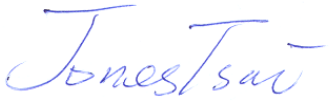
FCC RF Test Report

APPLICANT	**:**	**Dodds LLC**
EQUIPMENT	**:**	**Tablet PC**
MODEL NAME	**:**	**3HT7G**
FCC ID	**:**	**ZHS-1013**
STANDARD	**:**	**FCC Part 15 Subpart E**
CLASSIFICATION	**:**	**(NII) Unlicensed National Information Infrastructure**

The product was completely tested on Jul. 10, 2012. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the procedures and shown the 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.

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR1O2041B	Rev. 01	Initial issue of report	Jul. 18, 2012

SUMMARY OF TEST RESULT

Report Section	FCC Rule	IC Rule	Description	Limit	Result	Remark
3.1	15.403(i)	A9.2	26dB 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	15.407(b)	A9.3	Peak Excursion Ratio	≤ 13dB	Pass	-
3.5	15.407(b)	A9.3	Unwanted Emissions	≤ -17, -27 dBm (depend on band)&15.209(a)	Pass	Under limit 0.46 dB at 5150.000 MHz
3.6	15.207	Gen 7.2.4	AC Conducted Emission	15.207(a)	Pass	Under limit 8.80 dB at 4.998 MHz
3.7	15.407(g)	A9.5	Frequency Stability	Within Operation Band	Pass	-
3.8	15.407(c)	A9.5	Automatically Discontinue Transmission	Discontinue Transmission	Pass	-
3.9	15.203 & 15.407(a)	A9.2	Antenna Requirement	N/A	Pass	-

1 General Description

1.1 Applicant

Dodds LLC
Suite 400, 8040 Excelsior Drive Madison, WI 53717 302.691-6287

1.2 Feature of Equipment Under Test

Product Feature	
Equipment	Tablet PC
Model Name	3HT7G
FCC ID	ZHS-1013
EUT supports Radios application	WLAN 11abgn / Bluetooth

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 Specification subjective to this standard</th></tr>
<tr><td>Tx/Rx Frequency Range</td><td>5180MHz ~ 5240MHz</td></tr>
<tr><td>Maximum Output Power</td><td><Legacy Ant 2>
802.11a : 11.45 dBm / 0.0140 W
< SISO Ant 2>
802.11n HT-20 : 11.28 dBm / 0.0134 W
802.11n HT-40 : 11.28 dBm / 0.0134 W
<MIMO Ant 1+2>
802.11n HT-20 : 14.48 dBm / 0.0281 W
802.11n HT-40 : 13.44 dBm / 0.0221 W</td></tr>
<tr><td>Duty Cycle</td><td><Legacy Ant 2>
802.11a : 87.50%
<SISO Ant 2>
802.11n (BW 20MHz) : 86.65%
802.11n (BW 40MHz) : 98.44% for CH38
802.11n (BW 40MHz) : 87.17%
<MIMO Ant 1+2>
802.11n (BW 20MHz) : 76.42% for Ant 1
802.11n (BW 20MHz) : 76.66% for Ant 2
802.11n (BW 40MHz) : 78.28% for Ant 1
802.11n (BW 40MHz) : 77.83% for Ant 2</td></tr>
<tr><td>Antenna Type</td><td>Ant 1 :
PIFA Antenna with gain 2.50 dBi
Ant 2 :
PIFA Antenna with gain 2.70 dB</td></tr>
<tr><td>Type of Modulation</td><td>OFDM (BPSK / QPSK / 16QAM / 64QAM)</td></tr>
<tr><td>Antenna Function Description</td><td>
<table>
<tr><th></th><th>Ant 1.</th><th>Ant 2.</th></tr>
<tr><td>802.11 a</td><td>-</td><td>V</td></tr>
<tr><td>802.11 n SISO</td><td>-</td><td>V</td></tr>
<tr><td>802.11 n 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.
	TH02-HY	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 and ANSI C63.10-2009
- 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	Vostro 1510	FCC DoC	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
3.	LCD Monitor	Dell	U2410	FCC DoC	Shielded, 1.6 m	Unshielded, 1.8 m
4.	Bluetooth Earphone	Sony Ericsson	MW600	PY7DDA-2029	N/A	N/A
5.	iPod Earphone	Apple	N/A	FCC DoC	Unshielded, 1.0 m	N/A
6.	AC Adapter	N/A	N/A	N/A	N/A	N/A

2 Test Configuration of Equipment Under Test

The EUT supports 802.11 a/n with two diversity antennas, Antenna 1 and 2, and completely uncorrelated MIMO modes. The Antenna 1 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 ANSI C63.10-2009 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 (Y plane for Legacy Ant 2 and SISO Ant 2 , X plane for MIMO Ant 1+2) 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.

2.1 Test Mode

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

Test Cases				
	Test Items	**Mode**	**Data rate**	**Test Channel**
Conducted TCs	**26dB and 99% BW Power Spectral Density**	**802.11a**	**6 Mbps**	**L/M/H**
		802.11n HT-20	**6.5 Mbps**	**L/M/H**
		802.11n HT-40	**13.5 Mbps**	**L/M/H**
	Output Power	**802.11a**	**6 Mbps**	**L/M/H**
		802.11n HT-20	**6.5 Mbps**	**L/M/H**
		802.11n HT-40	**13.5 Mbps**	**L/M/H**
	Peak Excursion	**802.11a**	**6 Mbps**	**L/M/H**
		802.11n HT-20	**6.5 Mbps**	**L/M/H**
		802.11n HT-40	**13.5 Mbps**	**L/M/H**
	Frequency Stability	**802.11a**	**6 Mbps**	**L/M/H**
		802.11n HT-20	**6.5 Mbps**	**L/M/H**
		802.11n HT-40	**13.5 Mbps**	**L/M/H**
Radiated TCs	**Radiated Band Edge**	**802.11a**	**6 Mbps**	**L/H**
		802.11n HT-20	**6.5 Mbps**	**L/H**
		802.11n HT-40	**13.5 Mbps**	**L/H**
	Radiated Spurious Emission	**802.11a**	**6 Mbps**	**L/M/H**
		802.11n HT-20	**6.5 Mbps**	**L/M/H**
		802.11n HT-40	**13.5 Mbps**	**L/M/H**
AC Conducted Emission	Mode 1 : WLAN (5G) Link + Bluetooth Link + MPEG4 + HDMI Cable + Earphone + USB Cable (Charging from Adapter)			

Ch. #		Band I：5150-5250 MHz	
		802.11a, n HT-20	802.11n HT-40
L	Low	36	38
M	Middle	44	-
H	High	48	46

2.2 Carrier Frequency and Channel

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 and antenna configurations as following table and the highest power data rates were chosen for full test in the following tables. Final Output Power equals to Measured Output Power adds the duty factor.

<Legacy Ant 2>

5GHz 802.11a mode								
Data Rate (MHz)	**6M bps**	**9M bps**	**12M bps**	**18M bps**	**24M bps**	**36M bps**	**48M bps**	**54M bps**
Peak Power (dBm)	**11.45**	11.44	11.41	11.36	11.37	11.37	11.43	11.42

<SISO Ant 2>

5GHz 802.11n HT-20 mode								
Data Rate (MHz)	**MCS0**	**MCS1**	**MCS2**	**MCS3**	**MCS4**	**MCS5**	**MCS6**	**MCS7**
Peak Power (dBm)	**11.28**	11.23	11.25	11.24	11.20	11.25	11.25	11.21

5GHz 802.11n HT-40 mode								
Data Rate (MHz)	**MCS0**	**MCS1**	**MCS2**	**MCS3**	**MCS4**	**MCS5**	**MCS6**	**MCS7**
Peak Power (dBm)	**11.28**	11.25	11.12	11.12	11.21	11.24	11.09	11.19

<MIMO Ant 1 + 2>

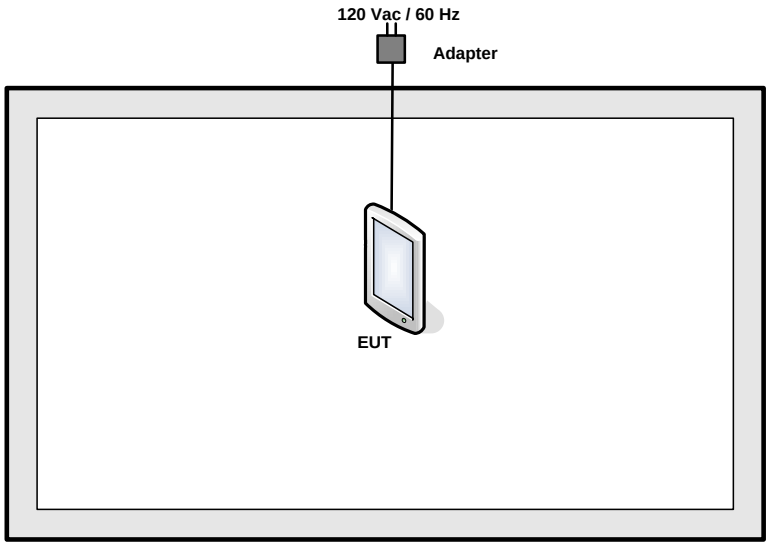
5GHz 802.11n HT-20 mode								
Data Rate (MHz)	**MCS8**	**MCS9**	**MCS10**	**MCS11**	**MCS12**	**MCS13**	**MCS14**	**MCS15**
Power (dBm) MIMO – Ant 1	13.12	12.96	12.98	13.10	13.02	13.13	**13.22**	13.12
Power (dBm) MIMO – Ant 2	8.79	8.80	8.47	8.51	**8.86**	8.58	8.43	8.63
MIMO Ant 1 + 2 (Measure and Sum)	**14.48**	14.37	14.29	14.40	14.43	14.44	14.46	14.44

5GHz 802.11n HT-40 mode								
Data Rate (MHz)	**MCS8**	**MCS9**	**MCS10**	**MCS11**	**MCS12**	**MCS13**	**MCS14**	**MCS15**
Power (dBm) MIMO – Ant 1	11.76	11.69	11.82	11.81	11.77	**11.92**	11.64	11.74
Power (dBm) MIMO – Ant 2	**8.51**	7.72	7.85	7.77	7.98	7.91	7.98	8.08
MIMO Ant 1 + 2 (Measure and Sum)	**13.44**	13.16	13.28	13.26	13.28	13.37	13.19	13.29

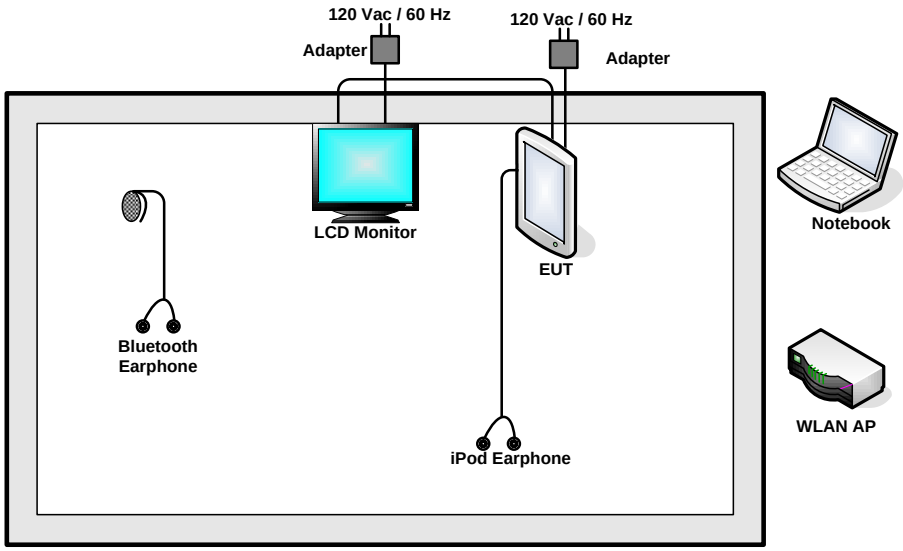
Note: MIMO Ant 1+2 is a calculated result from sum of the power MIMO Ant 1 and MIMO Ant 2.

2.4 Connection Diagram of Test System

<WLAN Tx Mode>



<AC Conducted Emission Mode>



2.5 RF Utility

The programmed RF Utility “PUTTERY.EXE” 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.

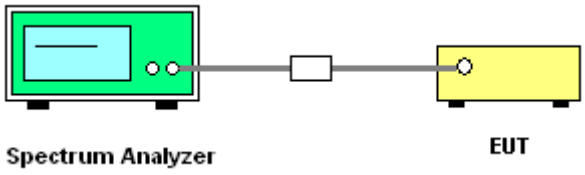
3.1.2 Measuring Instruments

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. Section D) Emission bandwidth
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



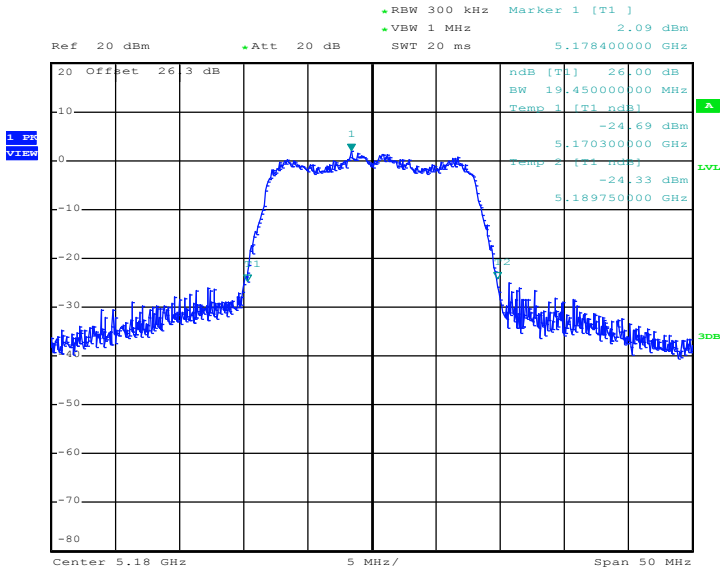
3.1.5 Test Result of 26dB Bandwidth

Test Mode :	802.11a	Temperature :	24~26℃
Test Engineer :	Book Lin	Relative Humidity :	45~49%

Channel	Frequency (MHz)	802.11a 26dB Bandwidth (MHz)	Pass/Fail
		Legacy Ant 2	
36	5180	19.45	N/A
44	5220	19.35	N/A
48	5240	19.45	N/A

802.11a – Legacy Ant 2

26 dB Bandwidth Plot on 802.11a Channel 36



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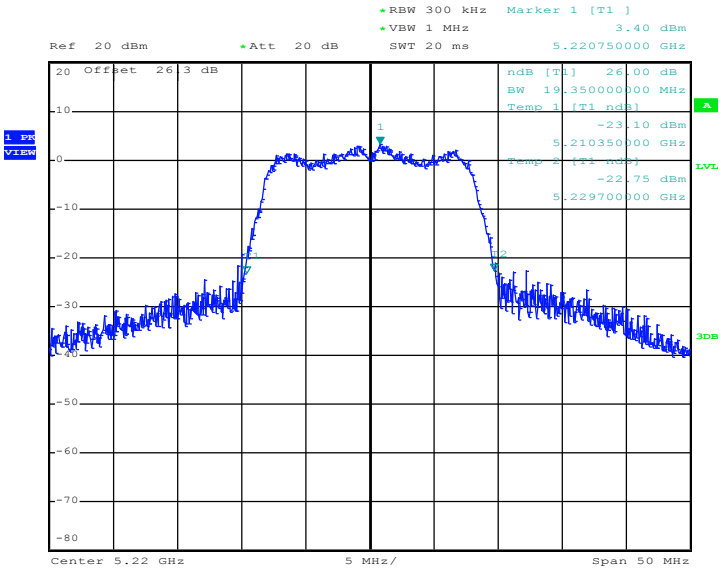
802.11a –Legacy Ant 2

26 dB Bandwidth Plot on 802.11a Channel 44



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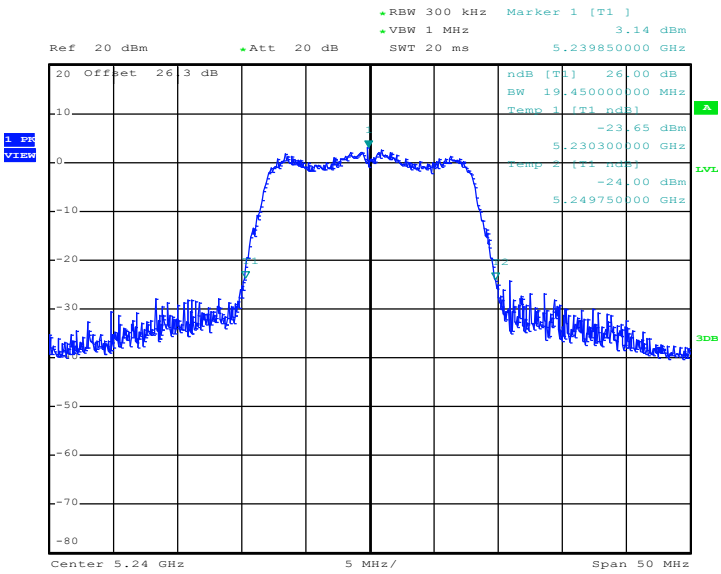
802.11a – Legacy Ant 2

26 dB Bandwidth Plot on 802.11a Channel 48



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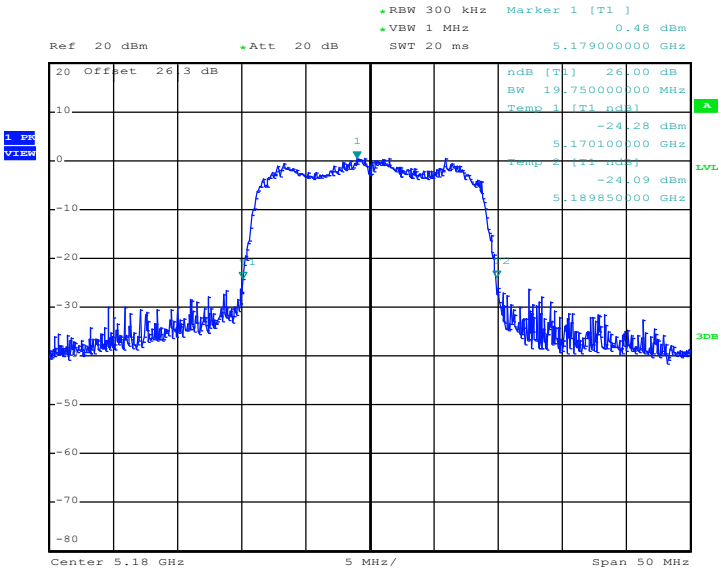
Test Mode :	802.11n HT-20	Temperature :	24~26℃
Test Engineer :	Book Lin	Relative Humidity :	45~49%

Channel	Frequency (MHz)	802.11n HT-20 26dB Bandwidth (MHz)			Pass/Fail
		SISO Ant 2	MIMO Ant 1	MIMO Ant 2	
36	5180	19.75	19.65	19.75	N/A
44	5220	19.75	19.65	19.60	N/A
48	5240	19.95	19.80	19.65	N/A

802.11n HT-20 – SISO Ant 2

26 dB Bandwidth Plot on Channel 36



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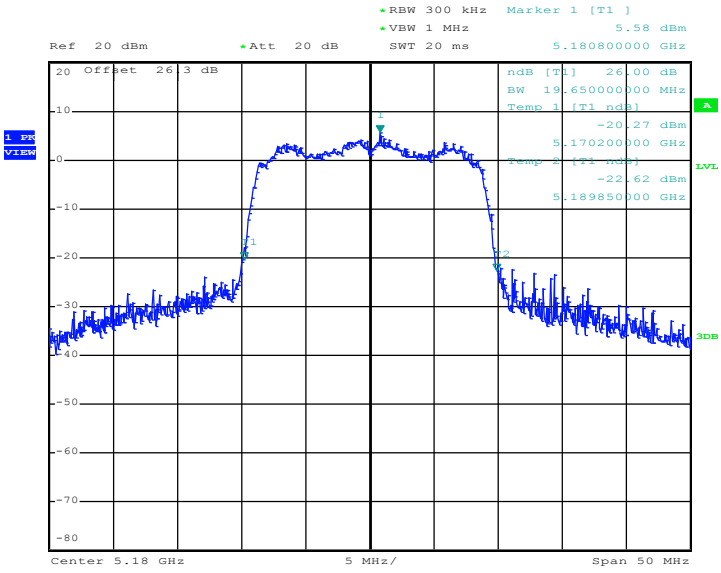
802.11n HT-20 – MIMO Ant 1

26 dB Bandwidth Plot on Channel 36



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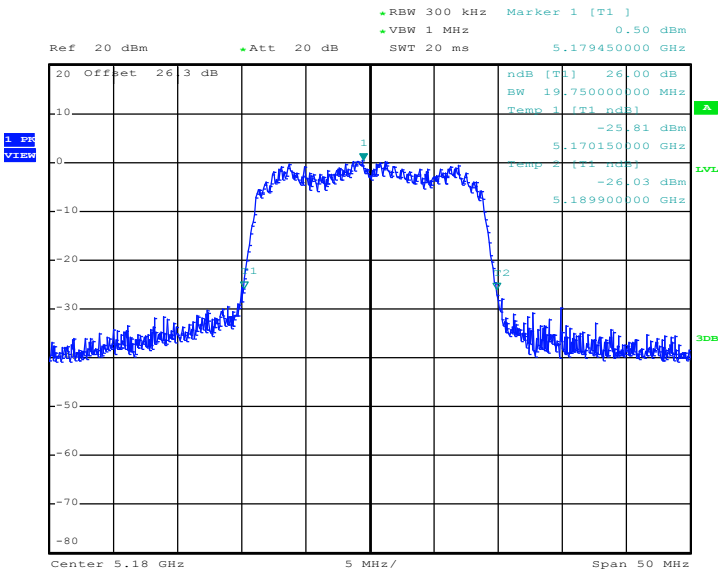
802.11n HT-20 – MIMO Ant 2

26 dB Bandwidth Plot on Channel 36



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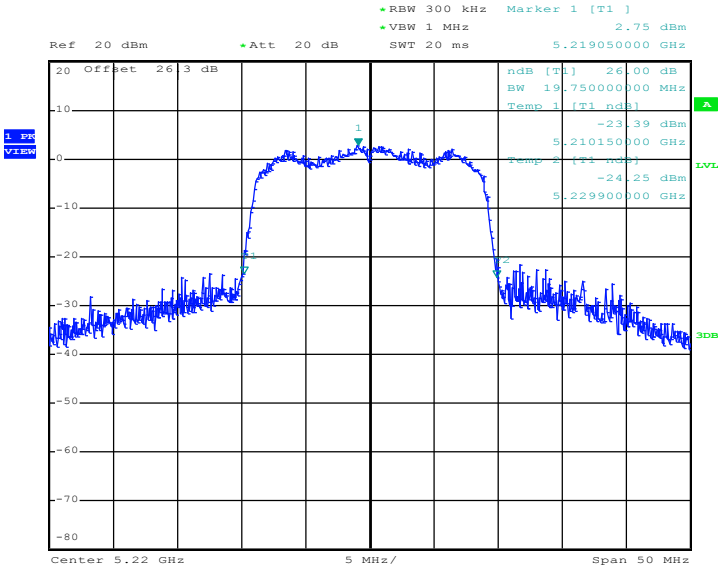
802.11n HT-20 – SISO Ant 2

26 dB Bandwidth Plot on Channel 44



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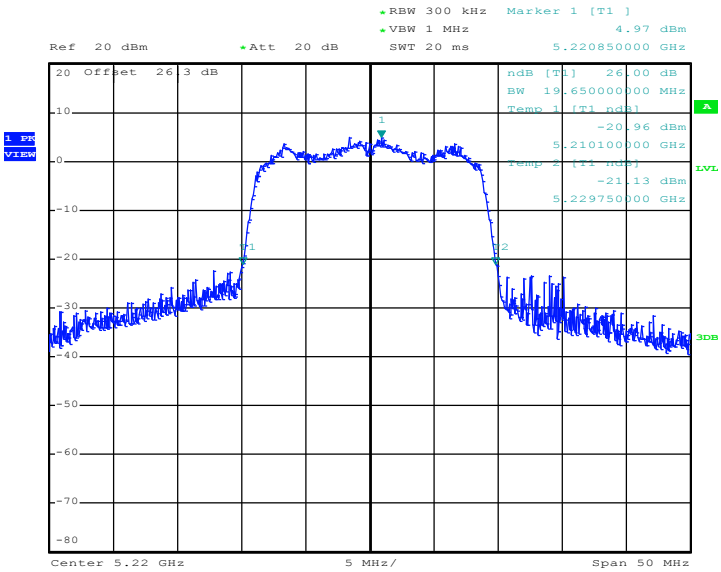
802.11n HT-20 – MIMO Ant 1

26 dB Bandwidth Plot on Channel 44



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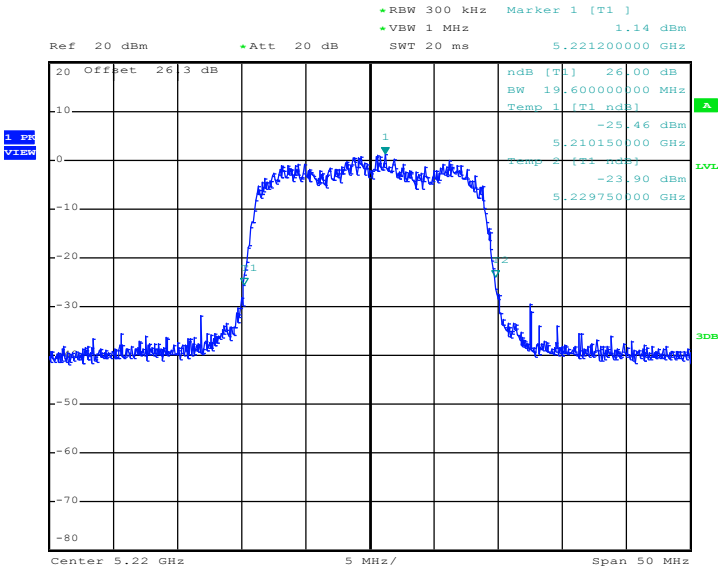
802.11n HT-20 – MIMO Ant 2

26 dB Bandwidth Plot on Channel 44



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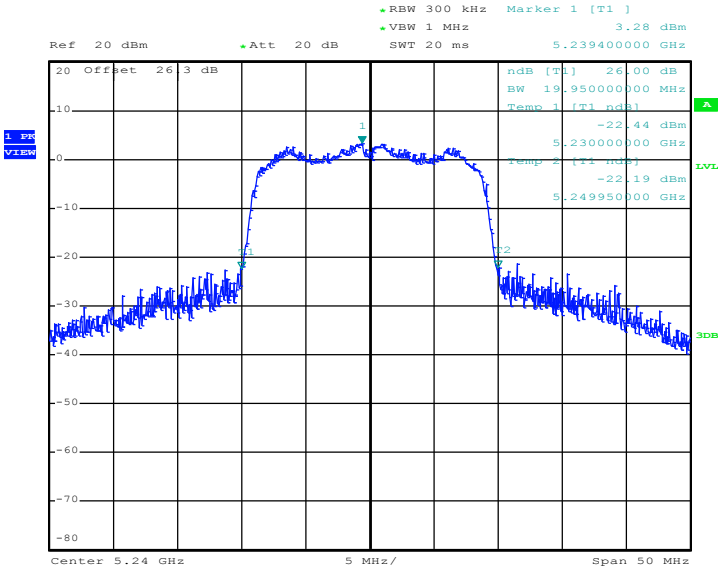
802.11n HT-20 – SISO Ant 2

26 dB Bandwidth Plot on Channel 48



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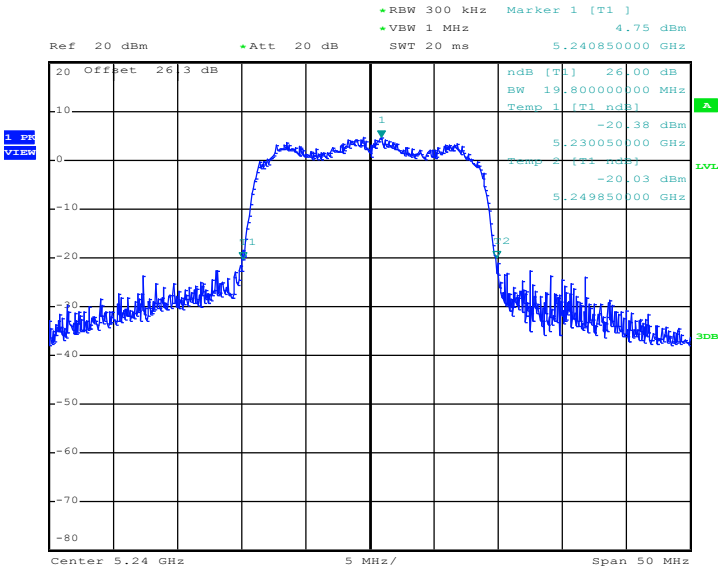
802.11n HT-20 – MIMO Ant 1

26 dB Bandwidth Plot on Channel 48



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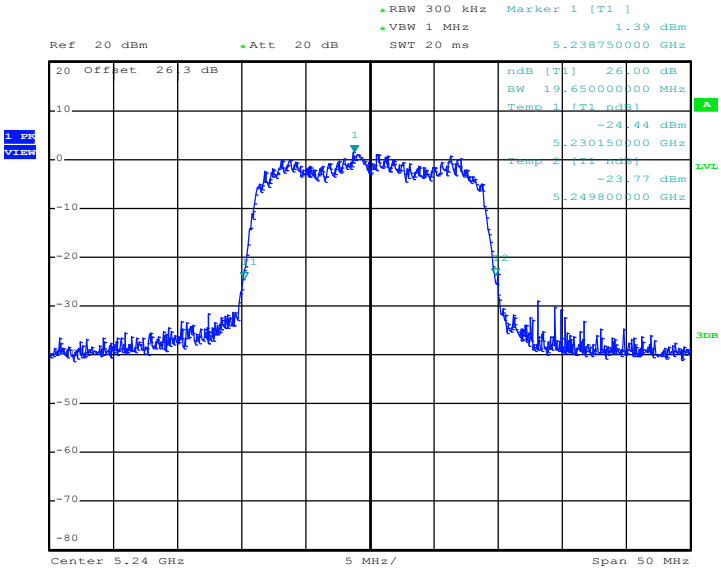
802.11n HT-20 – MIMO Ant 2

26 dB Bandwidth Plot on Channel 48



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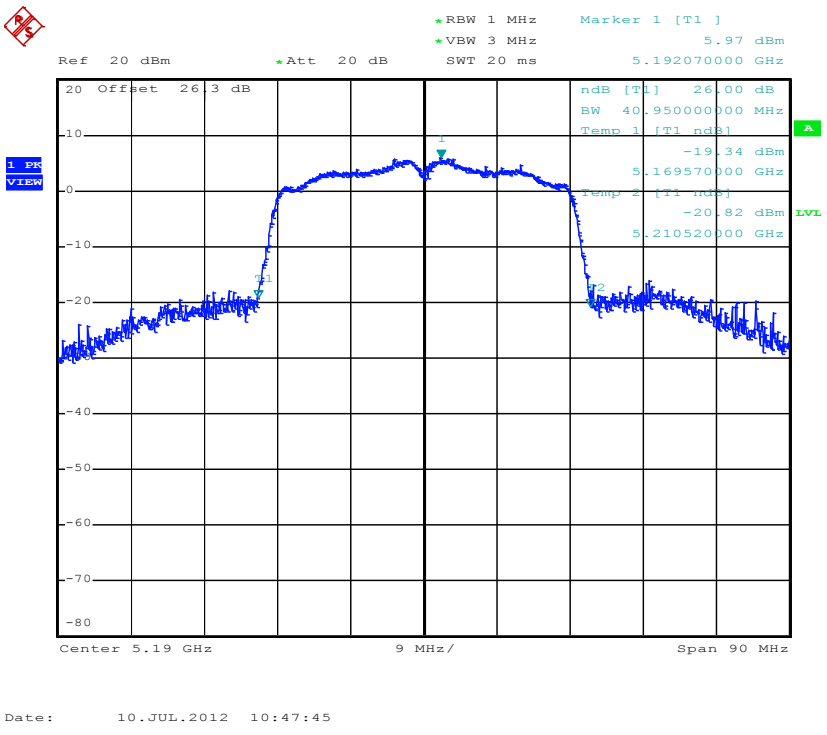
Test Mode :	802.11n HT-40	Temperature :	24~26℃
Test Engineer :	Book Lin	Relative Humidity :	45~49%

Channel	Frequency (MHz)	802.11n HT-40 26dB Bandwidth (MHz)			Pass/Fail
		SISO Ant 2	MIMO Ant 1	MIMO Ant 2	
38	5190	40.95	41.22	40.95	N/A
46	5230	41.04	41.04	40.68	N/A

802.11n HT-40 – SISO Ant 2

26 dB Bandwidth Plot on Channel 38



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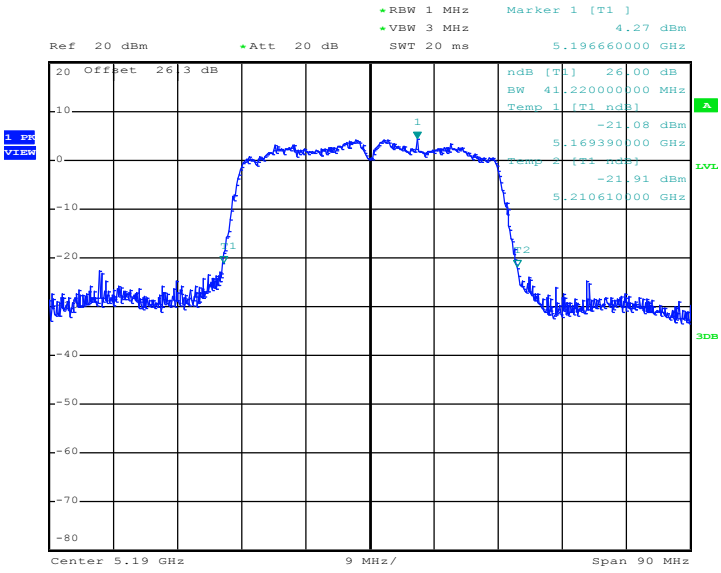
802.11n HT-40 – MIMO Ant 1

26 dB Bandwidth Plot on Channel 38



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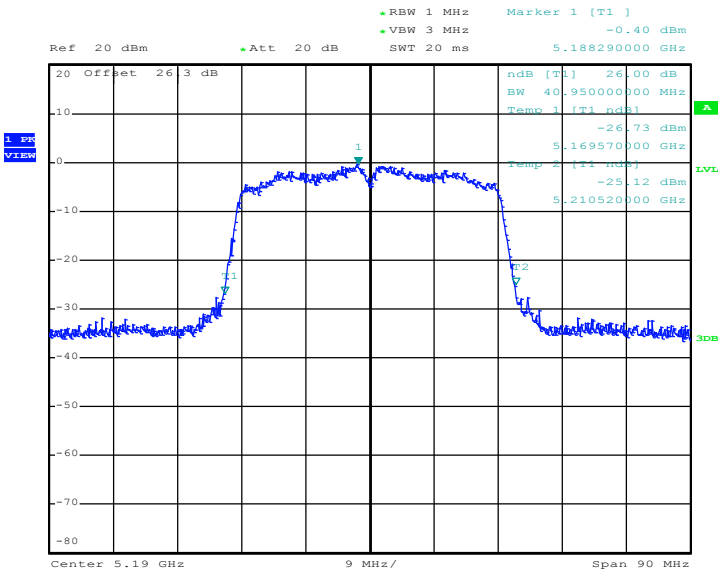
802.11n HT-40 – MIMO Ant 2

26 dB Bandwidth Plot on Channel 38



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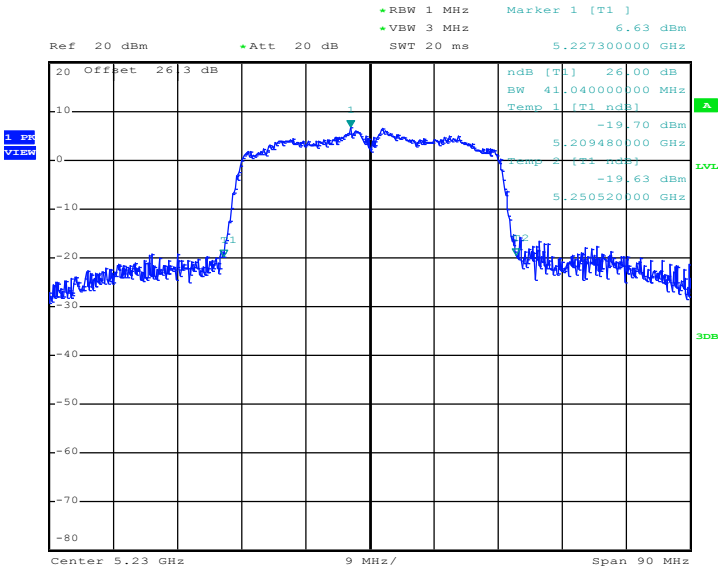
802.11n HT-40 – SISO Ant 2

26 dB Bandwidth Plot on Channel 46



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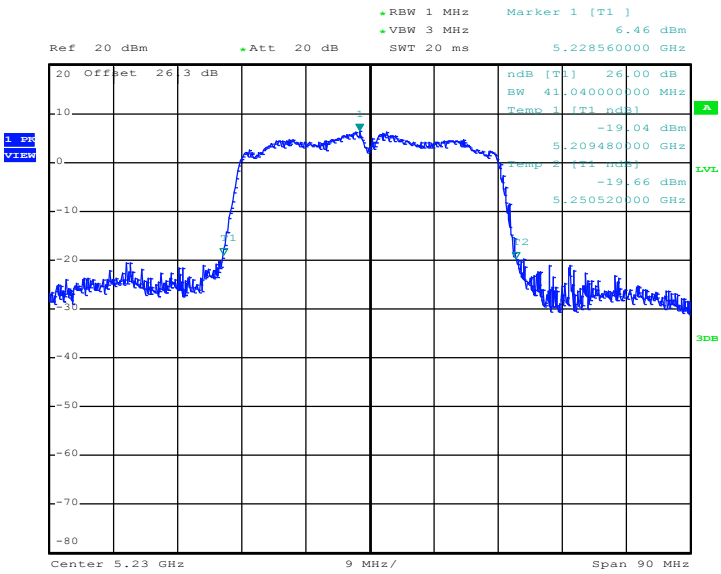
802.11n HT-40 – MIMO Ant 1

26 dB Bandwidth Plot on Channel 46



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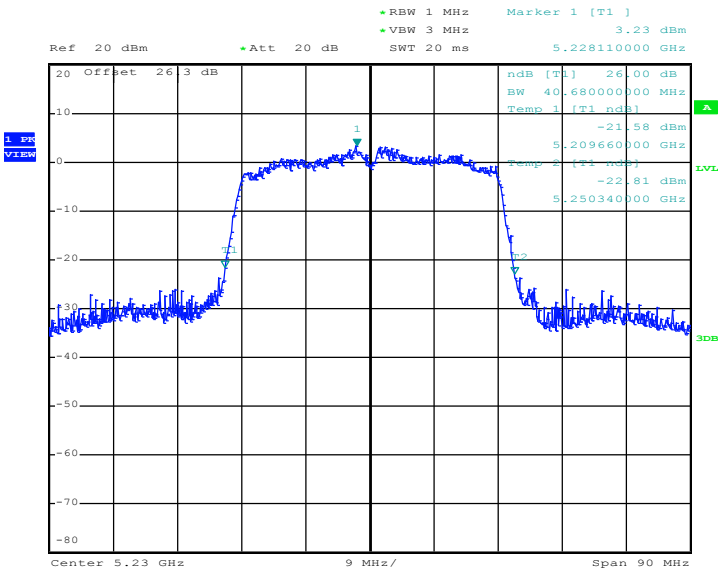
802.11n HT-40 – MIMO Ant 2

26 dB Bandwidth Plot on Channel 46



Date: 9.JUL.2012 23:15:10

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 1-MHz. If transmitting antenna directional gain is greater than 6 dBi, the peak output power 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.

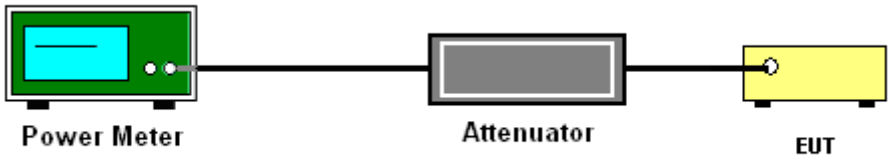
3.2.3 Test Procedures

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 :	Book Lin	Relative Humidity :	45~49%
Duty Cycle	87.50% for Ant 2	Duty Factor	0.58dB for Ant 2

Channel	Frequency (MHz)	802.11a Output Power (dBm)		Max. Limits (dBm)	Pass /Fail
		Measured	Final		
		Legacy Ant 2	Legacy Ant 2		
36	5180	9.58	10.16	16.89	Pass
44	5220	10.87	11.45	16.87	Pass
48	5240	10.69	11.27	16.89	Pass

Note:

1. Final Output Power equals to Measured Output Power adds the duty factor.
2. 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)

Test Mode :	802.11n HT-20	Temperature :	24~26℃
Test Engineer :	Book Lin	Relative Humidity :	45~49%
Duty Cycle	86.65% for SISO Ant 2	Duty Factor	0.62dB for SISO Ant 2

Channel	Frequency (MHz)	802.11n HT-20 Output Power (dBm)		Max. Limits (dBm)	Pass /Fail
		Measured	Final		
		SISO Ant 2	SISO Ant 2		
36	5180	8.81	9.43	16.96	Pass
44	5220	10.64	11.26	16.96	Pass
48	5240	10.66	11.28	17.00	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. Final Output Power equals to Measured Output Power adds the duty factor.

Test Mode :	802.11n HT-20	Temperature :	24~26℃
Test Engineer :	Book Lin	Relative Humidity :	45~49%
Duty Cycle	76.42% for MIMO Ant 1 76.66% for MIMO Ant 2	Duty Factor	1.17dB for MIMO Ant 1 1.15dB for MIMO Ant 2

Channel	Frequency (MHz)	802.11n (HT-20, 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	11.95	7.64	13.12	8.79	14.48	16.96	Pass
44	5220	12.01	7.31	13.18	8.46	14.44	16.93	Pass
48	5240	11.83	7.67	13.00	8.82	14.40	16.97	Pass

Note:

1. Final Output Power equals to Measured Output Power adds the duty factor.
2. MIMO Ant 1+2 is a calculated result from sum of the power MIMO Ant 1 and MIMO Ant 2.
3. 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)

Test Mode :	802.11n HT-40	Temperature :	24~26℃
Test Engineer :	Book Lin	Relative Humidity :	45~49%
Duty Cycle	98.44% for SISO Ant 2 Ch38 87.17% for SISO Ant 2	Duty Factor	0.07dB for SISO Ant 2 Ch38 0.60dB for SISO Ant 2

Channel	Frequency (MHz)	802.11n HT-40 Output Power (dBm)		Max. Limits (dBm)	Pass /Fail
		Measured	Final		
		SISO Ant 2	SISO Ant 2		
38	5190	10.00	10.07	17	Pass
46	5230	10.68	11.28	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. Final Output Power equals to Measured Output Power adds the duty factor.

Test Mode :	802.11n HT-40	Temperature :	24~26℃
Test Engineer :	Book Lin	Relative Humidity :	45~49%
Duty Cycle	78.28% for MIMO Ant 1 77.83% for MIMO Ant 2	Duty Factor	1.06dB for MIMO Ant 1 1.09dB for MIMO Ant 2

Channel	Frequency (MHz)	802.11n (HT-40, 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	8.75	3.31	9.81	4.40	10.91	17	Pass
46	5230	10.70	7.42	11.76	8.51	13.44	17	Pass

Note:

1. Final Output Power equals to Measured Output Power adds the duty factor.
2. MIMO Ant 1+2 is a calculated result from sum of the power MIMO Ant 1 and MIMO Ant 2.
3. 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)

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.

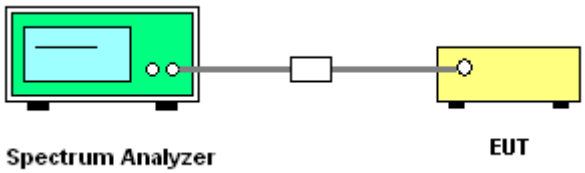
3.3.2 Measuring Instruments

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.
   - 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.
   - Sweep time = auto.
   - Detector = sample
   - 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

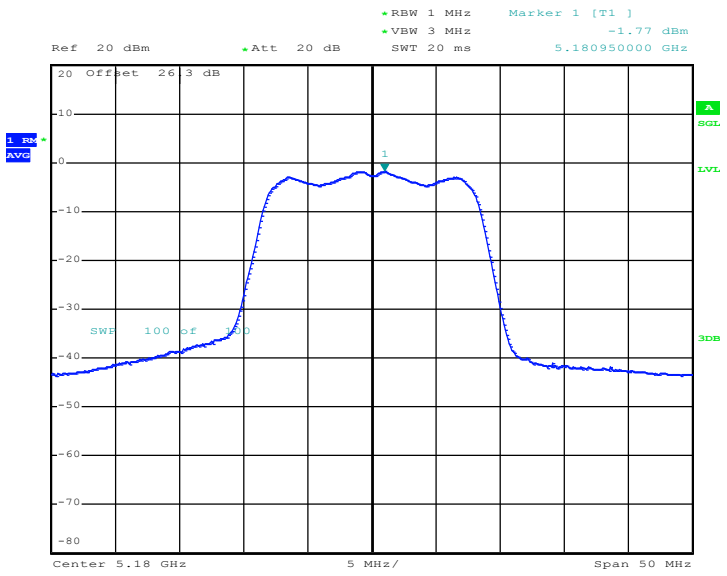
Test Mode :	802.11a	Temperature :	24~26℃
Test Engineer :	Book Lin	Relative Humidity :	45~49%
Duty Cycle:	87.50% for Ant 2	Duty Factor:	0.58dB for Ant 2

Channel	Frequency (MHz)	802.11a Measured PSD (dBm)		Max. Limits (dBm)	Pass /Fail
		Measured	Final		
		Legacy Ant 2	Legacy Ant 2		
36	5180	-1.77	-1.19	4	Pass
44	5220	-0.48	0.10	4	Pass
48	5240	-0.81	-0.23	4	Pass

Note: Result of Final PSD equals to Measured PSD adds the duty factor.

802.11a - Legacy Ant 2

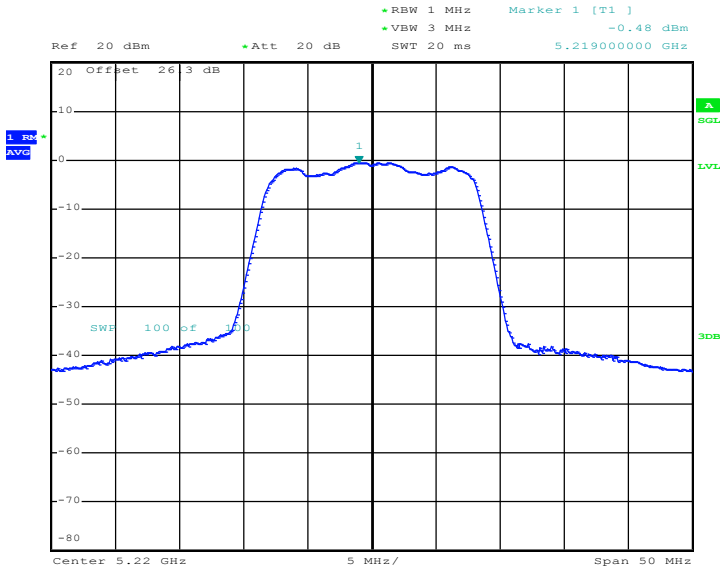
PSD Plot on Channel 36



Date: 9.JUL.2012 22:09:34

802.11a - Legacy Ant 2

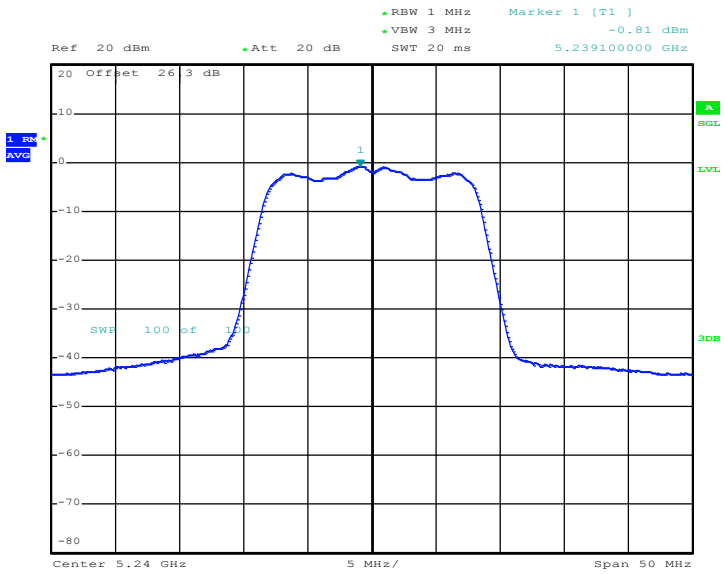
PSD Plot on Channel 44



Date: 9.JUL.2012 22:12:14

802.11a - Legacy Ant 2

PSD Plot on Channel 48



Date: 9.JUL.2012 22:16:40

Test Mode :	802.11n HT-20	Temperature :	24~26℃
Test Engineer :	Book Lin	Relative Humidity :	45~49%
Duty Cycle	86.65% for SISO Ant 2	Duty Factor	0.62dB for SISO Ant 2

Channel	Frequency (MHz)	802.11n HT-20 PSD (dBm)		Max. Limits (dBm)	Pass /Fail
		Measured	Final		
		SISO Ant 2	SISO Ant 2		
36	5180	-3.02	-2.40	4	Pass
44	5220	-0.41	0.21	4	Pass
48	5240	-0.23	0.39	4	Pass

Test Mode :	802.11n HT-20	Temperature :	24~26℃
Test Engineer :	Book Lin	Relative Humidity :	45~49%
Duty Cycle	76.42% for MIMO Ant 1 76.66% for MIMO Ant 2	Duty Factor	1.17dB for MIMO Ant 1 1.15dB for MIMO Ant 2

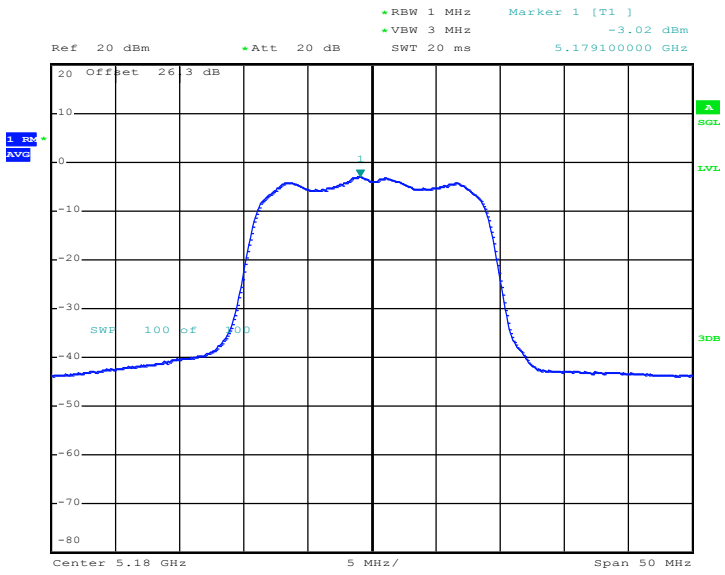
Channel	Frequency (MHz)	802.11n (HT-20, 2Tx) PSD (dBm)	Max. Limits (dBm)	Pass /Fail
		MIMO (2Tx)		
		MIMO Ant 1+2		
36	5180	1.55	4	Pass
44	5220	1.89	4	Pass
48	5240	1.91	4	Pass

Note:

1. Result of Final PSD equals to Measured PSD adds the duty factor.
2. Final MIMO Ant 1+2 is the bin-by-bin combination result from MIMO Ant 1 and MIMO Ant 2.

802.11n HT-20 – SISO Ant 2

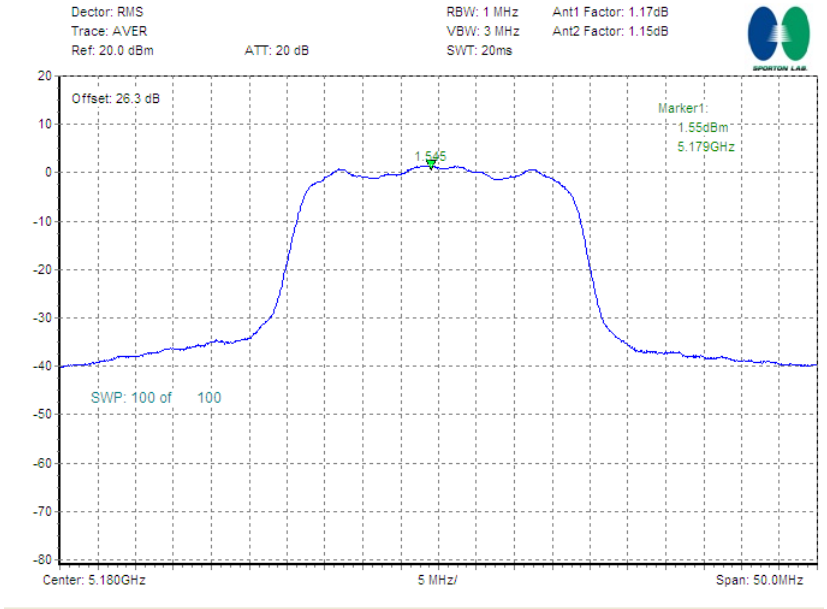
PSD Plot on Channel 36



Date: 9.JUL.2012 22:32:25

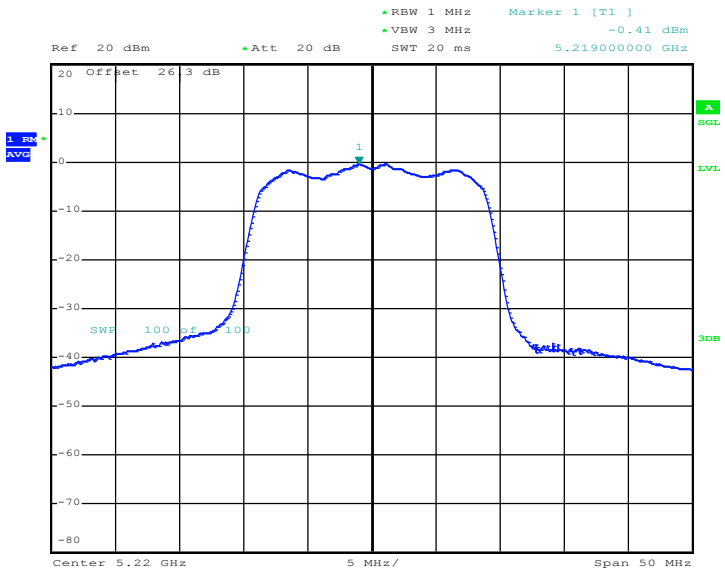
802.11n HT-20 – MIMO Ant 1+2

PSD Plot on Channel 36



802.11n HT-20 – SISO Ant 2

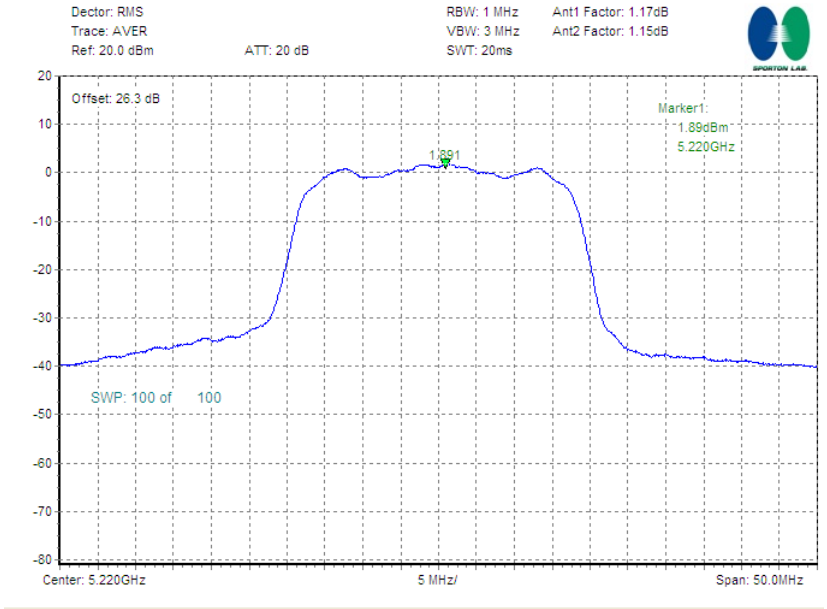
PSD Plot on Channel 44



Date: 9.JUL.2012 22:36:43

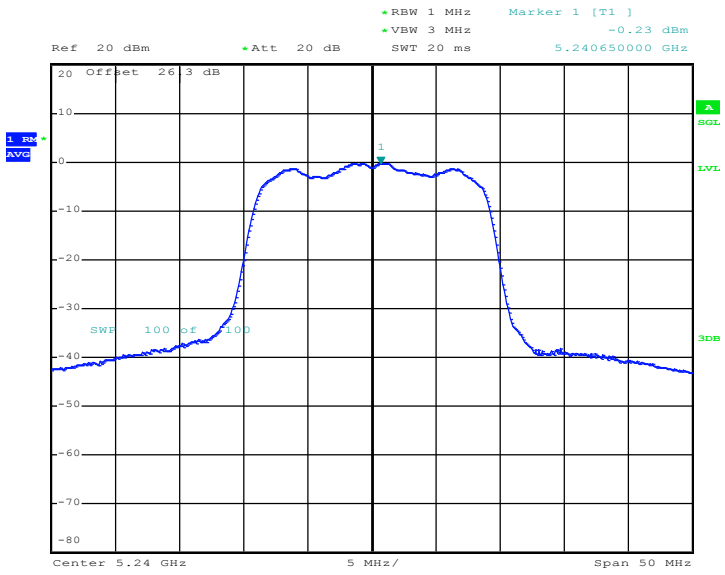
802.11n HT-20 – MIMO Ant 1+2

PSD Plot on Channel 44



802.11n HT-20 – SISO Ant 2

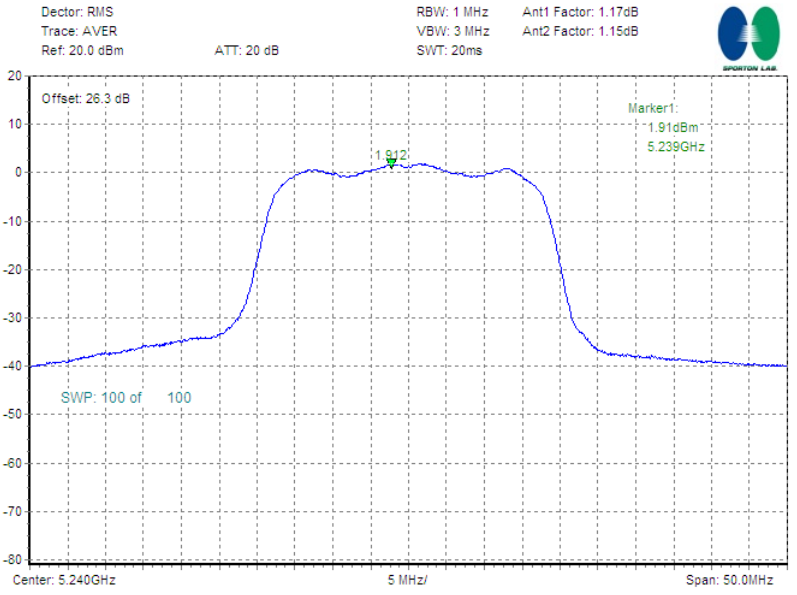
PSD Plot on Channel 48



Date: 9.JUL.2012 22:42:56

802.11n HT-20 – MIMO Ant 1+2

PSD Plot on Channel 48



Test Mode :	802.11n HT-40	Temperature :	24~26℃
Test Engineer :	Book Lin	Relative Humidity :	45~49%
Duty Cycle	98.44% for SISO Ant 2 Ch38 87.17% for SISO Ant 2	Duty Factor	0.07dB for SISO Ant 2 Ch38 0.60dB for SISO Ant 2

Channel	Frequency (MHz)	802.11n HT-40 PSD (dBm)		Max. Limits (dBm)	Pass /Fail
		Measured	Final		
		SISO Ant 2	SISO Ant 2		
38	5190	-3.45	-3.38	4	Pass
46	5230	-3.13	-2.53	4	Pass

Test Mode :	802.11n HT-40	Temperature :	24~26℃
Test Engineer :	Book Lin	Relative Humidity :	45~49%
Duty Cycle	78.28% for MIMO Ant 1 77.83% for MIMO Ant 2	Duty Factor	1.06dB for MIMO Ant 1 1.09dB for MIMO Ant 2

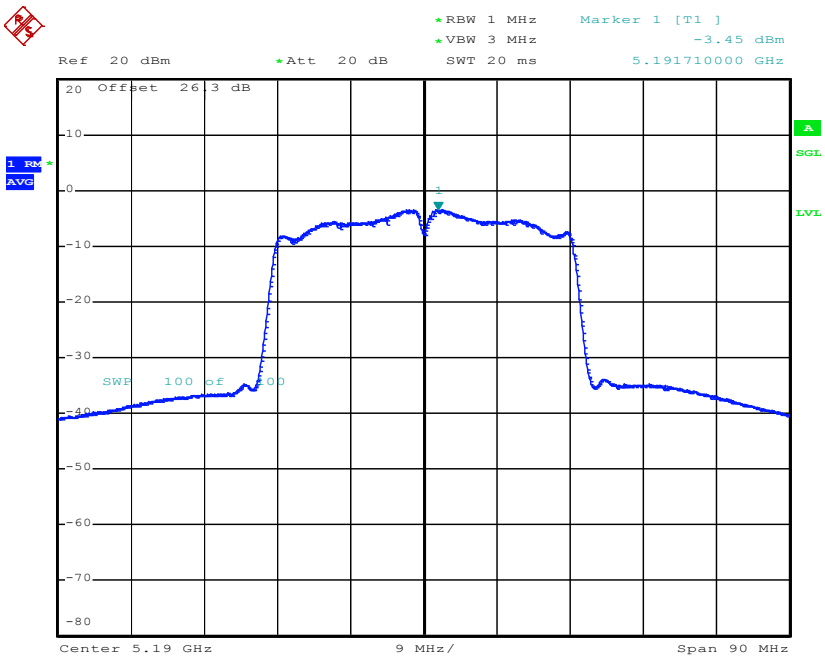
Channel	Frequency (MHz)	802.11n (HT-40, 2Tx) PSD (dBm)	Max. Limits (dBm)	Pass /Fail
		MIMO (2Tx)		
		MIMO Ant 1+2		
38	5190	-4.28	4	Pass
46	5230	-1.95	4	Pass

Note:

1. Result of Final PSD equals to Measured PSD adds the duty factor if less than 98%.
2. Final MIMO Ant 1+2 is the bin-by-bin combination result from MIMO Ant 1 and MIMO Ant 2.

802.11n HT-40 – SISO Ant 2

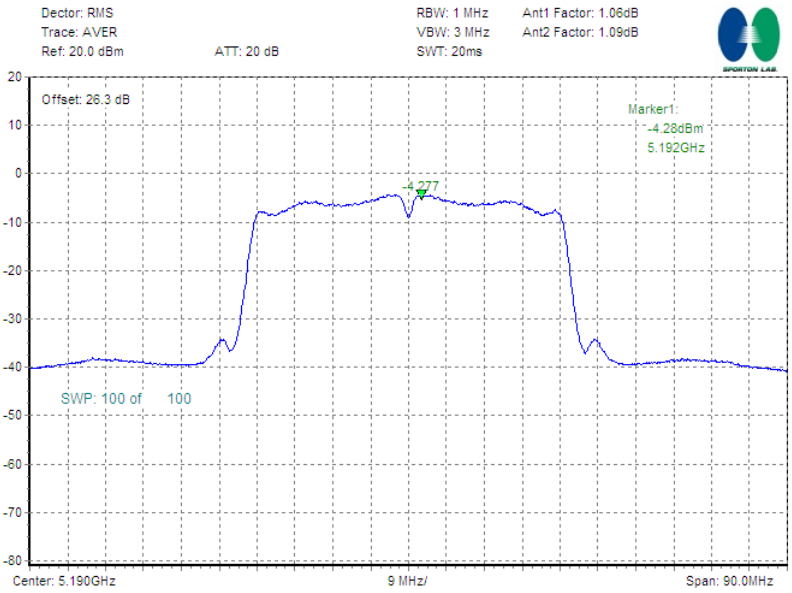
PSD Plot on Channel 38



Date: 10.JUL.2012 10:48:05

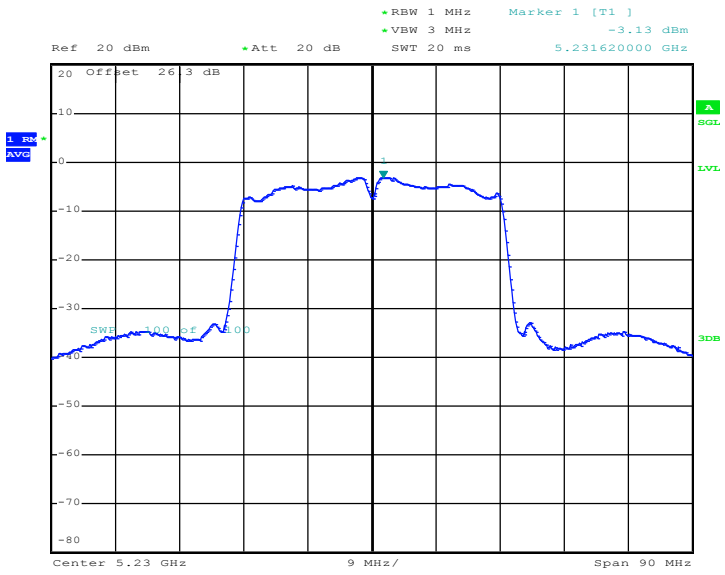
802.11n HT-40 – MIMO Ant 1+2

PSD Plot on Channel 38



802.11n HT-40 – SISO Ant 2

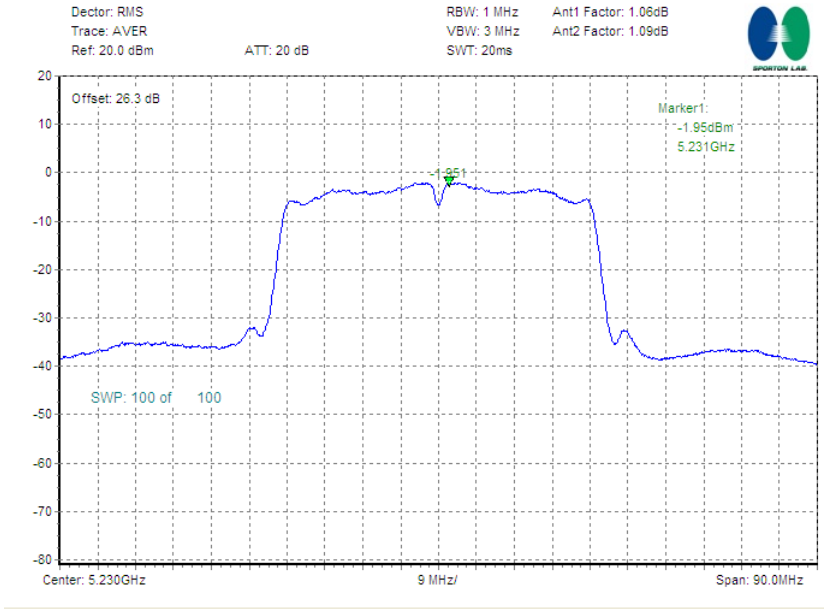
PSD Plot on Channel 46



Date: 9.JUL.2012 23:01:04

802.11n HT-40 – MIMO Ant 1+2

PSD Plot on Channel 46



3.4 Peak Excursion Ratio Measurement

3.4.1 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.

3.4.2 Measuring Instruments

See list of measuring instruments of this test report.

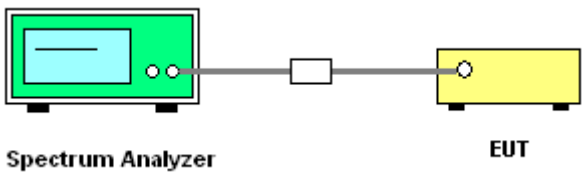
3.4.3 Test Procedures

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

Section F) Peak excursion measurement

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 = 1MHz.
   *Set VBW ≥ 3MHz.
   *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.

3.4.4 Test Setup

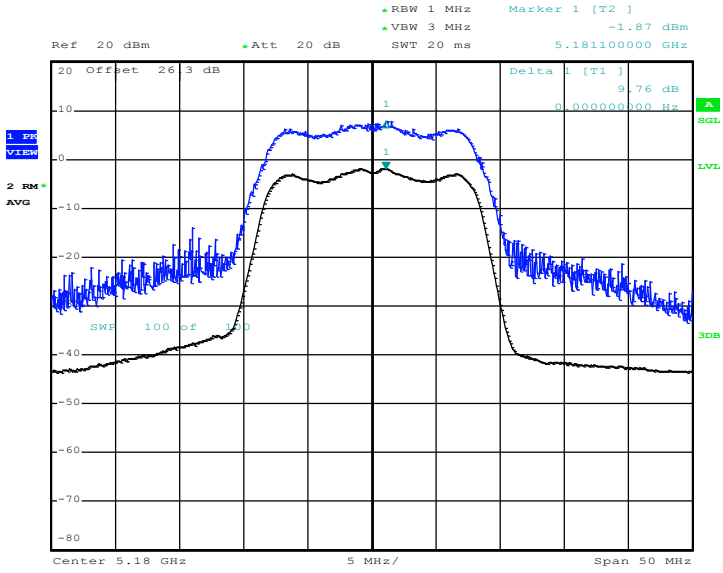


3.4.5 Test Result of Peak Excursion Ratio

Test Mode :	802.11a	Temperature :	24~26℃
Test Engineer :	Book Lin	Relative Humidity :	45~49%

802.11a – Legacy Ant 2

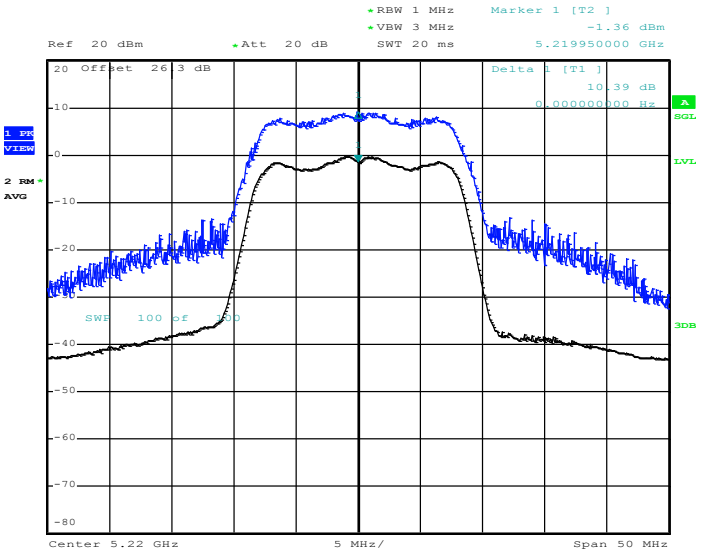
Peak Excursion Ratio Plot on Channel 36



Date: 9.JUL.2012 22:09:52

802.11a – Legacy Ant 2

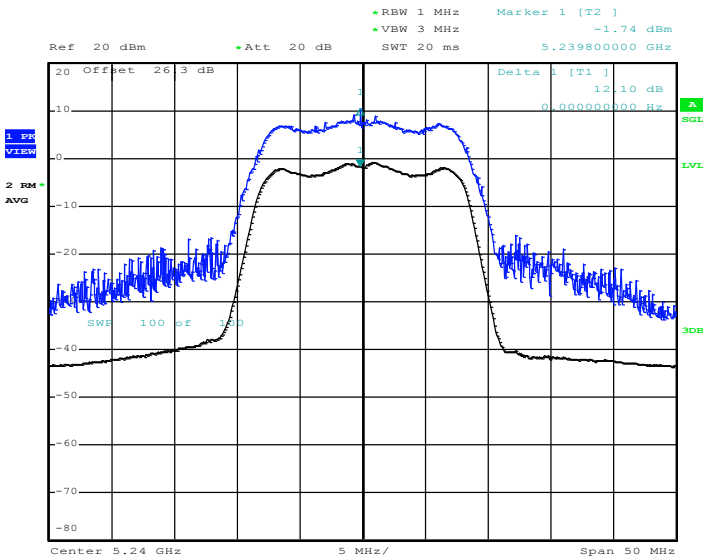
Peak Excursion Ratio Plot on Channel 44



Date: 9.JUL.2012 22:12:36

802.11a – Legacy Ant 2

Peak Excursion Ratio Plot on Channel 48

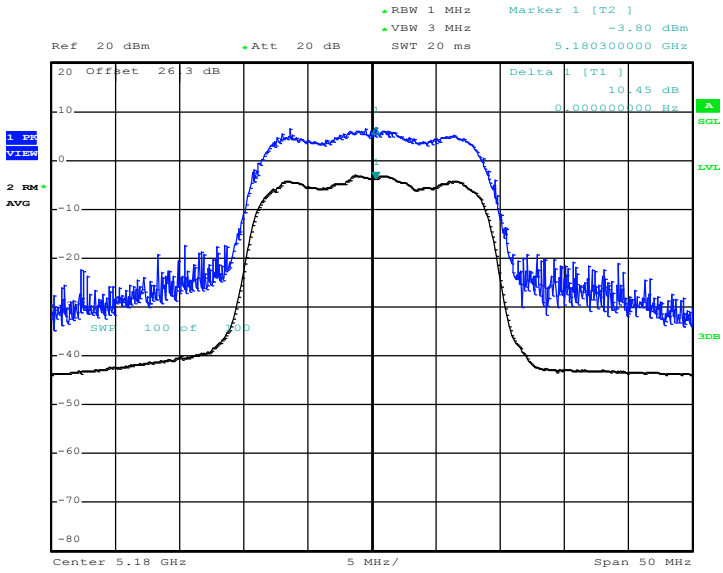


Date: 9.JUL.2012 22:17:52

Test Mode :	802.11n HT-20	**Temperature :**	24~26℃
Test Engineer :	Book Lin	**Relative Humidity :**	45~49%

802.11n HT-20 - SISO Ant 1

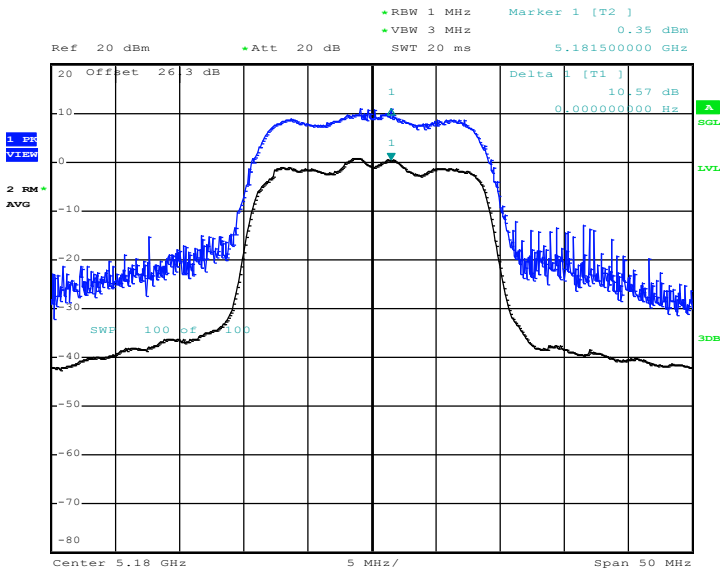
Peak Excursion Ratio Plot on Channel 36



Date: 9.JUL.2012 22:32:43

802.11n HT-20 - MIMO Ant 1

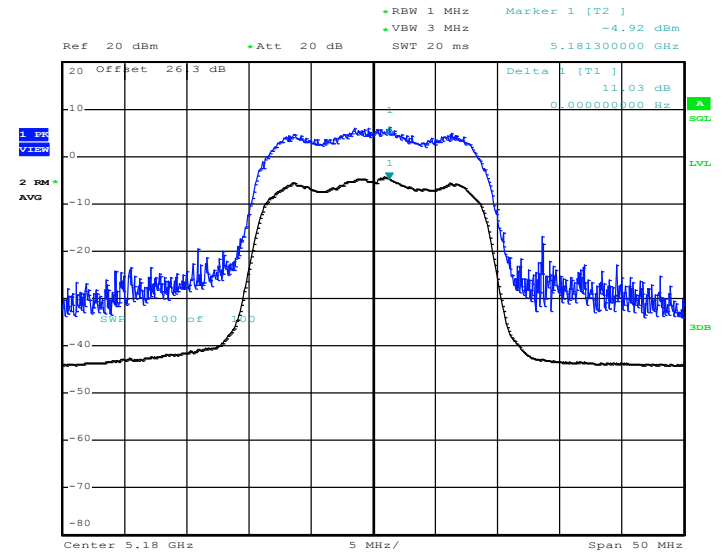
Peak Excursion Ratio Plot on Channel 36



Date: 9.JUL.2012 23:45:31

802.11n HT-20 - MIMO Ant 2

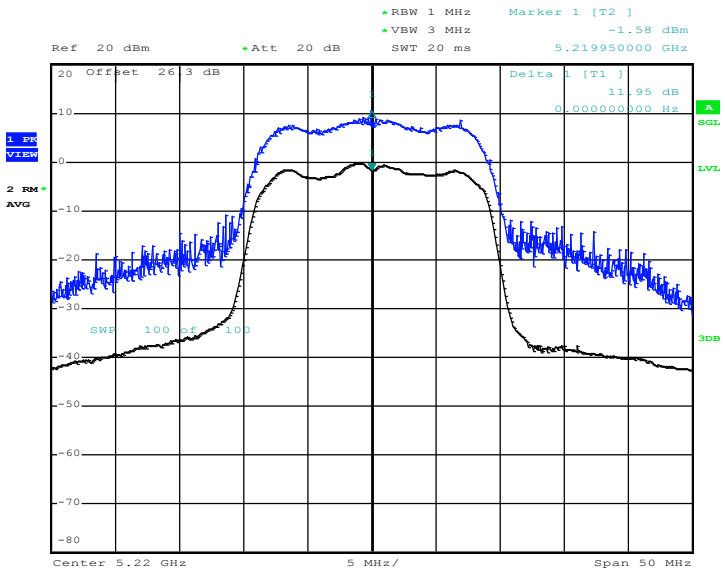
Peak Excursion Ratio Plot on Channel 36



Date: 9.JUL.2012 23:37:21

802.11n HT-20 - SISO Ant 1

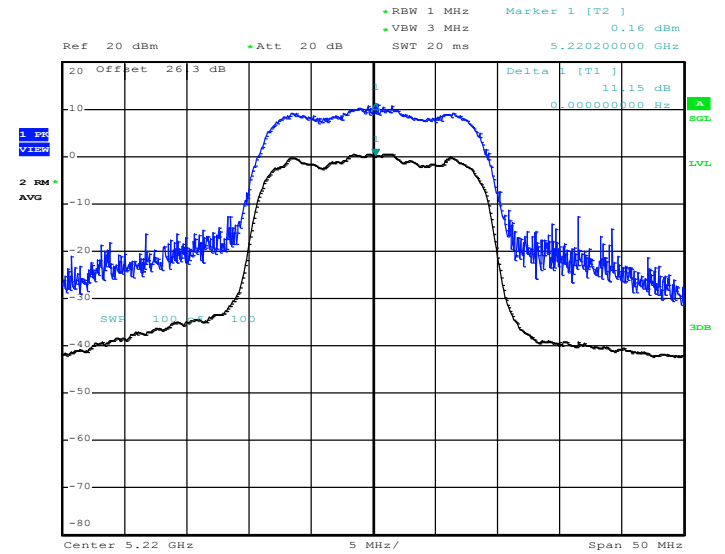
Peak Excursion Ratio Plot on Channel 44



Date: 9.JUL.2012 22:37:07

802.11n HT-20 - MIMO Ant 1

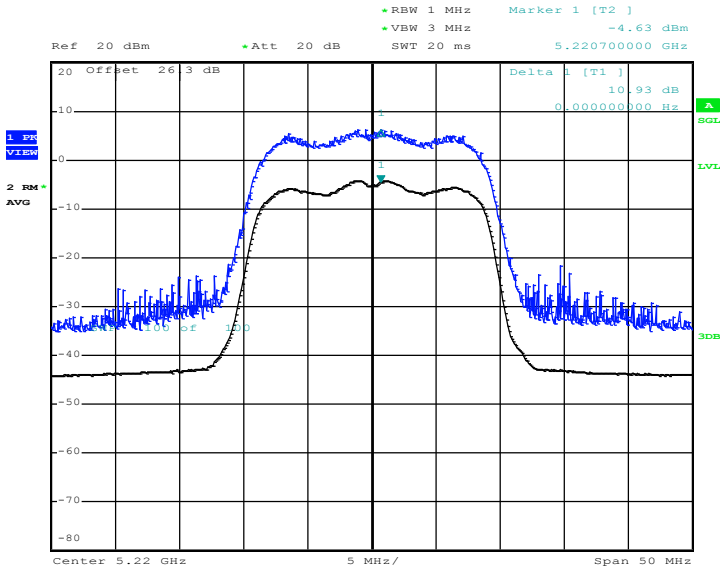
Peak Excursion Ratio Plot on Channel 44



Date: 10.JUL.2012 00:24:30

802.11n HT-20 - MIMO Ant 2

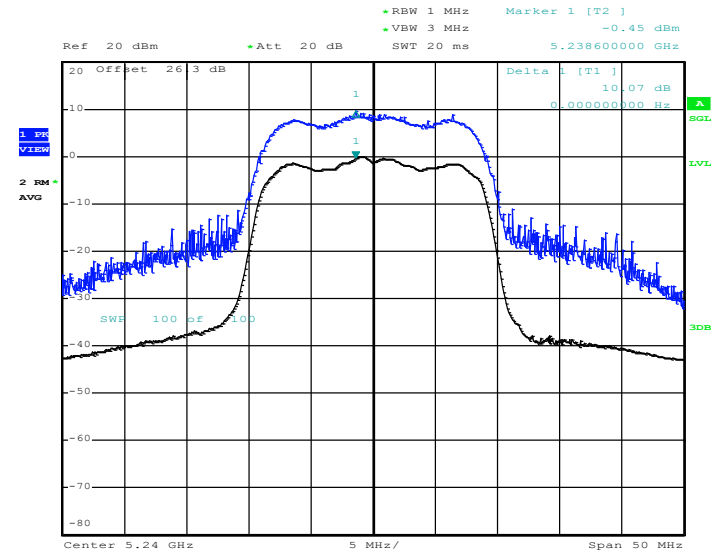
Peak Excursion Ratio Plot on Channel 44



Date: 10.JUL.2012 00:20:03

802.11n HT-20 - SISO Ant 1

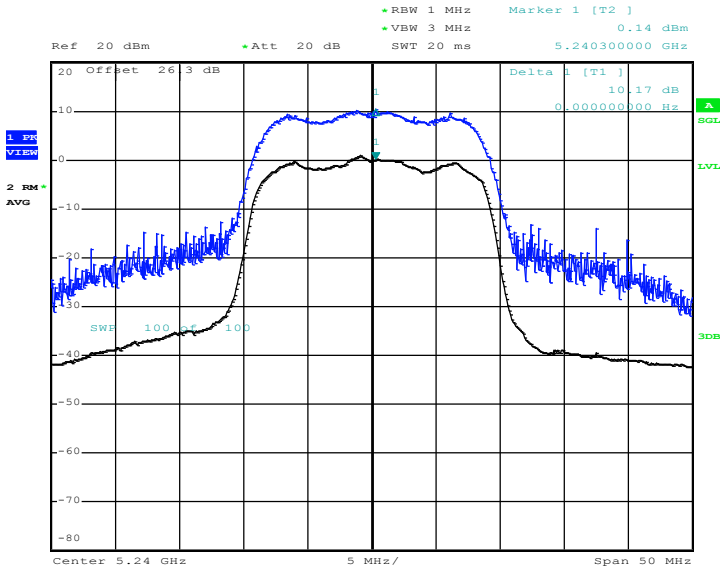
Peak Excursion Ratio Plot on Channel 48



Date: 9.JUL.2012 22:43:19

802.11n HT-20 - MIMO Ant 1

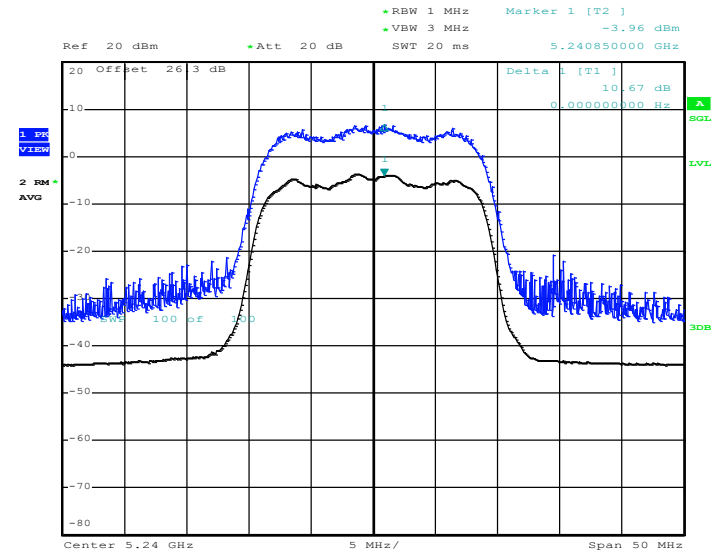
Peak Excursion Ratio Plot on Channel 48



Date: 10.JUL.2012 00:29:57

802.11n HT-20 - MIMO Ant 2

Peak Excursion Ratio Plot on Channel 48

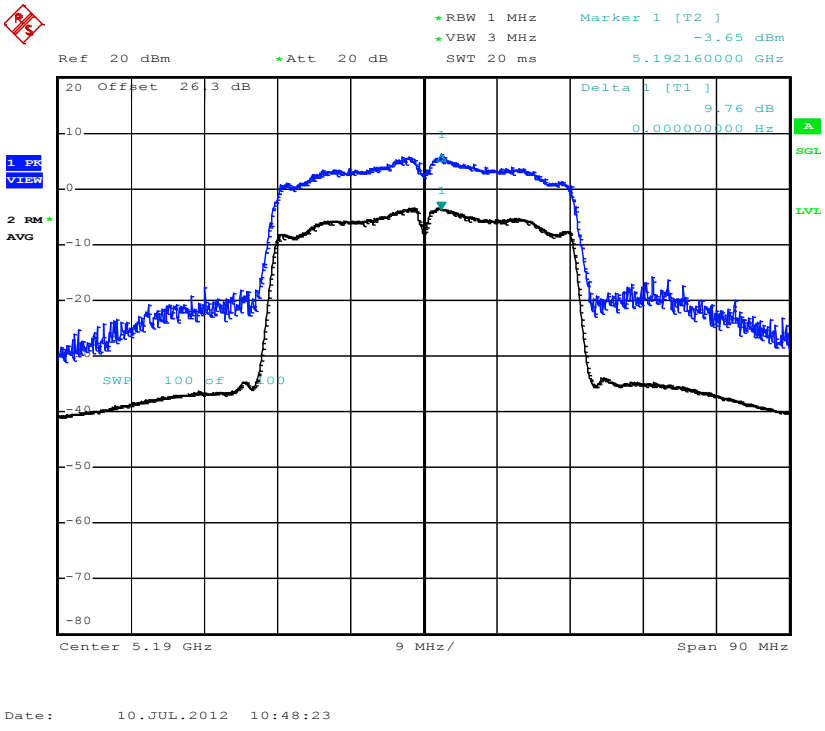


Date: 10.JUL.2012 00:32:03

Test Mode :	802.11n HT-40	Temperature :	24~26℃
Test Engineer :	Book Lin	Relative Humidity :	45~49%

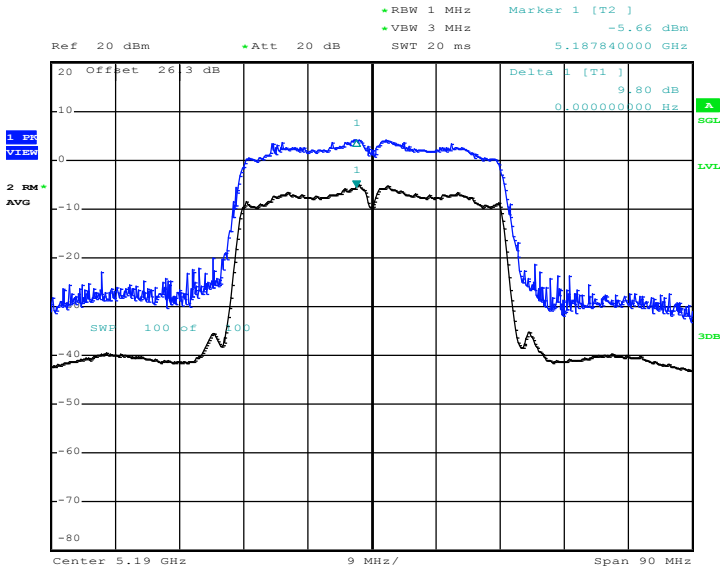
802.11n HT-40 - SISO Ant 1

Peak Excursion Ratio Plot on Channel 38



802.11n HT-40 – MIMO Ant 1

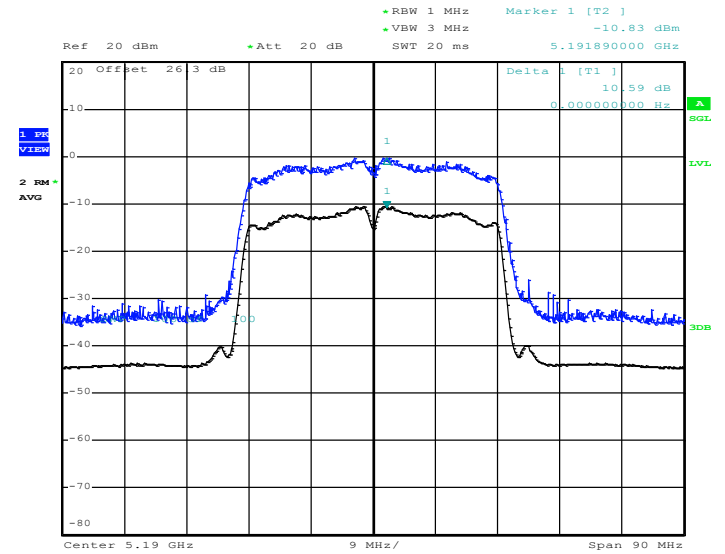
Peak Excursion Ratio Plot on Channel 38



Date: 9.JUL.2012 23:24:29

802.11n HT-40 – MIMO Ant 2

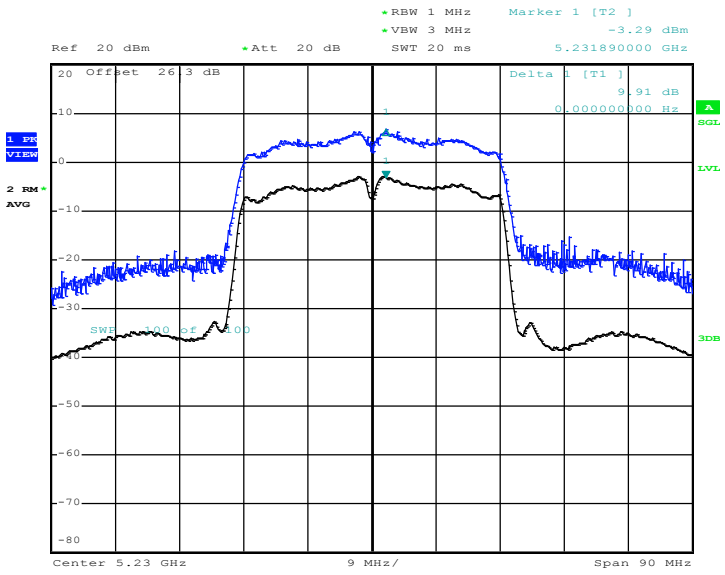
Peak Excursion Ratio Plot on Channel 38



Date: 9.JUL.2012 23:31:44

802.11n HT-40 - SISO Ant 1

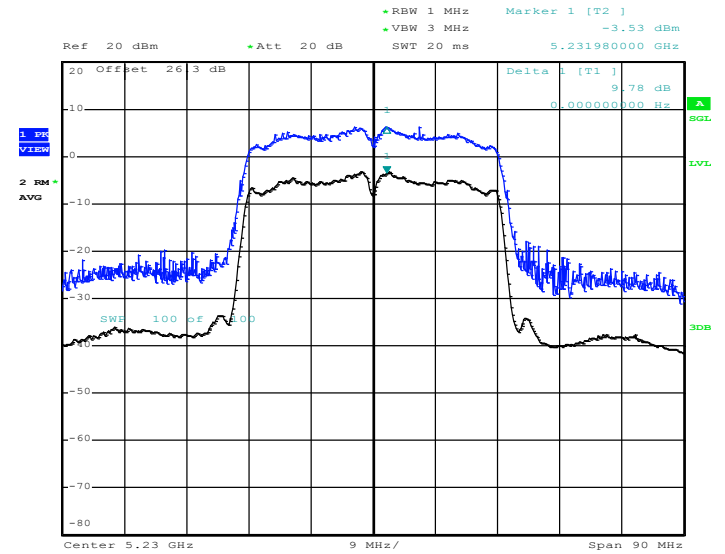
Peak Excursion Ratio Plot on Channel 46



Date: 9.JUL.2012 23:01:38

802.11n HT-40 – MIMO Ant 1

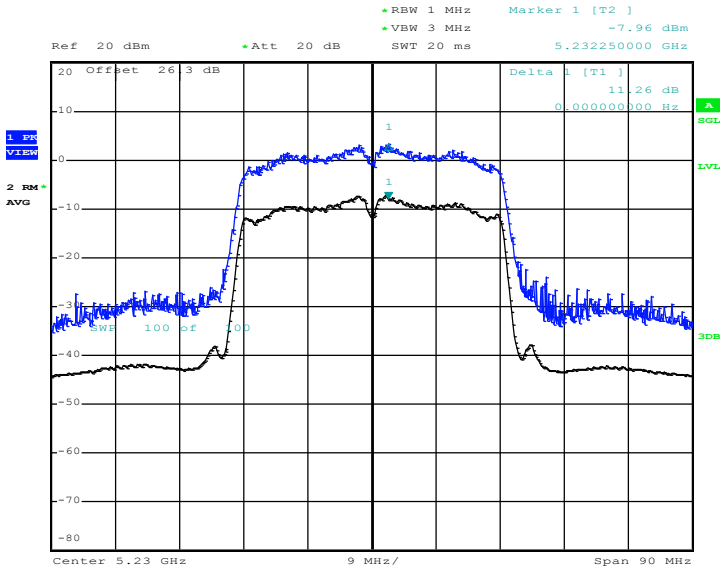
Peak Excursion Ratio Plot on Channel 46



Date: 9.JUL.2012 23:11:24

802.11n HT-40 – MIMO Ant2

Peak Excursion Ratio Plot on Channel 46



Date: 9.JUL.2012 23:15:58

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 fulfills ANSI C63.4-2003 and the guidelines in ANSI C63.10-2009 test site requirement and FCC KDB 789033 D01 General UNII Test Procedures v01r01.

   Section G) Unwanted emissions measurement.

   (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

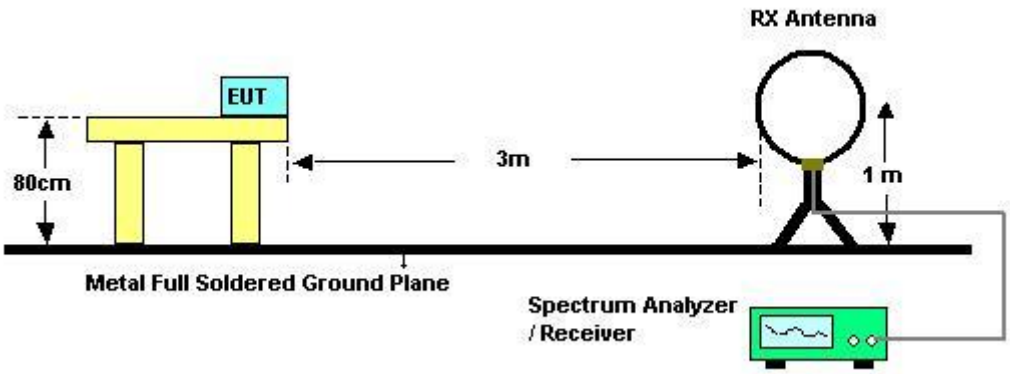
   - The setting follows G) 6) of FCC KDB 789033.
   - RBW = 1 MHz
   - VBW = 10 Hz, when duty cycle is no less than 98 percent.
   - VBW ≥ 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power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

Antenna	Band	Duty Cycle(%)	T(us)	1/T(KHz)	VBW Setting
1	802.11a	87.50	2058	0.486	1KHz
1	802.11n (BW 20MHz)	86.65	1908	0.524	1KHz
1	802.11n (BW 40MHz) for CH38	98.44	-	-	10Hz
1	802.11n (BW 40MHz)	87.17	652	1.534	3KHz
1+2	802.11n (BW 20MHz) for Ant1	76.42	972	1.029	3KHz
1+2	802.11n (BW 20MHz) for Ant2	76.66	972	1.029	
1+2	802.11n (BW 40MHz) for Ant1	78.28	346	2.890	3KHz
1+2	802.11n (BW 40MHz) for Ant2	77.83	344	2.907	

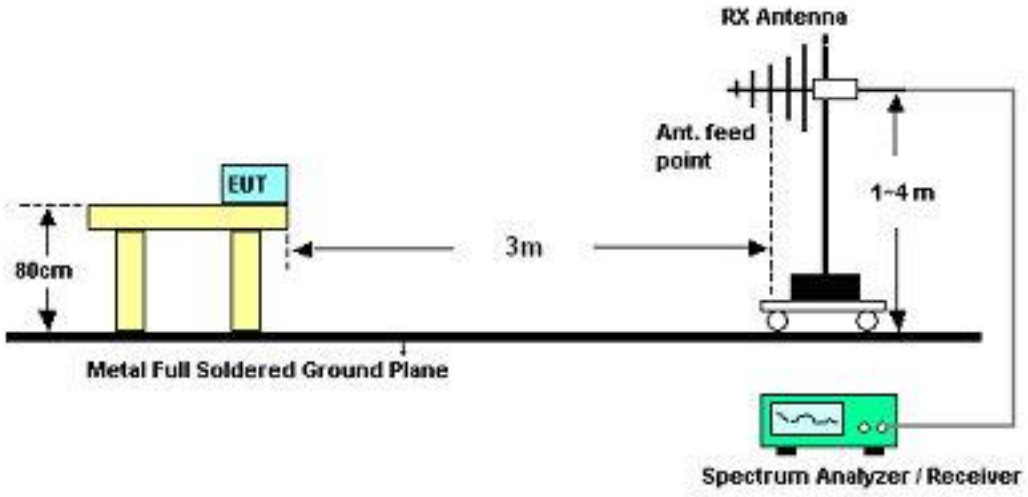
2. The EUT was placed on a rotatable table top 0.8 meter above ground.
3. The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
4. The antenna is a broadband antenna and its height is adjusted between one meter and four meters above ground to find the maximum value of the field strength for both horizontal polarization and vertical polarization of the antenna.
5. 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.
6. For testing below 1GHz, if the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then peak values of EUT will be reported, otherwise, the emissions will be repeated one by one using the CISPR quasi-peak method and reported.
7. 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 peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.

3.5.4 Test Setup

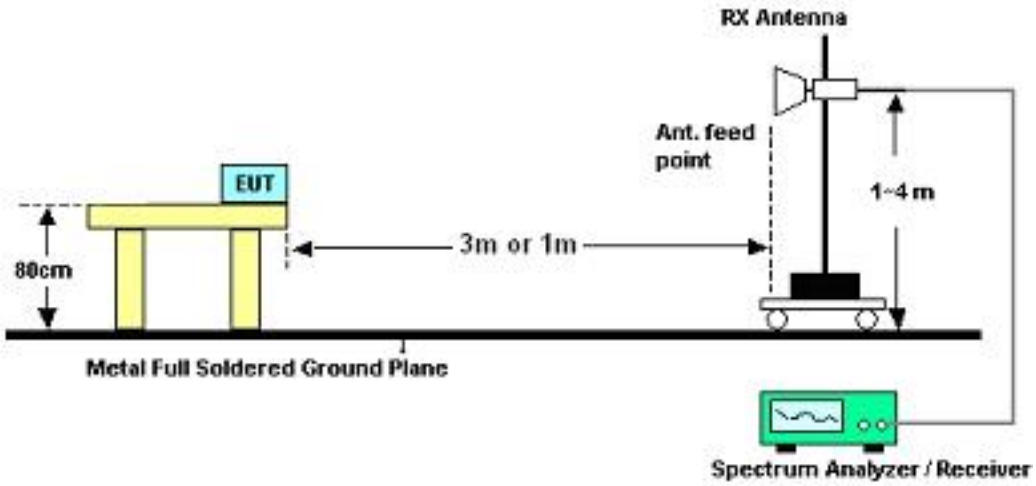
For radiated emissions below 30MHz



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 of Radiated Band Edges

<Legacy Ant 2>:

Test Mode :	802.11a <Ant 2>	**Temperature :**	24~25°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	62.58	-11.42	74	51.92	34.22	9.41	32.97	101	218	Peak
5150	45.61	-8.39	54	34.95	34.22	9.41	32.97	101	218	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	71.48	-2.52	74	60.82	34.22	9.41	32.97	100	46	Peak
5150	53.54	-0.46	54	42.88	34.22	9.41	32.97	100	46	Average

Test Mode :	802.11a <Ant 2>	**Temperature :**	24~25°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**
5378	55.29	-18.71	74	44.03	34.41	9.78	32.93	100	300	Peak
5378	43.41	-10.59	54	32.15	34.41	9.78	32.93	100	300	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**
5354	56.18	-17.82	74	44.99	34.38	9.74	32.93	112	42	Peak
5354	44.64	-9.36	54	33.45	34.38	9.74	32.93	112	42	Average

<SISO Ant 2>:

Test Mode :	802.11n HT-20 <SISO Ant 2>	Temperature :	24~25°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	60.24	-13.76	74	49.58	34.22	9.41	32.97	187	184	Peak
5150	44.15	-9.85	54	33.49	34.22	9.41	32.97	187	184	Average

ANTENNA POLARITY : VERTICAL										
Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Remark
5150	68.74	-5.26	74	58.08	34.22	9.41	32.97	102	54	Peak
5150	51.9	-2.1	54	41.24	34.22	9.41	32.97	102	54	Average

Test Mode :	802.11n HT-20 <SISO Ant 2>	Temperature :	24~25°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
5435.2	55.46	-18.54	74	44.02	34.45	9.9	32.91	100	301	Peak
5435.2	42.28	-11.72	54	30.84	34.45	9.9	32.91	100	301	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
5356.46	58.74	-15.26	74	47.51	34.38	9.78	32.93	102	58	Peak
5356.46	45.46	-8.54	54	34.23	34.38	9.78	32.93	102	58	Average

Test Mode :	802.11n HT-40 <SISO Ant 2>	Temperature :	24~25°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
5143.95	71.98	-2.02	74	61.32	34.22	9.41	32.97	101	139	Peak
5150	48.86	-5.14	54	38.2	34.22	9.41	32.97	101	139	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	69.14	-4.86	74	58.48	34.22	9.41	32.97	100	316	Peak
5150	47.96	-6.04	54	37.3	34.22	9.41	32.97	100	316	Average

Test Mode :	802.11n HT-40 <SISO Ant 2>	Temperature :	24~25°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
5354	57.08	-16.92	74	45.89	34.38	9.74	32.93	100	215	Peak
5354	42.66	-11.34	54	31.47	34.38	9.74	32.93	100	215	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
5354	61.44	-12.56	74	50.25	34.38	9.74	32.93	100	60	Peak
5354	45.66	-8.34	54	34.47	34.38	9.74	32.93	100	60	Average

<MIMO 1+2>:

Test Mode :	802.11n HT-20 <MIMO 1+2>	Temperature :	24~25°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	63.9	-10.1	74	53.24	34.22	9.41	32.97	100	126	Peak
5150	47.46	-6.54	54	36.8	34.22	9.41	32.97	100	126	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	69.05	-4.95	74	58.39	34.22	9.41	32.97	100	71	Peak
5150	50.68	-3.32	54	40.02	34.22	9.41	32.97	100	71	Average

Test Mode :	802.11n HT-20 <MIMO 1+2>	Temperature :	24~25°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
5360	54.75	-19.25	74	43.52	34.38	9.78	32.93	100	302	Peak
5360	42.28	-11.72	54	31.05	34.38	9.78	32.93	100	302	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
5350	55.8	-18.2	74	44.61	34.38	9.74	32.93	100	76	Peak
5350	43.3	-10.7	54	32.11	34.38	9.74	32.93	100	76	Average

Test Mode :	802.11n HT-20 <MIMO 1+2>	Temperature :	24~25°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
5148.6	72.3	-1.7	74	61.64	34.22	9.41	32.97	155	274	Peak
5148.6	52.94	-1.06	54	42.28	34.22	9.41	32.97	155	274	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
5147.45	68.41	-5.59	74	57.75	34.22	9.41	32.97	158	16	Peak
5147.45	49.34	-4.66	54	38.68	34.22	9.41	32.97	158	16	Average

Test Mode :	802.11n HT-20 <MIMO 1+2>	Temperature :	24~25°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
5350	53.94	-20.06	74	42.75	34.38	9.74	32.93	100	308	Peak
5350	42.13	-11.87	54	30.94	34.38	9.74	32.93	100	308	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
5352	55.94	-18.06	74	44.75	34.38	9.74	32.93	100	72	Peak
5352	43.01	-10.99	54	31.82	34.38	9.74	32.93	100	72	Average

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

<Legacy Ant 2>:

Test Mode :	802.11a <Ant 2>	**Temperature :**	24~25°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	45.61	-8.39	54	34.95	34.22	9.41	32.97	101	218	Average
5150	62.58	-11.42	74	51.92	34.22	9.41	32.97	101	218	Peak
5180	93.25	-	-	82.52	34.25	9.45	32.97	101	218	Average
5180	103.55	-	-	92.82	34.25	9.45	32.97	101	218	Peak
5376	41.99	-12.01	54	30.75	34.39	9.78	32.93	101	218	Average
5376	53.08	-20.92	74	41.84	34.39	9.78	32.93	101	218	Peak

Test Mode :	802.11a <Ant 2>	**Temperature :**	24~25°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	53.54	-0.46	54	42.88	34.22	9.41	32.97	100	46	Average
5150	71.48	-2.52	74	60.82	34.22	9.41	32.97	100	46	Peak
5180	101.51	-	-	90.78	34.25	9.45	32.97	100	46	Average
5180	112.14	-	-	101.41	34.25	9.45	32.97	100	46	Peak
5390	42.7	-11.3	54	31.39	34.41	9.82	32.92	100	46	Average
5390	54.46	-19.54	74	43.15	34.41	9.82	32.92	100	46	Peak

Test Mode :	802.11a <Ant 2>	Temperature :	24~25°C
Test Channel :	44	Relative Humidity :	41~42%
Test Engineer :	Gavin Wu	Polarization :	Horizontal
Remark :	10440 MHz is not within a restricted band, and its limit line is 68.3dBuV/m.		

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
143.13	35.38	-8.12	43.5	54.29	11.33	1.2	31.44	-	-	Peak
163.11	37.2	-6.3	43.5	57.12	10.22	1.22	31.36	112	187	Peak
168.78	36.64	-6.86	43.5	57.04	9.66	1.23	31.29	-	-	Peak
307	25.83	-20.17	46	41.75	13.51	1.79	31.22	-	-	Peak
702.5	23.12	-22.88	46	30.04	20.63	2.94	30.49	-	-	Peak
789.3	25.52	-20.48	46	30.7	21.94	3.12	30.24	-	-	Peak
10440	42.11	-26.19	68.3	53.97	37.36	11.21	60.43	100	0	Peak

Test Mode :	802.11a <Ant 2>	Temperature :	24~25°C
Test Channel :	44	Relative Humidity :	41~42%
Test Engineer :	Gavin Wu	Polarization :	Vertical
Remark :	10440 MHz is not within a restricted band, and its limit line is 68.3dBuV/m.		

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
42.96	30.04	-9.96	40	49.45	11.7	0.64	31.75	105	221	Peak
160.14	30.68	-12.82	43.5	50.35	10.5	1.22	31.39	-	-	Peak
194.43	28.61	-14.89	43.5	49.58	9.05	1.3	31.32	-	-	Peak
458.2	24.22	-21.78	46	35.86	17.21	2.32	31.17	-	-	Peak
663.3	23.37	-22.63	46	30.59	20.3	2.87	30.39	-	-	Peak
827.8	24.46	-21.54	46	29.25	22.37	3.21	30.37	-	-	Peak
10440	41.26	-27.04	68.3	53.12	37.36	11.21	60.43	100	0	Peak

Test Mode :	802.11a <Ant 2>	Temperature :	24~25°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
5130	41.39	-12.61	54	30.79	34.21	9.37	32.98	100	300	Average
5130	54.98	-19.02	74	44.38	34.21	9.37	32.98	100	300	Peak
5240	96.55	-	-	85.64	34.29	9.57	32.95	100	300	Average
5240	106.78	-	-	95.87	34.29	9.57	32.95	100	300	Peak
5378	43.41	-10.59	54	32.15	34.41	9.78	32.93	100	300	Average
5378	55.29	-18.71	74	44.03	34.41	9.78	32.93	100	300	Peak

Test Mode :	802.11a <Ant 2>	Temperature :	24~25°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
5148	43.73	-10.27	54	33.07	34.22	9.41	32.97	112	42	Average
5148	56.04	-17.96	74	45.38	34.22	9.41	32.97	112	42	Peak
5240	104.42	-	-	93.51	34.29	9.57	32.95	112	42	Average
5240	114.55	-	-	103.64	34.29	9.57	32.95	112	42	Peak
5354	44.64	-9.36	54	33.45	34.38	9.74	32.93	112	42	Average
5354	56.18	-17.82	74	44.99	34.38	9.74	32.93	112	42	Peak

<SISO Ant 2>:

Test Mode :	802.11n HT-20 <SISO Ant 2>	**Temperature :**	24~25°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	44.15	-9.85	54	33.49	34.22	9.41	32.97	187	184	Average
5150	60.24	-13.76	74	49.58	34.22	9.41	32.97	187	184	Peak
5180	90.39	-	-	79.66	34.25	9.45	32.97	187	184	Average
5180	100.76	-	-	90.03	34.25	9.45	32.97	187	184	Peak
5350	42.02	-11.98	54	30.83	34.38	9.74	32.93	187	184	Average
5350	54.17	-19.83	74	42.98	34.38	9.74	32.93	187	184	Peak

Test Mode :	802.11n HT-20 <SISO Ant 2>	**Temperature :**	24~25°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	51.9	-2.1	54	41.24	34.22	9.41	32.97	102	54	Average
5150	68.74	-5.26	74	58.08	34.22	9.41	32.97	102	54	Peak
5180	101.62	-	-	90.89	34.25	9.45	32.97	102	54	Average
5180	112.73	-	-	102	34.25	9.45	32.97	102	54	Peak
5350	42.29	-11.71	54	31.1	34.38	9.74	32.93	102	54	Average
5350	54.1	-19.9	74	42.91	34.38	9.74	32.93	102	54	Peak

Test Mode :	802.11n HT-20 <SISO Ant 2>	Temperature :	24~25°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	42.15	-11.85	54	31.49	34.22	9.41	32.97	100	301	Average
5150	52.27	-21.73	74	41.61	34.22	9.41	32.97	100	301	Peak
5240	95.92	-	-	85.01	34.29	9.57	32.95	100	301	Average
5240	106.56	-	-	95.65	34.29	9.57	32.95	100	301	Peak
5435.2	42.28	-11.72	54	30.84	34.45	9.9	32.91	100	301	Average
5435.2	55.46	-18.54	74	44.02	34.45	9.9	32.91	100	301	Peak

Test Mode :	802.11n HT-20 <SISO Ant 2>	Temperature :	24~25°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	44.94	-9.06	54	34.28	34.22	9.41	32.97	102	58	Average
5150	56.21	-17.79	74	45.55	34.22	9.41	32.97	102	58	Peak
5240	104.88	-	-	93.97	34.29	9.57	32.95	102	58	Average
5240	115.16	-	-	104.25	34.29	9.57	32.95	102	58	Peak
5356.46	45.46	-8.54	54	34.23	34.38	9.78	32.93	102	58	Average
5356.46	58.74	-15.26	74	47.51	34.38	9.78	32.93	102	58	Peak

Test Mode :	802.11n HT-40 <SISO Ant 2>	Temperature :	24~25°C
Test Channel :	38	Relative Humidity :	41~42%
Test Engineer :	Gavin Wu	Polarization :	Horizontal
Remark :	5190 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
5143.95	71.98	-2.02	74	61.32	34.22	9.41	32.97	101	139	Peak
5150	48.86	-5.14	54	38.2	34.22	9.41	32.97	101	139	Average
5190	91.82	-	-	81.04	34.25	9.49	32.96	101	139	Average
5190	103.54	-	-	92.81	34.25	9.45	32.97	101	139	Peak
5402	41.86	-12.14	54	30.54	34.42	9.82	32.92	101	139	Average
5402	54.37	-19.63	74	43.05	34.42	9.82	32.92	101	139	Peak

Test Mode :	802.11n HT-40 <SISO Ant 2>	Temperature :	24~25°C
Test Channel :	38	Relative Humidity :	41~42%
Test Engineer :	Gavin Wu	Polarization :	Vertical
Remark :	5190 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
5149	69.14	-4.86	74	58.48	34.22	9.41	32.97	100	316	Peak
5150	47.96	-6.04	54	37.3	34.22	9.41	32.97	100	316	Average
5190	90.59	-	-	79.81	34.25	9.49	32.96	100	316	Average
5190	101.49	-	-	90.76	34.25	9.45	32.97	100	316	Peak
5364	42.17	-11.83	54	30.93	34.39	9.78	32.93	100	316	Average
5364	54.33	-19.67	74	43.09	34.39	9.78	32.93	100	316	Peak

Test Mode :	802.11n HT-40	Temperature :	24~25°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	44.38	-9.62	54	33.72	34.22	9.41	32.97	100	215	Average
5150	60.8	-13.2	74	50.14	34.22	9.41	32.97	100	215	Peak
5230	93.31	-	-	82.45	34.29	9.53	32.96	100	215	Average
5230	104.54	-	-	93.68	34.29	9.53	32.96	100	215	Peak
5354	42.66	-11.34	54	31.47	34.38	9.74	32.93	100	215	Average
5354	57.08	-16.92	74	45.89	34.38	9.74	32.93	100	215	Peak

Test Mode :	802.11n HT-40	Temperature :	24~25°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
5148	49.51	-4.49	54	38.85	34.22	9.41	32.97	100	60	Average
5148	68.47	-5.53	74	57.81	34.22	9.41	32.97	100	60	Peak
5230	101.57	-	-	90.71	34.29	9.53	32.96	100	60	Average
5230	113.59	-	-	102.73	34.29	9.53	32.96	100	60	Peak
5354	45.66	-8.34	54	34.47	34.38	9.74	32.93	100	60	Average
5354	61.44	-12.56	74	50.25	34.38	9.74	32.93	100	60	Peak

<MIMO Ant 1+2>:

Test Mode :	802.11n HT-20 <MIMO 1+2>	**Temperature :**	24~25°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	47.46	-6.54	54	36.8	34.22	9.41	32.97	100	126	Average
5150	63.9	-10.1	74	53.24	34.22	9.41	32.97	100	126	Peak
5180	94.6	-	-	83.87	34.25	9.45	32.97	100	126	Average
5180	106.93	-	-	96.2	34.25	9.45	32.97	100	126	Peak
5410	42.13	-11.87	54	30.77	34.42	9.86	32.92	100	126	Average
5410	54.16	-19.84	74	42.8	34.42	9.86	32.92	100	126	Peak

Test Mode :	802.11n HT-20 <MIMO 1+2>	**Temperature :**	24~25°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	50.68	-3.32	54	40.02	34.22	9.41	32.97	100	71	Average
5150	69.05	-4.95	74	58.39	34.22	9.41	32.97	100	71	Peak
5180	100.19	-	-	89.46	34.25	9.45	32.97	100	71	Average
5180	112.49	-	-	101.76	34.25	9.45	32.97	100	71	Peak
5392	42.53	-11.47	54	31.22	34.41	9.82	32.92	100	71	Average
5392	54.74	-19.26	74	43.43	34.41	9.82	32.92	100	71	Peak

Test Mode :	802.11n HT-20 <MIMO 1+2>	**Temperature :**	24~25°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
143.13	35.38	-8.12	43.5	54.29	11.33	1.2	31.44	-	-	Peak
163.11	37.2	-6.3	43.5	57.12	10.22	1.22	31.36	115	164	Peak
168.78	36.64	-6.86	43.5	57.04	9.66	1.23	31.29	-	-	Peak
307	25.83	-20.17	46	41.75	13.51	1.79	31.22	-	-	Peak
702.5	23.12	-22.88	46	30.04	20.63	2.94	30.49	-	-	Peak
789.3	25.52	-20.48	46	30.7	21.94	3.12	30.24	-	-	Peak
5150	40.4	-13.6	54	29.74	34.22	9.41	32.97	158	45	Average
5150	49.82	-24.18	74	39.16	34.22	9.41	32.97	158	45	Peak
5220	80.96	-	-	70.12	34.27	9.53	32.96	158	45	Average
5220	104.12	-	-	93.28	34.27	9.53	32.96	158	45	Peak
5405.75	41.81	-12.19	54	30.45	34.42	9.86	32.92	158	45	Average
5405.75	52.96	-21.04	74	41.6	34.42	9.86	32.92	158	45	Peak
10440	42.07	-26.23	68.3	53.93	37.36	11.21	60.43	100	0	Peak

Test Mode :	802.11n HT-20 <MIMO 1+2>	**Temperature :**	24~25°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
42.96	30.04	-9.96	40	49.45	11.7	0.64	31.75	112	108	Peak
160.14	30.68	-12.82	43.5	50.35	10.5	1.22	31.39	-	-	Peak
194.43	28.61	-14.89	43.5	49.58	9.05	1.3	31.32	-	-	Peak
458.2	24.22	-21.78	46	35.86	17.21	2.32	31.17	-	-	Peak
710.2	22.99	-23.01	46	29.78	20.75	2.96	30.5	-	-	Peak
791.4	24.53	-21.47	46	29.66	21.97	3.13	30.23	-	-	Peak
5150	41.32	-12.68	54	30.66	34.22	9.41	32.97	100	133	Average
5150	53.26	-20.74	74	42.6	34.22	9.41	32.97	100	133	Peak
5220	85.03	-	-	74.19	34.27	9.53	32.96	100	133	Average
5220	109.7	-	-	98.86	34.27	9.53	32.96	100	133	Peak
5371.34	40.98	-13.02	54	29.74	34.39	9.78	32.93	100	133	Average
5371.34	54.38	-19.62	74	43.14	34.39	9.78	32.93	100	133	Peak
10440	40.93	-27.37	68.3	52.79	37.36	11.21	60.43	100	0	Peak

Test Mode :	802.11n HT-20 <MIMO 1+2>	Temperature :	24~25°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
5070	41.68	-12.32	54	31.23	34.15	9.29	32.99	100	302	Average
5070	54.05	-19.95	74	43.6	34.15	9.29	32.99	100	302	Peak
5240	93.26	-	-	82.35	34.29	9.57	32.95	100	302	Average
5240	105.83	-	-	94.92	34.29	9.57	32.95	100	302	Peak
5360	42.28	-11.72	54	31.05	34.38	9.78	32.93	100	302	Average
5360	54.75	-19.25	74	43.52	34.38	9.78	32.93	100	302	Peak

Test Mode :	802.11n HT-20 <MIMO 1+2>	Temperature :	24~25°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
5134	43.35	-10.65	54	32.75	34.21	9.37	32.98	100	76	Average
5134	56.02	-17.98	74	45.42	34.21	9.37	32.98	100	76	Peak
5240	100.5	-	-	89.59	34.29	9.57	32.95	100	76	Average
5240	112.64	-	-	101.73	34.29	9.57	32.95	100	76	Peak
5350	43.3	-10.7	54	32.11	34.38	9.74	32.93	100	76	Average
5350	55.8	-18.2	74	44.61	34.38	9.74	32.93	100	76	Peak

Test Mode :	802.11n HT-40 <MIMO 1+2>	**Temperature :**	24~25°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
143.13	35.38	-8.12	43.5	54.29	11.33	1.2	31.44	-	-	Peak
163.11	37.2	-6.3	43.5	57.12	10.22	1.22	31.36	110	197	Peak
168.78	36.64	-6.86	43.5	57.04	9.66	1.23	31.29	-	-	Peak
307	25.83	-20.17	46	41.75	13.51	1.79	31.22	-	-	Peak
753.6	23.36	-22.64	46	29.39	21.4	3.07	30.5	-	-	Peak
789.3	25.52	-20.48	46	30.7	21.94	3.12	30.24	-	-	Peak
5148.6	52.94	-1.06	54	42.28	34.22	9.41	32.97	155	274	Average
5148.6	72.3	-1.7	74	61.64	34.22	9.41	32.97	155	274	Peak
5190	91.46	-	-	80.68	34.25	9.49	32.96	155	274	Average
5190	106.32	-	-	95.59	34.25	9.45	32.97	155	274	Peak
5364	42.32	-11.68	54	31.08	34.39	9.78	32.93	155	274	Average
5364	54.39	-19.61	74	43.15	34.39	9.78	32.93	155	274	Peak

Test Mode :	802.11n HT-40 <MIMO 1+2>	**Temperature :**	24~25°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
42.96	30.04	-9.96	40	49.45	11.7	0.64	31.75	105	203	Peak
160.14	30.68	-12.82	43.5	50.35	10.5	1.22	31.39	-	-	Peak
277.86	32.34	-13.66	46	49.08	13	1.64	31.38	-	-	Peak
458.2	24.22	-21.78	46	35.86	17.21	2.32	31.17	-	-	Peak
663.3	23.37	-22.63	46	30.59	20.3	2.87	30.39	-	-	Peak
791.4	24.53	-21.47	46	29.66	21.97	3.13	30.23	-	-	Peak
5147.45	49.34	-4.66	54	38.68	34.22	9.41	32.97	158	16	Average
5147.45	68.41	-5.59	74	57.75	34.22	9.41	32.97	158	16	Peak
5190	87.39	-	-	76.61	34.25	9.49	32.96	158	16	Average
5190	100.7	-	-	89.97	34.25	9.45	32.97	158	16	Peak
5364	41.49	-12.51	54	30.25	34.39	9.78	32.93	158	16	Average
5364	53.76	-20.24	74	42.52	34.39	9.78	32.93	158	16	Peak

Test Mode :	802.11n HT-40 <MIMO 1+2>	Temperature :	24~25°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	41.58	-12.42	54	30.92	34.22	9.41	32.97	100	308	Average
5150	54.43	-19.57	74	43.77	34.22	9.41	32.97	100	308	Peak
5230	90.27	-	-	79.41	34.29	9.53	32.96	100	308	Average
5230	102.54	-	-	91.68	34.29	9.53	32.96	100	308	Peak
5350	42.13	-11.87	54	30.94	34.38	9.74	32.93	100	308	Average
5350	53.94	-20.06	74	42.75	34.38	9.74	32.93	100	308	Peak

Test Mode :	802.11n HT-40 <MIMO 1+2>	Temperature :	24~25°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
5136	42.91	-11.09	54	32.31	34.21	9.37	32.98	100	72	Average
5136	59.38	-14.62	74	48.78	34.21	9.37	32.98	100	72	Peak
5230	96.91	-	-	86.05	34.29	9.53	32.96	100	72	Average
5230	109.12	-	-	98.26	34.29	9.53	32.96	100	72	Peak
5352	43.01	-10.99	54	31.82	34.38	9.74	32.93	100	72	Average
5352	55.94	-18.06	74	44.75	34.38	9.74	32.93	100	72	Peak

3.6 AC Conducted Emission Measurement

3.6.1 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.

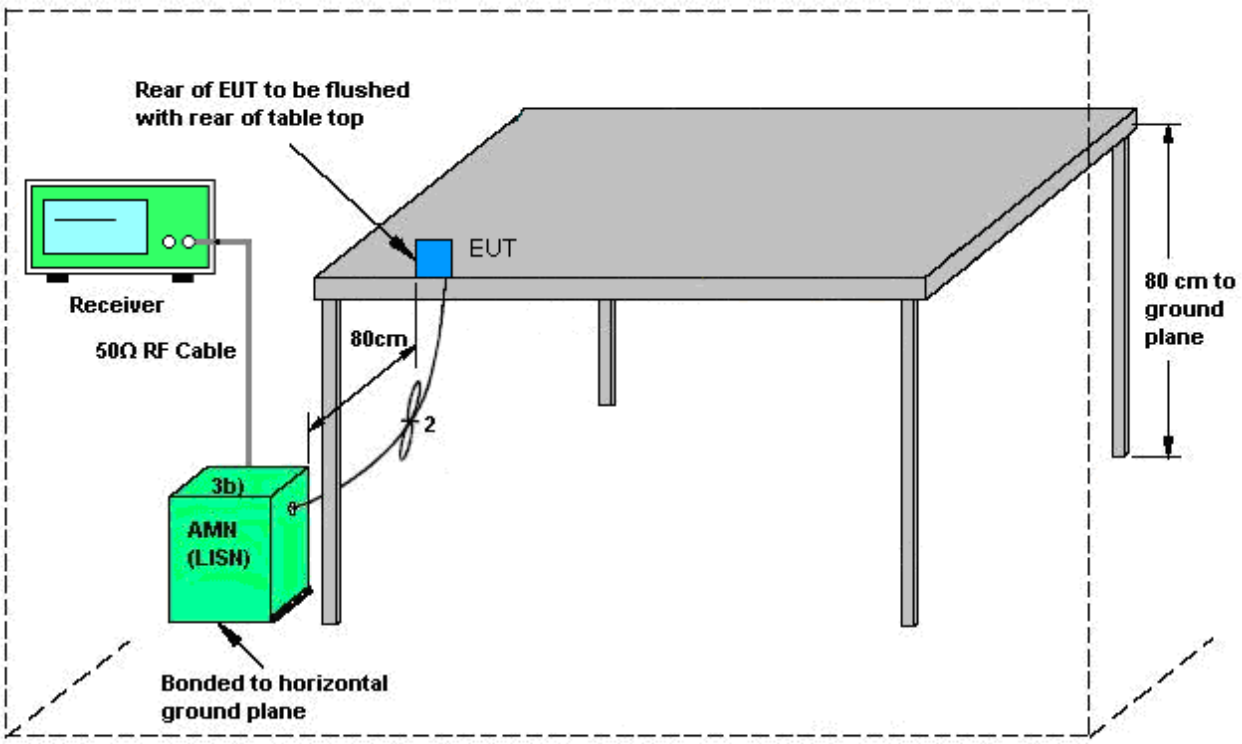
3.6.2 Measuring Instruments

See list of measuring instruments of this test report.

3.6.3 Test Procedures

1. The testing follows the guidelines in ANSI C63.4-2003 and ANSI C63.10-2009 test site requirement.
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.

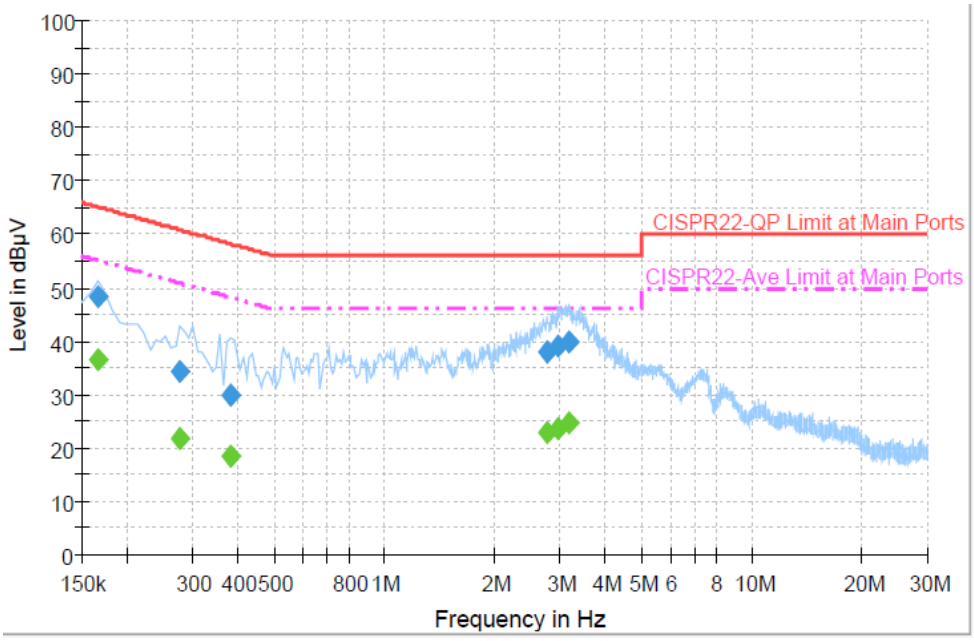
3.6.4 Test Setup



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

3.6.5 Test Result of AC Conducted Emission

Test Mode :	Mode 1	**Temperature :**	20~21℃
Test Engineer :	Kai-Chun Chu	**Relative Humidity :**	51~52%
Test Voltage :	120Vac / 60Hz	**Phase :**	Line
Function Type :	WLAN (5G) Link + Bluetooth Link + MPEG4 + HDMI Cable + Earphone + USB Cable (Charging from Adapter)		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



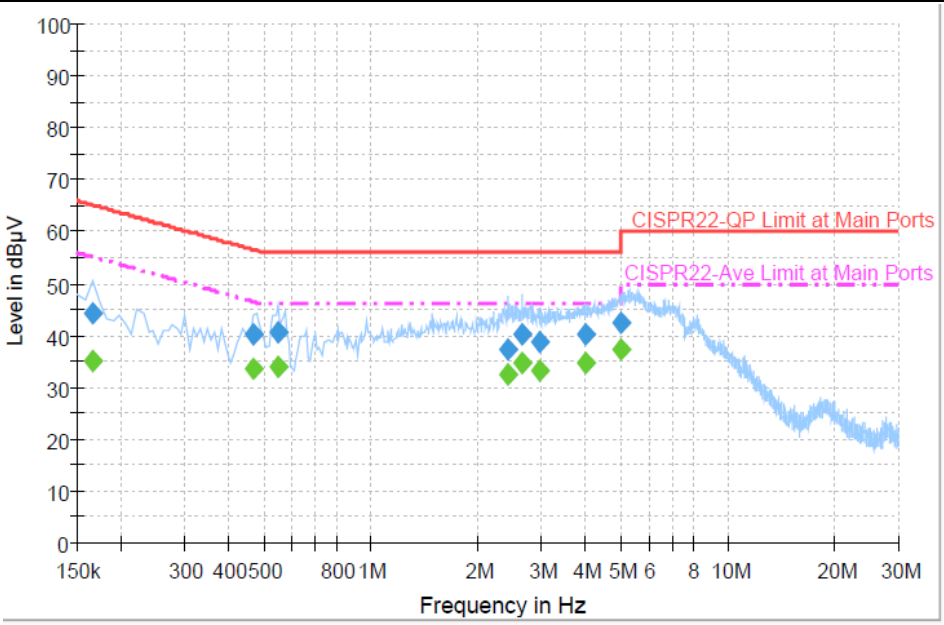
Final Result : QuasiPeak

Frequency (MHz)	QuasiPeak (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.166000	48.2	Off	L1	19.4	17.0	65.2
0.278000	34.4	Off	L1	19.4	26.5	60.9
0.382000	30.0	Off	L1	19.4	28.2	58.2
2.758000	38.0	Off	L1	19.4	18.0	56.0
2.958000	39.0	Off	L1	19.4	17.0	56.0
3.174000	39.8	Off	L1	19.5	16.2	56.0

Final Result : Average

Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.166000	36.4	Off	L1	19.4	18.8	55.2
0.278000	21.7	Off	L1	19.4	29.2	50.9
0.382000	18.6	Off	L1	19.4	29.6	48.2
2.758000	22.7	Off	L1	19.4	23.3	46.0
2.958000	23.8	Off	L1	19.4	22.2	46.0
3.174000	24.6	Off	L1	19.5	21.4	46.0

Test Mode :	Mode 1	**Temperature :**	20~21℃
Test Engineer :	Kai-Chun Chu	**Relative Humidity :**	51~52%
Test Voltage :	120Vac / 60Hz	**Phase :**	Neutral
Function Type :	WLAN (5G) Link + Bluetooth Link + MPEG4 + HDMI Cable + Earphone + USB Cable (Charging from 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)
0.166000	44.4	Off	N	19.4	20.8	65.2
0.470000	40.2	Off	N	19.4	16.3	56.5
0.550000	40.5	Off	N	19.4	15.5	56.0
2.414000	37.3	Off	N	19.5	18.7	56.0
2.646000	40.1	Off	N	19.5	15.9	56.0
2.966000	38.7	Off	N	19.5	17.3	56.0
3.998000	40.4	Off	N	19.5	15.6	56.0
4.998000	42.6	Off	N	19.5	13.4	56.0

Final Result : Average

Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.166000	35.0	Off	N	19.4	20.2	55.2
0.470000	33.6	Off	N	19.4	12.9	46.5
0.550000	33.8	Off	N	19.4	12.2	46.0
2.414000	32.6	Off	N	19.5	13.4	46.0
2.646000	34.6	Off	N	19.5	11.4	46.0
2.966000	33.2	Off	N	19.5	12.8	46.0
3.998000	34.8	Off	N	19.5	11.2	46.0
4.998000	37.2	Off	N	19.5	8.8	46.0

3.7 Frequency Stability Measurement

3.7.1 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.

3.7.2 Measuring Instruments

See list of measuring instruments of this test report.

3.7.3 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.

3.7.4 Test Setup

3.7.5 Test Result of Frequency Stability

Test Mode :	802.11a	Temperature :	24~26℃
Test Engineer :	Book Lin	Relative Humidity :	45~49%

802.11a – Legacy Ant 2				
Channel	Frequency (MHz)	Low Frequency (Fl)	High Frequency (Fh)	Frequency Stability (ppm)
36	5180	5171.80	5188.20	0.00
44	5220	5211.80	5228.20	0.00
48	5240	5231.85	5248.15	0.00

Test Mode :	802.11n HT-20	Temperature :	24~26℃
Test Engineer :	Book Lin	Relative Humidity :	45~49%

802.11n (HT-20, SISO) – SISO Ant 2				
Channel	Frequency (MHz)	Low Frequency (Fl)	High Frequency (Fh)	Frequency Stability (ppm)
36	5180	5171.20	5188.80	0.00
44	5220	5211.25	5228.75	0.00
48	5240	5231.15	5248.85	0.00

802.11n (HT-20, MIMO, 2Tx) – MIMO Ant 1				
Channel	Frequency (MHz)	Low Frequency (Fl)	High Frequency (Fh)	Frequency Stability (ppm)
36	5180	5171.25	5188.75	0.00
44	5220	5211.20	5228.80	0.00
48	5240	5231.15	5248.85	0.00

802.11n (HT-20, MIMO, 2Tx) MIMO Ant 2				
Channel	Frequency (MHz)	Low Frequency (Fl)	High Frequency (Fh)	Frequency Stability (ppm)
36	5180	5171.15	5188.85	0.00
44	5220	5211.15	5228.85	0.00
48	5240	5231.15	5248.85	0.00

Test Mode :	802.11n HT-40	Temperature :	24~26℃
Test Engineer :	Book Lin	Relative Humidity :	45~49%

802.11n (HT-40, SISO) – SISO Ant 2				
Channel	Frequency (MHz)	Low Frequency (Fl)	High Frequency (Fh)	Frequency Stability (ppm)
38	5190	5171.82	5208.36	17.34
46	5230	5211.82	5248.18	0.00

802.11n (HT-40, MIMO, 2Tx) – MIMO Ant 1				
Channel	Frequency (MHz)	Low Frequency (Fl)	High Frequency (Fh)	Frequency Stability (ppm)
38	5190	5171.82	5208.18	0.00
46	5230	5211.82	5248.18	0.00

802.11n (HT-40, MIMO, 2Tx) – MIMO Ant 2				
Channel	Frequency (MHz)	Low Frequency (Fl)	High Frequency (Fh)	Frequency Stability (ppm)
38	5190	5171.82	5208.18	0.00
46	5230	5211.82	5248.18	0.00

3.8 Automatically Discontinue Transmission

3.8.1 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.

3.8.2 Measuring Instruments

See list of measuring instruments of this test report.

3.8.3 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.

3.9 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 1.7 dBi. The composite antenna gain for 5GHz is 2.6 dBi as following table.

	2.4GHz	5GHz
ANT 1 GAIN (dBi)	1.9	2.5
ANT 2 GAIN (dBi)	1.5	2.7
COMPOSITE GAIN (dBi)	1.7	2.6

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. 06, 2012	Jul. 09, 2012~ Jul. 10, 2012	Jun. 05, 2013	Conducted (TH02-HY)
Power Meter	Anritsu	ML2495A	0932001	N/A	Sep. 18, 2011	Jul. 09, 2012~ Jul. 10, 2012	Sep. 17, 2012	Conducted (TH02-HY)
Power Sensor	Anritsu	MA2411B	0846202	N/A	Sep. 18, 2011	Jul. 09, 2012~ Jul. 10, 2012	Sep. 17, 2012	Conducted (TH02-HY)
EMI Test Receiver	R&S	ESCS 30	100356	9KHz ~ 2.75GHz	Oct. 27, 2011	May 14, 2012	Oct. 26, 2012	Conduction (CO05-HY)
Two-LISN	R&S	ENV216	11-100081	9KHz ~ 30MHz	Dec. 09, 2011	May 14, 2012	Dec. 08, 2012	Conduction (CO05-HY)
Two-LISN	R&S	ENV216	11-100080	9KHz ~ 30MHz	Dec. 06, 2011	May 14, 2012	Dec. 05, 2012	Conduction (CO05-HY)
AC Power Source	APC	APC-1000W	N/A	N/A	N/A	May 14, 2012	N/A	Conduction (CO05-HY)
Bilog Antenna	SCHAFFNER	CBL6111C	2726	30MHz ~ 1GHz	Oct. 22, 2011	Apr. 12, 2012~ Jul. 10, 2012	Oct. 21, 2012	Radiation (03CH07-HY)
Spectrum Analyzer	R&S	FSP30	101067	9KHz ~ 30GHz	Dec. 06, 2011	Apr. 12, 2012~ Jul. 10, 2012	Dec. 05, 2012	Radiation (03CH07-HY)
Double Ridge Horn Antenna	ESCO	3117	00075962	1GHz ~ 18GHz	Aug. 10, 2011	Apr. 12, 2012~ Jul. 10, 2012	Aug. 09, 2012	Radiation (03CH07-HY)
Pre Amplifier	Agilent	8449B	3008A02362	1GHz ~ 26.5GHz	Dec. 05, 2011	Apr. 12, 2012~ Jul. 10, 2012	Dec. 04, 2012	Radiation (03CH07-HY)
Pre Amplifier	COM-POWER	PA-103A	161241	10-1000MHz.32 dB.GAIN	Feb. 27, 2012	Apr. 12, 2012~ Jul. 10, 2012	Feb. 26, 2013	Radiation (03CH07-HY)
EMI TEST RECEIVER	R&S	ESCI 7	100724	9kHz ~ 7GHz	Aug. 22, 2011	Apr. 12, 2012~ Jul. 10, 2012	Aug. 21, 2012	Radiation (03CH07-HY)
Pre Amplifier	MITEQ	AMF-7D-0010 1800-30-10P	159088	1GHz ~ 18GHz	Mar. 10, 2012	Apr. 12, 2012~ Jul. 10, 2012	Mar. 09, 2013	Radiation (03CH07-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170251	15GHz ~ 40GHz	Oct. 21, 2011	Apr. 12, 2012~ Jul. 10, 2012	Oct. 20, 2012	Radiation (03CH07-HY)
Loop Antenna	R&S	HFH2-Z2	860004/001	9 kHz~30 MHz	Jul. 29, 2010	Apr. 12, 2012~ Jul. 10, 2012	Jul. 28, 2012	Radiation (03CH07-HY)

5 Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**2.26**

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**2.54**

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**4.72**