Radio Test Report: EDCS - 1206159

CP-DX650

Next Generation Video Endpoint

5470-5725 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: Dilip Patel
Title: Regulatory Compliance Manager

This report replaces any previously entered test report under EDCS - 1206159

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

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

15-Oct-2012

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, 10m Chamber	Company #: 4624-2
Building P, 5m Chamber	Company #: 4624-1
Building N, 5m Chamber	Company #: 6111
Building I, 5m Chamber	Company #: 6112

Test Engineers

Phillip Carranco

2.5 Equipment Assessed (EUT)

CP-DX650

2.6 EUT Description

The CP-DX650 is the next generation 1080p Video Endpoint with key expansion module support. This new generation of desktop phone incorporates an Android based operating system. Three USB ports, one micro OTG USB port, one higher powered USB-proprietary connector combination (AUX) and one standard USB Port. Support HDMI with a maximum external resolution of 1920 x 1200, also includes a single 3.5mm headset jack.

WiFi (802.11 A/B/G/N) & Bluetooth 3.0 capabilities.

Murata module, LBEH1ZNSXC-526, supports for 802.11/a/b/g/n + Bluetooth 3.0 module

SDIO interface to WLAN – Omap4 SD host controller port 5

PCM (McBSP1) interface to Bluetooth

WiFi + BT chip - Marvell 88W8787

Clocks – 38.4MHz 20ppm for main clock, 32.768KHz sleep clock

Supports 802.11i security standard

Coexistence between WiFi and BT with one antenna to both connected to the 2.4GHz radios

Single antenna for 2.4 and 5GHz bands with diplex inside the module

Up to 72Mbps (20 MHz channel)

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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 Spurions 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. Please also refer to the "Justification for worst Case test Configuration" section of this report for further details on the selection of EUT samples.

4.1 Sample Details (Photographs of the test samples, where appropriate can be found in appendix H)

Sample Number	Equipment Details	Serial Number	Part Number
S01	CP-DX650-K9	FCH1627A5AU	73-15144-01

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: (no external antenna can be used.)

5150 – 5250MHz: 2.4 dBi
5250 – 5350MHz: 3.9 dBi
5500 – 5700MHz: 3.8 dBi
5745 – 5805MHz: 3.3 dBi

4.2 System Details

System #	Description	Samples
1	Radio Test Sample	S01

4.3 Mode of Operation Details

Mode#	Description	Comments
1	802.11AN Test Mode	System is placed in a continuous Tx State at various channels per Test Requirements. 802.11A running at 6Mbps , HT20 running at 6.5Mbps and HT40 running 13.5Mbps.

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
Non HT-20, 6 to 54 Mbps	16	16	16
HT-20, M0 to M23	16	16	16
	5510	5590	5670
HT-40, M0 to M23	16	16	16

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).

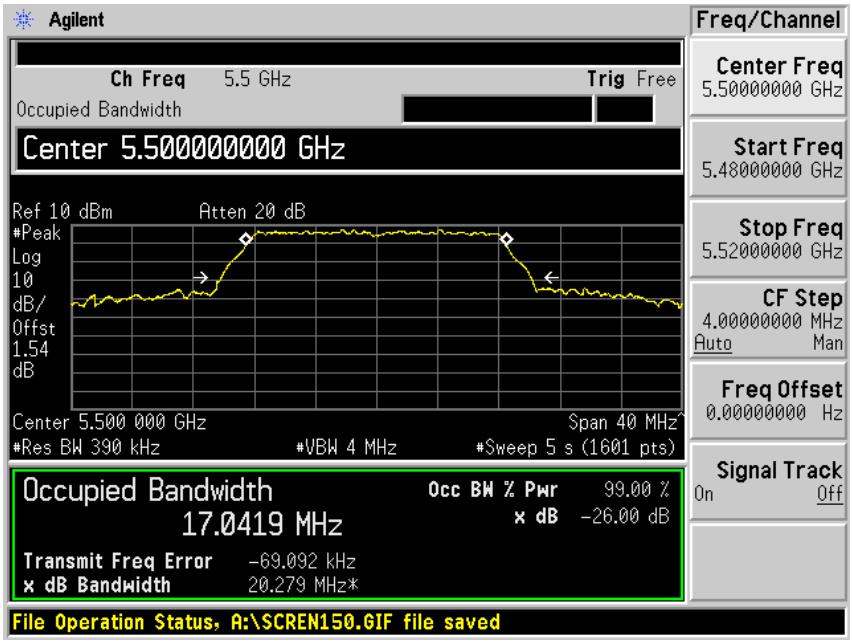
Center Frequency: Frequency from table below
Span: 2 x Nominal Bandwidth (e.g. 40MHz for a 20MHz channel)
Reference Level: 20 dBm
Attenuation: 10 dB
Sweep Time: 5 s
Resolution Bandwidth: 1%-3% of 26 dB Bandwidth
Video Bandwidth: ≥Resolution Bandwidth
X dB Bandwidth: 26 dB
Detector: Peak
Trace: Single

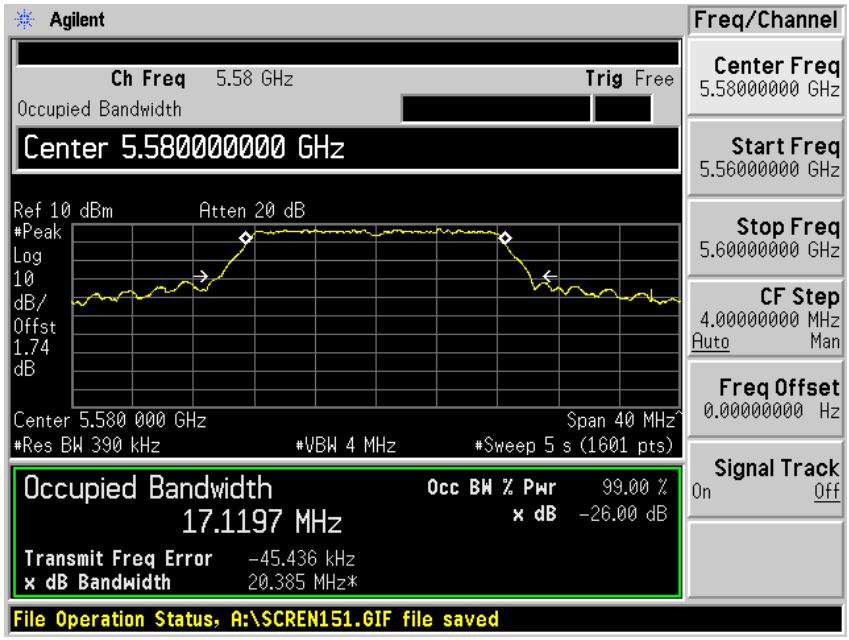
Place the radio in continuous transmit mode. View the transmitter waveform on the spectrum analyzer, and record the pertinent measurements:

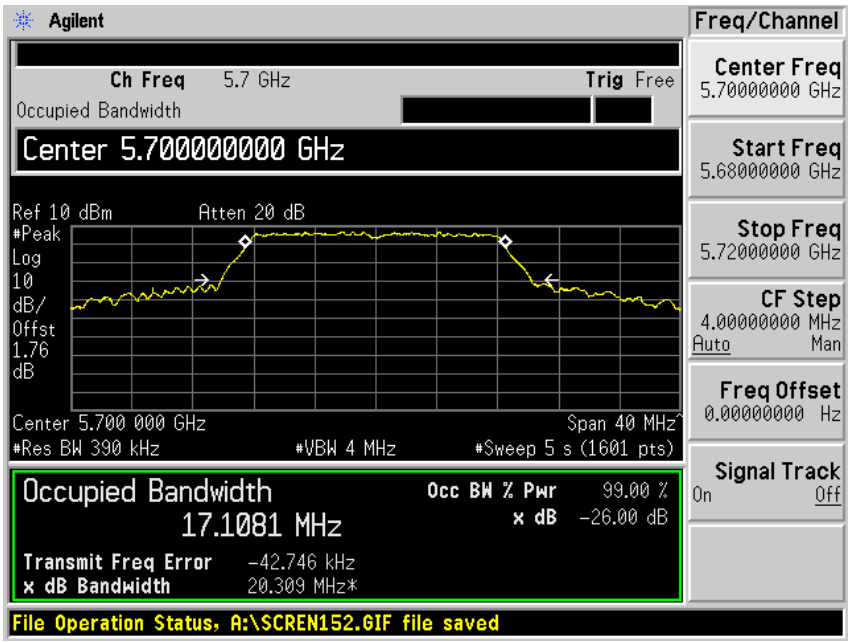
99% and 26dB Bandwidth for 802.11A

Frequency (MHz)	Data Rate (Mbps)	99% Bandwidth (MHz)	26dB Bandwidth (MHz)
5500	6	17.042	20.279
5580	6	17.120	20.385
5700	6	17.108	20.309

Graphical Test Results for 802.11a:



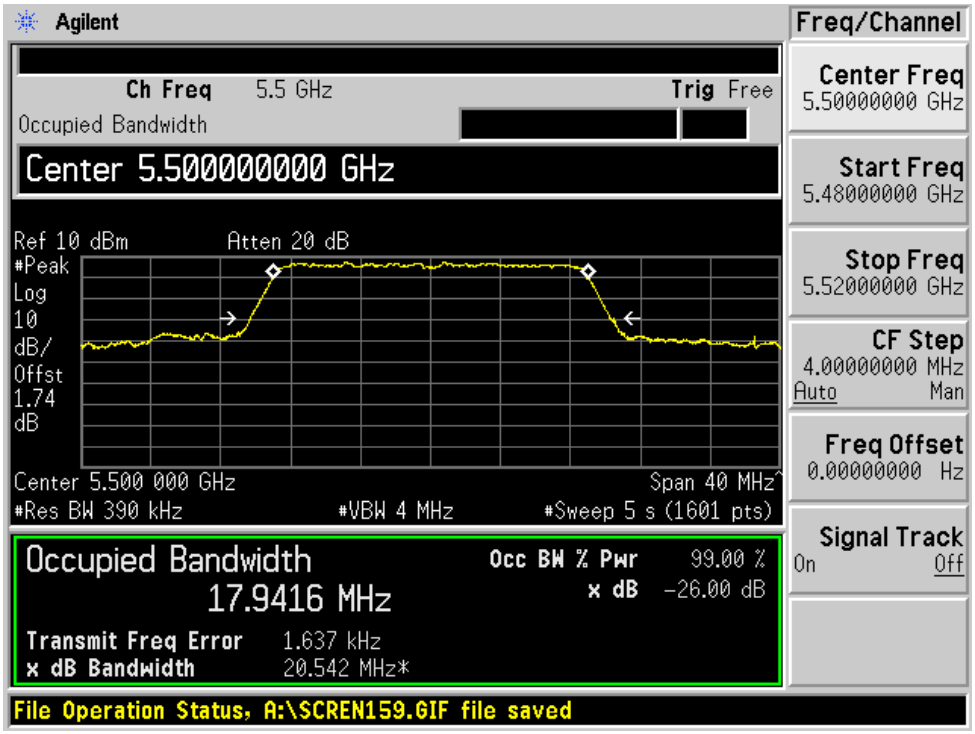


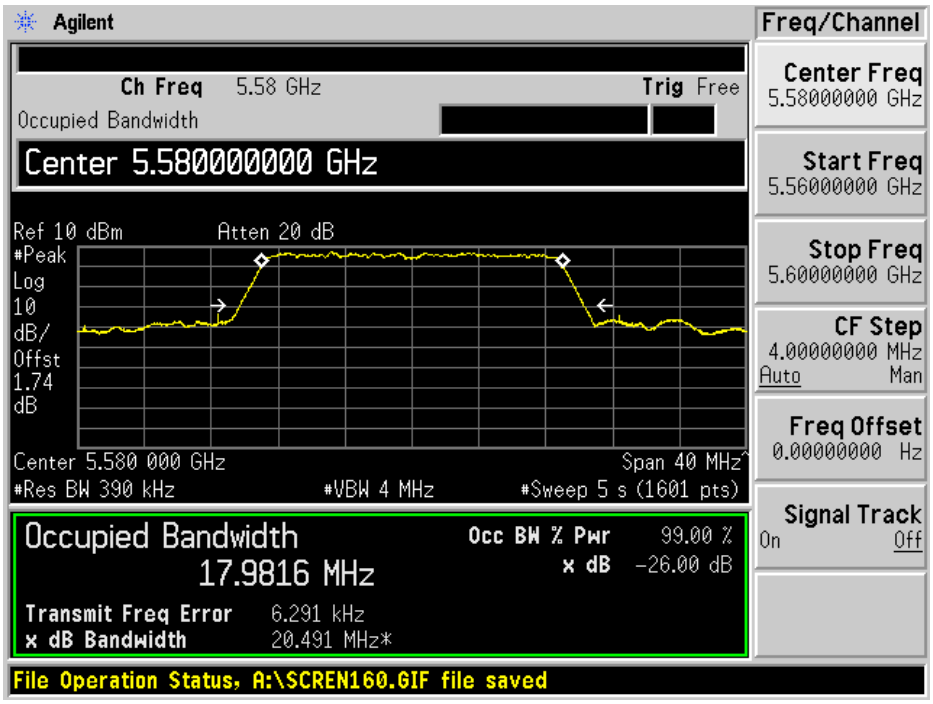


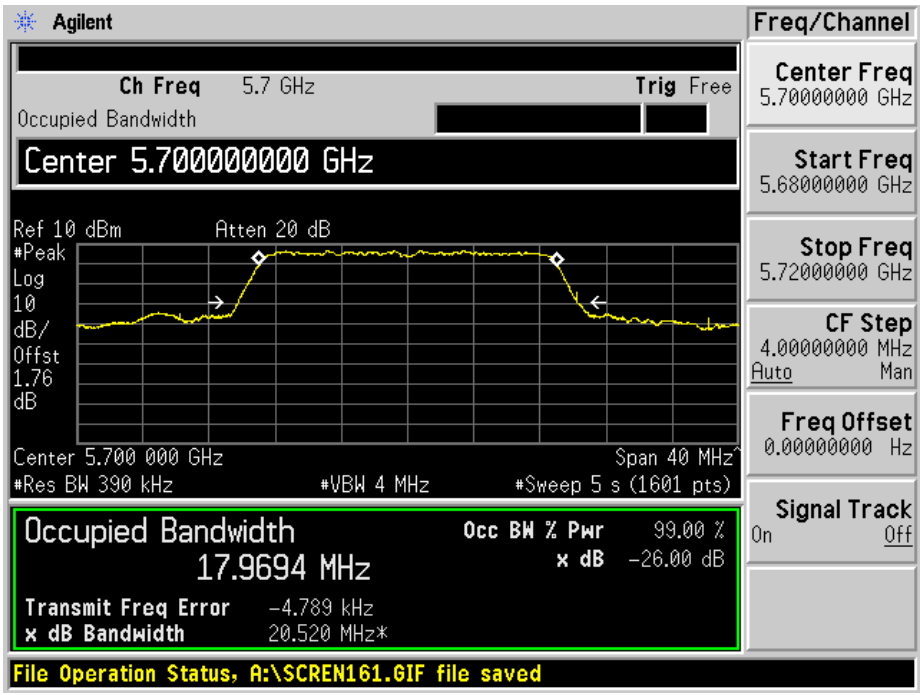
99% and 26dB Bandwidth for 802.11AN (HT20)

Frequency (MHz)	Data Rate (Mbps)	99% Bandwidth (MHz)	26dB Bandwidth (MHz)
5500	M0	17.942	20.542
5580	M0	17.982	20.491
5700	M0	17.969	20.52

Graphical Test Results for 802.11A (HT20):



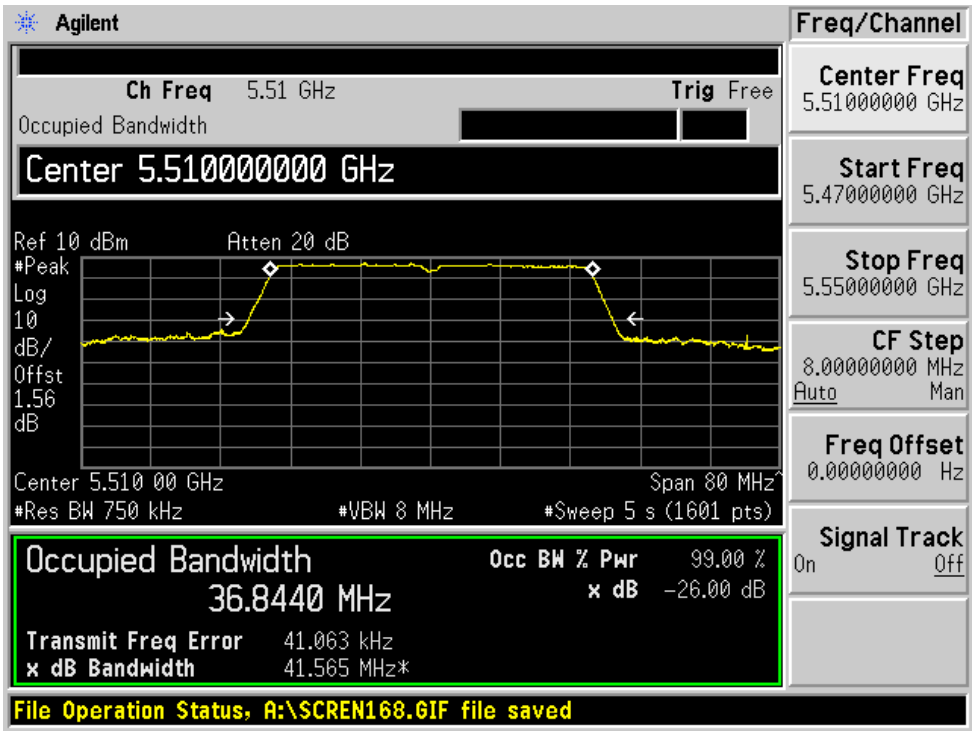


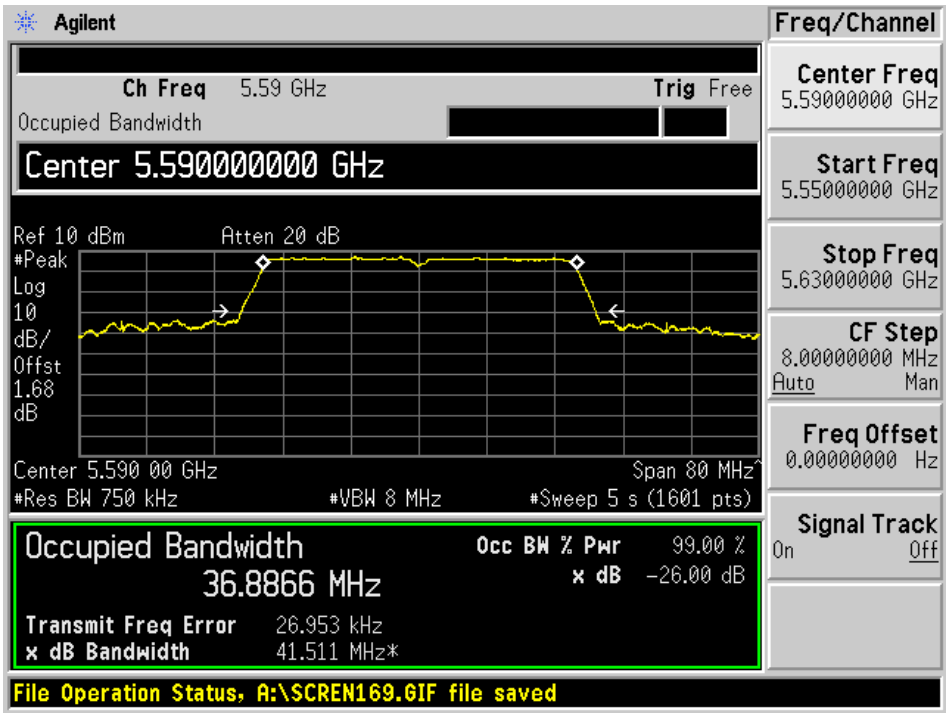


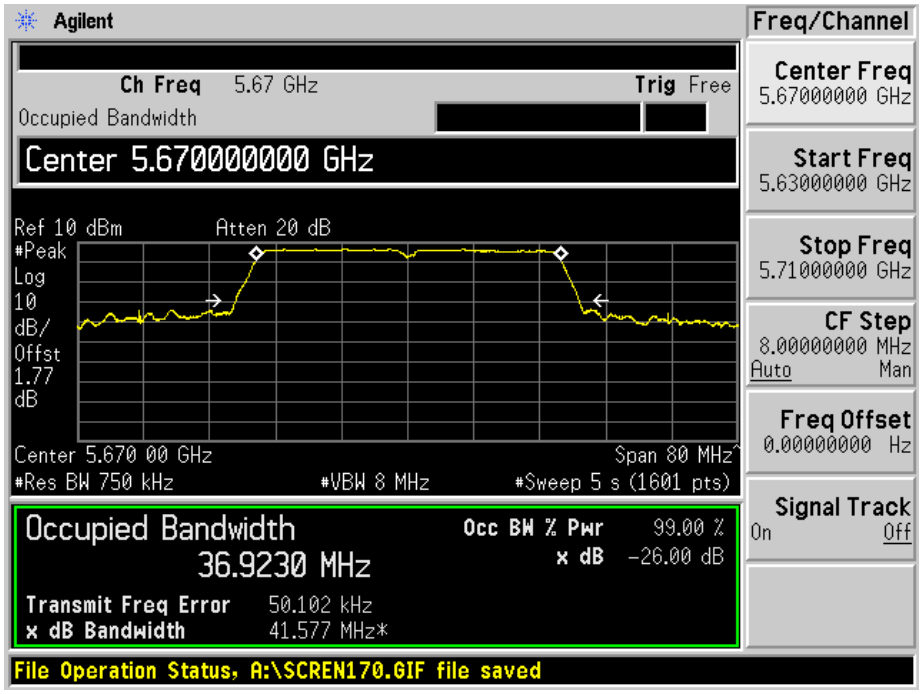
99% and 26dB Bandwidth for 802.11AN (HT40)

Frequency (MHz)	Data Rate (Mbps)	99% Bandwidth (MHz)	26dB Bandwidth (MHz)
5510	M0	36.844	41.565
5590	M0	36.887	41.511
5670	M0	36.923	41.577

Graphical Test Results for 802.11A (HT40):







Peak Output Power

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 20.279MHz. The maximum conducted output power is calculated as 11dBm+10*log(20.279 MHz) = 24.07dBm. This is greater than 250mW.

Power Spectral Density

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 3.8dBi.

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:	100ms, Single sweep
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.

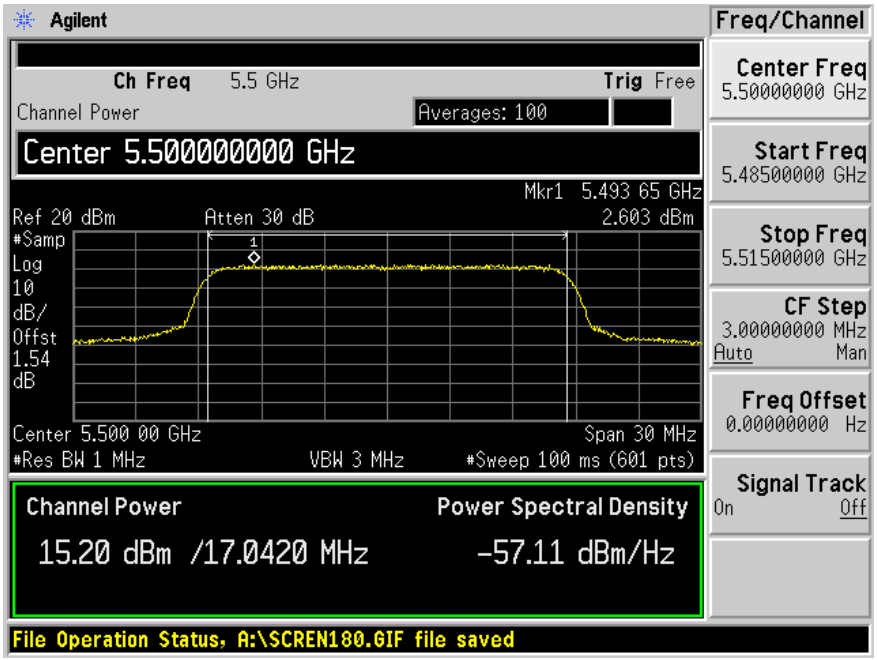
Peak Output Power for 11a:

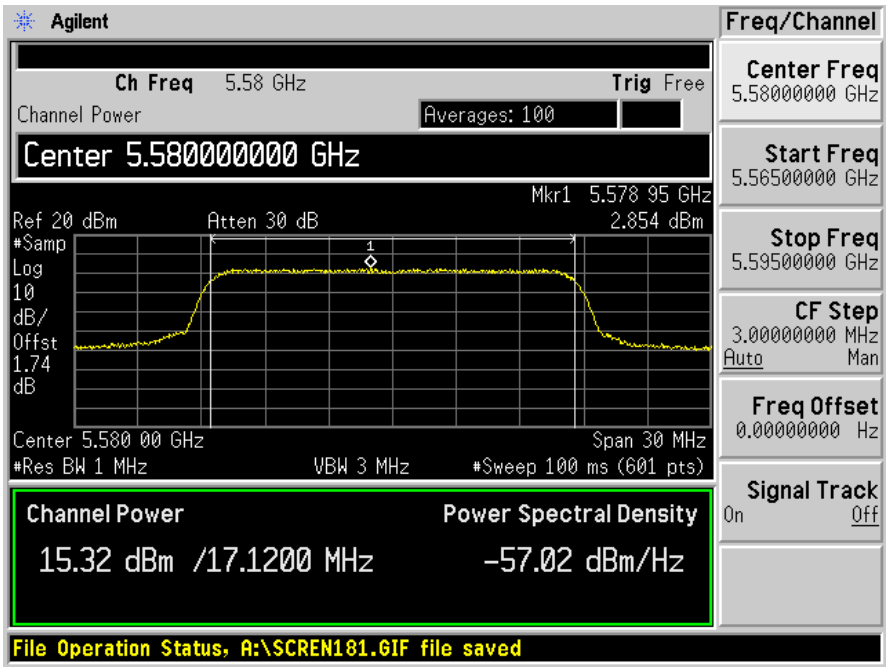
Frequency (MHz)	Data Rate (Mbps)	Peak Output Power (dBm)	Limit (dBm)	Margin (dB)
5500	6	15.20	24	-8.80
5580	6	15.32	24	-8.68
5700	6	14.95	24	-9.05

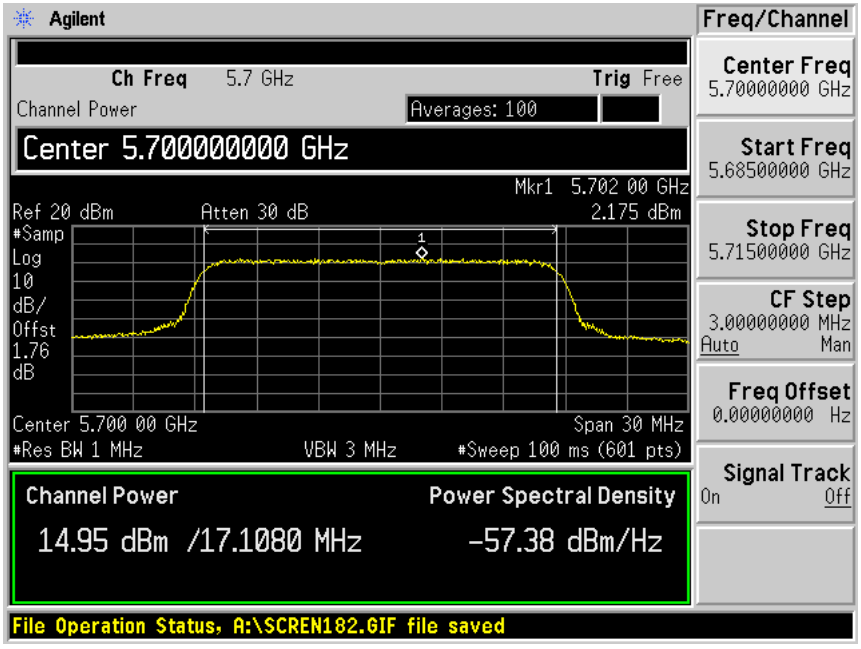
Power Spectral Density for 11a:

Frequency (MHz)	Data Rate (Mbps)	Peak Power Spectral Density (dBm/MHz)	Limit (dBm)	Margin (dB)
5500	6	2.603	11	-8.397
5580	6	2.854	11	-8.146
5700	6	2.175	11	-8.825

Graphical Test Results for 802.11a:







Peak Output Power for 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 20.491MHz. The maximum conducted output power is calculated as 11dBm+10*log(20.491MHz) = 24.12dBm. This is greater than 250mW.
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Power Spectral Density

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 3.8dBi.

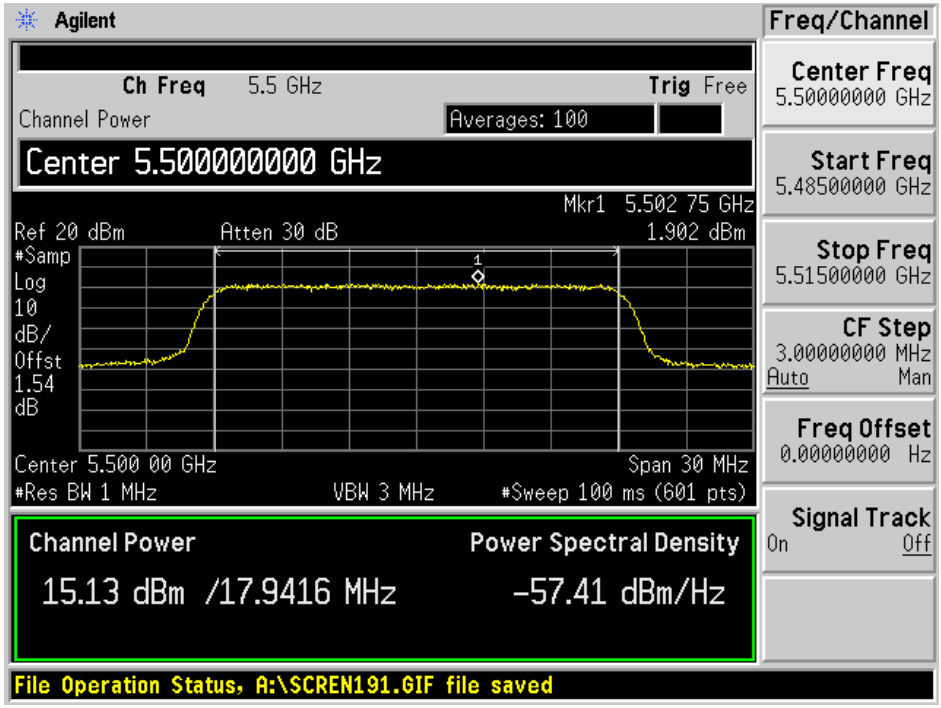
Peak Output Power for 802.11an (HT20):

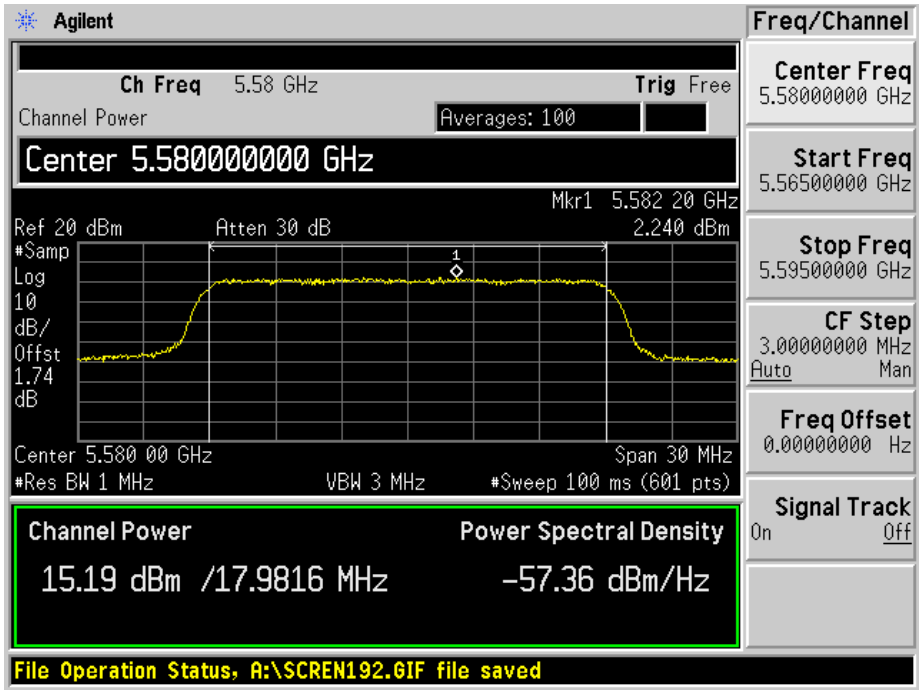
Frequency (MHz)	Data Rate (Mbps)	Peak Output Power (dBm)	Limit (dBm)	Margin (dB)
5500	M0	15.13	24	-8.87
5580	M0	15.19	24	-8.81
5700	M0	14.81	24	-9.19

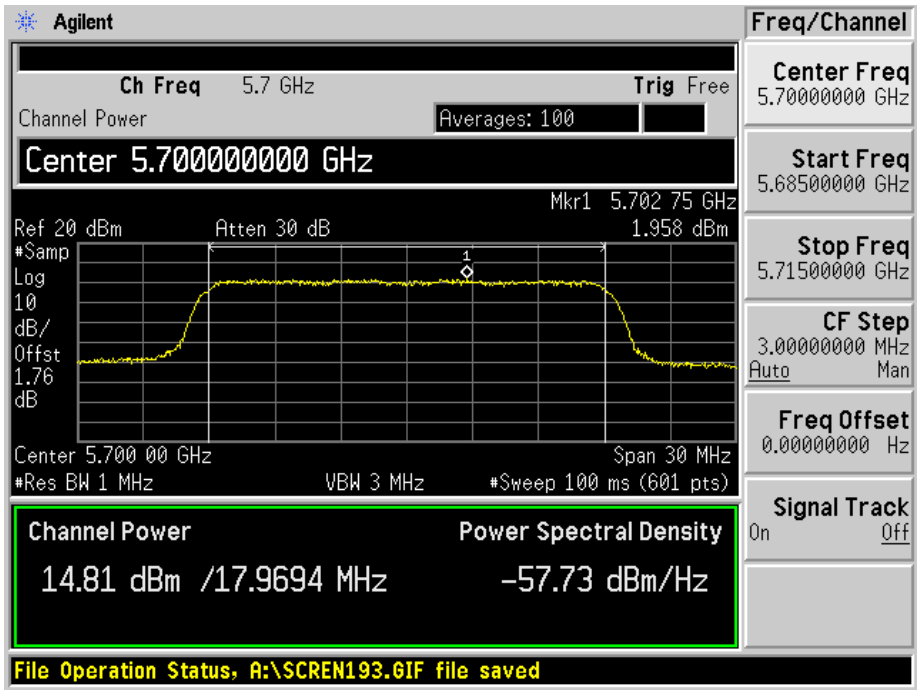
Power Spectral Density for 11a:

Frequency (MHz)	Data Rate (Mbps)	Peak Power Spectral Density (dBm/MHz)	Limit (dBm)	Margin (dB)
5500	M0	1.902	11	-9.098
5580	M0	2.24	11	-8.76
5700	M0	1.958	11	-9.042

Graphical Test Results for 802.11an (HT20):







Peak Output Power for 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 41.511MHz. The maximum conducted output power is calculated as 11dBm+10*log(41.511MHz) = 27.18dBm. This is greater than 250mW.
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Power Spectral Density

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 3.8dBi.

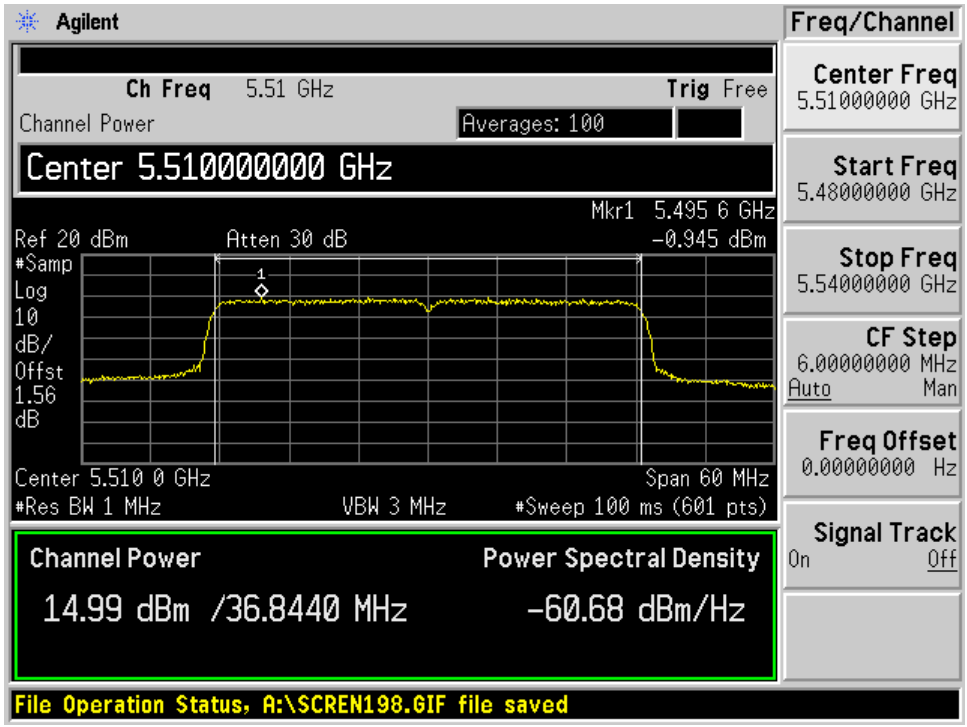
Peak Output Power for 802.11an (HT40):

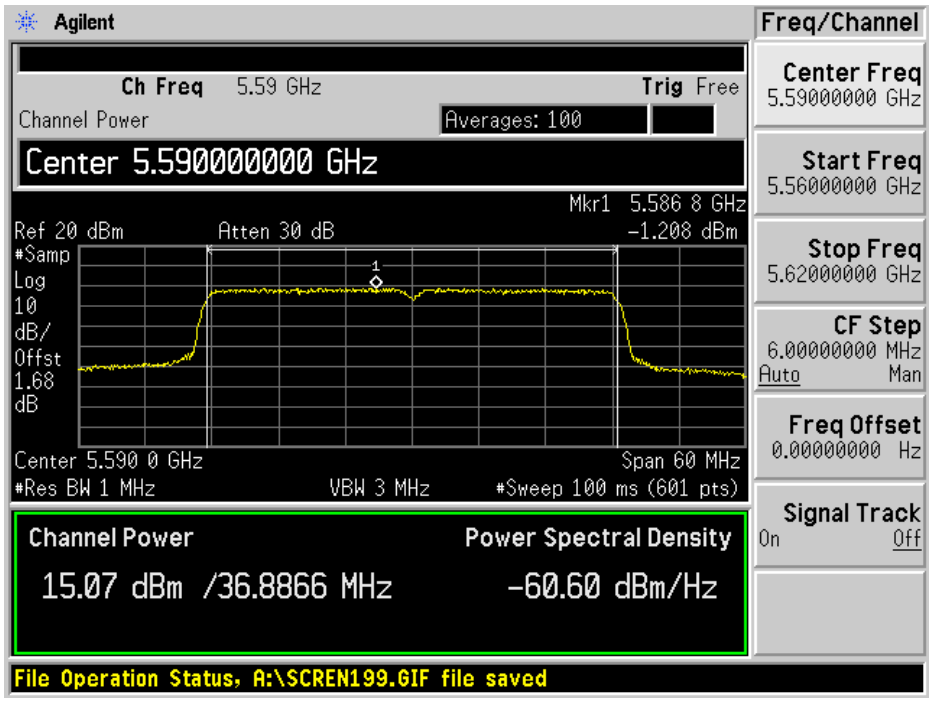
Frequency (MHz)	Data Rate (Mbps)	Peak Output Power (dBm)	Limit (dBm)	Margin (dB)
5510	M0	14.99	24	-9.01
5590	M0	15.07	24	-8.93
5670	M0	14.81	24	-9.19

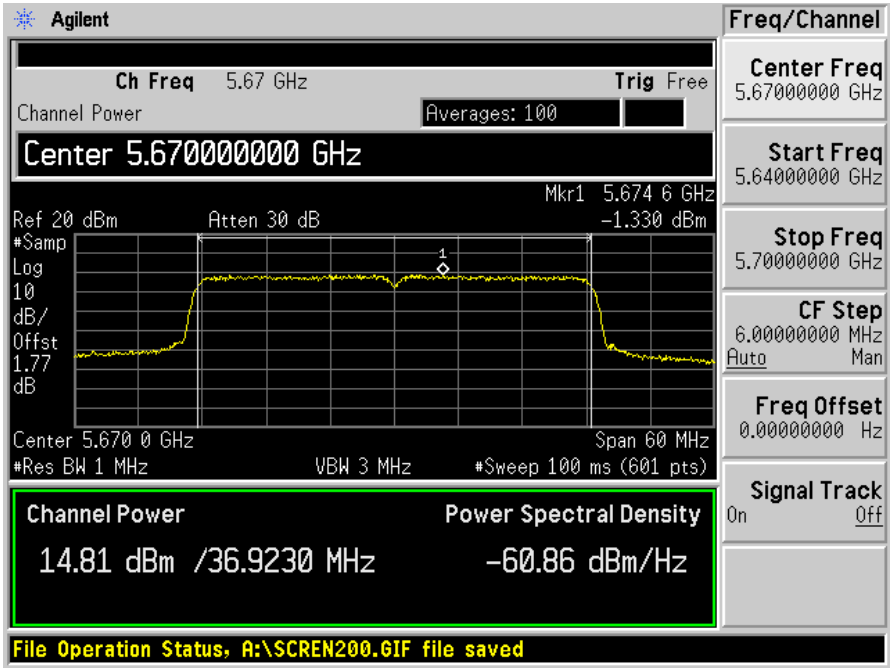
Power Spectral Density for 802.11an (HT40):

Frequency (MHz)	Data Rate (Mbps)	Peak Power Spectral Density (dBm/MHz)	Limit (dBm)	Margin (dB)
5510	M0	-0.945	11	-11.945
5590	M0	-1.208	11	-12.208
5670	M0	-1.33	11	-12.33

Graphical Test Results for 802.11an (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.

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

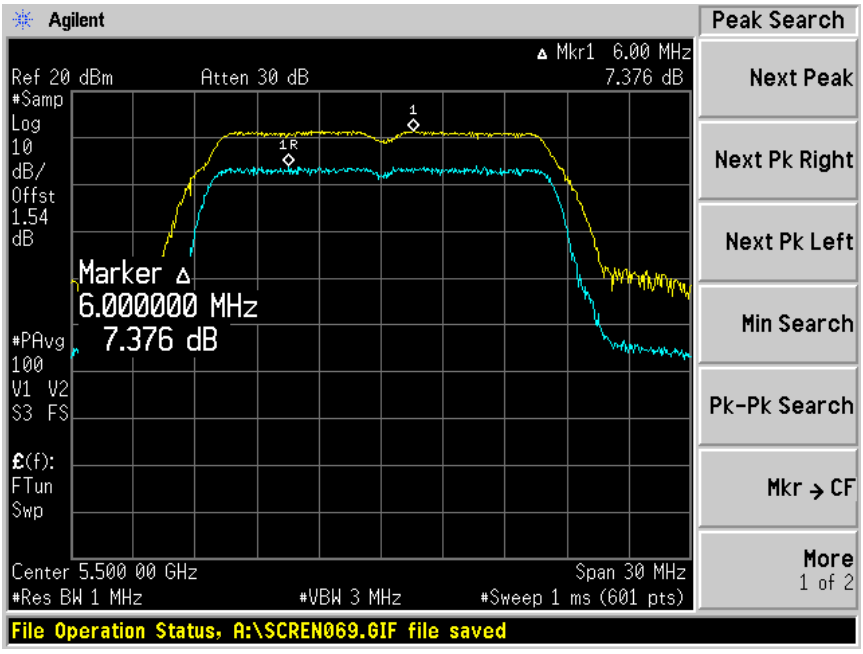
Trace 1 & Peak search
Marker Delta
Trace 2 & Peak search

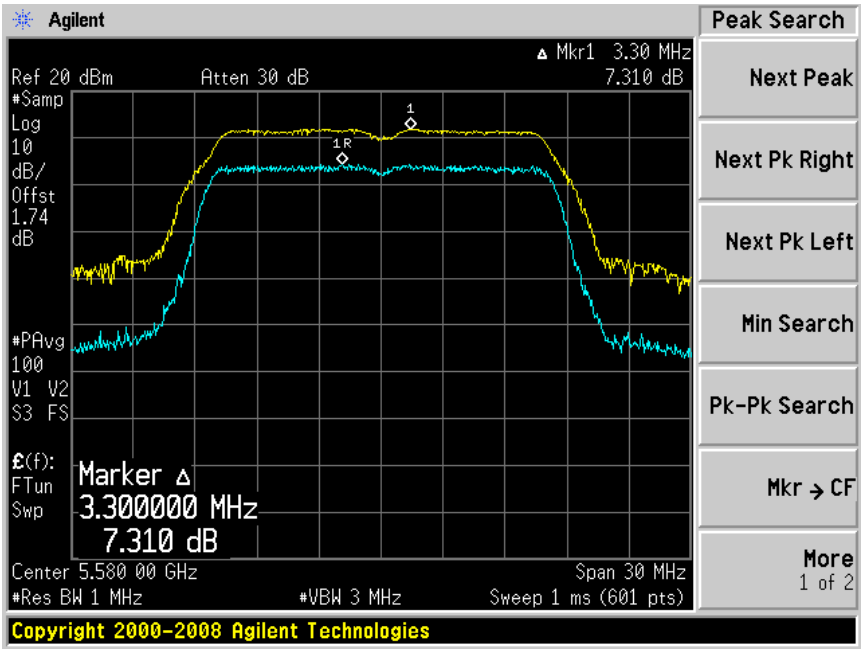
Record the difference between the Peak and Average Markers

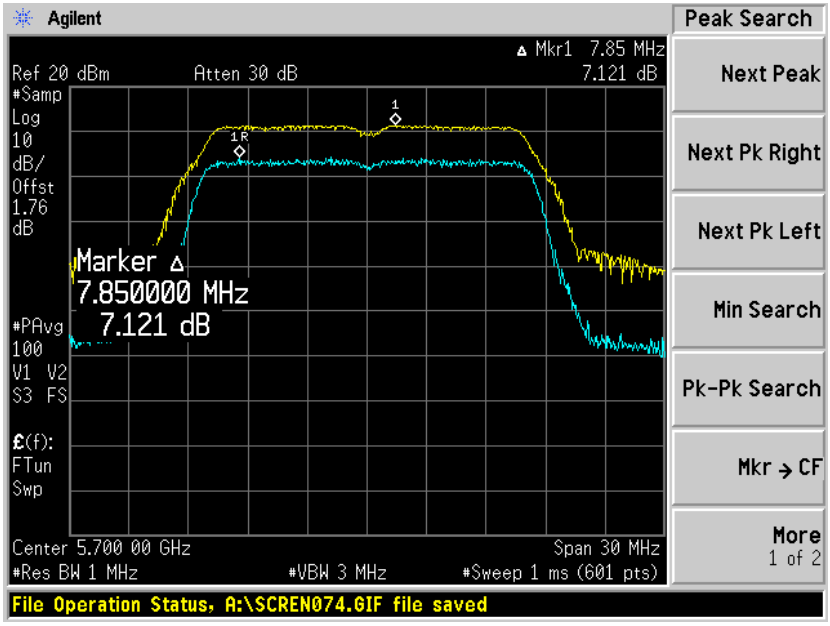
Results for 802.11a:

Frequency (MHz)	Data Rate (Mbps)	Peak Excursion (dB)	Limit (dBm)	Margin (dB)
5500	6	7.376	13	-5.624
5580	6	7.31	13	5.69
5700	6	7.121	13	5.879

Graphical Test Results for 802.11a:





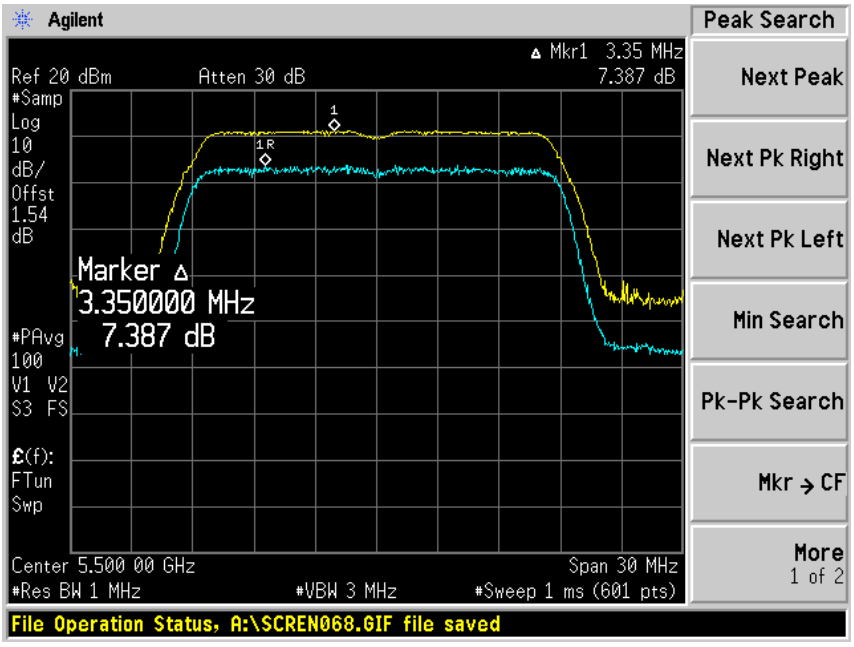


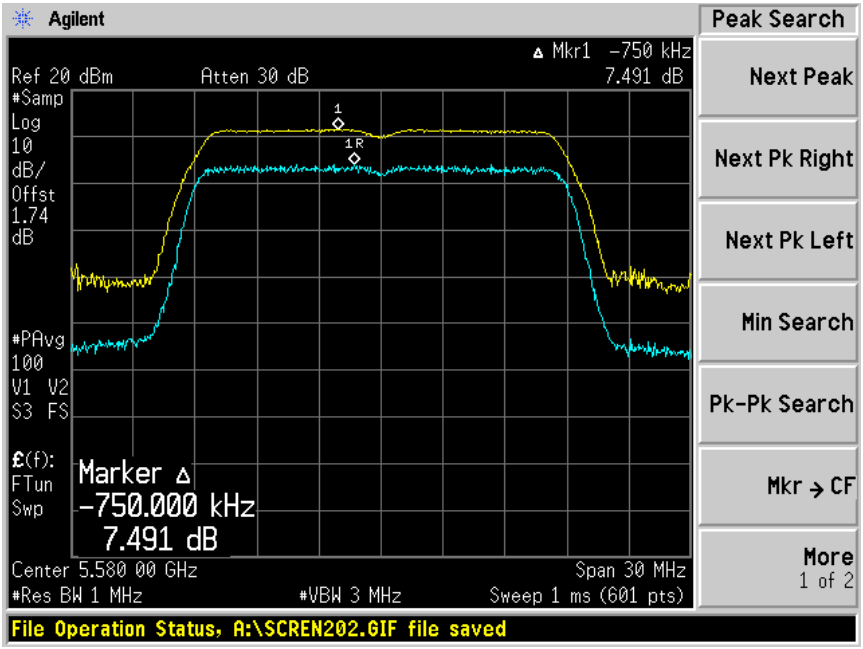
Peak Excursion for HT20:

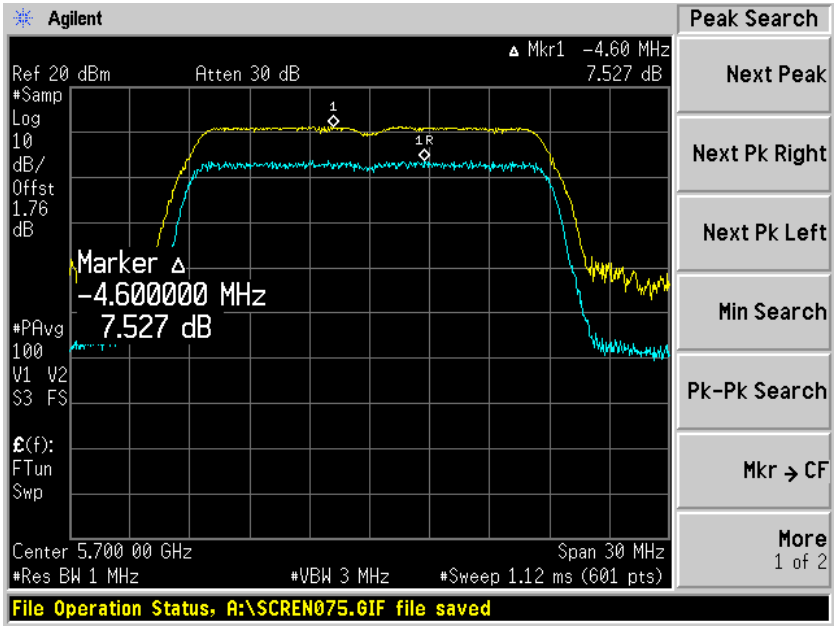
15.407: The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the maximum conducted output power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.

Frequency (MHz)	Data Rate (Mbps)	Peak Excursion (dB)	Limit (dBm)	Margin (dB)
5500	M0	7.387	13	-5.613
5580	M0	7.491	13	5.509
5700	M0	7.527	13	5.473

Graphical Test Results for 802.11an (HT20):





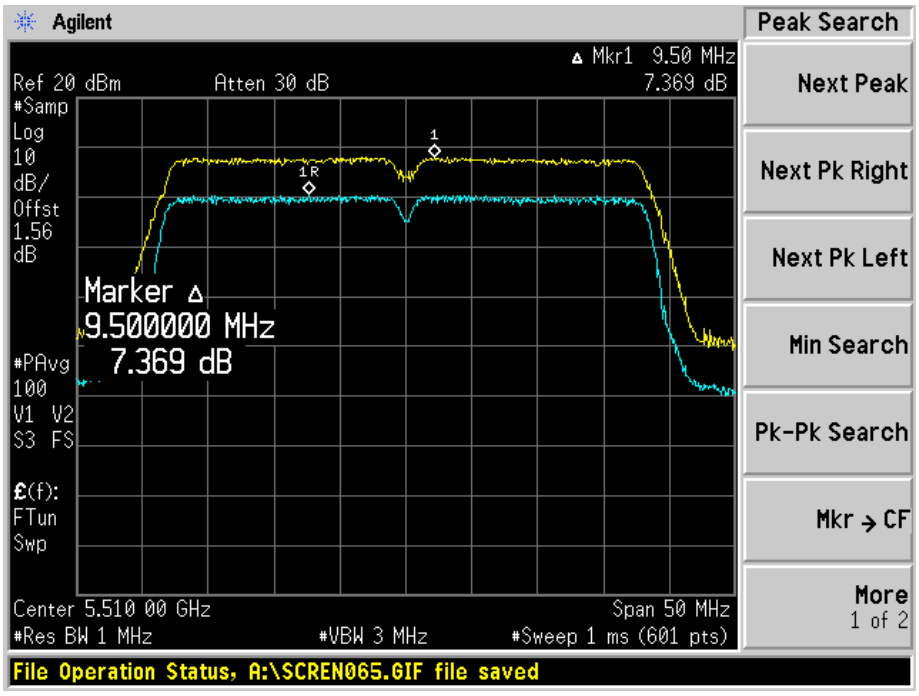


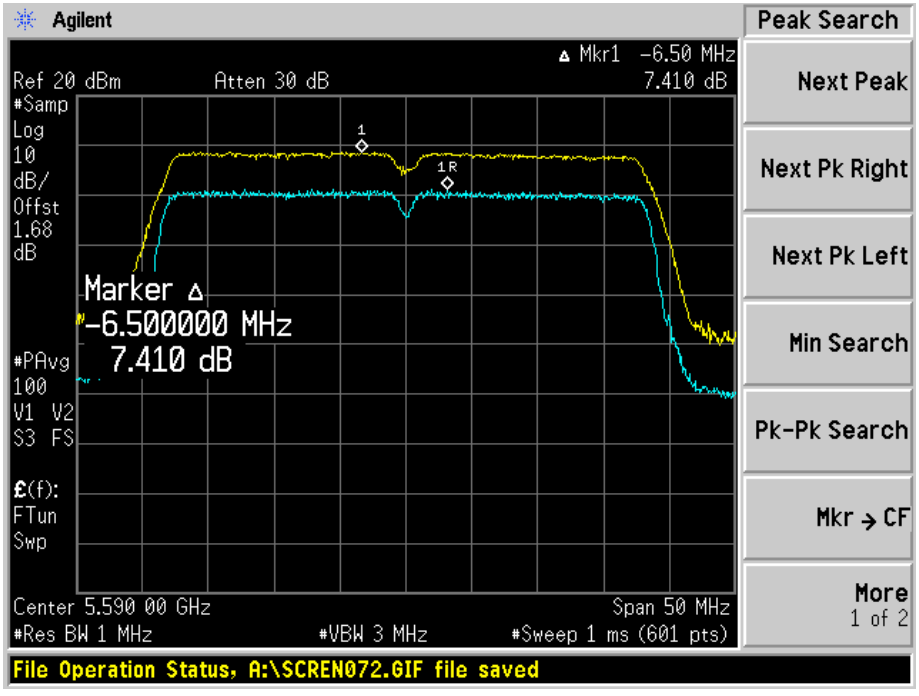
Peak Excursion for HT40:

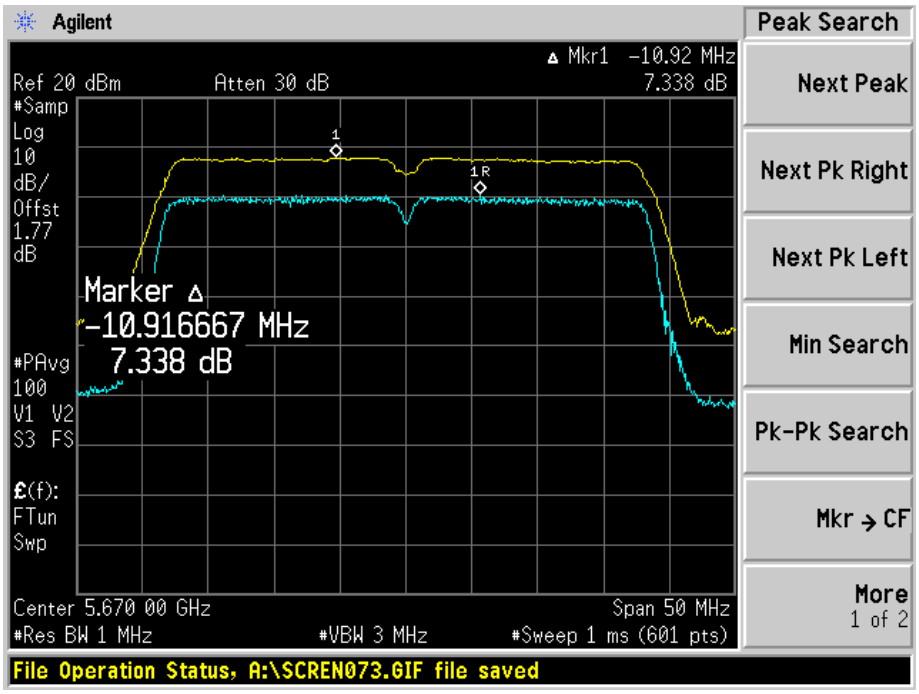
15.407: The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the maximum conducted output power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.

Frequency (MHz)	Data Rate (Mbps)	Peak Excursion (dB)	Limit (dBm)	Margin (dB)
5510	M0	7.369	13	-5.631
5590	M0	7.41	13	-5.59
5670	M0	7.338	13	-5.662

Graphical Test Results for 802.11an (HT40):







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.

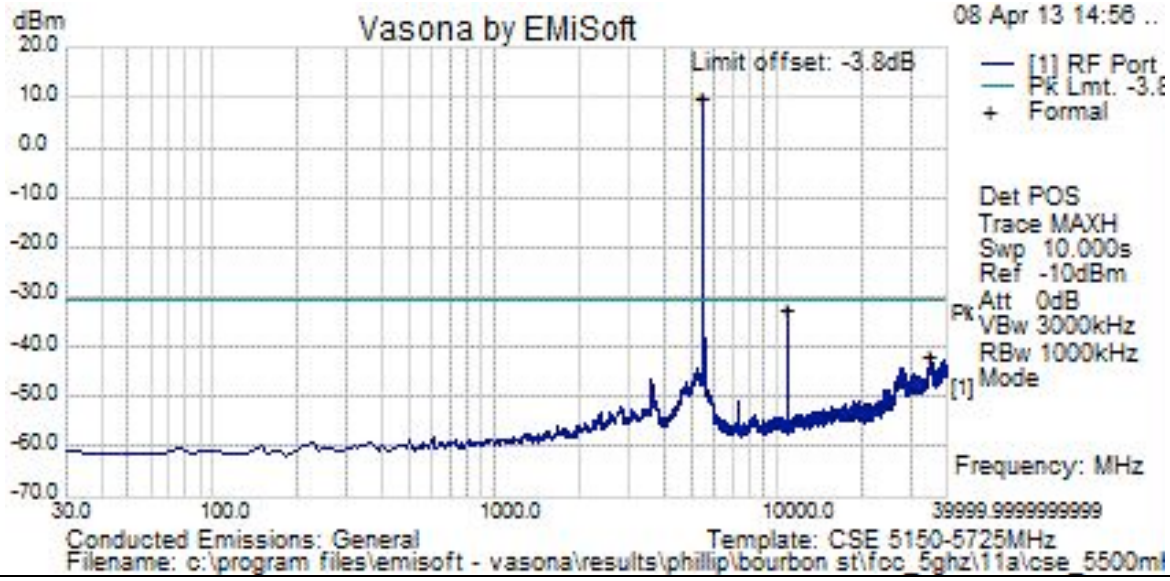
Connect the antenna port(s) to the spectrum analyzer input. Place the radio in continuous transmit mode. Configure the spectrum analyzer as shown below (be sure to enter all losses between the transmitter output and the spectrum analyzer).

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



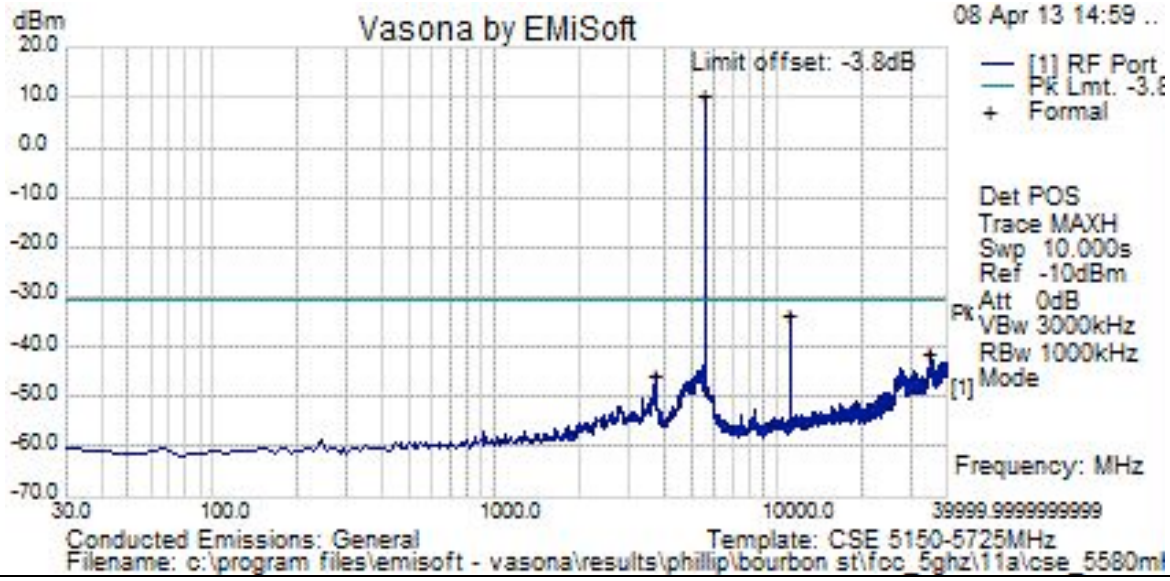
Title: Conducted Spurious Emissions Results for 5500MHz

Test Results Table

Frequency MHz	Raw dBm	Cable Loss	Factors dB	Level dBm	Measurement Type	Line	Limit dBm	Margin dB	Pass /Fail	Comments
5492.88	-12	22.1	0	10.1	Pk	RF	-30.8	40.9	Fail	Tx Signal
11000.685	-53.2	20.9	0	-32.2	Pk	RF	-30.8	-1.4	Pass	
35234.5	-64.5	22.8	0	-41.7	Pk	RF	-30.8	-10.9	Pass	

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



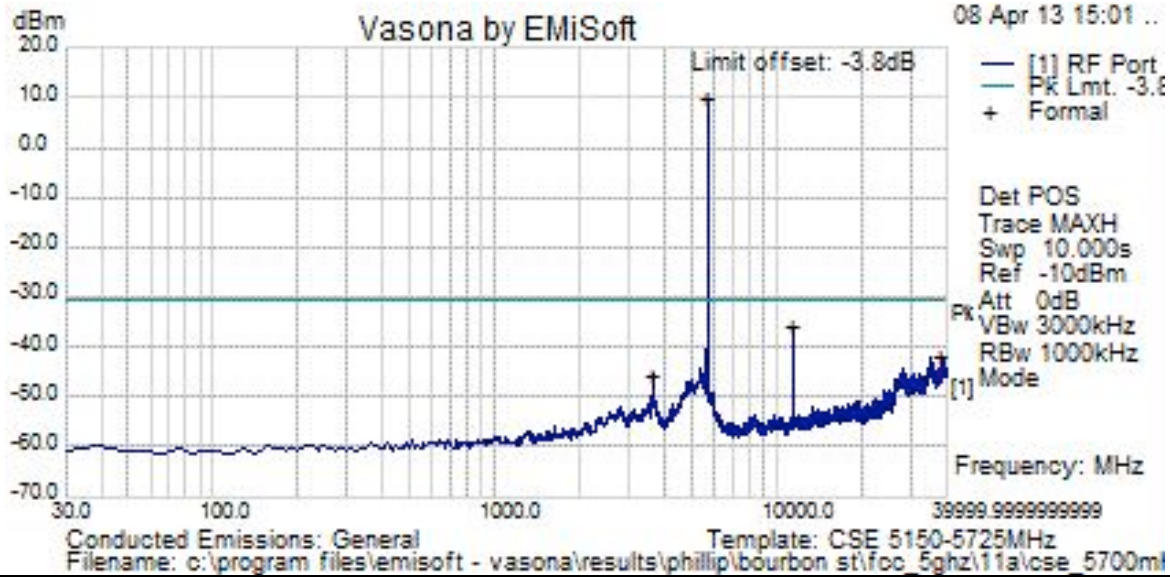
Title: Conducted Spurious Emissions Results for 5580MHz

Test Results Table

Frequency MHz	Raw dBm	Cable Loss	Factors dB	Level dBm	Measurement Type	Line	Limit dBm	Margin dB	Pass /Fail	Comments
5573.745	-11.8	22.1	0	10.3	Pk	RF	-30.8	41.1	Fail	Tx Signal
11153.43	-54.5	20.9	0	-33.6	Pk	RF	-30.8	-2.8	Pass	
35234.5	-64	22.8	0	-41.2	Pk	RF	-30.8	-10.4	Pass	
3713.983	-67.1	21.5	0	-45.6	Pk	RF	-30.8	-14.8	Pass	

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



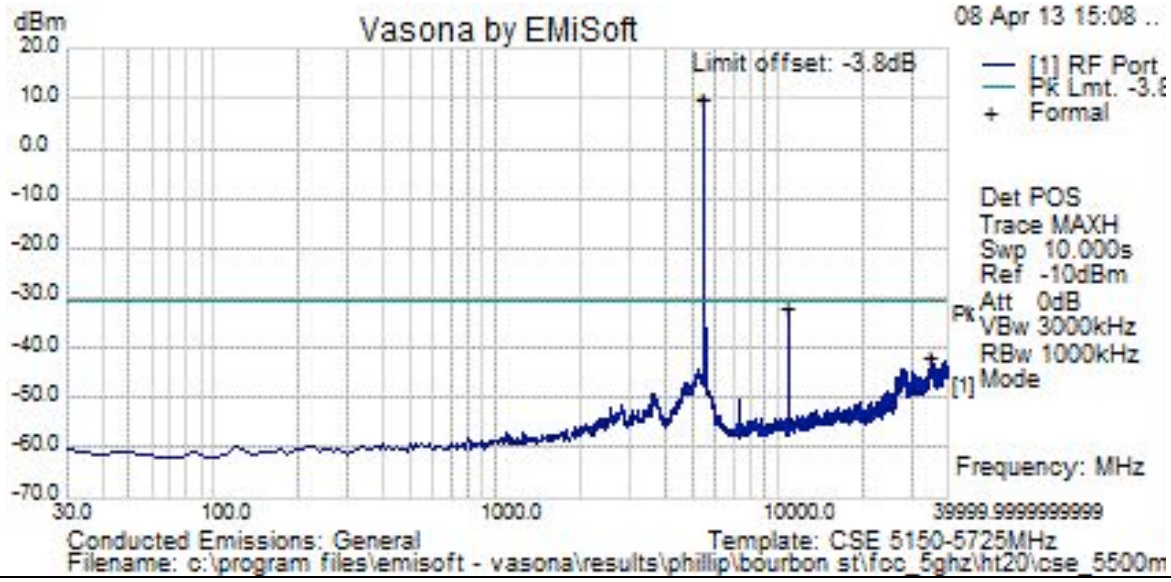
Title: Conducted Spurious Emissions Results for 5700MHz

Test Results Table

Frequency MHz	Raw dBm	Cable Loss	Factors dB	Level dBm	Measurement Type	Line	Limit dBm	Margin dB	Pass /Fail	Comments
5699.535	-12.4	22.3	0	9.9	Pk	RF	-30.8	40.7	Fail	Tx Signal
11405.01	-56.8	21	0	-35.8	Pk	RF	-30.8	-5	Pass	
38535.25	-64.8	22.8	0	-42	Pk	RF	-30.8	-11.2	Pass	
3659.94	-67.2	21.5	0	-45.7	Pk	RF	-30.8	-14.9	Pass	

Graphical Test Results for 802.11an (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



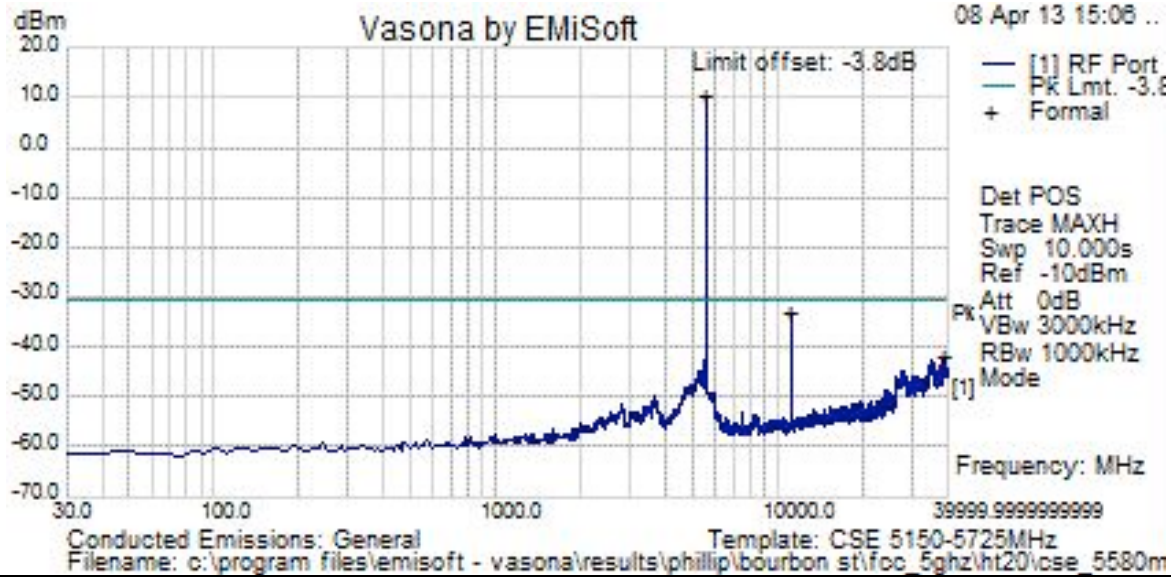
Title: HT20 - 5500MHz

Test Results Table

Frequency MHz	Raw dBm	Cable Loss	Factors dB	Level dBm	Measurement Type	Line	Limit dBm	Margin dB	Pass /Fail	Comments
5501.865	-12.1	22.1	0	10	Pk	RF	-30.8	40.8	Fail	Tx Signal
11009.67	-52.8	20.9	0	-31.9	Pk	RF	-30.8	-1.1	Pass	
35200.75	-64.5	22.8	0	-41.7	Pk	RF	-30.8	-10.9	Pass	

Graphical Test Results for 802.11an (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



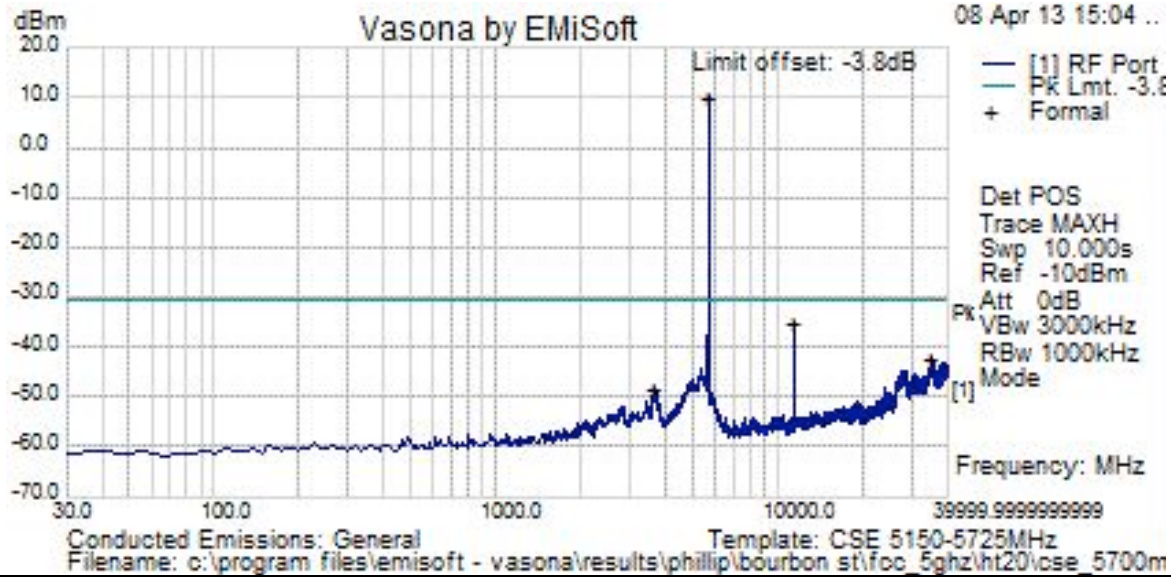
Title: HT20 - 5580MHz

Test Results Table

Frequency MHz	Raw dBm	Cable Loss	Factors dB	Level dBm	Measurement Type	Line	Limit dBm	Margin dB	Pass /Fail	Comments
5573.745	-11.9	22.1	0	10.3	Pk	RF	-30.8	41.1	Fail	Tx Signal
11162.415	-54	20.9	0	-33.1	Pk	RF	-30.8	-2.3	Pass	
39048.25	-64.9	22.8	0	-42.1	Pk	RF	-30.8	-11.3	Pass	

Graphical Test Results for 802.11an (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



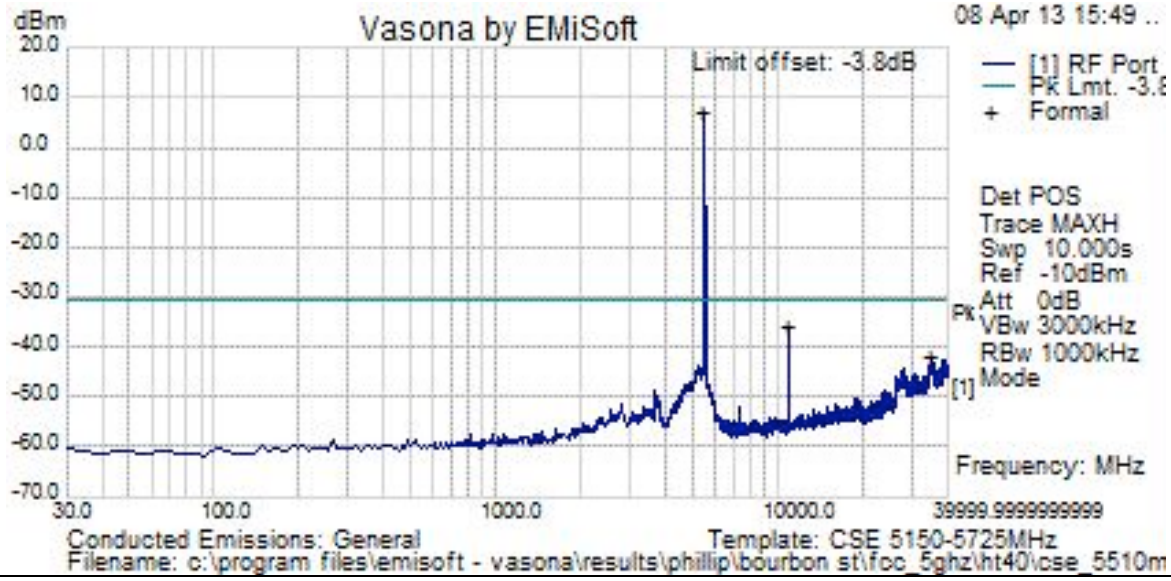
Title: ht20 - 5700mhz

Test Results Table

Frequency MHz	Raw dBm	Cable Loss	Factors dB	Level dBm	Measurement Type	Line	Limit dBm	Margin dB	Pass /Fail	Comments
5699.535	-12.3	22.3	0	10	Pk	RF	-30.8	40.8	Fail	Tx Signal
11396.025	-56.1	21	0	-35.1	Pk	RF	-30.8	-4.3	Pass	
35200.75	-65	22.8	0	-42.2	Pk	RF	-30.8	-11.4	Pass	
3668.925	-69.8	21.5	0	-48.3	Pk	RF	-30.8	-17.5	Pass	

Graphical Test Results for 802.11an (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



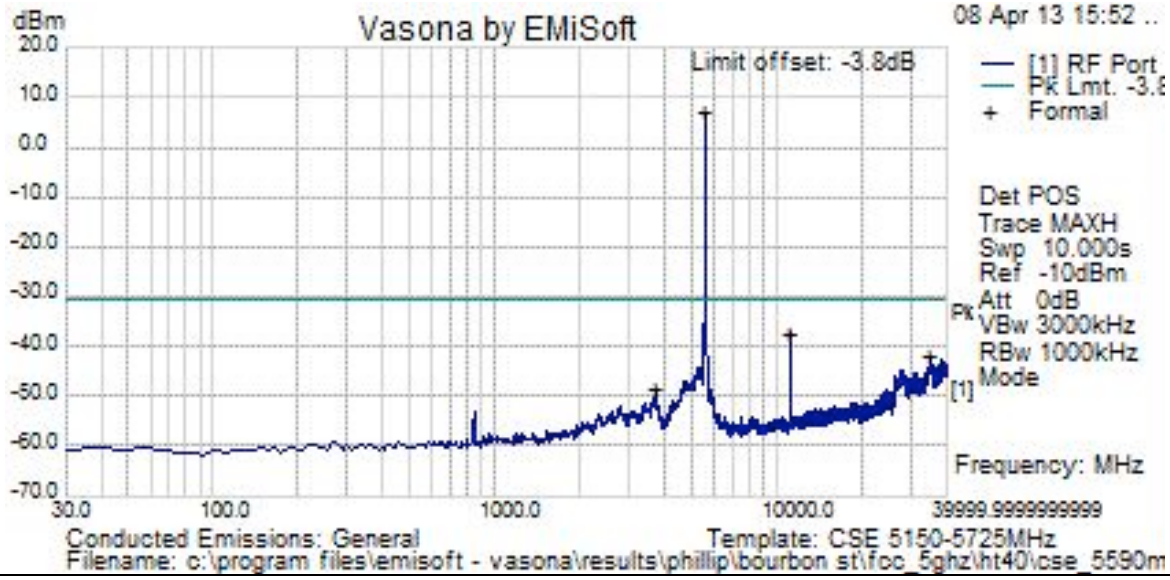
Title: ht40 - 5510mhz

Test Results Table

Frequency MHz	Raw dBm	Cable Loss	Factors dB	Level dBm	Measurement Type	Line	Limit dBm	Margin dB	Pass /Fail	Comments
5501.865	-15.1	22.1	0	7	Pk	RF	-30.8	37.7	Fail	Tx Signal
11018.655	-56.8	20.9	0	-35.9	Pk	RF	-30.8	-5.1	Pass	
35214.25	-64.7	22.8	0	-41.9	Pk	RF	-30.8	-11.1	Pass	

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



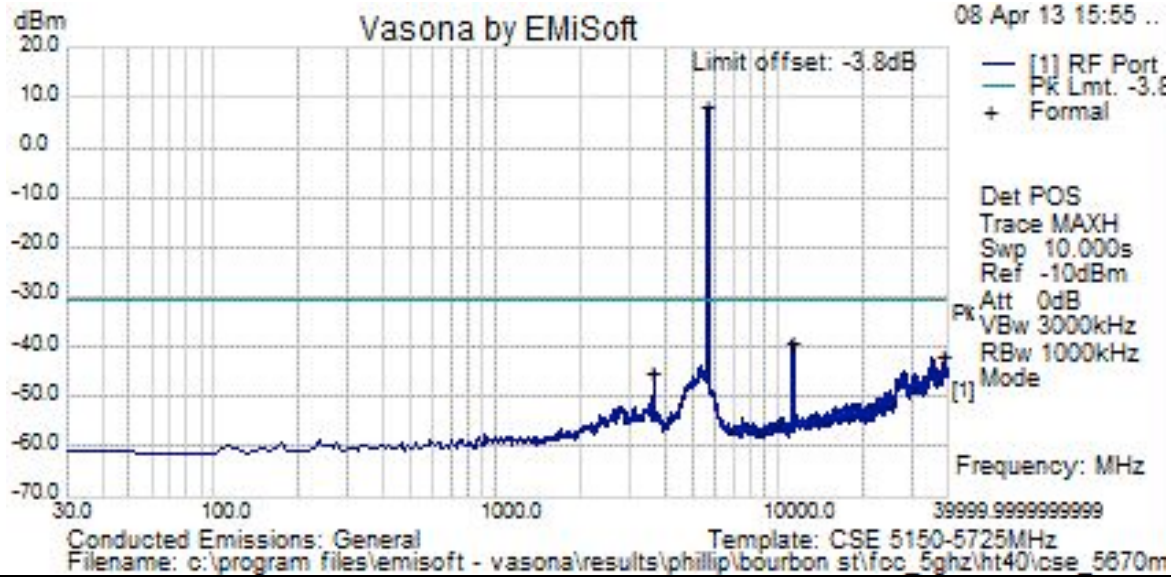
Title: ht40 - 5590mhz

Test Results Table

Frequency MHz	Raw dBm	Cable Loss	Factors dB	Level dBm	Measurement Type	Line	Limit dBm	Margin dB	Pass /Fail	Comments
5591.715	-15	22.2	0	7.2	Pk	RF	-30.8	38	Fail	Tx Signal
11180.385	-58.3	20.9	0	-37.4	Pk	RF	-30.8	-6.6	Pass	
35241.25	-64.7	22.8	0	-41.9	Pk	RF	-30.8	-11.1	Pass	
3758.775	-70.2	21.5	0	-48.7	Pk	RF	-30.8	-17.9	Pass	

Graphical Test Results for 802.11an (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

Test Results Table

Frequency MHz	Raw dBm	Cable Loss	Factors dB	Level dBm	Measurement Type	Line	Limit dBm	Margin dB	Pass /Fail	Comments
5663.595	-14.2	22.3	0	8.1	Pk	RF	-30.8	38.9	Fail	Tx Signal
11342.115	-59.8	21	0	-38.8	Pk	RF	-30.8	-8	Pass	
39257.5	-64.7	22.9	0	-41.8	Pk	RF	-30.8	-11	Pass	
3624	-66.5	21.6	0	-45	Pk	RF	-30.8	-14.2	Pass	

Conducted Bandedge

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 sall 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).

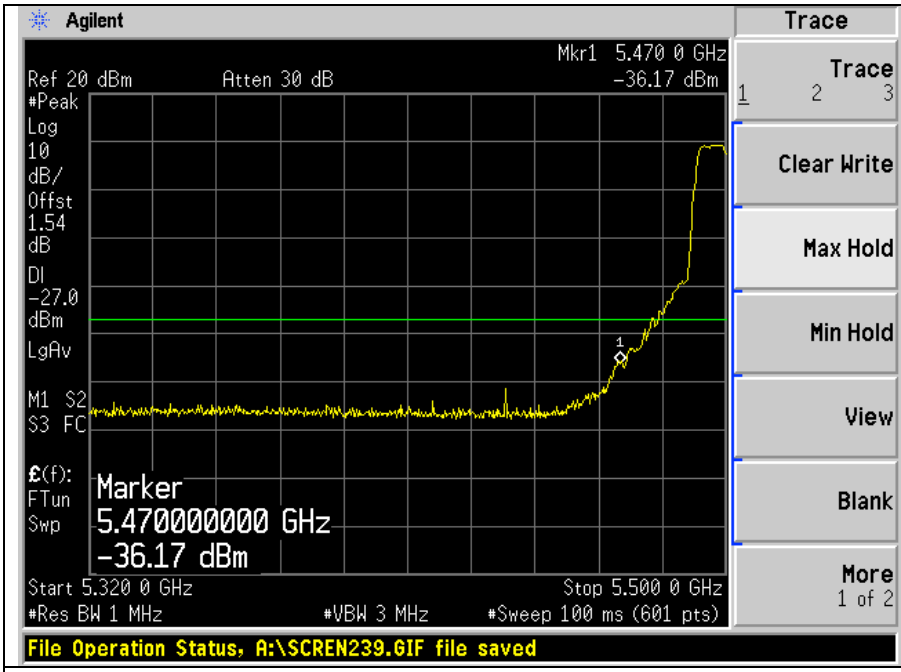
Span:	30 MHz-40 GHz
Reference Level:	20 dBm
Attenuation:	10 dB
Sweep Time:	10 s
Resolution Bandwidth:	1 MHz
Video Bandwidth:	3 MHz
Detector:	Peak
Trace:	Single
Marker:	Peak

Record the marker waveform peak to spur difference

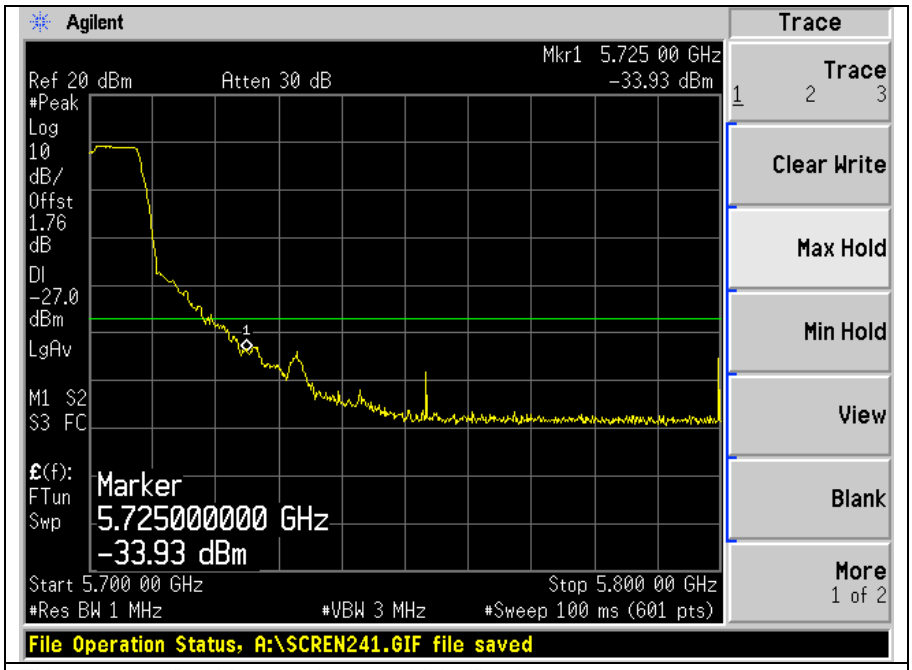
802.11an (HT-40) Marker-Delta Test Results:

Frequency Tested	Radiated Pk Measurement	Radiated Ave Measurement	Conducted Delta Measurement	Limit (dBm)	Margin (dBm)
5700 (Hortz)	108.55	101.7	-40.08	-74	-33.92
5700 (Vert)	108.42	101.53	-40.08	-54	-13.92

Graphical Test Results for 802.11A:

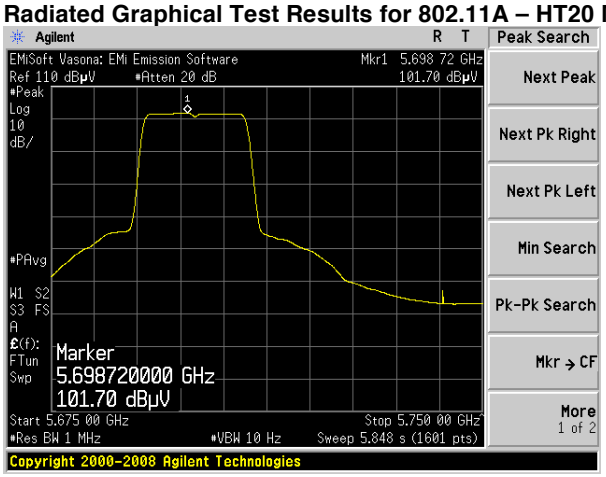


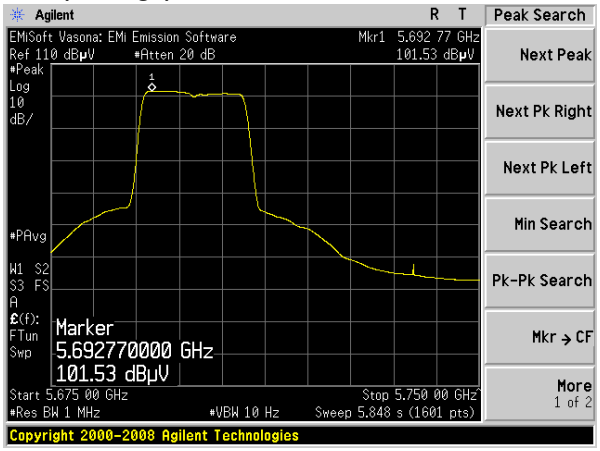
Title: -36.17dBm Measured at 5470MHz (Peak)



Title: -33.93dBm Measured at 5725MHz (Peak)

Radiated Graphical Test Results for 802.11A – HT20 Mode (Average):





Radiated Graphical Test Results for 802.11A – HT20 Mode (Peak):