

FCC RADIO TEST REPORT

according to

47 CFR FCC Part 15 Subpart C § 15.247

Equipment : **Wireless Access Point BSAP-1840**
Model No. : **BSAP-1840**
Brand Name : **bluesocket**
Filing Type : **New Application**
Applicant : **Bluesocket, Incorporated**
10 North Ave Burlington Massachusetts 01803 United States
FCC ID : **TIH-BSAP1840**
Manufacturer : **DONG GUAN G-COM COMPUTER CO., LTD**
1st Row Yin Shan Rd., Yin Hwu Industrial Area, Qingxi
Town, DongGuan City, Guang Dong, China
Received Date : May 01, 2008
Final Test Date : Aug. 03 2009

Statement

Test result included is only for the 802.11b/g and 802.11a (5725 ~ 5850MHz) Monopole Antenna 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.

6F, No. 106, Sec. 1, Hsin Tai Wu Rd., Hsi Chih, Taipei Hsien, Taiwan, R.O.C.

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CERTIFICATE OF COMPLIANCE

according to

47 CFR FCC Part 15 Subpart C § 15.247

Equipment : Wireless Access Point BSAP-1840
Model No. : BSAP-1840
Brand Name : bluesocket
Applicant : Bluesocket, Incorporated
10 North Ave Burlington Massachusetts
01803 United States

Sporton International as requested by the applicant to evaluate the EMC performance of the product sample received on May 01, 2008 would like to declare that the tested sample has been evaluated and found to be in compliance with the tested rule parts. The data recorded as well as the test configuration specified is true and accurate for showing the sample's EMC nature.


Wayne Hsu

SPORTON International Inc.

6F, No.106, Sec. 1, Hsin Tai Wu Rd., Hsi Chih, Taipei 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	1.62 dB
3.2	15.247(b)(3)	Maximum Conducted Output Power	Complies	9.56 dB
3.3	15.247(e)	Power Spectral Density	Complies	7.78 dB
3.4	15.247(a)(2)	6dB Spectrum Bandwidth	Complies	-
3.5	15.247(d)	Radiated Emissions	Complies	2.01 dB
3.6	15.247(d)	Band Edge Emissions	Complies	1.04 dB
3.7	15.203	Antenna Requirements	Complies	-

Test Items	Uncertainty	Remark
AC Power Line Conducted Emissions	±2.3dB	Confidence levels of 95%
Maximum Peak Conducted Output Power	±0.8dB	Confidence levels of 95%
Power Spectral Density	±0.5dB	Confidence levels of 95%
6dB Spectrum Bandwidth	±8.5×10 ⁻⁸	Confidence levels of 95%
Radiated Emissions (9kHz~30MHz)	±0.8dB	Confidence levels of 95%
Radiated Emissions (30MHz~1000MHz)	±1.9dB	Confidence levels of 95%
Radiated / Band Edge Emissions (1GHz~18GHz)	±1.9dB	Confidence levels of 95%
Radiated Emissions (18GHz~40GHz)	±1.9dB	Confidence levels of 95%
Temperature	±0.7	Confidence levels of 95%
Humidity	±3.2%	Confidence levels of 95%
DC / AC Power Source	±1.4%	Confidence levels of 95%

2 GENERAL INFORMATION

2.1 Product Details

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

Items	Description
Modulation	DSSS for IEEE 802.11b ; OFDM for IEEE 802.11a/g
Data Modulation	DSSS (DBPSK / DQPSK / CCK) ; OFDM (BPSK / QPSK / 16QAM / 64QAM)
Data Rate (Mbps)	DSSS (1/ 2/ 5.5/11) ; OFDM (6/9/12/18/24/36/48/54)
Frequency Range	2400 ~ 2483.5MHz / 5725 ~ 5850MHz
Channel Number	11a: 5 ; 11b/g: 11
Channel Band Width (99%)	11a: 16.44 MHz ; 11b: 15.12 MHz ; 11g: 16.60 MHz
Conducted Output Power	11a: 13.25 dBm ; 11b: 20.44 dBm ; 11g: 18.92 dBm

2.2 Table for Filed Antenna

Antenna & Bandwidth

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

Ant.	Antenna Type	Model Name	Product description	Gain (dBi)	Tx/Rx mode	REMARK
1	Monopole Ant.	TWX-145XRSXX361	2dBi 2.4/5GHz Dual-Band Antenna	2/2	2T3R concurrent	Main Ant. for test
2	Monopole Ant	IWX-145XRSCX-361	2dBi 2.4GHz Single-Band Antenna	2	2T3R concurrent	N/A
3	Monopole Ant	KWX-145XRSDX-361	2dBi 5GHz Single-Band Antenna	2	2T3R concurrent	N/A

Ant.	Antenna Type	Connector	Gain (dBi)		Remark
			2.4G	5G	
1	Monopole Antenna	Reversed-SMA	2	2	TX / RX
2	Monopole Antenna	Reversed-SMA	2	2	TX / RX
3	Monopole Antenna	Reversed-SMA	2	2	RX

Antenna: There are six antennas configuration used in this EUT. (3 Antennas for 2.4GHz band and 3 Antennas for 5GHz band) Three antennas used in the same band have 2T3R concurrent spatial multiplexing MIMO configuration and two of them for signal transceiving and the other antenna for signal receiving whenever in 2.4GHz or 5GHz.

2.3 Table for Carrier Frequencies

Frequency Allocation for 802.11a

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

Frequency Allocation for 802.11b/g

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

2.4 Table for Test Modes

Preliminary tests were performed in different data rate to find the worst radiated emission. The data rate shown in the table below is the worst-case rate with respect to the specific test item. Investigation has been done on all the possible Configuration for searching the worst cases. The following table is a list of the test modes shown in this test report.

Test Items	Mode	Data Rate	Channel	Antenna
AC Power Line Conducted Emissions	See the note	Auto	-	-
Max. Peak Conducted Output Power	11a/BPSK	6 Mbps	149/157/165	Ant. 1
Power Spectral Density	11b/CCK	11 Mbps	1/6/11	Ant. 1
6dB Spectrum Bandwidth	11g/BPSK	6 Mbps	1/6/11	Ant. 1
Radiated Emissions Below 1GHz	See the note	Auto	-	-
Radiated Emissions Above 1GHz	11a/BPSK	6 Mbps	149/157/165	Ant. 1
Band Edge Emissions	11b/CCK	11 Mbps	1/6/11	Ant. 1
	11g/BPSK	6 Mbps	1/6/11	Ant. 1

Note: The following modes were tested:

Conducted Emissions

Adapter Mode (DSA-15P-12 US)

Adapter Mode (DSA-20D-12 2)

POE Mode (Power Supply: POE20U-560(G) -R)

In the Radiated (Below 1GHz) because POE Mode is performed the worst test result; it was reported as final data (30MHz~1GHz Chapter 3.5.8).

2.5 Table for Testing Locations

Test Site No.	Site Category	Location	FCC Reg. No.	IC File No.
CO04-HY	Conduction	Hwa Ya	643075	IC 4086B-1
TH01-HY	OVEN Room	Hwa Ya	-	-
OS04-LK	OATS	Lin Kou	93596	IC 4086C-1
03CH03-HY	SAC	Hwa Ya	643075	IC 4086B-1

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

2.6 Table for Supporting Units

Support Unit	Brand	Model	FCC ID
P.C. (Remote Workstation)	COMPAQ	Evo D380mx	DoC
Notebook (Remote Workstation)	DELL	D400	DoC
Monitor (Remote Workstation)	COMPAQ	S510	DoC
Keyboard (PS2) (Remote Workstation)	COMPAQ	6511-VA	DoC
Mouse (PS2) (Remote Workstation)	COMPAQ	M-S69	JNZ211443
Switching Power Supply	PHIHONG	POE20U-560(G) -R	-

2.7 Table for Parameters of Test Software Setting

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

Power Parameters of IEEE 802.11a

Test Software Version	ART 0.5 BUILD#25		
Frequency	5745 MHz	5785 MHz	5825 MHz
IEEE 802.11a	15.5	14.5	15

Power Parameters of IEEE 802.11b/g

Test Software Version	ART 0.5 BUILD#25		
Frequency	2412 MHz	2437 MHz	2462 MHz
IEEE 802.11b	21	23	22
IEEE 802.11g	16	21.5	16

2.8 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 NB sends “ H “ messages to the panel, and the panel displays “ H “ patterns on the screen.

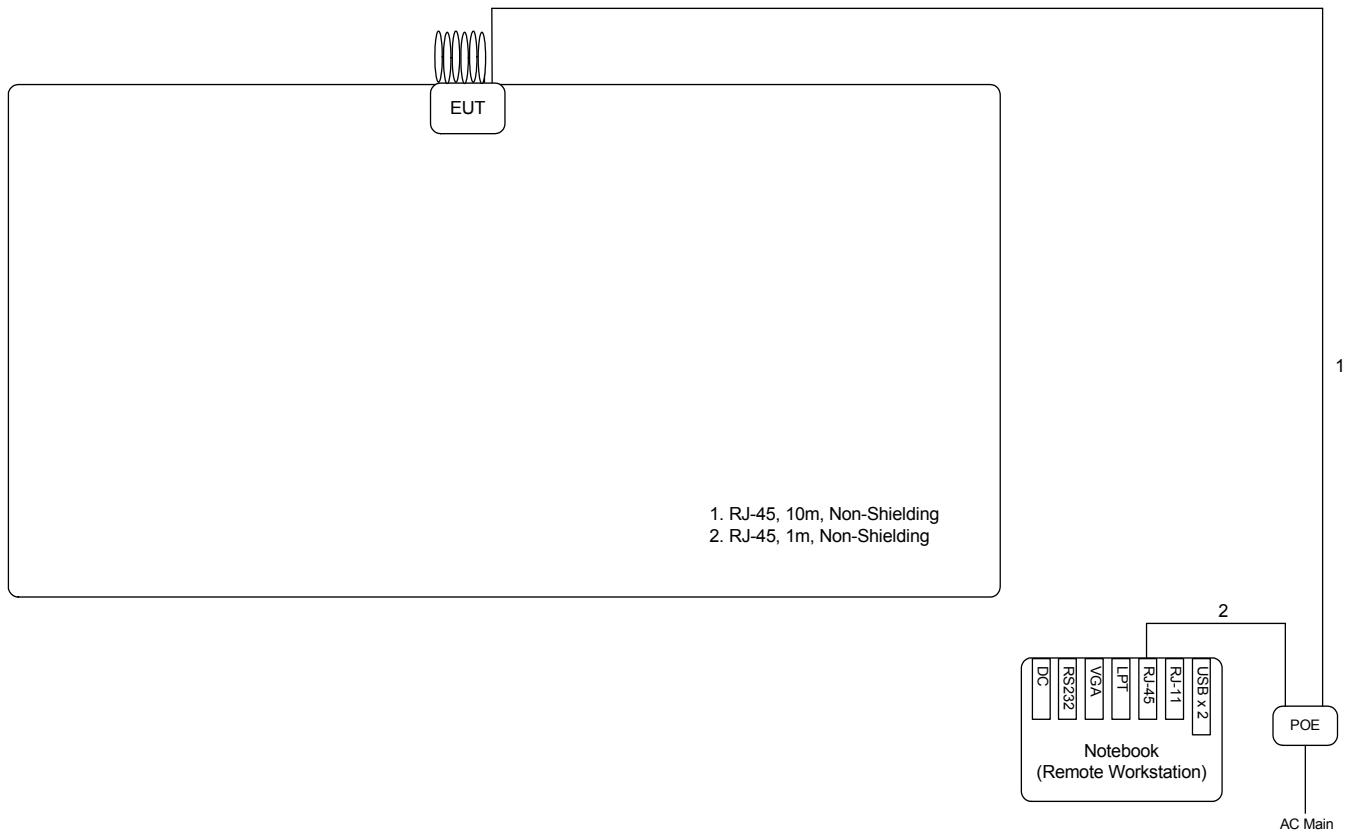
Executed "ping.exe" to link with the remote workstation to receive and transmit data by LAN and WLAN.

Executed “ART 0.5 BUILD#25” to keep transmitting signals at fixed frequency.

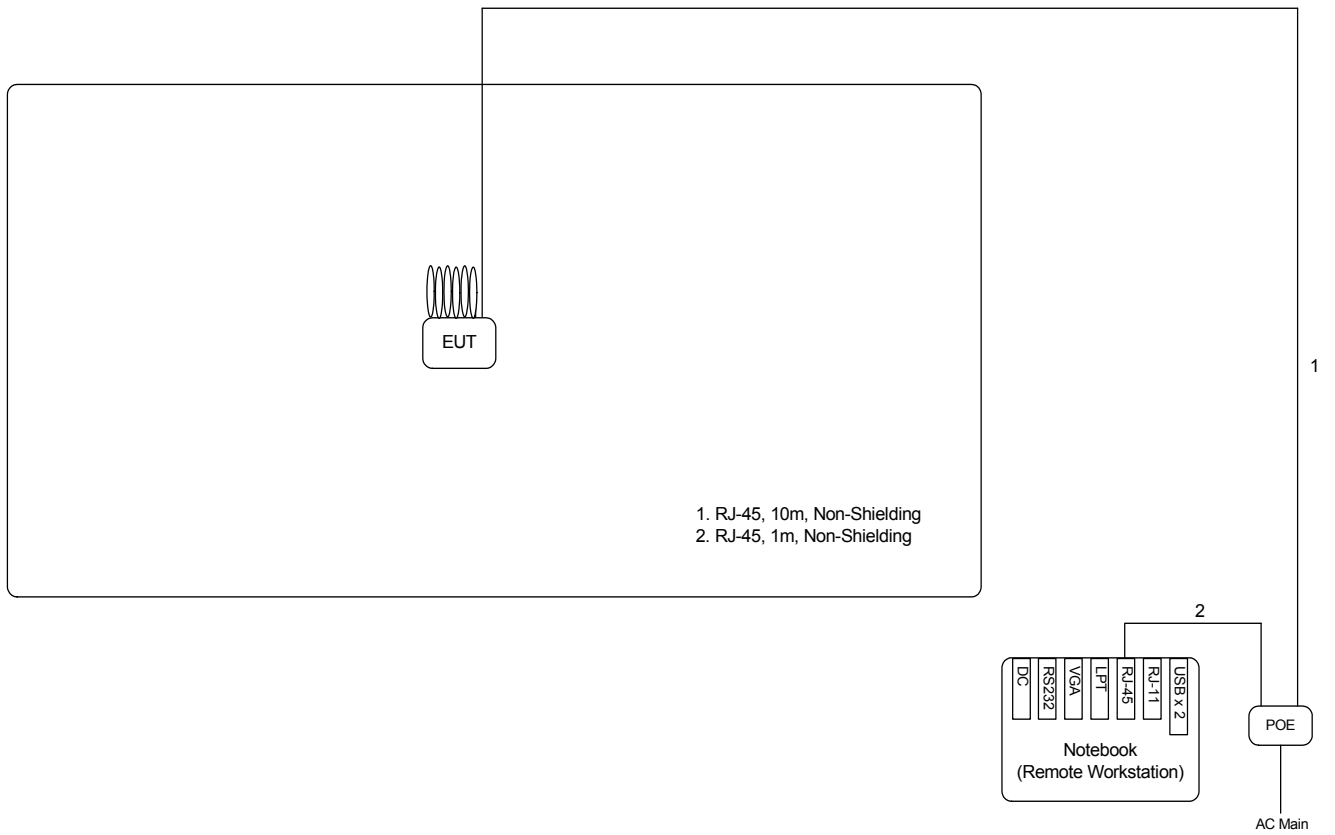
2.9 Test Configuration

2.9.1 Radiation Emissions Test Configuration

For radiated emissions 9kHz~1GHz



For radiated emissions above 1GHz



3 TEST RESULT

3.1 AC Power Line Conducted Emissions Measurement

3.1.1 Limit

For this product which is designed to be connected to the AC power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed below limits table.

Class B

Frequency (MHz)	QP Limit (dBuV)	AV Limit (dBuV)
0.15~0.5	66~56	56~46
0.5~5	56	46
5~30	60	50

3.1.2 Measuring Instruments and Setting

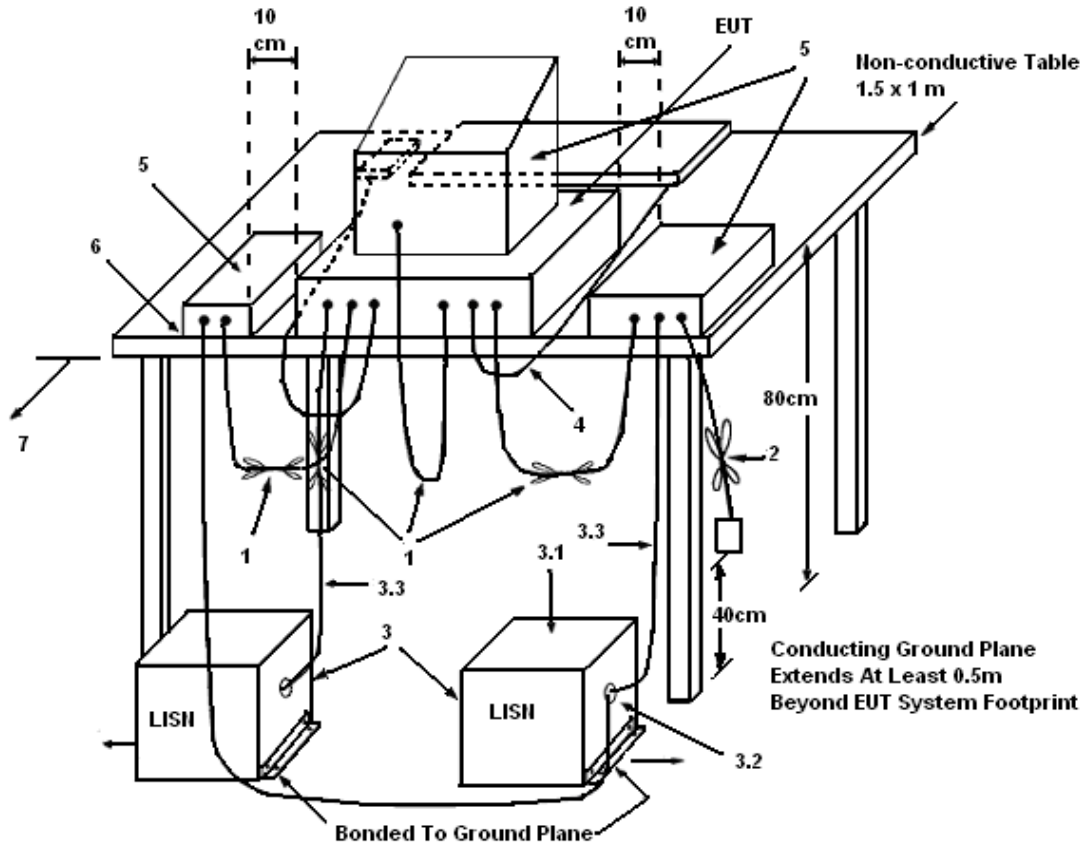
Please refer to section 4 of equipments list in this report. The following table is the setting of the receiver.

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

3.1.3 Test Procedures

1. 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.

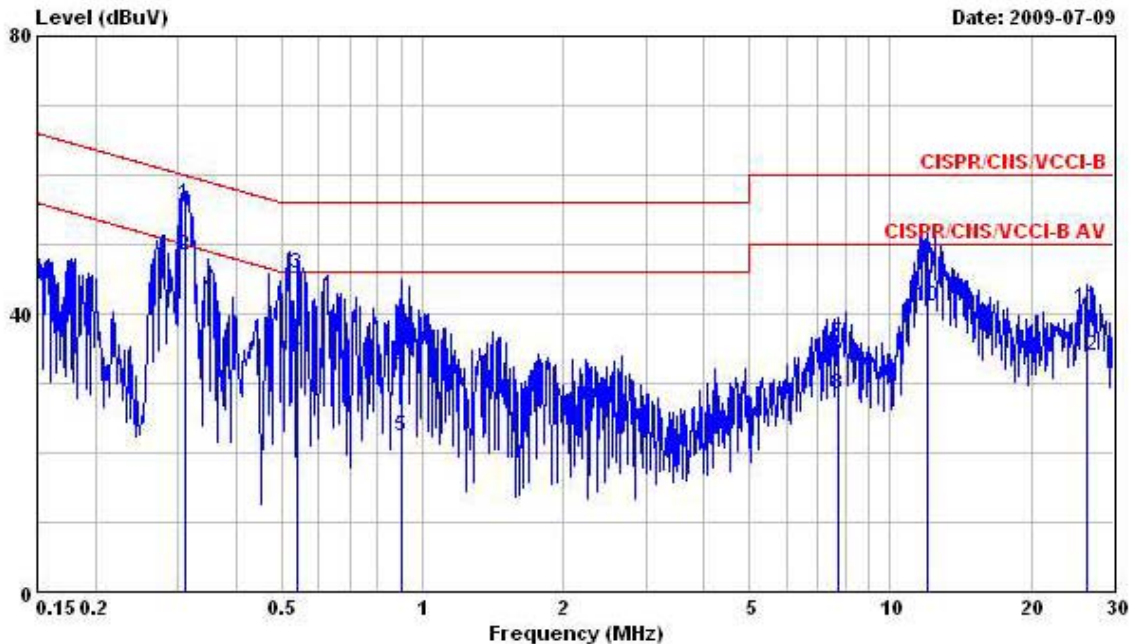
3.1.6 EUT Operation during Test

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

3.1.7 Results of AC Power Line Conducted Emissions Measurement

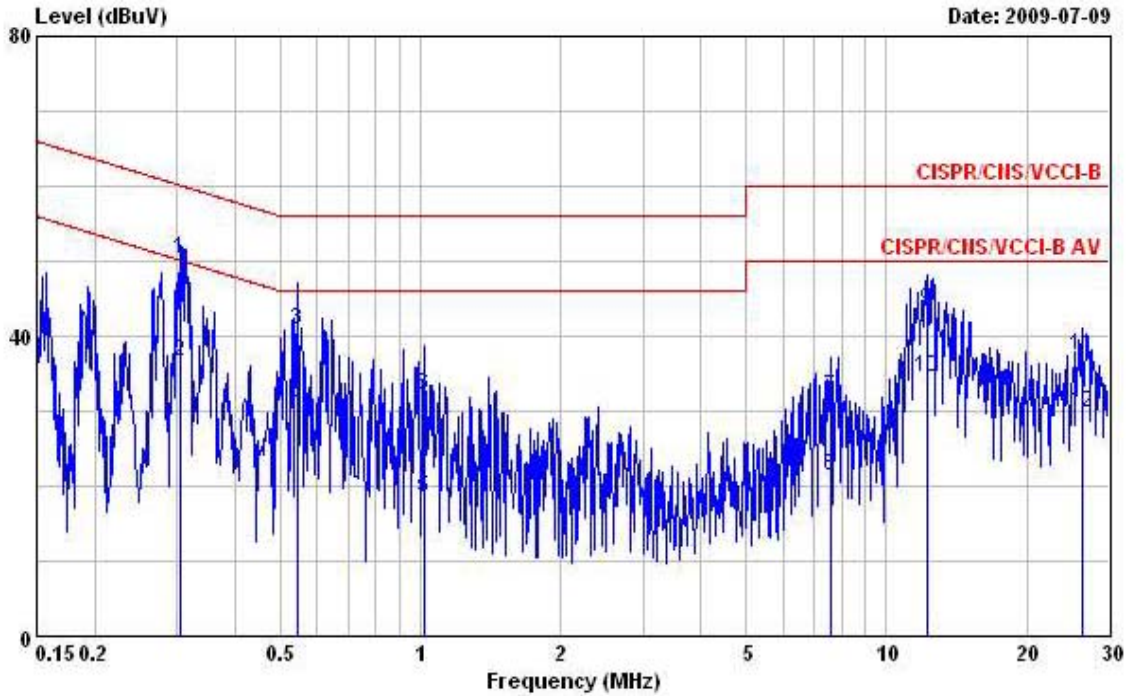
Final Test date	Jul. 09, 2009	Test Site No.	CO04-HY
Temperature	25	Humidity	55%
Test Engineer	Chris	Configuration	Adapter Mode (DSA-15P-12 US)

Line



	Freq	Level	Over	Limit	Read	LISN	Cable	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	@0.3099790	55.87	-4.10	59.97	55.71	0.09	0.07	QP
2	@0.3099790	48.35	-1.62	49.97	48.19	0.09	0.07	Average
3	@0.5394920	45.72	-10.28	56.00	45.52	0.10	0.10	QP
4	0.5394920	34.19	-11.81	46.00	33.99	0.10	0.10	Average
5	0.8991650	22.31	-23.69	46.00	22.07	0.11	0.13	Average
6	0.8991650	32.74	-23.26	56.00	32.50	0.11	0.13	QP
7	7.730	35.80	-24.20	60.00	35.22	0.24	0.34	QP
8	7.730	28.34	-21.66	50.00	27.76	0.24	0.34	Average
9	12.000	47.54	-12.46	60.00	46.84	0.29	0.41	QP
10	@ 12.000	40.92	-9.08	50.00	40.22	0.29	0.41	Average
11	26.420	40.71	-19.29	60.00	39.60	0.49	0.62	QP
12	26.420	33.91	-16.09	50.00	32.80	0.49	0.62	Average

Neutral



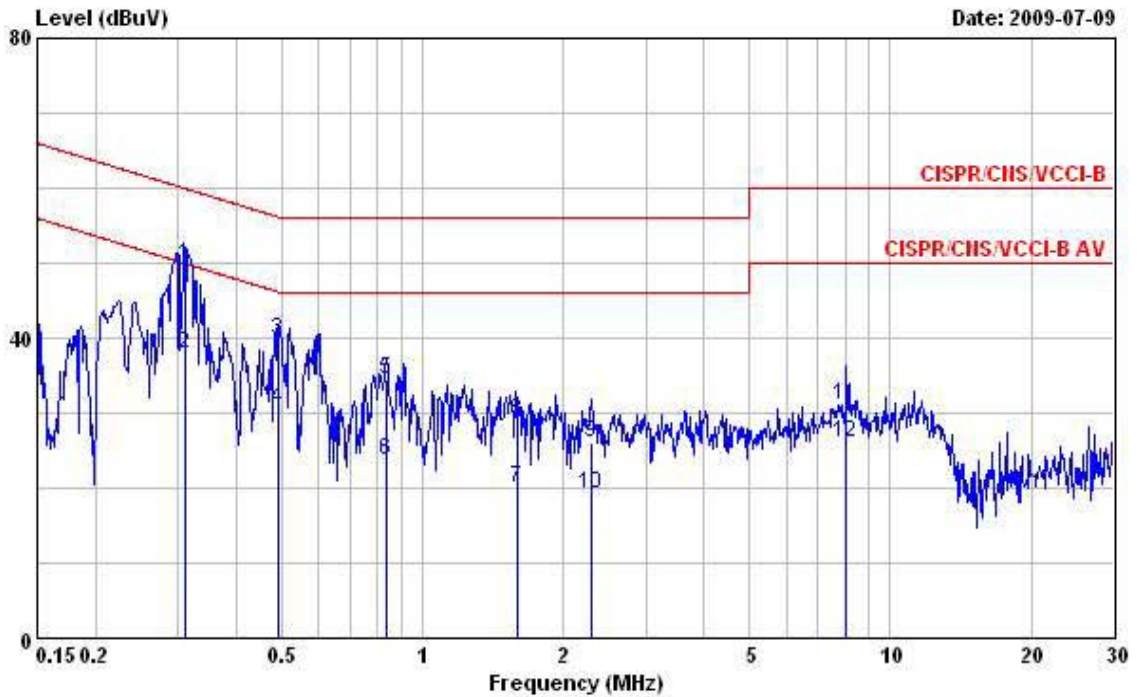
	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	@0.3050910	50.23	-9.87	60.10	50.08	0.08	0.07	QP
2	0.3050910	36.58	-13.52	50.10	36.43	0.08	0.07	Average
3	0.5435530	40.81	-15.19	56.00	40.62	0.09	0.10	QP
4	0.5435530	30.61	-15.39	46.00	30.42	0.09	0.10	Average
5	1.020	18.52	-27.48	46.00	18.28	0.10	0.14	Average
6	1.020	32.11	-23.89	56.00	31.87	0.10	0.14	QP
7	7.610	31.96	-28.04	60.00	31.39	0.23	0.34	QP
8	7.610	21.37	-28.63	50.00	20.80	0.23	0.34	Average
9	12.250	43.51	-16.49	60.00	42.79	0.30	0.42	QP
10	12.250	34.39	-15.61	50.00	33.67	0.30	0.42	Average
11	26.280	37.36	-22.64	60.00	36.23	0.51	0.62	QP
12	26.280	29.75	-20.25	50.00	28.62	0.51	0.62	Average

Note:

Level = Read Level + LISN Factor + Cable Loss.

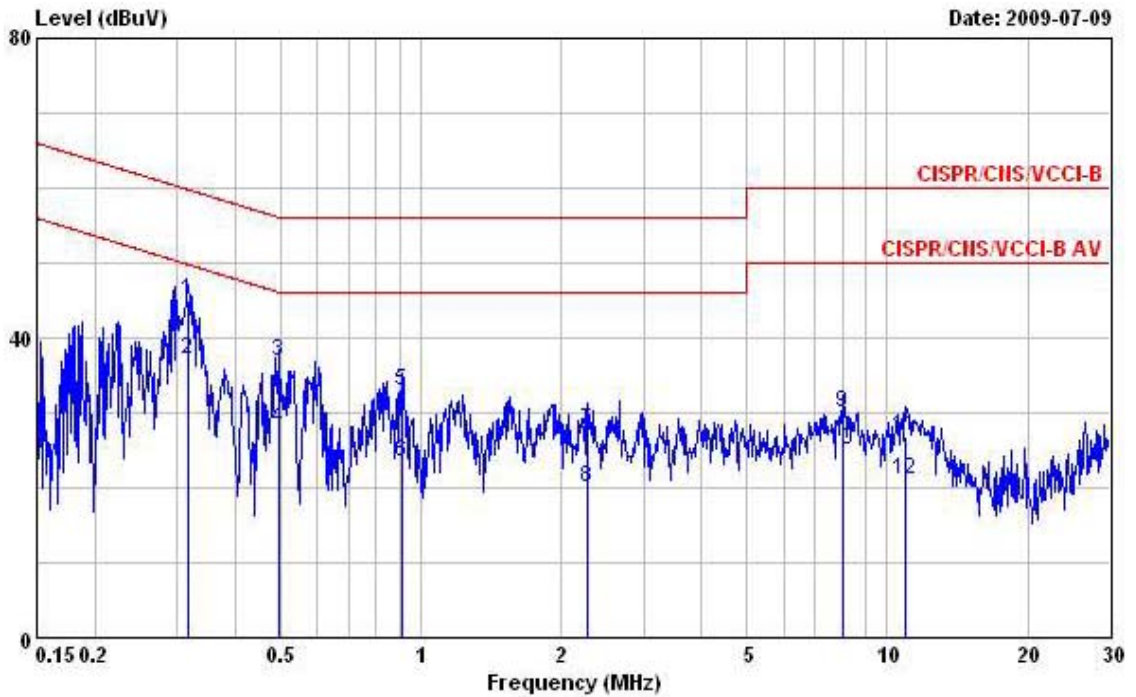
Final Test date	Jul. 09, 2009	Test Site No.	CO04-HY
Temperature	25	Humidity	55%
Test Engineer	Chris	Configuration	Adapter Mode (DSA-20D-12 2)

Line



	Freq	Level	Over	Limit	Read	LISN	Cable	Remark
	MHz	dBuV	Limit	Line	Level	Factor	Loss	
			dB	dBuV	dBuV	dB	dB	
1	0.3099790	49.63	-10.34	59.97	49.47	0.09	0.07	QP
2	0.3099790	38.02	-11.95	49.97	37.86	0.09	0.07	Average
3	0.4914980	39.67	-16.47	56.14	39.49	0.09	0.09	QP
4	0.4914980	30.58	-15.56	46.14	30.40	0.09	0.09	Average
5	0.8393170	34.43	-21.57	56.00	34.19	0.11	0.13	QP
6	0.8393170	23.70	-22.30	46.00	23.46	0.11	0.13	Average
7	1.590	19.94	-26.06	46.00	19.65	0.12	0.17	Average
8	1.590	28.97	-27.03	56.00	28.68	0.12	0.17	QP
9	2.300	26.05	-29.95	56.00	25.72	0.14	0.19	QP
10	2.300	19.22	-26.78	46.00	18.89	0.14	0.19	Average
11	8.060	31.09	-28.91	60.00	30.50	0.24	0.35	QP
12	8.060	25.92	-24.08	50.00	25.33	0.24	0.35	Average

Neutral



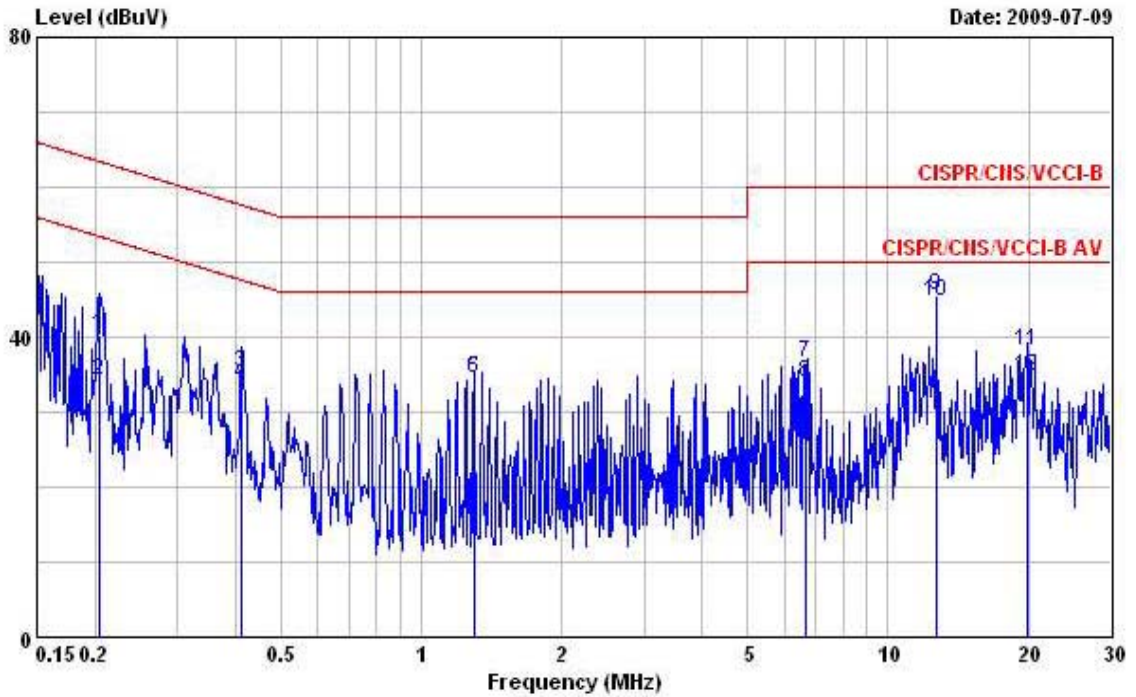
	Freq	Level	Over	Limit	Read	LISN	Cable	
	MHz	dBuV	Limit	Line	Level	Factor	Loss	Remark
			dB	dBuV	dBuV	dB	dB	
1	0.3166190	44.95	-14.85	59.80	44.80	0.08	0.07	QP
2	0.3166190	37.23	-12.57	49.80	37.08	0.08	0.07	Average
3	0.4941090	36.88	-19.22	56.10	36.71	0.08	0.09	QP
4	0.4941090	27.77	-18.33	46.10	27.60	0.08	0.09	Average
5	0.9135710	32.97	-23.03	56.00	32.74	0.10	0.13	QP
6	0.9135710	23.54	-22.46	46.00	23.31	0.10	0.13	Average
7	2.270	27.55	-28.45	56.00	27.24	0.12	0.19	QP
8	2.270	19.96	-26.04	46.00	19.65	0.12	0.19	Average
9	8.060	30.12	-29.88	60.00	29.54	0.23	0.35	QP
10	8.060	25.07	-24.93	50.00	24.49	0.23	0.35	Average
11	10.900	26.94	-33.06	60.00	26.26	0.28	0.40	QP
12	10.900	20.96	-29.04	50.00	20.28	0.28	0.40	Average

Note:

Level = Read Level + LISN Factor + Cable Loss.

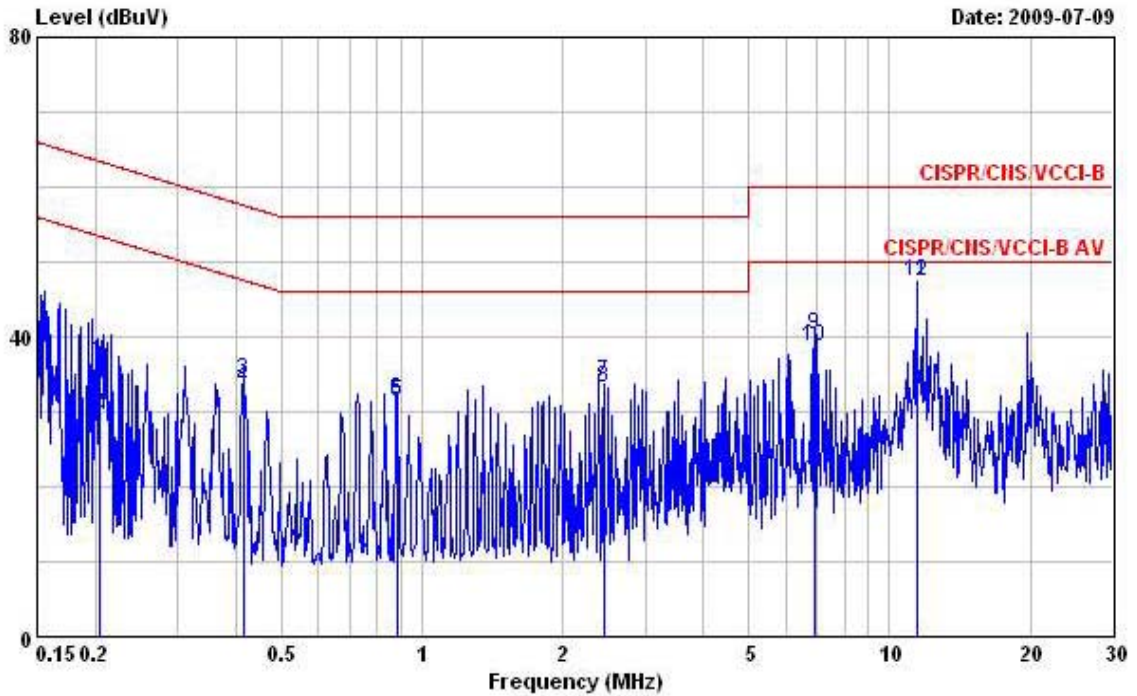
Final Test date	Jul. 09, 2009	Test Site No.	CO04-HY
Temperature	25	Humidity	55%
Test Engineer	Chris	Configuration	POE Mode (Power Supply: POE20U-560(G) -R)

Line



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.2050460	40.38	-23.02	63.40	40.24	0.08	0.06	QP
2	0.2050460	34.28	-19.12	53.40	34.14	0.08	0.06	Average
3	0.4126560	35.19	-22.40	57.59	35.02	0.09	0.08	QP
4	0.4126560	33.57	-14.02	47.59	33.40	0.09	0.08	Average
5	1.296	34.43	-21.57	56.00	34.16	0.12	0.15	QP
6	1.296	34.34	-11.66	46.00	34.07	0.12	0.15	Average
7	6.688	36.48	-23.52	60.00	35.94	0.22	0.32	QP
8	6.688	33.87	-16.13	50.00	33.33	0.22	0.32	Average
9	12.709	45.48	-14.52	60.00	44.76	0.30	0.42	QP
10	12.709	44.64	-5.36	50.00	43.92	0.30	0.42	Average
11	19.966	38.16	-21.84	60.00	37.23	0.40	0.53	QP
12	19.966	34.86	-15.14	50.00	33.93	0.40	0.53	Average

Neutral



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.2040370	36.96	-26.48	63.44	36.82	0.08	0.06	QP
2	0.2040370	29.79	-23.65	53.44	29.65	0.08	0.06	Average
3	0.4148480	34.08	-23.47	57.55	33.92	0.08	0.08	QP
4	0.4148480	33.26	-14.29	47.55	33.10	0.08	0.08	Average
5	0.8836060	31.36	-14.64	46.00	31.13	0.10	0.13	Average
6	0.8836060	31.51	-24.49	56.00	31.28	0.10	0.13	QP
7	2.441	33.84	-22.16	56.00	33.52	0.12	0.20	QP
8	2.441	33.18	-12.82	46.00	32.86	0.12	0.20	Average
9	6.905	40.32	-19.68	60.00	39.78	0.22	0.32	QP
10	6.905	38.75	-11.25	50.00	38.21	0.22	0.32	Average
11	11.411	47.25	-12.75	60.00	46.57	0.28	0.40	QP
12	11.411	47.27	-2.73	50.00	46.59	0.28	0.40	Average

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

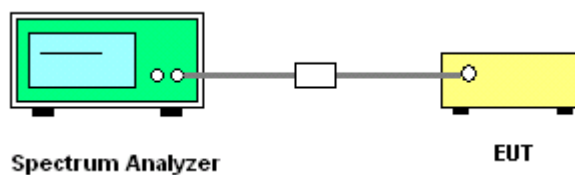
Please refer to section 4 of equipments list in this report. The following table is the setting of the spectrum analyzer.

Power Meter Parameter	Setting
Attenuation	Auto
Span Frequency	Encompass the entire emissions bandwidth (EBW) of the signal
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.

3.2.4 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	May 09, 2008	Test Site No.	TH01-HY
Temperature	27	Humidity	55%
Test Engineer	Sam	Configuration	802.11a/b/g

Configuration IEEE 802.11a

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
149	5745 MHz	13.25	30.00	Complies
157	5785 MHz	10.85	30.00	Complies
165	5825 MHz	11.01	30.00	Complies

Configuration IEEE 802.11b

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
1	2412 MHz	18.56	30.00	Complies
6	2437 MHz	20.44	30.00	Complies
11	2462 MHz	19.30	30.00	Complies

Configuration IEEE 802.11g

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
1	2412 MHz	13.91	30.00	Complies
6	2437 MHz	18.92	30.00	Complies
11	2462 MHz	13.76	30.00	Complies

3.3 Power Spectral Density Measurement

3.3.1 Limit

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

3.3.2 Measuring Instruments and Setting

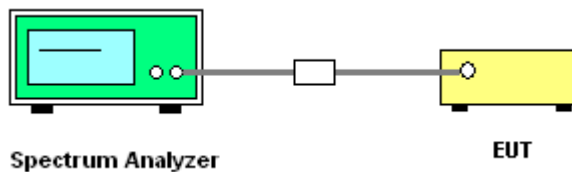
Please refer to section 4 of equipments list in this report. The following table is the setting of the spectrum analyzer.

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

3.3.3 Test Procedures

1. The transmitter output (antenna port) was connected to the spectrum analyzer.
2. Set RBW of spectrum analyzer to 3kHz and VBW to 30kHz. Set Detector to Peak, Trace to Max Hold.
3. Mark the frequency with maximum peak power as the center of the display of the spectrum.
4. Set the span to 1.5MHz and the sweep time to 500s and record the maximum peak value.

3.3.4 Test Setup Layout



3.3.5 Test Deviation

There is no deviation with the original standard.

3.3.6 EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

3.3.7 Test Result of Power Spectral Density

Final Test date	Jun. 01, 2008	Test Site No.	TH01-HY
Temperature	27	Humidity	55%
Test Engineer	Sam	Configuration	802.11a/b/g

Configuration IEEE 802.11a

Channel	Frequency	Power Density (dBm)	Max. Limit (dBm)	Result
149	5745 MHz	-11.77	8.00	Complies
157	5785 MHz	-11.57	8.00	Complies
165	5825 MHz	-11.52	8.00	Complies

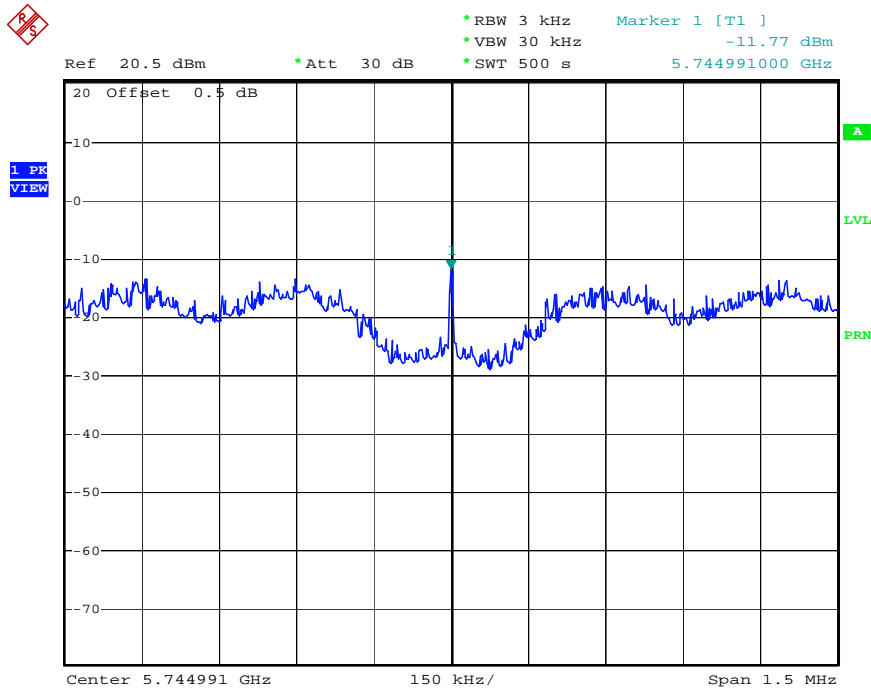
Configuration IEEE 802.11b

Channel	Frequency	Power Density (dBm)	Max. Limit (dBm)	Result
1	2412 MHz	-2.02	8.00	Complies
6	2437 MHz	0.22	8.00	Complies
11	2462 MHz	0.10	8.00	Complies

Configuration IEEE 802.11g

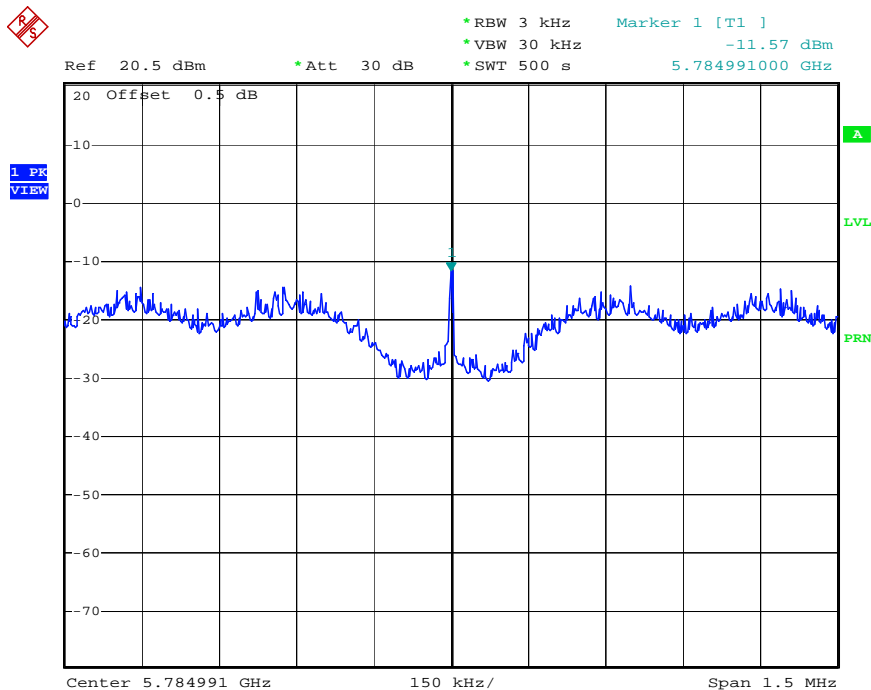
Channel	Frequency	Power Density (dBm)	Max. Limit (dBm)	Result
1	2412 MHz	-7.41	8.00	Complies
6	2437 MHz	-0.53	8.00	Complies
11	2462 MHz	-8.10	8.00	Complies

Power Density Plot on Configuration IEEE 802.11a / 5745 MHz



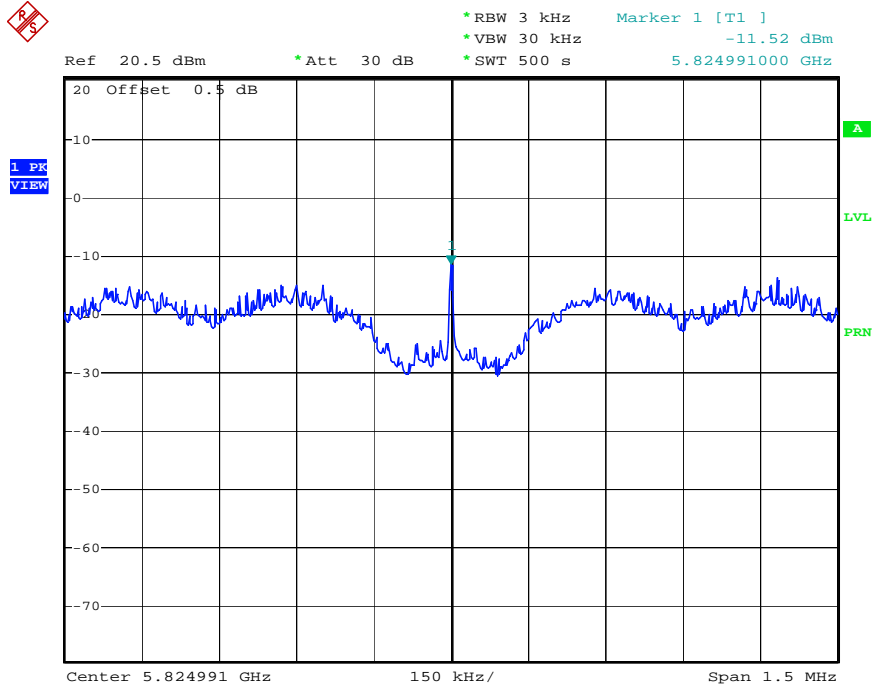
Date: 1.JUN.2008 05:57:07

Power Density Plot on Configuration IEEE 802.11a / 5785 MHz



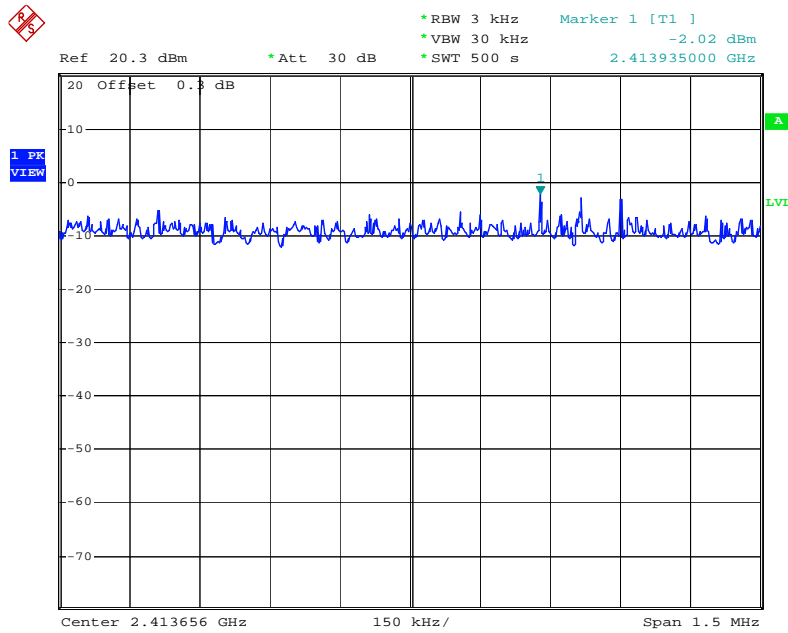
Date: 1.JUN.2008 05:52:02

Power Density Plot on Configuration IEEE 802.11a / 5825 MHz



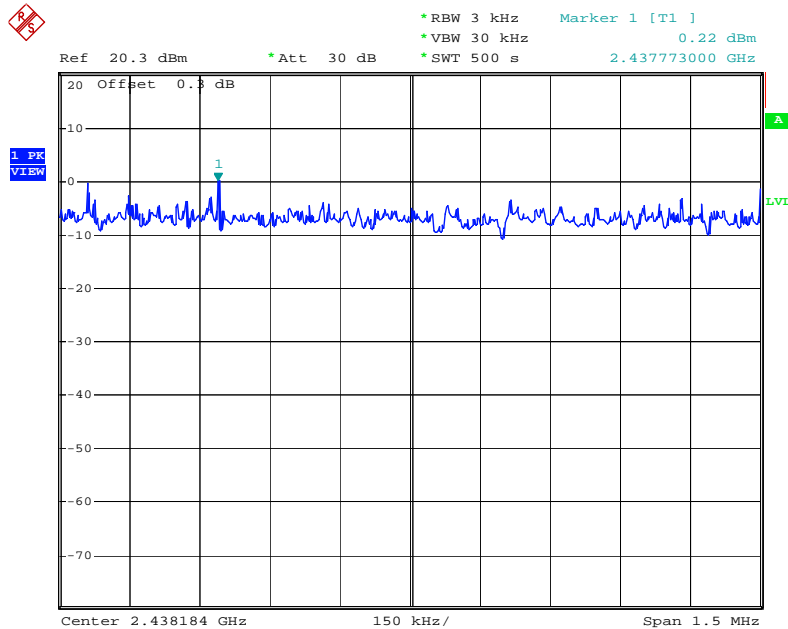
Date: 1.JUN.2008 05:51:01

Power Density Plot on Configuration IEEE 802.11b / 2412 MHz



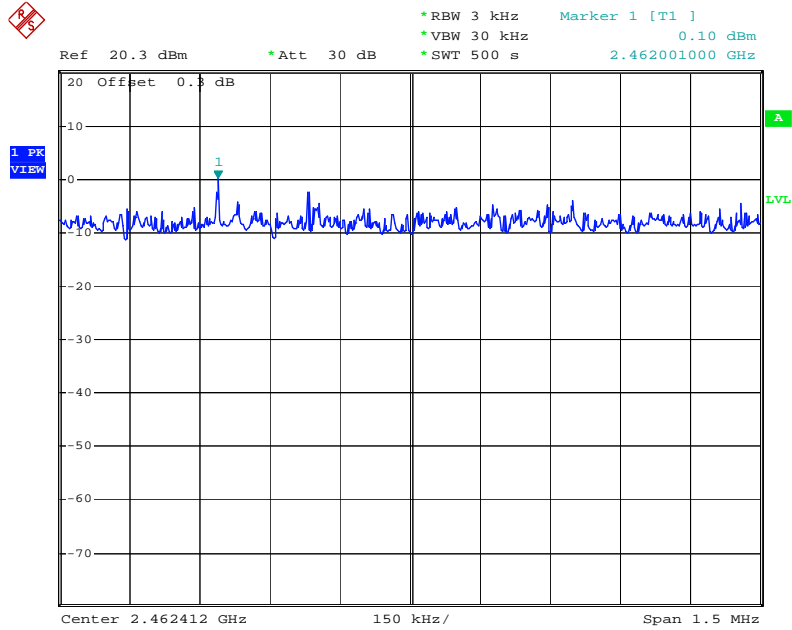
Date: 27.MAY.2008 18:03:26

Power Density Plot on Configuration IEEE 802.11b / 2437 MHz



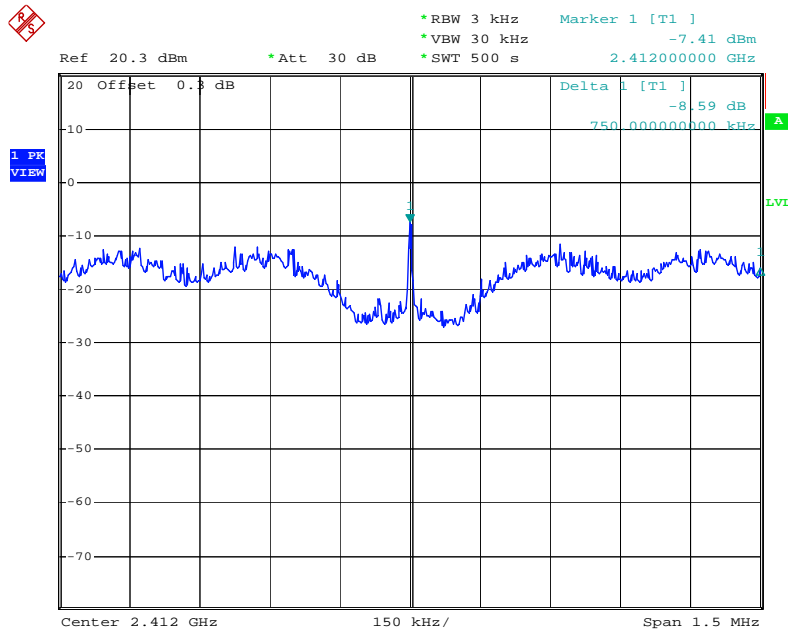
Date: 27.MAY.2008 18:21:21

Power Density Plot on Configuration IEEE 802.11b / 2462 MHz



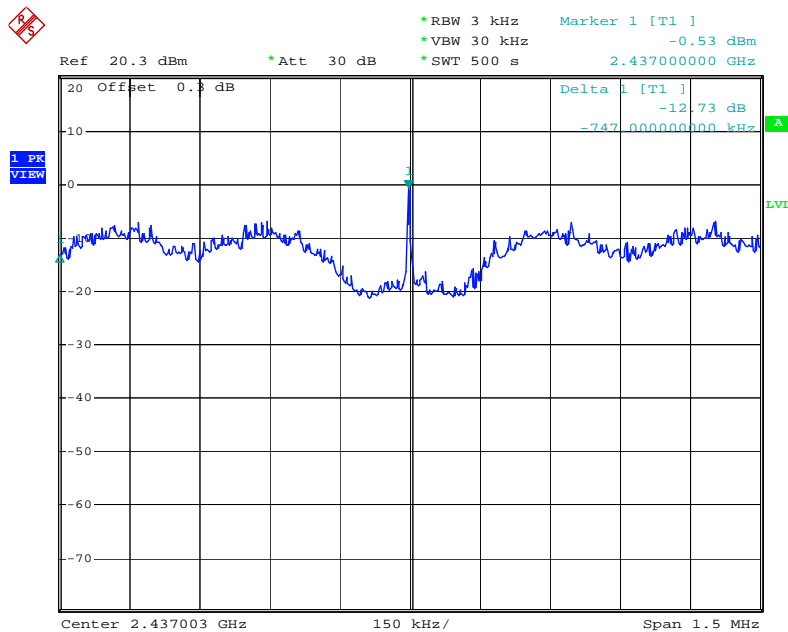
Date: 27.MAY.2008 18:23:35

Power Density Plot on Configuration IEEE 802.11g / 2412 MHz



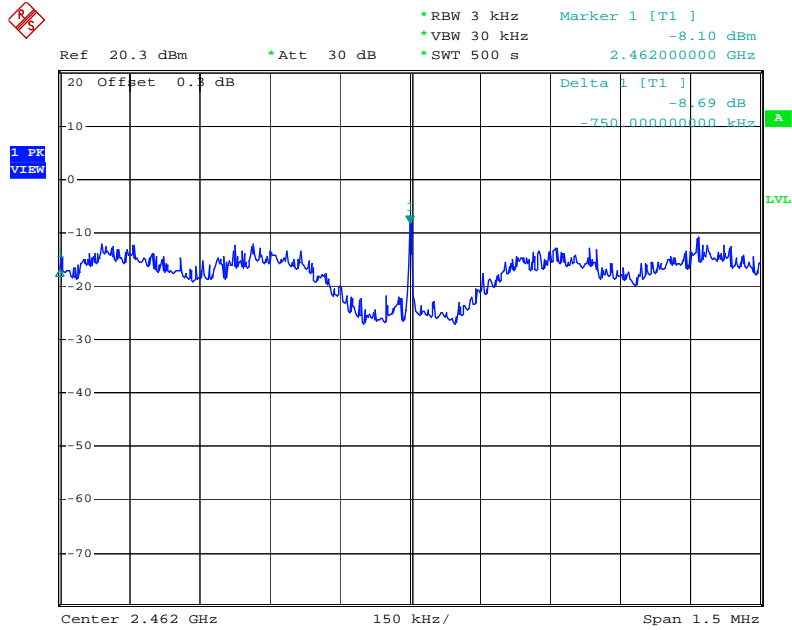
Date: 28.MAY.2008 10:17:40

Power Density Plot on Configuration IEEE 802.11g / 2437 MHz



Date: 28.MAY.2008 10:19:57

Power Density Plot on Configuration IEEE 802.11g / 2462 MHz



Date: 28.MAY.2008 10:16:52

3.4 6dB Spectrum Bandwidth Measurement

3.4.1 Limit

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

3.4.2 Measuring Instruments and Setting

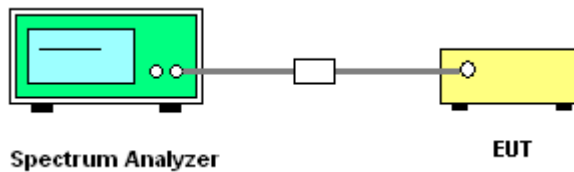
Please refer to section 4 of equipments list in this report. The following table is the setting of the spectrum analyzer.

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

3.4.3 Test Procedures

1. The transmitter output (antenna port) was connected to the spectrum analyzer in peak hold mode.
2. The resolution bandwidth of 100 kHz and the video bandwidth of 100 kHz were used.
3. Measured the spectrum width with power higher than 6dB below carrier.

3.4.4 Test Setup Layout



3.4.5 Test Deviation

There is no deviation with the original standard.

3.4.6 EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

3.4.7 Test Result of 6dB Spectrum Bandwidth

Final Test date	Jun. 01, 2008	Test Site No.	TH01-HY
Temperature	27	Humidity	55%
Test Engineer	Sam	Configuration	802.11a/b/g

Configuration IEEE 802.11a

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
149	5745 MHz	16.36	16.44	500	Complies
157	5785 MHz	16.36	16.44	500	Complies
165	5825 MHz	16.40	16.44	500	Complies

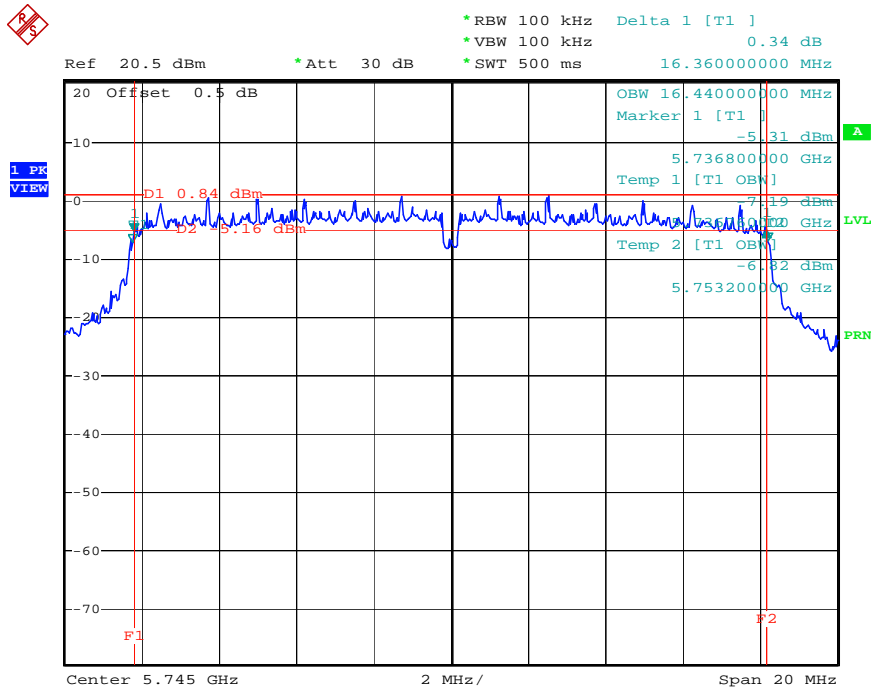
Configuration IEEE 802.11b

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
1	2412 MHz	11.36	15.12	500	Complies
6	2437 MHz	11.60	15.12	500	Complies
11	2462 MHz	11.12	15.12	500	Complies

Configuration IEEE 802.11g

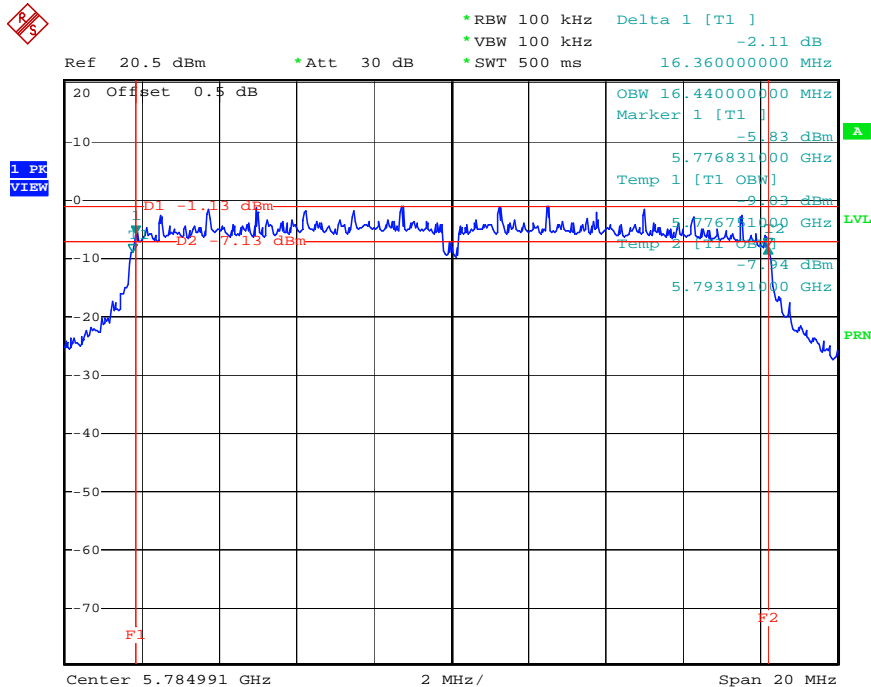
Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
1	2412 MHz	16.36	16.48	500	Complies
6	2437 MHz	16.36	16.60	500	Complies
11	2462 MHz	16.40	16.48	500	Complies

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



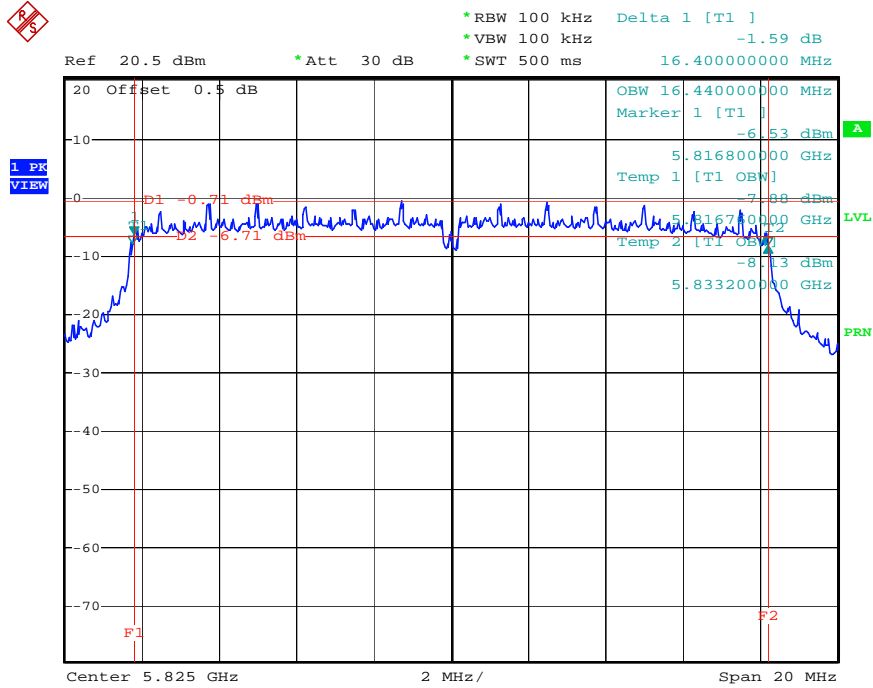
Date: 1 JUN. 2008 05:54:36

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



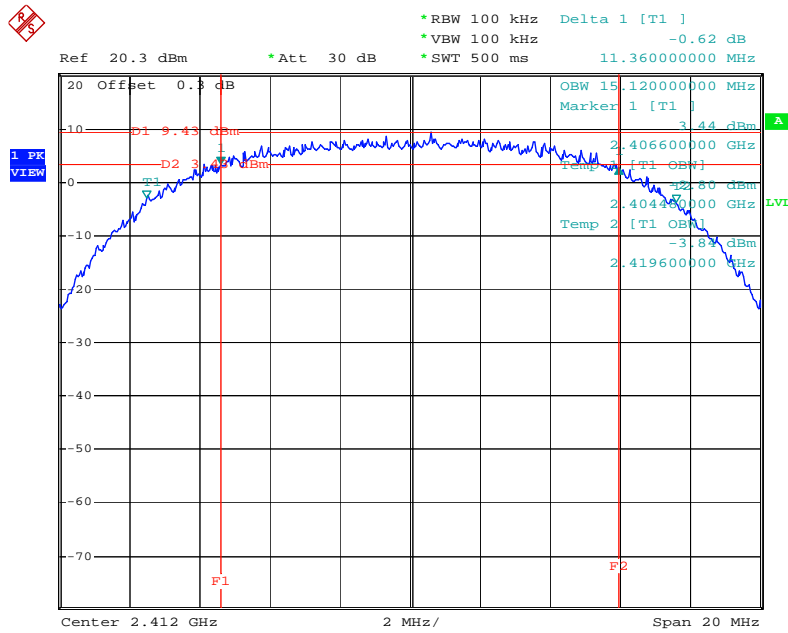
Date: 1 JUN. 2008 05:53:17

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



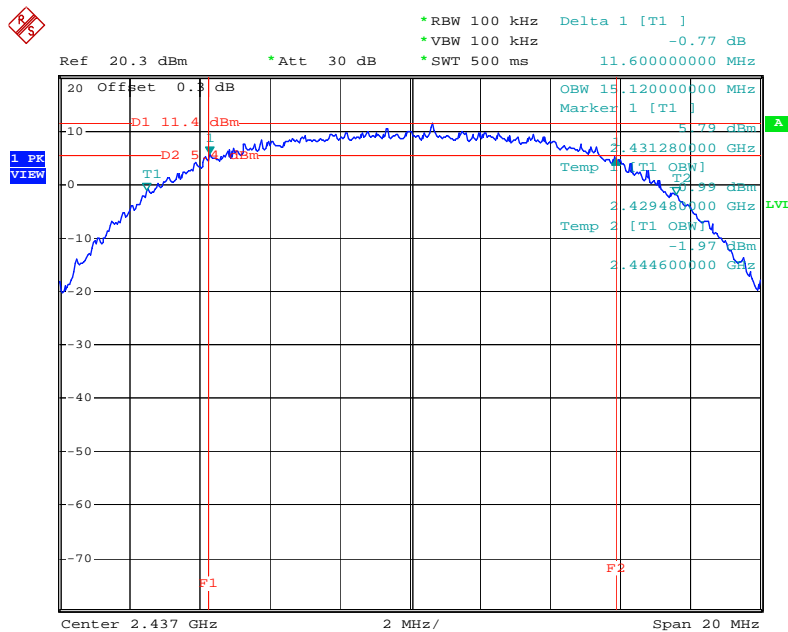
Date: 1 JUN 2008 05:48:37

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



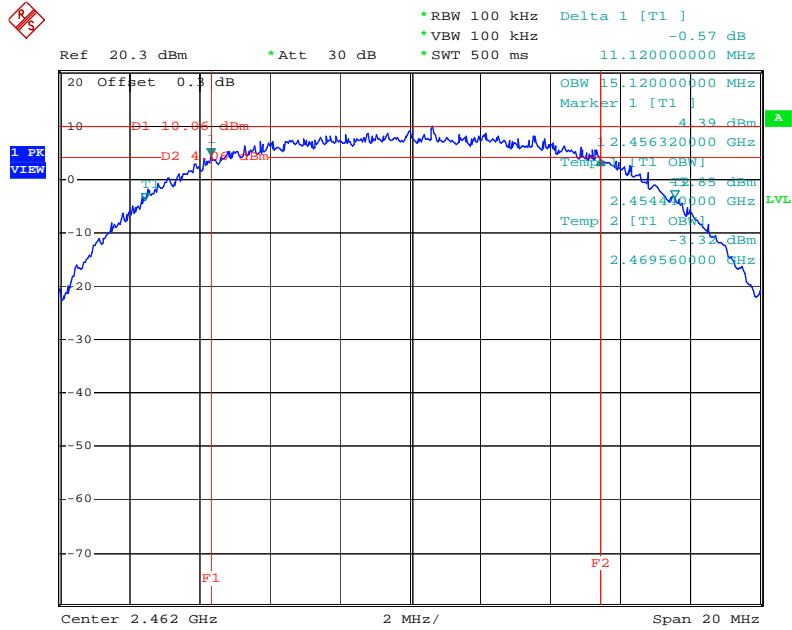
Date: 27.MAY.2008 18:01:02

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



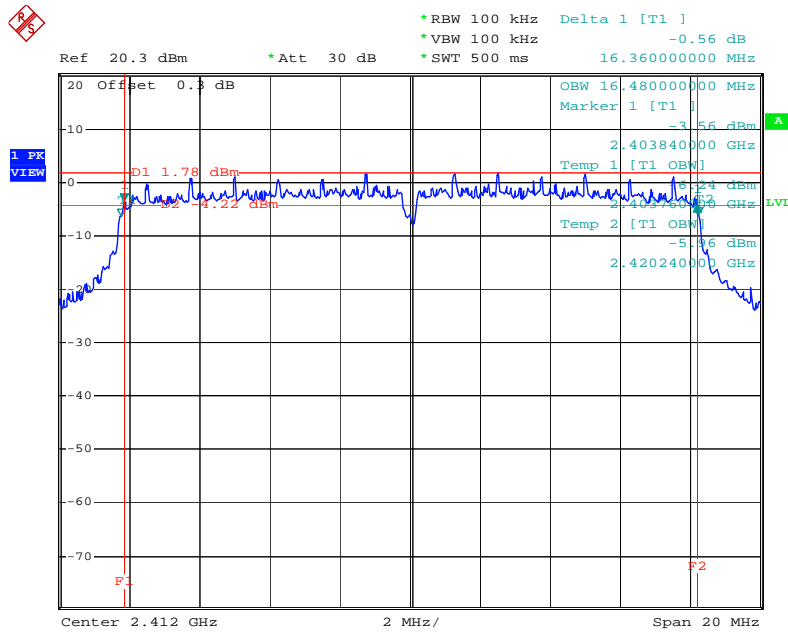
Date: 27.MAY.2008 18:20:03

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



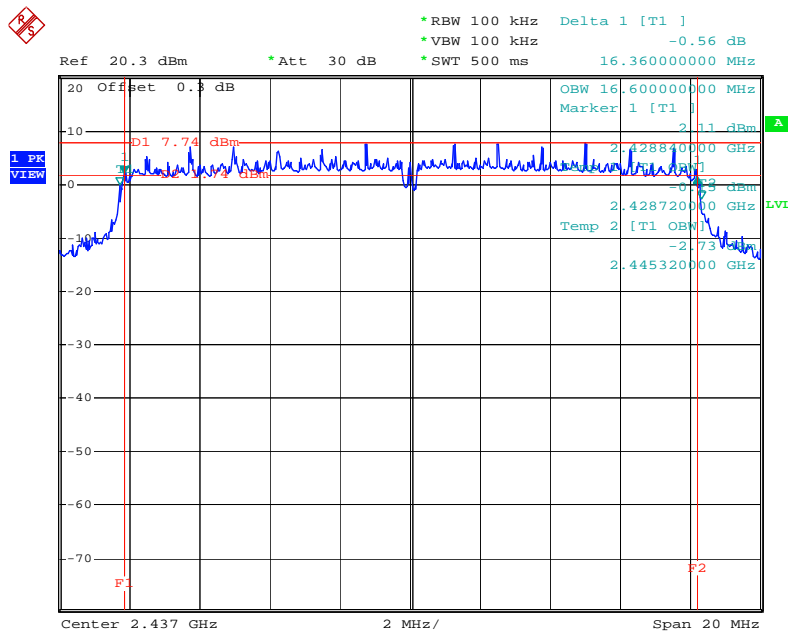
Date: 27.MAY.2008 18:24:35

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



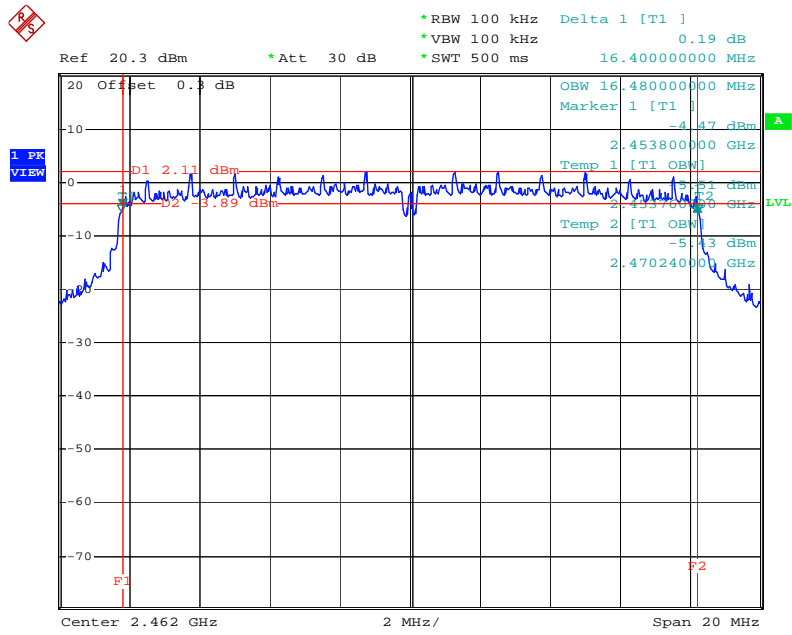
Date: 28.MAY.2008 10:21:42

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



Date: 28.MAY.2008 10:23:52

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



Date: 27.MAY.2008 18:55:04

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 (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 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)	100KHz / 100KHz for peak

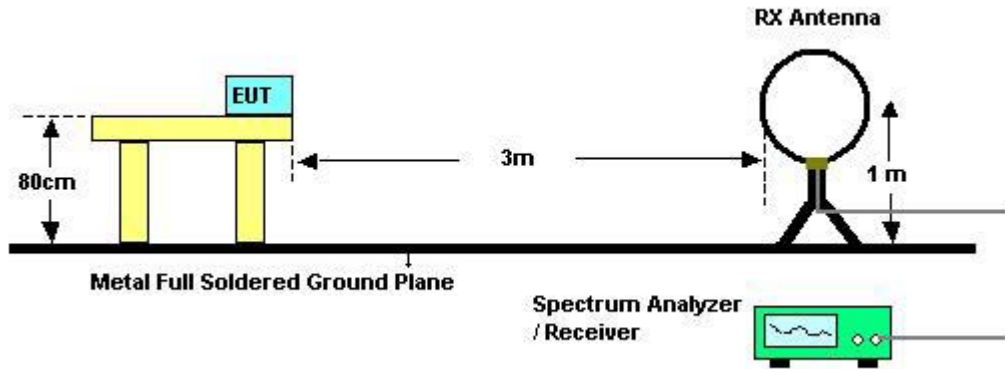
Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

3.5.3 Test Procedures

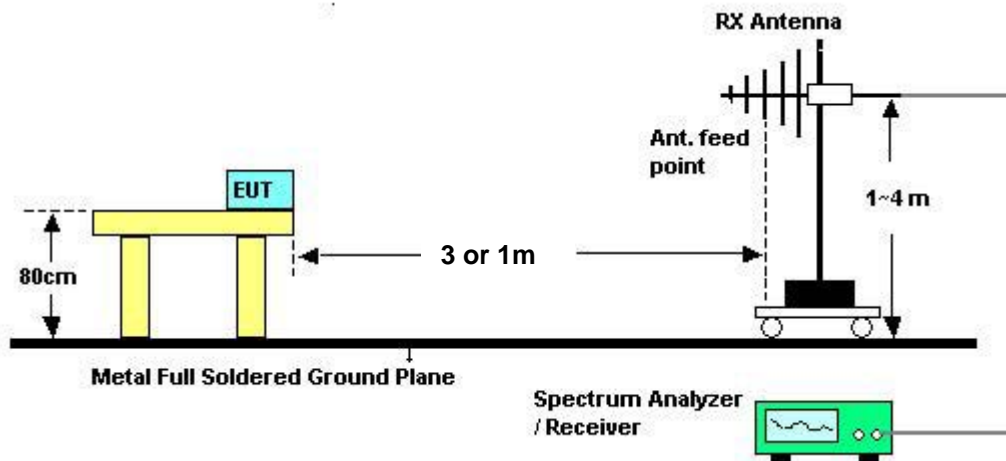
1. Configure the EUT according to ANSI C63.4. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting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

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

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

3.5.5 Test Deviation

There is no deviation with the original standard.

3.5.6 EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

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

Final Test date	Aug. 03 2009	Test Site No.	OS04-LK
Temperature	26	Humidity	49%
Test Engineer	Benny		

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

Note:

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

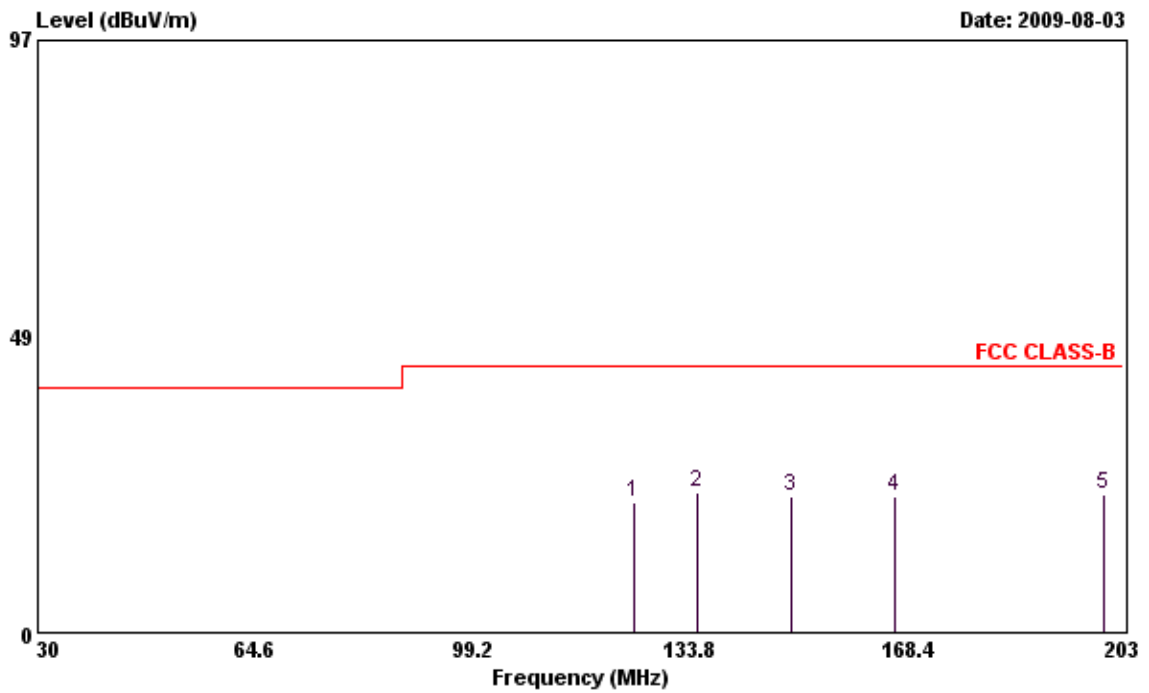
Distance extrapolation factor = $40 \log (\text{specific distance} / \text{test distance})$ (dB);

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

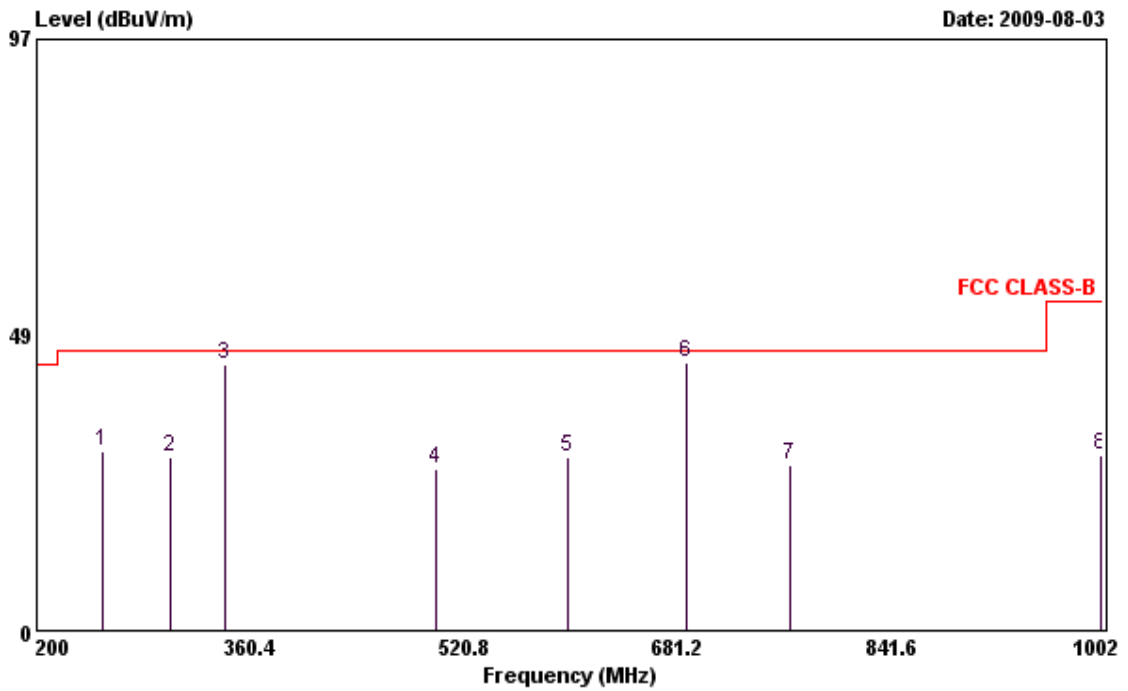
3.5.8 Results of Radiated Emissions (30MHz~1GHz)

Final Test date	Aug. 03 2009	Test Site No.	OS04-LK
Temperature	26	Humidity	49%
Test Engineer	Benny	Configuration	POE Mode (Power Supply: POE20U-560(G) -R) (1Gpbs)

Horizontal

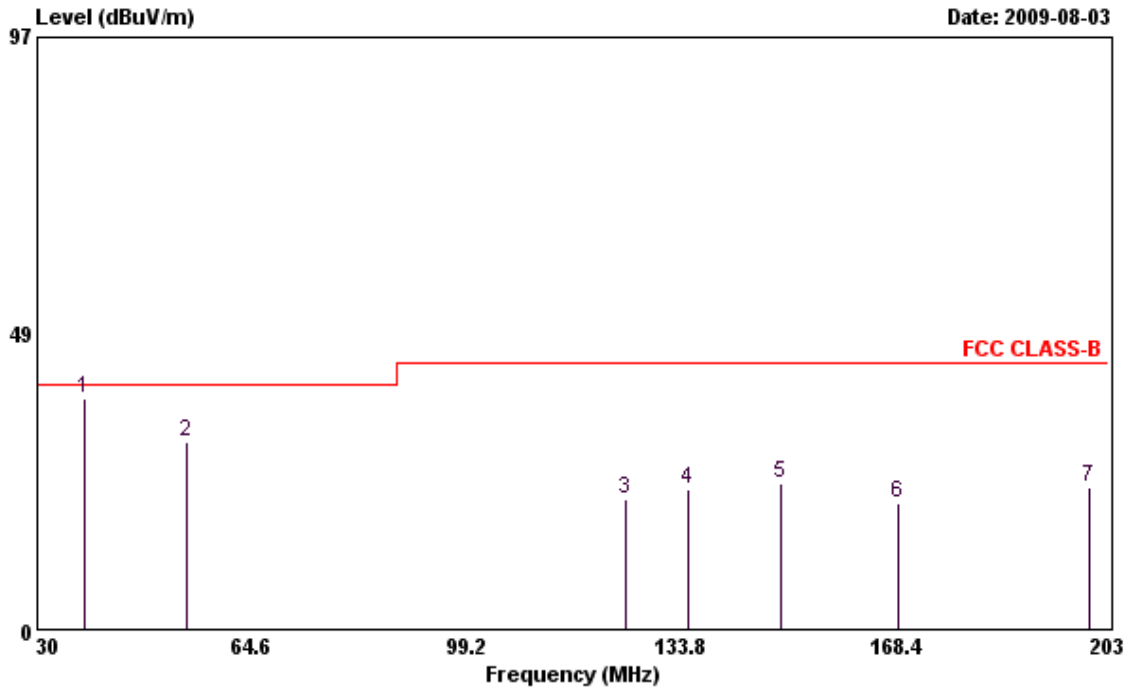


	Freq	Level	Over Limit	Limit Line	ReadAntenna	Cable	Preamp	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB		cm	deg
1	125.000	21.42	-22.08	43.50	34.81	11.41	0.20	25.00 Peak	---	---
2	135.000	22.95	-20.55	43.50	36.47	11.27	0.21	25.00 Peak	---	---
3	150.000	22.39	-21.11	43.50	36.08	11.05	0.26	25.00 Peak	---	---
4	166.670	22.26	-21.24	43.50	37.92	9.04	0.30	25.00 Peak	---	---
5	200.000	22.70	-20.80	43.50	38.41	8.95	0.34	25.00 Peak	---	---

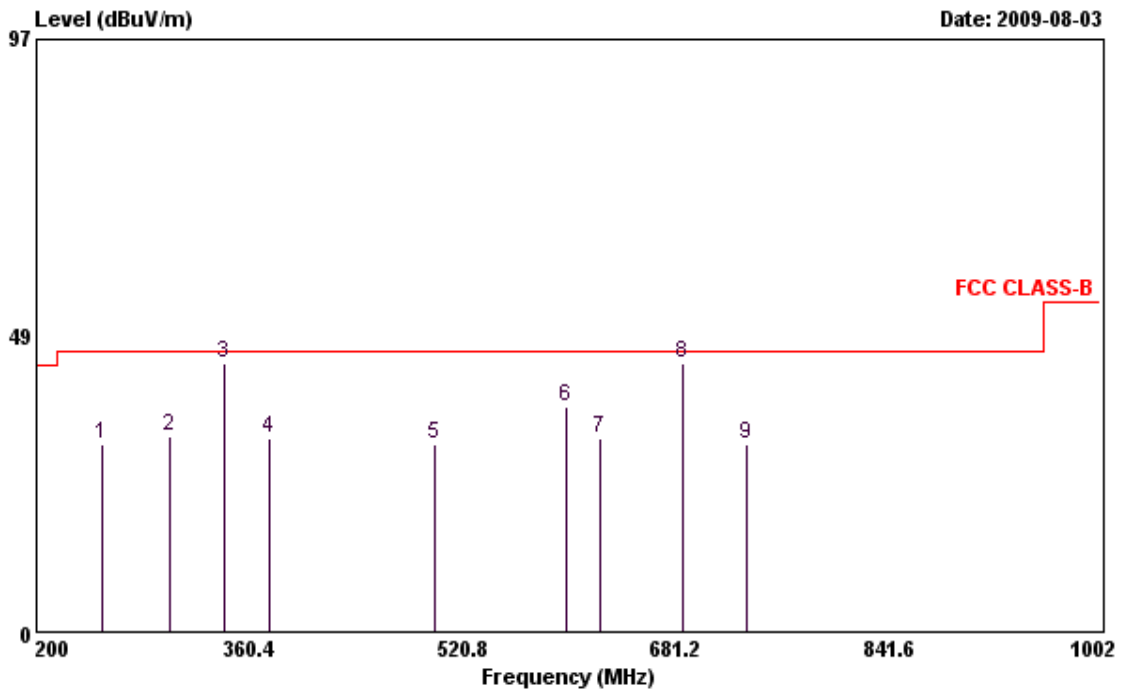


	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	250.000	29.41	-16.59	46.00	42.37	11.57	0.47	25.00	Peak	---	---
2	300.000	28.47	-17.53	46.00	40.28	12.61	0.58	25.00	Peak	---	---
3 @	342.000	43.78	-2.22	46.00	54.74	13.43	0.61	25.00	QP	---	---
4	500.000	26.51	-19.49	46.00	34.08	16.43	1.00	25.00	Peak	---	---
5	600.000	28.54	-17.46	46.00	34.72	17.72	1.20	25.10	Peak	---	---
6 @	688.500	43.88	-2.12	46.00	49.38	18.13	1.56	25.19	QP	---	---
7	766.500	27.00	-19.00	46.00	31.51	18.77	1.85	25.13	Peak	---	---
8	1000.000	28.86	-25.14	54.00	31.05	20.44	2.37	25.00	Peak	---	---

Vertical



	Freq	Level	Over Limit	Limit Line	ReadAntenna 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 @	37.500	37.96	-2.04	40.00	47.57	15.16	0.11	24.88	QP	---	---
2	54.220	30.86	-9.14	40.00	48.27	7.41	0.12	24.94	Peak	---	---
3	125.000	21.40	-22.10	43.50	34.79	11.41	0.20	25.00	Peak	---	---
4	135.010	23.09	-20.41	43.50	36.61	11.27	0.21	25.00	Peak	---	---
5	150.000	23.94	-19.56	43.50	37.63	11.05	0.26	25.00	Peak	---	---
6	168.920	20.82	-22.68	43.50	36.51	9.01	0.30	25.00	Peak	---	---
7	200.000	23.40	-20.10	43.50	39.11	8.95	0.34	25.00	Peak	---	---



Freq	Level	Over Limit	Limit Line	ReadAntenna 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	250.000	30.79	-15.21	46.00	43.75	11.57	0.47	25.00 Peak	---	---
2	300.000	32.04	-13.96	46.00	43.85	12.61	0.58	25.00 Peak	---	---
3 @	342.000	43.85	-2.15	46.00	54.81	13.43	0.61	25.00 QP	---	---
4	375.000	31.72	-14.28	46.00	41.91	14.08	0.73	25.00 Peak	---	---
5	500.000	30.76	-15.24	46.00	38.33	16.43	1.00	25.00 Peak	---	---
6	600.000	36.70	-9.30	46.00	42.88	17.72	1.20	25.10 Peak	---	---
7	625.000	31.83	-14.17	46.00	37.85	17.84	1.26	25.12 Peak	---	---
8 @	688.000	43.99	-2.01	46.00	49.49	18.13	1.56	25.19 QP	---	---
9	735.000	30.62	-15.38	46.00	35.54	18.50	1.75	25.17 Peak	---	---

Note:

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

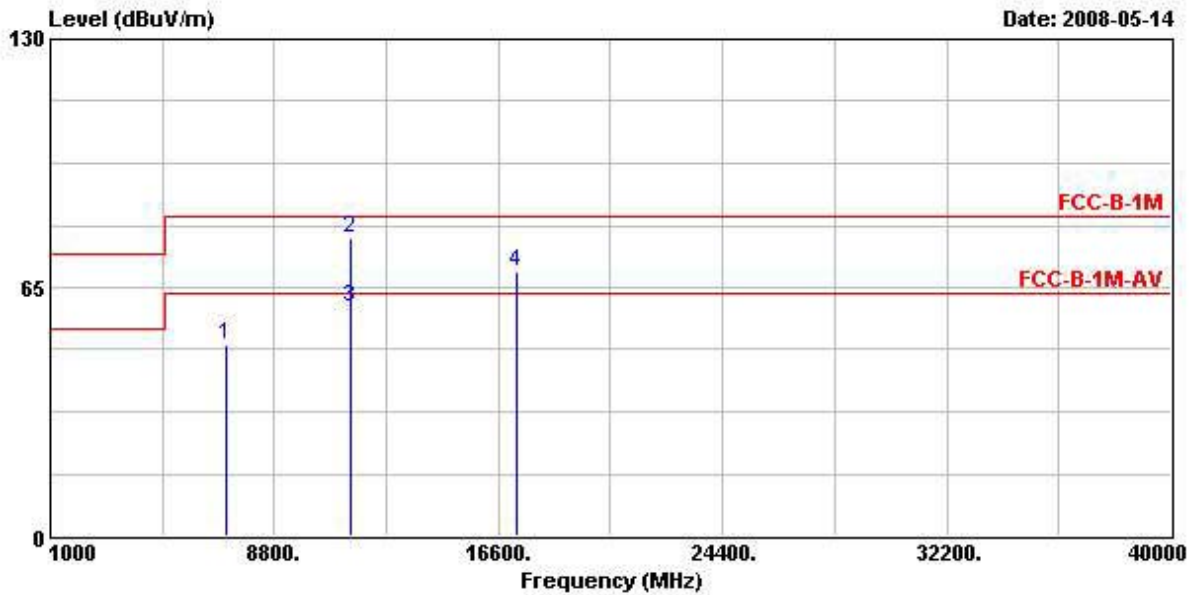
Emission level (dBuV/m) = 20 log Emission level (uV/m).

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

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

Final Test date	May 14, 2008	Test Site No.	03CH03-HY
Temperature	26	Humidity	54%
Test Engineer	Duncan	Configuration	802.11a CH 149

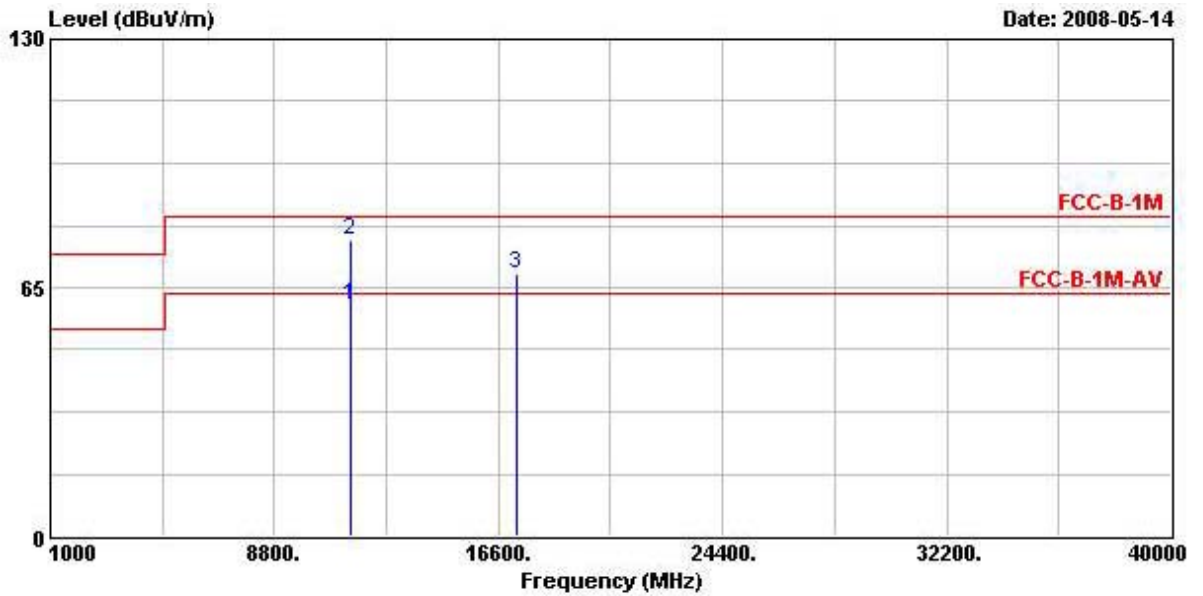
Horizontal



	Freq	Level	Over	Limit	ReadAntenna	Cable	Preamp	Remark
	MHz	dBUV/m	Limit	Line	Level	Loss	Factor	
			dB	dBUV/m	dBuV	dB	dB	
1	7104.000	50.23			43.30	3.30	32.71	PEAK
2	11485.400	77.75	-5.79	83.54	63.61	6.78	32.31	PEAK
3	11485.400	60.02	-3.52	63.54	45.88	6.78	32.31	Average
4	17235.700	69.38			46.86	7.80	28.55	PEAK

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

Vertical

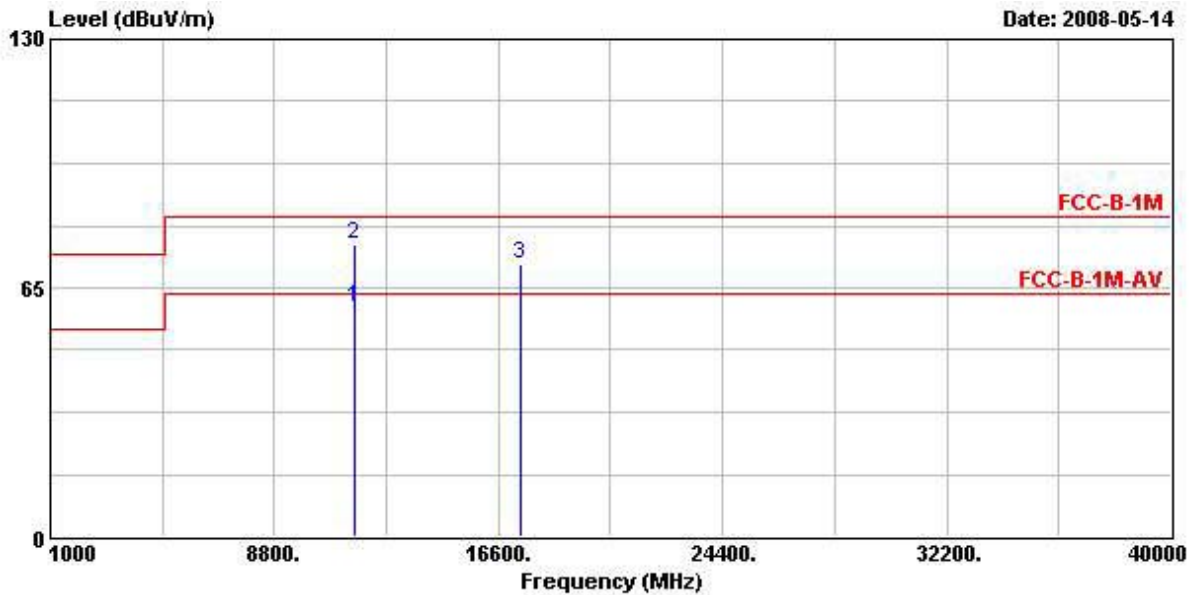


	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	11487.800	60.52	-3.02	63.54	46.38	39.68	6.78	32.31	Average
2	11487.800	77.20	-6.34	83.54	63.06	39.68	6.78	32.31	PEAK
3	17226.700	68.39			45.87	43.26	7.80	28.54	PEAK

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

Final Test date	May 14, 2008	Test Site No.	03CH03-HY
Temperature	26	Humidity	54%
Test Engineer	Duncan	Configuration	802.11a CH 157

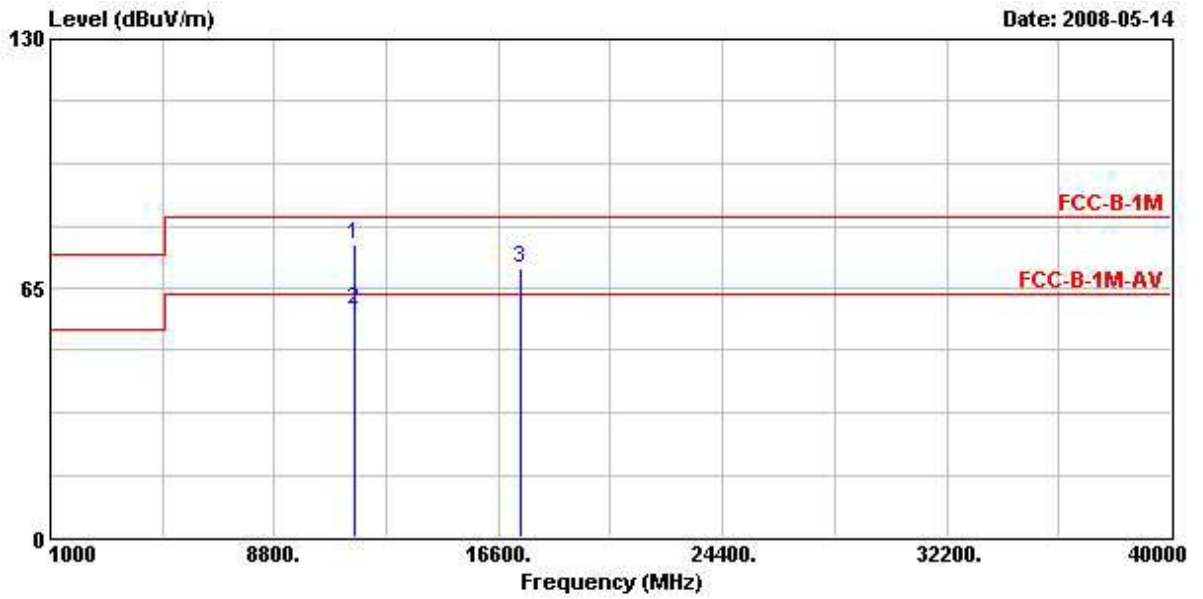
Horizontal



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBUV/m	dB	dBUV/m	dBuV	dB/m	dB	dB	
1	11575.600	59.59	-3.95	63.54	45.80	39.63	6.68	32.52	Average
2	11575.600	76.46	-7.08	83.54	62.67	39.63	6.68	32.52	PEAK
3	17345.900	71.37			47.87	44.24	7.82	28.56	PEAK

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

Vertical

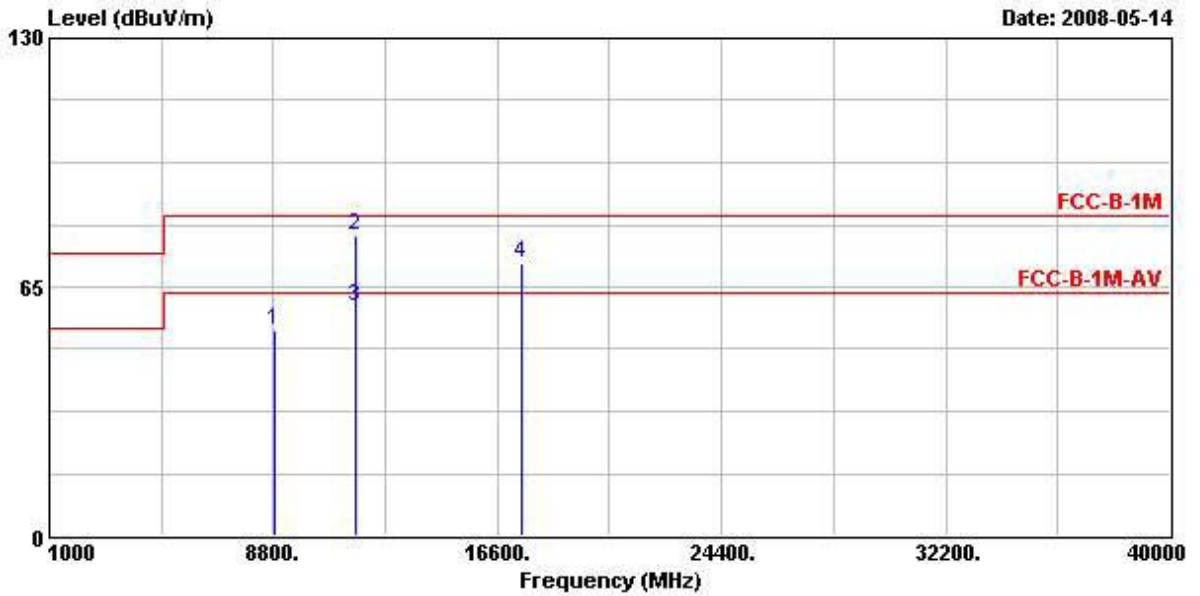


	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	11567.900	76.54	-7.00	83.54	62.73	39.63	6.68	32.49	PEAK
2	11567.900	59.18	-4.36	63.54	45.37	39.63	6.68	32.49	Average
3	17354.200	69.90			46.40	44.24	7.82	28.56	PEAK

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

Final Test date	May 14, 2008	Test Site No.	03CH03-HY
Temperature	26	Humidity	54%
Test Engineer	Duncan	Configuration	802.11a CH 165

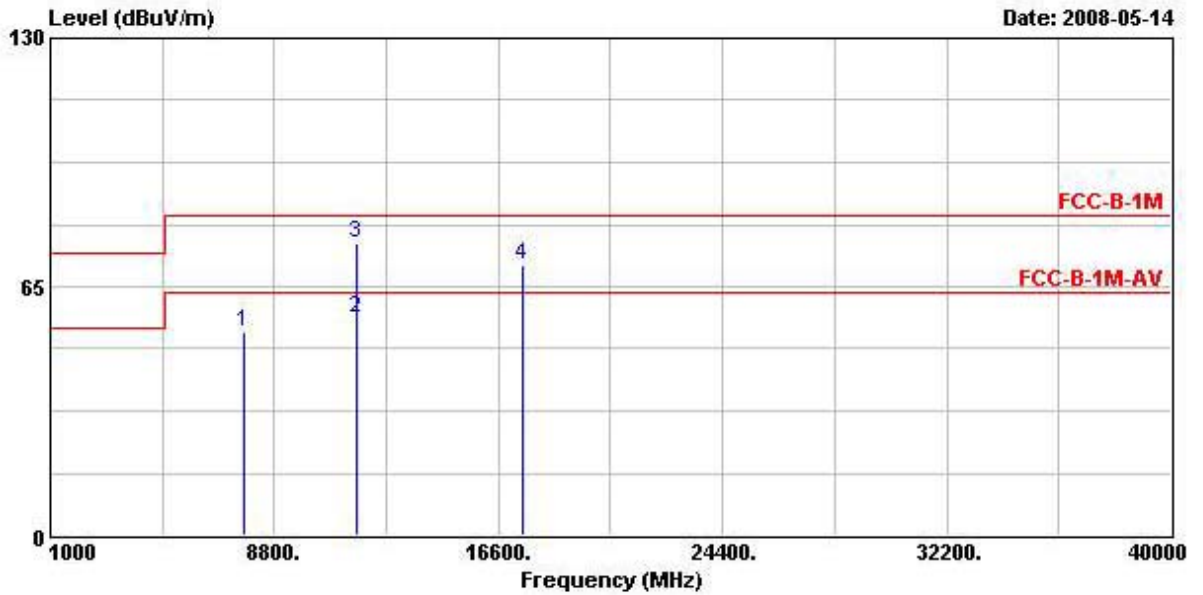
Horizontal



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBUV/m	dB	dBUV/m	dBUV	dB/m	dB	dB	
1	8808.000	53.73			43.12	38.48	4.94	32.81	PEAK
2	11644.800	78.32	-5.22	83.54	64.75	39.56	6.57	32.57	PEAK
3	11644.800	59.79	-3.75	63.54	46.22	39.56	6.57	32.57	Average
4	17462.900	71.38			47.04	45.08	7.84	28.57	PEAK

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

Vertical

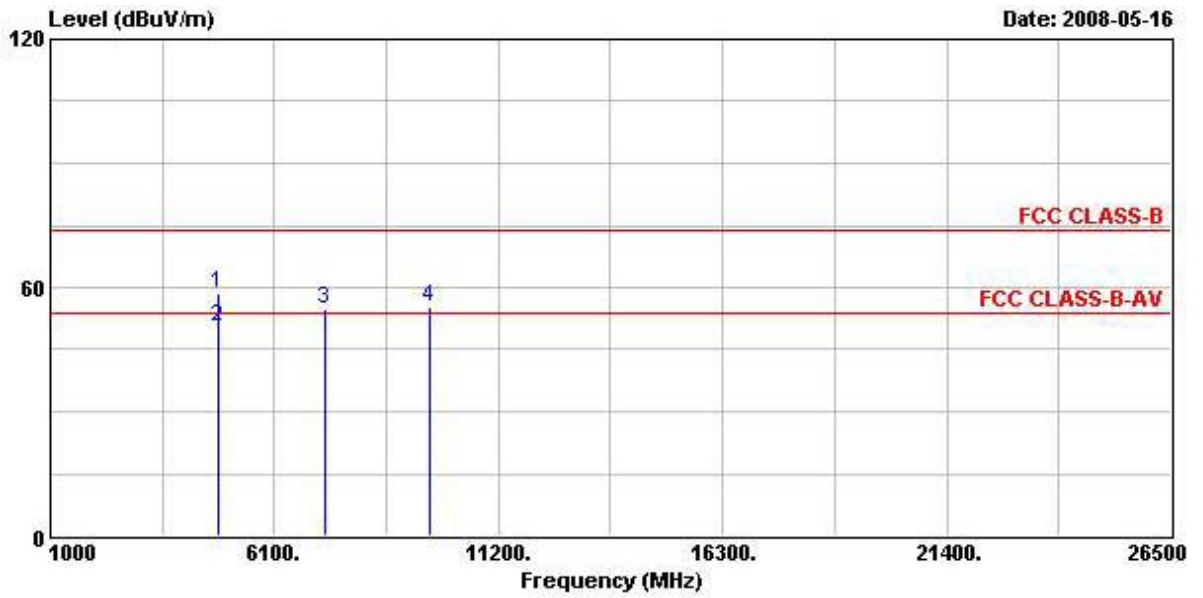


	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBUV/m	dB	dBUV/m	dBuV	dB/m	dB	dB	
1	7768.000	53.05			43.74	37.57	4.63	32.89	PEAK
2	11644.000	56.89	-6.65	63.54	43.32	39.56	6.57	32.57	Average
3	11644.000	76.30	-7.24	83.54	62.73	39.56	6.57	32.57	PEAK
4	17458.900	70.52			46.18	45.08	7.84	28.57	PEAK

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

Final Test date	May 16, 2008	Test Site No.	03CH03-HY
Temperature	26	Humidity	54%
Test Engineer	Duncan	Configuration	802.11b CH 1

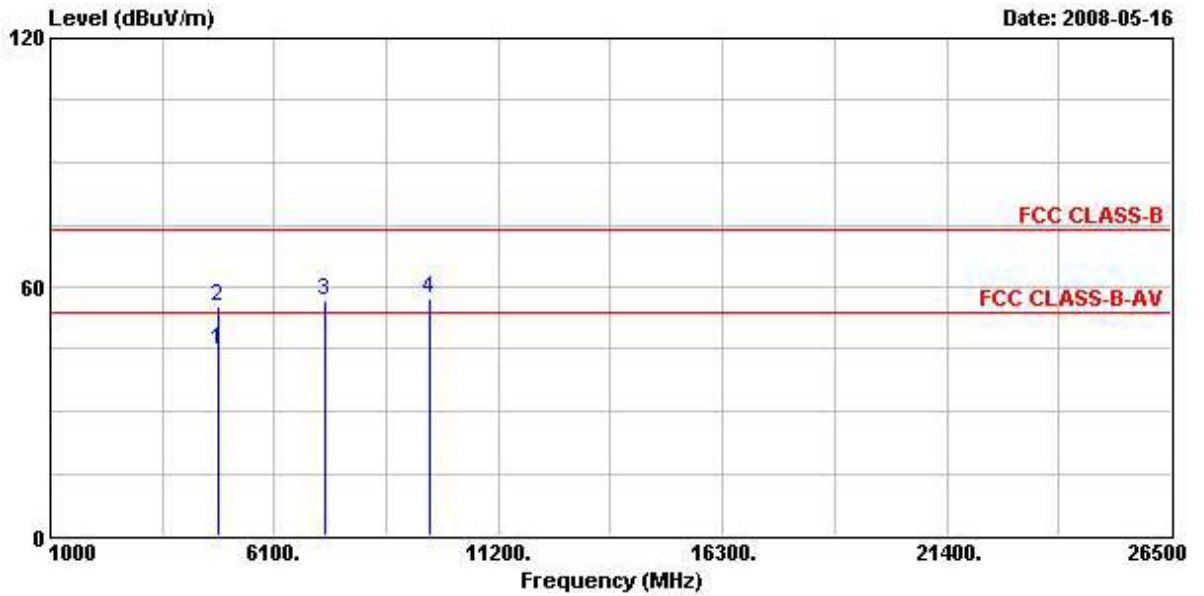
Horizontal



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	4824.170	58.38	-15.62	74.00	53.77	33.06	4.03	32.47	PEAK
2	4824.170	50.38	-3.62	54.00	45.77	33.06	4.03	32.47	Average
3	7237.900	54.53			47.90	35.78	3.67	32.82	PEAK
4	9648.060	55.27			44.60	38.41	5.21	32.95	PEAK

Note: An 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

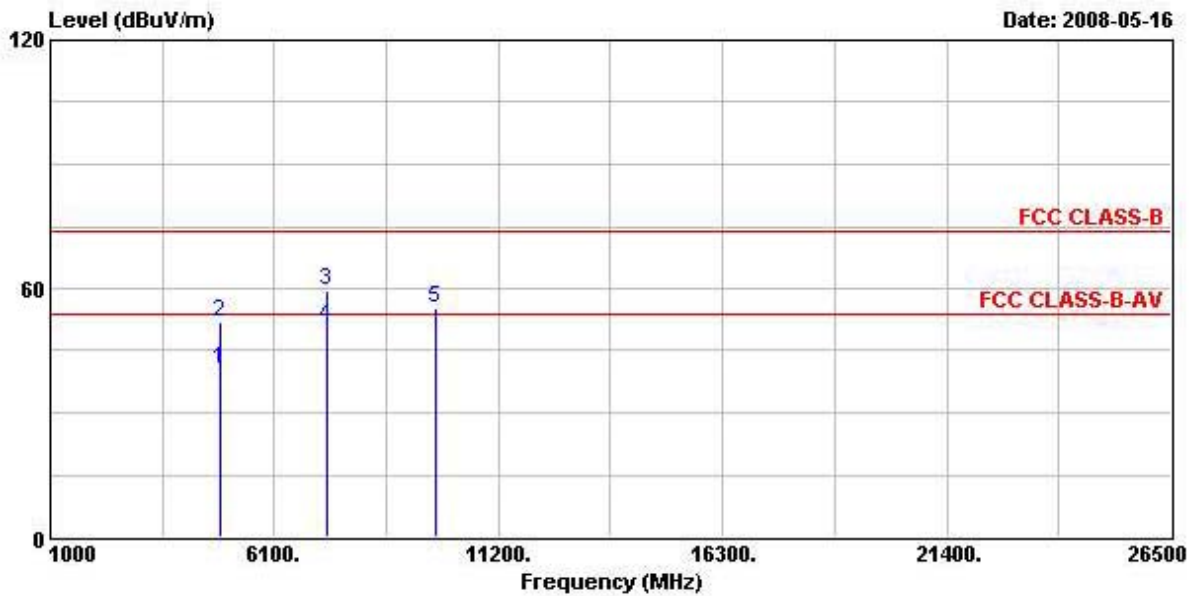


	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBUV/m	dB	dBUV/m	dBuV	dB/m	dB	dB	
1	4823.990	44.66	-9.34	54.00	40.05	33.06	4.03	32.47	Average
2	4823.990	55.22	-18.78	74.00	50.61	33.06	4.03	32.47	PEAK
3	7235.900	56.61			49.98	35.78	3.67	32.82	PEAK
4	9647.960	56.97			46.30	38.41	5.21	32.95	PEAK

Note: An 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).

Final Test date	May 16, 2008	Test Site No.	03CH03-HY
Temperature	26	Humidity	54%
Test Engineer	Duncan	Configuration	802.11b CH 6

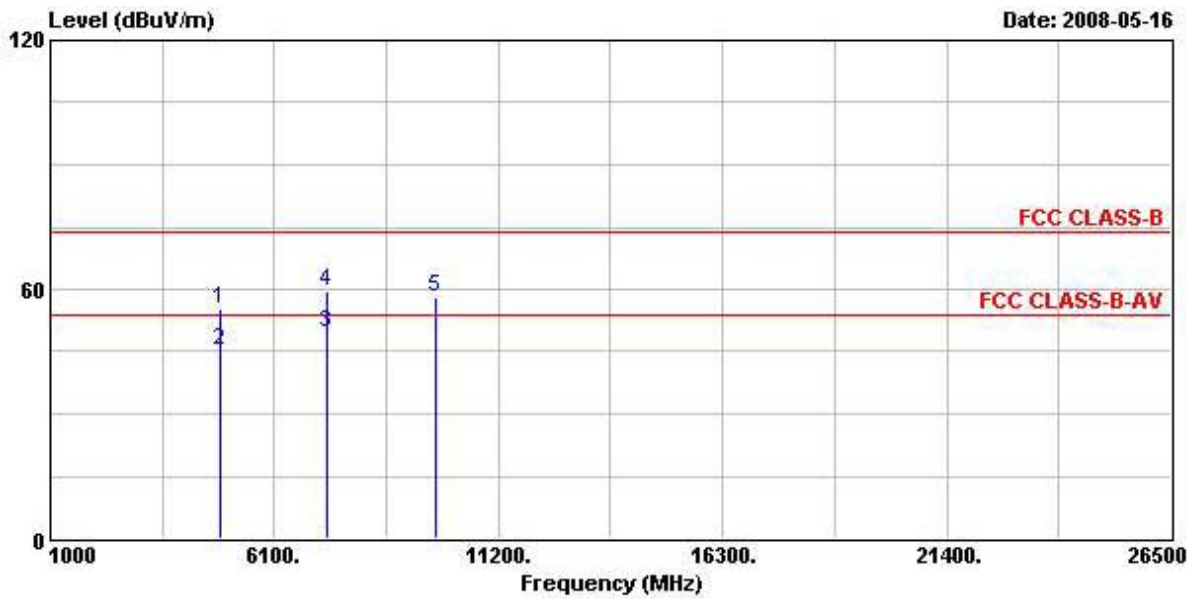
Horizontal



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBUV/m	dB	dBUV/m	dBuV	dB/m	dB	dB	
1	4873.700	40.60	-13.40	54.00	35.88	33.16	4.02	32.47	Average
2	4873.700	51.91	-22.09	74.00	47.20	33.16	4.02	32.47	PEAK
3	7311.200	59.45	-14.55	74.00	52.44	35.94	3.91	32.85	PEAK
4	7311.200	51.15	-2.85	54.00	44.14	35.94	3.91	32.85	Average
5	9748.200	55.44			44.43	38.62	5.31	32.92	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

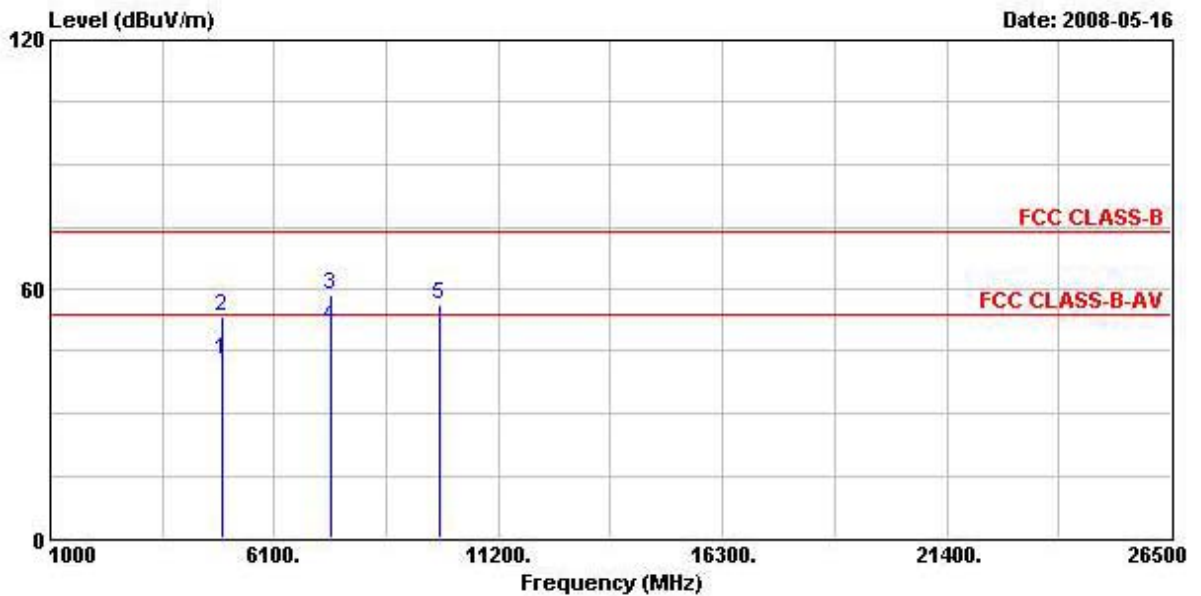


	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	4873.990	55.36	-18.64	74.00	50.65	33.16	4.02	32.47	PEAK
2 @	4873.990	45.12	-8.88	54.00	40.40	33.16	4.02	32.47	Average
3 @	7311.100	49.31	-4.69	54.00	42.30	35.94	3.91	32.85	Average
4	7311.100	59.30	-14.70	74.00	52.29	35.94	3.91	32.85	PEAK
5	9747.870	57.90			46.89	38.62	5.31	32.92	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).

Final Test date	May 16, 2008	Test Site No.	03CH03-HY
Temperature	26	Humidity	54%
Test Engineer	Duncan	Configuration	802.11b CH 11

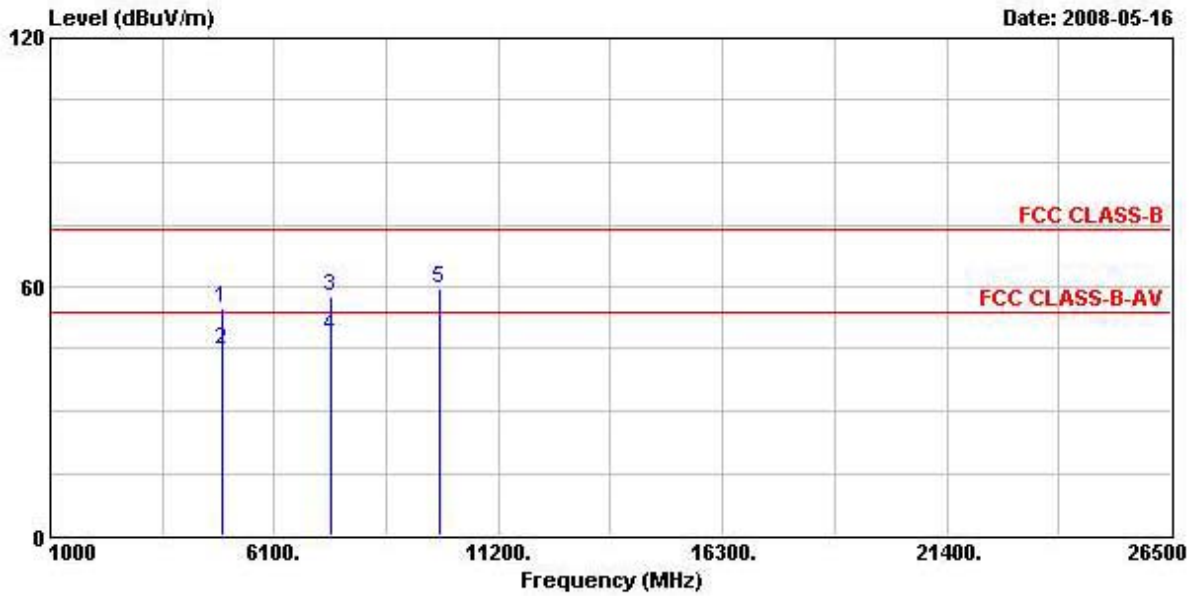
Horizontal



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBUV/m	dB	dBUV/m	dBuV	dB/m	dB	dB	
1	4924.000	42.80	-11.20	54.00	37.99	33.26	4.02	32.46	Average
2	4924.000	53.50	-20.50	74.00	48.68	33.26	4.02	32.46	PEAK
3	7387.100	58.70	-15.30	74.00	51.29	36.15	4.16	32.90	PEAK
4	7387.100	50.73	-3.27	54.00	43.32	36.15	4.16	32.90	Average
5	9848.140	56.37			45.01	38.79	5.47	32.89	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

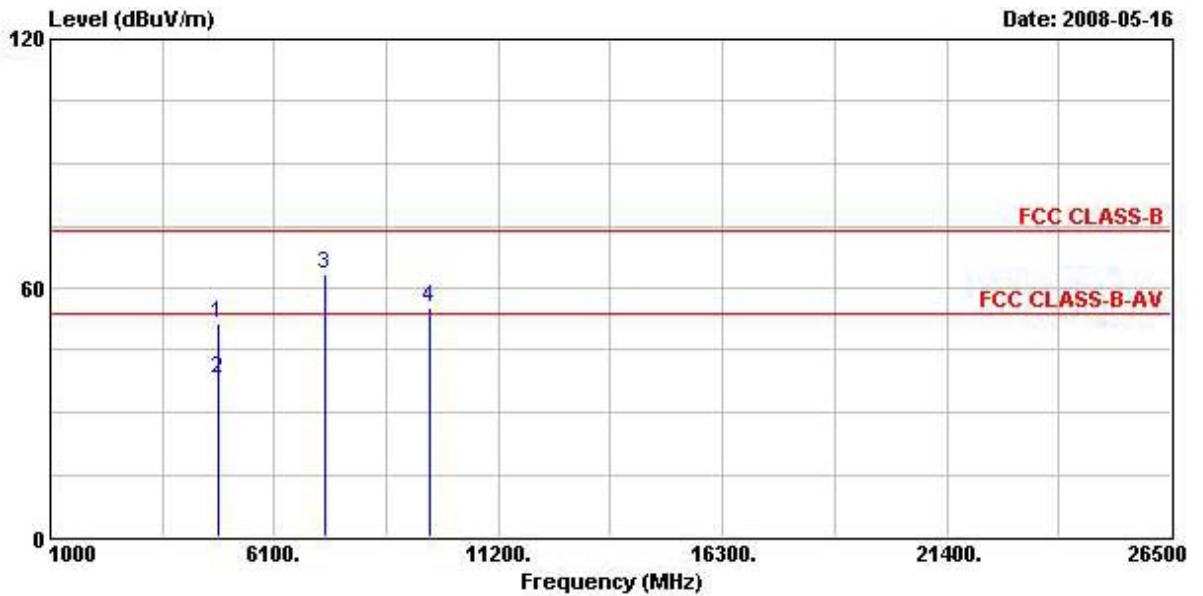


	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	4924.000	54.99	-19.01	74.00	50.18	33.26	4.02	32.46	PEAK
2	4924.000	44.74	-9.26	54.00	39.93	33.26	4.02	32.46	Average
3	7385.900	57.65	-16.35	74.00	50.24	36.15	4.16	32.90	PEAK
4	7385.900	48.27	-5.73	54.00	40.86	36.15	4.16	32.90	Average
5	9848.060	59.60			48.24	38.79	5.47	32.89	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).

Final Test date	May 16, 2008	Test Site No.	03CH03-HY
Temperature	26	Humidity	54%
Test Engineer	Duncan	Configuration	802.11g CH 1

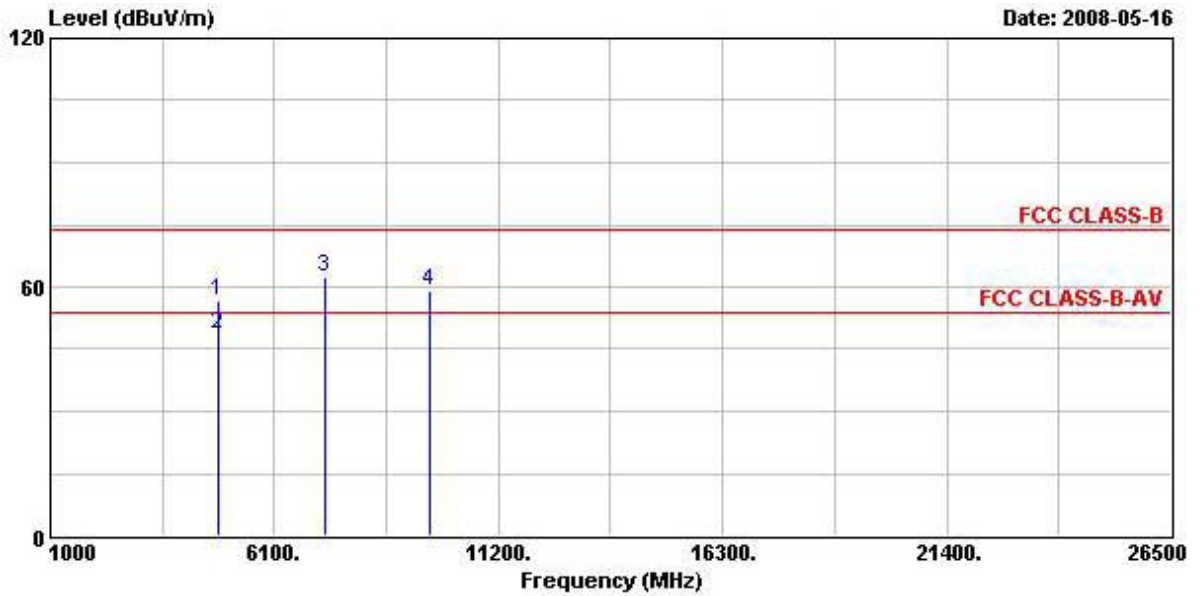
Horizontal



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBUV/m	dB	dBUV/m	dBuV	dB/m	dB	dB	
1	4823.100	51.31	-22.69	74.00	46.70	33.06	4.03	32.47	PEAK
2	4823.100	38.15	-15.85	54.00	33.54	33.06	4.03	32.47	Average
3	7231.100	63.23			56.58	35.78	3.67	32.80	PEAK
4	9652.400	55.41			44.74	38.41	5.21	32.95	PEAK

Note: An 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

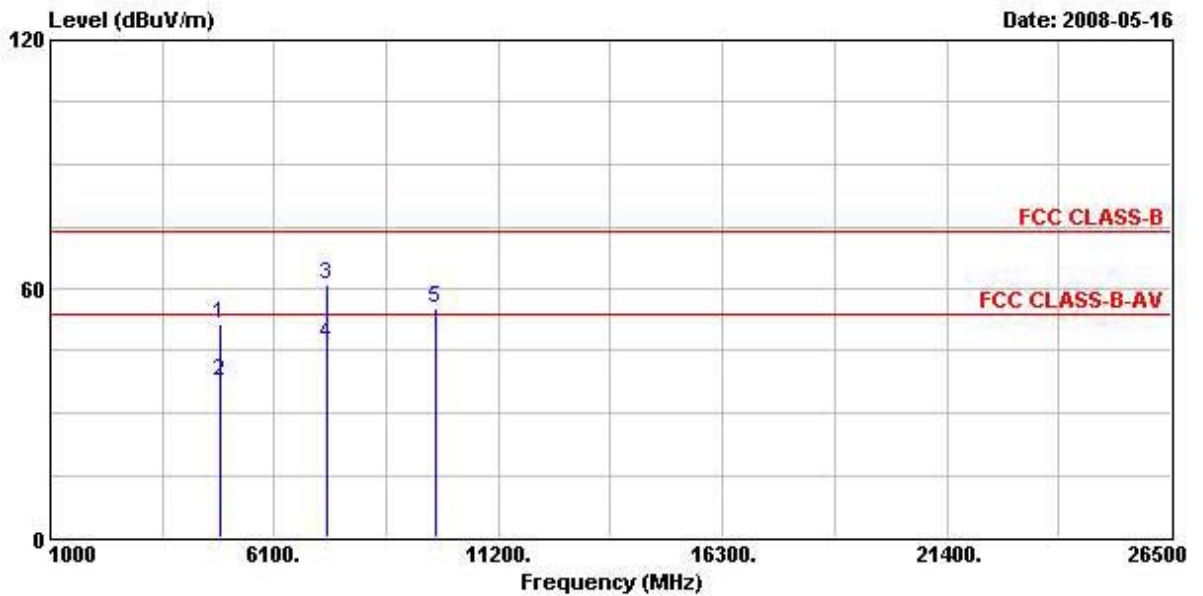


	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	4822.900	56.63	-17.37	74.00	52.02	33.06	4.03	32.47	PEAK
2 @	4822.900	48.40	-5.60	54.00	43.79	33.06	4.03	32.47	Average
3	7239.200	62.56			55.93	35.78	3.67	32.82	PEAK
4	9650.900	58.83			48.16	38.41	5.21	32.95	PEAK

Note: An 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).

Final Test date	May 16, 2008	Test Site No.	03CH03-HY
Temperature	26	Humidity	54%
Test Engineer	Duncan	Configuration	802.11g CH 6

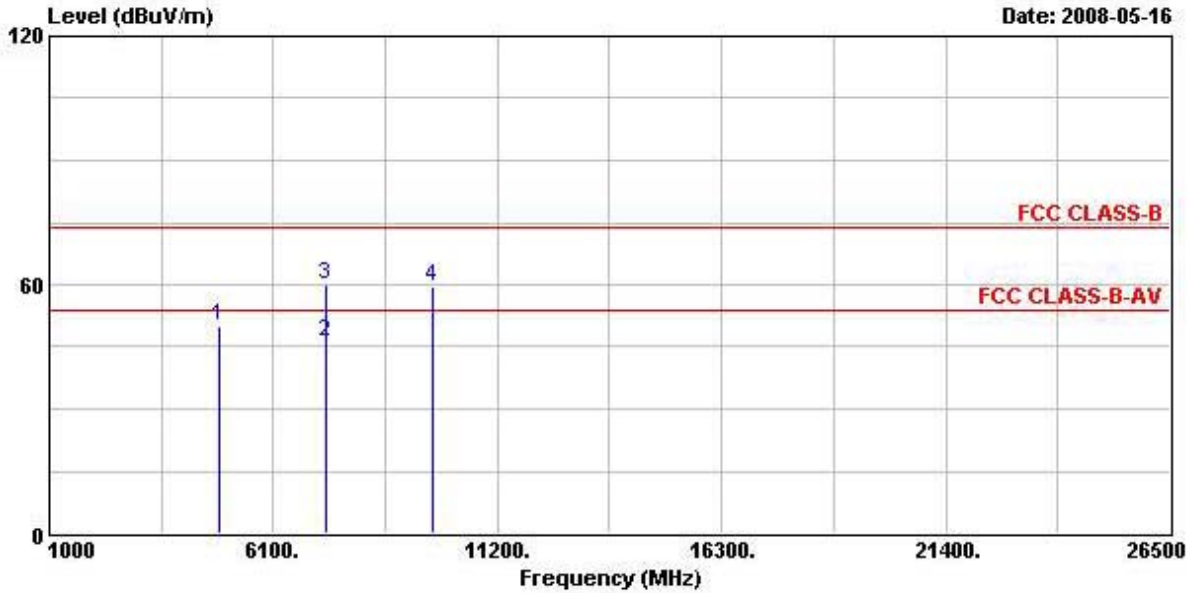
Horizontal



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	4872.800	51.21	-22.79	74.00	46.49	33.16	4.02	32.47	PEAK
2	4872.800	37.40	-16.60	54.00	32.68	33.16	4.02	32.47	Average
3	7314.100	60.84	-13.16	74.00	53.85	35.94	3.91	32.87	PEAK
4 @	7314.100	46.48	-7.52	54.00	39.49	35.94	3.91	32.87	Average
5	9755.100	55.46			44.40	38.62	5.36	32.92	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

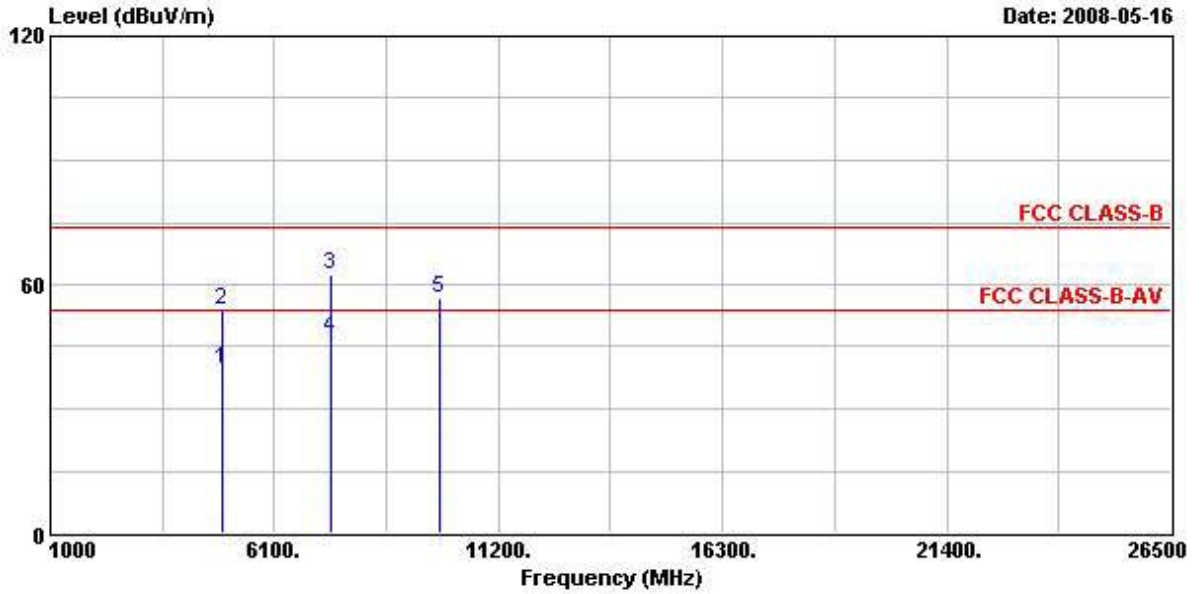


	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBUV/m	dB	dBUV/m	dBuV	dB/m	dB	dB	
1	4870.400	49.83	-4.17	54.00	45.12	33.16	4.02	32.47	PK
2	7309.300	46.30	-7.70	54.00	39.29	35.94	3.91	32.85	Average
3	7309.300	59.97	-14.03	74.00	52.96	35.94	3.91	32.85	PEAK
4	9743.800	59.74			48.77	38.58	5.31	32.92	PEAK

Note: An 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).

Final Test date	May 16, 2008	Test Site No.	03CH03-HY
Temperature	26	Humidity	54%
Test Engineer	Duncan	Configuration	802.11g CH 11

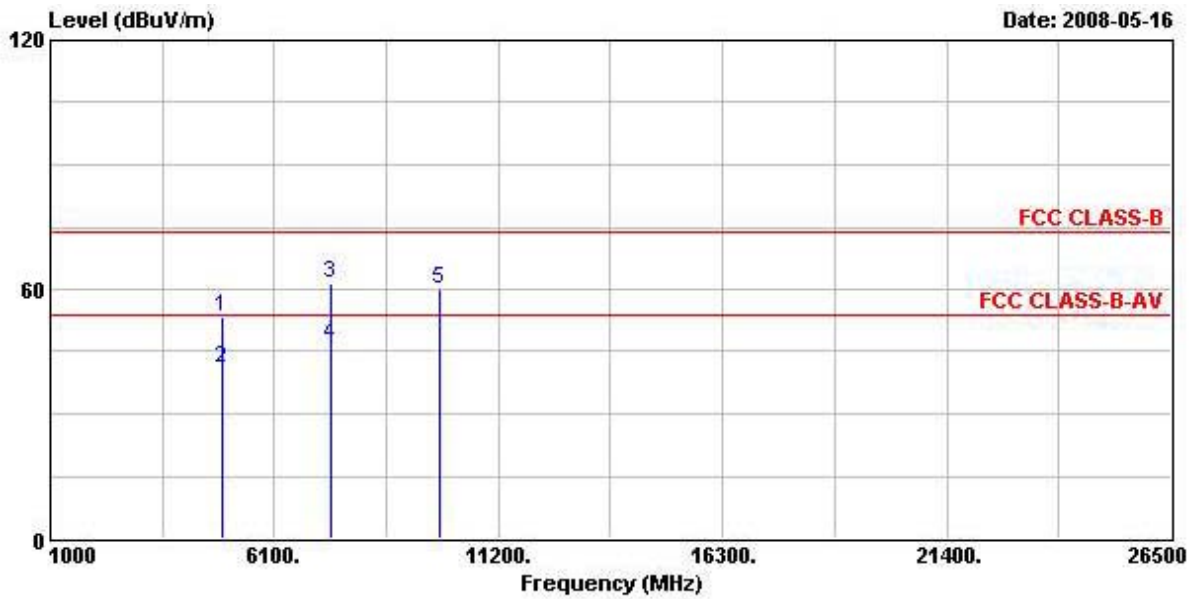
Horizontal



	Freq	Level	Over	Limit	ReadAntenna	Cable	Preamp	Remark
	MHz	dBUV/m	Limit	Line	Level	Loss	Factor	
			dB	dBUV/m	dBuV	dB	dB	
1	4924.800	39.65	-14.35	54.00	34.84	33.26	4.02	Average
2	4924.800	53.61	-20.39	74.00	48.79	33.26	4.02	PEAK
3	7389.100	62.46	-11.54	74.00	55.07	36.15	4.16	PEAK
4	7389.100	47.34	-6.66	54.00	39.95	36.15	4.16	Average
5	9844.000	56.61			45.25	38.79	5.47	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	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	4922.400	53.52	-20.48	74.00	48.70	33.26	4.02	32.46	PEAK
2	4922.400	40.74	-13.26	54.00	35.93	33.26	4.02	32.46	Average
3	7383.300	61.64	-12.36	74.00	54.28	36.11	4.16	32.90	PEAK
4	7383.300	46.62	-7.38	54.00	39.25	36.11	4.16	32.90	Average
5	9846.800	59.84			48.47	38.79	5.47	32.89	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).

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

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

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

3.6 Band Edge and Fundamental Emissions Measurement

3.6.1 Limit

20dBc in any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

Frequencies (MHz)	Field Strength (micorvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

3.6.2 Measuring Instruments and Setting

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

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	100 MHz
RB / VB (Emission in restricted band)	1MHz / 1MHz for Peak, 1 MHz / 10Hz for Average
RB / VB (Emission in non-restricted band)	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	May 26, 2008	Test Site No.	03CH03-HY
Temperature	26	Humidity	54%
Test Engineer	Duncan	Configuration	802.11b CH 1, 6, 11

Channel 1

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	2385.810	63.76	-10.24	74.00	33.28	28.29	2.19	0.00	Peak
2 @	2412.220	114.37			83.86	28.33	2.19	0.00	Peak
1 @	2386.570	52.96	-1.04	54.00	22.48	28.29	2.19	0.00	Average
2 @	2412.220	107.26			76.75	28.33	2.19	0.00	Average

An item 2 is Fundamental Emissions.

Channel 6

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1	2389.610	59.63	-14.37	74.00	29.15	28.29	2.19	0.00	Peak
2 @	2436.730	115.71			85.10	28.40	2.22	0.00	Peak
3	2486.130	57.91	-16.09	74.00	27.20	28.47	2.25	0.00	Peak
1 @	2388.090	48.63	-5.37	54.00	18.15	28.29	2.19	0.00	Average
2 @	2436.730	108.47			77.86	28.40	2.22	0.00	Average
3 @	2483.850	47.07	-6.93	54.00	16.36	28.47	2.25	0.00	Average

An item 2 is Fundamental Emissions.

Channel 11

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1 @	2460.860	115.86			85.21	28.43	2.22	0.00	Peak
2	2483.500	61.96	-12.04	74.00	31.25	28.47	2.25	0.00	Peak
1 @	2460.860	108.58			77.93	28.43	2.22	0.00	Average
2 @	2483.500	51.27	-2.73	54.00	20.56	28.47	2.25	0.00	Average

An item 1 is Fundamental Emissions.

Final Test date	May 27, 2008	Test Site No.	03CH03-HY
Temperature	26	Humidity	54%
Test Engineer	Duncan	Configuration	802.11g CH 1, 6, 11

Channel 1

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1 @	2390.000	68.47	-5.53	74.00	37.99	28.29	2.19	0.00	Peak
2 @	2414.690	110.70			80.19	28.33	2.19	0.00	Peak
1 @	2390.000	52.50	-1.50	54.00	22.02	28.29	2.19	0.00	Average
2 @	2414.690	100.64			70.13	28.33	2.19	0.00	Average

An item 2 is Fundamental Emissions.

Channel 6

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1 @	2390.000	68.31	-5.69	74.00	37.83	28.29	2.19	0.00	Peak
2 @	2430.650	115.00			84.42	28.36	2.22	0.00	Peak
3	2484.420	63.03	-10.97	74.00	32.32	28.47	2.25	0.00	Peak
1 @	2390.000	52.79	-1.21	54.00	22.31	28.29	2.19	0.00	Average
2 @	2430.650	105.55			74.97	28.36	2.22	0.00	Average
3 @	2483.660	49.07	-4.93	54.00	18.36	28.47	2.25	0.00	Average

An item 2 is Fundamental Emissions.

Channel 11

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	
1 @	2461.810	110.19			79.54	28.43	2.22	0.00	Peak
2 @	2483.660	72.04	-1.96	74.00	41.33	28.47	2.25	0.00	Peak
1 @	2461.810	100.36			69.71	28.43	2.22	0.00	Average
2 @	2483.470	52.31	-1.69	54.00	21.60	28.47	2.25	0.00	Average

An item 1 is Fundamental Emissions.

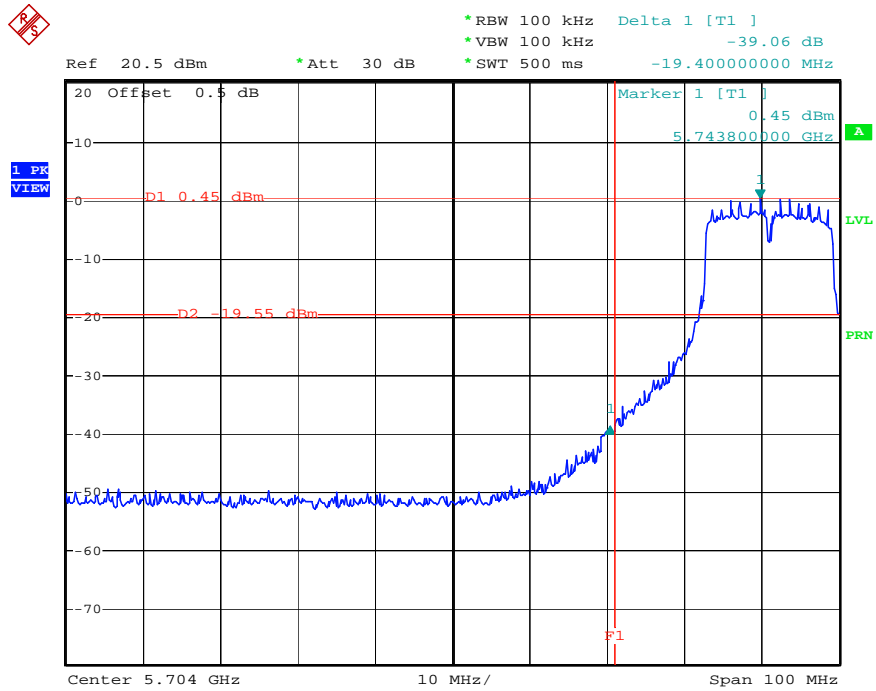
Note:

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

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

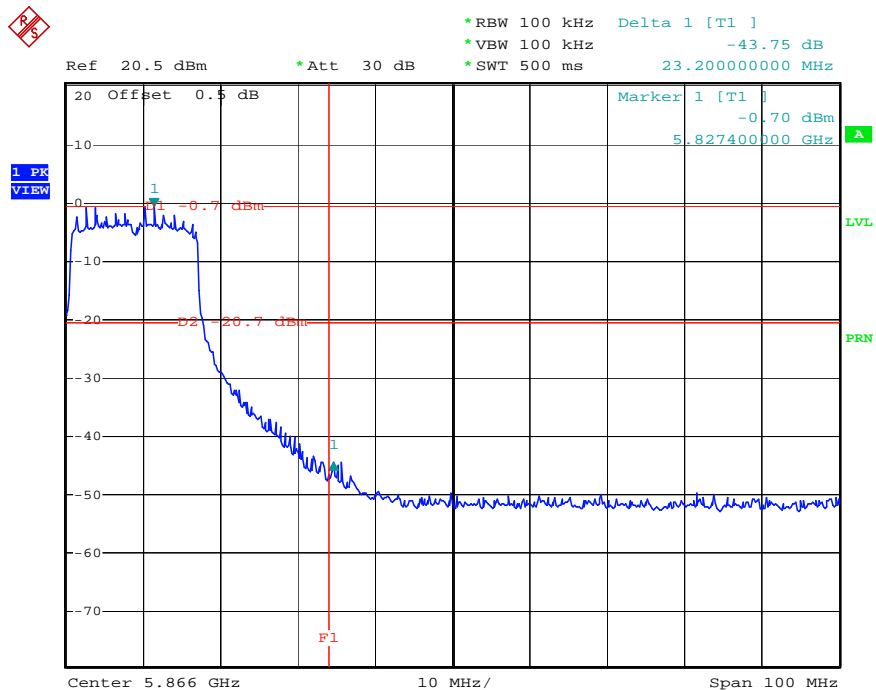
For Emission not in Restricted Band

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



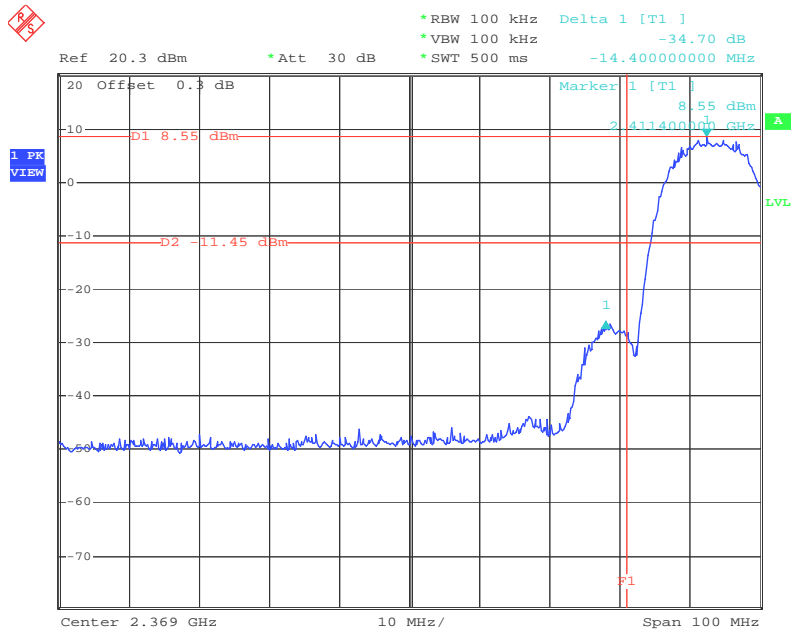
Date: 1.JUN.2008 05:56:09

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



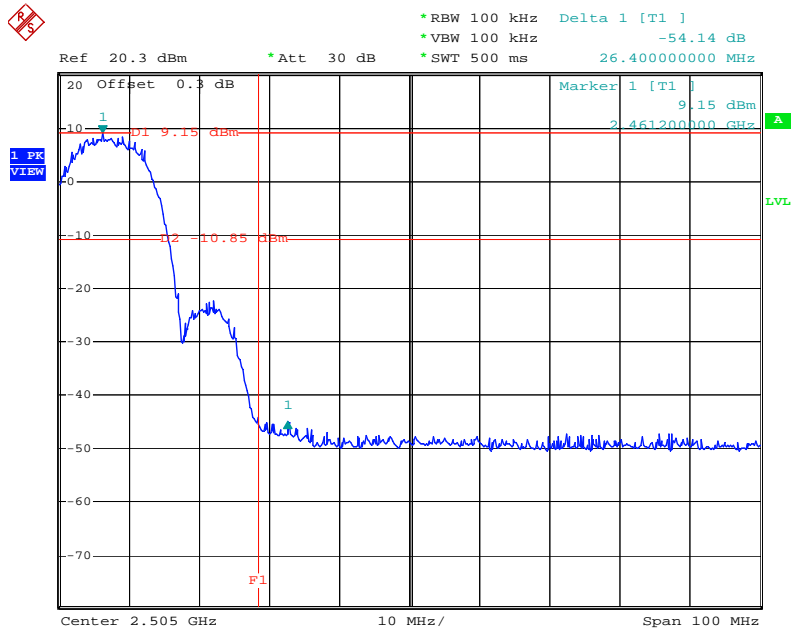
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Low Band Edge Plot on Configuration IEEE 802.11b / 2412 MHz



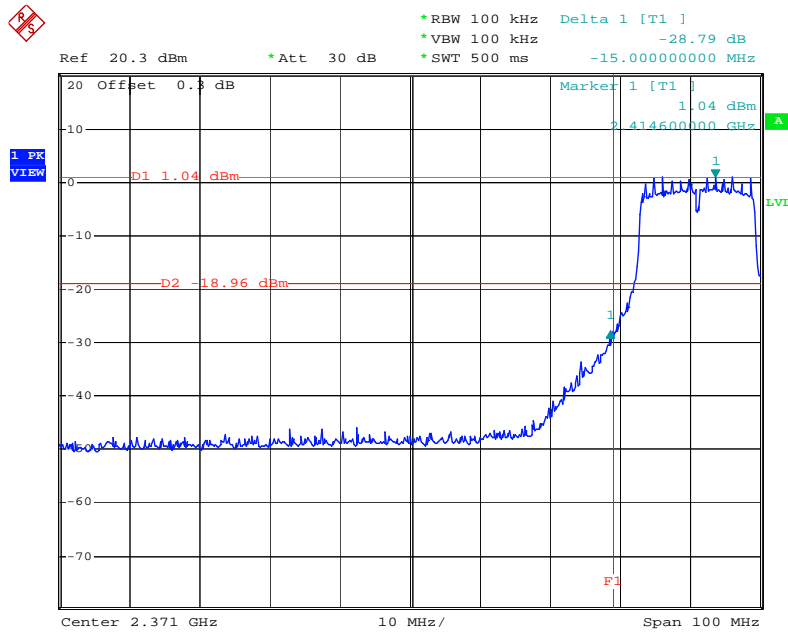
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High Band Edge Plot on Configuration IEEE 802.11b / 2462 MHz



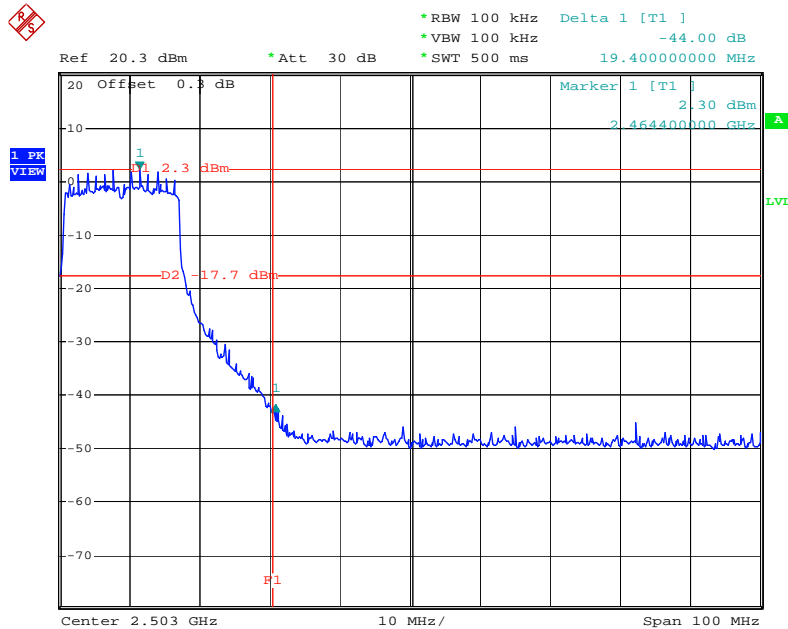
Date: 27.MAY.2008 18:25:27

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



Date: 28.MAY.2008 10:22:31

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



Date: 27.MAY.2008 18:58:40

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,

3.7.2 Antenna Connector Construction

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

4 LIST OF MEASURING EQUIPMENTS

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

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

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Spectrum Analyzer	R&S	FSP30	100023	9kHz ~ 30GHz	Jan. 10, 2008	Conducted (TH01-HY)
Power Meter	R&S	NRVS	100444	DC ~ 40GHz	Jun. 27, 2007	Conducted (TH01-HY)
Power Sensor	R&S	NRV-Z51	100458	DC ~ 30GHz	Jun. 27, 2007	Conducted (TH01-HY)
Power Sensor	R&S	NRV-Z32	100057	30MHz ~ 6GHz	Jun. 27, 2007	Conducted (TH01-HY)
DC Power Source	G.W.	GPC-6030D	C671845	DC 1V ~ 60V	Mar. 13, 2008	Conducted (TH01-HY)
Temp. and Humidity Chamber	KSON	THS-C3L	612	N/A	Oct. 01, 2007	Conducted (TH01-HY)
RF CABLE-1m	Jye Bao	RG142	CB034-1m	20MHz ~ 7GHz	Dec. 01, 2007	Conducted (TH01-HY)
RF CABLE-2m	Jye Bao	RG142	CB035-2m	20MHz ~ 1GHz	Dec. 01, 2007	Conducted (TH01-HY)
Vector Signal Generator	R&S	SMU200A	102098	100kHz ~ 6GHz	Nov. 14, 2007	Conducted (TH01-HY)
Signal Generator	R&S	SMR40	100116	10MHz ~ 40GHz	Mar. 10, 2008	Conducted (TH01-HY)

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	May 04, 2007*	Conducted (TH01-HY)

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

Radiated Emissions (9Khz~30MHz)

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Loop Antenna	R&S	HFH2-Z2	860004/001	9 kHz - 30 MHz	Jul. 28, 2008*	Radiation (03CH03-HY)

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

Radiated Emissions (30MHz~1GHz)

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Open Area Test Site	SPORTON	OATS-10	OS04-LK	30 MHz - 1 GHz 10m, 3m	Jul. 31, 2009	Radiation (OS04-LK)
Amplifier	HP	87405A	3207A01437	10 MHz - 3 GHz	Oct. 23, 2008	Radiation (OS04-LK)
Spectrum Analyzer	R&S	FSP	100642	9 kHz – 7 GHz	Dec. 19, 2008	Radiation (OS04-LK)
Receiver	R&S	ESCS 30	100354	9 kHz - 2.75 GHz	Dec.15, 2008	Radiation (OS04-LK)
Bilog Antenna	SCHAFFNER	CBL6112B	2672B	30 MHz - 2 GHz	Jul. 11, 2009	Radiation (OS04-LK)
Turn Table	EMCO	2080	9711-2021	0 - 360 degree	N/A	Radiation (OS04-LK)
Antenna Mast	EMCO	2075	9711-2115	1 m - 4 m	N/A	Radiation (OS04-LK)
RF Cable-R03m	BELDEN	RG8/U	CB012	30 MHz - 1 GHz	Jan. 05, 2009	Radiation (OS04-LK)

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

Radiated Emissions above 1GHz

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH03-HY	30 MHz - 1 GHz 3m	Jun. 14, 2007	Radiation (03CH03-HY)
Amplifier	SCHAFFNER	COA9231A	18667	9 kHz - 2 GHz	Jan. 14, 2008	Radiation (03CH03-HY)
Amplifier	Agilent	8449B	3008A02120	1 GHz - 26.5 GHz	Jun. 07, 2007	Radiation (03CH03-HY)
Spectrum Analyzer	R&S	FSP40	100305	9 kHz - 40 GHz	Sep. 27, 2007	Radiation (03CH03-HY)
Horn Antenna	EMCO	3115	6741	1GHz ~ 18GHz	Mar. 04, 2008	Radiation (03CH03-HY)
Horn Antenna	SCHWARZBECK	BBHA9170	BBHA9170154	15 GHz - 40 GHz	Jan.18, 2008	Radiation (03CH03-HY)
RF Cable-HIGH	SUHNER	SUCOFLEX 106	03CH03-HY	1 GHz - 40 GHz	Dec. 03, 2007	Radiation (03CH03-HY)
Turn Table	HD	DS 420	420/650/00	0 – 360 degree	N/A	Radiation (03CH03-HY)
Antenna Mast	HD	MA 240	240/560/00	1 m - 4 m	N/A	Radiation (03CH03-HY)

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

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Amplifier	MITEQ	AMF-6F-260400	9121372	26.5 GHz - 40 GHz	Jan. 22, 2007*	Radiation (03CH03-HY)

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

5 TEST LOCATION

SHIJR	ADD : 6Fl., No. 106, Sec. 1, Shintai 5th Rd., Shijr City, Taipei, Taiwan 221, R.O.C. TEL : 886-2-2696-2468 FAX : 886-2-2696-2255
HWA YA	ADD : No. 52, Hwa Ya 1st Rd., Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C. TEL : 886-3-327-3456 FAX : 886-3-318-0055
LINKOU	ADD : No. 30-2, Dingfu Tsuen, Linkou Shiang, Taipei, Taiwan 244, R.O.C TEL : 886-2-2601-1640 FAX : 886-2-2601-1695
DUNGHU	ADD : No. 3, Lane 238, Kangle St., Neihu Chiu, Taipei, Taiwan 114, R.O.C. TEL : 886-2-2631-4739 FAX : 886-2-2631-9740
JUNGHE	ADD : 7Fl., No. 758, Jungjeng Rd., Junghe City, Taipei, Taiwan 235, R.O.C. TEL : 886-2-8227-2020 FAX : 886-2-8227-2626
NEIHU	ADD : 4Fl., No. 339, Hsin Hu 2 nd Rd., Taipei 114, Taiwan, R.O.C. TEL : 886-2-2794-8886 FAX : 886-2-2794-9777
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. : L1190-090318

財團法人全國認證基金會
Taiwan Accreditation Foundation

Certificate of Accreditation

This is to certify that

Sporton International Inc.

EMC & Wireless Communications Laboratory

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

is accredited in respect of laboratory

- Accreditation Criteria : ISO/IEC 17025:2005
- Accreditation Number : 1190
- Originally Accredited : December 15, 2003
- Effective Period : January 10, 2007 to January 09, 2010
- Accredited Scope : Testing Field, see described in the Appendix
- Specific Accreditation Program : Accreditation Program for Designated Testing Laboratory for Commodities Inspection
Accreditation Program for Telecommunication Equipment Testing Laboratory
Accreditation Program for BSMI Mutual Recognition Arrangement with Foreign Authorities

Jay-San Chen
President, Taiwan Accreditation Foundation
Date : March 18, 2009

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