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Report No.: 1409RSU02702
Report Version: V01
Issue Date: 09-25-2014

MEASUREMENT REPORT
FCC PART 15.407 WLAN 802.11a/n/ac

FCC ID:	O9C-BJNGAFB0005
APPLICANT:	Hewlett Packard Company
Application Type:	Certification
Product:	Unified Wired-WLAN Walljack
Model No.:	BJNGA-FB0005, JH048A
Brand Name:	HP
FCC Classification:	Unlicensed National Information Infrastructure (UNII)
FCC Rule Part(s):	Part 15.407
Test Procedure(s):	KDB 789033 D02v01, KDB 662911 D01v02r01 KDB 644545 D03v01
Test Date:	Sep. 15 ~ 24, 2014

Reviewed By : Robin Wu
(Robin Wu)

Approved By : Marlin Chen
(Marlin Chen)

ACCREDITED
TESTING LABORATORY
CERTIFICATE #3628.01

The test results relate only to the samples tested.
This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in KDB 789033 D02v01. Test results reported herein relate only to the item(s) tested.
The test report shall not be reproduced except in full without the written approval of MRT Technology (Suzhou) Co., Ltd.

Revision History

Report No.	Version	Description	Issue Date
1409RSU02702	Rev. 01	Initial report	09-25-2014

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Description Page

§2.1033 General Information

Applicant:	Hewlett Packard Company
Applicant Address:	153 Taylor Street Littleton Massachusetts, United States 01460-1407
Manufacturer:	Hewlett Packard Company
Manufacturer Address:	153 Taylor Street Littleton Massachusetts, United States 01460-1407
Test Site:	MRT Technology (Suzhou) Co., Ltd
Test Site Address:	D8 Building, Youxin Industrial Park, No.2 Tian'edang Rd., Wuzhong Economic Development Zone, Suzhou, China
MRT FCC Registration No.:	809388
FCC Rule Part(s):	Part 15.407
Model No.:	BJNGA-FB0005, JH048A
FCC ID:	O9C-BJNGAFB0005
Test Device Serial No.:	N/A ☐ Production ☒ Pre-Production ☐ Engineering
FCC Classification:	Unlicensed National Information Infrastructure (UNII)
Date(s) of Test:	Sep. 15 ~ 24, 2014
Test Report S/N:	1409RSU02702

Test Facility / Accreditations

Measurements were performed at MRT Laboratory located in Tian'edang Rd., Suzhou, China.

- **MRT Lab is accredited to ISO 17025 by the American Association for Laboratory Accreditation (A2LA) under the American Association for Laboratory Accreditation Program (A2LA Cert. No. 3628.01) in EMC, Telecommunications and Radio testing for FCC, Industry Canada, EU and TELEC Rules.**
- **MRT facility is a FCC registered (MRT Reg. No. 809388) test facility with the site description report on file and has met all the requirements specified in Section 2.948 of the FCC Rules and Industry Canada (11384A-1).**
- **MRT facility is an IC registered (11384A-1) test laboratory with the site description on file at Industry Canada.**

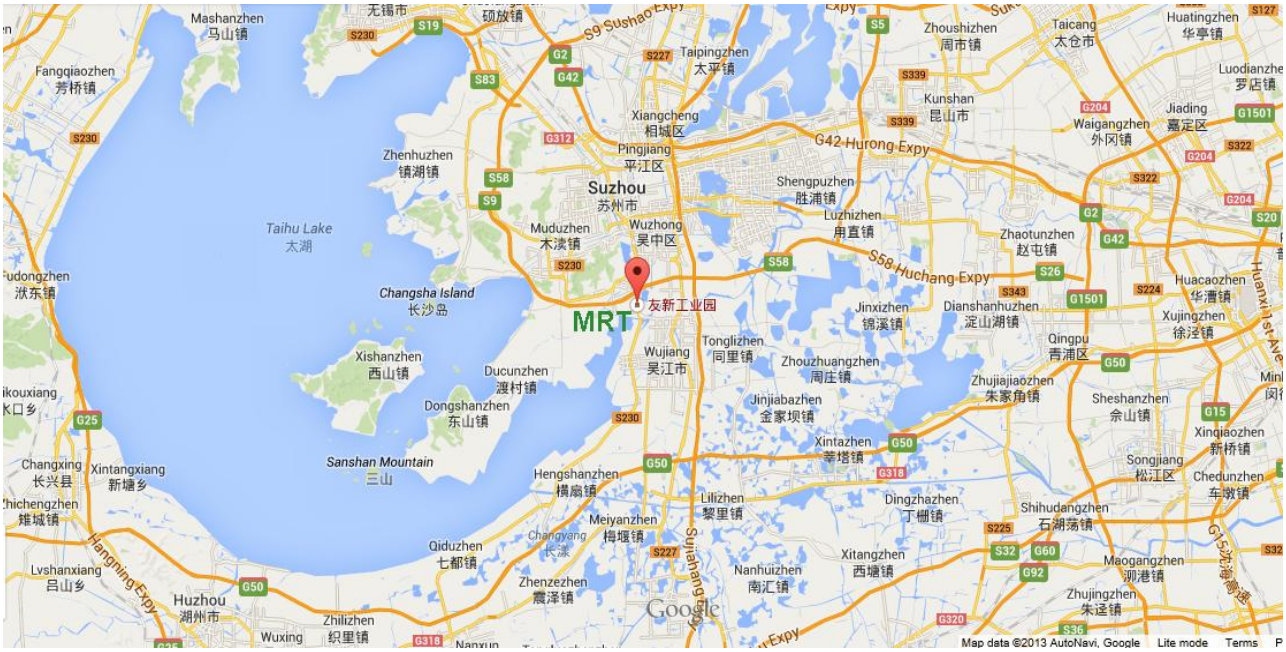
1. INTRODUCTION

1.1. Scope

Measurement and determination of electromagnetic emissions (EMC) of radio frequency devices including intentional and/or unintentional radiators for compliance with the technical rules and regulations of the Federal Communications Commission and the Industry Canada Certification and Engineering Bureau.

1.2. MRT Test Location

The map below shows the location of the MRT LABORATORY, its proximity to the Taihu Lake. These measurement tests were conducted at the MRT Technology (Suzhou) Co., Ltd. Facility located at D8 Building, Youxin Industrial Park, No.2 Tian'edang Rd., Wuzhong Economic Development Zone, Suzhou, China. The detailed description of the measurement facility was found to be in compliance with the requirements of § 2.948 according to ANSI C63.4-2009 on September 30, 2013.



2. PRODUCT INFORMATION

2.1. Equipment Description

Product Name	Unified Wired-WLAN Walljack
Model No.	BJNGA-FB0005, JH048A
Power Type	48Vdc, 0.63A (or POE input)
Frequency Range	For 802.11a/n-HT20: 5180~5320MHz, 5500~5700MHz, 5745~5825MHz For 802.11ac-VHT20: 5180~5320MHz, 5500~5720MHz, 5745~5825MHz For 802.11n-HT40: 5190~5310MHz, 5510~5670MHz, 5755~5795MHz For 802.11ac-VHT40: 5190~5310MHz, 5510~5710MHz, 5755~5795MHz For 802.11ac-VHT80: 5210MHz, 5290MHz, 5530MHz, 5610MHz, 5690MHz, 5775MHz
Maximum Output Power	802.11a: 20.86dBm 802.11n-HT20: 20.77dBm 802.11n-HT40: 20.65dBm 802.11ac-VHT20: 20.81dBm 802.11ac-VHT40: 20.58dBm 802.11ac-VHT80: 20.20dBm
Type of Modulation	802.11a/n/ac: OFDM
Adapter	Brand Name: DVE M/N: DSA-42D-48 2 480063 P/N: JD055B Input: 100-240V ~ 50/60Hz 1.2A Output: +48V ~ 0.63A

2.2. Frequency / Channel Operation

Channel List for 802.11a/n-HT20

Channel	Frequency	Channel	Frequency	Channel	Frequency
36	5180 MHz	40	5200 MHz	44	5220 MHz
48	5240 MHz	52	5260 MHz	56	5280 MHz
60	5300 MHz	64	5320 MHz	100	5500 MHz
104	5520 MHz	108	5540 MHz	112	5560 MHz
116	5580 MHz	120	5600 MHz	124	5620 MHz
128	5640 MHz	132	5660 MHz	136	5680 MHz
140	5700 MHz	149	5745 MHz	153	5765 MHz
157	5785 MHz	161	5805 MHz	165	5825 MHz

Channel List for 802.11ac-VHT20

Channel	Frequency	Channel	Frequency	Channel	Frequency
36	5180 MHz	40	5200 MHz	44	5220 MHz
48	5240 MHz	52	5260 MHz	56	5280 MHz
60	5300 MHz	64	5320 MHz	100	5500 MHz
104	5520 MHz	108	5540 MHz	112	5560 MHz
116	5580 MHz	120	5600 MHz	124	5620 MHz
128	5640 MHz	132	5660 MHz	136	5680 MHz
140	5700 MHz	144	5720 MHz	149	5745 MHz
153	5765 MHz	157	5785 MHz	161	5805 MHz
165	5825 MHz	--	--	--	--

Channel List for 802.11n-HT40

Channel	Frequency	Channel	Frequency	Channel	Frequency
38	5190 MHz	46	5230 MHz	54	5270 MHz
62	5310 MHz	102	5510 MHz	110	5550 MHz
118	5590 MHz	126	5630 MHz	134	5670 MHz
151	5755 MHz	159	5795 MHz	--	--

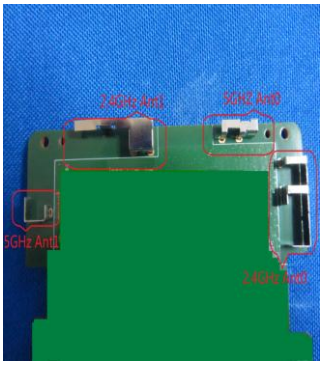
Channel List for 802.11ac-VHT40

Channel	Frequency	Channel	Frequency	Channel	Frequency
38	5190 MHz	46	5230 MHz	54	5270 MHz
62	5310 MHz	102	5510 MHz	110	5550 MHz
118	5590 MHz	126	5630 MHz	134	5670 MHz
142	5710 MHz	151	5755 MHz	159	5795 MHz

Channel List for 802.11ac-VHT80

Channel	Frequency	Channel	Frequency	Channel	Frequency
42	5210 MHz	58	5290 MHz	106	5530 MHz
122	5610 MHz	138	5690 MHz	155	5775 MHz

2.3. Description of Available Antennas

Antenna Type	Frequency Band (GHz)	Manufacturer	Model	Tx Paths	Max Peak Gain (dBi)	Directional Gain (dBi)	
						For Power	For PSD
	2.4	Lite-On Technology Corp.	WP388-FN EVT2	2	Ant 0: 2.7 Ant 1: 3.3	6.02	6.02
	5.2			2	Ant 0: 4.6 Ant 1: 4.2	7.41	7.41
	5.5				Ant 0: 4.9 Ant 1: 4.4	7.66	7.66
	5.8				Ant 0: 5.0 Ant 1: 5.4	8.21	8.21

Note:

1. The EUT supports Cyclic Delay Diversity (CDD) mode, and CDD signals are correlated.

   For CDD transmissions, directional gain is calculated as follows, N_{ANT} = 2, N_{SS} = 1.

   1) If all antennas have the same gain, G_{ANT}, Directional gain = G_{ANT} + Array Gain, where Array Gain is as follows.

   - For power spectral density (PSD) measurements on all devices,
     Array Gain = 10 log (N_{ANT}/ N_{SS}) dB = 3.01;
   - For power measurements on IEEE 802.11 devices,
     Array Gain = 0 dB for N_{ANT} ≤ 4;

   2) If antenna gains are not equal, the user may use either of the following methods to calculate directional gain, provided that each transmit antenna is driven by only one spatial stream:

   - Directional gain may be calculated by using the formulas applicable to equal gain antennas with G_{ANT} set equal to the gain of the antenna having the highest gain;
   - $$DirectionalGain = 10 \cdot \log \left[\frac{\sum_{j=1}^{N_{SS}} \left\{ \sum_{k=1}^{N_{ANT}} g_{j,k} \right\}^2}{N_{ANT}} \right]$$

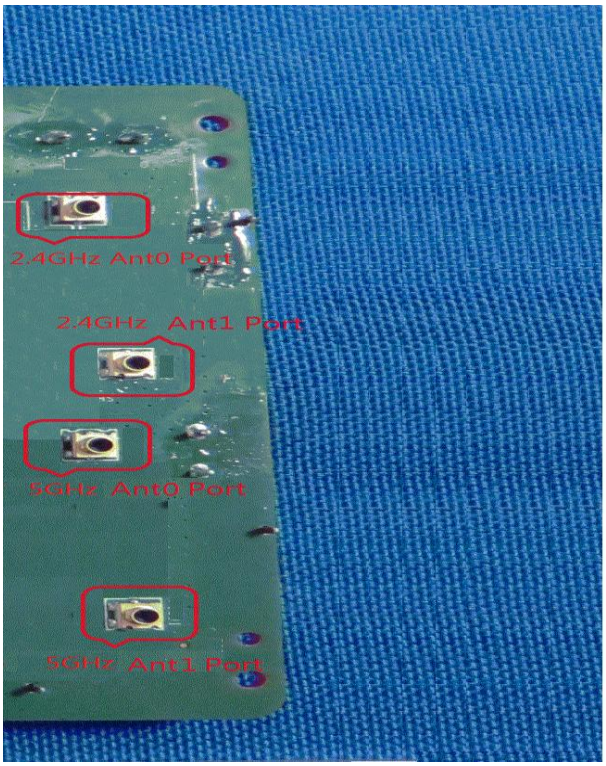
   $g_{j,k} = 10^{G_k/20}$ if the kth antenna is being fed by spatial stream j, or zero if it is not;

   G_k is the gain in dBi of the kth antenna.

2.4. Description of Antenna RF Port

Antenna RF Port				
--	2.4GHz RF Port		5GHz RF Port	
Software Control Port	Ant 0	Ant 1	Ant 0	Ant 1

Antenna RF Port Plot



2.5. Test Mode

Test Mode	Mode 1: Transmit by 802.11a
	Mode 2: Transmit by 802.11n-HT20
	Mode 3: Transmit by 802.11n-HT40
	Mode 4: Transmit by 802.11ac-VHT20
	Mode 5: Transmit by 802.11ac-VHT40
	Mode 6: Transmit by 802.11ac-VHT80

2.6. Test Software

The test utility software used during testing were “ART2-GUI Version: 2.3” and “CART Version: 4.9”. Final Power Parameter Value of the test software.

Test Mode	Test Frequency	Power Parameter Value Ant 0 + 1	Test Mode	Test Frequency	Power Parameter Value Ant 0 + 1
802.11a	5180	17.0	802.11n-HT20	5180	17.0
	5220	17.5		5220	17.5
	5240	17.5		5240	17.5
	5260	17.5		5260	17.5
	5300	17.5		5300	17.5
	5320	17.5		5320	17.5
	5500	16.5		5500	16.5
	5600	17.0		5600	17.5
	5700	16.5		5700	17.0
	5745	17.5		5745	17.5
	5785	17.5		5785	17.5
	5825	17.0		5825	17.5
802.11ac-VHT20	5180	17.0	802.11n-HT40	5190	14.0
	5220	17.5		5230	15.5
	5240	17.5		5270	16.0
	5260	17.5		5310	15.5
	5300	17.5		5510	15.5
	5320	17.5		5590	17.5
	5500	16.5		5670	18.0
	5600	17.5		5755	18.0
	5700	17.0		5795	18.0
	5720	17.5	802.11ac-VHT40	5190	14.0
	5745	17.5		5230	15.5
	5785	17.5		5270	15.5
	5825	17.0		5310	15.0
802.11ac-VHT80	5210	11.5		5510	14.5
	5290	12.5		5590	17.5
	5530	11.5		5670	17.5
	5610	18.0		5710	17.5
	5690	18.0		5755	18.0
	5775	18.0		5795	18.0

2.7. Device Capabilities

This device contains the following capabilities:
2.4GHz WLAN (DTS) and 5GHz WLAN (UNII).
Note: 5GHz (NII) operation is possible in 20MHz, 40MHz and 80MHz channel bandwidths. The maximum achievable duty cycles for all modes were determined based on measurements performed on a spectrum analyzer in zero-span mode with RBW = 8MHz, VBW = 50MHz, and detector = peak per the guidance of Section B)2)b) of KDB 789033 D02v01. The RBW and VBW were both greater than 50/T, where T is the minimum transmission duration, and the number of sweep points across T was greater than 100. The duty cycles are as follows:

- 802.11a 20MHz Bandwidth – 96.7%
- 802.11n 20MHz Bandwidth – 93.7%
- 802.11n 40MHz Bandwidth – 89.0%
- 802.11ac 20MHz Bandwidth – 93.8%
- 802.11ac 40MHz Bandwidth – 89.1%
- 802.11ac 80MHz Bandwidth – 81.5%

2.8. Test Configuration

The **Unified Wired-WLAN Walljack FCC ID: O9C-BJNGAFB0005** was tested per the guidance of KDB 789033 D02v01. ANSI C63.4-2009 was used to reference the appropriate EUT setup for radiated spurious emissions testing and AC line conducted testing.

2.9. EMI Suppression Device(s)/Modifications

No EMI suppression device(s) were added and/or no modifications were made during testing.

2.10. Labeling Requirements

Per 2.1074 & 15.19; Docket 95-19
The label shall be permanently affixed at a conspicuous location on the device; instruction manual or pamphlet supplied to the user and be readily visible to the purchaser at the time of purchase. However, when the device is so small wherein placement of the label with specified statement is not practical, only the trade name and FCC ID must be displayed on the device per Section 15.19(a)(5). Please see attachment for FCC ID label and label location.

3. DESCRIPTION OF TEST

3.1. Evaluation Procedure

The measurement procedures described in the American National Standard for Testing Unlicensed Wireless Devices (ANSI C63.4-2009), and the guidance provided in KDB 789033 D02v01 were used in the measurement of the **Unified Wired-WLAN Walljack FCC ID: O9C-BJNGAFB0005.**
Deviation from measurement procedure…….....None

3.2. AC Line Conducted Emissions

The line-conducted facility is located inside an 8'x4'x4' shielded enclosure. A 1m x 2m wooden table 80cm high is placed 40cm away from the vertical wall and 80cm away from the sidewall of the shielded room. Two 10kHz-30MHz, 50Ω/50uH Line-Impedance Stabilization Networks (LISNs) are bonded to the shielded room floor. Power to the LISNs is filtered by external high-current high-insertion loss power line filters. These filters attenuate ambient signal noise from entering the measurement lines. These filters are also bonded to the shielded enclosure.
The EUT is powered from one LISN and the support equipment is powered from the second LISN. All interconnecting cables more than 1 meter were shortened to a 1 meter length by non-inductive bundling (serpentine fashion) and draped over the back edge of the test table. All cables were at least 40cm above the horizontal reference ground-plane. Power cables for support equipment were routed down to the second LISN while ensuring that that cables were not draped over the second LISN.
Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The RF output of the LISN was connected to the receiver and exploratory measurements were made to determine the frequencies producing the maximum emission from the EUT. The receiver was scanned from 150kHz to 30MHz. The detector function was set to peak mode for exploratory measurements while the bandwidth of the analyzer was set to 9kHz. The EUT, support equipment, and interconnecting cables were arranged and manipulated to maximize each emission. Each emission was also maximized by varying: power lines, the mode of operation or data exchange speed, or support equipment whichever determined the worst-case emission. Once the worst case emissions have been identified, the one EUT cable configuration/arrangement and mode of operation that produced these emissions are used for final measurements on the same test site. The analyzer is set to CISPR quasi-peak and average detectors with a 9kHz resolution bandwidth for final measurements.
An extension cord was used to connect to a single LISN which powered by EUT. The extension cord was calibrated with LISN, the impedance and insertion loss are compliance with the requirements as stated in ANSI C63.4-2009 at Clause 4.3.
Line conducted emissions test results are shown in Section 7.10.

3.3. Radiated Emissions

The radiated test facilities consisted of an indoor 3 meter semi-anechoic chamber used for final measurements and exploratory measurements, when necessary. The measurement area is contained within the semi-anechoic chamber which is shielded from any ambient interference. For measurements above 1GHz absorbers are arranged on the floor between the turn table and the antenna mast in such a way so as to maximize the reduction of reflections. For measurements below 1GHz, the absorbers are removed. An MF Model 210SS turntable is used for radiated measurement. It is a continuously rotatable, remote controlled, metallic turntable and 2 meters (6.56 ft.) in diameter. The turn table is flush with the raised floor of the chamber in order to maintain its function as a ground plane. An 80cm high PVC support structure is placed on top of the turntable.
For all measurements, the spectrum was scanned through all EUT azimuths and from 1 to 4 meter receive antenna height using a broadband antenna from 30MHz up to the upper frequency shown in 15.33(b)(1) depending on the highest frequency generated or used in the device or on which the device operates or tunes. For frequencies above 1GHz, linearly polarized double ridge horn antennas were used. For frequencies below 30MHz, a calibrated loop antenna was used. When exploratory measurements were necessary, they were performed at 1 meter test distance inside the semi-anechoic chamber using broadband antennas, broadband amplifiers, and spectrum analyzers to determine the frequencies and modes producing the maximum emissions. Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The test set-up was placed on top of the 0.8 meter high, 1 x 1.5 meter table. The EUT, support equipment, and interconnecting cables were arranged and manipulated to maximize each emission. Appropriate precaution was taken to ensure that all emissions from the EUT were maximized and investigated. The system configuration, clock speed, mode of operation or video resolution, if applicable, turntable azimuth, and receive antenna height was noted for each frequency found.
Final measurements were made in the semi-anechoic chamber using calibrated, linearly polarized broadband and horn antennas. The test setup was configured to the setup that produced the worst case emissions. The spectrum analyzer was set to investigate all frequencies required for testing to compare the highest radiated disturbances with respect to the specified limits. The turntable containing the EUT was rotated through 360 degrees and the height of the receive antenna was varied 1 to 4 meters and stopped at the azimuth and height producing the maximum emission. Each emission was maximized by changing the orientation of the EUT through three orthogonal planes and changing the polarity of the receive antenna, whichever produced the worst-case emissions. According to 3dB Beam-width of horn antenna, the horn antenna should be always directed to the EUT when rising height.

4. ANTENNA REQUIREMENTS

Excerpt from §15.203 of the FCC Rules/Regulations:

"An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section."

- The antenna of the Unified Wired-WLAN Walljack is **permanently attached.**
- There are no provisions for connection to an external antenna.

Conclusion:

The **Unified Wired-WLAN Walljack FCC ID: O9C-BJNGAFB0005** unit complies with the requirement of §15.203.

5. TEST EQUIPMENT CALIBRATION DATE

Conducted Emissions

Instrument	Manufacturer	Type No.	Serial No.	Cali. Interval	Cali. Due Date
EMI Test Receiver	R&S	ESR7	101209	1 year	2014/11/08
Two-Line V-Network	R&S	ENV216	101683	1 year	2014/11/08
Two-Line V-Network	R&S	ENV216	101684	1 year	2014/11/08
Temperature/ Meter Humidity	Anymetre	TH101B	SR2-01	1 year	2014/11/15

Radiated Emission

Instrument	Manufacturer	Type No.	Serial No.	Cali. Interval	Cali. Due Date
Spectrum Analyzer	Agilent	E4447A	MY45300136	1 year	2014/11/18
EMI Test Receiver	R&S	ESR7	101209	1 year	2014/11/08
Preamplifier	MRT	AP01G18	1310002	1 year	2014/10/07
Preamplifier	MRT	AP18G40	1310001	1 year	2014/10/07
Loop Antenna	Schwarzbeck	FMZB1519	1519-041	1 year	2014/11/24
TRILOG Antenna	Schwarzbeck	VULB9162	9162-047	1 year	2014/11/24
Broad-Band Horn Antenna	Schwarzbeck	BBHA9120D	9120D-1167	1 year	2014/11/24
Broadband Horn Antenna	Schwarzbeck	BBHA9170	9170-549	1 year	2014/12/11
Temperature/Humidity Meter	Anymetre	TH101B	AC1-01	1 year	2014/11/15

Conducted Test Equipment

Instrument	Manufacturer	Type No.	Serial No.	Cali. Interval	Cali. Due Date
Spectrum Analyzer	Agilent	N9010A	MY5144016A	1 year	2015/01/04
Wideband Peak Power Meter	Anritsu	ML2495A	0905006	1 year	2015/01/12
Power Sensor	Anritsu	MA2411B	0846014	1 year	2015/01/12
Temperature & Humidity Chamber	BAOYT	BYH-1500L	1309W043	1 year	2014/11/20
Temperature/Humidity Meter	Anymetre	TH101B	TR3-01	1 year	2014/11/15

6. MEASUREMENT UNCERTAINTY

Where relevant, the following test uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k = 2.

AC Conducted Emission Measurement
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 150kHz~30MHz: ± 3.46dB
Radiated Emission Measurement
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 9kHz ~ 1GHz: ± 4.18dB 1GHz ~ 40GHz: ± 4.76dB

7. TEST RESULT

7.1. Summary

Company Name: **Hewlett Packard Company**

FCC ID: **O9C-BJNGAFB0005**

FCC Classification: **Unlicensed National Information Infrastructure (UNII)**

Data Rate(s) Tested: **6Mbps ~ 54Mbps (a);**
13/14.4Mbps ~ 130/144.4Mbps (n-HT20MHz BW);
27/30Mbps ~ 270/300Mbps (n-HT40MHz BW);
13/14.4Mbps ~ 156/173.4Mbps (ac-VHT20MHz BW);
27/30Mbps ~ 360/400Mbps (ac-VHT40MHz BW);
58.6/65Mbps ~ 780/866.6Mbps (ac-VHT80MHz BW)

FCC Part Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference
15.407(a)	26dB Bandwidth	N/A	Conducted	Pass	Section 7.2
15.407(e)	6dB Bandwidth	≥ 500kHz		Pass	Section 7.3
15.407(a)(1)(ii), (2), (3)	Maximum Conducted Output Power	< 28.59 dBm U-NII-1 < 22.57 dBm U-NII-2A < 22.32 dBm U-NII-2C < 27.79 dBm U-NII-3		Pass	Section 7.4
15.407(h)(1)	Transmit Power Control	< 24 dBm		Pass	Section 7.5
15.407(a)(1)(ii), (2), (3), (5)	Peak Power Spectral Density	< 15.59 dBm/MHz U-NII-1 < 9.59 dBm/MHz U-NII-2A < 9.34 dBm/MHz U-NII-2C < 27.79 dBm/500kHz U-NII-3		Pass	Section 7.6
15.407(g)	Frequency Stability	N/A		Pass	Section 7.7
15.407(b)(1), (2), (3), (4)	Undesirable Emissions	< -27dBm/MHz EIRP < -17dBm/MHz EIRP	Radiated	Pass	Section 7.8 & 7.9
15.205, 15.209 15.407(b)(5), (6), (7)	General Field Strength Limits (Restricted Bands and Radiated Emission Limits)	Emissions in restricted bands must meet the radiated limits detailed in 15.209		Pass	
15.207	AC Conducted Emissions 150kHz - 30MHz	< FCC 15.207 limits	Line Conducted	Pass	Section 7.10

Notes:

1) All channels, modes, and modulations/data rates were investigated among all UNII bands. For radiated emission test, every axis (X, Y, Z) was also verified. The test results shown in the following sections represent the worst case emissions.
2) The analyzer plots shown in this section were all taken with a correction table loaded into the analyzer. The correction table was used to account for the losses of the cables and attenuators used as part of the system to connect the EUT to the analyzer at all frequencies of interest.
3) All antenna port conducted emissions testing was performed on a test bench with the antenna port of the EUT connected to the spectrum analyzer through calibrated cables and attenuators.

7.2. 26dB Bandwidth Measurement

7.2.1. Test Limit

N/A

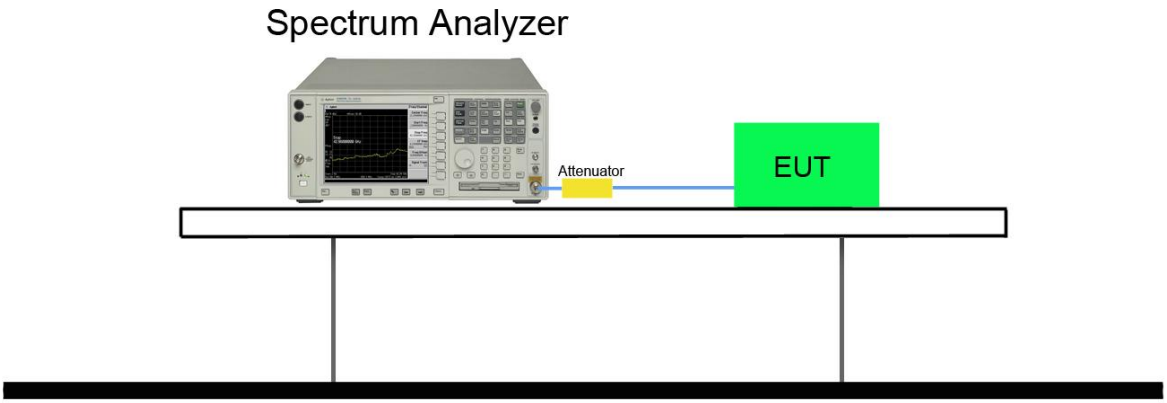
7.2.2. Test Procedure used

KDB 789033 D02v01 – Section C.1

7.2.3. Test Setting

1. The analyzers' automatic bandwidth measurement capability was used to perform the 26dB bandwidth measurement. The "X" dB bandwidth parameter was set to X = 26. The automatic bandwidth measurement function also has the capability of simultaneously measuring the 99% occupied bandwidth. The bandwidth measurement was not influenced by any intermediated power nulls in the fundamental emission.
2. RBW = approximately 1% of the emission bandwidth.
3. VBW ≥ 3 × RBW.
4. Detector = Peak.
5. Trace mode = max hold.

7.2.4. Test Setup



7.2.5. Test Result

Test Mode	Data Rate (Mbps)	Channel No.	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)	Result
Ant 0 / Ant 0 + 1						
802.11a	6	36	5180	26.110	16.981	Pass
802.11a	6	44	5220	26.230	16.973	Pass
802.11a	6	48	5240	25.230	17.000	Pass
802.11a	6	52	5260	26.380	17.068	Pass
802.11a	6	60	5300	26.080	17.031	Pass
802.11a	6	64	5320	24.710	16.937	Pass
802.11a	6	100	5500	25.860	16.920	Pass
802.11a	6	120	5600	25.990	16.931	Pass
802.11a	6	140	5700	25.360	16.948	Pass
802.11a	6	149	5745	24.990	16.922	Pass
802.11a	6	157	5785	25.380	16.995	Pass
802.11a	6	165	5825	25.250	16.942	Pass
802.11n-HT20	13	36	5180	25.900	18.017	Pass
802.11n-HT20	13	44	5220	26.510	18.064	Pass
802.11n-HT20	13	48	5240	25.780	18.019	Pass
802.11n-HT20	13	52	5260	26.120	18.064	Pass
802.11n-HT20	13	60	5300	26.740	18.015	Pass
802.11n-HT20	13	64	5320	25.600	17.992	Pass
802.11n-HT20	13	100	5500	25.250	17.984	Pass
802.11n-HT20	13	120	5600	25.800	18.018	Pass
802.11n-HT20	13	140	5700	25.180	17.977	Pass
802.11n-HT20	13	149	5745	26.000	18.046	Pass
802.11n-HT20	13	157	5785	25.920	18.012	Pass
802.11n-HT20	13	165	5825	26.020	18.055	Pass
802.11n-HT40	27	38	5190	48.520	36.742	Pass
802.11n-HT40	27	46	5230	49.910	36.714	Pass
802.11n-HT40	27	54	5270	50.090	36.606	Pass
802.11n-HT40	27	62	5310	49.290	36.533	Pass
802.11n-HT40	27	102	5510	49.100	36.704	Pass
802.11n-HT40	27	118	5590	51.590	36.747	Pass
802.11n-HT40	27	134	5670	51.690	36.739	Pass
802.11n-HT40	27	151	5755	49.700	36.661	Pass

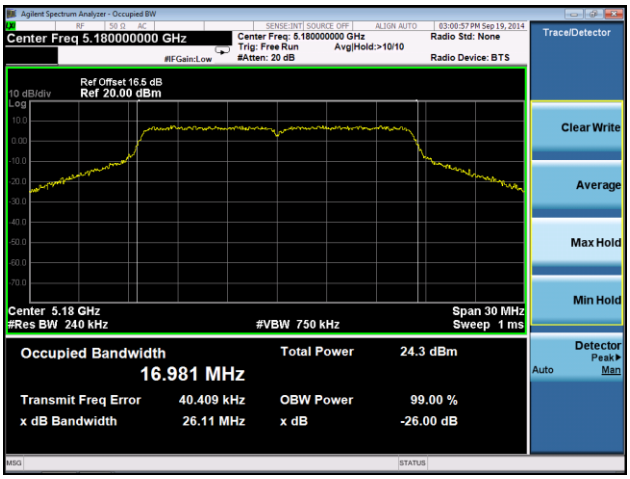
802.11n-HT40	27	159	5795	51.360	36.758	Pass
802.11ac-VHT20	13	36	5180	25.840	18.029	Pass
802.11ac-VHT20	13	44	5220	26.140	18.014	Pass
802.11ac-VHT20	13	48	5240	25.490	18.050	Pass
802.11ac-VHT20	13	52	5260	25.570	18.018	Pass
802.11ac-VHT20	13	60	5300	25.890	18.014	Pass
802.11ac-VHT20	13	64	5320	25.970	18.032	Pass
802.11ac-VHT20	13	100	5500	25.590	18.020	Pass
802.11ac-VHT20	13	120	5600	25.760	18.028	Pass
802.11ac-VHT20	13	140	5700	26.000	18.019	Pass
802.11ac-VHT20	13	144	5720	25.350	17.988	Pass
802.11ac-VHT20	13	149	5745	25.710	18.037	Pass
802.11ac-VHT20	13	157	5785	25.860	18.005	Pass
802.11ac-VHT20	13	165	5825	25.380	18.015	Pass
802.11ac-VHT40	27	38	5190	50.430	36.630	Pass
802.11ac-VHT40	27	46	5230	49.660	36.633	Pass
802.11ac-VHT40	27	54	5270	50.470	36.651	Pass
802.11ac-VHT40	27	62	5310	48.260	36.591	Pass
802.11ac-VHT40	27	102	5510	48.790	36.690	Pass
802.11ac-VHT40	27	118	5590	51.050	36.750	Pass
802.11ac-VHT40	27	134	5670	49.980	36.697	Pass
802.11ac-VHT40	27	142	5710	49.400	36.661	Pass
802.11ac-VHT40	27	151	5755	50.440	36.741	Pass
802.11ac-VHT40	27	159	5795	49.490	36.792	Pass
802.11ac-VHT80	58.6	42	5210	95.950	76.145	Pass
802.11ac-VHT80	58.6	58	5290	91.130	75.935	Pass
802.11ac-VHT80	58.6	106	5530	92.080	76.233	Pass
802.11ac-VHT80	58.6	122	5610	99.920	76.258	Pass
802.11ac-VHT80	58.6	138	5690	97.300	76.135	Pass
802.11ac-VHT80	58.6	155	5775	95.240	76.296	Pass

Ant 1 / Ant 0 + 1						
802.11a	6	36	5180	25.060	16.914	Pass
802.11a	6	44	5220	25.510	16.886	Pass
802.11a	6	48	5240	24.720	16.913	Pass
802.11a	6	52	5260	24.550	16.912	Pass
802.11a	6	60	5300	24.830	16.900	Pass
802.11a	6	64	5320	24.620	16.944	Pass
802.11a	6	100	5500	24.870	16.852	Pass
802.11a	6	120	5600	24.490	16.823	Pass
802.11a	6	140	5700	24.840	16.870	Pass
802.11a	6	149	5745	24.820	16.897	Pass
802.11a	6	157	5785	25.150	16.897	Pass
802.11a	6	165	5825	24.010	16.912	Pass
802.11n-HT20	13	36	5180	25.560	17.951	Pass
802.11n-HT20	13	44	5220	25.850	17.973	Pass
802.11n-HT20	13	48	5240	25.560	17.973	Pass
802.11n-HT20	13	52	5260	25.140	17.963	Pass
802.11n-HT20	13	60	5300	25.230	17.948	Pass
802.11n-HT20	13	64	5320	25.070	17.912	Pass
802.11n-HT20	13	100	5500	25.250	17.964	Pass
802.11n-HT20	13	120	5600	24.980	17.901	Pass
802.11n-HT20	13	140	5700	25.100	17.905	Pass
802.11n-HT20	13	149	5745	25.360	17.990	Pass
802.11n-HT20	13	157	5785	25.710	17.961	Pass
802.11n-HT20	13	165	5825	26.200	18.033	Pass
802.11n-HT40	27	38	5190	46.690	36.441	Pass
802.11n-HT40	27	46	5230	47.600	36.445	Pass
802.11n-HT40	27	54	5270	47.700	36.435	Pass
802.11n-HT40	27	62	5310	47.030	36.444	Pass
802.11n-HT40	27	102	5510	46.230	36.375	Pass
802.11n-HT40	27	118	5590	47.320	36.451	Pass
802.11n-HT40	27	134	5670	48.220	36.486	Pass
802.11n-HT40	27	151	5755	48.390	36.466	Pass
802.11n-HT40	27	159	5795	47.150	36.438	Pass
802.11ac-VHT20	13	36	5180	25.700	17.931	Pass
802.11ac-VHT20	13	44	5220	25.090	17.970	Pass

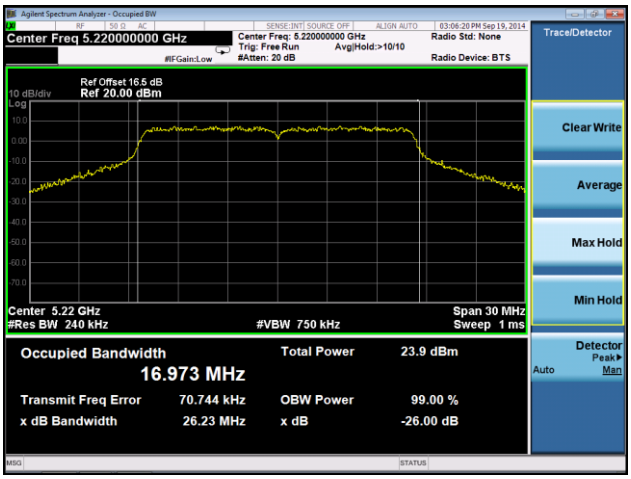
802.11ac-VHT20	13	48	5240	24.850	17.956	Pass
802.11ac-VHT20	13	52	5260	25.920	17.950	Pass
802.11ac-VHT20	13	60	5300	26.200	17.967	Pass
802.11ac-VHT20	13	64	5320	25.200	17.948	Pass
802.11ac-VHT20	13	100	5500	25.620	17.929	Pass
802.11ac-VHT20	13	120	5600	24.770	17.937	Pass
802.11ac-VHT20	13	140	5700	25.020	17.954	Pass
802.11ac-VHT20	13	144	5720	25.360	17.957	Pass
802.11ac-VHT20	13	149	5745	24.930	17.959	Pass
802.11ac-VHT20	13	157	5785	25.430	17.993	Pass
802.11ac-VHT20	13	165	5825	25.230	17.958	Pass
802.11ac-VHT40	27	38	5190	47.230	36.471	Pass
802.11ac-VHT40	27	46	5230	46.490	36.449	Pass
802.11ac-VHT40	27	54	5270	47.570	36.467	Pass
802.11ac-VHT40	27	62	5310	47.130	36.474	Pass
802.11ac-VHT40	27	102	5510	46.740	36.388	Pass
802.11ac-VHT40	27	118	5590	47.710	36.447	Pass
802.11ac-VHT40	27	134	5670	47.320	36.461	Pass
802.11ac-VHT40	27	142	5710	46.920	36.435	Pass
802.11ac-VHT40	27	151	5755	46.950	36.454	Pass
802.11ac-VHT40	27	159	5795	47.050	36.460	Pass
802.11ac-VHT80	58.6	42	5210	94.400	76.067	Pass
802.11ac-VHT80	58.6	58	5290	92.880	76.002	Pass
802.11ac-VHT80	58.6	106	5530	92.180	75.897	Pass
802.11ac-VHT80	58.6	122	5610	95.890	76.054	Pass
802.11ac-VHT80	58.6	138	5690	95.800	75.990	Pass
802.11ac-VHT80	58.6	155	5775	95.780	75.974	Pass

802.11a 26dB Bandwidth & 99% Bandwidth - Ant 0 / Ant 0 + 1

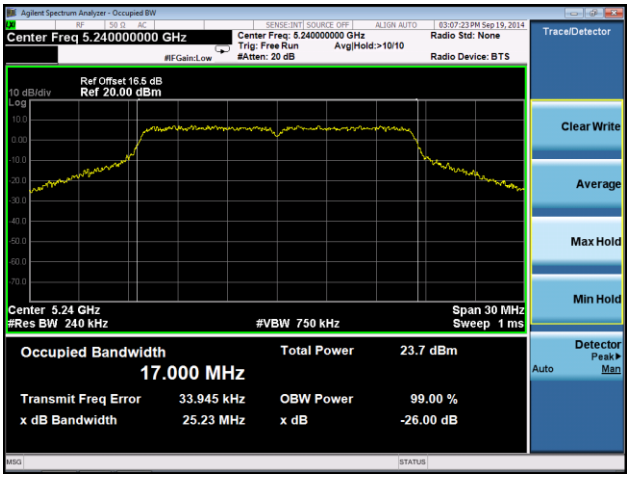
Channel 36 (5180MHz)



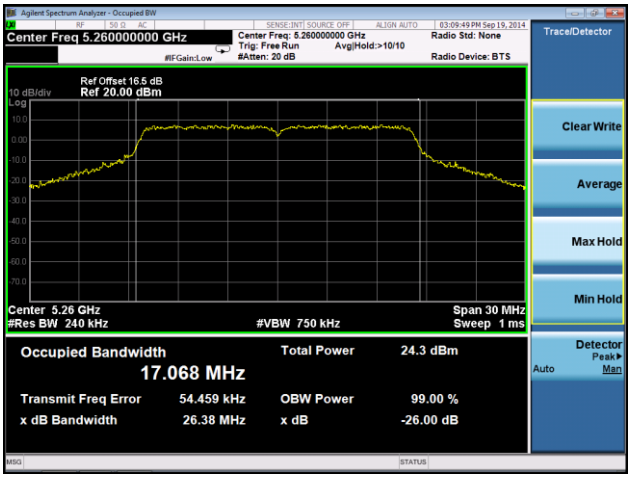
Channel 44 (5220MHz)



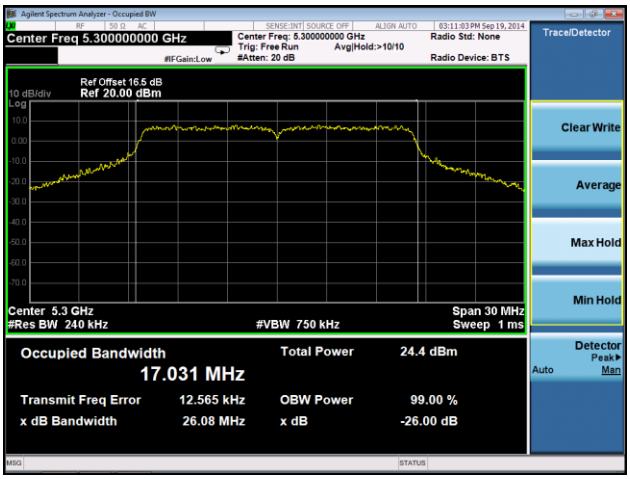
Channel 48 (5240MHz)



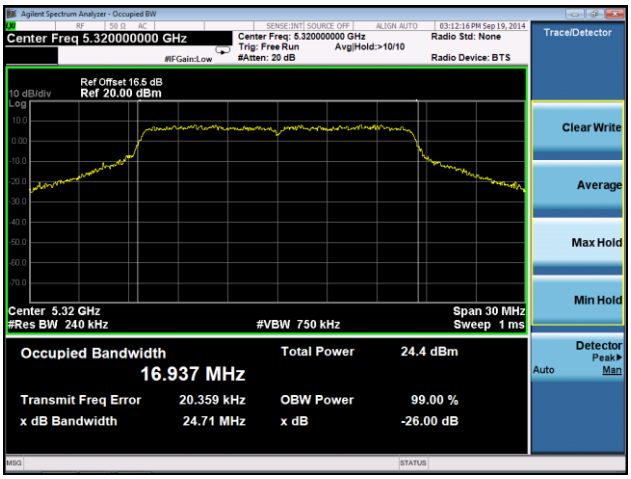
Channel 52 (5260MHz)

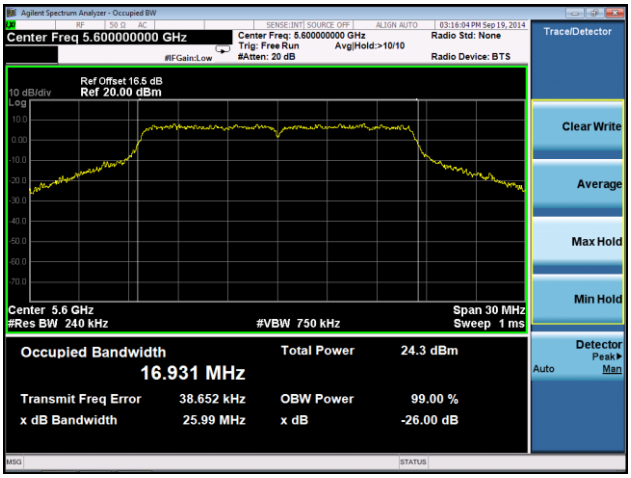
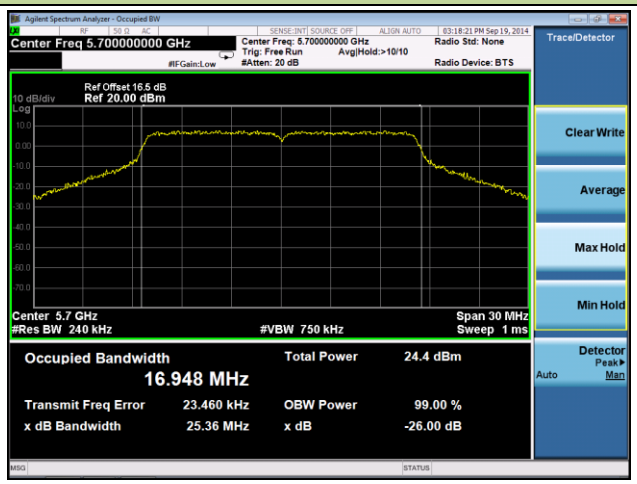
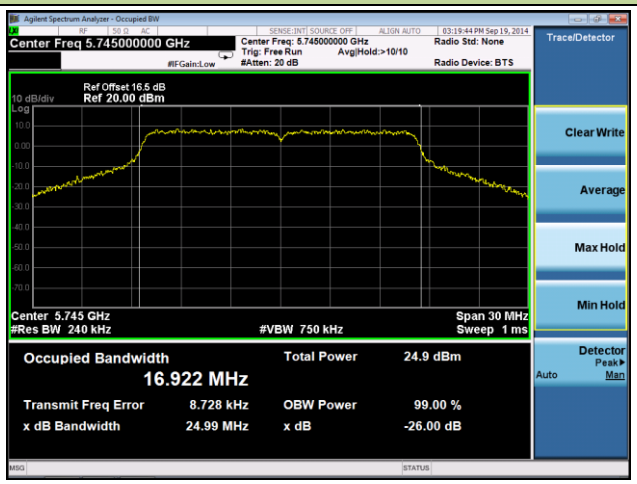
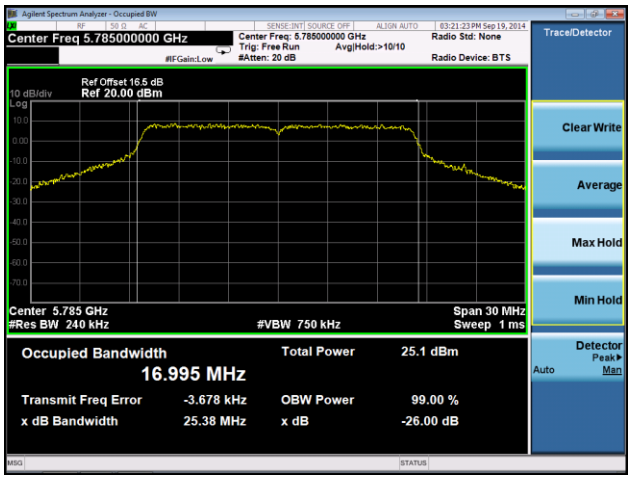
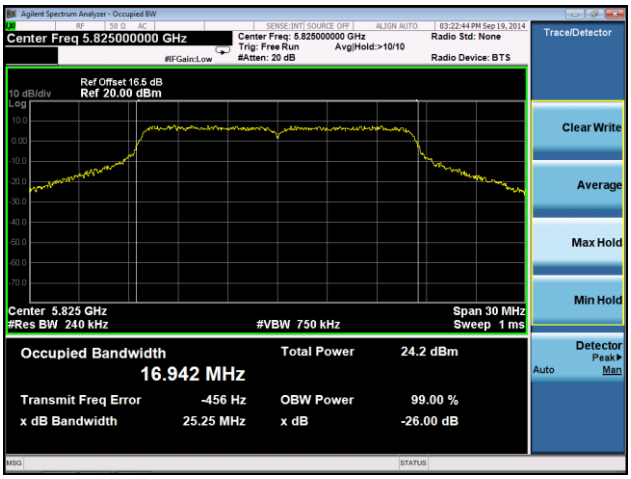


Channel 60 (5300MHz)



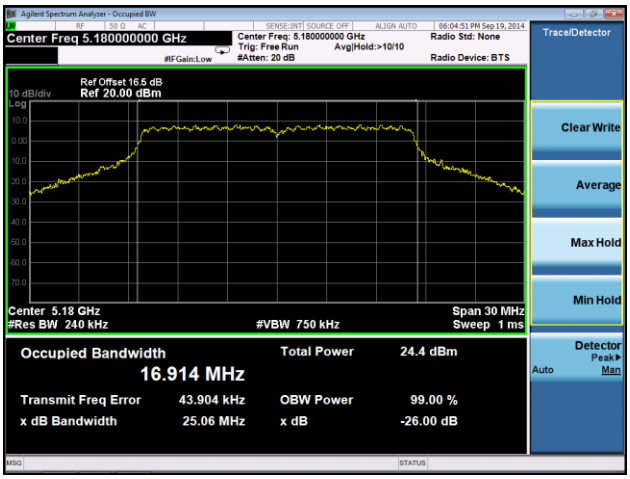
Channel 64 (5320MHz)



Channel 100 (5500MHz)	Channel 120 (5600MHz)
	
Channel 140 (5700MHz)	**Channel 149 (5745MHz)**
	
Channel 157 (5785MHz)	**Channel 165 (5825MHz)**
	

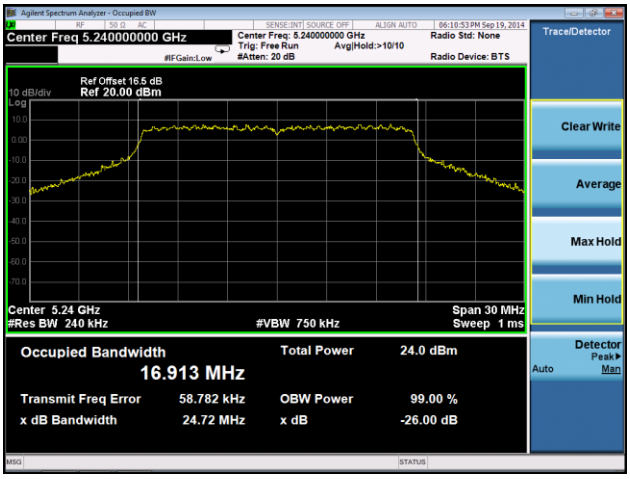
802.11a 26dB Bandwidth & 99% Bandwidth - Ant 1 / Ant 0 + 1

Channel 36 (5180MHz)

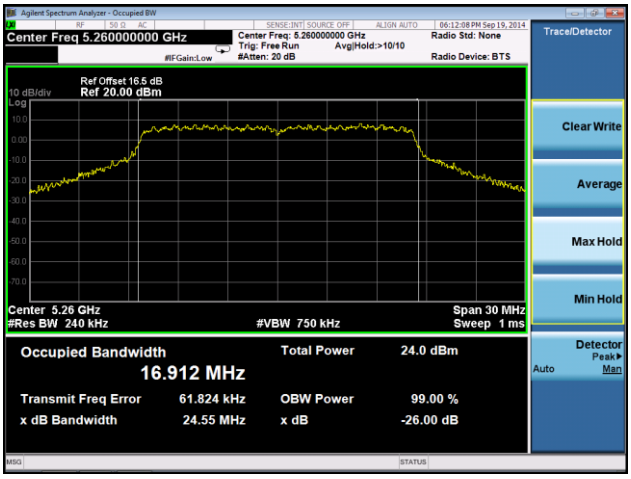


Channel 44 (5220MHz)

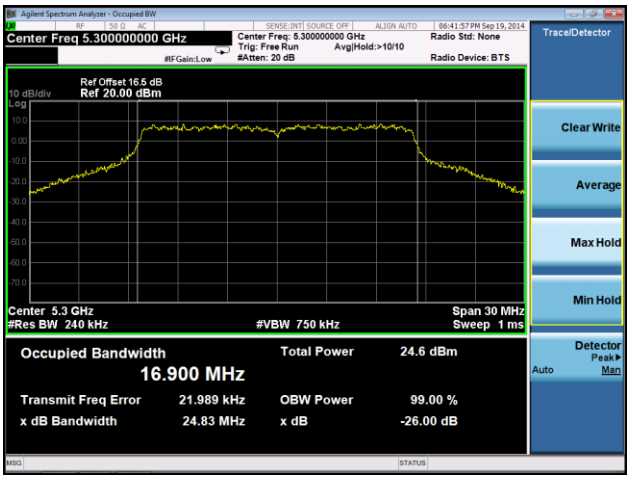
Channel 48 (5240MHz)



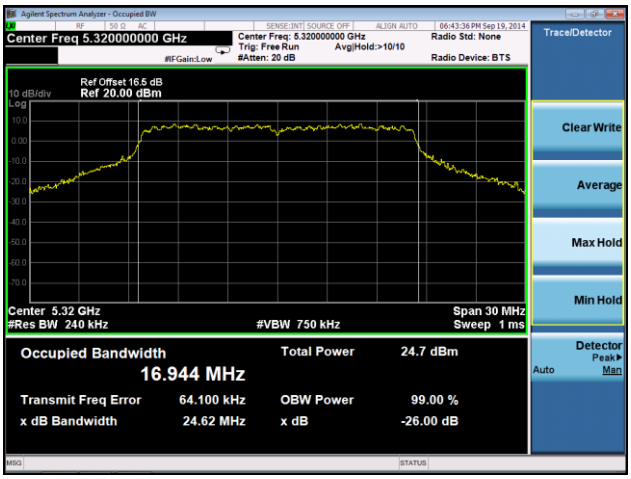
Channel 52 (5260MHz)

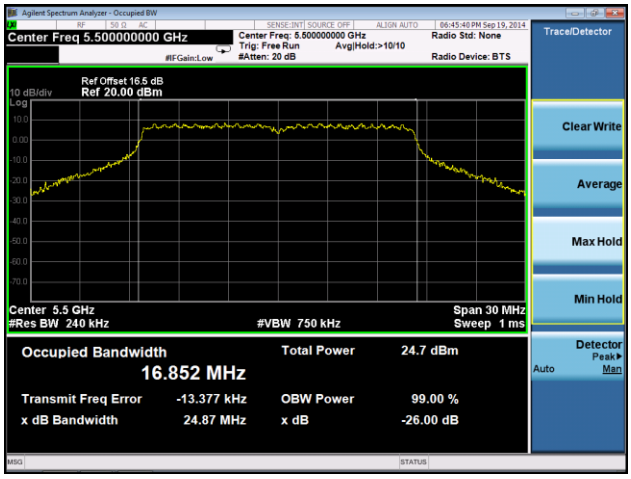
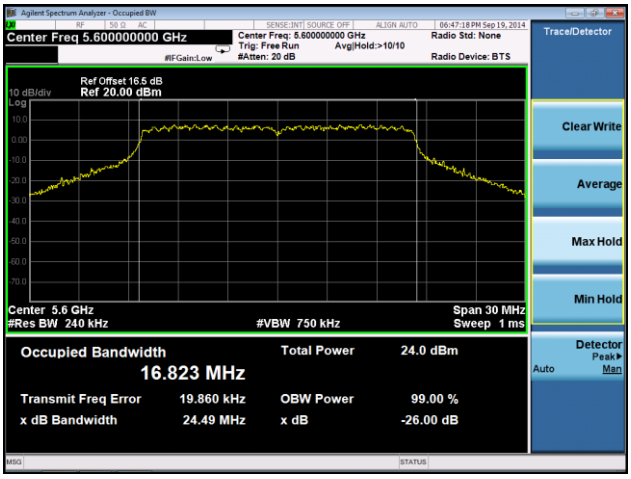
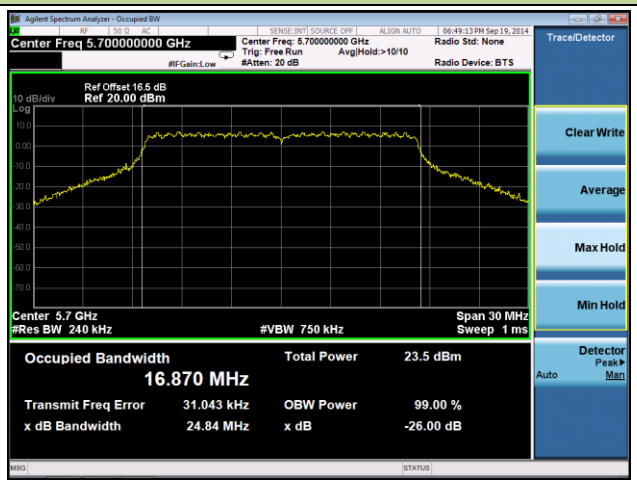
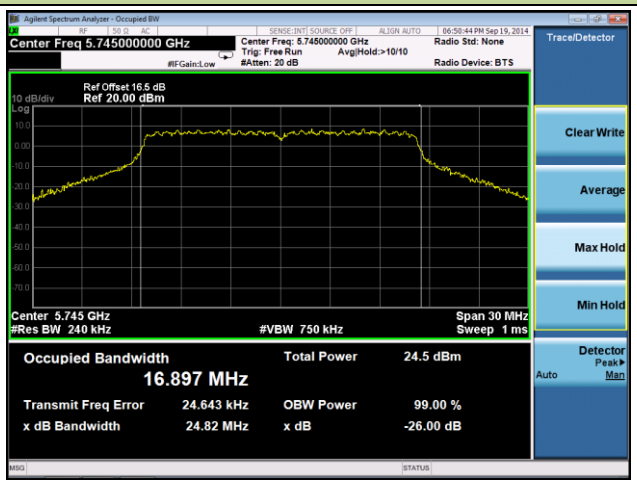
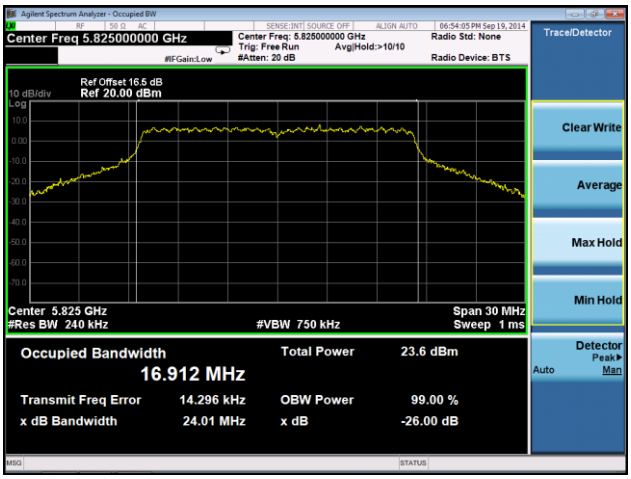


Channel 60 (5300MHz)



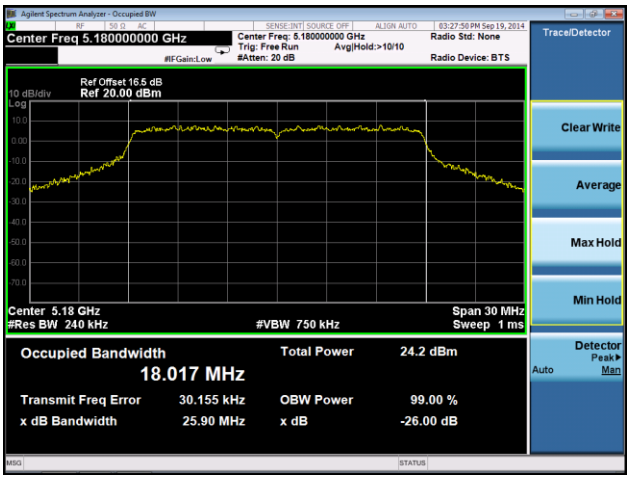
Channel 64 (5320MHz)



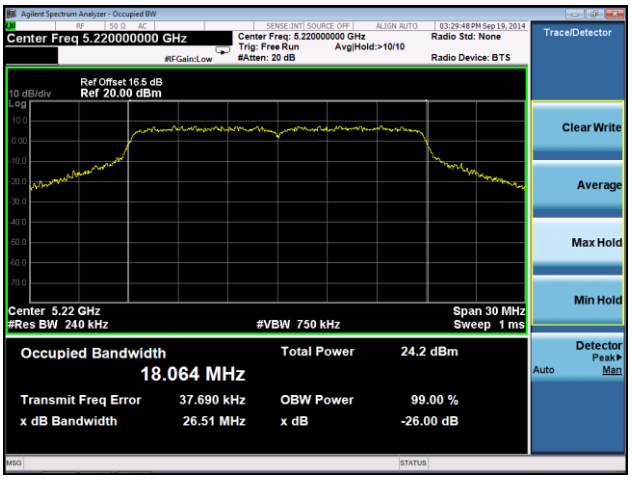
Channel 100 (5500MHz)	Channel 120 (5600MHz)
	
Channel 140 (5700MHz)	**Channel 149 (5745MHz)**
	
Channel 157 (5785MHz)	**Channel 165 (5825MHz)**
	

802.11n-HT20 26dB Bandwidth & 99% Bandwidth - Ant 0 / Ant 0 + 1

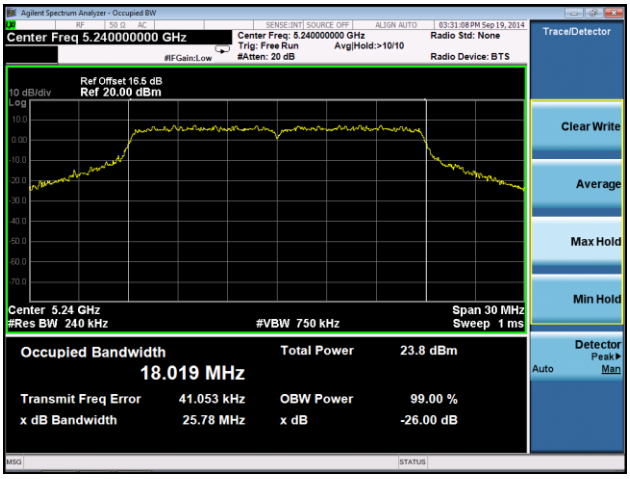
Channel 36 (5180MHz)



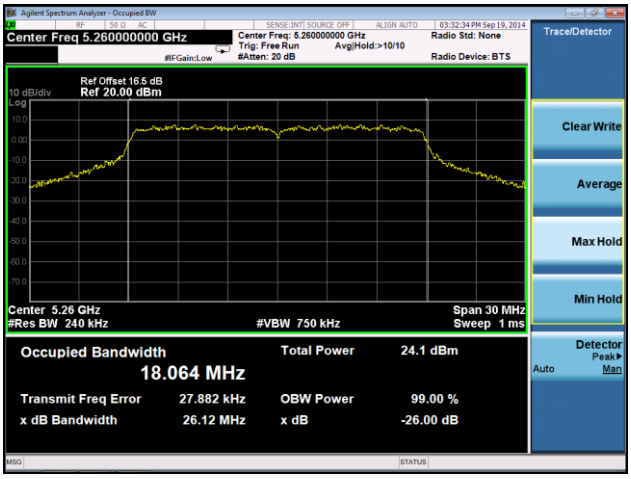
Channel 44 (5220MHz)



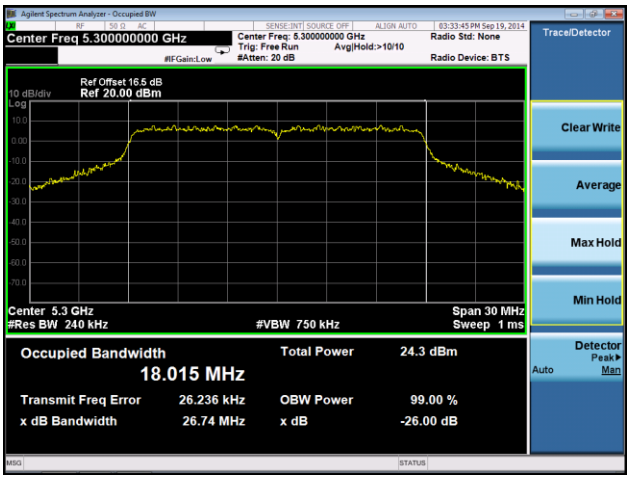
Channel 48 (5240MHz)



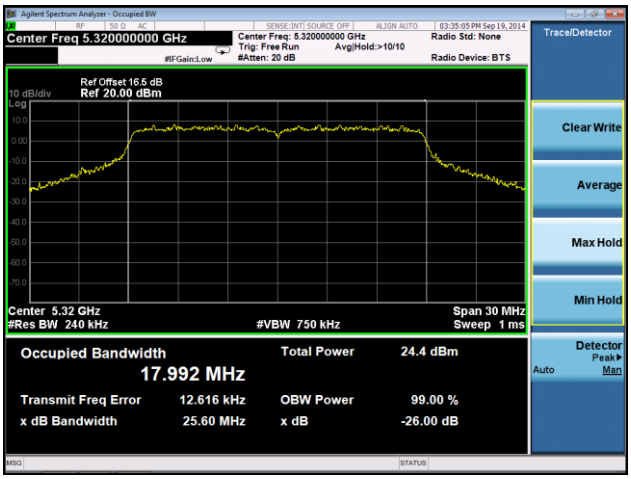
Channel 52 (5260MHz)

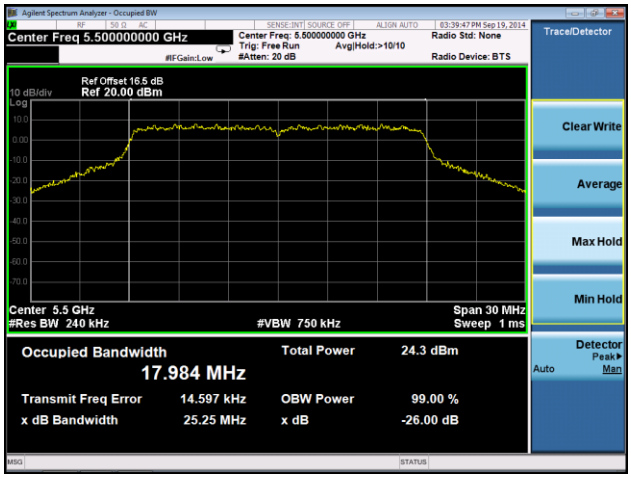
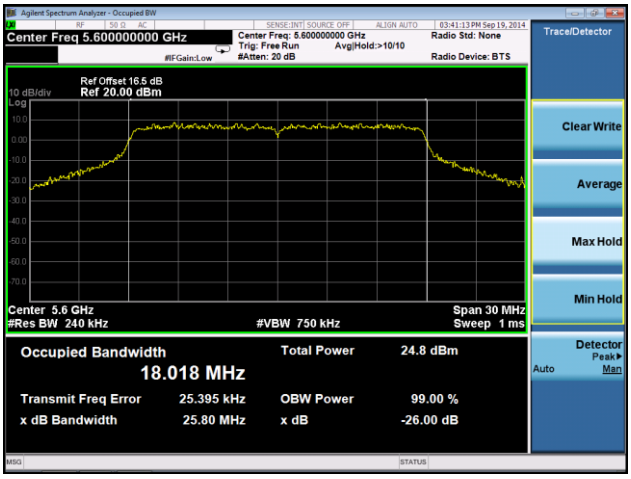
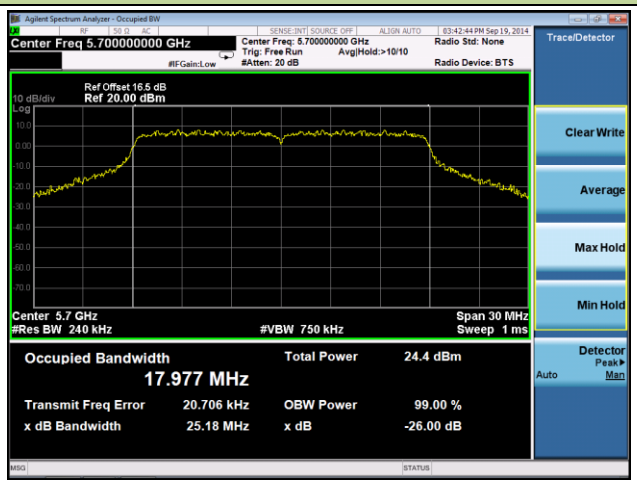
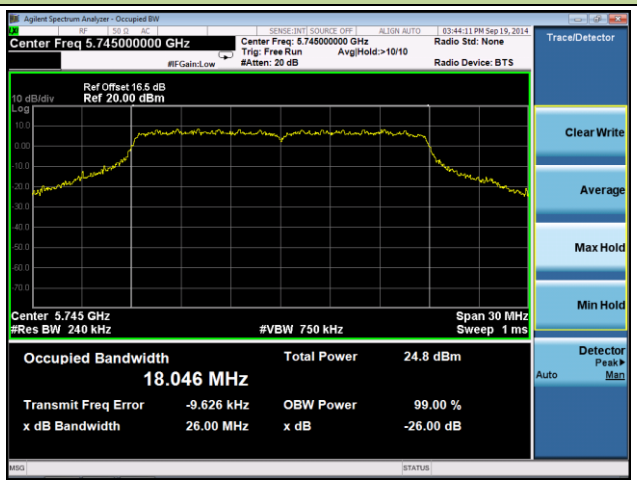
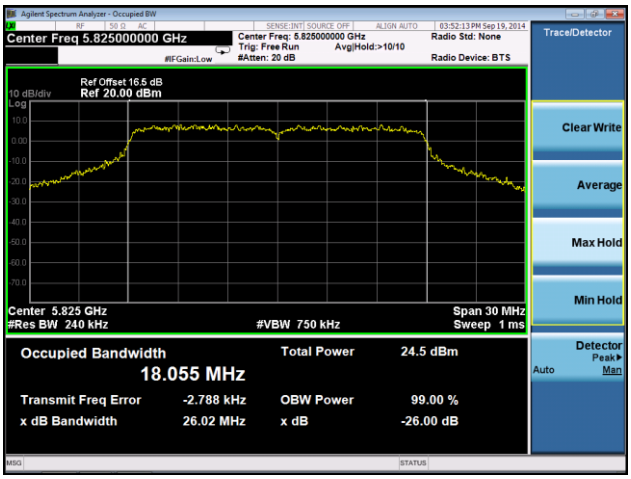


Channel 60 (5300MHz)



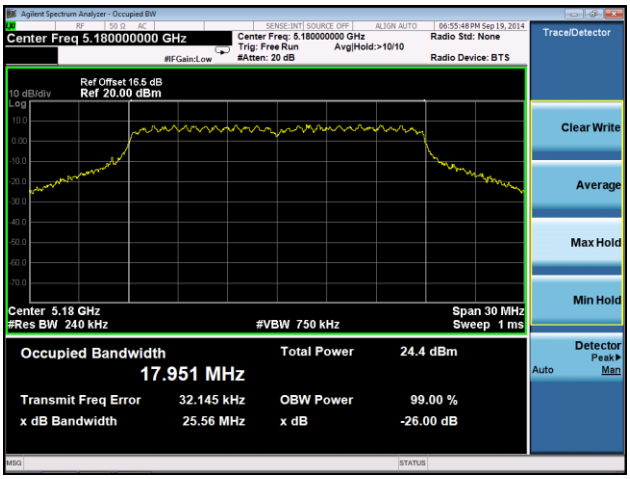
Channel 64 (5320MHz)



Channel 100 (5500MHz)	Channel 120 (5600MHz)
	
Channel 140 (5700MHz)	**Channel 149 (5745MHz)**
	
Channel 157 (5785MHz)	**Channel 165 (5825MHz)**
	

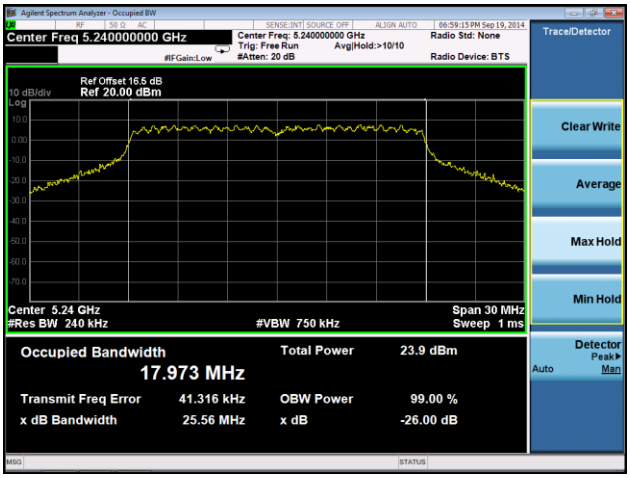
802.11n-HT20 26dB Bandwidth & 99% Bandwidth - Ant 1 / Ant 0 + 1

Channel 36 (5180MHz)

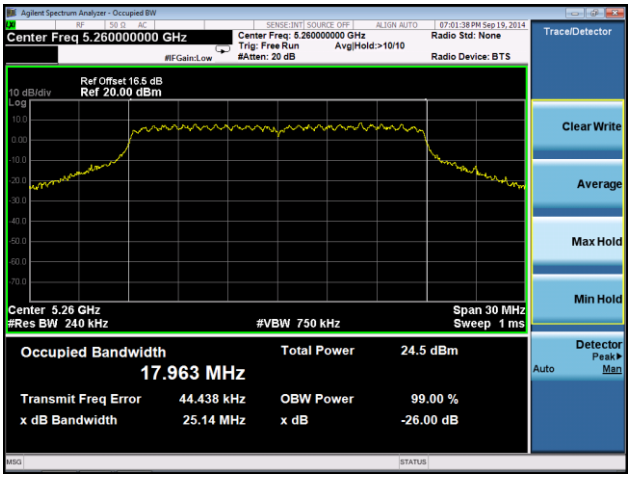


Channel 44 (5220MHz)

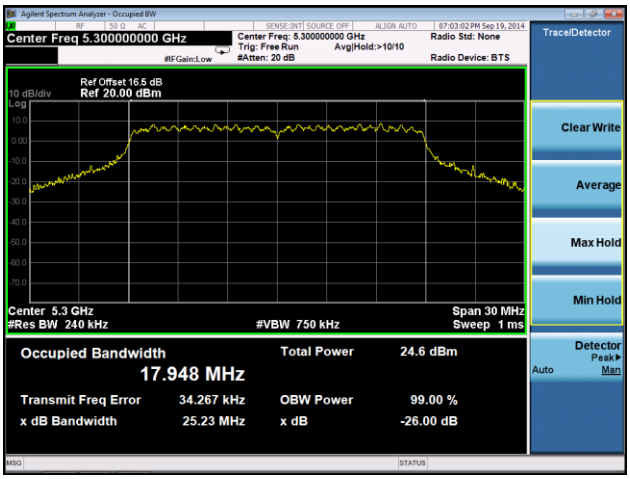
Channel 48 (5240MHz)



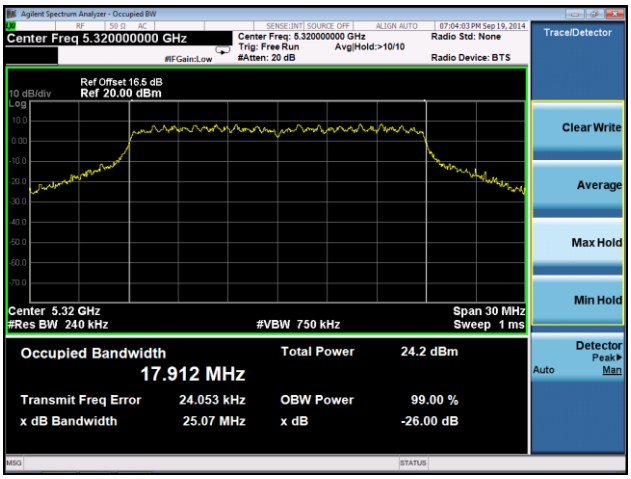
Channel 52 (5260MHz)

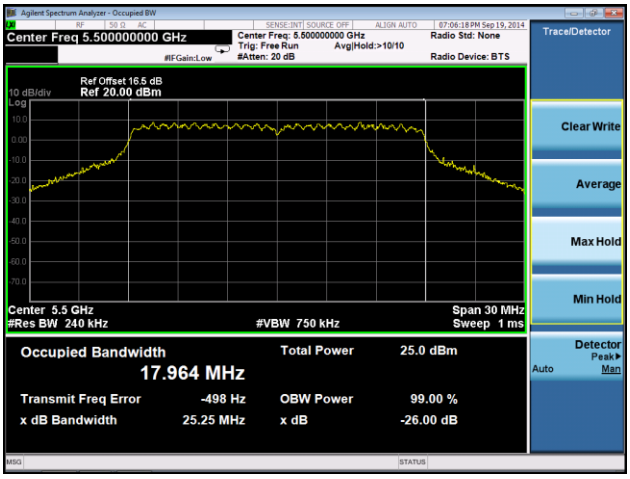
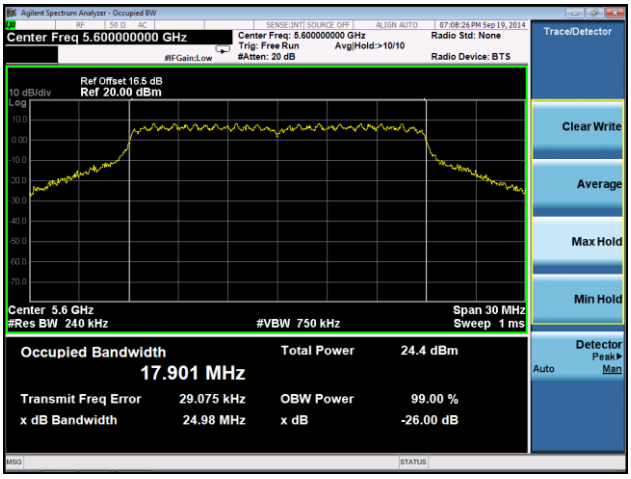
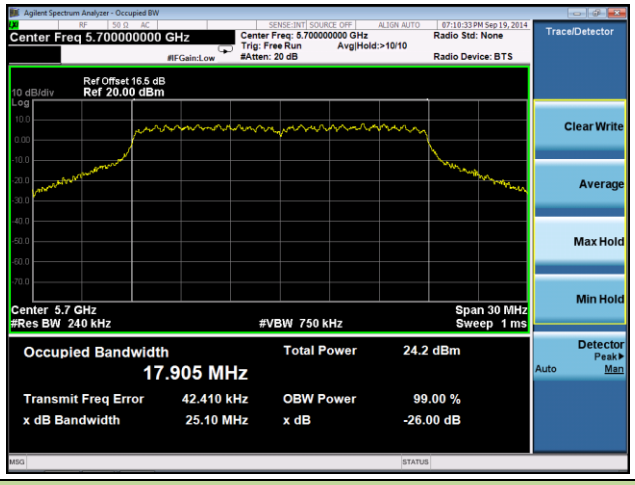
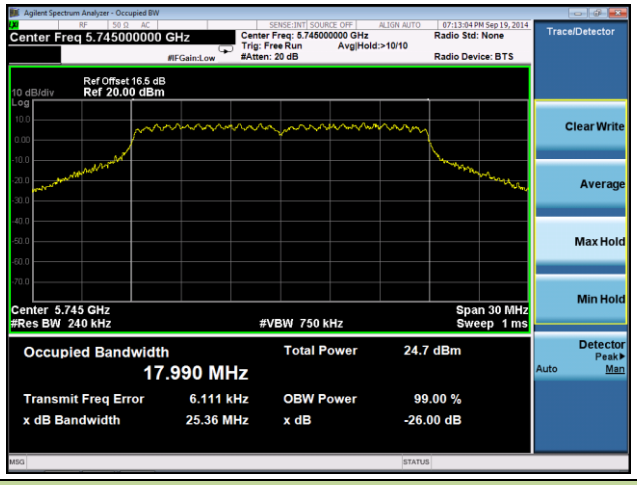


Channel 60 (5300MHz)



Channel 64 (5320MHz)



Channel 100 (5500MHz)	Channel 120 (5600MHz)
	
Channel 140 (5700MHz)	**Channel 149 (5745MHz)**
	
Channel 157 (5785MHz)	**Channel 165 (5825MHz)**