Radio Test Report: EDCS - 1392820

CP-DX80

Desktop TelePresence

5150-5250 MHz

Against the following Specifications:

CFR47 Part 15.407

RSS210

Cisco Systems
EMC Laboratory
170 West Tasman Drive
San Jose, CA 95134

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Approved By: See EDCS
Title: See EDCS

This report replaces any previously entered test report under EDCS - 1392820

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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 15.407 RSS-210	N/A

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.

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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 one or more of the following supply voltages:
110V 60 Hz (+/-20%)
220V 50 Hz (+/-20%)

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2.2 Date of testing

6-February-2014

2.3 Report Issue Date

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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, 5m Chamber	Company #: 2461N-1

Test Engineers

Johanna Knudsen, Jose Aguirre

2.5 Equipment Assessed (EUT)

CP-DX80

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2.6 EUT Description

The CP-DX80 is a 23 inch HD1080p video capable personal desktop collaboration endpoint that extends the DX series portfolio utilizing Android OS 4.1.1 (EX-60 replacement).

23 inch touch LDF
16 GB eMMC Flash memory (only 8 GB available) & 2 GB RAM
2 Gigabit Ethernet ports (1 for Network Uplink & 1 for Laptop connection)
3 standard A USB ports (2 in the back and 1 on the right side)
1 standard B USB port (with ADB support)
1 micro B USB port
1 HDMI for video out (to external monitor) with a maximum resolution of 1920 x 1200
1 HDMI for video in (from laptop)
1 micro SD card slot
1 Kensington Lock

Wi-Fi (802.11 a/b/g/n) & Bluetooth 3.0
Marvell 88W8787 - Wi-Fi + Bluetooth chip
Murata module LBEH1ZNRZC-TEMP, supports 802.11/a/b/g/n + Bluetooth 3.0 chip
SDIO interface to WLAN – Omap4 SD host controller port 5
PCM (McBSP1) interface to Bluetooth
Single OMAP4470 Architecture, with dual Cortex A9 running at 1.5GHz
Single antenna for 2.4 GHz and 5 GHz bands with diplex inside the module (SISO)
Amphenol SAA CI4671-15-000-R
4.61 dBi peak gain for 2.4 Ghz
7.05 dBi peak gain for 5 GHz
Coexistence between Wi-Fi and Bluetooth (1 antenna utilized)
Supports frequencies/channels 2.412 – 2.472 GHz & 5.180 – 5.825 GHz
Up to 72 Mbps (20 MHz channel), Up to 150 Mbps (40 MHz channel width)
Non- HT20 - 1 to 54 Mbps
HT20 - M0 to M7 (7 to 72 Mbps)
HT40 - M0 to M7 (15 to 150 Mbps)
802.11i security standard (WPA/WPA2)

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Section 3: Result Summary

Conducted emissions

Basic Standard	Result
99% and 26dB Bandwidth	Pass
Peak Output Power	Pass
Power Spectral Density	Pass
Peak Excursion	Pass
Conducted Spurious Emissions	Pass
Restricted Band Edge Measurements	Pass

Radiated emissions

Basic Standard	Result
Radiated Spurious and Harmonic Emissions	Pass
Co-Locator Radiated Spurious Emissions	Pass

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Section 4: Sample Details

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.

4.1 Sample Details

Sample Number	Equipment Details	Serial Number	Part Number
S01	CP-DX80	FOC1801N7WM	CSO 68-00355-01 04 (P2)
S02	CP-DX80	FOC1809N3R2	CSO 68-00355-01 04 (P3A)

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:

Fixed internal Amphenol Dual Band Antenna at 5GHz, Gain: 7.05 peak (no external antenna can be used)

5150 – 5250MHz: 3.4 dBi
5250 – 5350MHz: 4 dBi
5500 – 5700MHz: 6.1 dBi
5745 – 5850MHz: 7.05 dBi

4.2 System Details

System #	Description	Samples
1	Radio Test Sample - Manufacturing Image	S01
2	Radio Test Sample – Production Image	S02

4.3 Mode of Operation Details

Mode#	Description	Comments
1	802.11 Test Mode	System is placed in a continuous Tx State at various channels per Test Requirements. 802.11a running at 6Mbps, HT20 running at M0 and HT40 running M0. Manufacturing image used.
2	802.11 Test Mode + Bluetooth for co-location	System is placed in a continuous Tx State at various channels per Test Requirements. 802.11a running at 6Mbps, HT20 running at M0 and HT40 running M0. Production image used.

Section 5: Modifications

5.1 Sample Modifications Performed During Assessment

No modifications were performed during assessment.

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Appendix A: Emission Test Results

Target Maximum Channel Power

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

	Maximum Channel Power (dBm)		
	Frequency (MHz)		
Operating Mode	5180	5200	5240
802.11a, 6 to 54 Mbps	16	16	16
802.11n HT20, M0 to M7	15	15	15
	5190	5230	
802.11n HT40, M0 to M7	15	15	

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99% and 26dB Bandwidth

Connect the antenna port(s) to the spectrum analyzer input. Using the spectrum analyzer Channel Bandwidth mode, configure the spectrum analyzer as shown below (enter all losses between the transmitter output and the spectrum analyzer).

Center Frequency: Frequency from table below
Span: 2 x Nominal Bandwidth (e.g. 40MHz for a 20MHz channel)
Reference Level: 20 dBm
Attenuation: 10 dB
Sweep Time: 5 s
Resolution Bandwidth: 1%-3% of 26 dB Bandwidth
Video Bandwidth: ≥Resolution Bandwidth
X dB Bandwidth: 26 dB
Detector: Peak
Trace: Single

Place the radio in continuous transmit mode. View the transmitter waveform on the spectrum analyzer, and record the pertinent measurements:

99% and 26dB Bandwidth for 802.11a

Frequency (MHz)	Data Rate (Mbps)	99% Bandwidth (MHz)	26dB Bandwidth (MHz)
5180	6	16.601	19.965
5200	6	16.600	19.873
5240	6	16.663	20.035

Graphical Test Results for 802.11a:

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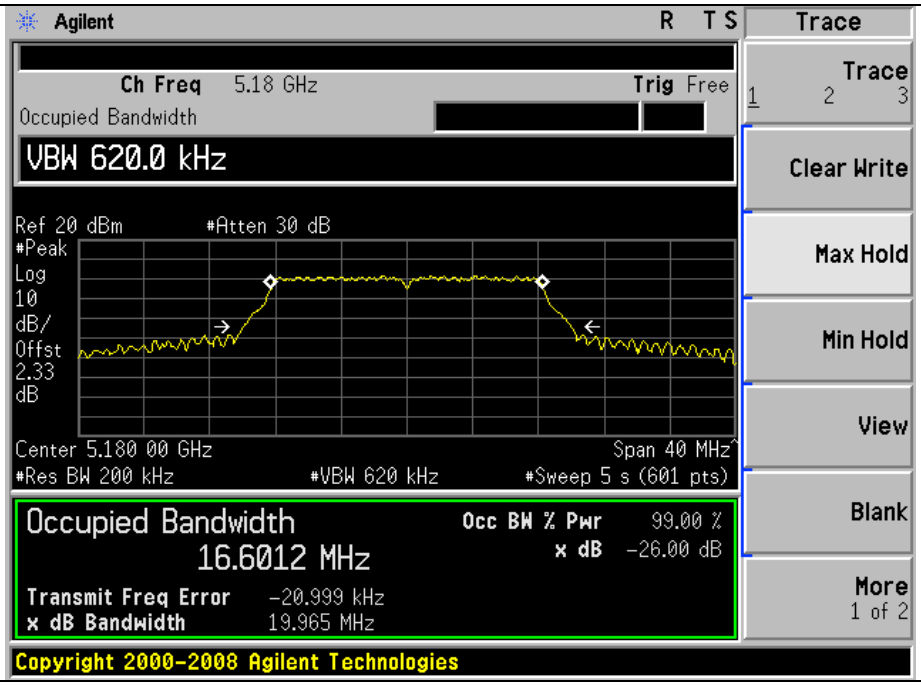
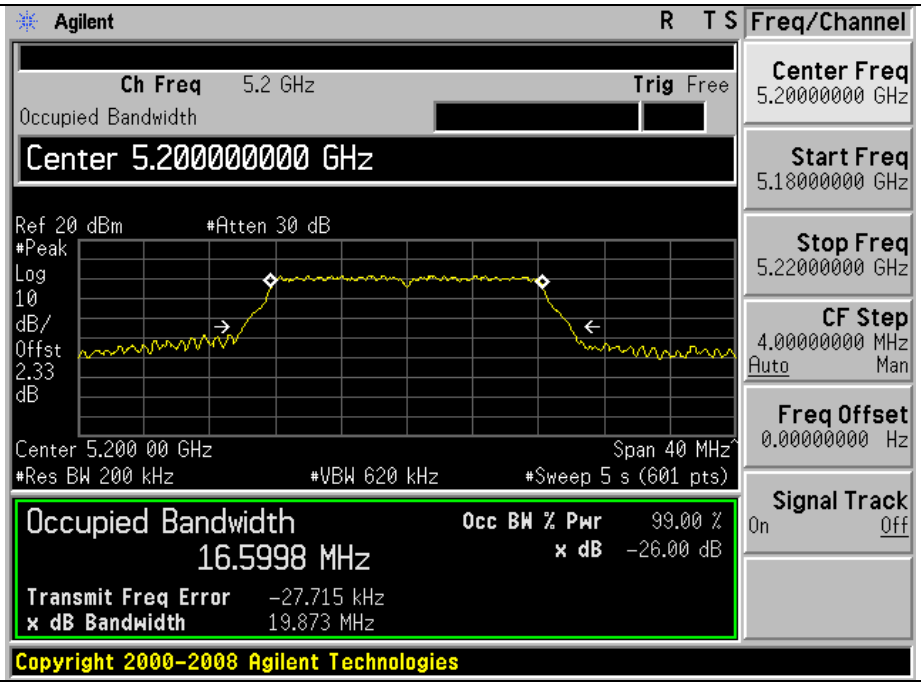


Title: 26dB & Occupied at 5180MHz for 802.11a



Title: 26dB & Occupied at 5200MHz for 802.11a

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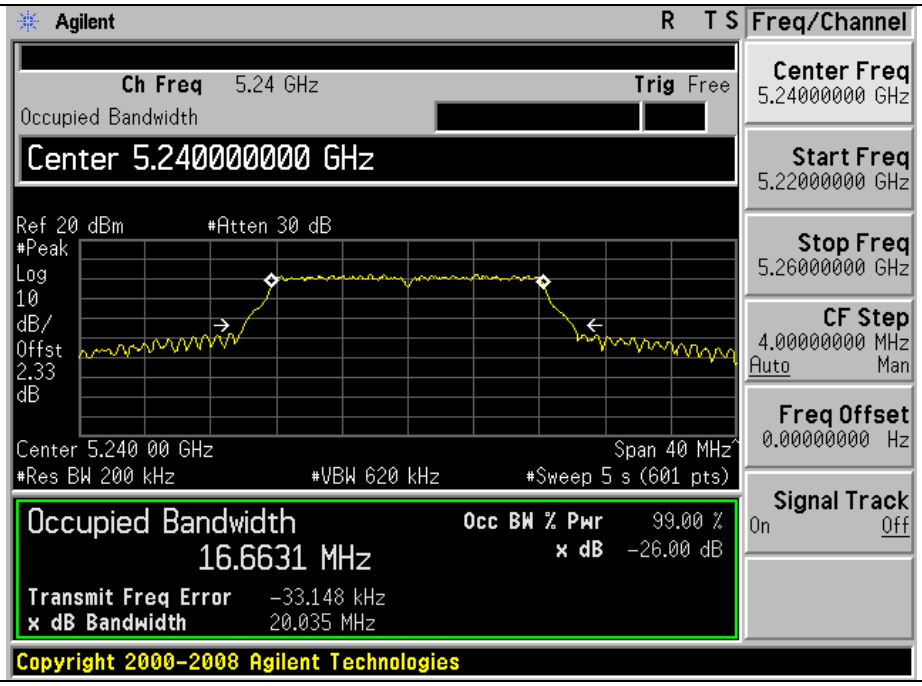

Title: 26dB & Occupied at 5240MHz for 802.11a

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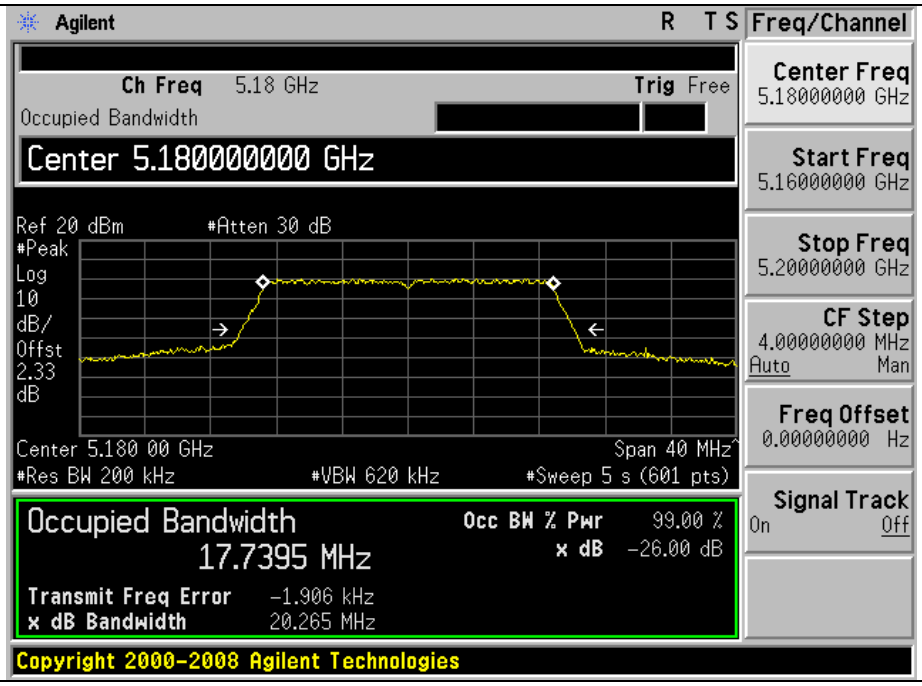
99% and 26dB Bandwidth for 802.11n (HT20)

Frequency (MHz)	Data Rate (Mbps)	99% Bandwidth (MHz)	26dB Bandwidth (MHz)
5180	M0	17.7395	20.265
5200	M0	17.7248	20.256
5240	M0	17.7004	20.209

Graphical Test Results for 802.11n (HT20):



Title: 26dB & Occupied at 5180MHz for 802.11n (HT20)

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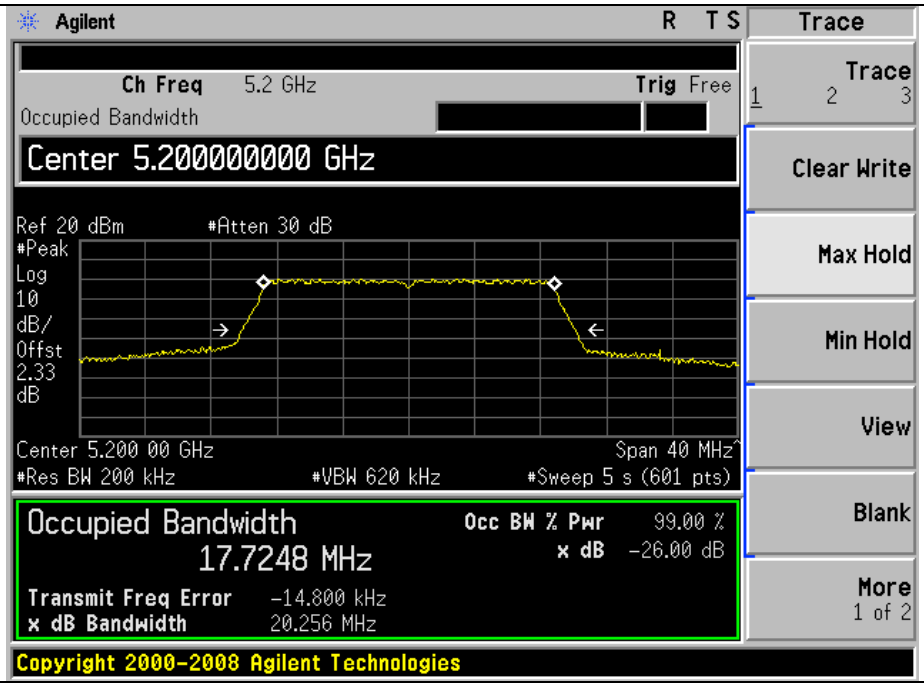
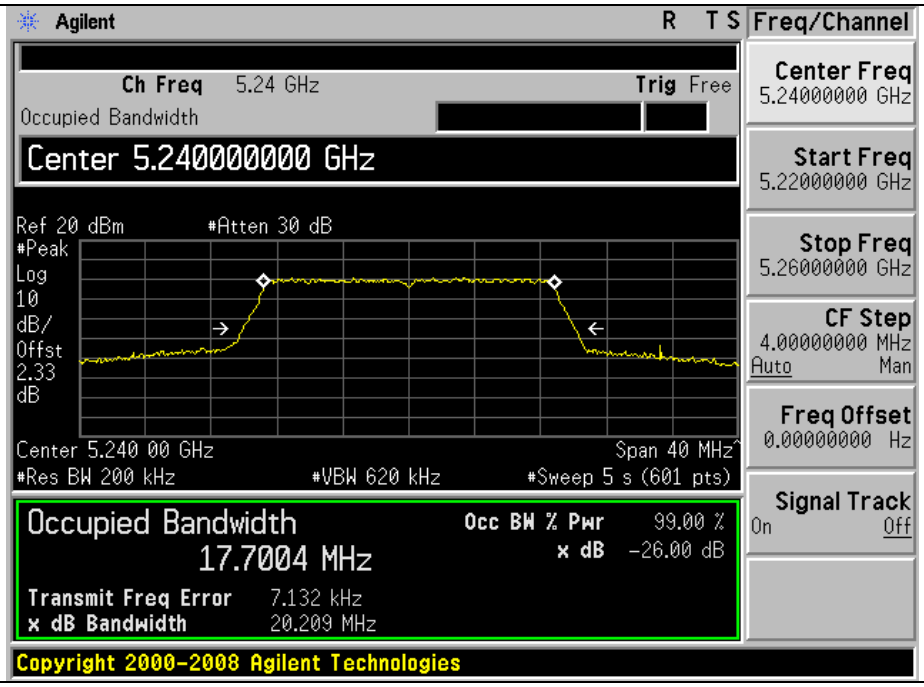


Title: 26dB & Occupied at 5200MHz for 802.11n (HT20)



Title: 26dB & Occupied at 5240MHz for 802.11n (HT20)

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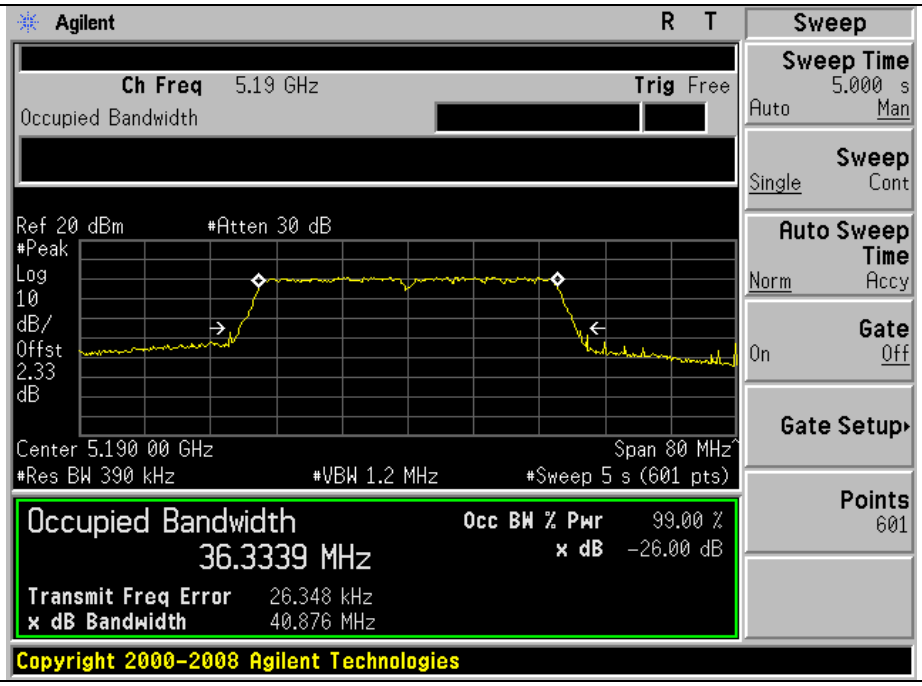
99% and 26dB Bandwidth for 802.11n (HT40)

Frequency (MHz)	Data Rate (Mbps)	99% Bandwidth (MHz)	26dB Bandwidth (MHz)
5190	M0	36.3339	40.876
5230	M0	36.3623	40.876

Graphical Test Results for 802.11n (HT40):



Title: 26dB & Occupied at 5190MHz for 802.11n (HT40)

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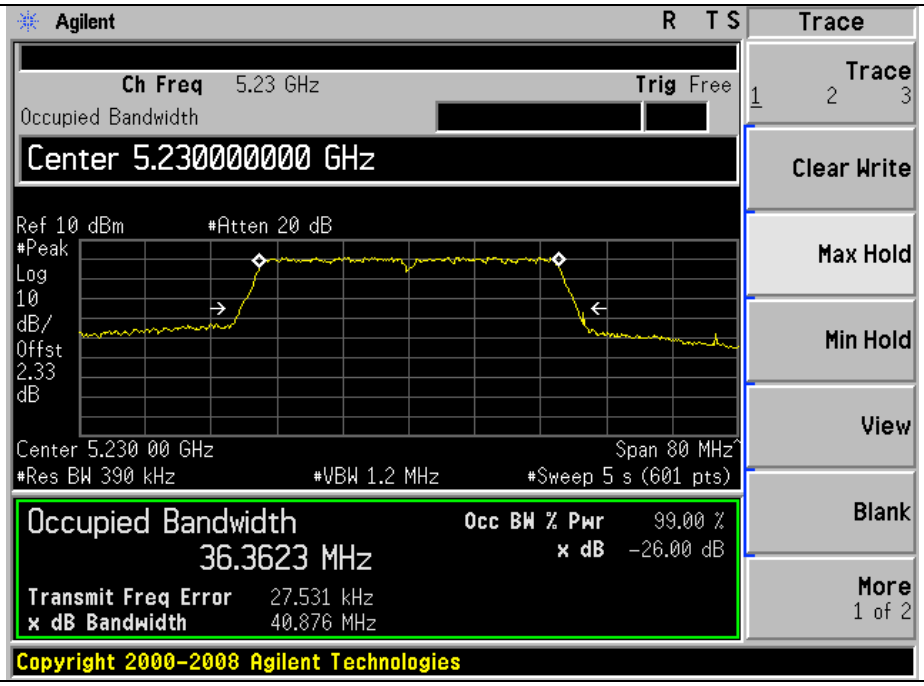

Title: 26dB & Occupied at 5230MHz for 802.11n (HT40)

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Peak Output Power for 802.11a

15.407

For the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 50 mW or 4 dBm + 10 log B, where B is the 26-dB emission bandwidth in MHz. 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.

The smallest 26dB bandwidth for all channels is 19.873MHz. The maximum conducted output power is calculated as 4dBm+10*log(19.873MHz) = 16.98dBm, which is lesser than 50mW.

Frequency (MHz)	Data Rate (Mbps)	Peak Output Power (dBm)	Limit (dBm)	Margin (dB)
5180	6	13.05	16.98	-3.93
5200	6	13.21	16.98	-3.77
5240	6	13.47	16.98	-3.51

RSS-210 (A9.2)

Band 5150–5250 MHz

Power limits

The maximum e.i.r.p. shall not exceed 200 mW or 10 + 10 $\log_{10}$ B, dBm, whichever power is less. B is the 99% emission bandwidth in MHz. The e.i.r.p. spectral density shall not exceed 10 dBm in any 1.0 MHz band.

The smallest 99dB bandwidth for all channels is 16.600MHz. The maximum conducted output power is calculated as 10dBm+10*log(16.600MHz) = 22.2dBm, which is less than 200mW (23dBm). The value of 3.4dBi is then subtracted from 22.2dBm to account for antenna gain, resulting in a limit of 18.8dBm.

Frequency (MHz)	Data Rate (Mbps)	Peak Output Power (dBm)	EIRP Limit (dBm)	Margin (dB)
5180	6	13.05	18.8	-5.75
5200	6	13.21	18.8	-5.59
5240	6	13.47	18.8	-5.33

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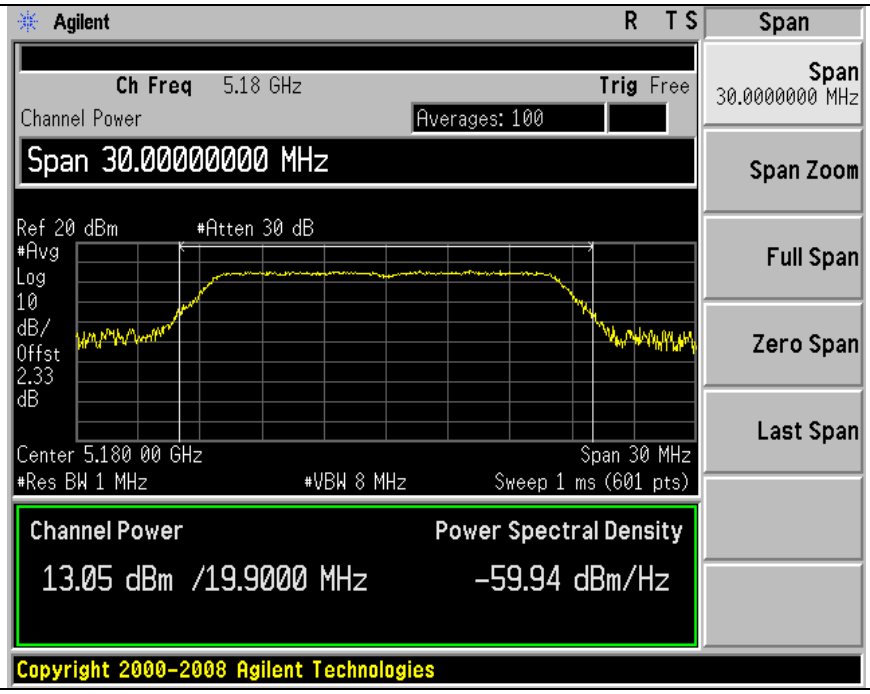
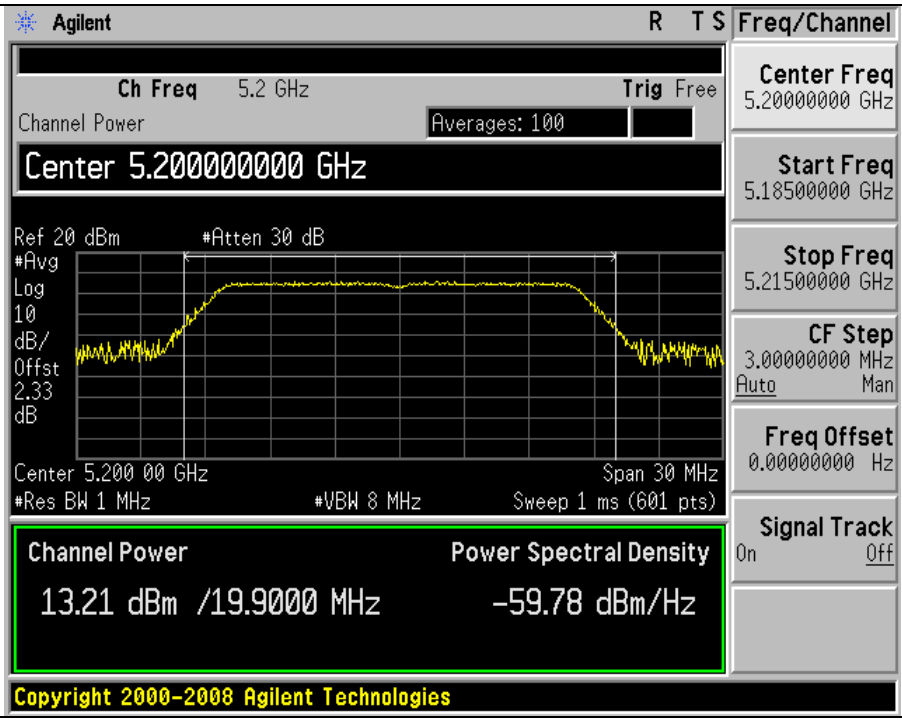
Graphical Test Results



Title: Peak Output Power at 5180MHz



Title: Peak Output Power at 5200MHz

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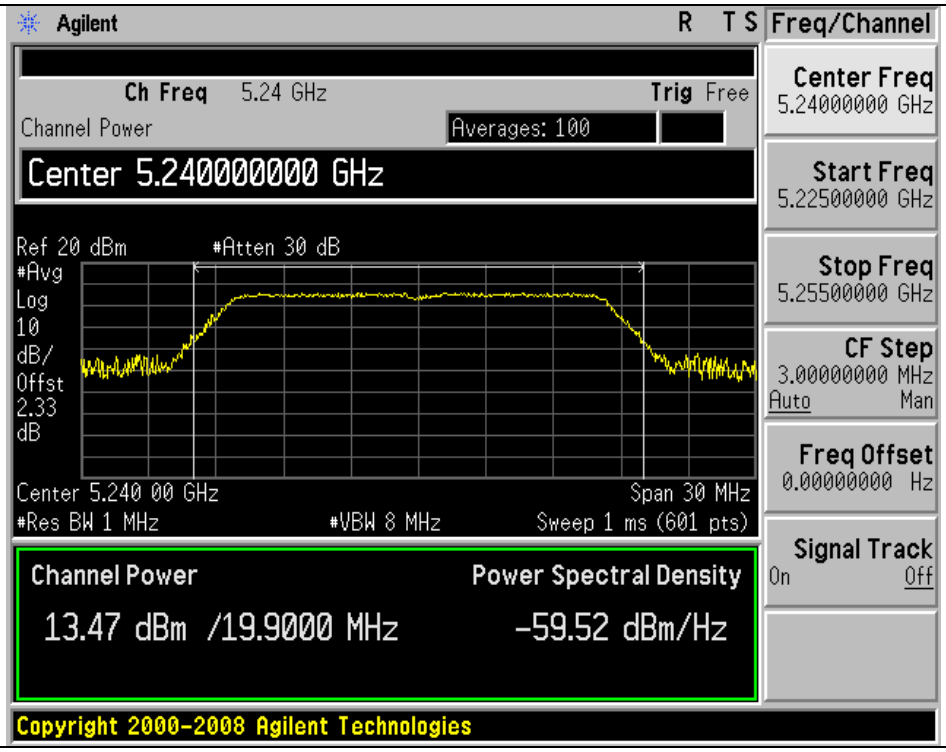

Title: Peak Output Power at 5240MHz

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Peak Output Power for 802.11n HT20

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For the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 50mW or 4dBm + 10*log B, where B is the 26-dB emission bandwidth in MHz. 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.

The smallest 26dB bandwidth for all channels is 20.209MHz. The maximum conducted output power is calculated as 4dBm +10*log(20.209MHz) = 17.055dBm. Which is greater than 50mW

Frequency (MHz)	Data Rate (Mbps)	Peak Output Power (dBm)	Limit (dBm)	Margin (dB)
5180	M0	11.97	17	-5.03
5200	M0	12.05	17	-4.95
5240	M0	12.60	17	-4.40

RSS-210 (A9.2)

Band 5150–5250 MHz

Power limits

The maximum e.i.r.p. shall not exceed 200 mW or 10 + 10 $\log_{10}$ B, dBm, whichever power is less. B is the 99% emission bandwidth in MHz. The e.i.r.p. spectral density shall not exceed 10 dBm in any 1.0 MHz band.

The smallest 99dB bandwidth for all channels is 17.7004MHz. The maximum conducted output power is calculated as 10dBm+10*log(17.7004MHz) = 22.5dBm, which is less than 200mW (23dBm). The value of 3.4dBi is then subtracted from 22.5dBm to account for antenna gain, resulting in a limit of 19.1dBm.

Frequency (MHz)	Data Rate (Mbps)	Peak Output Power (dBm)	EIRP Limit (dBm)	Margin (dB)
5180	M0	11.97	19.1	-7.13
5200	M0	12.05	19.1	-7.05
5240	M0	12.6	19.1	-6.5

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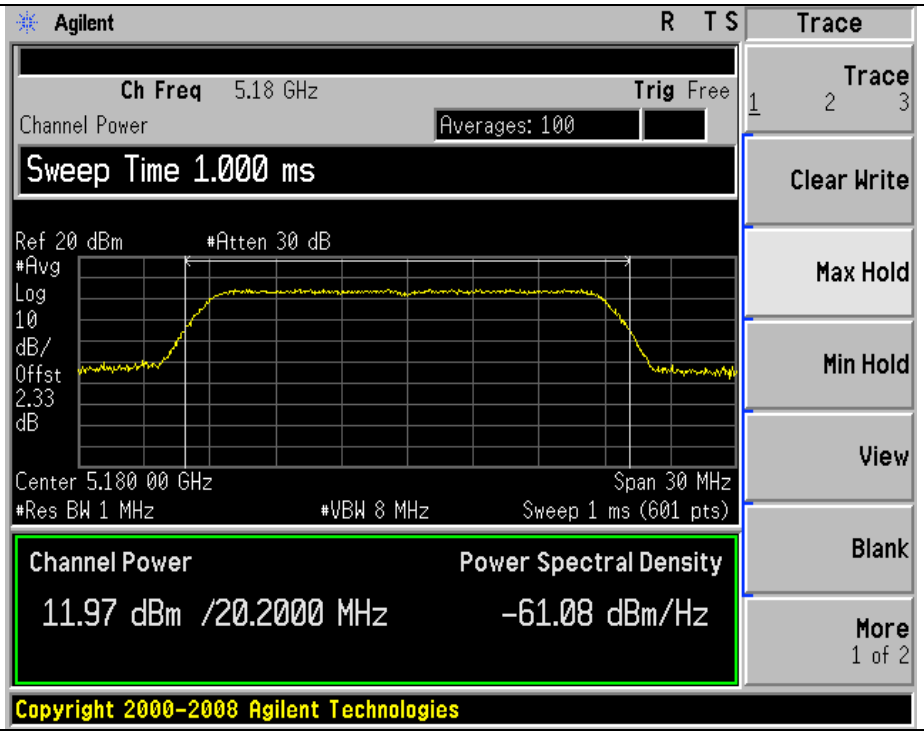
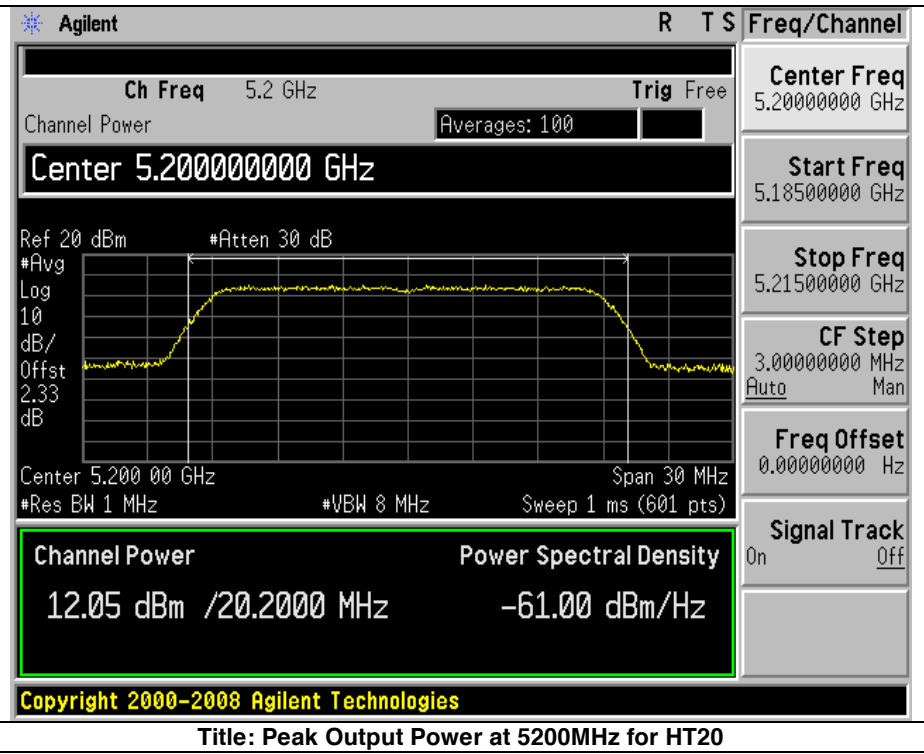


Title: Peak Output Power at 5180MHz for HT20



Title: Peak Output Power at 5200MHz for HT20

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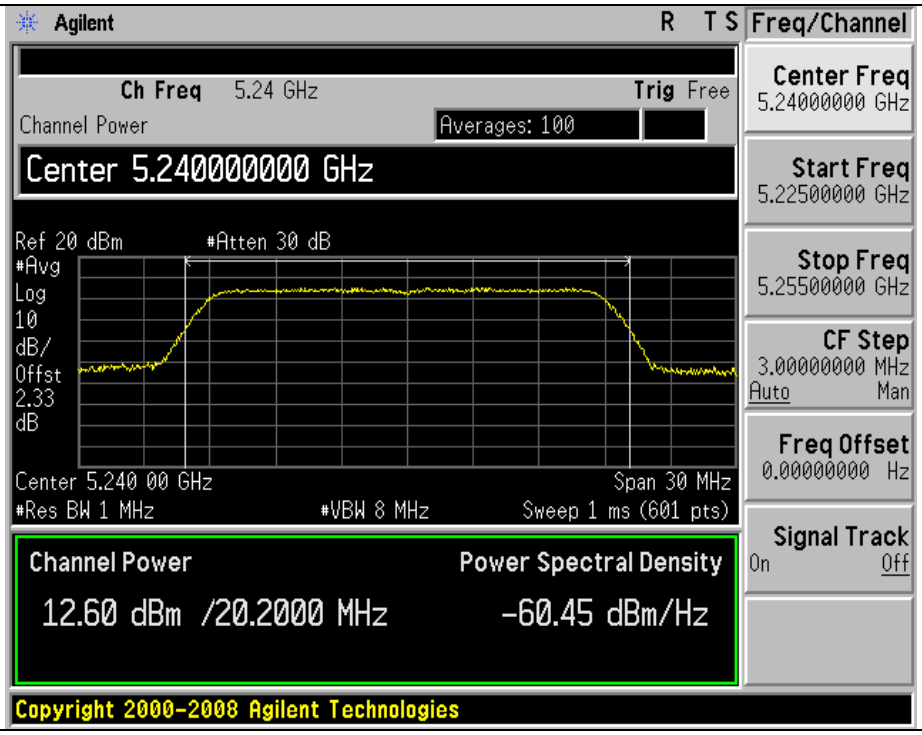

Title: Peak Output Power at 5240MHz for HT20

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Peak Output Power for HT40:

15.407:

For the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 50mW or 4dBm + 10*log B, where B is the 26-dB emission bandwidth in MHz. 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.

The smallest 26dB bandwidth for all channels is 40.876MHz. The maximum conducted output power is calculated as 4dBm+10*log(40.876MHz) = 20.115dBm = 102.6mW. Which is greater than 50mW.

Frequency (MHz)	Data Rate (Mbps)	Peak Power Output (dBm)	Limit	Margin (dB)
5190	M0	12.03	17	-4.97
5230	M0	12.39	17	-4.61

RSS-210 (A9.2)

Band 5150–5250 MHz

Power limits

The maximum e.i.r.p. shall not exceed 200 mW or 10 + 10 $\log_{10}$ B, dBm, whichever power is less. B is the 99% emission bandwidth in MHz. The e.i.r.p. spectral density shall not exceed 10 dBm in any 1.0 MHz band.

The smallest 99dB bandwidth for all channels is 36.3339MHz. The maximum conducted output power is calculated as 10dBm+10*log(36.3339MHz) = 25.6 dBm, which is greater than 200mW (23dBm). The value of 3.4dBi is then subtracted from 23dBm to account for antenna gain, resulting in a limit of 19.6dBm.

Frequency (MHz)	Data Rate (Mbps)	Peak Output Power (dBm)	Limit (dBm)	Margin (dB)
5190	M0	12.03	19.6	-7.57
5230	M0	12.39	19.6	-7.21

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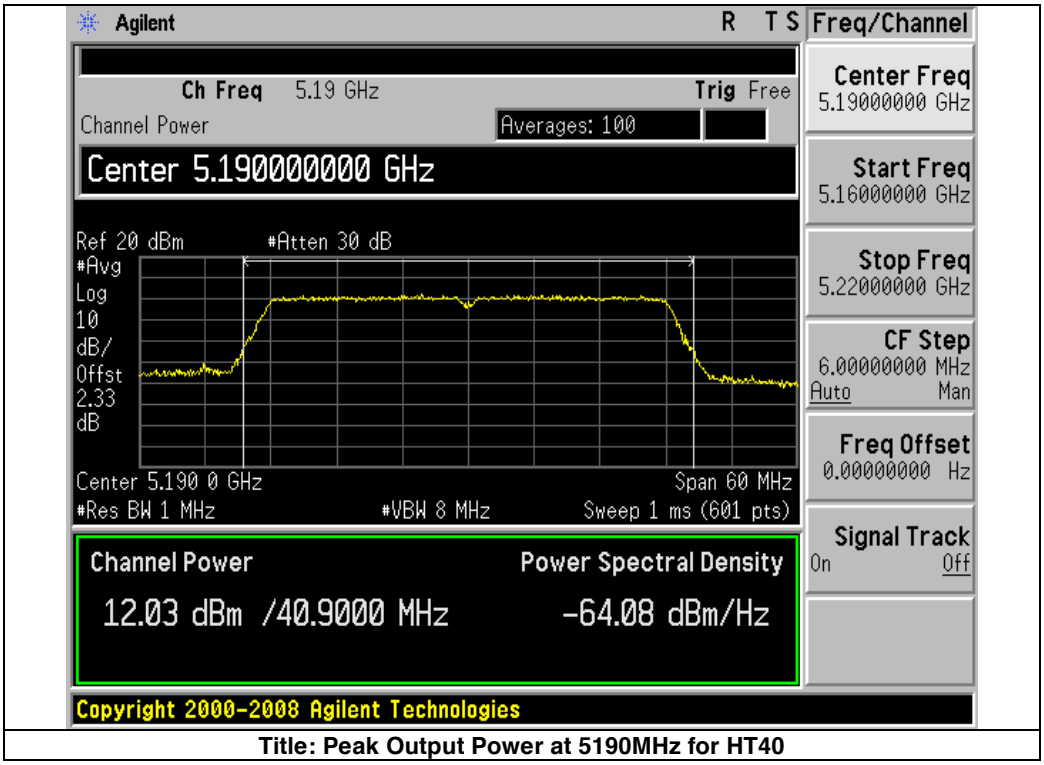
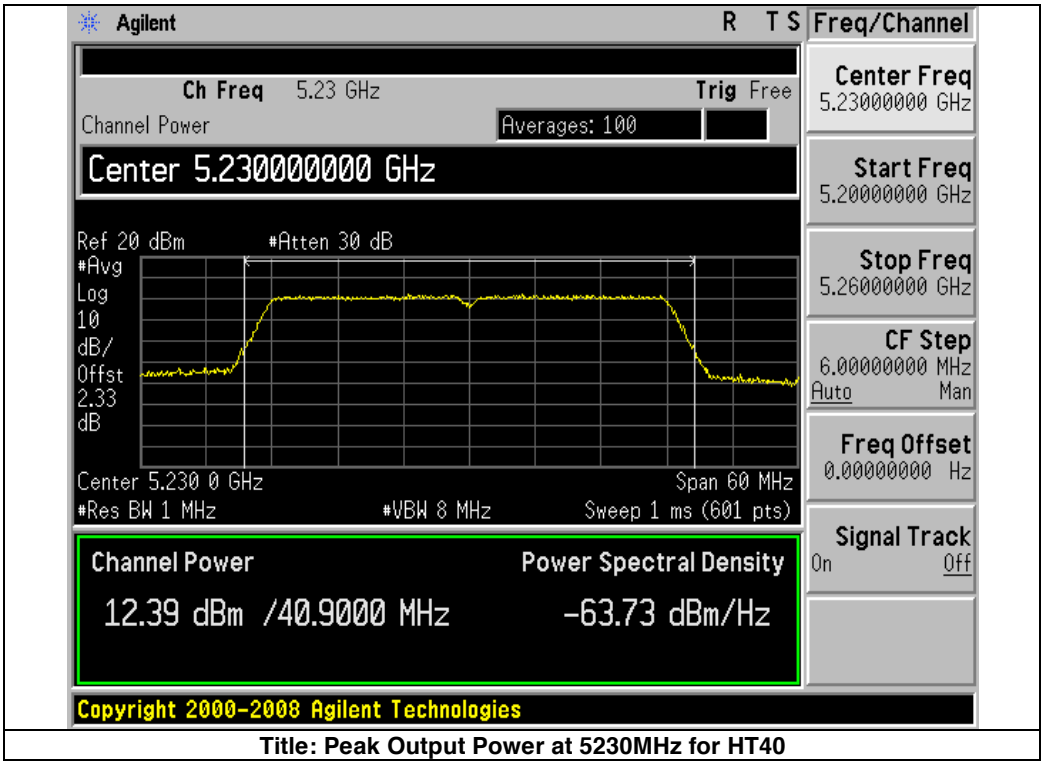


Title: Peak Output Power at 5190MHz for HT40



Title: Peak Output Power at 5230MHz for HT40

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Power Spectral Density

15.407: 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 antennas of directional gain greater than 6 dBi are used, the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.
RSS-210 A9.2: The e.i.r.p. spectral density shall not exceed 10 dBm in any 1.0 MHz band.

The results table below shows the FCC peak power spectral density limit. The maximum supported antenna gain is 3.4dBi. If the antenna gain is subtracted from the eirp spectral density limit from RSS-210, the limit is 6.6dBm. Compliance to the more stringent limit of 4dBm shows compliance to RSS-210 as well.

The “Measure and add 10 log(N) dB technique”, where N is the number of outputs, is used for measuring in-band Power Spectral Density. With this technique, spectrum measurements are performed at each output of the device, and the quantity 10 log(1) (or 0dB) is added to the worst case spectrum value before comparing to the emission limit.

Method SA-1 from KDB 789033
Connect the antenna port(s) to the spectrum analyzer input. Place the radio in continuous transmit mode. Configure the spectrum analyzer as shown below.

Enable "Channel Power" function of analyzer
Center Frequency: Frequency from table below
Span: 20 MHz (must be greater than 26dB bandwidth, adjust as necessary)
Ref Level Offset: Correct for attenuator and cable loss.
Reference Level: 20 dBm
Attenuation: 20 dB
Sweep Time: Auto
Resolution Bandwidth: 1 MHz
Video Bandwidth: 3 MHz
Detector: Sample
Trace: Trace Average 100 traces in Power Averaging Mode
Integration BW: =99 % BW from 99% Bandwidth Data

After averaging 100 traces of the transmitter waveform on the spectrum analyzer, record the spectrum analyzer Channel Power. Perform a Marker Peak Search function, and record this value as the Power Spectral Density.

Power Spectral Density for 802.11a:

Frequency (MHz)	Data Rate (Mbps)	Power Spectral Density (dBm/MHz)	Limit (dBm)	Margin (dB)
5180	6	2.227	4	-1.773
5200	6	2.379	4	-1.621

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5240	6	2.332	4	-1.668

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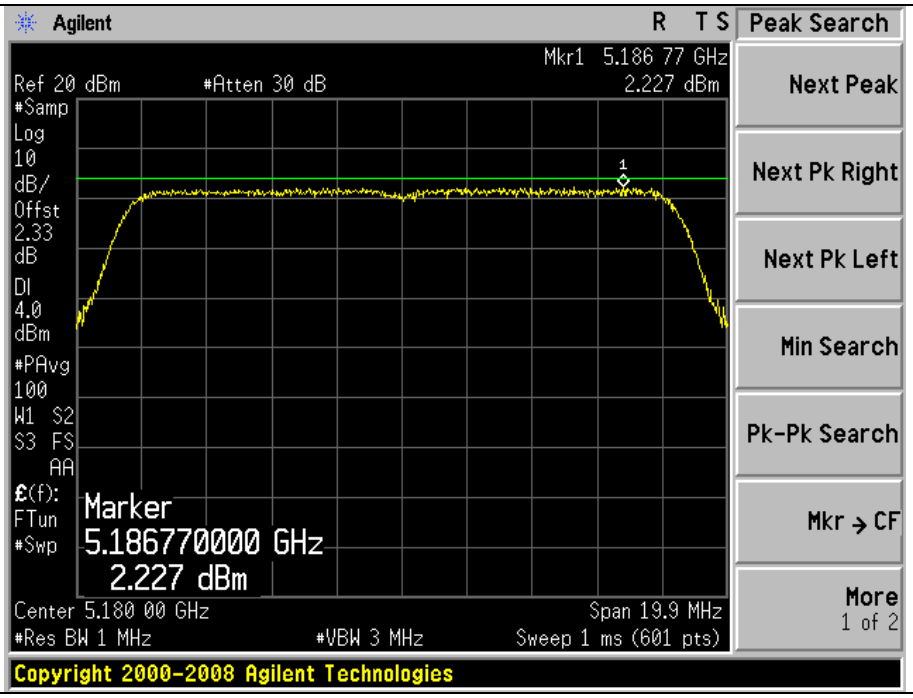
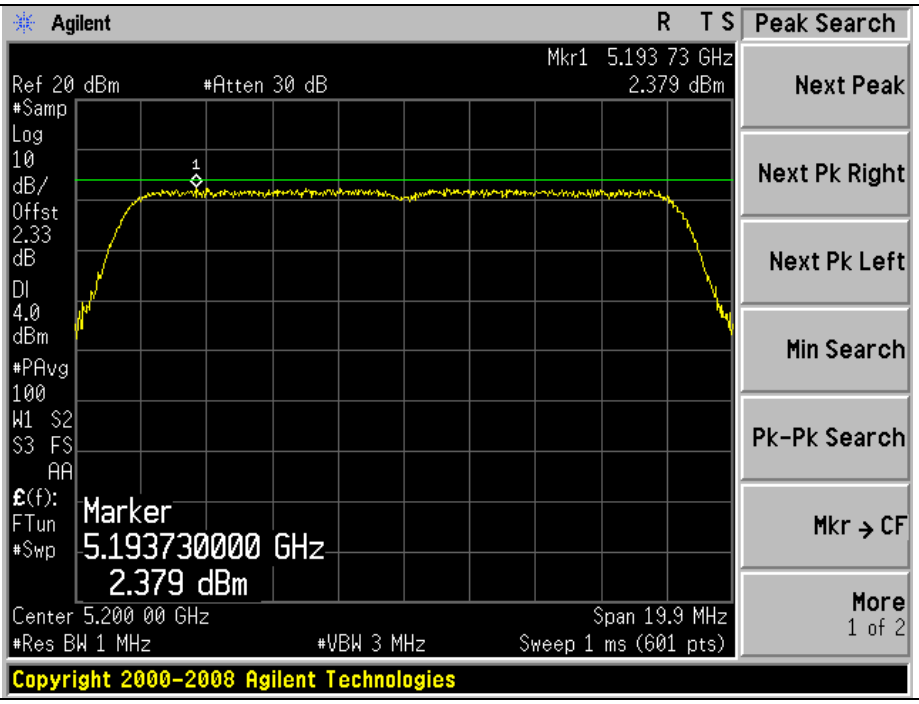
Graphical Test Results for 802.11a:



Title: Peak Power Spectral Density for 5180MHz , 802.11a at 6Mbps



Title: Peak Power Spectral Density at 5200MHz, 802.11a at 6Mbps

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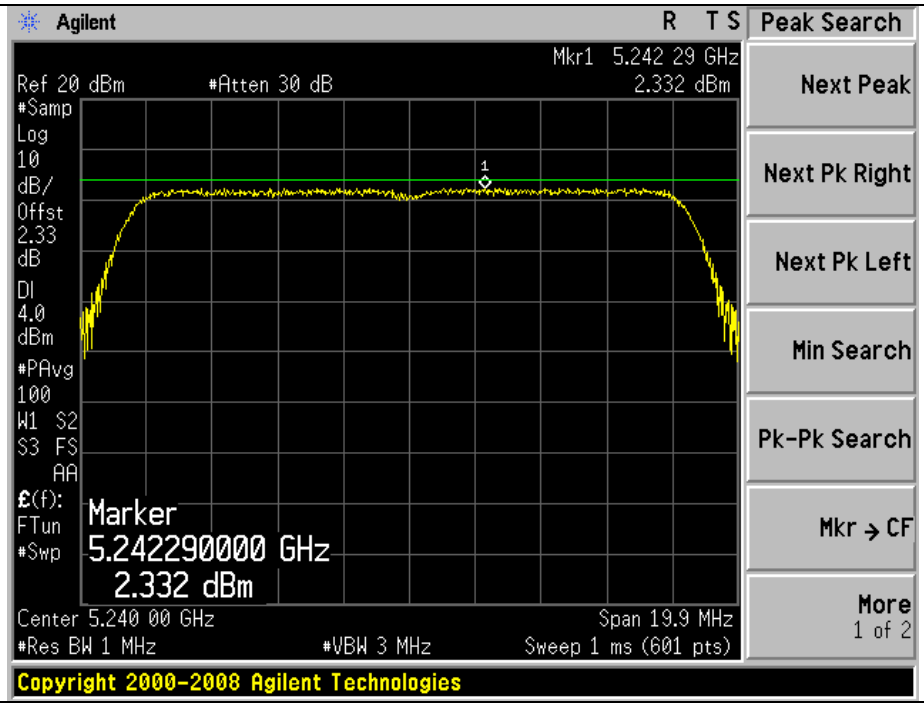

Title: Peak Power Spectral Density for 5240MHz, 802.11a at 6Mbps

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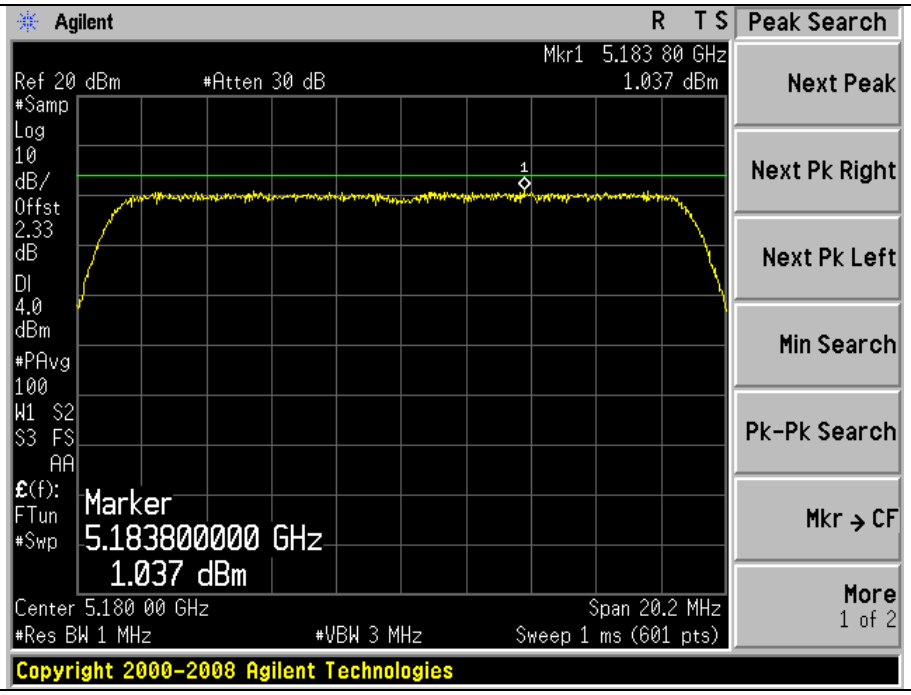
Power Spectral Density for 802.11n HT20:

Frequency (MHz)	Data Rate (Mbps)	Power Spectral Density (dBm/MHz)	Limit (dBm)	Margin (dB)
5180	M0	1.037	4	-2.963
5200	M0	0.962	4	-3.038
5240	M0	1.485	4	-2.515

Graphical Test Results for 802.11n HT20:



Title: Peak Power Spectral Density for 5180MHz, 802.11n HT20 at M0

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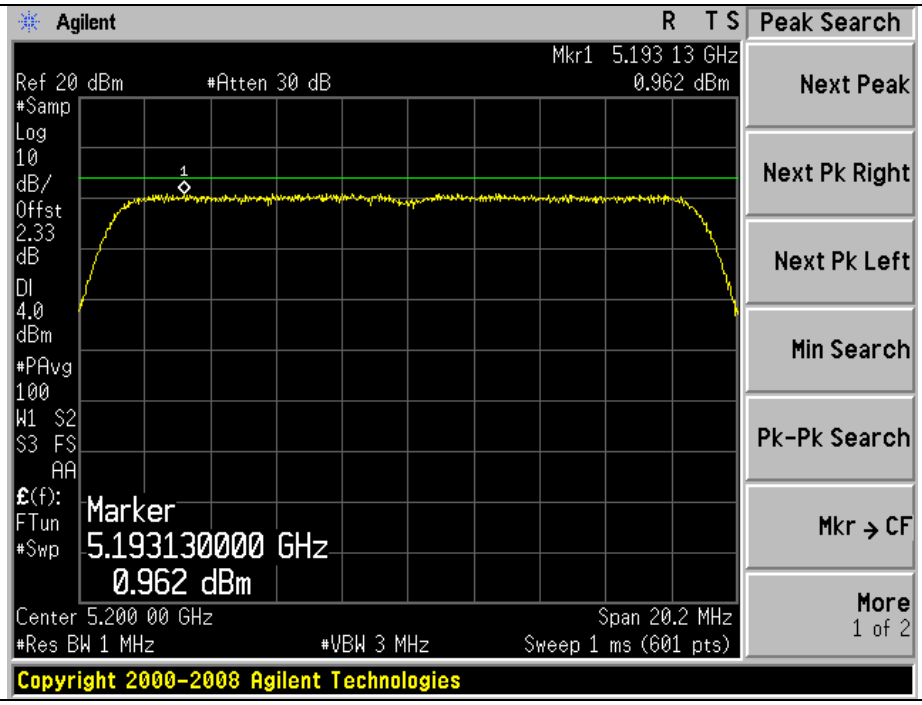
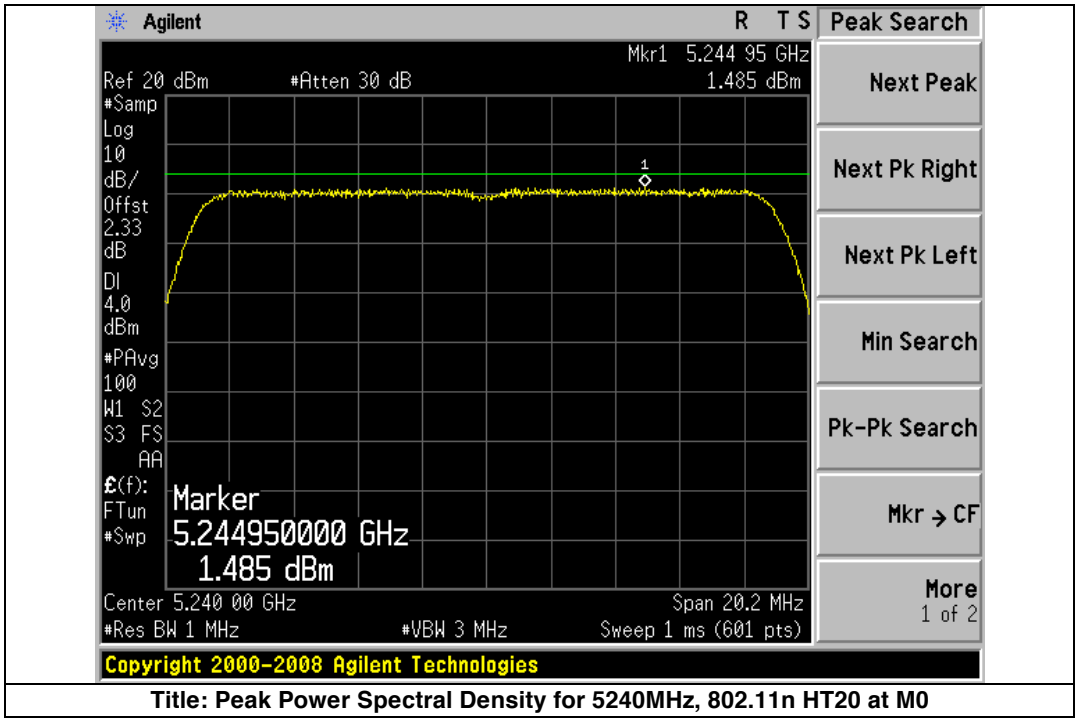


Title: Peak Power Spectral Density at 5200MHz, 802.11n HT20 at M0



Title: Peak Power Spectral Density for 5240MHz, 802.11n HT20 at M0

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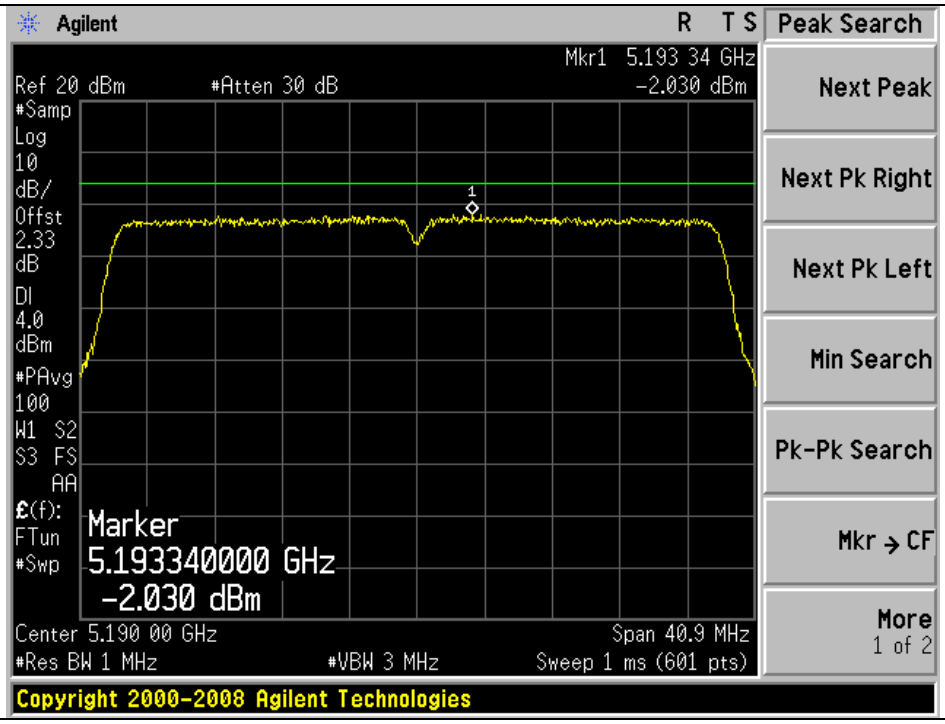
Power Spectral Density for 802.11n (HT40):

Frequency (MHz)	Data Rate (Mbps)	Power Spectral Density (dBm/MHz)	Limit (dBm)	Margin (dB)
5190	M0	-2.03	4	-6.03
5230	M0	-1.493	4	-5.493

Graphical Test Results for 802.11an (HT40):



Title: Peak Power Spectral Density for 5190MHz, 802.11n HT40 at M0

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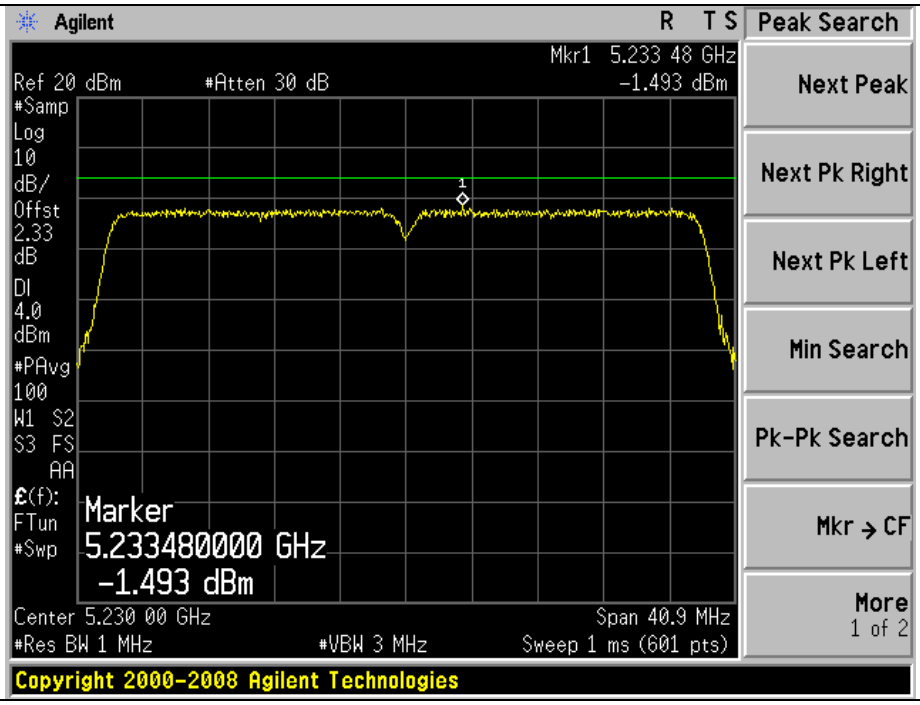

Title: Peak Power Spectral Density at 5230MHz, 802.11n HT40 at M0

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Peak Excursion

15.407: The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the maximum conducted output power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.

Set the spectrum analyzer span to view the entire emission bandwidth. The largest difference between the following two traces must be <= 13 dB for all frequencies across the emission bandwidth.

Set the spectrum analyzer span to view the entire emission bandwidth. The largest difference between the following two traces must be <= 13 dB for all frequencies across the emission bandwidth.

1st Trace: (Peak)

Set Span to encompass the entire emission bandwidth of the signal.
RBW = 1 MHz, VBW = 3 MHz
Detector = Peak
Sweep = 10 s
Trace 1 = Max-hold
Ref Level Offset = correct for attenuator and cable loss
Ref Level = 20dBm
Atten = 10dBm

2nd Trace: (Average)

Trace 2 = clear right
Detector = Sample
Avg/VBW type = Pwr(RMS)
Average = 100
Sweep = single

Set marker Deltas

Trace 1 & Peak search
Marker Delta
Trace 2 & Peak search

Record the difference between the Peak and Average Markers

Peak Excursion for 802.11a

Frequency (MHz)	Data Rate (Mbps)	Peak Excursion (dB)	Limit (dBm)	Margin (dB)
5180	6	7.153	13	-5.847
5200	6	7.023	13	-5.977
5240	6	6.821	13	-6.179

Graphical Test Results

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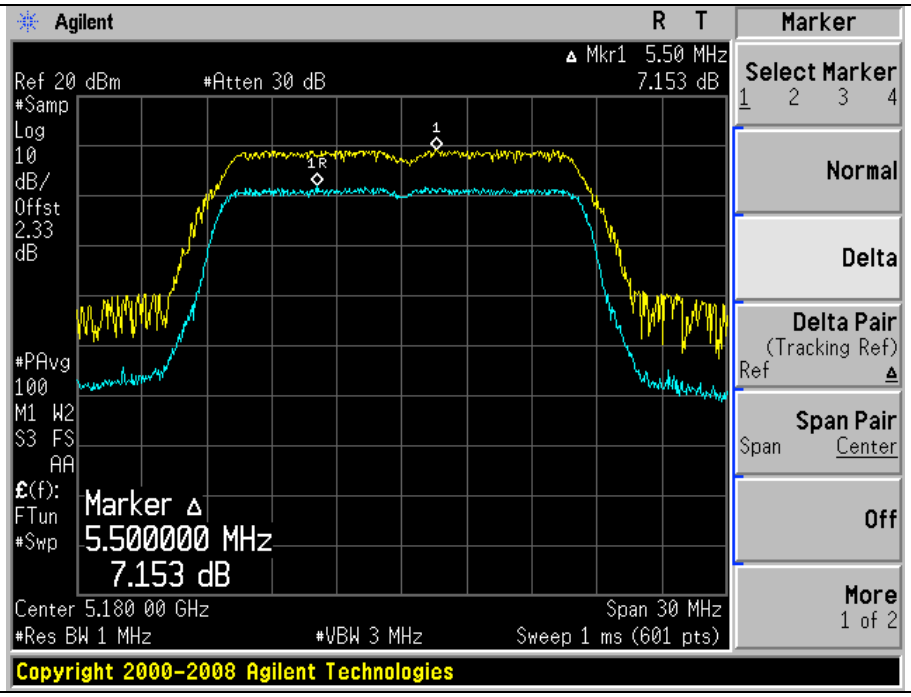
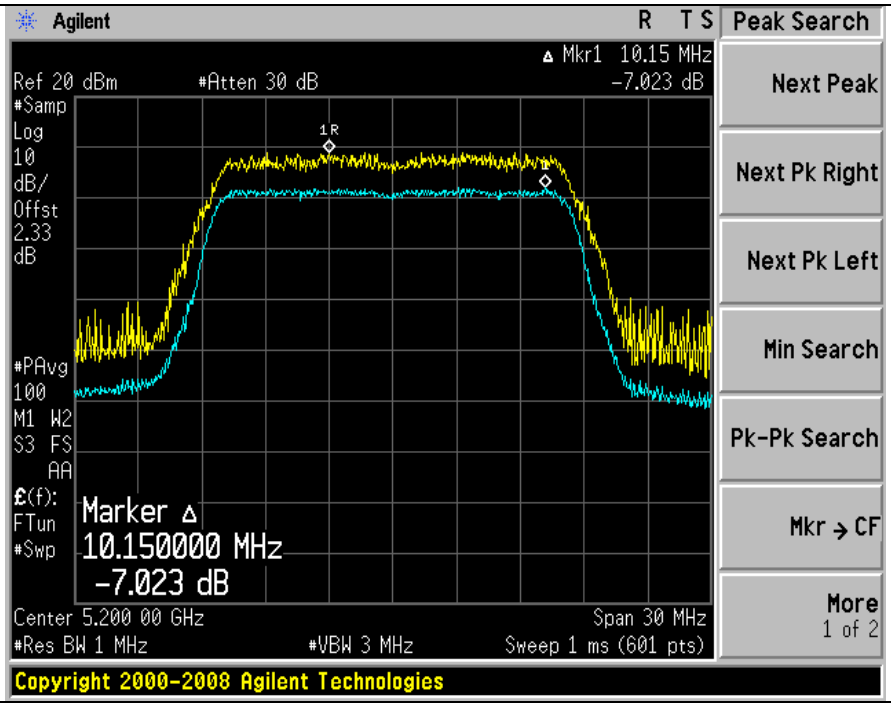


Title: Peak Excursion at 5180MHz, 6Mbps



Title: Peak Excursion at 5200MHz, 6Mbps

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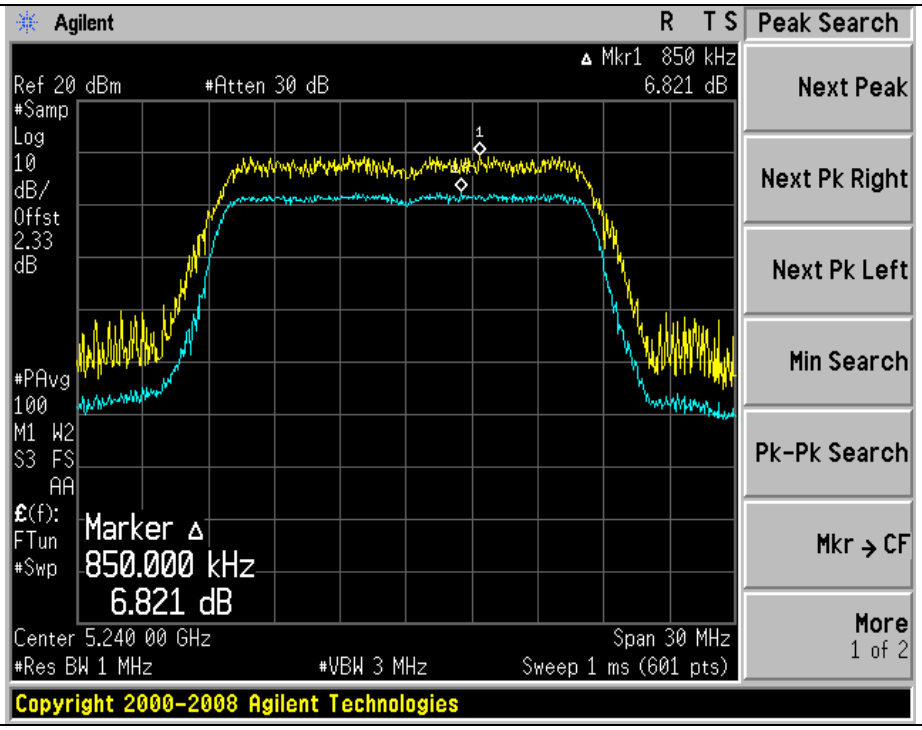

Title: Peak Excursion at 5240MHz, 6Mbps

Peak Excursion for 802.11n HT20:

Frequency (MHz)	Data Rate (Mbps)	Peak Excursion (dB)	Limit (dBm)	Margin (dB)
5180	M0	7.414	13	-5.586
5200	M0	7.447	13	-5.553
5240	M0	6.992	13	-6.008

Graphical Test Results

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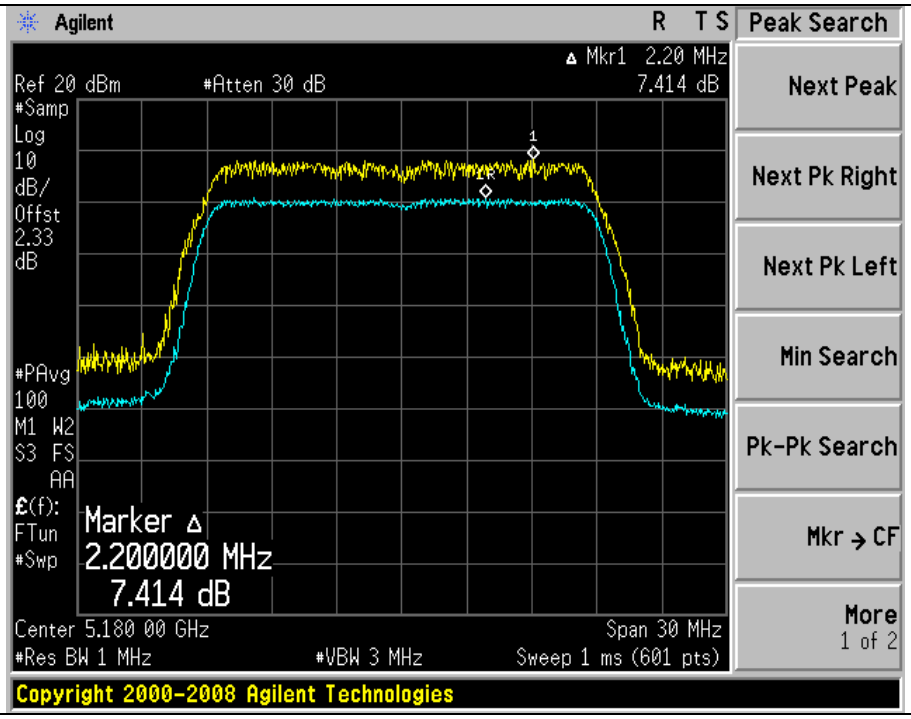
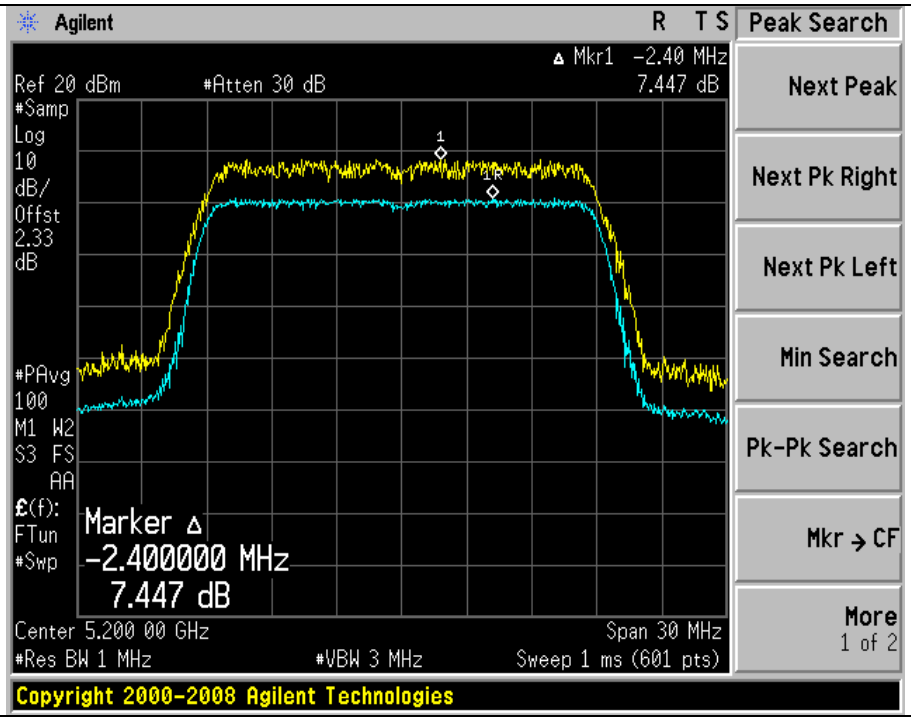


Title: Peak Excursion at 5180MHz, M0



Title: Peak Excursion at 5200MHz, M0

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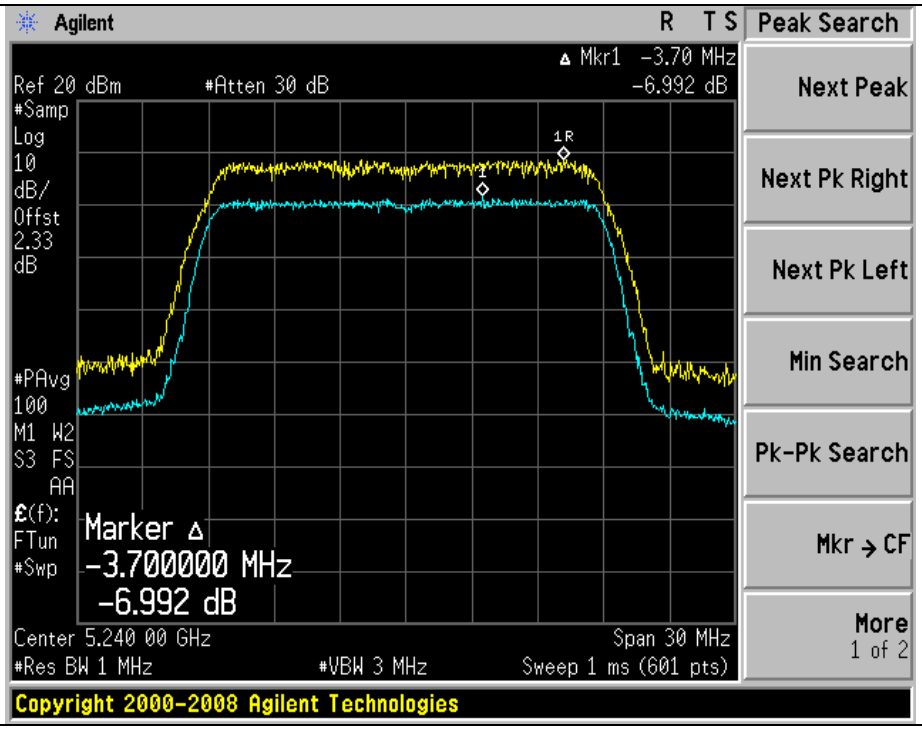

Title: Peak Excursion at 5240MHz, M0

Peak Excursion for 802.11n HT40:

Frequency (MHz)	Data Rate (Mbps)	Peak Excursion (dB)	Limit (dBm)	Margin (dB)
5190	M0	7.129	13	-5.871
5230	M0	6.973	13	-6.027

Graphical Test Results

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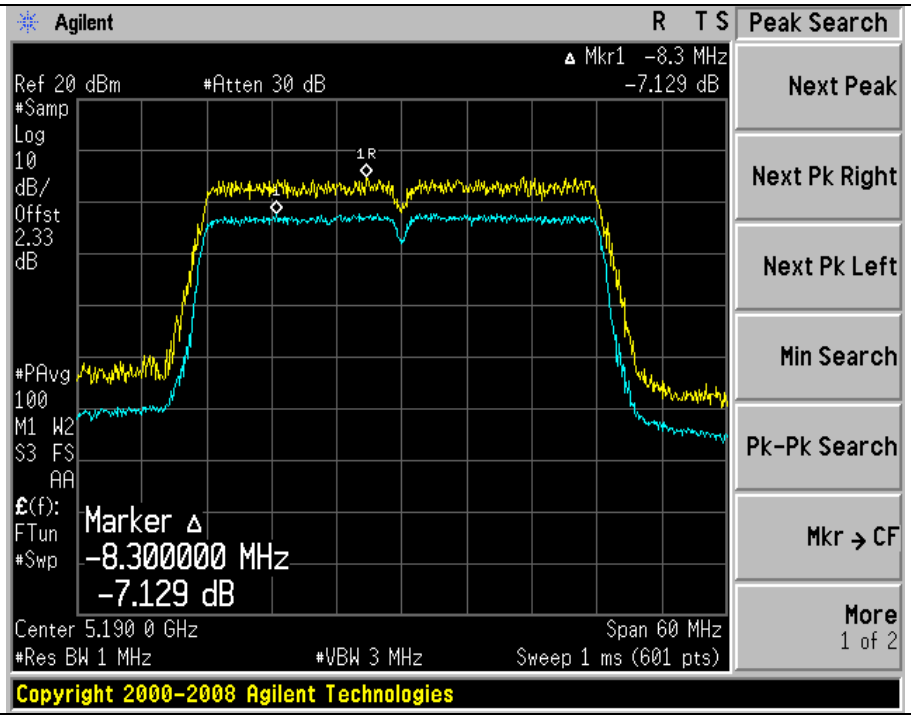
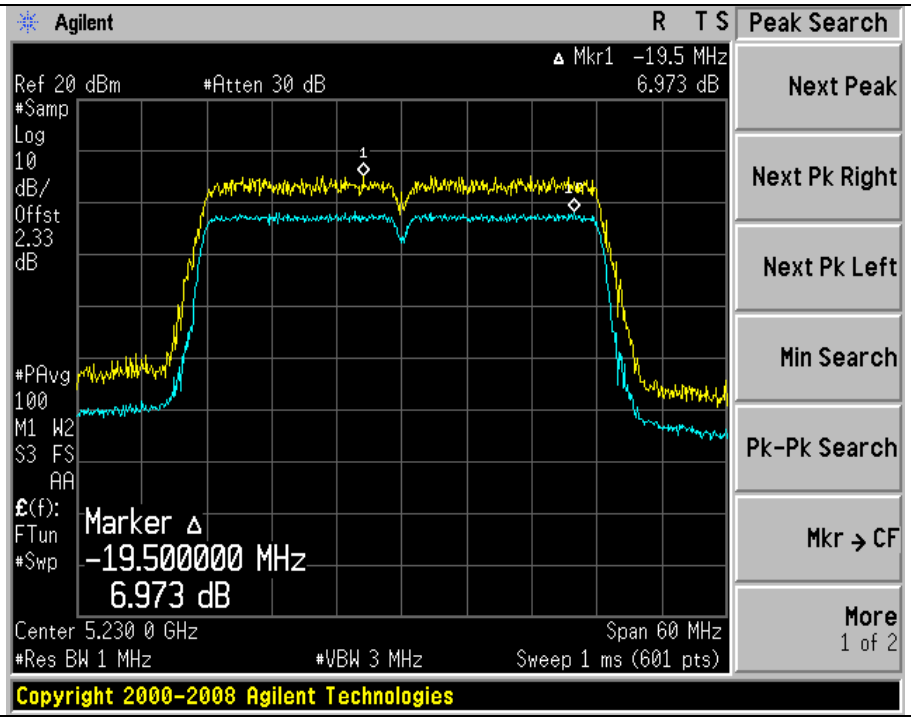


Title: Peak Excursion at 5190MHz, M0



Title: Peak Excursion at 5230MHz, M0

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Conducted Spurious Emissions:

15.407: For transmitters operating in the 5.15-5.25 GHz band: all emissions outside of the 5.15-5.35 GHz band shall not exceed an EIRP of -27dBm/MHz.

Connect the antenna port(s) to the spectrum analyzer input. Place the radio in continuous transmit mode. Configure the spectrum analyzer as shown below (be sure to enter all losses between the transmitter output and the spectrum analyzer).

Span:	30 MHz-40 GHz
Reference Level:	20 dBm
Attenuation:	10 dB
Sweep Time:	10 s
Resolution Bandwidth:	1 MHz
Video Bandwidth:	3 MHz
Detector:	Peak
Trace:	Single
Marker:	Peak

Record the marker waveform peak to spur difference

Note: No emissions observed above 26.5GHz.

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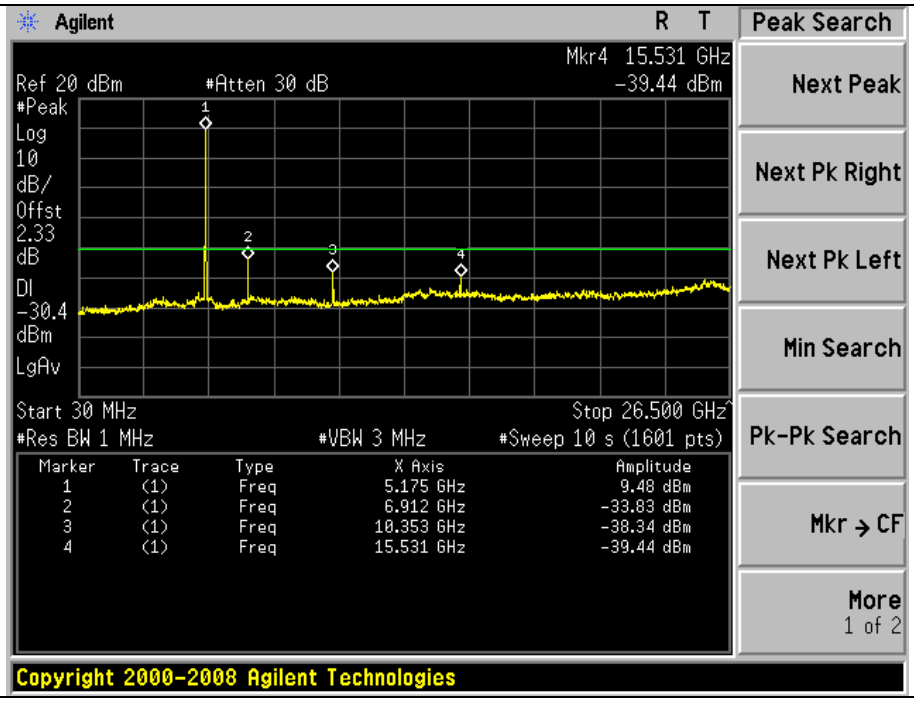
802.11a Graphical Test Results at 5180MHz:

Note that the data displayed on the plots detailed in this appendix were measured using a 'Peak Detector'. Please refer to the results table for the detectors used during formal measurements



Title: Conducted Spurious Emissions Results for 5180MHz

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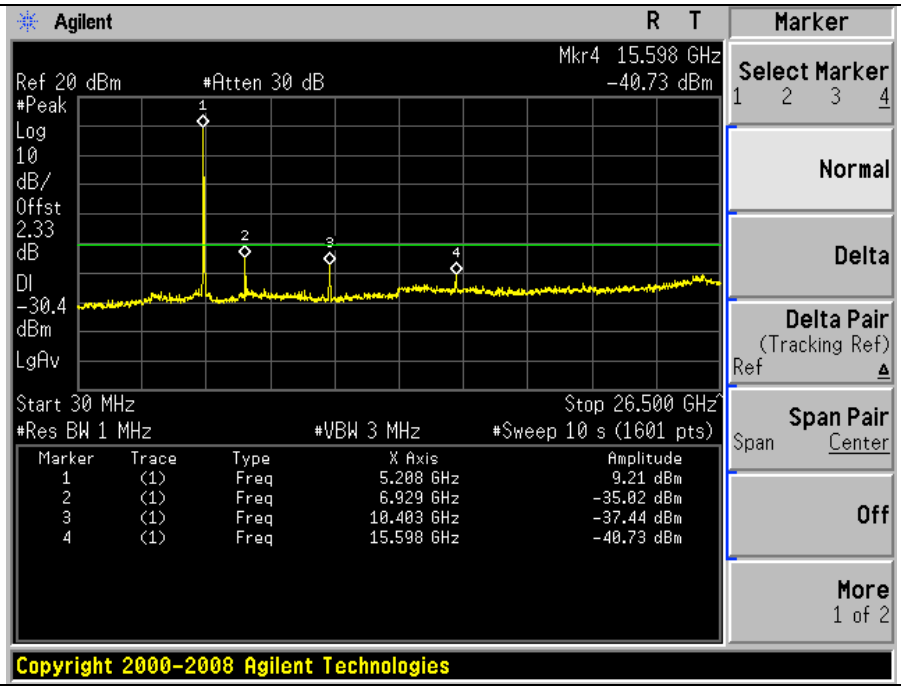
802.11A Graphical Test Results at 5200MHz:

Note that the data displayed on the plots detailed in this appendix were measured using a 'Peak Detector'. Please refer to the results table for the detectors used during formal measurements



Title: Conducted Spurious Emissions Results for 5200MHz

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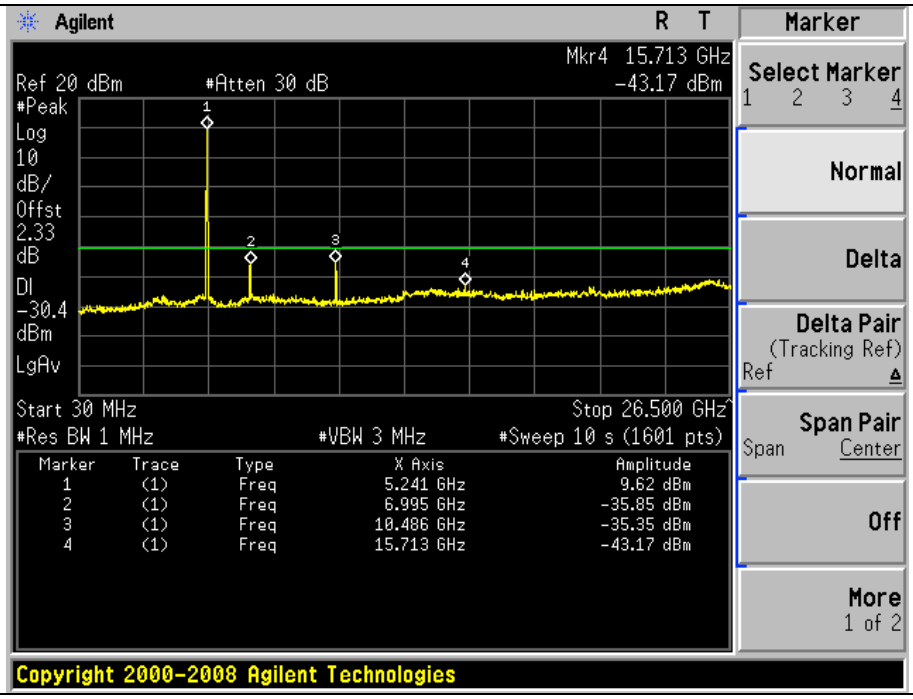
802.11A Graphical Test Results at 5240MHz:

Note that the data displayed on the plots detailed in this appendix were measured using a 'Peak Detector'. Please refer to the results table for the detectors used during formal measurements



Title: Conducted Spurious Emissions Results for 5240MHz

Conducted Spurious Emissions Results for 802.11n – HT20 Mode:

Graphical Test Results for 5180MHz:

Note that the data displayed on the plots detailed in this appendix were measured using a 'Peak Detector'. Please refer to the results table for the detectors used during formal measurements

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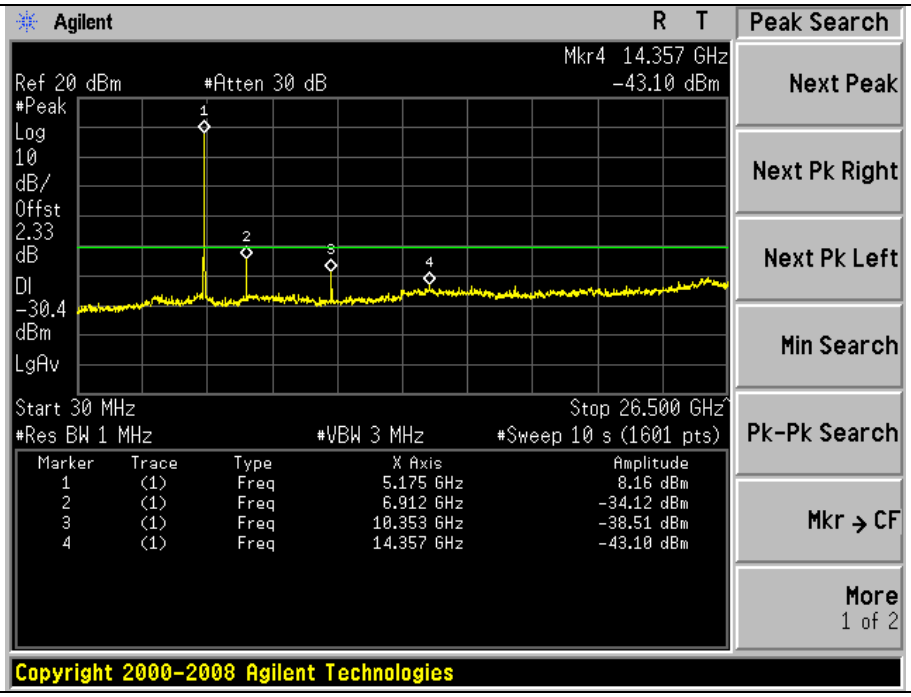

Title: HT20 -5180MHz

Graphical Test Results for 5200MHz:

Note that the data displayed on the plots detailed in this appendix were measured using a 'Peak Detector'. Please refer to the results table for the detectors used during formal measurements

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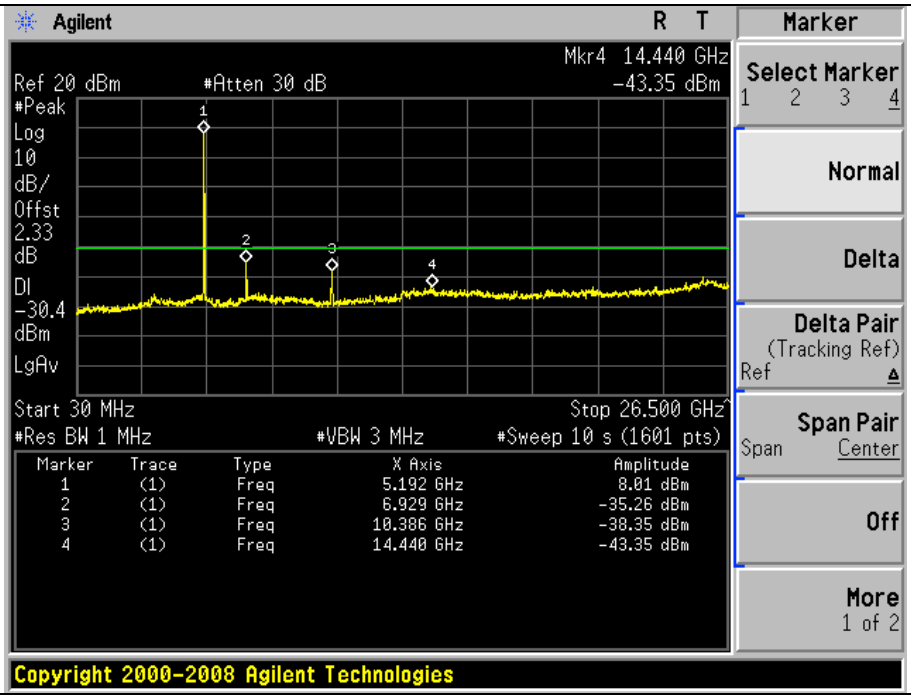

Title: HT20 - 5200MHz

Graphical Test Results for 5240MHz:

Note that the data displayed on the plots detailed in this appendix were measured using a 'Peak Detector'. Please refer to the results table for the detectors used during formal measurements

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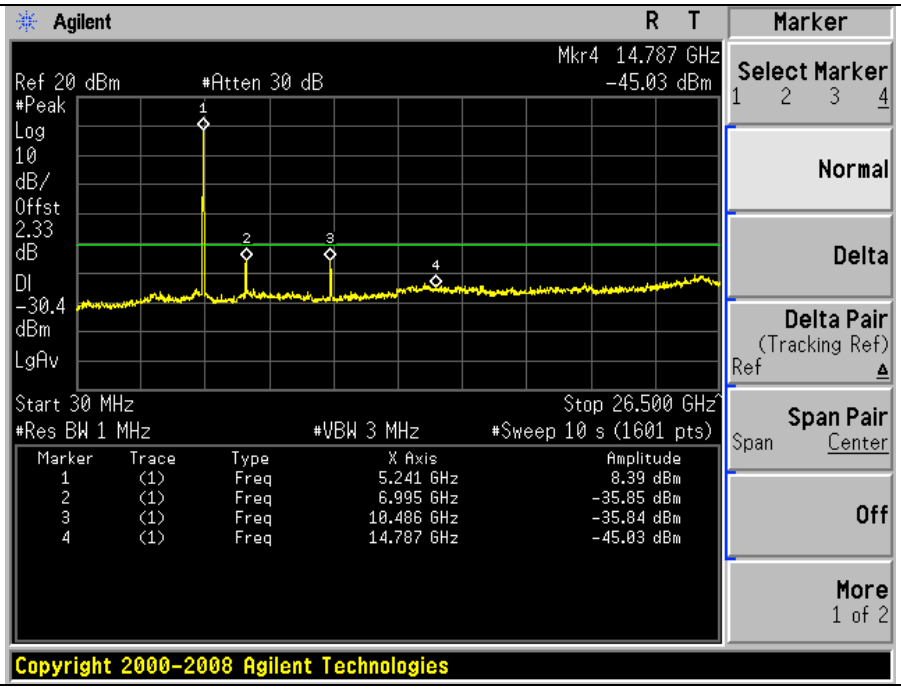

Title: HT20 - 5240MHz

Conducted Spurious Emissions Results for 802.11a – HT40 Mode:

Graphical Test Results for 5190MHz:

Note that the data displayed on the plots detailed in this appendix were measured using a 'Peak Detector'. Please refer to the results table for the detectors used during formal measurements

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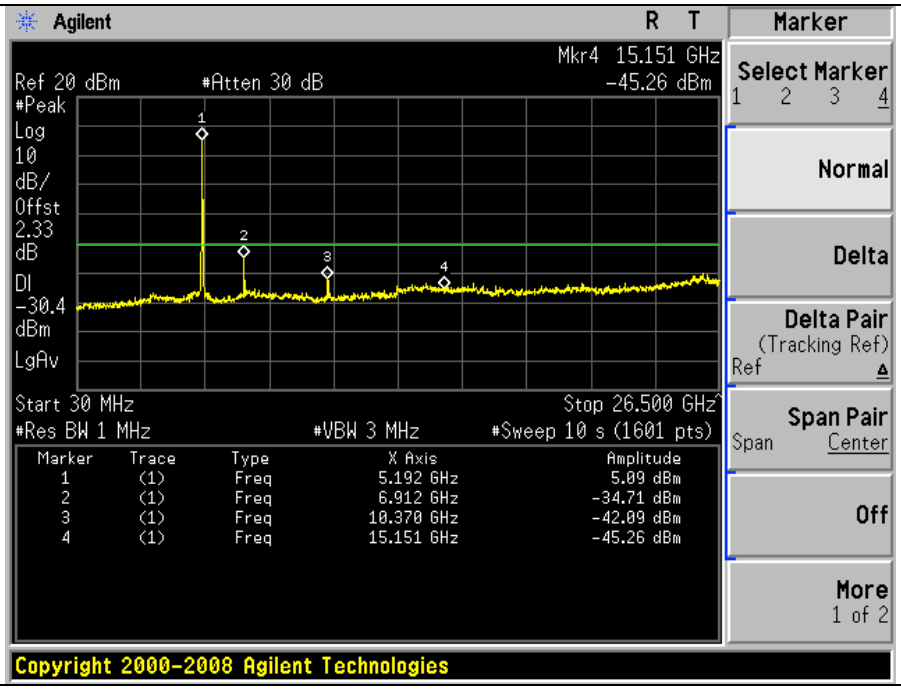

Title: Conducted Spurious Emissions HT40 – 5190MHz

Graphical Test Results for 5230MHz:

Note that the data displayed on the plots detailed in this appendix were measured using a 'Peak Detector'. Please refer to the results table for the detectors used during formal measurements

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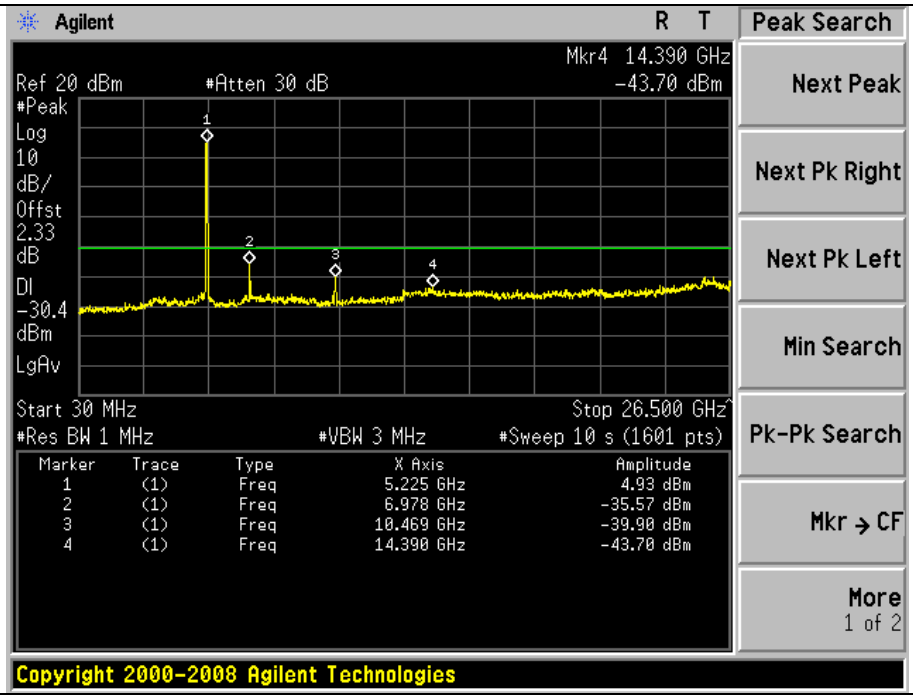

Title: Conducted Spurious Emissions HT40- 5230MHz

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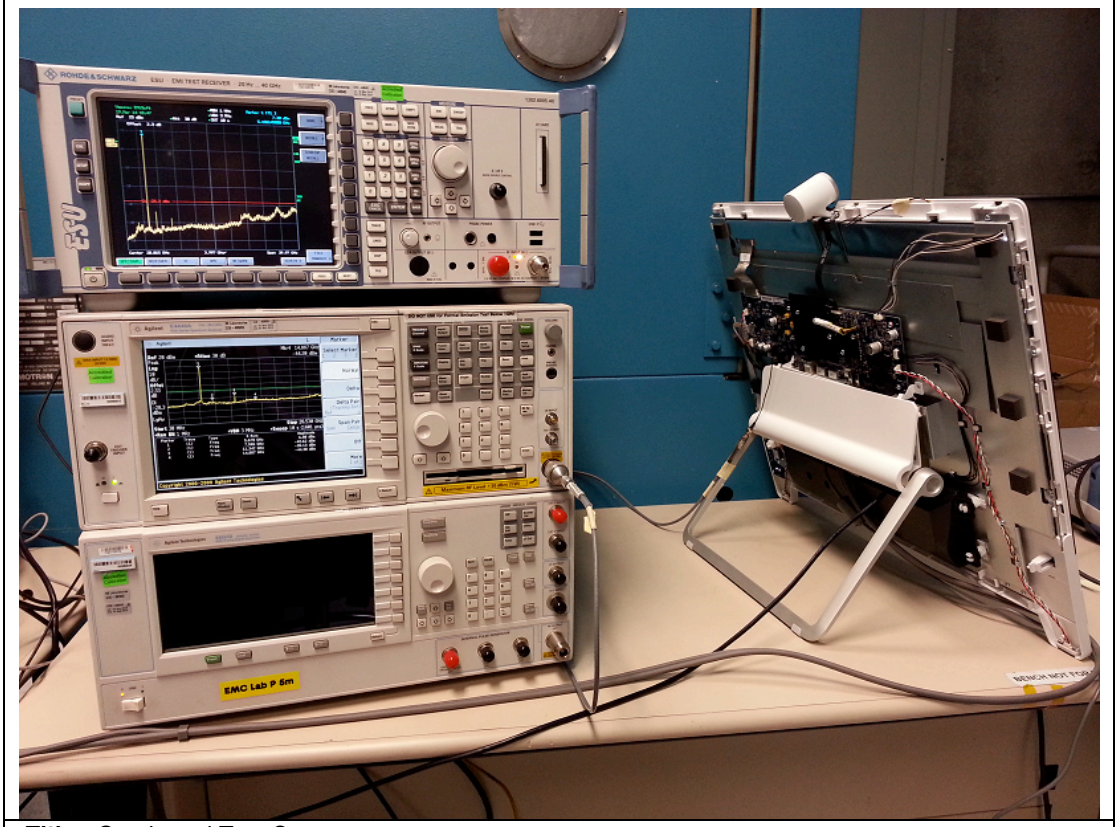

Title: Conducted Test Setup

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Conducted Band Edge

Radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

Connect the antenna port(s) to the spectrum analyzer input. Place the radio in continuous transmit mode. Be sure to enter all losses between the transmitter output and the spectrum analyzer.

Reference Level: 10 dBm
Attenuation: 4 dB
Sweep Time: Coupled
Resolution Bandwidth: 1MHz
Video Bandwidth: 1 MHz for peak, 100 Hz for average
Detector: Peak

Save 2 plots: 1) Average Plot (Vertical and Horizontal), Limit= -41.25 dBm eirp (54dBuV @3m)
2) Peak plot (Vertical and Horizontal), Limit = -21.25 dBm eirp (74dBuV @3m)

Place a marker at the end of the restricted band closest to the transmit frequency to show compliance. Also measure any emissions in the restricted bands.

802.11a Band Edge Test Results:

Mode	Transmit Frequency (MHz)	Measurement Type	Data Rate (Mbps)	Marker (MHz)	Band Edge Level (dBm)	Limit (dBm)	Limit adjusted for antenna gain (dBm)	Margin (dB)
802.11a	5180	Peak	6	5150	-36.72	-21.25	-24.2	-12.52
	5180	Average	6	5150	-54.42	-41.25	-44.7	-9.72

Graphical Test Results for 802.11a:

Note that the data displayed on the plots detailed in this appendix were measured using a 'Peak Detector'. Please refer to the results table for the detectors used during formal measurements

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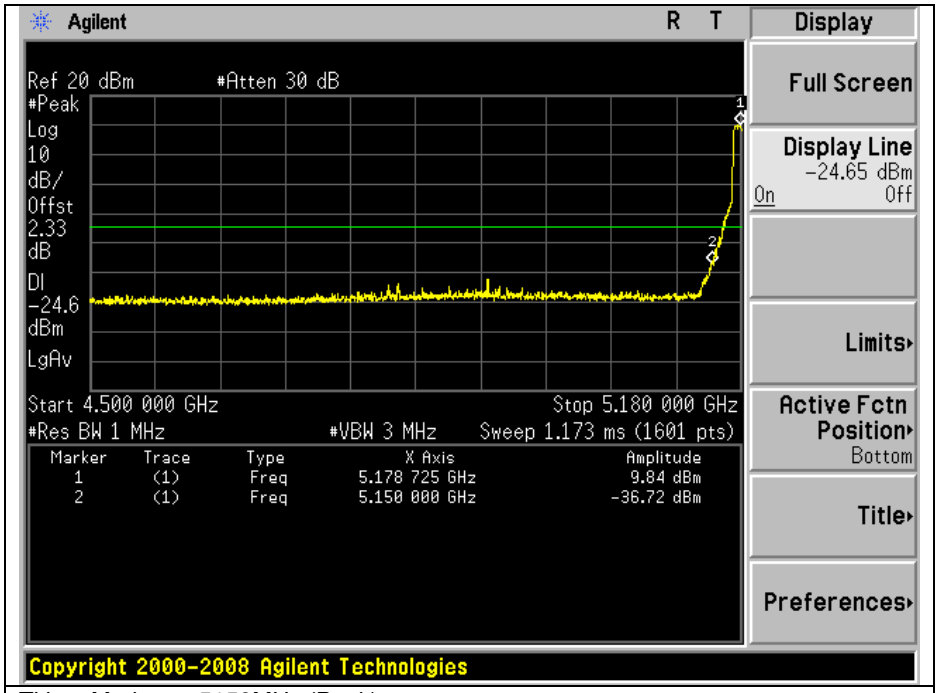
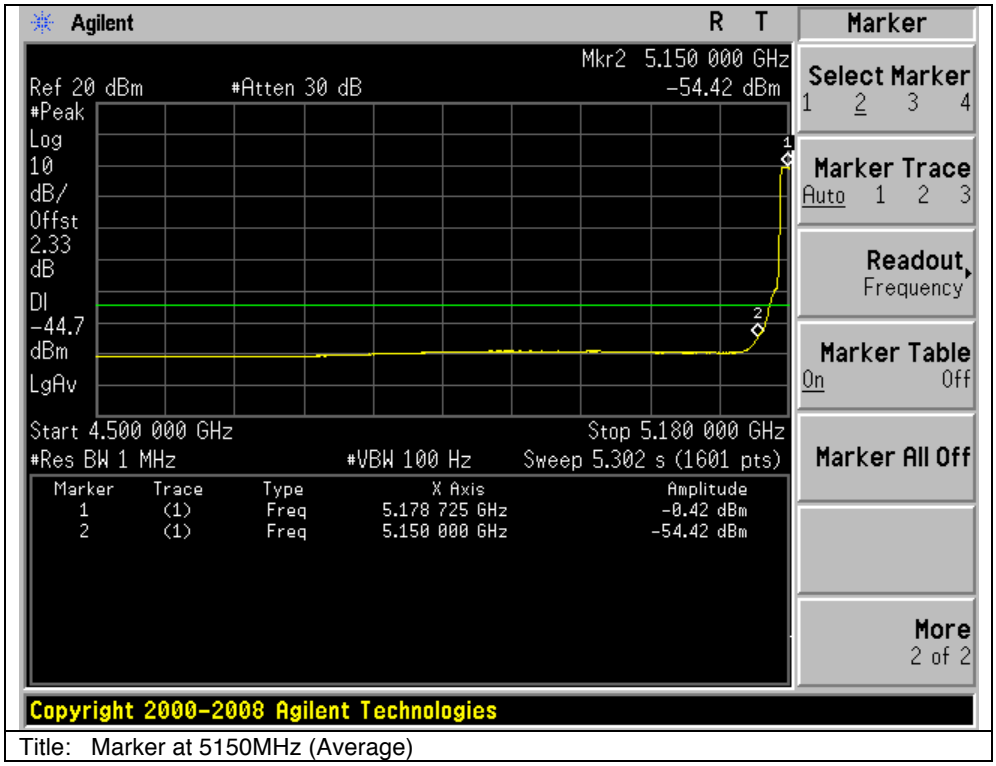


Title: Marker at 5150MHz (Peak)



Title: Marker at 5150MHz (Average)

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