



# SPORTON International Inc.

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## FCC RADIO TEST REPORT

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

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 E § 15.407
Test Freq. Range	5150 ~ 5350MHz / 5470 ~ 5725MHz
Received Date	Dec. 08, 2010
Final Test Date	Apr. 25, 2011
Submission Type	Class II Change
Operating Mode	Client (without radar detection function)
Class II Change	Please refer to section 3.7



### Statement

**Test result included is for the IEEE 802.11n and IEEE 802.11a (5150 ~ 5350MHz / 5470 ~ 5725MHz) 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 E**.

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



## Table of Contents

<b>1. CERTIFICATE OF COMPLIANCE</b> .....	<b>1</b>
<b>2. SUMMARY OF THE TEST RESULT</b> .....	<b>2</b>
<b>3. GENERAL INFORMATION</b> .....	<b>3</b>
3.1. Product Details .....	3
3.2. Accessories .....	4
3.3. Table for Filed Antenna .....	5
3.4. Table for Carrier Frequencies .....	6
3.5. Table for Test Modes .....	7
3.6. Table for Testing Locations.....	7
3.7. Table for Class II Change .....	8
3.8. Table for Supporting Units .....	8
3.9. Table for Parameters of Test Software Setting .....	8
3.10. Test Configurations.....	9
<b>4. TEST RESULT</b> .....	<b>10</b>
4.1. Peak Conducted Output Power Measurement .....	10
4.2. Test Result of Peak Conducted Output Power.....	12
4.3. Radiated Emissions Measurement.....	16
4.4. Band Edge Emissions Measurement.....	44
4.5. Antenna Requirements .....	54
<b>5. LIST OF MEASURING EQUIPMENTS</b> .....	<b>55</b>
<b>6. TEST LOCATION</b> .....	<b>57</b>
<b>7. TAF CERTIFICATE OF ACCREDITATION</b> .....	<b>58</b>
<b>APPENDIX A. PHOTOGRAPHS OF EUT</b> .....	<b>A1 ~ A8</b>
<b>APPENDIX B. TEST PHOTOS</b> .....	<b>B1 ~ B5</b>



## History of This Test Report

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



## 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 E § 15.407

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 E				
Part	Rule Section	Description of Test	Result	Under Limit
4.1	15.407(a)	Peak Conducted Output Power	Complies	0.02 dB
4.2	15.407(b)	Radiated Emissions	Complies	10.49dB
4.3	15.407(b)	Band Edge Emissions	Complies	0.04 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	±0.5dB	Confidence levels of 95%
Power Spectral Density	±0.5dB	Confidence levels of 95%
Peak Excursion	±0.5dB	Confidence levels of 95%
26dB Spectrum Bandwidth / Frequency Stability	±8.5×10 <sup>-8</sup>	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°C	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 (1TX, 1RX)
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	5150 ~ 5350MHz / 5470 ~ 5725MHz
Channel Number	19 for 20MHz bandwidth ; 9 for 40MHz bandwidth
Conducted Output Power	Band 1: MCS0 (20MHz): 16.33 dBm ; MCS0 (40MHz): 16.24 dBm Band 2: MCS0 (20MHz): 20.84 dBm ; MCS0 (40MHz): 19.96 dBm Band 3: MCS0 (20MHz): 22.27 dBm ; MCS0 (40MHz): 21.29 dBm
Carrier Frequencies	Please refer to section 3.4
Antenna	Please refer to section 3.3

##### IEEE 802.11a

Items	Description
Product Type	WLAN (1TX, 1RX)
Radio Type	Intentional Transceiver
Power Type	From Host System
Modulation	OFDM for IEEE 802.11a
Data Modulation	OFDM (BPSK / QPSK / 16QAM / 64QAM)
Data Rate (Mbps)	OFDM (6/9/12/18/24/36/48/54)
Frequency Range	5150 ~ 5350MHz / 5470 ~ 5725MHz
Channel Number	11a: 13+5 (US/Canada) /8+3 (Taiwan)
Conducted Output Power	Band 1: 16.80 dBm ; Band 2: 17.73 dBm ; Band 3: 19.58 dBm
Carrier Frequencies	Please refer to section 3.4
Antenna	Please refer to section 3.3

##### Antenna & Band width

Antenna	Single (TX)		Two (TX)	
	20 MHz	40 MHz	20 MHz	40 MHz
IEEE 802.11a	X	X	X	X
IEEE 802.11n	X	X	V	V

## IEEE 802.11n spec

MCS Index	Nss	Modulation	R	NBPS	NCBPS		NDBPS		Datarate(Mbps)			
					20MHz	40MHz	20MHz	40MHz	800nsGI		400nsGI	
									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
NBPS	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.

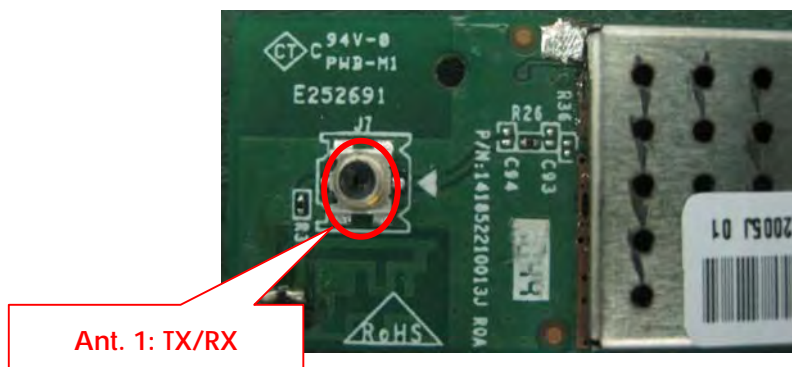
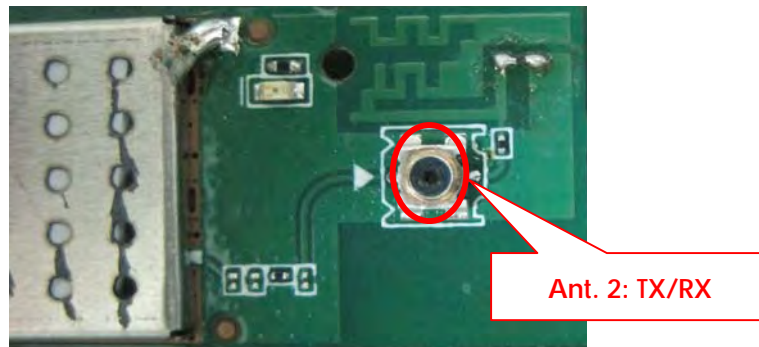
Due to Ant. 1 & Ant. 2 are identical and the Ant. 1 generated the worst test result, all the tests were base on this setting and recorded in this report.

**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

#### Frequency Allocation for 802.11a

There are two bandwidth systems for IEEE 802.11n.

For both 20MHz bandwidth systems, use Channel 36, 40, 44, 48, 52, 56, 60, 64, 100, 104, 108, 112, 116, 120, 124, 128, 132, 136, 140.

For both 40MHz bandwidth systems, use Channel 38, 46, 54, 62, 102, 110, 118, 126, 134.

Frequency Band	Channel No.	Frequency	Channel No.	Frequency
5150~5250 MHz Band 1	36	5180 MHz	44	5220 MHz
	38	5190 MHz	46	5230 MHz
	40	5200 MHz	48	5240 MHz
5250~5350 MHz Band 2	52	5260 MHz	60	5300 MHz
	54	5270 MHz	62	5310 MHz
	56	5280 MHz	64	5320 MHz
5470~5725 MHz Band 3	100	5500 MHz	116	5580 MHz
	102	5510 MHz	132	5660 MHz
	104	5520 MHz	134	5670 MHz
	108	5540 MHz	136	5680 MHz
	110	5550 MHz	140	5700 MHz
	112	5560 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
Peak Conducted Output Power	MCS0/20MHz	Band 1~2	13Mbps	36/40/48/52/60/64	1/2/1+2
		Band 3	13Mbps	100/116/140	1/2/1+2
	MCS0/40MHz	Band 1~2	27Mbps	38/46/54/62	1/2/1+2
		Band 3	27Mbps	102/110/134	1/2/1+2
	11a/BPSK	Band 1~2	13Mbps	36/40/48/52/60/64	1
		Band 3	13Mbps	100/116/140	1
Radiated Emission Below 1GHz	MCS0/CTX		6Mbps	-	-
Radiated Emission Above 1GHz	MCS0/20MHz	Band 1~2	13Mbps	36/40/48/52/60/64	1/2/1+2
		Band 3	13Mbps	100/116/140	1/2/1+2
	MCS0/40MHz	Band 1~2	27Mbps	38/46/54/62	1/2/1+2
		Band 3	27Mbps	102/110/134	1/2/1+2
	11a/BPSK	Band 1~2	13Mbps	36/40/48/52/60/64	1
		Band 3	13Mbps	100/116/140	1
Band Edge Emission	MCS0/20MHz	Band 1~2	13Mbps	36/40/60/64	1/2/1+2
		Band 3	13Mbps	100/140	1/2/1+2
	MCS0/40MHz	Band 1~2	27Mbps	38/46/54/62	1/2/1+2
		Band 3	27Mbps	102/110/134	1/2/1+2
	11a/BPSK	Band 1~2	13Mbps	36/40/60/64	1
		Band 3	13Mbps	100/140	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.

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

Test Software Version	DOS								
Frequency	5180 MHz	5200 MHz	5240 MHz	5260 MHz	5300 MHz	5320 MHz	5500 MHz	5580 MHz	5700 MHz
MCS0 20MHz	51	51	51	84	84	84	84	84	84

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

Test Software Version	DOS						
Frequency	5190 MHz	5230 MHz	5270 MHz	5310 MHz	5510 MHz	5550 MHz	5670 MHz
MCS0 40MHz	51	53	84	59	52	84	84

#### Power Parameters of IEEE 802.11a, Ant. 1

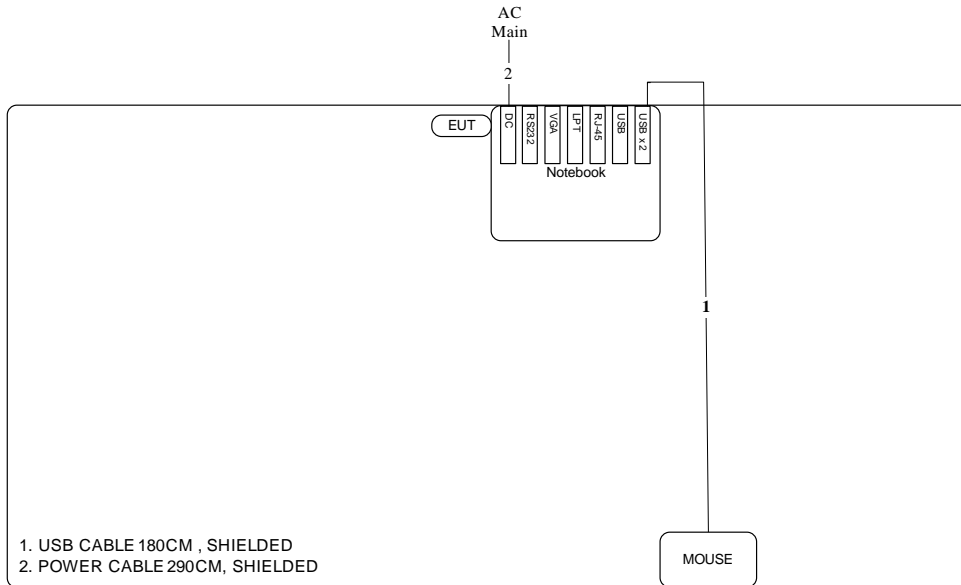
Test Software Version	DOS								
Frequency	5180 MHz	5200 MHz	5240 MHz	5260 MHz	5300 MHz	5320 MHz	5500 MHz	5580 MHz	5700 MHz
IEEE 802.11a	66.00	66.00	66.00	84.00	84.00	84.00	84	84	84

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

### 3.10. Test Configurations

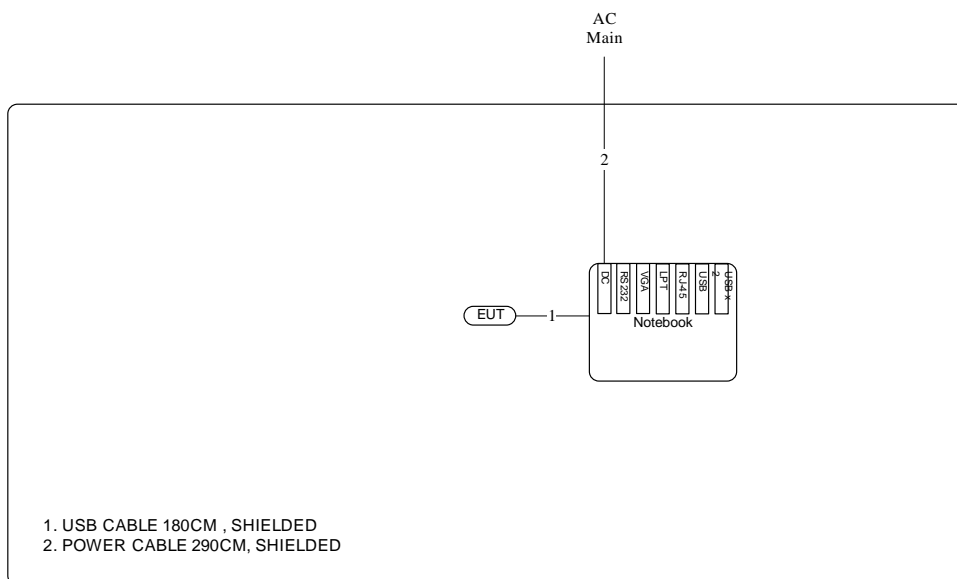
#### 3.10.1. Radiation Emissions Test Configuration

Test Configuration: 9KHz~1GHz



AP

Test Configuration: above 1GHz



## 4. TEST RESULT

### 4.1. Peak Conducted Output Power Measurement

#### 4.1.1. Limit

For the band 5.15~5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 50 mW (17dBm) or  $4 \text{ dBm} + 10\log B$ , where B is the 26 dB emissions bandwidth in MHz. If transmitting antennas of directional gain greater than 6 dBi are used, the peak output power and power density from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

For the 5.25-5.35 GHz and 5.470-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW (24dBm) or  $11 \text{ dBm} + 10\log B$ . If transmitting antennas of directional gain greater than 6 dBi are used, the peak output power and power density from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

For the band 5.725-5.825 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 1 W (30dBm) or  $17 \text{ dBm} + 10\log B$ . If transmitting antennas of directional gain greater than 6 dBi are used, the peak output power and power density from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain up to 23 dBi without any corresponding reduction in the transmitter peak output power and peak power spectral density. For fixed, point-to-point U-NII transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in peak transmitter power and peak power spectral density for each 1 dB of antenna gain in excess of 23 dBi would be required.

#### 4.1.2. Measuring Instruments and Setting

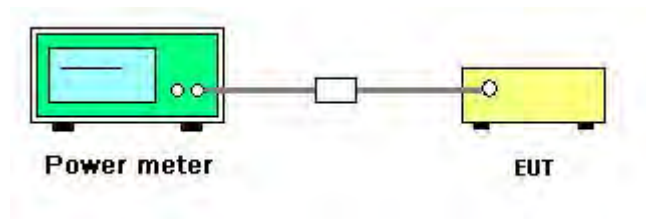
Please refer to section 5 of equipments list in this report. The following table is the setting of the peak power meter

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	<input checked="" type="checkbox"/> ANSI C63.10 clause 6.10.2.1 (a) power meter method
RF Output Power Method	<input type="checkbox"/> ANSI C63.10 clause 6.10.2.1 (b) channel integration method
RF Output Power Method	<input type="checkbox"/> ANSI C63.10 clause 6.10.3.1 Method 1 - spectral trace averaging
RF Output Power Method	<input type="checkbox"/> 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 Conducted Output Power

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

##### Configuration IEEE 802.11n MCS0 20MHz Ant. 1

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
36	5180 MHz	13.20	17.00	Complies
40	5200 MHz	13.25	17.00	Complies
48	5240 MHz	13.16	17.00	Complies
52	5260 MHz	16.13	24.00	Complies
60	5300 MHz	17.22	24.00	Complies
64	5320 MHz	15.60	24.00	Complies
100	5500 MHz	19.20	24.00	Complies
116	5580 MHz	16.00	24.00	Complies
140	5700 MHz	17.09	24.00	Complies

##### Configuration IEEE 802.11n MCS0 20MHz Ant. 2

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
36	5180 MHz	13.38	17.00	Complies
40	5200 MHz	13.30	17.00	Complies
48	5240 MHz	13.48	17.00	Complies
52	5260 MHz	17.94	24.00	Complies
60	5300 MHz	18.36	24.00	Complies
64	5320 MHz	17.00	24.00	Complies
100	5500 MHz	19.32	24.00	Complies
116	5580 MHz	17.90	24.00	Complies
140	5700 MHz	18.08	24.00	Complies

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

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
36	5180 MHz	16.30	17.00	Complies
40	5200 MHz	16.29	17.00	Complies
48	5240 MHz	16.33	17.00	Complies
52	5260 MHz	20.14	24.00	Complies
60	5300 MHz	20.84	24.00	Complies
64	5320 MHz	19.37	24.00	Complies
100	5500 MHz	22.27	24.00	Complies
116	5580 MHz	20.06	24.00	Complies
140	5700 MHz	20.62	24.00	Complies

**Configuration IEEE 802.11n MCS0 40MHz Ant. 1**

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
38	5190 MHz	12.65	17.00	Complies
46	5230 MHz	13.07	17.00	Complies
54	5270 MHz	16.62	24.00	Complies
62	5310 MHz	14.20	24.00	Complies
102	5510 MHz	13.02	24.00	Complies
110	5550 MHz	13.99	24.00	Complies
134	5670 MHz	18.16	24.00	Complies

**Configuration IEEE 802.11nMCS0 40MHz Ant. 2**

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
38	5190 MHz	12.83	17.00	Complies
46	5230 MHz	13.39	17.00	Complies
54	5270 MHz	17.25	24.00	Complies
62	5310 MHz	14.92	24.00	Complies
102	5510 MHz	14.32	24.00	Complies
110	5550 MHz	14.82	24.00	Complies
134	5670 MHz	18.40	24.00	Complies



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

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
38	5190 MHz	15.75	17.00	Complies
46	5230 MHz	16.24	17.00	Complies
54	5270 MHz	19.96	24.00	Complies
62	5310 MHz	17.59	24.00	Complies
102	5510 MHz	16.73	24.00	Complies
110	5550 MHz	17.44	24.00	Complies
134	5670 MHz	21.29	24.00	Complies



Temperature	22°C	Humidity	60%
Test Engineer	Johnson Chang	Configurations	IEEE 802.11a

**Configuration IEEE 802.11a Ant. 1**

Channel	Frequency	Conducted Power (dBm)	Max. Limit (dBm)	Result
36	5180 MHz	16.77	17.00	Complies
40	5200 MHz	16.80	17.00	Complies
48	5240 MHz	16.75	17.00	Complies
52	5260 MHz	16.75	24.00	Complies
60	5300 MHz	17.73	24.00	Complies
64	5320 MHz	17.40	24.00	Complies
100	5500 MHz	19.58	24.00	Complies
116	5580 MHz	17.73	24.00	Complies
140	5700 MHz	19.06	24.00	Complies

### 4.3. Radiated Emissions Measurement

#### 4.3.1. Limit

For transmitters operating in the 5.15-5.35 GHz band: all emissions outside of the 5.15-5.35 GHz band shall not exceed an EIRP of -27 dBm/MHz (68.3dBuV/m at 3m). For transmitters operating in the 5.470-5.725 GHz band: all emissions outside of the 5.470-5.725 GHz band shall not exceed an EIRP of -27 dBm/MHz (68.3dBuV/m at 3m). For transmitters operating in the 5.725-5.825 GHz band: all emissions within the frequency range from the band edge to 10 MHz above or below the band edge shall not exceed an EIRP of -17 dBm/MHz (78.3dBuV/m at 3m); for frequencies 10 MHz or greater above or below the band edge, emissions shall not exceed an EIRP of -27 dBm/MHz (68.3dBuV/m at 3m). In addition, 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

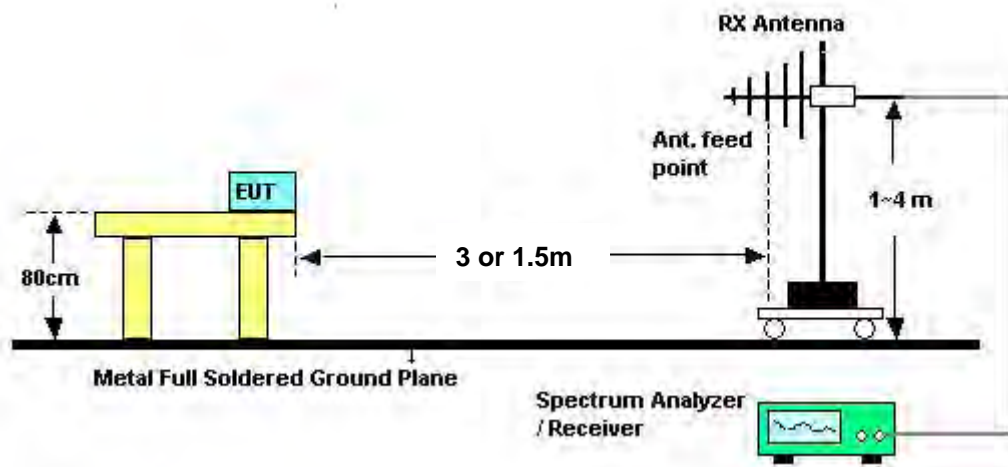
Please refer to section 5 of equipments list in this report. The following table is the setting of spectrum analyzer and receiver.

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 5GHz 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].

#### 4.3.5. 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~40GHz)

Temperature	12°C	Humidity	61%
Test Engineer	Sean Ku	Configurations	IEEE 802.11n MCS0 20MHz Ch 36 / 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	15539.84	39.33	60.00	-20.67	30.86	6.13	37.65	35.31	134	100	Average	HORIZONTAL
2	15540.36	51.45	80.00	-28.55	42.98	6.13	37.65	35.31	134	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	15540.13	39.27	60.00	-20.73	30.76	6.13	37.69	35.31	190	100	Average	VERTICAL
2	15540.37	51.59	80.00	-28.41	43.08	6.13	37.69	35.31	190	100	Peak	VERTICAL



Temperature	12°C	Humidity	61%
Test Engineer	Sean Ku	Configurations	IEEE 802.11n MCS0 20MHz Ch 40 / 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	15599.90	51.35	80.00	-28.65	42.96	6.13	37.60	35.34	273	100	Peak	HORIZONTAL
2	15600.39	38.91	60.00	-21.09	30.52	6.13	37.60	35.34	273	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	15599.64	38.97	60.00	-21.03	30.58	6.13	37.60	35.34	205	100	Average	VERTICAL
2	15600.31	50.81	80.00	-29.19	42.42	6.13	37.60	35.34	205	100	Peak	VERTICAL



Temperature	12°C	Humidity	61%
Test Engineer	Sean Ku	Configurations	IEEE 802.11n MCS0 20MHz Ch 48 / 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	15719.68	50.37	80.00	-29.63	42.14	6.14	37.48	35.39	138	100	Peak	HORIZONTAL
2	15719.99	37.79	60.00	-22.21	29.56	6.14	37.48	35.39	138	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	15719.53	37.67	60.00	-22.33	29.44	6.14	37.48	35.39	223	100	Average	VERTICAL
2	15719.88	50.06	80.00	-29.94	41.83	6.14	37.48	35.39	223	100	Peak	VERTICAL





Temperature	12°C	Humidity	61%
Test Engineer	Sean Ku	Configurations	IEEE 802.11n MCS0 20MHz Ch 52 / 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	15796.70	49.87	80.00	-30.13	41.77	6.14	37.39	35.43	176	100	Peak	HORIZONTAL
2	15800.80	37.95	60.00	-22.05	29.85	6.14	37.39	35.43	176	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	15757.20	50.66	80.00	-29.34	42.49	6.14	37.44	35.41	207	100	Peak	VERTICAL
2	15802.00	38.10	60.00	-21.90	30.00	6.14	37.39	35.43	207	100	Average	VERTICAL



Temperature	12°C	Humidity	61%
Test Engineer	Sean Ku	Configurations	IEEE 802.11n MCS0 20MHz Ch 60 / 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	10600.13	39.91	60.00	-20.09	31.94	5.01	38.38	35.42	78	100	Average	HORIZONTAL
2	10600.13	50.79	80.00	-29.21	42.82	5.01	38.38	35.42	78	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	10600.13	42.07	60.00	-17.93	34.10	5.01	38.38	35.42	162	100	Average	VERTICAL
2	10600.13	52.80	80.00	-27.20	44.83	5.01	38.38	35.42	162	100	Peak	VERTICAL



Temperature	12°C	Humidity	61%
Test Engineer	Sean Ku	Configurations	IEEE 802.11n MCS0 20MHz Ch 64 / 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	10639.76	51.52	80.00	-28.48	43.53	5.01	38.37	35.39	61	100	Peak	HORIZONTAL
2	10639.79	39.97	60.00	-20.03	31.98	5.01	38.37	35.39	61	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	10640.74	59.50	80.00	-20.50	51.51	5.01	38.37	35.39	209	111	Peak	VERTICAL
2	10641.06	45.96	60.00	-14.04	37.97	5.01	38.37	35.39	209	111	Average	VERTICAL



Temperature	12°C	Humidity	61%
Test Engineer	Sean Ku	Configurations	IEEE 802.11n MCS0 20MHz Ch 100 / Ant. 1 + Ant. 2
Test Date	Apr. 25, 2011		

*Horizontal*

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	11000.03	42.46	60.00	-17.54	34.23	5.01	38.32	35.10	278	124	Average	HORIZONTAL
2	11000.45	55.64	80.00	-24.36	47.41	5.01	38.32	35.10	278	124	Peak	HORIZONTAL

*Vertical*

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	10999.83	60.69	80.00	-19.31	52.48	5.01	38.30	35.10	195	107	Peak	VERTICAL
2	11000.20	47.37	60.00	-12.63	39.16	5.01	38.30	35.10	195	107	Average	VERTICAL

Temperature	12°C	Humidity	61%
Test Engineer	Sean Ku	Configurations	IEEE 802.11n MCS0 20MHz Ch 116 / 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	11159.66	56.61	80.00	-23.39	48.27	5.04	38.47	35.17	275	117	Peak	HORIZONTAL
2	11159.68	42.23	60.00	-17.77	33.89	5.04	38.47	35.17	275	117	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	11159.37	60.91	80.00	-19.09	52.57	5.04	38.47	35.17	179	108	Peak	VERTICAL
2	11159.52	46.79	60.00	-13.21	38.45	5.04	38.47	35.17	179	108	Average	VERTICAL



Temperature	12°C	Humidity	61%
Test Engineer	Sean Ku	Configurations	IEEE 802.11n MCS0 20MHz Ch 140 / Ant. 1 + Ant. 2
Test Date	Apr. 25, 2011		

*Horizontal*

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	11398.03	59.40	80.00	-20.60	50.85	5.10	38.70	35.25	325	128	Peak	HORIZONTAL
2	11398.32	44.39	60.00	-15.61	35.84	5.10	38.70	35.25	325	128	Average	HORIZONTAL

*Vertical*

	Freq	Level	Limit	Over	Read	Cable	Antenna	Preamp	T/Pos	A/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	deg	cm		
1	11400.41	49.51	60.00	-10.49	40.96	5.10	38.70	35.25	185	122	Average	VERTICAL
2	11400.56	63.32	80.00	-16.68	54.77	5.10	38.70	35.25	185	122	Peak	VERTICAL



Temperature	12°C	Humidity	61%
Test Engineer	Sean Ku	Configurations	IEEE 802.11n MCS0 40MHz Ch 38 / 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	15569.57	51.33	80.00	-28.67	42.90	6.13	37.63	35.33	156	100	Peak	HORIZONTAL
2	15569.74	38.81	60.00	-21.19	30.38	6.13	37.63	35.33	156	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	15569.54	51.19	80.00	-28.81	42.74	6.13	37.65	35.33	216	100	Peak	VERTICAL
2	15570.27	39.04	60.00	-20.96	30.59	6.13	37.65	35.33	216	100	Average	VERTICAL



Temperature	12°C	Humidity	61%
Test Engineer	Sean Ku	Configurations	IEEE 802.11n MCS0 40MHz Ch 46 / 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	15689.74	50.53	80.00	-29.47	42.25	6.14	37.51	35.37	160	100	Peak	HORIZONTAL
2	15689.86	38.28	60.00	-21.72	30.00	6.14	37.51	35.37	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	15690.18	38.24	60.00	-21.76	29.96	6.14	37.51	35.37	195	100	Average	VERTICAL
2	15690.48	51.27	80.00	-28.73	42.99	6.14	37.51	35.37	195	100	Peak	VERTICAL





Temperature	12°C	Humidity	61%
Test Engineer	Sean Ku	Configurations	IEEE 802.11n MCS0 40MHz Ch 54 / 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	15809.81	50.46	80.00	-29.54	42.36	6.14	37.39	35.43	185	100	Peak	HORIZONTAL
2	15810.10	38.12	60.00	-21.88	30.02	6.14	37.39	35.43	185	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	15809.59	38.10	60.00	-21.90	30.00	6.14	37.39	35.43	218	100	Average	VERTICAL
2	15809.94	50.61	80.00	-29.39	42.51	6.14	37.39	35.43	218	100	Peak	VERTICAL



Temperature	12°C	Humidity	61%
Test Engineer	Sean Ku	Configurations	IEEE 802.11n MCS0 40MHz Ch 62 / 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	10619.65	36.79	60.00	-23.21	28.82	5.01	38.38	35.42	125	100	Average	HORIZONTAL
2	10620.06	48.78	80.00	-31.22	40.81	5.01	38.38	35.42	125	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	10620.41	38.04	60.00	-21.96	30.07	5.01	38.38	35.42	172	100	Average	VERTICAL
2	10620.47	50.20	80.00	-29.80	42.23	5.01	38.38	35.42	172	100	Peak	VERTICAL



Temperature	12°C	Humidity	61%
Test Engineer	Sean Ku	Configurations	IEEE 802.11n MCS0 40MHz Ch 102 / 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	11019.91	37.42	60.00	-22.58	29.18	5.02	38.33	35.11	255	100	Average	HORIZONTAL
2	11020.23	48.29	80.00	-31.71	40.05	5.02	38.33	35.11	255	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	11020.10	52.30	80.00	-27.70	44.07	5.02	38.32	35.11	185	100	Peak	VERTICAL
2	11020.23	39.11	60.00	-20.89	30.88	5.02	38.32	35.11	185	100	Average	VERTICAL



Temperature	12°C	Humidity	61%
Test Engineer	Sean Ku	Configurations	IEEE 802.11n MCS0 40MHz Ch 110 / 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	11100.26	49.78	80.00	-30.22	41.49	5.03	38.40	35.14	155	100	Peak	HORIZONTAL
2	11100.31	38.28	60.00	-21.72	29.99	5.03	38.40	35.14	155	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	11100.11	45.60	60.00	-14.40	37.31	5.03	38.40	35.14	215	100	Average	VERTICAL
2	11100.23	59.16	80.00	-20.84	50.87	5.03	38.40	35.14	215	100	Peak	VERTICAL

Temperature	12°C	Humidity	61%
Test Engineer	Sean Ku	Configurations	IEEE 802.11n MCS0 40MHz Ch 134 / 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	11335.89	49.99	80.00	-30.01	41.51	5.08	38.63	35.23	134	100	Peak	HORIZONTAL
2	11336.30	39.33	60.00	-20.67	30.85	5.08	38.63	35.23	134	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	11340.25	43.87	60.00	-16.13	35.39	5.09	38.63	35.24	205	100	Average	VERTICAL
2	11340.32	58.64	80.00	-21.36	50.16	5.09	38.63	35.24	205	100	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.

The limits above 5GHz 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 (specific distance [3m] / test distance [1.5m]) (dB);

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



Temperature	12°C	Humidity	61%
Test Engineer	Sean Ku	Configurations	IEEE 802.11a Ch 36 / 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	15539.73	53.15	80.00	-26.85	44.68	6.13	37.65	35.31	145	100	Peak	HORIZONTAL
2	15540.03	40.58	60.00	-19.42	32.11	6.13	37.65	35.31	145	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	15539.95	42.81	60.00	-17.19	34.30	6.13	37.69	35.31	90	100	Average	VERTICAL
2	15539.99	55.30	80.00	-24.70	46.79	6.13	37.69	35.31	90	100	Peak	VERTICAL



Temperature	12°C	Humidity	61%
Test Engineer	Sean Ku	Configurations	IEEE 802.11a Ch 40 / 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	15600.22	39.73	60.00	-20.27	31.34	6.13	37.60	35.34	146	100	Average	HORIZONTAL
2	15600.23	51.60	80.00	-28.40	43.21	6.13	37.60	35.34	146	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	15599.75	53.03	80.00	-26.97	44.64	6.13	37.60	35.34	54	100	Peak	VERTICAL
2	15600.11	40.77	60.00	-19.23	32.38	6.13	37.60	35.34	54	100	Average	VERTICAL



Temperature	12°C	Humidity	61%
Test Engineer	Sean Ku	Configurations	IEEE 802.11a Ch 48 / Ant. 1
Test Date	Apr. 25, 2011		

*Horizontal*

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna 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	15719.61	38.18	60.00	-21.82	29.95	6.14	37.48	35.39	154	100	Average	HORIZONTAL
2	15720.46	50.92	80.00	-29.08	42.69	6.14	37.48	35.39	154	100	Peak	HORIZONTAL

*Vertical*

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna 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	15719.71	38.12	60.00	-21.88	29.89	6.14	37.48	35.39	223	100	Average	VERTICAL
2	15720.28	50.75	80.00	-29.25	42.52	6.14	37.48	35.39	223	100	Peak	VERTICAL





Temperature	12°C	Humidity	61%
Test Engineer	Sean Ku	Configurations	IEEE 802.11a Ch 52 / Ant. 1
Test Date	Apr. 25, 2011		

*Horizontal*

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna 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	15780.01	50.58	80.00	-29.42	42.45	6.14	37.41	35.42	292	100	Peak	HORIZONTAL
2	15780.29	38.17	60.00	-21.83	30.04	6.14	37.41	35.42	292	100	Average	HORIZONTAL

*Vertical*

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna 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	15779.71	37.73	60.00	-22.27	29.60	6.14	37.41	35.42	202	100	Average	VERTICAL
2	15780.25	50.44	80.00	-29.56	42.31	6.14	37.41	35.42	202	100	Peak	VERTICAL



Temperature	12°C	Humidity	61%
Test Engineer	Sean Ku	Configurations	IEEE 802.11a Ch 60 / 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	10600.10	42.55	60.00	-17.45	34.58	5.01	38.38	35.42	76	125	Average	HORIZONTAL
2	10600.10	54.43	80.00	-25.57	46.46	5.01	38.38	35.42	76	125	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	10600.70	44.55	60.00	-15.45	36.58	5.01	38.38	35.42	331	118	Average	VERTICAL
2	10600.70	56.69	80.00	-23.31	48.72	5.01	38.38	35.42	331	118	Peak	VERTICAL



Temperature	12°C	Humidity	61%
Test Engineer	Sean Ku	Configurations	IEEE 802.11a Ch 64 / Ant. 1
Test Date	Apr. 25, 2011		

*Horizontal*

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna 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	10639.79	58.03	80.00	-21.97	50.04	5.01	38.37	35.39	74	124	Peak	HORIZONTAL
2	10639.93	42.72	60.00	-17.28	34.73	5.01	38.37	35.39	74	124	Average	HORIZONTAL

*Vertical*

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna 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	10639.45	55.67	80.00	-24.33	47.68	5.01	38.37	35.39	259	105	Peak	VERTICAL
2	10640.10	42.96	60.00	-17.04	34.97	5.01	38.37	35.39	259	105	Average	VERTICAL



Temperature	12°C	Humidity	61%
Test Engineer	Sean Ku	Configurations	IEEE 802.11a Ch 100 / 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	10999.68	55.38	80.00	-24.62	47.15	5.01	38.32	35.10	0	121	Peak	HORIZONTAL
2	10999.80	42.42	60.00	-17.58	34.19	5.01	38.32	35.10	0	121	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	11000.99	59.17	80.00	-20.83	50.96	5.01	38.30	35.10	353	100	Peak	VERTICAL
2	11001.00	45.74	60.00	-14.26	37.53	5.01	38.30	35.10	353	100	Average	VERTICAL



Temperature	12°C	Humidity	61%
Test Engineer	Sean Ku	Configurations	IEEE 802.11a Ch 116 / 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	11159.98	38.79	60.00	-21.21	30.45	5.04	38.47	35.17	185	100	Average	HORIZONTAL
2	11160.35	50.84	80.00	-29.16	42.50	5.04	38.47	35.17	185	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	11157.90	42.86	60.00	-17.14	34.53	5.04	38.45	35.16	350	103	Average	VERTICAL
2	11158.31	55.07	80.00	-24.93	46.75	5.04	38.45	35.17	350	103	Peak	VERTICAL



<b>Temperature</b>	12°C	<b>Humidity</b>	61%
<b>Test Engineer</b>	Sean Ku	<b>Configurations</b>	IEEE 802.11a Ch 140 / Ant. 1
<b>Test Date</b>	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	11399.66	56.67	80.00	-23.33	48.12	5.10	38.70	35.25	273	116	Peak	HORIZONTAL
2	11399.93	41.57	60.00	-18.43	33.02	5.10	38.70	35.25	273	116	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	11399.40	44.95	60.00	-15.05	36.40	5.10	38.70	35.25	177	107	Average	VERTICAL
2	11399.54	60.61	80.00	-19.39	52.06	5.10	38.70	35.25	177	107	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.

The limits above 5GHz 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].

## 4.4. Band Edge Emissions Measurement

### 4.4.1. Limit

For transmitters operating in the 5.15-5.35 GHz band: all emissions outside of the 5.15-5.35 GHz band shall not exceed an EIRP of -27 dBm/MHz (68.3dBuV/m at 3m). For transmitters operating in the 5.470-5.725 GHz band: all emissions outside of the 5.470-5.725 GHz band shall not exceed an EIRP of -27 dBm/MHz (68.3dBuV/m at 3m). For transmitters operating in the 5.725-5.825 GHz band: all emissions within the frequency range from the band edge to 10 MHz above or below the band edge shall not exceed an EIRP of -17 dBm/MHz (78.3dBuV/m at 3m); for frequencies 10 MHz or greater above or below the band edge, emissions shall not exceed an EIRP of -27 dBm/MHz (68.3dBuV/m at 3m). In addition, 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)	1 MHz / 1 MHz for Peak

### 4.4.3. Test Procedures

1. The test procedure is the same as section 4.6.3, 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 4.6.4.

#### 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

<b>Temperature</b>	12°C	<b>Humidity</b>	61%
<b>Test Engineer</b>	Sean Ku	<b>Configurations</b>	IEEE 802.11n MCS0 20MHz Ch 36, 40 / Ant. 1 + Ant. 2
<b>Test Date</b>	Apr. 25, 2011		

##### Channel 36

	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	5150.00	53.86	60.00	-6.14	16.76	3.43	33.67	0.00	273	116	Average	VERTICAL
2	5150.00	69.10	80.00	-10.90	32.00	3.43	33.67	0.00	273	116	Peak	VERTICAL
3	5177.60	103.91	94.00			3.44	33.73	0.00	273	116	Peak	VERTICAL
4	5180.40	91.71	74.00			3.44	33.73	0.00	273	116	Average	VERTICAL

Item 3, 4 are the fundamental frequency at 5180 MHz.

##### Channel 40

	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	5150.00	52.21	60.00	-7.79	15.11	3.43	33.67	0.00	272	121	Average	VERTICAL
2	5150.00	62.18	80.00	-17.82	25.08	3.43	33.67	0.00	272	121	Peak	VERTICAL
3	5200.40	91.91	74.00			3.45	33.76	0.00	272	121	Average	VERTICAL
4	5205.20	103.26	94.00			3.45	33.76	0.00	272	121	Peak	VERTICAL

Item 3, 4 are the fundamental frequency at 5200 MHz.





Temperature	12°C	Humidity	61%
Test Engineer	Sean Ku	Configurations	IEEE 802.11n MCS0 20MHz Ch 60, 64 / Ant. 1 + Ant. 2
Test Date	Apr. 25, 2011		

**Channel 60**

	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	5300.00	109.29	94.00			3.48	33.94	0.00	275	100	Peak	VERTICAL
2	5300.40	96.74	74.00			3.48	33.94	0.00	275	100	Average	VERTICAL
3	5350.00	54.02	60.00	-5.98	16.50	3.49	34.03	0.00	275	100	Average	VERTICAL
4	5350.80	66.61	80.00	-13.39	29.09	3.49	34.03	0.00	275	100	Peak	VERTICAL

Item 1, 2 are the fundamental frequency at 5300 MHz.

**Channel 64**

	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	5320.40	95.87	74.00			3.48	33.97	0.00	276	100	Average	VERTICAL
2	5320.40	109.00	94.00			3.48	33.97	0.00	276	100	Peak	VERTICAL
3	5350.00	59.37	60.00	-0.63	21.85	3.49	34.03	0.00	276	100	Average	VERTICAL
4	5352.80	74.89	80.00	-5.11	37.37	3.49	34.03	0.00	276	100	Peak	VERTICAL

Item 1, 2 are the fundamental frequency at 5320 MHz.



<b>Temperature</b>	12°C	<b>Humidity</b>	61%
<b>Test Engineer</b>	Sean Ku	<b>Configurations</b>	IEEE 802.11n MCS0 20MHz Ch 100, 140 / Ant. 1 + Ant. 2
<b>Test Date</b>	Apr. 25, 2011		

**Channel 100**

	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	5459.60	70.18	80.00	-9.82	32.45	3.52	34.21	0.00	270	105	Peak	VERTICAL
2	5460.00	55.77	60.00	-4.23	18.04	3.52	34.21	0.00	270	105	Average	VERTICAL
3	5500.40	97.92	74.00			3.53	34.26	0.00	270	105	Average	VERTICAL
4	5500.60	110.21	94.00			3.53	34.26	0.00	270	105	Peak	VERTICAL

Item 3, 4 are the fundamental frequency at 5500 MHz.

**Channel 140**

	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	5697.60	107.85	94.00			3.59	34.34	0.00	259	109	Peak	VERTICAL
2	5700.40	95.02	74.00			3.59	34.34	0.00	259	109	Average	VERTICAL
3	5725.40	60.39	74.00	-13.61	22.45	3.60	34.34	0.00	259	109	Average	VERTICAL
4	5725.40	74.31	94.00	-19.69	36.37	3.60	34.34	0.00	259	109	Peak	VERTICAL

Item 1, 2 are the fundamental frequency at 5700 MHz.



Temperature	12°C	Humidity	61%
Test Engineer	Sean Ku	Configurations	IEEE 802.11n MCS0 40MHz Ch 38, 46 / Ant. 1 + Ant. 2
Test Date	Apr. 25, 2011		

**Channel 38**

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna 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	5149.60	77.13	80.00	-2.87	40.03	3.43	33.67	0.00	276	106	Peak	VERTICAL
2	5150.00	59.96	60.00	-0.04	22.86	3.43	33.67	0.00	276	106	Average	VERTICAL
3	5187.20	87.58	74.00			3.44	33.73	0.00	276	106	Average	VERTICAL
4	5187.60	103.07	94.00			3.44	33.73	0.00	276	106	Peak	VERTICAL

Item 3, 4 are the fundamental frequency at 5190 MHz.

**Channel 46**

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna 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	5149.60	63.20	80.00	-16.80	26.10	3.43	33.67	0.00	285	135	Peak	VERTICAL
2	5150.00	52.54	60.00	-7.46	15.44	3.43	33.67	0.00	285	135	Average	VERTICAL
3	5227.60	87.45	74.00			3.46	33.79	0.00	285	135	Average	VERTICAL
4	5227.60	101.23	94.00			3.46	33.79	0.00	285	135	Peak	VERTICAL

Item 3, 4 are the fundamental frequency at 5230 MHz.



<b>Temperature</b>	12°C	<b>Humidity</b>	61%
<b>Test Engineer</b>	Sean Ku	<b>Configurations</b>	IEEE 802.11n MCS0 40MHz Ch 54, 62 / Ant. 1 + Ant. 2
<b>Test Date</b>	Apr. 25, 2011		

**Channel 54**

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna 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	5272.40	88.87	74.00			3.47	33.88	0.00	277	100	Average	VERTICAL
2	5272.40	104.17	94.00			3.47	33.88	0.00	277	100	Peak	VERTICAL
3	5350.00	54.03	60.00	-5.97	16.51	3.49	34.03	0.00	277	100	Average	VERTICAL
4	5350.00	67.10	80.00	-12.90	29.58	3.49	34.03	0.00	277	100	Peak	VERTICAL

Item 1, 2 are the fundamental frequency at 5270 MHz.

**Channel 62**

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna 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	5307.60	88.94	74.00			3.48	33.94	0.00	285	100	Average	VERTICAL
2	5312.40	103.91	94.00			3.48	33.94	0.00	285	100	Peak	VERTICAL
3	5350.00	59.14	60.00	-0.86	21.62	3.49	34.03	0.00	285	100	Average	VERTICAL
4	5350.80	75.16	80.00	-4.84	37.64	3.49	34.03	0.00	285	100	Peak	VERTICAL

Item 1, 2 are the fundamental frequency at 5310 MHz.

Temperature	12°C	Humidity	61%
Test Engineer	Sean Ku	Configurations	IEEE 802.11n MCS0 40MHz Ch 102, 110, 134 / Ant. 1 + Ant. 2
Test Date	Apr. 25, 2011		

#### Channel 102

	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	5460.00	59.71	60.00	-0.29	21.98	3.52	34.21	0.00	267	117	Average	VERTICAL
2	5460.00	74.81	80.00	-5.19	37.08	3.52	34.21	0.00	267	117	Peak	VERTICAL
3	5508.00	89.55	74.00			3.54	34.28	0.00	267	117	Average	VERTICAL
4	5512.80	104.34	94.00			3.54	34.28	0.00	267	117	Peak	VERTICAL

Item 3, 4 are the fundamental frequency at 5510 MHz.

#### Channel 110

	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	5460.00	53.51	60.00	-6.49	15.78	3.52	34.21	0.00	290	117	Average	VERTICAL
2	5460.00	63.75	80.00	-16.25	26.02	3.52	34.21	0.00	290	117	Peak	VERTICAL
3	5547.60	91.16	74.00			3.55	34.31	0.00	290	117	Average	VERTICAL
4	5547.60	106.50	94.00			3.55	34.31	0.00	290	117	Peak	VERTICAL

Item 3, 4 are the fundamental frequency at 5550 MHz.

#### Channel 134

	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	5667.60	90.71	74.00			3.59	34.33	0.00	281	100	Average	VERTICAL
2	5667.60	106.03	94.00			3.59	34.33	0.00	281	100	Peak	VERTICAL
3	5725.00	68.05	94.00	-25.95	30.11	3.60	34.34	0.00	281	100	Peak	VERTICAL
4	5725.40	55.76	74.00	-18.24	17.82	3.60	34.34	0.00	281	100	Average	VERTICAL

Item 1, 2 are the fundamental frequency at 5670 MHz.

Note:

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

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

The limits above 5GHz 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 (specific distance [3m] / test distance [1.5m]) (dB);

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



Temperature	12°C	Humidity	61%
Test Engineer	Sean Ku	Configurations	IEEE 802.11a Ch 36, 40 / Ant. 1
Test Date	Apr. 25, 2011		

**Channel 36**

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna 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	5149.40	75.79	80.00	-4.21	38.69	3.43	33.67	0.00	274	107	Peak	VERTICAL
2	5150.00	55.83	60.00	-4.17	18.73	3.43	33.67	0.00	274	107	Average	VERTICAL
3	5178.80	93.24	74.00			3.44	33.73	0.00	274	107	Average	VERTICAL
4	5179.40	105.75	94.00			3.44	33.73	0.00	274	107	Peak	VERTICAL

Item 3, 4 are the fundamental frequency at 5180 MHz.

**Channel 40**

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna 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	5146.80	64.12	80.00	-15.88	27.02	3.43	33.67	0.00	178	100	Peak	HORIZONTAL
2	5150.00	52.21	60.00	-7.79	15.11	3.43	33.67	0.00	178	100	Average	HORIZONTAL
3	5200.00	102.72	94.00			3.45	33.76	0.00	178	100	Peak	HORIZONTAL
4	5200.80	90.32	74.00			3.45	33.76	0.00	178	100	Average	HORIZONTAL

Item 3, 4 are the fundamental frequency at 5200 MHz.



Temperature	12°C	Humidity	61%
Test Engineer	Sean Ku	Configurations	IEEE 802.11a Ch 60, 64 / Ant. A1
Test Date	Apr. 25, 2011		

**Channel 60**

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna 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	5299.60	106.97	94.00			3.48	33.94	0.00	288	100	Peak	VERTICAL
2	5300.80	94.62	74.00			3.48	33.94	0.00	288	100	Average	VERTICAL
3	5350.00	53.19	60.00	-6.81	15.67	3.49	34.03	0.00	288	100	Average	VERTICAL
4	5350.00	65.40	80.00	-14.60	27.88	3.49	34.03	0.00	288	100	Peak	VERTICAL

Item 1, 2 are the fundamental frequency at 5300 MHz.

**Channel 64**

	Freq	Level	Limit Line	Over Limit	Read Level	CableAntenna 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	5319.20	94.55	74.00			3.48	33.97	0.00	288	100	Average	VERTICAL
2	5319.80	108.95	94.00			3.48	33.97	0.00	288	100	Peak	VERTICAL
3	5350.00	54.58	60.00	-5.42	17.06	3.49	34.03	0.00	288	100	Average	VERTICAL
4	5350.20	68.35	80.00	-11.65	30.83	3.49	34.03	0.00	288	100	Peak	VERTICAL

Item 1, 2 are the fundamental frequency at 5320 MHz.



Temperature	12°C	Humidity	61%
Test Engineer	Sean Ku	Configurations	IEEE 802.11a Ch 100, 140 / Ant. 1
Test Date	Apr. 25, 2011		

**Channel 100**

	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	5458.40	74.38	80.00	-5.62	36.65	3.52	34.21	0.00	287	124	Peak	VERTICAL
2	5460.00	56.16	60.00	-3.84	18.43	3.52	34.21	0.00	287	124	Average	VERTICAL
3	5500.80	96.17	74.00			3.54	34.26	0.00	287	124	Average	VERTICAL
4	5501.00	109.81	94.00			3.54	34.26	0.00	287	124	Peak	VERTICAL

Item 3, 4 are the fundamental frequency at 5500 MHz.

**Channel 140**

	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	5699.00	94.65	74.00			3.59	34.34	0.00	273	100	Average	VERTICAL
2	5700.20	107.04	94.00			3.59	34.34	0.00	273	100	Peak	VERTICAL
3	5725.00	59.93	74.00	-14.07	21.99	3.60	34.34	0.00	273	100	Average	VERTICAL
4	5725.60	78.31	94.00	-15.69	40.37	3.60	34.34	0.00	273	100	Peak	VERTICAL

Item 1, 2 are the fundamental frequency at 5700 MHz.

Note:

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

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

The limits above 5GHz 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].



## 4.5. 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 2 <sup>nd</sup> 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**

<b>Accreditation Criteria</b>	: ISO/IEC 17025:2005
<b>Accreditation Number</b>	: 1190
<b>Originally Accredited</b>	: December 15, 2003
<b>Effective Period</b>	: January 10, 2010 to January 09, 2013
<b>Accredited Scope</b>	: Testing Field, see described in the Appendix
<b>Specific Accreditation Program</b>	: 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*

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

Pl, total 22 pages

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