

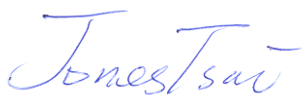
Partial FCC RF Test Report

APPLICANT : Qualcomm Atheros, Inc.
EQUIPMENT : PCIE 802.11a/b/g/n 2.4GHz/5GHz + USB BT 4.0 card
BRAND NAME : Atheros
MODEL NAME : AR5B22
FCC ID : PPD-AR5B22
STANDARD : FCC Part 15 Subpart C §15.247
CLASSIFICATION : (DTS) Digital Transmission System

This is a partial report which is included the Conducted Power and Radiated Band Edges and Spurious Emission Measurement items. The product was received on Dec. 14, 2013 and testing was completed on Jan. 18, 2014. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the procedures and shown to be compliant with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC., the test report shall not be reproduced except in full.



Reviewed by: Joseph Lin / Supervisor

Approved by: Jones Tsai / Manager

SPORTON INTERNATIONAL INC.

No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.



TABLE OF CONTENTS

REVISION HISTORY	3
SUMMARY OF TEST RESULT	4
1 GENERAL DESCRIPTION	5
1.1 Applicant	5
1.2 Manufacturer	5
1.3 Feature of Equipment Under Test	5
1.4 Product Specification of Equipment Under Test	6
1.5 Modification of EUT	7
1.6 Testing Site	7
1.7 Applied Standards	8
2 TEST CONFIGURATION OF EQUIPMENT UNDER TEST	9
2.1 Carrier Frequency and Channel	9
2.2 Pre-Scanned RF Power	10
2.3 Test Mode	14
2.4 Connection Diagram of Test System	15
2.5 Support Unit used in test configuration and system	15
2.6 EUT Operation Test Setup	15
3 TEST RESULT	16
3.1 Radiated Band Edges and Spurious Emission Measurement	16
3.2 Antenna Requirements	53
4 LIST OF MEASURING EQUIPMENT	55
5 UNCERTAINTY OF EVALUATION	56
APPENDIX A. SETUP PHOTOGRAPHS	



REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR3D1404C	Rev. 01	Initial issue of report	Feb. 11, 2014
FR3D1404C	Rev. 02	Revising conducted power in section 1.4 and 2.2.	Feb. 24, 2014
FR3D1404C	Rev. 03	Revising applicant information in cover page and section 1.1.	Feb. 25, 2014



SUMMARY OF TEST RESULT

Report Section	FCC Rule	IC Rule	Description	Limit	Result	Remark
3.1	15.247(d)	RSS-210 A8.5	Radiated Band Edges and Radiated Spurious Emission	15.209(a) & 15.247(d)	Pass	Under limit 0.12 dB at 2390.000 MHz
3.2	15.203 & 15.247(b)	RSS-210 A8.4	Antenna Requirement	N/A	Pass	-



1 General Description

1.1 Applicant

Qualcomm Atheros, Inc.
1700 Technology Drive, San Jose, CA 95110

1.2 Manufacturer

Qualcomm Atheros, Inc.
1700 Technology Drive, San Jose, CA 95110

1.3 Feature of Equipment Under Test

Product Feature	
Equipment	PCIE 802.11a/b/g/n 2.4GHz/5GHz + USB BT 4.0 card
Brand Name	Atheros
Model Name	AR5B22
FCC ID	PPD-AR5B22
Sample 1	EUT with Antenna 1
Sample 2	EUT with Antenna 2
Installed into host	Equipment Name: Tablet PC Brand Name: Lenovo Marketing Name: Lenovo Miix 2 11
EUT supports Radios application	WLAN 11a/b/g/n HT20/HT40 Bluetooth v2.1 + EDR Bluetooth v4.0 + LE
EUT Stage	Production Unit

Remark: The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

1.4 Product Specification of Equipment Under Test

Product Specification subjective to this standard				
Tx/Rx Channel Frequency Range		802.11b/g/n : 2412 MHz ~ 2462 MHz 802.11a/n: 5745~5825MHz.		
Maximum (Peak) Output Power to Antenna		SISO <Ant. Port 2> <2412 MHz ~ 2462 MHz> 802.11b : 19.25 dBm (0.0841 W) 802.11g : 25.57 dBm (0.3606 W) <5745 MHz ~ 5825 MHz> 802.11a : 20.20 dBm (0.1047 W) MIMO <Ant. Port 1 + 2> <2412 MHz ~ 2462 MHz> 802.11b : 22.02 dBm (0.1592 W) 802.11g : 26.68 dBm (0.4656 W) 802.11n HT20 : 26.63 dBm (0.4603 W) 802.11n HT40 : 24.84 dBm (0.3048 W) <5745 MHz ~ 5825 MHz> 802.11a : 22.36 dBm (0.1722 W) 802.11n HT20 : 23.17 dBm (0.2075 W) 802.11n HT40 : 23.05 dBm (0.2018 W)		
Type of Modulation		802.11b : DSSS (DBPSK / DQPSK / CCK) 802.11a/g/n : OFDM (BPSK / QPSK / 16QAM / 64QAM)		
Antenna Function for Transmitter				
			Ant. Port 1	Ant. Port 2
		802.11 b SISO	-	V
		802.11 b MIMO	V	V
		802.11 g SISO	-	V
		802.11 g MIMO	V	V
		802.11 n SISO	-	V
		802.11 n MIMO	V	V

Antenna Information			
Antenna 1	Manufacturer	WNC	
	P/N	Main: 025.9000X.0001	Aux:025.9000Y.0001
	Antenna Type	Main: PIFA Antenna	Aux.: PIFA Antenna
	Antenna connector	RF	
	Peak gain	Main Antenna : WLAN (2.4G) : 1.87 dBi WLAN : -3.71 dBi Bluetooth: 1.87 dBi	Aux. Antenna : WLAN (2.4G) : 0.69 dBi WLAN : 2.67 dBi
Antenna 2	Manufacturer	HT	
	P/N	Main: 025.9000X.0011	Aux.: 025.9000Y.0011
	Antenna Type	Main: PIFA Antenna	Aux.: PIFA Antenna
	Antenna connector	IPEX	
	Peak gain	Main Antenna : WLAN (2.4G) : -1.63 dBi WLAN : 1.84 dBi Bluetooth: -1.63 dBi	Aux. Antenna : WLAN (2.4G) : -0.35 dBi WLAN : -1.91 dBi

1.5 Modification of EUT

No modifications are made to the EUT during all test items.

1.6 Testing Site

Test Site	SPORTON INTERNATIONAL INC.		
Test Site Location	No. 52, Hwa Ya 1 st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C. TEL: +886-3-3273456 / FAX: +886-3-3284978		
Test Site No.	Sporton Site No.		FCC/IC Registration No.
	TH02-HY	03CH06-HY	722060/4086B-1

Note: The test site complies with ANSI C63.4 2003 requirement.



1.7 Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- ♦ FCC Part 15 Subpart C §15.247
- ♦ FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v03r01
- ♦ FCC KDB 662911 D01 Multiple Transmitter Output v02r01.
- ♦ ANSI C63.4-2003

Remark: All test items were verified and recorded according to the standards and without any deviation during the test.

2 Test Configuration of Equipment Under Test

The EUT has been associated with peripherals and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: radiated emission (9 kHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower).

The final configuration from all the combinations and the worst-case data rates were investigated by measuring the maximum power across all the data rates and modulation modes under section 2.2.

Based on the worst configuration found above, the RF power setting is set individually to meet FCC compliance limit for the final conducted and radiated tests shown in section 2.3.

2.1 Carrier Frequency and Channel

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
2400-2483.5 MHz	1	2412	7	2442
	2	2417	8	2447
	3	2422	9	2452
	4	2427	10	2457
	5	2432	11	2462
	6	2437		

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
5725-5850 MHz Band 4	149	5745	159	5795
	151	5755	161	5805
	153	5765	165	5825
	157	5785	-	-

2.2 Pre-Scanned RF Power

Preliminary tests were performed in different data rate and data rate associated with the highest power were chosen for full test shown in the following tables.

SISO <Ant. Port 2>

802.11b			
Channel	CH 01	CH 06	CH 11
Frequency(MHz)	2412	2437	2462
Peak Power (dBm)	18.51	19.25	18.56

802.11g			
Channel	CH 01	CH 06	CH 11
Frequency(MHz)	2412	2437	2462
Peak Power (dBm)	22.62	25.57	22.07

802.11a			
Channel	CH 149	CH 157	CH 165
Frequency(MHz)	5745	5785	5825
Peak Power (dBm)	20.20	20.09	19.59

MIMO <Ant. Port 1 + 2>

802.11b			
Channel	CH 01	CH 06	CH 11
Frequency(MHz)	2412	2437	2462
Peak Power (dBm)	20.69	22.02	21.43

802.11g			
Channel	CH 01	CH 06	CH 11
Frequency(MHz)	2412	2437	2462
Peak Power (dBm)	25.25	26.68	24.79

2.4GHz 802.11n HT20			
Channel	CH 01	CH 06	CH 11
Frequency (MHz)	2412	2437	2462
Peak Power (dBm)	24.00	26.63	22.90

2.4GHz 802.11n HT40			
Channel	CH 03	CH 06	CH 09
Frequency (MHz)	2422	2437	2452
Peak Power (dBm)	20.45	24.84	22.18

802.11a			
Channel	CH 149	CH 157	CH 165
Frequency (MHz)	5745	5785	5825
Peak Power (dBm)	22.36	22.14	22.08

5GHz 802.11n HT20			
Channel	CH 149	CH 157	CH 165
Frequency (MHz)	5745	5785	5825
Peak Power (dBm)	22.99	23.17	22.90

5GHz 802.11n HT40		
Channel	CH 151	CH 159
Frequency (MHz)	5755	5795
Peak Power (dBm)	23.05	22.57

SISO <Ant. Port 2>

802.11b (Duty Cycle: 100.00%)			
Channel	CH 01	CH 06	CH 11
Frequency (MHz)	2412	2437	2462
Average Power (dBm)	16.34	17.00	16.35

802.11g (Duty Cycle: 98.90%)			
Channel	CH 01	CH 06	CH 11
Frequency (MHz)	2412	2437	2462
Average Power (dBm)	13.41	17.19	12.25

802.11a (Duty Cycle: 99.12%)			
Channel	CH 149	CH 157	CH 165
Frequency (MHz)	5745	5785	5825
Average Power (dBm)	11.76	11.69	11.42

MIMO <Ant. Port 1 + 2>

802.11b			
Channel	CH 01	CH 06	CH 11
Frequency (MHz)	2412	2437	2462
Average Power (dBm)	19.39	19.87	19.33

802.11g			
Channel	CH 01	CH 06	CH 11
Frequency (MHz)	2412	2437	2462
Average Power (dBm)	15.89	19.94	15.47

2.4GHz 802.11n HT20			
Channel	CH 01	CH 06	CH 11
Frequency (MHz)	2412	2437	2462
Average Power (dBm)	16.10	19.72	14.78

2.4GHz 802.11n HT40			
Channel	CH 03	CH 06	CH 09
Frequency (MHz)	2422	2437	2452
Average Power (dBm)	12.46	16.34	14.89

802.11a			
Channel	CH 149	CH 157	CH 165
Frequency (MHz)	5745	5785	5825
Average Power (dBm)	14.43	14.49	14.42

5GHz 802.11n HT20			
Channel	CH 149	CH 157	CH 165
Frequency (MHz)	5745	5785	5825
Average Power (dBm)	16.90	17.33	17.31

5GHz 802.11n HT40			
Channel	CH 151	CH 159	
Frequency (MHz)	5755	5795	
Average Power (dBm)	17.26	17.03	

Note: MIMO Ant. 1+2 is a calculated result from sum of the power MIMO Ant. 1 and MIMO Ant. 2.

2.3 Test Mode

Final results of test modes, data rates and test channels are shown as following table.

<2.4GHz>

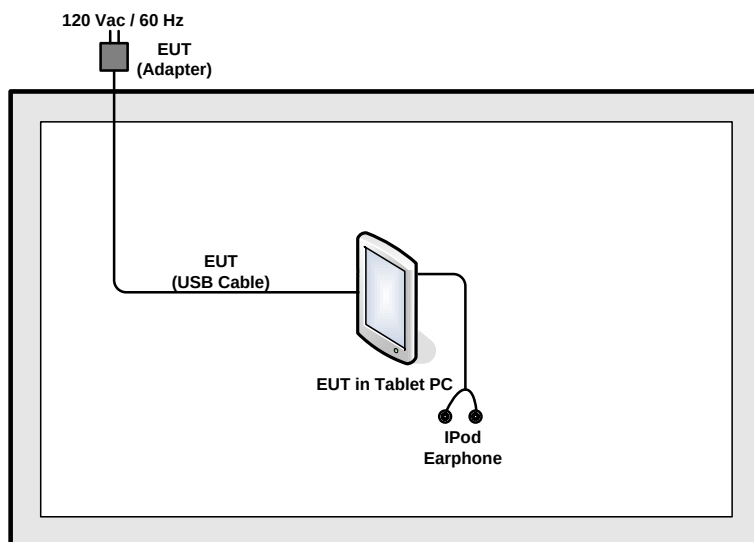
Test Cases				
Radiated TCs	Test Items	Mode	Data Rate	Test Channel
	Radiated Band Edge	802.11b	1 Mbps	1/11
		802.11g	6 Mbps	1/11
		802.11n HT20	MCS8	1/11
		802.11n HT40	MCS8	3/9
	Radiated Spurious Emission	802.11b	1 Mbps	1/6/11
		802.11g	6 Mbps	1/6/11
		802.11n HT20	MCS8	1/6/11
		802.11n HT40	MCS8	3/6/9

<5GHz>

Test Cases				
Radiated TCs	Test Items	Mode	Data Rate	Test Channel
	Radiated Spurious Emission	802.11a	6 Mbps	149/157/165
		802.11n HT20	MCS8	149/157/165
		802.11n HT40	MCS8	151/159

Note: All test items were performed with Sample1 and Battery 1.

2.4 Connection Diagram of Test System



2.5 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	iPod Earphone	Apple	N/A	Verification	Unshielded, 1.0 m	N/A

2.6 EUT Operation Test Setup

The programmed RF utility "artgui.exe", is installed in Tablet PC to provide channel selection, power level, data rate and the application type. RF Utility can send transmitting signal for all testing. 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.

3 Test Result

3.1 Radiated Band Edges and Spurious Emission Measurement

3.1.1 Limit of Radiated band edge and Spurious Emission Measurement

In any 100 kHz bandwidth outside the intentional radiator frequency band, all harmonics/spurious must be at least 20 dB below the highest emission level within the authorized band. If the output power of this device was measured by spectrum analyzer, the attenuation under this paragraph shall be 30 dB instead of 20 dB. In addition, radiated emissions which fall in the restricted bands must also comply with the FCC section 15.209 limits as below.

Frequency (MHz)	Field Strength (microvolts/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

3.1.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.1.3 Test Procedure

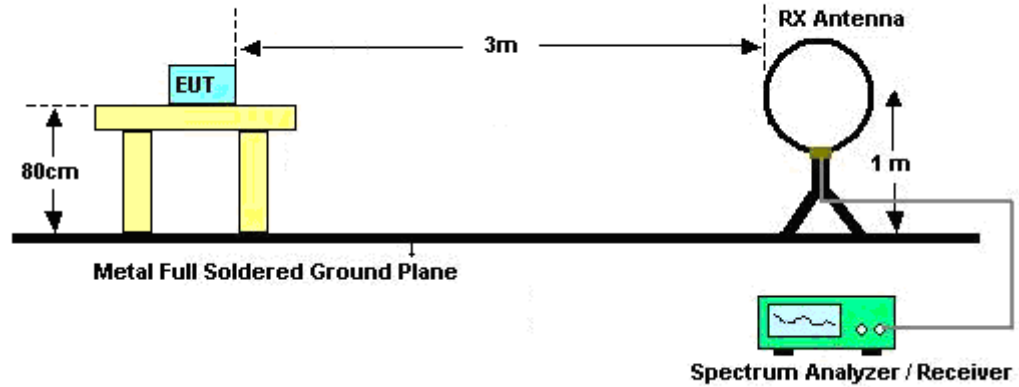
1. The testing follows FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v03r01.
2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level.
3. The EUT was placed on a turntable with 0.8 meter above ground.
4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
5. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level
6. For measurement below 1GHz, If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.
7. Use the following spectrum analyzer settings:
 - (1) Span shall wide enough to fully capture the emission being measured;
 - (2) Set RBW=100 kHz for $f < 1$ GHz; $VBW \geq RBW$; Sweep = auto; Detector function = peak; Trace = max hold;
 - (3) Set RBW = 1 MHz, VBW= 3MHz for $f \geq 1$ GHz for peak measurement.
For average measurement:
 - $VBW = 10$ Hz, when duty cycle is no less than 98 percent.
 - $VBW \geq 1/T$, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.



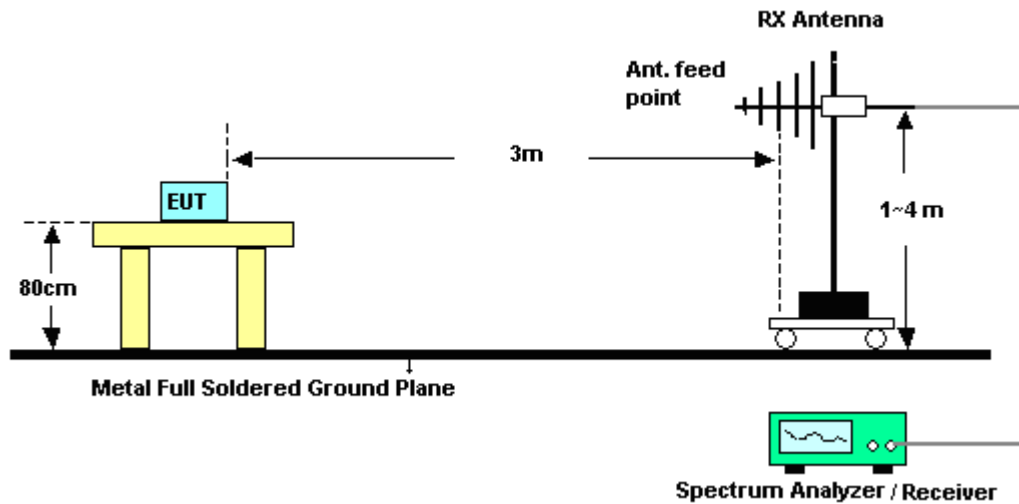
Antenna	Band	Duty Cycle(%)	T(us)	1/T(kHz)	VBW Setting
1+2	802.11b for Ant 1	100.00	-	-	10Hz
1+2	802.11b for Ant 2	100.00	-	-	
1+2	802.11g for Ant 1	98.90	-	-	
1+2	802.11g for Ant 2	98.90	-	-	
1+2	2.4GHz 802.11n HT20 for Ant 1	98.44	-	-	
1+2	2.4GHz 802.11n HT20 for Ant 2	98.44	-	-	
1+2	2.4GHz 802.11n HT40 for Ant 1	96.85	1230.00	0.813	1kHz
1+2	2.4GHz 802.11n HT40 for Ant 2	96.85	1230.00	0.813	
1+2	802.11a for Ant 1	99.12	-	-	10Hz
1+2	802.11a for Ant 2	99.12	-	-	
1+2	5GHz 802.11n HT20 for Ant 1	98.44	-	-	
1+2	5GHz 802.11n HT20 for Ant 2	98.44	-	-	
1+2	5GHz 802.11n HT40 for Ant 1	97.62	1230.00	0.813	1kHz
1+2	5GHz 802.11n HT40 for Ant 2	97.62	1230.00	0.813	

3.1.4 Test Setup

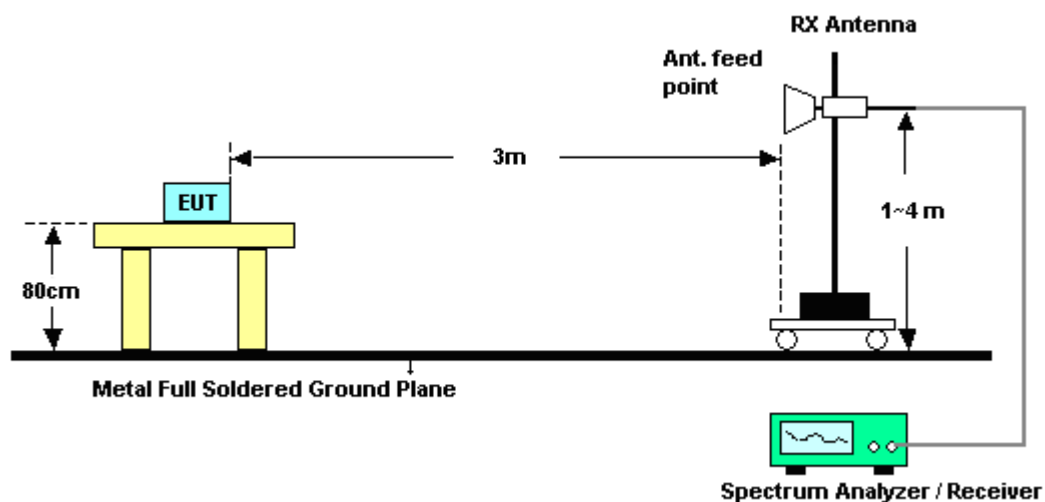
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



3.1.5 Test Results of Radiated Emissions (9kHz ~ 30MHz)

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not reported.

3.1.6 Test Result of Radiated Spurious at Band Edges

MIMO <Ant. Port 1+2>

Test Mode :	802.11b	Temperature :	22~24°C
Test Band :	Low	Relative Humidity :	47~49%
Test Channel :	01	Test Engineer :	Marlboro Hsu

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2386.59	60.48	-13.52	74	56.44	31.92	6.45	34.33	200	233	Peak
2387.22	50.02	-3.98	54	45.98	31.92	6.45	34.33	200	233	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2390.00	59.7	-14.3	74	55.66	31.92	6.45	34.33	200	268	Peak
2387.04	49	-5	54	44.96	31.92	6.45	34.33	200	268	Average

Test Mode :	802.11b	Temperature :	22~24°C
Test Band :	High	Relative Humidity :	47~49%
Test Channel :	11	Test Engineer :	Marlboro Hsu

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2487.85	62.76	-11.24	74	58.47	32	6.59	34.3	133	184	Peak
2487.73	53.47	-0.53	54	49.18	32	6.59	34.3	133	184	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2487.4	60.86	-13.14	74	56.58	31.99	6.59	34.3	101	94	Peak
2487.64	51.08	-2.92	54	46.79	32	6.59	34.3	101	94	Average



Test Mode :	802.11g	Temperature :	22~24°C
Test Band :	Low	Relative Humidity :	47~49%
Test Channel :	01	Test Engineer :	Marlboro Hsu

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2389.2	69.87	-4.13	74	65.83	31.92	6.45	34.33	176	360	Peak
2389.11	50	-4	54	45.96	31.92	6.45	34.33	176	360	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2389.83	72.21	-1.79	74	68.17	31.92	6.45	34.33	127	270	Peak
2390	53.88	-0.12	54	49.84	31.92	6.45	34.33	127	270	Average

Test Mode :	802.11g	Temperature :	22~24°C
Test Band :	High	Relative Humidity :	47~49%
Test Channel :	11	Test Engineer :	Marlboro Hsu

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2483.86	71.22	-2.78	74	66.94	31.99	6.59	34.3	200	230	Peak
2483.5	49.46	-4.54	54	45.18	31.99	6.59	34.3	200	230	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2483.56	70.78	-3.22	74	66.5	31.99	6.59	34.3	124	273	Peak
2483.5	48.84	-5.16	54	44.56	31.99	6.59	34.3	124	273	Average



Test Mode :	802.11n HT20	Temperature :	22~24°C
Test Band :	Low	Relative Humidity :	47~49%
Test Channel :	01	Test Engineer :	Marlboro Hsu

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2389.02	73.74	-0.26	74	69.7	31.92	6.45	34.33	111	231	Peak
2390	53.72	-0.28	54	49.68	31.92	6.45	34.33	111	231	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2389.38	70.36	-3.64	74	66.32	31.92	6.45	34.33	100	267	Peak
2390	51.51	-2.49	54	47.47	31.92	6.45	34.33	100	267	Average

Test Mode :	802.11n HT20	Temperature :	22~24°C
Test Band :	High	Relative Humidity :	47~49%
Test Channel :	11	Test Engineer :	Marlboro Hsu

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2484.64	73.64	-0.36	74	69.36	31.99	6.59	34.3	200	233	Peak
2483.5	52.89	-1.11	54	48.61	31.99	6.59	34.3	200	233	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2483.5	73.35	-0.65	74	69.07	31.99	6.59	34.3	100	273	Peak
2483.5	53.53	-0.47	54	49.25	31.99	6.59	34.3	100	273	Average



Test Mode :	802.11n HT40	Temperature :	22~24°C
Test Band :	Low	Relative Humidity :	47~49%
Test Channel :	03	Test Engineer :	Marlboro Hsu

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2388.12	70.36	-3.64	74	66.32	31.92	6.45	34.33	113	230	Peak
2390	53.43	-0.57	54	49.39	31.92	6.45	34.33	113	230	Average
2484.22	51.54	-22.46	74	47.26	31.99	6.59	34.3	113	230	Peak
2484.64	37.95	-16.05	54	33.67	31.99	6.59	34.3	113	230	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2388.21	68.1	-5.9	74	64.06	31.92	6.45	34.33	100	271	Peak
2389.83	52.75	-1.25	54	48.71	31.92	6.45	34.33	100	271	Average
2485.69	52.17	-21.83	74	47.89	31.99	6.59	34.3	100	271	Peak
2483.65	39.12	-14.88	54	34.84	31.99	6.59	34.3	100	271	Average



Test Mode :	802.11n HT40	Temperature :	22~24°C
Test Band :	High	Relative Humidity :	47~49%
Test Channel :	09	Test Engineer :	Marlboro Hsu

ANTENNA POLARITY : HORIZONTAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2386.59	54.54	-19.46	74	50.5	31.92	6.45	34.33	200	234	Peak
2388.12	40.69	-13.31	54	36.65	31.92	6.45	34.33	200	234	Average
2483.68	71.92	-2.08	74	67.64	31.99	6.59	34.3	200	234	Peak
2483.65	53.71	-0.29	54	49.43	31.99	6.59	34.3	200	234	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2389.47	53.41	-20.59	74	49.37	31.92	6.45	34.33	125	273	Peak
2389.47	39.06	-14.94	54	35.02	31.92	6.45	34.33	125	273	Average
2483.77	69.69	-4.31	74	65.41	31.99	6.59	34.3	125	273	Peak
2483.62	51.93	-2.07	54	47.65	31.99	6.59	34.3	125	273	Average

3.1.7 Test Result of Radiated Spurious Emission (30MHz ~ 10th Harmonic)

Note: Pre-scanned all test modes and only choose the worst case mode recorded in the test report for radiated spurious emission below 1GHz.

<MIMO Ant. Port 1+2>

Test Mode :	802.11b	Temperature :	22~24°C
Test Channel :	01	Relative Humidity :	47~49%
Test Engineer :	Marlboro Hsu	Polarization :	Horizontal
Remark :	2414 MHz is fundamental signal which can be ignored.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2414	106.42	-	-	102.33	31.93	6.49	34.33	200	233	Average
2414	111.22	-	-	107.13	31.93	6.49	34.33	200	233	Peak
4824	49.69	-4.31	54	60.71	34.4	10.17	55.59	100	26	Average
4824	52.22	-21.78	74	63.24	34.4	10.17	55.59	100	26	Peak

Test Mode :	802.11b	Temperature :	22~24°C
Test Channel :	01	Relative Humidity :	47~49%
Test Engineer :	Marlboro Hsu	Polarization :	Vertical
Remark :	2414 MHz is fundamental signal which can be ignored.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2414	106.41	-	-	102.32	31.93	6.49	34.33	200	268	Average
2414	110.82	-	-	106.73	31.93	6.49	34.33	200	268	Peak
4824	49.16	-4.84	54	60.18	34.4	10.17	55.59	100	326	Average
4824	51.91	-22.09	74	62.93	34.4	10.17	55.59	100	326	Peak

Test Mode :	802.11b	Temperature :	22~24°C
Test Channel :	06	Relative Humidity :	47~49%
Test Engineer :	Marlboro Hsu	Polarization :	Horizontal
Remark :	1. 2439 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2439	108.03	-	-	103.87	31.96	6.52	34.32	140	311	Average
2439	112.95	-	-	108.79	31.96	6.52	34.32	140	311	Peak
4875	51.85	-2.15	54	62.98	34.37	10.18	55.68	100	78	Average
4875	54.43	-19.57	74	65.56	34.37	10.18	55.68	100	78	Peak
7308	50.96	-23.04	74	60.69	35.61	10.94	56.28	100	0	Peak

Test Mode :	802.11b	Temperature :	22~24°C
Test Channel :	06	Relative Humidity :	47~49%
Test Engineer :	Marlboro Hsu	Polarization :	Vertical
Remark :	1. 2439 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2439	107.15	-	-	102.99	31.96	6.52	34.32	194	268	Average
2439	111.59	-	-	107.43	31.96	6.52	34.32	194	268	Peak
4875	50.66	-3.34	54	61.79	34.37	10.18	55.68	100	310	Average
4875	53.59	-20.41	74	64.72	34.37	10.18	55.68	100	310	Peak
7311	50.89	-23.11	74	60.62	35.61	10.94	56.28	100	0	Peak



Test Mode :	802.11b	Temperature :	22~24°C
Test Channel :	11	Relative Humidity :	47~49%
Test Engineer :	Marlboro Hsu	Polarization :	Horizontal
Remark :	2464 MHz is fundamental signal which can be ignored.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
152.85	24.07	-19.43	43.5	44.04	10.4	1.38	31.75	-	-	Peak
259.5	25.34	-20.66	46	41.38	13.9	1.79	31.73	-	-	Peak
268.14	27.25	-18.75	46	44.08	13.09	1.81	31.73	-	-	Peak
798.4	32.9	-13.1	46	41.77	20.02	3.06	31.95	-	-	Peak
910.4	33.17	-12.83	46	40.23	21.01	3.37	31.44	-	-	Peak
930	33.87	-12.13	46	40.56	21.2	3.36	31.25	100	215	Peak
2464	107.46	-	-	103.24	31.97	6.56	34.31	133	184	Average
2464	113.96	-	-	109.74	31.97	6.56	34.31	133	184	Peak
4923	52.12	-1.88	54	63.36	34.34	10.2	55.78	100	34	Average
4923	55.72	-18.28	74	66.96	34.34	10.2	55.78	100	34	Peak
7386	44.98	-9.02	54	54.61	35.56	10.92	56.11	121	338	Average
7386	52.49	-21.51	74	62.12	35.56	10.92	56.11	121	338	Peak



Test Mode :	802.11b	Temperature :	22~24°C
Test Channel :	11	Relative Humidity :	47~49%
Test Engineer :	Marlboro Hsu	Polarization :	Vertical
Remark :	2464 MHz is fundamental signal which can be ignored.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
30	29.62	-10.38	40	42.28	18.5	0.64	31.8	-	-	Peak
40.26	32.32	-7.68	40	51.13	12.24	0.74	31.79	122	158	Peak
91.56	24.75	-18.75	43.5	46.55	8.9	1.06	31.76	-	-	Peak
480.6	26.81	-19.19	46	38.8	17.61	2.31	31.91	-	-	Peak
625.5	24.3	-21.7	46	33.85	19.71	2.79	32.05	-	-	Peak
798.4	27.9	-18.1	46	36.77	20.02	3.06	31.95	-	-	Peak
2464	106.48	-	-	102.26	31.97	6.56	34.31	101	94	Average
2464	111.49	-	-	107.27	31.97	6.56	34.31	101	94	Peak
4923	49.55	-4.45	54	60.79	34.34	10.2	55.78	100	311	Average
4923	52.07	-21.93	74	63.31	34.34	10.2	55.78	100	311	Peak
7386	45.03	-8.97	54	54.66	35.56	10.92	56.11	100	56	Average
7386	52.51	-21.49	74	62.14	35.56	10.92	56.11	100	56	Peak

Test Mode :	802.11g	Temperature :	22~24°C
Test Channel :	01	Relative Humidity :	47~49%
Test Engineer :	Marlboro Hsu	Polarization :	Horizontal
Remark :	1. 2411 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
152.85	24.11	-19.39	43.5	44.08	10.4	1.38	31.75	-	-	Peak
260.04	24.74	-21.26	46	40.78	13.9	1.79	31.73	-	-	Peak
268.14	27.28	-18.72	46	44.11	13.09	1.81	31.73	-	-	Peak
480.6	27.72	-18.28	46	39.71	17.61	2.31	31.91	-	-	Peak
797	34.75	-11.25	46	43.61	20.03	3.06	31.95	100	147	Peak
931.4	34.17	-11.83	46	40.84	21.21	3.36	31.24	-	-	Peak
2411	98.91	-	-	94.82	31.93	6.49	34.33	176	360	Average
2411	109.69	-	-	105.6	31.93	6.49	34.33	176	360	Peak
4824	47.42	-26.58	74	58.44	34.4	10.17	55.59	100	0	Peak



Test Mode :	802.11g	Temperature :	22~24°C
Test Channel :	01	Relative Humidity :	47~49%
Test Engineer :	Marlboro Hsu	Polarization :	Vertical
Remark :	1. 2411 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
30	29.58	-10.42	40	42.24	18.5	0.64	31.8	-	-	Peak
35.4	27.98	-12.02	40	44.09	14.98	0.7	31.79	-	-	Peak
40.26	30.61	-9.39	40	49.42	12.24	0.74	31.79	110	358	Peak
480.6	27.38	-18.62	46	39.37	17.61	2.31	31.91	-	-	Peak
601	25.11	-20.89	46	34.99	19.41	2.77	32.06	-	-	Peak
928.6	25.2	-20.8	46	31.92	21.18	3.36	31.26	-	-	Peak
2411	98.85	-	-	94.76	31.93	6.49	34.33	127	270	Average
2411	109.45	-	-	105.36	31.93	6.49	34.33	127	270	Peak
4824	46.97	-27.03	74	57.99	34.4	10.17	55.59	100	0	Peak

Test Mode :	802.11g	Temperature :	22~24°C
Test Channel :	06	Relative Humidity :	47~49%
Test Engineer :	Marlboro Hsu	Polarization :	Horizontal
Remark :	1. 2436 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2436	102.55	-	-	98.41	31.94	6.52	34.32	173	360	Average
2436	113.16	-	-	109.02	31.94	6.52	34.32	173	360	Peak
4875	41.25	-12.75	54	52.38	34.37	10.18	55.68	103	338	Average
4875	52.8	-21.2	74	63.93	34.37	10.18	55.68	103	338	Peak
7311	50.48	-23.52	74	60.21	35.61	10.94	56.28	100	0	Peak

Test Mode :	802.11g	Temperature :	22~24°C
Test Channel :	06	Relative Humidity :	47~49%
Test Engineer :	Marlboro Hsu	Polarization :	Vertical
Remark :	1. 2438 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2438	102.07	-	-	97.91	31.96	6.52	34.32	126	274	Average
2438	112.8	-	-	108.64	31.96	6.52	34.32	126	274	Peak
4872	40.35	-13.65	54	51.48	34.37	10.18	55.68	100	326	Average
4872	51.1	-22.9	74	62.23	34.37	10.18	55.68	100	326	Peak
7311	49.13	-24.87	74	58.86	35.61	10.94	56.28	100	0	Peak

Test Mode :	802.11g	Temperature :	22~24°C
Test Channel :	11	Relative Humidity :	47~49%
Test Engineer :	Marlboro Hsu	Polarization :	Horizontal
Remark :	1. 2461 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2461	99.04	-	-	94.82	31.97	6.56	34.31	200	230	Average
2461	110.14	-	-	105.92	31.97	6.56	34.31	200	230	Peak
4923	46.96	-27.04	74	58.2	34.34	10.2	55.78	100	0	Peak
7386	49.81	-24.19	74	59.44	35.56	10.92	56.11	100	0	Peak

Test Mode :	802.11g	Temperature :	22~24°C
Test Channel :	11	Relative Humidity :	47~49%
Test Engineer :	Marlboro Hsu	Polarization :	Vertical
Remark :	1. 2463 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2463	99.2	-	-	94.98	31.97	6.56	34.31	124	273	Average
2463	110.25	-	-	106.03	31.97	6.56	34.31	124	273	Peak
4923	46.51	-27.49	74	57.75	34.34	10.2	55.78	100	0	Peak
7386	48.91	-25.09	74	58.54	35.56	10.92	56.11	100	0	Peak



Test Mode :	802.11n HT20	Temperature :	22~24°C
Test Channel :	01	Relative Humidity :	47~49%
Test Engineer :	Marlboro Hsu	Polarization :	Horizontal
Remark :	1. 2414 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
150.96	23.7	-19.8	43.5	43.5	10.6	1.35	31.75	-	-	Peak
260.04	24.36	-21.64	46	40.4	13.9	1.79	31.73	-	-	Peak
268.14	28.47	-17.53	46	45.3	13.09	1.81	31.73	-	-	Peak
333.6	25.96	-20.04	46	41.91	13.81	1.99	31.75	-	-	Peak
480.6	27.97	-18.03	46	39.96	17.61	2.31	31.91	-	-	Peak
900.6	31.58	-14.42	46	38.64	21.09	3.37	31.52	100	215	Peak
2414	95.26	-	-	91.17	31.93	6.49	34.33	111	231	Average
2414	107.2	-	-	103.11	31.93	6.49	34.33	111	231	Peak
4824	47.01	-26.99	74	58.03	34.4	10.17	55.59	100	0	Peak

Test Mode :	802.11n HT20	Temperature :	22~24°C
Test Channel :	01	Relative Humidity :	47~49%
Test Engineer :	Marlboro Hsu	Polarization :	Vertical
Remark :	1. 2410 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
30	28.6	-11.4	40	41.26	18.5	0.64	31.8	-	-	Peak
40.26	31.68	-8.32	40	50.49	12.24	0.74	31.79	112	198	Peak
91.56	26.57	-16.93	43.5	48.37	8.9	1.06	31.76	-	-	Peak
480.6	26.56	-19.44	46	38.55	17.61	2.31	31.91	-	-	Peak
762	24	-22	46	32.75	20.18	3.05	31.98	-	-	Peak
882.4	24.6	-21.4	46	31.99	20.9	3.32	31.61	-	-	Peak
2410	94.6	-	-	90.51	31.93	6.49	34.33	100	267	Average
2410	106.65	-	-	102.56	31.93	6.49	34.33	100	267	Peak
4824	46.15	-27.85	74	57.17	34.4	10.17	55.59	100	0	Peak

Test Mode :	802.11n HT20	Temperature :	22~24°C
Test Channel :	06	Relative Humidity :	47~49%
Test Engineer :	Marlboro Hsu	Polarization :	Horizontal
Remark :	1. 2439 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2439	98.92	-	-	94.76	31.96	6.52	34.32	128	269	Average
2439	109.17	-	-	105.01	31.96	6.52	34.32	128	269	Peak
4875	40.47	-13.53	54	51.6	34.37	10.18	55.68	101	356	Average
4875	52.13	-21.87	74	63.26	34.37	10.18	55.68	101	356	Peak
7314	50.35	-23.65	74	60.08	35.61	10.94	56.28	100	0	Peak

Test Mode :	802.11n HT20	Temperature :	22~24°C
Test Channel :	06	Relative Humidity :	47~49%
Test Engineer :	Marlboro Hsu	Polarization :	Vertical
Remark :	1. 2439 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2439	99.29	-	-	95.13	31.96	6.52	34.32	100	268	Average
2439	111.62	-	-	107.46	31.96	6.52	34.32	100	268	Peak
4875	39.43	-14.57	54	50.56	34.37	10.18	55.68	100	316	Average
4875	51.18	-22.82	74	62.31	34.37	10.18	55.68	100	316	Peak
7311	48.88	-25.12	74	58.61	35.61	10.94	56.28	100	0	Peak

Test Mode :	802.11n HT20	Temperature :	22~24°C
Test Channel :	11	Relative Humidity :	47~49%
Test Engineer :	Marlboro Hsu	Polarization :	Horizontal
Remark :	1. 2464 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2464	95.88	-	-	91.65	31.97	6.56	34.3	200	233	Average
2464	108.4	-	-	104.17	31.97	6.56	34.3	200	233	Peak
4923	48.38	-25.62	74	59.62	34.34	10.2	55.78	100	0	Peak
7386	48.88	-25.12	74	58.51	35.56	10.92	56.11	100	0	Peak

Test Mode :	802.11n HT20	Temperature :	22~24°C
Test Channel :	11	Relative Humidity :	47~49%
Test Engineer :	Marlboro Hsu	Polarization :	Vertical
Remark :	1. 2464 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2464	93.98	-	-	89.76	31.97	6.56	34.31	100	273	Average
2464	107.27	-	-	103.05	31.97	6.56	34.31	100	273	Peak
4923	46.63	-27.37	74	57.87	34.34	10.2	55.78	100	0	Peak
7386	49.04	-24.96	74	58.67	35.56	10.92	56.11	100	0	Peak

Test Mode :	802.11n HT40	Temperature :	22~24°C
Test Channel :	03	Relative Humidity :	47~49%
Test Engineer :	Marlboro Hsu	Polarization :	Horizontal
Remark :	1. 2424 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2424	93.38	-	-	89.27	31.94	6.49	34.32	113	230	Average
2424	104.14	-	-	100.03	31.94	6.49	34.32	113	230	Peak
4845	46.87	-27.13	74	57.93	34.39	10.17	55.62	100	0	Peak
7266	48.21	-25.79	74	57.98	35.63	10.95	56.35	100	0	Peak

Test Mode :	802.11n HT40	Temperature :	22~24°C
Test Channel :	03	Relative Humidity :	47~49%
Test Engineer :	Marlboro Hsu	Polarization :	Vertical
Remark :	1. 2424 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2424	90.71	-	-	86.6	31.94	6.49	34.32	100	271	Average
2424	102.3	-	-	98.19	31.94	6.49	34.32	100	271	Peak
4845	45.96	-28.04	74	57.02	34.39	10.17	55.62	100	0	Peak
7266	48.51	-25.49	74	58.28	35.63	10.95	56.35	100	0	Peak

Test Mode :	802.11n HT40	Temperature :	22~24°C
Test Channel :	06	Relative Humidity :	47~49%
Test Engineer :	Marlboro Hsu	Polarization :	Horizontal
Remark :	1. 2439 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2439	96.47	-	-	92.31	31.96	6.52	34.32	107	230	Average
2439	106.54	-	-	102.38	31.96	6.52	34.32	107	230	Peak
4845	46.87	-27.13	74	57.93	34.39	10.17	55.62	100	0	Peak
7311	48.96	-25.04	74	58.69	35.61	10.94	56.28	100	0	Peak

Test Mode :	802.11n HT40	Temperature :	22~24°C
Test Channel :	06	Relative Humidity :	47~49%
Test Engineer :	Marlboro Hsu	Polarization :	Vertical
Remark :	1. 2439 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
2439	92.54	-	-	88.38	31.96	6.52	34.32	100	260	Average
2439	102.3	-	-	98.14	31.96	6.52	34.32	100	260	Peak
4845	45.96	-28.04	74	57.02	34.39	10.17	55.62	100	0	Peak
7311	49.1	-24.9	74	58.83	35.61	10.94	56.28	100	0	Peak

Test Mode :	802.11n HT40	Temperature :	22~24°C
Test Channel :	09	Relative Humidity :	47~49%
Test Engineer :	Marlboro Hsu	Polarization :	Horizontal
Remark :	1. 2454 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
71.04	20.93	-19.07	40	45.26	6.5	0.94	31.77	-	-	Peak
253.56	25.38	-20.62	46	42.51	12.85	1.75	31.73	-	-	Peak
268.14	27.33	-18.67	46	44.16	13.09	1.81	31.73	-	-	Peak
336.4	25.27	-20.73	46	41.14	13.89	2	31.76	-	-	Peak
480.6	27.73	-18.27	46	39.72	17.61	2.31	31.91	-	-	Peak
909	31.18	-14.82	46	38.25	21.01	3.37	31.45	112	256	Peak
2454	94.17	-	-	89.95	31.97	6.56	34.31	200	234	Average
2454	105.11	-	-	100.94	31.96	6.52	34.31	200	234	Peak
4905	46.98	-27.02	74	58.17	34.35	10.2	55.74	100	0	Peak
7356	48.58	-25.42	74	58.26	35.58	10.92	56.18	100	0	Peak



Test Mode :	802.11n HT40	Temperature :	22~24°C
Test Channel :	09	Relative Humidity :	47~49%
Test Engineer :	Marlboro Hsu	Polarization :	Vertical
Remark :	1. 2454 MHz is fundamental signal which can be ignored. 2. Average measurement was not performed if peak level went lower than the average limit.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
39.45	31.89	-8.11	40	50.04	12.9	0.74	31.79	100	219	Peak
71.85	23.56	-16.44	40	47.88	6.5	0.95	31.77	-	-	Peak
92.64	26.54	-16.96	43.5	47.72	9.5	1.07	31.75	-	-	Peak
480.6	27.28	-18.72	46	39.27	17.61	2.31	31.91	-	-	Peak
601	24.25	-21.75	46	34.13	19.41	2.77	32.06	-	-	Peak
758.5	23.7	-22.3	46	32.43	20.2	3.05	31.98	-	-	Peak
2454	91.98	-	-	87.76	31.97	6.56	34.31	125	273	Average
2454	101.41	-	-	97.19	31.97	6.56	34.31	125	273	Peak
4905	46.46	-27.54	74	57.65	34.35	10.2	55.74	100	0	Peak
7356	48.9	-25.1	74	58.58	35.58	10.92	56.18	100	0	Peak



Test Mode :	802.11a	Temperature :	22~24°C
Test Channel :	149	Relative Humidity :	47~49%
Test Engineer :	Marlboro Hsu	Polarization :	Horizontal
Remark :	5747 MHz is fundamental signal which can be ignored.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
154.74	23.48	-20.02	43.5	43.63	10.2	1.4	31.75	-	-	Peak
260.04	24.22	-21.78	46	40.26	13.9	1.79	31.73	-	-	Peak
268.14	28.02	-17.98	46	44.85	13.09	1.81	31.73	-	-	Peak
797	29.65	-16.35	46	38.51	20.03	3.06	31.95	-	-	Peak
882.4	32.09	-13.91	46	39.48	20.9	3.32	31.61	-	-	Peak
923	34	-12	46	40.83	21.13	3.36	31.32	112	321	Peak
5747	98.42	-	-	85.29	35.04	11.39	33.3	110	27	Average
5747	109.35	-	-	96.22	35.04	11.39	33.3	110	27	Peak
11487	44.21	-9.79	54	49.21	37.79	11.04	53.83	100	309	Average
11487	55.42	-18.58	74	60.42	37.79	11.04	53.83	100	309	Peak



Test Mode :	802.11a	Temperature :	22~24°C
Test Channel :	149	Relative Humidity :	47~49%
Test Engineer :	Marlboro Hsu	Polarization :	Vertical
Remark :	5747 MHz is fundamental signal which can be ignored.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
30	29.11	-10.89	40	41.77	18.5	0.64	31.8	-	-	Peak
40.8	31.84	-8.16	40	50.65	12.24	0.74	31.79	100	123	Peak
92.64	26.89	-16.61	43.5	48.07	9.5	1.07	31.75	-	-	Peak
331.5	19.47	-26.53	46	35.48	13.75	1.99	31.75	-	-	Peak
417.6	21.35	-24.65	46	34.25	16.7	2.24	31.84	-	-	Peak
480.6	28.5	-17.5	46	40.49	17.61	2.31	31.91	-	-	Peak
5747	97.3	-	-	84.17	35.04	11.39	33.3	109	83	Average
5747	107.99	-	-	94.86	35.04	11.39	33.3	109	83	Peak
11487	53.22	-0.78	54	58.22	37.79	11.04	53.83	100	351	Average
11487	65.66	-8.34	74	70.66	37.79	11.04	53.83	100	351	Peak

Test Mode :	802.11a	Temperature :	22~24°C
Test Channel :	157	Relative Humidity :	47~49%
Test Engineer :	Marlboro Hsu	Polarization :	Horizontal
Remark :	5787 MHz is fundamental signal which can be ignored.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5787	99.11	-	-	85.91	35.09	11.43	33.32	109	205	Average
5787	110.08	-	-	96.88	35.09	11.43	33.32	109	205	Peak
11571	44.94	-9.06	54	49.69	37.92	11.09	53.76	100	316	Average
11571	56.78	-17.22	74	61.53	37.92	11.09	53.76	100	316	Peak

Test Mode :	802.11a	Temperature :	22~24°C
Test Channel :	157	Relative Humidity :	47~49%
Test Engineer :	Marlboro Hsu	Polarization :	Vertical
Remark :	5787 MHz is fundamental signal which can be ignored.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5787	96.46	-	-	83.26	35.09	11.43	33.32	120	86	Average
5787	107.31	-	-	94.11	35.09	11.43	33.32	120	86	Peak
11565	53.11	-0.89	54	57.9	37.89	11.09	53.77	100	347	Average
11565	65.3	-8.7	74	70.09	37.89	11.09	53.77	100	347	Peak

Test Mode :	802.11a	Temperature :	22~24°C
Test Channel :	165	Relative Humidity :	47~49%
Test Engineer :	Marlboro Hsu	Polarization :	Horizontal
Remark :	5827 MHz is fundamental signal which can be ignored.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5827	96.48	-	-	83.17	35.13	11.51	33.33	106	236	Average
5827	108.54	-	-	95.23	35.13	11.51	33.33	106	236	Peak
11652	44.71	-9.29	54	49.2	38.08	11.14	53.71	100	318	Average
11652	56.33	-17.67	74	60.82	38.08	11.14	53.71	100	318	Peak

Test Mode :	802.11a	Temperature :	22~24°C
Test Channel :	165	Relative Humidity :	47~49%
Test Engineer :	Marlboro Hsu	Polarization :	Vertical
Remark :	5827 MHz is fundamental signal which can be ignored.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5827	97.57	-	-	84.26	35.13	11.51	33.33	157	84	Average
5827	107.99	-	-	94.68	35.13	11.51	33.33	157	84	Peak
11652	52.63	-1.37	54	57.12	38.08	11.14	53.71	100	347	Average
11652	63.5	-10.5	74	67.99	38.08	11.14	53.71	100	347	Peak



Test Mode :	802.11n HT20	Temperature :	22~24°C
Test Channel :	149	Relative Humidity :	47~49%
Test Engineer :	Marlboro Hsu	Polarization :	Horizontal
Remark :	5742 MHz is fundamental signal which can be ignored.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
84.54	20.69	-19.31	40	43.78	7.66	1.01	31.76	-	-	Peak
154.2	23.78	-19.72	43.5	43.84	10.3	1.39	31.75	-	-	Peak
268.14	28.22	-17.78	46	45.05	13.09	1.81	31.73	-	-	Peak
336.4	25.63	-20.37	46	41.5	13.89	2	31.76	-	-	Peak
480.6	28.47	-17.53	46	40.46	17.61	2.31	31.91	-	-	Peak
835.5	30.12	-15.88	46	38.09	20.65	3.18	31.8	100	213	Peak
5742	99.54	-	-	86.41	35.04	11.39	33.3	100	207	Average
5742	112.08	-	-	98.95	35.04	11.39	33.3	100	207	Peak
11490	44.08	-9.92	54	49.08	37.79	11.04	53.83	100	342	Average
11490	55.96	-18.04	74	60.96	37.79	11.04	53.83	100	342	Peak



Test Mode :	802.11n HT20	Temperature :	22~24°C
Test Channel :	149	Relative Humidity :	47~49%
Test Engineer :	Marlboro Hsu	Polarization :	Vertical
Remark :	5743 MHz is fundamental signal which can be ignored.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
30	29.05	-10.95	40	41.71	18.5	0.64	31.8	-	-	Peak
40.26	32.48	-7.52	40	51.29	12.24	0.74	31.79	115	258	Peak
92.64	26.02	-17.48	43.5	47.2	9.5	1.07	31.75	-	-	Peak
438.6	21.96	-24.04	46	34.73	16.8	2.29	31.86	-	-	Peak
623.4	24.07	-21.93	46	33.67	19.67	2.78	32.05	-	-	Peak
837.6	25.36	-20.64	46	33.28	20.68	3.19	31.79	-	-	Peak
5743	99.12	-	-	85.99	35.04	11.39	33.3	101	195	Average
5743	107.89	-	-	94.76	35.04	11.39	33.3	101	195	Peak
11490	53.36	-0.64	54	58.36	37.79	11.04	53.83	101	347	Average
11490	65.7	-8.3	74	70.7	37.79	11.04	53.83	101	347	Peak

Test Mode :	802.11n HT20	Temperature :	22~24°C
Test Channel :	157	Relative Humidity :	47~49%
Test Engineer :	Marlboro Hsu	Polarization :	Horizontal
Remark :	5784 MHz is fundamental signal which can be ignored.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5784	99.93	-	-	86.73	35.08	11.43	33.31	100	206	Average
5784	112.39	-	-	99.19	35.08	11.43	33.31	100	206	Peak
11570	44	-10	54	48.75	37.92	11.09	53.76	103	341	Average
11570	56.01	-17.99	74	60.76	37.92	11.09	53.76	103	341	Peak

Test Mode :	802.11n HT20	Temperature :	22~24°C
Test Channel :	157	Relative Humidity :	47~49%
Test Engineer :	Marlboro Hsu	Polarization :	Vertical
Remark :	5785 MHz is fundamental signal which can be ignored.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5785	96.39	-	-	83.15	35.09	11.47	33.32	101	193	Average
5785	108.52	-	-	95.28	35.09	11.47	33.32	101	193	Peak
11570	53.25	-0.75	54	58	37.92	11.09	53.76	104	350	Average
11570	62.6	-11.4	74	67.35	37.92	11.09	53.76	104	350	Peak

Test Mode :	802.11n HT20	Temperature :	22~24°C
Test Channel :	165	Relative Humidity :	47~49%
Test Engineer :	Marlboro Hsu	Polarization :	Horizontal
Remark :	5824 MHz is fundamental signal which can be ignored.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5824	99.57	-	-	86.26	35.13	11.51	33.33	100	160	Average
5824	112.86	-	-	99.55	35.13	11.51	33.33	100	160	Peak
11650	43.46	-10.54	54	47.95	38.08	11.14	53.71	101	3	Average
11650	56.6	-17.4	74	61.09	38.08	11.14	53.71	101	3	Peak

Test Mode :	802.11n HT20	Temperature :	22~24°C
Test Channel :	165	Relative Humidity :	47~49%
Test Engineer :	Marlboro Hsu	Polarization :	Vertical
Remark :	5826 MHz is fundamental signal which can be ignored.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5826	96.22	-	-	82.91	35.13	11.51	33.33	100	189	Average
5826	108.43	-	-	95.12	35.13	11.51	33.33	100	189	Peak
11650	52.75	-1.25	54	57.24	38.08	11.14	53.71	102	355	Average
11650	60.99	-13.01	74	65.48	38.08	11.14	53.71	102	355	Peak



Test Mode :	802.11n HT40	Temperature :	22~24°C
Test Channel :	151	Relative Humidity :	47~49%
Test Engineer :	Marlboro Hsu	Polarization :	Horizontal
Remark :	5757 MHz is fundamental signal which can be ignored.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
40.8	20.02	-19.98	40	38.83	12.24	0.74	31.79	-	-	Peak
154.2	23.46	-20.04	43.5	43.52	10.3	1.39	31.75	-	-	Peak
268.14	27.73	-18.27	46	44.56	13.09	1.81	31.73	-	-	Peak
480.6	27.88	-18.12	46	39.87	17.61	2.31	31.91	-	-	Peak
800.5	30.13	-15.87	46	39.02	20	3.06	31.95	-	-	Peak
937	31.19	-14.81	46	37.75	21.27	3.36	31.19	100	215	Peak
5757	99.71	-	-	86.58	35.04	11.39	33.3	100	207	Average
5757	111.09	-	-	97.96	35.04	11.39	33.3	100	207	Peak
11510	44.28	-9.72	54	49.24	37.8	11.04	53.8	100	260	Average
11510	54.83	-19.17	74	59.79	37.8	11.04	53.8	100	260	Peak

Test Mode :	802.11n HT40	Temperature :	22~24°C
Test Channel :	151	Relative Humidity :	47~49%
Test Engineer :	Marlboro Hsu	Polarization :	Vertical
Remark :	5753 MHz is fundamental signal which can be ignored.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
30	28.18	-11.82	40	40.84	18.5	0.64	31.8	-	-	Peak
40.8	31.93	-8.07	40	50.74	12.24	0.74	31.79	115	308	Peak
91.56	27.07	-16.43	43.5	48.87	8.9	1.06	31.76	-	-	Peak
480.6	27.93	-18.07	46	39.92	17.61	2.31	31.91	-	-	Peak
604.5	24.34	-21.66	46	34.19	19.44	2.77	32.06	-	-	Peak
825	30.3	-15.7	46	38.49	20.51	3.15	31.85	-	-	Peak
5753	95.83	-	-	82.7	35.04	11.39	33.3	100	194	Average
5753	106.88	-	-	93.75	35.04	11.39	33.3	100	194	Peak
11510	52.69	-1.31	54	57.59	37.83	11.06	53.79	104	351	Average
11510	61.48	-12.52	74	66.38	37.83	11.06	53.79	104	351	Peak

Test Mode :	802.11n HT40	Temperature :	22~24°C
Test Channel :	159	Relative Humidity :	47~49%
Test Engineer :	Marlboro Hsu	Polarization :	Horizontal
Remark :	5797 MHz is fundamental signal which can be ignored.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5797	98.42	-	-	85.18	35.09	11.47	33.32	101	160	Average
5797	108.89	-	-	95.65	35.09	11.47	33.32	101	160	Peak
11590	45.66	-8.34	54	50.35	37.96	11.1	53.75	155	342	Average
11590	54.05	-19.95	74	58.74	37.96	11.1	53.75	155	342	Peak

Test Mode :	802.11n HT40	Temperature :	22~24°C
Test Channel :	159	Relative Humidity :	47~49%
Test Engineer :	Marlboro Hsu	Polarization :	Vertical
Remark :	5795 MHz is fundamental signal which can be ignored.		

Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5795	94.81	-	-	81.57	35.09	11.47	33.32	101	193	Average
5795	106.76	-	-	93.52	35.09	11.47	33.32	101	193	Peak
11590	50.32	-3.68	54	55.01	37.96	11.1	53.75	131	292	Average
11590	59.99	-14.01	74	64.68	37.96	11.1	53.75	131	292	Peak

3.2 Antenna Requirements

3.2.1 Standard Applicable

According to FCC 47 CFR Section 15.407(a)(1)(2) ,if transmitting antenna directional gain is greater than 6 dBi, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

3.2.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

3.2.3 Antenna Gain

FCC KDB 662911 D01 Multiple Transmitter Output v02r01

For CDD transmissions, directional gain is calculated as

$$DirectionalGain = 10 \cdot \log \left[\frac{\sum_{j=1}^{N_{SS}} \left\{ \sum_{k=1}^{N_{ANT}} g_{j,k} \right\}^2}{N_{ANT}} \right]$$

where

Each antenna is driven by no more than one spatial stream;

N_{SS} = the number of independent spatial streams of data;

N_{ANT} = the total number of antennas

$g_{j,k} = 10^{G_k / 20}$ if the k th antenna is being fed by spatial stream j , or zero if it is not;
 G_k is the gain in dBi of the k th antenna.

The EUT supports CDD mode.

The power and PSD limit should be modified if the directional gain of EUT is over 6 dBi,

The directional gain “DG” is calculated as following table.

<For Sample 1>

			DG for Power (dBi)	DG for PSD (dBi)	Power Limit Reduction (dB)	PSD Limit Reduction (dB)
	Ant. Port 1 (dBi)	Ant. Port 2 (dBi)				
2.4GHz	1.87	0.69	1.32	4.33	0.00	0.00
5GHz	-3.71	2.67	0.56	3.57	0.00	0.00

Power Limit Reduction = DG(Power) – 6dBi, (min = 0)

PSD Limit Reduction = DG(PSD) – 6dBi, (min = 0)

<For Sample 2>

			DG for Power (dBi)	DG for PSD (dBi)	Power Limit Reduction (dB)	PSD Limit Reduction (dB)
	Ant. Port 1 (dBi)	Ant. Port 2 (dBi)				
2.4GHz	-1.63	-0.35	-0.94	2.07	0.00	0.00
5GHz	1.84	-1.91	0.36	3.37	0.00	0.00

Power Limit Reduction = DG(Power) – 6dBi, (min = 0)

PSD Limit Reduction = DG(PSD) – 6dBi, (min = 0)

4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Power Meter	Anritsu	ML2495A	1036004	300MHz~40GHz	Aug. 17, 2013	Dec. 17, 2013~ Dec. 24, 2013	Aug. 16, 2014	Conducted (TH02-HY)
Power Sensor	Anritsu	MA2411B	1027253	300MHz~40GHz	Aug. 17, 2013	Dec. 17, 2013~ Dec. 24, 2013	Aug. 16, 2014	Conducted (TH02-HY)
Spectrum Analyzer	R&S	FSP30	101067	9kHz ~ 30GHz	Nov. 20, 2013	Jan. 15, 2014~ Jan. 18, 2014	Nov. 19, 2014	Radiation (03CH06-HY)
Spectrum Analyzer	Agilent	E4408B	MY442110 30	9kHz ~ 26.5GHz	Dec. 02, 2013	Jan. 15, 2014~ Jan. 18, 2014	Dec. 01, 2014	Radiation (03CH06-HY)
EMI Test Receiver	R&S	ESVS10	834468/00 03	20MHz ~ 1000MHz	May 06, 2013	Jan. 15, 2014~ Jan. 18, 2014	May 05, 2014	Radiation (03CH06-HY)
Bilog Antenna	Schaffner	CBL6112B	2885	30MHz ~ 2GHz	Oct. 10, 2013	Jan. 15, 2014~ Jan. 18, 2014	Oct. 09, 2014	Radiation (03CH06-HY)
Double Ridge Horn Antenna	EMCO	3117	00066583	1GHz ~ 18GHz	Aug. 02, 2013	Jan. 15, 2014~ Jan. 18, 2014	Aug. 01, 2014	Radiation (03CH06-HY)
Amplifier	Agilent	310N	186713	9kHz ~ 1GHz	Apr. 12, 2013	Jan. 15, 2014~ Jan. 18, 2014	Apr. 11, 2014	Radiation (03CH06-HY)
Pre Amplifier	EMCI	EMC051845	SN980048	1GHz ~ 18GHz	Jul. 18, 2013	Jan. 15, 2014~ Jan. 18, 2014	Jul. 17, 2014	Radiation (03CH06-HY)
SHF-EHF Horn Antenna	SCHWARZBE CK	BBHA 9170	BBHA917 0251	15GHz ~ 40GHz	Oct. 03, 2013	Jan. 15, 2014~ Jan. 18, 2014	Oct. 02, 2014	Radiation (03CH06-HY)
Preamplifier	Agilent	8449B	3008A019 17	1GHz ~ 26.5GHz	Apr. 12, 2013	Jan. 15, 2014~ Jan. 18, 2014	Apr. 11, 2014	Radiation (03CH06-HY)
Turn Table	INN-CO	DS2000	420/650/0 0	0 ~ 360 degree	N/A	Jan. 15, 2014~ Jan. 18, 2014	N/A	Radiation (03CH06-HY)
Antenna Mast	MF	MF-7802	MF780208 212	1 m ~ 4 m	N/A	Jan. 15, 2014~ Jan. 18, 2014	N/A	Radiation (03CH06-HY)



5 Uncertainty of Evaluation

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	4.50
---	-------------

