RF MEASUREMENT REPORT

FCC ID	:	2AXJ4EAP670
Applicant	:	TP-Link Corporation Limited
Application Type	:	Certification
Product	:	AX5400 Ceiling Mount Wi-Fi 6 Access Point
Model No.	:	EAP670
Brand Name	:	tp-link
FCC Classification	:	Unlicensed National Information Infrastructure (NII)
FCC Rule Part(s)	:	Part15 Subpart E (Section 15.407)
Received Date	:	February 07, 2022
Test Date	:	February 14~March 23, 2022

Tested By : Peter Syu
(Peter Syu)

Reviewed By : Paddy Chen
(Paddy Chen)

Approved By : Chenz Ker
(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.

The test report shall not be reproduced except in full without the written approval of MRT Technology (Taiwan) Co., Ltd.

Revision History

Report No.	Version	Description	Issue Date	Note
2202TW0101-U2	V1.0	Original Report	2022-04-15	Valid

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General Information

Applicant	TP-Link Corporation Limited
Applicant Address	Room 901, 9/F. , New East Ocean Centre, 9 Science Museum Road, Tsim Sha Tsui, Kowloon, Hongkong
Manufacturer	TP-Link Corporation Limited
Manufacturer Address	Room 901, 9/F. , New East Ocean Centre, 9 Science Museum Road, Tsim Sha Tsui, Kowloon, Hongkong
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 FCC Registration No.	291082
FCC Rule Part(s)	Part 15.407
Test Device Serial No.	N/A ☐ Production ☒ Pre-Production ☐ Engineering

Test Facility / Accreditations

1. MRT facility is a FCC registered (Reg. No. 291082) test facility with the site description report on file and is designated by the FCC as an Accredited Test Firm.
2. MRT facility is an IC registered (MRT Reg. No. 21723) test laboratory with the site description on file at Industry Canada.
3. MRT Lab is accredited to ISO 17025 by the Taiwan Accreditation Foundation (TAF Cert. No. 3261) in EMC, Telecommunications and Radio testing for FCC (Designation Number: TW3261), Industry Taiwan, EU and TELEC Rules.

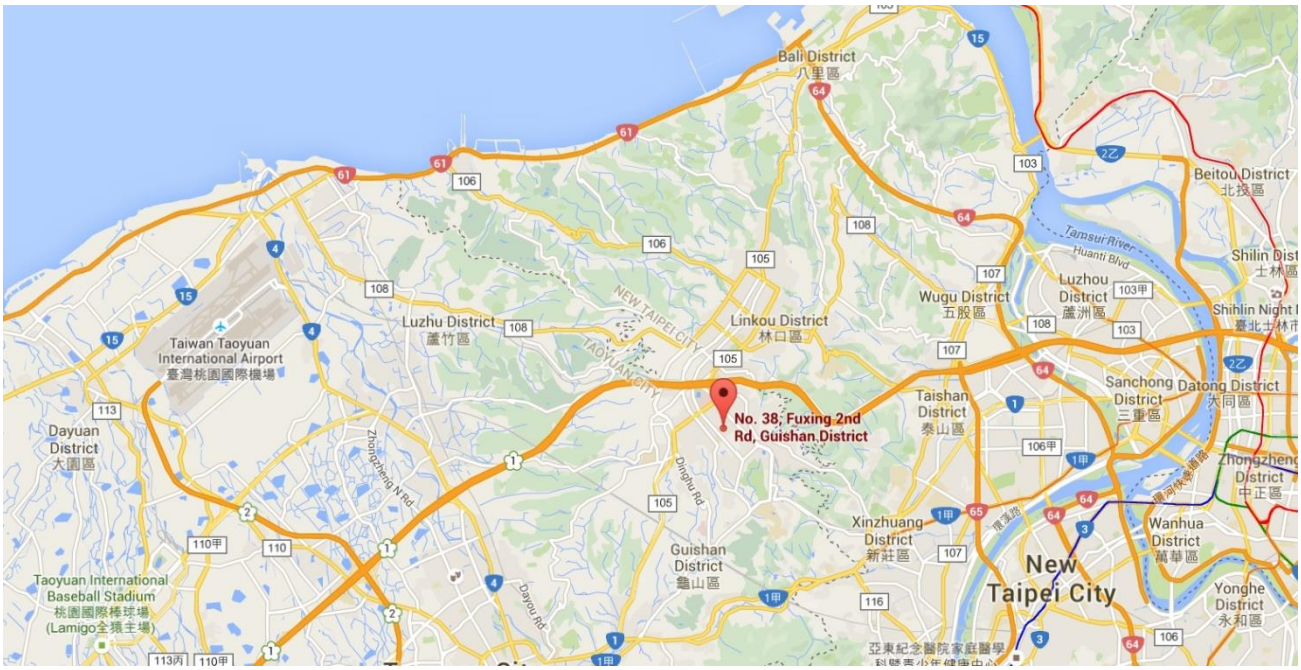
1. INTRODUCTION

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 Innovation, Science and Economic Development Canada and 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:	AX5400 Ceiling Mount Wi-Fi 6 Access Point
Model No.:	EAP670
Brand Name:	tp-link
Wi-Fi Specification:	802.11a/b/g/n/ac/ax
EUT Identification No.:	20220105Sample#15 (Conducted) 20220105Sample#14 (Radiated)
Adapter	BRAND: TP-Link MODEL: T120150-2B1 INPUT: 100 - 240V ~ 50/60Hz 0.6A. OUTPUT: DC 12.0V 1.5A

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, 5690MHz, 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 600Mbps 802.11ac: up to 3466.7Mbps 802.11ax: up to 4804Mbps

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	5550MHz
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	5250MHz	114	5570 MHz	--	--

2.4. Description of Available Antennas

Antenna Type	Frequency Band (MHz)	T_X Paths	Number of spatial streams	Max Antenna Gain (dBi)	Beamforming Directional Gain (dBi)	CDD Directional Gain (dBi)	
						For Power	For PSD
Dipole Antenna	2412 ~ 2462	2	1	4.70	7.71	4.70	7.71
	5150 ~ 5350	4	1	4.70	10.72	4.70	10.72
		4	4	4.70	--	4.70	4.70
	5470 ~ 5725	4	1	4.50	10.52	4.50	10.52
		4	4	4.50	--	4.50	4.50
	5725 ~ 5850	4	1	4.50	10.52	4.50	10.52

Note:

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

   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;

   - For power measurements on IEEE 802.11 devices,

   Array Gain = 0 dB for $N_{ANT} \leq 4$;

2. The EUT also supports Beam Forming mode, and the Beam Forming support 802.11ac/ax, not include 802.11a/b/g/n. BF Directional gain = G_{ANT} + 10 log (N_{ANT}).
3. All messages of antenna were declared by manufacturer.

2.5. Test Mode

Test Mode	Mode 1: Transmit by 802.11a (6Mbps) (CDD mode)
	Mode 2: Transmit by 802.11ac-VHT20 (MCS0) (CDD mode)
	Mode 3: Transmit by 802.11ac-VHT40 (MCS0) (CDD mode)
	Mode 4: Transmit by 802.11ac-VHT80 (MCS0) (CDD mode)
	Mode 5: Transmit by 802.11ac-VHT160 (MCS0) (CDD mode)
	Mode 6: Transmit by 802.11ax-HE20 (MCS0) (CDD mode)
	Mode 7: Transmit by 802.11ax-HE40 (MCS0) (CDD mode)
	Mode 8: Transmit by 802.11ax-HE80 (MCS0) (CDD mode)
	Mode 9: Transmit by 802.11ax-HE160 (MCS0) (CDD mode)
	Mode 10: Transmit by 802.11ac-VHT20 (MCS0) (Beam-Forming mode)
	Mode 11: Transmit by 802.11ac-VHT40 (MCS0) (Beam-Forming mode)
	Mode 12: Transmit by 802.11ac-VHT80 (MCS0) (Beam-Forming mode)
	Mode 13: Transmit by 802.11ac-VHT160 (MCS0) (Beam-Forming mode)
	Mode 14: Transmit by 802.11ax-HE20 (MCS0) (Beam-Forming mode)
	Mode 15: Transmit by 802.11ax-HE40 (MCS0) (Beam-Forming mode)
	Mode 16: Transmit by 802.11ax-HE80 (MCS0) (Beam-Forming mode)
	Mode 17: Transmit by 802.11ax-HE160 (MCS0) (Beam-Forming mode)
	Mode 18: Transmit by 802.11a (6Mbps) (CDD mode_NSS4)
	Mode 19: Transmit by 802.11ac-VHT20 (MCS0) (CDD mode_NSS4)
	Mode 20: Transmit by 802.11ac-VHT40 (MCS0) (CDD mode_NSS4)
	Mode 21: Transmit by 802.11ac-VHT80 (MCS0) (CDD mode_NSS4)
	Mode 22: Transmit by 802.11ac-VHT160 (MCS0) (CDD mode_NSS4)
	Mode 23: Transmit by 802.11ax-HE20 (MCS0) (CDD mode_NSS4)
	Mode 24: Transmit by 802.11ax-HE40 (MCS0) (CDD mode_NSS4)
	Mode 25: Transmit by 802.11ax-HE80 (MCS0) (CDD mode_NSS4)
	Mode 26: Transmit by 802.11ax-HE160 (MCS0) (CDD mode_NSS4)

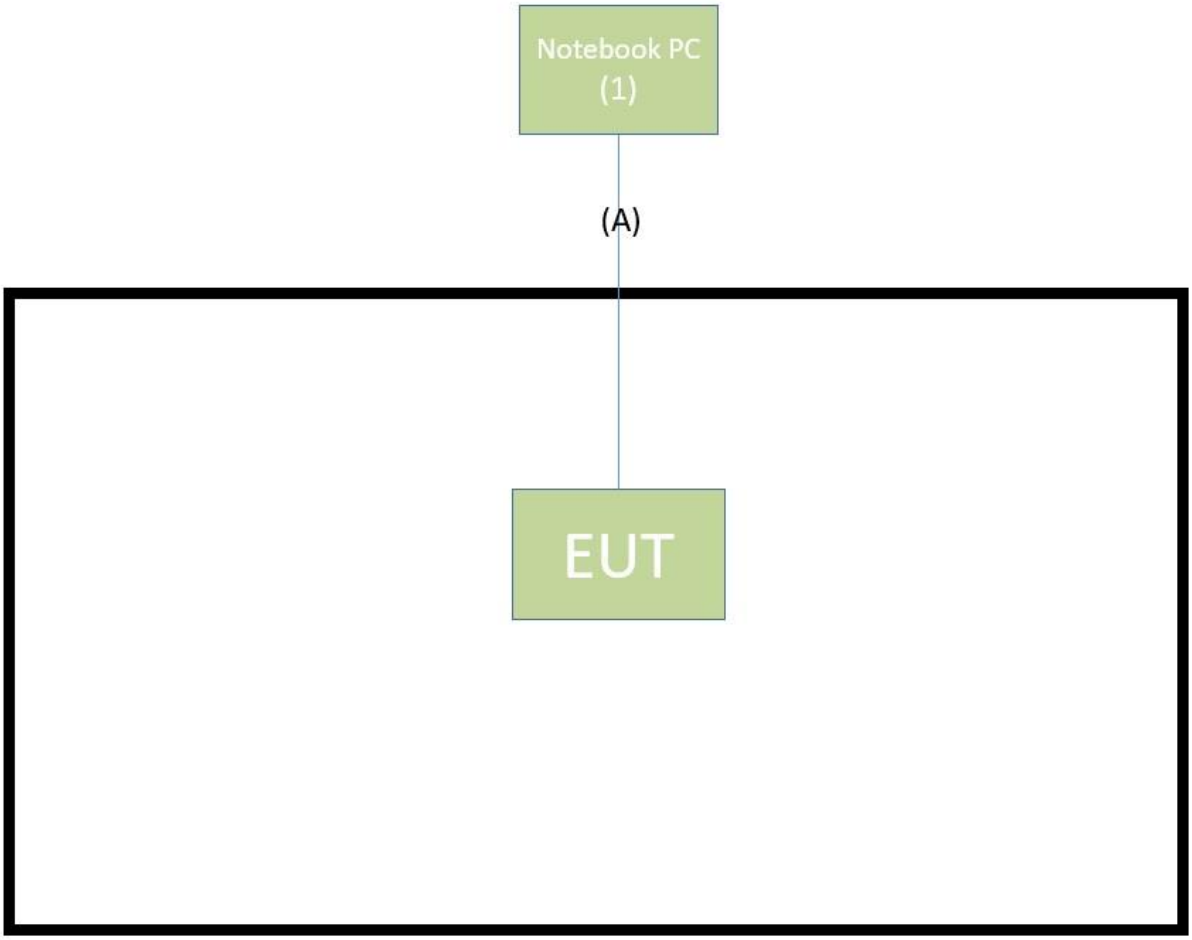
Note 1: Due to the same modulation between 802.11n and 802.11ac, so 802.11n-HT20 and HT40 are covered by 802.11ac-VHT20 and VHT40 in this report, meanwhile, power level for 802.11n-HT20 and HT40 will not be greater than 802.11ac-VHT20 and VHT40.

Note 2: Due to CDD mode was the worst mode, so all test items were evaluated in this report. The beamforming mode only evaluated the RF output power.

2.6. Configuration of Test System

The devicewas tested per the guidance ANSI C63.10: 2013 was used to reference the appropriate EUT setup for radiated emissions testing and AC line conducted testing.

Connection Diagram



	Cable Type	Cable Description
A	LAN Cable	Non shielded, > 10m

2.7. Test System Details

The types for all equipments, plus descriptions of all cables used in the tested system (including inserted cards) are:

	Product	Manufacturer	Model No.	Serial No.	Power Cord
1	Notebook	Lenovo	ThinkPad T450	PC0BH4FR	Non-Shielded, 0.8m

2.8. Description of Test Software

The test utility software used during testing was “QDART”.

Note: Final power setting please refer to operational description.

2.9. Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- FCC Part 15.247
- KDB 789033 D02v02r01,
- KDB 662911 D01v02r01
- ANSI C63.10-2013

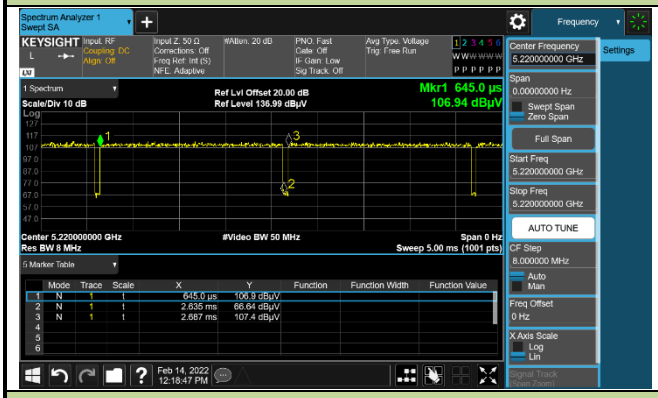
2.10. Duty Cycle

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:

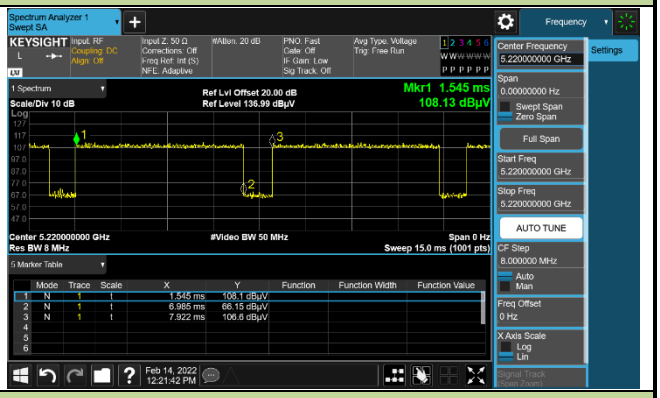
Test Mode	Duty Cycle
802.11a	97.45%
802.11ac-VHT20	85.31%
802.11ac-VHT40	85.20%
802.11ac-VHT80	85.95%
802.11ac-VHT160	93.68%
802.11ax-HE20	86.35%
802.11ax-HE40	85.85%
802.11ax-HE80	85.24%
802.11ax-HE160	85.31%

Duty Cycle

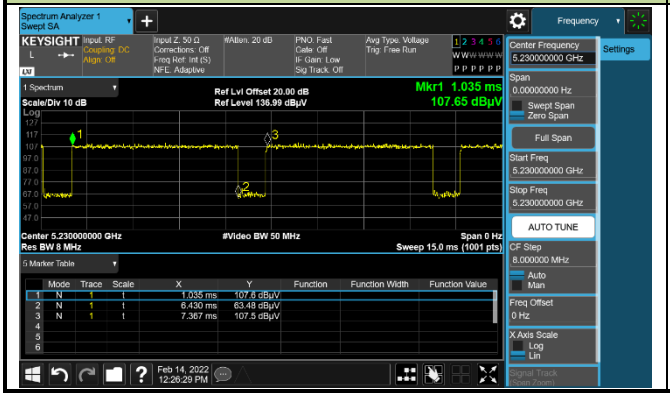
802.11a



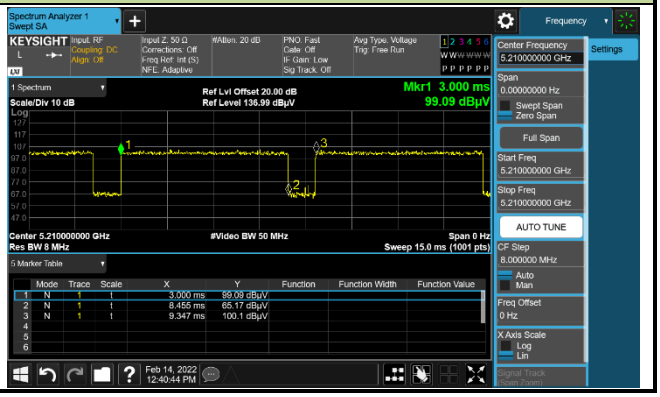
802.11ac-VHT20

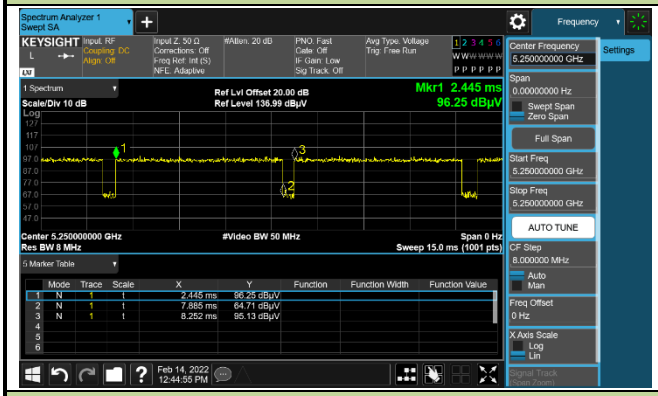
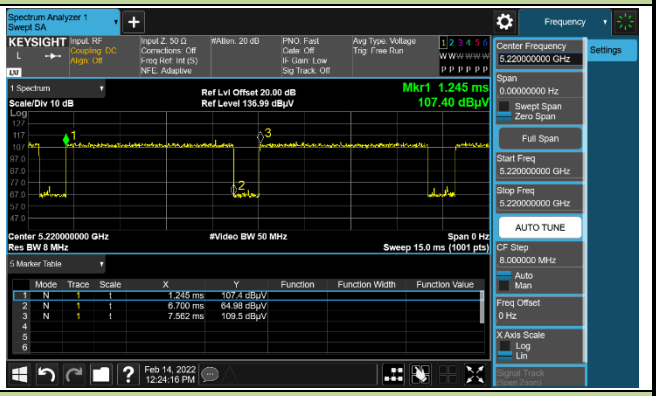
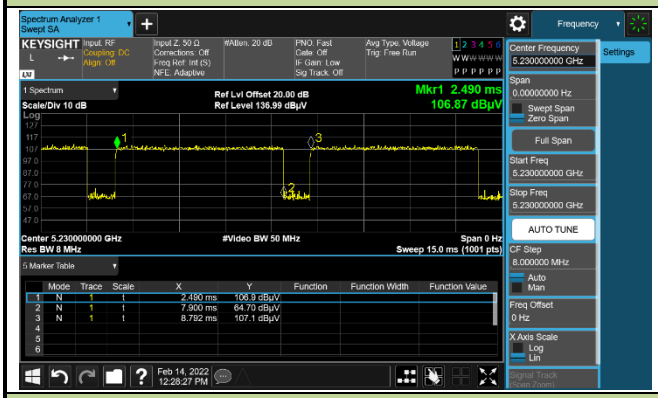
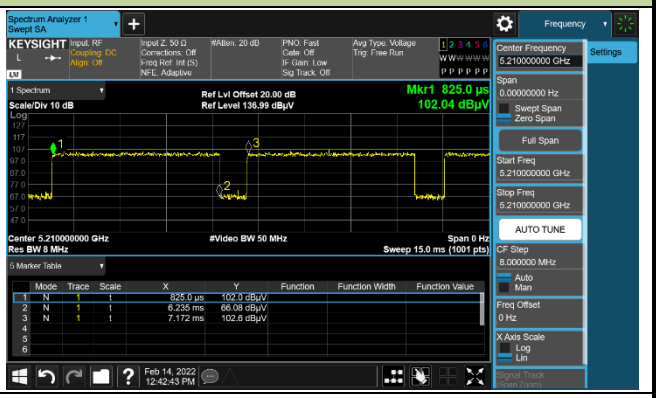
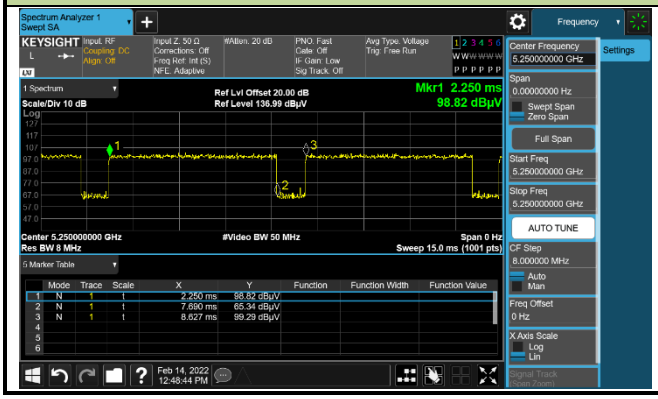


802.11ac-VHT40



802.11ac-VHT80



Duty Cycle (T = Transmission Duration)	
802.11ac-VHT160	802.11ax-HE20
	
802.11ax-HE40	802.11ax-HE80
	
802.11ax-HE160	
	

2.11. Test Configuration

The devicewas 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.

2.12. EMI Suppression Device(s)/Modifications

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

2.13. 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 ofProcedures for Compliance Testing of Unlicensed Wireless Devices (ANSI C63.10-2013), and the guidance provided in KDB 789033 D02v02r01 were used in themeasurement.

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 thedeviceis**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	2022/3/23
Two-Line V-Network	R&S	ENV216	MRTTWA00020	1 year	2022/4/28
EMI Test Receiver	R&S	ESR3	MRTTWA00045	1 year	2022/5/25

Radiated Emissions

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
Broadband TRILOG Antenna	SCHWARZBECK	VULB 9162	MRTTWA00001	1 year	2022/10/4
Acitve Loop Antenna	SCHWARZBECK	FMZB 1519B	MRTTWA00002	1 year	2022/10/4
Broadband Hornantenna	SCHWARZBECK	BBHA 9120D	MRTTWA00003	1 year	2022/4/21
BreitbandHornantenna	SCHWARZBECK	BBHA 9170	MRTTWA00004	1 year	2022/4/28
Broadband Preamplifier	SCHWARZBECK	BBV 9718	MRTTWA00005	1 year	2022/4/21
Broadband Amplifier	SCHWARZBECK	BBV 9721	MRTTWA00006	1 year	2022/4/26
Signal Analyzer	R&S	FSV40	MRTTWA00007	1 year	2022/3/23
EMI Test Receiver	R&S	ESR3	MRTTWA00009	1 year	2022/4/24
EXA Signal Analyzer	KEYSIGHT	N9010A	MRTTWA00012	1 year	2022/10/18
EXA Signal Analyzer	KEYSIGHT	N9010B	MRTTWA00074	1 year	2022/7/19
Antenna Cable	HUBERSUHNER	SF106	MRTTWE00010	1 year	2022/6/15
Temperature/Humidity Meter	TFA	35.1078.10.IT	MRTTWA00032	1 year	2022/6/6

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	2022/4/21
EXA Signal Analyzer	KEYSIGHT	N9010A	MRTTWA00012	1 year	2022/10/18
EXA Signal Analyzer	KEYSIGHT	N9010B	MRTTWA00074	1 year	2022/7/19
Attenuator	WTI	218FS-20	MRTTWE00026	1 year	2022/5/29
Attenuator	WTI	218FS-10	MRTTWE00027	1 year	2022/6/16
Temperature & Humidity Chamber	TEN BILLION	TTH-B3UP	MRTTWA00036	1 year	2022/6/14
DIVA PLUS Funk-Wetterstation	TFA	35.1083	MRTTWA00050	1 year	2022/6/3

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
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 150kHz~30MHz: ± 2.53dB
Radiated Emission Measurement
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 9kHz ~ 1GHz: ± 4.25dB 1GHz ~ 40GHz: ± 4.45dB
Conducted Power (Carrier Power / Power Density)
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): ± 0.84dB
Conducted Spurious Emission
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)):± 2.65 dB
Occupied Bandwidth
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): ± 3.3%
Temp. / Humidity
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): ±0.82°C/ ±3%
Frequency Error
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): ±78.4Hz

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	Section7.2
15.407(e)	6dB Bandwidth	≥ 500kHz		Pass	Section 7.3
15.407(a)(1)(ii), (2), (3)(i)	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)(i), (12)	Peak Power Spectral Density	Refer to section 7.6		Pass	Section 7.6
15.407(g)	Frequency Stability	N/A		Pass	Section 7.7
15.407(b)(1), (2), (3), (4)(i)	Undesirable Emissions	Refer to Section 7.8	Radiated	Pass	Section 7.8 & 7.9
15.205, 15.209 15.407(b)(8), (9), (10)	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) Determining compliance is based on the test results met the regulation limits or requirements declared by clients, and the test results don't take into account the value of measurement uncertainty.
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 ofthe system to connect the EUT to the analyzer at all frequencies of interest.
3) Output power test was verified over all data rates of each mode (data refers to operational description), and then choose the maximum power output (low data rate) for final test of each channel.
4) 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.
5) EUT supports one configuration only in 802.11ax full RU mode, i.e. 242 tone in 11ax-HE20, 484 tone in 11ax-HE40, 996 tone in 11ax-HE80 and 2 x 996 tone in 11ax-HE160.

7.2. 26dB & 99% Bandwidth Measurement

7.2.1.Test Limit

N/A

7.2.2.Test Procedure used

KDB 789033 D02v02r01- Section II)C)1) (26dB Bandwidth)

KDB 789033 D02v02r01- Section II)D) (99% Bandwidth)

7.2.3.Test Setting

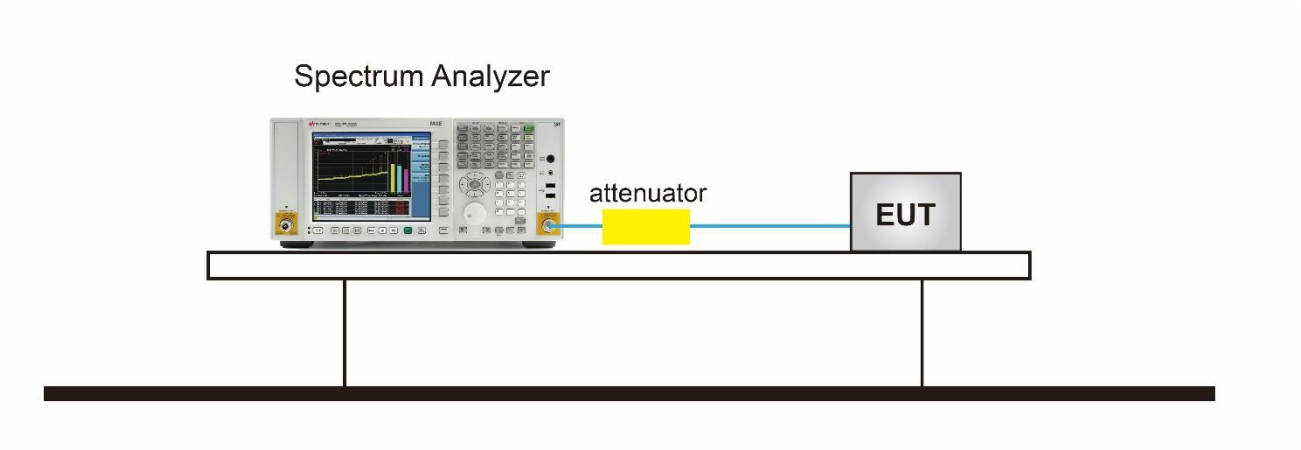
26dB Bandwidth

1. The analyzers' automatic bandwidth measurement capability was used to perform the 26dB bandwidth
2. RBW = approximately 1% of the emission bandwidth.
3. VBW > RBW
4. Detector = Peak.
5. Trace mode = max hold.
6. Measure the maximum width of the emission that is 26 dB down from the maximum of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

99% Bandwidth

1. Set center frequency to the nominal EUT channel center frequency.
2. RBW = 1% to 5% of the OBW
3. VBW ≥ 3 × RBW
4. Span = 1.5 times to 5 times the OBW
5. Detector = peak
6. Trace mode = max hold
7. Allow the trace to stabilize
8. Use the 99% power bandwidth function of the instrument.

7.2.4.Test Setup



7.2.5.Test Result

Product	AX5400 Ceiling Mount Wi-Fi 6 Access Point	Test Engineer	Eric Lin
Test Site	SR5	Test Date	2022/2/22

Test Mode	Data Rate/ MCS	Channel No.	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Ant 1					
802.11a	6Mbps	36	5180	19.450	16.517
802.11a	6Mbps	44	5220	19.490	16.572
802.11a	6Mbps	48	5240	20.770	16.535
802.11a	6Mbps	52	5260	19.580	16.532
802.11a	6Mbps	60	5300	19.450	16.543
802.11a	6Mbps	64	5320	20.150	16.539
802.11a	6Mbps	100	5500	19.770	16.546
802.11a	6Mbps	116	5580	19.770	16.507
802.11a	6Mbps	140	5700	19.370	16.577
802.11a	6Mbps	144	5720	20.410	16.517
802.11a	6Mbps	149	5745	19.620	16.545
802.11a	6Mbps	157	5785	19.940	16.500
802.11a	6Mbps	165	5825	20.120	16.550
802.11ac-VHT20	MCS0	36	5180	19.860	17.780
802.11ac-VHT20	MCS0	44	5220	20.790	17.731
802.11ac-VHT20	MCS0	48	5240	20.170	17.747
802.11ac-VHT20	MCS0	52	5260	20.830	17.701
802.11ac-VHT20	MCS0	60	5300	20.720	17.768
802.11ac-VHT20	MCS0	64	5320	20.670	17.758
802.11ac-VHT20	MCS0	100	5500	21.270	17.736
802.11ac-VHT20	MCS0	116	5580	21.410	17.770
802.11ac-VHT20	MCS0	140	5700	20.600	17.774
802.11ac-VHT20	MCS0	144	5720	21.020	17.740
802.11ac-VHT20	MCS0	149	5745	21.150	17.784
802.11ac-VHT20	MCS0	157	5785	20.970	17.790
802.11ac-VHT20	MCS0	165	5825	21.410	17.848

Test Mode	Data Rate/ MCS	Channel No.	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Ant 1					
802.11ac-VHT40	MCS0	38	5190	39.230	35.981
802.11ac-VHT40	MCS0	46	5230	38.950	35.967
802.11ac-VHT40	MCS0	54	5270	38.710	35.930
802.11ac-VHT40	MCS0	62	5310	38.620	35.913
802.11ac-VHT40	MCS0	102	5510	39.170	35.972
802.11ac-VHT40	MCS0	110	5550	39.000	35.917
802.11ac-VHT40	MCS0	134	5670	39.000	36.026
802.11ac-VHT40	MCS0	142	5710	38.990	35.988
802.11ac-VHT40	MCS0	151	5755	40.180	36.119
802.11ac-VHT40	MCS0	159	5795	39.000	36.129
802.11ac-VHT80	MCS0	42	5210	80.800	75.304
802.11ac-VHT80	MCS0	58	5290	80.770	75.423
802.11ac-VHT80	MCS0	106	5530	80.510	75.485
802.11ac-VHT80	MCS0	122	5610	80.290	75.368
802.11ac-VHT80	MCS0	138	5690	81.000	75.443
802.11ac-VHT80	MCS0	155	5775	80.720	75.483
802.11ac-VHT160	MCS0	50	5250	162.700	153.000
802.11ac-VHT160	MCS0	114	5570	160.900	153.220
802.11ax-HE20	MCS0	36	5180	20.980	19.038
802.11ax-HE20	MCS0	44	5220	20.780	19.037
802.11ax-HE20	MCS0	48	5240	21.020	19.098
802.11ax-HE20	MCS0	52	5260	20.970	19.153
802.11ax-HE20	MCS0	60	5300	20.640	19.074
802.11ax-HE20	MCS0	64	5320	20.770	19.025
802.11ax-HE20	MCS0	100	5500	21.490	19.045
802.11ax-HE20	MCS0	116	5580	21.280	19.103
802.11ax-HE20	MCS0	140	5700	20.700	19.044
802.11ax-HE20	MCS0	144	5720	20.550	19.059
802.11ax-HE20	MCS0	149	5745	21.140	19.079
802.11ax-HE20	MCS0	157	5785	21.010	19.016
802.11ax-HE20	MCS0	165	5825	20.910	19.033

Test Mode	Data Rate/ MCS	Channel No.	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Ant 1					
802.11ax-HE40	MCS0	38	5190	39.250	37.712
802.11ax-HE40	MCS0	46	5230	39.710	37.628
802.11ax-HE40	MCS0	54	5270	39.450	37.595
802.11ax-HE40	MCS0	62	5310	40.220	37.703
802.11ax-HE40	MCS0	102	5510	39.750	37.681
802.11ax-HE40	MCS0	110	5550	40.520	37.627
802.11ax-HE40	MCS0	134	5670	39.920	37.681
802.11ax-HE40	MCS0	142	5710	39.570	37.624
802.11ax-HE40	MCS0	151	5755	40.030	37.772
802.11ax-HE40	MCS0	159	5795	40.550	37.751
802.11ax-HE80	MCS0	42	5210	80.480	76.861
802.11ax-HE80	MCS0	58	5290	80.100	77.056
802.11ax-HE80	MCS0	106	5530	81.040	77.058
802.11ax-HE80	MCS0	122	5610	80.540	76.971
802.11ax-HE80	MCS0	138	5690	80.820	76.920
802.11ax-HE80	MCS0	155	5775	81.560	76.908
802.11ax-HE160	MCS0	50	5250	161.600	154.500
802.11ax-HE160	MCS0	114	5570	163.700	155.130

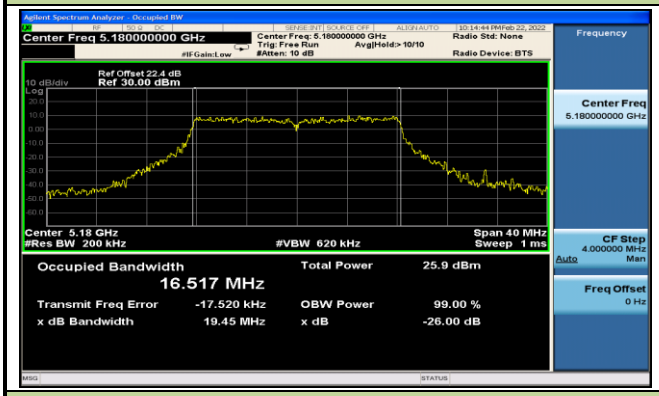
Product	AX5400 Ceiling Mount Wi-Fi 6 Access Point	Test Engineer	Eric Lin
Test Site	SR5	Test Date	2022/3/22

Test Mode	Data Rate/ MCS	Channel No.	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Ant 1_N_{SS} = 4					
802.11a	6Mbps	36	5180	19.420	16.545
802.11a	6Mbps	44	5220	19.060	16.527
802.11a	6Mbps	48	5240	18.940	16.523
802.11a	6Mbps	52	5260	20.000	16.565
802.11a	6Mbps	60	5300	19.580	16.568
802.11a	6Mbps	64	5320	19.970	16.553
802.11a	6Mbps	100	5500	19.240	16.558
802.11a	6Mbps	116	5580	19.790	16.568
802.11a	6Mbps	140	5700	19.700	16.533
802.11a	6Mbps	144	5720	19.570	16.567
802.11ac-VHT20	MCS0	36	5180	20.850	17.740
802.11ac-VHT20	MCS0	44	5220	21.000	17.806
802.11ac-VHT20	MCS0	48	5240	20.950	17.769
802.11ac-VHT20	MCS0	52	5260	21.230	17.761
802.11ac-VHT20	MCS0	60	5300	20.740	17.754
802.11ac-VHT20	MCS0	64	5320	20.840	17.792
802.11ac-VHT20	MCS0	100	5500	20.410	17.771
802.11ac-VHT20	MCS0	116	5580	20.660	17.731
802.11ac-VHT20	MCS0	140	5700	21.210	17.741
802.11ac-VHT20	MCS0	144	5720	20.610	17.742
802.11ac-VHT40	MCS0	38	5190	39.140	36.010
802.11ac-VHT40	MCS0	46	5230	38.780	35.981
802.11ac-VHT40	MCS0	54	5270	39.140	35.967
802.11ac-VHT40	MCS0	62	5310	38.280	36.007
802.11ac-VHT40	MCS0	102	5510	38.830	35.987
802.11ac-VHT40	MCS0	110	5550	39.220	35.954
802.11ac-VHT40	MCS0	134	5670	38.780	35.975
802.11ac-VHT40	MCS0	142	5710	38.790	35.928

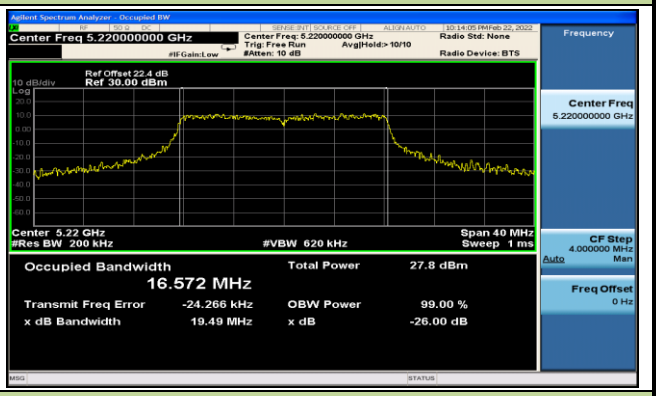
Test Mode	Data Rate/ MCS	Channel No.	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
Ant 1_ N_{SS} = 4					
802.11ac-VHT80	MCS0	42	5210	80.500	75.452
802.11ac-VHT80	MCS0	58	5290	81.350	75.303
802.11ac-VHT80	MCS0	106	5530	80.020	75.386
802.11ac-VHT80	MCS0	122	5610	81.220	75.368
802.11ac-VHT80	MCS0	138	5690	80.450	75.363
802.11ac-VHT160	MCS0	50	5250	161.800	153.320
802.11ac-VHT160	MCS0	114	5570	162.700	153.350
802.11ax-HE20	MCS0	36	5180	21.020	19.072
802.11ax-HE20	MCS0	44	5220	21.010	19.053
802.11ax-HE20	MCS0	48	5240	20.970	19.008
802.11ax-HE20	MCS0	52	5260	20.380	19.029
802.11ax-HE20	MCS0	60	5300	20.900	19.046
802.11ax-HE20	MCS0	64	5320	20.840	19.046
802.11ax-HE20	MCS0	100	5500	20.930	19.103
802.11ax-HE20	MCS0	116	5580	20.760	19.039
802.11ax-HE20	MCS0	140	5700	20.480	19.039
802.11ax-HE20	MCS0	144	5720	20.980	19.073
802.11ax-HE40	MCS0	38	5190	39.700	37.695
802.11ax-HE40	MCS0	46	5230	40.020	37.821
802.11ax-HE40	MCS0	54	5270	40.090	37.666
802.11ax-HE40	MCS0	62	5310	39.720	37.526
802.11ax-HE40	MCS0	102	5510	40.170	37.629
802.11ax-HE40	MCS0	110	5550	40.050	37.541
802.11ax-HE40	MCS0	134	5670	39.550	37.576
802.11ax-HE40	MCS0	142	5710	39.940	37.646
802.11ax-HE80	MCS0	42	5210	80.710	77.088
802.11ax-HE80	MCS0	58	5290	80.810	77.033
802.11ax-HE80	MCS0	106	5530	80.950	77.114
802.11ax-HE80	MCS0	122	5610	80.820	76.796
802.11ax-HE80	MCS0	138	5690	80.560	76.940
802.11ax-HE160	MCS0	50	5250	161.900	154.460
802.11ax-HE160	MCS0	114	5570	162.300	155.010

802.11a 26dB Bandwidth & 99% Bandwidth

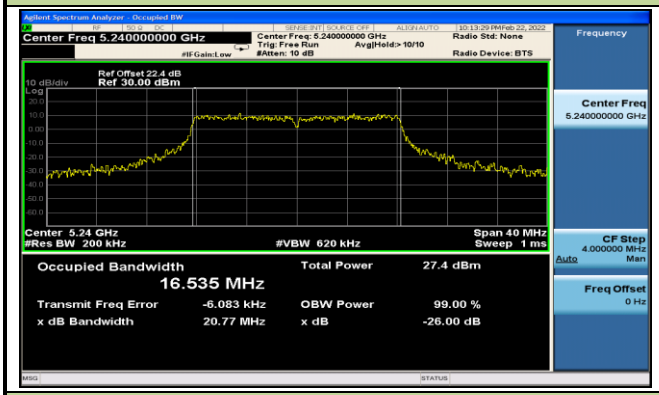
Channel 36 (5180MHz)



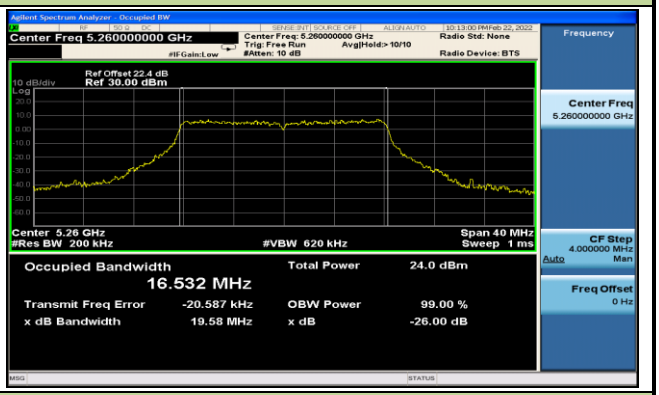
Channel 44 (5220MHz)



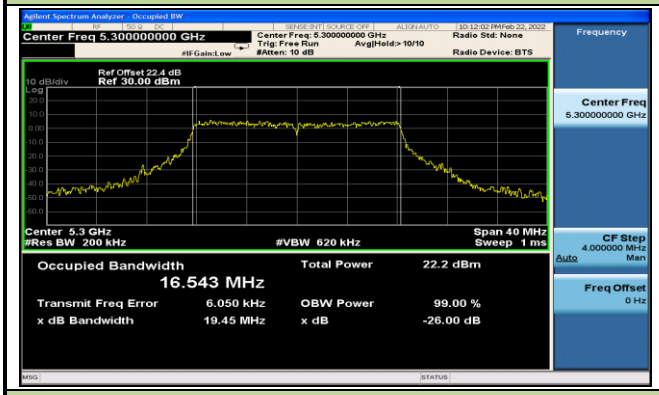
Channel 48 (5240MHz)



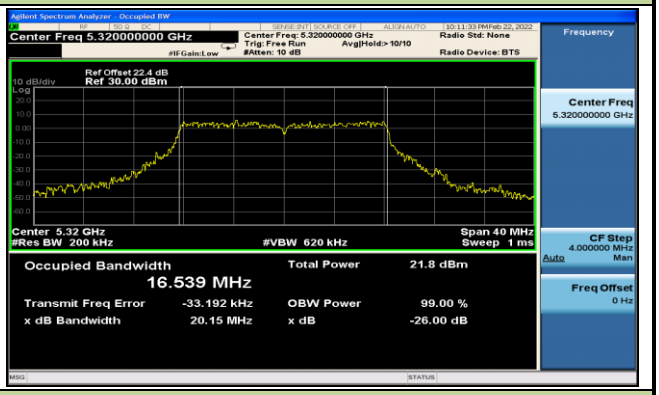
Channel 52 (5260MHz)



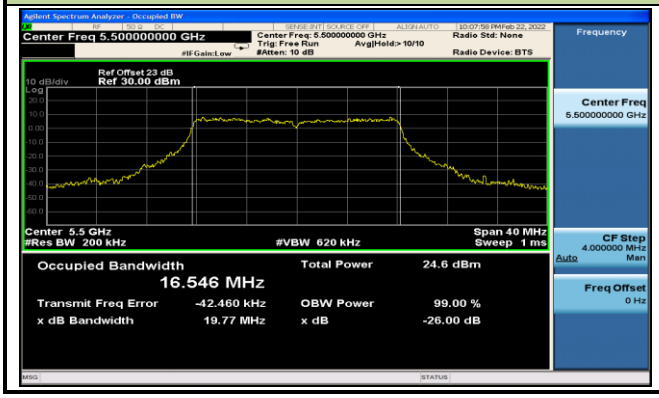
Channel 60 (5300MHz)



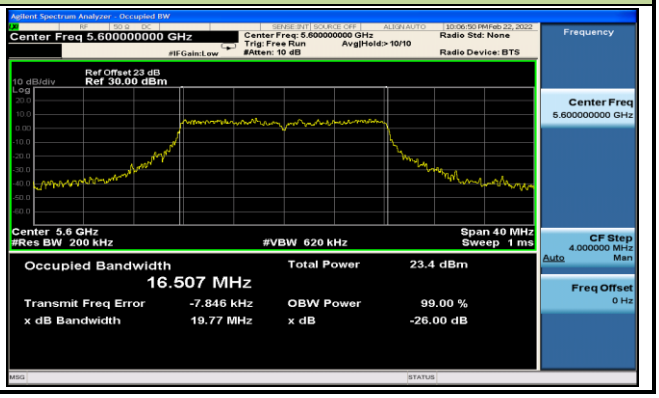
Channel 64 (5320MHz)

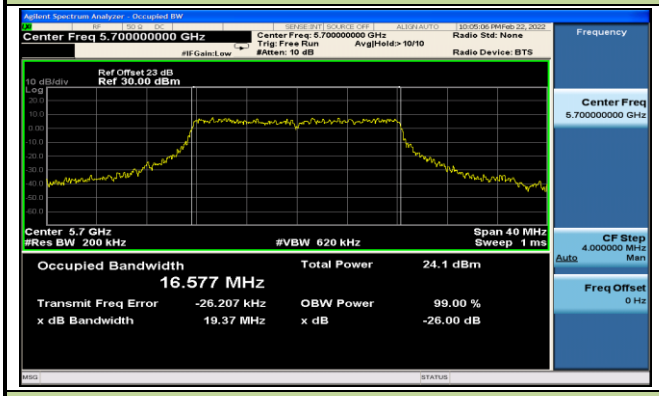
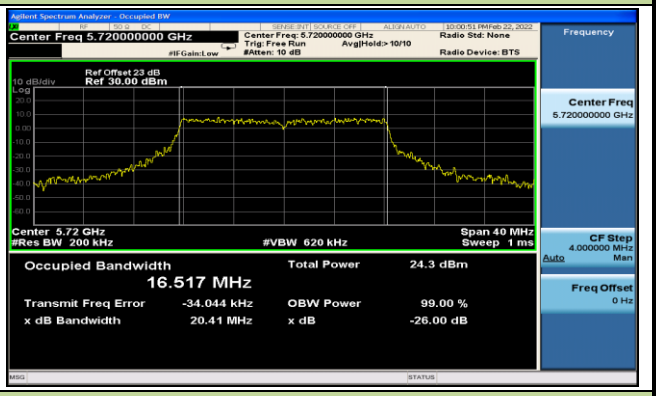
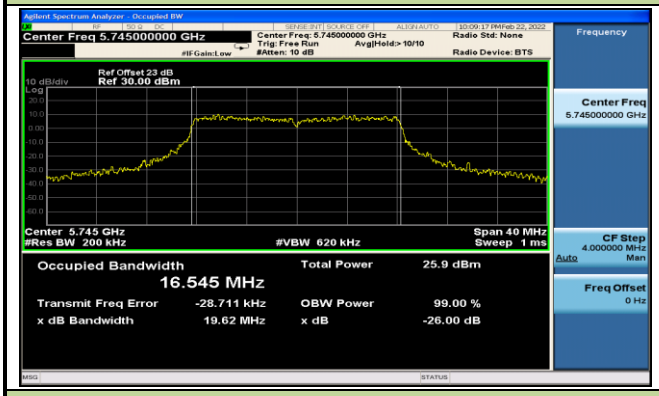
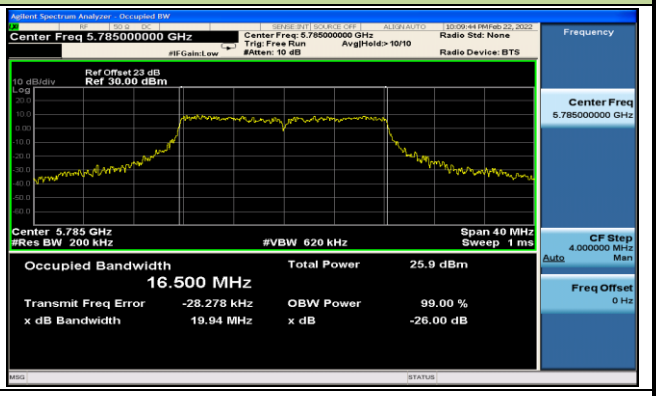
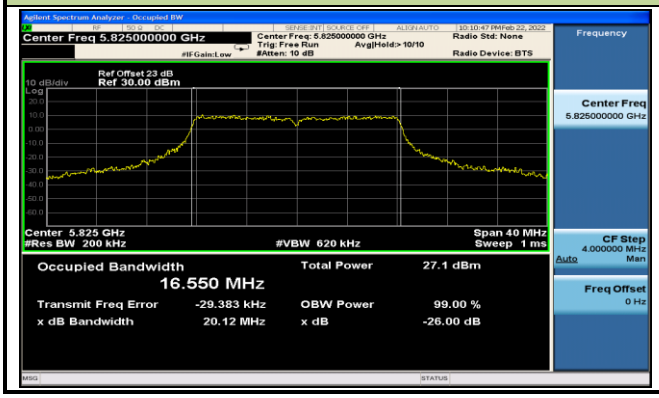


Channel 100 (5500MHz)



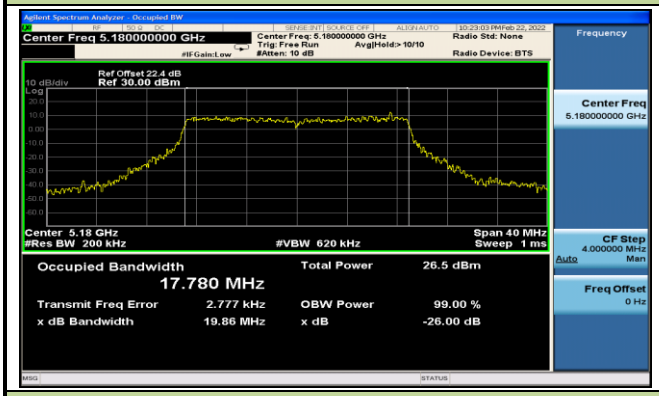
Channel 116 (5580MHz)



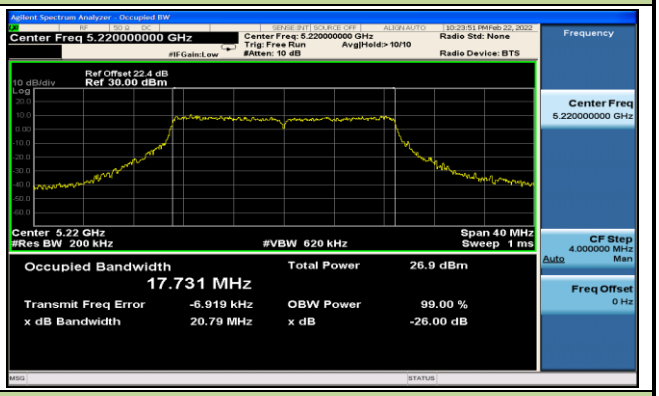
Channel 140 (5700MHz)	Channel 144 (5720MHz)
	
Channel 149 (5745MHz)	**Channel 157 (5785MHz)**
	
Channel 165 (5825MHz)	
	

802.11ac-VHT20 26dB Bandwidth & 99% Bandwidth

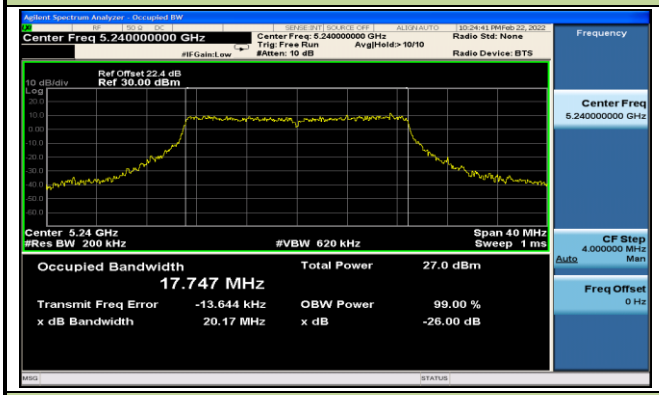
Channel 36 (5180MHz)



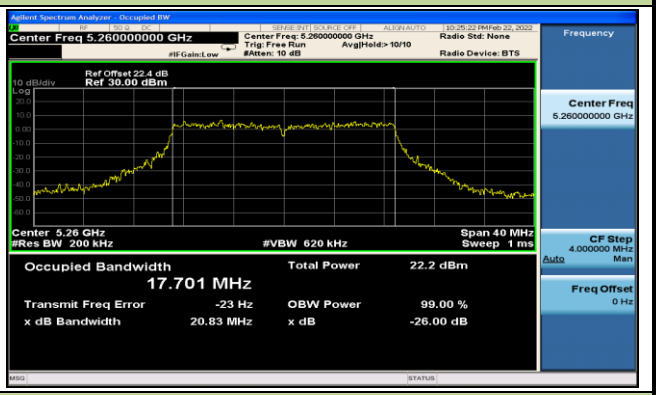
Channel 44 (5220MHz)



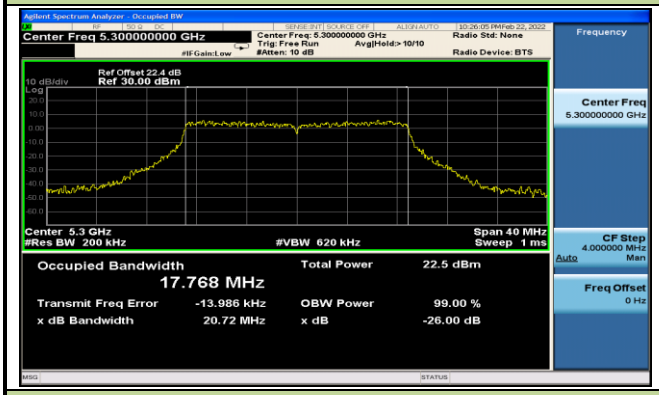
Channel 48 (5240MHz)



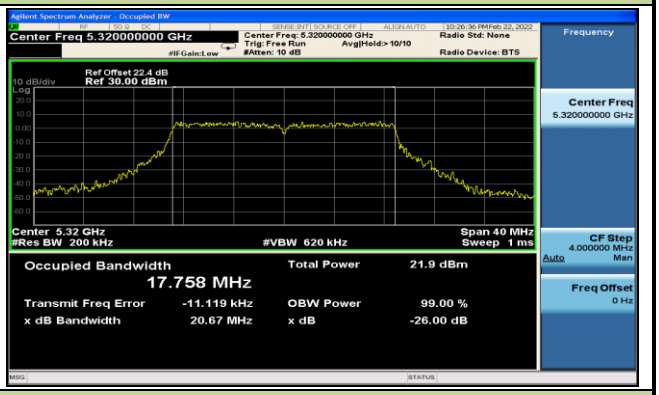
Channel 52 (5260MHz)



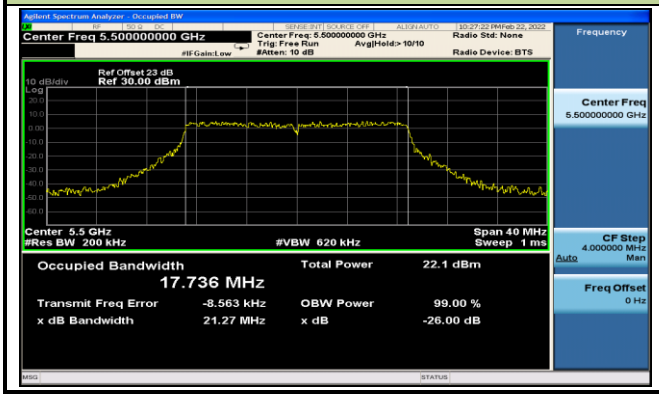
Channel 60 (5300MHz)



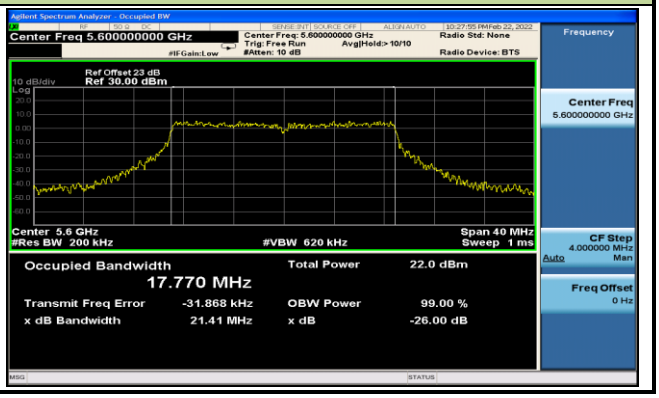
Channel 64 (5320MHz)

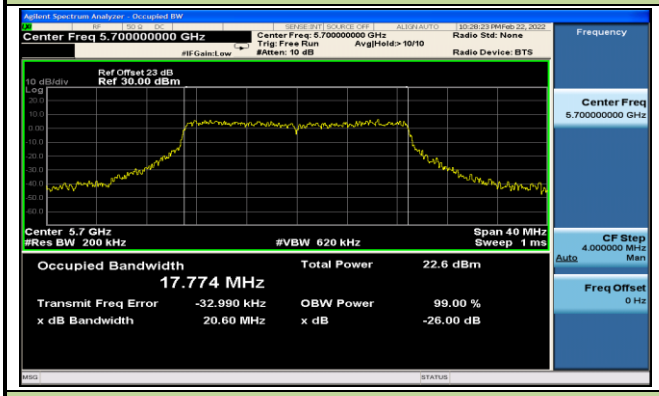
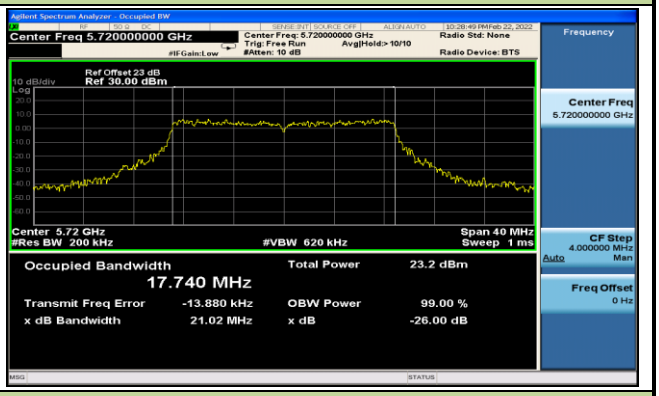
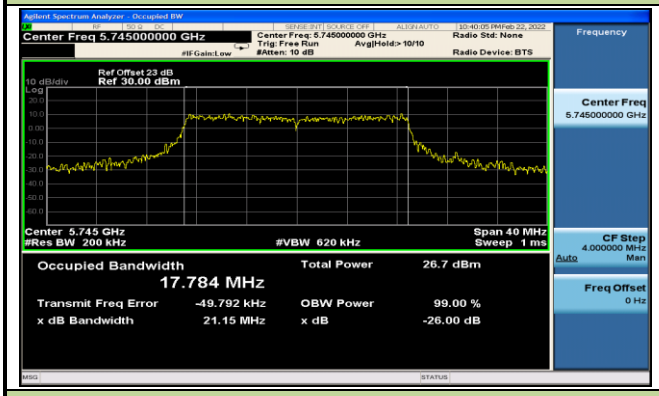
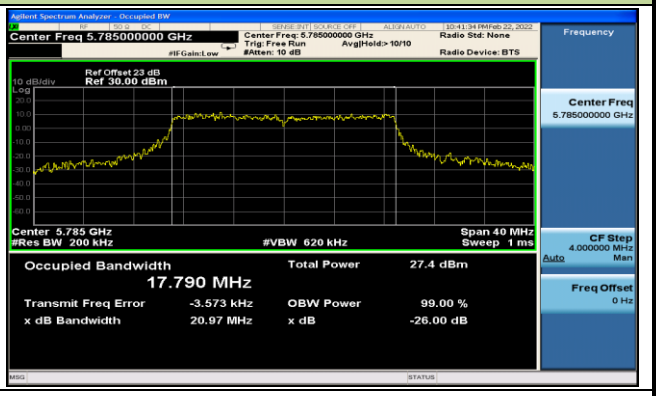
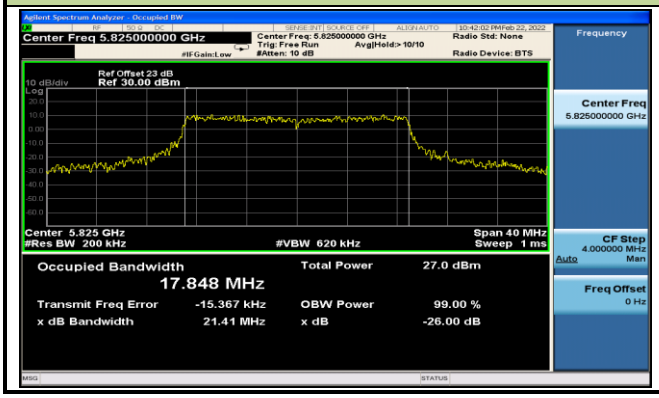


Channel 100 (5500MHz)



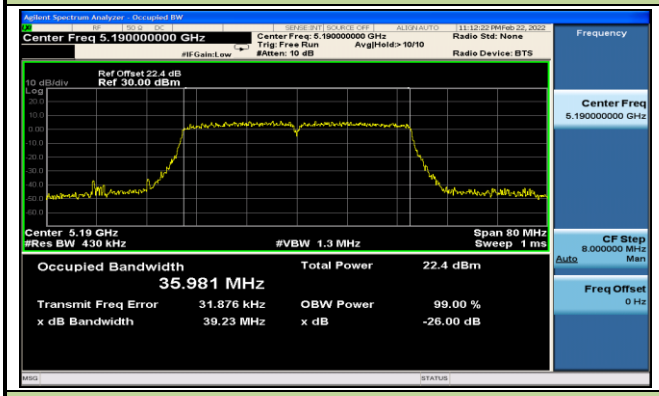
Channel 116 (5580MHz)



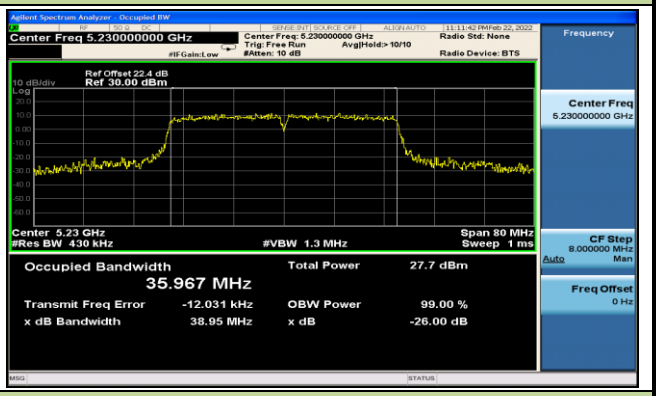
Channel 140 (5700MHz)	Channel 144 (5720MHz)
	
Channel 149 (5745MHz)	**Channel 157 (5785MHz)**
	
Channel 165 (5825MHz)	
	

802.11ac-VHT40 26dB Bandwidth & 99% Bandwidth

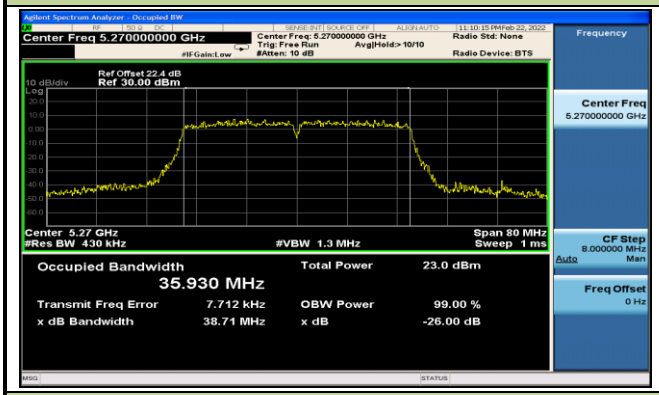
Channel 38 (5190MHz)



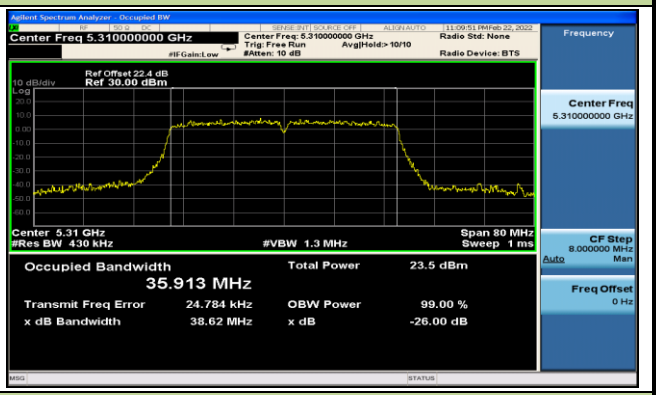
Channel 46 (5230MHz)



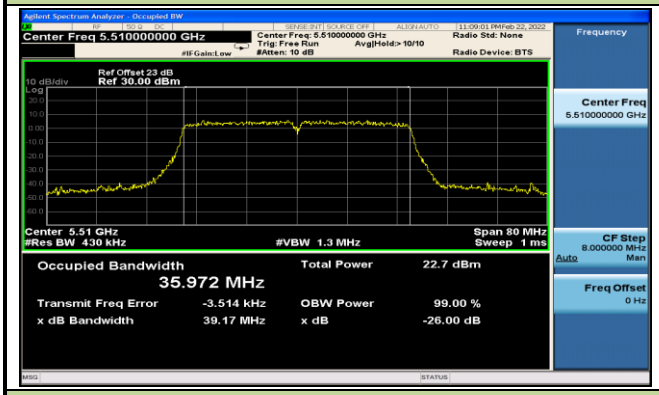
Channel 54 (5270MHz)



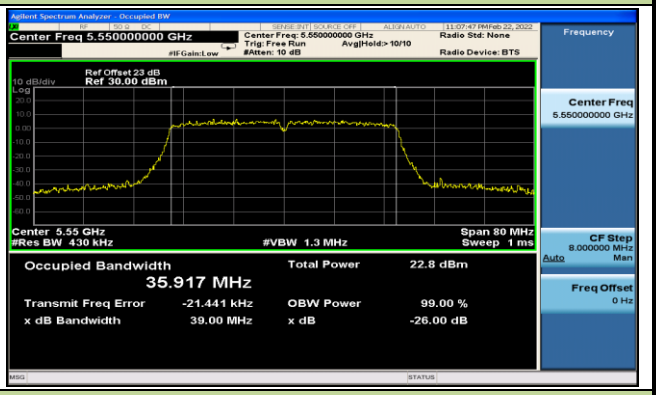
Channel 62 (5310MHz)



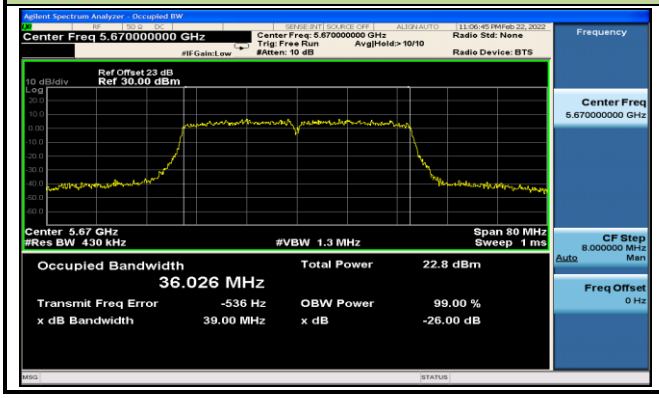
Channel 102 (5510MHz)



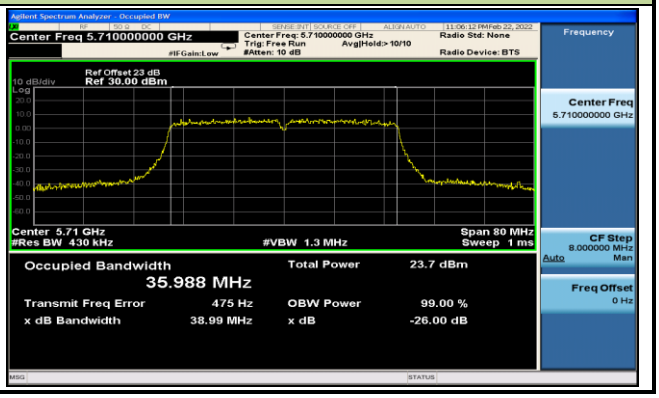
Channel 110 (5550MHz)

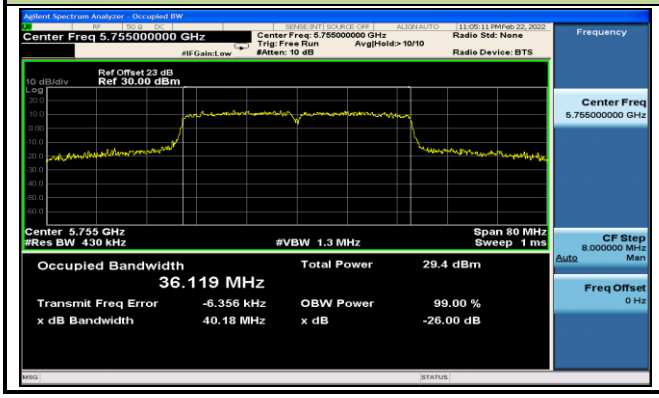
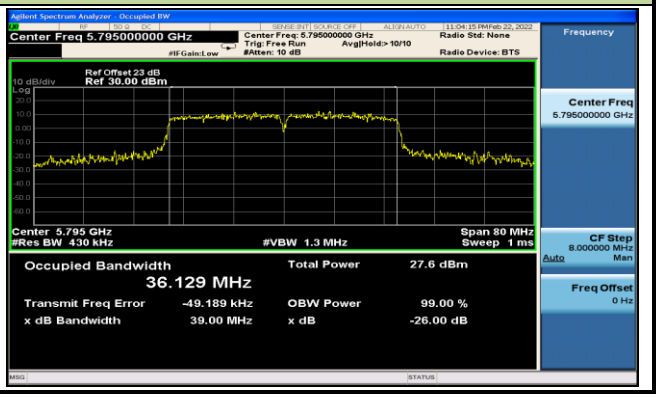


Channel 134 (5670MHz)



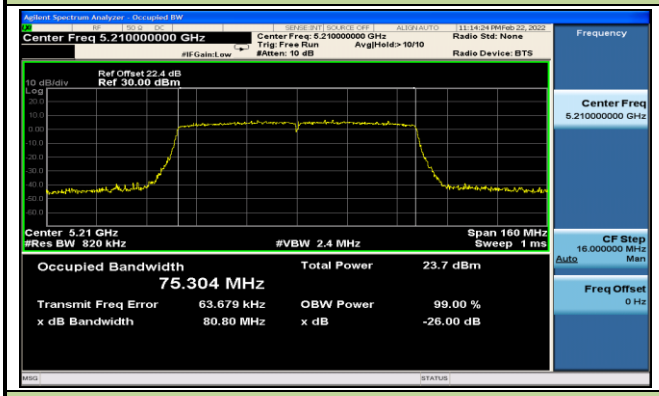
Channel 142 (5710MHz)



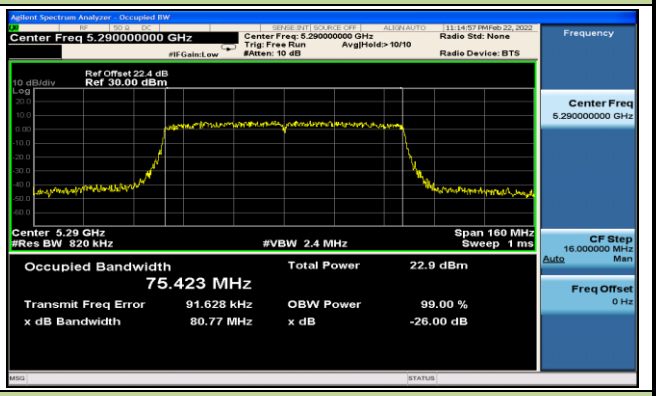
Channel 151 (5755MHz)	Channel 159 (5795MHz)
	

802.11ac-VHT80 26dB Bandwidth & 99% Bandwidth

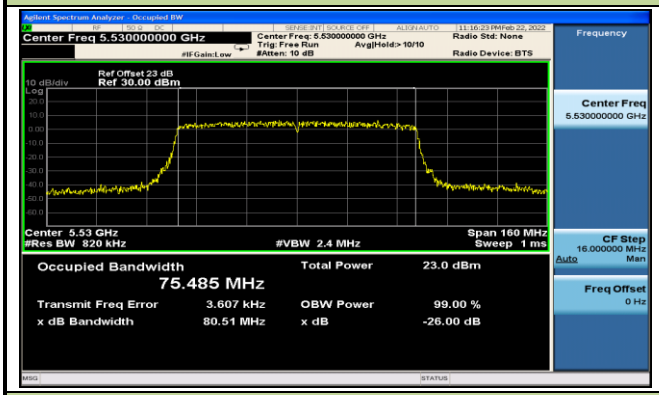
Channel 42 (5210MHz)



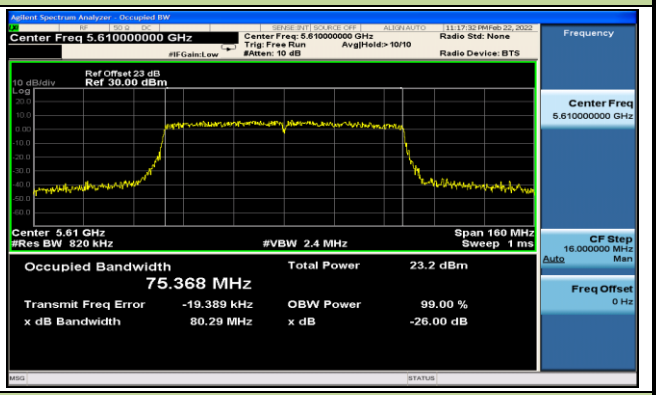
Channel 58 (5290MHz)



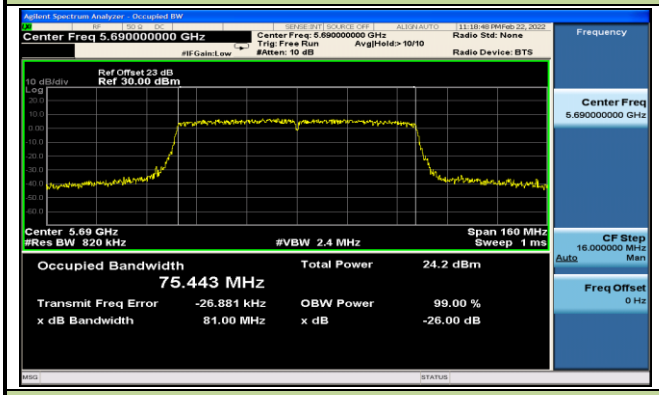
Channel 106 (5530MHz)



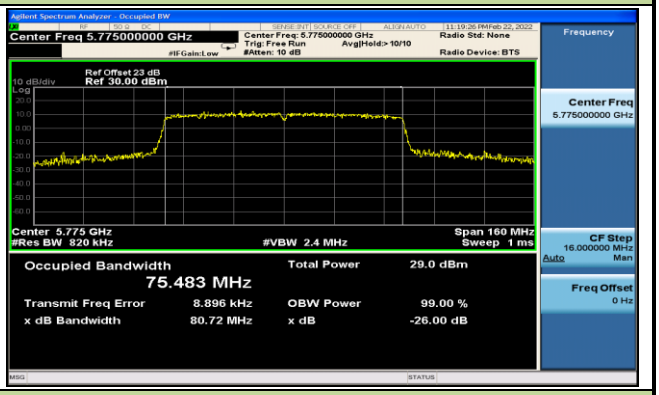
Channel 122 (5610MHz)



Channel 138 (5690MHz)

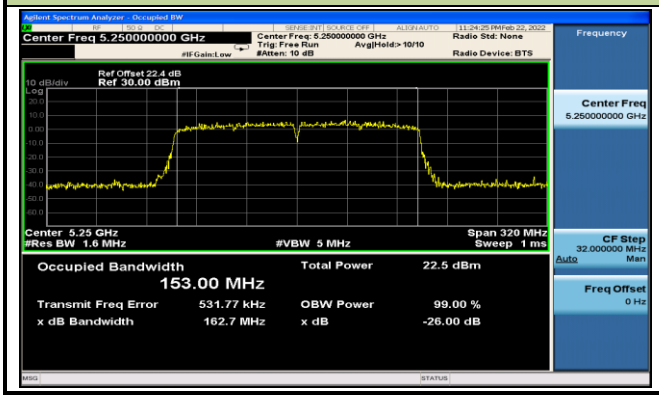


Channel 155 (5775MHz)

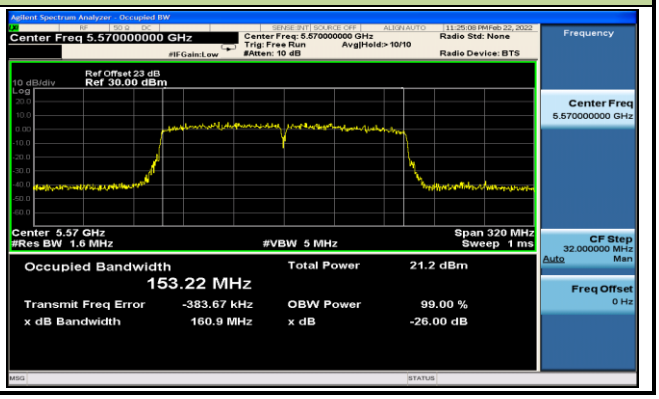


802.11ac-VHT160 26dB Bandwidth & 99% Bandwidth

Channel 50 (5250MHz)

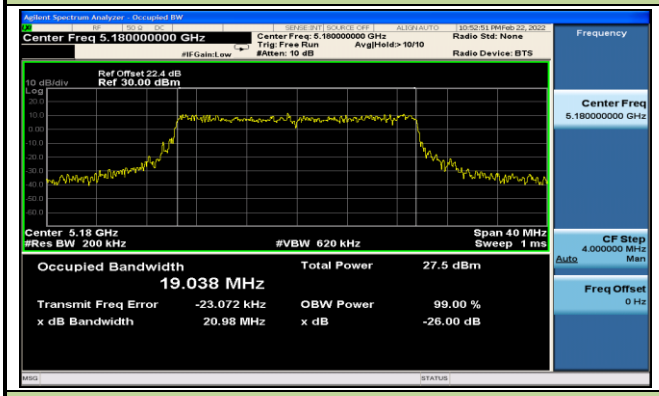


Channel 114 (5570MHz)

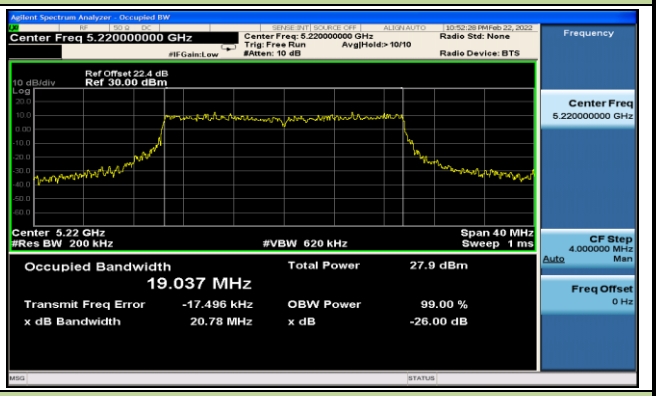


802.11ax-HE20 26dB Bandwidth & 99% Bandwidth

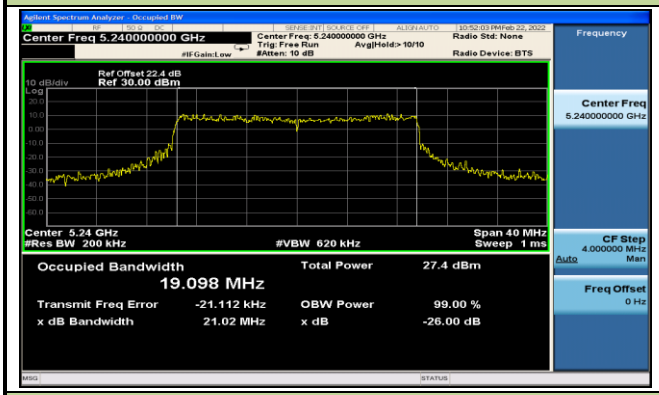
Channel 36 (5180MHz)



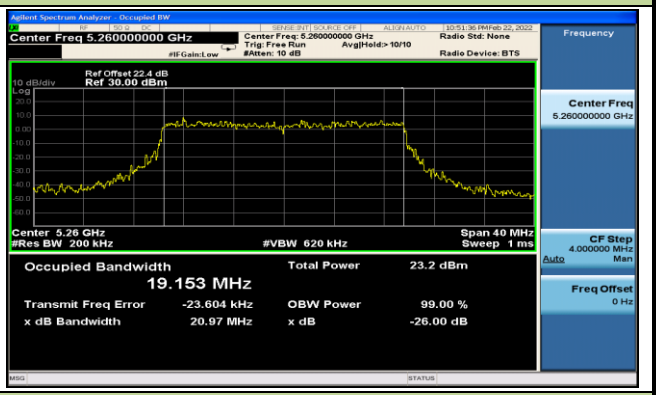
Channel 44 (5220MHz)



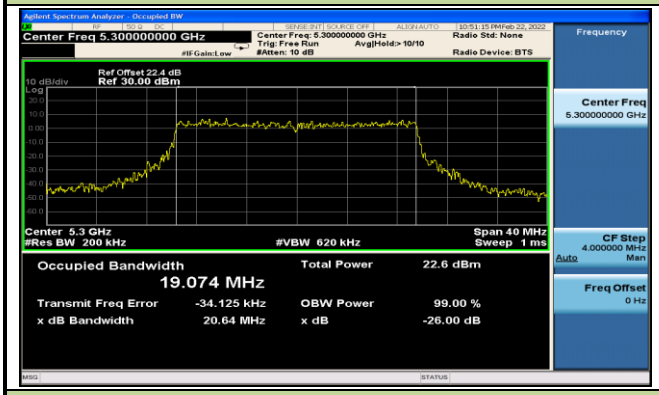
Channel 48 (5240MHz)



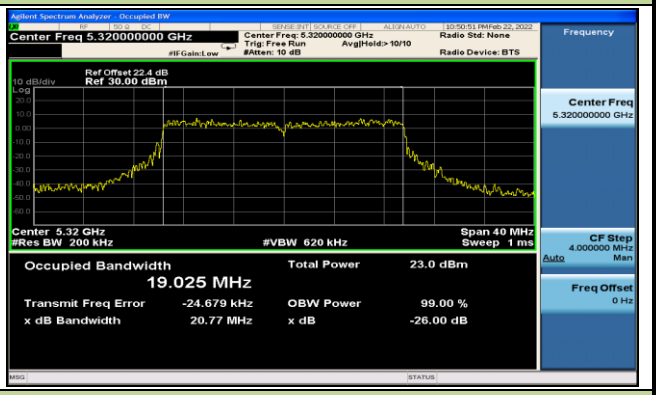
Channel 52 (5260MHz)



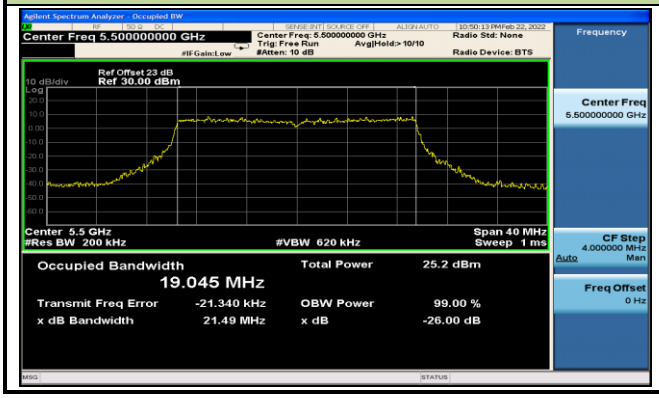
Channel 60 (5300MHz)



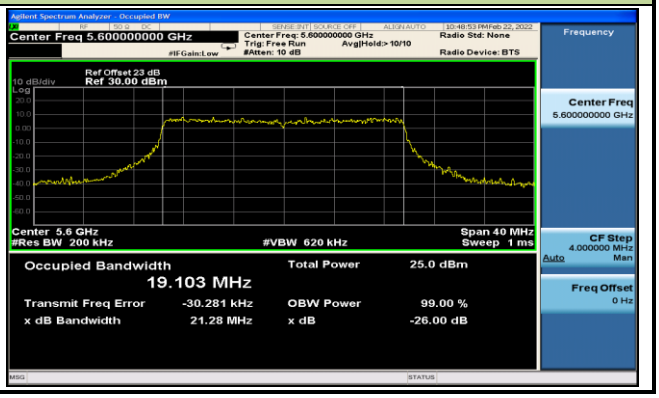
Channel 64 (5320MHz)

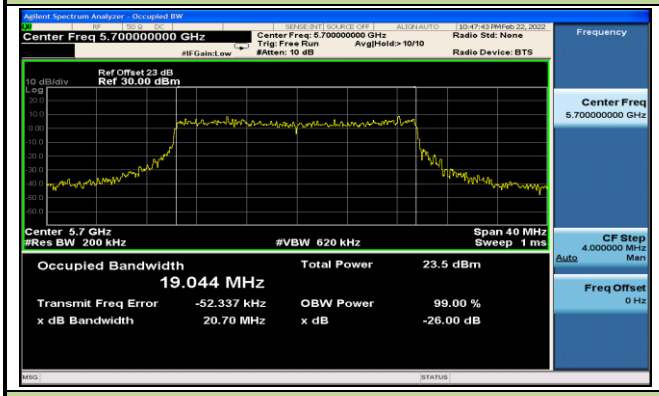
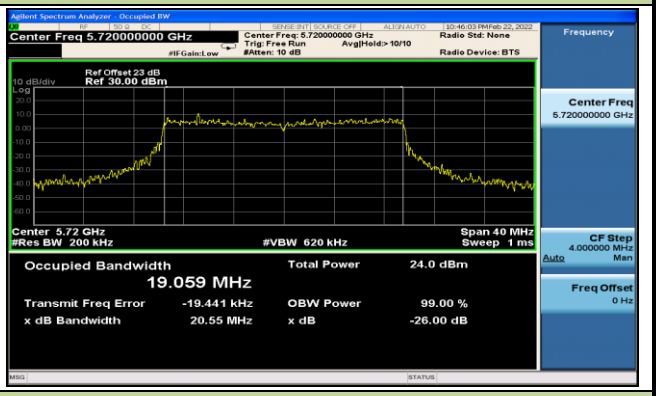
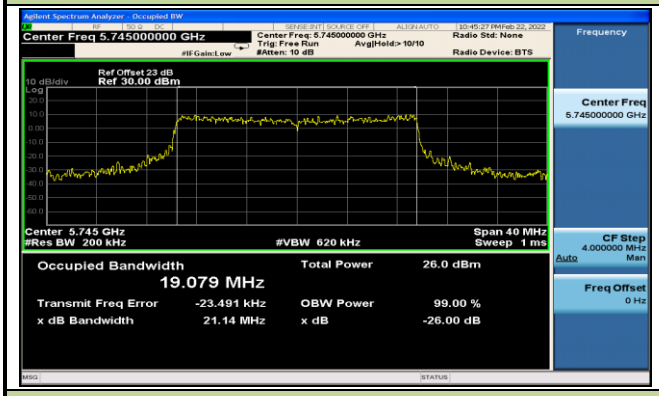
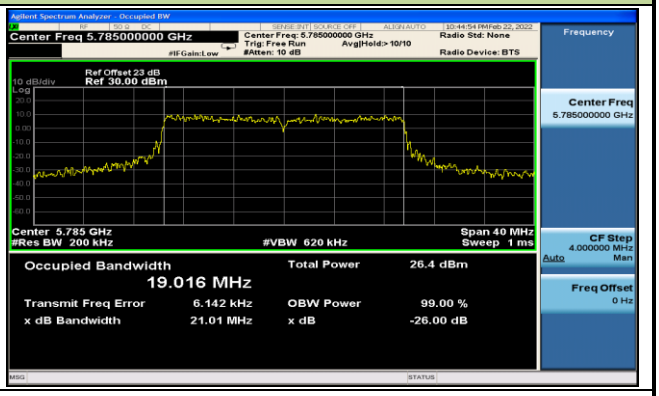
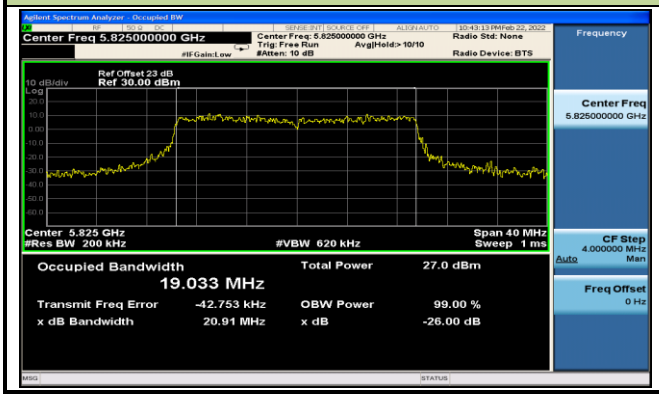


Channel 100 (5500MHz)



Channel 116 (5580MHz)



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