Radio Test Report: EDCS - 1394693

CP-DX80

5470-5725 MHz

Against the following Specifications:

CFR47 Part 15.407

RSS210

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

Author: Johanna Knudsen
Approved By: See EDCS
Title: See EDCS

This report replaces any previously entered test report under EDCS - 1394693

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

SECTION 1: OVERVIEW **3**

1.1 TEST SUMMARY 3

SECTION 2: ASSESSMENT INFORMATION **4**

2.1 GENERAL 4
2.6 EUT DESCRIPTION 6

SECTION 3: RESULT SUMMARY **7**

SECTION 4: SAMPLE DETAILS ..... ERROR! BOOKMARK NOT DEFINED.

APPENDIX A: EMISSION TEST RESULTS **9**

TARGET MAXIMUM CHANNEL POWER 9
99% AND 26DB BANDWIDTH 10
PEAK OUTPUT POWER 17
POWER SPECTRAL DENSITY 17
POWER SPECTRAL DENSITY 23
POWER SPECTRAL DENSITY 27
PEAK EXCURSION 32
CONDUCTED SPURIOUS EMISSIONS 39
CONDUCTED BANDEDGE 50

APPENDIX B: EMISSION TEST RESULTS **56**

RADIATED SPURIOUS EMISSIONS 56
CO-LOCATOR RADIATED SPURIOUS EMISSIONS 81
RADIATED EMISSIONS ..... **ERROR! BOOKMARK NOT DEFINED.**
MAXIMUM PERMISSIBLE EXPOSURE (MPE) CALCULATIONS 92

APPENDIX C: TEST EQUIPMENT USED TO PERFORM THE TEST **94**

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 RSS210	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.

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%)

2.2 Start Date of Testing

6-February-2014

2.3 Report Issue Date

Cisco Systems, Inc. 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, 5m Chamber	Company #: 2461N-1

Test Engineers

Johanna Knudsen, Jose Aguirre

2.5 Equipment Assessed (EUT)

CP-DX80

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)

2.7 Scope of Assessment

Tests have been performed in accordance with the relevant Test and Assessment Plan (TAP), a copy of which is contained in Appendix F of this report, and the relevant Cisco Systems, Inc. radio test procedures (EDCS-420238). This test report may not cover all of the tests highlighted in the test plan.

2.8 Units of Measurement

The units of measurements defined in the appendices are reported in specific terms, which are test dependent. Where radiated measurements are concerned these are defined at a particular distance. Basic voltage measurements are defined in units of [dBuV]

As an example, the basic calculation for all measurements is as follows:

Emission level [dBuV] = Indicated voltage level [dBuV] + Cable Loss [dB] + Other correction factors [dB]

The combinations of correction factors are dependent upon the exact test configurations [see test equipment lists for further details] and may include:-

Antenna Factors, Pre Amplifier Gain, LISN Loss, Pulse Limiter Loss and Filter Insertion Loss..

Note: to convert the results from dBuV/m to uV/m use the following formula:-

Level in uV/m = Common Antilogarithm [(X dBuV/m)/20] = Y uV/m

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

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.

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	5500	5580	5700
802.11a, 6 to 54 Mbps	16	16	16
802.11n HT20, M0 to M7	13	13	13
	5510	5590	5670
802.11n HT40, M0 to M7	12	12	12

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).

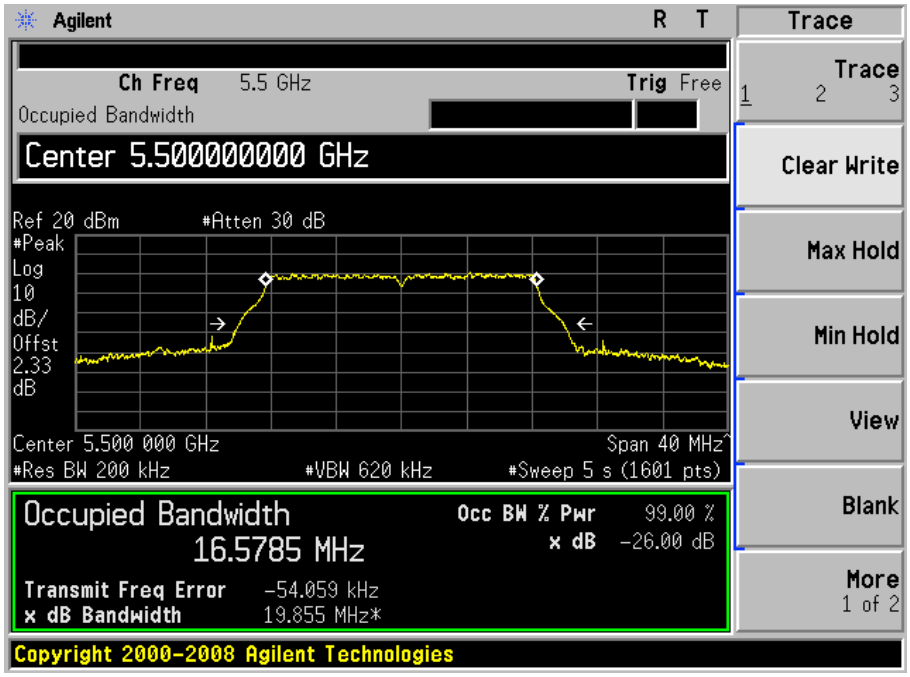
Center Frequency: Frequency from table below
Span: 2 x Nominal Bandwidth (e.g. 40MHz for a 20MHz channel)
Reference Level: 20 dBm
Attenuation: 10 dB
Sweep Time: 5 s
Resolution Bandwidth: 1%-3% of 26 dB Bandwidth
Video Bandwidth: ≥Resolution Bandwidth
X dB Bandwidth: 26 dB
Detector: Peak
Trace: Single

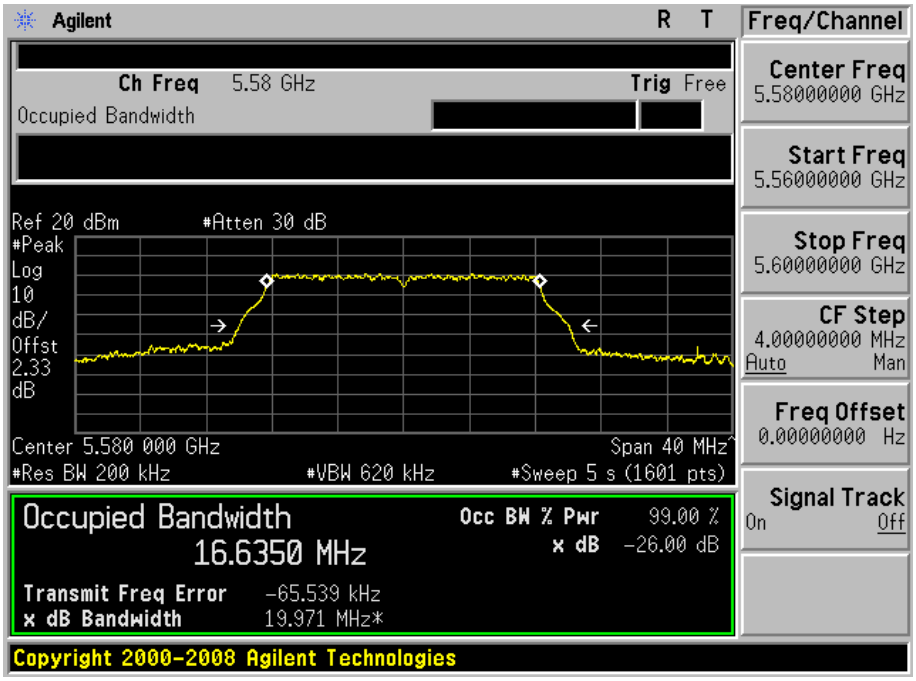
Place the radio in continuous transmit mode. View the transmitter waveform on the spectrum analyzer, and record the pertinent measurements:

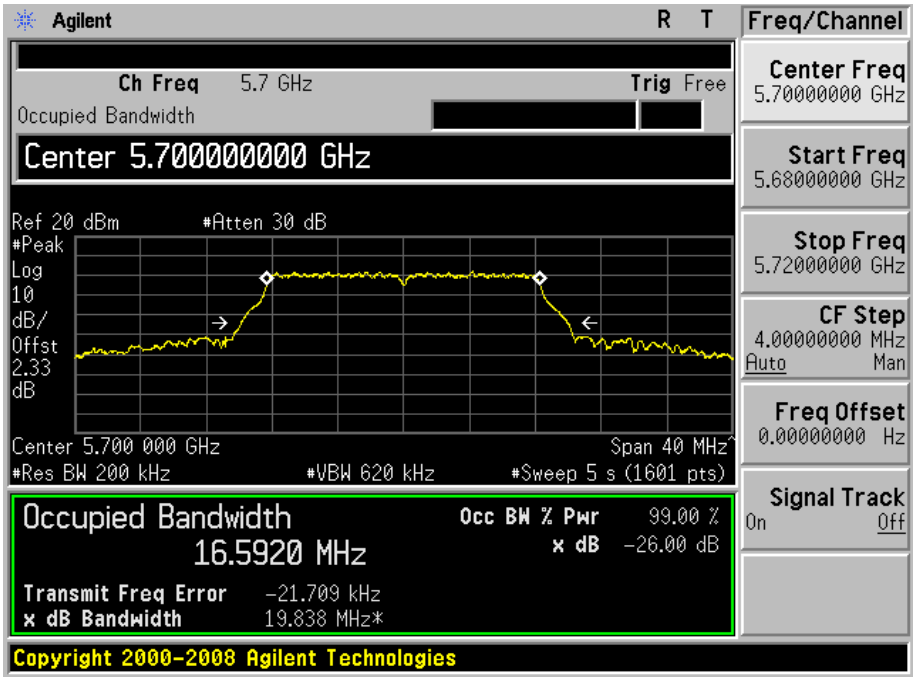
99% and 26dB Bandwidth for 802.11a

Mode	Frequency (MHz)	Data Rate (Mbps)	99% Bandwidth (MHz)	26dB Bandwidth (MHz)
802.11a	5500	6	16.5785	19.855
	5580	6	16.6350	19.971
	5700	6	16.5920	19.838

Graphical Test Results for 802.11a:



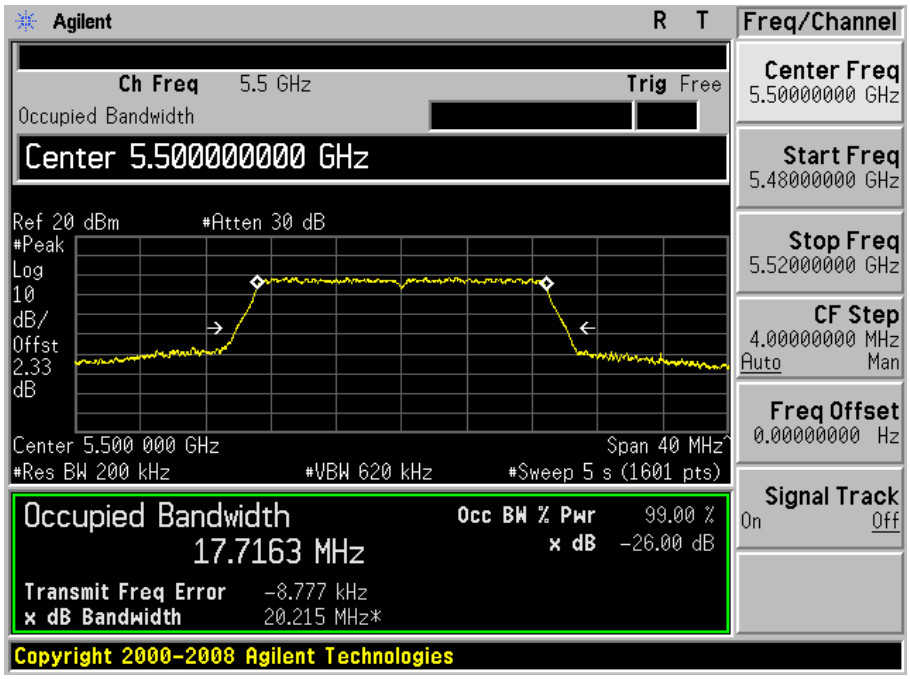


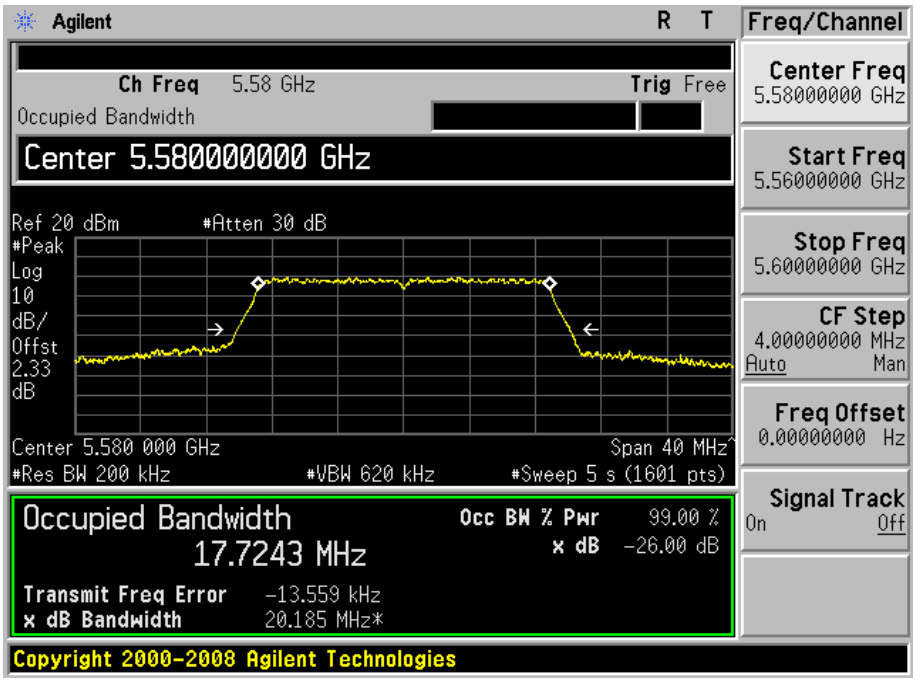


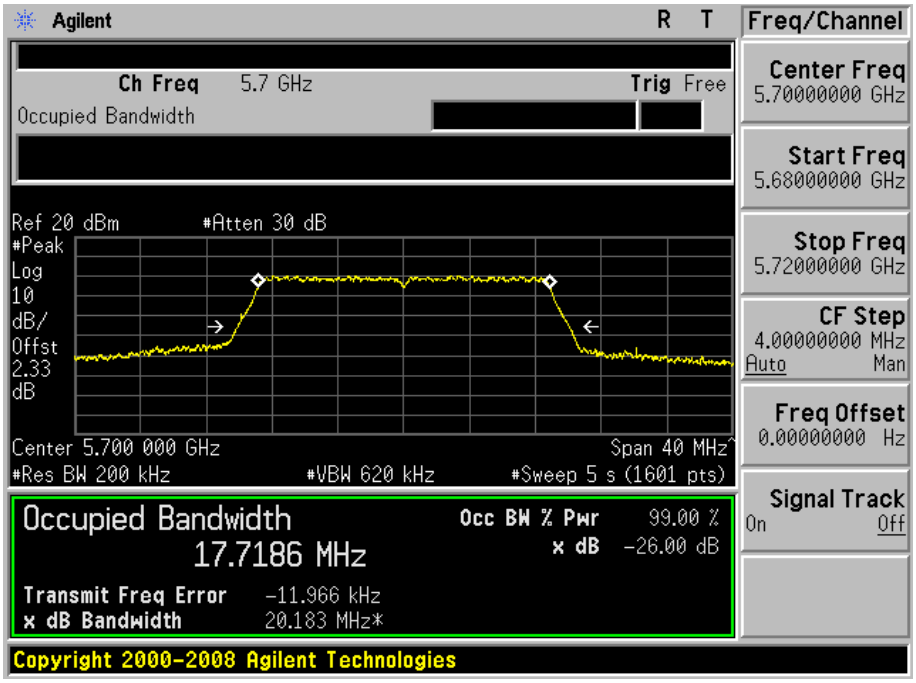
99% and 26dB Bandwidth for 802.11n (HT20)

Mode	Frequency (MHz)	Data Rate (Mbps)	99% Bandwidth (MHz)	26dB Bandwidth (MHz)
802.11nHT20	5500	M0	17.7163	20.215
	5580	M0	17.7243	20.185
	5700	M0	17.7186	20.183

Graphical Test Results for 802.11n (HT20):



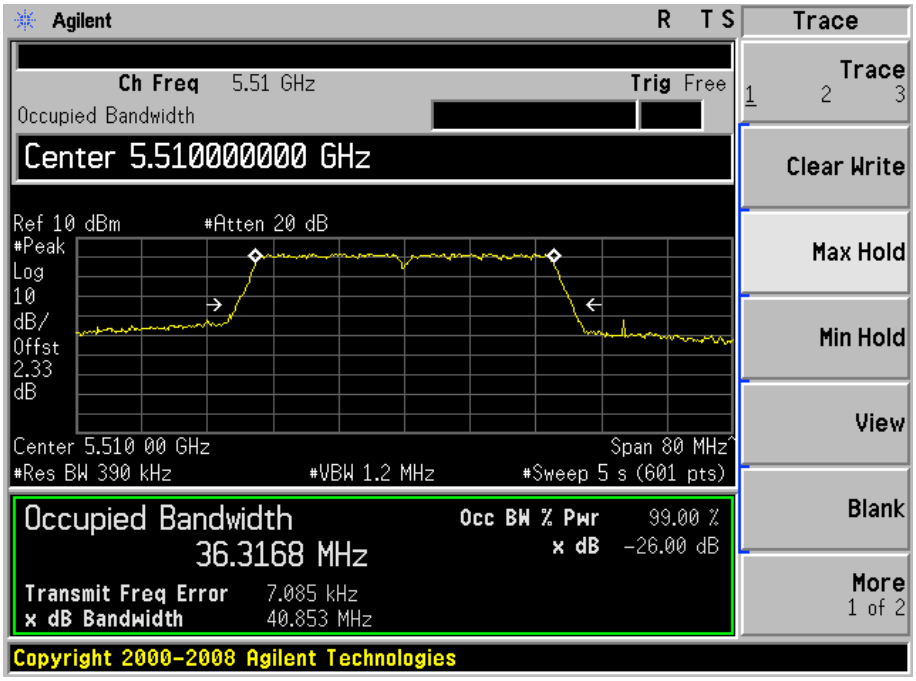


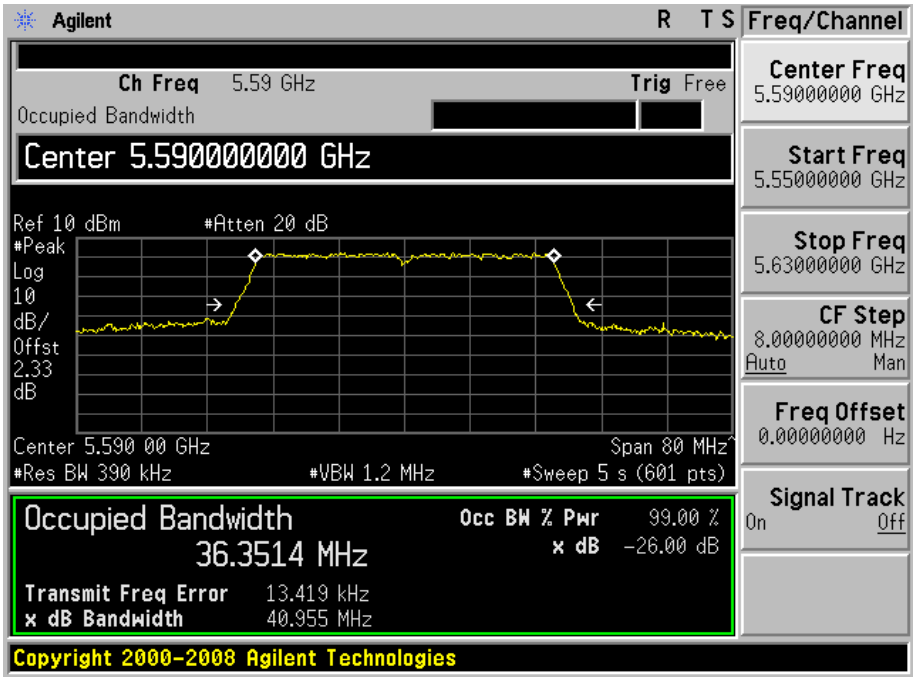


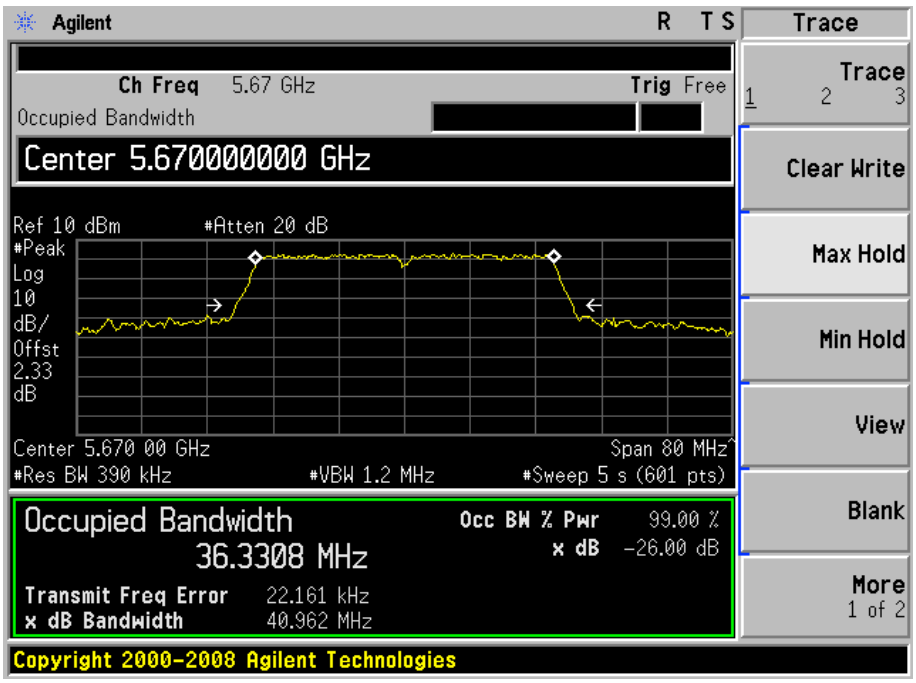
99% and 26dB Bandwidth for 802.11n (HT40)

Mode	Frequency (MHz)	Data Rate (Mbps)	99% Bandwidth (MHz)	26dB Bandwidth (MHz)
802.11nHT40	5510	M0	36.3168	40.853
	5590	M0	36.3514	40.955
	5670	M0	36.3308	40.962

Graphical Test Results for 802.11n (HT40):







Peak Output Power for 802.11a

15.407: For the bands 5.25-5.35 and 5.47-5.725 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 250 mW or 11 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 19.838MHz. The maximum conducted output power is calculated as 11dBm+10*log(19.838 MHz) = 23.975dBm. This is less than 250mW (24dBm). The value of 0.1dBm was also subtracted from 23.975 to account for the antenna gain in excess of 6dBi. The resulting limit is 23.875dBm.

Power Spectral Density for 802.11a

15.407: For the bands 5.25-5.35 and 5.47-5.725 GHz, the peak power spectral density shall not exceed 11 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.

The maximum supported antenna gain in the range 5.47-5.725GHz is 6.1 dBi. The resulting limit for PSD is 10.9dBm/MHz.

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.

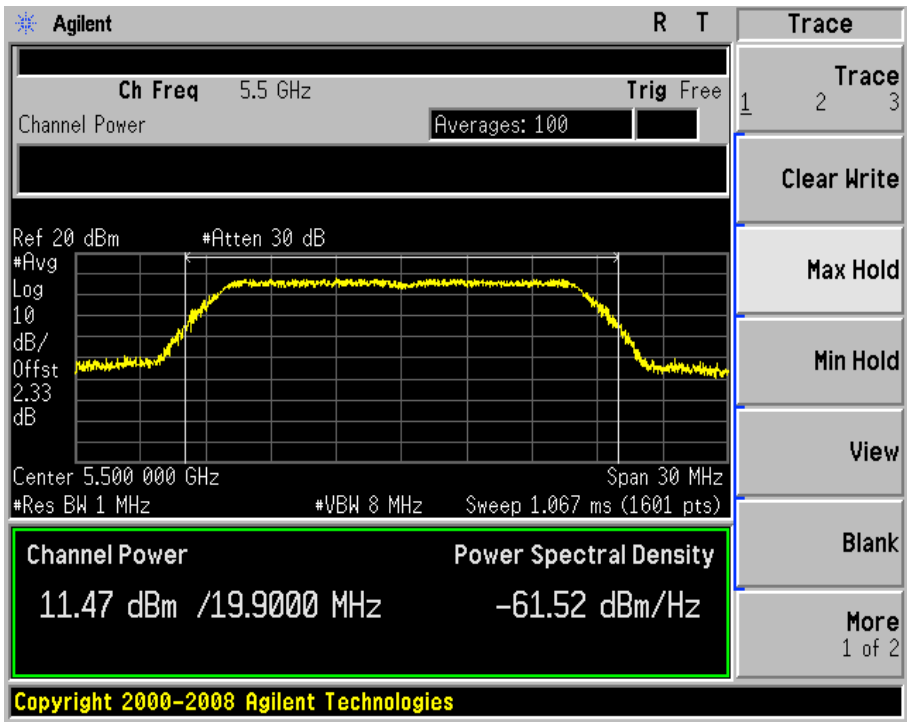
Peak Output Power for 802.11a:

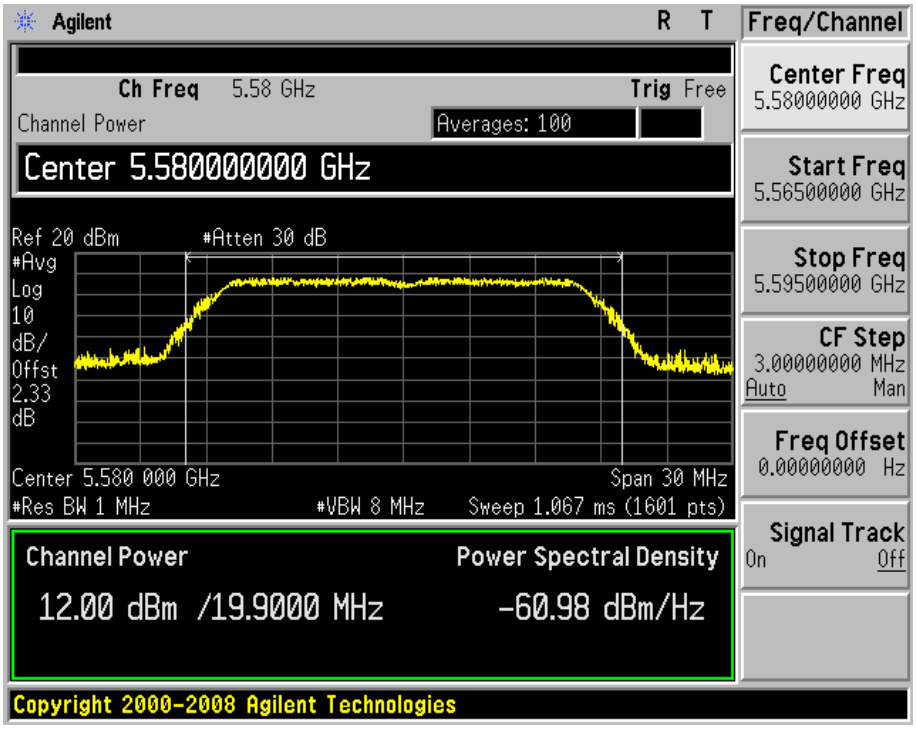
Mode	Frequency (MHz)	Data Rate (Mbps)	Peak Output Power (dBm)	Limit (dBm)	Margin (dB)
802.11a	5500	6	11.47	23.875	-12.405
	5580	6	12	23.875	-11.875
	5700	6	12.8	23.875	-11.075

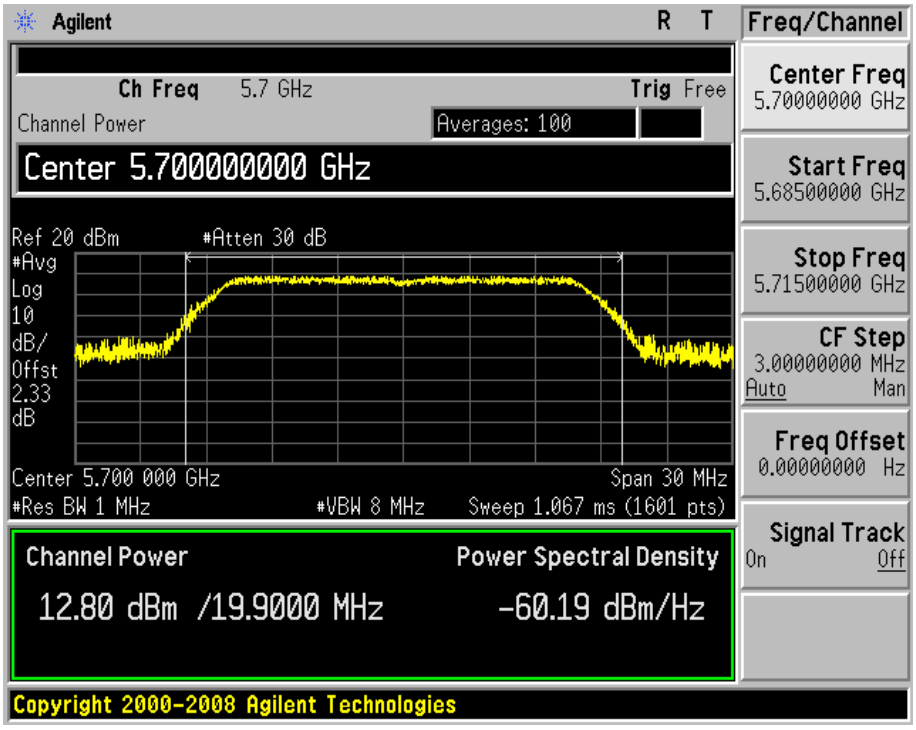
Power Spectral Density for 11a:

Mode	Frequency (MHz)	Data Rate (Mbps)	Power Spectral Density (dBm/MHz)	Limit (dBm)	Margin (dB)
802.11a	5500	6	0.981	10.9	-9.919
	5580	6	0.958	10.9	-9.942
	5700	6	1.89	10.9	-9.01

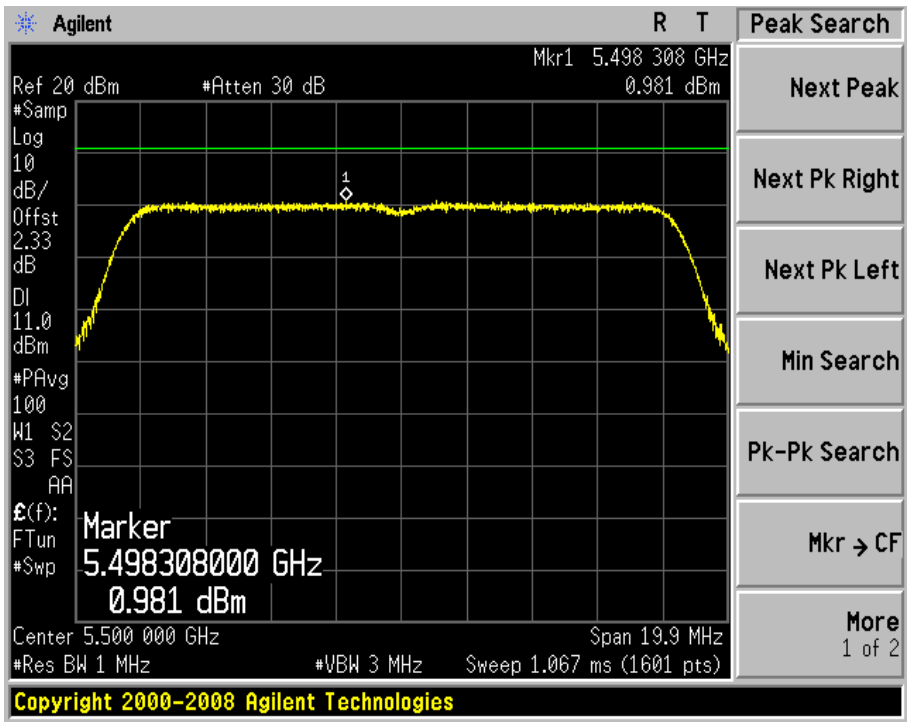
Graphical Test Results for 802.11a Peak Output Power:

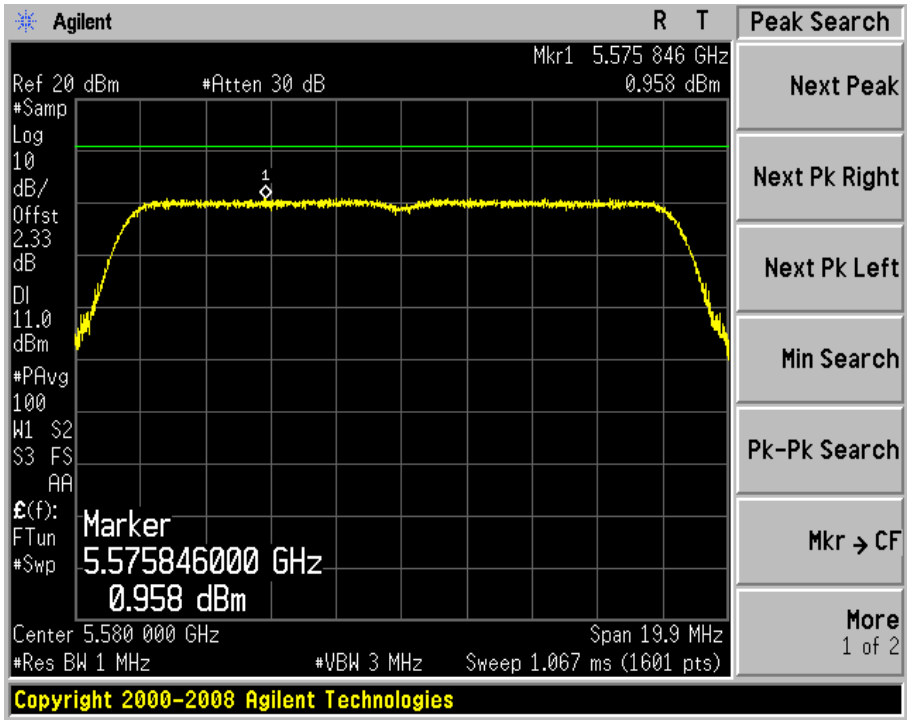


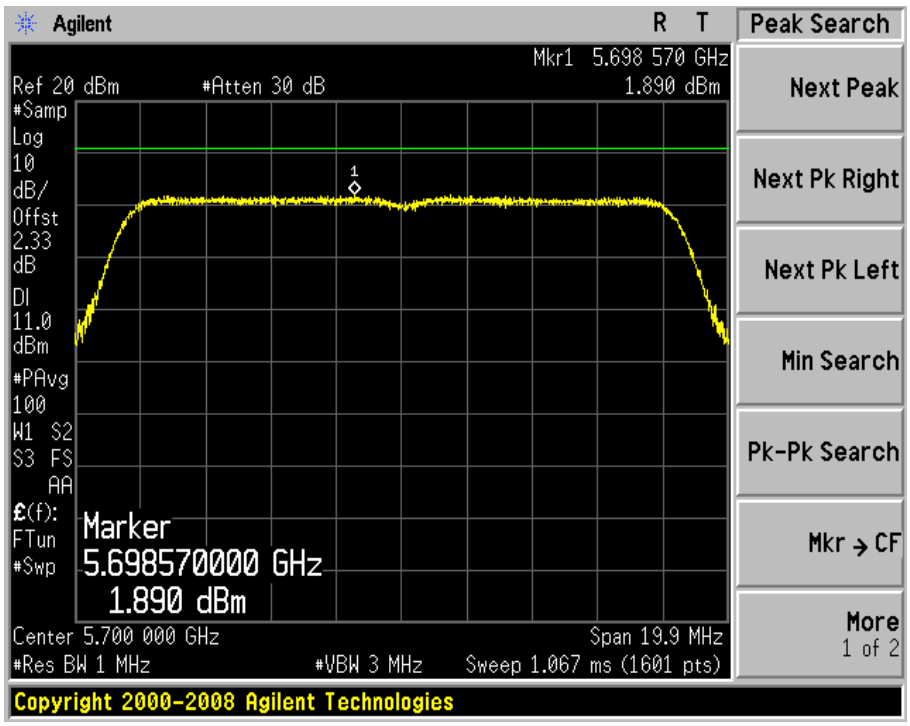




Graphical Test Results for 802.11a Power Spectral Density:







Peak Output Power for 802.11n HT20:

15.407: For the bands 5.25-5.35 and 5.47-5.725 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 250 mW or 11 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 20.183MHz. The maximum conducted output power is calculated as 11dBm+10*log(20.183MHz) = 24.0499dBm. This is greater than 250mW (24dBm). The value of 0.1dBm was also subtracted from 24dBm to account for the antenna gain in excess of 6dBi. The resulting limit is 23.9dBm.

Power Spectral Density for 802.11n HT20

15.407: For the bands 5.25-5.35 and 5.47-5.725 GHz, the peak power spectral density shall not exceed 11 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.

The maximum supported antenna gain is 6.1dBi. The resulting limit for PSD is 10.9dBm/MHz.

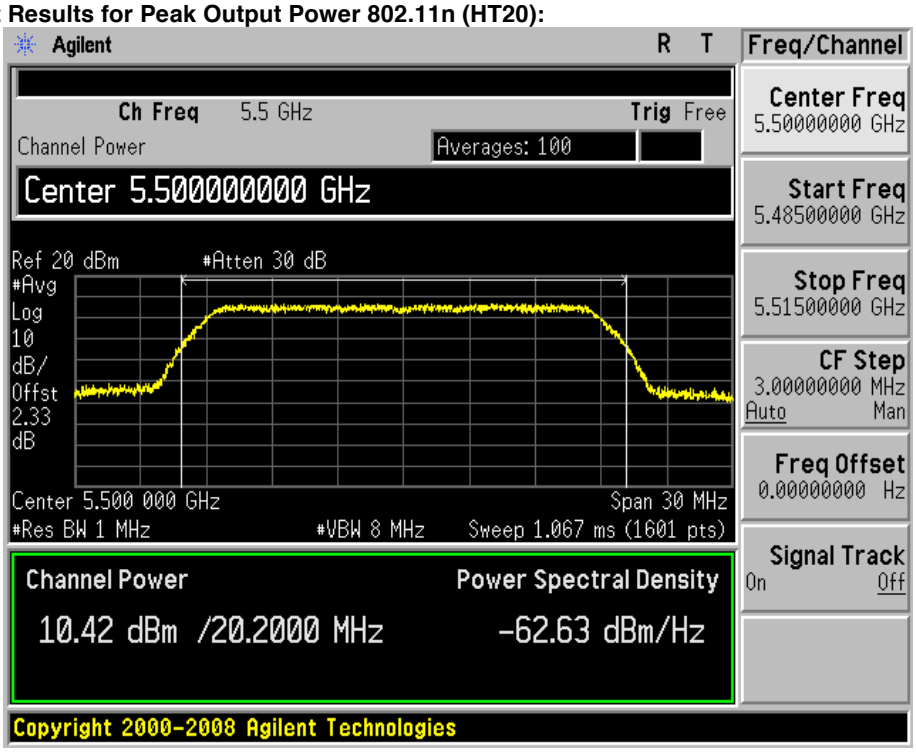
Peak Output Power for 802.11n HT20:

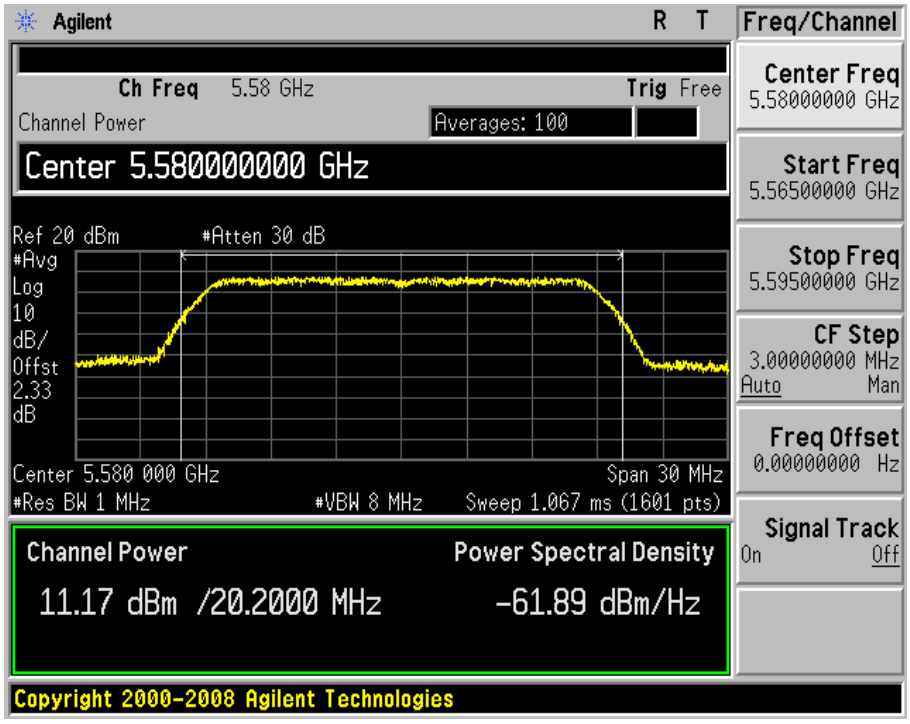
Mode	Frequency (MHz)	Data Rate (Mbps)	Peak Output Power (dBm)	Limit (dBm)	Margin (dB)
802.11n HT20	5500	M0	10.42	23.9	-13.48
	5580	M0	11.17	23.9	-12.73
	5700	M0	12.08	23.9	-11.82

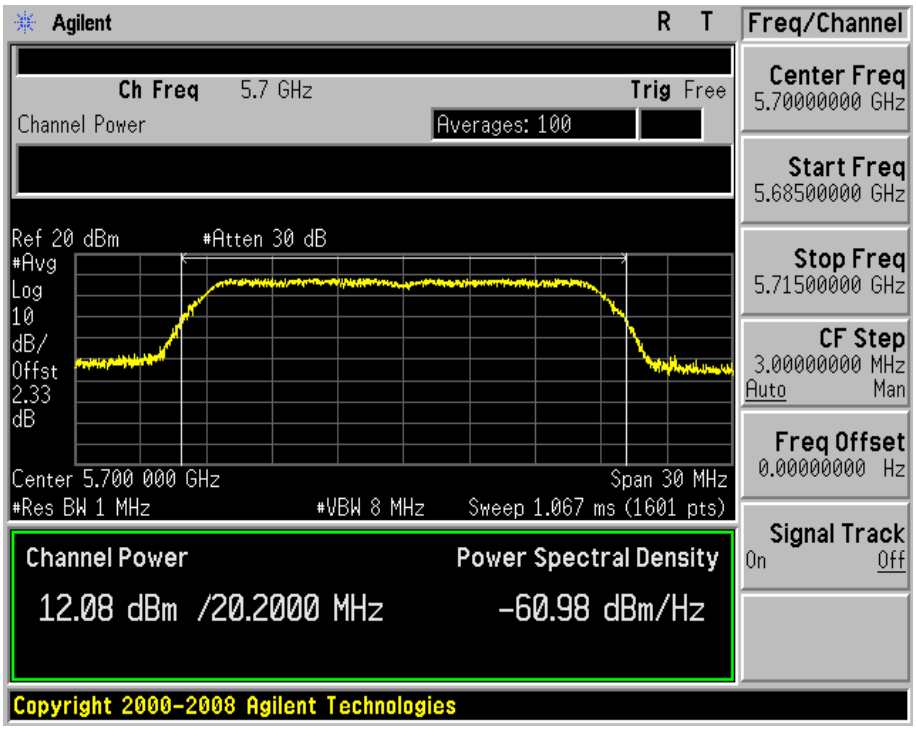
Power Spectral Density for 802.11n HT20:

Mode	Frequency (MHz)	Data Rate (Mbps)	Power Spectral Density (dBm/MHz)	Limit (dBm)	Margin (dB)
802.11n HT20	5500	M0	-1.616	10.9	-12.516
	5580	M0	-0.216	10.9	-11.116
	5700	M0	0.695	10.9	-10.205

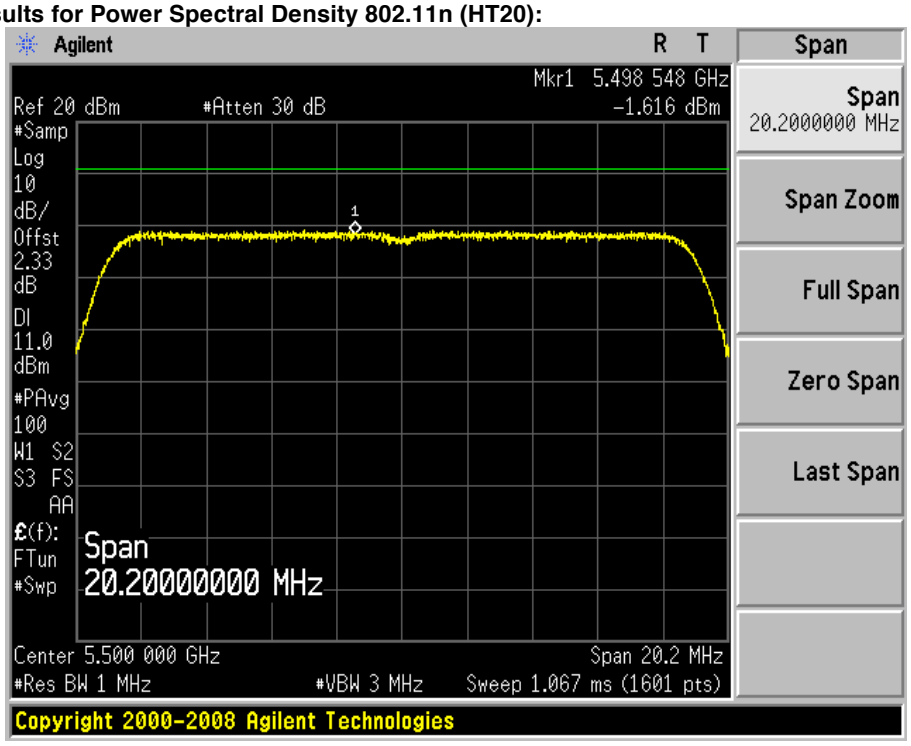
Graphical Test Results for Peak Output Power 802.11n (HT20):

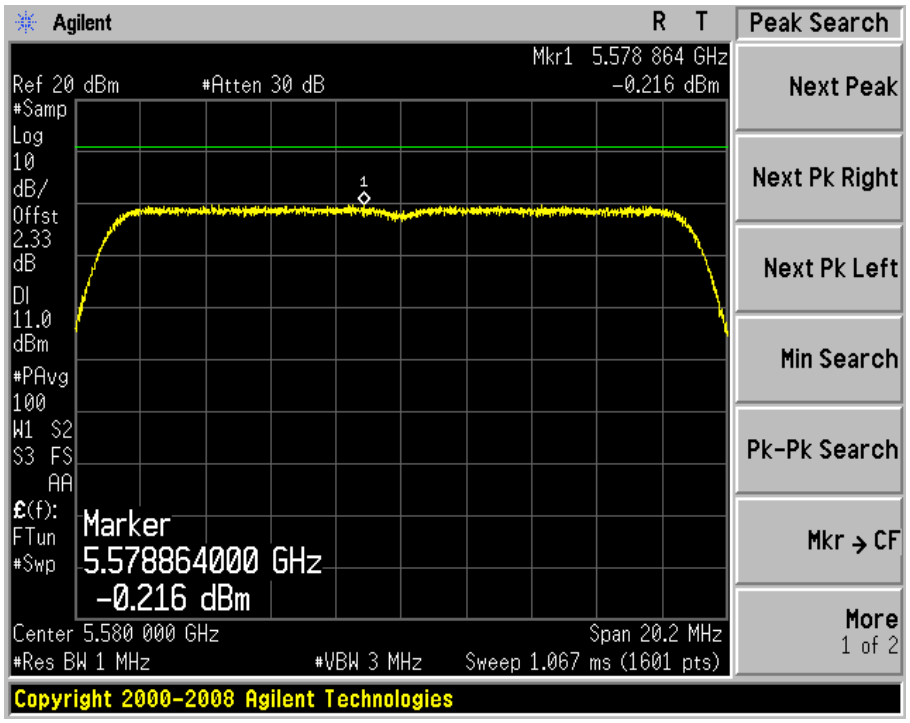


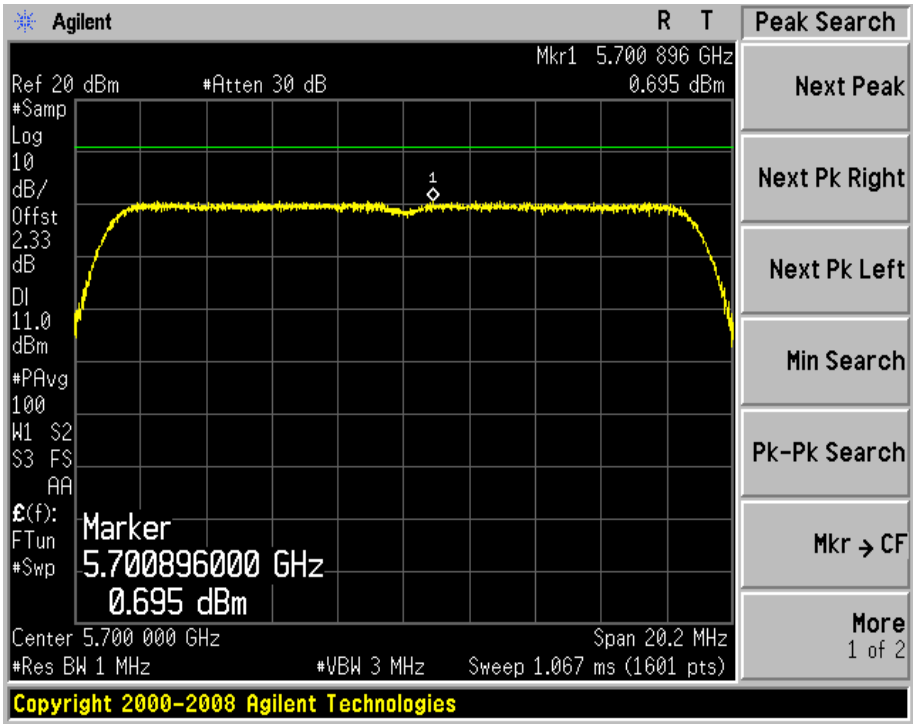




Graphical Test Results for Power Spectral Density 802.11n (HT20):







Peak Output Power for 802.11n HT40:

15.407: For the bands 5.25-5.35 and 5.47-5.725 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 250 mW or 11 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 40.853MHz. The maximum conducted output power is calculated as 11dBm+10*log(40.853MHz) = 27.1122dBm. This is greater than 250mW (24dBm). The value of 0.1dBm was also subtracted from 24dBm to account for the antenna gain in excess of 6dBi. The resulting limit is 23.9dBm.

Power Spectral Density for 802.11n HT40

15.407: For the bands 5.25-5.35 and 5.47-5.725 GHz, the peak power spectral density shall not exceed 11 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.

The maximum supported antenna gain is 6.1dBi. The resulting limit for PSD is 10.9dBm/MHz.

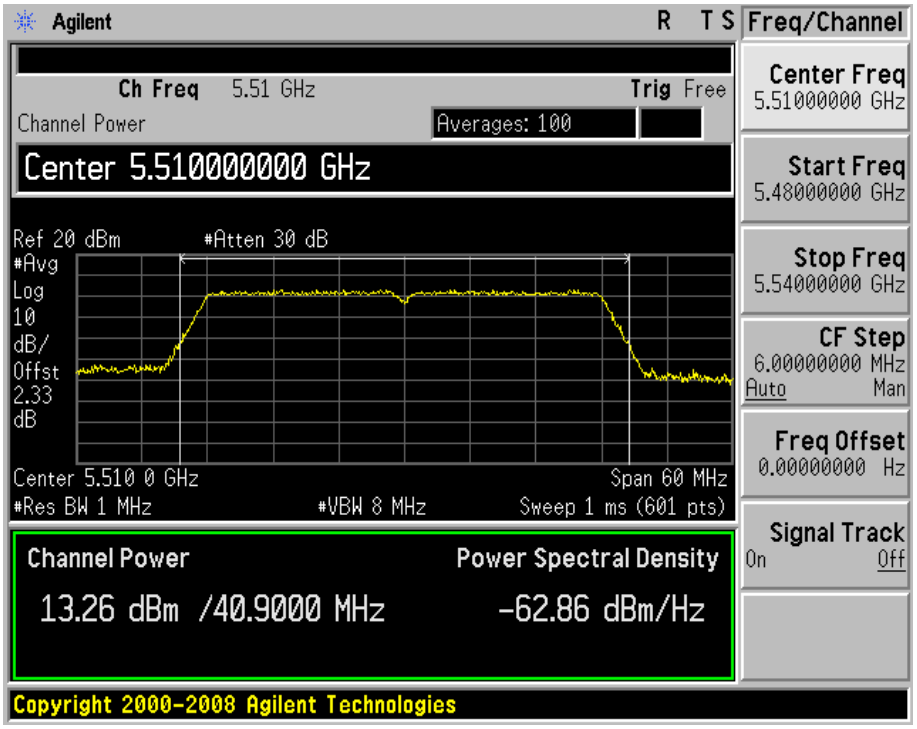
Peak Output Power for 802.11n (HT40):

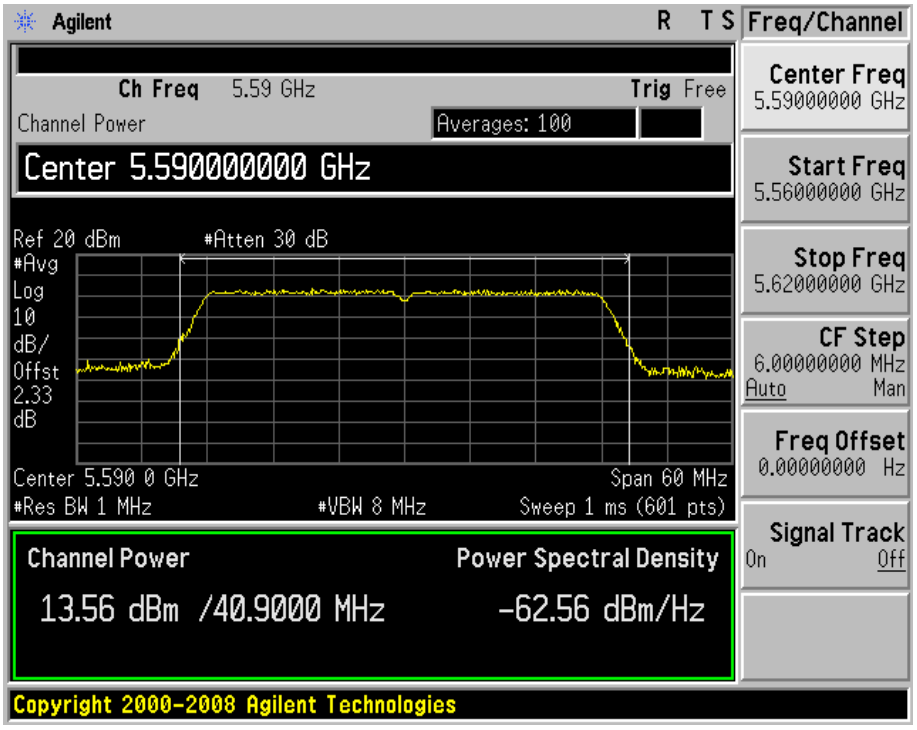
Mode	Frequency (MHz)	Data Rate (Mbps)	Peak Output Power (dBm)	Limit (dBm)	Margin (dB)
802.11nHT40	5510	M0	13.26	23.9	-10.64
	5590	M0	13.92	23.9	-9.98
	5670	M0	13.56	23.9	-10.34

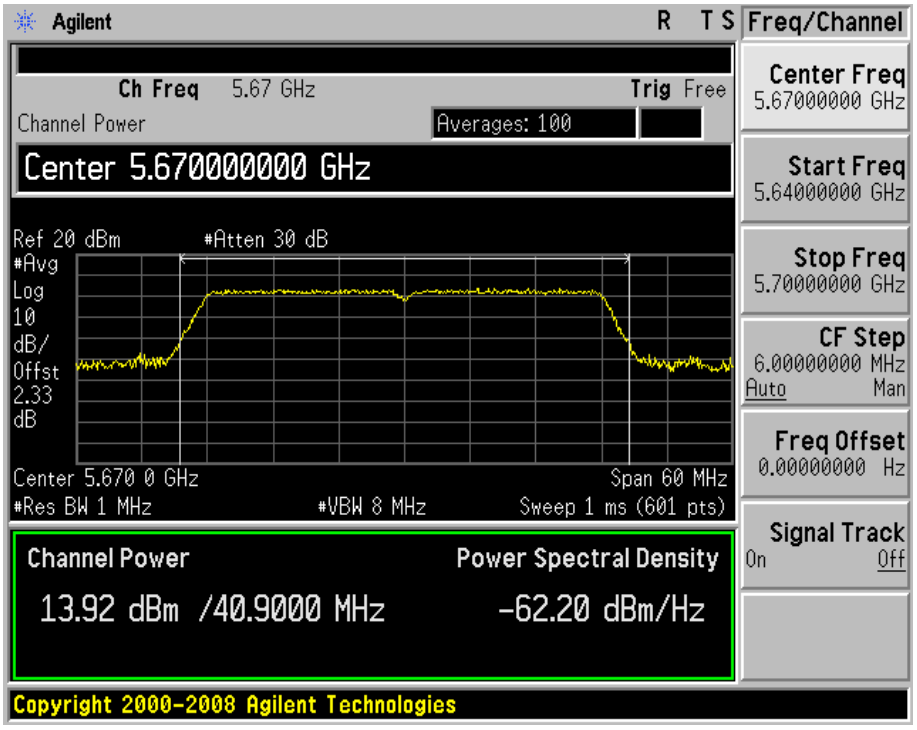
Power Spectral Density for 802.11n (HT40):

Mode	Frequency (MHz)	Data Rate (Mbps)	Power Spectral Density (dBm/MHz)	Limit (dBm)	Margin (dB)
802.11nHT40	5510	M0	-0.845	10.9	-11.745
	5590	M0	-0.63	10.9	-11.53
	5670	M0	-0.385	10.9	-11.285

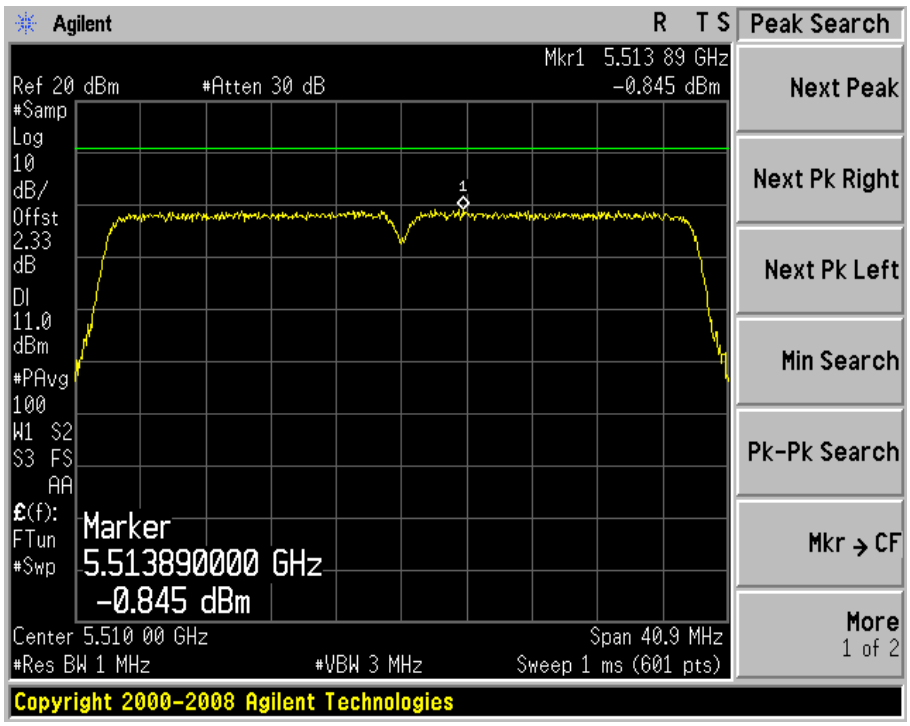
Graphical Test Results for Peak Power Output for 802.11n (HT40):

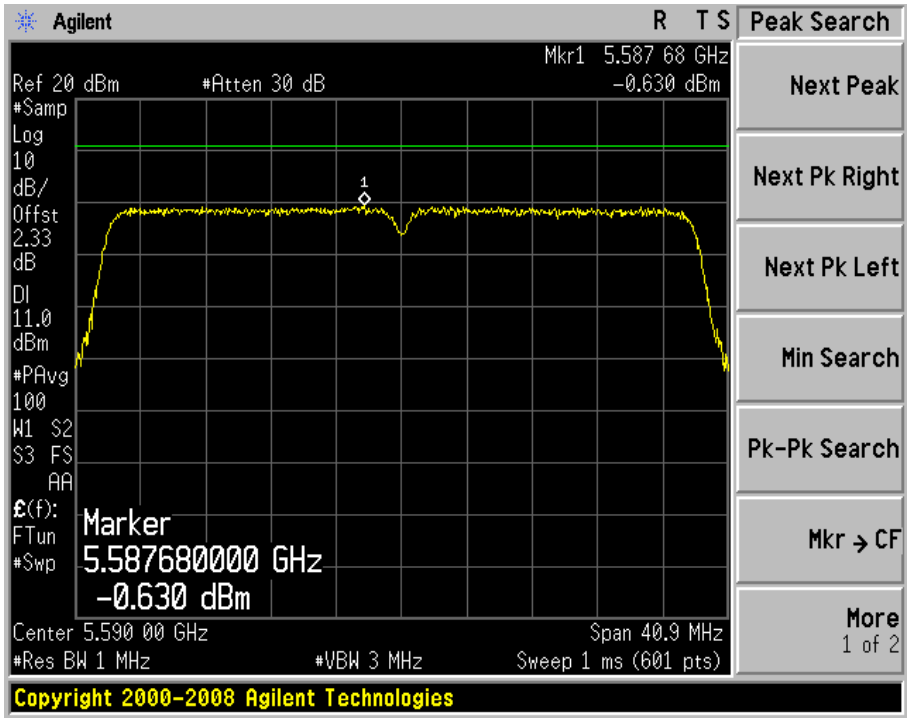


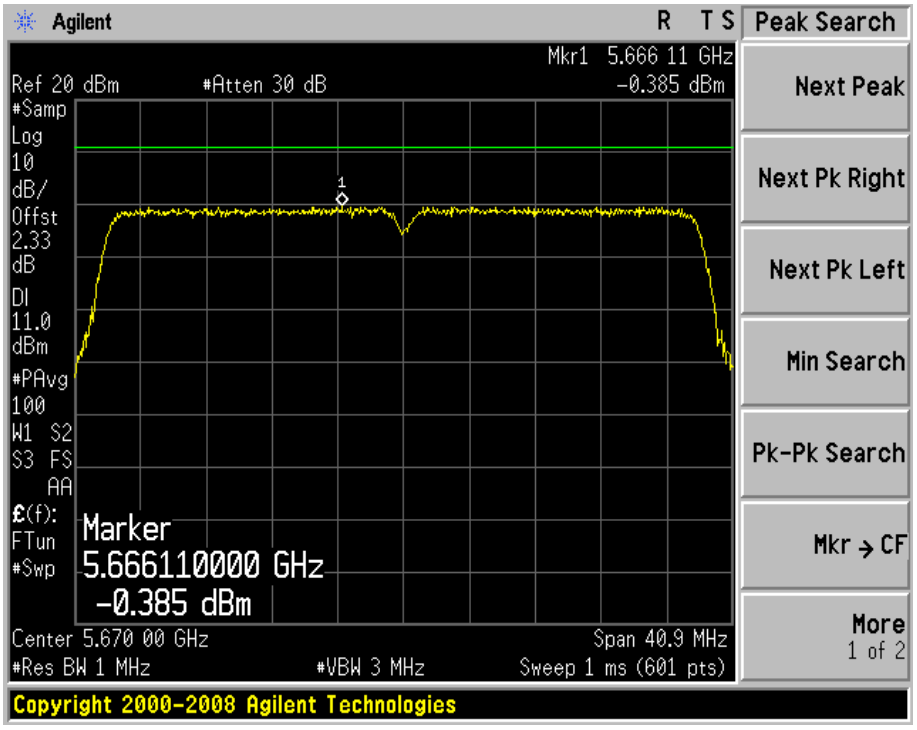




Graphical Test Results for Power Spectral Density for 802.11n (HT40):







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.

1st Trace: (Peak)

Set Span to encompass the entire emission bandwidth of the signal.
RBW = 1 MHz, VBW = 3 MHz
Detector = Peak
Sweep = Auto
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

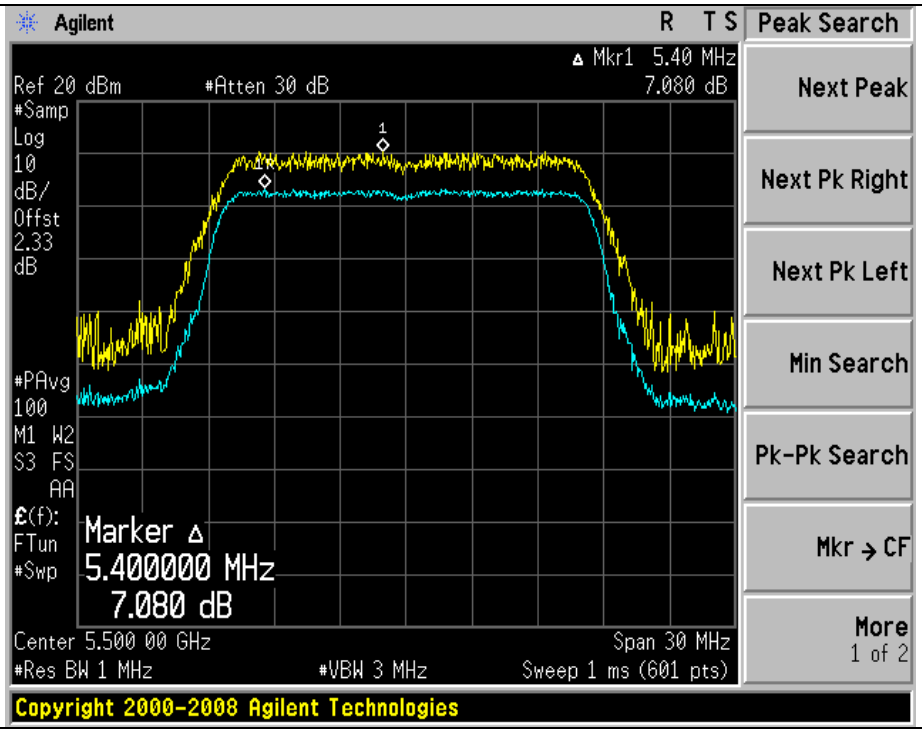
Frequency (MHz)	Data Rate (Mbps)	Peak Excursion (dB)	Limit (dBm)	Margin (dB)
5500	6	7.080	13	-5.920
5580	6	7.142	13	-5.858
5700	6	7.034	13	-5.966

RSS-210 A9.4 (2)

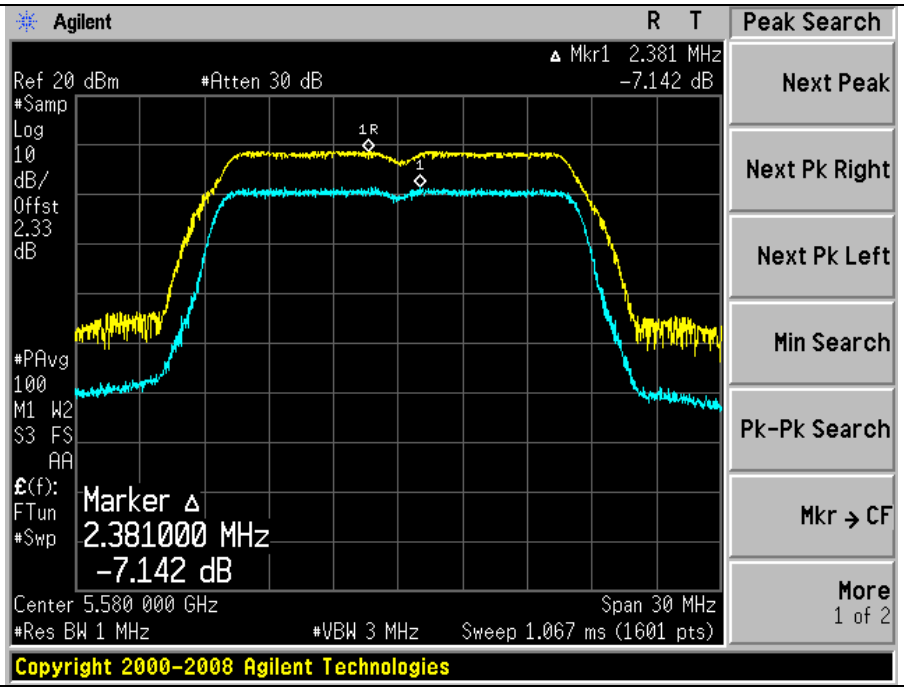
Within the emission bandwidth, when the peak spectral density per MHz over any continuous transmission exceeds the average (10 log10 B) value by more than 3 dB, the permissible power spectral density shall be reduced by the excess amount.

The smallest bandwidth was 16.5785MHz. Using this bandwidth, the equation above results in 10*log(16.5785) = 12.195dBm. The limit is calculated by adding 3dB to this value. The resulting limit is 15.195dBm. The FCC limit is more strict.

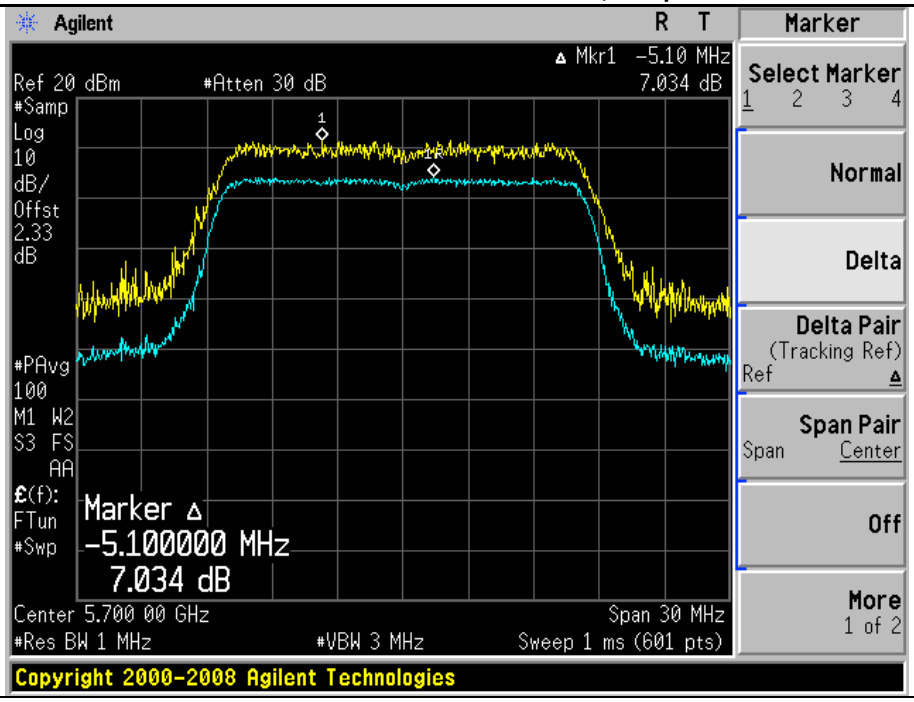
Graphical Test Results



Title: Peak Excursion at 5500MHz, 6Mbps



Title: Peak Excursion at 5580MHz, 6Mbps



Title: Peak Excursion at 5700MHz, 6Mbps

Peak Excursion for 802.11n HT20:

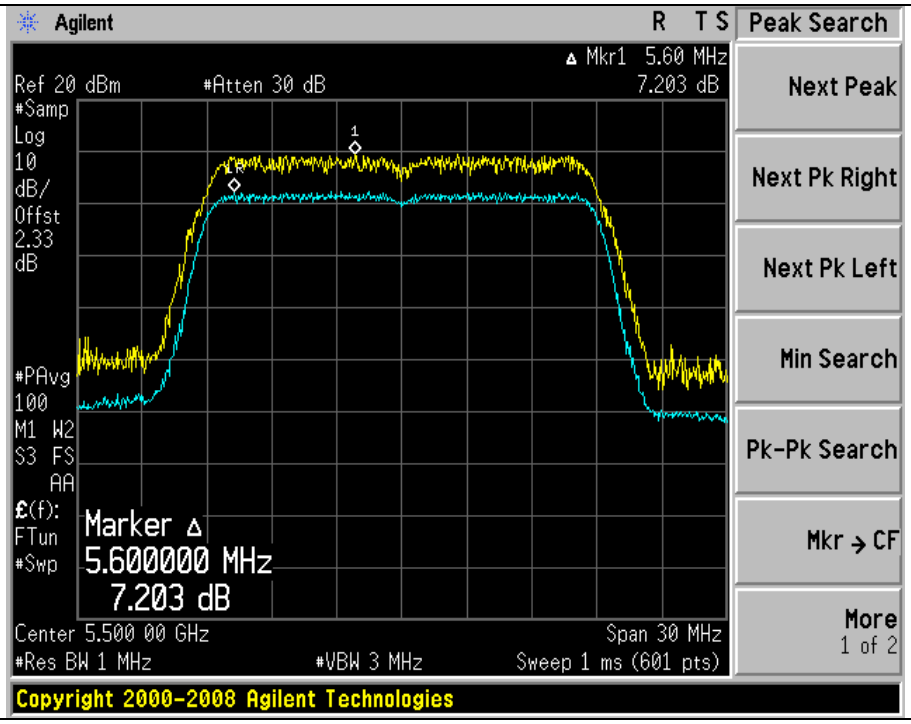
Frequency (MHz)	Data Rate (Mbps)	Peak Excursion (dB)	Limit (dBm)	Margin (dB)
5500	M0	7.203	13	-5.797
5580	M0	7.515	13	-5.485
5700	M0	6.982	13	-6.018

RSS-210 A9.4 (2)

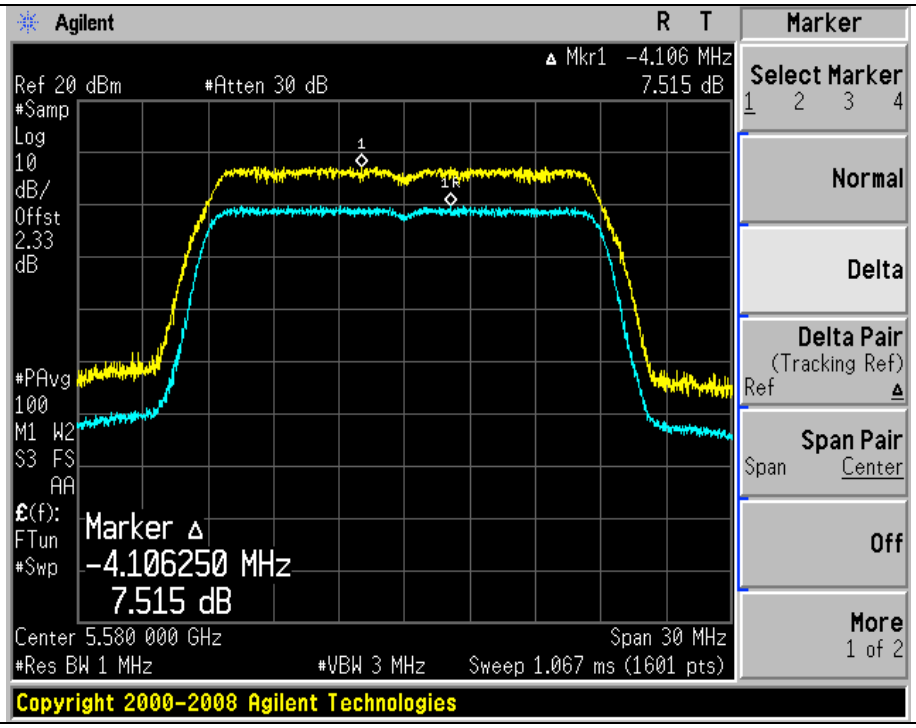
Within the emission bandwidth, when the peak spectral density per MHz over any continuous transmission exceeds the average (10 log10 B) value by more than 3 dB, the permissible power spectral density shall be reduced by the excess amount.

The smallest bandwidth was 17.7163MHz. Using this bandwidth, the equation above results in 10*log(17.7163) =12.484dBm. The limit is calculated by adding 3dB to this value. The resulting limit is 15.484dBm. The FCC limit is more strict.

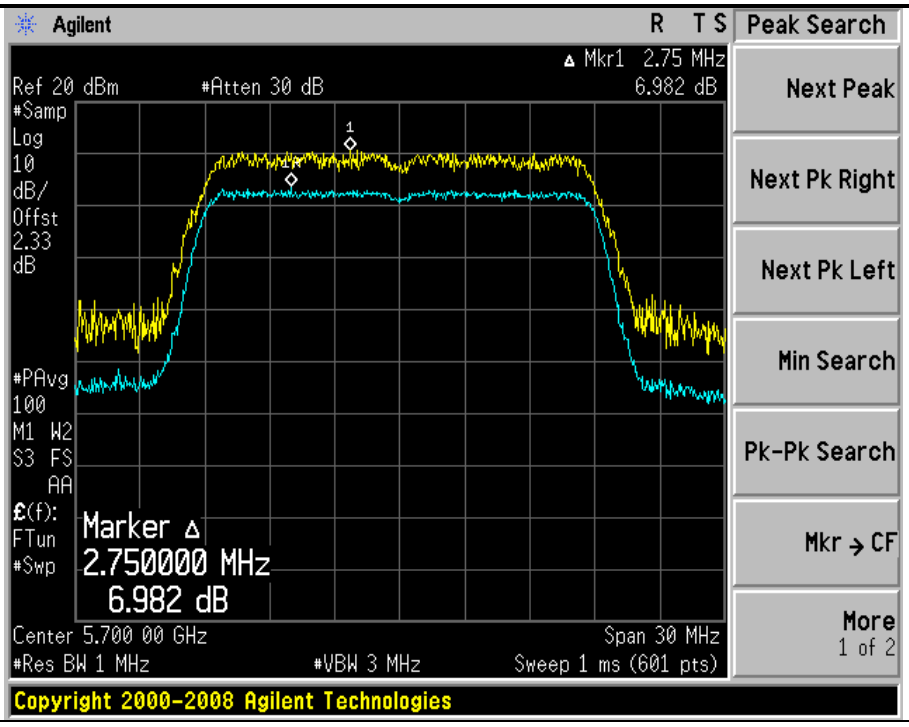
Graphical Test Results



Title: Peak Excursion at 5500MHz, M0



Title: Peak Excursion at 5580MHz, M0



Title: Peak Excursion at 5700MHz, M0

Peak Excursion for 802.11n HT40:

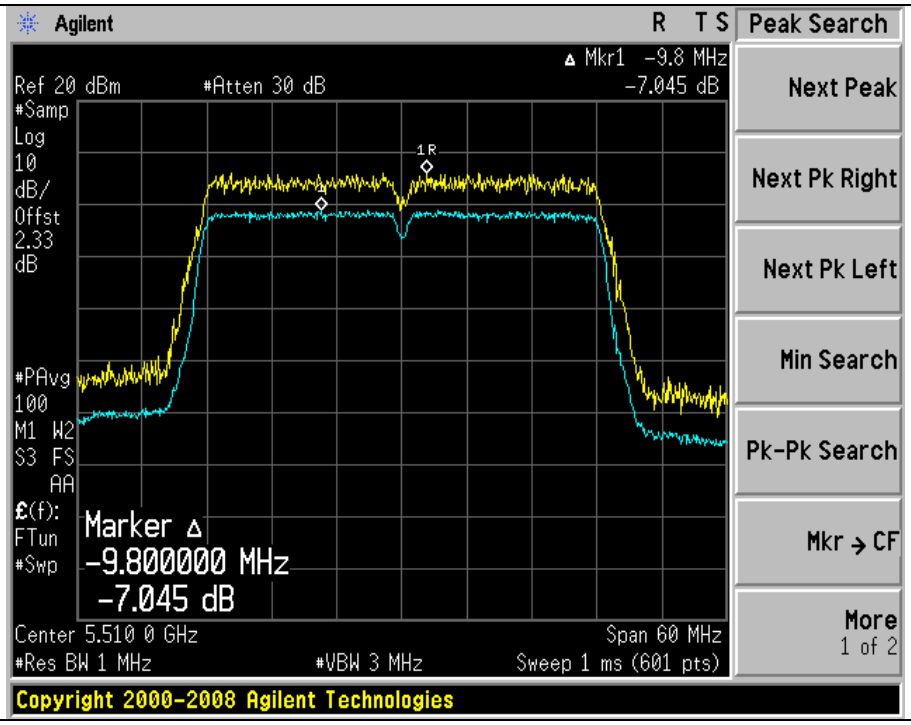
Frequency (MHz)	Data Rate (Mbps)	Peak Excursion (dB)	Limit (dBm)	Margin (dB)
5510	M0	7.045	13	-5.955
5590	M0	6.924	13	-6.076
5670	M0	6.829	13	-6.171

RSS-210 A9.4 (2)

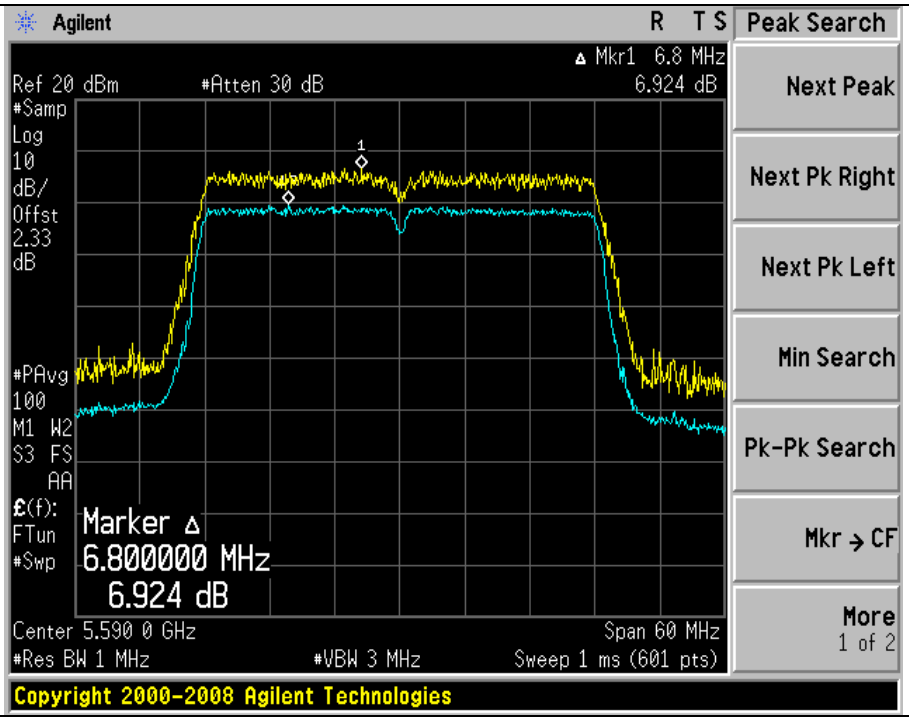
Within the emission bandwidth, when the peak spectral density per MHz over any continuous transmission exceeds the average (10 log10 B) value by more than 3 dB, the permissible power spectral density shall be reduced by the excess amount.

The smallest bandwidth was 36.3168MHz. Using this bandwidth, the equation above results in 10*log(16.3168) =15.601dBm. The limit is calculated by adding 3dB to this value. The resulting limit is 18.601dBm. The FCC limit is more strict.

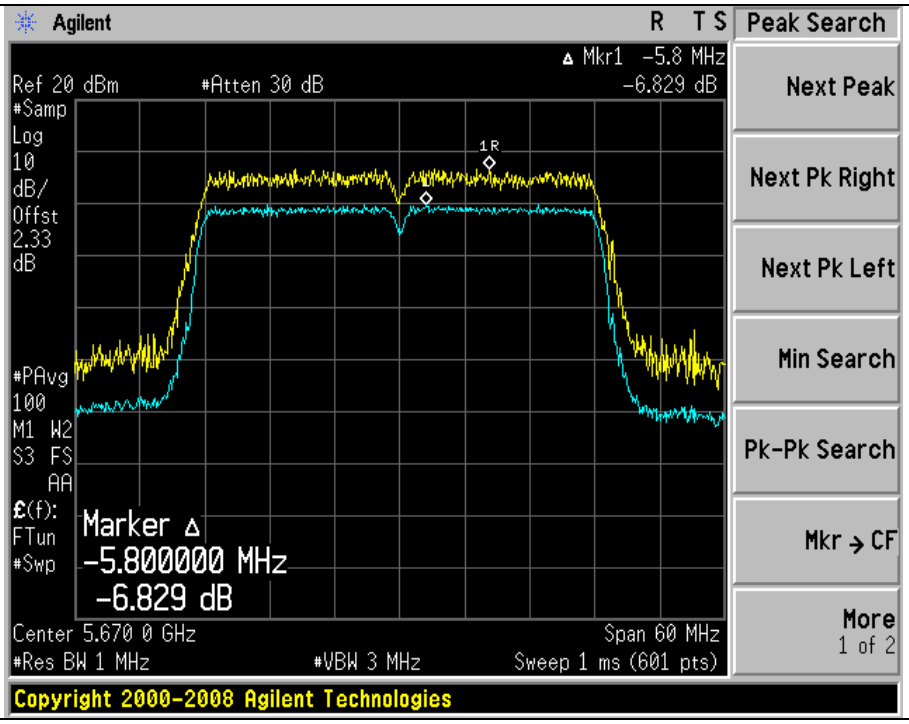
Graphical Test Results



Title: Peak Excursion at 5510MHz, M0



Title: Peak Excursion at 5590MHz, M0



Title: Peak Excursion at 5670MHz, M0

Conducted Spurious Emissions

15.407: For transmitters operating in the 5.25-5.35 and 5.47-5.725 GHz band: all emissions outside of the 5.25-5.35 and 5.47-5.725 GHz bands shall not exceed an EIRP of -27dBm/MHz.

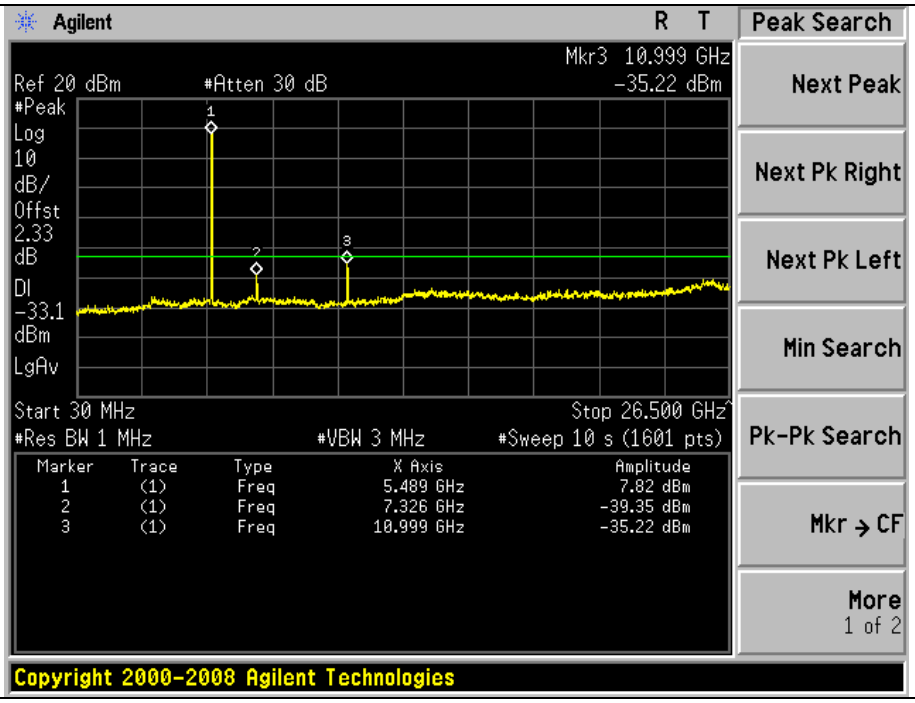
Connect the antenna port(s) to the spectrum analyzer input. Place the radio in continuous transmit mode. Configure the spectrum analyzer as shown below (be sure to enter all losses between the transmitter output and the spectrum analyzer).

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

802.11a Graphical Test Results at 5500MHz:

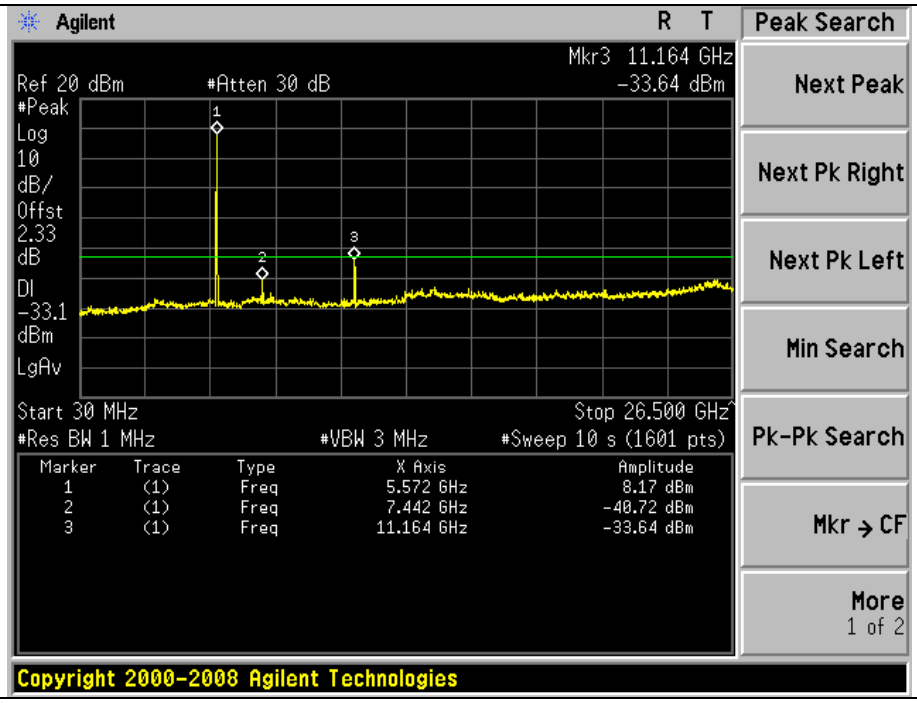
Note that the data displayed on the plots detailed in this appendix were measured using a 'Peak Detector'. Please refer to the results table for the detectors used during formal measurements



Title: Conducted Spurious Emissions Results for 5500MHz

802.11a Graphical Test Results at 5580MHz:

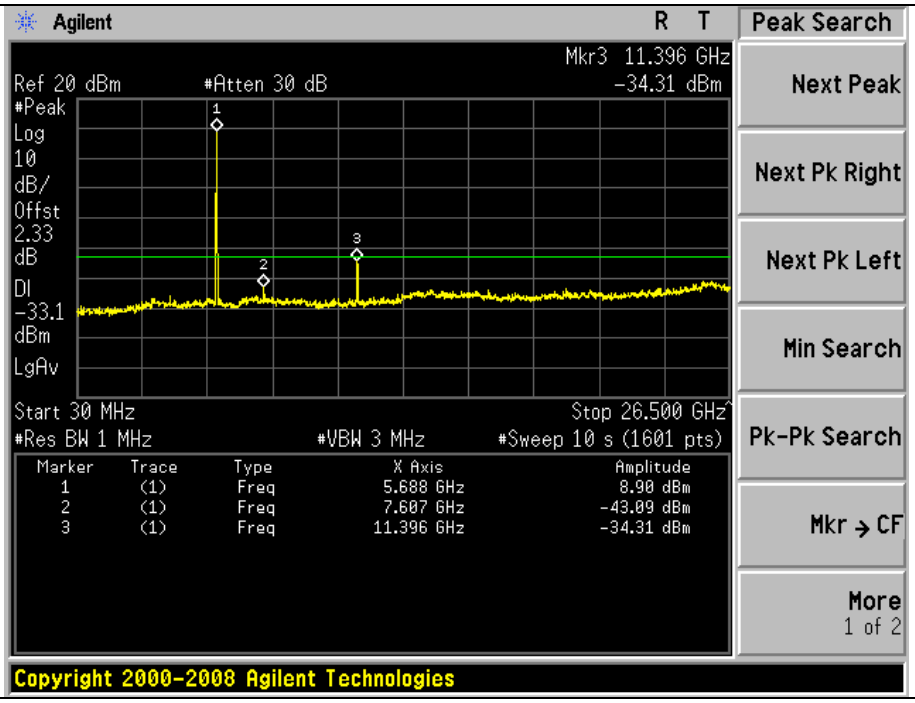
Note that the data displayed on the plots detailed in this appendix were measured using a 'Peak Detector'. Please refer to the results table for the detectors used during formal measurements



Title: Conducted Spurious Emissions Results for 5580MHz

802.11a Graphical Test Results at 5700MHz:

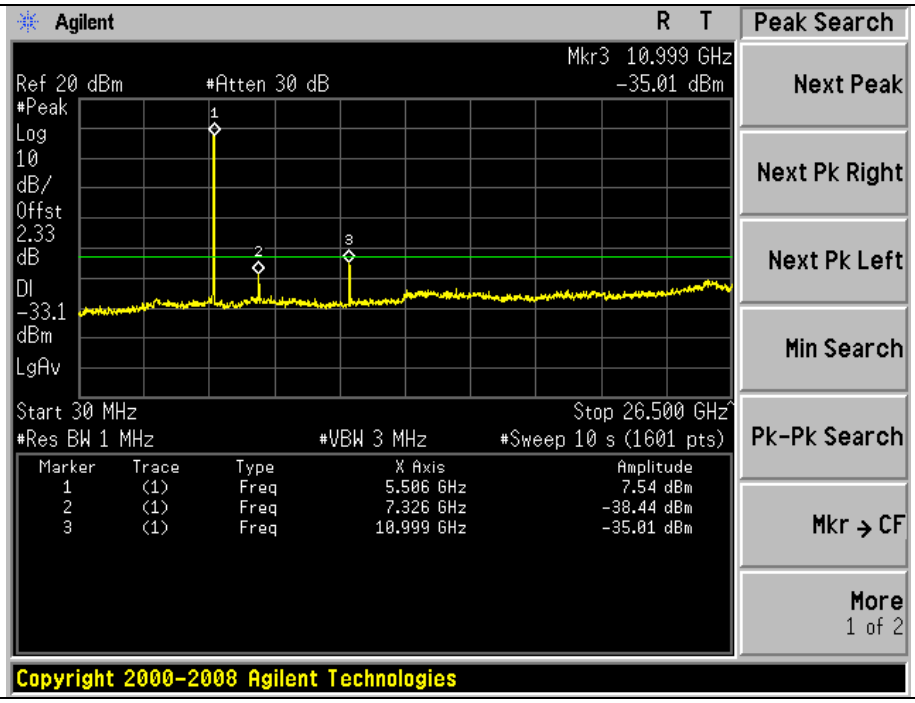
Note that the data displayed on the plots detailed in this appendix were measured using a 'Peak Detector'. Please refer to the results table for the detectors used during formal measurements



Title: Conducted Spurious Emissions Results for 5700MHz

Graphical Test Results for 802.11n (HT-20) 5500MHz:

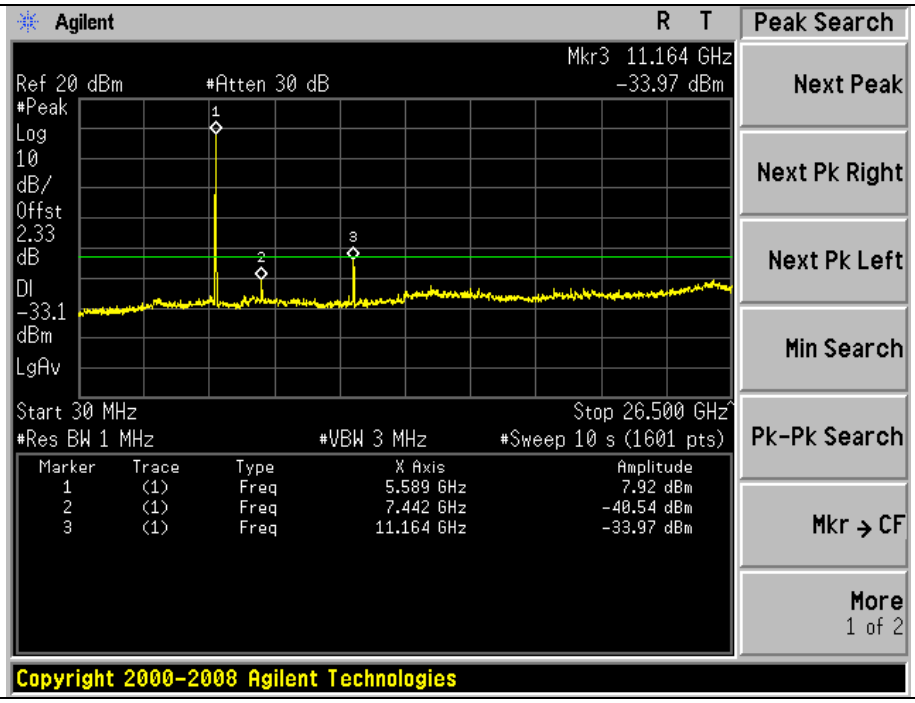
Note that the data displayed on the plots detailed in this appendix were measured using a 'Peak Detector'. Please refer to the results table for the detectors used during formal measurements



Title: HT20 - 5500MHz

Graphical Test Results for 802.11n (HT-20) 5580MHz:

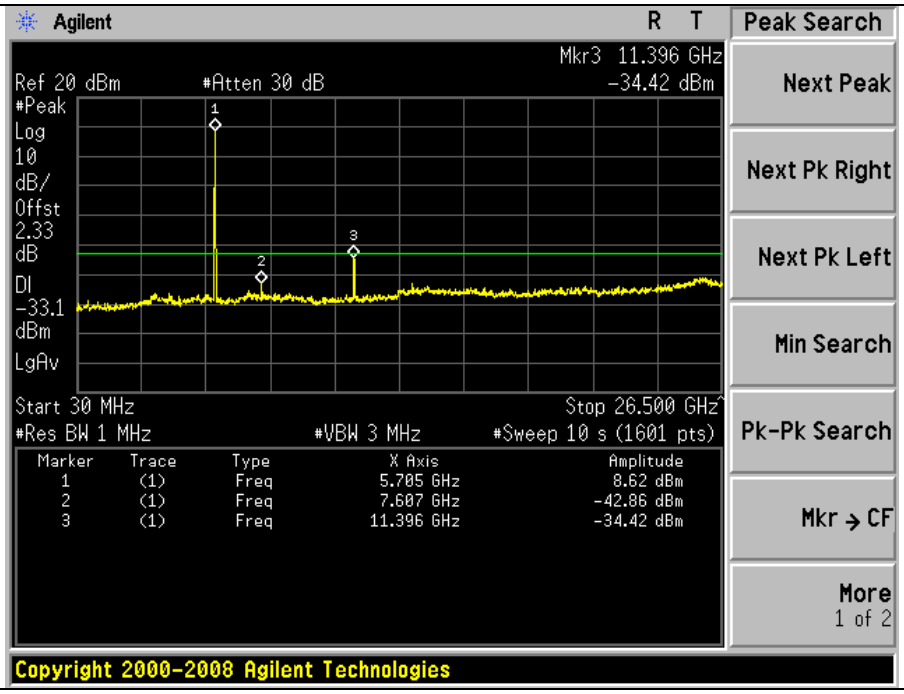
Note that the data displayed on the plots detailed in this appendix were measured using a 'Peak Detector'. Please refer to the results table for the detectors used during formal measurements



Title: HT20 - 5580MHz

Graphical Test Results for 802.11n (HT-20) 5700MHz:

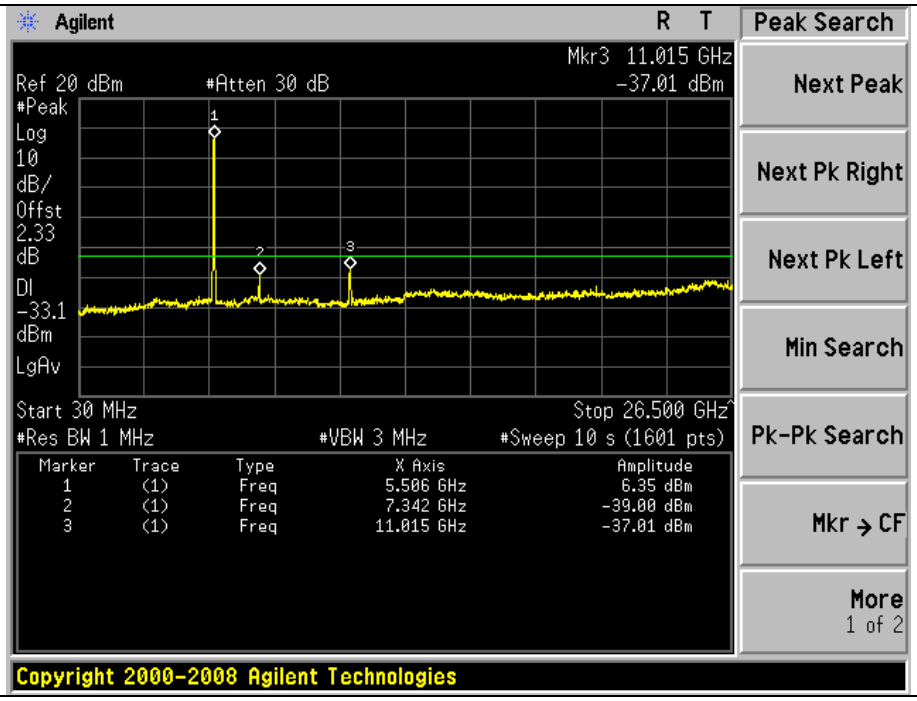
Note that the data displayed on the plots detailed in this appendix were measured using a 'Peak Detector'. Please refer to the results table for the detectors used during formal measurements



Title: HT20 – 5700MHz

Graphical Test Results for 802.11n (HT-40) 5510MHz:

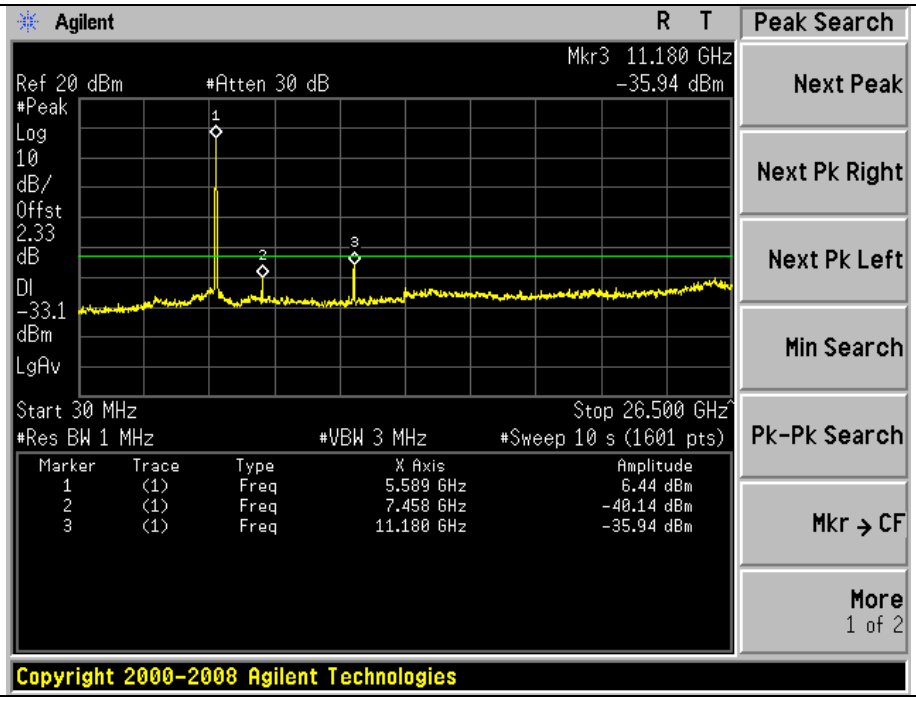
Note that the data displayed on the plots detailed in this appendix were measured using a 'Peak Detector'. Please refer to the results table for the detectors used during formal measurements



Title: HT40 – 5510MHz

Graphical Test Results for 802.11an (HT-40) 5590MHz:

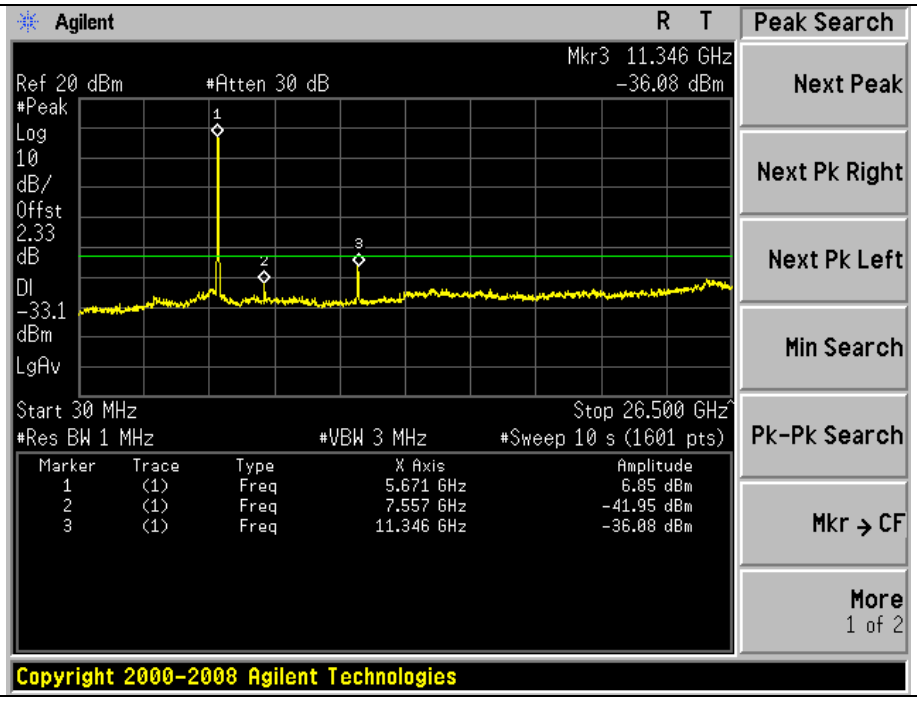
Note that the data displayed on the plots detailed in this appendix were measured using a 'Peak Detector'. Please refer to the results table for the detectors used during formal measurements



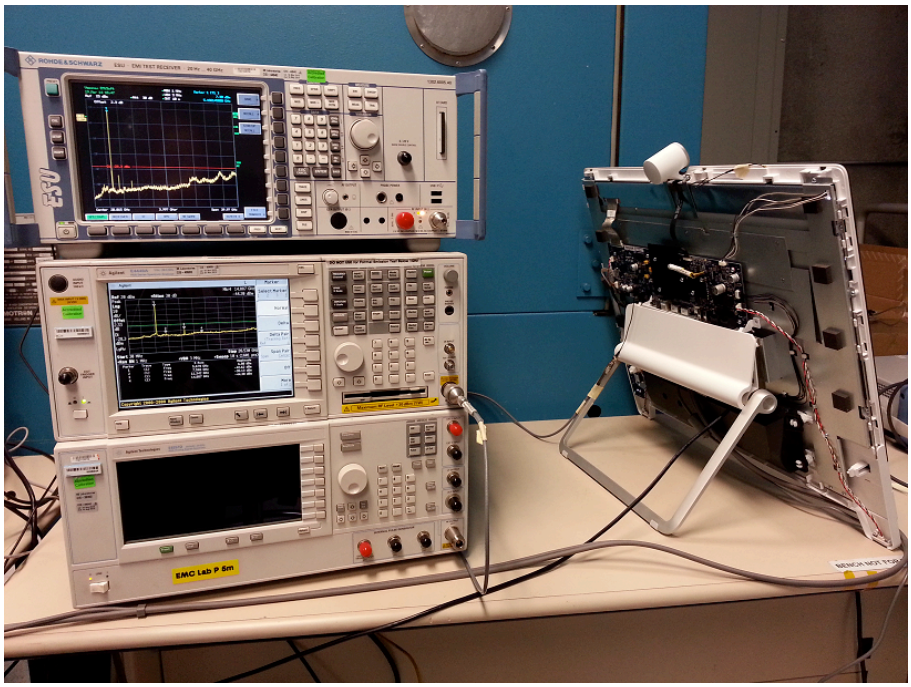
Title: HT40 – 5590MHz

Graphical Test Results for 802.11n (HT-40) 5670MHz:

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: HT40 – 5670MHz



Conducted Band Edge

15.407: For transmitters operating in the 5.25-5.35 and 5.47-5.725 GHz band: all emissions outside of the 5.25-5.35 and 5.47-5.725 GHz bands 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).

Antenna gain in the band 5.47-5.725GHz is 6.1dBi

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

802.11a 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	5500	Peak	6	5470	-35.25	-27	-33.1	-2.15
	5700	Peak	6	5725	-36.55	-27	-33.1	-3.45