FCC TEST REPORT

Test report
On Behalf of
TeVii Technology Co.,Ltd.
For
Wireless HDMI Extender
Model No.: G230RX, Extend+Expand

FCC ID: 2ALU5G230RX

Prepared For:	**TeVii Technology Co.,Ltd.** **10F, No. 125, Sec. 2, Datong Rd. 22183 Xizhi District, New Taipei City, Taiwan**
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:	**Mar. 29, 2022 ~ May. 17, 2022**
Date of Report:	**May. 17, 2022**
Report Number:	**HK2203291299-1E**

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 .:	G230RX, Extend+Expand
Standards .....:	FCC Rules and Regulations Part 15 Subpart C Section 15.247 ANSI C63.10: 2013

Date of Test.....:	
Date (s) of performance of tests .....:	Mar. 29, 2022 ~ May. 17, 2022
Date of Issue.....:	May. 17, 2022
Test Result.....:	**Pass**

Testing Engineer : Gary Qian

(Gary Qian)

Technical Manager : Eden Hu

(Eden Hu)

Authorized Signatory : Jason Zhou

(Jason Zhou)

TABLE OF CONTENTS

**** Modified History ****

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

TEL : +86-755 2302 9901 FAX : +86-755 2302 9901 E-mail : service@cer-mark.com
Add: 1-2F., Building B2, Junfeng Zhongcheng Zhizao Innovation Park, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China

1. TEST RESULT SUMMARY

1.1. TEST PROCEDURES AND RESULTS

Requirement	CFR 47 Section	Result
Antenna requirement	§15.203/§15.247(b)(4)	PASS
AC Power Line Conducted Emission	§15.207	PASS
Conducted Peak Output Power	§15.247(b)(3)	PASS
6dB Emission Bandwidth	§15.247(a)(2)	PASS
Power Spectral Density	§15.247(e)	PASS
Band Edge	1§5.247(d)	PASS
Spurious Emission	§15.205/§15.209	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 ± 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	±2.71dB
2	RF power, conducted	±0.37dB
3	Spurious emissions, conducted	±0.11dB
4	All emissions, radiated(<1G)	±3.90dB
5	All emissions, radiated(>1G)	±4.28dB
6	Temperature	±0.1°C
7	Humidity	±1.0%

2. EUT DESCRIPTION

2.1. GENERAL DESCRIPTION OF EUT

Equipment	Wireless HDMI Extender
Model Name	G230RX
Series Model	Extend+Expand
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: G230RX.
Trade Mark	TEVII/ClearClick
FCC ID	2ALU5G230RX
Antenna Type	External Antenna
Antenna Gain	Antenna 1:2.45dBi Antenna 2:2.45dBi MIMO: 5.46dBi
Operation frequency	802.11b/g/n 20:2412~2462 MHz 802.11n 40: 2422~2452MHz
Number of Channels	802.11b/g/n20: 11CH 802.11n 40: 7CH
Modulation Type	CCK/OFDM/DBPSK/DAPSK
Power Source	DC 12V from adapter
Power Rating	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. CARRIER FREQUENCY OF CHANNELS

Channel List for 802.11b/802.11g/802.11n (HT20)							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
01	2412	04	2427	07	2442	10	2457
02	2417	05	2432	08	2447	11	2462
03	2422	06	2437	09	2452		

Channel List For 802.11n (HT40)							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
--	--	04	2427	07	2442	--	--
--	--	05	2432	08	2447	--	--
03	2422	06	2437	09	2452	--	--

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

Operating Mode

The mode is used: Transmitting mode for 802.11b/802.11g/802.11n (HT20)

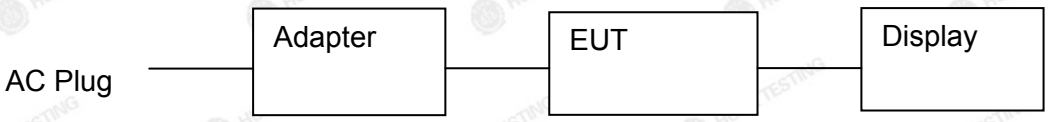
Low Channel: 2412MHz
Middle Channel: 2437MHz
High Channel: 2462MHz

The mode is used: Transmitting mode for 802.11n (HT40)

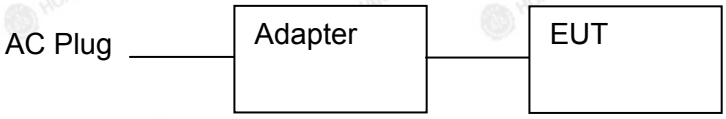
Low Channel: 2422MHz
Middle Channel: 2437MHz
High Channel: 2452MHz

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:



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 98.46%)
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. For the full battery state and The output power to the maximum state.	

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
802.11b	1Mbps
802.11g	6Mbps
802.11n(H20)	6.5Mbps
802.11n(H40)	13.5Mbps
Final Test Mode:	
Operation mode:	Keep the EUT in continuous transmitting with modulation
1. For WIFI function, the engineering test program was provided and enabled to make EUT continuous transmit/receive. 2. According to ANSI C63.10 standards, the test results are both the “worst case” and “worst setup” 1Mbps for 802.11b, 6Mbps for 802.11g, 6.5Mbps for 802.11n(H20), 13.5Mbps for 802.11(H40). Duty cycle setting during the transmission is 98.5% with maximum power setting for all modulations.	

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.

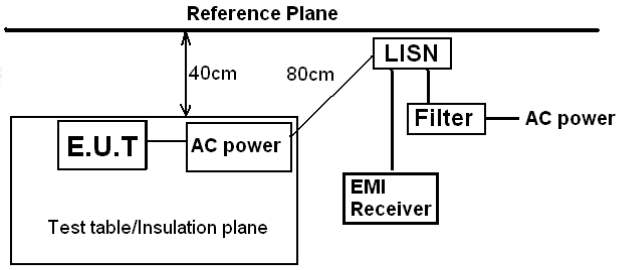
2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

3. For conducted measurements (Output Power, 6dB 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

<table>
<tr><td>Test Requirement:</td><td>FCC Part15 C Section 15.207</td></tr>
<tr><td>Test Method:</td><td>ANSI C63.10:2013</td></tr>
<tr><td>Frequency Range:</td><td>150 kHz to 30 MHz</td></tr>
<tr><td>Receiver setup:</td><td>RBW=9 kHz, VBW=30 kHz, Sweep time=auto</td></tr>
<tr><td>Limits:</td><td>
<table>
<tr><td rowspan="2">Frequency range (MHz)</td><td colspan="2">Limit (dBuV)</td></tr>
<tr><td>Quasi-peak</td><td>Average</td></tr>
<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>
</table>
</td></tr>
<tr><td>Test Setup:</td><td> 

Remark:
E.U.T: Equipment Under Test
LISN: Line Impedence Stabilization Network
Test table height=0.8m</td></tr>
<tr><td>Test Mode:</td><td>Charging + transmitting with modulation</td></tr>
<tr><td>Test Procedure:</td><td>1. The E.U.T is 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.</td></tr>
<tr><td>Test Result:</td><td>PASS</td></tr>
</table>

4.1.2. Test Instruments

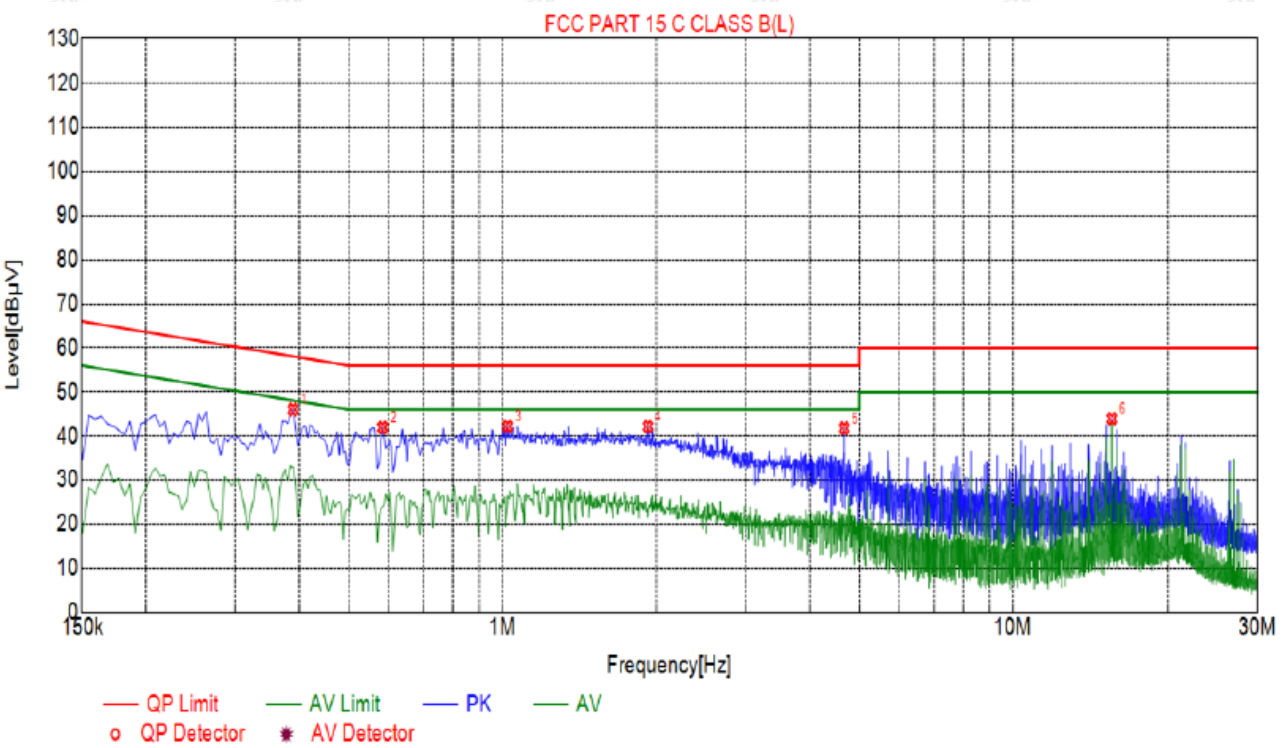
Conducted Emission Shielding Room Test Site (843)				
Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Due**
Receiver	R&S	ESCI 7	HKE-010	Feb. 17, 2023
LISN	R&S	ENV216	HKE-002	Feb. 17, 2023
Conducted test software	Tonscend	TS+ Rev 2.5.0.0	N/A	N/A

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:

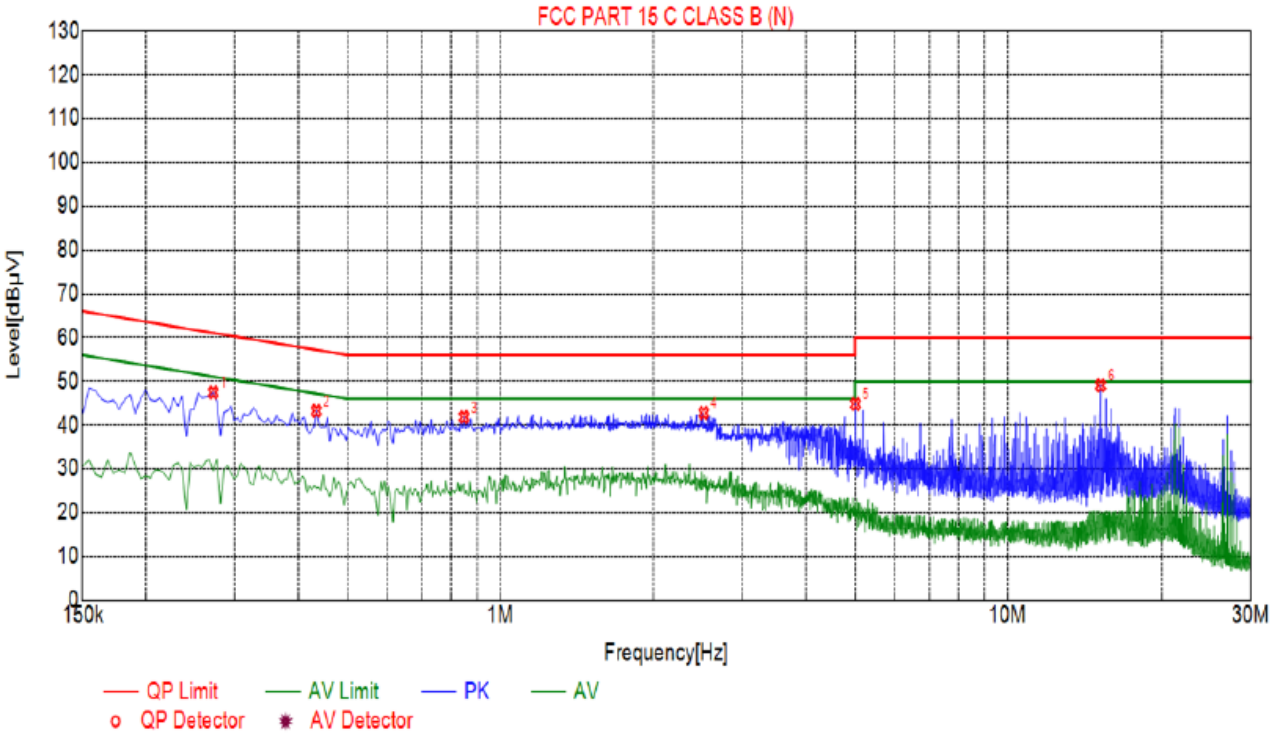
Conducted Emission on Line Terminal of the power line (150 kHz to 30MHz)



Suspected List								
NO.	Freq. [MHz]	Level [dBµV]	Factor [dB]	Limit [dBµV]	Margin [dB]	Reading [dBµV]	Detector	Type
1	0.3885	46.03	20.04	58.10	12.07	25.99	PK	L
2	0.5820	41.95	20.05	56.00	14.05	21.90	PK	L
3	1.0230	42.20	20.07	56.00	13.80	22.13	PK	L
4	1.9275	42.16	20.14	56.00	13.84	22.02	PK	L
5	4.6725	41.79	20.26	56.00	14.21	21.53	PK	L
6	15.5535	43.94	19.97	60.00	16.06	23.97	PK	L

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

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

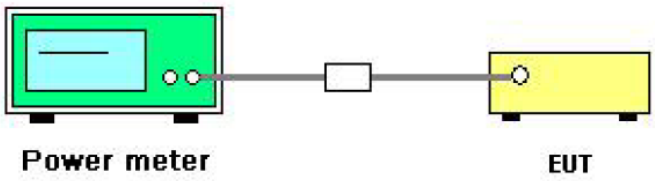


Suspected List								
NO.	Freq. [MHz]	Level [dBµV]	Factor [dB]	Limit [dBµV]	Margin [dB]	Reading [dBµV]	Detector	Type
1	0.2715	47.46	20.03	61.07	13.61	27.43	PK	N
2	0.4335	43.24	20.05	57.19	13.95	23.19	PK	N
3	0.8475	41.84	20.06	56.00	14.16	21.78	PK	N
4	2.5170	42.78	20.19	56.00	13.22	22.59	PK	N
5	5.0145	44.83	20.26	60.00	15.17	24.57	PK	N
6	15.1665	49.06	19.96	60.00	10.94	29.10	PK	N

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

4.2. MAXIMUM CONDUCTED OUTPUT POWER

4.2.1. Test Specification

Test Requirement:	FCC Part15 C Section 15.247 (b)(3)
Test Method:	KDB 558074
Limit:	30dBm
Test Setup:	
Test Mode:	Transmitting mode with modulation
Test Procedure:	1. The testing follows the Measurement Procedure of FCC KDB No. 558074 D01 15.247 Meas Guidance v05r02. 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 Peak output power and record the results in the test report.
Test Result:	PASS

4.2.2. Test Instruments

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

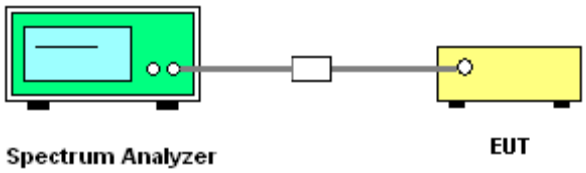
Note: *The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).*

4.2.3. Test Data

Test Channel	Frequency	Maximum Peak Conducted Output Power (dBm)			LIMIT
	(MHz)	Antenna port 1	Antenna port 2	MIMO	dBm
TX 802.11b Mode					
CH01	2412	14.92	17.59	/	30
CH06	2437	17.58	15.71	/	30
CH11	2462	15.08	15.77	/	30
TX 802.11g Mode					
CH01	2412	15.41	15.46	/	30
CH06	2437	15.85	17.18	/	30
CH11	2462	16.40	16.90	/	30
TX 802.11n20 Mode					
CH01	2412	15.29	16.27	18.82	30
CH06	2437	15.65	16.62	19.17	30
CH11	2462	16.28	16.75	19.53	30
TX 802.11n40 Mode					
CH03	2422	15.94	16.87	19.44	30
CH06	2437	16.18	16.86	19.54	30
CH09	2452	16.43	16.91	19.69	30
Note: This product supports antenna 1 and antenna 2 launch, but only support 802.11 n for MIMO mode, not support 802.11 b and 802.11 g for MIMO mode.					

4.3. EMISSION BANDWIDTH

4.3.1. Test Specification

Test Requirement:	FCC Part15 C Section 15.247 (a)(2)
Test Method:	KDB 558074
Limit:	>500kHz
Test Setup:	
Test Mode:	Transmitting mode with modulation
Test Procedure:	1. The testing follows FCC KDB Publication No. 558074 D01 15.247 Meas Guidance v05r02. 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 Due**
Spectrum analyzer	Agilent	N9020A	HKE-048	Feb. 17, 2023
RF Cable (9KHz-26.5GHz)	Tonscend	170660	N/A	Feb. 17, 2023
RF automatic control unit	Tonscend	JS0806-2	HKE-060	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

For antenna port 1

Test channel	6dB Emission Bandwidth (MHz)			
	802.11b	802.11g	802.11n(H20)	802.11n(H40)
Lowest	8.52	16.32	17.40	36.08
Middle	9.48	16.32	16.88	35.68
Highest	9.04	16.32	17.00	35.92
Limit:	>500k			
Test Result:	PASS			

Test plots as follows:

802.11b Modulation

Lowest channel

Middle channel

Highest channel

802.11g Modulation

Lowest channel

Middle channel

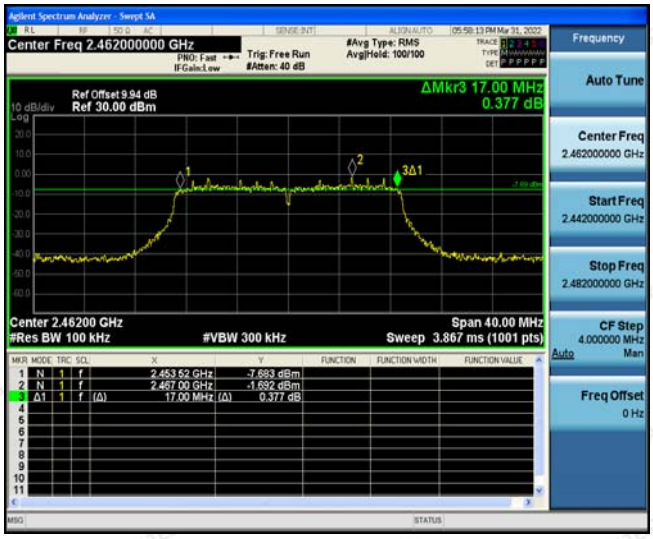
Highest channel

802.11n (HT20) Modulation

Lowest channel

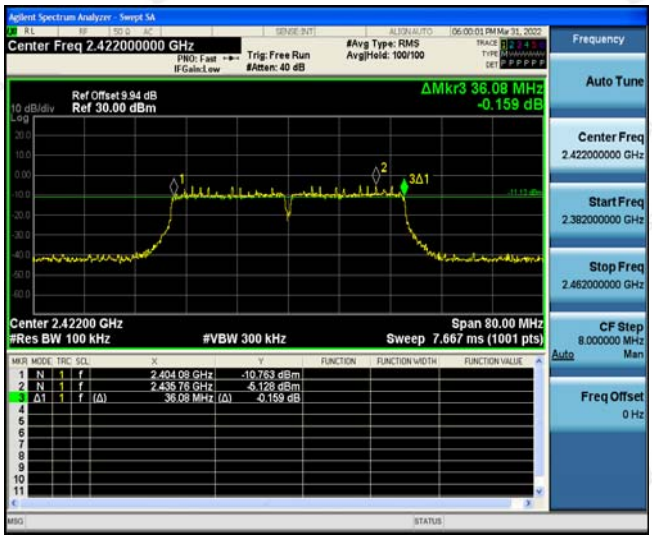
Middle channel

Highest channel

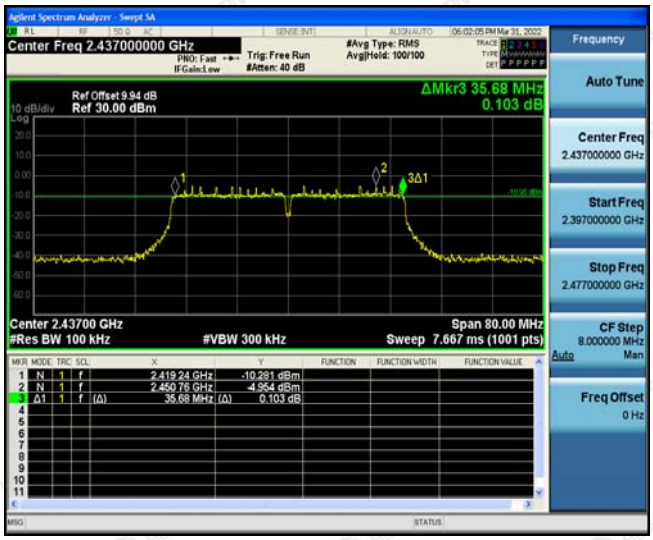


802.11n (HT40) Modulation

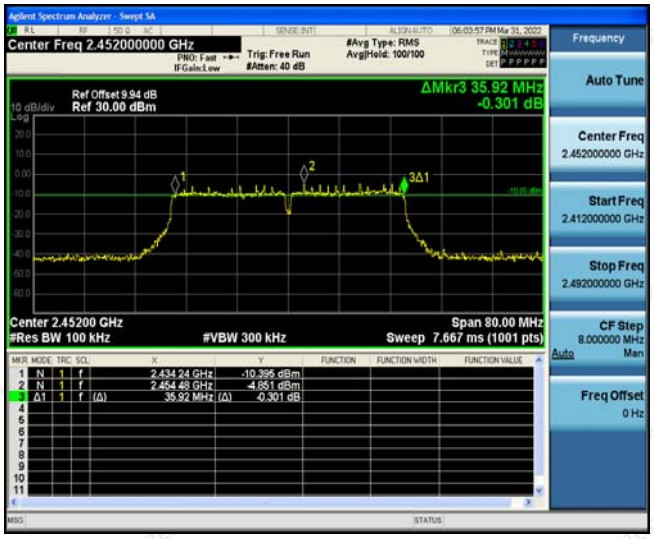
Lowest channel



Middle channel



Highest channel



For antenna port 2

Test channel	6dB Emission Bandwidth (MHz)			
	802.11b	802.11g	802.11n(H20)	802.11n(H40)
Lowest	9.00	16.32	17.28	35.76
Middle	9.52	16.32	17.52	35.84
Highest	9.00	16.32	16.88	35.76
Limit:	≥500 (kHz)			
Test Result:	PASS			

Test plots as follows:

802.11b Modulation

Lowest channel

Middle channel

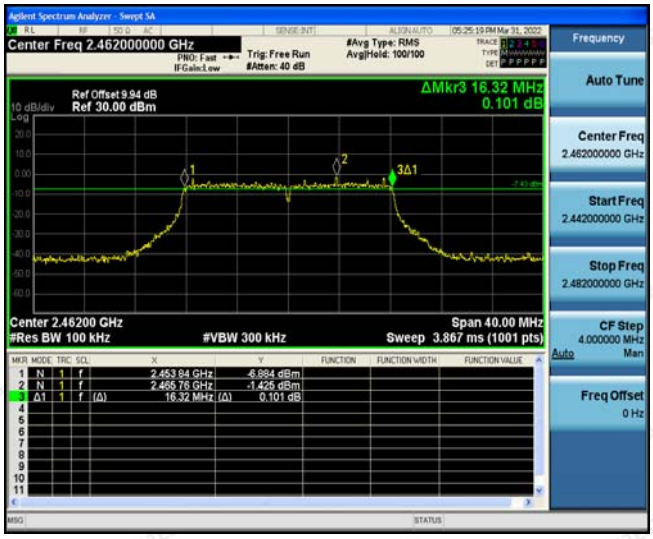
Highest channel

802.11g Modulation

Lowest channel

Middle channel

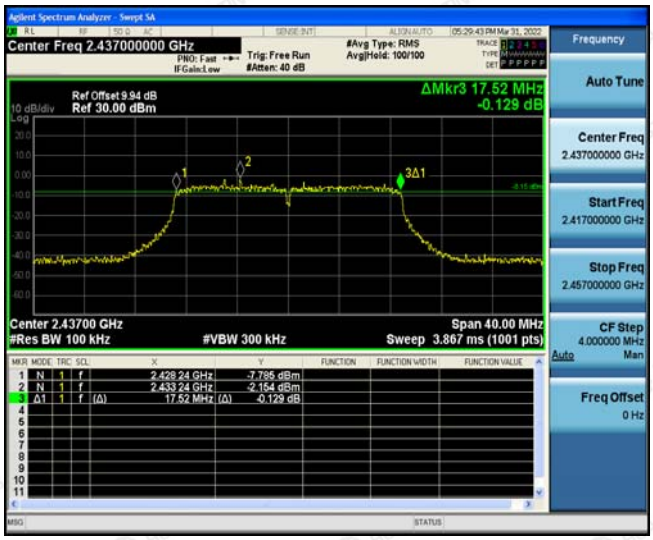
Highest channel



802.11n (HT20) Modulation

Lowest channel

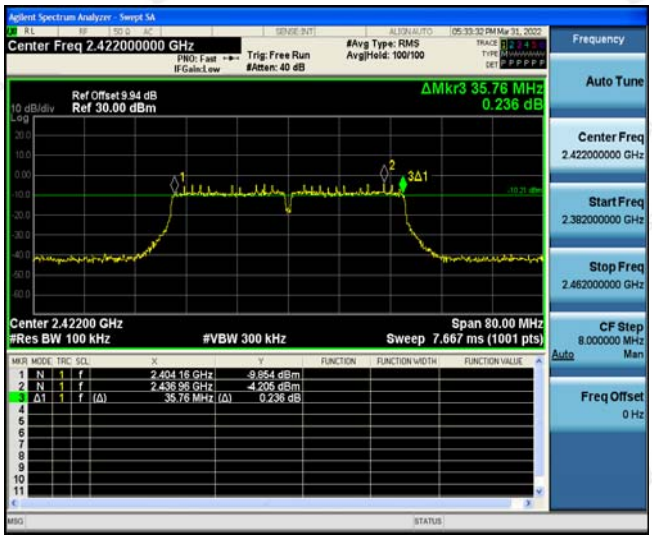
Middle channel



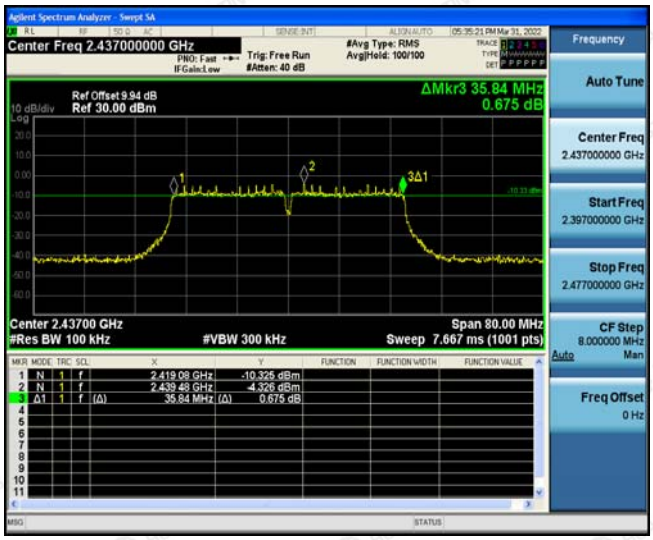
Highest channel

802.11n (HT40) Modulation

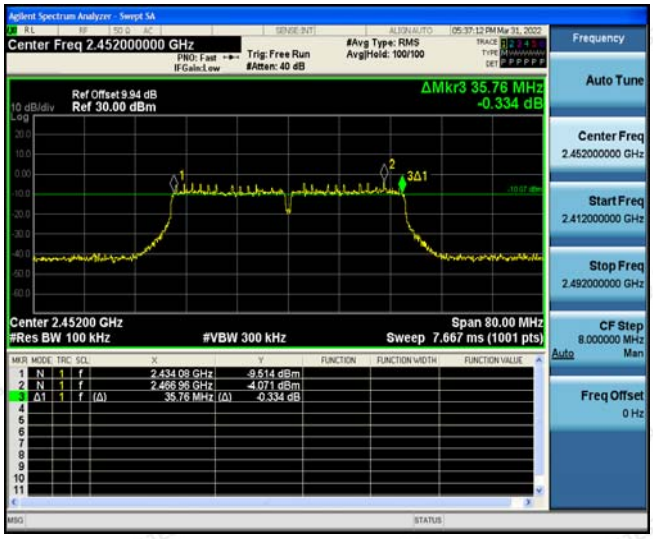
Lowest channel



Middle channel

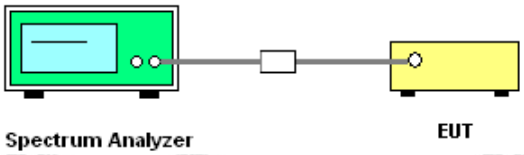


Highest channel



4.4. POWER SPECTRAL DENSITY

4.4.1. Test Specification

Test Requirement:	FCC Part15 C Section 15.247 (e)
Test Method:	KDB 558074
Limit:	The average power spectral density shall not be greater than 8dBm in any 3kHz band at any time interval of continuous transmission.
Test Setup:	
Test Mode:	Transmitting mode with modulation
Test Procedure:	1. The testing follows Measurement procedure 10.2 method PKPSD of FCC KDB Publication No.558074 D01 15.247 Meas Guidance v05r02. 2. The RF output of EUT was connected to the spectrum analyzer 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. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW): 3 kHz ≤ RBW ≤ 100 kHz. Video bandwidth VBW ≥ 3 x RBW. Set the span to at least 1.5 times the OBW. 5. Detector = Peak, Sweep time = auto couple. 6. Employ trace averaging (Peak) mode over a minimum of 100 traces. Use the peak marker function to determine the maximum power level. 7. 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 Due**
Spectrum analyzer	Agilent	N9020A	HKE-048	Feb. 17, 2023
RF Cable (9KHz-26.5GHz)	Tonscend	170660	N/A	Feb. 17, 2023
RF automatic control unit	Tonscend	JS0806-2	HKE-060	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

For antenna port 1

EUT Set Mode	Channel	Result (dBm/30kHz)	Result (dBm/3kHz)
802.11b	Lowest	-1.78	-11.78
	Middle	-2.41	-12.41
	Highest	-0.99	-10.99
802.11g	Lowest	-7.08	-17.08
	Middle	-6.85	-16.85
	Highest	-6.76	-16.76
802.11n(H20)	Lowest	-8.03	-18.03
	Middle	-7.88	-17.88
	Highest	-6.9	-16.9
802.11n(H40)	Lowest	-9.65	-19.65
	Middle	-8.96	-18.96
	Highest	-9.39	-19.39
PSD test result (dBm/3kHz)= PSD test result (dBm/30kHz)-10			
Limit: 8dBm/3kHz			
Test Result:	PASS		

Test plots as follows:

802.11b Modulation

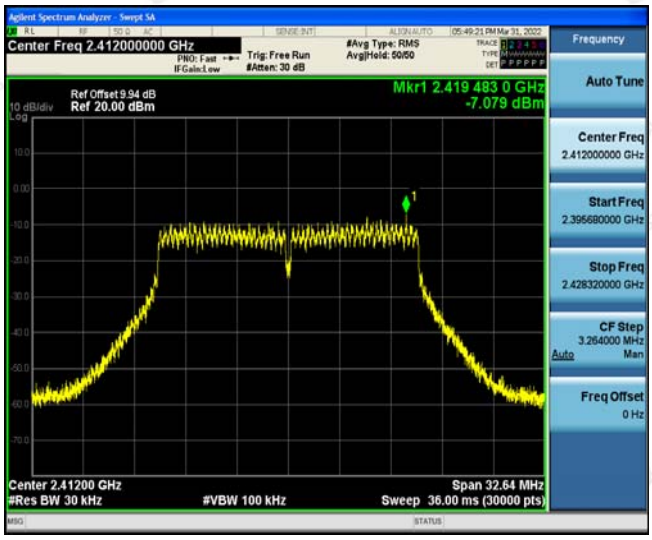
Lowest channel

Middle channel

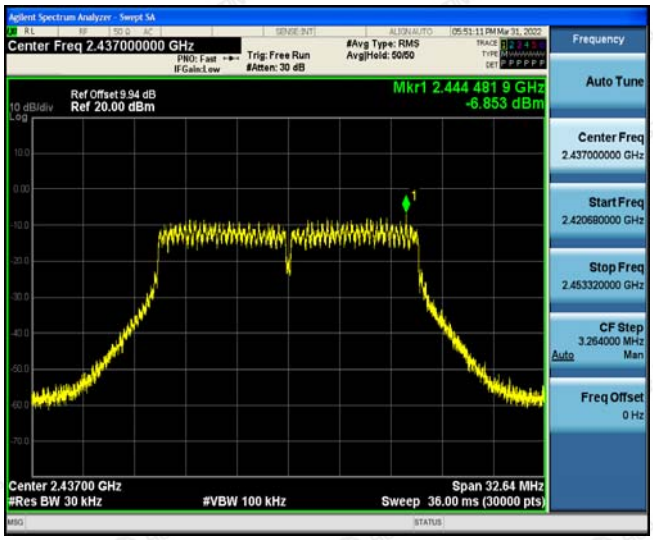
Highest channel

802.11g Modulation

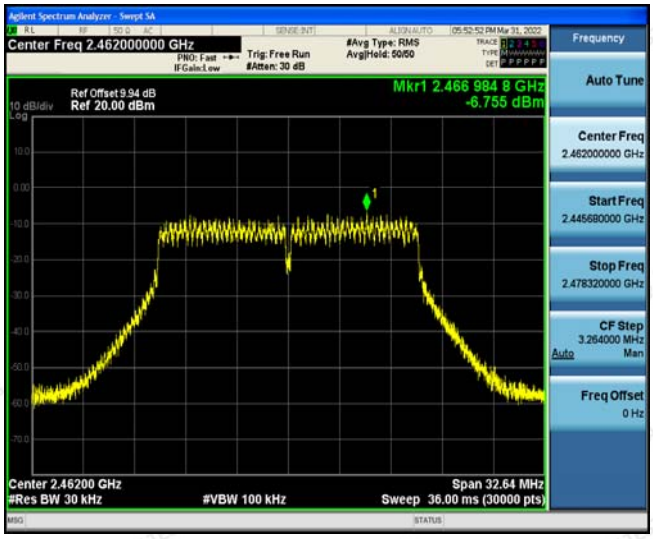
Lowest channel



Middle channel

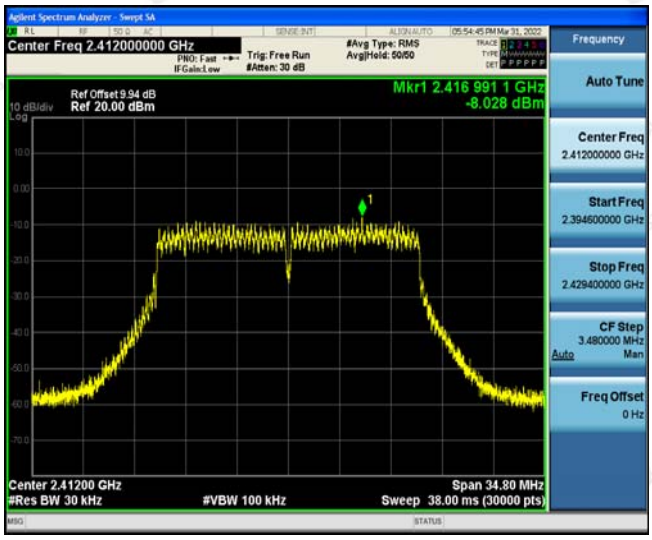


Highest channel

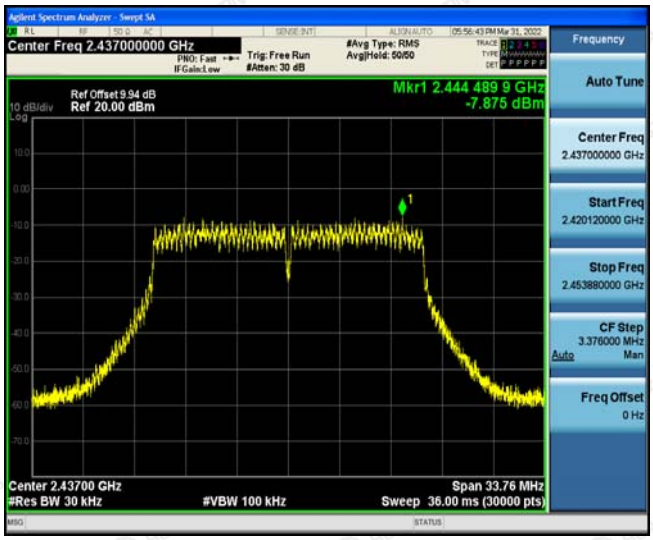


802.11n (HT20) Modulation

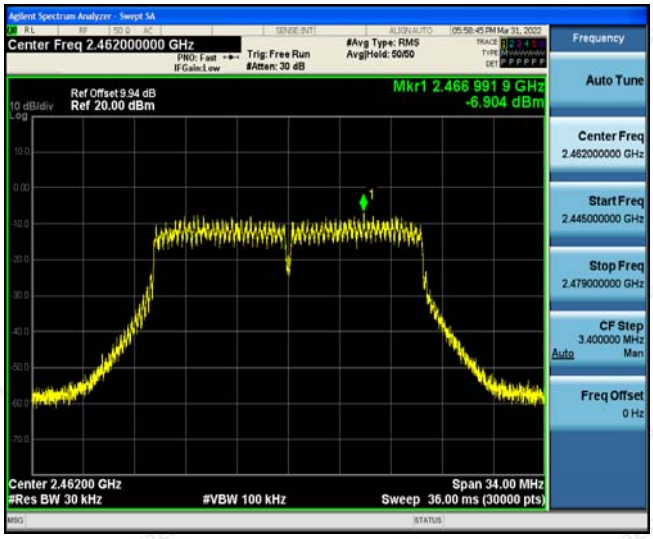
Lowest channel



Middle channel

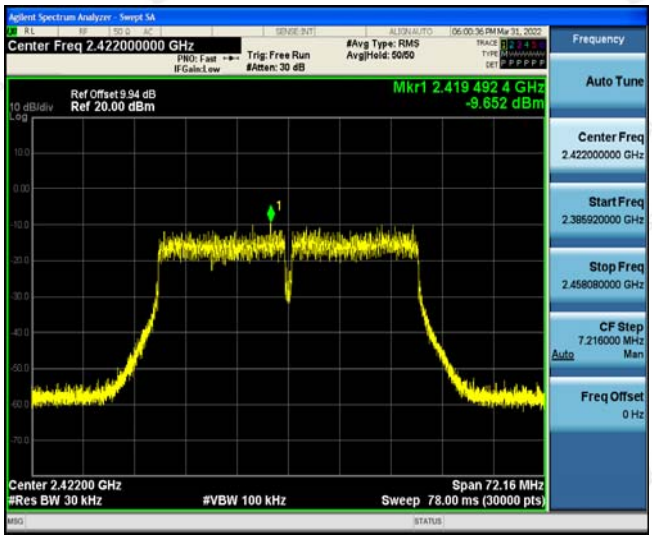


Highest channel

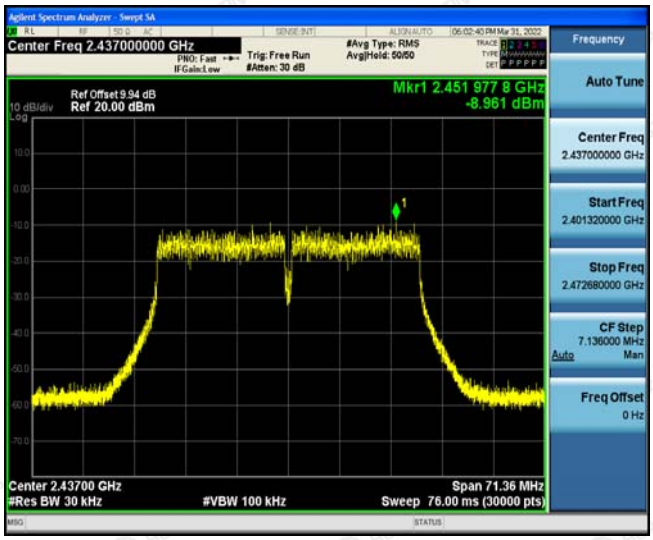


802.11n (HT40) Modulation

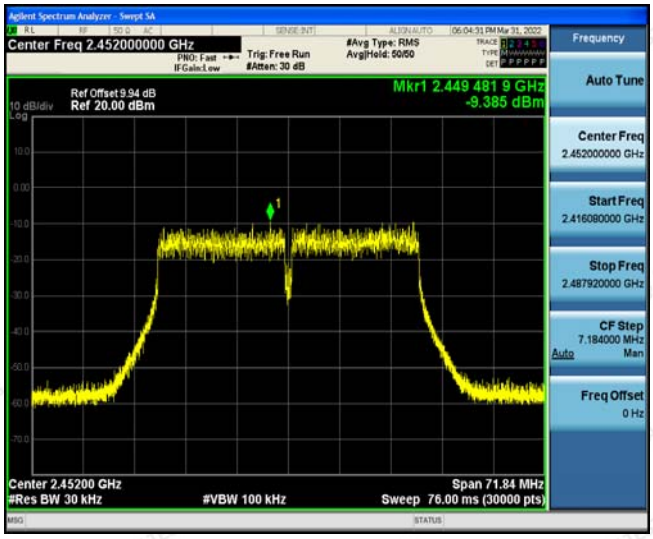
Lowest channel



Middle channel



Highest channel



For antenna port 2

EUT Set Mode	Channel	Result (dBm/30kHz)	Result (dBm/3kHz)
802.11b	Lowest	-0.59	-10.59
	Middle	-1.29	-11.29
	Highest	-0.35	-10.35
802.11g	Lowest	-6.5	-16.5
	Middle	-6.13	-16.13
	Highest	-5.83	-15.83
802.11n(H20)	Lowest	-6.56	-16.56
	Middle	-7.29	-17.29
	Highest	-6.13	-16.13
802.11n(H40)	Lowest	-9.33	-19.33
	Middle	-8.44	-18.44
	Highest	-8.33	-18.33
PSD test result (dBm/3kHz)= PSD test result (dBm/30kHz)-10			
Limit: 8dBm/3kHz			
Test Result:	PASS		

Test plots as follows:

802.11b Modulation

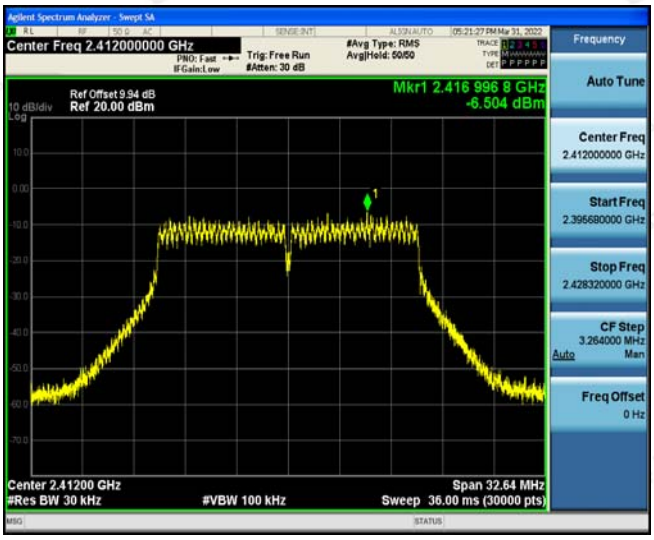
Lowest channel

Middle channel

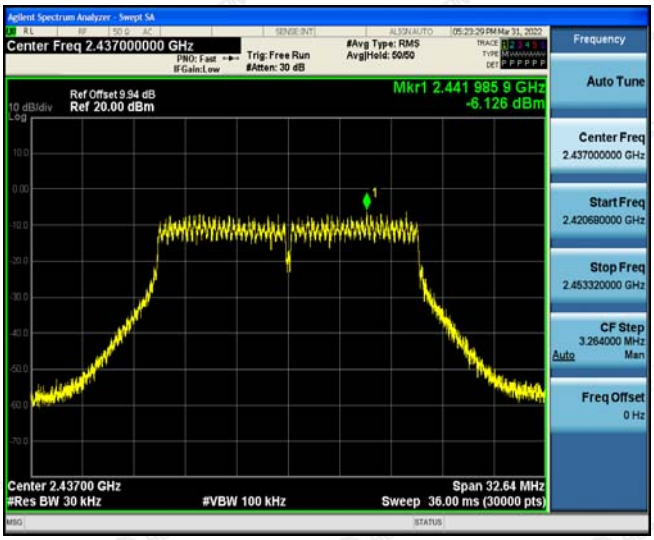
Highest channel

802.11g Modulation

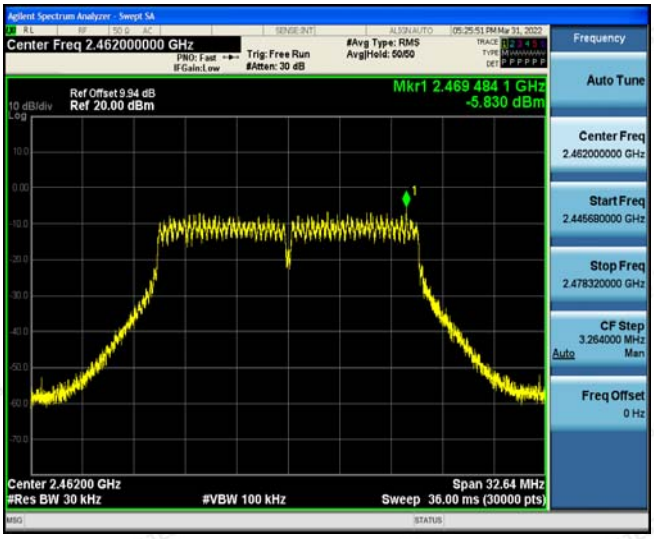
Lowest channel



Middle channel

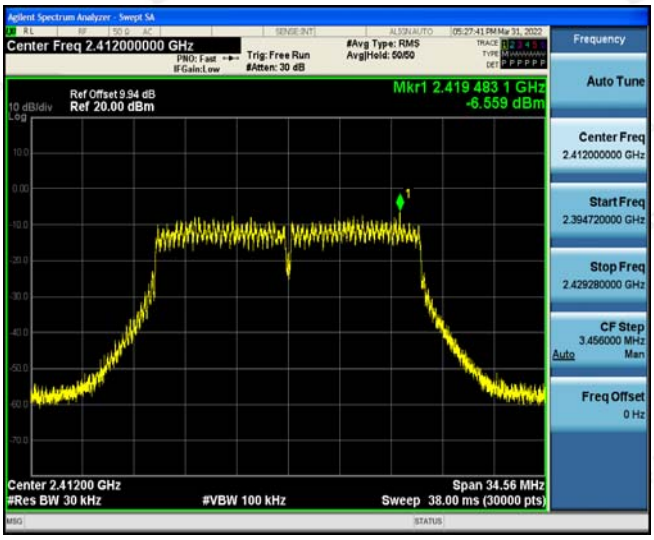


Highest channel

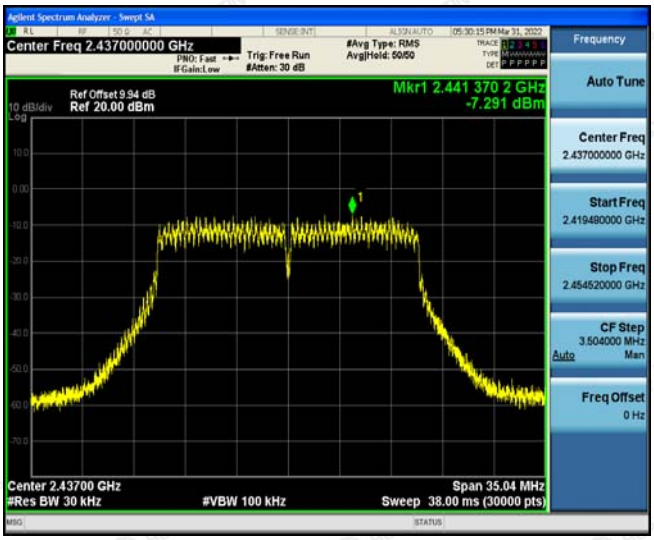


802.11n (HT20) Modulation

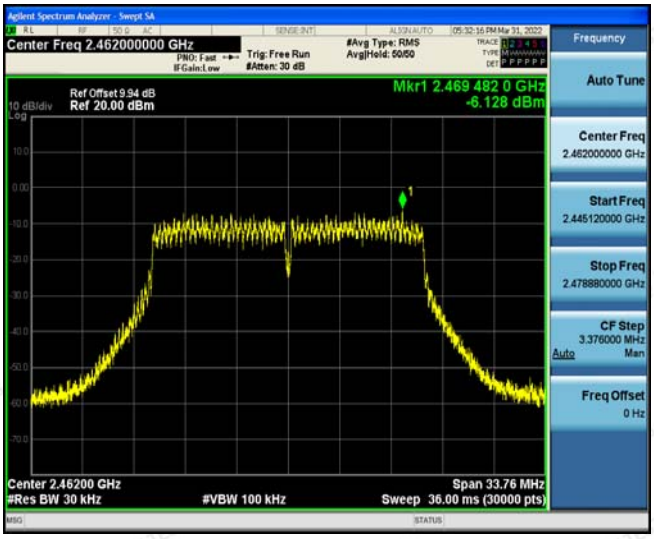
Lowest channel



Middle channel

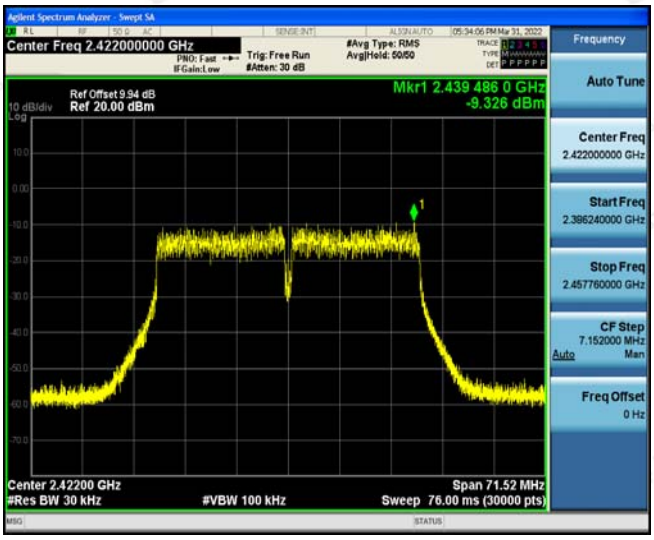


Highest channel

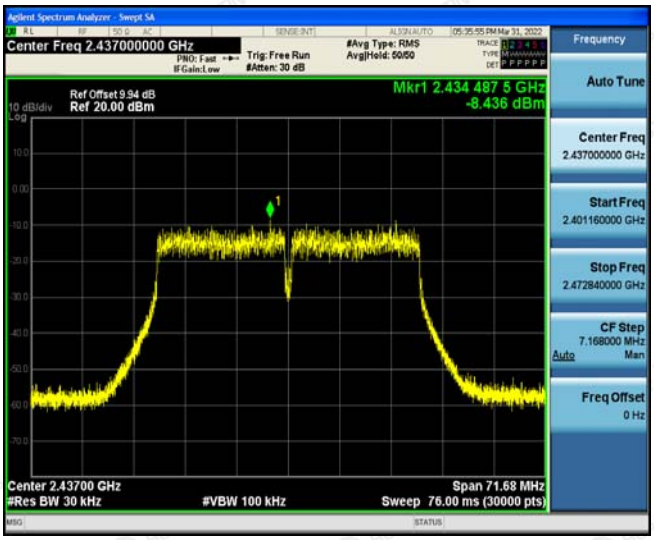


802.11n (HT40) Modulation

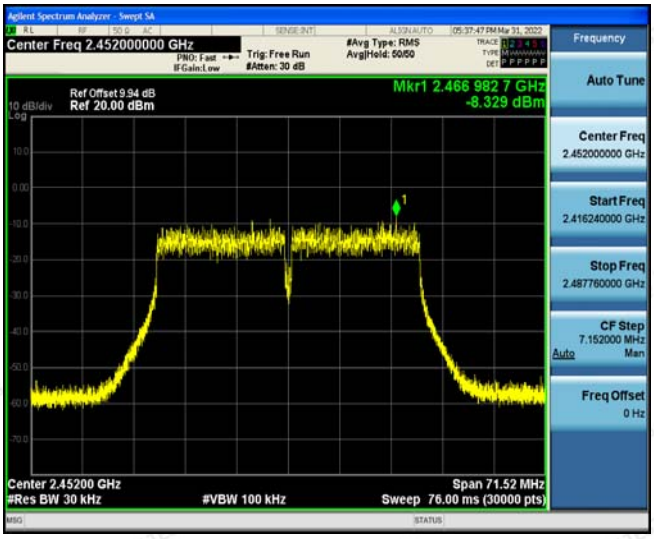
Lowest channel



Middle channel



Highest channel



For MIMO antenna port 1+antenna port 2

Frequency	Power Density (dBm/3kHz)	Limit (dBm/3kHz)	Result
TX 802.11n/HT20 Mode			
2412 MHz	-14.22	8	**PASS**
2437 MHz	-14.56	8	**PASS**
2462 MHz	-13.49	8	**PASS**
TX 802.11n/HT40 Mode			
2422 MHz	-16.48	8	**PASS**
2437 MHz	-15.68	8	**PASS**
2452 MHz	-15.82	8	**PASS**
Note: 1 According to KDB 662911, Result power = $10\log(10^{(ant1/10)}+10^{(ant2/10)})$. 2. limit=8dBm-(direction gain-6dBi)=8dBm			

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