

FCC RADIO TEST REPORT

according to

47 CFR FCC Part 15 Subpart C § 15.247

Equipment : Glee Cube
Model No. : MBA-01
Brand Name : GIGABYTE
Filing Type : New Application
Applicant : KCS DIGITAL Inc.
8F, No.69-8. Sec.2 Chung Cheng E. Rd, Tamshui Town,
Taipei County, Taiwan
FCC ID : VBK-GLEECUBE-MBA
Manufacturer : Regent Electron Dongguan Co.,Ltd.
The 3rd Industrial Area Qing Xi Town, Dongguan City,
Guangdong, Province, P.R.C.
Received Date : Oct. 02, 2007
Final Test Date : Oct. 24, 2007

Statement

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

The test result in this report refers exclusively to the presented test model / sample.

Without written approval of SPORTON International Inc., the test report shall not be reproduced except in full.

The measurements and test results shown in this test report were made in accordance with the procedures and found in compliance with the limit given in **ANSI C63.4-2003** and **47 CFR FCC Part 15 Subpart C**.

The test equipment used to perform the test is calibrated and traceable to NML/ROC.



SPORTON International Inc.

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

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History of This Test Report

Original Issue Date: Oct. 29, 2007

Report No.: FR741206-02

☒ No additional attachment.

☐ Additional attachment were issued as following record:

Attachment No.	Issue Date	Description


CERTIFICATE OF COMPLIANCE

according to

47 CFR FCC Part 15 Subpart C § 15.247

Equipment : Glee Cube
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Taipei County, Taiwan

Sporton International as requested by the applicant to evaluate the EMC performance of the product sample received on Oct. 02, 2007 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	9.01 dB
3.2	15.247(b)(3)	Maximum Peak Conducted Output Power	Complies	8.72 dB
3.3	15.247(e)	Power Spectral Density	Complies	13.84 dB
3.4	15.247(a)(2)	6dB Spectrum Bandwidth	Complies	-
3.5	15.247(d)	Radiated Emissions	Complies	2.32 dB
3.6	15.247(d)	Band Edge Emissions	Complies	1.29 dB
3.7	15.203	Antenna Requirements	Complies	-

Test Items	Uncertainty	Remark
AC Power Line Conducted Emissions	$\pm 2.3\text{dB}$	Confidence levels of 95%
Maximum Peak Conducted Output Power	$\pm 0.8\text{dB}$	Confidence levels of 95%
Power Spectral Density	$\pm 0.5\text{dB}$	Confidence levels of 95%
6dB Spectrum Bandwidth	$\pm 8.5 \times 10^{-8}$	Confidence levels of 95%
Radiated Emissions (9kHz~30MHz)	$\pm 0.8\text{dB}$	Confidence levels of 95%
Radiated Emissions (30MHz~1000MHz)	$\pm 1.9\text{dB}$	Confidence levels of 95%
Radiated / Band Edge Emissions (1GHz~18GHz)	$\pm 1.9\text{dB}$	Confidence levels of 95%
Radiated Emissions (18GHz~40GHz)	$\pm 1.9\text{dB}$	Confidence levels of 95%
Temperature	$\pm 0.7^{\circ}\text{C}$	Confidence levels of 95%
Humidity	$\pm 3.2\%$	Confidence levels of 95%
DC / AC Power Source	$\pm 1.4\%$	Confidence levels of 95%

2. GENERAL INFORMATION

2.1. Product Details

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

Items	Description
Power Type	12 VDC from adapter
Modulation	DSSS for IEEE 802.11b ; OFDM for IEEE 802.11g
Data Modulation	DSSS (BPSK / QPSK / 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
Channel Number	11
Channel Band Width (99%)	11b: 15.35 MHz ; 11g: 16.51 MHz
Conducted Output Power	11b: 20.12 dBm ; 11g: 21.28 dBm

2.2. Accessories

Power	Brand	Model	Rating
AC Adapter	ENERTRONIX	EXA0606XB	INPUT: AC100-240V, 50-60Hz, 0.8A OUTPUT: 12V, 2A
Others			
Power Cable / S-VIDEO Cable / AV-VIDEO Cable / IR Transmitter Antenna			

2.3. Table for Filed Antenna

Ant.	Model Name	Antenna Type	Connector	Gain (dBi)
1	L-ANT-001	Dipole Antenna	UFL	1.20
2	L-ANT-001	Dipole Antenna	UFL	1.20

2.4. Table for Carrier Frequencies

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

2.5. Table for Test Modes

Preliminary tests were performed in different data rate to find the worst radiated emission. The data rate shown in the table below is the worst-case rate with respect to the specific test item. Investigation has been done on all the possible configurations 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	Mode 4	Auto	Auto	1
Maximum Peak Conducted Output Power	11b/CCK	11 Mbps	1/6/11	NA
Power Spectral Density	11g/BPSK	6 Mbps	1/6/11	NA
6dB Spectrum Bandwidth				
Radiated Emissions 9kHz~1GHz	11g/BPSK	6 Mbps	6	1
Radiated Emissions 1GHz~10 th Harmonic	11b/CCK	11 Mbps	1/6/11	1
	11g/BPSK	6 Mbps	1/6/11	1
Band Edge Emissions	11b/CCK	11 Mbps	1/6/11	1
	11g/BPSK	6 Mbps	1/6/11	1

For EMI test, the following modes were tested:

Mode 1. FCC AVI Mode

Mode 2. CATV Mode

Mode 3. USB Recording Mode

Mode 4. S-Video Mode

Mode 5. AV2 Mode

Conducted-Because "mode 4" generated the worst test result, it was reported as final data.

2.6. Table for Testing Locations

Test Site No.	Site Category	Location	FCC Reg. No.	IC File No.	VCCI Reg. No
03CH03-HY	SAC	Hwa Ya	101377	IC 4088	-
CO04-HY	Conduction	Hwa Ya	101377	IC 4088	-
TH01-HY	OVEN Room	Hwa Ya	-	-	-

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

2.7. Table for Supporting Units

Support Unit	Brand	Model	FCC ID
DVD Player	SONY	DVP-NS90V	DoC
i-Pod nano	Apple	A1199	DoC
LCD Monitor	DELL	W2600	DoC
Notebook	DELL	PP01L	DoC
TV SG (Remote Workstation)	LEADER	408NPS	-
Notebook (Remote Workstation)	DELL	D400	DoC

2.8. Table for Parameters of Test Software Setting

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

Power Parameters of IEEE 802.11b/g

Test Software Version	ART V5.3		
Frequency	2412 MHz	2437 MHz	2462 MHz
IEEE 802.11b	19	20	17.5
IEEE 802.11g	14	15	15

2.9. EUT Operation during Test

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

The program was executed as follows:

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

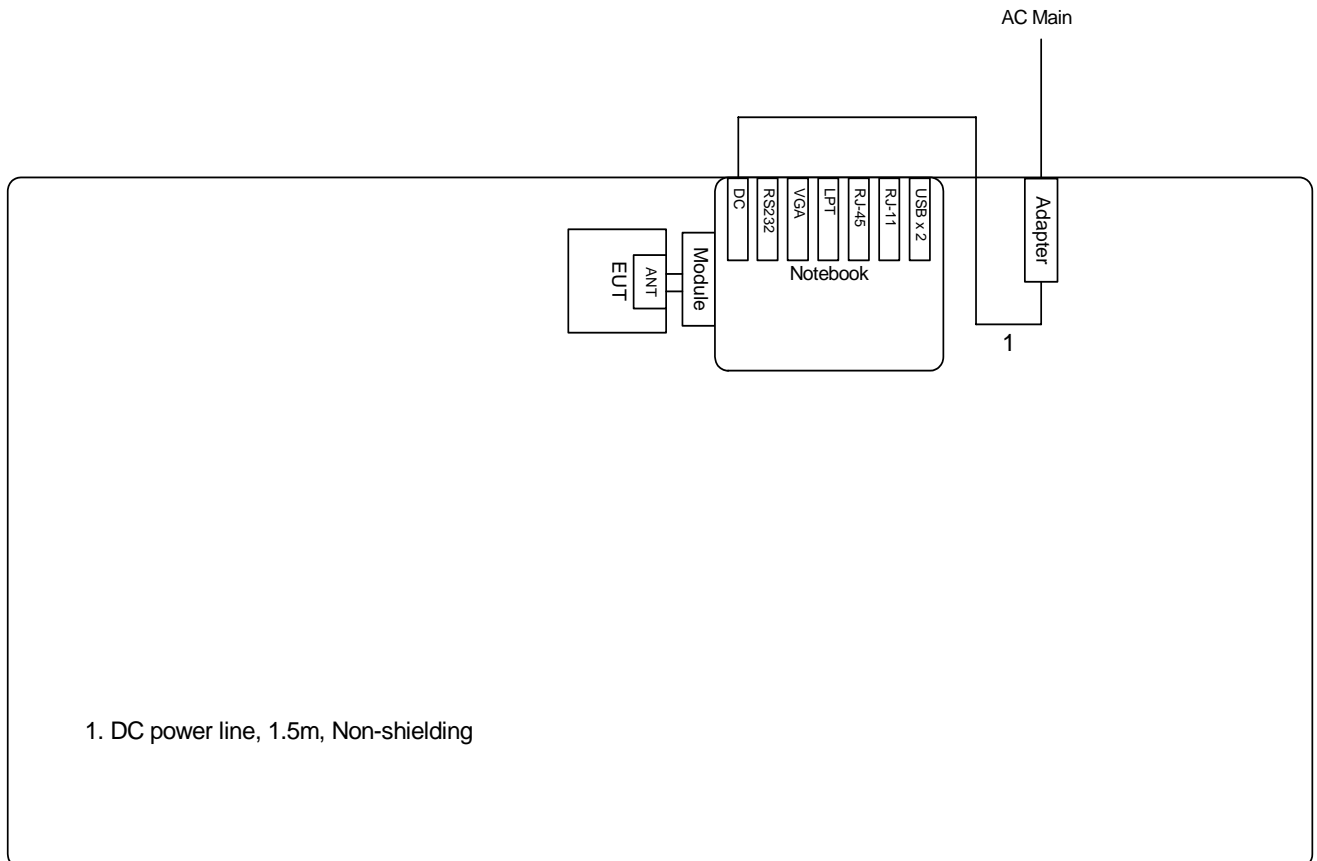
Executed "DIG-220N" to play audio and video.

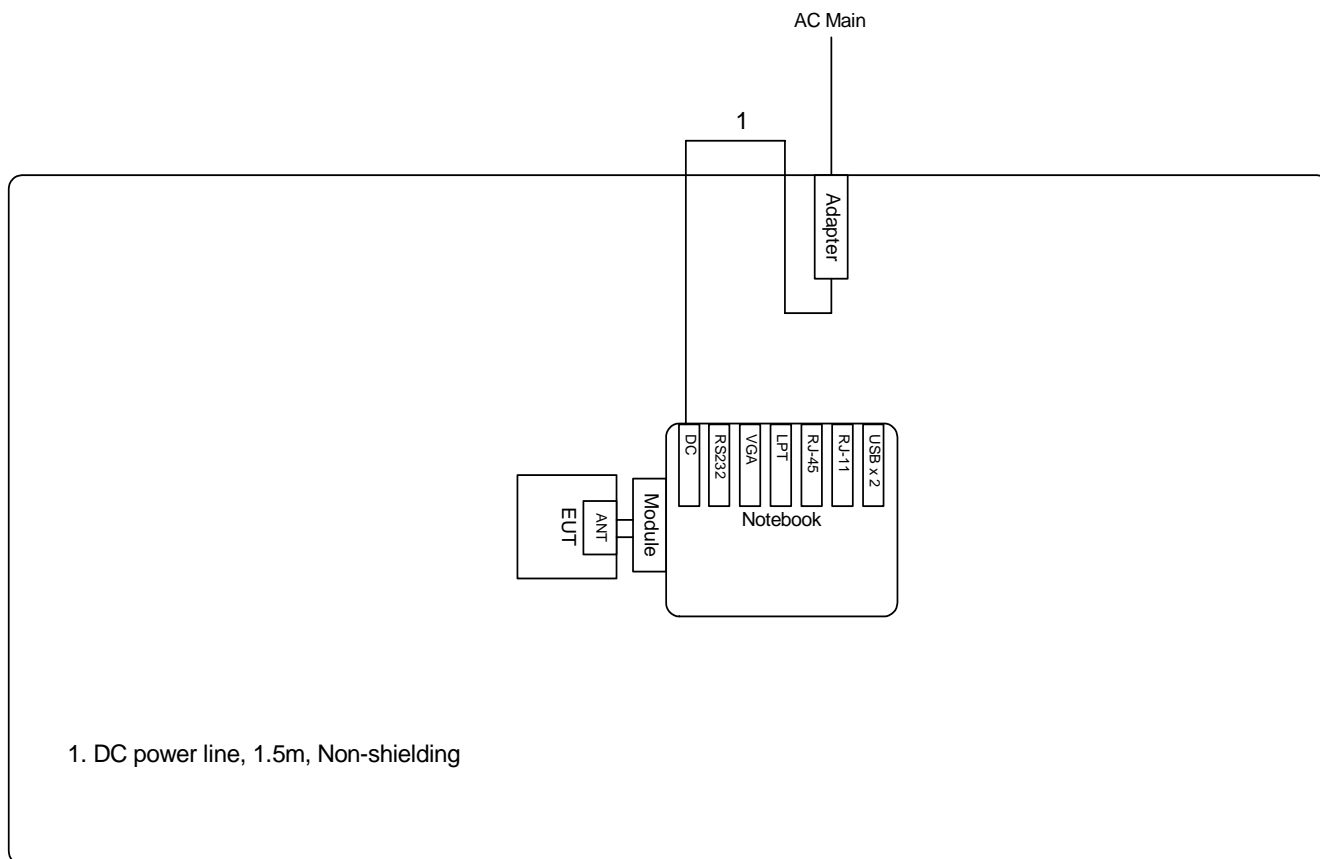
Executed “ART RF” to keep transmitting signals at fixed frequency.

2.10. Test Configurations

2.10.1. 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.

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

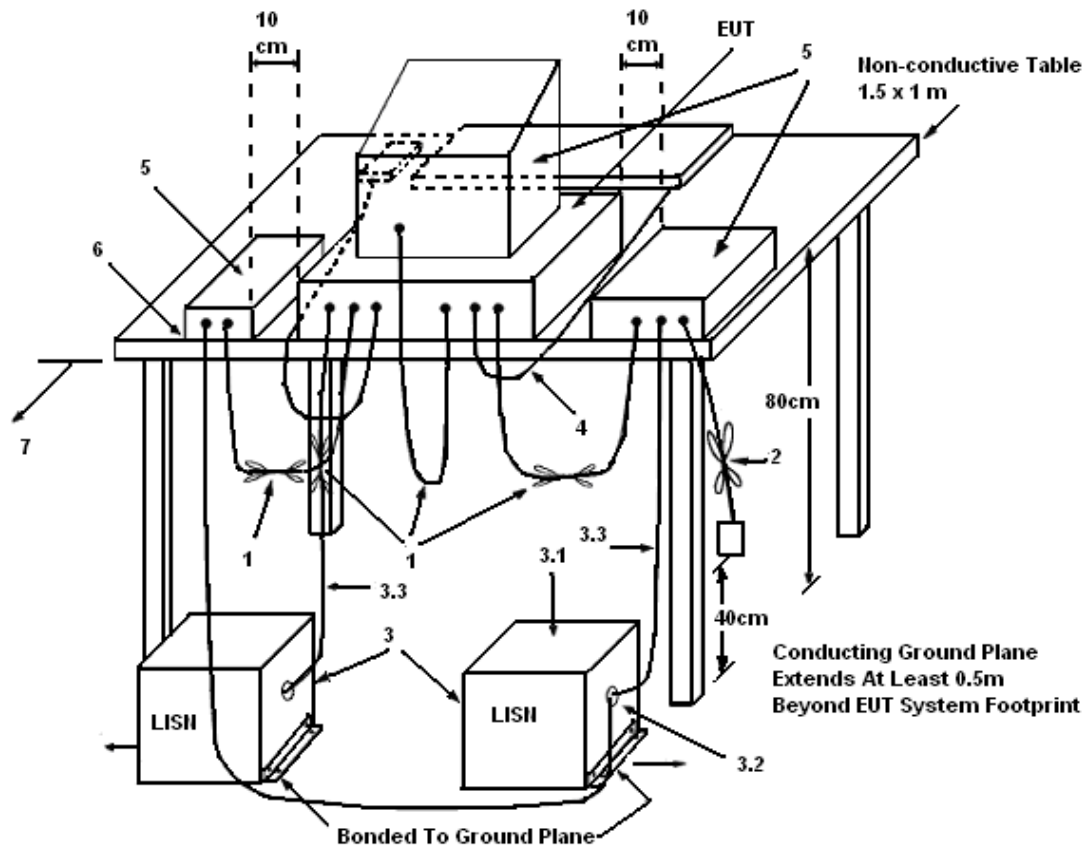
Please refer to section 4 of equipments list in this report. The following table is the setting of the receiver.

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

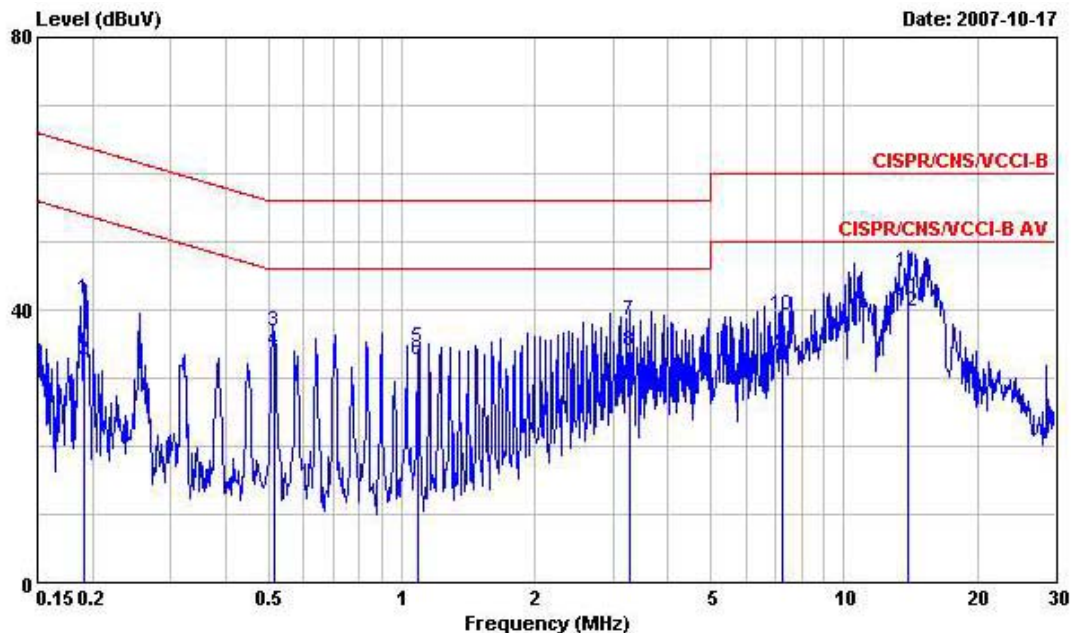
There is no deviation with the original standard.

3.1.6. EUT Operation during Test

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

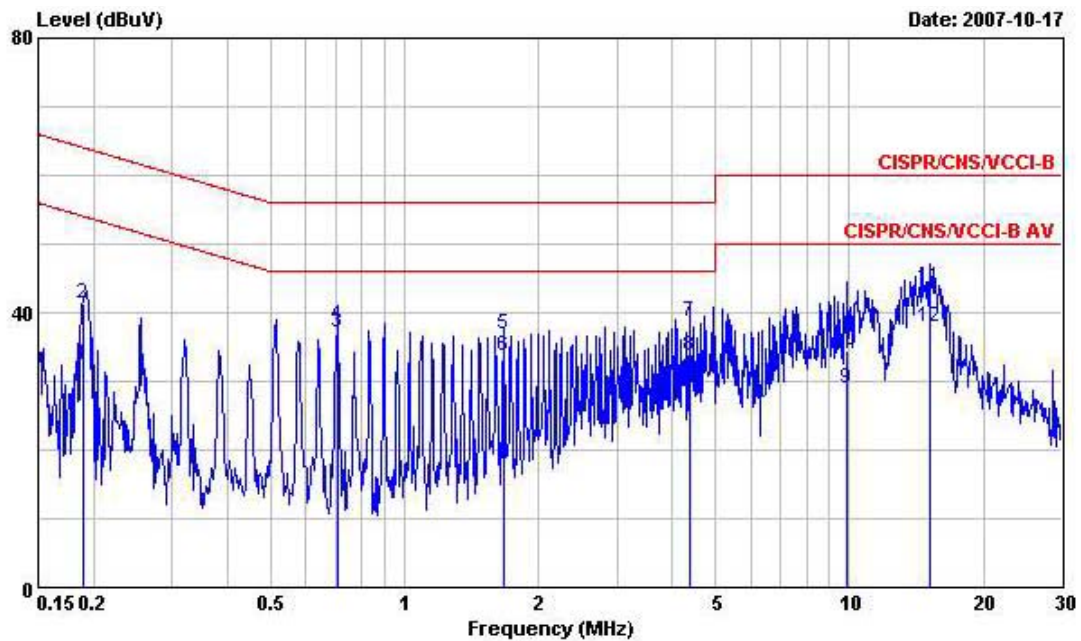
3.1.7. Results of AC Power Line Conducted Emissions Measurement

Temperature	24°C	Humidity	43%
Test Engineer	Chris	Phase	Line
Configuration	Mode 4		



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.1903870	41.71	-22.31	64.02	41.47	0.10	0.14	QP
2	0.1903870	32.64	-21.38	54.02	32.40	0.10	0.14	Average
3	0.5133190	36.82	-19.18	56.00	36.07	0.10	0.65	QP
4	0.5133190	33.85	-12.15	46.00	33.10	0.10	0.65	Average
5	1.090	34.50	-21.50	56.00	33.96	0.10	0.44	QP
6	1.090	32.58	-13.42	46.00	32.04	0.10	0.44	Average
7	3.270	38.29	-17.71	56.00	37.84	0.10	0.35	QP
8	3.270	33.83	-12.17	46.00	33.38	0.10	0.35	Average
9	7.243	33.75	-16.25	50.00	33.33	0.16	0.26	Average
10	7.243	39.15	-20.85	60.00	38.73	0.16	0.26	QP
11	13.910	45.52	-14.48	60.00	44.83	0.53	0.16	QP
12	13.910	39.65	-10.35	50.00	38.96	0.53	0.16	Average

Temperature	24°C	Humidity	43%
Test Engineer	Chris	Phase	Neutral
Configuration	Mode 4		



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.1897900	32.41	-21.64	54.05	32.17	0.10	0.14	Average
2	0.1897900	41.29	-22.76	64.05	41.05	0.10	0.14	QP
3	0.7049240	36.99	-9.01	46.00	36.34	0.10	0.55	Average
4	0.7049240	38.23	-17.77	56.00	37.58	0.10	0.55	QP
5	1.666	36.76	-19.24	56.00	36.23	0.10	0.43	QP
6	1.666	33.77	-12.23	46.00	33.24	0.10	0.43	Average
7	4.360	38.76	-17.24	56.00	38.24	0.21	0.31	QP
8	4.360	33.61	-12.39	46.00	33.09	0.21	0.31	Average
9	9.910	28.94	-21.06	50.00	28.42	0.30	0.22	Average
10	9.910	34.51	-25.49	60.00	33.99	0.30	0.22	QP
11	15.197	43.62	-16.38	60.00	43.18	0.30	0.14	QP
12	15.197	37.88	-12.12	50.00	37.44	0.30	0.14	Average

Note:

Level = Read Level + LISN Factor + Cable Loss.

3.2. Maximum Peak Output Power Measurement

3.2.1. Limit

For systems using digital modulation in the 2400-2483.5MHz, the limit for peak output power is 30dBm. The limited has to be reduced by the amount in dB that the gain of the antenna exceed 6dBi. In case of point-to-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

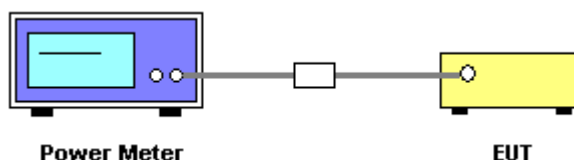
Please refer to section 4 of equipments list in this report. The following table is the setting of the power meter.

Power Meter Parameter	Setting
Filter No.	Auto
Measurement time	0.135 s ~ 26 s
Used Peak Sensor	NRV-Z32 (model 04)

3.2.3. Test Procedures

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

3.2.4. Test Setup Layout



3.2.5. Test Deviation

There is no deviation with the original standard.

3.2.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

3.2.7. Test Result of Maximum Peak Output Power

Test date	Oct. 12, 2007		
Temperature	25.6°C	Humidity	57%
Test Engineer	Nan	Configurations	802.11b/g

Configuration IEEE 802.11b

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
1	2412 MHz	19.78	30.00	Complies
6	2437 MHz	20.12	30.00	Complies
11	2462 MHz	18.46	30.00	Complies

Configuration IEEE 802.11g

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
1	2412 MHz	20.80	30.00	Complies
6	2437 MHz	21.20	30.00	Complies
11	2462 MHz	21.28	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

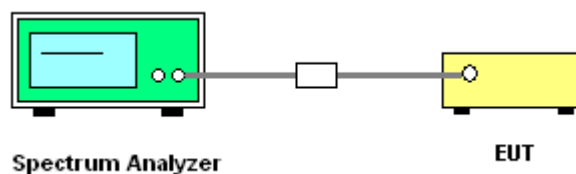
Please refer to section 4 of equipments list in this report. The following table is the setting of the spectrum analyzer.

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 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.

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	Oct. 12, 2007		
Temperature	25.6°C	Humidity	57%
Test Engineer	Nan	Configurations	802.11b/g

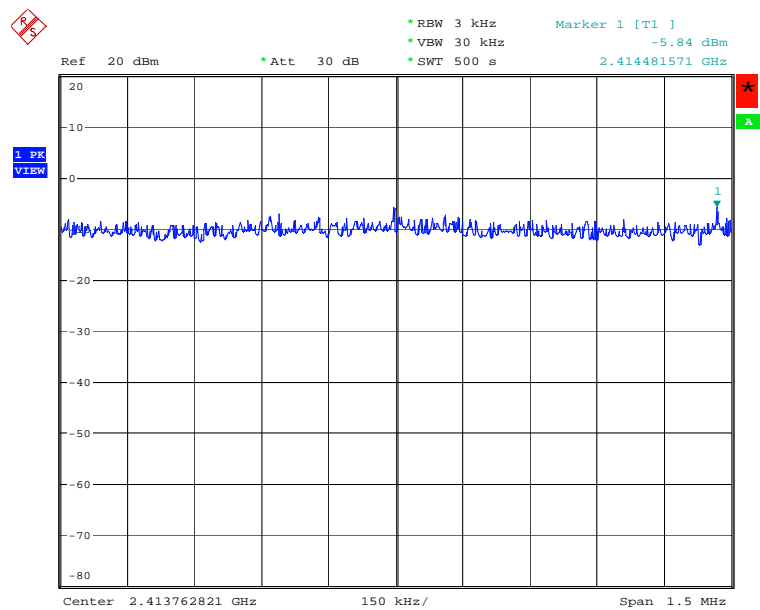
Configuration IEEE 802.11b

Channel	Frequency	Power Density (dBm)	Max. Limit (dBm)	Result
1	2412 MHz	-5.84	8.00	Complies
6	2437 MHz	-6.83	8.00	Complies
11	2462 MHz	-7.54	8.00	Complies

Configuration IEEE 802.11g

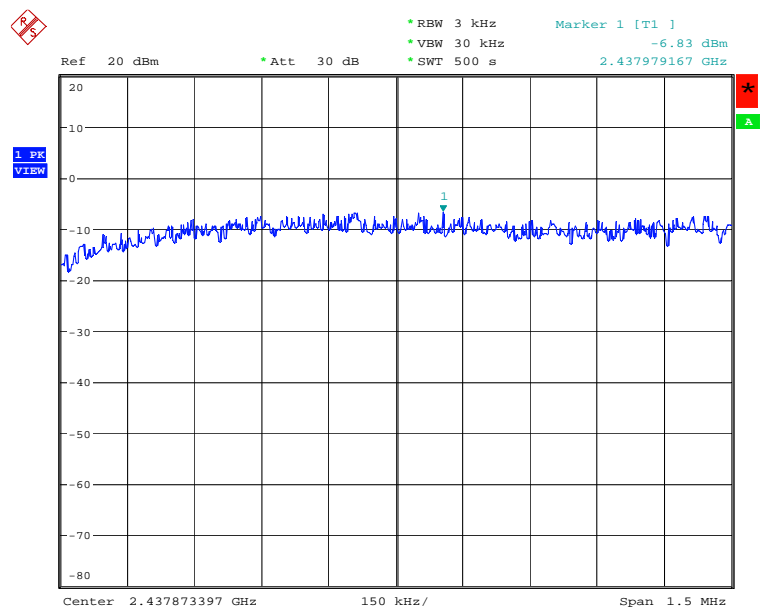
Channel	Frequency	Power Density (dBm)	Max. Limit (dBm)	Result
1	2412 MHz	-13.26	8.00	Complies
6	2437 MHz	-12.03	8.00	Complies
11	2462 MHz	-9.45	8.00	Complies

Power Density Plot on Configuration IEEE 802.11b / 2412 MHz



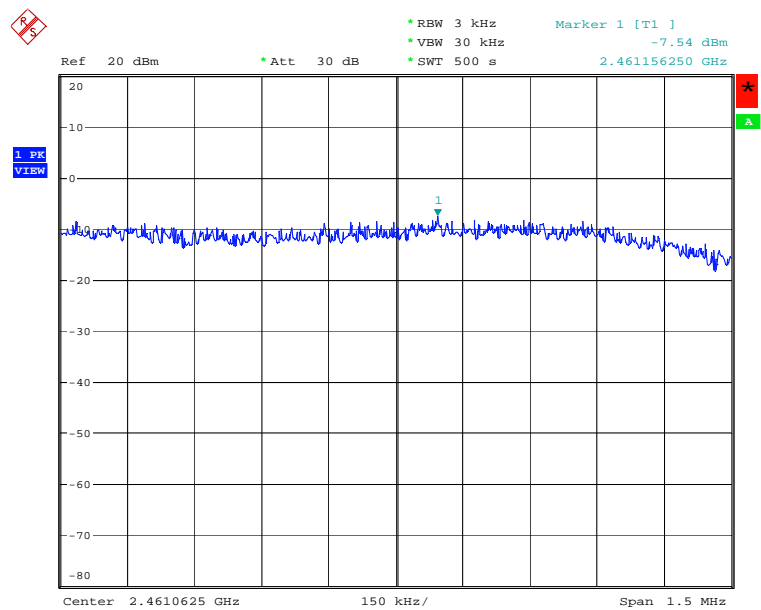
444
Date: 12.OCT.2007 04:27:20

Power Density Plot on Configuration IEEE 802.11b / 2437 MHz



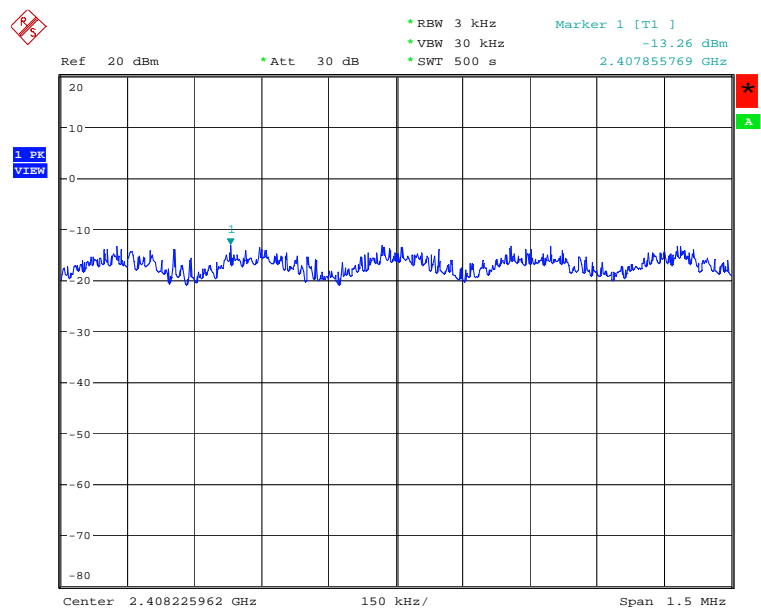
444
Date: 12.OCT.2007 04:28:12

Power Density Plot on Configuration IEEE 802.11b / 2462 MHz



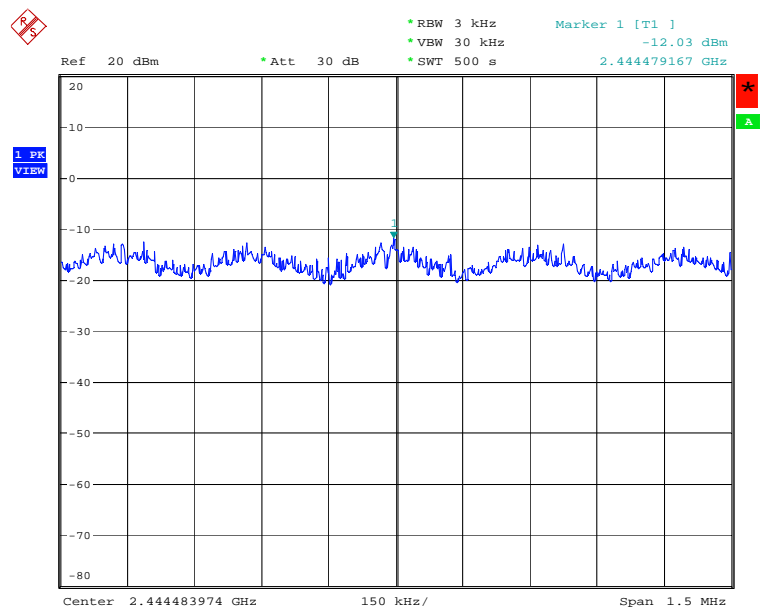
444
Date: 12.OCT.2007 04:29:09

Power Density Plot on Configuration IEEE 802.11g / 2412 MHz



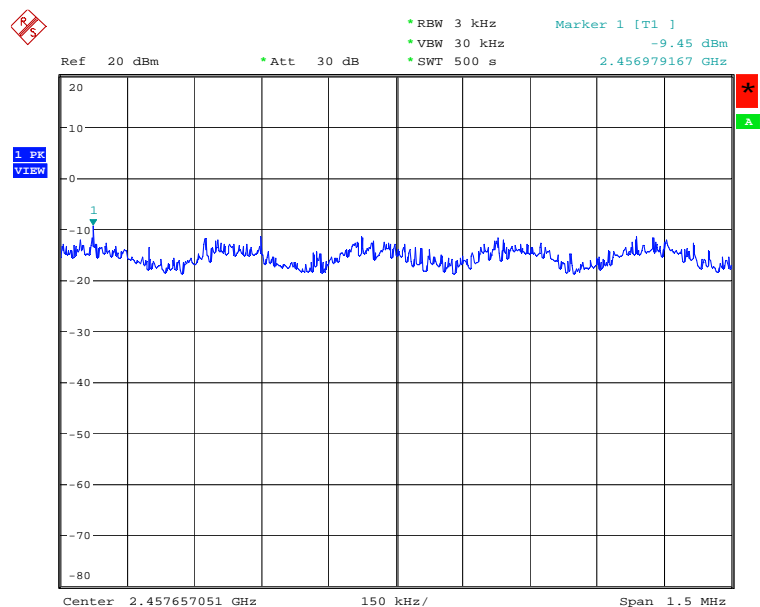
444
Date: 12.OCT.2007 04:23:34

Power Density Plot on Configuration IEEE 802.11g / 2437 MHz



444
Date: 12.OCT.2007 04:22:38

Power Density Plot on Configuration IEEE 802.11g / 2462 MHz



444
Date: 12.OCT.2007 04:21:38

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

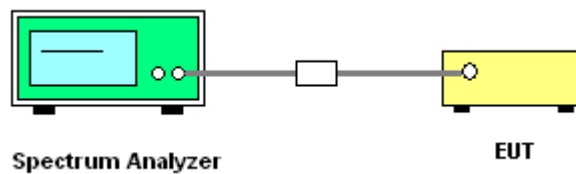
Please refer to section 4 of equipments list in this report. The following table is the setting of the spectrum analyzer.

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 analyser 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

Test date	Oct. 04, 2007		
Temperature	25.6°C	Humidity	57%
Test Engineer	Nan	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	11.96	15.35	500	Complies
6	2437 MHz	12.12	15.35	500	Complies
11	2462 MHz	11.92	15.35	500	Complies

Configuration IEEE 802.11g

Channel	Frequency	6dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)	Min. Limit (kHz)	Test Result
1	2412 MHz	16.38	16.51	500	Complies
6	2437 MHz	16.38	16.51	500	Complies
11	2462 MHz	16.38	16.51	500	Complies

The screenshot shows a Spectrum Analyzer interface with the following details:

- Top Bar:**
 - Left: A red square icon with a white 'R' and a diagonal line.
 - Center: "Ref 20 dBm" and "* Att 30 dB".
 - Right: "Delta 1 [T1]", "0.24 dB", "11.955128205 MHz", and "500 ms".
- Measurement Area:**
 - Y-axis: Power in dBm, ranging from -80 to 20.
 - X-axis: Frequency in MHz, ranging from 2.412 GHz to 2.416 GHz.
 - Signal: A noisy blue line representing the spectrum.
 - Grid: A black grid with major lines every 10 dB and 2 MHz.
 - Vertical Red Lines: Labeled "F1" and "F2" at the bottom.
 - Horizontal Red Lines: Labeled "D1 7.34 dBm" and "D2 1.33 dBm" on the left.
 - Text Labels: "OBW 15.352564103 MHz", "Marker 1 [T1]", "1 [T1 OBW]", "Temp 2.405874205 GHz", "2 [T1 OBW]", "Temp 2.404374692 GHz", "2.419660250 GHz".
- Bottom Bar:**
 - Left: "Center 2.412 GHz".
 - Center: "2 MHz/".
 - Right: "Span 20 MHz".
- Left Panel:**
 - Buttons: "1 PK" and "VIEW".
- Right Panel:**
 - Buttons: "Star" (red) and "A" (green).

Date: 4.OCT.2007 13:21:13

1 PK VIEW

Ref 20 dBm * Att 30 dB

* RBW 100 kHz Delta 1 [T1] -0.28 dB
 * VBW 100 kHz
 * SWT 500 ms 12.115384615 MHz

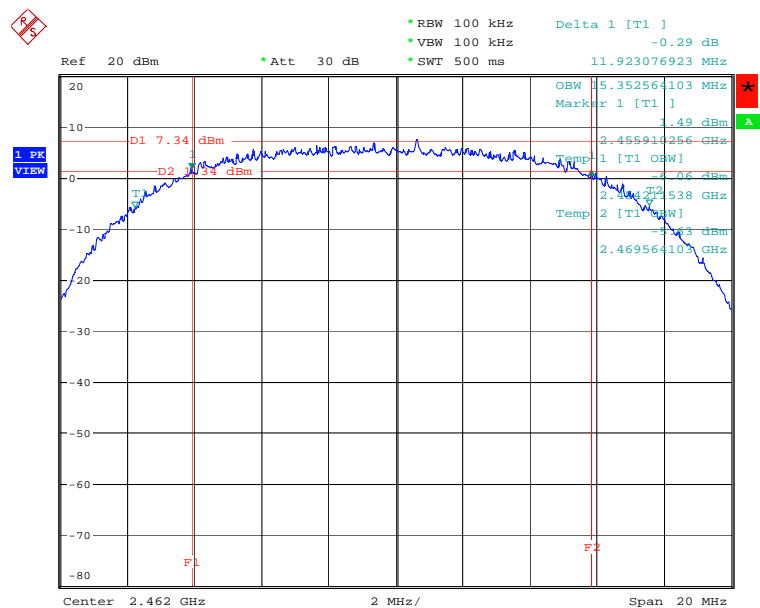
OBW 15.352564103 MHz
 Marker 1 [T1]
 0.34 dBm
 2.430844154 GHz
 1 [T1 OBW]
 Temp
 2.429224538 GHz
 2 [T1 BW]
 Temp
 2.440 dBm
 2.444564103 GHz

F1 F2

Center 2.437 GHz 2 MHz/ Span 20 MHz

Date: 4.OCT.2007 13:22:39

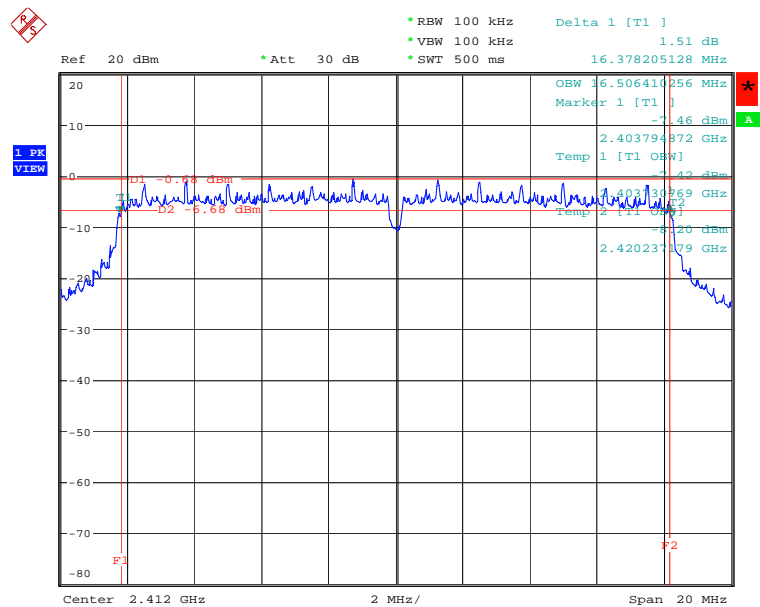
6 dB Bandwidth Plot on Configuration IEEE 802.11b / 2462 MHz



444

Date: 4.OCT.2007 13:23:56

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



444

Date: 4.OCT.2007 13:42:26

1 PK View

Ref 20 dBm * Att 30 dB • RBW 100 kHz • VBW 100 kHz • SWT 500 ms Delta 1 [T1] 0.32 dB 16.378205128 MHz

OBW 16.506410256 MHz
Marker 1 [T1]
-5.83 dBm
2.428794872 GHz
Temp 1 [T1 OBW]
-5.41 dBm
2.428794872 GHz
Temp 2 [T1 OBW]
-1.93 dBm
2.445205128 GHz

Center 2.437 GHz 2 MHz/ Span 20 MHz

Date: 4.OCT.2007 13:43:49

1 PK
VIEW

Delta 1 [T1]
0.05 dB
16.378205128 MHz

Ref 20 dBm * Att 30 dB RBW 100 kHz VBW 100 kHz SWT 500 ms

OBW 16.506410256 MHz
Marker 1 [T1]
-5.43 dBm
Temp 1 [T1 OBW]
2.453794872 GHz
Temp 2 [T1 OBW]
2.470205128 GHz

D1 0.43 dBm
D2 -5.57 dBm

Center 2.462 GHz 2 MHz/ Span 20 MHz

F1 F2

Date: 4.OCT.2007 13:45:13

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

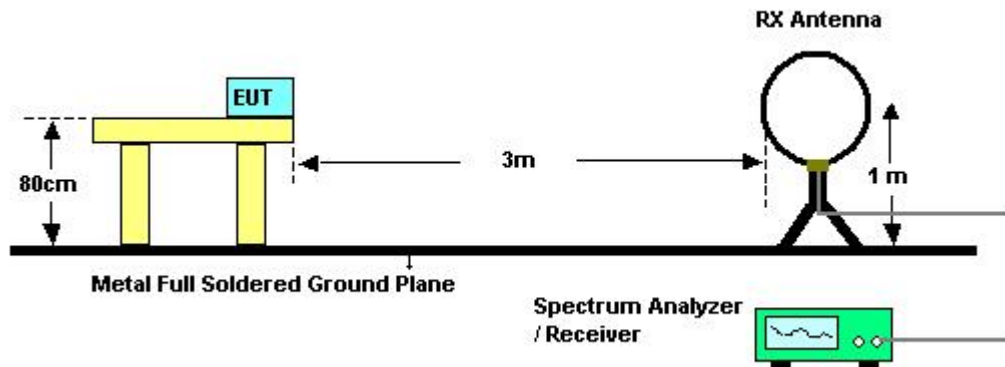
Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

3.5.3. Test Procedures

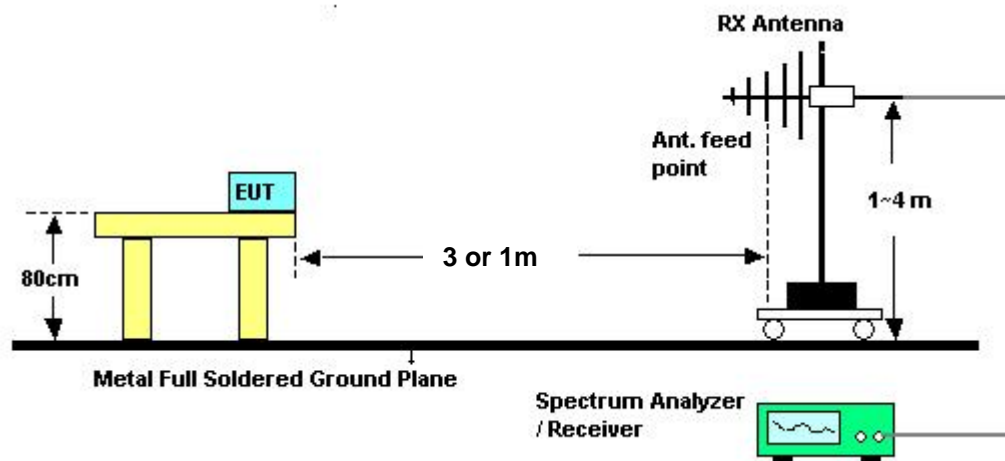
1. Configure the EUT according to ANSI C63.4. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting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

Temperature	25°C	Humidity	52%
Test Engineer	Duncan		

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

Note:

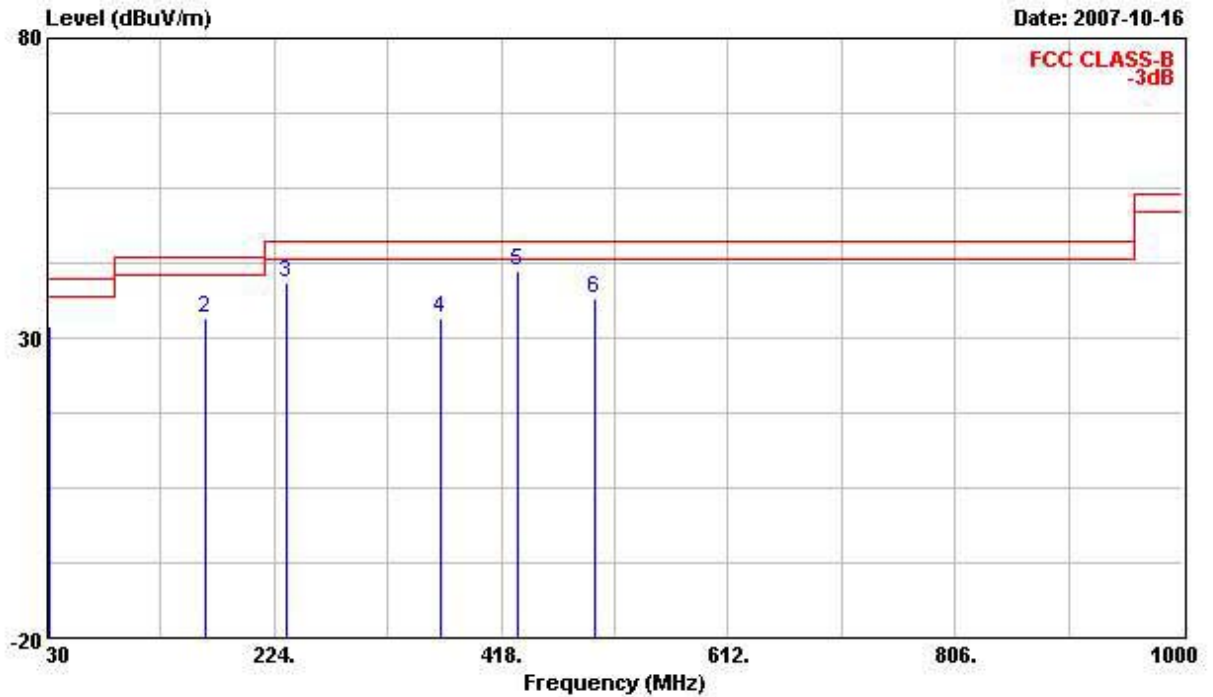
The amplitude of spurious emissions that are attenuated by more than 20 dB below the permissible value has no need to be reported.

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

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

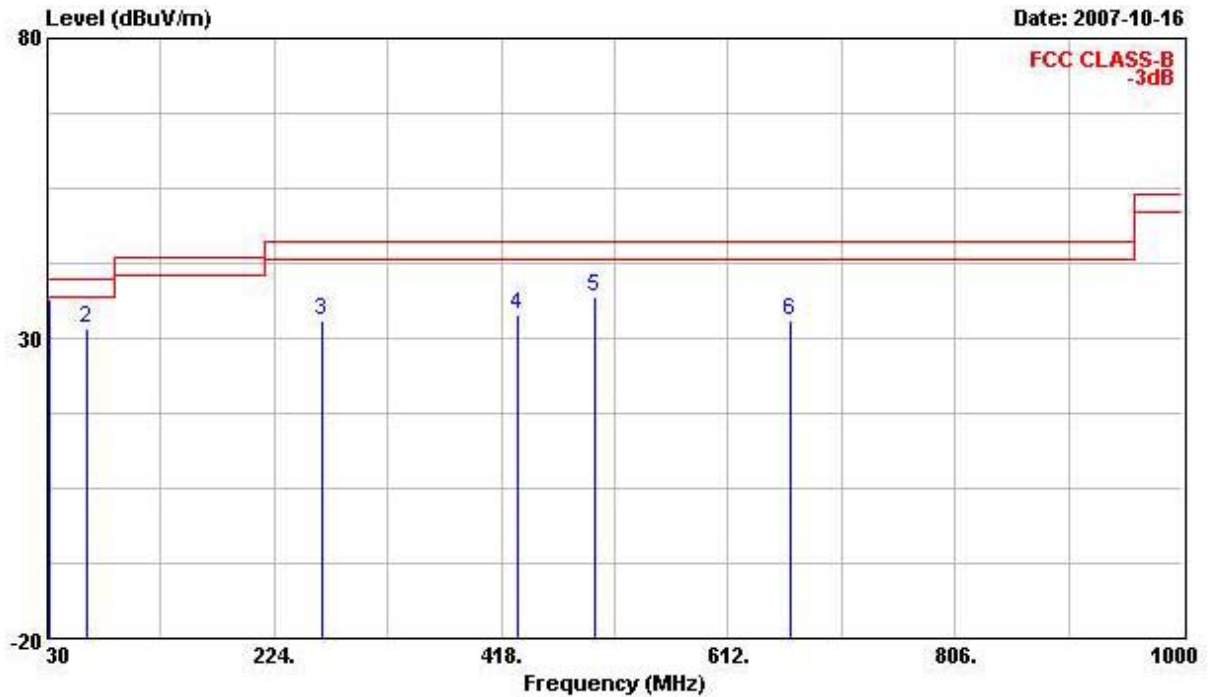
3.5.8. Results of Radiated Emissions (30MHz~1GHz)

Temperature	25°C	Humidity	52%
Test Engineer	Duncan	Configurations	802.11g CH 6

Horizontal

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level Factor	Cable Preamp Loss Factor	Ant Pos	Table Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	deg	
1	31.940	32.02	-7.98	40.00	40.24	17.30	2.16	27.68	200 0 Peak
2	164.830	33.19	-10.31	43.50	47.79	9.89	3.40	27.90	200 0 Peak
3	233.700	39.32	-6.68	46.00	53.10	10.84	3.59	28.21	200 0 Peak
4	366.590	33.22	-12.78	46.00	42.27	15.41	4.31	28.77	200 0 Peak
5 @	431.580	41.09	-4.91	46.00	48.50	17.09	4.41	28.91	200 0 Peak
6	498.510	36.55	-9.45	46.00	43.13	18.09	4.43	29.10	200 0 Peak

Vertical



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	31.940	36.54	-3.46	40.00	44.76	17.30	2.16	27.68	200	0	QP
2	63.950	31.53	-8.47	40.00	49.82	6.20	3.23	27.73	200	0	Peak
3	264.740	33.08	-12.92	46.00	44.02	13.57	3.71	28.23	200	0	Peak
4	431.580	33.86	-12.14	46.00	41.27	17.09	4.41	28.91	200	0	Peak
5	498.510	36.99	-9.01	46.00	43.57	18.09	4.43	29.10	200	0	Peak
6	665.350	33.02	-12.98	46.00	37.81	19.73	5.28	29.80	200	0	Peak

Note:

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

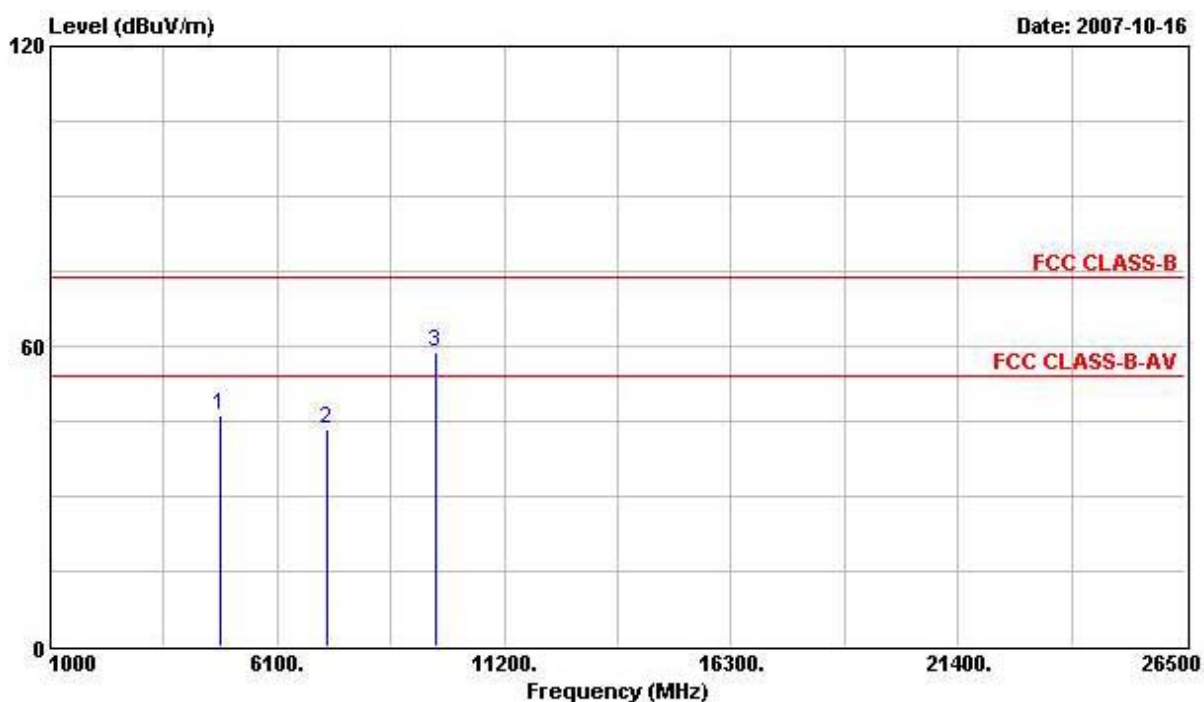
Emission level (dBuV/m) = 20 log Emission level (uV/m).

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

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

Temperature	25°C	Humidity	52%
Test Engineer	Duncan	Configurations	802.11b CH 1

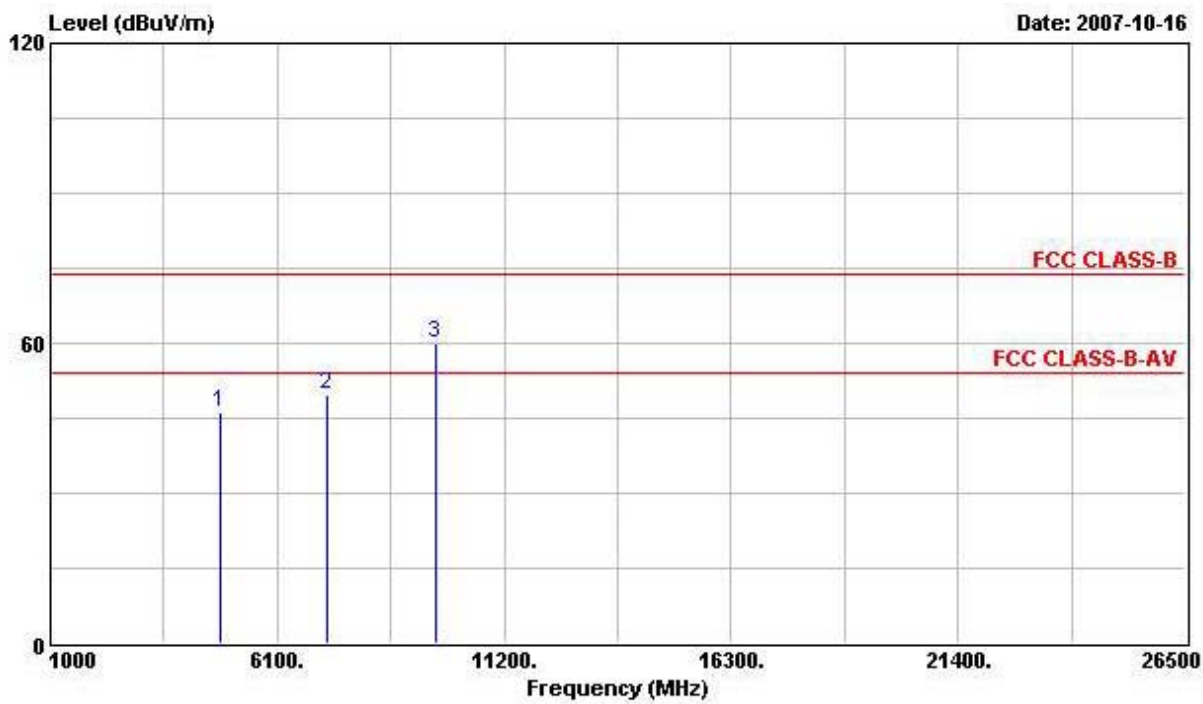
Horizontal



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	4824.000	46.38	-7.62	54.00	41.71	33.06	4.35	32.74	200	360	Average
2	7236.000	43.56	-10.44	54.00	35.55	35.78	5.18	32.95	200	0	Average
3	9648.000	58.75			47.26	38.41	6.48	33.40	200	0	PERK

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

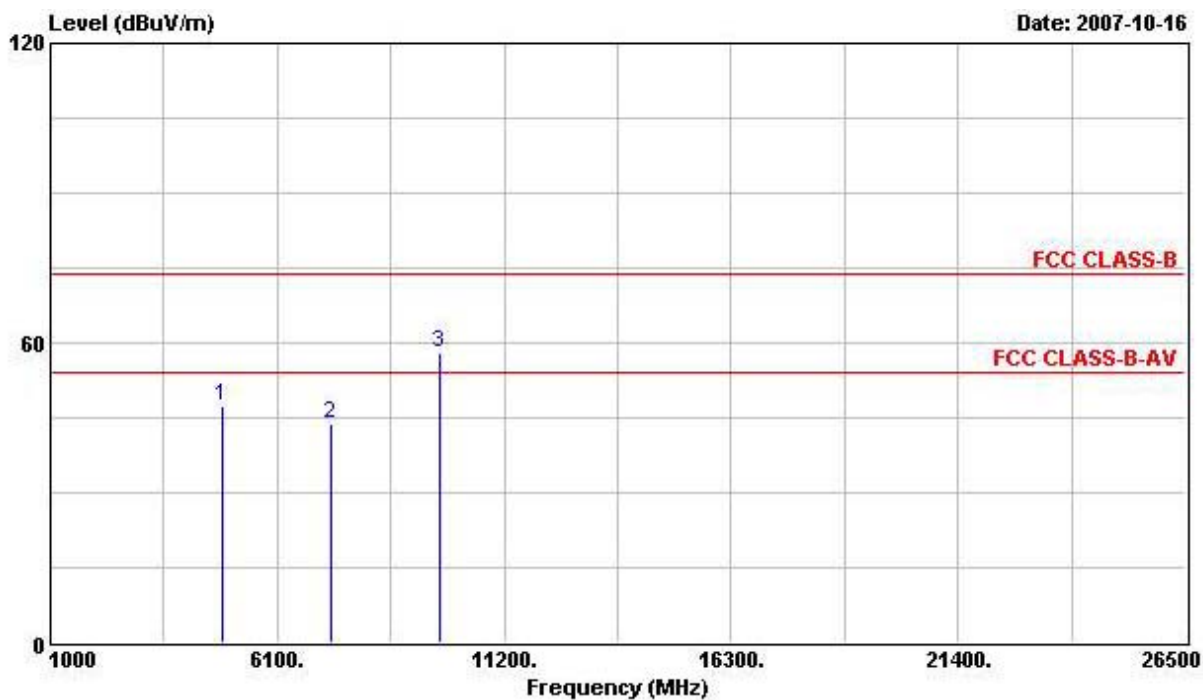
Vertical



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	4824.000	46.02	-7.98	54.00	41.36	33.06	4.35	32.74	200	0	Average
2 @	7232.000	49.93	-4.07	54.00	41.91	35.78	5.18	32.95	200	0	Average
3	9648.000	60.18			48.69	38.41	6.48	33.40	200	0	PEAK

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

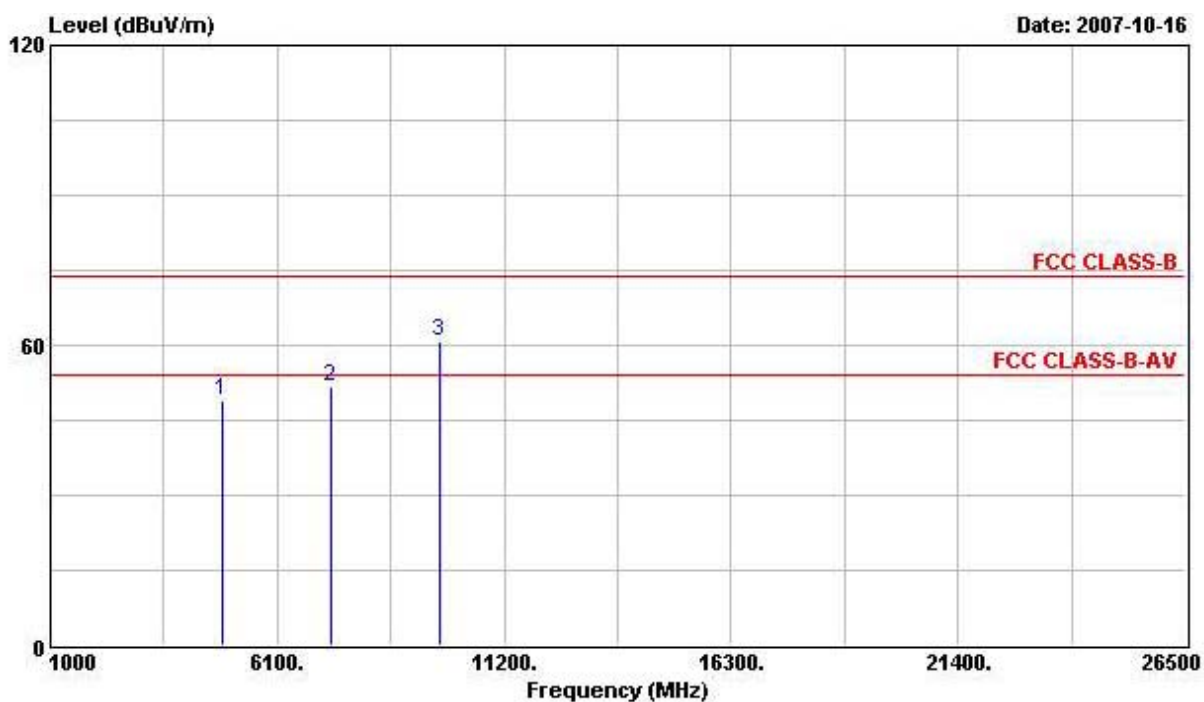
Temperature	25°C	Humidity	52%
Test Engineer	Duncan	Configurations	802.11b CH 6

Horizontal

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	4874.000	47.35			42.55	33.16	4.36	32.73	200	360	PEAK
2	7310.100	43.99	-10.01	54.00	35.71	35.94	5.30	32.96	174	278	AVERAGE
3	9748.000	57.95			46.15	38.62	6.58	33.40	200	0	PEAK

Note: Items 1 and 3 are on un-restricted band, so the limit is -20dBc for the field strength of the fundamental emissions (see section 3.6.7).

Vertical

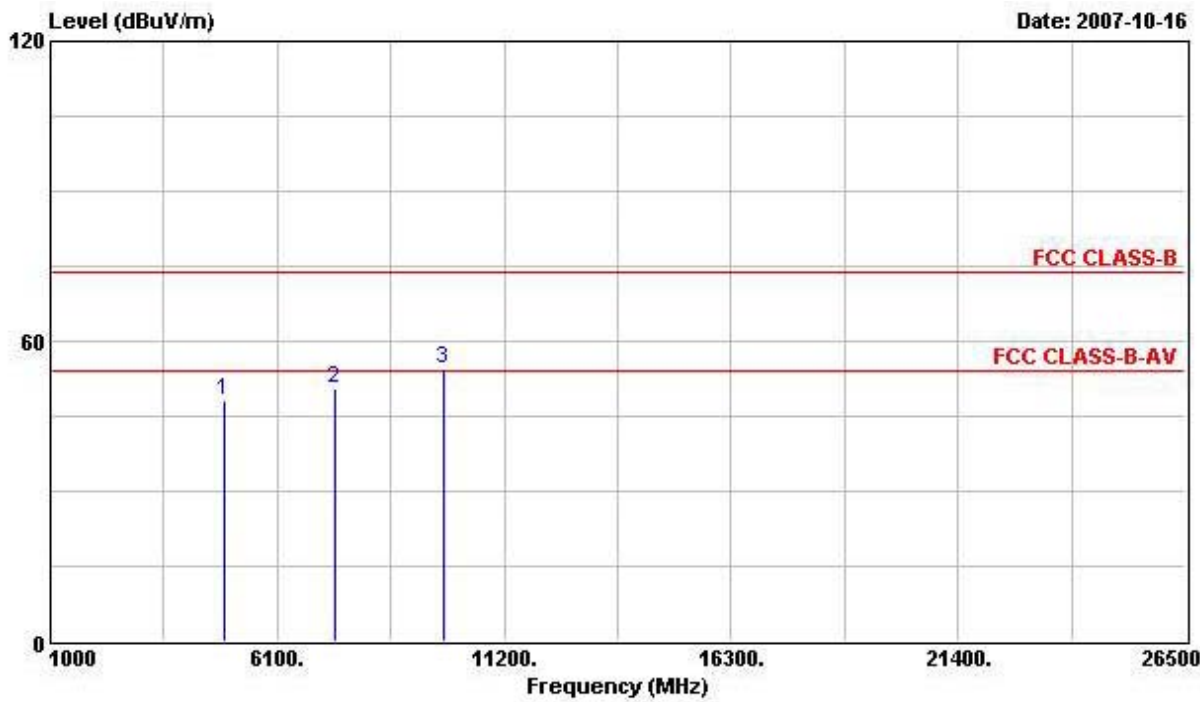


	Freq	Level	Over Limit	Limit Line	ReadAntenna Level Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg
1	4874.000	48.76			43.96	33.16	4.36	32.73	200	360 PEAK
2 @	7310.200	51.68	-2.32	54.00	43.40	35.94	5.30	32.96	150	84 AVERAGE
3	9748.000	60.81			49.01	38.62	6.58	33.40	200	0 PEAK

Note: Items 1 and 3 are on un-restricted band, so the limit is -20dBc for the field strength of the fundamental emissions (see section 3.6.7).

Temperature	25°C	Humidity	52%
Test Engineer	Duncan	Configurations	802.11b CH 11

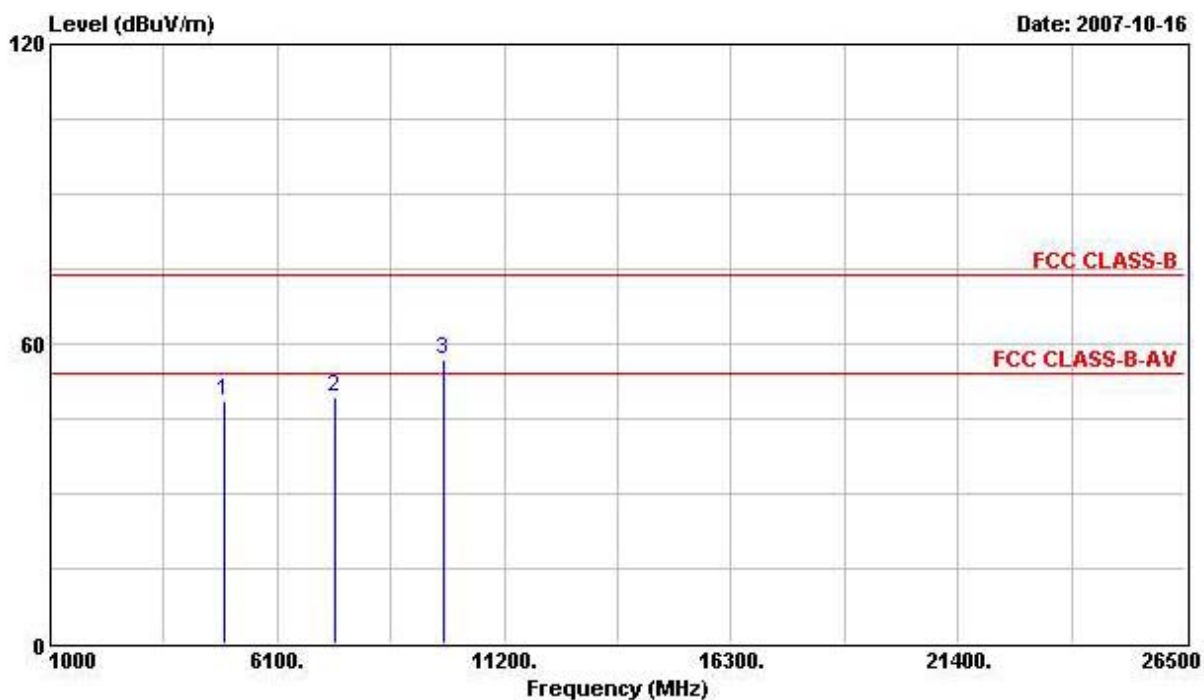
Horizontal



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	4924.000	48.10			43.16	33.26	4.40	32.72	200	0	PEAK
2	7382.000	50.65			42.10	36.11	5.41	32.98	200	0	PEAK
3	9848.000	54.66			42.53	38.79	6.74	33.40	200	0	PEAK

Note: Items 1,2 and 3 are on un-restricted band, so the limit is -20dBc for the field strength of the fundamental emissions (see section 3.6.7).

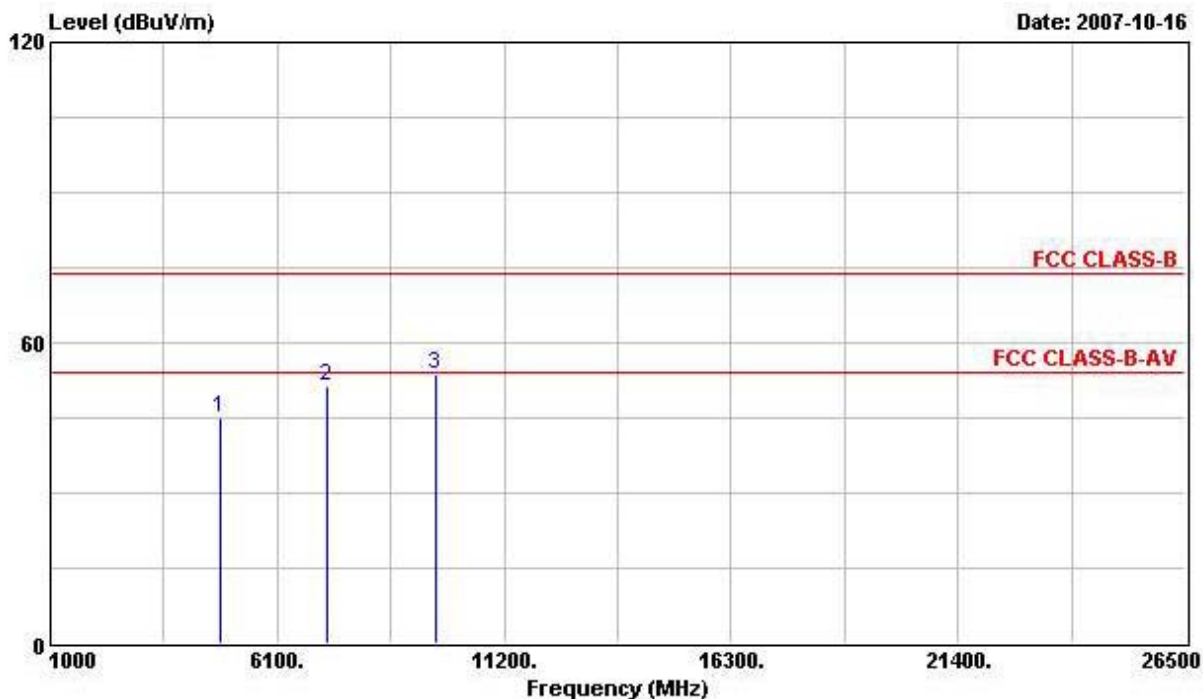
Vertical



	Freq	Level	Over Limit	Limit Line	ReadAntenna Level Factor	Cable Preamp Loss Factor	Ant Pos	Table Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	deg	
1	4924.000	48.40			43.46	33.26	4.40	32.72	200 360 PEAK
2	7384.000	49.35	-4.65	54.00	40.76	36.15	5.41	32.98	200 360 Average
3	9848.000	56.85			44.72	38.79	6.74	33.40	200 0 PEAK

Note: Items 1 and 3 are on un-restricted band, so the limit is -20dBc for the field strength of the fundamental emissions (see section 3.6.7).

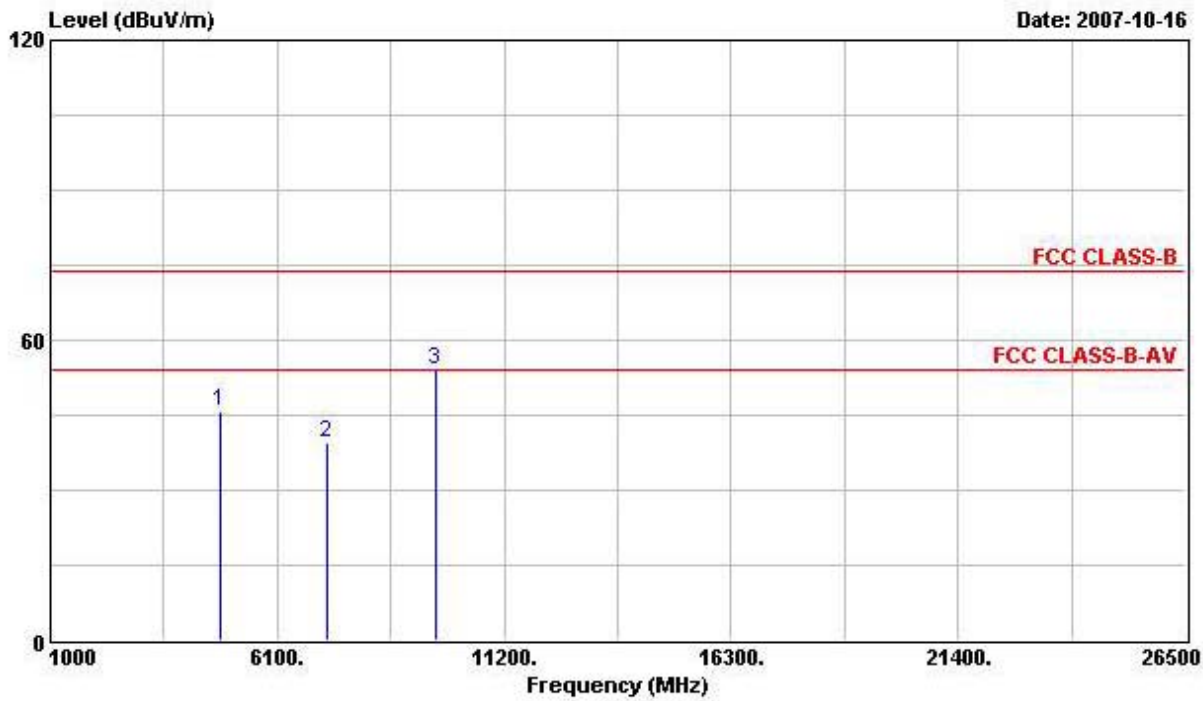
Temperature	25°C	Humidity	52%
Test Engineer	Duncan	Configurations	802.11g CH 1

Horizontal

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg
1	4824.000	44.97			40.31	33.06	4.35	32.74	200	360 PEAK
2	7236.000	51.50			43.49	35.78	5.18	32.95	100	0 PEAK
3	9652.000	53.88			42.39	38.41	6.48	33.40	200	0 PEAK

Note: Items 1,2 and 3 are on un-restricted band, so the limit is -20dBc for the field strength of the fundamental emissions (see section 3.6.7).

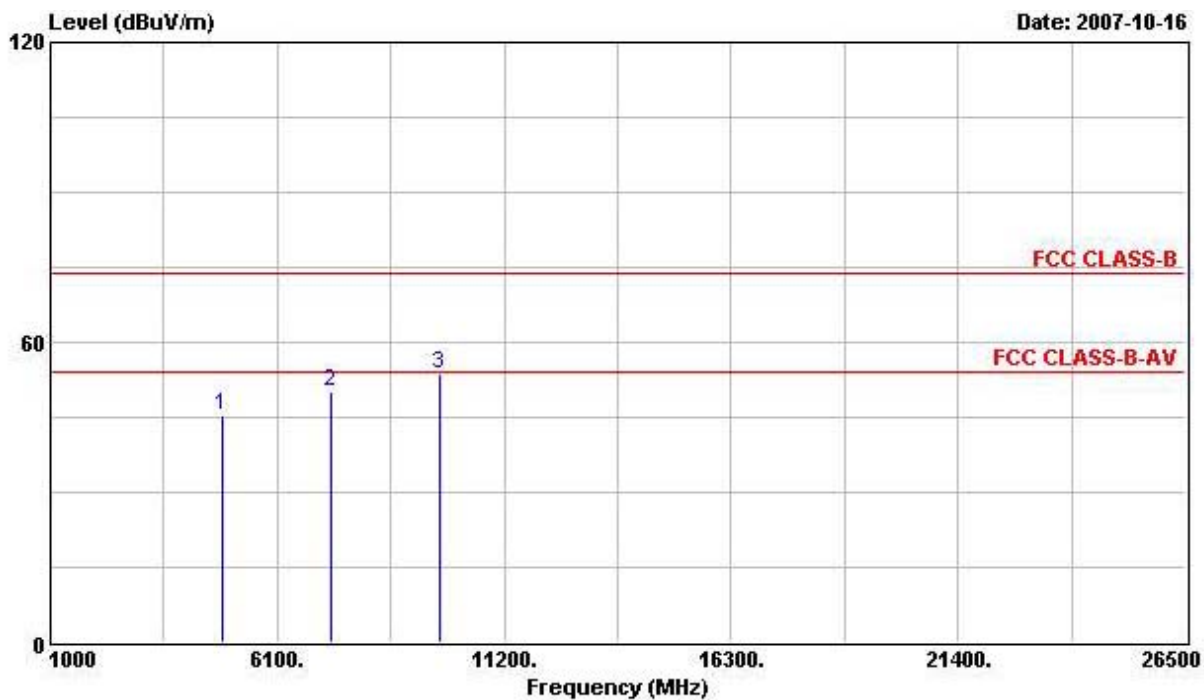
Vertical



	Freq	Level	Over	Limit	ReadAntenna	Cable	Preamp	Ant	Table	
	MHz	dBuV/m	Limit	Line	Level	Loss	Factor	Pos	Pos	Remark
			dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg
1	4828.000	45.67			41.01	33.06	4.35	32.74	200	360 PEAK
2	7240.700	39.52	-14.48	54.00	31.51	35.78	5.18	32.95	100	38 AVERAGE
3	9644.000	53.98			42.53	38.38	6.48	33.40	200	0 PEAK

Note: Items 1 and 3 are on un-restricted band, so the limit is -20dBc for the field strength of the fundamental emissions (see section 3.6.7).

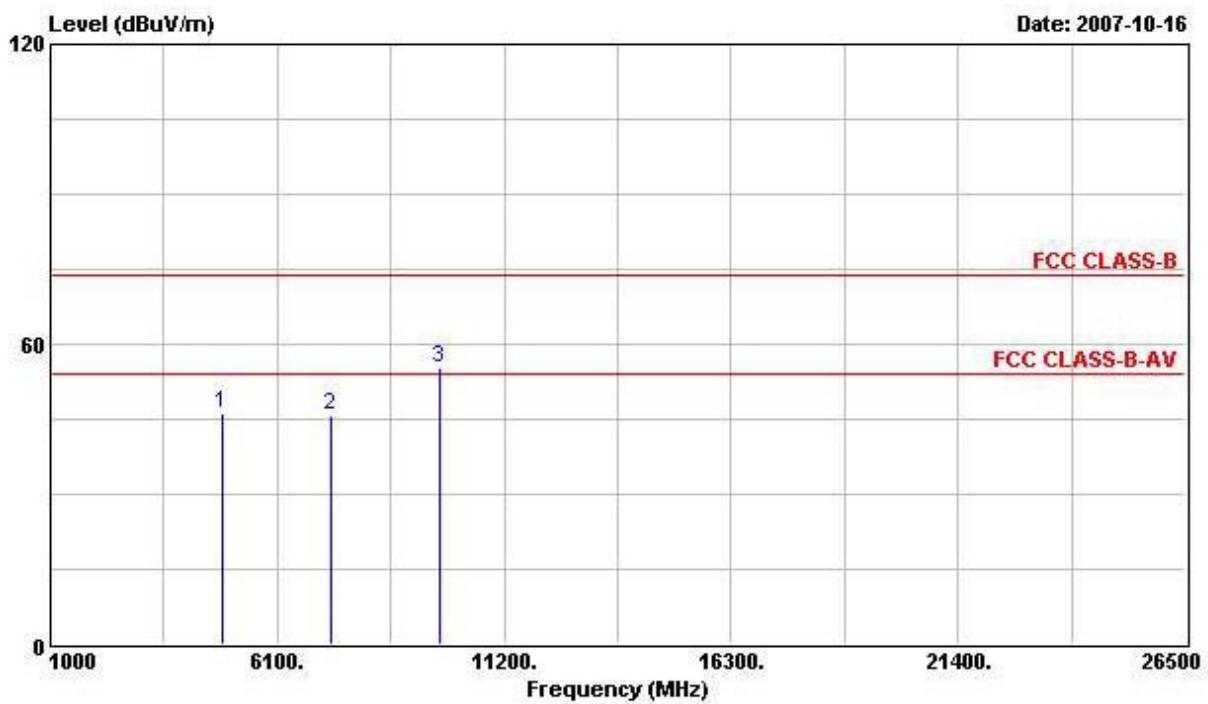
Temperature	25°C	Humidity	52%
Test Engineer	Duncan	Configurations	802.11g CH 6

Horizontal

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	4878.000	45.52			40.72	33.16	4.36	32.73	100	360	PEAK
2	7311.000	50.16			41.87	35.94	5.30	32.96	200	0	PEAK
3	9744.000	53.66			41.89	38.58	6.58	33.40	100	0	PEAK

Note: Items 1,2 and 3 are on un-restricted band, so the limit is -20dBc for the field strength of the fundamental emissions (see section 3.6.7).

Vertical

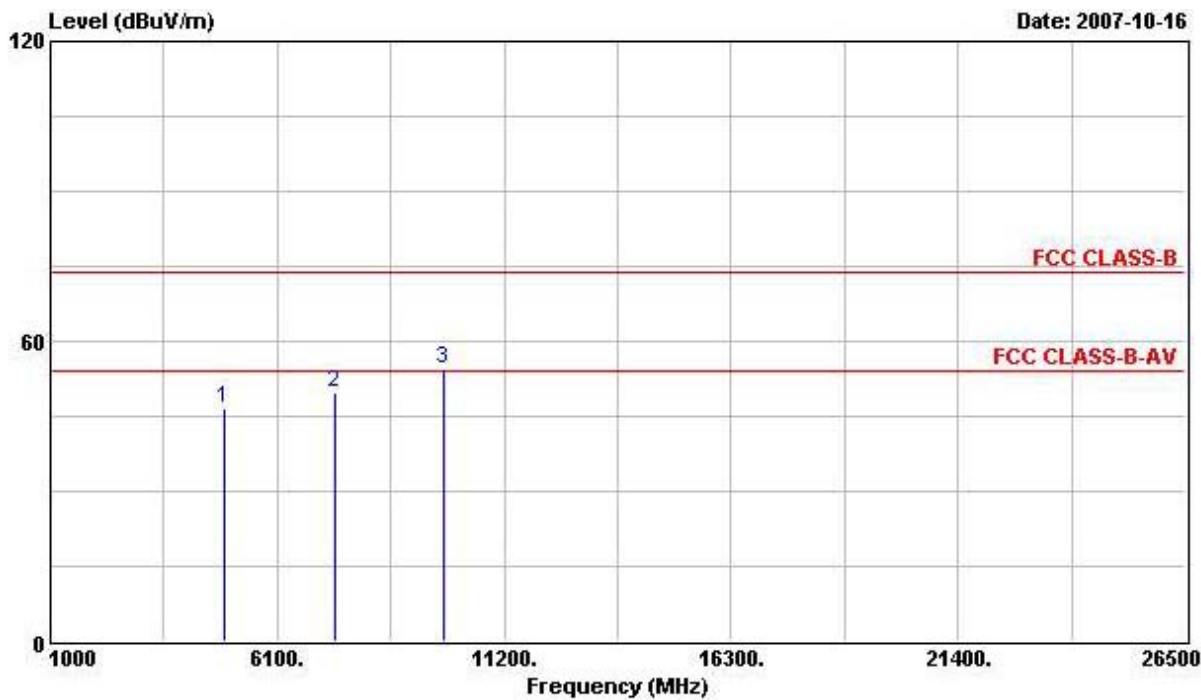


	Freq	Level	Over	Limit	ReadAntenna	Cable	Preamp	Ant	Table	
	MHz	dBuV/m	Limit	Line	Level	Factor	Loss	Factor	Pos	Pos Remark
			dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg
1	4874.000	46.23			41.43	33.16	4.36	32.73	100	0 PEAK
2	7306.800	45.64	-8.36	54.00	37.36	35.94	5.30	32.96	151	84 AVERAGE
3	9748.000	55.08			43.28	38.62	6.58	33.40	100	360 PEAK

Note: Items 1 and 3 are on un-restricted band, so the limit is -20dBc for the field strength of the fundamental emissions (see section 3.6.7).

Temperature	25°C	Humidity	52%
Test Engineer	Duncan	Configurations	802.11g CH 11

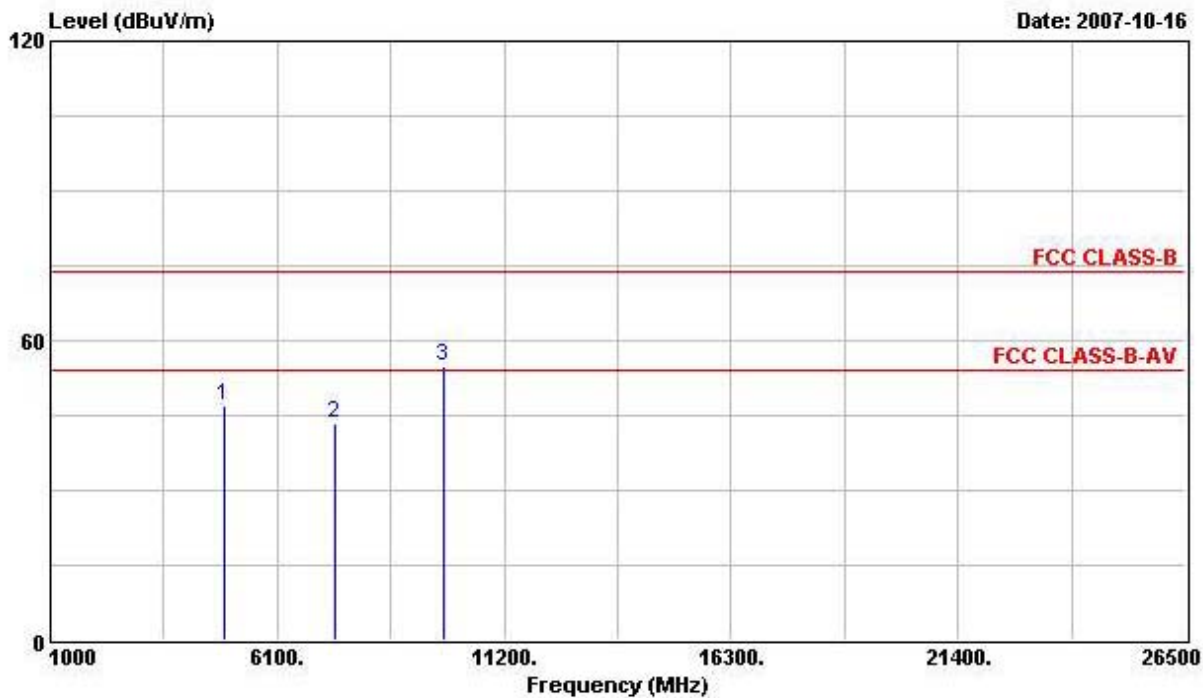
Horizontal



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	4928.000	46.65			41.71	33.26	4.40	32.72	100	360	PEAK
2	7382.000	49.55			41.00	36.11	5.41	32.98	200	360	PEAK
3	9844.000	54.28			42.15	38.79	6.74	33.40	100	360	PEAK

Note: Items 1,2 and 3 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	ReadAntenna Level Factor	Cable Preamp Loss Factor	Ant Pos	Table Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	deg	
1	4920.000	47.00			42.06	33.26	4.40	32.72	200 360 PEAK
2	7387.100	43.43	-10.57	54.00	34.84	36.15	5.41	32.98	159 78 AVERAGE
3	9852.000	55.05			42.89	38.82	6.74	33.40	200 0 PEAK

Note:

Items 1 and 3 are on un-restricted band, so the limit is -20dBc 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 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 and Fundamental Emissions

Temperature	25°C	Humidity	52%
Test Engineer	Duncan	Configurations	802.11b CH 1, 6, 11

Channel 1

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	2390.000	62.07	-11.93	74.00	30.95	28.29	2.82	0.00	100	174	Peak
2 @	2413.170	113.69			82.54	28.33	2.82	0.00	100	174	Peak
1 @	2390.000	49.99	-4.01	54.00	18.87	28.29	2.82	0.00	100	174	Average
2 @	2413.170	105.54			74.39	28.33	2.82	0.00	100	174	Average

Channel 6

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1 @	2438.250	113.41			82.17	28.40	2.85	0.00	100	67	Peak
1 @	2438.250	105.24			74.00	28.40	2.85	0.00	100	67	Average

Channel 11

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1 @	2462.570	112.80			81.50	28.43	2.87	0.00	100	357	Peak
2	2488.220	61.62	-12.38	74.00	30.25	28.50	2.87	0.00	100	357	Peak
1 @	2462.570	104.70			73.40	28.43	2.87	0.00	100	357	Average
2 @	2487.650	51.66	-2.34	54.00	20.29	28.50	2.87	0.00	100	357	Average

Temperature	25°C	Humidity	52%
Test Engineer	Duncan	Configurations	802.11g CH 1, 6, 11

Channel 1

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1 @	2390.000	72.71	-1.29	74.00	41.59	28.29	2.82	0.00	100	173	Peak
2 @	2408.610	109.43			78.28	28.33	2.82	0.00	100	173	Peak
1 @	2390.000	52.60	-1.40	54.00	21.48	28.29	2.82	0.00	100	173	Average
2 @	2408.610	98.87			67.72	28.33	2.82	0.00	100	173	Average

Channel 6

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1 @	2440.340	109.67			78.43	28.40	2.85	0.00	100	356	Peak
1 @	2440.340	98.95			67.71	28.40	2.85	0.00	100	356	Average

Channel 11

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1 @	2464.660	107.70			76.40	28.43	2.87	0.00	100	357	Peak
2 @	2483.500	71.30	-2.70	74.00	39.96	28.47	2.87	0.00	100	357	Peak
1 @	2464.660	96.52			65.22	28.43	2.87	0.00	100	357	Average
2 @	2483.500	52.18	-1.82	54.00	20.84	28.47	2.87	0.00	100	357	Average

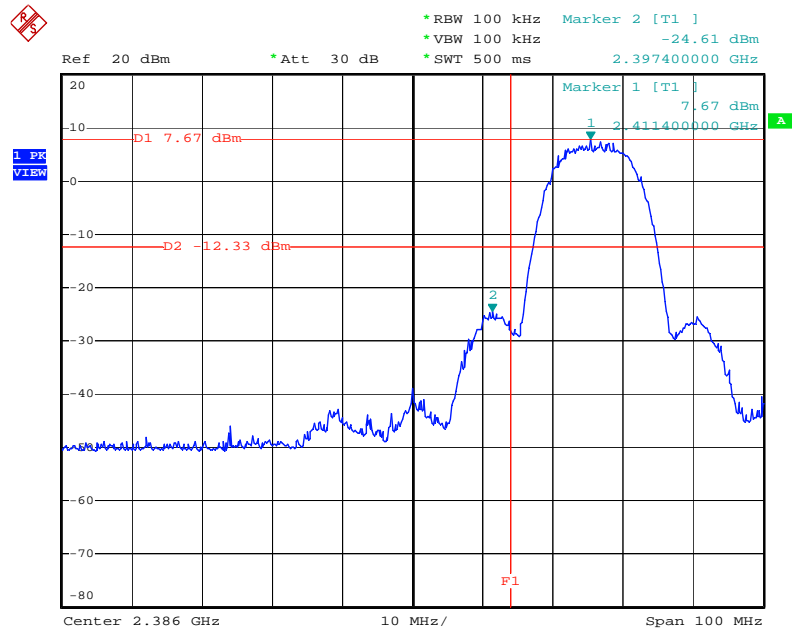
Note:

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

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

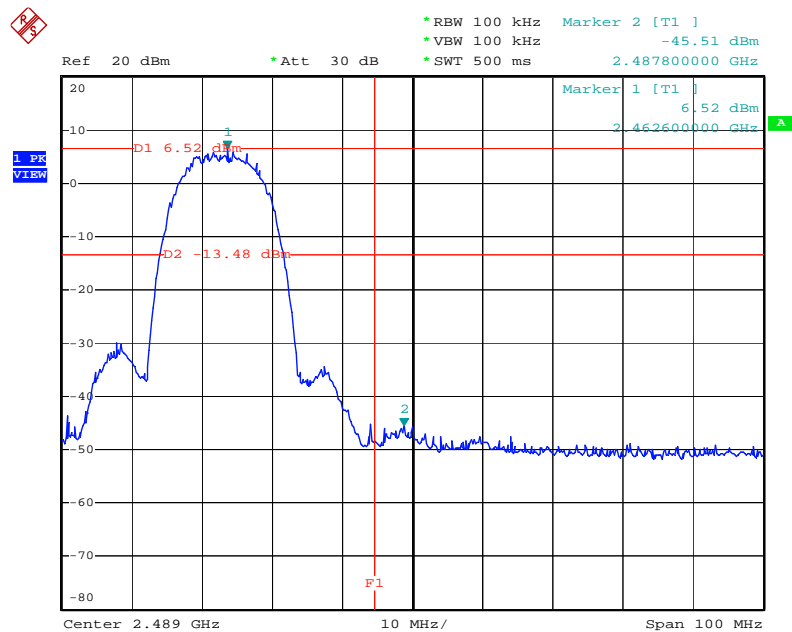
For Emission not in Restricted Band

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



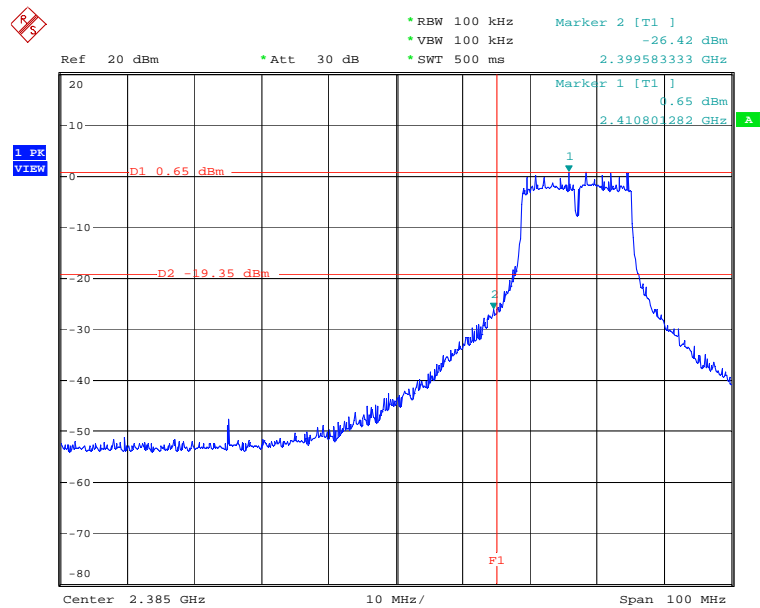
Date: 15.OCT.2007 21:02:43

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



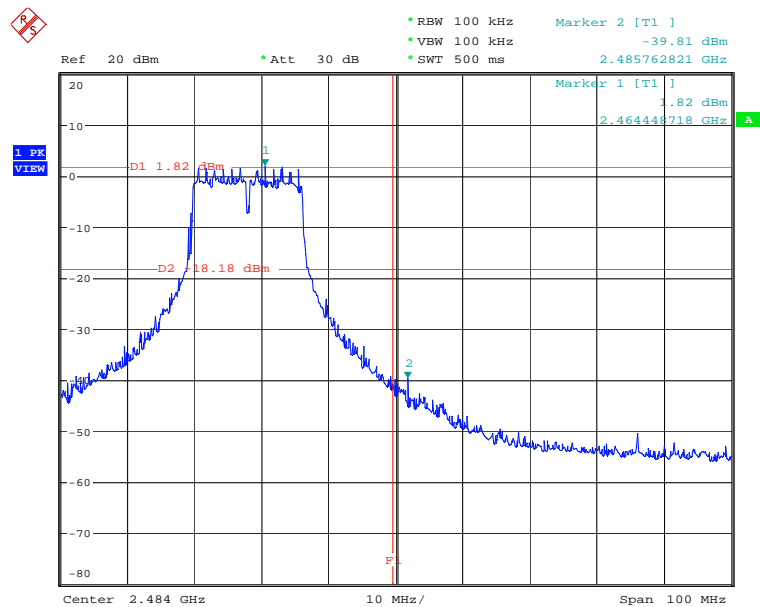
Date: 15.OCT.2007 21:04:18

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



444
Date: 12.OCT.2007 04:18:50

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



444
Date: 12.OCT.2007 04:20:08

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; 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	100359	9kHz – 2.75GHz	Mar. 01, 2007	Conduction (CO04-HY)
LISN	MessTec	NNB-2/16Z	99079	9kHz – 30MHz	Mar. 31, 2007	Conduction (CO04-HY)
LISN (Support Unit)	EMCO	3810/2NM	9703-1839	9kHz – 30MHz	Mar. 22, 2007	Conduction (CO04-HY)
RF Cable-CON	UTIFLEX	3102-26886-4	CB049	9kHz – 30MHz	Apr. 20, 2007	Conduction (CO04-HY)
ISN	SCHAFFNER	ISN T400	21653	9kHz – 30MHz	May 09, 2007	Conduction (CO04-HY)
EMI Filter	LINDGREN	LRE-2030	2651	< 450 Hz	N/A	Conduction (CO04-HY)
Isolation Transformer	Erika Fiedler OHG	D-65396 Walluf	58	45MHz-2.15GHz	N/A	Conduction (CO04-HY)
3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH03-HY	30 MHz - 1 GHz 3m	Jun. 14, 2007	Radiation (03CH03-HY)
Amplifier	SCHAFFNER	CPA9231A	1886	9 kHz - 2 GHz	Jan. 22, 2007	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	Dec. 15, 2006	Radiation (03CH03-HY)
Bilog Antenna	SCHAFFNER	CBL 6112D	22237	30 MHz – 1 GHz	Jul. 21, 2007	Radiation (03CH03-HY)
Horn Antenna	EMCO	3115	6741	1GHz ~ 18GHz	May 04, 2007	Radiation (03CH03-HY)
Horn Antenna	SCHWARZBECK	BBHA9170	BBHA9170154	15 GHz - 40 GHz	NCR	Radiation (03CH03-HY)
RF Cable-R03m	Jye Bao	RG142	CB021	30 MHz - 1 GHz	Dec. 02, 2006	Radiation (03CH03-HY)
RF Cable-HIGH	SUHNER	SUCOFLEX 106	03CH03-HY	1 GHz - 40 GHz	Dec. 02, 2006	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)
Spectrum Analyzer	R&S	FSP30	100023	9kHz ~ 30GHz	Dec. 17, 2006	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. 03, 2007	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, 2006	Conducted (TH01-HY)

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
RF CABLE-2m	Jye Bao	RG142	CB035-2m	20MHz ~ 1GHz	Dec. 01, 2006	Conducted (TH01-HY)
Vector Signal Generator	R&S	SMU200A	102098	100kHz ~ 6GHz	Nov. 14, 2006	Conducted (TH01-HY)
Signal Generator	R&S	SMR40	100116	10MHz ~ 40GHz	Mar. 07, 2007	Conducted (TH01-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
Amplifier	MITEQ	AMF-6F-260400	923364	26.5 GHz - 40 GHz	Jan. 22, 2007*	Radiation (03CH03-HY)
Loop Antenna	R&S	HFH2-Z2	860004/001	9 kHz - 30 MHz	May 23, 2006*	Radiation (03CH03-HY)
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.

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


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

Certificate No.: L1190-070110

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


Jay-San Chen
President, Taiwan Accreditation Foundation
Date : January 10, 2007

PI, total 9 pages

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