



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-A
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-A



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	 <small>NVLAP Lab Code: 200533-0</small>
Test Result	Complied	

The Test Results relate only to the samples tested.

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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	2 dBi in 2.4GHz 3 dBi in 5.0GHz	Without metal reflector
2	AmTRAN	EDB-45S	2 dBi in 2.4GHz 3 dBi in 5.0GHz	
3	AmTRAN	MSA-3025-25GC4	2.54 dBi in 2.4GHz 4 dBi in 5.0GHz	
4	AmTRAN	FPA-3025-25GC4	2.75 dBi in 2.4GHz 4.5 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 without metal reflector 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.

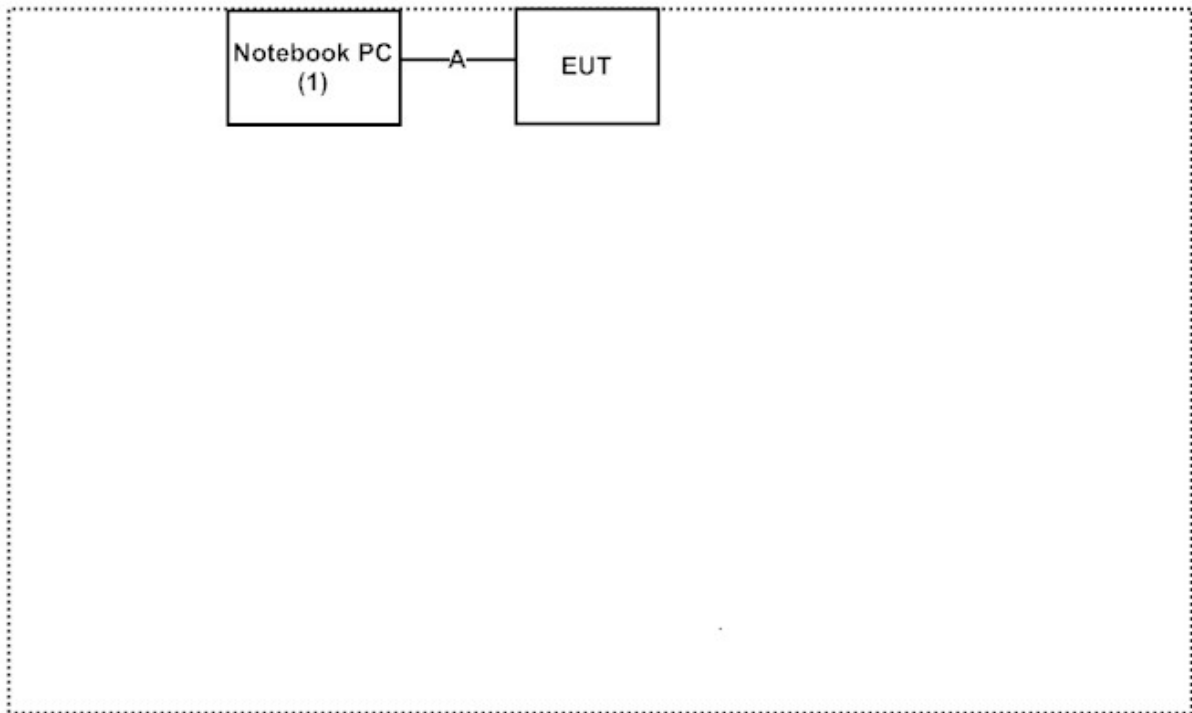
1.3. Tested System Details

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
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 FCC Engineering Laboratory
 7435 Oakland Mills Road
 Columbia, MD 21046
 Registration Number: 92195



Accreditation on NVLAP
 NVLAP Lab Code: 200533-0



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2. Conducted Emission

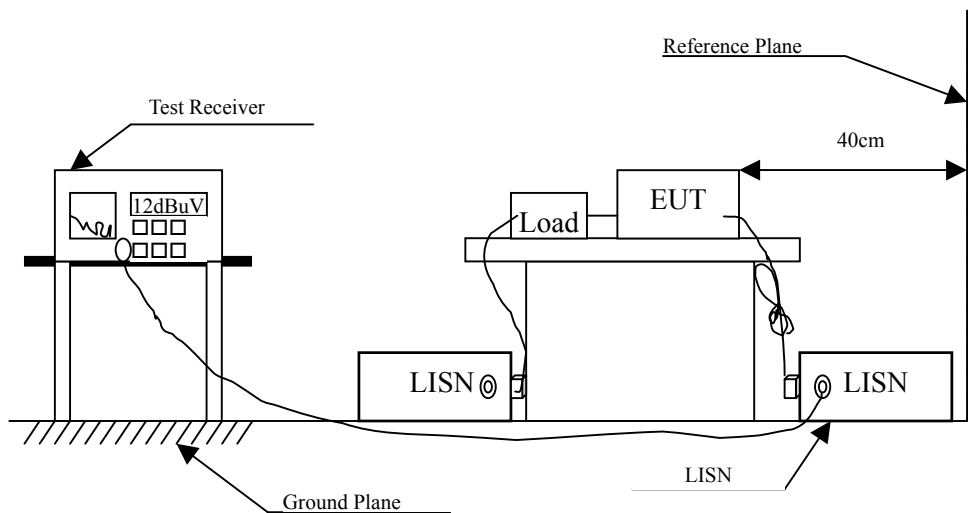
2.1. Test Equipment

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	48.610	58.360	-7.297	65.657
0.240	9.680	39.710	49.390	-14.039	63.429
0.330	9.650	31.250	40.900	-19.957	60.857
0.509	9.640	22.740	32.380	-23.620	56.000
0.775	9.649	27.810	37.459	-18.541	56.000
2.670	9.690	18.450	28.140	-27.860	56.000
Average					
0.162	9.750	35.220	44.970	-10.687	55.657
0.240	9.680	17.720	27.400	-26.029	53.429
0.330	9.650	21.730	31.380	-19.477	50.857
0.509	9.640	3.450	13.090	-32.910	46.000
0.775	9.649	27.310	36.959	-9.041	46.000
2.670	9.690	5.310	15.000	-31.000	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					
0.185	9.727	42.980	52.708	-12.292	65.000
0.330	9.660	31.130	40.790	-20.067	60.857
0.888	9.670	24.300	33.970	-22.030	56.000
1.771	9.680	25.840	35.520	-20.480	56.000
3.435	9.690	23.810	33.500	-22.500	56.000
13.181	9.920	29.360	39.280	-20.720	60.000
Average					
0.185	9.727	19.820	29.548	-25.452	55.000
0.330	9.660	18.230	27.890	-22.967	50.857
0.888	9.670	23.010	32.680	-13.320	46.000
1.771	9.680	25.750	35.430	-10.570	46.000
3.435	9.690	21.880	31.570	-14.430	46.000
13.181	9.920	24.830	34.750	-15.250	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					
0.158	9.756	49.540	59.296	-6.475	65.771
0.267	9.665	39.510	49.175	-13.482	62.657
0.349	9.650	28.120	37.770	-22.544	60.314
0.775	9.649	27.770	37.419	-18.581	56.000
2.662	9.690	26.920	36.610	-19.390	56.000
10.857	9.850	28.590	38.440	-21.560	60.000
Average					
0.158	9.756	35.220	44.976	-10.795	55.771
0.267	9.665	21.720	31.385	-21.272	52.657
0.349	9.650	6.310	15.960	-34.354	50.314
0.775	9.649	27.250	36.899	-9.101	46.000
2.662	9.690	23.740	33.430	-12.570	46.000
10.857	9.850	24.670	34.520	-15.480	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 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					
0.170	9.743	46.550	56.293	-9.136	65.429
0.533	9.640	25.430	35.070	-20.930	56.000
1.771	9.680	25.860	35.540	-20.460	56.000
2.834	9.690	17.690	27.380	-28.620	56.000
6.646	9.740	26.780	36.520	-23.480	60.000
13.291	9.920	28.850	38.770	-21.230	60.000
Average					
0.170	9.743	26.840	36.583	-18.846	55.429
0.533	9.640	5.260	14.900	-31.100	46.000
1.771	9.680	25.830	35.510	-10.490	46.000
2.834	9.690	0.900	10.590	-35.410	46.000
6.646	9.740	25.380	35.120	-14.880	50.000
13.291	9.920	24.460	34.380	-15.620	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					
0.158	9.756	49.460	59.216	-6.555	65.771
0.197	9.709	42.140	51.849	-12.808	64.657
0.252	9.675	39.620	49.295	-13.791	63.086
0.338	9.650	30.520	40.170	-20.459	60.629
0.509	9.640	24.050	33.690	-22.310	56.000
0.775	9.649	27.790	37.439	-18.561	56.000
Average					
0.158	9.756	35.070	44.826	-10.945	55.771
0.197	9.709	18.870	28.579	-26.078	54.657
0.252	9.675	18.450	28.125	-24.961	53.086
0.338	9.650	16.460	26.110	-24.519	50.629
0.509	9.640	4.100	13.740	-32.260	46.000
0.775	9.649	27.250	36.899	-9.101	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					
0.189	9.724	42.600	52.324	-12.562	64.886
0.291	9.663	35.410	45.073	-16.898	61.971
0.537	9.640	25.710	35.350	-20.650	56.000
1.330	9.670	24.370	34.040	-21.960	56.000
2.658	9.690	28.080	37.770	-18.230	56.000
6.755	9.740	28.390	38.130	-21.870	60.000
Average					
0.189	9.724	19.270	28.994	-25.892	54.886
0.291	9.663	12.890	22.553	-29.418	51.971
0.537	9.640	6.140	15.780	-30.220	46.000
1.330	9.670	24.360	34.030	-11.970	46.000
2.658	9.690	26.770	36.460	-9.540	46.000
6.755	9.740	26.170	35.910	-14.090	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

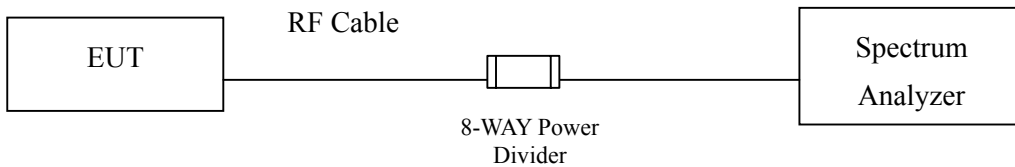
	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
X	Power Meter	Anritsu	ML2495A/6K00003357	May, 2010
X	Power Sensor	Anritsu	MA2411B/0738448	Jun, 2010
X	Spectrum Analyzer	Agilent	N9010A / MY48030495	Apr., 2010
X	8-WAY Power Divider	JFW	50PD-647 / 526770 0916	Apr., 2010

Note:

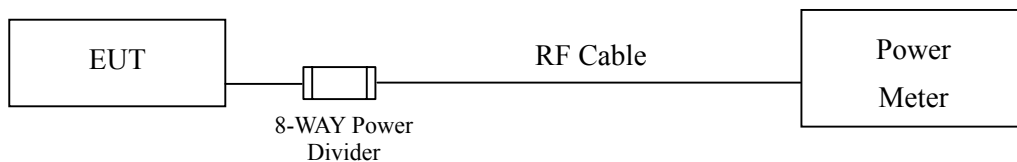
1. All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.
2. The test instruments marked with “X” are used to measure the final test results.

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	15.18	--	--	--	--	--	--	--	<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	16.61	--	--	--	--	--	--	--	<24dBm
100	5500	16.83	--	--	--	--	--	--	--	<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

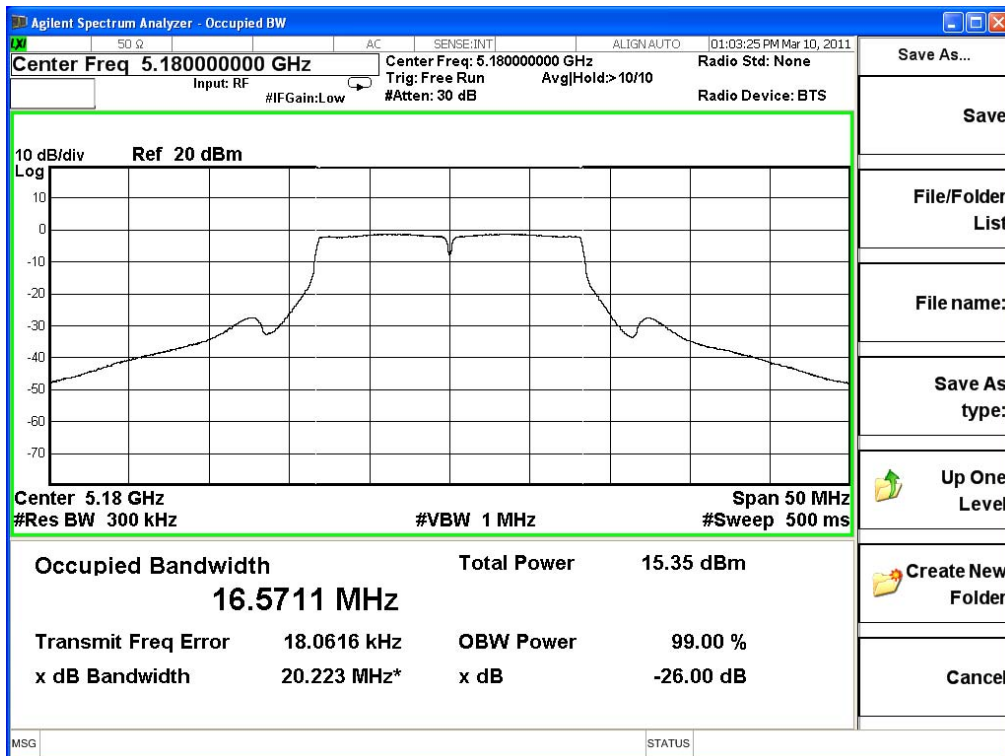
Note:

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	20.223	15.18	17	17.06	Pass

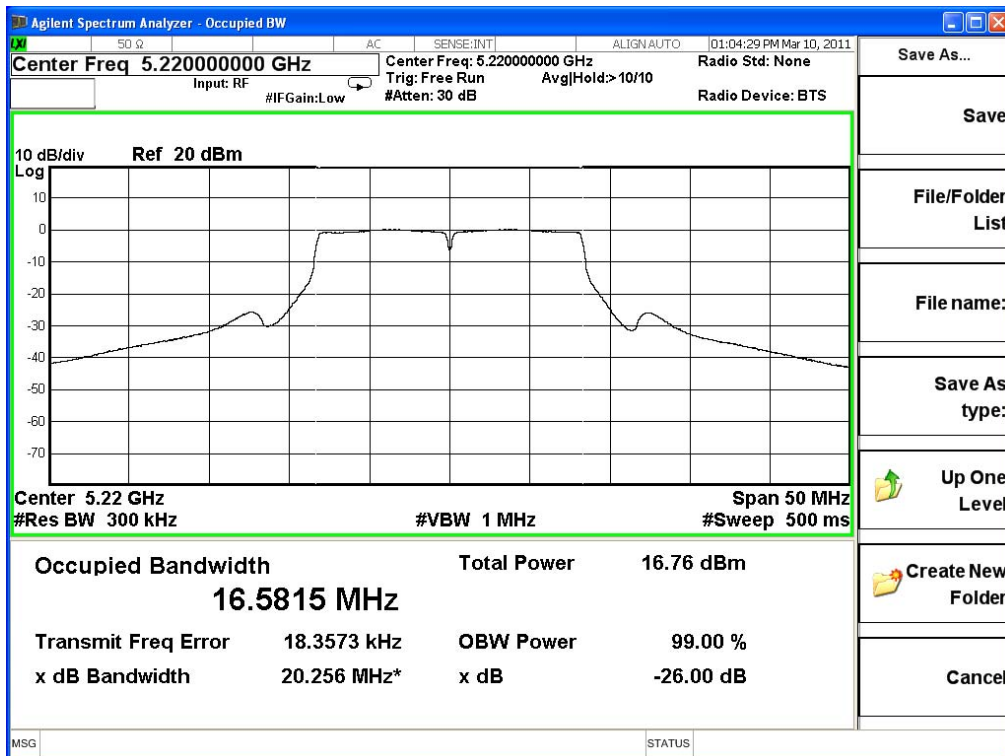
**26dBc Occupied Bandwidth:
Channel 36**



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**

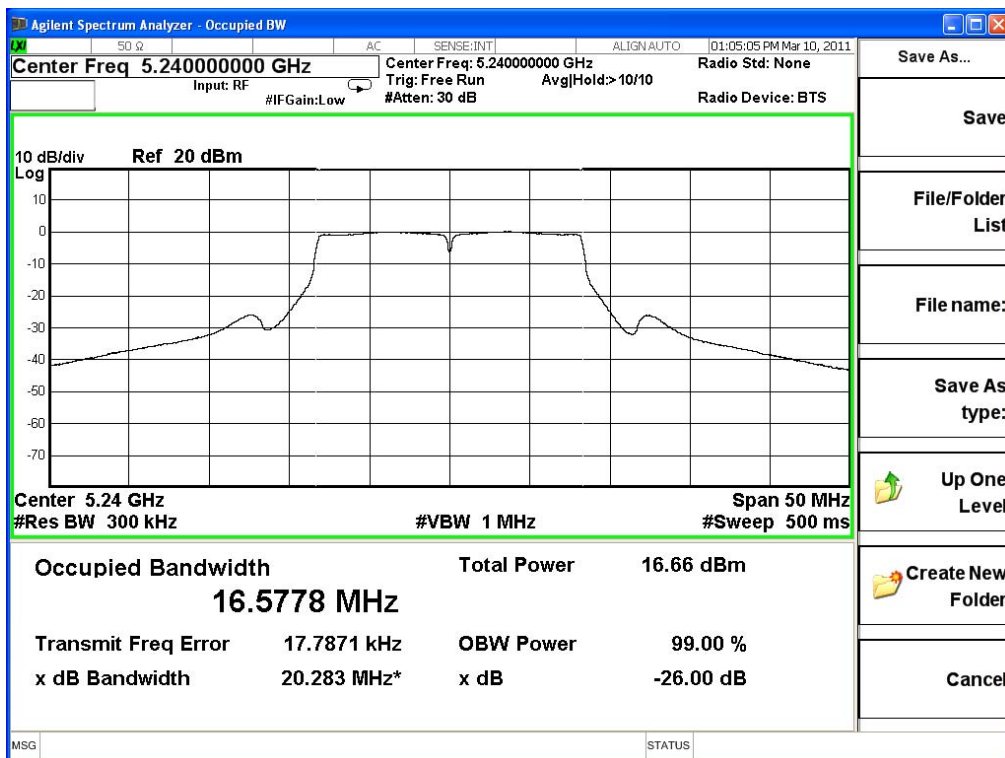


Peak Transmit Power Measurement:

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:

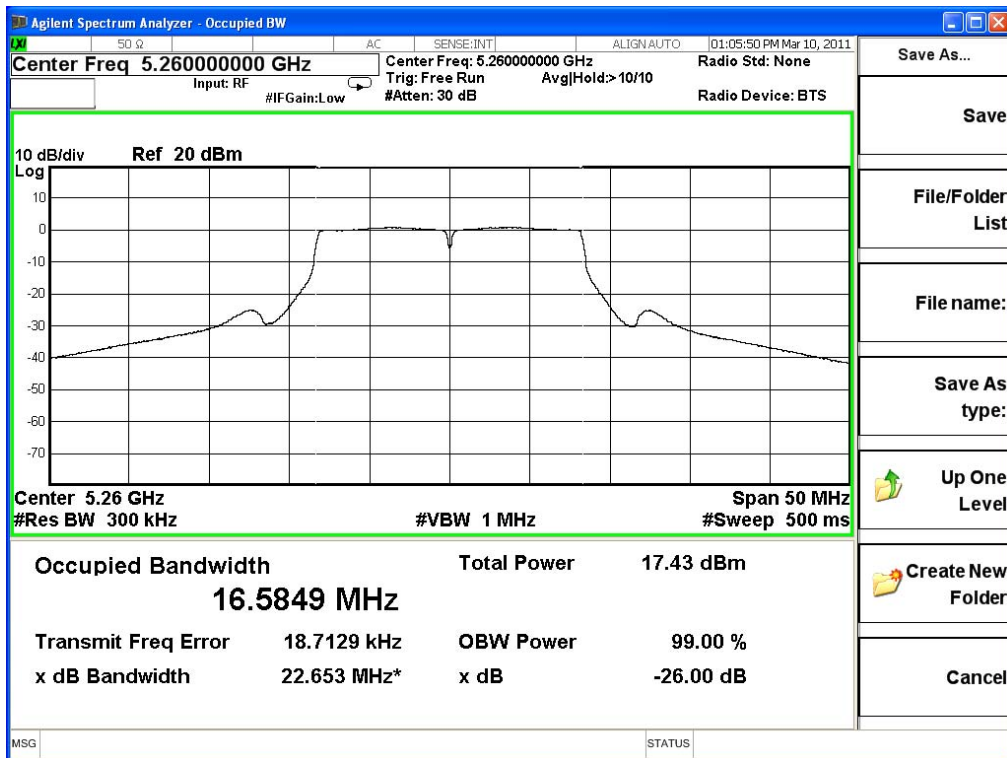
Channel 48



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

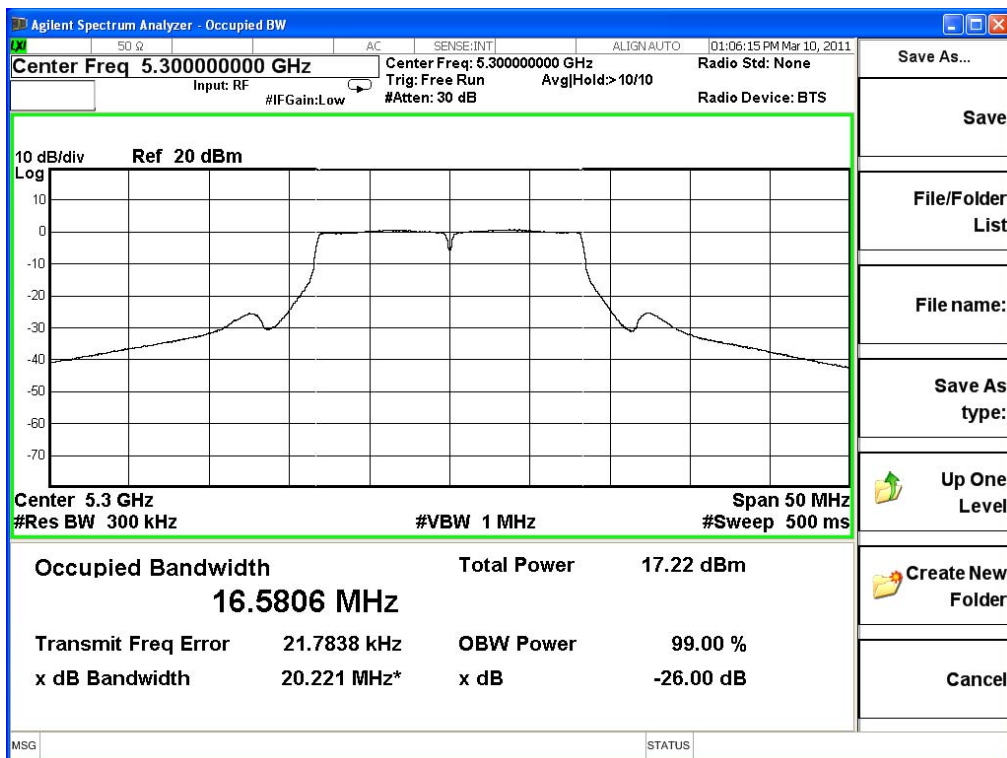
**26dBc Occupied Bandwidth:
Channel 52**



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

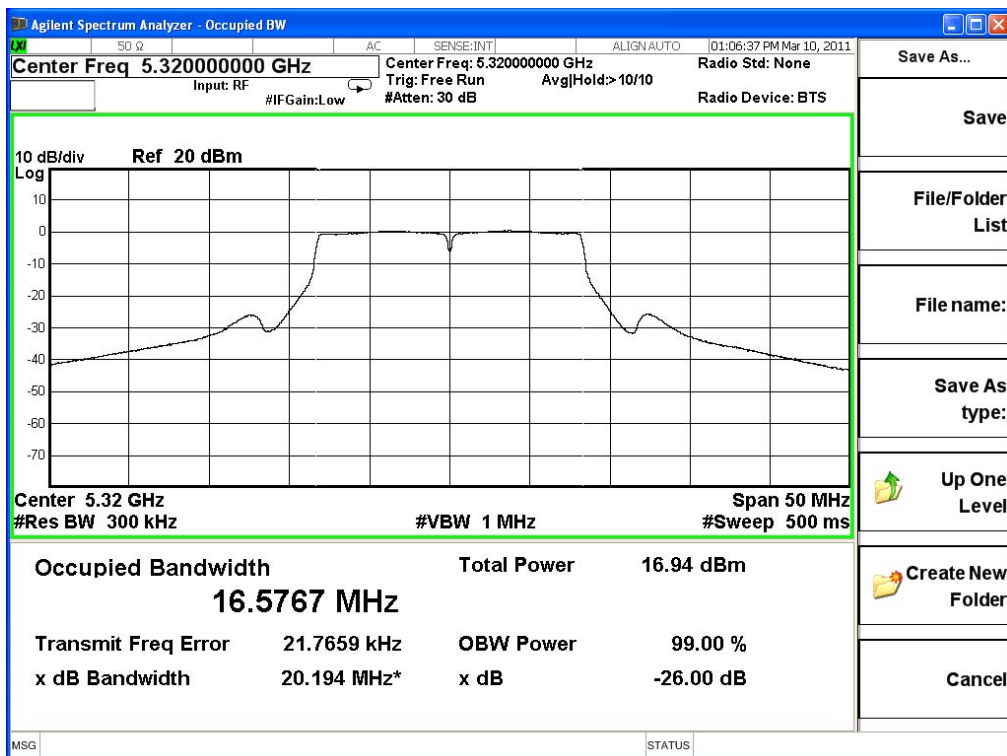
**26dBc Occupied Bandwidth:
Channel 60**



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	20.194	16.61	24	24.05	Pass

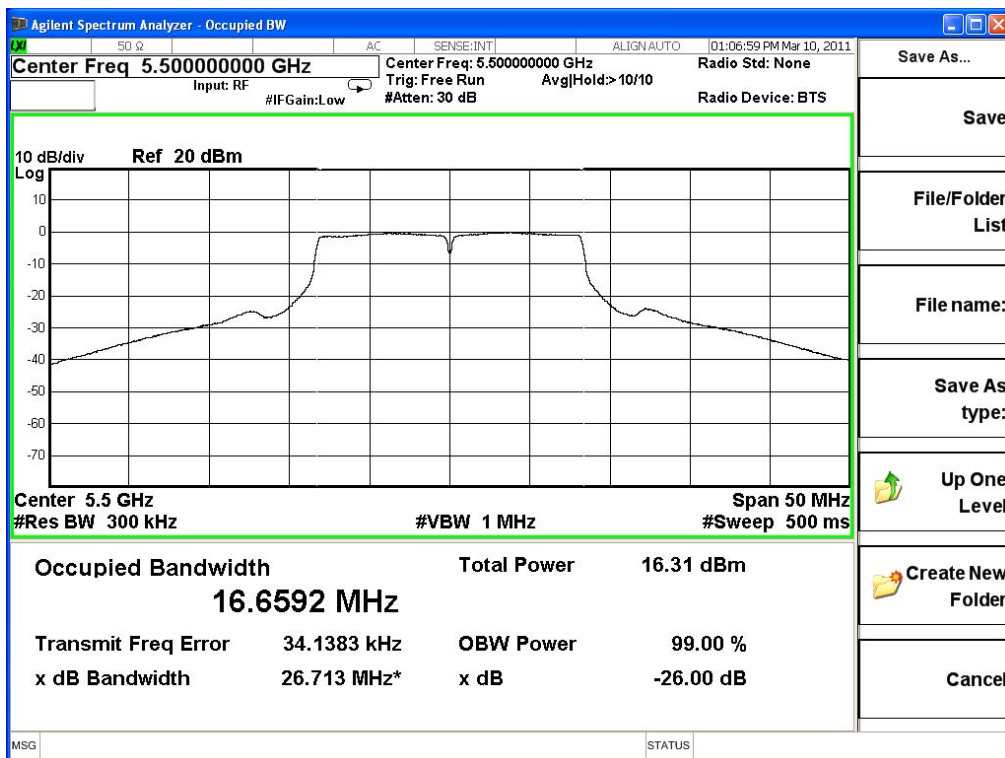
**26dBc Occupied Bandwidth:
Channel 64**



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	26.713	16.83	24	25.27	Pass

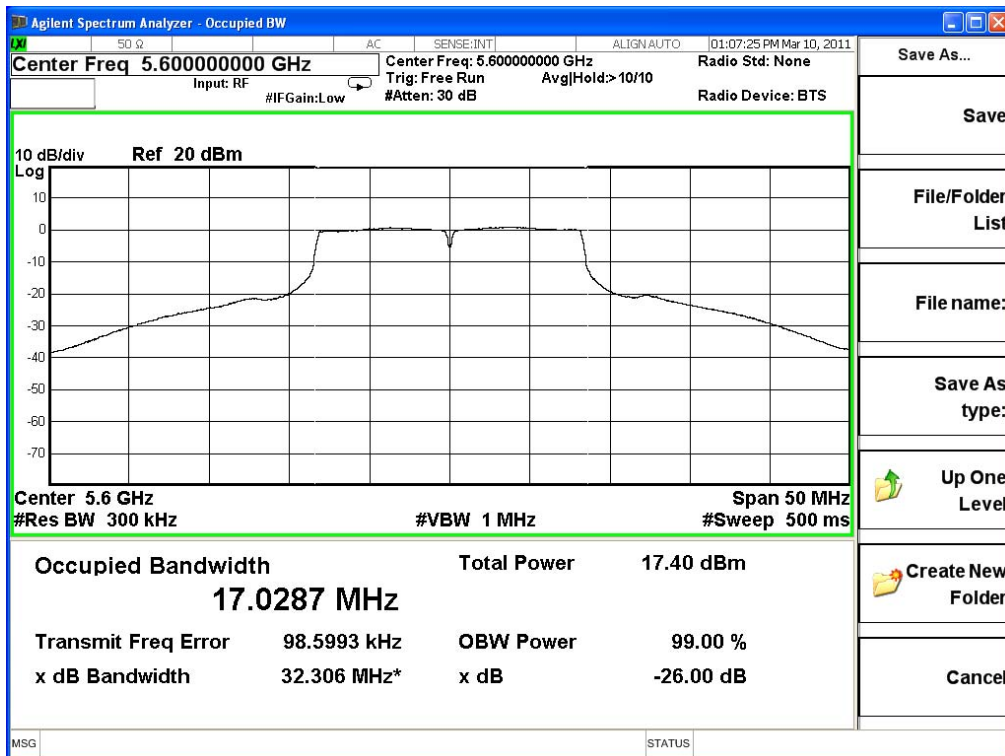
**26dBc Occupied Bandwidth:
Channel 100**



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

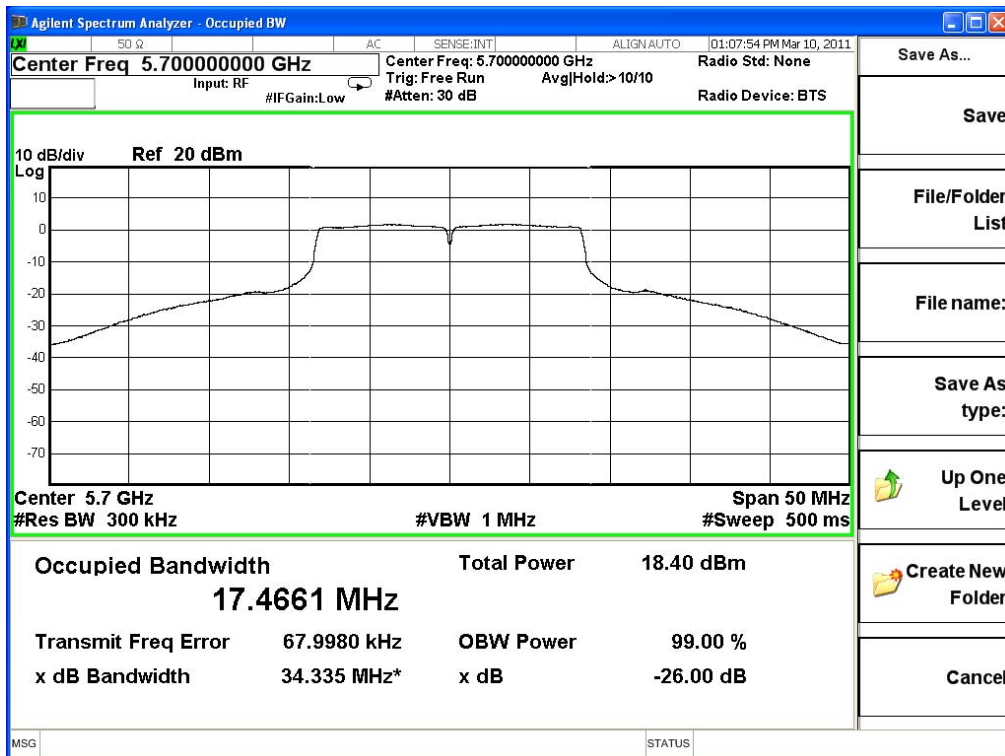
**26dBc Occupied Bandwidth:
Channel 120**



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	16.92	16.72	16.51	16.21	16.02	15.83	15.71	15.53	<17dBm
44	5220	16.62	--	--	--	--	--	--	--	<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	17.72	--	--	--	--	--	--	--	<24dBm
100	5500	16.58	--	--	--	--	--	--	--	<24dBm
120	5600	20.71	--	--	--	--	--	--	--	<24dBm
140	5700	21.15	20.96	20.77	20.52	20.31	20.11	19.98	19.71	<24dBm

Note:

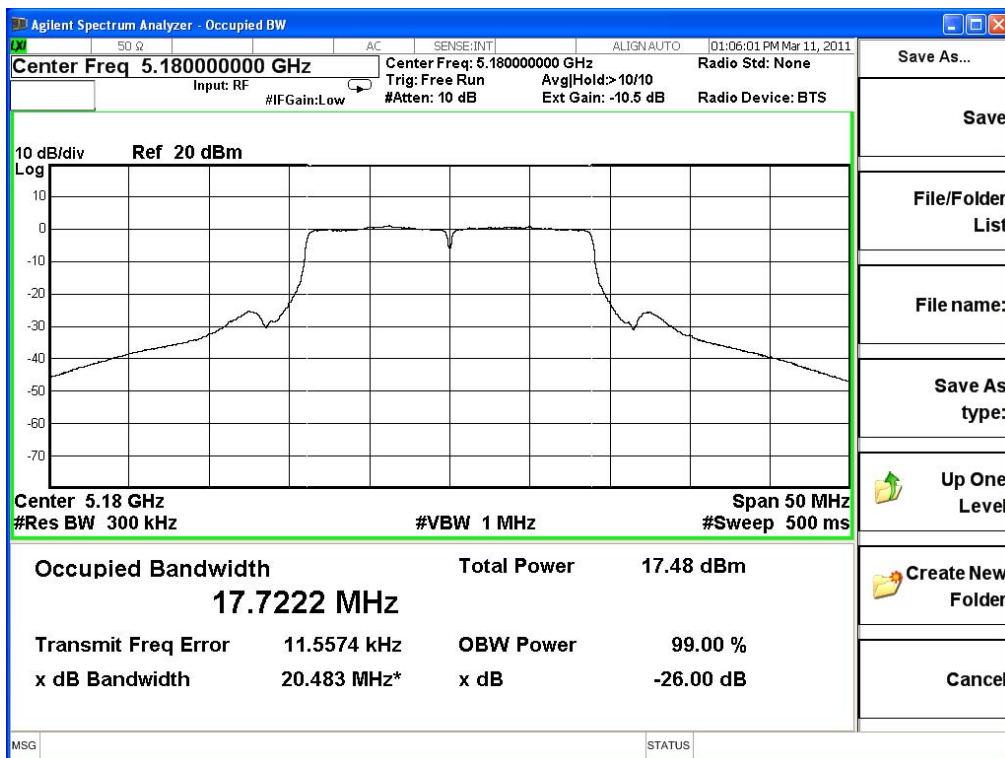
1. Peak Power Output Value = Reading value on peak power meter + cable loss

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	20.483	16.92	17	17.11	Pass

26dBc Occupied Bandwidth:

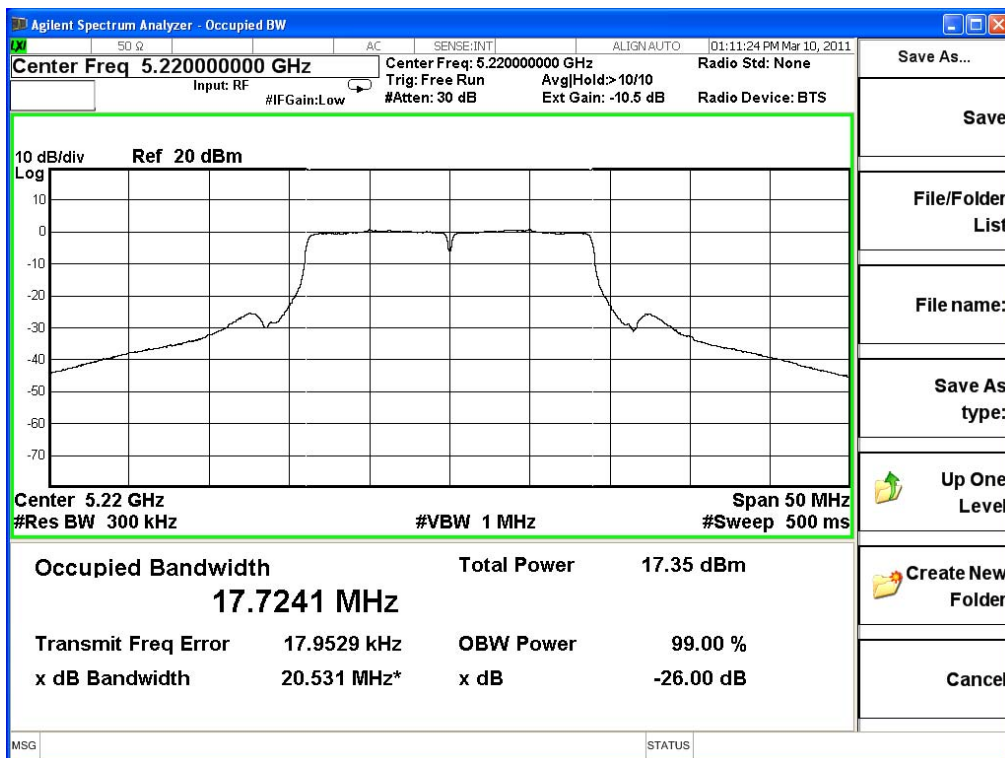
Channel 36



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

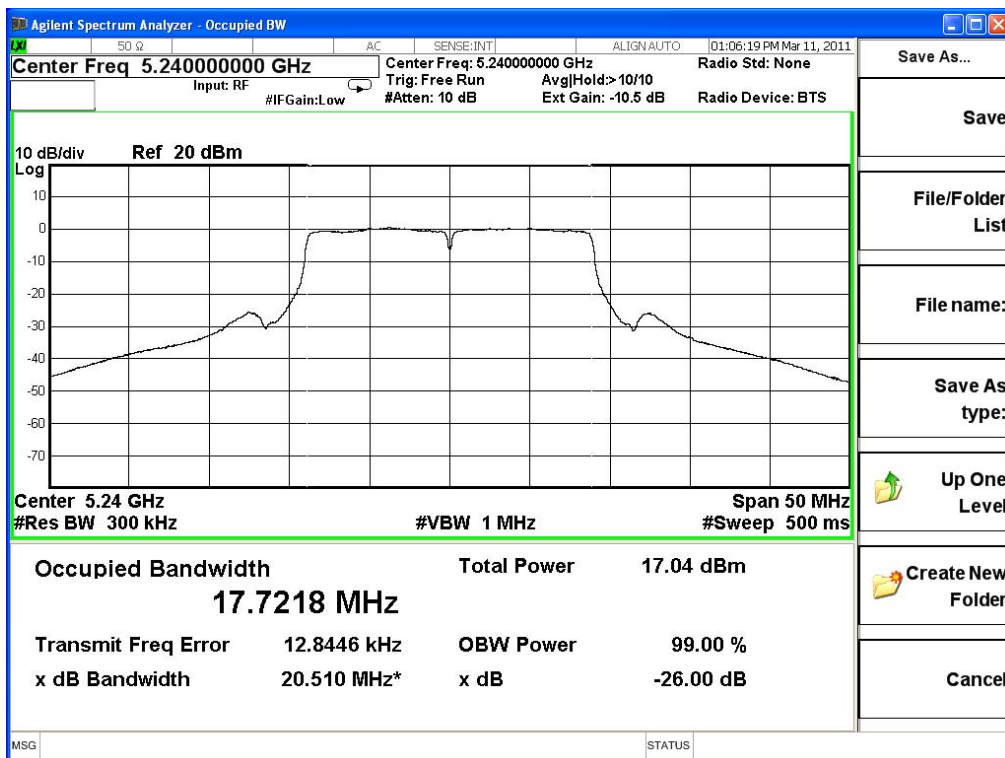
**26dBc Occupied Bandwidth:
Channel 44**



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

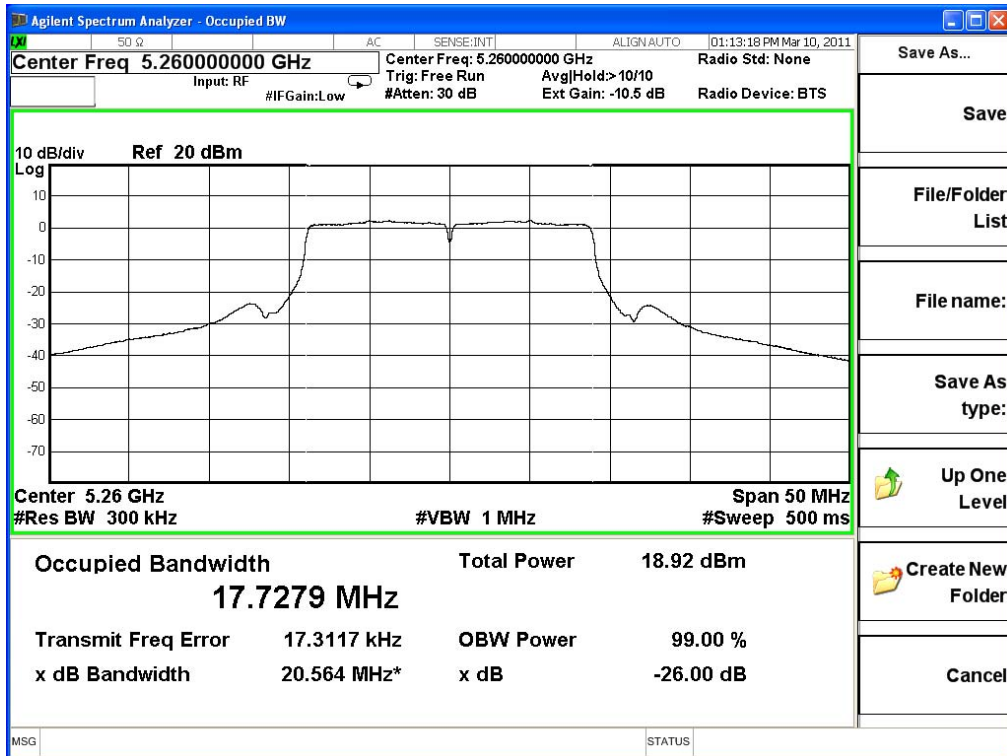
**26dBc Occupied Bandwidth:
Channel 48**



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

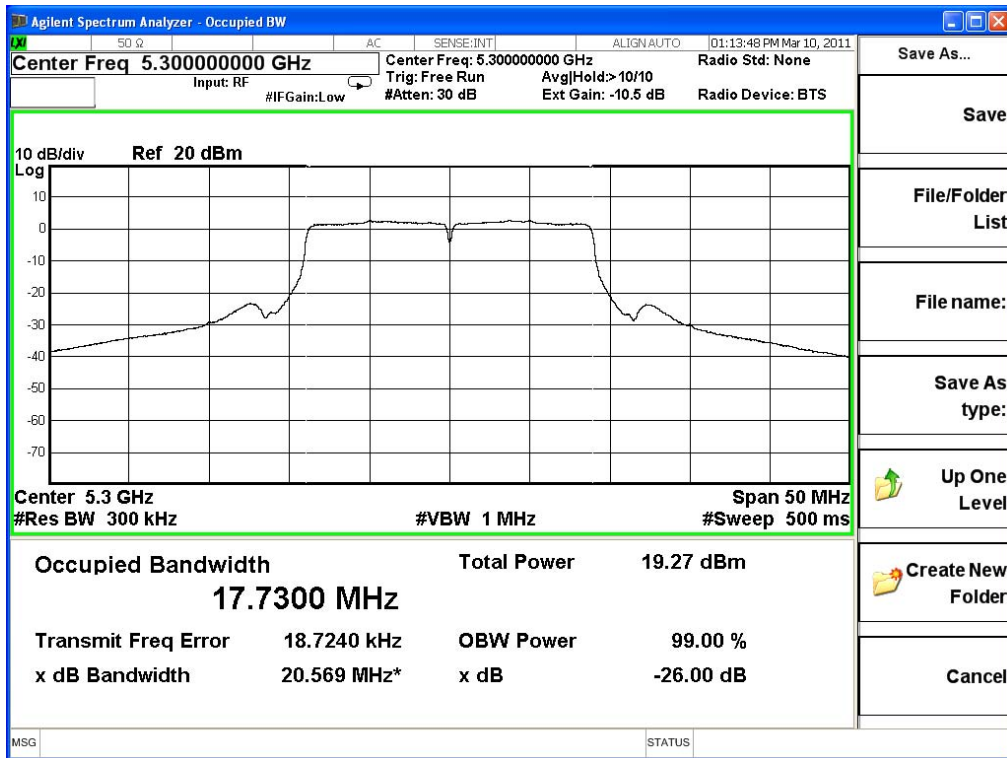
**26dBc Occupied Bandwidth:
Channel 52**



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

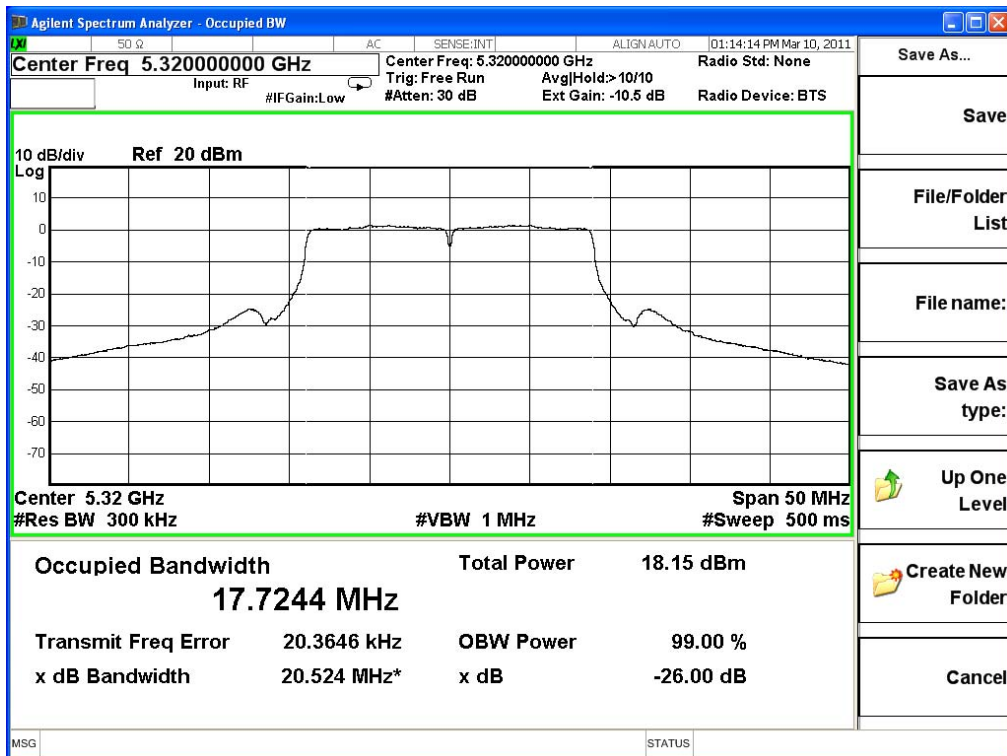
**26dBc Occupied Bandwidth:
Channel 60**



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	20.524	17.72	24	24.12	Pass

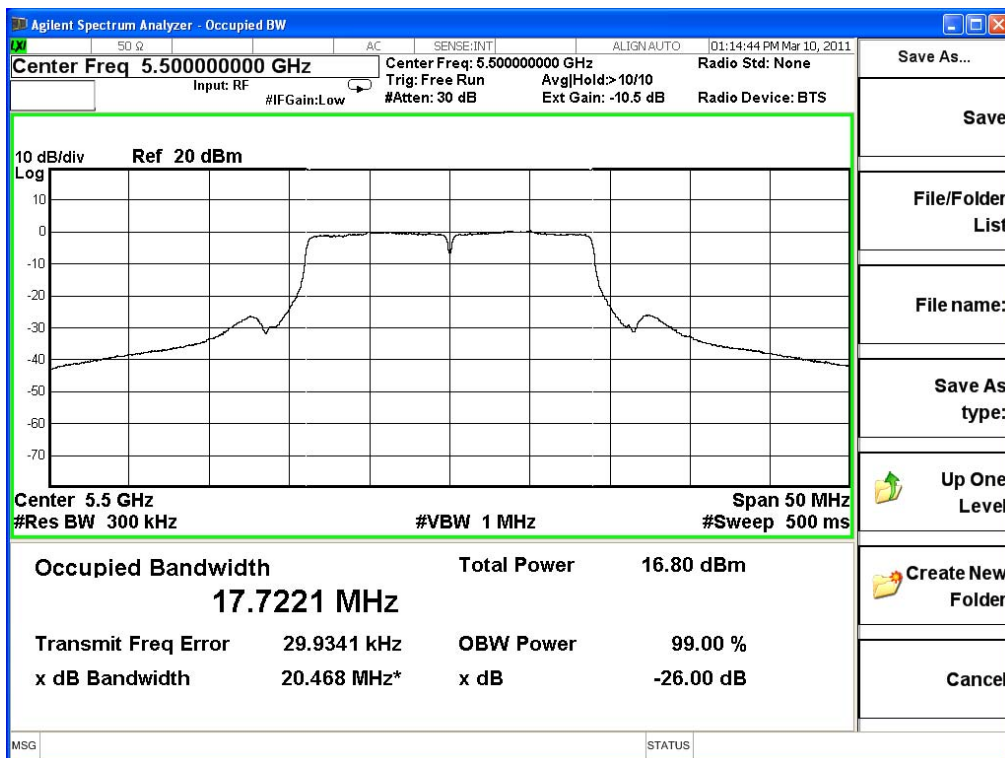
**26dBc Occupied Bandwidth:
Channel 64**



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	20.468	16.58	24	24.11	Pass

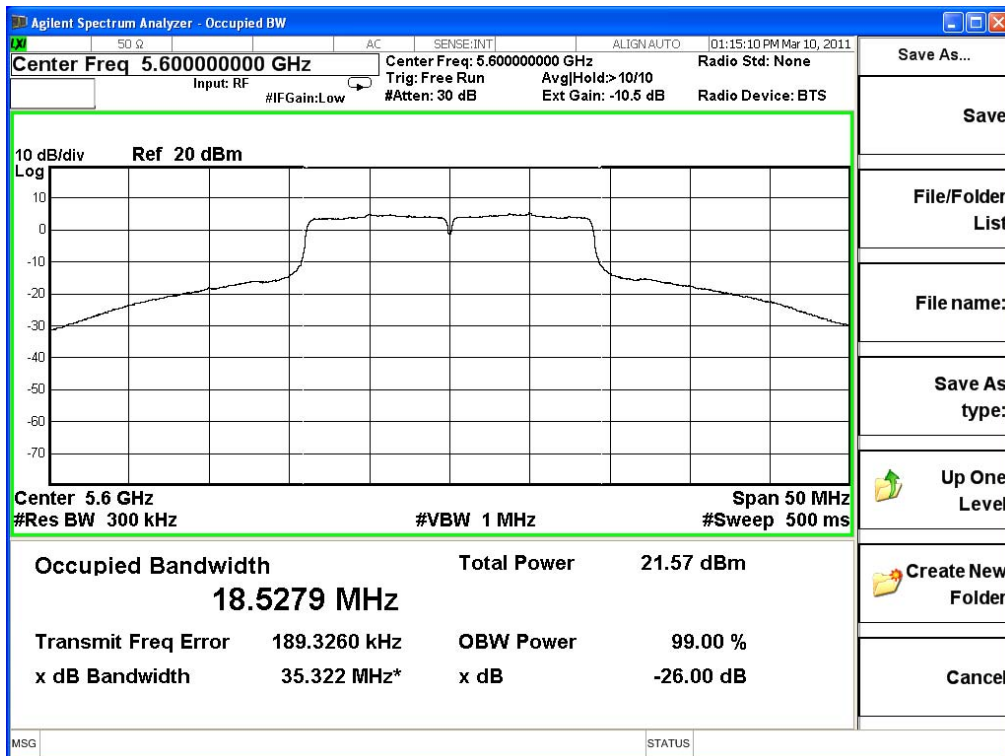
**26dBc Occupied Bandwidth:
Channel 100**



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

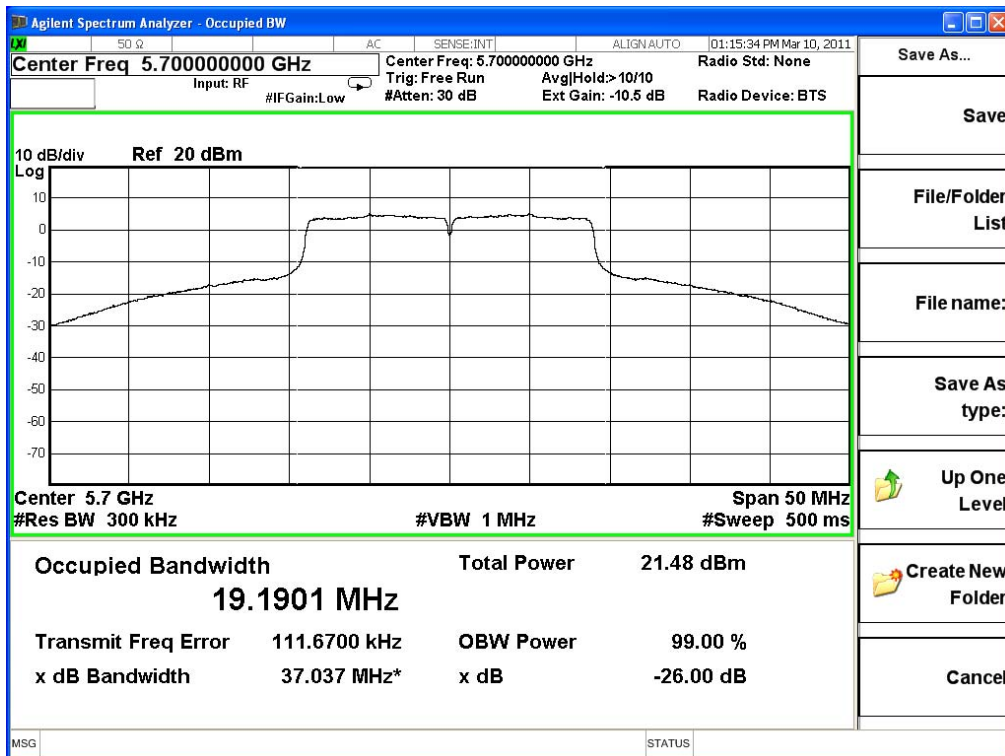
**26dBc Occupied Bandwidth:
Channel 120**



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	37.037	21.15	24	26.69	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	14.05	--	--	--	--	--	--	--	<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	14.04	--	--	--	--	--	--	--	<24dBm
102	5510	13.71	--	--	--	--	--	--	--	<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

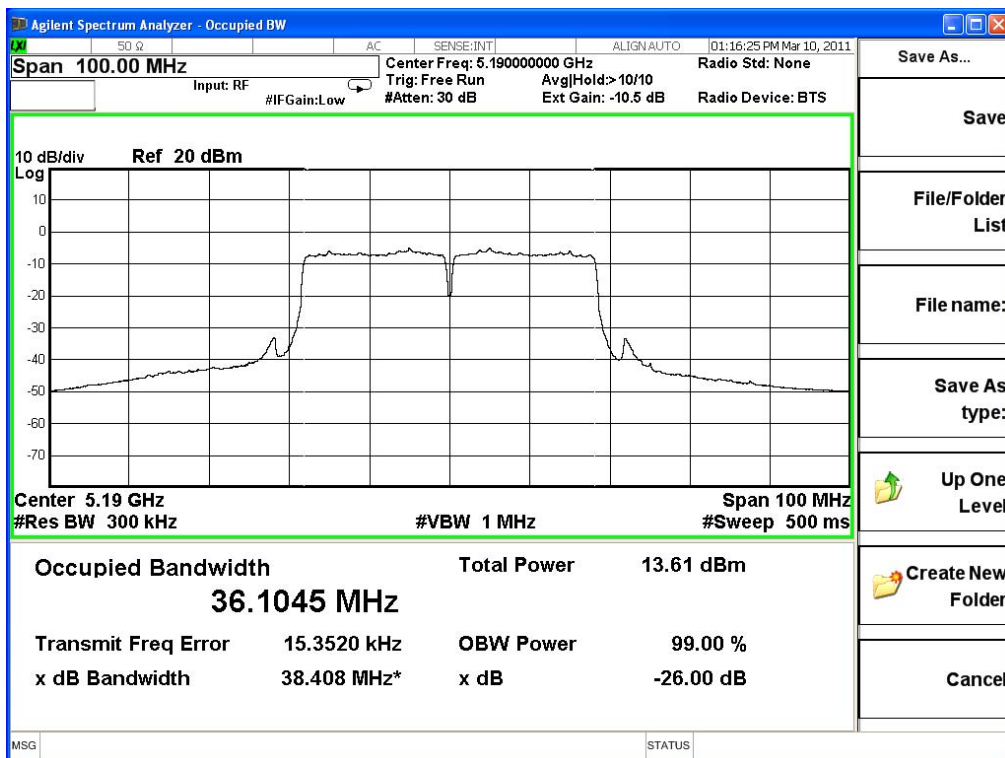
Note:

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	38.408	14.05	17	19.84	Pass

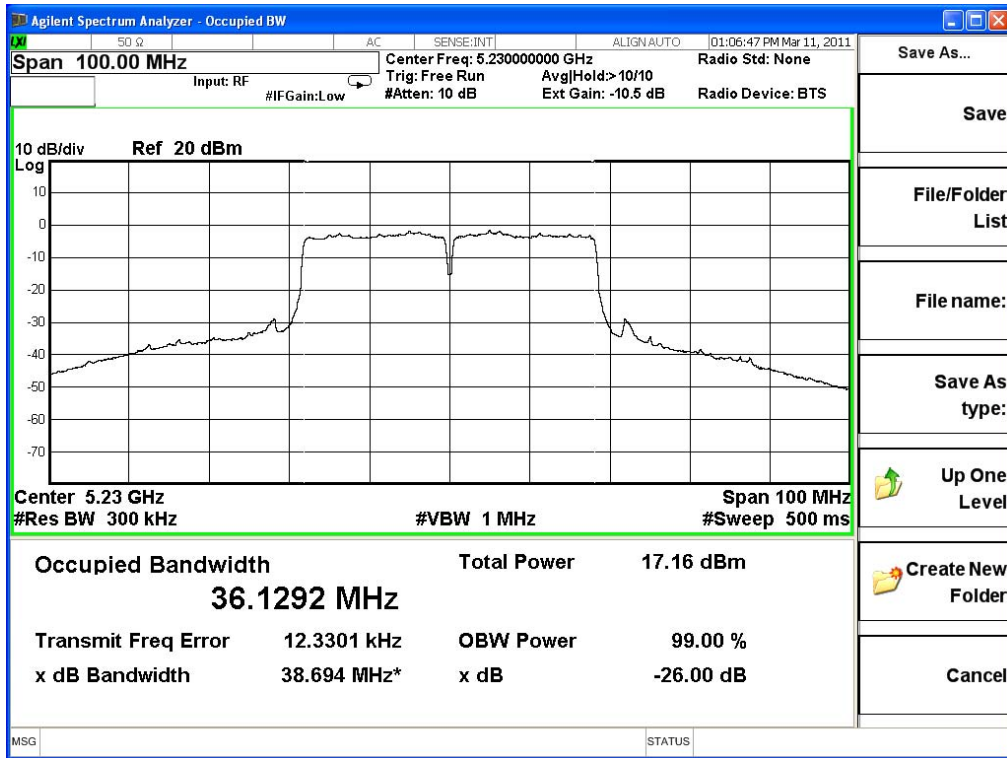
**26dBc Occupied Bandwidth:
Channel 38**



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

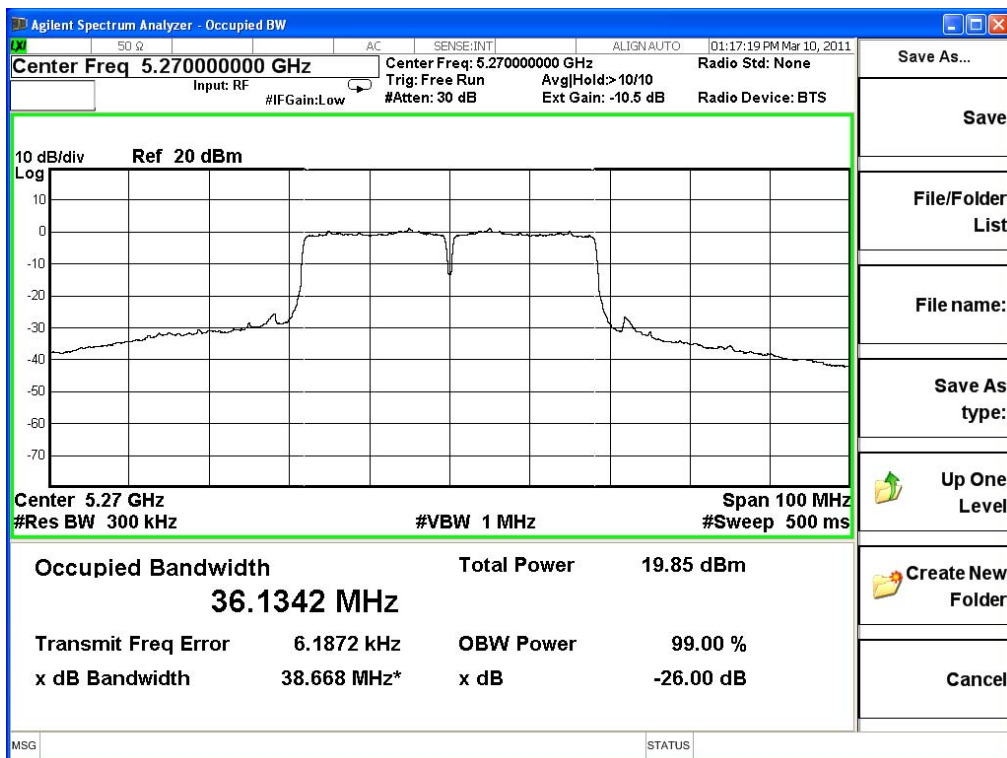
**26dBc Occupied Bandwidth:
Channel 46**



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

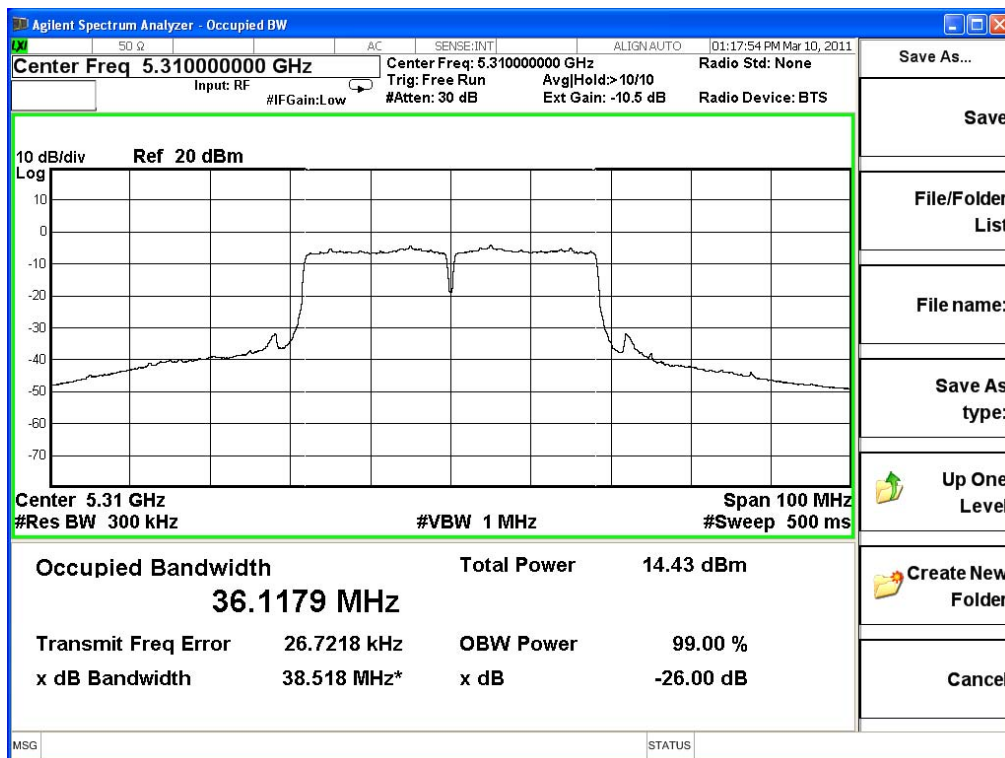
**26dBc Occupied Bandwidth:
Channel 54**



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	35.518	14.04	24	26.50	Pass

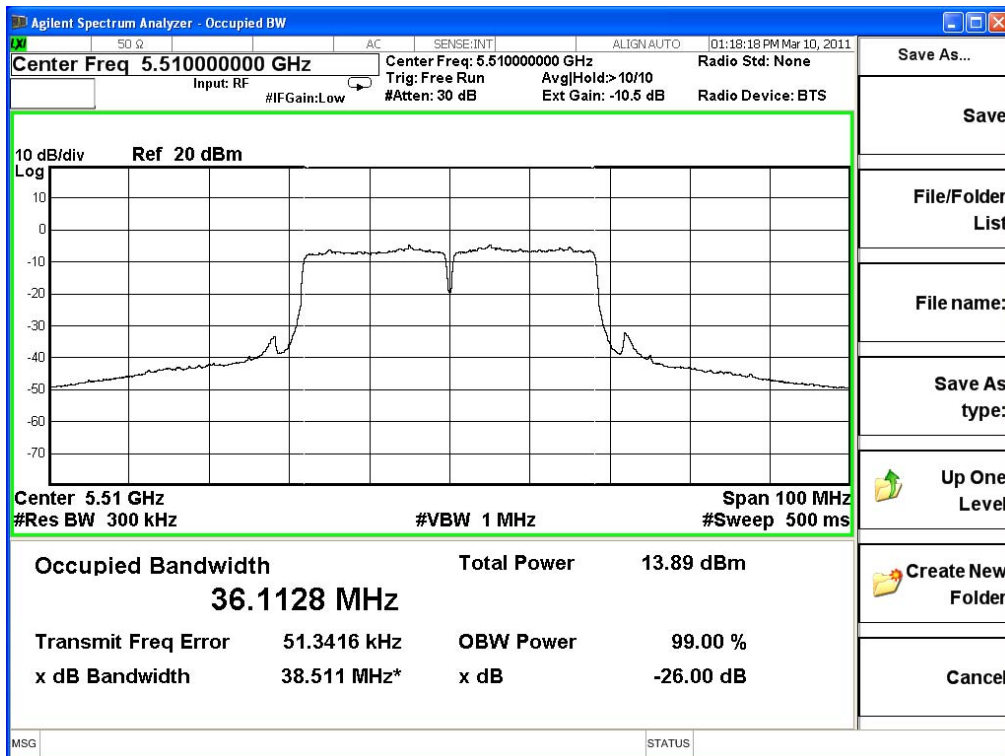
**26dBc Occupied Bandwidth:
Channel 62**



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	38.511	13.71	24	26.86	Pass

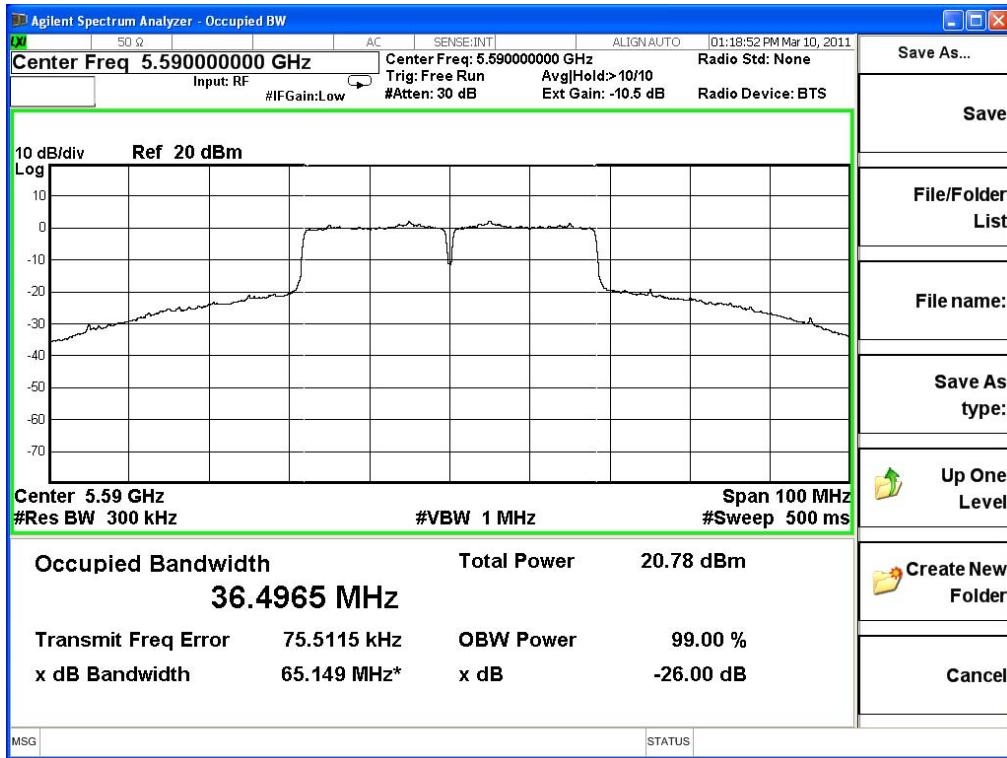
**26dBc Occupied Bandwidth:
Channel 102**



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

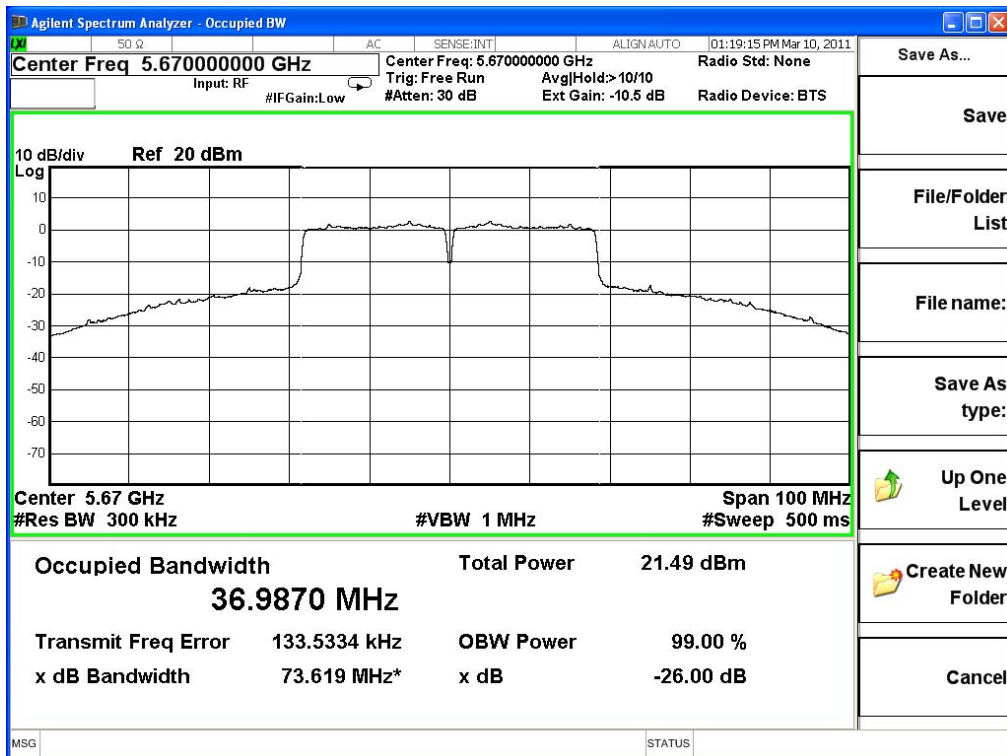
**26dBc Occupied Bandwidth:
Channel 118**



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

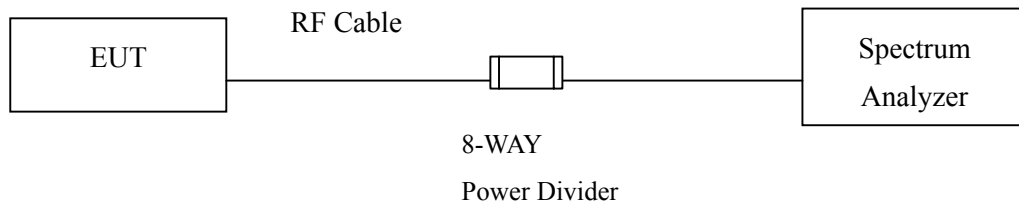
4.1. Test Equipment

	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

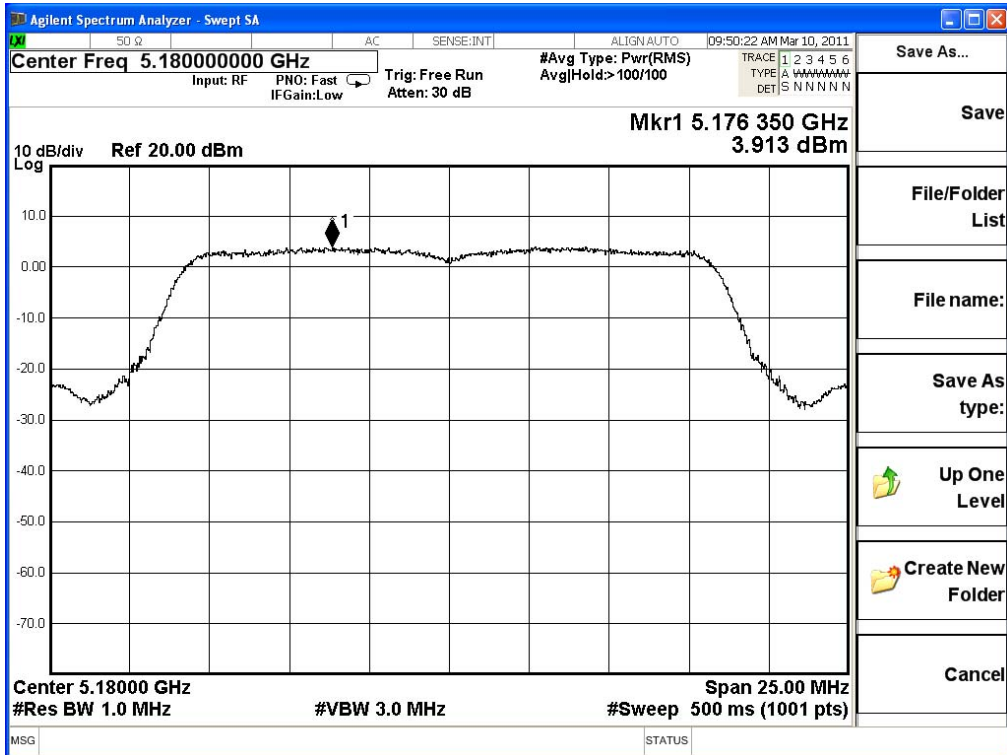
± 1.27 dB

4.6. Test Result of Peak Power Spectral Density

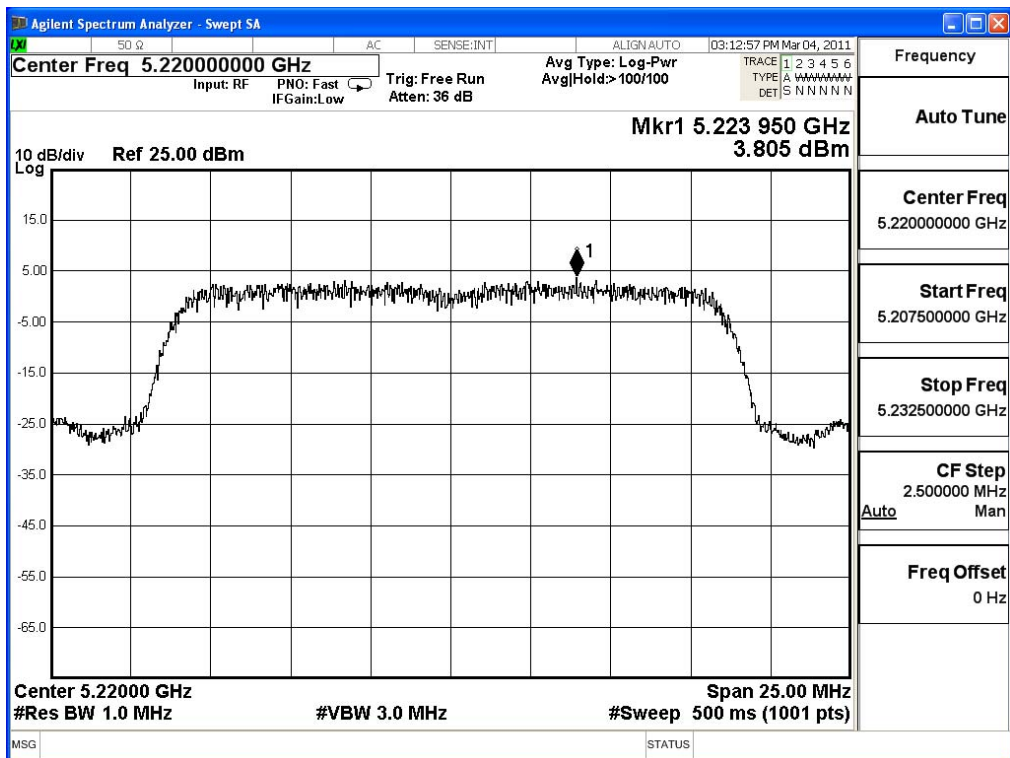
Product : 802.11 a/b/g/n module
Test Item : Peak Power Spectral Density
Test Site : No.3 OATS
Test Mode : Mode 1: Transmit (802.11a-6Mbps)

Channel No.	Frequency (MHz)	Measurement Level (dBm)	Required Limit (dBm)	Result
36	5180	3.913	<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	3.418	<11	Pass
100	5500	2.843	<11	Pass
120	5600	5.288	<11	Pass
140	5700	4.896	<11	Pass

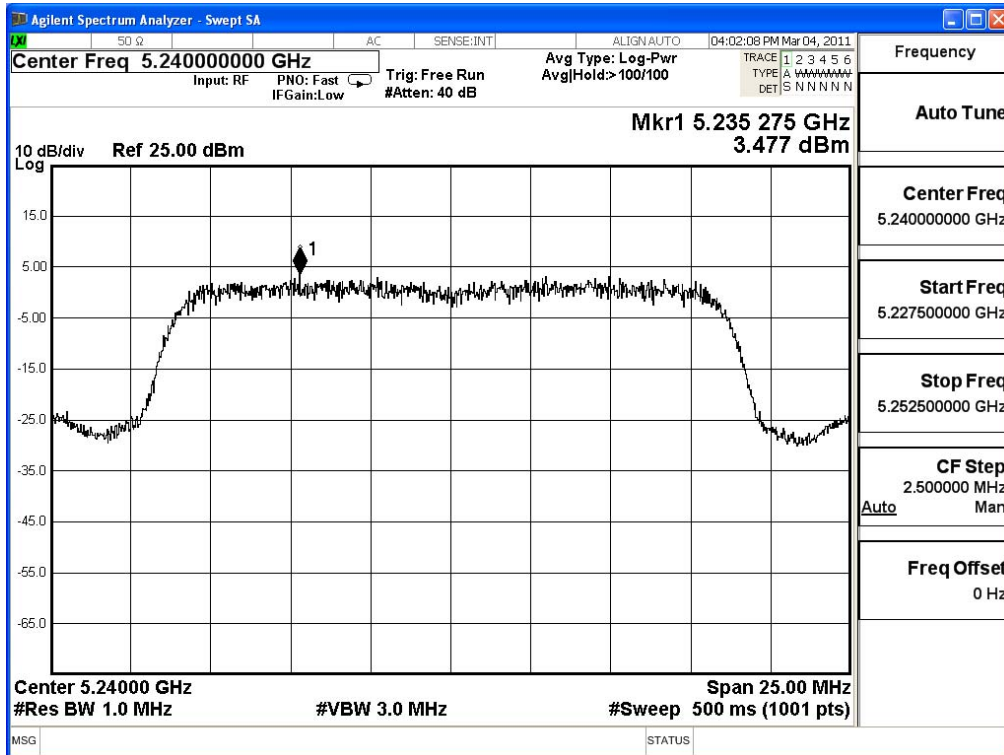
Channel 36:



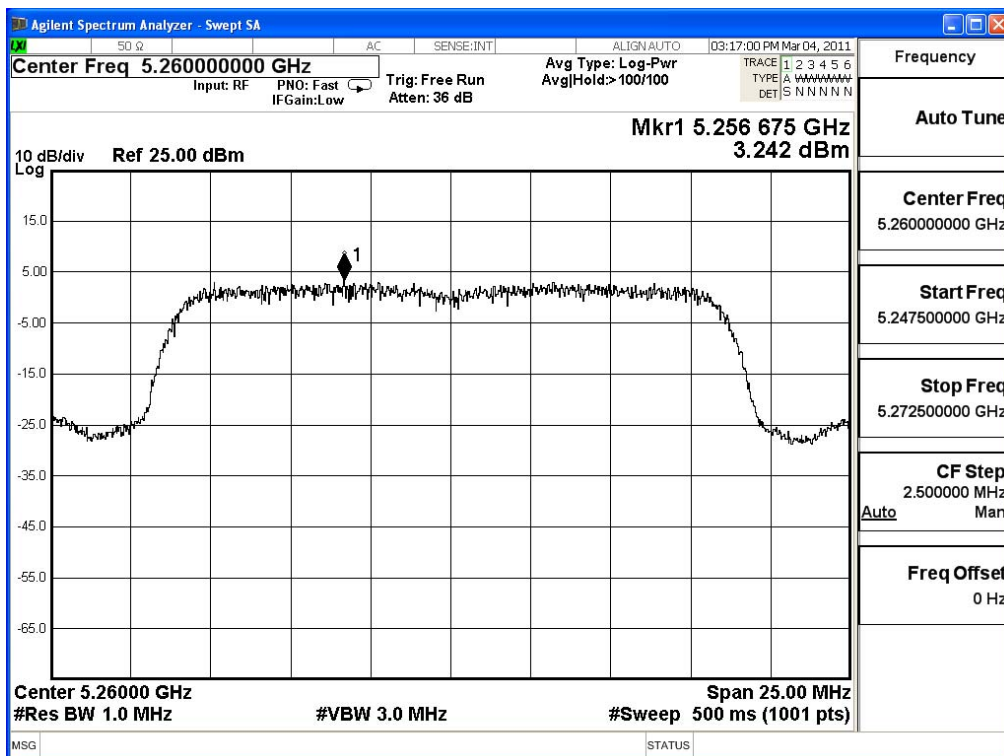
Channel 44:



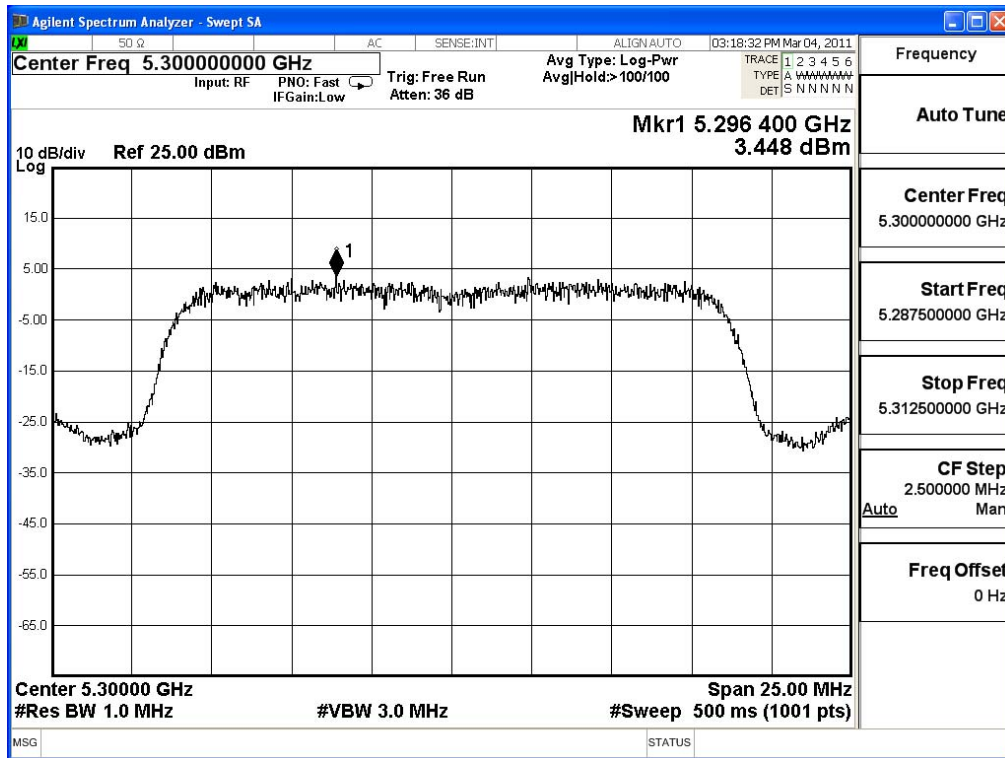
Channel 48:



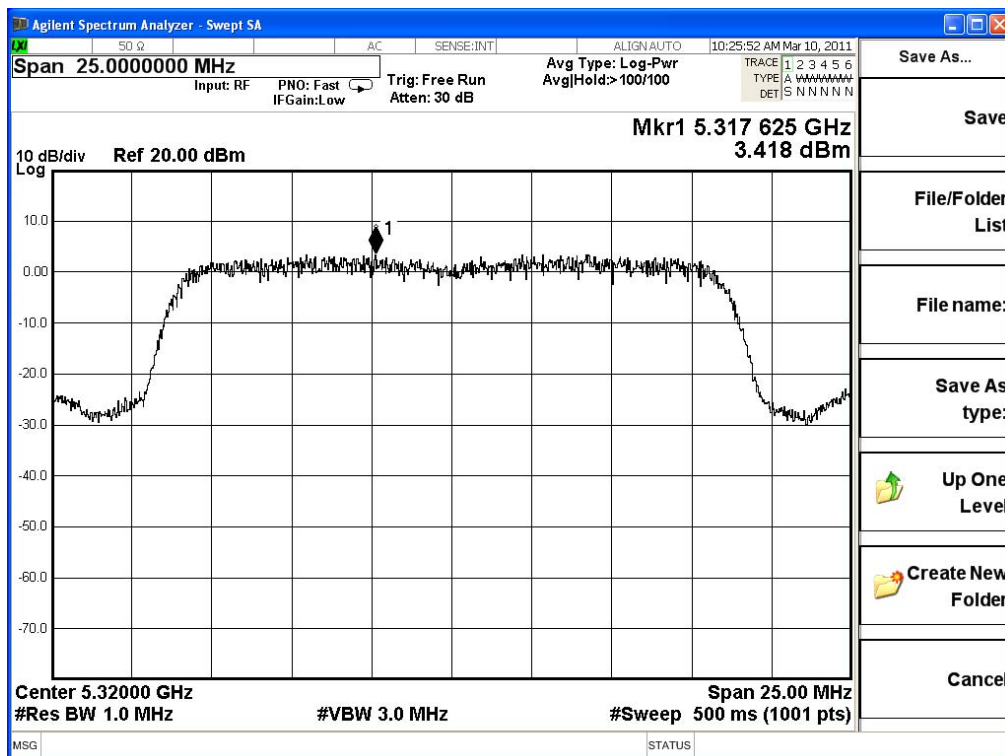
Channel 52:



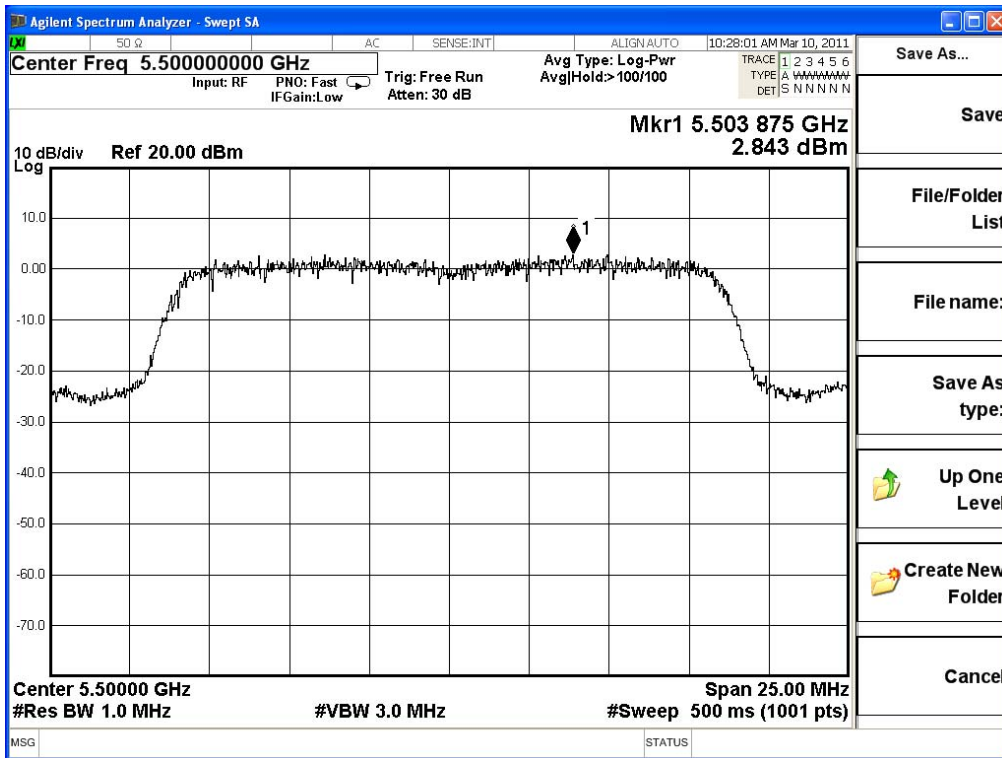
Channel 60:



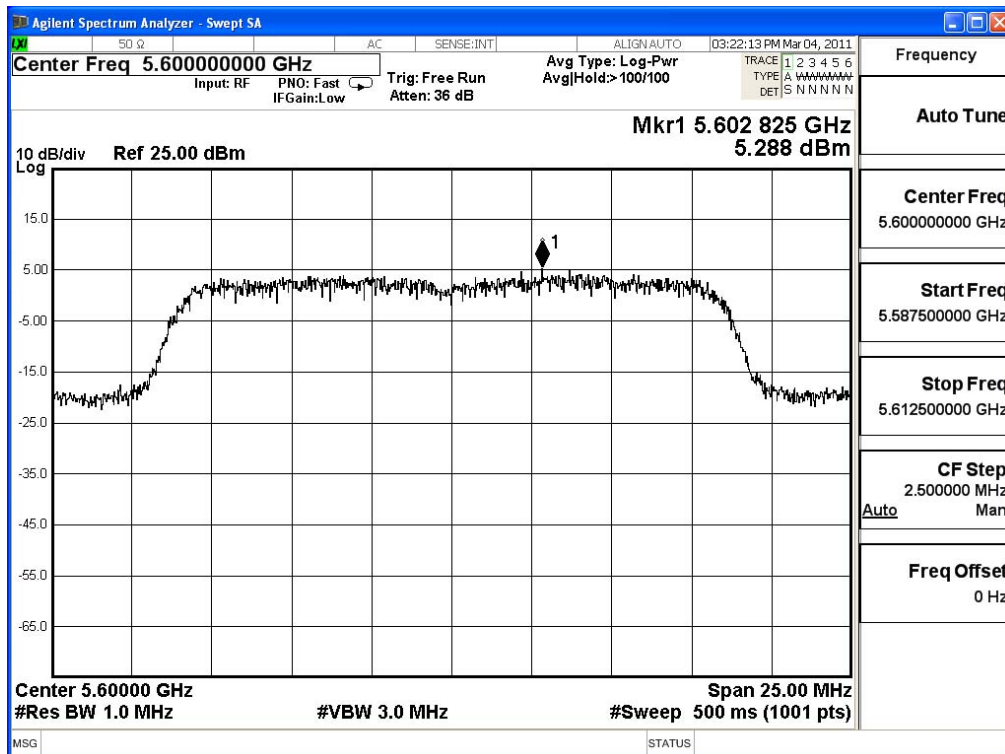
Channel 64:



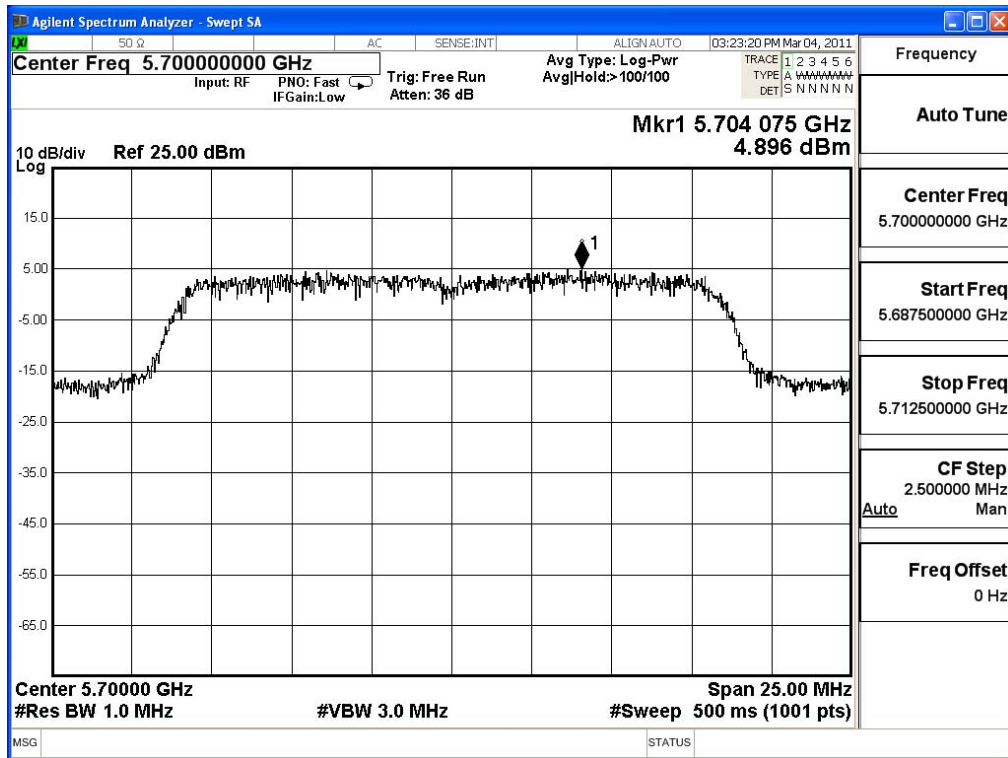
Channel 100:



Channel 120:



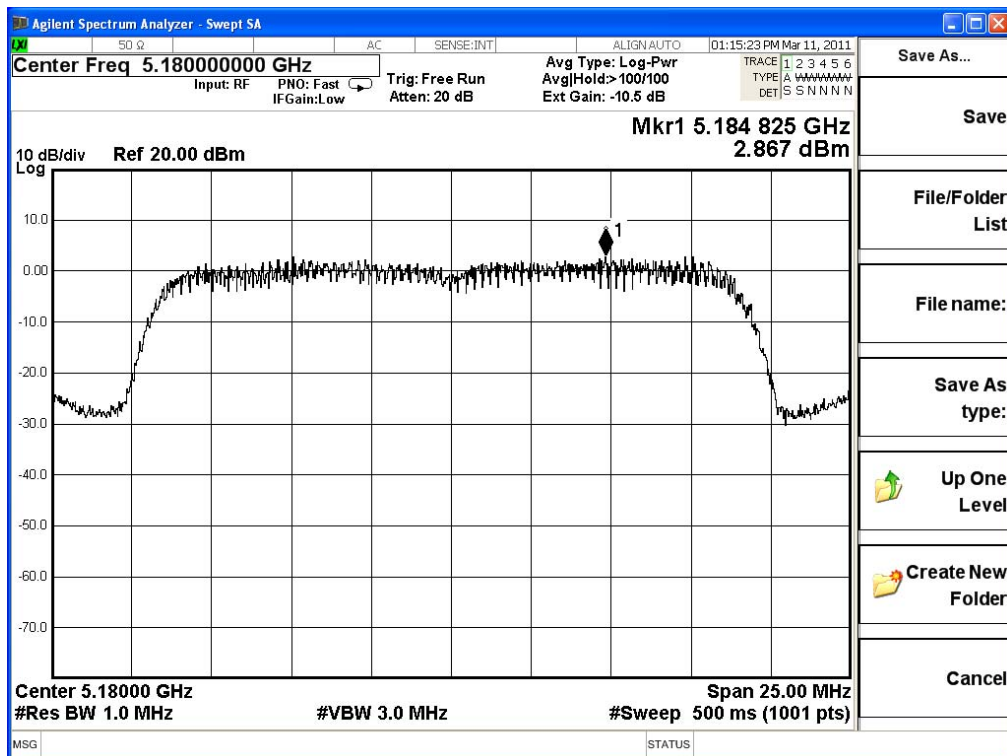
Channel 140:



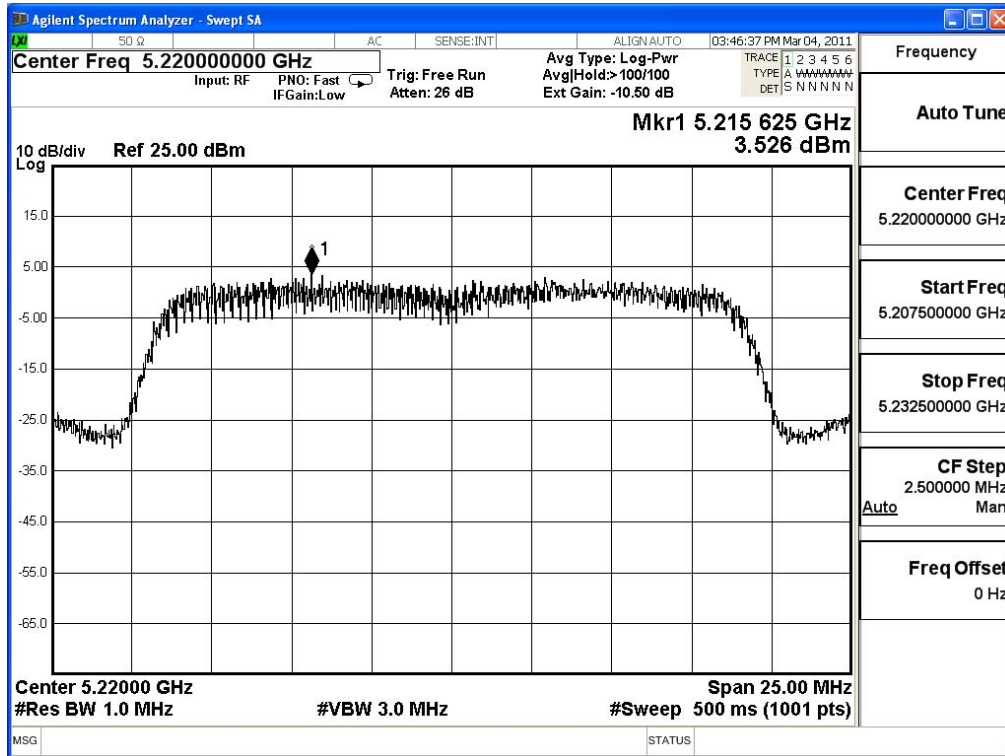
Product : 802.11 a/b/g/n module
 Test Item : Peak Power Spectral Density
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmit (802.11n-20BW 14.4Mbps)

Channel No.	Frequency (MHz)	Measurement Level (dBm)	Required Limit (dBm)	Result
36	5180	2.867	<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	3.601	<11	Pass
100	5500	3.168	<11	Pass
120	5600	7.253	<11	Pass
140	5700	6.966	<11	Pass

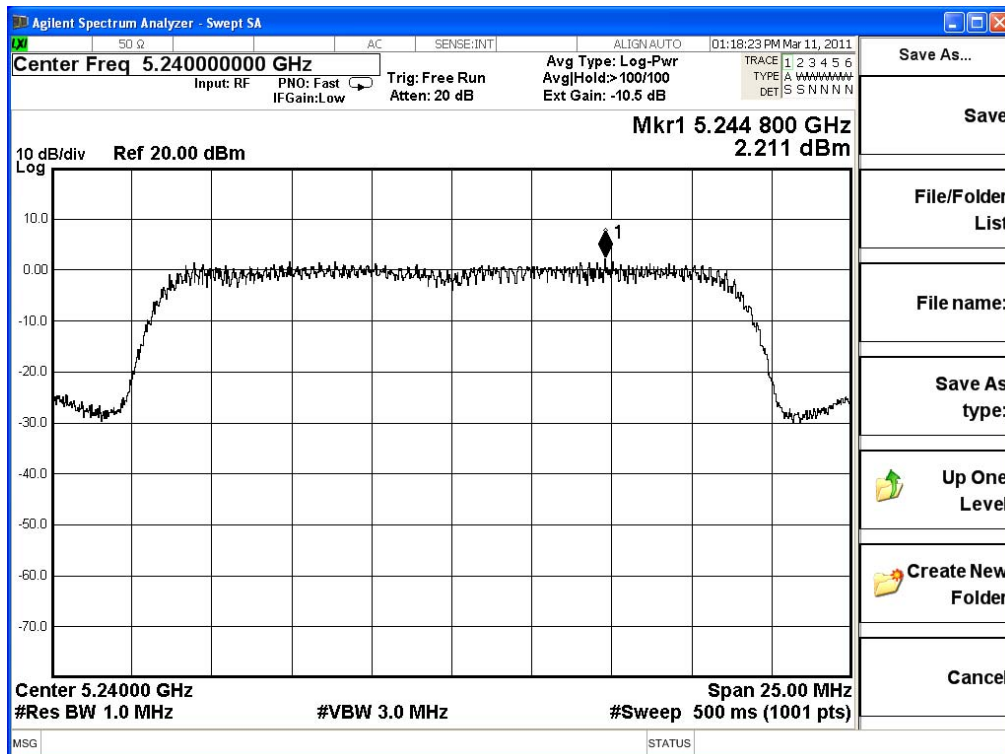
Channel 36:



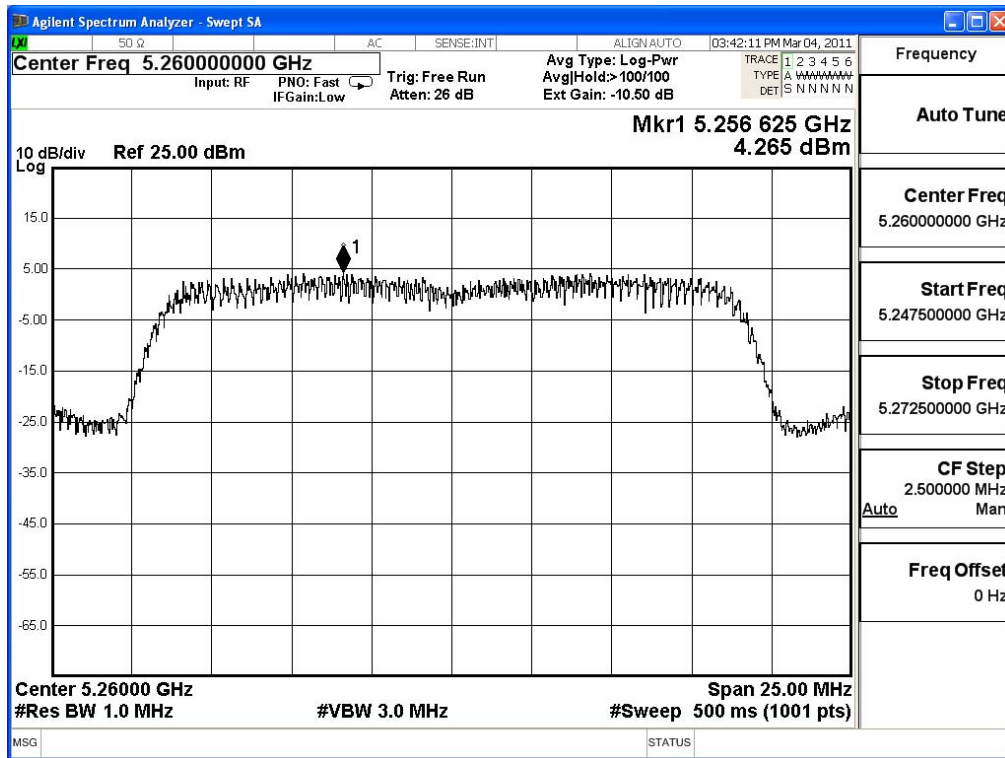
Channel 44:



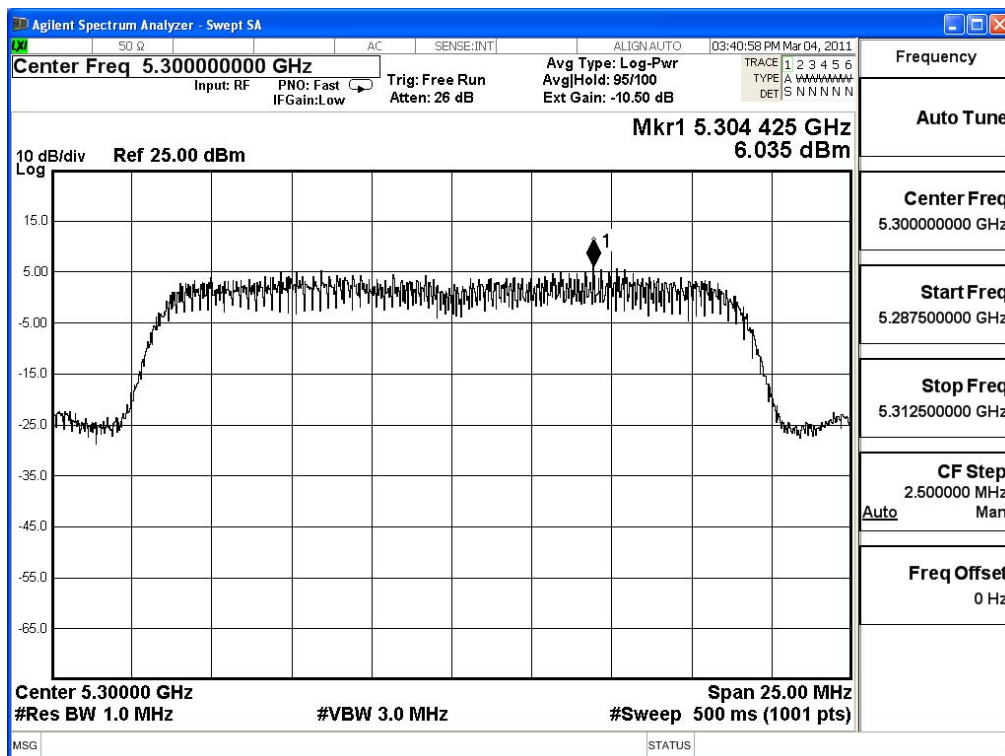
Channel 48:



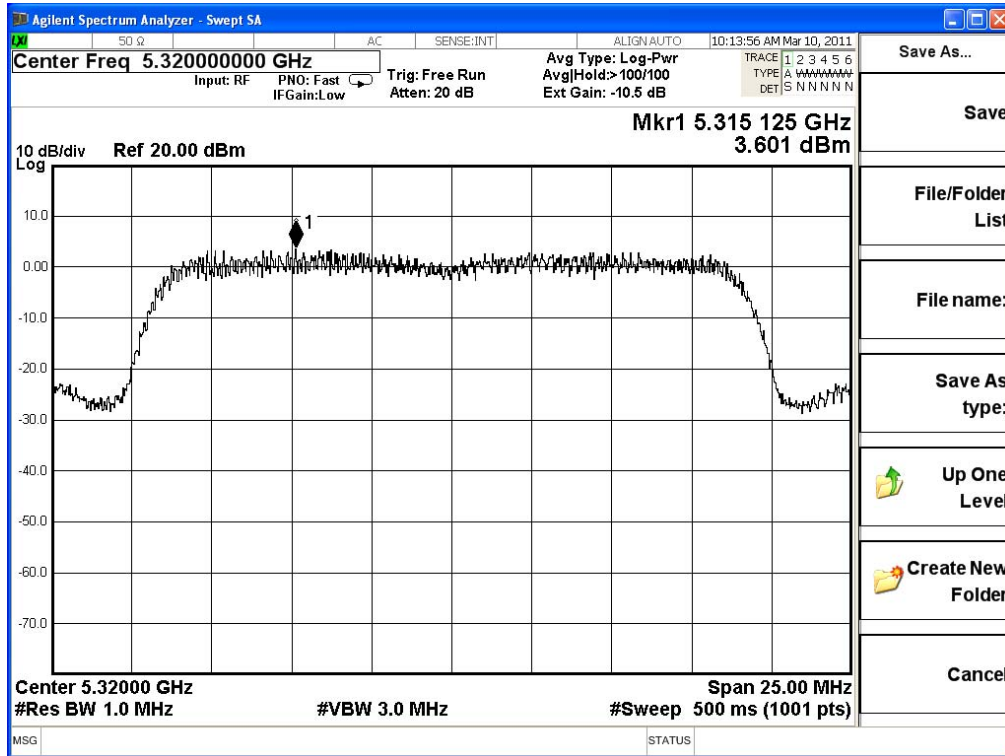
Channel 52:



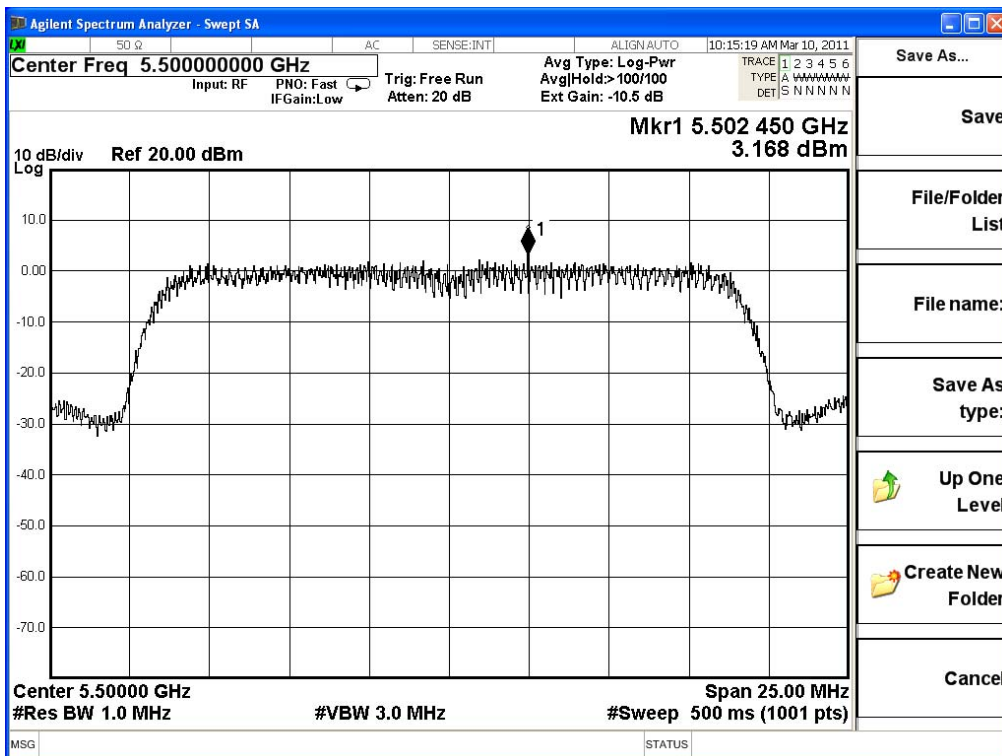
Channel 60:



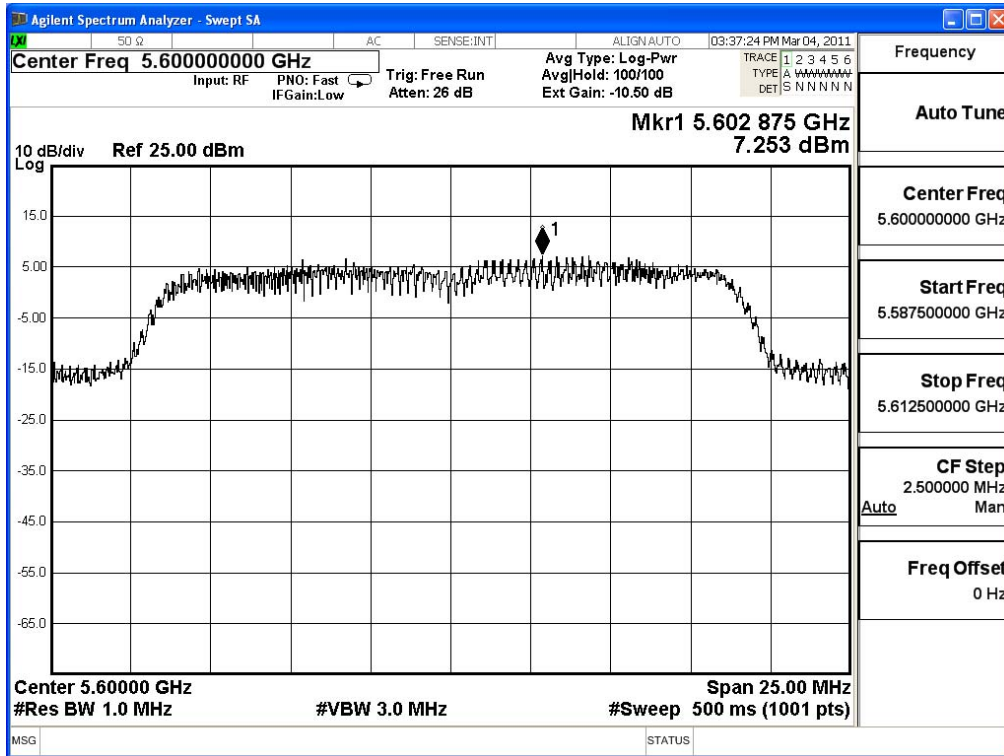
Channel 64:



Channel 100:



Channel 120:



Channel 140:

