Shenzhen Huaxia Testing Technology Co., Ltd

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Report Template Version: V03
Report Template Revision Date: Mar.1st, 2017

Test Report

Report No. :	CQASZ20210100004EX-02
Applicant:	SHENZHEN AOME CO.,LTD
Address of Applicant:	Room301 workshop, Xinfeng Building, Yangguang Community, Xili subdustreet, Nanshan District, Shenzhen, China
Manufacturer:	SHENZHEN AOME CO.,LTD
Address of Manufacturer:	Room301 workshop, Xinfeng Building, Yangguang Community, Xili subdustreet, Nanshan District, Shenzhen, China

Equipment Under Test (EUT):

Product:	Projector
All Model:	S350, S280, RODPJS450, RODPJS400
Test Model No.:	S350
Brand Name:	N/A
FCC ID:	2ARL5-S350RN
Standards:	47 CFR Part 15, Subpart C
Date of Test:	2021-1-12 to 2021-1-29
Date of Issue:	2021-3-1
Test Result :	**PASS**

Tested By: Jun Li

(Jun Li)

Reviewed By: Ares Liu

(Ares Liu)

Approved By: Sheek Luo

(Sheek Luo)

SHENZHEN HUAXIA TESTING TECHNOLOGY CO.,LTD 华夏准测 APPROVED

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* In the configuration tested, the EUT complied with the standards specified above.

The test report is effective only with both signature and specialized stamp, The result(s) shown in this report refer only to the sample(s) tested. Without written approval of CQA, this report can't be reproduced except in full.

2 Version

Revision History Of Report

Report No.	Version	Description	Issue Date
CQASZ20210100004EX-02	Rev.01	Initial report	2021-3-1

3 Test Summary

Test Item	Test Requirement	Test method	Result
Antenna Requirement	47 CFR Part 15, Subpart C Section 15.203/15.247 (c)	ANSI C63.10 2013	PASS
AC Power Line Conducted Emission	47 CFR Part 15, Subpart C Section 15.207	ANSI C63.10 2013	PASS
Conducted Peak & Average Output Power	47 CFR Part 15, Subpart C Section 15.247 (b)(3)	ANSI C63.10 2013	PASS
6dB Occupied Bandwidth	47 CFR Part 15, Subpart C Section 15.247 (a)(2)	ANSI C63.10 2013	PASS
Power Spectral Density	47 CFR Part 15, Subpart C Section 15.247 (e)	ANSI C63.10 2013	PASS
Band-edge for RF Conducted Emissions	47 CFR Part 15, Subpart C Section 15.247(d)	ANSI C63.10 2013	PASS
RF Conducted Spurious Emissions	47 CFR Part 15, Subpart C Section 15.247(d)	ANSI C63.10 2013	PASS
Radiated Spurious Emissions	47 CFR Part 15, Subpart C Section 15.205/15.209	ANSI C63.10 2013	PASS
Restricted bands around fundamental frequency (Radiated Emission)	47 CFR Part 15, Subpart C Section 15.205/15.209	ANSI C63.10 2013	PASS

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5 General Information

5.1 Client Information

Applicant:	SHENZHEN AOME CO.,LTD
Address of Applicant:	Room301 workshop, Xinfeng Building, Yangguang Community, Xili subdustreet, Nanshan District, Shenzhen, China
Manufacturer:	SHENZHEN AOME CO.,LTD
Address of Manufacturer:	Room301 workshop, Xinfeng Building, Yangguang Community, Xili subdustreet, Nanshan District, Shenzhen, China

5.2 General Description of EUT

Product Name:	Projector
Model No.:	S350, S280, RODPJS450, RODPJS400
Test Model No.:	S350
Trade Mark:	N/A
Hardware version：	1V1
Software version：	V2.5.8
Operation Frequency:	IEEE 802.11b/g/n(HT20): 2412MHz to 2462MHz IEEE 802.11n(HT40): 2422 MHz to 2452MHz
Channel Numbers:	IEEE 802.11b/g, IEEE 802.11n HT20: 11 Channels IEEE 802.11n(HT40): 7 Channels
Channel Separation:	5MHz
Type of Modulation:	IEEE for 802.11b: DSSS(CCK,DQPSK,DBPSK) IEEE for 802.11 g/n(HT20)/n(HT40) : OFDM
Product Type:	☐ Mobile ☐ Portable ☒ Fix Location
Test Software of EUT:	RF test (manufacturer declare)
Antenna Type	IPEX Antenna
Antenna Gain	ANT1: 2dBi ANT2: 2dBi MIMO: 5.01dBi
EUT Power Supply:	DC 3.7V from battery
Adapter Information:	MODEL: FJ-SW1501500N INPUT:100-240 50/60Hz 0.6A Max OUTPUT:15V 1500mA

Note:
All model: S350, S280, RODPJS450, RODPJS400
Only the model S350 was tested, since the electrical circuit design, layout, components used and internal wiring were identical for the above models, with difference being model name.

Operation Frequency each of channel(802.11b/g/n HT20)							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	2412MHz	4	2427MHz	7	2442MHz	10	2457MHz
2	2417MHz	5	2432MHz	8	2447MHz	11	2462MHz
3	2422MHz	6	2437MHz	9	2452MHz		

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:

For 802.11b/g/n (HT20)		For 802.11n (HT40)	
Channel	Frequency	Channel	Frequency
The Lowest channel	2412MHz	The Lowest channel	2422MHz
The Middle channel	2437MHz	The Middle channel	2437MHz
The Highest channel	2462MHz	The Highest channel	2452MHz

Note: Software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel individually.

5.3 Description of Support Units

The EUT has been tested with associated equipment below.

Description	Manufacturer	Model No.	Remark	Certification
AC-DC adapter	SHENZHEN FUJIA APPLIANCE CO.,LTD	MODEL: FJ-SW1501500N INPUT:100-240 50/60Hz 0.6A Max OUTPUT:15V 1500mA	Provide by applicant	SDOC

5.4 Test Location

All tests were performed at:

Shenzhen Huaxia Testing Technology Co., Ltd.,

1F., Block A of Tongsheng Technology Building, Huahui Road, Dalang Street, Longhua New District, Shenzhen, Guangdong, China

5.5 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **ISED Registration No.: 22984-1**

The 3m Semi-anechoic chamber of Shenzhen Huaxia Testing Technology Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing

- **A2LA (Certificate No. 4742.01)**

Shenzhen Huaxia Testing Technology Co., Ltd., Shenzhen EMC Laboratory is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 4742.01.

- **FCC Registration No.: 522263**

Shenzhen Huaxia Testing Technology Co., Ltd., Shenzhen EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration No.:522263

5.6 Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate.

The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities.

The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4 „Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements“ and is documented in the **Shenzhen Huaxia Testing Technology Co., Ltd.** quality system acc. to DIN EN ISO/IEC 17025.

Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for CQA laboratory is reported:

No.	Item	Uncertainty	Notes
1	Radiated Emission (Below 1GHz)	±5.12dB	(1)
2	Radiated Emission (Above 1GHz)	±4.60dB	(1)
3	Conducted Disturbance (0.15~30MHz)	±3.34dB	(1)
4	Radio Frequency	3×10^{-8}	(1)
5	Duty cycle	0.6 %.	(1)
6	Occupied Bandwidth	1.1%	(1)
7	RF conducted power	0.86dB	(1)
8	RF power density	0.74	(1)
9	Conducted Spurious emissions	0.86dB	(1)
10	Temperature test	0.8℃	(1)
11	Humidity test	2.0%	(1)
12	Supply voltages	0.5 %.	(1)
13	time	0.6 %.	(1)
14	Frequency Error	5.5 Hz	(1)

(1)This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

5.7 Deviation from Standards

None.

5.8 Abnormalities from Standard Conditions

None.

5.9 Other Information Requested by the Customer

None.

5.10 Equipment List

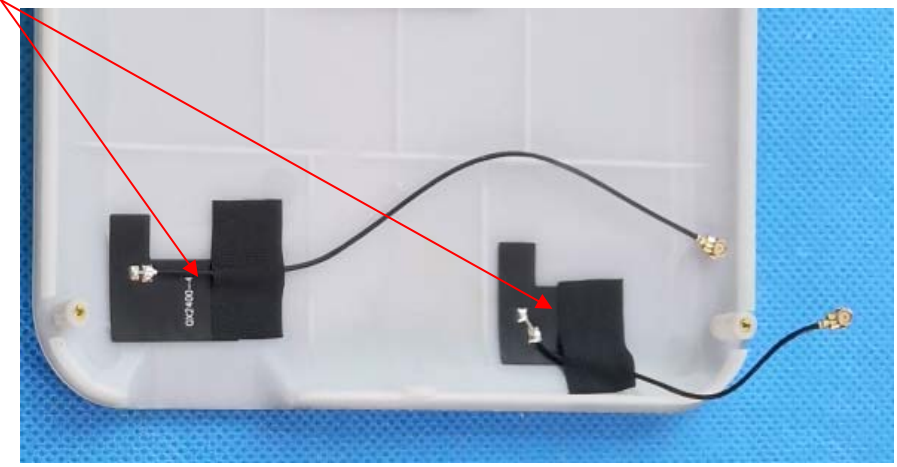
Test Equipment	Manufacturer	Model No.	Instrument No.	Calibration Date	Calibration Due Date
EMI Test Receiver	R&S	ESR7	CQA-005	2020/9/22	2021/9/21
Spectrum analyzer	R&S	FSU26	CQA-038	2020/10/24	2021/10/23
Preamplifier	MITEQ	AFS4-00010300-18-10P-4	CQA-035	2020/9/22	2021/9/21
Preamplifier	MITEQ	AMF-6D-02001800-29-20P	CQA-036	2020/10/28	2021/10/27
Loop antenna	Schwarzbeck	FMZB1516	CQA-087	2020/10/24	2021/10/23
Bilog Antenna	R&S	HL562	CQA-011	2020/9/22	2021/9/21
Horn Antenna	R&S	HF906	CQA-012	2020/9/22	2021/9/21
Horn Antenna	Schwarzbeck	BBHA 9170	CQA-088	2020/9/22	2021/9/21
Coaxial Cable (Above 1GHz)	CQA	N/A	C019	2020/9/22	2021/9/21
Coaxial Cable (Below 1GHz)	CQA	N/A	C020	2020/9/22	2021/9/21
Antenna Connector	CQA	RFC-01	CQA-080	2020/9/22	2021/9/21
RF cable(9KHz~40GHz)	CQA	RF-01	CQA-079	2020/9/22	2021/9/21
Power Sensor	KEYSIGHT	U2021XA	CQA-30	2020/9/22	2021/9/21
N1918A Power Analysis Manager Power Panel	Agilent	N1918A	CQA-074	2020/9/22	2021/9/21
Power divider	MIDWEST	PWD-2533-02-SMA-79	CQA-067	2020/9/22	2021/9/21
EMI Test Receiver	R&S	ESPI3	CQA-013	2020/9/22	2021/9/21
LISN	R&S	ENV216	CQA-003	2020/11/1	2021/10/30
Coaxial cable	CQA	N/A	CQA-C009	2020/9/22	2021/9/21

Note:

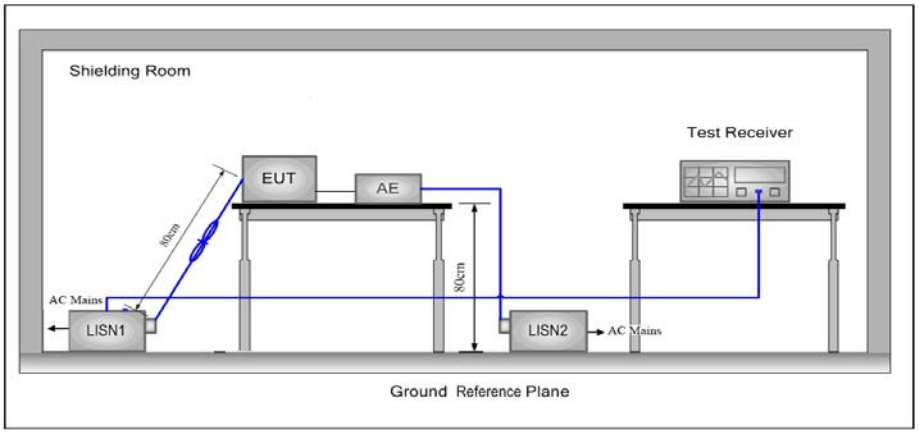
The temporary antenna connector is soldered on the PCB board in order to perform conducted tests and this temporary antenna connector is listed in the equipment list.

6 Test results and Measurement Data

6.1 Antenna Requirement

Standard requirement:	47 CFR Part 15C Section 15.203 /247(c)
15.203 requirement: An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. 15.247(b) (4) requirement: The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.	
EUT Antenna:	Antenna 
The antenna is IPEX antenna. The best case gain of the ant1 and ant2 is 2dBi,MIMO is 5.01dBi.	

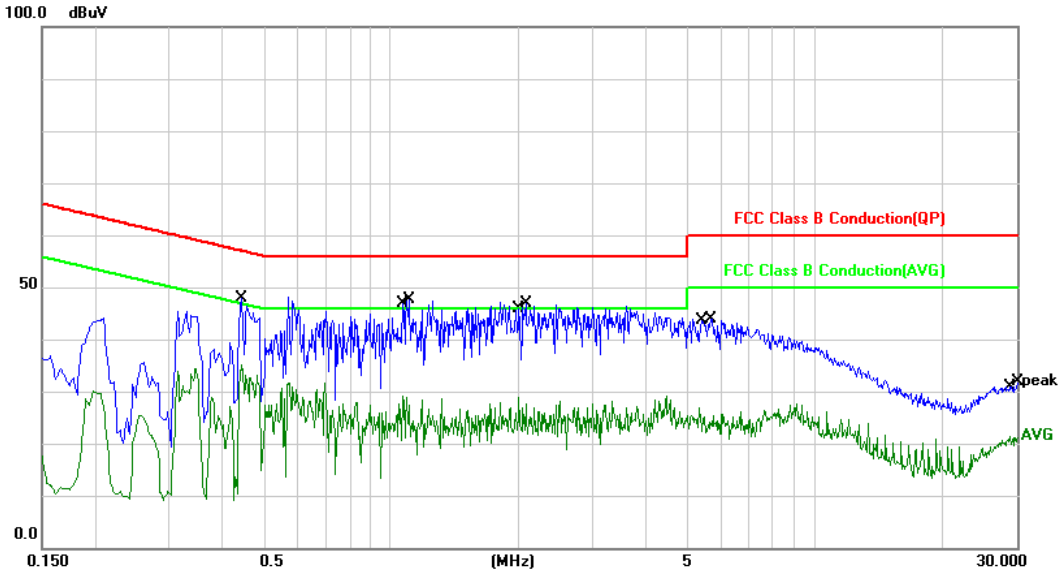
6.2 Conducted Emissions

<table>
<tr><td>Test Requirement:</td><td>47 CFR Part 15C Section 15.207</td></tr>
<tr><td>Test Method:</td><td>ANSI C63.10: 2013</td></tr>
<tr><td>Test Frequency Range:</td><td>150kHz to 30MHz</td></tr>
<tr><td>Limit:</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>
* Decreases with the logarithm of the frequency.
</td></tr>
<tr><td>Test Procedure:</td><td>1) The mains terminal disturbance voltage test was conducted in a shielded room.
2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50Ω/50μH + 5Ω linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference
plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a
single LISN provided the rating of the LISN was not exceeded.
3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane,
4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2.
5) 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 Setup:</td><td> 
</td></tr>
<tr><td>Exploratory Test Mode:</td><td>Transmitting with all kind of modulations, data rates at lowest, middle and</td></tr>
</table>

	highest channel.
Final Test Mode:	All modes of 802.11b/g/n20/n40 were tested at Low, Middle, and High channel; only the worst result of 802.11b CH11 was reported as below
Test Voltage:	AC120V/60Hz
Test Results:	Pass

Measurement Data

Live Line:

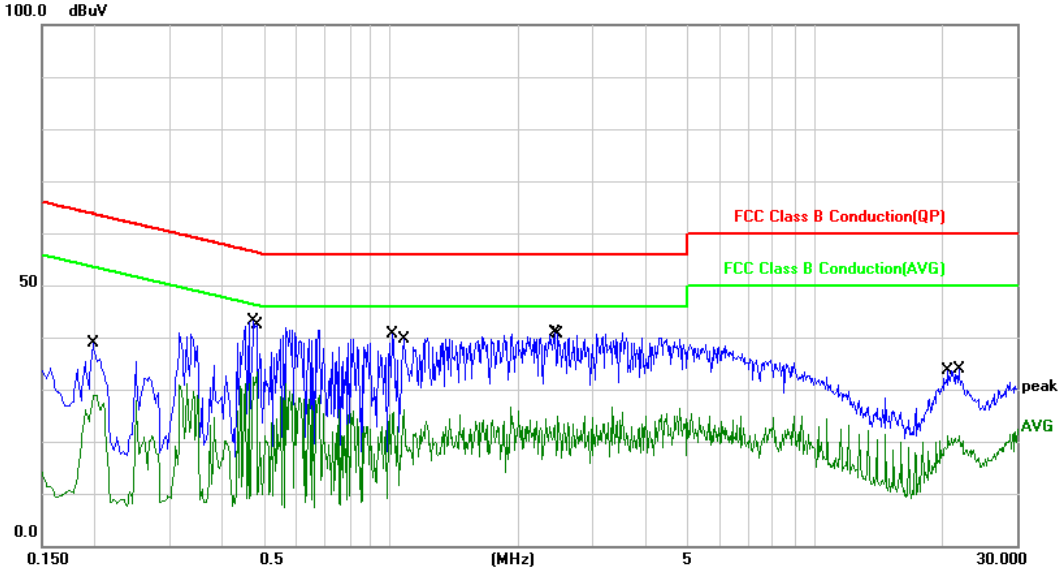


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.4460	47.98	-0.02	47.96	56.95	-8.99	QP	
2		0.4460	35.25	-0.02	35.23	46.95	-11.72	AVG	
3		1.0660	29.34	-0.13	29.21	46.00	-16.79	AVG	
4	*	1.1019	47.69	-0.14	47.55	56.00	-8.45	QP	
5		2.0020	29.23	-0.23	29.00	46.00	-17.00	AVG	
6		2.0780	47.14	-0.23	46.91	56.00	-9.09	QP	
7		5.3419	27.16	-0.23	26.93	50.00	-23.07	AVG	
8		5.7059	44.17	-0.24	43.93	60.00	-16.07	QP	
9		29.0420	21.80	-0.40	21.40	50.00	-28.60	AVG	
10		30.0000	32.18	-0.41	31.77	60.00	-28.23	QP	

Remark:

1. The following Quasi-Peak and Average measurements were performed on the EUT:
2. Final Test Level =Receiver Reading + LISN Factor + Cable Loss.
3. If the Peak value under Average limit, the Average value is not recorded in the report.

Neutral Line:

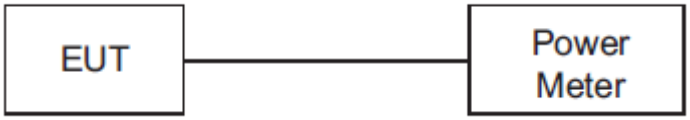


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1980	38.80	0.19	38.99	63.69	-24.70	QP	
2		0.1980	28.78	0.19	28.97	53.69	-24.72	AVG	
3		0.4740	42.81	0.32	43.13	56.44	-13.31	QP	
4	*	0.4820	33.04	0.32	33.36	46.30	-12.94	AVG	
5		1.0060	40.41	0.29	40.70	56.00	-15.30	QP	
6		1.0740	25.76	0.28	26.04	46.00	-19.96	AVG	
7		2.4380	40.70	0.16	40.86	56.00	-15.14	QP	
8		2.4739	24.75	0.19	24.94	46.00	-21.06	AVG	
9		20.7020	21.37	-0.12	21.25	50.00	-28.75	AVG	
10		21.8940	33.94	-0.13	33.81	60.00	-26.19	QP	

Remark:

1. The following Quasi-Peak and Average measurements were performed on the EUT:
2. Final Test Level =Receiver Reading + LISN Factor + Cable Loss.
3. If the Peak value under Average limit, the Average value is not recorded in the report.

6.3 Conducted Peak & Average Output Power

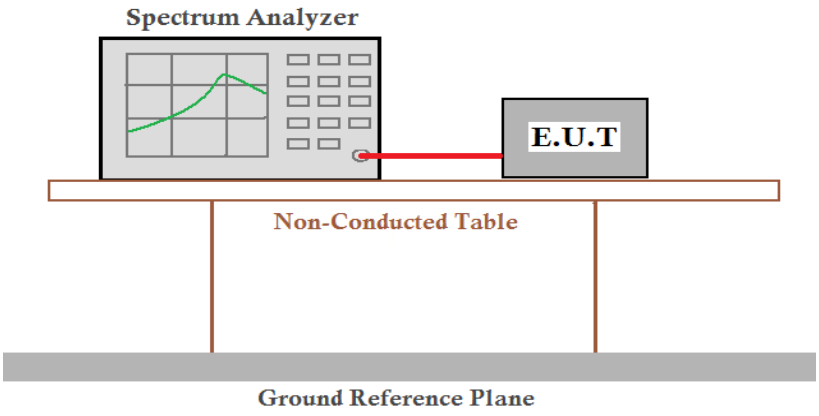
Test Requirement:	47 CFR Part 15C Section 15.247 (b)(3)
Test Method:	ANSI C63.10: 2013
Test Setup:	
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates
Final Test Mode:	Through Pre-scan, find the 1Mbps of rate is the worst case of 802.11b; 6Mbps of rate is the worst case of 802.11g; MCS0Mbps of rate is the worst case of 802.11n(HT20)/n(HT40);Only the worst case is recorded in the report.
Limit:	30dBm
Test Results:	Pass

WIFI

Type	Test channel	Peak Output Power (dBm)			Limit (dBm)	Result
		ANT1	ANT2	MIMO		
802.11b	Lowest	14.76	15.88	/	30.00	Pass
	Middle	15.14	16.78	/		
	Highest	15.47	15.31	/		
802.11g	Lowest	11.68	12.25	/	30.00	Pass
	Middle	11.65	13.05	/		
	Highest	12.61	14.15	/		
802.11n (HT20)	Lowest	10.18	11.05	13.647	30.00	Pass
	Middle	10.96	11.50	14.249		
	Highest	11.06	12.55	14.879		
802.11n (HT40)	Lowest	9.54	10.83	13.243	30.00	Pass
	Middle	9.58	11.15	13.446		
	Highest	10.30	11.73	14.084		

Note: 1.The test results including the cable lose.

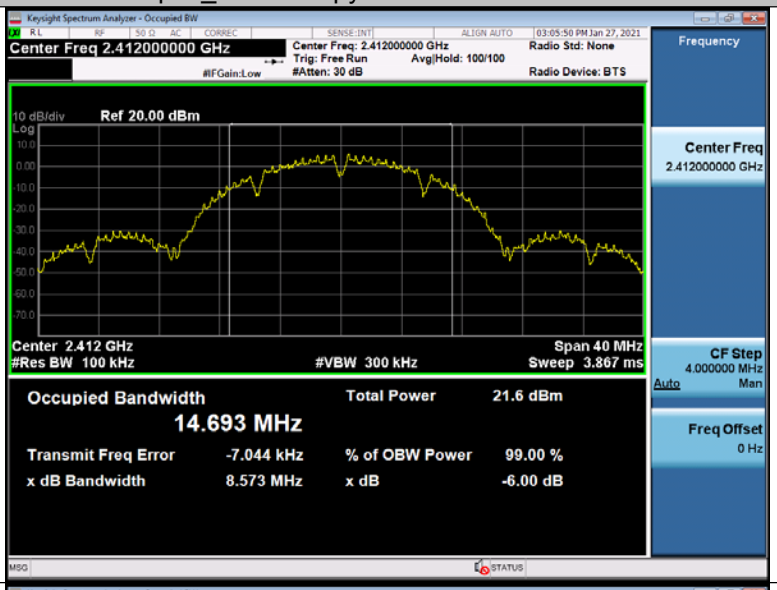
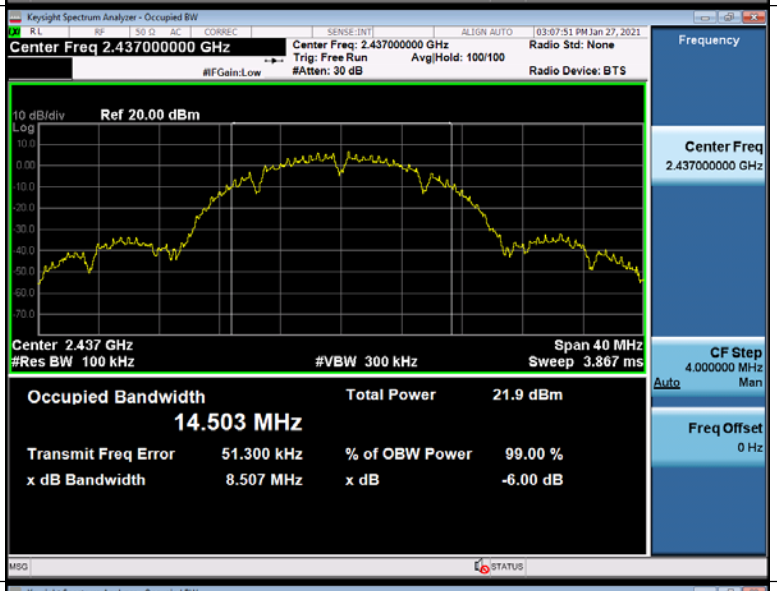
6.4 6dB Occupy Bandwidth

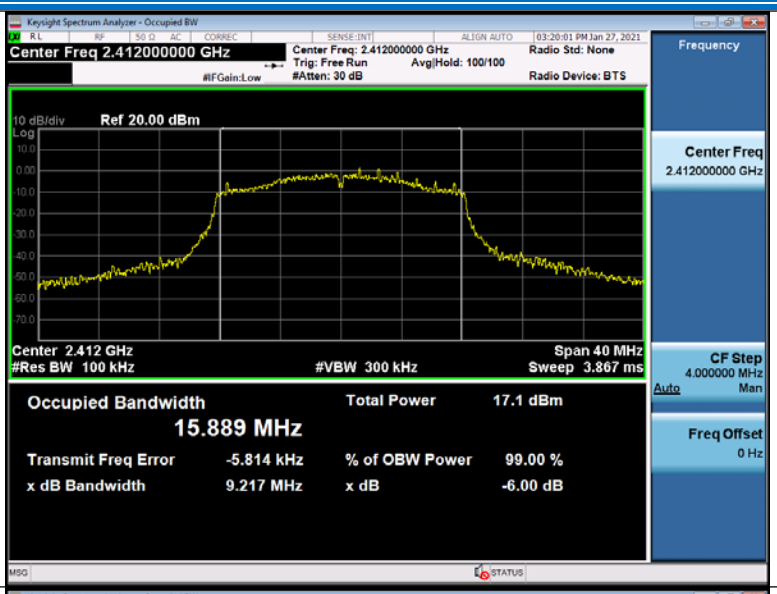
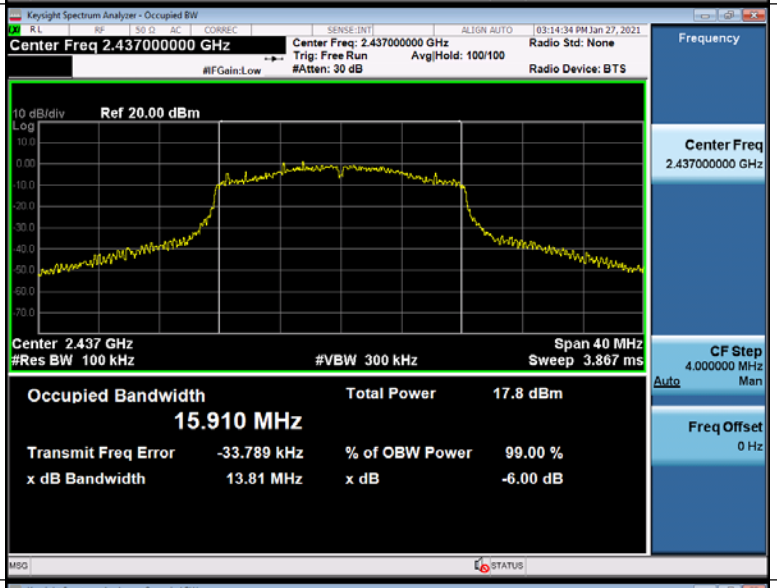
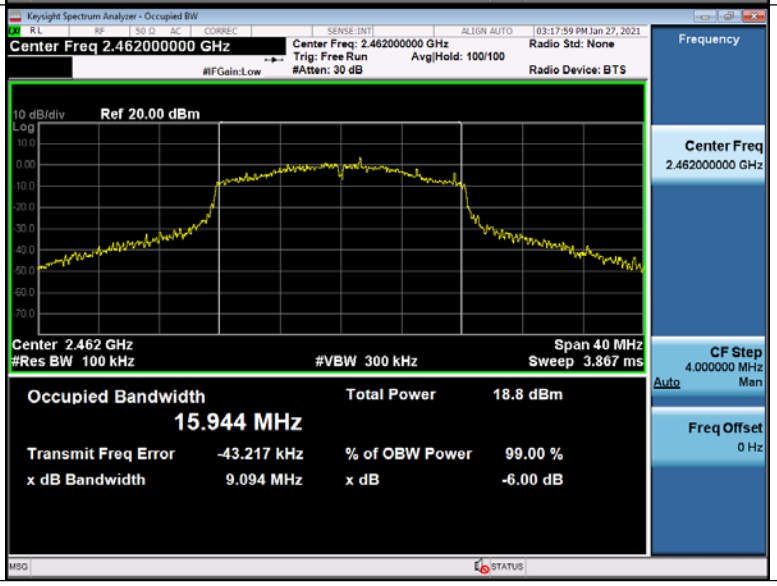
Test Requirement:	47 CFR Part 15C Section 15.247 (a)(2)
Test Method:	ANSI C63.10: 2013
Test Setup:	 Offset=cable loss+ attenuation factor
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates
Final Test Mode:	Through Pre-scan, find the 1Mbps of rate is the worst case of 802.11b; 6Mbps of rate is the worst case of 802.11g; MCS0Mbps of rate is the worst case of 802.11n(HT20)/n(HT40);Only the worst case is recorded in the report.
Limit:	≥ 500 kHz
Test Results:	Pass

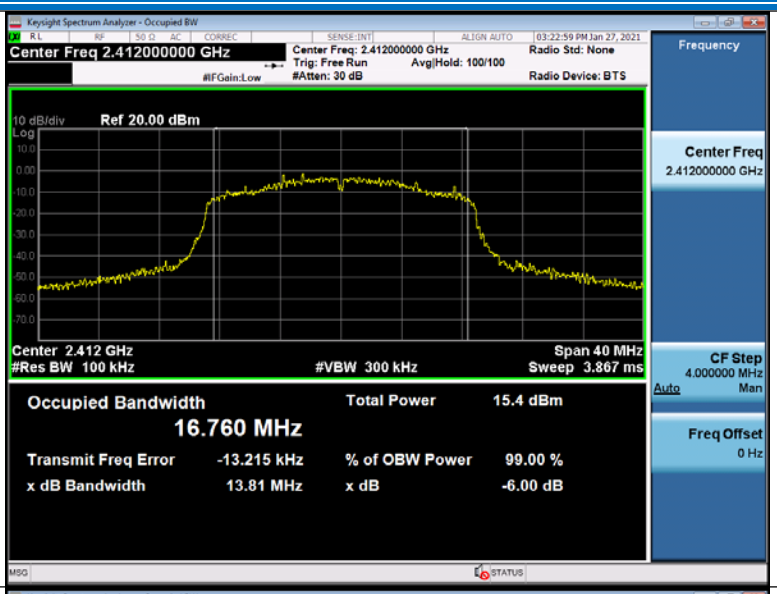
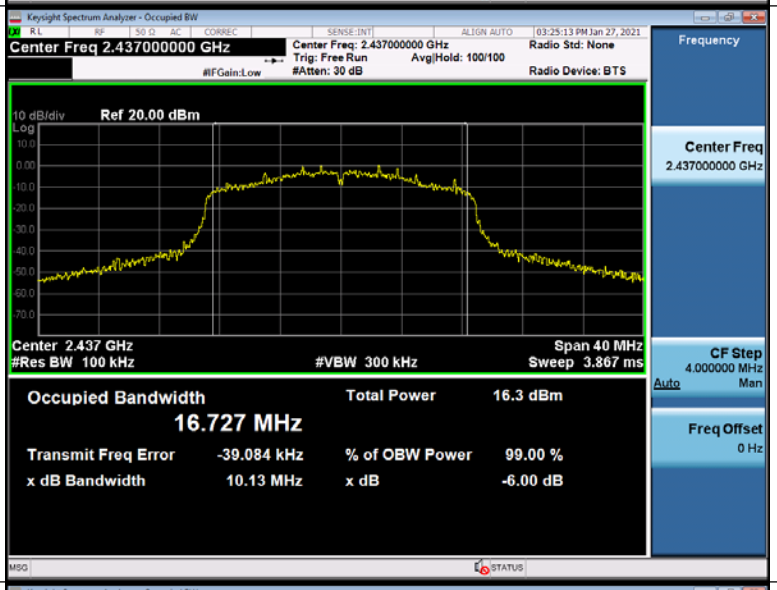
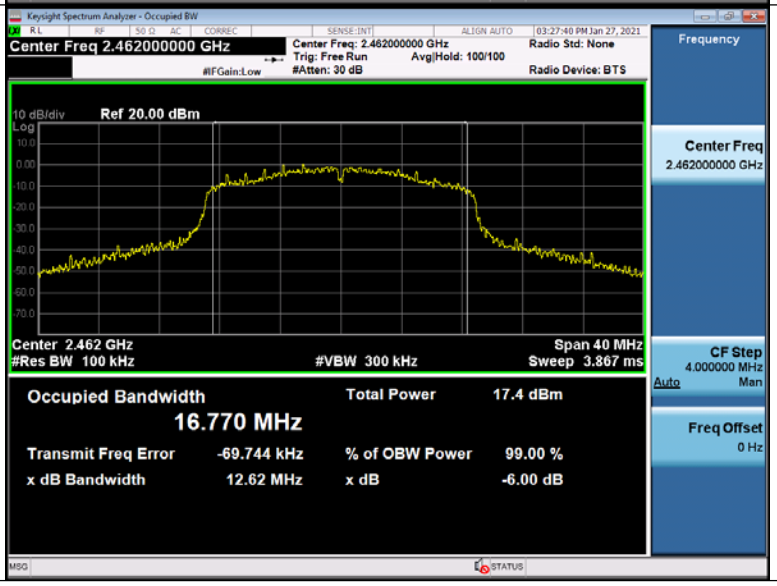
Measurement Data

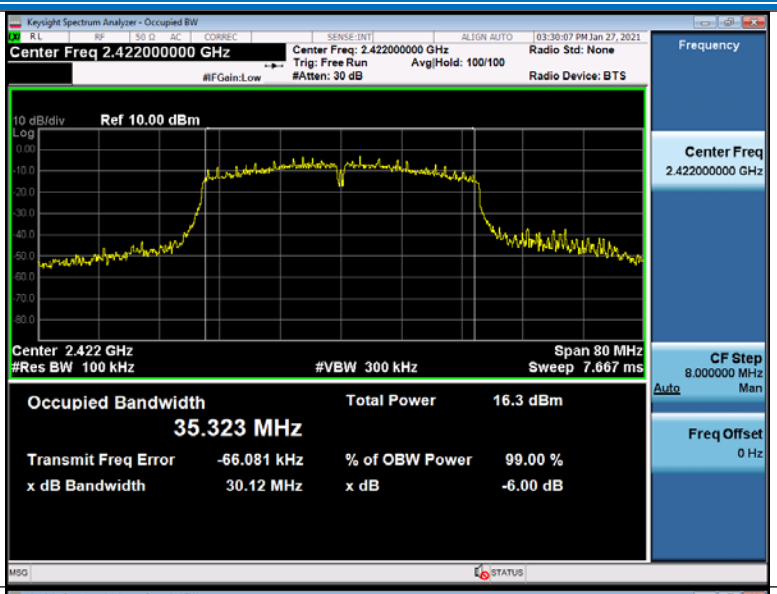
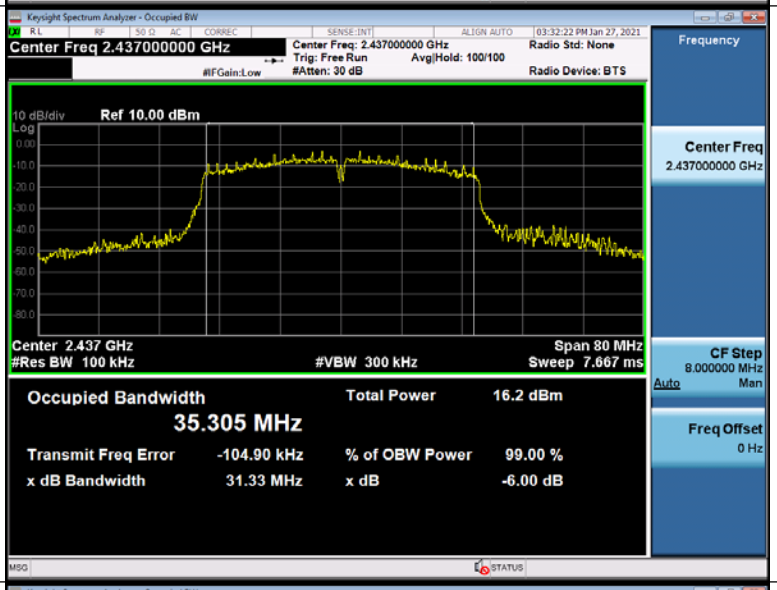
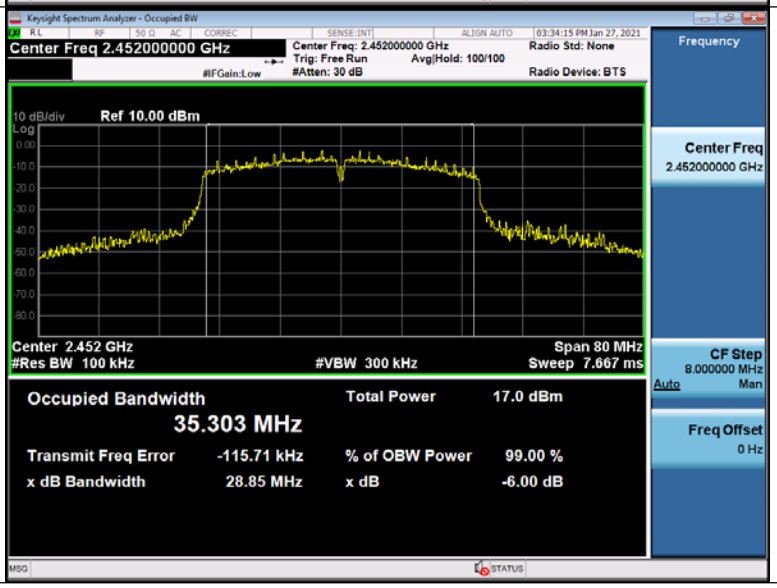
Type	Channel	6dB Bandwidth (MHz)		Limit (KHz)	Result
		ANT1	ANT2		
802.11b	Lowest	8.573	9.105	≥500	Pass
	Middle	8.507	9.051		
	Highest	9.11	9.108		
802.11g	Lowest	9.217	10.07	≥500	Pass
	Middle	13.81	10.78		
	Highest	9.094	11.65		
802.11n(HT20)	Lowest	13.81	9.437	≥500	Pass
	Middle	10.13	8.904		
	Highest	12.62	8.782		
802.11n(HT40)	Lowest	30.12	30.05	≥500	Pass
	Middle	31.33	31.33		
	Highest	28.85	28.92		

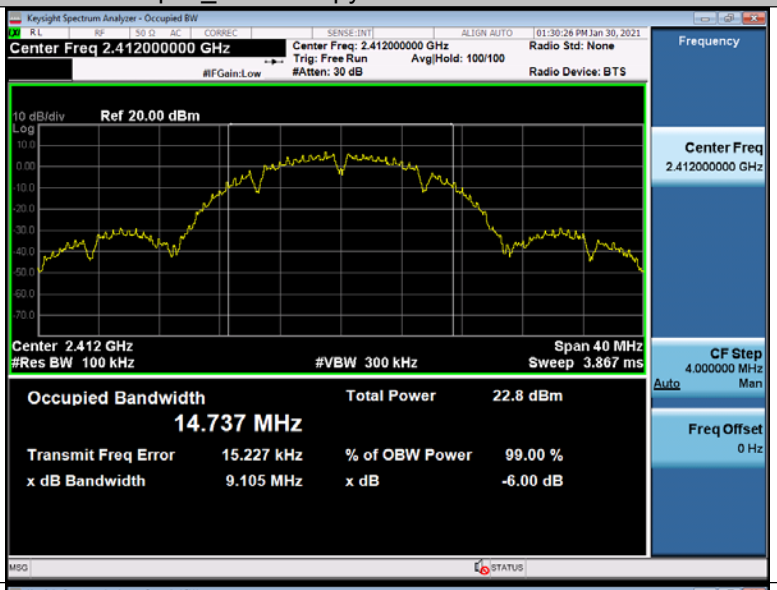
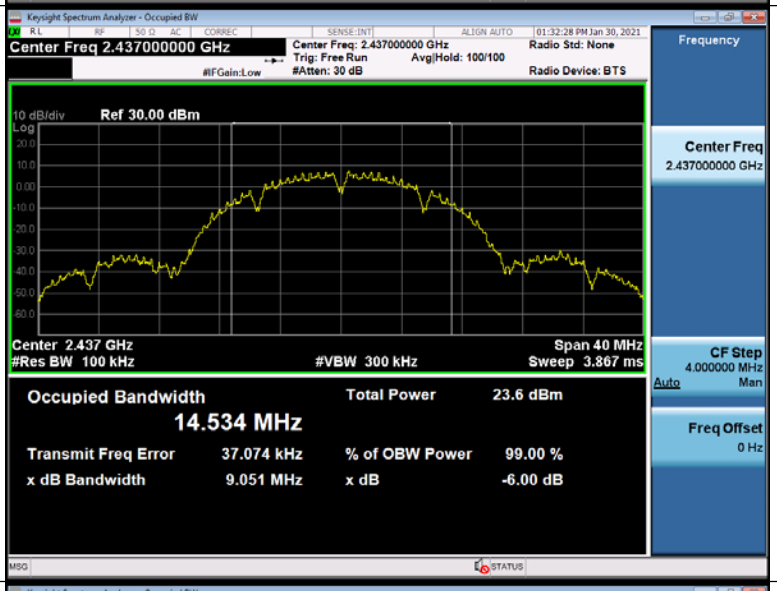
Test plot as follows:

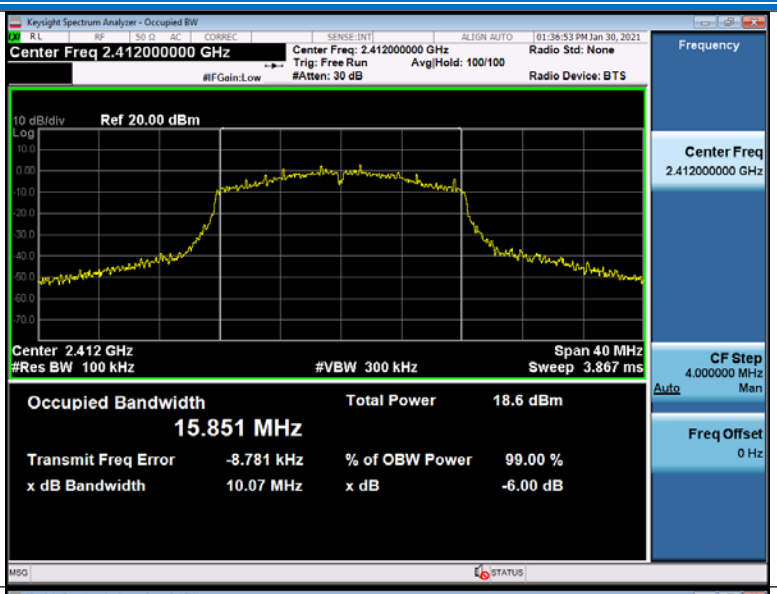
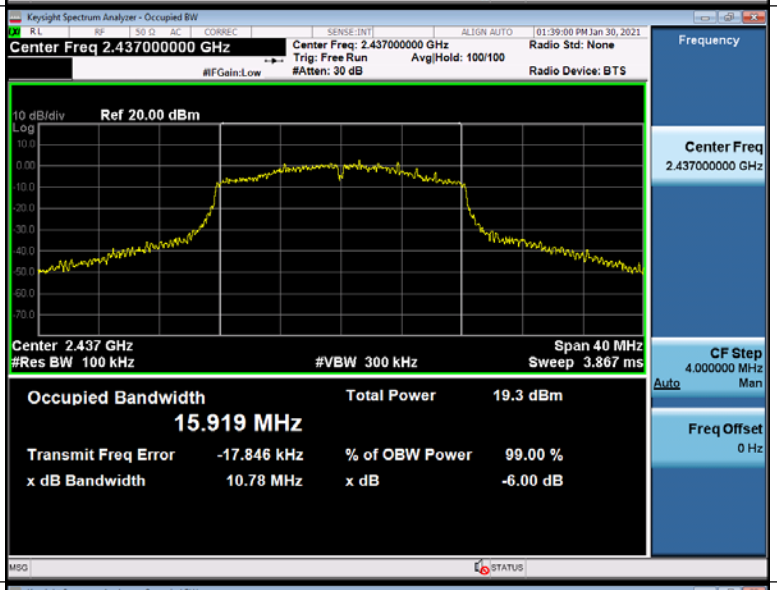
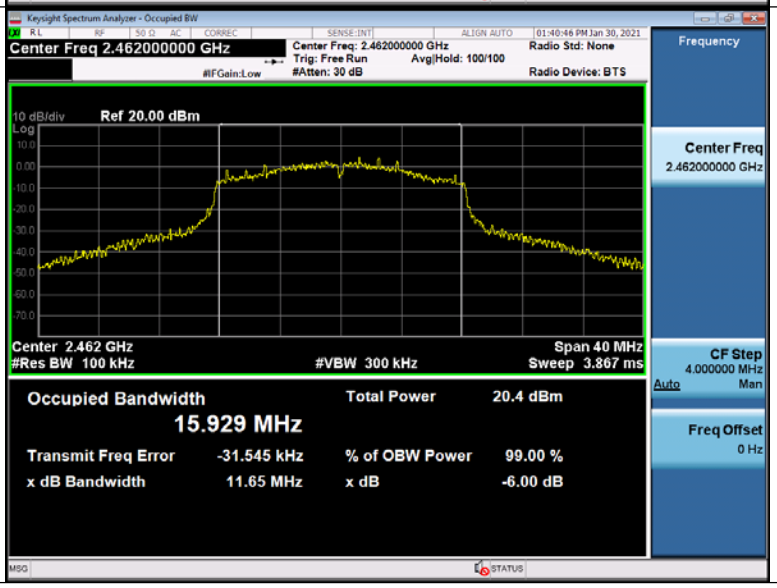
ANT1--Graphs_6dB Occupy Bandwidth		
11B/LCH		
11B/MCH		
11B/HCH		

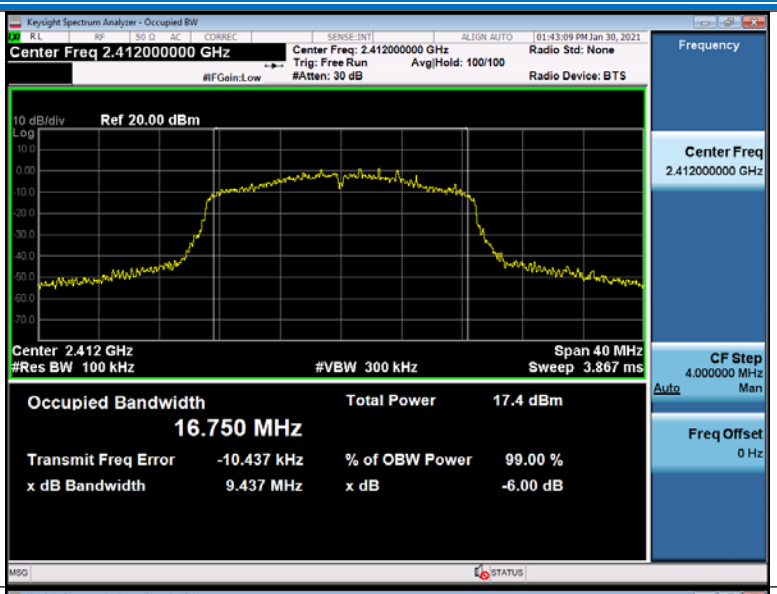
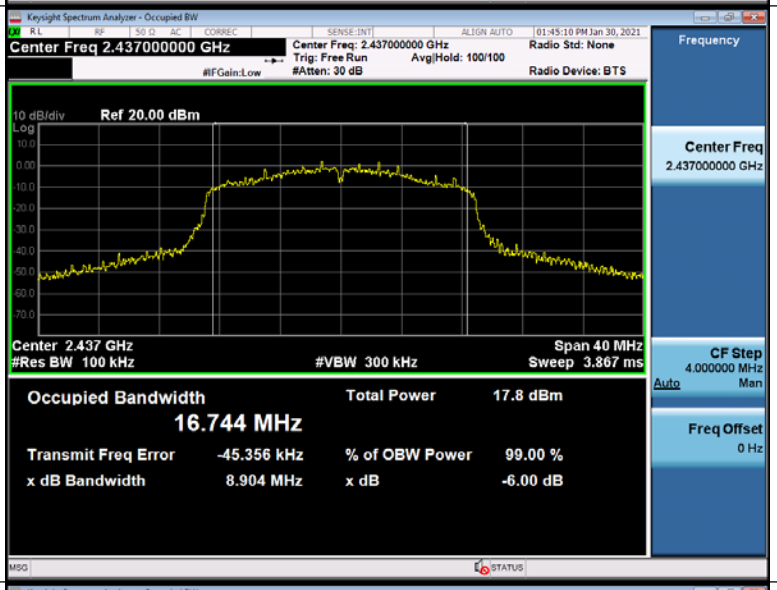
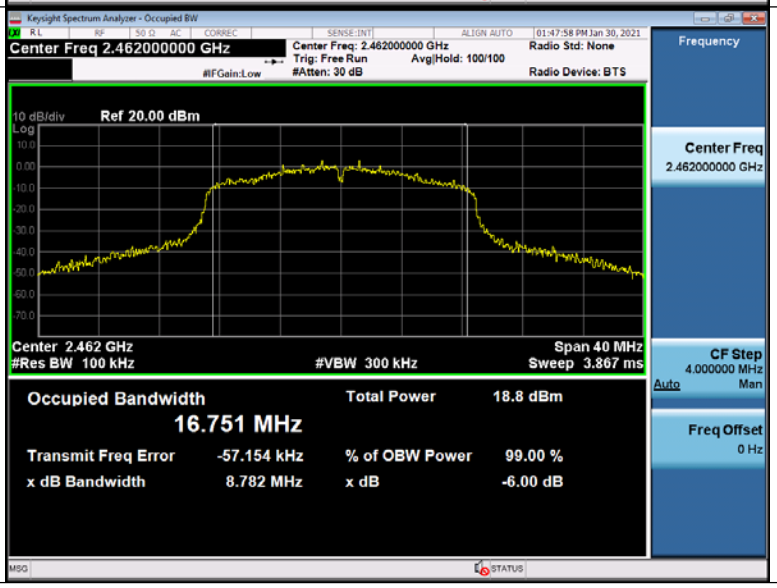
11G/LCH		
11G/MCH		
11G/HCH		

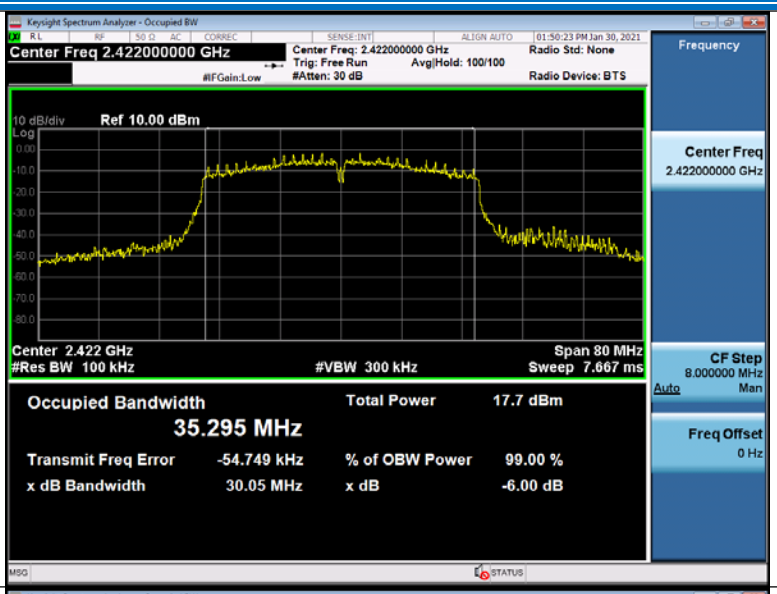
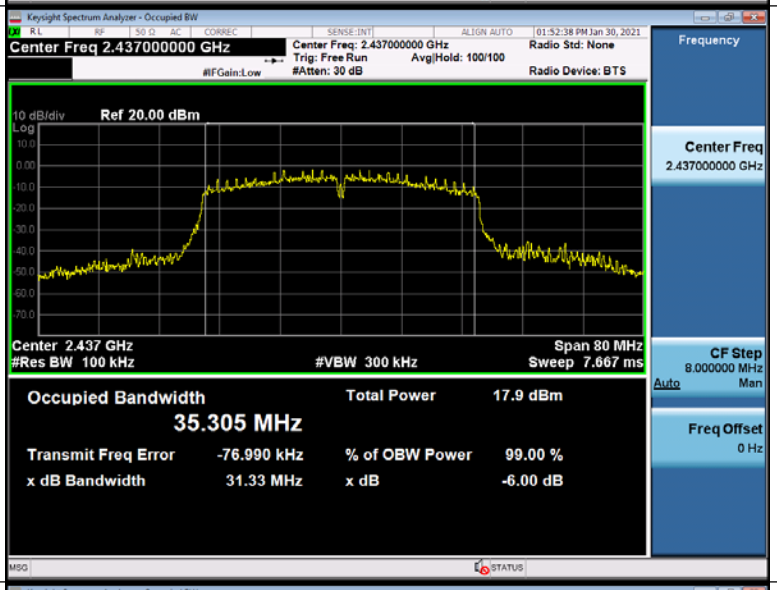
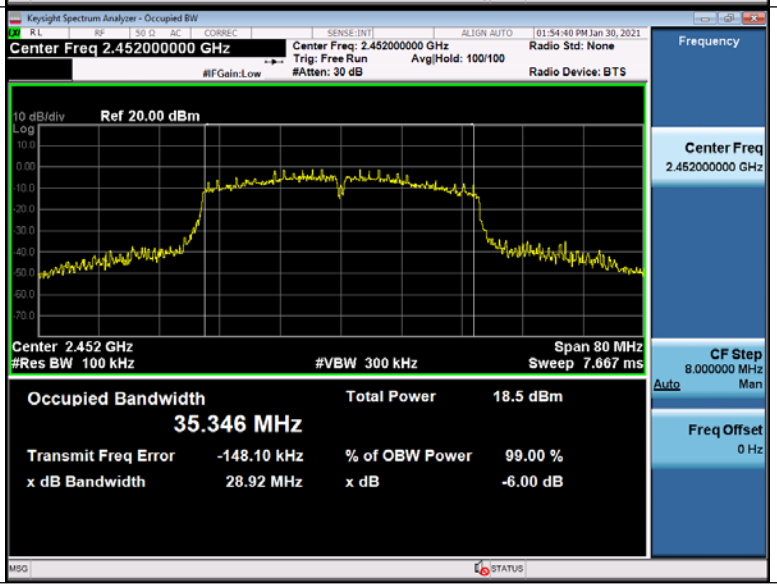
11N20/LCH	
11N20/MCH	
11N20/HCH	

11N40/LCH		
11N40/MCH		
11N40/HCH		

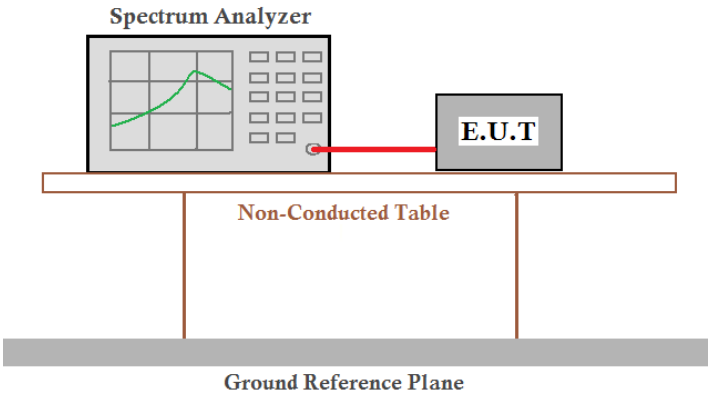
ANT2--Graphs_6dB Occupy Bandwidth		
11B/LCH		
11B/MCH		
11B/HCH		

11G/LCH	
11G/MCH	
11G/HCH	

11N20/LCH		
11N20/MCH		
11N20/HCH		

11N40/LCH		
11N40/MCH		
11N40/HCH		

6.5 Power Spectral Density

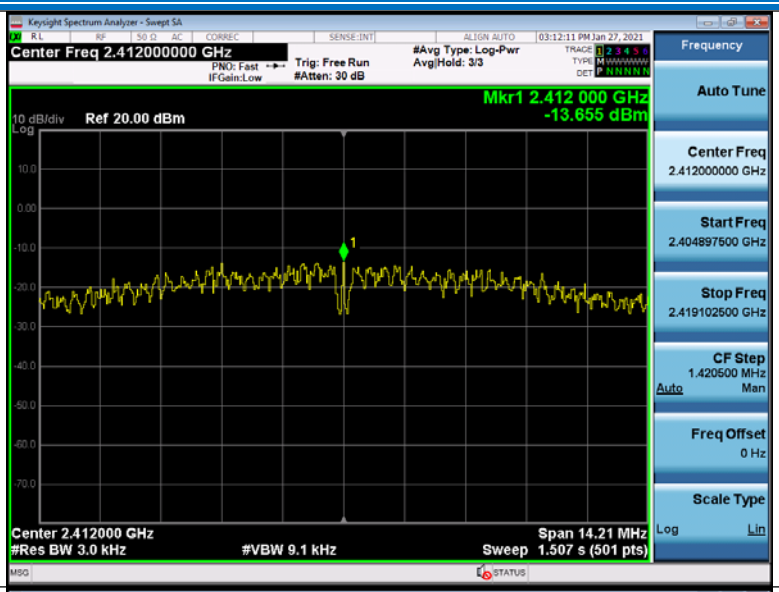
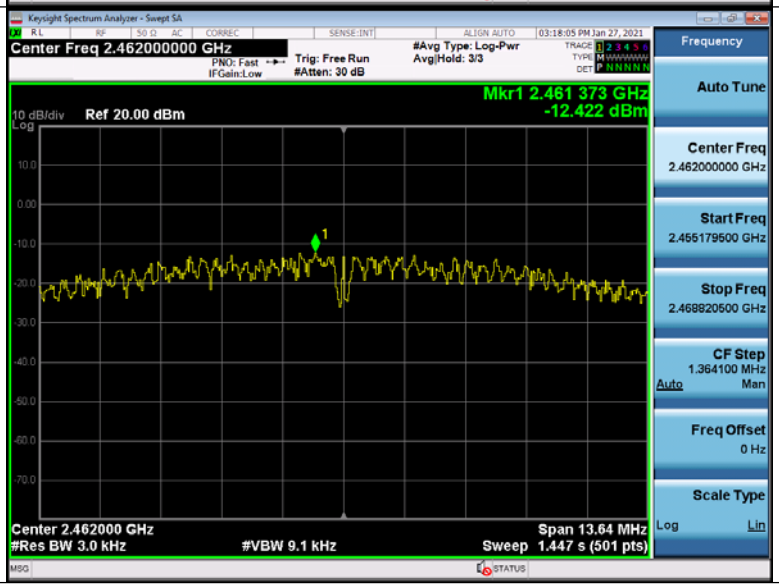
Test Requirement:	47 CFR Part 15C Section 15.247 (e)
Test Method:	ANSI C63.10: 2013
Test Setup:	 Offset=cable loss+ attenuation factor
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates
Final Test Mode:	Through Pre-scan, find the 1Mbps of rate is the worst case of 802.11b; 6Mbps of rate is the worst case of 802.11g; MCS0Mbps of rate is the worst case of 802.11n(HT20)/n(HT40);Only the worst case is recorded in the report.
Limit:	≤8.00dBm/3kHz
Test Results:	Pass

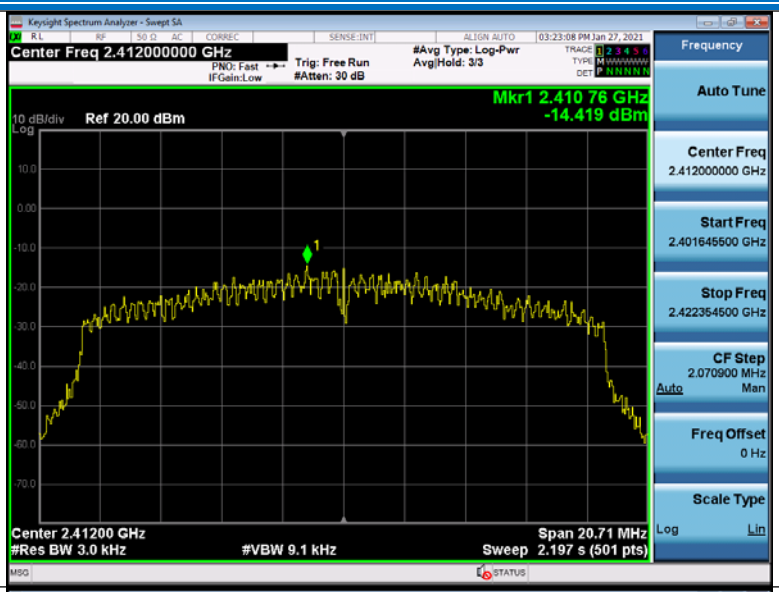
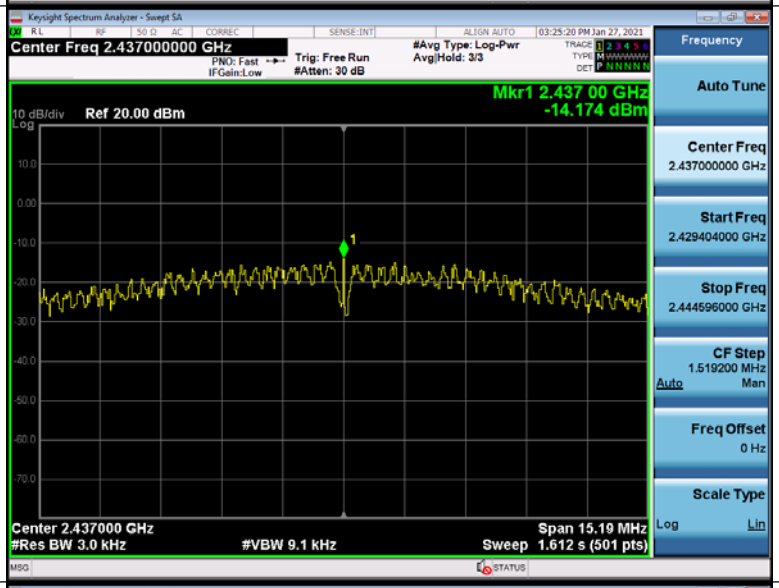
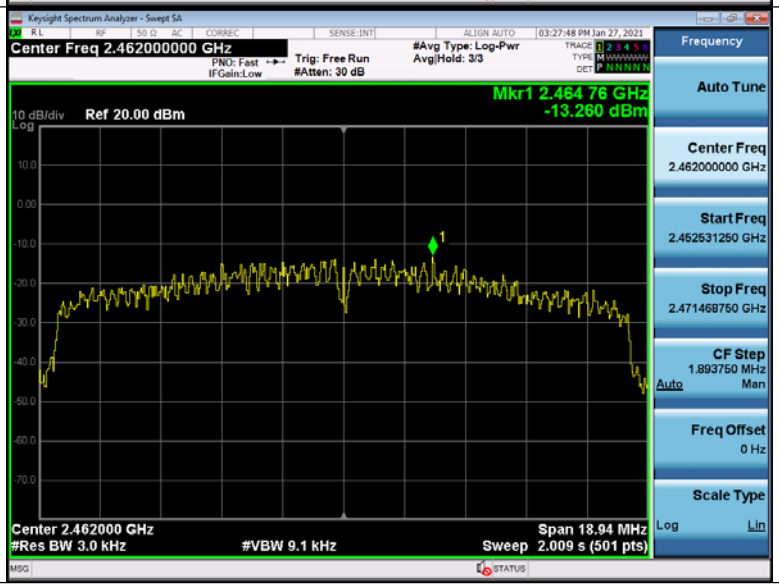
Measurement Data

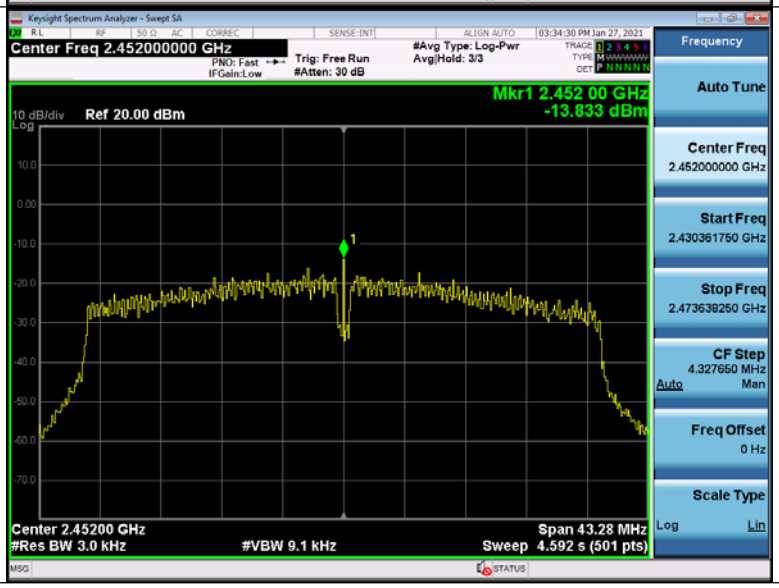
Type	Channel	Power Spectral Density (dBm/3KHz)			Limit (dBm/3KHz)	Result
		ANT1	ANT2	SUM		
802.11b	Lowest	-9.620	-6.805	/	8	Pass
	Middle	-8.860	-6.813	/		
	Highest	-8.578	-6.182	/		
802.11g	Lowest	-13.655	-11.444	/	8	Pass
	Middle	-13.017	-11.354	/		
	Highest	-12.422	-10.14	/		
802.11n(HT20)	Lowest	14.419	-12.871	14.427	8	Pass
	Middle	-14.174	-12.291	-10.121		
	Highest	-13.260	-11.219	-9.110		
802.11n(HT40)	Lowest	-13.117	-11.798	-9.397	8	Pass
	Middle	-14.041	-11.922	-9.843		
	Highest	-13.833	-12.299	-9.988		

Test plot as follows:

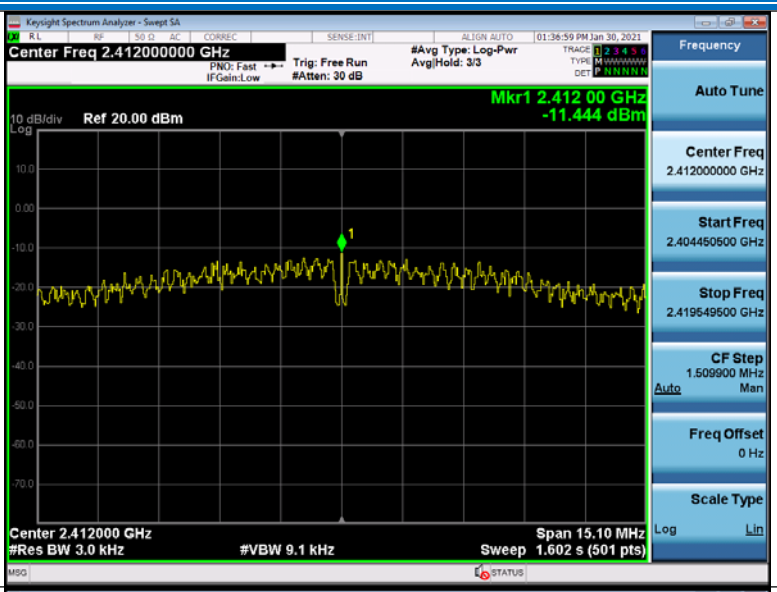
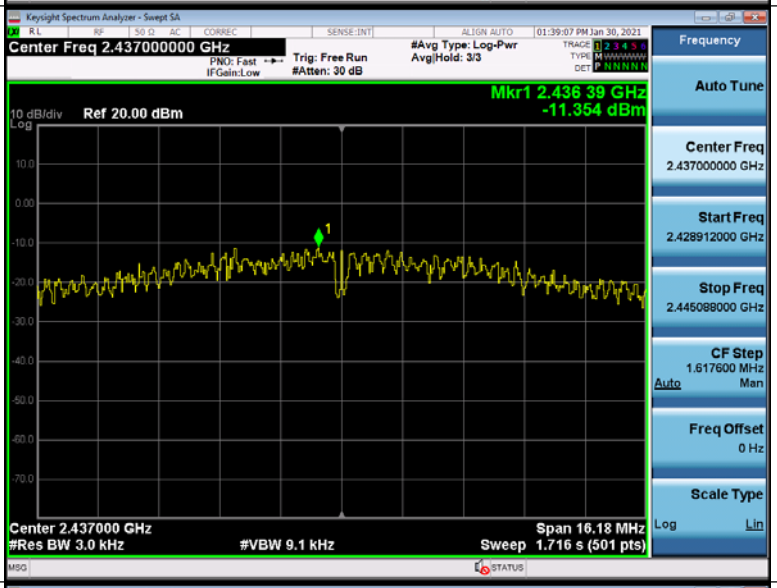
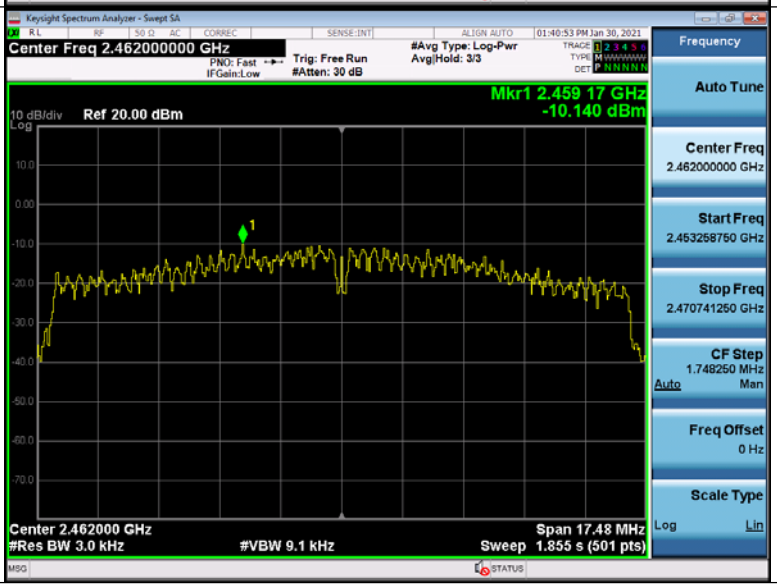
ANT1--Graphs		
11B/LCH		
11B/MCH		
11B/HCH		

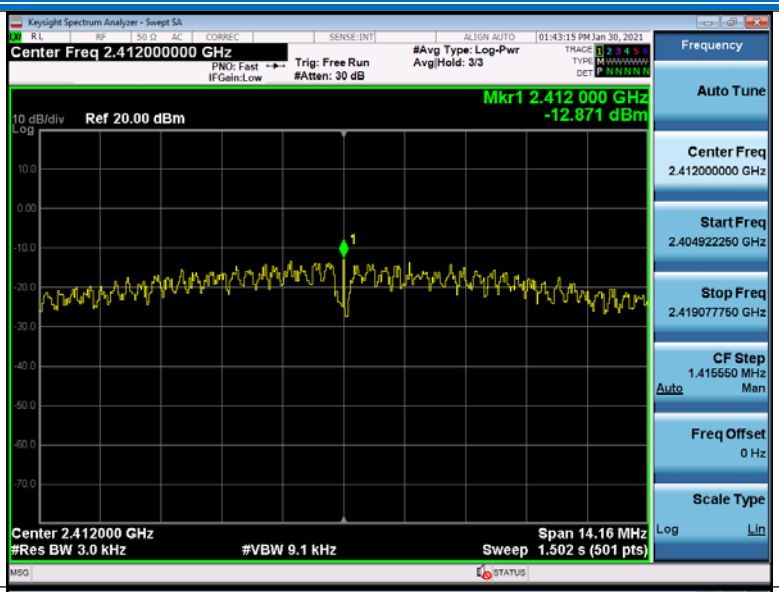
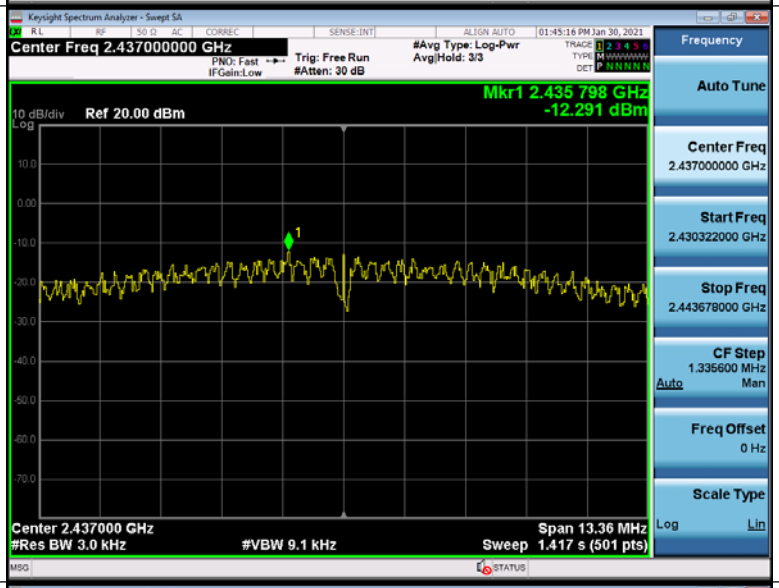
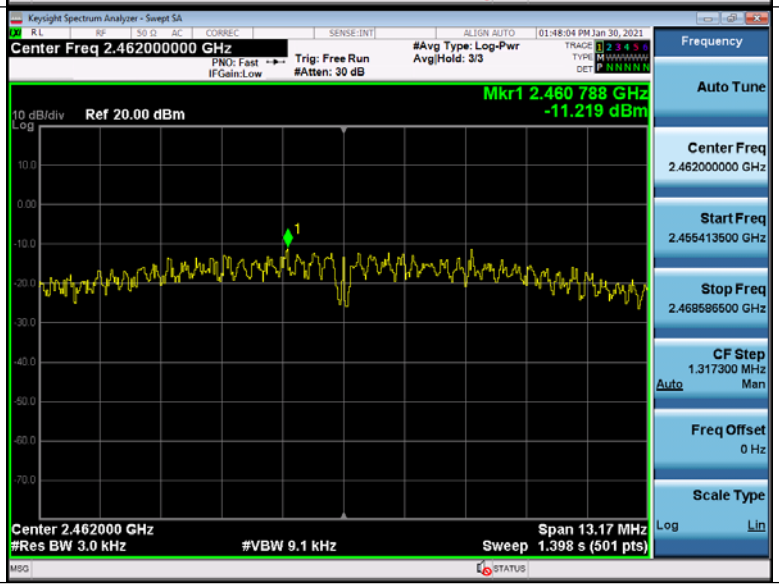
11G/LCH		
11G/MCH		
11G/HCH		

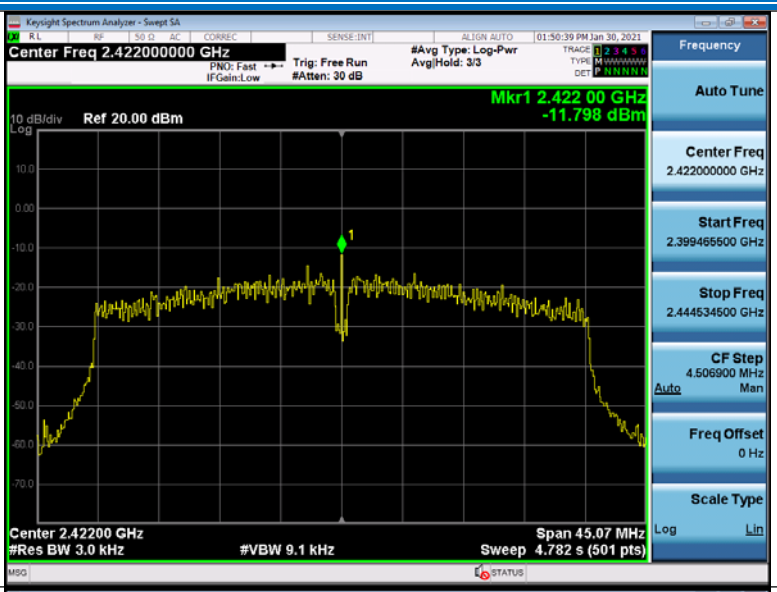
11N20/LCH		
11N20/MCH		
11N20/HCH		

11N40/LCH		
11N40/MCH		
11N40/HCH		

ANT2--Graphs		
11B/LCH		
11B/MCH		
11B/HCH		

11G/LCH		
11G/MCH		
11G/HCH		

11N20/LCH		
11N20/MCH		
11N20/HCH		

11N40/LCH		
11N40/MCH		
11N40/HCH