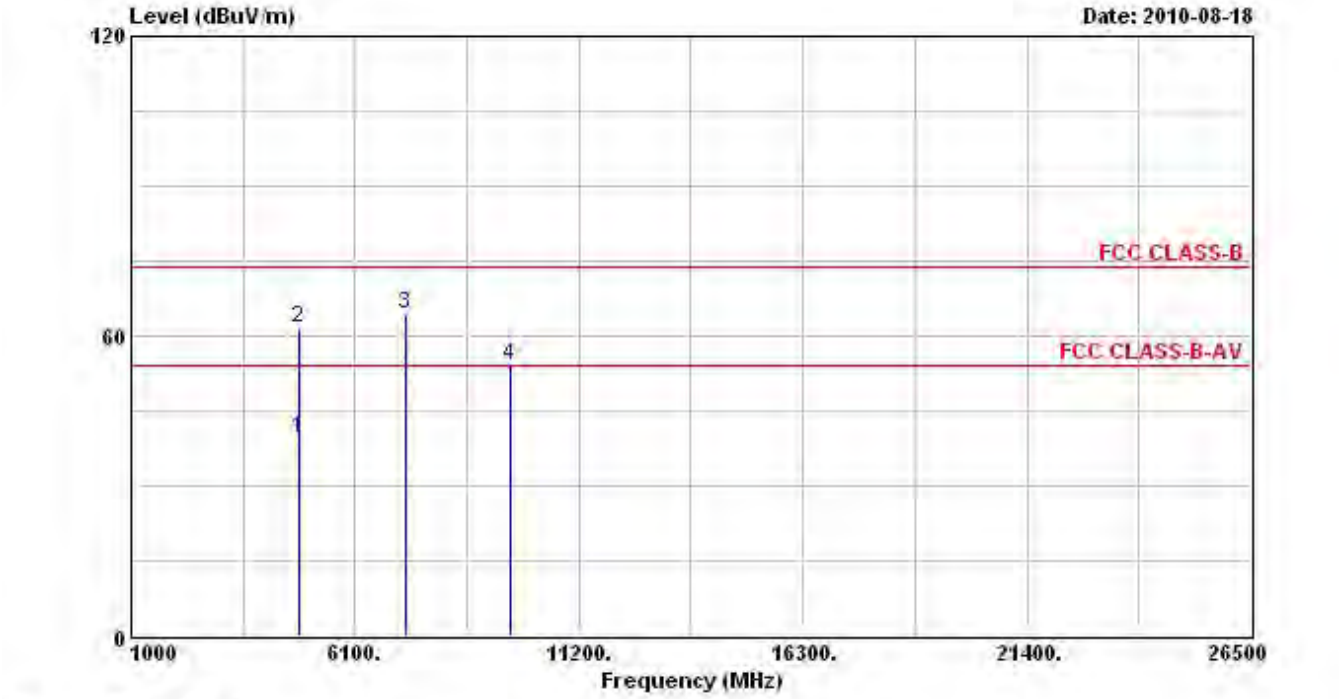


	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	4924.000	44.60	-9.40	54.00	39.07	35.23	4.68	34.38	Average
2	4924.000	51.59	-22.41	74.00	46.06	35.23	4.68	34.38	Peak
3	7386.000	43.75	-10.25	54.00	35.43	36.96	5.65	34.29	Average
4	7386.000	54.03	-19.97	74.00	45.71	36.96	5.65	34.29	Peak
5	9848.000	53.56			42.91	38.81	6.38	34.54	Peak

Note: An 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).

Test Date	Aug. 18, 2010	**Test Site No.**	03CH02-HY
Temperature	25℃	**Humidity**	54%
Test Engineer	Daniel	**Configurations**	802.11g CH 1 (Ant. 1)

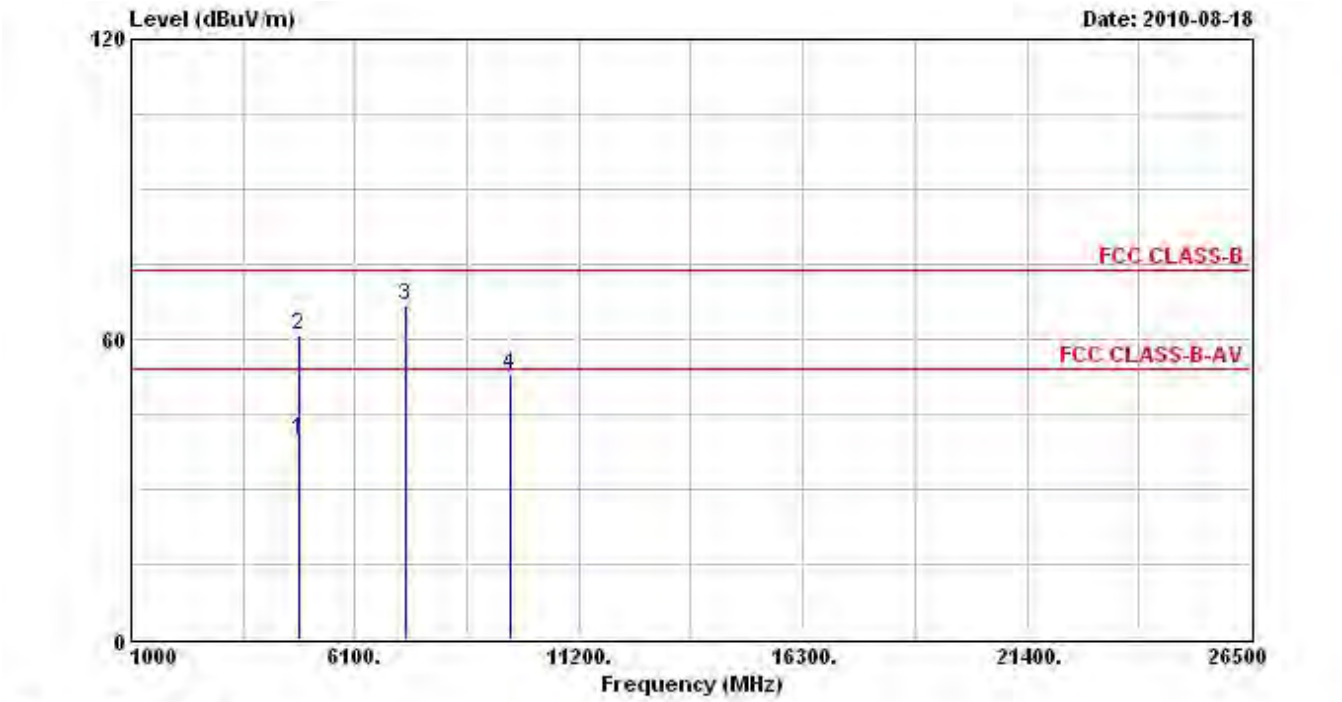
Horizontal



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	4824.000	39.50	-14.50	54.00	33.67	35.76	4.58	34.51	Average
2	4824.000	61.40	-12.60	74.00	55.57	35.76	4.58	34.51	Peak
3	7236.000	64.23			55.04	37.85	5.63	34.29	Peak
4	9648.000	54.09			42.99	39.39	6.34	34.63	Peak

Note: Item 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

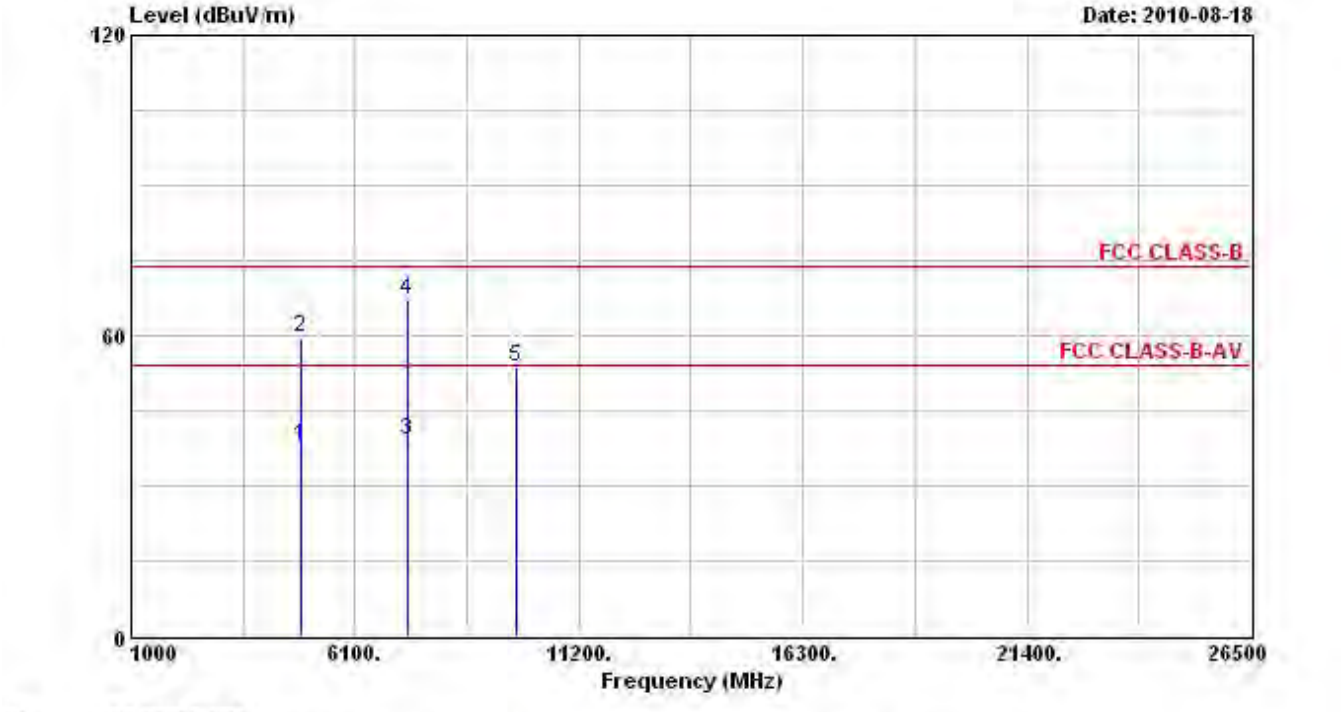


	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	4824.000	40.06	-13.94	54.00	34.86	35.13	4.58	34.51	Average
2	4824.000	60.81	-13.19	74.00	55.61	35.13	4.58	34.51	Peak
3	7236.000	66.71			58.47	36.90	5.63	34.29	Peak
4	9648.000	52.87			42.57	38.59	6.34	34.63	Peak

Note: Item 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).

Test Date	Aug. 18, 2010	**Test Site No.**	03CH02-HY
Temperature	25℃	**Humidity**	54%
Test Engineer	Daniel	**Configurations**	802.11g CH 6 (Ant. 1)

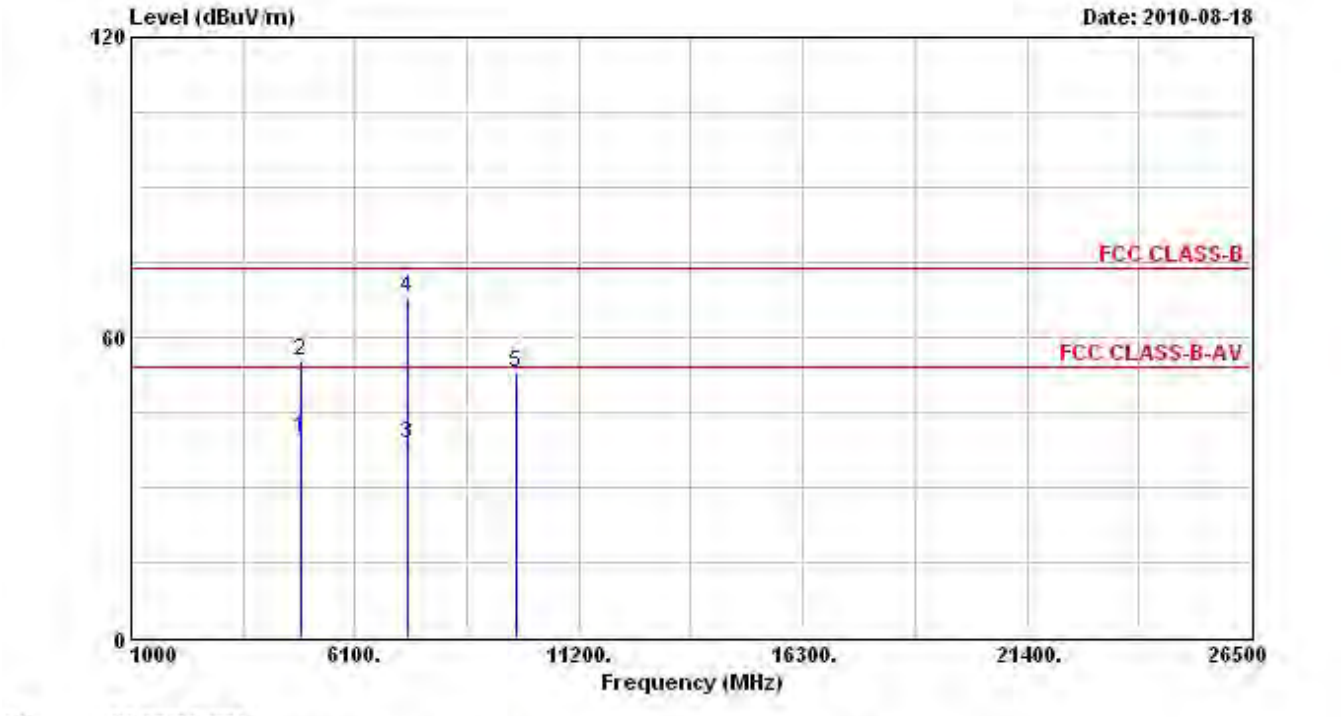
Horizontal



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	4874.000	37.98	-16.02	54.00	31.99	35.83	4.61	34.45	Average
2	4874.000	59.41	-14.59	74.00	53.42	35.83	4.61	34.45	Peak
3	7311.000	39.04	-14.96	54.00	29.83	37.86	5.64	34.29	Average
4	7311.000	66.92	-7.08	74.00	57.71	37.86	5.64	34.29	Peak
5	9748.000	53.74			42.45	39.51	6.36	34.58	Peak

Note: An 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

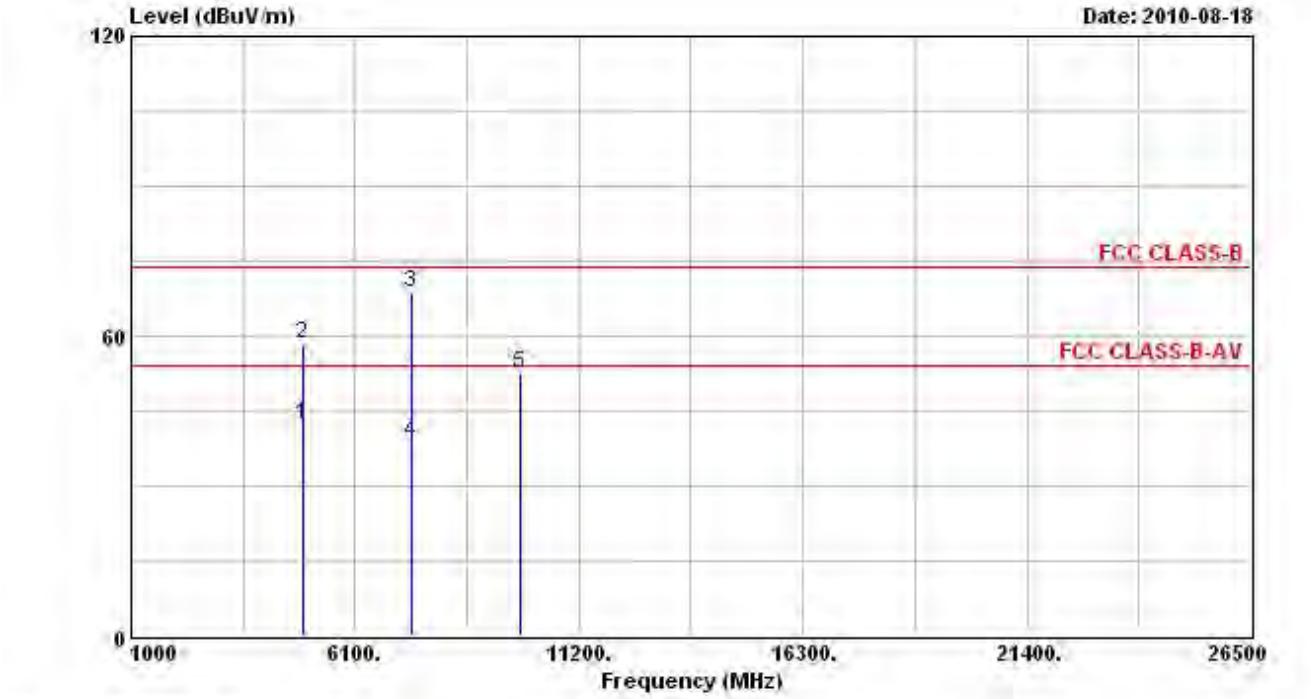


	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	4874.000	39.86	-14.14	54.00	34.52	35.18	4.61	34.45	Average
2	4874.000	55.36	-18.64	74.00	50.02	35.18	4.61	34.45	Peak
3	7311.000	38.53	-15.47	54.00	30.26	36.92	5.64	34.29	Average
4	7311.000	67.82	-6.18	74.00	59.55	36.92	5.64	34.29	Peak
5	9748.000	52.99			42.50	38.71	6.36	34.58	Peak

Note: An 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).

Test Date	Aug. 18, 2010	**Test Site No.**	03CH02-HY
Temperature	25℃	**Humidity**	54%
Test Engineer	Daniel	**Configurations**	802.11g CH 11 (Ant. 1)

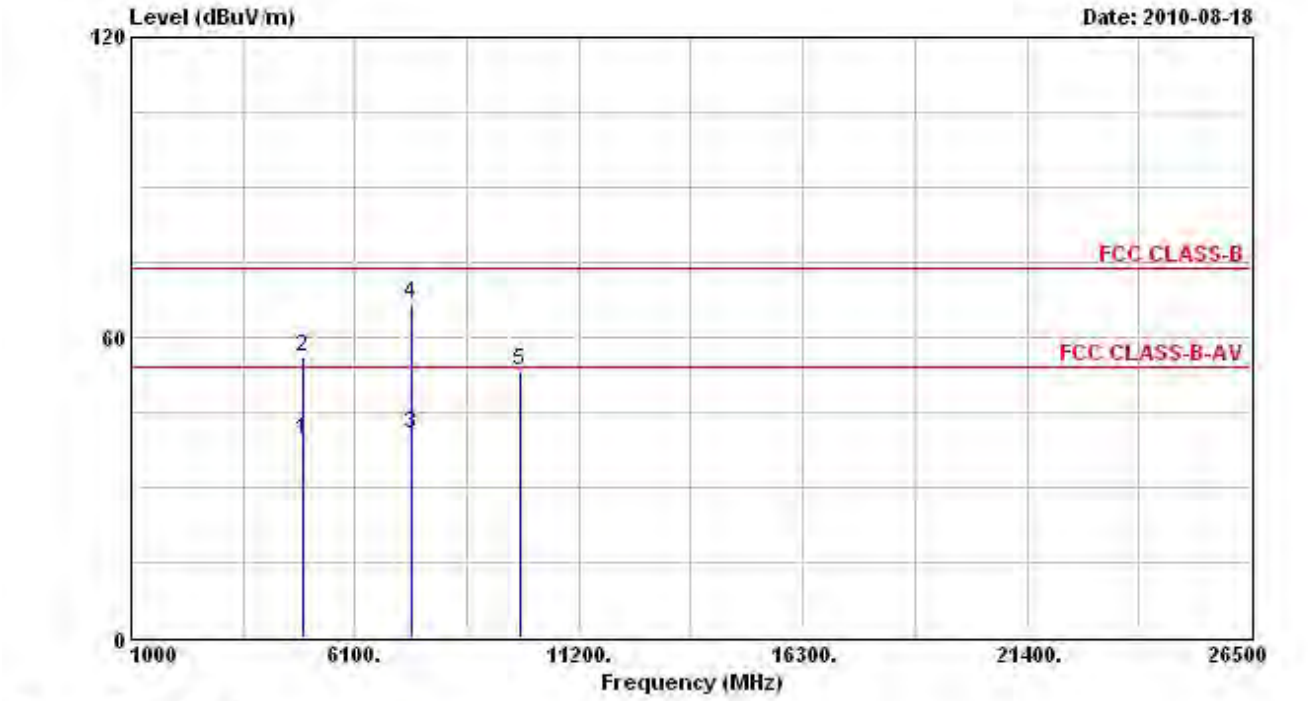
Horizontal



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	4924.000	42.06	-11.94	54.00	35.86	35.90	4.68	34.38	Average
2	4924.000	58.41	-15.59	74.00	52.21	35.90	4.68	34.38	Peak
3	7386.000	68.78	-5.22	74.00	59.54	37.88	5.65	34.29	Peak
4	7386.000	38.59	-15.41	54.00	29.35	37.88	5.65	34.29	Average
5	9848.000	52.40			40.95	39.61	6.38	34.54	Peak

Note: An 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

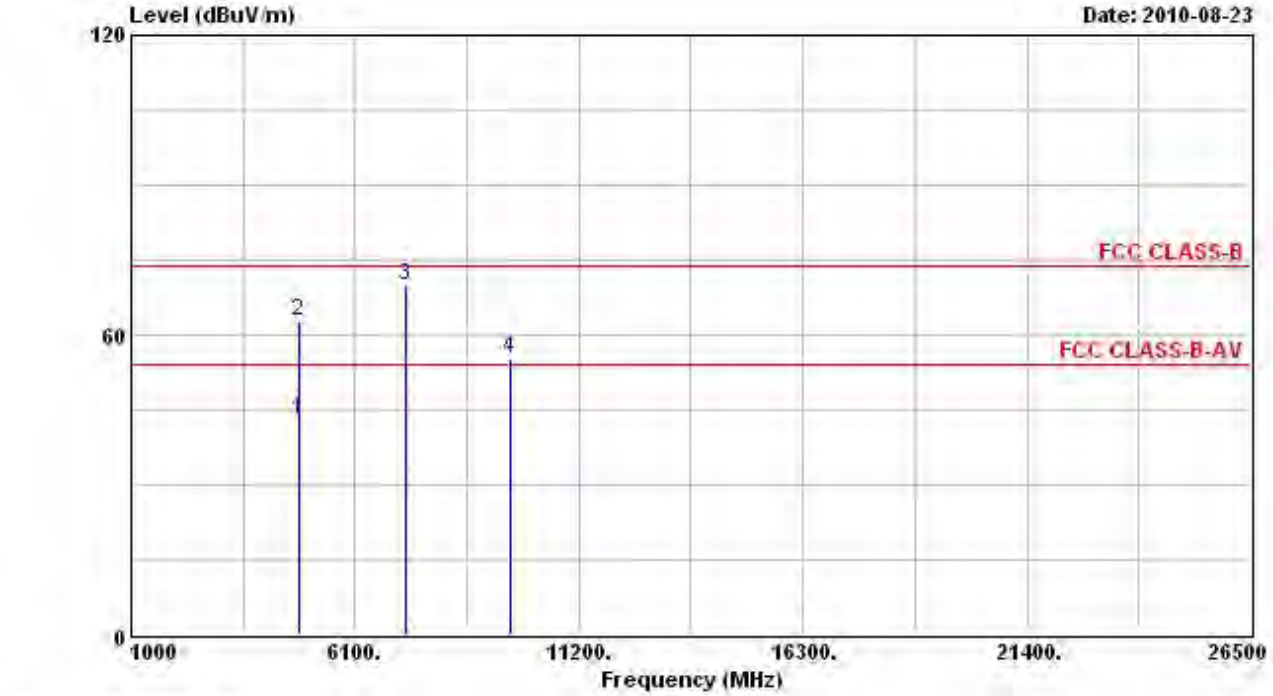


	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	4924.000	39.64	-14.36	54.00	34.11	35.23	4.68	34.38	Average
2	4924.000	56.10	-17.90	74.00	50.57	35.23	4.68	34.38	Peak
3	7386.000	40.72	-13.28	54.00	32.40	36.96	5.65	34.29	Average
4	7386.000	66.72	-7.28	74.00	58.40	36.96	5.65	34.29	Peak
5	9848.000	53.30			42.65	38.81	6.38	34.54	Peak

Note: An 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).

Test Date	Aug. 23, 2010	**Test Site No.**	03CH02-HY
Temperature	25℃	**Humidity**	54%
Test Engineer	Daniel	**Configurations**	MCS0 20MHz Ch 1 (Ant. 1)

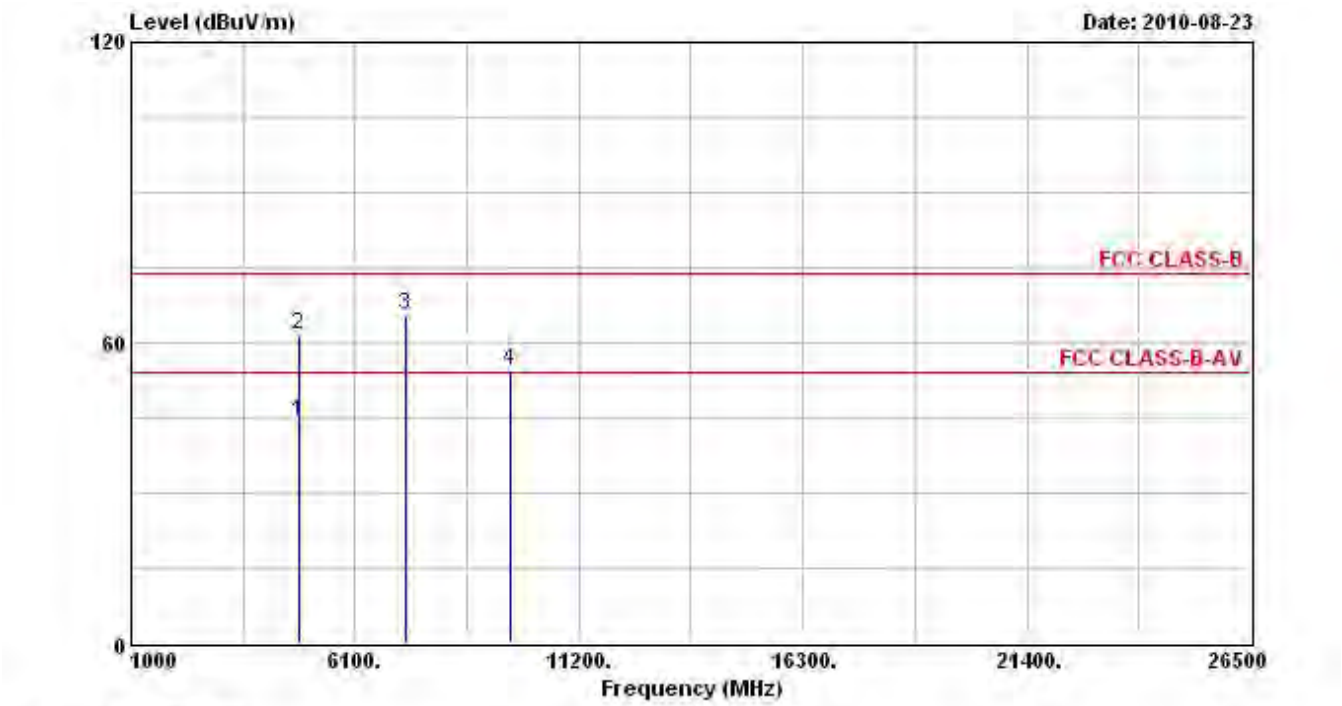
Horizontal



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	4824.000	43.07	-10.93	54.00	37.24	35.76	4.58	34.51	Average
2	4824.000	62.89	-11.11	74.00	57.06	35.76	4.58	34.51	Peak
3	7236.000	69.84			60.65	37.85	5.63	34.29	Peak
4	9648.000	55.11			44.01	39.39	6.34	34.63	Peak

Note: Item 3 and 4 are on un-restricted band, so the limit is -20dBc for the field strength of the fundamental emissions (see section 3.6.7).

Vertical

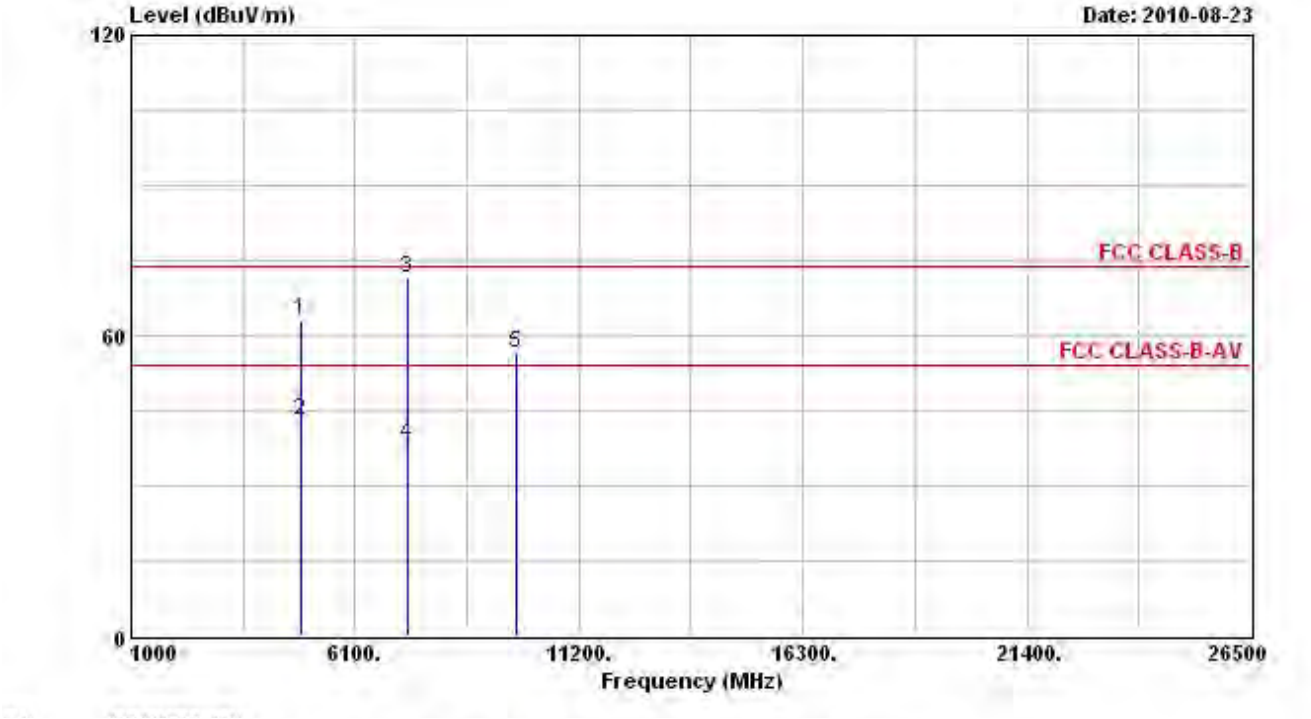


	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	4824.000	44.02	-9.98	54.00	38.82	35.13	4.58	34.51	Average
2	4824.000	61.62	-12.38	74.00	56.42	35.13	4.58	34.51	Peak
3	7236.000	65.51			57.27	36.90	5.63	34.29	Peak
4	9648.000	54.66			44.36	38.59	6.34	34.63	Peak

Note: Item 3 and 4 are on un-restricted band, so the limit is -20dBc for the field strength of the fundamental emissions (see section 3.6.7).

Test Date	Aug. 23, 2010	**Test Site No.**	03CH02-HY
Temperature	25℃	**Humidity**	54%
Test Engineer	Daniel	**Configurations**	MCS0 20MHz Ch 6 (Ant. 1)

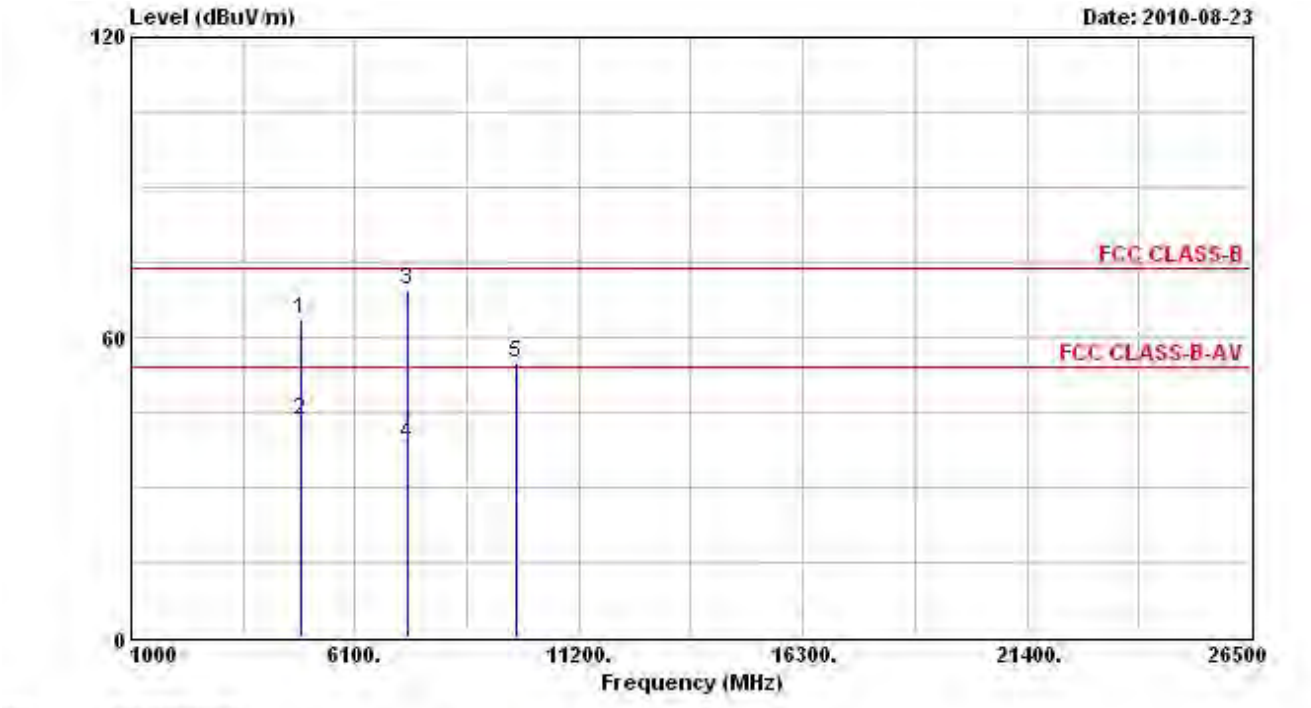
Horizontal



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	4874.000	63.18	-10.82	74.00	57.19	35.83	4.61	34.45	Peak
2	4874.000	43.18	-10.82	54.00	37.19	35.83	4.61	34.45	Average
3	7311.000	71.49	-2.51	74.00	62.28	37.86	5.64	34.29	Peak
4	7311.000	38.39	-15.61	54.00	29.18	37.86	5.64	34.29	Average
5	9748.000	56.46			45.17	39.51	6.36	34.58	Peak

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

Vertical

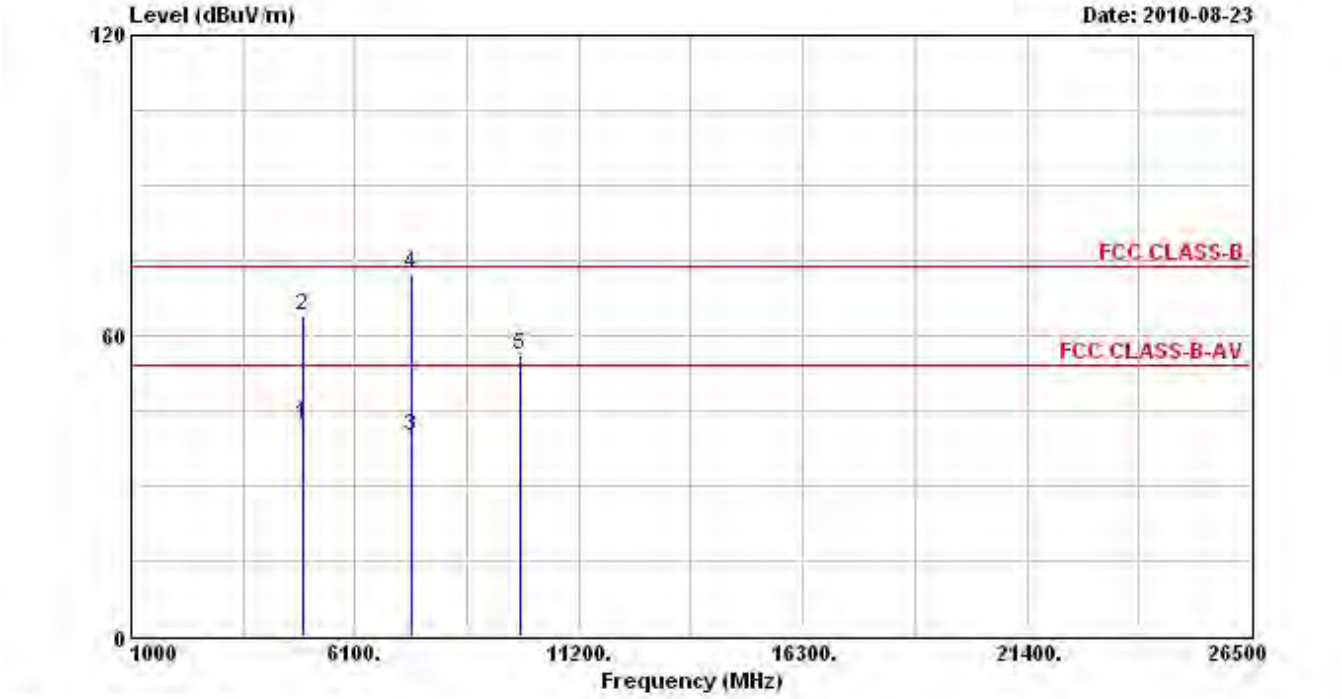


	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	4874.000	63.59	-10.41	74.00	58.25	35.18	4.61	34.45	Peak
2	4874.000	43.32	-10.68	54.00	37.98	35.18	4.61	34.45	Average
3	7311.000	69.46	-4.54	74.00	61.19	36.92	5.64	34.29	Peak
4	7311.000	38.49	-15.51	54.00	30.22	36.92	5.64	34.29	Average
5	9748.000	54.73			44.24	38.71	6.36	34.58	Peak

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

Test Date	Aug. 23, 2010	**Test Site No.**	03CH02-HY
Temperature	25℃	**Humidity**	54%
Test Engineer	Daniel	**Configurations**	MCS0 20MHz Ch 11 (Ant. 1)

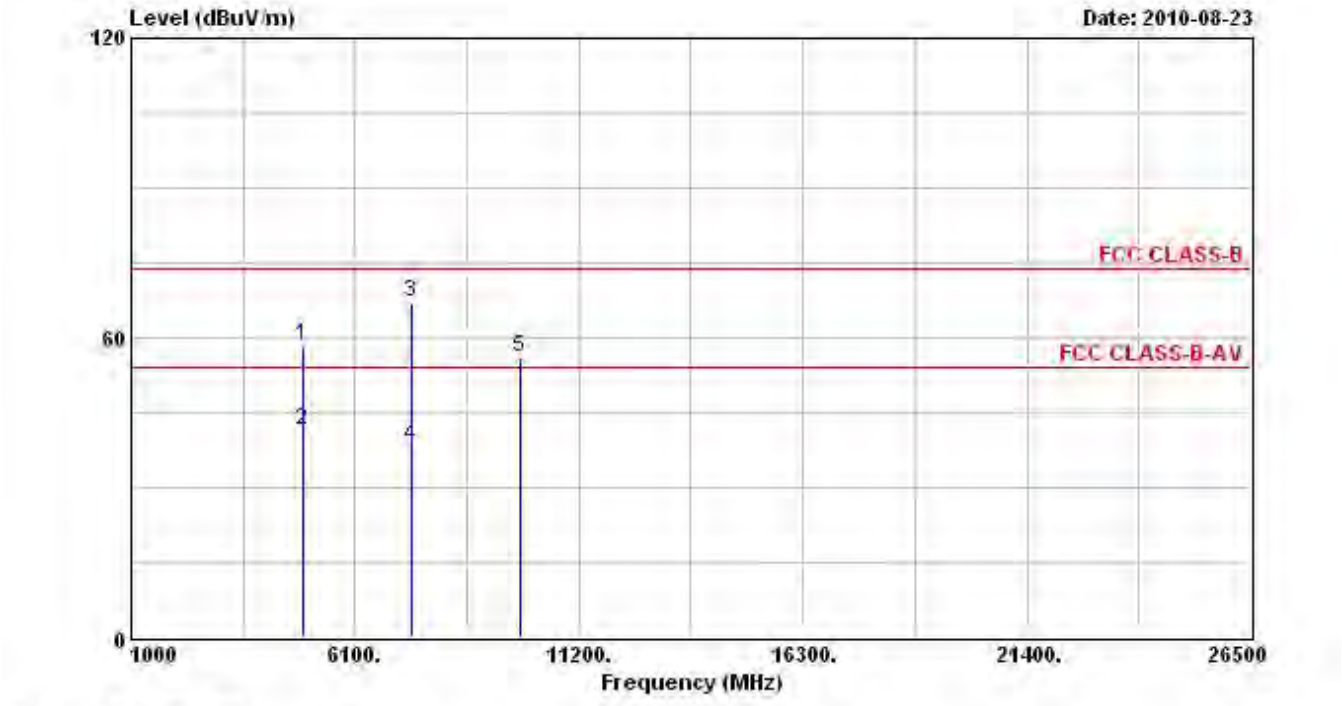
Horizontal



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	4924.000	42.14	-11.86	54.00	35.94	35.90	4.68	34.38	Average
2	4924.000	63.94	-10.06	74.00	57.74	35.90	4.68	34.38	Peak
3	7386.000	39.92	-14.08	54.00	30.68	37.88	5.65	34.29	Average
4	7386.000	72.43	-1.57	74.00	63.19	37.88	5.65	34.29	Peak
5	9848.000	56.05			44.60	39.61	6.38	34.54	Peak

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

Vertical

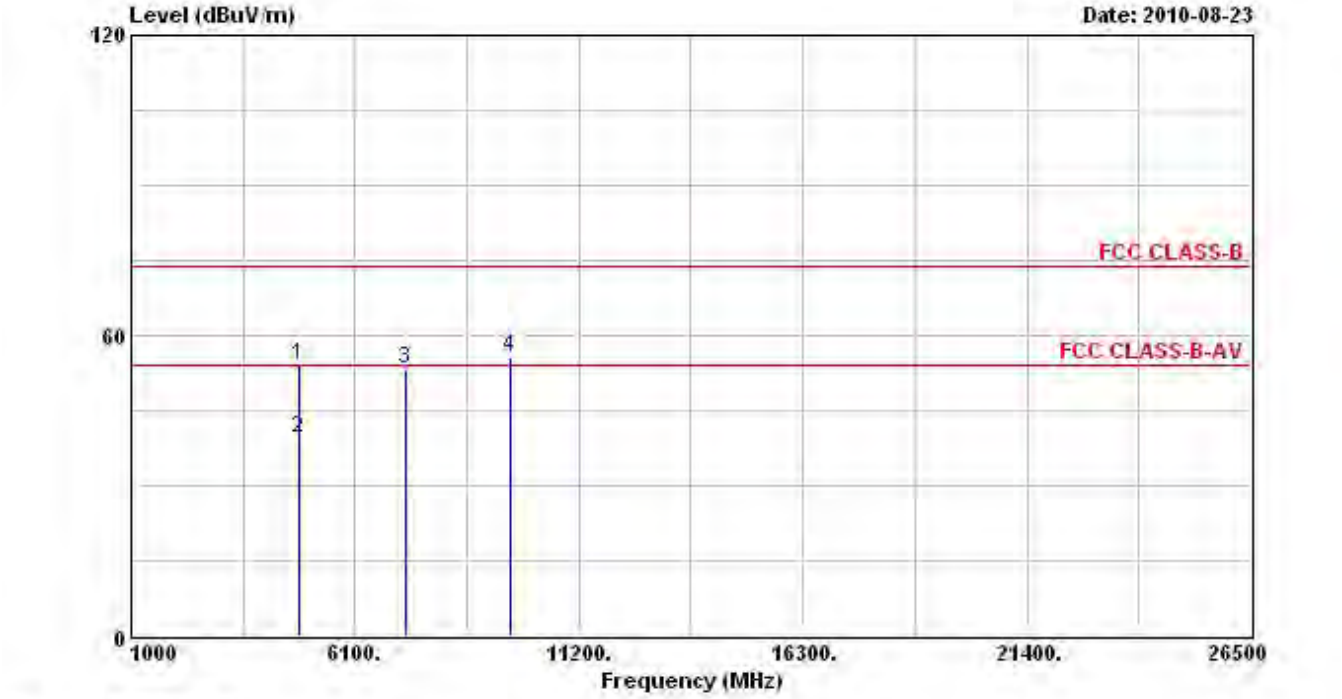


	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	4924.000	58.30	-15.70	74.00	52.77	35.23	4.68	34.38	Peak
2	4924.000	41.49	-12.51	54.00	35.96	35.23	4.68	34.38	Average
3	7386.000	67.23	-6.77	74.00	58.91	36.96	5.65	34.29	Peak
4	7386.000	38.18	-15.82	54.00	29.86	36.96	5.65	34.29	Average
5	9848.000	56.20			45.55	38.81	6.38	34.54	Peak

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

Test Date	Aug. 23, 2010	**Test Site No.**	03CH02-HY
Temperature	25℃	**Humidity**	54%
Test Engineer	Daniel	**Configurations**	MCS8 20MHz Ch 1 (Ant. 1 + Ant. 2)

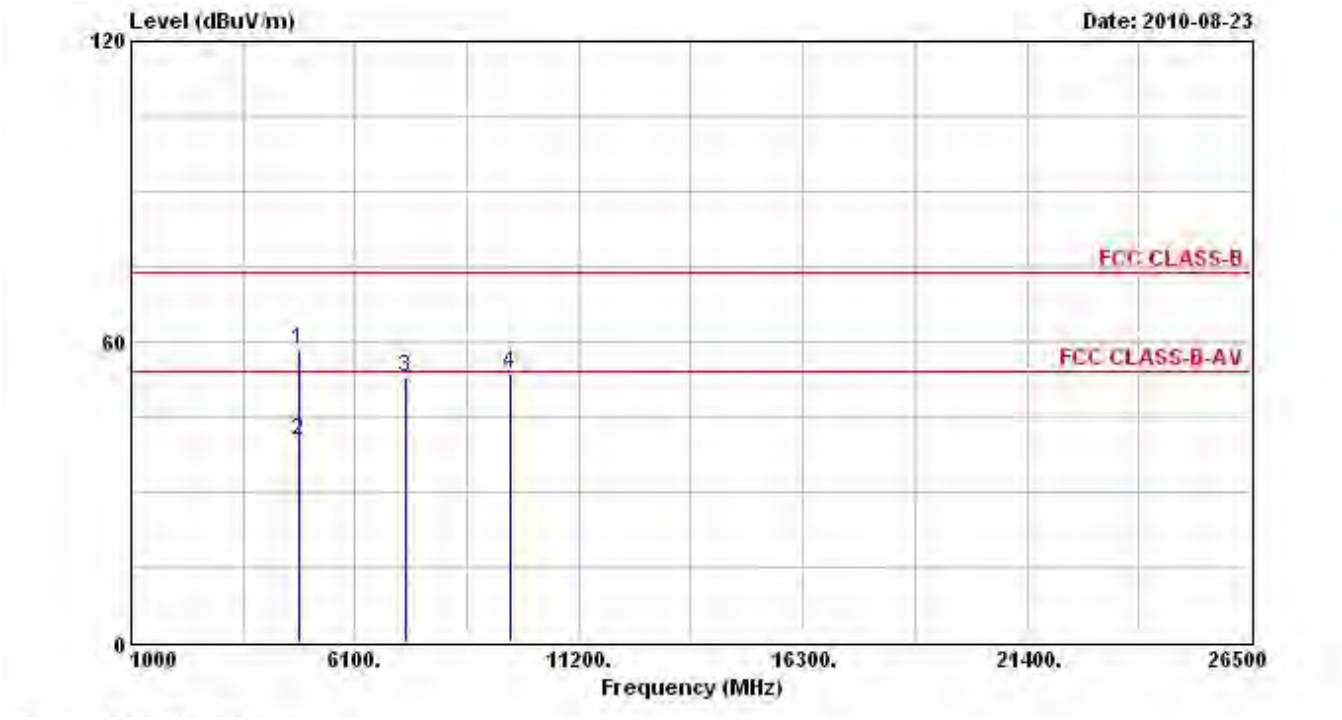
Horizontal



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	4824.000	53.97	-20.03	74.00	48.14	35.76	4.58	34.51	Peak
2	4824.000	39.60	-14.40	54.00	33.77	35.76	4.58	34.51	Average
3	7236.000	53.24			44.05	37.85	5.63	34.29	Peak
4	9648.000	55.65			44.55	39.39	6.34	34.63	Peak

Note: Item 3 and 4 are on un-restricted band, so the limit is -20dBc for the field strength of the fundamental emissions (see section 3.6.7).

Vertical

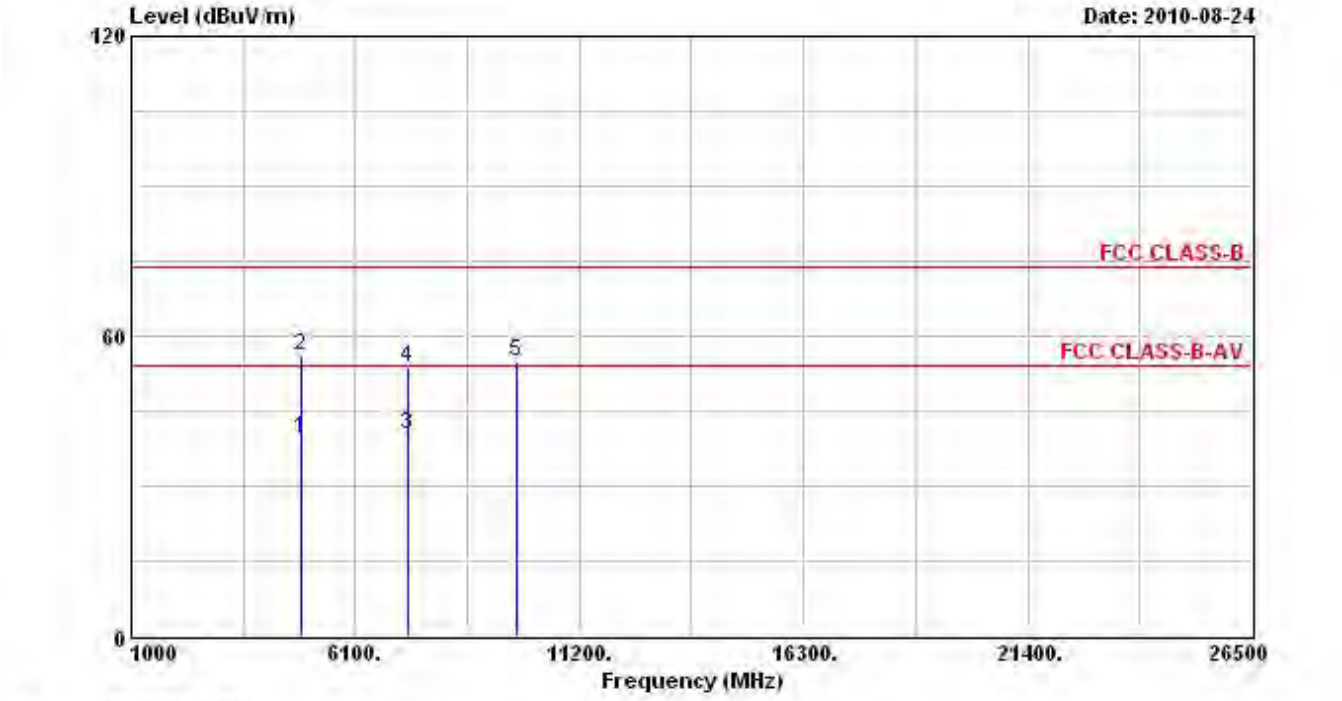


	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	4824.000	58.41	-15.59	74.00	53.21	35.13	4.58	34.51	Peak
2	4824.000	40.36	-13.64	54.00	35.16	35.13	4.58	34.51	Average
3	7236.000	52.82			44.58	36.90	5.63	34.29	Peak
4	9648.000	53.75			43.45	38.59	6.34	34.63	Peak

Note: Item 3 and 4 are on un-restricted band, so the limit is -20dBc for the field strength of the fundamental emissions (see section 3.6.7).

Test Date	Aug. 24, 2010	**Test Site No.**	03CH02-HY
Temperature	25℃	**Humidity**	54%
Test Engineer	Daniel	**Configurations**	MCS8 20MHz Ch 6 (Ant. 1 + Ant. 2)

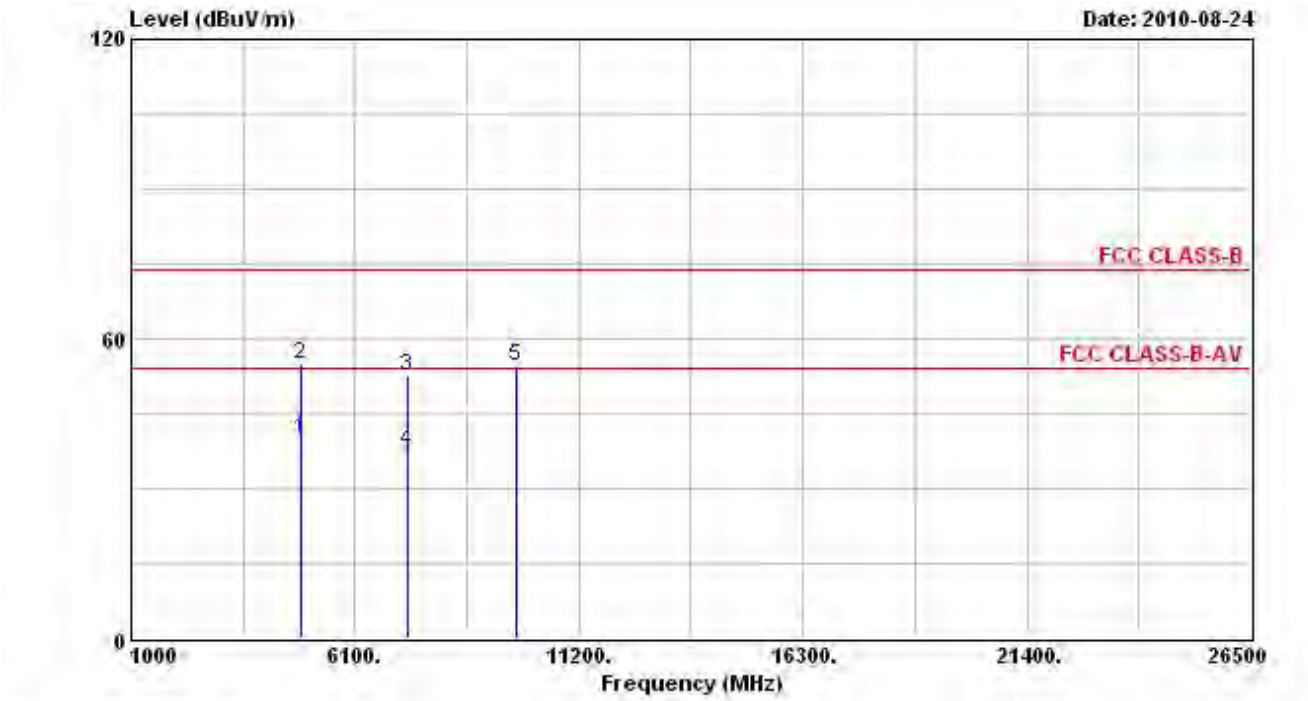
Horizontal



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	4874.000	39.60	-14.40	54.00	33.61	35.83	4.61	34.45	Average
2	4874.000	56.24	-17.76	74.00	50.25	35.83	4.61	34.45	Peak
3	7311.000	40.23	-13.77	54.00	31.02	37.86	5.64	34.29	Average
4	7311.000	53.51	-20.49	74.00	44.30	37.86	5.64	34.29	Peak
5	9748.000	54.81			43.52	39.51	6.36	34.58	Peak

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

Vertical

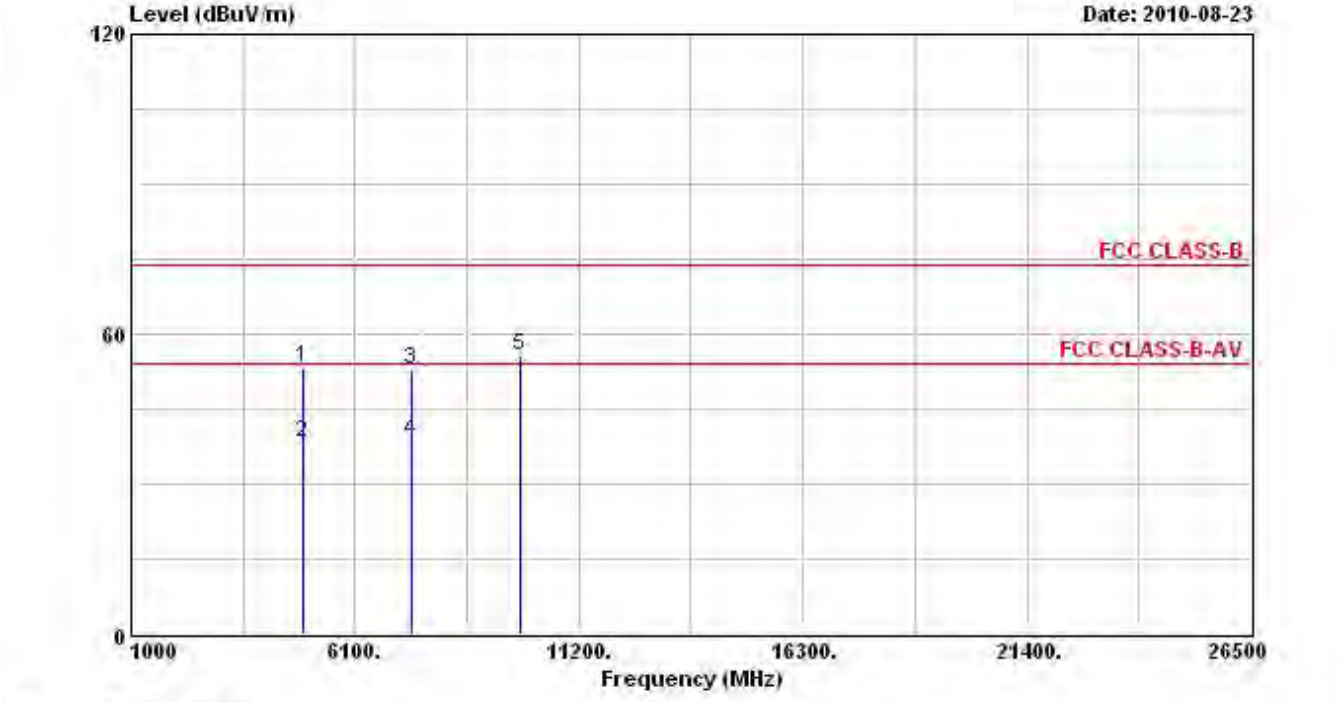


	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	4874.000	39.82	-14.18	54.00	34.48	35.18	4.61	34.45	Average
2	4874.000	54.96	-19.04	74.00	49.62	35.18	4.61	34.45	Peak
3	7311.000	52.33	-21.67	74.00	44.06	36.92	5.64	34.29	Peak
4	7311.000	37.55	-16.45	54.00	29.28	36.92	5.64	34.29	Average
5	9748.000	54.34			43.85	38.71	6.36	34.58	Peak

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

Test Date	Aug. 23, 2010	**Test Site No.**	03CH02-HY
Temperature	25℃	**Humidity**	54%
Test Engineer	Daniel	**Configurations**	MCS8 20MHz Ch 11 (Ant. 1 + Ant. 2)

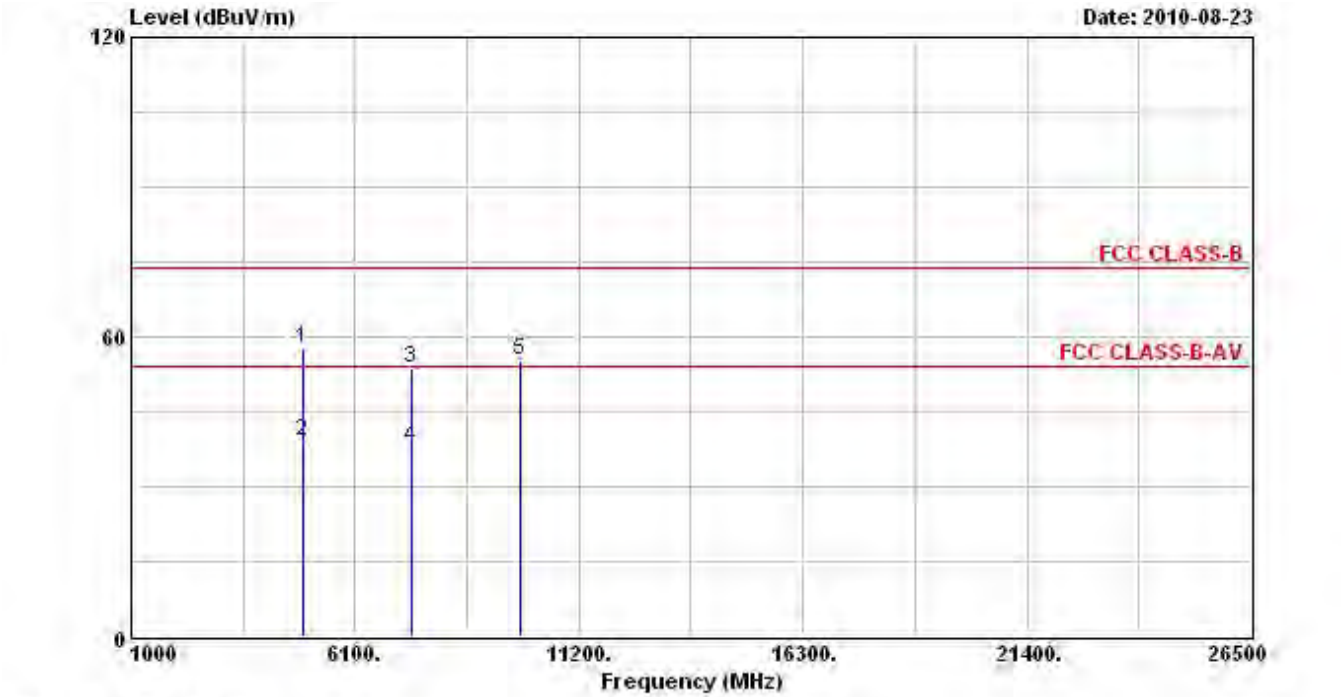
Horizontal



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	4924.000	53.21	-20.79	74.00	47.01	35.90	4.68	34.38	Peak
2	4924.000	38.20	-15.80	54.00	32.00	35.90	4.68	34.38	Average
3	7386.000	53.01	-20.99	74.00	43.77	37.88	5.65	34.29	Peak
4	7386.000	38.54	-15.46	54.00	29.30	37.88	5.65	34.29	Average
5	9848.000	55.57			44.12	39.61	6.38	34.54	Peak

Note: Item 5 is on un-restricted band, so the limit is -20dBc 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
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	4924.000	57.52	-16.48	74.00	51.99	35.23	4.68	34.38	Peak
2	4924.000	39.08	-14.92	54.00	33.55	35.23	4.68	34.38	Average
3	7386.000	53.78	-20.22	74.00	45.46	36.96	5.65	34.29	Peak
4	7386.000	37.75	-16.25	54.00	29.43	36.96	5.65	34.29	Average
5	9848.000	55.27			44.62	38.81	6.38	34.54	Peak

Note: Item 5 is on un-restricted band, so the limit is -20dBc 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 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 bandedges.
2. In case the emission is fail due to the used RB/VB is too wide, marker-delta method of FCC Public Notice DA00-705 will be followed.

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 Emissions

Test Date	Aug. 24, 2010	**Test Site No.**	03CH02-HY
Temperature	25℃	**Humidity**	54%
Test Engineer	Daniel	**Configurations**	802.11b CH 1, 6, 11 (Ant. 1)

Channel 1

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	2389.990	62.35	-11.65	74.00	27.54	31.79	3.02	0.00	Peak
2 @	2412.980	113.74			78.86	31.86	3.02	0.00	Peak
1	2387.330	49.36	-4.64	54.00	14.55	31.79	3.02	0.00	Average
2 @	2412.410	108.80			73.92	31.86	3.02	0.00	Average

An item 2 is Fundamental Emissions.

Channel 6

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1 X	2438.060	113.37			78.33	31.99	3.05	0.00	Peak
1 @	2435.970	108.19			73.22	31.92	3.05	0.00	Average

An item 1 is Fundamental Emissions.

Channel 11

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1 @	2463.330	114.44			79.30	32.06	3.08	0.00	Peak
2	2498.290	64.81	-9.19	74.00	29.53	32.20	3.08	0.00	Peak
1 @	2462.570	109.41			74.27	32.06	3.08	0.00	Average
2	2499.810	51.52	-2.48	54.00	16.24	32.20	3.08	0.00	Average

An 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.

Test Date	Aug. 24, 2010	**Test Site No.**	03CH02-HY
Temperature	25℃	**Humidity**	54%
Test Engineer	Daniel	**Configurations**	802.11g CH 1, 6, 11 (Ant. 1)

Channel 1

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	2389.990	73.54	-0.46	74.00	38.73	31.79	3.02	0.00	Peak
2 @	2411.650	116.46			81.58	31.86	3.02	0.00	Peak
1	2389.990	53.31	-0.69	54.00	18.50	31.79	3.02	0.00	Average
2 @	2410.890	102.73			67.85	31.86	3.02	0.00	Average

Item 2 is Fundamental Emissions.

Channel 6

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1 @	2436.730	116.32			81.28	31.99	3.05	0.00	Peak
1 @	2435.970	103.27			68.30	31.92	3.05	0.00	Average

An item 1 is Fundamental Emissions.

Channel 11

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1 X	2461.620	112.29			77.18	32.06	3.05	0.00	Peak
2	2483.470	72.70	-1.30	74.00	37.49	32.13	3.08	0.00	Peak
1 @	2461.050	100.48			65.37	32.06	3.05	0.00	Average
2	2483.850	52.63	-1.37	54.00	17.42	32.13	3.08	0.00	Average

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.

Test Date	Aug. 24, 2010	Test Site No.	03CH02-HY
Temperature	25℃	Humidity	54%
Test Engineer	Daniel	Configurations	MCS0 20MHz Ch1, 6, 11 (Ant. 1)

Channel 1

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	2388.090	72.06	-1.94	74.00	37.25	31.79	3.02	0.00	Peak
2 X	2406.330	110.75			75.87	31.86	3.02	0.00	Peak
1	2389.990	52.43	-1.57	54.00	17.62	31.79	3.02	0.00	Average
2 @	2410.890	99.95			65.07	31.86	3.02	0.00	Average

Item 2 is Fundamental Emissions.

Channel 6

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1 X	2436.730	112.49			77.45	31.99	3.05	0.00	Peak
1 X	2437.490	100.13			65.09	31.99	3.05	0.00	Average

An item 1 is Fundamental Emissions.

Channel 11

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1 X	2460.860	112.62			77.51	32.06	3.05	0.00	Peak
2	2483.500	70.99	-3.01	74.00	35.78	32.13	3.08	0.00	Peak
1 @	2461.050	101.21			66.10	32.06	3.05	0.00	Average
2	2483.470	52.82	-1.18	54.00	17.61	32.13	3.08	0.00	Average

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.

Test Date	Aug. 24, 2010	**Test Site No.**	03CH02-HY
Temperature	25℃	**Humidity**	54%
Test Engineer	Daniel	**Configurations**	MCS8 20MHz Ch 1, 6 , 11 (Ant. 1 + Ant. 2)

Channel 1

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	2389.610	68.07	-5.93	74.00	33.26	31.79	3.02	0.00	Peak
2 X	2412.980	110.57			75.69	31.86	3.02	0.00	Peak
1	2389.990	53.52	-0.48	54.00	18.71	31.79	3.02	0.00	Average
2 @	2413.170	98.00			63.12	31.86	3.02	0.00	Average

Item 2 is Fundamental Emissions.

Channel 6

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1 @	2438.060	113.94			78.90	31.99	3.05	0.00	Peak
1 @	2438.060	100.67			65.63	31.99	3.05	0.00	Average

An item 1 is Fundamental Emissions.

Channel 11

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1 X	2460.860	112.25			77.14	32.06	3.05	0.00	Peak
2	2484.420	72.34	-1.66	74.00	37.13	32.13	3.08	0.00	Peak
1 @	2463.140	99.21			64.07	32.06	3.08	0.00	Average
2	2483.470	53.02	-0.98	54.00	17.81	32.13	3.08	0.00	Average

Item 1 is Fundamental Emissions.

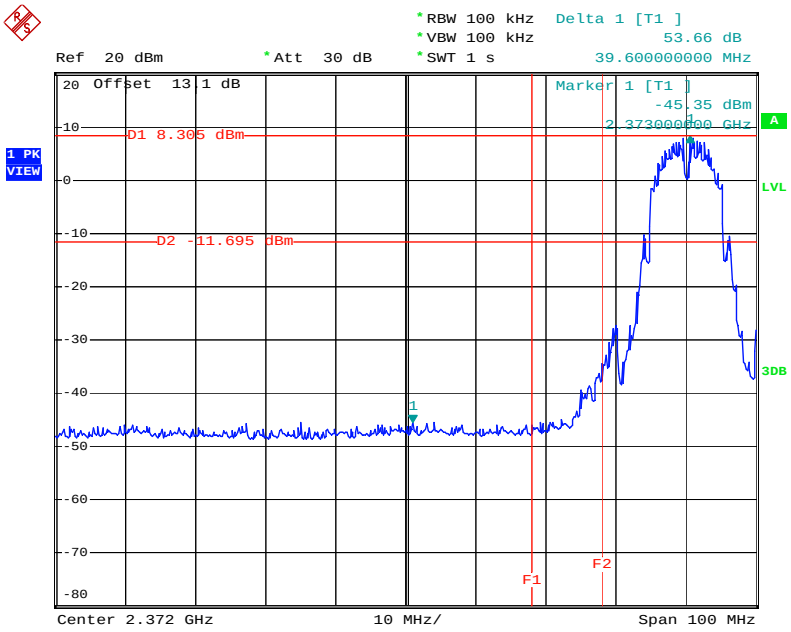
Note:

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

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

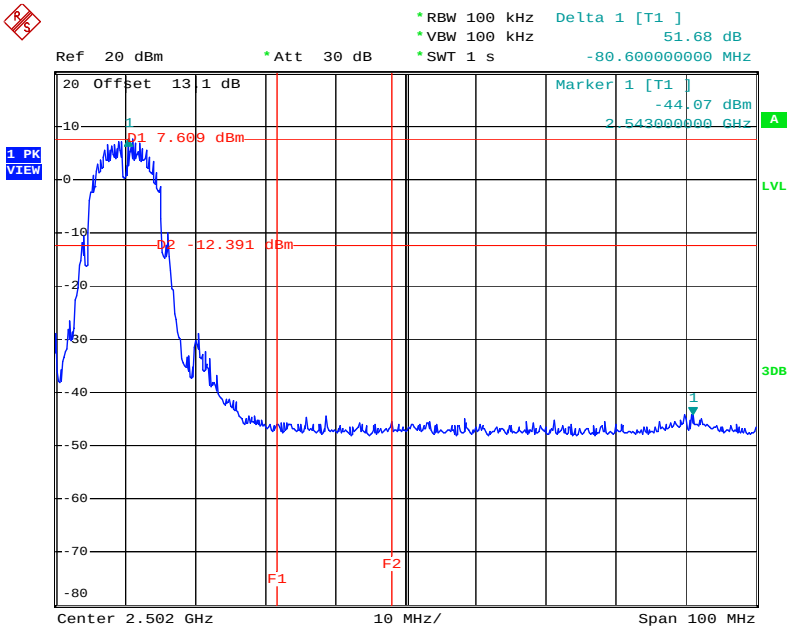
For Emission not in Restricted Band

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



Date: 7.JAN.2010 05:19:48

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



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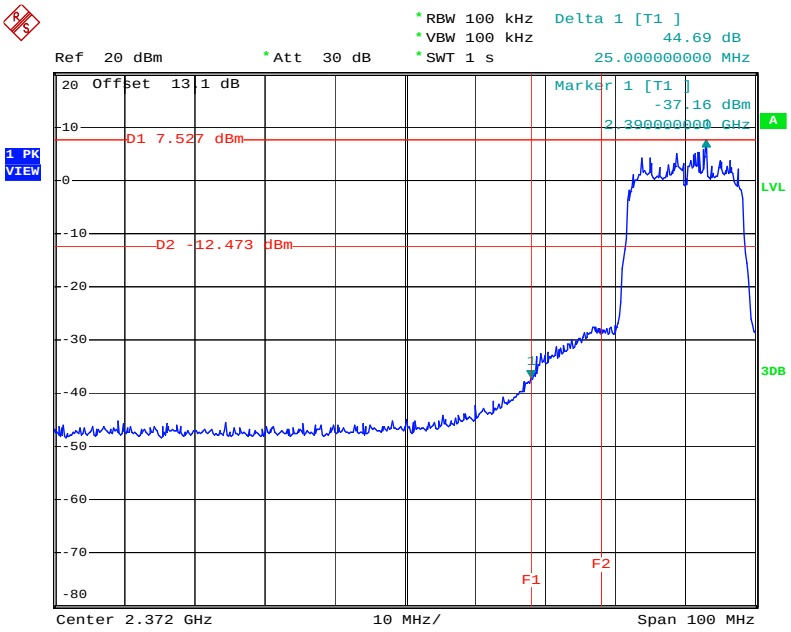
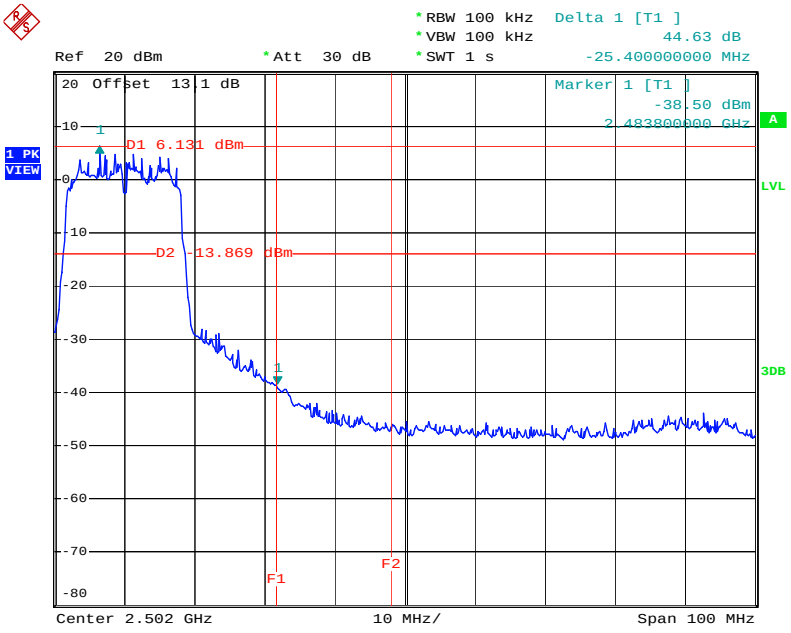
Low Band Edge Plot on Configuration IEEE 802.11g / 2412 MHz



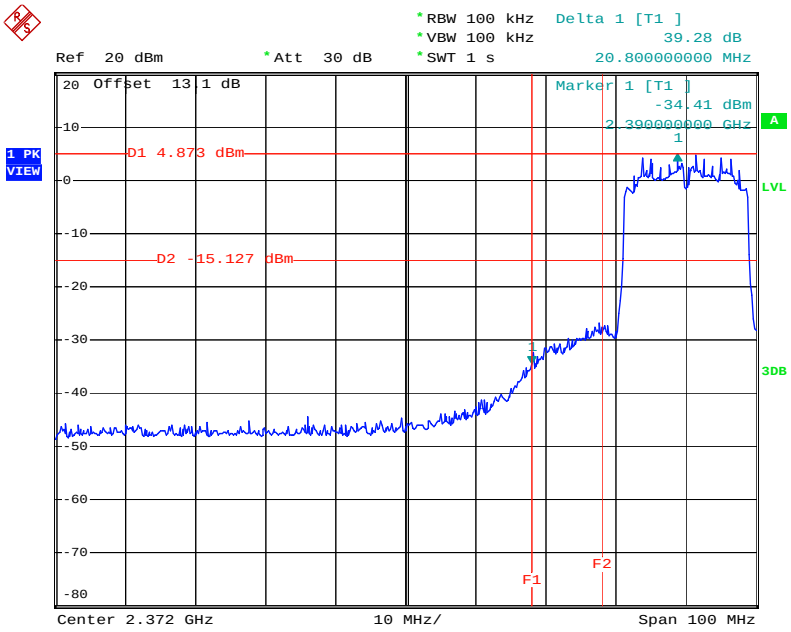
Date: 8.JAN.2010 05:03:43

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



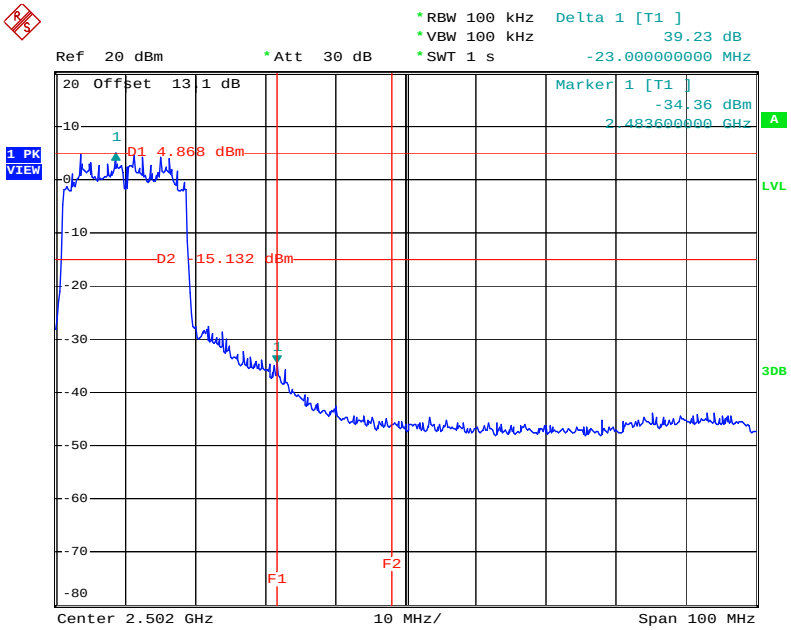
Date: 8.JAN.2010 05:18:40

Low Band Edge Plot on Configuration IEEE 802.11n MCS0 20MHz Ant. 1 / 2412 MHz



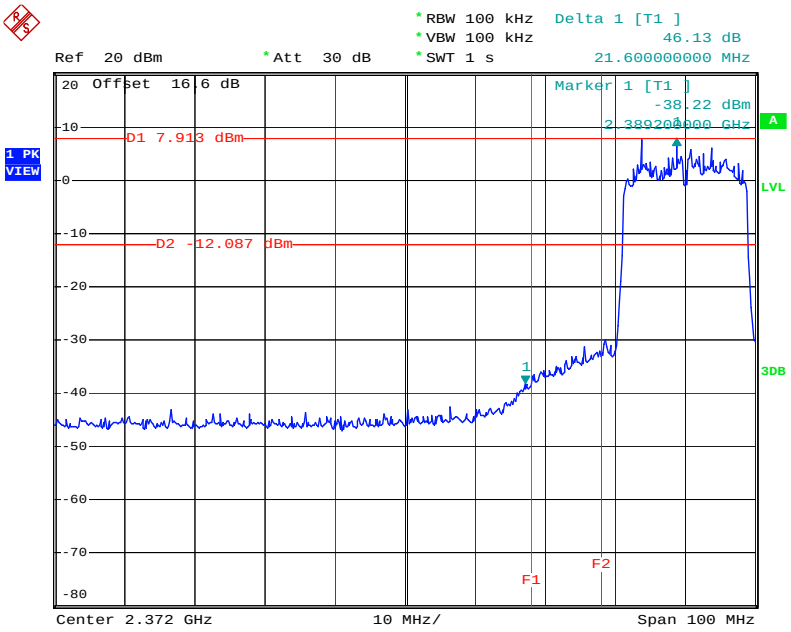
Date: 7.JAN.2010 07:19:30

High Band Edge Plot on Configuration IEEE 802.11n MCS0 20MHz Ant. 1 / 2462 MHz



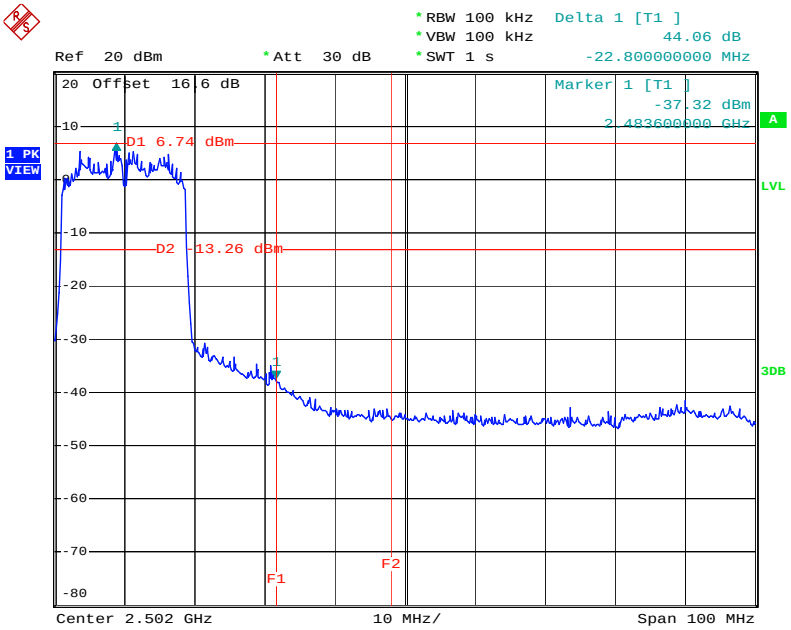
Date: 7.JAN.2010 07:26:51

Low Band Edge Plot on Configuration IEEE 802.11n MCS8 20MHz 2412 MHz



Date: 7.JAN.2010 07:31:39

High Band Edge Plot on Configuration IEEE 802.11n MCS8 20MHz 2462 MHz



Date: 7.JAN.2010 07:47:12

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. Further, this requirement does not apply to intentional radiators that must be professionally installed.

3.7.2. Antenna Connector Construction

Please refer to section 2.3 in this test report; there is no antenna connector on this board.

4. LIST OF MEASURING EQUIPMENTS

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
EMC Receiver	R&S	ESCS 30	100174	9kHz – 2.75GHz	Apr. 06, 2010	Conduction (CO04-HY)
LISN	MessTec	NNB-2/16Z	99041	9kHz – 30MHz	Mar. 23, 2010	Conduction (CO04-HY)
LISN (Support Unit)	EMCO	3810/2NM	9703-1839	9kHz – 30MHz	Apr. 29, 2010	Conduction (CO04-HY)
RF Cable-CON	UTIFLEX	3102-26886-4	CB049	9kHz – 30MHz	Apr. 20, 2010	Conduction (CO04-HY)
ISN	SCHAFFNER	ISN T400	21653	9kHz –30MHz	Jun. 10, 2010	Conduction (CO04-HY)
EMI Filter	LINDGREN	LRE-2030	2651	< 450 Hz	N/A	Conduction (CO04-HY)

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

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Spectrum Analyzer	R&S	FSU26.5	100015	20Hz ~ 26.5GHz	Oct. 29, 2009	Conducted (TH01-HY)
Power Meter	Anritsu	ML2495A	0949003	300MHz~ 40GHz	Dec. 03, 2009	Conducted (TH01-HY)
Power Sensor	R&S	NRV-Z51	100666	DC ~ 30GHz	Aug. 05, 2009	Conducted (TH01-HY)
Power Sensor	R&S	NRV-Z32	100057	30MHz ~ 6GHz	Jul. 31, 2009	Conducted (TH01-HY)
DC Power Source	G.W.	GPC-6030D	C671845	DC 1V ~ 60V	Mar. 13, 2009	Conducted (TH01-HY)
Temp. and Humidity Chamber	Giant Force	GTH-225-20-S	MAB0103-001	N/A	Aug. 06, 2009	Conducted (TH01-HY)
RF CABLE-1m	Jye Bao	RG142	CB034-1m	20MHz ~ 7GHz	Dec. 02, 2009	Conducted (TH01-HY)
RF CABLE-2m	Jye Bao	RG142	CB035-2m	20MHz ~ 1GHz	Dec. 02, 2009	Conducted (TH01-HY)
Vector Signal Generator	R&S	SMU200A	102098	100kHz ~ 6GHz	Feb. 13, 2009	Conducted (TH01-HY)
Signal Generator	R&S	SMR40	100116	10MHz ~ 40GHz	Mar. 25, 2009	Conducted (TH01-HY)

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

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH02-HY	30 MHz - 1 GHz 3m	May 01, 2010	Radiation (03CH02-HY)
Spectrum Analyzer	R&S	FSP40	100305/040	9 kHz - 40GHz	Feb. 02, 2010	Radiation (03CH02-HY)
Amplifier	Agilent	8447D	2944A11146	100 kHz – 1.3 GHz	Jul. 07, 2010	Radiation (03CH02-HY)
Amplifier	Agilent	8449B	3008A02373	1GHz – 26.5 GHz	Jul. 16, 2010	Radiation (03CH02-HY)
Horn Antenna	ETS-LINDGREN	3117	00091920	1GHz~18GHz	Oct. 22, 2009	Radiation (03CH02-HY)
Horn Antenna	SCHWARZBECK	BBHA9170	BBHA9170154	15 GHz - 40 GHz	NCR	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. NCR: Non-Calibration required.

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Loop Antenna	R&S	HFH2-Z2	860004/001	9 kHz - 30 MHz	Jul 28, 2010*	Radiation (03CH02-HY)
AC Power Source	HPC	HPA-500W	HPA-9100024	AC 0 ~ 300V	Jul. 12, 2009*	Conducted (TH01-HY)

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

5. TEST LOCATIONS

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.：L1190-100529

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：May 29, 2010

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