



Test Report

Product Name : Dual-band Wireless-AC1200 USB Adapter
Model No. : USB-AC53
FCC ID. : MSQUSBAC53

Applicant : ASUSTeK COMPUTER INC.

Address : 4F, No. 150, Li-Te Rd., Peitou, Taipei, Taiwan, R.O.C.

Date of Receipt : 2012/10/03

Issued Date : 2013/02/08

Report No. : 12A087R-RFUSP46V01

Report Version : V1.0



The test results relate only to the samples tested.

The test report shall not be reproduced except in full without the written approval of Quietek Corporation.

Test Report Certification

Issued Date : 2013/02/08

Report No. : 12A087R-RFUSP46V01



Product Name : Dual-band Wireless-AC1200 USB Adapter
 Applicant : ASUSTeK COMPUTER INC.
 Address : 4F, No. 150, Li-Te Rd., Peitou, Taipei, Taiwan, R.O.C.
 Manufacturer : Askey Technology (Jiang Su) LTD.
 Model No. : USB-AC53
 FCC ID. : MSQUSBAC53
 EUT Voltage : DC 5V (Power by PC)
 Trade Name : ASUS
 Applicable Standard : FCC CFR Title 47 Part 15 Subpart E Section 15.407: 2011
 ANSI C63.4: 2009
 Test Result : Complied

The test results relate only to the samples tested.

The test report shall not be reproduced except in full without the written approval of Quietek Corporation.

Documented By : Demi Chang
 (Demi Chang / Engineering Adm. Specialist)

Reviewed By : Ben Huang
 (Ben Huang / Engineer)

Approved By : Roy Wang
 (Roy Wang / Manager)

Laboratory Information

We, **Quietek Corporation**, are an independent RF consultancy that was established the whole facility in our laboratories. The test facility has been accredited/accepted (audited or listed) by the following related bodies in compliance with ISO 17025 specified testing scopes:

Taiwan R.O.C.	:	TAF, Accreditation Number: 1313 NCC, Certificate No : NCC-RCB-07
USA	:	FCC, Registration Number: 365520
Canada	:	IC, Submission No: 150981

The related certificate for our laboratories about the test site and management system can be downloaded from Quietek Corporation's Web Site:<http://www.quietek.com/tw/ctg/cts/accreditations.htm>

The address and introduction of Quietek Corporation's laboratories can be founded in our Web site :
<http://www.quietek.com/>

If you have any comments, Please don't hesitate to contact us. Our contact information is as below:

HsinChu Testing Laboratory:

No.75-2, 3rd Lin, Wangye Keng, Yonghxing Tsuen, Qionglin Shiang, Hsinchu County 307, Taiwan, R.O.C.
TEL:+886-3-592-8858 / FAX:+886-3-592-8859 E-Mail : service@quietek.com

Linkou Testing Laboratory:

No.5-22, Ruishukeng, Linkou Dist., New Taipei City 24451, Taiwan, R.O.C.
TEL : 886-2-8601-3788 / FAX : 886-2-8601-3789 E-Mail : service@quietek.com

TABLE OF CONTENTS

Description	Page
1. General Information.....	6
1.1. EUT DESCRIPTION.....	6
1.2. OPERATIONAL DESCRIPTION.....	11
1.3. TEST MODE.....	12
1.4. TESTED SYSTEM DETAILS.....	13
1.5. CONFIGURATION OF TESTED SYSTEM.....	14
1.6. EUT EXERCISE SOFTWARE.....	14
1.7. TEST FACILITY.....	15
2. Conducted Emission.....	16
2.1. TEST EQUIPMENT.....	16
2.2. TEST SETUP.....	16
2.3. LIMITS.....	17
2.4. TEST PROCEDURE.....	17
2.5. TEST SPECIFICATION.....	17
2.6. UNCERTAINTY.....	17
2.7. TEST RESULT.....	18
2.8. TEST PHOTO.....	20
3. 99% & 26dB Bandwidth.....	21
3.1. TEST EQUIPMENT.....	21
3.2. TEST SETUP.....	21
3.3. LIMITS.....	21
3.4. TEST PROCEDURE.....	21
3.5. UNCERTAINTY.....	21
3.6. TEST RESULT.....	22
4. Peak Transmit Output.....	34
4.1. TEST EQUIPMENT.....	34
4.2. TEST SETUP.....	34
4.3. LIMITS.....	35
4.4. TEST PROCEDURE.....	35
4.5. UNCERTAINTY.....	35
4.6. TEST RESULT.....	36
5. Peak Power Spectrum Density.....	50
5.1. TEST EQUIPMENT.....	53
5.2. TEST SETUP.....	53

5.3.	LIMITS	53
5.4.	TEST PROCEDURE	54
5.5.	UNCERTAINTY	54
5.6.	TEST RESULT.....	55
6.	Peak Excursion.....	70
6.1.	TEST EQUIPMENT.....	70
6.2.	TEST SETUP	70
6.3.	LIMITS	70
6.4.	TEST PROCEDURE	70
6.5.	UNCERTAINTY	70
6.6.	TEST RESULT.....	71
7.	Radiated Emission.....	83
7.1.	TEST EQUIPMENT.....	83
7.2.	TEST SETUP	83
7.3.	LIMITS	84
7.4.	TEST PROCEDURE	85
7.5.	UNCERTAINTY	85
7.6.	TEST RESULT.....	86
7.7.	TEST PHOTO.....	112
8.	Band Edge.....	114
8.1.	TEST EQUIPMENT.....	114
8.2.	TEST SETUP	114
8.3.	LIMITS	115
8.4.	TEST PROCEDURE	116
8.5.	UNCERTAINTY	116
8.6.	TEST RESULT.....	117
9.	Frequency Stability.....	133
9.1.	TEST EQUIPMENT.....	133
9.2.	TEST SETUP	133
9.3.	LIMITS	133
9.4.	TEST PROCEDURE	133
9.5.	UNCERTAINTY	133
9.6.	TEST RESULT.....	134
	ATTACHEMENT	145
	EUT PHOTOGRAPH.....	145

1. General Information

1.1. EUT Description

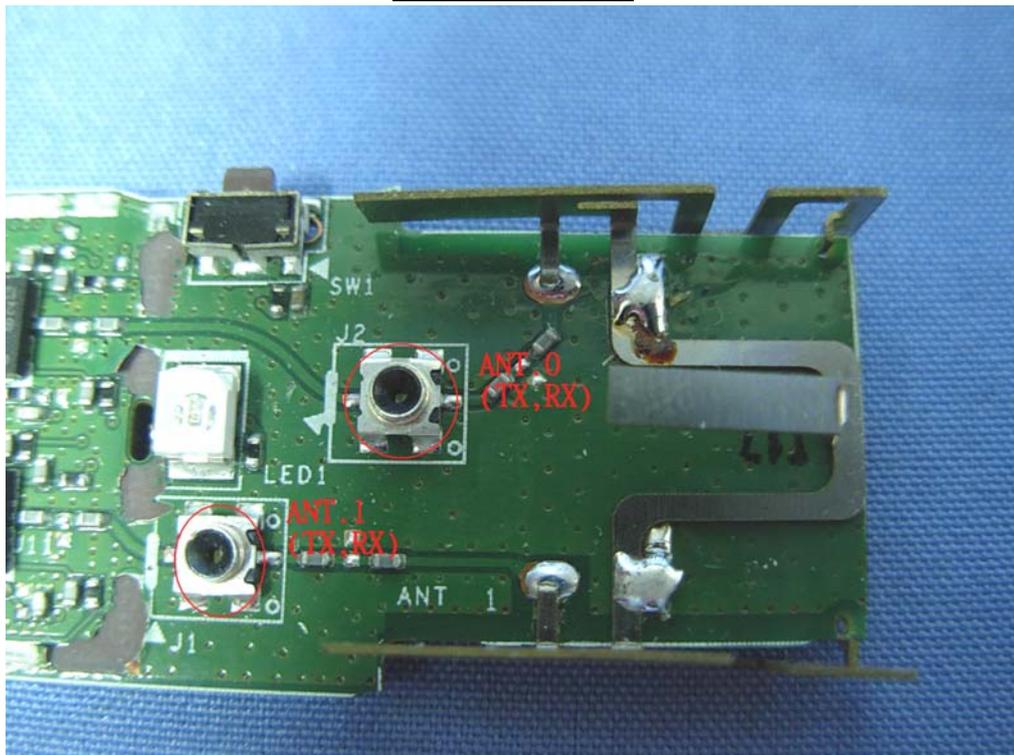
Product Name	Dual-band Wireless-AC1200 USB Adapter
Product Type	WLAN (2TX, 2RX)
Trade Name	ASUS
Model No.	USB-AC53
Frequency Range -IEEE 802.11a & IEEE 802.11n (20MHz)	5180~5240MHz
Frequency Range- IEEE 802.11n (40MHz)	5190~5230MHz
Frequency Range- IEEE 802.11ac (80MHz)	5210MHz
Channel Number - IEEE 802.11a & IEEE 802.11n (20MHz))	4
Channel Number- IEEE 802.11n (40MHz)	2
Channel Number- IEEE 802.11 ac (80MHz)	1
Type of Modulation (IEEE 802.11a/n)	Orthogonal Frequency Division Multiplexing (OFDM)
Data Speed (IEEE 802.11a)	6Mbps,9Mbps,12Mbps,18Mbps,24Mbps,36Mbps,48Mbps,54Mbps
Data Speed (IEEE 802.11n)	Support a subset of the combination of GI, MCS 0~MCS 15 and bandwidth defined in 802.11n
Data Speed (IEEE 802.11ac)	Support a subset of the combination of GI, MCS 0~MCS 9 and bandwidth defined in 802.11ac
Antenna Gain	4dBi
Channel Control	AUTO
Antenna Type	PIFA

Component	
USB Cable	Shielded, 1.0m

ANT-TX / Rx & Bandwidth

ANT-TX / RX	SINGLE-TX	TWO-TX			RX		
		20MHz	20MHz	40MHz	80MHz	20MHz	40MHz
Mode/ Channel Bandwidth	20MHz	20MHz	40MHz	80MHz	20MHz	40MHz	80MHz
IEEE802.11a	✓				✓		
IEEE802.11n		✓	✓		✓	✓	
IEEE802.11ac		✓	✓	✓	✓	✓	✓

ANT 0/1 (TX / RX)



IEEE 802.11n

MCS Index	Modulation	R	N _{BPSCS}	N _{CBPS}		N _{DBPS}		Data Rate(Mb/s)			
				20MHz	40MHz	20MHz	40MHz	800ns GI		400ns GI (Note1)	
								20MHz	40MHz	20MHz	40MHz
0	BPSK	1/2	1	52	108	26	54	6.5	13.5	7.2	15.0
1	QPSK	1/2	2	104	216	52	108	13.0	27.0	14.4	30.0
2	QPSK	3/4	2	104	216	78	162	19.5	40.5	21.7	45.0
3	16-QAM	1/2	4	208	432	104	216	26.0	54.0	28.9	60.0
4	16-QAM	3/4	4	208	432	156	324	39.0	81.0	43.3	90.0
5	64-QAM	2/3	6	312	648	208	432	52.0	108.0	57.8	120.0
6	64-QAM	3/4	6	312	648	234	486	58.5	121.5	65.0	135.0
7	64-QAM	5/6	6	312	648	260	540	65.0	135.0	72.2	150.0

Note 1: Support of 400ns GI is optional on transmit and receive.

Table 1 – MCS parameters for TX Antenna number = 1

MCS Index	Modulation	R	N _{BPSCS}	N _{CBPS}		N _{DBPS}		Data Rate(Mb/s)			
				20MHz	40MHz	20MHz	40MHz	800ns GI		400ns GI (Note1)	
								20MHz	40MHz	20MHz	40MHz
8	BPSK	1/2	1	104	216	52	108	13.0	27.0	14.4	30.0
9	QPSK	1/2	2	208	432	104	216	26.0	54.0	28.9	60.0
10	QPSK	3/4	2	208	432	156	324	39.0	81.0	43.3	90.0
11	16-QAM	1/2	4	416	864	208	432	52.0	108.0	57.8	120.0
12	16-QAM	3/4	4	416	864	312	648	78.0	162.0	86.7	180.0
13	64-QAM	2/3	6	624	1296	416	864	104.0	216.0	115.6	240.0
14	64-QAM	3/4	6	624	1296	468	972	117.0	243.0	130.0	270.0
15	64-QAM	5/6	6	624	1296	520	1080	130.0	270.0	144.4	300.0

Note 1: Support of 400ns GI is optional on transmit and receive.

Table 2 – MCS parameters for TX Antenna number = 2

Symbol	Explanation
R	Code rate
N _{BPSC}	Number of coded bits per single carrier
N _{CBPS}	Number of coded bits per symbol
N _{DBPS}	Number of data bits per symbol
GI	guard interval

Draft IEEE 802.11ac Data Rate

Spatial Streams (Note1)	MCS Index	Modulation type	Coding rate	Data Rate(Mb/s)							
				20 MHz		40 MHz		80 MHz		160 MHz	
				Guard Interval		Guard Interval		Guard Interval		Guard Interval	
				800ns	400ns	800ns	400ns	800ns	400ns	800ns	400ns
1	0	BPSK	1/2	6.5	7.2	13.5	15	29.3	32.5	58.5	65
	1	QPSK	1/2	13	14.4	27	30	58.5	65	117	130
	2	QPSK	3/4	19.5	21.7	40.5	45	87.8	97.5	175.5	195
	3	16-QAM	1/2	26	28.9	54	60	117	130	234	260
	4	16-QAM	3/4	39	43.3	81	90	175.5	195	351	390
	5	64-QAM	2/3	52	57.8	108	120	234	260	468	520
	6	64-QAM	3/4	58.5	65	121.5	135	263.3	292.5	526.5	585
	7	64-QAM	5/6	65	72.2	135	150	292.5	325	585	650
	8	256-QAM	3/4	78	86.7	162	180	351	390	702	780
	9	256-QAM	5/6	N/A	N/A	180	200	390	433.3	780	866.7
2	0	BPSK	1/2	13	14.4	27	30	58.6	65	117	130
	1	QPSK	1/2	26	28.8	54	60	117	130	234	260
	2	QPSK	3/4	39	43.4	81	90	175.6	195	351	390
	3	16-QAM	1/2	52	57.8	108	120	234	260	468	520
	4	16-QAM	3/4	78	86.6	162	180	351	390	702	780
	5	64-QAM	2/3	104	115.6	216	240	468	520	936	1040
	6	64-QAM	3/4	117	130	243	270	526.6	585	1053	1170
	7	64-QAM	5/6	130	144.4	270	300	585	650	1170	1300
	8	256-QAM	3/4	156	173.4	324	360	702	780	1404	1560
	9	256-QAM	5/6	N/A	N/A	360	400	780	866.6	1560	1733.4

IEEE 802.11a & IEEE 802.11n (20MHz)

Working Frequency of Each Channel							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
36	5180MHz	40	5200MHz	44	5220MHz	48	5240MHz

IEEE 802.11n (40MHz)

Working Frequency of Each Channel			
Channel	Frequency	Channel	Frequency
38	5190MHz	46	5230MHz

IEEE 802.11ac (80MHz)

Working Frequency of Each Channel			
Channel	Frequency	Channel	Frequency
42	5210MHz		

Note:

1. This device is a Dual-band Wireless-AC1200 USB Adapter including 2.4GHz b/g/n and 5GHz a/n (2x2) transmitting and receiving function.
2. These test results on a sample of the device are for the purpose of demonstrating Compliance with Part 15 Subpart E Paragraph 15.407.
3. Regards to the frequency band operation; the lowest , middle and highest frequency of channel were selected to perform the test, and then shown on this report.
4. The function of the 2.4GHz and 5.8GHz transmitting is measured and makes a test report of the report number: 12A087R-RFUSP42V01.
5. This device has USB and Ethernet ports, which can be connected to computer. The receiving function receiving was tested and its test report number is 12A087R-RFUSP37V02 under Declaration of Conformity.

1.3. Test Mode

Quietek has verified the construction and function in typical operation. The preliminary tests were performed in different data rate, and to find the worst condition, which was shown in this test report. The following table is the final test mode.

TX	Mode 1: Transmit
----	------------------

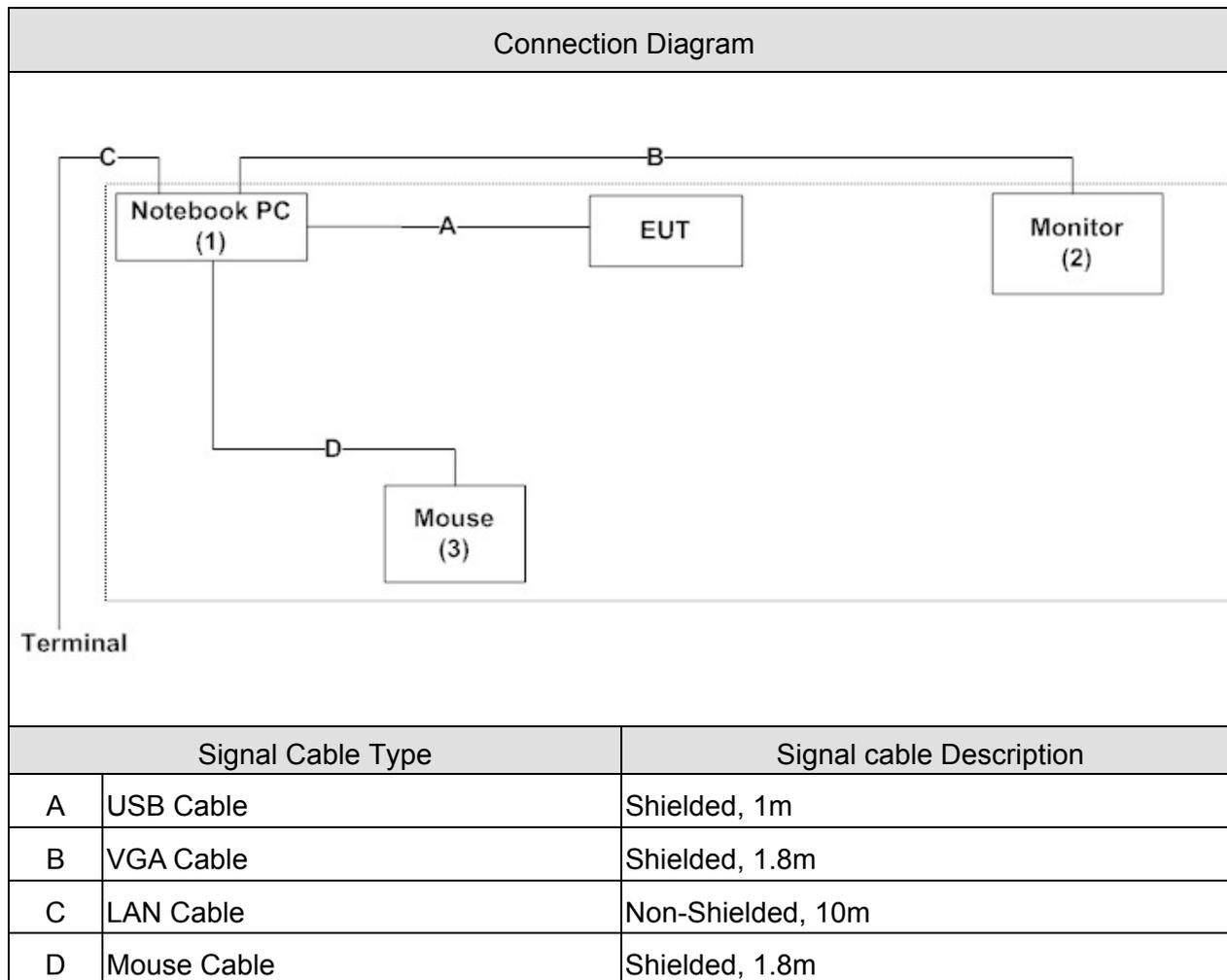
Test Items	Mode	Channel	Antenna	Result
Conducted Emission	11ac (80MHz)	42	0+1	Complies
99 % & 26dB Bandwidth	a	36/44/48	0	Complies
	11n/ac (20MHz)	36/44/48	0/1	Complies
	11n/ac (40MHz)	38/46	0/1	Complies
	11ac (80MHz)	42	0/1	Complies
Peak Transmit Output	a	36/44/48	0	Complies
	11n/ac (20MHz)	36/44/48	0+1	Complies
	11n/ac (40MHz)	38/46	0+1	Complies
	11ac (80MHz)	42	0+1	Complies
Peak Power Spectrum Density	a	36/44/48	0	Complies
	11n/ac (20MHz)	36/44/48	0+1	Complies
	11n/ac (40MHz)	38/46	0+1	Complies
	11ac (80MHz)	42	0+1	Complies
Power Excursion	a	36/44/48	0	Complies
	11n/ac (20MHz)	36/44/48	0/1	Complies
	11n/ac (40MHz)	38/46	0/1	Complies
	11ac (80MHz)	42	0/1	Complies
Radiated Emission	a	36/44/48	0	Complies
	11n/ac (20MHz)	36/44/48	0+1	Complies
	11n/ac (40MHz)	38/46	0+1	Complies
	11ac (80MHz)	42	0+1	Complies
Band Edge	a	36	0	Complies
	11n/ac (20MHz)	36	0+1	Complies
	11n/ac (40MHz)	38	0+1	Complies
	11ac (80MHz)	42	0+1	Complies
Frequency Stability	a	36/44/48	0	Complies
	11n/ac (20MHz)	36/44/48	0/1	Complies
	11n/ac (40MHz)	38/46	0/1	Complies
	11ac (80MHz)	42	0/1	Complies

1.4. Tested System Details

The types for all equipments, plus descriptions of all cables used in the tested system (including inserted cards) are:

Product	Manufacturer	Model No.	Serial No.	FCC ID	Power Cord	
1	Notebook PC	DELL	PP37L	CD8BNG1	DoC	Non-Shielded, 1.8m
2	Monitor	DELL	U2410f	082WXD-72872-16R-0UNL	DoC	Non-Shielded, 1.8m
3	Mouse	Logitech	M-SBF83	HCA52200174	DoC	--

1.5. Configuration of tested System



1.6. EUT Exercise Software

1	Setup the EUT as shown in Section 1.5.
2	Execute the test program "Mtool V1.0.0.9" on the Notebook.
3	Configure the test mode, the test channel, and the data rate.
4	Press "Start TX" to start the continuous transmitting.
5	Verify that the EUT works properly.

1.7. Test Facility

Ambient conditions in the laboratory:

Items	Test Item	Required (IEC 68-1)	Actual
Temperature (°C)	FCC PART 15 C 15.407 Conducted Emission	15 - 35	20
Humidity (%RH)		25 - 75	50
Barometric pressure (mbar)		860 - 1060	950-1000
Temperature (°C)	FCC PART 15 C 15.407 99 % & 26dB Bandwidth	15 - 35	25
Humidity (%RH)		25 - 75	48
Barometric pressure (mbar)		860 - 1060	950-1000
Temperature (°C)	FCC PART 15 C 15.407 Peal Transmit Power	15 - 35	25
Humidity (%RH)		25 - 75	65
Barometric pressure (mbar)		860 - 1060	950-1000
Temperature (°C)	FCC PART 15 C 15.407 Peak Power Spectrum	15 - 35	24
Humidity (%RH)		25 - 75	49
Barometric pressure (mbar)		860 - 1060	950-1000
Temperature (°C)	FCC PART 15 C 15.407 Power Excursion	15 - 35	25
Humidity (%RH)		25 - 75	48
Barometric pressure (mbar)		860 - 1060	950-1000
Temperature (°C)	FCC PART 15 C 15.407 Radiated Emission	15 - 35	25
Humidity (%RH)		25 - 75	48
Barometric pressure (mbar)		860 - 1060	950-1000
Temperature (°C)	FCC PART 15 C 15.407 Band Edge	15 - 35	25
Humidity (%RH)		25 - 75	48
Barometric pressure (mbar)		860 - 1060	950-1000
Temperature (°C)	FCC PART 15 C 15.407 Frequency Stability	15 - 35	25
Humidity (%RH)		25 - 75	48
Barometric pressure (mbar)		860 - 1060	950-1000

2. Conducted Emission

2.1. Test Equipment

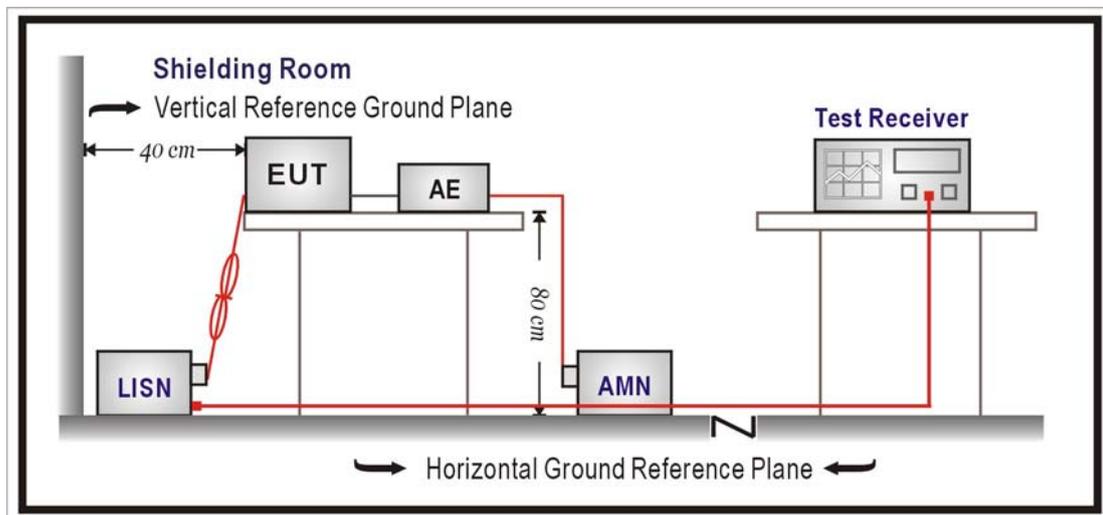
The following test equipments are used during the test:

Conducted Emission / SR3

Instrument	Manufacturer	Model No.	Serial No	Next Cal. Date
LISN	R&S	ENV216	100096	2013/08/12
LISN	R&S	ESH3-Z5	836679/022	2013/02/06
Test Receiver	R&S	ESCS 30	825442/017	2013/01/01

Note: 1. All equipments that need to calibrate are with calibration period of 1 year.

2.2. Test Setup



2.3. Limits

FCC Part 15 Subpart C Paragraph 15.207 Limits (dBuV)		
Frequency MHz	QP	AV
0.15 - 0.50	66-56	56-46
0.50 - 5.0	56	46
5.0 - 30	60	50

Remarks: In the above table, the tighter limit applies at the band edges.

2.4. Test Procedure

The EUT was setup according to ANSI C63.4: 2009. The EUT was placed on a platform of nominal size, 1 m by 1.5 m, raised 80 cm above the conducting ground plane. The vertical conducting plane was located 40 cm to the rear of the EUT. All other surfaces of EUT were at least 80 cm from any other grounded conducting surface. The EUT and simulators are connected to the main power through a line impedance stabilization network (LISN). The LISN provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN. (Please refer to the block diagram of the test setup and photographs.)

Each current-carrying conductor of the EUT power cord, except the ground (safety) conductor, was individually connected through a LISN to the input power source.

The excess length of the power cord between the EUT and the LISN receptacle were folded back and forth at the center of the lead to form a bundle not exceeding 40 cm in length.

Conducted emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9 kHz.

2.5. Test Specification

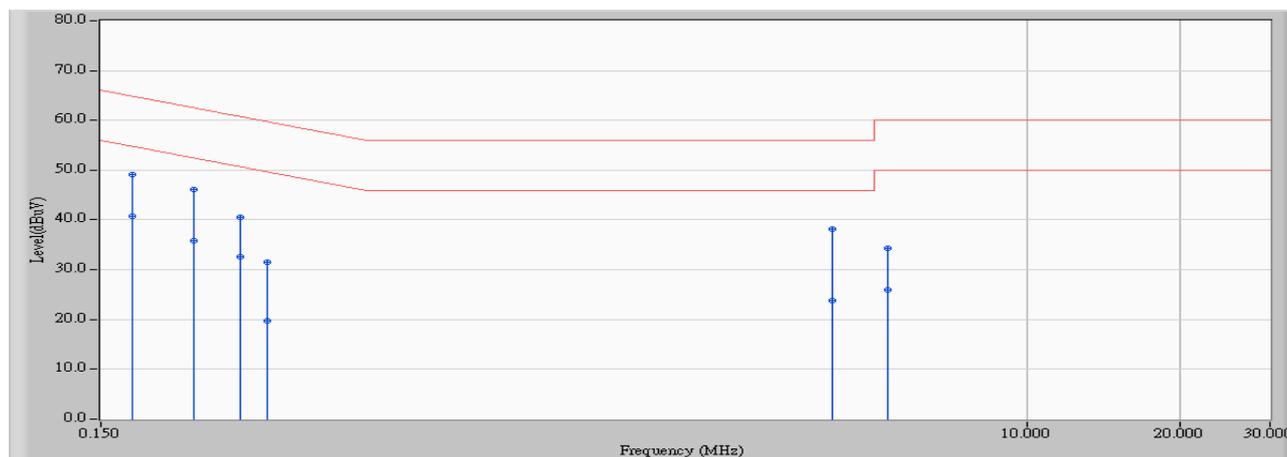
According to FCC Part 15 Subpart C Paragraph 15.207: 2011

2.6. Uncertainty

The measurement uncertainty is defined as ± 2.26 dB.

2.7. Test Result

Site : SR3	Time : 2012/12/13 - 10:36
Limit : CISPR_B_00M_QP	Margin : 10
Probe : SR3_LISN(16A)-2_0813 - Line1	Power : AC 120V/60Hz
EUT : Dual-band Wireless-AC1200 USB Adapter	Note : Mode 1: Transmit -5210MHz_802.11ac(80M)

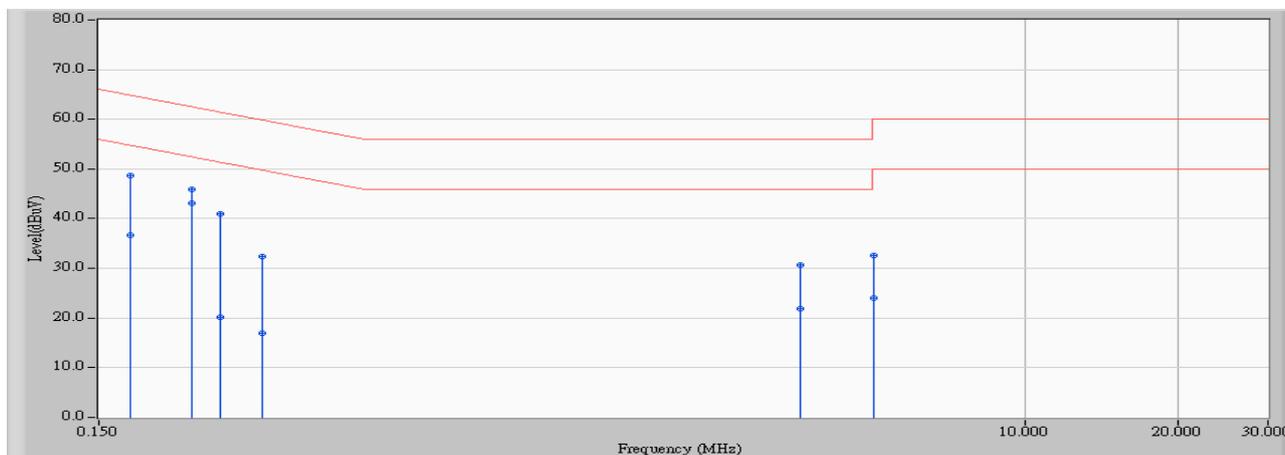


	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV)	Margin (dB)	Limit (dBuV)	Detector Type
1	0.173	9.748	39.300	49.048	-15.747	64.794	QUASPEAK
2	* 0.173	9.748	30.940	40.688	-14.107	54.794	AVERAGE
3	0.228	9.674	36.510	46.184	-16.334	62.518	QUASPEAK
4	0.228	9.674	26.120	35.794	-16.724	52.518	AVERAGE
5	0.283	9.705	30.830	40.535	-20.197	60.733	QUASPEAK
6	0.283	9.705	22.860	32.565	-18.167	50.733	AVERAGE
7	0.318	9.725	21.790	31.515	-28.244	59.760	QUASPEAK
8	0.318	9.725	10.020	19.745	-30.014	49.760	AVERAGE
9	4.119	10.081	28.110	38.191	-17.809	56.000	QUASPEAK
10	4.119	10.081	13.700	23.781	-22.219	46.000	AVERAGE
11	5.298	10.110	24.120	34.230	-25.770	60.000	QUASPEAK
12	5.298	10.110	15.780	25.890	-24.110	50.000	AVERAGE

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.

Site : SR3	Time : 2012/12/13 - 10:37
Limit : CISPR_B_00M_QP	Margin : 10
Probe : SR3_LISN(16A)-2_0813 - Line2	Power : AC 120V/60Hz
EUT : Dual-band Wireless-AC1200 USB Adapter	Note : Mode 1: Transmit -5210MHz_802.11ac(80M)



	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV)	Margin (dB)	Limit (dBuV)	Detector Type
1	0.173	9.646	39.000	48.646	-16.149	64.794	QUASPEAK
2	0.173	9.646	27.130	36.776	-18.019	54.794	AVERAGE
3	0.228	9.673	36.290	45.963	-16.555	62.518	QUASPEAK
4	*	9.673	33.350	43.023	-9.495	52.518	AVERAGE
5	0.259	9.689	31.180	40.869	-20.582	61.451	QUASPEAK
6	0.259	9.689	10.370	20.059	-31.392	51.451	AVERAGE
7	0.314	9.717	22.760	32.478	-27.385	59.862	QUASPEAK
8	0.314	9.717	7.290	17.008	-32.855	49.862	AVERAGE
9	3.615	10.010	20.600	30.610	-25.390	56.000	QUASPEAK
10	3.615	10.010	11.780	21.790	-24.210	46.000	AVERAGE
11	5.017	10.075	22.570	32.645	-27.355	60.000	QUASPEAK
12	5.017	10.075	13.860	23.935	-26.065	50.000	AVERAGE

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.

3. 99% & 26dB Bandwidth

3.1. Test Equipment

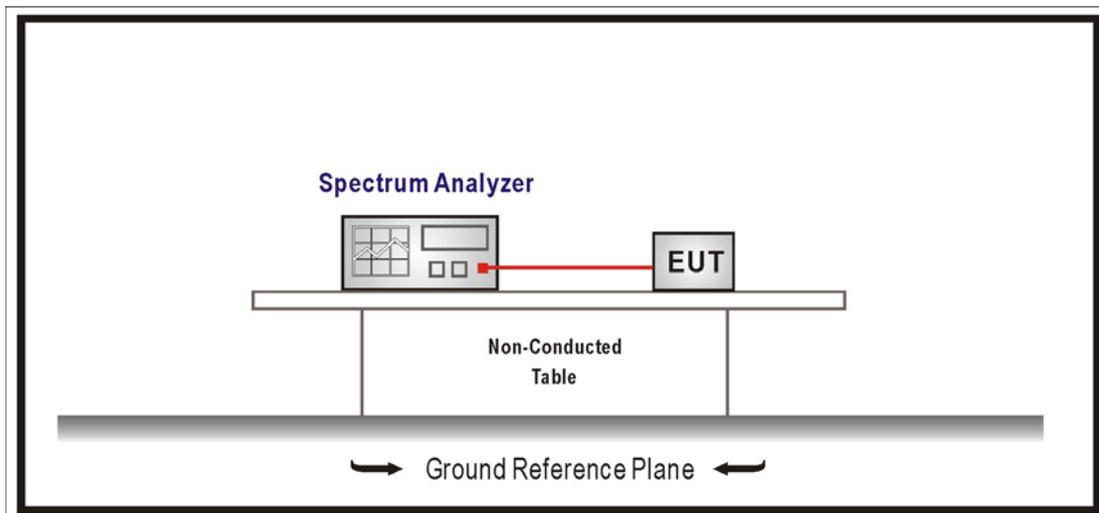
The following test equipments are used during the radiated emission tests:

99% & 26dB Bandwidth / SR7

Instrument	Manufacturer	Model No.	Serial No	Next Cal. Date
Spectrum Analyzer	R&S	FSP	100561	2013/02/19

Note: 1. All equipments that need to calibrate are with calibration period of 1 year.

3.2. Test Setup



3.3. Limits

No Required

3.4. Test Procedure

The EUT was tested according to U-NII test procedure of March 2012 KDB 789033. Set RBW 1% of the emission bandwidth, VBW equal to 3 times the RBW.

3.5. Uncertainty

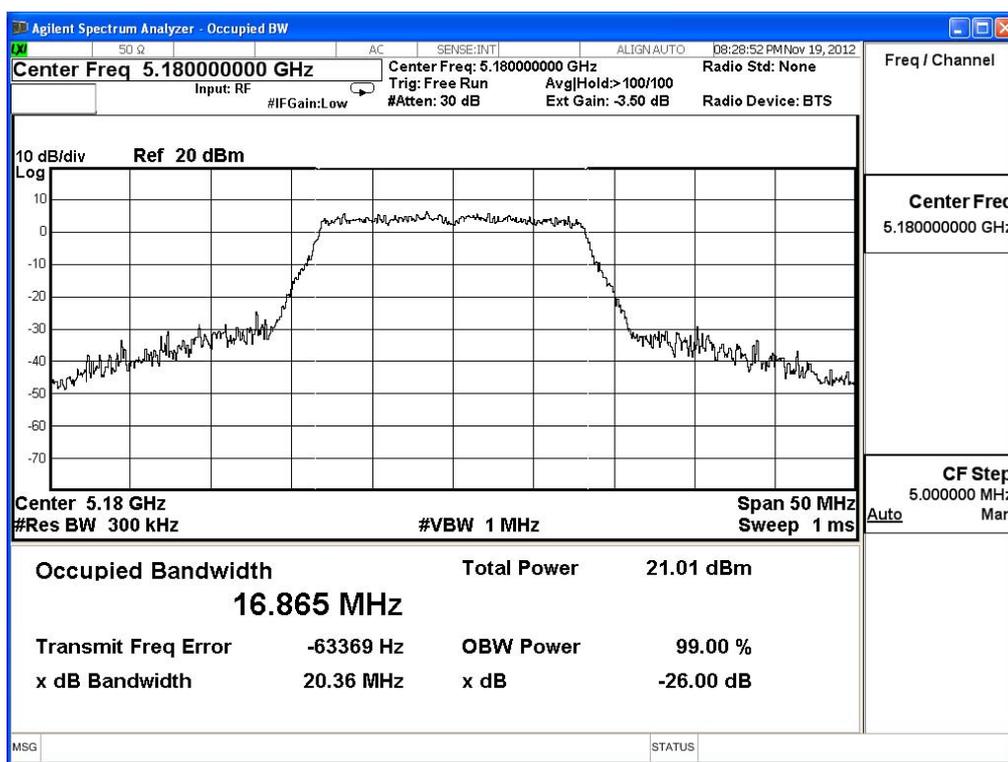
The measurement uncertainty is defined as $\pm 150\text{Hz}$

3.6. Test Result

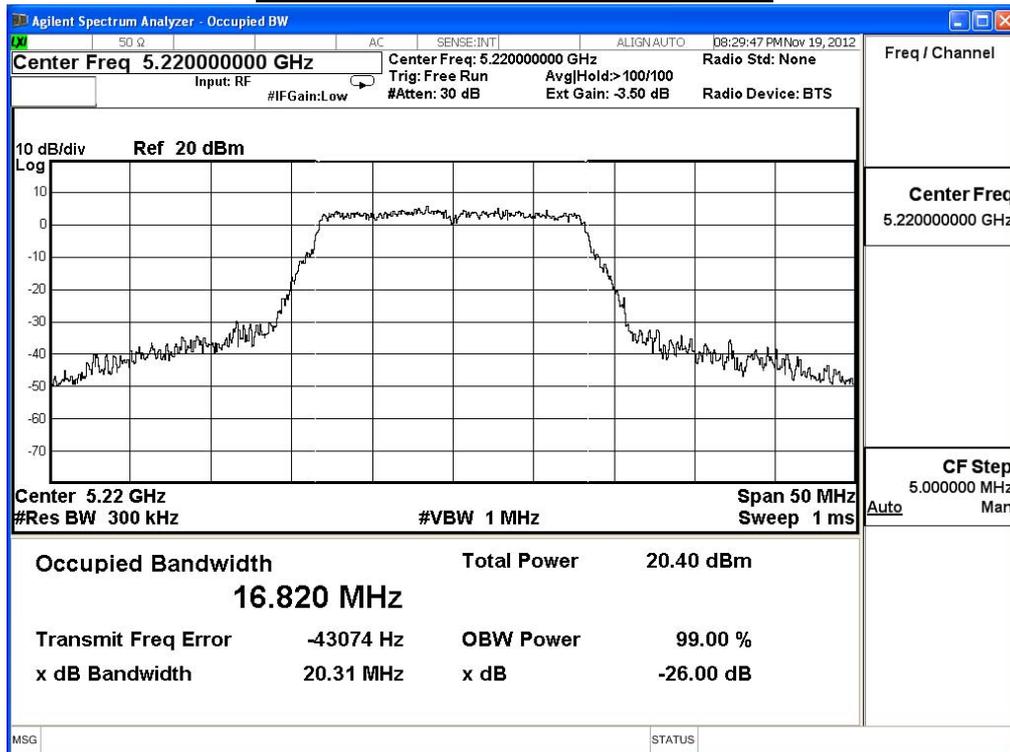
Product	Dual-band Wireless-AC1200 USB Adapter		
Test Item	99% & 26dB Bandwidth		
Test Mode	Mode 1: Transmit		
Date of Test	2012/11/19	Test Site	SR7

802.11a					
Channel No.	Frequency (MHz)	26dB BW (MHz)	99 % OBW (MHz)	Required Limit (MHz)	Result
36	5180	20.36	16.86	--	Pass
44	5220	20.31	16.82	--	Pass
48	5240	20.22	16.88	--	Pass

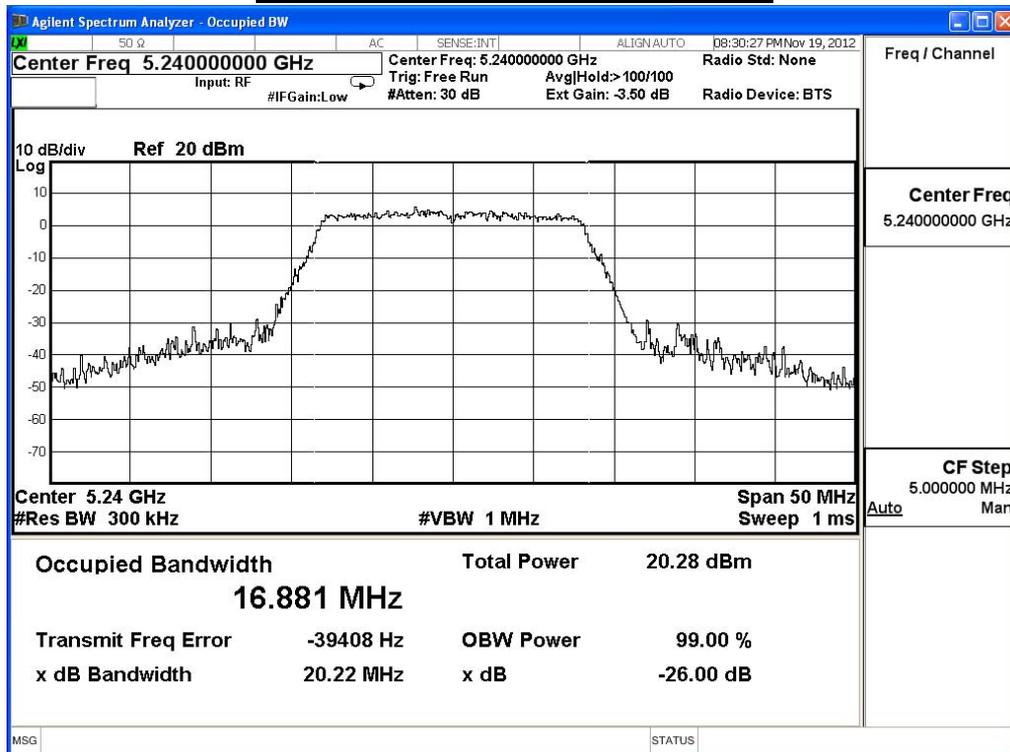
99% & 26dB Bandwidth – Channel 36



99% & 26dB Bandwidth – Channel 44



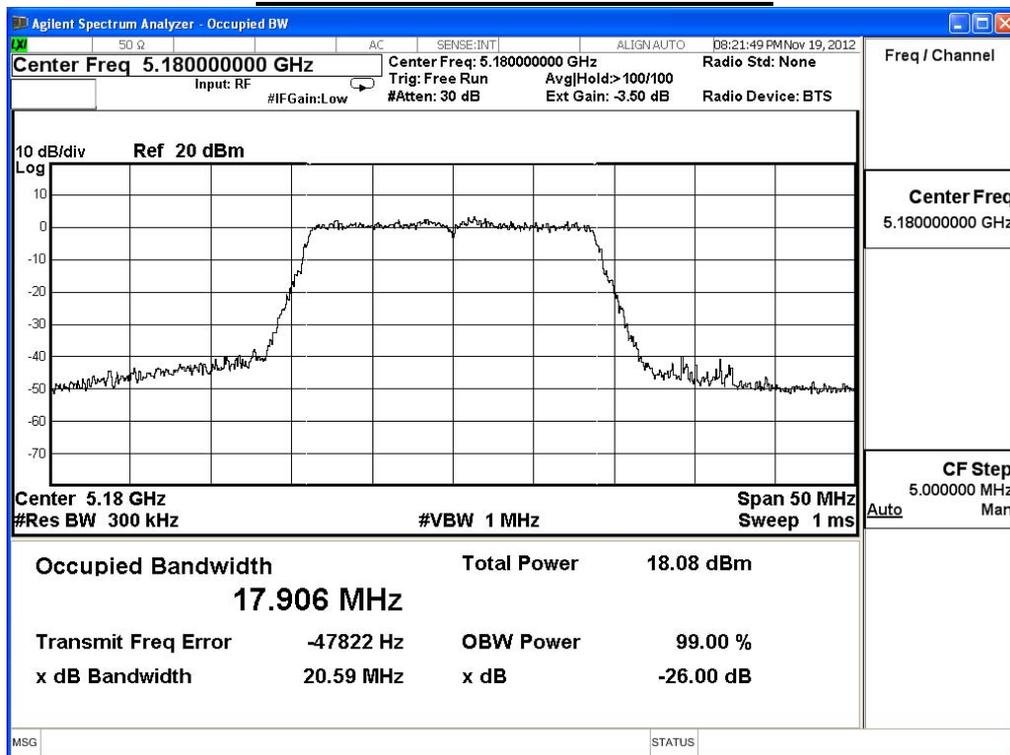
99% & 26dB Bandwidth – Channel 48



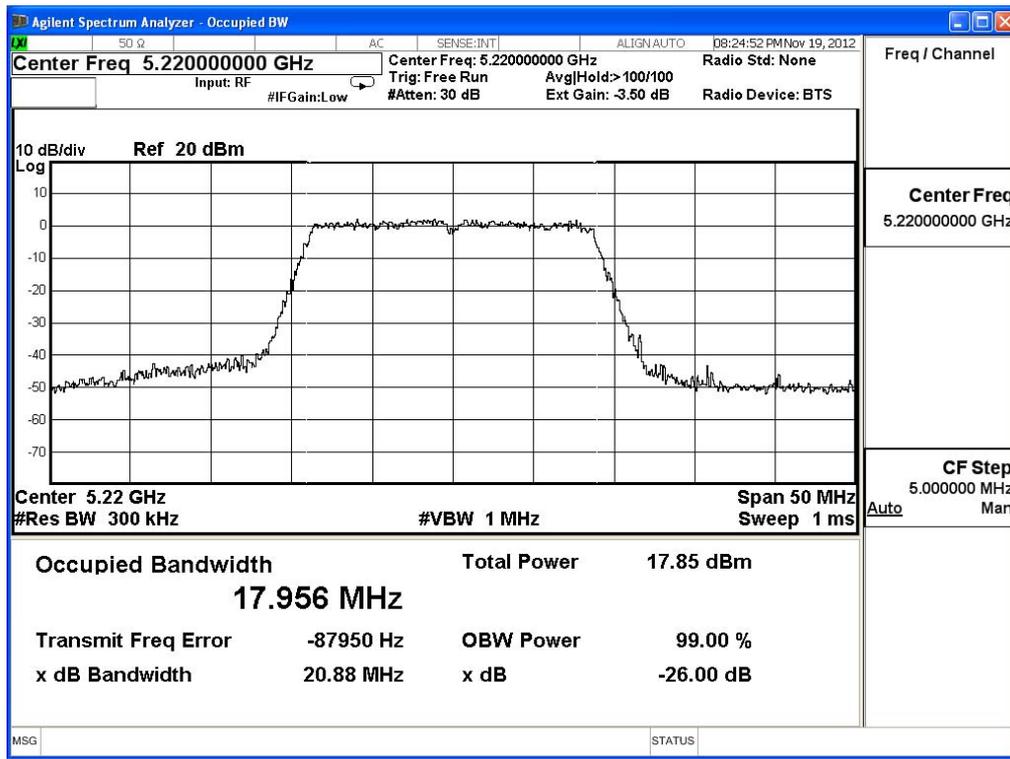
Product	Dual-band Wireless-AC1200 USB Adapter		
Test Item	99% & 26dB Bandwidth		
Test Mode	Mode 1: Transmit		
Date of Test	2012/11/19	Test Site	SR7

802.11n_20M(ANT 0)					
Channel No.	Frequency (MHz)	26dB BW (MHz)	99 % OBW (MHz)	Required Limit (MHz)	Result
36	5180	20.59	17.90	--	Pass
44	5220	20.88	17.95	--	Pass
48	5240	20.46	17.90	--	Pass

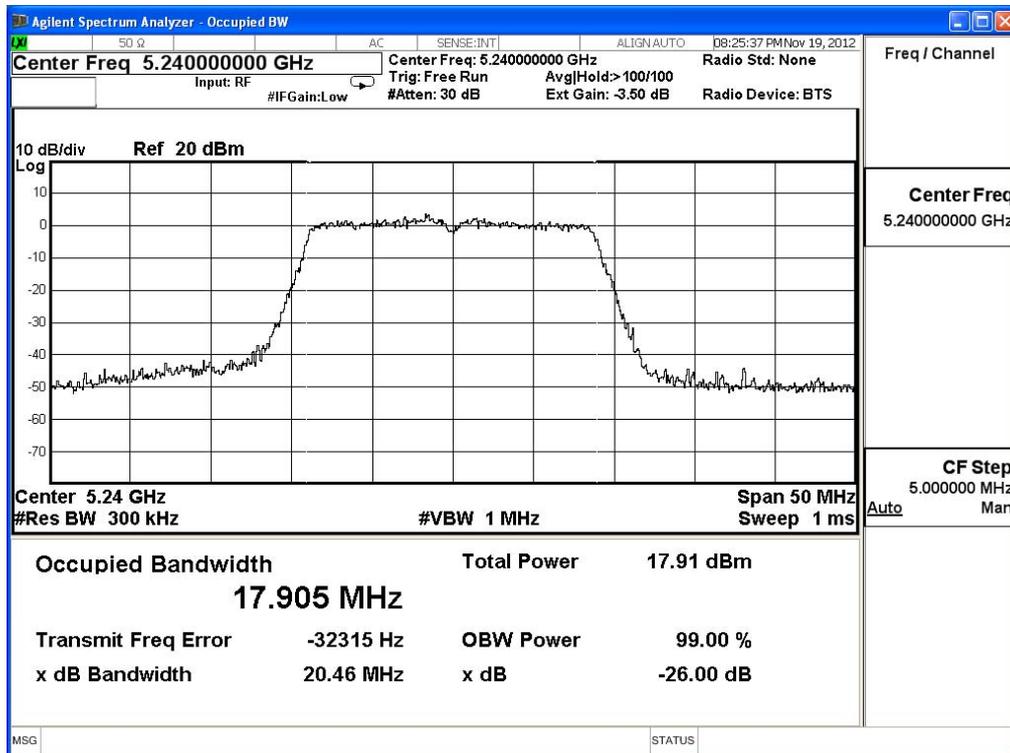
99% & 26dB Bandwidth – Channel 36



99% & 26dB Bandwidth – Channel 44



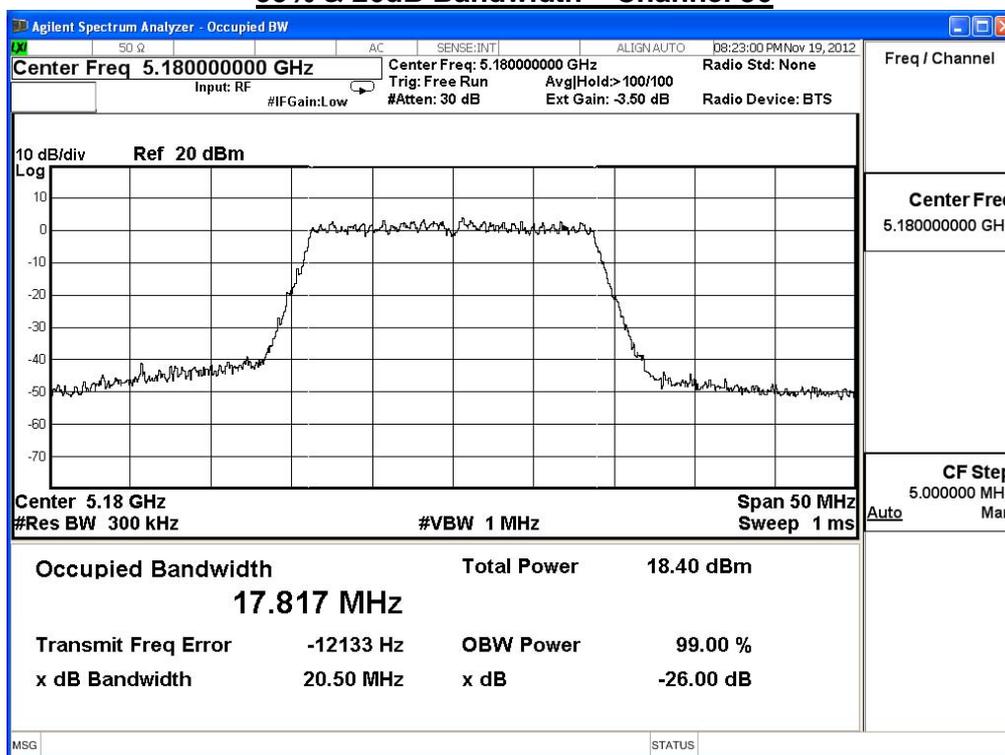
99% & 26dB Bandwidth – Channel 48



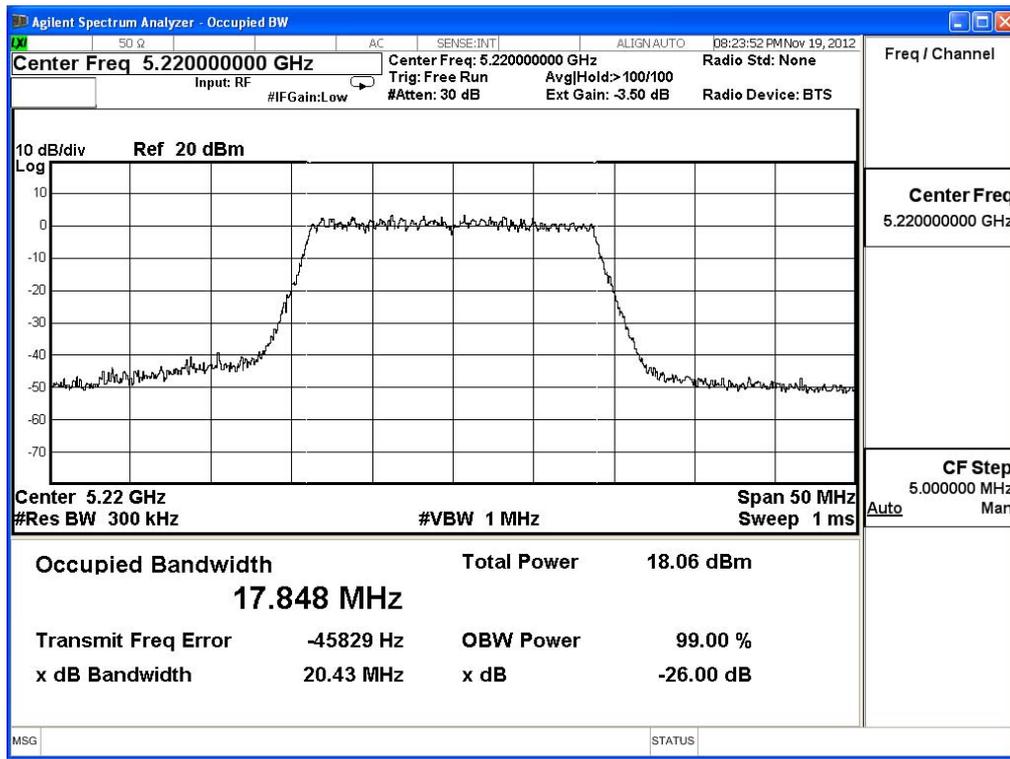
Product	Dual-band Wireless-AC1200 USB Adapter		
Test Item	99% & 26dB Bandwidth		
Test Mode	Mode 1: Transmit		
Date of Test	2012/11/19	Test Site	SR7

802.11n_20M(ANT 1)					
Channel No.	Frequency (MHz)	26dB BW (MHz)	99 % OBW (MHz)	Required Limit (MHz)	Result
36	5180	20.50	17.81	--	Pass
44	5220	20.43	17.84	--	Pass
48	5240	20.34	17.81	--	Pass

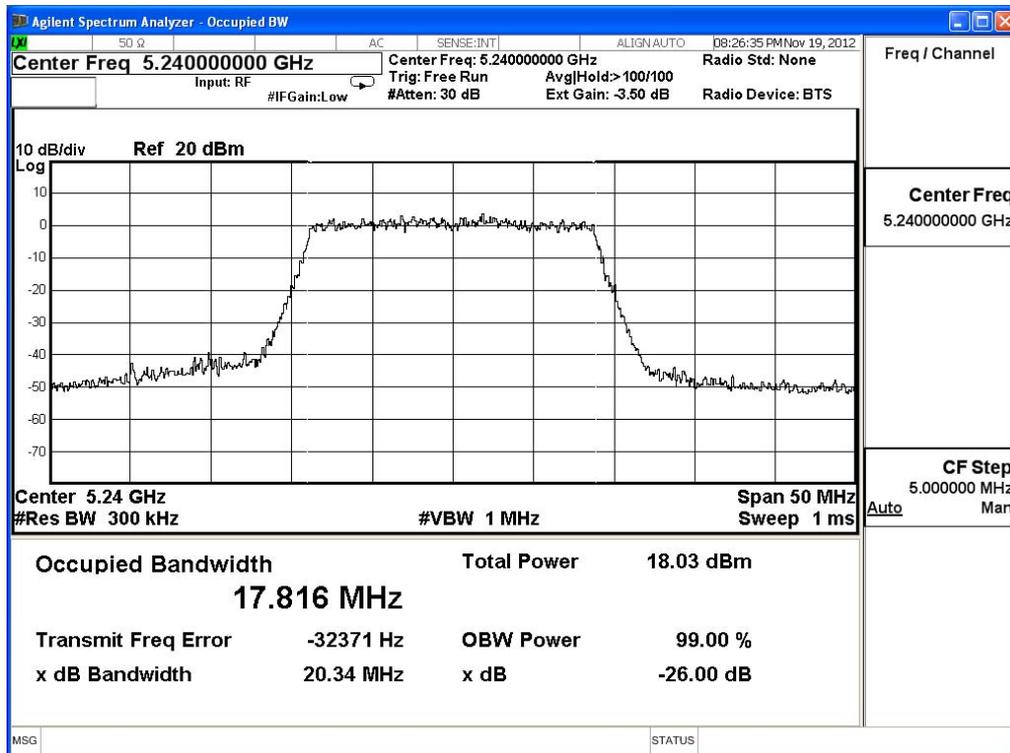
99% & 26dB Bandwidth – Channel 36



99% & 26dB Bandwidth – Channel 44



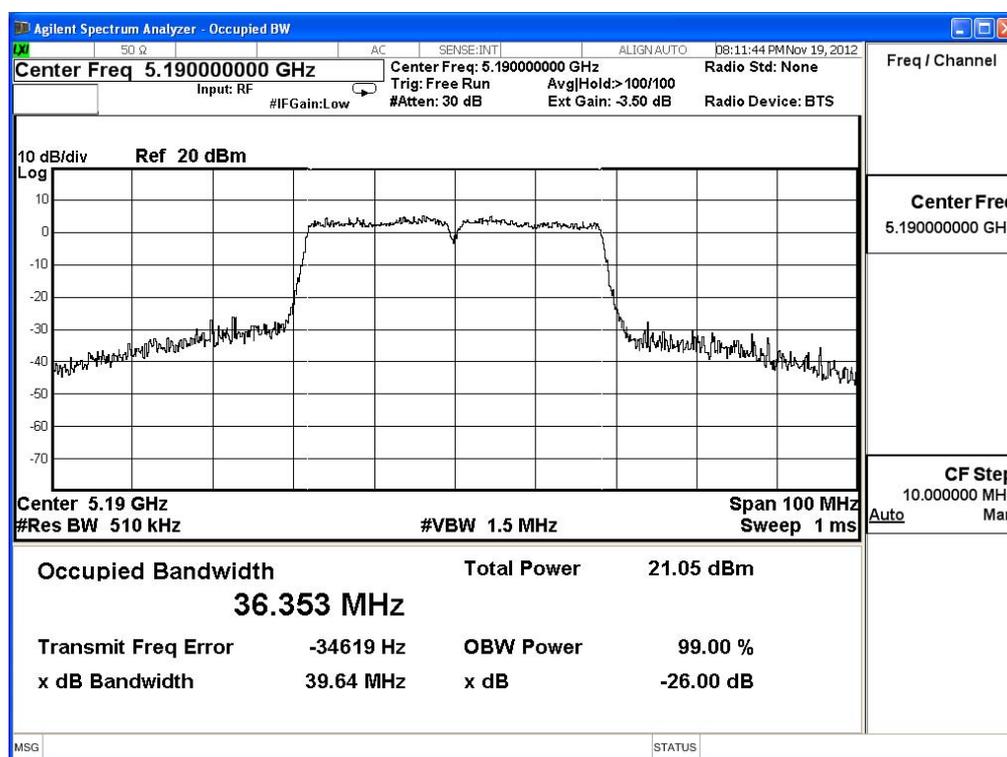
99% & 26dB Bandwidth – Channel 48



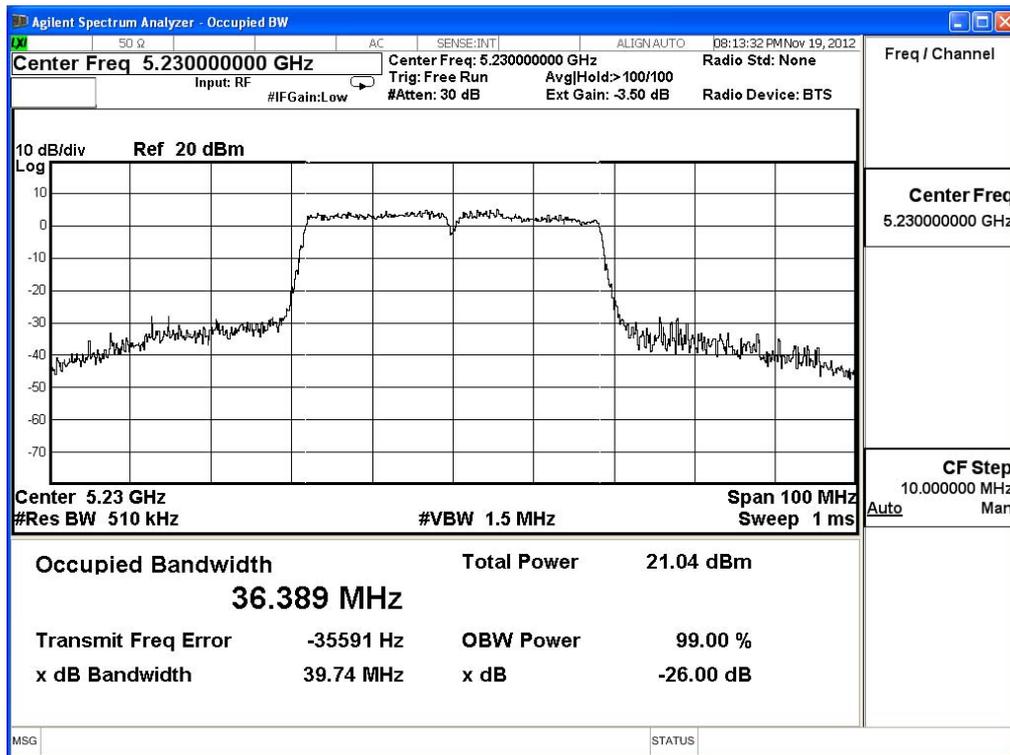
Product	Dual-band Wireless-AC1200 USB Adapter		
Test Item	99% & 26dB Bandwidth		
Test Mode	Mode 1: Transmit		
Date of Test	2012/11/19	Test Site	SR7

802.11n_40M(ANT 0)					
Channel No.	Frequency (MHz)	26dB BW (MHz)	99 % OBW (MHz)	Required Limit (MHz)	Result
38	5190	39.64	36.35	--	Pass
46	5230	39.74	36.38	--	Pass

99% & 26dB Bandwidth – Channel 38



99% & 26dB Bandwidth – Channel 46

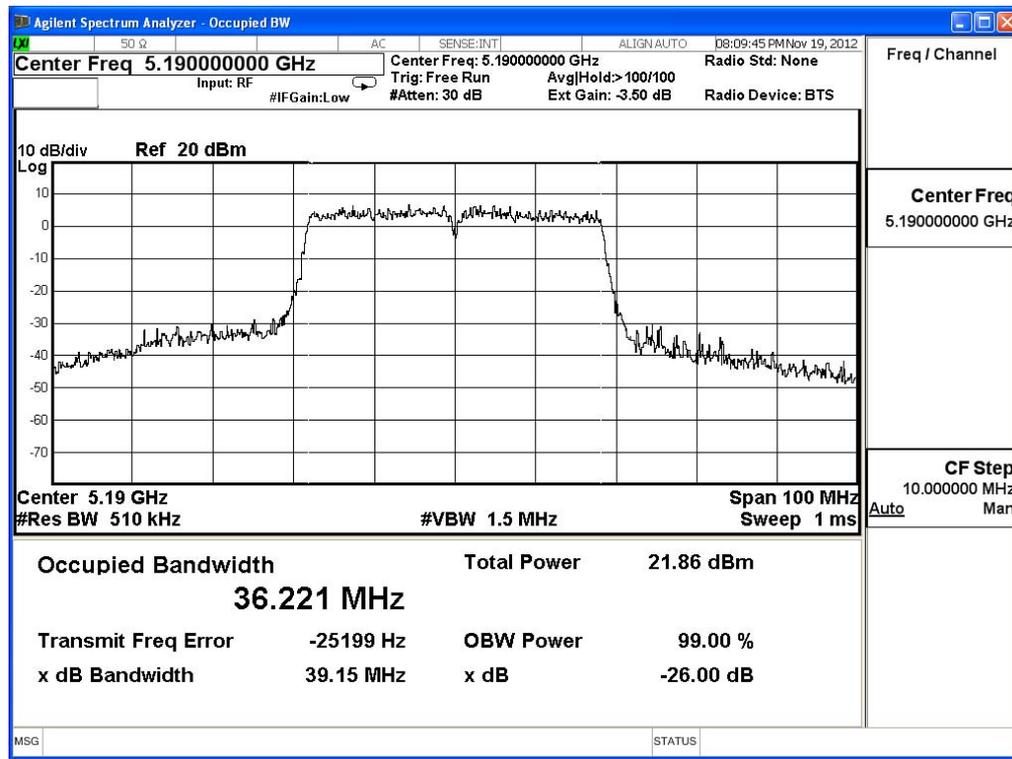


Product	Dual-band Wireless-AC1200 USB Adapter		
Test Item	99% & 26dB Bandwidth		
Test Mode	Mode 1: Transmit		
Date of Test	2012/11/19	Test Site	SR7

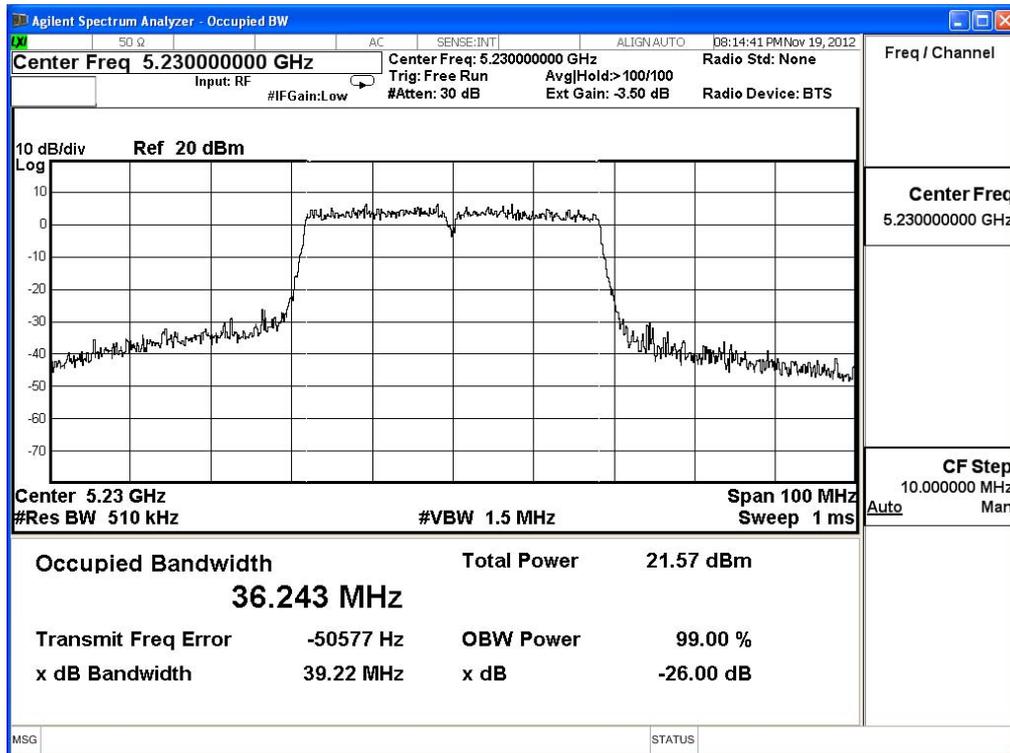
802.11n_40M(ANT 1)

Channel No.	Frequency (MHz)	26dB BW (MHz)	99 % OBW (MHz)	Required Limit (MHz)	Result
38	5190	39.15	36.22	--	Pass
46	5230	39.22	36.24	--	Pass

99% & 26dB Bandwidth – Channel 38



99% & 26dB Bandwidth – Channel 46

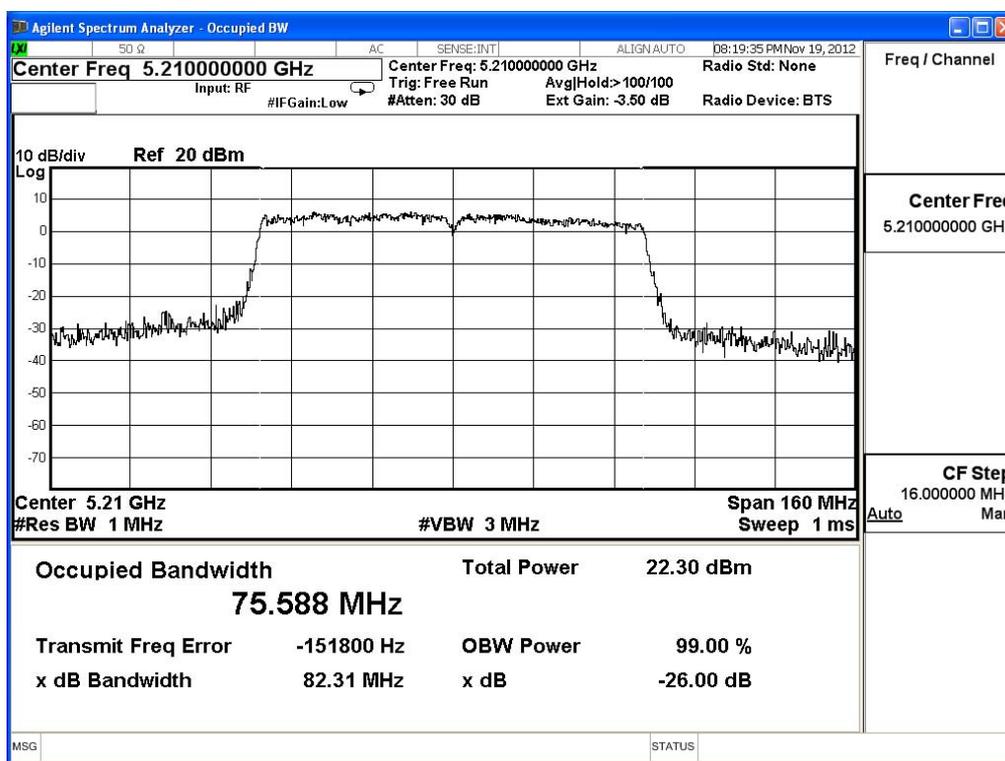


Product	Dual-band Wireless-AC1200 USB Adapter		
Test Item	99% & 26dB Bandwidth		
Test Mode	Mode 1: Transmit		
Date of Test	2012/11/19	Test Site	SR7

802.11ac_80M(ANT 0)

Channel No.	Frequency (MHz)	26dB BW (MHz)	99 % OBW (MHz)	Required Limit (MHz)	Result
42	5210	82.31	75.58	--	Pass

99% & 26dB Bandwidth – Channel 42

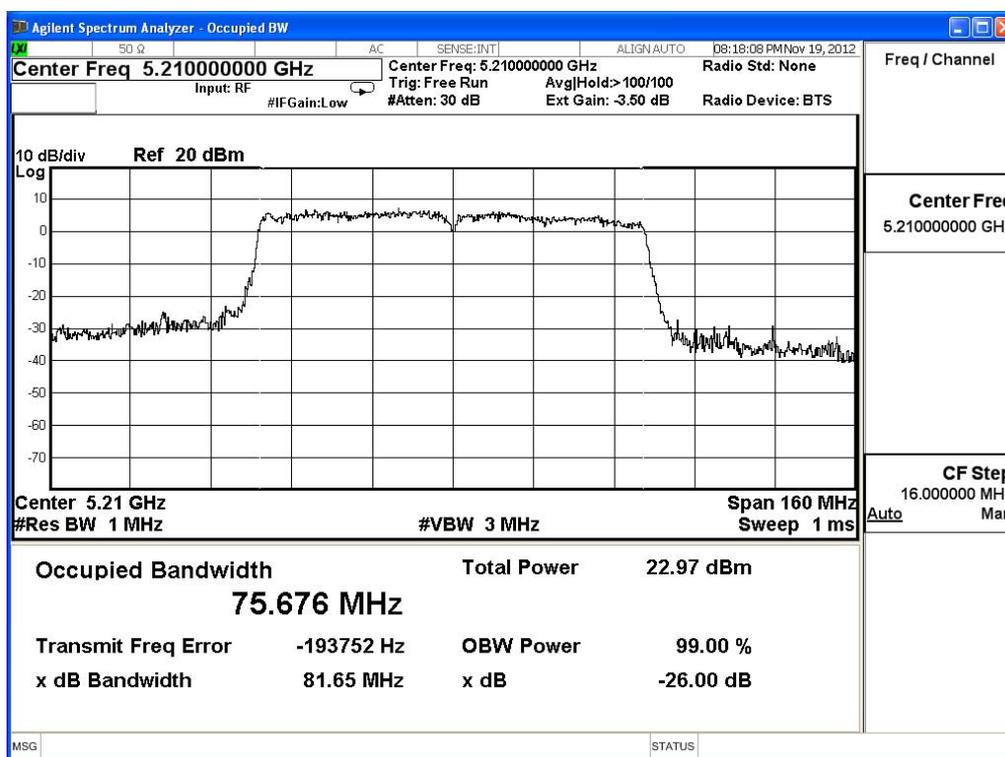


Product	Dual-band Wireless-AC1200 USB Adapter		
Test Item	99% & 26dB Bandwidth		
Test Mode	Mode 1: Transmit		
Date of Test	2012/11/19	Test Site	SR7

802.11ac_80M(ANT 1)

Channel No.	Frequency (MHz)	26dB BW (MHz)	99 % OBW (MHz)	Required Limit (MHz)	Result
42	5210	81.65	75.67	--	Pass

99% & 26dB Bandwidth – Channel 42



4. Peak Transmit Output

4.1. Test Equipment

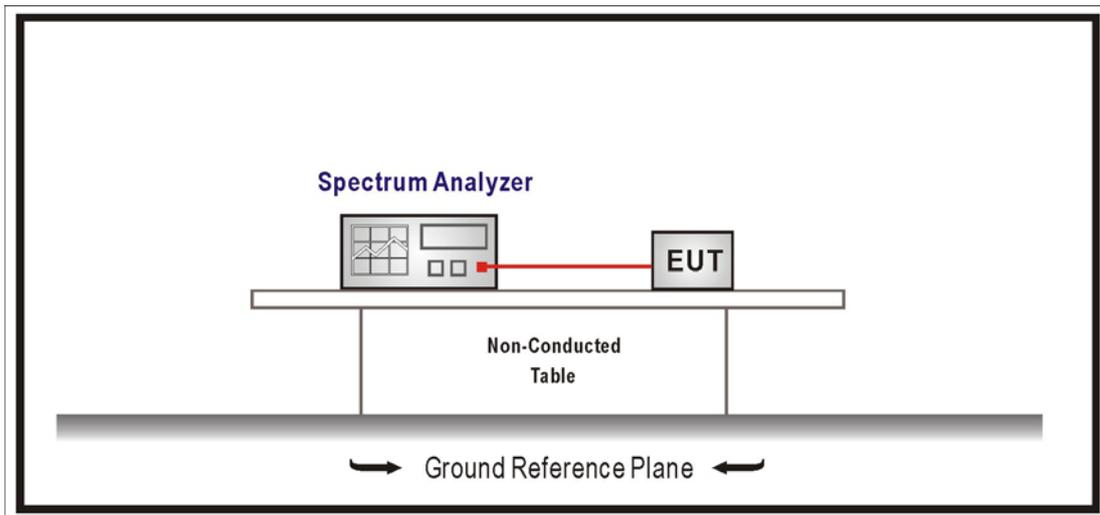
The following test equipments are used during the radiated emission tests:

Peak Transmit Output / SR7

Instrument	Manufacturer	Model No.	Serial No	Next Cal. Date
Spectrum Analyzer	R&S	FSP	100561	2013/02/19

Note: 1. All equipments that need to calibrate are with calibration period of 1 year.

4.2. Test Setup



4.3. Limits

1. For the band 5.15-5.25 GHz, the peak transmit power over the frequency band of operation shall not exceed the lesser of 50 mW or $4 \text{ dBm} + 10\log B$, where B is the 26dB emission bandwidth in MHz. If transmitting antenna of directional gain greater than 6 dBi are used, the peak transmit power shall be reduced by the amount in dB that directional gain of the antenna exceeds 6 dBi.
2. For the band 5.25-5.35 GHz, the peak transmit power over the frequency band of operation shall not exceed the lesser of 250 mW or $11 \text{ dBm} + 10\log B$, where B is the 26dB emission bandwidth in MHz. If transmitting antenna of directional gain greater than 6 dBi are used, the peak transmit power shall be reduced by the amount in dB that directional gain of the antenna exceeds 6 dBi.
3. For the band 5.725-5.825 GHz, the peak transmit power over the frequency band of operation shall not exceed the lesser of 1W or $17 \text{ dBm} + 10\log B$, where B is the 26dB emission bandwidth in MHz. If transmitting antenna of directional gain greater than 6 dBi are used, the peak transmit power shall be reduced by the amount in dB that directional gain of the antenna exceeds 6 dBi.

4.4. Test Procedure

The EUT was setup to ANSI C63.4, 2009; tested to U-NII test procedure of March 2012 KDB 789033 for compliance to FCC 47CFR Subpart E requirements. The Method SA-1 of the Maximum conducted output power was used.

Set RBW=1MHz, VBW=3MHz with RMS detector and trace average 100 traces in power averaging mode. Set span to encompass the entire emission bandwidth (EBW) of the signal. Compute power by integrating the spectrum across the 26 dB EBW of the signal.

4.5. Uncertainty

The measurement uncertainty is defined as $\pm 1.27 \text{ dB}$

4.6. Test Result

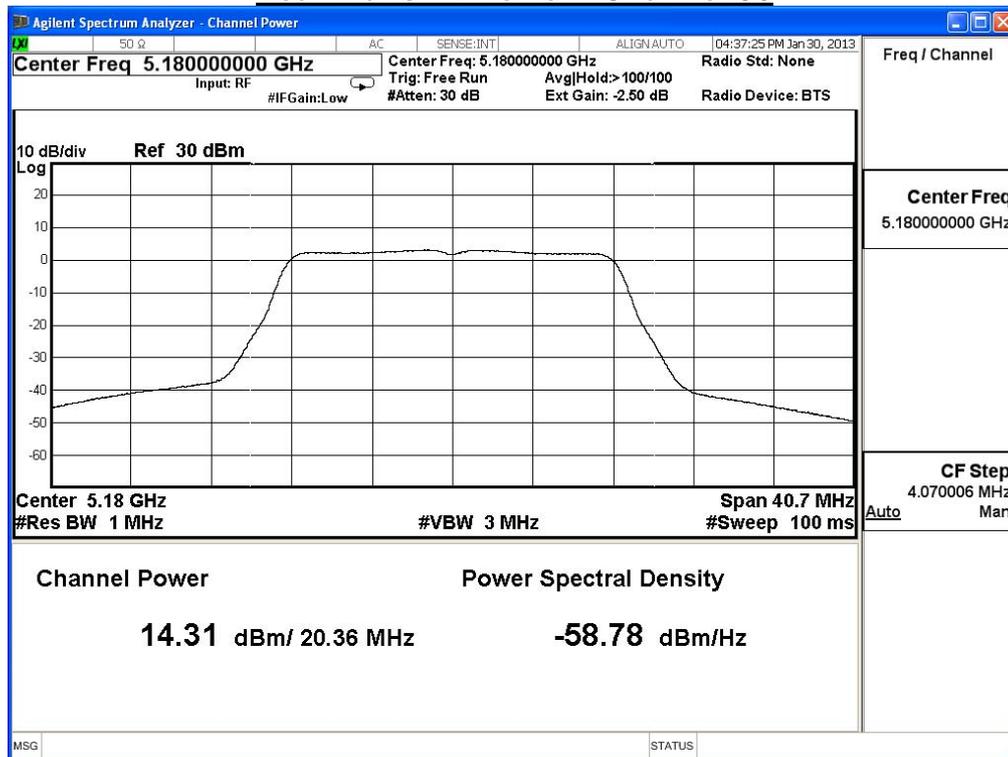
Product	Dual-band Wireless-AC1200 USB Adapter		
Test Item	Peak Transmit Output		
Test Mode	Mode 1: Transmit		
Date of Test	2012/11/19	Test Site	SR7

802.11a						
Channel No.	Frequency (MHz)	26dB Bandwidth (MHz)	Output Power (dBm)	Required Limit		Result
				Fixed Limit (dBm)	4+10logB Limit (dBm)	
36	5180	20.36	14.31	≤ 15.99	≤17.08	Pass
44	5220	20.31	14.23	≤ 15.99	≤17.07	Pass
48	5240	20.22	14.15	≤ 15.99	≤17.05	Pass

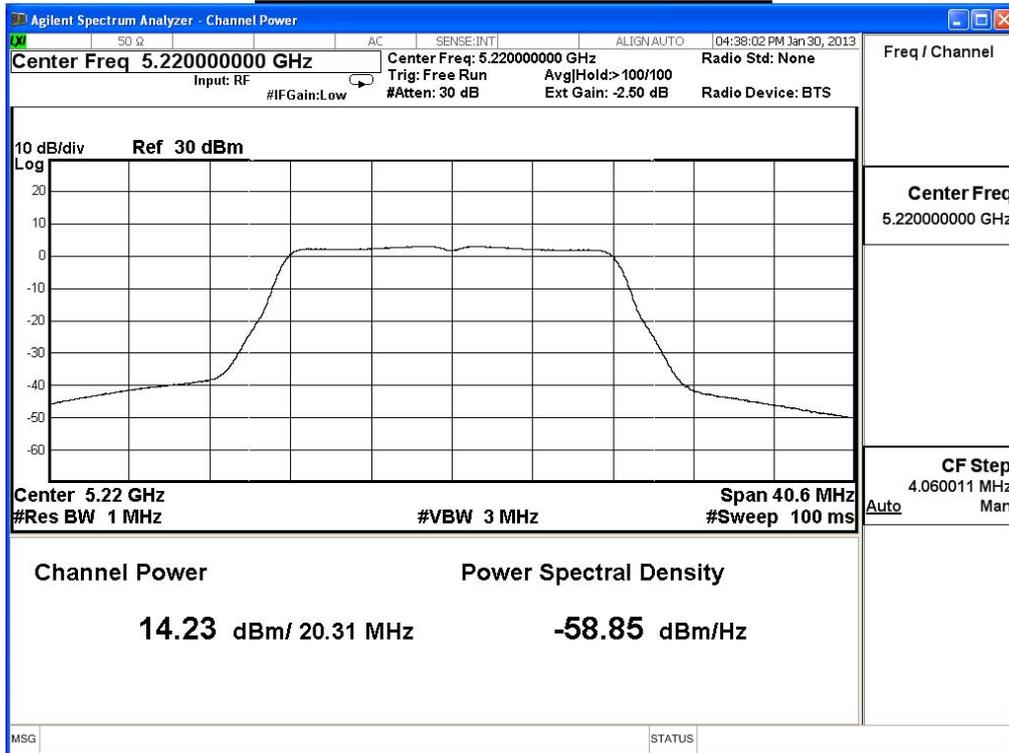
The worst emission of data rate is 6 Mbps.

Peak Power Output (dBm)									
Channel No	Frequency (MHz)	Data Rate							Required Limit
		6	12	18	24	36	48	54	
36	5180	14.31	--	--	--	--	--	--	≤ 15.99
44	5220	14.23	14.22	14.21	14.20	14.19	14.18	14.17	≤ 15.99
48	5240	14.15	--	--	--	--	--	--	≤ 15.99

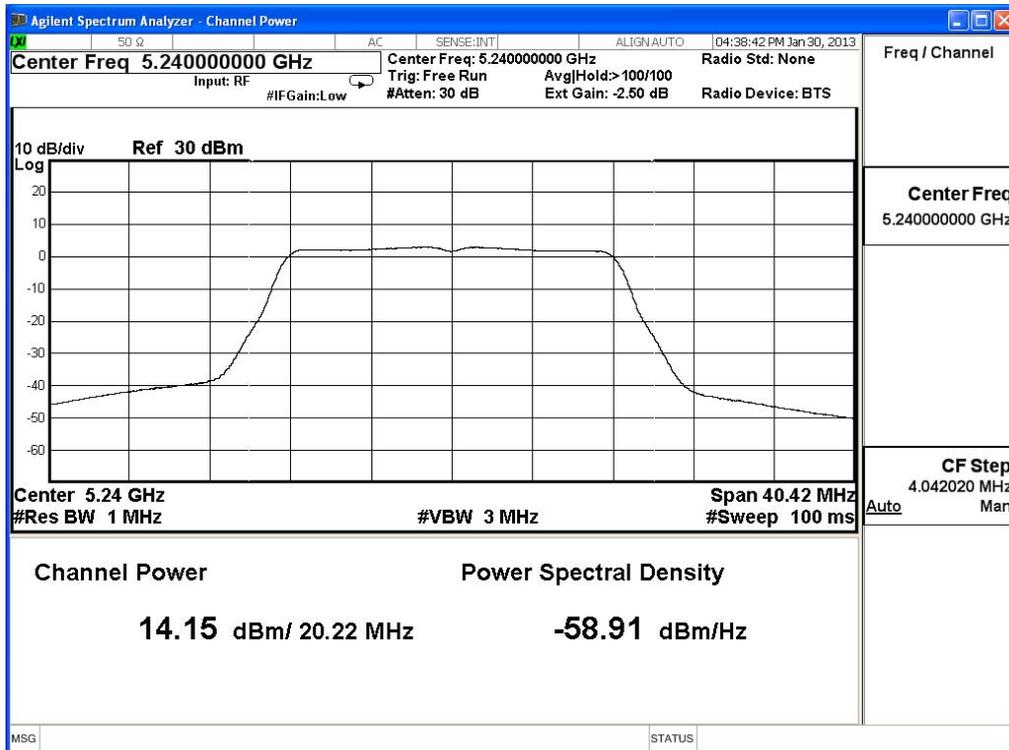
Peak transmit Power - Channel 36



Peak transmit Power - Channel 44



Peak transmit Power - Channel 48



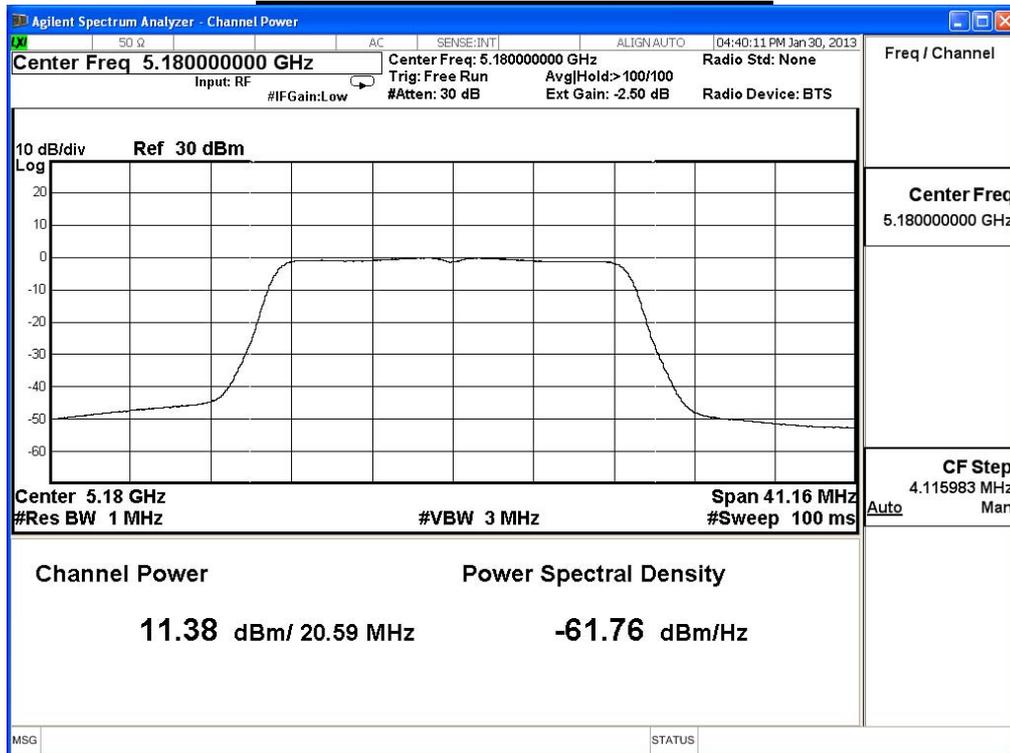
Product	Dual-band Wireless-AC1200 USB Adapter		
Test Item	Peak Transmit Output		
Test Mode	Mode 1: Transmit		
Date of Test	2012/11/19	Test Site	SR7

IEEE 802.11n(20MHz)_ANT 0						
Channel No.	Frequency (MHz)	26dB Bandwidth (MHz)	Output Power (dBm)	Required Limit		Result
				Fixed Limit (dBm)	4+10logB Limit (dBm)	
36	5180	20.59	11.38	≤ 15.99	≤17.13	Pass
44	5220	20.88	11.26	≤ 15.99	≤17.19	Pass
48	5240	20.46	11.53	≤ 15.99	≤17.10	Pass

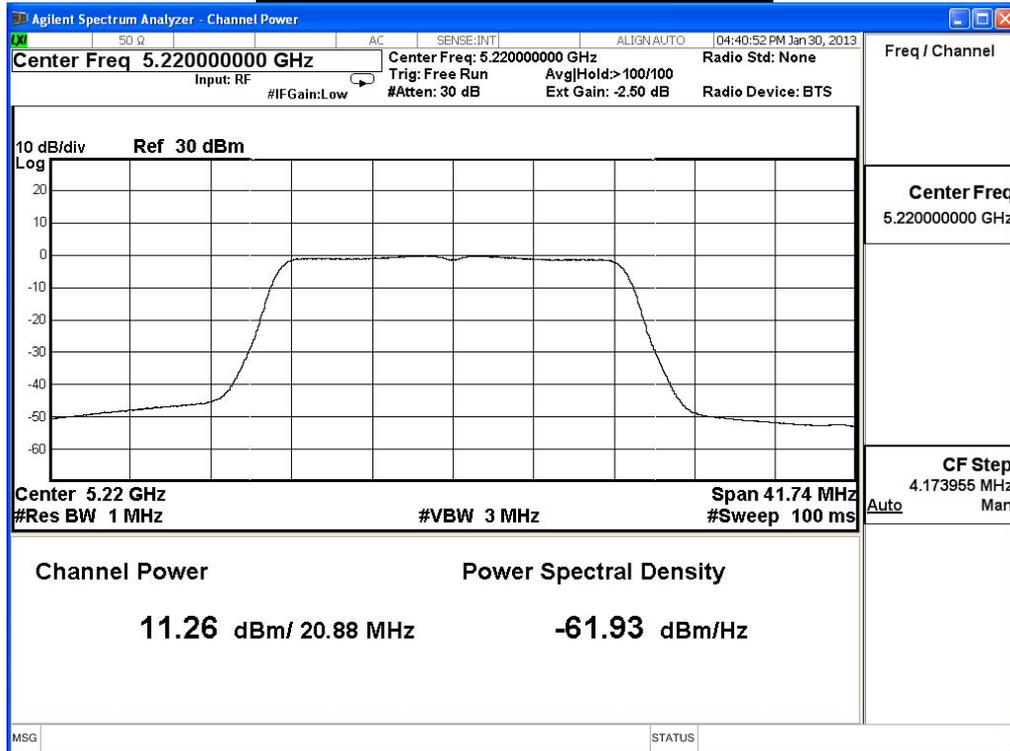
The worst emission of data rate is 19.5Mbps.

Peak Power Output (dBm)										
MCS Index		8	9	10	11	12	13	14	15	Required Limit
Channel No	Frequency (MHz)	Data Rate								
		13	26	39	52	78	104	117	130	
36	5180	11.38	--	--	--	--	--	--	--	≤ 15.99
44	5220	11.26	11.25	11.24	11.22	11.21	11.20	11.19	11.18	≤ 15.99
48	5240	11.53	--	--	--	--	--	--	--	≤ 15.99

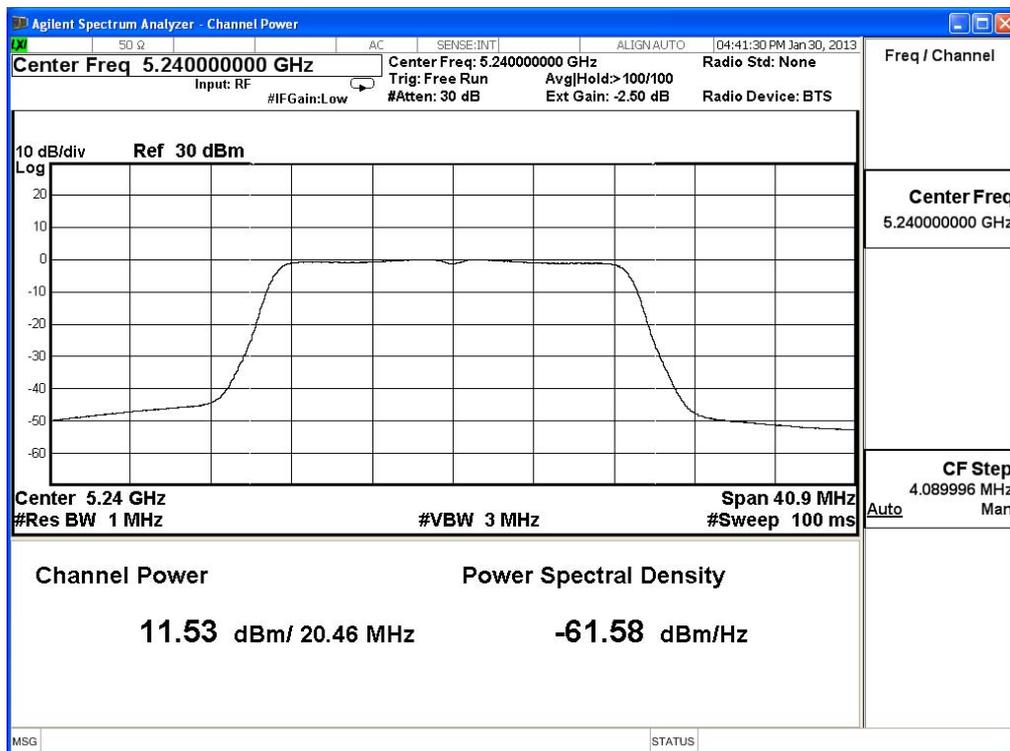
Peak transmit Power - Channel 36



Peak transmit Power - Channel 44



Peak transmit Power - Channel 48



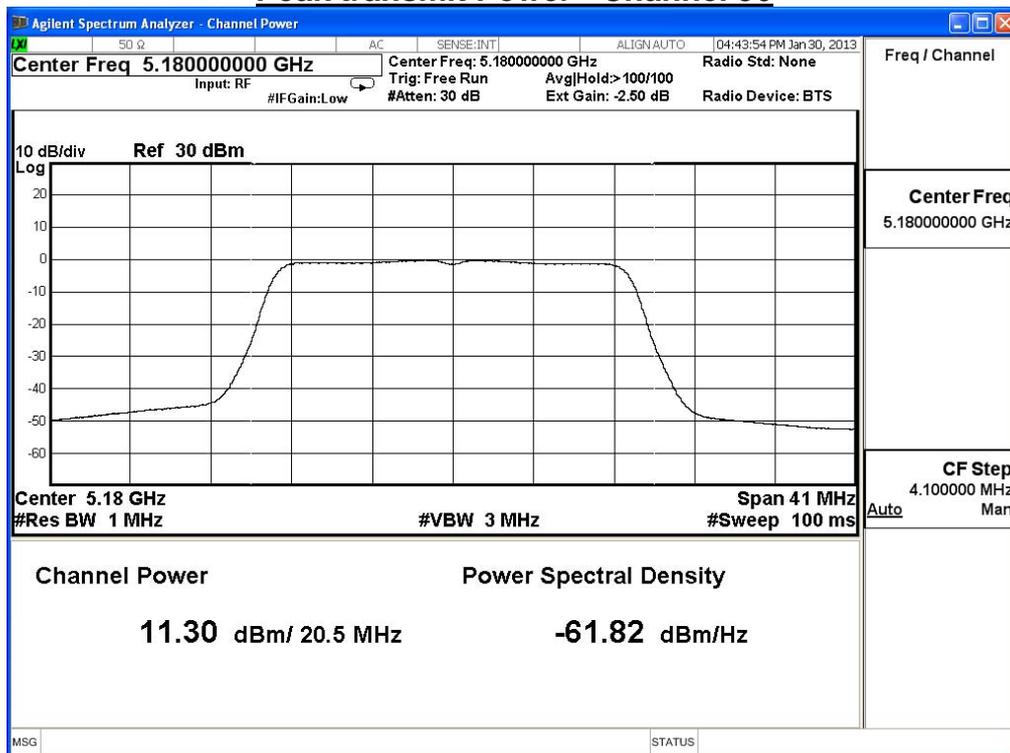
Product	Dual-band Wireless-AC1200 USB Adapter		
Test Item	Peak Transmit Output		
Test Mode	Mode 1: Transmit		
Date of Test	2012/11/19	Test Site	SR7

IEEE 802.11n(20MHz)_ANT 1						
Channel No.	Frequency (MHz)	26dB Bandwidth (MHz)	Output Power (dBm)	Required Limit		Result
				Fixed Limit (dBm)	4+10logB Limit (dBm)	
36	5180	20.50	11.30	≤ 15.99	≤17.11	Pass
44	5220	20.43	11.23	≤ 15.99	≤17.10	Pass
48	5240	20.34	11.55	≤ 15.99	≤17.08	Pass

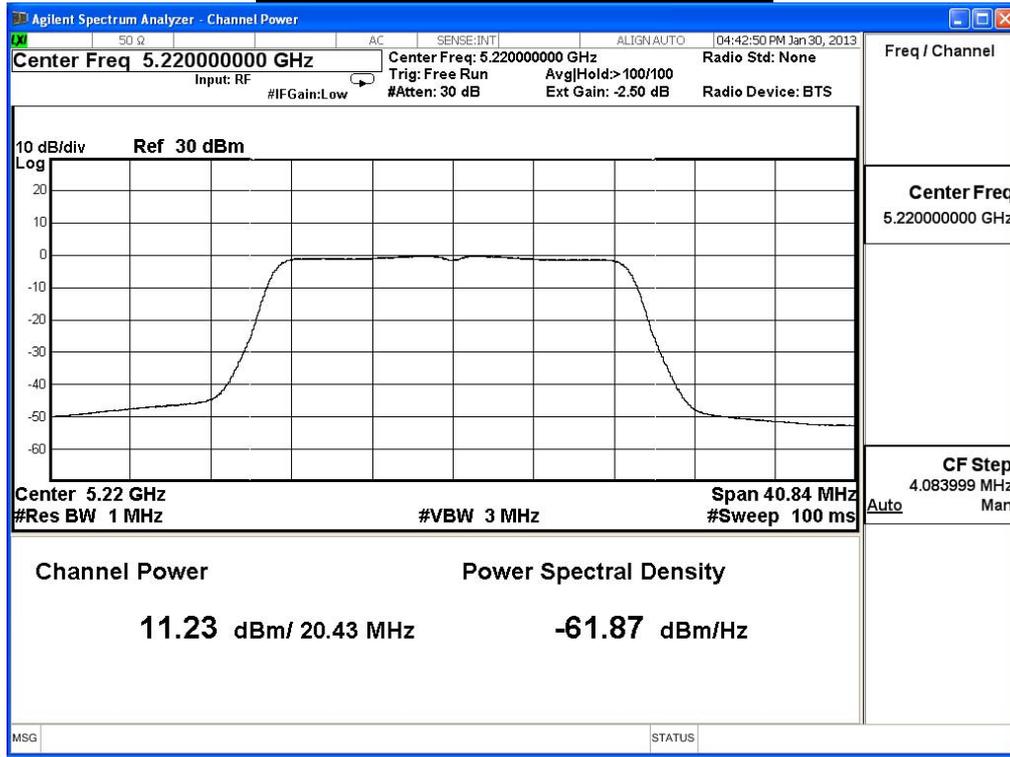
The worst emission of data rate is 19.5Mbps.

Peak Power Output (dBm)										
MCS Index		8	9	10	11	12	13	14	15	Required Limit
Channel No	Frequency (MHz)	Data Rate								
		13	26	39	52	78	104	117	130	
36	5180	11.30	--	--	--	--	--	--	--	≤ 15.99
44	5220	11.23	11.22	11.21	11.20	11.18	11.17	11.15	11.16	≤ 15.99
48	5240	11.55	--	--	--	--	--	--	--	≤ 15.99

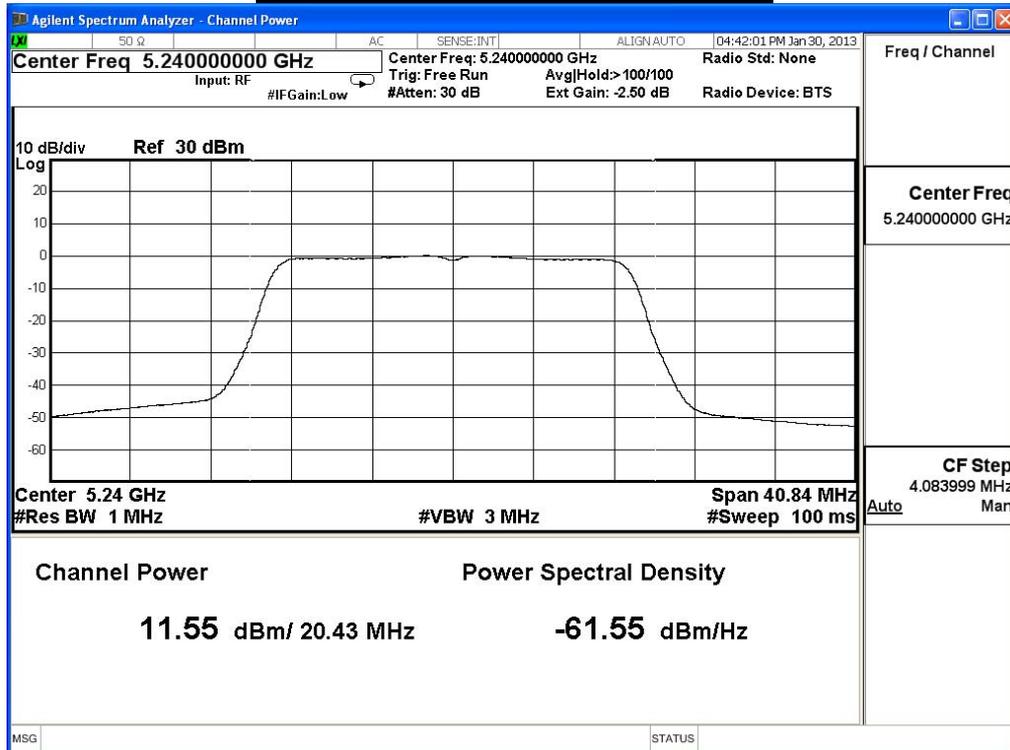
Peak transmit Power - Channel 36



Peak transmit Power - Channel 44



Peak transmit Power - Channel 48



Product	Dual-band Wireless-AC1200 USB Adapter		
Test Item	Peak Transmit Output		
Test Mode	Mode 1: Transmit		
Date of Test	2012/11/19	Test Site	SR7

IEEE 802.11n(20MHz)_ANT 0+1					
Channel No.	Frequency (MHz)	Total Output Power		Required Limit (dBm)	Result
		(mW)	(dBm)		
36	5180	27.23	14.35	≤ 15.99	Pass
44	5220	26.67	14.26	≤ 15.99	Pass
48	5240	28.51	14.55	≤ 15.99	Pass

802.11 n(20M), Antenna 0+1

Peak Power Output (dBm)										
MCS Index		8	9	10	11	12	13	14	15	Required Limit
Channel No	Frequency (MHz)	Data Rate								
		13	26	39	52	78	104	117	130	
36	5180	14.35	--	--	--	--	--	--	--	≤ 15.99
44	5220	14.26	14.25	14.23	14.22	14.21	14.20	14.19	14.17	≤ 15.99
48	5240	14.55	--	--	--	--	--	--	--	≤ 15.99

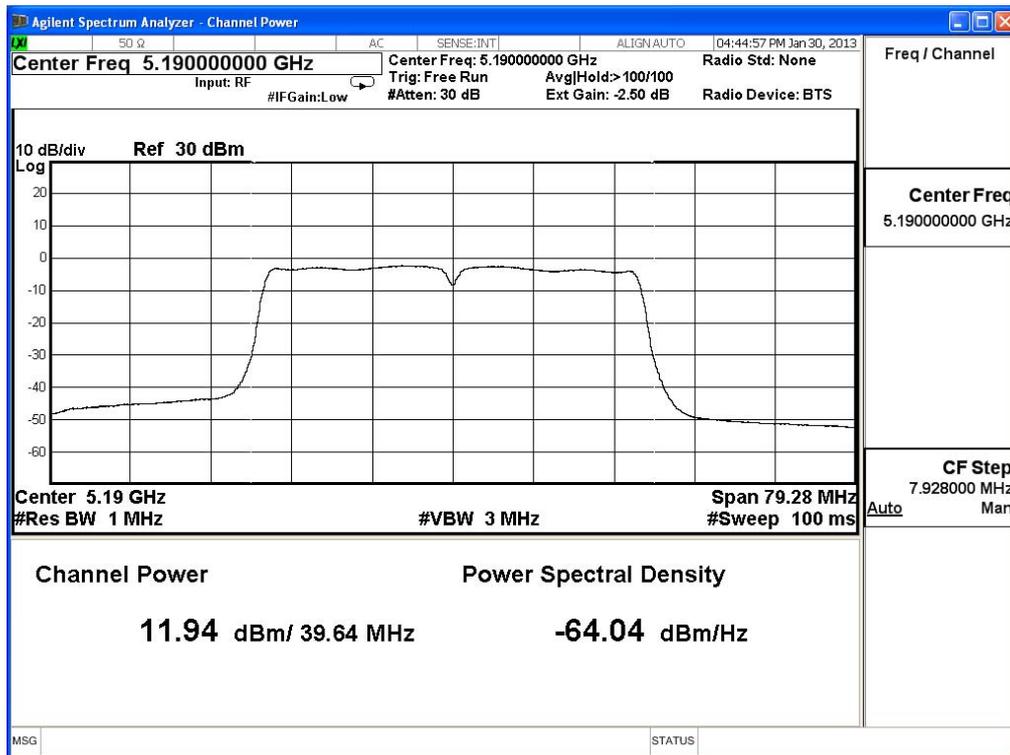
Product	Dual-band Wireless-AC1200 USB Adapter		
Test Item	Peak Transmit Output		
Test Mode	Mode 1: Transmit		
Date of Test	2012/11/19	Test Site	SR7

IEEE 802.11n(40MHz)_ANT 0						
Channel No.	Frequency (MHz)	26dB Bandwidth (MHz)	Output Power (dBm)	Required Limit		Result
				Fixed Limit (dBm)	4+10logB Limit (dBm)	
38	5190	39.64	11.94	≤ 15.99	≤19.98	Pass
46	5230	39.74	11.85	≤ 15.99	≤19.99	Pass

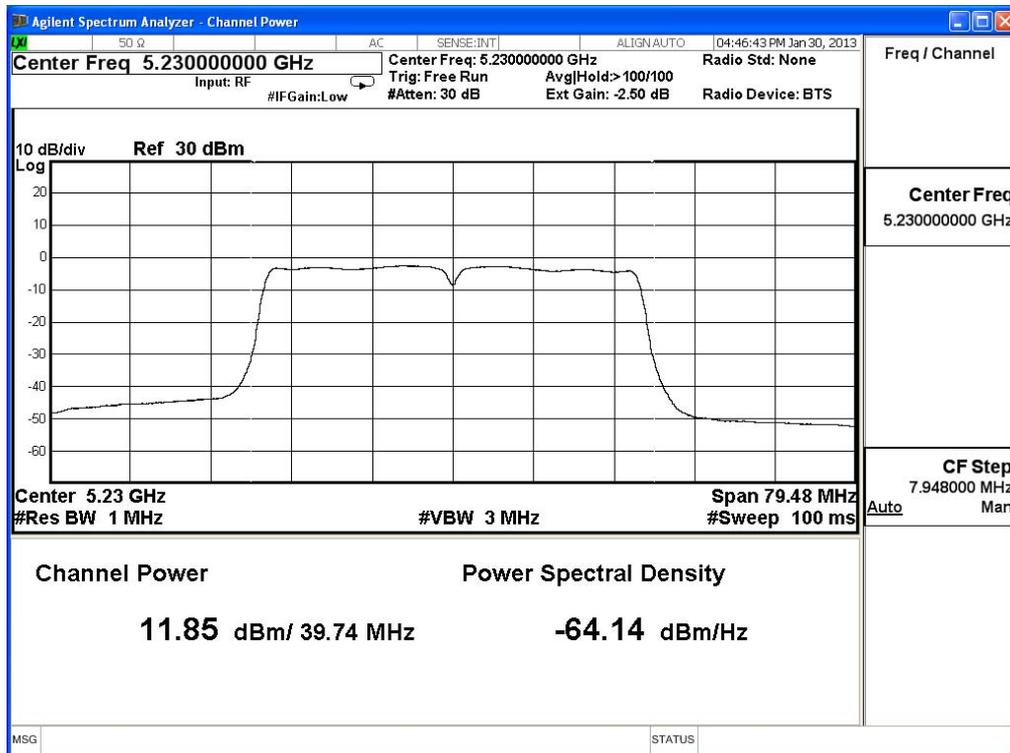
The worst emission of data rate is 40.5 Mbps

Peak Power Output (dBm)										
MCS Index		8	9	10	11	12	13	14	15	Required Limit
Channel No	Frequency (MHz)	Data Rate								
		27	54	81	108	162	216	243	270	
38	5190	11.94	11.93	11.91	11.90	11.89	11.87	11.85	11.84	≤15.99
46	5230	11.85	--	--	--	--	--	--	--	≤15.99

Peak transmit Power - Channel 38



Peak transmit Power - Channel 46



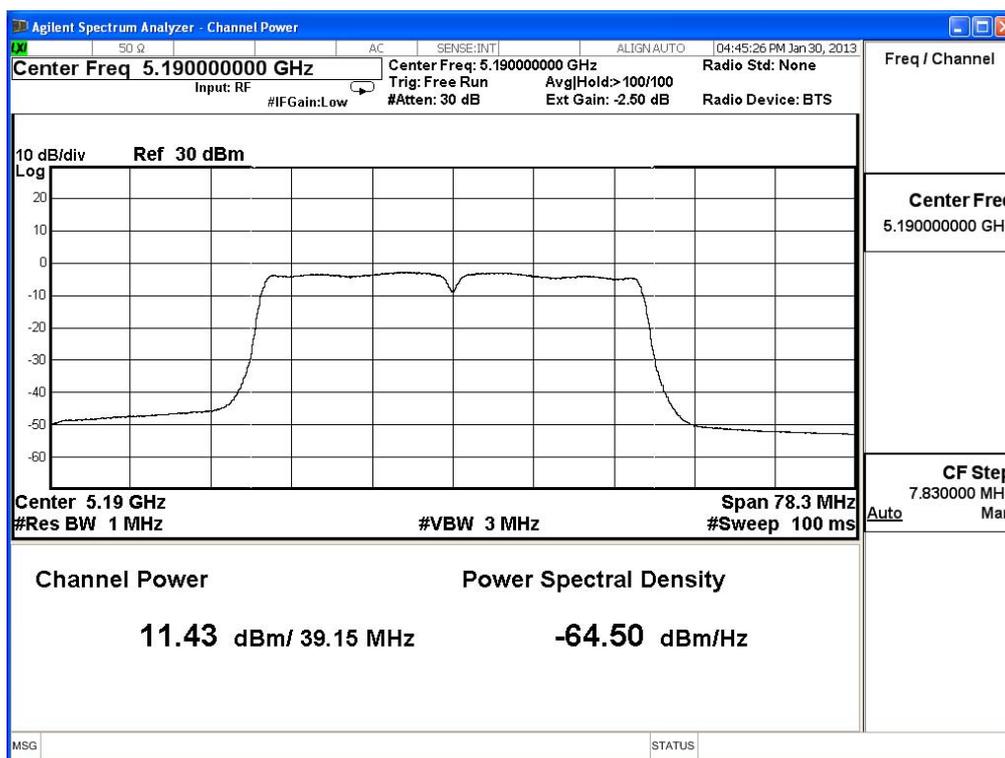
Product	Dual-band Wireless-AC1200 USB Adapter		
Test Item	Peak Transmit Output		
Test Mode	Mode 1: Transmit		
Date of Test	2012/11/19	Test Site	SR7

IEEE 802.11n(40MHz)_ANT 1						
Channel No.	Frequency (MHz)	26dB Bandwidth (MHz)	Output Power (dBm)	Required Limit		Result
				Fixed Limit (dBm)	4+10logB Limit (dBm)	
38	5190	39.15	11.43	≤ 15.99	≤19.92	Pass
46	5230	39.22	11.50	≤ 15.99	≤19.93	Pass

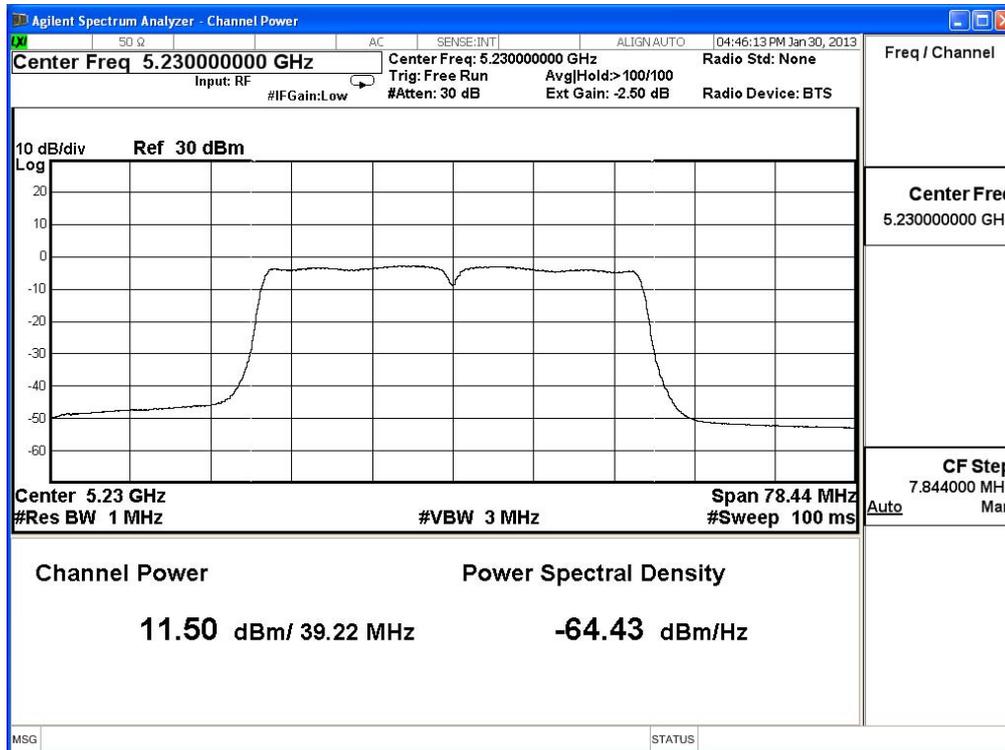
The worst emission of data rate is 40.5 Mbps

Peak Power Output (dBm)										
MCS Index		8	9	10	11	12	13	14	15	Required Limit
Channel No	Frequency (MHz)	Data Rate								
		27	54	81	108	162	216	243	270	
38	5190	11.43	11.42	11.40	11.39	11.38	11.37	11.35	11.36	≤15.99
46	5230	11.50	--	--	--	--	--	--	--	

Peak transmit Power - Channel 38



Peak transmit Power - Channel 46



Product	Dual-band Wireless-AC1200 USB Adapter		
Test Item	Peak Transmit Output		
Test Mode	Mode 1: Transmit		
Date of Test	2012/11/19	Test Site	SR7

IEEE 802.11n(40MHz)_ANT 0+1					
Channel No.	Frequency (MHz)	Total Output Power		Required Limit (dBm)	Result
		(mW)	(dBm)		
38	5190	29.53	14.70	≤ 15.99	Pass
46	5230	29.44	14.69	≤ 15.99	Pass

802.11 n(40M), Antenna 0+1

Peak Power Output (dBm)										
MCS Index		8	9	10	11	12	13	14	15	Required Limit
Channel No	Frequency (MHz)	Data Rate								
		27	54	81	108	162	216	243	270	
38	5190	14.70	14.69	14.68	14.67	14.65	14.64	14.63	14.62	≤15.99
46	5230	14.69	--	--	--	--	--	--	--	≤15.99

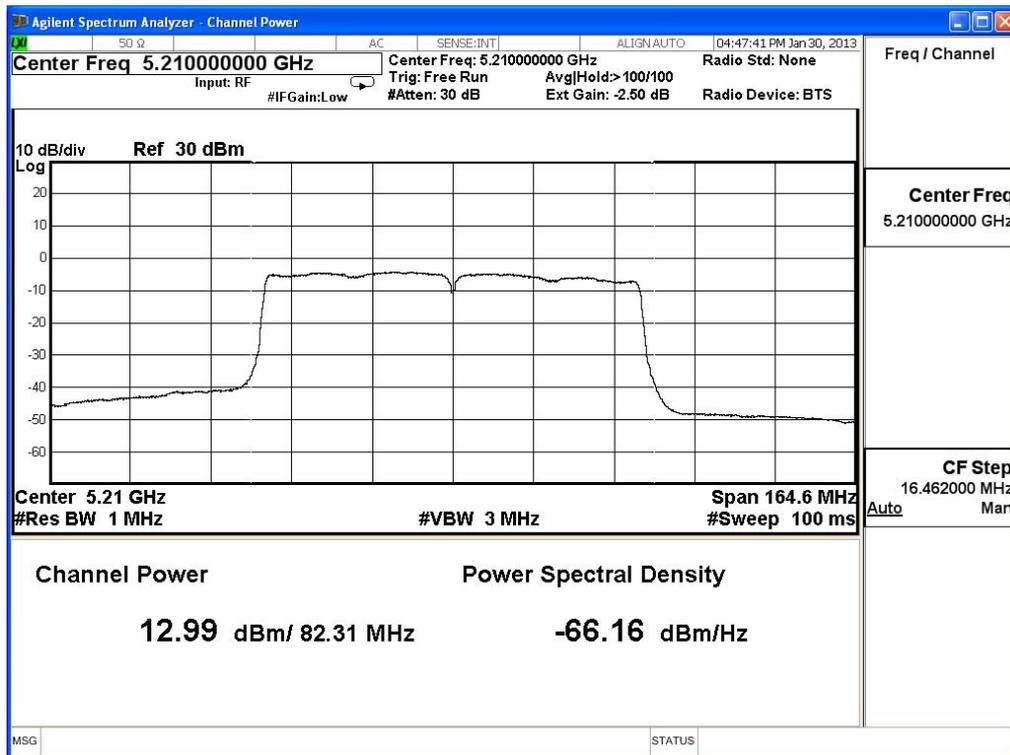
Product	Dual-band Wireless-AC1200 USB Adapter		
Test Item	Peak Transmit Output		
Test Mode	Mode 1: Transmit		
Date of Test	2012/11/19	Test Site	SR7

IEEE 802.11ac(40MHz)_ANT 0						
Channel No.	Frequency (MHz)	26dB Bandwidth (MHz)	Output Power (dBm)	Required Limit		Result
				Fixed Limit (dBm)	4+10logB Limit (dBm)	
42	5210	82.31	12.99	≤15.99	≤ 23.15	Pass

The worst emission of data rate is 40.5 Mbps

Peak Power Output (dBm)											
MCS Index		0	1	2	3	4	5	6	7	8	9
Channel No	Frequency (MHz)	Data Rate									
		28.6	117	175.6	234	351	468	526.6	585	702	780
42	5210	12.99	12.97	12.96	12.88	12.85	12.82	12.80	12.77	12.74	11.92

Peak transmit Power - Channel 42



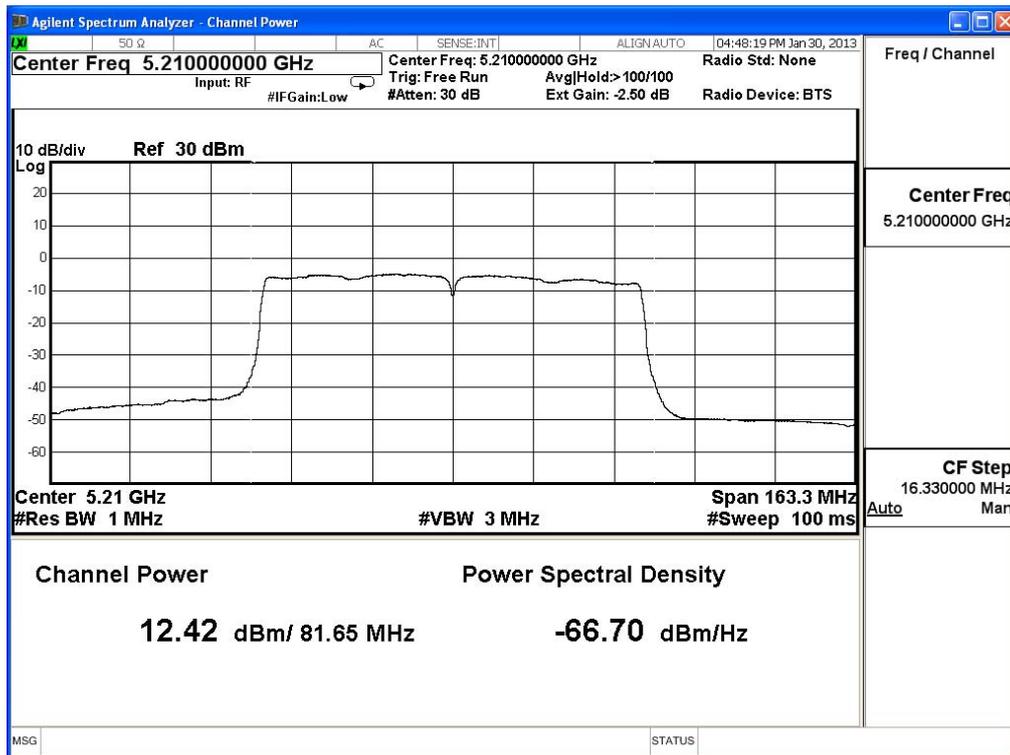
Product	Dual-band Wireless-AC1200 USB Adapter		
Test Item	Peak Transmit Output		
Test Mode	Mode 1: Transmit		
Date of Test	2012/11/19	Test Site	SR7

IEEE 802.11ac(40MHz)_ANT 1						
Channel No.	Frequency (MHz)	26dB Bandwidth (MHz)	Output Power (dBm)	Required Limit		Result
				Fixed Limit (dBm)	4+10logB Limit (dBm)	
42	5210	81.65	12.42	≤15.99	≤ 23.11	Pass

The worst emission of data rate is 40.5 Mbps

Peak Power Output (dBm)											
MCS Index		0	1	2	3	4	5	6	7	8	9
Channel No	Frequency (MHz)	Data Rate									
		28.6	117	175.6	234	351	468	526.6	585	702	780
42	5210	12.42	12.35	12.32	12.29	12.27	12.26	12.22	12.20	12.18	12.35

Peak transmit Power - Channel 42



Product	Dual-band Wireless-AC1200 USB Adapter		
Test Item	Peak Transmit Output		
Test Mode	Mode 1: Transmit		
Date of Test	2012/11/19	Test Site	SR7

IEEE 802.11ac(80MHz)_ANT 0+1					
Channel No.	Frequency (MHz)	Total Output Power		Required Limit (dBm)	Result
		(mW)	(dBm)		
42	5210	37.36	15.72	≤15.99	Pass

802.11 AC(80M), Antenna 0+1

Peak Power Output (dBm)											
MCS Index		0	1	2	3	4	5	6	7	8	9
Channel No	Frequency (MHz)	Data Rate									
		28.6	117	175.6	234	351	468	526.6	585	702	780
42	5210	15.72	15.67	15.65	15.60	15.58	15.56	15.53	15.40	15.48	15.45

5. Peak Power Spectrum Density

5.1. Test Equipment

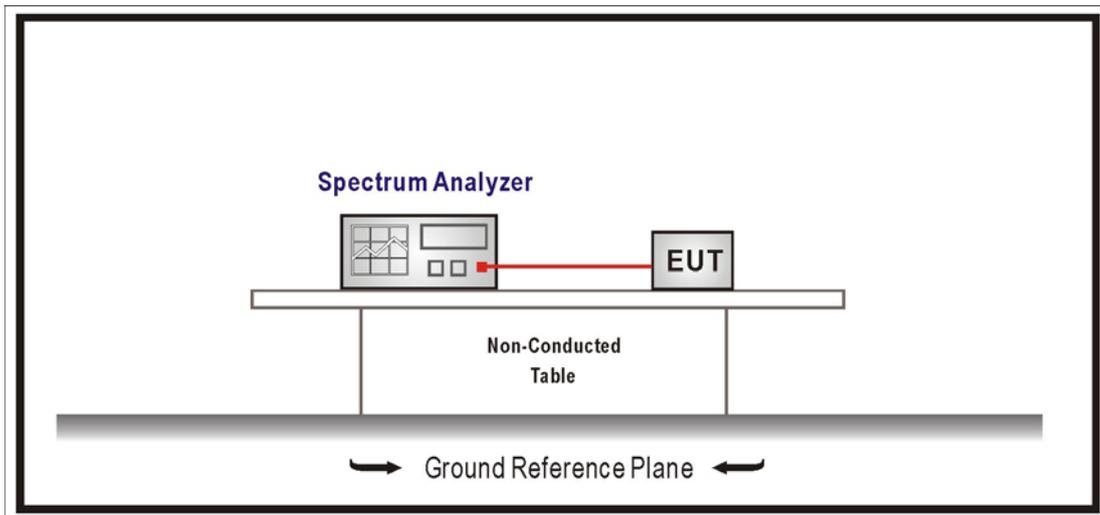
The following test equipments are used during the radiated emission tests:

Peak Power Spectrum Density / SR7

Instrument	Manufacturer	Model No.	Serial No	Next Cal. Date
Spectrum Analyzer	R&S	FSP	100561	2013/02/19

Note: 1. All equipments that need to calibrate are with calibration period of 1 year.

5.2. Test Setup



5.3. Limits

1. For the band 5.15-5.25 GHz, the peak power spectral density shall not exceed 4 dBm in any 1-MHz band. If transmitting antenna of directional gain greater than 6 dBi are used, the peak power spectral density shall be reduced by the amount in dB that directional gain of the antenna exceeds 6 dBi.
2. For the band 5.25-5.35 GHz, the peak power spectral density shall not exceed 11 dBm in any 1-MHz band. If transmitting antenna of directional gain greater than 6 dBi are used, the peak power spectral density shall be reduced by the amount in dB that directional gain of the antenna exceeds 6 dBi.
3. For the band 5.725-5.825 GHz, the peak power spectral density shall not exceed 17 dBm in any 1-MHz band. If transmitting antenna of directional gain greater than 6 dBi are used, the peak power spectral density shall be reduced by the amount in dB that directional gain of the antenna exceeds 6 dBi.

5.4. Test Procedure

The EUT was setup to ANSI C63.4, 2009; tested to U-NII test procedure of March 2012 KDB 789033 for compliance to FCC 47CFR Subpart E requirements.

Set RBW=1MHz, VBW=3MHz with RMS detector. The PPSD is the highest level found across the emission in any 1-MHz band after 100 sweeps of averaging.

5.5. Uncertainty

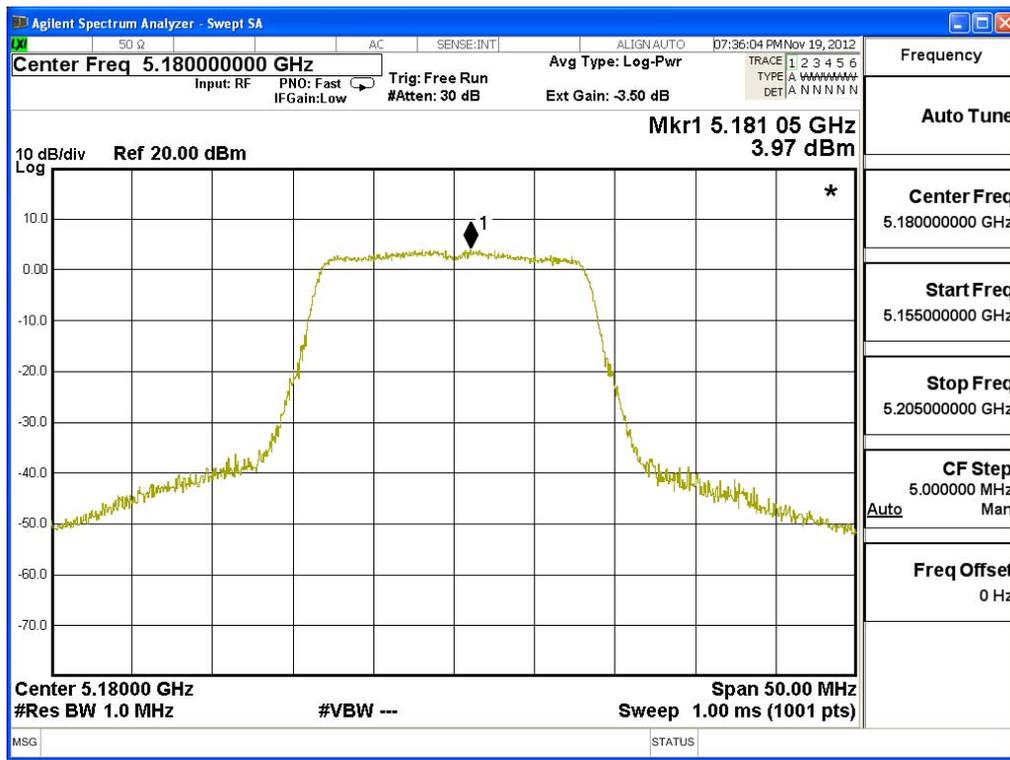
The measurement uncertainty is defined as ± 1.27 dB

5.6. Test Result

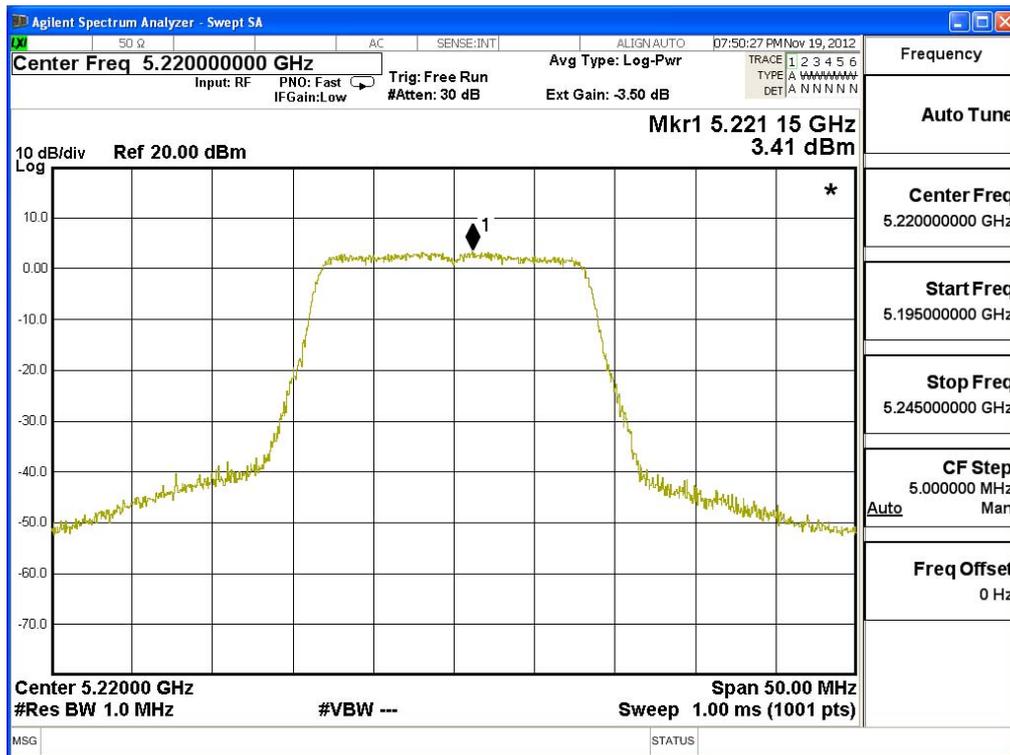
Product	Dual-band Wireless-AC1200 USB Adapter		
Test Item	Peak Power Spectral Density		
Test Mode	Mode 1: Transmit		
Date of Test	2012/11/19	Test Site	SR7

IEEE 802.11a				
Channel No.	Frequency (MHz)	Measure Level (dBm)	Required Limit (dBm)	Result
36	5180	3.97	≤ 4	Pass
44	5220	3.41	≤ 4	Pass
48	5240	3.53	≤ 4	Pass

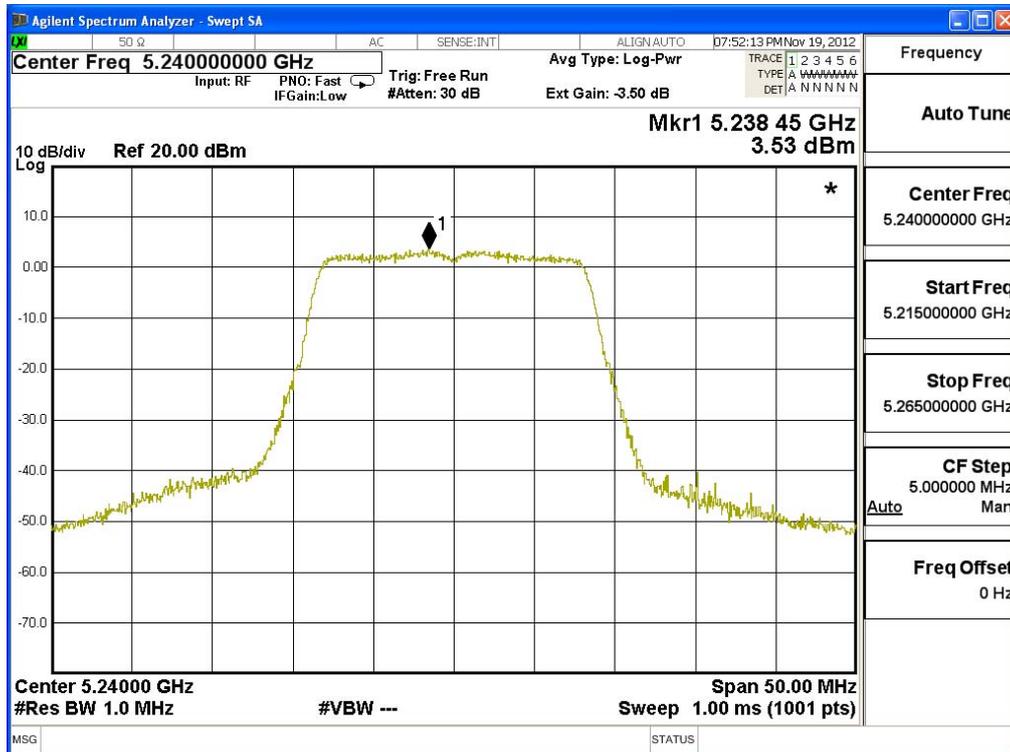
Peak Power Spectral Density – Channel 36



Peak Power Spectral Density – Channel 44



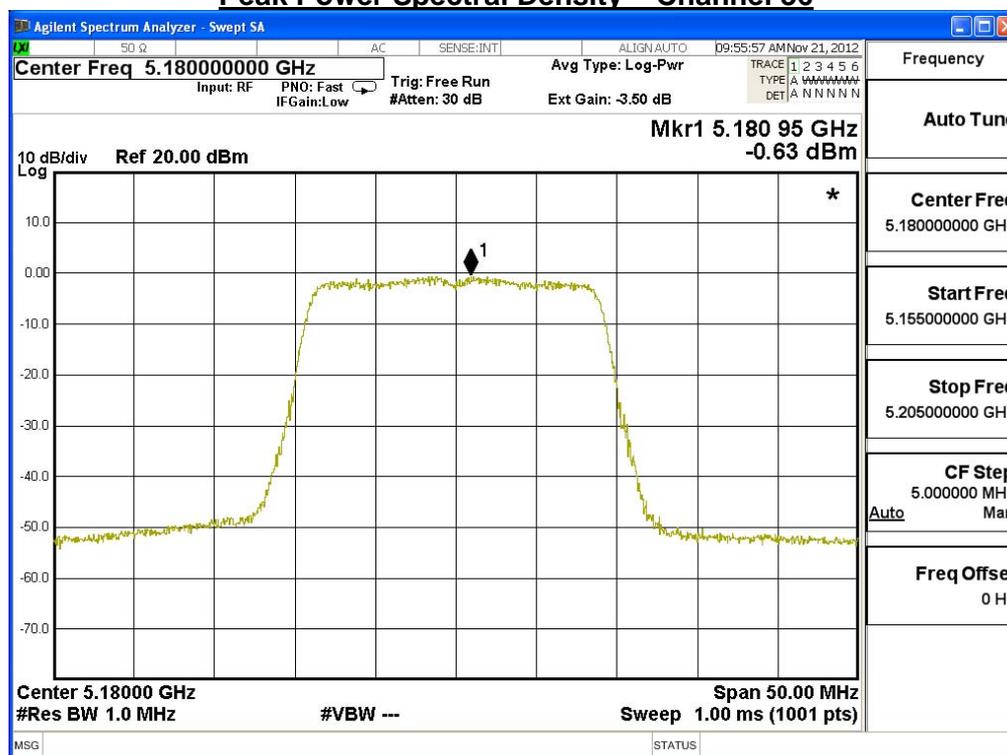
Peak Power Spectral Density – Channel 48



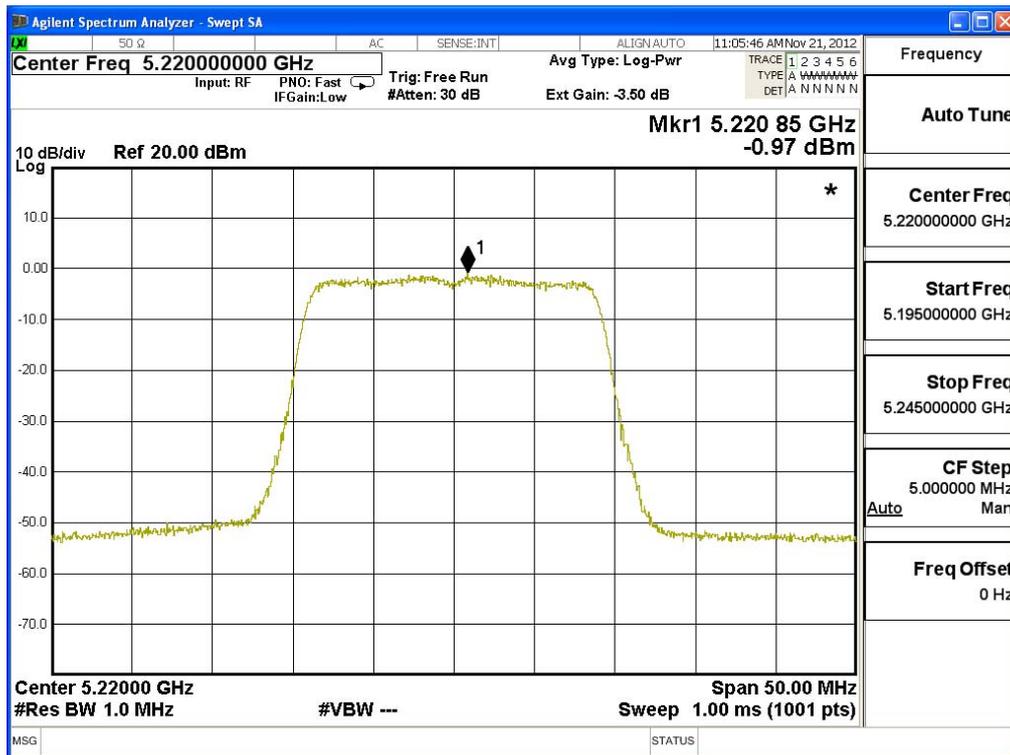
Product	Dual-band Wireless-AC1200 USB Adapter		
Test Item	Peak Power Spectral Density		
Test Mode	Mode 1: Transmit		
Date of Test	2012/11/19	Test Site	SR7

IEEE 802.11n_20M(ANT 0)				
Channel No.	Frequency (MHz)	Measure Level (dBm)	Required Limit (dBm)	Result
36	5180	-0.63	≤ 4	Pass
44	5220	-0.97	≤ 4	Pass
48	5240	-0.67	≤ 4	Pass

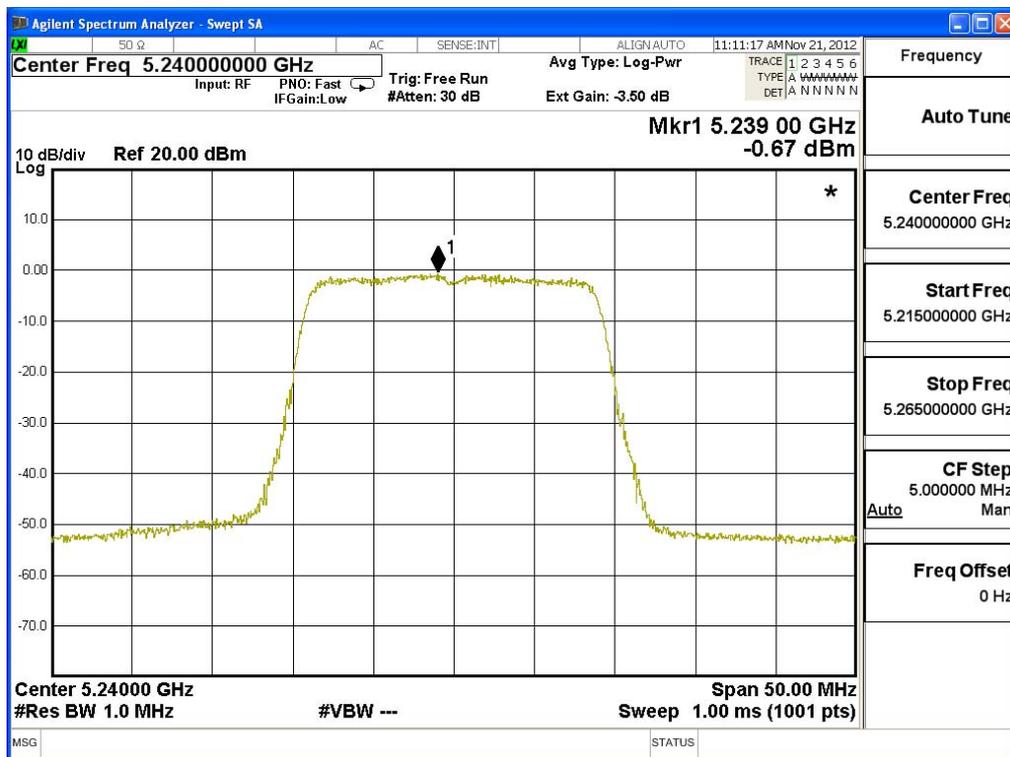
Peak Power Spectral Density – Channel 36



Peak Power Spectral Density – Channel 44



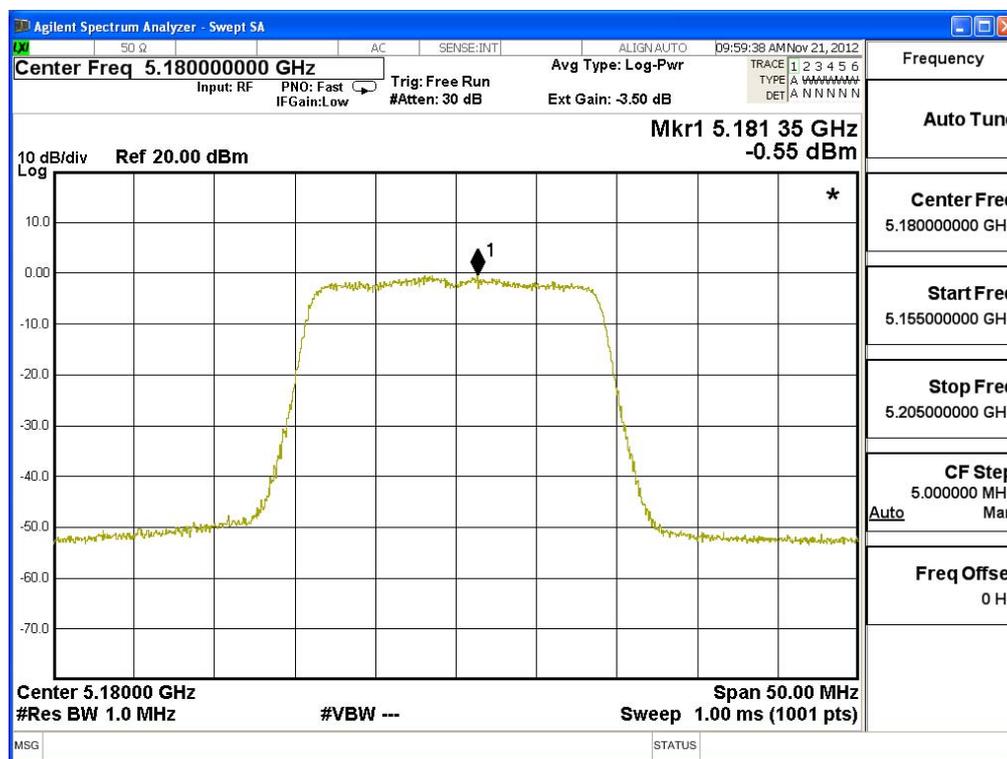
Peak Power Spectral Density – Channel 48



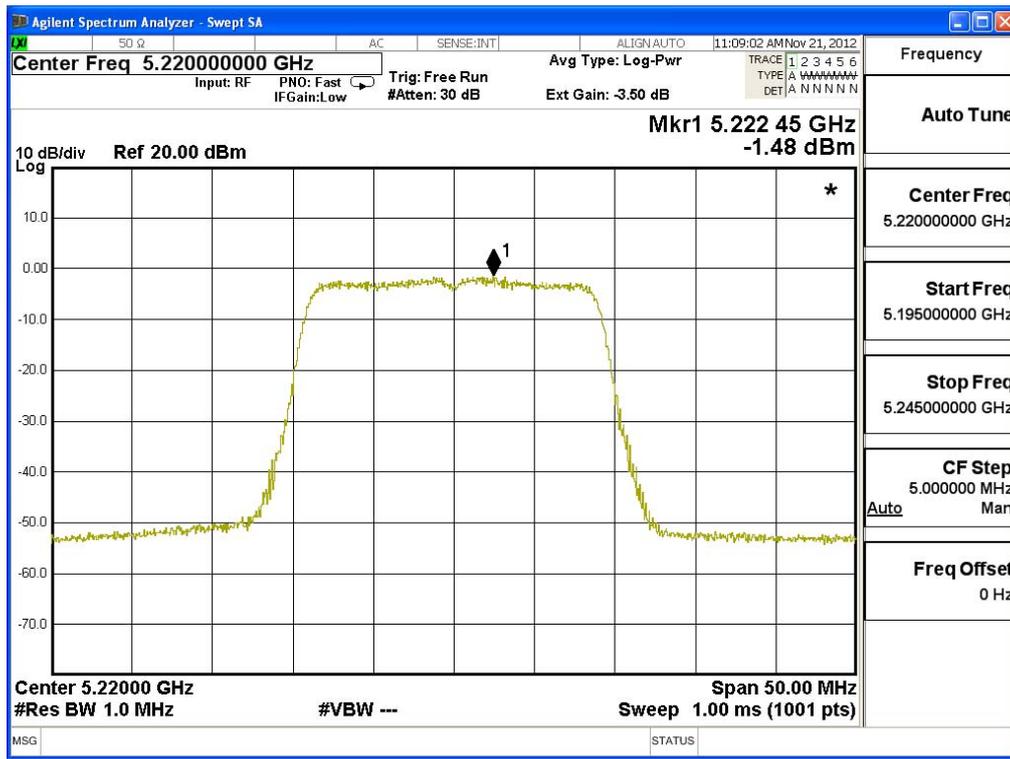
Product	Dual-band Wireless-AC1200 USB Adapter		
Test Item	Peak Power Spectral Density		
Test Mode	Mode 1: Transmit		
Date of Test	2012/11/19	Test Site	SR7

IEEE 802.11n_20M(ANT 1)				
Channel No.	Frequency (MHz)	Measure Level (dBm)	Required Limit (dBm)	Result
36	5180	-0.55	≤ 4	Pass
44	5220	-1.48	≤ 4	Pass
48	5240	-0.71	≤ 4	Pass

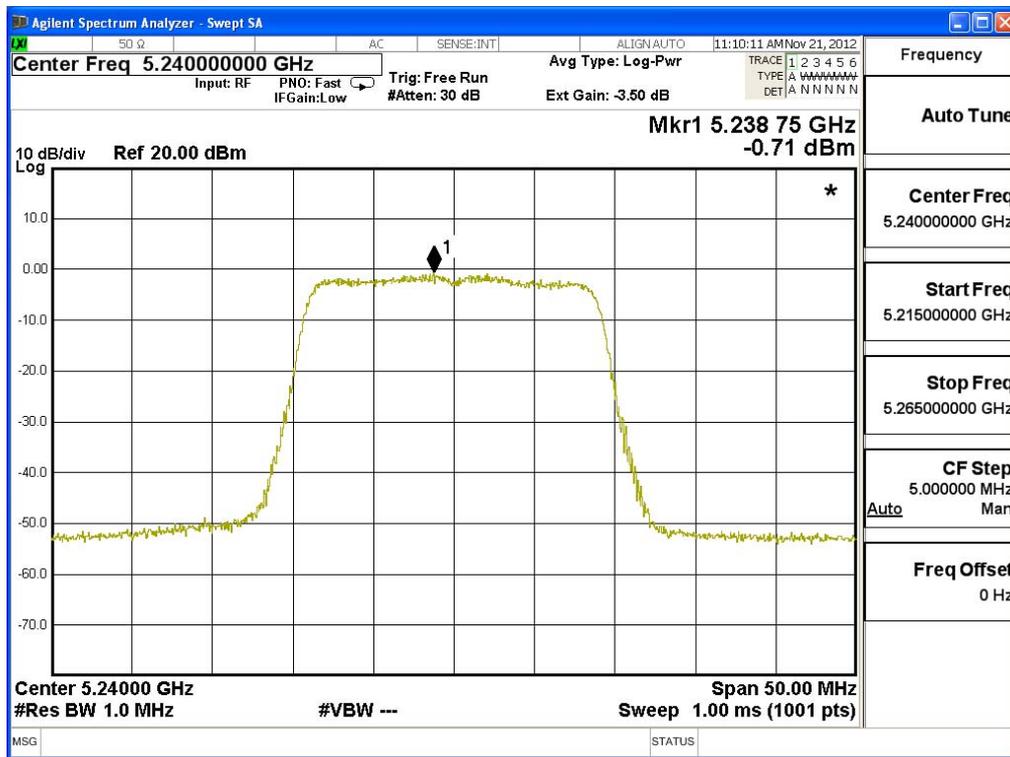
Peak Power Spectral Density – Channel 36



Peak Power Spectral Density – Channel 44



Peak Power Spectral Density – Channel 48



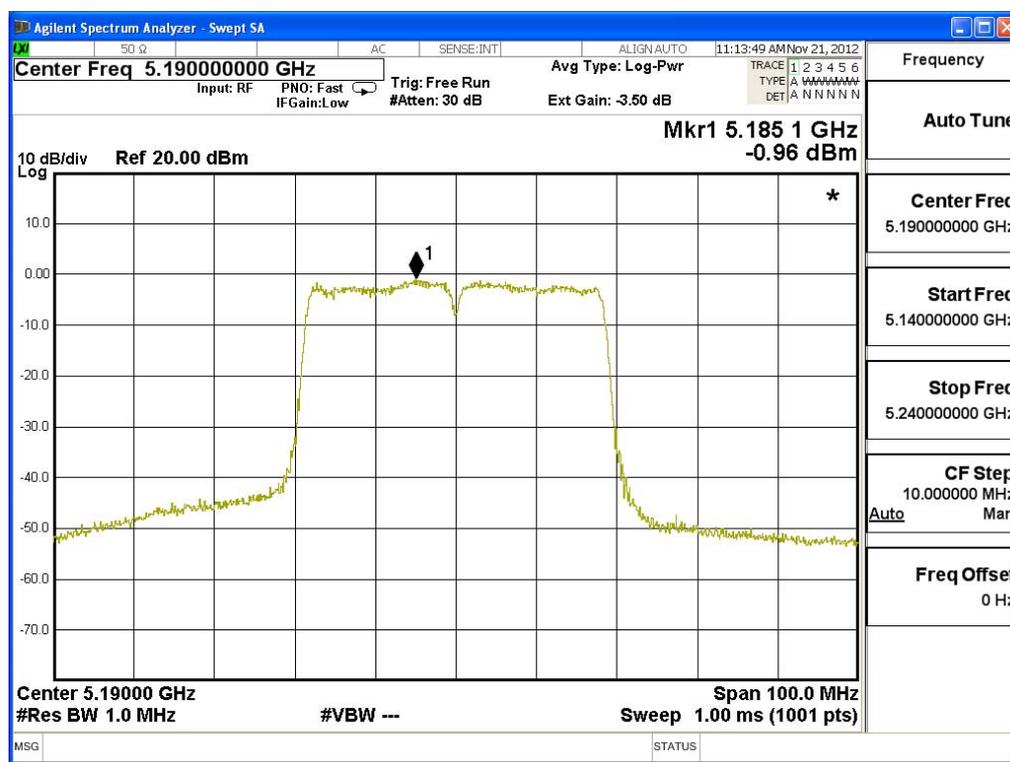
Product	Dual-band Wireless-AC1200 USB Adapter		
Test Item	Peak Power Spectral Density		
Test Mode	Mode 1: Transmit		
Date of Test	2012/11/19	Test Site	SR7

IEEE 802.11n_20M(ANT 0+1)				
Channel No.	Frequency (MHz)	Measure Level (dBm)	Required Limit (dBm)	Result
36	5180	2.42	≤ 4	Pass
44	5220	1.79	≤ 4	Pass
48	5240	2.32	≤ 4	Pass

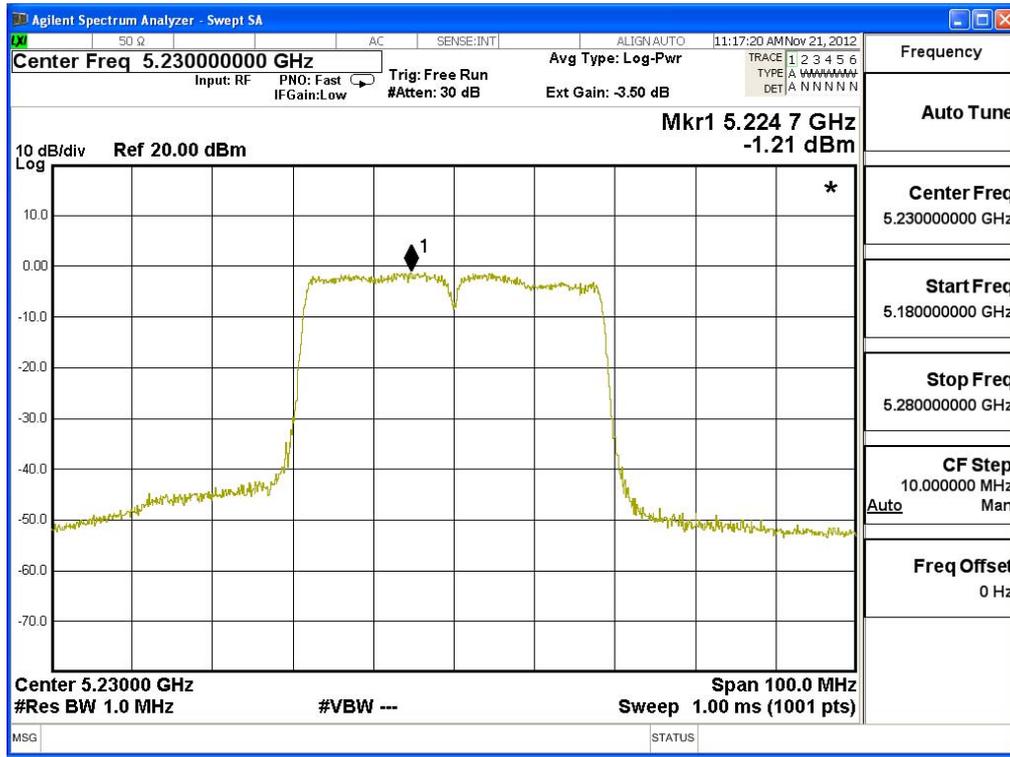
Product	Dual-band Wireless-AC1200 USB Adapter		
Test Item	Peak Power Spectral Density		
Test Mode	Mode 1: Transmit		
Date of Test	2012/11/19	Test Site	SR7

IEEE 802.11n_40M(ANT 0)				
Channel No.	Frequency (MHz)	Measure Level (dBm)	Required Limit (dBm)	Result
38	5190	-0.96	≤ 4	Pass
46	5230	-1.21	≤ 4	Pass

Peak Power Spectral Density – Channel 38



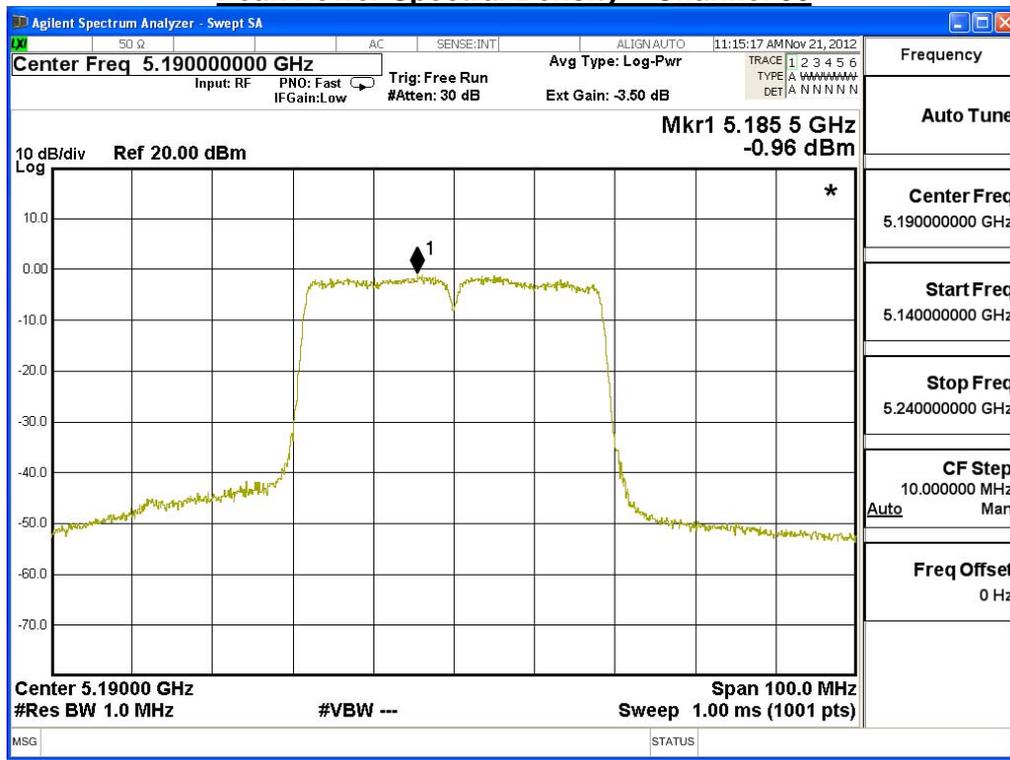
Peak Power Spectral Density – Channel 46



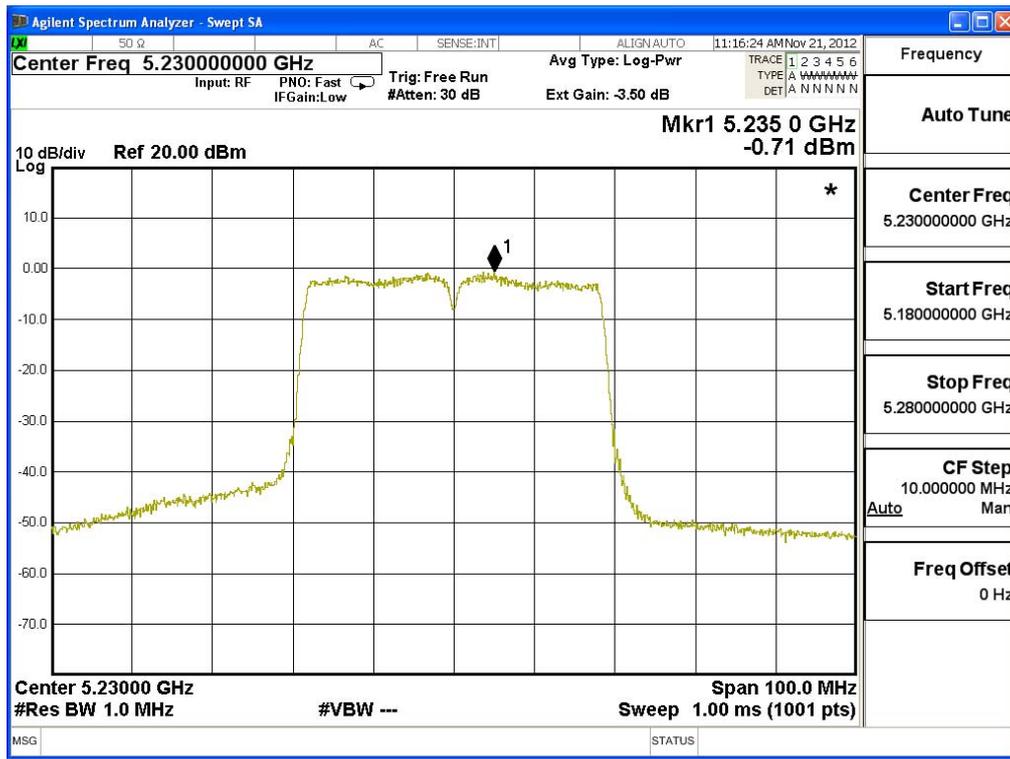
Product	Dual-band Wireless-AC1200 USB Adapter		
Test Item	Peak Power Spectral Density		
Test Mode	Mode 1: Transmit		
Date of Test	2012/11/19	Test Site	SR7

IEEE 802.11n_40M(ANT 1)				
Channel No.	Frequency (MHz)	Measure Level (dBm)	Required Limit (dBm)	Result
38	5190	-0.96	≤ 4	Pass
46	5230	-0.71	≤ 4	Pass

Peak Power Spectral Density – Channel 38



Peak Power Spectral Density – Channel 46



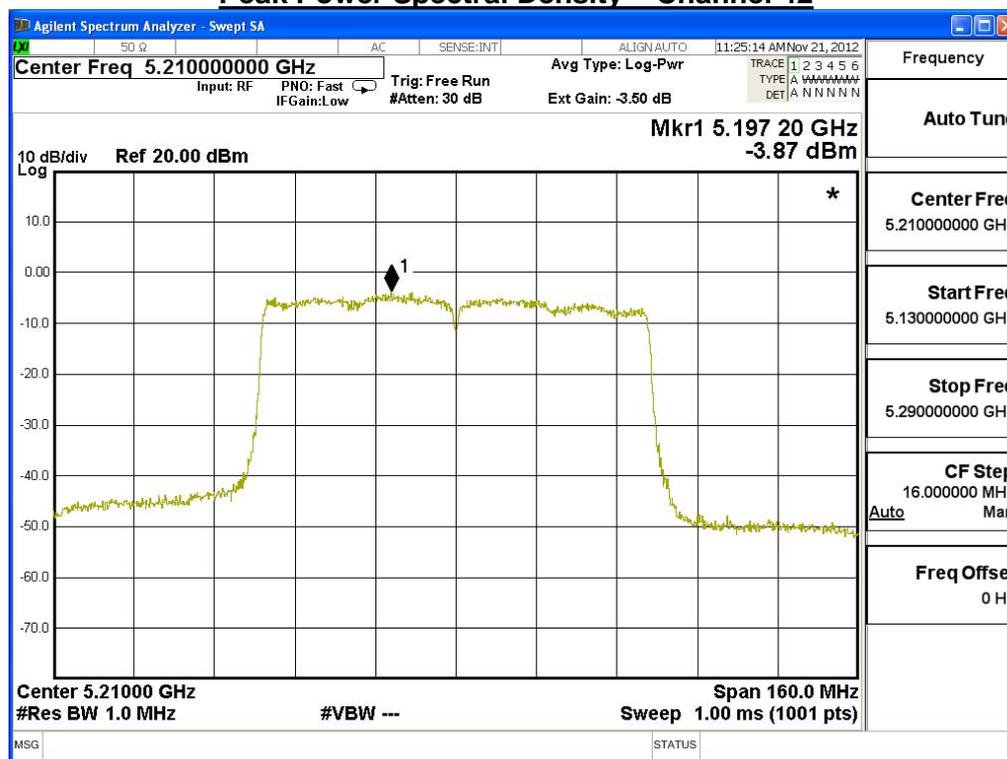
Product	Dual-band Wireless-AC1200 USB Adapter		
Test Item	Peak Power Spectral Density		
Test Mode	Mode 1: Transmit		
Date of Test	2012/11/19	Test Site	SR7

IEEE 802.11n_40M(ANT 0+1)				
Channel No.	Frequency (MHz)	Measure Level (dBm)	Required Limit (dBm)	Result
38	5190	2.05	≤ 4	Pass
46	5230	2.06	≤ 4	Pass

Product	Dual-band Wireless-AC1200 USB Adapter		
Test Item	Peak Power Spectral Density		
Test Mode	Mode 1: Transmit		
Date of Test	2012/11/19	Test Site	SR7

IEEE 802.11ac_80M(ANT 0)				
Channel No.	Frequency (MHz)	Measure Level (dBm)	Required Limit (dBm)	Result
42	5210	-3.87	≤ 4	Pass

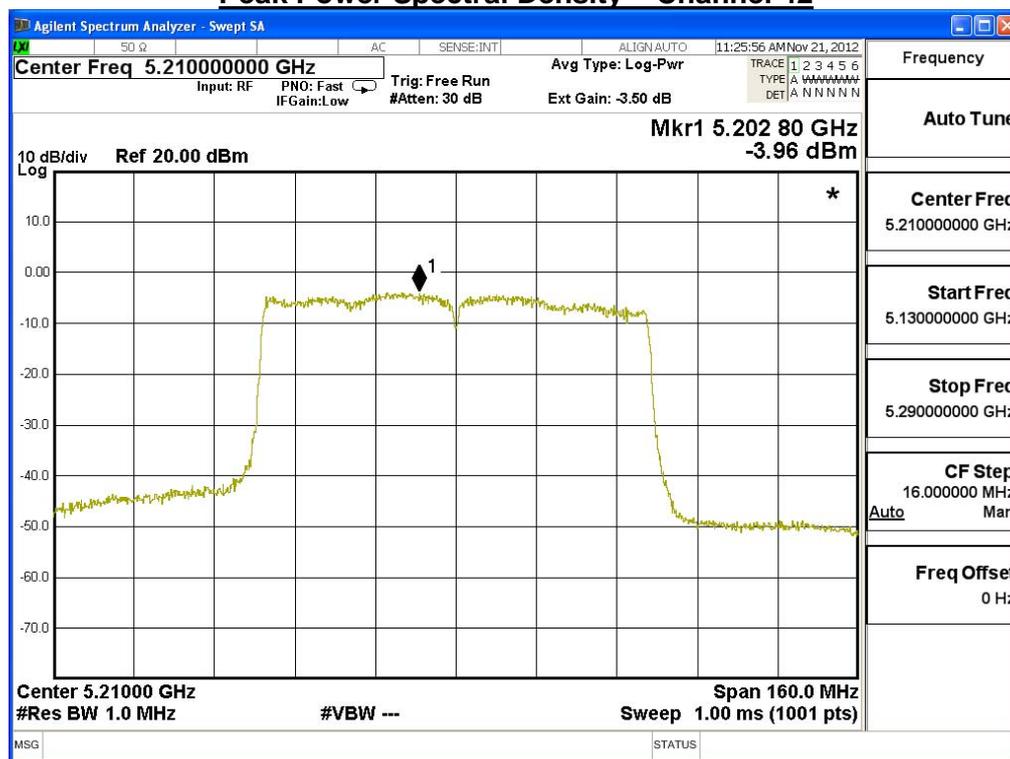
Peak Power Spectral Density – Channel 42



Product	Dual-band Wireless-AC1200 USB Adapter		
Test Item	Peak Power Spectral Density		
Test Mode	Mode 1: Transmit		
Date of Test	2012/11/19	Test Site	SR7

IEEE 802.11ac_80M(ANT 1)				
Channel No.	Frequency (MHz)	Measure Level (dBm)	Required Limit (dBm)	Result
42	5210	-3.96	≤ 4	Pass

Peak Power Spectral Density – Channel 42



Product	Dual-band Wireless-AC1200 USB Adapter		
Test Item	Peak Power Spectral Density		
Test Mode	Mode 1: Transmit		
Date of Test	2012/11/19	Test Site	SR7

IEEE 802.11ac_80M(ANT 0+1)				
Channel No.	Frequency (MHz)	Measure Level (dBm)	Required Limit (dBm)	Result
42	5210	-0.90	≤ 4	Pass