2.4 GHz Wi-Fi Radio Test Report
802.11b/g/n

For

Wi-Fi Dual Band Wireless Router

Model: WRP500

Against the following Specifications :

47 CFR 15.247
47 CFR 15.209
47 CFR 15.205
RSS-Gen issue 4
RSS-210 issue 8

Cisco Systems
EMC Laboratory
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ACCREDITED

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Title: Regulatory Compliance Manager

This report replaces any previously entered test report under EDCS – **1465480**

This test report has been electronically authorized and archived using the CISCO Engineering Document Control system.

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Section 1: Overview

1.1 Test Summary

Samples were assessed against the tests detailed in section 3 under the requirements of the following specifications:

Emission	Immunity
CFR47 Part 15.247 CFR47 Part 15.209 CFR47 Part 15.205 RSS-Gen Issue 3 RSS210 Issue 8	N/A

Measurements were made in accordance with ANSI C63.10:2009, KDB Publication No.558074v3r2, ET docket 96-8 measurement method of spurious emission tolerance to the International Telecommunication Union (ITU) Recommendation SM329.

The specifications listed above represent actual tests performed to demonstrate compliance against the specifications and basic standards listed on the front cover of this report. This list is not a one to one match to the front cover for one or more of the following reasons.

1. Basic standards call up many different test phenomena specifications such as the 61000-4-X series. The basic standards define which elements and levels shall be applied from these specifications and as such it is not appropriate to list the individual specifications on the front cover.
2. A Standard listed on the front cover may be required in a particular country but is not appropriate for the particular technologies included in the equipment under test. E.g. You cannot test a DC product to the mains Harmonics requirements in EN61000-3-2. See section 3.2.
3. Test results against a particular standard or specification may be included in a different test report. See section 3.2 for an EDCS reference of this data.
4. Where appropriate, Cisco may have substituted a later revision of a basic standard to those referenced in the specification on the front sheet of this test report. This decision was based upon improved test methodology and repeatability and/or where the newer revision represented a more stringent test.
5. Where relevant, testing has been carried out to the requirements of both EN and IEC Specifications. This was possible because of the similarities of the test methods involved and the Cisco EMC test procedures.
6. Testing may have been performed to an equivalent test that satisfies the requirements of the standards and specifications listed on the front cover of the report. See section 3.2.
7. Where radiated emissions testing has been performed to EN55022/CISPR22 the additional requirements of VCCI: V- 3/2006.04, EN55022: 1994 +A1/2 and CAN/CSA- CISPR 22-02 have also been evaluated unless otherwise stated.
8. Testing to the requirements of CFR47 Part 15 was performed against the CISPR22 limits. The results are therefore deemed satisfactory evidence of compliance with Industry Canada Interference Causing Equipment Standard ICES-003.
9. Where assessment has been performed to CISPR24, all the applicable test requirements may have not been covered. Refer to the results section for the tests performed.

Notes:

1) Where a specification listed on the front cover of this report has deviations from the basic standards listed above, the additional technical requirements of the specification were also assessed.
2) Where appropriate, Cisco may have substituted a later revision of a basic standard to those referenced in the specification on the front sheet of this test report. This decision was based upon improved test methodology and repeatability and/or where the newer revision represented a more stringent test.
3) Where relevant, testing has been carried out to the requirements of both EN and IEC Specifications. This was possible because of the similarities of the test methods involved and the Cisco EMC test procedures.

Section 2: Assessment Information

2.1 General

This report contains an assessment of an apparatus against Electromagnetic Compatibility Standards based upon tests carried out on the samples submitted. The testing was performed by and for the use of Cisco systems Inc:

With regard to this assessment, the following points should be noted:

a) The results contained in this report relate only to the items tested and were obtained in the period between the date of the initial assessment and the date of issue of the report. Manufactured products will not necessarily give identical results due to production and measurement tolerances.

b) The apparatus was set up and exercised using the configuration and modes of operation defined in this report only.

c) Where relevant, the apparatus was only assessed using the susceptibility criteria defined in this report and the Test Assessment Plan (TAP).

d) All testing was performed under the following environmental conditions:

Temperature	15°C to 35°C (54°F to 95°F)
Atmospheric Pressure	860mbar to 1060mbar (25.4" to 31.3")
Humidity	10% to 75*%

*[Where applicable] For ESD testing the humidity limits used were 30% to 60% and for EFT/B tests the humidity limits used were 25% to 75%.

e) All AC testing was performed at the following supply voltage:
110V 60 Hz (+/-20%)

2.2 Testing Dates

01-Oct-2014 – 31-Oct-2014

2.3 Report Issue Date

Cisco uses an electronic system to issue, store and control the revision of test reports. This system is called the Engineering Document Control System (EDCS). The actual report issue date is embedded into the original file on EDCS. Any copies of this report, either electronic or paper, that are not on EDCS must be considered uncontrolled.

2.4 Testing facilities

This assessment was performed by:

Testing Laboratory

Cisco Systems, Inc.,
170 West Tasman Drive
San Jose, CA 95134,
USA

Registration Numbers for Industry Canada

Cisco System Site	Site Identifier
Building P, 10m Chamber	Company #: 2461N-2
Building P, 5m Chamber	Company #: 2461N-1
Building I, 5m Chamber	Company #: 2461M-1

Test Engineers

Danh Le

2.5 Equipment Assessed (EUT)

WRP500 Dual Band Wireless 802.11a/ac/b/g/n Router

The WRP500 is the dual band Wireless-B, G, A, AC, N Broadband router with one WAN port, four 10/100 LAN ports for wired connections and two phone jacks for voice over Internet Protocol (VoIP) functionality. The WRP500 uses advanced quality-of-service (QoS) functionality to preserve the consistency and clarity of voice and video communications. It keeps your data safe by supporting WPS2.0 and WPA/WPA2 and WAPI wireless security protocols, access limitations based on MAC and IP addresses, and a robust firewall that prevents against malicious external attacks to the network.

Additional features of the WRP500 Wireless Broadband Router include:

- Embedded MIPS24KEc(580 MHz) with 64 KB I-Cache and 32 KB D-Cache
- 2T2R 2.4 GHz with 300 Mbps PHY data rate
- 20/40 MHz channel bandwidth
- Legacy 802.11b/g and HT 802.11n modes
- 16-bit SDRAM up to 64 Mbytes
- 16-bit DDRAM up to 128/256 Mbytes (MT7620A)
- SPI, NAND Flash/SD-XC/eMMC
- 1x USB 2.0, 1x PCIe host/device
- 5-port 10/100 SW and two RGMII
- An optimized PMU
- Green AP
  - Intelligent Clock Scaling (exclusive)
  - DDRII: ODT off, Self-refresh mode
  - SDRAM: Pre-charge power down
- 12C, 12S, SPI, PCM, UART, JTAG, MDC, MDIO, GPIO
- Hardware NAT with IPv6 and 2 Gbps wired speed
- 16 Multiple BSSID
- WEP64/128, TKIP, AES, WPA, WPA2, WAPI
- QoS: WMM, WMM-PS
- WPS: PBC, PIN
- Voice Enterprise: 802.11k+r
- AP Firmware: Linux 2.6 SDK, eCOS with IPv6
- RGMII iNIC Driver: Linux 2.4/2.6

Section 3: Result Summary

3.1 Results Summary Table

RF Conducted at antenna port

Standard(s)	Test Details / Comments	Result
FCC15.247(b)(3) Max. Conducted Output power **RSS-210 A8.4(4)** Transmitter Output Power and e.i.r.p. Requirements	15.247: The maximum conducted output power of the intentional radiator for systems using digital modulation in the 2400-2483.5MHz band shall not exceed 1 Watt (30dBm). If transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. A8.4: Except as provided in Section A8.4 (5), the e.i.r.p. shall not exceed 4 W. Systems operating in the 2400-2483.5 MHz band that are used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6 dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.	Pass
FCC15.247(a)(2) 6dB Bandwidth **RSS-210 A8.2(a)**	15.247/A8.2: The minimum -6 dB bandwidth shall be at least 500 kHz.	Pass
FCC15.247(e) Spectral Density **RSS-210 A8.2(b)**	15.247/A8.2: The transmitter power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.	Pass
FCC15.247(d) Band Edge **RSS-210 A8.5** Out of band Emissions	15.247/A8.5: In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in FCC§15.209(a) & RSS-Gen is not required.	Pass
FCC15.247(e) Restricted Bands **RSS-Gen 8.10**	15.205: Radiated emissions which fall in the restricted bands, as defined in FCC §15.205(a), must also comply with the radiated emission limits specified in Sec. 15.209(a). Gen 8.10: Unwanted emissions falling into restricted bands of Table 6 shall comply with the limits of Table 4 specified in RSS-Gen 8.9.	Pass

Radiated emissions & Conducted emissions

Basic Standard	Test Details / Comments	Result
FCC15.209 Radiated Spurious and Harmonic Emissions **RSS-Gen 6.13** Transmitter Unwanted Emissions	15.209/4.9: The level of any unwanted emissions from an intentional radiator operating under these general provisions shall not exceed the level of the fundamental emission. Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the table specified in the table in FCC§15.209(a) and in RSS-Gen 8.9 6.13: Except when the requirements applicable to a given device state otherwise, emissions from licence-exempt transmitters shall comply with the field strength limits shown in Table 4 or Table 5 in section 8.9. Additionally, the level of any transmitter emission shall not exceed the level of the transmitter's fundamental emission.	Pass
FCC15.209 Conducted Emissions **RSS-Gen 8.8** AC Power Line Conducted Emissions	15.207: (a) Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 µH/50 ohms line impedance stabilization network (LISN). 8.8 : A radio apparatus that is designed to be connected to the public utility (AC) power line shall ensure that the radio frequency voltage, which is conducted back onto the AC power line on any frequency or frequencies within the band 0.15 MHz to 30 MHz shall not exceed the limits in Table 3 shown in this section.	Pass
RSS-Gen 5.0 Receiver Spurious Emission	5.0: Spurious emissions from receivers shall not exceed the radiated limits shown in Table 2 of section 7.1.2	Pass

* DFS measurements and MPE calculation to be reported in separate reports

Section 4: Sample Details

4.1 Sample Details

Sample Number	Equipment Description	Manufacture / Model#	Serial Number	Part Number
S01	Wireless router	Cisco / WRP-500-A-K9	CCQ17460S3U	97908111
S02	Switching Power Supply	PhiHong / PSAA20R-120	P140402781A3	----------

4.2 System Details

System #	Description	Samples
1	Radio Test Sample and Power Supply	S01 & S02

4.3 Mode of Operation Details

Mode#	Description	Comments
1,2,3,4	802.11b,g,n20,n40 Test Mode	System shall be placed in a continuous Transmitter Mode at various data rate and channel combinations per all Transmitter Test Requirements. For Receiver Spurious Emissions test, the system shall be set to Receiver/Standby Mode.

4.4 Test Mode, Modulation and Data Rate Description

Mode#	Test Mode	Modulation	Data Rate
1	802.11b	DBPSK	1 Mbps
2	802.11g	DBPSK	6 Mbps
3	802.11n (HT20)	BPSK	6.5 Mbps (MCS0)
4	802.11n (HT40)	BPSK	13.5 Mbps (MCS0)
Note1: Table above represents the worst case scenarios for all modulation and data rate.			

4.5 Antenna Information

The following antennas were evaluated as part of this testing process. The antennas listed reflect the maximum gain allowed for each family type of antenna:

External Dual Band Antenna at 2.4 GHz, Gain:
2400 – 2500MHz: 2.0dBi (Peak)
4900 – 5825MHz: 2.0dBi (Peak)

Section 5: Modifications

5.1 Sample Modifications Performed During Assessment

No modifications were performed during assessment.

Section 6: Target Maximum Channel Power

Note: Each sample was evaluated to ensure that its condition was suitable to be used as a test sample prior to the commencement of testing. During preliminary testing, slowest data rate setting was evaluated to determine the "Worst Case" mode.

The following table details the maximum supported Total Channel Power for all operating modes.

Operating Mode	Maximum Channel Power (dBm)		
	Frequency (MHz)		
	2412	**2437**	**2462**
802.11b (MCS0 – MCS3) up to 11 Mbps	17	17	17
802.11g (MCS0 – MCS7) up to 54 Mbps	13	17	13
802.11n HT20 (MCS0 – MCS15) up to 130 Mbps	12	17	12
	2422	**2437**	**2452**
802.11n HT40 (MCS0 – MCS15) up to 270 Mbps	9	17	9

Note: 802.11 MCS0 shows worst case emission of all modes.

Section 7: Test Data & Measurement Plots

99% and -6dB Bandwidth

FCC 15.247(a) (2)/ RSS-210 A8.2(a): The -6 dB emission bandwidth is defined as the frequency range between two points, one above and one below the carrier frequency, at which the spectral density of the emission is attenuated 6 dB below the maximum in-band spectral density of the modulated signal.

The minimum -6 dB bandwidth shall be at least 500 kHz.

The 99% occupied bandwidth is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers are each equal to 0.5% of the total mean power of the given emission.

Test Procedure

Ref. KDB 558074 DTS Meas Guidance v3.2 section 8.1 Option 2 / RSS-Gen issue 3 section 4.6.1

99% BW and EBW (-6dB) Test Procedure
1. The radio is configured in the continuous transmitting mode. 2. Allow the trace to stabilize. 3. Setting the x-dB bandwidth mode to -6dB and OBW power function to 99% within the measurement set up function. 4. Select the automatic OBW measurement function of an instrument to perform bandwidth measurement. 5. Capture graphs and record pertinent measurement data.

99% BW and EBW (-6dB) Test parameters
Span =Wide enough to capture the entire emission bandwidth RBW =100 kHz VBW ≥ 3 x RBW Detector =Peak Trace = Max. Hold Sweep = Auto couple

99% and 6dB Bandwidth for 802.11b mode

Frequency (MHz)	Data Rate (Mbps)	Ant. Port0 99% BW (MHz)	Ant. Port0 6dB BW (MHz)	Ant. Port1 99% BW (MHz)	Ant. Port1 6dB BW (MHz)	Limit 6dB BW (kHz)	Result
2412	1	12.27	10.10	12.34	10.10	≥ 500	Pass
2437	1	12.26	10.10	12.32	10.10	≥ 500	Pass
2462	1	12.29	10.10	12.36	10.10	≥ 500	Pass

99% and 6dB Bandwidth for 802.11g mode

Frequency (MHz)	Data Rate (Mbps)	Ant. Port0 99% BW (MHz)	Ant. Port0 6dB BW (MHz)	Ant. Port1 99% BW (MHz)	Ant. Port1 6dB BW (MHz)	Limit 6dB BW (kHz)	Result
2412	6	16.49	16.61	16.50	16.61	≥ 500	Pass
2437	6	16.60	16.61	16.64	16.61	≥ 500	Pass
2462	6	16.50	16.59	16.49	16.59	≥ 500	Pass

99% and 6dB Bandwidth for 802.11n (HT20) mode

Frequency (MHz)	Data Rate (Mbps)	Ant. Port0 99% BW (MHz)	Ant. Port0 6dB BW (MHz)	Ant. Port1 99% BW (MHz)	Ant. Port1 6dB BW (MHz)	Limit 6dB BW (kHz)	Result
2412	6.5	17.59	17.76	17.58	17.74	≥ 500	Pass
2437	6.5	17.66	17.79	17.71	17.78	≥ 500	Pass
2462	6.5	17.59	17.76	17.58	17.75	≥ 500	Pass

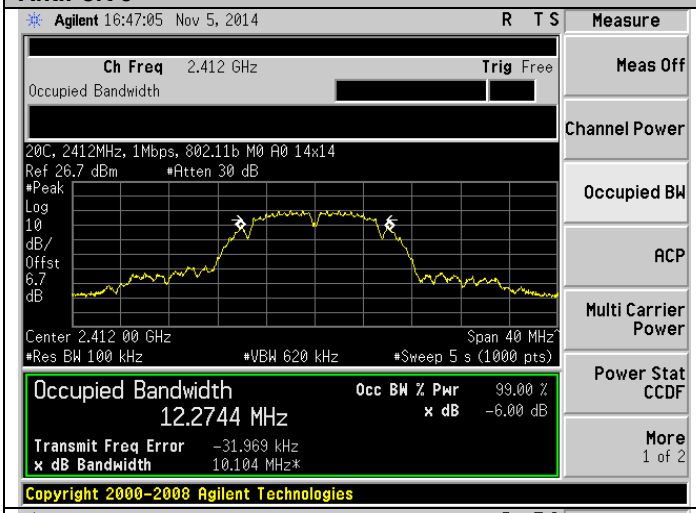
99% and 6dB Bandwidth for 802.11n (HT40) mode

Frequency (MHz)	Data Rate (Mbps)	Ant. Port0 99% BW (MHz)	Ant. Port0 6dB BW (MHz)	Ant. Port1 99% BW (MHz)	Ant. Port1 6dB BW (MHz)	Limit 6dB BW (kHz)	Result
2422	13.5	36.19	36.50	36.18	36.49	≥ 500	Pass
2437	13.5	36.32	36.51	36.38	36.47	≥ 500	Pass
2452	13.5	36.18	36.48	36.20	36.48	≥ 500	Pass

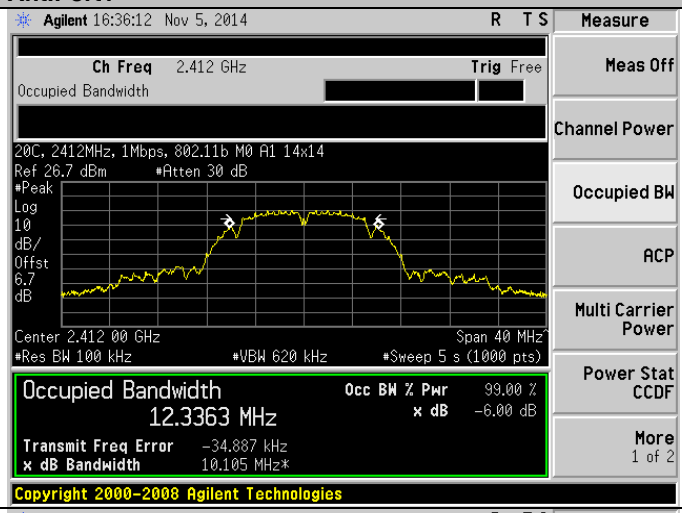
Graphical Test Results:

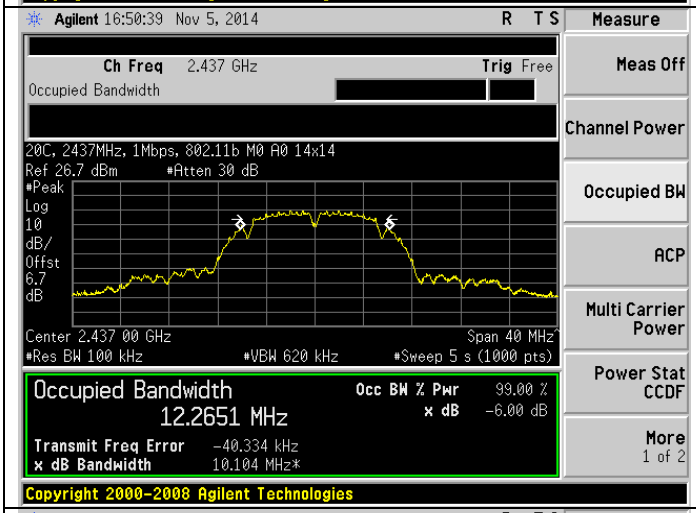
802.11b, 1Mbps	99% Bandwidth & 6 dB Bandwidth

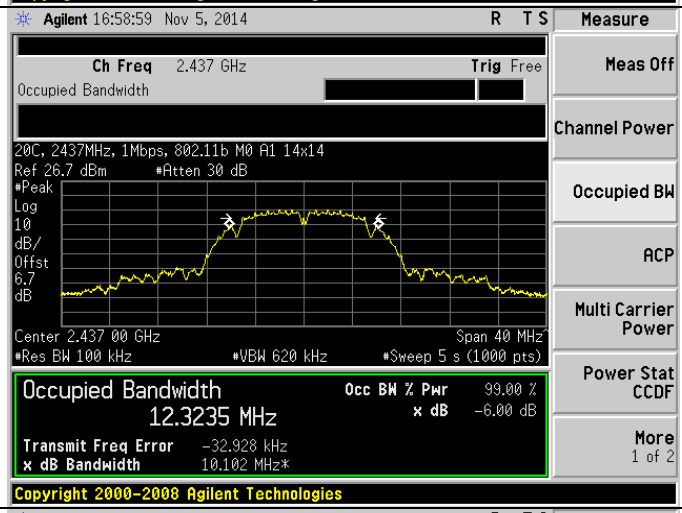
Ant.Port 0

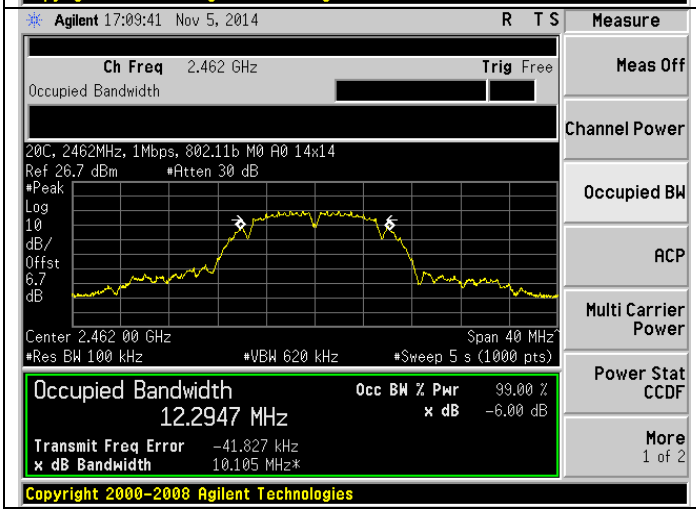


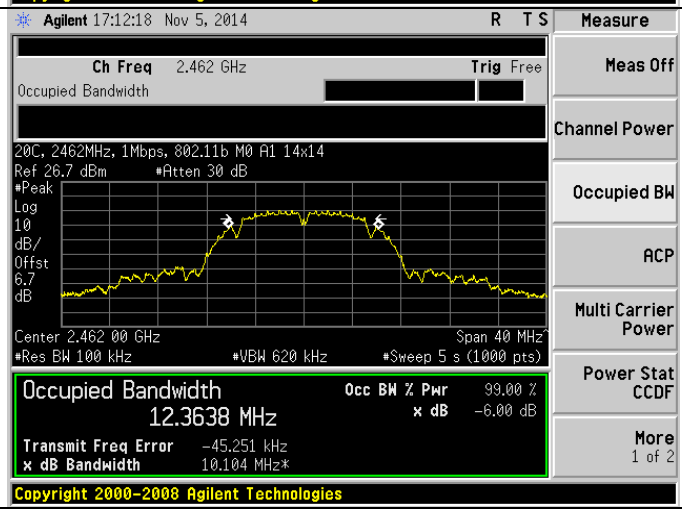
Ant.Port1



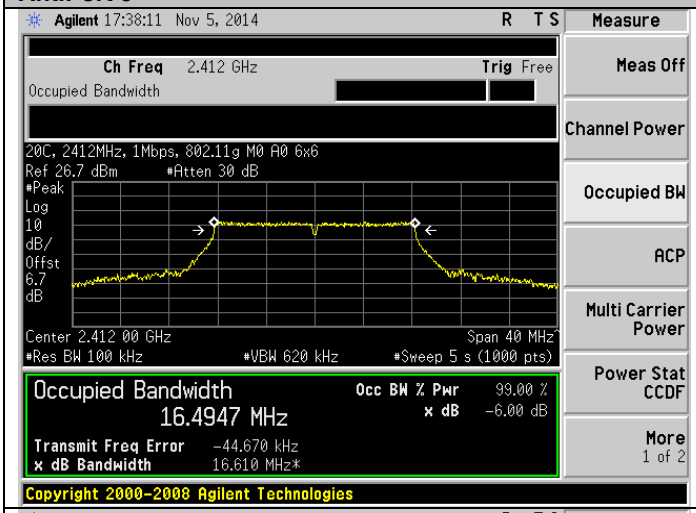


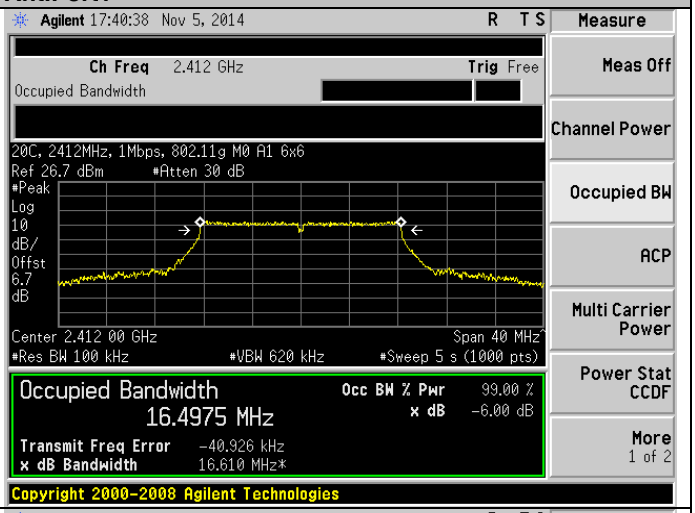


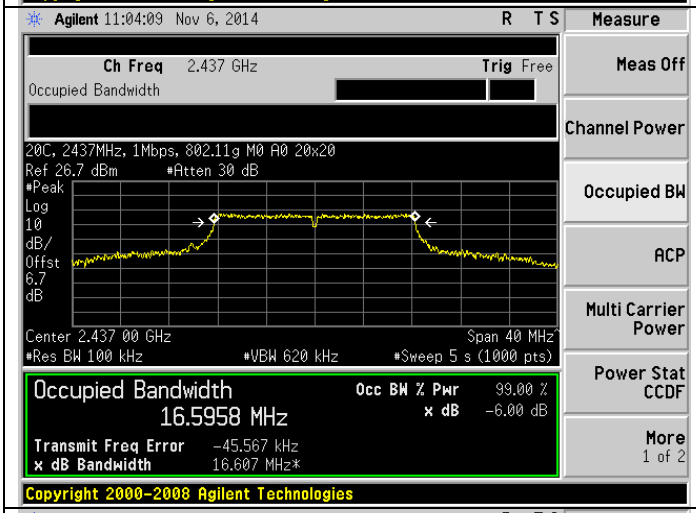


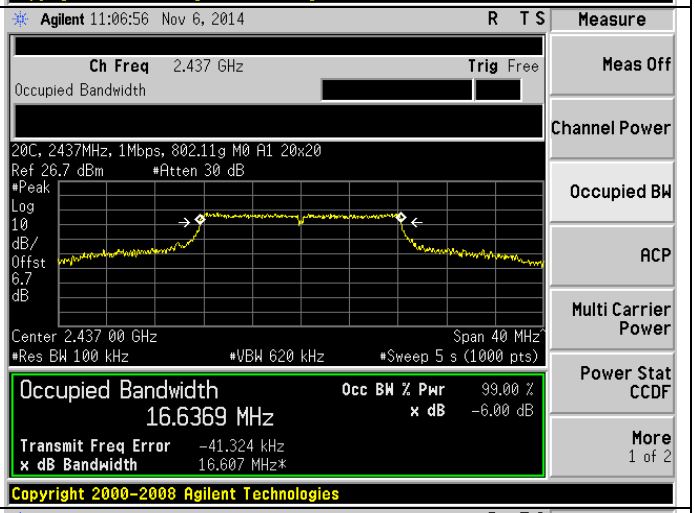


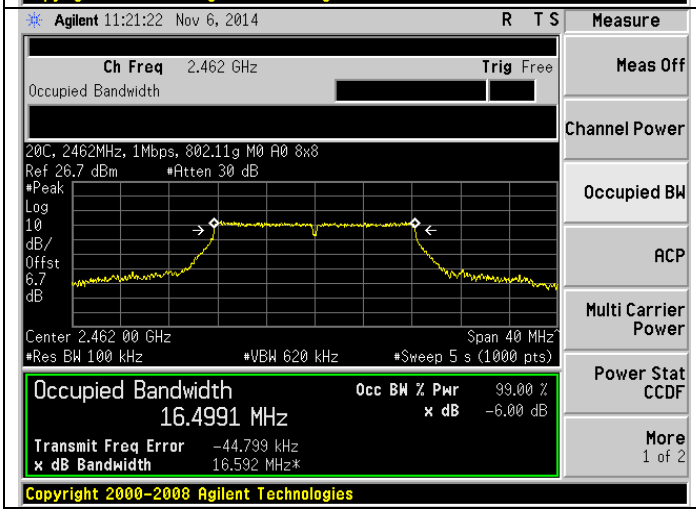
802.11g, 6Mbps	99% Bandwidth & 6 dB Bandwidth
Ant.Port 0	**Ant.Port1**

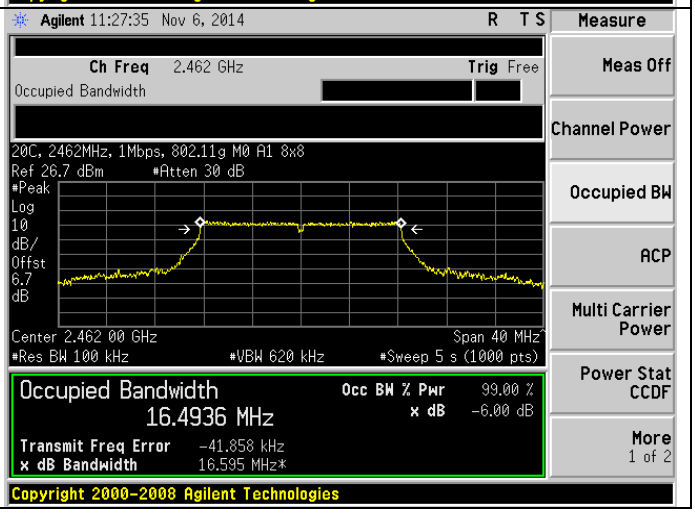






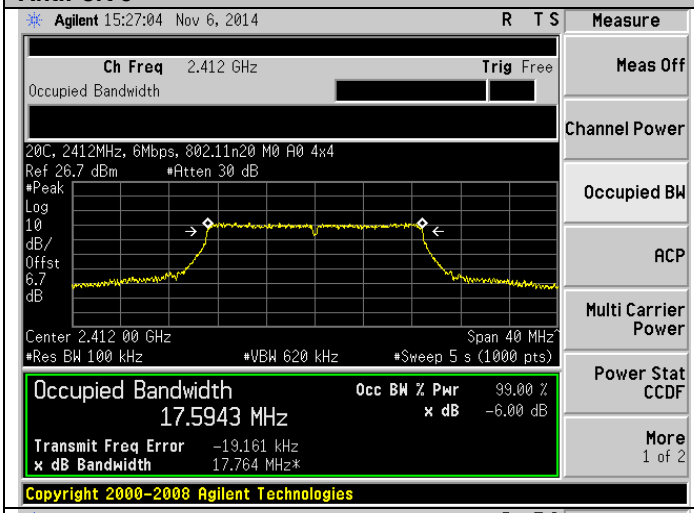




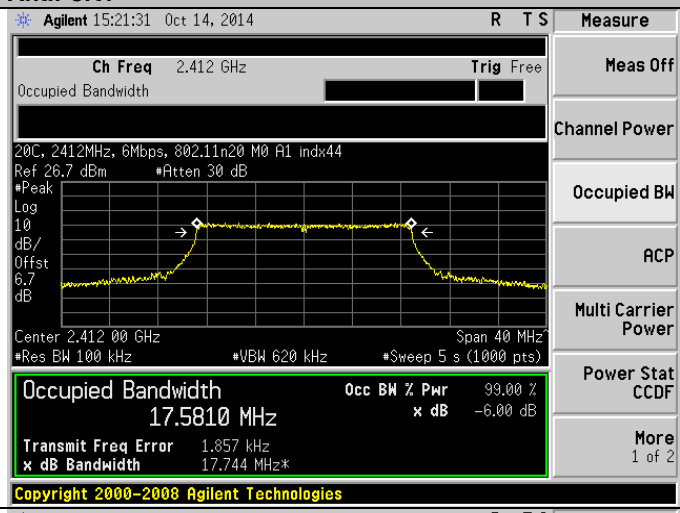


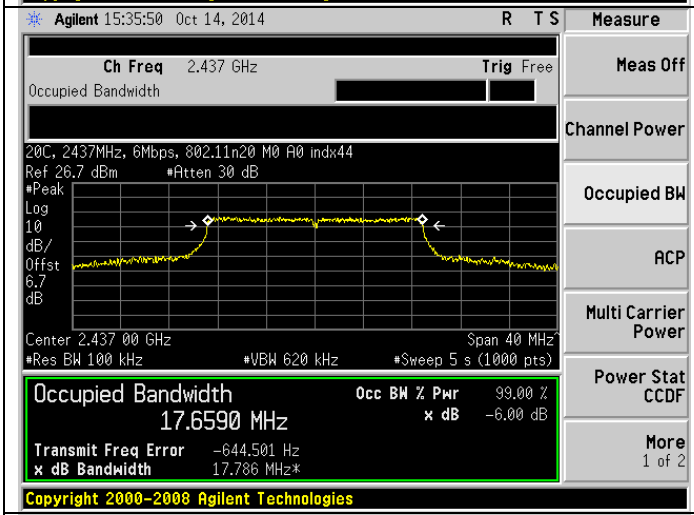
802.11n (HT20), 6.5Mbps	99% Bandwidth & 6 dB Bandwidth

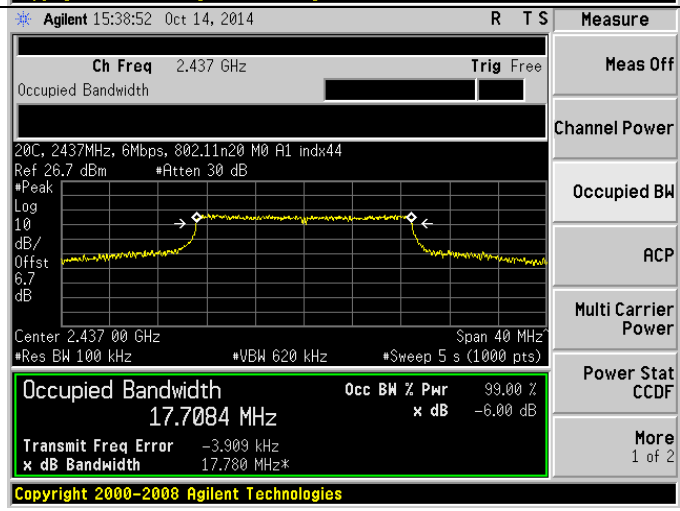
Ant.Port 0

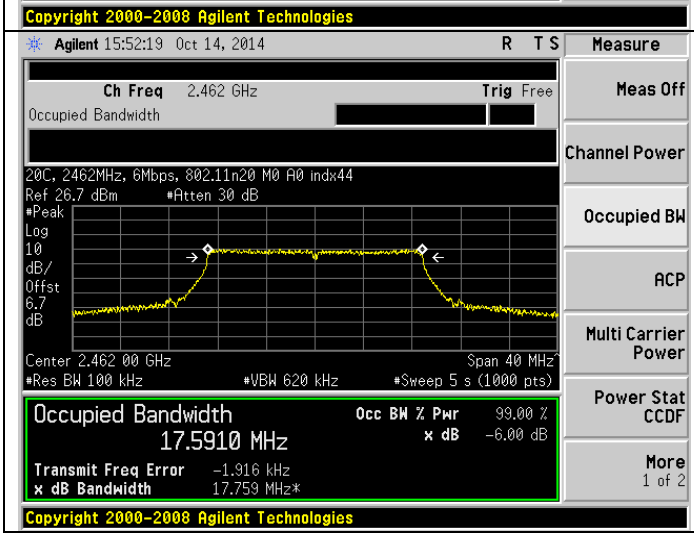


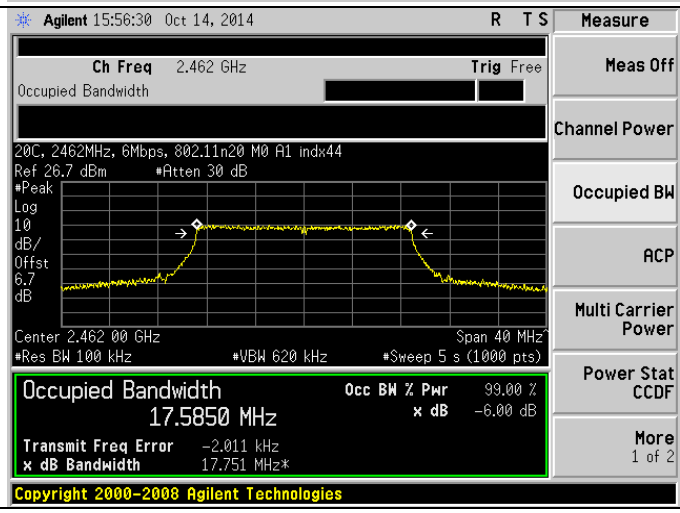
Ant.Port1





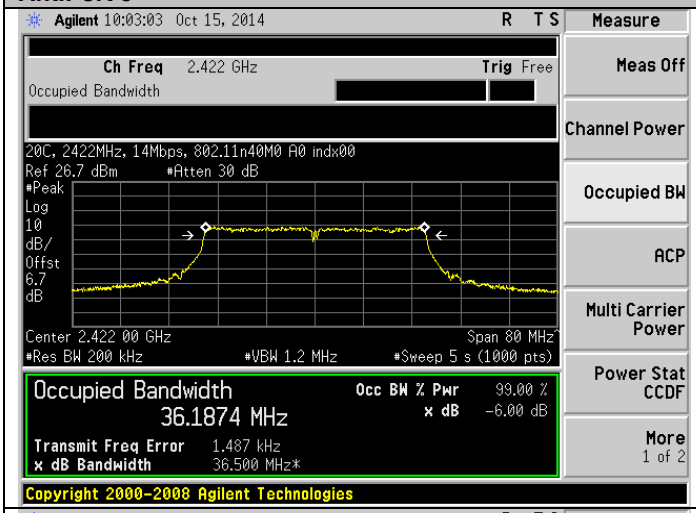




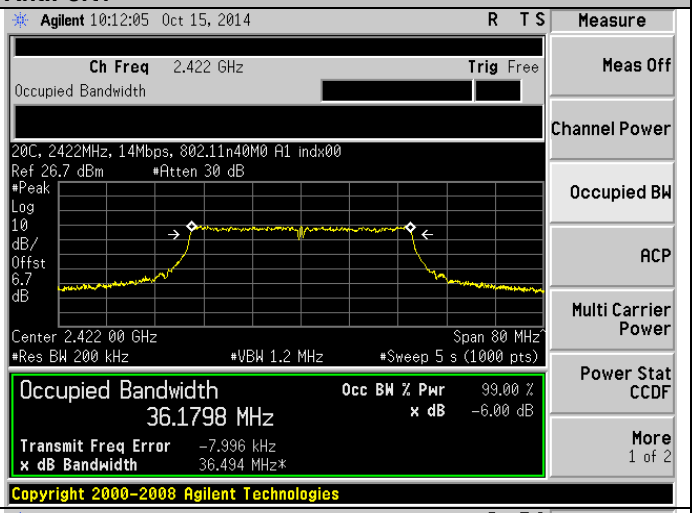


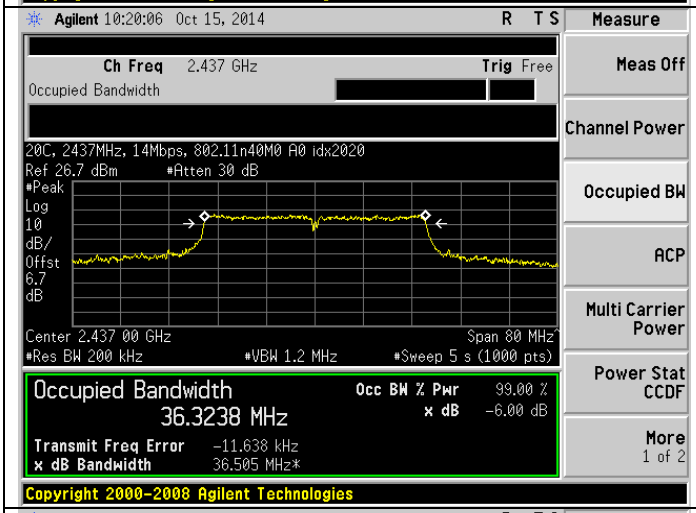
802.11n (HT40), 13.5Mbps	99% Bandwidth & 6 dB Bandwidth

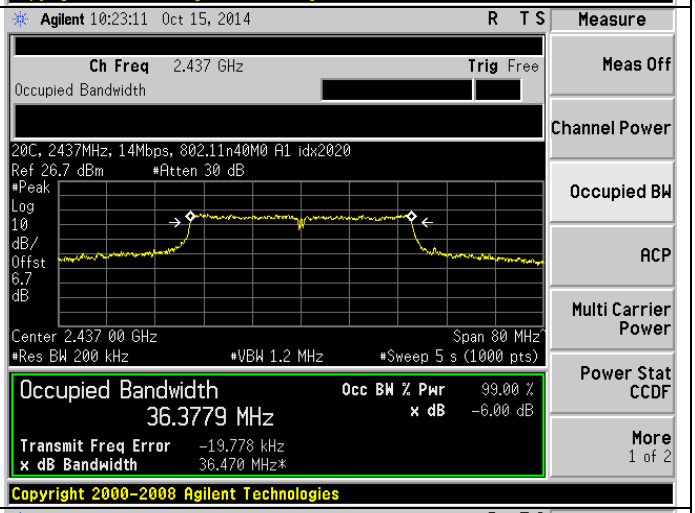
Ant.Port 0

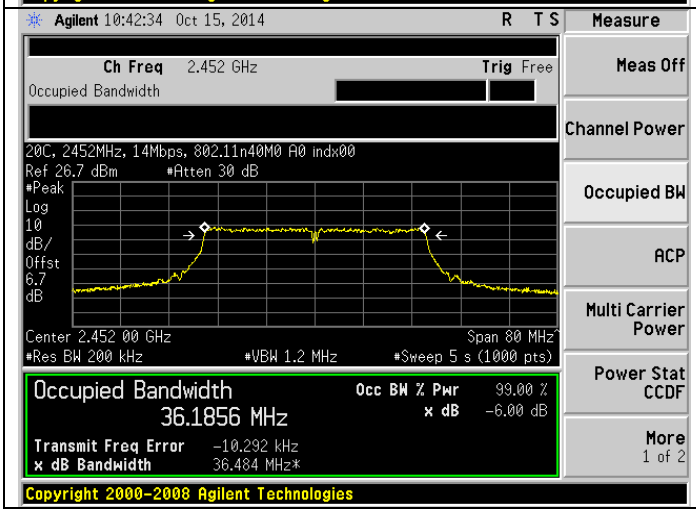


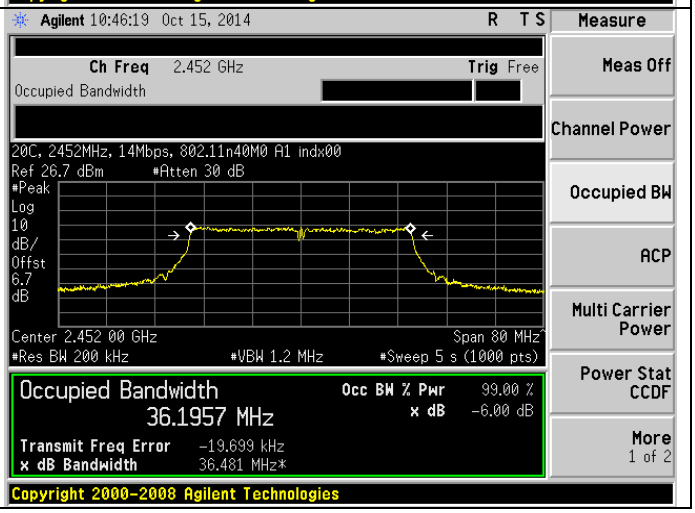
Ant.Port1











Maximum Conducted Output power

FCC15.247 (b) (3): The maximum conducted output power of the intentional radiator for systems using digital modulation in the 2400-2483.5MHz band shall not exceed 1 Watt (30dBm). If transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

RSS-210 A8.4 (4): For systems employing digital modulation techniques operating in the bands 2400-2483.5 MHz and 5725-5850 MHz, the maximum peak conducted output power shall not exceed 1 W. Except as provided in Section A8.4 (5), the e.i.r.p. shall not exceed 4 W.

Antenna gain =	2.0 dBi

Test Procedure

Ref. KDB 558074 DTS Meas Guidance v3.2 section 9.2.2.2

Max. Conducted Output Power Test Procedure
1. Set the radio in the continuous transmitting mode. 2. Compute power by integrating the spectrum across the OBW of the signal using the instrument's band power measurement function. The integration shall be performed using the spectrum analyzer band-power measurement function with band limits set equal to the OBW band edges. 3. Capture graphs and record pertinent measurement data.

Ref. KDB 558074 DTS Meas Guidance v3.2 section 9.2.2.2

Max. Conducted Output Power Test parameters
Span ≥ 1.5 times the OBW RBW = 1 – 5% of the OBW, not to exceed 1 MHz VBW ≥ 3 x RBW Detector = RMS Trace Average ≥ 100 Sweep = Auto Sweep Points ≥ 2 x span/ RBW.

Recorded Test Data:

Max. Conducted Output Power for 802.11b mode

Frequency (MHz)	Data Rate (Mbps)	Ant. Port0 Max. Conducted Output Power (dBm)	Ant. Port1 Max. Conducted Output Power (dBm)	Total Power Ant.P0+Ant.P1 (mW)	/ (dBm)	Limit (dBm)	Result
2412	1	17.23	17.61	110.5	20.43	30	Pass
2437	1	16.80	17.36	102.3	20.10	30	Pass
2462	1	16.94	17.46	105.1	20.22	30	Pass

Max. Conducted Output Power for 802.11b mode

Frequency (MHz)	Data Rate (Mbps)	Ant. Port0 Max. Conducted Output Power (dBm)	Ant. Port1 Max. Conducted Output Power (dBm)	Total Power Ant.P0+Ant.P1 (mW)	/ (dBm)	Limit (dBm)	Result
2412	11	17.17	17.62	109.9	20.41	30	Pass
2437	11	16.73	17.24	100.1	20.00	30	Pass
2462	11	16.88	17.45	104.3	20.18	30	Pass

EIRP for 802.11b mode

Frequency (MHz)	Data Rate (Mbps)	Total Power AP0 + AP1 (mW)	/ (dBm)	Total EIRP = Total Power + Ant.G (dBm)	Limit (dBm)	Result
2412	1	110.5	20.43	22.43	36	Pass
2437	1	102.3	20.10	22.10	36	Pass
2462	1	105.1	20.22	22.22	36	Pass

EIRP for 802.11b mode

Frequency (MHz)	Data Rate (Mbps)	Total Power AP0 + AP1 (mW)	/ (dBm)	Total EIRP = Total Power + Ant.G (dBm)	Limit (dBm)	Results
2412	11	109.9	20.41	22.41	36	Pass
2437	11	100.1	20.00	22.00	36	Pass
2462	11	104.3	20.18	22.18	36	Pass

Max. Conducted Output Power for 802.11g mode

Frequency (MHz)	Data Rate (Mbps)	Ant. Port0 Max. Conducted Output Power (dBm)	Ant. Port1 Max. Conducted Output Power (dBm)	Total Power Ant.P0+Ant.P1 (mW) / (dBm)		Limit (dBm)	Result
2412	6	13.25	13.54	43.73	16.41	30	Pass
2437	6	18.23	18.38	135.4	21.32	30	Pass
2462	6	12.96	13.43	41.80	16.21	30	Pass

Max. Conducted Output Power for 802.11g mode

Frequency (MHz)	Data Rate (Mbps)	Ant. Port0 Max. Conducted Output Power (dBm)	Ant. Port1 Max. Conducted Output Power (dBm)	Total Power Ant.P0+Ant.P1 (mW) / (dBm)		Limit (dBm)	Result
2412	54	10.93	11.41	26.22	14.19	30	Pass
2437	54	16.02	16.41	83.75	19.23	30	Pass
2462	54	10.60	11.10	24.36	13.87	30	Pass

EIRP for 802.11g mode

Frequency (MHz)	Data Rate (Mbps)	Total Power AP0 + AP1 (mW) / (dBm)		Total EIRP = Total Power + Ant.G (dBm)	Limit (dBm)	Result
2412	6	43.73	16.41	18.41	36	Pass
2437	6	135.4	21.32	23.32	36	Pass
2462	6	41.80	16.21	18.21	36	Pass

EIRP for 802.11g mode

Frequency (MHz)	Data Rate (Mbps)	Total Power AP0 + AP1 (mW) / (dBm)		Total EIRP = Total Power + Ant.G (dBm)	Limit (dBm)	Result
2412	54	26.22	14.19	16.19	36	Pass
2437	54	83.75	19.23	21.23	36	Pass
2462	54	24.36	13.87	15.87	36	Pass

Max. Conducted Output Power for 802.11n (HT20) mode

Frequency (MHz)	Data Rate (Mbps)	Ant. Port0 Max. Conducted Output Power (dBm)	Ant. Port1 Max. Conducted Output Power (dBm)	Total Power Ant.P0+Ant.P1 (mW)	/ (dBm)	Limit (dBm)	Result
2412	6.5	12.25	12.20	33.38	15.23	30	Pass
2437	6.5	17.48	17.54	112.7	20.52	30	Pass
2462	6.5	10.94	11.03	25.09	13.99	30	Pass

Max. Conducted Output Power for 802.11n (HT20) mode

Frequency (MHz)	Data Rate (Mbps)	Ant. Port0 Max. Conducted Output Power (dBm)	Ant. Port1 Max. Conducted Output Power (dBm)	Total Power Ant.P0+Ant.P1 (mW)	/ (dBm)	Limit (dBm)	Result
2412	65	9.08	9.37	16.74	12.24	30	Pass
2437	65	14.83	15.02	62.18	17.94	30	Pass
2462	65	7.69	7.93	12.08	10.82	30	Pass

EIRP for 802.11n (HT20) mode

Frequency (MHz)	Data Rate (Mbps)	Total Power AP0 + AP1 (mW)	/ (dBm)	Total EIRP = Total Power + Ant.G (dBm)	Limit (dBm)	Result
2412	6.5	33.38	15.23	17.23	36	Pass
2437	6.5	112.7	20.52	22.52	36	Pass
2462	6.5	25.09	13.99	15.99	36	Pass

EIRP for 802.11n (HT20) mode

Frequency (MHz)	Data Rate (Mbps)	Total Power AP0 + AP1 (mW)	/ (dBm)	Total EIRP = Total Power + Ant.G (dBm)	Limit (dBm)	Results
2412	65	7.16	8.55	10.55	36	Pass
2437	65	62.18	17.94	19.94	36	Pass
2462	65	12.08	10.82	12.82	36	Pass

Max. Conducted Output Power for 802.11n (HT40) mode

Frequency (MHz)	Data Rate (Mbps)	Ant. Port0 Max. Conducted Output Power (dBm)	Ant. Port1 Max. Conducted Output Power (dBm)	Total Power Ant.P0+Ant.P1 (mW)	/ (dBm)	Limit (dBm)	Result
2422	13.5	9.55	9.91	18.81	12.74	30	Pass
2437	13.5	17.18	17.42	107.4	20.31	30	Pass
2452	13.5	9.03	9.27	16.45	12.16	30	Pass

Max. Conducted Output Power for 802.11n (HT40) mode

Frequency (MHz)	Data Rate (Mbps)	Ant. Port0 Max. Conducted Output Power (dBm)	Ant. Port1 Max. Conducted Output Power (dBm)	Total Power Ant.P0+Ant.P1 (mW)	/ (dBm)	Limit (dBm)	Result
2422	270	6.32	6.75	9.02	9.55	30	Pass
2437	270	14.60	14.77	58.83	17.69	30	Pass
2452	270	5.93	6.16	8.05	9.06	30	Pass

EIRP for 802.11n (HT40) mode

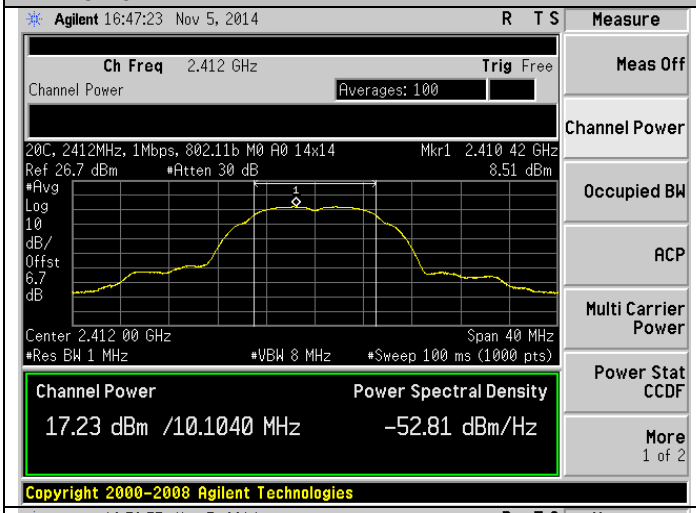
Frequency (MHz)	Data Rate (Mbps)	Total Power AP0 + AP1 (mW)	/ (dBm)	Total EIRP = Total Power + Ant.G (dBm)	Limit (dBm)	Result
2422	13.5	18.81	12.74	14.74	36	Pass
2437	13.5	107.4	20.31	22.31	36	Pass
2452	13.5	16.45	12.16	14.16	36	Pass

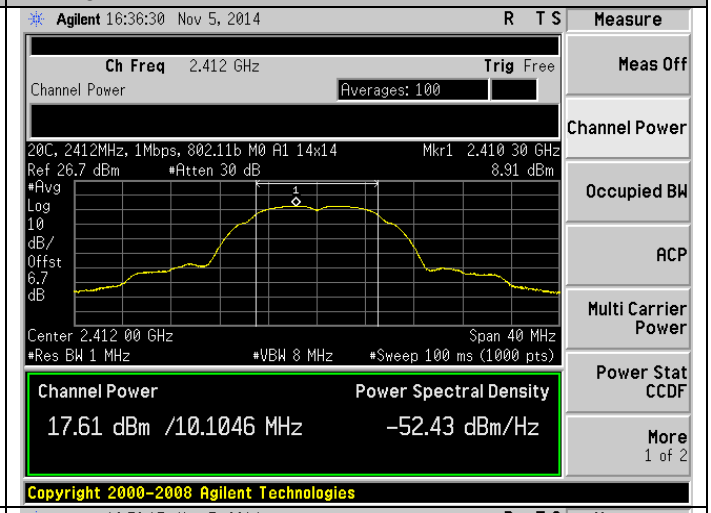
EIRP for 802.11n (HT40) mode

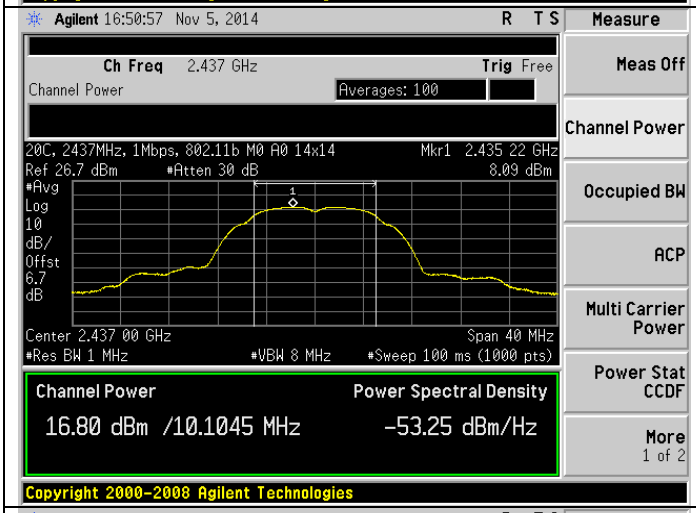
Frequency (MHz)	Data Rate (Mbps)	Total Power AP0 + AP1 (mW)	/ (dBm)	Total EIRP = Total Power + Ant.G (dBm)	Limit (dBm)	Result
2422	270	9.02	9.55	11.55	36	Pass
2437	270	58.83	17.69	19.69	36	Pass
2452	270	8.05	9.06	11.06	36	Pass

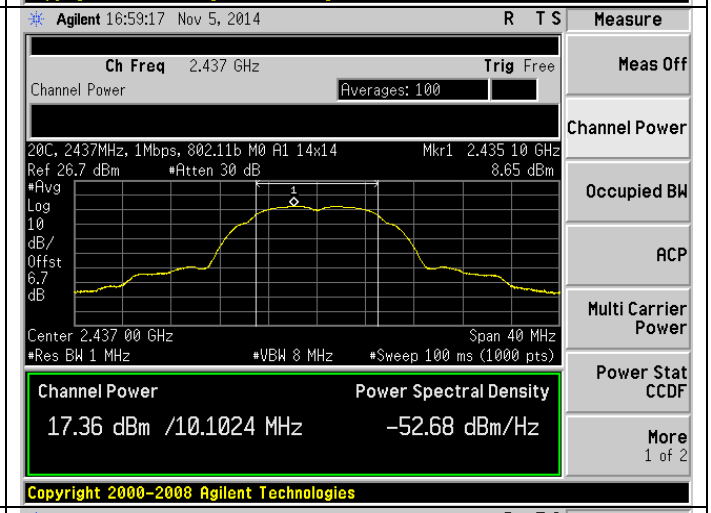
Graphical Test Results for 802.11b Mode (Lowest Data Rate):

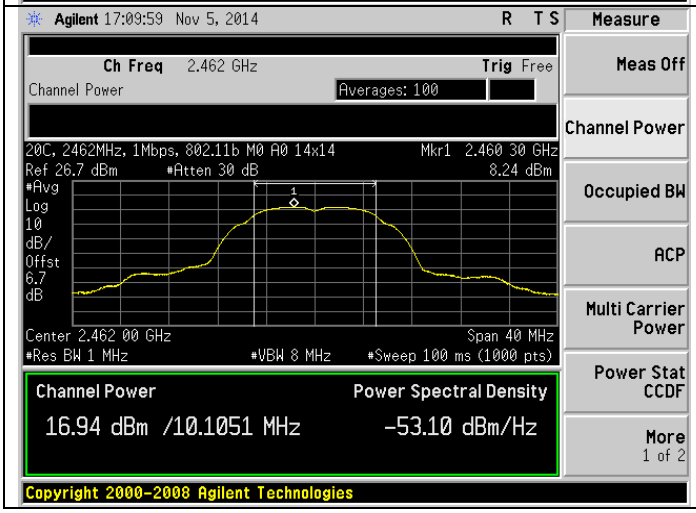
802.11b, 1Mbps	Maximum Conducted Output Power
Ant.Port 0	**Ant.Port1**

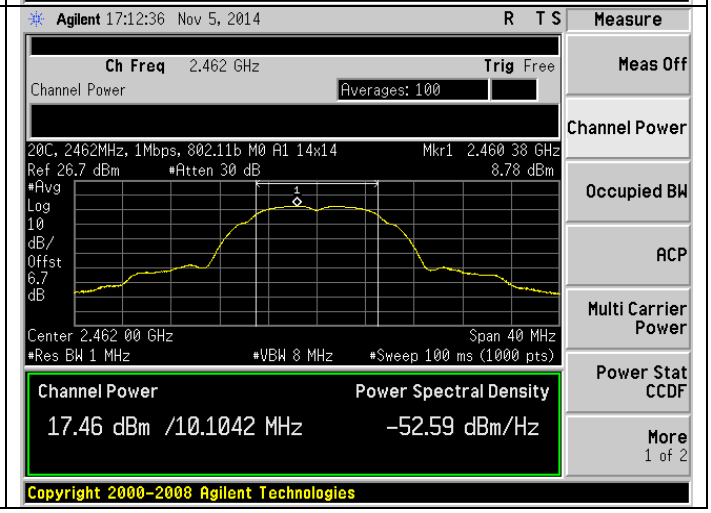






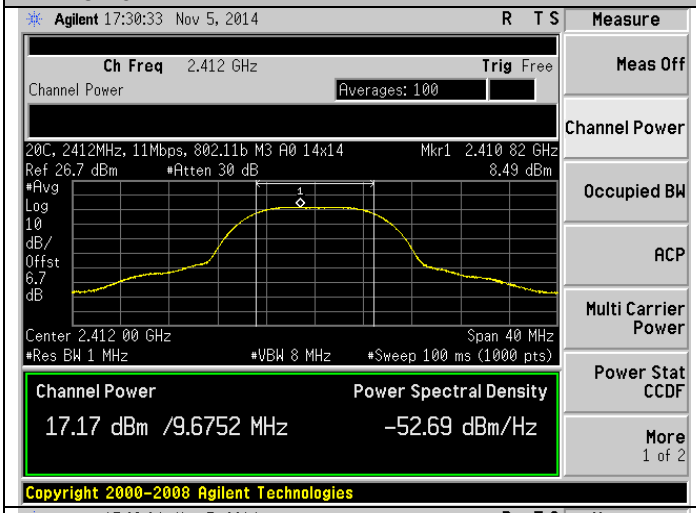


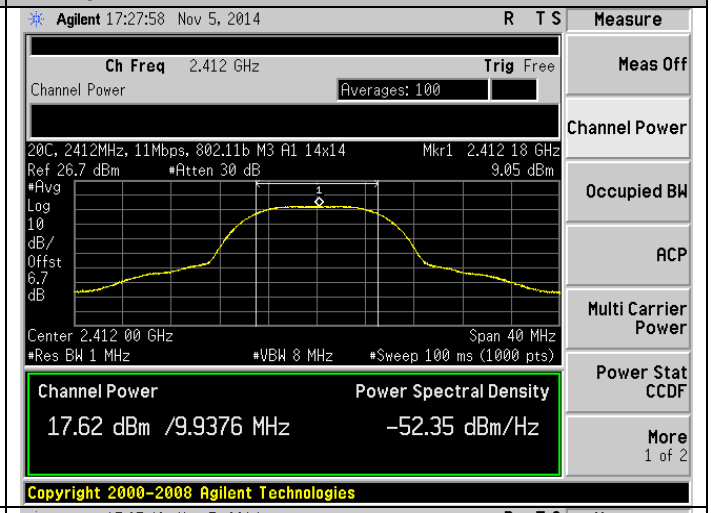


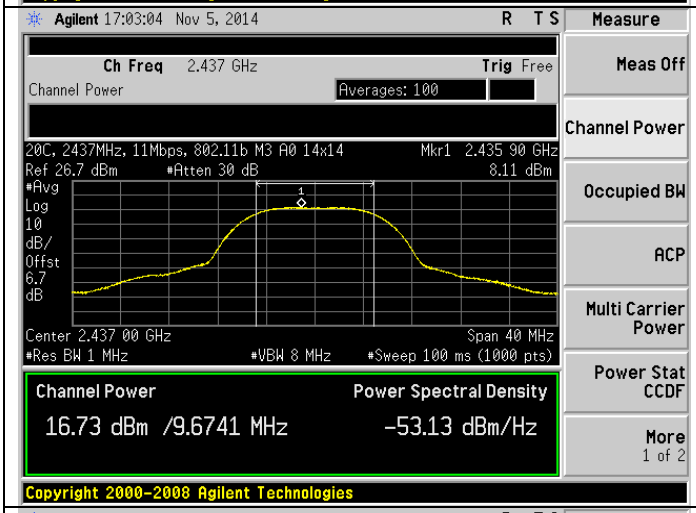


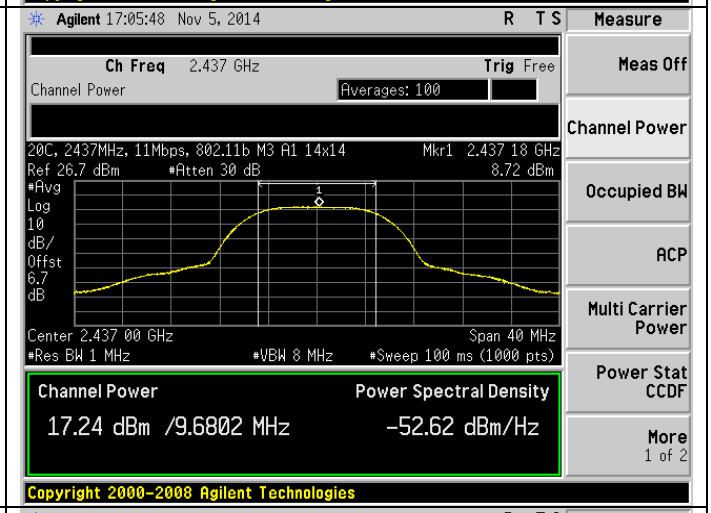
Graphical Test Results 802.11b Mode (Highest Data Rate):

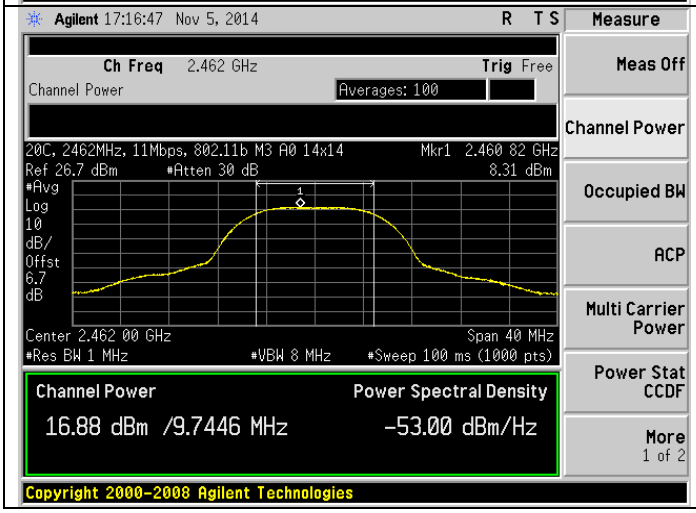
802.11b, 11Mbps	Maximum Conducted Output Power
Ant.Port 0	**Ant.Port1**

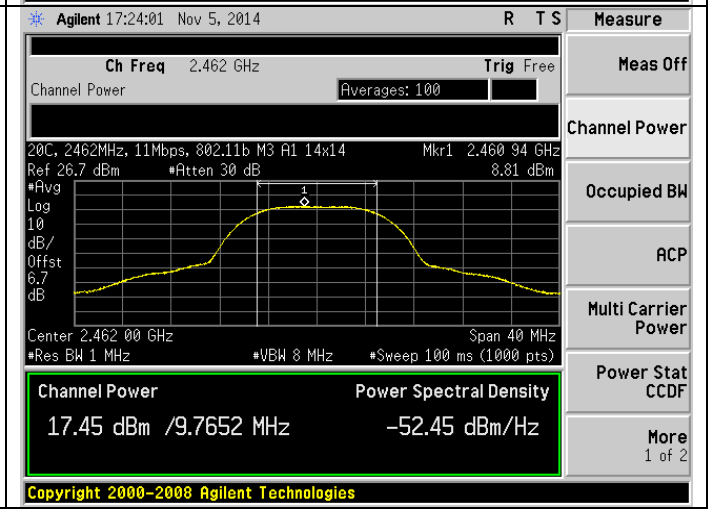






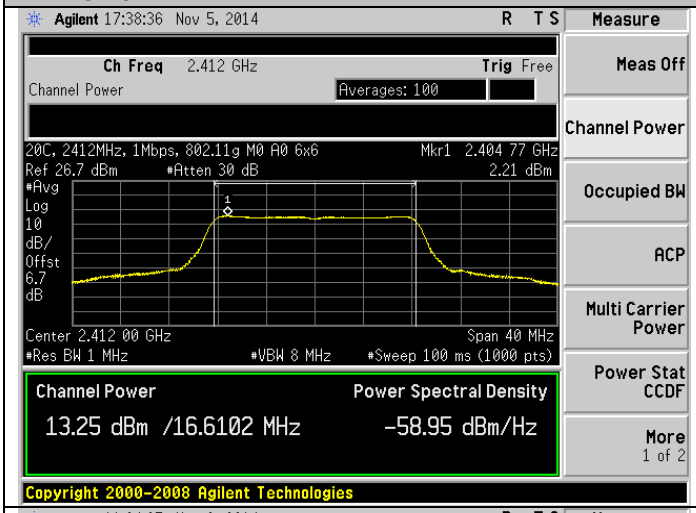


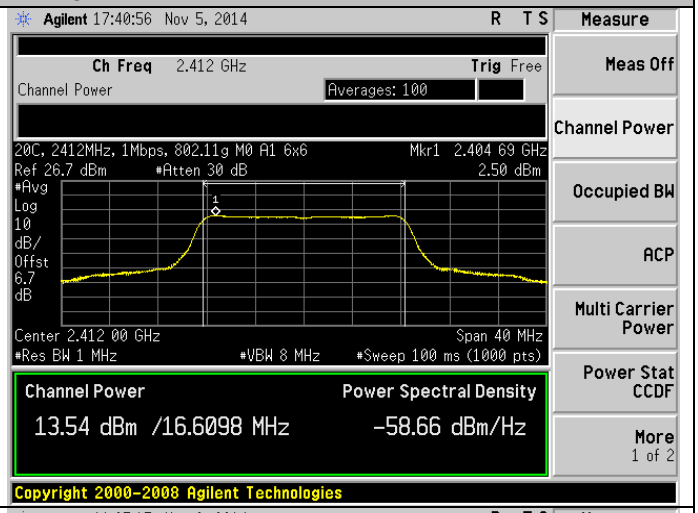


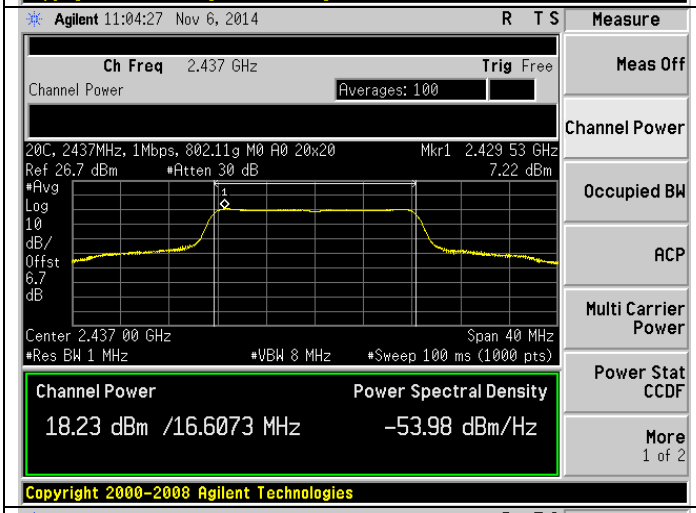


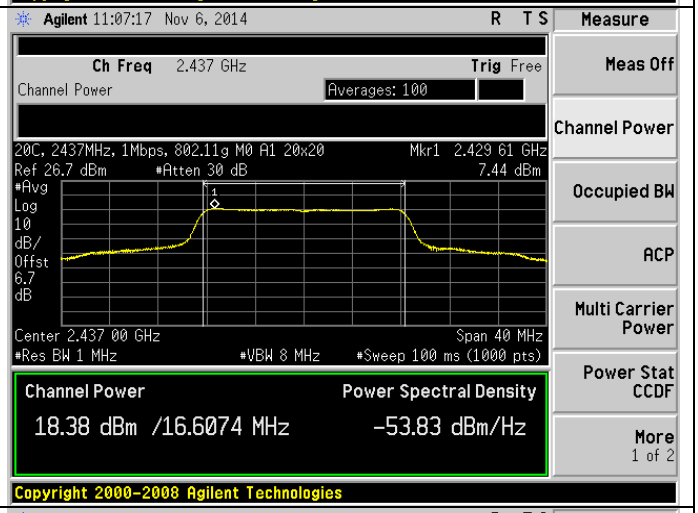
Graphical Test Results for 802.11g Mode (Lowest Data Rate):

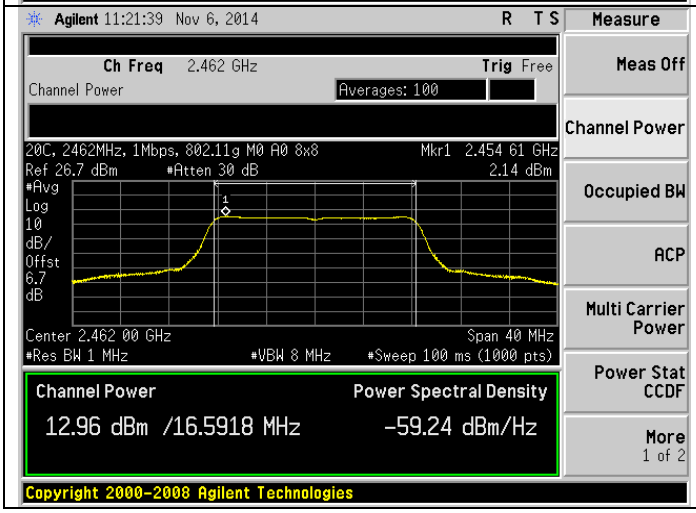
802.11g, 6Mbps	Maximum Conducted Output Power
Ant.Port 0	**Ant.Port1**

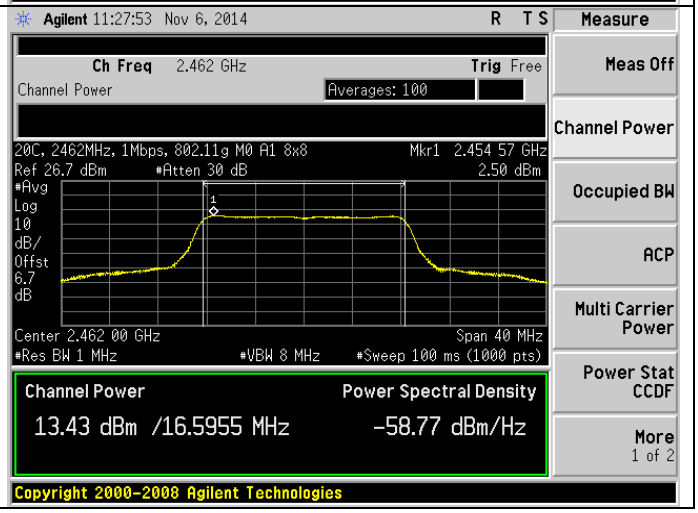






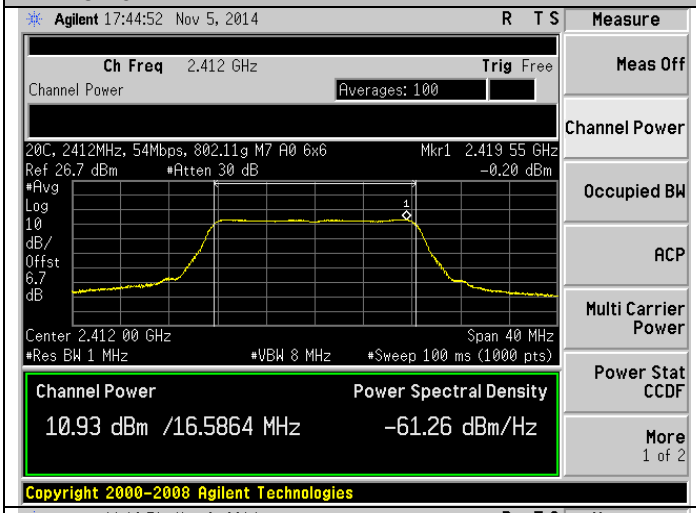


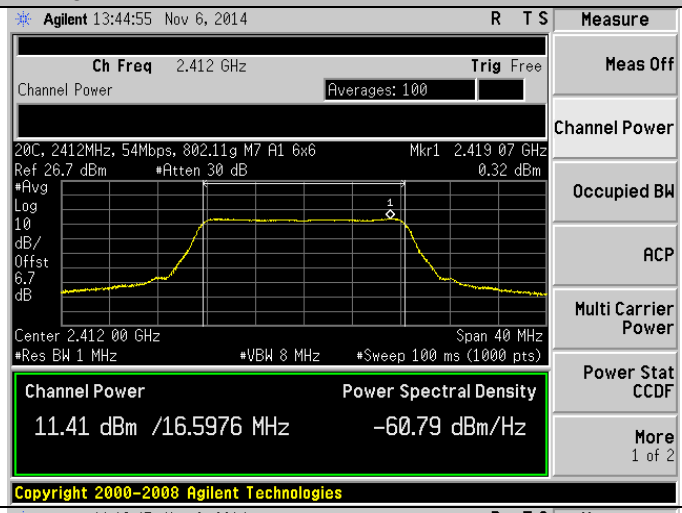


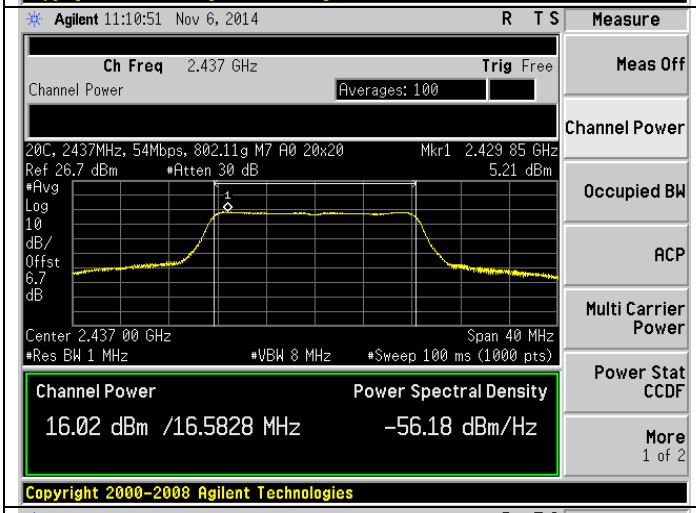


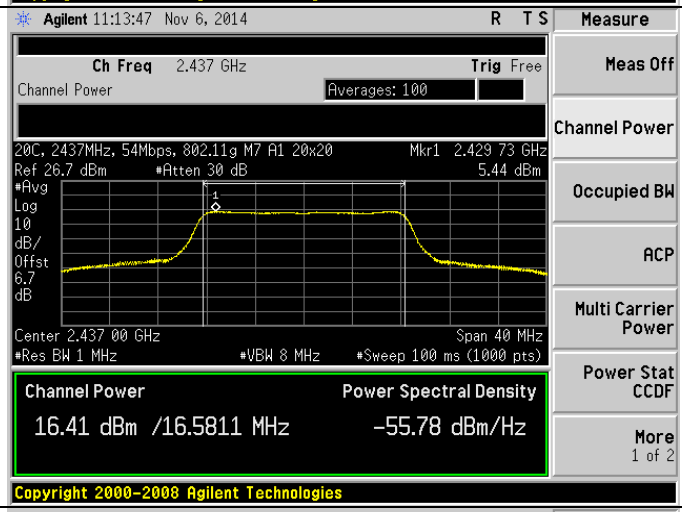
Graphical Test Results for 802.11g Mode (Highest Data Rate):

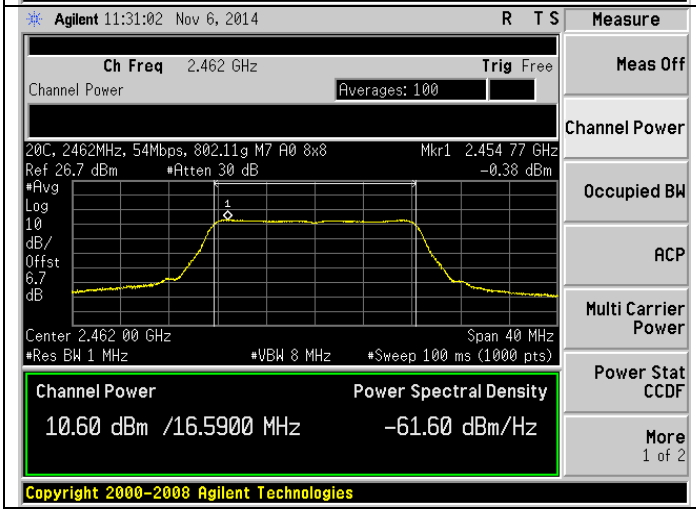
802.11g, 54Mbps	Maximum Conducted Output Power
Ant.Port 0	**Ant.Port1**

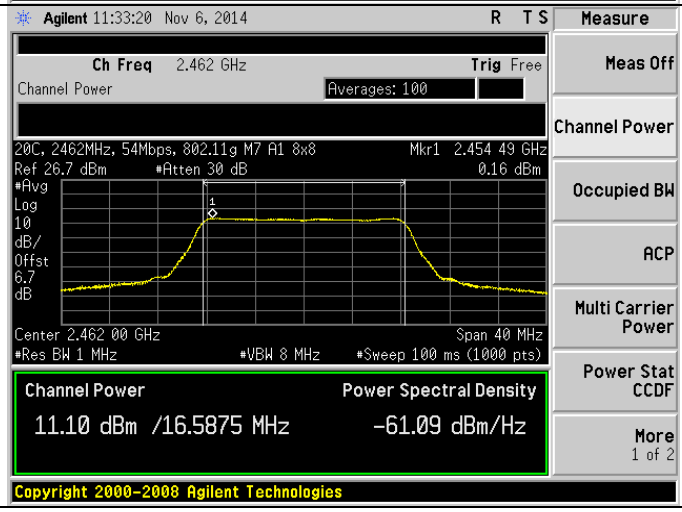






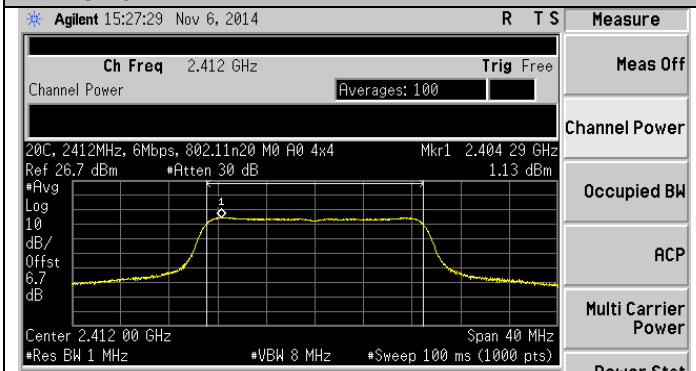


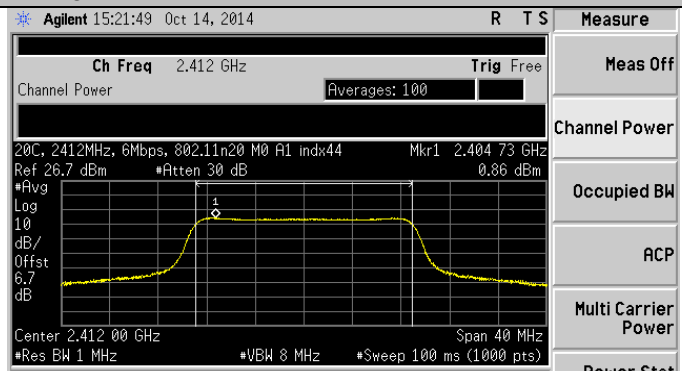


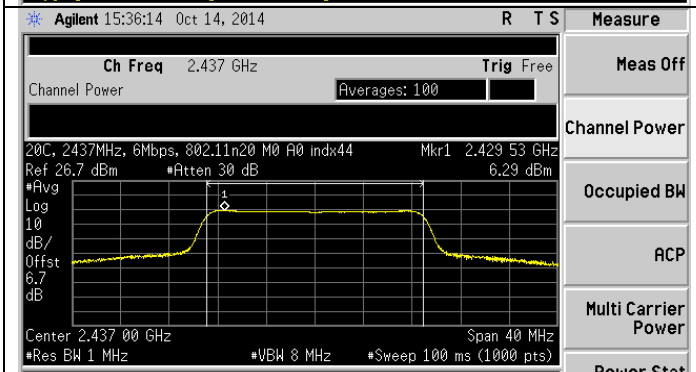


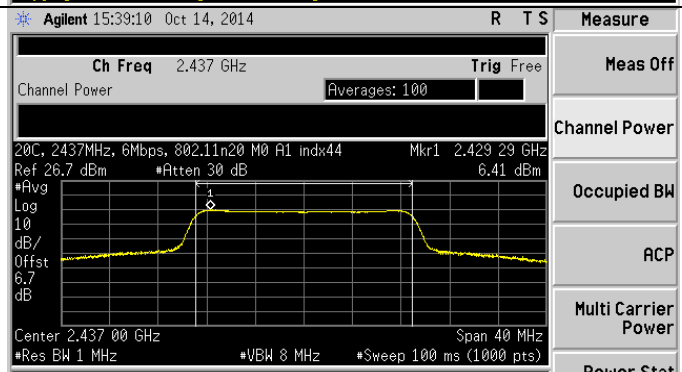
Graphical Test Results for 802.11n (HT20) Mode (Lowest Data Rate):

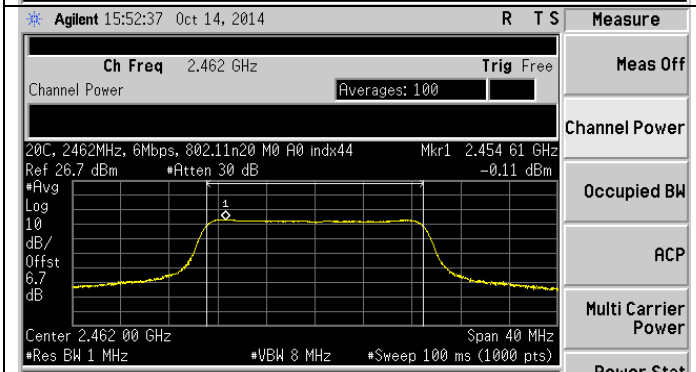
802.11n (HT20), 6.5Mbps	Maximum Conducted Output Power
Ant.Port 0	**Ant.Port1**

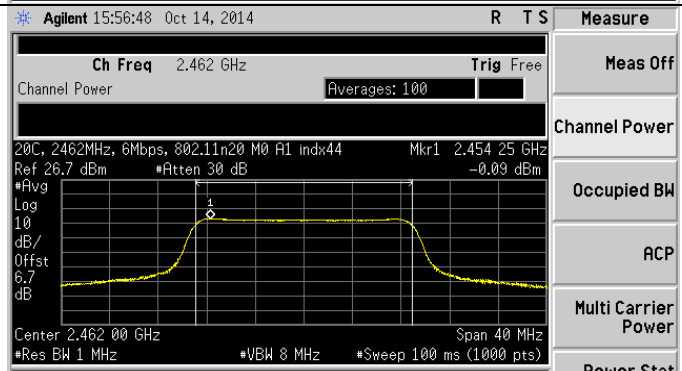






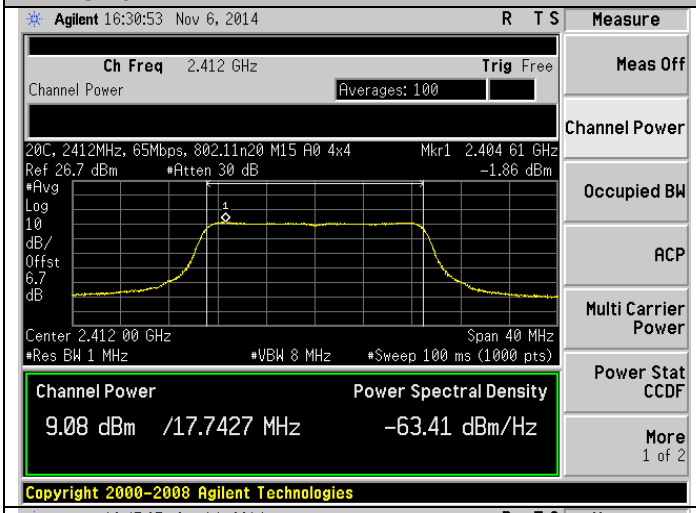


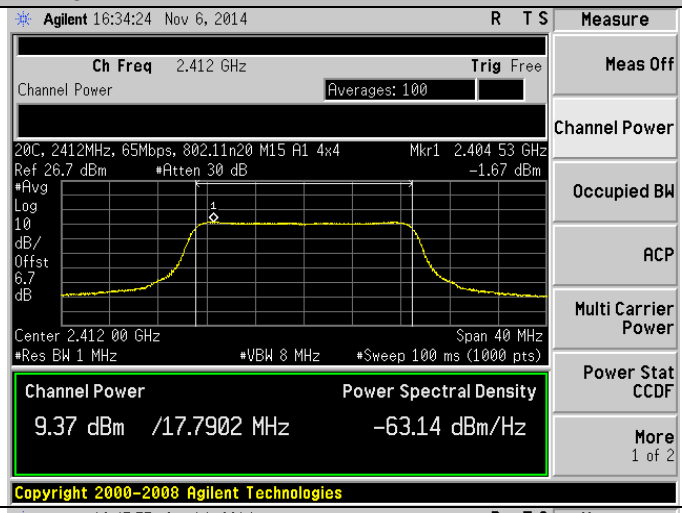


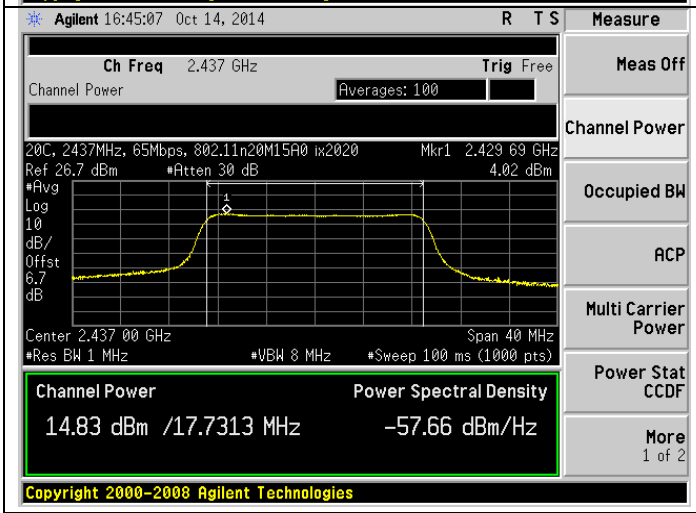


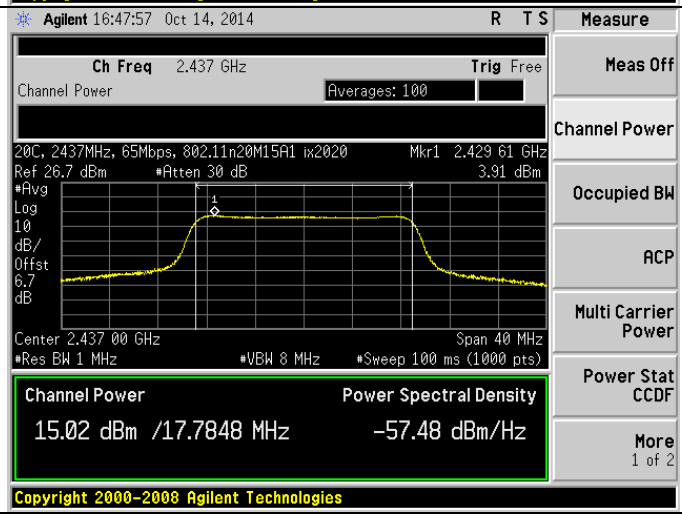
Graphical Test Results for 802.11n (HT20) Mode (Highest Data Rate):

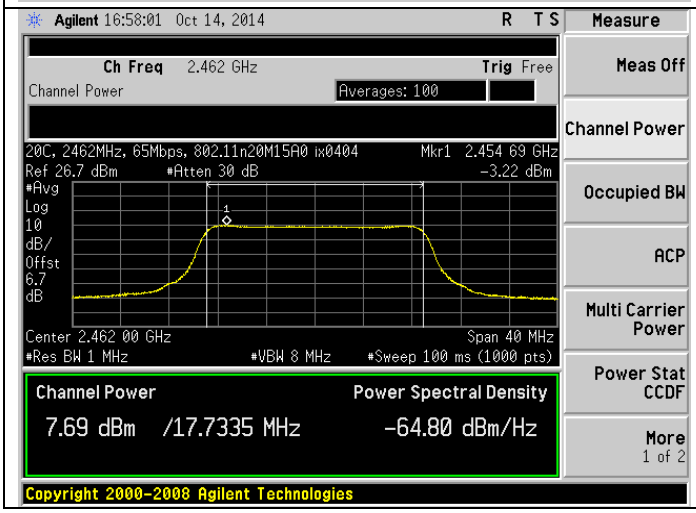
802.11n (HT20), 65Mbps	Maximum Conducted Output Power
Ant.Port 0	**Ant.Port1**

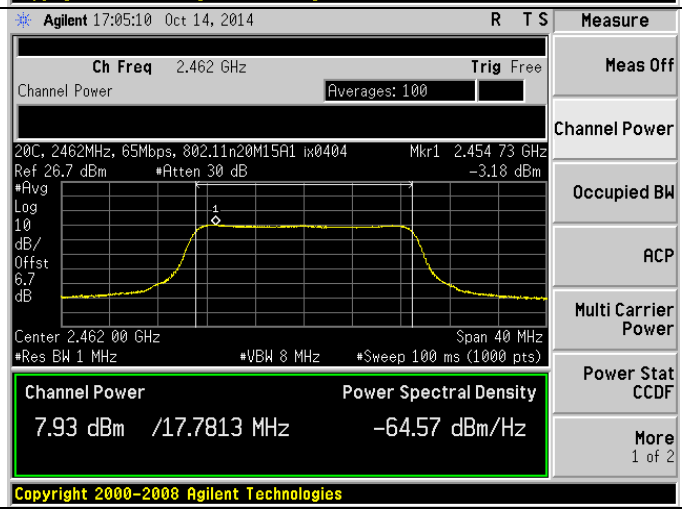






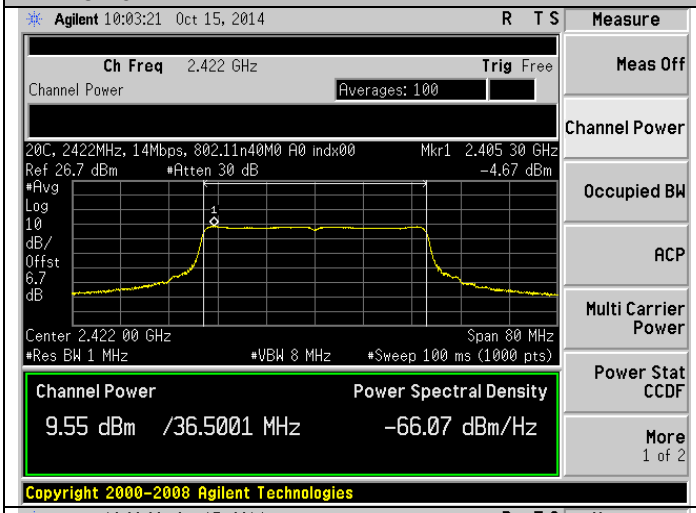


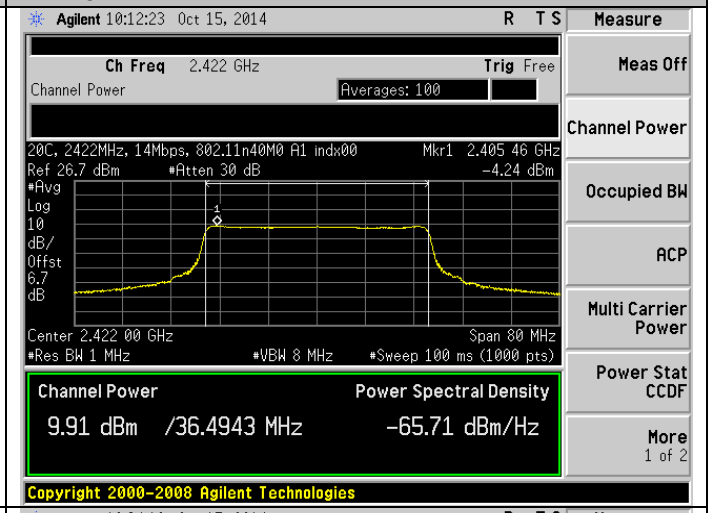


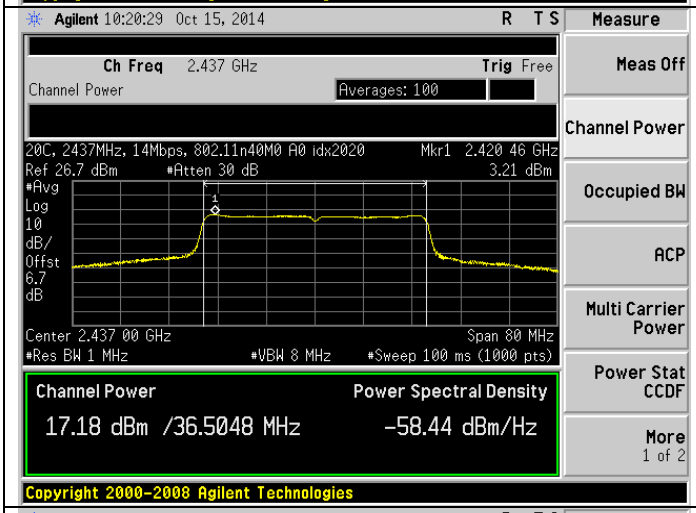


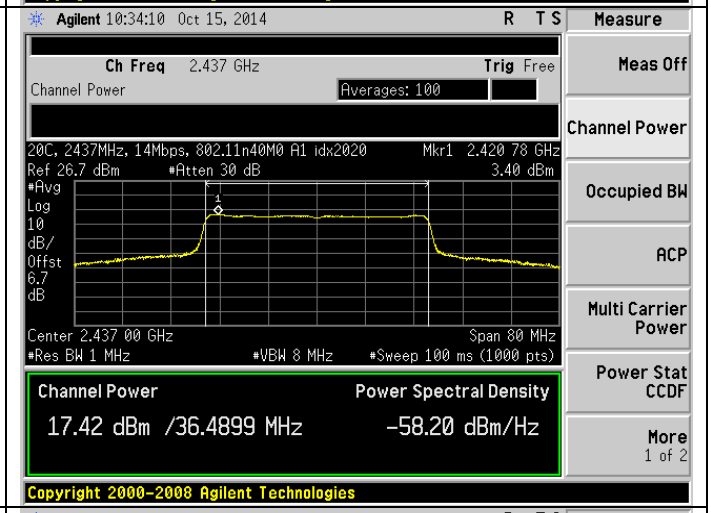
Graphical Test Results for 802.11n (HT40) Mode (Lowest Data Rate):

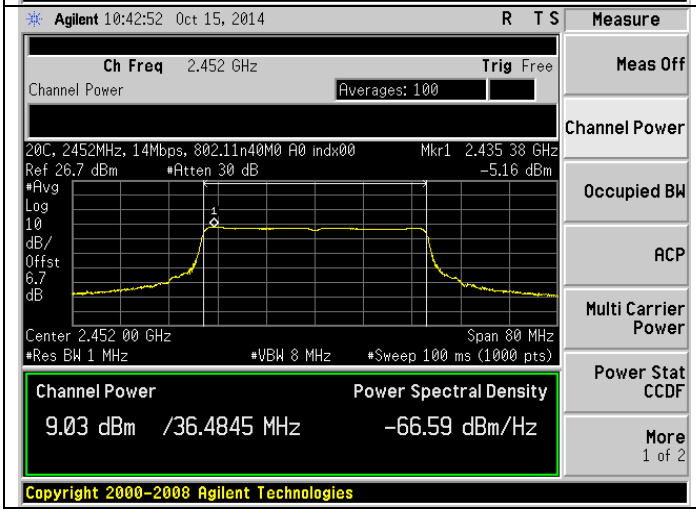
802.11n (HT40), 13.5Mbps	Maximum Conducted Output Power
Ant.Port 0	**Ant.Port1**

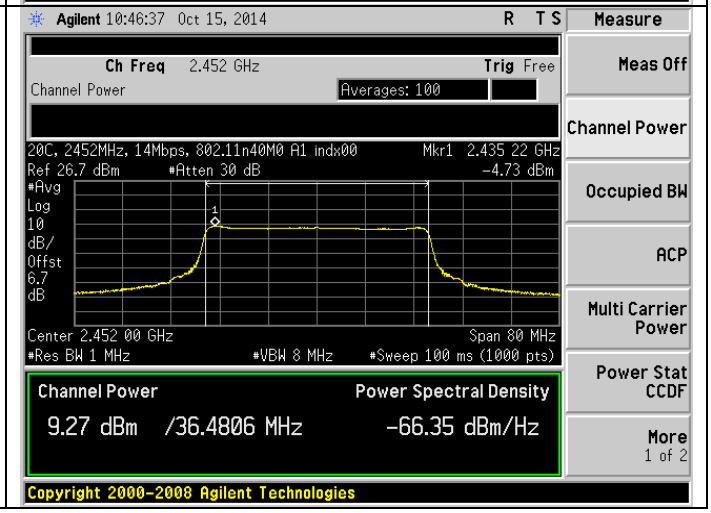






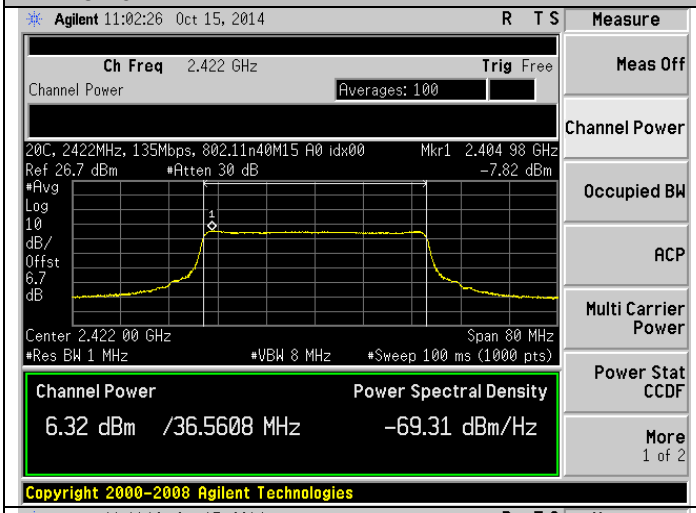


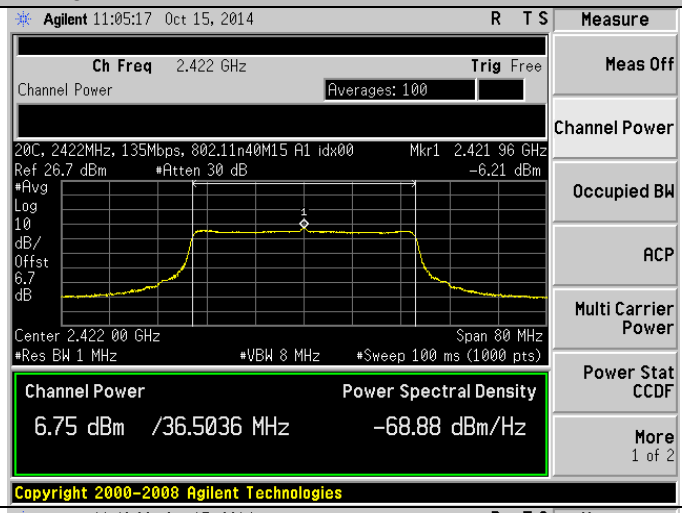


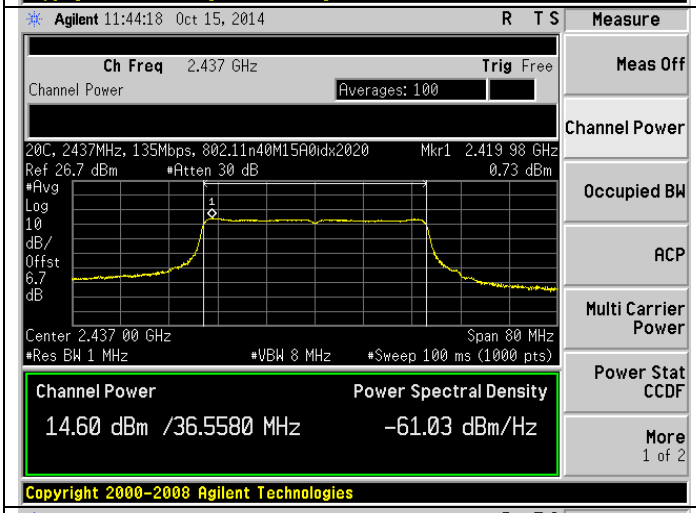


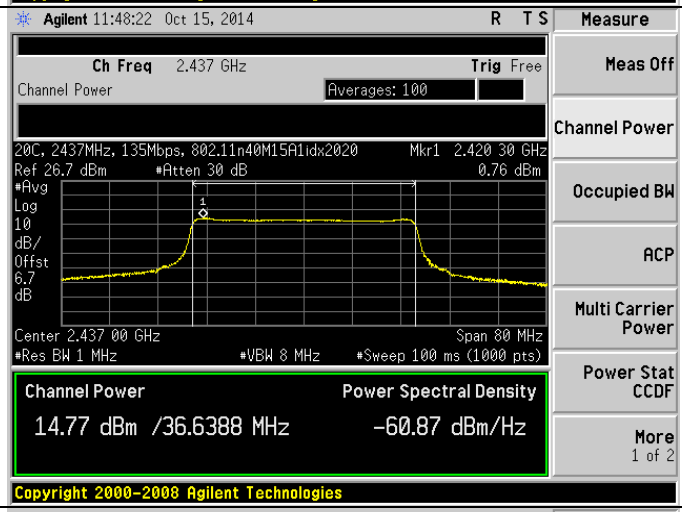
Graphical Test Results for 802.11n (HT40) Mode (Highest Data Rate):

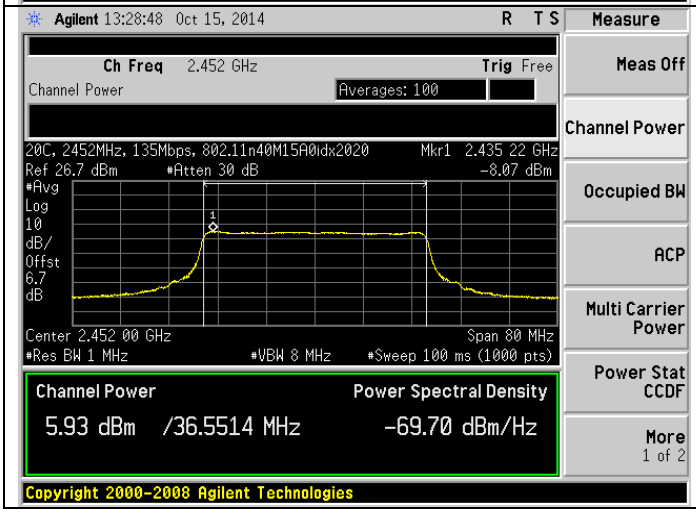
802.11n (HT40), 270Mbps	Maximum Conducted Output Power
Ant.Port 0	**Ant.Port1**

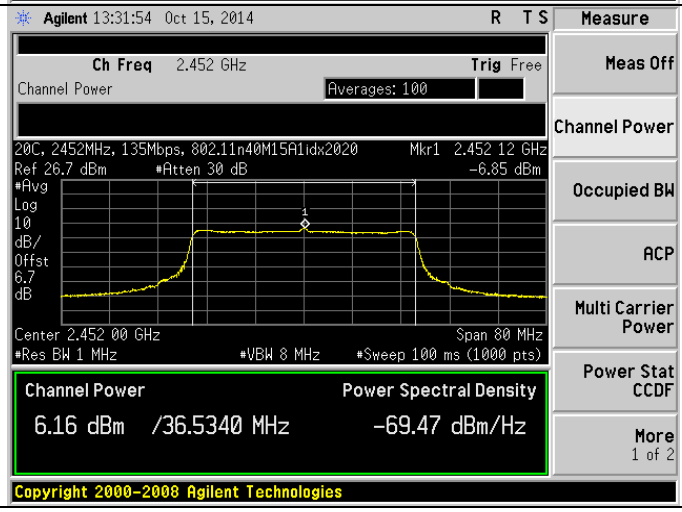












Power Spectral Density

FCC 15.247(e)/ RSS-210 A8.2(b): The transmitter power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

Test Procedure

Ref. KDB 558074 DTS Meas Guidance v3.2 section 10.

Power Spectral Density Test Procedure
1. Set the radio in the continuous transmitting mode. 2. Perform the measurement over a single sweep by using the peak marker function to determine the maximum amplitude level. 3. Capture graphs and record pertinent measurement data

Ref. KDB 558074 DTS Meas Guidance v3.2 section 10.4

Power Spectral Density Test parameters
Span ≥ 1.5 times the OBW RBW ≥ 3 kHz VBW ≥ 3 x RBW Detector = RMS Trace Average ≥ 100 Sweep time ≥ 10 x (number of measurement point in sweep) x (transmission symbol period), no less than the auto sweep time. Sweep Points ≥ 2 x span/ RBW

Recorded Test Data:

Power Spectral Density for 802.11b mode

Frequency (MHz)	Data Rate (Mbps)	Ant. Port0 Power Spectral Density (dBm)	Ant. Port1 Power Spectral Density (dBm)	Total PSD Ant.P0+Ant.P1 (mW)	/ (dBm)	Limit (dBm)	Results
2412	1	-11.80	-5.77	0.33	-4.80	8	Pass
2437	1	-12.23	-5.90	0.32	-4.99	8	Pass
2462	1	-11.90	-6.83	0.27	-5.65	8	Pass

Power Spectral Density for 802.11b mode

Frequency (MHz)	Data Rate (Mbps)	Ant. Port0 Power Spectral Density (dBm)	Ant. Port1 Power Spectral Density (dBm)	Total PSD Ant.P0+Ant.P1 (mW) / (dBm)		Limit (dBm)	Result
2412	11	-6.30	-3.14	0.72	-1.43	8	Pass
2437	11	-6.72	-3.23	0.69	-1.62	8	Pass
2462	11	-6.64	-4.38	0.58	-2.35	8	Pass

Power Spectral Density for 802.11g mode

Frequency (MHz)	Data Rate (Mbps)	Ant. Port0 Power Spectral Density (dBm)	Ant. Port1 Power Spectral Density (dBm)	Total PSD Ant.P0+Ant.P1 (mW) / (dBm)		Limit (dBm)	Result
2412	1	-15.66	-10.02	0.13	-8.97	8	Pass
2437	1	-10.15	-5.18	0.40	-3.98	8	Pass
2462	1	-15.38	-10.95	0.11	-9.61	8	Pass

Power Spectral Density for 802.11g mode

Frequency (MHz)	Data Rate (Mbps)	Ant. Port0 Power Spectral Density (dBm)	Ant. Port1 Power Spectral Density (dBm)	Total PSD Ant.P0+Ant.P1 (mW)	/ (dBm)	Limit (dBm)	Result
2412	54	-15.72	-10.99	0.11	-9.73	8	Pass
2437	54	-10.65	-5.96	0.34	-4.69	8	Pass
2462	54	-15.85	-11.85	0.09	-10.4	8	Pass

Power Spectral Density for 802.11n (HT20) mode

Frequency (MHz)	Data Rate (Mbps)	Ant. Port0 Power Spectral Density (dBm)	Ant. Port1 Power Spectral Density (dBm)	Total PSD Ant.P0+Ant.P1 (mW) / (dBm)		Limit (dBm)	Result
2412	6.5	-15.77	-10.20	0.12	-9.14	8	Pass
2437	6.5	-5.97	-2.08	0.87	-0.59	8	Pass
2462	6.5	-10.97	-7.59	0.25	-5.95	8	Pass

Power Spectral Density for 802.11n (HT20) mode

Frequency (MHz)	Data Rate (Mbps)	Ant. Port0 Power Spectral Density (dBm)	Ant. Port1 Power Spectral Density (dBm)	Total PSD Ant.P0+Ant.P1 (mW) / (dBm)		Limit (dBm)	Result
2412	65	-18.45	-11.20	0.09	-10.4	8	Pass
2437	65	-6.07	-2.16	0.85	-0.68	8	Pass
2462	65	-11.96	-8.34	0.21	-6.77	8	Pass

Power Spectral Density for 802.11n (HT40) mode

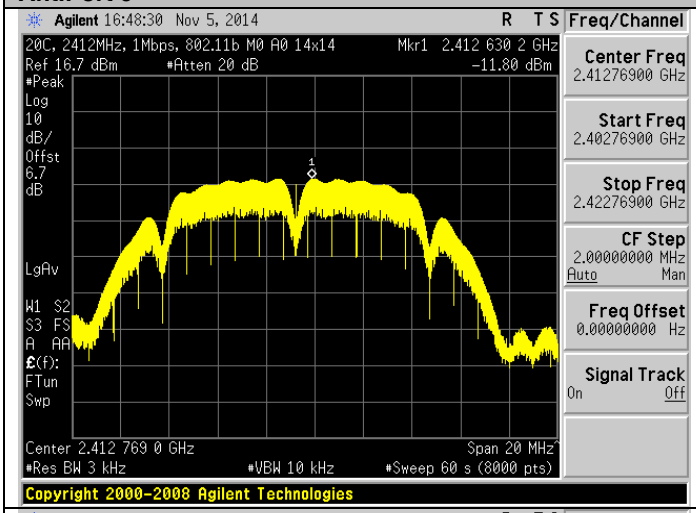
Frequency (MHz)	Data Rate (Mbps)	Ant. Port0 Power Spectral Density (dBm)	Ant. Port1 Power Spectral Density (dBm)	Total PSD Ant.P0+Ant.P1 (mW) / (dBm)		Limit (dBm)	Result
2422	13.5	-9.86	-6.51	0.33	-4.86	8	Pass
2437	13.5	-5.41	-1.41	1.01	0.05	8	Pass
2452	13.5	-10.51	-7.04	0.29	-5.43	8	Pass

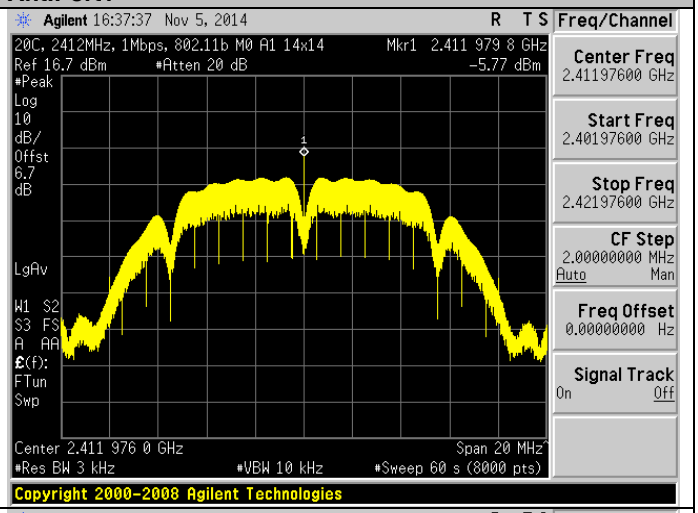
Power Spectral Density for 802.11n (HT40) mode

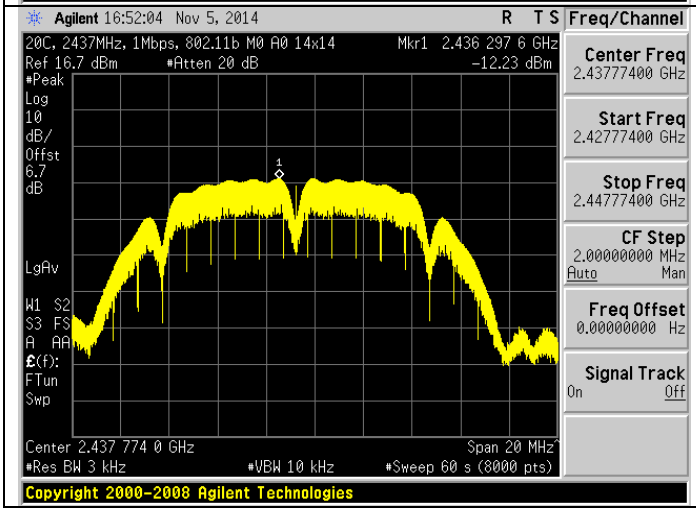
Frequency (MHz)	Data Rate (Mbps)	Ant. Port0 Power Spectral Density (dBm)	Ant. Port1 Power Spectral Density (dBm)	Total PSD Ant.P0+Ant.P1 (mW) / (dBm)		Limit (dBm)	Result
2422	135	-10.81	-7.14	0.27	-5.59	8	Pass
2437	135	-5.49	-1.74	0.95	-0.21	8	Pass
2452	135	-11.31	-7.66	0.24	-6.10	8	Pass

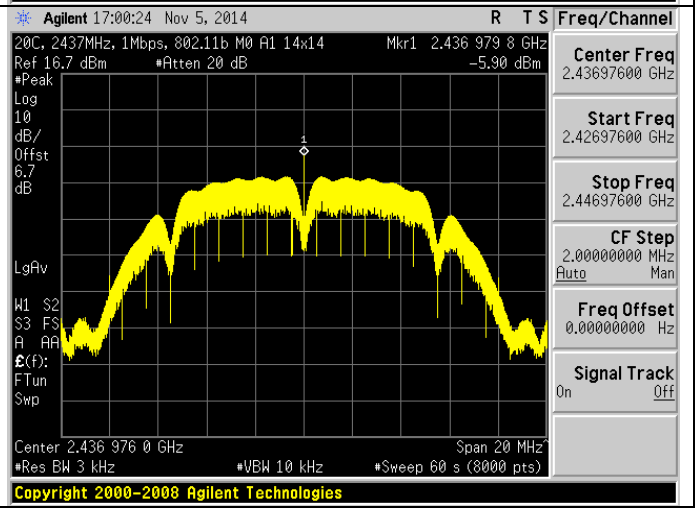
Graphical Test Results 802.11b mode:

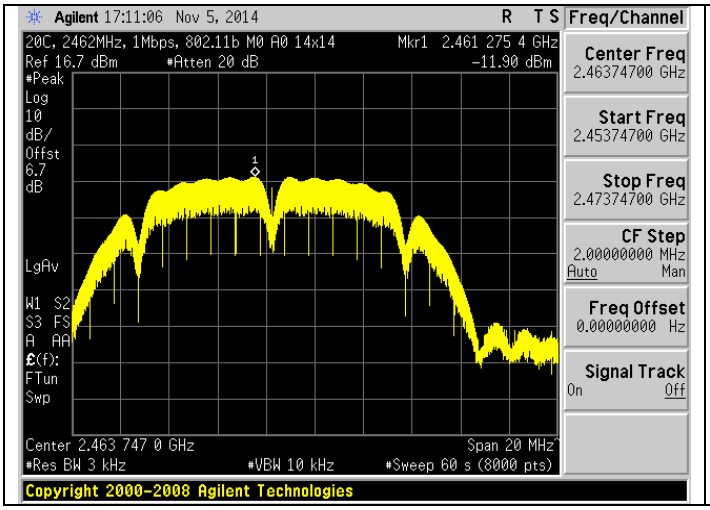
802.11b, 1Mbps	Power Spectral Density
Ant.Port 0	**Ant.Port1**

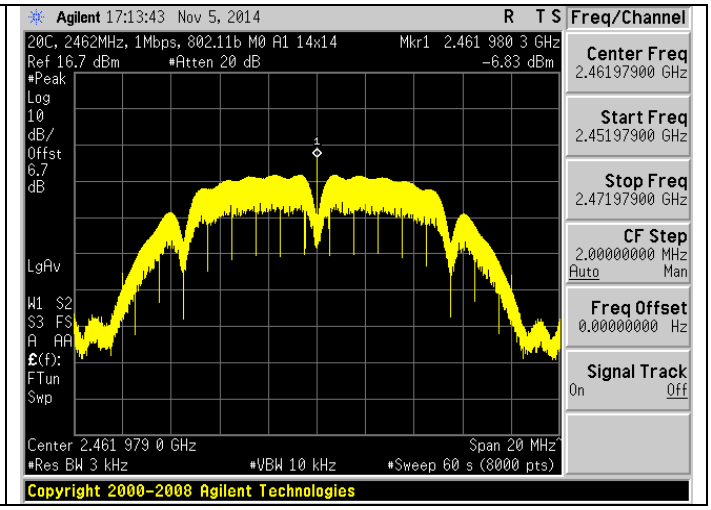






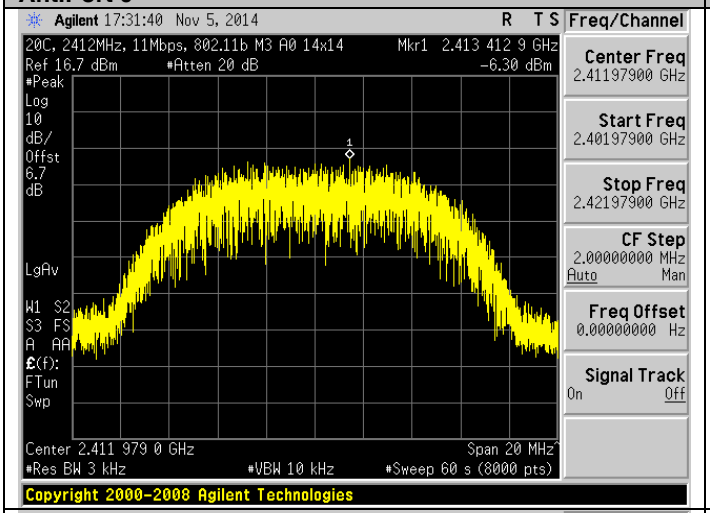


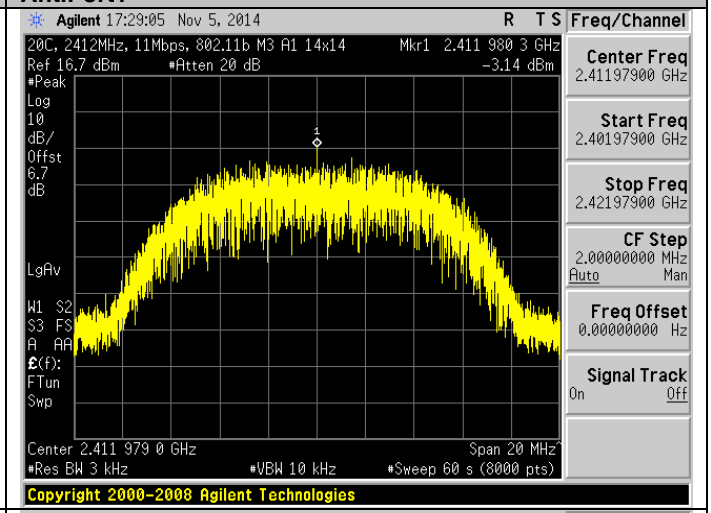


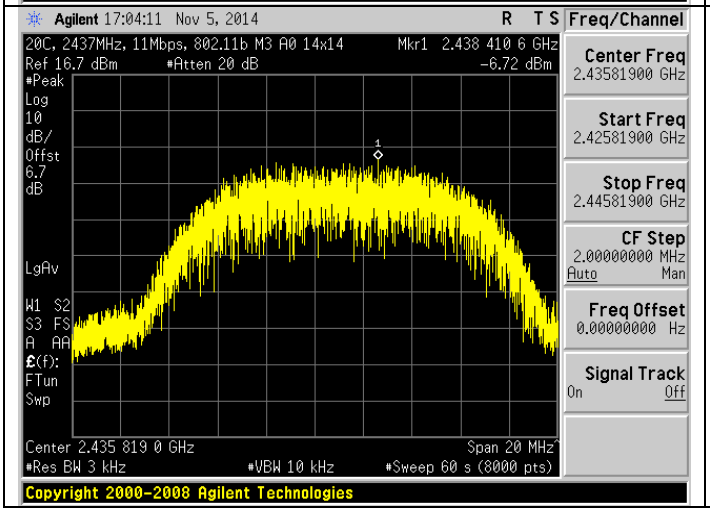


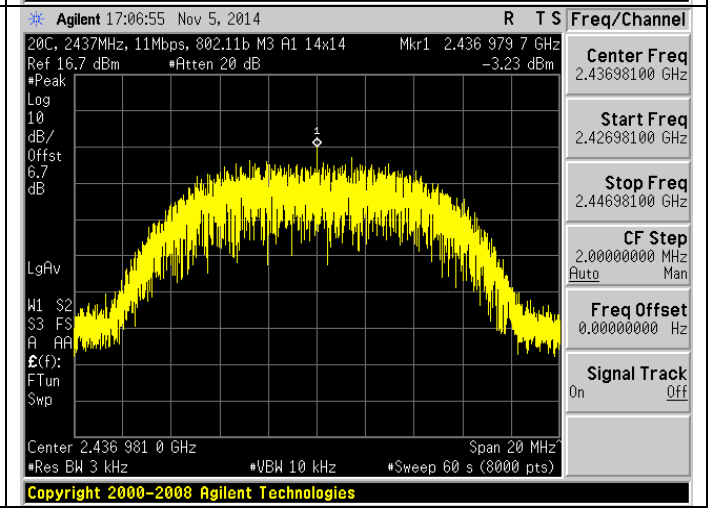
Graphical Test Results for 802.11b mode:

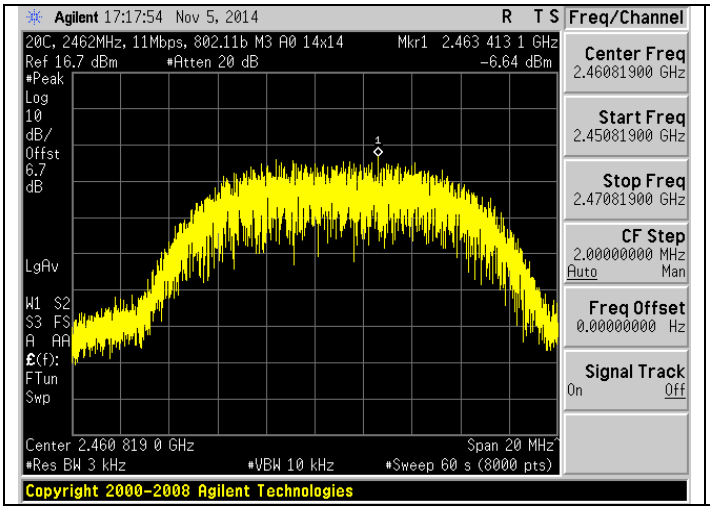
802.11b, 11Mbps	Power Spectral Density
Ant.Port 0	**Ant.Port1**

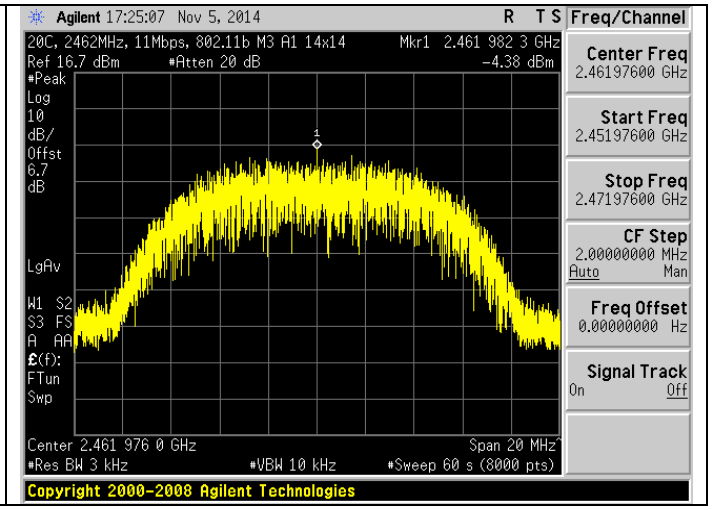






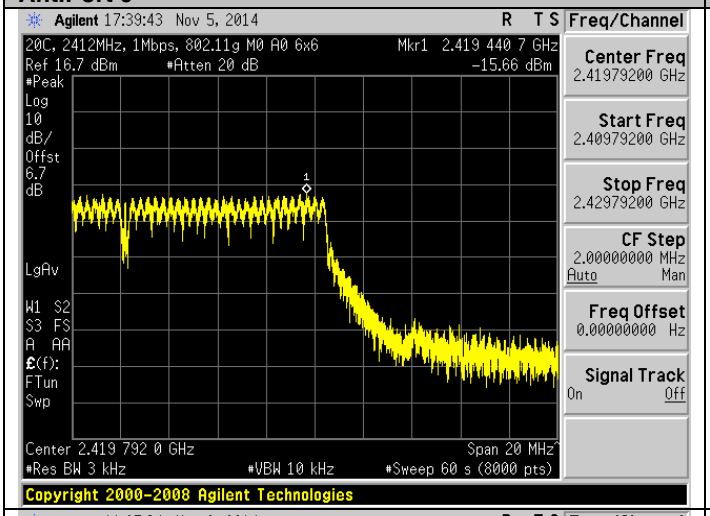


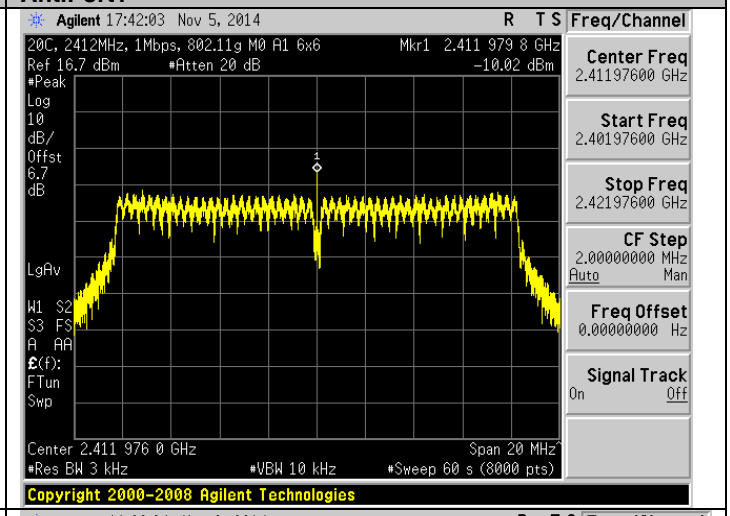


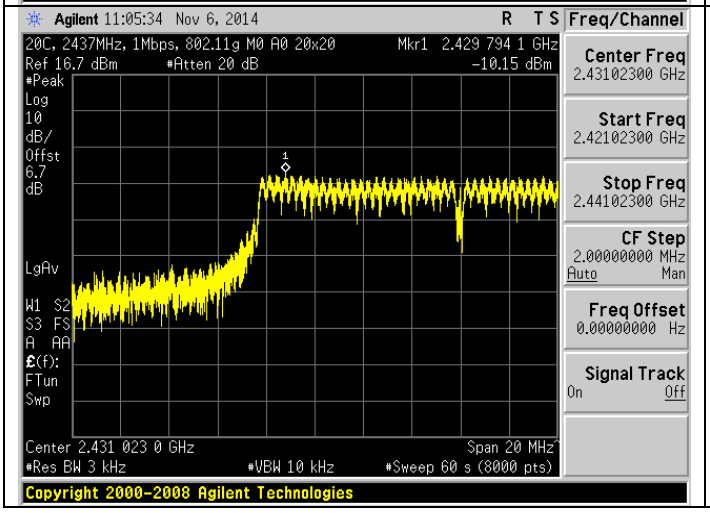


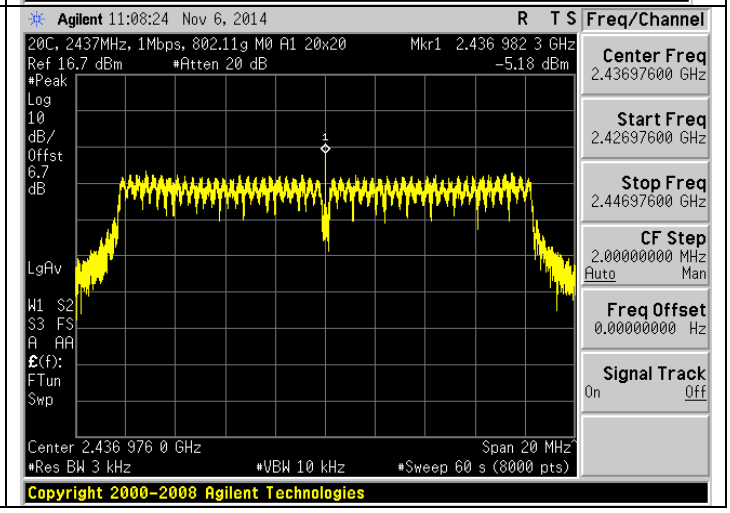
Graphical Test Results for 802.11g mode:

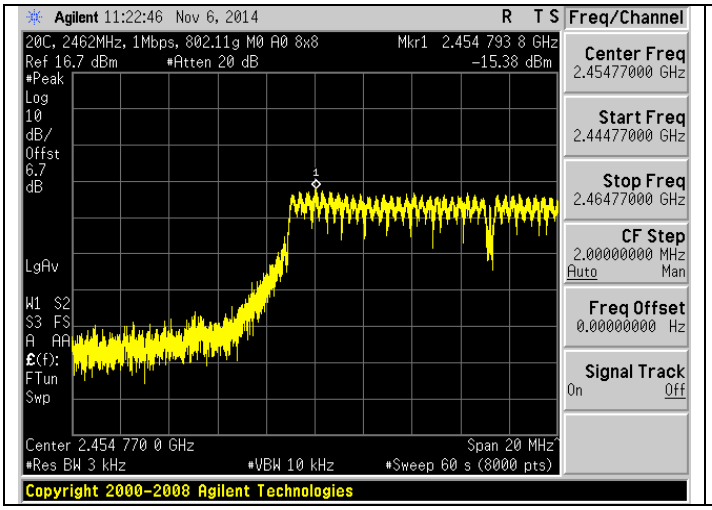
802.11g, 1Mbps	Power Spectral Density
Ant.Port 0	**Ant.Port1**

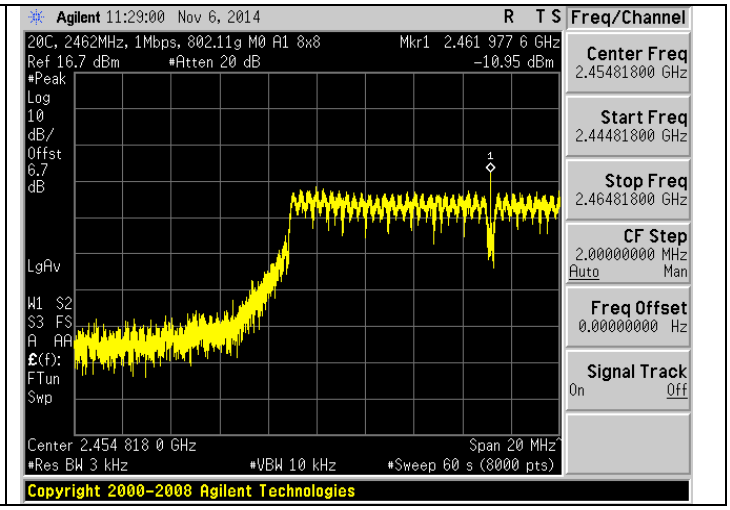








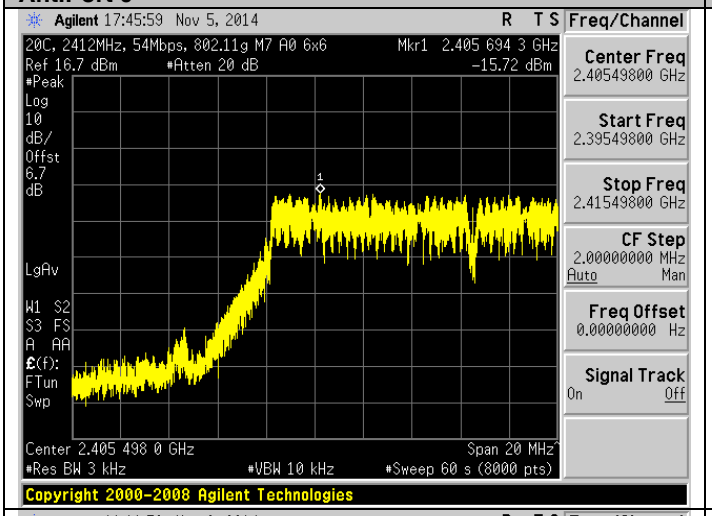


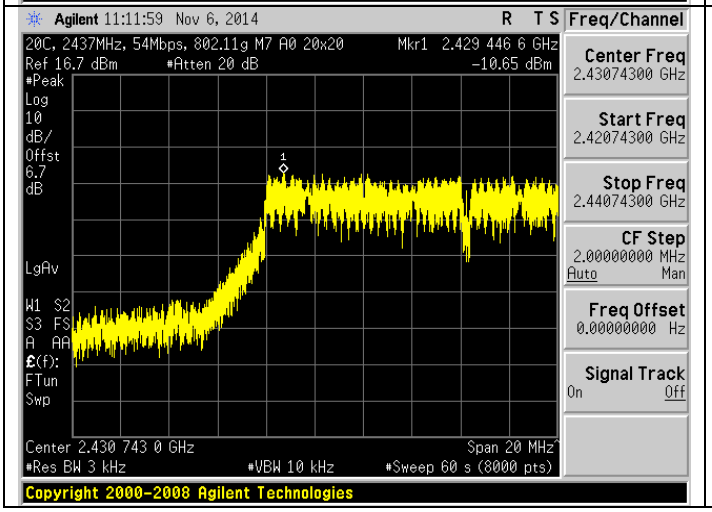


Graphical Test Results for 802.11g mode:

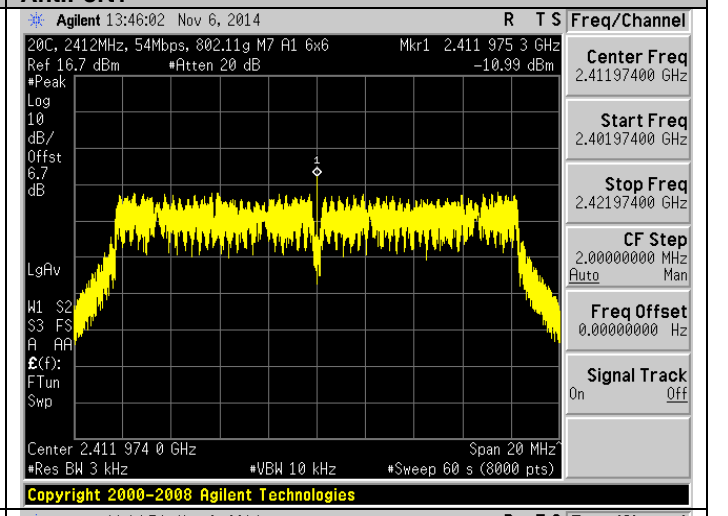
802.11g, 54Mbps — **Power Spectral Density**

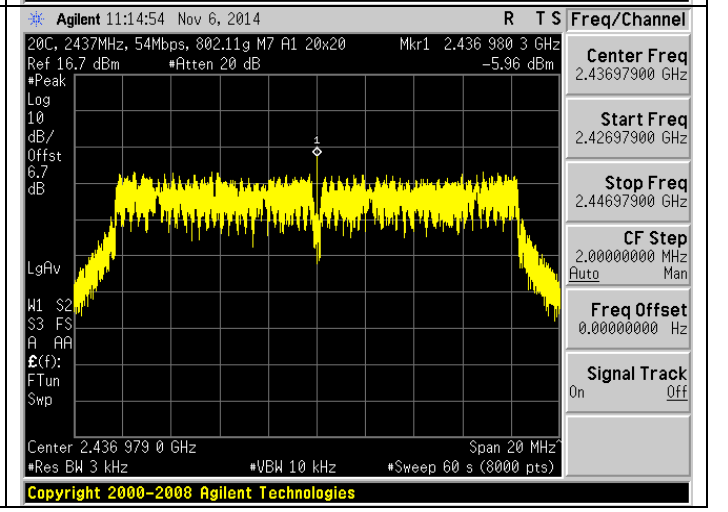
Ant.Port 0

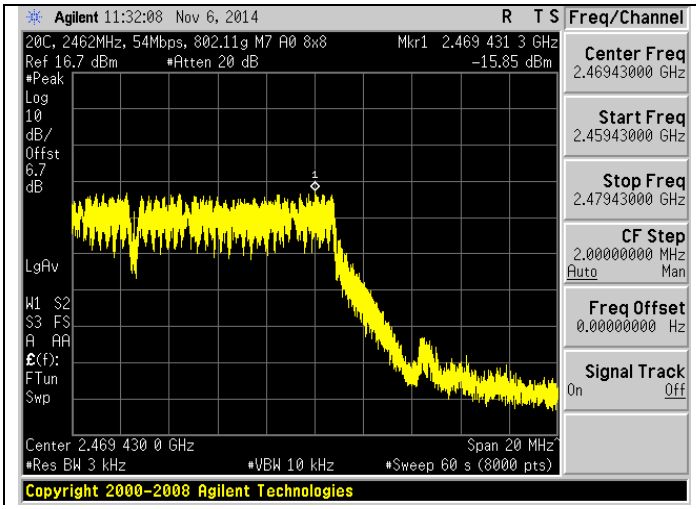


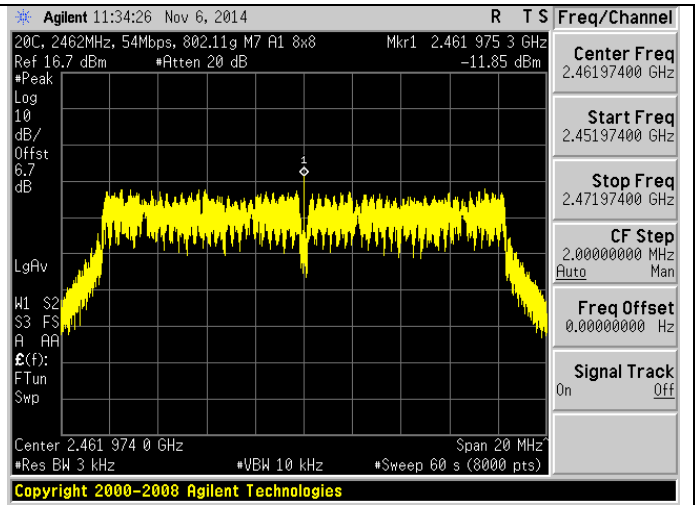


Ant.Port1



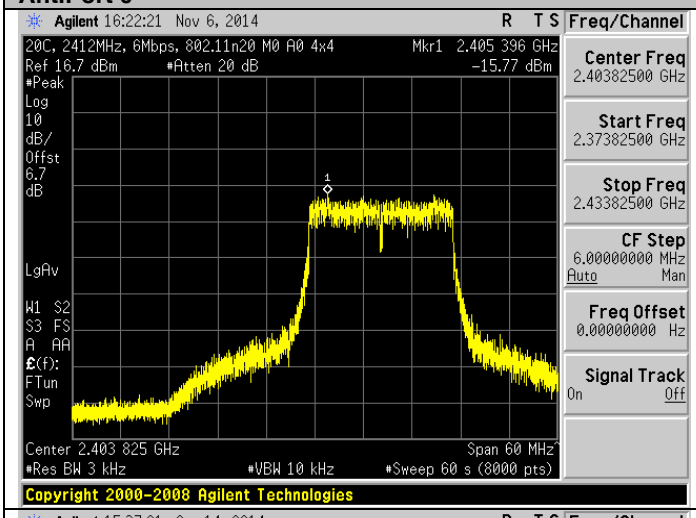


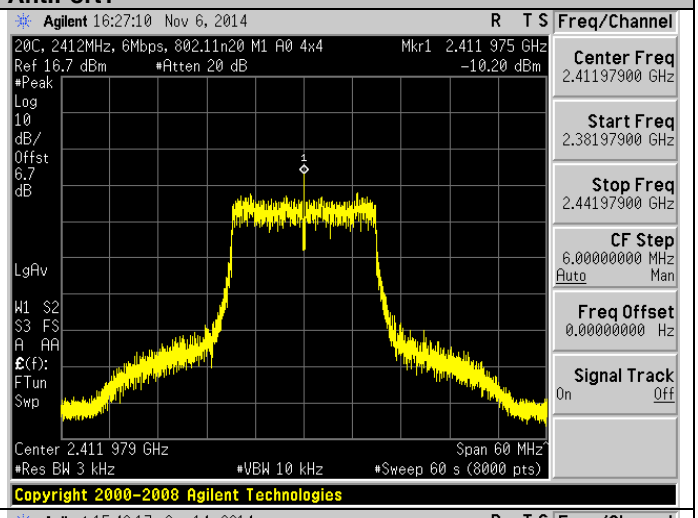


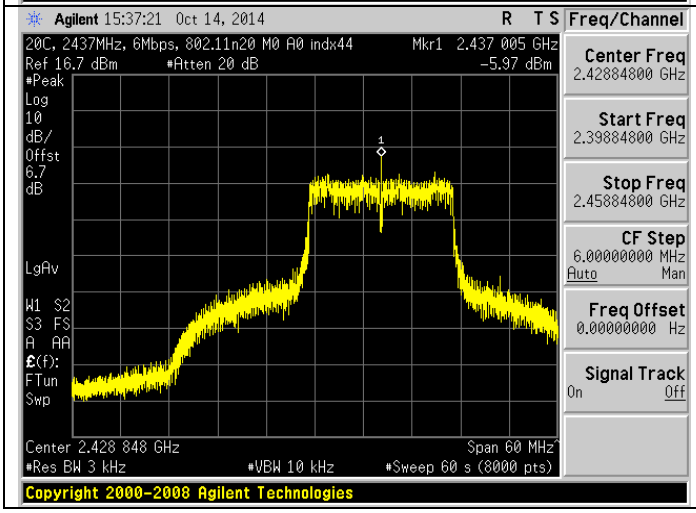


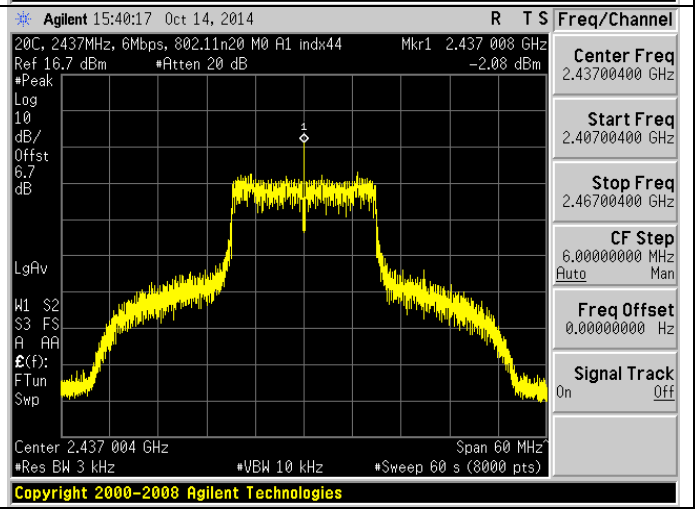
Graphical Test Results for 802.11n20 mode:

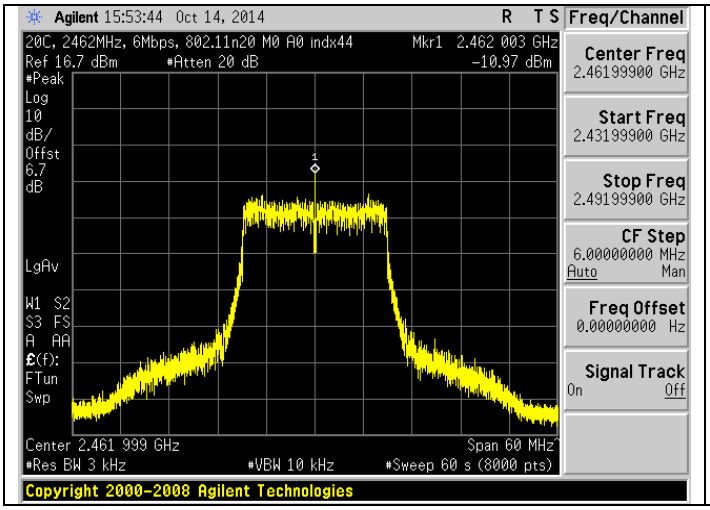
802.11n (HT20), 6.5Mbps	Power Spectral Density
Ant.Port 0	**Ant.Port1**

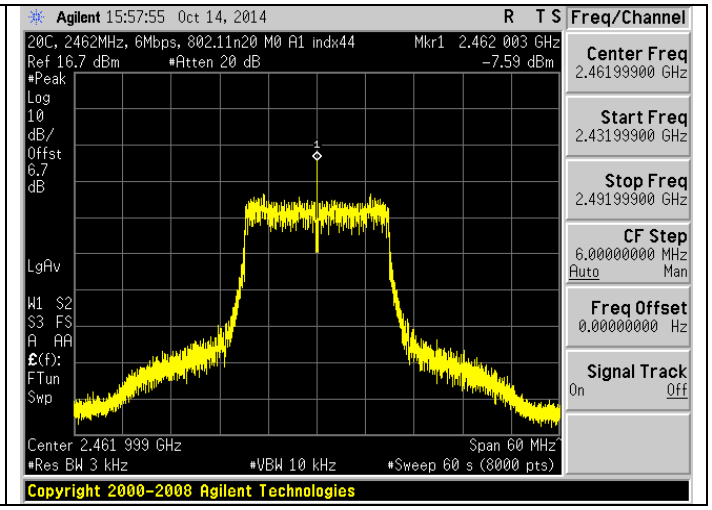






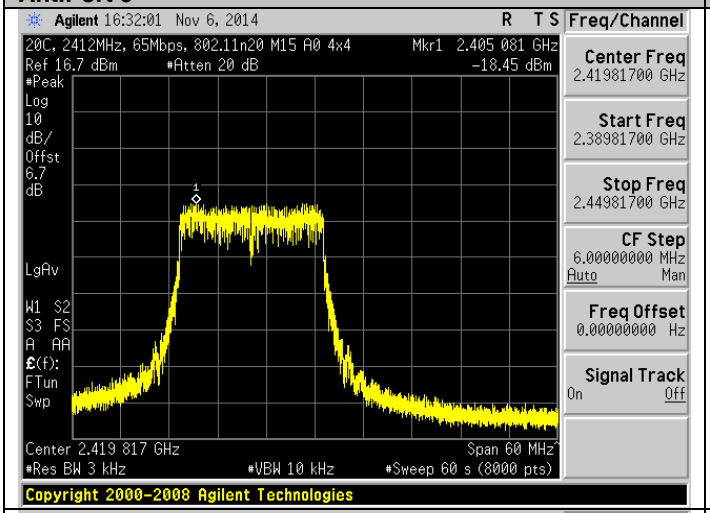


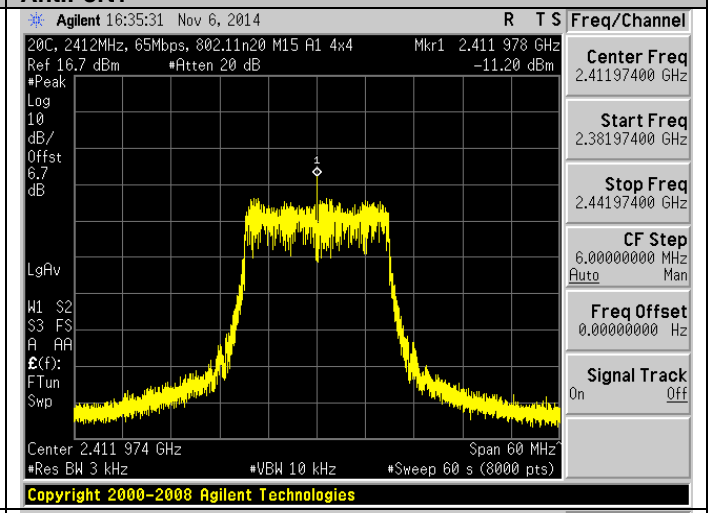


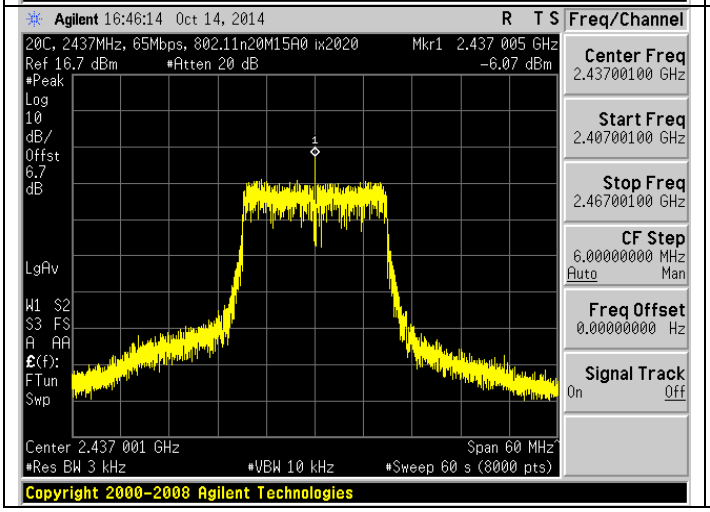


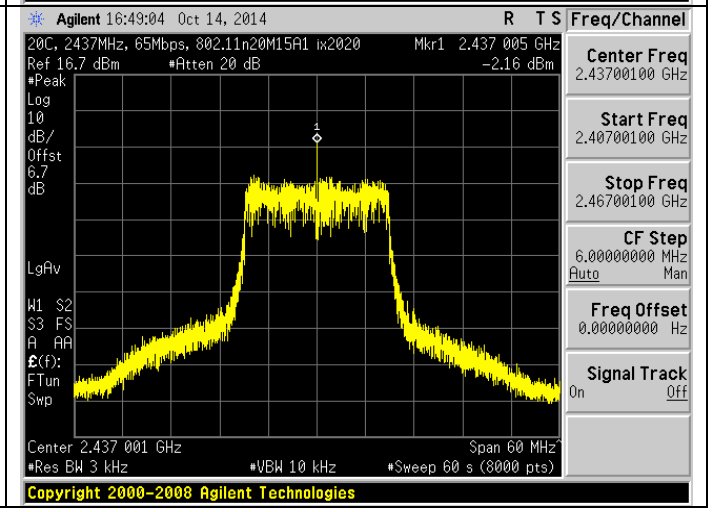
Graphical Test Results for 802.11n20 mode:

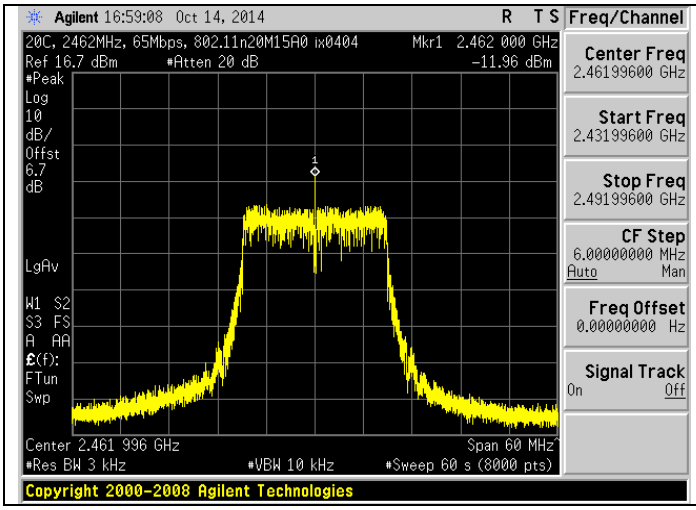
802.11n (HT20), 65Mbps	Power Spectral Density
Ant.Port 0	**Ant.Port1**

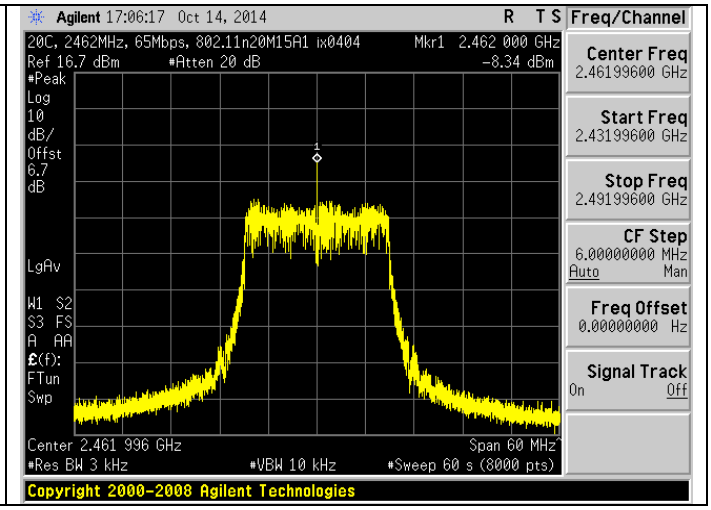






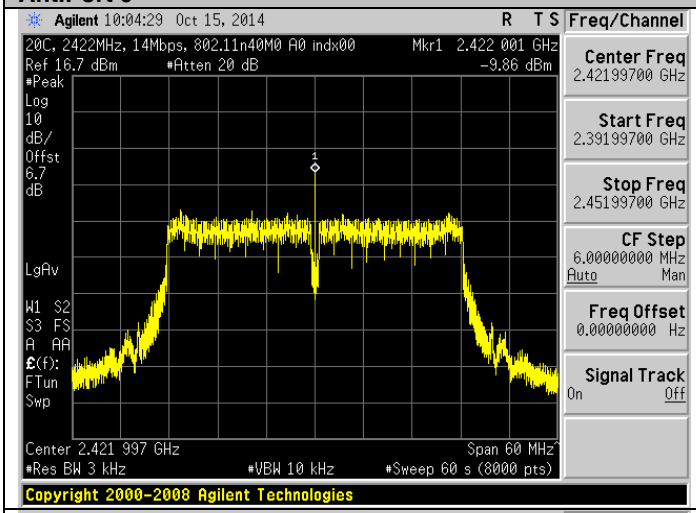


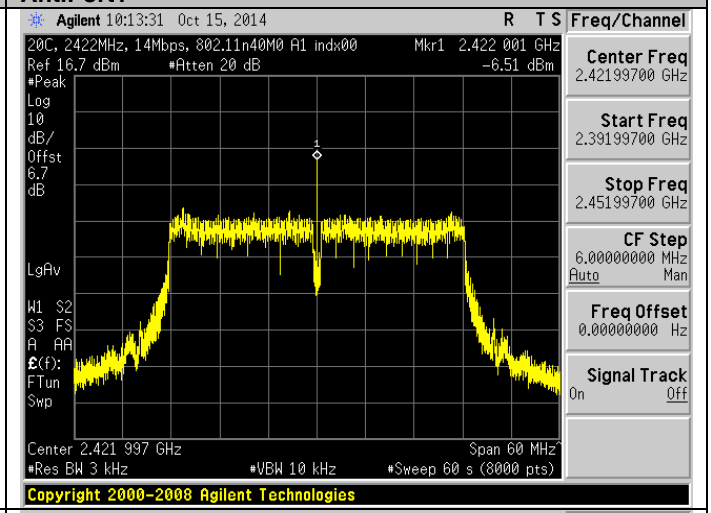


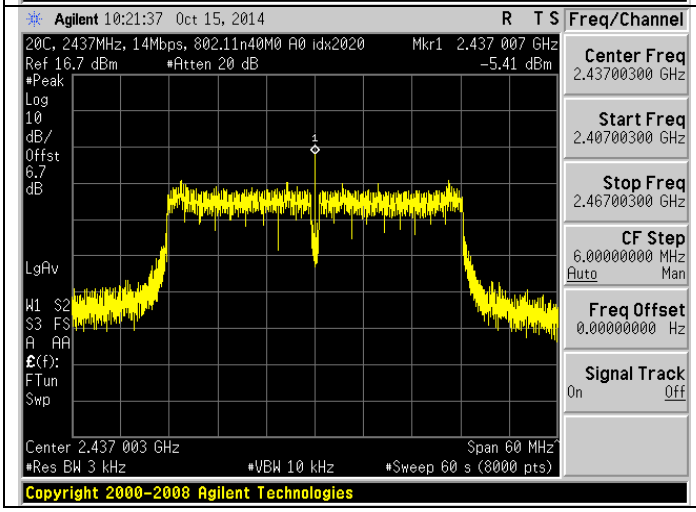


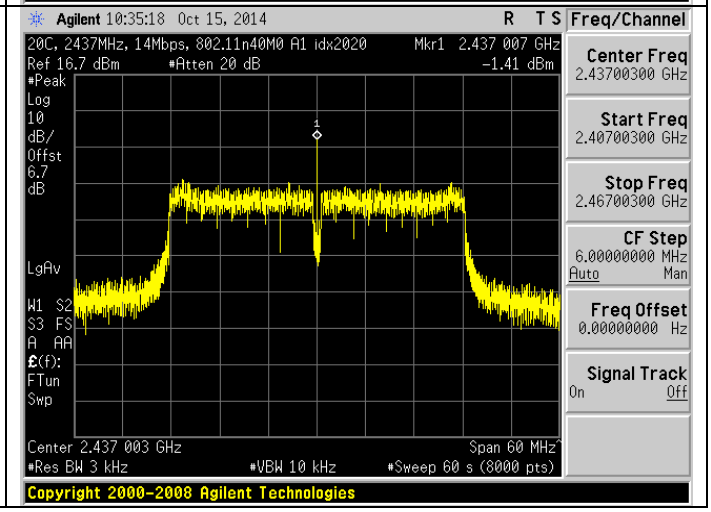
Graphical Test Results for 802.11n40 mode:

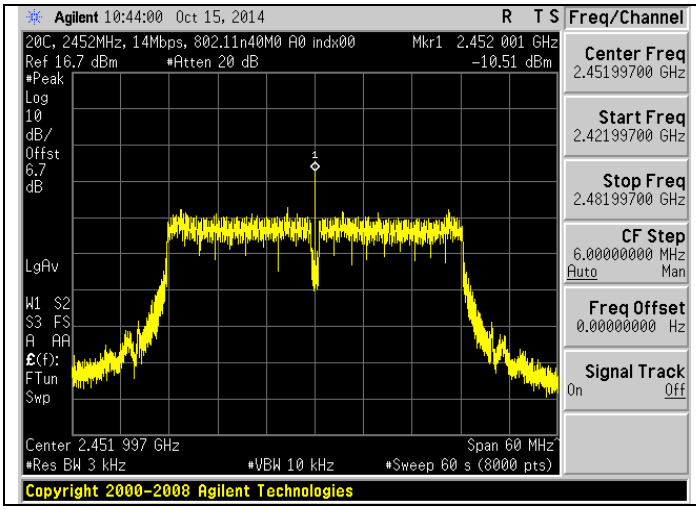
802.11n (HT40), 13.5Mbps	Power Spectral Density
Ant.Port 0	**Ant.Port1**

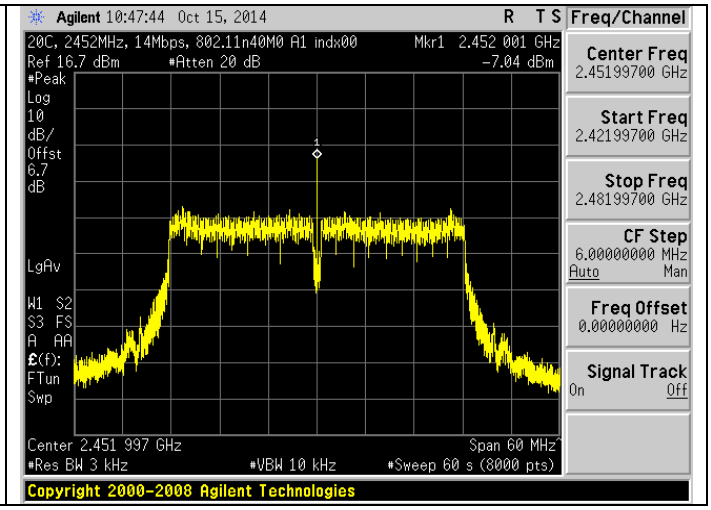












Graphical Test Results 802.11n40 mode:

802.11n (HT40), 270Mbps	Power Spectral Density
Ant.Port 0	**Ant.Port1**