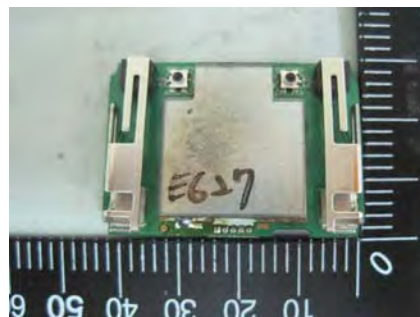


FCC RADIO TEST REPORT

Applicant's company	LG Electronics Inc.
Applicant Address	19-1, Cheongho-ri, Jinwi-myeon, Pyeongtaek-si, Gyeonggi-do, 451-713, Korea
FCC ID	BEJ9QK-WN8522D2

Product Name	WLAN Adapter Card
Brand Name	LG
Model Name	WN8522D2
Test Rule	47 CFR FCC Part 15 Subpart C § 15.247
Test Freq. Range	2400 ~ 2483.5MHz / 5725 ~ 5850MHz
Received Date	Apr. 08, 2011
Final Test Date	Apr. 15, 2011
Submission Type	Class II Change
Class II Change	Please refer to section 3.7



Statement

Test result included is only for the IEEE 802.11n, IEEE 802.11b/g part and IEEE 802.11a (5725 ~ 5850MHz) 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 C63.10-2009** and **47 CFR FCC Part 15 Subpart C**.

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

Table of Contents

1. CERTIFICATE OF COMPLIANCE	1
2. SUMMARY OF THE TEST RESULT	2
3. GENERAL INFORMATION	3
3.1. Product Details.....	3
3.2. Accessories.....	5
3.3. Table for Filed Antenna.....	5
3.4. Table for Carrier Frequencies	5
3.5. Table for Test Modes	6
3.6. Table for Testing Locations.....	6
3.7. Table for Class II Change	7
3.8. Table for Supporting Units	7
3.9. Test Configurations	8
4. TEST RESULT	9
4.1. Radiated Emissions Measurement	9
4.2. Antenna Requirements	32
5. LIST OF MEASURING EQUIPMENTS	33
6. TEST LOCATION.....	34
7. TAF CERTIFICATE OF ACCREDITATION	35
APPENDIX A. PHOTOGRAPHS OF EUT.....	A1 ~ A3
APPENDIX B. TEST PHOTOS.....	B1 ~ B4

History of This Test Report

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR141543-01AA	Rev. 01	Initial issue of report	Jul. 06, 2011

1. CERTIFICATE OF COMPLIANCE

Product Name : WLAN Adapter Card
Brand Name : LG
Model Name : WN8522D2
Applicant : LG Electronics Inc.
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 Apr. 08, 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

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
4.1	15.247(d)	Radiated Emissions	Complies	0.08 dB
4.2	15.203	Antenna Requirements	Complies	-

Note: The test configurations in this report are designated by the applicant.

Radiated Emissions testing is based on original conducted output power.

The original application and RF output power are reported under AUDIX Technology Corporation, project number is EM-F991077.

Test Items	Uncertainty	Remark
AC Power Line Conducted Emissions	$\pm 2.3\text{dB}$	Confidence levels of 95%
Maximum 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%

3. GENERAL INFORMATION

3.1. Product Details

IEEE 802.11n

Items	Description
Product Type	WLAN (2TX, 2RX)
Radio Type	Intentional Transceiver
Power Type	From Host System
Modulation	see the below table for IEEE 802.11n
Data Modulation	OFDM (BPSK / QPSK / 16QAM / 64QAM)
Data Rate (Mbps)	see the below table for IEEE 802.11n
Frequency Range	2400 ~ 2483.5MHz / 5725 ~ 5850MHz
Carrier Frequencies	Please refer to section 3.4
Antenna	Please refer to section 3.3

802.11a/b/g

Items	Description
Product Type	IEEE 802.11a/g: WLAN (1TX, 1RX) IEEE 802.11b: WLAN (1TX, 1RX)
Radio Type	Intentional Transceiver
Power Type	From Host System
Modulation	DSSS for IEEE 802.11b ; OFDM for IEEE 802.11a/g
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 / 5725 ~ 5850MHz
Channel Number	11b/g: 11 ; 11a: 5
Carrier Frequencies	Please refer to section 3.4
Antenna	Please refer to section 3.3

Antenna & Band width

Antenna	Single (TX)		Two (TX)	
Band width Mode	20 MHz	40 MHz	20 MHz	40 MHz
IEEE 802.11a	V	X	X	X
IEEE 802.11b	V	X	X	X
IEEE 802.11g	V	X	X	X
IEEE 802.11n	X	X	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	Part Number	Antenna Type	Connector	Antenna Gain (dBi)
1	Arcadyan	120800003400J	MIFA. (Cut-pin)	N/A	1.89
2	Arcadyan	120800003600J	MIFA. (Cut-pin)	N/A	1.89

Note: For IEEE 802.11n mode (2TX/2RX):

Ant. 1 & Ant. 2 could both transmitting/receiving simultaneously.

For IEEE 802.11b mode (1TX/1RX):

Ant. 1 can be used as transmitting/receiving antenna.

For IEEE 802.11a/g mode (1TX/1RX):

Ant. 1 and Ant. 2 can be used as transmitting/receiving antenna.

The EUT supports the antenna with TX/RX diversity function.

Due to the "Ant. 1" generated higher output power than "Ant. 2", all the tests were base on this setting and recorded in this report.

3.4. Table for Carrier Frequencies

For 2.4GHz Band

Frequency Allocation for IEEE 802.11b/g

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

There are two bandwidth systems for IEEE 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	-	-

For 5GHz Band

Frequency Allocation for IEEE 802.11a

For IEEE 802.11a, use Channel 149, 153, 157, 161, 165.

There are two bandwidth systems for IEEE 802.11n.

For 20MHz bandwidth systems, use Channel 149, 153, 157, 161, 165.

For 40MHz bandwidth systems, use Channel 151, 159.

Frequency Band	Channel No.	Frequency	Channel No.	Frequency
5725~5850 MHz Band 4	149	5745 MHz	159	5795 MHz
	151	5755 MHz	161	5805 MHz
	153	5765 MHz	165	5825 MHz
	157	5785 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.

For 2.4GHz Band

Test Items	Mode	Data Rate	Channel	Antenna
Radiated Emissions Above 1GHz	MCS0/20MHz	6.5 Mbps	1/6/11	1+2
	MCS0/40MHz	13.5 Mbps	3/6/9	1+2
	11b/CCK	1 Mbps	1/6/11	1
	11g/BPSK	6 Mbps	1/6/11	1

For 5GHz Band

Test Items	Mode	Data Rate	Channel	Antenna
Radiated Emissions Above 1GHz	MCS0/20MHz	6.5 Mbps	149/157/165	1+2
	MCS0/40MHz	13.5 Mbps	151/159	1+2
	11a/BPSK	6 Mbps	149/157/165	1

3.6. Table for Testing Locations

Test Site No.	Site Category	Location	FCC Reg. No.	IC File No.	VCCI Reg. No
03CH01-CB	SAC	Hsin Chu	187376	IC 4086D	-

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 AUDIX Technology Corporation. Project number: EM-F991077.

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

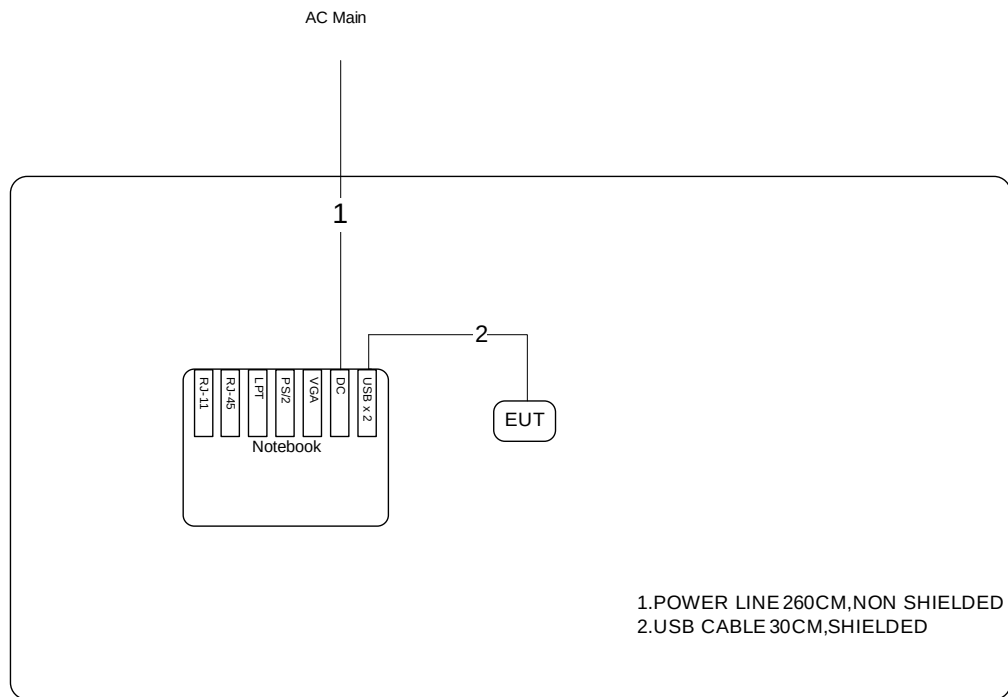
Modifications	Description	Performance Checking
Change switch	Change U3 and U4 from TDK switch to SiGe switch	Radiated Emissions

3.8. Table for Supporting Units

Support Unit	Brand	Model	FCC ID
Notebook	DELL	M1330	E2KWM3945ABG

3.9. Test Configurations

3.9.1. Radiation 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)	1MHz / 1MHz for peak

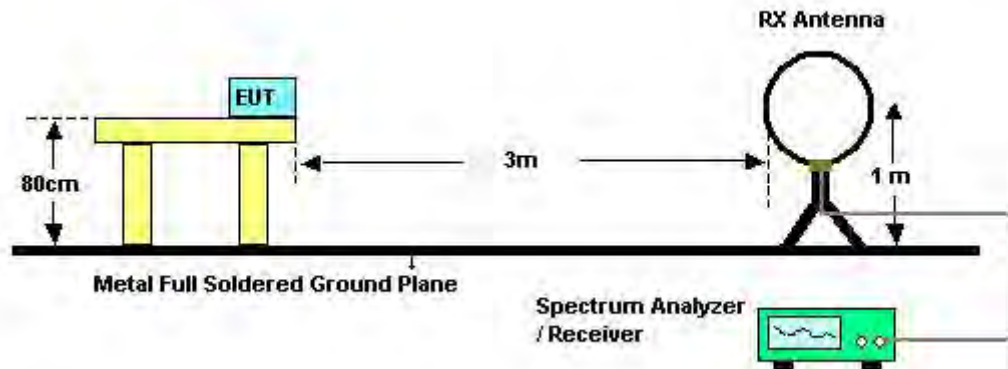
Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

4.1.3. Test Procedures

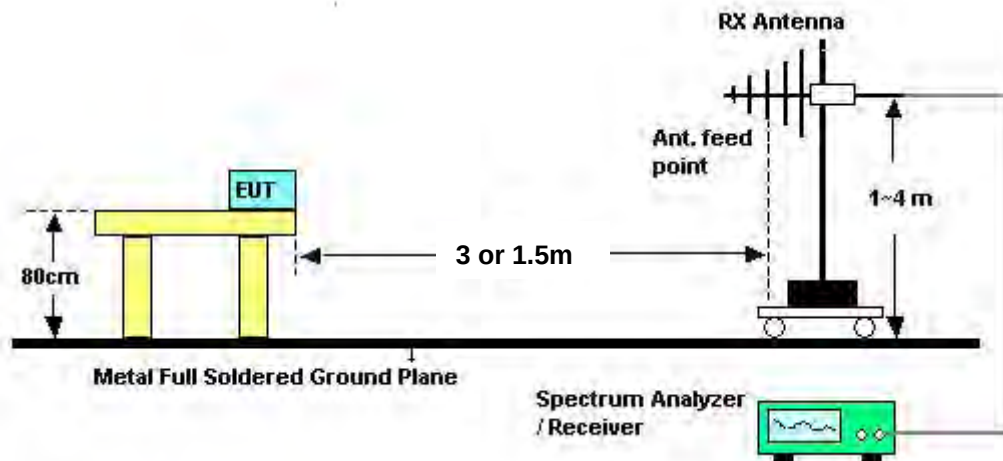
1. Configure the EUT according to ANSI C63.10. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting 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 1GHz



For radiated emissions above 1GHz



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

Distance extrapolation factor = $20 \log (\text{specific distance [3m]} / \text{test distance [1.5m]})$ (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 for Radiated Emissions (1GHz~10th Harmonic)

Temperature	20°C	Humidity	65%
Test Engineer	Serway Li	Configurations	IEEE 802.11n MCS0 20MHz Ch 1 / Ant. 1 + Ant. 2
Test Date	Apr. 13, 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	4823.86	30.61	54.00	-23.39	29.27	3.31	33.06	35.03	245	100	Average	HORIZONTAL
2	4824.49	43.55	74.00	-30.45	42.21	3.31	33.06	35.03	245	100	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	4823.66	43.42	74.00	-30.58	42.08	3.31	33.06	35.03	197	100	Peak	VERTICAL
2	4823.99	30.83	54.00	-23.17	29.49	3.31	33.06	35.03	197	100	Average	VERTICAL

Temperature	20°C	Humidity	65%
Test Engineer	Serway Li	Configurations	IEEE 802.11n MCS0 20MHz Ch 6 / Ant. 1 + Ant. 2
Test Date	Apr. 13, 2011		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm	
1	4873.50	43.37	74.00	-30.63	41.91	3.33	33.16	35.03	238	100 Peak	HORIZONTAL
2	4874.00	31.66	54.00	-22.34	30.20	3.33	33.16	35.03	238	100 Average	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm	
1	4873.90	43.67	74.00	-30.33	42.21	3.33	33.16	35.03	186	100 Peak	VERTICAL
2	4873.93	32.15	54.00	-21.85	30.69	3.33	33.16	35.03	186	100 Average	VERTICAL

Temperature	20°C	Humidity	65%
Test Engineer	Serway Li	Configurations	IEEE 802.11n MCS0 20MHz Ch11 / Ant. 1 + Ant. 2
Test Date	Apr. 13, 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	4923.98	32.59	54.00	-21.41	30.99	3.35	33.26	35.01	216	100	Average	HORIZONTAL
2	4924.09	43.55	74.00	-30.45	41.95	3.35	33.26	35.01	216	100	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	4923.94	33.13	54.00	-20.87	31.53	3.35	33.26	35.01	189	100	Average	VERTICAL
2	4924.29	44.26	74.00	-29.74	42.66	3.35	33.26	35.01	189	100	Peak	VERTICAL

Temperature	20°C	Humidity	65%
Test Engineer	Serway Li	Configurations	IEEE 802.11n MCS0 40MHz Ch 3 / Ant. 1 + Ant. 2
Test Date	Apr. 13, 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	4843.82	43.74	74.00	-30.26	42.36	3.32	33.09	35.03	249	100	Peak	HORIZONTAL
2	4844.05	31.14	54.00	-22.86	29.76	3.32	33.09	35.03	249	100	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	4843.94	43.07	74.00	-30.93	41.69	3.32	33.09	35.03	169	100	Peak	VERTICAL
2	4844.00	31.42	54.00	-22.58	30.04	3.32	33.09	35.03	169	100	Average	VERTICAL

Temperature	20°C	Humidity	65%
Test Engineer	Serway Li	Configurations	IEEE 802.11n MCS0 40MHz Ch 6 / Ant. 1 + Ant. 2
Test Date	Apr. 13, 2011		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm	
1	4873.89	30.86	54.00	-23.14	29.40	3.33	33.16	35.03	195	100 Average	HORIZONTAL
2	4873.92	43.46	74.00	-30.54	42.00	3.33	33.16	35.03	195	100 Peak	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm	
1	4874.03	31.56	54.00	-22.44	30.10	3.33	33.16	35.03	131	100 Average	VERTICAL
2	4874.49	44.24	74.00	-29.76	42.78	3.33	33.16	35.03	131	100 Peak	VERTICAL

Temperature	20°C	Humidity	65%
Test Engineer	Serway Li	Configurations	IEEE 802.11n MCS0 40MHz Ch 9 / Ant. 1 + Ant. 2
Test Date	Apr. 13, 2011		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	deg	cm		
1	4903.97	32.48	54.00	-21.52	30.97	3.34	33.19	35.02	206	100 Average	HORIZONTAL
2	4904.16	43.37	74.00	-30.63	41.86	3.34	33.19	35.02	206	100 Peak	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	deg	cm		
1	4903.94	33.81	54.00	-20.19	32.30	3.34	33.19	35.02	269	100 Average	VERTICAL
2	4903.99	44.63	74.00	-29.37	43.12	3.34	33.19	35.02	269	100 Peak	VERTICAL

Temperature	20°C	Humidity	65%
Test Engineer	Serway Li	Configurations	11a IEEE 802.11n MCS0 20MHz CH 149 / Ant. 1 + Ant. 2
Test Date	Apr. 15, 2011		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm	
1	11490.01	41.24	60.00	-18.76	32.63	5.11	38.78	35.28	21	120 Average	HORIZONTAL
2	11490.04	59.96	80.00	-20.04	51.35	5.11	38.78	35.28	21	120 Peak	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm	
1	11489.07	43.05	60.00	-16.95	34.44	5.11	38.78	35.28	338	130 Average	VERTICAL
2	11489.39	58.12	80.00	-21.88	49.51	5.11	38.78	35.28	338	130 Peak	VERTICAL

Temperature	20°C	Humidity	65%
Test Engineer	Serway Li	Configurations	11a IEEE 802.11n MCS0 20MHz CH 157 / Ant. 1 + Ant. 2
Test Date	Apr. 15, 2011		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	deg	cm		
1	11570.55	59.10	80.00	-20.90	50.43	5.14	38.83	35.30	51	122 Peak	HORIZONTAL
2	11570.61	40.25	60.00	-19.75	31.58	5.14	38.83	35.30	51	122 Average	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	deg	cm		
1	11571.54	43.01	60.00	-16.99	34.34	5.14	38.83	35.30	337	133 Average	VERTICAL
2	11571.59	58.35	80.00	-21.65	49.68	5.14	38.83	35.30	337	133 Peak	VERTICAL

Temperature	20°C	Humidity	65%
Test Engineer	Serway Li	Configurations	11a IEEE 802.11n MCS0 20MHz CH 165 / Ant. 1 + Ant. 2
Test Date	Apr. 15, 2011		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm	
1	11648.24	39.86	60.00	-20.14	31.14	5.16	38.86	35.30	49	120 Average	HORIZONTAL
2	11648.34	55.35	80.00	-24.65	46.63	5.16	38.86	35.30	49	120 Peak	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm	
1	11646.68	41.39	60.00	-18.61	32.67	5.16	38.86	35.30	338	132 Average	VERTICAL
2	11646.77	56.43	80.00	-23.57	47.71	5.16	38.86	35.30	338	132 Peak	VERTICAL

Temperature	20°C	Humidity	65%
Test Engineer	Serway Li	Configurations	11a IEEE 802.11n MCS0 40MHz CH 151 / Ant. 1 + Ant. 2
Test Date	Apr. 15, 2011		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm	
1	11509.82	38.24	60.00	-21.76	29.61	5.12	38.79	35.28	87	101 Average	HORIZONTAL
2	11510.48	50.09	80.00	-29.91	41.46	5.12	38.79	35.28	87	101 Peak	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm	
1	11509.73	39.28	60.00	-20.72	30.65	5.12	38.79	35.28	358	128 Average	VERTICAL
2	11510.04	53.70	80.00	-26.30	45.07	5.12	38.79	35.28	358	128 Peak	VERTICAL

Temperature	20°C	Humidity	65%
Test Engineer	Serway Li	Configurations	11a IEEE 802.11n MCS0 40MHz CH 159 / Ant. 1 + Ant. 2
Test Date	Apr. 15, 2011		

Horizontal

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm	
1	11597.28	51.93	80.00	-28.07	43.25	5.15	38.83	35.30	228	101 Peak	HORIZONTAL
2	11597.32	39.68	60.00	-20.32	31.00	5.15	38.83	35.30	228	101 Average	HORIZONTAL

Vertical

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna Loss Factor	Preamp Factor	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm	
1	11599.60	51.68	80.00	-28.32	43.00	5.15	38.83	35.30	192	101 Peak	VERTICAL
2	11599.88	39.82	60.00	-20.18	31.14	5.15	38.83	35.30	192	101 Average	VERTICAL

Temperature	20°C	Humidity	65%
Test Engineer	Serway Li	Configurations	IEEE 802.11b CH 1 / Ant. 1
Test Date	Apr. 13, 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	4823.93	50.45	74.00	-23.55	49.11	3.31	33.06	35.03	305	102	Peak	HORIZONTAL
2	4823.98	46.87	54.00	-7.13	45.53	3.31	33.06	35.03	305	102	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	4823.94	54.97	74.00	-19.03	53.63	3.31	33.06	35.03	92	115	Peak	VERTICAL
2	4823.97	53.02	54.00	-0.98	51.68	3.31	33.06	35.03	92	115	Average	VERTICAL

Temperature	20°C	Humidity	65%
Test Engineer	Serway Li	Configurations	IEEE 802.11b CH 6 / Ant. 1
Test Date	Apr. 13, 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	4873.96	46.80	54.00	-7.20	45.34	3.33	33.16	35.03	280	113	Average	HORIZONTAL
2	4874.08	51.18	74.00	-22.82	49.72	3.33	33.16	35.03	280	113	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	4873.94	56.58	74.00	-17.42	55.12	3.33	33.16	35.03	92	113	Peak	VERTICAL
2	4873.97	53.92	54.00	-0.08	52.46	3.33	33.16	35.03	92	113	Average	VERTICAL

Temperature	20°C	Humidity	65%
Test Engineer	Serway Li	Configurations	IEEE 802.11b CH 11 / Ant. 1
Test Date	Apr. 13, 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	4923.86	51.52	74.00	-22.48	49.92	3.35	33.26	35.01	79	100	Peak	HORIZONTAL
2	4923.97	48.40	54.00	-5.60	46.80	3.35	33.26	35.01	79	100	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	4924.01	52.90	54.00	-1.10	51.30	3.35	33.26	35.01	94	100	Average	VERTICAL
2	4924.02	55.37	74.00	-18.63	53.77	3.35	33.26	35.01	94	100	Peak	VERTICAL

Temperature	20°C	Humidity	65%
Test Engineer	Serway Li	Configurations	IEEE 802.11g CH 1 / Ant. 1
Test Date	Apr. 13, 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	4824.04	42.84	74.00	-31.16	41.50	3.31	33.06	35.03	177	100	Peak	HORIZONTAL
2	4824.04	30.69	54.00	-23.31	29.35	3.31	33.06	35.03	177	100	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	4824.01	48.12	74.00	-25.88	46.78	3.31	33.06	35.03	94	116	Peak	VERTICAL
2	4824.40	34.96	54.00	-19.04	33.62	3.31	33.06	35.03	94	116	Average	VERTICAL

Temperature	20°C	Humidity	65%
Test Engineer	Serway Li	Configurations	IEEE 802.11g CH 6 / Ant. 1
Test Date	Apr. 13, 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	4874.22	32.19	54.00	-21.81	30.73	3.33	33.16	35.03	148	100	Average	HORIZONTAL
2	4874.47	45.06	74.00	-28.94	43.60	3.33	33.16	35.03	148	100	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	4873.58	49.32	74.00	-24.68	47.86	3.33	33.16	35.03	127	156	Peak	VERTICAL
2	4873.90	35.75	54.00	-18.25	34.29	3.33	33.16	35.03	127	156	Average	VERTICAL

Temperature	20°C	Humidity	65%
Test Engineer	Serway Li	Configurations	IEEE 802.11g CH 11 / Ant. 1
Test Date	Apr. 13, 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	4923.93	46.56	74.00	-27.44	44.96	3.35	33.26	35.01	153	100	Peak	HORIZONTAL
2	4924.29	32.92	54.00	-21.08	31.32	3.35	33.26	35.01	153	100	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	4923.81	36.88	54.00	-17.12	35.28	3.35	33.26	35.01	94	100	Average	VERTICAL
2	4924.46	49.80	74.00	-24.20	48.20	3.35	33.26	35.01	94	100	Peak	VERTICAL

Temperature	20°C	Humidity	65%
Test Engineer	Serway Li	Configurations	IEEE 802.11a CH 149 / Ant. 1
Test Date	Apr. 15, 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	11490.64	39.62	60.00	-20.38	31.01	5.11	38.78	35.28	325	114	Average	HORIZONTAL
2	11490.91	54.35	80.00	-25.65	45.74	5.11	38.78	35.28	325	114	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	11489.98	42.77	60.00	-17.23	34.16	5.11	38.78	35.28	73	115	Average	VERTICAL
2	11490.28	59.04	80.00	-20.96	50.43	5.11	38.78	35.28	73	115	Peak	VERTICAL

Temperature	20°C	Humidity	65%
Test Engineer	Serway Li	Configurations	IEEE 802.11a CH 157 / Ant. 1
Test Date	Apr. 15, 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	11569.11	40.28	60.00	-19.72	31.62	5.13	38.83	35.30	44	120	Average	HORIZONTAL
2	11569.47	57.56	80.00	-22.44	48.90	5.13	38.83	35.30	44	120	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	11569.44	58.05	80.00	-21.95	49.39	5.13	38.83	35.30	335	131	Peak	VERTICAL
2	11570.16	42.26	60.00	-17.74	33.59	5.14	38.83	35.30	335	131	Average	VERTICAL

Temperature	20°C	Humidity	65%
Test Engineer	Serway Li	Configurations	IEEE 802.11a CH 165 / Ant. 1
Test Date	Apr. 15, 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	11650.16	40.97	60.00	-19.03	32.25	5.16	38.86	35.30	43	124	Average	HORIZONTAL
2	11650.26	56.73	80.00	-23.27	48.01	5.16	38.86	35.30	43	124	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	11649.83	57.84	80.00	-22.16	49.12	5.16	38.86	35.30	65	118	Peak	VERTICAL
2	11650.17	42.35	60.00	-17.65	33.63	5.16	38.86	35.30	65	118	Average	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.

4.2. Antenna Requirements

4.2.1. 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.

4.2.2. 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)

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 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

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 Arrangement 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