5.0 GHz Wi-Fi Radio Test Report
802.11a/ac/n
UNII-4 Band

For

Wi-Fi Dual Band Wireless Router

Model: WRP500

Against the following Specifications :

47 CFR 15.407
47 CFR 15.209
47 CFR 15.205
RSS-Gen Issue 4
RSS-210 Issue 8

Cisco Systems

EMC Laboratory
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ACCREDITED

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Title: Regulatory Compliance Manager

This report replaces any previously entered test report under EDCS – 1465482.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 CFR47 Part 15.209 CFR47 Part 15.205 RSS-Gen Issue 3 RSS-210 Issue 8	N/A

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

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

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

Notes:

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

Section 2: Assessment Information

2.1 General

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

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

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

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

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

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

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

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

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

2.2 Date of testing

01-Oct-2014 – 31-Oct-2014

2.3 Report Issue Date

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

2.4 Testing facilities

This assessment was performed by:

Testing Laboratory

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

Registration Numbers for Industry Canada

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

Test Engineers

Danh Le

2.5 Equipment Assessed (EUT)

WRP500-A-k9 Dual Band Router

2.6 EUT Description

WRP500-A-k9 Dual Band Router

2.6 EUT Description

The WRP500-A-K9 is the dual band Wireless-B, G, A, AC, N Broadband router with one WAN port, four 10/100 LAN ports for wired connections and two phone jacks for voice over Internet Protocol (VoIP) functionality. The WRP500-A-K9 uses advanced quality-of-service (QoS) functionality to preserve the consistency and clarity of voice and video communications. It keeps your data safe by supporting WPS2.0 and WPA/WPA2 and WAPI wireless security protocols, access limitations based on MAC and IP addresses, and a robust firewall that prevents against malicious external attacks to the network.

Additional features of the WRP500 Wireless- Broadband Router include:

- WiFi 802.11a/ac/n
- Support 20 mHz, 40 MHz, 80 MHz in 5.0 GHz band
- Dual-band 2T2R mode with data rate up to 867 Mbps
- Greenfield, mixed mode legacy modes support
- Integrated LNA, PA and T/R switch
- IEEE 802.11 d/e/h/i/k/r/w support
- Security support for WFA WPA/WPA2 personal, WPS2.0, WAPI
- Supports 802.11w protectd managed frames
- QoS support of WFA WMM, WM PS
- 802.11 to 802.3 header translation iffload
- Support Wi-Fi direct
- Per packet transmit power control
- Wake on WLAN

Section 3: Result Summary

3.1 Results Summary Table

RADIATED EMISSIONS & CONDUCTED EMISSIONS

Basic Standard	Test Details / Comments	Results
FCC15.209 Radiated Spurious and Harmonic Emissions **RSS-Gen 6.13** Transmitter Spurious Emissions	**FCC15.209**: The level of any unwanted emissions from an intentional radiator operating under these general provisions shall not exceed the level of the fundamental emission. Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the table specified in the table in FCC§15.209(a). **RSS-Gen:** In measuring unwanted emissions, the spectrum shall be investigated from 30 MHz or the lowest radio frequency signal generated in the equipment, whichever is lower, without going below 9 kHz, up to at least the frequency given below: (a) If the equipment operates below 10 GHz: to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower. (b) If the equipment operates at or above 10 GHz: to the fifth harmonic of the highest fundamental frequency or to 100 GHz, whichever is lower.	**Pass**
FCC15.407(b)(4)&(6) TX Spurious Emission /Undesirable Emission **RSS-210 A9.2 (4)** Out of band Emissions	**FCC 15.407:** (4) For transmitters operating in the 5.725-5.850 GHz band: frequencies 10 MHz or greater above or below the band edge, emissions shall not exceed an EIRP of -27 dBm/MHz. (6) Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in §15.209. **RSS-210**: For frequencies more than 10 MHz above or below the band edge, emissions shall not exceed -27 dBm/MHz.	**Pass**
RSS-Gen 5.0 Receiver Spurious Emission	**RSS-Gen:** Spurious emissions from receivers shall not exceed the radiated limits shown in Table 2 of section 7.1.2	**Pass**
FCC15.207 **Conducted Emissions** **RSS-Gen 8.8** **AC Power Line Conducted Emissions**	**FCC 15.207**: (a) Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 µH/50 ohms line impedance stabilization network (LISN). **RSS-Gen**: A radio apparatus that is designed to be connected to the public utility (AC) power line shall ensure that the radio frequency voltage, which is conducted back onto the AC power line on any frequency or frequencies within the band 0.15 MHz to 30 MHz shall not exceed the limits in Table 3 shown in this section.	**Pass**

RADIATED EMISSIONS & CONDUCTED EMISSIONS SUMMARY TABLE (CONTINUE)

Basic Standard	Test Details / Comments	Results
FCC15.407(b)(7) Restricted Bands **FCC15.205** **RSS-Gen 8.10**	**FCC 15.407**: The provisions of §15.205 apply to intentional radiators operating under this section. **FCC 5.205**: Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands. (b) Except as provided in paragraphs (d) and (e) of this section, the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in §15.209. **RSS-Gen**: Unwanted emissions falling into restricted bands of Table 6 shall comply with the limits of Table 4 specified in RSS-Gen 8.9.	**Pass**

RF Conducted at antenna port

Standard(s)	Test Details / Comments	Results
FCC15.407(a) (3) Max. Conducted Output power **RSS-210 A9.2** (4) Transmitter Output Power and e.i.r.p. Requirements	**FCC 15.407**: For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W **RSS-210**: The maximum e.i.r.p. shall not exceed 1.0 W or 17 + 10 log10 B, dBm, whichever power is less.	**Pass**
FCC15.407(e) 26dB & 99% Bandwidth **RSS-210** A9.2 / **RSS-Gen** 6.6	**FCC 15.407/RSS-210**: Within the 5.725-5.85 GHz band, the minimum 6 dB bandwidth of the UNII devices shall be at least 500 kHz. The 99% bandwidth measurements shall be measures and used as reference.	**Pass**
FCC15.407(a) (3) Spectral Density **RSS-210 A9.2** (4)	**FCC 15.407**: For the 5.725-5.850 GHz band, the maximum power spectral density shall not exceed 30 dBm in any 500 kHz band. **RSS-210**: For the 5.725-5.825 MHz band, the power spectral density shall not exceed 17 dBm in any 1.0 MHz band.	**Pass**
FCC15.407 (b) (4) (8): Band Edge **RSS-210 A9.2** (4)	**FCC 15.407/ RSS-210**: For transmitters operating in the 5.725-5.85 GHz band: All emissions within the frequency range from the band edge to 10 MHz above or below the band edge shall not exceed an e.i.r.p. of −17 dBm/MHz; for frequencies 10 MHz or greater above or below the band edge, emissions shall not exceed an e.i.r.p. of −27 dBm/MHz.	**Exempt**

* DFS measurements & MPE calculation to report in separate reports

Section 4: Sample Details

4.1 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. During preliminary testing, the slowest data rate and highest of each mode were evaluated. The "Worst Case" mode was determined to be 802.11a and 802.11ac with the slowest data rate. The "Worst Case" mode is the mode with highest emissions level.

Sample Number	Equipment Details	Serial Number	Part Number
S01	WRP-500-A-K9 Wireless router	CCQ17460S3U	74-12879-01

4.2 System Details

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

4.3 Mode of Operation Details

The EUT supports the following modes of operation:

Mode#	Description	Comments
1	802.11a	Up to 54 Mbps
2	802.11n (HT20) MCS0 – MCS15	Up to 144 Mbps
3	802.11n (HT40) MCS0 – MCS15	Up to 300 Mbps
4	802.11ac (VTH20) MCS0 – MCS9 (VTH40) MCS0 – MCS9 (VTH80) MCS0 – MCS9	Up to 87 Mbps Up to 200 Mbps Up to 433 Mbps

4.4 Selected Test Mode, Modulation and Data Rate for testing

Mode#	Test Mode	Modulation	Data Rate
1*	802.11a	BPSK	6 Mbps
2	802.11n (HT20)	BPSK	6.5 Mbps (MCS0)
3	802.11n (HT40)	BPSK	13.5 Mbps (MCS0)
4	802.11ac (VHT20) 802.11ac (VHT40) 802.11ac (VHT80)	BPSK	6.5 Mbps (MCS0) 13.5 Mbps (MCS0) 29.3.5 Mbps (MCS0)
Note1: Table above represents the worst case scenarios in all modulation and data rate combination for each mode. ***: Mode**#1 was determined to be the worst case emissions of all modes and selected to perform radiated spurious emissions test.			

4.5 Antenna Information

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

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

External Dual Band Antenna Gain:

	Part number	Antenna Type	Antenna Gain (dBi)
2400-2483.5MHz	External	Omni-directional	2.0 (Peak)
4900 – 5825MHz	External	Omni-directional	2.0 (Peak)

Section 5: Modifications

5.1 Sample Modifications Performed During Assessment

No modifications were performed during assessment.

Section 6: Target Maximum Channel Power

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

Operating Mode	Maximum Channel Power (dBm)
	Operating Band
	UNII-4
802.11a (6 Mbps)	17
802.11n HT20 (MCS0 – 6.5 Mbps)	17
802.11n HT40 (MCS0 – 13.5 Mbps)	12
802.11ac VHT20 (MCS0 – 6.5 Mbps)	17
802.11ac VHT40 (MCS0 – 13.5 Mbps)	12
802.11ac VHT80 (MCS0 – 29.3 Mbps)	14

Appendix A: Test Cases

99% and 6dB Bandwidth

The 99% occupied bandwidth is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers are each equal to 0.5% of the total mean power of the given emission. There is no limit for 99% OBW.

The 6 dB emission is the width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

FCC15.407 (e): Within the 5.725-5.850 GHz band, the minimum 6 dB bandwidth of the UNII devices shall be at least 500 kHz. The 99% bandwidth measurements shall be measures and used as reference.

RSS-Gen 6.6: When the occupied bandwidth limit is not stated in the applicable RSS or reference measurement method, the transmitted signal shall be reported as the 99% emissions bandwidth, as calculated or measured.

Test Procedure

Ref. KDB 789033 D02 General UNII Test Procedure New Rules v01 section C (2)
RSS-Gen issue 3 section 4.6.1

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

Ref. KDB 789033 D02 General UNII Test Procedure New Rules v01 section C (2)
RSS-Gen issue 3 section 4.6.1

99% BW and EBW (-6dB) Test parameters
Span = Large enough to capture the entire EBW RBW = 100 KHz VBW ≥ 3 x RBW Sweep = Auto couple Detector = Peak or where practical sample shall be used Trace = Max. Hold

Recorded Test Data:

99% and 6dB Bandwidth for 802.a mode

UNII-4 Band							
Frequency (MHz)	**Data Rate (Mbps)**	**Ant. Port0 99% BW (MHz)**	**Ant. Port0 6dB BW (MHz)**	**Ant. Port1 99% BW (MHz)**	**Ant. Port1 6dB BW (MHz)**	**Limit 6dB BW (kHz)**	**Result**
5745	6	16.55	16.51	16.77	16.50	≥ 500 (FCC)	Pass
5785	6	16.55	16.44	16.81	16.41	≥ 500 (FCC)	Pass
5825	6	16.58	16.43	16.63	16.43	≥ 500 (FCC)	Pass

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

UNII-4 Band							
Frequency (MHz)	**Data Rate (Mbps)**	**Ant. Port0 99% BW (MHz)**	**Ant. Port0 6dB BW (MHz)**	**Ant. Port1 99% BW (MHz)**	**Ant. Port1 dB BW (MHz)**	**Limit 99% & 6dB BW (kHz)**	**Result**
5745	6.5	17.79	17.66	17.94	17.67	≥ 500 (FCC)	Pass
5785	6.5	17.81	17.68	17.89	17.68	≥ 500 (FCC)	Pass
5825	6.5	17.85	17.68	17.83	17.67	≥ 500 (FCC)	Pass

99% and 6dB Bandwidth for 802.n (HT40) mode

UNII-4 Band							
Frequency (MHz)	**Data Rate (Mbps)**	**Ant. Port0 99% BW (MHz)**	**Ant. Port0 6dB BW (MHz)**	**Ant. Port1 99% BW (MHz)**	**Ant. Port1 6dB BW (MHz)**	**Limit 99% & 6dB BW (kHz)**	**Result**
5755	13.5	35.93	36.09	35.93	36.08	≥ 500 (FCC)	Pass
5795	13.5	37.23	36.47	37.23	36.42	≥ 500 (FCC)	Pass

99% and 6dB Bandwidth for 802.ac mode

UNII-4 Band							
Frequency (MHz)	**Data Rate (Mbps)**	**Ant. Port0 99% BW (MHz)**	**Ant. Port0 6dB BW (MHz)**	**Ant. Port1 99% BW (MHz)**	**Ant. Port1 6dB BW (MHz)**	**Limit 99% & 6dB BW (kHz)**	**Result**
5745	6	17.73	17.65	17.83	17.65	≥ 500 (FCC)	Pass
5785	6	17.70	17.68	17.88	17.69	≥ 500 (FCC)	Pass
5825	6	17.73	17.66	17.78	17.72	≥ 500 (FCC)	Pass

99% and 6dB Bandwidth for 802.ac (VHT40) mode

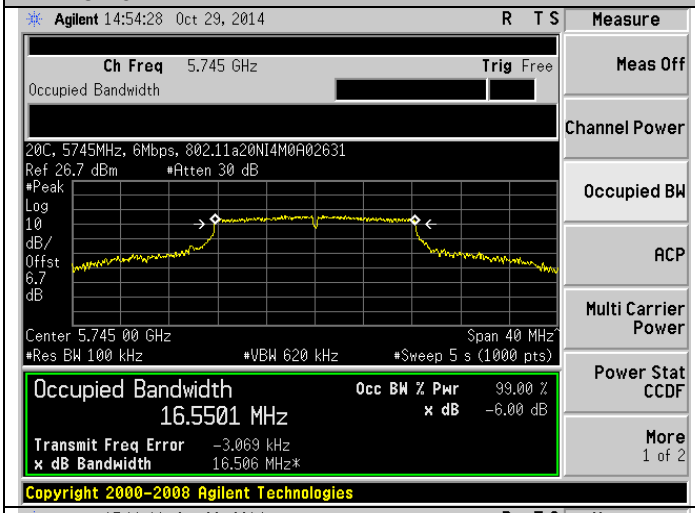
UNII-4 Band							
Frequency (MHz)	**Data Rate (Mbps)**	**Ant. Port0 99% BW (MHz)**	**Ant. Port0 6dB BW (MHz)**	**Ant. Port1 99% BW (MHz)**	**Ant. Port1 6dB BW (MHz)**	**Limit 99% & 6dB BW (kHz)**	**Result**
5755	13.5	35.91	36.10	35.92	36.08	≥ 500 (FCC)	Pass
5795	13.5	37.21	35.91	35.91	36.10	≥ 500 (FCC)	Pass

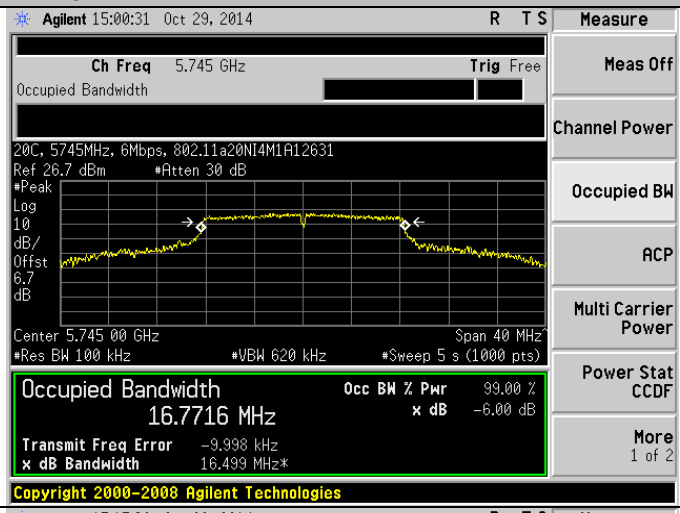
99% and 6dB Bandwidth for 802.ac (VHT80) mode

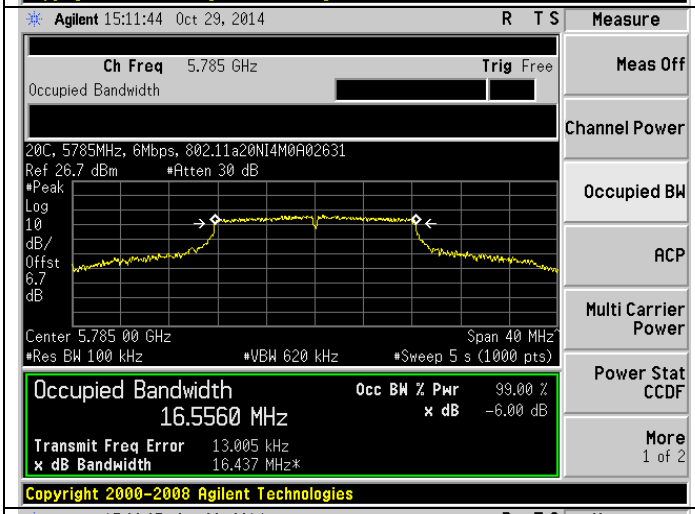
UNII-4 Band							
Frequency (MHz)	**Data Rate (Mbps)**	**Ant. Port0 99% BW (MHz)**	**Ant. Port0 6dB BW (MHz)**	**Ant. Port1 99% BW (MHz)**	**Ant. Port1 6dB BW (MHz)**	**Limit 99% & 6dB BW (kHz)**	**Result**
5775	29.3	75.13	75.58	75.12	75.73	≥ 500 (FCC)	Pass

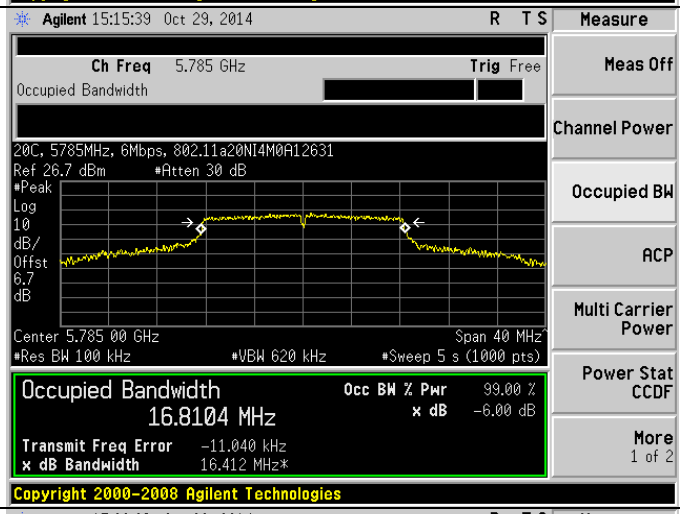
Graphical Test Results for 802.11a mode / UNII-4:

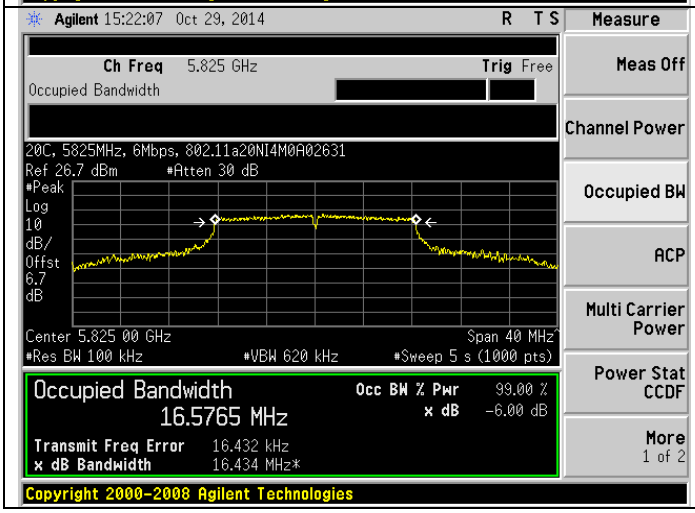
802.11a, 6Mbps	99% Bandwidth & 26 dB Bandwidth
Ant.Port 0	**Ant.Port1**

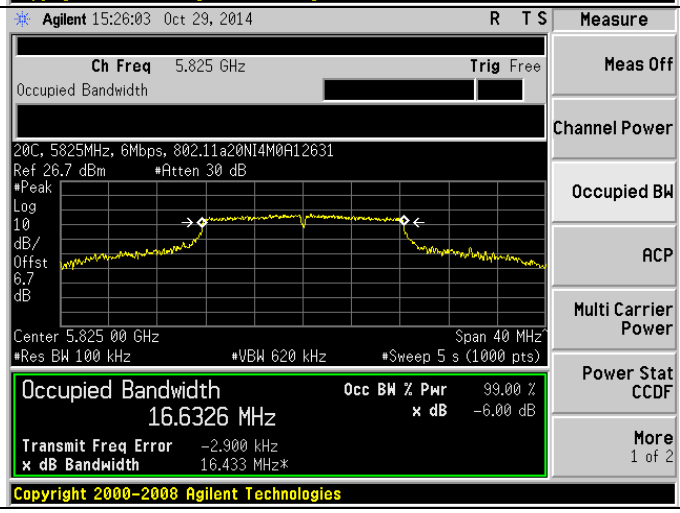






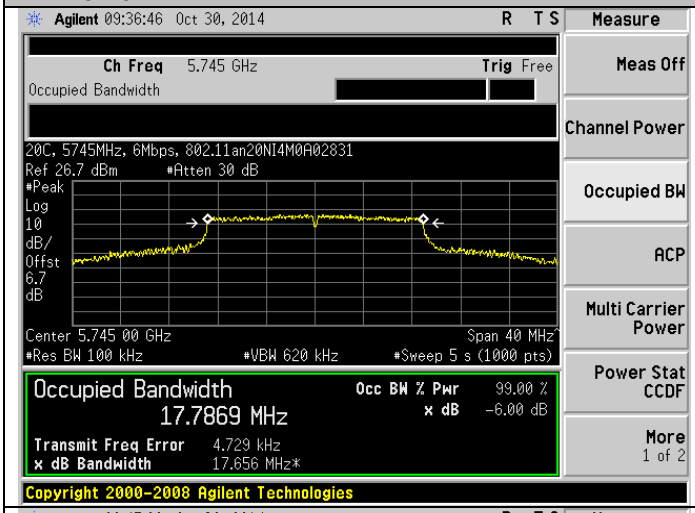


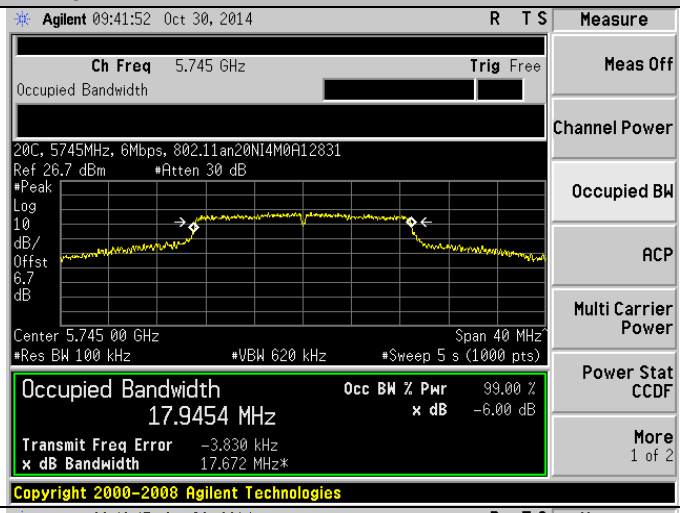


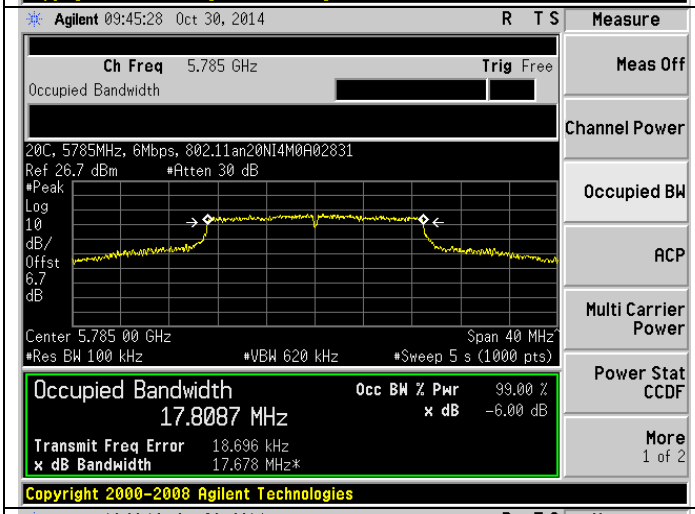


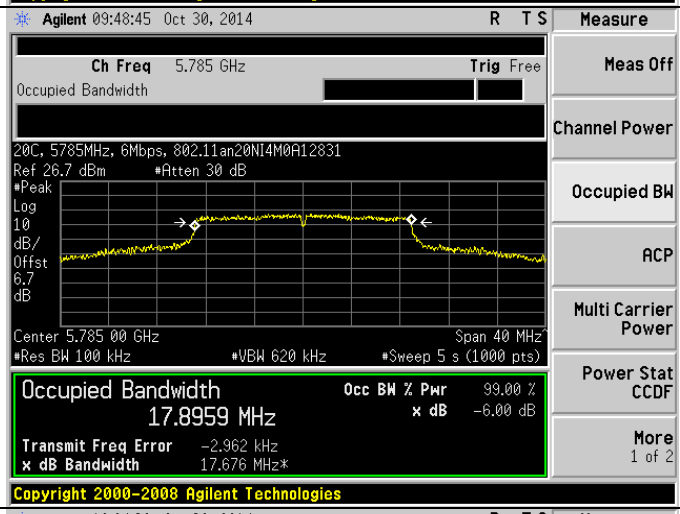
Graphical Test Results for 802.11n (HT20) mode / UNII-4:

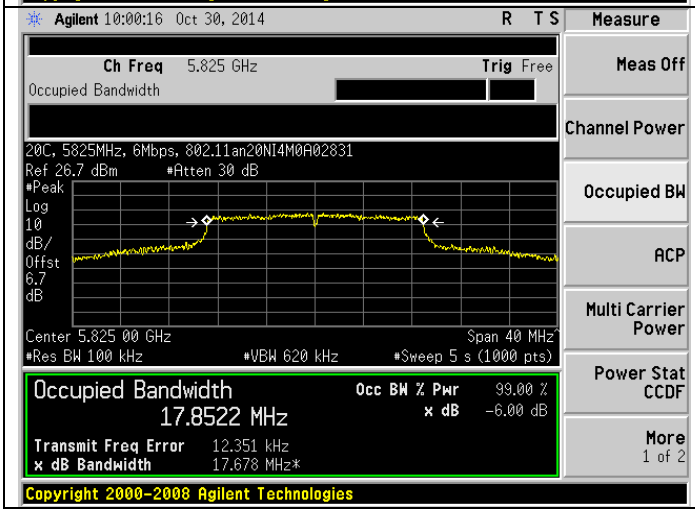
802.11n (HT20), 6.5Mbps	99% Bandwidth & 6 dB Bandwidth
Ant.Port 0	**Ant.Port1**

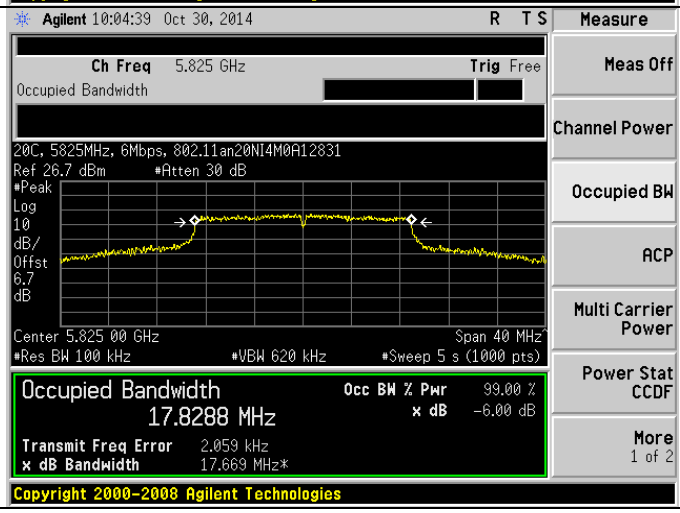






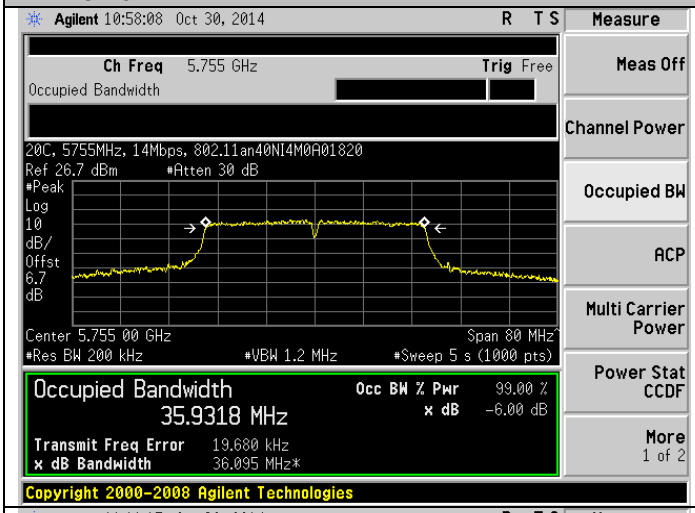


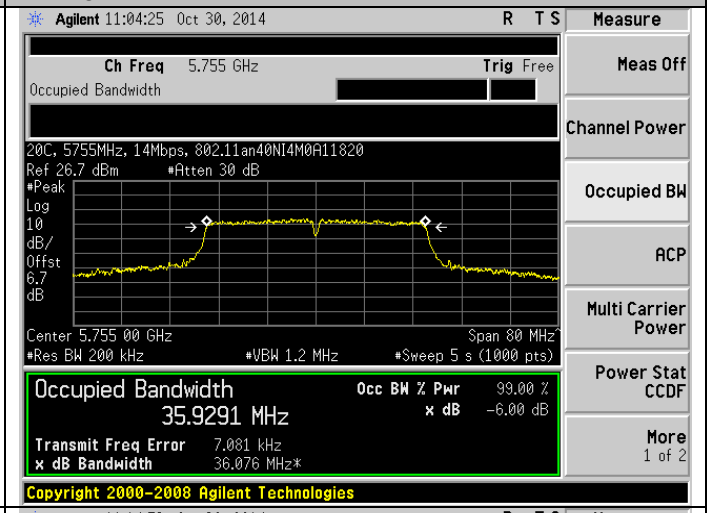


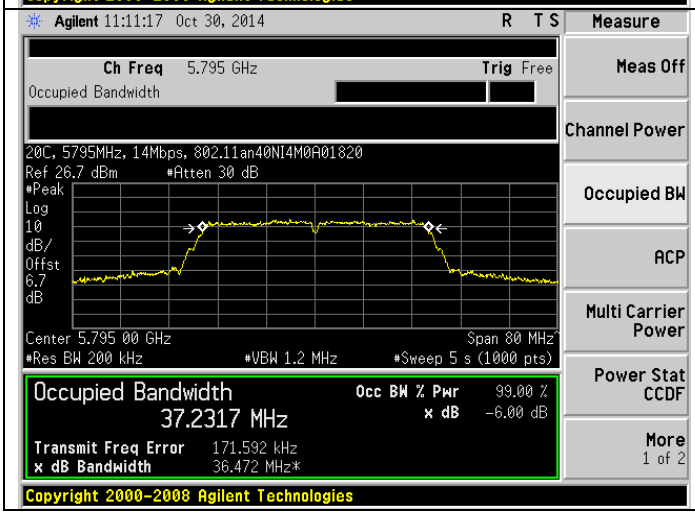


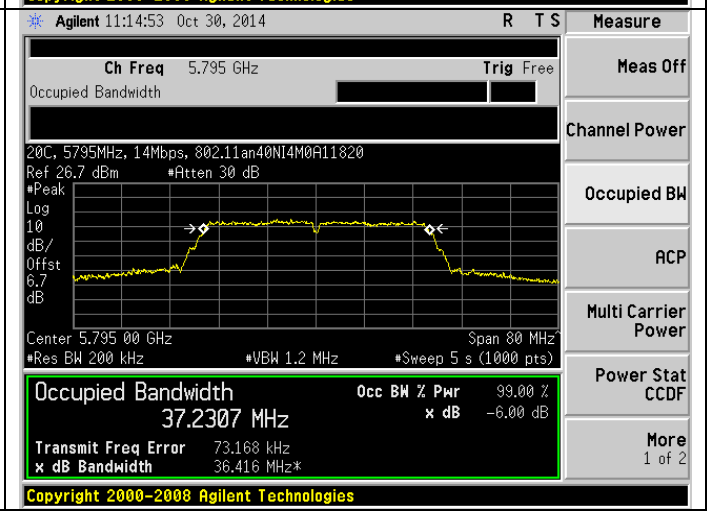
Graphical Test Results for 802.11n (HT40) mode / UNII-4:

802.11n (HT40), 13.5Mbps	99% Bandwidth & 6 dB Bandwidth
Ant.Port 0	**Ant.Port1**



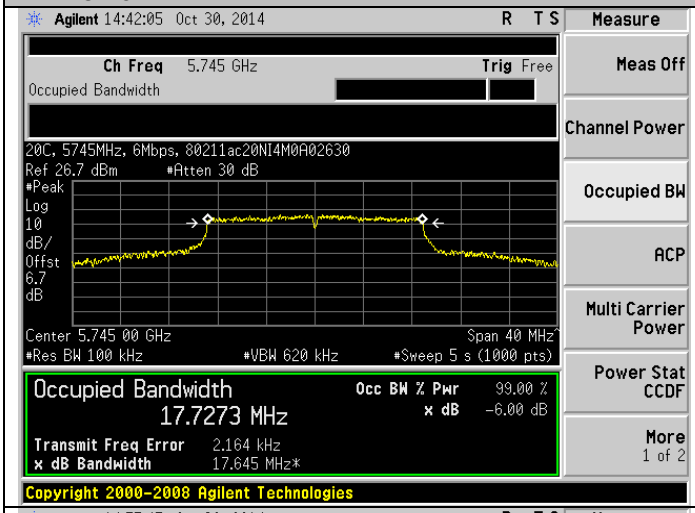


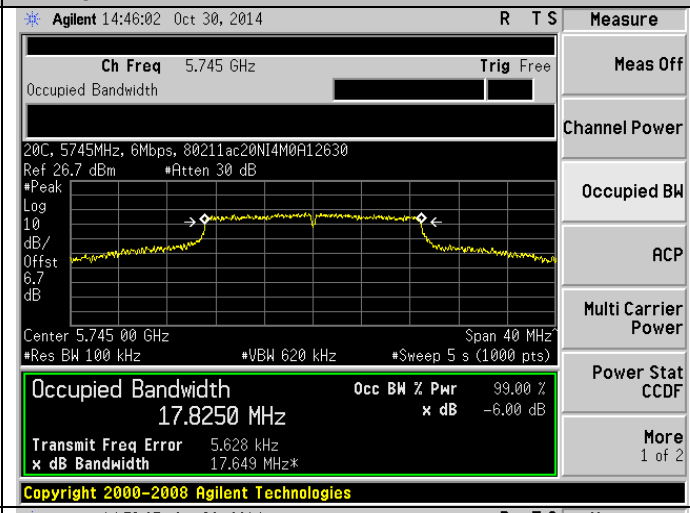


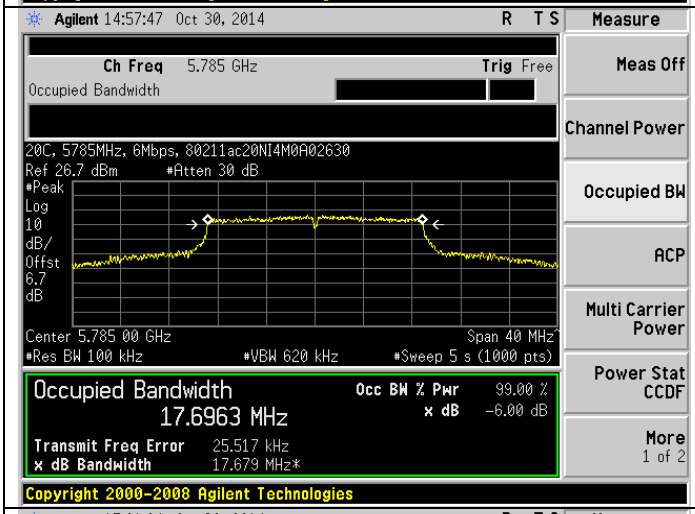


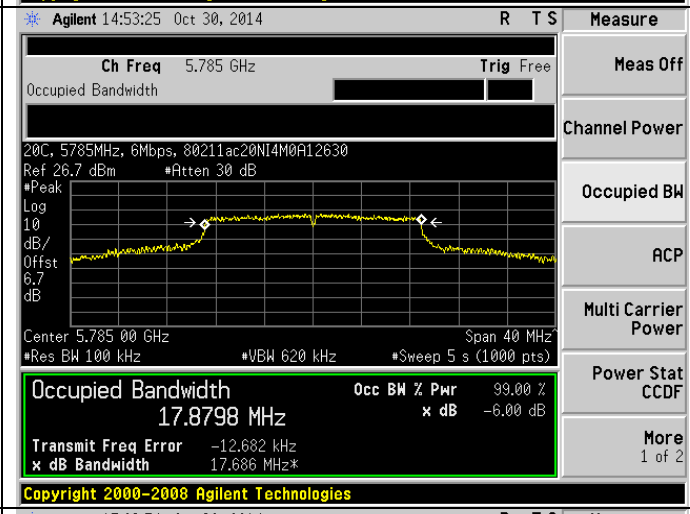
Graphical Test Results for 802.11ac mode / UNII-4:

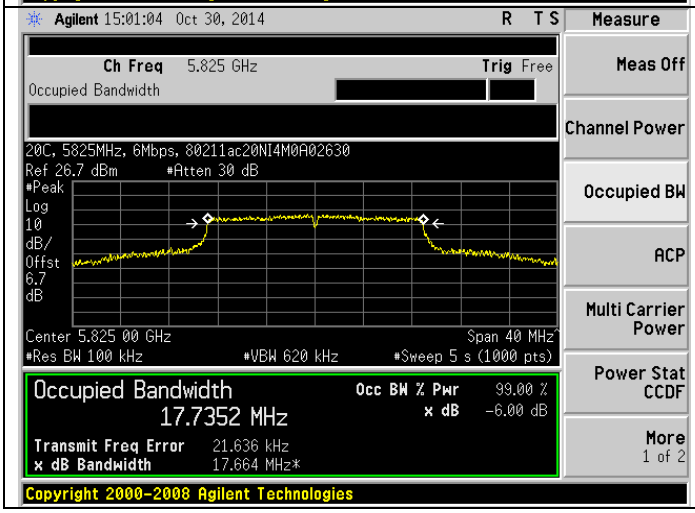
802.11ac, 6.5Mbps	99% Bandwidth & 6 dB Bandwidth
Ant.Port 0	**Ant.Port1**

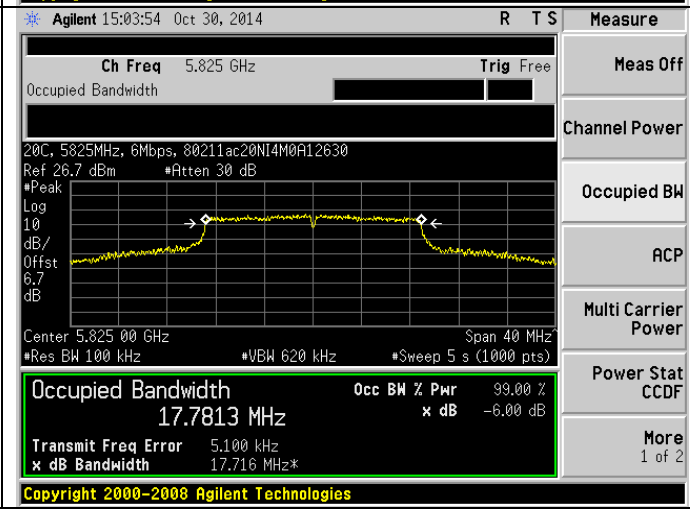






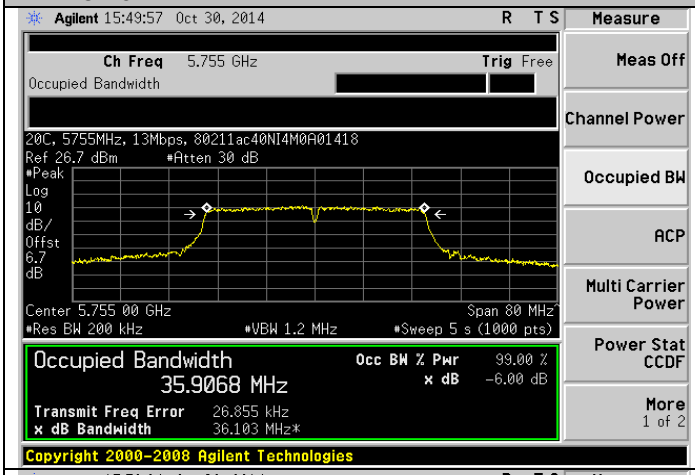


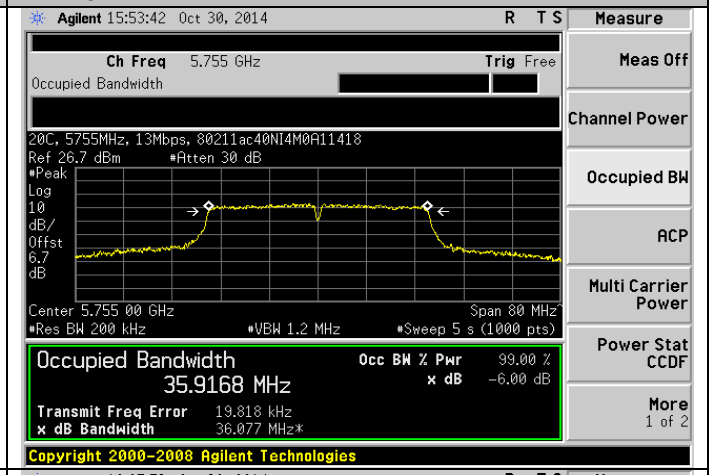


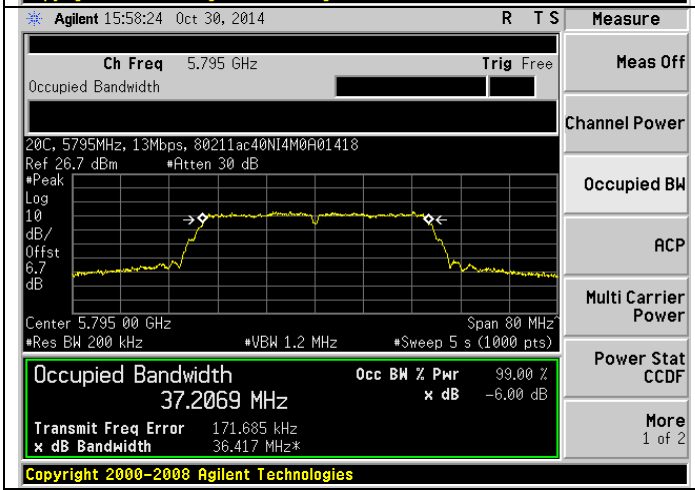


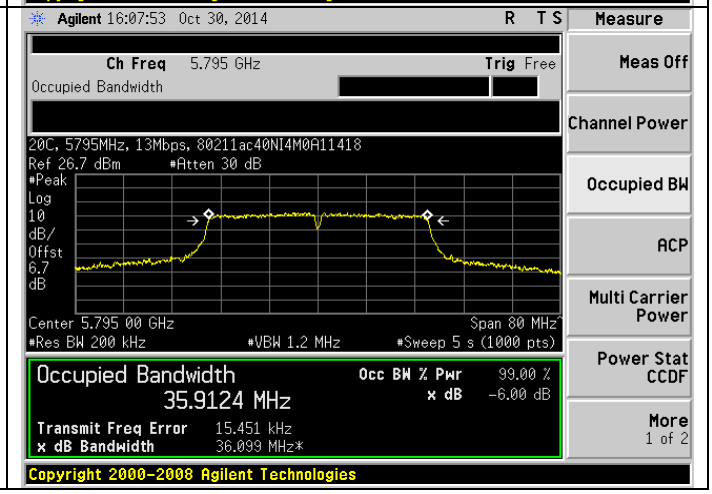
Graphical Test Results for 802.11ac (VHT40) mode / UNII-4:

802.11ac40, 13.5Mbps	99% Bandwidth & 6 dB Bandwidth
Ant.Port 0	**Ant.Port1**



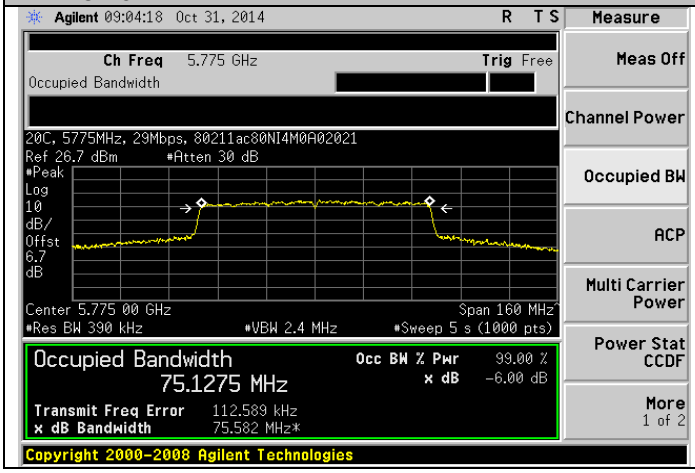


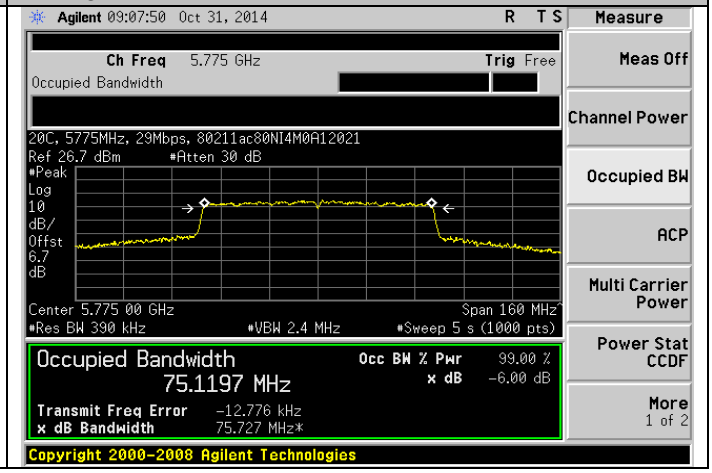




Graphical Test Results for 802.11ac (VHT80) mode / UNII-4:

802.11ac80, 29.3Mbps	99% Bandwidth & 6 dB Bandwidth
Ant.Port 0	**Ant.Port1**





Maximum Conducted Output Power & EIRP

FCC 15.407(a) (3)
For the band 5.725-5.850 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1.0 W provided the maximum antenna gain does not exceed 6 dBi.

FCC Maximum Conducted Output Power & EIRP Limits Table								
UNII Band	**Frequency Range (MHz)**	**6dBBandwidth** (Smallest 6dB BW for all channels) **(MHz)**	**Calculated Conducted Power Limit**		**Constant Conducted Power Limits**		**Constant EIRP Limits**	
			(mW)	**(dBm)**	**(mW)**	**(dBm)**	**(mW)**	**(dBm)**
Mode: 802.11a								
1	5725-5850	Not required	Not required		1000	**30**	4000	**36**
Mode: 802.11n (HT20)								
1	5725-5850	Not required	Not required		1000	**30**	4000	**36**
Mode: 802.11n (HT40)								
1	5725-5850	Not required	Not required		1000	**30**	4000	**36**
Mode: 802.11ac								
1	5725-5850	Not required	Not required		1000	**30**	4000	**36**
Mode: 802.11ac (VHT40)								
1	5725-5850	Not required	Not required		1000	**30**	4000	**36**
Mode: 802.11ac (VHT80)								
1	5725-5850	Not required	Not required		1000	**30**	4000	**36**

RSS-210 A9.2 (4)

Band 5725–5850 MHz
The maximum e.i.r.p. shall not exceed 1.0 W (30 dBm) or 17 + 10 log10 B, dBm, whichever power is less. B is the 99% emission bandwidth in MHz. The maximum e.i.r.p shall not exceed 4.0 W (36 dBm) or 23 + 10 log10 B.

The maximum conducted output power & EIRP limit shall be calculated by using the formula below:
Max Power© Limit = 17 dBm +10*log (OBW) for UNII-4 band; where OBW is the 99% BW
EIRP Limit = 23 dBm +10*log (OBW) for UNII-4 band; where OBW is the 99% BW

RSS EIRP Limits Table										
UNII Band	**Frequency Range (MHz)**	**99% Bandwidth** (Smallest 99% BW for all channels in UNII band) **(MHz)**	**Calculated Max. Conducted Pwr Limits**		**Constant Conducted Pwr Limits**		**Calculated EIRP Limits**		**Constant EIPR Limits**	
			(mW)	**(dBm)**	**(mW)**	**(dBm)**	**(mW)**	**(dBm)**	**(mW)**	**(dBm)**
Mode: 802.11a										
1	5725-5850	16.55	829.8	**29.19**	1000	30	3304	**35.19**	4000	36
Mode: 802.11n (HT20)										
1	5725-5850	17.79		**29.50**	1000	30	3548	**35.50**	4000	36
Mode: 802.11n (HT40)										
1	5725-5850	35.93		32.55	1000	**30**	7161	38.55	4000	**36**
Mode: 802.11ac										
1	5725-5850	17.70		**29.48**	1000	30	3532	35.48	4000	**36**
Mode: 802.11ac (VHT40)										
1	5725-5850	35.91		32.55	1000	**30**	7161	38.55	4000	**36**
Mode: 802.11ac (VHT80)										
1	5725-5850	75.12		35.76	1000	**30**	14997	41.76	4000	**36**

Note: In comparison between the calculated limit and the constant limit, the lower limit shall be used to determine compliance in accordance with the rule.

Test Procedure

Ref. KDB 789033 D02 General UNII Test Procedure New Rules v01 section E 2.b **Method SA-1**

Max. Conducted Output Power Test Procedure
1. Set the radio in the continuous transmitting mode at full power 2. Compute power by integrating the spectrum across the EBW (or alternatively entire 99% OBW) of the signal using the instrument's band power measurement function. The integration shall be performed using the spectrum analyzer band-power measurement function with band limits set equal to the EBW or the OBW band edges. 3. Capture graphs and record pertinent measurement data.

Ref. KDB 789033 D02 General UNII Test Procedure New Rules v01 section E 2.b **Method SA-1**

Max. Conducted Output Power Test parameters
Span ≥ entire EBW (or alternatively the 99% OBW) RBW = 1 MHz VBW ≥ 3 x RBW Detector = RMS Trace Average ≥ 100 Sweep = Auto Sweep Points ≥ 2 x span/ RBW.

Recorded Test Data:

Max. Conducted Output Power for 802.11a mode

Frequency (MHz)	Data Rate (Mbps)	Ant. Port0 Max. Conducted Output Power (dBm)	Ant. Port1 Max. Conducted Output Power (dBm)	Total Power Ant.P0+Ant.P1 (mW)	Total Power Ant.P0+Ant.P1 (dBm)	Constant Conducted Output Pwr FCC Limits (dBm)	Calculated Conducted Output Pwr RSS Limits (dBm)	Result
UNII-4 Band								
5745	6	16.22	17.67	100.4	20.01	30	29.2	Pass
5785	6	16.52	17.61	102.6	20.11	30	29.2	Pass
5825	6	17.19	17.17	104.5	20.19	30	29.2	Pass

EIRP for 802.11a mode

Frequency (MHz)	Data Rate (Mbps)	Total Power AP0 + AP1 (mW)	Total Power AP0 + AP1 (dBm)	Total EIRP = Total Power + Ant.G Ant. Gain = 2 dBi (dBm)	Constant EIRP Limits FCC (dBm)	Calculated EIRP Limits RSS (dBm)	Result
UNII-4 Band							
5745	6	100.4	20.01	22.01	36	35.2	Pass
5785	6	102.6	20.11	22.11	36	35.2	Pass
5825	6	104.5	20.19	22.19	36	35.2	Pass

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

Frequency (MHz)	Data Rate (Mbps)	Ant. Port0 Max. Conducted Output Power (dBm)	Ant. Port1 Max. Conducted Output Power (dBm)	Total Power Ant.P0+Ant.P1 (mW)	Total Power Ant.P0+Ant.P1 (dBm)	Constant Conducted Output Pwr FCC Limits (dBm)	Calculated Conducted Output Pwr RSS Limits (dBm)	Result
UNII-4 Band								
5745	6.5	16.92	17.87	110.4	20.43	30	29.5	Pass
5785	6.5	17.32	17.53	110.6	20.44	30	29.5	Pass
5825	6.5	17.96	17.43	117.8	20.71	30	29.5	Pass

EIRP for 802.11n (HT20) mode

Frequency (MHz)	Data Rate (Mbps)	Total Power = Ant.P0+Ant.P1 (mW)	Total Power = Ant.P0+Ant.P1 (dBm)	Total EIRP = Total Power + Ant.G Ant. Gain = 2 dBi (dBm)	Constant EIRP FCC Limits (dBm)	Calculated EIRP RSS Limits (dBm)	Result
UNII-4 Band							
5745	6.5	110.4	20.43	22.43	36	35.5	Pass
5785	6.5	110.6	20.44	22.44	36	35.5	Pass
5825	6.5	117.8	20.71	22.71	36	35.5	Pass

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

Frequency (MHz)	Data Rate (Mbps)	Ant. Port0 Max. Conducted Output Power (dBm)	Ant. Port1 Max. Conducted Output Power (dBm)	Total Power Ant.P0+Ant.P1 (mW) / (dBm)		Constant Conducted Output Pwr FCC Limits (dBm)	Constant Conducted Output Pwr RSS Limits (dBm)	Result
UNII-4 Band								
5755	13.5	13.05	13.70	43.63	16.40	30	30	Pass
5795	13.5	13.39	13.36	43.50	16.38	30	30	Pass

EIRP for 802.11n (HT40) mode

Frequency (MHz)	Data Rate (Mbps)	Total Power = Ant.P0+Ant.P1 (mW) / (dBm)		Total EIRP = Total Power + Ant.G Ant. Gain = 2 dBi (dBm)	Constant EIRP Limits FCC (dBm)	Constant EIRP Limits RSS (dBm)	Result
UNII-4 Band							
5755	13.5	43.63	16.40	18.40	36	36	Pass
5795	13.5	43.50	16.38	18.38	36	36	Pass

Max. Conducted Output Power for 802.11ac mode

Frequency (MHz)	Data Rate (Mbps)	Ant. Port0 Max. Conducted Output Power (dBm)	Ant. Port1 Max. Conducted Output Power (dBm)	Total Power Ant.P0+Ant.P1 (mW) / (dBm)		Constant Conducted Output Pwr FCC Limits (dBm)	Calculated Conducted Output Pwr RSS Limits (dBm)	Result
UNII-4 Band								
5745	6.5	16.48	17.64	102.5	20.11	30	29.5	Pass
5785	6.5	16.52	17.53	101.5	20.06	30	29.5	Pass
5825	6.5	17.16	17.11	103.4	20.14	30	29.5	Pass

EIRP for 802.11ac mode

Frequency (MHz)	Data Rate (Mbps)	Total Power AP0 + AP1 (mW) / (dBm)		Total EIRP = Total Power + Ant.G Ant. Gain = 2 dBi (dBm)	Constant EIRP FCC Limits (dBm)	Calculated EIRP RSS Limits (dBm)	Result
UNII-4 Band							
5745	6.5	102.5	20.11	22.11	36	35.5	Pass
5785	6.5	101.5	20.06	22.06	36	35.5	Pass
5825	6.5	103.4	20.14	22.14	36	35.3	Pass

Max. Conducted Output Power for 802.11ac (VHT40) mode

Frequency (MHz)	Data Rate (Mbps)	Ant. Port0 Max. Conducted Output Power (dBm)	Ant. Port1 Max. Conducted Output Power (dBm)	Total Power Ant.P0+Ant.P1 (mW) / (dBm)		Constant Conducted Pwr Limits FCC / RSS (dBm)	Constant Conducted Pwr Limits FCC / RSS (dBm)	Result
UNII-4 Band								
5755	13.5	11.37	13.11	34.17	15.34	30	30	Pass
5795	13.5	11.70	12.57	32.86	15.17	30	30	Pass

EIRP for 802.11ac (VHT40) mode

Frequency (MHz)	Data Rate (Mbps)	Total Power = Ant.P0+Ant.P1 (mW) / (dBm)		Total EIRP = Total Power + Ant.G Ant. Gain = 2 dBi (dBm)	Constant EIRP Limits FCC (dBm)	Constant EIRP Limits RSS (dBm)	Result
UNII-4 Band							
5755	13.5	34.17	15.34	17.34	36	36	Pass
5795	13.5	32.86	15.17	17.17	36	36	Pass

Max. Conducted Output Power for 802.11ac (VHT80) mode

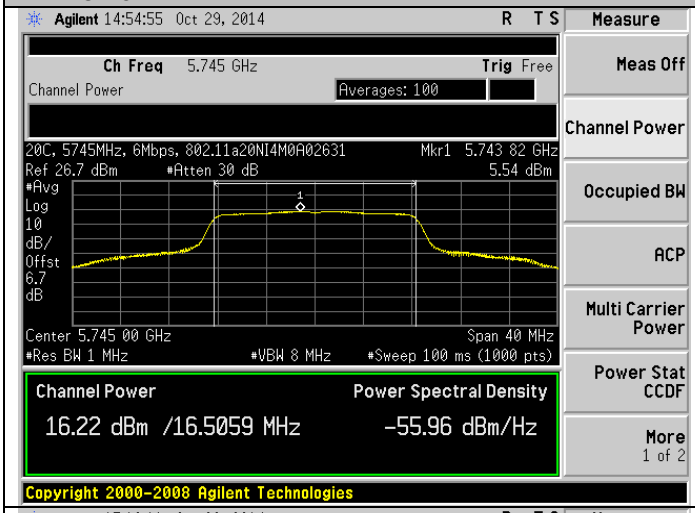
Frequency (MHz)	Data Rate (Mbps)	Ant. Port0 Max. Conducted Output Power (dBm)	Ant. Port1 Max. Conducted Output Power (dBm)	Total Power Ant.P0+Ant.P1 (mW) / (dBm)		Constant Conducted Pwr Limits FCC / RSS (dBm)	Constant Conducted Pwr Limits FCC / RSS (dBm)	Result
UNII-4 Band								
5775	29.3	14.45	14.36	55.15	17.41	30	30	Pass

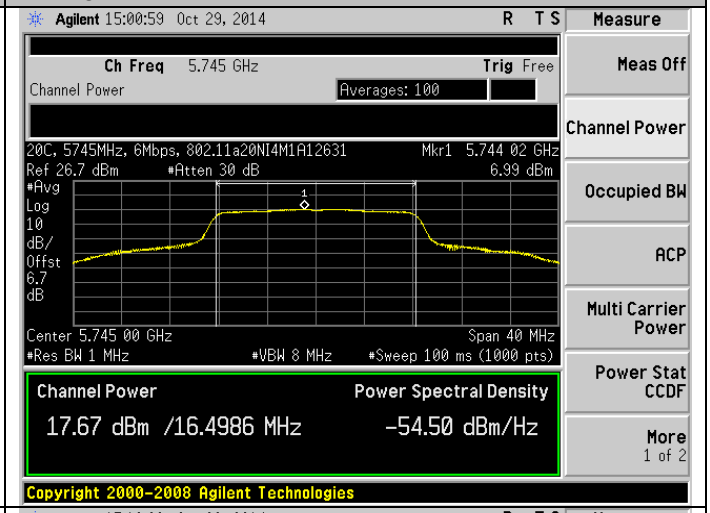
EIRP for 802.11ac (VHT80) mode

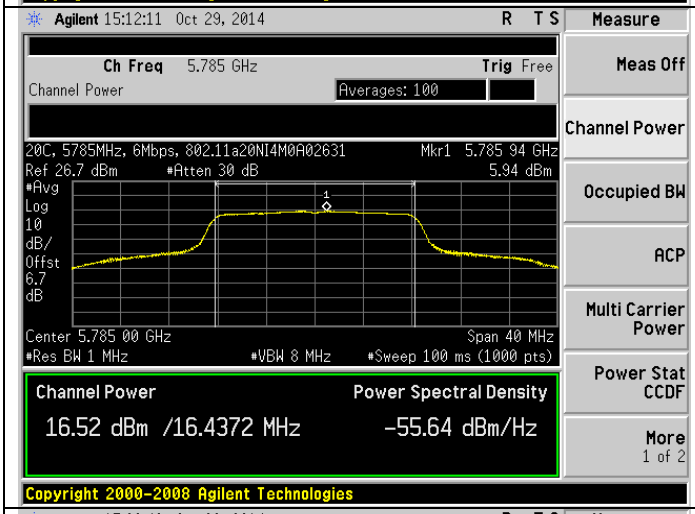
Frequency (MHz)	Data Rate (Mbps)	Total Power = Ant.P0+Ant.P1 (mW) / (dBm)		Total EIRP = Total Power + Ant.G Ant. Gain = 2 dBi (dBm)	Constant EIRP Limits FCC (dBm)	Constant EIRP Limits RSS (dBm)	Result
UNII-4 Band							
5775	29.3	55.15	17.41	19.41	36	36	Pass

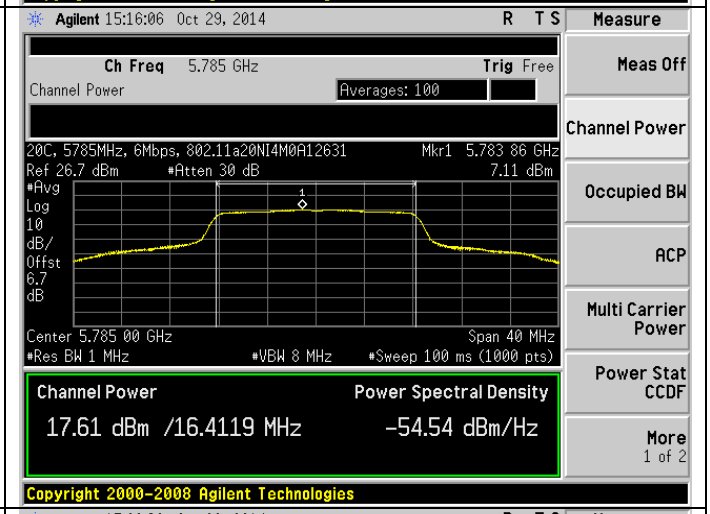
Graphical Test Results for 802.11a mode / UNII-4:

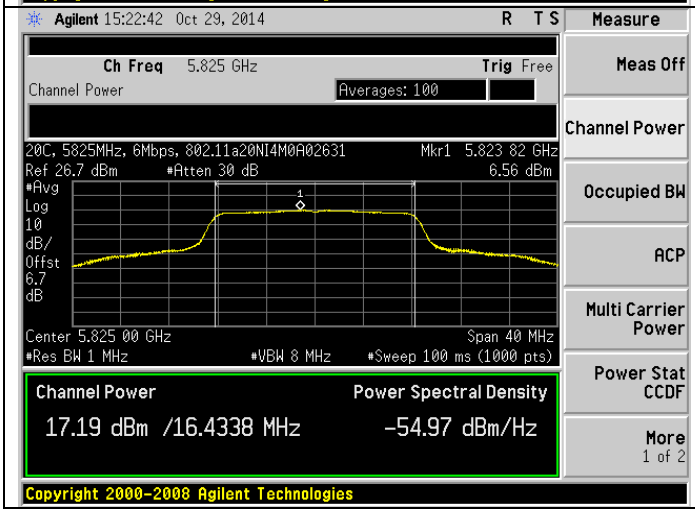
802.11a, 6Mbps	Maximum Conducted Output Power
Ant.Port 0	**Ant.Port1**

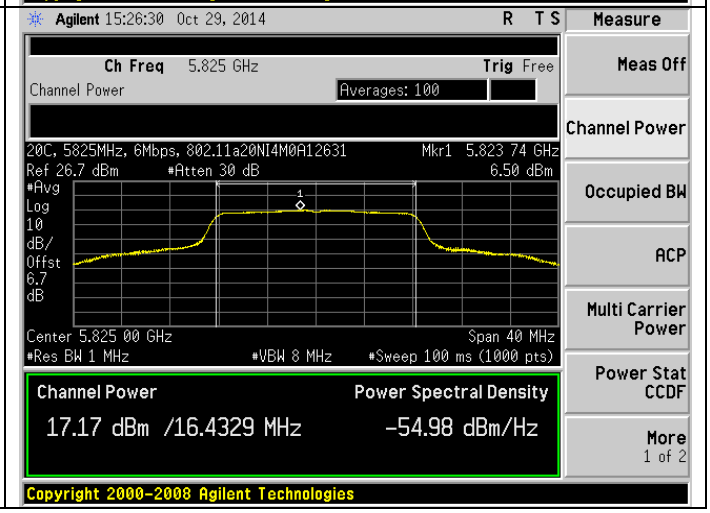






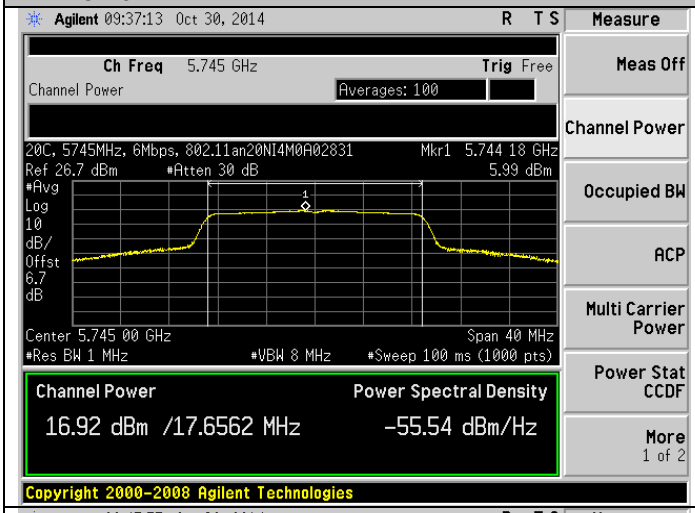


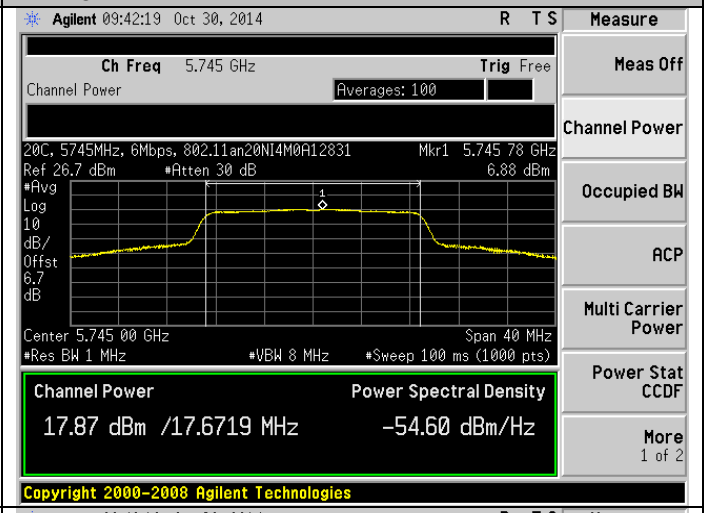


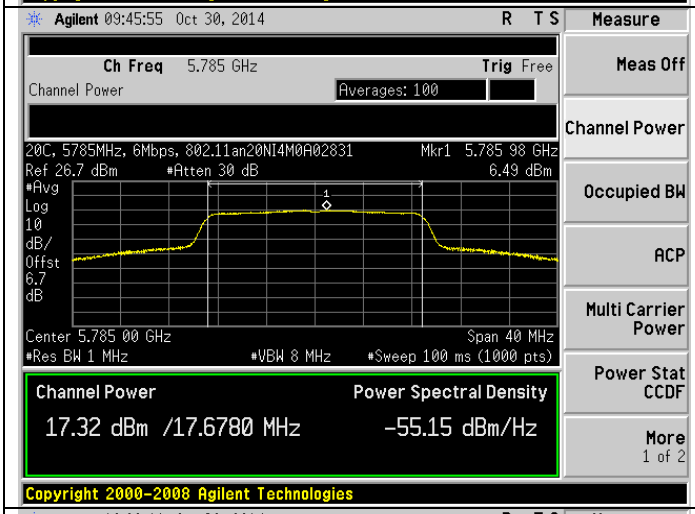


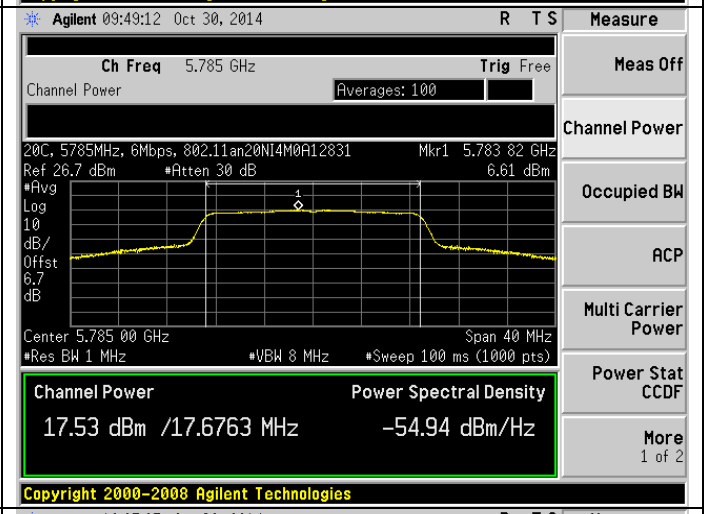
Graphical Test Results for 802.11n (HT20) mode / UNII-4:

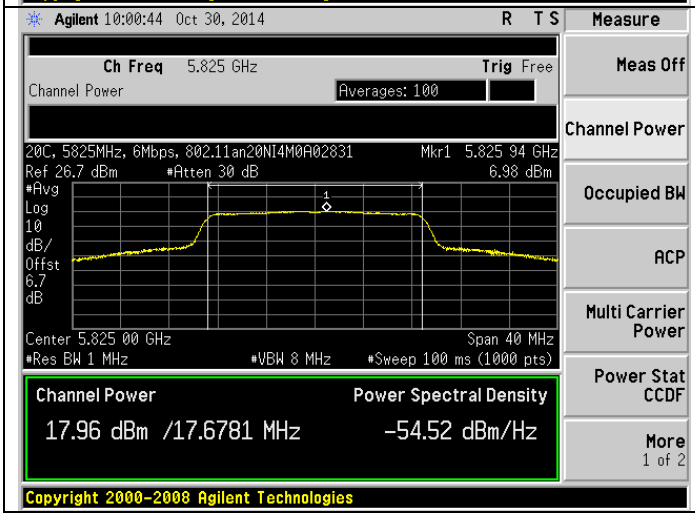
802.11n20, 6.5Mbps	Maximum Conducted Output Power
Ant.Port 0	**Ant.Port1**

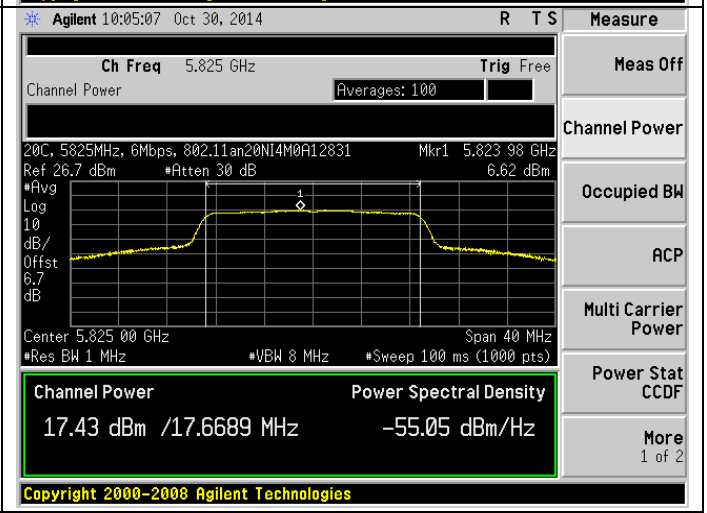






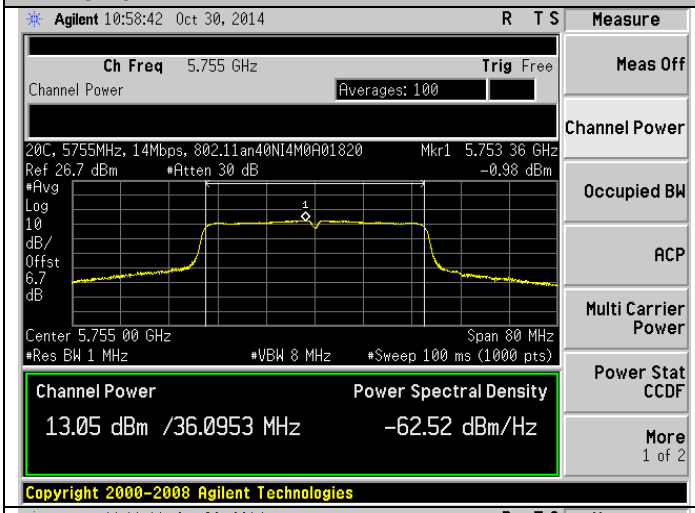


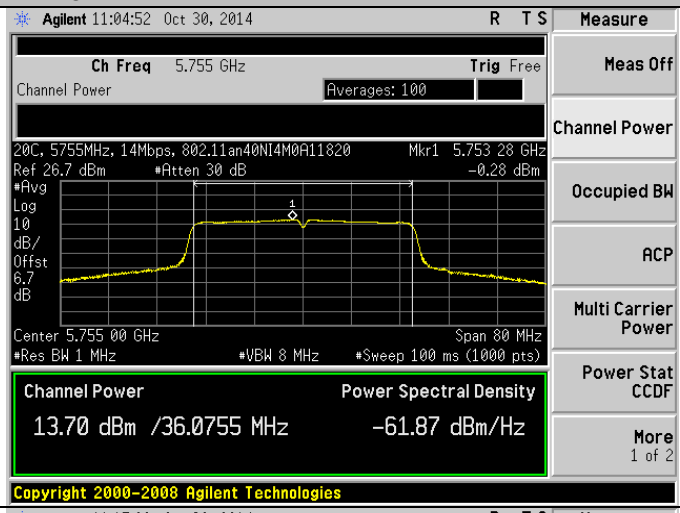


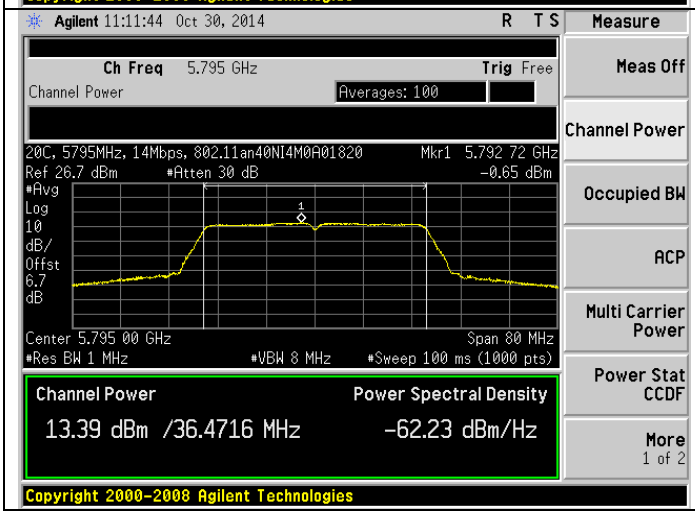


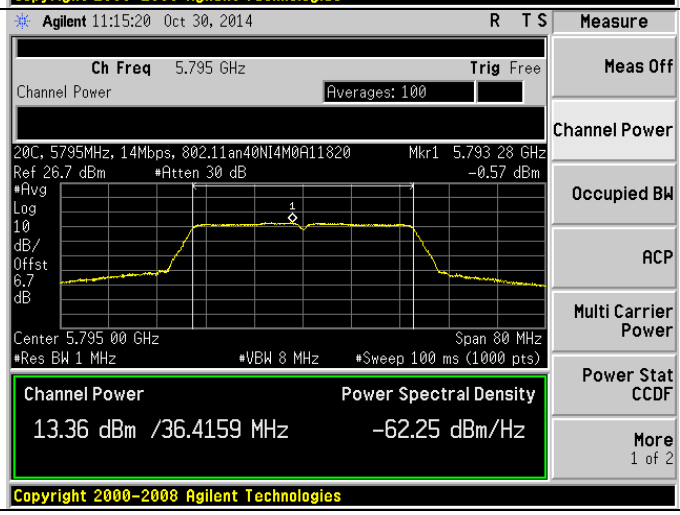
Graphical Test Results for 802.11n (HT40) mode / UNII-4:

802.11n40, 13.5Mbps	Maximum Conducted Output Power
Ant.Port 0	**Ant.Port1**



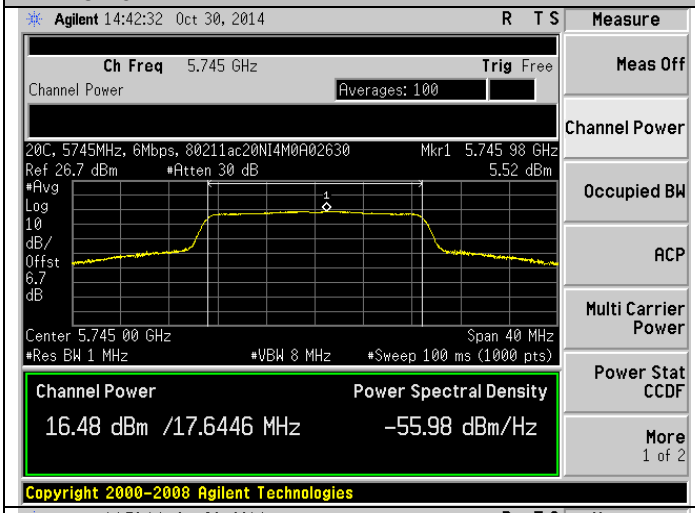


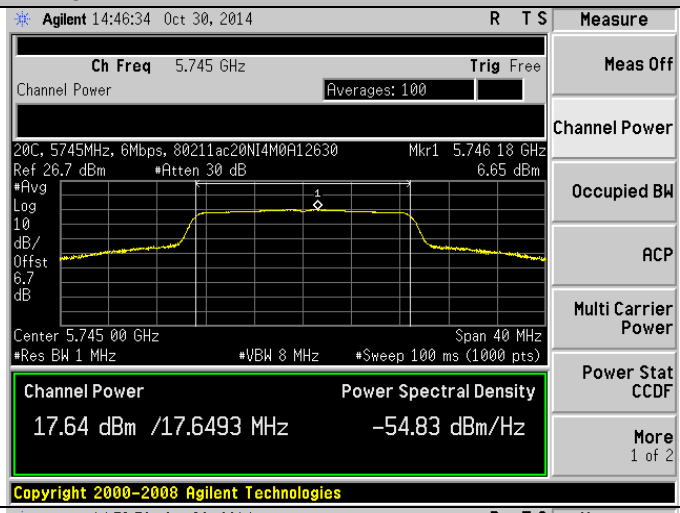


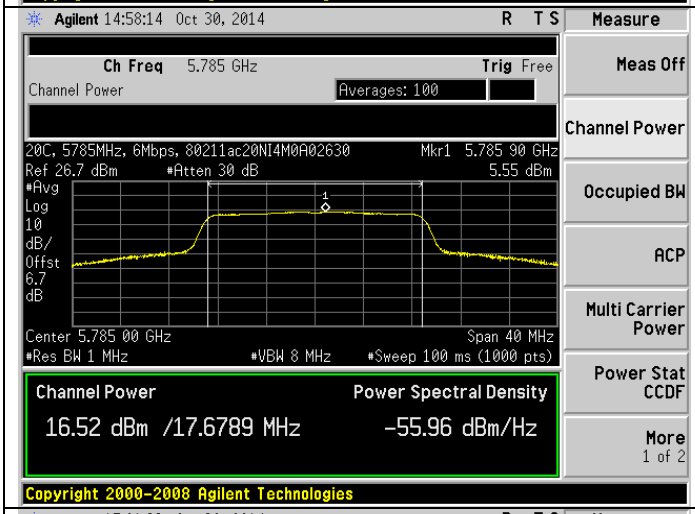


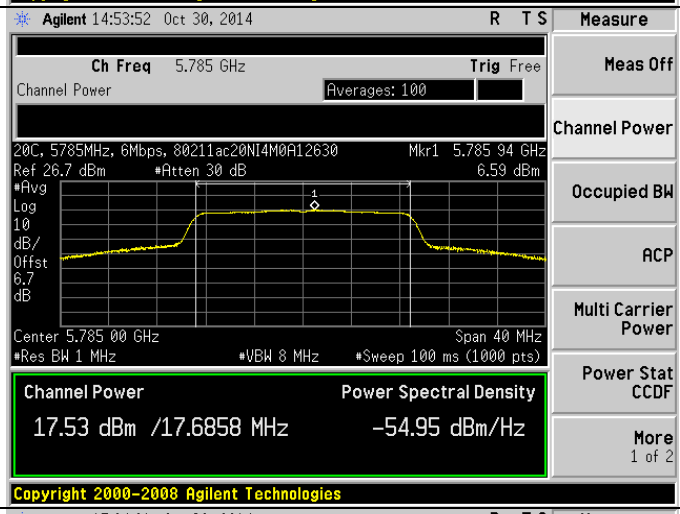
Graphical Test Results for 802.11ac mode / UNII-4:

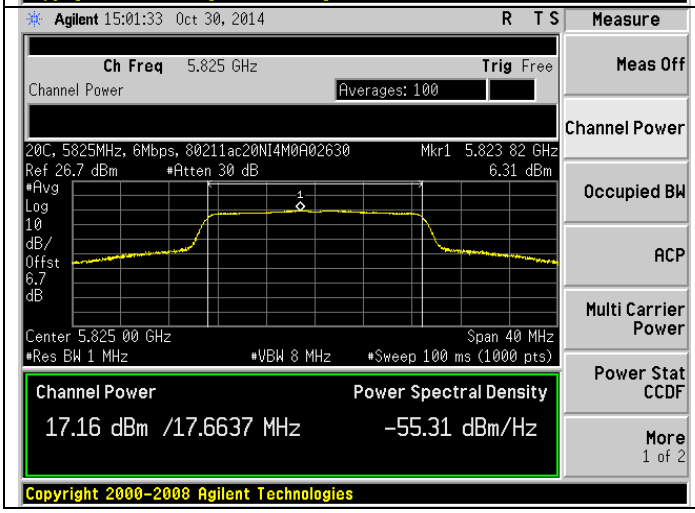
802.11ac20, 6.5Mbps	Maximum Conducted Output Power
Ant.Port 0	**Ant.Port1**

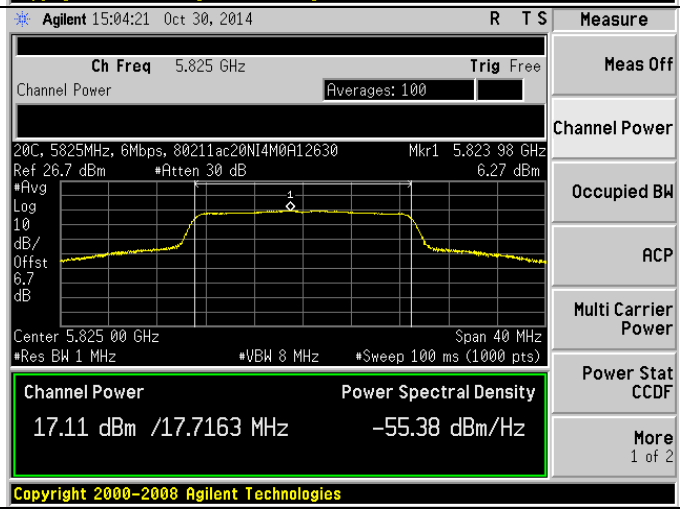






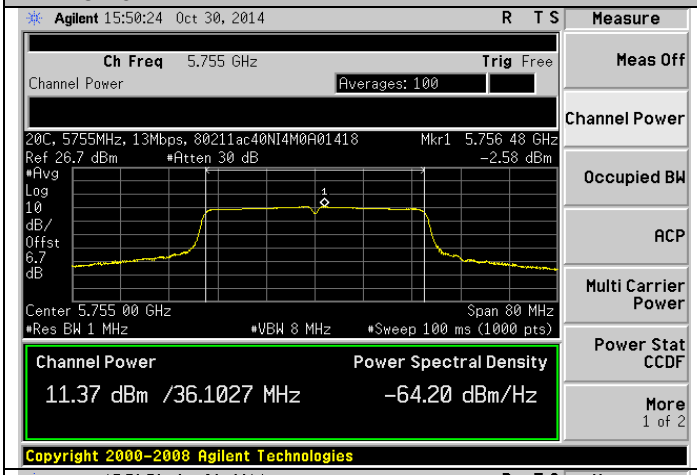


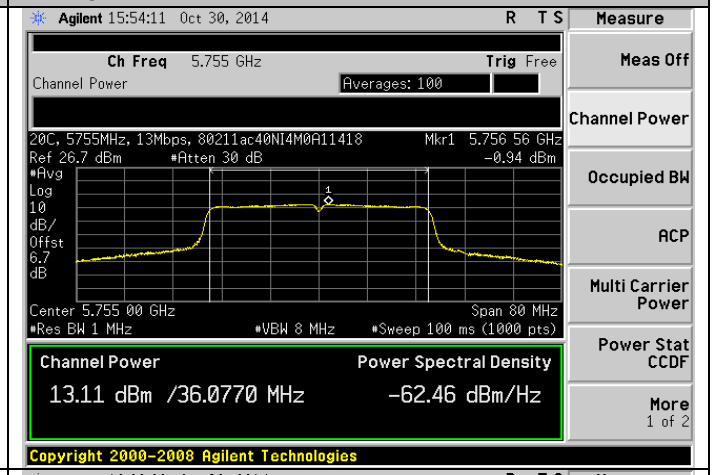


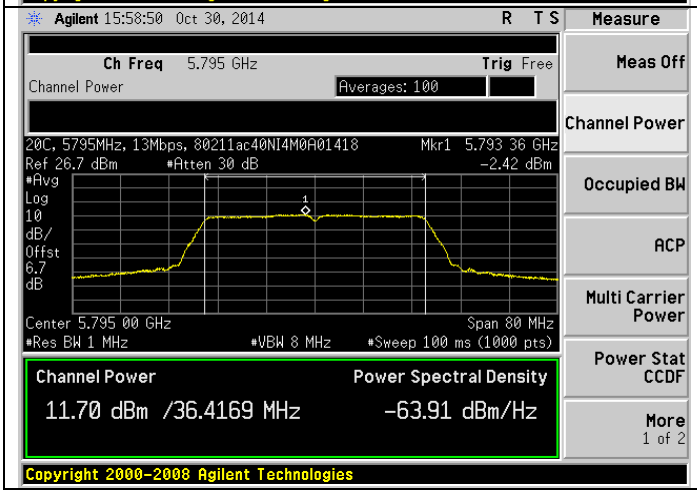


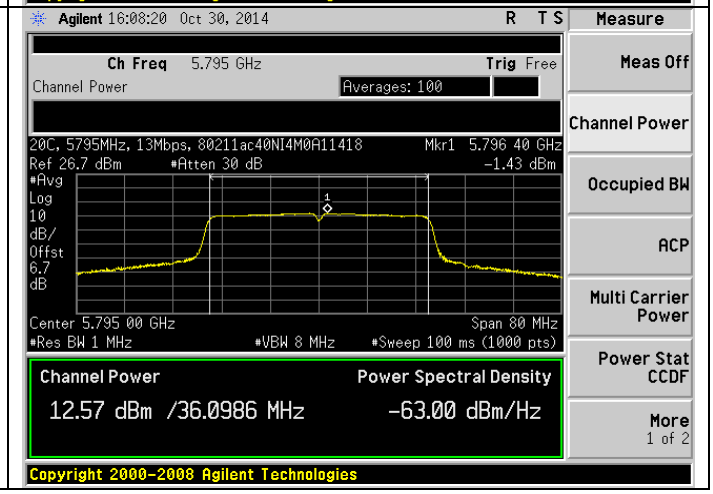
Graphical Test Results for 802.11ac (VHT40) mode / UNII-4:

802.11ac40, 13.5Mbps	Maximum Conducted Output Power
Ant.Port 0	**Ant.Port1**



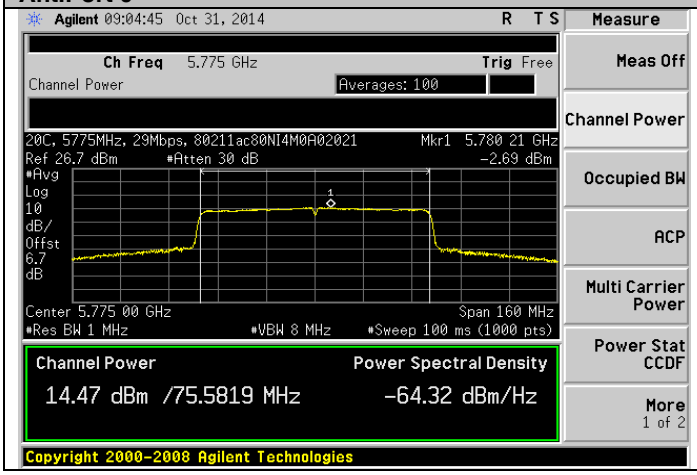


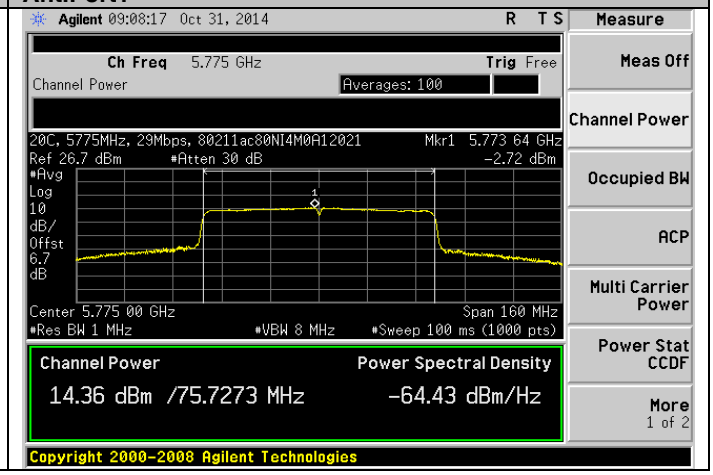




Graphical Test Results for 802.11ac (VHT80) mode / UNII-4:

802.11ac80, 29.2Mbps	Maximum Conducted Output Power
Ant.Port 0	**Ant.Port1**





Power Spectral Density

FCC 15.407(a) (3): For the band 5.725-5.850 GHz, the maximum power spectral density shall not exceed 30 dBm in any 500 kHz band.

RSS-210 A9.2 (4): For the 5725 – 5850 MHz band, the power spectral density shall not exceed 17 dBm in any 1 MHz band.

Test Procedure

Ref. KDB 789033 D02 General UNII Test Procedure New Rules v01 section F

Max. Conducted Output Power Test Procedure
1. Set the radio in the continuous transmitting mode at full power 2. Use peak search function to find the peak value 3. Capture graphs and record pertinent measurement data.

Ref. KDB 789033 D02 General UNII Test Procedure New Rules v01 section E 2.b **Method SA-1**

Max. Conducted Output Power Test parameters
Span ≥ entire EBW (or alternatively the 99% OBW) RBW = 1 MHz VBW ≥ 3 x RBW Detector = RMS Trace Average ≥ 100 Sweep = Auto Sweep Points ≥ 2 x span/ RBW.

Scaling Factor

When the measurements are performed using a lower resolution bandwidth (500 kHz) according to the FCC 15.407 new rules for UNII-4, the following adjustment shall be corrected to the measured results to satisfy the 1 MHz reference bandwidth specified in the RSS-210 standard:

By adding **10 log (1000 kHz/ 500 kHz)** to the measured results

SF = 10 log (2) = **3 dB**

Max. Power Spectral Density Recorded Test Data:

Max. Power Spectral Density for 802.11a mode

Frequency (MHz)	Data Rate (Mbps)	Ant. Port0 Max. PSD 500kHz RBW (dBm)	Ant. Port1 Max. PSD 500kHz RBW (dBm)	Total PSD Ant.P0+Ant.P1 500kHz RBW (mW) / (dBm)		Total PSD Ant.P0+Ant.P1 1MHz RBW (mW) / (dBm)		PSD FCC Limits (dBm/500kHz)	PSD RSS Limits (dBm/1MHz)	Result
UNII-4 Band										
5745	6	3.434	4.023	4.730	6.749	9.438	9.749	30	17	Pass
5785	6	3.278	3.819	4.536	6.567	9.051	9.567	30	17	Pass
5825	6	4.092	3.914	5.028	7.014	10.03	10.01	30	17	Pass

Max. Power Spectral Density for 802.11n (HT20) mode

Frequency (MHz)	Data Rate (Mbps)	Ant. Port0 Max. PSD 500kHz RBW (dBm)	Ant. Port1 Max. PSD 500kHz RBW (dBm)	Total PSD Ant.P0+Ant.P1 500kHz RBW (mW) / (dBm)		Total PSD Ant.P0+Ant.P1 1MHz RBW (mW) / (dBm)		PSD FCC Limits (dBm/500kHz)	PSD RSS Limits (dBm/1MHz)	Result
UNII-4 Band										
5745	6.5	3.307	3.947	4.623	6.649	9.223	9.649	30	17	Pass
5785	6.5	2.811	3.389	4.092	6.120	8.166	9.120	30	17	Pass
5825	6.5	4.346	3.689	5.058	7.040	10.09	10.04	30	17	Pass

Max. Power Spectral Density for 802.11n (HT40) mode

Frequency (MHz)	Data Rate (Mbps)	Ant. Port0 Max. PSD 500kHz RBW (dBm)	Ant. Port1 Max. PSD 500kHz RBW (dBm)	Total PSD Ant.P0+Ant.P1 500kHz RBW (mW) / (dBm)		Total PSD Ant.P0+Ant.P1 1MHz BW (mW) / (dBm)		PSD FCC Limits (dBm/500kHz)	PSD RSS Limits (dBm/1MHz)	Result
UNII-4 Band										
5755	13.5	-4.140	-3.877	0.795	-0.99	1.588	2.01	30	17	Pass
5795	13.5	-3.693	-4.079	0.818	-0.87	1.633	2.13	30	17	Pass

Note: The measurement RBW of 500 kHz was used to perform PSD testing as specified in the FCC15.407 rule. The following adjustment was made by adding 3 dB to the measured results from the derived formula {10 log (1MHz/RBW)}
to satisfy with RSS-210 requirement of 1 MHz RBW. See scaling factor section for calculation detail.

Max. Power Spectral Density for 802.11ac mode

Frequency (MHz)	Data Rate (Mbps)	Ant. Port0 Max. PSD 500kHz RBW (dBm)	Ant. Port1 Max. PSD 500kHz RBW (dBm)	Total PSD Ant.P0+Ant.P1 500kHz RBW (mW) / (dBm)		Total PSD Ant.P0+Ant.P1 1MHz RBW (mW) / (dBm)		PSD FCC Limits (dBm/500kHz)	PSD RSS Limits (dBm/1MHz)	Result
UNII-4 Band										
5745	6.5	2.790	3.359	4.068	6.094	8.117	9.094	30	17	Pass
5785	6.5	2.928	3.088	3.998	6.019	7.978	9.019	30	17	Pass
5825	6.5	3.532	3.141	4.316	6.351	8.614	9.351	30	17	Pass

Max. Power Spectral Density for 802.11ac (VHT40) mode

Frequency (MHz)	Data Rate (Mbps)	Ant. Port0 Max. PSD 500kHz RBW (dBm)	Ant. Port1 Max. PSD 500kHz RBW (dBm)	Total PSD Ant.P0+Ant.P1 500kHz RBW (mW) / (dBm)		Total PSD Ant.P0+Ant.P1 1MHz BW (mW) / (dBm)		PSD FCC Limits (dBm/500kHz)	PSD RSS Limits (dBm/1MHz)	Result
UNII-4 Band										
5755	13.5	-5.997	-5.255	0.549	-2.60	1.096	0.40	30	17	Pass
5795	13.5	-4.983	-4.622	0.662	-1.79	1.321	1.210	30	17	Pass

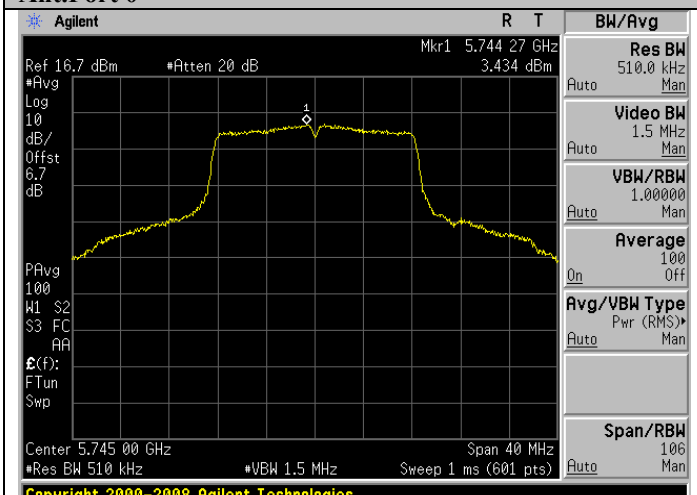
Max. Power Spectral Density for 802.11ac (VHT80) mode

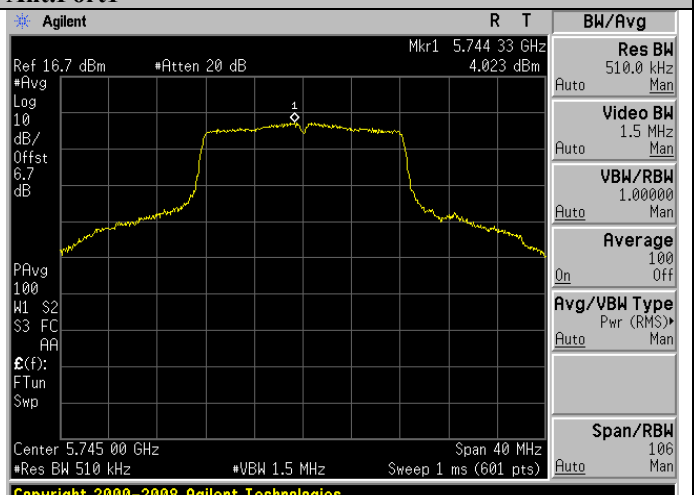
Frequency (MHz)	Data Rate (Mbps)	Ant. Port0 Max. PSD 500kHz RBW (dBm)	Ant. Port1 Max. PSD 500kHz RBW (dBm)	Total PSD Ant.P0+Ant.P1 500kHz RBW (mW) / (dBm)		Total PSD Ant.P0+Ant.P1 1MHz BW (mW) / (dBm)		PSD FCC Limits (dBm/500kHz)	PSD RSS Limits (dBm/1MHz)	Result
UNII-4 Band										
5775	29.3	-5.529	-6.401	0.509	-2.93	1.016	0.07	30	17	Pass

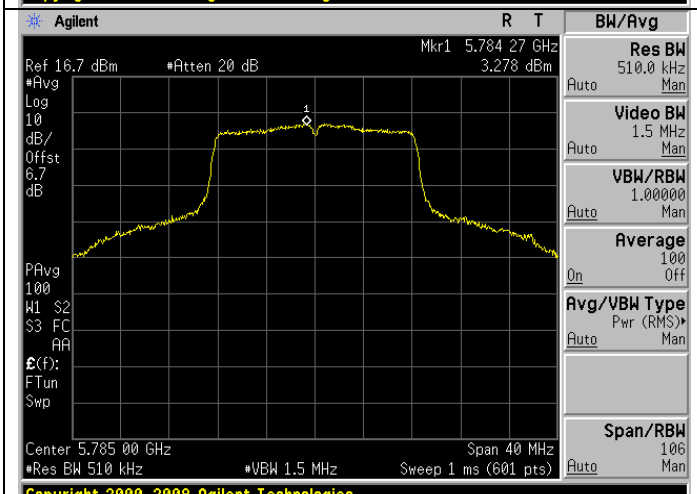
Note: The measurement RBW of 500 kHz was used to perform PSD testing as specified in the FCC15.407 rule. The following adjustment was made by adding 3 dB to the measured results from the derived formula {10 log (1MHz/RBW)}
to satisfy with RSS-210 requirement of 1 MHz RBW.

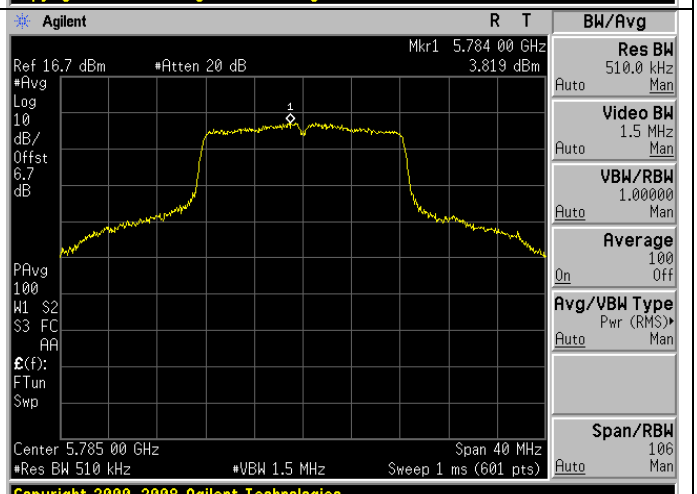
Graphical Test Results for 802.11a mode / UNII-4:

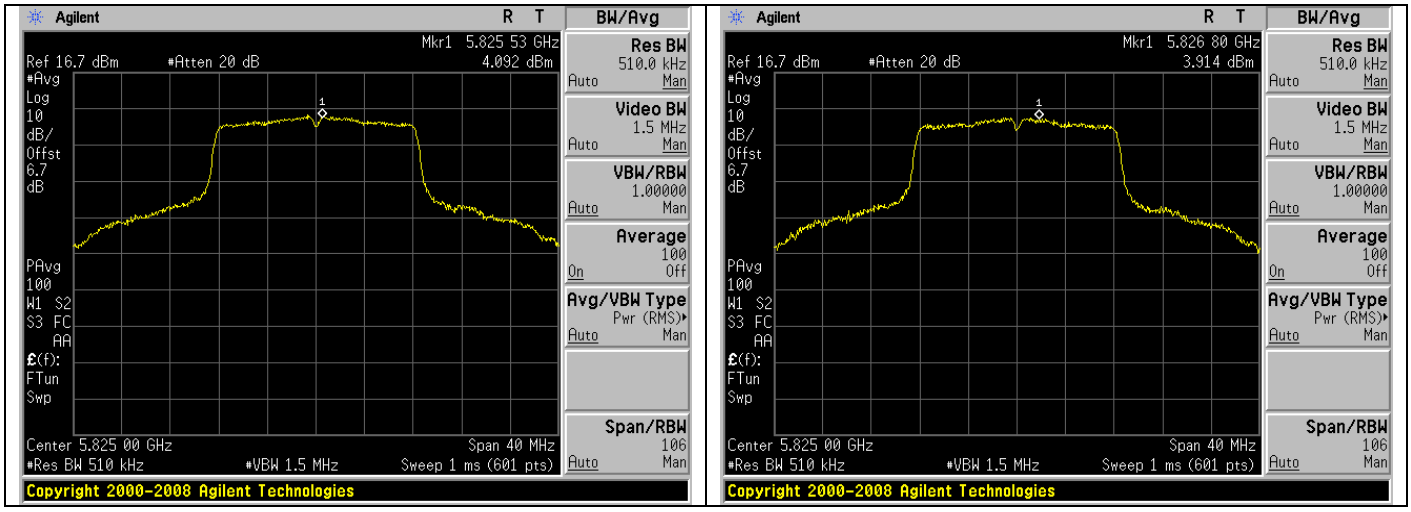
802.11a, 6Mbps	Power Spectral Density
Ant.Port 0	Ant.Port1





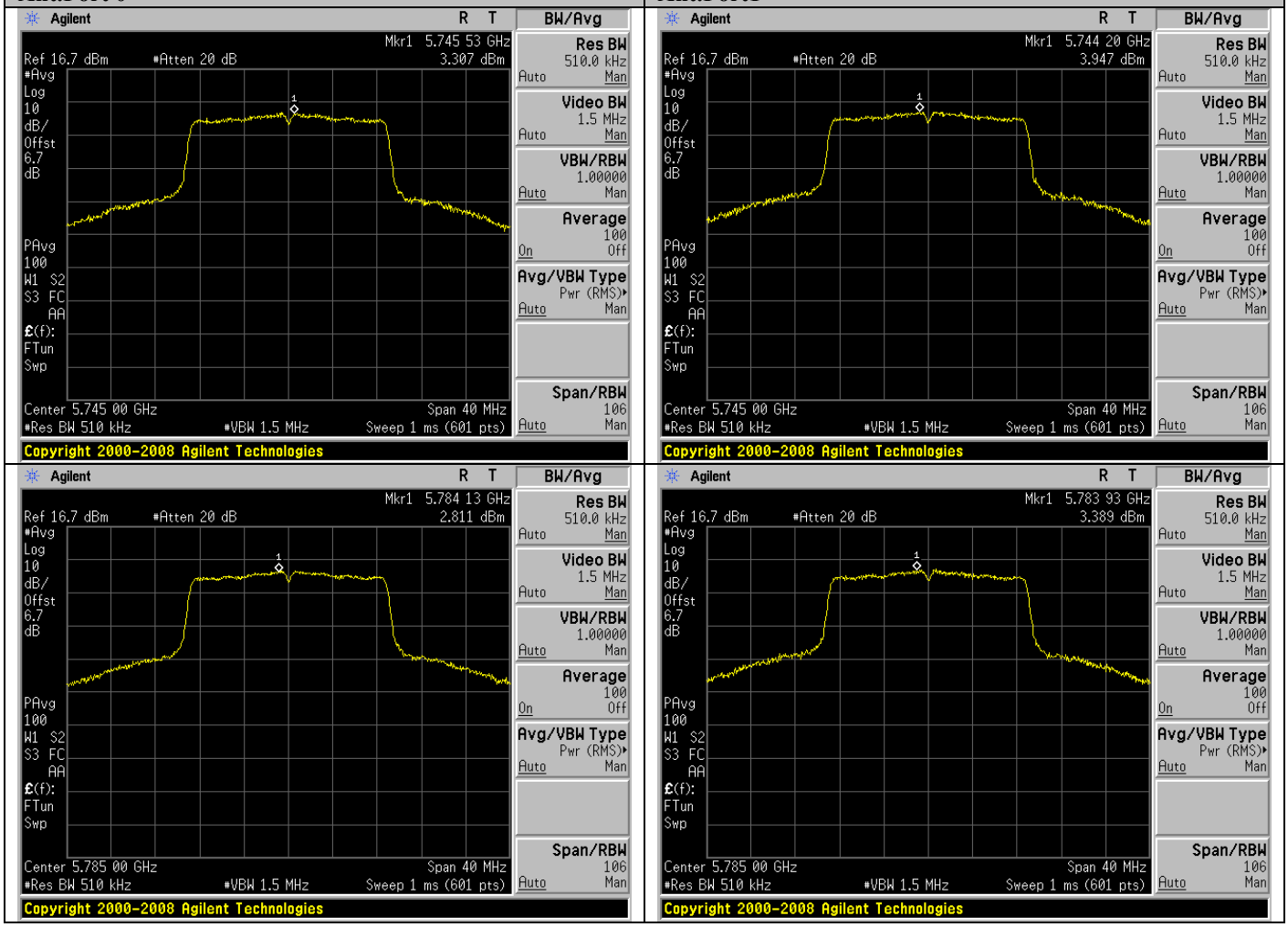


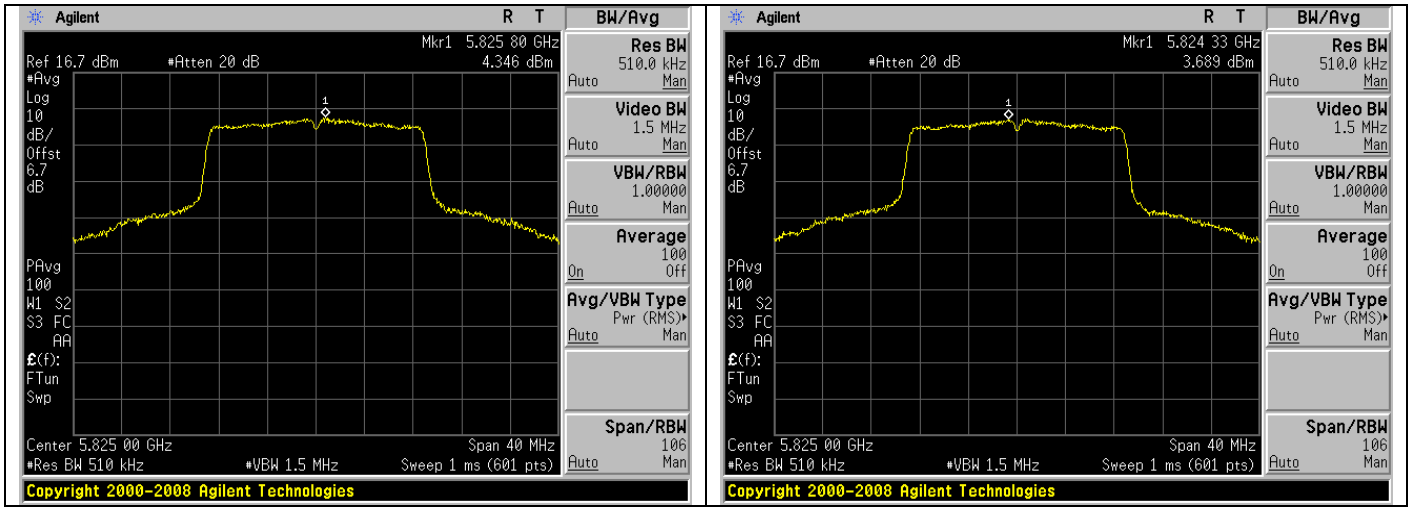




Graphical Test Results for 802.11n (HT20) mode / UNII-4:

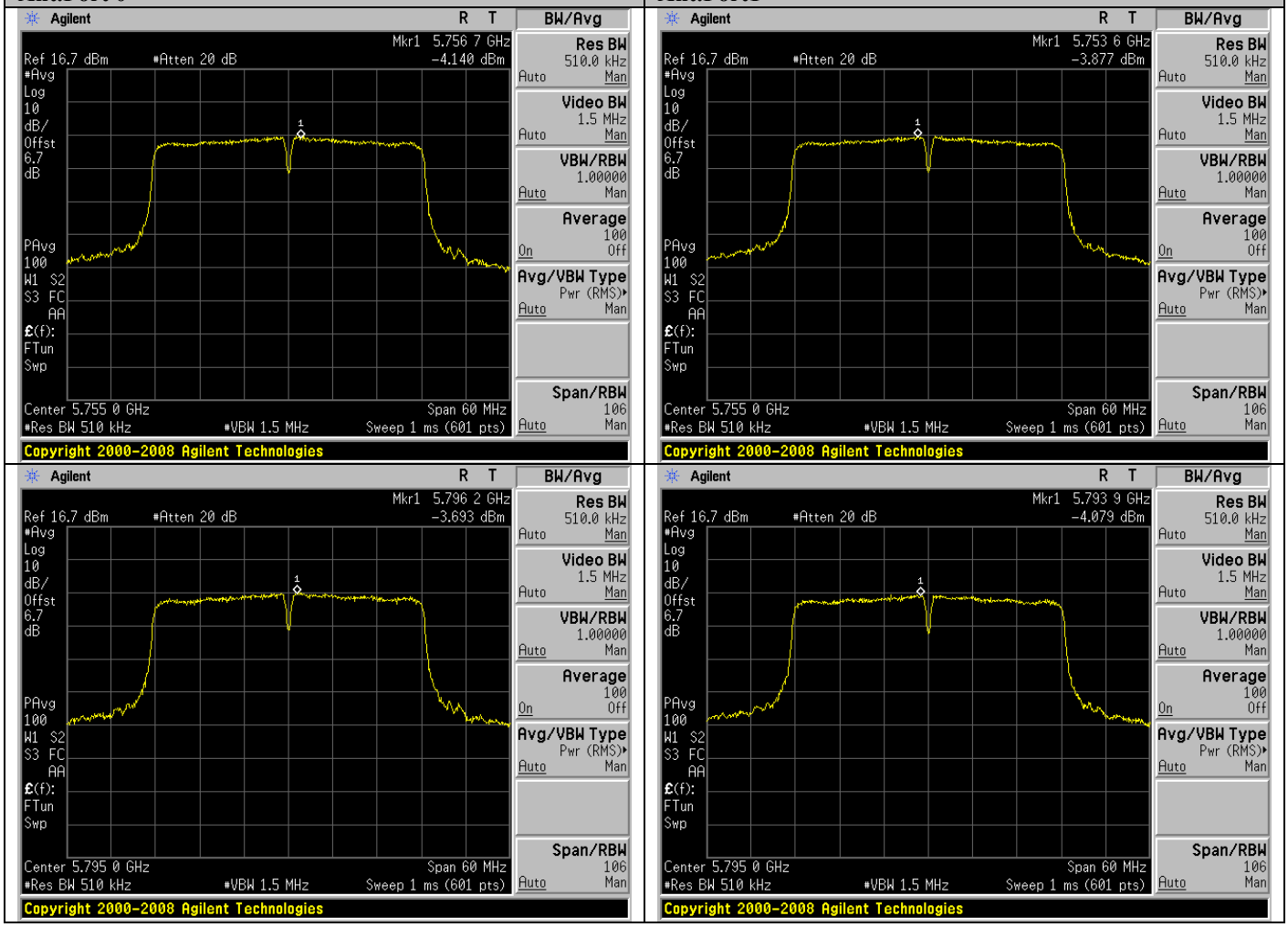
802.11n20, 6.5Mbps	**Power Spectral Density**
Ant.Port 0	**Ant.Port1**





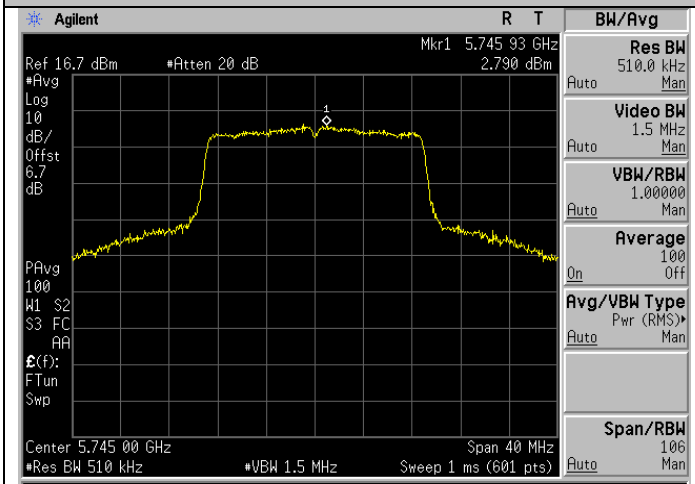
Graphical Test Results for 802.11n (HT40) mode / UNII-4:

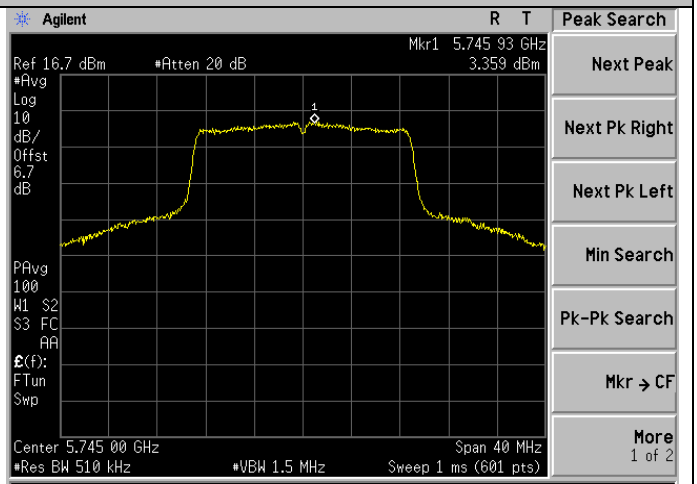
802.11n40, 13.5Mbps	**Power Spectral Density**
Ant.Port 0	**Ant.Port1**

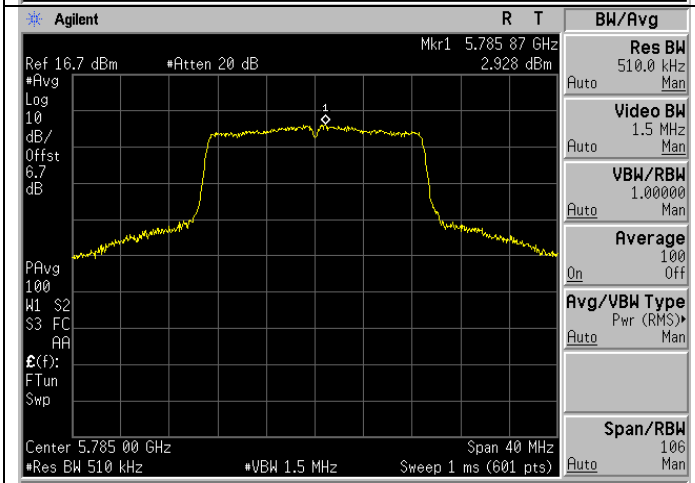


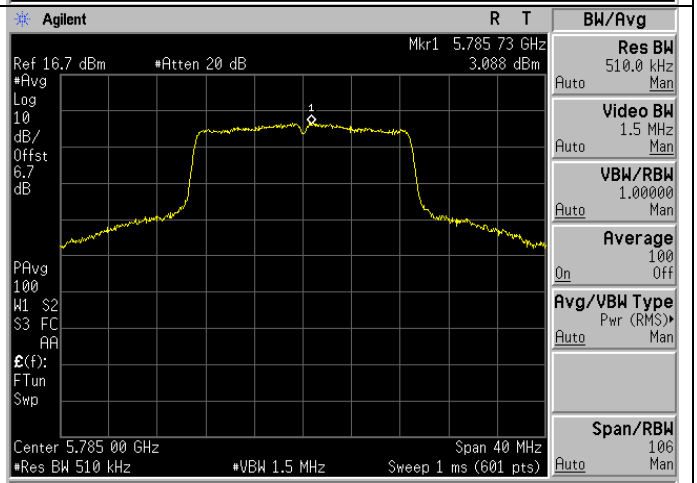
Graphical Test Results for 802.11ac mode / UNII-4:

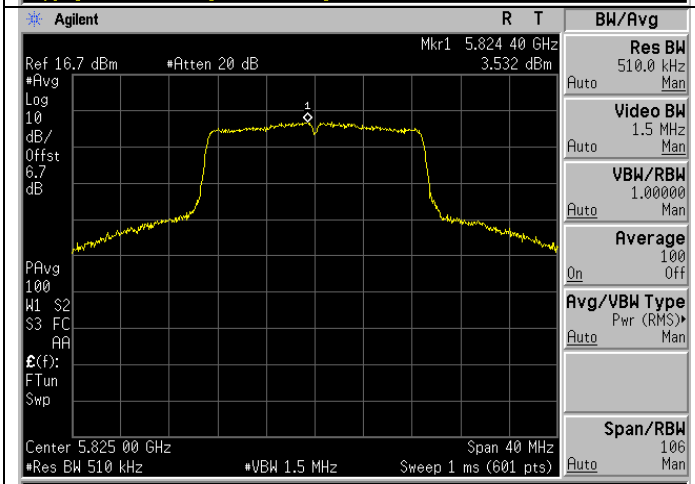
802.11ac, 6.5Mbps	Power Spectral Density
Ant.Port 0	**Ant.Port1**

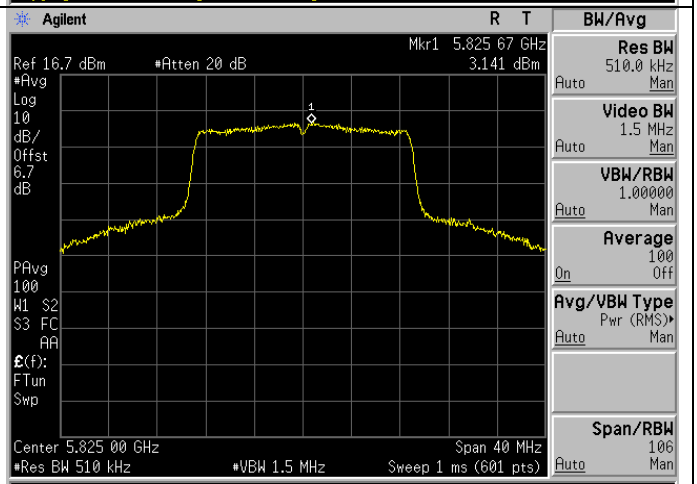






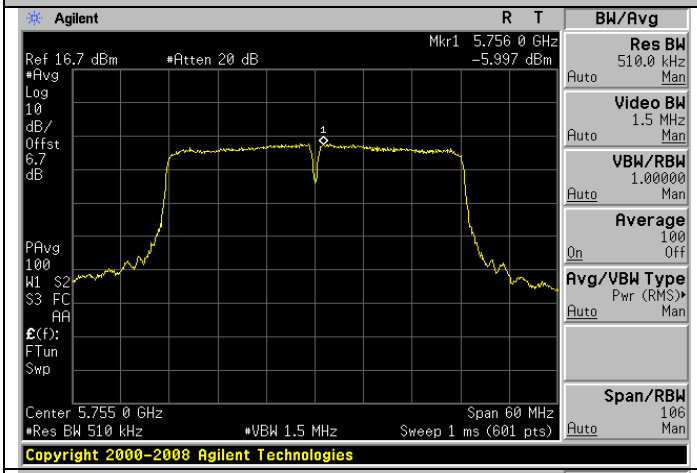


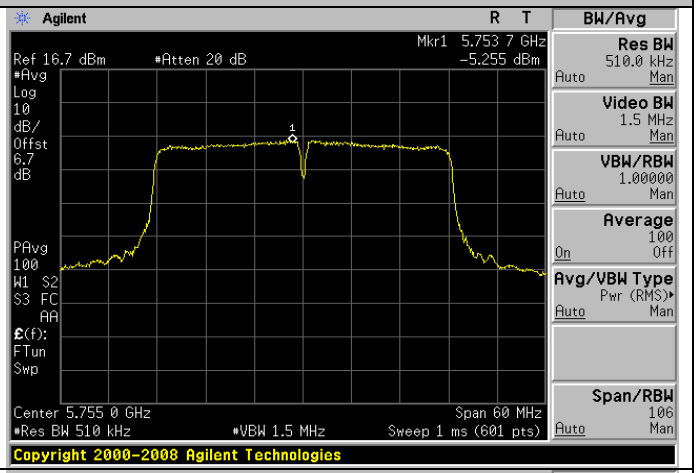


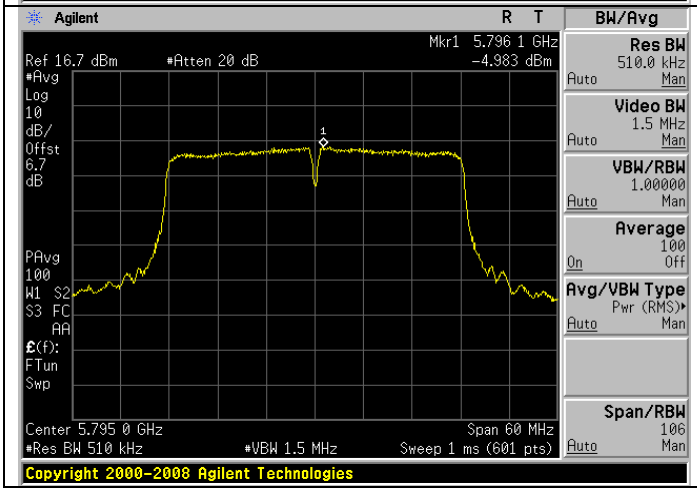


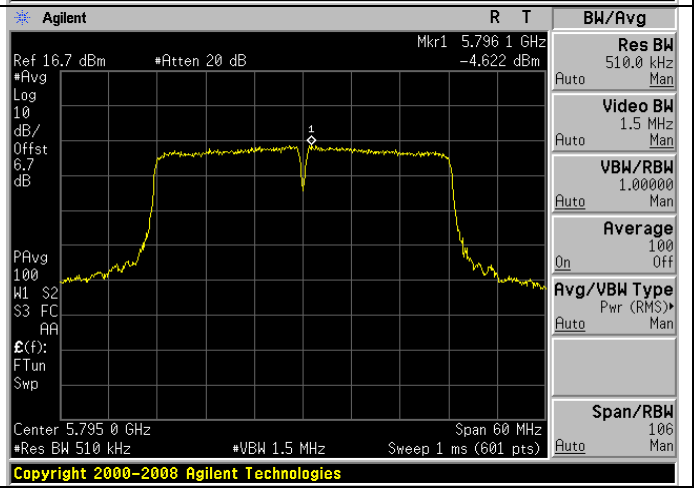
Graphical Test Results for 802.11ac (VHT40) mode / UNII-4

802.11ac40, 13.5Mbps	Power Spectral Density
Ant.Port 0	**Ant.Port1**



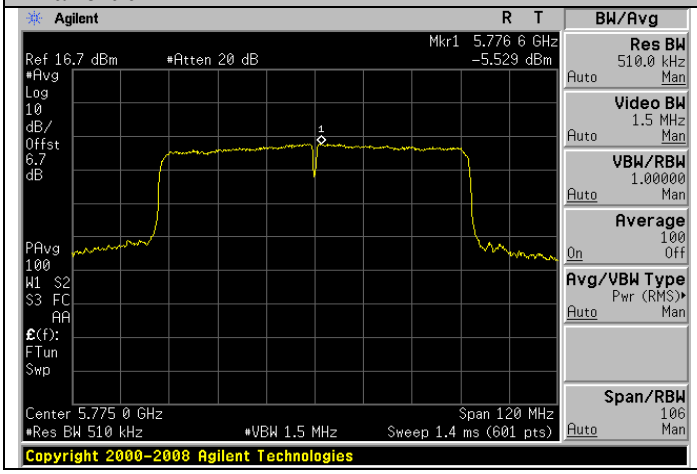


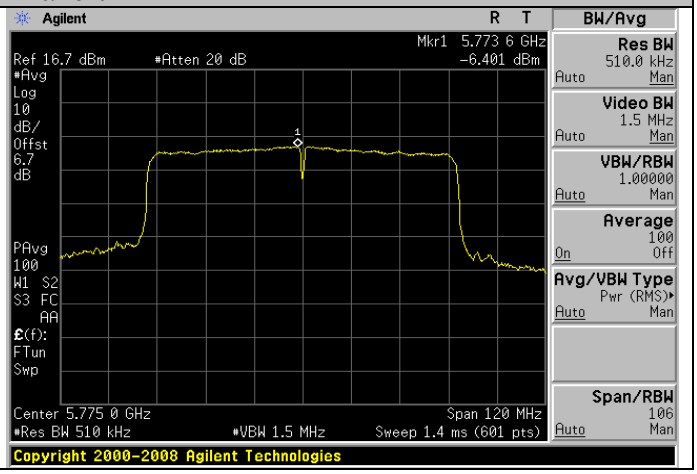




Graphical Test Results for 802.11ac (VHT80) mode / UNII-4

802.11ac80, 29.3Mbps	Power Spectral Density
Ant.Port 0	**Ant.Port1**





Band Edge

FCC15.407 (b) (4): For transmitters operating in the 5.725-5.850 GHz band, all emissions within the frequency range from the band edge to 10 MHz above or below the band edge shall not exceed an e.i.r.p. of −17 dBm/MHz; for frequencies 10 MHz or greater above or below the band edge, emissions shall not exceed an e.i.r.p. of −27 dBm/MHz.

Test Procedure
Ref. KDB 789033 D02 General UNII Test Procedure New Rules v01 section II G.6

Unwanted Emission Outside of Restricted Band Measurement above 1 GHz **Test Procedure**
1. The radio is configured in the continuous transmitting mode 2. Allow trace to fully stabilize. Use marker peak search function to determine the maximum emissions level outside of the frequency band of operation.

Ref. KDB 789033 D02 General UNII Test Procedure New Rules v01 section II G.6

Unwanted Emission Outside of Restricted Band Measurement above 1 GHz **Test parameters**
RBW ≥ 1 MHz VBW ≥ 3 x RBW Detector = RMS Average Type = Power average Sweep time = Auto Trace Average ≥ 100

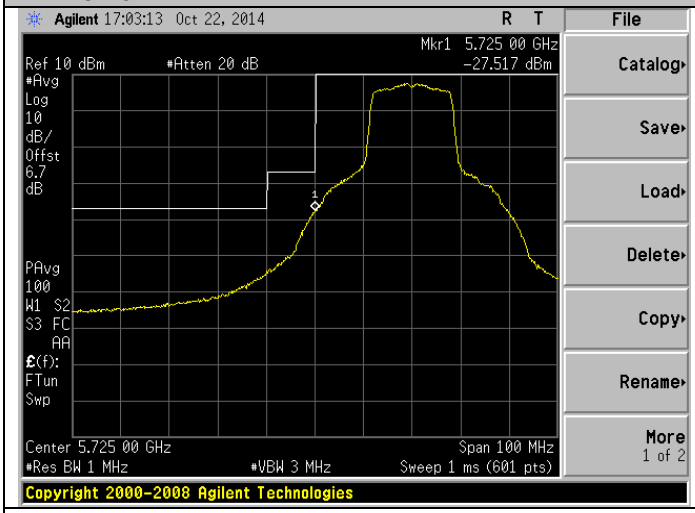
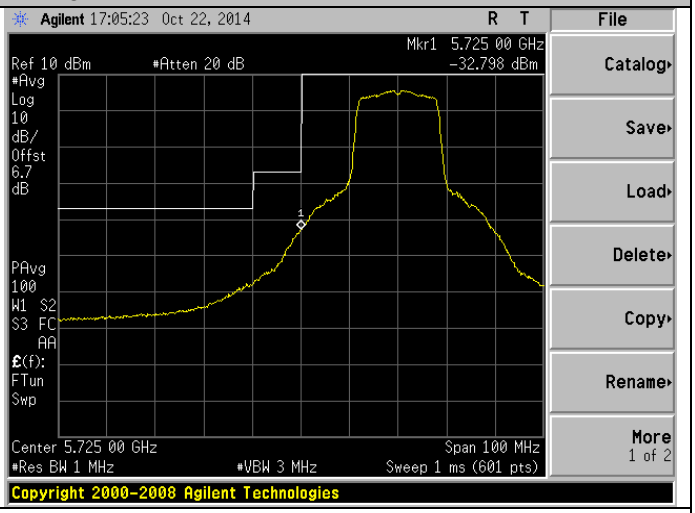
Recorded Test Data:

802.11a Band Edge						
Test Frequency (MHz)	**Data Rate (Mbps)**	**Ant. Port0 Power lvl + Ant. G @Band Edge (dBm)**	**Ant. Port1 Power lvl + Ant. G @Band Edge (dBm)**	**Limit Ant. P0 / Ant. P1 (dBm/MHz)**		**Results**
Low End Band Edge Test Results / UNII-4						
5745	6	-27.52+2 = **-25.52**	-32.80 +2 = **-30.80**	-17	-17	Pass
High End Band Edge Test Results / UNII-4						
5825	6	-42.88+2 = **-40.88**	-41.41+2 = **-39.41**	-17	-17	Pass

802.11ac (VHT80) Band Edge						
Test Frequency (MHz)	**Data Rate (Mbps)**	**Ant. Port0 Power lvl + Ant. G @Band Edge (dBm)**	**Ant. Port1 Power lvl + Ant. G @Band Edge (dBm)**	**Limit Ant. P0 / Ant. P1 (dBm/MHz)**		**Results**
Low End Band Edge Test Results / UNII-4						
5775	6	-35.16 +2 = **-33.16**	-35.48 + 2 = **-33.48**	-17	-17	Pass
High End Band Edge Test Results / UNII-4						
5775	6	-41.26 + 2 = **-39.26**	-42.71 + 2 = **-40.71**	-17	-17	Pass

Note: correction factors (ext. attenuation + cable loss) are compensated in the offset function of the Spectrum Analyzer.

Graphical Test Results for 802.11a / UNII-4:

802.11a, 6Mbps	Out of Band Emissions & Low End Band Edge
Ant.Port 0	**Ant.Port1**
	
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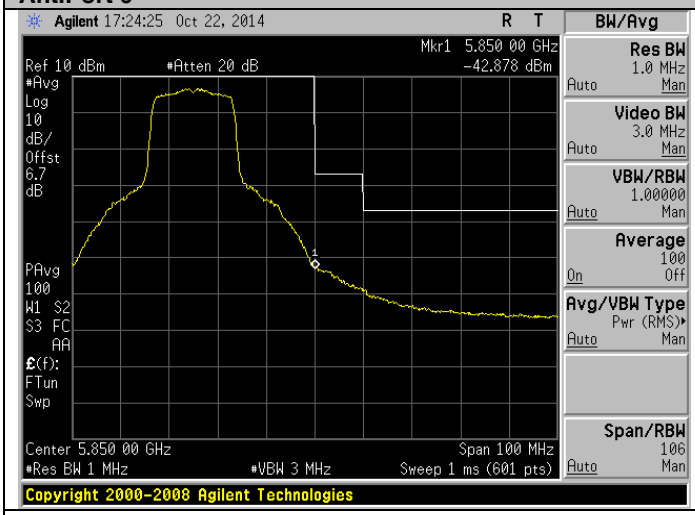
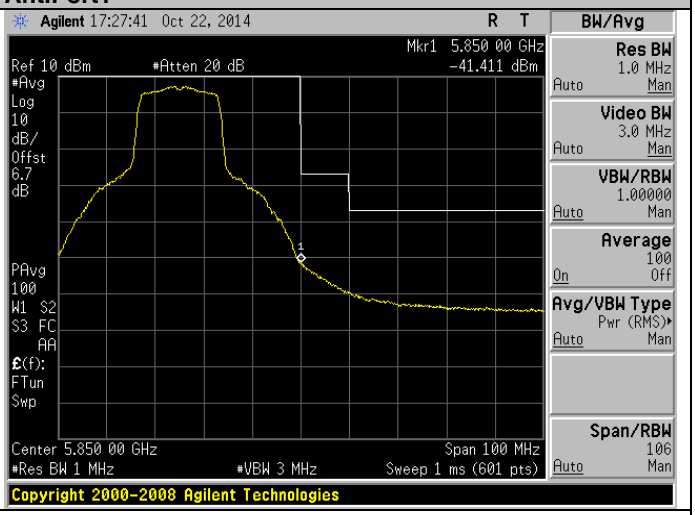
802.11a, 6Mbps	Out of Band Emissions & High End Band Edge
Ant.Port 0	**Ant.Port1**
	
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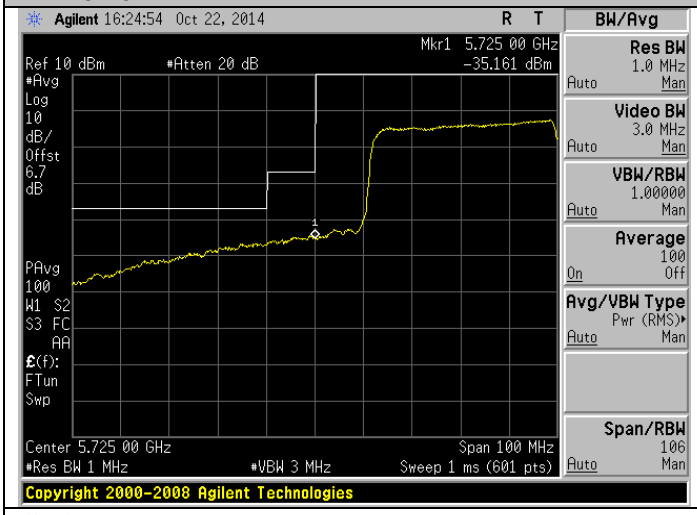
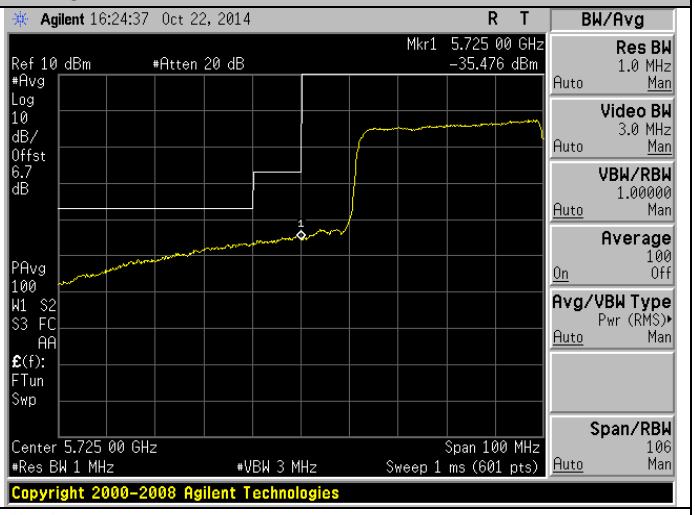
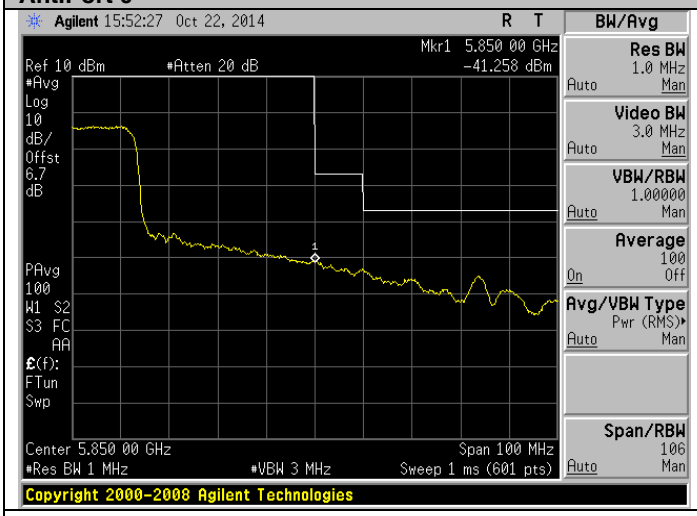
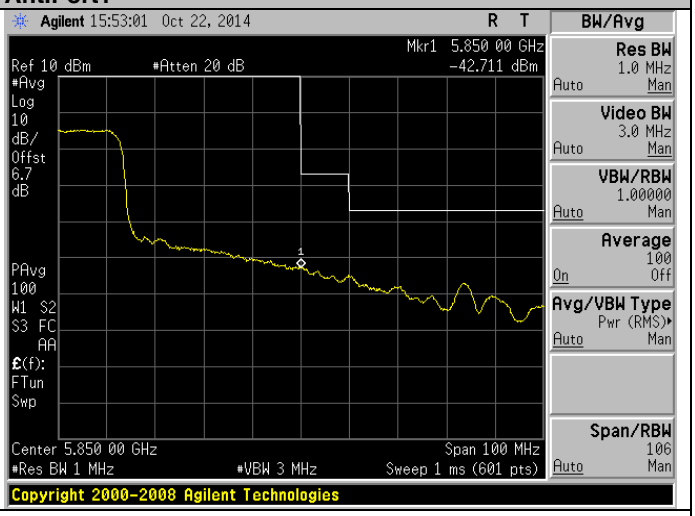
Graphical Test Results for 802.11ac (VTH80) / UNII-4:

802.11ac, 29.3Mbps	Out of Band Emissions & Low End Band Edge
Ant.Port 0	**Ant.Port1**
	
Ch.155	**Ch.155**
802.11ac, 29.3Mbps	**Out of Band Emissions & High End Band Edge**
Ant.Port 0	**Ant.Port1**
	
Ch.155	**Ch.155**

Transmitter Spurious Emissions (Undesirable Emissions) / Out-of-band Emissions and Restricted Bands

FCC 15.407 (b) (1) (6)/ RSS-210 A9.2: Undesirable emission limits. Except as shown in paragraph (b) (7) of this section, the maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:
(1) 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 e.i.r.p. of –27 dBm/MHz.

(6) Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in §15.209.

FCC 15.209: The level of any unwanted emissions from an intentional radiator operating under these general provisions shall not exceed the level of the fundamental emission. Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the table specified in the table in FCC§15.209(a).

RSS-Gen 6.13: In measuring unwanted emissions, the spectrum shall be investigated from 30 MHz or the lowest radio frequency signal generated in the equipment, whichever is lower, without going below 9 kHz, up to at least the frequency given below:
(a) If the equipment operates below 10 GHz: to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.
(b) If the equipment operates at or above 10 GHz: to the fifth harmonic of the highest fundamental frequency or to 100 GHz, whichever is lower.

RSS-Gen 8.9: Except when the requirements applicable to a given device state otherwise, emissions from licence-exempt transmitters shall comply with the field strength limits shown in Table 4 or Table 5 below. Additionally, the level of any transmitter emission shall not exceed the level of the transmitter's fundamental emission.

FCC15.407 (b) (7): The provision of §15.205 apply to intentional radiators operating under this section.

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

RSS-Gen 8.10: Except where otherwise indicated, the following restrictions apply:
(a) Fundamental components of modulation of licence-exempt radio apparatus shall not fall within the restricted bands of Table 6 except for apparatus complying under RSS-287;
(b) Unwanted emissions that fall into restricted bands of Table 6 shall comply with the limits specified in RSS-Gen; and
(c) Unwanted emissions that do not fall within the restricted frequency bands of Table 6 shall comply either with the limits specified in the applicable RSS or with those specified in this RSS-Gen.

15.209 (a)/RSS Gen 8.9: Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field strength (uV/meter)	Field strength (dBuV/meter)	Measurement distance (meters)
30-88	100**	40 Qp	3
88-216	150**	43.5 Qp	3
216-960	200**	46 Qp	3
Above 960	500	54 Av / 74 Pk	3

**Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz.

The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

Limit Conversion

When the DUT power is measured using a radiated test configuration, the EIRP can be directly determined using the power (logarithmic) approach as follows:

eirp = pt x gt = (E x d)2/30

where: $\mathbf{p_t}$ = transmitter output power in watts,
$\mathbf{g_t}$ = numeric gain of the transmitting antenna (unit less),
E = electric field strength in V/m,
d = measurement distance in meters (m).

Based on the equation above, unit conversion from log => linear

(1) Conversion from dBm to Watt

W = 10 EXP (-27dBm – 30 /10)
W = 10 EXP (-5.7) = 2 E-6

(2) E Field Strength can be derived by inverse calculation.

E = SQRT (**pt** x **gt** x **30) / d**
E = SQRT (2E-6 x 1.0 x 30) / 3 = 0.0026 V/m

(3) Conversion from Linear to Log, using the following formula

Volts to dBuV = 20 log (*Volts)* + 120

E (in dBuV) = 20 Log (0.0026) + 120 = **68.23/m @ 3 meter**

Test Procedure

Ref. C63.10-2009 section 6.5 & 6.6

Test Procedure
1. Using Vasona software, configure the spectrum analyzer as shown in the test parameter table below (be sure to enter all losses between the transmitter output and the spectrum analyzer). 2. Place the radio in continuous transmit mode. Maximize Turntable (find worst case table angle) and maximize Antenna (find worst case height). 3. Use the peak marker function to determine the maximum amplitude level. 4. Center marker frequency and perform final measurement in Quasi-peak (≤ 1Ghz) and Average (above 1 GHz) 4. Record at least 6 highest readings for the worst case operating mode.

Ref. C63.10-2009 section 4 / CISPR16-1-1

Test Parameters
Span = Entire frequency range or segment if necessary. Reference Level = 80 dBuV RBW = 100 kHz (less than or equal to 1 GHz); 1 MHz (above 1 GHz) VBW ≥ 3 x RBW Detector = Peak & Quasi-Peak (frequency range 30 MHz to 1 GHz); Peak & Average (frequency range above 1 GHz); Change VBW to 10 Hz for average measurement Sweep Time = Couple

. The system was evaluated up to 26 GHz but there were no measurable emissions above 18 GHz.
. These data represent the worst case mode data for all supported operating modes and antennas.

- For emissions below 1000 MHz, measurements shall be performed using a CISPR quasi-peak detector and the related measurement bandwidth. As an alternative to CISPR quasi-peak measurement, compliance with the emission limit can be demonstrated using measuring equipment employing a peak detector function properly adjusted for factors such as pulse desensitization as required, with an equal or greater measurement bandwidth relative to the applicable CISPR quasi-peak bandwidth.
- Above 1000 MHz, measurements shall be performed using an average detector with a minimum resolution bandwidth of 1 MHz.

Note1: A Notch Filter was used during formal testing from 1 – 18GHz to help prevent the front end of the analyzer from over loading. The Notch filters used are designed to suppress TX fundamental frequency but do not effect harmonics of the fundamental frequency from being measured

Note2: The data displayed on the plots detailed in the graphical test results section were measured using a 'Peak Detector'. Please refer to the results table for the detectors used during formal measurements.

Recorded Test Data:

TX Radiated Spurious Emissions Test Result Tables for 802.11a (Worst Case TX mode / Qp)

Subtest Date:	07-Nov-2014
Engineer	Jose Aguirre
Lab Information	Building P, 5m Anechoic
Subtest Title	Transmitter Spurious Emissions
Frequency Range	30.0 MHz - 1.0 GHz
Comments on the above Test Results	Worst Case TX mode– 6.0 Mbps

Frequency (MHz)	Raw (dBuV)	Cab Loss (dB)	AF (dB)	Level (dBuV)	Detector	Polarity	Height (cm)	Azt (Deg)	Limit (dBuV)	Margin (dB)	Results Pass / Fail	Comments
375.005	20.3	1.8	15.1	37.2	Quasi-Pk	V	195	17	47.5	-10.3	Pass	Worst Case
45.742	20.2	0.6	9.9	30.8	Quasi-Pk	V	151	76	40.5	-9.7	Pass	Worst Case
199.988	12.2	1.3	12.6	26.1	Quasi-Pk	H	128	83	40.5	-14.4	Pass	Worst Case
71.605	20	0.8	8.1	28.8	Quasi-Pk	V	136	226	40.5	-11.7	Pass	Worst Case
32.101	5.1	0.5	18.9	24.5	Quasi-Pk	V	216	338	40.5	-16	Pass	Worst Case
249.954	14.4	1.5	11.5	27.3	Quasi-Pk	V	171	338	47.5	-20.2	Pass	Worst Case

TX Radiated Spurious Emissions Test Result Tables for 802.11a mode/ UNII-4

Subtest Date:	07-Nov-2014
Engineer	Jose Aguirre
Lab Information	Building P, 5m Anechoic
Subtest Title	Transmitter Spurious Emissions
Frequency Range	1.0 GHz - 18.0 GHz
Comments on the above Test Results	802.11a / 6.0 Mbps

Band of Operating Frequency: UNII-4 (Ch Low)

Frequency (MHz)	Raw (dBuV)	Cab Loss (dB)	AF (dB)	Level (dBuV)	Detector	Polarity	Height (cm)	Azt (Deg)	Limit (dBuV)	Margin (dB)	Results Pass /Fail	Comments
5752.90704	60.9	4.7	-4	61.59	Peak	H	100	0	68.23	-6.64	------	Fundamental
11489.855	40.8	6.6	4.4	51.77	Peak	V	112	170	74	-22.23	Pass	TX / Ch149
17234.469	42.8	8.3	7.8	58.89	Peak	V	112	170	68.23	-9.34	Pass	TX / Ch149
11489.212	41.5	6.6	4.4	52.41	Peak	H	100	200	74	-21.59	Pass	TX / Ch149
11490.001	30.6	6.6	4.4	41.51	Average	V	120	165	54	-12.5	Pass	TX / Ch149
11489.926	31	6.6	4.4	41.91	Average	H	100	212	54	-12.1	Pass	TX / Ch149

Band of Operating Frequency: UNII-4 (Ch Mid)

Frequency (MHz)	Raw (dBuV)	Cab Loss (dB)	AF (dB)	Level (dBuV)	Detector	Polarity	Height (cm)	Azt (Deg)	Limit (dBuV)	Margin (dB)	Results Pass /Fail	Comments
5809.419	59.93	4.71	-4.07	60.58	Peak	H	100	0	74	-13.42	------	Fundamental
11570.203	40.1	6.6	4.7	51.32	Peak	H	100	236	74	-22.68	Pass	TX / Ch157
11571.111	40.2	6.6	4.7	51.48	Peak	V	116	164	74	-22.52	Pass	TX / Ch157
17354.288	42.4	8.6	7.5	58.52	Peak	V	116	164	68.23	-9.71	Pass	TX / Ch157
17355.049	42.9	8.6	7.5	59.01	Peak	H	100	236	68.23	-9.22	Pass	TX / Ch157
11570.496	30.68	6.58	4.67	41.92	Average	V	115	166	54	-12.08	Pass	TX / Ch157
11569.498	30.74	6.58	4.66	41.98	Average	H	100	225	54	-12.02	Pass	TX / Ch157

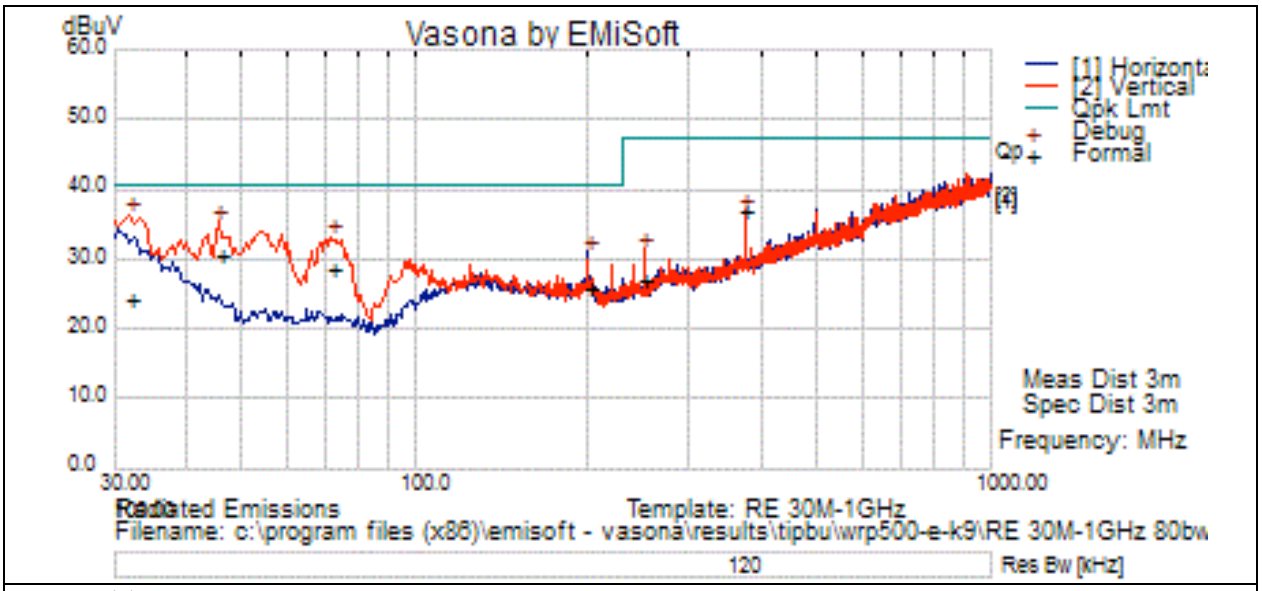
Band of Operating Frequency: UNII-4 (Ch High)

Frequency (MHz)	Raw (dBuV)	Cab Loss (dB)	AF (dB)	Level (dBuV)	Detector	Polarity	Height (cm)	Azt (Deg)	Limit (dBuV)	Margin (dB)	Results Pass /Fail	Comments
11650.886	39.7	6.8	5.7	52.16	Peak	V	116	168	74	-21.84	Pass	TX / Ch165
17474.743	42.9	8.5	8.4	59.78	Peak	V	116	168	68.23	-8.45	Pass	TX / Ch165
11651.076	41.4	6.8	5.7	53.85	Peak	H	100	250	74	-20.15	Pass	TX / Ch165
17475.893	42.1	8.5	8.4	58.97	Peak	H	100	250	68.23	-9.26	Pass	TX / Ch165
11649.417	30.2	6.8	5.7	42.63	Average	H	100	255	54	-11.37	Pass	TX / Ch165
11651.000	30.2	6.8	5.7	42.69	Average	V	115	174	54	-11.31	Pass	TX / Ch165

Note1: 68.23 dBuV/m field strength limit @3m distance was converted from **t**he specified 27 dBm/Mhz limit in FCC15.407 (b). Refer to limit conversion section for more detail.

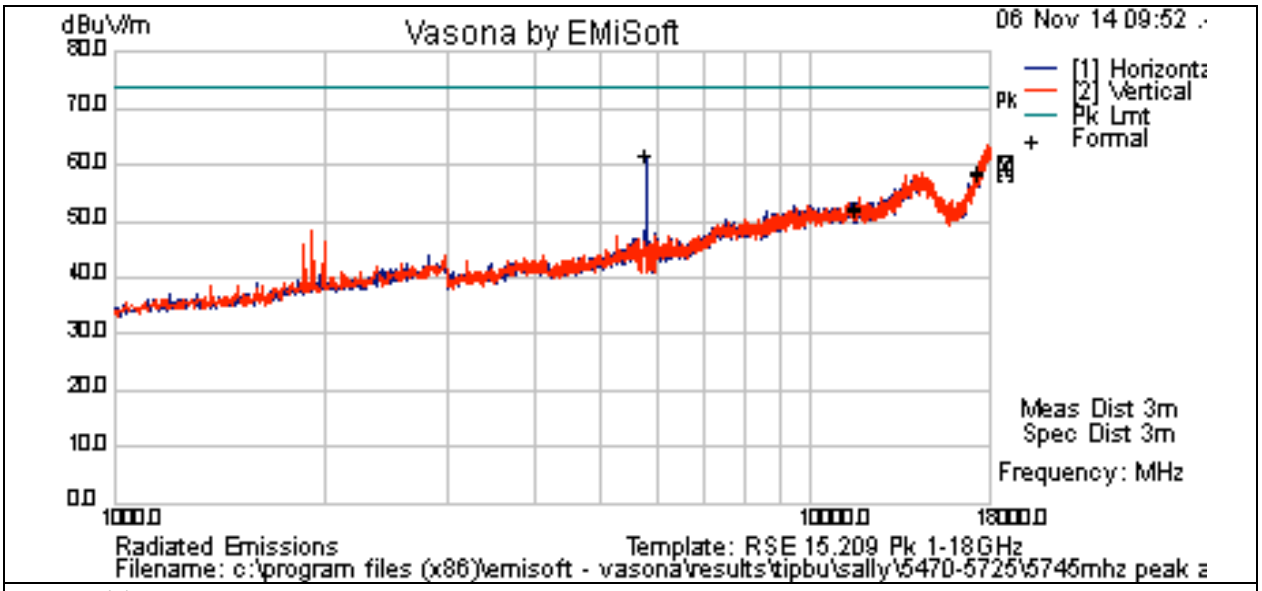
Note2: The frequencies in bolt type represent frequencies inside the restricted bands.

Graphical Test Results for TX 802.11a mode:

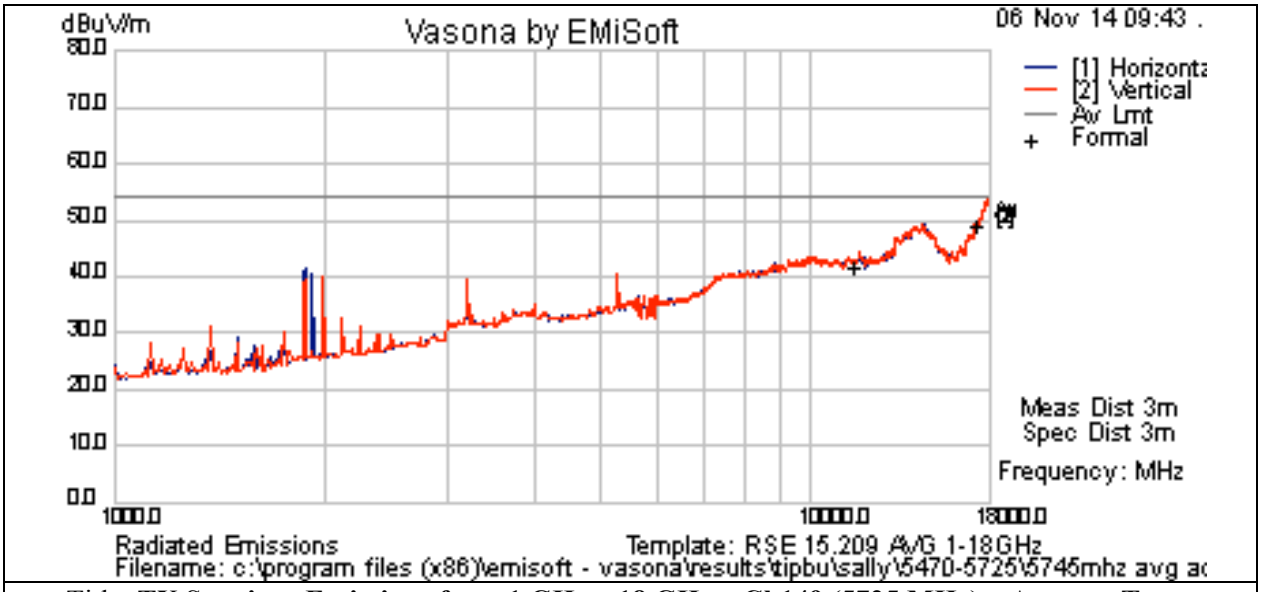


Title: **TX Spurious Emissions from 30 MHz – 1 GHz – Ch64 (5320 MHz) – Peak Trace**

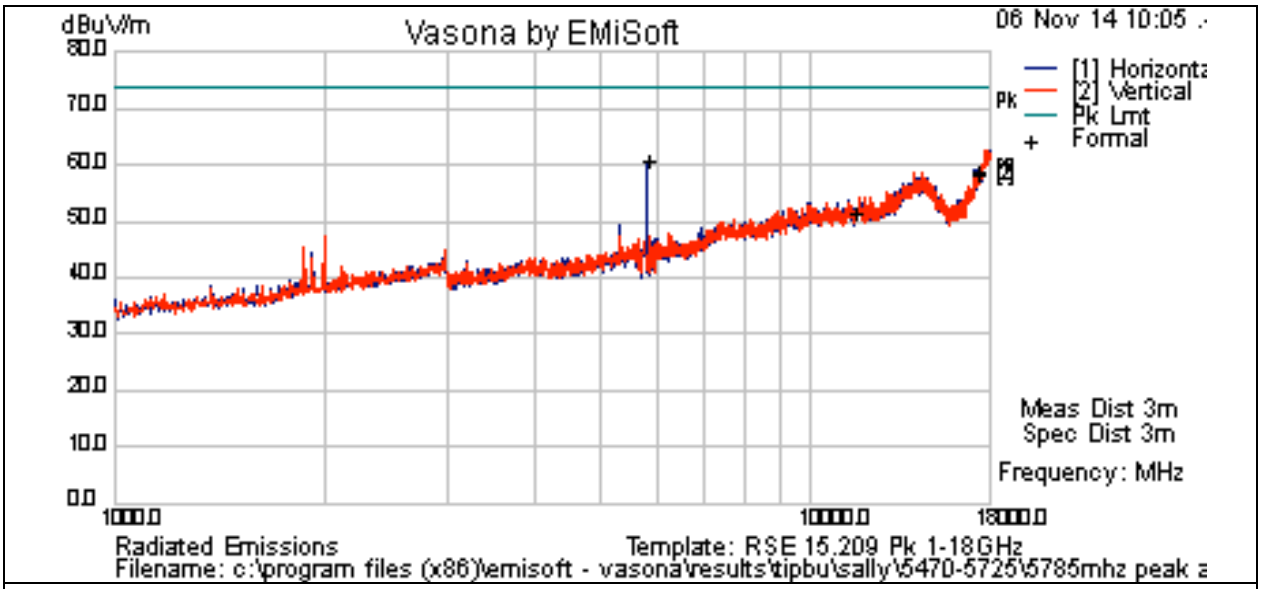
Note: The data displayed on the plots detailed in the graphical test results section were measured using a 'Peak Detector'. Please refer to the results table for the detectors used during formal measurements.



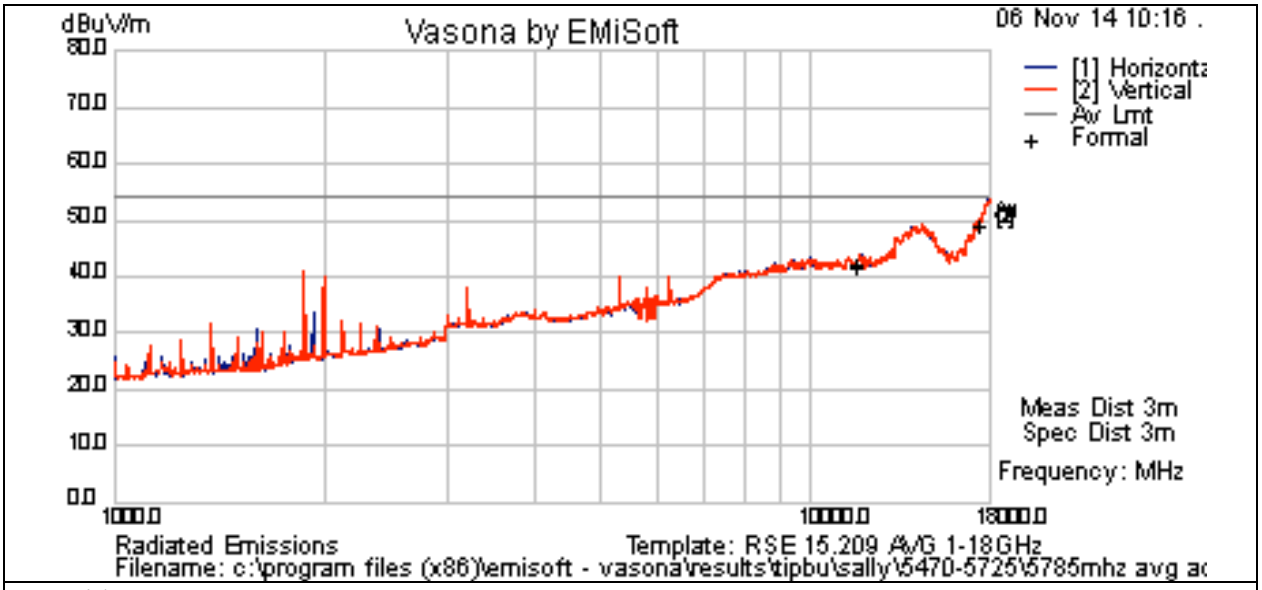
Title: **TX Spurious Emissions from 1 GHz – 18 GHz – Ch149 (5725 MHz) – Peak Trace**



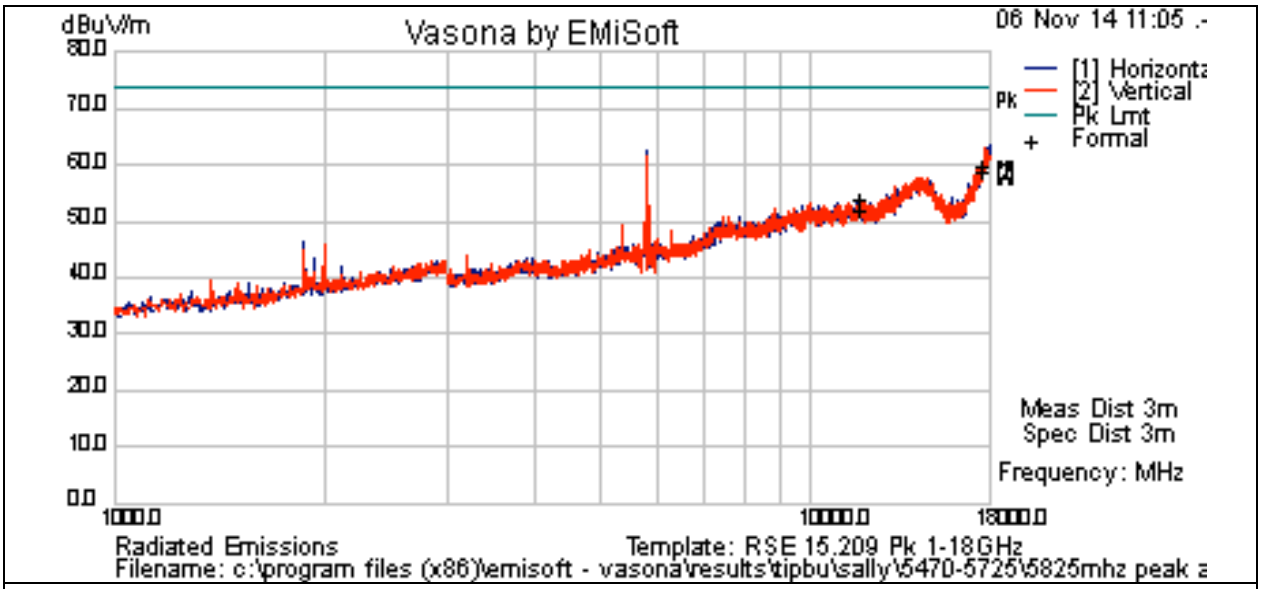
Title: **TX Spurious Emissions from 1 GHz – 18 GHz – Ch149 (5725 MHz) – Average Trace**



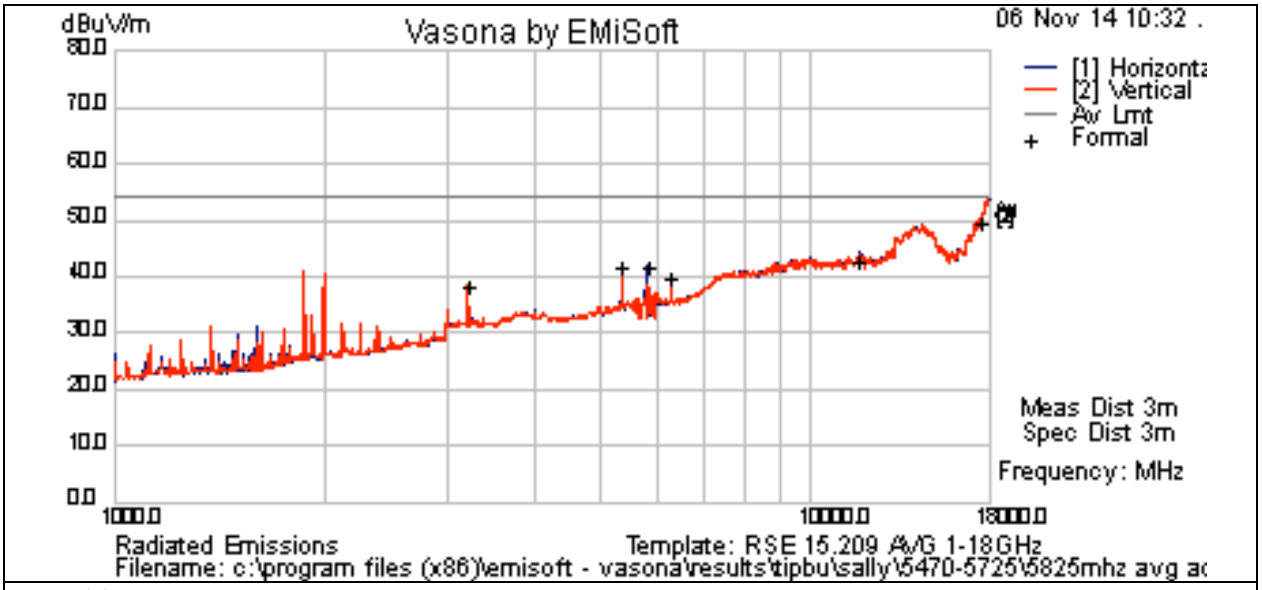
Title: **TX Spurious Emissions from 1 GHz – 18 GHz – Ch157 (5785 MHz) – Peak Trace**



Title: **TX Spurious Emissions from 1 GHz – 18 GHz – Ch157 (5785 MHz) – Average Trace**



Title: **TX Spurious Emissions from 1 GHz – 18 GHz – Ch165 (5825 MHz) – Peak Trace**



Title: **TX Spurious Emissions from 1 GHz – 18 GHz – Ch165 (5825 MHz) – Average Trace**

Receiver Radiated Spurious Emissions

RSS-Gen 5.0 / 7.1: The receiver shall be operated in the normal receive mode near the mid-point of the band in which the receiver is designed to operate. And spurious emissions from the receivers shall not exceed the radiated limits shown in the table 2 in section 7.1.2 of RSS-Gen.

For either method, the search for spurious emissions shall be from the lowest frequency internally generated or used in the receiver (e.g. local oscillator frequency, intermediate or carrier frequency), or 30 MHz, whichever is higher, to at least 3 times the highest turntable or local oscillator frequency whichever is higher, without exceeding 40 GHz.

For emissions below 1000 MHz, measurements shall be performed using a CISPR quasi-peak detector and the related measurement bandwidth. Above 1000 MHz, measurements shall be performed using an average detector with a minimum resolution bandwidth of 1 MHz.

As an alternative to CISPR quasi-peak measurement, compliance with the emission limit can be demonstrated using measuring equipment employing a peak detector function properly adjusted for factors such as pulse desensitization as required, with an equal or greater than the applicable CISPR quasi-peak bandwidth or 1 MHz bandwidth, respectively.

Table 2: Radiated Limits of Receiver Spurious Emissions

Frequency (MHz)	Field strength (uV/meter)*	Field strength (dBuV/meter)	Measurement distance (meters)
30-88	100	40 Qp	3
88-216	150	43.5 Qp	3
216-960	200	46 Qp	3
Above 960	500	54 Av / 74 Pk	3

*Measurements for compliance with limits in the above table may be performed at distances other than 3 metres, in accordance with Section 6.5.

Test Procedure

Ref. C63.10-2009/2009 section 6.5 & 6.6

Test Procedure
1. Using Vasona software, configure the spectrum analyzer as shown in the test parameter table below (be sure to enter all losses between the transmitter output and the spectrum analyzer). 2. Place the radio in continuous Receiver mode. Maximize Turntable (find worst case table angle) and maximize Antenna (find worst case height). 3. Use the peak marker function to determine the maximum amplitude level. 4. Center marker frequency and perform final measurement in Quasi-peak (≤ 1Ghz) and Average (above 1GHz) 5. Record at least 6 highest readings.

Ref. C63.10-2009/2009 section 4 / CISPR16-1-1

Test Parameters
Span = Entire frequency range or segment if necessary. Reference Level = 80 dBuV RBW = 100 kHz (less than or equal to 1 GHz); 1 MHz (above 1 GHz) VBW ≥ 3 x RBW Detector = Peak & Quasi-Peak (frequency range 30 MHz to 1 GHz); Peak & Average (frequency range above 1 GHz); Changing VBW to 10 Hz for average measurement Sweep Time = Couple

Recorded Test Data:

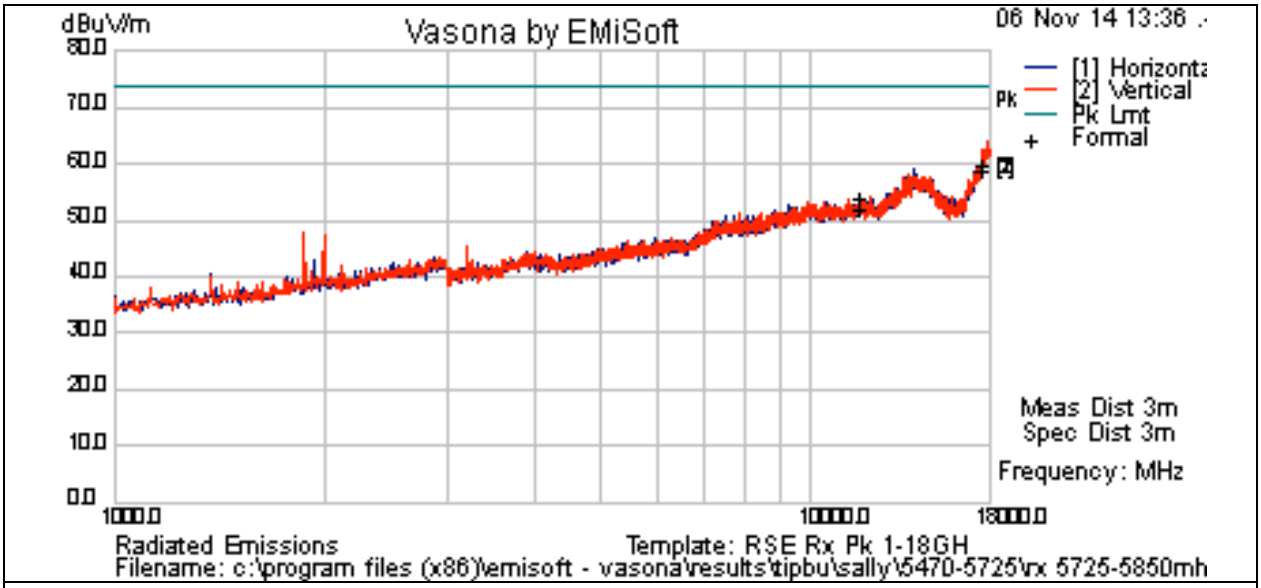
RX Spurious Emissions Test Result Tables for 802.11a / UNII-4

Subtest Date:	06-Nov-2014
Engineer	Jose Aguirre
Lab Information	Building P, 5m Anechoic
Subtest Title	Transmitter Spurious Emissions
Frequency Range	1 GHz - 18 GHz
Comments on the above Test Results	RX Mode

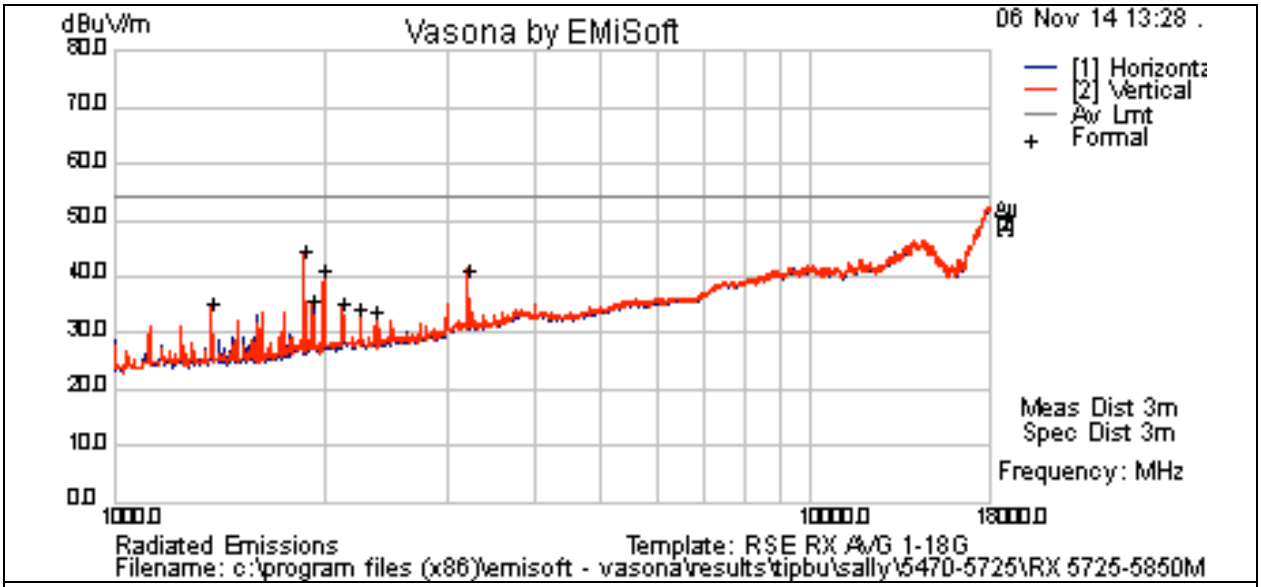
Band of Operating Frequency: UNII-4 (RX mode)

Frequency (MHz)	Raw (dBuV)	Cab Loss (dB)	AF (dB)	Level (dBuV)	Detector	Polarity	Height (cm)	Azt (Deg)	Limit (dBuV)	Margin (dB)	Results Pass /Fail	Comments
1874.981	50.5	2.5	-6.2	46.73	Peak	V	100	1	74	-27.3	Pass	RX Mode
2002.13	49.2	2.6	-6.2	45.57	Peak	V	100	1	74	-28.4	Pass	RX Mode
3216.447	45.7	3.3	-4.2	44.79	Peak	V	100	1	74	-29.2	Pass	RX Mode
1874.922	48.2	2.47	-6.2	44.48	Average	V	100	349	54	-9.52	Pass	RX Mode
3216.469	42.22	3.31	-4.22	41.32	Average	V	100	260	54	-12.68	Pass	RX Mode
2002.183	44.71	2.6	-6.21	41.09	Average	V	100	172	54	-12.91	Pass	RX Mode
1922.645	39.28	2.5	-6.06	35.72	Average	V	100	172	54	-18.28	Pass	RX Mode
2124.142	38.56	2.65	-6.09	35.12	Average	V	100	260	54	-18.88	Pass	RX Mode
1376.482	40.79	2.12	-7.83	35.09	Average	V	100	260	54	-18.91	Pass	RX Mode
2251.404	37.66	2.74	-5.87	34.52	Average	V	100	260	54	-19.48	Pass	RX Mode
2373.362	36.86	2.82	-5.61	34.07	Average	V	100	260	54	-19.93	Pass	RX Mode

Graphical Test Results for 802.11a RX Mode:



Title: **RX Spurious Emissions from 1GHz – 18GHz – Ch165 (5825 MHz) – Peak**



Title: **RX Spurious Emissions from 1GHz – 18GHz – Ch165 (5825 MHz) – Average**

AC Power Line Conducted Emissions

FCC 15.207: (a) Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 μH/50 ohms line impedance stabilization network (LISN).

RSS-Gen 8.8 : A radio apparatus that is designed to be connected to the public utility (AC) power line shall ensure that the radio frequency voltage, which is conducted back onto the AC power line on any frequency or frequencies within the band 0.15 MHz to 30 MHz shall not exceed the limits in Table 3 shown in this section.

Test Procedure

C63.10:2009
Section 6.2.2 Measurement requirements
Measured levels of ac power-line conducted emission shall be the emission voltages from the voltage probe or across the 50 Ω LISN port (to which the EUT is connected), where permitted, terminated into a 50 Ω measuring instrument, or where permitted or required, the emission currents on the power line sensed by a current probe. All emission voltage and current measurements shall be made on each current-carrying conductor at the plug end of the EUT power cord by the use of mating plugs and receptacles on the LISN, if used. Equipment shall be tested with power cords that are normally supplied or recommended by the
manufacturer, and that have electrical and shielding characteristics that are the same as those cords normally supplied or recommended by the manufacturer. For those measurements, using a LISN, the 50 Ω measuring port is terminated by a measuring instrument having a 50 Ω input impedance. All other ports are terminated in 50 Ω loads. Figure 5, Figure 6, and Figure 7 show typical test setups for ac power-line conducted emissions testing (see 6.13). For information about the use of a RF-shielded (screen) room, vertical conducting plane and voltage probe, see ANSI C63.4.

Tabletop devices shall be placed on a platform of nominal size, 1 m by 1.5 m, raised 80 cm above the reference ground plane. The vertical conducting plane or wall of an RF-shielded (screen) room shall be located 40 cm to the rear of the EUT. Floor-standing devices shall be placed either directly on the reference ground-plane or on insulating material as described in ANSI C63.4. All other surfaces of tabletop or floor standing EUTs shall be at least 80 cm from any other grounded conducting surface, including the case or cases of one or more LISNs.

6.2.5 Final ac power-line conducted emission measurements
Based on the exploratory tests of the EUT performed in 6.2.4, the one EUT cable configuration and arrangement and mode of operation that produced the emission with the highest amplitude relative to the limit is selected for the final measurement, while applying the appropriate modulating signal to the EUT. If the EUT is relocated from an exploratory test site to a final test site, the highest emissions shall be re-maximized at the final test location before final ac power-line conducted emission measurements are performed. The final test on all current-carrying conductors of all of the power cords to the equipment that comprises the EUT (but not the cords associated with other non-EUT equipment in the system) is then performed for the full frequency range for which the EUT is being tested for compliance without further variation of the EUT arrangement, cable positions, or EUT mode of operation. If the EUT is comprised of equipment units that have their own separate ac power connections, e.g., floor-standing equipment with independent power cords for each shelf that are able to connect directly to the ac power network, each current-carrying conductor of one unit is measured while the other units are connected to a second (or more) LISN(s). All units shall be separately measured. If a power strip is provided by the manufacturer, to supply all of the units making up the EUT, only the conductors in the power cord of the power strip shall be measured.

Record the six highest EUT emissions relative to the limit of each of the current-carrying conductors of the power cords of the equipment that comprises the EUT over the frequency range specified by the procuring or regulatory agency.
Ref. C63.10-2009 section 6.2

Test Procedure
1. Using Vasona software, configure the spectrum analyzer as shown above (be sure to enter all losses between the transmitter output and the spectrum analyzer). 2. Set the radio in continuous transmit mode. 3. Connect cable end to LISN Hot port and other cable end to the spectrum Analyzer/EMC receiver RF input port. Terminate the LISN neutral port with a 50 Ω impedance terminator. 4. Sweep the frequency range from 150 kHz to 30 MHz (segment if necessary) 5. Use the peak marker function to determine the maximum amplitude level. 6. Center marker frequency and perform final measurement using applicable detector (Quasi-Pk/Average). 7. Record at least 6 highest reading for the worst case operating modes in Quasi-peak/Average. 8. Repeat the test on Neutral lead. 9. Repeat step 3 – 7 with the radio sets in the Receiver mode. 10. Record at least 6 highest reading in Quasi-peak/Average

Ref. C63.10-2009 section 4 / CISPR16-1-1

Test Parameters
Span = Entire frequency range or segment if necessary. Reference Level = 70 dBuV RBW = 9 kHz VBW ≥ 3 x RBW Sweep Time = Couple Detector = Quasi-Peak & Average

Recorded Test Data for 802.11a mode:

Conducted Emissions Test Result Tables for 802.11a (TX Mid Channel/ Quasi-Peak & Average)

Subtest Date:	12-Nov-2014
Engineer	Danh Le
Lab Information	Building B, 3m Anechoic
Subtest Title	Conducted Emissions
Frequency Range	150 kHz - 30 MHz
Comments on the above Test Results	TX Ch Mid– 6 Mbps

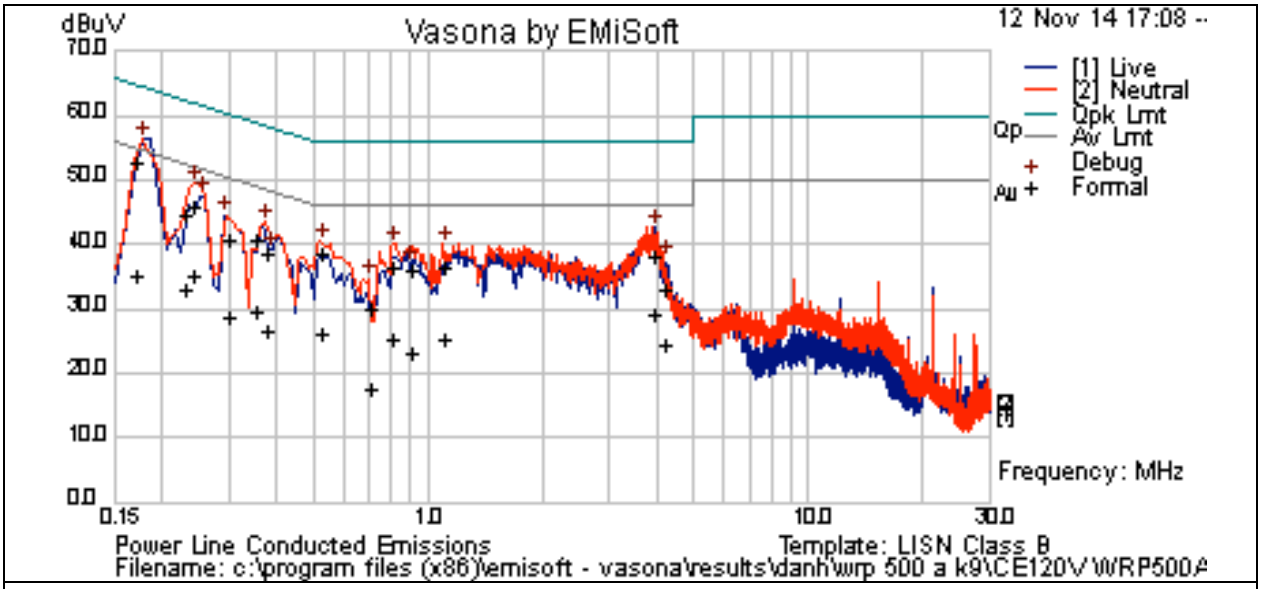
Frequency (MHz)	Raw (dBuV)	Cab Loss (dB)	Factors (dB)	Level (dBuV)	Detector	Lines (Live/Neutral)	Limit (dBuV)	Margin (dB)	Results Pass / Fail	Comments
0.1715	31.6	20.98	0.03	52.61	Quasi Peak	Live	64.89	-12.28	Pass	TX / Ch Mid
0.2418	25.04	20.65	0.02	45.71	Quasi Peak	Live	62.03	-16.33	Pass	TX / Ch Mid
0.2418	14.42	20.65	0.02	35.09	Average	Live	52.03	-16.95	Pass	TX / Ch Mid
3.9266	9	20	0.04	29.04	Average	Live	46	-16.96	Pass	TX / Ch Mid
0.5285	18.5	20.03	0.03	38.56	Quasi Peak	Neutral	56	-17.44	Pass	TX / Ch Mid
0.2284	24.07	20.7	0.03	44.81	Quasi Peak	Neutral	62.51	-17.7	Pass	TX / Ch Mid
3.9266	18.12	20	0.04	38.16	Quasi Peak	Live	56	-17.84	Pass	TX / Ch Mid
0.3557	20.58	20.27	0.02	40.88	Quasi Peak	Neutral	58.83	-17.95	Pass	TX / Ch Mid
0.2284	12.5	20.7	0.03	33.24	Average	Neutral	52.51	-19.27	Pass	TX / Ch Mid
0.3557	9.22	20.27	0.02	29.52	Average	Neutral	48.83	-19.31	Pass	TX / Ch Mid
0.8067	16.65	20.01	0.03	36.68	Quasi Peak	Neutral	56	-19.32	Pass	TX / Ch Mid
0.2986	20.47	20.44	0.02	40.94	Quasi Peak	Live	60.28	-19.34	Pass	TX / Ch Mid
1.1028	16.53	19.99	0.06	36.58	Quasi Peak	Neutral	56	-19.42	Pass	TX / Ch Mid
0.1715	14.12	20.98	0.03	35.13	Average	Live	54.89	-19.76	Pass	TX / Ch Mid
0.9061	16.09	20	0.02	36.1	Quasi Peak	Live	56	-19.9	Pass	TX / Ch Mid
0.5285	6.03	20.03	0.03	26.09	Average	Neutral	46	-19.91	Pass	TX / Ch Mid
0.3754	18.2	20.22	0.03	38.45	Quasi Peak	Live	58.38	-19.93	Pass	TX / Ch Mid
0.8067	5.43	20.01	0.03	25.47	Average	Neutral	46	-20.53	Pass	TX / Ch Mid
1.1028	5.08	19.99	0.06	25.13	Average	Neutral	46	-20.87	Pass	TX / Ch Mid
0.2986	8.37	20.44	0.02	28.84	Average	Live	50.28	-21.44	Pass	TX / Ch Mid
0.3754	6.49	20.22	0.03	26.74	Average	Live	48.38	-21.64	Pass	TX / Ch Mid
4.189	4.23	20.01	0.03	24.27	Average	Live	46	-21.73	Pass	TX / Ch Mid
0.9061	3.12	20	0.02	23.14	Average	Live	46	-22.86	Pass	TX / Ch Mid
4.189	12.81	20.01	0.03	32.85	Quasi Peak	Live	56	-23.15	Pass	TX / Ch Mid
0.7049	9.99	20.02	0.03	30.04	Quasi Peak	Neutral	56	-25.96	Pass	TX / Ch Mid
0.7049	-2.55	20.02	0.03	17.5	Average	Neutral	46	-28.5	Pass	TX / Ch Mid

Subtest Date:	12-Nov-2014
Engineer	Danh Le
Lab Information	Building B, 3m Anechoic
Subtest Title	Conducted Emissions
Frequency Range	150 kHz - 30 MHz
Comments on the above Test Results	Receiver Mode

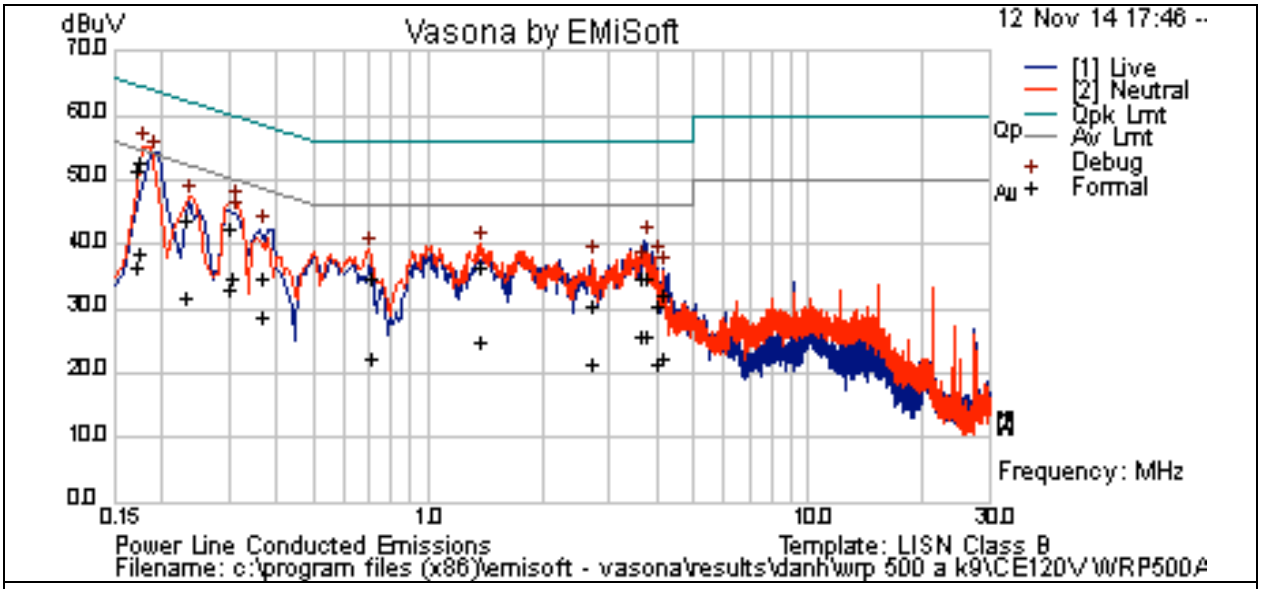
Frequency (MHz)	Raw (dBuV)	Cab Loss (dB)	Factors (dB)	Level (dBuV)	Detector	Lines (Live/Neutral)	Limit (dBuV)	Margin (dB)	Results Pass / Fail	Comments
0.1735	31.68	20.97	0.05	52.7	Quasi Peak	Live	64.79	-12.1	Pass	RX Mode
0.1713	30.51	20.98	0.03	51.53	Quasi Peak	Neutral	64.9	-13.37	Pass	RX Mode
0.3024	14.41	20.43	0.02	34.86	Average	Neutral	50.18	-15.31	Pass	RX Mode
0.1735	17.61	20.97	0.05	38.63	Average	Live	54.79	-16.16	Pass	RX Mode
0.3003	12.43	20.44	0.03	32.91	Average	Live	50.23	-17.33	Pass	RX Mode
0.3003	22.1	20.44	0.03	42.57	Quasi Peak	Live	60.23	-17.66	Pass	RX Mode
0.1713	15.43	20.98	0.03	36.44	Average	Neutral	54.9	-18.45	Pass	RX Mode
0.2291	22.95	20.7	0.03	43.69	Quasi Peak	Neutral	62.48	-18.79	Pass	RX Mode
1.3649	16.54	19.98	0.04	36.56	Quasi Peak	Neutral	56	-19.44	Pass	RX Mode
3.6494	5.91	20	0.05	25.95	Average	Live	46	-20.05	Pass	RX Mode
0.3623	8.31	20.26	0.03	28.59	Average	Live	48.68	-20.08	Pass	RX Mode
3.7308	5.8	20	0.04	25.84	Average	Live	46	-20.16	Pass	RX Mode
0.2291	10.92	20.7	0.03	31.65	Average	Neutral	52.48	-20.83	Pass	RX Mode
0.7047	14.9	20.02	0.03	34.95	Quasi Peak	Neutral	56	-21.05	Pass	RX Mode
1.3649	4.93	19.98	0.04	24.95	Average	Neutral	46	-21.05	Pass	RX Mode
3.6494	14.83	20	0.05	34.87	Quasi Peak	Live	56	-21.13	Pass	RX Mode
3.7308	14.82	20	0.04	34.86	Quasi Peak	Live	56	-21.14	Pass	RX Mode
0.7047	2.49	20.02	0.03	22.54	Average	Neutral	46	-23.46	Pass	RX Mode
4.1444	12.32	20.01	0.04	32.37	Quasi Peak	Live	56	-23.63	Pass	RX Mode
4.1444	2.19	20.01	0.04	22.24	Average	Live	46	-23.76	Pass	RX Mode
0.3623	14.58	20.26	0.03	34.87	Quasi Peak	Live	58.68	-23.81	Pass	RX Mode
2.7089	1.55	19.97	0.03	21.55	Average	Neutral	46	-24.45	Pass	RX Mode
3.9794	1.33	20	0.04	21.38	Average	Neutral	46	-24.62	Pass	RX Mode
0.3024	14.5	20.43	0.02	34.95	Quasi Peak	Neutral	60.18	-25.23	Pass	RX Mode
2.7089	10.68	19.97	0.03	30.67	Quasi Peak	Neutral	56	-25.33	Pass	RX Mode
3.9794	10.34	20	0.04	30.38	Quasi Peak	Neutral	56	-25.62	Pass	RX Mode

Graphical Test Results for 802.11a Mode:

Note: The data displayed on the plots detailed in this section were measured using a 'Peak Detector'.
Please refer to the results table for the detectors used during final measurements.



Title: **TX Conducted Emissions from 150kHz – 30MHz – Ch40 (5200 MHz)**



Title: **RX Conducted Emissions from 150kHz – 30MHz – Ch40 (5200 MHz)**

Appendix B: Photographs of Test Setups

Setup photos are in a separate document.

Appendix C: Test Equipment/Software Used to perform the test

Test Equipment List					
Equipment #	**Manufacturer**	**Model**	**Description**	**Last Cal**	**Next Cal Due Date**
CIS005691	Miteq	NSP1800-25-S1	Broadband Preamplifier (1-18GHz)	27-JAN-14	27-JAN-15
CIS008448	Cisco	NSA 5m Chamber	NSA 5m Chamber	07-OCT-14	07-OCT-15
CIS021117	Micro-Coax	UFB311A-0-2484-520520	RF Coaxial Cable, to 18GHz, 248.4 in	25-AUG-14	25-AUG-15
CIS025655	Micro-Coax	UFB311A-1-0840-504504	RF Coaxial Cable, to 18GHz, 84 in	27-FEB-14	27-FEB-15
CIS025658	Micro-Coax	UFB311A-1-0840-504504	RF Coaxial Cable, to 18GHz, 84 in	14-FEB-14	14-FEB-15
CIS032806	Sunol Sciences	JB1	Combination Antenna	20-MAR-14	20-MAR-15
CIS037581	ETS-Lindgren	3117	Double Ridged Waveguide Horn Antenna	16-SEP-14	16-SEP-15
CIS040597	Cisco	Above 1GHz Site Cal	Above 1GHz Cispr Site Verification	28-MAY-14	28-MAY-15
CIS042013	ETS-Lindgren	3117	Double Ridged Waveguide Horn Antenna	09-APR-14	09-APR-15
CIS040641	Rohde & Schwarz	ESU26	EMI Test Receiver	29-JUL-14	29-JUL-15
CIS041935	Newport	iBTHP-5-DB9	5 inch Temp/RH/Press Sensor w/20ft cable	01-APR-14	01-APR-15
CIS049563	Huber + Suhner	Sucoflex 106A	N Type Cable 18GHz	25-AUG-14	25-AUG-15
CIS030666	Micro-Tronics	BRM50702-02	Band Reject Filter, Stop Band=2.4-2.5GHz	03-JUN-14	03-JUN-2015
CIS051741	Rohde & Schwarz	NRP-Z81	Power Meter	08-Jan-14	08-Jan-15
CIS040503	Agilent	E4440A	Spectrum Analyzer	06-Jun-14	06-Jun-15
CIS041995	Mini-Circuits	BW-S6W2+	SMA 6 dB Attenuator	21-MAR-14	21-Mar-15
CIS07036	Agilent	E7401A	EMC Analyzer	11-Sep-14	11-Sep-15
CIS08197	TTL, Inc	H613-150K-50-21378	HP-Filter	17-Apr-14	17-Apr-15
CIS08192	Fisher Custom Com	53779	Pulse Limiter	30-Jul-14	30-Jul-15
CIS046010	Fisher Custom Com	F-090527-1009-1	LISN	20-Jun-14	20-Jun-15

Software Used for Testing
1. Vasona File version 5.073, 5.089 2. Winsoft Radio Automation Software version 1.2