RF MEASUREMENT REPORT

FCC ID:	Q9DAPIN0635
Applicant:	Hewlett Packard Enterprise Company
Product:	ACCESS POINT
Model No.:	APIN0635
Brand Name:	aruba a Hewlett Packard Enterprise company, Hewlett Packard Enterprise
FCC Classification:	Unlicensed National Information Infrastructure (NII)
FCC Rule Part(s):	Part 15 Subpart E (Section 15.407)
Test Date:	January 04 ~ February 11, 2022

Reviewed By: Jame Yuan

Approved By: Robin Wu

ACCREDITED
TESTING LABORATORY
CERTIFICATE #3628.01

The test results relate only to the samples tested.

This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in KDB789033. Test results reported herein relate only to the item(s) tested.

Revision History

Report No.	Version	Description	Issue Date	Note
2201RSU050-U1	Rev. 01	Initial Report	2022-02-12	Valid

CONTENTS

1. General Information

1.1. Applicant

Hewlett Packard Enterprise Company

3333 Scott Blvd, Santa Clara, CA 95054, USA

1.2. Manufacturer

Hewlett Packard Enterprise Company

3333 Scott Blvd, Santa Clara, CA 95054, USA

1.3. Testing Facility

☒	**Test Site – MRT Suzhou Laboratory**				
	Laboratory Location (Suzhou - Wuzhong) D8 Building, No.2 Tian'edang Rd., Wuzhong Economic Development Zone, Suzhou, China **Laboratory Location (Suzhou - SIP)** 4b Building, Liando U Valley, No.200 Xingpu Rd., Shengpu Town, Suzhou Industrial Park, China				
	Laboratory Accreditations				
	A2LA: 3628.01		CNAS: L10551		
	FCC: CN1166		ISED: CN0001		
	VCCI:	☐R-20025	☐G-20034	☐C-20020	☐T-20020
		☐R-20141	☐G-20134	☐C-20103	☐T-20104
☐	**Test Site – MRT Shenzhen Laboratory**				
	Laboratory Location (Shenzhen) 1G, Building A, Junxiangda Building, Zhongshanyuan Road West, Nanshan District, Shenzhen, China				
	Laboratory Accreditations				
	A2LA: 3628.02		CNAS: L10551		
	FCC: CN1284		ISED: CN0105		
☐	**Test Site – MRT Taiwan Laboratory**				
	Laboratory Location (Taiwan) No. 38, Fuxing 2nd Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.)				
	Laboratory Accreditations				
	TAF: L3261-190725				
	FCC: 291082, TW3261		ISED: TW3261		

1.4. Product Information

Product Name	ACCESS POINT
Model No.	APIN0635
Software Version	2021.0105 spf.11.3.cs
Wi-Fi Specification	802.11a/b/g/n/ac/ax
Bluetooth Specification	v5.0 single mode, BLE only
Zigbee Specification	802.15.4
GNSS Specification	GPS, GLONASS, Galileo
Operating Temperature	0 ~ 50 °C
Power Type	AC Adapter or PoE input
Operating Environment	Indoor Use
Remark: The information of EUT was provided by the manufacturer, and the accuracy of the information shall be the responsibility of the manufacturer.	

1.5. Radio Specification

Frequency Range	For 802.11a/n-HT20/ac-VHT20/ax-HE20: 5845MHz, 5865MHz, 5885MHz For 802.11n-HT40/ac-VHT40/ax-HE40: 5835MHz, 5875MHz For 802.11ac-VHT80/ax-HE80: 5855MHz
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 866.6Mbps 802.11ax: up to 1201Mbps

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

1.6. Working Frequencies

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

Channel	Frequency	Channel	Frequency	Channel	Frequency
169	5845 MHz	173	5865 MHz	177	5885 MHz

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

Channel	Frequency	Channel	Frequency	Channel	Frequency
167	5835 MHz	175	5875 MHz	--	--

802.11ac-VHT80/ax-HE80

Channel	Frequency	Channel	Frequency	Channel	Frequency
169	5855 MHz	--	--	--	--

1.7. Antenna Details

Antenna Type	Frequency Band (GHz)	Max Peak Gain (dBi)	CDD Directional Gain (dBi)		BF Directional Gain (dBi)
			For Power	For PSD	
Wi-Fi Internal Antenna (2*2 MIMO)					
PIFA	2.4 ~ 2.5	2.90	2.90	5.91	5.91
	5.15 ~ 5.9	4.90	4.90	7.91	7.91
	5.9 ~ 7.2	4.30	4.30	4.30	4.30
Bluetooth / ZigBee Internal Antenna					
PIFA	2.4 ~ 2.5	3.0			

Note:

1. The EUT supports Cyclic Delay Diversity (CDD) mode, and CDD signals are correlated.
2. The EUT also supports Beam Forming mode, and the Beam Forming support 802.11n/ac/ax, not include 802.11a/b/g. Directional gain = G_{ANT} + BF Gain. For beamforming operation, Aruba OS automatically backs power down based on a 10log(N) factor based on CDD power.
3. All antenna information is from antenna specification provided by the manufacturer.

2. Test Configuration

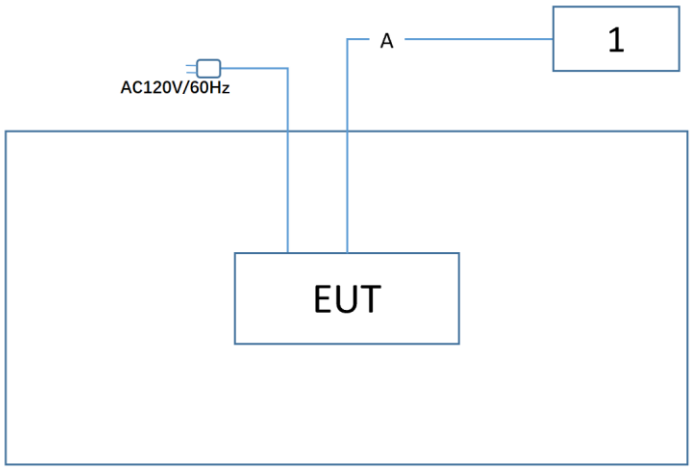
2.1. Test Mode

Mode 1: Transmit by 802.11a (6Mbps)
Mode 2: Transmit by 802.11ac-VHT20 (MCS0)
Mode 3: Transmit by 802.11ac-VHT40 (MCS0)
Mode 4: Transmit by 802.11ac-VHT80 (MCS0)
Mode 5: Transmit by 802.11ax-HE20 (MCS0)
Mode 6: Transmit by 802.11ax-HE40 (MCS0)
Mode 7: Transmit by 802.11ax-HE80 (MCS0)

Note: 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.

2.2. Test System Connection Diagram

The device was 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 – Radiated Emission testing & AC Conducted Emissions			
			
Cable Type		Cable Description	
A	LAN Cable	Non shielded, > 10m	
Product		Manufacturer	Model No.
1	Notebook	DELL	Precision 3510

Note 1: The test utility software used during testing was “QSPR”, and the version was v5.0-00186.

Note 2: Final power setting please refer to operational description.

2.3. Applied Standards

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

- FCC Part 15.407
- KDB 789033 D02v02r01
- KDB 291074 D01v01
- KDB 662911 D01v02r01
- ANSI C63.10-2013

2.4. Test Environment Condition

Ambient Temperature	15 ~ 35°C
Relative Humidity	20 ~ 75%RH

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

Conclusion:

The unit complies with the requirement of §15.203.

4. Measuring Instrument

Instrument	Manufacturer	Model No.	Asset No.	Cali. Interval	Cali. Due Date	Test Site
Two-Line V-Network	R&S	ENV216	MRTSUE06002	1 year	2022/6/8	WZ-SR2
Shielding Room	MIX-BEP	WZ-SR2	MRTSUE06215	/	/	WZ-SR2
Thermohygrometer	testo	608-H1	MRTSUE06404	1 year	2022/6/28	WZ-SR2
EMI Test Receiver	R&S	ESR3	MRTSUE06909	1 year	2022/11/1	WZ-SR2
EMI Test Receiver	R&S	ESR7	MRTSUE06001	1 year	2022/12/29	WZ-AC1
Horn Antenna	Schwarzbeck	BBHA 9120D	MRTSUE06023	1 year	2022/9/16	WZ-AC1
Preamplifier	Agilent	83017A	MRTSUE06076	1 year	2022/11/12	WZ-AC1
TRILOG Antenna	Schwarzbeck	VULB 9168	MRTSUE06172	1 year	2022/8/5	WZ-AC1
Thermohygrometer	Yuhuaze	HTC-2	MRTSUE06184	1 year	2022/8/10	WZ-AC1
Anechoic Chamber	TDK	WZ-AC1	MRTSUE06212	1 year	2022/4/29	WZ-AC1
Thermohygrometer	testo	608-H1	MRTSUE06403	1 year	2022/6/28	WZ-AC1
Signal Analyzer	Keysight	N9010B	MRTSUE06607	1 year	2022/12/29	WZ-AC1
Signal Analyzer	Agilent	N9020A	MRTSUE06106	1 year	2022/4/13	WZ-SR5
Thermohygrometer	testo	608-H1	MRTSUE06402	1 year	2022/6/28	WZ-SR5
USB Power Sensor	Agilent	U2021XA	MRTSUE06030	1 year	2022/10/10	WZ-SR5
Shielding Room	HUAMING	WZ-SR5	MRTSUE06442	N/A	N/A	WZ-SR5
Signal Analyzer	Keysight	N9010B	MRTSUE06457	1 year	2022/6/24	WZ-SR5

Software	Version	Function
EMI Software	V3	EMI Test Software
Controller_MF 7802	V 1.02	RE Antenna & Turntable

5. 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
Measurement Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 9kHz~150kHz: 3.74dB 150kHz~30MHz: 3.44dB
Radiated Disturbance
Measurement Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): Horizontal: 30MHz~300MHz: 5.04dB 300MHz~1GHz: 4.95dB 1GHz~40GHz: 6.40dB Vertical: 30MHz~300MHz: 5.24dB 300MHz~1GHz: 6.03dB 1GHz~40GHz: 6.40dB
Spurious Emissions, Conducted
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 0.78dB
Output Power
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 1.13dB
Power Spectrum Density
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 1.15dB
Occupied Bandwidth
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 0.28%

6. Test Result

6.1. Summary

FCC Section(s)	Test Description	Test Condition	Verdict
15.407(a)	26dB Bandwidth	Conducted	Pass
15.407(e)	6dB Bandwidth		Pass
15.407(a)(3)(ii)	Maximum Conducted Output Power		Pass
15.407(a)(3)(ii)	Peak Power Spectral Density		Pass
15.407(b)(5)	Undesirable Emissions		Pass
15.205, 15.209 15.407(b)(5)(i), (8), (9)	General Field Strength Limits (Restricted Bands and Radiated Emission Limits)	Radiated	Pass
15.207	AC Conducted Emissions 150kHz - 30MHz	Line Conducted	Pass

Remark:

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. 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. EUT supports one configuration only in 802.11ax full RU mode.
4. This product has two filter configurations (Type A and Type B) and RF output power is within the tolerance of the device for the same setting. We choose Type A filter to perform all RF testing and choose Type B filter to perform spot check testing (output power and radiated spurious emission).

6.2. 26dB & 99% Bandwidth Measurement

6.2.1. Test Limit

N/A

6.2.2. Test Procedure

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

KDB 789033 D02v02r01- Section D (99% Bandwidth)

6.2.3. Test Setting

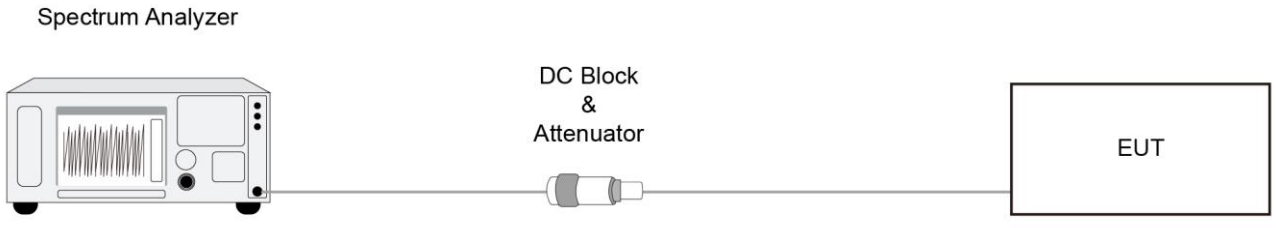
26dB Bandwidth

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.

99% Bandwidth

1. Set center frequency to the nominal EUT channel center frequency.
2. Set span = 1.5 times to 5.0 times the OBW.
3. Set RBW = 1% to 5% of the OBW
4. Set VBW ≥ 3×RBW
5. Detector = Peak.
6. Use the 99% power bandwidth function of the instrument.

6.2.4. Test Setup



6.2.5. Test Result

Refer to Appendix A.2.

6.3. 6dB Bandwidth Measurement

6.3.1. Test Limit

The minimum 6dBbandwidth shall be at least 500 kHz.

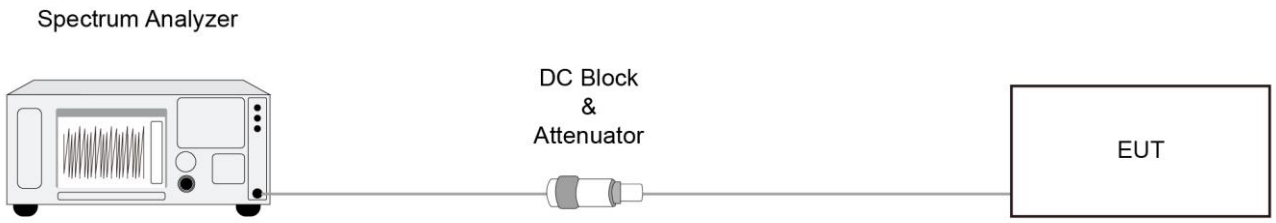
6.3.2. Test Procedure

KDB 789033 D02v02r01- Section C.2

6.3.3. Test Setting

1. Set center frequency to the nominal EUT channel center frequency.
2. RBW = 100 kHz.
3. VBW ≥ 3 × RBW.
4. Detector = Peak.
5. Trace mode = max hold.
6. Sweep = auto couple.
7. Allow the trace to stabilize.
8. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

6.3.4. Test Setup



6.3.5. Test Result

Refer to Appendix A.3.

6.4. Output Power Measurement

6.4.1. Test Limit

For the band 5.85-5.895 GHz, the maximum e.i.r.p shall not exceed 36dBm.

6.4.2. Test Procedure

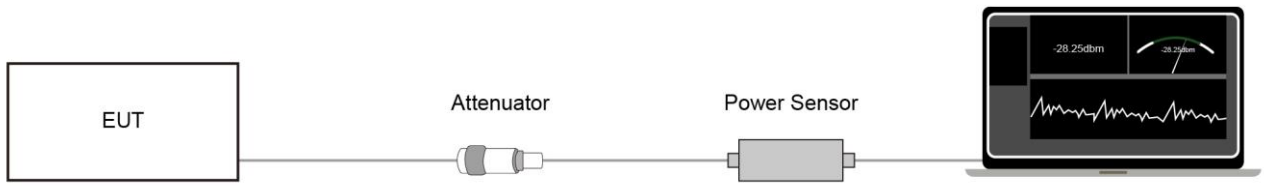
KDB 789033D02v02r01- Section E)3)b) Method PM-G

6.4.3. Test Setting

Average Power Measurement

Average power measurements were performed only when the EUT was transmitting at its maximum power control level using a broadband power meter with a pulse sensor. The power meter implemented triggering and gating capabilities which were set up such that power measurements were recorded only during the ON time of the transmitter.

6.4.4. Test Setup



6.4.5. Test Result

Refer to Appendix A.4.

6.5. Power Spectral Density Measurement

6.5.1. Test Limit

For the band 5.85-5.895 GHz, the maximum e.i.r.p power spectral density shall not exceed 20dBm/MHz.

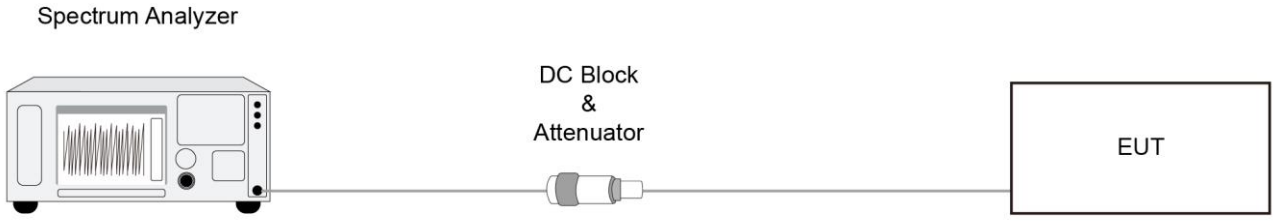
6.5.2. Test Procedure

KDB 789033 D02v02r01-SectionF

6.5.3. Test Setting

1. Analyzer was set to the center frequency of the UNII channel under investigation
2. Span was set to encompass the entire 26dB EBW of the signal.
3. RBW = 1MHz (510kHz, if measurement bandwidth of Maximum PSD is specified in 500 kHz)
4. VBW = 3 × RBW
5. Number of sweep points ≥ 2 × (span / RBW)
6. Detector = power averaging (Average)
7. Sweep time = auto
8. Trigger = free run
9. Trace average at least 100 traces in power averaging (rms) mode; however, the number of traces to be averaged shall be increased above 100 as needed to ensure that the average accurately represents the true average over the on and off periods of the transmitter.
10. Use the peak search function on the instrument to find the peak of the spectrum and record its value.
11. Add 10*log(1/x), where x is the duty cycle, to the measured power in order to compute the average power during the actual transmission times (because the measurement represents an average over both the on and off times of the transmission). For example, add 10*log(1/0.25) = 6 dB if the duty cycle is 25 percent.

6.5.4. Test Setup



6.5.5. Test Result

Refer to Appendix A.5.

6.6. Frequency Stability Measurement

6.6.1. Test Limit

Manufactures of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual.

6.6.2. Test Procedure

Frequency Stability Under Temperature Variations:

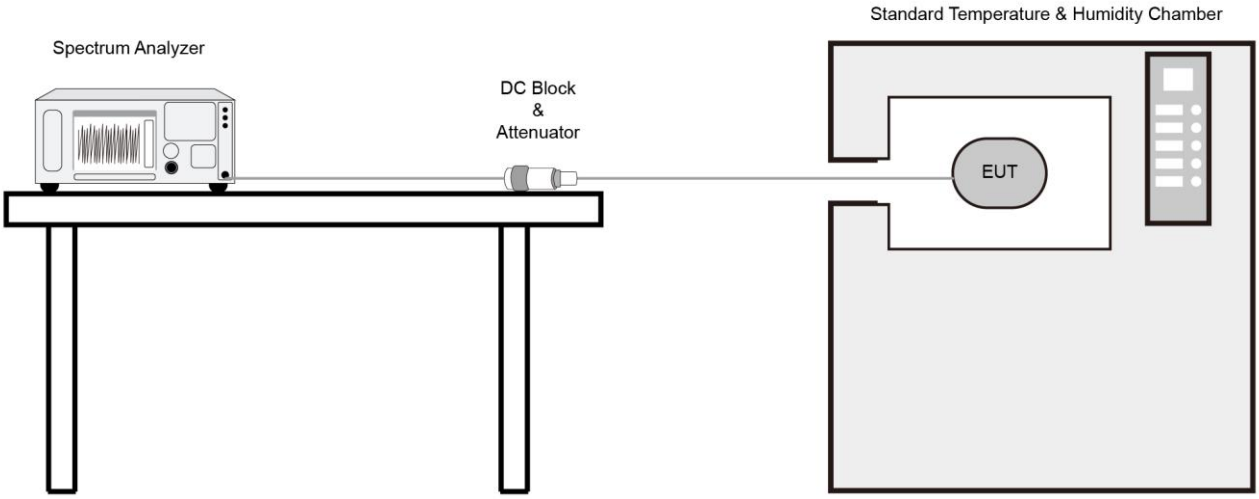
The equipment under test was connected to an external AC or DC power supply and input rated voltage. RF output was connected to a frequency counter or spectrum analyzer via feed through attenuators. The EUT was placed inside the temperature chamber. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and measure EUT 20°C operating frequency as reference frequency. Turn EUT off and set the chamber temperature to highest. After the temperature stabilized for approximately 30 minutes recorded the frequency. Repeat step measure with 10°C decreased per stage until the lowest temperature reached.

Frequency Stability Under Voltage Variations:

Set chamber temperature to 20°C. Use a variable AC power supply / DC power source to power the EUT and set the voltage to rated voltage. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and recorded the frequency.

Reduce the input voltage to specify extreme voltage variation (±15%) and endpoint, recordthe maximum frequency change.

6.6.3. Test Setup



6.6.4. Test Result

Refer to Appendix A.6.

6.7. Radiated Spurious Emission Measurement

6.7.1. Test Limit

All out of band emissions appearing in a restricted band as specified in Section 15.205 of the Title 47 CFR must not exceed the limits shown in Table per Section 15.209.

FCC Part 15 Subpart C Paragraph 15.209		
Frequency [MHz]	Field Strength [uV/m]	Measured Distance [Meters]
0.009 - 0.490	2400/F (kHz)	300
0.490 - 1.705	24000/F (kHz)	30
1.705 - 30	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
Above 960	500	3

6.7.2. Test Procedure

KDB 789033 D02v02r01- Section G

6.7.3. Test Setting

Table 1 - RBW as a function of frequency

Frequency	RBW
9 ~ 150 kHz	200 ~ 300 Hz
0.15 ~ 30 MHz	9 ~ 10 kHz
30 ~ 1000 MHz	100 ~ 120 kHz
> 1000MHz	1MHz

Quasi-Peak Measurements below 1GHz

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest

2. Span was set greater than 1MHz

3. RBW = as specified in Table 1

4. Detector = CISPR quasi-peak

5. Sweep time = auto couple

6. Trace was allowed to stabilize

Peak Measurements above 1GHz

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest

2. RBW = 1MHz

3. VBW = 3MHz

4. Detector = peak

5. Sweep time = auto couple

6. Trace mode = max hold

7. Trace was allowed to stabilize

Average Measurements above 1GHz (Method VB)

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest

2. RBW = 1MHz

3. VBW; If the EUT is configured to transmit with duty cycle ≥ 98%, set VBW = 10 Hz.

If the EUT duty cycle is < 98%, set VBW ≥ 1/T. T is the minimum transmission duration.

802.11a	VBW = 750Hz	802.11ax-HE20	VBW = 200Hz
802.11ac-VHT20	VBW = 100Hz	802.11ax-HE40	VBW = 200Hz
802.11ac-VHT40	VBW = 200Hz	802.11ax-HE80	VBW = 200Hz
802.11ac-VHT80	VBW = 200Hz	N/A	N/A

4. Detector = Peak

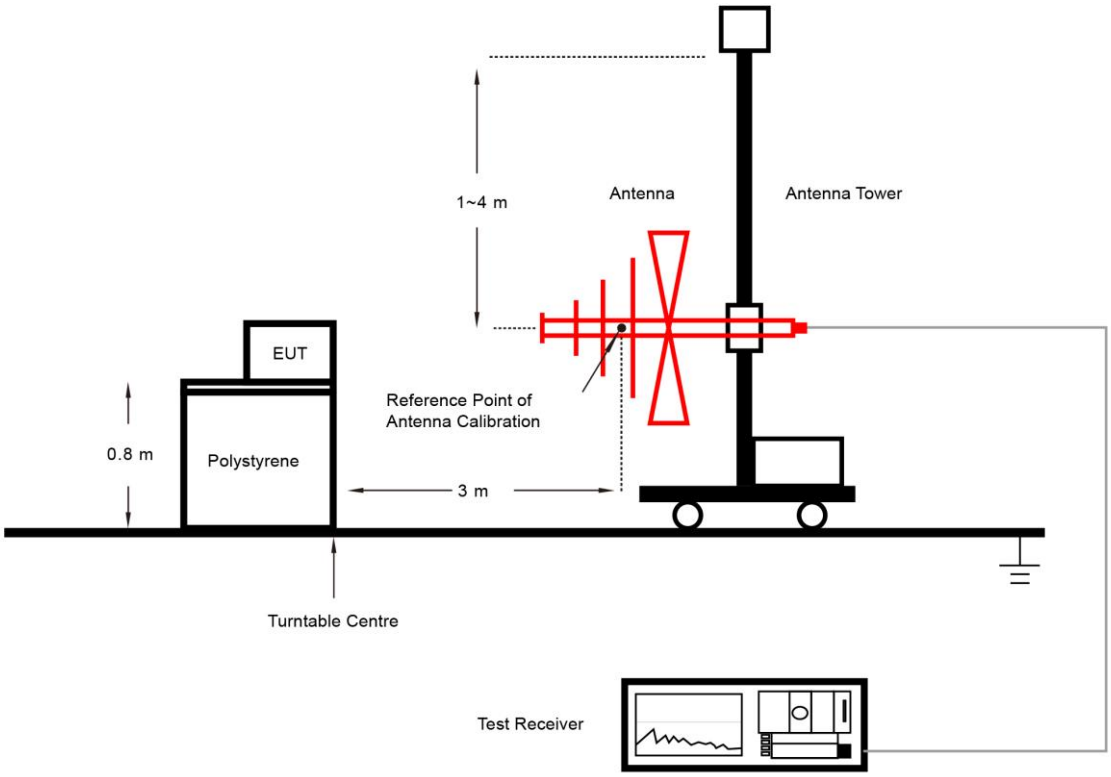
5. Sweep time = auto

6. Trace mode = max hold

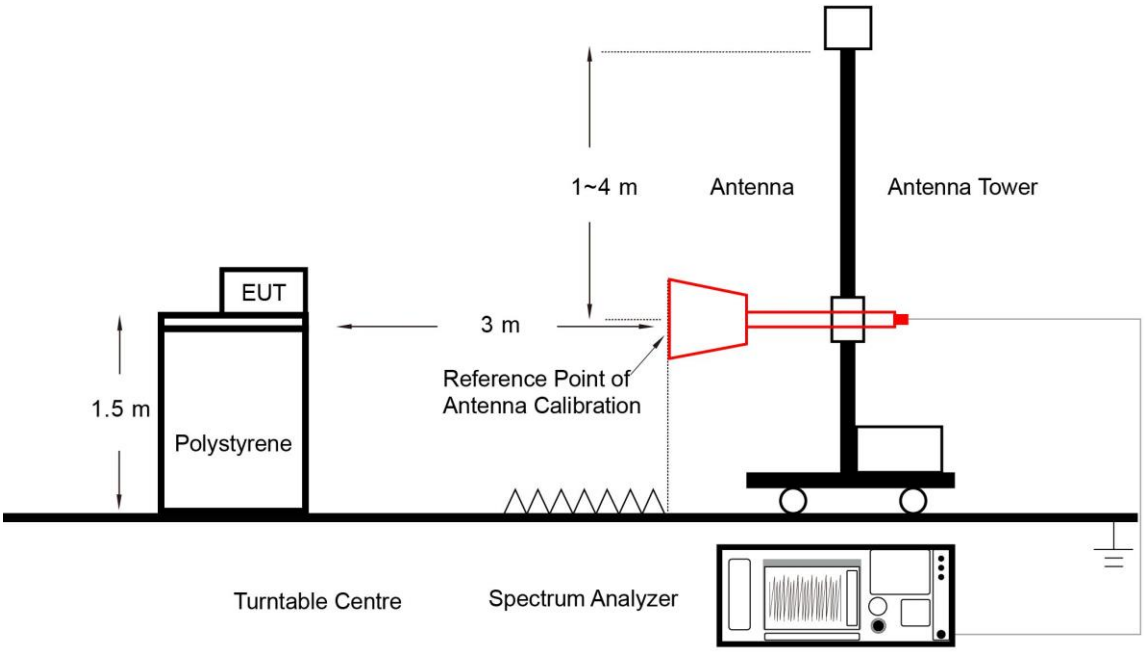
7. Trace was allowed to stabilize

6.7.4. Test Setup

Below 1GHz Test Setup:



Above 1GHz Test Setup:



6.7.5. Test Result

Refer to Appendix A.7.

6.8. Radiated Restricted Band Edge Measurement

6.8.1. Test Limit

For 15.205 requirement:

Radiated emissions which fall in the restricted bands, as defined in Section 15.205(a) of FCC part 15, must also comply with the radiated emission limits specified in Section 15.209(a).

Frequency (MHz)	Frequency (MHz)	Frequency (MHz)	Frequency (GHz)
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
[1] 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2690 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	([2])
13.36 - 13.41	--	--	--

For 15.407(b) requirement:

For transmitters operating in the 5.725-5.85 GHz band: All emissions shall be limited to a level of −27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

For an indoor access point, all emissions at or above 5.895GHz shall not exceed an e.i.r.p. of 15 dBm/MHz and shall decrease linearly to an e.i.r.p. of -7 dBm/MHz at or above 5.925GHz.

Refer to KDB 789033 D02v02r01 G)2)c), as specified in § 15.407(b), emissions above 1000 MHz that are outside of the restricted bands are subject to a maximum emission limit of -27 dBm/MHz (or -17 dBm/MHz as specified in § 15.407(b)(4)). However, an out-of-band emission that complies with both the peak and average limits of § 15.209 is not required to satisfy the -27 dBm/MHz or -17 dBm/MHz maximum emission limit.

All out of band emissions appearing in a restricted band as specified in Section 15.205 of the Title 47CFR must not exceed the limits shown in Table per Section 15.209.

FCC Part 15 Subpart C Paragraph 15.209		
Frequency [MHz]	Field Strength [uV/m]	Measured Distance [Meters]
0.009 - 0.490	2400/F (kHz)	300
0.490 - 1.705	24000/F (kHz)	30
1.705 - 30	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
Above 960	500	3

6.8.2. Test Procedure

KDB 789033 D02v02r01- Section G

6.8.3. Test Setting

Peak Measurements above 1GHz

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW = 3MHz
4. Detector = Peak
5. Sweep time = Auto couple
6. Trace mode = Max hold
7. Trace was allowed to stabilize

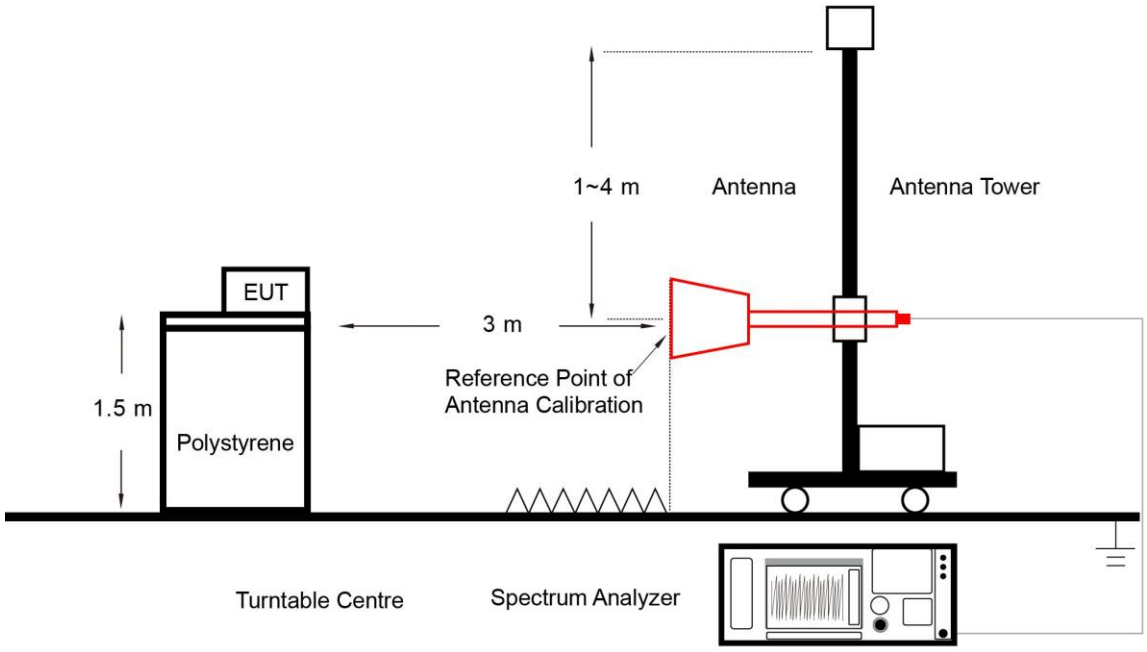
Average Measurements above 1GHz (Method VB)

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW; if the EUT is configured to transmit with duty cycle ≥ 98%, set VBW = 10Hz

802.11a	VBW = 750Hz	802.11ax-HE20	VBW = 200Hz
802.11ac-VHT20	VBW = 100Hz	802.11ax-HE40	VBW = 200Hz
802.11ac-VHT40	VBW = 200Hz	802.11ax-HE80	VBW = 200Hz
802.11ac-VHT80	VBW = 200Hz	N/A	N/A

4. If the EUT duty cycle is < 98%, set VBW ≥ 1/T. T is the minimum transmission duration
5. Detector = Peak
6. Sweep time = Auto
7. Trace mode = Max hold
8. Trace was allowed to stabilize

6.8.4. Test Setup



6.8.5. Test Result

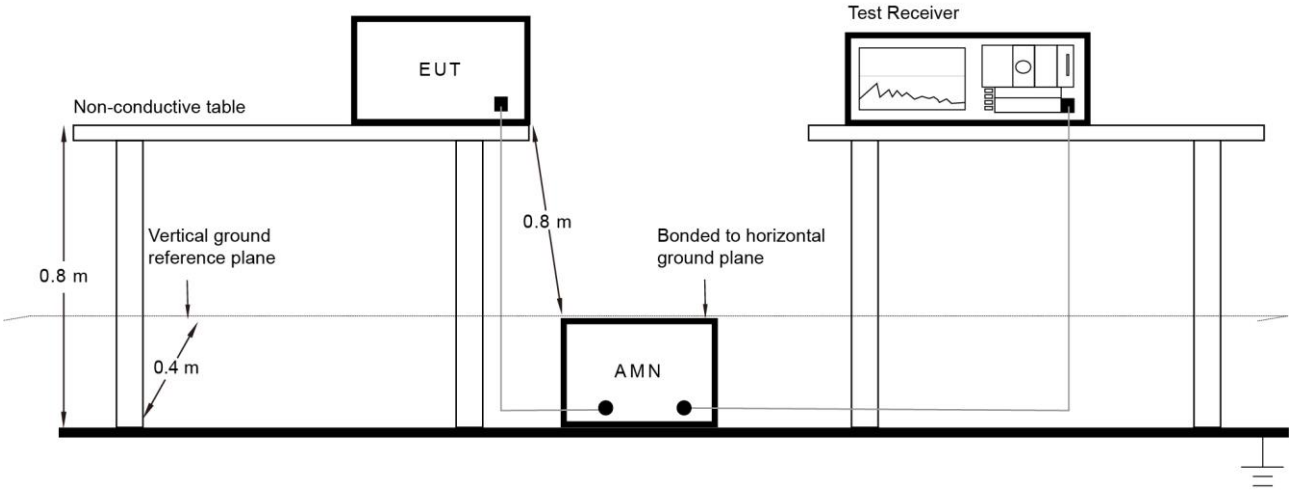
Refer to Appendix A.8.

6.9. AC Conducted Emissions Measurement

6.9.1. Test Limit

FCC Part 15.207 Limits		
Frequency (MHz)	QP (dBuV)	AV (dBuV)
0.15 - 0.50	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30	60	50
Note 1: The lower limit shall apply at the transition frequencies. Note 2: The limit decreases linearly with the logarithm of the frequency in the range 0.15MHz to 0.5MHz.		

6.9.2. Test Setup



6.9.3. Test Result

Refer to Appendix A.9.

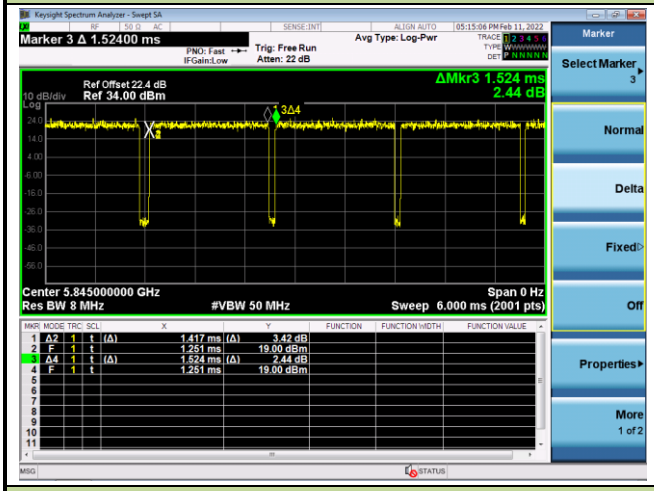
Appendix A – Test Result

A.1 Duty Cycle Test Result

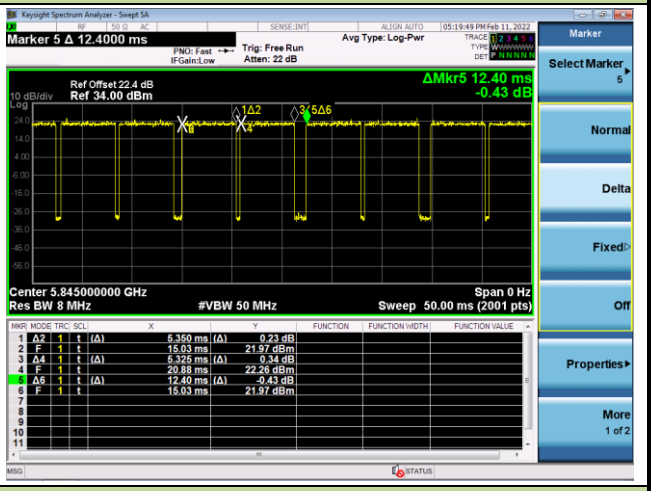
Test Mode	Duty Cycle	
802.11a	92.98%	1.417 / 1.524
802.11ac-VHT20	86.09%	(5.35 + 5.325) / 12.40
802.11ac-VHT40	87.53%	5.370 / 6.135
802.11ac-VHT80	87.25%	5.340 / 6.120
802.11ax-HE20	93.98%	5.385 / 5.730
802.11ax-HE40	94.50%	5.415 / 5.730
802.11ax-HE80	93.28%	5.415 / 5.805

Duty Cycle (T = Transmission Duration)

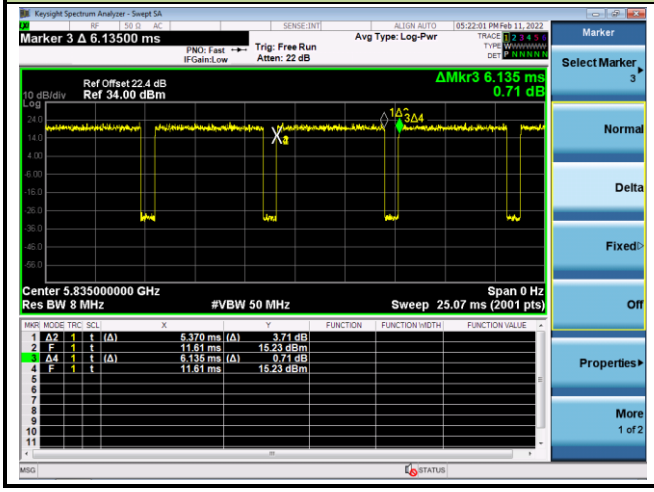
802.11a (T = 1.417ms)



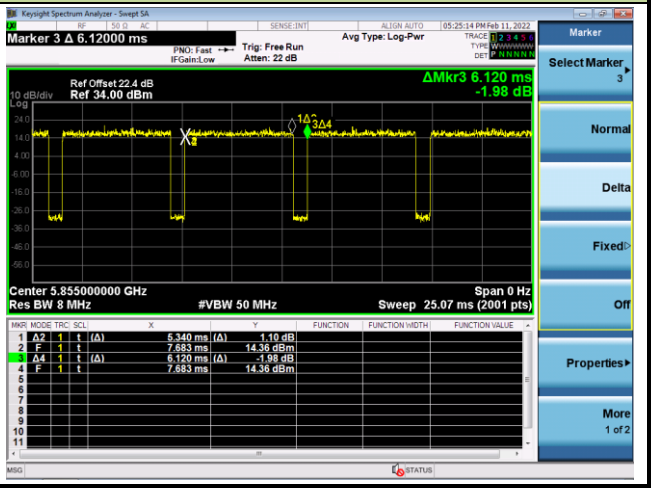
802.11ac-VHT20 (T = 10.675ms)

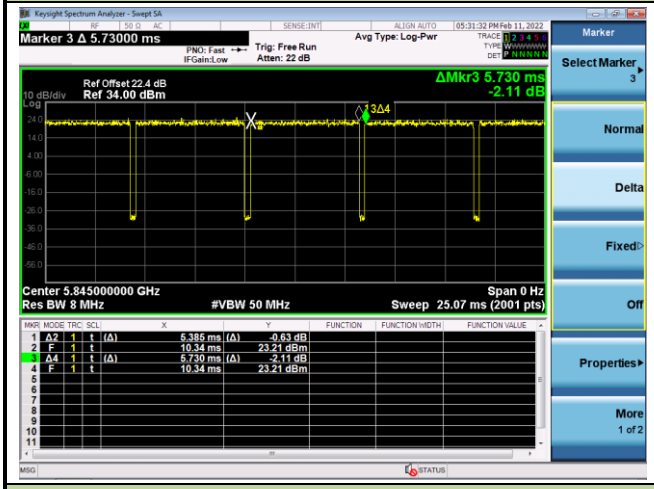
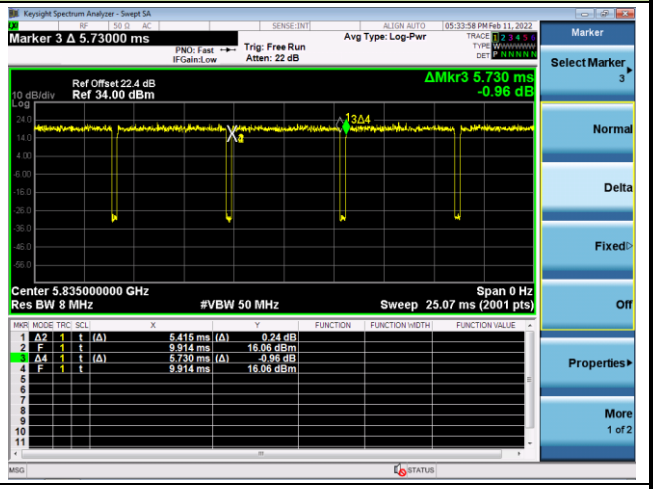
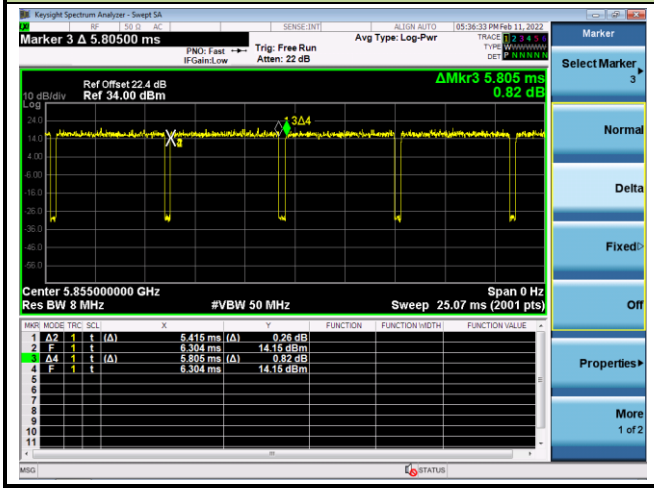


802.11ac-VHT40 (T = 5.37ms)



802.11ac-VHT80 (T = 5.34ms)

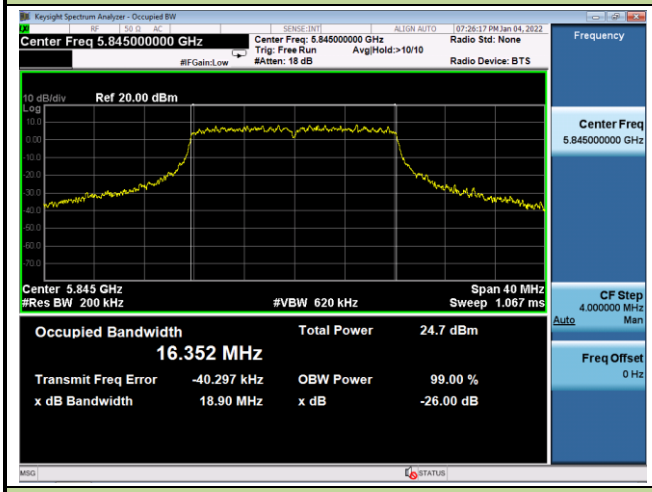
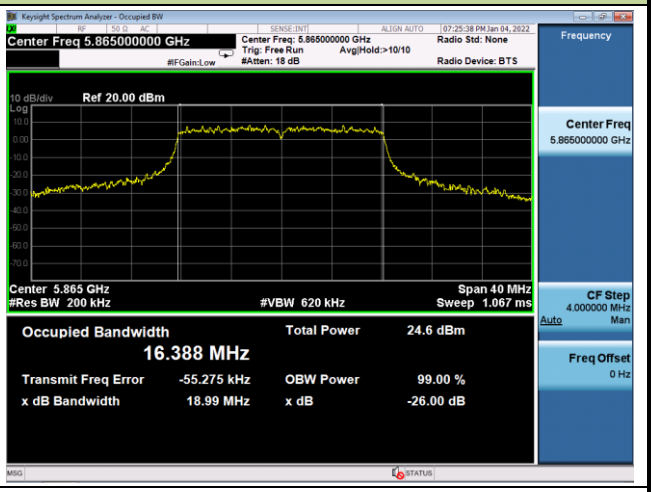
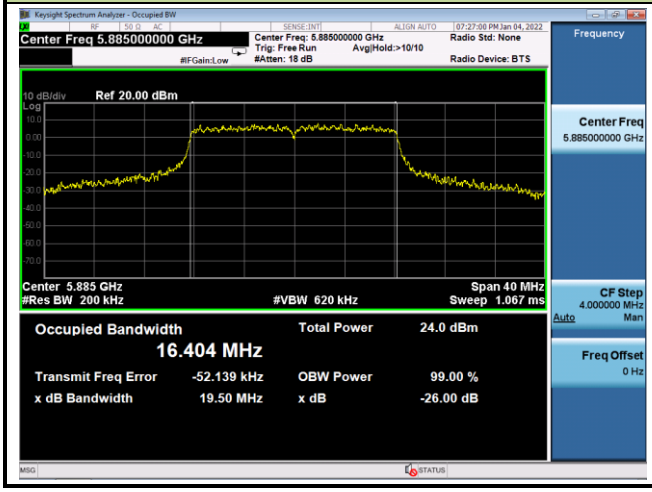


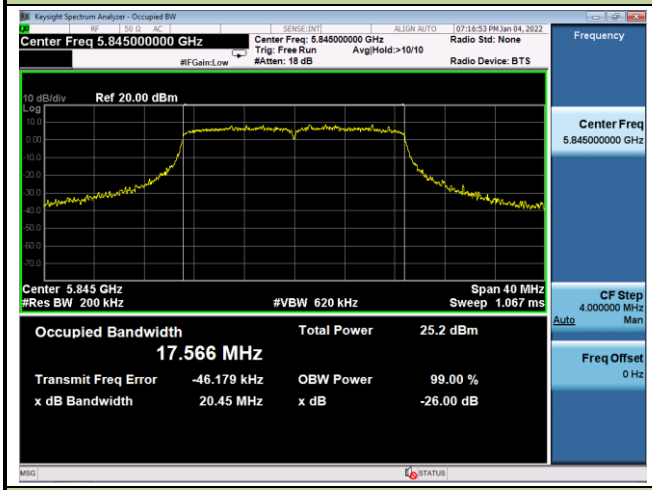
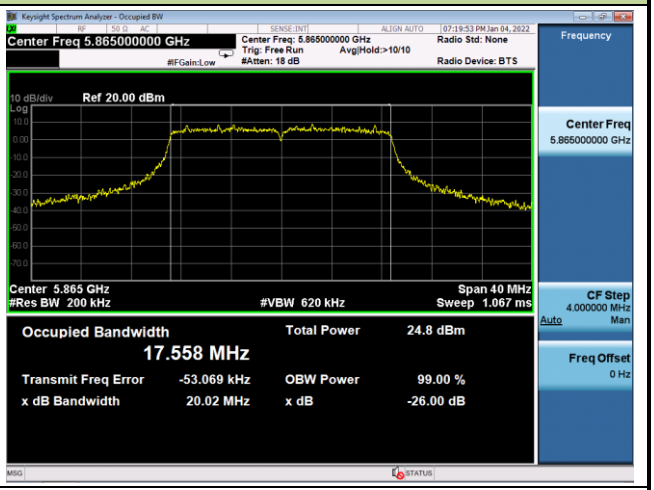
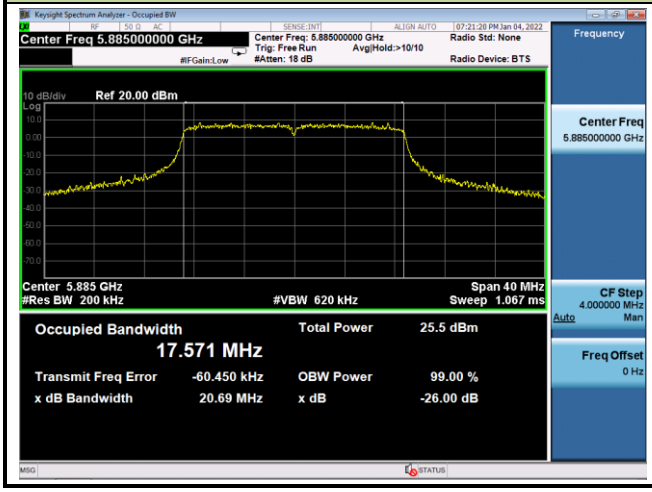
Duty Cycle (T = Transmission Duration)	
802.11ax-HE20 (T = 5.385ms)	802.11ax-HE40 (T = 5.415ms)
	
802.11ax-HE80 (T = 5.415ms)	
	

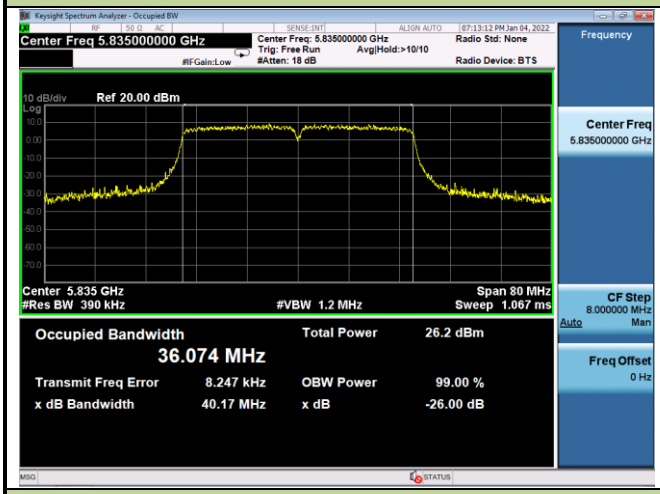
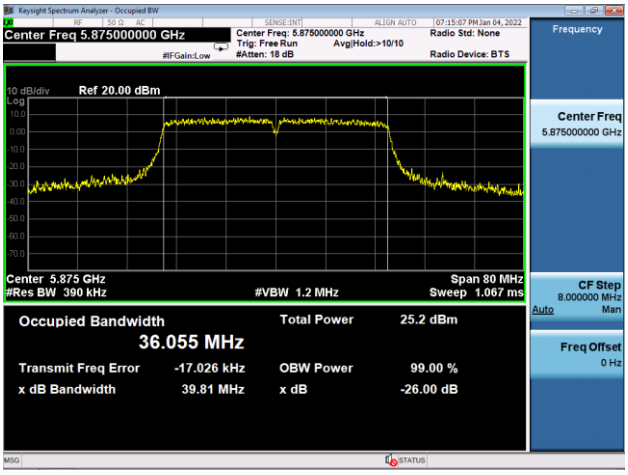
A.2 26dB Bandwidth Test Result

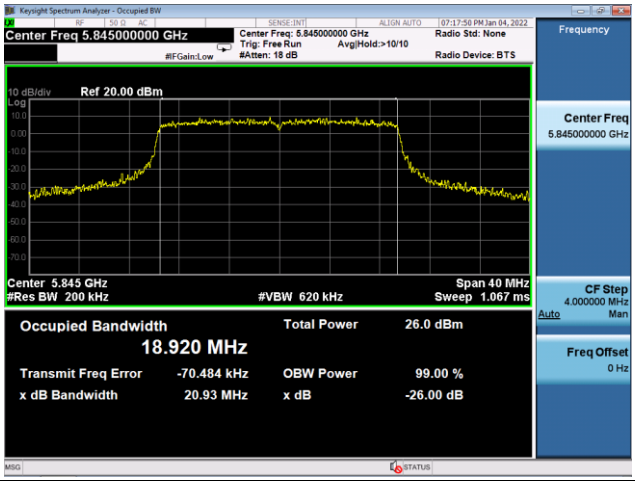
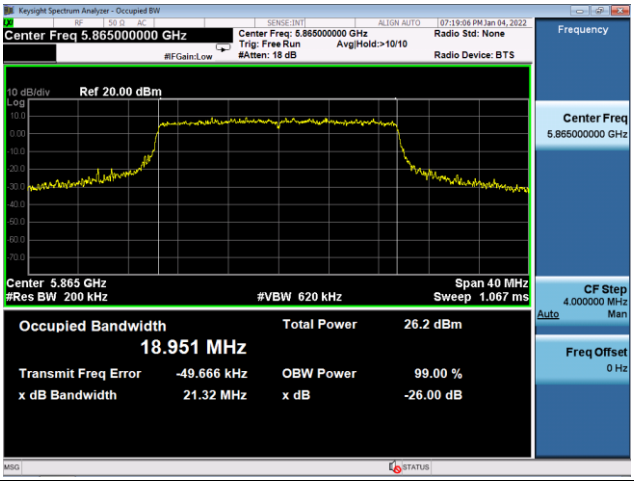
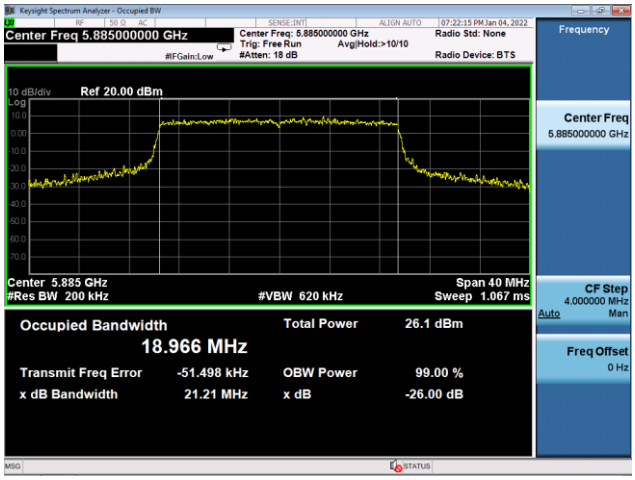
Test Site	WZ-SR5	Test Engineer	Lynn Yang
Test Date	2022/01/04		

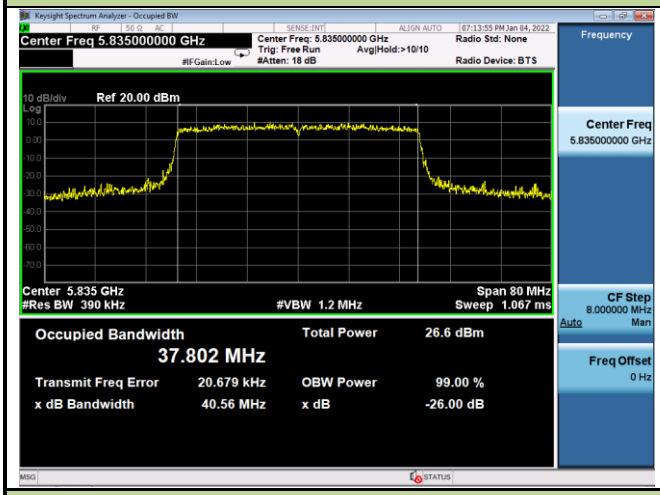
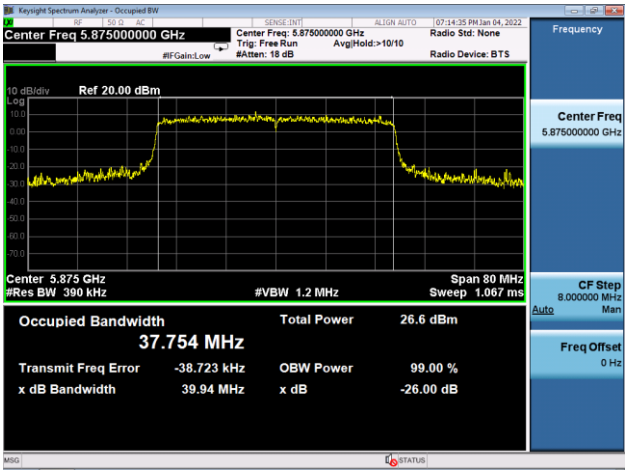
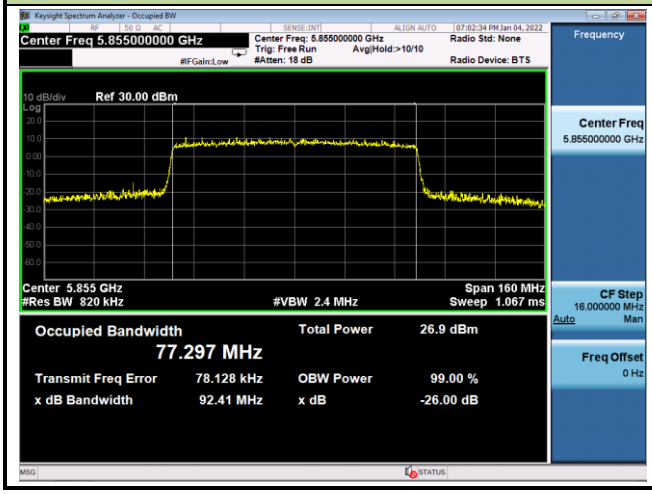
Test Mode	Data Rate/ MCS	Channel No.	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
11a	6Mbps	169	5845	18.90	16.352
11a	6Mbps	173	5865	18.99	16.388
11a	6Mbps	177	5885	19.50	16.404
11ac-VHT20	MCS0	169	5845	20.45	17.566
11ac-VHT20	MCS0	173	5865	20.02	17.558
11ac-VHT20	MCS0	177	5885	20.69	17.571
11ac-VHT40	MCS0	167	5835	40.17	36.074
11ac-VHT40	MCS0	175	5875	39.81	36.055
11ac-VHT80	MCS0	171	5855	81.01	75.472
11ax-HE20	MCS0	169	5845	20.93	18.920
11ax-HE20	MCS0	173	5865	21.32	18.951
11ax-HE20	MCS0	177	5885	21.21	18.966
11ax-HE40	MCS0	167	5835	40.56	37.802
11ax-HE40	MCS0	175	5875	39.94	37.754
11ax-HE80	MCS0	171	5855	92.41	77.297

802.11a 26dB Bandwidth	
Channel 169 (5845MHz)	Channel 173 (5865MHz)
	
Channel 177 (5885MHz)	
	

802.11ac-VHT20 26dB Bandwidth	
Channel 169 (5845MHz)	Channel 173 (5865MHz)
	
Channel 177 (5885MHz)	
	

802.11ac-VHT40 26dB Bandwidth	
Channel 167 (5835MHz)	Channel 175(5875MHz)
	
802.11ac-VHT80 26dB Bandwidth	
Channel 171 (5855MHz)	
	

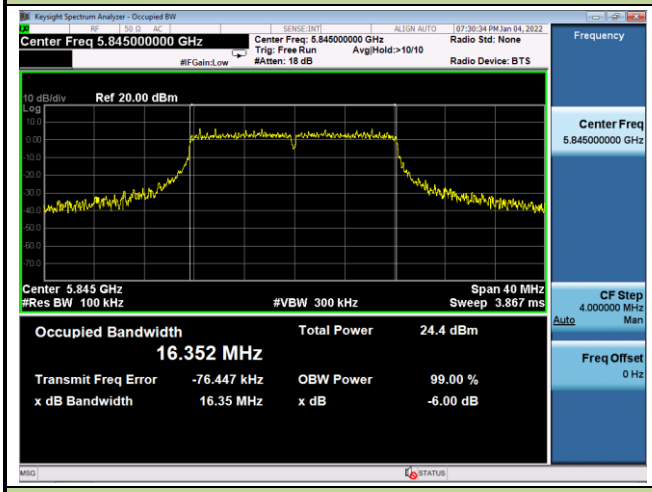
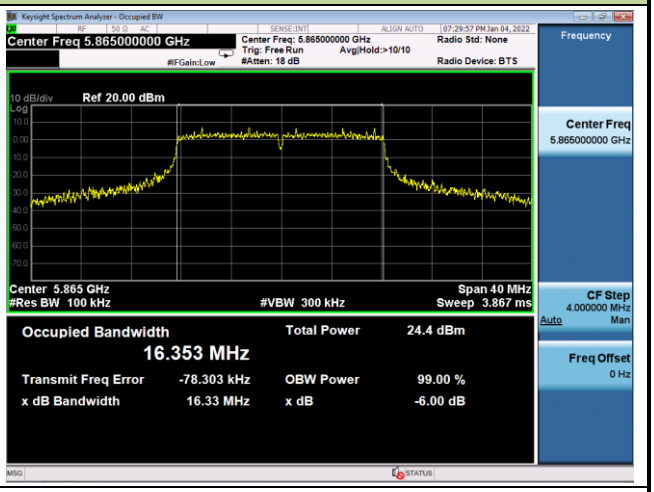
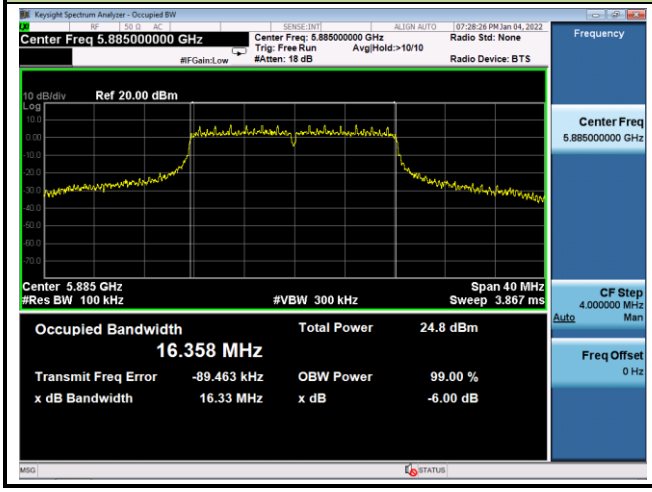
802.11ax-HE20 26dB Bandwidth	
Channel 169 (5845MHz)	Channel 173 (5865MHz)
	
Channel 177 (5885MHz)	
	

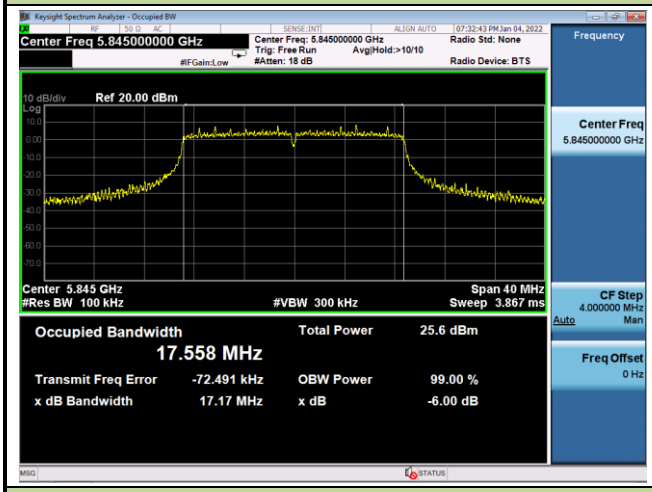
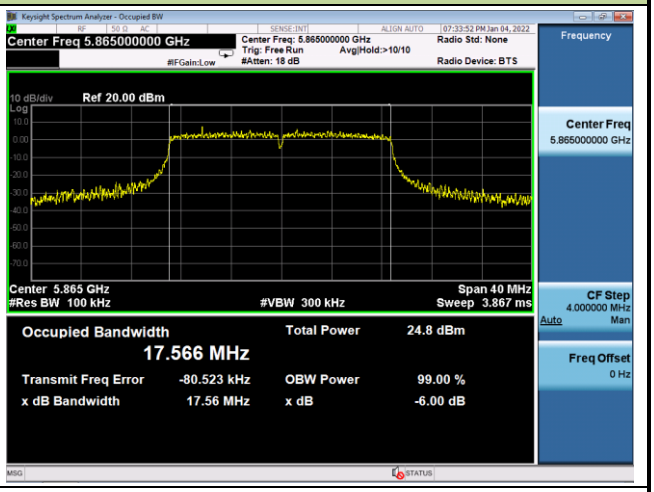
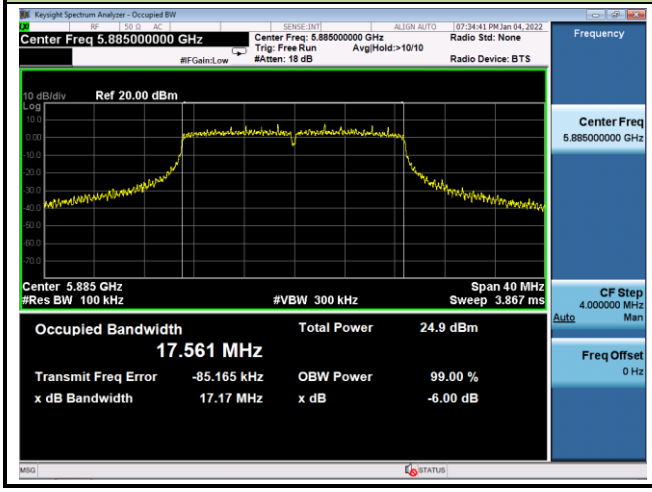
802.11ax-HE40 26dB Bandwidth	
Channel 167 (5835MHz)	Channel 175(5875MHz)
	
802.11ax-HE80 26dB Bandwidth	
Channel 171 (5855MHz)	
	

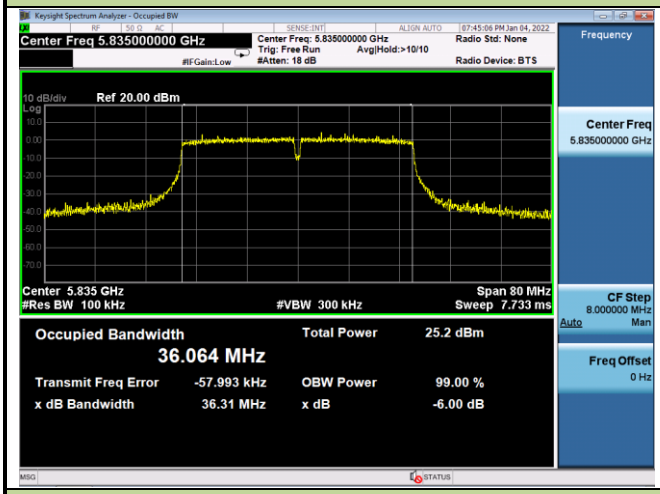
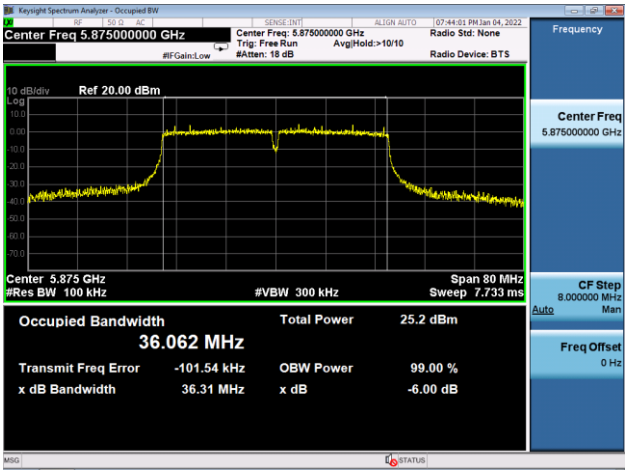
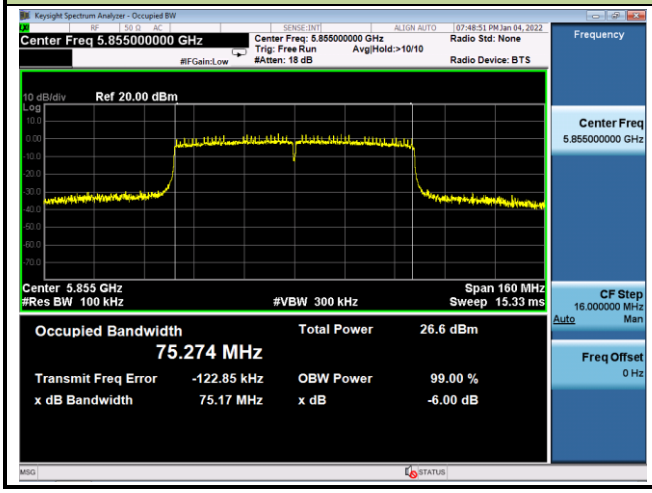
A.3 6dB Bandwidth Test Result

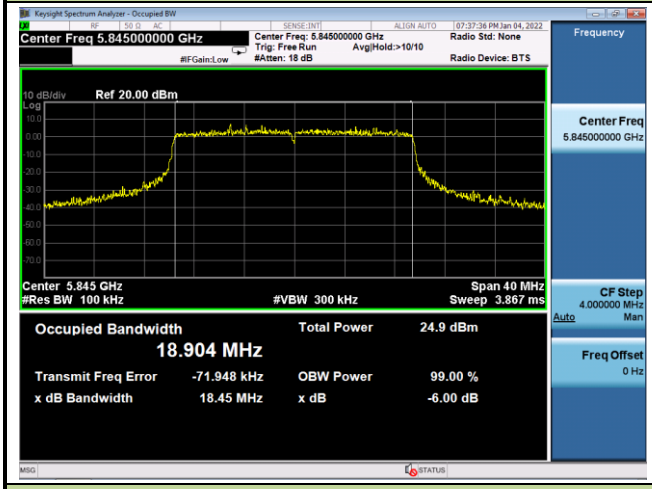
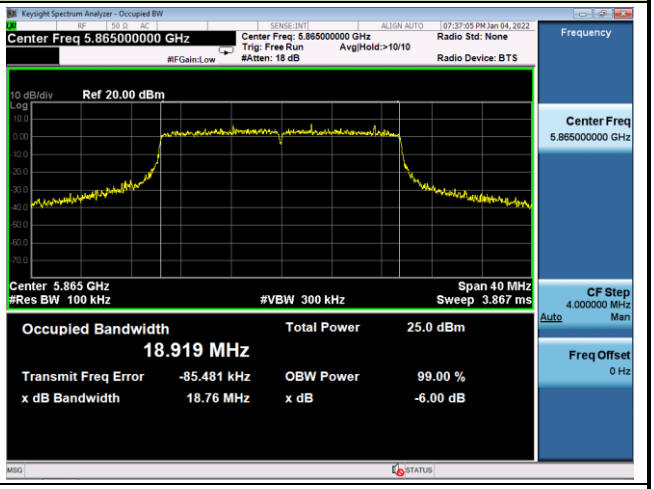
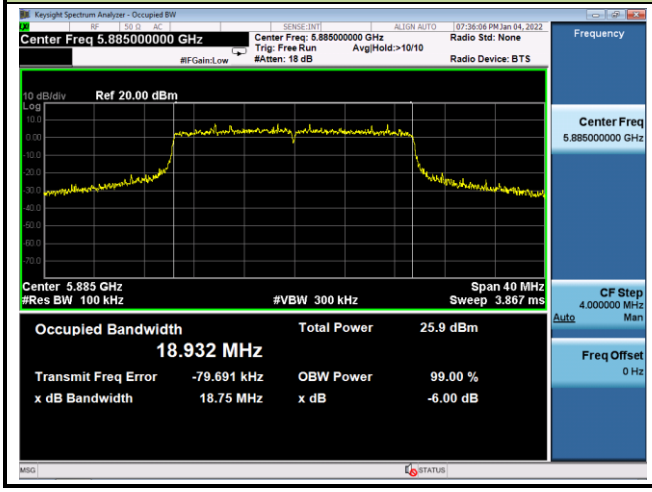
Test Site	WZ-SR5	Test Engineer	Lynn Yang
Test Date	2022/01/04		

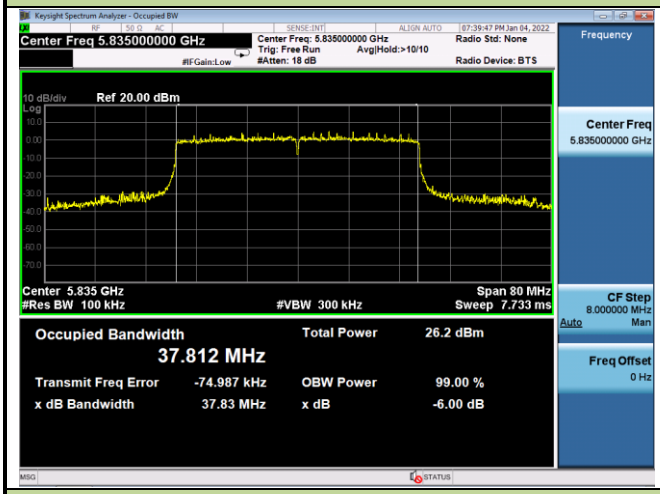
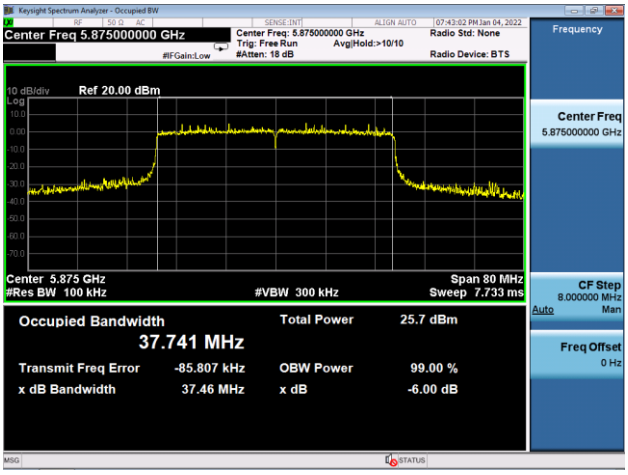
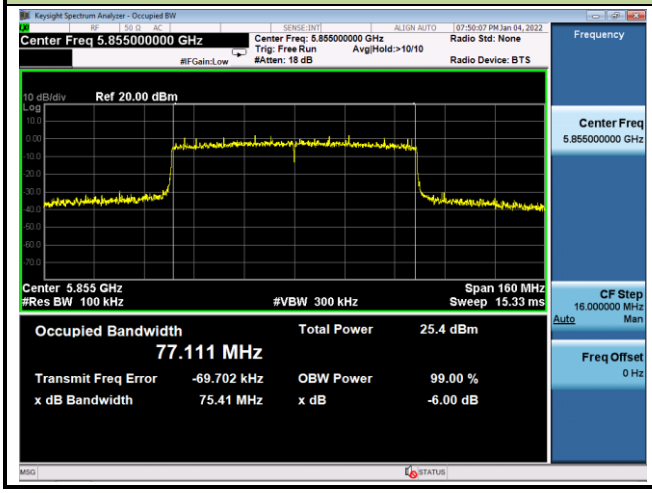
Test Mode	Data Rate/ MCS	Channel No.	Frequency (MHz)	6dB Bandwidth (MHz)	Limit (MHz)
11a	6Mbps	169	5845	16.35	≥0.5
11a	6Mbps	173	5865	16.33	≥0.5
11a	6Mbps	177	5885	16.33	≥0.5
11ac-VHT20	MCS0	169	5845	17.17	≥0.5
11ac-VHT20	MCS0	173	5865	17.56	≥0.5
11ac-VHT20	MCS0	177	5885	17.17	≥0.5
11ac-VHT40	MCS0	167	5835	36.31	≥0.5
11ac-VHT40	MCS0	175	5875	36.31	≥0.5
11ac-VHT80	MCS0	171	5855	75.17	≥0.5
11ax-HE20	MCS0	169	5845	18.45	≥0.5
11ax-HE20	MCS0	173	5865	18.76	≥0.5
11ax-HE20	MCS0	177	5885	18.75	≥0.5
11ax-HE40	MCS0	167	5835	37.83	≥0.5
11ax-HE40	MCS0	175	5875	37.46	≥0.5
11ax-HE80	MCS0	171	5855	75.41	≥0.5

802.11a 6dB Bandwidth	
Channel 169 (5845MHz)	Channel 173 (5865MHz)
	
Channel 177 (5885MHz)	
	

802.11ac-VHT20 6dB Bandwidth	
Channel 169 (5845MHz)	Channel 173 (5865MHz)
	
Channel 177 (5885MHz)	
	

802.11ac-VHT40 6dB Bandwidth	
Channel 167 (5835MHz)	Channel 175(5875MHz)
	
802.11ac-VHT80 6dB Bandwidth	
Channel 171 (5855MHz)	
	

802.11ax-HE20 6dB Bandwidth	
Channel 169 (5845MHz)	Channel 173 (5865MHz)
	
Channel 177 (5885MHz)	
	

802.11ax-HE40 6dB Bandwidth	
Channel 167 (5835MHz)	Channel 175(5875MHz)
	
802.11ax-HE80 6dB Bandwidth	
Channel 171 (5855MHz)	
	

A.4 Output Power Test Result

Test Site	WZ-SR5	Test Engineer	Lynn Yang
Test Date	2022/01/04	Filter Configuration	Type A Filter

Test Mode	Data Rate MCS	Channel No.	Freq. (MHz)	Average Power (dBm)		Total Average Power (dBm)	Total EIRP Power (dBm)	EIRP Power Limit (dBm)
				Ant 0	Ant 1			
11a	6Mbps	169	5845	17.91	18.31	21.12	26.02	≤ 36.00
11a	6Mbps	173	5865	17.44	18.23	20.86	25.76	≤ 36.00
11a	6Mbps	177	5885	17.53	18.41	21.00	25.90	≤ 36.00
11ac-VHT20	MCS0	169	5845	17.70	18.21	20.97	25.87	≤ 36.00
11ac-VHT20	MCS0	173	5865	17.58	18.23	20.93	25.83	≤ 36.00
11ac-VHT20	MCS0	177	5885	17.45	18.28	20.90	25.80	≤ 36.00
11ac-VHT40	MCS0	167	5835	17.62	18.25	20.96	25.86	≤ 36.00
11ac-VHT40	MCS0	175	5875	17.21	18.14	20.71	25.61	≤ 36.00
11ac-VHT80	MCS0	171	5855	17.38	18.26	20.85	25.75	≤ 36.00
11ax-HE20	MCS0	169	5845	17.83	18.40	21.13	26.03	≤ 36.00
11ax-HE20	MCS0	173	5865	17.56	18.39	21.01	25.91	≤ 36.00
11ax-HE20	MCS0	177	5885	17.34	18.61	21.03	25.93	≤ 36.00
11ax-HE40	MCS0	167	5835	17.43	18.07	20.77	25.67	≤ 36.00
11ax-HE40	MCS0	175	5875	17.25	18.47	20.91	25.81	≤ 36.00
11ax-HE80	MCS0	171	5855	17.56	18.32	20.97	25.87	≤ 36.00

Note 1: Total Average Power (dBm) = 10*log {$10^{(\text{Ant 0 Average Power /10})}$ + $10^{(\text{Ant 1 Average Power /10})}$}.

Note 2: EIRP Power (dBm) = Total Average Power (dBm) + Antenna Gain (dBi).

Test Site	WZ-SR5	Test Engineer	Lynn Yang
Test Date	2022/01/04	Filter Configuration	Type B Filter

Test Mode	Data Rate MCS	Channel No.	Freq. (MHz)	Average Power (dBm)		Total Average Power (dBm)	Total EIRP Power (dBm)	EIRP Power Limit (dBm)
				Ant 0	Ant 1			
11a	6Mbps	169	5845	17.60	18.26	20.95	25.85	≤ 36.00
11a	6Mbps	173	5865	17.17	17.69	20.45	25.35	≤ 36.00
11a	6Mbps	177	5885	17.46	18.12	20.81	25.71	≤ 36.00
11ac-VHT20	MCS0	169	5845	17.34	17.84	20.61	25.51	≤ 36.00
11ac-VHT20	MCS0	173	5865	17.30	17.68	20.50	25.40	≤ 36.00
11ac-VHT20	MCS0	177	5885	17.36	17.81	20.60	25.50	≤ 36.00
11ac-VHT40	MCS0	167	5835	17.52	18.01	20.78	25.68	≤ 36.00
11ac-VHT40	MCS0	175	5875	17.50	17.84	20.68	25.58	≤ 36.00
11ac-VHT80	MCS0	171	5855	17.35	17.77	20.58	25.48	≤ 36.00
11ax-HE20	MCS0	169	5845	17.58	18.16	20.89	25.79	≤ 36.00
11ax-HE20	MCS0	173	5865	17.64	18.16	20.92	25.82	≤ 36.00
11ax-HE20	MCS0	177	5885	17.45	17.96	20.72	25.62	≤ 36.00
11ax-HE40	MCS0	167	5835	17.38	18.00	20.71	25.61	≤ 36.00
11ax-HE40	MCS0	175	5875	17.67	18.00	20.85	25.75	≤ 36.00
11ax-HE80	MCS0	171	5855	17.56	18.07	20.83	25.73	≤ 36.00

Note 1: Total Average Power (dBm) = 10*log {$10^{(\text{Ant 0 Average Power /10})}$ + $10^{(\text{Ant 1 Average Power /10})}$}.

Note 2: EIRP Power (dBm) = Total Average Power (dBm) + Antenna Gain (dBi).

A.5 Power Spectral Density Test Result

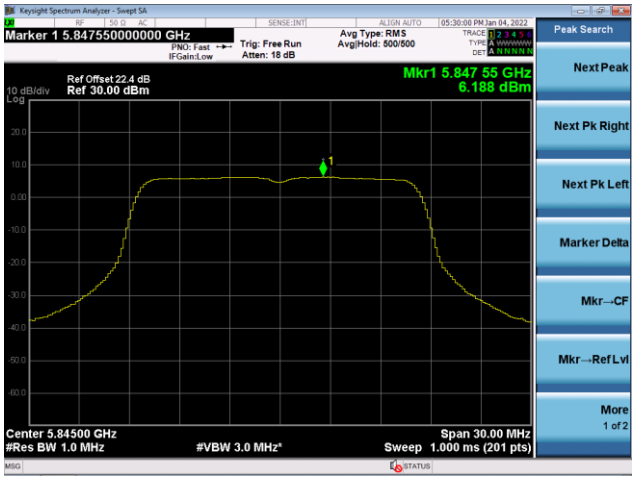
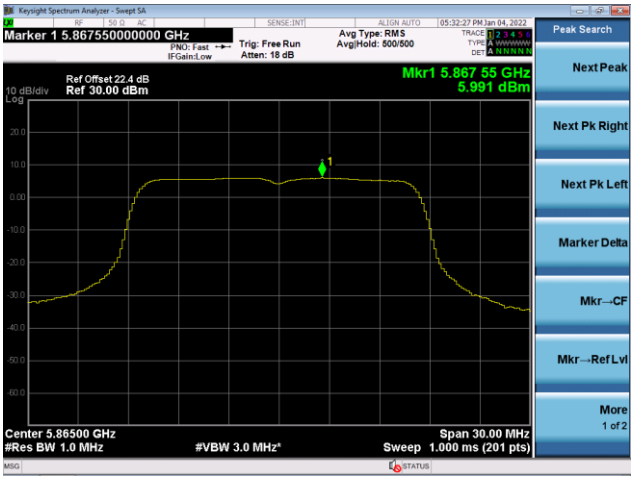
Test Site	WZ-SR5	Test Engineer	Lynn Yang
Test Date	2022/01/04 ~ 2022/02/11		
Test Item	Power Spectral Density		

Test Mode	Data Rate/ MCS	Channel No.	Freq. (MHz)	AVPSD (dBm/ MHz)		Duty Cycle (%)	Total PSD (dBm/ MHz)	Total EIRP PSD (dBm/ MHz)	EIRP PSD Limit (dBm/MHz)
				Ant 0	Ant 1				
11a	6Mbps	169	5845	6.19	6.75	92.98	9.80	17.71	≤ 20.00
11a	6Mbps	173	5865	5.99	6.89	92.98	9.79	17.70	≤ 20.00
11a	6Mbps	177	5885	5.73	7.23	92.98	9.87	17.78	≤ 20.00
11ac-VHT20	MCS0	169	5845	6.07	6.60	86.09	10.00	17.91	≤ 20.00
11ac-VHT20	MCS0	173	5865	5.67	6.57	86.09	9.80	17.71	≤ 20.00
11ac-VHT20	MCS0	177	5885	5.45	6.87	86.09	9.88	17.79	≤ 20.00
11ac-VHT40	MCS0	167	5835	2.66	3.49	87.53	6.69	14.60	≤ 20.00
11ac-VHT40	MCS0	175	5875	2.77	3.87	87.53	6.95	14.86	≤ 20.00
11ac-VHT80	MCS0	171	5855	-0.06	0.77	87.25	3.98	11.89	≤ 20.00
11ax-HE20	MCS0	169	5845	6.20	6.63	93.98	9.70	17.61	≤ 20.00
11ax-HE20	MCS0	173	5865	5.96	6.85	93.98	9.71	17.62	≤ 20.00
11ax-HE20	MCS0	177	5885	5.48	6.92	93.98	9.54	17.45	≤ 20.00
11ax-HE40	MCS0	167	5835	2.81	3.50	94.50	6.43	14.34	≤ 20.00
11ax-HE40	MCS0	175	5875	1.43	3.89	94.50	6.09	14.00	≤ 20.00
11ax-HE80	MCS0	171	5855	0.05	0.98	93.28	3.85	11.76	≤ 20.00

Note1: When EUT duty cycle < 98%, the total PSD (dBm/MHz) =10*log {$10^{(\text{Ant 0 AVGPSD}/10)}$ + $10^{(\text{Ant 1 AVGPSD}/10)}$} +10*log (1/Duty cycle).

Note 2: EIRP PSD (dBm/MHz) = Total PSD (dBm/MHz) + Antenna Gain (dBi).

Note 3: For Channels span the 5.725-5.850 GHz and 5.850-5.895 GHz bands, we record the maximum level of 5.725-5.850 GHz and 5.850-5.895 GHz with RBW=1MHz, and the level complied with the 5.850-5.895 GHz EIRP PSD Limit.

802.11a Power Spectral Density- Ant 0	
Channel 169 (5845MHz)	Channel 173 (5865MHz)
	
Channel 177 (5885MHz)