FCC RF Test Report

APPLICANT	:	**Meru Networks Inc.**
EQUIPMENT	:	**IEEE 802.11n Access point**
BRAND NAME	:	**Meru Networks Inc.**
MODEL NAME	:	**AP433e**
FCC ID	:	**RE7-AP433E**
STANDARD	:	**FCC Part 15 Subpart E**
CLASSIFICATION	:	**Unlicensed National Information Infrastructure (UNII)**

The product was received on Apr. 11, 2011 and completely tested on May 09, 2011. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the procedures given in FCC Public Notice DA 02-2138 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:

Roy Wu / Manager

Testing Laboratory 1190

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
FR141108B	Rev. 01	Initial issue of report	May 12, 2011

SUMMARY OF TEST RESULT

Report Section	FCC Rule	IC Rule	Description	Limit	Result	Remark
3.1	15.403(i)	A9.2	26dB & 99% Bandwidth	-	-	-
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	Frequency Band Edges	≤ -17, -27 dBm (depend on band)&15.209(a)	Pass	-
3.5	15.207	Gen 7.2.2	AC Conducted Emission	15.207(a)	Pass	Under limit 4.2 dB at 11.10 MHz
3.6	15.407(b)	A9.3	Transmitter Radiated Emission	≤ -17, -27 dBm (depend on band)&15.209(a)	Pass	Under limit 1.28 dB at 5150 MHz
3.7	15.407(b)	A9.3	Peak Excursion Ratio	≤ 13dB	Pass	-
3.8	15.407(c)	A9.5	Automatically Discontinue Transmission	Discontinue Transmission	Pass	-
3.9	15.407(g)	A9.5	Frequency Stability	Within Operation Band	Pass	-
3.10	15.203 & 15.407(a)	A9.2	Antenna Requirement	N/A	Pass	-

1 General Description

1.1 Applicant

Meru Networks Inc.
894 Ross Drive Sunnyvale, CA 94089 USA

1.2 Manufacturer

Meru Networks Inc.
894 Ross Drive Sunnyvale, CA 94089 USA

1.3 Feature of Equipment Under Test

Product Feature & Specification	
Equipment	IEEE 802.11n Access point
Brand Name	Meru Networks Inc.
Model Name	AP433e
FCC ID	RE7-AP433E
Tx/Rx Frequency Range	5150 MHz ~ 5250 MHz
Maximum Output Power to Antenna	802.11a : 14.73 dBm / 0.03 W 802.11n (BW 20MHz) : 14.23 dBm / 0.03 W 802.11n (BW 40MHz) : 14.69 dBm / 0.03 W
HW Version	Teton_MB_v21_D1
SW Version	rfs-8378-TETON-e1.0-V0.1.0-20101108
Type of Modulation	OFDM (BPSK / QPSK / 16QAM / 64QAM)
EUT Stage	Production Unit

Remark:

1. For other wireless features of this EUT, test report will be issued separately.
2. This test report recorded only product characteristics and test results of Unlicensed National Information Infrastructure (UNII).
3. The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

<Antenna Information>

Type	Manufacturer	Model Number	Gain (dBi)	Gain (dBi)	Note
			2.4GHz	5 GHz	
Dipole	Terrawave	M6060060MO13620O	6	6	Antenna 1
	Terrawave	M6025040MO1D3620P	2.5	4	Antenna 5
	SOCAA	AS123-F	2	3	Antenna 3
	SOCAA	AS123-F-4	2	3	Antenna 4
Panel	Laird	S24493TS	3	4	Antenna 2

1.4 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

1.5 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 Public Notice DA 02-2138, (Measurement Guidelines of UNII)
- ANSI C63.4-2003
- IC RSS-210 Issued 8

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 (DoC), recorded in a separate test report.

1.6 Ancillary Equipment List

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	Notebook	DELL	Vostro 1510	FCC DoC	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
2.	USB Dongle	Transcend	D33193	FCC DoC	N/A	N/A
3.	iPod	Apple	A1285	FCC DoC	Shielded, 1.0 m	N/A
4.	POE	PowerDsine	PD-3501G/AC	N/A	N/A	N/A

2 Test Configuration of Equipment Under Test

2.1 Carrier Frequency Channel

802.11a Carrier Frequency Channel					
Channel	**Freq. (MHz)**	**Channel**	**Freq. (MHz)**	**Channel**	**Freq. (MHz)**
36	5180	**44**	5220	**48**	5240

802.11n (BW 20MHz) Carrier Frequency Channel					
Channel	**Freq. (MHz)**	**Channel**	**Freq. (MHz)**	**Channel**	**Freq. (MHz)**
36	5180	**44**	5220	**48**	5240

802.11n (BW 40MHz) Carrier Frequency Channel			
Channel	**Freq. (MHz)**	**Channel**	**Freq. (MHz)**
38	5190	**46**	5230

2.2 Test Mode

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: conduction (150 kHz to 30 MHz), radiation (9 kHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower).

Pre-scanned tests were conducted to determine the final configuration from all possible combinations.

WORST-CASE CONFIGURATION AND MODE:

The worst-case data rates are determined to be as follows for each mode, based on the investigations by measuring the average power, peak power and PPSD across all the data rates, bandwidths, modulations and spatial stream modes.

Thus all tests were made with following data rates:

802.11a mode, 20 MHz Channel Bandwidth, 6 Mb/s, OFDM Modulation

802.11n HT20 mode, 20 MHz Channel Bandwidth, MCS16, OFDM Modulation

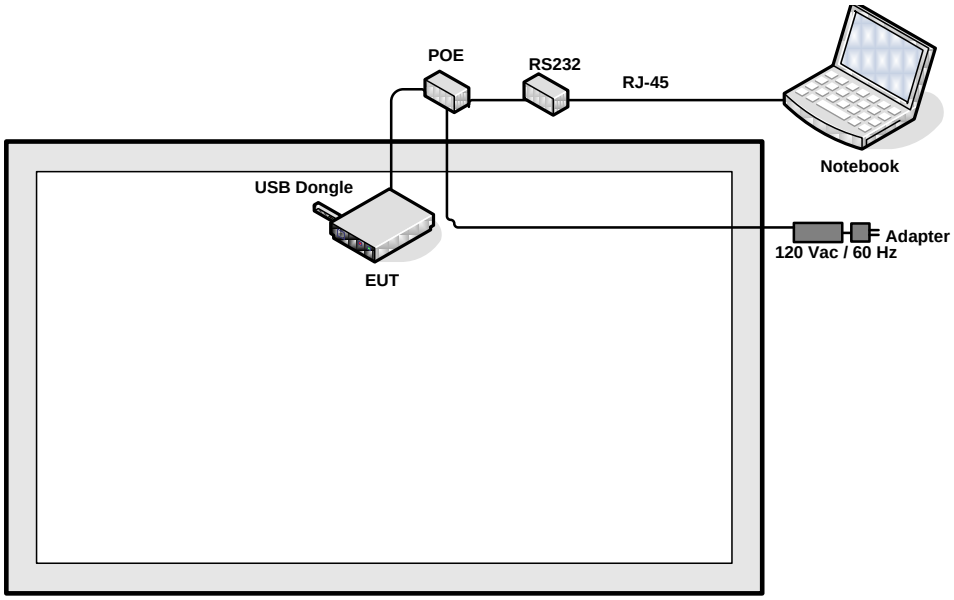
802.11n HT40 mode, 40 MHz Channel Bandwidth, MCS16, OFDM Modulation

The following tables are showing the test modes as the worst cases and recorded in this report.

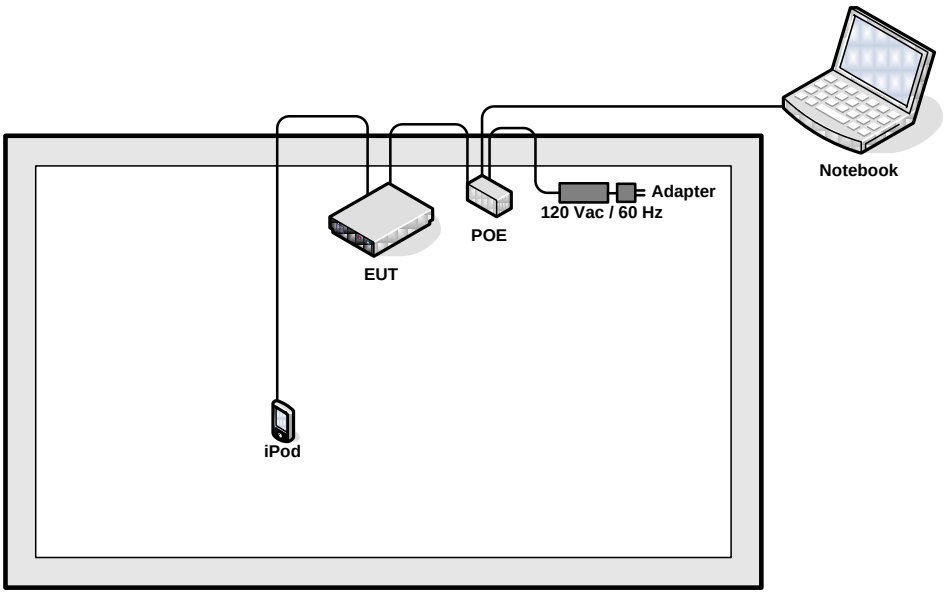
Test Cases	
Test Item	**802.11a/n (Modulation : OFDM)**
Conducted TCs	■ Mode 1: 802.11a_CH36_5180 MHz ■ Mode 2: 802.11a_CH44_5220 MHz ■ Mode 3: 802.11a_CH48_5240 MHz ■ Mode 4: 802.11a_CH36_5180 MHz (BW 20M) ■ Mode 5: 802.11a_CH44_5220 MHz (BW 20M) ■ Mode 6: 802.11a_CH48_5240 MHz (BW 20M) ■ Mode 7: 802.11n_CH38_5190 MHz (BW 40M) ■ Mode 8: 802.11n_CH46_5230 MHz (BW 40M)
AC Conducted Emission	Mode 1 : WLAN Link + USB Link with iPod + PoE for Antenna 3

2.3 Connection Diagram of Test System

<WLAN Tx Mode>



<AC Conducted Emission Mode>



2.4 RF Utility

The programmed RF Utility is installed in notebook to provide channel selection, power level, data rate and the application type. RF Utility can send transmitting signal for all testing. The EUT was set to the maximum obtainable power level and was tested at that power level.

3 Test Result

3.1 26dB & 99% Bandwidth Measurement

3.1.1 Limit of 26dB & 99% 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. For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW (24dBm) or 11 dBm + 10log B. For the band 5.725-5.825 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 1 W (30dBm) or 17 dBm + 10log B.

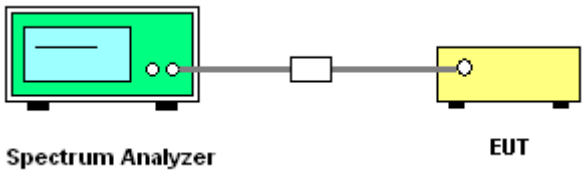
3.1.2 Measuring Instruments

See list of measuring instruments of this test report.

3.1.3 Test Procedures

1. The testing follows FCC Public Notice DA 02-2138 (Measurement Guidelines of UNII).
2. The RF output of EUT was connected to the spectrum analyzer by a low loss cable.
3. Read RBW and repeat measurement as needed until the RBW/BW ratio is approximately 1%.
4. Use a RBW = approximately 1% of the emission bandwidth; Set the VBW > RBW; Use a peak detector.
5. Measure the maximum width of the emission that is 26 dB relative to the peak of the emission and 99% occupied bandwidth.

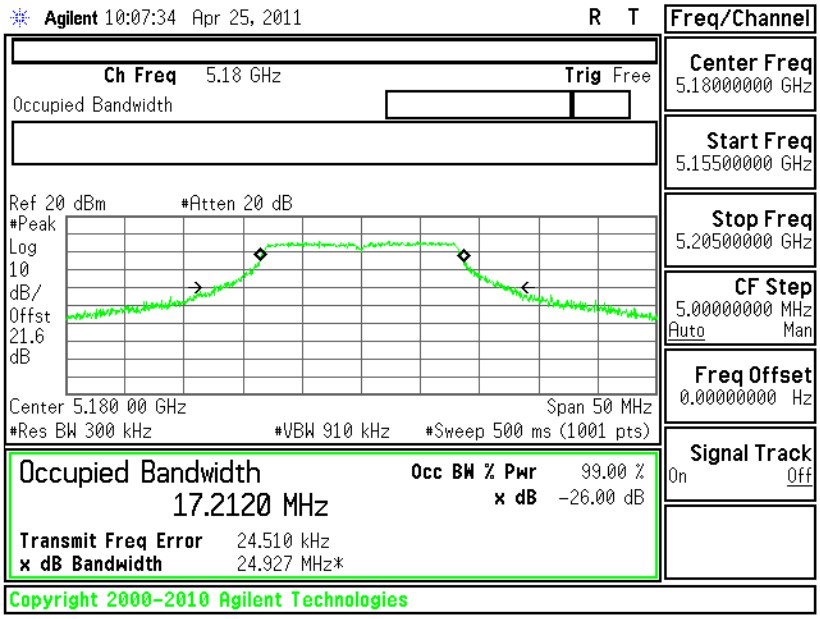
3.1.4 Test Setup



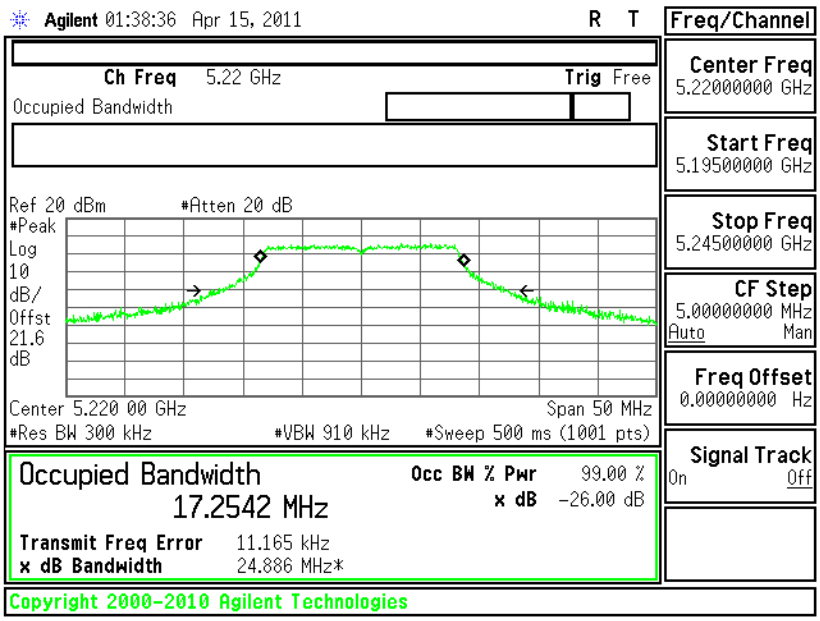
3.1.5 Test Result of 26dB & 99% Bandwidth

Test Mode :	Mode 1~8	Temperature :	24~26℃
Test Engineer :	Alan Liu	Relative Humidity :	40~44%

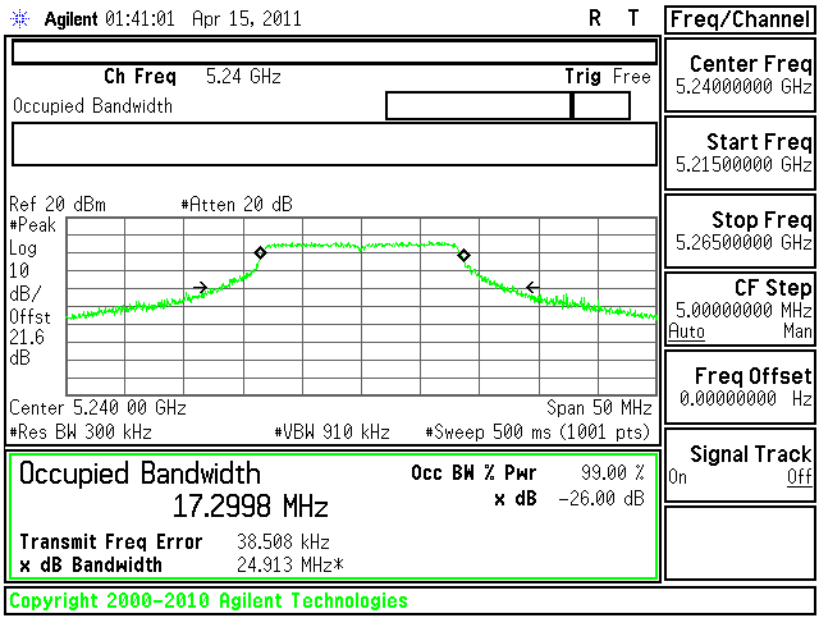
26 dB & 99% Bandwidth Plot on 802.11a Channel 36 - Chain A



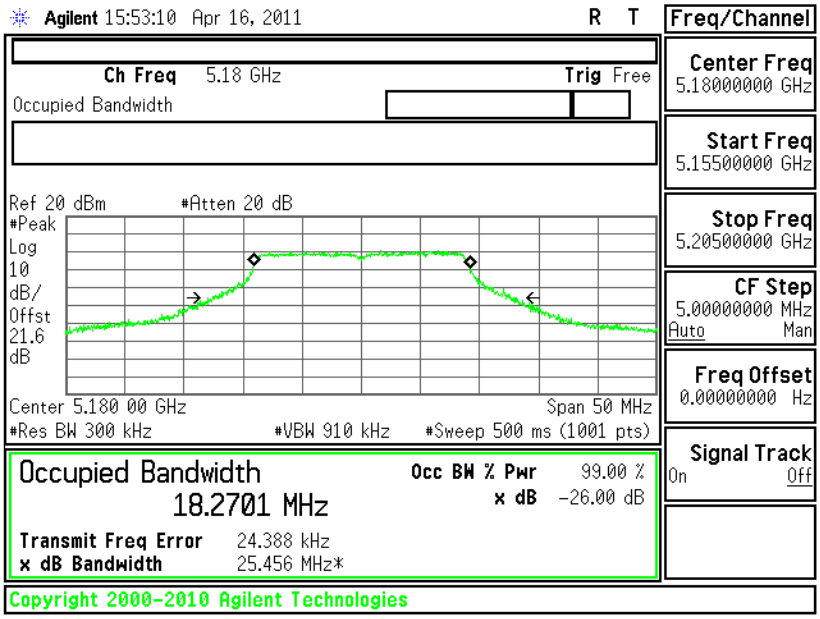
26 dB & 99% Bandwidth Plot on 802.11a Channel 44 - Chain A



26 dB & 99% Bandwidth Plot on 802.11a Channel 48 - Chain A

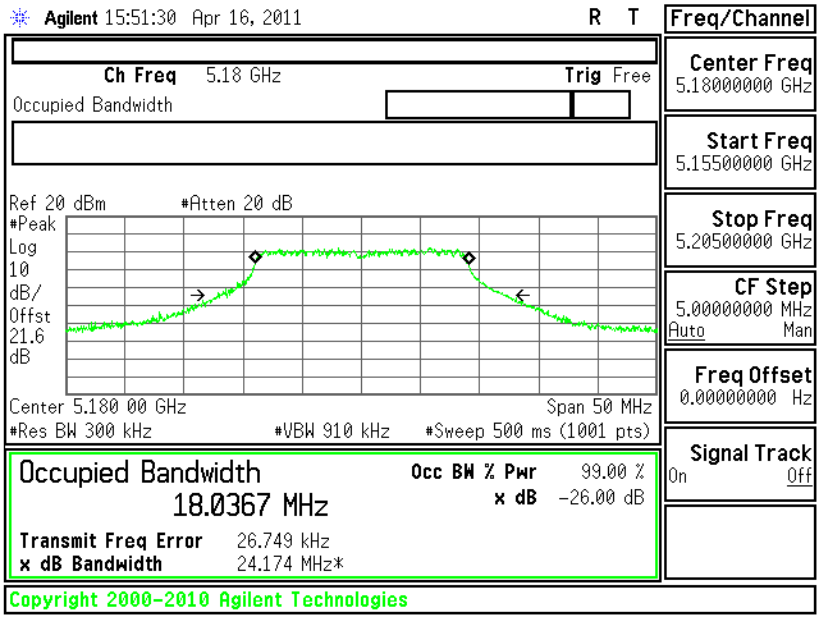


26 dB & 99% Bandwidth Plot on 802.11n (BW 20MHz) Channel 36 - Chain A



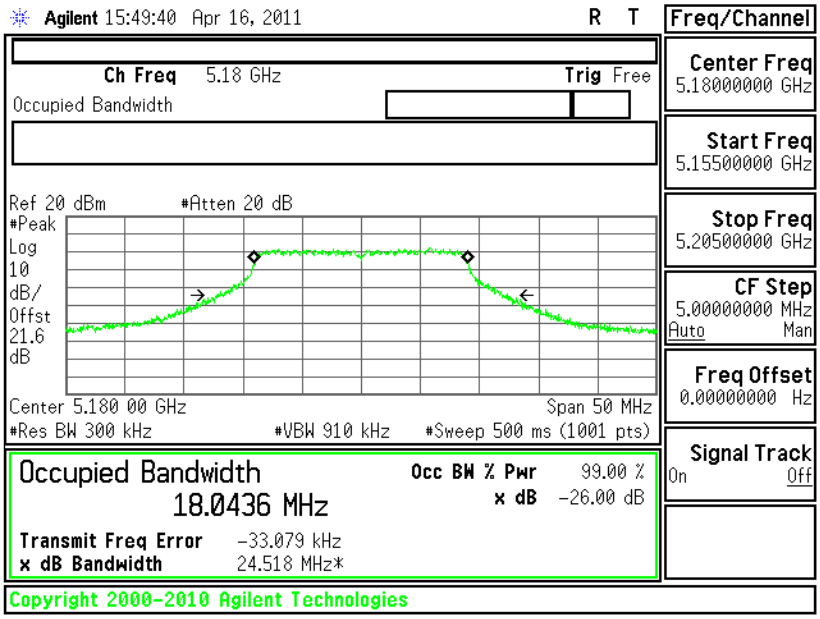
26 dB & 99% Bandwidth Plot on 802.11n (BW 20MHz) Channel 36

- Chain B



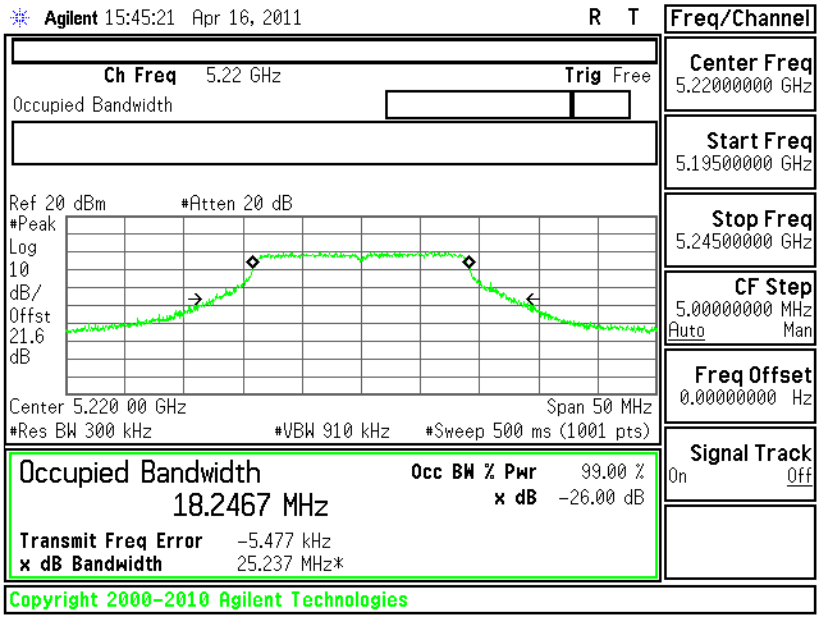
26 dB & 99% Bandwidth Plot on 802.11n (BW 20MHz) Channel 36

- Chain C



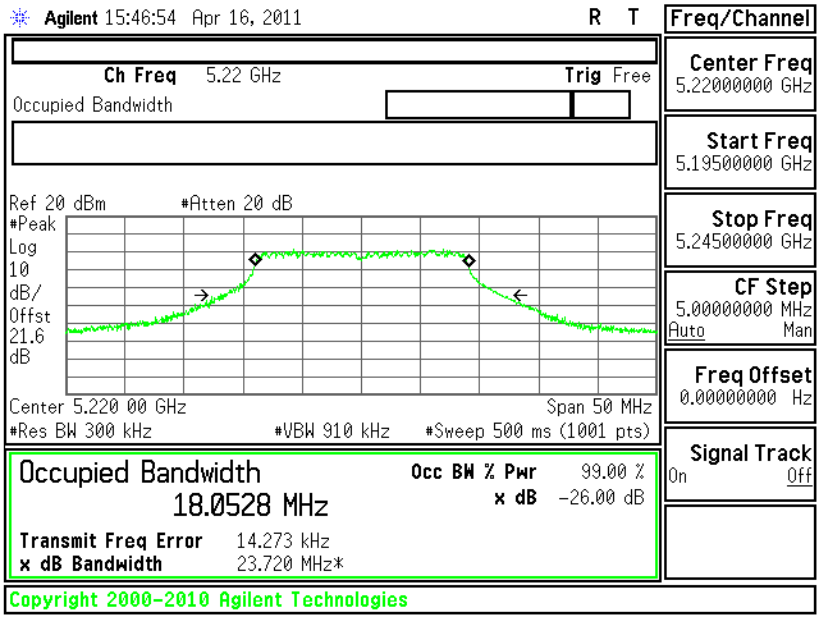
26 dB & 99% Bandwidth Plot on 802.11n (BW 20MHz) Channel 44

- Chain A



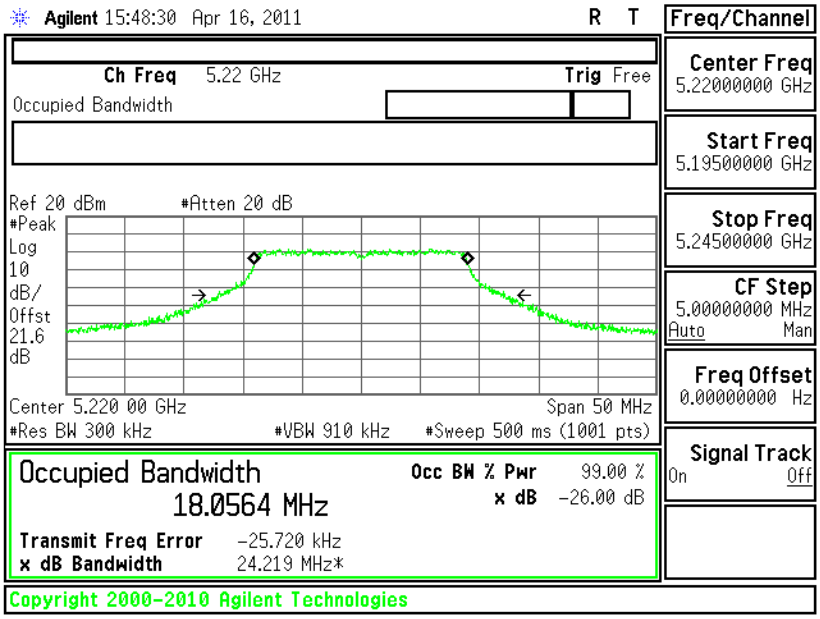
26 dB & 99% Bandwidth Plot on 802.11n (BW 20MHz) Channel 44

- Chain B



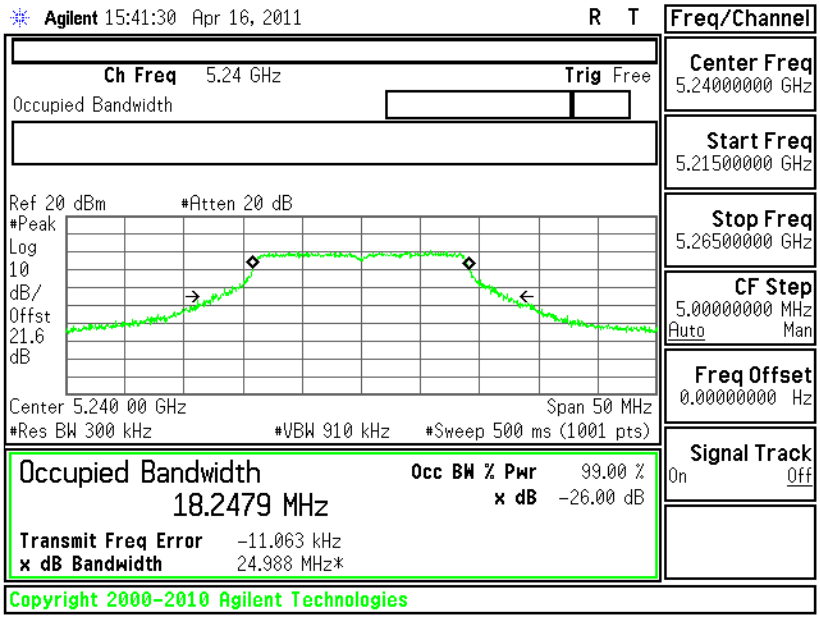
26 dB & 99% Bandwidth Plot on 802.11n (BW 20MHz) Channel 44

- Chain C



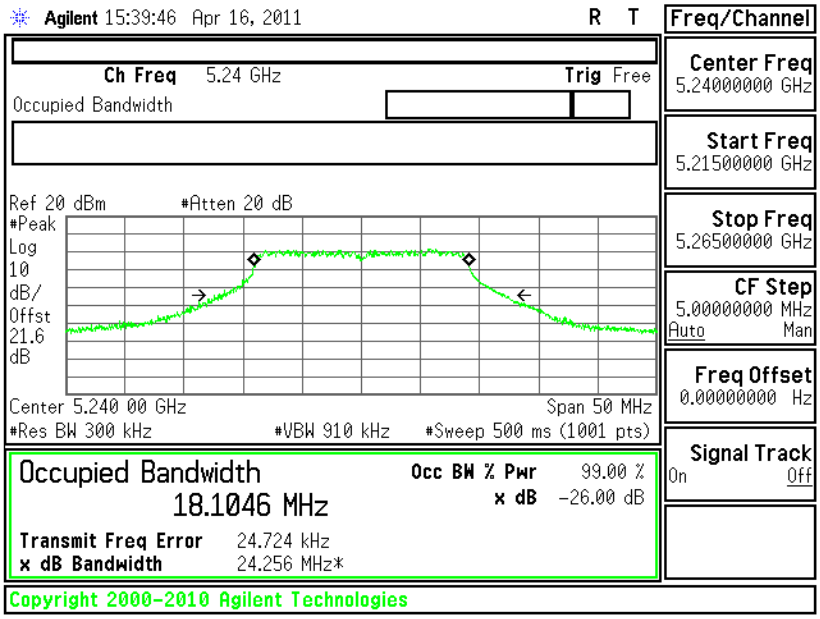
26 dB & 99% Bandwidth Plot on 802.11n (BW 20MHz) Channel 48

- Chain A



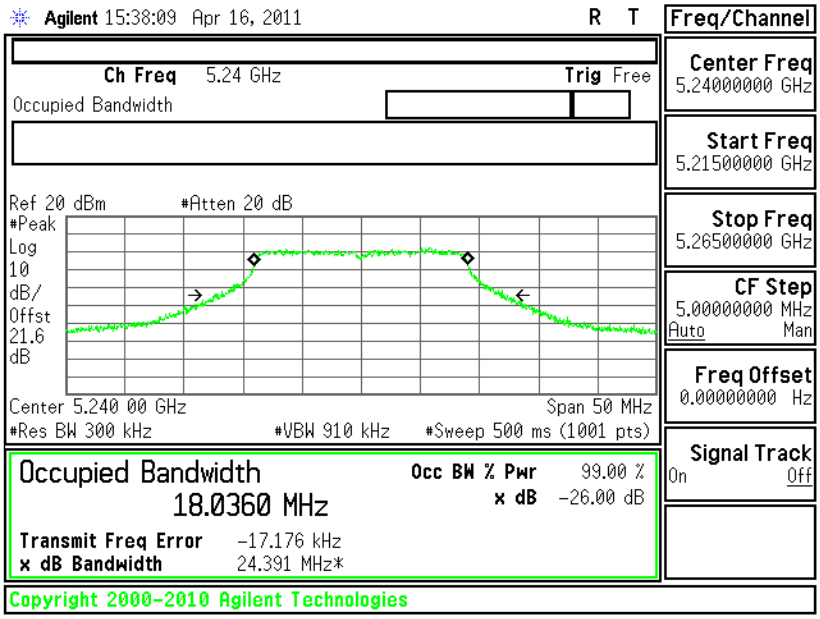
26 dB & 99% Bandwidth Plot on 802.11n (BW 20MHz) Channel 48

- Chain B



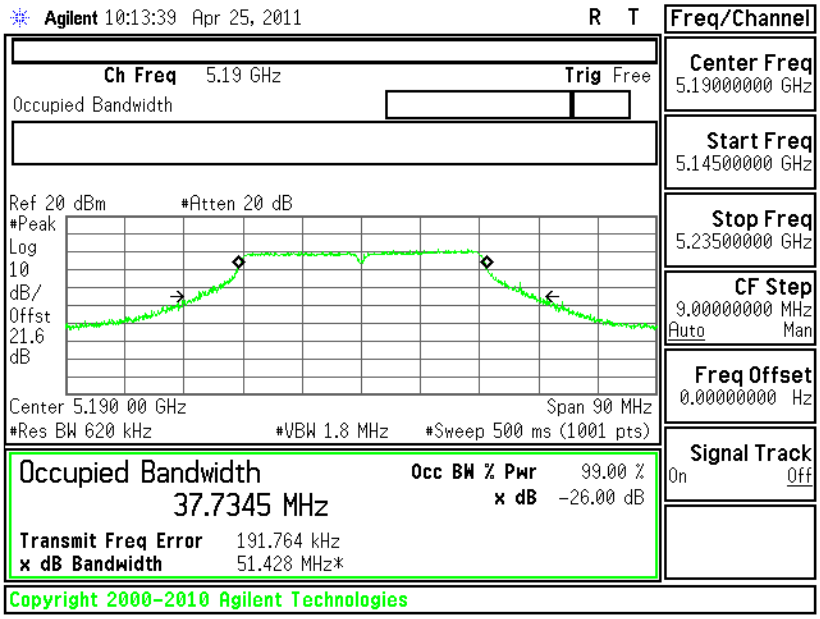
26 dB & 99% Bandwidth Plot on 802.11n (BW 20MHz) Channel 48

- Chain C



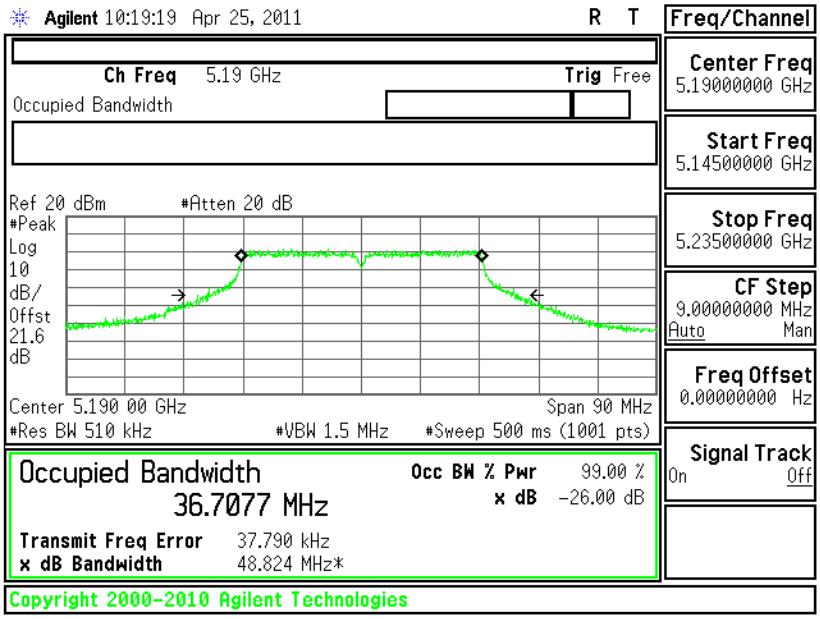
26 dB & 99% Bandwidth Plot on 802.11n (BW 40MHz) Channel 38

- Chain A



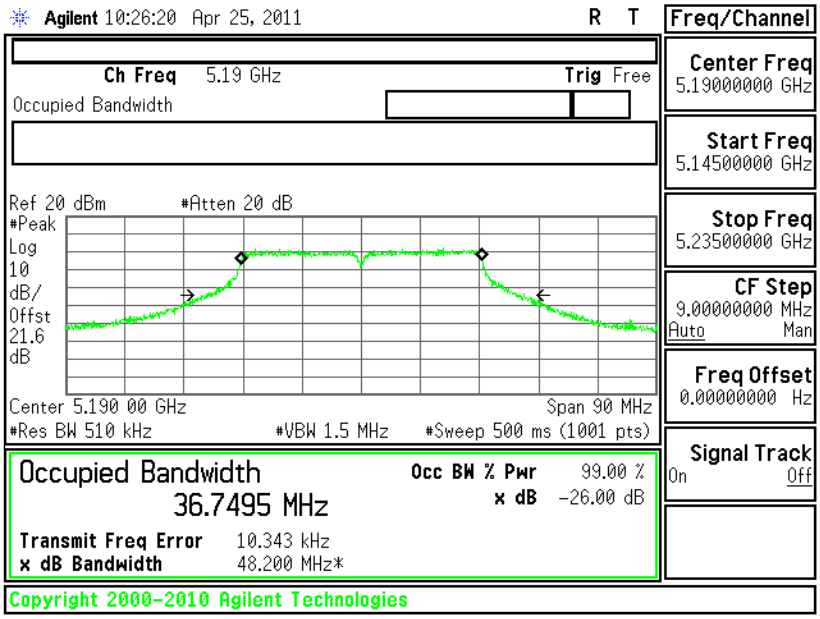
26 dB & 99% Bandwidth Plot on 802.11n (BW 40MHz) Channel 38

- Chain B



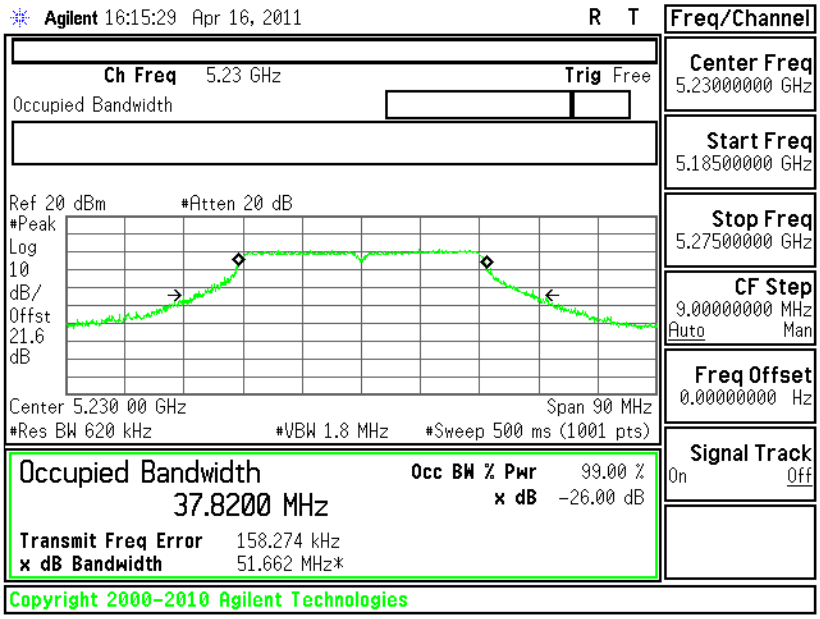
26 dB & 99% Bandwidth Plot on 802.11n (BW 40MHz) Channel 38

- Chain C



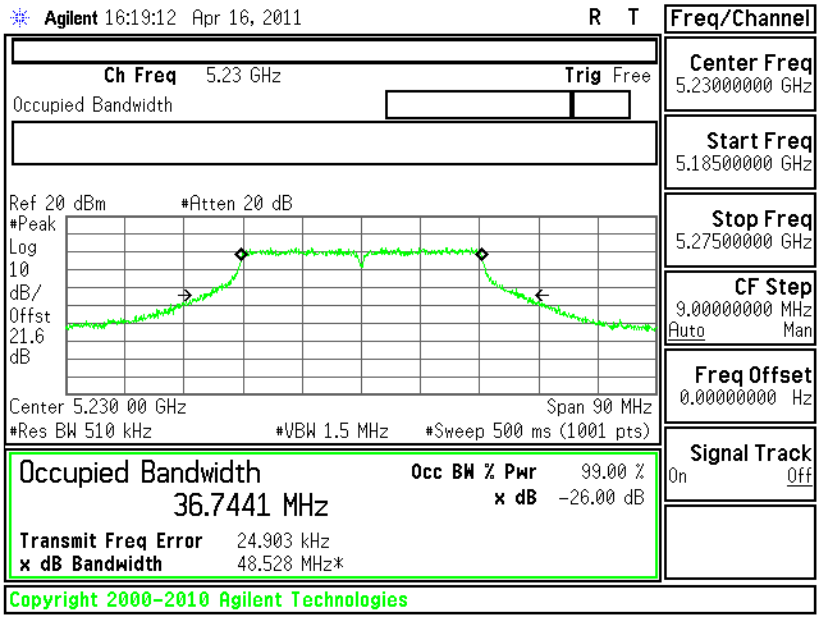
26 dB & 99% Bandwidth Plot on 802.11n (BW 40MHz) Channel 46

- Chain A



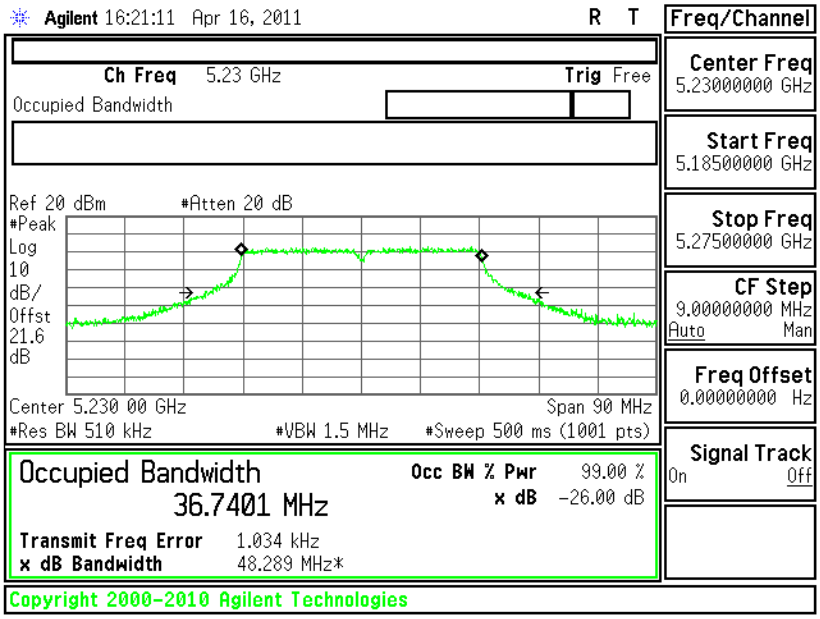
26 dB & 99% Bandwidth Plot on 802.11n (BW 40MHz) Channel 46

- Chain B



26 dB & 99% Bandwidth Plot on 802.11n (BW 40MHz) Channel 46

- Chain C



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.

For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power shall not exceed the lesser of 250 mW (24dBm) or 11 dBm + 10log B. 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.

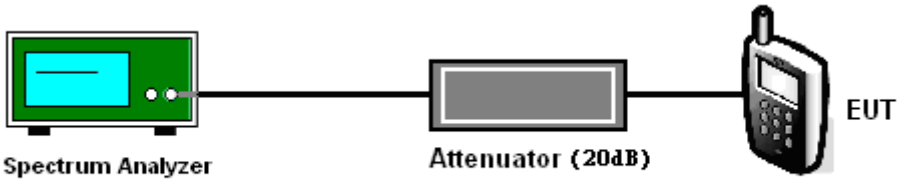
3.2.3 Test Procedures

1. The testing follows FCC Public Notice DA 02-2138 (Measurement Guidelines of UNII).
   Method #1:
   - Set span to encompass the entire emission bandwidth (EBW) of the signal.
   - Set RBW = 1 MHz.
   - Set VBW ≥ 3 MHz.
   - Use sample detector mode
   - Use a video trigger with the trigger level set to enable triggering only on full power pulses. Transmitter must operate at full control power for entire sweep of every sweep.
   - Trace average 100 traces in power averaging mode.
   - Compute power by integrating the spectrum across the 26 dB EBW of the signal.
2. The RF output of EUT was connected to the spectrum analyzer by a low loss cable.
3. The cable loss (1.8 dB) and attenuator loss (20 dB) are normalized / entered in to the Spectrum Analyzer as an offset as below examples,
   (1) For SISO mode,
   <Antenna 1 for 4.5V>: For 802.11a Channel 36 Chain A, the final power in test report is 15.30 dBm which is the reading of spectrum analyzer with offseted cable loss (1.8 dB), and attenuator loss (20 dB).

(2) For MIMO mode, each chain was measured individually and calculated with the formula of 10*LOG (10^ (chain A/10) + 10^ (chain B/10)).
<Antenna 1 for 4.5V>: For 802.11a Channel 36 Chain A+B: the total final power is 14.82 dBm from the formula of 10*LOG (10^ (11.27 dBm/10) + 10^ (12.29 dBm/10)).
(a) Plot: Conducted Output Power on 802.11a Channel 36 - Chain A+B (A): 11.27 dBm
(b) Plot: Conducted Output Power on 802.11a Channel 36 - Chain A+B (B): 12.29 dBm.
Each plots has already offseted with cable loss (1.8 dB), and attenuator loss (20 dB).

4. When the radio transmitter enables both transmit chains, the power on each chain is reduced below when only chain A or chain B is enabled.
5. Measure the power and record it.

3.2.4 Test Setup



3.2.5 Test Result of Conducted Output Power

Test Mode :	Mode 1~3	Temperature :	24~26℃
Test Engineer :	Alan Liu	Relative Humidity :	40~44%

Channel	Frequency (MHz)	Date Rate	Power Setting	802.11a (Chain A) Measured Output Power (dBm)	Max. Limits (dBm)	Pass/Fail
36	5180	6	15	14.46	17	Pass
44	5220	6	15.5	14.02	17	Pass
48	5240	6	15.5	14.73	17	Pass

Test Mode :	Mode 4~6	Temperature :	24~26℃
Test Engineer :	Alan Liu	Relative Humidity :	40~44%

Channel	Frequency (MHz)	Date Rate	Power Setting	802.11n (BW 20MHz, Chain A+B+C) Measured Output Power (dBm)				Max. Limits (dBm)	Pass/Fail
				Chain A	Chain B	Chain C	Total Power		
36	5180	MCS16	10.5	8.91	9.58	9.84	14.23	17	Pass
44	5220	MCS16	10.5	8.68	9.21	10.11	14.15	17	Pass
48	5240	MCS16	10	8.89	9.08	9.65	13.99	17	Pass

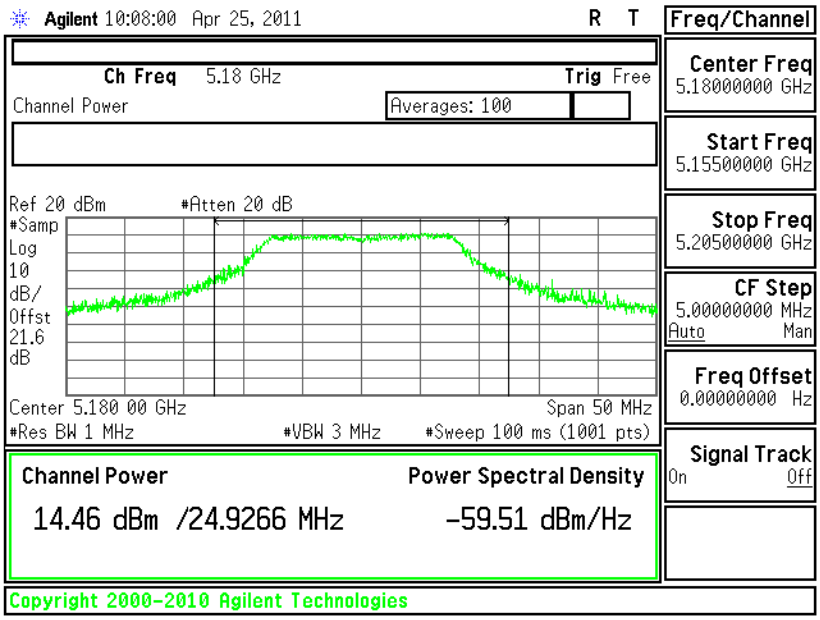
Note: Each chain was measured individually and calculated with the formula of 10*LOG (10^ (chain A/10) + 10^ (chain B/10) + 10^ (chain C/10)).

Test Mode :	Mode 7~8	Temperature :	24~26℃
Test Engineer :	Alan Liu	Relative Humidity :	40~44%

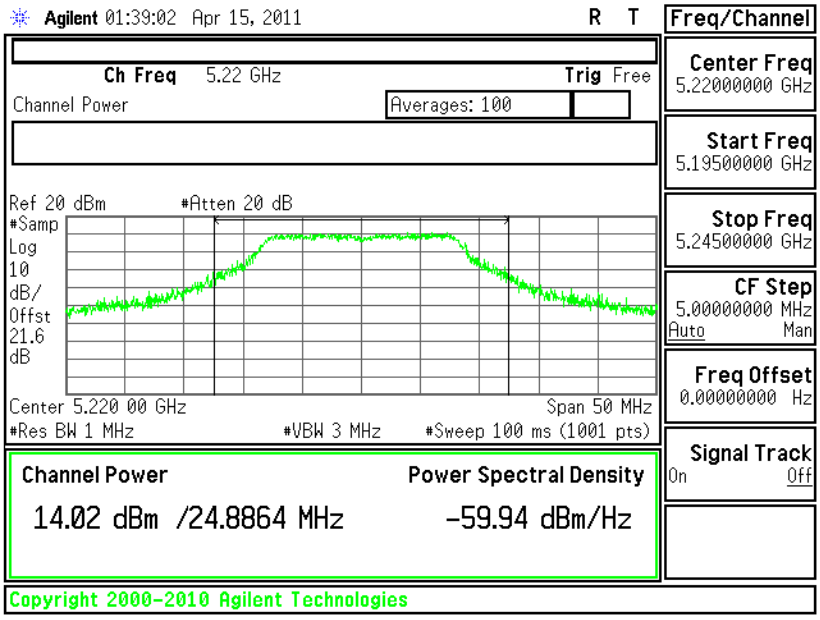
Channel	Frequency (MHz)	Date Rate	Power Setting	802.11n (BW 40MHz, Chain A+B) Measured Output Power (dBm)				Max. Limits (dBm)	Pass/Fail
				Chain A	Chain B	Chain C	Total Power		
38	5190	MCS16	9.5	8.96	8.69	9.23	13.74	17	Pass
46	5230	MCS16	11	9.30	9.71	10.63	14.69	17	Pass

Note: Each chain was measured individually and calculated with the formula of 10*LOG (10^ (chain A/10) + 10^ (chain B/10) + 10^ (chain C/10)).

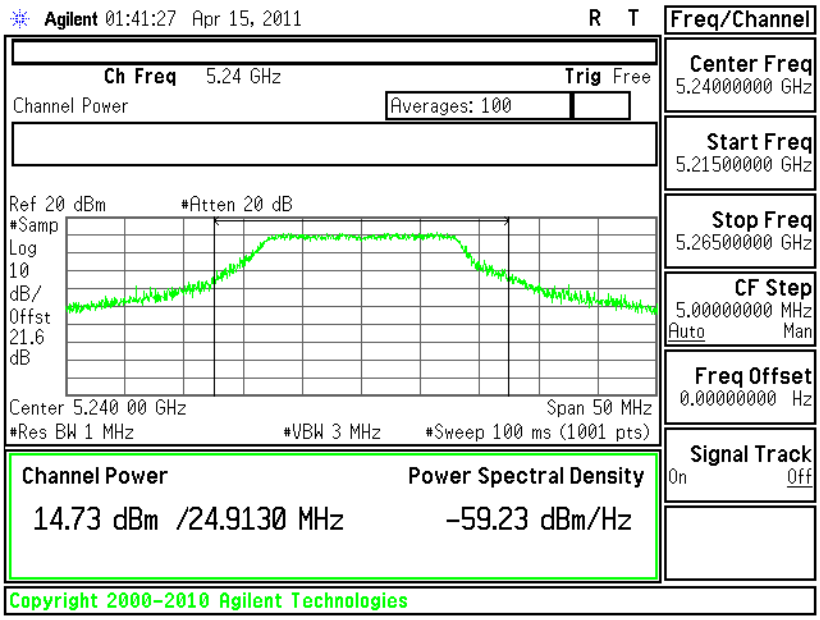
Conducted Output Power on 802.11a Channel 36 - Chain A



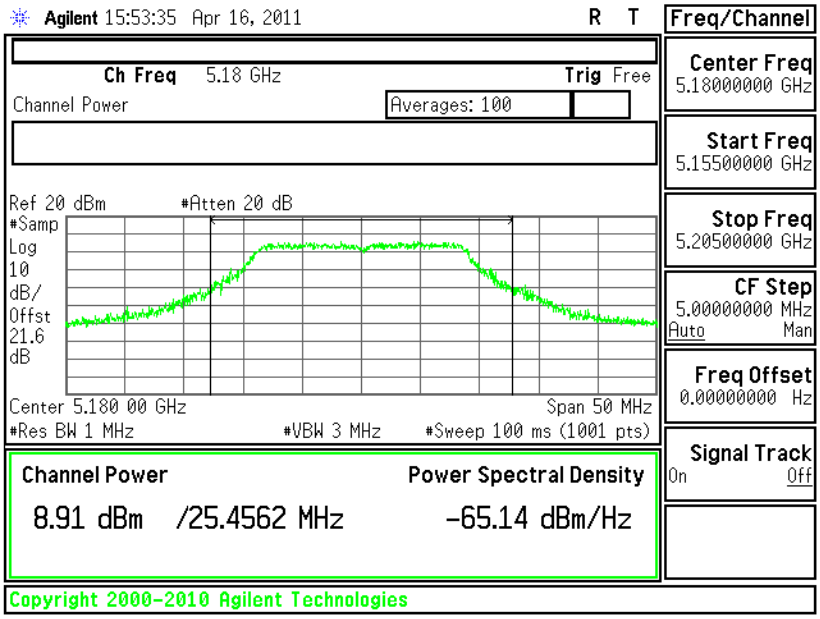
Conducted Output Power on 802.11a Channel 44 - Chain A



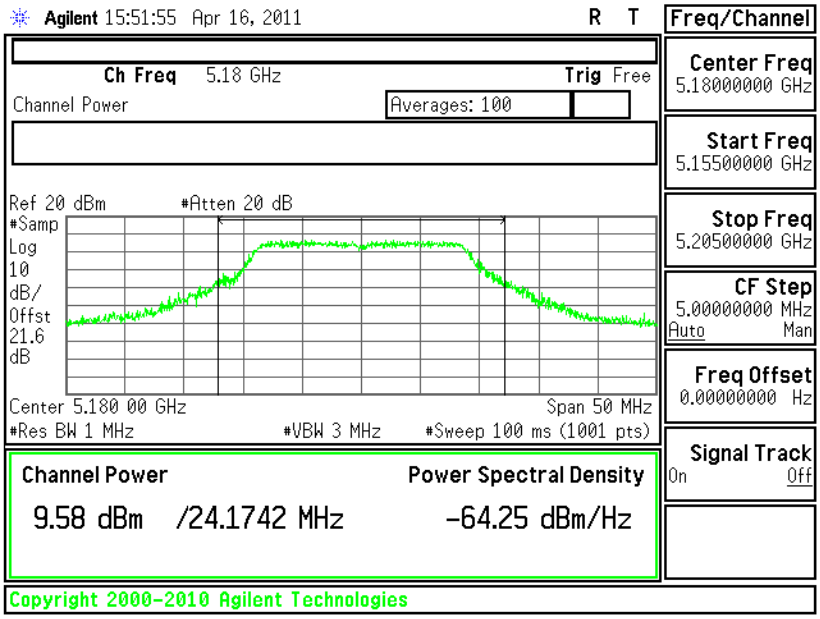
Conducted Output Power on 802.11a Channel 48 - Chain A



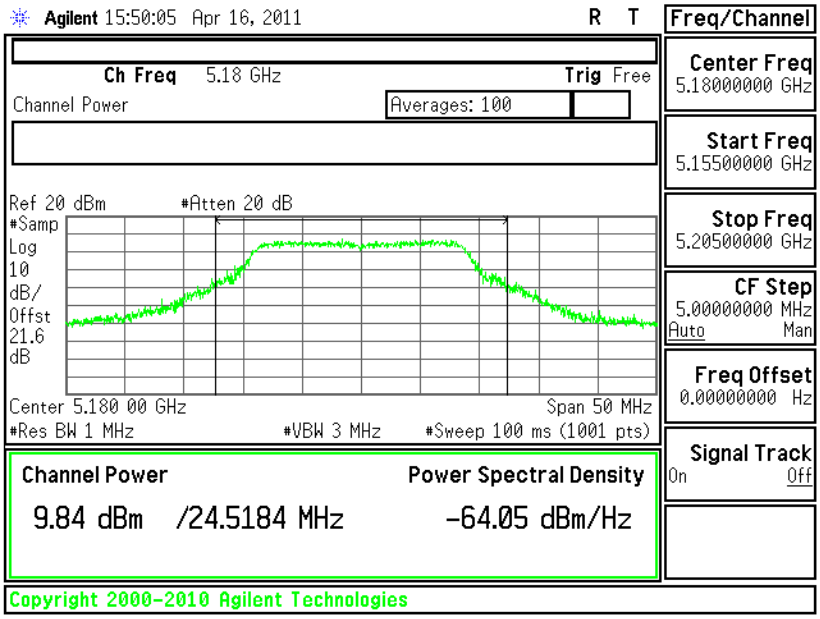
Conducted Output Power on 802.11n (BW 20MHz) Channel 36 - Chain A



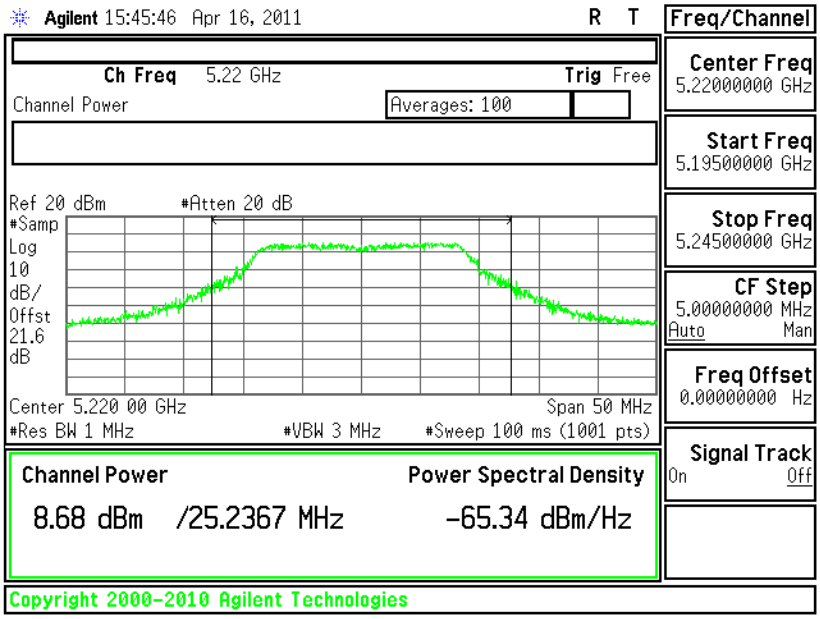
Conducted Output Power on 802.11n (BW 20MHz) Channel 36 - Chain B



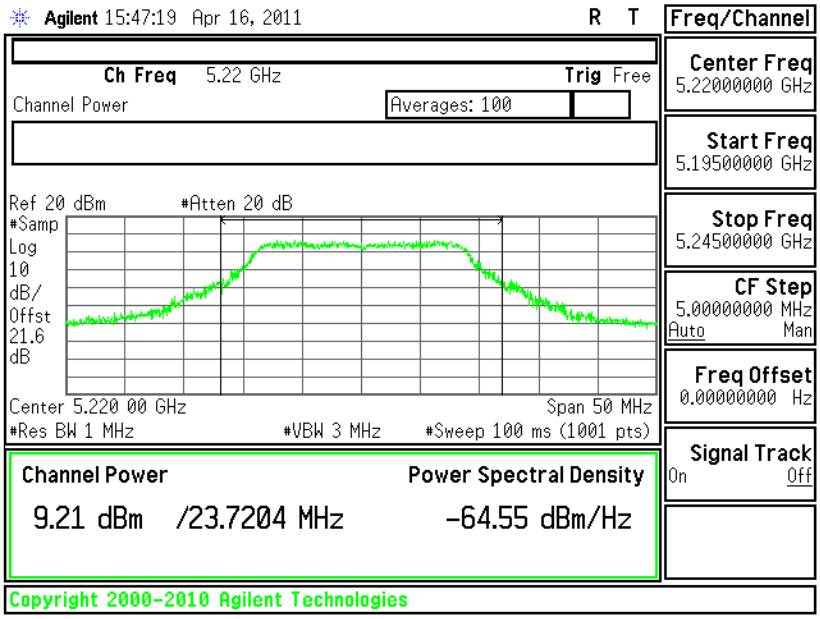
Conducted Output Power on 802.11n (BW 20MHz) Channel 36 - Chain C



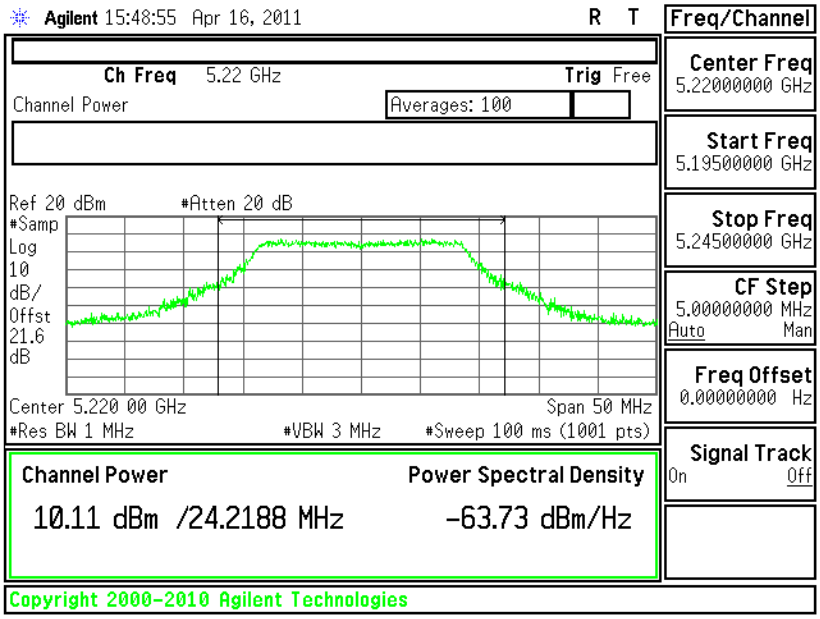
Conducted Output Power on 802.11n (BW 20MHz) Channel 44 - Chain A



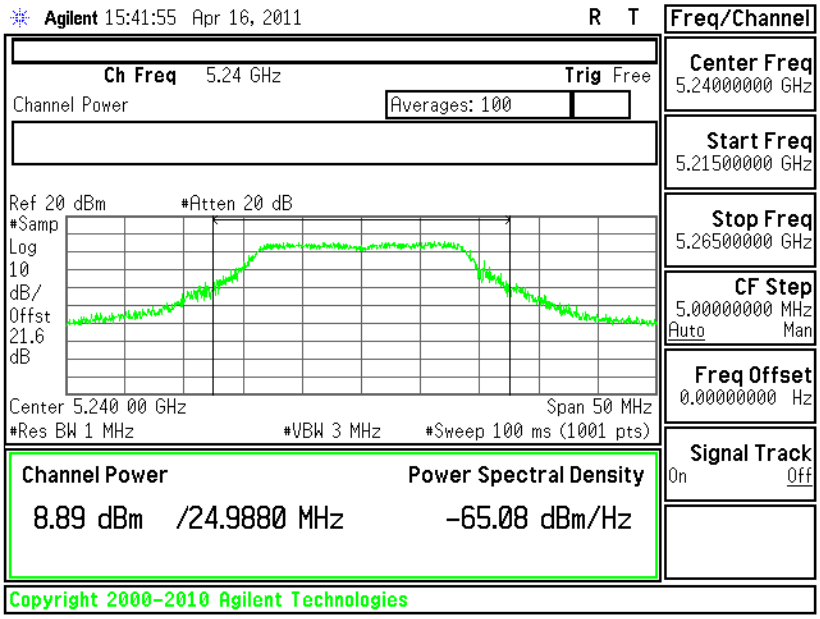
Conducted Output Power on 802.11n (BW 20MHz) Channel 44 - Chain B



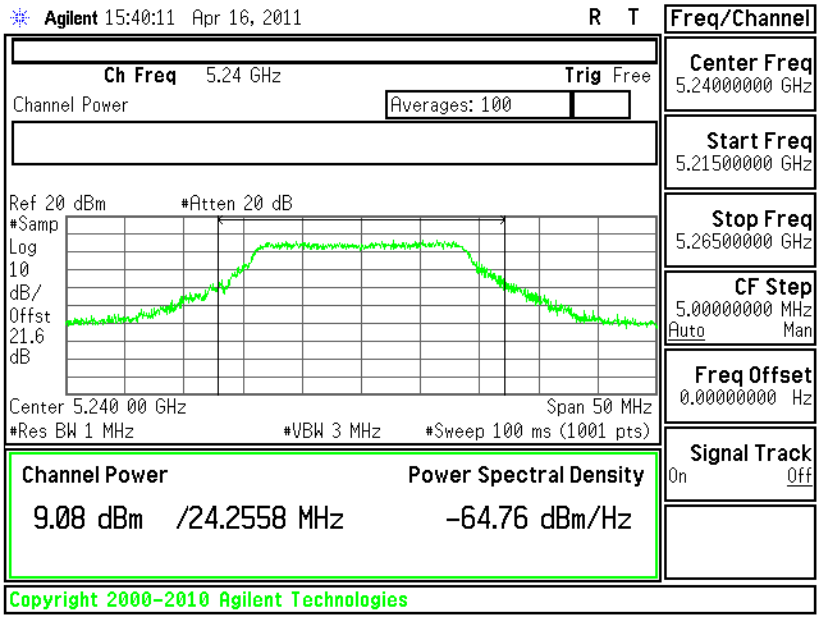
Conducted Output Power on 802.11n (BW 20MHz) Channel 44 – Chain C



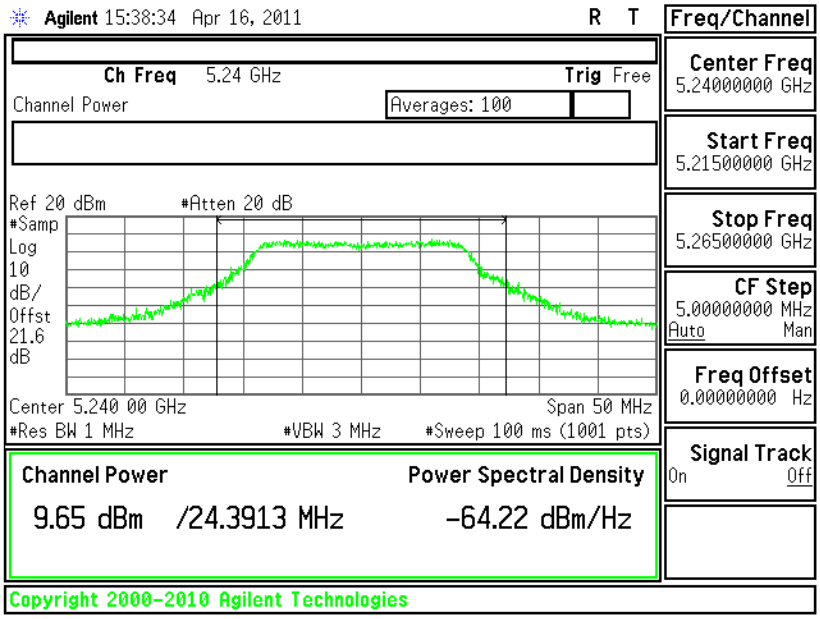
Conducted Output Power on 802.11n (BW 20MHz) Channel 48 - Chain A



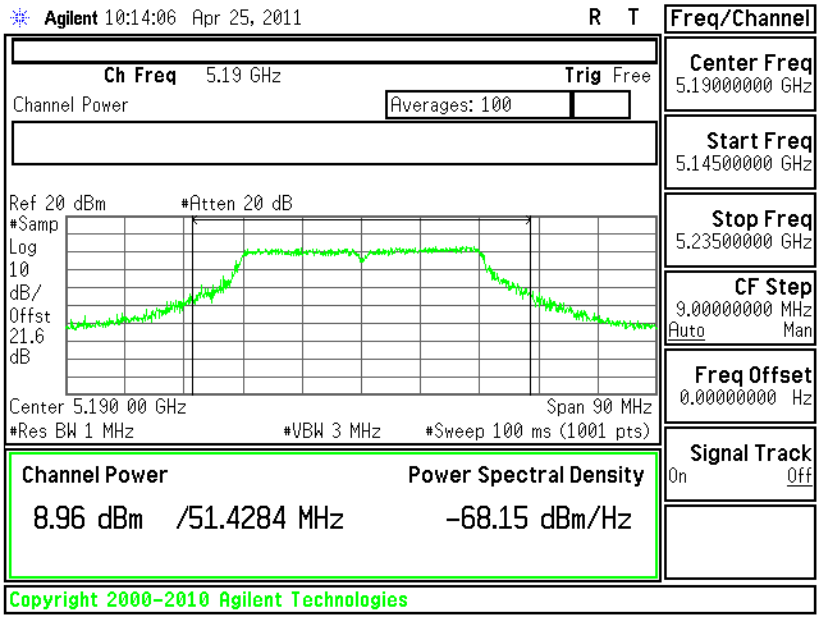
Conducted Output Power on 802.11n (BW 20MHz) Channel 48 - Chain B



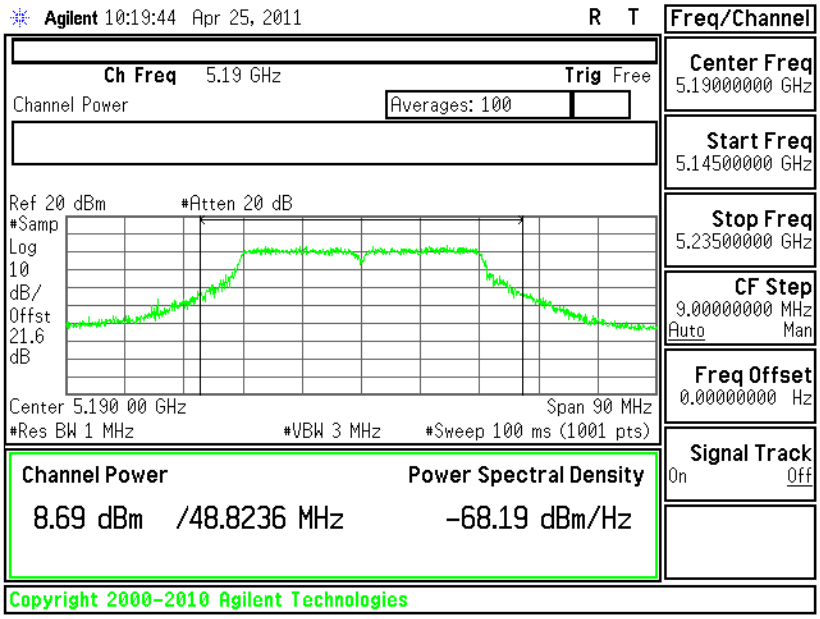
Conducted Output Power on 802.11n (BW 20MHz) Channel 48 - Chain C



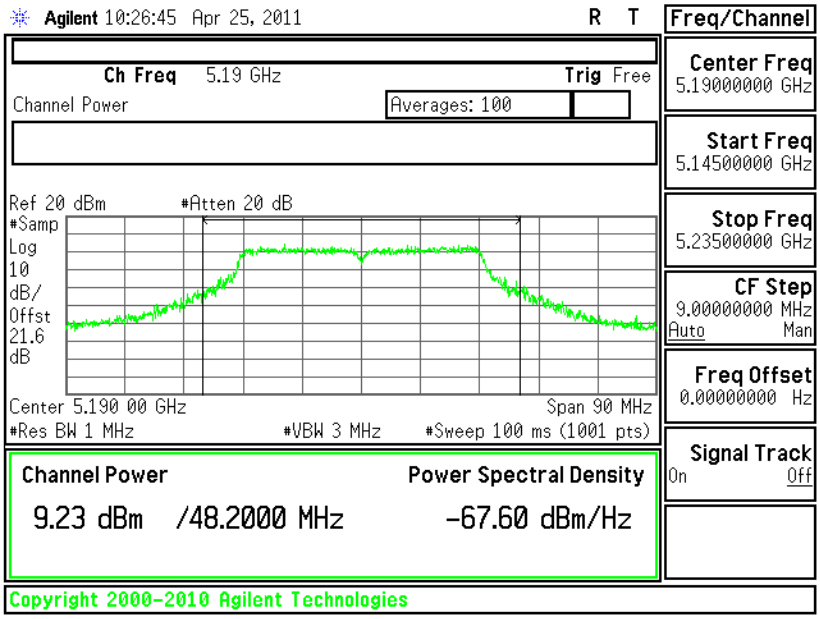
Conducted Output Power on 802.11n (BW 40MHz) Channel 38 - Chain A



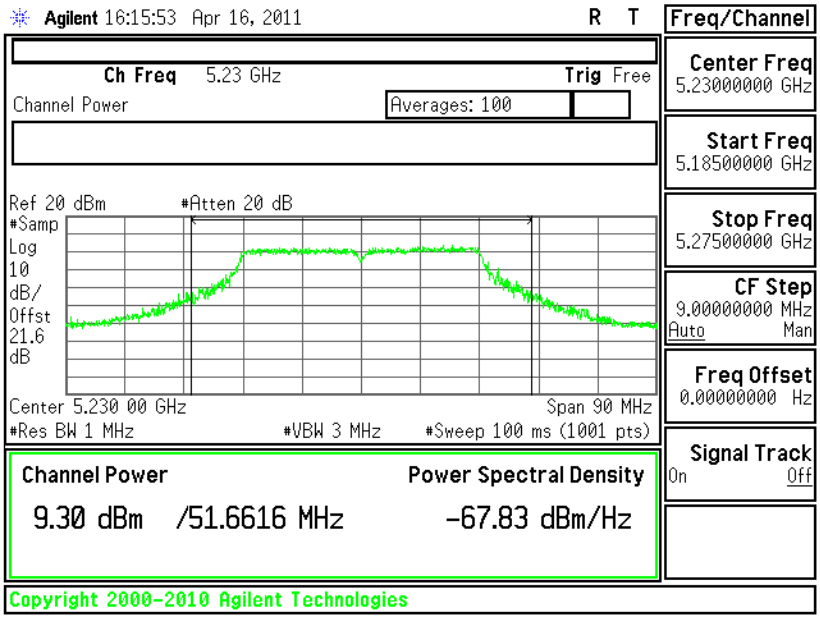
Conducted Output Power on 802.11n (BW 40MHz) Channel 38 - Chain B



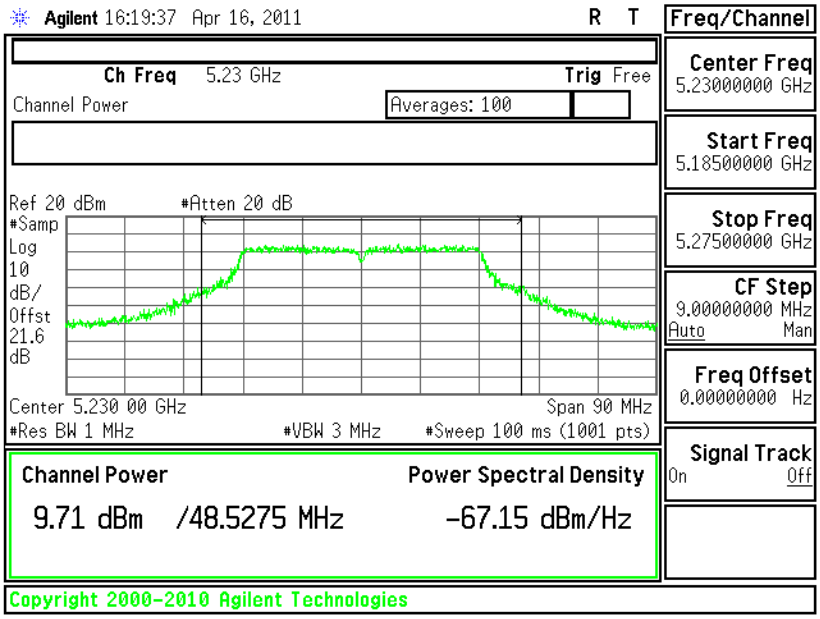
Conducted Output Power on 802.11n (BW 40MHz) Channel 38 - Chain C



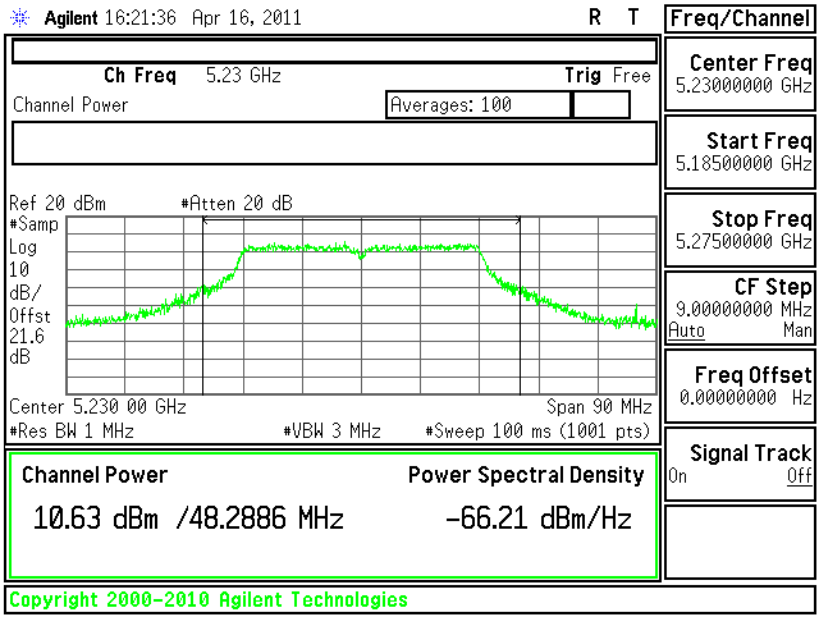
Conducted Output Power on 802.11n (BW 40MHz) Channel 46 - Chain A



Conducted Output Power on 802.11n (BW 40MHz) Channel 46 - Chain B



Conducted Output Power on 802.11n (BW 40MHz) Channel 46 - Chain C



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. For the 5.25–5.35 GHz and 5.47–5.725 GHz bands, the peak power spectral density shall not exceed 11 dBm in any 1 MHz 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.

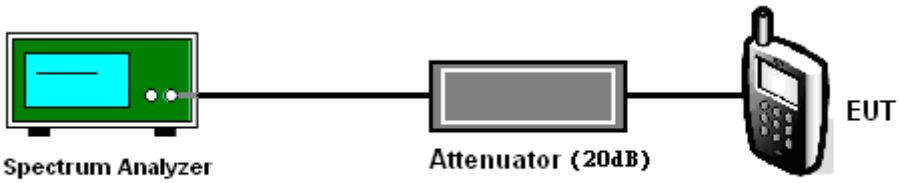
3.3.2 Measuring Instruments

See list of measuring instruments of this test report.

3.3.3 Test Procedures

1. The transmitter output is connected to the spectrum analyzer. According to the method 2 of DA-02-2138, the resolution bandwidth is set to 1 MHz, video bandwidth is 3MHz, trace average 100 traces in power averaging mode, and sample detection is used, and the analyzer is set for video averaging.
2. The RF output of EUT was connected to the spectrum analyzer by a low loss cable.
3. The cable loss (1.8 dB) and attenuator loss (20 dB) are normalized / entered in to the Spectrum Analyzer as an offset as below examples,
   (1) For SISO mode,
   For 802.11a Channel 36 Chain A, the final power in test report is 3.50 dBm which is the reading of spectrum analyzer with offseted cable loss (1.8 dB), and attenuator loss (20 dB).
   (2) For MIMO mode, each chain was measured individually and calculated with the formula of 10*LOG (10^ (chain A/10) + 10^ (chain B/10)).
   For 802.11a Channel 36 Chain A+B: the total final power is 3.59 dBm from the formula of 10*LOG (10^ (0.54 dBm/10) + 10^ (0.62 dBm/10)).
   (a) Plot: PSD Plot on 802.11a Channel 36 - Chain A+B (A): 0.54 dBm
   (b) Plot: PSD Plot on 802.11a Channel 36 - Chain A+B (B): 0.62 dBm.
4. Each plots has already offseted with cable loss (1.8 dB), and attenuator loss (20 dB).When the radio transmitter enables both transmit chains, the power on each chain is reduced below when only chain A or chain B is enabled.
5. Measure the power and record it.

3.3.4 Test Setup



3.3.5 Test Result of Power Spectral Density

Test Mode :	Mode 1~3	Temperature :	24~26℃
Test Engineer :	Alan Liu	Relative Humidity :	40~44%

Channel	Frequency (MHz)	802.11a Measured PSD (dBm)	Max. Limits (dBm)	Pass/Fail
		Chain A		
36	5180	3.843	4	Pass
44	5220	3.939	4	Pass
48	5240	3.874	4	Pass

Test Mode :	Mode 4~6	Temperature :	24~26℃
Test Engineer :	Alan Liu	Relative Humidity :	40~44%

Channel	Frequency (MHz)	802.11n (BW 20MHz, Chain A+B+C) Measured PSD (dBm)				Max. Limits (dBm)	Pass/Fail
		Chain A	Chain B	Chain C	Total (dBm)		
36	5180	-1.670	-1.413	-1.585	3.22	4	Pass
44	5220	-1.249	-1.695	-0.795	3.54	4	Pass
48	5240	-0.954	-1.762	-0.935	3.57	4	Pass

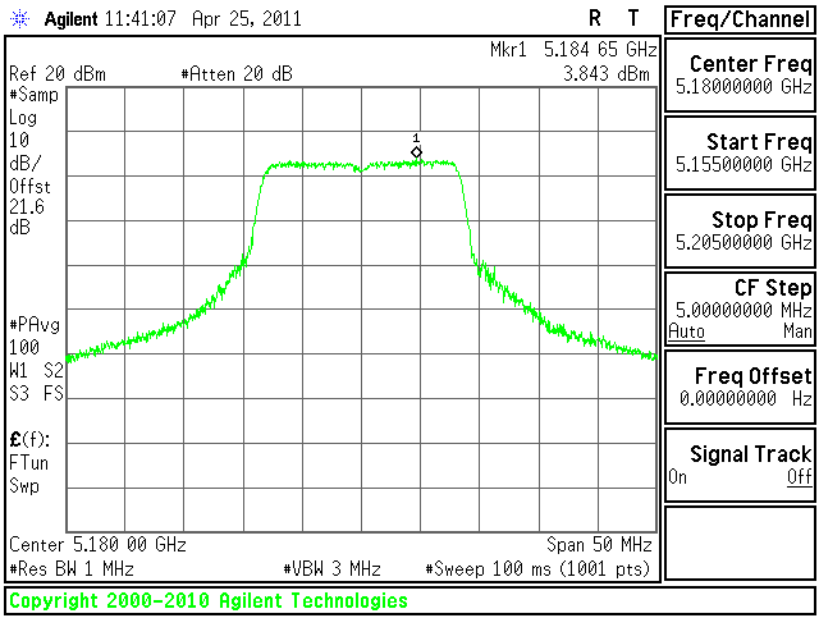
Note: Each chain was measured individually and calculated with the formula of 10*LOG (10^ (chain A/10) + 10^ (chain B/10) + 10^ (chain C/10)).

Test Mode :	Mode 7~8	Temperature :	24~26℃
Test Engineer :	Alan Liu	Relative Humidity :	40~44%

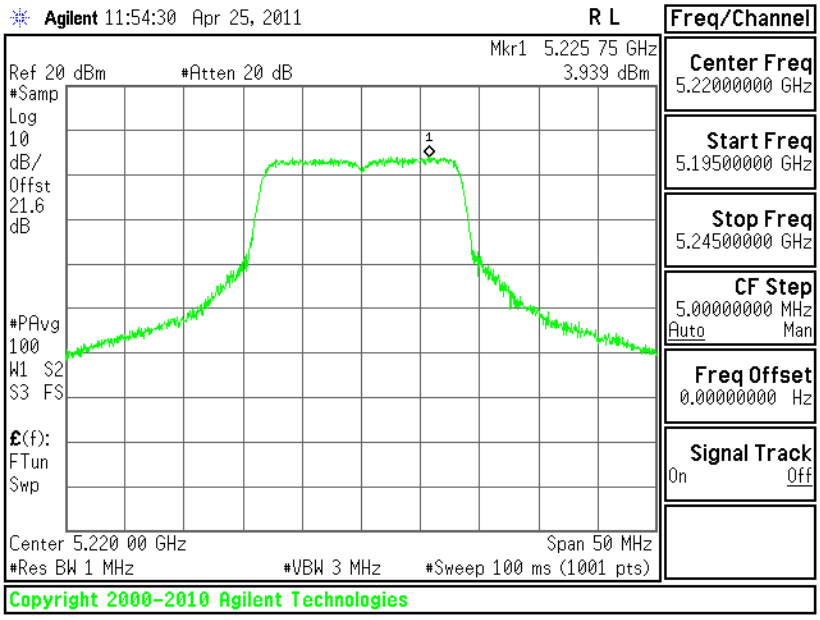
Channel	Frequency (MHz)	802.11n (BW 40MHz, Chain A+B+C) Measured PSD (dBm)				Max. Limits (dBm)	Pass/Fail
		Chain A	Chain B	Chain C	Total (dBm)		
38	5190	-4.456	-5.127	-4.689	0.02	4	Pass
46	5230	-2.543	-3.606	-3.370	1.62	4	Pass

Note: Each chain was measured individually and calculated with the formula of 10*LOG (10^ (chain A/10) + 10^ (chain B/10) + 10^ (chain C/10)).

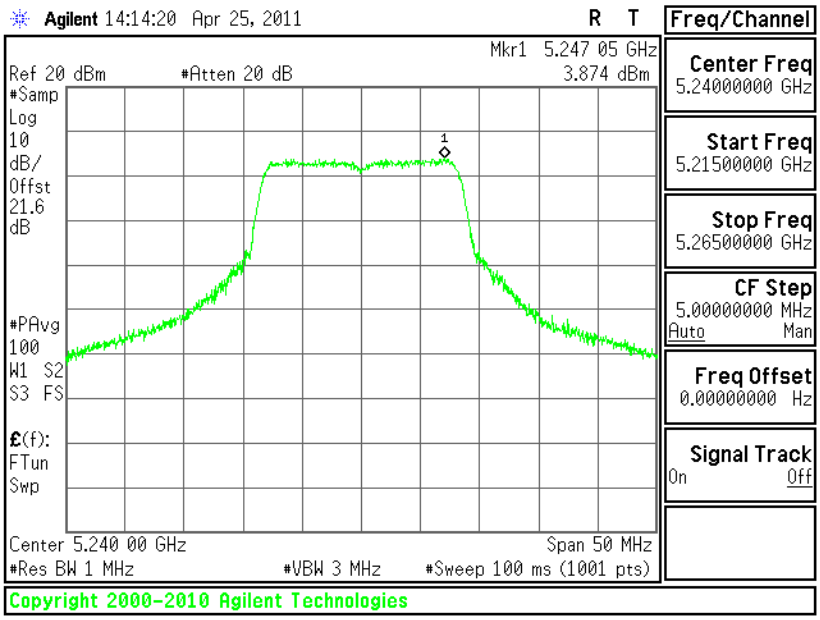
PSD Plot on 802.11a Channel 36 - Chain A



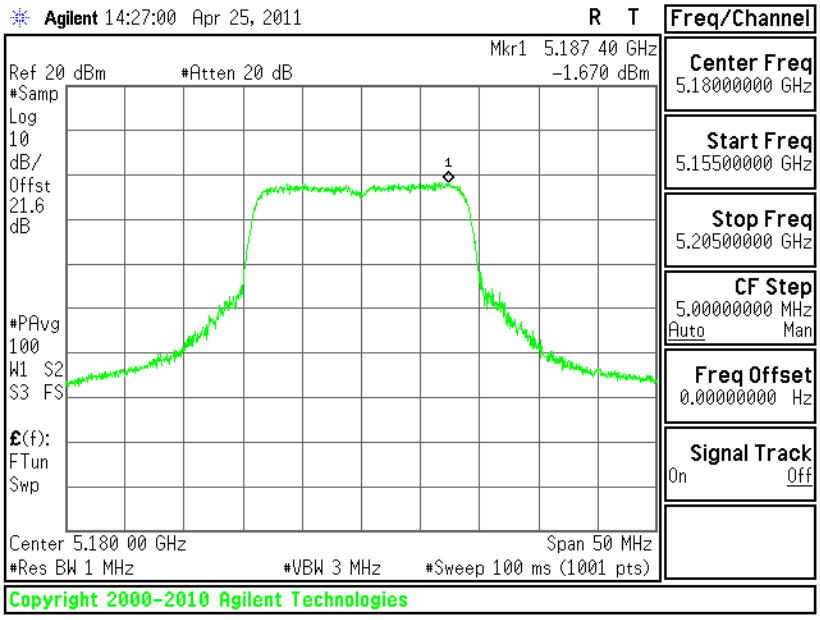
PSD Plot on 802.11a Channel 44 - Chain A



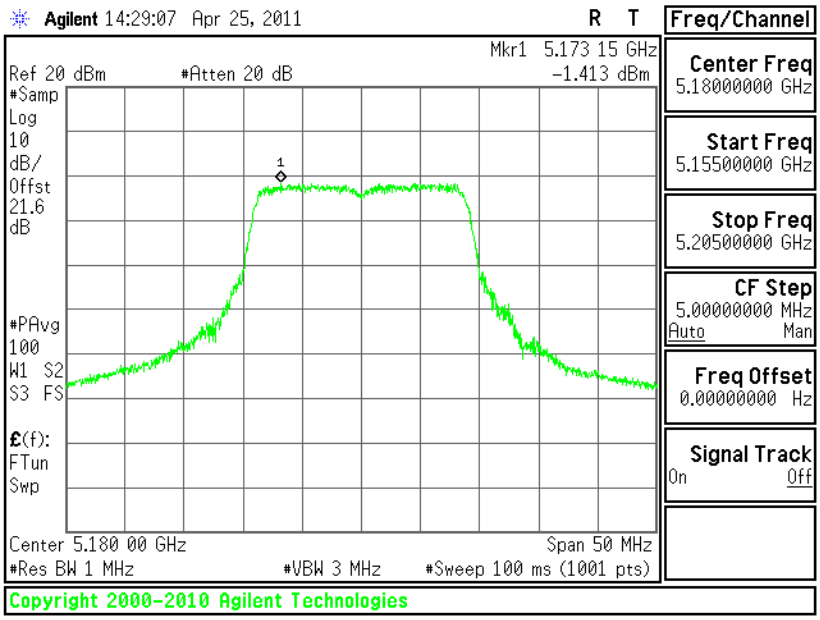
PSD Plot on 802.11a Channel 48 - Chain A



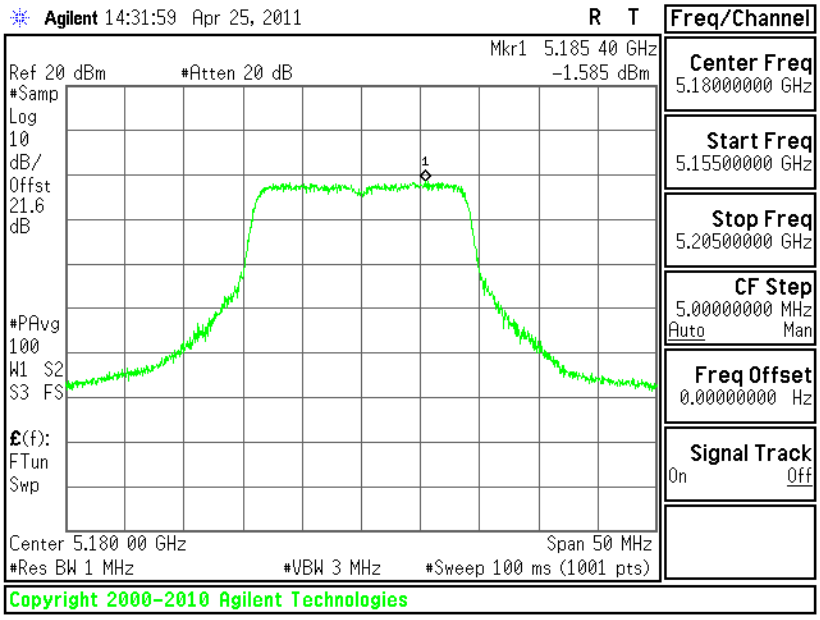
PSD Plot on 802.11n (BW 20MHz) Channel 36 - Chain A



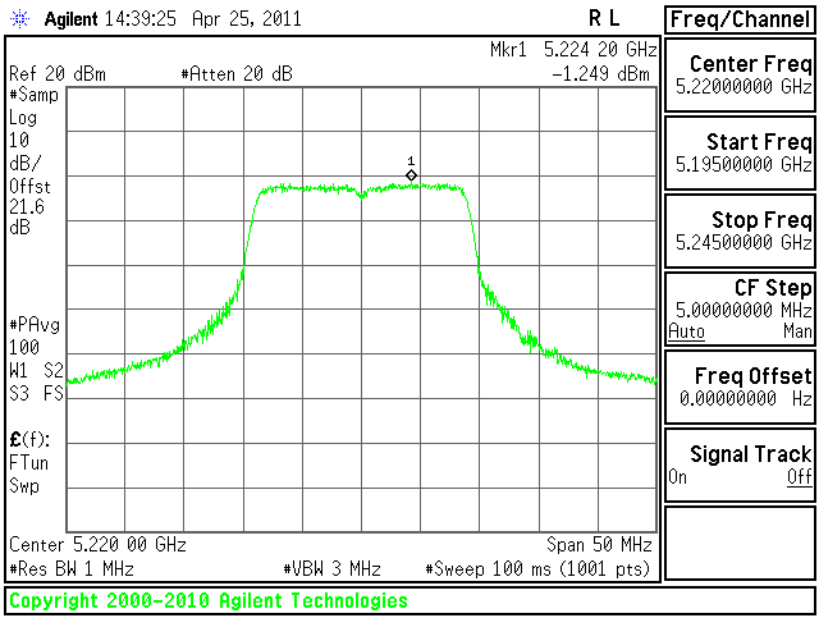
PSD Plot on 802.11n (BW 20MHz) Channel 36 - Chain B



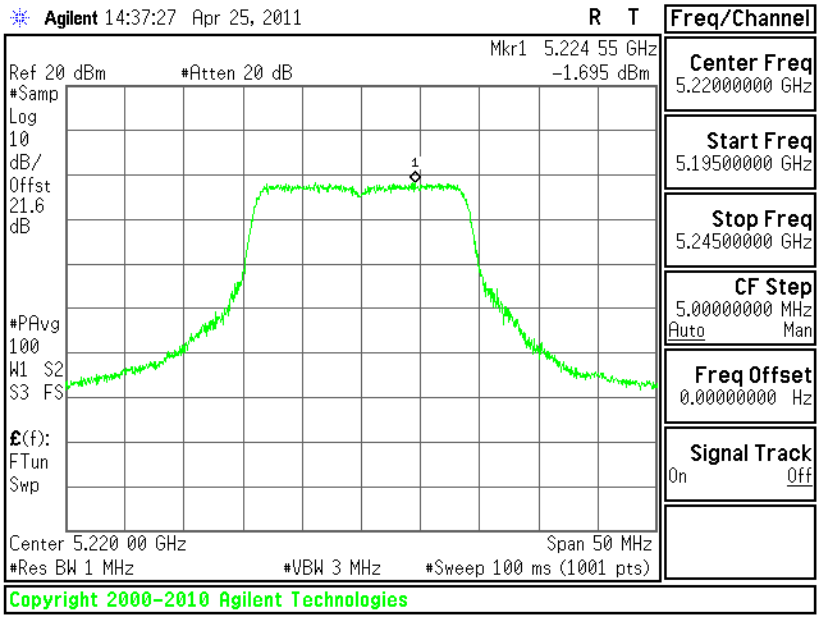
PSD Plot on 802.11n (BW 20MHz) Channel 36 - Chain C



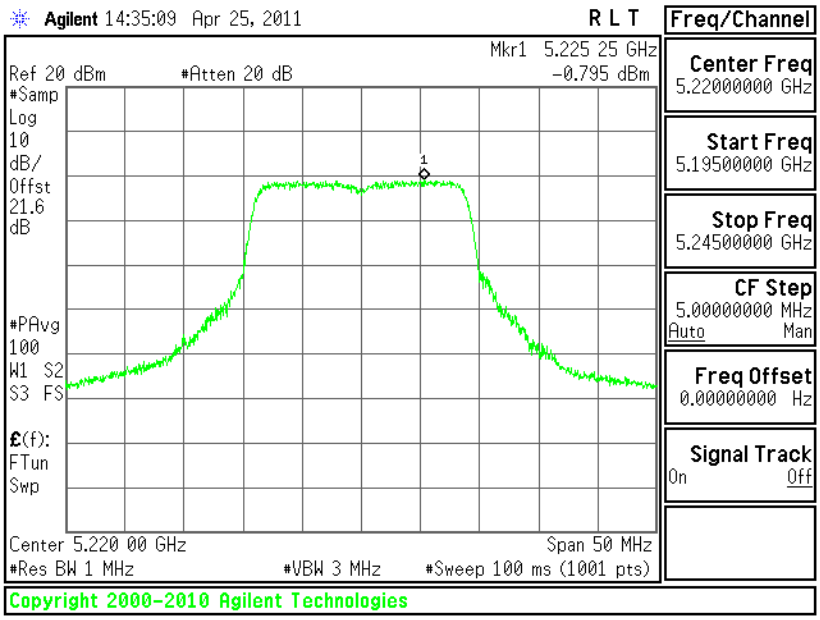
PSD Plot on 802.11n (BW 20MHz) Channel 44 - Chain A



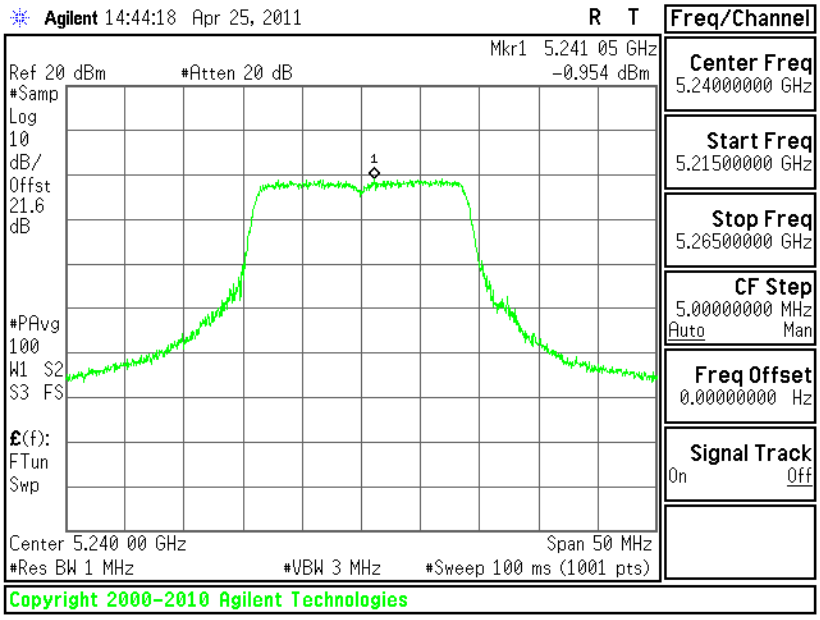
PSD Plot on 802.11n (BW 20MHz) Channel 44 - Chain B



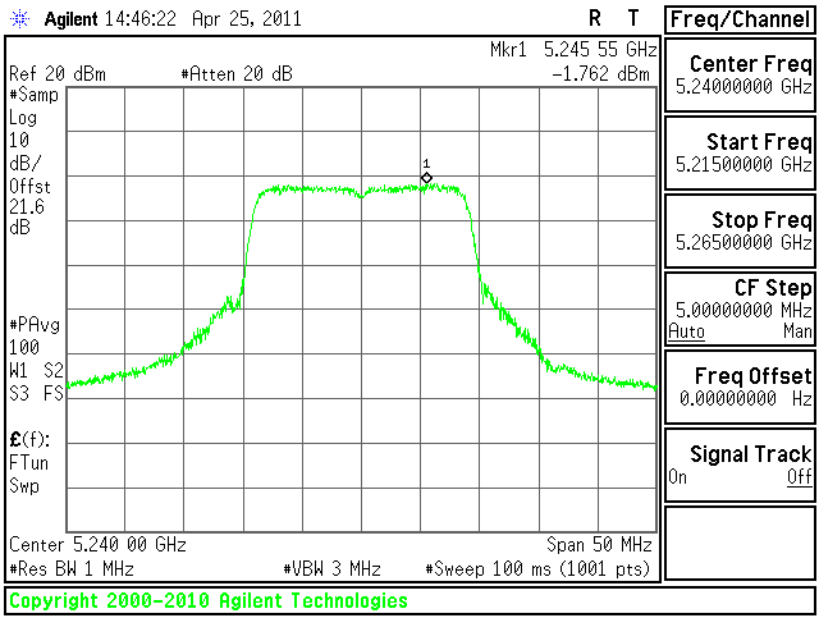
PSD Plot on 802.11n (BW 20MHz) Channel 44 - Chain C



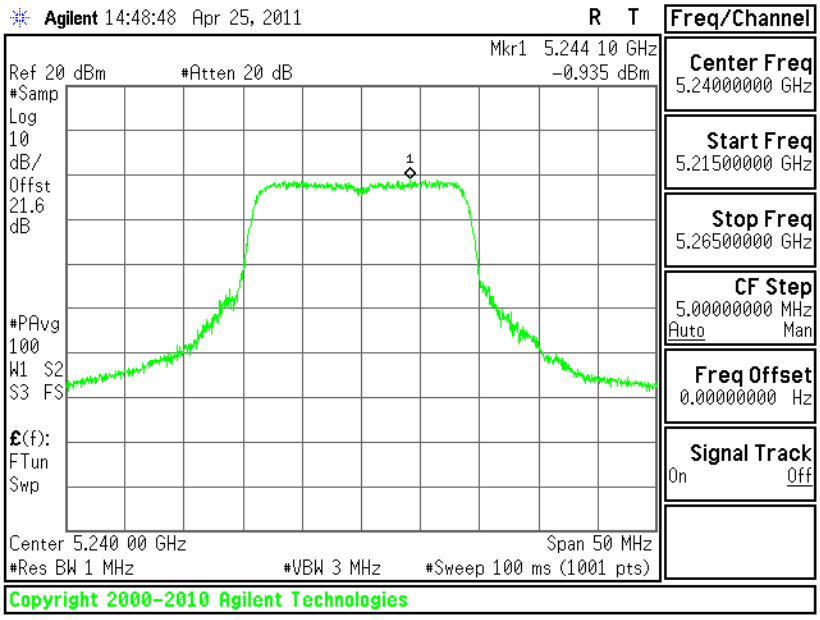
PSD Plot on 802.11n (BW 20MHz) Channel 48 - Chain A



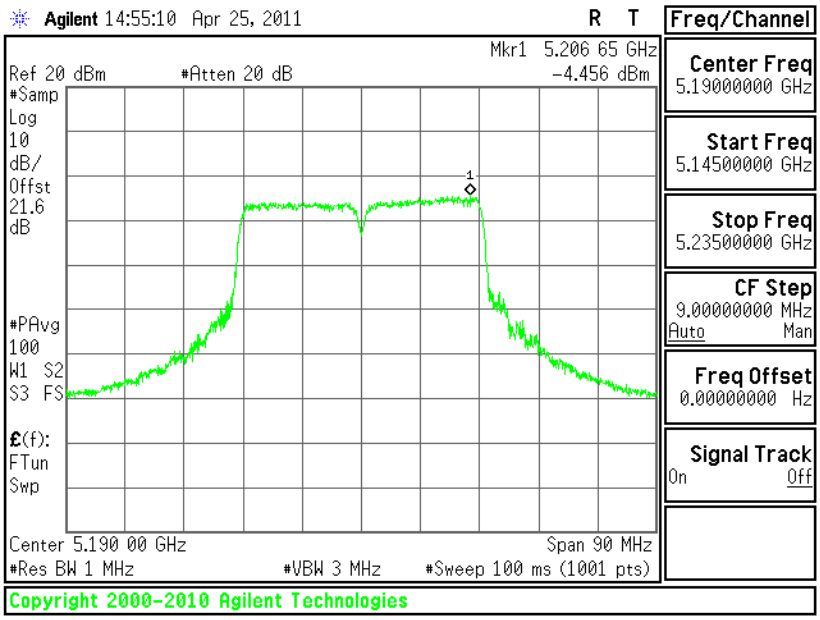
PSD Plot on 802.11n (BW 20MHz) Channel 48 - Chain B



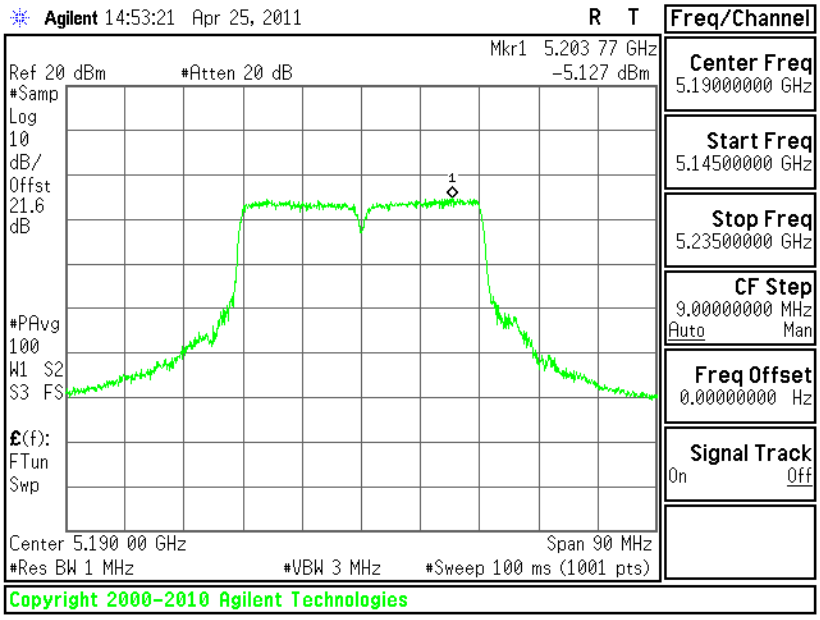
PSD Plot on 802.11n (BW 20MHz) Channel 48 - Chain C



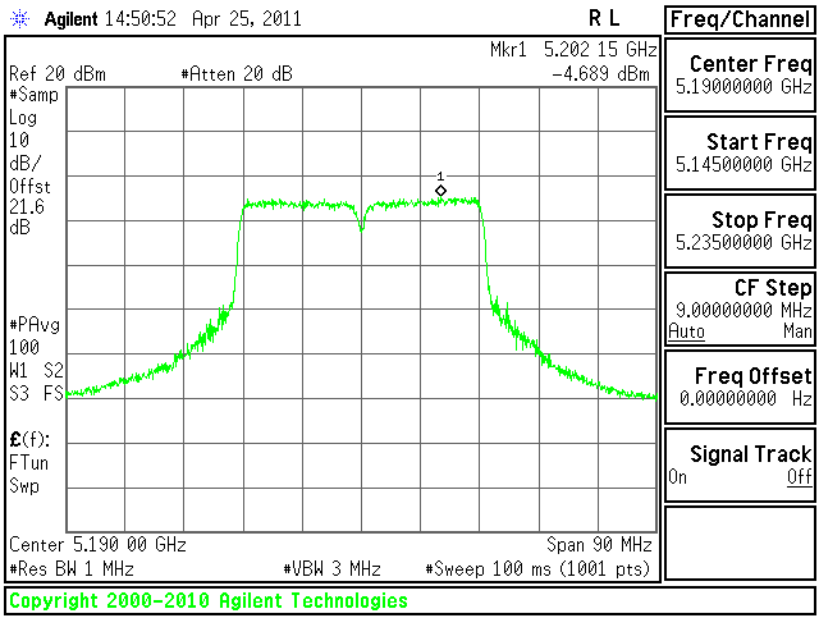
PSD Plot on 802.11n (BW 40MHz) Channel 38 - Chain A



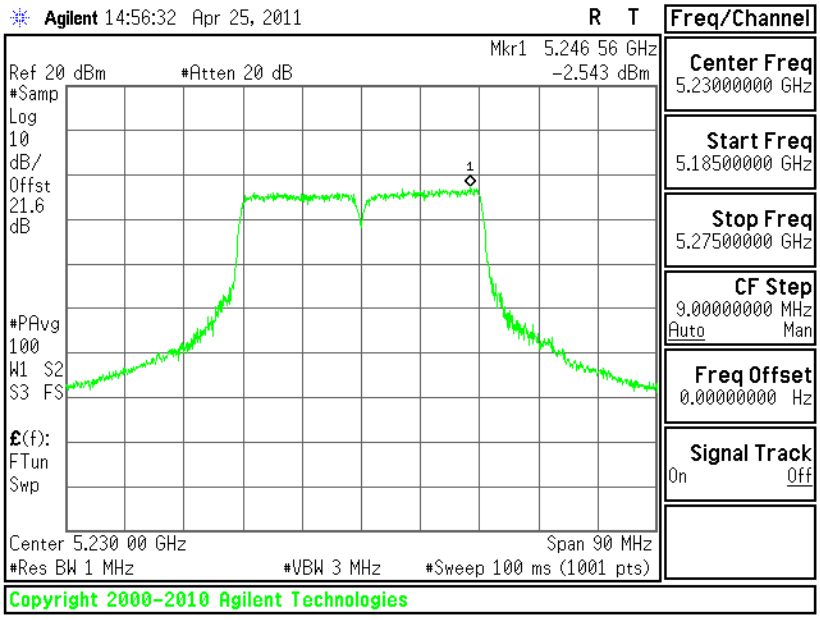
PSD Plot on 802.11n (BW 40MHz) Channel 38 - Chain B



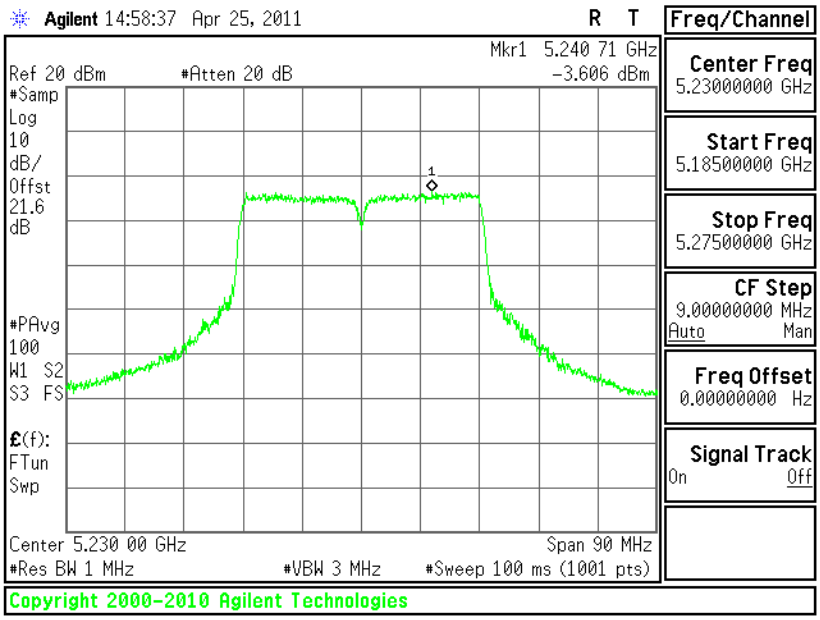
PSD Plot on 802.11n (BW 40MHz) Channel 38 - Chain C



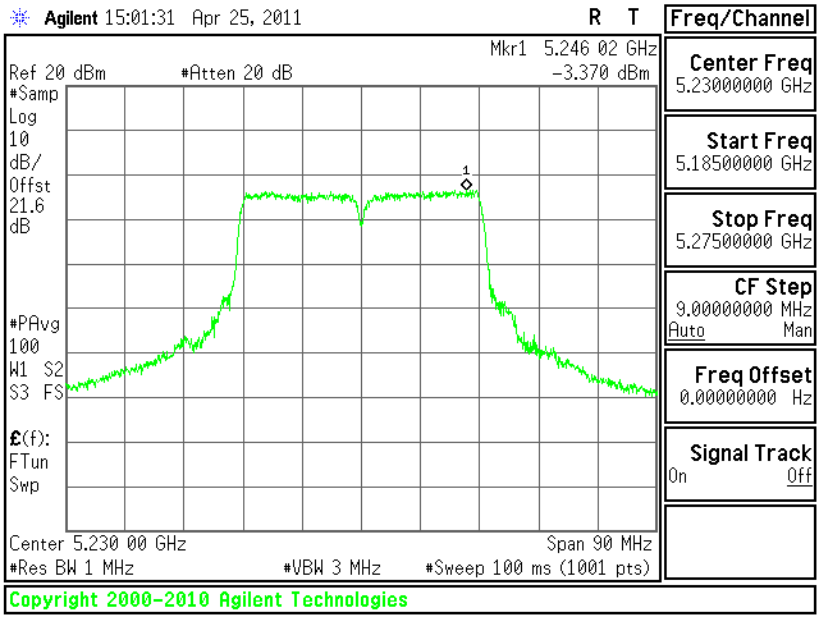
PSD Plot on 802.11n (BW 40MHz) Channel 46 - Chain A



PSD Plot on 802.11n (BW 40MHz) Channel 46 - Chain B



PSD Plot on 802.11n (BW 40MHz) Channel 46 - Chain C



3.4 Band Edges Measurement

3.4.1 Limit of Band Edges

(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 –27 dBm/MHz. For transmitters operating in the 5.25–5.35 GHz band: all emissions outside of the 5.15–5.35 GHz band shall not exceed an EIRP of –27 dBm/MHz. Devices operating in the 5.25–5.35 GHz band that generate emissions in the 5.15–5.25 GHz band must meet all applicable technical requirements for operation in the 5.15–5.25 GHz band (including indoor use) or alternatively meet an out-of-band emission EIRP limit of –27 dBm/MHz in the 5.15–5.25 GHz band. For transmitters operating in the 5.47–5.725 GHz band: all emissions outside of the 5.47–5.725 GHz band shall not exceed an EIRP of -27 dBm/MHz.

(2) The provisions of Section 15.205 Restricted bands of operation of this part apply to intentional radiators operating under this section.

3.4.2 Measuring Instruments

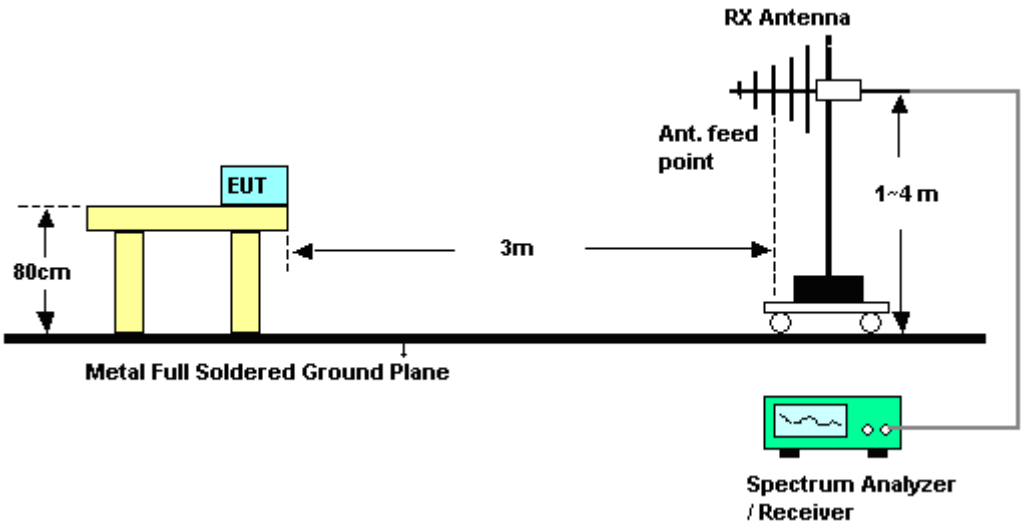
See list of measuring instruments of this test report.

3.4.3 Test Procedures

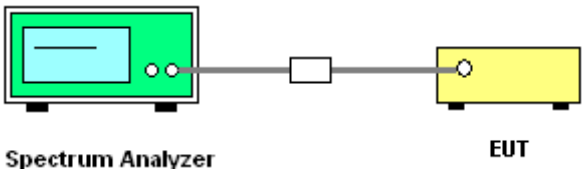
1. Set both RBW and VBW of spectrum analyzer to 1MHz with convenient frequency span including 1MHz bandwidth from band edge.
2. The band edges was measured and recorded.

3.4.4 Test Setup

<Radiated>



<Conducted>



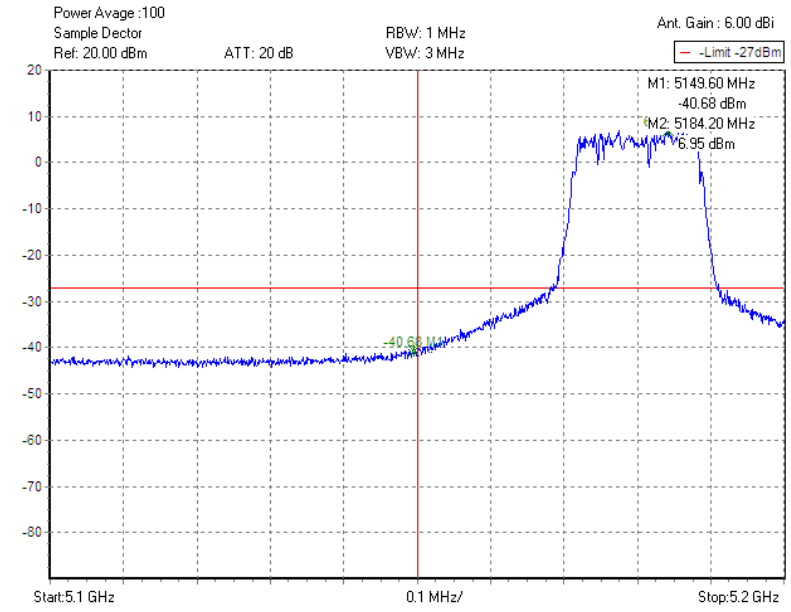
3.4.5 Test Result of Radiated Band Edges

Please refer to Appendix A to B.

3.4.6 Test Result of Conducted Band Edges

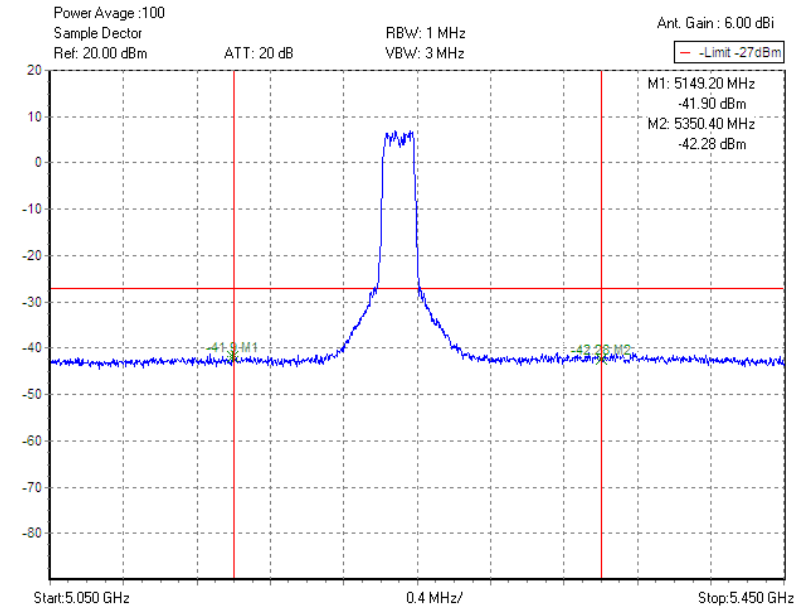
Test Mode :	Mode 1 and 3	Temperature :	24~26℃
Test Engineer :	Alan Liu	Relative Humidity :	40~44%

Low Band Edge Plot on 802.11a Channel 36 - Chain A



Test result was offseted with path loss, and antenna gain.

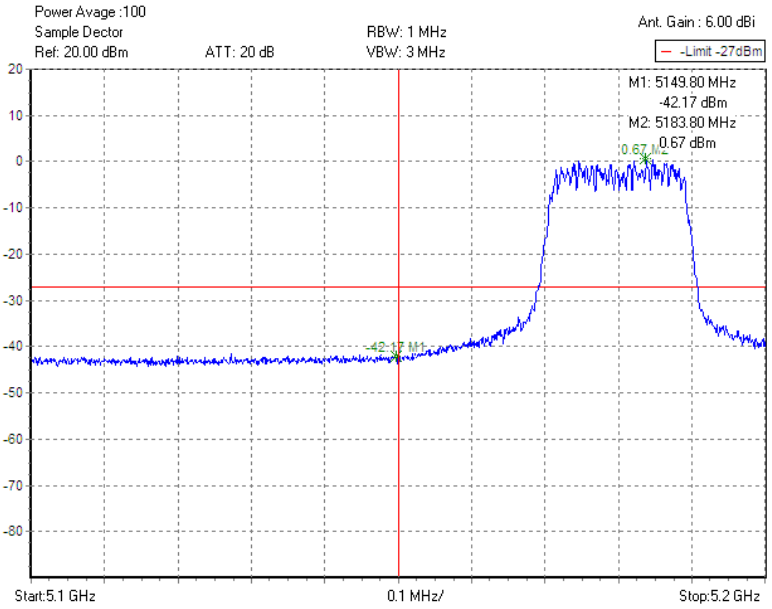
High Band Edge Plot on 802.11a Channel 48 - Chain A



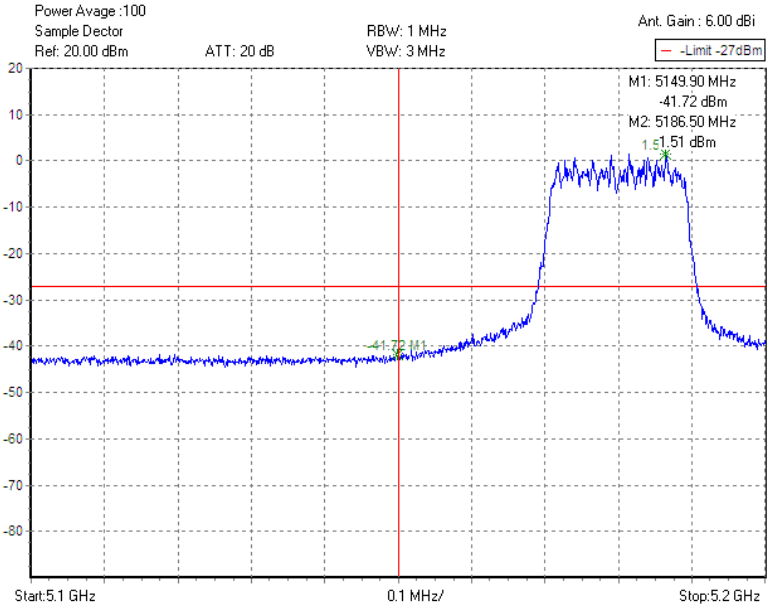
Test result was offseted with path loss, and antenna gain.

Test Mode :	Mode 4 and 6	Temperature :	24~26℃
Test Engineer :	Alan Liu	Relative Humidity :	40~44%

Low Band Edge Plot on 802.11n (BW 20MHz) Channel 36 - Chain A

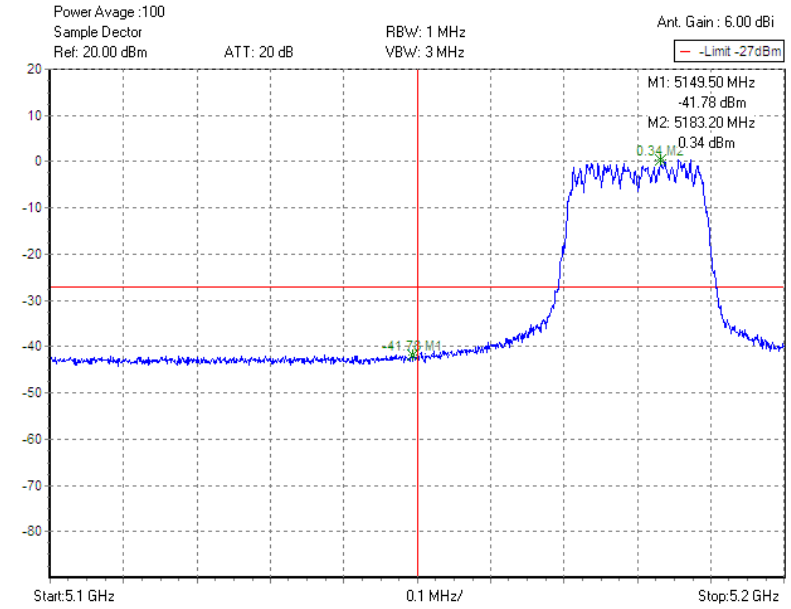


Low Band Edge Plot on 802.11n (BW 20MHz) Channel 36 - Chain B



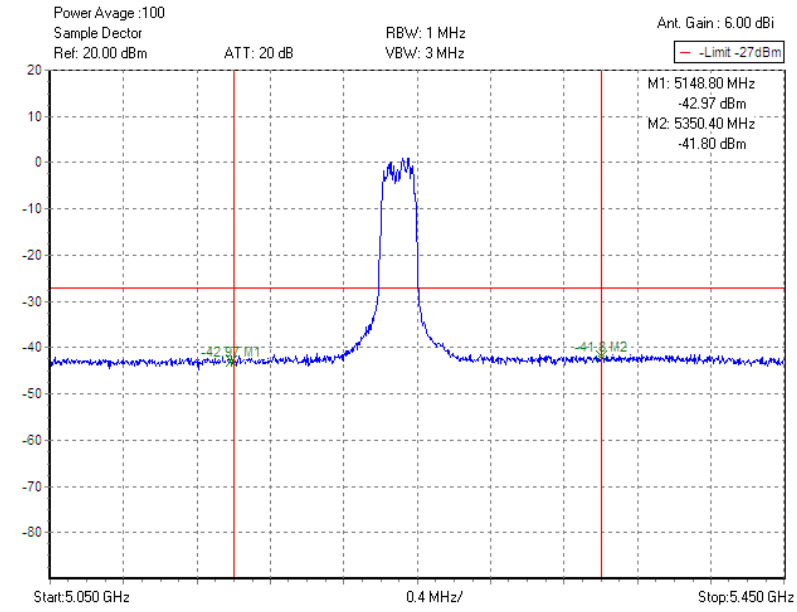
Test result was offseted with path loss and antenna gain

Low Band Edge Plot on 802.11n (BW 20MHz) Channel 36 - Chain C



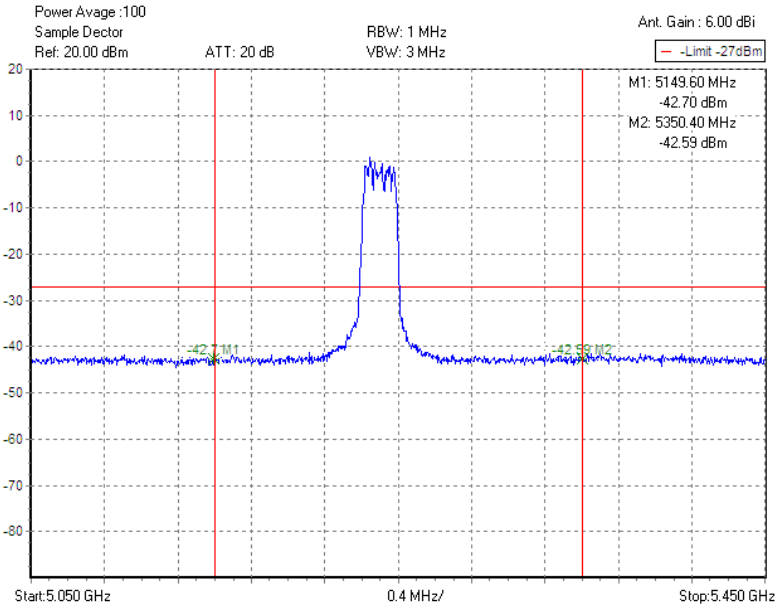
Test result was offseted with path loss, and antenna gain.

High Band Edge Plot on 802.11n (BW 20MHz) Channel 48 - Chain A

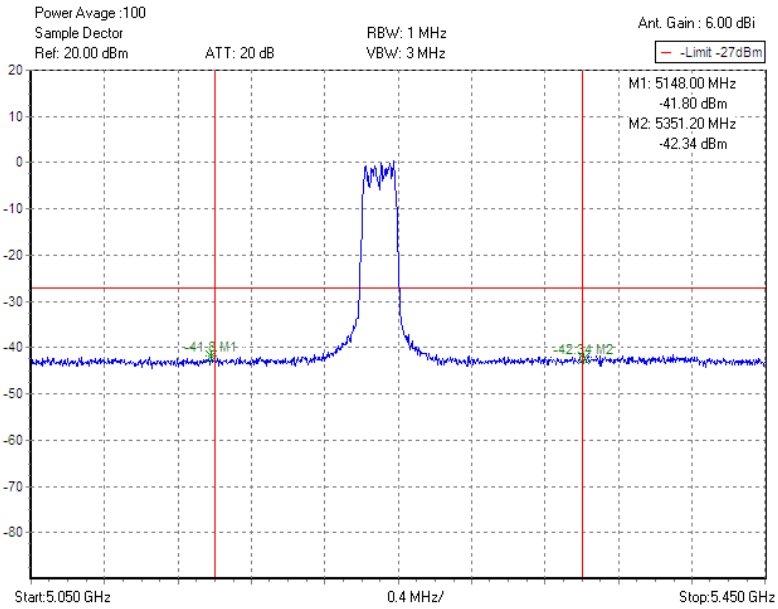


Test result was offseted with path loss, and antenna gain.

High Band Edge Plot on 802.11n (BW 20MHz) Channel 48 - Chain B

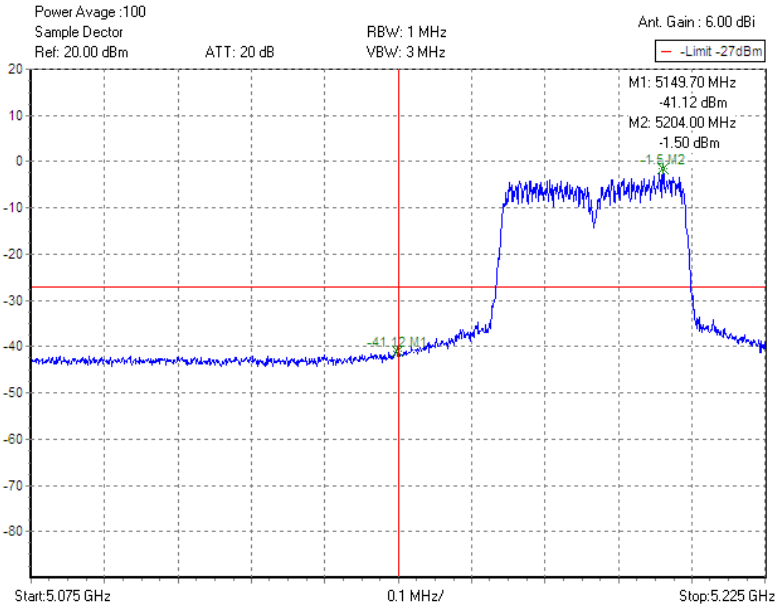


High Band Edge Plot on 802.11n (BW 20MHz) Channel 48 - Chain C

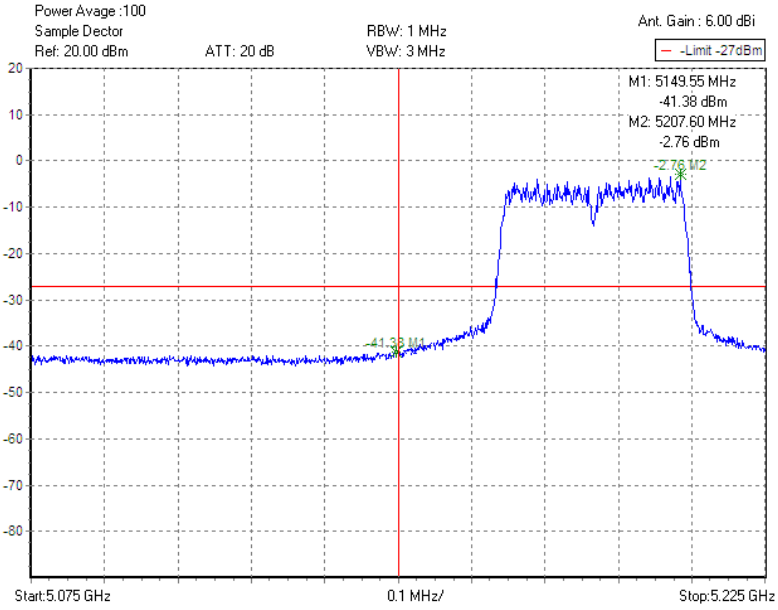


Test Mode :	Mode 7 and 8	Temperature :	24~26℃
Test Engineer :	Alan Liu	Relative Humidity :	40~44%

Low Band Edge Plot on 802.11n (BW 40MHz) Channel 38 - Chain A

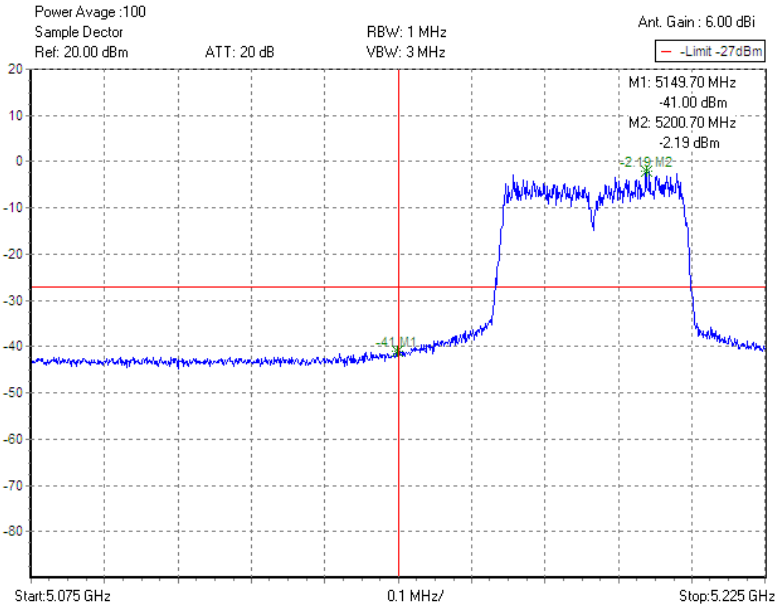


Low Band Edge Plot on 802.11n (BW 40MHz) Channel 38 - Chain B

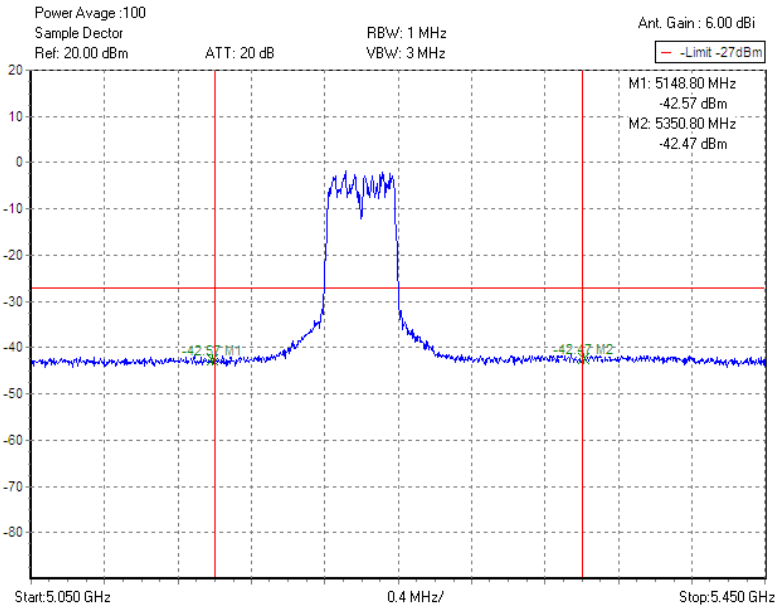


Test result was offseted with path loss and antenna gain

Low Band Edge Plot on 802.11n (BW 40MHz) Channel 38 - Chain C

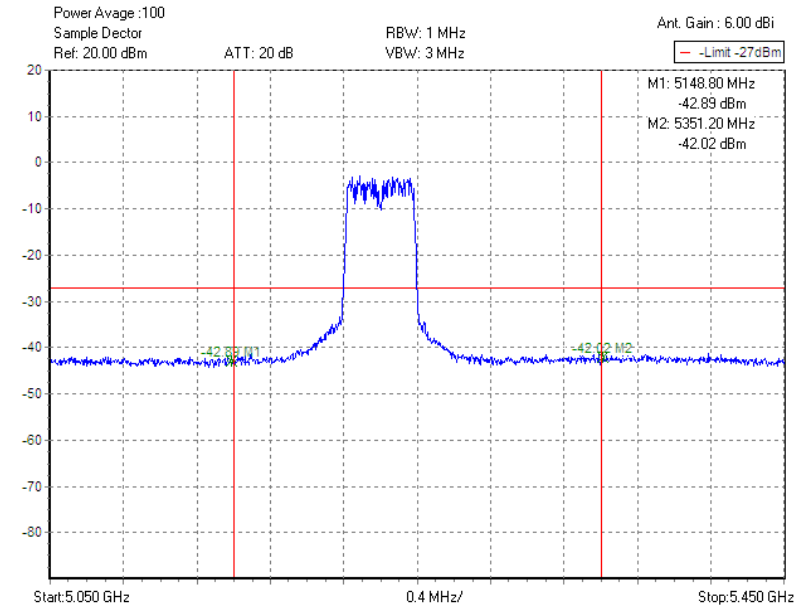


High Band Edge Plot on 802.11n (BW 40MHz) Channel 46 - Chain A



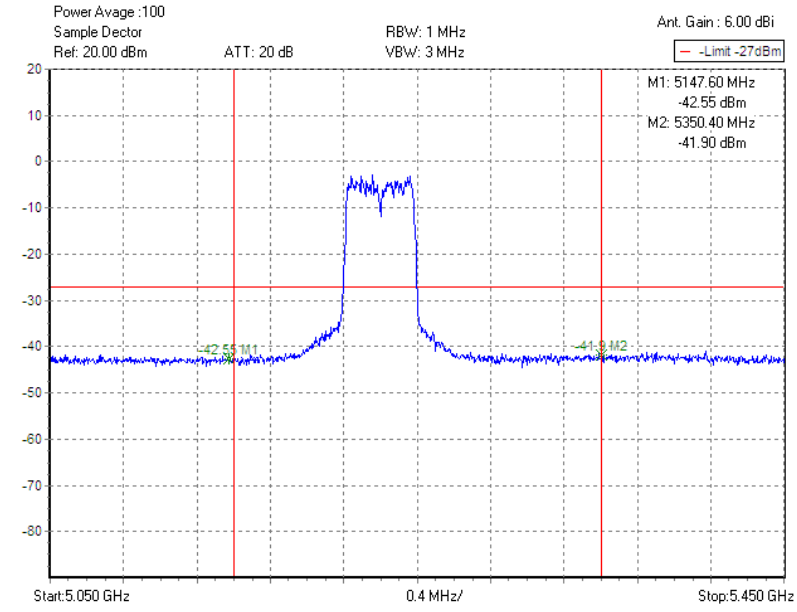
Test result was offseted with path loss, and antenna gain.

High Band Edge Plot on 802.11n (BW 40MHz) Channel 46 - Chain B



Test result was offseted with path loss, and antenna gain.

High Band Edge Plot on 802.11n (BW 40MHz) Channel 46 - Chain C



Test result was offseted with path loss, and antenna gain.

3.5 AC Conducted Emission Measurement

3.5.1 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.

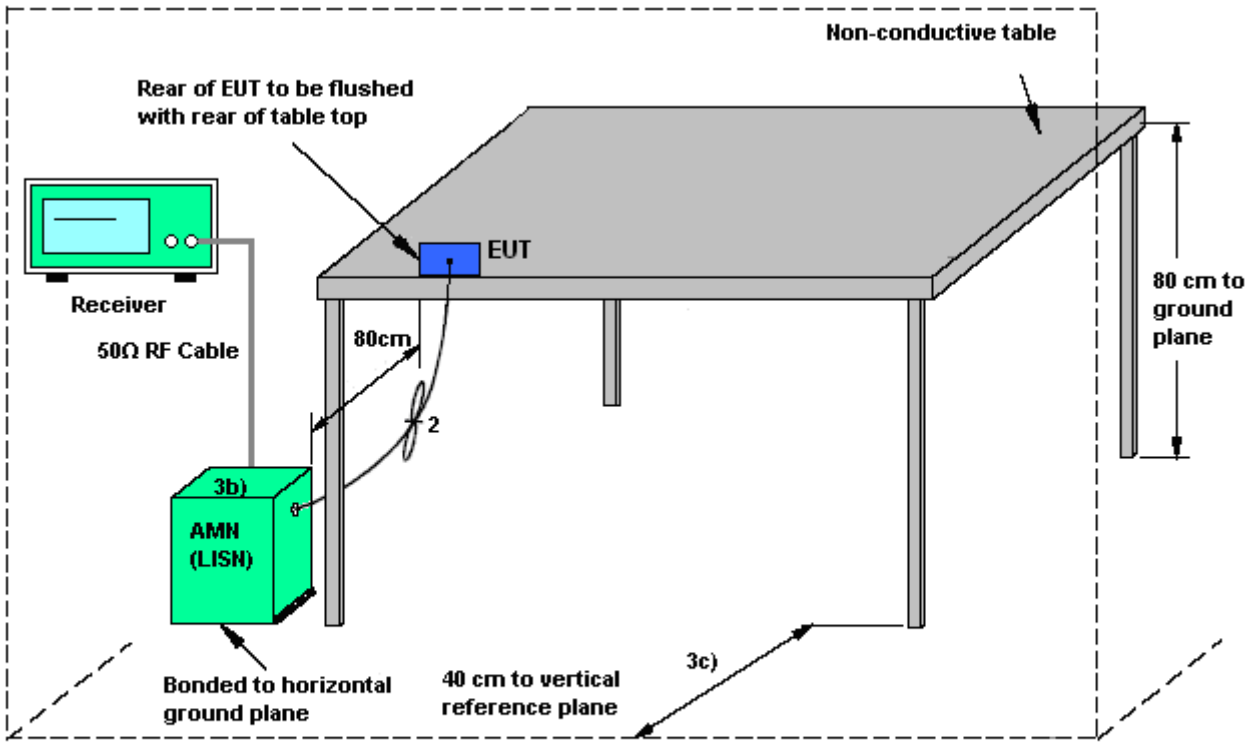
3.5.2 Measuring Instruments

See list of measuring instruments of this test report.

3.5.3 Test Procedures

1. Please follow the guidelines in FCC Public Notice DA 02-2138.
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.

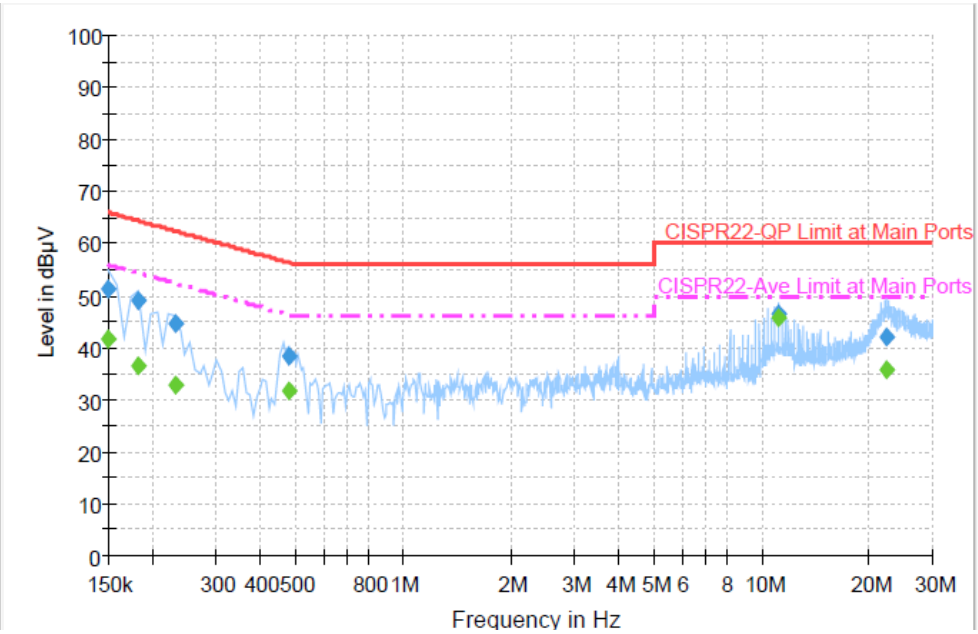
3.5.4 Test Setup



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

3.5.5 Test Result of AC Conducted Emission

Test Mode :	Mode 1	Temperature :	20~22℃
Test Engineer :	Novic Chiang	Relative Humidity :	40~42%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	WLAN Link + USB Link with iPod + PoE for Antenna 3		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



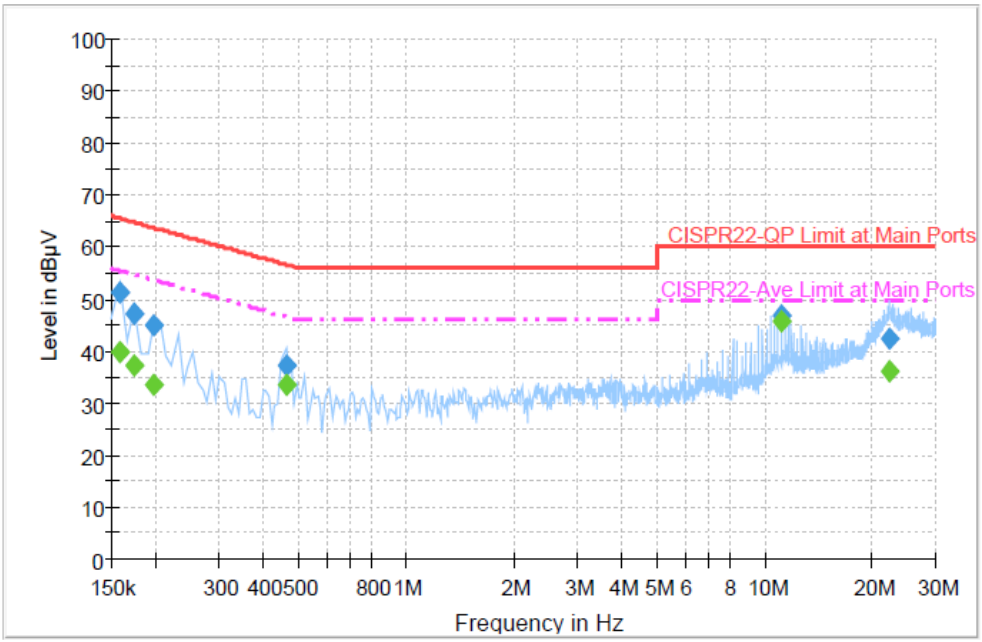
Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	51.4	Off	L1	19.4	14.6	66.0
0.182000	48.9	Off	L1	19.4	15.9	64.8
0.230000	44.7	Off	L1	19.4	18.0	62.7
0.478000	38.2	Off	L1	19.4	17.8	56.0
11.102000	46.5	Off	L1	19.6	13.5	60.0
22.326000	42.1	Off	L1	19.8	17.9	60.0

Final Result 2

Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	41.8	Off	L1	19.4	14.2	56.0
0.182000	36.6	Off	L1	19.4	18.2	54.8
0.230000	33.0	Off	L1	19.4	19.7	52.7
0.478000	31.8	Off	L1	19.4	14.2	46.0
11.102000	45.7	Off	L1	19.6	4.3	50.0
22.326000	35.8	Off	L1	19.8	14.2	50.0

Test Mode :	Mode 1	Temperature :	20~22℃
Test Engineer :	Novic Chiang	Relative Humidity :	40~42%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	WLAN Link + USB Link with iPod + PoE for Antenna 3		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.158000	51.3	Off	N	19.4	14.7	66.0
0.174000	47.3	Off	N	19.4	17.5	64.8
0.198000	45.2	Off	N	19.4	18.2	63.4
0.462000	37.1	Off	N	19.4	19.6	56.7
11.102000	47.0	Off	N	19.6	13.0	60.0
22.342000	42.4	Off	N	19.8	17.6	60.0

Final Result 2

Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.158000	40.0	Off	N	19.4	16.0	56.0
0.174000	37.3	Off	N	19.4	17.5	54.8
0.198000	33.7	Off	N	19.4	19.6	53.4
0.462000	33.4	Off	N	19.4	13.3	46.7
11.102000	45.8	Off	N	19.6	4.2	50.0
22.342000	36.0	Off	N	19.8	14.0	50.0

3.6 Radiated Emission Measurement

3.6.1 Limit of Radiated Emission

Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in § 15.209.

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

(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 -27 dBm/MHz.

(2) For transmitters operating in the 5.25–5.35 GHz band: all emissions outside of the 5.15–5.35 GHz band shall not exceed an EIRP of -27 dBm/MHz. Devices operating in the 5.25–5.35 GHz band that generate emissions in the 5.15–5.25 GHz band must meet all applicable technical requirements for operation in the 5.15–5.25 GHz band (including indoor use) or alternatively meet an out-of-band emission EIRP limit of -27 dBm/MHz in the 5.15–5.25 GHz band.

(3) For transmitters operating in the 5.47–5.725 GHz band: all emissions outside of the 5.47–5.725 GHz band shall not exceed an EIRP of -27 dBm/MHz.

(4) The provisions of Section 15.205 Restricted bands of operation of this part apply to intentional radiators operating under this section.

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)
- 27	68.3

3.6.2 Measuring Instruments

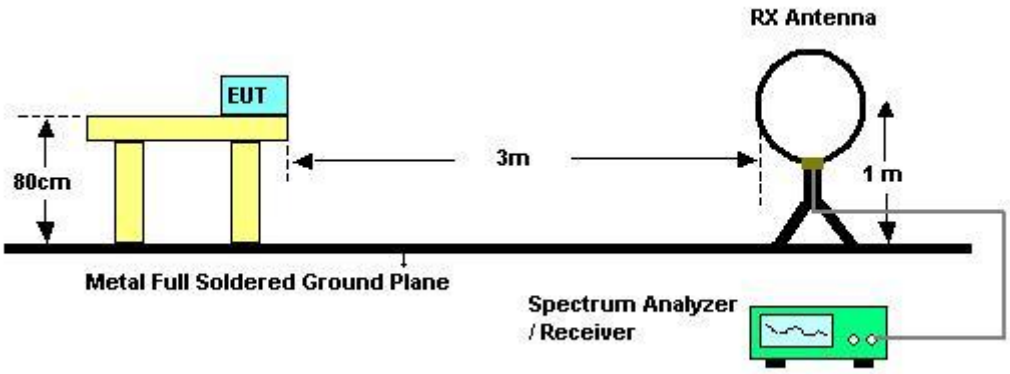
See list of measuring instruments of this test report.

3.6.3 Test Procedures

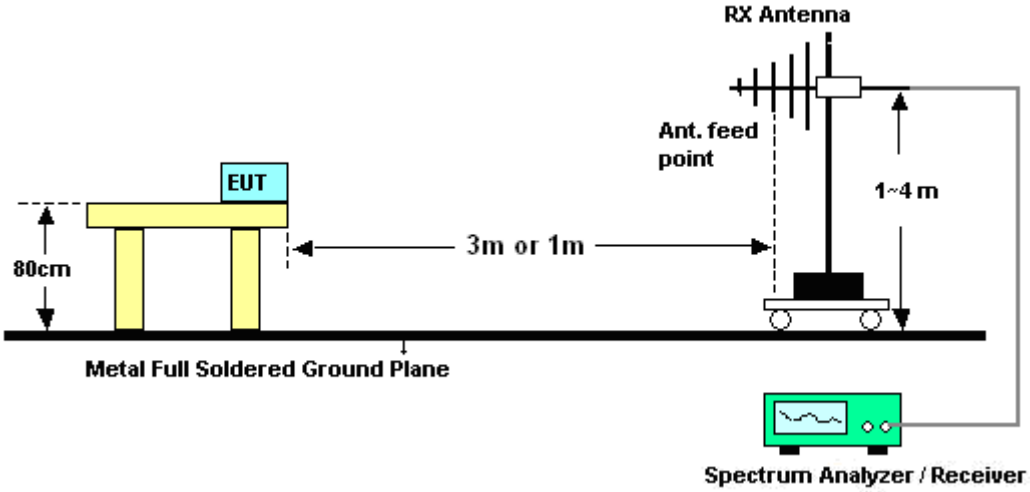
1. The testing follows the guidelines in FCC Public Notice DA 02-2138, (Measurement Guidelines of UNII)
2. The EUT was placed on a rotatable table top 0.8 meter above ground.
3. The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna 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. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function and specified bandwidth with Maximum Hold Mode.
8. 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 quasi-peak method and reported.
9. 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.

3.6.4 Test Setup

For radiated emissions below 30MHz



For radiated emissions above 30MHz



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

Temperature	24~25°C	Humidity	49~50%
Test Engineer	Ivan Jiang		

Freq. (MHz)	Level (dBuV)	Over Limit (dB)	Limit Line (dBuV)	Remark
-	-	-	-	See Note

Note:

The amplitude of spurious emissions that are attenuated by more than 20dB below the permissible value has no need to be reported.

Distance extrapolation factor = 40 log (specific distance / test distance) (dB);

Limit line = specific limits (dBuV) + distance extrapolation factor.

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

Please refer to Appendix A to B.

3.7 Peak Excursion Ratio Measurement

3.7.1 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.

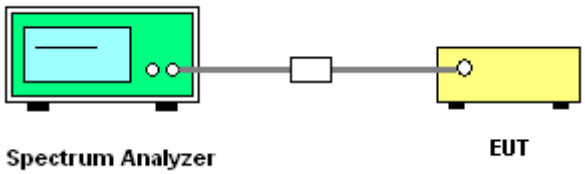
3.7.2 Measuring Instruments

See list of measuring instruments of this test report.

3.7.3 Test Procedures

1. The transmitter output is connected to the spectrum analyzer.
2. The resolution bandwidth and video bandwidth are set as below,
   Trace A: RBW=1 MHz, VBW=3 MHz
   Trace B: RBW=1 MHz, VBW=300 kHz
3. Trace A is set peak detector and to Max Hold, then to View. Then the detector is readjusted to sample detector, max hold to run for 60 seconds, and the signal under this measurement condition is captured in Trace B in Accordance with the method 1 of DA-02-2138.
4. The difference between the traces is investigated. The marker is placed at the frequency, which shows the largest difference. The amplitude delta between the traces at this frequency is the peak excursion.

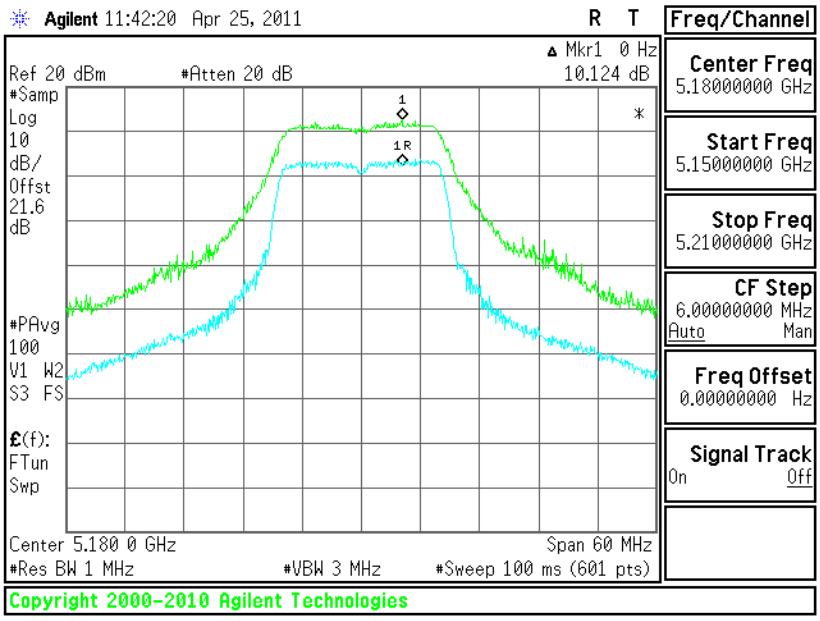
3.7.4 Test Setup



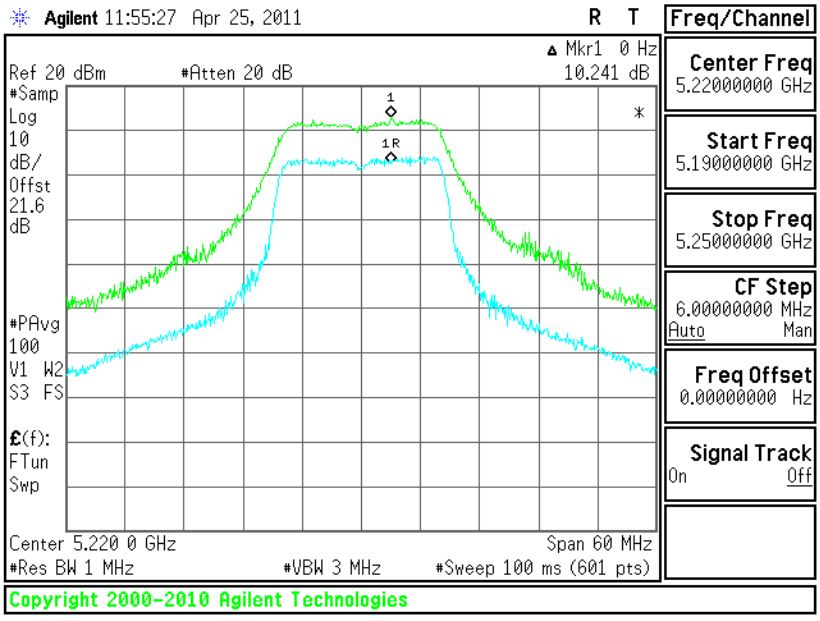
3.7.5 Test Result of Peak Excursion Ratio

Test Mode :	Mode 1~3	Temperature :	24~26℃
Test Engineer :	Alan Liu	Relative Humidity :	40~44%

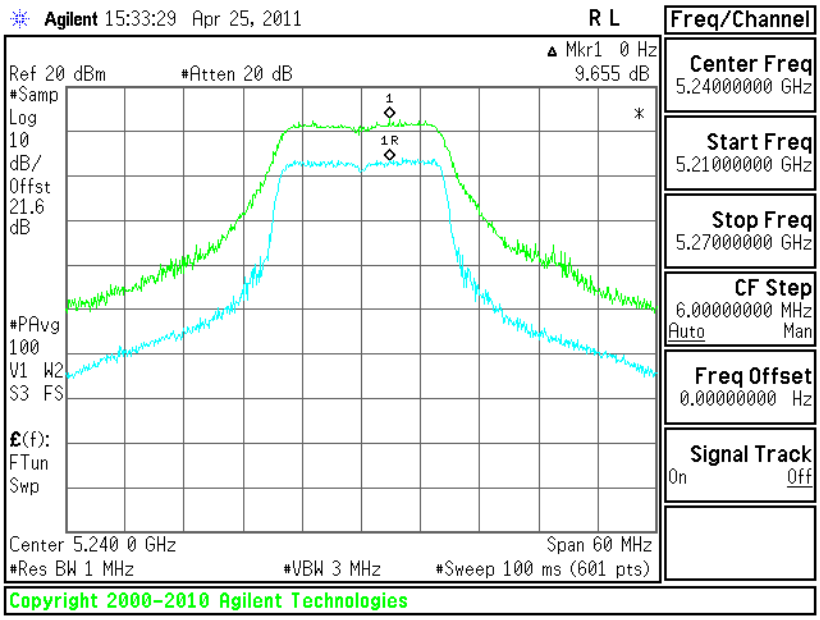
Peak Excursion Ratio Plot on 802.11a Channel 36 - Chain A



Peak Excursion Ratio Plot on 802.11a Channel 44 - Chain A

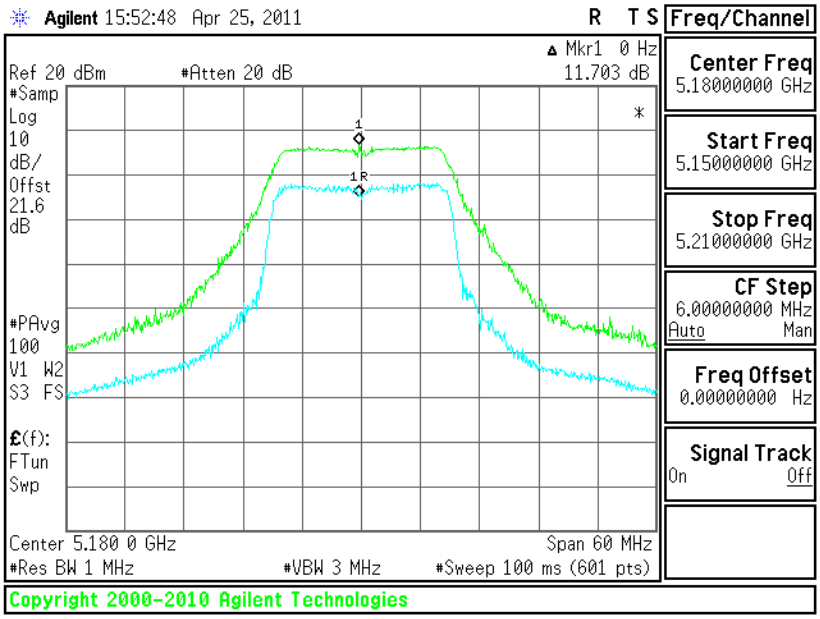


Peak Excursion Ratio Plot on 802.11a Channel 48 - Chain A

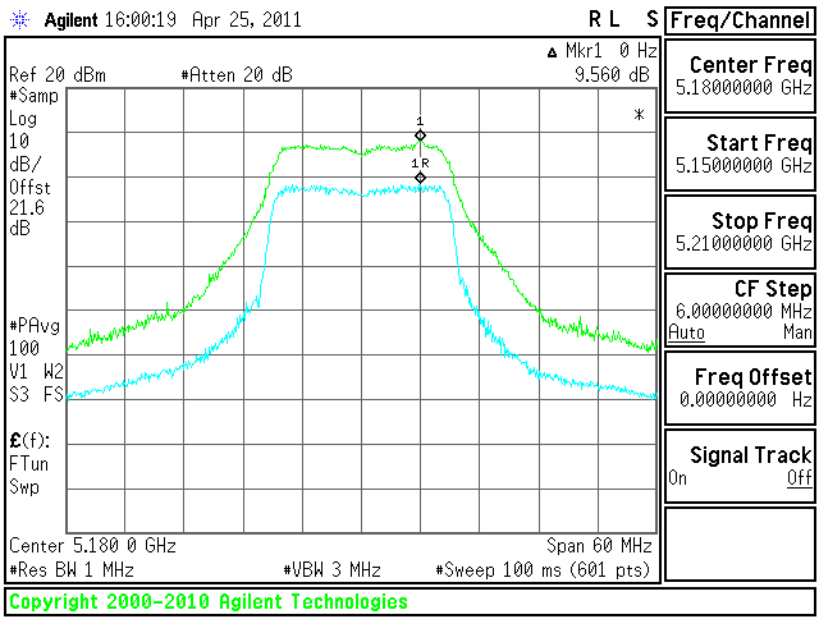


Test Mode :	Mode 4~6	Temperature :	24~26℃
Test Engineer :	Alan Liu	Relative Humidity :	40~44%

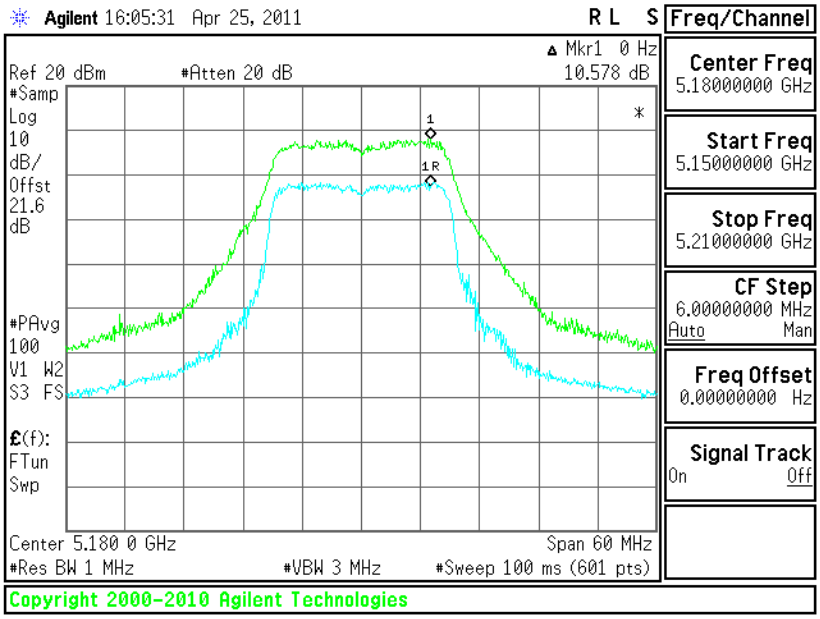
Peak Excursion Ratio Plot on 802.11n (BW 20MHz) Channel 36 - Chain A



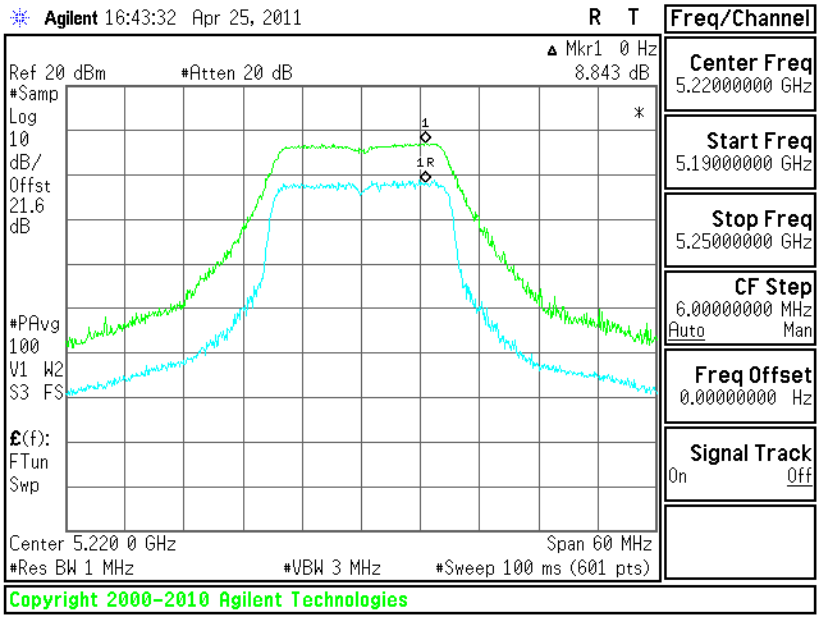
Peak Excursion Ratio Plot on 802.11n (BW 20MHz) Channel 36 - Chain B



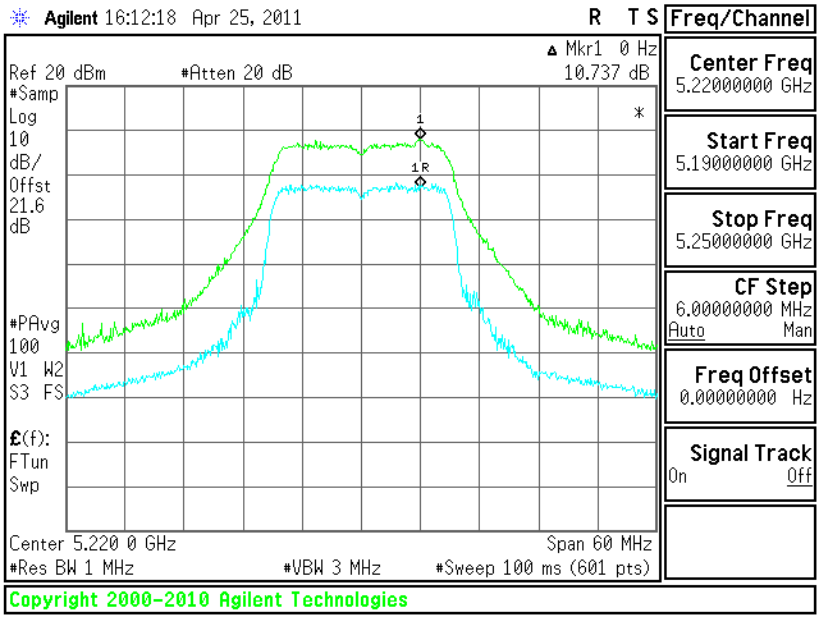
Peak Excursion Ratio Plot on 802.11n (BW 20MHz) Channel 36 - Chain C



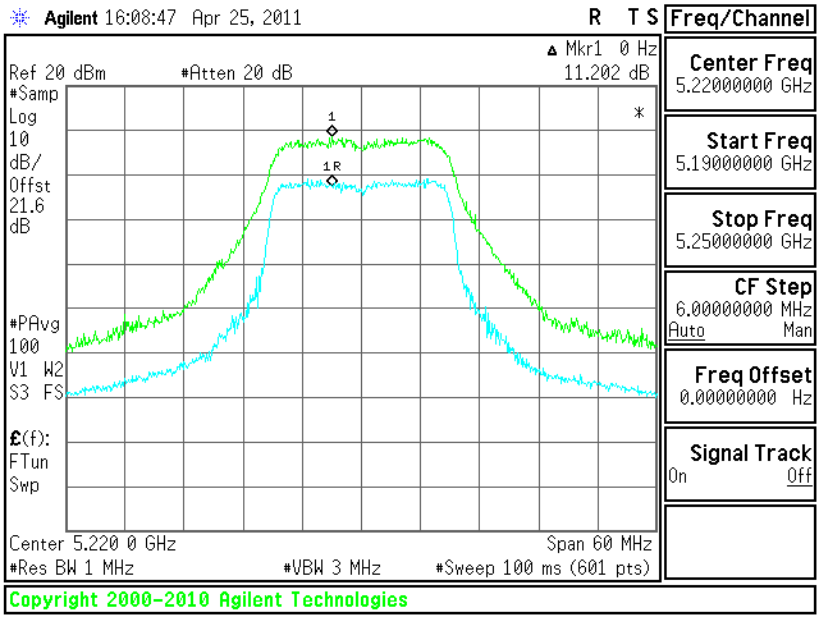
Peak Excursion Ratio Plot on 802.11n (BW 20MHz) Channel 44 - Chain A



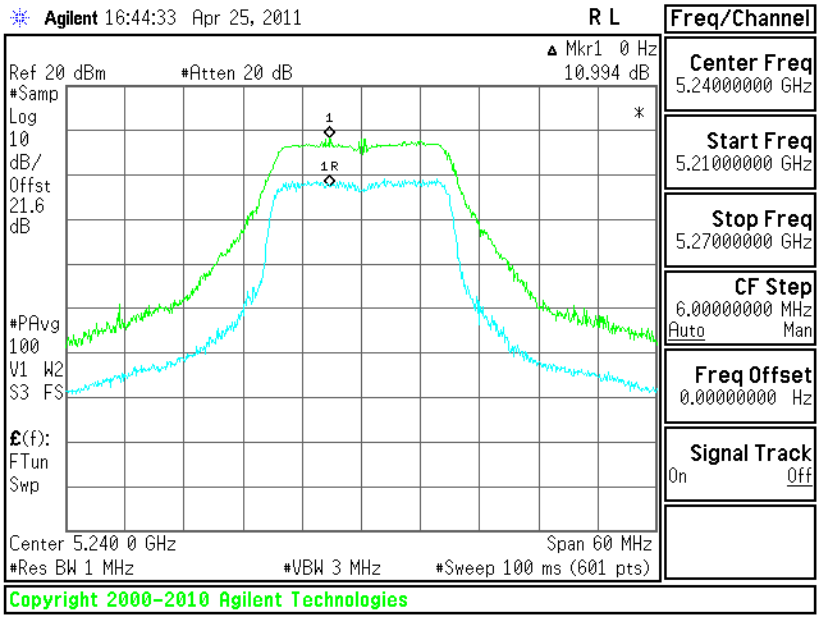
Peak Excursion Ratio Plot on 802.11n (BW 20MHz) Channel 44 - Chain B



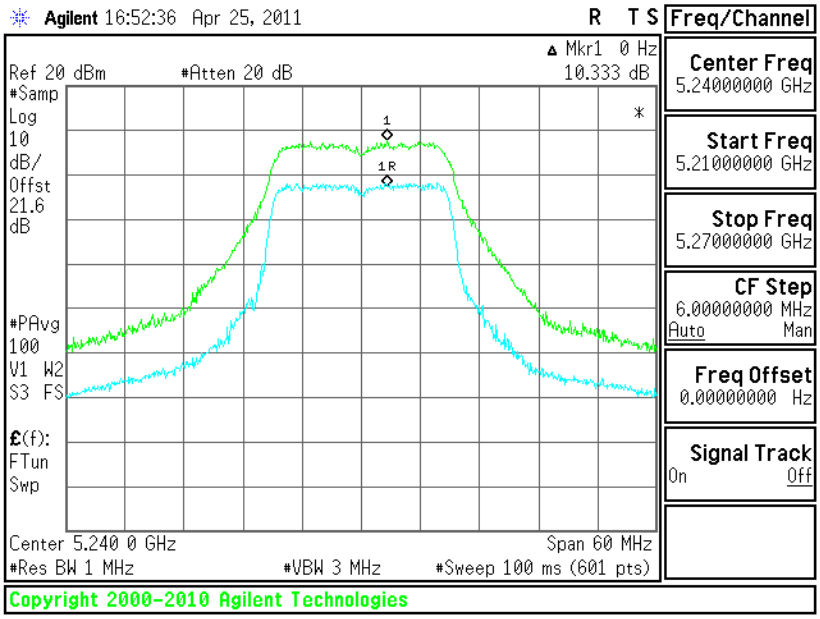
Peak Excursion Ratio Plot on 802.11n (BW 20MHz) Channel 44 - Chain C



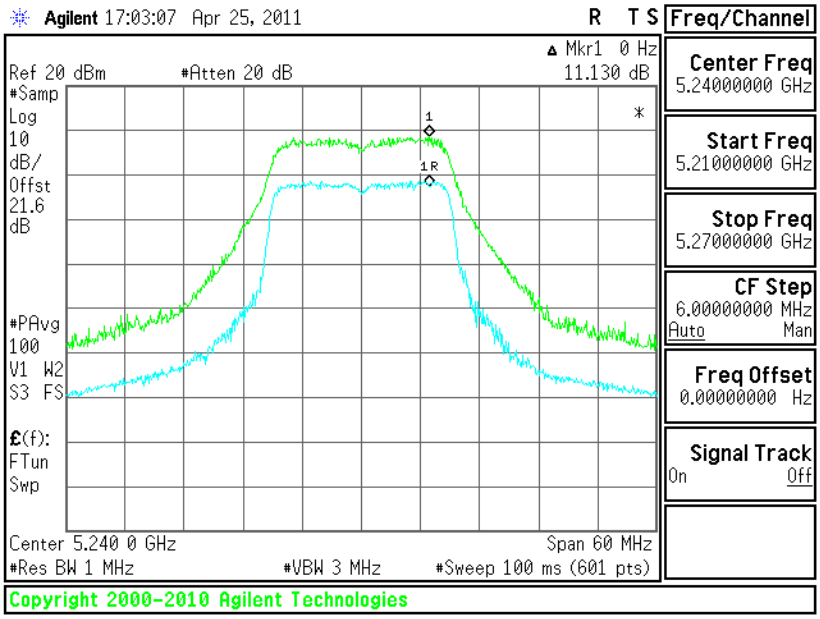
Peak Excursion Ratio Plot on 802.11n (BW 20MHz) Channel 48 - Chain A



Peak Excursion Ratio Plot on 802.11n (BW 20MHz) Channel 48 - Chain B

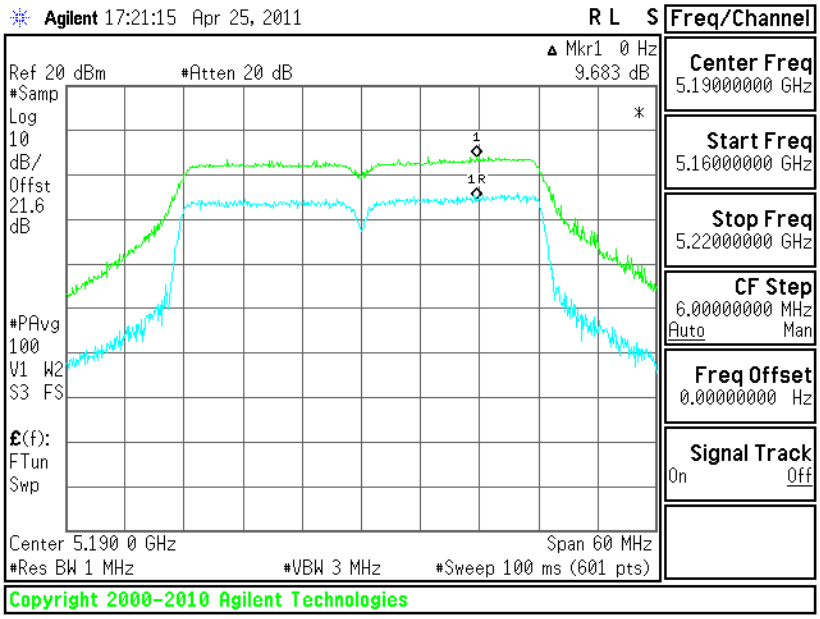


Peak Excursion Ratio Plot on 802.11n (BW 20MHz) Channel 48 - Chain C

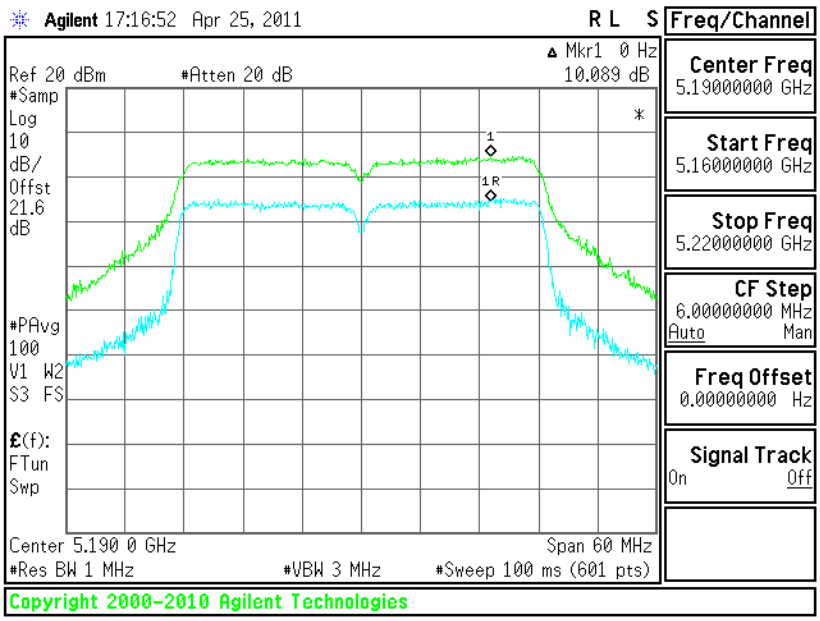


Test Mode :	Mode 7~8	Temperature :	24~26℃
Test Engineer :	Alan Liu	Relative Humidity :	40~44%

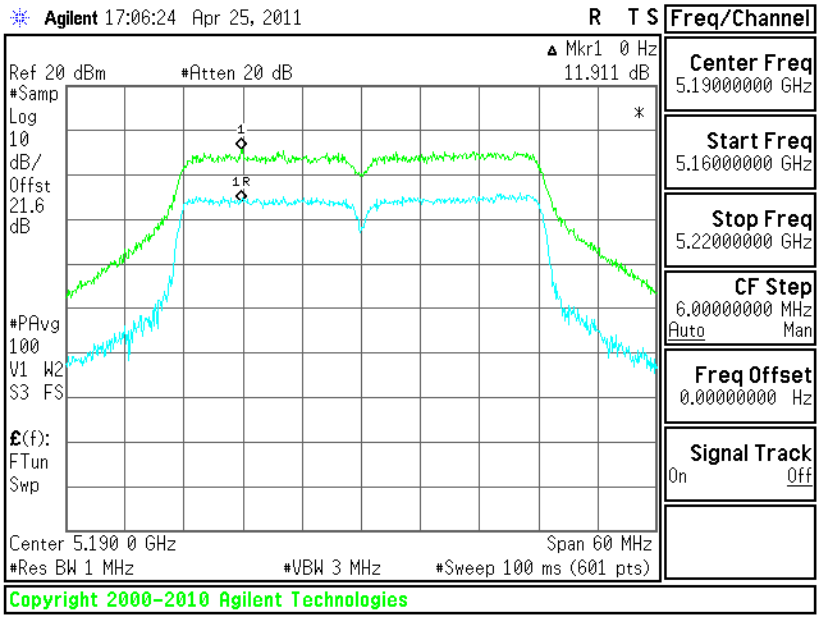
Peak Excursion Ratio Plot on 802.11n (BW 40MHz) Channel 38 - Chain A



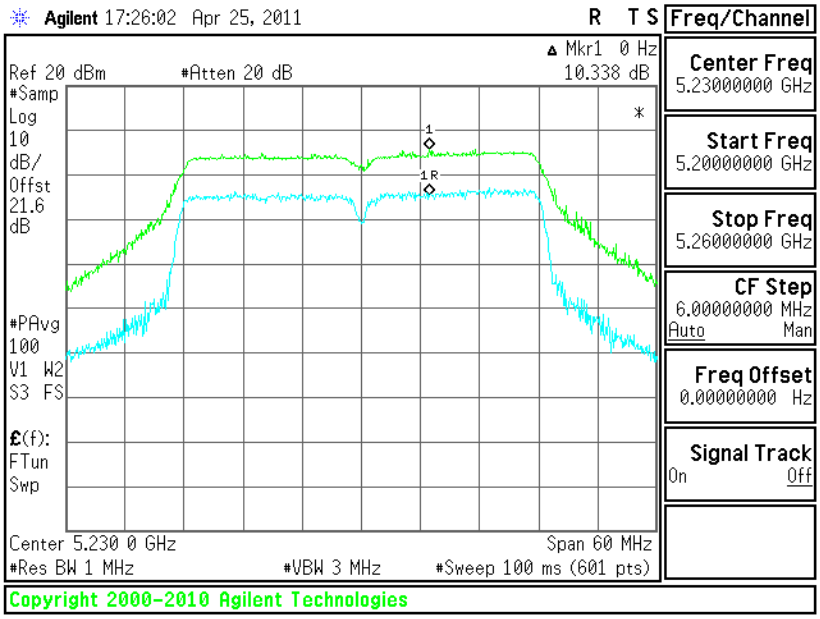
Peak Excursion Ratio Plot on 802.11n (BW 40MHz) Channel 38 - Chain B



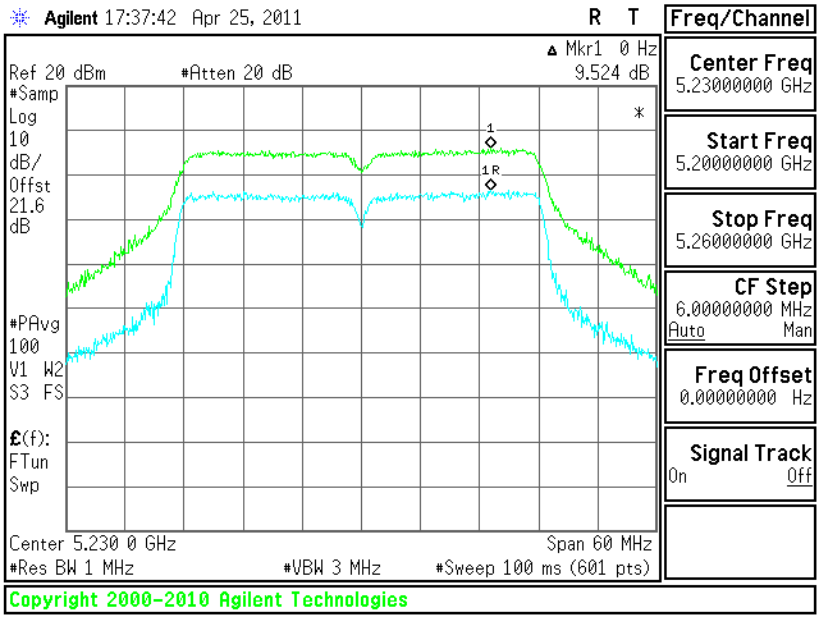
Peak Excursion Ratio Plot on 802.11n (BW 40MHz) Channel 38 - Chain C



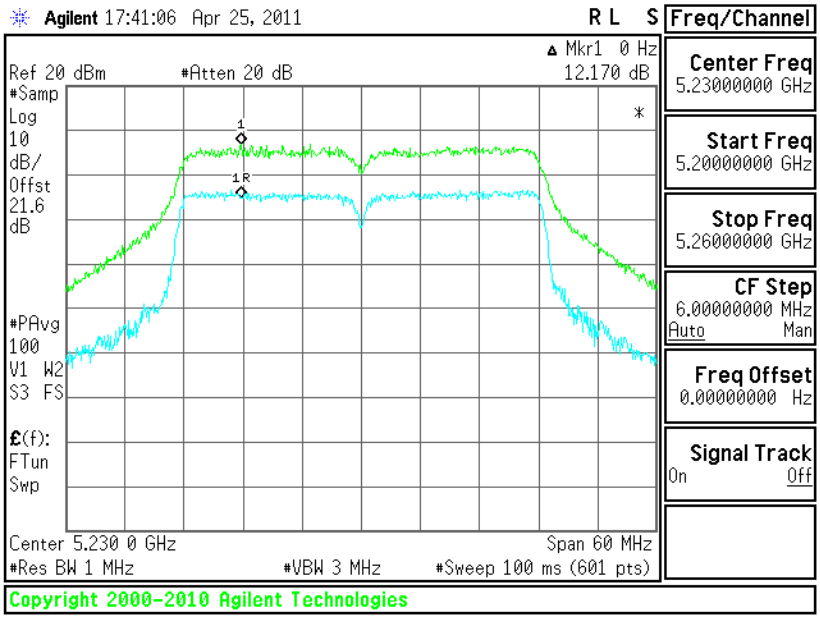
Peak Excursion Ratio Plot on 802.11n (BW 40MHz) Channel 46 - Chain A



Peak Excursion Ratio Plot on 802.11n (BW 40MHz) Channel 46 - Chain B



Peak Excursion Ratio Plot on 802.11n (BW 40MHz) Channel 46 – Chain C



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 Frequency Stability Measurement

3.9.1 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.

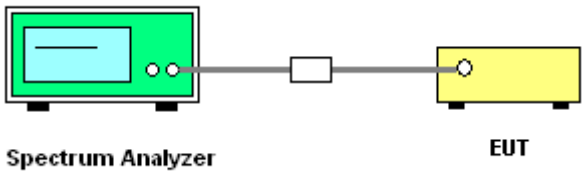
3.9.2 Measuring Instruments

See list of measuring instruments of this test report.

3.9.3 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.

3.9.4 Test Setup



3.9.5 Test Result of Frequency Stability

Test Mode :	Mode 1~3	Temperature :	24~26℃
Test Engineer :	Alan Liu	Relative Humidity :	40~44%

Chain A				
Channel	Frequency (MHz)	Low Frequency (Fl)	High Frequency (Fh)	Frequency Stability (ppm)
36	5180	5171.67	5188.29	-3.86
44	5220	5211.67	5228.29	-3.83
48	5240	5231.67	5248.29	-3.82

Test Mode :	Mode 4~6	Temperature :	24~26℃
Test Engineer :	Alan Liu	Relative Humidity :	40~44%

Chain A+B+C (A)				
Channel	Frequency (MHz)	Low Frequency (Fl)	High Frequency (Fh)	Frequency Stability (ppm)
36	5180	5171.04	5188.92	-3.86
44	5220	5211.04	5228.92	-3.83
48	5240	5231.04	5248.92	-3.82

Chain A+B+C (B)				
Channel	Frequency (MHz)	Low Frequency (Fl)	High Frequency (Fh)	Frequency Stability (ppm)
36	5180	5171.04	5188.92	-3.86
44	5220	5211.04	5228.92	-3.83
48	5240	5231.04	5248.92	-3.82

Chain A+B+C (C)				
Channel	Frequency (MHz)	Low Frequency (Fl)	High Frequency (Fh)	Frequency Stability (ppm)
36	5180	5171.04	5188.92	-3.86
44	5220	5211.04	5228.92	-3.83
48	5240	5231.04	5248.92	-3.82

Test Mode :	Mode 7~8	Temperature :	24~26℃
Test Engineer :	Alan Liu	Relative Humidity :	40~44%

Chain A+B+C (A)				
Channel	Frequency (MHz)	Low Frequency (Fl)	High Frequency (Fh)	Frequency Stability (ppm)
38	5190	5171.67	5208.25	-7.71
46	5230	5211.67	5248.25	-7.65

Chain A+B+C (B)				
Channel	Frequency (MHz)	Low Frequency (Fl)	High Frequency (Fh)	Frequency Stability (ppm)
38	5190	5171.67	5208.25	-7.71
46	5230	5211.67	5248.25	-7.65

Chain A+B+C (C)				
Channel	Frequency (MHz)	Low Frequency (Fl)	High Frequency (Fh)	Frequency Stability (ppm)
38	5190	5171.67	5208.25	-7.71
46	5230	5211.67	5248.25	-7.65

3.10 Antenna Requirements

3.10.1 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.

3.10.2 Antenna Connected Construction

The antennas type used in this product are Dipole Antenna, Panel Antenna, Patch Antenna, and PIFA Antenna without connector and it is considered to meet antenna requirement of FCC.

3.10.3 Antenna Gain

The antenna gain is less than 6 dBi. Therefore, it is not necessary to reduce maximum peak output power limit.

4 List of Measuring Equipments

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Due Date	Remark
Spectrum Analyzer	R&S	FSP40	100055	9kHz~40GHz	Jun. 11, 2010	Jun. 10, 2011	Conducted (TH02-HY)
Power Meter	Anritsu	ML2495A	0932001	N/A	Sep. 13, 2010	Sep. 12, 2011	Conducted (TH02-HY)
Power Sensor	Anritsu	MA2411B	0846202	N/A	Sep. 14, 2010	Sep. 13, 2011	Conducted (TH02-HY)
Bilog Antenna	SCHAFFNER	CBL6111C	2726	30MHz ~ 1GHz	Oct. 31, 2010	Oct. 30, 2011	Radiation (03CH07-HY)
Spectrum Analyzer	R&S	FSP	101067	9KHz ~ 30GHz	Dec. 03, 2010	Dec. 02, 2011	Radiation (03CH07-HY)
Double Ridge Horn Antenna	ESCO	3117	00075962	1GHz ~ 18GHz	Aug. 19, 2010	Aug. 18, 2011	Radiation (03CH07-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170251	15GHz- 40GHz	Oct. 18, 2010	Oct. 17, 2011	Radiation (03CH07-HY)
Pre Amplifier	Agilent	8449B	3008A02362	1GHz~ 26.5GHz	Dec. 06, 2010	Dec. 05, 2011	Radiation (03CH07-HY)
Pre Amplifier	COM-POWER	PA-103A	161241	10-1000MHz.32 dB.GAIN	Mar. 29, 2011	Mar. 28, 2012	Radiation (03CH07-HY)
Loop Antenna	R&S	HFH2-Z2	860004/001	9 kHz~30 MHz	Jul. 29, 2010	Jul. 28, 2011	Radiation (03CH07-HY)
EMI Test Receive	R&S	ESCS 30	100356	9KHz – 2.75GHz	Aug. 16, 2010	Aug. 15, 2011	Conduction (CO05-HY)
Two-LISN	R&S	ENV216	11-100081	9KHz – 30MHz	Dec. 03, 2010	Dec. 02, 2011	Conduction (CO05-HY)
Two-LISN	R&S	ENV216	11-100080	9KHz – 30MHz	Dec. 01, 2010	Nov. 30, 2011	Conduction (CO05-HY)
AC Power Source	APC	APC-1000W	N/A	N/A	N/A	N/A	Conduction (CO05-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				