SPORTON International Inc.
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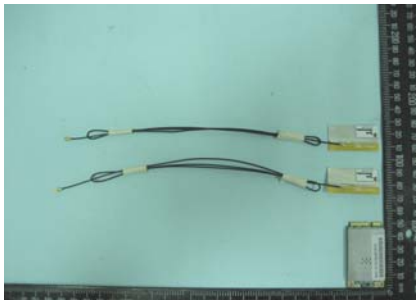
FCC RADIO TEST REPORT

Applicant's company	**Ralink Technology Corporation**
Applicant Address	5F., No.36, Taiyuan St., Jhubei City, Hsinchu County 302, Taiwan, R.O.C.
FCC ID	**VQF-RT2700E**
Manufacturer's company	**Ralink Technology Corporation**
Manufacturer Address	5F., No.36, Taiyuan St., Jhubei City, Hsinchu County 302, Taiwan, R.O.C.

Product Name	11b/g/n 1T2R WLAN Mini Card
Brand Name	Ralink
Model Name	RT2700E
Test Rule	47 CFR FCC Part 15 Subpart C § 15.247
Test Freq. Range	2400 ~ 2483.5MHz
Received Date	Oct. 9, 2007
Final Test Date	Nov. 27, 2007
Submission Type	Class II Change
Multiple Listing	Please refer to section 3.7



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.

Testing Laboratory
1190

Table of Contents

History of This Test Report

Original Issue Date: Dec. 17, 2007

Report No.: FR7O1204-01AB

■ No additional attachment.

☐ Additional attachment were issued as following record:

Attachment No.	Issue Date	Description

1. CERTIFICATE OF COMPLIANCE

Product Name	:	11b/g/n 1T2R WLAN Mini Card
Brand Name	:	Ralink
Model Name	:	RT2700E
Applicant	:	Ralink Technology Corporation
Test Rule Part(s)	:	47 CFR FCC Part 15 Subpart C § 15.247

Sporton International as requested by the applicant to evaluate the EMC performance of the product sample received on Oct. 9, 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 18.12.07

Wayne Hsu

SPORTON INTERNATIONAL INC.

2. SUMMARY OF THE TEST RESULT

Applied Standard: 47 CFR FCC Part 15 Subpart C				
Part	**Rule Section**	**Description of Test**	**Result**	**Under Limit**
-	15.207	AC Power Line Conducted Emissions	Complies	-
-	15.247(b)(3)	Maximum Peak Conducted Output Power	Complies	-
-	15.247(e)	Power Spectral Density	Complies	-
-	15.247(a)(2)	6dB Spectrum Bandwidth	Complies	-
4.1	15.247(d)	Radiated Emissions	Complies	0.73 dB
4.2	15.247(d)	Band Edge Emissions	Complies	0.79 dB
4.3	15.203	Antenna Requirements	Complies	-

Test Items	Uncertainty	Remark
AC Power Line Conducted Emissions	±2.3dB	Confidence levels of 95%
Maximum Peak Conducted Output Power	±0.8dB	Confidence levels of 95%
Power Spectral Density	±0.5dB	Confidence levels of 95%
6dB Spectrum Bandwidth	$\pm 8.5 \times 10^{-8}$	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%

3. GENERAL INFORMATION

3.1. Product Details

Items	Description
Product Type	WLAN (1TX, 2RX)
Radio Type	Intentional Transceiver
Power Type	From Host System
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
Conducted Output Power	11b: 23.10 dBm ; 11g: 24.30 dBm
Carrier Frequencies	Please refer to section 3.4
Antenna	Please refer to section 3.3

Antenna & Band width

Antenna	Single (TX)	
Band width Mode	20 MHz	40 MHz
802.11b	V	X
802.11g	V	X
Draft n	V	V

3.2. Accessories

N/A

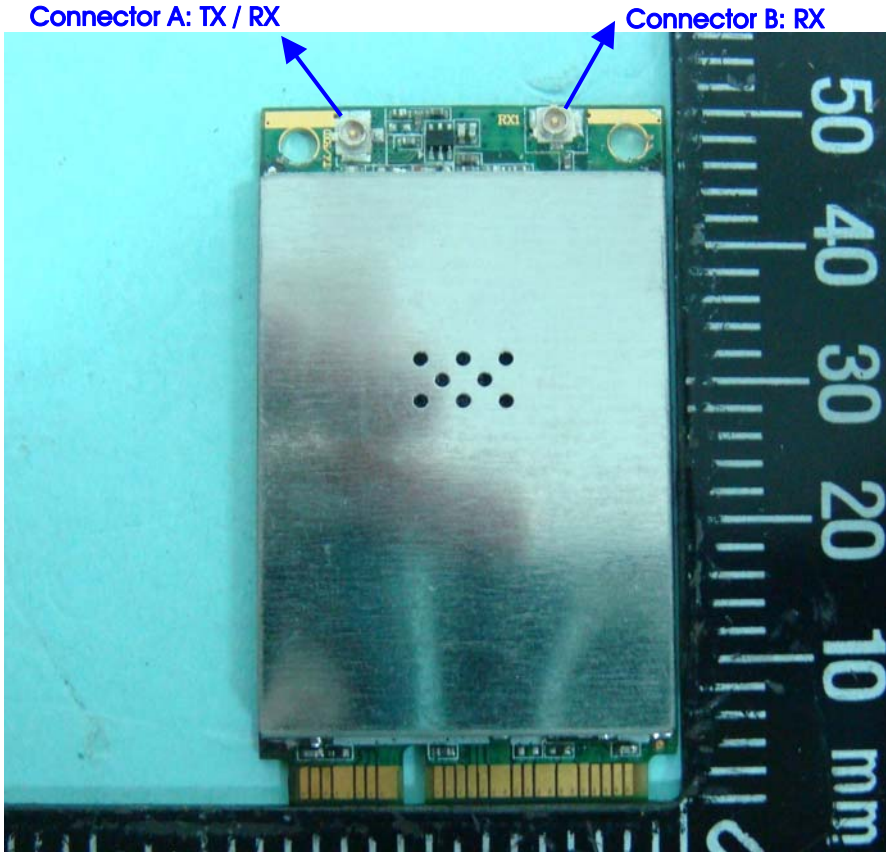
3.3. Table for Filed Antenna

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
A	Tyco	1909966-1	PIFA Antenna	N/A	2.99
B	Tyco	1909967-1	PIFA Antenna	N/A	1.04
C	ACON	APP8P-700003	PIFA Antenna	N/A	1.82
D	ACON	APP8P-700004	PIFA Antenna	N/A	1.60

Note: The EUT has 30 antennas. Due to Ant. A ~ Ant. D is the same type antenna, only the higher gain antenna "Ant. A and Ant. B" was tested and recorded in this report.

Please refer to appendix D for all 30 antennas.

Connect A & Connect B could receive simultaneously.



3.4. 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		

3.5. 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
Radiated Emissions 9kHz~1GHz	Normal Link	Auto	-	A
Radiated Emissions 1GHz~10th Harmonic	11b/BPSK	1 Mbps	1/6/11	A
	11g/BPSK	6 Mbps	1/6/11	A
Band Edge Emissions	11b/BPSK	1 Mbps	1/11	A
	11g/BPSK	6 Mbps	1/11	A

3.6. 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	-

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

Please refer section 6 for Test Site Address.

3.7. Table for Multiple Listing & Class II Change

This product is an extension of original one reported under Sporton project number: 7O1204

Below is the table for the change of the product with respect to the original one.

Modifications	Description	Performance Checking
Add 2 antennas	Original report has 30 antennas. And the highest antenna gain is 4dB. New antennas: PIFA antenna: 1909966-1, Antenna gain: 2.99dB PIFA antenna: 1909967-1, Antenna gain: 1.04dBi PIFA antenna: APP8P-700003, Antenna gain: 1.82dBi PIFA antenna: APP8P-700004, Antenna gain: 1.60dBi Due to Ant. A ~ Ant. D is the same type antenna, only the higher gain antenna "Ant. A and Ant. B" was tested and recorded in this report.	Radiated Emissions

3.8. Table for Supporting Units

Support Unit	Brand	Model	FCC ID
Notebook	ASUS	A8H	PPD-AR5BXB61
Mouse	QSKY	Lx-619B	DOC
Modem	ACEEX	DM1414	IFAXDM1414
Printer	EPSON	LQ-300	DOC
AP	PLANEX	GW-AP54SGX	N/A

3.9. 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

Test Software Version	ART		
Frequency	2412 MHz	2437 MHz	2462 MHz
IEEE 802.11b	8	0E	0D

Power Parameters of IEEE 802.11g

Test Software Version	ART		
Frequency	2412 MHz	2437 MHz	2462 MHz
IEEE 802.11g	0A	0E	0D

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

The program was executed as follows:

a. Turn on the power of all equipment.

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

c. The NB sends " H " messages to the printer, then the printer prints them on the paper.

d. The NB sends " H " messages to the modem.

e. Repeat the steps from b to d.

At the same time, the following programs were executed:

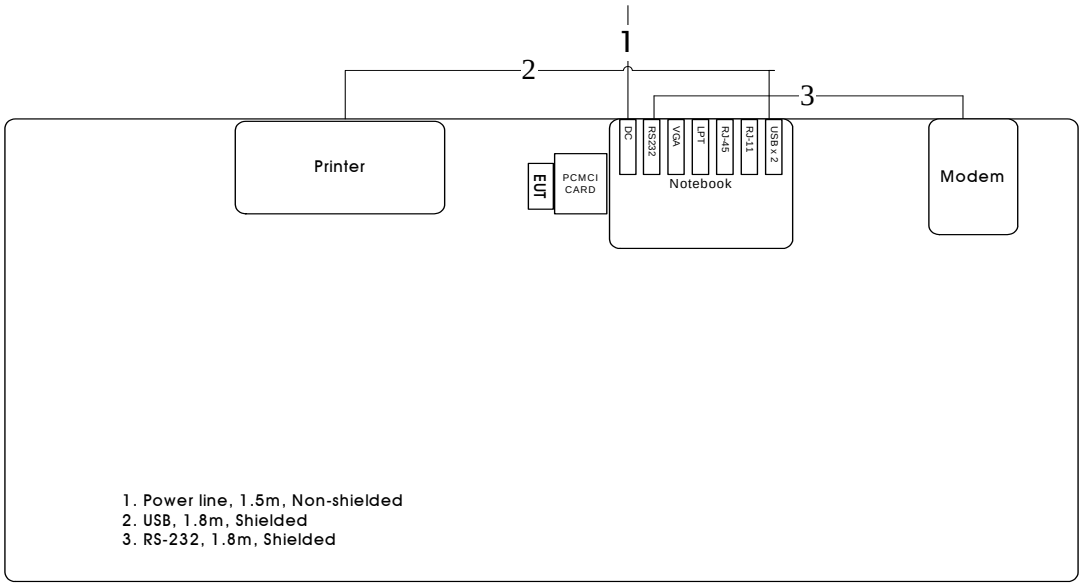
Executed "ping.exe" to link with the remote workstation to receive and transmit data by LAN and WLAN.

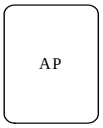
Executed " RALINK" to control the EUT continuously transmit RF signal.

3.10. Test Configurations

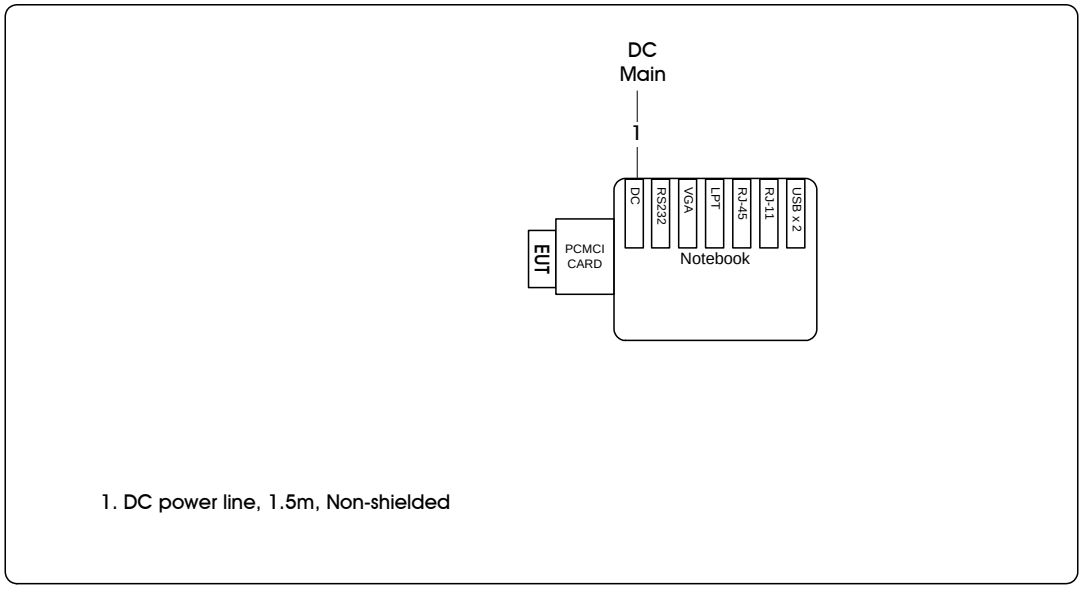
3.10.1. Radiation Emissions Test Configuration

Test Configuration: 9KHz~1GHz

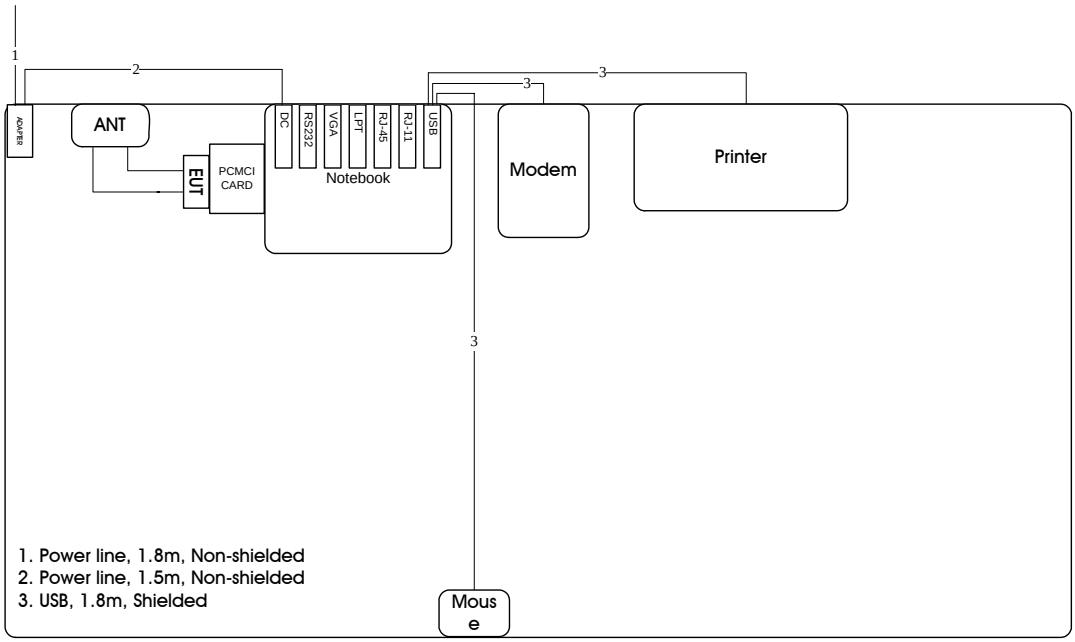


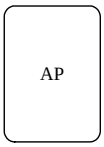


Test Configuration: Above 1GHz



3.10.2. AC Power Line Conduction Emissions Test Configuration





4. TEST RESULT

4.1. Radiated Emissions Measurement

4.1.1. 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

4.1.2. Measuring Instruments and Setting

Please refer to section 5 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

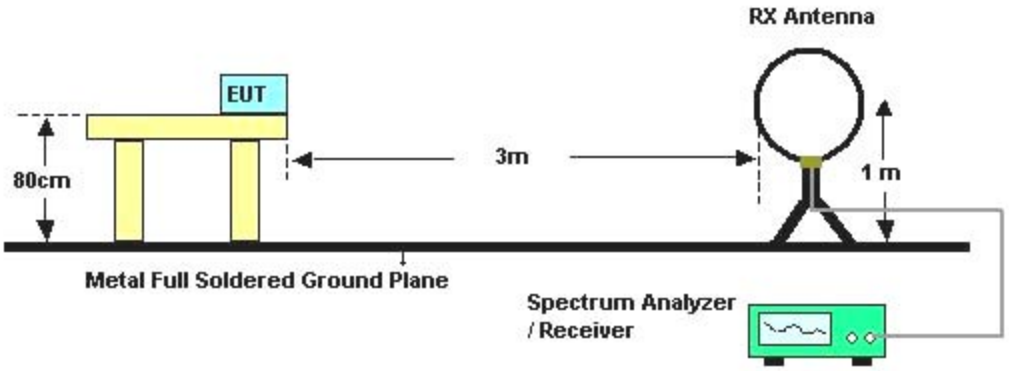
Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

4.1.3. Test Procedures

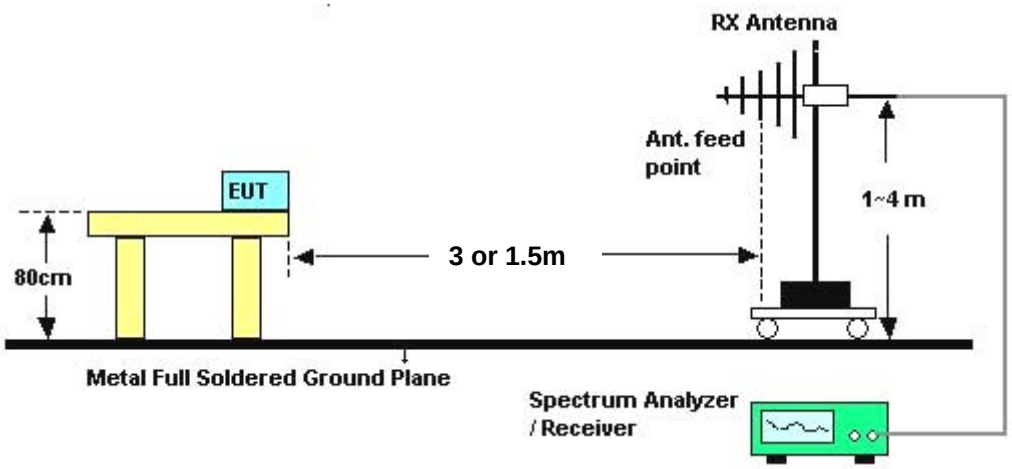
1. Configure the EUT according to ANSI C63.4. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting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

4.1.4. Test Setup Layout

For radiated emissions below 30MHz



For radiated emissions above 30MHz



Above 10 GHz shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade form 3m to 1.5m.

Distance extrapolation factor = 20 log (specific distance [3m] / test distance [1.5m]) (dB);

Limit line = specific limits (dBuV) + distance extrapolation factor [6 dB].

4.1.5. Test Deviation

There is no deviation with the original standard.

4.1.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.1.7. Results of Radiated Emissions (9kHz~30MHz)

Temperature	23℃	Humidity	56%
Test Engineer	Aric Lee	Configurations	Normal Link

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

Note:

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

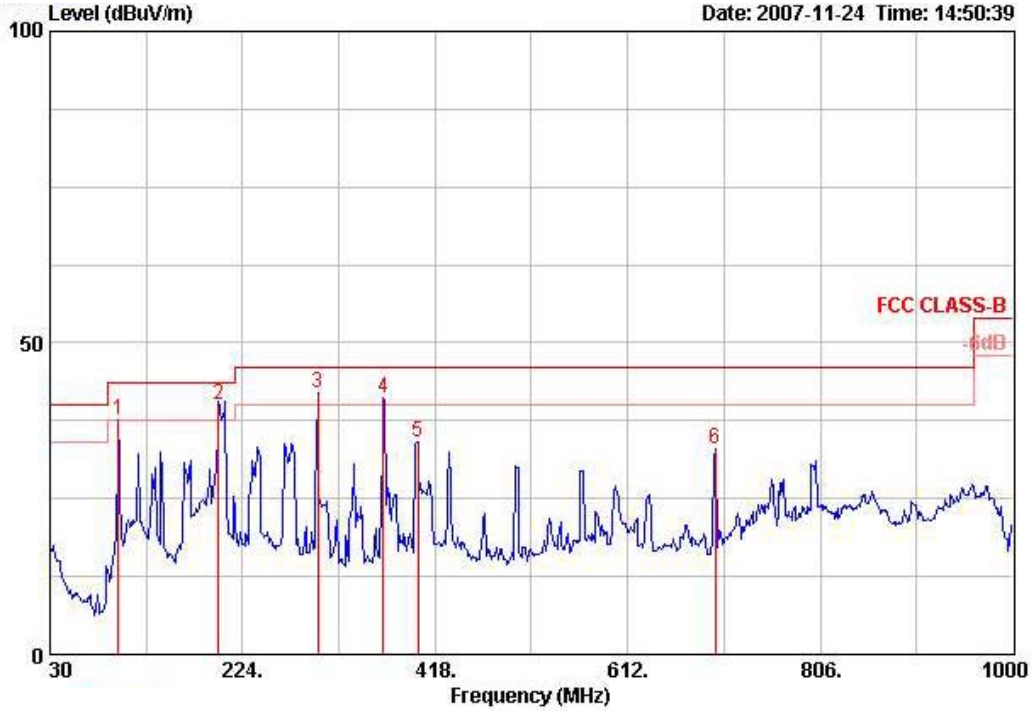
Distance extrapolation factor = 40 log (specific distance / test distance) (dB);

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

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

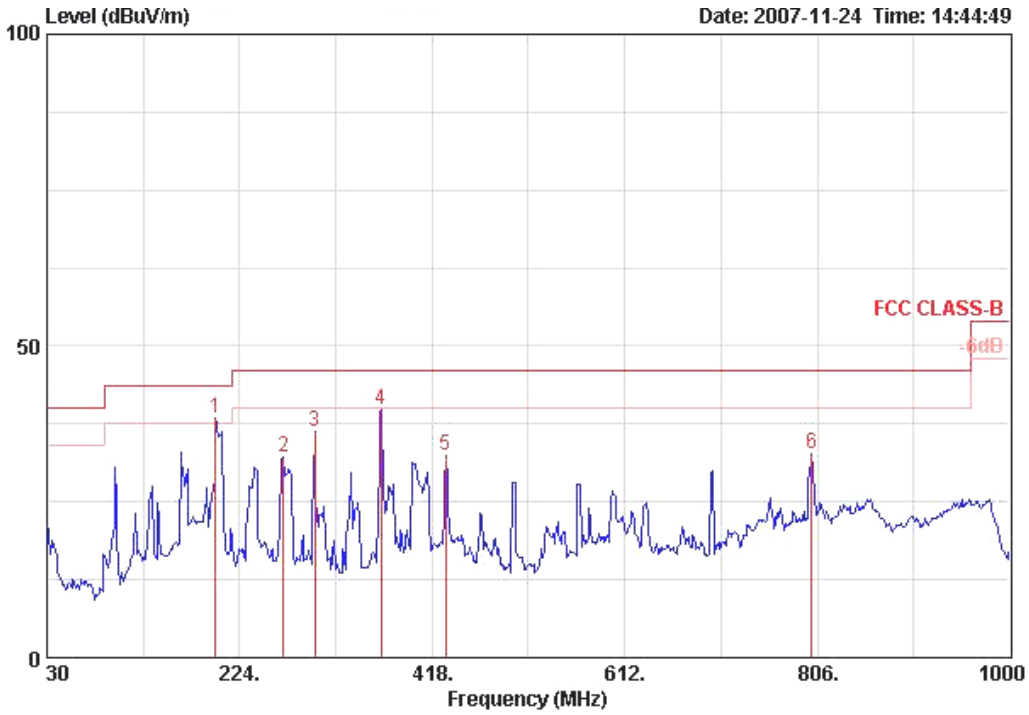
Temperature	23℃	Humidity	56%
Test Engineer	Aric Lee	Configurations	Normal Link

Horizontal



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	98.870	37.49	-6.01	43.50	52.09	11.01	0.36	25.96	Peak	100	0
2 @	199.700	40.12	-3.38	43.50	54.32	10.30	0.96	25.46	QP	100	248
3 !	299.660	41.91	-4.09	46.00	51.81	13.90	1.14	24.94	Peak	100	0
4 !	365.620	41.15	-4.85	46.00	49.34	15.68	1.30	25.16	Peak	100	0
5	400.540	34.09	-11.91	46.00	41.52	16.51	1.61	25.55	Peak	100	0
6	700.270	32.94	-13.06	46.00	37.04	19.70	2.13	25.93	Peak	100	0

Vertical



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1 !	199.750	38.34	-5.16	43.50	52.54	10.30	0.96	25.46	Peak	100	46
2	268.620	32.16	-13.84	46.00	42.71	13.55	1.15	25.24	Peak	400	0
3	299.660	36.11	-9.89	46.00	46.01	13.90	1.14	24.94	Peak	400	0
4	366.590	39.70	-6.30	46.00	47.87	15.70	1.31	25.17	Peak	400	0
5	431.580	32.44	-13.56	46.00	39.80	16.94	1.49	25.79	Peak	400	0
6	800.180	32.63	-13.37	46.00	34.62	20.70	2.50	25.19	Peak	400	0

Note:

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

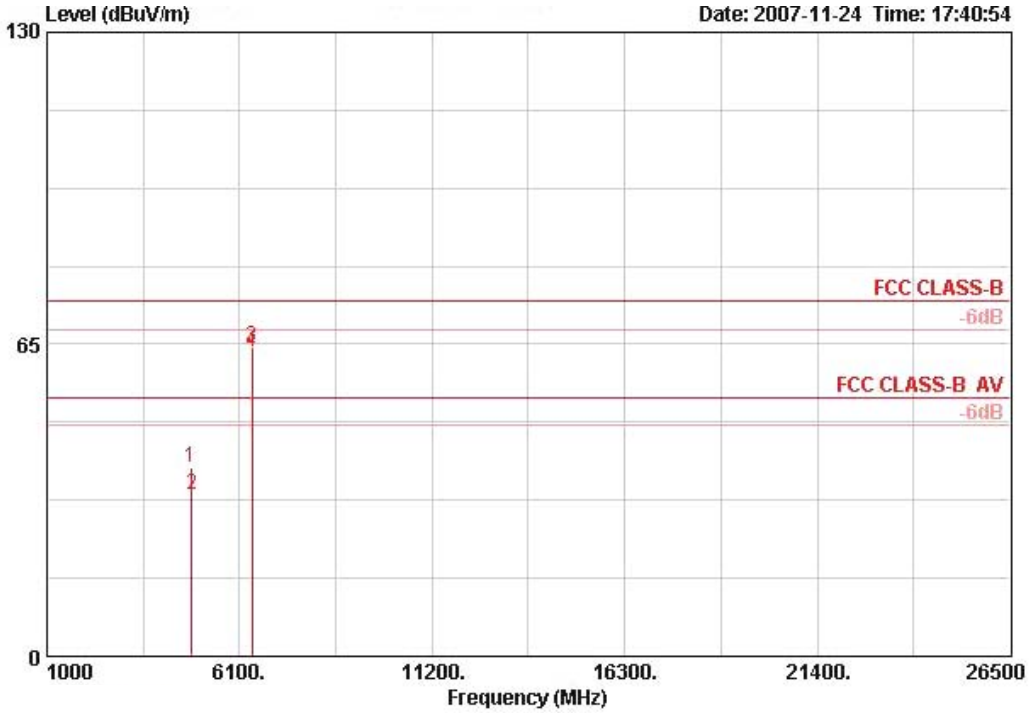
Emission level (dBuV/m) = 20 log Emission level (uV/m).

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

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

Temperature	23℃	Humidity	56%
Test Engineer	Aric Lee	Configurations	802.11b CH 1 Ant. A

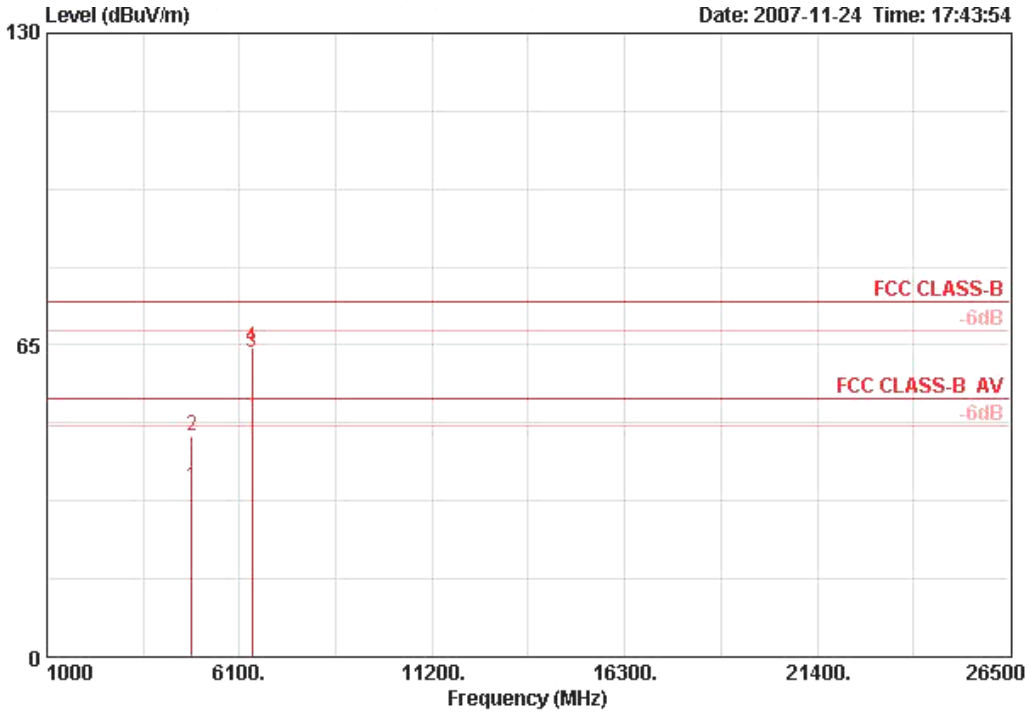
Horizontal



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos	Pol/Phase
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg	
1	4819.020	39.16	-34.84	74.00	36.23	33.39	4.78	35.25	PEAK	100	195	HORIZONTAL
2	4823.940	33.64	-20.36	54.00	30.71	33.39	4.78	35.25	AVERAGE	100	195	HORIZONTAL
3	6431.920	64.41			59.07	35.01	5.59	35.26	PEAK	145	255	HORIZONTAL

Note: Item are on un-restricted band, so the limit is -20dBc for the field strength of fundamental emission.

Vertical

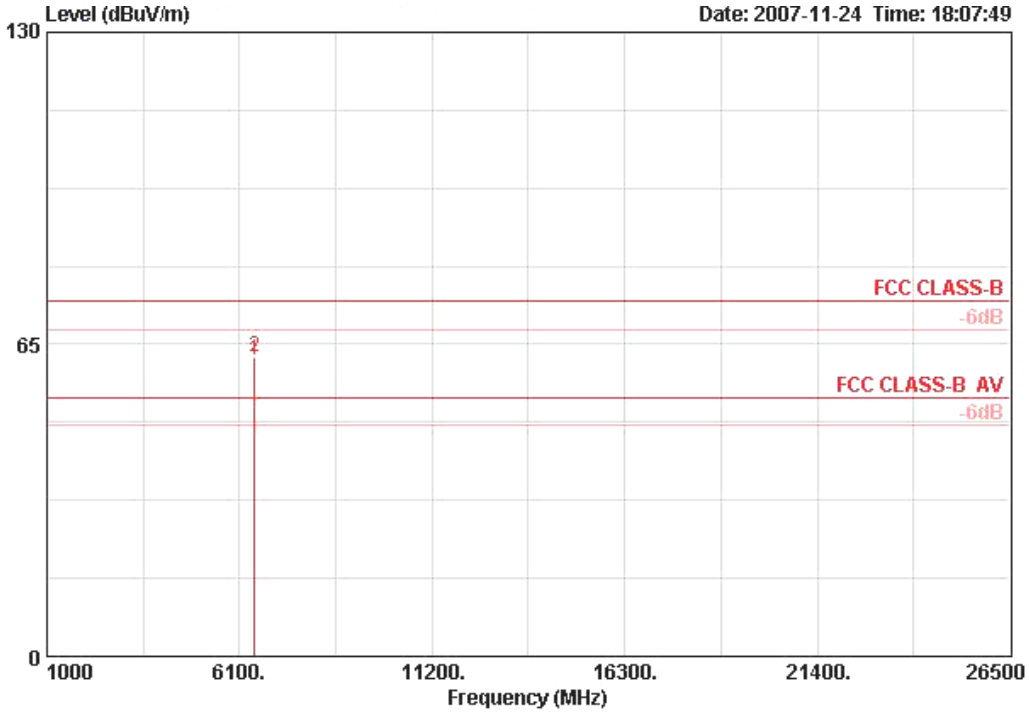


	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos	Pol/Phase
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg	
1	4823.980	35.49	-18.51	54.00	32.56	33.39	4.78	35.25	AVERAGE	100	198	VERTICAL
2	4824.120	46.22	-27.78	74.00	43.29	33.39	4.78	35.25	PEAK	100	198	VERTICAL
4	6431.960			74.00	59.00	35.01	5.59	35.26	PEAK	100	225	VERTICAL

Note: Item 4 is on un-restricted band, so the limit is -20dBc for the field strength of fundamental emission.

Temperature	23℃	Humidity	56%
Test Engineer	Aric Lee	Configurations	802.11b CH 6 Ant. A

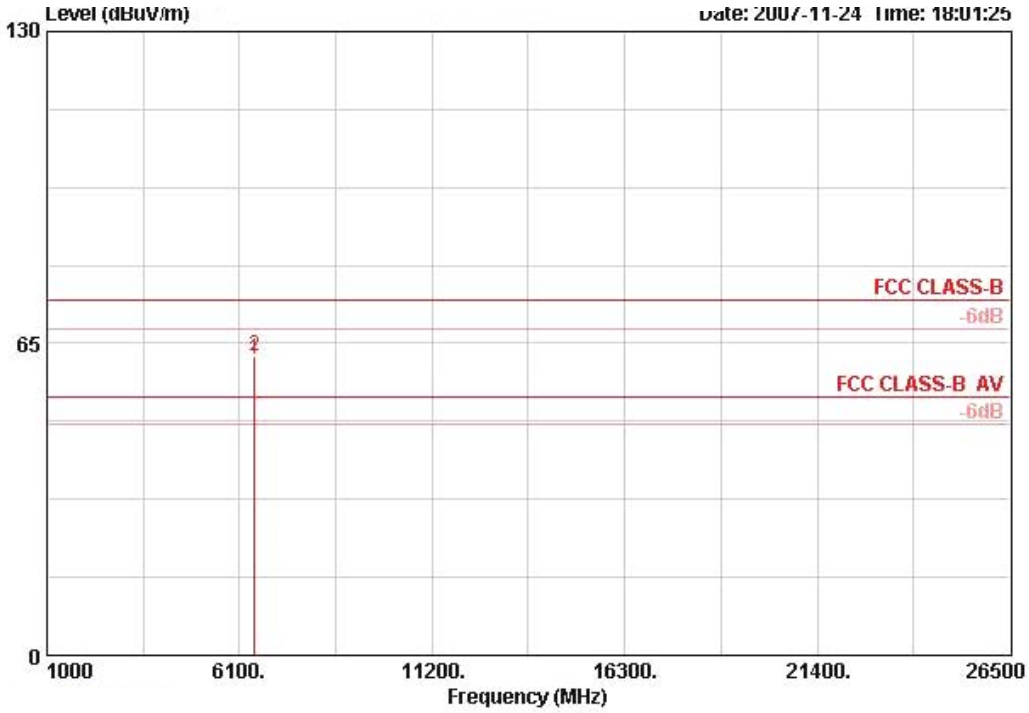
Horizontal



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos	Pol/Phase
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg	
2	6498.680	62.21			56.83	35.00	5.61	35.23	PEAK	109	227	HORIZONTAL

Note: Item 2 is on un-restricted band, so the limit is -20dBc for the field strength of fundamental emission.

Vertical

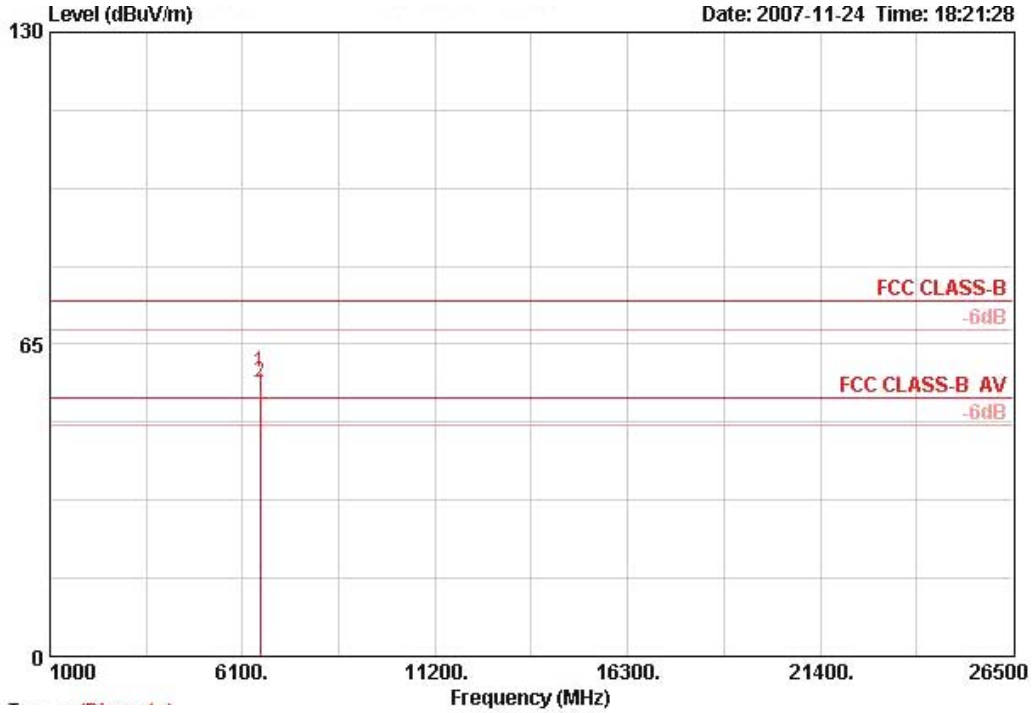


	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos	Pol/Phase
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg	
2	6498.660	62.29			56.91	35.00	5.61	35.23	PEAK	119	253	VERTICAL

Note: Item 2 is on un-restricted band, so the limit is -20dBc for the field strength of fundamental emission.

Temperature	23℃	Humidity	56%
Test Engineer	Aric Lee	Configurations	802.11b CH 11 Ant. A

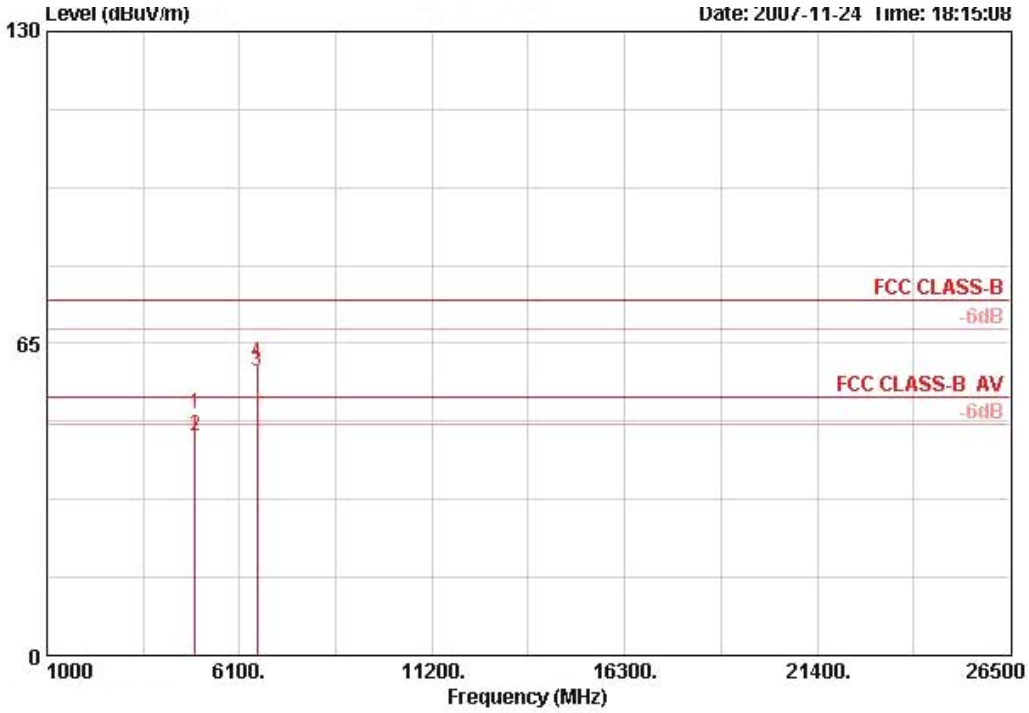
Horizontal



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos	Pol/Phase
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg	
1	6565.220	58.99			53.54	35.10	5.65	35.30	PEAK	100	206	HORIZONTAL

Note: Item 1 is on un-restricted band, so the limit is -20dBc for the field strength of fundamental emission.

Vertical

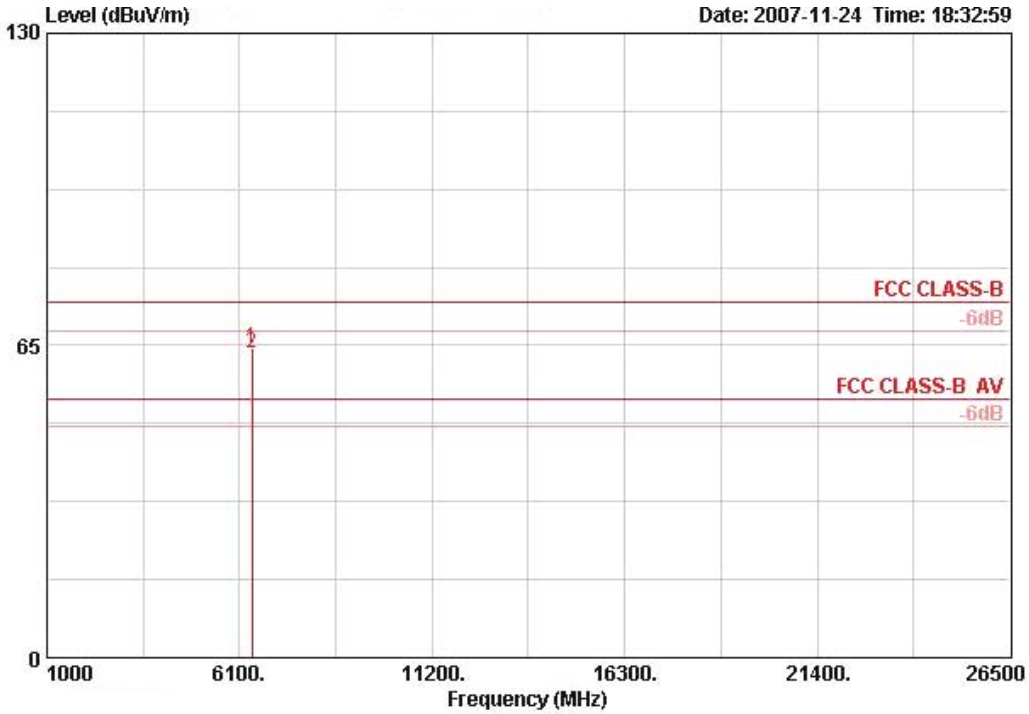


	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos	Pol/Phase
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg	
1	4924.050	50.27	-23.73	74.00	47.14	33.58	4.80	35.24	PEAK	100	210	HORIZONTAL
2	4924.110	45.68	-8.32	54.00	42.55	33.58	4.80	35.24	AVERAGE	100	210	HORIZONTAL
4	6565.420	60.80			55.34	35.10	5.65	35.30	PEAK	118	228	VERTICAL

Note: Item 4 is on un-restricted band, so the limit is -20dBc for the field strength of fundamental emission.

Temperature	23℃	Humidity	56%
Test Engineer	Aric Lee	Configurations	802.11g CH 1 Ant. A

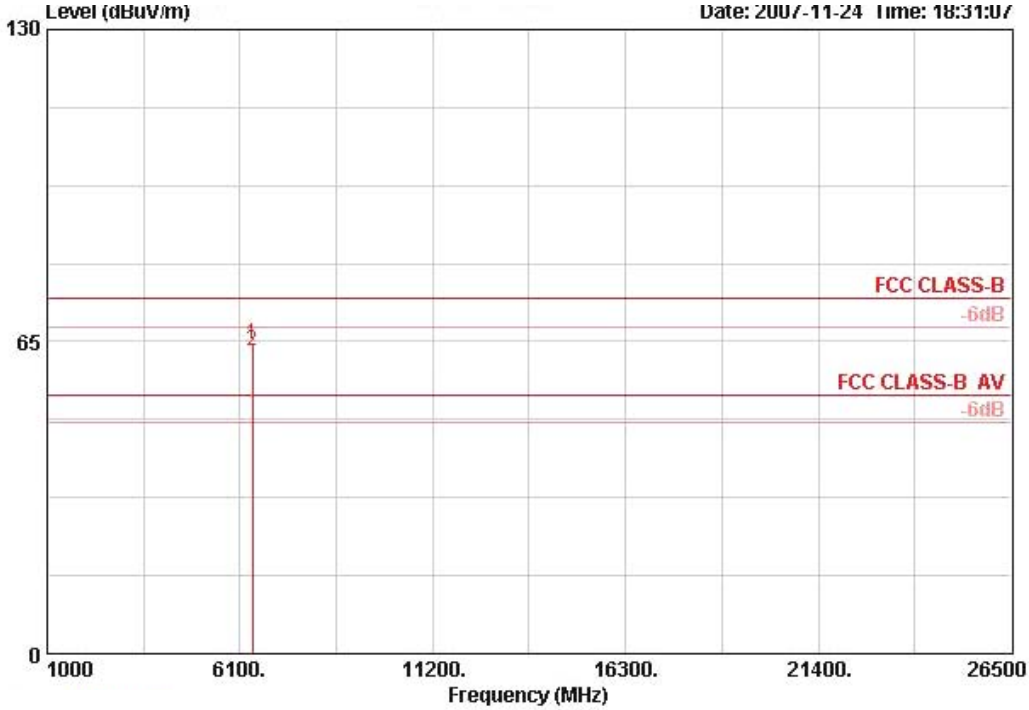
Horizontal



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos	Pol/Phase
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg	
1	6431.860	64.52			59.18	35.01	5.59	35.26	PEAK	149	254	HORIZONTAL

Note: Item 1 is on un-restricted band, so the limit is -20dBc for the field strength of fundamental emission.

Vertical

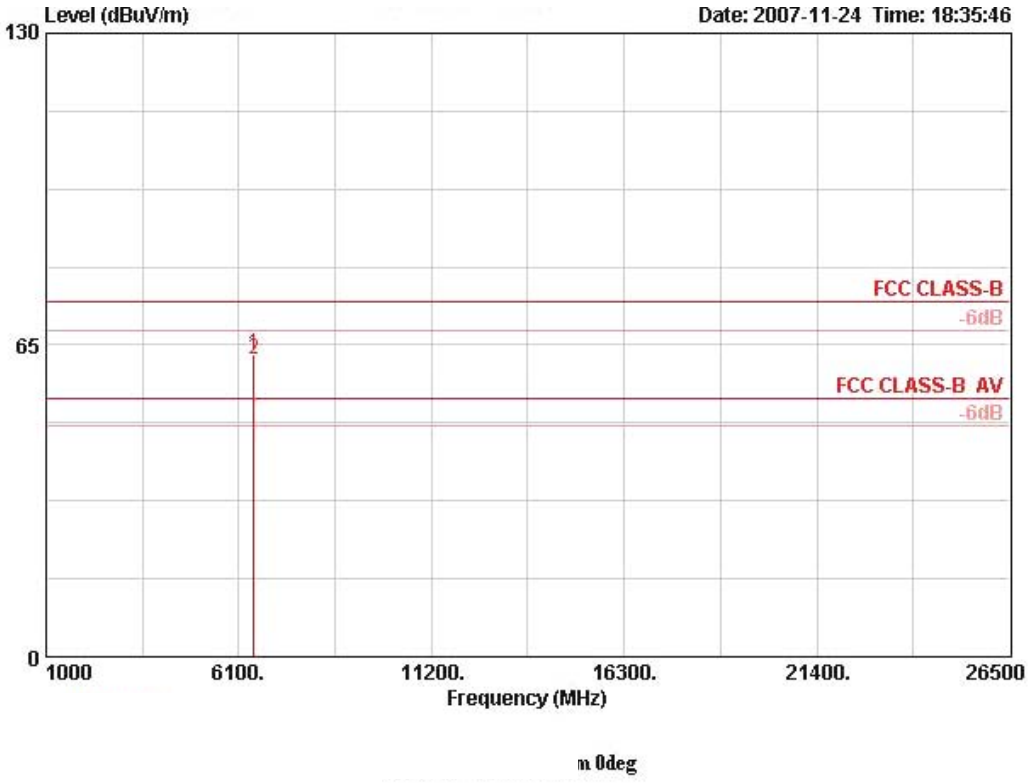


	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos	Pol/Phase
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg	
1	6431.900	64.44			59.09	35.01	5.59	35.26	PEAK	100	226	VERTICAL

Note: Item 1 is on un-restricted band, so the limit is -20dBc for the field strength of fundamental emission.

Temperature	23℃	Humidity	62%
Test Engineer	Aric Lee	Configurations	802.11g CH 6 Ant. A

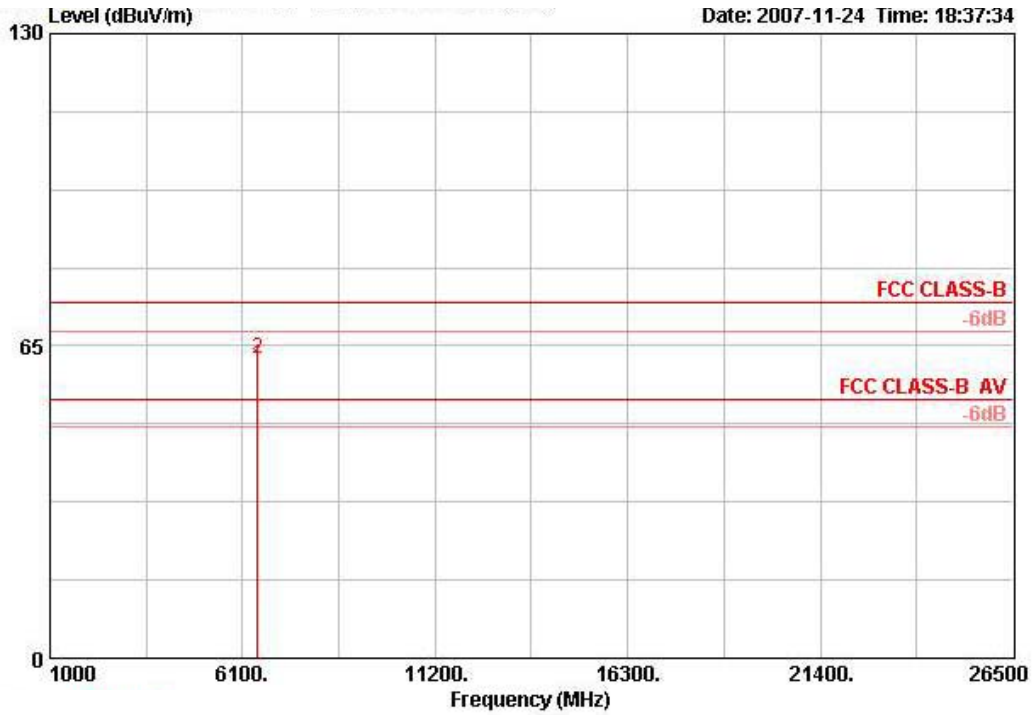
Horizontal



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos	Pol/Phase
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg	
1	6498.620	62.90			57.51	35.00	5.61	35.23	PEAK	119	253	HORIZONTAL

Note: Item 1 is on un-restricted band, so the limit is -20dBc for the field strength of fundamental emission.

Vertical

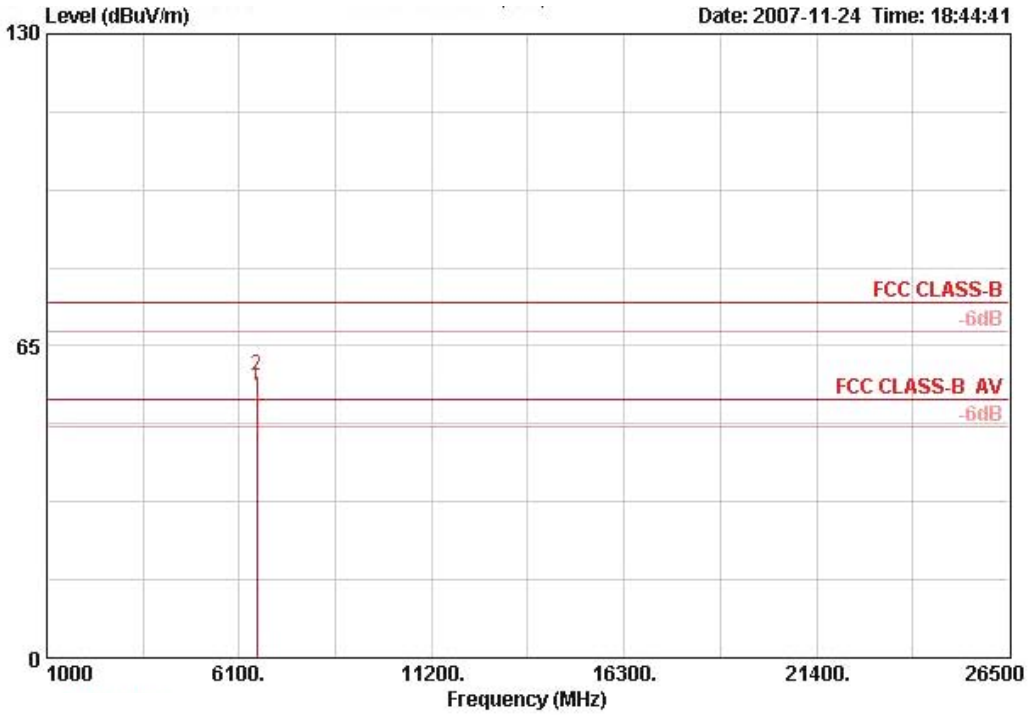


	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos	Pol/Phase
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg	
2	6498.720	62.24			56.86	35.00	5.61	35.23	PEAK	100	228	VERTICAL

Note: Item 2 is on un-restricted band, so the limit is -20dBc for the field strength of fundamental emission.

Temperature	23℃	Humidity	62%
Test Engineer	Aric Lee	Configurations	802.11g CH 11 Ant. A

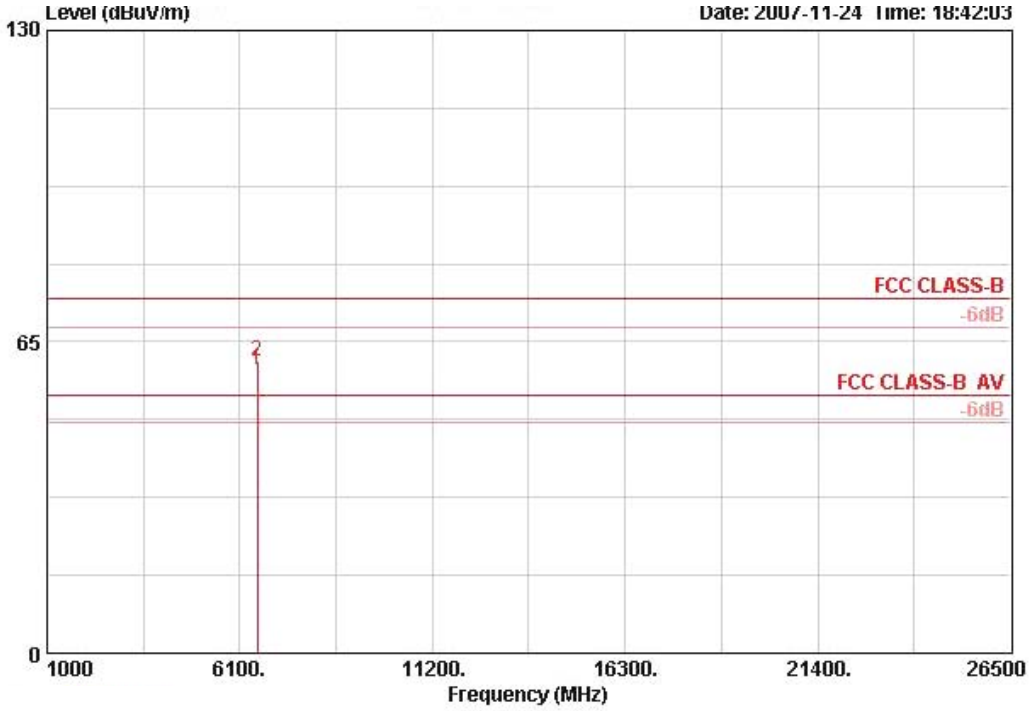
Horizontal



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos	Pol/Phase
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg	
2	6565.450	58.79			53.33	35.10	5.65	35.30	PEAK	100	206	HORIZONTAL

Note: Item 2 is on un-restricted band, so the limit is -20dBc for the field strength of fundamental emission.

Vertical



	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos	Pol/Phase
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg	
2	6565.400	60.79			55.34	35.10	5.65	35.30	PEAK	119	232	VERTICAL

Note: Item 2 is on un-restricted band, so the limit is -20dBc for the field strength of fundamental emission.

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.

4.2. Band Edge Emissions Measurement

4.2.1. 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

4.2.2. Measuring Instruments and Setting

Please refer to section 5 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

4.2.3. Test Procedures

1. The test procedure is the same as section 4.5.3, 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.

4.2.4. Test Setup Layout

This test setup layout is the same as that shown in section 4.5.4.

4.2.5. Test Deviation

There is no deviation with the original standard.

4.2.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.2.7. Test Result of Band Edge and Fundamental Emissions

Temperature	23℃	Humidity	62%
Test Engineer	Aric Lee	Configurations	802.11b CH 1, 6, 11

Channel 1

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos	Pol/Phase
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg	
1	2389.800	55.57	-18.43	74.00	24.18	28.05	3.33	0.00	PEAK	100	188	VERTICAL
2	2390.000	44.74	-9.26	54.00	13.36	28.05	3.33	0.00	AVERAGE	100	188	VERTICAL
3 @	2409.200	92.41			60.99	28.09	3.33	0.00	AVERAGE	100	188	VERTICAL
4 @	2410.600	95.88			64.45	28.09	3.33	0.00	PEAK	100	188	VERTICAL

Item 3, 4 are the fundamental frequency at 2412 MHz.

Channel 6

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos	Pol/Phase
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg	
1 @	2438.200	102.68			71.16	28.18	3.35	0.00	PEAK	100	34	VERTICAL
2 @	2439.800	99.13			67.60	28.18	3.35	0.00	AVERAGE	100	34	VERTICAL

Item 1, 2 are the fundamental frequency at 2437MHz.

Channel 11

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos	Pol/Phase
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg	
1 @	2459.200	101.56			69.98	28.22	3.36	0.00	AVERAGE	100	36	VERTICAL
2 @	2460.600	105.13			73.55	28.22	3.36	0.00	PEAK	100	36	VERTICAL
3 !	2483.500	48.74	-5.26	54.00	17.11	28.26	3.38	0.00	AVERAGE	100	36	VERTICAL
4	2483.700	59.05	-14.95	74.00	27.41	28.26	3.38	0.00	PEAK	100	36	VERTICAL

Item 1, 2 are the fundamental frequency at 2462 MHz.

Temperature	23℃	Humidity	62%
Test Engineer	Aric Lee	Configurations	802.11g CH 1, 6, 11

Channel 1

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos	Pol/Phase
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg	
1	2389.800	55.31	-18.69	74.00	23.93	28.05	3.33	0.00	PEAK	100	215	VERTICAL
2	2390.000	44.71	-9.29	54.00	13.32	28.05	3.33	0.00	AVERAGE	100	215	VERTICAL
3 @	2419.200	85.00			53.56	28.09	3.35	0.00	AVERAGE	100	215	VERTICAL
4 @	2419.400	93.76			62.32	28.09	3.35	0.00	PEAK	100	215	VERTICAL

Item 3, 4 are the fundamental frequency at 2412 MHz.

Channel 6

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos	Pol/Phase
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg	
1 @	2444.000	92.82			61.29	28.18	3.36	0.00	AVERAGE	100	33	VERTICAL
2 @	2444.200	98.90			67.36	28.18	3.36	0.00	PEAK	100	33	VERTICAL

Item 1, 2 are the fundamental frequency at 2437 MHz.

Channel 11

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos	Pol/Phase
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg	
1 @	2469.000	94.81			63.22	28.22	3.38	0.00	AVERAGE	100	35	VERTICAL
2 @	2469.200	103.99			72.39	28.22	3.38	0.00	PEAK	100	35	VERTICAL
3	2483.500	47.05	-6.95	54.00	15.42	28.26	3.38	0.00	AVERAGE	100	35	VERTICAL
4	2484.100	59.83	-14.17	74.00	28.20	28.26	3.38	0.00	PEAK	100	35	VERTICAL

Item 1, 2 are the fundamental frequency at 2462 MHz.

4.3. Antenna Requirements

4.3.1. 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.

4.3.2. Antenna Connector Construction

Please refer to section 3.3 in this test report; antenna connector complied with the requirements.

5. LIST OF MEASURING EQUIPMENTS

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	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)
Amplifier	MITEQ	AMF-6F-260400	923364	26.5 GHz - 40 GHz	Jan. 22, 2007*	Radiation (03CH03-HY)
Spectrum Analyzer	R&S	FSP40	100305	9 kHz - 40 GHz	Dec. 15, 2006	Radiation (03CH03-HY)
Loop Antenna	R&S	HFH2-Z2	860004/001	9 kHz - 30 MHz	May 23, 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)

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

* Calibration Interval of instruments listed above is two year.

NCR means Non-Calibration required.

6. TEST LOCATION

SHIJR	ADD	:	6Fl., No. 106, Sec. 1, Shintai 5th Rd., Shijr City, Taipei, Taiwan 221, R.O.C.
	TEL	:	886-2-2696-2468
	FAX	:	886-2-2696-2255
HWA YA	ADD	:	No. 52, Hwa Ya 1st Rd., Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.
	TEL	:	886-3-327-3456
	FAX	:	886-3-318-0055
LINKOU	ADD	:	No. 30-2, Dingfu Tsuen, Linkou Shiang, Taipei, Taiwan 244, R.O.C
	TEL	:	886-2-2601-1640
	FAX	:	886-2-2601-1695
DUNGHU	ADD	:	No. 3, Lane 238, Kangle St., Neihu Chiu, Taipei, Taiwan 114, R.O.C.
	TEL	:	886-2-2631-4739
	FAX	:	886-2-2631-9740
JUNGHE	ADD	:	7Fl., No. 758, Jungjeng Rd., Junghe City, Taipei, Taiwan 235, R.O.C.
	TEL	:	886-2-8227-2020
	FAX	:	886-2-8227-2626
NEIHU	ADD	:	4Fl., No. 339, Hsin Hu 2nd Rd., Taipei 114, Taiwan, R.O.C.
	TEL	:	886-2-2794-8886
	FAX	:	886-2-2794-9777
JHUBEI	ADD	:	No.8, Lane 724, Bo-ai St., Jhubei City, HsinChu County 302, Taiwan, R.O.C.
	TEL	:	886-3-656-9065
	FAX	:	886-3-656-9085

7. TAF CERTIFICATE OF ACCREDITATION

Certificate No. : L1190-070110

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

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

P1, total 9 pages

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