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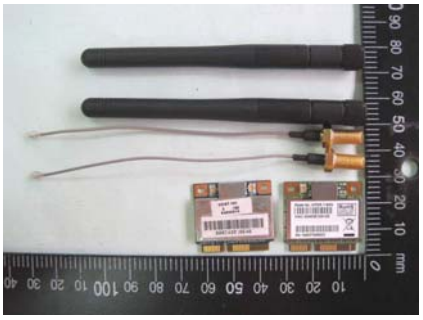
FCC RADIO TEST REPORT

Applicant's company	**Ralink Technology Corporation**
Applicant Address	5F., No.5, Taiyuan 1st St., Jhubei City, Hsinchu County 302, Taiwan, R.O.C.
FCC ID	**VQF-RT3090-1T1R**
Manufacturer's company	**Ralink Technology Corporation**
Manufacturer Address	5F., No.5, Taiyuan 1st St., Jhubei City, Hsinchu County 302, Taiwan, R.O.C.

Product Name	11b/g/n 1T1R WLAN Mini Card
Brand Name	Ralink
Model Name	RT3090
Test Rule	47 CFR FCC Part 15 Subpart C § 15.247
Test Freq. Range	2400 ~ 2483.5MHz
Received Date	Mar. 16, 2011
Final Test Date	Apr. 20, 2011
Submission Type	Class II Change



Statement

Test result included in this report is for the 802.11n and 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 C63.4-2009** 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: Apr. 27, 2011

Report No.: FR131660

■ No additional attachment.

□ Additional attachment were issued as following record:

Attachment No.	Issue Date	Description

Certificate No.: CB10004103

1. CERTIFICATE OF COMPLIANCE

Product Name	:	**11b/g/n 1T1R WLAN Mini Card**
Brand Name	:	**Ralink**
Model Name	:	**RT3090**
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 Mar. 16, 2011 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.

Jordan Hsiao 2011.4.29

Jordan Hsiao

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	-	-
4.1	15.247(b)(3)	Maximum Conducted Output Power	Complies	8.92 dB
-	15.247(e)	Power Spectral Density	Complies	-
-	15.247(a)(2)	6dB Spectrum Bandwidth	Complies	-
4.2	15.247(d)	Radiated Emissions	Complies	4.77 dB
4.3	15.247(d)	Band Edge Emissions	Complies	0.01 dB
4.4	15.203	Antenna Requirements	Complies	-

Test Items	Uncertainty	Remark
AC Power Line Conducted Emissions	±2.3dB	Confidence levels of 95%
Maximum Conducted Output Power	±0.8dB	Confidence levels of 95%
Power Spectral Density	±0.5dB	Confidence levels of 95%
6dB Spectrum Bandwidth	$\pm 8.5\times10^{-8}$	Confidence levels of 95%
Radiated Emissions (9kHz~30MHz)	±0.8dB	Confidence levels of 95%
Radiated Emissions (30MHz~1000MHz)	±1.9dB	Confidence levels of 95%
Radiated / Band Edge Emissions (1GHz~18GHz)	±1.9dB	Confidence levels of 95%
Radiated Emissions (18GHz~40GHz)	±1.9dB	Confidence levels of 95%
Temperature	±0.7℃	Confidence levels of 95%
Humidity	±3.2%	Confidence levels of 95%
DC / AC Power Source	±1.4%	Confidence levels of 95%

3. GENERAL INFORMATION

3.1. Product Details

IEEE 802.11b/g

Items	Description
Product Type	WLAN (1TX, 1RX)
Radio Type	Intentional Transceiver
Power Type	From Host System
Modulation	see the below table for 802.11n
Data Modulation	OFDM (BPSK / QPSK / 16QAM / 64QAM)
Data Rate (Mbps)	see the below table for 802.11n
Frequency Range	2400 ~ 2483.5MHz
Channel Number	11 for 20MHz bandwidth ; 7 for 40MHz bandwidth
Channel Band Width (99%)	MCS0 (20MHz): 17.52 MHz ; MCS0 (40MHz): 36.00 MHz
Conducted Output Power	MCS0 (20MHz): 18.96 dBm ; MCS0 (40MHz): 18.27 dBm
Carrier Frequencies	Please refer to section 3.4
Antenna	Please refer to section 3.3

802.11b/g

Items	Description
Product Type	WLAN (1TX, 1RX)
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
Channel Band Width (99%)	11b: 15.12 MHz ; 11g: 16.40 MHz
Conducted Output Power	11b: 21.08 dBm ; 11g: 19.07 dBm
Carrier Frequencies	Please refer to section 3.4
Antenna	Please refer to section 3.3

Antenna & Bandwidth

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

IEEE 802.11n spec

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

Symbol	Explanation
NSS	Number of spatial streams
R	Code rate
NBPSC	Number of coded bits per single carrier
NCBPS	Number of coded bits per symbol
NDBPS	Number of data bits per symbol
GI	guard interval

3.2. Accessories

N/A

3.3. Table for Filed Antenna

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)	Cable loss (dB)	Test Gain (dBi)
1	Wha Yu	C642-510038-A	Dipole Antenna	SMA Plug Reverse	2.00	0.8	1.20

Note 1: There are four types of EUT.

EUT 1: Full Size Module with one Antenna Connector

EUT 2: Full Size Module with two Antenna Connectors

EUT 3: Half Size Module with one Antenna Connector

EUT 4: Half Size Module with two Antenna Connectors

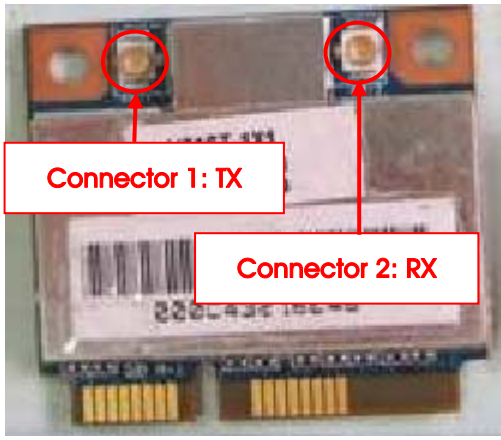
The EUT 2 / EUT 4 have two antenna Connectors, the Connector 1 have TX function, Connector 2 have only RX function.

The EUT 1 / EUT 3 have one antenna Connector, the Connector 1 have both TX/RX function.

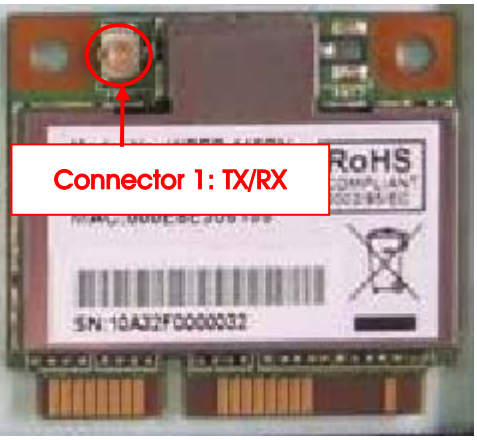
Note 2: The EUT has two types of antenna. One is PIFA antenna, and another is Dipole antenna.

And dipole antenna is restricted for half size modules use only.

2. EUT 2 / EUT 4 with two Connectors:



1. EUT 1 / EUT 3 with one Connector:



3.4. Table for Carrier Frequencies

For 802.11b/g, use Channel 1~Channel 11.

There are two bandwidth systems for 802.11n.

For both 20MHz bandwidth systems, use Channel 1~Channel 11.

For both 40MHz bandwidth systems, use Channel 3~Channel 9.

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

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
Maximum Peak Conducted Output Power	MCS0/20MHz	6.5 Mbps	1/6/11	1
	MCS0/40MHz	13.5 Mbps	3/6/9	1
	11b/BPSK	1 Mbps	1/6/11	1
	11g/BPSK	6 Mbps	1/6/11	1
Radiated Emissions 9kHz~1GHz	Normal Link	-	-	-
Radiated Emissions 1GHz~10th Harmonic	MCS0/20MHz	6.5 Mbps	1/6/11	1
	MCS0/40MHz	13.5 Mbps	3/6/9	1
	11b/BPSK	1 Mbps	1/6/11	1
	11g/BPSK	6 Mbps	1/6/11	1
Band Edge Emissions	MCS0/20MHz	6.5 Mbps	1/11	1
	MCS0/40MHz	13.5 Mbps	3/9	1
	11b/BPSK	1 Mbps	1/11	1
	11g/BPSK	6 Mbps	1/11	1

All the test modes were listed as below:

Mode 1: EUT 3 with Ant. 1

Mode 2: EUT 4 with Ant. 1

After pretest, it was selected Mode 2 as worse case and recorded the test data in the report.

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	187376	IC 4086D	-
CO04-HY	Conduction	Hwa Ya	-	-	-

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 Class II Change

This product is an extension of original one reported under Sporton project number: 8N2012-01

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

Modifications	Description	Performance Checking
Add one dipole antenna only for half size of EUT	Dipole antenna Brand Name: Wha Yu Model No.: C642-510038-A Antenna Gain: 2.00 dBi	Maximum Peak Conducted Output Power Radiated Emissions Band Edge Emissions

3.8. Table for Supporting Units

Support Unit	Brand	Model	FCC ID
Notebook	DELL	PP25L	E2K4965AGNM
Modem	ACEEX	DM1414	IFAXDM1414
Mouse	HP	M-UV96	DoC
Wireless 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 802.11n MCS0 20MHz

Test Software Version	RT3x9x Release Version 1.5.0.1		
Frequency	2412 MHz	2437 MHz	2462 MHz
MCS0 20MHz	12	17	16

Power Parameters of 802.11n MCS0 40MHz

Test Software Version	RT3x9x Release Version 1.5.0.1		
Frequency	2422 MHz	2437 MHz	2452 MHz
MCS0 40MHz	0F	16	0F

Power Parameters of IEEE 802.11b/g

Test Software Version	RT3x9x Release Version 1.5.0.1		
Frequency	2412 MHz	2437 MHz	2462 MHz
IEEE 802.11b	11	17	16
IEEE 802.11g	13	17	16

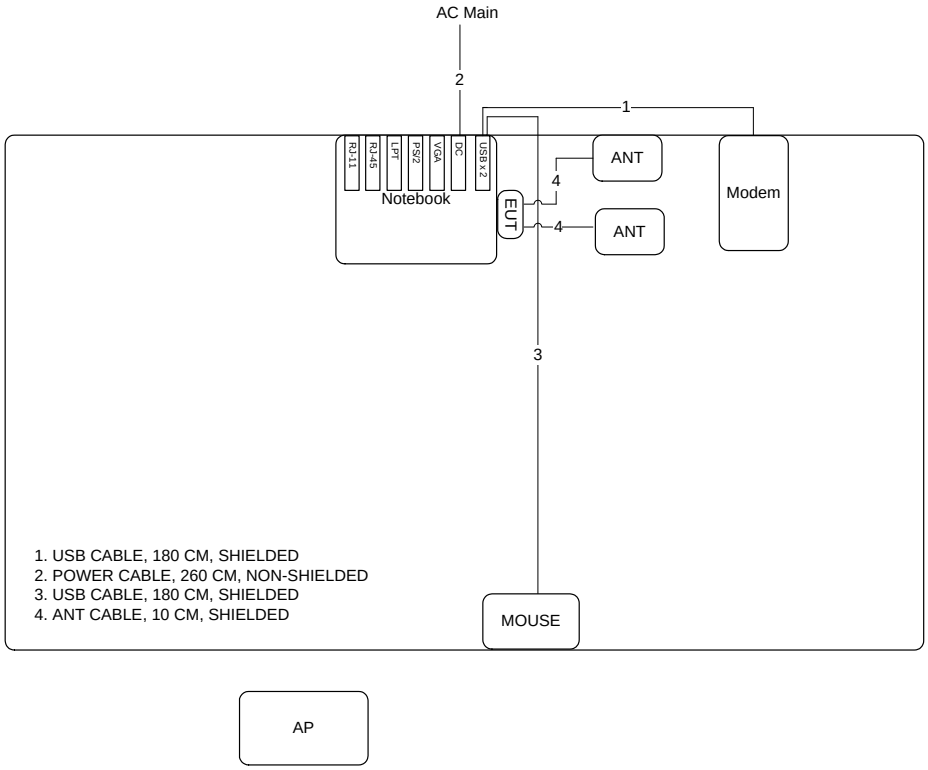
During the test, "RT3x9x Release Version 1.5.0.1" under WIN XP was executed to link with the remote workstation to receive and transmit signal.

3.10. Test Configurations

3.10.1. Radiation Emissions Test Configuration

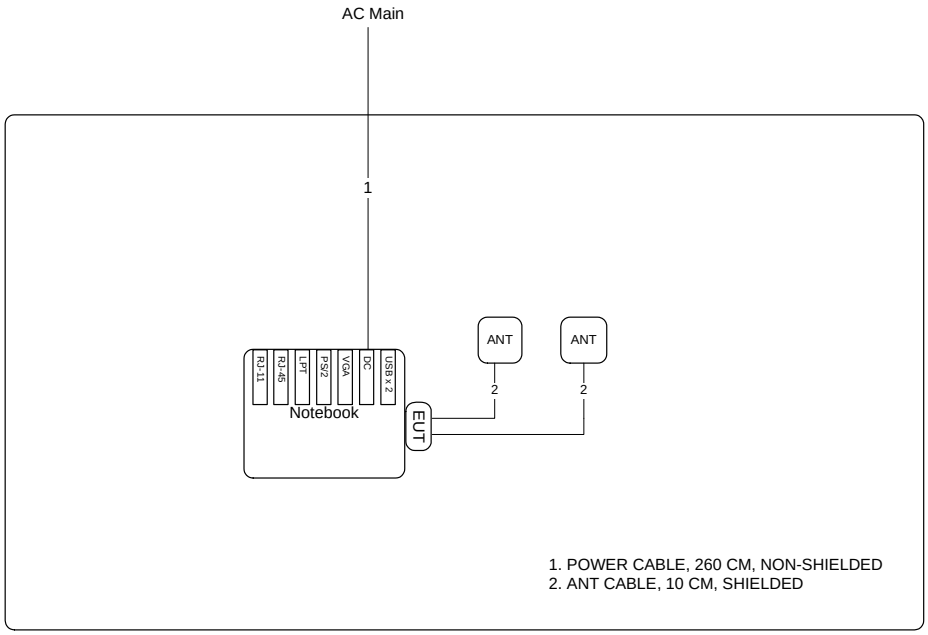
Test Configuration: 30MHz~1GHz

Test Mode: Mode 2



Test Configuration: above 1GHz

Test Mode: Mode 2



4. TEST RESULT

4.1. Maximum Conducted Output Power Measurement

4.1.1. 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.

4.1.2. Measuring Instruments and Setting

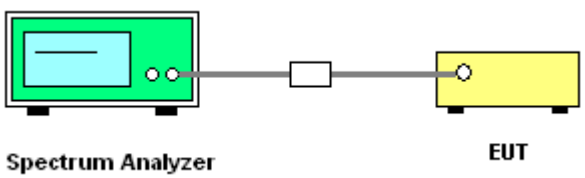
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

Spectrum 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

4.1.3. 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 March 23, 2005.

4.1.4. Test Setup Layout



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. Test Result of Maximum Conducted Output Power

Temperature	25°C	Humidity	60%
Test Engineer	Jacky Ho	Configurations	802.11n
Test Date	Apr. 20, 2011		

Configuration 802.11n MCS0 20MHz Ant. 1

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
1	2412 MHz	16.67	30.00	Complies
6	2437 MHz	18.96	30.00	Complies
11	2462 MHz	17.45	30.00	Complies

Configuration 802.11n MCS0 40MHz Ant. 1

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
3	2422 MHz	13.63	30.00	Complies
6	2437 MHz	18.27	30.00	Complies
9	2452 MHz	13.08	30.00	Complies

Temperature	25°C	Humidity	60%
Test Engineer	Jacky Ho	Configurations	802.11b/g
Test Date	Apr. 20, 2011		

Configuration IEEE 802.11b Ant. 1

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
1	2412 MHz	18.20	30.00	Complies
6	2437 MHz	21.08	30.00	Complies
11	2462 MHz	20.30	30.00	Complies

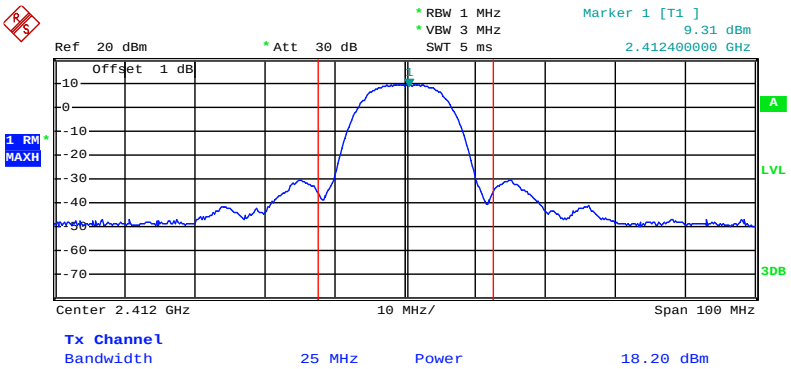
Configuration IEEE 802.11g Ant. 1

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
1	2412 MHz	17.28	30.00	Complies
6	2437 MHz	19.07	30.00	Complies
11	2462 MHz	17.80	30.00	Complies

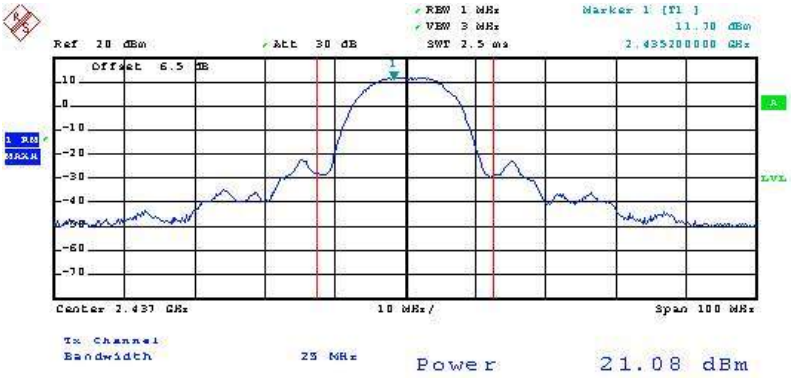
Note: All the test values were listed in the report.

For plots, only the worse case of DSSS and OFDM modulation were listed in the report.

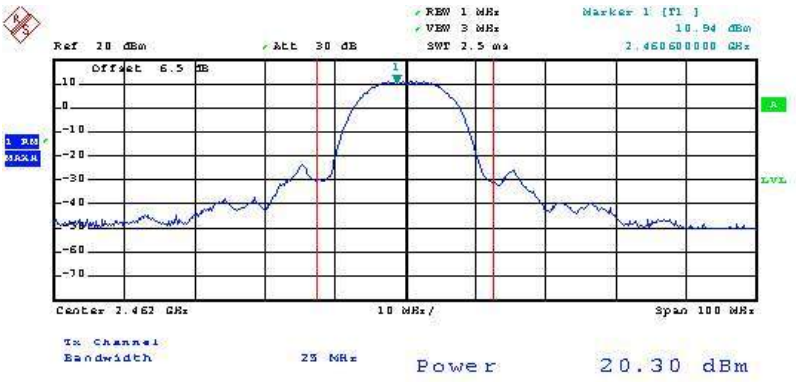
Conducted Output Power Plot on Configuration IEEE 802.11b Ant. 1 / 2412 MHz



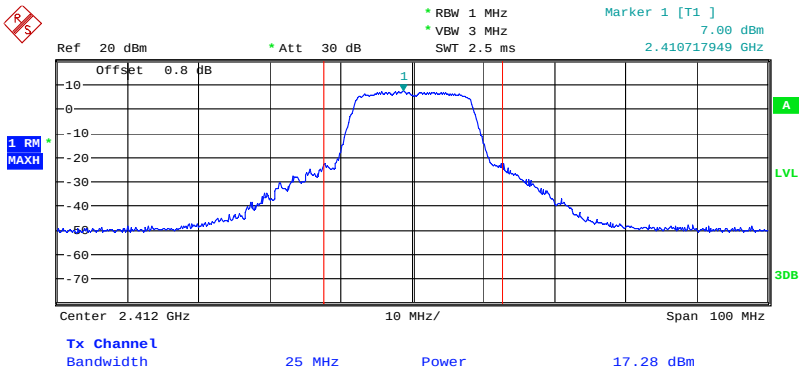
Conducted Output Power Plot on Configuration IEEE 802.11b Ant. 1 / 2437 MHz



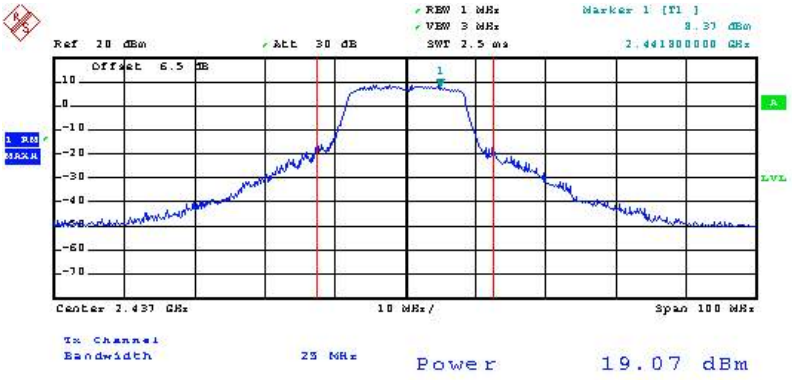
Conducted Output Power Plot on Configuration IEEE 802.11b Ant. 1 / 2462 MHz



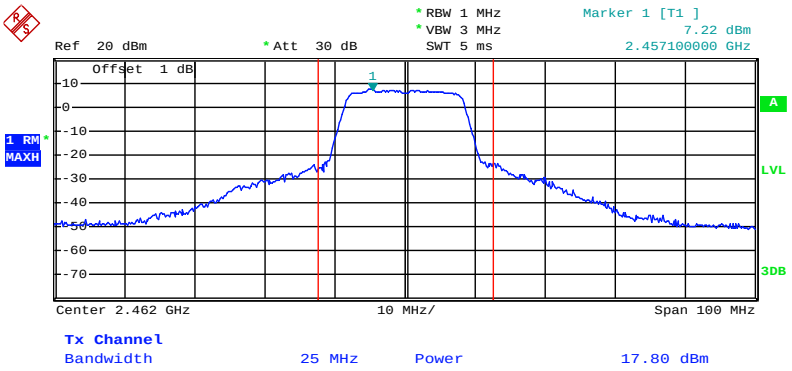
Conducted Output Power Plot on Configuration IEEE 802.11g Ant. 1 / 2412 MHz



Conducted Output Power Plot on Configuration IEEE 802.11g Ant. 1 / 2437 MHz



Conducted Output Power Plot on Configuration IEEE 802.11g Ant. 1 / 2462 MHz



4.2. Radiated 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 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)	1000KHz / 1000KHz for peak

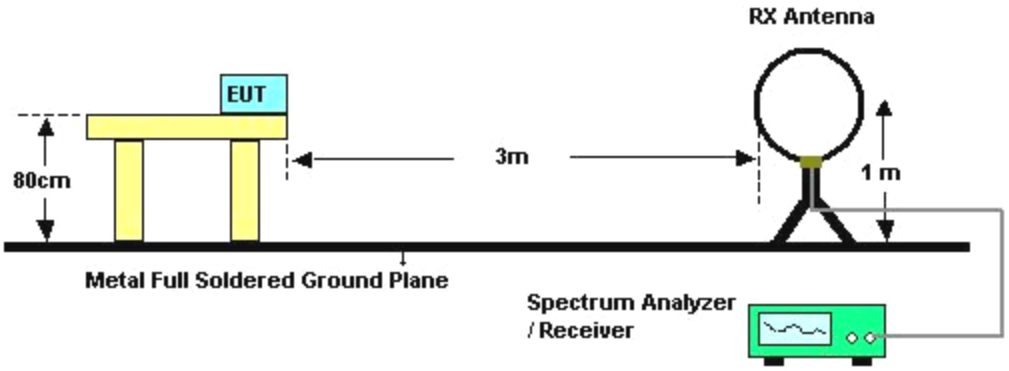
Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

4.2.3. Test Procedures

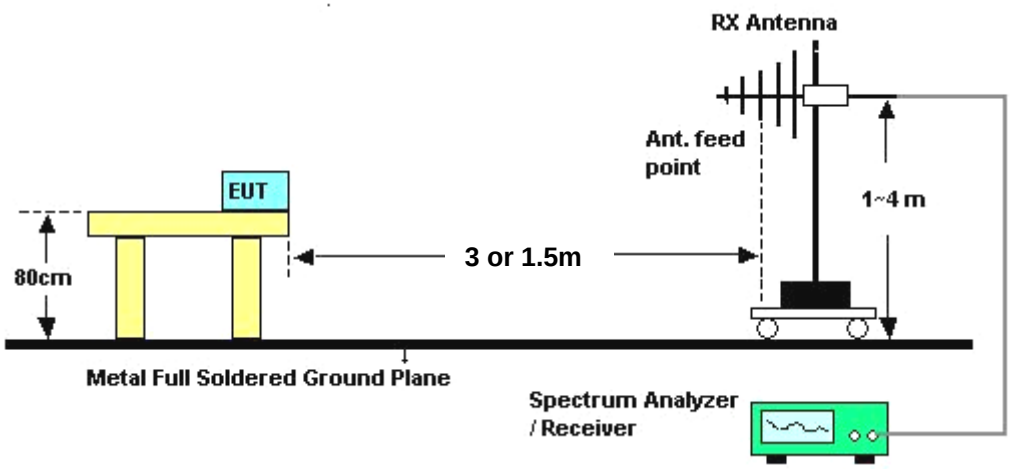
1. Configure the EUT according to ANSI C63.4. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting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

4.2.4. 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 distanc [3m] / test distance [1.5m]) (dB);

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

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

Temperature	26°C	Humidity	60%
Test Engineer	Jacky Ho	Configurations	Normal Link
Test Date	Apr. 16, 2011		

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

Note:

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

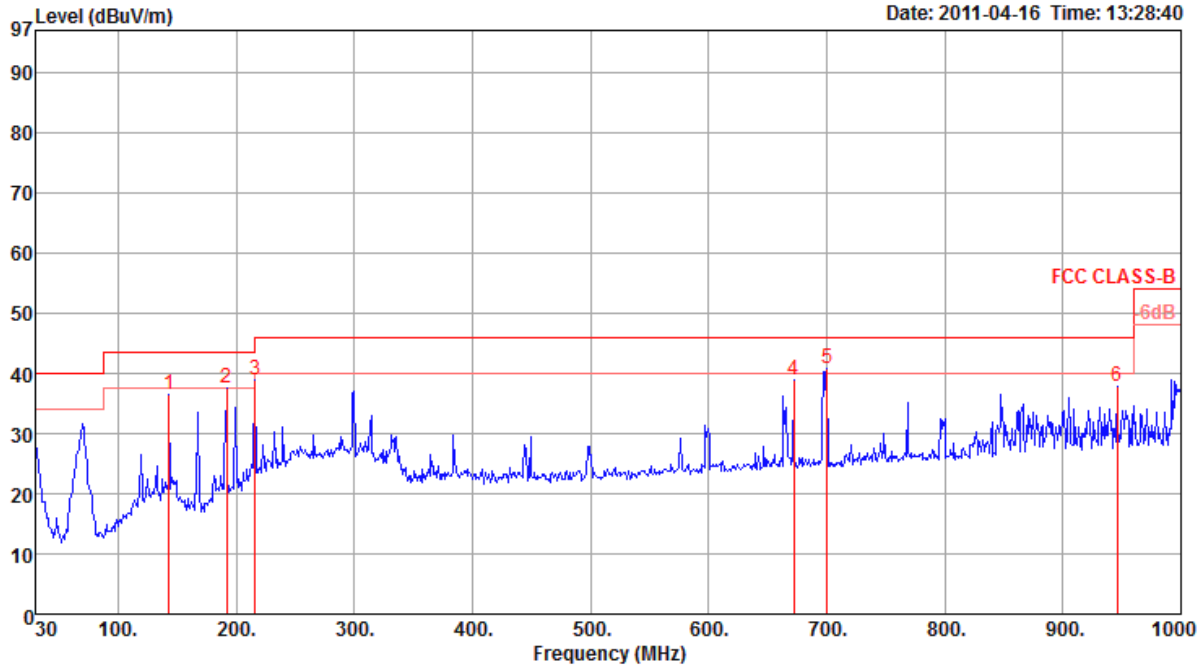
Distance extrapolation factor = 40 log (specific distance / test distance) (dB);

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

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

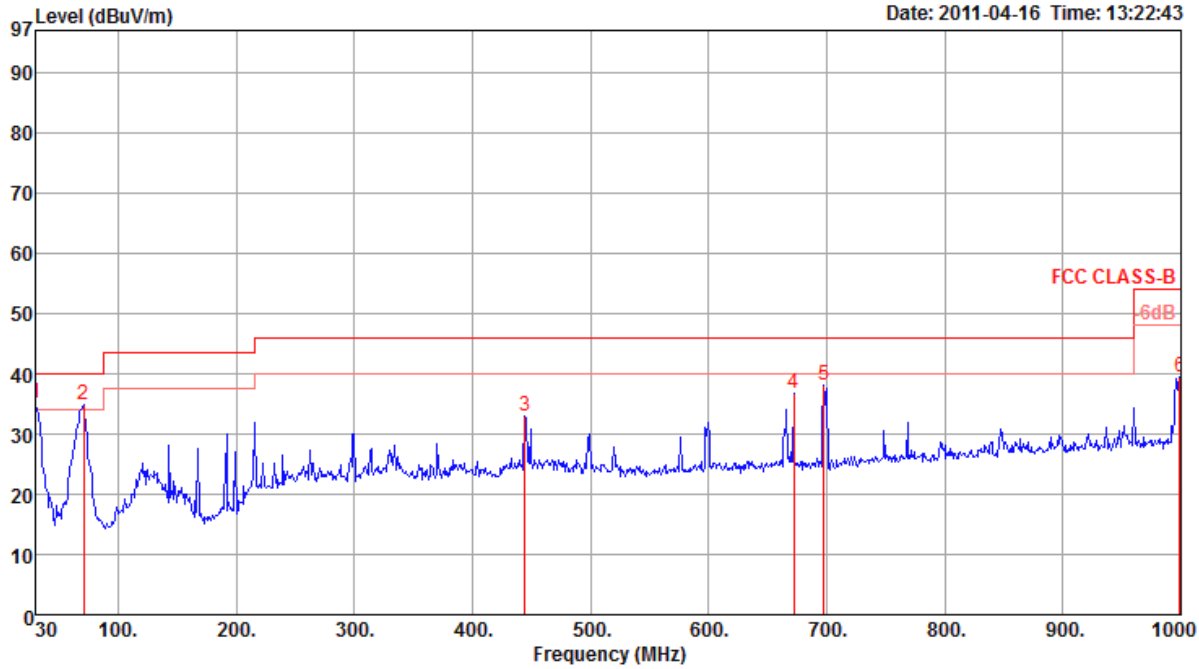
Temperature	26°C	Humidity	60%
Test Engineer	Jacky Ho	Configurations	Normal Link / Mode 2

Horizontal



	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m	deg	cm		
1	143.49	36.47	43.50	-7.03	51.38	1.42	27.38	11.05	0	100	Peak	HORIZONTAL
2	191.99	37.43	43.50	-6.07	53.57	1.66	27.14	9.34	0	100	Peak	HORIZONTAL
3	216.24	38.94	46.00	-7.06	53.77	1.77	27.07	10.47	0	100	Peak	HORIZONTAL
4	672.14	38.80	46.00	-7.20	44.41	3.41	28.03	19.01	0	100	Peak	HORIZONTAL
5 p	700.27	40.67	46.00	-5.33	46.27	3.30	27.99	19.09	0	100	Peak	HORIZONTAL
6	945.68	37.95	46.00	-8.05	40.18	3.60	27.22	21.39	0	100	Peak	HORIZONTAL

Vertical



	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Preamp Factor	Antenna Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB	dB/m	deg	cm		
1 p	30.00	35.23	40.00	-4.77	44.12	0.50	27.80	18.41	0	400	Peak	VERTICAL
2 !	70.74	34.93	40.00	-5.07	55.48	0.82	27.72	6.35	0	400	Peak	VERTICAL
3	444.19	32.92	46.00	-13.08	41.35	2.57	27.82	16.82	0	400	Peak	VERTICAL
4	672.14	36.64	46.00	-9.36	42.25	3.41	28.03	19.01	0	400	Peak	VERTICAL
5	697.36	37.99	46.00	-8.01	43.60	3.31	28.00	19.08	0	400	Peak	VERTICAL
6	999.03	39.48	54.00	-14.52	41.15	3.70	27.01	21.64	0	400	Peak	VERTICAL

Note:

The amplitude of spurious emissions which are attenuated by more than 20 dB 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.

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

Temperature	26°C	Humidity	60%
Test Engineer	Jacky Ho	Configurations	802.11n MCS0 20MHz Ch 1 / Mode 2
Test Date	Apr. 16, 2011		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	4824.32	30.40	54.00	-23.60	29.06	3.31	33.06	35.03	342	173	Average	HORIZONTAL
2	4826.06	42.79	74.00	-31.21	41.45	3.31	33.06	35.03	342	173	Peak	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	4823.68	44.21	74.00	-29.79	42.87	3.31	33.06	35.03	273	164	Peak	VERTICAL
2	4826.32	30.56	54.00	-23.44	29.22	3.31	33.06	35.03	273	164	Average	VERTICAL

Temperature	26°C	Humidity	60%
Test Engineer	Jacky Ho	Configurations	802.11n MCS0 20MHz Ch 6 / Mode 2
Test Date	Apr. 16, 2011		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	7312.70	46.71	74.00	-27.29	42.09	4.06	35.96	35.40	38	168	Peak	HORIZONTAL
2	7314.50	32.79	54.00	-21.21	28.17	4.06	35.96	35.40	38	168	Average	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	7310.72	37.02	54.00	-16.98	32.40	4.06	35.96	35.40	270	140	Average	VERTICAL
2	7311.18	50.92	74.00	-23.08	46.30	4.06	35.96	35.40	270	140	Peak	VERTICAL

Temperature	26°C	Humidity	60%
Test Engineer	Jacky Ho	Configurations	802.11n MCS0 20MHz Ch11 / Mode 2
Test Date	Apr. 16, 2011		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	7381.98	32.47	54.00	-21.53	27.72	4.06	36.09	35.40	49	163	Average	HORIZONTAL
2	7384.12	45.94	74.00	-28.06	41.19	4.06	36.09	35.40	49	163	Peak	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	7382.82	51.22	74.00	-22.78	46.47	4.06	36.09	35.40	271	138	Peak	VERTICAL
2	7385.94	36.20	54.00	-17.80	31.45	4.06	36.09	35.40	271	138	Average	VERTICAL

Temperature	26°C	Humidity	60%
Test Engineer	Jacky Ho	Configurations	802.11n MCS0 40MHz Ch 3 / Mode 2
Test Date	Apr. 16, 2011		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	4839.58	30.26	54.00	-23.74	28.88	3.32	33.09	35.03	51	169	Average	HORIZONTAL
2	4842.30	42.91	74.00	-31.09	41.53	3.32	33.09	35.03	51	169	Peak	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	4840.54	44.07	74.00	-29.93	42.69	3.32	33.09	35.03	274	136	Peak	VERTICAL
2	4844.24	30.06	54.00	-23.94	28.68	3.32	33.09	35.03	274	136	Average	VERTICAL

Temperature	26°C	Humidity	60%
Test Engineer	Jacky Ho	Configurations	802.11n MCS0 40MHz Ch 6 / Mode 2
Test Date	Apr. 16, 2011		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	7310.00	32.16	54.00	-21.84	27.54	4.06	35.96	35.40	49	163	Average	HORIZONTAL
2	7310.08	44.48	74.00	-29.52	39.86	4.06	35.96	35.40	49	163	Peak	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	7311.46	49.56	74.00	-24.44	44.94	4.06	35.96	35.40	51	169	Peak	VERTICAL
2	7312.30	36.53	54.00	-17.47	31.91	4.06	35.96	35.40	51	169	Average	VERTICAL

Temperature	26℃	Humidity	60%
Test Engineer	Jacky Ho	Configurations	802.11n MCS0 40MHz Ch 9 / Mode 2
Test Date	Apr. 16, 2011		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	7351.42	44.20	74.00	-29.80	39.52	4.06	36.02	35.40	42	161	Peak	HORIZONTAL
2	7352.20	32.55	54.00	-21.45	27.87	4.06	36.02	35.40	42	161	Average	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	7351.82	45.99	74.00	-28.01	41.31	4.06	36.02	35.40	265	141	Peak	VERTICAL
2	7353.28	32.47	54.00	-21.53	27.79	4.06	36.02	35.40	265	141	Average	VERTICAL

Note:

The amplitude of spurious emissions which are attenuated by more than 20 dB 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.

Temperature	26℃	Humidity	60%
Test Engineer	Jacky Ho	Configurations	802.11b CH 1 / Mode 2
Test Date	Apr. 16, 2011		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	4823.82	45.20	74.00	-28.80	43.86	3.31	33.06	35.03	335	195	Peak	HORIZONTAL
2	4823.95	35.68	54.00	-18.32	34.34	3.31	33.06	35.03	335	195	Average	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	4823.96	47.57	74.00	-26.43	46.23	3.31	33.06	35.03	268	170	Peak	VERTICAL
2	4823.97	41.31	54.00	-12.69	39.97	3.31	33.06	35.03	268	170	Average	VERTICAL

Temperature	26℃	Humidity	60%
Test Engineer	Jacky Ho	Configurations	802.11b CH 6 / Mode 2
Test Date	Apr. 16, 2011		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	7310.38	47.61	74.00	-26.39	42.99	4.06	35.96	35.40	44	169	Peak	HORIZONTAL
2	7311.78	38.31	54.00	-15.69	33.69	4.06	35.96	35.40	44	169	Average	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	7309.38	51.57	74.00	-22.43	46.95	4.06	35.96	35.40	267	139	Peak	VERTICAL
2	7310.22	45.93	54.00	-8.07	41.31	4.06	35.96	35.40	267	139	Average	VERTICAL

Temperature	26℃	Humidity	60%
Test Engineer	Jacky Ho	Configurations	802.11b CH 11/ Mode 2
Test Date	Apr. 16, 2011		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	7385.04	48.45	74.00	-25.55	43.70	4.06	36.09	35.40	30	172	Peak	HORIZONTAL
2	7385.16	39.67	54.00	-14.33	34.92	4.06	36.09	35.40	30	172	Average	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	7384.96	52.28	74.00	-21.72	47.53	4.06	36.09	35.40	269	146	Peak	VERTICAL
2	7385.20	45.97	54.00	-8.03	41.22	4.06	36.09	35.40	269	146	Average	VERTICAL

Temperature	26℃	Humidity	60%
Test Engineer	Jacky Ho	Configurations	802.11g CH 1 / Mode 2
Test Date	Apr. 16, 2011		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	4823.88	30.33	54.00	-23.67	28.99	3.31	33.06	35.03	335	190	Average	HORIZONTAL
2	4824.32	43.23	74.00	-30.77	41.89	3.31	33.06	35.03	335	190	Peak	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	4823.85	43.68	74.00	-30.32	42.34	3.31	33.06	35.03	265	171	Peak	VERTICAL
2	4823.95	30.88	54.00	-23.12	29.54	3.31	33.06	35.03	265	171	Average	VERTICAL

Temperature	26℃	Humidity	60%
Test Engineer	Jacky Ho	Configurations	802.11g CH 6 / Mode 2
Test Date	Apr. 16, 2011		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	7312.40	48.22	74.00	-25.78	43.60	4.06	35.96	35.40	39	169	Peak	HORIZONTAL
2	7312.84	34.46	54.00	-19.54	29.84	4.06	35.96	35.40	39	169	Average	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	7310.28	50.26	74.00	-23.74	45.64	4.06	35.96	35.40	272	138	Peak	VERTICAL
2	7310.52	36.70	54.00	-17.30	32.08	4.06	35.96	35.40	272	138	Average	VERTICAL

Temperature	26℃	Humidity	60%
Test Engineer	Jacky Ho	Configurations	802.11g CH 11 / Mode 2
Test Date	Apr. 16, 2011		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	7389.16	45.57	74.00	-28.43	40.82	4.06	36.09	35.40	45	163	Peak	HORIZONTAL
2	7389.64	32.67	54.00	-21.33	27.92	4.06	36.09	35.40	45	163	Average	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	7388.16	36.05	54.00	-17.95	31.30	4.06	36.09	35.40	263	138	Average	VERTICAL
2	7389.04	50.61	74.00	-23.39	45.86	4.06	36.09	35.40	263	138	Peak	VERTICAL

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.

4.3. Band Edge Emissions Measurement

4.3.1. 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

4.3.2. 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

4.3.3. Test Procedures

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

4.3.4. Test Setup Layout

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

4.3.5. Test Deviation

There is no deviation with the original standard.

4.3.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.3.7. Test Result of Band Edge and Fundamental Emissions

Temperature	26°C	Humidity	60%
Test Engineer	Jacky Ho	Configurations	802.11n MCS0 20MHz Ch 1, 6, 11 / Mode 2
Test Date	Apr. 16, 2011		

Channel 1

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	2389.20	69.65	74.00	-4.35	39.27	2.21	28.17	0.00	325	100	Peak	VERTICAL
2	2390.00	53.28	54.00	-0.72	22.89	2.22	28.17	0.00	325	100	Average	VERTICAL
3	2410.40	97.02	54.00			2.22	28.21	0.00	325	100	Average	VERTICAL
4	2411.00	107.47	74.00			2.22	28.21	0.00	325	100	Peak	VERTICAL

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

Channel 6

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	2389.00	55.99	74.00	-18.01	25.61	2.21	28.17	0.00	326	100	Peak	VERTICAL
2	2389.20	45.14	54.00	-8.86	14.76	2.21	28.17	0.00	326	100	Average	VERTICAL
3	2432.80	108.32	74.00			2.23	28.25	0.00	326	100	Peak	VERTICAL
4	2435.60	97.99	54.00			2.23	28.29	0.00	326	100	Average	VERTICAL
5	2483.50	44.22	54.00	-9.78	13.59	2.26	28.37	0.00	326	100	Average	VERTICAL
6	2483.50	56.53	74.00	-17.47	25.90	2.26	28.37	0.00	326	100	Peak	VERTICAL

Item 3, 4 are the fundamental frequency at 2437MHz.

Channel 11

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	2461.00	109.10	74.00			2.24	28.33	0.00	150	100	Peak	VERTICAL
2	2463.40	98.85	54.00			2.24	28.33	0.00	150	100	Average	VERTICAL
3	2483.50	53.77	54.00	-0.23	23.14	2.26	28.37	0.00	150	100	Average	VERTICAL
4	2485.30	71.95	74.00	-2.05	41.28	2.26	28.41	0.00	150	100	Peak	VERTICAL

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

Temperature	26℃	Humidity	60%
Test Engineer	Jacky Ho	Configurations	802.11n MCS0 40MHz Ch 3, 6, 9 / Mode 2
Test Date	Apr. 16, 2011		

Channel 3

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	2390.00	49.61	54.00	-4.39	19.22	2.22	28.17	0.00	327	100	Average	VERTICAL
2	2390.00	68.52	74.00	-5.48	38.13	2.22	28.17	0.00	327	100	Peak	VERTICAL
3	2436.80	89.31	54.00			2.23	28.29	0.00	327	100	Average	VERTICAL
4	2437.60	99.53	74.00			2.23	28.29	0.00	327	100	Peak	VERTICAL

Item 3, 4 are the fundamental frequency at 2422 MHz.

Channel 6

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	2388.80	68.26	74.00	-5.74	37.88	2.21	28.17	0.00	176	100	Peak	VERTICAL
2	2390.00	53.99	54.00	-0.01	23.60	2.22	28.17	0.00	176	100	Average	VERTICAL
3	2435.40	94.31	54.00			2.23	28.29	0.00	176	100	Average	VERTICAL
4	2439.40	105.04	74.00			2.23	28.29	0.00	176	100	Peak	VERTICAL
5	2483.50	50.43	54.00	-3.57	19.80	2.26	28.37	0.00	176	100	Average	VERTICAL
6	2483.50	64.39	74.00	-9.61	33.76	2.26	28.37	0.00	176	100	Peak	VERTICAL

Item 3, 4 are the fundamental frequency at 2437MHz.

Channel 9

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	2460.00	102.35	74.00			2.24	28.33	0.00	148	100	Peak	VERTICAL
2	2463.20	91.79	54.00			2.24	28.33	0.00	148	100	Average	VERTICAL
3	2483.50	48.99	54.00	-5.01	18.36	2.26	28.37	0.00	148	100	Average	VERTICAL
4	2483.50	66.28	74.00	-7.72	35.65	2.26	28.37	0.00	148	100	Peak	VERTICAL

Item 1, 2 are the fundamental frequency at 2452 MHz.

Note:

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

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

Temperature	26℃	Humidity	60%
Test Engineer	Jacky Ho	Configurations	802.11b CH 1, 6, 11 / Mode 2
Test Date	Apr. 16, 2011		

Channel 1

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	2386.00	60.32	74.00	-13.68	29.94	2.21	28.17	0.00	327	100	Peak	VERTICAL
2	2386.20	52.56	54.00	-1.44	22.18	2.21	28.17	0.00	327	100	Average	VERTICAL
3	2411.00	108.38	74.00			2.22	28.21	0.00	327	100	Peak	VERTICAL
4	2411.20	104.67	54.00			2.22	28.21	0.00	327	100	Average	VERTICAL

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

Channel 6

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	2389.60	56.68	74.00	-17.32	26.30	2.21	28.17	0.00	209	99	Peak	VERTICAL
2	2390.00	45.35	54.00	-8.65	14.96	2.22	28.17	0.00	209	99	Average	VERTICAL
3	2438.00	113.58	74.00			2.23	28.29	0.00	209	99	Peak	VERTICAL
4	2438.80	109.77	54.00			2.23	28.29	0.00	209	99	Average	VERTICAL
5	2483.50	43.69	54.00	-10.31	13.06	2.26	28.37	0.00	209	99	Average	VERTICAL
6	2483.50	53.61	74.00	-20.39	22.98	2.26	28.37	0.00	209	99	Peak	VERTICAL

Item 3, 4 are the fundamental frequency at 2437MHz.

Channel 11

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	24[illegible]0	111.26	74.00			2.24	28.33	0.00	150	100	Peak	VERTICAL
2	2463.60	106.62	54.00			2.24	28.33	0.00	150	100	Average	VERTICAL
3	2487.70	53.23	54.00	-0.77	22.56	2.26	28.41	0.00	150	100	Average	VERTICAL
4	2488.10	63.05	74.00	-10.95	32.38	2.26	28.41	0.00	150	100	Peak	VERTICAL

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

Temperature	26℃	Humidity	60%
Test Engineer	Jacky Ho	Configurations	802.11g CH 1, 6, 11 / Mode 2
Test Date	Apr. 16, 2011		

Channel 1

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	2388.20	68.76	74.00	-5.24	38.38	2.21	28.17	0.00	326	100	Peak	VERTICAL
2	2390.00	53.77	54.00	-0.23	23.38	2.22	28.17	0.00	326	100	Average	VERTICAL
3	2407.60	107.49	74.00			2.22	28.21	0.00	326	100	Peak	VERTICAL
4	2411.00	97.44	54.00			2.22	28.21	0.00	326	100	Average	VERTICAL

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

Channel 6

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	2389.80	57.12	74.00	-16.88	26.73	2.22	28.17	0.00	326	100	Peak	VERTICAL
2	2390.00	45.68	54.00	-8.32	15.29	2.22	28.17	0.00	326	100	Average	VERTICAL
3	2435.80	98.66	54.00			2.23	28.29	0.00	326	100	Average	VERTICAL
4	2442.20	109.51	74.00			2.24	28.29	0.00	326	100	Peak	VERTICAL
5	2483.50	44.06	54.00	-9.94	13.43	2.26	28.37	0.00	326	100	Average	VERTICAL
6	2484.10	54.73	74.00	-19.27	24.10	2.26	28.37	0.00	326	100	Peak	VERTICAL

Item 3, 4 are the fundamental frequency at 2437 MHz.

Channel 11

	Freq	Level	Limit Line	Over Limit	Read Level	Cable Loss	Antenna Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	2457.20	111.11	74.00			2.24	28.33	0.00	149	100	Peak	VERTICAL
2	2463.20	100.34	54.00			2.24	28.33	0.00	149	100	Average	VERTICAL
3	2483.50	53.28	54.00	-0.72	22.65	2.26	28.37	0.00	149	100	Average	VERTICAL
4	2483.70	71.93	74.00	-2.07	41.30	2.26	28.37	0.00	149	100	Peak	VERTICAL

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

Note:

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

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

4.4. Antenna Requirements

4.4.1. 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.

4.4.2. 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
BILOG ANTENNA	Schaffner	CBL6112D	22021	20MHz ~ 2GHz	Oct. 17, 2010	Radiation (03CH01-CB)
Horn Antenna	EMCO	3115	00075790	750MHz~18GHz	Nov. 22, 2010	Radiation (03CH01-CB)
Horn Antenna	SCHWARZBEAK	BBHA 9170	BBHA9170252	15GHz ~ 40GHz	Oct. 08, 2010	Radiation (03CH01-CB)
Pre-Amplifier	Agilent	8447D	2944A10991	0.1MHz ~ 1.3GHz	Nov. 17, 2010	Radiation (03CH01-CB)
Pre-Amplifier	Agilent	8449B	3008A02310	1GHz ~ 26.5GHz	Nov. 23, 2010	Radiation (03CH01-CB)
Pre-Amplifier	WM	TF-130N-R1	923365	26.5GHz ~ 40GHz	Nov. 17, 2010	Radiation (03CH01-CB)
Spectrum analyzer	R&S	FSP	100304	9kHz ~ 40GHz	Nov. 22, 2010	Radiation (03CH01-CB)
EMI Test Receiver	R&S	ESCS 30	100355	9KHz ~ 2.75GHz	Mar. 22, 2011	Radiation (03CH01-CB)
Loop Antenna	Teseq	HLA 6120	24155	9 kHz - 30 MHz	Sep. 09, 2010*	Radiation (03CH01-CB)
Turn Table	INN CO	CO 2000	N/A	0 ~ 360 degree	N/A	Radiation (03CH01-CB)
Antenna Mast	INN CO	CO2000	N/A	1 m - 4 m	N/A	Radiation (03CH01-CB)
RF Cable-low	Woken	Low Cable-1	N/A	30 MHz - 1 GHz	Nov. 17, 2010	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-1	N/A	1 GHz – 26.5 GHz	Nov. 17, 2010	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-2	N/A	1 GHz – 26.5 GHz	Nov. 17, 2010	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-3	N/A	1 GHz - 40 GHz	Nov. 17, 2010	Radiation (03CH01-CB)
RF Cable-high	Woken	High Cable-4	N/A	1 GHz - 40 GHz	Nov. 17, 2010	Radiation (03CH01-CB)
Spectrum analyzer	R&S	FSP30	100023	9KHz~30GHz	Mar. 15, 2011	Conducted (TH01-CB)
Spectrum analyzer	R&S	FSV30	101026	9KHz~30GHz	Jul. 23, 2010	Conducted (TH01-CB)
Temp. and Humidity Chamber	Ten Billion	TTH-D3SP	TBN-931011	-30~100 degree	May 21, 2010	Conducted (TH01-CB)
Thermo-Hygro Meter	N/A	HC 520	#1	15~70 degree	Nov. 02, 2010	Conducted (TH01-CB)
Signal Generator	R&S	SMR40	100302	10MHz-40GHz	Nov. 19, 2010	Conducted (TH01-CB)
RF Power Divider	HP	11636A	00306	2GHz ~ 18GHz	N/A	Conducted (TH01-CB)
RF Power Splitter	Anaren	44100	1839	2GHz ~ 18GHz	N/A	Conducted (TH01-CB)
RF Power Splitter	Anaren	42100	17930	2GHz ~ 18GHz	N/A	Conducted (TH01-CB)
Signal generator	R&S	SMU200A	102782	10MHz-40GHz	Mar. 09, 2011	Conducted (TH01-CB)
Horn Antenna	COM-POWER	AH-118	071187	1GHz – 18GHz	Mar. 18, 2011	Conducted (TH01-CB)
Power Sensor	Anritsu	MA2411B	0917223	300MHz~40GHz	Sep. 13, 2010	Conducted (TH01-CB)

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Power Meter	Anritsu	ML2495A	1035008	300MHz~40GHz	Sep. 08, 2010	Conducted (TH01-CB)

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

Note: "*" Calibration Interval of instruments listed above is two years.

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. : L1190-091230

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

Certificate of Accreditation

This is to certify that

Sporton International Inc.
EMC & Wireless Communications Laboratory
No.52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.

is accredited in respect of laboratory

Accreditation Criteria	:	ISO/IEC 17025:2005
Accreditation Number	:	1190
Originally Accredited	:	December 15, 2003
Effective Period	:	January 10, 2010 to January 09, 2013
Accredited Scope	:	Testing Field, see described in the Appendix
Specific Accreditation Program	:	Accreditation Program for Designated Testing Laboratory for Commodities Inspection Accreditation Program for Telecommunication Equipment Testing Laboratory Accreditation Program for BSMI Mutual Recognition Arrangment with Foreign Authorities

Jay-San Chen
President, Taiwan Accreditation Foundation
Date : December 30, 2009

P1, total 22 pages

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