FCC Test Report

Test report
On Behalf of
Aviron Interactive.
For
Aviron 21.5 inch Touch Screen
Model No.: ATS4, BTS4

FCC ID: 2ASJ3-ATS4

Prepared For :	**Aviron Interactive.** **265 Bartley Drive. North York, M4A2N7 Canada**
Prepared By :	**Shenzhen HUAK Testing Technology Co., Ltd.** **1-2/F., Building B2, Junfeng Zhongcheng Zhizao Innovation Park, Heping, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China**
Date of Test:	**Jan. 18, 2024 ~ Feb. 01, 2024**
Date of Test:	**Aug. 01, 2024 ~ Aug. 08, 2024**
Date of Report:	**Aug. 08, 2024**
Report Number:	**HK2408014304-4E**

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Test Result Certification

Applicant's name ..... :	Aviron Interactive.
Address ..... :	265 Bartley Drive. North York, M4A2N7 Canada
Manufacturer's Name ..... :	Aviron Interactive.
Address ..... :	265 Bartley Drive. North York, M4A2N7 Canada

Product description

Trade Mark:	N/A
Product name..... :	Aviron 21.5 inch Touch Screen
Model and/or type reference .:	ATS4, BTS4
Standards ..... :	FCC Rules and Regulations Part 15 Subpart E Section 15.407 ANSI C63.10: 2013

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Date of Test ..... :	
Date (s) of performance of tests ..... :	Jan. 18, 2024 ~ Feb. 01, 2024
Date (s) of performance of tests ..... :	Aug. 01, 2024 ~ Aug. 08, 2024
Date of Issue..... :	Aug. 08, 2024
Test Result..... :	**Pass**

Testing Engineer : Len Liao

(Len Liao)

Technical Manager : Sliver Wan

(Sliver Wan)

Authorized Signatory : Jason Zhou

(Jason Zhou)

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** Modified History **

Revision	Description	Issued Data	Remark
Revision 1.0	Initial Test Report Release	Feb. 01, 2024	Jason Zhou
Revision 2.0	Add models, radiation and conduction test data, and modify report numbers. Refer to the original report HK2401180403-4E	Aug. 08, 2024	Jason Zhou

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1. Test Result Summary

1.1. Test Procedures and Results

Requirement	CFR 47 Section	Result
Antenna requirement	§15.203	PASS
AC Power Line Conducted Emission	§15.207	PASS
Maximum Conducted Output Power	§15.407(a)	PASS
6dB Emission Bandwidth	§15.407(e)	N/A
26dB Emission Bandwidth& 99% Occupied Bandwidth	§15.407(a)	PASS
Power Spectral Density	§15.407(a)	PASS
Band edge	§15.407(b)/15.209/15.205	PASS
Radiated Emission	§15.407(b)/15.209/15.205	PASS
Frequency Stability	§15.407(g)	PASS

Note:

1. PASS: Test item meets the requirement.

2. Fail: Test item does not meet the requirement.

3. N/A: Test case does not apply to the test object.

4. The test result judgment is decided by the limit of test standard.

1.2. Information of the Test Laboratory

Shenzhen HUAK Testing Technology Co., Ltd.
Add.: 1-2/F., Building B2, Junfeng Zhongcheng Zhizao Innovation Park, Heping, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China

Testing Laboratory Authorization：

A2LA Accreditation Code is 4781.01.
FCC Designation Number is CN1229.
Canada IC CAB identifier is CN0045.
CNAS Registration Number is L9589.

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1.3. Measurement Uncertainty

The reported uncertainty of measurement y ± U, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95 %.

No.	Item	MU
1	Conducted Emission	±0.37dB
2	RF power, conducted	±3.35dB
3	Spurious emissions, conducted	±2.20dB
4	All emissions, radiated(<1G)	±3.90dB
5	All emissions, radiated(>1G)	±4.28dB
6	Temperature	±0.1°C
7	Humidity	±1.0%

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2. EUT Description

2.1. General Description of EUT

Equipment:	Aviron 21.5 inch Touch Screen
Model Name:	ATS4
Serial Model:	BTS4
Model Difference:	All model's the function, software and electric circuit are the same, only with a product model named different. Test sample mode: ATS4.
Trade Mark:	N/A
FCC ID:	2ASJ3-ATS4
Operation Frequency:	IEEE 802.11a/n/ac (HT20) 5.180GHz-5.240GHz IEEE 802.11n/ac (HT40) 5.190GHz-5.230GHz IEEE 802.11ac (HT80) 5.210GHz
Modulation Technology:	IEEE 802.11a/n/ac
Modulation Type:	OFDM, OFDMA
Antenna Type:	Internal Antenna
Antenna Gain:	Antenna 1:3dBi Antenna 2:3dBi MIMO: 6.01dBi
Power Source:	DC 12V From Adapter 1 DC 24V From Adapter 2
Power Supply:	DC 12V From Adapter 1 DC 24V From Adapter 2
Hardware Version	V1.6
Software Version:	V1.6

Note:
1.The EUT incorporates a MIMO function. Physically, it provides two completed transmitters a nd receivers(2T2R), two transmit signals are completely correlated, then, Direction gain= GANT + Array Gain(Array Gain=10 log(2) dB for power spectral density; Array Gain=0 for power measurement)
2. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.
3. Antenna gain Refer to the antenna specifications.
4. The cable loss data is obtained from the supplier.
5. The test results in the report only apply to the tested sample.

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2.2. Operation Frequency Each of Channel

802.11a/802.11n(HT20) 802.11ac(HT20)		802.11n(HT40)/ 802.11ac(HT40)		802.11ac(HT80)	
Channel	Frequency	Channel	Frequency	Channel	Frequency
36	5180	38	5190	42	5210
40	5200	46	5230		
44	5220				
48	5240				

Note:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

2.3. Operation of EUT During Testing

For 802.11a/n (HT20)/ac(HT20)

Band I (5150 - 5250 MHz)		
Channel Number	Channel	Frequency (MHz)
36	Low	5180
40	Mid	5200
48	High	5240

For 802.11n (HT40)/ ac(HT40)

Band I (5150 - 5250 MHz)		
Channel Number	Channel	Frequency (MHz)
38	Low	5190
46	High	5230

For 802.11ac(HT80)

Band I (5150 - 5250 MHz)	
Channel Number	Frequency (MHz)
42	5210

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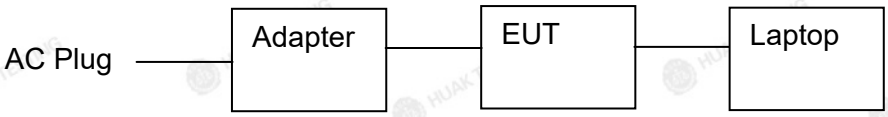
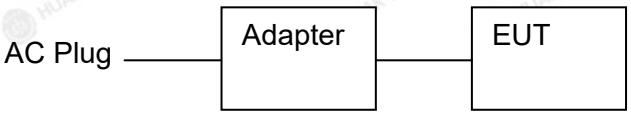
2.4. Description of Test Setup

Operation of EUT during conducted testing and below 1GHz radiation testing:



Operation of EUT during above1GHz radiation testing:



The sample was placed (0.8m below 1GHz, 1.5m above 1GHz) above the ground plane of 3m chamber. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, rotating the turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarizations. The emissions worst-case are shown in Test Results of the following pages. The worst case is X position.

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2.5. Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Trade Mark	Model/Type No.	Specification	Remark
1	Aviron 21.5 inch Touch Screen	N/A	ATS4	N/A	EUT
2	Power Line	N/A	N/A	Length:1.85m	Accessory
3	Adapter 1	N/A	SYS1546-3612-T3	Input: 100-240V, 50/60Hz, 1.5A Output: 12V, 3A	Accessory
4	Data Cable	N/A	N/A	Length:1.0m	Peripheral
5	Laptop	Lenovo	TP00096A	Input: DC 20V, 2.25A/3.25A	Peripheral
6	Adapter 2	N/A	SOY-2400630-454	Input: 100-240V, 50/60Hz, 2.5A Max Output: 24V, 6.3A 151.2W	Accessory

Note:
1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.
3. For conducted measurements (Output Power, 26db Bandwidth and 99% Occupied Bandwidth, Power Spectral Density, Spurious Emissions), the antenna of EUT is connected to the test equipment via temporary antenna connector, the antenna connector is soldered on the antenna port of EUT, and the temporary antenna connector is listed in the Test Instruments.

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3. Genera Information

3.1. Test Environment and Mode

Operating Environment:	
Temperature:	25.0 °C
Humidity:	56 % RH
Atmospheric Pressure:	1010 mbar
Test Mode:	
Engineering mode:	Keep the EUT in continuous transmitting by select channel and modulations
The sample was placed 0.8m/1.5m for blow/above 1GHz above the ground plane of 3m chamber. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, rotating the turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarizations. The emissions worst-case are shown in Test Results of the following pages.	

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We have verified the construction and function in typical operation. All the test modes were carried out with the EUT in transmitting operation, which was shown in this test report and defined as follows:

Per-scan all kind of data rate in lowest channel, and found the follow list which it was worst case.

Mode	Data rate
802.11a	6 Mbps
802.11n(HT20)	MCS0
802.11n(HT40)	MCS0
802.11ac(HT20)/ac(HT40)/ac(HT80)	MCS0

Final Test Mode:

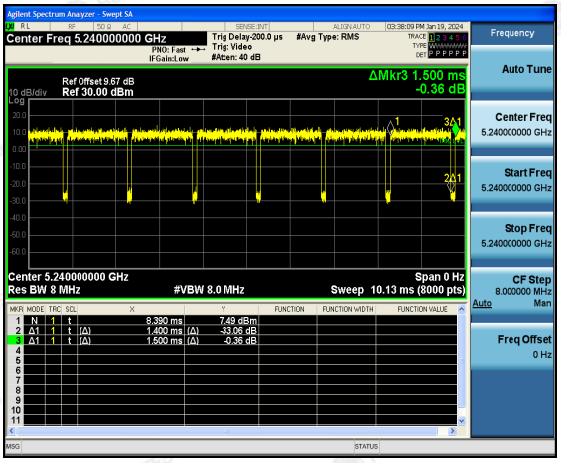
Operation mode:	Keep the EUT in continuous transmitting with modulation

Mode Test Duty Cycle： ANT.1

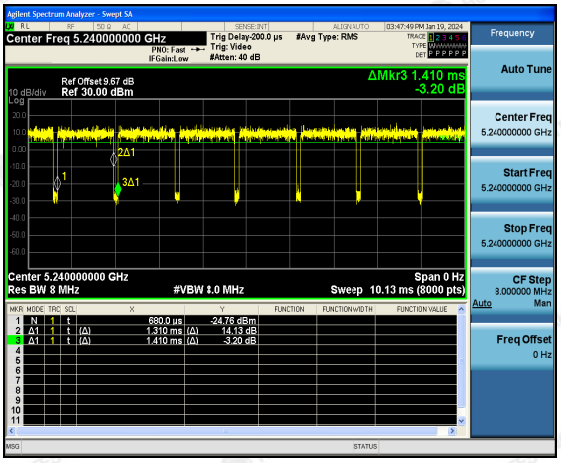
Mode	Duty Cycle	Duty Cycle Factor (dB)
802.11a	0.93	-0.32
802.11n(HT20)	0.93	-0.32
802.11n(HT40)	0.87	-0.60
802.11ac(HT20)	0.93	-0.32
802.11ac(HT40)	0.87	-0.60
802.11ac(HT80)	0.76	-1.19

Test plots as follows:

802.11a



802.11n(HT20)



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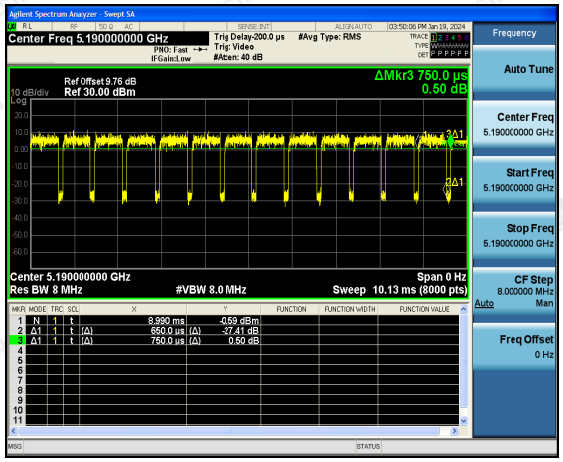
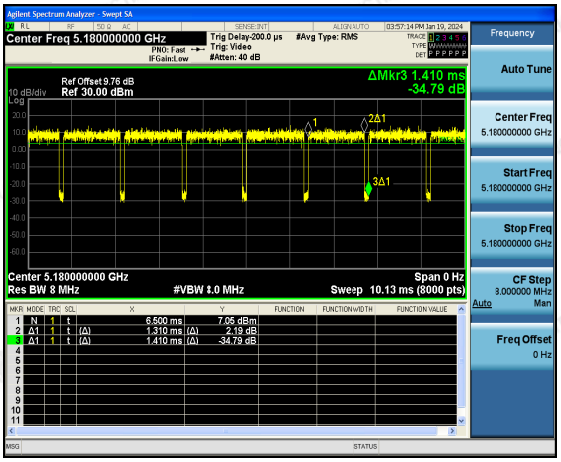
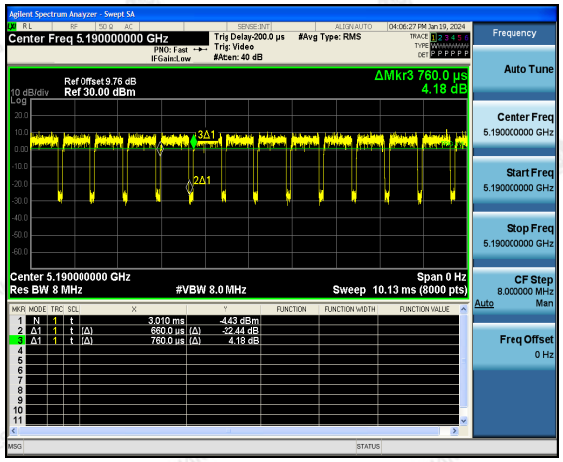
802.11n(HT40)



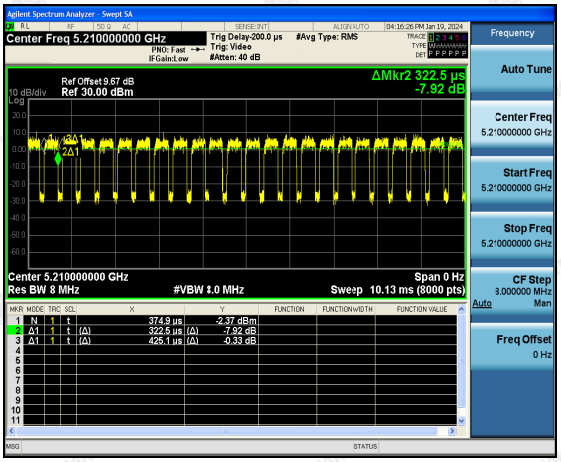
802.11ac(HT20)



802.11ac(HT40)



802.11ac(HT80)



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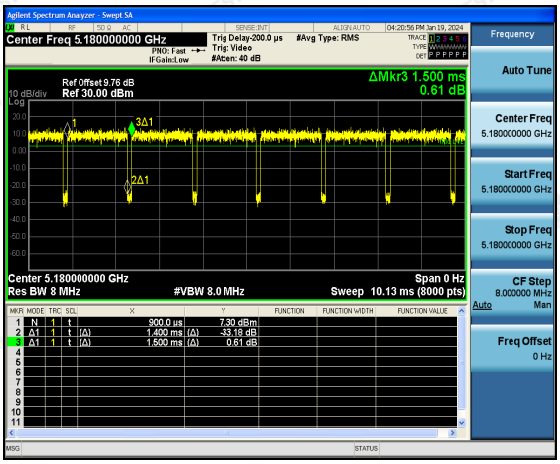
Mode Test Duty Cycle：ANT.2

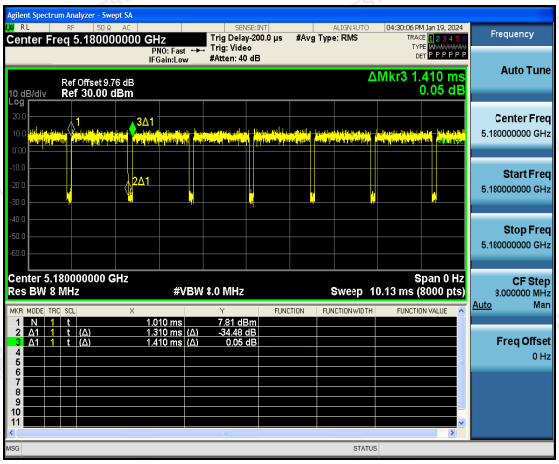
Mode	Duty Cycle	Duty Cycle Factor (dB)
802.11a	0.93	-0.32
802.11n(HT20)	0.93	-0.32
802.11n(HT40)	0.86	-0.66
802.11ac(HT20)	0.93	-0.32
802.11ac(HT40)	0.87	-0.60
802.11ac(HT80)	0.75	-1.25

Test plots as follows:

802.11a



802.11n(HT20)



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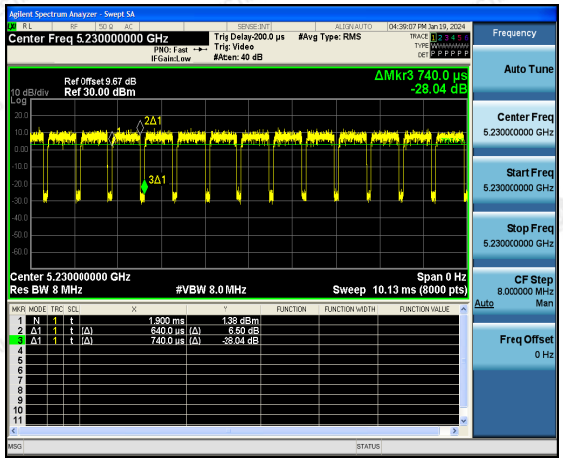
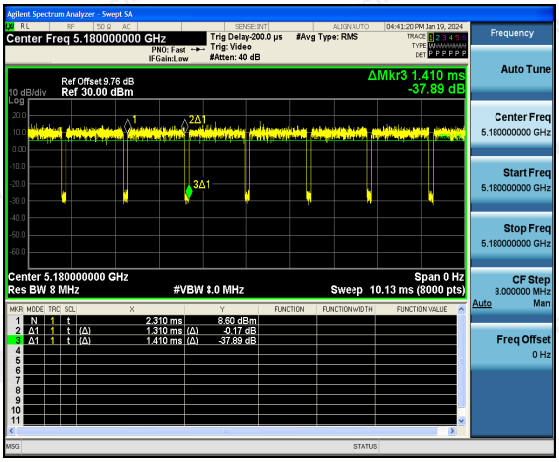
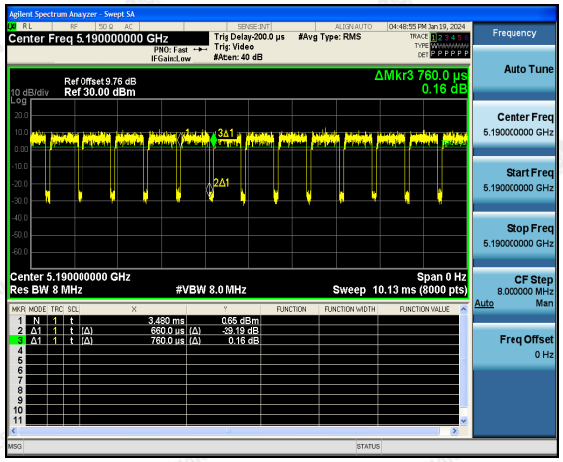
802.11n(HT40)



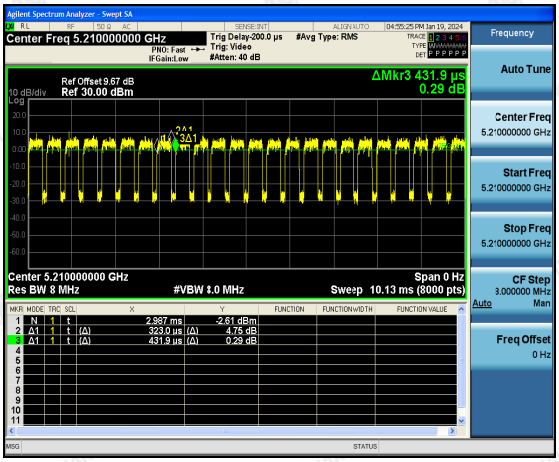
802.11ac(HT20)



802.11ac(HT40)



802.11ac(HT80)



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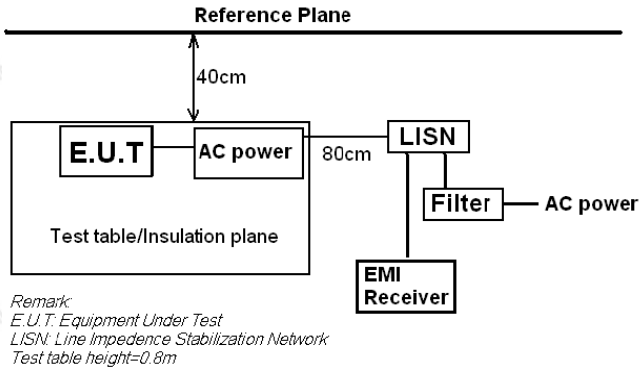
4. Test Results and Measurement Data

4.1. Conducted Emission

4.1.1. Test Specification

Test Requirement:	FCC Part15 C Section 15.207
Test Method:	ANSI C63.10:2013
Frequency Range:	150 kHz to 30 MHz
Receiver setup:	RBW=9 kHz, VBW=30 kHz, Sweep time=auto
Limits:	Frequency range (MHz) / Limit (dBuV): Quasi-peak / Average 0.15-0.5: 66 to 56* / 56 to 46* 0.5-5: 56 / 46 5-30: 60 / 50
Test Setup:	 *Remark:* *E.U.T: Equipment Under Test* *LISN: Line Impedence Stabilization Network* *Test table height=0.8m*
Test Mode:	Tx Mode
Test Procedure:	1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm/50uH coupling impedance for the measuring equipment. 2. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs). 3. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10: 2013 on conducted measurement.
Test Result:	PASS

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4.1.2. Test Instruments

Conducted Emission Shielding Room Test Site (843)					
Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Date**	**Calibration Due**
Receiver	R&S	ESR-7	HKE-005	Feb. 17, 2023	Feb. 16, 2024
LISN	R&S	ENV216	HKE-002	Feb. 17, 2023	Feb. 16, 2024
Coax cable (9KHz-30MHz)	Times	381806-002	N/A	Feb. 17, 2023	Feb. 16, 2024
10dB Attenuator	Schwarzbeck	VTSD9561F	HKE-153	Feb. 17, 2023	Feb. 16, 2024
Conducted test software	Tonscend	TS+ Rev 2.5.0.0	HKE-081	N/A	N/A

Conducted Emission Shielding Room Test Site (843)					
Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Date**	**Calibration Due**
Receiver	R&S	ESR	HKE-005	Feb. 20, 2024	Feb. 19, 2025
LISN	R&S	ENV216	HKE-002	Feb. 20, 2024	Feb. 19, 2025
LISN	R&S	ENV216	HKE-059	Feb. 20, 2024	Feb. 19, 2025
Coax cable (9KHz-30MHz)	Times	381806-002	N/A	Feb. 20, 2024	Feb. 19, 2025
EMI Test Software	Tonscend	JS32-CE 2.5.0.6	HKE-081	N/A	N/A
10dB Attenuator	Schwarzbeck	VTSD9561F	HKE-153	Feb. 20, 2024	Feb. 19, 2025

Note: *The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).*

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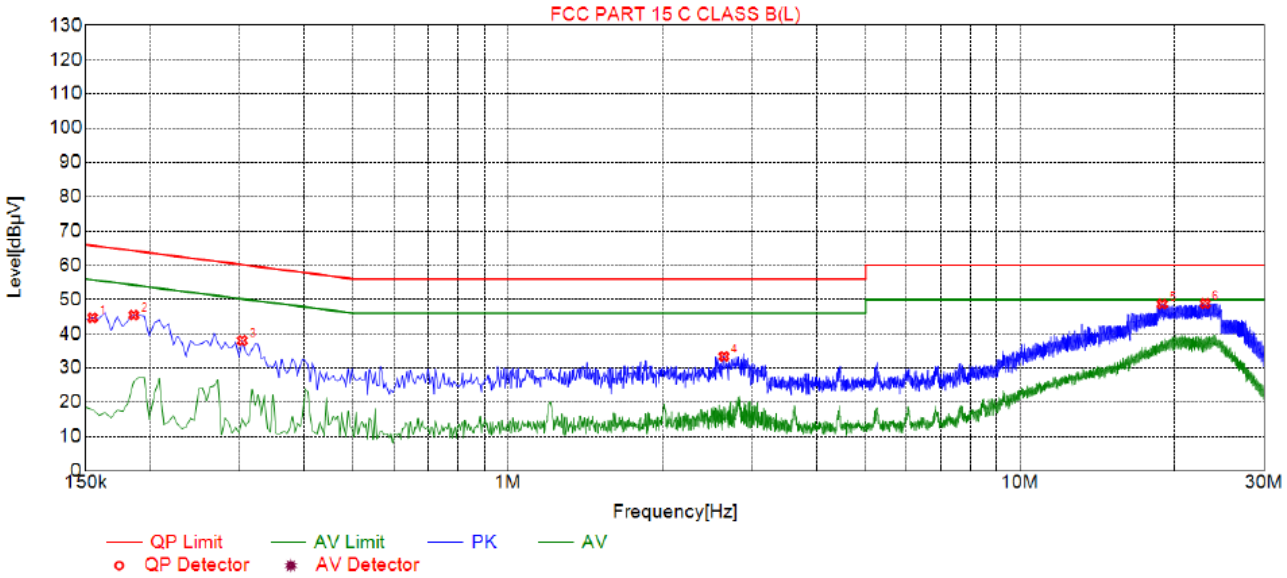
4.1.3. Test data

Test Specification: Line



Suspected List								
NO.	Freq. [MHz]	Level [dBµV]	Factor [dB]	Limit [dBµV]	Margin [dB]	Reading [dBµV]	Detector	Type
1	0.1545	44.67	20.03	65.75	21.08	24.64	PK	L
2	0.1860	45.44	20.05	64.21	18.77	25.39	PK	L
3	0.3030	38.00	20.04	60.16	22.16	17.96	PK	L
4	2.6430	33.39	20.21	56.00	22.61	13.18	PK	L
5	18.9555	48.66	20.06	60.00	11.34	28.60	PK	L
6	23.0010	48.82	20.19	60.00	11.18	28.63	PK	L

Remark: Margin = Limit – Level
Correction factor = Cable lose + LISN insertion loss
Level=Test receiver reading + correction factor

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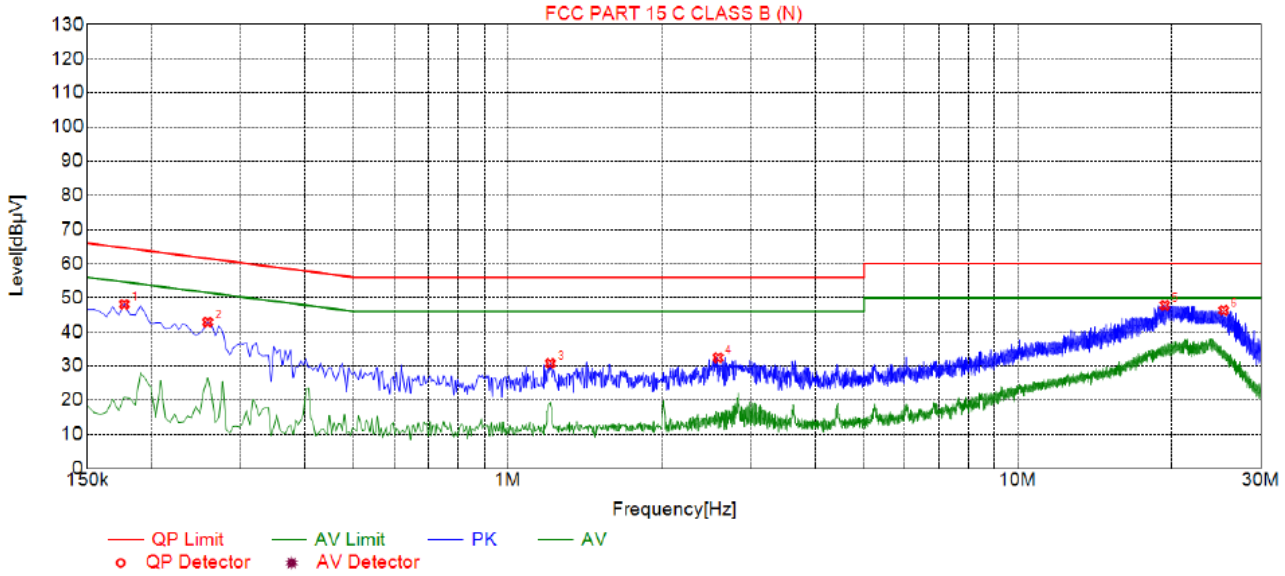
Test Specification: Neutral



Suspected List

NO.	Freq. [MHz]	Level [dBµV]	Factor [dB]	Limit [dBµV]	Margin [dB]	Reading [dBµV]	Detector	Type
1	0.1770	48.10	20.05	64.63	16.53	28.05	PK	N
2	0.2580	42.87	20.04	61.50	18.63	22.83	PK	N
3	1.2120	30.77	20.09	56.00	25.23	10.68	PK	N
4	2.5845	32.47	20.20	56.00	23.53	12.27	PK	N
5	19.4325	47.79	20.08	60.00	12.21	27.71	PK	N
6	25.3455	46.32	20.25	60.00	13.68	26.07	PK	N

Remark: Margin = Limit – Level
Correction factor = Cable lose + LISN insertion loss
Level=Test receiver reading + correction factor

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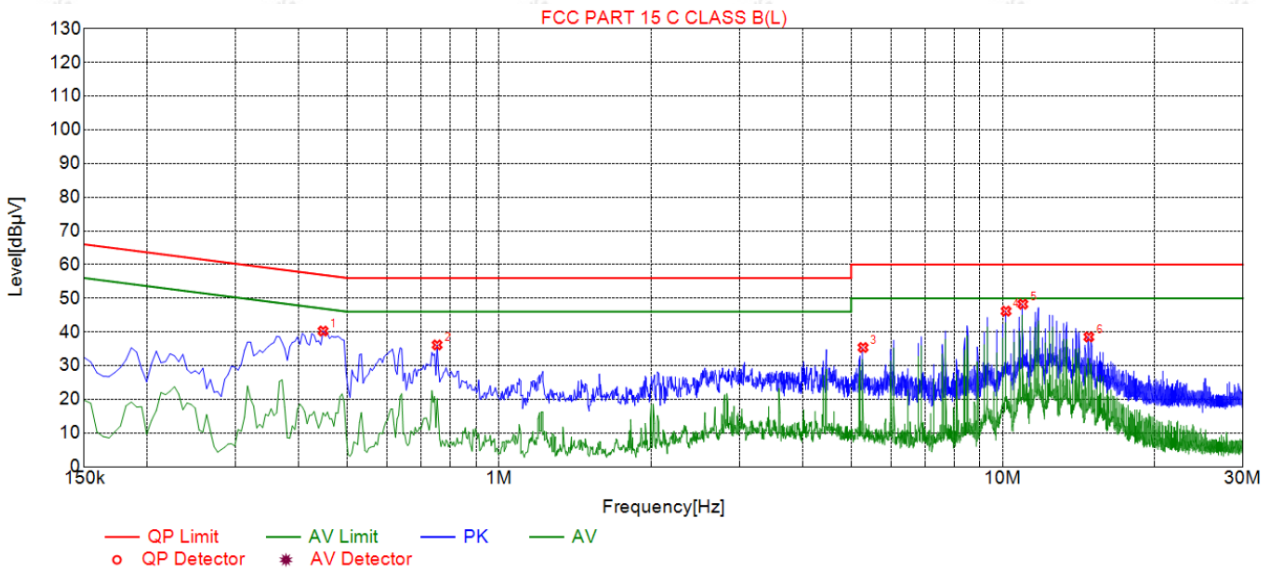
Add adapter 2:

Test Specification: Line



Suspected List								
NO.	Freq. [MHz]	Level [dBµV]	Factor [dB]	Limit [dBµV]	Margin [dB]	Reading [dBµV]	Detector	Type
1	0.4470	40.27	19.85	56.93	16.66	20.42	PK	L
2	0.7530	36.15	19.86	56.00	19.85	16.29	PK	L
3	5.2800	35.38	20.11	60.00	24.62	15.27	PK	L
4	10.1535	46.19	19.95	60.00	13.81	26.24	PK	L
5	10.9635	48.26	19.91	60.00	11.74	28.35	PK	L
6	14.8245	38.53	19.81	60.00	21.47	18.72	PK	L

Remark: Margin = Limit – Level
Correction factor = Cable lose + LISN insertion loss
Level=Test receiver reading + correction factor

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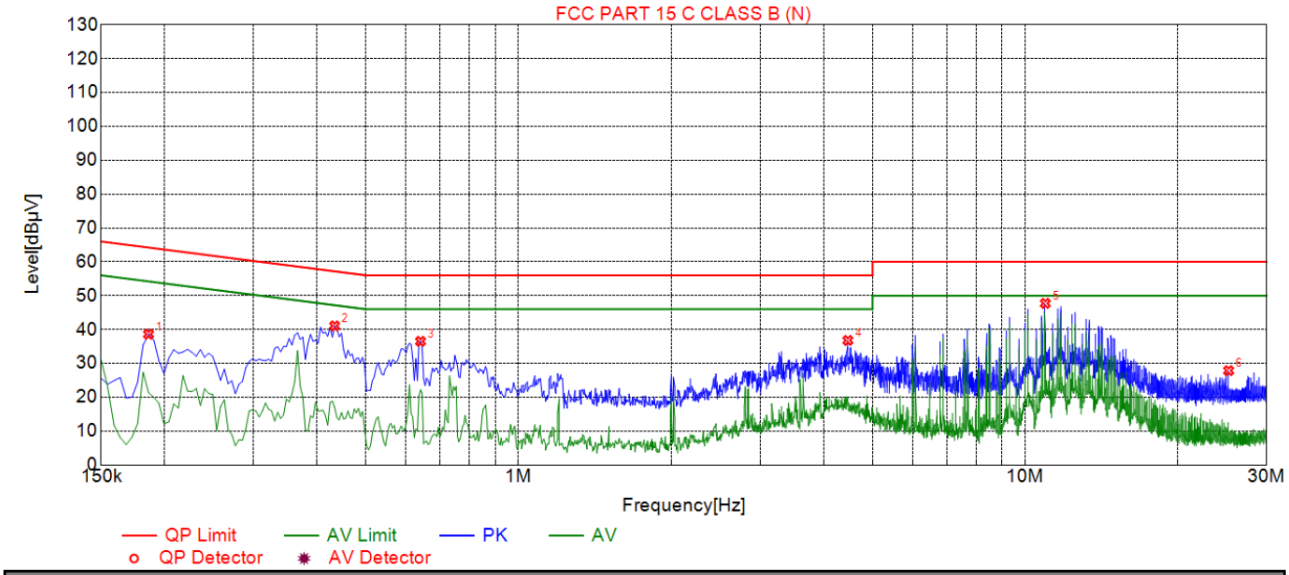
Test Specification: Neutral



Suspected List

NO.	Freq. [MHz]	Level [dBµV]	Factor [dB]	Limit [dBµV]	Margin [dB]	Reading [dBµV]	Detector	Type
1	0.1860	38.62	19.74	64.21	25.59	18.88	PK	N
2	0.4335	41.07	19.74	57.19	16.12	21.33	PK	N
3	0.6405	36.52	19.74	56.00	19.48	16.78	PK	N
4	4.4700	36.79	19.98	56.00	19.21	16.81	PK	N
5	10.9680	47.73	19.83	60.00	12.27	27.90	PK	N
6	25.2375	27.85	20.25	60.00	32.15	7.60	PK	N

Remark: Margin = Limit – Level
Correction factor = Cable lose + LISN insertion loss
Level=Test receiver reading + correction factor

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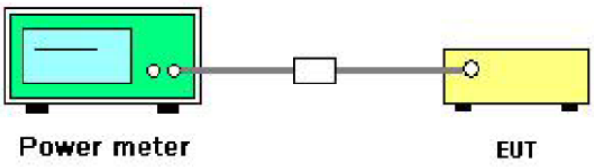
4.2. Output Power

4.2.1. Test Specification

<table>
<tr><td>Test Requirement:</td><td>FCC Part15 E Section 15.407(a)</td></tr>
<tr><td>Test Method:</td><td>KDB789033 D02 General UNII Test Procedures New Rules v02.r01 Section E</td></tr>
<tr><td>Limit:</td><td><table><tr><td>Frequency Band (MHz)</td><td>Limit</td></tr><tr><td>5150-5250</td><td>250mW for client devices</td></tr></table></td></tr>
<tr><td>Test Setup:</td><td> 
</td></tr>
<tr><td>Test Mode:</td><td>Transmitting mode with modulation</td></tr>
<tr><td>Test Procedure:</td><td>Conducted Power Measurement:
1. The testing follows the Measurement Procedure of KDB789033 D02 General UNII Test Procedures New Rules v02r01 Section E, 3, a.
2. The RF output of EUT was connected to the power meter by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Measure the conducted output power and record the results in the test report.</td></tr>
<tr><td>Test Result:</td><td>PASS</td></tr>
<tr><td>Remark:</td><td>Conducted output power= measurement power +10log(1/x) X is duty cycle=1, so 10log(1/1)=0
Conducted output power= measurement power</td></tr>
</table>

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4.2.2. Test Instruments

RF Test Room					
Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Date**	**Calibration Due**
Spectrum analyzer	Agilent	N9020A	HKE-048	Feb. 17, 2023	Feb. 16, 2024
Power meter	Agilent	E4419B	HKE-085	Feb. 17, 2023	Feb. 16, 2024
Power Sensor	Agilent	E9300A	HKE-086	Feb. 17, 2023	Feb. 16, 2024
RF cable	Times	1-40G	HKE-034	Feb. 17, 2023	Feb. 16, 2024
RF automatic control unit	Tonscend	JS0806-2	HKE-060	Feb. 17, 2023	Feb. 16, 2024

Note: *The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).*

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4.2.3. Test Data

Configuration Band I (5150 - 5250 MHz)						
Mode	Test channel	Maximum Conducted Output Power (dBm)			FCC Limit (dBm)	Result
		Antenna port 1	Antenna port 2	MIMO		
802.11a	CH36	6.13	8.32		24	PASS
802.11a	CH40	6.49	6.34		24	PASS
802.11a	CH48	7.20	6.09		24	PASS
802.11n(HT20)	CH36	7.13	5.89	9.56	24	PASS
802.11n(HT20)	CH40	5.96	5.92	8.95	24	PASS
802.11n(HT20)	CH48	6.97	5.77	9.42	24	PASS
802.11n(HT40)	CH38	5.77	6.32	9.06	24	PASS
802.11n(HT40)	CH46	5.82	7.57	9.79	24	PASS
802.11ac(HT20)	CH36	5.93	7.04	9.53	24	PASS
802.11ac(HT20)	CH40	5.87	5.88	8.89	24	PASS
802.11ac(HT20)	CH48	5.89	5.79	8.85	24	PASS
802.11ac(HT40)	CH38	5.81	6.90	9.40	24	PASS
802.11ac(HT40)	CH46	6.38	6.57	9.49	24	PASS
802.11ac(HT80)	CH42	4.98	6.02	8.54	24	PASS

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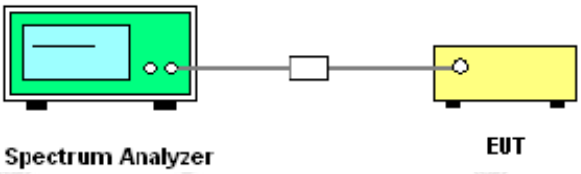
4.3. 6db Emission Bandwidth

4.3.1. Test Specification

Test Requirement:	FCC CFR47 Part 15 Section 15.407(e)
Test Method:	KDB789033 D02 General UNII Test Procedures New Rules v02r01 Section C
Limit:	>500kHz
Test Setup:	
Test Mode:	Transmitting mode with modulation
Test Procedure:	1. KDB789033 D02 General UNII Test Procedures New Rules v02r01 Section C. 2. Set to the maximum power setting and enable the EUT transmit continuously. 3. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 100 kHz. Set the Video bandwidth (VBW) = 300 kHz. In order to make an accurate measurement. The 6dB bandwidth must be greater than 500 kHz. 4. Measure and record the results in the test report.
Test Result:	PASS

4.3.2. Test Instruments

	RF Test Room				
Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Date**	**Calibration Due**
Spectrum analyzer	Agilent	N9020A	HKE-048	Feb. 17, 2023	Feb. 16, 2024
RF cable	Times	1-40G	HKE-034	Feb. 17, 2023	Feb. 16, 2024
RF automatic control unit	Tonscend	JS0806-2	HKE-060	Feb. 17, 2023	Feb. 16, 2024

Note: *The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).*

4.3.3. Test data

N/A

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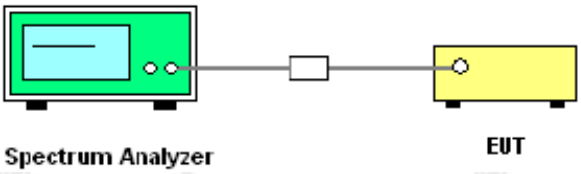
4.4. 26db Bandwidth and 99% Occupied Bandwidth

4.4.1. Test Specification

Test Requirement:	47 CFR Part 15C Section 15.407
Test Method:	KDB789033 D02 General UNII Test Procedures New Rules v02r01 Section C
Limit:	No restriction limits
Test Setup:	
Test Mode:	Transmitting mode with modulation
Test Procedure:	1. KDB789033 D02 General UNII Test Procedures New Rules v02r01 Section C. 2. Set to the maximum power setting and enable the EUT transmit continuously. 3. Make the measurement with the spectrum analyzer's resolution bandwidth RBW = 1% EBW, VBW≥3RBW, In order to make an accurate measurement. 4. Measure and record the results in the test report.
Test Result:	PASS

4.4.2. Test Instruments

RF Test Room					
Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Date**	**Calibration Due**
Spectrum analyzer	Agilent	N9020A	HKE-048	Feb. 17, 2023	Feb. 16, 2024
RF cable	Times	1-40G	HKE-034	Feb. 17, 2023	Feb. 16, 2024
RF automatic control unit	Tonscend	JS0806-2	HKE-060	Feb. 17, 2023	Feb. 16, 2024

Note: *The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).*

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4.4.3. Test data

ANT 1

Mode	Test channel	Frequency (MHz)	26 dB Bandwidth (MHz)	Verdict
802.11a	CH36	5180	20.86	PASS
802.11a	CH40	5200	20.79	PASS
802.11a	CH48	5240	20.86	PASS
802.11n(HT20)	CH36	5180	21.00	PASS
802.11n(HT20)	CH40	5200	21.10	PASS
802.11n(HT20)	CH48	5240	21.10	PASS
802.11n(HT40)	CH38	5190	39.48	PASS
802.11n(HT40)	CH46	5230	39.22	PASS
802.11ac(HT20)	CH36	5180	21.15	PASS
802.11ac(HT20)	CH40	5200	21.38	PASS
802.11ac(HT20)	CH48	5240	21.47	PASS
802.11ac(HT40)	CH38	5190	39.34	PASS
802.11ac(HT40)	CH46	5230	39.33	PASS
802.11ac(HT80)	CH42	5210	81.13	PASS

Test plots as follows:

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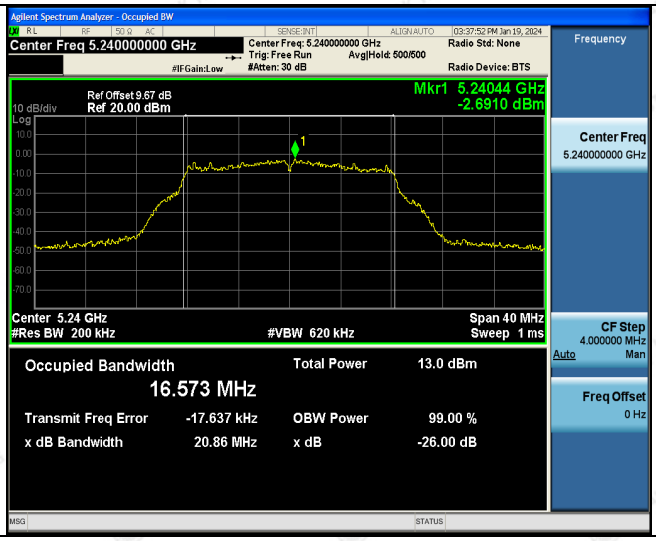
Band I （5150 – 5250 MHz）

802.11a

Low

Mid

High

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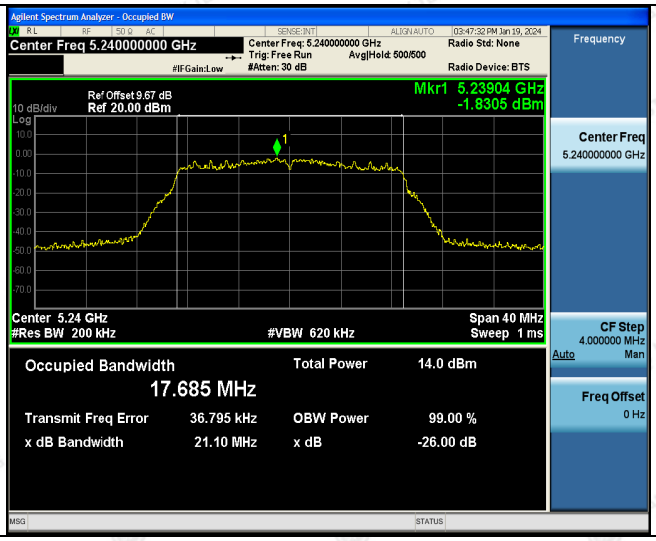
802.11n(HT20)

Low

Mid

High

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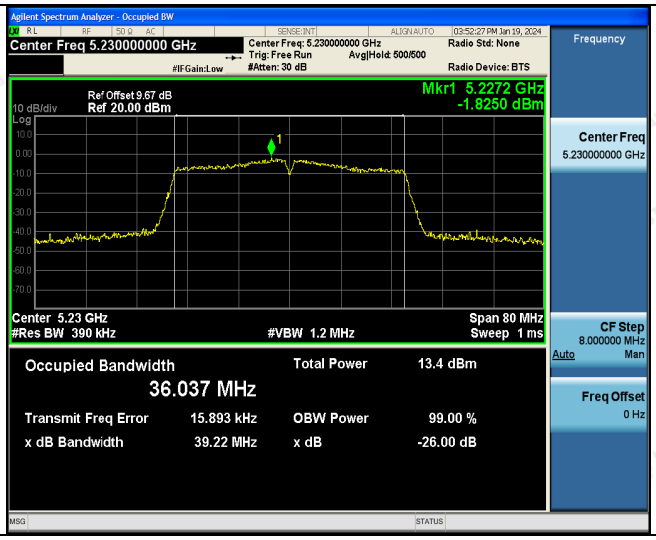
802.11n(HT40)

Low

High

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802.11ac(HT20)

Low

Mid

High

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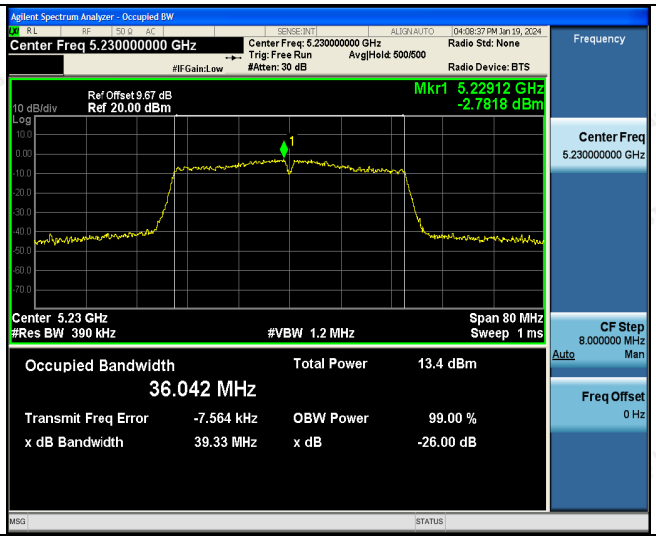
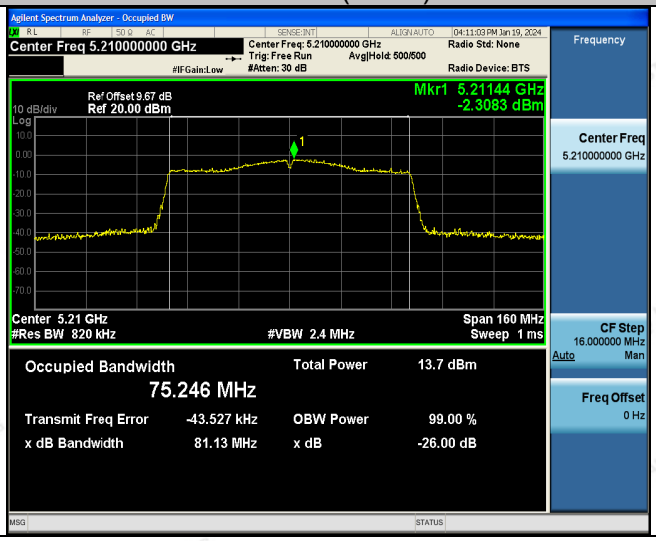
802.11ac(HT40)

Low

High

802.11ac(HT80)


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ANT 2

Mode	Test channel	Frequency (MHz)	26 dB Bandwidth (MHz)	Verdict
802.11a	CH36	5180	21.08	PASS
802.11a	CH40	5200	20.89	PASS
802.11a	CH48	5240	21.07	PASS
802.11n(HT20)	CH36	5180	21.23	PASS
802.11n(HT20)	CH40	5200	21.46	PASS
802.11n(HT20)	CH48	5240	21.29	PASS
802.11n(HT40)	CH38	5190	39.41	PASS
802.11n(HT40)	CH46	5230	39.39	PASS
802.11ac(HT20)	CH36	5180	21.17	PASS
802.11ac(HT20)	CH40	5200	21.22	PASS
802.11ac(HT20)	CH48	5240	21.11	PASS
802.11ac(HT40)	CH38	5190	39.38	PASS
802.11ac(HT40)	CH46	5230	39.46	PASS
802.11ac(HT80)	CH42	5210	80.69	PASS

Test plots as follows:

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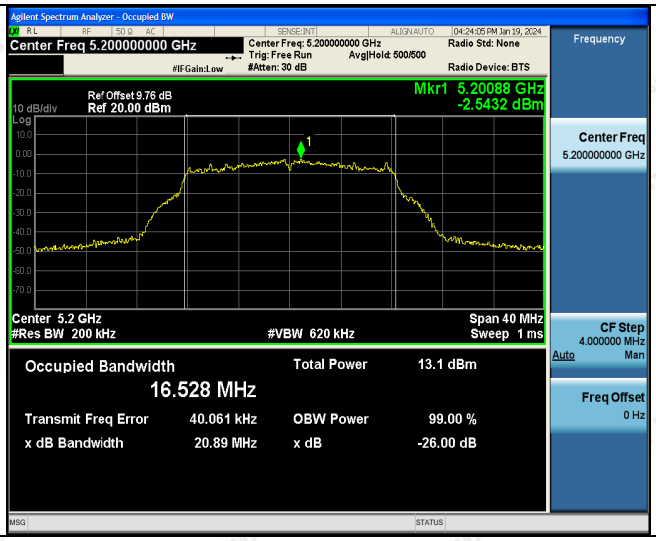
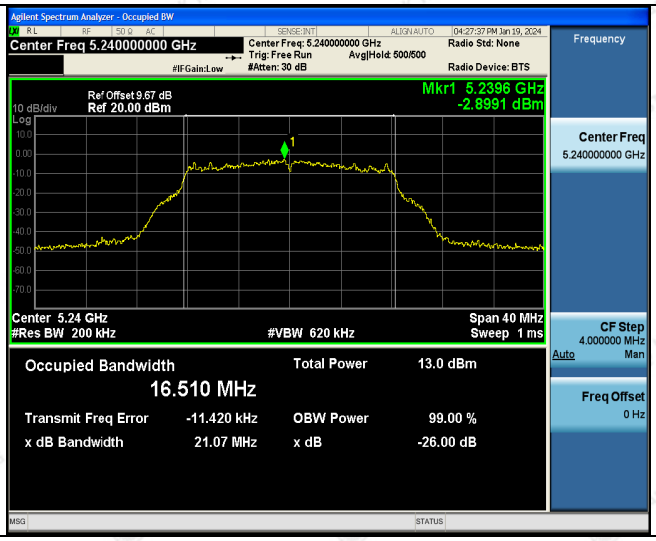
Band I （5150 – 5250 MHz）

802.11a

Low

Mid

High

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802.11n(HT20)

Low

Mid

High

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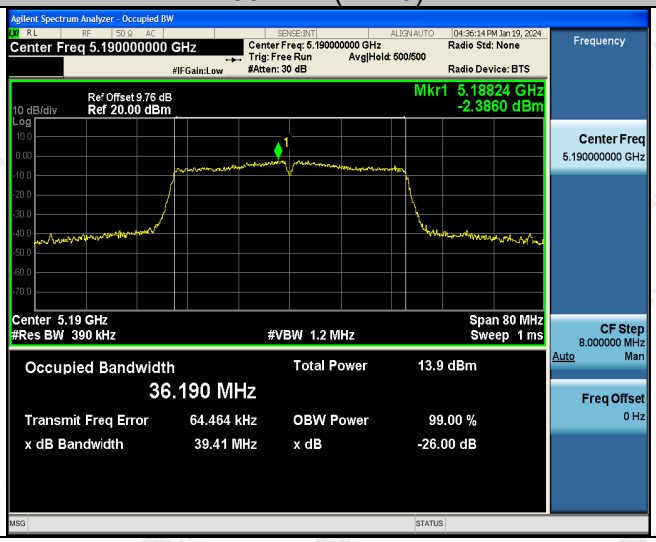
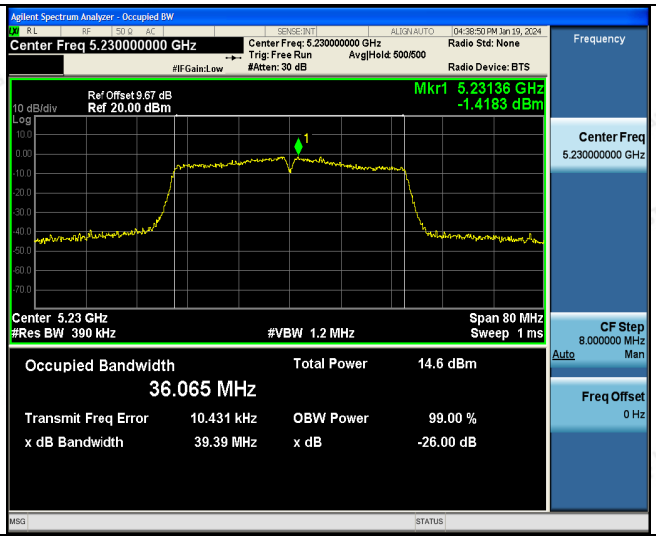
802.11n(HT40)

Low

High

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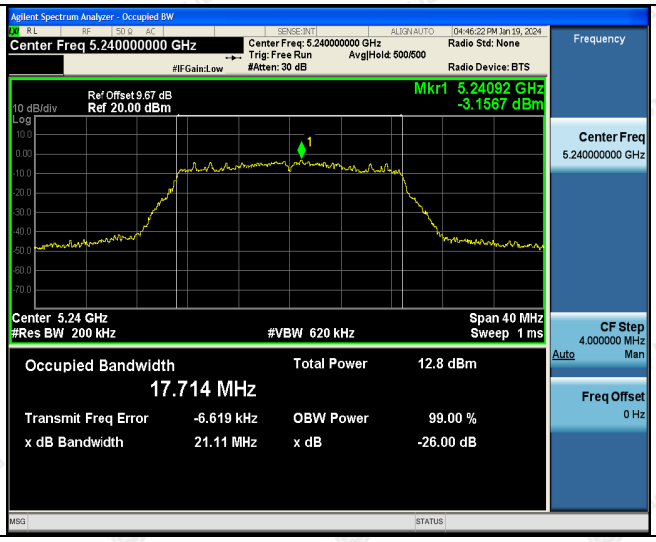
802.11ac(HT20)

Low

Mid

High

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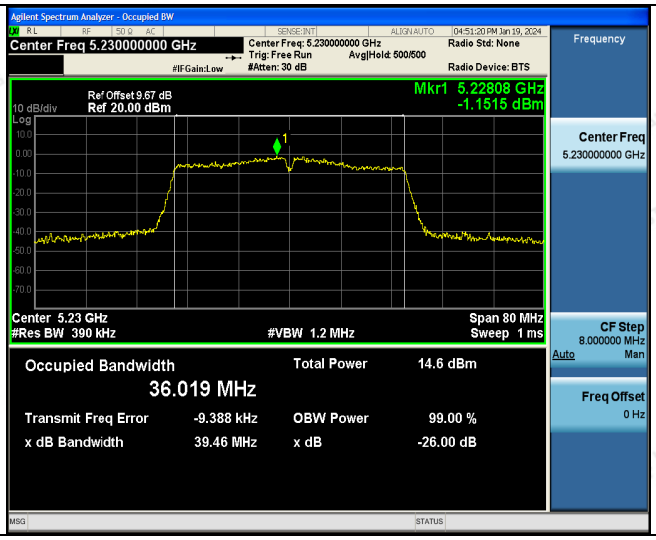
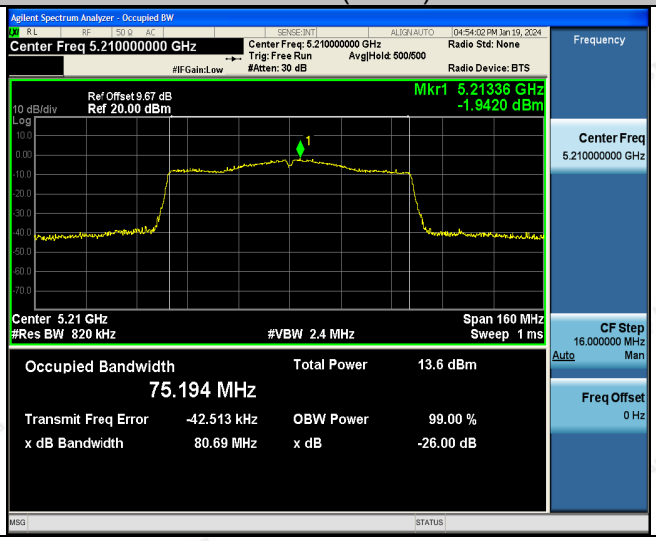
802.11ac(HT40)

Low

High

802.11ac(HT80)


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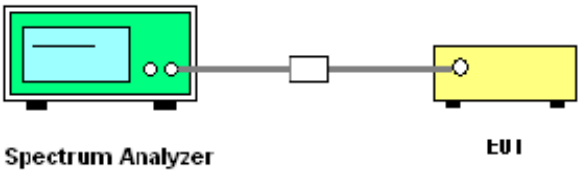
4.5. Power Spectral Density

4.5.1. Test Specification

Test Requirement:	FCC Part15 E Section 15.407 (a)
Test Method:	KDB789033 D02 General UNII Test Procedures New Rules v02r01 Section F
Limit:	≤11.00dBm/MHz for Band I 5150MHz-5250MHz
Test Setup:	
Test Mode:	Transmitting mode with modulation
Test Procedure:	1. Set the spectrum analyzer or EMI receiver span to view the entire emission bandwidth. 2. Set RBW =1 MHz, VBW ≥ 3*RBW, Sweep time = Auto, Detector = RMS. 3. Allow the sweeps to continue until the trace stabilizes. 4. Use the peak marker function to determine the maximum amplitude level. 5. The E.I.R.P spectral density used radiated test method. At a test site that has been validated using the procedures of ANSI C63.4 or the latest CISPR 16-1-4 for measurements above 1 GHz, so as to simulate a near free-space environment.
Test Result:	PASS

4.5.2. Test Instruments

RF Test Room					
Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Date**	**Calibration Due**
Spectrum analyzer	Agilent	N9020A	HKE-048	Feb. 17, 2023	Feb. 16, 2024
RF cable	Times	1-40G	HKE-034	Feb. 17, 2023	Feb. 16, 2024
RF automatic control unit	Tonscend	JS0806-2	HKE-060	Feb. 17, 2023	Feb. 16, 2024

Note: *The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).*

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4.5.3. Test data

ANT 1

Configuration Band I (5150 - 5250 MHz)				
Mode	Test channel	Level [dBm/MHz]	Limit (dBm/MHz)	Result
802.11a	CH36	4.90	11	PASS
802.11a	CH40	4.57	11	PASS
802.11a	CH48	4.20	11	PASS
802.11n(HT20)	CH36	2.79	11	PASS
802.11n(HT20)	CH40	2.41	11	PASS
802.11n(HT20)	CH48	2.27	11	PASS
802.11n(HT40)	CH38	0.57	11	PASS
802.11n(HT40)	CH46	2.14	11	PASS
802.11ac(HT20)	CH36	2.57	11	PASS
802.11ac(HT20)	CH40	2.64	11	PASS
802.11ac(HT20)	CH48	1.99	11	PASS
802.11ac(HT40)	CH38	0.69	11	PASS
802.11ac(HT40)	CH46	1.46	11	PASS
802.11ac(HT80)	CH42	-0.28	11	PASS

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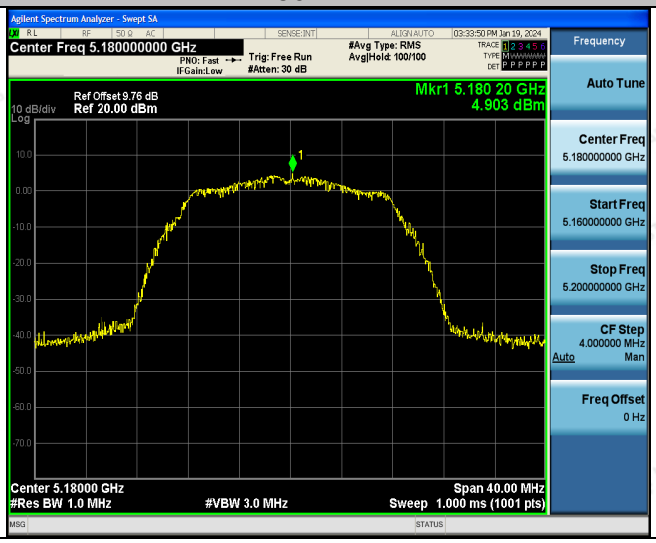
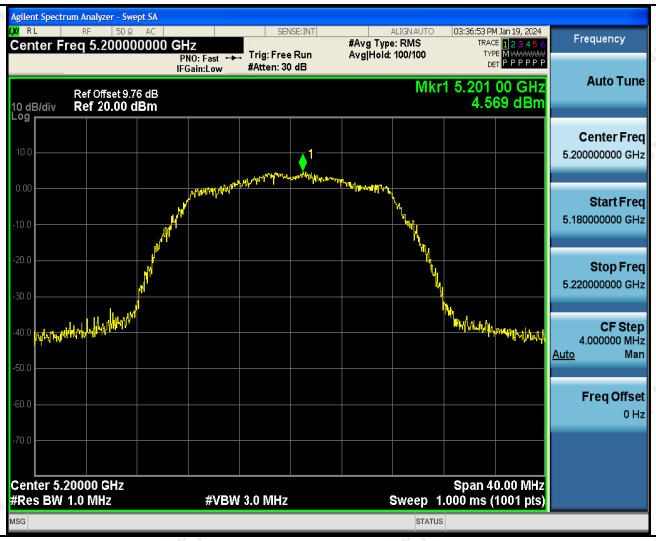
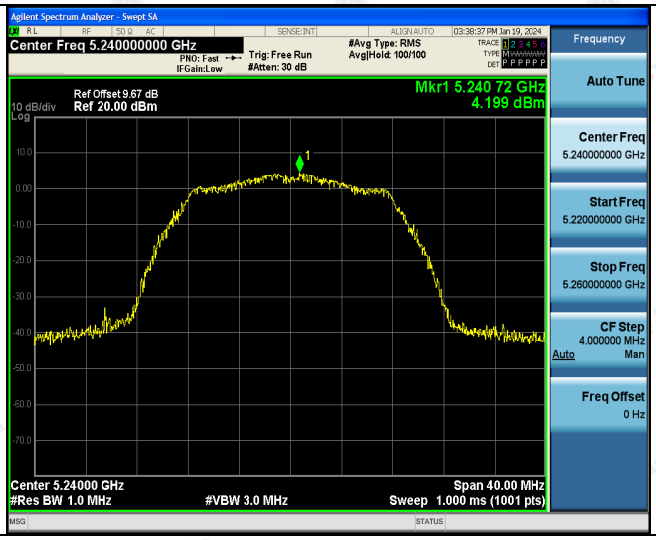
Test plots as follows:

Band I （5150 – 5250 MHz）

802.11a

Low

Mid

High

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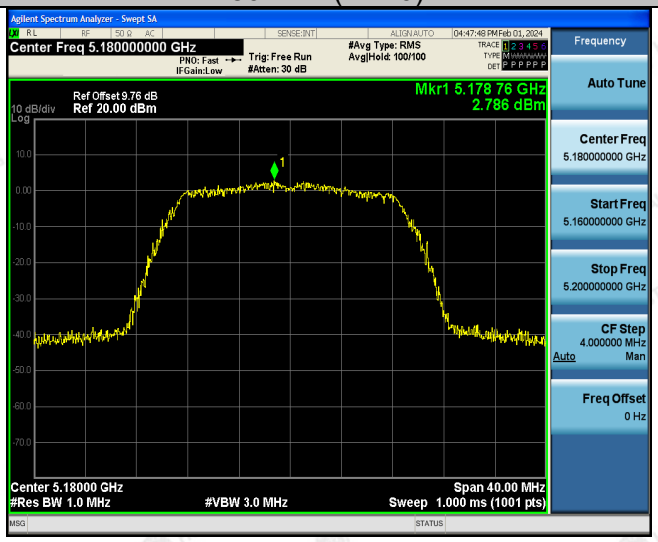
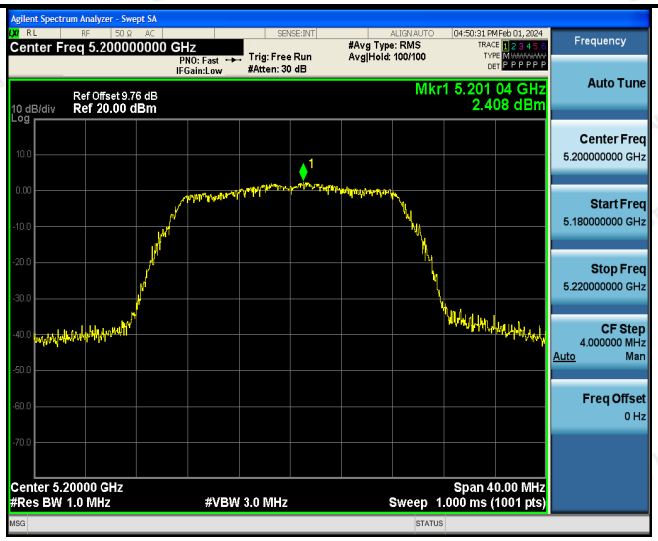
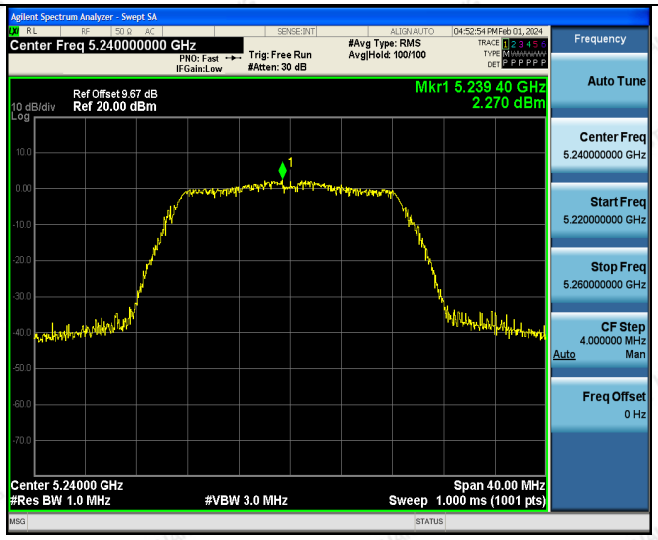
802.11n(HT20)



Low



Mid



High

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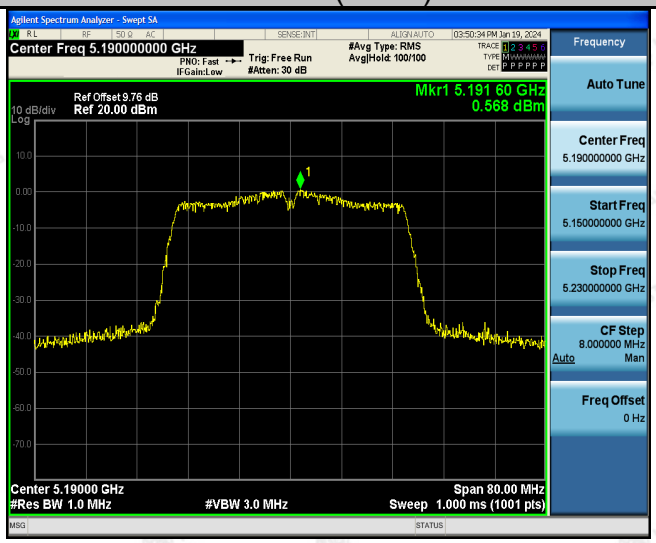
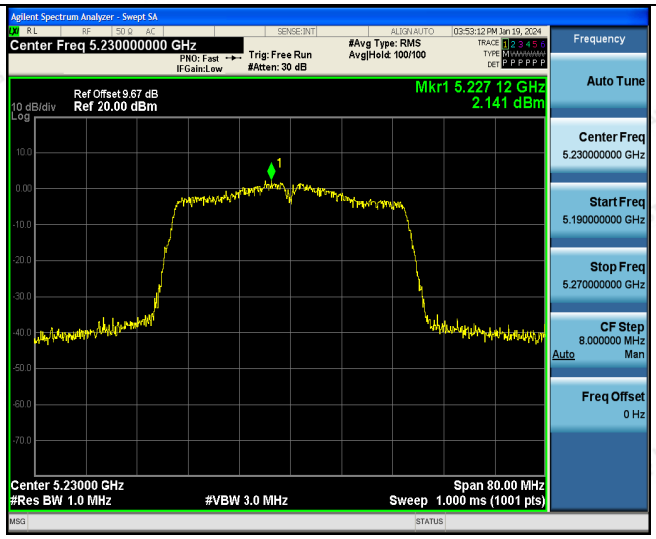
802.11n(HT40)
 Low
 High

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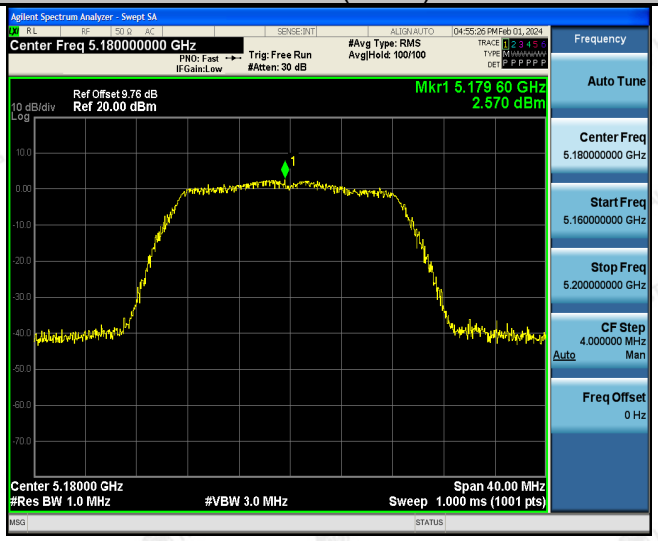
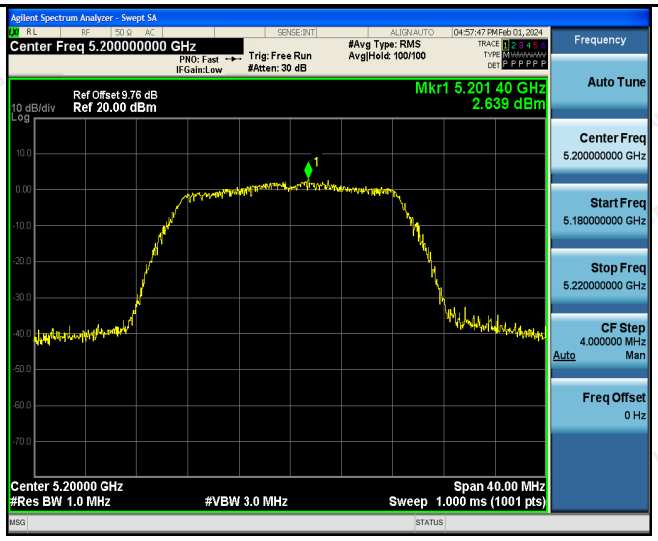
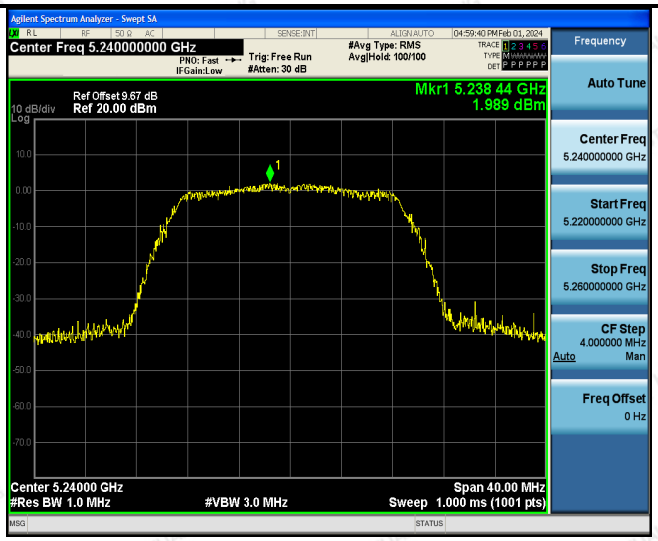
802.11ac(HT20)



Low



Mid



High

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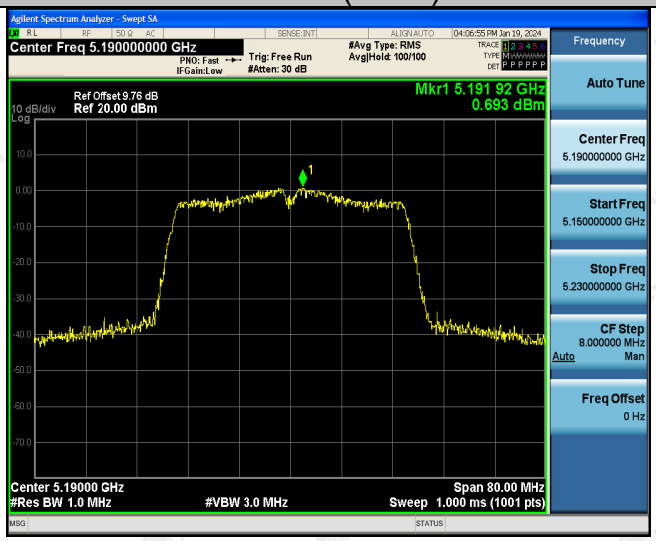
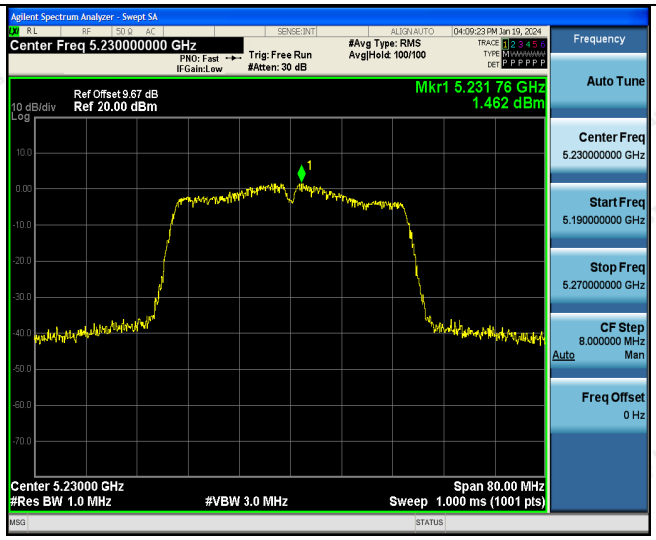
802.11ac(HT40)

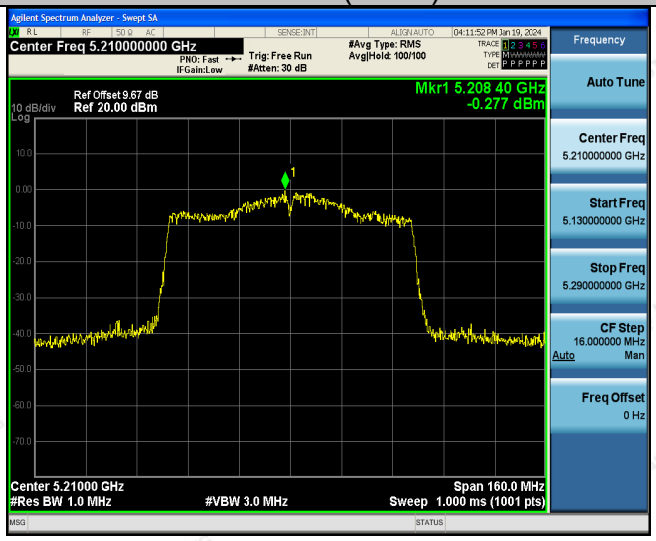


Low



High

802.11ac(HT80)



Low

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ANT 2

Configuration Band I (5150 - 5250 MHz)				
Mode	Test channel	Level [dBm/MHz]	Limit (dBm/MHz)	Result
802.11a	CH36	4.41	11	PASS
802.11a	CH40	4.46	11	PASS
802.11a	CH48	4.18	11	PASS
802.11n(HT20)	CH36	2.42	11	PASS
802.11n(HT20)	CH40	2.43	11	PASS
802.11n(HT20)	CH48	2.32	11	PASS
802.11n(HT40)	CH38	1.86	11	PASS
802.11n(HT40)	CH46	2.85	11	PASS
802.11ac(HT20)	CH36	2.66	11	PASS
802.11ac(HT20)	CH40	1.89	11	PASS
802.11ac(HT20)	CH48	2.13	11	PASS
802.11ac(HT40)	CH38	1.91	11	PASS
802.11ac(HT40)	CH46	3.08	11	PASS
802.11ac(HT80)	CH42	-0.16	11	PASS

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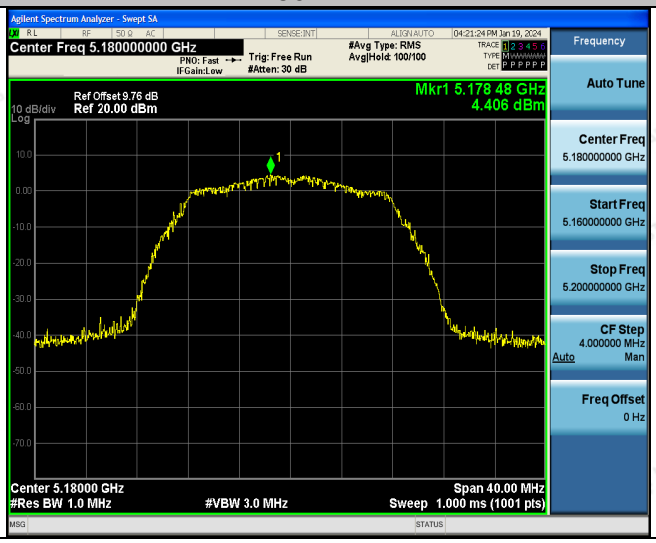
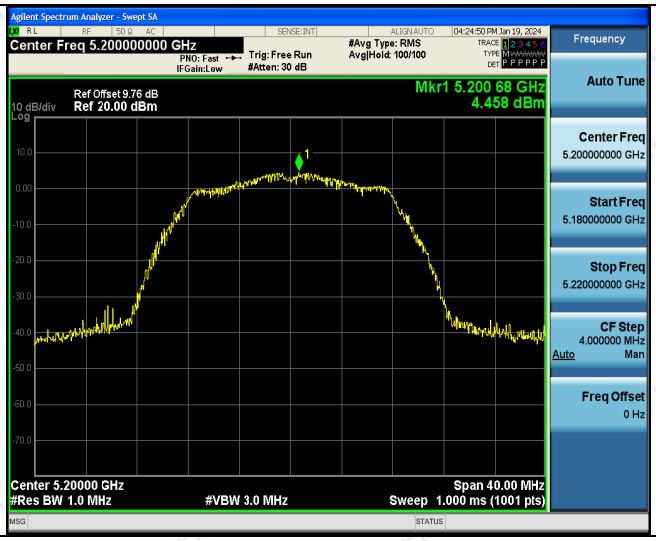
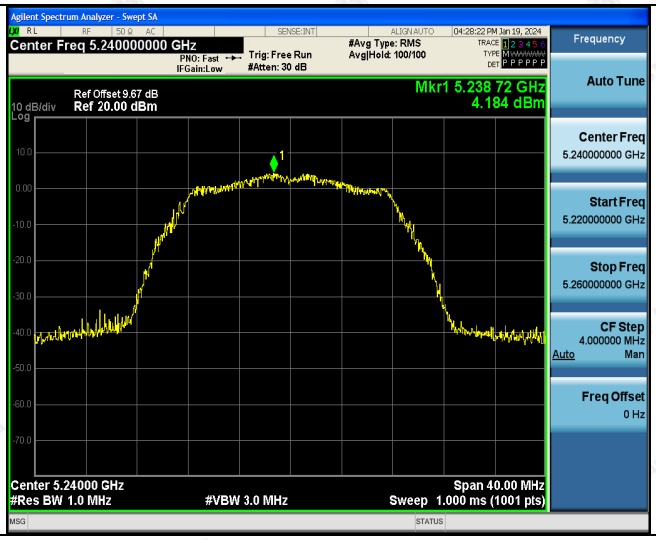
Test plots as follows:

Band I （5150 – 5250 MHz）

802.11a

Low

Mid

High

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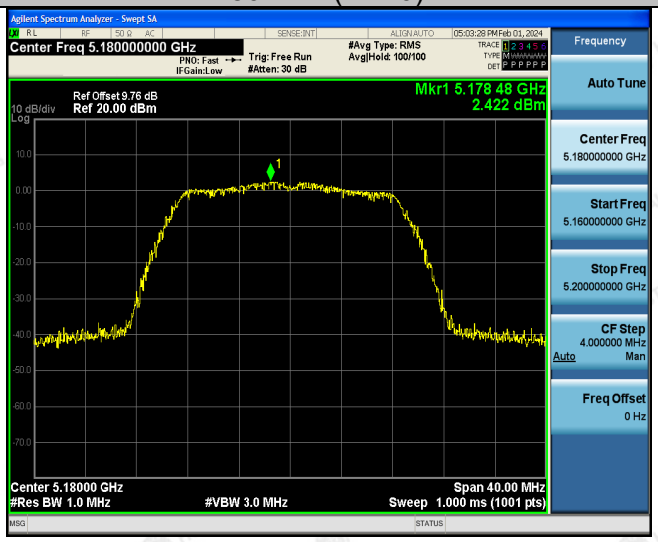
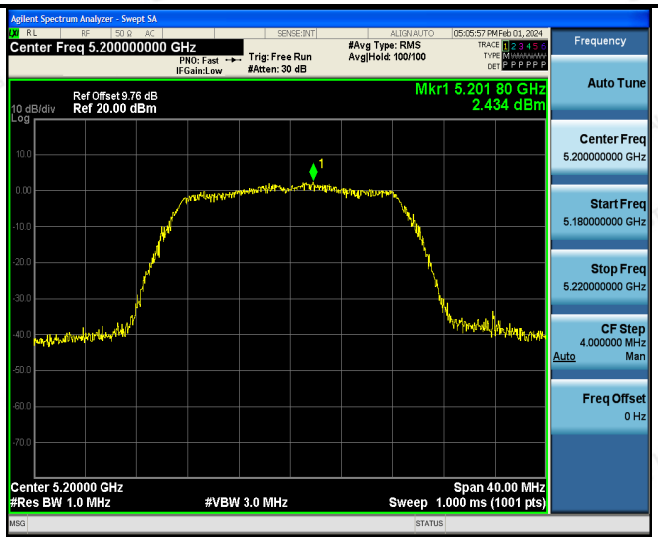
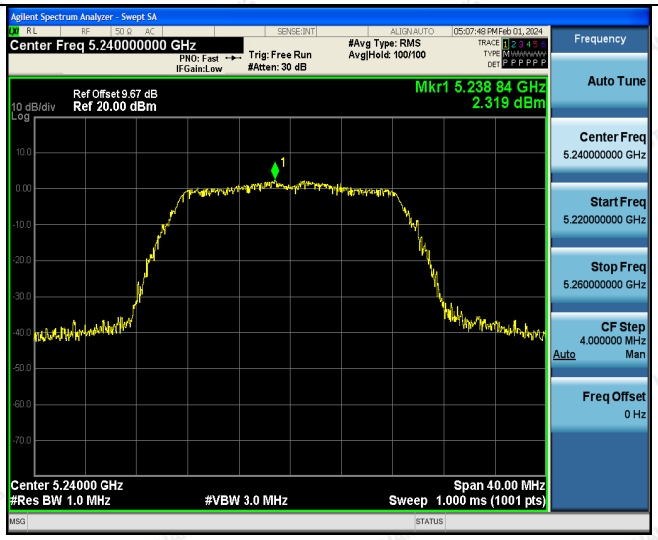
802.11n(HT20)



Low



Mid



High

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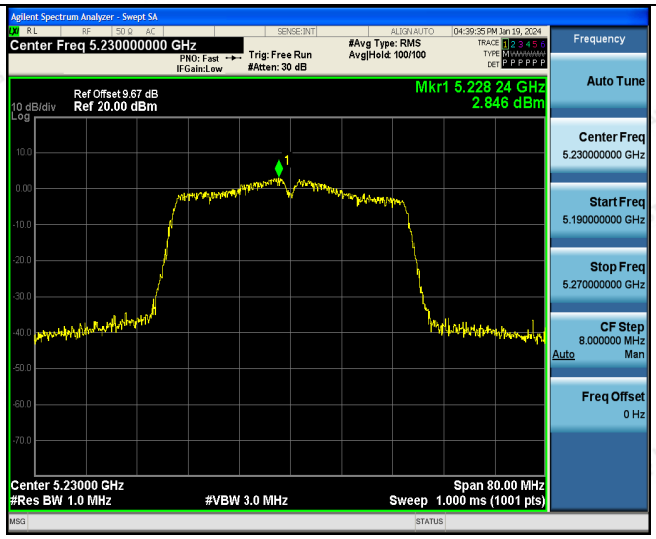
802.11n(HT40)

Low

High

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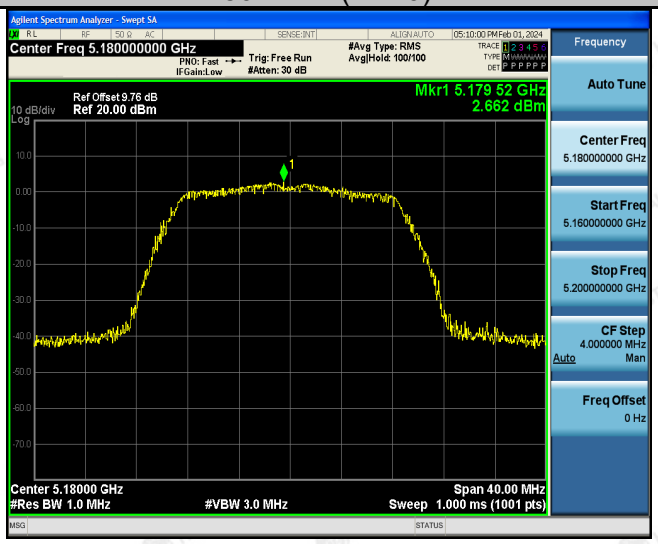
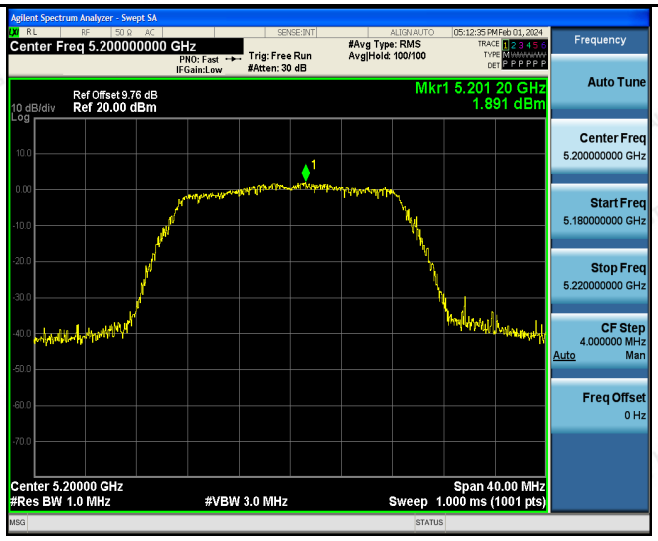
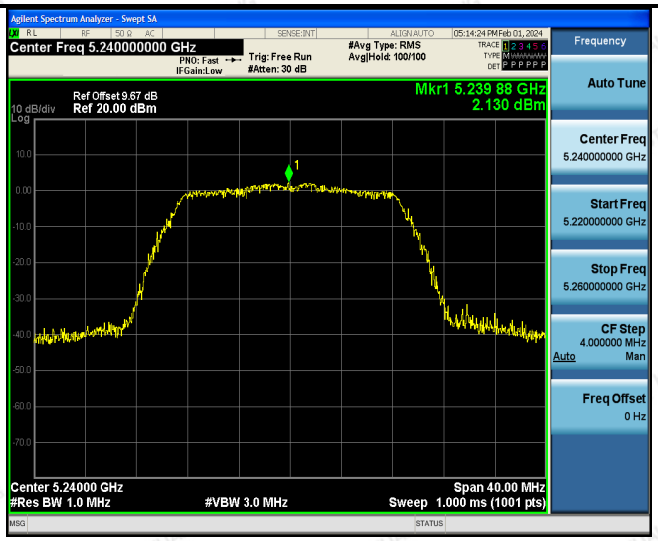
802.11ac(HT20)



Low



Mid



High

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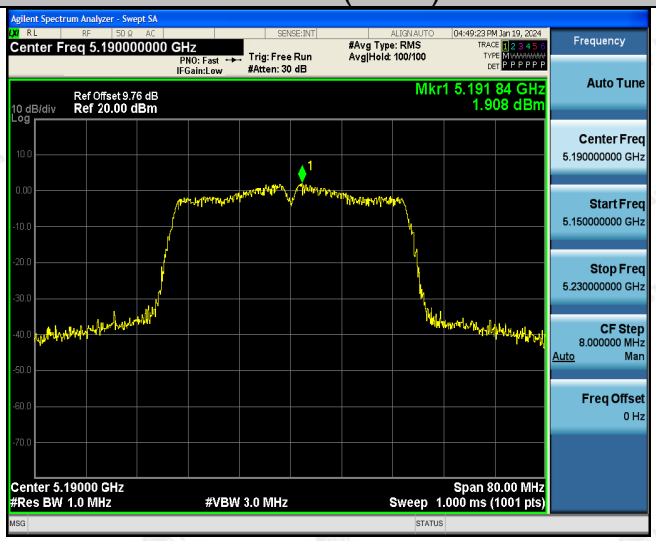
802.11ac(HT40)



Low

High

802.11ac(HT80)

Low

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For MIMO antenna port 1+antenna port 2

Configuration Band IV (5150 - 5250MHz)				
Mode	**Test channel**	**Power Density (dBm)**	**Limit (dBm/MHz)**	**Result**
802.11n(HT20)	CH36	5.62	10.99	PASS
802.11n(HT20)	CH40	5.43	10.99	PASS
802.11n(HT20)	CH48	5.31	10.99	PASS
802.11n(HT40)	CH38	4.27	10.99	PASS
802.11n(HT40)	CH46	5.52	10.99	PASS
802.11ac(HT20)	CH36	5.63	10.99	PASS
802.11ac(HT20)	CH40	5.29	10.99	PASS
802.11ac(HT20)	CH48	5.07	10.99	PASS
802.11ac(HT40)	CH38	4.35	10.99	PASS
802.11ac(HT40)	CH46	5.36	10.99	PASS
802.11ac(HT80)	CH42	2.79	10.99	PASS
	Note: 1 According to KDB 662911, Result power = $10\log(10^{(ant1/10)}+10^{(ant2/10)})$. 2 Result unit: W, The end result is converted to units of dBm. limit=11dBm-(direction gain-6dBi)=11-(3+10log2-6)=10.99dBm			

Note: This product supports antenna 1 and antenna 2 launch, but only support 802.11 n/ac for MIMO mode, not support 802.11 a for MIMO mode.

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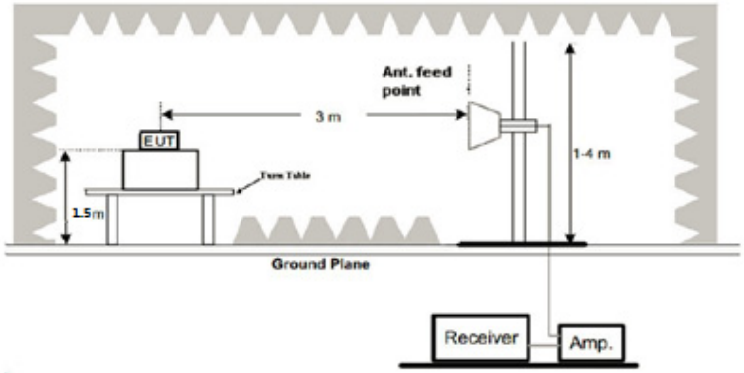
4.6. Band Edge

4.6.1. Test Specification

Test Requirement:	FCC CFR47 Part 15E Section 15.407
Test Method:	ANSI C63.10 2013
Limit:	(1) For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.ir.p. of -27 dBm/MHz. (2) For transmitters operating in the 5.25-5.35 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of-27 dBm/MHz. (3) For transmitters operating in the 5.47-5.725 GHz band: All emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of-27 dBm/MHz. (4) For transmitters operating in the 5.725-5.85 GHz band: (i) 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. The limit of frequency below 1GHz and which fall in restricted bands should complies 15.209.
Test Setup:	
Test Mode:	Transmitting mode with modulation

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