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Report No.: 1703TW0106-U6
Report Version: V01
Issue Date: 06-02-2017

MEASUREMENT REPORT

FCC PART 15 Subpart E WLAN 802.11a/n/ac

FCC ID:	Q9DAPINH203
APPLICANT:	Hewlett Packard Enterprise Company
Application Type:	Class III Permissible Change
Product:	ACCESS POINT
Model No.:	APINH203
Brand Name:	aruba a Hewlett Packard Enterprise company , Hewlett Packard Enterprise
FCC Classification:	Unlicensed National Information Infrastructure (UNII)
FCC Rule Part(s):	Part 15 Subpart E (Section 15.407)
Test Procedure(s):	ANSI C63.10-2013, KDB 789033 D02v01r03, KDB 662911 D01v02r01, KDB 644545 D03v01
Test Date:	December 28, 2016 ~ May 23, 2017

Reviewed By : Paddy Chen
(Paddy Chen)

Approved By : Chenz Ker
(Chenz Ker)

ilac-MRA

TAF Testing Laboratory 3261

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 D02v01r03. Test results reported herein relate only to the item(s) tested.

Revision History

Report No.	Version	Description	Issue Date	Note
1703TW0106-U6	Rev. 01	Initial report	06-02-2017	Valid

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§2.1033 General Information

Applicant:	Hewlett Packard Enterprise Company
Applicant Address:	3000 Hanover St. Palo Alto, CA 94304, USA
Manufacturer:	Hewlett Packard Enterprise Company
Manufacturer Address:	3000 Hanover St. Palo Alto, CA 94304, USA
Test Site:	MRT Technology (Taiwan) Co., Ltd
Test Site Address:	No. 38, Fuxing Second Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C)
MRT Registration No.:	153292
FCC Rule Part(s):	Part 15.407
Model No.:	APINH203
FCC ID:	Q9DAPINH203
Test Device Serial No.:	CNCKK2S0W2 ☐ Production ☒ Pre-Production ☐ Engineering
FCC Classification:	Unlicensed National Information Infrastructure (UNII)

Test Facility / Accreditations

Measurements were performed at MRT Laboratory located in Fuxing Rd., Taoyuan, Taiwan (R.O.C)

- **MRT facility is a FCC registered (MRT Reg. No. 153292) test facility with the site description report on file and is designated by the FCC as an Accredited Test Film.**
- **MRT facility is an IC registered (MRT Reg. No. 21723-1) test laboratory with the site description on file at Industry Canada.**
- **MRT Lab is accredited to ISO 17025 by the American Association for Laboratory Accreditation (TAF) under the American Association for Laboratory Accreditation Program (TAF Cert. No. 3261) in EMC, Telecommunications and Radio testing for FCC, Industry Canada, Taiwan, EU and TELEC Rules.**

TAF certificate here

Testing Laboratory
3261

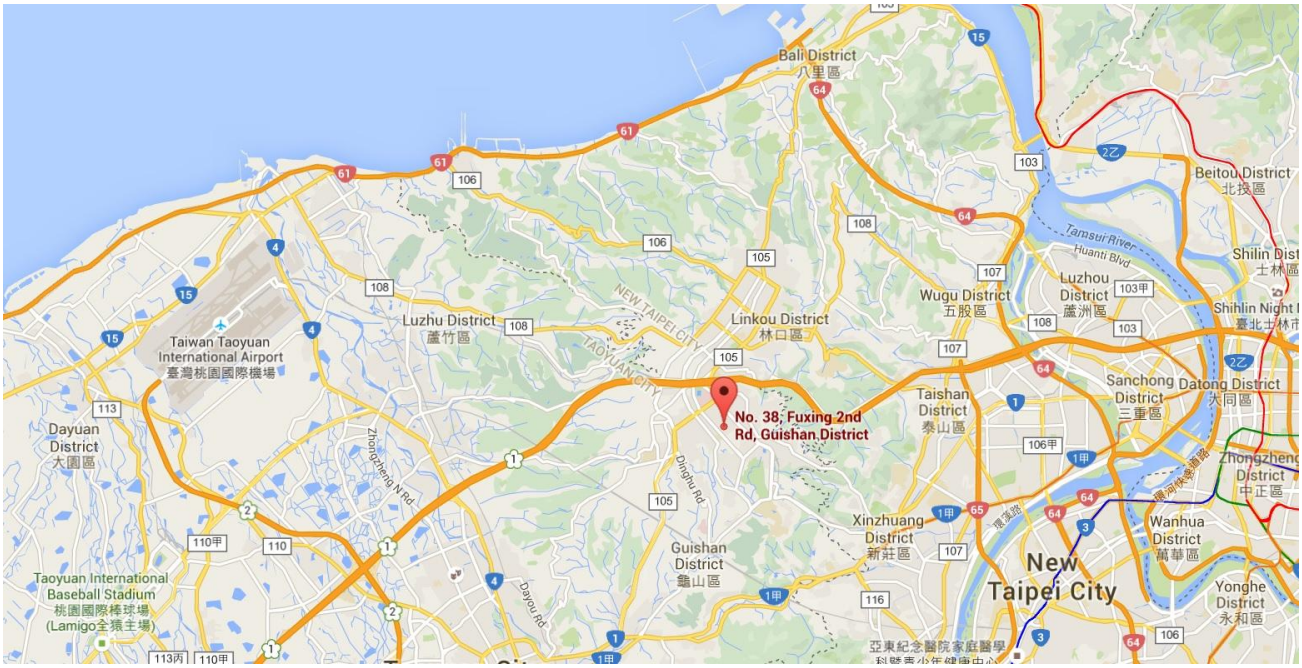
1. INTRODUCTION

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

sThe map below shows the location of the MRT LABORATORY, its proximity to the Taoyuan City. These measurement tests were conducted at the MRT Technology (Taiwan) Co., Ltd. Facility located at No.38, Fuxing 2nd Rd., Guishan Dist., Taoyuan City 33377, Taiwan (R.O.C).



2. PRODUCT INFORMATION

2.1. Equipment Description

Product Name:	ACCESS POINT
Model No.:	APINH203
Brand Name:	aruba a Hewlett Packard Enterprise company , Hewlett Packard Enterprise
Software Version:	9.10 RC178.40 e5.0.9.1
Operating Temperature:	0 ~ 40 °C
Power Type:	POE input
Wi-Fi Specification:	802.11a/b/g/n/ac

Note: The applicant has provided one POE adapter (Manufacturer: MICROSEMI & Model: PD-9001GR/AT/AC & Output: 55VDC, 0.6A) for approval testing and it is not for sale.

2.2. Product Specification Subjective to this Report

Frequency Range:	For 802.11a/n-HT20/ ac-VHT20: 5240~5320MHz, 5500~5720MHz For 802.11n-HT40/ac-VHT40: 5230~5310MHz, 5510~5710MHz For 802.11ac-VHT80: 5290MHz, 5530MHz, 5610MHz, 5690MHz
Type of Modulation:	802.11a/n/ac: OFDM
Data Rate:	802.11a: 6/9/12/18/24/36/48/54Mbps 802.11n: up to 300Mbps 802.11ac: up to 866.6Mbps
Maximum Average Output Power:	802.11a: 19.79dBm 802.11n-HT20: 19.83dBm 802.11n-HT40: 19.87dBm 802.11ac-VHT20: 19.72dBm 802.11ac-VHT40: 19.98dBm 802.11ac-VHT80: 19.46dBm

Note: For other features of this EUT, test report will be issued separately.

2.3. Operating Frequency and Channel List

802.11a/n-HT20/ac-VHT20

Channel	Frequency	Channel	Frequency	Channel	Frequency
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	--	--	--	--

802.11n-HT40/ac-VHT40

Channel	Frequency	Channel	Frequency	Channel	Frequency
54	5270 MHz	62	5310 MHz	102	5510 MHz
110	5550 MHz	118	5590 MHz	126	5630 MHz
134	5670 MHz	142	5710 MHz	--	--

802.11ac-VHT80

Channel	Frequency	Channel	Frequency	Channel	Frequency
58	5290 MHz	106	5530 MHz	122	5610 MHz
138	5690 MHz	--	--	--	--

2.4. Description of Available Antennas

Antenna Type	Frequency Band (MHz)	TX Paths	Max Antenna Gain (dBi)	Directional Gain (dBi)
PCB Antenna	2412 ~ 2462	1 (Note 3)	4.3	N/A
		2	3.8	6.8
	5150 ~ 5850	1 (Note 3)	6.3	N/A
		2	4.0	7.0

Note 1: The EUT supports Cyclic Delay Diversity (CDD) technology for 802.11a/b/g/n/ac mode, and the transmitter output signal is correlated.

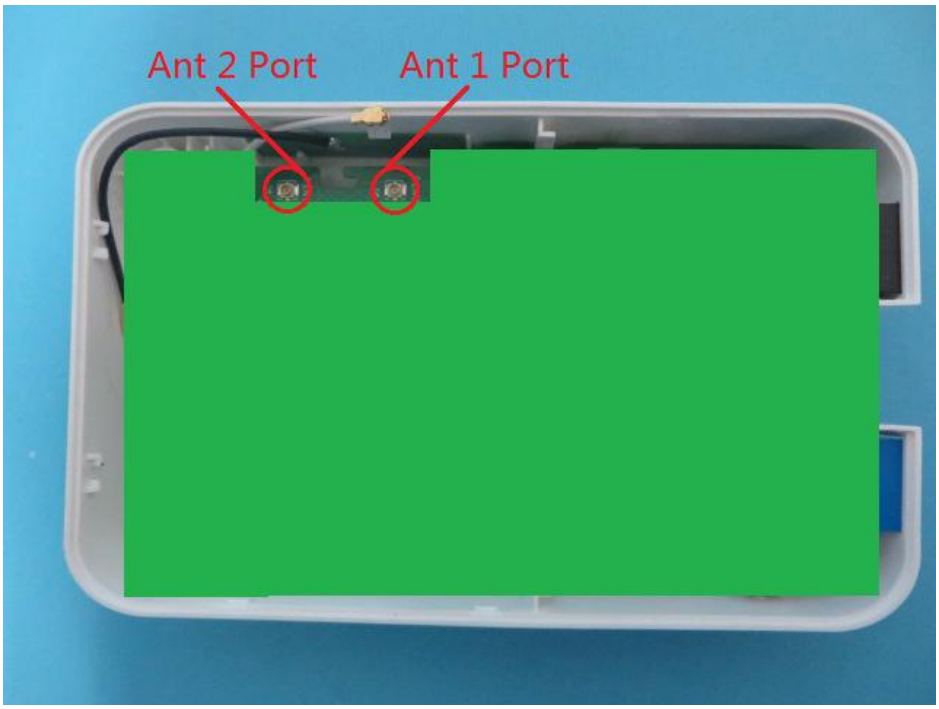
For CDD transmissions, directional gain = G_{ANT} + Array Gain, Array Gain = 3.0 dBi which is declared by the applicant. For power measurements on IEEE 802.11 devices, Array Gain = 0 dB for $N_{ANT} \leq 4$.

Note 2: The EUT also supports Beam Forming technology, and the Beam Forming only support 802.11n/ac mode. Directional gain = G_{ANT} + BF Gain, BF Gain = 3.0 dBi which is declared by the applicant.

Note 3: For SISO mode, only Ant 2 port can transmit 2.4GHz and Ant 1 port can transmit 5GHz.

2.5. Description of Antenna RF Port

Antenna RF Port				
--	2.4GHz RF Port		5GHz RF Port	
Software Control Port for 1Tx	--	Ant 2	Ant 1	--
Software Control Port for 2Tx	Ant 1	Ant 2	Ant 1	Ant 2



2.6. Test Mode

Test Mode	Mode 1: Transmit by 802.11a
	Mode 2: Transmit by 802.11n-HT20 (CDD Mode / Beam-Forming Mode)
	Mode 3: Transmit by 802.11n-HT40 (CDD Mode / Beam-Forming Mode)
	Mode 4: Transmit by 802.11ac-VHT20 (CDD Mode / Beam-Forming Mode)
	Mode 5: Transmit by 802.11ac-VHT40 (CDD Mode / Beam-Forming Mode)
	Mode 6: Transmit by 802.11ac-VHT80 (CDD Mode / Beam-Forming Mode)

2.7. Description of Test Software

The test utility software used during testing was “AcctonMTool.exe”.

1TX _ Ant 1

Test Mode	Test Frequency	Power Parameter Value	Test Mode	Test Frequency	Power Parameter Value
802.11a	5260	64.0	802.11n-HT20	5260	66.0
	5300	64.0		5300	66.0
	5320	64.0		5320	66.0
	5500	66.0		5500	66.0
	5600	66.0		5600	66.0
	5700	66.0		5700	66.0
	5720	66.0		5720	66.0
802.11ac-VHT20	5260	64.0	802.11n-HT40	5270	64.0
	5300	64.0		5310	60.0
	5320	64.0		5510	56.0
	5500	66.0		5590	66.0
	5600	66.0		5670	66.0
	5700	66.0		5710	66.0
	5720	66.0	802.11ac-VHT40	5270	64.0
802.11ac-VHT80	5290	60.0		5310	60.0
	5530	58.0		5510	56.0
	5610	66.0		5590	66.0
	5690	66.0		5670	66.0
				5710	66.0

CDD Mode

2TX _ Ant 1 + 2

Test Mode	Test Frequency	Power Parameter Value	Test Mode	Test Frequency	Power Parameter Value
802.11a	5260	64.0	802.11n-HT20	5260	64.0
	5300	64.0		5300	64.0
	5320	64.0		5320	64.0
	5500	66.0		5500	60.0
	5600	66.0		5600	66.0
	5700	60.0		5700	62.0
	5720	68.0		5720	68.0
802.11ac-VHT20	5260	64.0	802.11n-HT40	5270	64.0
	5300	64.0		5310	56.0
	5320	64.0		5510	50.0
	5500	60.0		5590	66.0
	5600	66.0		5670	66.0
	5700	60.0		5710	66.0
	5720	68.0	802.11ac-VHT40	5270	64.0
802.11ac-VHT80	5290	50.0		5310	54.0
	5530	46.0		5510	48.0
	5610	68.0		5590	66.0
	5690	68.0		5670	62.0
				5710	68.0

Beam-Forming Mode

2TX _ Ant 1 + 2

Test Mode	Test Frequency	Power Parameter Value	Test Mode	Test Frequency	Power Parameter Value
802.11n-HT20	5260	64.0	802.11n-HT40	5270	64.0
	5300	64.0		5310	50.0
	5320	64.0		5510	56.0
	5500	58.0		5590	66.0
	5600	64.0		5670	66.0
	5700	56.0		5710	68.0
	5720	64.0	802.11ac-VHT40	5270	68.0
802.11ac-VHT20	5260	64.0		5310	50.0
	5300	64.0		5510	50.0
	5320	64.0		5590	68.0
	5500	60.0		5670	68.0
	5600	64.0		5710	68.0
	5700	62.0	802.11ac-VHT80	5290	54.0
	5720	68.0		5530	58.0
				5610	66.0
				5690	66.0

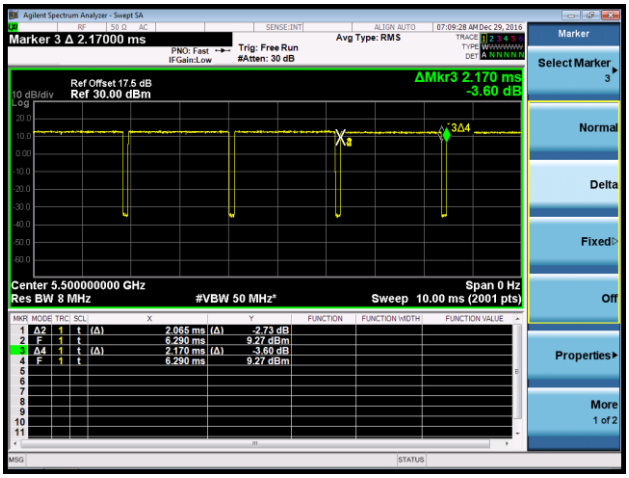
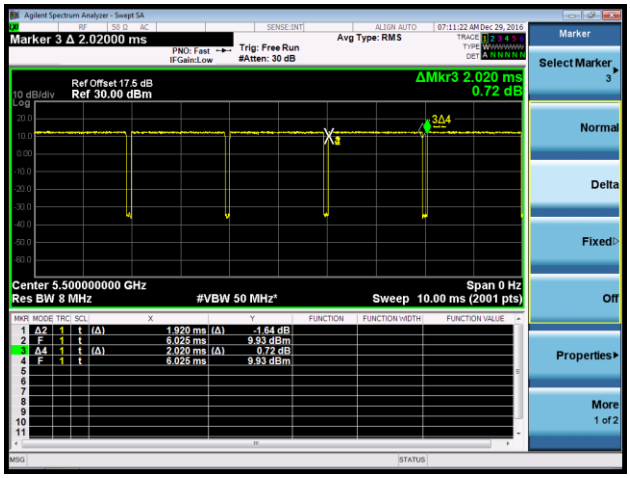
2.8. Device Capabilities

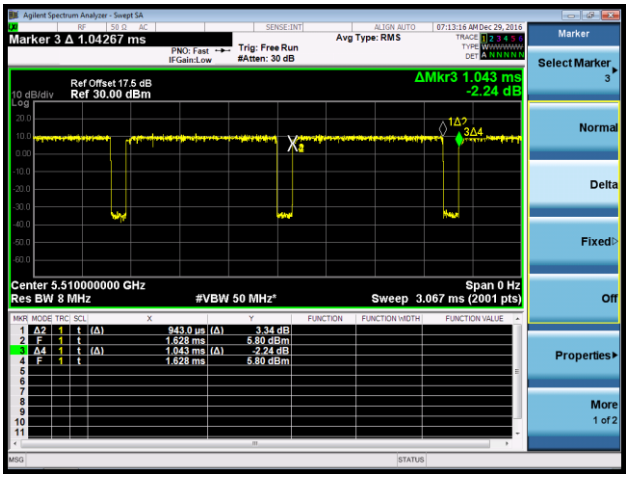
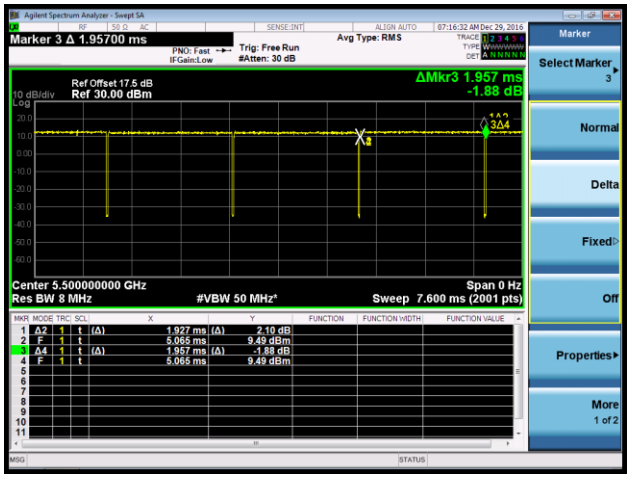
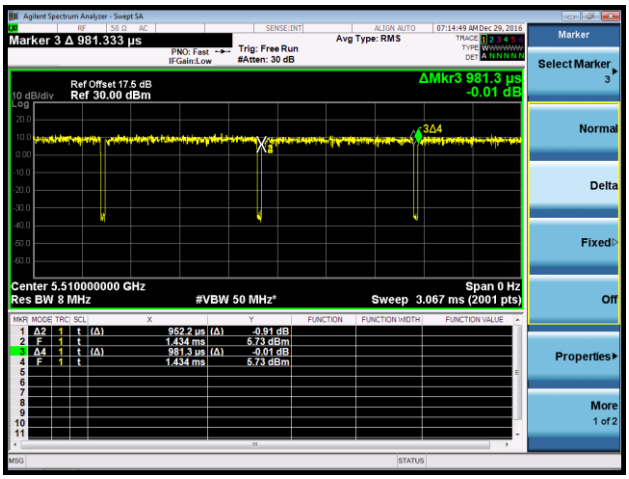
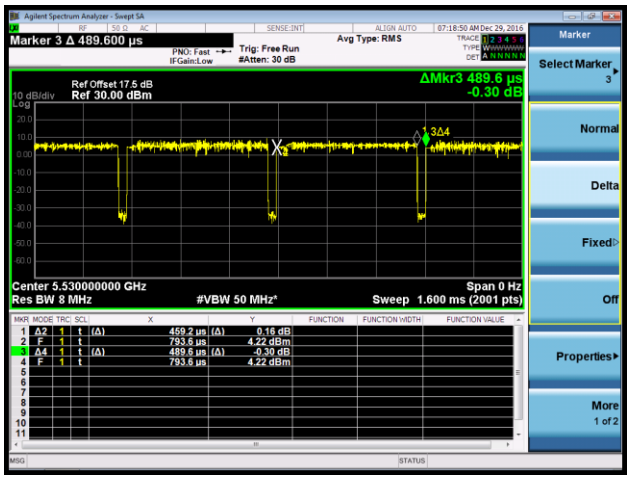
This device contains the following capabilities:

2.4GHz WLAN (DTS) and 5GHz WLAN (NII)

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 = average per the guidance of Section B)2)b) of KDB 789033 D02v01r03. 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:

Test Mode	Duty Cycle
802.11a	95.16 %
802.11n-HT20	95.05 %
802.11n-HT40	90.41 %
802.11ac-VHT20	98.47 %
802.11ac-VHT40	97.03 %
802.11ac-VHT80	93.79 %

802.11a	802.11n-HT20
	

802.11n-HT40	802.11ac-VHT20
	
802.11ac-VHT40	**802.11ac-VHT80**
	

2.9. Test Configuration

The **ACCESS POINT** was tested per the guidance of KDB 789033 D02v01r03. ANSI C63.10-2013 was used to reference the appropriate EUT setup for radiated spurious emissions testing and AC line conducted testing.

2.10. EMI Suppression Device(s)/Modifications

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

2.11. 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 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 C63.10-2013), and the guidance provided in KDB 789033 D02v01r03 were used in the measurement of the **ACCESS POINT.**

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 C63.10-2013.

Line conducted emissions test results are shown in Section 7.8.

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. A 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 for frequencies below 1GHz was placed on top of the 0.8 meter high, 1 x 1.5 meter table; and test set-up for frequencies 1-40GHz was placed on top of the 1.5 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 **ACCESS POINT** is **permanently attached.**
- There are no provisions for connection to an external antenna.

Conclusion:

The **ACCESS POINT** unit complies with the requirement of §15.203.

5. TEST EQUIPMENT CALIBRATION DATE

Conducted Emissions - SR2

Instrument	Manufacturer	Type No.	Asset No.	Cali. Due Date
Two-Line V-Network	R&S	ENV216	MRTTWA00019	2017.03.23
Two-Line V-Network	R&S	ENV216	MRTTWA00020	2017.03.23
Absorbing Clamp	R&S	MDS21	MRTTWA00016	2017.03.02
EMI Test Receiver	R&S	ESR3	MRTTWA00009	2017.03.17
Conducted Cable	Rosnol	N1C50-RG400-B1 C50-500CM	MRTTWE00013	2017.05.20
Temperature/Humidity Meter	TFA	35.1078.10.IT	MRTTWA00033	2017.06.09

Radiated Spurious Emission and Radiated Restricted Band Edge - AC1

Instrument	Manufacturer	Type No.	Asset No.	Cali. Due Date
Acitve Loop Antenna	SCHWARZBECK	FMZB 1519B	MRTTWA00002	2017.04.06
				2018.04.06
Broadband TRILOG Antenna	SCHWARZBECK	VULB 9162	MRTTWA00001	2017.04.06
				2018.04.06
Broadband Hornantenna	SCHWARZBECK	BBHA 9120D	MRTTWA00003	2017.04.06
				2018.04.06
Breitband Hornantenna	SCHWARZBECK	BBHA 9170	MRTTWA00004	2017.04.06
				2018.04.06
Broadband Preamplifier	SCHWARZBECK	BBV 9718	MRTTWA00005	2017.04.06
				2018.04.06
Broadband Amplifier	SCHWARZBECK	BBV 9721	MRTTWA00006	2017.04.06
				2018.04.06
Signal Analyzer	R&S	FSV40	MRTTWA00007	2017.03.02
				2018.03.02
EXA Signal Analyzer	KEYSIGHT	N9010A	MRTTWA00012	2017.07.11
Antenna Cable	HUBERSUHNER	SF106	MRTTWE00010	2017.05.20
				2018.05.20

Conducted Test Equipment - SR1

Instrument	Manufacturer	Type No.	Asset No.	Cali. Due Date
Signal Analyzer	R&S	FSV40	MRTTWA00007	2017.03.02
				2018.03.02
EXA Signal Analyzer	KEYSIGHT	N9010A	MRTTWA00012	2017.07.11
USB wideband power sensor	Boonton	55006	MRTTWA00050	2017.05.08
				2018.05.08
X-Series USB Peak and Average Power Sensor	KEYSIGHT	U2021XA	MRTTWA00014	2017.03.18
				2018.03.18

Software	**Version**	**Function**
e3	V 8.3.5	EMI Test Software

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 - SR2
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 150kHz~30MHz: 3.46dB
Radiated Emission Measurement - AC1
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 9kHz ~ 1GHz: 4.18dB 1GHz ~ 40GHz: 4.76dB
Output Power - SR1
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 1.13dB
Power Spectrum Density - SR1
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 1.15dB
Occupied Bandwidth - SR1
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 0.28%

7. TEST RESULT

7.1. Summary

Product Name: **ACCESS POINT**

FCC ID: **Q9DAPINH203**

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

Data Rate / MCS Tested: **6Mbps for 802.11a;**
MCS0 for 802.11n-HT20MHz;
MCS0 for 802.11n-HT40MHz;
MCS0 for 802.11ac-VHT20MHz;
MCS0 for 802.11ac-VHT40MHz;
MCS0 for 802.11ac-VHT80MHz

FCC 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(a)(2)	Maximum Conducted Output Power	≤ 24 dBm U-NII-2A & 2C		Pass	Section 7.3
15.407(a)(2), (5)	Peak Power Spectral Density	≤ 11 dBm/MHz U-NII-2A&2C		Pass	Section 7.4
15.407(g)	Frequency Stability	N/A		Pass	Section 7.5
15.407(b)(2), (3)	Undesirable Emissions	Detail see section 7.8	Radiated	Pass	Section 7.6 & 7.7
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 7.8

Notes:

1) 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.
2) Test Items “26dB Bandwidth” & “6dB Bandwidth” & “Frequency Stability” have been assessed MIMO transmission, and showed the worst single test data in this report.

7.2. 26dB Bandwidth Measurement

7.2.1. Test Limit

N/A

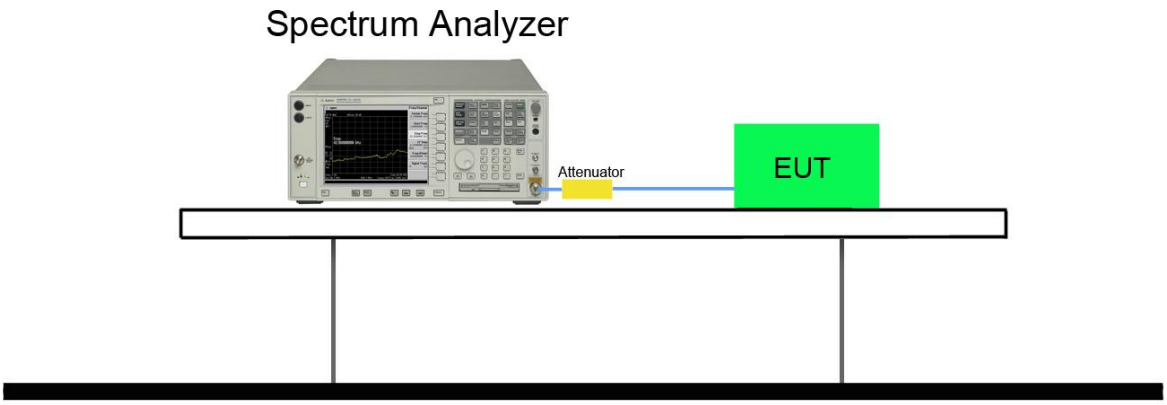
7.2.2. Test Procedure used

KDB 789033 D02v01r03 - 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

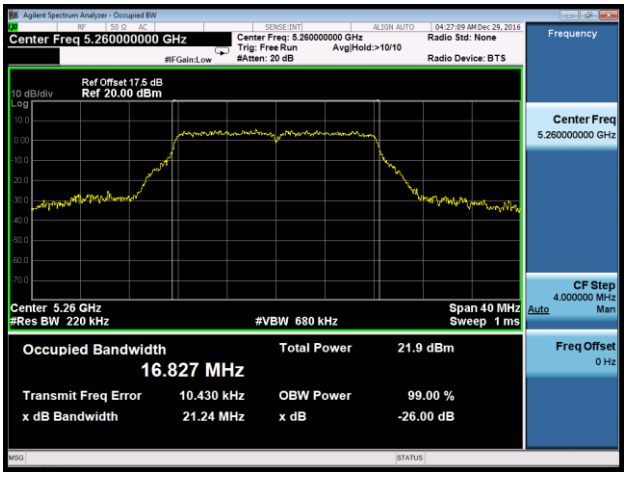
Product	ACCESS POINT	Temperature	22°C
Test Engineer	Kevin Ker	Relative Humidity	54%
Test Site	SR1	Test Date	2016/12/29

Test Mode	Data Rate / MCS	Channel No.	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)	Result
Ant 1						
802.11a	6Mbps	52	5260	21.24	16.83	Pass
802.11a	6Mbps	60	5300	21.32	16.81	Pass
802.11a	6Mbps	64	5320	21.29	16.78	Pass
802.11a	6Mbps	100	5500	21.53	16.83	Pass
802.11a	6Mbps	120	5600	21.62	16.87	Pass
802.11a	6Mbps	140	5700	21.37	16.89	Pass
802.11a	6Mbps	144	5720	21.77	16.94	Pass
802.11n-HT20	MCS0	52	5260	21.78	18.00	Pass
802.11n-HT20	MCS0	60	5300	21.72	17.97	Pass
802.11n-HT20	MCS0	64	5320	21.72	18.00	Pass
802.11n-HT20	MCS0	100	5500	22.84	18.02	Pass
802.11n-HT20	MCS0	120	5600	23.35	18.06	Pass
802.11n-HT20	MCS0	140	5700	22.12	18.04	Pass
802.11n-HT20	MCS0	144	5720	22.07	18.04	Pass
802.11n-HT40	MCS0	54	5270	41.89	36.46	Pass
802.11n-HT40	MCS0	62	5310	40.37	36.43	Pass
802.11n-HT40	MCS0	102	5510	40.24	36.43	Pass
802.11n-HT40	MCS0	118	5590	44.78	36.55	Pass
802.11n-HT40	MCS0	134	5670	40.55	36.46	Pass
802.11n-HT40	MCS0	142	5710	53.43	36.49	Pass
802.11ac-VHT20	MCS0	52	5260	21.68	18.00	Pass
802.11ac-VHT20	MCS0	60	5300	21.78	18.02	Pass
802.11ac-VHT20	MCS0	64	5320	21.78	18.00	Pass
802.11ac-VHT20	MCS0	100	5500	22.26	18.04	Pass
802.11ac-VHT20	MCS0	120	5600	21.94	18.08	Pass
802.11ac-VHT20	MCS0	140	5700	21.94	18.03	Pass
802.11ac-VHT20	MCS0	144	5720	22.08	18.08	Pass

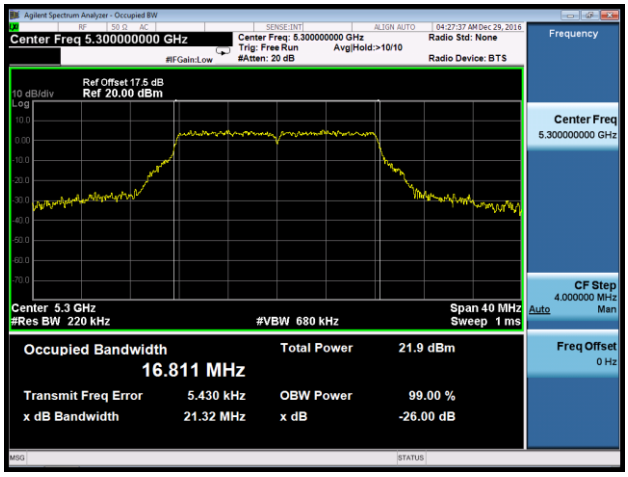
Test Mode	Data Rate / MCS	Channel No.	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)	Result
Ant 1						
802.11ac-VHT40	MCS0	54	5270	40.29	36.44	Pass
802.11ac-VHT40	MCS0	62	5310	40.20	36.47	Pass
802.11ac-VHT40	MCS0	102	5510	45.45	36.45	Pass
802.11ac-VHT40	MCS0	118	5590	40.46	36.49	Pass
802.11ac-VHT40	MCS0	134	5670	51.07	36.58	Pass
802.11ac-VHT40	MCS0	142	5710	40.39	36.54	Pass
802.11ac-VHT80	MCS0	58	5290	82.06	75.96	Pass
802.11ac-VHT80	MCS0	106	5530	83.31	75.82	Pass
802.11ac-VHT80	MCS0	122	5610	81.70	75.96	Pass
802.11ac-VHT80	MCS0	138	5690	81.88	75.99	Pass

802.11a 26dB Bandwidth & 99% Bandwidth - Ant 1

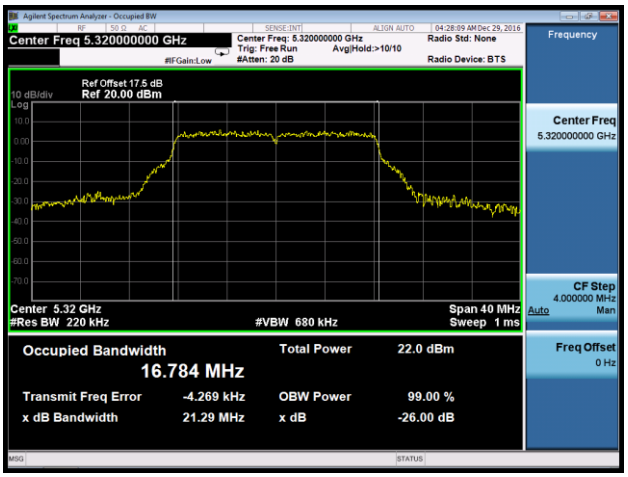
Channel 52 (5260MHz)



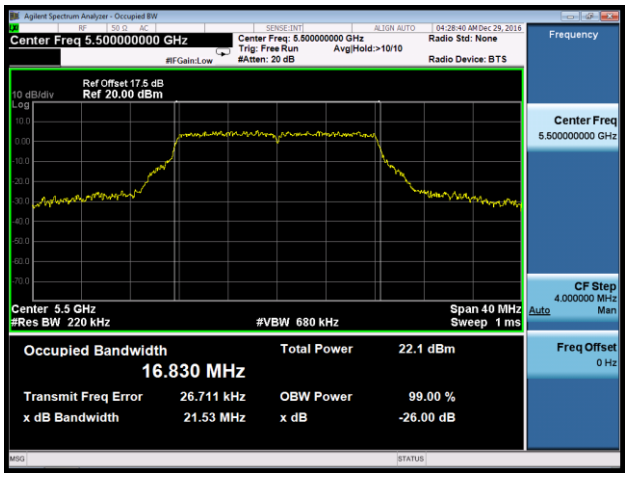
Channel 60 (5300MHz)



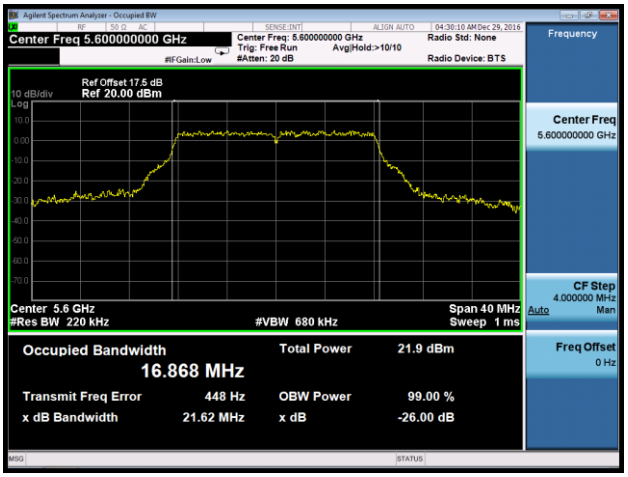
Channel 64 (5320MHz)



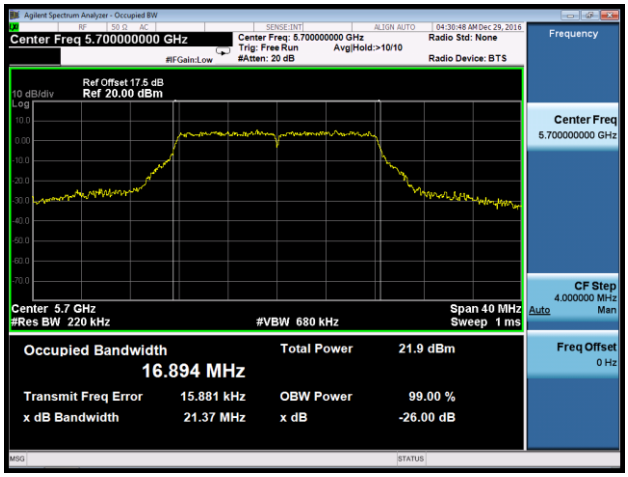
Channel 100 (5500MHz)

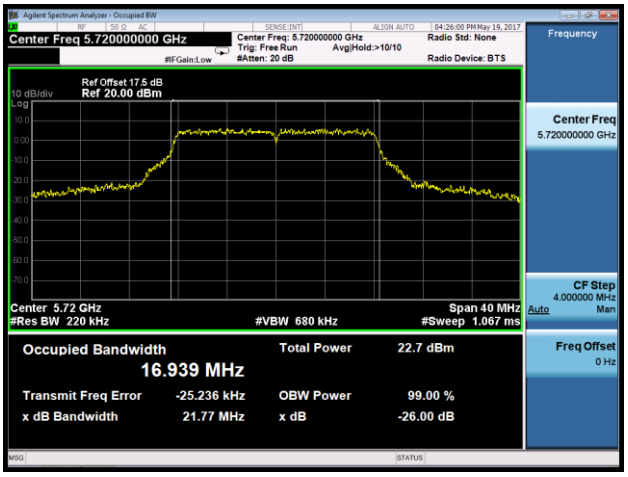
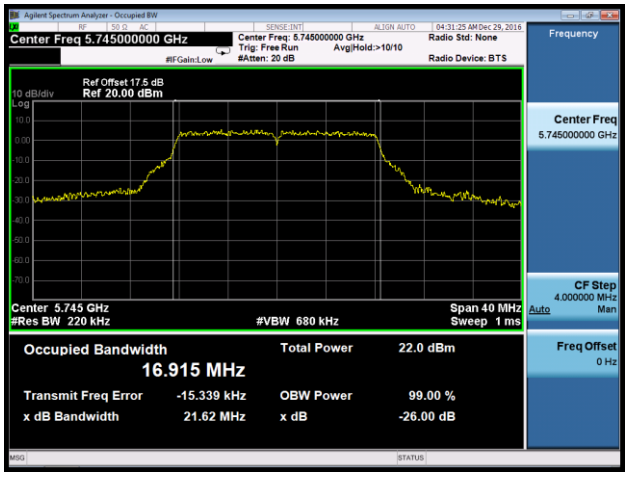
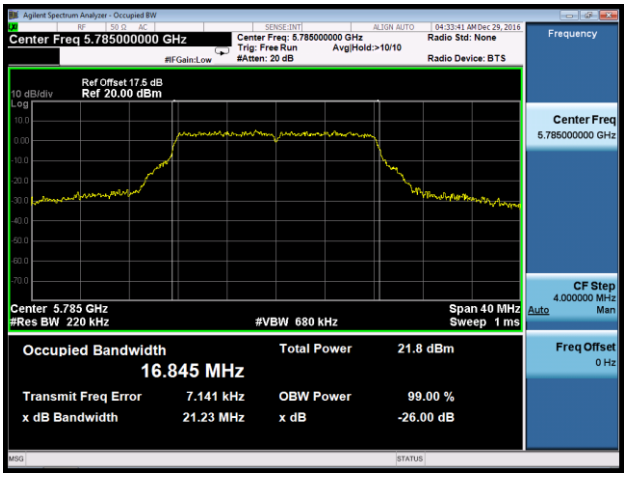
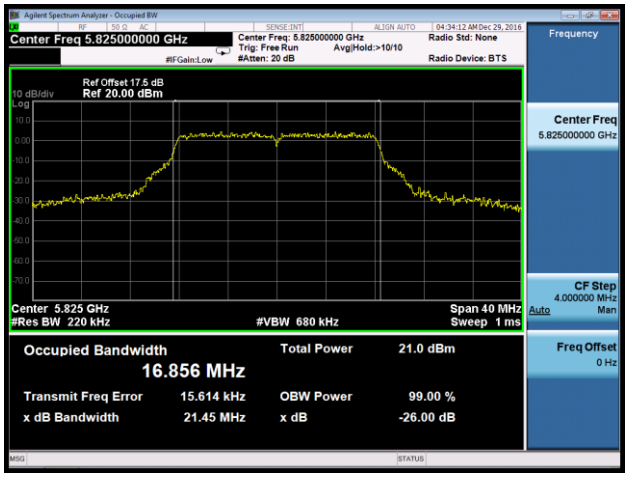


Channel 120 (5600MHz)



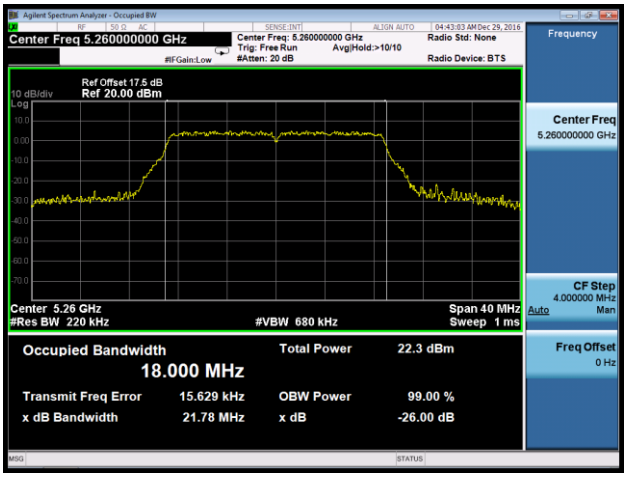
Channel 140 (5700MHz)



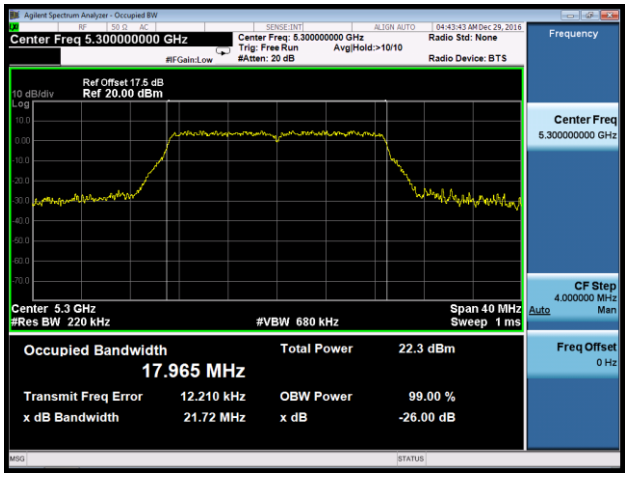
802.11a 26dB Bandwidth & 99% Bandwidth - Ant 1	
Channel 144 (5720MHz)	**Channel 149 (5745MHz)**
	
Channel 157 (5785MHz)	**Channel 165 (5825MHz)**
	

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

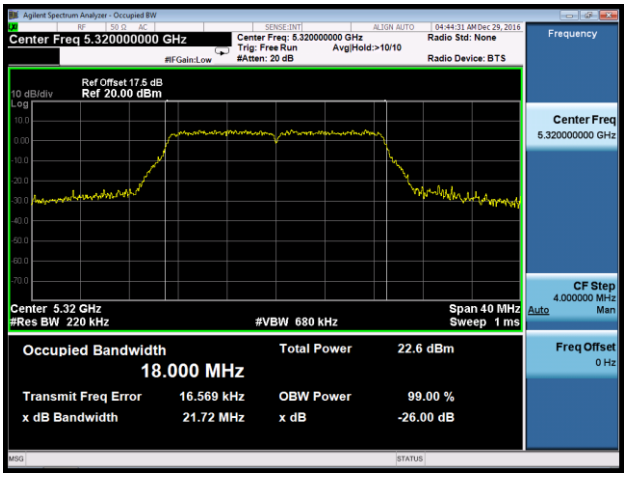
Channel 52 (5260MHz)



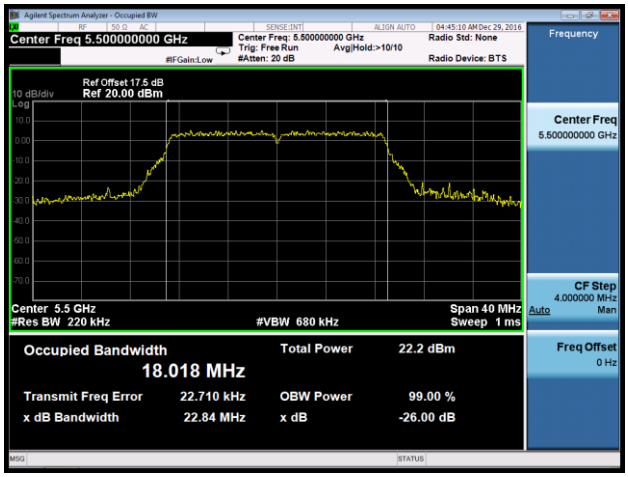
Channel 60 (5300MHz)



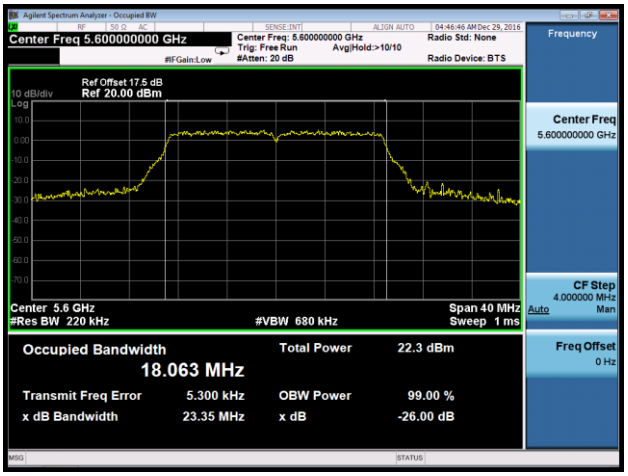
Channel 64 (5320MHz)



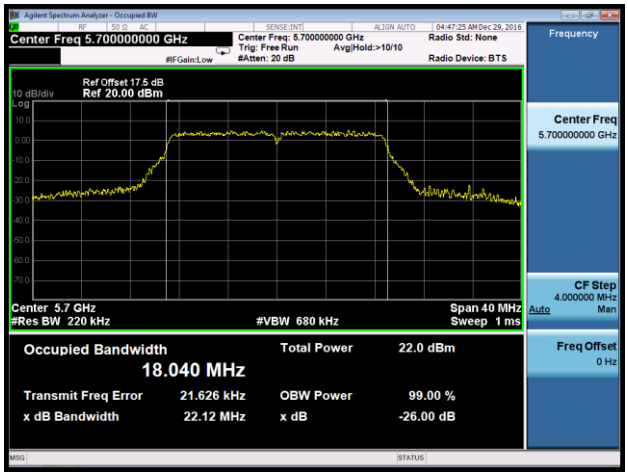
Channel 100 (5500MHz)

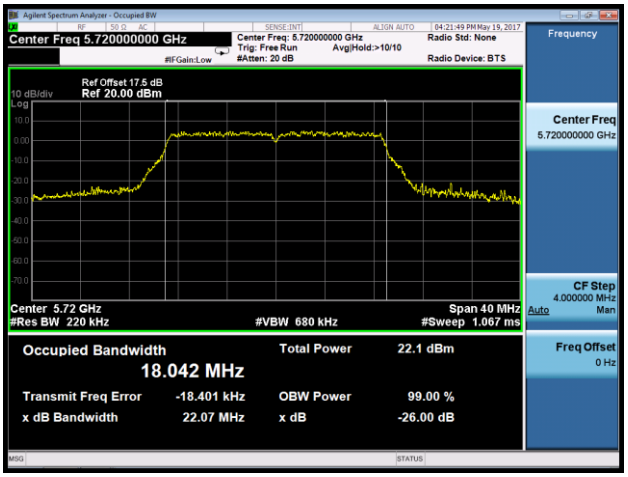
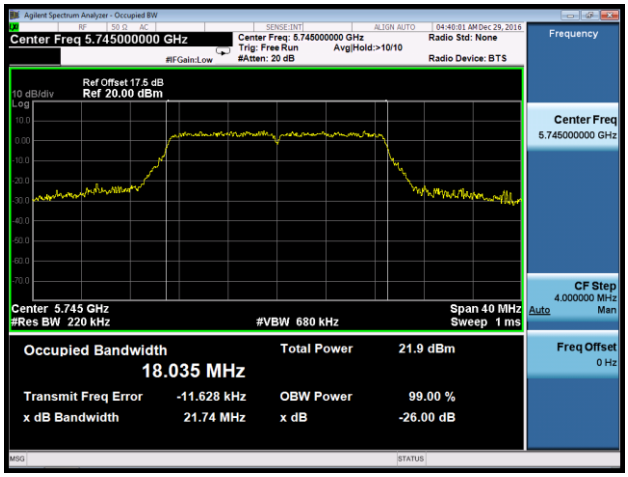
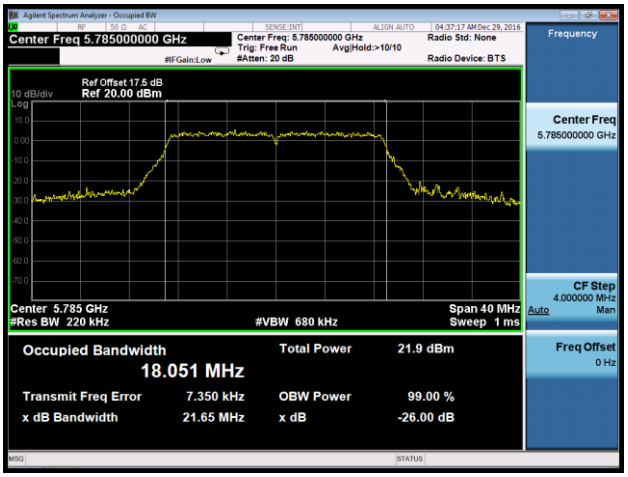
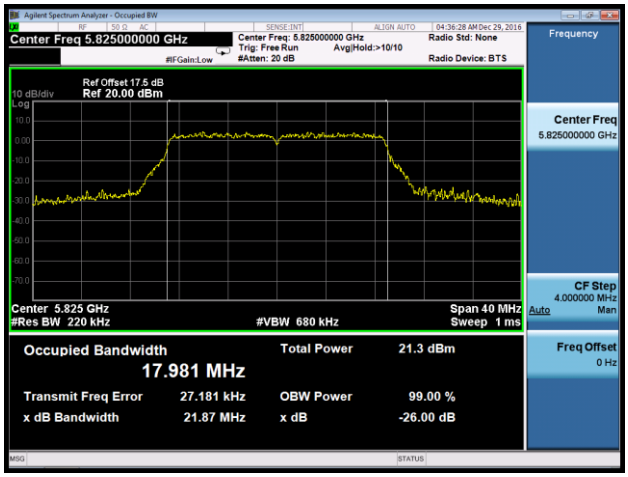


Channel 120 (5600MHz)



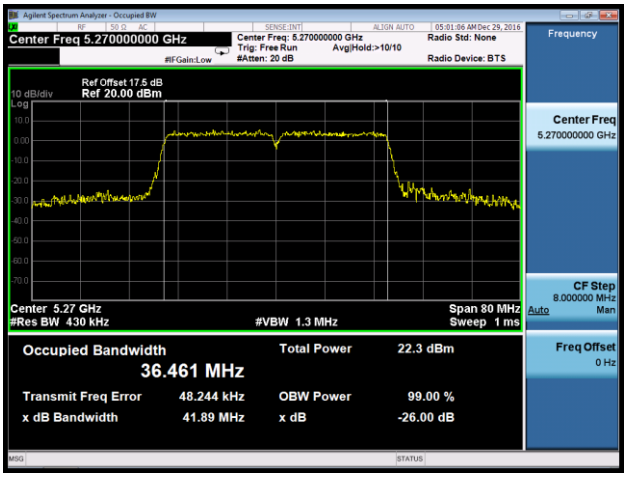
Channel 140 (5700MHz)



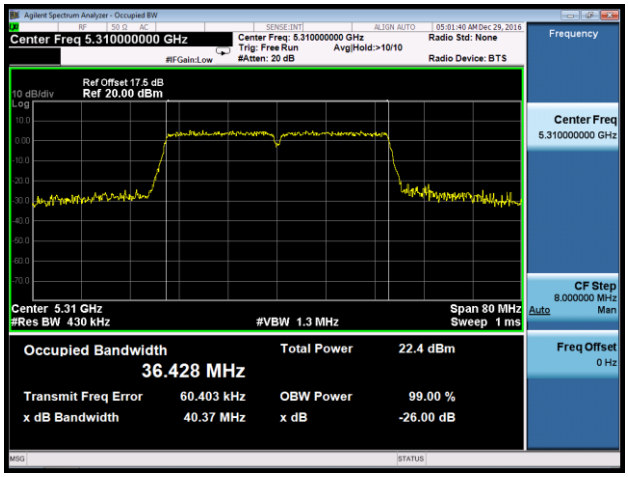
802.11n-HT20 26dB Bandwidth & 99% Bandwidth - Ant 1	
Channel 144 (5720MHz)	**Channel 149 (5745MHz)**
	
Channel 157 (5785MHz)	**Channel 165 (5825MHz)**
	

802.11n-HT40 26dB Bandwidth & 99% Bandwidth - Ant 1

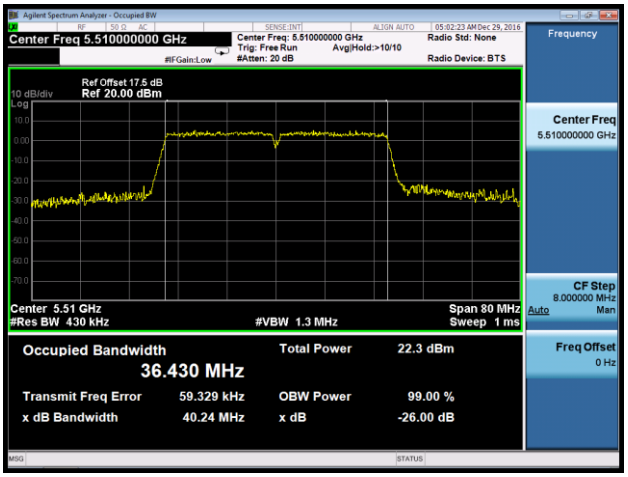
Channel 54 (5270MHz)



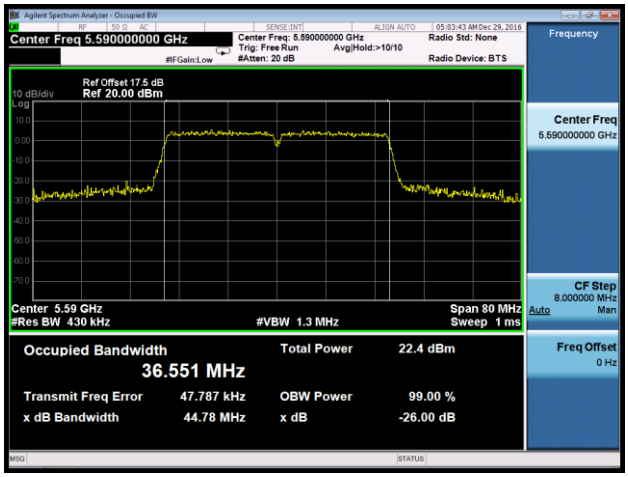
Channel 62 (5310MHz)



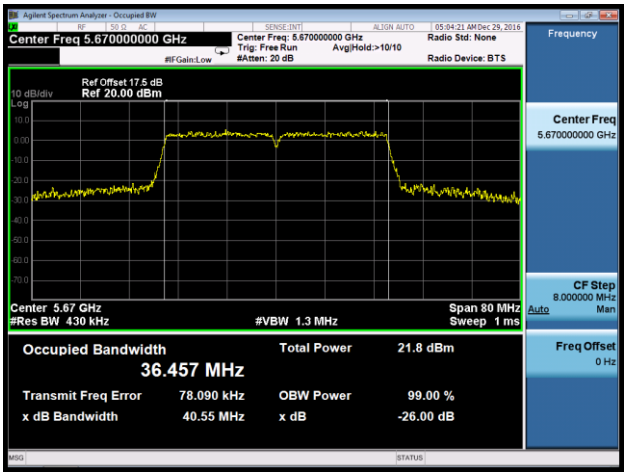
Channel 102 (5510MHz)



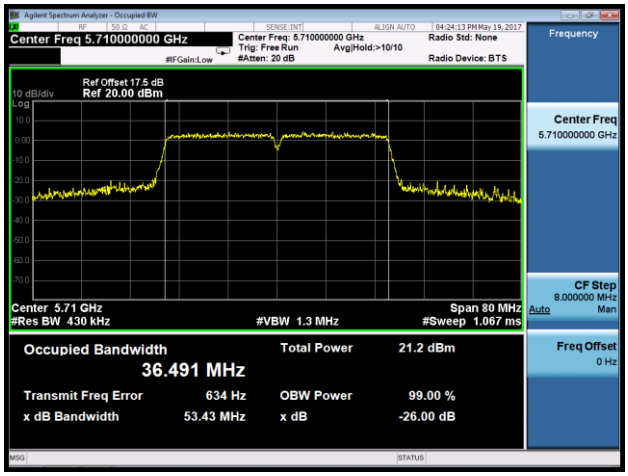
Channel 118 (5590MHz)

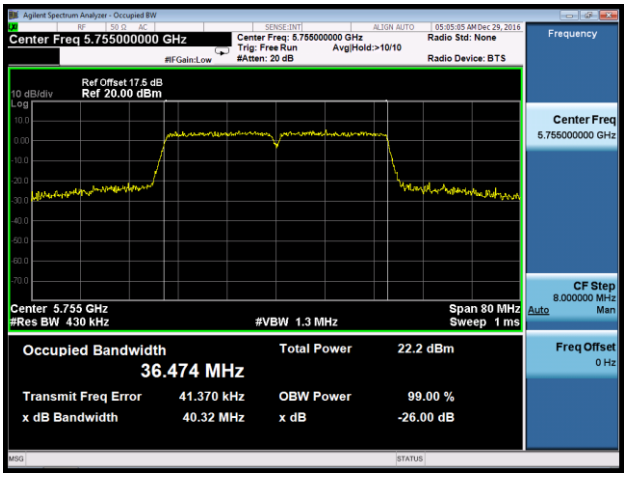
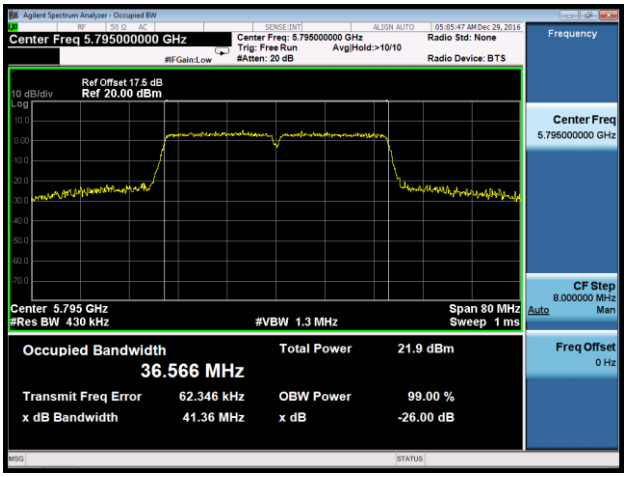


Channel 134 (5670MHz)



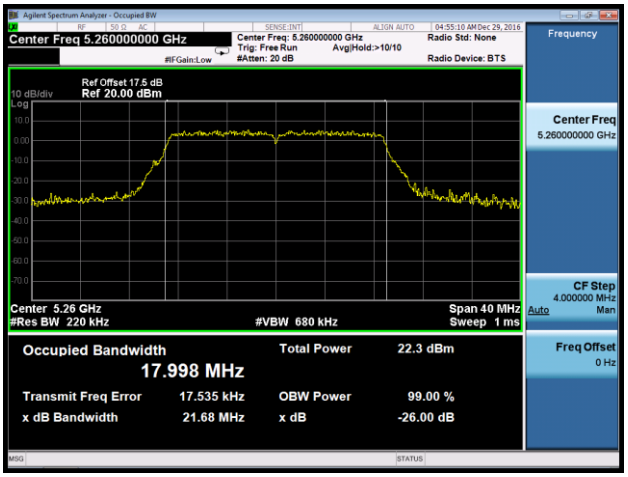
Channel 142 (5710MHz)



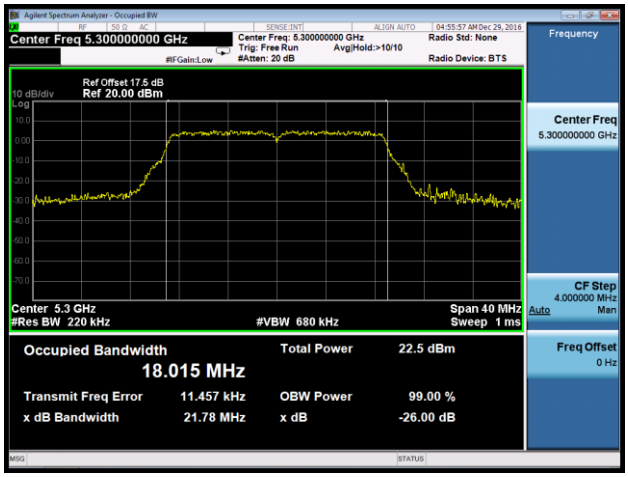
802.11n-HT40 26dB Bandwidth & 99% Bandwidth - Ant 1	
Channel 151 (5755MHz)	**Channel 159 (5795MHz)**
	

802.11ac-VHT20 26dB Bandwidth & 99% Bandwidth - Ant 1

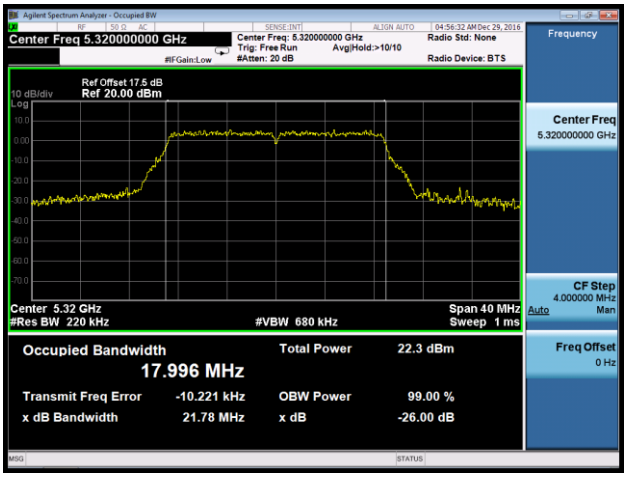
Channel 52 (5260MHz)



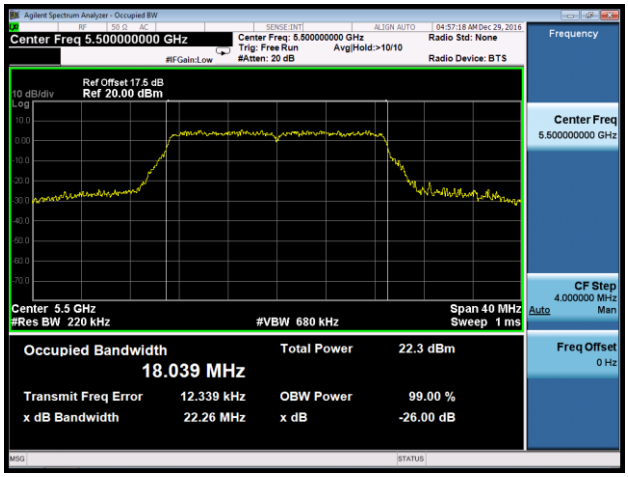
Channel 60 (5300MHz)



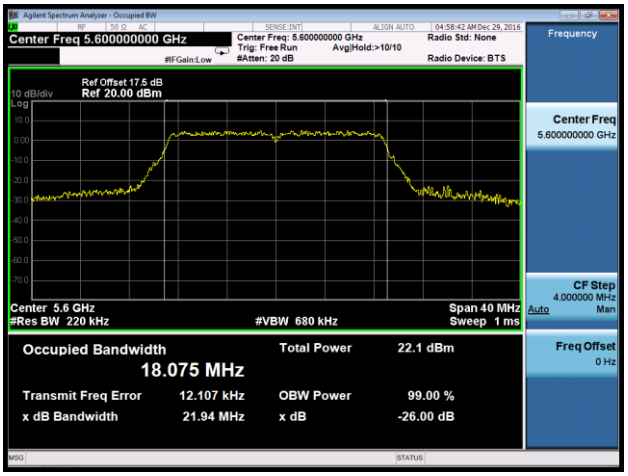
Channel 64 (5320MHz)



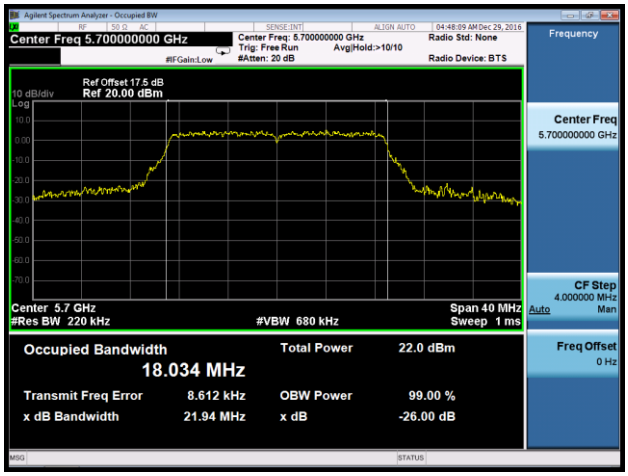
Channel 100 (5500MHz)

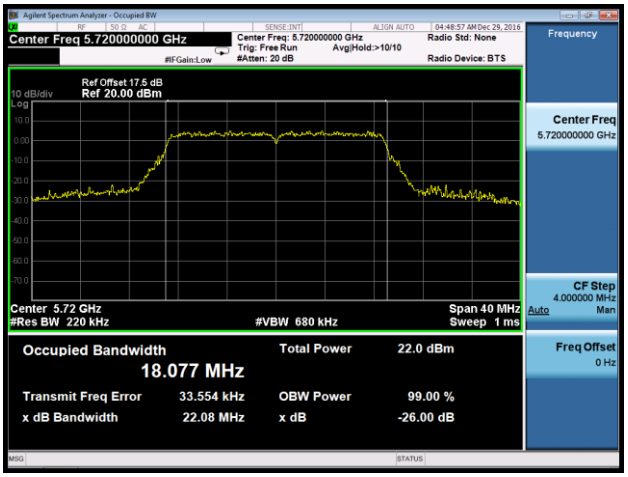
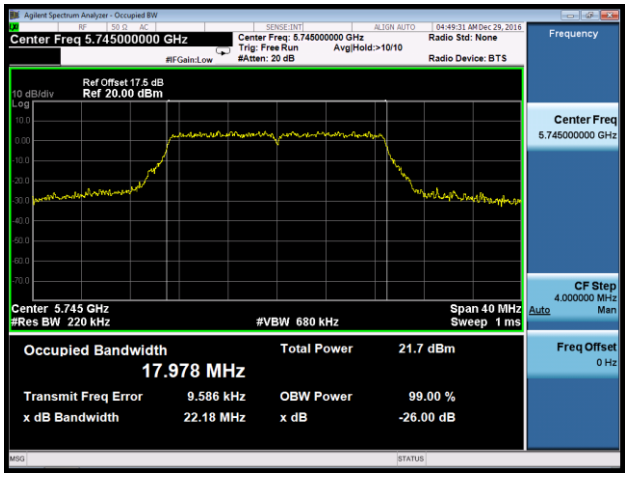
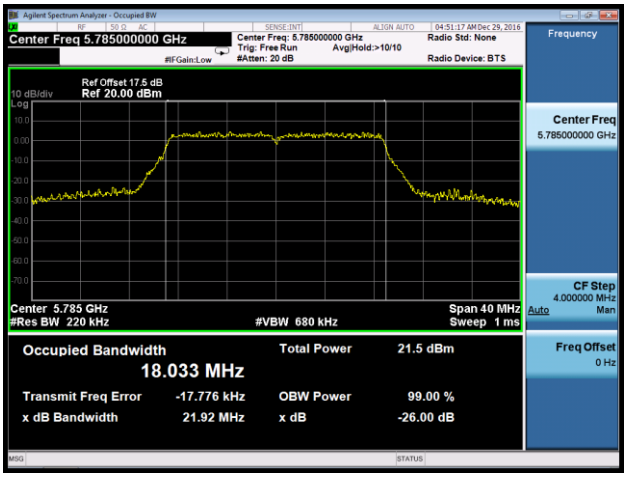
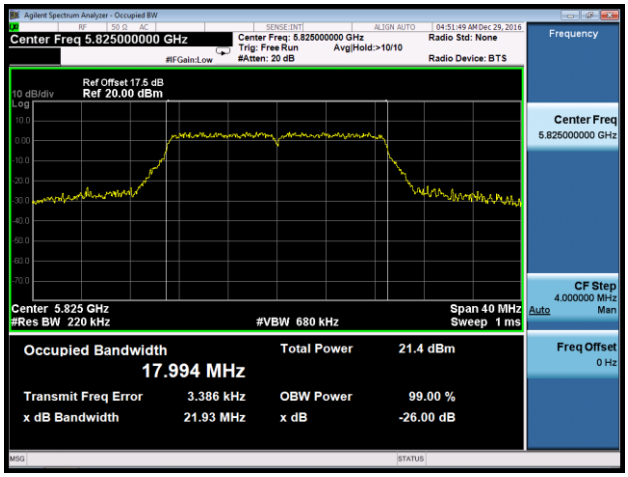


Channel 120 (5600MHz)



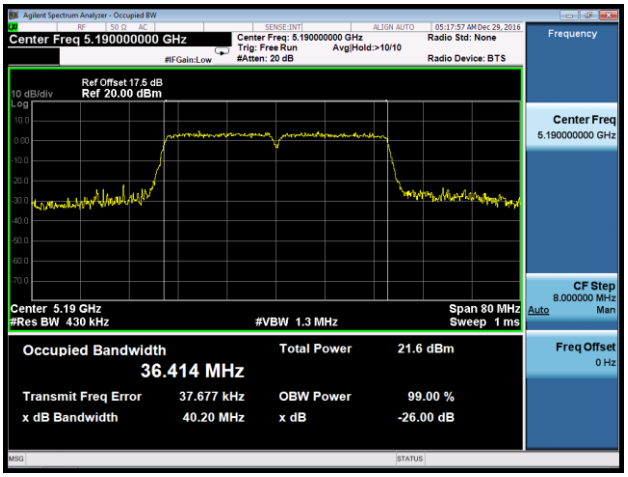
Channel 140 (5700MHz)



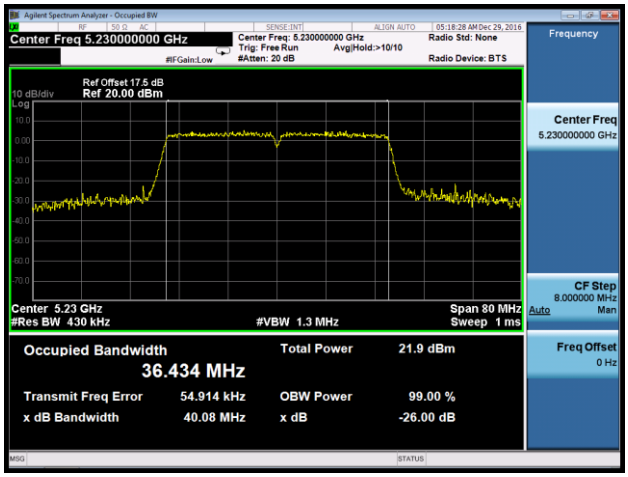
802.11ac-VHT20 26dB Bandwidth & 99% Bandwidth - Ant 1	
Channel 144 (5720MHz)	**Channel 149 (5745MHz)**
	
Channel 157 (5785MHz)	**Channel 165 (5825MHz)**
	

802.11ac-VHT40 26dB Bandwidth & 99% Bandwidth - Ant 1

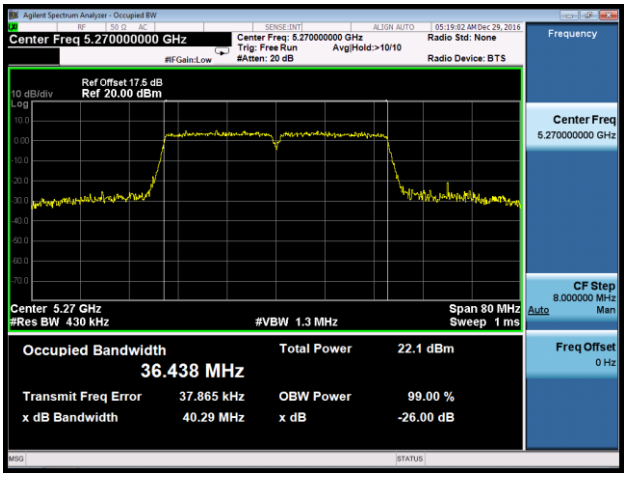
Channel 38 (5190MHz)



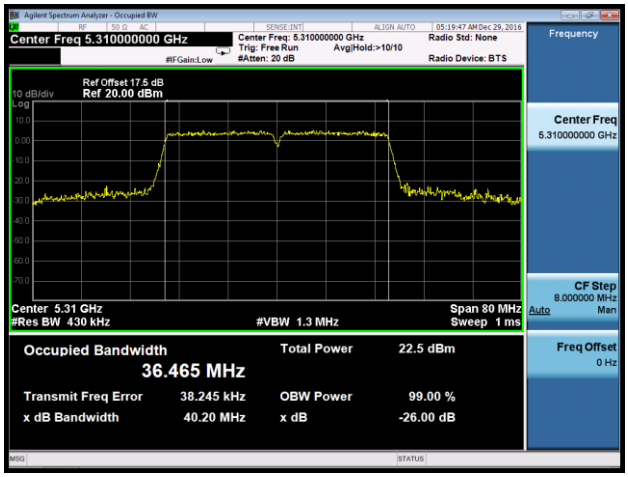
Channel 46 (5230MHz)



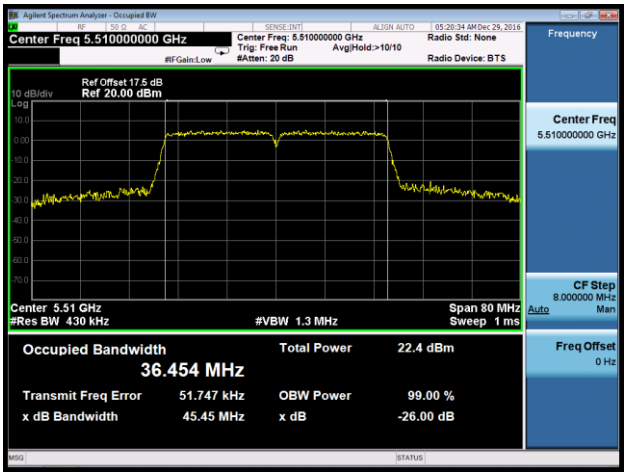
Channel 54 (5270MHz)



Channel 62 (5310MHz)



Channel 102 (5510MHz)



Channel 118 (5590MHz)