



FCC TEST REPORT

**Test report
On Behalf of
TeVii Technology Co.,Ltd.
For
Wireless HDMI Extender
Model No.: G230TX, Extend+Expand**

FCC ID: 2ALU5G230TX

Prepared For: TeVii Technology Co.,Ltd.
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Date of Test: Mar. 29, 2022 ~ May. 17, 2022
Date of Report: May. 17, 2022
Report Number: HK2203291300-2E

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**TEST RESULT CERTIFICATION****Applicant's name** TeVii Technology Co.,Ltd.

Address 10F, No. 125, Sec. 2, Datong Rd. 22183 Xizhi District, New Taipei City, Taiwan

Manufacture's Name TeVii Technology Co.,Ltd.

Address 10F, No. 125, Sec. 2, Datong Rd. 22183 Xizhi District, New Taipei City, Taiwan

Product description

Trade Mark: TEVII/ClearClick

Product name Wireless HDMI Extender

Model and/or type reference .. G230TX, Extend+Expand

FCC Rules and Regulations Part 15 Subpart E Section 15.407

Standards ANSI C63.10: 2013

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Date of Test

Date (s) of performance of tests Mar. 29, 2022 ~ May. 17, 2022

Date of Issue May. 17, 2022

Test Result Pass

Prepared by:

Project Engineer

Reviewed by:

Project Supervisor

Approved by:

Technical Director



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**** Modified History ****

Revision	Description	Issued Data	Remark
Revision 1.0	Initial Test Report Release	May. 17, 2022	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.



1.3. MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement $y \pm U$, 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	$\pm 2.71\text{dB}$
2	RF power, conducted	$\pm 0.37\text{dB}$
3	Spurious emissions, conducted	$\pm 0.11\text{dB}$
4	All emissions, radiated(<1G)	$\pm 3.90\text{dB}$
5	All emissions, radiated(>1G)	$\pm 4.28\text{dB}$
6	Temperature	$\pm 0.1^\circ\text{C}$
7	Humidity	$\pm 1.0\%$



2. EUT DESCRIPTION

2.1. GENERAL DESCRIPTION OF EUT

Equipment	Wireless HDMI Extender
Model Name	G230TX
Series Model	Extend+Expand
Trade Mark	TEVII/ClearClick
Model Difference	All model's the function, software and electric circuit are the same, only with a product color, appearance and model named different. Test sample model: G230TX.
FCC ID	2ALU5G230TX
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
Antenna Type	External Antenna
Antenna Gain	Antenna 1:2.85dBi Antenna 2:2.85dBi MIMO: 5.86dBi
Power Source	DC 12V from adapter
Power Supply	DC 12V from adapter
Note: The EUT incorporates a MIMO function. Physically, it provides two completed transmitters and 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).	



2.2. 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

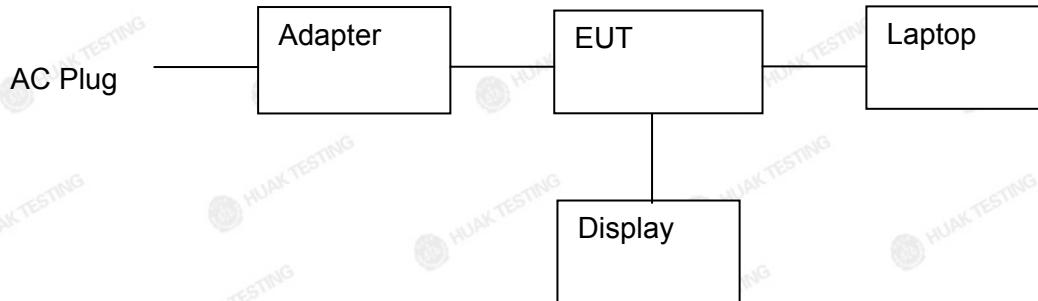
For 802.11ac (HT80)

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

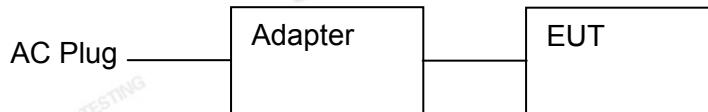


2.4. DESCRIPTION OF TEST SETUP

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



Operation of EUT during radiation above 1GHz testing:



Laptop information

Model: TP00018A

Input: 20V, 3.25~4.5A

Adapter information

Model: GQ12-120100-CU

Input: 100-240V~50-60Hz 0.4A

Output: 12V, 1A

Display information

Model: 280LM00004

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.



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 value of duty cycle is 100%)
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.	

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
-----------------	---



3.2. 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.

Equipment	Model No.	Serial No.	FCC ID	Trade Name
/	/	/	/	/

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, Emission 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.



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:	<table border="1"> <thead> <tr> <th>Frequency range (MHz)</th> <th colspan="2">Limit (dBuV)</th> </tr> <tr> <th></th> <th>Quasi-peak</th> <th>Average</th> </tr> </thead> <tbody> <tr> <td>0.15-0.5</td> <td>66 to 56*</td> <td>56 to 46*</td> </tr> <tr> <td>0.5-5</td> <td>56</td> <td>46</td> </tr> <tr> <td>5-30</td> <td>60</td> <td>50</td> </tr> </tbody> </table>	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
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:	<p>Reference Plane</p> <p>40cm</p> <p>80cm</p> <p>LISN</p> <p>Filter</p> <p>AC power</p> <p>E.U.T</p> <p>AC power</p> <p>Test table/Insulation plane</p> <p>EMI Receiver</p> <p>Remark E.U.T: Equipment Under Test LISN: Line Impedance Stabilization Network Test table height=0.8m</p>															
Test Mode:	Tx Mode															
Test Procedure:	<ol style="list-style-type: none"> 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

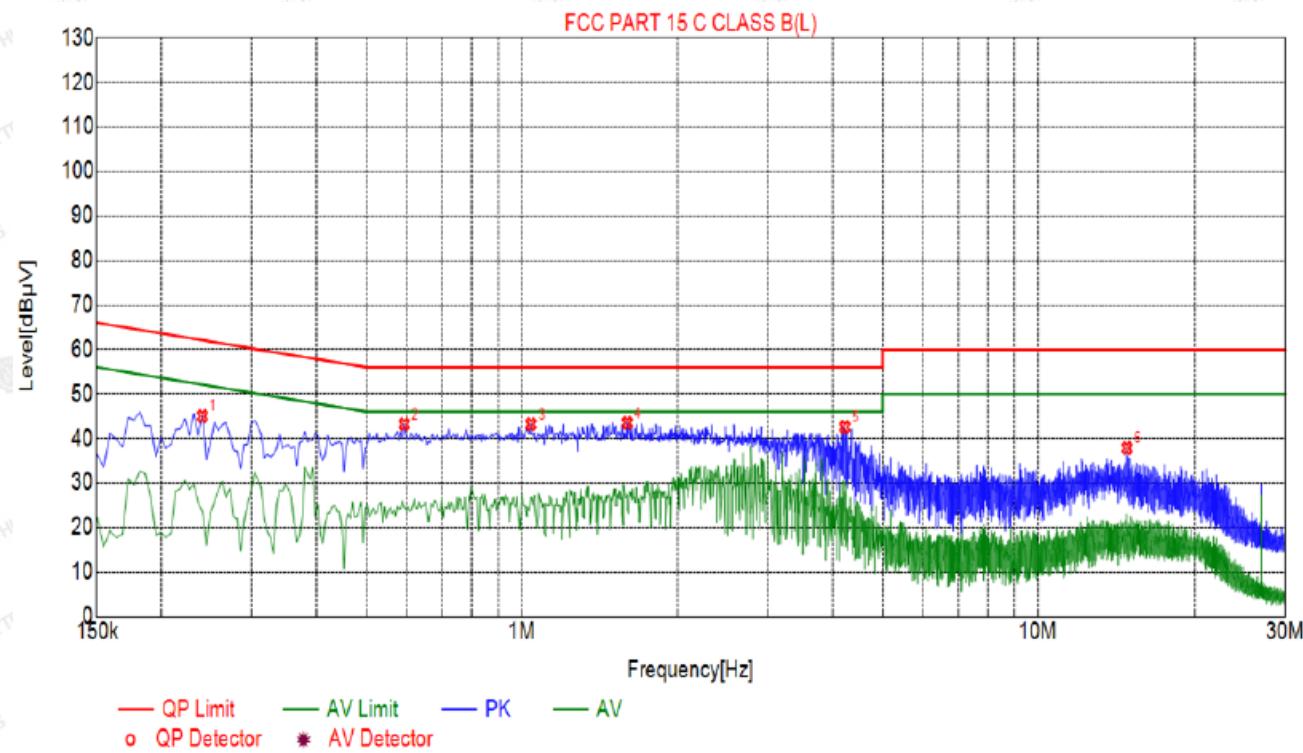
Conducted Emission Shielding Room Test Site (843)					
Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
Receiver	R&S	ESCI 7	HKE-010	Feb. 18, 2022	Feb. 17, 2023
LISN	R&S	ENV216	HKE-002	Feb. 18, 2022	Feb. 17, 2023
Coax cable (9KHz-30MHz)	Times	381806-002	N/A	Feb. 18, 2022	Feb. 17, 2023
Conducted test software	Tonscend	TS+ Rev 2.5.0.0	HKE-081	N/A	N/A

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



4.1.3. Test data

All the test modes completed for test, only the worst result was reported as below:
 Conducted Emission on Line Terminal of the power line (150 kHz to 30MHz)



Suspected List								
NO.	Freq. [MHz]	Level [dBμV]	Factor [dB]	Limit [dBμV]	Margin [dB]	Reading [dBμV]	Detector	Type
1	0.2400	45.03	20.03	62.10	17.07	25.00	PK	L
2	0.5910	43.21	20.05	56.00	12.79	23.16	PK	L
3	1.0410	43.21	20.07	56.00	12.79	23.14	PK	L
4	1.5990	43.49	20.11	56.00	12.51	23.38	PK	L
5	4.2270	42.57	20.25	56.00	13.43	22.32	PK	L
6	14.7840	37.85	19.95	60.00	22.15	17.90	PK	L

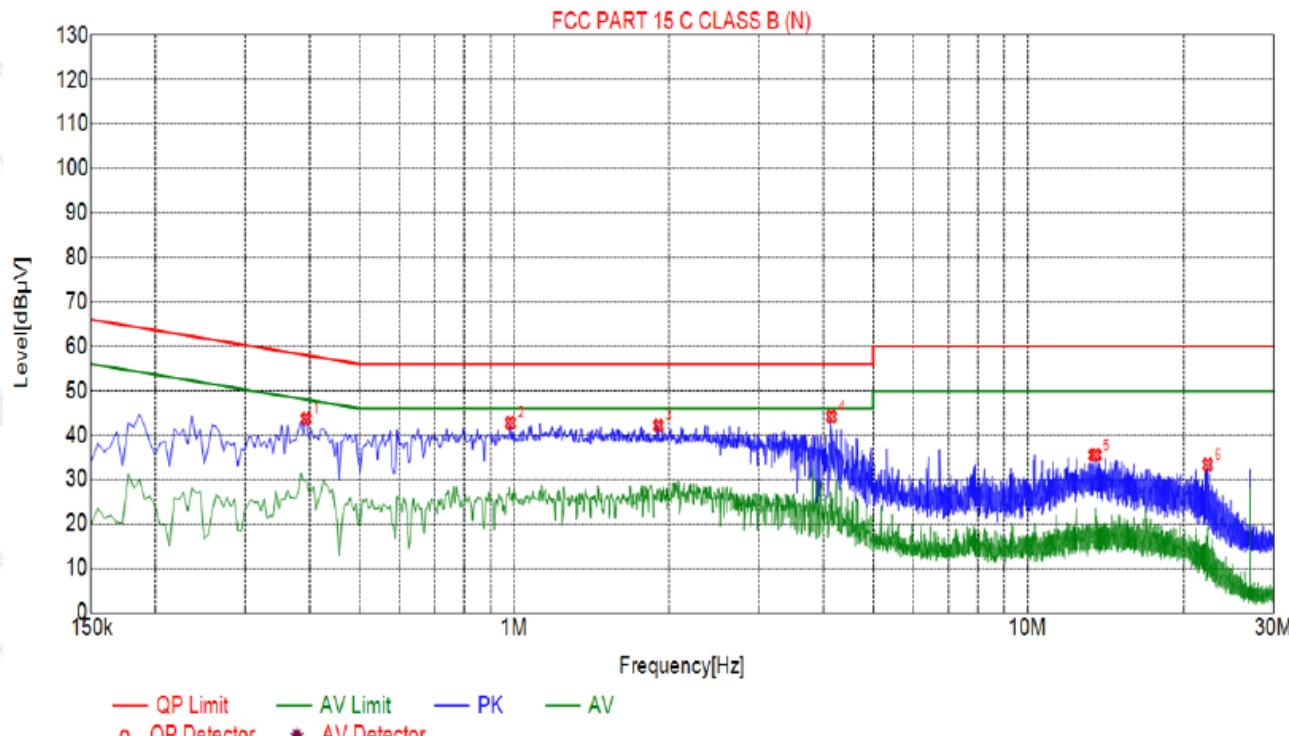
Remark: Margin = Limit – Level

Correction factor = Cable loss + LISN insertion loss

Level=Test receiver reading + correction factor



Conducted Emission on Neutral Terminal of the power line (150 kHz to 30MHz)

**Suspected List**

NO.	Freq. [MHz]	Level [dB μ V]	Factor [dB]	Limit [dB μ V]	Margin [dB]	Reading [dB μ V]	Detector	Type
1	0.3930	43.67	20.04	58.00	14.33	23.63	PK	N
2	0.9825	42.73	20.06	56.00	13.27	22.67	PK	N
3	1.9095	42.16	20.14	56.00	13.84	22.02	PK	N
4	4.1460	44.15	20.25	56.00	11.85	23.90	PK	N
5	13.4835	35.50	19.96	60.00	24.50	15.54	PK	N
6	22.2855	33.39	20.16	60.00	26.61	13.23	PK	N

Remark: Margin = Limit – Level

Correction factor = Cable loss + LISN insertion loss

Level=Test receiver reading + correction factor

4.2. MAXIMUM CONDUCTED OUTPUT POWER

4.2.1. Test Specification

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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. 18, 2022	Feb. 17, 2023
Power meter	Agilent	E4419B	HKE-085	Feb. 18, 2022	Feb. 17, 2023
Power Sensor	Agilent	E9300A	HKE-086	Feb. 18, 2022	Feb. 17, 2023
RF cable	Times	1-40G	HKE-034	Feb. 18, 2022	Feb. 17, 2023
RF automatic control unit	Tonscend	JS0806-2	HKE-060	Feb. 18, 2022	Feb. 17, 2023

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



4.2.3. Test Data

Configuration Band I (5150 - 5250 MHz)						
Mode	Test channel	Maximum Conducted Output Power (dBm)			FCC Limit (dBm)	Result
		Antenna 1	Antenna 2	MIMO		
11a	CH36	12.60	14.31	/	30	PASS
11a	CH40	10.54	10.27	/	30	PASS
11a	CH48	13.22	14.24	/	30	PASS
11n(HT20)	CH36	10.05	9.52	12.80	30	PASS
11n(HT20)	CH40	10.96	10.51	13.75	30	PASS
11n(HT20)	CH48	11.23	10.52	13.90	30	PASS
11n(HT40)	CH38	11.18	11.14	14.17	30	PASS
11n(HT40)	CH46	11.21	12.98	15.19	30	PASS
11ac(HT20)	CH36	9.72	10.88	13.35	30	PASS
11ac(HT20)	CH40	10.59	10.39	13.50	30	PASS
11ac(HT20)	CH48	11.28	10.31	13.83	30	PASS
11ac(HT40)	CH38	10.76	11.58	14.20	30	PASS
11ac(HT40)	CH46	11.19	10.68	13.95	30	PASS
11ac(HT80)	CH42	10.21	9.81	13.02	30	PASS

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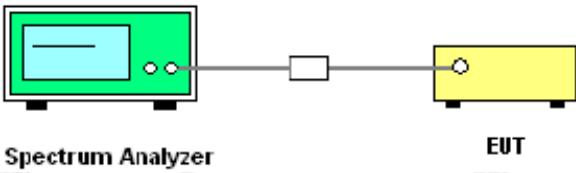
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4.3. 6DB EMISSION BANDWIDTH

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:	 <p>Spectrum Analyzer EUT</p>
Test Mode:	Transmitting mode with modulation
Test Procedure:	<ol style="list-style-type: none"> 1. KDB789033 D02 General UNII Test Procedures New Rules v01r04 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. 18, 2022	Feb. 17, 2023
RF cable	Times	1-40G	HKE-034	Feb. 18, 2022	Feb. 17, 2023
RF automatic control unit	Tonscend	JS0806-2	HKE-060	Feb. 18, 2022	Feb. 17, 2023

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

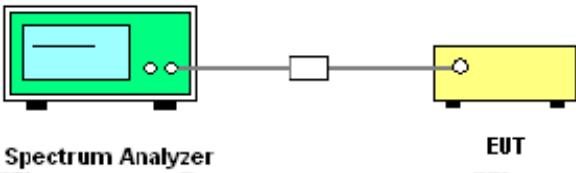
N/A

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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 (a)
Test Method:	KDB789033 D02 General UNII Test Procedures New Rules v02r01 Section C
Limit:	No restriction limits
Test Setup:	 <p>Spectrum Analyzer EUT</p>
Test Mode:	Transmitting mode with modulation
Test Procedure:	<ol style="list-style-type: none"> 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, $VBW \geq 3RBW$, 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. 18, 2022	Feb. 17, 2023
RF cable	Times	1-40G	HKE-034	Feb. 18, 2022	Feb. 17, 2023
RF automatic control unit	Tonscend	JS0806-2	HKE-060	Feb. 18, 2022	Feb. 17, 2023

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

**4.4.3. Test data****Band I**
ANT 1

Mode	Test channel	Frequency (MHz)	26 dB Bandwidth (MHz)	Verdict
11a	CH36	5180	20.52	PASS
11a	CH40	5200	20.16	PASS
11a	CH48	5240	20.08	PASS
11n(HT20)	CH36	5180	20.72	PASS
11n(HT20)	CH40	5200	20.60	PASS
11n(HT20)	CH48	5240	20.68	PASS
11n(HT40)	CH38	5190	42.48	PASS
11n(HT40)	CH46	5230	42.88	PASS
11ac(HT20)	CH36	5180	20.88	PASS
11ac(HT20)	CH40	5200	20.72	PASS
11ac(HT20)	CH48	5240	20.72	PASS
11ac(HT40)	CH38	5190	42.64	PASS
11ac(HT40)	CH46	5230	43.52	PASS
11ac(HT80)	CH42	5210	82.08	PASS

Test plots as follows:

Band I (5150 – 5250 MHz)

802.11a



Low



Mid



High

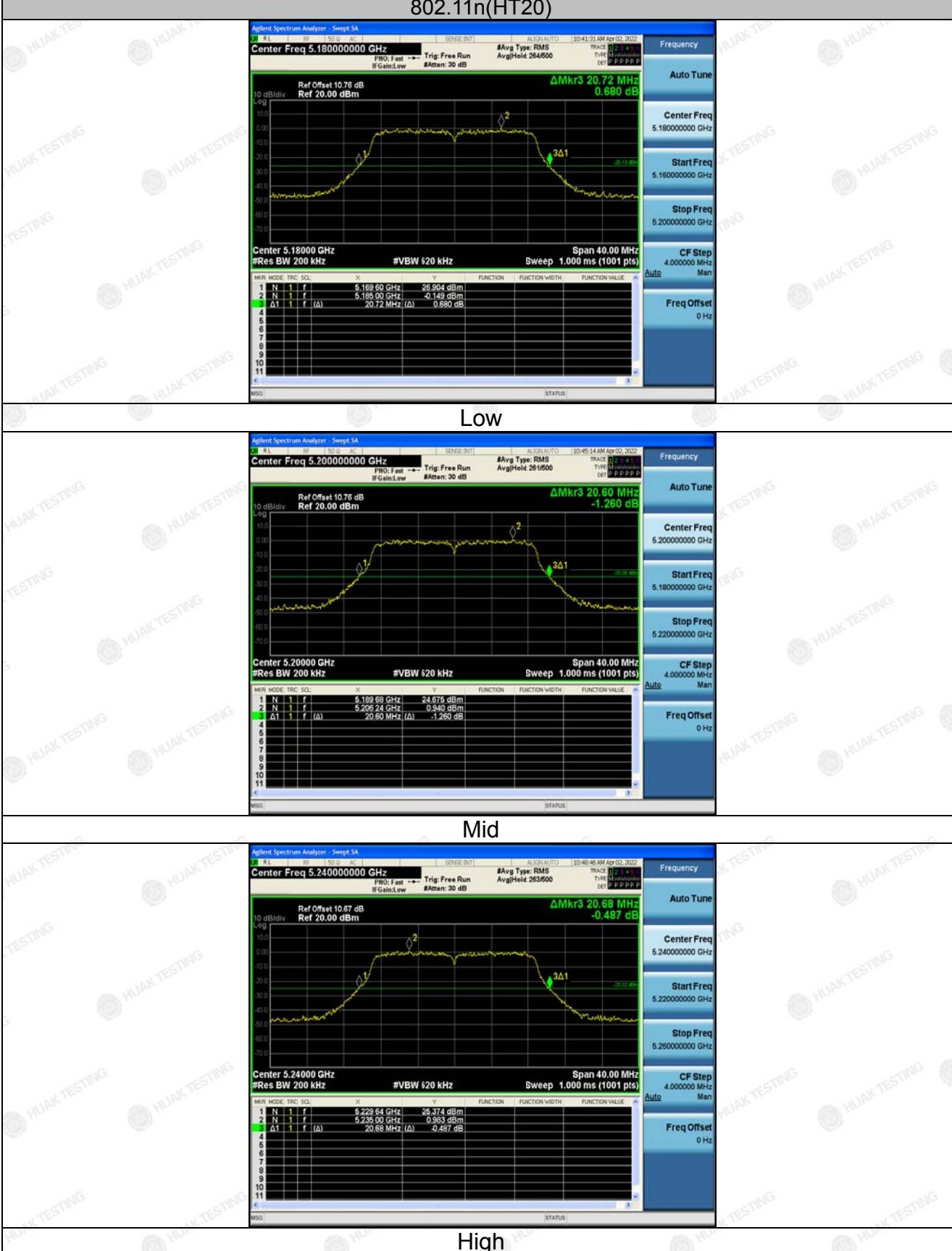
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802.11n(HT20)



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802.11n(HT40)



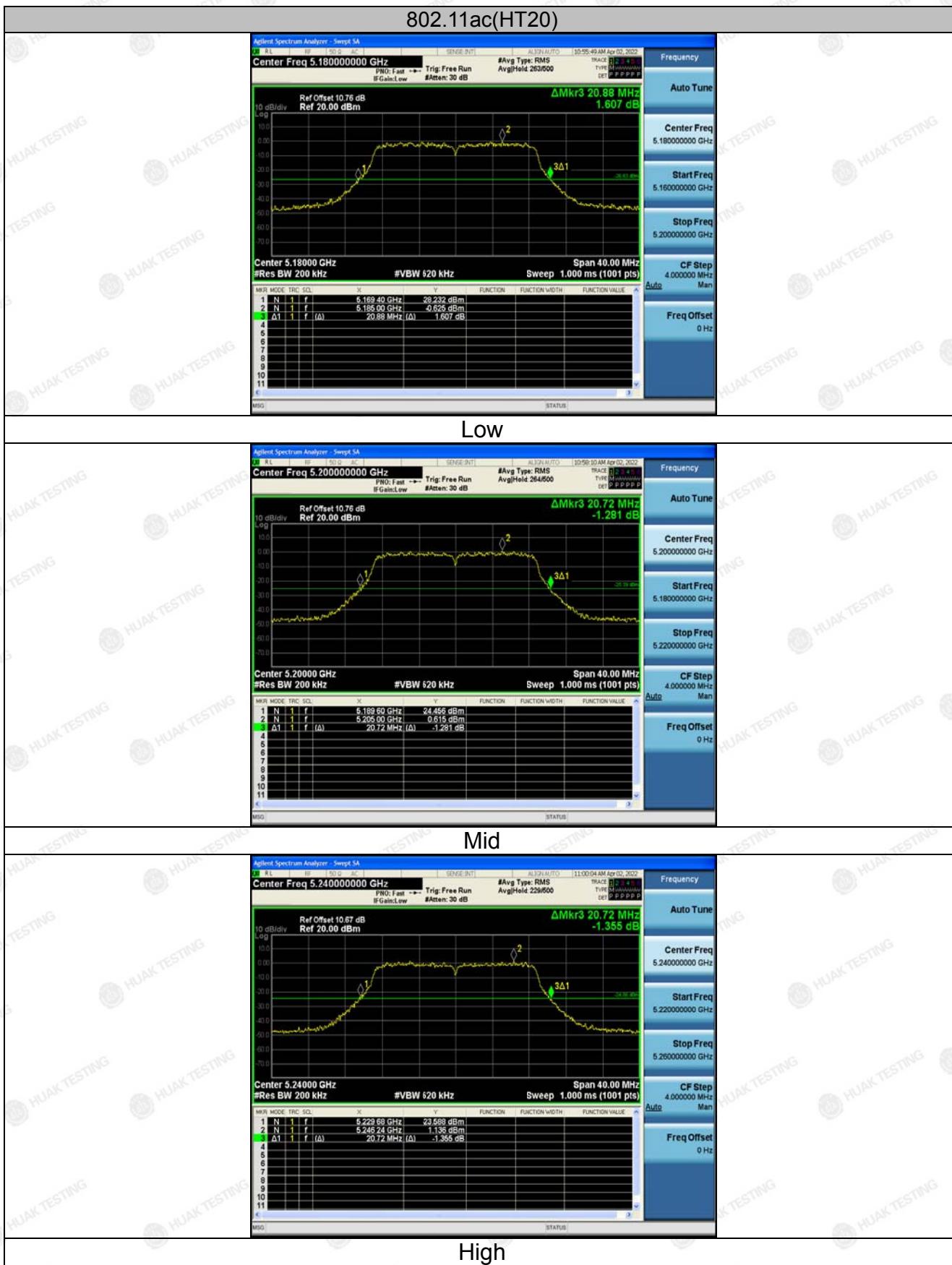
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802.11ac(HT20)



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802.11ac(HT40)

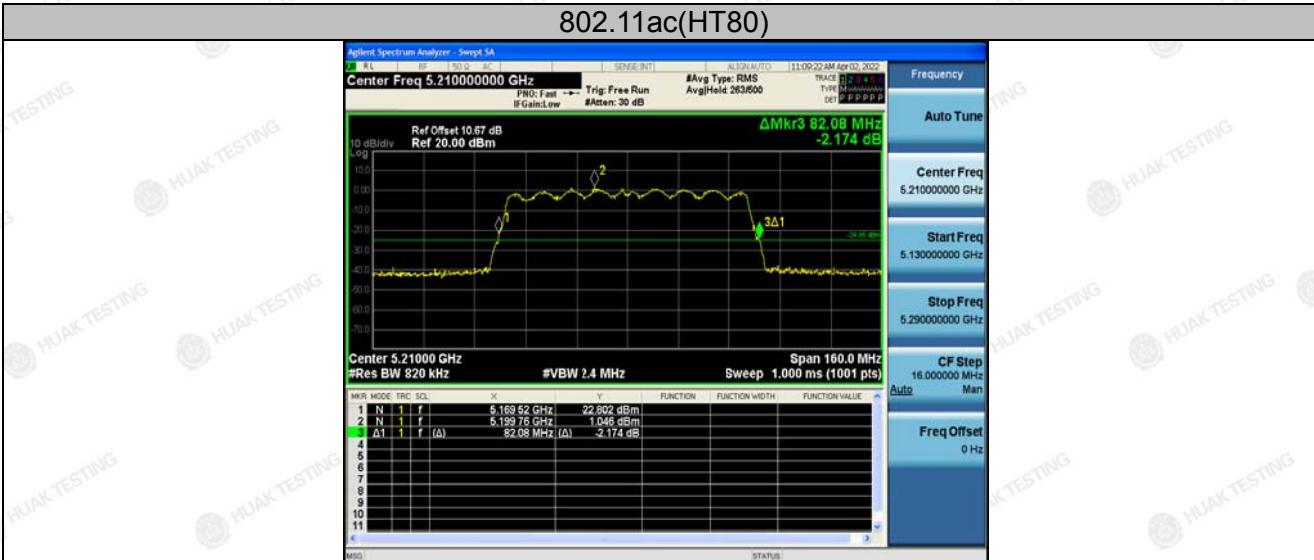


LOW



High

802.11ac(HT80)



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ANT 2

Mode	Test channel	Frequency (MHz)	26 dB Bandwidth (MHz)	Verdict
11a	CH36	5180	20.68	PASS
11a	CH40	5200	20.48	PASS
11a	CH48	5240	20.52	PASS
11n(HT20)	CH36	5180	21.00	PASS
11n(HT20)	CH40	5200	20.88	PASS
11n(HT20)	CH48	5240	20.88	PASS
11n(HT40)	CH38	5190	43.28	PASS
11n(HT40)	CH46	5230	42.88	PASS
11ac(HT20)	CH36	5180	20.92	PASS
11ac(HT20)	CH40	5200	20.76	PASS
11ac(HT20)	CH48	5240	20.80	PASS
11ac(HT40)	CH38	5190	42.72	PASS
11ac(HT40)	CH46	5230	43.20	PASS
11ac(HT80)	CH42	5210	82.24	PASS

Test plots as follows:



Band I (5150 – 5250 MHz)

802.11a



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802.11n(HT20)



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802.11n(HT40)



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802.11ac(HT20)



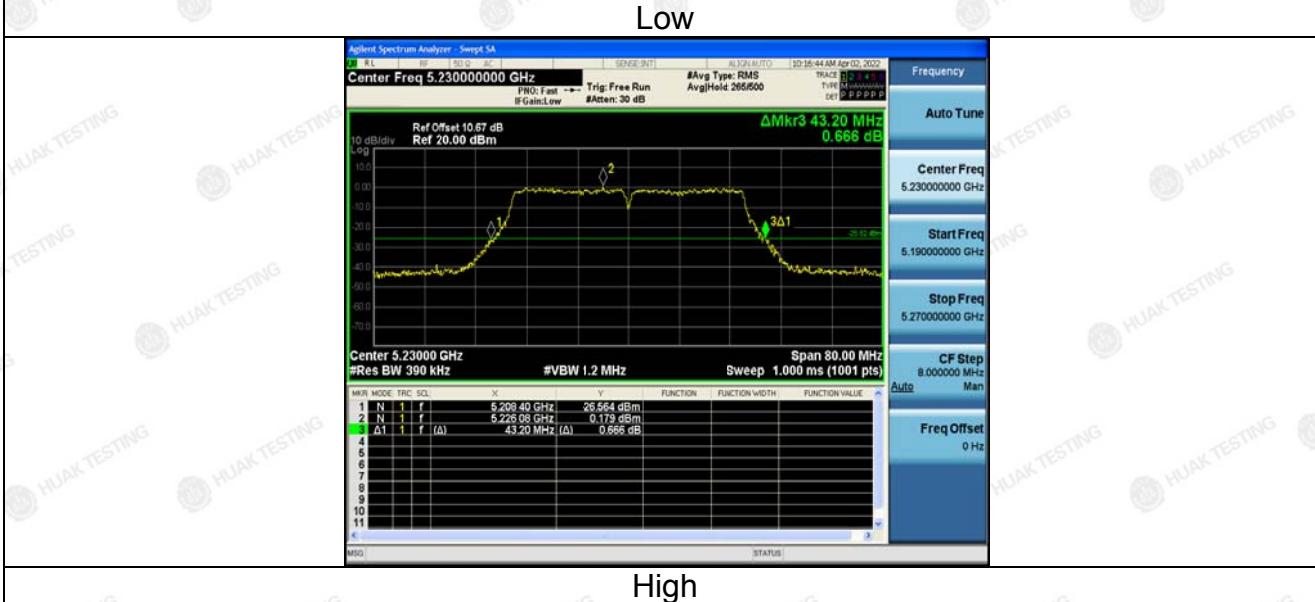
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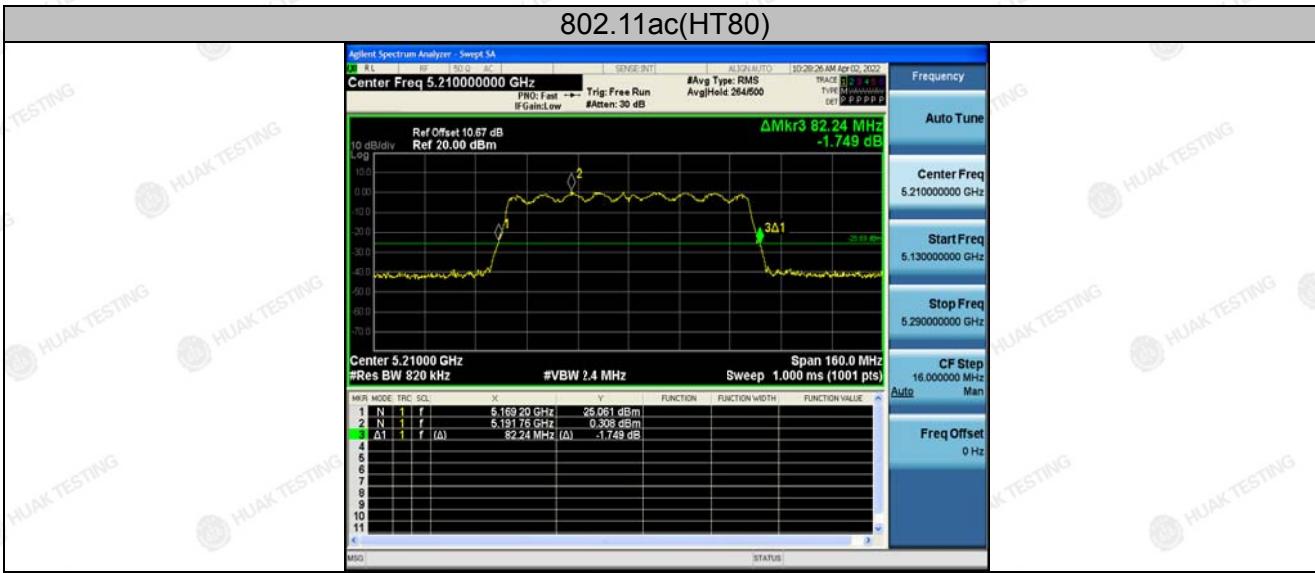
Add: 1-2F., Building B2, Junfeng Zhongcheng Zhizao Innovation Park, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China



802.11ac(HT40)



802.11ac(HT80)



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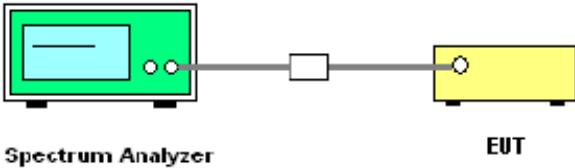
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4.5. POWER SPECTRAL DENSITY

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 ≤17dBm/MHz for indoor access device
Test Setup:	
Test Mode:	Transmitting mode with modulation
Test Procedure:	<ol style="list-style-type: none"> 1. Set the spectrum analyzer or EMI receiver span to view the entire emission bandwidth. 2. Set RBW = 1MHz, VBW \geq 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. 18, 2022	Feb. 17, 2023
RF cable	Times	1-40G	HKE-034	Feb. 18, 2022	Feb. 17, 2023
RF automatic control unit	Tonscend	JS0806-2	HKE-060	Feb. 18, 2022	Feb. 17, 2023

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



4.5.3. Test data

ANT 1

Configuration Band I (5150 - 5250 MHz)

Mode	Test channel	Level [dBm/MHz]	Limit (dBm/MHz)	Result
11a	CH36	6.26	17	PASS
11a	CH40	4.66	17	PASS
11a	CH48	7.06	17	PASS
11n(HT20)	CH36	4.68	17	PASS
11n(HT20)	CH40	5.3	17	PASS
11n(HT20)	CH48	5.49	17	PASS
11n(HT40)	CH38	2.95	17	PASS
11n(HT40)	CH46	3.49	17	PASS
11ac(HT20)	CH36	3.81	17	PASS
11ac(HT20)	CH40	4.93	17	PASS
11ac(HT20)	CH48	5.8	17	PASS
11ac(HT40)	CH38	2.69	17	PASS
11ac(HT40)	CH46	2.72	17	PASS
11ac(HT80)	CH42	-0.12	17	PASS

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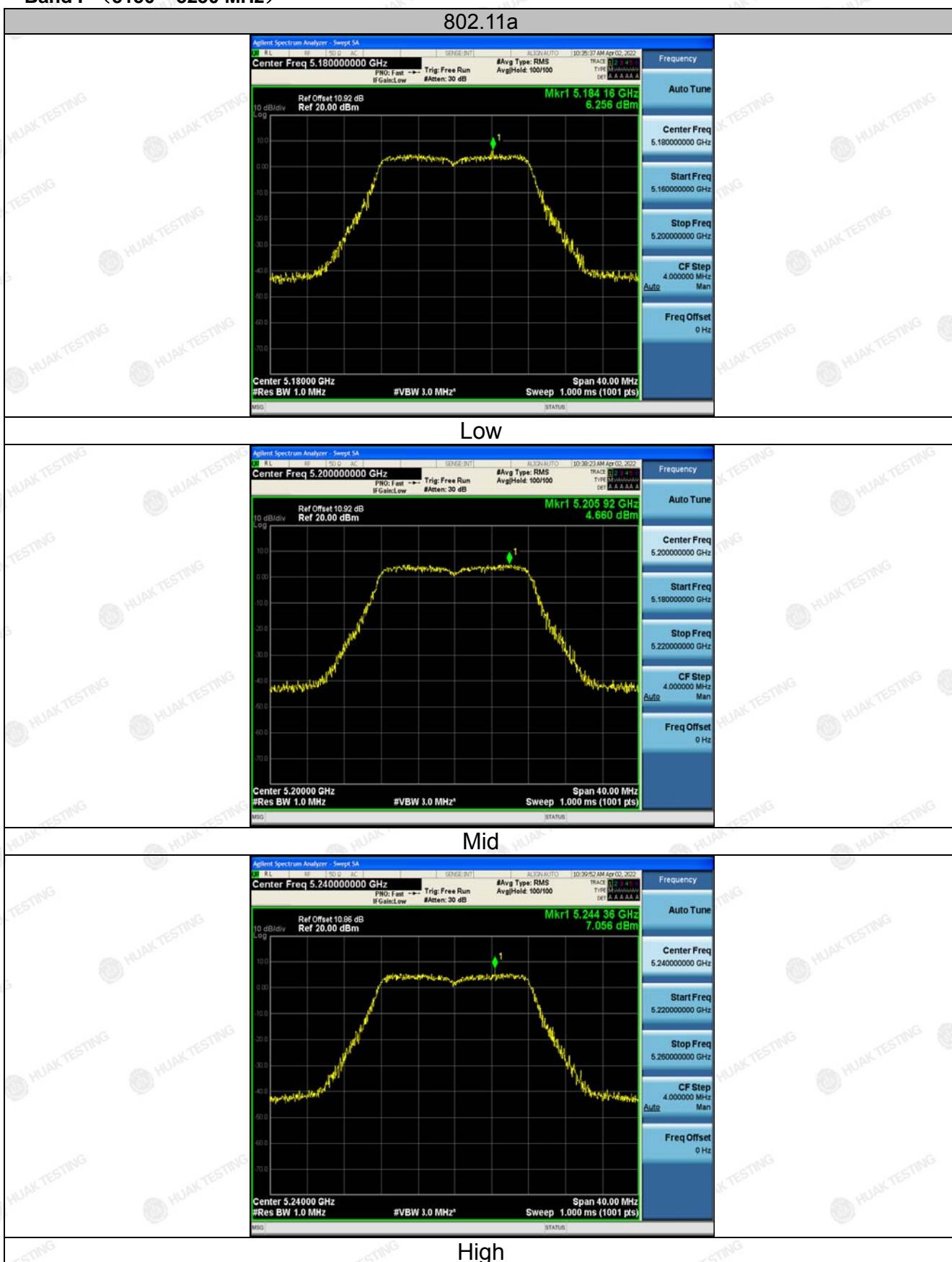
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Test plots as follows:

Band I (5150 – 5250 MHz)



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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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