



Test Report

(Class II Permissive Change)

Product Name	Intel® Centrino® Advanced-N 6230
Model No	62230ANHMW
FCC ID	PD962230ANH

Applicant	Intel Corporation
Address	100 Center Point Circle Suite 200 Columbia, SC 29210

Date of Receipt	Feb. 24, 2012
Issued Date	Mar. 22, 2012
Report No.	122428R-RFUSP31V01
Report Version	V1.0



The test results relate only to the samples tested.

The test report shall not be reproduced except in full without the written approval of Quietek Corporation.
This report must not be used to claim product endorsement by NVLAP any agency of the U.S. Government

Test Report Certification

Issued Date: Mar. 22, 2012

Report No.: 122428R-RFUSP31V01




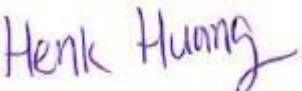
Product Name	Intel® Centrino® Advanced-N 6230
Applicant	Intel Corporation
Address	100 Center Point Circle Suite 200 Columbia, SC 29210
Manufacturer	Intel Corporation
Model No.	62230ANHMW
FCC ID.	PD962230ANH
EUT Rated Voltage	DC 3.3V (via Mini-PCI Express slot)
EUT Test Voltage	AC 120V/ 60Hz
Trade Name	Intel
Applicable Standard	FCC CFR Title 47 Part 15 Subpart E: 2010 ANSI C63.4: 2003
Test Result	Complied

The Test Results relate only to the samples tested.

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

This report must not be used to claim product endorsement by NVLAP any agency of the U.S. Government

Documented By : 
 (Adm. Specialist / Joanne Lin)

Tested By : 
 (Engineer / Henk Huang)


Approved By : 
 (Manager / Vincent Lin)

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1. GENERAL INFORMATION

1.1. EUT Description

Product Name	Intel® Centrino® Advanced-N 6230
Trade Name	Intel
FCC ID.	PD962230ANH
Model No.	62230ANHMW
Frequency Range	802.11a/n-20MHz: 5180-5320MHz, 5500-5700MHz 802.11n-40MHz: 5190-5310, 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	Dipole Antenna
Antenna Gain	Refer to the table "Antenna List"

Antenna List

No.	Manufacturer	Part No.	Peak Gain
1	Air802 + Amphenol + Hirose	Air 802 Antenna: ANRD245X05-RTP Amphenol Connector: 901-10097 Hirose Cable: U.FL-2LP-04N1-A-(100)	0.25 dBi for 5.15~5.35GHz 0.12 dBi for 5.47~5.725GHz

Note:

1. 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						

Note:

1. This device is an Intel® Centrino® Advanced-N 6230 with a built-in 2.4GHz and 5GHz WLAN +Bluetooth transceiver, this report for WLAN.
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. (802.11b is 1Mbps 、802.11g is 6Mbps 、802.11n(20M-BW) is 14.4Mbps and 、802.11n(40M-BW) is 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.
5. This is to request a Class II permissive change for **FCC ID: PD962230ANH**, originally granted on **10/21/2010**.

The major change filed under this application is:

Change #1: Addition new antenna, antenna type is different with the original application. (Antenna type: Dipole antenna)

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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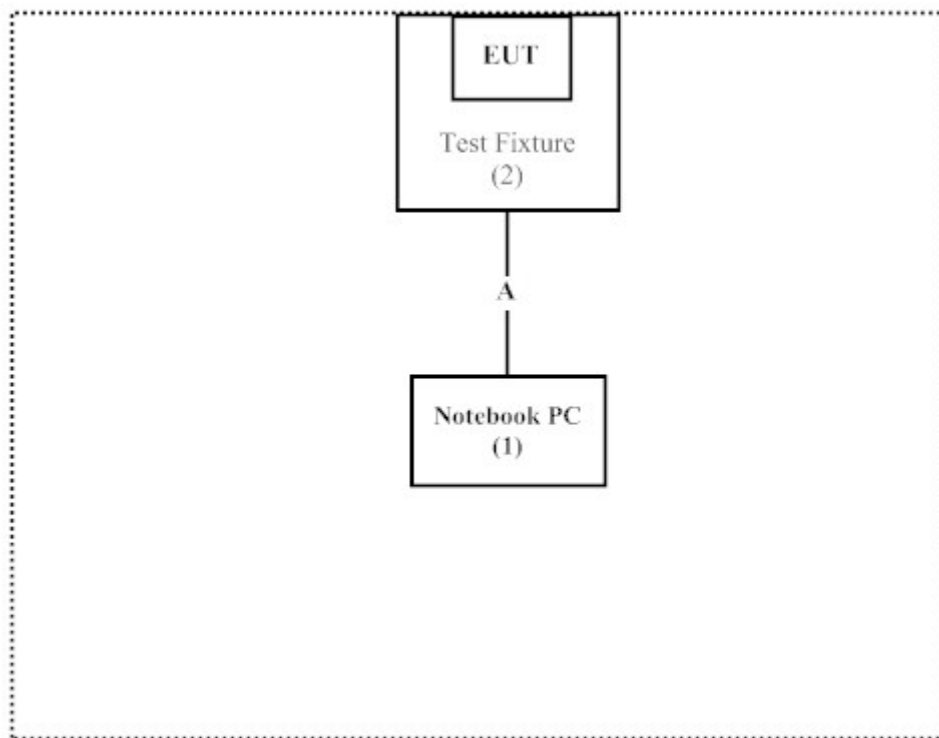
1.3. Tested System Details

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	Intel	N/A	N/A	Non-Shielded, 1.8m
2	Test Fixture	Intel	N/A	N/A	N/A

	Signal Cable Type	Signal cable Description
1	Test Fixture Cable	Non-shielded, 0.15m

1.4. Configuration of tested System



1.5. EUT Exercise Software

- (1) Setup the EUT as shown in Section 1.4
- (2) Execute “DRTU v1.5.3-0320” program on the notebook.
- (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

Accreditation on NVLAP
NVLAP Lab Code: 200533-0

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. Peak Transmit Power

2.1. Test Equipment

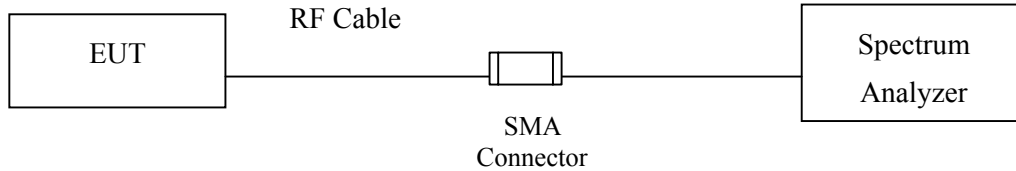
	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
X	Power Meter	Anritsu	ML2495A/6K00003357	May, 2011
X	Power Sensor	Anritsu	MA2411B/0738448	Jun, 2011
X	Spectrum Analyzer	Agilent	N9010A / MY48030495	Apr., 2011

Note:

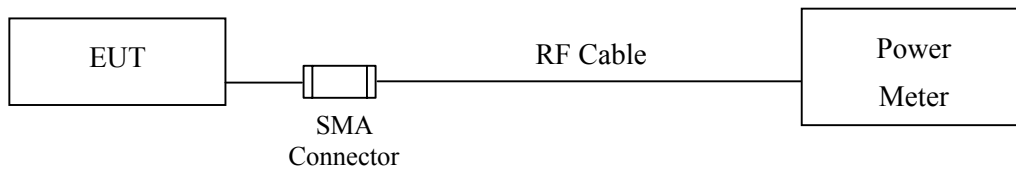
1. All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.
2. The test instruments marked with “X” are used to measure the final test results.

2.2. Test Setup

26dBc Occupied Bandwidth



Conduction Power Measurement



2.3. 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.

2.4. Test Procedur

As an alternative to FCC KDB-789033, 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 FCC KDB-789033, and provides more accurate measurements.

2.5. Uncertainty

$\pm 1.27 \text{ dB}$

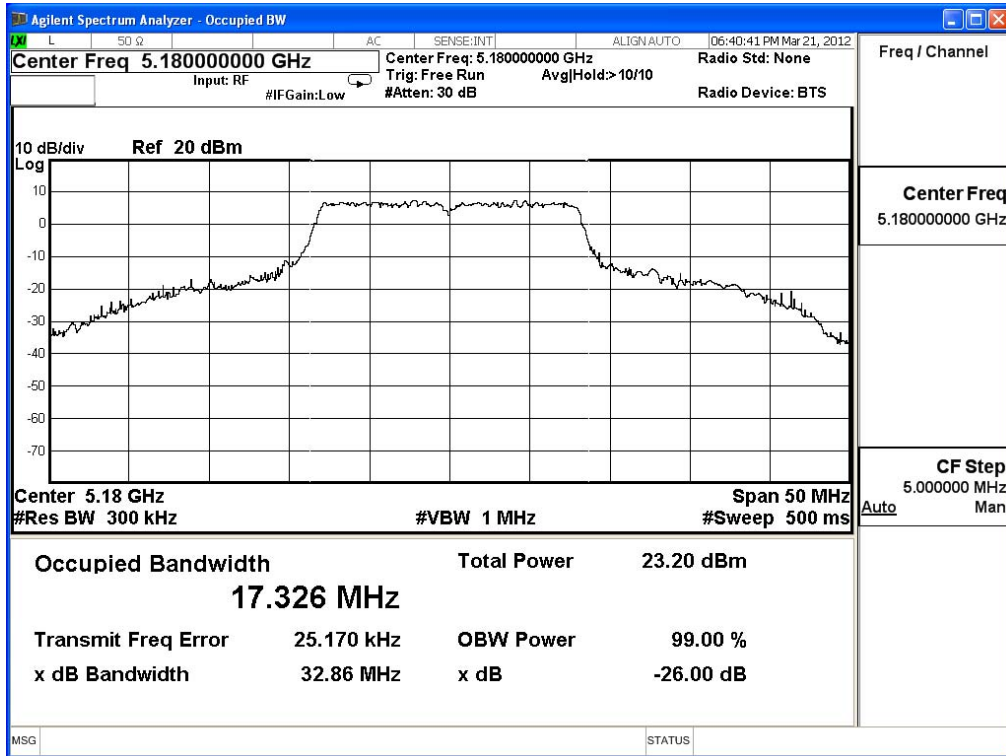
2.6. Test Result of Peak Transmit Power

Product : Intel® Centrino® Advanced-N 6230
 Test Item : Peak Transmit Power
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit (802.11a-6Mbps)

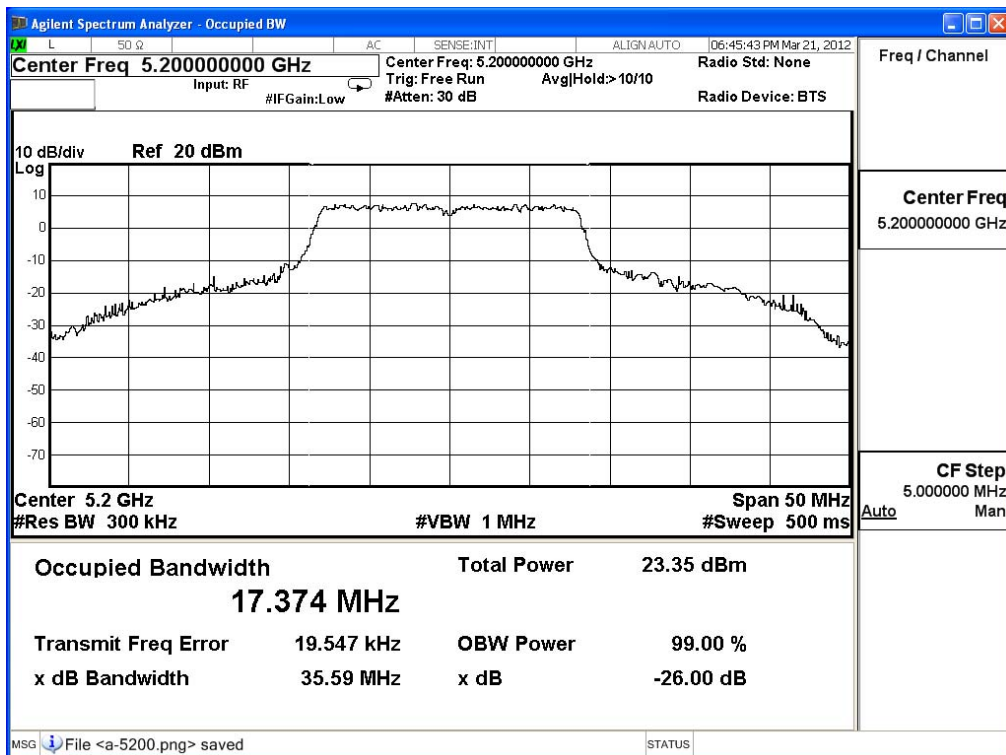
Peak Transmit Power Measurement:

Channel Number	Frequency (MHz)	26dB Bandwidth (MHz)	Output Power (dBm)	Output Power Limit	
				(dBm)	dBm+10log(BW)
36	5180	32.860	15.95	17	19.17
40	5200	35.590	16.13	17	19.51
48	5240	31.340	15.76	17	18.96
52	5260	31.320	15.54	24	25.96
60	5300	29.830	16.05	24	25.75
64	5320	34.670	16.29	24	26.40
100	5500	35.880	16	24	26.55
116	5580	34.600	16.34	24	26.39
140	5700	36.290	16.12	24	26.60

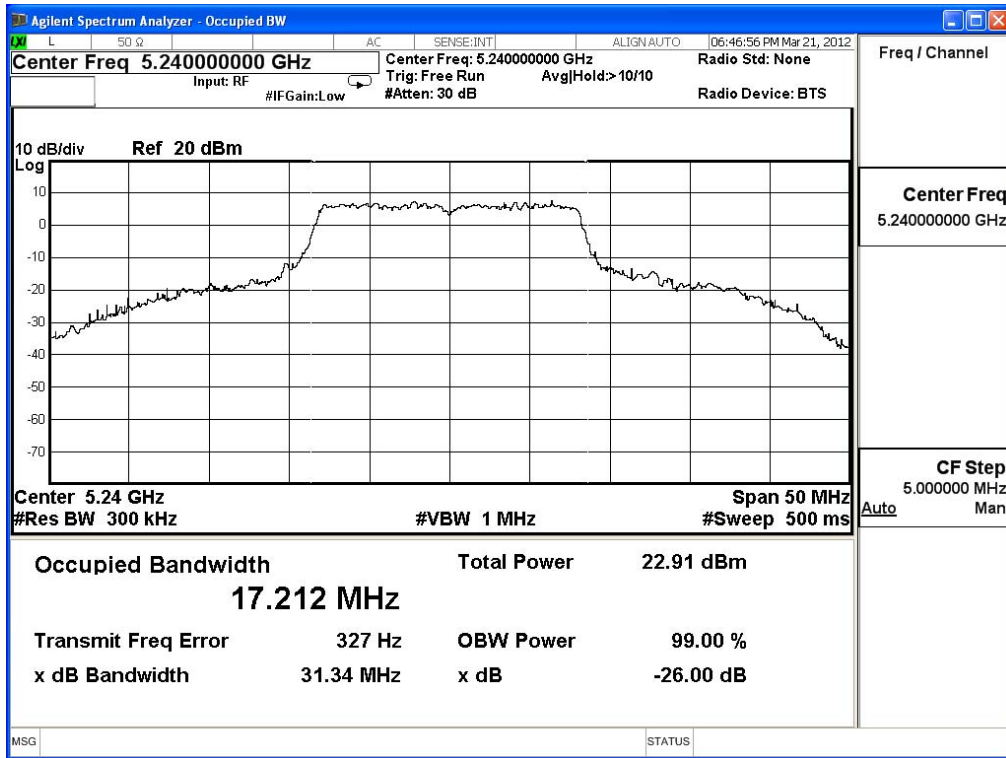
**26dBc Occupied Bandwidth:
Channel 36**



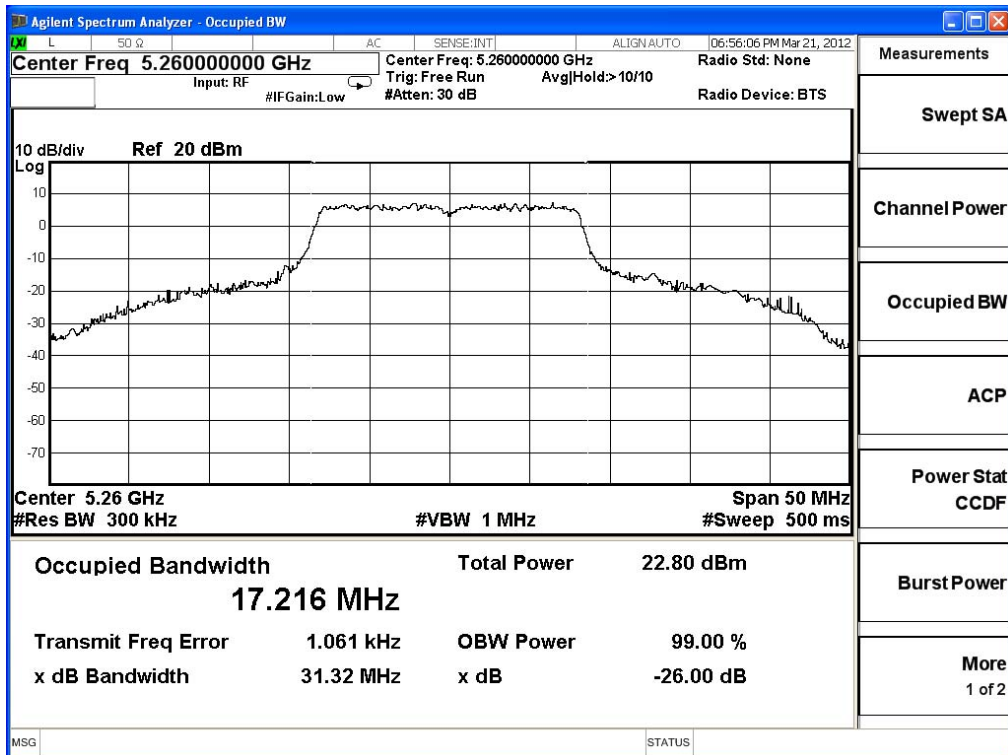
Channel 40



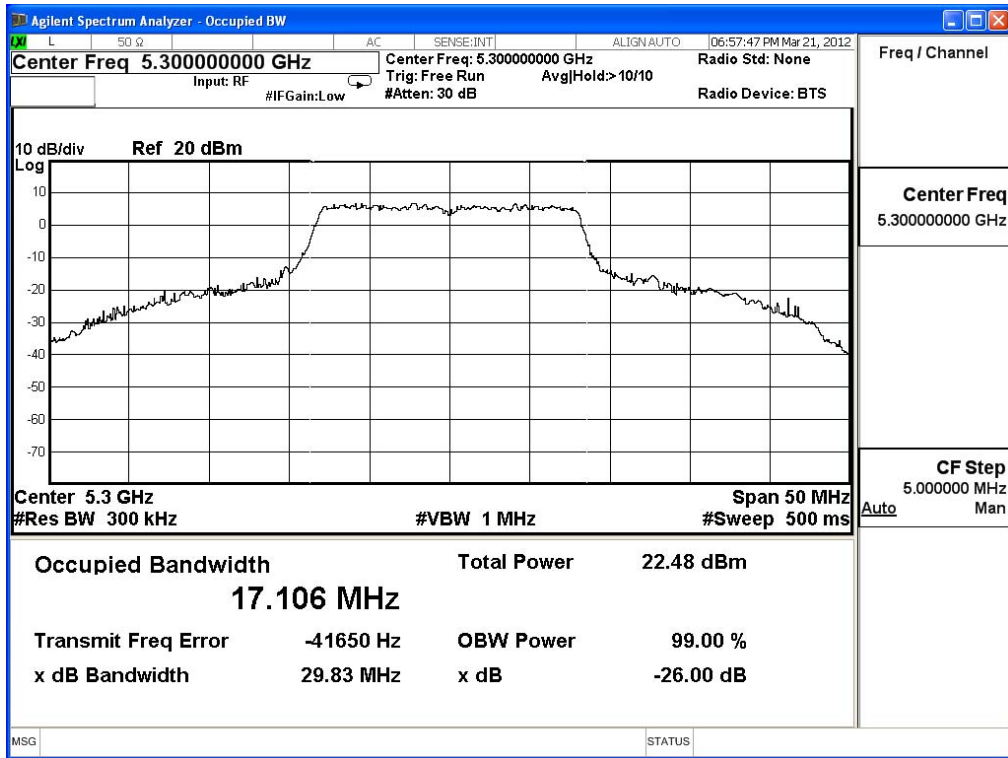
Channel 48



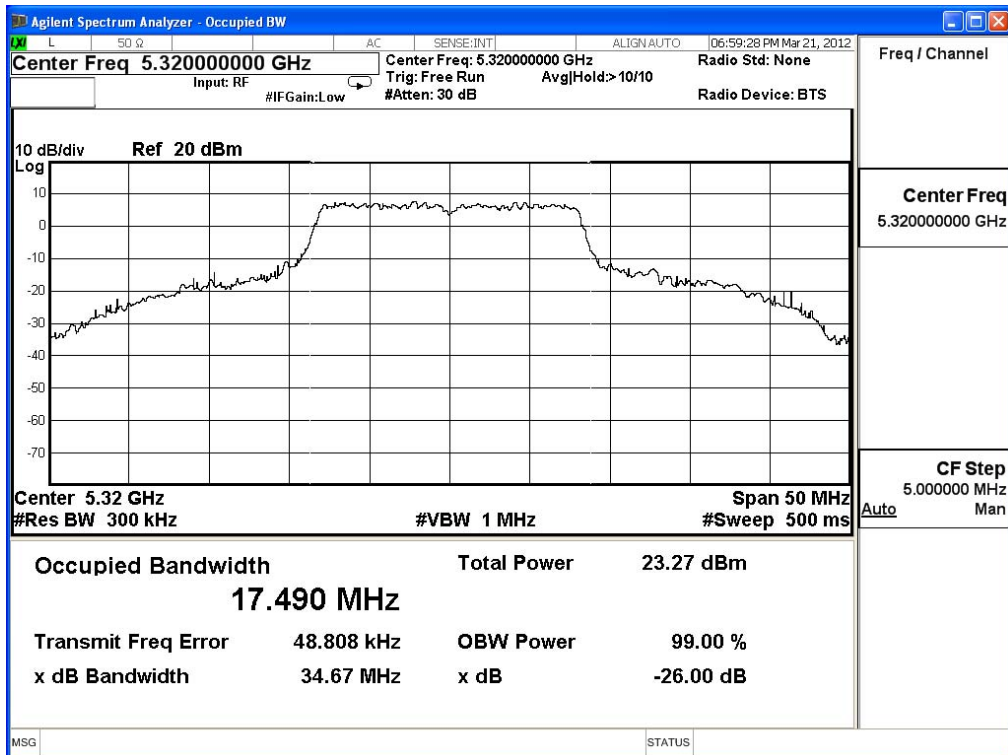
Channel 52



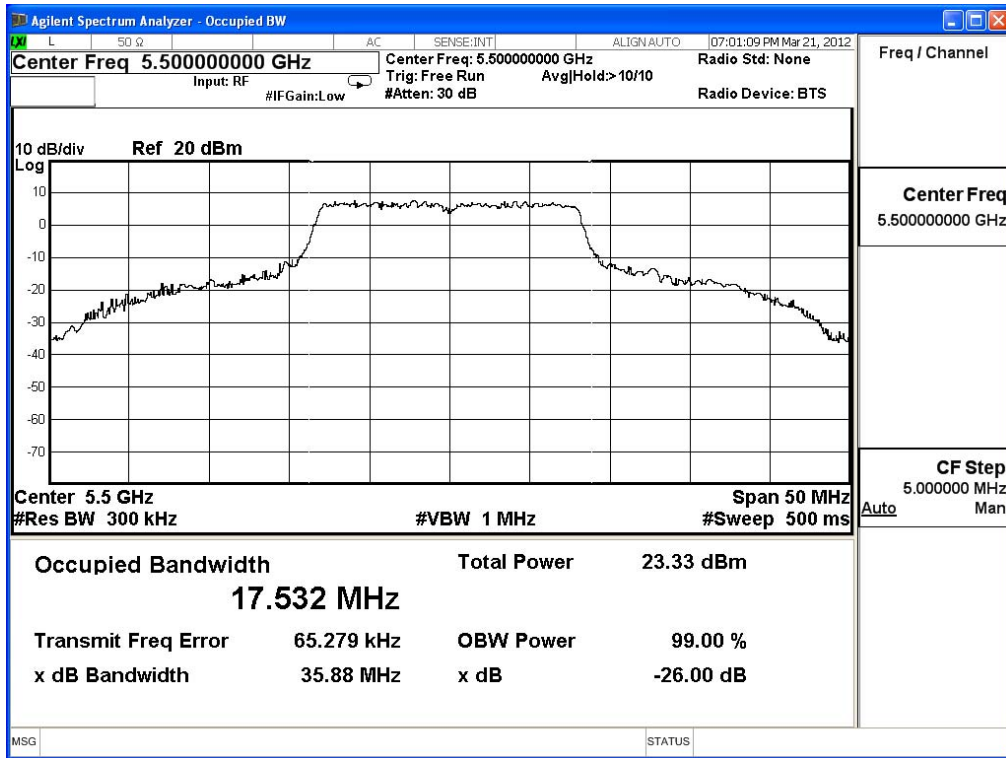
Channel 60



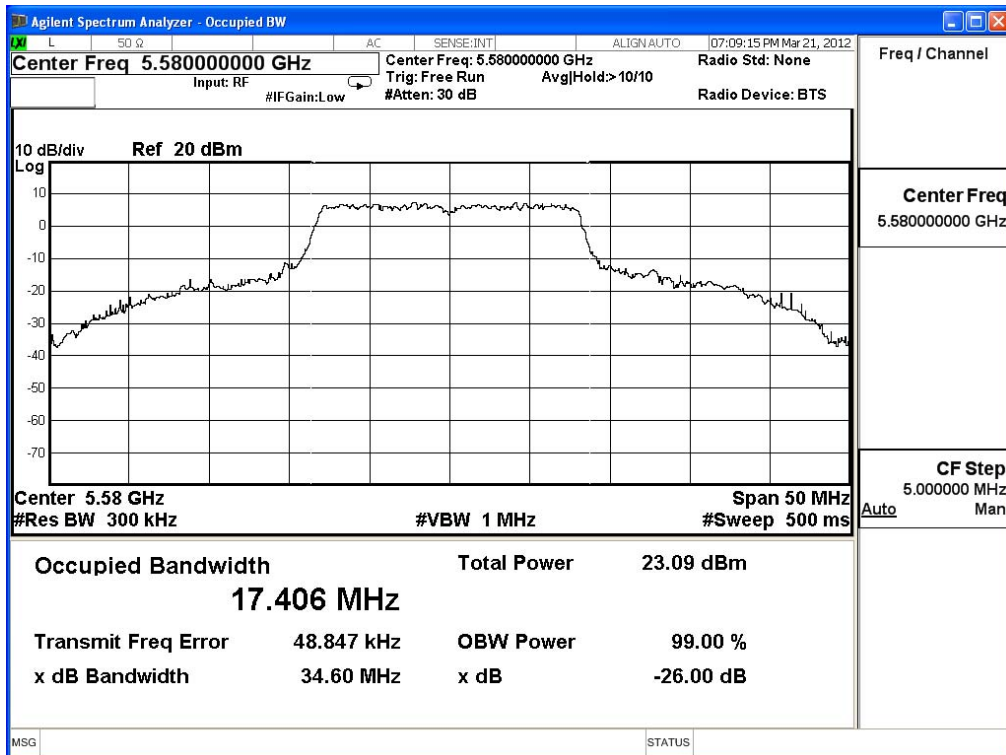
Channel 64



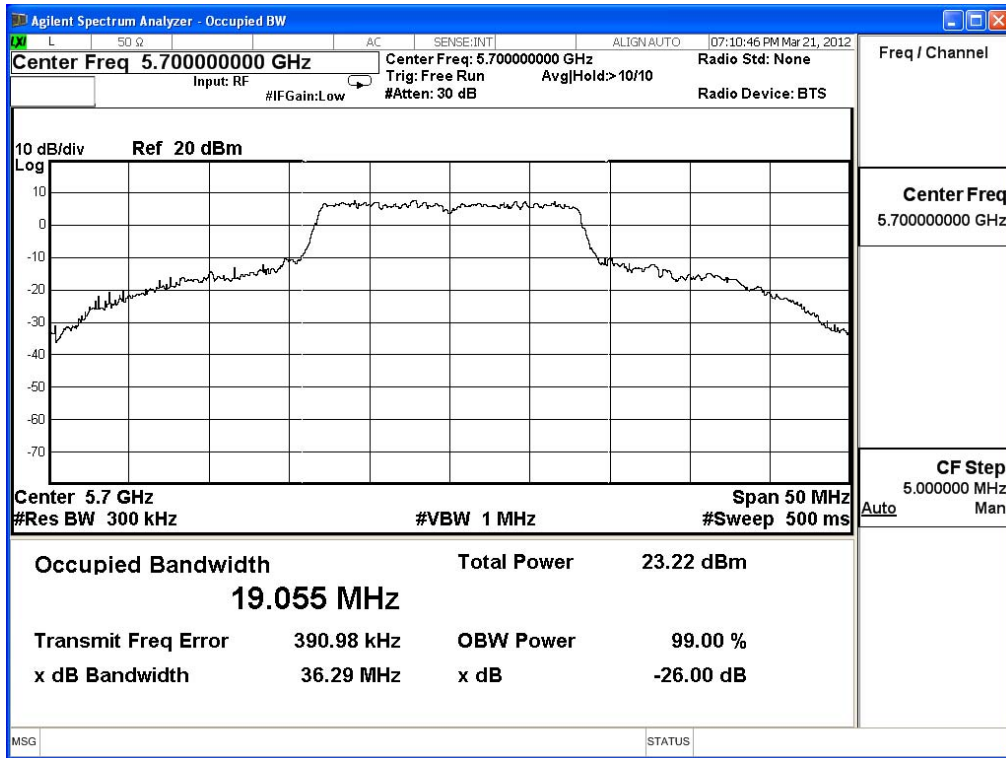
Channel 100



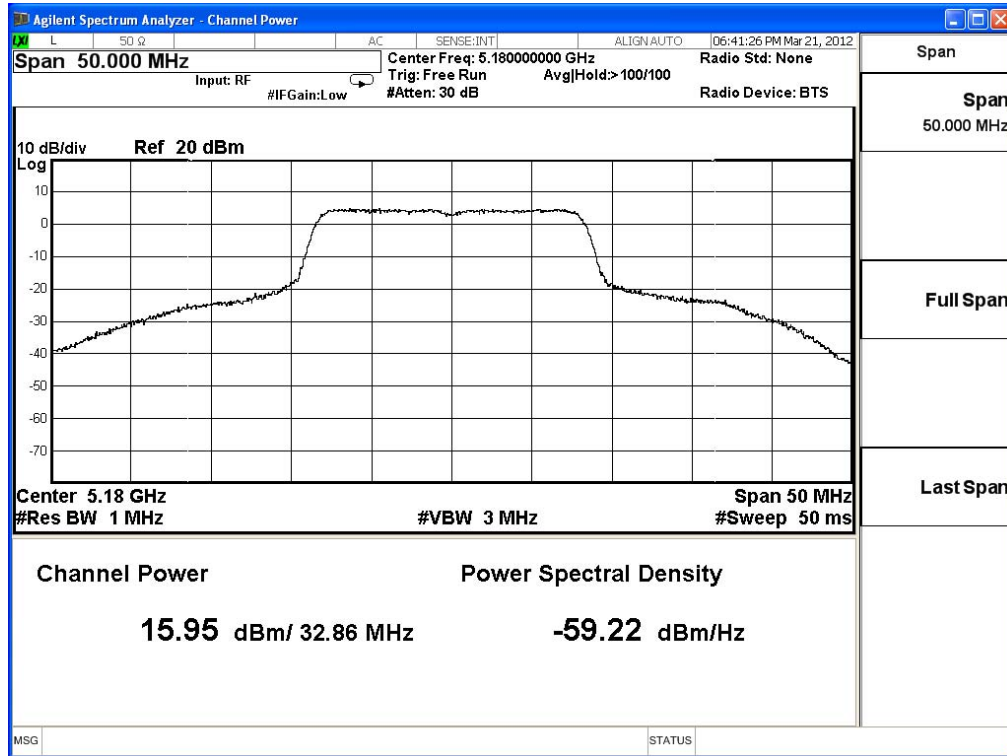
Channel 116



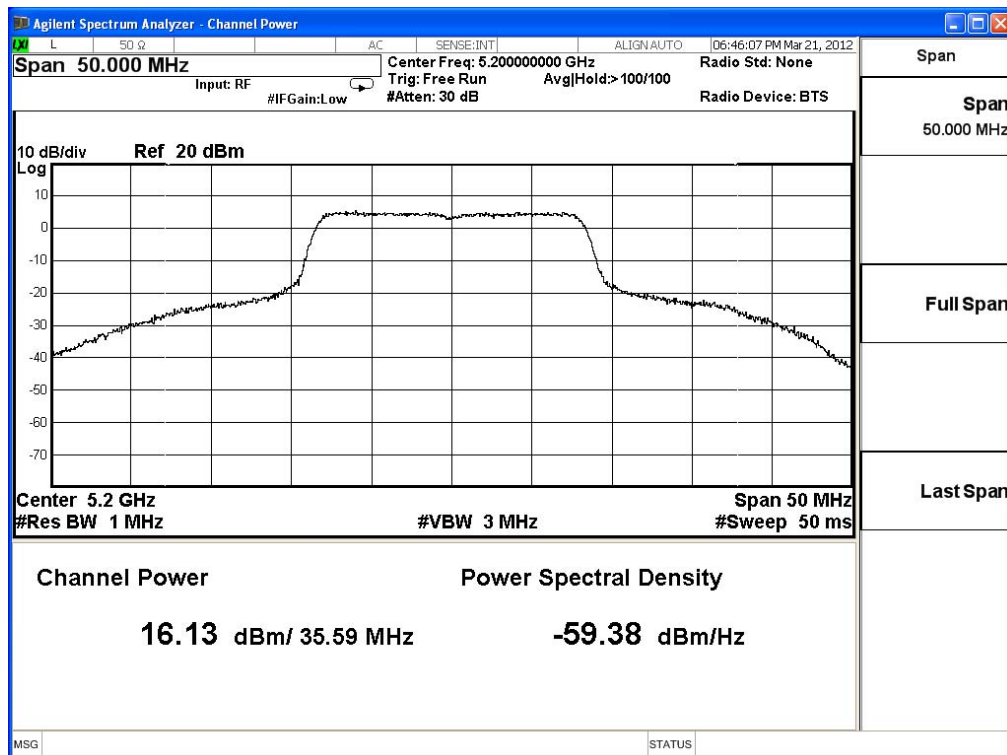
Channel 140



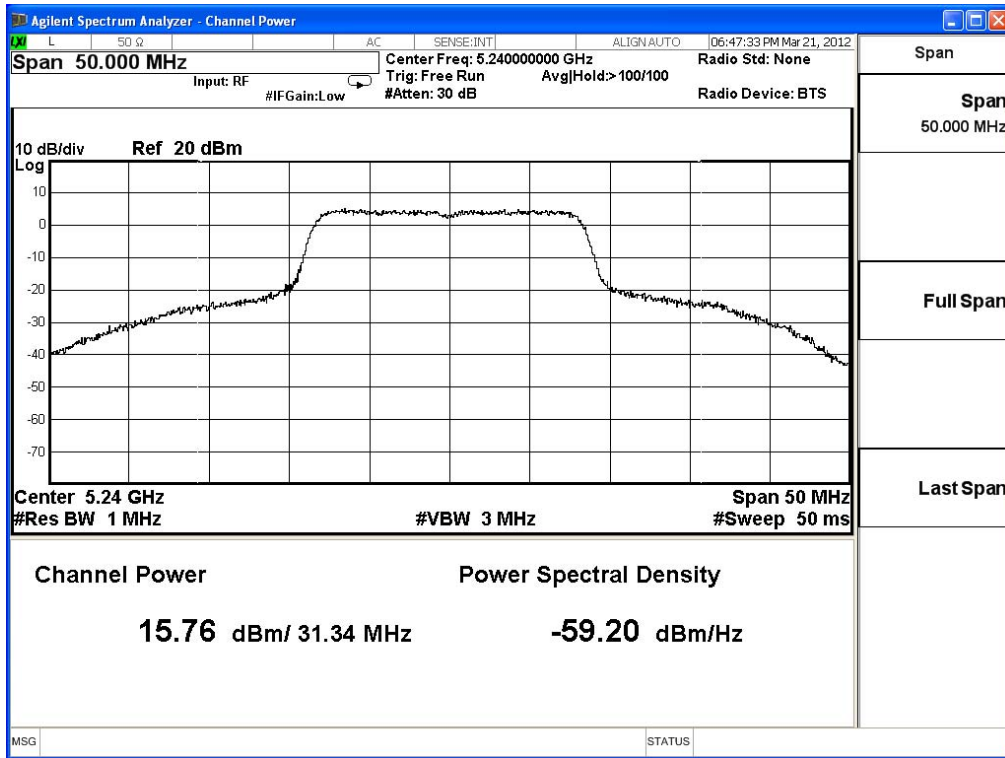
Conduction Power Measurement Channel 36



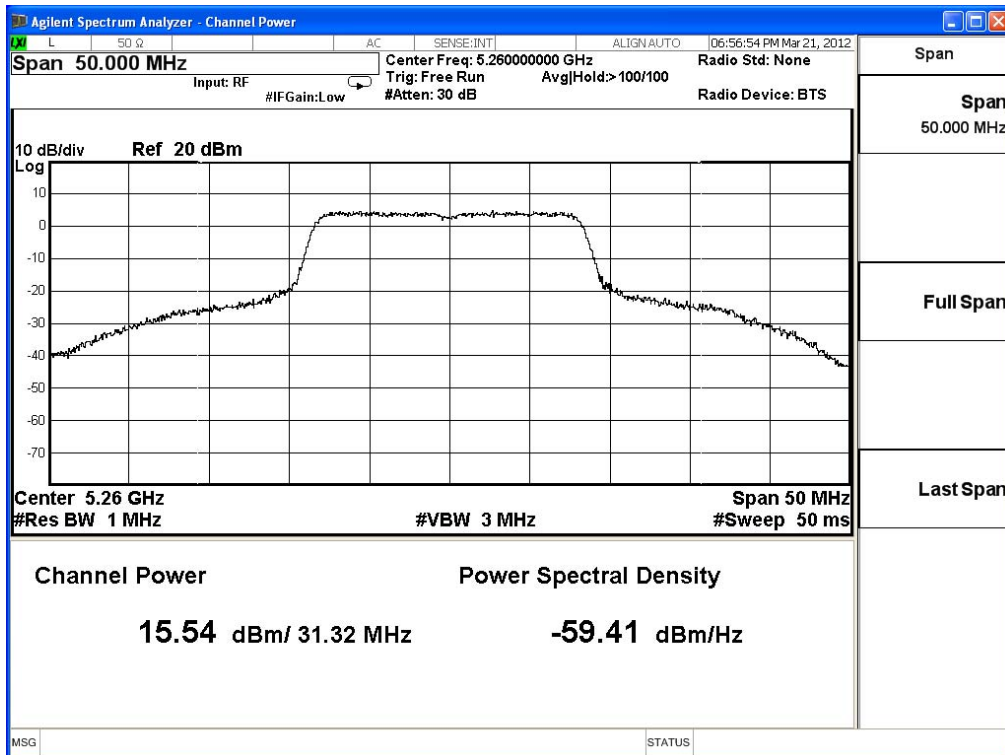
Channel 40



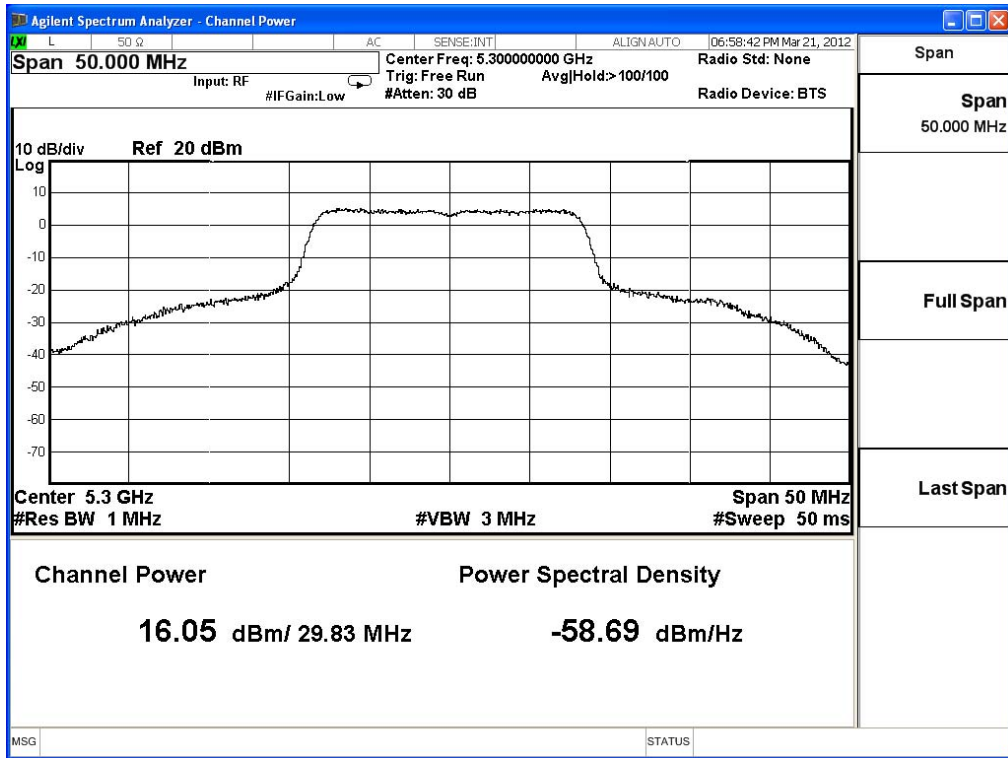
Channel 48



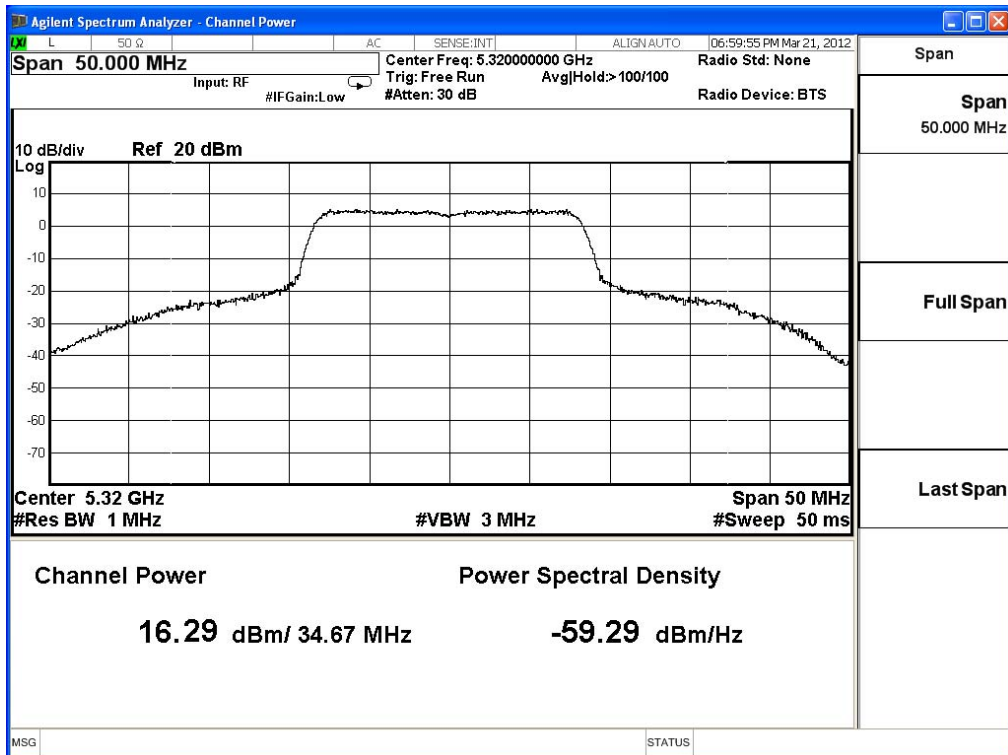
Channel 52



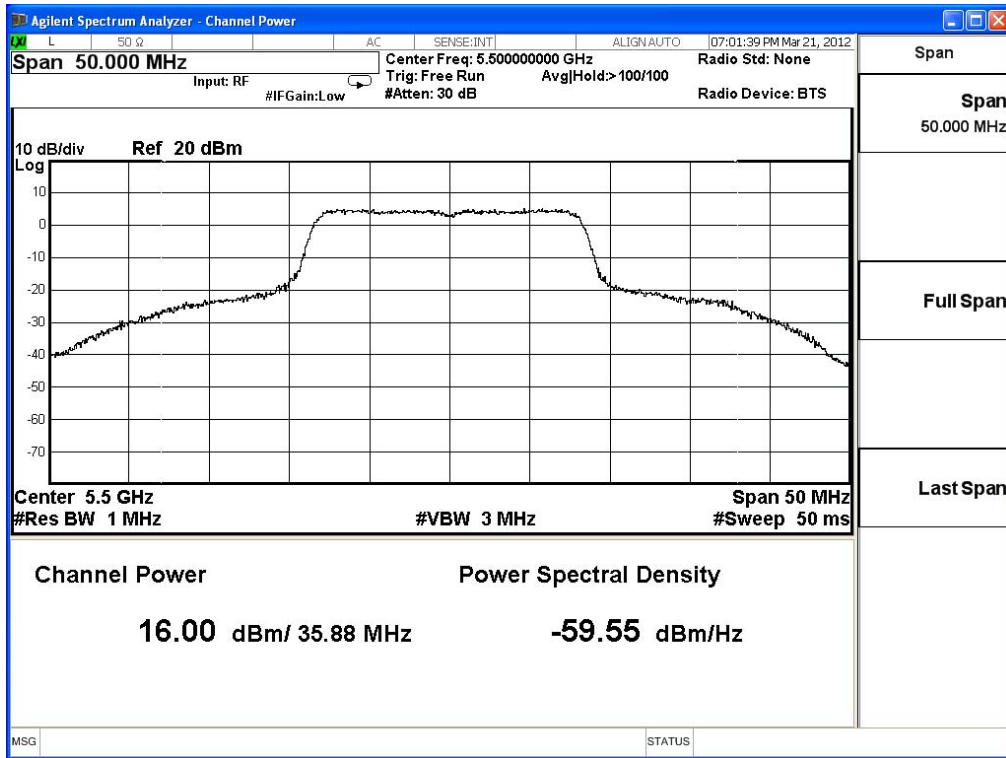
Channel 60



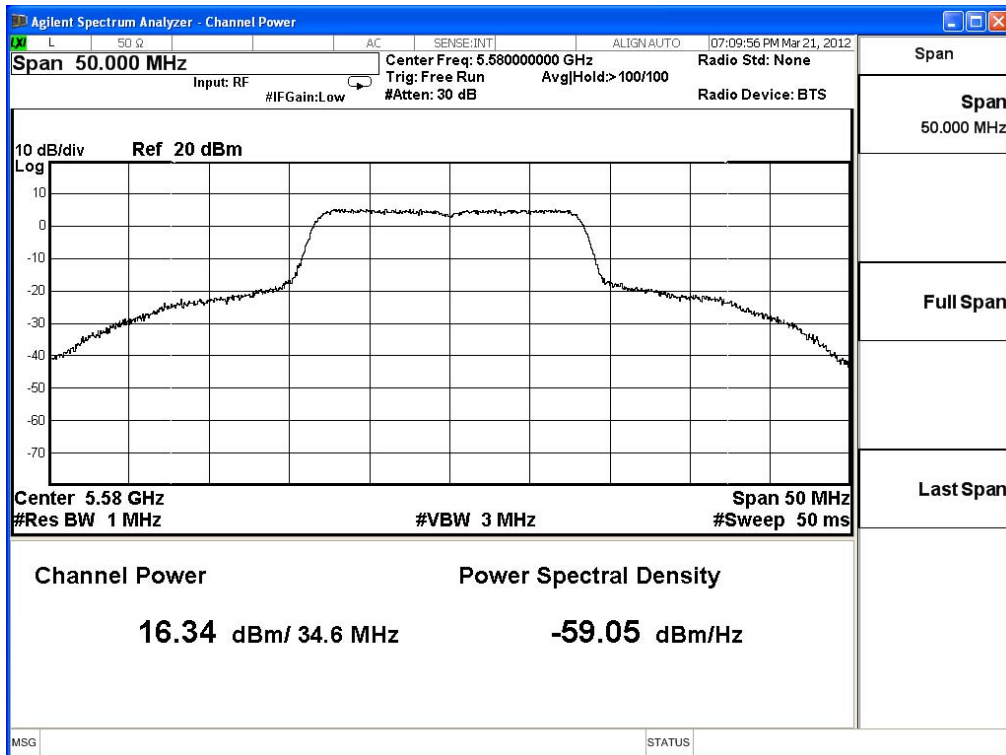
Channel 64



Channel 100



Channel 116



Product : Intel® Centrino® Advanced-N 6230
 Test Item : Peak Transmit Power
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmit (802.11n-20BW 14.4Mbps)

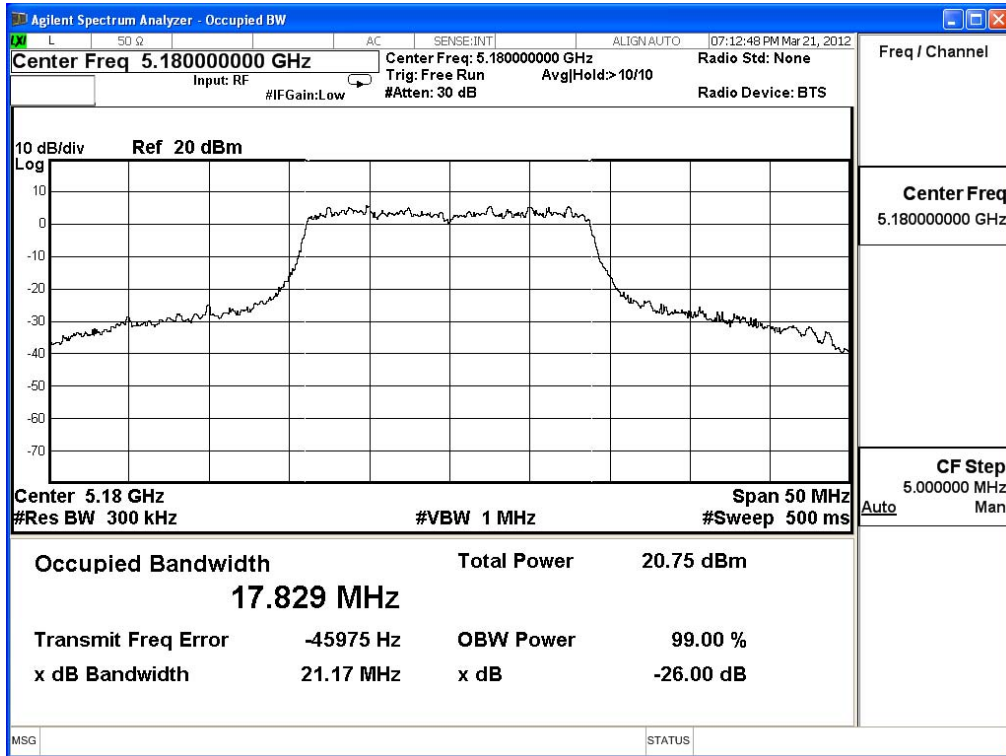
Peak Transmit Power Measurement:
CHAIN A+B

Channel Number	Frequency (MHz)	26dB Bandwidth (MHz)	Chain A Power (dBm)	Chain B Power (dBm)	Output Power (dBm)	Output Power Limit	
						(dBm)	dBm+10log(BW)
36	5180	21.170	13.12	13.16	16.15	17	17.26
40	5200	21.270	13.03	13.04	16.05	17	17.28
48	5240	21.170	12.67	12.64	15.67	17	17.26
52	5260	21.360	12.54	12.45	15.51	24	24.30
60	5300	21.240	12.49	12.45	15.48	24	24.27
64	5320	21.240	13.46	13.23	15.56	24	24.27
100	5500	21.250	12.43	12.82	15.64	24	24.27
116	5580	21.310	13.29	13.12	15.74	24	24.29
140	5700	21.030	11.95	12.31	15.14	24	24.23

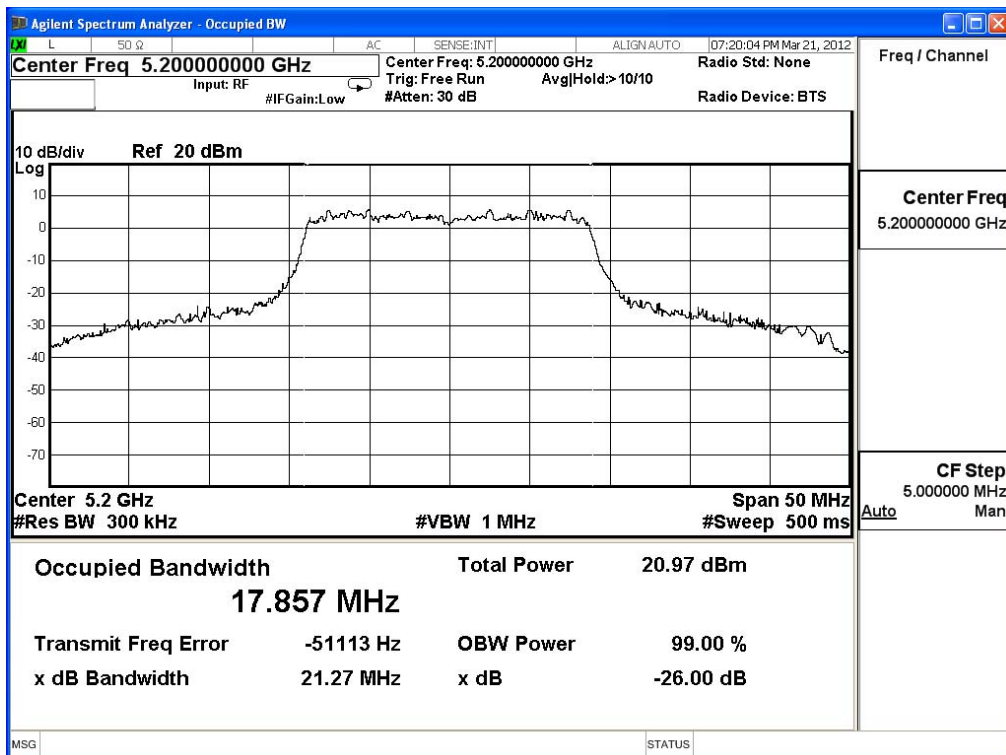
Note:

- Output Power (dBm) = 10*LOG (Chain A Power (mW)+ Chain B Power (mW))
- 26 dB Bandwidth is the bandwidth of chain A or chain B whichever is less bandwidth, output power limitation is more stringent.

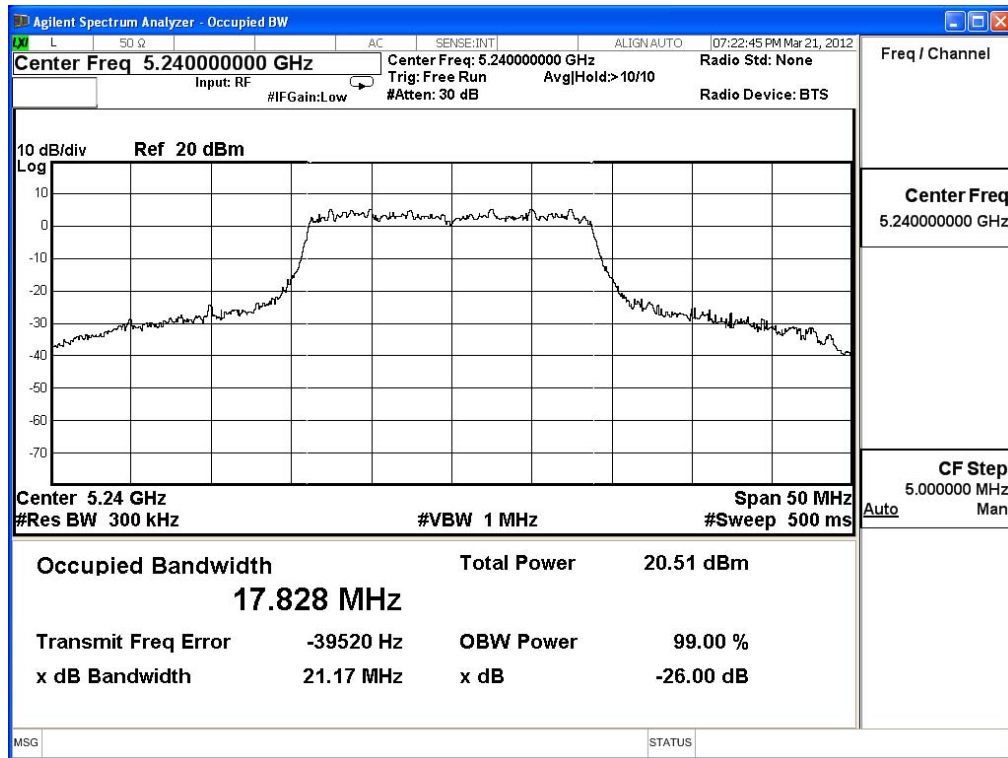
**26dBc Occupied Bandwidth:
Channel 36 -Chain A**



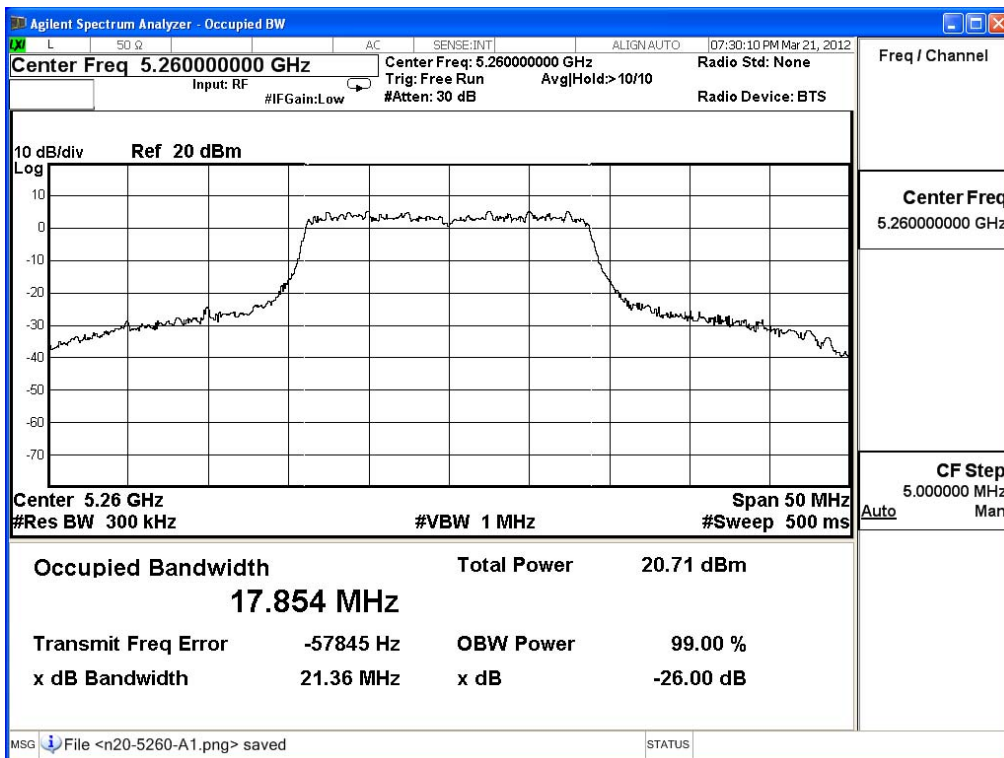
Channel 40 -Chain A



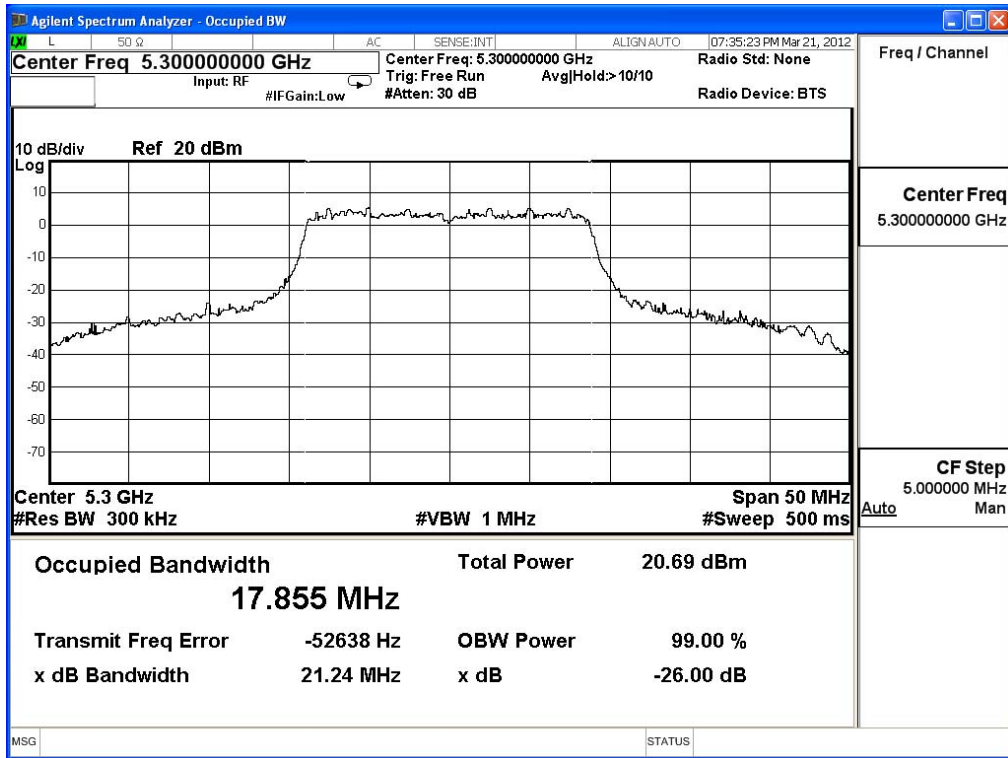
Channel 48 -Chain A



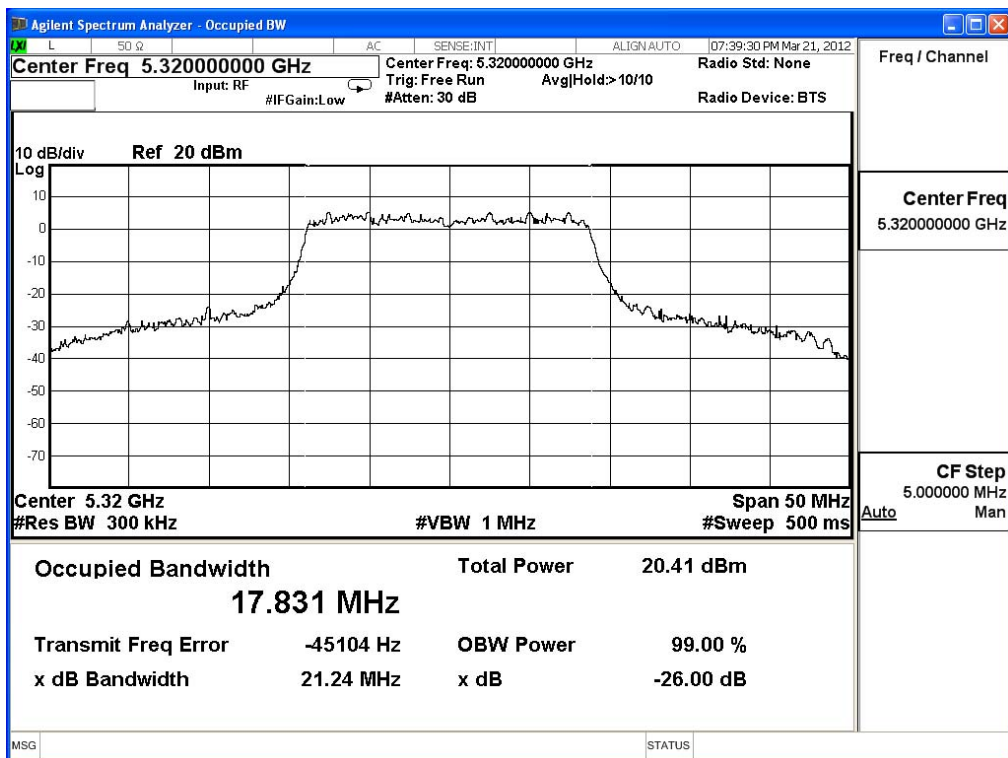
Channel 52 -Chain A



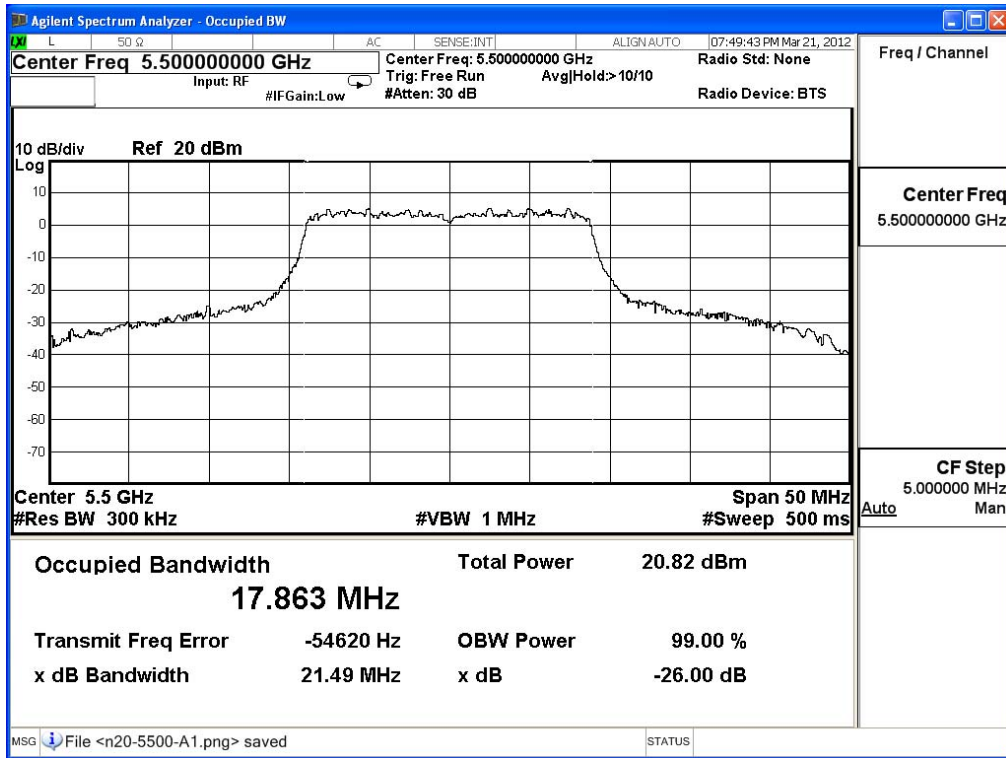
Channel 60 -Chain A



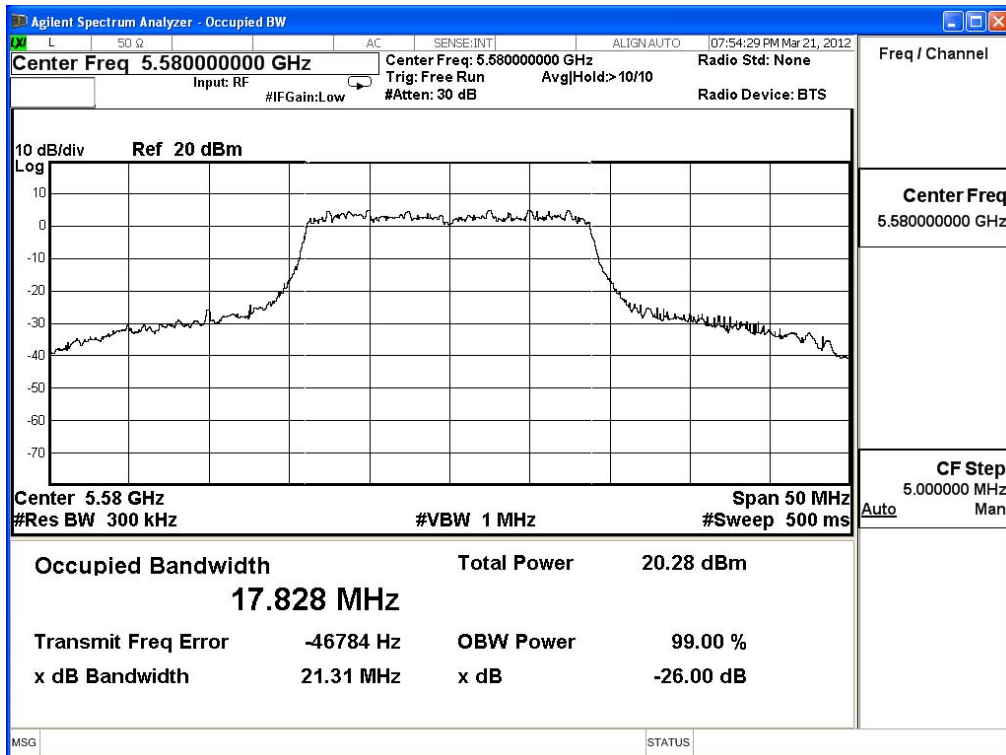
Channel 64 -Chain A



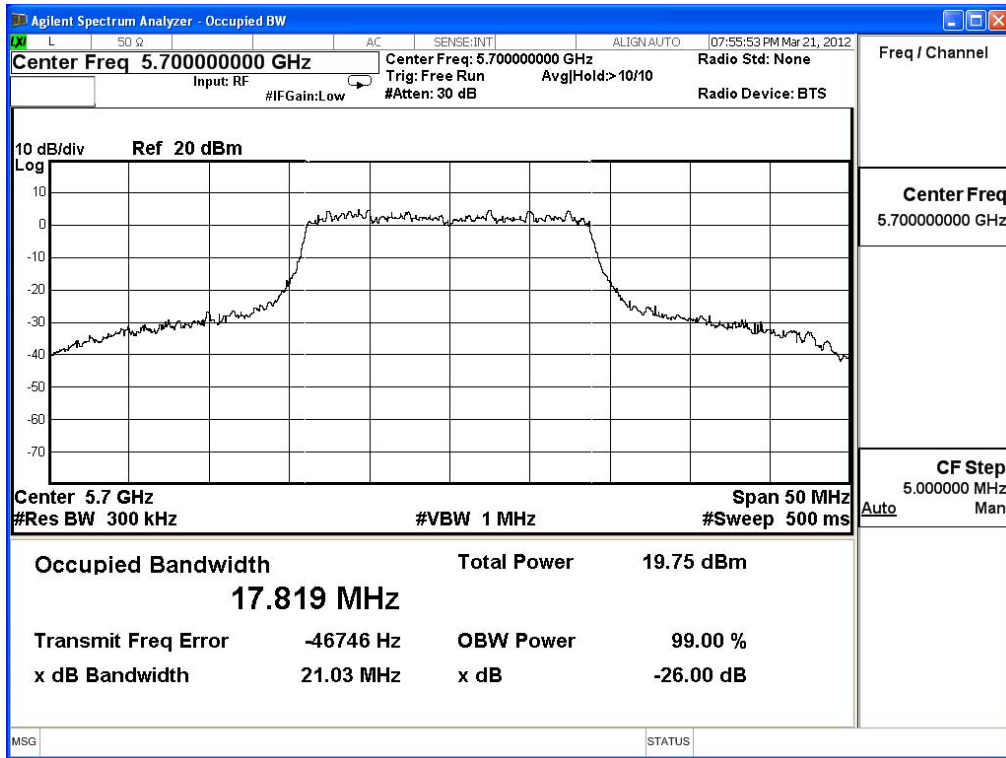
Channel 100 -Chain A



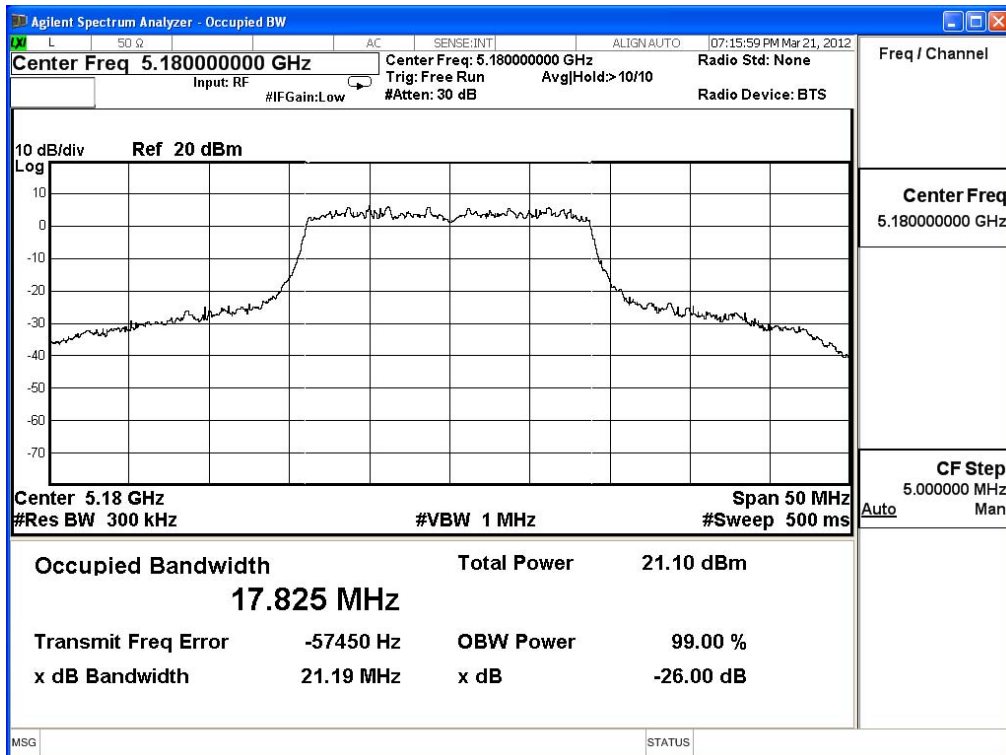
Channel 116 -Chain A



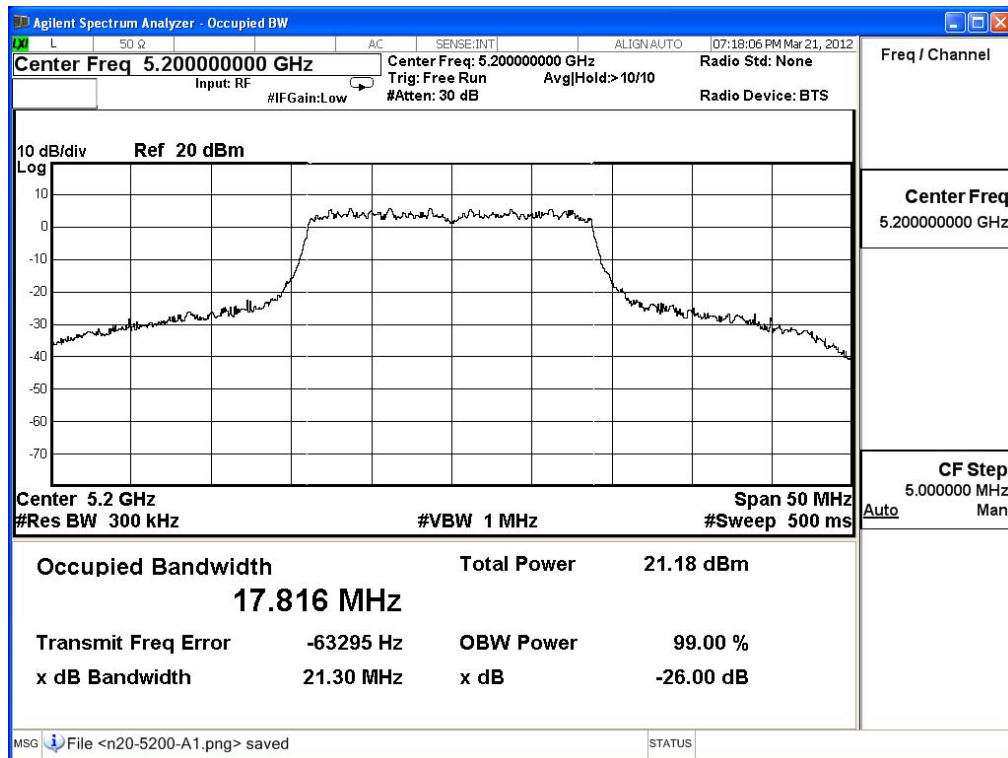
Channel 140 -Chain A



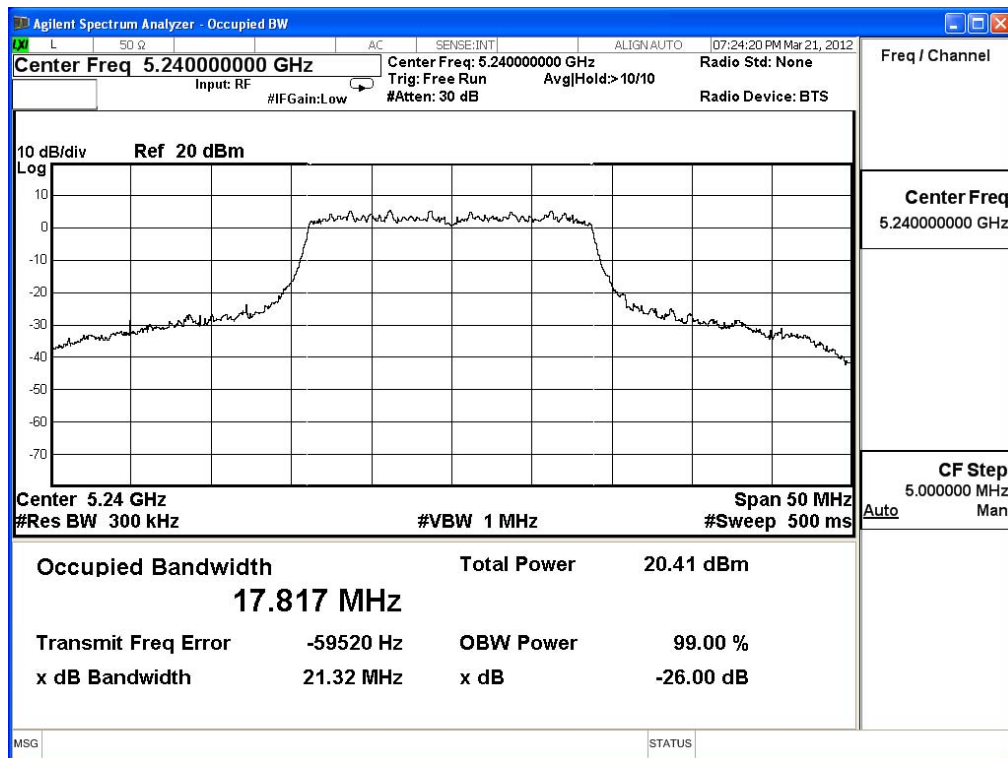
Channel 36 -Chain B



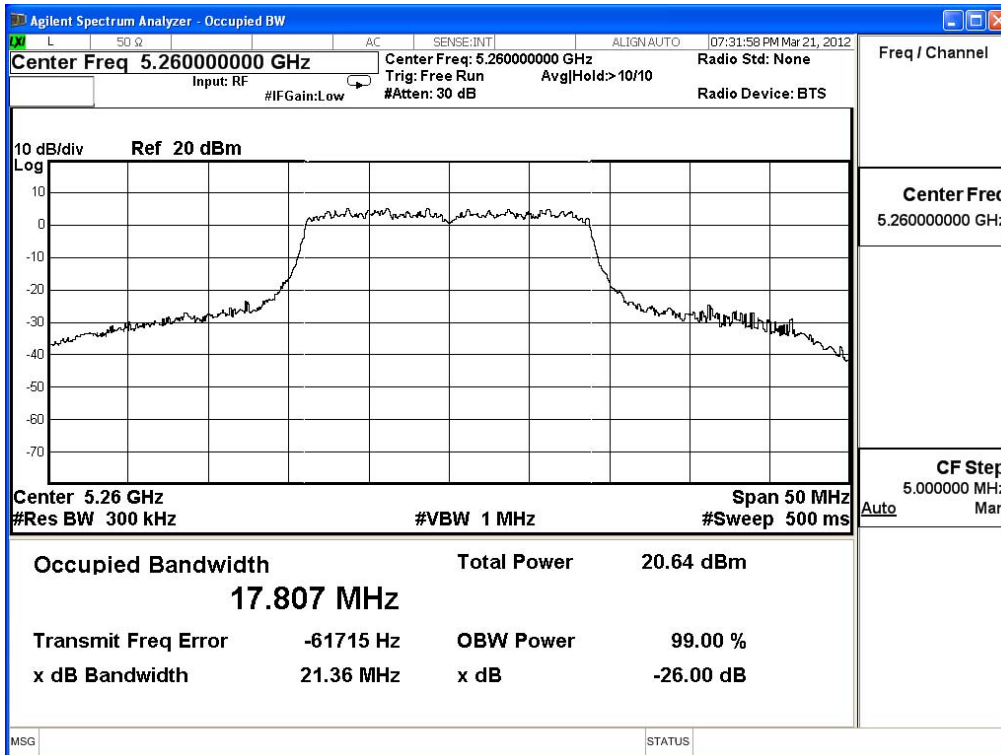
Channel 40 -Chain B



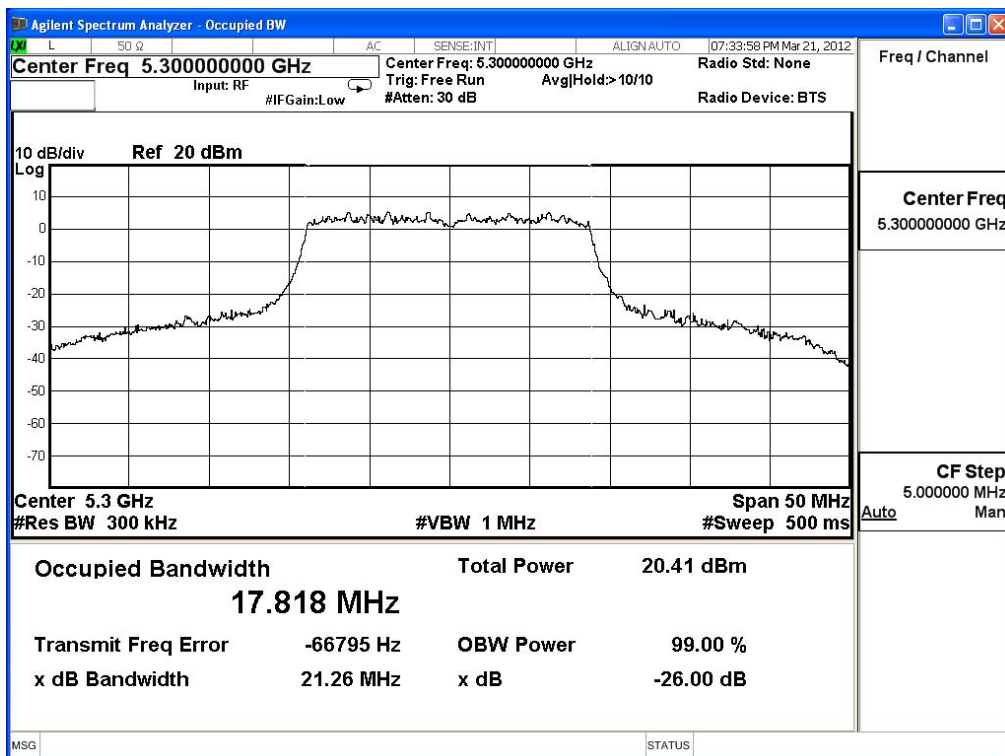
Channel 48 -Chain B



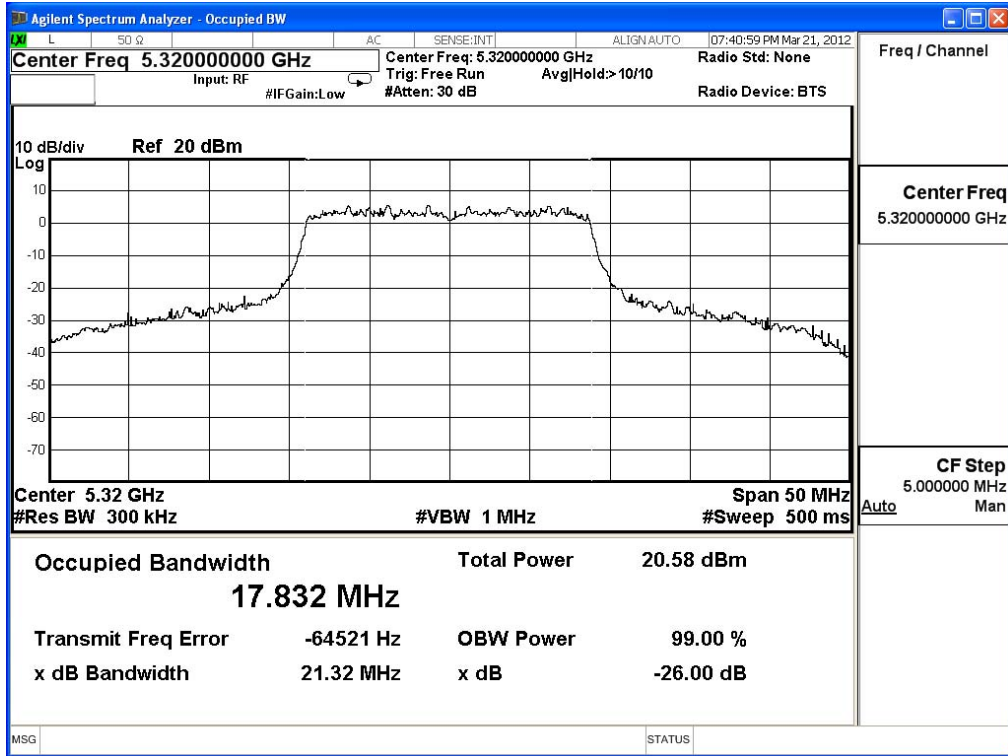
Channel 52 -Chain B



Channel 60 -Chain B



Channel 64 -Chain B



Channel 100 -Chain B

