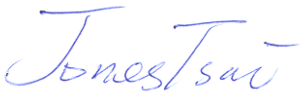
FCC RF Test Report

APPLICANT	**:**	**Harpers LLC**
EQUIPMENT	**:**	**Tablet Device**
MODEL NAME	**:**	**X43Z60**
FCC ID	**:**	**YJM-0725**
STANDARD	**:**	**FCC Part 15 Subpart E**
CLASSIFICATION	**:**	**(NII) Unlicensed National Information Infrastructure**

The product was received on Jan. 02, 2012 and completely tested on May 30, 2012. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.4-2003 and shown compliance 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:



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

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR210222C	Rev. 01	Initial issue of report	Jun. 04, 2012
FR210222C	Rev. 02	Update report of adding Unwanted Emissions and antenna gain description	Jul. 11, 2012

SUMMARY OF TEST RESULT

Report Section	FCC Rule	IC Rule	Description	Limit	Result	Remark
3.1	15.403(i)	A9.2	26dB & 99% Bandwidth	-	Pass	-
3.2	15.407(a)	A9.2	Maximum Conducted Output Power	≤ 17, 24, 30 dBm (depend on band)	Pass	-
3.3	15.407(a)	A9.2	Power Spectral Density	≤ 4, 11, 17 dBm (depend on band)	Pass	-
3.4	15.207	Gen 7.2.4	AC Conducted Emission	15.207(a)	Pass	Under limit 3.60 dB at 0.470 MHz
3.5	15.407(b)	A9.3	Unwanted Emissions	≤ -17, -27 dBm (depend on band)&15.209(a)	Pass	Under limit 0.22 dB at 5147.25 MHz
3.6	15.407(b)	A9.3	Peak Excursion Ratio	≤ 13dB	Pass	-
3.7	15.407(c)	A9.5	Automatically Discontinue Transmission	Discontinue Transmission	Pass	-
3.8	15.407(g)	A9.5	Frequency Stability	Within Operation Band	Pass	-
3.9	15.203 & 15.407(a)	A9.2	Antenna Requirement	N/A	Pass	-

1 General Description

1.1 Applicant

Harpers LLC
Suite 5, 2215-B Renaissance Drive Las Vegas, NV 89119

1.2 Feature of Equipment Under Test

Product Specification	
Equipment	Tablet Device
Model Name	X43Z60
FCC ID	YJM-0725
Tx/Rx Frequency Range	5180 MHz ~ 5240 MHz
Antenna Type	Ant 1 : Fixed Internal Antenna with gain 3.50 dBi Ant 2 : Fixed Internal Antenna with gain 2.90 dB
Type of Modulation	OFDM (BPSK / QPSK / 16QAM / 64QAM)

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

<table>
<tr><th colspan="2">Product Feature</th></tr>
<tr><td>Maximum Output Power to Antenna</td><td><5180 MHz ~ 5240 MHz>
<Legacy Ant 1>
802.11a : 13.14 dBm / 0.0206 W
<SISO Ant 1>
802.11n (BW 20MHz) : 12.94 dBm / 0.0197 W
802.11n (BW 40MHz) : 12.88 dBm / 0.0194 W
<MIMO Ant 1+2>
802.11n (BW 20MHz) : 15.08 dBm / 0.0322 W
802.11n (BW 40MHz) : 14.22 dBm / 0.0264 W</td></tr>
<tr><td>Duty Cycle</td><td><Legacy Ant 1>
802.11a : 97.81%
<SISO Ant 1>
802.11n (BW 20MHz) : 96.91%
802.11n (BW 40MHz) : 98.10% for CH38
802.11n (BW 40MHz) : 95.36%
<MIMO Ant 1+2>
802.11n (BW 20MHz) : 95.52% for Ant 1
802.11n (BW 20MHz) : 95.53% for Ant 2
802.11n (BW 40MHz) : 96.36% for Ant 1 CH38
802.11n (BW 40MHz) : 91.49% for Ant 1
802.11n (BW 40MHz) : 96.36% for Ant 2 CH38
802.11n (BW 40MHz) : 91.44% for Ant 2</td></tr>
<tr><td>Antenna Function Description</td><td><table><tr><td></td><td>Ant 1.</td><td>Ant 2.</td></tr><tr><td>802.11 a</td><td>V</td><td>-</td></tr><tr><td>802.11n
SISO</td><td>V</td><td>-</td></tr><tr><td>802.11n
MIMO</td><td>V</td><td>V</td></tr></table></td></tr>
</table>

1.3 Testing Site

Test Site	SPORTON INTERNATIONAL INC.		
Test Site Location	No. 52, Hwa Ya 1st 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.
	CO05-HY	03CH07-HY	722060/4086B-1

1.4 Applied Standards

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

- FCC Part 15 Subpart E
- FCC KDB 789033 D01 General UNII Test Procedures v01r01
- FCC KDB 662911 D01 Multiple Transmitter Output v01r01
- ANSI C63.4-2003
- IC RSS-210 Issued 8
- IC RSS-Gen Issue 3

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.

1.5 Ancillary Equipment List

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	WLAN AP	D-Link	DIR-628	KA2DIR628A2	N/A	Unshielded, 1.8 m
2.	Notebook	DELL	P20G	FCC DoC	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
3.	LCD Monitor	Dell	ST2220Lb	FCC DoC	Shielded, 1.6m	Unshielded,1.8m
4.	Bluetooth Earphone	Sony Ericsson	HPM-78	PY7DDA-2029	N/A	N/A
5.	iPod Earphone	Apple	N/A	FCC DoC	Unshielded, 1.0 m	N/A

2 Test Configuration of Equipment Under Test

2.1 Test Mode

The EUT supports 802.11 a/n with two diversity antennas, Antenna 1 and 2, and completely uncorrelated MIMO modes. The Antenna 2 is receiver only for WLAN legacy/SISO mode, and dedicates for Bluetooth. The test configurations are reported in following sections.

For conducted test cases, the high, middle, low channels of legacy modes (802.11a) and 802.11n mode (SISO, MIMO) were tested respectively by choosing the highest RF output power chain, and data rate from preliminary conducted power testing as shown in section 2.3.

The EUT has been associated with peripherals pursuant to ANSI C63.4-2003 and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: conducted emission (150 KHz to 30 MHz), radiated emission (30 MHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower).

For radiated measurements, pre-scanned tests were conducted to determine the final configuration from all possible combinations. Pre-scanned tests, X, Y, Z in three orthogonal panels, were conducted to determine the final configuration from all possible combinations modes, and the worst mode (Z plane for Mode 1~8, Y plane for Mode 9~13) is recorded in this report only, and the worst modes from the legacy modes and n modes were used for the full radiated test measurement.

<table>
<tr><th colspan="2">Test Cases</th></tr>
<tr><th>Test Item</th><th>802.11a/n (Modulation : OFDM)</th></tr>
<tr><td>Conducted TCs</td><td>
<Legacy Ant 1>:
<table>
<tr><th>Test Mode</th><th>802.11a</th></tr>
<tr><td>CH36</td><td>Mode 1</td></tr>
<tr><td>CH44</td><td>Mode 2</td></tr>
<tr><td>CH48</td><td>Mode 3</td></tr>
</table>
<SISO Ant 1>:
<table>
<tr><th>Test Mode</th><th>802.11n (BW 20MHz)</th><th>Test Mode</th><th>802.11n (BW 40MHz)</th></tr>
<tr><td>CH36</td><td>Mode 4</td><td>CH38</td><td>Mode 7</td></tr>
<tr><td>CH44</td><td>Mode 5</td><td>CH46</td><td>Mode 8</td></tr>
<tr><td>CH48</td><td>Mode 6</td><td></td><td></td></tr>
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<MIMO Ant 1>:
<table>
<tr><th>Test Mode</th><th>802.11n (BW 20MHz)</th><th>Test Mode</th><th>802.11n (BW 40MHz)</th></tr>
<tr><td>CH36</td><td>Mode 9</td><td>CH38</td><td>Mode 12</td></tr>
<tr><td>CH44</td><td>Mode 10</td><td>CH46</td><td>Mode 13</td></tr>
<tr><td>CH48</td><td>Mode 11</td><td></td><td></td></tr>
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<MIMO Ant 2>:
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<tr><th>Test Mode</th><th>802.11n (BW 20MHz)</th><th>Test Mode</th><th>802.11n (BW 40MHz)</th></tr>
<tr><td>CH36</td><td>Mode 14</td><td>CH38</td><td>Mode 17</td></tr>
<tr><td>CH44</td><td>Mode 15</td><td>CH46</td><td>Mode 18</td></tr>
<tr><td>CH48</td><td>Mode 16</td><td></td><td></td></tr>
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<tr><th colspan="2">Test Cases</th></tr>
<tr><td>Radiated TCs</td><td>
<Legacy Ant 1>:
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<tr><th>Test Mode</th><th>802.11a</th></tr>
<tr><td>CH36</td><td>Mode 1</td></tr>
<tr><td>CH44</td><td>Mode 2</td></tr>
<tr><td>CH48</td><td>Mode 3</td></tr>
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<SISO Ant 1>:
<table>
<tr><th>Test Mode</th><th>802.11n (BW 20MHz)</th><th>Test Mode</th><th>802.11n (BW 40MHz)</th></tr>
<tr><td>CH36</td><td>Mode 4</td><td>CH38</td><td>Mode 7</td></tr>
<tr><td>CH44</td><td>Mode 5</td><td>CH46</td><td>Mode 8</td></tr>
<tr><td>CH48</td><td>Mode 6</td><td></td><td></td></tr>
</table>
<MIMO>:
<table>
<tr><th>Test Mode</th><th>802.11n (BW 20MHz)</th><th>Test Mode</th><th>802.11n (BW 40MHz)</th></tr>
<tr><td>CH36</td><td>Mode 9</td><td>CH38</td><td>Mode 12</td></tr>
<tr><td>CH44</td><td>Mode 10</td><td>CH46</td><td>Mode 13</td></tr>
<tr><td>CH48</td><td>Mode 11</td><td></td><td></td></tr>
</table>
</td></tr>
<tr><td>AC Conducted Emission</td><td>Mode 1 : WLAN Link + Bluetooth Link + HDMI Cable + USB Cable (Charging from Adapter) + Earphone + H Pattern + Adapter</td></tr>
<tr><td colspan="2">Remark:
1. SISO stands for single input and single output. It means that only one chain transmits signals at a time.
2. 2Tx is one type of MIMO, which means that two chains transmit signals at the same time.</td></tr>
</table>

2.2 Carrier Frequency Channel

There are two bandwidth systems for the device.

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
5150-5250 MHz Band 1	36	5180	44	5220
	38	5190	46	5230
	40	5200	48	5240

2.3 Pre-Scanned RF Power

Preliminary tests were performed in different data rate as below table and the highest power data rates (11a, 11n (BW 20MHz), 11n (BW 40MHz) modes) were chosen for full test in the following sections to demonstrate compliance to the FCC limit line. Final Output Power equals to Measured Output Power adds the duty factor.

<Legacy Ant 1>

5GHz 802.11a mode								
Data Rate (MHz)	**6M bps**	**9M bps**	**12M bps**	**18M bps**	**24M bps**	**36M bps**	**48M bps**	**54M bps**
Power (dBm)	**13.14**	12.81	13.03	13.05	13.03	13.06	13.10	12.69

<SISO Ant 1>

5GHz 802.11n (BW 20MHz) mode								
Data Rate (MHz)	**MCS0**	**MCS1**	**MCS2**	**MCS3**	**MCS4**	**MCS5**	**MCS6**	**MCS7**
Power (dBm)	**12.94**	12.70	12.85	12.14	12.56	12.19	12.17	12.70

5GHz 802.11n (BW 40MHz) mode								
Data Rate (MHz)	**MCS0**	**MCS1**	**MCS2**	**MCS3**	**MCS4**	**MCS5**	**MCS6**	**MCS7**
Power (dBm)	**12.88**	12.86	12.84	12.78	12.86	12.76	12.82	12.80

<MIMO Ant 1 + 2>

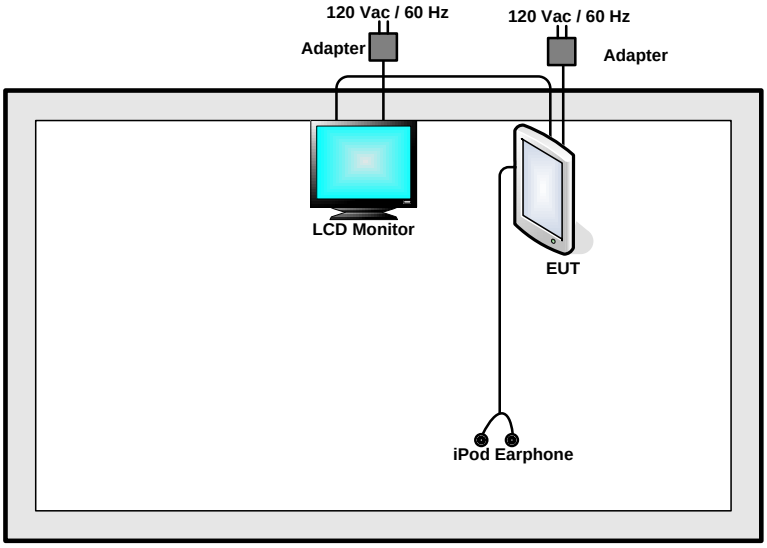
5GHz 802.11n (BW 20MHz) mode								
Data Rate (MHz)	**MCS8**	**MCS9**	**MCS10**	**MCS11**	**MCS12**	**MCS13**	**MCS14**	**MCS15**
Power (dBm) MIMO – Ant 1	**11.55**	10.98	10.93	10.85	10.91	11.09	11.02	10.97
Power (dBm) MIMO – Ant 2	**12.53**	12.39	12.26	12.32	12.35	12.28	12.37	12.41
MIMO Ant 1 + 2 (Measure and Sum)	**15.08**	14.75	14.66	14.66	14.70	14.74	14.76	14.76

5GHz 802.11n (BW 40MHz) mode								
Data Rate (MHz)	**MCS8**	**MCS9**	**MCS10**	**MCS11**	**MCS12**	**MCS13**	**MCS14**	**MCS15**
Power (dBm) MIMO – Ant 1	**11.05**	11.01	10.95	10.98	10.97	11.02	10.94	10.90
Power (dBm) MIMO – Ant 2	**11.37**	11.27	11.25	11.25	11.24	11.30	11.20	11.20
MIMO Ant 1 + 2 (Measure and Sum)	**14.22**	14.15	14.11	14.13	14.12	14.17	14.08	14.06

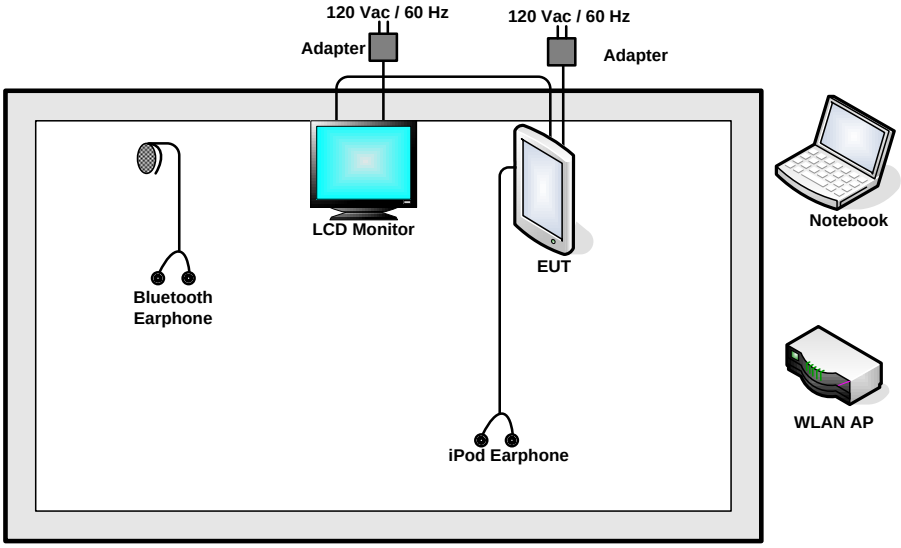
Note: Output power= measurement + duty factor

2.4 Connection Diagram of Test System

<WLAN Tx Mode>



<AC Conducted Emission Mode>



2.5 RF Utility

The programmed RF Utility “Compliance Tool”, is installed in EUT 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 26dB Bandwidth Measurement

3.1.1 Limit of 26dB% Bandwidth

There is no restriction limits for bandwidth. The maximum conducted output power can be limited by measured emission bandwidth (B). 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 dBm + 10log B.

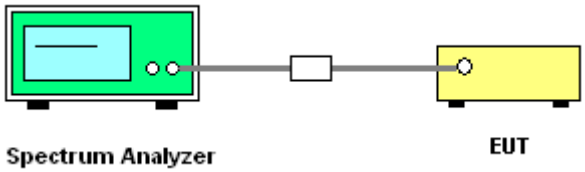
3.1.2 Measuring Instruments

See list of measuring instruments of this test report.

3.1.3 Test Procedures

1. The testing follows FCC KDB 789033 D01 General UNII Test Procedures v01r01.
2. Set RBW = approximately 1% of the emission bandwidth.
3. Set the VBW > RBW.
4. Detector = Peak.
5. Trace mode = max hold
6. Measure the maximum width of the emission that is 26 dB down from the peak of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

3.1.4 Test Setup

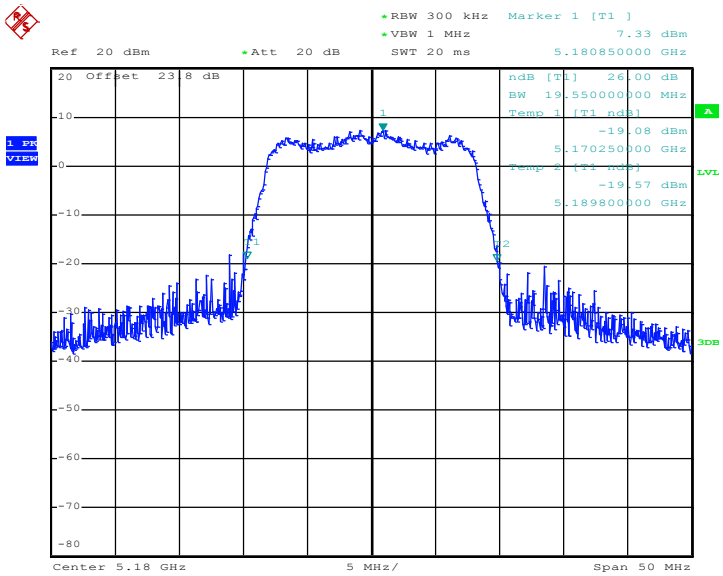


3.1.5 Test Result of 26dB Bandwidth

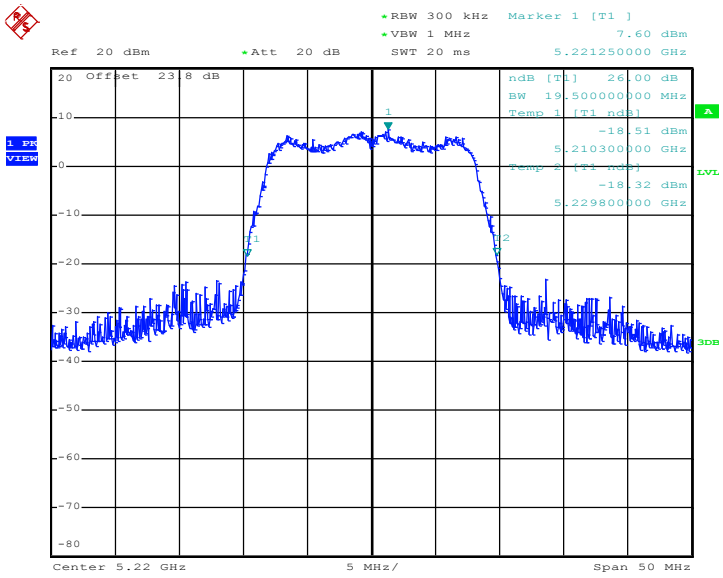
Test Mode :	802.11a	Temperature :	24~26℃
Test Engineer :	Pinkston Tu and Kenny Chen	Relative Humidity :	45~49%

Channel	Frequency (MHz)	802.11a 26dB Bandwidth (MHz)	Pass/Fail
		Legacy Ant 1	
36	5180	19.55	N/A
44	5220	19.50	N/A
48	5240	19.50	N/A

26 dB Bandwidth Plot on 802.11a Channel 36 - Legacy Ant 1



26 dB Bandwidth Plot on 802.11a Channel 44 - Legacy Ant 1



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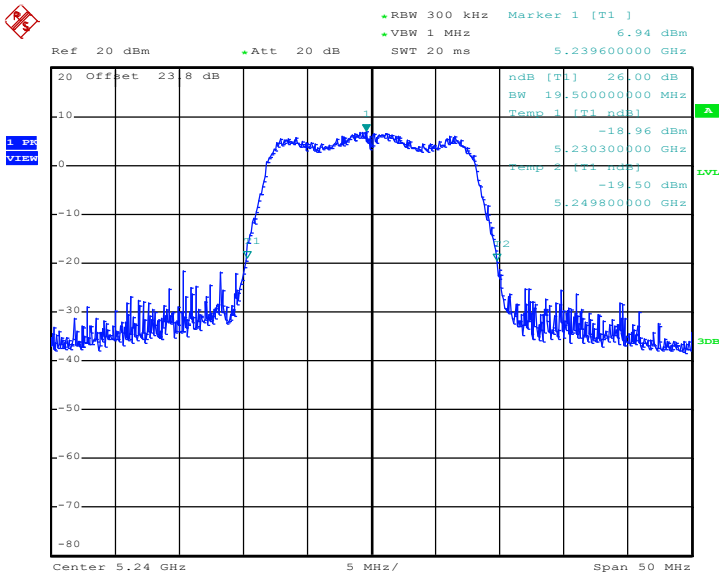
26 dB Bandwidth Plot on 802.11a Channel 48 - Legacy Ant 1



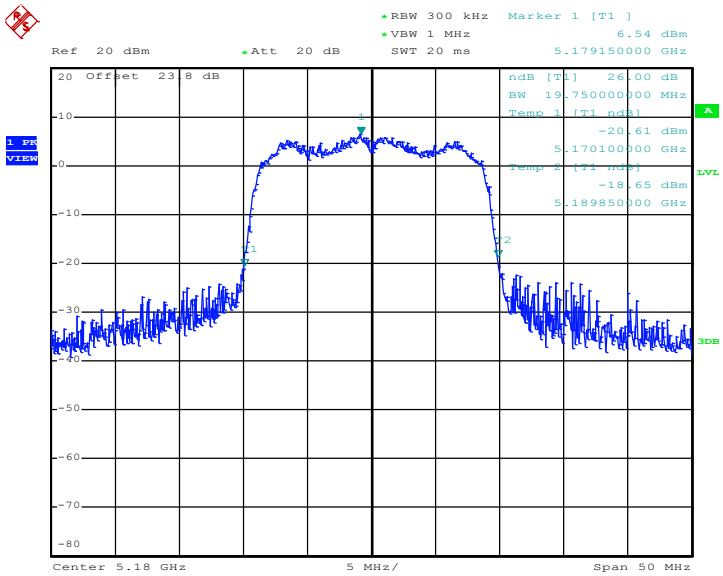
Date: 1.MAY.2012 14:23:59

Test Mode :	802.11n (BW 20MHz)	Temperature :	24~26℃
Test Engineer :	Pinkston Tu and Kenny Chen	Relative Humidity :	45~49%

Channel	Frequency (MHz)	802.11n (BW 20MHz, SISO, MIMO) 26dB Bandwidth (MHz)			Pass/Fail
		SISO Ant 1	MIMO Ant 1	MIMO Ant 2	
36	5180	19.75	19.70	19.85	N/A
44	5220	19.85	19.60	19.85	N/A
48	5240	19.80	19.70	19.90	N/A

26 dB Bandwidth Plot on 802.11n (BW 20MHz) Channel 36

- SISO Ant 1



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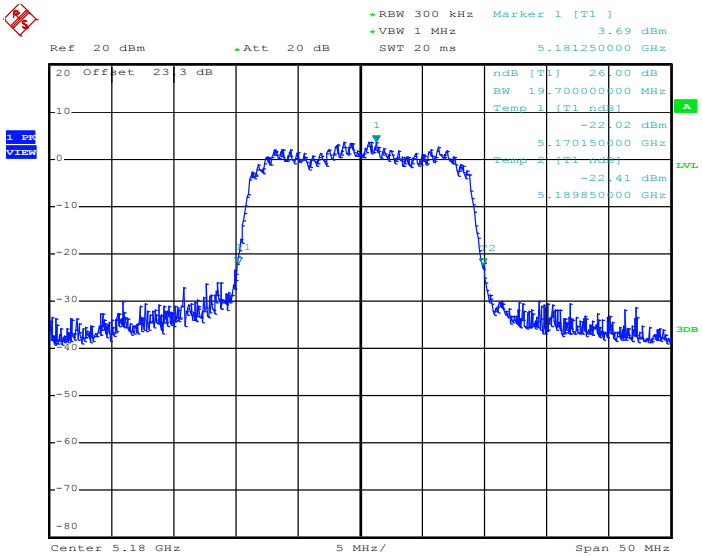
26 dB Bandwidth Plot on 802.11n (BW 20MHz) Channel 36 - MIMO Ant 1



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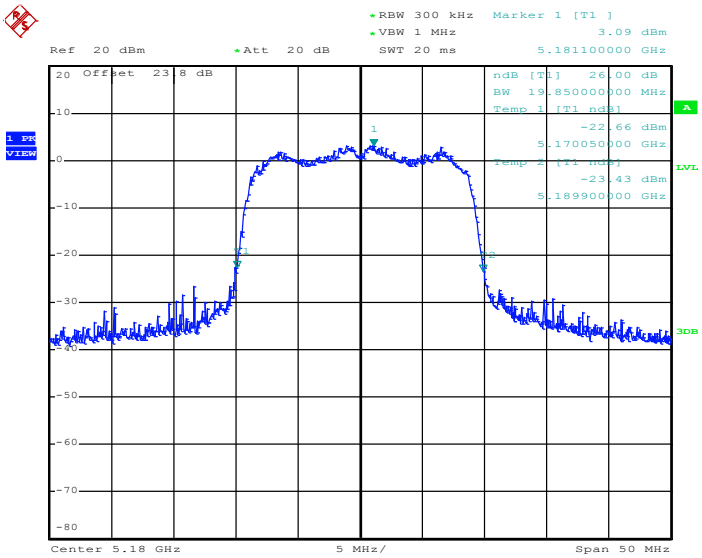
26 dB Bandwidth Plot on 802.11n (BW 20MHz) Channel 36 - MIMO Ant 2



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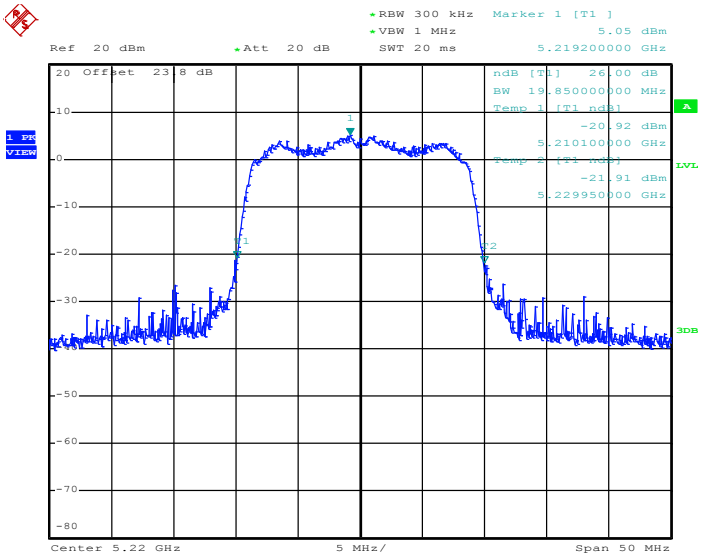
26 dB Bandwidth Plot on 802.11n (BW 20MHz) Channel 44 - SISO Ant 1



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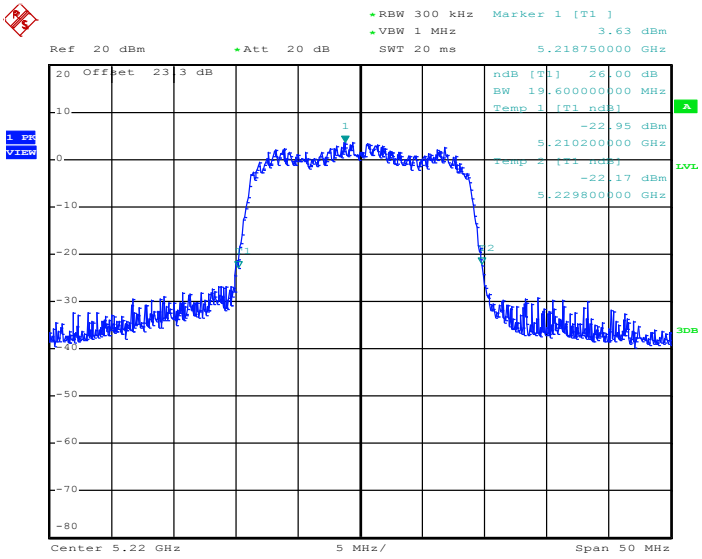
26 dB Bandwidth Plot on 802.11n (BW 20MHz) Channel 44 - MIMO Ant 1



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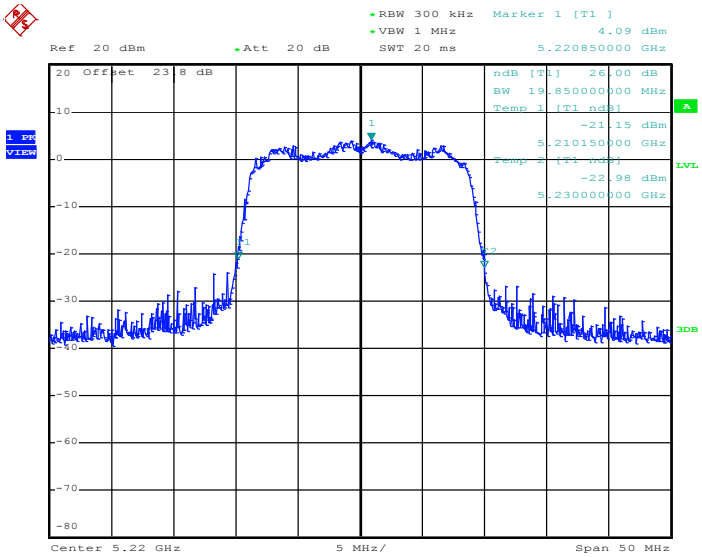
26 dB Bandwidth Plot on 802.11n (BW 20MHz) Channel 44 - MIMO Ant 2



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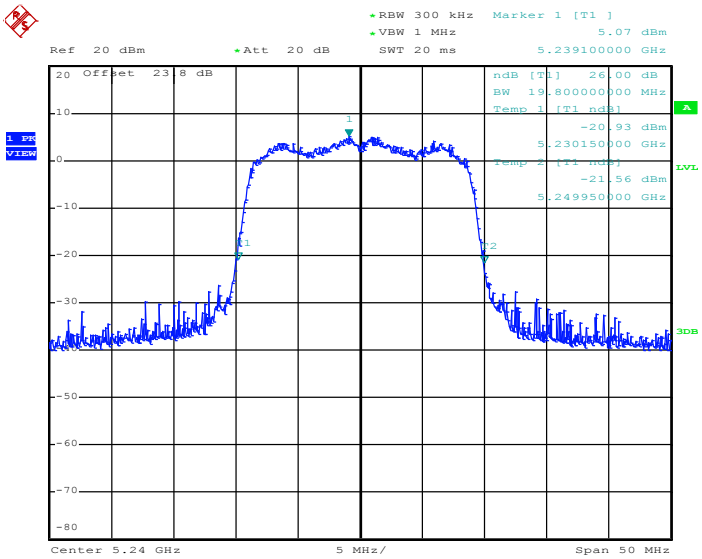
26 dB Bandwidth Plot on 802.11n (BW 20MHz) Channel 48 - SISO Ant 1



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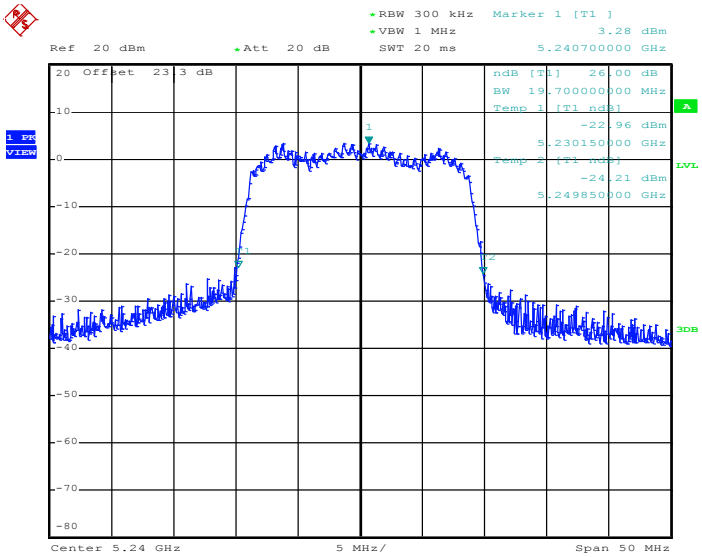
26 dB Bandwidth Plot on 802.11n (BW 20MHz) Channel 48 - MIMO Ant 1



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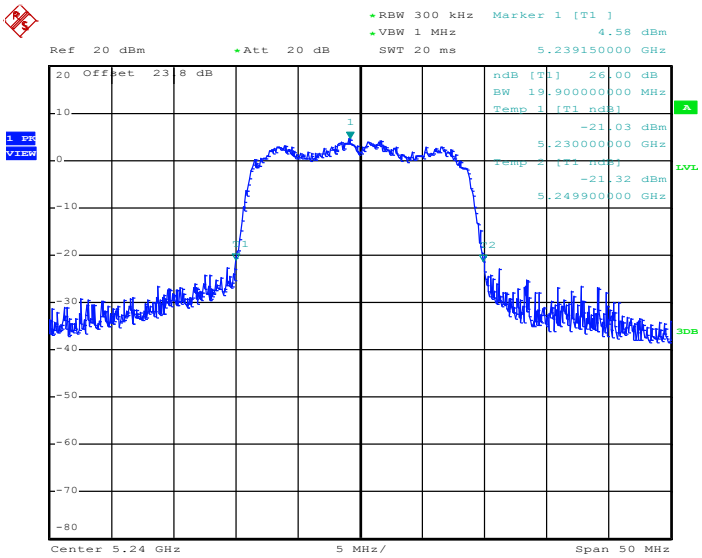
26 dB Bandwidth Plot on 802.11n (BW 20MHz) Channel 48 - MIMO Ant 2



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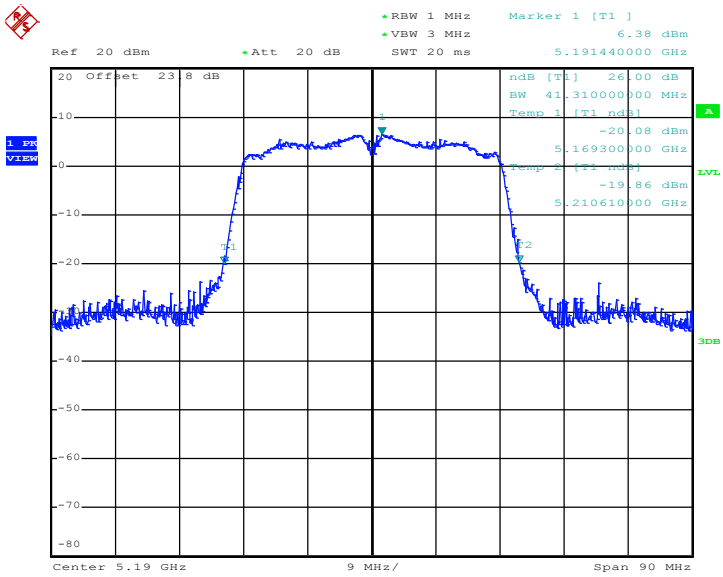
Test Mode :	802.11n (BW 40MHz)	Temperature :	24~26℃
Test Engineer :	Pinkston Tu and Kenny Chen	Relative Humidity :	45~49%

Channel	Frequency (MHz)	802.11n (BW 40MHz, SISO, MIMO) 26dB Bandwidth (MHz)			Pass/Fail
		SISO Ant 1	MIMO Ant 1	MIMO Ant 2	
38	5190	41.31	40.86	41.49	N/A
46	5230	41.22	40.95	41.40	N/A

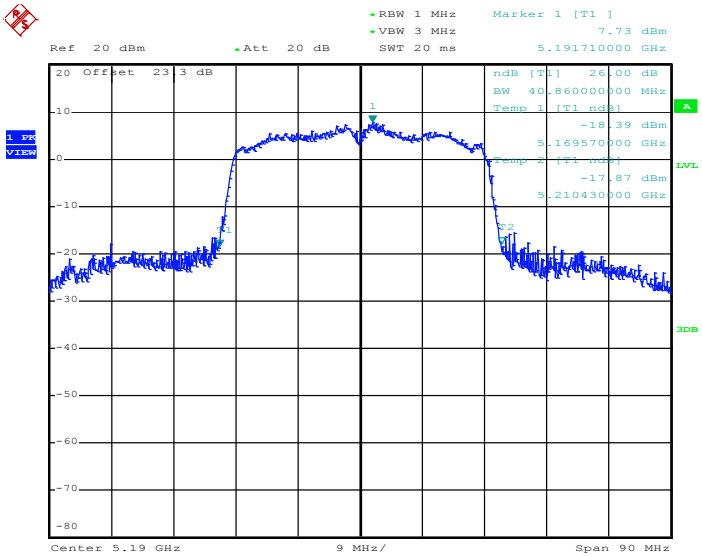
26 dB Bandwidth Plot on 802.11n (BW 40MHz) Channel 38

- SISO Ant 1



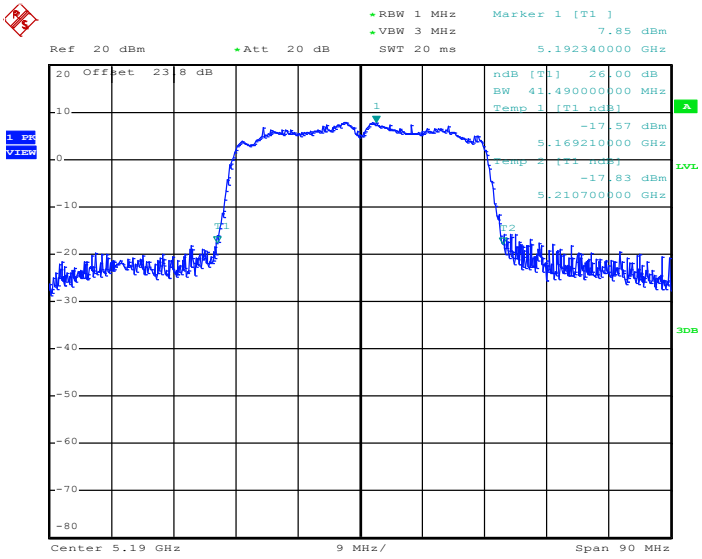
Date: 1.MAY.2012 15:23:51

26 dB Bandwidth Plot on 802.11n (BW 40MHz) Channel 38 - MIMO Ant 1



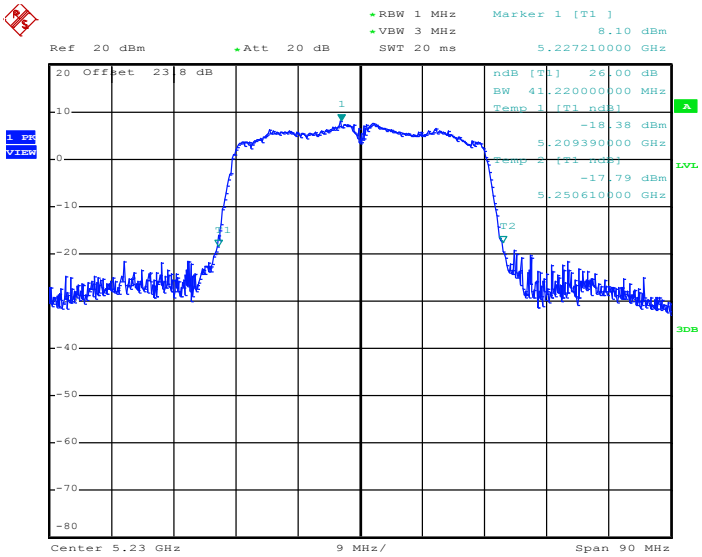
Date: 12.MAY.2012 15:45:39

26 dB Bandwidth Plot on 802.11n (BW 40MHz) Channel 38 - MIMO Ant 2



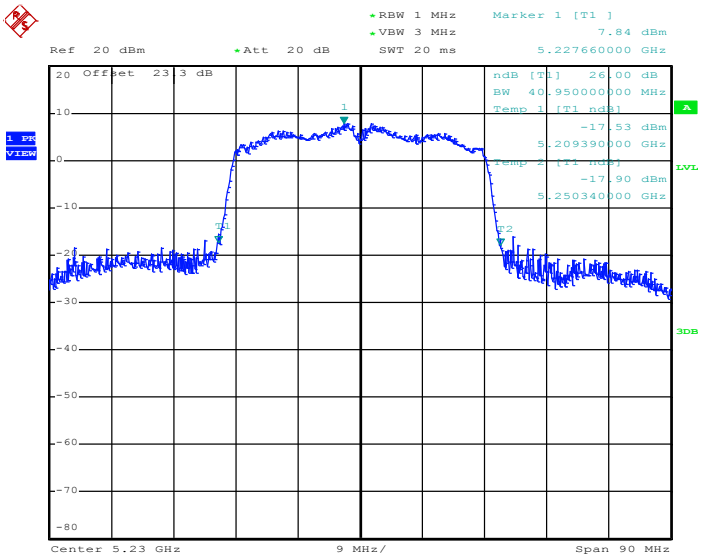
Date: 12.MAY.2012 15:42:43

26 dB Bandwidth Plot on 802.11n (BW 40MHz) Channel 46 - SISO Ant 1



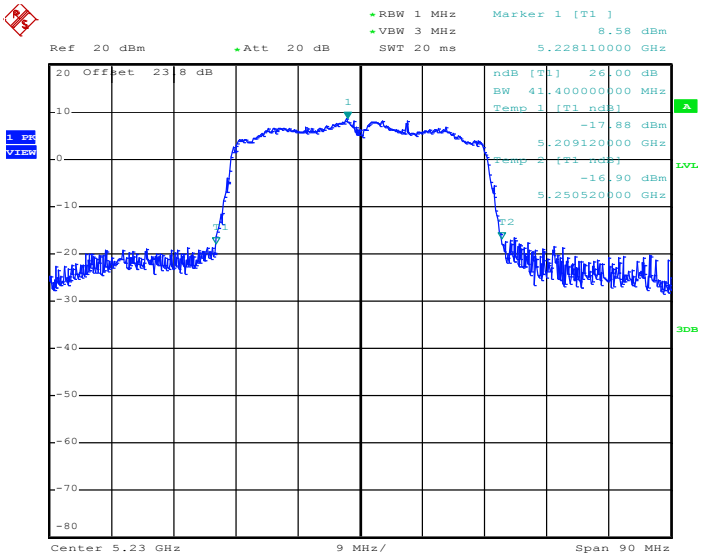
Date: 1.MAY.2012 15:27:38

26 dB Bandwidth Plot on 802.11n (BW 40MHz) Channel 46 - MIMO Ant 1



Date: 12.MAY.2012 15:38:01

26 dB Bandwidth Plot on 802.11n (BW 40MHz) Channel 46 - MIMO Ant 2



Date: 12.MAY.2012 15:40:19

3.2 Maximum Conducted Output Power Measurement

3.2.1 Limit of Maximum Conducted Output Power

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

3.2.2 Measuring Instruments

See list of measuring instruments of this test report.

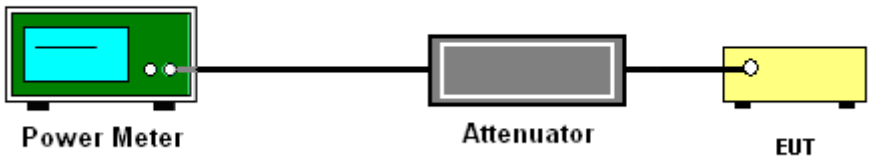
3.2.3 Test Procedures

The testing follows Method PM of FCC KDB 789033 D01 General UNII Test Procedures v01r01.

Method PM (Measurement using an RF average power meter):

1. Measurement is performed using a wideband RF power meter.
2. The EUT is configured to transmit continuously with a consistent duty cycle at its maximum power control level.
3. Measure the average power of the transmitter, and the average power is corrected with duty factor, 10 log(1/x), where x is the duty cycle.

3.2.4 Test Setup



3.2.5 Test Result of Maximum Conducted Output Power

Test Mode :	802.11a	**Temperature :**	24~26℃
Test Engineer :	Pinkston Tu and Kenny Chen	**Relative Humidity :**	45~49%
Duty Cycle	97.81% for Ant 1	**Duty Factor**	0.10dB for Ant 1

Channel	Frequency (MHz)	802.11a Output Power (dBm)		Max. Limits (dBm)	Pass /Fail
		Measured	Final		
		Legacy Ant 1	Legacy Ant 1		
36	5180	12.35	12.45	16.91	Pass
44	5220	13.04	13.14	16.90	Pass
48	5240	12.57	12.67	16.90	Pass

Note:

1. For the band 5.15~5.25 GHz, the maximum conducted output power shall not exceed the lesser of 50 mW (17dBm) or 4 dBm + 10log (26dB BW).
2. The final result is corrected the duty factor with measured result which has been offset the cable loss in power meter.

Test Mode :	802.11n (BW 20MHz)	Temperature :	24~26℃
Test Engineer :	Pinkston Tu and Kenny Chen	Relative Humidity :	45~49%
Duty Cycle	96.91% for SISO Ant 1	Duty Factor	0.14dB for SISO Ant 1

Channel	Frequency (MHz)	802.11n (BW 20MHz) Output Power (dBm)		Max. Limits (dBm)	Pass /Fail
		Measured	Final		
		SISO Ant 1	SISO Ant 1		
36	5180	11.96	12.10	16.96	Pass
44	5220	12.17	12.31	16.98	Pass
48	5240	12.80	12.94	16.97	Pass

Note:

1. For the band 5.15~5.25 GHz, the maximum conducted output power shall not exceed the lesser of 50 mW (17dBm) or 4 dBm + 10log (26dB BW).
2. The final result is corrected the duty factor with measured result which has been offset the cable loss in power meter.

Test Mode :	802.11n (BW 20MHz)	Temperature :	24~26℃
Test Engineer :	Pinkston Tu and Kenny Chen	Relative Humidity :	45~49%
Duty Cycle	95.52% for MIMO Ant 1 95.53% for MIMO Ant 2	Duty Factor	0.20dB for MIMO Ant 1 0.20dB for MIMO Ant 2

Channel	Frequency (MHz)	802.11n (BW 20MHz, 2Tx) Output Power (dBm)					Max. Limits (dBm)	Pass /Fail
		Measured		Final				
		MIMO Ant 1	MIMO Ant 2	MIMO Ant 1	MIMO Ant 2	MIMO Ant 1+2		
36	5180	11.03	12.15	11.23	12.35	14.84	16.98	Pass
44	5220	11.35	12.33	11.55	12.53	15.08	16.98	Pass
48	5240	11.23	12.29	11.43	12.49	15.00	16.99	Pass

Note:

1. For the band 5.15~5.25 GHz, the maximum conducted output power shall not exceed the lesser of 50 mW (17dBm) or 4 dBm + 10log (26dB BW).
2. The final result is corrected the duty factor with measured result which has been offset the cable loss in power meter.

Test Mode :	802.11n (BW 40MHz)	Temperature :	24~26℃
Test Engineer :	Pinkston Tu and Kenny Chen	Relative Humidity :	45~49%
Duty Cycle	98.10% for SISO Ant 1 Ch38 95.36% for SISO Ant 1	Duty Factor	0.08dB for SISO Ant 1 Ch38 0.21dB for SISO Ant 1

Channel	Frequency (MHz)	802.11n (BW 40MHz) Output Power (dBm)		Max. Limits (dBm)	Pass /Fail
		Measured	Final		
		SISO Ant 1	SISO Ant 1		
38	5190	10.92	11.00	17	Pass
46	5230	12.67	12.88	17	Pass

Note:

1. For the band 5.15~5.25 GHz, the maximum conducted output power shall not exceed the lesser of 50 mW (17dBm) or 4 dBm + 10log (26dB BW).
2. The final result is corrected the duty factor with measured result which has been offset the cable loss in power meter.

Test Mode :	802.11n (BW 40MHz)	Temperature :	24~26℃
Test Engineer :	Pinkston Tu and Kenny Chen	Relative Humidity :	45~49%
Duty Cycle	96.36% for MIMO Ant 1 Ch38 91.49% for MIMO Ant 1 96.36% for MIMO Ant 2 Ch38 91.44% for MIMO Ant 2	Duty Factor	0.16dB for MIMO Ant 1 CH38 0.39dB for MIMO Ant 1 0.16dB for MIMO Ant 2 CH38 0.39dB for MIMO Ant 2

Channel	Frequency (MHz)	802.11n (BW 40MHz, 2Tx) Output Power (dBm)					Max. Limits (dBm)	Pass /Fail
		Measured		Final				
		MIMO Ant 1	MIMO Ant 2	MIMO Ant 1	MIMO Ant 2	MIMO Ant 1+2		
38	5190	10.89	11.21	11.05	11.37	14.22	17	Pass
46	5230	9.80	10.92	10.19	11.31	13.79	17	Pass

Note:

1. For the band 5.15~5.25 GHz, the maximum conducted output power shall not exceed the lesser of 50 mW (17dBm) or 4 dBm + 10log (26dB BW).
2. The final result is corrected the duty factor with measured result which has been offset the cable loss in power meter.

3.3 Power Spectral Density Measurement

3.3.1 Limit of Power Spectral Density

For the band 5.15–5.25 GHz, the peak power spectral density shall not exceed 4 dBm in any 1MHz band. If transmitting antenna directional gain is greater than 6 dBi, both the maximum conducted output 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.

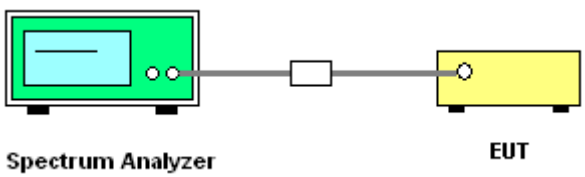
3.3.2 Measuring Instruments

See list of measuring instruments of this test report.

3.3.3 Test Procedures

1. The testing follows Method SA-2 of FCC KDB 789033 D01 General UNII Test Procedures v01r01 to measure PPSD.
   - Measure the duty cycle.
   - Set span to encompass the entire emission bandwidth (EBW) of the signal.
   - Set RBW = 1 MHz.
   - Set VBW ≥ 3 MHz.
   - Number of points in sweep ≥ 2 Span / RBW..
   - Detector = RMS
   - Perform a single sweep.
   - Trace average at least 100 traces in power averaging mode.
   - Add 10 log(1/x), where x is the duty cycle, to the measured power in order to compute the average power during the actual transmission times. For example, add 10 log(1/0.25) = 6 dB if the duty cycle is 25 percent.
2. The RF output of EUT was connected to the spectrum analyzer by a low loss cable.
3. Each plot has already offset with cable loss, and attenuator loss. Measure the PPSD and record it.

3.3.4 Test Setup

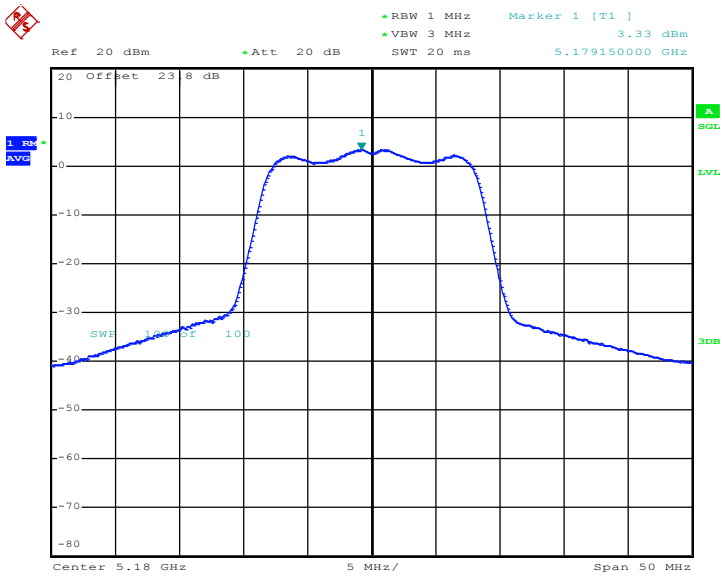


3.3.5 Test Result of Power Spectral Density

Test Mode :	802.11a	**Temperature :**	24~26℃
Test Engineer :	Pinkston Tu and Kenny Chen	**Relative Humidity :**	45~49%
Duty Cycle	97.81% for Ant 1	**Duty Factor**	0.10dB for Ant 1

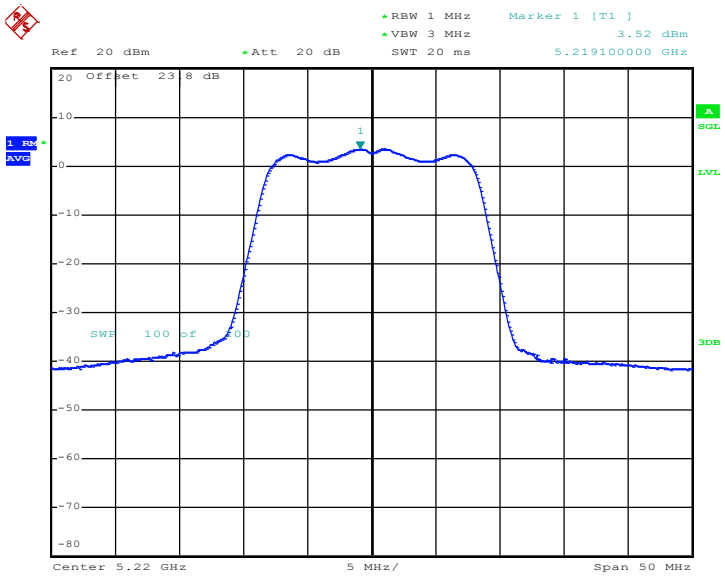
Channel	Frequency (MHz)	802.11a Measured PSD (dBm)		Max. Limits (dBm)	Pass /Fail
		Measured	Final		
		Legacy Ant 1	Legacy Ant 1		
36	5180	3.33	3.43	4	Pass
44	5220	3.52	3.62	4	Pass
48	5240	3.61	3.71	4	Pass

PSD Plot on 802.11a Channel 36 - Legacy Ant 1



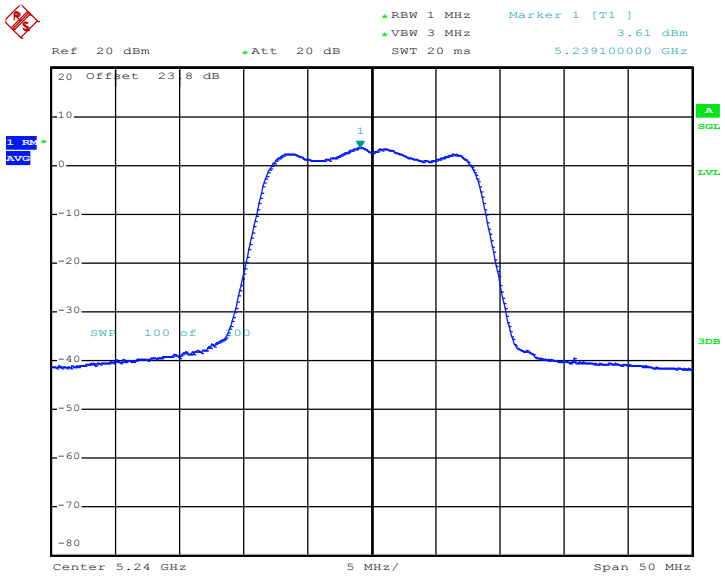
Date: 2.MAY.2012 23:57:28

PSD Plot on 802.11a Channel 44 - Legacy Ant 1



Date: 1.MAY.2012 14:21:16

PSD Plot on 802.11a Channel 48 - Legacy Ant 1



Date: 1.MAY.2012 14:24:22

Test Mode :	802.11n (BW 20MHz)	Temperature :	24~26℃
Test Engineer :	Pinkston Tu and Kenny Chen	Relative Humidity :	45~49%
Duty Cycle	96.91% for SISO Ant 1	Duty Factor	0.14dB for SISO Ant 1

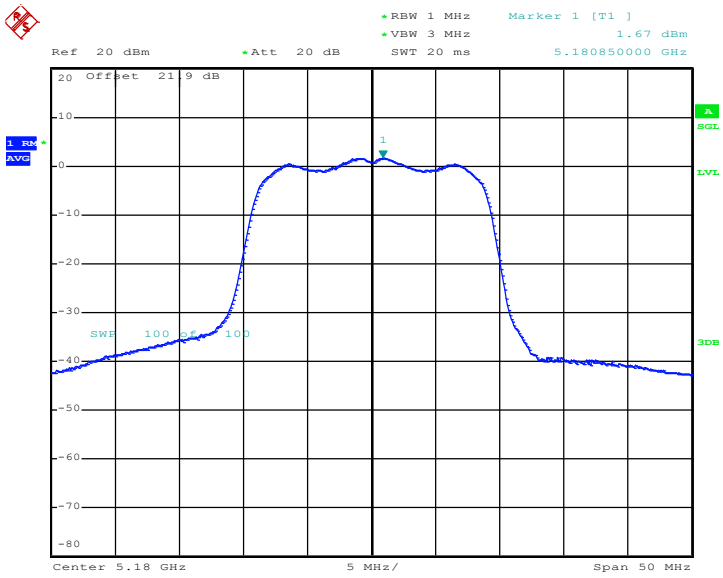
Channel	Frequency (MHz)	802.11n (BW 20MHz) PSD (dBm)		Max. Limits (dBm)	Pass /Fail
		Measured	Final		
		SISO Ant 1	SISO Ant 1		
36	5180	1.67	1.81	4	Pass
44	5220	1.91	2.05	4	Pass
48	5240	1.69	1.83	4	Pass

Test Mode :	802.11n (BW 20MHz)	Temperature :	24~26℃
Test Engineer :	Pinkston Tu and Kenny Chen	Relative Humidity :	45~49%
Duty Cycle	95.52% for MIMO Ant 1 95.53% for MIMO Ant 2	Duty Factor	0.20dB for MIMO Ant 1 0.20dB for MIMO Ant 2

Channel	Frequency (MHz)	802.11n (BW 20MHz, 2Tx) PSD (dBm)	Max. Limits (dBm)	Pass /Fail
		MIMO (2Tx)		
		MIMO Ant 1+2		
36	5180	2.93	4	Pass
44	5220	2.88	4	Pass
48	5240	2.52	4	Pass

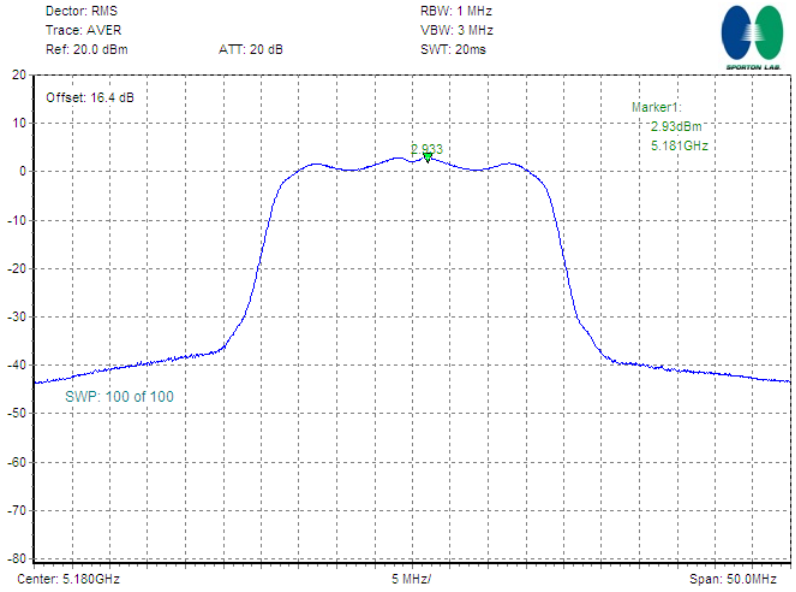
Note: According to the method (1) of In-Band Power Spectral Density (PSD) Measurements in FCC KDB789033 D01 General UNII Test Procedures v01r01, measure and sum the bin-by-bin from two outputs by computer.

PSD Plot on 802.11n (BW 20MHz) Channel 36 – SISO Ant 1

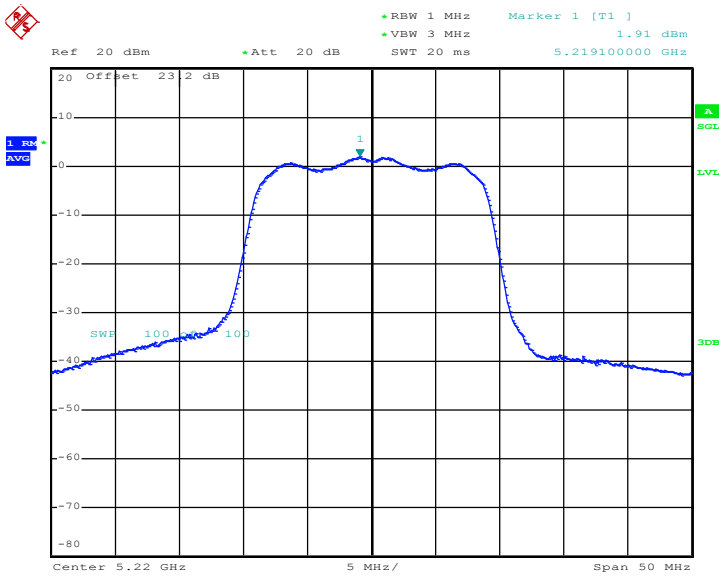


Date: 21.MAY.2012 10:43:35

PSD Plot on 802.11n (BW 20MHz) Channel 36 – MIMO Ant 1+2

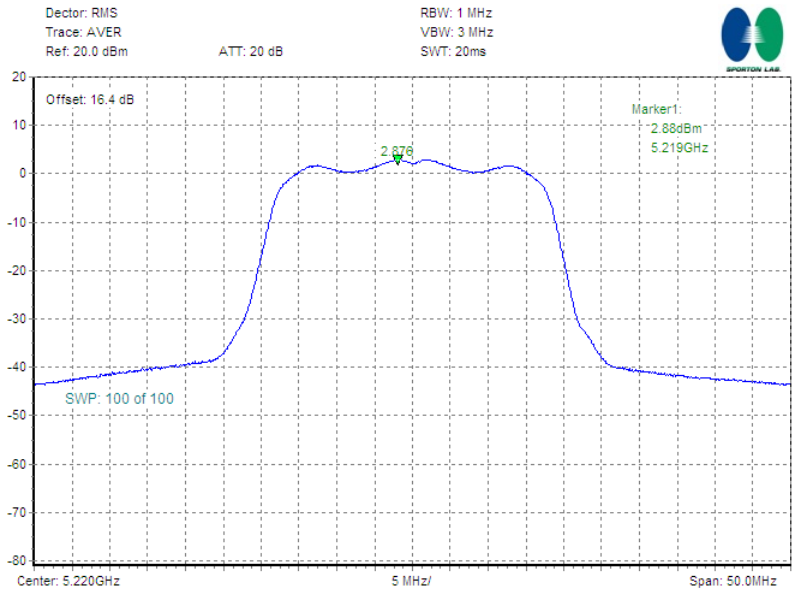


PSD Plot on 802.11n (BW 20MHz) Channel 44 – SISO Ant 1

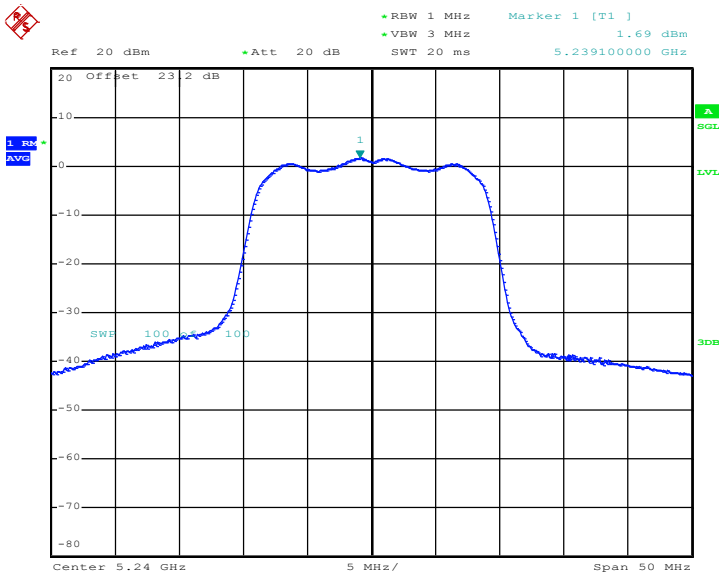


Date: 28.APR.2012 20:59:27

PSD Plot on 802.11n (BW 20MHz) Channel 44 - MIMO Ant 1+2

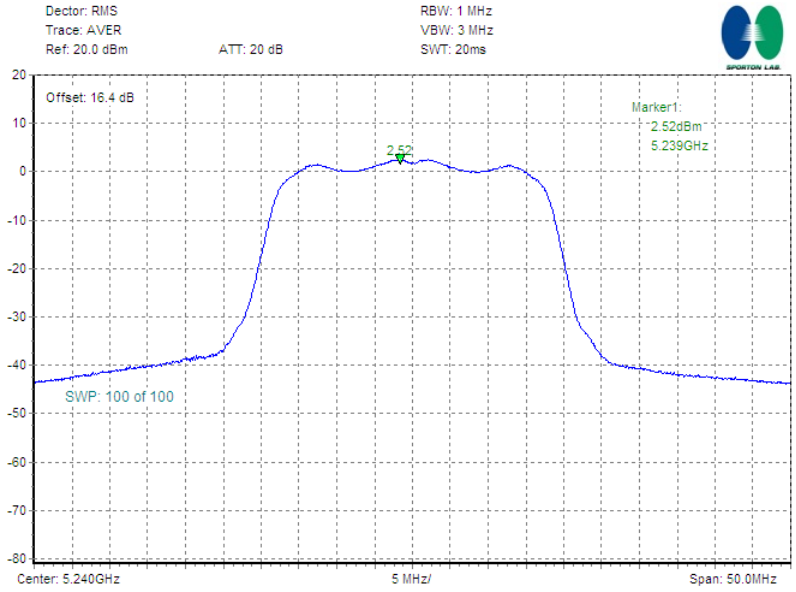


PSD Plot on 802.11n (BW 20MHz) Channel 48 - SISO Ant 1



Date: 28.APR.2012 21:00:06

PSD Plot on 802.11n (BW 20MHz) Channel 48 - MIMO Ant 1+2



Test Mode :	802.11n (BW 40MHz)	Temperature :	24~26℃
Test Engineer :	Pinkston Tu and Kenny Chen	Relative Humidity :	45~49%
Duty Cycle	98.10% for SISO Ant 1 Ch38 95.36% for SISO Ant 1	Duty Factor	0.08dB for SISO Ant 1 Ch38 0.21dB for SISO Ant 1

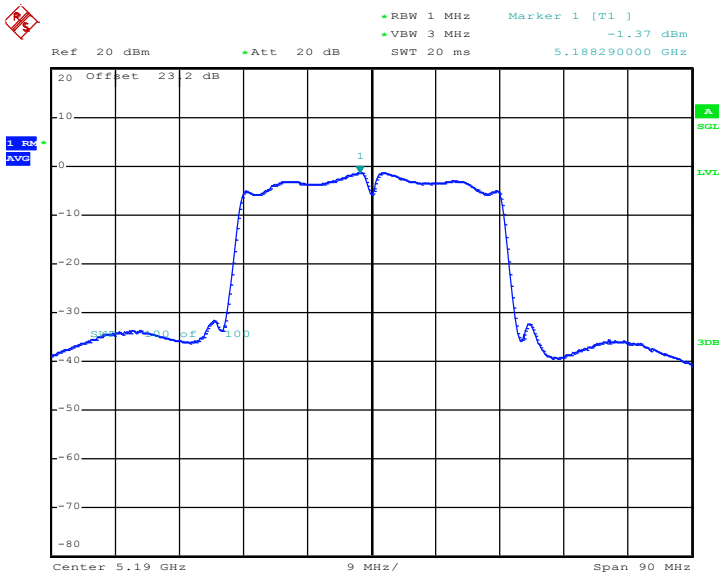
Channel	Frequency (MHz)	802.11n (BW 40MHz) PSD (dBm)		Max. Limits (dBm)	Pass /Fail
		Measured	Final		
		SISO Ant 1	SISO Ant 1		
38	5190	-1.37	-1.16	4	Pass
46	5230	-0.60	-0.39	4	Pass

Test Mode :	802.11n (BW 40MHz)	Temperature :	24~26℃
Test Engineer :	Pinkston Tu and Kenny Chen	Relative Humidity :	45~49%
Duty Cycle	96.36% for MIMO Ant 1 Ch38 91.49% for MIMO Ant 1 96.36% for MIMO Ant 2 Ch38 91.44% for MIMO Ant 2	Duty Factor	0.16dB for MIMO Ant 1 CH38 0.39dB for MIMO Ant 1 0.16dB for MIMO Ant 2 CH38 0.39dB for MIMO Ant 2

Channel	Frequency (MHz)	802.11n (BW 40MHz, 2Tx) PSD (dBm)	Max. Limits (dBm)	Pass /Fail
		MIMO (2Tx)		
		MIMO Ant 1+2		
38	5190	-0.37	4	Pass
46	5230	-0.44	4	Pass

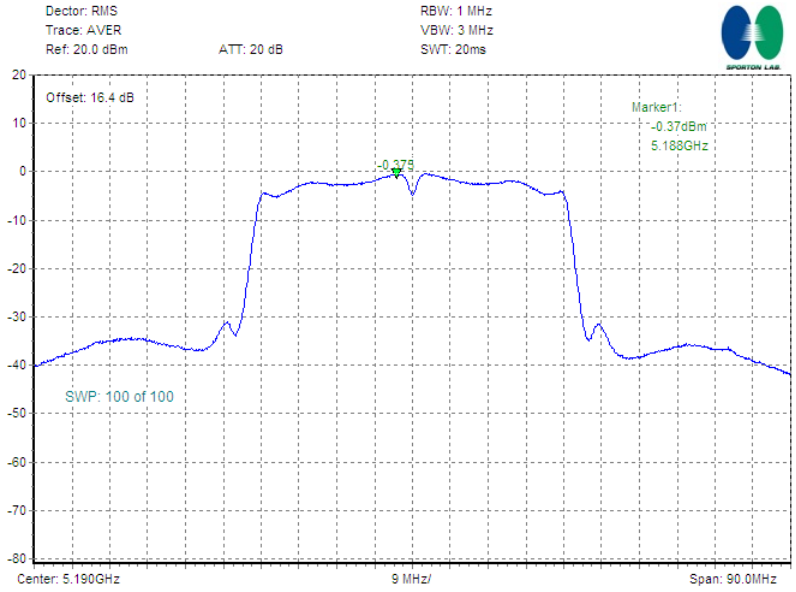
Note: According to the method (1) of In-Band Power Spectral Density (PSD) Measurements in FCC KDB789033 D01 General UNII Test Procedures v01r01, measure and sum the bin-by-bin from two outputs by computer.

PSD Plot on 802.11n (BW 40MHz) Channel 38 - SISO Ant 1

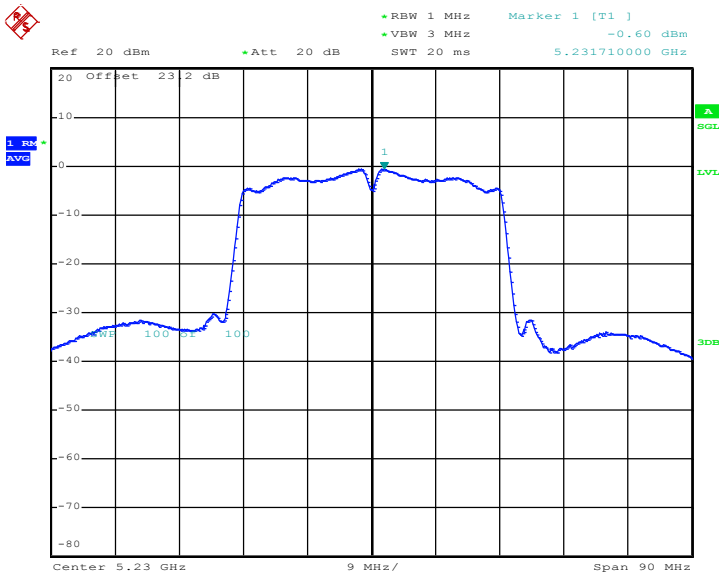


Date: 28.APR.2012 21:05:17

PSD Plot on 802.11n (BW 40MHz) Channel 38 – MIMO Ant 1+2

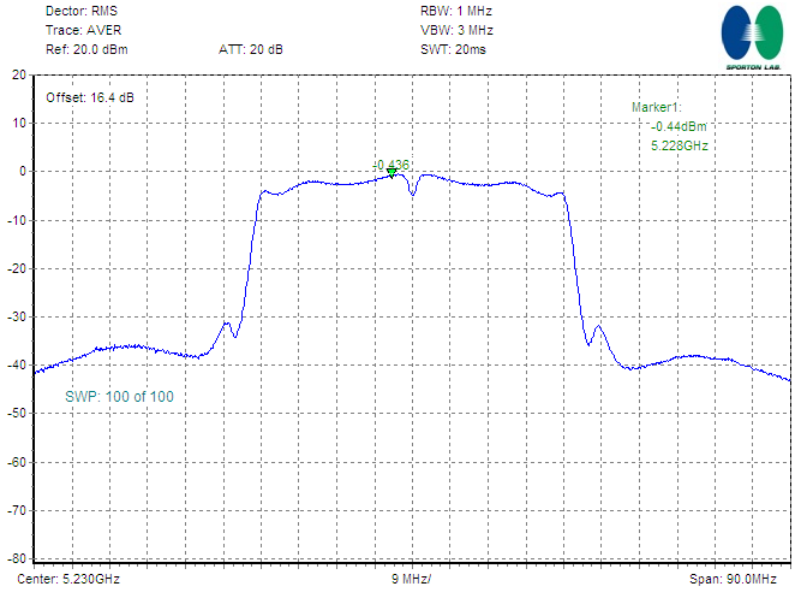


PSD Plot on 802.11n (BW 40MHz) Channel 46 - SISO Ant 1



Date: 28.APR.2012 21:05:51

PSD Plot on 802.11n (BW 40MHz) Channel 46 - MIMO Ant 1+2



3.4 AC Conducted Emission Measurement

3.4.1 Limit of AC Conducted Emission

For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table.

Frequency of emission (MHz)	Conducted limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

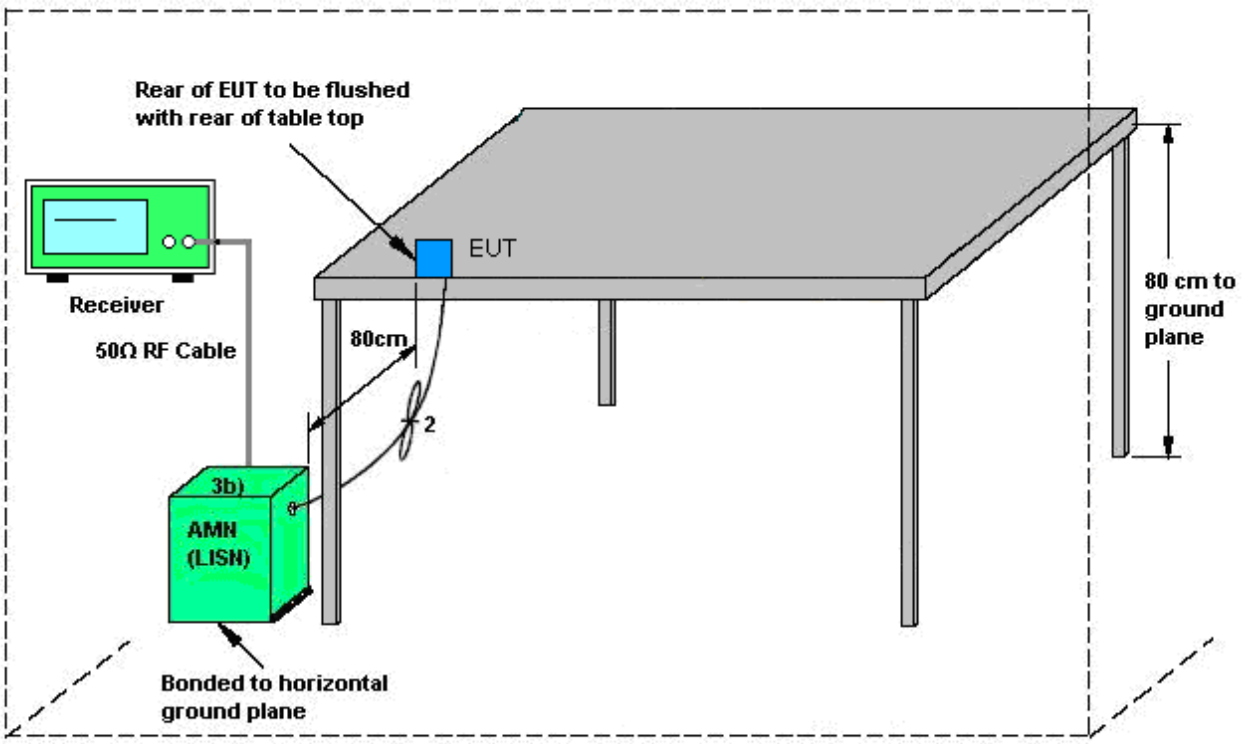
3.4.2 Measuring Instruments

See list of measuring instruments of this test report.

3.4.3 Test Procedures

1. Please follow the guidelines in ANSI C63.4-2003.
2. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
3. Connect EUT to the power mains through a line impedance stabilization network (LISN).
4. All the support units are connecting to the other LISN.
5. The LISN provides 50 ohm coupling impedance for the measuring instrument.
6. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
7. Both sides of AC line were checked for maximum conducted interference.
8. The frequency range from 150 kHz to 30 MHz was searched.
9. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode.

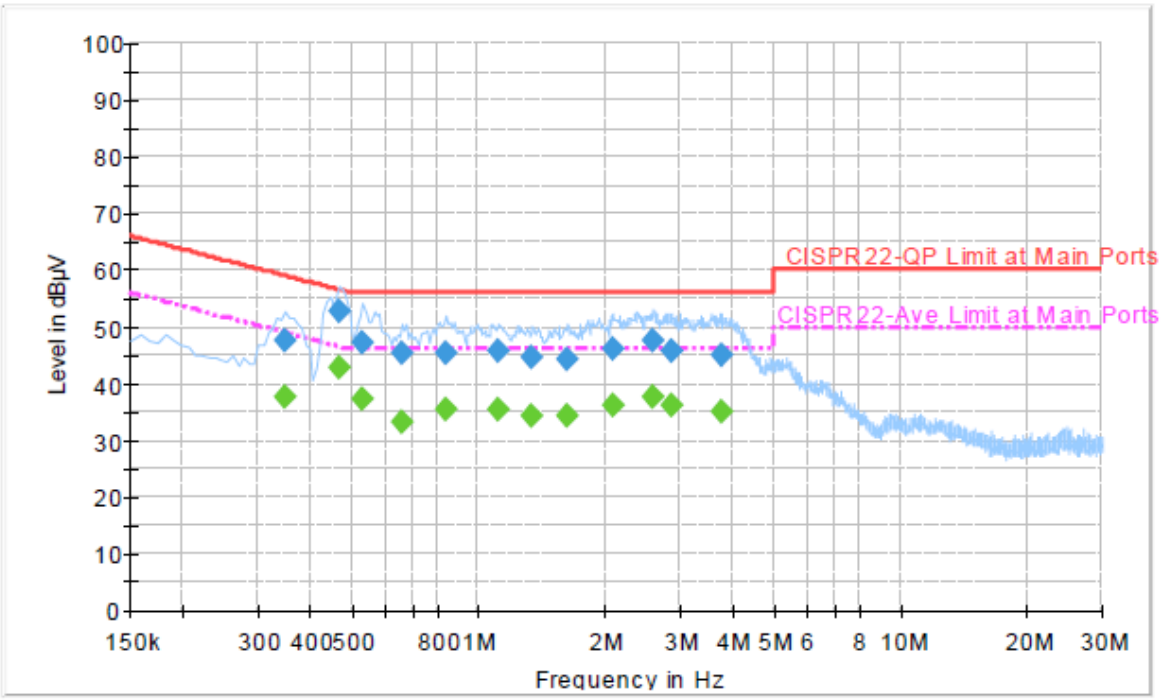
3.4.4 Test Setup



AMN = Artificial mains network (LISN)
AE = Associated equipment
EUT = Equipment under test
ISN = Impedance stabilization network

3.4.5 Test Result of AC Conducted Emission

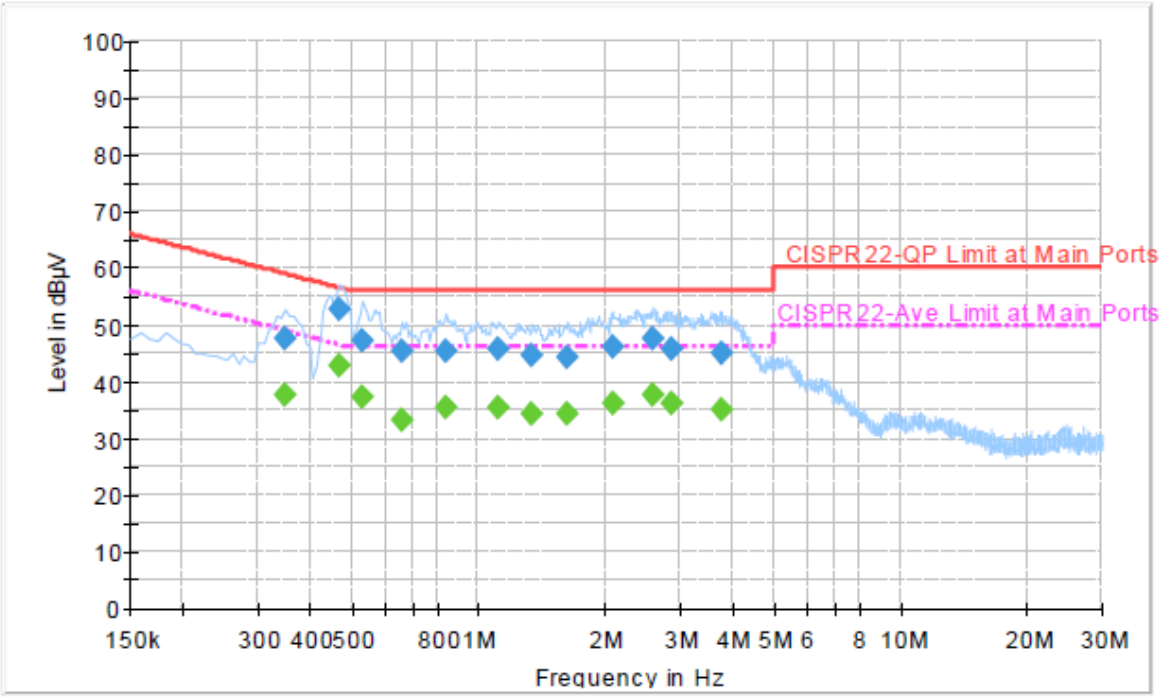
Test Mode :	Mode 1	**Temperature :**	21~23℃
Test Engineer :	Kai-Chun Chu	**Relative Humidity :**	53~55%
Test Voltage :	120Vac / 60Hz	**Phase :**	Line
Function Type :	WLAN Link + Bluetooth Link + HDMI Cable + USB Cable (Charging from Adapter) + Earphone + H Pattern + Adapter		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



Final Result : QuasiPeak

Frequency (MHz)	QuasiPeak (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.350000	47.6	Off	L1	19.3	11.4	59.0
0.470000	52.9	Off	L1	19.4	3.6	56.5
0.534000	47.2	Off	L1	19.3	8.8	56.0
0.662000	45.3	Off	L1	19.4	10.7	56.0
0.838000	45.3	Off	L1	19.5	10.7	56.0
1.118000	45.6	Off	L1	19.4	10.4	56.0
1.342000	44.6	Off	L1	19.4	11.4	56.0
1.622000	44.4	Off	L1	19.4	11.6	56.0
2.078000	46.2	Off	L1	19.4	9.8	56.0
2.590000	47.5	Off	L1	19.5	8.5	56.0
2.862000	45.9	Off	L1	19.5	10.1	56.0
3.782000	45.1	Off	L1	19.5	10.9	56.0

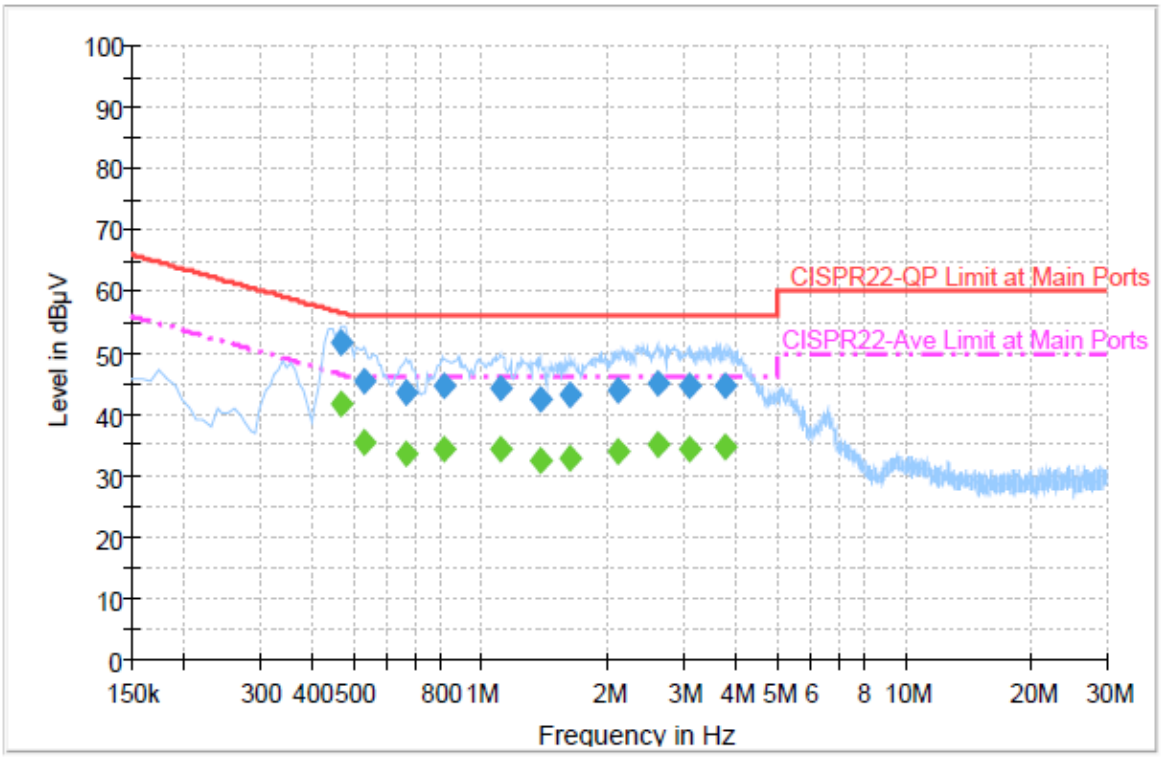
Test Mode :	Mode 1	**Temperature :**	21~23℃
Test Engineer :	Kai-Chun Chu	**Relative Humidity :**	53~55%
Test Voltage :	120Vac / 60Hz	**Phase :**	Line
Function Type :	WLAN Link + Bluetooth Link + HDMI Cable + USB Cable (Charging from Adapter) + Earphone + H Pattern + Adapter		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



Final Result : Average

Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.350000	37.7	Off	L1	19.3	11.3	49.0
0.470000	42.8	Off	L1	19.4	3.7	46.5
0.534000	37.1	Off	L1	19.3	8.9	46.0
0.662000	33.3	Off	L1	19.4	12.7	46.0
0.838000	35.4	Off	L1	19.5	10.6	46.0
1.118000	35.5	Off	L1	19.4	10.5	46.0
1.342000	34.5	Off	L1	19.4	11.5	46.0
1.622000	34.4	Off	L1	19.4	11.6	46.0
2.078000	36.1	Off	L1	19.4	9.9	46.0
2.590000	37.6	Off	L1	19.5	8.4	46.0
2.862000	36.0	Off	L1	19.5	10.0	46.0
3.782000	35.0	Off	L1	19.5	11.0	46.0

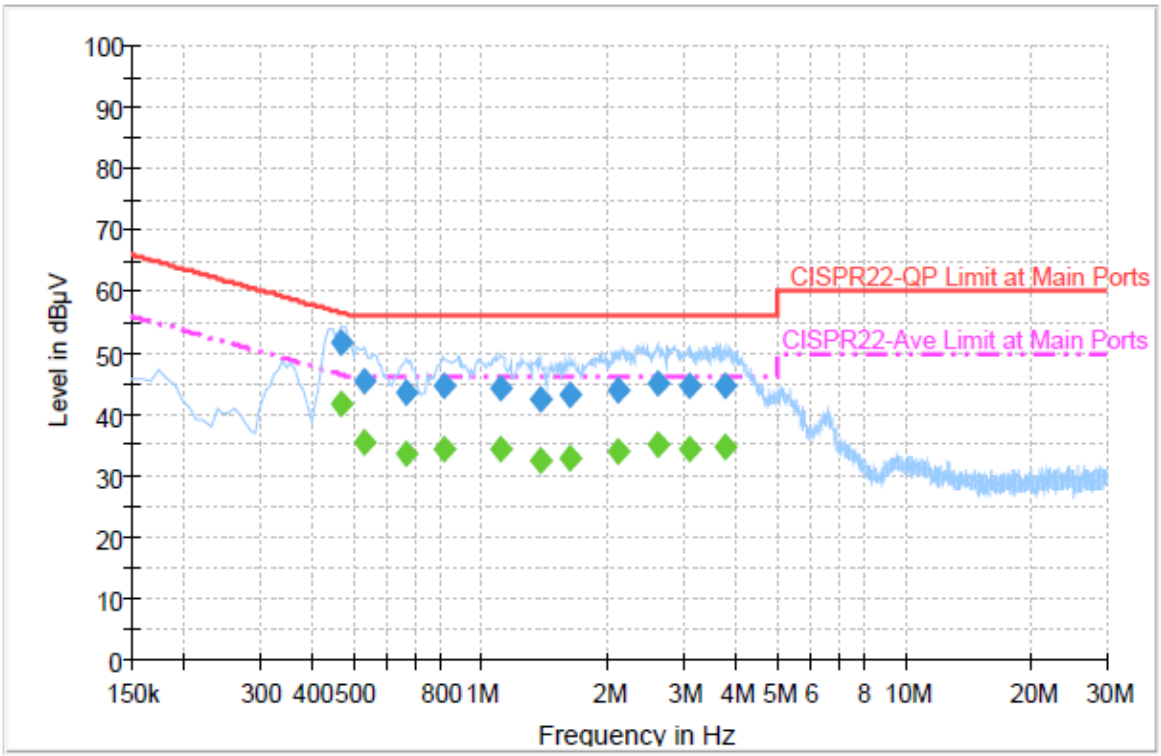
Test Mode :	Mode 1	**Temperature :**	21~23℃
Test Engineer :	Kai-Chun Chu	**Relative Humidity :**	53~55%
Test Voltage :	120Vac / 60Hz	**Phase :**	Neutral
Function Type :	WLAN Link + Bluetooth Link + HDMI Cable + USB Cable (Charging from Adapter) + Earphone + H Pattern + Adapter		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



Final Result : QuasiPeak

Frequency (MHz)	QuasiPeak (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.470000	51.7	Off	N	19.4	4.8	56.5
0.534000	45.4	Off	N	19.3	10.6	56.0
0.670000	43.5	Off	N	19.4	12.5	56.0
0.822000	44.6	Off	N	19.5	11.4	56.0
1.110000	44.3	Off	N	19.4	11.7	56.0
1.382000	42.4	Off	N	19.5	13.6	56.0
1.630000	43.0	Off	N	19.4	13.0	56.0
2.110000	43.9	Off	N	19.5	12.1	56.0
2.606000	45.1	Off	N	19.5	10.9	56.0
3.094000	44.5	Off	N	19.5	11.5	56.0
3.750000	44.7	Off	N	19.5	11.3	56.0

Test Mode :	Mode 1	**Temperature :**	21~23℃
Test Engineer :	Kai-Chun Chu	**Relative Humidity :**	53~55%
Test Voltage :	120Vac / 60Hz	**Phase :**	Neutral
Function Type :	WLAN Link + Bluetooth Link + HDMI Cable + USB Cable (Charging from Adapter) + Earphone + H Pattern + Adapter		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



Final Result : Average

Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.470000	41.8	Off	N	19.4	4.7	46.5
0.534000	35.5	Off	N	19.3	10.5	46.0
0.670000	33.4	Off	N	19.4	12.6	46.0
0.822000	34.5	Off	N	19.5	11.5	46.0
1.110000	34.2	Off	N	19.4	11.8	46.0
1.382000	32.5	Off	N	19.5	13.5	46.0
1.630000	32.9	Off	N	19.4	13.1	46.0
2.110000	34.0	Off	N	19.5	12.0	46.0
2.606000	35.0	Off	N	19.5	11.0	46.0
3.094000	34.4	Off	N	19.5	11.6	46.0
3.750000	34.6	Off	N	19.5	11.4	46.0

3.5 Unwanted Emissions Measurement

This section as specified in FCC Part 15.407(b) is to measure unwanted emissions through radiated measurement for band edge spurious emissions and out of band emissions measurement. The unwanted emissions shall comply with 15.407(b)(1) to (6), and restricted bands per FCC Part15.205.

3.5.1 Limit of Unwanted Emissions

(1) For transmitters operating in the 5.15–5.25 GHz band: all emissions outside of the 5.15–5.35 GHz band shall not exceed an EIRP of –27dBm/MHz.

(2) Unwanted spurious emissions fallen in restricted bands per FCC Part15.205 shall comply with the general field strength limits set forth in § 15.209 as below table,

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

Note: The following formula is used to convert the EIRP to field strength.

$$E=\frac{1000000\sqrt{30P}}{3}$$ μV/m, where P is the eirp (Watts)

EIRP (dBm)	Field Strength at 3m (dBuV/m)
-17	78.3
- 27	68.3

3.5.2 Measuring Instruments

See list of measuring instruments of this test report.

3.5.3 Test Procedures

1. The testing follows the guidelines in FCC KDB 789033 D01 General UNII Test Procedures v01r01.

   (1) Procedure for Unwanted Emissions Measurements Below 1000MHz

   - RBW = 120 KHz
   - VBW = 300 KHz
   - Detector = Peak
   - Trace mode = max hold

   (2) Procedure for Peak Unwanted Emissions Measurements Above 1000 MHz

   - The setting follows the G) 5) of FCC KDB 789033.
   - RBW = 1 MHz
   - VBW ≥ 3 MHz
   - Detector = Peak
   - Sweep time = auto
   - Trace mode = max hold

   (3) Procedures for Average Unwanted Emissions Measurements Above 1000MHz

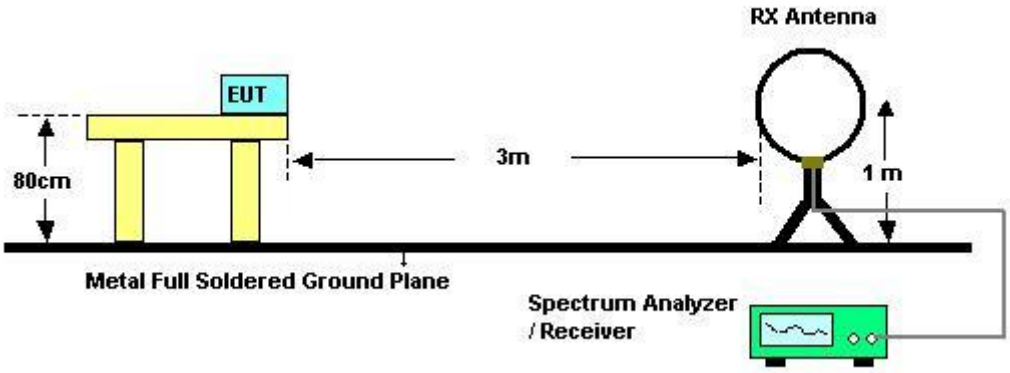
   - The setting follows G) 6) of FCC KDB 789033.
   - RBW = 1 MHz
   - VBW = 10 Hz, when duty cycle is no less than 98 percent.
   - VBW ≥ 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

Antenna	Band	Duty Cycle(%)	T(us)	1/T(KHz)	VBW Setting
1	802.11a	97.81	1426	0.701	1KHz
1	802.11n (BW 20MHz)	96.91	1316	0.760	1KHz
1	802.11n (BW 40MHz) for CH38	98.10	-	-	10Hz
1	802.11n (BW 40MHz)	95.36	658	1.520	3KHz
1+2	802.11n (BW 20MHz) for Ant1	95.52	682	1.466	3KHz
1+2	802.11n (BW 20MHz) for Ant2	95.53	684	1.462	
1+2	802.11n (BW 40MHz) for Ant1 CH38	96.36	636	1.572	3KHz
1+2	802.11n (BW 40MHz) for Ant2 CH38	96.36	636	1.572	
1+2	802.11n (BW 40MHz) for Ant1	91.49	344	2.907	3KHz
1+2	802.11n (BW 40MHz) for Ant2 CH38	91.44	342	2.924	

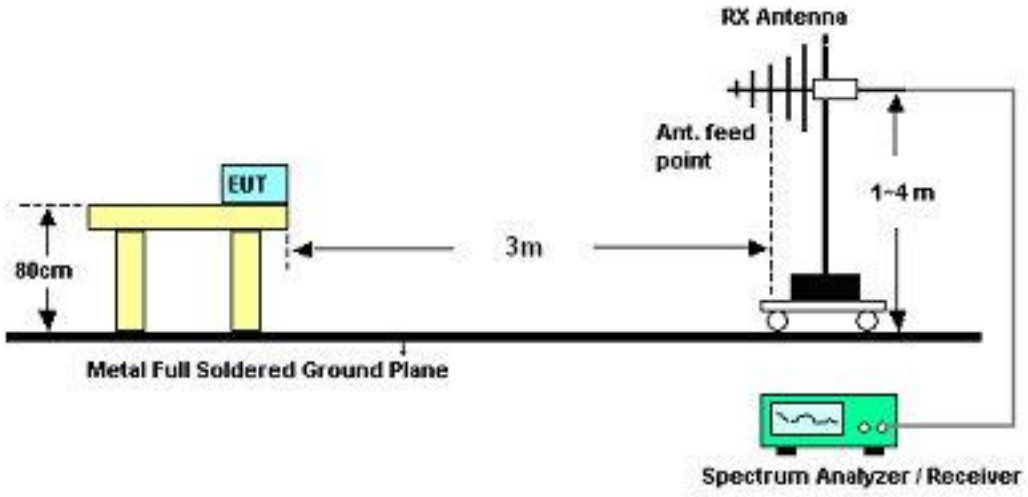
2. The EUT was placed on a rotatable table top 0.8 meter above ground.
3. The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
4. The table was rotated 360 degrees to determine the position of the highest radiation.
5. The antenna is a broadband antenna and its height is adjusted between one meter and four meters above ground to find the maximum value of the field strength for both horizontal polarization and vertical polarization of the antenna.
6. For each suspected emission, the EUT was arranged to its worst case and then adjust the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading.
7. For testing below 1GHz, if the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be repeated one by one using the CISPR quasi-peak method and reported.
8. For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than average limit (that means the emission level in average 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.

3.5.4 Test Setup

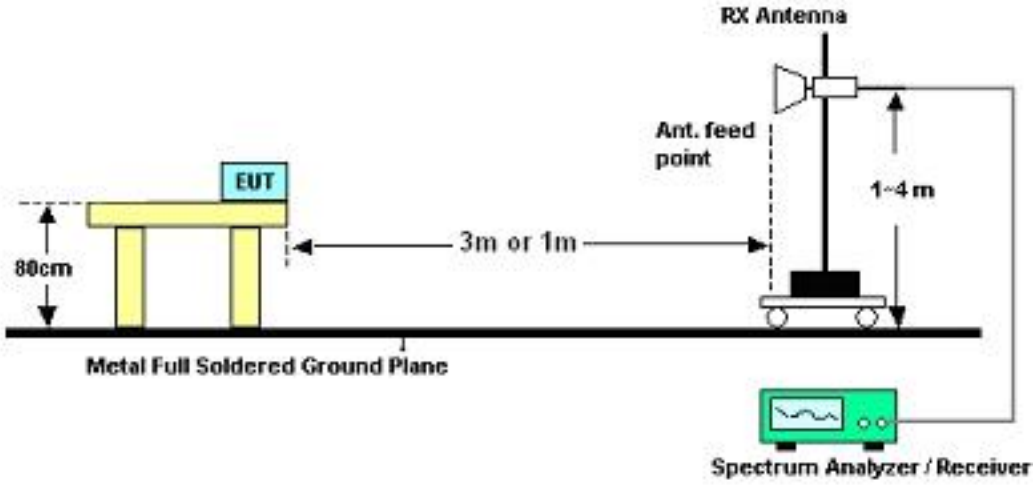
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



3.5.5 Test Results of Radiated Emissions (9 KHz ~ 30 MHz)

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.

3.5.6 Test Result

3.5.6.1 Test Result of Radiated Band Edges

<Legacy Ant 1>:

Test Mode :	802.11a <Ant 1>	**Temperature :**	21~22°C
Test Channel :	36	**Relative Humidity :**	41~42%
		Test Engineer :	Gavin Wu

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**
5150	70.48	-3.52	74	59.82	34.22	9.41	32.97	100	237	Peak
5150	51.57	-2.43	54	40.91	34.22	9.41	32.97	100	237	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**
5150	63.55	-10.45	74	52.89	34.22	9.41	32.97	132	60	Peak
5150	46.57	-7.43	54	35.91	34.22	9.41	32.97	132	60	Average

Test Mode :	802.11a <Ant 1>	**Temperature :**	21~22°C
Test Band :	802.11a	**Relative Humidity :**	41~42%
Test Channel :	48	**Test Engineer :**	Gavin Wu

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**
5393.3	55.24	-18.76	74	43.93	34.41	9.82	32.92	128	233	Peak
5393.3	43	-11	54	31.69	34.41	9.82	32.92	128	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**
5403.27	54.84	-19.16	74	43.52	34.42	9.82	32.92	191	51	Peak
5403.27	42.54	-11.46	54	31.22	34.42	9.82	32.92	191	51	Average

<SISO Ant 1>:

Test Mode :	802.11n (BW 20MHz) <SISO Ant 1>	Temperature :	21~22°C
Test Channel :	36	Relative Humidity :	41~42%
		Test Engineer :	Gavin Wu

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
5150	67.17	-6.83	74	56.51	34.22	9.41	32.97	102	52	Peak
5150	52.64	-1.36	54	41.98	34.22	9.41	32.97	102	52	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
5150	63.86	-10.14	74	53.2	34.22	9.41	32.97	115	271	Peak
5150	46.45	-7.55	54	35.79	34.22	9.41	32.97	115	271	Average

Test Mode :	802.11n (BW 20MHz) <SISO Ant 1>	Temperature :	21~22°C
Test Channel :	48	Relative Humidity :	41~42%
		Test Engineer :	Gavin Wu

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
5358.63	55.31	-18.69	74	44.08	34.38	9.78	32.93	100	230	Peak
5358.63	42.6	-11.4	54	31.37	34.38	9.78	32.93	100	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
5403.89	54.43	-19.57	74	43.11	34.42	9.82	32.92	191	51	Peak
5403.89	42.48	-11.52	54	31.16	34.42	9.82	32.92	191	51	Average

Test Mode :	802.11n (BW 40MHz) <SISO Ant 1>	Temperature :	21~22°C
Test Channel :	38	Relative Humidity :	41~42%
		Test Engineer :	Gavin Wu

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
5145.01	71.67	-2.33	74	61.01	34.22	9.41	32.97	142	236	Peak
5149.94	53.58	-0.42	54	42.92	34.22	9.41	32.97	142	236	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
5149.09	65.35	-8.65	74	54.69	34.22	9.41	32.97	143	56	Peak
5149.94	48.21	-5.79	54	37.55	34.22	9.41	32.97	143	56	Average

Test Mode :	802.11n (BW 40MHz) <SISO Ant 1>	Temperature :	21~22°C
Test Channel :	46	Relative Humidity :	41~42%
		Test Engineer :	Gavin Wu

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
5387.15	56.1	-17.9	74	44.79	34.41	9.82	32.92	113	237	Peak
5387.15	43.46	-10.54	54	32.15	34.41	9.82	32.92	113	237	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
5388.08	55.7	-18.3	74	44.39	34.41	9.82	32.92	190	53	Peak
5388.08	42.51	-11.49	54	31.2	34.41	9.82	32.92	190	53	Average

<MIMO>:

Test Mode :	802.11n (BW 20MHz) <MIMO>	**Temperature :**	21~22°C
Test Channel :	36	**Relative Humidity :**	41~42%
		Test Engineer :	Gavin Wu

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**
5150	69.54	-4.46	74	58.88	34.22	9.41	32.97	100	38	Peak
5150	51.56	-2.44	54	40.9	34.22	9.41	32.97	100	38	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**
5150	66.66	-7.34	74	56	34.22	9.41	32.97	112	58	Peak
5150	47.91	-6.09	54	37.25	34.22	9.41	32.97	112	58	Average

Test Mode :	802.11n (BW 20MHz) <MIMO>	**Temperature :**	21~22°C
Test Channel :	48	**Relative Humidity :**	41~42%
		Test Engineer :	Gavin Wu

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**
5394	56.17	-17.83	74	44.86	34.41	9.82	32.92	100	34	Peak
5394	45.13	-8.87	54	33.82	34.41	9.82	32.92	100	34	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**
5394	58	-16	74	46.69	34.41	9.82	32.92	100	353	Peak
5394	46.35	-7.65	54	35.04	34.41	9.82	32.92	100	353	Average

Test Mode :	802.11n (BW 40MHz) <MIMO>	Temperature :	21~22°C
Test Channel :	38	Relative Humidity :	41~42%
		Test Engineer :	Gavin Wu

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
5147.25	73.44	-0.56	74	62.78	34.22	9.41	32.97	112	15	Peak
5147.25	53.78	-0.22	54	43.12	34.22	9.41	32.97	112	15	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
5148.2	57.16	-16.84	74	46.5	34.22	9.41	32.97	112	15	Peak
5148.2	41.22	-12.78	54	30.56	34.22	9.41	32.97	112	15	Average

Test Mode :	802.11n (BW 40MHz) <MIMO>	Temperature :	21~22°C
Test Channel :	46	Relative Humidity :	41~42%
		Test Engineer :	Gavin Wu

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
5388	57.5	-16.5	74	46.19	34.41	9.82	32.92	100	35	Peak
5388	45.85	-8.15	54	34.54	34.41	9.82	32.92	100	35	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
5388	56.42	-17.58	74	45.11	34.41	9.82	32.92	101	83	Peak
5388	44.7	-9.3	54	33.39	34.41	9.82	32.92	101	83	Average

3.5.6.2 Test Result of Unwanted Radiated Emission (30MHz ~ 10th Harmonic)

<Legacy Ant 1>:

Test Mode :	802.11a <Ant 1>	**Temperature :**	21~22°C
Test Channel :	36	**Relative Humidity :**	41~42%
Test Engineer :	Gavin Wu	**Polarization :**	Horizontal
Remark :	5180 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
5150	51.57	-2.43	54	40.91	34.22	9.41	32.97	100	237	Average
5150	70.48	-3.52	74	59.82	34.22	9.41	32.97	100	237	Peak
5180	99.52	-	-	88.79	34.25	9.45	32.97	100	237	Average
5180	109.24	-	-	98.51	34.25	9.45	32.97	100	237	Peak
5350	43.51	-10.49	54	32.32	34.38	9.74	32.93	100	237	Average
5350	52.94	-21.06	74	41.75	34.38	9.74	32.93	100	237	Peak

Test Mode :	802.11a <Ant 1>	**Temperature :**	21~22°C
Test Channel :	36	**Relative Humidity :**	41~42%
Test Engineer :	Gavin Wu	**Polarization :**	Vertical
Remark :	5180 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
5150	46.57	-7.43	54	35.91	34.22	9.41	32.97	132	60	Average
5150	63.55	-10.45	74	52.89	34.22	9.41	32.97	132	60	Peak
5180	93.22	-	-	82.49	34.25	9.45	32.97	132	60	Average
5180	102.69	-	-	91.96	34.25	9.45	32.97	132	60	Peak
5425.28	41.85	-12.15	54	30.48	34.43	9.86	32.92	132	60	Average
5425.28	54	-20	74	42.63	34.43	9.86	32.92	132	60	Peak

Test Mode :	802.11a <Ant 1>	**Temperature :**	21~22°C
Test Channel :	44	**Relative Humidity :**	41~42%
Test Engineer :	Gavin Wu	**Polarization :**	Horizontal
Remark :	1. 5220 MHz is fundamental signal which can be ignored. 2. 10440 MHz is not within a restricted band, and its limit line is 68.3dBuV/m. 3. All other emission found more than 20dB below limit line is not reported.		

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
48.9	24.41	-15.59	40	46.46	8.9	0.68	31.63	-	-	Peak
86.43	22.5	-17.5	40	45.04	8.24	0.92	31.7	-	-	Peak
159.87	28.56	-14.94	43.5	48.23	10.5	1.22	31.39	110	254	Peak
417.6	27.57	-18.43	46	40.27	16.38	2.2	31.28	-	-	Peak
496.7	25.02	-20.98	46	35.46	18.02	2.44	30.9	-	-	Peak
552	25.9	-20.1	46	35.6	18.97	2.56	31.23	-	-	Peak
5150	44.47	-9.53	54	33.81	34.22	9.41	32.97	100	233	Average
5150	54.19	-19.81	74	43.53	34.22	9.41	32.97	100	233	Peak
5220	99.66	-	-	88.82	34.27	9.53	32.96	100	233	Average
5220	109.1	-	-	98.26	34.27	9.53	32.96	100	233	Peak
5379.09	43.4	-10.6	54	32.14	34.41	9.78	32.93	100	233	Average
5379.09	55.25	-18.75	74	43.99	34.41	9.78	32.93	100	233	Peak
10440	43.71	-24.59	68.3	55.57	37.36	11.21	60.43	100	0	Peak

Test Mode :	802.11a <Ant 1>	**Temperature :**	21~22°C
Test Channel :	44	**Relative Humidity :**	41~42%
Test Engineer :	Gavin Wu	**Polarization :**	Vertical
Remark :	1. 5220 MHz is fundamental signal which can be ignored. 2. 10440 MHz is not within a restricted band. 3. All other emission found more than 20dB below limit line is not reported.		

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
34.05	26.78	-13.22	40	40.97	17.12	0.57	31.88	116	205	Peak
142.32	25.14	-18.36	43.5	44.04	11.35	1.2	31.45	-	-	Peak
162.03	26.39	-17.11	43.5	46.23	10.31	1.22	31.37	-	-	Peak
415.5	29.42	-16.58	46	42.23	16.32	2.19	31.32	-	-	Peak
514.2	27.84	-18.16	46	38.02	18.33	2.48	30.99	-	-	Peak
553.4	25.84	-20.16	46	35.49	19.01	2.56	31.22	-	-	Peak
5150	41.97	-12.03	54	31.31	34.22	9.41	32.97	130	61	Average
5150	52.37	-21.63	74	41.71	34.22	9.41	32.97	130	61	Peak
5220	93.85	-	-	83.01	34.27	9.53	32.96	130	61	Average
5220	103.28	-	-	92.44	34.27	9.53	32.96	130	61	Peak
5375.37	43.15	-10.85	54	31.91	34.39	9.78	32.93	130	61	Average
5375.37	55.44	-18.56	74	44.2	34.39	9.78	32.93	130	61	Peak
10440	46.15	-22.15	68.3	58.01	37.36	11.21	60.43	100	0	Peak

Test Mode :	802.11a <Ant 1>	Temperature :	21~22°C
Test Channel :	48	Relative Humidity :	41~42%
Test Engineer :	Gavin Wu	Polarization :	Horizontal
Remark :	5240 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
5150	43.39	-10.61	54	32.73	34.22	9.41	32.97	128	233	Average
5150	54.74	-19.26	74	44.08	34.22	9.41	32.97	128	233	Peak
5240	99.99	-	-	89.08	34.29	9.57	32.95	128	233	Average
5240	109.4	-	-	98.49	34.29	9.57	32.95	128	233	Peak
5393.3	43	-11	54	31.69	34.41	9.82	32.92	128	233	Average
5393.3	55.24	-18.76	74	43.93	34.41	9.82	32.92	128	233	Peak

Test Mode :	802.11a <Ant 1>	Temperature :	21~22°C
Test Channel :	48	Relative Humidity :	41~42%
Test Engineer :	Gavin Wu	Polarization :	Vertical
Remark :	5240 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
5150	41.93	-12.07	54	31.27	34.22	9.41	32.97	191	51	Average
5150	52.34	-21.66	74	41.68	34.22	9.41	32.97	191	51	Peak
5240	93.96	-	-	83.05	34.29	9.57	32.95	191	51	Average
5240	103.69	-	-	92.78	34.29	9.57	32.95	191	51	Peak
5403.27	42.54	-11.46	54	31.22	34.42	9.82	32.92	191	51	Average
5403.27	54.84	-19.16	74	43.52	34.42	9.82	32.92	191	51	Peak

<SISO Ant 1>:

Test Mode :	802.11n (BW 20MHz) <SISO Ant 1>	Temperature :	21~22°C
Test Channel :	36	Relative Humidity :	41~42%
Test Engineer :	Gavin Wu	Polarization :	Horizontal
Remark :	5180 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
5150	52.64	-1.36	54	41.98	34.22	9.41	32.97	102	52	Average
5150	67.17	-6.83	74	56.51	34.22	9.41	32.97	102	52	Peak
5180	101	-	-	90.27	34.25	9.45	32.97	102	52	Average
5180	112.08	-	-	101.35	34.25	9.45	32.97	102	52	Peak
5430	43.58	-10.42	54	32.14	34.45	9.9	32.91	102	52	Average
5430	55.3	-18.7	74	43.86	34.45	9.9	32.91	102	52	Peak

Test Mode :	802.11n (BW 20MHz) <SISO Ant 1>	Temperature :	21~22°C
Test Channel :	36	Relative Humidity :	41~42%
Test Engineer :	Gavin Wu	Polarization :	Vertical
Remark :	5180 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
5150	46.45	-7.55	54	35.79	34.22	9.41	32.97	115	271	Average
5150	63.86	-10.14	74	53.2	34.22	9.41	32.97	115	271	Peak
5180	96.42	-	-	85.69	34.25	9.45	32.97	115	271	Average
5180	105.75	-	-	95.02	34.25	9.45	32.97	115	271	Peak
5382	41.8	-12.2	54	30.49	34.41	9.82	32.92	115	271	Average
5382	53.46	-20.54	74	42.15	34.41	9.82	32.92	115	271	Peak

Test Mode :	802.11n (BW 20MHz) <SISO Ant 1>	**Temperature :**	21~22°C
Test Channel :	44	**Relative Humidity :**	41~42%
Test Engineer :	Gavin Wu	**Polarization :**	Horizontal
Remark :	1. 5220 MHz is fundamental signal which can be ignored. 2. 10440 MHz is not within a restricted band. 3. All other emission found more than 20dB below limit line is not reported.		

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
5150	45.17	-8.83	54	34.51	34.22	9.41	32.97	100	232	Average
5150	55.27	-18.73	74	44.61	34.22	9.41	32.97	100	232	Peak
5220	100.19	-	-	89.35	34.27	9.53	32.96	100	232	Average
5220	109.53	-	-	98.69	34.27	9.53	32.96	100	232	Peak
5373.2	43.49	-10.51	54	32.25	34.39	9.78	32.93	100	232	Average
5373.2	55.41	-18.59	74	44.17	34.39	9.78	32.93	100	232	Peak
10440	44.06	-24.24	68.3	55.92	37.36	11.21	60.43	100	0	Peak

Test Mode :	802.11n (BW 20MHz) <SISO Ant 1>	**Temperature :**	21~22°C
Test Channel :	44	**Relative Humidity :**	41~42%
Test Engineer :	Gavin Wu	**Polarization :**	Vertical
Remark :	1. 5220 MHz is fundamental signal which can be ignored. 2. 10440 MHz is not within a restricted band. 3. All other emission found more than 20dB below limit line is not reported.		

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
5150	42.25	-11.75	54	31.59	34.22	9.41	32.97	189	45	Average
5150	53.41	-20.59	74	42.75	34.22	9.41	32.97	189	45	Peak
5220	94.24	-	-	83.4	34.27	9.53	32.96	189	45	Average
5220	104	-	-	93.16	34.27	9.53	32.96	189	45	Peak
5385.29	42.62	-11.38	54	31.31	34.41	9.82	32.92	189	45	Average
5385.29	55.44	-18.56	74	44.13	34.41	9.82	32.92	189	45	Peak
10440	47.31	-20.99	68.3	59.17	37.36	11.21	60.43	100	0	Peak

Test Mode :	802.11n (BW 20MHz) <SISO Ant 1>	**Temperature :**	21~22°C
Test Channel :	48	**Relative Humidity :**	41~42%
Test Engineer :	Gavin Wu	**Polarization :**	Horizontal
Remark :	5240 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
5150	43.57	-10.43	54	32.91	34.22	9.41	32.97	100	230	Average
5150	53.98	-20.02	74	43.32	34.22	9.41	32.97	100	230	Peak
5240	99.57	-	-	88.66	34.29	9.57	32.95	100	230	Average
5240	109.02	-	-	98.11	34.29	9.57	32.95	100	230	Peak
5358.63	42.6	-11.4	54	31.37	34.38	9.78	32.93	100	230	Average
5358.63	55.31	-18.69	74	44.08	34.38	9.78	32.93	100	230	Peak

Test Mode :	802.11n (BW 20MHz) <SISO Ant 1>	**Temperature :**	21~22°C
Test Channel :	48	**Relative Humidity :**	41~42%
Test Engineer :	Gavin Wu	**Polarization :**	Vertical
Remark :	5240 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
5150	41.8	-12.2	54	31.14	34.22	9.41	32.97	191	51	Average
5150	52.48	-21.52	74	41.82	34.22	9.41	32.97	191	51	Peak
5240	93.09	-	-	82.18	34.29	9.57	32.95	191	51	Average
5240	103.52	-	-	92.61	34.29	9.57	32.95	191	51	Peak
5403.89	42.48	-11.52	54	31.16	34.42	9.82	32.92	191	51	Average
5403.89	54.43	-19.57	74	43.11	34.42	9.82	32.92	191	51	Peak

Test Mode :	802.11n (BW 40MHz) <SISO Ant 1>	Temperature :	21~22°C
Test Channel :	38	Relative Humidity :	41~42%
Test Engineer :	Gavin Wu	Polarization :	Horizontal
Remark :	1. 5190 MHz is fundamental signal which can be ignored. 2. 10380 MHz emission found more than 20dB below limit line is not reported. 3. All other emission found more than 20dB below limit line is not reported.		

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
5149.94	53.58	-0.42	54	42.92	34.22	9.41	32.97	142	236	Average
5145.01	71.67	-2.33	74	61.01	34.22	9.41	32.97	142	236	Peak
5190	95.58	-	-	84.8	34.25	9.49	32.96	112	17	Average
5190	105.4	-	-	94.62	34.25	9.49	32.96	112	17	Peak
5406	41.25	-12.75	54	29.89	34.42	9.86	32.92	112	17	Average
5406	53.53	-20.47	74	42.17	34.42	9.86	32.92	112	17	Peak

Test Mode :	802.11n (BW 40MHz) <SISO Ant 1>	Temperature :	21~22°C
Test Channel :	38	Relative Humidity :	41~42%
Test Engineer :	Gavin Wu	Polarization :	Vertical
Remark :	1. 5190 MHz is fundamental signal which can be ignored. 2. 10380 MHz emission found more than 20dB below limit line is not reported. 3. All other emission found more than 20dB below limit line is not reported.		

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
5149.94	48.21	-5.79	54	37.55	34.22	9.41	32.97	143	56	Average
5149.09	65.35	-8.65	74	54.69	34.22	9.41	32.97	143	56	Peak
5190	77.75	-	-	66.97	34.25	9.49	32.96	112	17	Average
5190	88	-	-	77.22	34.25	9.49	32.96	112	17	Peak
5422	40.5	-13.5	54	29.13	34.43	9.86	32.92	112	17	Average
5422	52.34	-21.66	74	40.97	34.43	9.86	32.92	112	17	Peak

Test Mode :	802.11n (BW 40MHz) <SISO Ant 1>	Temperature :	21~22°C
Test Channel :	46	Relative Humidity :	41~42%
Test Engineer :	Gavin Wu	Polarization :	Horizontal
Remark :	5230 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
5150	45.18	-8.82	54	34.52	34.22	9.41	32.97	113	237	Average
5150	63.06	-10.94	74	52.4	34.22	9.41	32.97	113	237	Peak
5230	97.12	-	-	86.26	34.29	9.53	32.96	113	237	Average
5230	107.15	-	-	96.29	34.29	9.53	32.96	113	237	Peak
5387.15	43.46	-10.54	54	32.15	34.41	9.82	32.92	113	237	Average
5387.15	56.1	-17.9	74	44.79	34.41	9.82	32.92	113	237	Peak

Test Mode :	802.11n (BW 40MHz) <SISO Ant 1>	Temperature :	21~22°C
Test Channel :	46	Relative Humidity :	41~42%
Test Engineer :	Gavin Wu	Polarization :	Vertical
Remark :	5230 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
5150	41.94	-12.06	54	31.28	34.22	9.41	32.97	190	53	Average
5150	54.97	-19.03	74	44.31	34.22	9.41	32.97	190	53	Peak
5230	90.61	-	-	79.75	34.29	9.53	32.96	190	53	Average
5230	101.16	-	-	90.3	34.29	9.53	32.96	190	53	Peak
5388.08	42.51	-11.49	54	31.2	34.41	9.82	32.92	190	53	Average
5388.08	55.7	-18.3	74	44.39	34.41	9.82	32.92	190	53	Peak

<MIMO Ant 1+2>:

Test Mode :	802.11n (BW 20MHz) <MIMO>	**Temperature :**	21~22°C
Test Channel :	36	**Relative Humidity :**	41~42%
Test Engineer :	Gavin Wu	**Polarization :**	Horizontal
Remark :	1. 5180 MHz is fundamental signal which can be ignored. 2. 5340 MHz is not within a restricted band.		

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
5150	51.56	-2.44	54	40.9	34.22	9.41	32.97	100	38	Average
5150	69.54	-4.46	74	58.88	34.22	9.41	32.97	100	38	Peak
5180	99.93	-	-	89.2	34.25	9.45	32.97	100	38	Average
5180	110.09	-	-	99.36	34.25	9.45	32.97	100	38	Peak
5340	59.29	-9.01	68.3	48.11	34.37	9.74	32.93	100	38	Peak
5444	48.94	-5.06	54	37.5	34.45	9.9	32.91	100	38	Average
5444	54.32	-19.68	74	42.88	34.45	9.9	32.91	100	38	Peak

Test Mode :	802.11n (BW 20MHz) <MIMO>	**Temperature :**	21~22°C
Test Channel :	36	**Relative Humidity :**	41~42%
Test Engineer :	Gavin Wu	**Polarization :**	Vertical
Remark :	1. 5180 MHz is fundamental signal which can be ignored. 2. 10360 MHz is not within a restricted band.		

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
5150	47.91	-6.09	54	37.25	34.22	9.41	32.97	112	58	Average
5150	66.66	-7.34	74	56	34.22	9.41	32.97	112	58	Peak
5180	94.96	-	-	84.23	34.25	9.45	32.97	112	58	Average
5180	105.54	-	-	94.81	34.25	9.45	32.97	112	58	Peak
5370	42.29	-11.71	54	31.05	34.39	9.78	32.93	112	58	Average
5370	55.28	-18.72	74	44.04	34.39	9.78	32.93	112	58	Peak
10360	47.39	-20.91	68.3	59.21	37.32	11.31	60.45	100	0	Peak

Test Mode :	802.11n (BW 20MHz) <MIMO>	**Temperature :**	21~22°C
Test Channel :	44	**Relative Humidity :**	41~42%
Test Engineer :	Gavin Wu	**Polarization :**	Horizontal
Remark :	1. 5220 MHz is fundamental signal which can be ignored. 2. All other emission found more than 20dB below limit line is not reported.		

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
5060	46.85	-7.15	54	36.44	34.15	9.25	32.99	100	32	Average
5060	58.46	-15.54	74	48.05	34.15	9.25	32.99	100	32	Peak
5220	98.54	-	-	87.7	34.27	9.53	32.96	100	32	Average
5220	110	-	-	99.16	34.27	9.53	32.96	100	32	Peak
5374	44.65	-9.35	54	33.41	34.39	9.78	32.93	100	32	Average
5374	57.74	-16.26	74	46.5	34.39	9.78	32.93	100	32	Peak

Test Mode :	802.11n (BW 20MHz) <MIMO>	**Temperature :**	21~22°C
Test Channel :	44	**Relative Humidity :**	41~42%
Test Engineer :	Gavin Wu	**Polarization :**	Vertical
Remark :	1. 5220 MHz is fundamental signal which can be ignored. 2. All other emission found more than 20dB below limit line is not reported.		

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
5146	42.77	-11.23	54	32.11	34.22	9.41	32.97	100	82	Average
5146	55.16	-18.84	74	44.5	34.22	9.41	32.97	100	82	Peak
5220	94.43	-	-	83.59	34.27	9.53	32.96	100	82	Average
5220	105.34	-	-	94.5	34.27	9.53	32.96	100	82	Peak
5380	44.73	-9.27	54	33.47	34.41	9.78	32.93	100	82	Average
5380	56.33	-17.67	74	45.07	34.41	9.78	32.93	100	82	Peak

Test Mode :	802.11n (BW 20MHz) <MIMO>	**Temperature :**	21~22°C
Test Channel :	48	**Relative Humidity :**	41~42%
Test Engineer :	Gavin Wu	**Polarization :**	Horizontal
Remark :	5240 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
5080	47.45	-6.55	54	36.98	34.17	9.29	32.99	100	34	Average
5080	58.17	-15.83	74	47.7	34.17	9.29	32.99	100	34	Peak
5240	98.82	-	-	87.91	34.29	9.57	32.95	100	34	Average
5240	109.62	-	-	98.71	34.29	9.57	32.95	100	34	Peak
5394	45.13	-8.87	54	33.82	34.41	9.82	32.92	100	34	Average
5394	56.17	-17.83	74	44.86	34.41	9.82	32.92	100	34	Peak

Test Mode :	802.11n (BW 20MHz) <MIMO>	**Temperature :**	21~22°C
Test Channel :	48	**Relative Humidity :**	41~42%
Test Engineer :	Gavin Wu	**Polarization :**	Vertical
Remark :	1. 5240 MHz is fundamental signal which can be ignored. 2. 10480 MHz are not within a restricted band.		

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
5070	42.13	-11.87	54	31.68	34.15	9.29	32.99	100	353	Average
5070	55.34	-18.66	74	44.89	34.15	9.29	32.99	100	353	Peak
5240	94.45	-	-	83.54	34.29	9.57	32.95	100	353	Average
5240	106.2	-	-	95.29	34.29	9.57	32.95	100	353	Peak
5394	46.35	-7.65	54	35.04	34.41	9.82	32.92	100	353	Average
5394	58	-16	74	46.69	34.41	9.82	32.92	100	353	Peak
10480	46.9	-21.4	68.3	58.78	37.39	11.14	60.41	100	0	Peak

Test Mode :	802.11n (BW 40MHz) <MIMO>	**Temperature :**	21~22°C
Test Channel :	38	**Relative Humidity :**	41~42%
Test Engineer :	Gavin Wu	**Polarization :**	Horizontal
Remark :	1. 5190 MHz is fundamental signal which can be ignored. 2. All other emission found more than 20dB below limit line is not reported.		

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
48.9	23.41	-16.59	40	45.46	8.9	0.68	31.63	-	-	Peak
159.87	27.56	-15.94	43.5	47.23	10.5	1.22	31.39	100	82	Peak
228.99	21.74	-24.26	46	40.36	11.12	1.47	31.21	-	-	Peak
326.6	25.77	-20.23	46	41.12	14.03	1.84	31.22	-	-	Peak
417.6	28.57	-17.43	46	41.27	16.38	2.2	31.28	-	-	Peak
843.9	25.96	-20.04	46	30.66	22.54	3.25	30.49	-	-	Peak
5147.25	53.78	-0.22	54	43.12	34.22	9.41	32.97	112	15	Average
5147.25	73.44	-0.56	74	62.78	34.22	9.41	32.97	112	15	Peak
5190	96.25	-	-	85.47	34.25	9.49	32.96	112	15	Average
5190	106.28	-	-	95.5	34.25	9.49	32.96	112	15	Peak
5430	42.2	-11.8	54	30.76	34.45	9.9	32.91	112	15	Average
5430	52.93	-21.07	74	41.49	34.45	9.9	32.91	112	15	Peak

Test Mode :	802.11n (BW 40MHz) <MIMO>	**Temperature :**	21~22°C
Test Channel :	38	**Relative Humidity :**	41~42%
Test Engineer :	Gavin Wu	**Polarization :**	Vertical
Remark :	1. 5190 MHz is fundamental signal which can be ignored. 2. All other emission found more than 20dB below limit line is not reported.		

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
34.05	27.78	-12.22	40	41.97	17.12	0.57	31.88	100	24	Peak
162.03	25.39	-18.11	43.5	45.23	10.31	1.22	31.37	-	-	Peak
229.8	25.81	-20.19	46	44.35	11.19	1.48	31.21	-	-	Peak
407.1	27.37	-18.63	46	40.47	16.16	2.17	31.43	-	-	Peak
514.2	28.84	-17.16	46	39.02	18.33	2.48	30.99	-	-	Peak
553.4	26.84	-19.16	46	36.49	19.01	2.56	31.22	-	-	Peak
5148.2	41.22	-12.78	54	30.56	34.22	9.41	32.97	112	15	Average
5148.2	57.16	-16.84	74	46.5	34.22	9.41	32.97	112	15	Peak
5190	81.39	-	-	70.61	34.25	9.49	32.96	112	15	Average
5190	91.23	-	-	80.45	34.25	9.49	32.96	112	15	Peak
5352	41.38	-12.62	54	30.19	34.38	9.74	32.93	112	15	Average
5352	52.71	-21.29	74	41.52	34.38	9.74	32.93	112	15	Peak

Test Mode :	802.11n (BW 40MHz) <MIMO>	Temperature :	21~22°C
Test Channel :	46	Relative Humidity :	41~42%
Test Engineer :	Gavin Wu	Polarization :	Horizontal
Remark :	5230 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
5132	46.09	-7.91	54	35.49	34.21	9.37	32.98	100	35	Average
5132	58.55	-15.45	74	47.95	34.21	9.37	32.98	100	35	Peak
5230	96.17	-	-	85.31	34.29	9.53	32.96	100	35	Average
5230	107.56	-	-	96.7	34.29	9.53	32.96	100	35	Peak
5388	45.85	-8.15	54	34.54	34.41	9.82	32.92	100	35	Average
5388	57.5	-16.5	74	46.19	34.41	9.82	32.92	100	35	Peak

Test Mode :	802.11n (BW 40MHz) <MIMO>	Temperature :	21~22°C
Test Channel :	46	Relative Humidity :	41~42%
Test Engineer :	Gavin Wu	Polarization :	Vertical
Remark :	5230 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
5150	43.03	-10.97	54	32.37	34.22	9.41	32.97	101	83	Average
5150	56.58	-17.42	74	45.92	34.22	9.41	32.97	101	83	Peak
5230	92.31	-	-	81.45	34.29	9.53	32.96	101	83	Average
5230	103.57	-	-	92.71	34.29	9.53	32.96	101	83	Peak
5388	44.7	-9.3	54	33.39	34.41	9.82	32.92	101	83	Average
5388	56.42	-17.58	74	45.11	34.41	9.82	32.92	101	83	Peak

3.6 Peak Excursion Ratio Measurement

3.6.1 Limit of Peak Excursion Ratio

The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the maximum conducted output power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.

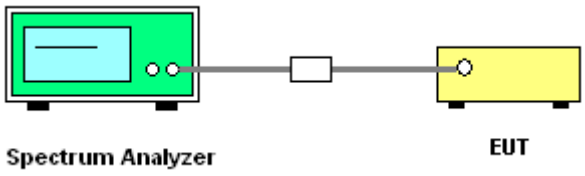
3.6.2 Measuring Instruments

See list of measuring instruments of this test report.

3.6.3 Test Procedures

1. The transmitter output is connected to the spectrum analyzer.
2. Set the spectrum analyzer span to view the entire emission bandwidth.
3. Find the maximum of the peak-max-hold spectrum.
   * Set RBW = 1 MHz.
   *Set VBW ≥ 3 MHz.
   *Detector = peak.
   *Trace mode = max-hold.
   *Allow the sweeps to continue until the trace stabilizes.
   *Use the peak search function to find the peak of the spectrum.
4. Use the procedure found under section 3.3 to measure the PPSD.
5. Compute the ratio of the maximum of the peak-max-hold spectrum to the PPSD.

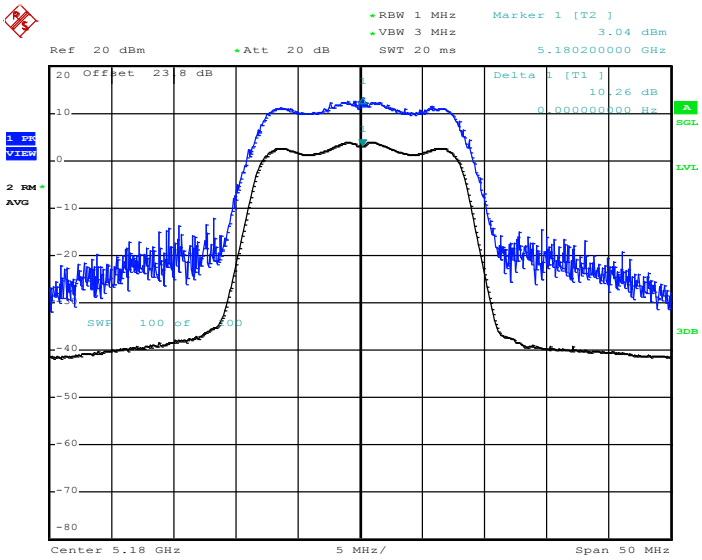
3.6.4 Test Setup



3.6.5 Test Result of Peak Excursion Ratio

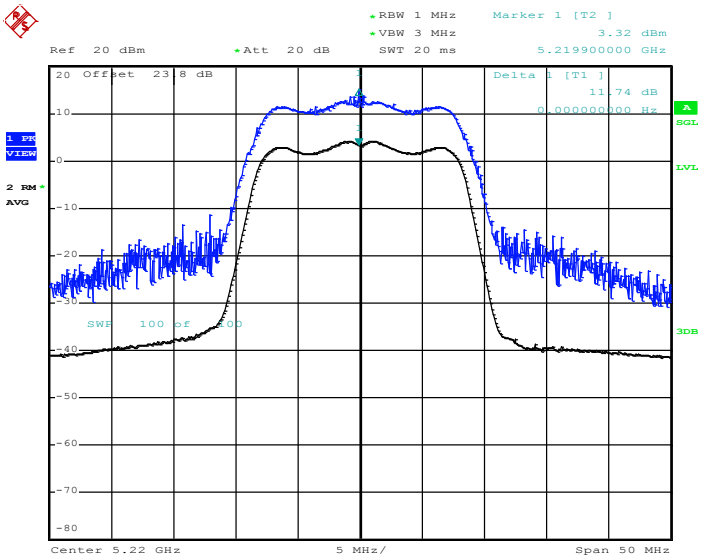
Test Mode :	802.11a	Temperature :	24~26℃
Test Engineer :	Pinkston Tu and Kenny Chen	Relative Humidity :	45~49%

Peak Excursion Ratio Plot on 802.11a Channel 36 - SISO Ant 1



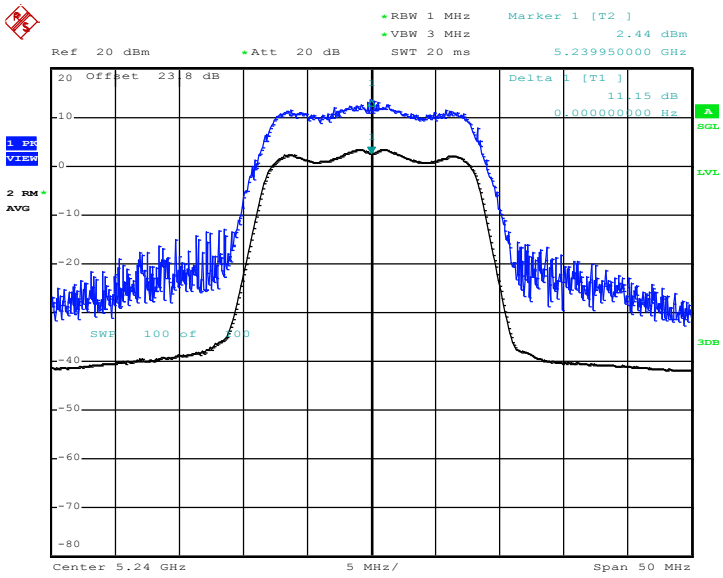
Date: 1.MAY.2012 14:17:03

Peak Excursion Ratio Plot on 802.11a Channel 44 - SISO Ant 1



Date: 1.MAY.2012 14:21:35

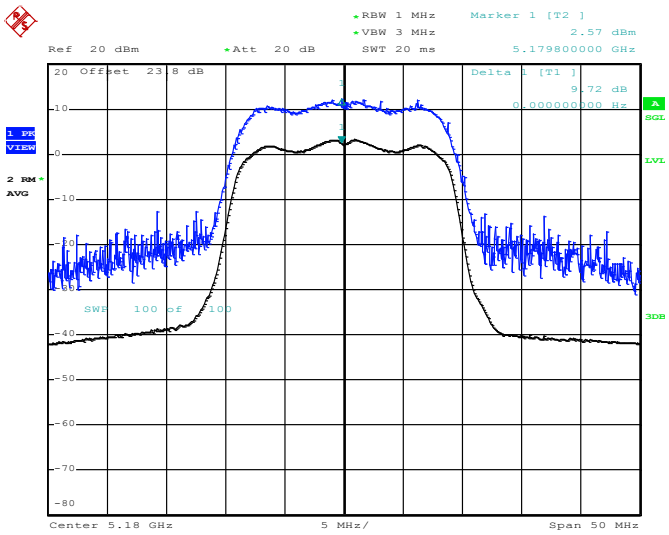
Peak Excursion Ratio Plot on 802.11a Channel 48 - SISO Ant 1



Date: 1.MAY.2012 14:24:41

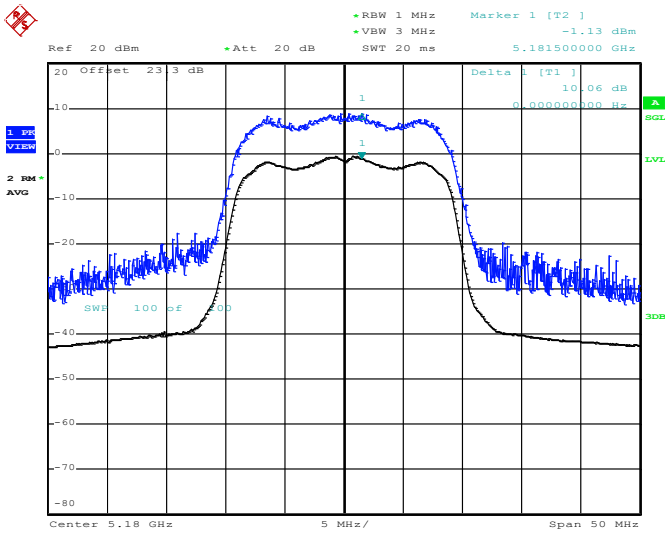
Test Mode :	802.11n (BW 20MHz)	Temperature :	24~26℃
Test Engineer :	Pinkston Tu and Kenny Chen	Relative Humidity :	45~49%

Peak Excursion Ratio Plot on 802.11n (BW 20MHz) Channel 36 - SISO Ant 1



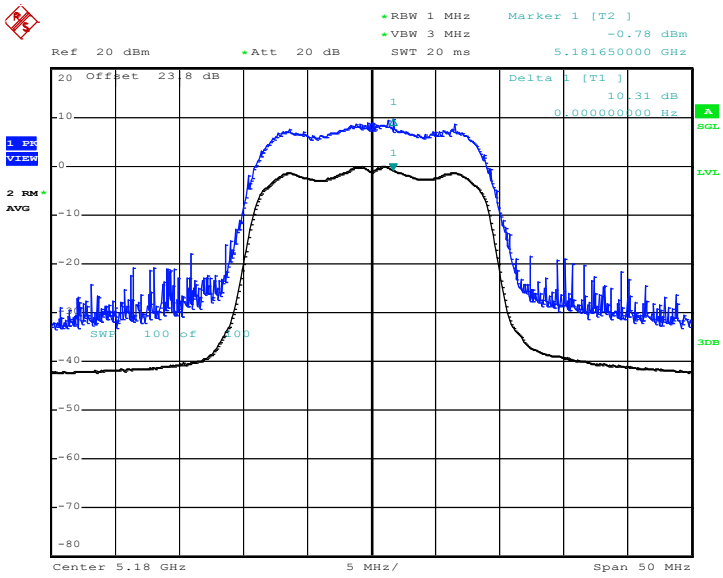
Date: 1.MAY.2012 15:07:39

Peak Excursion Ratio Plot on 802.11n (BW 20MHz) Channel 36 - MIMO Ant 1



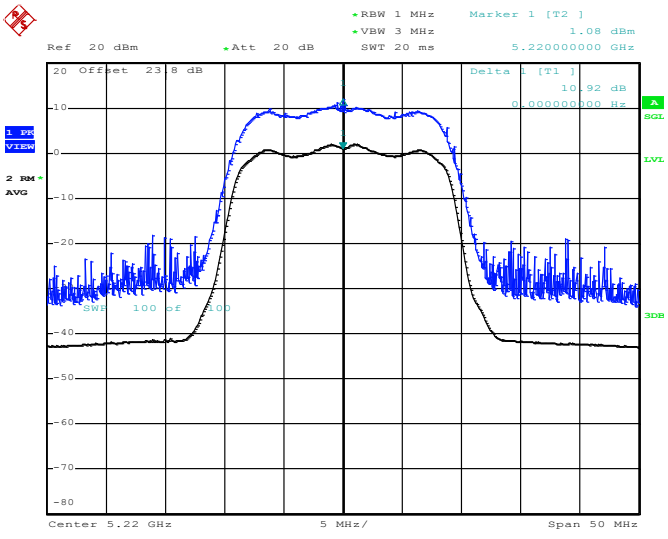
Date: 12.MAY.2012 14:49:05

Peak Excursion Ratio Plot on 802.11n (BW 20MHz) Channel 36 - MIMO Ant 2



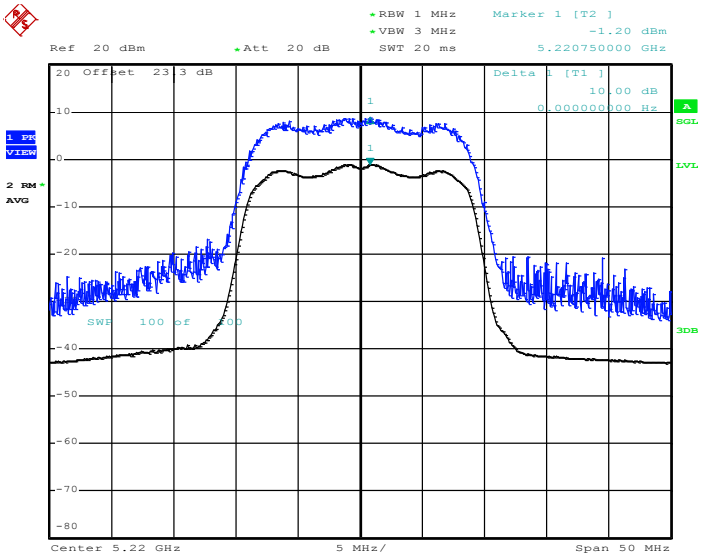
Date: 12.MAY.2012 14:51:37

Peak Excursion Ratio Plot on 802.11n (BW 20MHz) Channel 44- SISO Ant 1



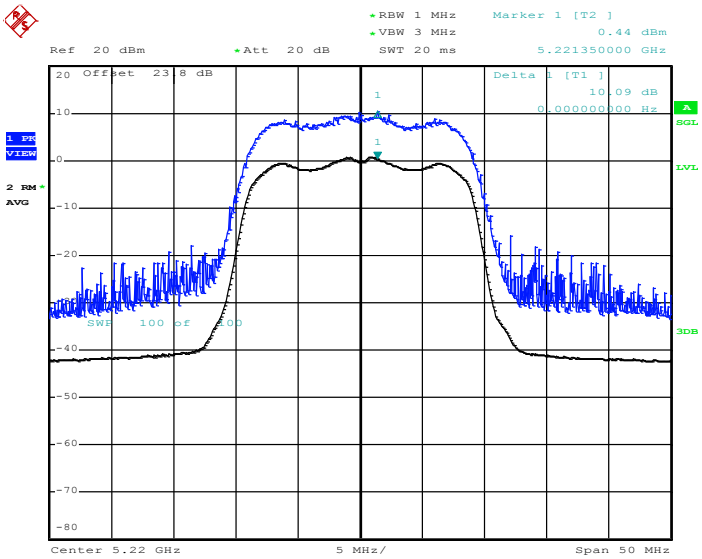
Date: 1.MAY.2012 15:10:45

Peak Excursion Ratio Plot on 802.11n (BW 20MHz) Channel 44 - MIMO Ant 1



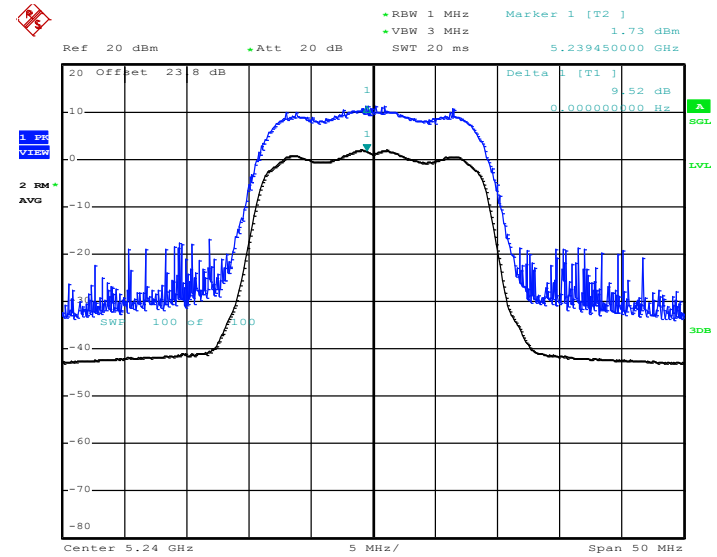
Date: 12.MAY.2012 14:55:59

Peak Excursion Ratio Plot on 802.11n (BW 20MHz) Channel 44 - MIMO Ant 2



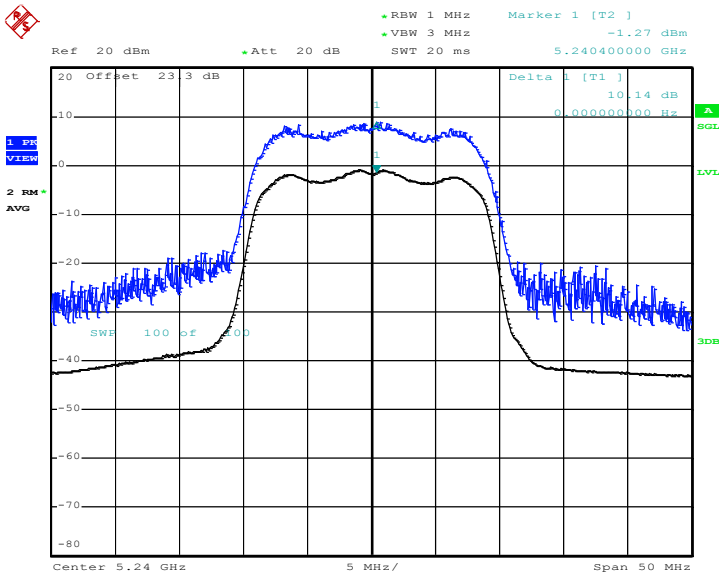
Date: 12.MAY.2012 14:53:35

Peak Excursion Ratio Plot on 802.11n (BW 20MHz) Channel 48 - SISO Ant 1



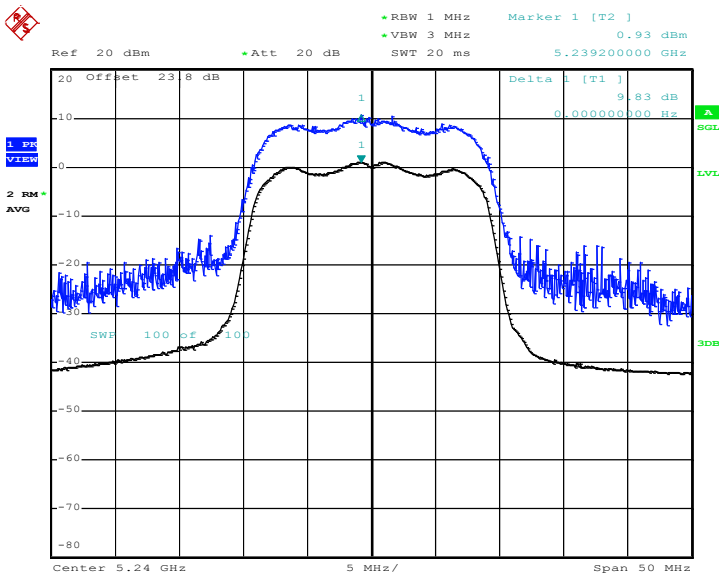
Date: 1.MAY.2012 15:14:15

Peak Excursion Ratio Plot on 802.11n (BW 20MHz) Channel 48 - MIMO Ant 1



Date: 12.MAY.2012 14:58:56

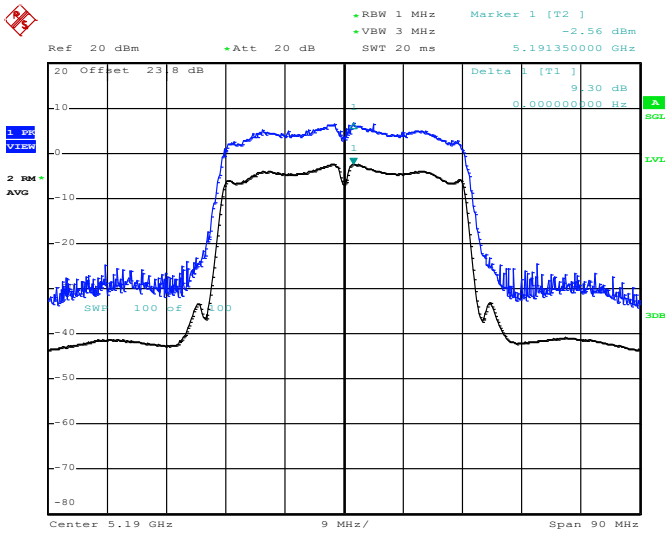
Peak Excursion Ratio Plot on 802.11n (BW 20MHz) Channel 48 - MIMO Ant 2



Date: 12.MAY.2012 15:09:42

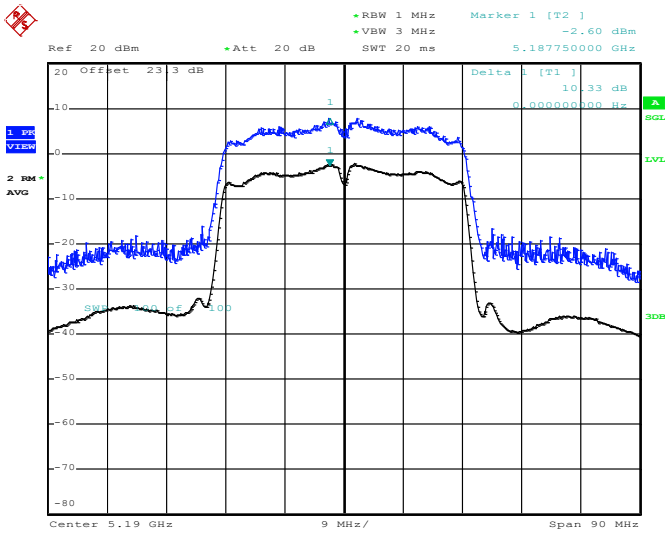
Test Mode :	802.11n (BW 40MHz)	Temperature :	24~26℃
Test Engineer :	Pinkston Tu and Kenny Chen	Relative Humidity :	45~49%

Peak Excursion Ratio Plot on 802.11n (BW 40MHz) Channel 38 - SISO Ant 1



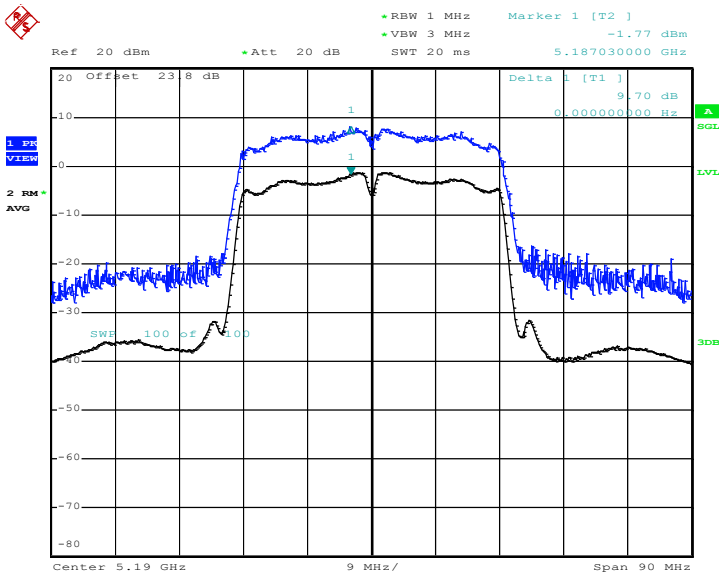
Date: 1.MAY.2012 15:25:04

Peak Excursion Ratio Plot on 802.11n (BW 40MHz) Channel 38 - MIMO Ant 1



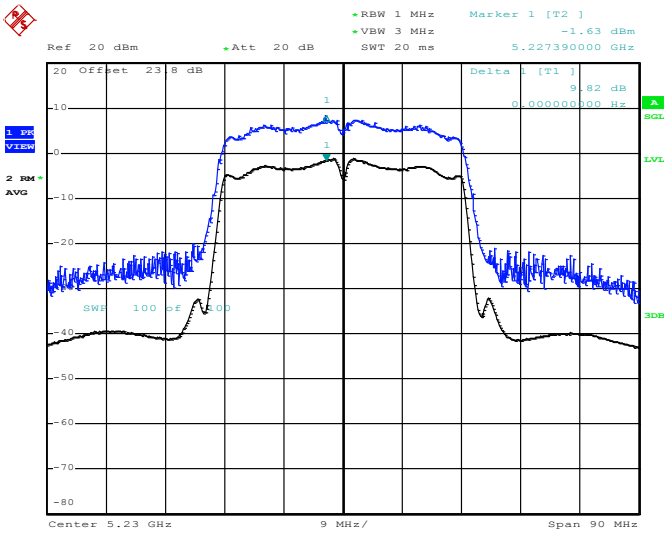
Date: 12.MAY.2012 15:46:04

Peak Excursion Ratio Plot on 802.11n (BW 40MHz) Channel 38 - MIMO Ant 2



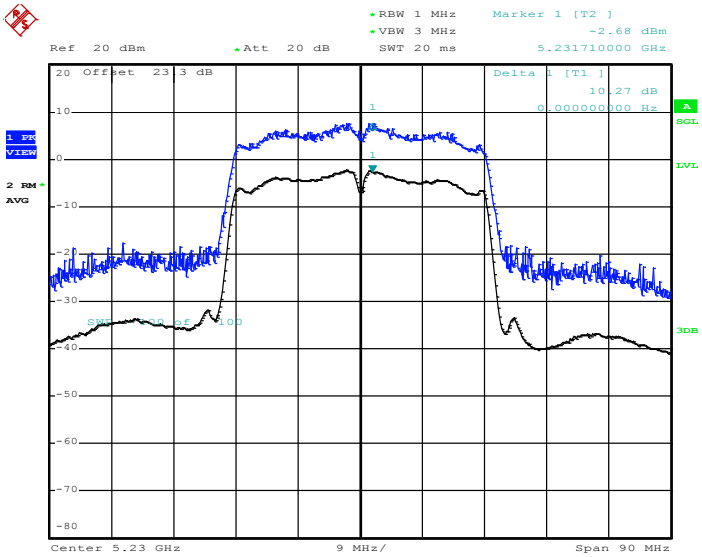
Date: 12.MAY.2012 15:43:12

Peak Excursion Ratio Plot on 802.11n (BW 40MHz) Channel 46 - SISO Ant 1



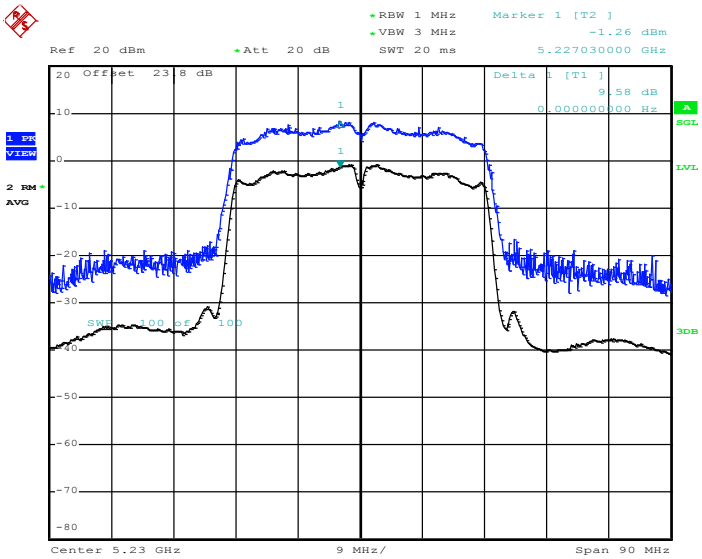
Date: 1.MAY.2012 15:28:27

Peak Excursion Ratio Plot on 802.11n (BW 40MHz) Channel 46 - MIMO Ant 1



Date: 12.MAY.2012 15:38:24

Peak Excursion Ratio Plot on 802.11n (BW 40MHz) Channel 46 - MIMO Ant 2



Date: 12.MAY.2012 15:40:41

3.7 Automatically Discontinue Transmission

3.7.1 Limit of Automatically Discontinue Transmission

The device shall automatically discontinue transmission in case of either absence of information to transmit or operational failure. These provisions are not intended to preclude the transmission of control or signaling information or the use of repetitive codes used by certain digital technologies to complete frame or burst intervals. Applicants shall include in their application for equipment authorization to describe how this requirement is met.

3.7.2 Measuring Instruments

See list of measuring instruments of this test report.

3.7.3 Test Result of Automatically Discontinue Transmission

During no any information transmission, the EUT can automatically discontinue transmission and become standby mode for power saving. The EUT can detect the controlling signal of ACK message transmitting from remote device and verify whether it shall resend or discontinue transmission.

3.8 Frequency Stability Measurement

3.8.1 Limit of Frequency Stability

Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual.

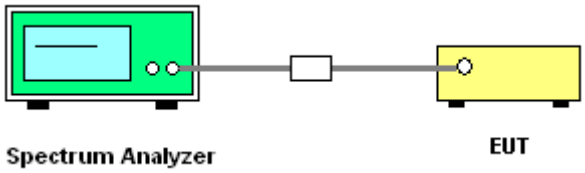
3.8.2 Measuring Instruments

See list of measuring instruments of this test report.

3.8.3 Test Procedures

1. To ensure emission at the band edge is maintained within the authorized band, those values shall be measured by radiation emissions at upper and lower frequency points, and finally compensated by frequency deviation as procedures below.
2. The EUT was operated at the maximum output power, and connected to the spectrum analyzer, which is set to maximum hold function and peak detector. The peak value of the power envelope was measured and noted. The upper and lower frequency points were respectively measured relatively 10dB lower than the measured peak value.
3. The frequency deviation was calculated by adding the upper frequency point and the lower frequency point divided by two. Those detailed values of frequency deviation are provided in table below.

3.8.4 Test Setup



3.8.5 Test Result of Frequency Stability

Test Mode :	802.11a	Temperature :	24~26℃
Test Engineer :	Pinkston Tu and Kenny Chen	Relative Humidity :	45~49%

802.11a – Legacy Ant 1				
Channel	Frequency (MHz)	Low Frequency (Fl)	High Frequency (Fh)	Frequency Stability (ppm)
36	5180	5171.80	5188.20	0.00
44	5220	5211.90	5228.20	9.58
48	5240	5231.85	5248.15	0.00

Test Mode :	802.11n (BW 20MHz)	Temperature :	24~26℃
Test Engineer :	Pinkston Tu and Kenny Chen	Relative Humidity :	45~49%

802.11n (BW 20MHz, SISO) – SISO Ant 1				
Channel	Frequency (MHz)	Low Frequency (Fl)	High Frequency (Fh)	Frequency Stability (ppm)
36	5180	5171.25	5188.80	4.83
44	5220	5211.25	5228.75	0.00
48	5240	5231.25	5248.75	0.00

802.11n (BW 20MHz, MIMO, 2Tx) – MIMO Ant 1				
Channel	Frequency (MHz)	Low Frequency (Fl)	High Frequency (Fh)	Frequency Stability (ppm)
36	5180	5171.20	5188.90	9.65
44	5220	5211.15	5228.85	0.00
48	5240	5231.15	5248.85	0.00

802.11n (BW 20MHz, MIMO, 2Tx) MIMO Ant 2				
Channel	Frequency (MHz)	Low Frequency (Fl)	High Frequency (Fh)	Frequency Stability (ppm)
36	5180	5171.00	5189.00	0.00
44	5220	5211.10	5228.90	0.00
48	5240	5231.05	5248.85	-9.54

Test Mode :	802.11n (BW 40MHz)	Temperature :	24~26℃
Test Engineer :	Pinkston Tu and Kenny Chen	Relative Humidity :	45~49%

802.11n (BW 40MHz, SISO) – SISO Ant 1				
Channel	Frequency (MHz)	Low Frequency (Fl)	High Frequency (Fh)	Frequency Stability (ppm)
38	5190	5171.82	5208.27	8.67
46	5230	5211.82	5248.18	0.00

802.11n (BW 40MHz, MIMO, 2Tx) – MIMO Ant 1				
Channel	Frequency (MHz)	Low Frequency (Fl)	High Frequency (Fh)	Frequency Stability (ppm)
38	5190	5171.82	5208.27	8.67
46	5230	5211.82	5248.18	0.00

802.11n (BW 40MHz, MIMO, 2Tx) – MIMO Ant 2				
Channel	Frequency (MHz)	Low Frequency (Fl)	High Frequency (Fh)	Frequency Stability (ppm)
38	5190	5171.55	5208.45	0.00
46	5230	5211.55	5248.45	0.00

3.9 Antenna Requirements

3.9.1 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.

3.9.2 Antenna Connected Construction

Non-standard connector used.

3.9.3 Antenna Gain

The antenna peak gain of EUT is less than 6 dBi. Therefore, it is not necessary to reduce maximum peak output power limit. The EUT supports completely uncorrelated MIMO mode. The composite antenna gain for 2.4GHz is 2.15 dBi. The composite antenna gain for 5GHz is 3.21 dBi as following table.

	2.4GHz	5GHz
ANT 1 GAIN (dBi)	2.00	3.50
ANT 2 GAIN (dBi)	2.30	2.90
COMPOSITE GAIN(dBi)	2.15	3.21

FCC KDB 662911 D01 Multiple Transmitter Output v01r01

Unequal antenna gains, with equal transmit powers.

For antenna gains given by G_1, G_2, …, G_N dBi.

If all transmit signals are *completely uncorrelated*, then

Directional gain = $10 \log[(10^{G1/10} + 10^{G2/10} + \ldots + 10^{GN/10})/N]$ dBi

4 List of Measuring Equipments

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	R&S	FSP40	100055	9kHz~40GHz	Jun. 13, 2011	May 01, 2012 ~ May 30, 2012	Jun. 12, 2012	Conducted (TH02-HY)
EMI Test Receive	R&S	ESCS 30	100356	9KHz ~ 2.75GHz	Oct. 27, 2011	Jan. 31, 2012	Oct. 26, 2012	Conduction (CO05-HY)
Two-LISN	R&S	ENV216	11-100081	9KHz ~ 30MHz	Dec. 09, 2011	Jan. 31, 2012	Dec. 08, 2012	Conduction (CO05-HY)
Two-LISN	R&S	ENV216	11-100080	9KHz ~ 30MHz	Dec. 06, 2011	Jan. 31, 2012	Dec. 05, 2012	Conduction (CO05-HY)
AC Power Source	APC	APC-1000W	N/A	N/A	N/A	Jan. 31, 2012	N/A	Conduction (CO05-HY)
Bilog Antenna	SCHAFFNER	CBL6111C	2726	30MHz ~ 1GHz	Oct. 22, 2011	May 01, 2012 ~ May 12, 2012	Oct. 21, 2012	Radiation (03CH07-HY)
Spectrum Analyzer	R&S	FSP30	101067	9KHz ~ 30GHz	Dec. 06, 2011	May 01, 2012 ~ May 12, 2012	Dec. 05, 2012	Radiation (03CH07-HY)
Double Ridge Horn Antenna	ESCO	3117	00075962	1GHz ~ 18GHz	Aug. 10, 2011	May 01, 2012 ~ May 12, 2012	Aug. 09, 2012	Radiation (03CH07-HY)
Pre Amplifier	Agilent	8449B	3008A02362	1GHz ~ 26.5GHz	Dec. 05, 2011	May 01, 2012 ~ May 12, 2012	Dec. 04, 2012	Radiation (03CH07-HY)
Pre Amplifier	COM-POWER	PA-103A	161241	10-1000MHz.32 dB.GAIN	Feb. 27, 2012	May 01, 2012 ~ May 12, 2012	Feb. 26, 2013	Radiation (03CH07-HY)
EMI TEST RECEIVER	R&S	ESCI 7	100724	9kHz ~ 7GHz	Aug. 22, 2011	May 01, 2012 ~ May 12, 2012	Aug. 21, 2012	Radiation (03CH07-HY)
Pre Amplifier	MITEQ	AMF-7D-0010 1800-30-10P	159088	1GHz ~ 18GHz	Mar. 10, 2012	May 01, 2012 ~ May 12, 2012	Mar. 09, 2013	Radiation (03CH07-HY)
Loop Antenna	R&S	HFH2-Z2	860004/001	9 kHz~30 MHz	Jul. 29, 2010	May 01, 2012 ~ May 12, 2012	Jul. 28, 2012	Radiation (03CH07-HY)

5 Uncertainty of Evaluation

Uncertainty of Conducted Emission Measurement (150kHz ~ 30MHz)

Contribution	Uncertainty of X_i		$u(X_i)$
	dB	Probability Distribution	
Receiver Reading	0.10	Normal (k=2)	0.05
Cable Loss	0.10	Normal (k=2)	0.05
AMN Insertion Loss	2.50	Rectangular	0.63
Receiver Specification	1.50	Rectangular	0.43
Site Imperfection	1.39	Rectangular	0.80
Mismatch	+0.34 / -0.35	U-Shape	0.24
Combined Standard Uncertainty Uc(y)	**1.13**		
Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**2.26**		

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

Contribution	Uncertainty of X_i		$u(X_i)$
	dB	Probability Distribution	
Receiver Reading	0.41	Normal (k=2)	0.21
Antenna Factor Calibration	0.83	Normal (k=2)	0.42
Cable Loss Calibration	0.25	Normal (k=2)	0.13
Pre-Amplifier Gain Calibration	0.27	Normal (k=2)	0.14
RCV/SPA Specification	2.50	Rectangular	0.72
Antenna Factor Interpolation for Frequency	1.00	Rectangular	0.29
Site Imperfection	1.43	Rectangular	0.83
Mismatch	+0.39 / -0.41	U-Shape	0.28
Combined Standard Uncertainty Uc(y)	**1.27**		
Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**2.54**		

Uncertainty of Radiated Emission Measurement (1GHz ~ 40GHz)

Contribution	Uncertainty of X_i		$u(X_i)$	C_i	$C_i * u(X_i)$
	dB	Probability Distribution			
Receiver Reading	±0.10	Normal (k=2)	0.10	1	0.10
Antenna Factor Calibration	±1.70	Normal (k=2)	0.85	1	0.85
Cable Loss Calibration	±0.50	Normal (k=2)	0.25	1	0.25
Receiver Correction	±2.00	Rectangular	1.15	1	1.15
Antenna Factor Directional	±1.50	Rectangular	0.87	1	0.87
Site Imperfection	±2.80	Triangular	1.14	1	1.14
Mismatch Receiver VSWR Γ1 = 0.197 Antenna VSWR Γ2 = 0.194 Uncertainty = 20Log(1-Γ1*Γ2)	+0.34 / -0.35	U-Shape	0.244	1	0.244
Combined Standard Uncertainty Uc(y)	**2.36**				
Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**4.72**				