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FCC RADIO TEST REPORT

Applicant's company	**Arcadyan Technology Corporation**
Applicant Address	4F, No.9, Park Avenue II, Science-based Industrial Park, Hsinchu 300, Taiwan, R.O.C
FCC ID	**RAXWN8522D7JU**

Product Name	802.11n Dual Band WLAN Adapter
Brand Name	SHARP
Model Name	WN8522D 7-JU
Test Rule Part(s)	47 CFR FCC Part 15 Subpart C § 15.247
Test Freq. Range	2400 ~ 2483.5MHz / 5725 ~ 5850MHz
Received Date	Dec. 08, 2010
Final Test Date	Apr. 25, 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 C63.4-2009** 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

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History of This Test Report

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR0D0846-03AB	Rev. 01	Initial issue of report	May 04, 2011

Certificate No.: CB10005022

1. CERTIFICATE OF COMPLIANCE

Product Name	:	**802.11n Dual Band WLAN Adapter**
Brand Name	:	**SHARP**
Model Name	:	**WN8522D 7-JU**
Applicant	:	**Arcadyan 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 Dec. 08, 2010 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 2011.5.5

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(b)(3)	Peak Conducted Output Power	Complies	0.67 dB
4.2	15.247(d)	Radiated Emissions	Complies	10.84 dB
4.3	15.247(d)	Band Edge Emissions	Complies	0.24 dB
4.4	15.203	Antenna Requirements	Complies	-

Note:

Radiated Emissions above 1GHz and Band Edge Emissions are based on original RF output power.

Test Items	Uncertainty	Remark
AC Power Line Conducted Emissions	±2.3dB	Confidence levels of 95%
Peak Conducted Output Power	±0.8dB	Confidence levels of 95%
Power Spectral Density	±0.5dB	Confidence levels of 95%
6dB Spectrum Bandwidth	$\pm 8.5\times10^{-8}$	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 802.11n

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
Channel Number	For 2.4GHz Band: 11 for 20MHz bandwidth ; 7 for 40MHz bandwidth For 5GHz Band: 5 for 20MHz bandwidth ; 2 for 40MHz bandwidth
Conducted Output Power	For 2.4GHz Band: MCS0 (20MHz): 29.33 dBm ; MCS0 (40MHz): 27.81 dBm For 5GHz Band: MCS0 (20MHz): 26.16 dBm ; MCS0 (40MHz): 25.87 dBm
Carrier Frequencies	Please refer to section 3.4
Antenna	Please refer to section 3.3

802.11a/b/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 802.11a/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
Conducted Output Power	11b: 24.52 dBm ; 11g: 25.26 dBm ; 11a: 24.08 dBm
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	Model Name	Antenna Type	Connector	Antenna Gain (dBi)		Remark
					2.4GHz Band	5GHz Band	
1	Arcadyan	-	Printed Antenna	RSW	-2.63	3.63	TX/RX
2	Arcadyan	-	Printed Antenna	RSW	-1.72	3.04	TX/RX

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

Ant. 1 & Ant. 2 could both transmit/receive simultaneously.

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

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

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

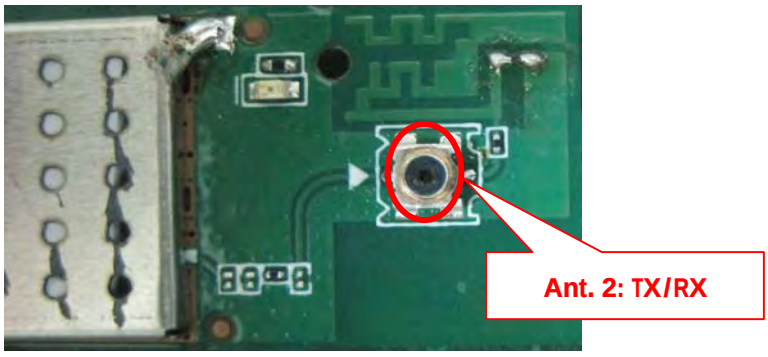
Due to Ant. 1 & Ant. 2 are identical and the Ant. 1 generated the worst test result, all the tests were base on this setting and recorded in this report.

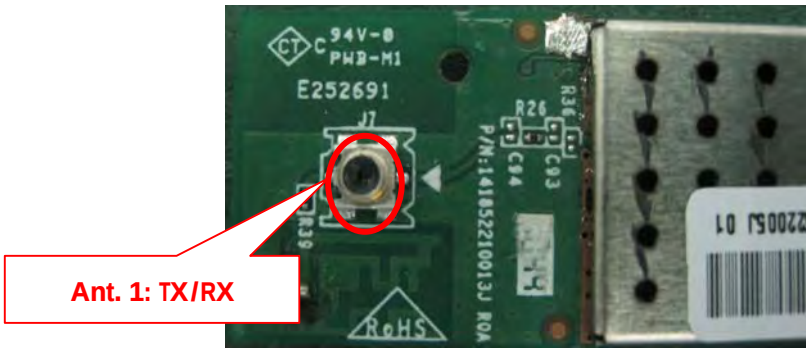
For IEEE 802.11b/g mode (1TX/1RX):

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

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

Due to Ant. 1 & Ant. 2 are identical and the Ant. 2 generated the worst test result, 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 (USA/Canada/Taiwan)	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
Peak Conducted Output Power	MCS0/20MHz	6.5 Mbps	1/6/11	1/2/1+2
	MCS0/40MHz	13.5 Mbps	3/6/9	1/2/1+2
	11b/CCK	1 Mbps	1/6/11	2
	11g/BPSK	6 Mbps	1/6/11	2
Radiated Emissions Below 1GHz	MCS0/CTX	6 Mbps	-	-
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	2
	11g/BPSK	6 Mbps	1/6/11	2
Band Edge Emissions	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	2
	11g/BPSK	6 Mbps	1/6/11	2

For 5GHz Band

Test Items	Mode	Data Rate	Channel	Antenna
Peak Conducted Output Power	MCS0/20MHz	6.5 Mbps	149/157/165	1/2/1+2
	MCS0/40MHz	13.5 Mbps	151/159	1/2/1+2
	11a/BPSK	6 Mbps	149/157/165	1
Radiated Emissions Below 1GHz	MCS0/CTX	6 Mbps	-	-
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	-
CO01-CB	Conduction	Hsin Chu	187376	IC 4086D	-
TH01-CB	OVEN Room	Hsin Chu	-	-	-

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 International Inc, project number is FR0D0846-03.

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

Modifications	Description	Performance Checking
Change RF switch	Change RF Switch as SiGe switch	Radiated Emissions above 1GHz Band Edge Emissions

3.8. Table for Supporting Units

Support Unit	Brand	Model	FCC ID
Notebook	DELL	PP25L	E2K4965AGNM
Mouse	Logitech	M90	N/A
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.

For 2.4GHz Band

Power Parameters of IEEE 802.11n MCS0 20MHz, Ant. 1 / Ant. 2

Test Software Version	DOS		
Frequency	2412 MHz	2437 MHz	2462 MHz
MCS0 20MHz	58	77	77

Power Parameters of IEEE 802.11n MCS0 40MHz, Ant. 1 / Ant. 2

Test Software Version	DOS		
Frequency	2422 MHz	2437 MHz	2452 MHz
MCS0 40MHz	54	62	64

Power Parameters of IEEE 802.11b/g, Ant. 2

Test Software Version	DOS		
Frequency	2412 MHz	2437 MHz	2462 MHz
IEEE 802.11b	72	77	77
IEEE 802.11g	78	81	79

For 5GHz Band

Power Parameters of IEEE 802.11n MCS0 20MHz, Ant. 1 / Ant. 2

Test Software Version	DOS		
Frequency	5745 MHz	5785 MHz	5825 MHz
MCS0 20MHz	84	84	84

Power Parameters of IEEE 802.11n MCS0 40MHz, Ant. 1 / Ant. 2

Test Software Version	DOS	
Frequency	5755 MHz	5795 MHz
MCS0 40MHz	84	84

Power Parameters of IEEE 802.11a, Ant. 1

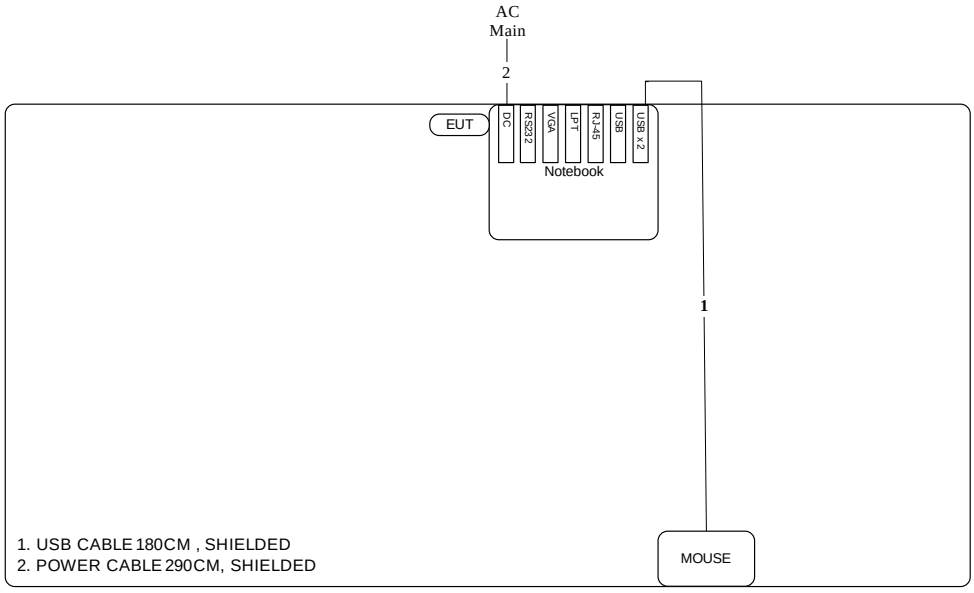
Test Software Version	DOS		
Frequency	5745 MHz	5785 MHz	5825 MHz
IEEE 802.11a	84	84	84

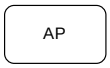
During the test, “DOS” under WIN XP was executed the test program to control the EUT continuously transmit RF signal.

3.10. Test Configurations

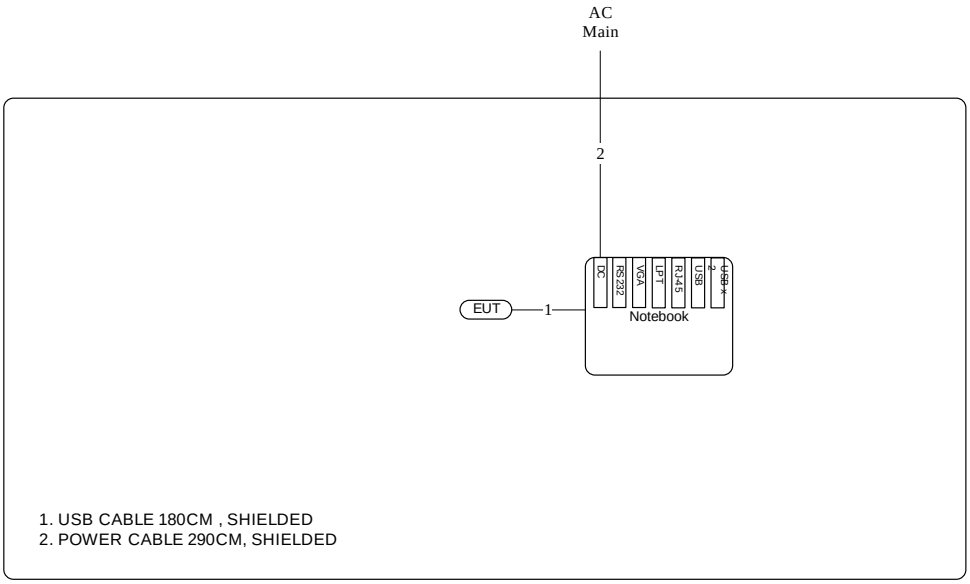
3.10.1. Radiation Emissions Test Configuration

Test Configuration: 9kHz~1GHz





Test Configuration: above 1GHz



4. TEST RESULT

4.1. Peak 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

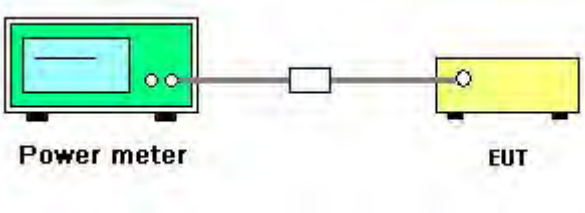
Please refer to section 5 of equipments list in this report. The following table is the setting of the peak power meter

Power Meter Parameter	Setting
Bandwidth	50MHz bandwidth is greater than the EUT emission bandwidth
Detector	Peak

4.1.3. Test Procedures

Spectrum Parameter	Setting
RF Output Power Method	☒ ANSI C63.10 clause 6.10.2.1 (a) power meter method
RF Output Power Method	☐ ANSI C63.10 clause 6.10.2.1 (b) channel integration method
RF Output Power Method	☐ ANSI C63.10 clause 6.10.3.1 Method 1 - spectral trace averaging
RF Output Power Method	☐ ANSI C63.10 clause 6.10.3.2 Method 2 - zero-span mode with trace averaging
Note: When measuring maximum conducted output power with multiple antenna systems, add every result of the values by mathematic formula.	

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.

4.2. Test Result of Peak Output Power

Temperature	22℃	Humidity	60%
Test Engineer	Johnson Chang	Configurations	IEEE 802.11n

For 2.4GHz Band

Configuration IEEE 802.11n MCS0 20MHz Ant. 1

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
1	2412 MHz	24.33	30.00	**Complies**
6	2437 MHz	26.43	30.00	**Complies**
11	2462 MHz	24.46	30.00	**Complies**

Configuration IEEE 802.11n MCS0 20MHz Ant. 2

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
1	2412 MHz	25.00	30.00	**Complies**
6	2437 MHz	26.20	30.00	**Complies**
11	2462 MHz	25.13	30.00	**Complies**

Configuration IEEE 802.11n MCS0 20MHz Ant. 1 + Ant. 2

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
1	2412 MHz	27.69	30.00	**Complies**
6	2437 MHz	29.33	30.00	**Complies**
11	2462 MHz	27.82	30.00	**Complies**

Configuration IEEE 802.11n MCS0 40MHz Ant. 1

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
3	2422 MHz	22.45	30.00	**Complies**
6	2437 MHz	24.60	30.00	**Complies**
9	2452 MHz	24.10	30.00	**Complies**

Configuration IEEE 802.11n MCS0 40MHz Ant. 2

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
3	2422 MHz	22.90	30.00	**Complies**
6	2437 MHz	25.00	30.00	**Complies**
9	2452 MHz	24.77	30.00	**Complies**

Configuration IEEE 802.11n MCS0 40MHz Ant. 1 + Ant. 2

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
3	2422 MHz	25.69	30.00	**Complies**
6	2437 MHz	27.81	30.00	**Complies**
9	2452 MHz	27.46	30.00	**Complies**

For 5GHz Band

Configuration IEEE 802.11n MCS0 20MHz Ant. 1

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
149	5745 MHz	23.45	30.00	**Complies**
157	5785 MHz	23.30	30.00	**Complies**
165	5825 MHz	23.37	30.00	**Complies**

Configuration IEEE 802.11n MCS0 20MHz Ant. 2

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
149	5745 MHz	22.82	30.00	**Complies**
157	5785 MHz	22.72	30.00	**Complies**
165	5825 MHz	22.68	30.00	**Complies**

Configuration IEEE 802.11n MCS0 20MHz Ant. 1 + Ant. 2

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
149	5745 MHz	26.16	30.00	**Complies**
157	5785 MHz	26.03	30.00	**Complies**
165	5825 MHz	26.05	30.00	**Complies**

Configuration IEEE 802.11n MCS0 40MHz Ant. 1

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
151	5755 MHz	23.11	30.00	**Complies**
159	5795 MHz	23.10	30.00	**Complies**

Configuration IEEE 802.11n MCS0 40MHz Ant. 2

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
151	5755 MHz	22.60	30.00	**Complies**
159	5795 MHz	22.52	30.00	**Complies**

Configuration IEEE 802.11n MCS0 40MHz Ant. 1 + Ant. 2

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
151	5755 MHz	25.87	30.00	**Complies**
159	5795 MHz	25.83	30.00	**Complies**

Temperature	22℃	Humidity	60%
Test Engineer	Johnson Chang	Configurations	IEEE 802.11a/b/g

Configuration IEEE 802.11b Ant. 2

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
1	2412 MHz	22.41	30.00	**Complies**
6	2437 MHz	24.52	30.00	**Complies**
11	2462 MHz	24.39	30.00	**Complies**

Configuration IEEE 802.11g Ant. 2

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
1	2412 MHz	25.26	30.00	**Complies**
6	2437 MHz	25.25	30.00	**Complies**
11	2462 MHz	25.25	30.00	**Complies**

Configuration IEEE 802.11a Ant. 1

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
149	5745 MHz	24.05	30.00	**Complies**
157	5785 MHz	24.08	30.00	**Complies**
165	5825 MHz	23.83	30.00	**Complies**

4.3. Radiated 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

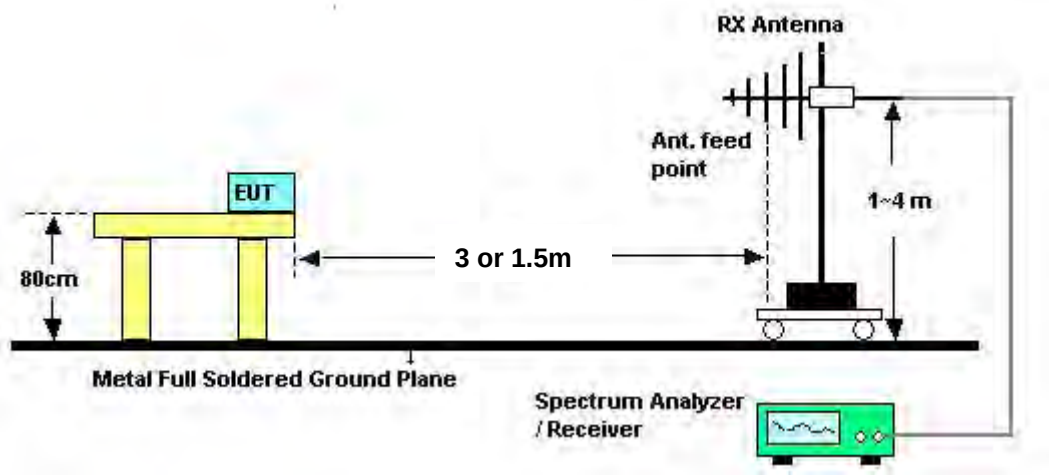
Please refer to section 5 of equipments list in this report. The following table is the setting of spectrum analyzer and receiver.

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

4.3.3. 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.

4.3.4. Test Setup Layout



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].

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

Temperature	12℃	Humidity	61%
Test Engineer	Sean Ku	Configurations	IEEE 802.11n MCS0 20MHz Ch 1 / Ant. 1 + Ant. 2
Test Date	Apr. 25, 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	4823.64	41.92	74.00	-32.08	40.58	3.31	33.06	35.03	231	100	Peak	HORIZONTAL
2	4824.32	29.83	54.00	-24.17	28.49	3.31	33.06	35.03	231	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	4823.69	30.50	54.00	-23.50	29.16	3.31	33.06	35.03	184	100	Average	VERTICAL
2	4824.14	42.51	74.00	-31.49	41.17	3.31	33.06	35.03	184	100	Peak	VERTICAL

Temperature	12℃	Humidity	61%
Test Engineer	Sean Ku	Configurations	IEEE 802.11n MCS0 20MHz Ch 6 / Ant. 1 + Ant. 2
Test Date	Apr. 25, 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	4873.54	44.43	74.00	-29.57	42.97	3.33	33.16	35.03	217	100	Peak	HORIZONTAL
2	4873.88	32.14	54.00	-21.86	30.68	3.33	33.16	35.03	217	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	4873.99	32.00	54.00	-22.00	30.54	3.33	33.16	35.03	221	100	Average	VERTICAL
2	4874.32	44.31	74.00	-29.69	42.85	3.33	33.16	35.03	221	100	Peak	VERTICAL

Temperature	12℃	Humidity	61%
Test Engineer	Sean Ku	Configurations	IEEE 802.11n MCS0 20MHz Ch11 / Ant. 1 + Ant. 2
Test Date	Apr. 25, 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	4923.70	30.13	54.00	-23.87	28.53	3.35	33.26	35.01	181	100	Average	HORIZONTAL
2	4923.82	42.63	74.00	-31.37	41.03	3.35	33.26	35.01	181	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	4924.14	43.88	74.00	-30.12	42.28	3.35	33.26	35.01	207	100	Peak	VERTICAL
2	4924.20	31.27	54.00	-22.73	29.67	3.35	33.26	35.01	207	100	Average	VERTICAL

Temperature	12℃	Humidity	61%
Test Engineer	Sean Ku	Configurations	IEEE 802.11n MCS0 40MHz Ch 3 / Ant. 1 + Ant. 2
Test Date	Apr. 25, 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	4843.70	42.29	74.00	-31.71	40.91	3.32	33.09	35.03	160	100	Peak	HORIZONTAL
2	4844.00	29.87	54.00	-24.13	28.49	3.32	33.09	35.03	160	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	4843.96	30.16	54.00	-23.84	28.78	3.32	33.09	35.03	304	100	Average	VERTICAL
2	4844.36	42.30	74.00	-31.70	40.92	3.32	33.09	35.03	304	100	Peak	VERTICAL

Temperature	12℃	Humidity	61%
Test Engineer	Sean Ku	Configurations	IEEE 802.11n MCS0 40MHz Ch 6 / Ant. 1 + Ant. 2
Test Date	Apr. 25, 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	4873.72	29.88	54.00	-24.12	28.42	3.33	33.16	35.03	211	100	Average	HORIZONTAL
2	4874.05	42.32	74.00	-31.68	40.86	3.33	33.16	35.03	211	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	4873.62	30.14	54.00	-23.86	28.68	3.33	33.16	35.03	130	100	Average	VERTICAL
2	4873.88	42.83	74.00	-31.17	41.37	3.33	33.16	35.03	130	100	Peak	VERTICAL

Temperature	12℃	Humidity	61%
Test Engineer	Sean Ku	Configurations	IEEE 802.11n MCS0 40MHz Ch 9 / Ant. 1 + Ant. 2
Test Date	Apr. 25, 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	4904.15	29.86	54.00	-24.14	28.35	3.34	33.19	35.02	270	100	Average	HORIZONTAL
2	4904.38	42.39	74.00	-31.61	40.88	3.34	33.19	35.02	270	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	4903.65	43.65	74.00	-30.35	42.14	3.34	33.19	35.02	213	100	Peak	VERTICAL
2	4904.31	30.03	54.00	-23.97	28.52	3.34	33.19	35.02	213	100	Average	VERTICAL

Temperature	12℃	Humidity	61%
Test Engineer	Sean Ku	Configurations	11a IEEE 802.11n MCS0 20MHz CH 149 / Ant. 1 + Ant. 2
Test Date	Apr. 25, 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	11490.40	58.35	80.00	-21.65	49.74	5.11	38.78	35.28	326	124	Peak	HORIZONTAL
2	11490.45	43.89	60.00	-16.11	35.28	5.11	38.78	35.28	326	124	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	11487.70	48.15	60.00	-11.85	39.54	5.11	38.78	35.28	190	110	Average	VERTICAL
2	11487.97	62.89	80.00	-17.11	54.28	5.11	38.78	35.28	190	110	Peak	VERTICAL

Temperature	12℃	Humidity	61%
Test Engineer	Sean Ku	Configurations	11a IEEE 802.11n MCS0 20MHz CH 157 / Ant. 1 + Ant. 2
Test Date	Apr. 25, 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	11570.13	58.73	80.00	-21.27	50.06	5.14	38.83	35.30	347	124	Peak	HORIZONTAL
2	11570.40	44.05	60.00	-15.95	35.38	5.14	38.83	35.30	347	124	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	11569.90	45.89	60.00	-14.11	37.22	5.14	38.83	35.30	185	112	Average	VERTICAL
2	11570.13	60.42	80.00	-19.58	51.75	5.14	38.83	35.30	185	112	Peak	VERTICAL

Temperature	12℃	Humidity	61%
Test Engineer	Sean Ku	Configurations	11a IEEE 802.11n MCS0 20MHz CH 165 / Ant. 1 + Ant. 2
Test Date	Apr. 25, 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	11647.55	60.22	80.00	-19.78	51.50	5.16	38.86	35.30	133	120	Peak	HORIZONTAL
2	11647.71	45.53	60.00	-14.47	36.81	5.16	38.86	35.30	133	120	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	11648.16	60.54	80.00	-19.46	51.82	5.16	38.86	35.30	206	116	Peak	VERTICAL
2	11648.40	47.60	60.00	-12.40	38.88	5.16	38.86	35.30	206	116	Average	VERTICAL

Temperature	12℃	Humidity	61%
Test Engineer	Sean Ku	Configurations	11a IEEE 802.11n MCS0 40MHz CH 151 / Ant. 1 + Ant. 2
Test Date	Apr. 25, 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	11509.89	41.28	60.00	-18.72	32.65	5.12	38.79	35.28	288	100	Average	HORIZONTAL
2	11510.09	53.92	80.00	-26.08	45.29	5.12	38.79	35.28	288	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	11507.40	45.35	60.00	-14.65	36.72	5.12	38.79	35.28	192	120	Average	VERTICAL
2	11507.69	59.39	80.00	-20.61	50.76	5.12	38.79	35.28	192	120	Peak	VERTICAL

Temperature	12℃	Humidity	61%
Test Engineer	Sean Ku	Configurations	11a IEEE 802.11n MCS0 40MHz CH 159 / Ant. 1 + Ant. 2
Test Date	Apr. 25, 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	11590.31	43.20	60.00	-16.80	34.53	5.14	38.83	35.30	240	100	Average	HORIZONTAL
2	11590.32	55.79	80.00	-24.21	47.12	5.14	38.83	35.30	240	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	11585.20	48.58	60.00	-11.42	39.91	5.14	38.83	35.30	193	105	Average	VERTICAL
2	11585.37	61.07	80.00	-18.93	52.40	5.14	38.83	35.30	193	105	Peak	VERTICAL

Temperature	12℃	Humidity	61%
Test Engineer	Sean Ku	Configurations	IEEE 802.11b CH 1 / Ant. 2
Test Date	Apr. 25, 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	4824.00	48.81	74.00	-25.19	47.47	3.31	33.06	35.03	323	101	Peak	HORIZONTAL
2	4824.01	42.30	54.00	-11.70	40.96	3.31	33.06	35.03	323	101	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	4823.85	47.92	74.00	-26.08	46.58	3.31	33.06	35.03	195	105	Peak	VERTICAL
2	4823.99	40.57	54.00	-13.43	39.23	3.31	33.06	35.03	195	105	Average	VERTICAL

Temperature	12℃	Humidity	61%
Test Engineer	Sean Ku	Configurations	IEEE 802.11b CH 6 / Ant. 2
Test Date	Apr. 25, 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	4873.95	43.16	54.00	-10.84	41.70	3.33	33.16	35.03	323	102	Average	HORIZONTAL
2	4874.20	49.36	74.00	-24.64	47.90	3.33	33.16	35.03	323	102	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	4873.87	47.86	74.00	-26.14	46.40	3.33	33.16	35.03	348	100	Peak	VERTICAL
2	4873.93	40.36	54.00	-13.64	38.90	3.33	33.16	35.03	348	100	Average	VERTICAL

Temperature	12℃	Humidity	61%
Test Engineer	Sean Ku	Configurations	IEEE 802.11b CH 11 / Ant. 2
Test Date	Apr. 25, 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	4923.75	49.05	74.00	-24.95	47.45	3.35	33.26	35.01	323	100	Peak	HORIZONTAL
2	4924.00	43.14	54.00	-10.86	41.54	3.35	33.26	35.01	323	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	4924.02	41.93	54.00	-12.07	40.33	3.35	33.26	35.01	2	100	Average	VERTICAL
2	4924.06	49.30	74.00	-24.70	47.70	3.35	33.26	35.01	2	100	Peak	VERTICAL

Temperature	12℃	Humidity	61%
Test Engineer	Sean Ku	Configurations	IEEE 802.11g CH 1 / Ant. 2
Test Date	Apr. 25, 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	4824.05	29.65	54.00	-24.35	28.31	3.31	33.06	35.03	167	100	Average	HORIZONTAL
2	4824.36	41.90	74.00	-32.10	40.56	3.31	33.06	35.03	167	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	43.02	74.00	-30.98	41.68	3.31	33.06	35.03	97	100	Peak	VERTICAL
2	4824.03	30.77	54.00	-23.23	29.43	3.31	33.06	35.03	97	100	Average	VERTICAL

Temperature	12℃	Humidity	61%
Test Engineer	Sean Ku	Configurations	IEEE 802.11g CH 6 / Ant. 2
Test Date	Apr. 25, 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	4873.68	30.46	54.00	-23.54	29.00	3.33	33.16	35.03	221	100	Average	HORIZONTAL
2	4873.84	41.79	74.00	-32.21	40.33	3.33	33.16	35.03	221	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	4873.54	30.80	54.00	-23.20	29.34	3.33	33.16	35.03	182	100	Average	VERTICAL
2	4873.77	44.28	74.00	-29.72	42.82	3.33	33.16	35.03	182	100	Peak	VERTICAL

Temperature	12℃	Humidity	61%
Test Engineer	Sean Ku	Configurations	IEEE 802.11g CH 11 / Ant. 2
Test Date	Apr. 25, 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	4923.90	42.49	74.00	-31.51	40.89	3.35	33.26	35.01	169	100	Peak	HORIZONTAL
2	4924.05	30.18	54.00	-23.82	28.58	3.35	33.26	35.01	169	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	4923.82	42.61	74.00	-31.39	41.01	3.35	33.26	35.01	265	100	Peak	VERTICAL
2	4924.31	30.94	54.00	-23.06	29.34	3.35	33.26	35.01	265	100	Average	VERTICAL

Temperature	12℃	Humidity	61%
Test Engineer	Sean Ku	Configurations	IEEE 802.11a CH 149 / Ant. 1
Test Date	Apr. 25, 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	11490.50	42.89	60.00	-17.11	34.28	5.11	38.78	35.28	135	122	Average	HORIZONTAL
2	11490.78	57.46	80.00	-22.54	48.85	5.11	38.78	35.28	135	122	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	11490.76	44.57	60.00	-15.43	35.96	5.11	38.78	35.28	202	104	Average	VERTICAL
2	11491.59	58.35	80.00	-21.65	49.74	5.11	38.78	35.28	202	104	Peak	VERTICAL

Temperature	12℃	Humidity	61%
Test Engineer	Sean Ku	Configurations	IEEE 802.11a CH 157 / Ant. 1
Test Date	Apr. 25, 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	11569.05	43.46	60.00	-16.54	34.80	5.13	38.83	35.30	129	121	Average	HORIZONTAL
2	11569.06	58.58	80.00	-21.42	49.92	5.13	38.83	35.30	129	121	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	11569.56	44.56	60.00	-15.44	35.90	5.13	38.83	35.30	165	108	Average	VERTICAL
2	11570.11	59.73	80.00	-20.27	51.06	5.14	38.83	35.30	165	108	Peak	VERTICAL

Temperature	12℃	Humidity	61%
Test Engineer	Sean Ku	Configurations	IEEE 802.11a CH 165 / Ant. 1
Test Date	Apr. 25, 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	11649.50	60.48	80.00	-19.52	51.76	5.16	38.86	35.30	131	119	Peak	HORIZONTAL
2	11649.60	46.03	60.00	-13.97	37.31	5.16	38.86	35.30	131	119	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	11648.94	62.52	80.00	-17.48	53.80	5.16	38.86	35.30	201	102	Peak	VERTICAL
2	11649.10	47.61	60.00	-12.39	38.89	5.16	38.86	35.30	201	102	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.

4.4. Band Edge Emissions Measurement

4.4.1. 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

4.4.2. 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

4.4.3. 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.

4.4.4. Test Setup Layout

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

4.4.5. Test Deviation

There is no deviation with the original standard.

4.4.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.4.7. Test Result of Band Edge and Fundamental Emissions

Temperature	12℃	Humidity	61%
Test Engineer	Sean Ku	Configurations	IEEE 802.11n MCS0 20MHz Ch 1, 6, 11 / Ant. 1 + Ant. 2
Test date	Apr. 25, 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	2389.40	53.76	54.00	-0.24	23.38	2.21	28.17	0.00	333	100	Average	HORIZONTAL
2	2389.60	73.22	74.00	-0.78	42.84	2.21	28.17	0.00	333	100	Peak	HORIZONTAL
3	2411.60	90.29	54.00			2.22	28.21	0.00	333	100	Average	HORIZONTAL
4	2414.00	106.83	74.00			2.22	28.21	0.00	333	100	Peak	HORIZONTAL

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	2389.20	66.29	74.00	-7.71	35.91	2.21	28.17	0.00	330	100	Peak	HORIZONTAL
2	2389.40	50.28	54.00	-3.72	19.90	2.21	28.17	0.00	330	100	Average	HORIZONTAL
3	2431.40	107.79	74.00			2.23	28.25	0.00	330	100	Peak	HORIZONTAL
4	2436.80	89.52	54.00			2.23	28.29	0.00	330	100	Average	HORIZONTAL
5	2484.10	45.40	54.00	-8.60	14.76	2.26	28.38	0.00	330	100	Average	HORIZONTAL
6	2484.10	60.61	74.00	-13.39	29.97	2.26	28.38	0.00	330	100	Peak	HORIZONTAL

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	2457.00	106.46	74.00			2.24	28.33	0.00	311	106	Peak	HORIZONTAL
2	2462.20	87.90	54.00			2.24	28.33	0.00	311	106	Average	HORIZONTAL
3	2484.30	53.04	54.00	-0.96	22.40	2.26	28.38	0.00	311	106	Average	HORIZONTAL
4	2484.70	72.55	74.00	-1.45	41.91	2.26	28.38	0.00	311	106	Peak	HORIZONTAL

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

Temperature	12℃	Humidity	61%
Test Engineer	Sean Ku	Configurations	IEEE 802.11n MCS0 40MHz Ch 3, 6, 9 / Ant. 1 + Ant. 2
Test date	Apr. 25, 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	2388.80	72.51	74.00	-1.49	42.13	2.21	28.17	0.00	332	100	Peak	HORIZONTAL
2	2389.20	53.23	54.00	-0.77	22.85	2.21	28.17	0.00	332	100	Average	HORIZONTAL
3	2419.20	78.16	54.00			2.23	28.25	0.00	332	100	Average	HORIZONTAL
4	2419.60	101.73	74.00			2.23	28.25	0.00	332	100	Peak	HORIZONTAL

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	53.03	54.00	-0.97	22.65	2.21	28.17	0.00	331	100	Average	HORIZONTAL
2	2389.60	72.45	74.00	-1.55	42.07	2.21	28.17	0.00	331	100	Peak	HORIZONTAL
3	2419.00	77.77	54.00			2.23	28.25	0.00	331	100	Average	HORIZONTAL
4	2439.00	102.72	74.00			2.23	28.29	0.00	331	100	Peak	HORIZONTAL
5	2484.30	46.74	54.00	-7.26	16.10	2.26	28.38	0.00	331	100	Average	HORIZONTAL
6	2484.70	64.00	74.00	-10.00	33.36	2.26	28.38	0.00	331	100	Peak	HORIZONTAL

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	2454.40	102.45	74.00			2.24	28.33	0.00	259	100	Peak	VERTICAL
2	2454.80	77.86	54.00			2.24	28.33	0.00	259	100	Average	VERTICAL
3	2487.10	73.50	74.00	-0.50	42.83	2.26	28.41	0.00	259	100	Peak	VERTICAL
4	2489.50	51.43	54.00	-2.57	20.76	2.26	28.41	0.00	259	100	Average	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	12℃	Humidity	61%
Test Engineer	Sean Ku	Configurations	IEEE 802.11b CH 1, 6, 11 / Ant. 2
Test Date	Apr. 25, 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	2387.00	49.91	54.00	-4.09	19.53	2.21	28.17	0.00	328	100	Average	HORIZONTAL
2	2387.20	59.16	74.00	-14.84	28.78	2.21	28.17	0.00	328	100	Peak	HORIZONTAL
3	2411.00	106.16	74.00			2.22	28.21	0.00	328	100	Peak	HORIZONTAL
4	2411.20	101.66	54.00			2.22	28.21	0.00	328	100	Average	HORIZONTAL

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	2390.00	45.77	54.00	-8.23	15.38	2.22	28.17	0.00	326	100	Average	HORIZONTAL
2	2390.00	54.24	74.00	-19.76	23.85	2.22	28.17	0.00	326	100	Peak	HORIZONTAL
3	2436.20	100.80	54.00			2.23	28.29	0.00	326	100	Average	HORIZONTAL
4	2438.00	105.13	74.00			2.23	28.29	0.00	326	100	Peak	HORIZONTAL
5	2483.50	44.70	54.00	-9.30	14.06	2.26	28.38	0.00	326	100	Average	HORIZONTAL
6	2483.50	52.86	74.00	-21.14	22.22	2.26	28.38	0.00	326	100	Peak	HORIZONTAL

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	2461.00	107.19	74.00			2.24	28.33	0.00	292	100	Peak	HORIZONTAL
2	2461.20	102.83	54.00			2.24	28.33	0.00	292	100	Average	HORIZONTAL
3	2483.50	61.17	74.00	-12.83	30.53	2.26	28.38	0.00	292	100	Peak	HORIZONTAL
4	2483.70	53.12	54.00	-0.88	22.48	2.26	28.38	0.00	292	100	Average	HORIZONTAL

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

Temperature	12℃	Humidity	61%
Test Engineer	Sean Ku	Configurations	IEEE 802.11g CH 1, 6, 11 / Ant. 2
Test Date	Apr. 25, 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	2389.40	72.55	74.00	-1.45	42.17	2.21	28.17	0.00	329	100	Peak	HORIZONTAL
2	2390.00	53.06	54.00	-0.94	22.67	2.22	28.17	0.00	329	100	Average	HORIZONTAL
3	2411.40	88.70	54.00			2.22	28.21	0.00	329	100	Average	HORIZONTAL
4	2412.00	105.36	74.00			2.22	28.21	0.00	329	100	Peak	HORIZONTAL

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	2390.00	46.65	54.00	-7.35	16.26	2.22	28.17	0.00	328	100	Average	HORIZONTAL
2	2390.00	56.41	74.00	-17.59	26.02	2.22	28.17	0.00	328	100	Peak	HORIZONTAL
3	2435.80	103.92	74.00			2.23	28.29	0.00	328	100	Peak	HORIZONTAL
4	2437.80	87.72	54.00			2.23	28.29	0.00	328	100	Average	HORIZONTAL
5	2483.50	43.91	54.00	-10.09	13.27	2.26	28.38	0.00	328	100	Average	HORIZONTAL
6	2483.50	52.77	74.00	-21.23	22.13	2.26	28.38	0.00	328	100	Peak	HORIZONTAL

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	2462.20	103.46	74.00			2.24	28.33	0.00	259	100	Peak	VERTICAL
2	2462.60	86.58	54.00			2.24	28.33	0.00	259	100	Average	VERTICAL
3	2483.50	48.82	54.00	-5.18	18.19	2.26	28.37	0.00	259	100	Average	VERTICAL
4	2484.10	70.16	74.00	-3.84	39.53	2.26	28.37	0.00	259	100	Peak	VERTICAL

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

4.5. Antenna Requirements

4.5.1. 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.

4.5.2. 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
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	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-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	July. 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)
Horn Antenna	COM-POWER	AH-118	071042	1GHz – 18GHz	Oct. 14, 2010	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-7	-	1 GHz – 26.5 GHz	Nov. 17, 2010	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-8	-	1 GHz – 26.5 GHz	Nov. 17, 2010	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-9	-	1 GHz – 26.5 GHz	Nov. 17, 2010	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-10	-	1 GHz – 26.5 GHz	Nov. 17, 2010	Conducted (TH01-CB)

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
RF Cable-high	Woken	High Cable-11	-	1 GHz – 26.5 GHz	Nov. 17, 2010	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-12	-	1 GHz – 26.5 GHz	Nov. 17, 2010	Conducted (TH01-CB)
RF Cable-high	Woken	High Cable-13	-	1 GHz – 26.5 GHz	Nov. 17, 2010	Conducted (TH01-CB)
Power Sensor	Anritsu	MA2411B	0917223	300MHz~40GHz	Sep. 13, 2010	Conducted (TH01-CB)
Power Meter	Anritsu	ML2495A	1035008	300MHz~40GHz	Sep. 08, 2010	Conducted (TH01-CB)

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

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

Note: 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. : L1190-091230

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