FCC Test Report

Product Name	802.11A/B/G/N/AC 1T1R WLAN USB Dongle
Model No	WN4509L
FCC ID	MSQ-WN4509L

Applicant	ASUSTeK COMPUTER INC.
Address	4F, No. 150, Li-Te Rd., Peitou, Taipei, Taiwan

Date of Receipt	Jul. 04, 2014
Issued Date	Aug. 19, 2014
Report No.	1470161R-RFUSP06V00
Report Version	V1.0

Testing Laboratory
0914

The test results relate only to the samples tested.
The test results shown in the test report are traceable to the national/international standard through the calibration of the equipment and evaluated measurement uncertainty herein.
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Test Report

Issued Date: Aug. 19, 2014
Report No.: 1470161R-RFUSP06V00

Product Name	802.11A/B/G/N/AC 1T1R WLAN USB Dongle
Applicant	ASUSTeK COMPUTER INC.
Address	4F, No. 150, Li-Te Rd., Peitou, Taipei, Taiwan
Manufacturer	LITEON Technology(Chang Zhou) CO.,LTD(NA BU)
Model No.	WN4509L
FCC ID.	MSQ-WN4509L
EUT Rated Voltage	DC 5V (Power by USB)
EUT Test Voltage	DC 5V (Power by USB)
Trade Name	ASUS
Applicable Standard	FCC CFR Title 47 Part 15 Subpart E: 2013 ANSI C63.10: 2009, FCC KDB-789033
Test Result	Complied

Documented By : Jinn Chen
(Senior Adm. Specialist / Jinn Chen)

Tested By : Jerry Tsai
(Engineer / Jerry Tsai)

Approved By :
(Director/ Vincent Lin)

TABLE OF CONTENTS

1. GENERAL INFORMATION

1.1. EUT Description

Product Name	802.11A/B/G/N/AC 1T1R WLAN USB Dongle
Trade Name	ASUS
FCC ID.	MSQ-WN4509L
Model No.	WN4509L
Frequency Range	802.11a/n-20MHz: 5180-5320MHz, 5500-5700MHz 802.11n-40MHz: 5190-5310, 5510-5670MHz 802.11ac-20MHz: 5720, 802.11ac-40MHz: 5710 802.11ac-80MHz: 5210-5290MHz, 5530-5690MHz
Number of Channels	802.11a/n-20MHz: 19; 802.11n-40MHz: 9 802.11ac-20MHz: 1, 802.11ac-40MHz: 1, 802.11ac-80MHz: 4
Data Rate	802.11a: 6 - 54Mbps 802.11n: up to 150Mbps 802.11ac-80MHz: up to 433.3MHz
Channel Control	Auto
Type of Modulation	802.11a/n:OFDM, BPSK, QPSK, 16QAM, 64QAM, 256QAM
Antenna Type	PIFA Antenna
Antenna Gain	Refer to the table “Antenna List”

Antenna List

No.	Manufacturer	Part No.	Antenna Type	Peak Gain
1	INPAQ	N/A (Main) N/A (Aux)	PIFA	5.30 dBi for 5.15~5.25GHz 4.93 dBi for 5.25~5.35GHz 5.31 dBi for 5.47~5.725GHz 5.55 dBi for 5.725~5.825GHz
2	MAG. LAYERS	MSA-3409-25GC1-A1(WLAN MAIN) MSA-3310-25GC1-A2(WLAN AUX)	PIFA	3.15 dBi for 5.15~5.25GHz 3.11 dBi for 5.25~5.35GHz 3.26 dBi for 5.47~5.725GHz 3.41 dBi for 5.725~5.825GHz

Note: The antenna of EUT is conform to FCC 15.203

802.11a/n-20MHz Center Working Frequency of Each Channel:

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
Channel 36:	5180 MHz	Channel 40:	5200 MHz	Channel 44:	5220 MHz	Channel 48:	5240 MHz
Channel 52:	5260 MHz	Channel 56:	5280 MHz	Channel 60:	5300 MHz	Channel 64:	5320 MHz
Channel 100:	5500 MHz	Channel 104:	5520 MHz	Channel 108:	5540 MHz	Channel 112:	5560 MHz
Channel 116:	5580 MHz	Channel 120:	5600 MHz	Channel 124:	5620 MHz	Channel 128:	5640 MHz
Channel 132:	5660 MHz	Channel 136:	5680 MHz	Channel 140:	5700 MHz		

802.11n-40MHz Center Working Frequency of Each Channel:

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
Channel 38:	5190 MHz	Channel 46:	5230 MHz	Channel 54:	5270 MHz	Channel 62:	5310 MHz
Channel 102:	5510 MHz	Channel 110:	5550 MHz	Channel 118:	5590 MHz	Channel 126:	5630 MHz
Channel 134:	5670 MHz						

802.11ac-20MHz Center Working Frequency of Each Channel:

Channel	Frequency
Channel 144:	5720 MHz

802.11ac-40MHz Center Working Frequency of Each Channel:

Channel	Frequency
Channel 142:	5710 MHz

802.11ac-80MHz Center Working Frequency of Each Channel:

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
Channel 42:	5210 MHz	Channel 58:	5290 MHz	Channel 106:	5530 MHz	Channel 138:	5690 MHz

Note:

1. This device is a 802.11A/B/G/N/AC 1T1R WLAN USB Dongle, including an IEEE 802.11 a/n/ac WLAN transceiver.
2. Regarding to the operation frequency, the lowest, middle and highest frequency are selected to perform the test.
3. Lowest and highest data rates are tested in each mode. Only worst case is shown in the report. (802.11a is 6Mbps、802.11n(20M-BW) is 7.2Mbps、802.11n(40M-BW) is 15Mbps、802.11ac(20M-BW) is 7.2Mbps、802.11ac(40M-BW) is 15Mbps and 802.11ac(80M-BW) is 32.5Mbps).).
4. The radiation measurements are performed in X, Y, Z axis positioning. Only the worst case is shown in the report.
5. These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 15 Subpart E for Unlicensed National Information Infrastructure devices.

Test Mode	Mode 1: Transmit (802.11a-6Mbps)
	Mode 2: Transmit (802.11n-20BW 7.2Mbps)
	Mode 3: Transmit (802.11n-40BW 15Mbps)
	Mode 4: Transmit (802.11ac-20BW-7.2Mbps)
	Mode 5: Transmit (802.11ac-40BW-15Mbps)
	Mode 6: Transmit (802.11ac-80BW-32.5Mbps)

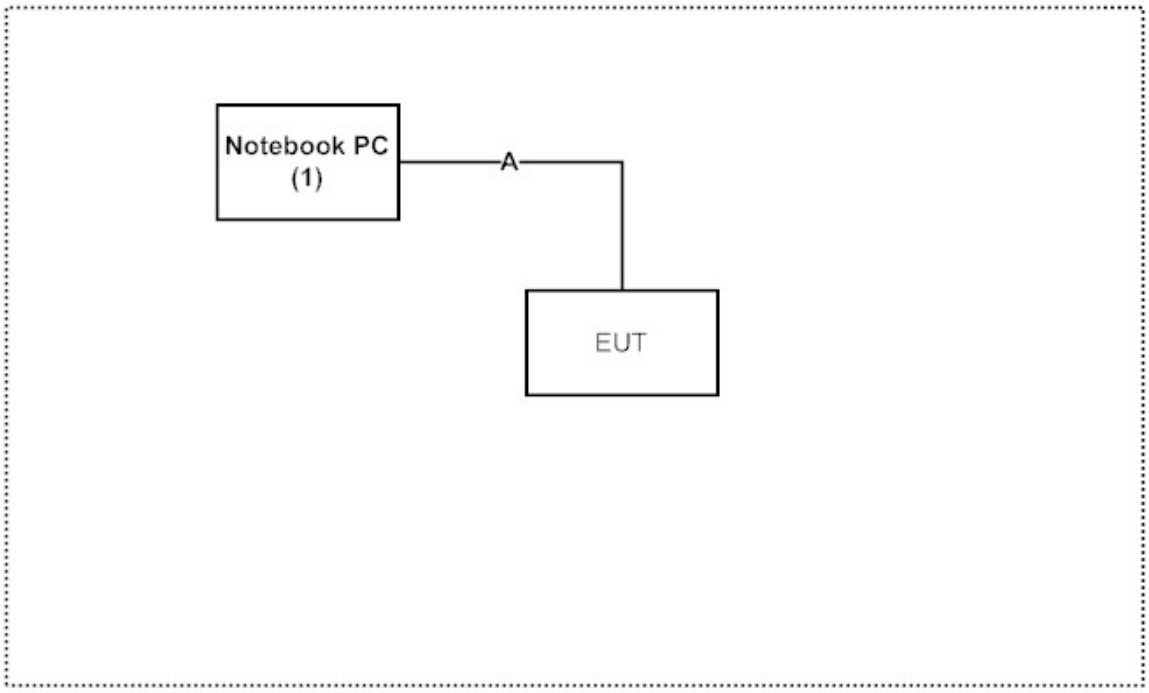
1.3. Tested System Datails

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

Product		Manufacturer	Model No.	Serial No.	Power Cord
(1)	Notebook PC	DELL	PPT	N/A	Non-Shielded, 0.8m

Signal Cable Type		Signal cable Description
A	USB Cable	Shielded, 1.2m

1.4. Configuration of tested System



1.5. EUT Exercise Software

(1) Setup the EUT as shown in Section 1.4

(2) Execute software “MP819xVC-v0.28.119.2010” on the Notebook PC.

(3) Configure the test mode, the test channel, and the data rate.

(4) Press “OK” to start the continuous Transmit.

(5) Verify that the EUT works properly.

1.6. Test Facility

Ambient conditions in the laboratory:

Items	Required (IEC 68-1)	Actual
Temperature (°C)	15-35	20-35
Humidity (%RH)	25-75	50-65
Barometric pressure (mbar)	860-1060	950-1000

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/

Site Description: File on
Federal Communications Commission
FCC Engineering Laboratory
7435 Oakland Mills Road
Columbia, MD 21046
Registration Number: 92195

Site Name: Quietek Corporation
Site Address: 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

FCC Accreditation Number: TW1014

2. Conducted Emission

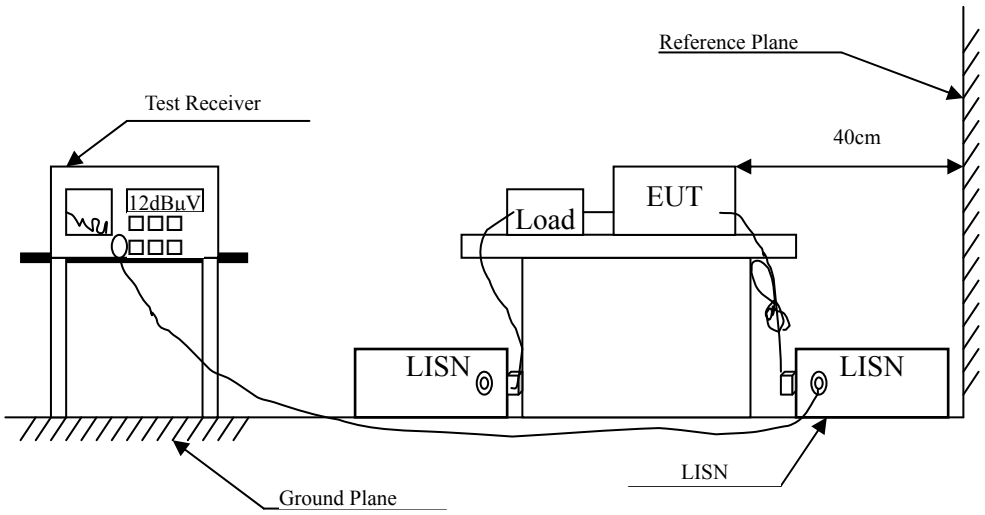
2.1. Test Equipment

	Equipment	Manufacturer	Model No. / Serial No.	Last Cal.	Remark
X	Test Receiver	R & S	ESCS 30 / 825442/018	Sep., 2013	
X	Artificial Mains Network	R & S	ENV4200 / 848411/10	Feb., 2014	Peripherals
X	LISN	R & S	ESH3-Z5 / 825562/002	Feb., 2014	EUT
	DC LISN	Schwarzbeck	8226 / 176	Mar, 2014	EUT
X	Pulse Limiter	R & S	ESH3-Z2 / 357.8810.52	Feb., 2014	
	No.1 Shielded Room				

Note:

1. All equipments are calibrated every one year.
2. The test instruments marked by "X" are used to measure the final test results.

2.2. Test Setup



2.3. Limits

FCC Part 15 Subpart C Paragraph 15.207 (dBµV) Limit		
Frequency MHz	Limits	
	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 and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm /50uH coupling impedance with 50ohm termination. (Please refers to the block diagram of the test setup and photographs.)

Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10, 2009 on conducted measurement.

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

The EUT was setup to ANSI C63.10, 2009; tested to UNII test procedure of FCC KDB-789033 for compliance to FCC 47CFR Subpart E requirements.

2.5. Uncertainty

± 2.26 dB

2.6. Test Result of Conducted Emission

Product : 802.11A/B/G/N/AC 1T1R WLAN USB Dongle
Test Item : Conducted Emission Test
Power Line : Line 1
Test Mode : Mode 6: Transmit (802.11ac-80BW-32.5Mbps) (5210MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBµV	dBµV	dB	dBµV
LINE 1					
Quasi-Peak					
0.158	9.747	34.680	44.427	-21.344	65.771
0.170	9.743	32.900	42.644	-22.785	65.429
0.212	9.739	28.440	38.179	-26.050	64.229
0.341	9.745	26.150	35.895	-24.648	60.543
0.505	9.753	33.100	42.853	-13.147	56.000
0.654	9.759	26.900	36.659	-19.341	56.000
Average					
0.158	9.747	26.160	35.907	-19.864	55.771
0.170	9.743	13.810	23.554	-31.875	55.429
0.212	9.739	20.420	30.159	-24.070	54.229
0.341	9.745	10.480	20.225	-30.318	50.543
0.505	9.753	21.420	31.173	-14.827	46.000
0.654	9.759	19.760	29.519	-16.481	46.000

Note:

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

Product : 802.11A/B/G/N/AC 1T1R WLAN USB Dongle
Test Item : Conducted Emission Test
Power Line : Line 2
Test Mode : Mode 6: Transmit (802.11ac-80BW-32.5Mbps) (5210MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBµV	dBµV	dB	dBµV
LINE 2					
Quasi-Peak					
0.166	9.747	33.830	43.577	-21.966	65.543
0.212	9.749	28.580	38.329	-25.900	64.229
0.373	9.747	28.450	38.197	-21.432	59.629
0.498	9.752	32.750	42.502	-13.555	56.057
7.912	9.920	27.580	37.500	-22.500	60.000
21.162	10.105	25.840	35.945	-24.055	60.000
Average					
0.166	9.747	28.500	38.247	-17.296	55.543
0.212	9.749	24.300	34.049	-20.180	54.229
0.373	9.747	15.410	25.157	-24.472	49.629
0.498	9.752	28.740	38.492	-7.565	46.057
7.912	9.920	22.630	32.550	-17.450	50.000
21.162	10.105	20.160	30.265	-19.735	50.000

Note:

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

Product : 802.11A/B/G/N/AC 1T1R WLAN USB Dongle
Test Item : Conducted Emission Test
Power Line : Line 1
Test Mode : Mode 6: Transmit (802.11ac-80BW-32.5Mbps) (5290MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBµV	dBµV	dB	dBµV
LINE 1					
Quasi-Peak					
0.170	9.743	31.770	41.514	-23.915	65.429
0.216	9.739	29.070	38.809	-25.305	64.114
0.377	9.747	28.700	38.447	-21.067	59.514
0.525	9.753	32.540	42.293	-13.707	56.000
1.263	9.795	25.850	35.645	-20.355	56.000
21.170	10.065	26.590	36.655	-23.345	60.000
Average					
0.170	9.743	19.210	28.954	-26.475	55.429
0.216	9.739	21.590	31.329	-22.785	54.114
0.377	9.747	24.340	34.087	-15.427	49.514
0.525	9.753	24.320	34.073	-11.927	46.000
1.263	9.795	17.130	26.925	-19.075	46.000
21.170	10.065	19.700	29.765	-20.235	50.000

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. “ “ means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

Product : 802.11A/B/G/N/AC 1T1R WLAN USB Dongle
Test Item : Conducted Emission Test
Power Line : Line 2
Test Mode : Mode 6: Transmit (802.11ac-80BW-32.5Mbps) (5290MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBµV	dBµV	dB	dBµV
LINE 2					
Quasi-Peak					
0.162	9.747	34.780	44.527	-21.130	65.657
0.314	9.744	26.650	36.394	-24.920	61.314
0.377	9.747	28.840	38.587	-20.927	59.514
0.529	9.754	32.420	42.174	-13.826	56.000
7.931	9.920	27.330	37.250	-22.750	60.000
21.205	10.105	25.610	35.715	-24.285	60.000
Average					
0.162	9.747	20.840	30.587	-25.070	55.657
0.314	9.744	20.460	30.204	-21.110	51.314
0.377	9.747	18.490	28.237	-21.277	49.514
0.529	9.754	24.910	34.664	-11.336	46.000
7.931	9.920	21.940	31.860	-18.140	50.000
21.205	10.105	20.650	30.755	-19.245	50.000

Note:

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

Product : 802.11A/B/G/N/AC 1T1R WLAN USB Dongle
Test Item : Conducted Emission Test
Power Line : Line 1
Test Mode : Mode 6: Transmit (802.11ac-80BW-32.5Mbps) (5530MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBµV	dBµV	dB	dBµV
LINE 1					
Quasi-Peak					
0.154	9.749	33.630	43.378	-22.508	65.886
0.205	9.739	27.460	37.199	-27.230	64.429
0.267	9.742	25.920	35.662	-26.995	62.657
0.490	9.752	32.790	42.542	-13.744	56.286
8.056	9.910	27.490	37.400	-22.600	60.000
21.369	10.068	27.010	37.078	-22.922	60.000
Average					
0.154	9.749	19.990	29.738	-26.148	55.886
0.205	9.739	15.970	25.709	-28.720	54.429
0.267	9.742	20.280	30.022	-22.635	52.657
0.490	9.752	27.340	37.092	-9.194	46.286
8.056	9.910	22.110	32.020	-17.980	50.000
21.369	10.068	20.660	30.728	-19.272	50.000

Note:

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

Product : 802.11A/B/G/N/AC 1T1R WLAN USB Dongle
Test Item : Conducted Emission Test
Power Line : Line 2
Test Mode : Mode 6: Transmit (802.11ac-80BW-32.5Mbps) (5530MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBµV	dBµV	dB	dBµV
LINE 2					
Quasi-Peak					
0.220	9.750	28.520	38.270	-25.730	64.000
0.267	9.752	25.860	35.612	-27.045	62.657
0.509	9.753	33.100	42.853	-13.147	56.000
1.283	9.798	26.680	36.478	-19.522	56.000
8.021	9.920	27.580	37.500	-22.500	60.000
20.986	10.101	26.380	36.481	-23.519	60.000
Average					
0.220	9.750	20.710	30.460	-23.540	54.000
0.267	9.752	18.890	28.642	-24.015	52.657
0.509	9.753	21.730	31.483	-14.517	46.000
1.283	9.798	17.030	26.828	-19.172	46.000
8.021	9.920	22.510	32.430	-17.570	50.000
20.986	10.101	23.120	33.221	-16.779	50.000

Note:

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

3. Maximun conducted output power

3.1. Test Equipment

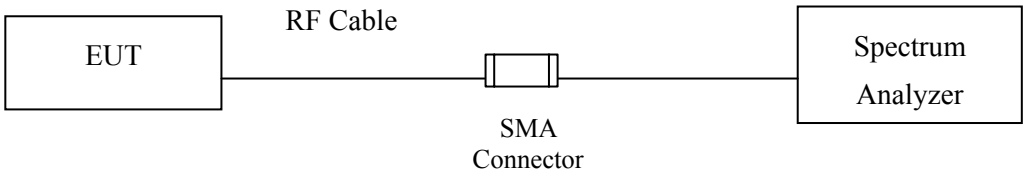
	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
X	Power Meter	Anritsu	ML2495A/6K00003357	May, 2014
X	Power Sensor	Anritsu	MA2411B/0738448	Jun, 2014
X	Spectrum Analyzer	Agilent	N9010A / MY48030495	Apr., 2014

Note:

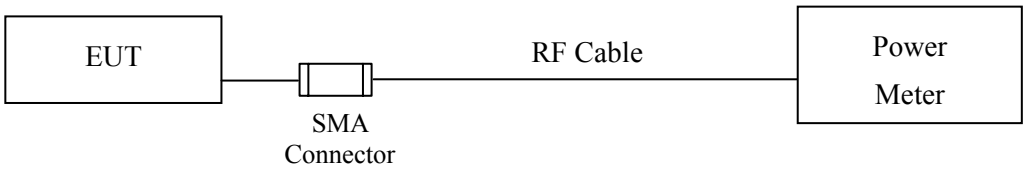
1. All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.
2. The test instruments marked with "X" are used to measure the final test results.

3.2. Test Setup

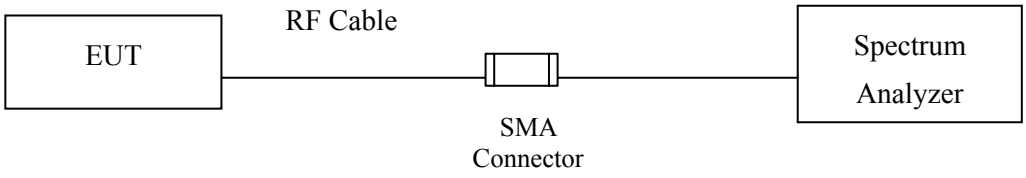
26dBc Occupied Bandwidth



Conduction Power Measurement (for 802.11an)



Conduction Power Measurement (for 802.11ac)



3.3. Limits

(1) 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 or 4 dBm + 10log B, where B is the 26-dB emission bandwidth in MHz. If transmitting antenna of directional gain greater than 6 dBi are used, the Maximum conducted output 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 maximum conducted output power over the frequency band of operation shall not exceed the lesser of 250 mW or 11 dBm + 10log B, where B is the 26-dB emission bandwidth in MHz. If transmitting antenna of directional gain greater than 6 dBi are used, the Maximum conducted output 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 maximum conducted output power over the frequency band of operation shall not exceed the lesser of 1W or 17 dBm + 10log B, where B is the 26-dB emission bandwidth in MHz. If transmitting antenna of directional gain greater than 6 dBi are used, the Maximum conducted output power shall be reduced by the amount in dB that directional gain of the antenna exceeds 6 dBi.

3.4. Test Procedure

As an alternative to FCC KDB-789033, the EUT maximum conducted output power was measured with an average power meter employing a video bandwidth greater than 6dB BW of the emission under test. Maximum conducted output power was read directly from the meter across all data rates, and across three channels within each sub-band. Special care was used to make sure that the EUT was transmitting in continuous mode. This method exceeds the limitations of FCC KDB-789033, and provides more accurate measurements.

802.11an (BW≦40MHz) Maximum conducted output power using KDB 789033 section E)3)b) Method PM-G (Measurement using a gated RF average power meter)
Note: the power meter have a video bandwidth that is greater than or equal to the measurement bandwidth, (Anritsu/ MA2411B video bandwidth: 65MHz)

802.11ac (BW=80MHz) Maximum conducted output power using KDB 789033 section E)2)b) Method SA-1 (trace averaging with the EUT transmitting at full power throughout each sweep).

When transmitted signals consist of two or more non-contiguous spectrum segments (e.g., 80+80 MHz mode) or when a single spectrum segment of a transmission crosses the boundary between two adjacent U-NII bands, KDB 644545 D01 section F) procedure is used for measurements.

3.5. Uncertainty

± 1.27 dB

3.6. Test Result of Maximum conducted output power

Product : 802.11A/B/G/N/AC 1T1R WLAN USB Dongle
Test Item : Maximum conducted output power
Test Site : No.3 OATS
Test Mode : Mode 1: Transmit (802.11a-6Mbps)

Cable loss=1dB		Maximum conducted output power								
Channel No.	Frequency (MHz)	Data Rate (Mbps)								Required Limit
		6	9	12	18	24	36	48	54	
		Measurement Level (dBm)								
36	5180	15.03	--	--	--	--	--	--	--	<17dBm
44	5220	15.11	15.05	14.94	14.93	14.87	14.71	14.65	14.56	<17dBm
48	5240	15.02	--	--	--	--	--	--	--	<17dBm
52	5260	15.01	--	--	--	--	--	--	--	<24dBm
60	5300	15.03	14.93	14.83	14.73	14.61	14.58	14.46	14.33	<24dBm
64	5320	15.03	--	--	--	--	--	--	--	<24dBm
100	5500	15.02	--	--	--	--	--	--	--	<24dBm
116	5580	15.03	14.89	14.75	14.69	14.57	14.53	14.59	14.47	<24dBm
140	5700	15.01	--	--	--	--	--	--	--	<24dBm

Note: Maximum conducted output power Value =Reading value on average power meter + cable loss

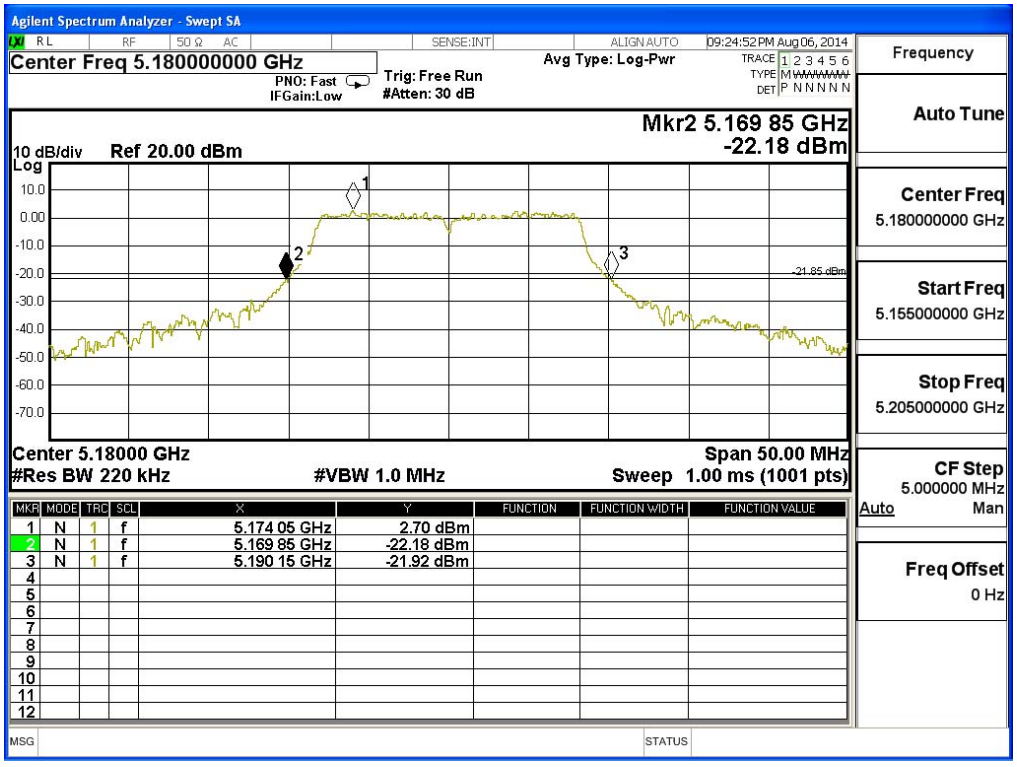
Maximum conducted output power Measurement:

Channel Number	Frequency (MHz)	26dB Bandwidth (MHz)	Output Power (dBm)	Output Power Limit	
				(dBm)	dBm+10log(BW)
36	5180	20.30	15.03	17	17.07
44	5220	20.05	15.11	17	17.02
48	5240	20.05	15.02	17	17.02
52	5260	20.40	15.01	24	24.10
60	5300	20.45	15.03	24	24.11
64	5320	20.40	15.03	24	24.10
100	5500	20.40	15.02	24	24.10
116	5580	20.15	15.03	24	24.04
140	5700	20.30	15.01	24	24.07

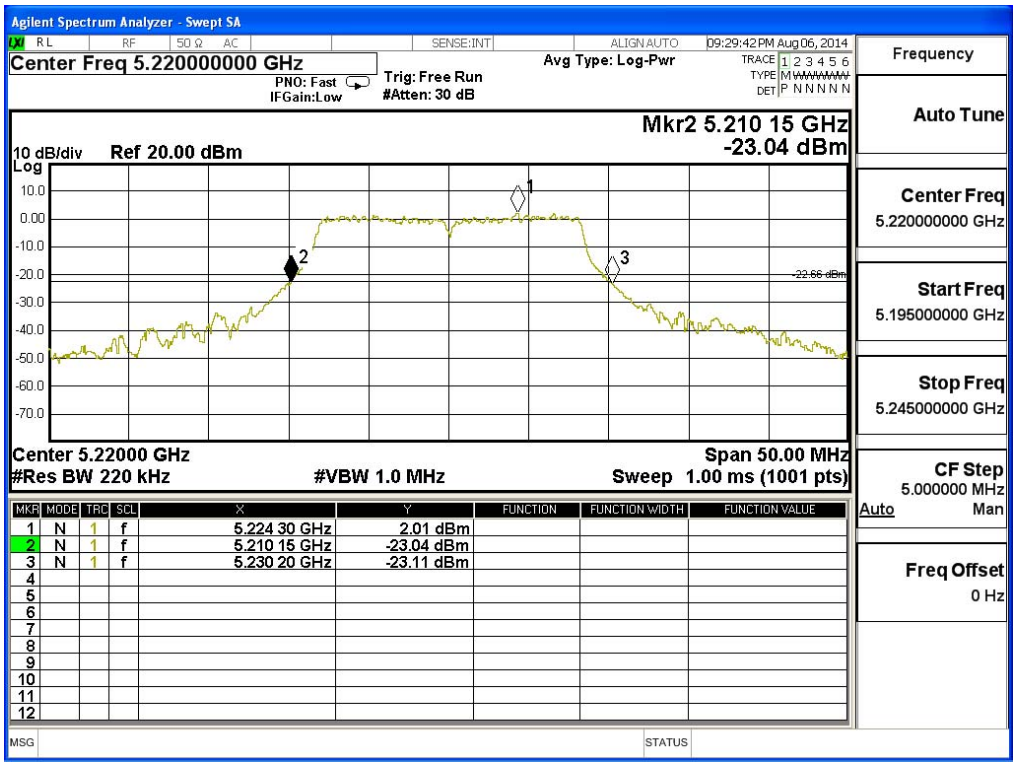
Note: Power Output Value =Reading value on average power meter + cable loss

26dBc Occupied Bandwidth:

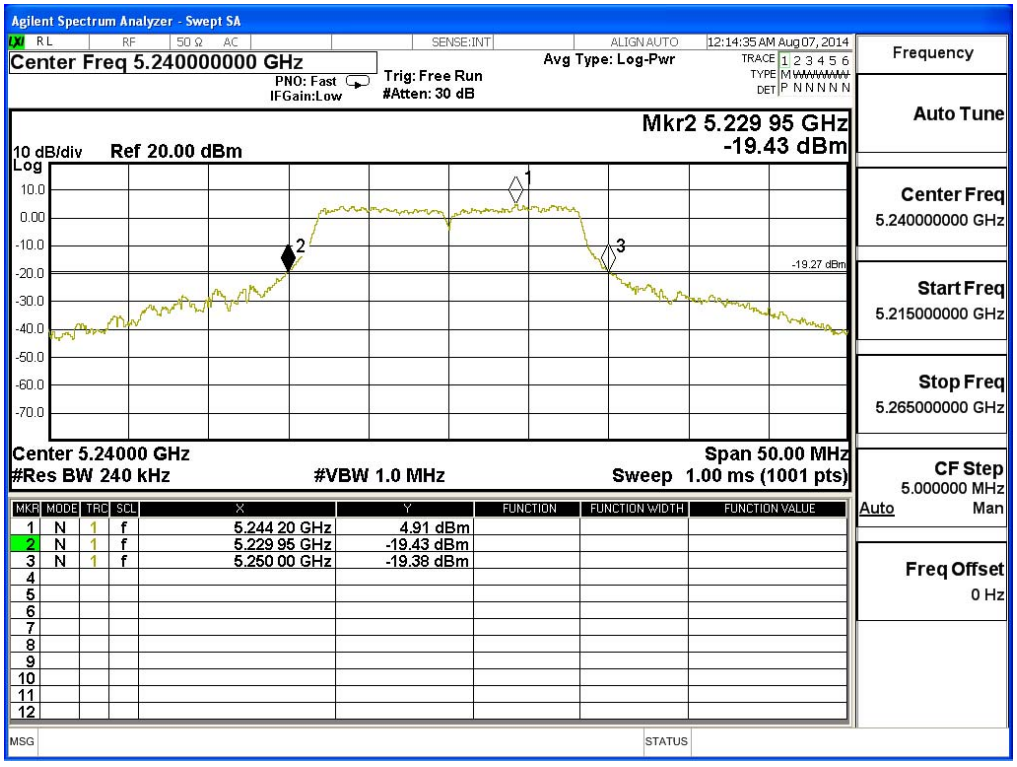
Channel 36



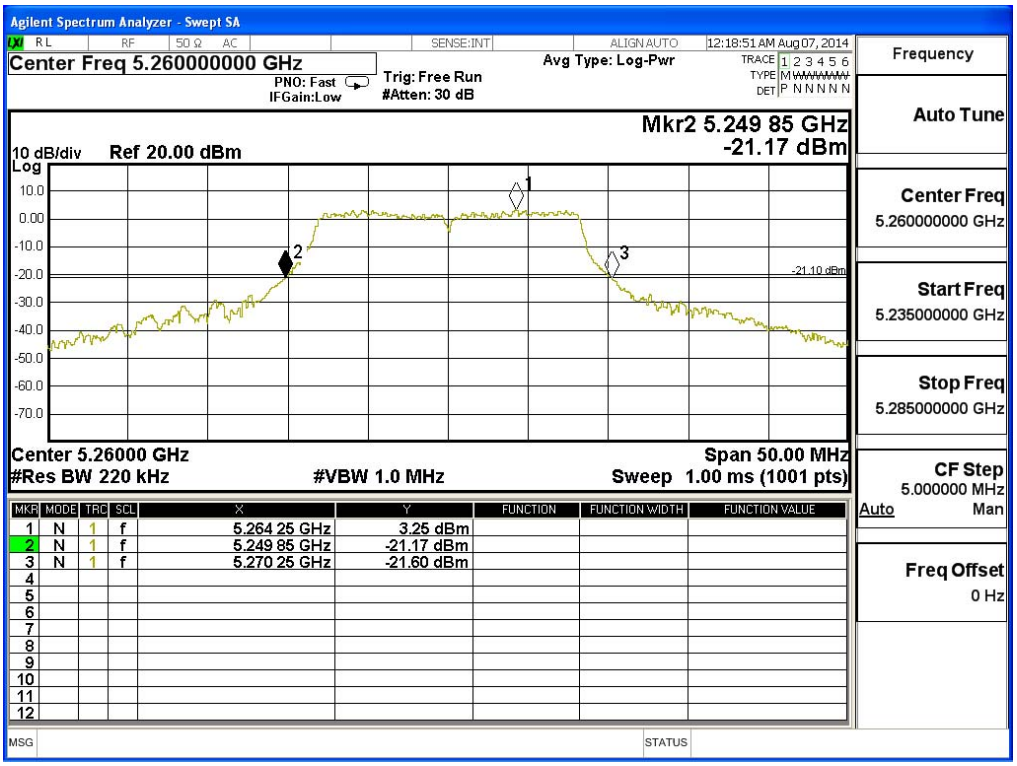
Channel 40



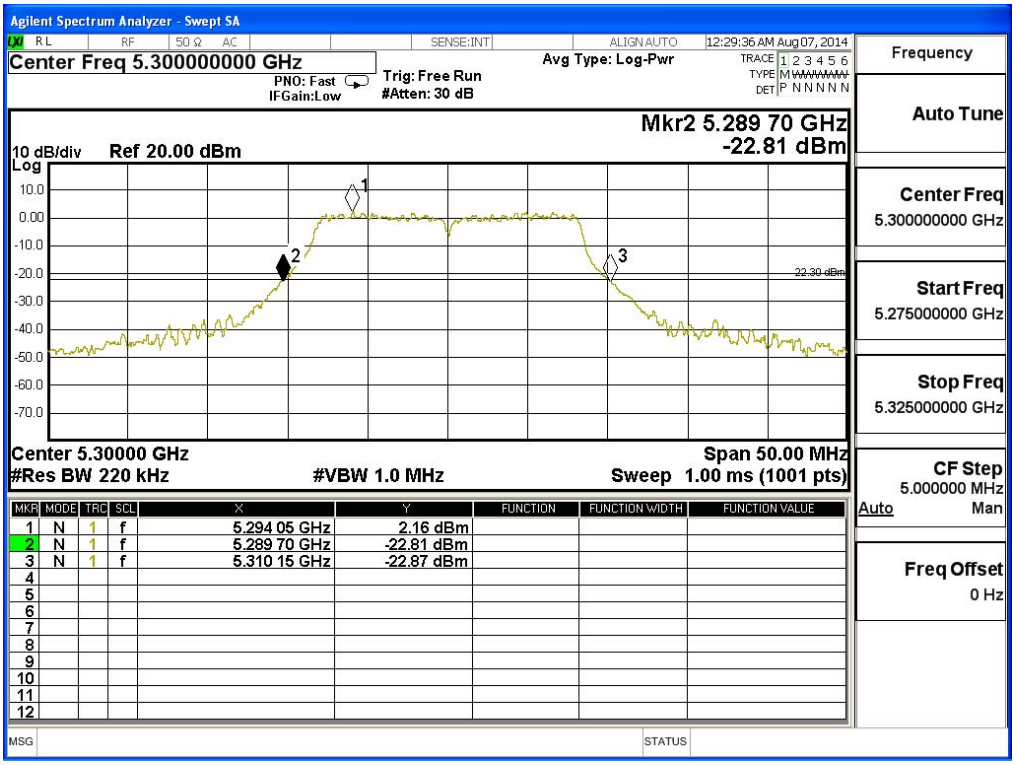
Channel 48



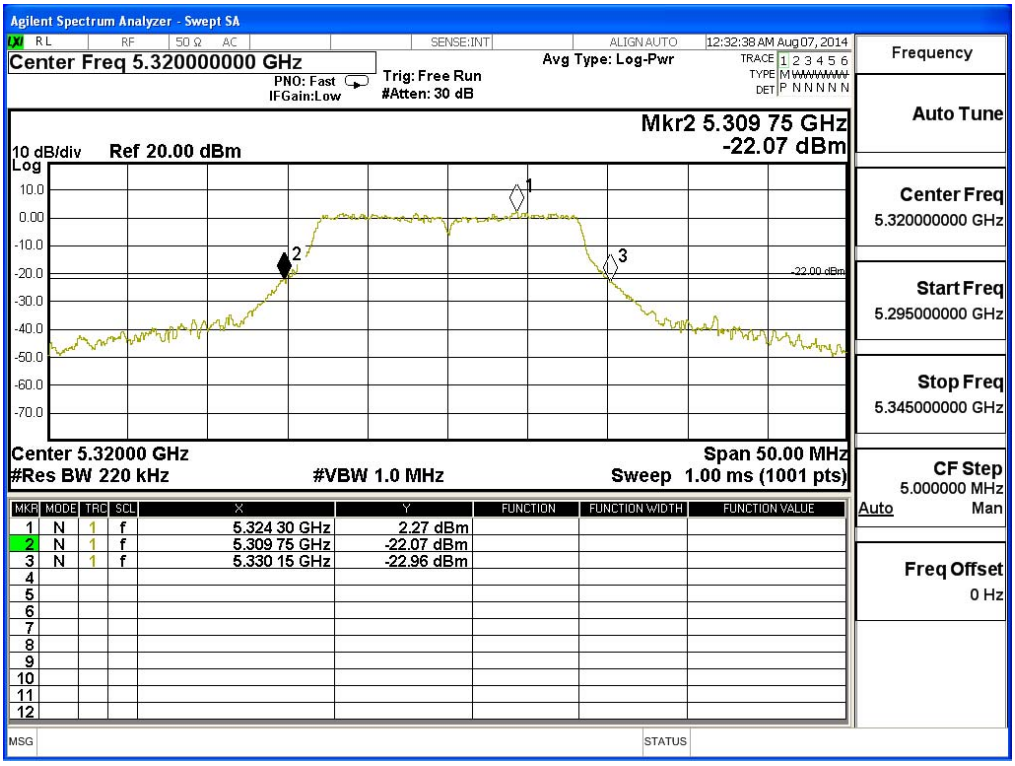
Channel 52



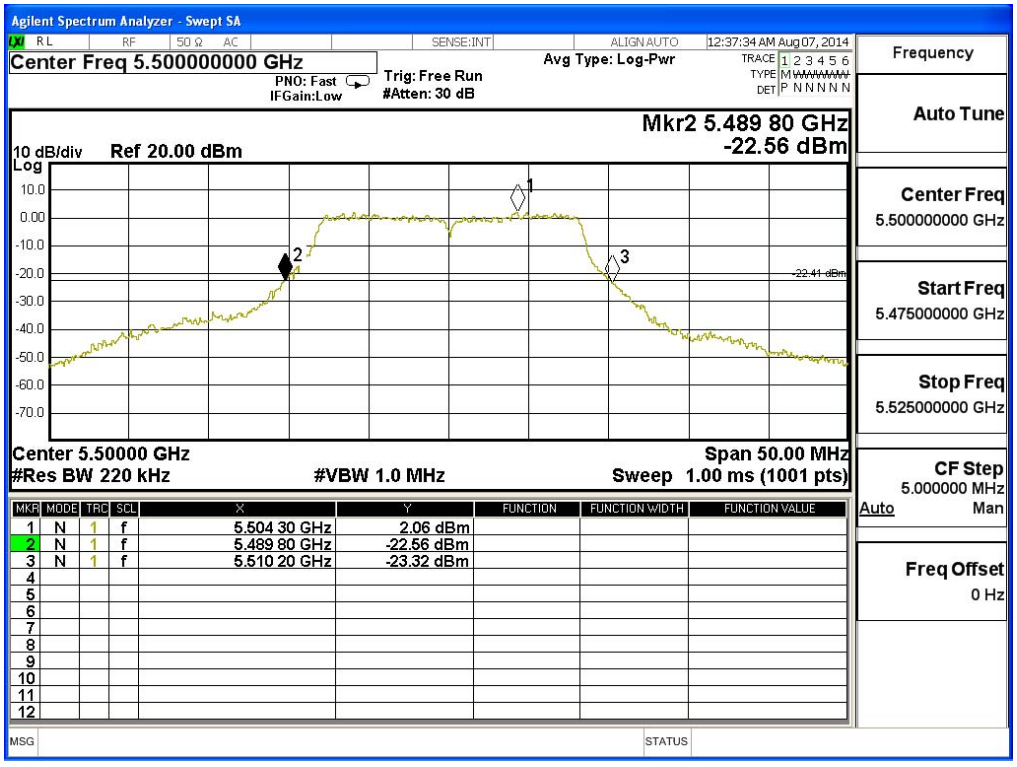
Channel 60



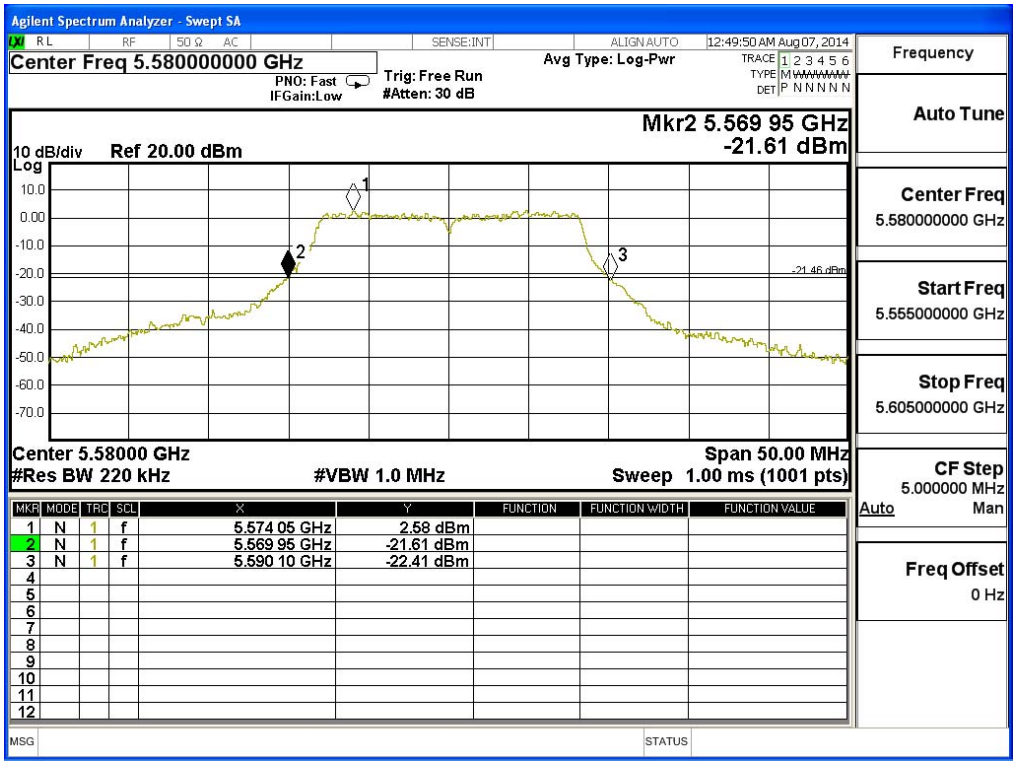
Channel 64



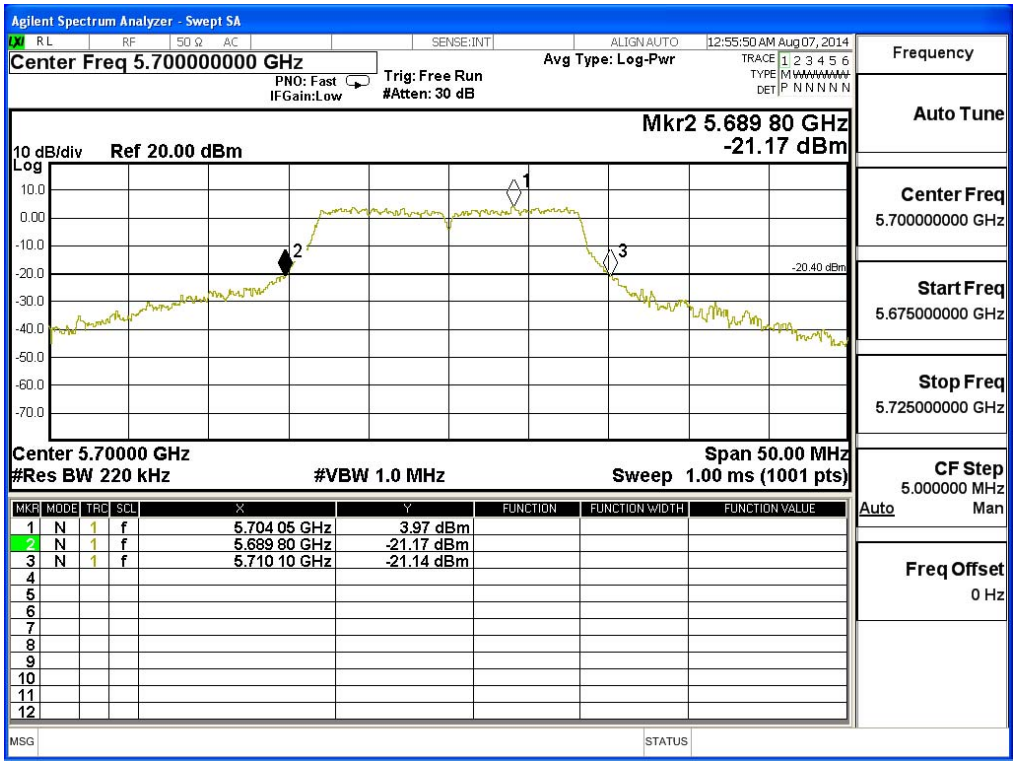
Channel 100



Channel 116



Channel 140


Agilent Spectrum Analyzer - Swept SA
Center Freq 5.700000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
Avg Type: Log-Pwr
12:55:50 AM Aug 07, 2014
Mkr2 5.689 80 GHz
-21.17 dBm
10 dB/div
Log
Ref 20.00 dBm
-20.40 dBm
Center 5.70000 GHz
#Res BW 220 kHz
#VBW 1.0 MHz
Span 50.00 MHz
Sweep 1.00 ms (1001 pts)
1 N 1 f 5.704 05 GHz 3.97 dBm
2 N 1 f 5.689 80 GHz -21.17 dBm
3 N 1 f 5.710 10 GHz -21.14 dBm
Frequency
Auto Tune
Center Freq
5.700000000 GHz
Start Freq
5.675000000 GHz
Stop Freq
5.725000000 GHz
CF Step
5.000000 MHz
Auto
Man
Freq Offset
0 Hz

Product : 802.11A/B/G/N/AC 1T1R WLAN USB Dongle
Test Item : Maximum conducted output power
Test Site : No.3 OATS
Test Mode : Mode 2: Transmit (802.11n-20BW 7.2Mbps)

Cable loss=1dB		Maximum conducted output power								
Channel No.	Frequency (MHz)	Data Rate (Mbps)								Required Limit
		7.2	14.4	21.7	28.9	43.3	57.8	65	72.2	
		Measurement Level (dBm)								
36	5180	15.05	--	--	--	--	--	--	--	<17dBm
44	5220	15.02	14.93	14.84	14.72	14.66	14.58	14.53	14.51	<17dBm
48	5240	15.03	--	--	--	--	--	--	--	<17dBm
52	5260	15.01	--	--	--	--	--	--	--	<24dBm
60	5300	15.02	14.87	14.77	14.58	14.45	14.36	14.32	14.29	<24dBm
64	5320	15.03	--	--	--	--	--	--	--	<24dBm
100	5500	15.01	--	--	--	--	--	--	--	<24dBm
116	5580	15.02	14.94	14.86	14.78	14.68	14.52	14.44	14.38	<24dBm
140	5700	15.02	--	--	--	--	--	--	--	<24dBm

Note: Maximum conducted output power Value =Reading value on average power meter + cable loss

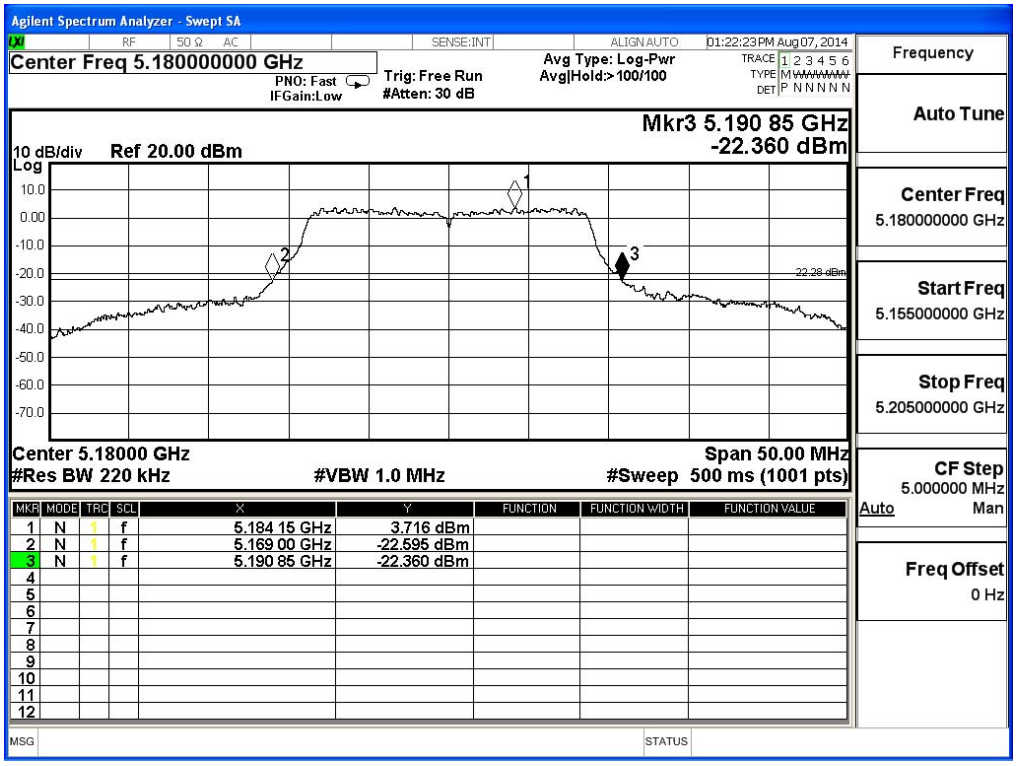
Maximum conducted output power Measurement:

Channel Number	Frequency (MHz)	26dB Bandwidth (MHz)	Output Power (dBm)	Output Power Limit	
				(dBm)	dBm+10log(BW)
36	5180	21.85	15.05	17	17.39
44	5220	21.15	15.02	17	17.25
48	5240	21.15	15.03	17	17.25
52	5260	21.30	15.01	24	24.28
60	5300	20.95	15.02	24	24.21
64	5320	20.95	15.03	24	24.21
100	5500	21.25	15.01	24	24.27
116	5580	21.20	15.02	24	24.26
140	5700	21.50	15.02	24	24.32

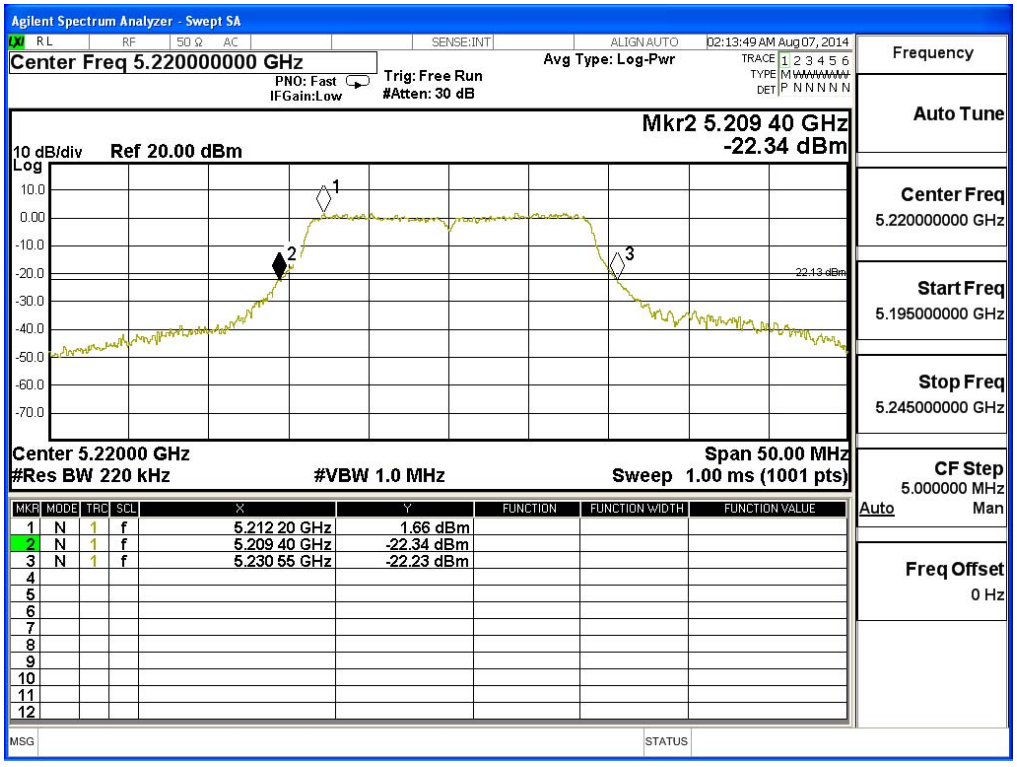
Note: Power Output Value =Reading value on average power meter + cable loss

26dBc Occupied Bandwidth:

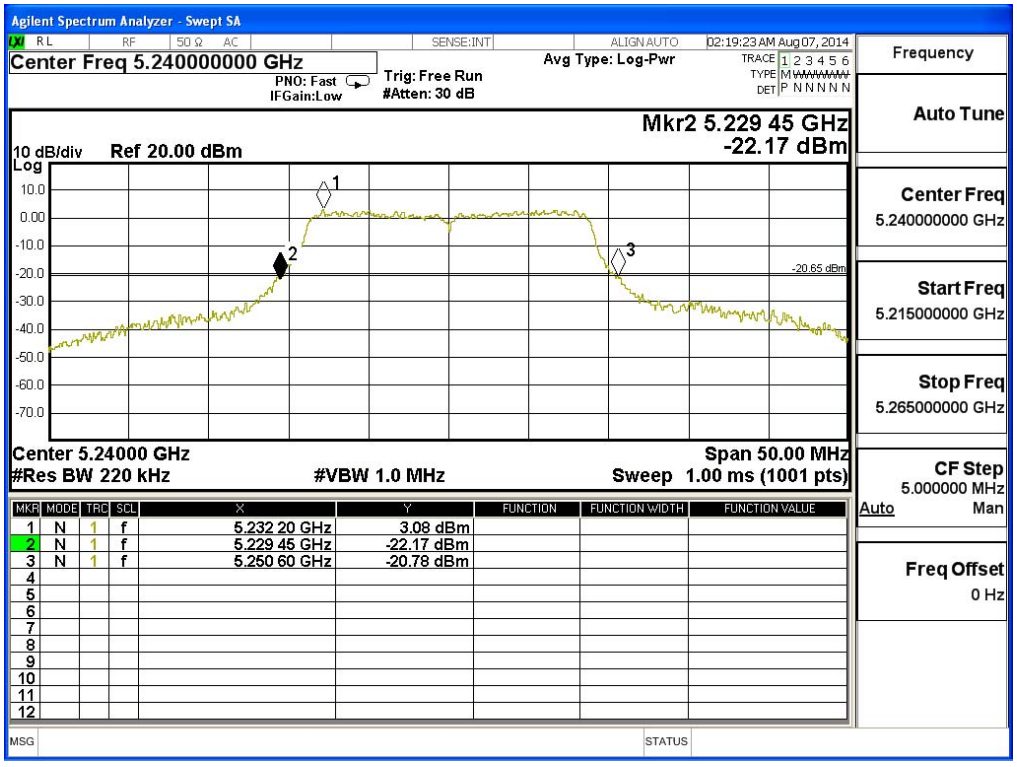
Channel 36



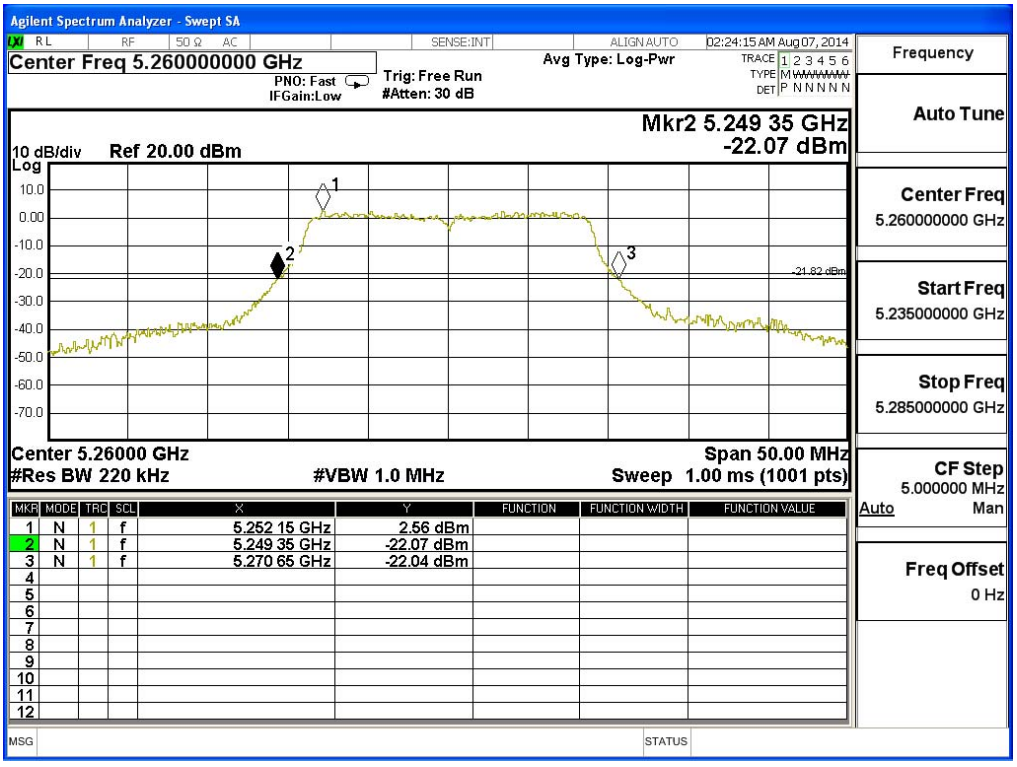
Channel 44



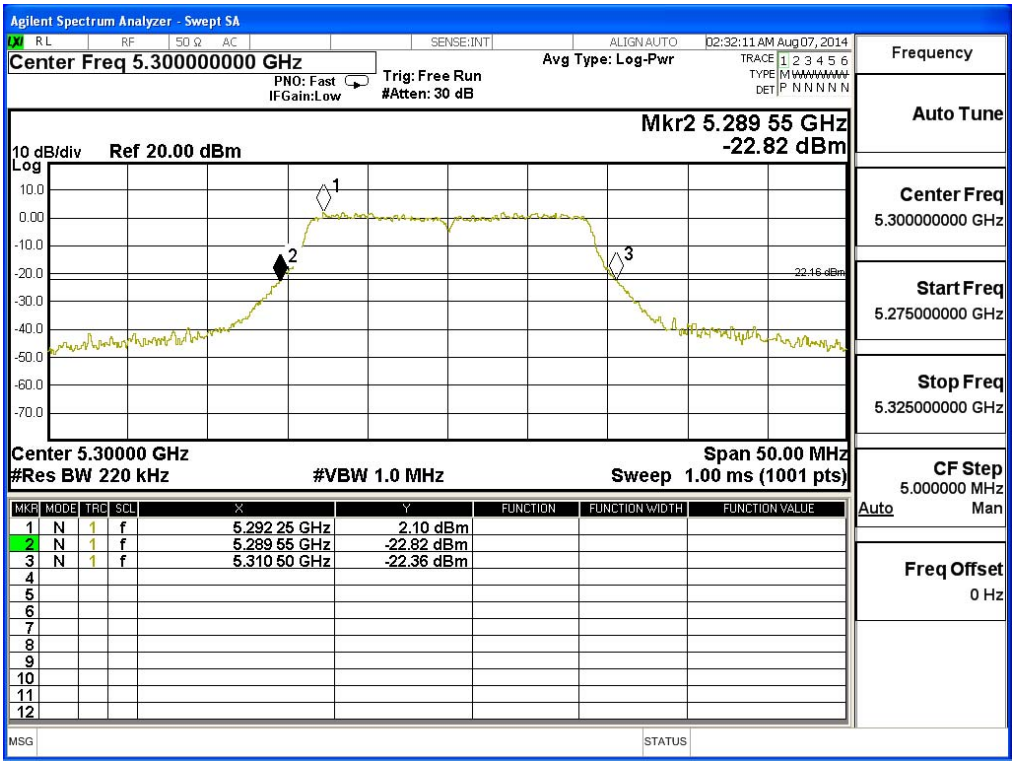
Channel 48



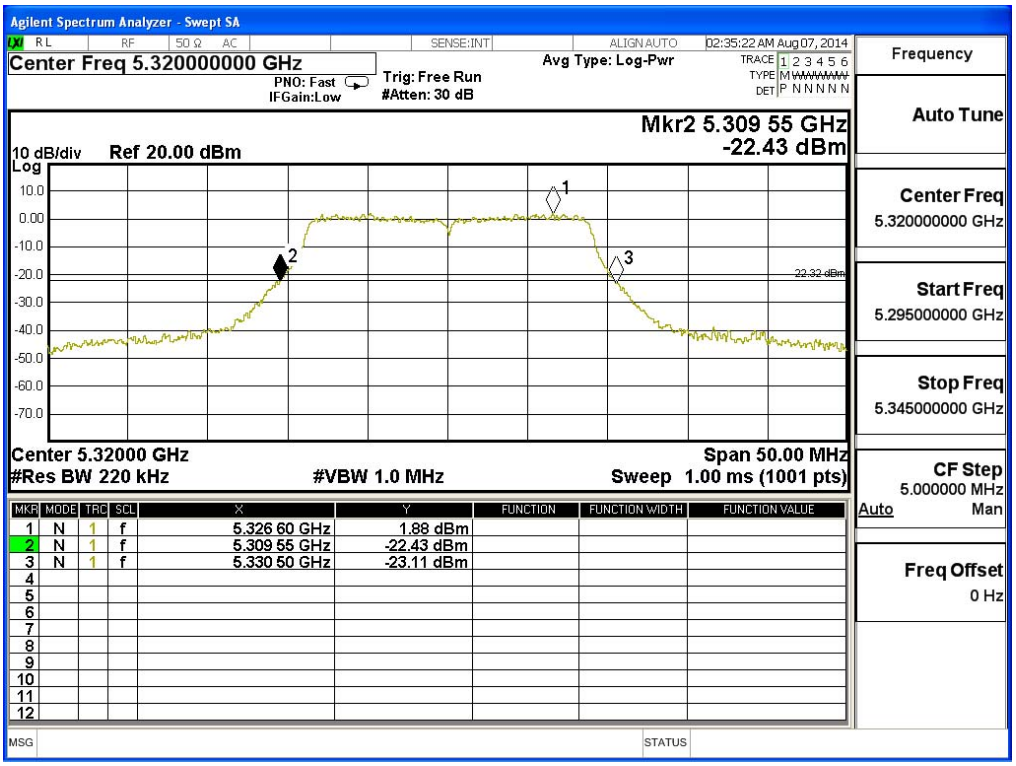
Channel 52



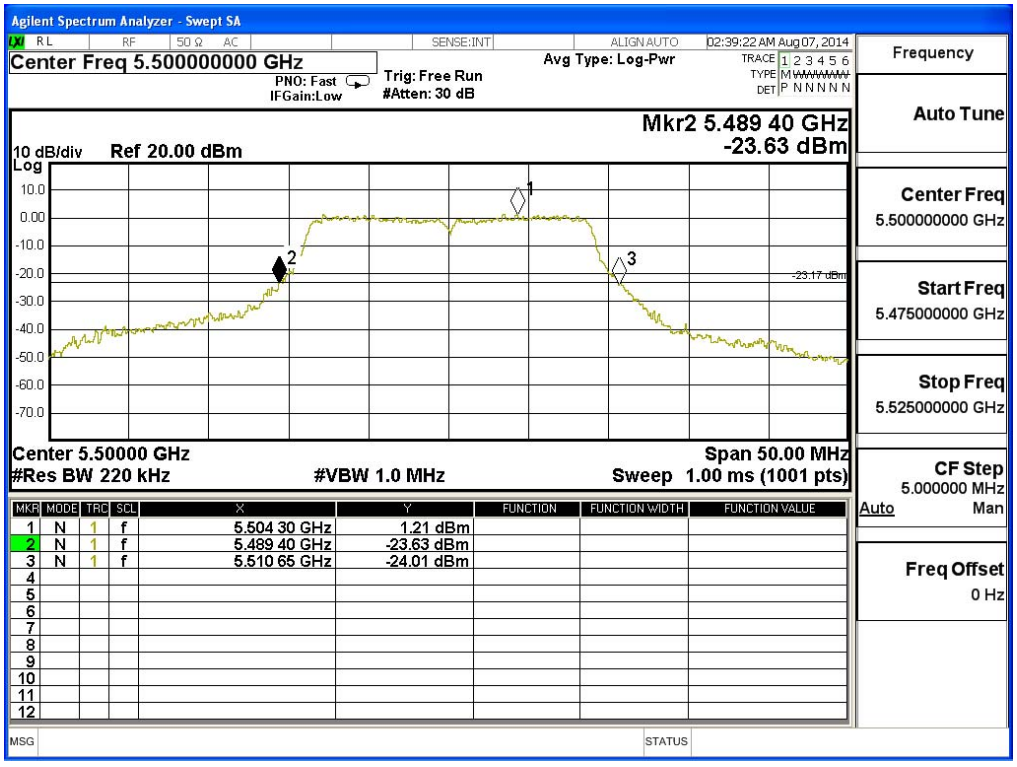
Channel 60



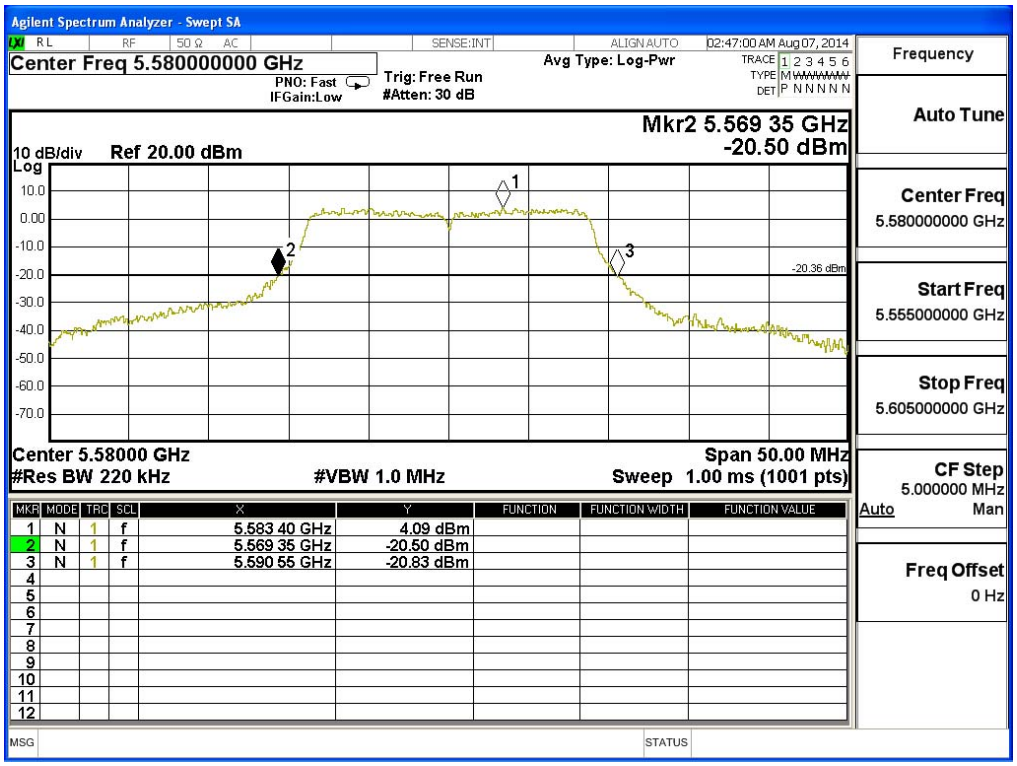
Channel 64



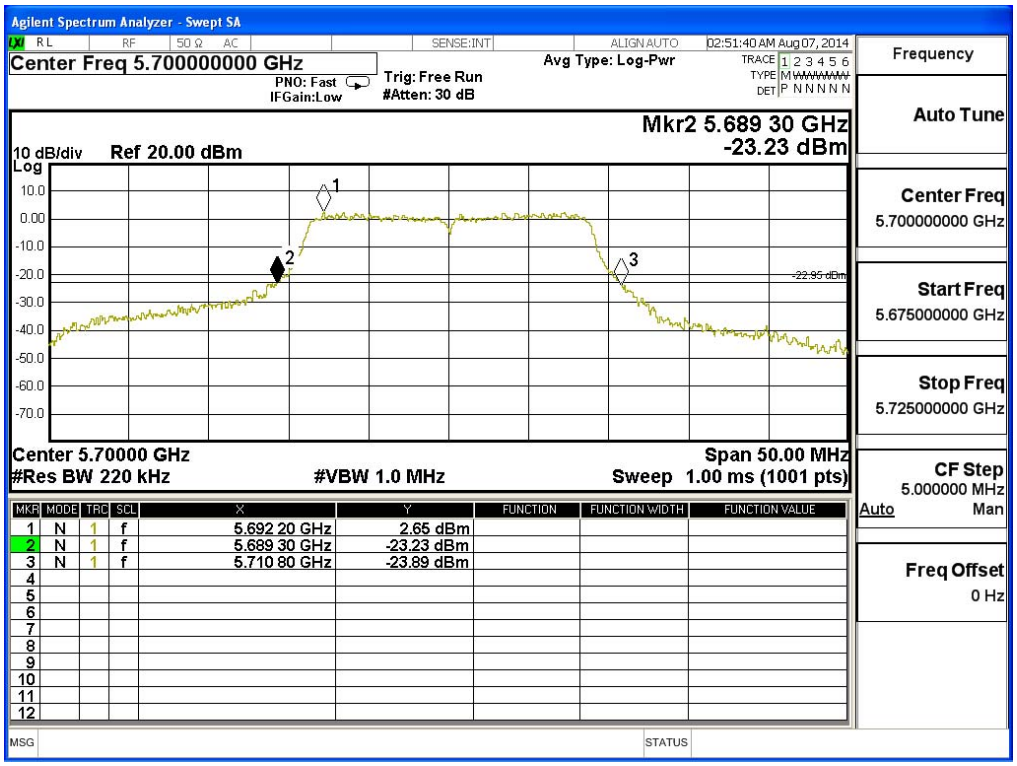
Channel 100



Channel 116



Channel 140


Agilent Spectrum Analyzer - Swept SA
RL
RF
50 Ω AC
SENSE:INT
ALIGN AUTO
02:51:40 AM Aug 07, 2014
Center Freq 5.700000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
Avg Type: Log-Pwr
TRACE 1 2 3 4 5 6
TYPE M WWWWW
DET P N N N N N
Mkr2 5.689 30 GHz
-23.23 dBm
10 dB/div
Log
Ref 20.00 dBm
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-22.95 dBm
Center 5.70000 GHz
#Res BW 220 kHz
#VBW 1.0 MHz
Span 50.00 MHz
Sweep 1.00 ms (1001 pts)
MKR MODE TRC SCL X Y FUNCTION FUNCTION WIDTH FUNCTION VALUE
1 N 1 f 5.692 20 GHz 2.65 dBm
2 N 1 f 5.689 30 GHz -23.23 dBm
3 N 1 f 5.710 80 GHz -23.89 dBm
MSG
STATUS
Frequency
Auto Tune
Center Freq
5.700000000 GHz
Start Freq
5.675000000 GHz
Stop Freq
5.725000000 GHz
CF Step
5.000000 MHz
Auto
Man
Freq Offset
0 Hz

Product : 802.11A/B/G/N/AC 1T1R WLAN USB Dongle
Test Item : Maximum conducted output power
Test Site : No.3 OATS
Test Mode : Mode 3: Transmit (802.11n-40BW 15Mbps)

Cable loss=1dB		Maximum conducted output power								
Channel No.	Frequency (MHz)	Data Rate (Mbps)								Required Limit
		15	30	45	60	90	120	135	150	
		Measurement Level (dBm)								
38	5190	14.03	13.87	13.71	13.65	13.59	13.43	13.37	13.31	<17dBm
46	5230	14.12	--	--	--	--	--	--	--	<17dBm
54	5270	14.01	13.86	13.71	13.66	13.51	13.47	13.41	13.45	<17dBm
62	5310	14.02	--	--	--	--	--	--	--	<24dBm
102	5510	14.01	--	--	--	--	--	--	--	<24dBm
110	5550	14.02	13.94	13.87	13.78	13.69	13.52	13.34	13.27	<24dBm
134	5670	14.01	--	--	--	--	--	--	--	<24dBm

Note: Maximum conducted output power Value =Reading value on average power meter + cable loss

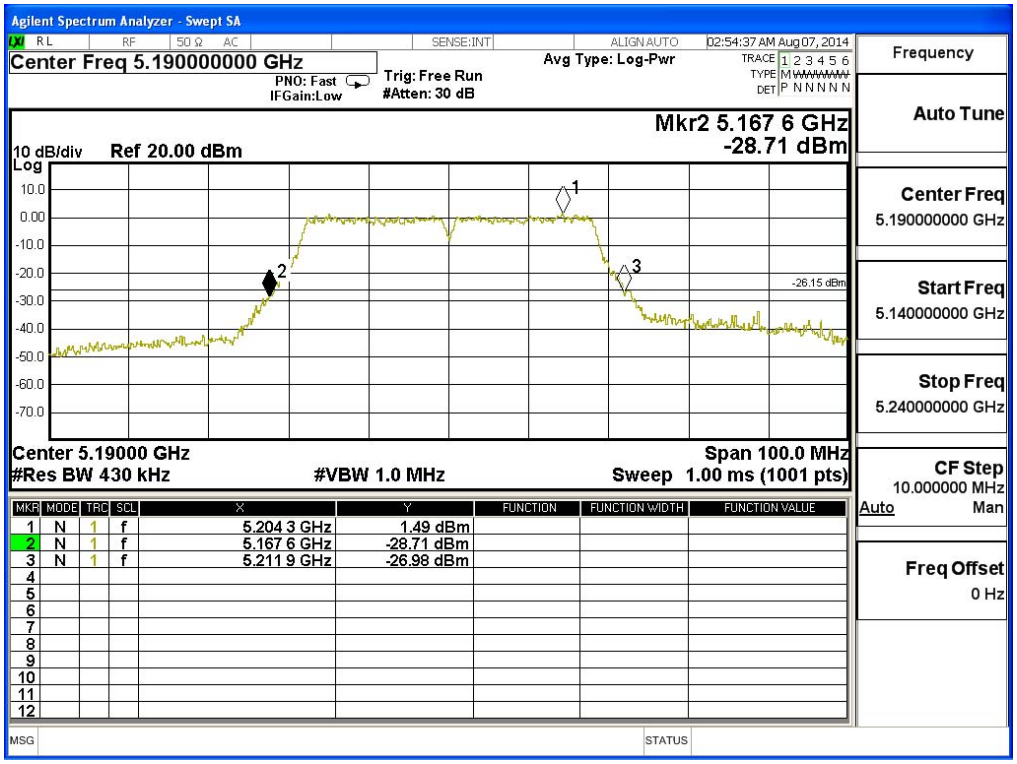
Maximum conducted output power Measurement:

Channel Number	Frequency (MHz)	26dB Bandwidth (MHz)	Output Power (dBm)	Output Power Limit	
				(dBm)	dBm+10log(BW)
38	5190	44.30	14.03	17	20.46
46	5230	43.60	14.12	17	20.39
54	5270	43.60	14.01	24	27.39
62	5310	43.70	14.02	24	27.40
102	5510	43.40	14.01	24	27.37
110	5550	44.30	14.02	24	27.46
134	5670	43.60	14.01	24	27.39

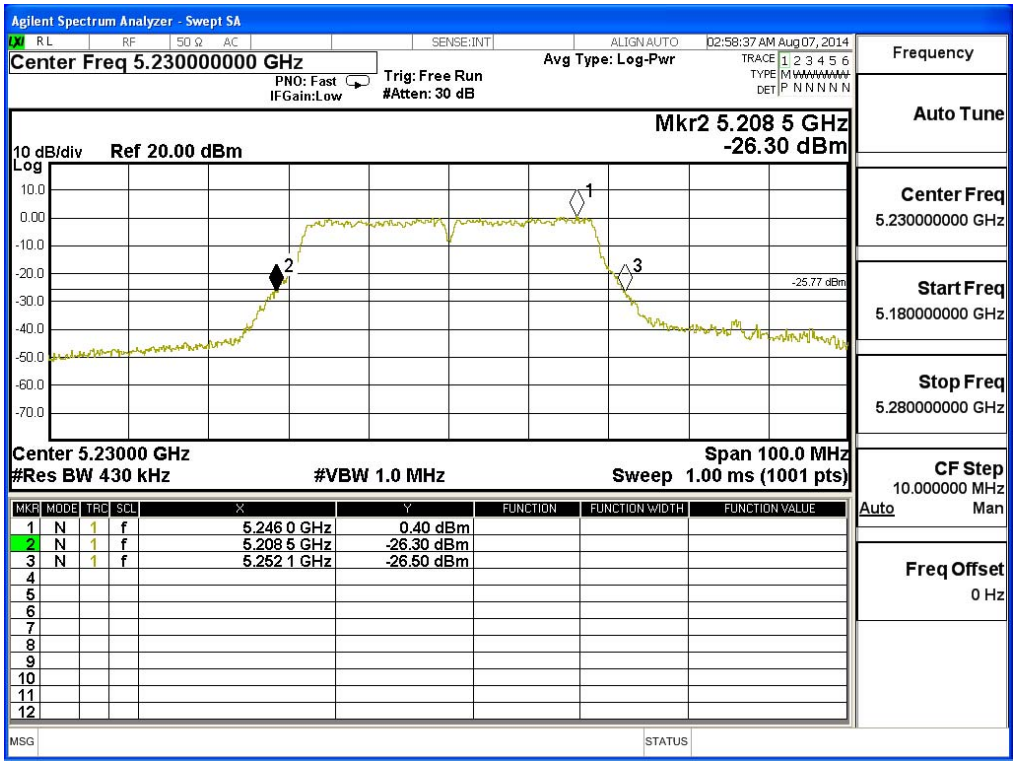
Note: Power Output Value =Reading value on average power meter + cable loss

26dBc Occupied Bandwidth:

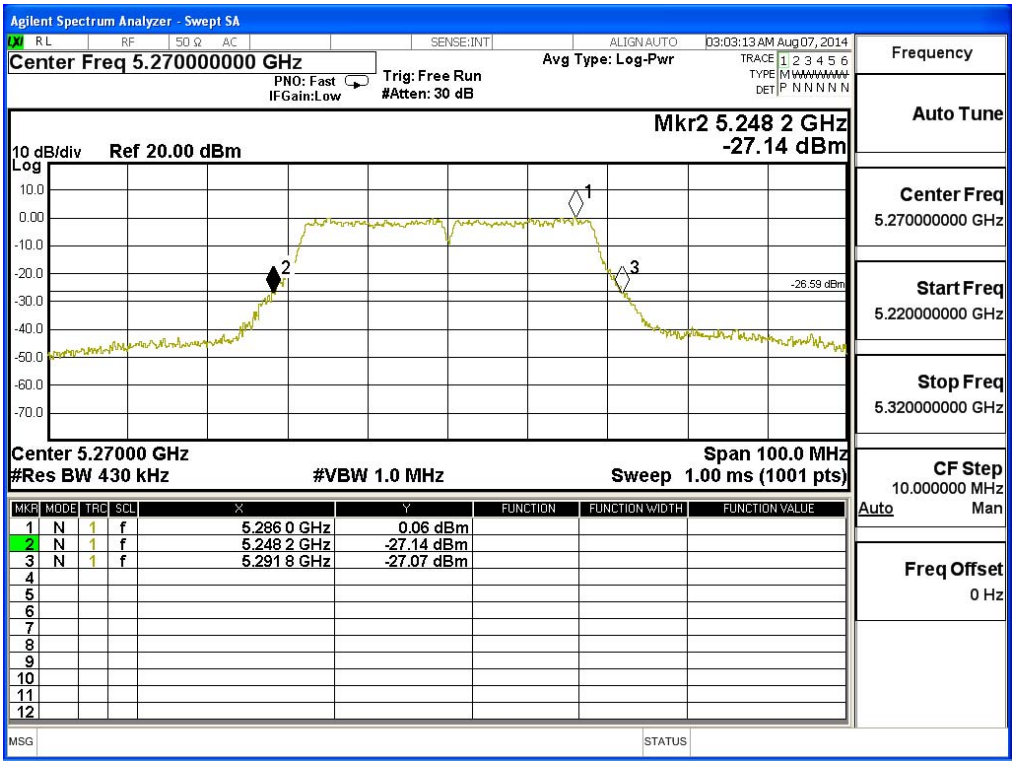
Channel 38



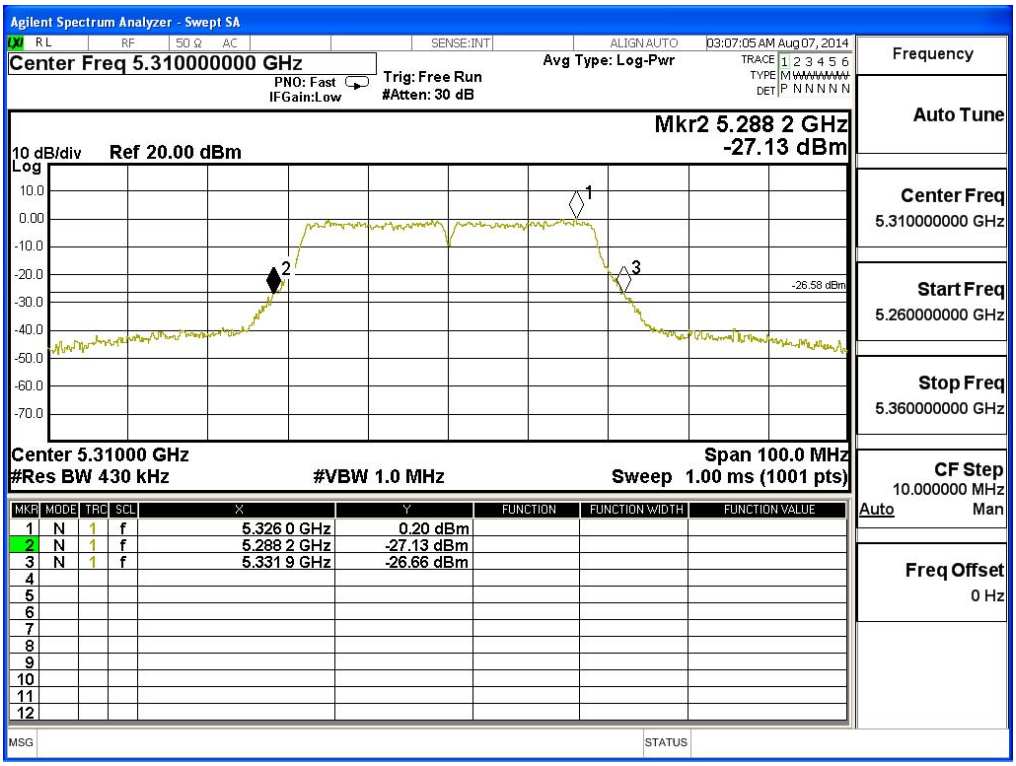
Channel 46



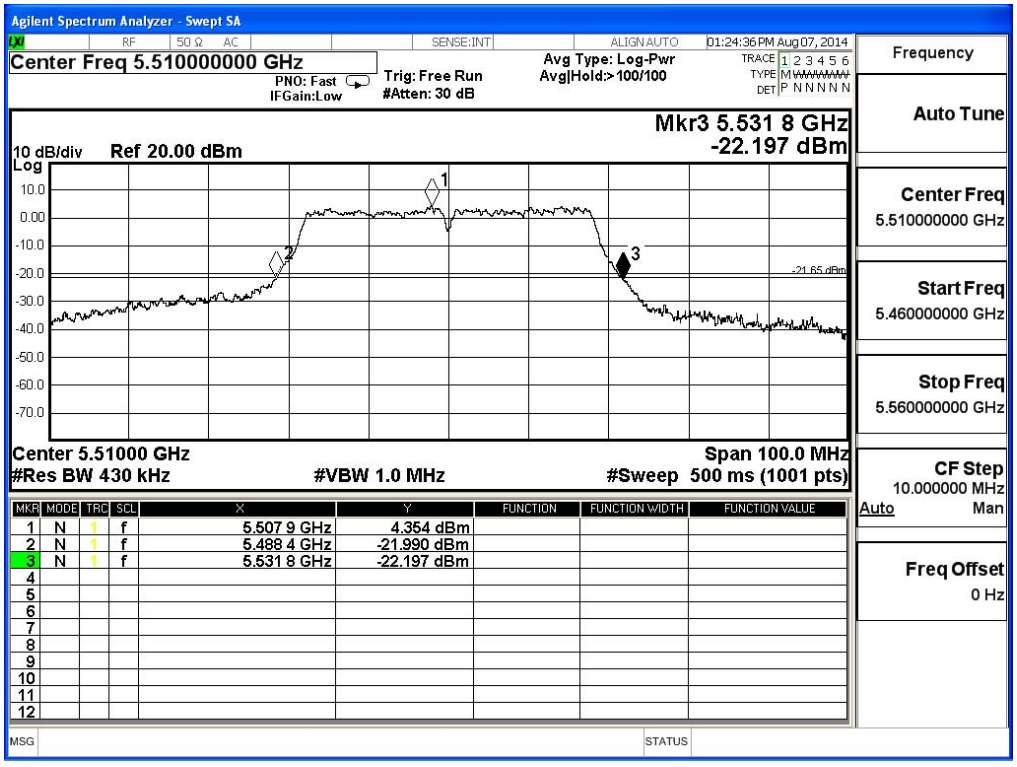
Channel 54



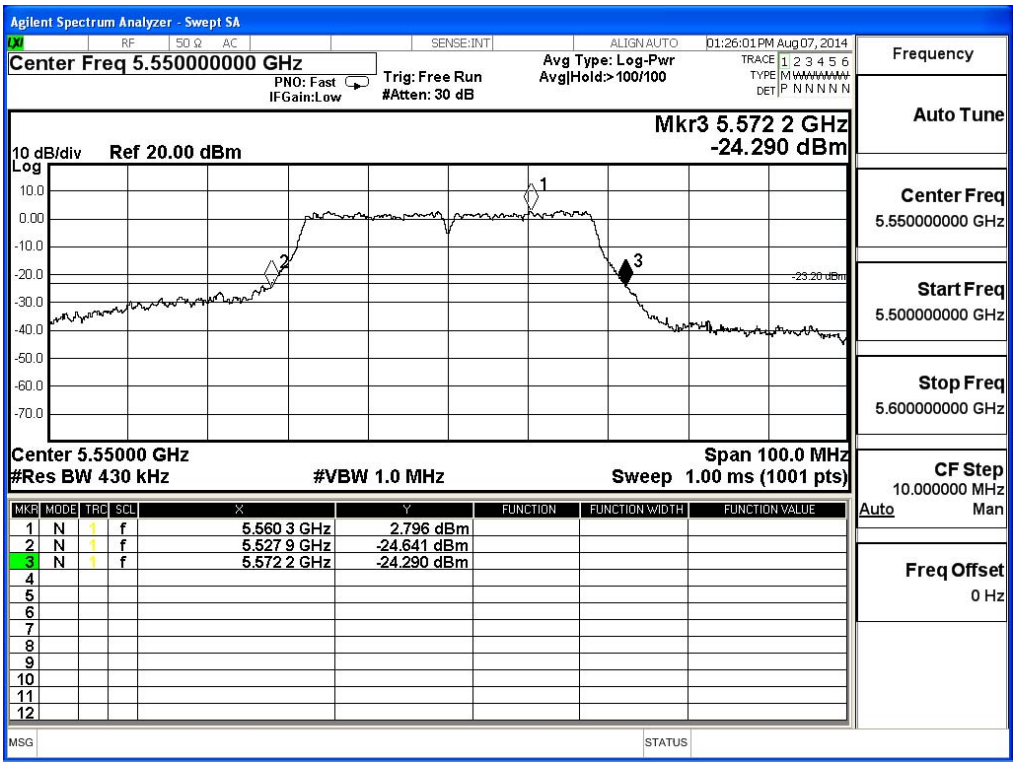
Channel 62



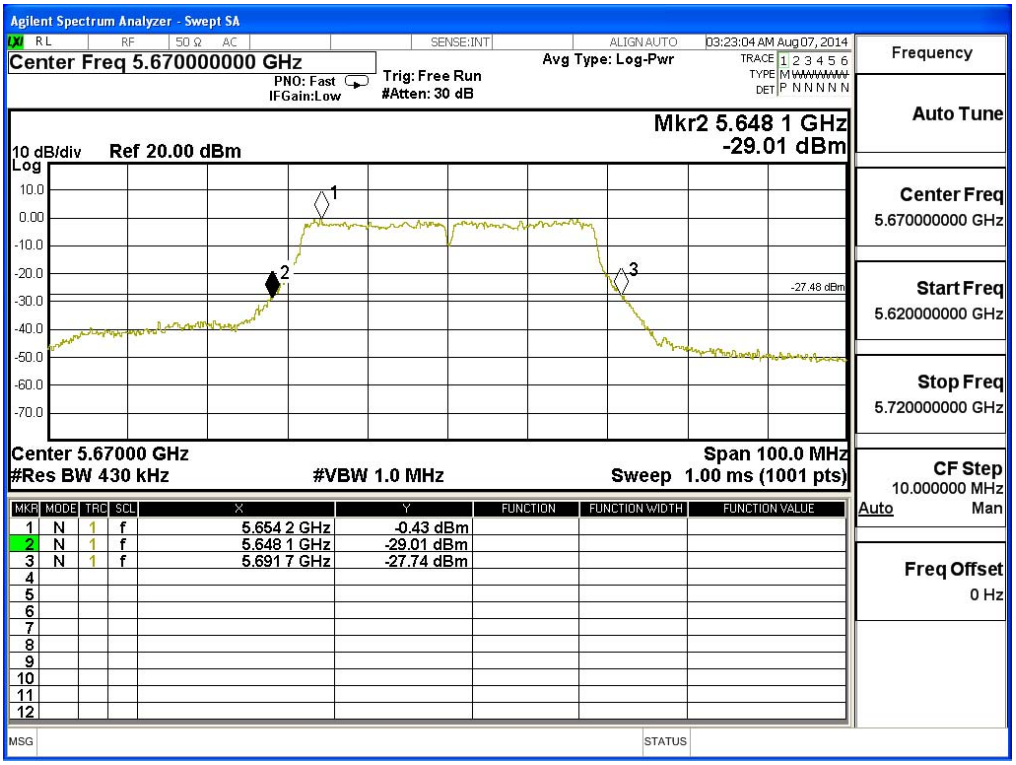
Channel 102



Channel 110



Channel 134


Agilent Spectrum Analyzer - Swept SA
Center Freq 5.670000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
Avg Type: Log-Pwr
03:23:04 AM Aug 07, 2014
Mkr2 5.648 1 GHz
-29.01 dBm
10 dB/div
Log
Ref 20.00 dBm
-27.48 dBm
Center 5.67000 GHz
#Res BW 430 kHz
#VBW 1.0 MHz
Span 100.0 MHz
Sweep 1.00 ms (1001 pts)
1 N 1 f 5.654 2 GHz -0.43 dBm
2 N 1 f 5.648 1 GHz -29.01 dBm
3 N 1 f 5.691 7 GHz -27.74 dBm
Frequency
Auto Tune
Center Freq
5.670000000 GHz
Start Freq
5.620000000 GHz
Stop Freq
5.720000000 GHz
CF Step
10.000000 MHz
Auto
Man
Freq Offset
0 Hz

Product : 802.11A/B/G/N/AC 1T1R WLAN USB Dongle
Test Item : Maximum conducted output power
Test Site : No.3 OATS
Test Mode : Mode 4: Transmit (802.11ac-20BW-7.2Mbps)

Cable loss=1dB		Maximum conducted output power									
Channel No.	Frequency (MHz)	Data Rate (Mbps)									Required Limit
		VTH0	VTH1	VTH2	VTH3	VTH4	VTH5	VTH6	VTH7	VTH8	
		Measurement Level (dBm)									
144 (Band3)	5720	13.68	13.57	13.46	13.33	13.24	13.13	13.09	13.11	13.07	<24dBm
144 (Band4)	5720	8.94	8.85	8.72	8.67	8.58	8.46	8.31	8.29	8.18	<30dBm

Note: Maximum conducted output power Value =Reading value on average power meter + cable loss

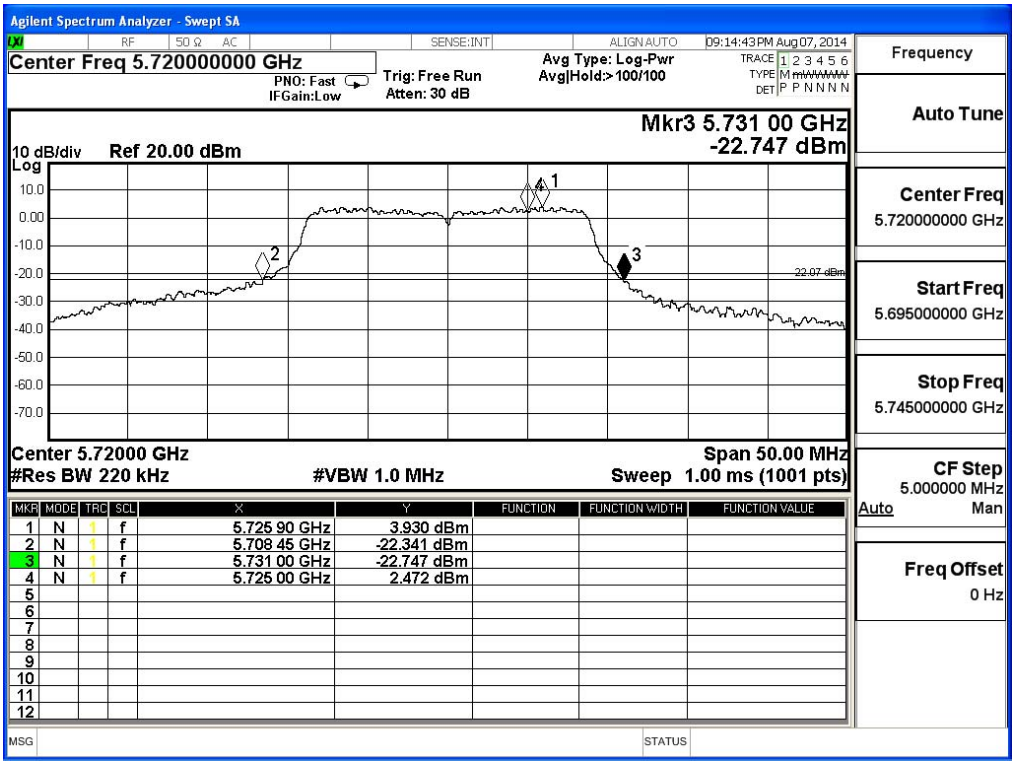
Maximum conducted output power Measurement:

Channel Number	Frequency (MHz)	26dB Bandwidth (MHz)	Chain A Power (dBm)	Output Power (dBm)	Output Power Limit	
					(dBm)	dBm+10log(BW)
144(Band3)	5720	16.55	13.68	13.68	24	23.19
144(Band4)	5720	6.00	8.94	8.94	30	18.78

Note: Power Output Value =Reading value on average power meter + cable loss

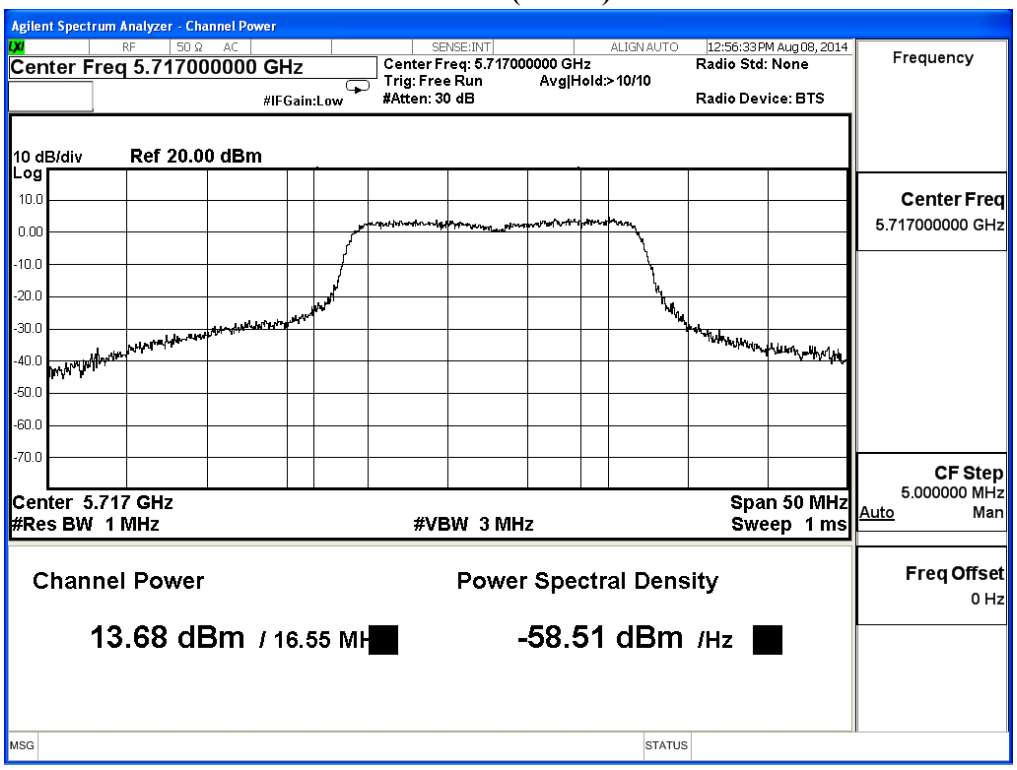
26dBc Occupied Bandwidth:

Channel 144

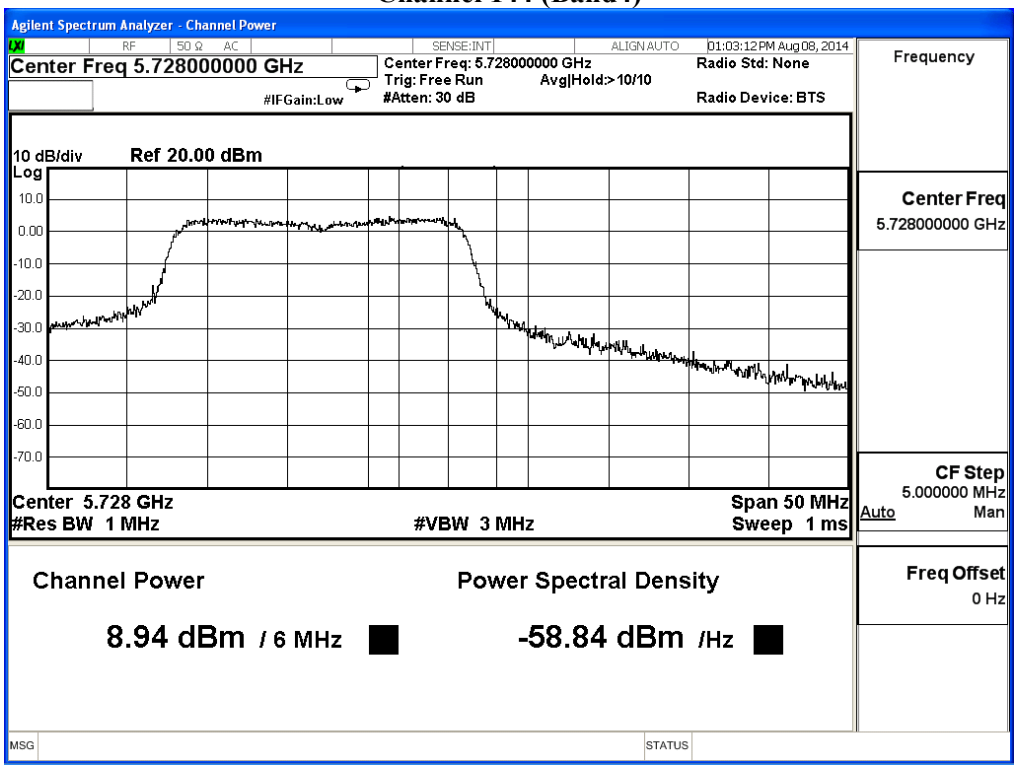


Maximum conducted output power:

Channel 144 (Band3)



Channel 144 (Band4)



Product : 802.11A/B/G/N/AC 1T1R WLAN USB Dongle
Test Item : Maximum conducted output power
Test Site : No.3 OATS
Test Mode : Mode 5: Transmit (802.11ac-40BW-15Mbps)

Cable loss=1dB		Maximum conducted output power										
Channel No	Frequency (MHz)	Data Rate (Mbps)										Required Limit
		VTH0	VTH1	VTH2	VTH3	VTH4	VTH5	VTH6	VTH7	VTH8	VTH9	
142F(Band3)	5710	14.01	13.95	13.89	13.83	13.76	13.71	13.65	13.53	13.58	13.49	<24dBm
142F(Band4)	5710	4.54	4.48	4.43	4.38	4.30	4.24	4.28	4.15	4.16	4.12	<30dBm

Note: Maximum conducted output power Value =Reading value on average power meter + cable loss

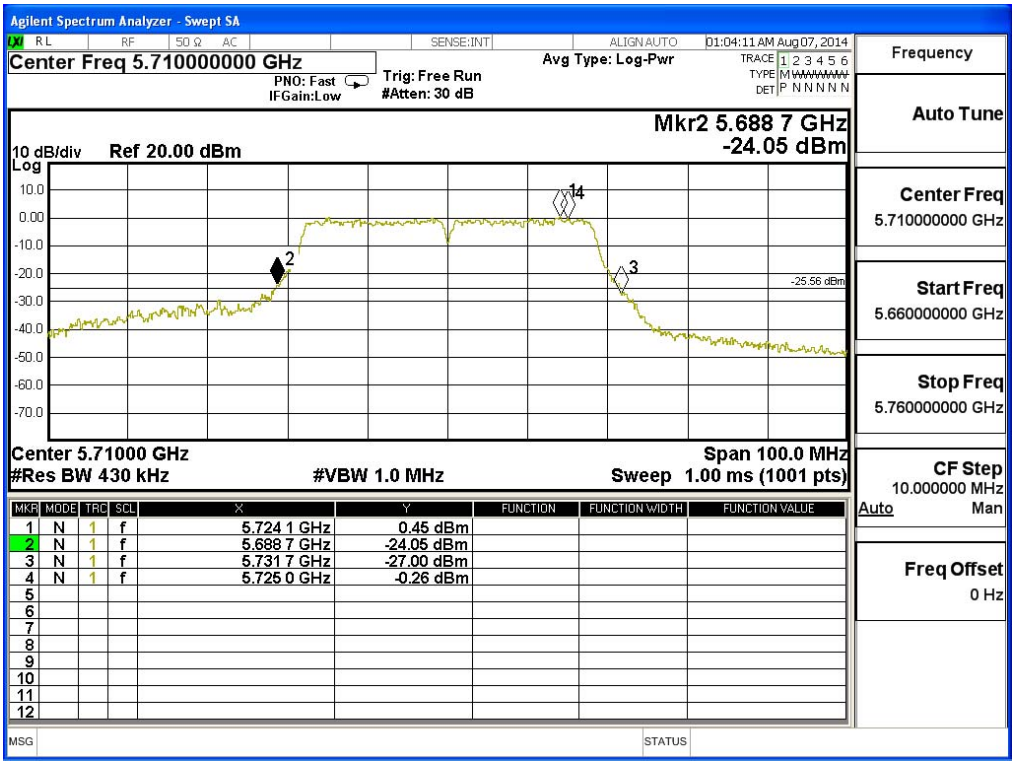
Maximum conducted output power Measurement:

Channel Number	Frequency (MHz)	26dB Bandwidth (MHz)	Chain A Power (dBm)	Output Power (dBm)	Output Power Limit	
					(dBm)	dBm+10log(BW)
142F(Band3)	5710	36.30	14.01	14.01	24	26.60
142F(Band4)	5710	6.70	4.54	4.54	30	19.26

Note: Power Output Value =Reading value on average power meter + cable loss

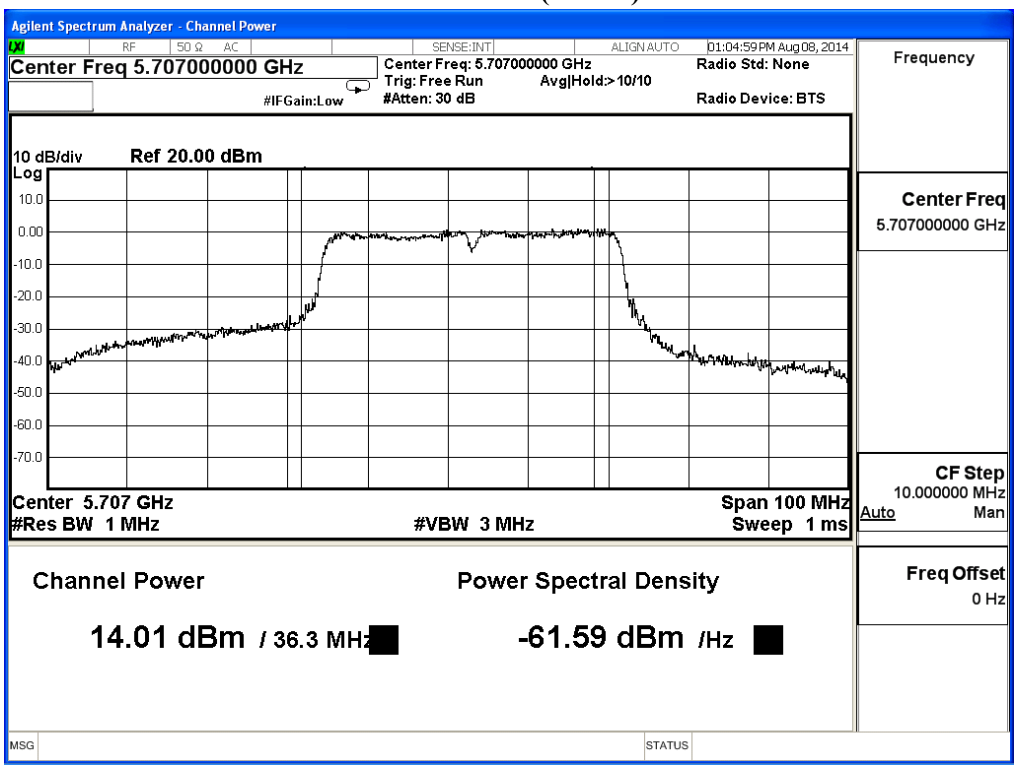
26dBc Occupied Bandwidth:

Channel 142

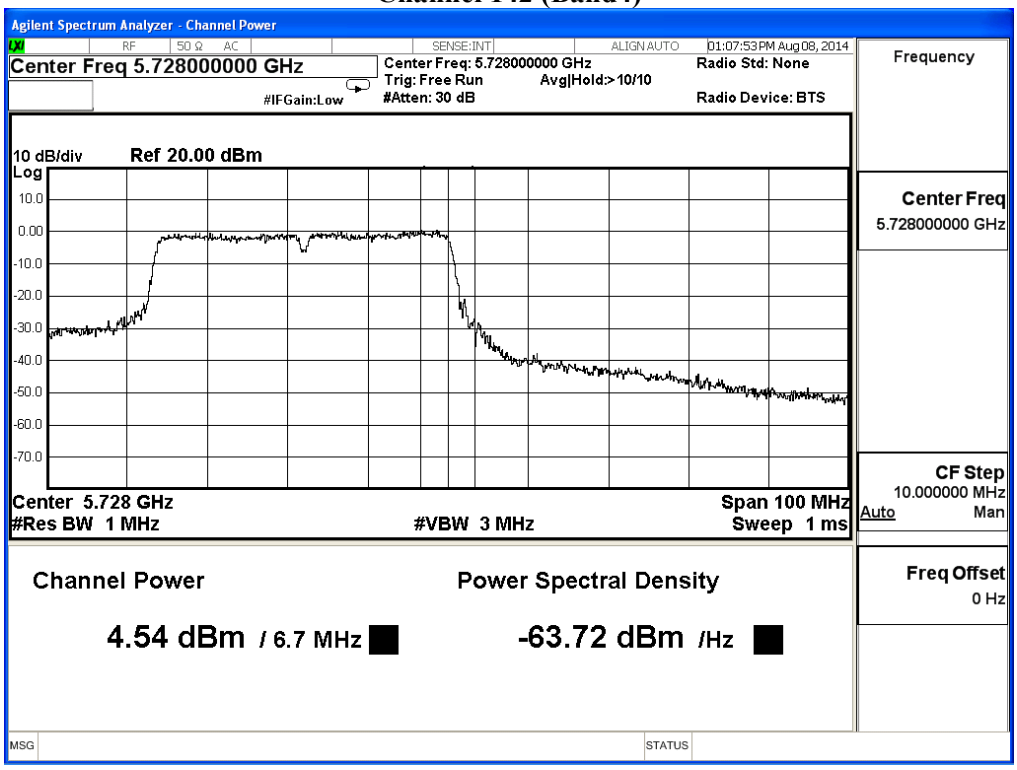


Maximum conducted output power:

Channel 142 (Band3)



Channel 142 (Band4)



Product : 802.11A/B/G/N/AC 1T1R WLAN USB Dongle
Test Item : Maximum conducted output power
Test Site : No.3 OATS
Test Mode : Mode 6: Transmit (802.11ac-80BW-32.5Mbps)

Cable loss=1dB		Maximum conducted output power										
Channel No	Frequency (MHz)	Data Rate (Mbps)										Required Limit
		VTH0	VTH1	VTH2	VTH3	VTH4	VTH5	VTH6	VTH7	VTH8	VTH9	
42	5210	12.57	12.47	12.38	12.31	12.26	12.21	12.22	12.18	12.14	12.11	<24dBm
58	5290	12.95	12.86	12.77	12.68	12.59	12.50	12.49	12.32	12.39	12.48	<24dBm
106	5530	12.84	12.77	12.70	12.63	12.57	12.49	12.41	12.35	12.28	12.23	<24dBm
138(Band3)	5690	12.71	12.66	12.61	12.58	12.51	12.46	12.44	12.36	12.29	12.18	<24dBm
138(Band4)	5690	0.14	0.05	-0.04	-0.18	-0.22	-0.31	-0.43	-0.69	-0.78	-0.98	<30dBm

Note: Maximum conducted output power Value =Reading value on average power meter + cable loss

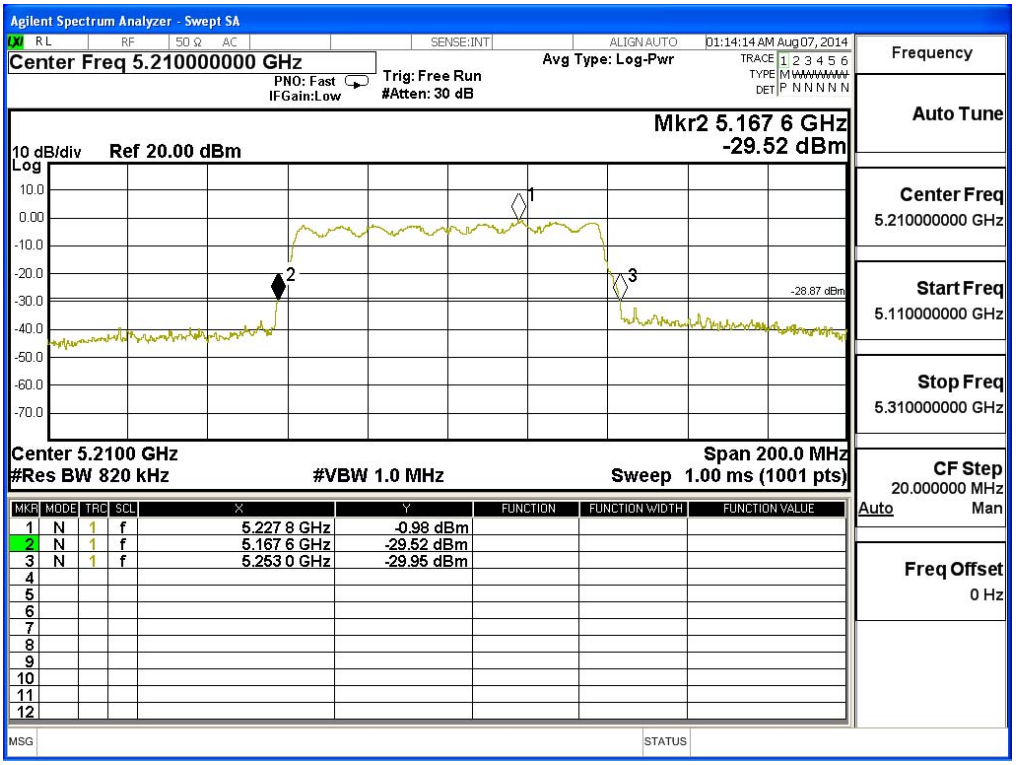
Maximum conducted output power Measurement:

Note: Power Output Value =Reading value on average power meter + cable loss

Channel Number	Frequency (MHz)	26dB Bandwidth (MHz)	Chain A Power (dBm)	Output Power (dBm)	Output Power Limit	
					(dBm)	dBm+10log(BW)
42	5210	85.40	12.57	12.57	17	30.31
58	5290	85.40	12.95	12.95	17	30.31
106	5530	85.60	12.84	12.84	24	30.32
138(Band3)	5690	77.40	12.71	12.71	24	29.89
138(Band4)	5690	7.60	0.14	0.14	30	25.81

26dBc Occupied Bandwidth:

Channel 42



Channel 58