



Test Report

Product Name	802.11 a/b/g/n module
Model No	WN4502B
FCC ID	PPQ-WN4502B

Applicant	LITE-ON TECHNOLOGY CORP.
Address	4F, 90, Chien 1 Road, Chung Ho, Taipei Hsien 235, Taiwan, R.O.C.

Date of Receipt	March 08, 2011
Issued Date	March 28, 2011
Report No.	113119R-RFUSP42V01
Report Version	V1.0

The test results relate only to the samples tested.

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Test Report Certification

Issued Date: March 28, 2011

Report No.: 113119R-RFUSP42V01



Product Name	802.11 a/b/g/n module	
Applicant	LITE-ON TECHNOLOGY CORP.	
Address	4F, 90, Chien 1 Road, Chung Ho, Taipei Hsien 235, Taiwan, R.O.C.	
Manufacturer	1. DONG GUAN G-COM COMPUTER CO., LTD 2. LITE-ON TECHNOLOGY (Changzhou) CO., LTD	
Model No.	WN4502B	
FCC ID.	PPQ-WN4502B	
EUT Rated Voltage	DC 5V (Power by USB)	
EUT Test Voltage	DC 5V (Power by USB)	
Trade Name	LITEON	
Applicable Standard	FCC CFR Title 47 Part 15 Subpart E: 2010 ANSI C63.4: 2009	 NVLAP Lab Code: 200533-0
Test Result	Complied	

The Test Results relate only to the samples tested.

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Documented By : Rita Huang
(Senior Adm. Specialist / Rita Huang)



Tested By : Henk Huang
(Engineer / Henk Huang)

Approved By : Vincent Lin
(Manager / Vincent Lin)



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1. GENERAL INFORMATION

1.1. EUT Description

Product Name	802.11 a/b/g/n module
Trade Name	LITEON
FCC ID.	PPQ-WN4502B
Model No.	WN4502B
Frequency Range	802.11a/n-20MHz: 5180-5320MHz, 5500-5700MHz 802.11n-40MHz: 5190-5310MHz, 5510-5670MHz
Number of Channels	802.11a/n-20MHz: 19; 802.11n-40MHz: 9
Data Rate	802.11a: 6 - 54Mbps, 802.11n: up to 300Mbps
Channel Control	Auto
Type of Modulation	802.11a/n:OFDM, BPSK, QPSK, 16QAM, 64QAM
Antenna type	PIFA
Antenna Gain	Refer to the table “Antenna List”

Antenna List

No.	Manufacturer	Part No.	Peak Gain	
1	AmTRAN	EDB-18S with metal reflector	2.5 dBi in 2.4GHz 4.5 dBi in 5.0GHz	With metal reflector
2	AmTRAN	EDB-45S with metal reflector	2.5 dBi in 2.4GHz 4.5 dBi in 5.0GHz	
3	AmTRAN	MSA-3025-25GC4 with metal reflector	4.21 dBi in 2.4GHz 4.5 dBi in 5.0GHz	
4	AmTRAN	FPA-3025-25GC4 with metal reflector	4.26 dBi in 2.4GHz 6 dBi in 5.0GHz	

Note:

1. The antenna of EUT is conforming to FCC 15.203.
2. Only the higher gain antenna was tested and recorded in this report.

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						

Note:

1. This device is a 802.11 a/b/g/n module with a built-in 2.4GHz and 5GHz WLAN transceiver, 802.11a/b/g/n all functions support 2(Transmit) × 2(Receive) technology.
2. There are two different EUT output power for with metal reflector antenna and without metal reflector antenna, this report for with ground plane antenna.
3. Regarding to the operation frequency, the lowest, middle and highest frequency are selected to perform the test. Lowest and highest data rates are tested in each mode. Only worst case is shown in the report. (802.11a is 6Mbps, 802.11n-20BW is 14.4Mbps and 802.11n-40BW are 30Mbps)
4. 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.

1.2. Operational Description

The EUT is a 802.11 a/b/g/n module with a built-in 2.4GHz and 5GHz WLAN card. This device provided four kinds of transmitting speed 1, 2, 5.5 and 11Mbps and the device of RF carrier is DBPSK, DQPSK and CCK (IEEE 802.11b). The device provided of eight kinds of transmitting speed 6, 9, 12, 18, 24, 36, 48 and 54Mbps the device of RF carrier is BPSK, QPSK, 16QAM and 64QAM (IEEE 802.11a/g).

The device provided of eight kinds of transmitting speed 14.4,28.8,43.4,57.8,86.6,115.6,130 and 144.4Mbps in 802.11n(20M-BW) mode and 30,60,90,120,180,240,270 and 300 Mbps (40M-BW) the device of RF carrier is BPSK, QPSK, 16QAM and 64QAM (IEEE 802.11n), the IEEE 802.11n is Multiple In, Multiple Out” (MIMO) technology.

The device adapts direct sequence spread spectrum modulation. The antenna provides diversity function to improve the receiving function and the antennas to support 2(Transmit) × 2(Receive) MIMO technology.

This 802.11 a/b/g/n module, compliant with IEEE 802.11b and IEEE 802.11a/g/n, is a high-efficiency Wireless LAN adapter. It allows your computer to connect to a wireless network and to share resources, such as files or printers without being bound to the network wires. Operation in 2.4GHz/5GHz Direct Sequence Spread Spectrum (DSSS) radio transmission, the 802.11 a/b/g/n module Wired Equivalent Protection (WEP) algorithm is used. In addition, its standard compliance ensures that it can communicate with any IEEE 802.11b and IEEE 802.11a/g/n network.

There are two different EUT output power for with metal reflector antenna and without metal reflector antenna.

The Device is not radar detection and not ad-hoc operation in the DFS band, another information please refer to users manual.

Test Mode	Mode 1: Transmit (802.11a-6Mbps) Mode 2: Transmit (802.11n-20BW 14.4Mbps) Mode 3: Transmit (802.11n-40BW 30Mbps)
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NOTE: The power combiner is used for conducted test, the factor of combiner is 10dB and offset it in test instrument.

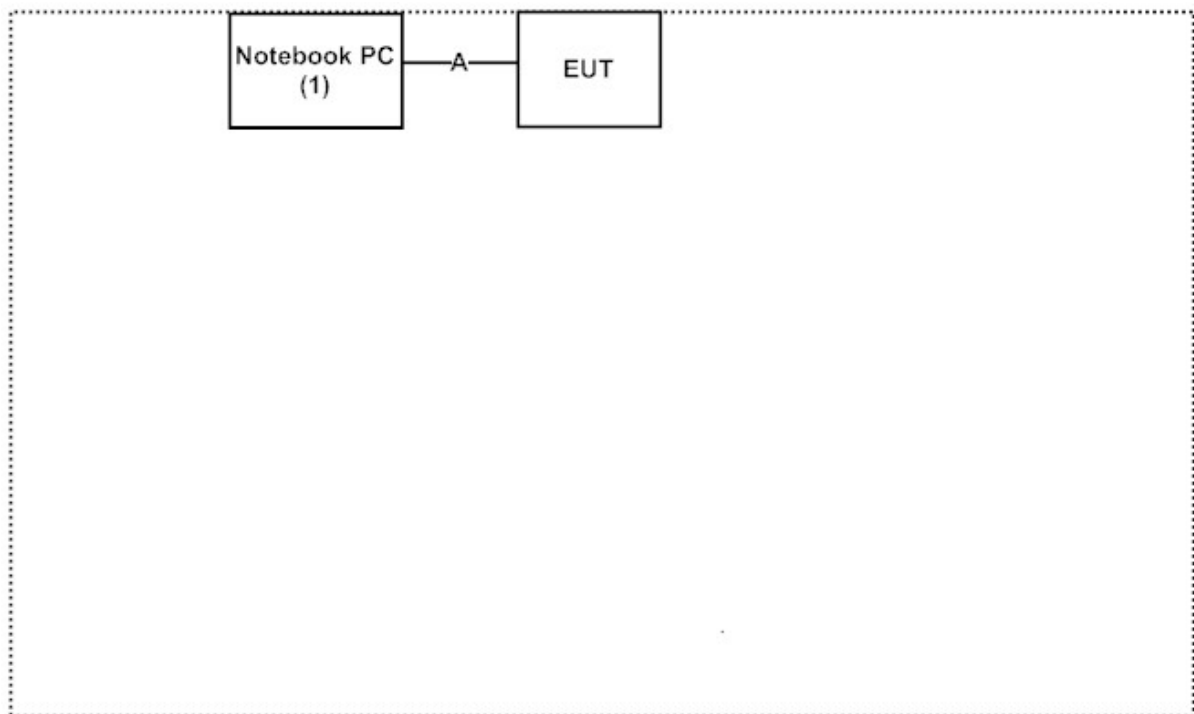
1.3. Tested System Details

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

Signal Cable Type	Signal cable Description
A	Shielded, 0.1m

1.4. Configuration of tested System



1.5. EUT Exercise Software

- (1) Setup the EUT as shown on 1.4.
- (2) Execute the command under DOS mode.
- (3) Setup the test mode, the test channel and the data rate.
- (4) Start the continuous transmission.
- (5) Repeat the above procedure (3) to (4).

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



Accreditation on NVLAP
 NVLAP Lab Code: 200533-0



Site Name: Quietek Corporation
 Site Address: No. 5-22, Ruei-Shu Valley, Ruei-Ping Tsuen,
 Lin-Kou Shiang, Taipei,
 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

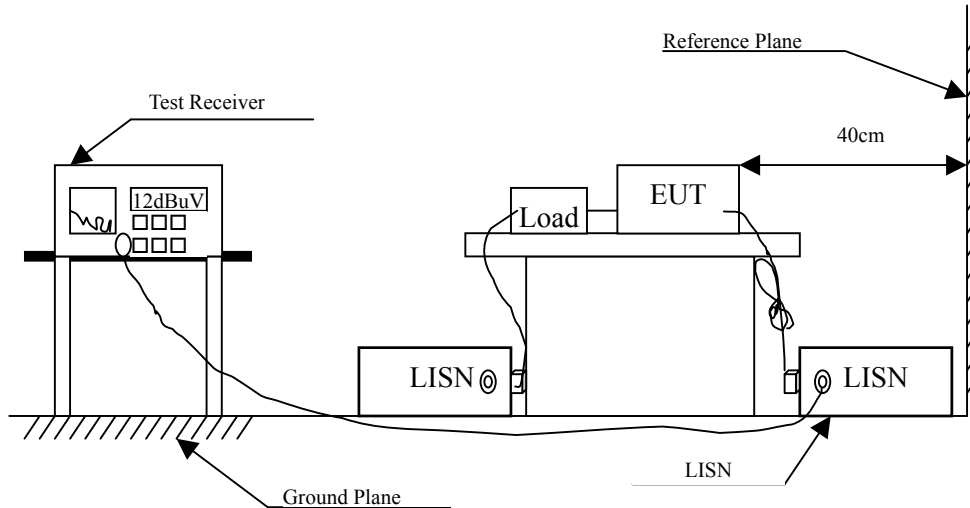
2.1. Test Equipment

The following test equipment are used during the conducted emission test:

Item	Instrument	Manufacturer	Type No./Serial No	Last Cal.	Remark
1	Test Receiver	R & S	ESCS 30/825442/17	May, 2010	
2	L.I.S.N.	R & S	ESH3-Z5/825016/6	May, 2010	EUT
3	L.I.S.N.	Kyoritsu	KNW-407/8-1420-3	May, 2010	Peripherals
4	Pulse Limiter	R & S	ESH3-Z2	May, 2010	
5	No.1 Shielded Room			N/A	

Note: All equipments are calibrated every one year.

2.2. Test Setup



2.3. Limits

FCC Part 15 Subpart C Paragraph 15.207 (dBuV) 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 C63.4: 2009 on conducted measurement.

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

The EUT was setup to ANSI C63.4: 2009; tested to DTS test procedure of Aug 2002 DA 02-2138 for compliance to FCC 47CFR Subpart E requirements.

2.5. Uncertainty

± 2.26 dB

2.6. Test Result of Conducted Emission

Product : 802.11 a/b/g/n module
 Test Item : Conducted Emission Test
 Power Line : Line 1
 Test Mode : Mode 3: Transmit (802.11n-40BW 30Mbps) (5190MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV	Margin dB	Limit dBuV
LINE 1					
Quasi-Peak					
0.162	9.750	48.900	58.650	-7.007	65.657
0.232	9.685	40.030	49.715	-13.942	63.657
0.306	9.650	36.100	45.750	-15.793	61.543
0.486	9.640	20.960	30.600	-25.800	56.400
0.775	9.649	27.830	37.479	-18.521	56.000
2.732	9.690	21.650	31.340	-24.660	56.000
Average					
0.162	9.750	35.070	44.820	-10.837	55.657
0.232	9.685	18.460	28.145	-25.512	53.657
0.306	9.650	14.930	24.580	-26.963	51.543
0.486	9.640	9.580	19.220	-27.180	46.400
0.775	9.649	27.380	37.029	-8.971	46.000
2.732	9.690	5.990	15.680	-30.320	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 : 802.11 a/b/g/n module
 Test Item : Conducted Emission Test
 Power Line : Line 2
 Test Mode : Mode 3: Transmit (802.11n-40BW 30Mbps) (5190MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV	Margin dB	Limit dBuV
LINE 2					
Quasi-Peak					
0.162	9.751	48.960	58.711	-6.946	65.657
0.295	9.662	35.810	45.472	-16.385	61.857
0.630	9.650	13.860	23.510	-32.490	56.000
1.775	9.680	25.230	34.910	-21.090	56.000
2.877	9.690	21.580	31.270	-24.730	56.000
9.861	9.840	28.620	38.460	-21.540	60.000
Average					
0.162	9.751	34.630	44.381	-11.276	55.657
0.295	9.662	12.810	22.472	-29.385	51.857
0.630	9.650	-0.500	9.150	-36.850	46.000
1.775	9.680	24.920	34.600	-11.400	46.000
2.877	9.690	19.260	28.950	-17.050	46.000
9.861	9.840	26.450	36.290	-13.710	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 : 802.11 a/b/g/n module
 Test Item : Conducted Emission Test
 Power Line : Line 1
 Test Mode : Mode 3: Transmit (802.11n-40BW 30Mbps) (5270MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV	Margin dB	Limit dBuV
LINE 1					
Quasi-Peak					
0.170	9.740	46.670	56.410	-9.019	65.429
0.248	9.677	39.420	49.097	-14.103	63.200
0.310	9.650	35.290	44.940	-16.489	61.429
0.384	9.650	24.470	34.120	-25.194	59.314
0.537	9.640	25.650	35.290	-20.710	56.000
2.709	9.690	21.930	31.620	-24.380	56.000
Average					
0.170	9.740	28.240	37.980	-17.449	55.429
0.248	9.677	17.710	27.387	-25.813	53.200
0.310	9.650	14.390	24.040	-27.389	51.429
0.384	9.650	3.490	13.140	-36.174	49.314
0.537	9.640	5.830	15.470	-30.530	46.000
2.709	9.690	5.840	15.530	-30.470	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 : 802.11 a/b/g/n module
 Test Item : Conducted Emission Test
 Power Line : Line 2
 Test Mode : Mode 3: Transmit (802.11n-40BW 30Mbps) (5270MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV	Margin dB	Limit dBuV
LINE 2					
Quasi-Peak					
0.154	9.760	44.230	53.991	-11.895	65.886
0.291	9.663	35.590	45.253	-16.718	61.971
0.619	9.650	26.480	36.130	-19.870	56.000
1.330	9.670	24.330	34.000	-22.000	56.000
2.662	9.690	26.260	35.950	-20.050	56.000
6.759	9.740	28.510	38.250	-21.750	60.000
Average					
0.154	9.760	28.200	37.961	-17.925	55.886
0.291	9.663	12.290	21.953	-30.018	51.971
0.619	9.650	4.550	14.200	-31.800	46.000
1.330	9.670	24.270	33.940	-12.060	46.000
2.662	9.690	24.810	34.500	-11.500	46.000
6.759	9.740	26.710	36.450	-13.550	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 : 802.11 a/b/g/n module
 Test Item : Conducted Emission Test
 Power Line : Line 1
 Test Mode : Mode 3: Transmit (802.11n-40BW 30Mbps) (5590MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV	Margin dB	Limit dBuV
LINE 1					
Quasi-Peak					
0.193	9.711	42.000	51.711	-13.060	64.771
0.263	9.667	39.220	48.887	-13.884	62.771
0.318	9.650	33.270	42.920	-18.280	61.200
0.775	9.649	27.930	37.579	-18.421	56.000
1.216	9.670	25.070	34.740	-21.260	56.000
2.670	9.690	16.380	26.070	-29.930	56.000
Average					
0.193	9.711	18.780	28.491	-26.280	54.771
0.263	9.667	19.750	29.417	-23.354	52.771
0.318	9.650	19.550	29.200	-22.000	51.200
0.775	9.649	27.310	36.959	-9.041	46.000
1.216	9.670	24.890	34.560	-11.440	46.000
2.670	9.690	4.980	14.670	-31.330	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 : 802.11 a/b/g/n module
 Test Item : Conducted Emission Test
 Power Line : Line 2
 Test Mode : Mode 3: Transmit (802.11n-40BW 30Mbps) (5590MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV	Margin dB	Limit dBuV
LINE 2					
Quasi-Peak					
0.162	9.751	48.960	58.711	-6.946	65.657
0.275	9.669	39.830	49.499	-12.930	62.429
0.322	9.660	33.680	43.340	-17.746	61.086
0.619	9.650	24.500	34.150	-21.850	56.000
2.662	9.690	26.100	35.790	-20.210	56.000
13.400	9.930	28.750	38.680	-21.320	60.000
Average					
0.162	9.751	34.630	44.381	-11.276	55.657
0.275	9.669	21.240	30.909	-21.520	52.429
0.322	9.660	20.440	30.100	-20.986	51.086
0.619	9.650	3.670	13.320	-32.680	46.000
2.662	9.690	24.810	34.500	-11.500	46.000
13.400	9.930	23.720	33.650	-16.350	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. Peak Transmit Power

3.1. Test Equipment

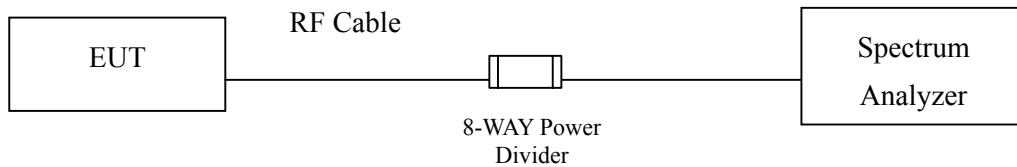
	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
X	Power Meter	Anritsu	ML2495A/6K00003357	May, 2010
X	Power Sensor	Anritsu	MA2411B/0738448	Jun, 2010
X	Spectrum Analyzer	Agilent	N9010A / MY48030495	Apr., 2010
X	8-WAY Power Divider	JFW	50PD-647 / 526770 0916	Apr., 2010

Note:

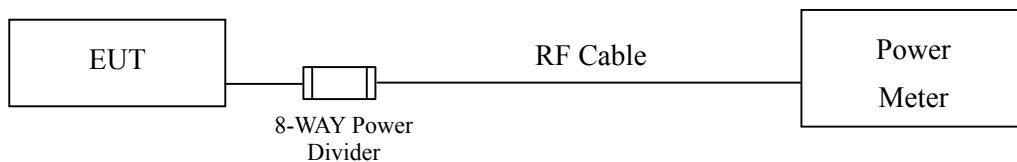
1. All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.
2. The test instruments marked with “X” are used to measure the final test results.

3.2. Test Setup

26dBc Occupied Bandwidth



Conduction Power Measurement



3.3. 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 26-dB 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 26-dB 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 26-dB 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.

3.4. Test Procedur

As an alternative to DA 02-2138, the EUT peak power was measured with a peak power meter employing a video bandwidth greater than 6dB BW of the emission under test. Peak 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 DA 02-2138, and provides more accurate measurements.

3.5. Uncertainty

$\pm 1.27 \text{ dB}$

3.6. Test Result of Peak Transmit Power

Product : 802.11 a/b/g/n module
 Test Item : Peak Transmit Power
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit (802.11a-6Mbps)

Cable loss=1dB		Peak Power Output								
Channel No.	Frequency (MHz)	Data Rate (Mbps)								Required Limit
		6	9	12	18	24	36	48	54	
		Measurement Level (dBm)								
36	5180	13.11	--	--	--	--	--	--	--	<17dBm
44	5220	16.74	16.52	16.34	16.38	16.12	16.06	15.81	15.78	<17dBm
48	5240	16.56	--	--	--	--	--	--	--	<17dBm
52	5260	17.44	17.34	17.21	17.2	17.11	17.07	17.02	16.94	<24dBm
60	5300	16.82	--	--	--	--	--	--	--	<24dBm
64	5320	13.61	--	--	--	--	--	--	--	<24dBm
100	5500	14.87	--	--	--	--	--	--	--	<24dBm
120	5600	17.67	--	--	--	--	--	--	--	<24dBm
140	5700	18.04	17.95	17.8	17.68	17.58	17.42	17.21	17.16	<24dBm

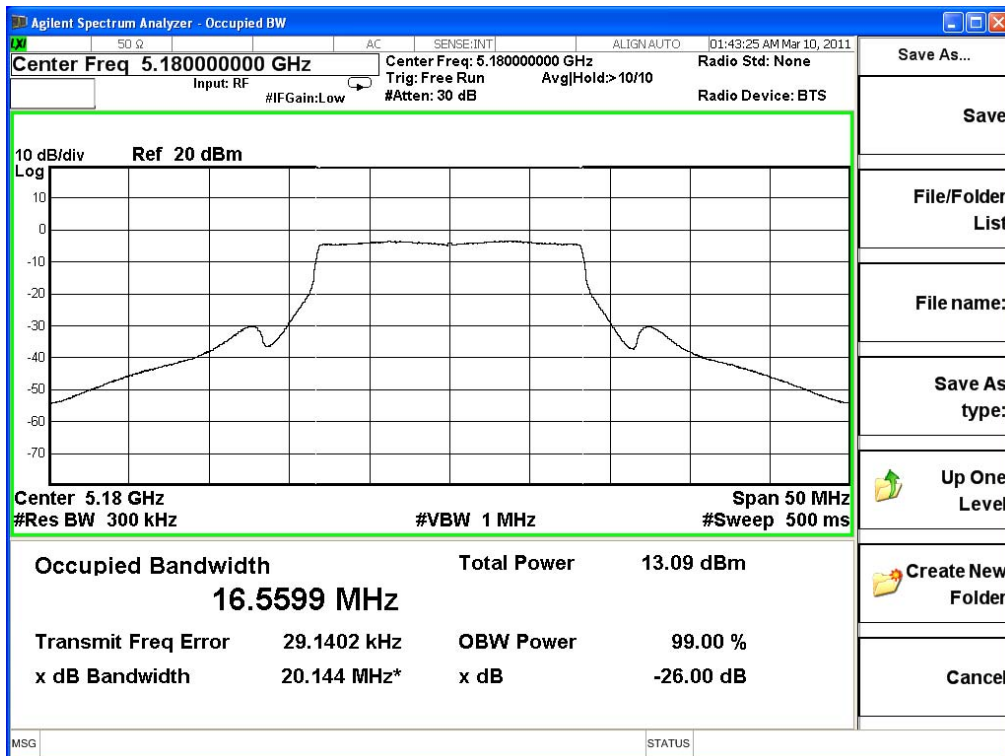
Note:

1. Peak Power Output Value = Reading value on peak power meter + cable loss

Peak Transmit Power Measurement:

Channel No	Frequency Range (MHz)	26dB Bandwidth (MHz)	Output Power (dBm)	Output Power Limit		Result
				(dBm)	dBm+10log(BW)	
36	5180	20.144	13.11	17	17.04	Pass

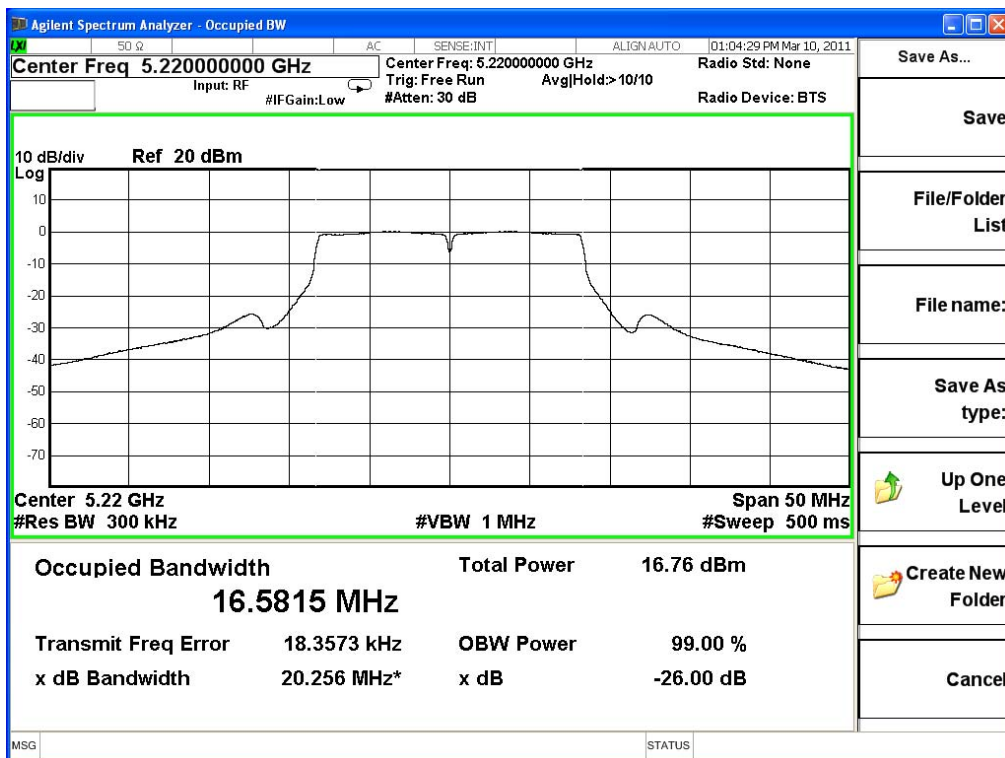
**26dBc Occupied Bandwidth:
Channel 36**



Peak Transmit Power Measurement:

Channel No	Frequency Range (MHz)	26dB Bandwidth (MHz)	Output Power (dBm)	Output Power Limit		Result
				(dBm)	dBm+10log(BW)	
44	5220	20.256	16.74	17	17.07	Pass

**26dBc Occupied Bandwidth:
Channel 40**

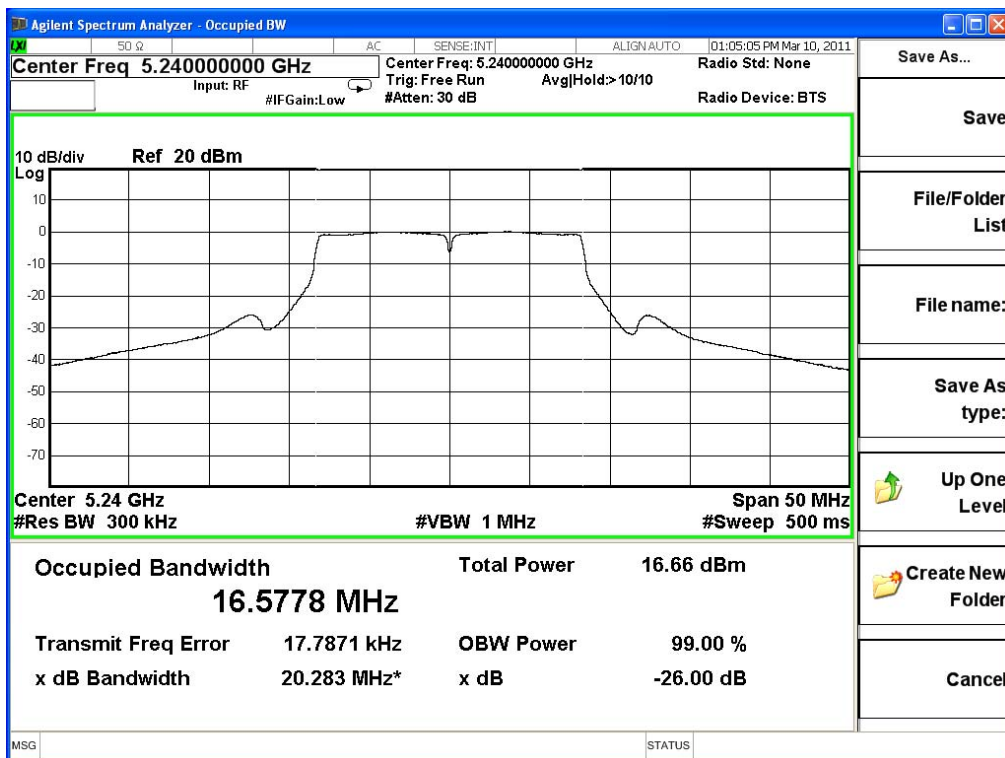


Peak Transmit Power Measurement:

Channel No	Frequency Range (MHz)	26dB Bandwidth (MHz)	Output Power (dBm)	Output Power Limit		Result
				(dBm)	dBm+10log(BW)	
48	5240	20.283	16.56	17	17.07	Pass

26dBc Occupied Bandwidth:

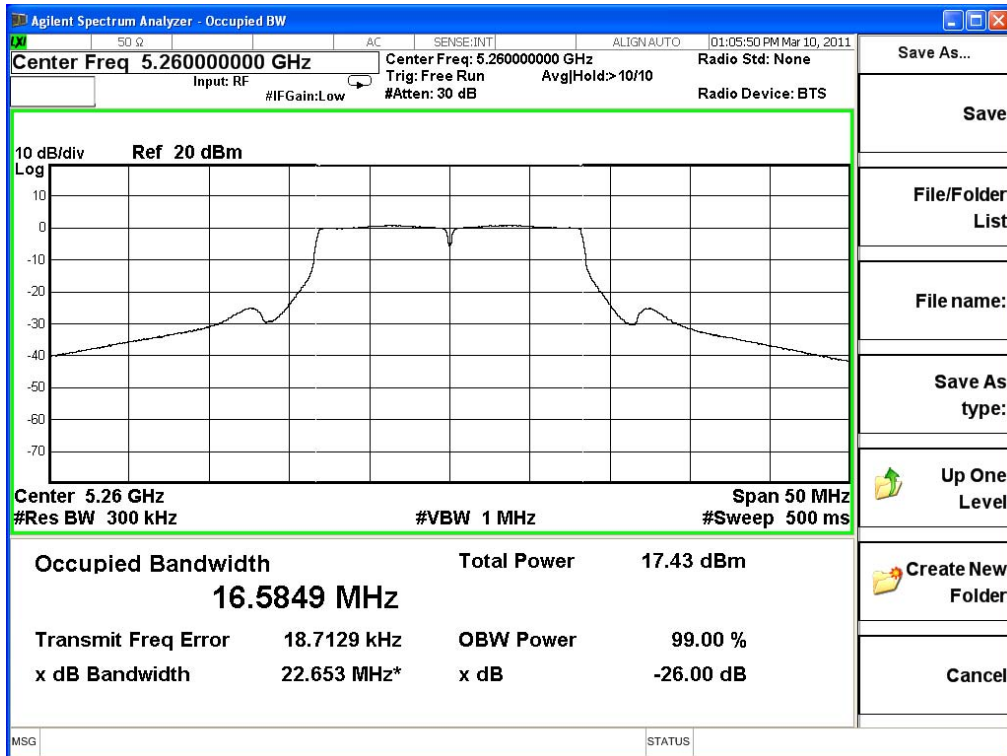
Channel 48



Peak Transmit Power Measurement:

Channel No	Frequency Range (MHz)	26dB Bandwidth (MHz)	Output Power (dBm)	Output Power Limit		Result
				(dBm)	dBm+10log(BW)	
52	5260	22.653	17.44	24	24.55	Pass

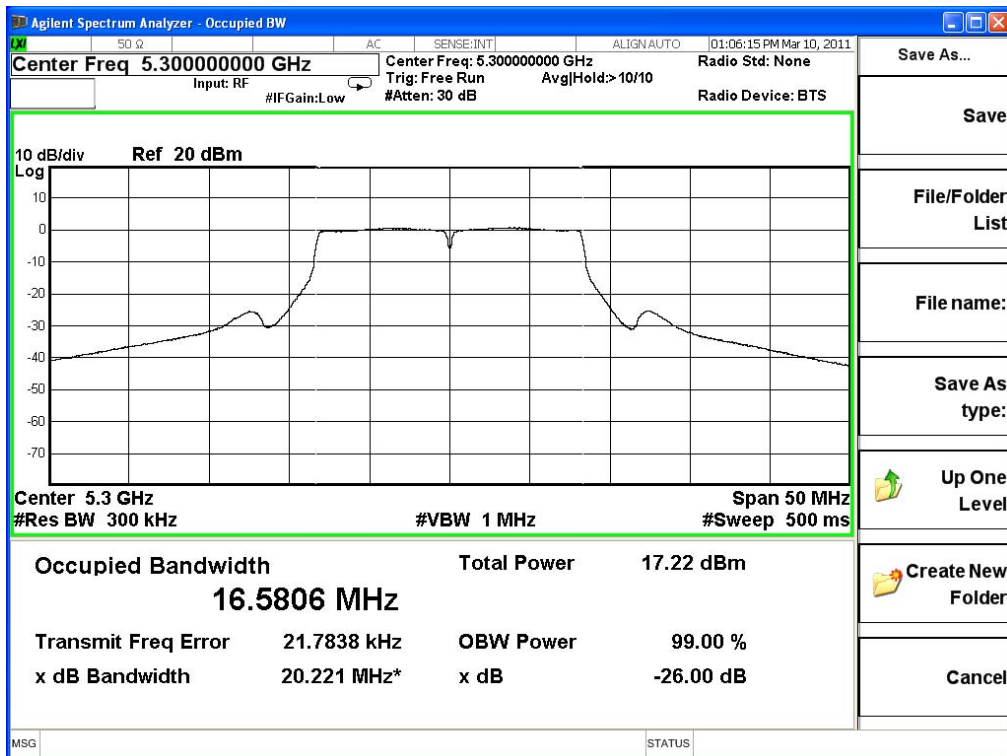
**26dBc Occupied Bandwidth:
Channel 52**



Peak Transmit Power Measurement:

Channel No	Frequency Range (MHz)	26dB Bandwidth (MHz)	Output Power (dBm)	Output Power Limit		Result
				(dBm)	dBm+10log(BW)	
60	5300	20.221	16.82	24	24.06	Pass

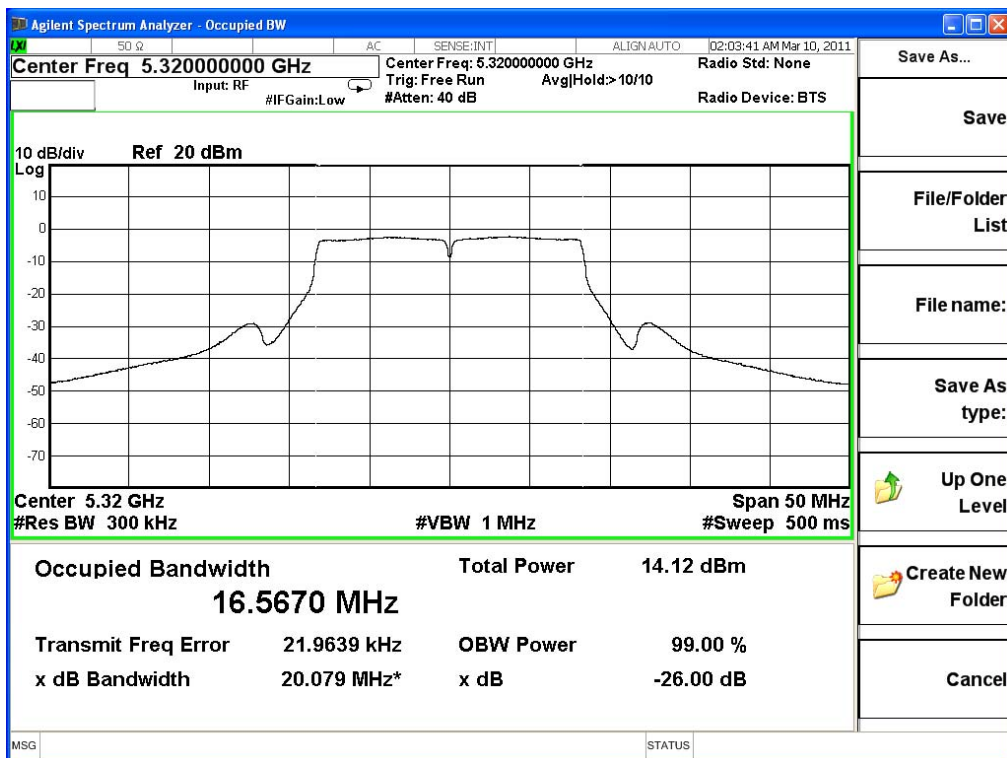
**26dBc Occupied Bandwidth:
Channel 60**



Peak Transmit Power Measurement:

Channel No	Frequency Range (MHz)	26dB Bandwidth (MHz)	Output Power (dBm)	Output Power Limit		Result
				(dBm)	dBm+10log(BW)	
64	5320	20.079	13.61	24	24.03	Pass

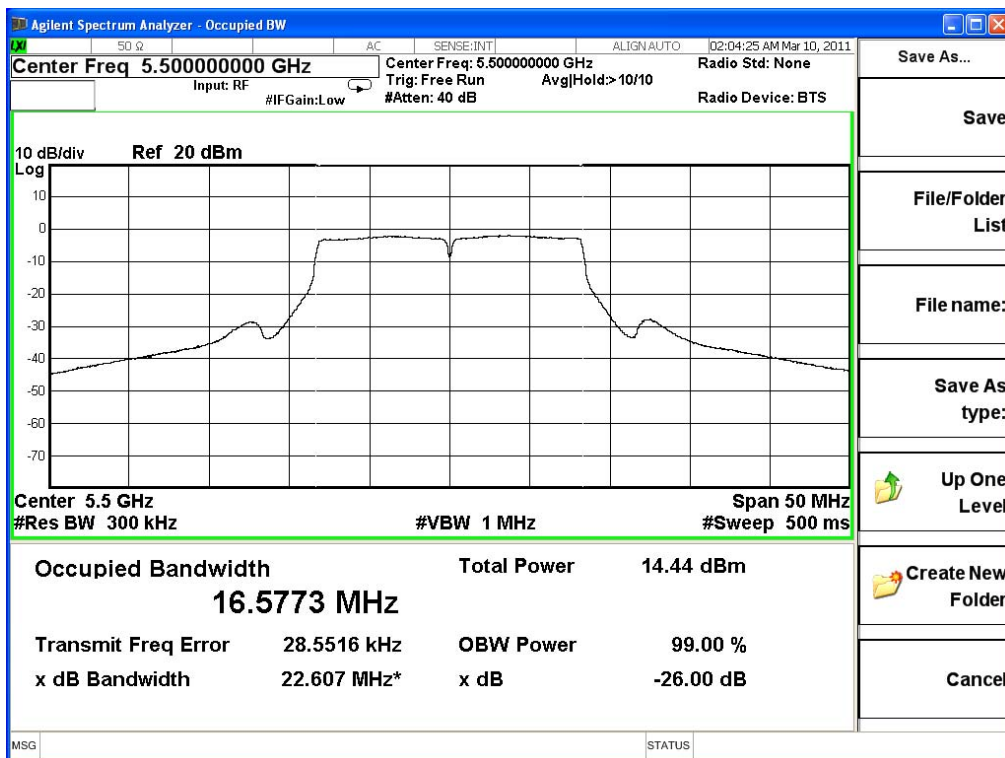
**26dBc Occupied Bandwidth:
Channel 64**



Peak Transmit Power Measurement:

Channel No	Frequency Range (MHz)	26dB Bandwidth (MHz)	Output Power (dBm)	Output Power Limit		Result
				(dBm)	dBm+10log(BW)	
100	5500	22.607	14.87	24	24.54	Pass

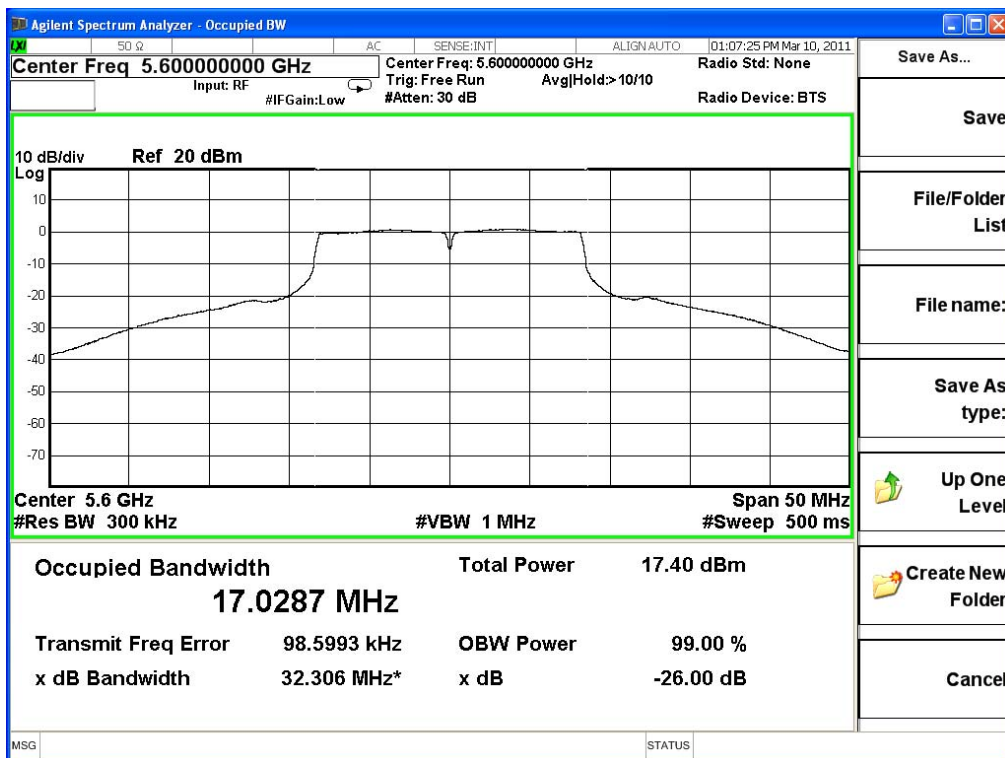
**26dBc Occupied Bandwidth:
Channel 100**



Peak Transmit Power Measurement:

Channel No	Frequency Range (MHz)	26dB Bandwidth (MHz)	Output Power (dBm)	Output Power Limit		Result
				(dBm)	dBm+10log(BW)	
120	5600	32.306	17.67	24	26.09	Pass

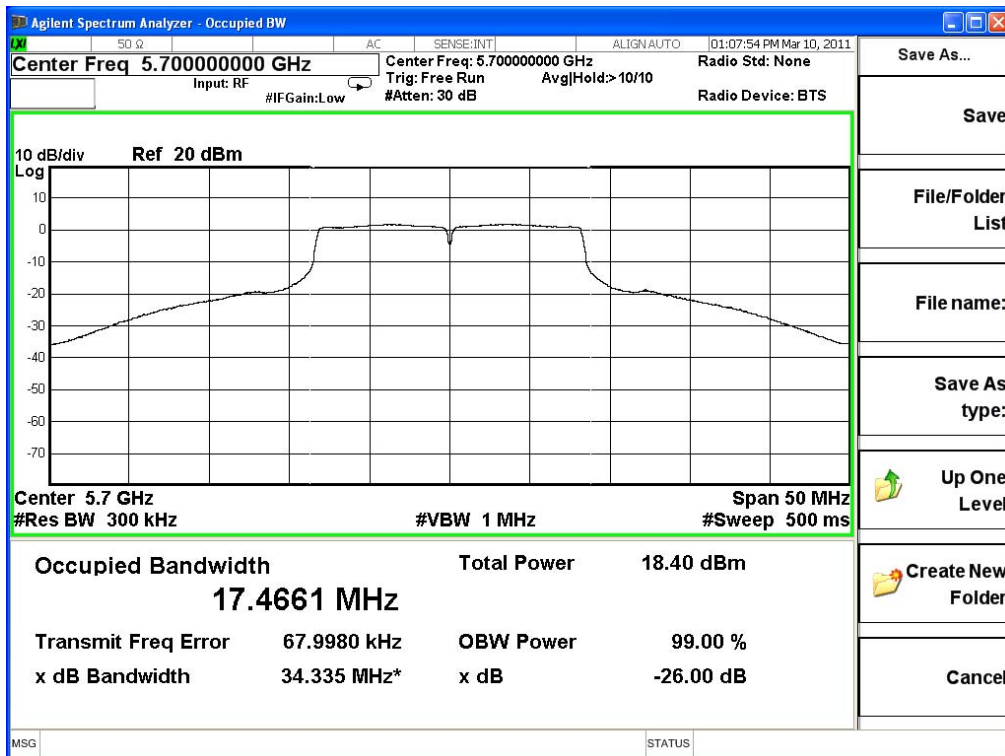
**26dBc Occupied Bandwidth:
Channel 120**



Peak Transmit Power Measurement:

Channel No	Frequency Range (MHz)	26dB Bandwidth (MHz)	Output Power (dBm)	Output Power Limit		Result
				(dBm)	dBm+10log(BW)	
140	5700	34.335	18.04	24	26.36	Pass

**26dBc Occupied Bandwidth:
Channel 140**



Product : 802.11 a/b/g/n module
 Test Item : Peak Transmit Power
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmit (802.11n-20BW 14.4Mbps)

Cable loss=1dB		Peak Power Output								
Channel No.	Frequency (MHz)	Data Rate (Mbps)								Required Limit
		14.4	28.8	43.4	57.8	86.6	115.6	130	144.4	
		Measurement Level (dBm)								
36	5180	15.86	--	--	--	--	--	--	--	<17dBm
44	5220	16.62	16.5	16.35	16.33	16.14	16.02	15.88	15.74	<17dBm
48	5240	16.48	--	--	--	--	--	--	--	<17dBm
52	5260	18.27	18.22	18.17	18.15	18.11	18.02	17.94	17.88	<24dBm
60	5300	18.62	--	--	--	--	--	--	--	<24dBm
64	5320	14.48	--	--	--	--	--	--	--	<24dBm
100	5500	13.37	--	--	--	--	--	--	--	<24dBm
120	5600	20.71	20.64	20.44	20.37	20.04	19.85	19.66	19.41	<24dBm
140	5700	19.71	--	--	--	--	--	--	--	<24dBm

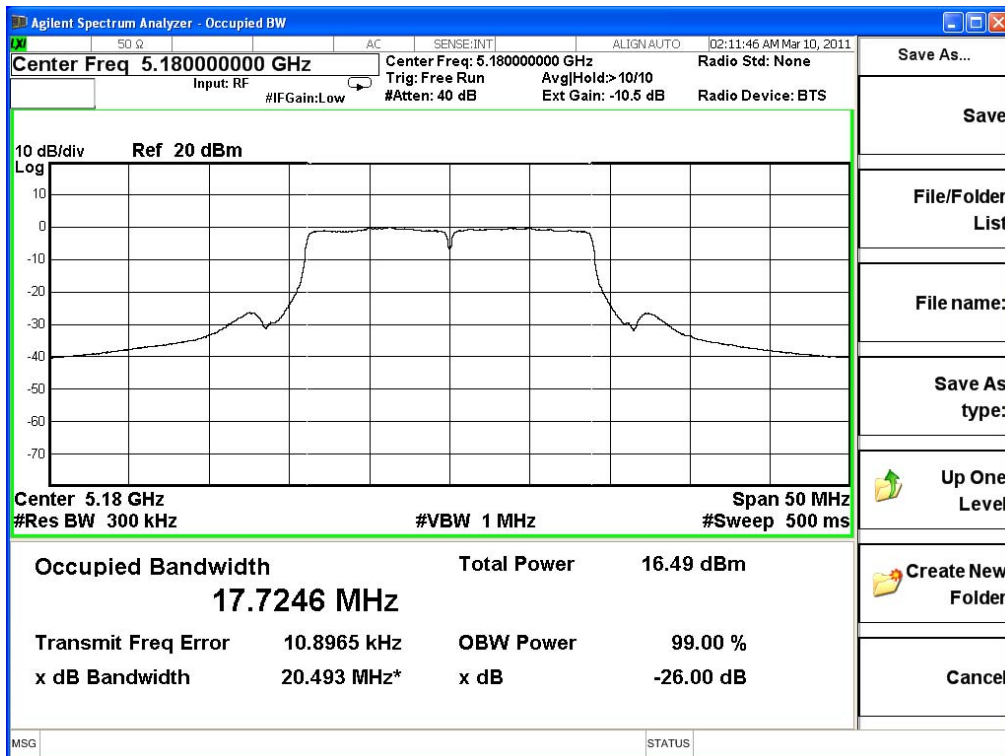
Note:

1. Peak Power Output Value = Reading value on peak power meter + cable loss

Peak Transmit Power Measurement:

Channel No	Frequency Range (MHz)	26dB Bandwidth (MHz)	Output Power (dBm)	Output Power Limit		Result
				(dBm)	dBm+10log(BW)	
36	5180	20.493	15.86	17	17.12	Pass

**26dBc Occupied Bandwidth:
Channel 36**

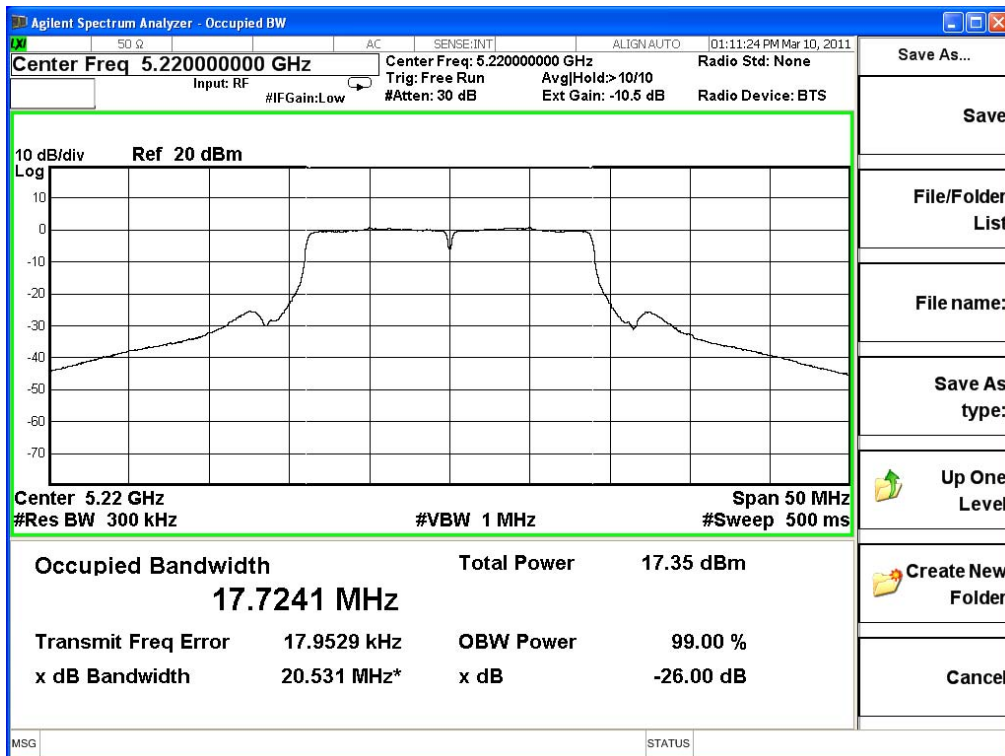


Peak Transmit Power Measurement:

Channel No	Frequency Range (MHz)	26dB Bandwidth (MHz)	Output Power (dBm)	Output Power Limit		Result
				(dBm)	dBm+10log(BW)	
44	5220	20.531	16.62	17	17.12	Pass

26dBc Occupied Bandwidth:

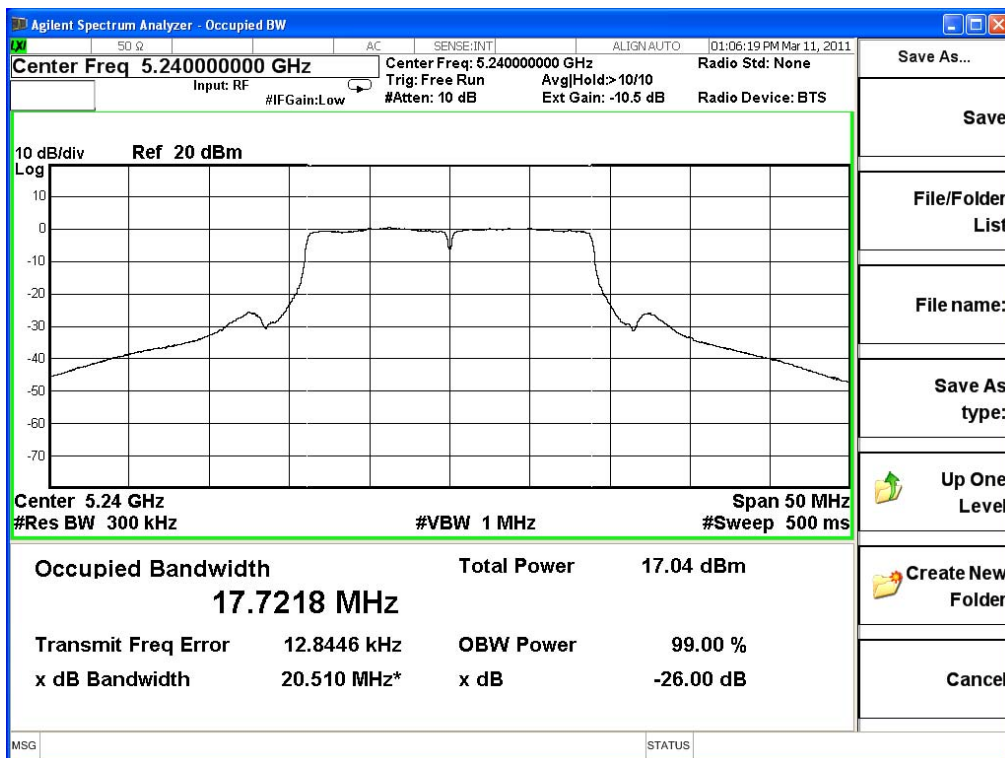
Channel 44



Peak Transmit Power Measurement:

Channel No	Frequency Range (MHz)	26dB Bandwidth (MHz)	Output Power (dBm)	Output Power Limit		Result
				(dBm)	dBm+10log(BW)	
48	5240	20.51	16.48	17	17.12	Pass

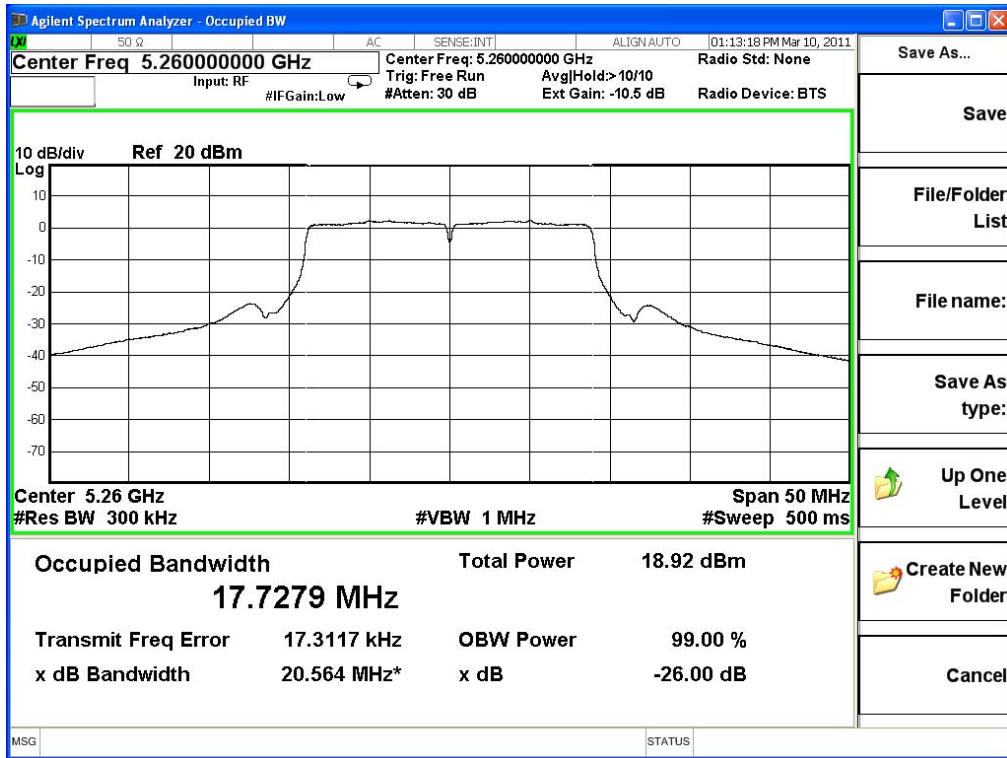
**26dBc Occupied Bandwidth:
Channel 48**



Peak Transmit Power Measurement:

Channel No	Frequency Range (MHz)	26dB Bandwidth (MHz)	Output Power (dBm)	Output Power Limit		Result
				(dBm)	dBm+10log(BW)	
52	5260	20.564	18.27	24	24.13	Pass

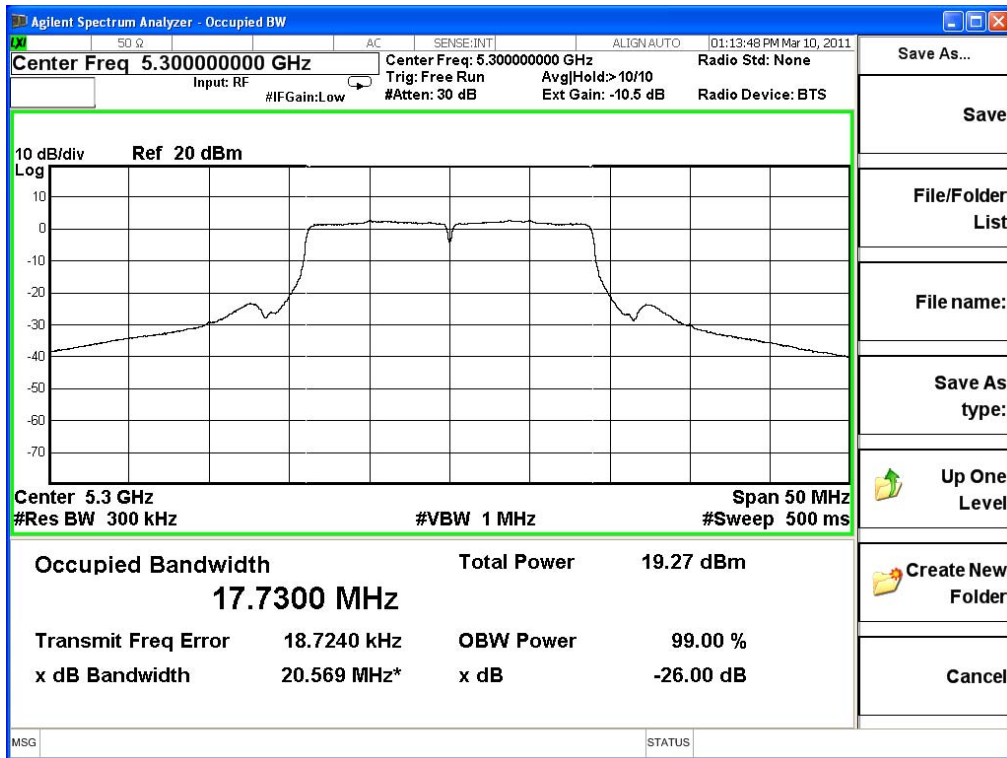
**26dBc Occupied Bandwidth:
Channel 52**



Peak Transmit Power Measurement:

Channel No	Frequency Range (MHz)	26dB Bandwidth (MHz)	Output Power (dBm)	Output Power Limit		Result
				(dBm)	dBm+10log(BW)	
60	5300	20.569	18.62	24	24.13	Pass

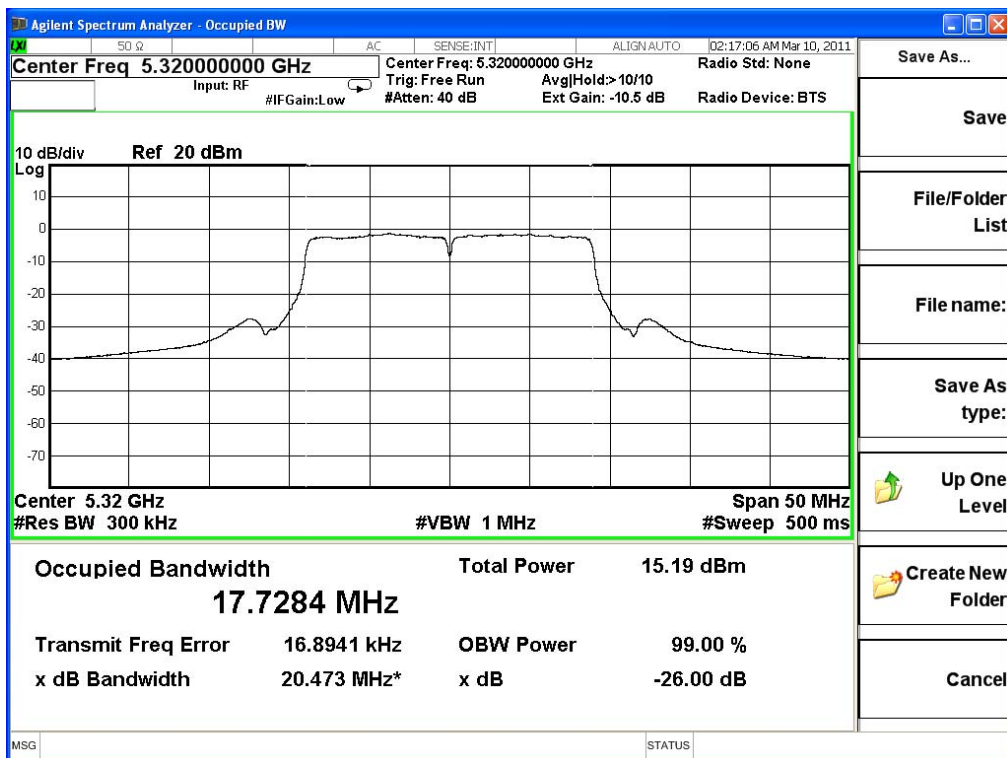
**26dBc Occupied Bandwidth:
Channel 60**



Peak Transmit Power Measurement:

Channel No	Frequency Range (MHz)	26dB Bandwidth (MHz)	Output Power (dBm)	Output Power Limit		Result
				(dBm)	dBm+10log(BW)	
64	5320	20.473	14.48	24	24.11	Pass

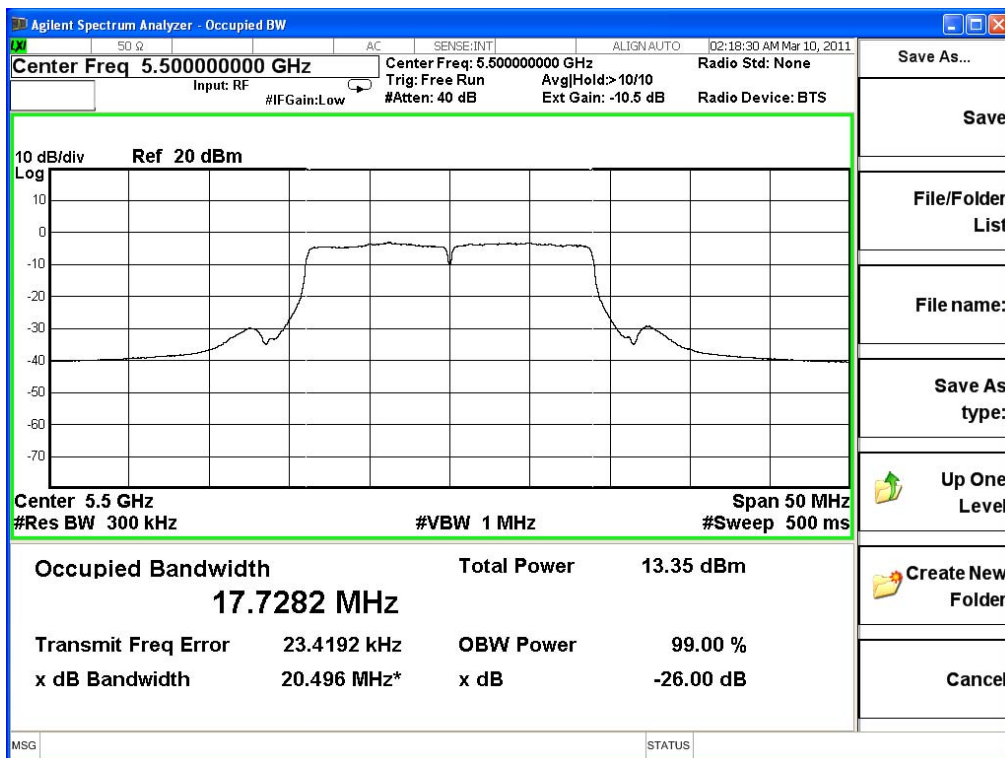
**26dBc Occupied Bandwidth:
Channel 64**



Peak Transmit Power Measurement:

Channel No	Frequency Range (MHz)	26dB Bandwidth (MHz)	Output Power (dBm)	Output Power Limit		Result
				(dBm)	dBm+10log(BW)	
100	5500	20.496	13.37	24	24.12	Pass

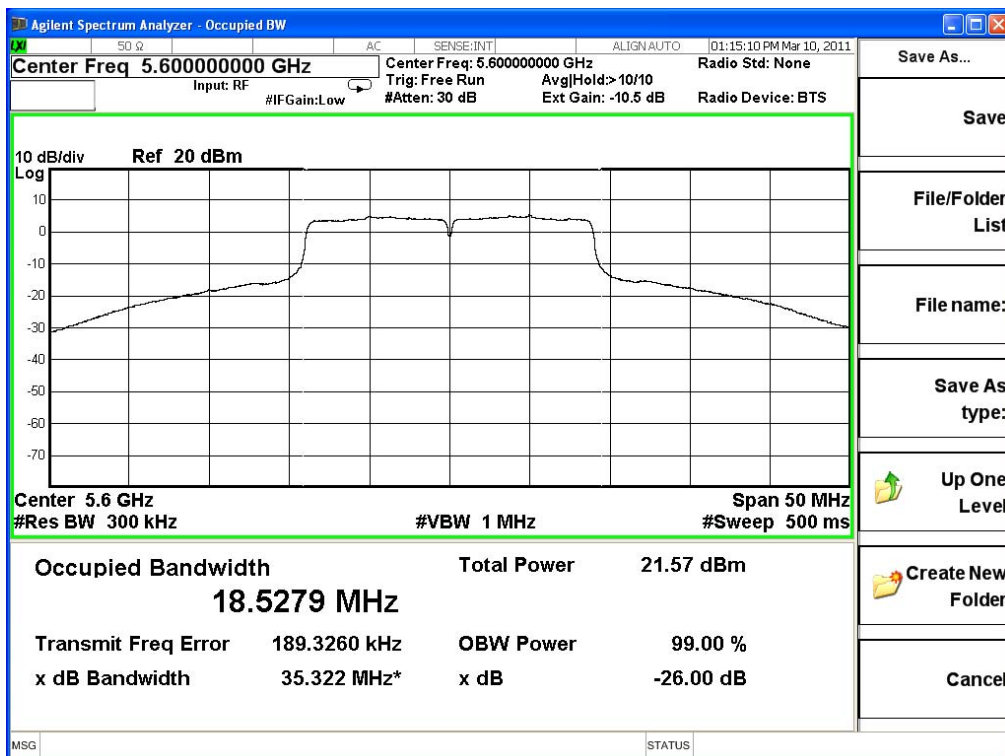
**26dBc Occupied Bandwidth:
Channel 100**



Peak Transmit Power Measurement:

Channel No	Frequency Range (MHz)	26dB Bandwidth (MHz)	Output Power (dBm)	Output Power Limit		Result
				(dBm)	dBm+10log(BW)	
120	5600	35.322	20.71	24	26.48	Pass

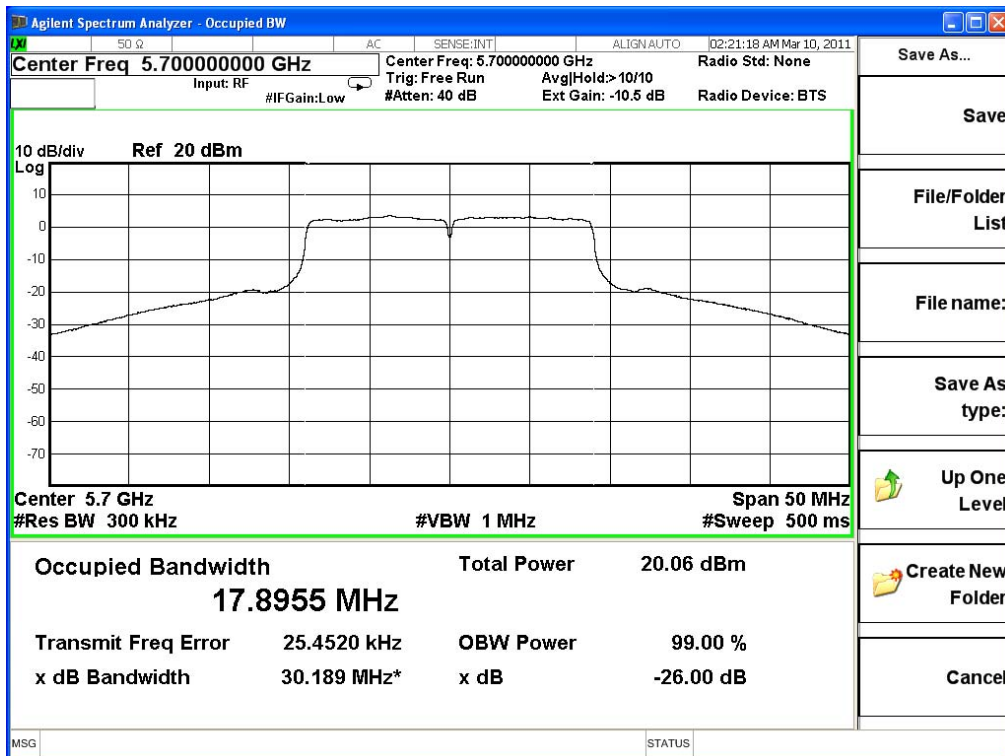
**26dBc Occupied Bandwidth:
Channel 120**



Peak Transmit Power Measurement:

Channel No	Frequency Range (MHz)	26dB Bandwidth (MHz)	Output Power (dBm)	Output Power Limit		Result
				(dBm)	dBm+10log(BW)	
140	5700	30.189	19.71	24	25.80	Pass

**26dBc Occupied Bandwidth:
Channel 140**



Product : 802.11 a/b/g/n module
 Test Item : Peak Transmit Power
 Test Site : No.3 OATS
 Test Mode : Mode 3: Transmit (802.11n-40BW 30Mbps)

Cable loss=1dB		Peak Power Output								
Channel No.	Frequency (MHz)	Data Rate (Mbps)								Required Limit
		30	60	90	120	180	240	270	300	
		Measurement Level (dBm)								
38	5190	10.63	--	--	--	--	--	--	--	<17dBm
46	5230	16.82	16.61	16.53	16.44	16.31	16.12	15.96	15.72	<17dBm
54	5270	19.16	19.11	19.07	18.98	18.97	19.9	18.87	18.75	<24dBm
62	5310	11.68	--	--	--	--	--	--	--	<24dBm
102	5510	11.70	--	--	--	--	--	--	--	<24dBm
118	5590	20.29	--	--	--	--	--	--	--	<24dBm
134	5670	20.63	20.44	20.18	19.92	19.75	19.41	19.22	19.02	<24dBm

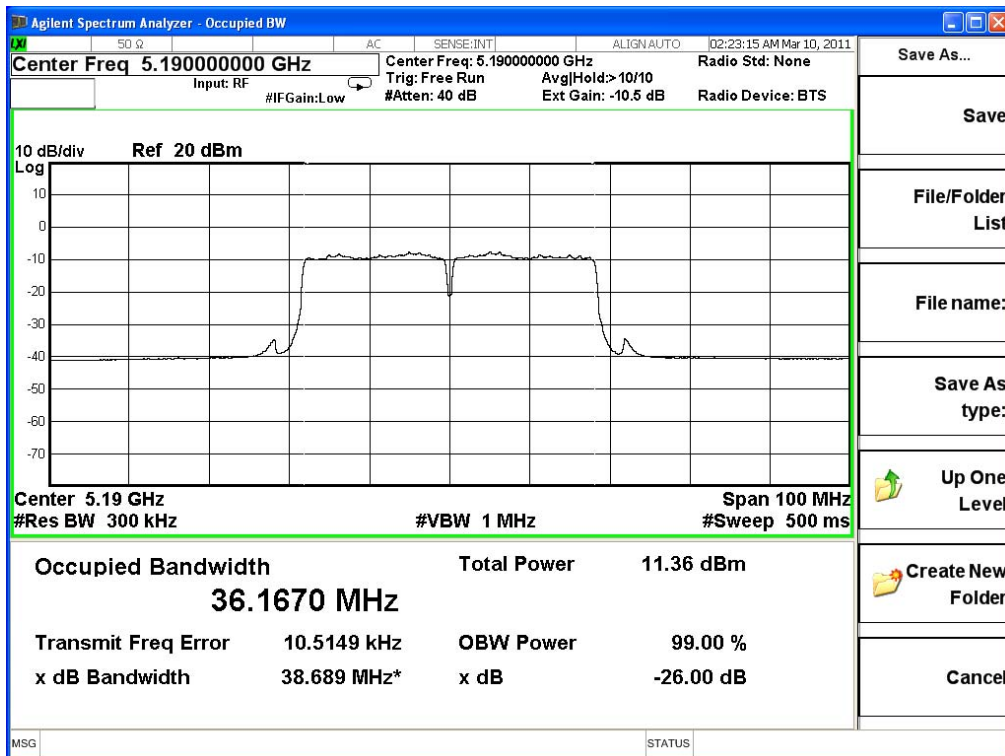
Note:

1. Peak Power Output Value = Reading value on peak power meter + cable loss

Peak Transmit Power Measurement:

Channel No	Frequency Range (MHz)	26dB Bandwidth (MHz)	Output Power (dBm)	Output Power Limit		Result
				(dBm)	dBm+10log(BW)	
38	5190	38.689	10.63	17	19.88	Pass

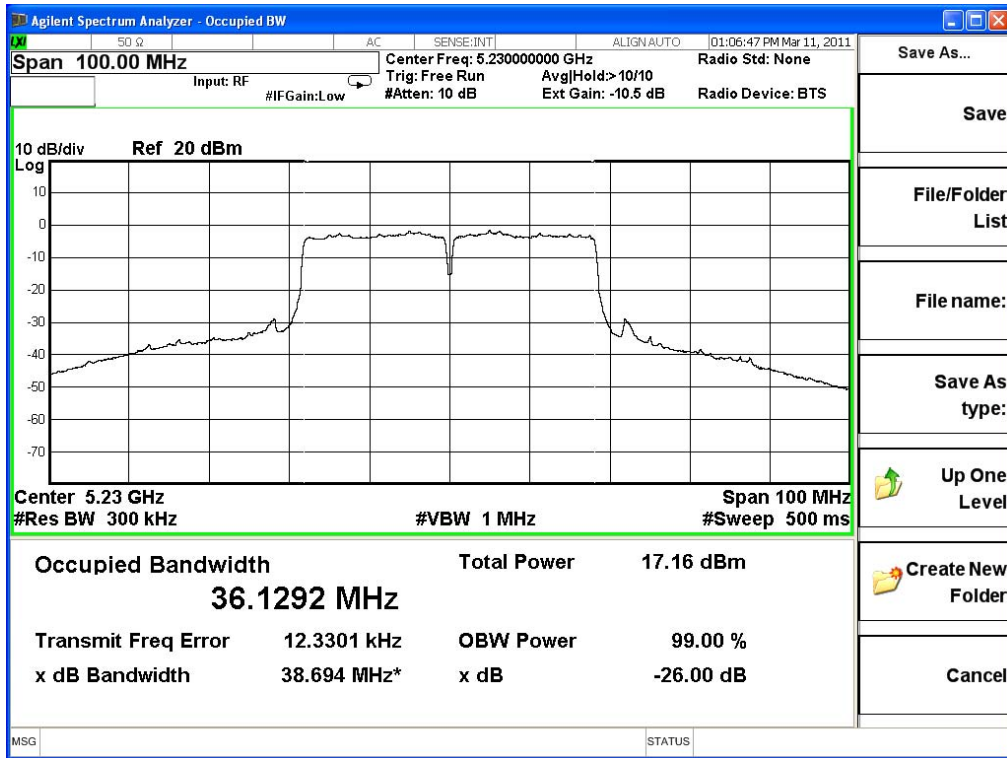
**26dBc Occupied Bandwidth:
Channel 38**



Peak Transmit Power Measurement:

Channel No	Frequency Range (MHz)	26dB Bandwidth (MHz)	Output Power (dBm)	Output Power Limit		Result
				(dBm)	dBm+10log(BW)	
46	5230	38.694	16.82	17	19.88	Pass

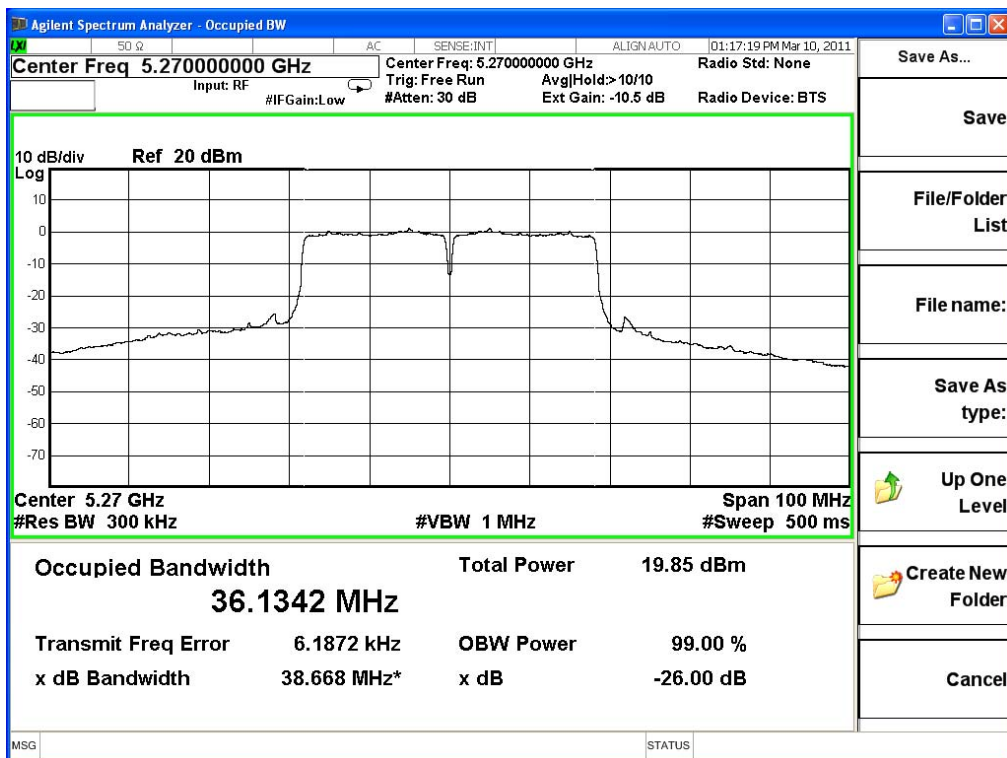
**26dBc Occupied Bandwidth:
Channel 46**



Peak Transmit Power Measurement:

Channel No	Frequency Range (MHz)	26dB Bandwidth (MHz)	Output Power (dBm)	Output Power Limit		Result
				(dBm)	dBm+10log(BW)	
54	5270	38.668	19.16	24	26.87	Pass

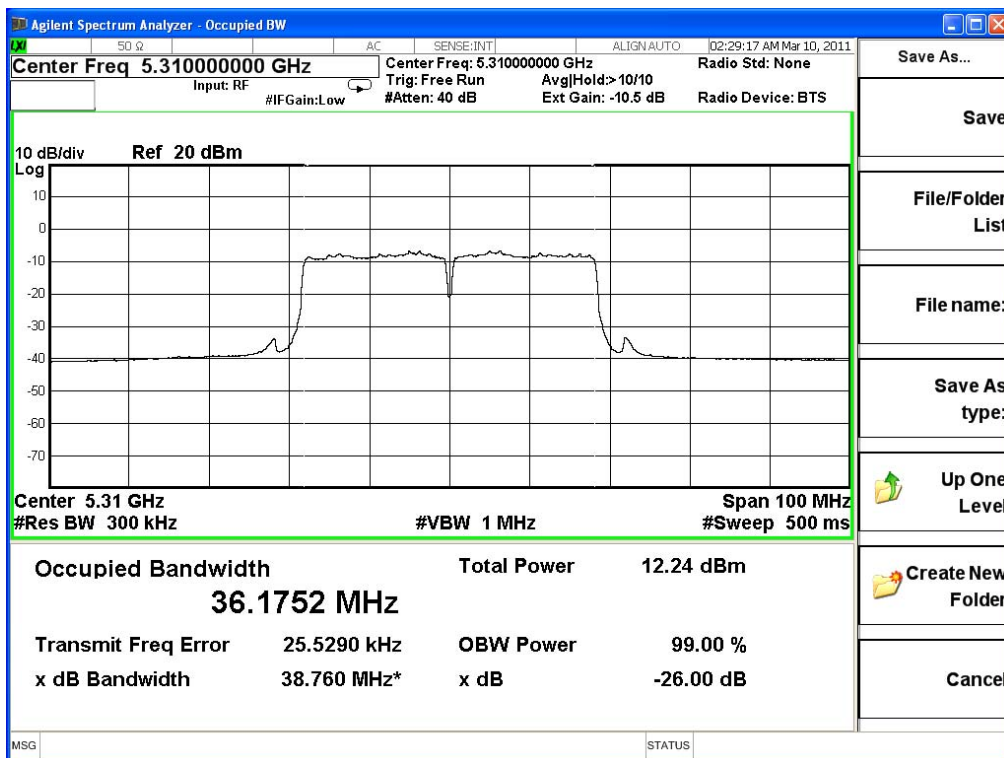
**26dBc Occupied Bandwidth:
Channel 54**



Peak Transmit Power Measurement:

Channel No	Frequency Range (MHz)	26dB Bandwidth (MHz)	Output Power (dBm)	Output Power Limit		Result
				(dBm)	dBm+10log(BW)	
62	5310	38.76	11.68	24	26.88	Pass

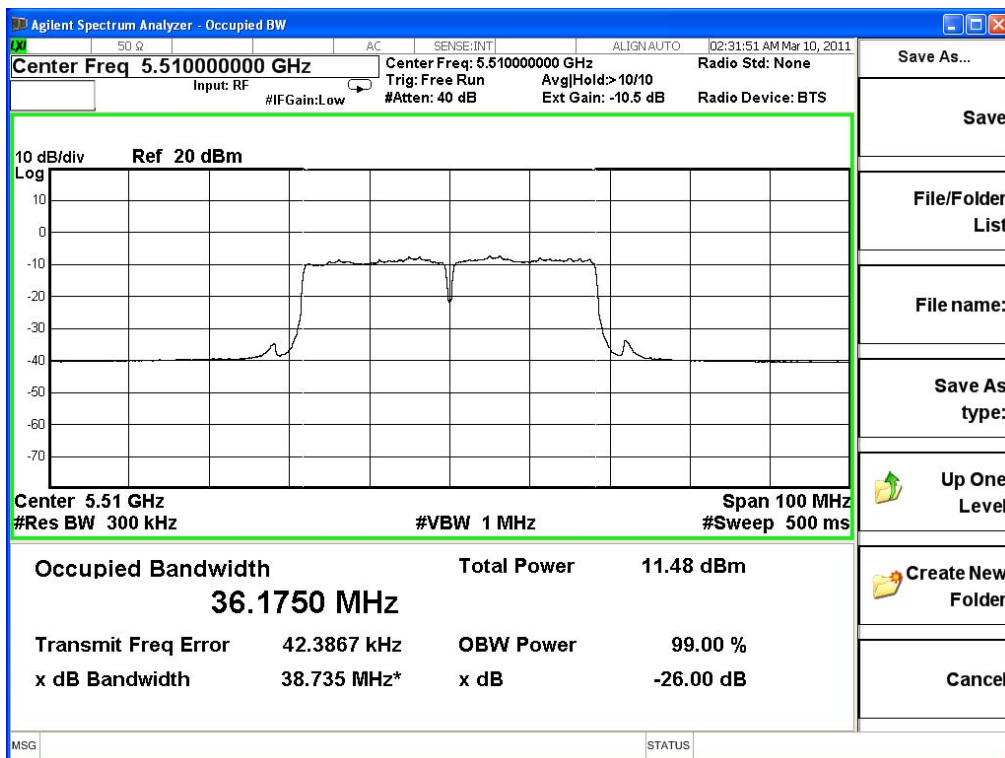
**26dBc Occupied Bandwidth:
Channel 62**



Peak Transmit Power Measurement:

Channel No	Frequency Range (MHz)	26dB Bandwidth (MHz)	Output Power (dBm)	Output Power Limit		Result
				(dBm)	dBm+10log(BW)	
102	5510	38.735	11.7	24	26.88	Pass

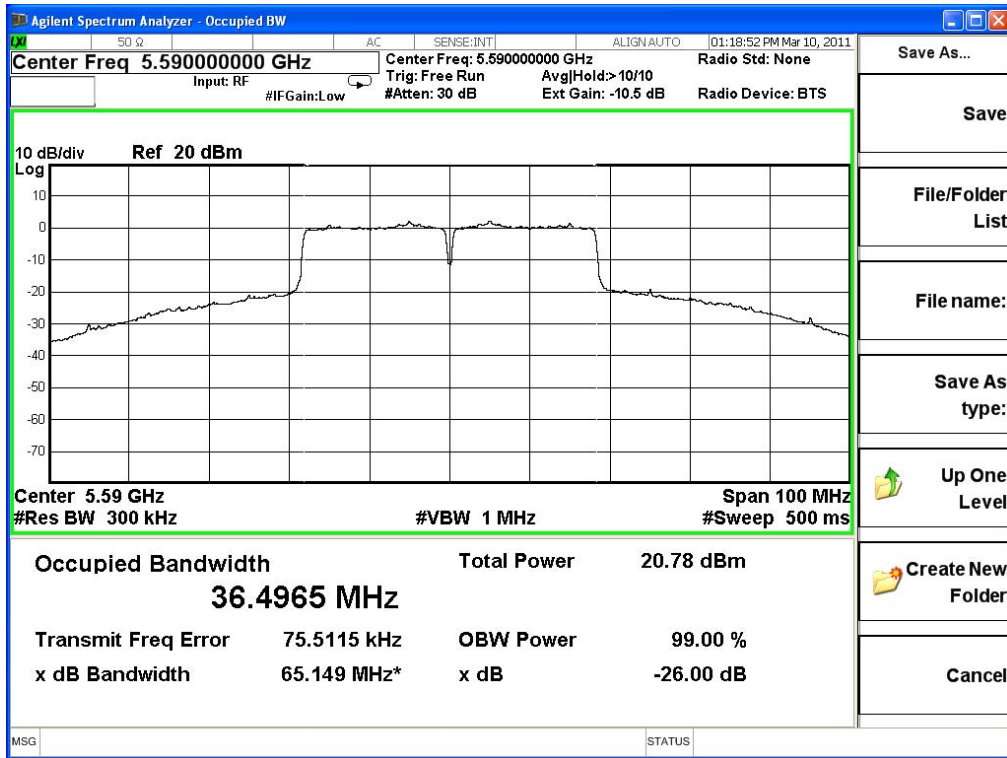
**26dBc Occupied Bandwidth:
Channel 102**



Peak Transmit Power Measurement:

Channel No	Frequency Range (MHz)	26dB Bandwidth (MHz)	Output Power (dBm)	Output Power Limit		Result
				(dBm)	dBm+10log(BW)	
118	5590	65.149	20.29	24	29.14	Pass

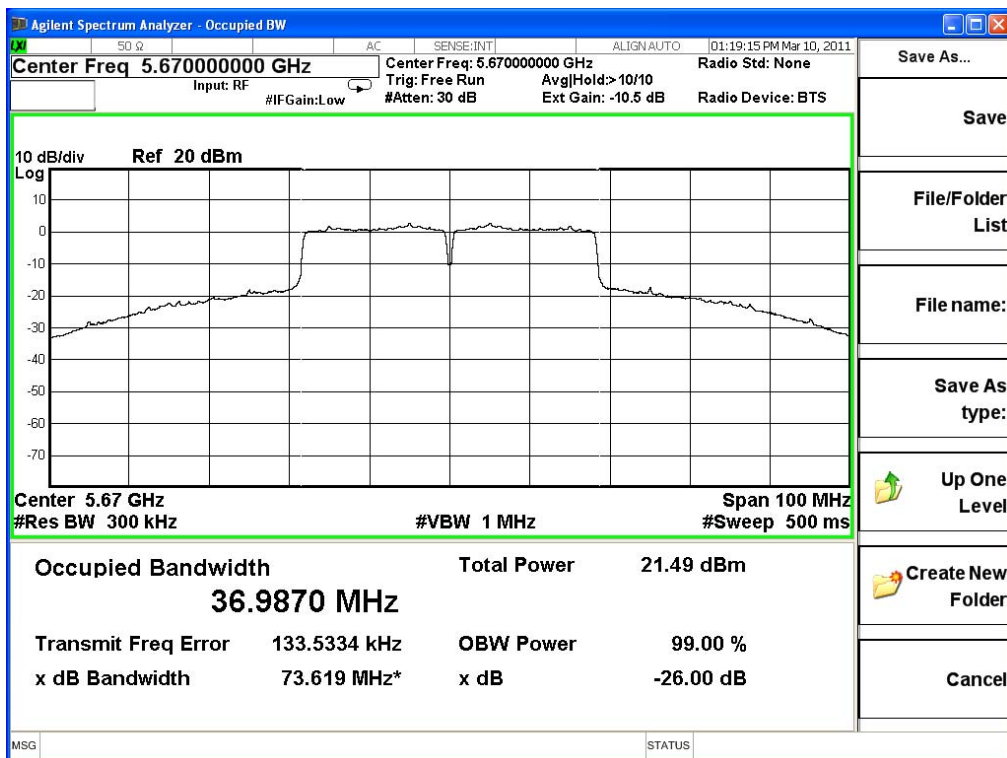
**26dBc Occupied Bandwidth:
Channel 118**



Peak Transmit Power Measurement:

Channel No	Frequency Range (MHz)	26dB Bandwidth (MHz)	Output Power (dBm)	Output Power Limit		Result
				(dBm)	dBm+10log(BW)	
134	5670	73.619	20.63	24	29.67	Pass

**26dBc Occupied Bandwidth:
Channel 134**



4. Peak Power Spectral Density

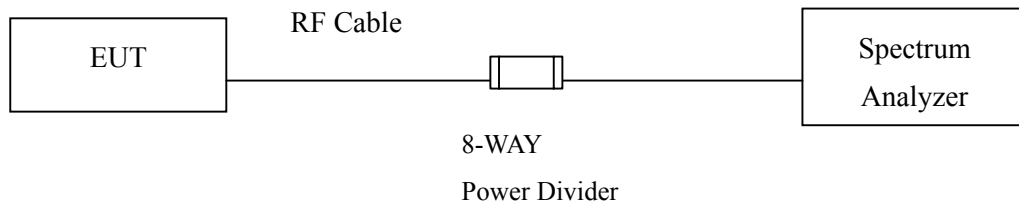
4.1. Test Equipment

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
	Spectrum Analyzer	R&S	FSP40 / 100170	Jun, 2010
	Spectrum Analyzer	Agilent	E4407B / US39440758	Jun, 2010
X	Spectrum Analyzer	Agilent	N9010A / MY48030495	Apr., 2010
X	8-WAY Power Divider	JFW	50PD-647 / 526770 0916	Apr., 2010

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. The power combiner is used for measure 11n mode.

4.2. Test Setup



4.3. 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.

4.4. Test Procedure

The EUT was setup to ANSI C63.4: 2009; tested to DTS test procedure of Aug 2002 DA 02-2138 for compliance to FCC 47CFR Subpart E requirements.

4.5. Uncertainty

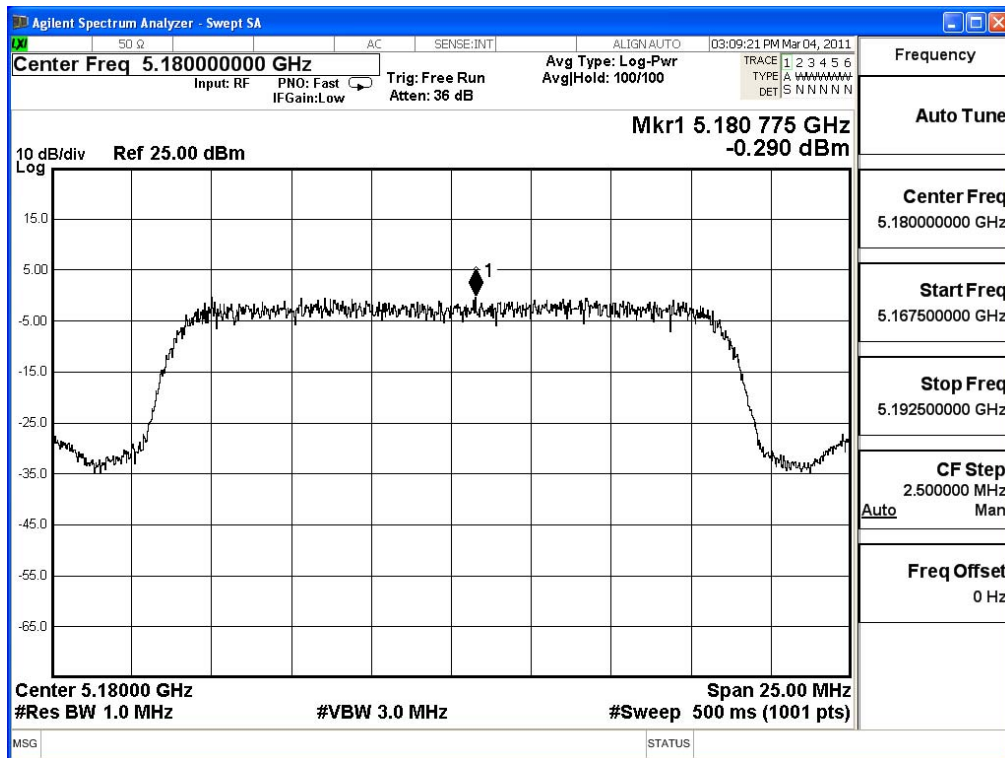
± 1.27 dB

4.6. Test Result of Peak Power Spectral Density

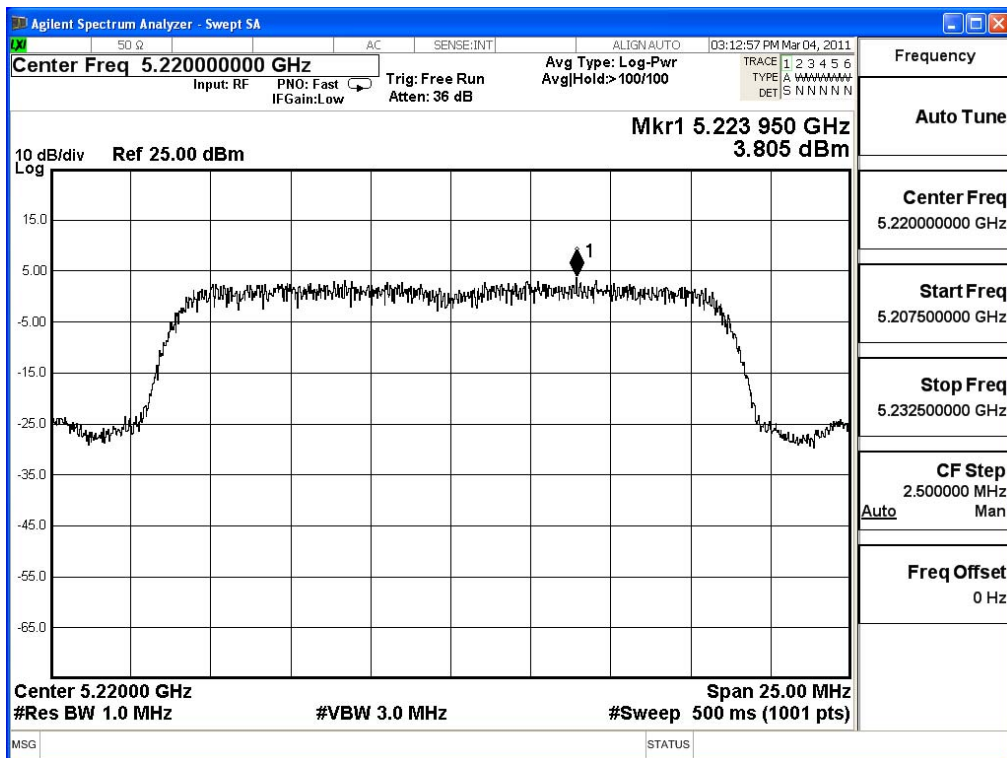
Product : 802.11 a/b/g/n module
 Test Item : Peak Power Spectral Density
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit (802.11a-6Mbps)

Channel No.	Frequency (MHz)	Measurement Level (dBm)	Required Limit (dBm)	Result
36	5180	-0.290	<4	Pass
44	5220	3.805	<4	Pass
48	5240	3.477	<4	Pass
52	5260	3.242	<11	Pass
60	5300	3.448	<11	Pass
64	5320	0.253	<11	Pass
100	5500	1.549	<11	Pass
120	5600	5.288	<11	Pass
140	5700	4.896	<11	Pass

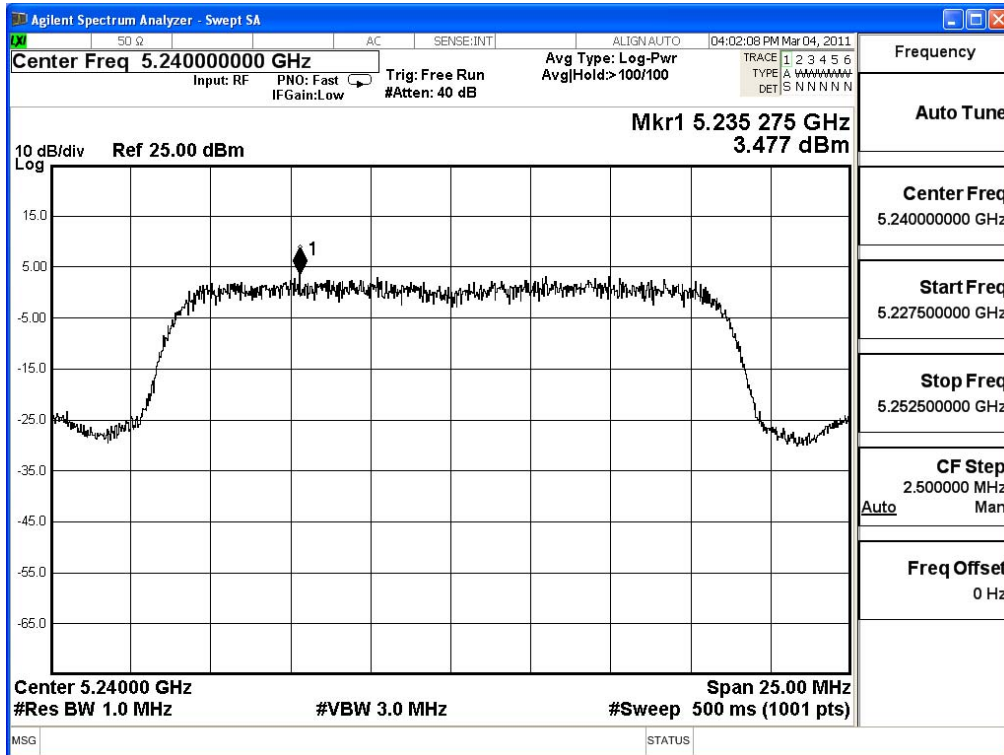
Channel 36:



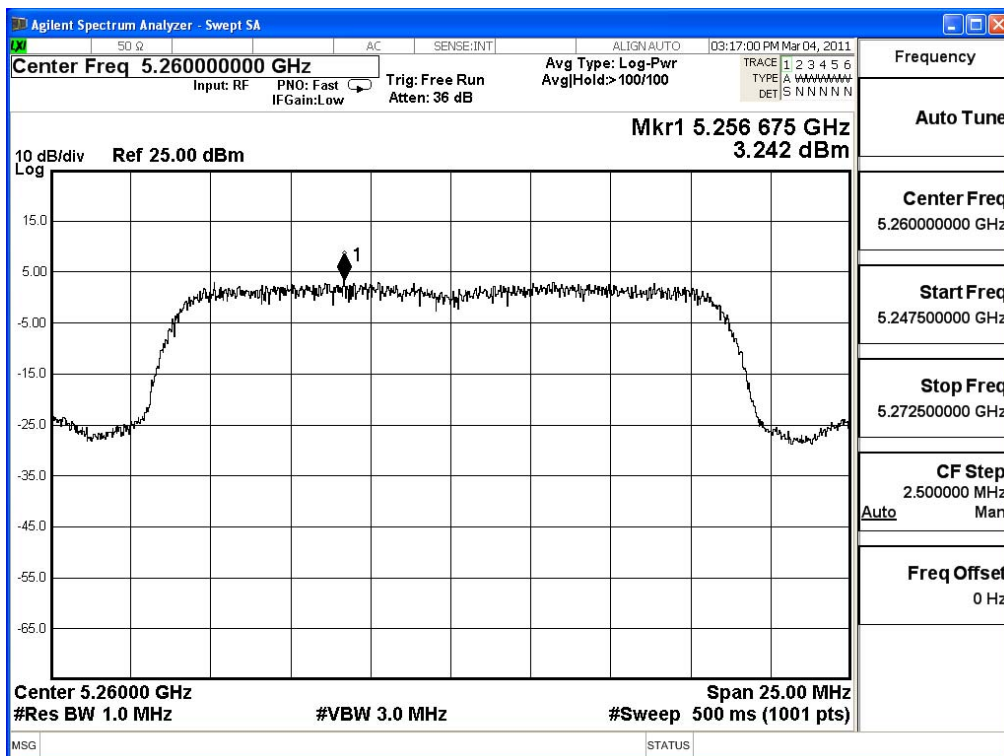
Channel 44:



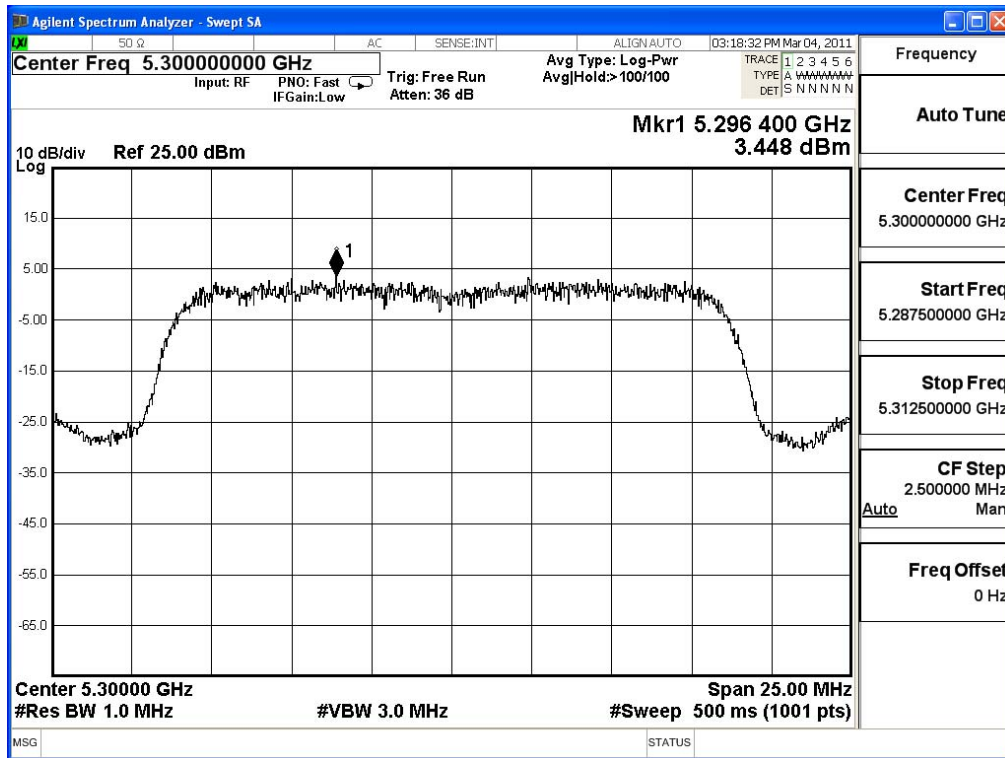
Channel 48:



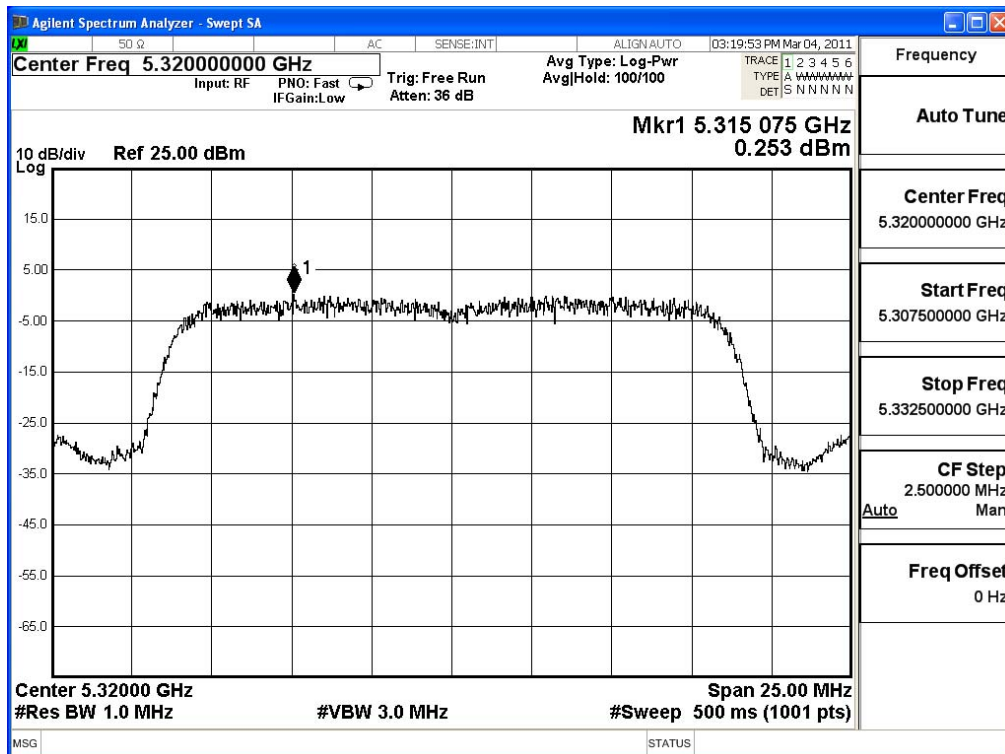
Channel 52:



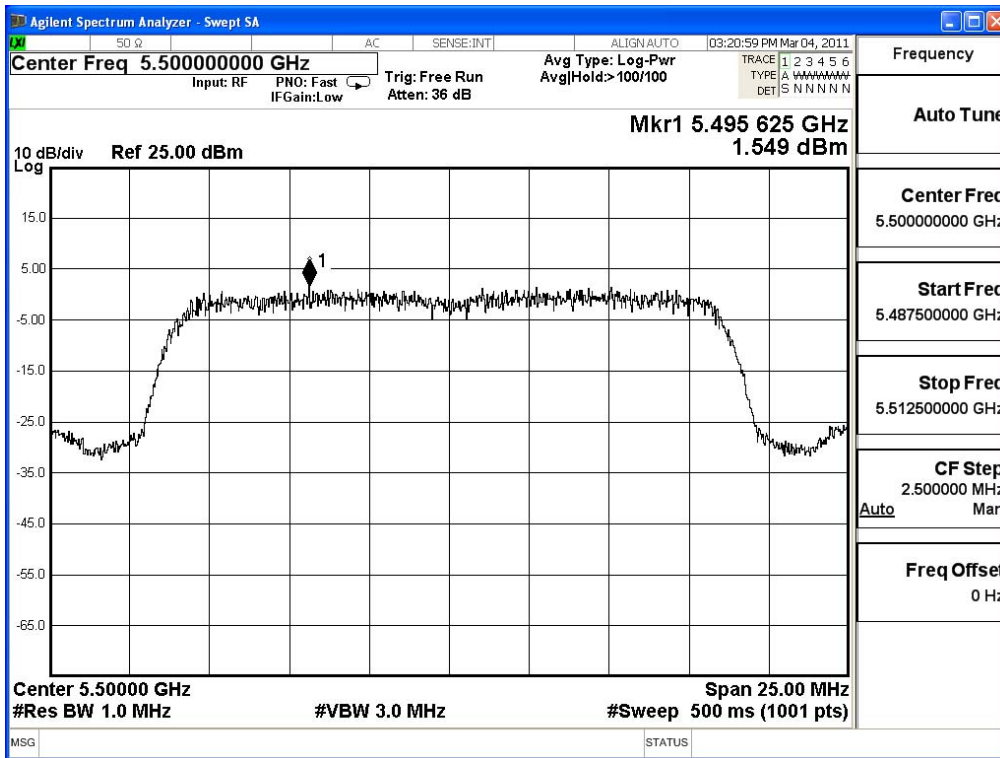
Channel 60:



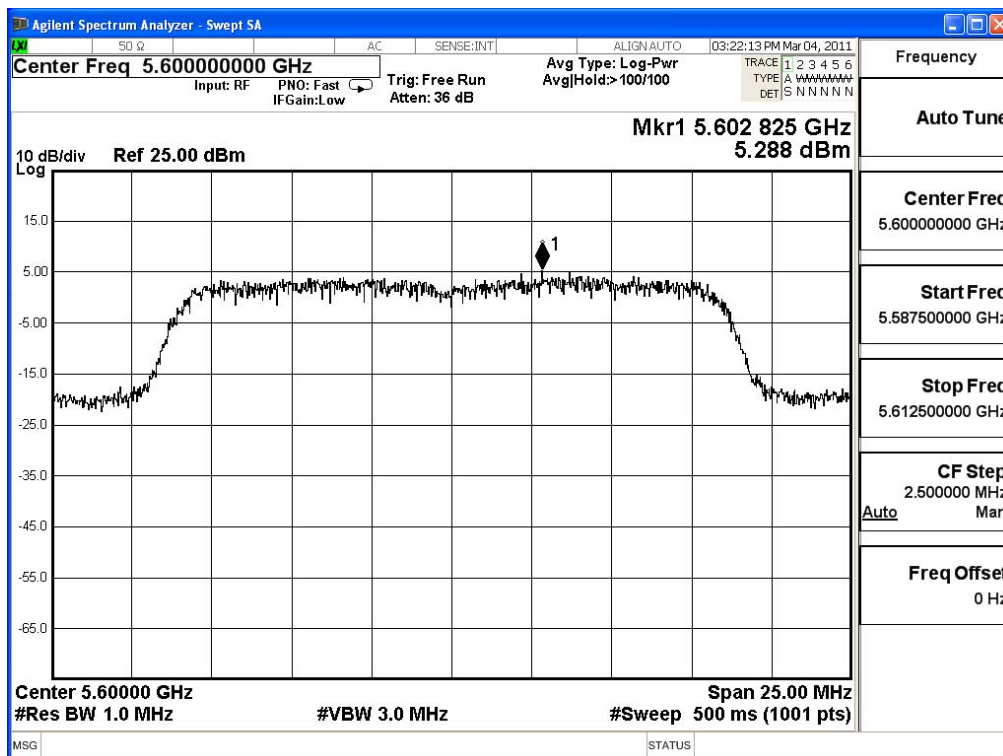
Channel 64:



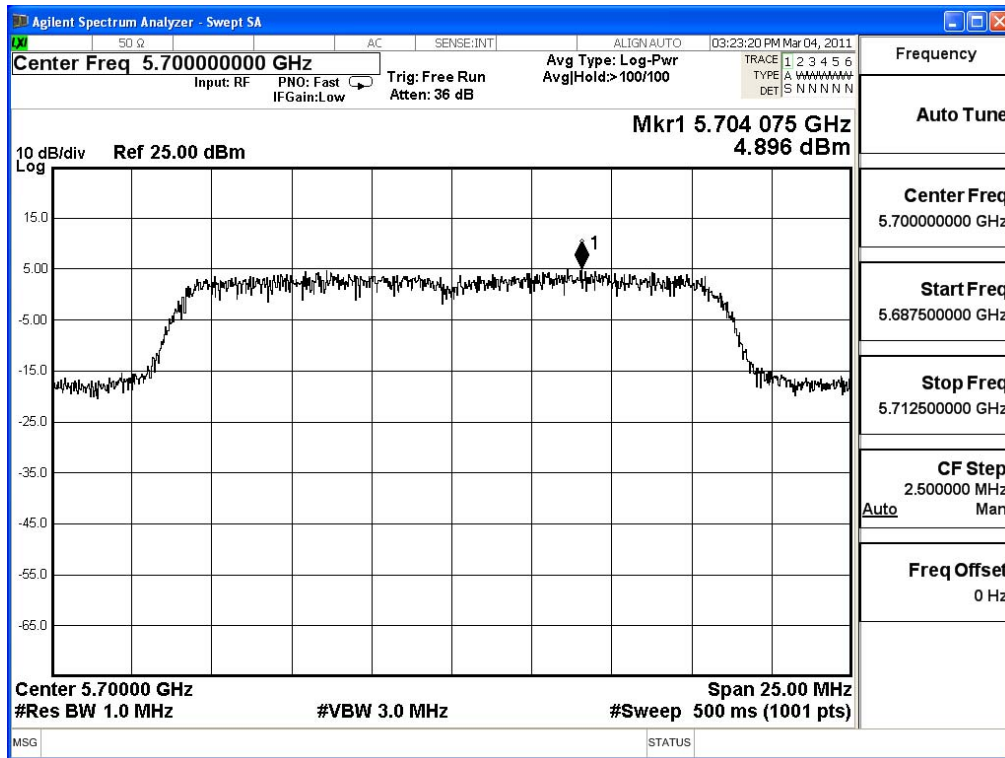
Channel 100:



Channel 120:



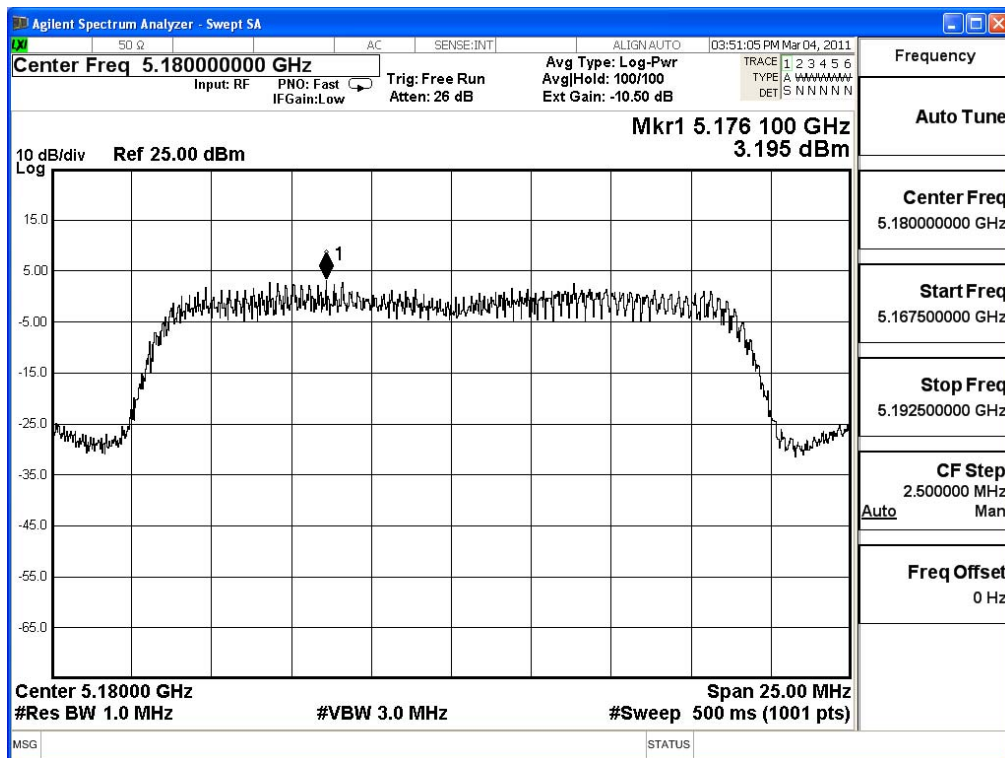
Channel 140:



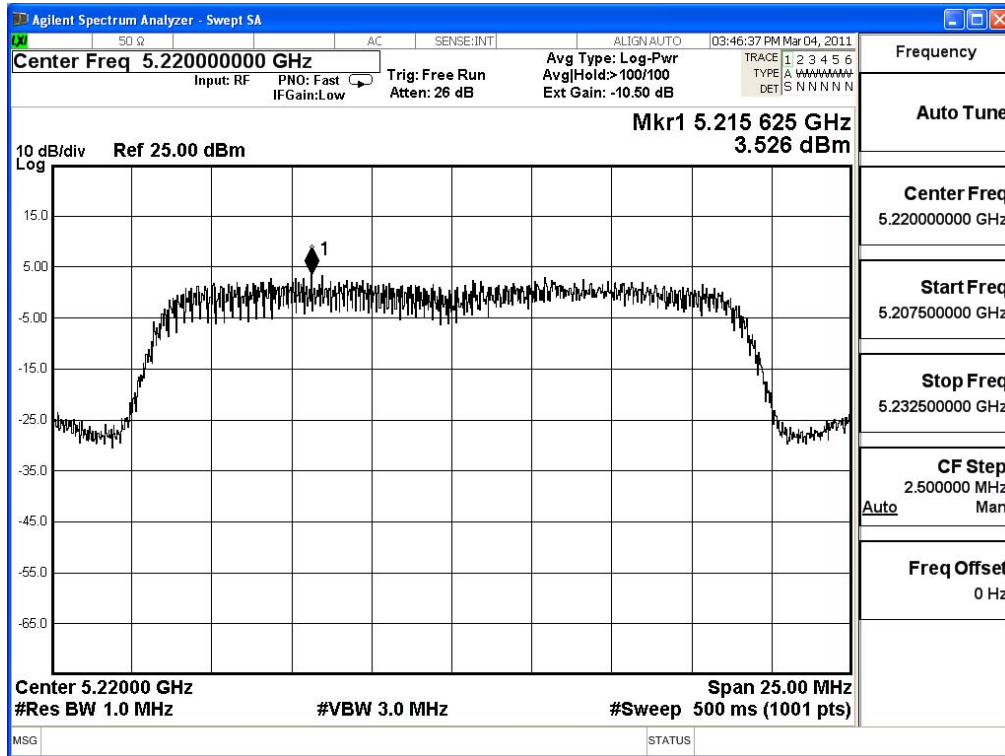
Product : 802.11 a/b/g/n module
 Test Item : Peak Power Spectral Density
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmit (802.11n-20BW 14.4Mbps)

Channel No.	Frequency (MHz)	Measurement Level (dBm)	Required Limit (dBm)	Result
36	5180	3.195	<4	Pass
44	5220	3.526	<4	Pass
48	5240	2.211	<4	Pass
52	5260	4.265	<11	Pass
60	5300	6.035	<11	Pass
64	5320	1.210	<11	Pass
100	5500	-0.236	<11	Pass
120	5600	7.253	<11	Pass
140	5700	6.148	<11	Pass

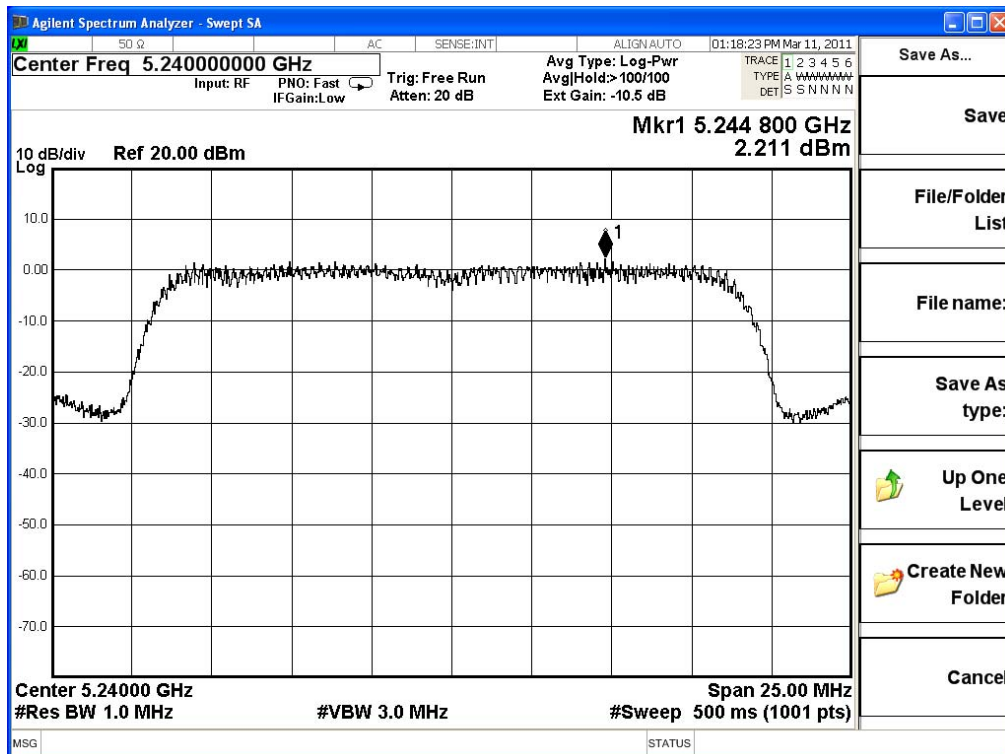
Channel 36:



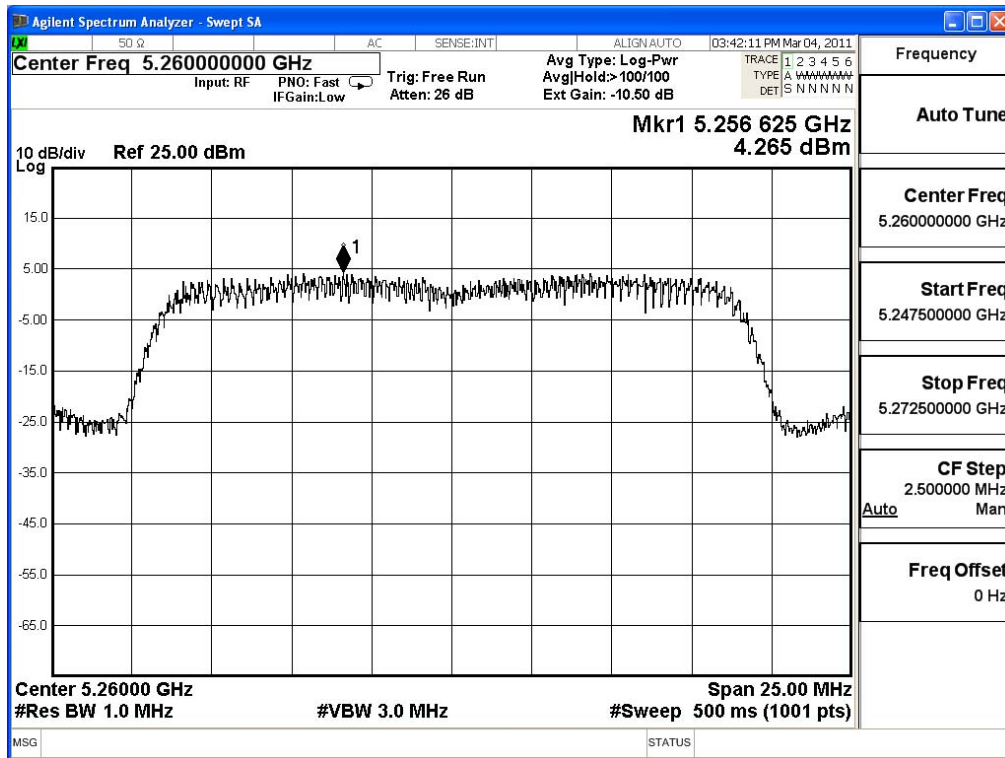
Channel 44:



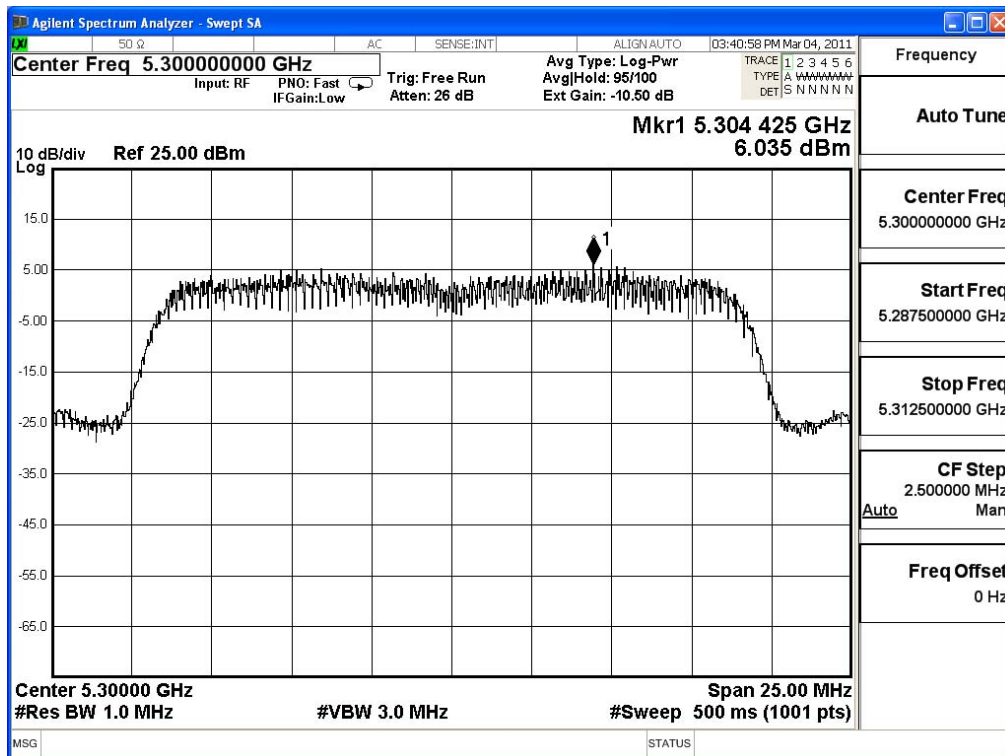
Channel 48:



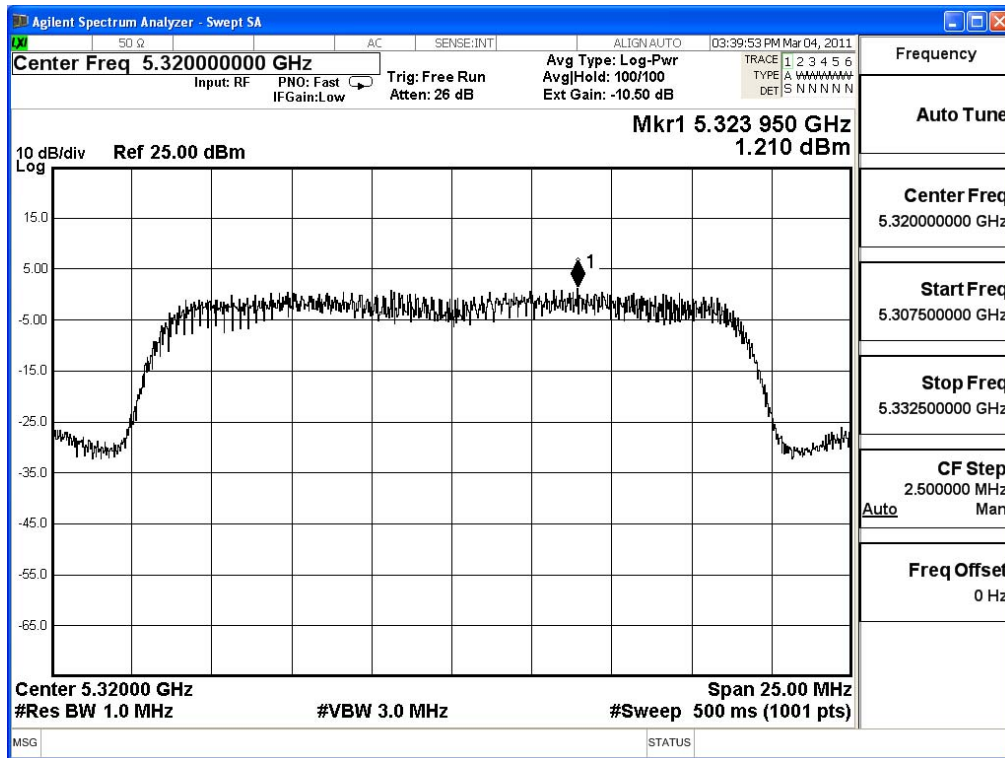
Channel 52:



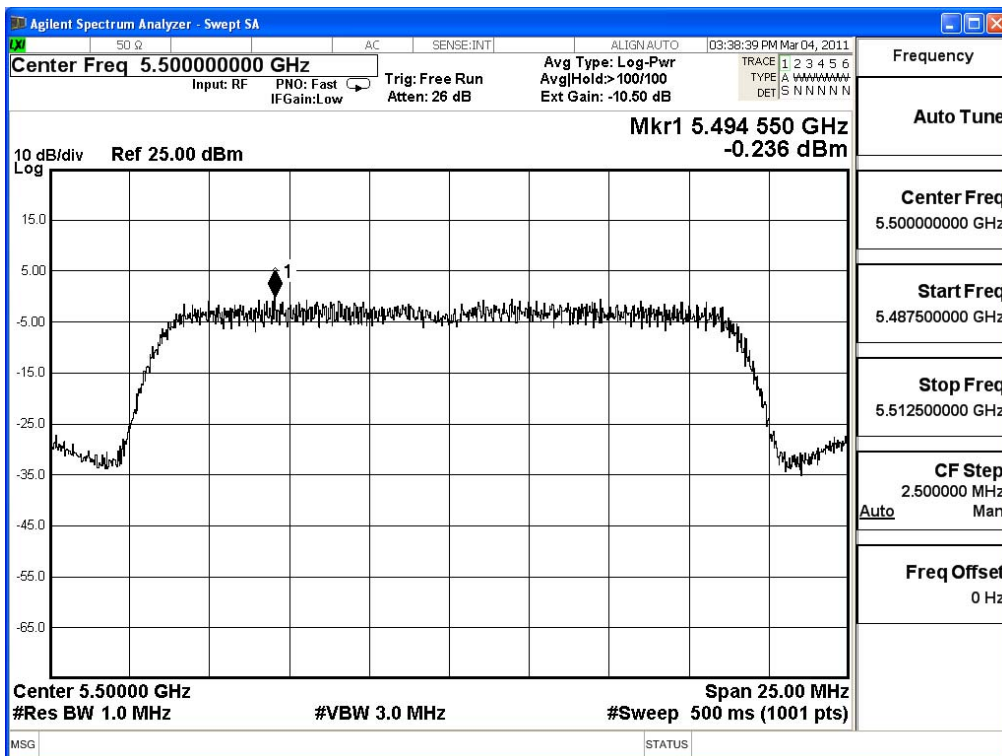
Channel 60:



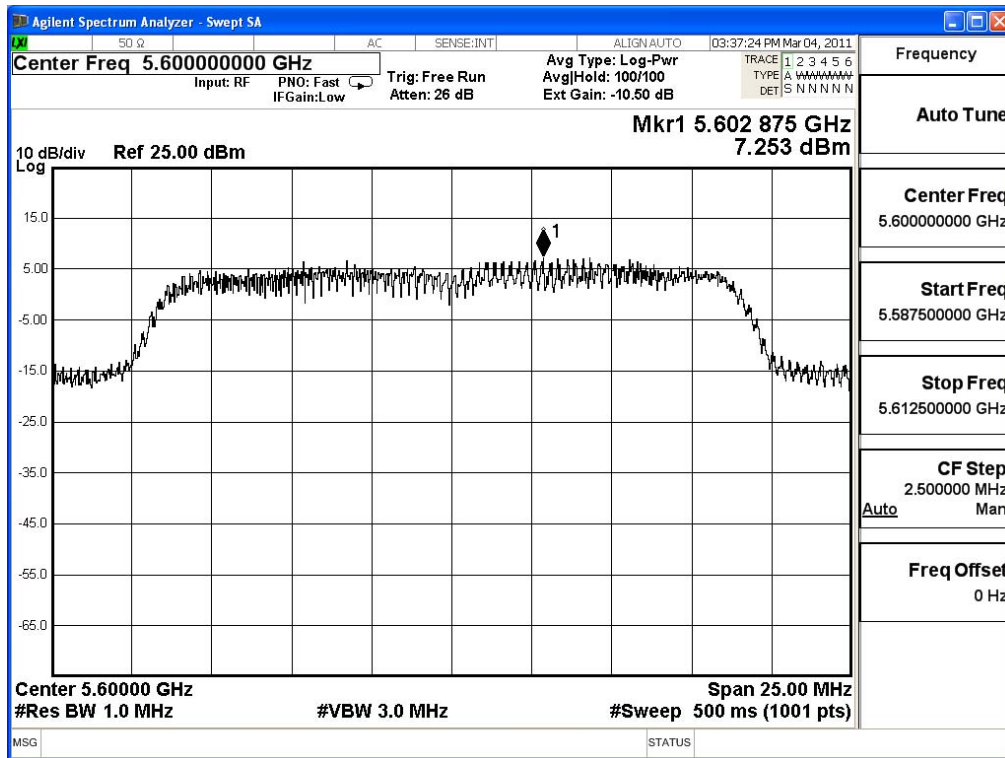
Channel 64:



Channel 100:



Channel 120:



Channel 140:

