MEASUREMENT REPORT

FCC PART 15.407 WLAN 802.11a/n/ac/ax

FCC ID:	TE7AX50
APPLICANT:	TP-Link Technologies Co., Ltd.
Application Type:	Certification
Product:	AX3000 Gigabit Wi-Fi 6 Router
Model No.:	Archer AX50, Archer AX3000
Brand Name:	tp-link
FCC Classification:	Unlicensed National Information Infrastructure (UNII)
FCC Rule Part(s):	Part15 Subpart E (Section 15.407)
Test Procedure(s):	ANSI C63.10-2013, KDB 789033 D02v02r01, KDB 662911 D01v02r01
Test Date:	April 25 ~ May 24, 2019

Reviewed By: Paddy Chen
(Paddy Chen)

Approved By:
(Chenz Ker)

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 D02v02r01. Test results reported herein relate only to the item(s) tested.

Revision History

Report No.	Version	Description	Issue Date	Note
1905TW0114-U2	Rev. 01	Initial report	05-25-2019	Valid

CONTENTS

Description Page

§2.1033General Information

Applicant:	TP-Link Technologies Co., Ltd.
Applicant Address:	Building 24 (floors 1,3,4,5) and 28 (floors1-4), Central Science and Technology Park,Nanshan Shenzhen, 518057 China
Manufacturer:	TP-Link Technologies Co., Ltd.
Manufacturer Address:	Building 24 (floors 1,3,4,5) and 28 (floors1-4), Central Science and Technology Park,Nanshan Shenzhen, 518057 China
Test Site:	MRT Technology (Taiwan) Co., Ltd
Test Site Address:	No. 38, Fuxing Second Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C)
Test Device Serial No.:	N/A ☐ Production ☒ Pre-Production ☐ Engineering

Test Facility / Accreditations

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

- **MRT facility is a FCC registered (Reg. No. 153292 and 291082) test facility with the site description report on file and is designated by the FCC as an Accredited Test Firm.**
- **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 Taiwan, EU and TELEC Rules.**

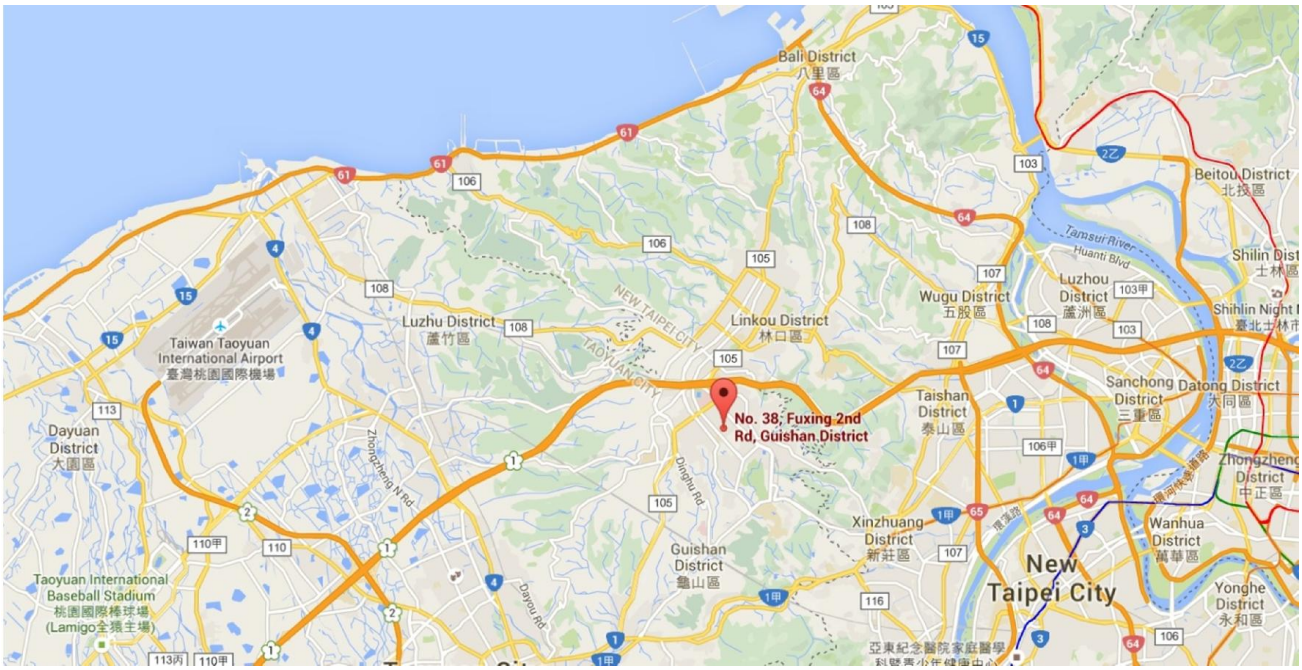
1. INTRODUCTION

1.1. Scope

Measurement and determination of electromagnetic emissions (EMC) of radio frequency devices includingintentional and/or unintentional radiators for compliance with the technical rules and regulations of the FederalCommunications 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 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:	AX3000 Gigabit Wi-Fi 6 Router
Model No.:	Archer AX50, Archer AX3000
Brand Name:	tp-link
Wi-Fi Specification:	802.11a/b/g/n/ac/ax

Note: These models are different in the USB interface, “Archer AX50” supports USB 3.0, “Archer AX3000” supports USB2.0. Other circuits are the same. So “Archer AX50” is chosen for the tests.

2.2. Product Specification Subjective to this Report

Frequency Range:	For 802.11a/n-HT20/ac-VHT20/ax-HE20: 5180~5240MHz, 5260~5320MHz, 5500~5720MHz, 5745~5825MHz For 802.11n-HT40/ac-VHT40/ax-HE40: 5190~5230MHz, 5270~5310MHz, 5510~5710MHz, 5755~5795MHz For 802.11ac-VHT80/ax-HE80: 5210MHz, 5290MHz, 5530MHz, 5610 MHz, 5690 MHz, 5775MHz For 802.11ac-VHT160/ax-HE160: 5250MHz, 5570MHz
Type of Modulation:	802.11a/n/ac: OFDM 802.11ax:OFDMA
Data Rate:	802.11a: 6/9/12/18/24/36/48/54Mbps 802.11n: up to 300Mbps 802.11ac: up to 1733.3Mbps 802.11ax: up to 2401.9Mbps

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

2.3. Working Frequencies for this report

802.11a/n-HT20/ac-VHT20/ax-HE20

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	--	--	--	--

802.11n-HT40/ac-VHT40/ax-HE40

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

802.11ac-VHT80/ax-HE80

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

802.11ac-VHT160/ax-HE160

Channel	Frequency	Channel	Frequency	Channel	Frequency
50	5250 MHz	114	5570 MHz	--	--

2.4. Description of Available Antennas

Antenna Type	Frequency Band (MHz)	T_X Paths	Max Antenna Gain (dBi)		Directional Gain (dBi)	
			Ant 0	Ant 1	For Power	For PSD
Dipole Antenna	2400 ~ 2500	2	2.00	2.00	2.00	5.01
	5150 ~ 5850	2	3.00	3.00	3.00	6.01

Note:

1. 802.11b support single transmission at Ant 0 port only.
2. 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.

   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,

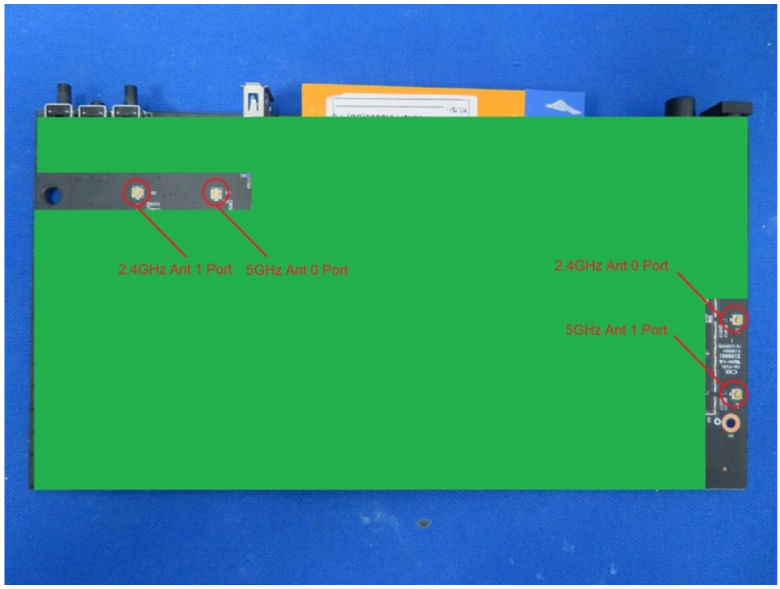
     Array Gain = 10 log (N_{ANT}/ N_{SS}) dB = 3.01;

   - For power measurements on IEEE 802.11 devices,

     Array Gain = 0 dB for N_{ANT} ≤ 4;

2.5. Description of Antenna RF Port

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



2.6. Test Mode

Test Mode	Mode 1: Transmit by 802.11a (6Mbps)
	Mode 2: Transmit by 802.11n-HT20 (MCS0)
	Mode 3: Transmit by 802.11n-HT40 (MCS0)
	Mode 4: Transmit by 802.11ac-VHT20 (MCS0)
	Mode 5: Transmit by 802.11ac-VHT40 (MCS0)
	Mode 6: Transmit by 802.11ac-VHT80 (MCS0)
	Mode 7: Transmit by 802.11ac-VHT160 (MCS0)
	Mode 8: Transmit by 802.11ax-HE20 (MCS0)
	Mode 9: Transmit by 802.11ax-HE40 (MCS0)
	Mode 10: Transmit by 802.11ax-HE80 (MCS0)
	Mode 11:Transmit by 802.11ax-HE160 (MCS0)

2.7. Description of Test Software

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

Power Parameter Value:

Test Mode	Test Frequency (MHz)	Power Parameter Value	Test Mode	Test Frequency (MHz)	Power Parameter Value
802.11a	5180	26.0	802.11n-HT20	5180	26.0
	5220	26.0		5220	26.0
	5240	25.5		5240	25.0
	5260	18.5		5260	18.5
	5300	18.5		5300	18.5
	5320	19.0		5320	18.5
	5500	20.0		5500	20.0
	5600	19.5		5600	20.0
	5700	19.5		5700	19.5
	5720	18.5		5720	18.5
	5745	26.0		5745	26.0
	5785	26.0		5785	26.0
	5825	26.0		5825	26.0
802.11n-HT40	5190	23.5	--		
	5230	26.0			
	5270	20.0			
	5310	20.0			
	5510	21.5			
	5590	20.0			
	5670	20.0			
	5710	20.0			
	5755	26.0			
	5795	26.0			

Test Mode	Test Frequency (MHz)	Power Parameter Value	Test Mode	Test Frequency (MHz)	Power Parameter Value
802.11ac-VHT20	5180	26.0	802.11ax-HE20	5180	26.0
	5220	25.0		5220	26.0
	5240	26.0		5240	25.0
	5260	19.0		5260	18.5
	5300	18.5		5300	18.5
	5320	18.5		5320	18.5
	5500	20.0		5500	20.0
	5600	19.5		5600	20.0
	5700	19.5		5700	19.5
	5720	19.0		5720	19.5
	5745	26.0		5745	26.0
	5785	26.0		5785	26.0
	5825	26.0		5825	26.0
802.11ac-VHT40	5190	23.0	802.11ax-HE40	5190	23.0
	5230	26.0		5230	26.0
	5270	19.5		5270	19.5
	5310	20.0		5310	20.0
	5510	21.0		5510	20.5
	5590	20.5		5590	20.0
	5670	20.5		5670	20.0
	5710	20.5		5710	20.0
	5755	26.0		5755	26.0
	5795	26.0		5795	26.0
802.11ac-VHT80	5210	22.5	802.11ax-HE80	5210	22.0
	5290	21.5		5290	21.0
	5530	20.5		5530	20.0
	5610	20.5		5610	20.0
	5690	20.5		5690	20.0
	5775	25.5		5775	24.5
802.11ac-VHT160	5250	20.5	802.11ax-HE160	5250	20.0
	5570	21.0		5570	21.0

2.8. Device Capabilities

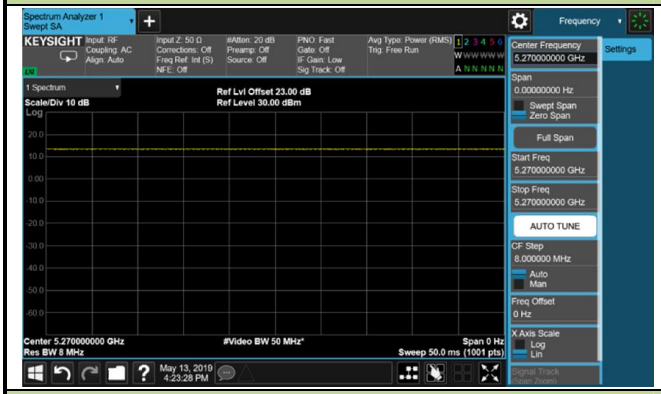
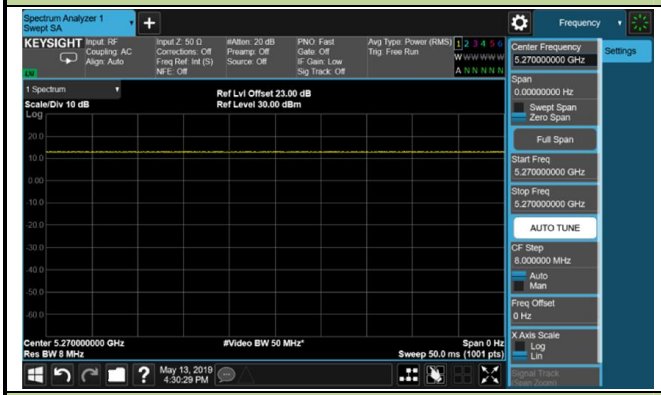
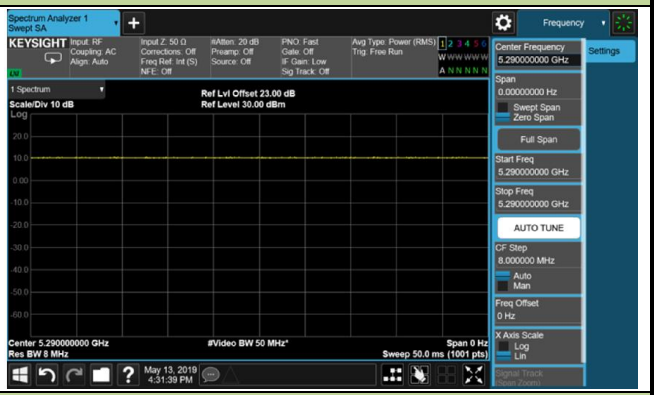
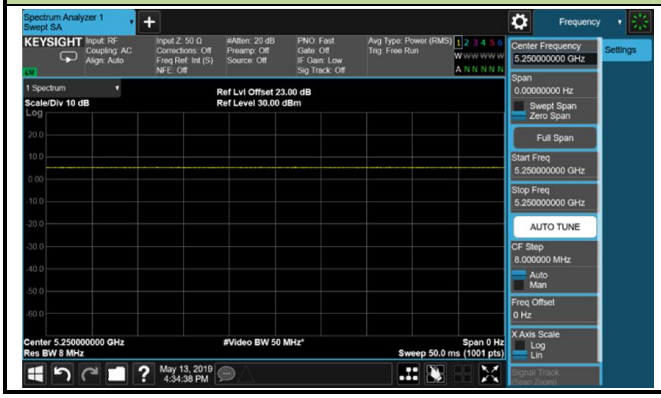
This device contains the following capabilities:

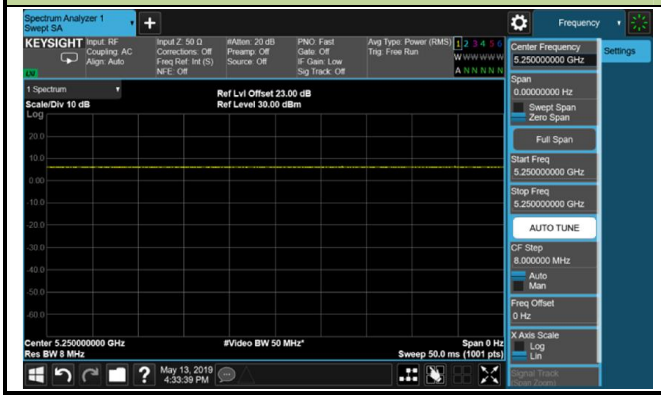
2.4GHz WLAN (DTS), 5GHz WLAN (NII).

Note: 5GHz (NII) operation is possible in 20MHz, 40MHz, 80MHz and 160MHz 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. 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:

Model No.	Test Mode	Duty Cycle
Archer AX50	802.11a	100%
	802.11n-HT20	100%
	802.11n-HT40	100%
	802.11ac-VHT20	100%
	802.11ac-VHT40	100%
	802.11ac-VHT80	100%
	802.11ac-VHT160	100%
	802.11ax-HE20	100%
	802.11ax-HE40	100%
	802.11ax-HE80	100%
	802.11ax-HE160	100%

Duty Cycle (T = Transmission Duration)	
802.11a	802.11n-HT20
	

Duty Cycle (T = Transmission Duration)	
802.11n-HT40	802.11ac-VHT20
	
802.11ac-VHT40	802.11ac-VHT80
	
802.11ac-VHT160	802.11ax-HE20
	

Duty Cycle (T = Transmission Duration)	
802.11ax-HE40	802.11ax-HE80
	
802.11ax-HE160	
	

2.9. Test Configuration

The device was tested per the guidance of KDB 789033 D02v02r01.ANSI C63.10-2013 was used to reference the appropriate EUT setup for radiated spurious emissions testingand 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 pamphletsupplied to the user and be readily visible to the purchaser at the time of purchase. However, when the deviceis 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 andlabel location.

3. DESCRIPTION OF TEST

3.1. Evaluation Procedure

The measurement procedures described in the American National Standard for Testing Unlicensed WirelessDevices (ANSI C63.10-2013), and the guidance provided in KDB 789033 D02v02r01 were used in themeasurement.

Deviation from measurement procedure…….....None

3.2. AC Line Conducted Emissions

The line-conducted facility is located inside an8'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.

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, remotecontrolled, 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. An80cm 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 tomaximize 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 theresponsible party can be used with the device. The use of a permanently attached antenna or of an antennathat uses a unique coupling to the intentional radiator shall be considered sufficient to comply with theprovisions of this section.”

- The antenna of the device is **permanently attached.**
- There are no provisions for connection to an external antenna.

Conclusion:

The unit complies with the requirement of §15.203.

5. TEST EQUIPMENT CALIBRATION DATE

Conducted Emissions

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
Two-Line V-Network	R&S	ENV216	MRTTWA00019	1 year	2020/03/25
Two-Line V-Network	R&S	ENV216	MRTTWA00020	1 year	2020/04/25
8-Wire ISN (T8)	R&S	ENY81	MRTTWA00018	1 year	2020/04/23
EMI Test Receiver	R&S	ESR3	MRTTWA00009	1 year	2020/03/25
Temperature/Humidity Meter	TFA	35.1078.10.IT	MRTTWA00033	1 year	2020/05/20

Radiated Emissions

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
Acitve Loop Antenna	SCHWARZBECK	FMZB 1519B	MRTTWA00002	1 year	2020/04/29
Broadband TRILOG Antenna	SCHWARZBECK	VULB 9162	MRTTWA00001	1 year	2020/05/22
Broadband Hornantenna	SCHWARZBECK	BBHA 9120D	MRTTWA00003	1 year	2020/04/22
Breitband Hornantenna	SCHWARZBECK	BBHA 9170	MRTTWA00004	1 year	2020/04/23
Broadband Preamplifier	SCHWARZBECK	BBV 9718	MRTTWA00005	1 year	2020/04/24
Broadband Amplifier	SCHWARZBECK	BBV 9721	MRTTWA00006	1 year	2020/04/24
Signal Analyzer	R&S	FSV40	MRTTWA00007	1 year	2020/03/26
EMI Test Receiver	R&S	ESR3	MRTTWA00009	1 year	2020/03/25
EXA Signal Analyzer	KEYSIGHT	N9010A	MRTTWA00012	1 year	2019/07/30
Antenna Cable	HUBERSUHNER	SF106	MRTTWE00010	1 year	2019/06/18
Temperature/Humidity Meter	TFA	35.1078.10.IT	MRTTWA00032	1 year	2020/05/20

Conducted Test Equipment

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
X-Series USB Peak and Average Power Sensor	KEYSIGHT	U2021XA	MRTTWA00014	1 year	2020/04/22
Wideband Radio Communication Taster	R&S	CMW 500	MRTTWA00041	1 year	2020/01/28
EXA Signal Analyzer	KEYSIGHT	N9010A	MRTTWA00012	1 year	2019/07/30
EXA Signal Analyzer	KEYSIGHT	N9010B	MRTSUE06457	1 year	2019/07/19
Signal Analyzer	R&S	FSV40	MRTTWA00007	1 year	2020/03/26
Temperature/Humidity Meter	TFA	35.1078.10.IT	MRTTWA00033	1 year	2020/05/20

Software	**Version**	**Function**
e3	9.160520a	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: 2.53dB
Radiated Emission Measurement - AC1
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 9kHz ~ 1GHz: 4.25dB 1GHz ~ 25GHz: 4.45dB

7. TEST RESULT

7.1. Summary

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(e)	6dB Bandwidth	≥ 500kHz		Pass	Section 7.3
15.407(a)(1)(ii), (2), (3)	Maximum Conducted Output Power	Refer to section 7.4		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	Refer to section 7.6		Pass	Section 7.6
15.407(g)	Frequency Stability	± 20 ppm		Pass	Section 7.7
15.407(b)(1), (4)(i)	Undesirable Emissions	Refer to Section 7.8	Radiated	Pass	Section 7.8 & 7.9
15.205, 15.209 15.407(b)(5), (6), (7)	General Field Strength Limits(Restricted Bands andRadiated Emission Limits)	Emissions in restrictedbands must meet theradiated limits detailed in15.209		Pass	
15.207	AC Conducted Emissions 150kHz - 30MHz	< FCC 15.207 limits	Line Conducted	Pass	Section 7.10

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 ofthe system to connect the EUT to the analyzer at all frequencies of interest.
2) All modes of operation and data rates were investigated. 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.
3) Test Items “26dB Bandwidth” & “6dB Bandwidth” have been assessed MIMO transmission, and showed the worst test data in this report.

7.2. 26dB Bandwidth Measurement

7.2.1.Test Limit

N/A

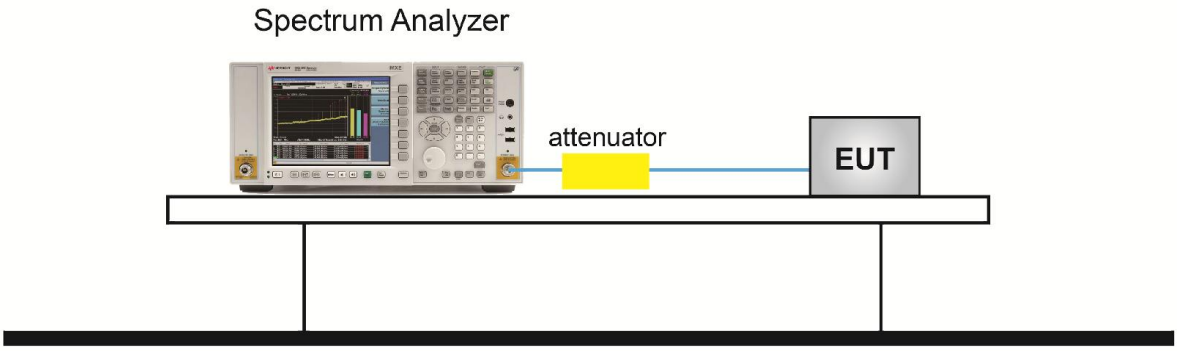
7.2.2.Test Procedure used

KDB 789033 D02v02r01 - 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	AX3000 Gigabit Wi-Fi 6 Router	Temperature	24 ~ 25°C
Test Engineer	Kevin Ker	Relative Humidity	48 ~ 56%
Test Site	SR1	Test Date	2019/05/06 ~ 2019/05/09

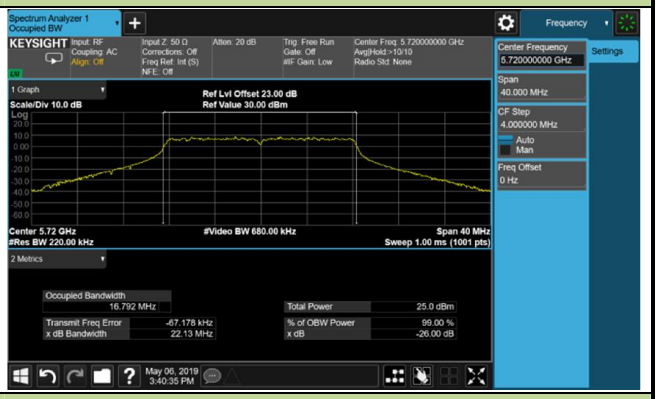
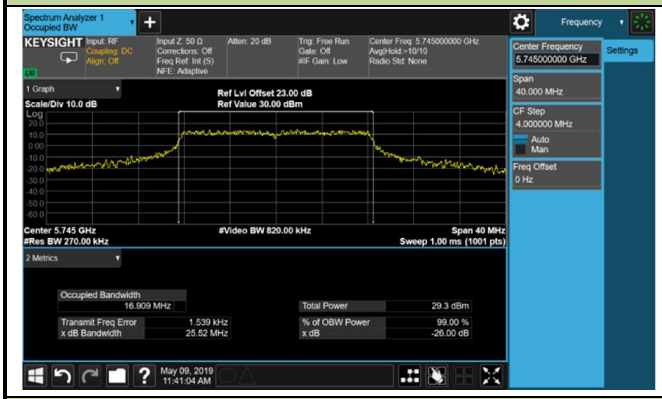
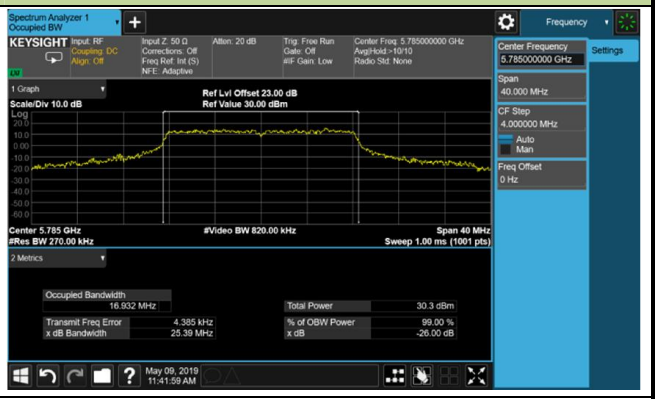
Test Mode	Data Rate/ MCS	Channel No.	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
802.11a	6Mbps	36	5180	21.93	16.71
802.11a	6Mbps	44	5220	23.58	16.71
802.11a	6Mbps	48	5240	24.71	16.70
802.11a	6Mbps	52	5260	22.69	16.80
802.11a	6Mbps	60	5300	25.43	16.86
802.11a	6Mbps	64	5320	22.55	16.80
802.11a	6Mbps	100	5500	22.98	16.78
802.11a	6Mbps	120	5600	27.56	16.94
802.11a	6Mbps	140	5700	25.30	16.91
802.11a	6Mbps	144	5720	22.13	16.79
802.11a	6Mbps	149	5745	25.52	16.91
802.11a	6Mbps	157	5785	25.39	16.93
802.11a	6Mbps	165	5825	30.82	17.05
802.11n-HT20	MCS0	36	5180	25.08	17.94
802.11n-HT20	MCS0	44	5220	24.14	17.94
802.11n-HT20	MCS0	48	5240	24.12	17.94
802.11n-HT20	MCS0	52	5260	24.61	18.04
802.11n-HT20	MCS0	60	5300	24.31	18.03
802.11n-HT20	MCS0	64	5320	24.57	18.01
802.11n-HT20	MCS0	100	5500	24.22	18.03
802.11n-HT20	MCS0	120	5580	24.42	18.01
802.11n-HT20	MCS0	140	5700	24.39	18.00
802.11n-HT20	MCS0	144	5720	24.42	18.03
802.11n-HT20	MCS0	149	5745	28.45	18.07
802.11n-HT20	MCS0	157	5785	28.92	18.08
802.11n-HT20	MCS0	165	5825	30.30	18.15

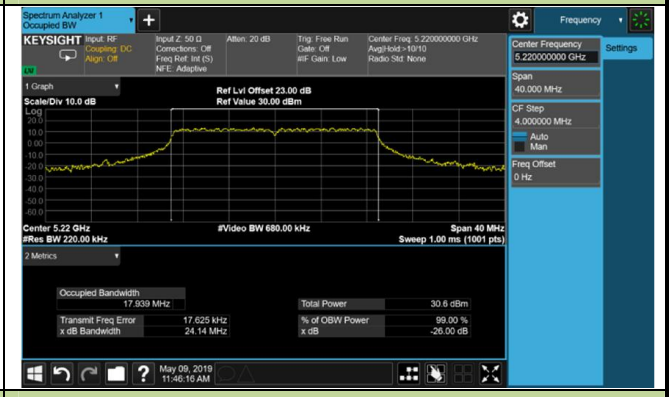
Test Mode	Data Rate/ MCS	Channel No.	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
802.11n-HT40	MCS0	38	5190	45.68	36.44
802.11n-HT40	MCS0	46	5230	45.17	36.46
802.11n-HT40	MCS0	54	5270	50.58	37.24
802.11n-HT40	MCS0	62	5310	49.97	37.17
802.11n-HT40	MCS0	102	5510	50.12	37.24
802.11n-HT40	MCS0	118	5590	49.87	37.15
802.11n-HT40	MCS0	134	5670	50.06	37.07
802.11n-HT40	MCS0	142	5710	50.23	37.16
802.11n-HT40	MCS0	151	5755	50.50	36.72
802.11n-HT40	MCS0	159	5795	49.50	35.69
802.11ac-VHT20	MCS0	36	5180	25.02	17.95
802.11ac-VHT20	MCS0	44	5220	24.10	17.91
802.11ac-VHT20	MCS0	48	5240	24.64	17.96
802.11ac-VHT20	MCS0	52	5260	24.34	18.00
802.11ac-VHT20	MCS0	60	5300	24.24	18.00
802.11ac-VHT20	MCS0	64	5320	24.10	18.04
802.11ac-VHT20	MCS0	100	5500	24.42	18.01
802.11ac-VHT20	MCS0	120	5600	24.43	18.04
802.11ac-VHT20	MCS0	140	5700	24.60	18.00
802.11ac-VHT20	MCS0	144	5720	24.46	18.00
802.11ac-VHT20	MCS0	149	5745	28.70	18.05
802.11ac-VHT20	MCS0	157	5785	26.10	18.05
802.11ac-VHT20	MCS0	165	5825	30.67	18.11
802.11ac-VHT40	MCS0	38	5190	44.55	36.43
802.11ac-VHT40	MCS0	46	5230	44.03	36.40
802.11ac-VHT40	MCS0	54	5270	49.92	37.13
802.11ac-VHT40	MCS0	62	5310	50.12	37.04
802.11ac-VHT40	MCS0	102	5510	50.06	37.21
802.11ac-VHT40	MCS0	118	5590	49.89	37.06
802.11ac-VHT40	MCS0	134	5670	49.80	37.13
802.11ac-VHT40	MCS0	142	5710	50.22	37.15
802.11ac-VHT40	MCS0	151	5755	52.09	37.74
802.11ac-VHT40	MCS0	159	5795	52.65	36.65

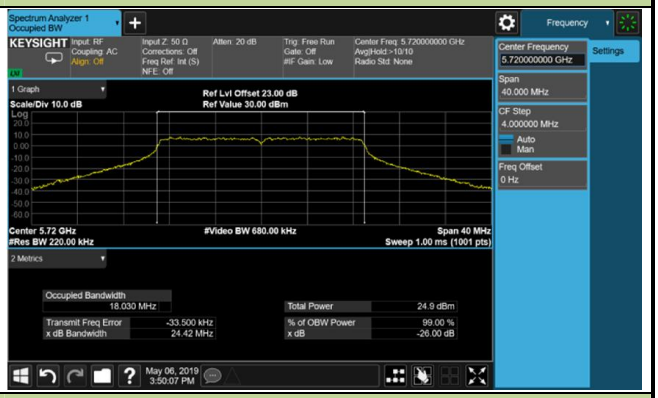
Test Mode	Data Rate/ MCS	Channel No.	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
802.11ac-VHT80	MCS0	42	5210	88.25	76.16
802.11ac-VHT80	MCS0	58	5290	85.99	75.96
802.11ac-VHT80	MCS0	106	5530	86.36	76.03
802.11ac-VHT80	MCS0	122	5610	85.60	76.01
802.11ac-VHT80	MCS0	138	5690	87.02	75.95
802.11ac-VHT80	MCS0	155	5775	100.80	76.25
802.11ac-VHT160	MCS0	50	5250	171.80	155.02
802.11ac-VHT160	MCS0	114	5570	169.60	155.00
802.11ax-HET20	MCS0	36	5180	22.38	19.06
802.11ax-HET20	MCS0	44	5220	22.15	19.14
802.11ax-HET20	MCS0	48	5240	20.68	19.01
802.11ax-HET20	MCS0	52	5260	22.65	19.05
802.11ax-HET20	MCS0	60	5300	21.93	19.12
802.11ax-HET20	MCS0	64	5320	22.39	19.04
802.11ax-HET20	MCS0	100	5500	21.39	18.95
802.11ax-HET20	MCS0	120	5580	21.51	19.02
802.11ax-HET20	MCS0	140	5700	22.63	19.11
802.11ax-HET20	MCS0	144	5720	20.48	18.90
802.11ax-HET20	MCS0	149	5745	23.09	19.06
802.11ax-HET20	MCS0	157	5785	22.94	19.00
802.11ax-HET20	MCS0	165	5825	25.14	19.01
802.11ax-HET40	MCS0	38	5190	41.49	37.75
802.11ax-HET40	MCS0	46	5230	40.39	37.87
802.11ax-HET40	MCS0	54	5270	41.84	37.99
802.11ax-HET40	MCS0	62	5310	40.23	37.78
802.11ax-HET40	MCS0	102	5510	42.24	37.95
802.11ax-HET40	MCS0	118	5590	42.59	38.17
802.11ax-HET40	MCS0	134	5670	42.76	38.25
802.11ax-HET40	MCS0	142	5710	41.40	38.01
802.11ax-HET40	MCS0	151	5755	47.80	38.25
802.11ax-HET40	MCS0	159	5795	51.79	38.26

Test Mode	Data Rate/ MCS	Channel No.	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
802.11ax-HET80	MCS0	42	5210	82.91	77.57
802.11ax-HET80	MCS0	58	5290	81.60	77.53
802.11ax-HET80	MCS0	106	5530	81.62	77.27
802.11ax-HET80	MCS0	122	5610	84.12	77.55
802.11ax-HET80	MCS0	138	5690	83.71	77.40
802.11ax-HET80	MCS0	155	5775	83.89	77.51
802.11ax-HET160	MCS0	50	5250	165.60	156.35
802.11ax-HET160	MCS0	114	5570	162.70	156.71

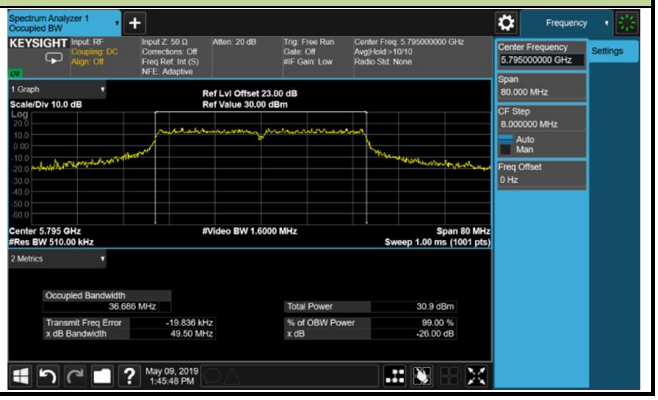
802.11a 26dB Bandwidth & 99% Bandwidth - Ant 0 / Ant 0 + 1	
Channel 36 (5180MHz)	Channel 44 (5220MHz)
	
Channel 48 (5240MHz)	Channel 52 (5260MHz)
	
Channel 60 (5300MHz)	Channel 64 (5320MHz)
	
Channel 100 (5500MHz)	Channel 120 (5600MHz)
	

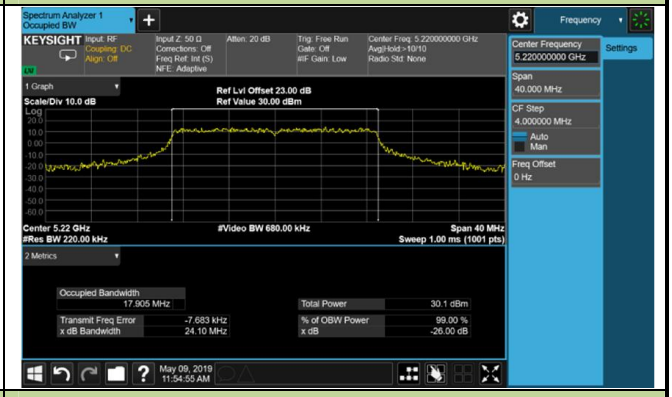
Channel 140 (5700MHz)	Channel 144 (5720MHz)
	
Channel 149 (5745MHz)	**Channel 157 (5785MHz)**
	
Channel 165 (5825MHz)	
	

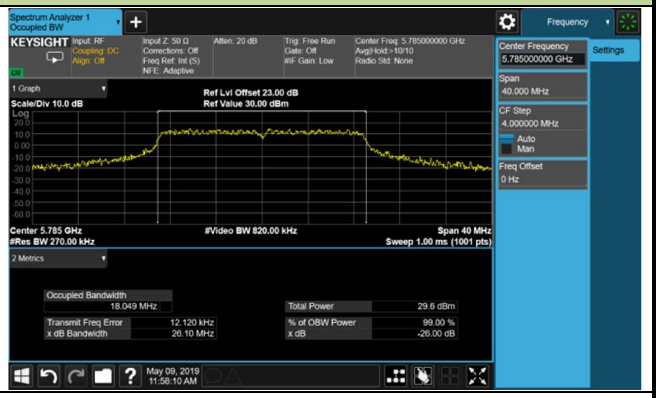
802.11n-HT20 26dB Bandwidth & 99% Bandwidth - Ant 0 / Ant 0 + 1	
Channel 36 (5180MHz)	Channel 44 (5220MHz)
	
Channel 48 (5240MHz)	Channel 52 (5260MHz)
	
Channel 60 (5300MHz)	Channel 64 (5320MHz)
	
Channel 100 (5500MHz)	Channel 120 (5600MHz)
	

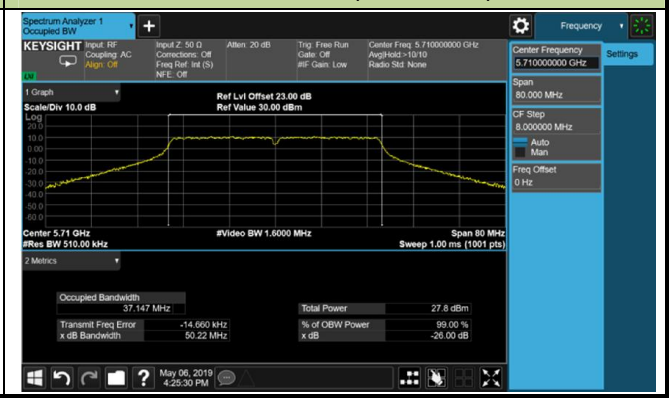
Channel 140 (5700MHz)	Channel 144 (5720MHz)
	
Channel 149 (5745MHz)	**Channel 157 (5785MHz)**
	
Channel 165 (5825MHz)	
	

802.11n-HT40 26dB Bandwidth & 99% Bandwidth - Ant 0 / Ant 0 + 1	
Channel 38 (5190MHz)	Channel 46 (5230MHz)
	
Channel 54 (5270MHz)	Channel 62 (5310MHz)
	
Channel 102 (5510MHz)	Channel 118 (5590MHz)
	
Channel 134 (5670MHz)	Channel 142 (5710MHz)
	

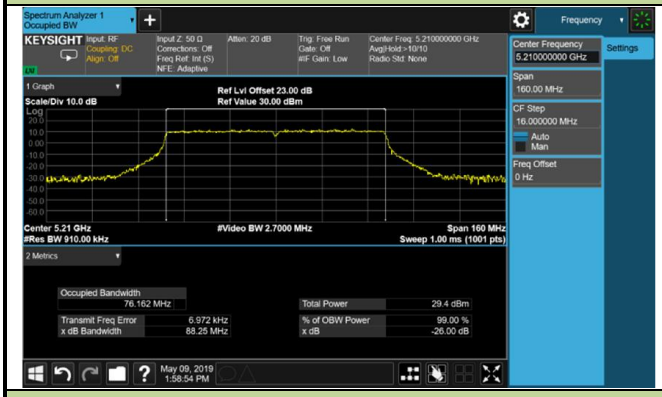
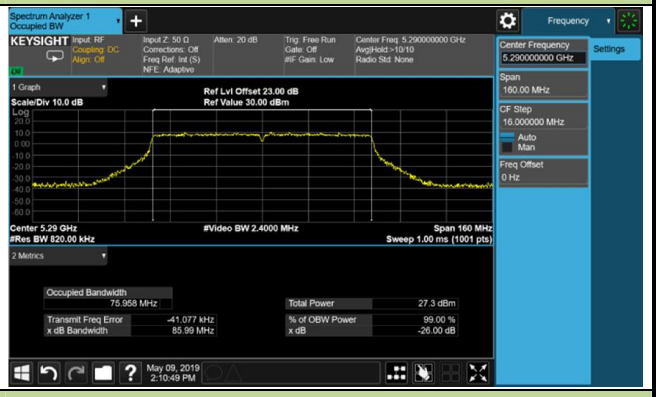
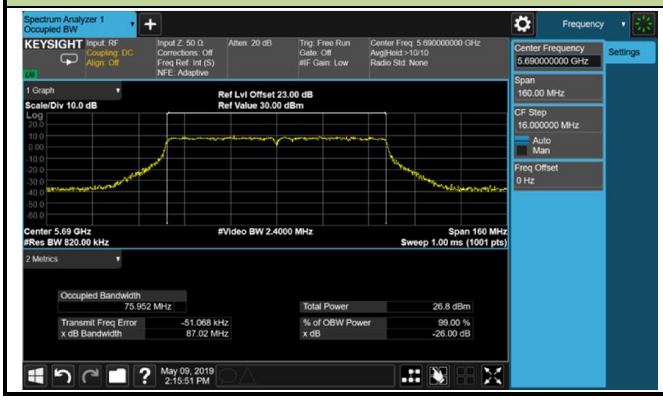
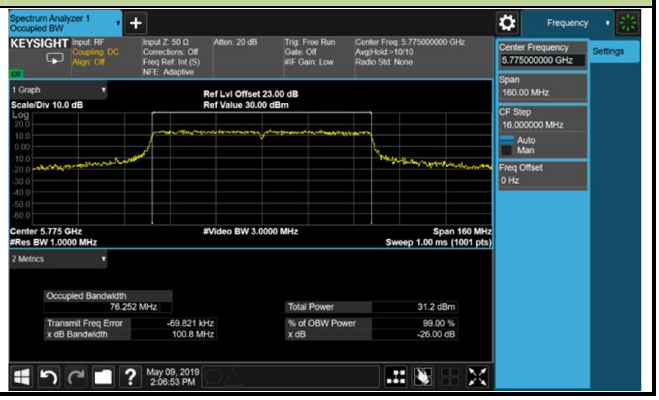
Channel 151 (5755MHz)	Channel 159 (5795MHz)
	

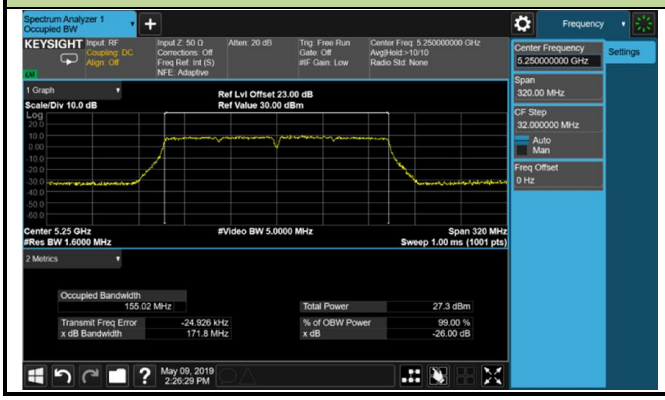
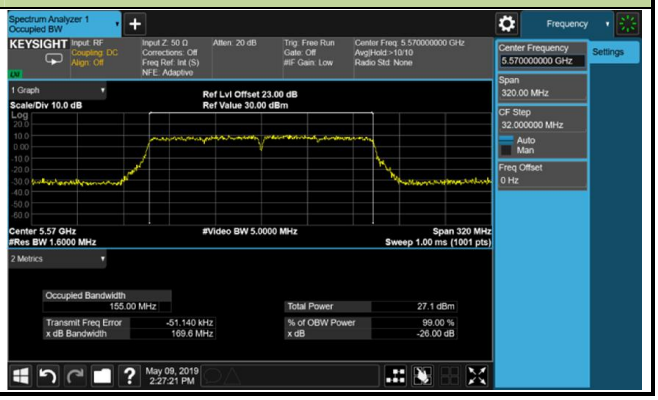
802.11ac-VHT20 26dB Bandwidth & 99% Bandwidth - Ant 0 / Ant 0 + 1	
Channel 36 (5180MHz)	Channel 44 (5220MHz)
	
Channel 48 (5240MHz)	Channel 52 (5260MHz)
	
Channel 60 (5300MHz)	Channel 64 (5320MHz)
	
Channel 100 (5500MHz)	Channel 120 (5600MHz)
	

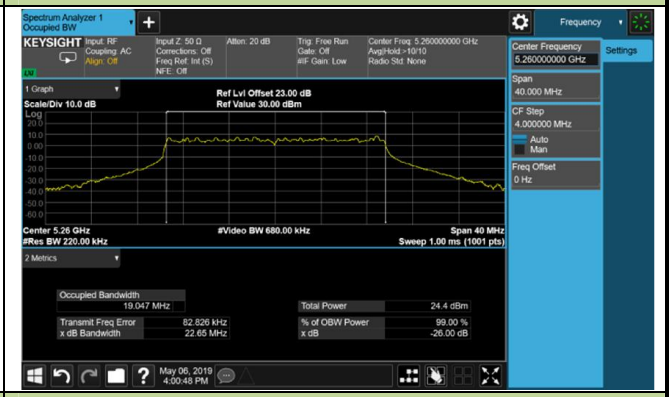
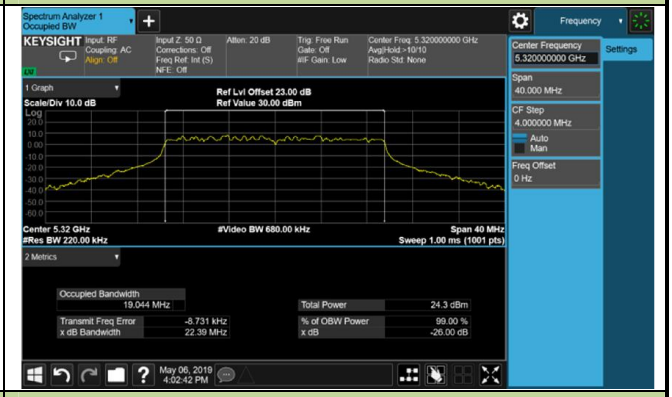
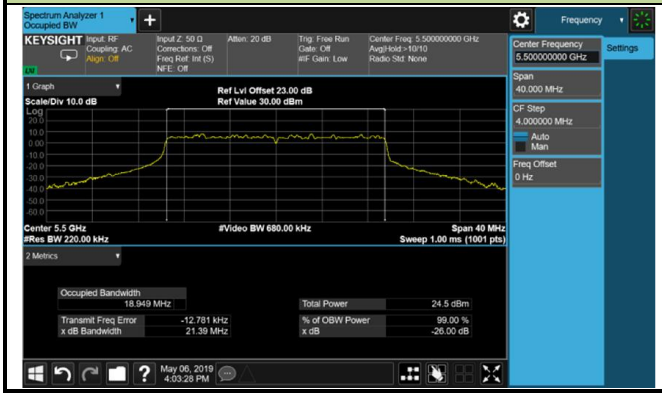
Channel 140 (5700MHz)	Channel 144 (5720MHz)
	
Channel 149 (5745MHz)	**Channel 157 (5785MHz)**
	
Channel 165 (5825MHz)	
	

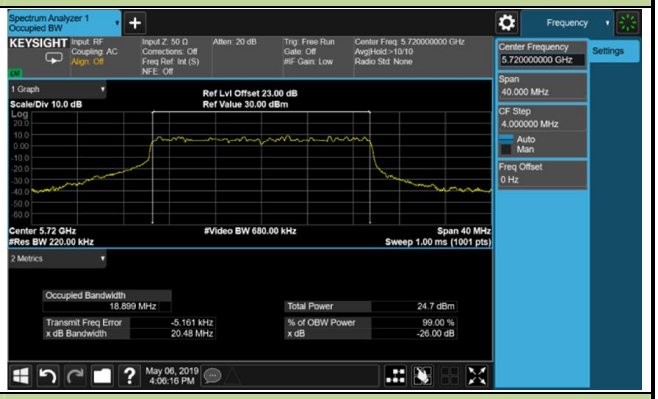
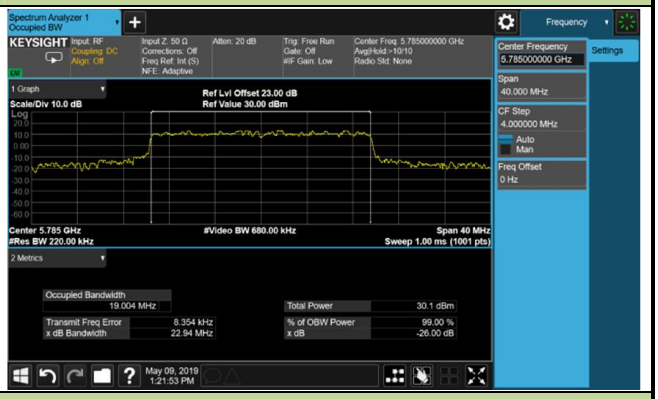
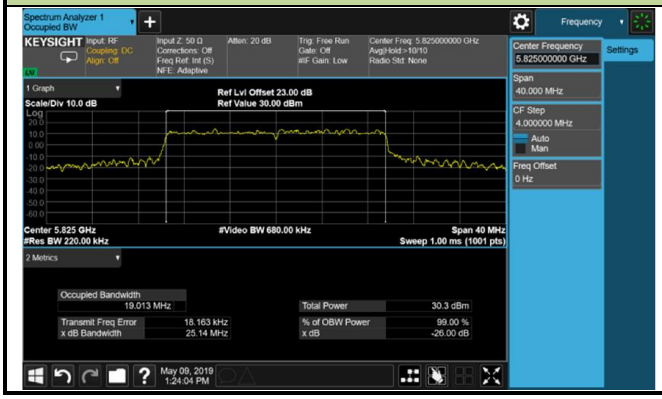
802.11ac-VHT40 26dB Bandwidth & 99% Bandwidth - Ant 0 / Ant 0 + 1	
Channel 38 (5190MHz)	Channel 46 (5230MHz)
	
Channel 54 (5270MHz)	Channel 62 (5310MHz)
	
Channel 102 (5510MHz)	Channel 118 (5590MHz)
	
Channel 134 (5670MHz)	Channel 142 (5710MHz)
	

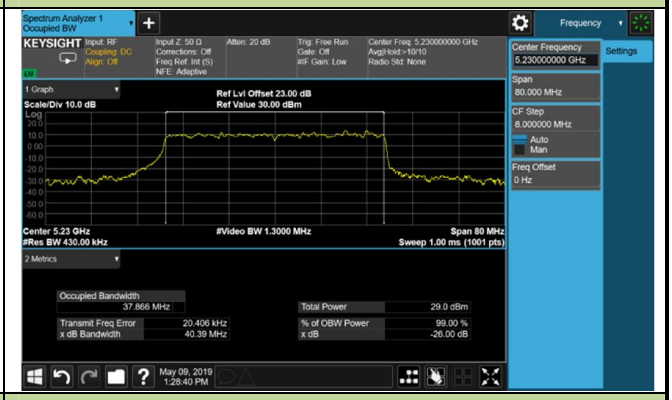
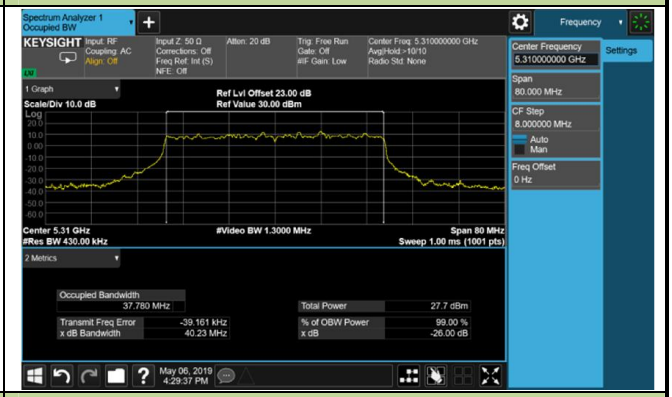
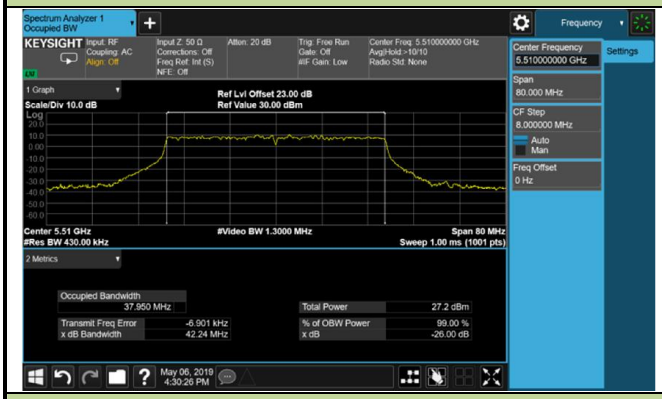
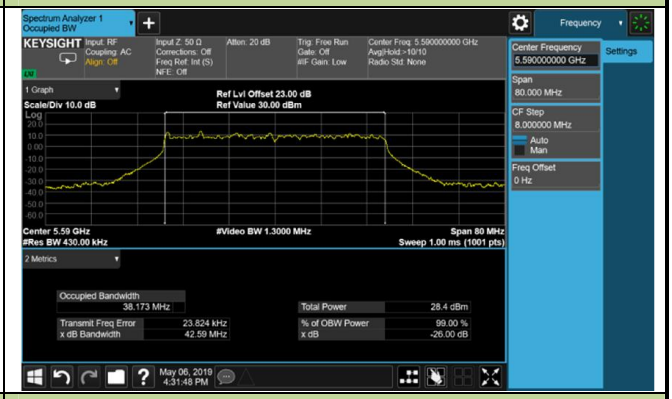
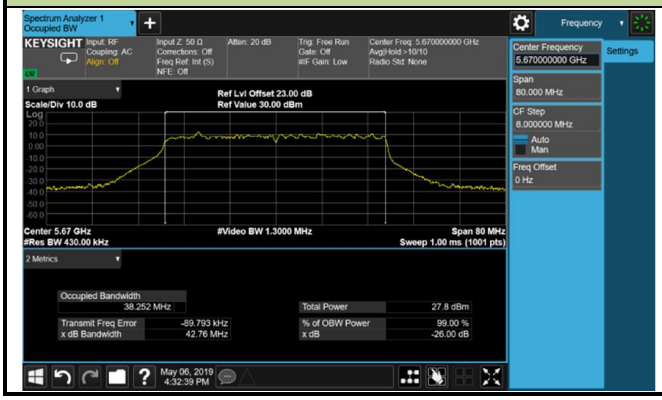
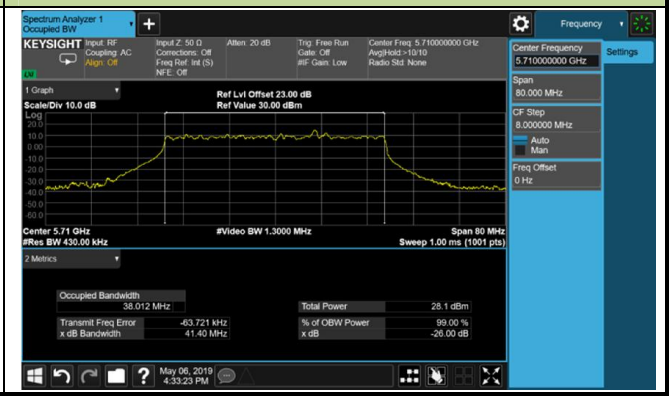
Channel 151 (5755MHz)	Channel 159 (5795MHz)
	

802.11ac-VHT80 26dB Bandwidth & 99% Bandwidth - Ant 0 / Ant 0 + 1	
Channel 42 (5210MHz)	Channel 58 (5290MHz)
	
Channel 106 (5530MHz)	Channel 122 (5610MHz)
	
Channel 138 (5690MHz)	Channel 155 (5775MHz)
	

802.11ac-VHT160 26dB Bandwidth & 99% Bandwidth - Ant 0 / Ant 0 + 1	
Channel 50 (5250MHz)	Channel 114 (5570MHz)
	

802.11ax-HE20 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 144 (5720MHz)
	
Channel 149 (5745MHz)	**Channel 157 (5785MHz)**
	
Channel 165 (5825MHz)	
	

802.11ax-HE40 26dB Bandwidth & 99% Bandwidth - Ant 0 / Ant 0 + 1	
Channel 38 (5190MHz)	Channel 46 (5230MHz)
	
Channel 54 (5270MHz)	Channel 62 (5310MHz)
	
Channel 102 (5510MHz)	Channel 118 (5590MHz)
	
Channel 134 (5670MHz)	Channel 142 (5710MHz)
	

Channel 151 (5755MHz)	Channel 159 (5795MHz)