TEST REPORT

Applicant	:	PCD, LLC
Address of Applicant	:	1500 Tradeport Drive, Suite A Orlando Florida 32824 United States
Product Name	:	MIFI
Model No.	:	J600
Sample No.	:	E19110011-01#01 E19110011-01#02
FCC ID	:	2ALJJJ600
Standards	:	FCC CFR47 Part 15, Subpart C
Date of Receipt	:	2019-12-23
Date of Test	:	2019-12-24 ~ 2020-1-11
Date of Issue	:	2020-1-11

Remark:

This report details the results of the testing carried out on one sample, the results contained in this report do not relate to other samples of the same product. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.

Prepared by: Jennifer zhou (Jennifer Zhou) Reviewed by: Jesse (Jesse) Approved by: Guoyou Chi (Authorized signatory: Guoyou Chi)

Revision Record			
Version	**Date**	**Revisions**	**Revised By**
1.0	2020-1-11	Original	--

Contents

1 General Information

1.1 Testing Laboratory

Company Name	ICAS Testing Technology Services (Shanghai) Co., Ltd.
Address	155 Pingbei Rd, Minhang District, Shanghai, China
Telephone	0086 21-51682999
Fax	0086 21-54711112
Homepage	www.icasiso.com

1.2 Details of Application

Company Name	PCD, LLC
Address	1500 Tradeport Drive, Suite A Orlando Florida 32824 United States
Contact Person	Mauricio Velasco
Telephone	+1.631.495.7537
Email	mvelasco@pcdlatam.com

1.3 Details of EUT

Product Name	MIFI
Brand Name	PCD
Model No.	J600
FCC ID	2ALJJJ600
Network and Wireless connectivity	WCDMA/HSDPA/HSUPA Band II/V/VIII; LTE FDD Band 2/4/7/28; WLAN 802.11b/g/n(HT20/HT40)
Mode of Operation	WLAN 802.11b/g/n(HT20/HT40)
Frequency Range	2400MHz ~ 2483.5MHz
Channel Separation	5 MHz
Modulation Type	DSSS, OFDM
Antenna Type	Internal Antenna
Antenna Gain	-1.5 dBi
Extreme Temperature Range	-10℃~ +55℃
Test Voltage	DC 3.7V

Note(s):

The product has two chain for wifi chipset. Details please see clause 5.1.

1.4 Test Methodology

47 CFR Part 15, Subpart C	Miscellaneous Wireless Communications Services
KDB Publication 558074 D01 v05r02	15.247 Meas Guidance.
ANSI C63.10-2013	American National Standard for Testing Unlicensed Wireless Devices

Note(s):

All test items were verified and recorded according to the standards and without any addition/deviation/exclusion during the test.

1.5 Test Verdict

No.	FCC Part No.	ISED Part No.	Description	Test Result	Verdict
1	15.203	RSS-247, 5.4(6)	Antenna Requirement	Clause 4.1.1	PASS
2	15.247(b)	RSS-247, 5.4(4)	Peak Output Power	Clause 4.1.2	PASS
3	15.247(a)	RSS-Gen, 6.6; RSS-247, 5.2(1)	6dB Bandwidth and 99% Bandwidth	Clause 4.1.3	PASS
4	15.247(e)	RSS-247, 5.2(2)	Power Spectral Density	Clause 4.1.4	PASS
5	15.247(d), 15.209	RSS0Gen, 8.9; RSS-247, 5.5	Conducted Spurious Emission & Authorized-band band-edge	Clause 4.1.5	PASS
6	15.247(d), 15.205, 15.209	RSS-247, 5.5	Spurious Emission	Clause 4.1.6	PASS
7	15.247(d), 15.205, 15.209	RSS-247, 5.5	Band Edge (Restricted-band band-edge)	Clause 4.1.7	PASS
8	15.207(a)	RSS-Gen 8.8	Conducted Emission	Clause 4.2.1	PASS

2 Test Condition

2.1 Test Facility

2.2 Environmental conditions

Temperature (°C)	18-25
Humidity (%RH)	40-65
Barometric Pressure (mbar)	960-1060

2.3 Equipment List

Name of Equipment	Manufacturer	Model	Serial No.	Cal. Due Date
Spectrum Analyzer	Keysight	N9020B	MY59260184	2020-07-28
Spectrum Analyzer	Rohde & Schwarz	FSV40N	101450	2020-06-24
EMI Test Receiver	Rohde & Schwarz	ESPI3	100173	2020-06-19
EMI Test Receiver	Rohde & Schwarz	ESR 7	101911	2020-06-19
V-network	SCHWARZBECK	NSLK 8127	8127-902	2020-02-20
Wideband Radio Communication Tester	Rohde & Schwarz	CMW 500	100687	2020-08-22
Broadband Antenna	SCHWARZBECK	VULB9163	9163-1037	2020-06-06
Horn Antenna-18G	SCHWARZBECK	BBHA9120D	9120D-1775	2020-06-06
Loop Antenna	SCHWARZBECK	FMZB 1513	N/A	2021-03-19
Horn Antenna-40G	YINGLIAN	LB-180400-KF	N/A	2020-07-26
EMC chamber 9*6*6（L*W*H)	CHANGNING	966	N/A	2020-06-26
Shielded Enclosure 8*5*4（L*W*H)	CHANGNING	854	N/A	2020-08-28
Test Software	BL	BL410_E	N/A	N/A

2.4 Measurement Uncertainty

Parameter	Frequency	Uncertainty
Antenna Port Conducted Emission	< 1GHz	± 1.5 dB
	> 1GHz	± 1.5 dB
Radiated Emission	30 MHz – 1 GHz	± 3 dB
	> 1GHz	± 3 dB

3 Test Set-up and Operation Modes

3.1 Details of Test Mode

Using test software was control EUT work in continuous transmitter and receiver mode. Select test channel as below:
For 802.11b/g/n (HT20/HT40)

Channel	Frequency	Remark
CH1	2412MHz	
CH6	2437MHz	
CH11	2462MHz	
CH13	2472MHz	Only for Output Power and Band Edge

Through Pre-scan under all rate at lowest channel, the data rate as below table described is the worst case, so we choose these data rate for test.

Type	Data rate (For Chain 1)	Data rate (For Chain 2)
802.11b	11Mbps	11Mbps
802.11g	48Mbps	54Mbps
802.11n(HT20)	MCS3	MCS3
802.11n(HT40)	MCS0	MCS3

The basic operation modes are:

A. On
   1. WLAN mode
      a. Transmitting
         i. Low Channel
         ii. Middle Channel
         iii. High Channel
      b. Receiving

B. Standby

C. Off

3.2 Special Accessories and Auxiliary Equipment

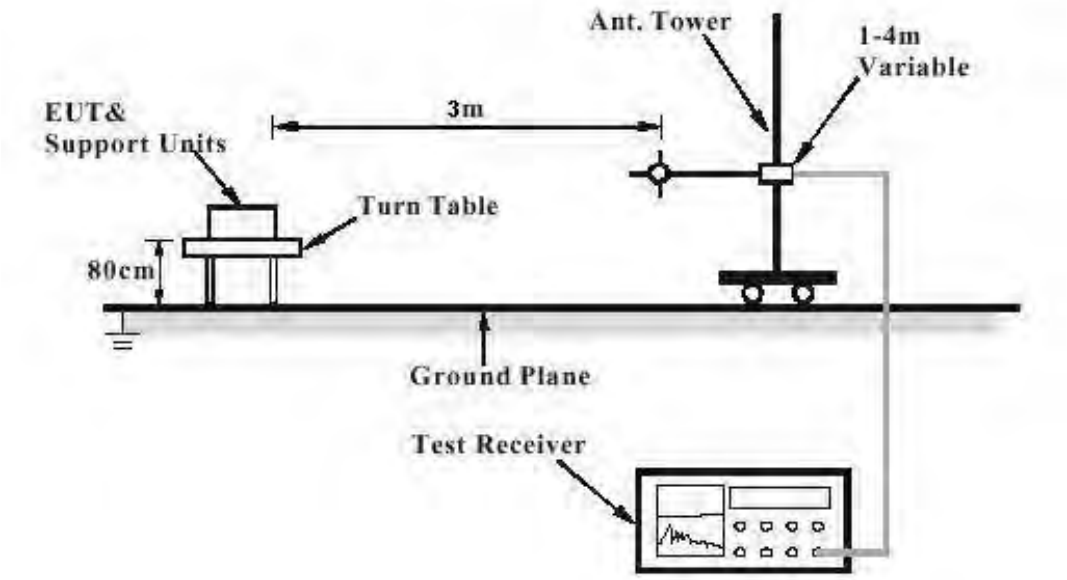
Description	Manufacturer	Model No.	Serial No.
Laptop	Lenovo	TP00083A	N/A

3.3 Support Software

Description	Manufacturer	Software Name
/	/	/

3.4 Test Setup Diagram

Diagram of Measurement Configuration for Radiation Test



Note: Measurements above 1GHz are done with a table height of 1.5m. In addition, there is RF absorbing material on the floor of the test site for above 1GHz measurement.

Diagram of Measurement Equipment Configuration for Conduction Measurement

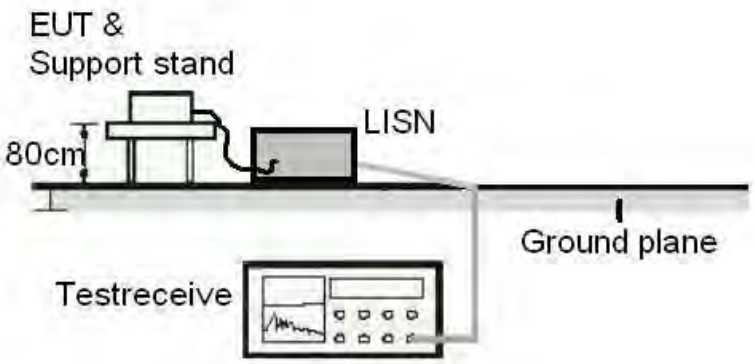
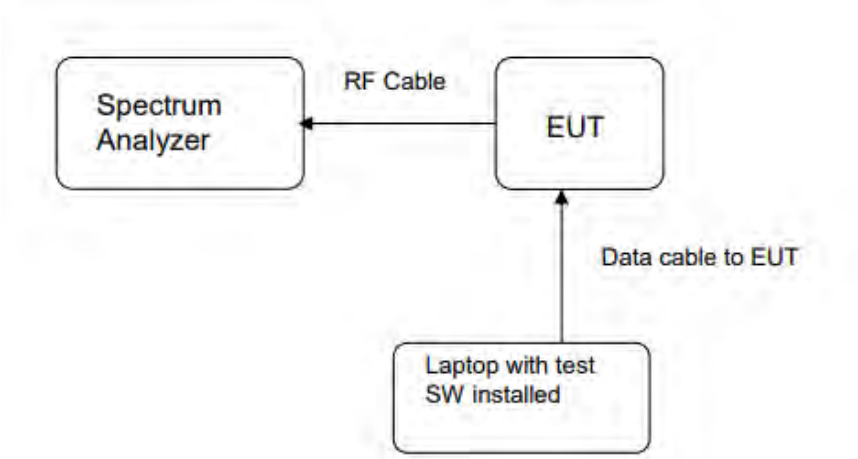


Diagram of Measurement Equipment Configuration for Transmitter Measurement



4 Test Results

4.1 Transmitter Requirement & Test Suites

4.1.1 Antenna Requirement

RESULT: **PASS**

Test standard : FCC Part 15.247(b)(4), Part 15.203

Requirement : The use of approved antennas only with directional gains that do not exceed 6 dBi

According to the manufacturer declaration, the EUT has an antenna with a directional gain of **-1.5** dBi. The antenna is an internal antenna with no possibility of replacement with a non-approvrd antenna by the end-user.

Therefore, the EUT is considered to comply with this provision.

4.1.2 Peak Output Power

RESULT: **PASS**

Test standard : FCC Part 15.247(b)(3)

Requirement : ANSI C63.10-2013, KDB 558074

Kind of test site : Shielded room

Test setup

Test Channel : Low/Middle/High

Operation Mode : A.1.a

Ambient temperature : 25℃

Relative humidity : 52%

Table 1: Peak Output Power

Test Mode	Test Channel (MHz)	Measured Peak Power				Limit (W)
		Chain 1		Chain 2		
		(dBm)	(mW)	(dBm)	(mW)	
802.11b	2412	11.08	12.82	11.21	13.21	< 1
	2437	11.09	12.85	13.19	20.84	
	2462	10.16	10.38	11.61	14.49	
	2472	8.11	6.47	10.73	11.83	
802.11g	2412	7.28	5.35	7.65	5.82	
	2437	7.41	5.51	8.96	7.87	
	2462	6.70	4.68	8.10	6.46	
	2472	5.42	3.48	6.85	4.84	
802.11n(HT20)	2412	7.40	5.50	8.26	6.70	
	2437	7.80	6.03	10.36	10.86	
	2462	6.77	4.75	8.84	7.66	
	2472	5.33	3.41	8.16	6.55	
802.11n(HT40)	2422	10.21	10.50	10.89	12.27	
	2437	10.29	10.69	8.86	7.69	
	2452	9.31	8.53	8.27	6.71	
	2462	1.38	1.37	2.66	1.85	

4.1.3 6dB Bandwidth and 99% Bandwidth

RESULT: **PASS**

Test standard : FCC Part 15.247(a)(2)

Requirement : ANSI C63.10-2013, KDB 558074

Kind of test site : Shielded room

Test setup

Test Channel : Low/Middle/High

Operation Mode : A.1.a

Ambient temperature : 25℃

Relative humidity : 52%

Table 2: 6dB Bandwidth and 99% Bandwidth

Test Mode	Test Channel (MHz)	6dB Bandwidth (MHz)		99% Bandwidth (MHz)		6 dB Bandwidth Limit (MHz)
		Chain 1	Chain 2	Chain 1	Chain 2	
802.11b	2412	9.037	9.087	14.973	15.005	0.5
	2437	9.040	9.073	14.910	14.915	
	2462	9.033	9.239	15.136	15.021	
802.11g	2412	16.470	16.490	16.423	16.440	
	2437	16.460	16.480	16.414	16.427	
	2462	16.460	16.480	16.435	16.443	
802.11n(HT20)	2412	17.680	17.710	17.660	17.654	
	2437	17.590	17.680	17.652	17.633	
	2462	17.71	17.700	17.679	17.657	
802.11n(HT40)	2422	35.070	36.370	35.595	36.086	
	2437	35.380	35.220	35.934	35.922	
	2452	36.020	36.130	36.084	36.070	

Chain 1

Figure 1: 6dB Bandwidth and 99% Bandwidth, 802.11b, 2412MHz

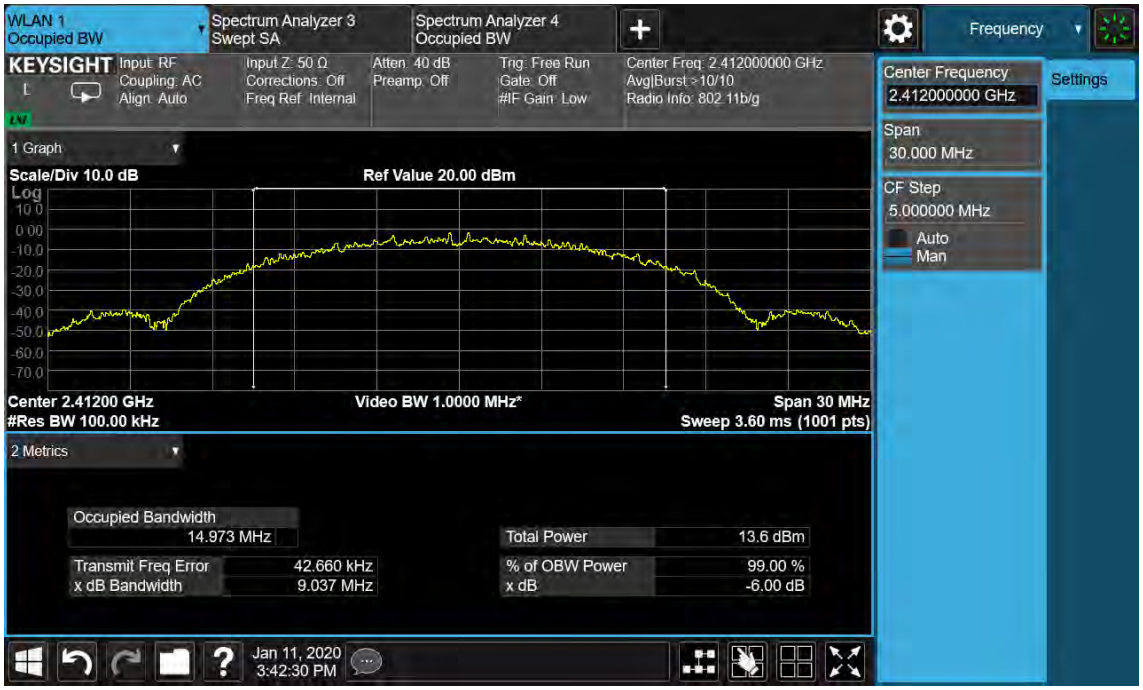


Figure 2: 6dB Bandwidth and 99% Bandwidth, 802.11b, 2437MHz

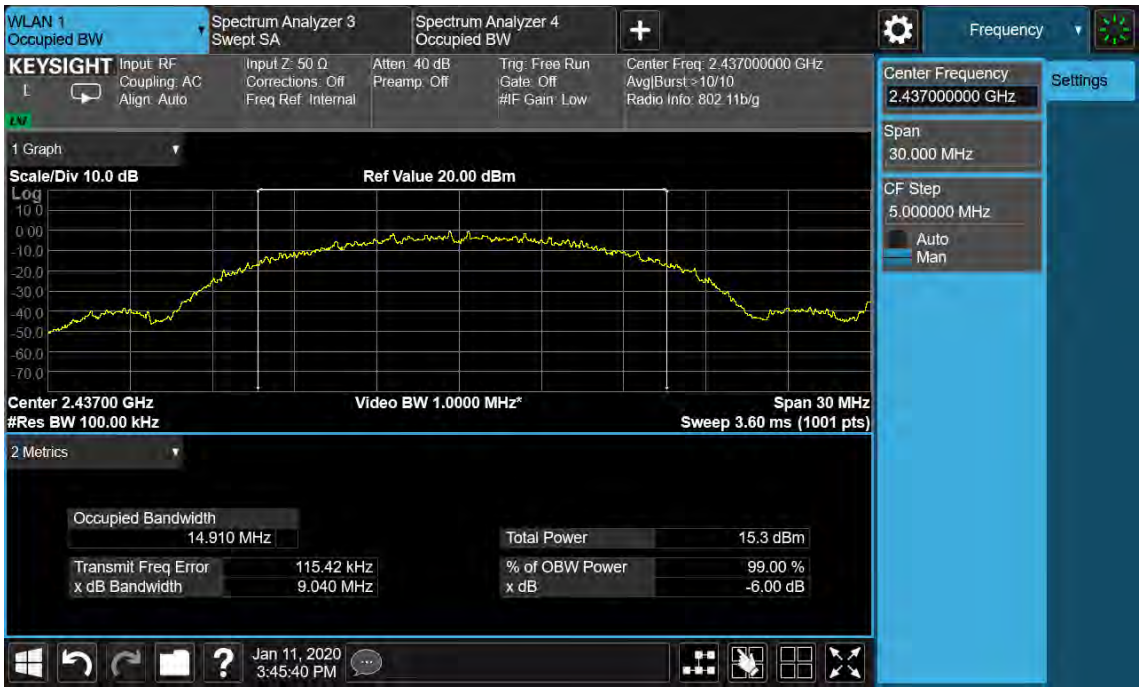


Figure 3: 6dB Bandwidth and 99% Bandwidth, 802.11b, 2462MHz

Figure 4: 6dB Bandwidth and 99% Bandwidth, 802.11g, 2412MHz

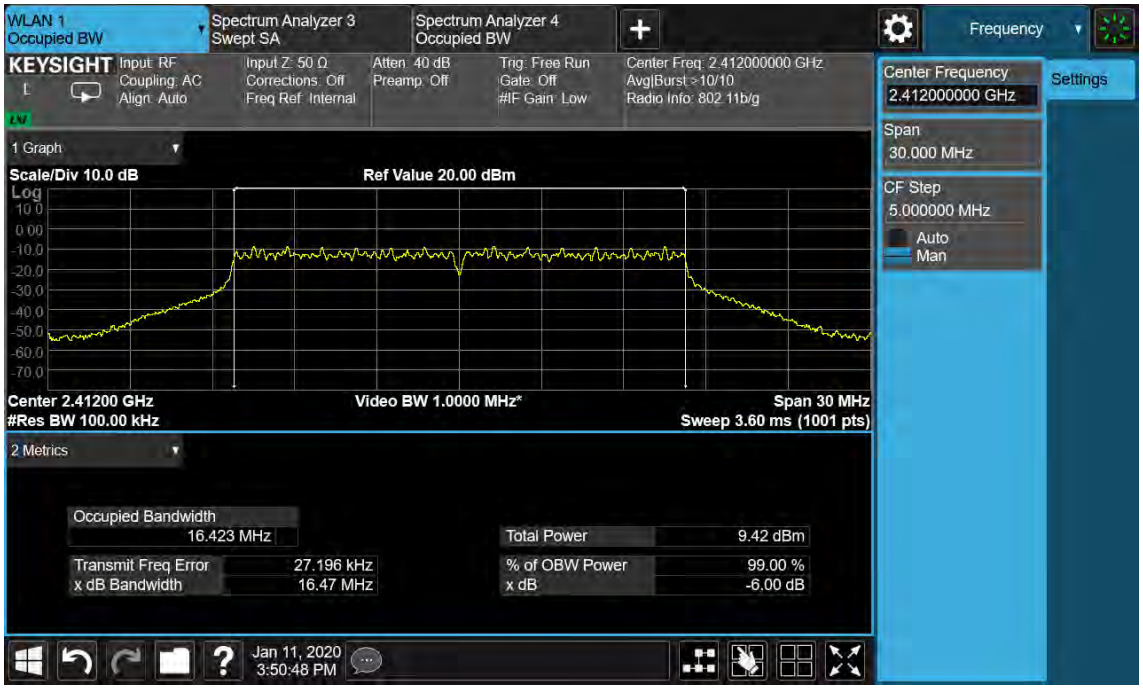


Figure 5: 6dB Bandwidth and 99% Bandwidth, 802.11g, 2437MHz

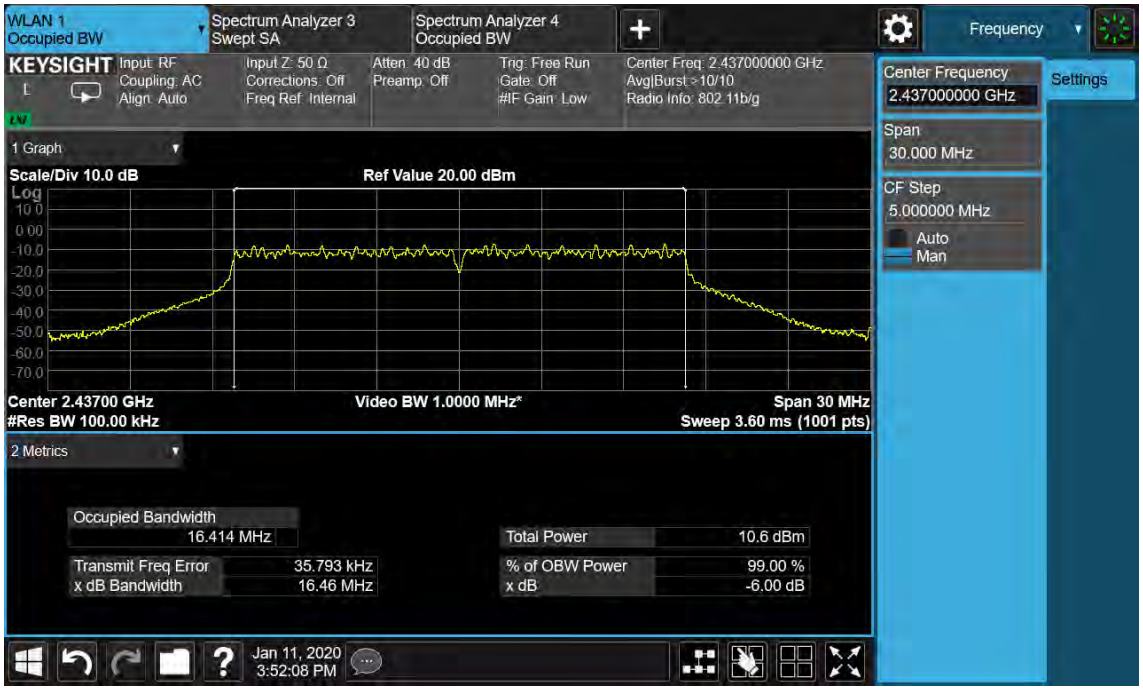


Figure 6: 6dB Bandwidth and 99% Bandwidth, 802.11g, 2462MHz

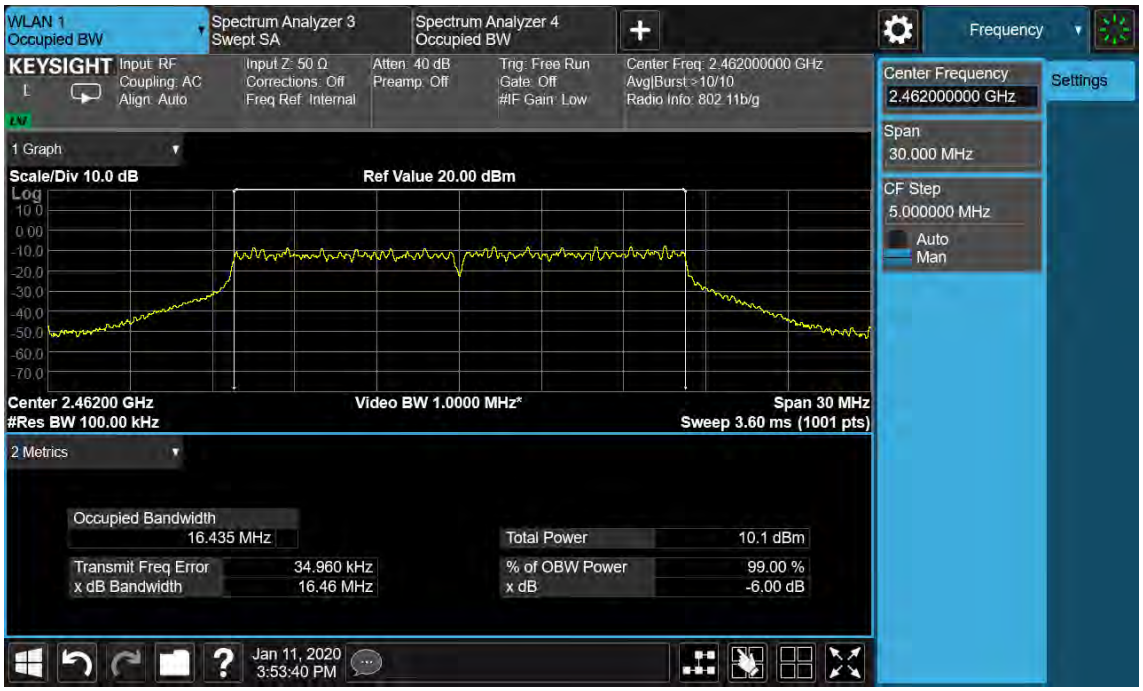


Figure 7: 6dB Bandwidth and 99% Bandwidth, 802.11n(HT20), 2412MHz

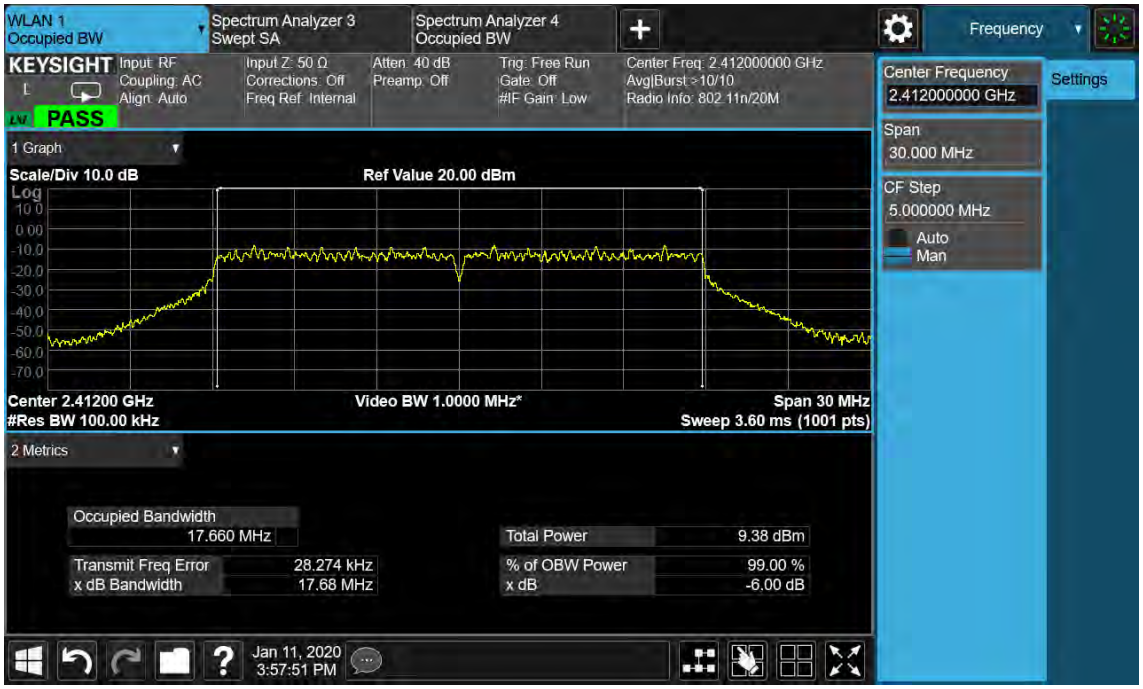


Figure 8: 6dB Bandwidth and 99% Bandwidth, 802.11n(HT20), 2437MHz

Figure 9: 6dB Bandwidth and 99% Bandwidth, 802.11n(HT20), 2462MHz

Figure 10: 6dB Bandwidth and 99% Bandwidth, 802.11n(HT40), 2422MHz

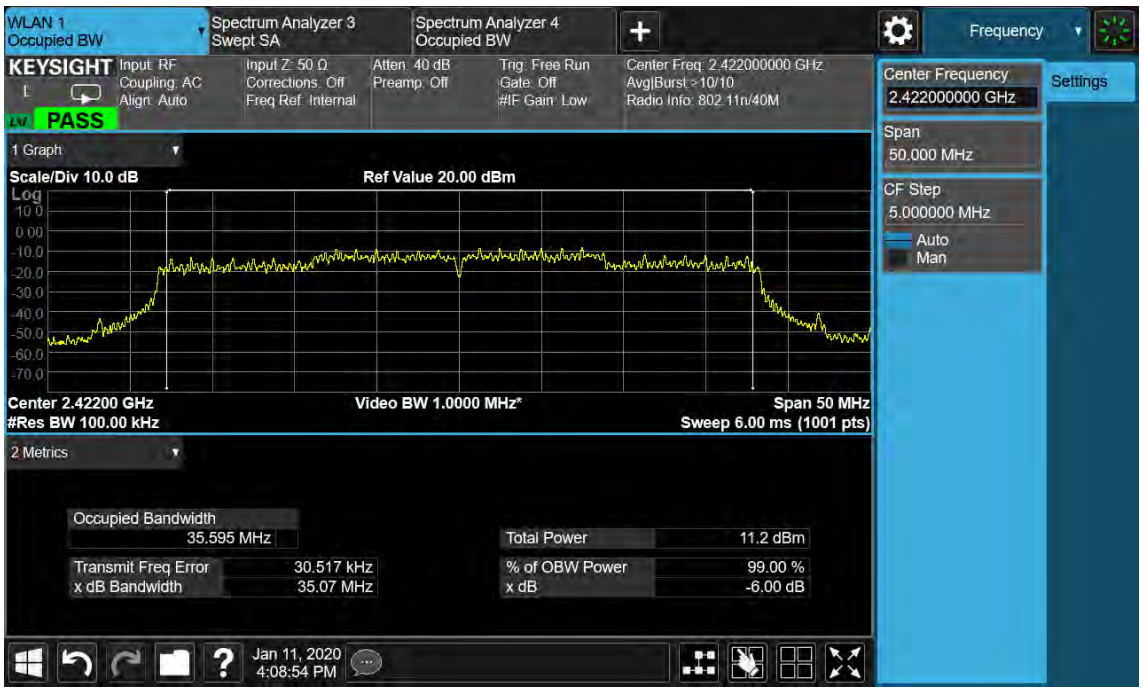


Figure 11: 6dB Bandwidth and 99% Bandwidth, 802.11n(HT40), 2437MHz

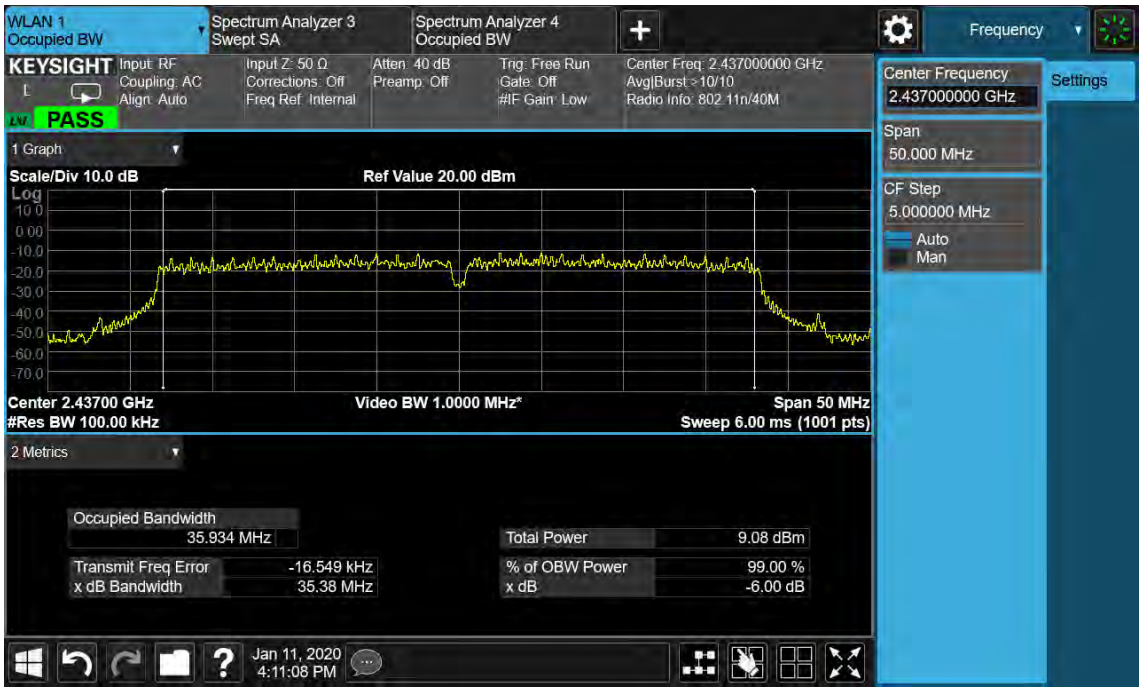
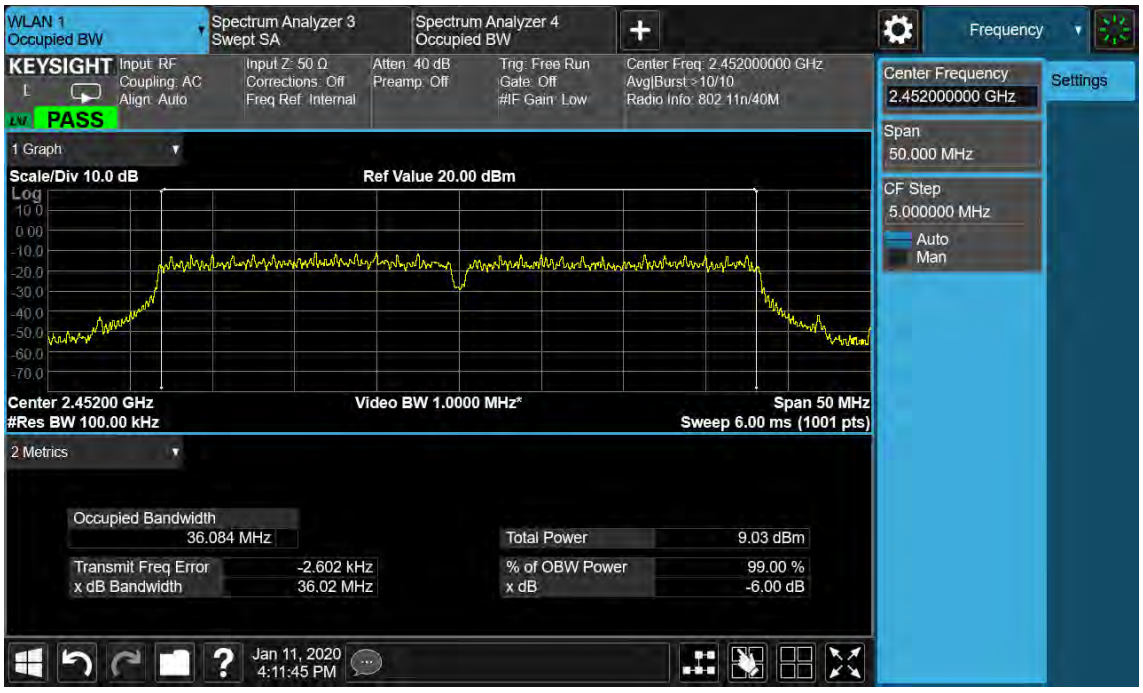


Figure 12: 6dB Bandwidth and 99% Bandwidth, 802.11n(HT40), 2452MHz



Chain 2

Figure 43: 6dB Bandwidth and 99% Bandwidth, 802.11b, 2412MHz

Figure 14: 6dB Bandwidth and 99% Bandwidth, 802.11b, 2437MHz

Figure 15: 6dB Bandwidth and 99% Bandwidth, 802.11b, 2462MHz

Figure 16: 6dB Bandwidth and 99% Bandwidth, 802.11g, 2412MHz

Figure 17: 6dB Bandwidth and 99% Bandwidth, 802.11g, 2437MHz

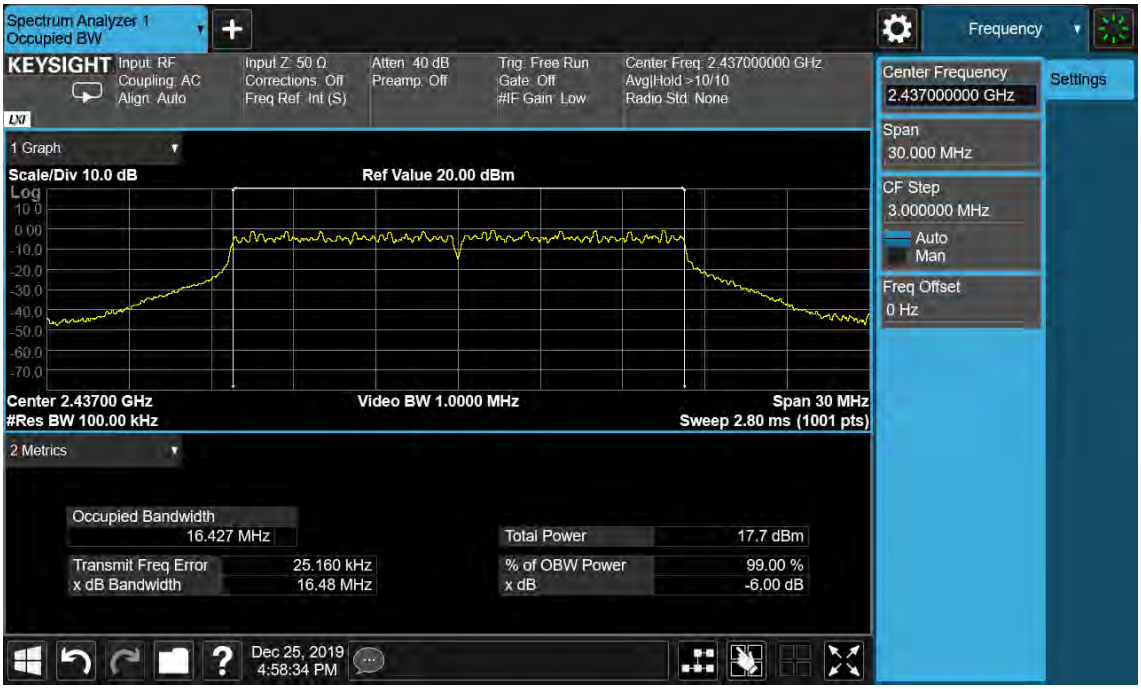


Figure 18: 6dB Bandwidth and 99% Bandwidth, 802.11g, 2462MHz

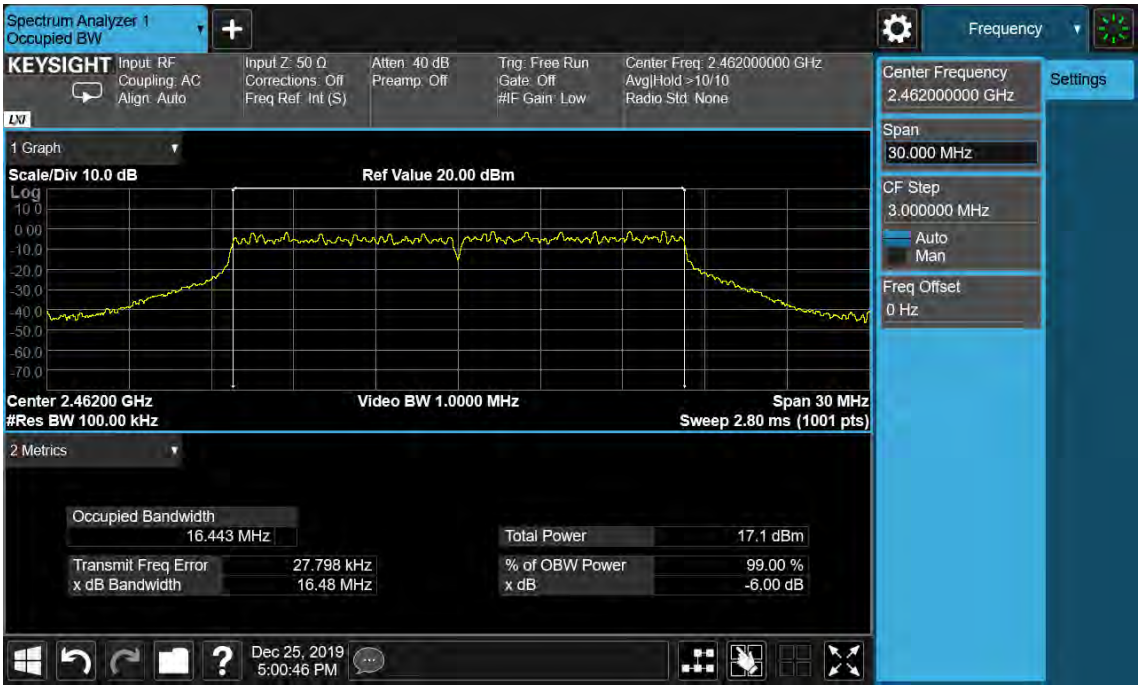


Figure 19: 6dB Bandwidth and 99% Bandwidth, 802.11n(HT20), 2412MHz

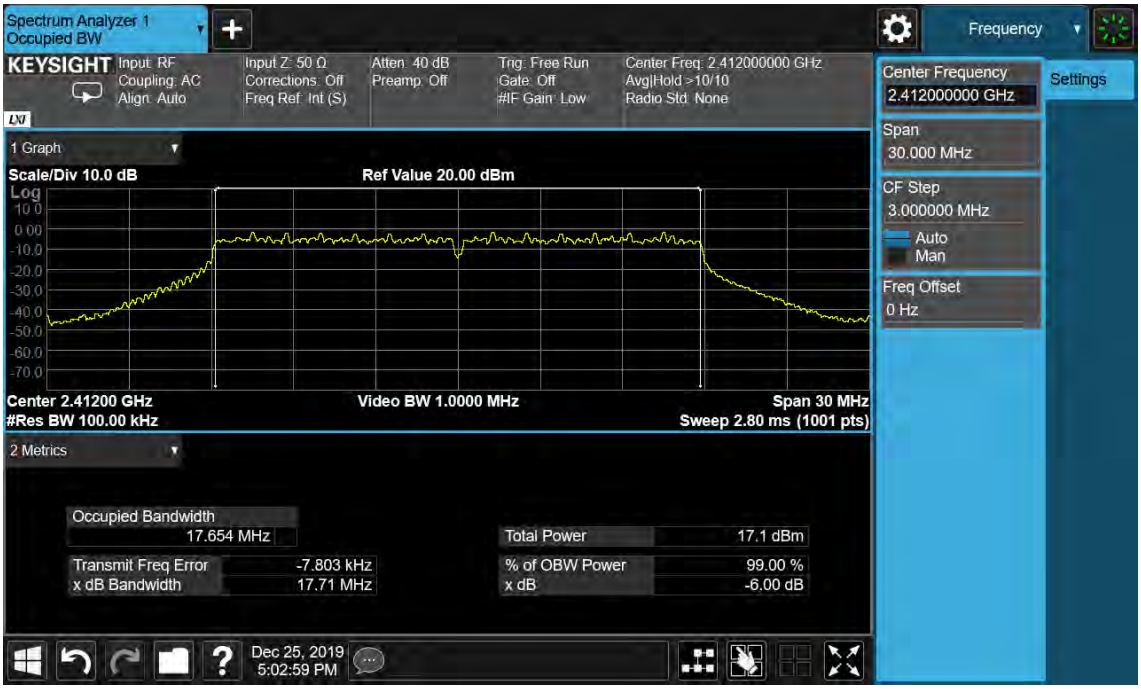


Figure 20: 6dB Bandwidth and 99% Bandwidth, 802.11n(HT20), 2437MHz

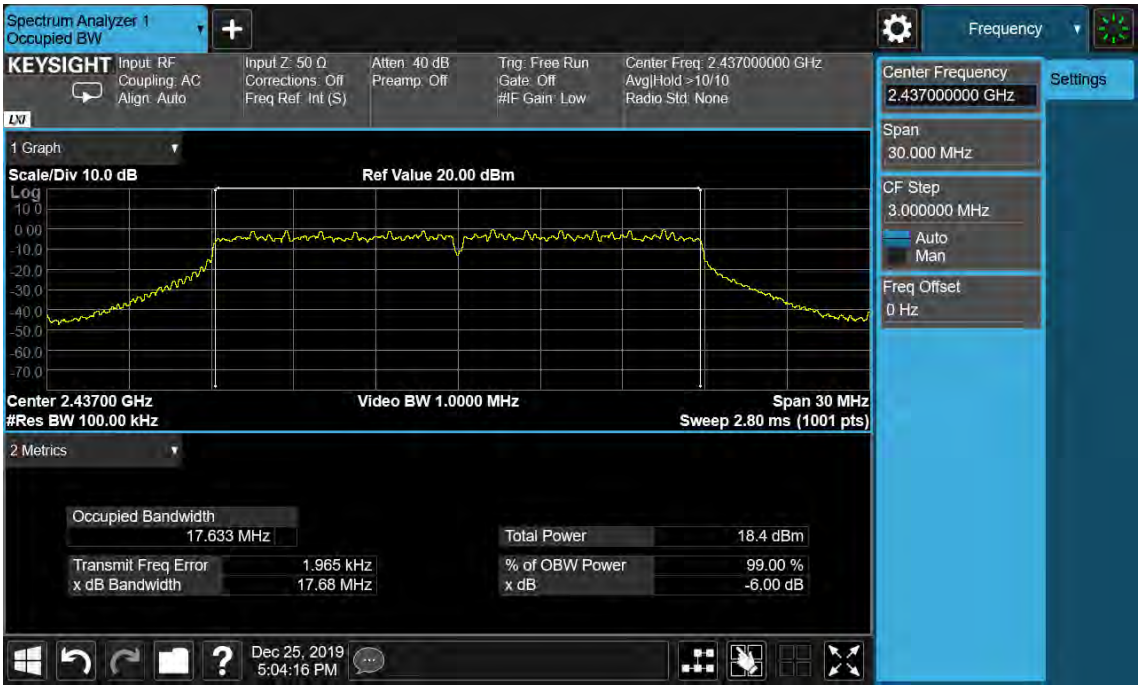


Figure 21: 6dB Bandwidth and 99% Bandwidth, 802.11n(HT20), 2462MHz

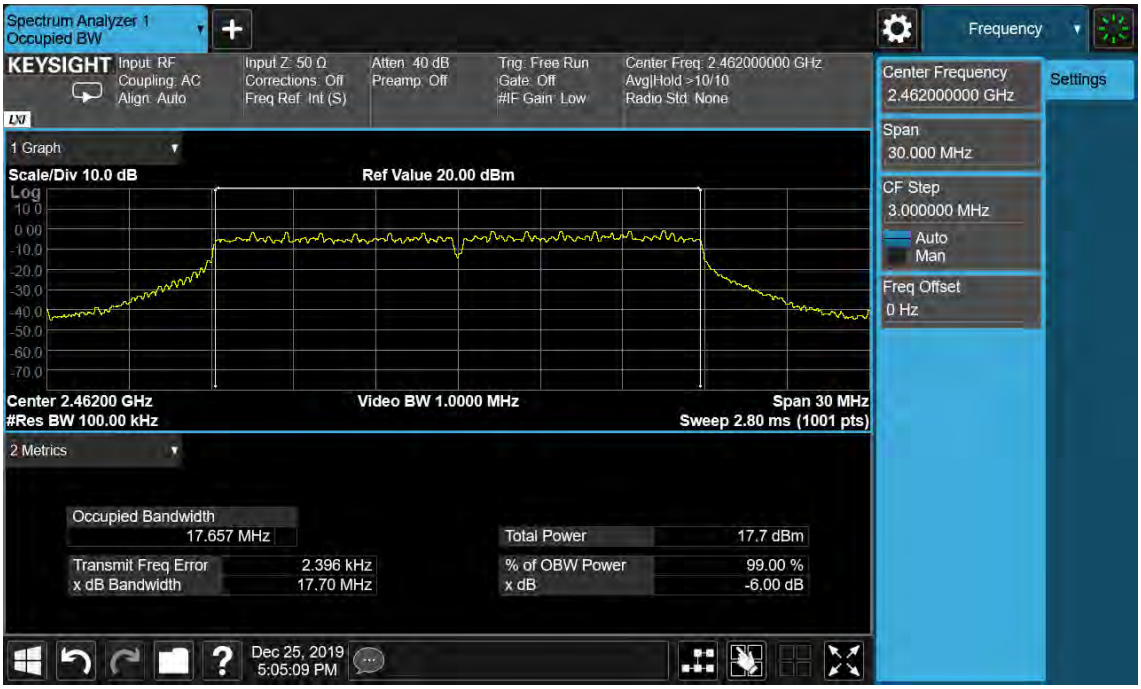


Figure 5: 6dB Bandwidth and 99% Bandwidth, 802.11n(HT40), 2422MHz

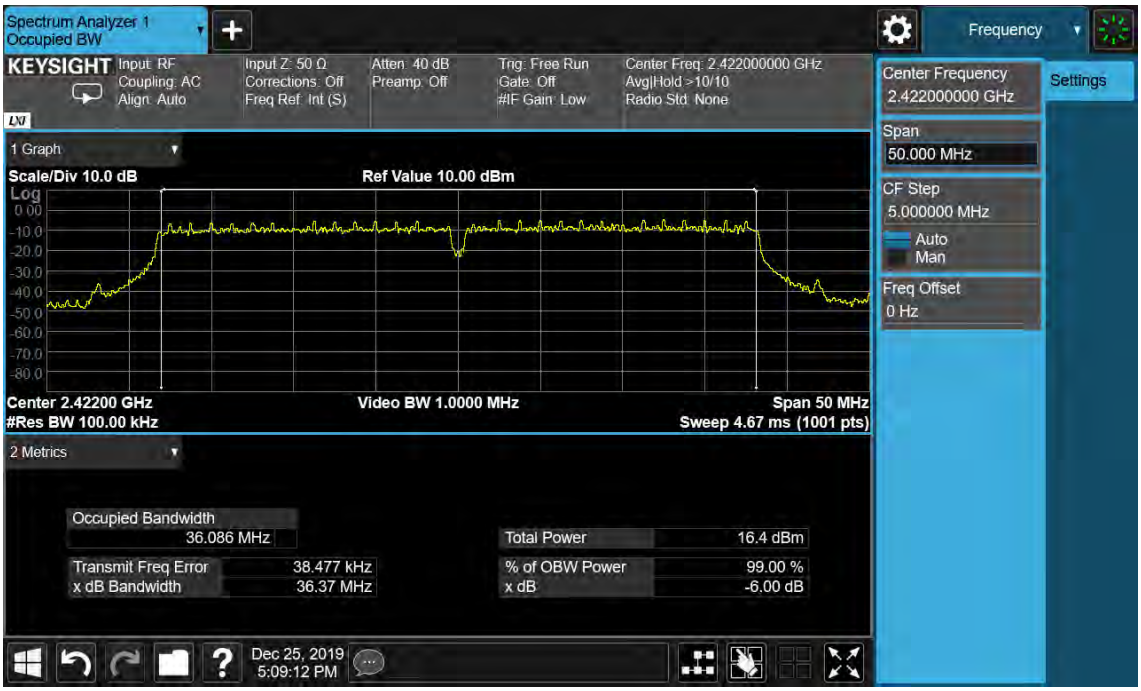


Figure 23: 6dB Bandwidth and 99% Bandwidth, 802.11n(HT40), 2437MHz

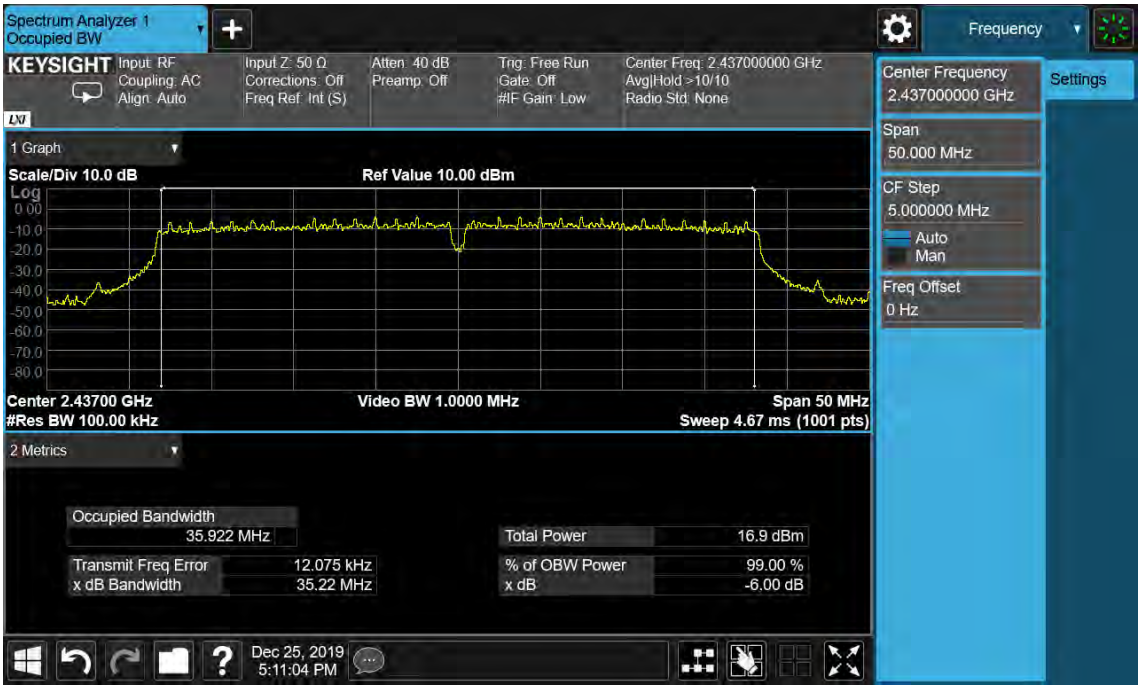
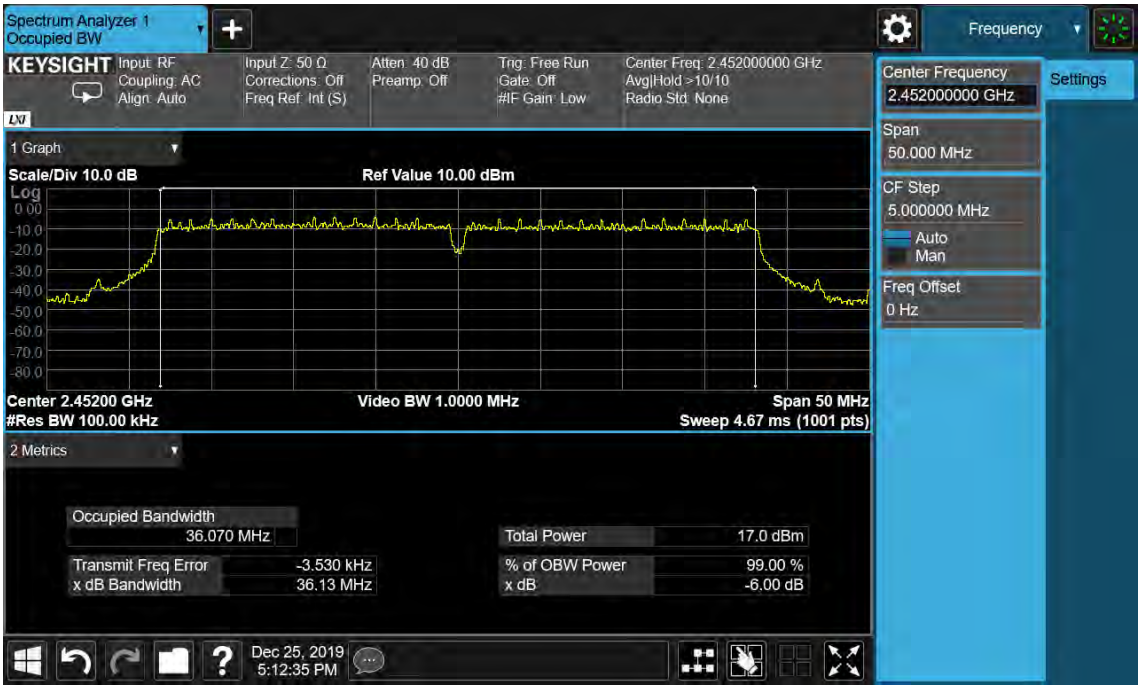


Figure 6: 6dB Bandwidth and 99% Bandwidth, 802.11n(HT40), 2452MHz



4.1.4 Power Spectral Density

RESULT: **PASS**

Test standard : FCC Part 15.247(e)

Requirement : ANSI C63.10-2013, KDB 558074

Kind of test site : Shielded room

Test setup

Test Channel : Low/Middle/High

Operation Mode : A.1.a

Ambient temperature : 25℃

Relative humidity : 52%

Table 3: Power Spectral Density

Test Mode	Test Channel (MHz)	Measured Result (dBm/3kHz)		Limit (dBm/3kHz)
		Chain 1	Chain 2	
802.11b	2412	-11.58	-10.16	8
	2437	-10.26	-8.72	
	2462	-11.17	-9.55	
802.11g	2412	-18.86	-18.08	
	2437	-17.94	-17.37	
	2462	-17.99	-17.23	
802.11n(HT20)	2412	-17.56	-16.64	
	2437	-16.79	-16.61	
	2462	-17.17	-16.56	
802.11n(HT40)	2422	-22.40	-21.66	
	2437	-21.58	-19.71	
	2452	-22.05	-20.27	

Chain 1

Figure 7: Power Spectral Density, 802.11b, 2412MHz

Figure 26: Power Spectral Density, 802.11b, 2437MHz

Figure 27: Power Spectral Density, 802.11b, 2462MHz

Figure 28: Power Spectral Density, 802.11g, 2412MHz

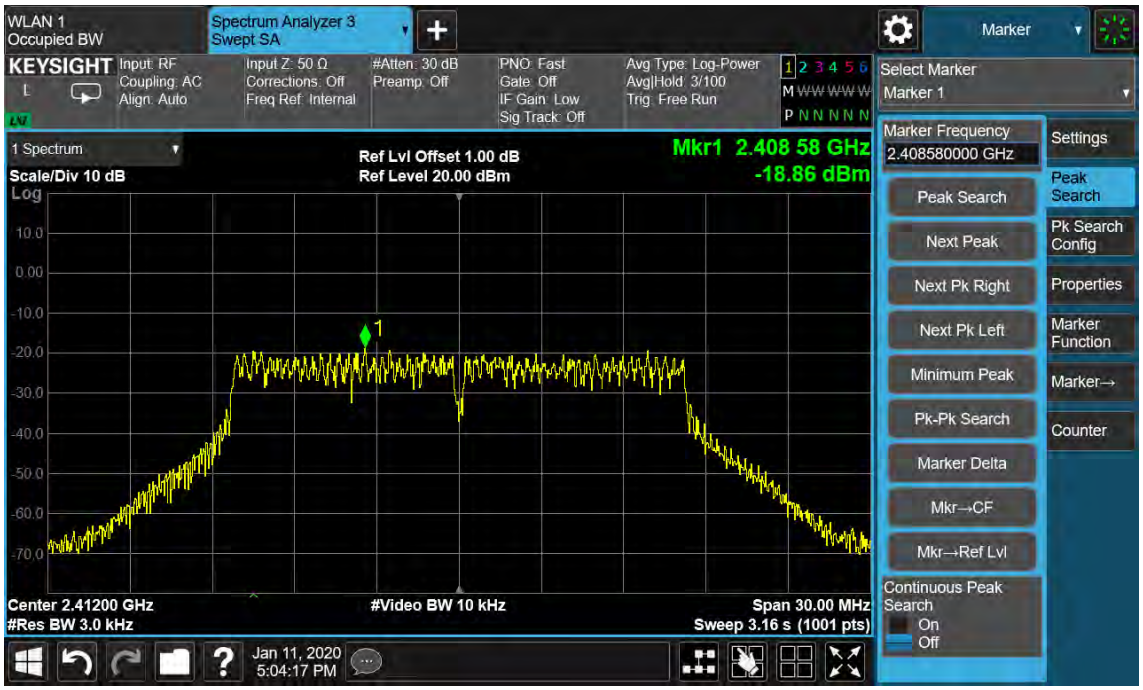


Figure 29: Power Spectral Density, 802.11g, 2437MHz

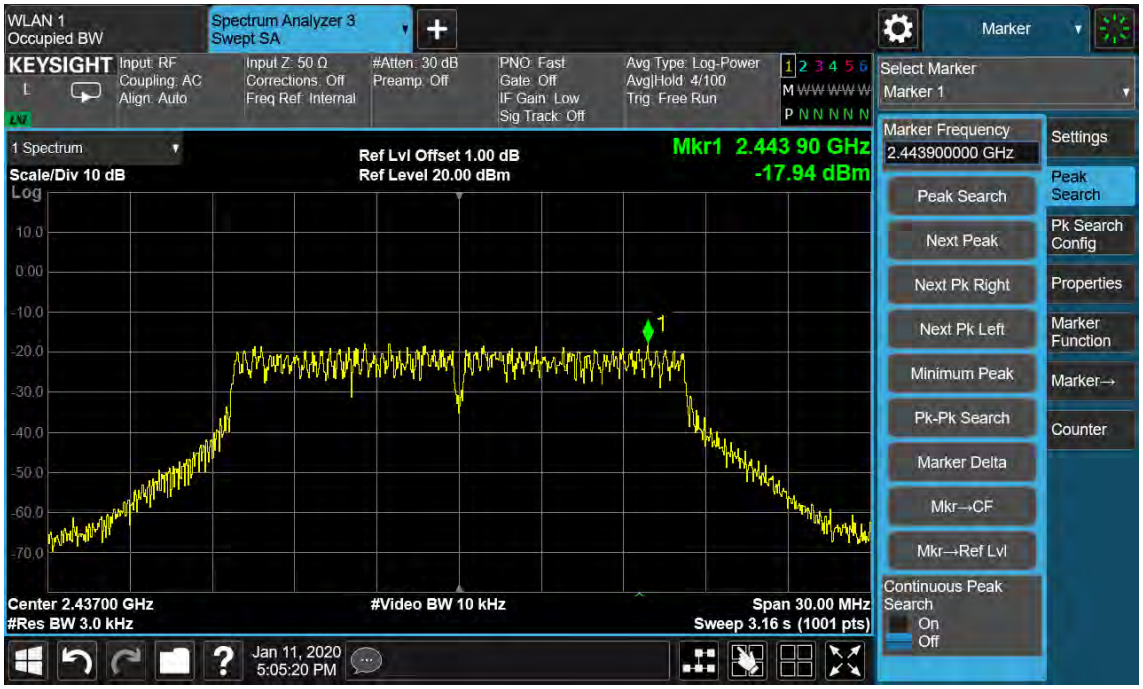


Figure 30: Power Spectral Density, 802.11g, 2462MHz

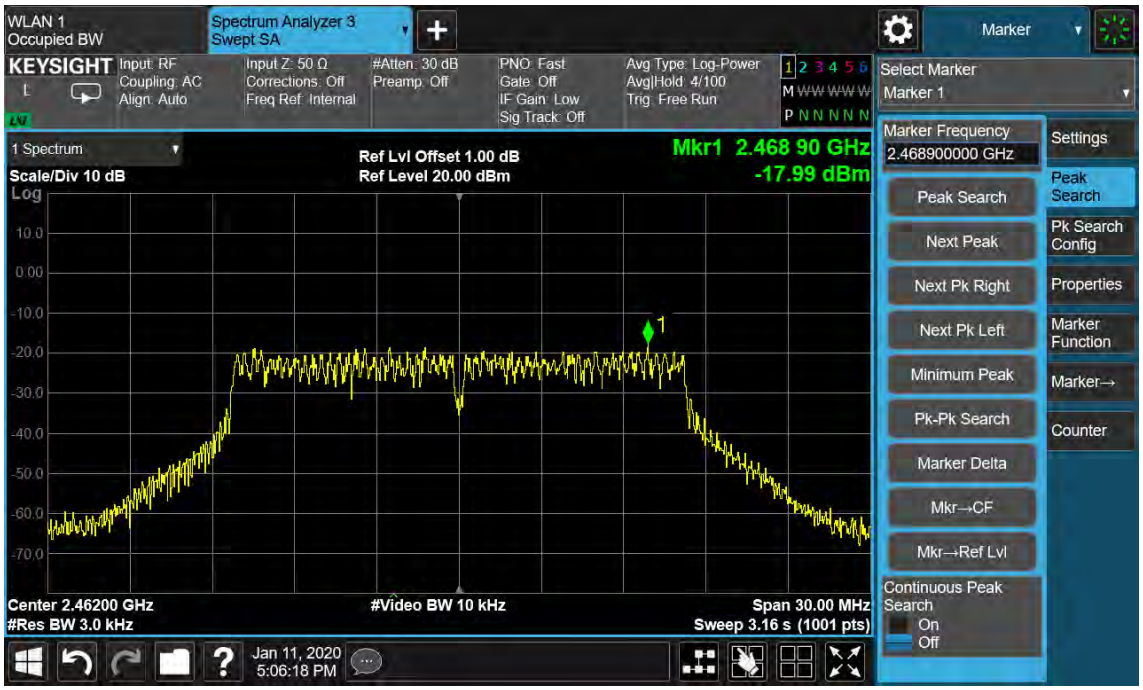


Figure 31: Power Spectral Density, 802.11n(HT20), 2412MHz

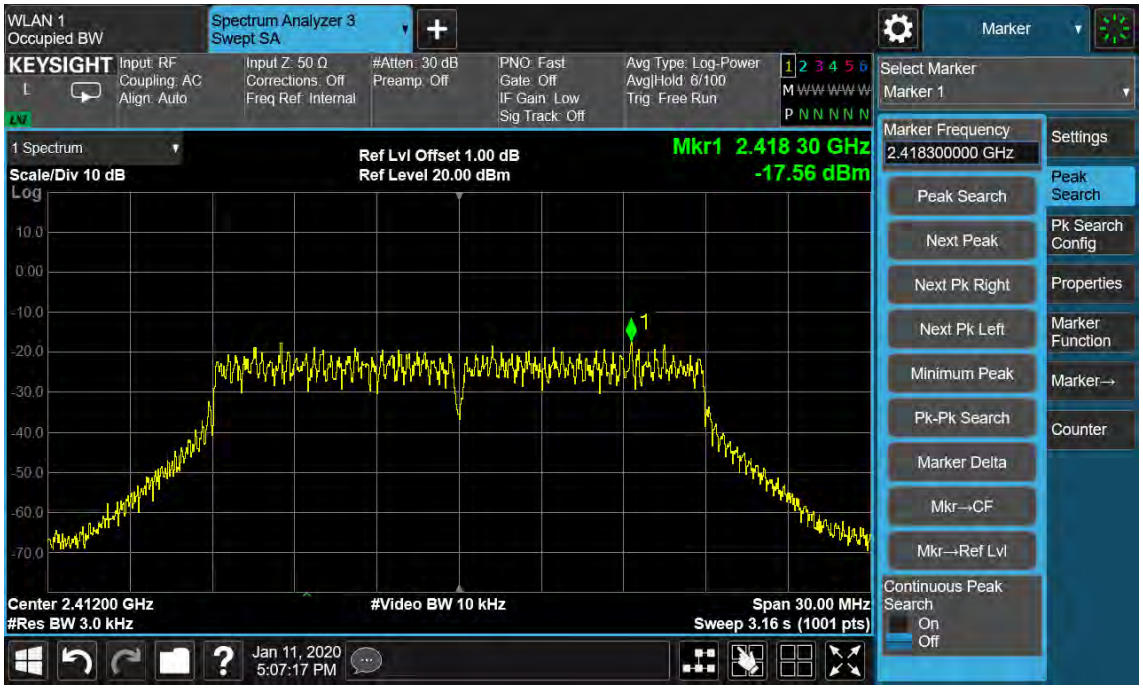


Figure 32: Power Spectral Density, 802.11n(HT20), 2437MHz

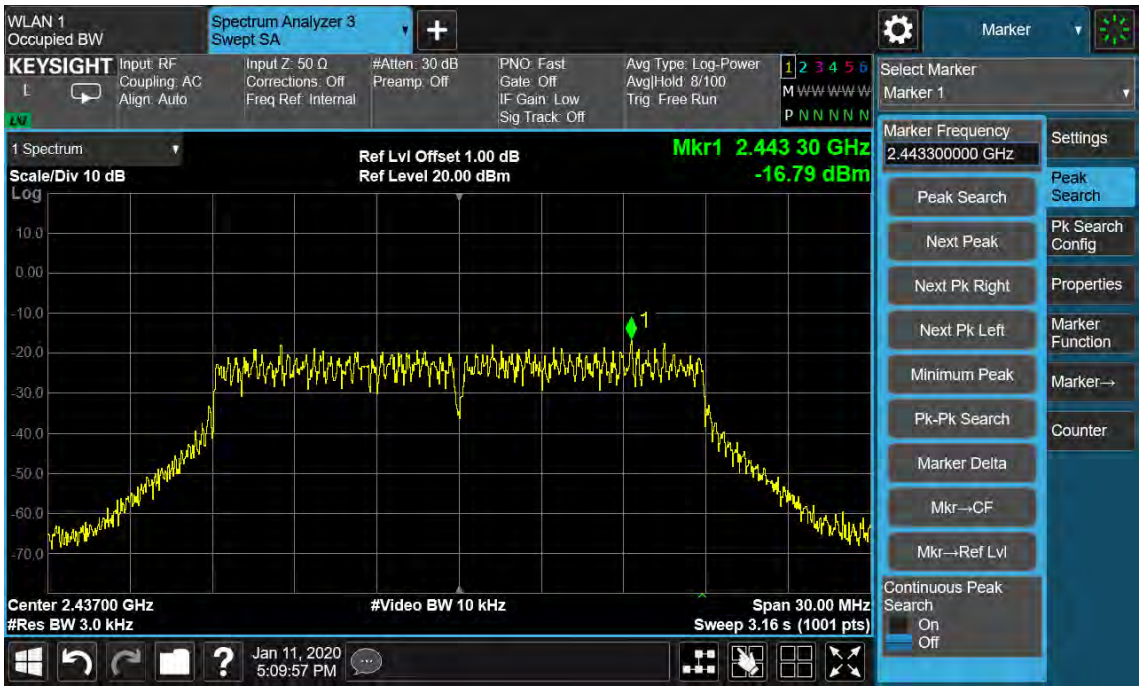


Figure 33: Power Spectral Density, 802.11n(HT20), 2462MHz

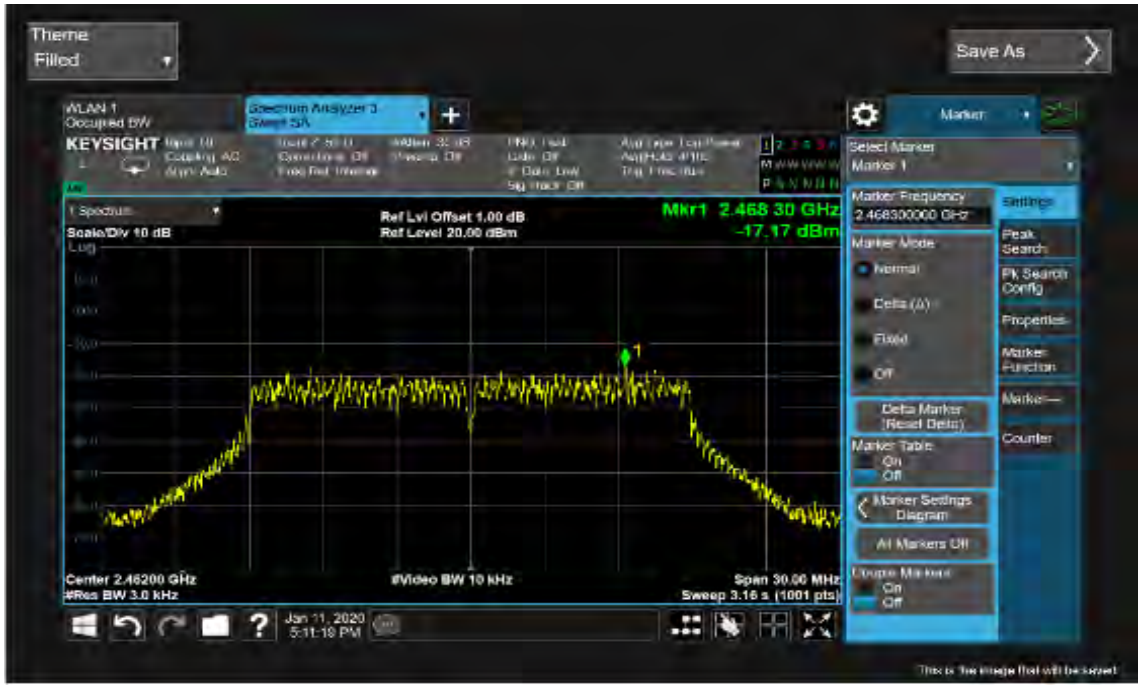


Figure 34: Power Spectral Density, 802.11n(HT20), 2412MHz

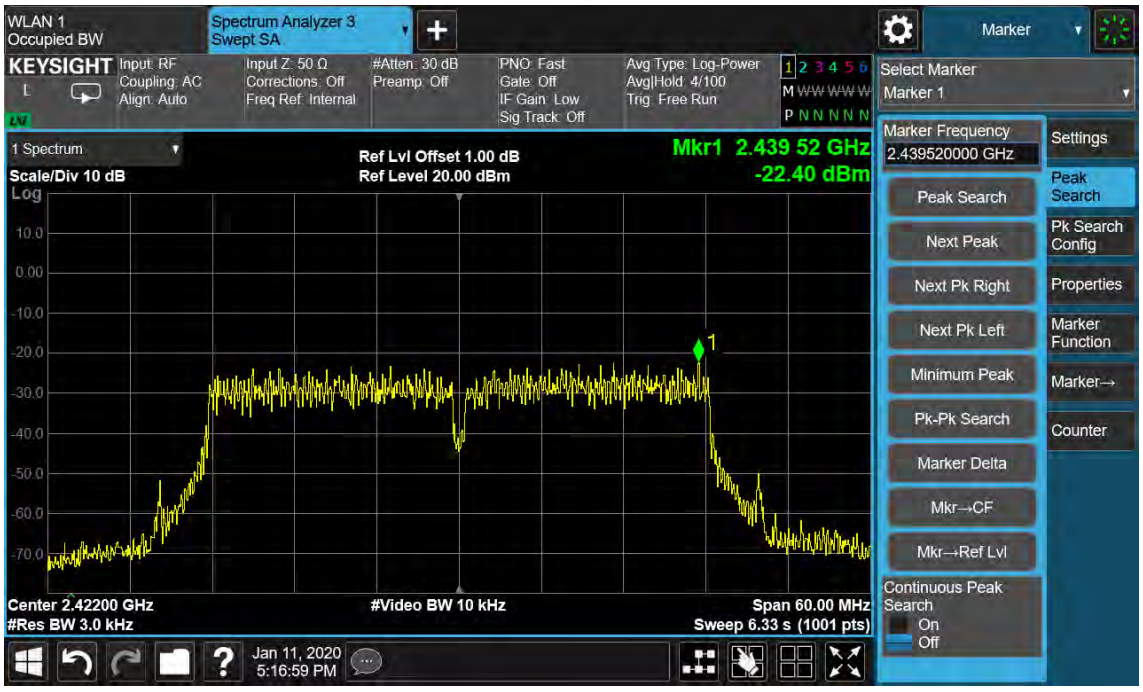


Figure 35: Power Spectral Density, 802.11n(HT20), 2437MHz

Figure 36: Power Spectral Density, 802.11n(HT20), 2462MHz

Chain 2

Figure 8: Power Spectral Density, 802.11b, 2422MHz

Figure 38: Power Spectral Density, 802.11b, 2437MHz

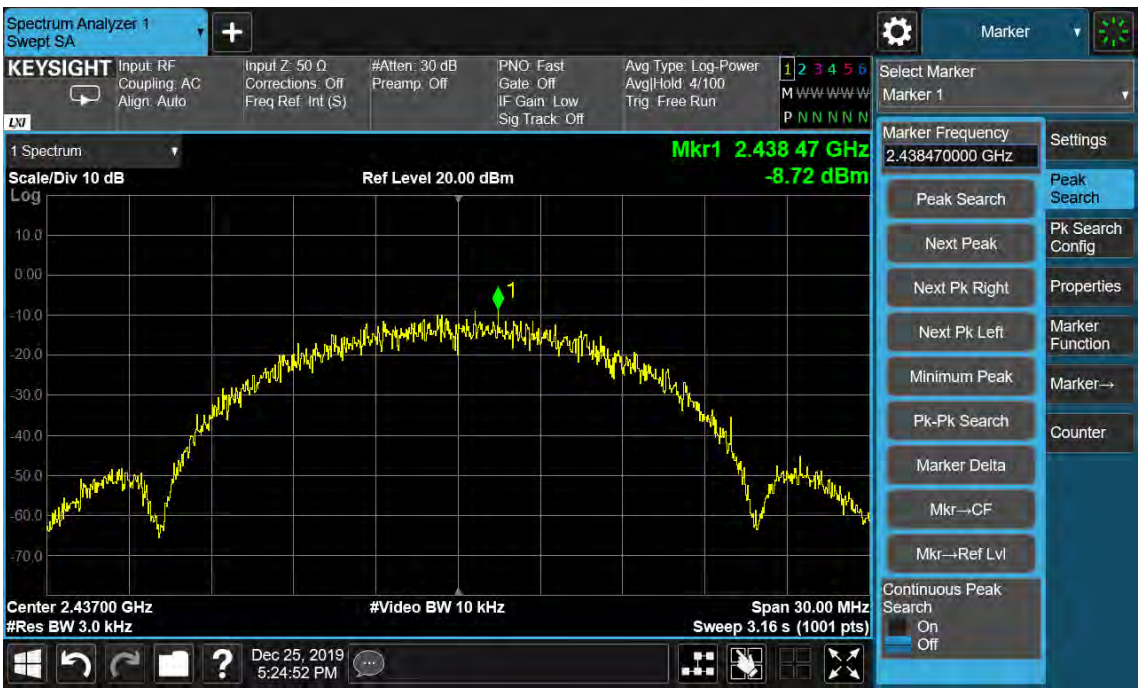


Figure 39: Power Spectral Density, 802.11b, 2452MHz

Figure 40: Power Spectral Density, 802.11g, 2412MHz

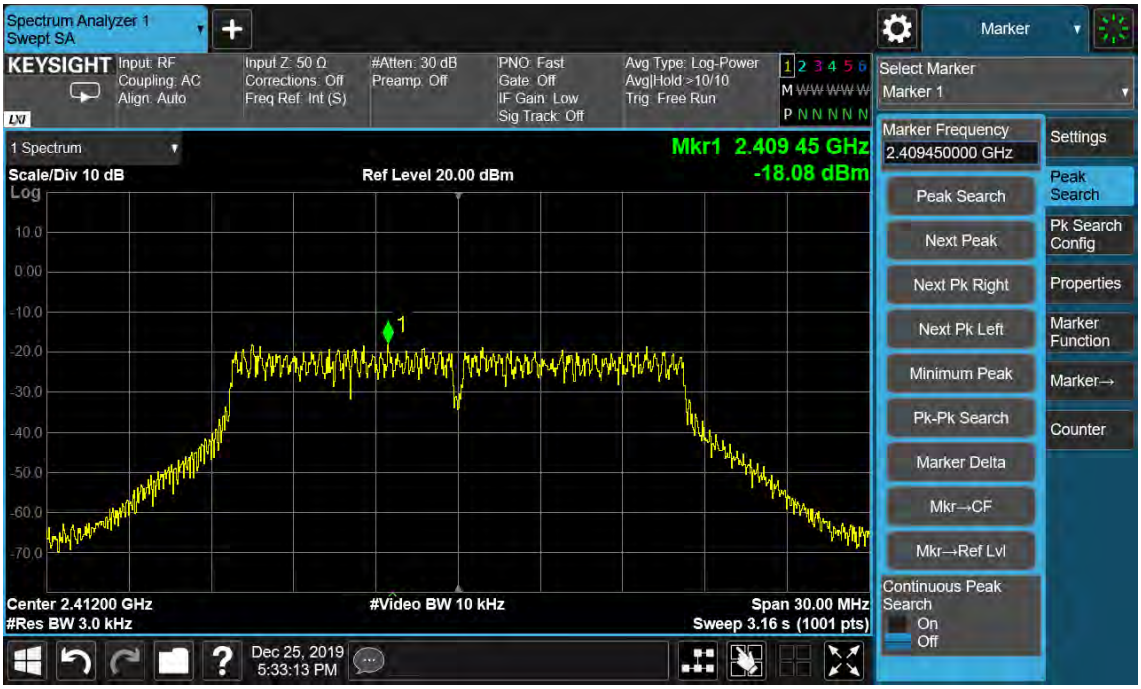


Figure 41: Power Spectral Density, 802.11g, 2437MHz

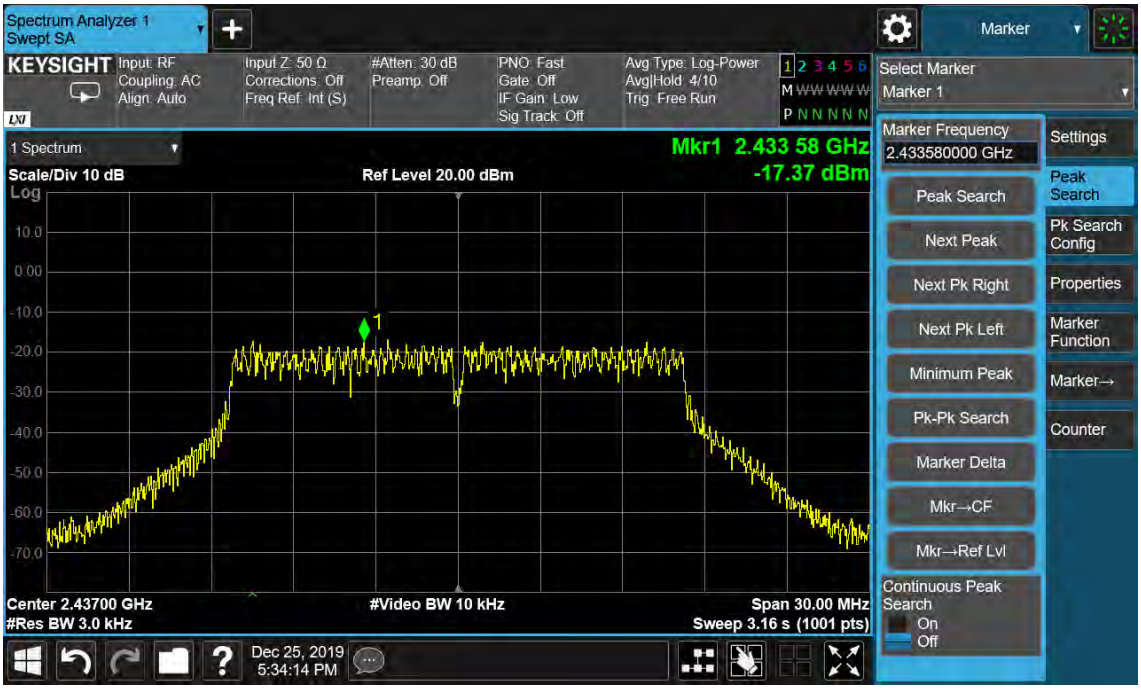


Figure 9: Power Spectral Density, 802.11g, 2462MHz

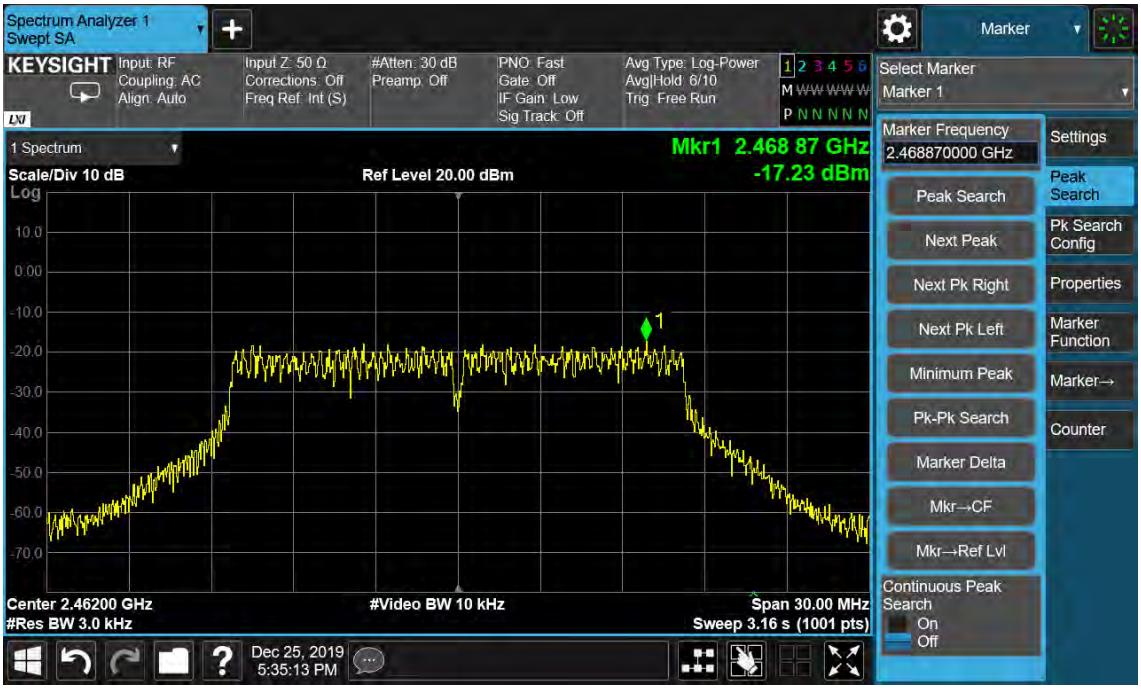


Figure 43: Power Spectral Density, 802.11n(HT20), 2412MHz

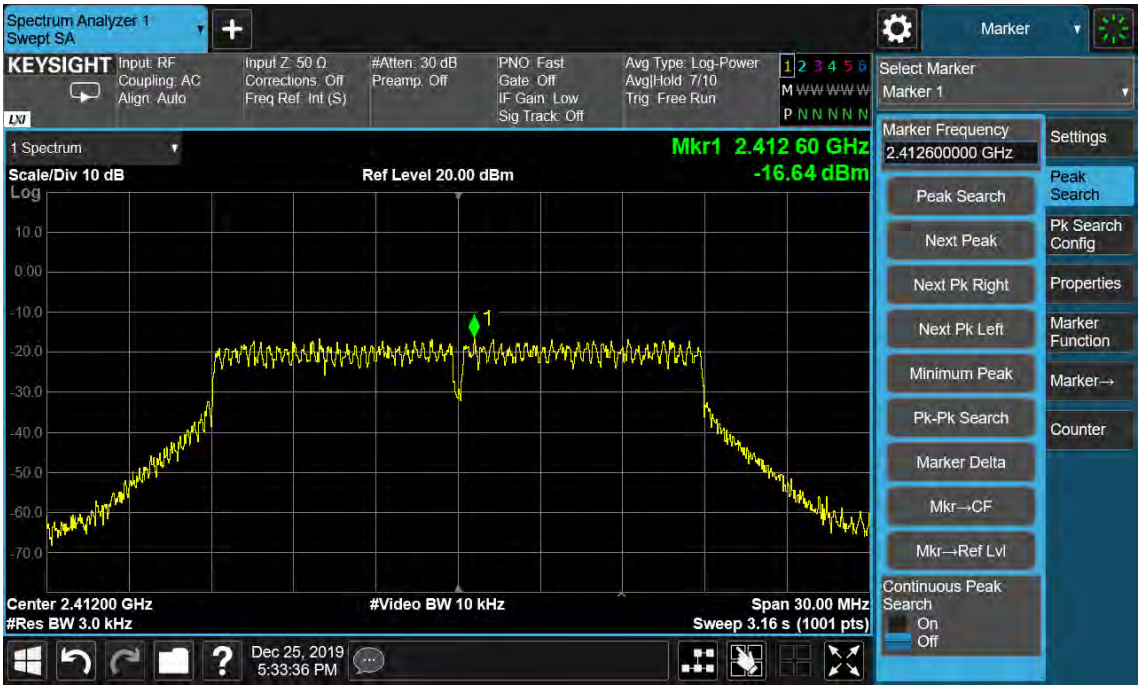


Figure 44: Power Spectral Density, 802.11n(HT20), 2437MHz

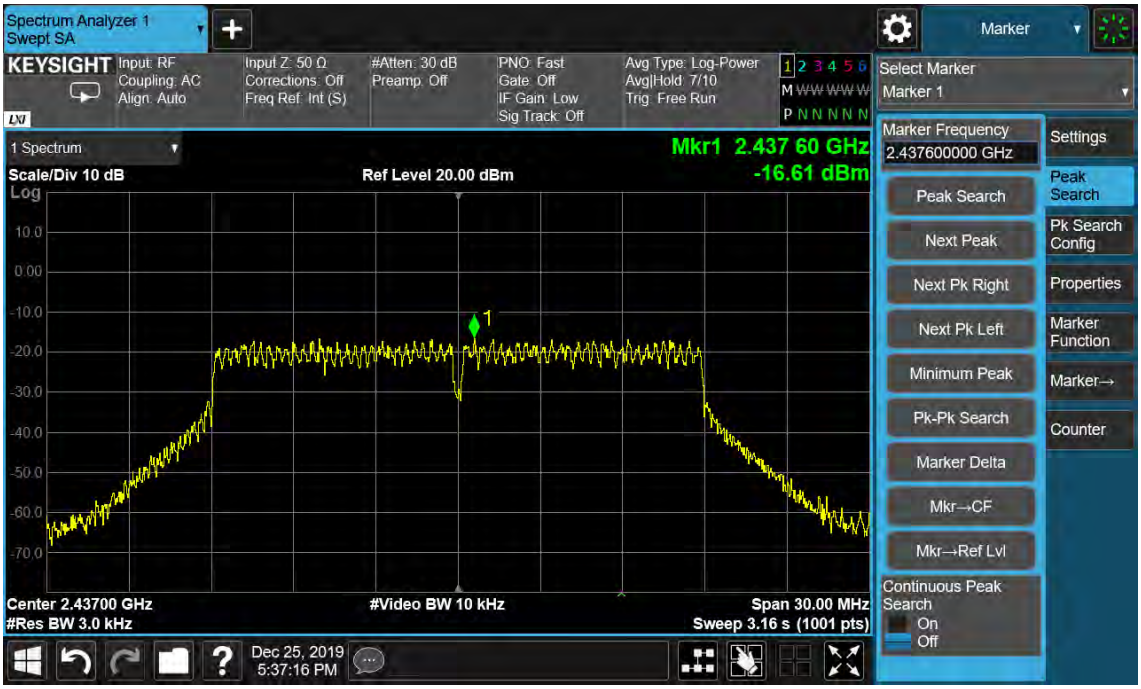


Figure 45: Power Spectral Density, 802.11n(HT20), 2462MHz

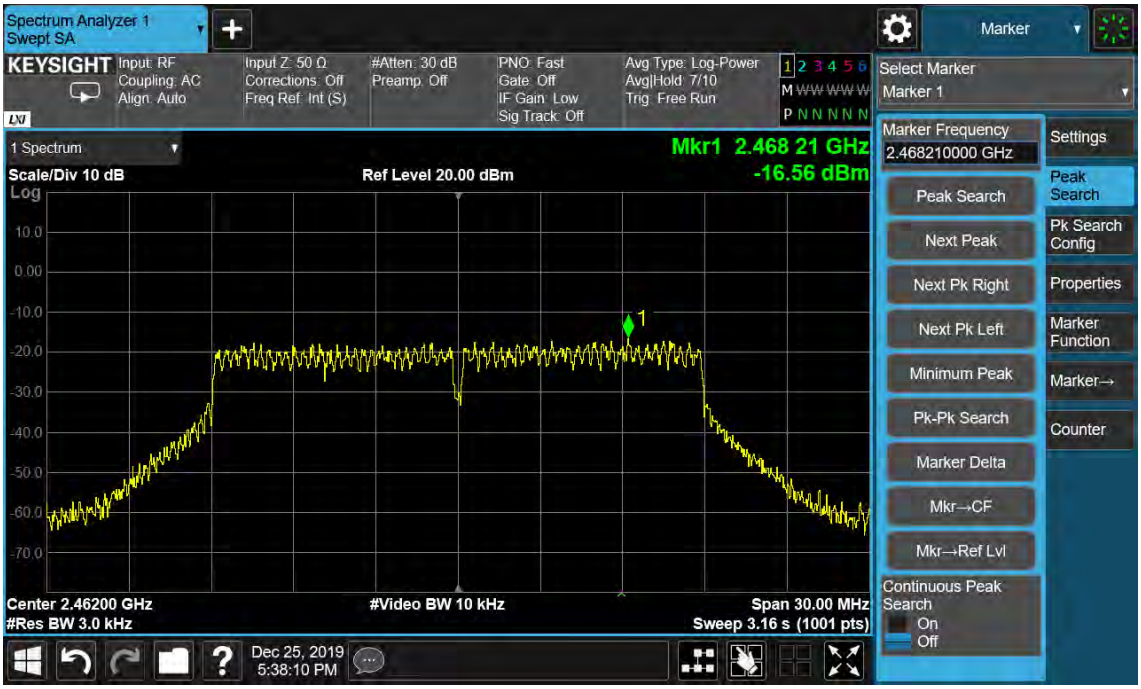


Figure 46: Power Spectral Density, 802.11n(HT40), 2422MHz

Figure 47: Power Spectral Density, 802.11n(HT40), 2437MHz

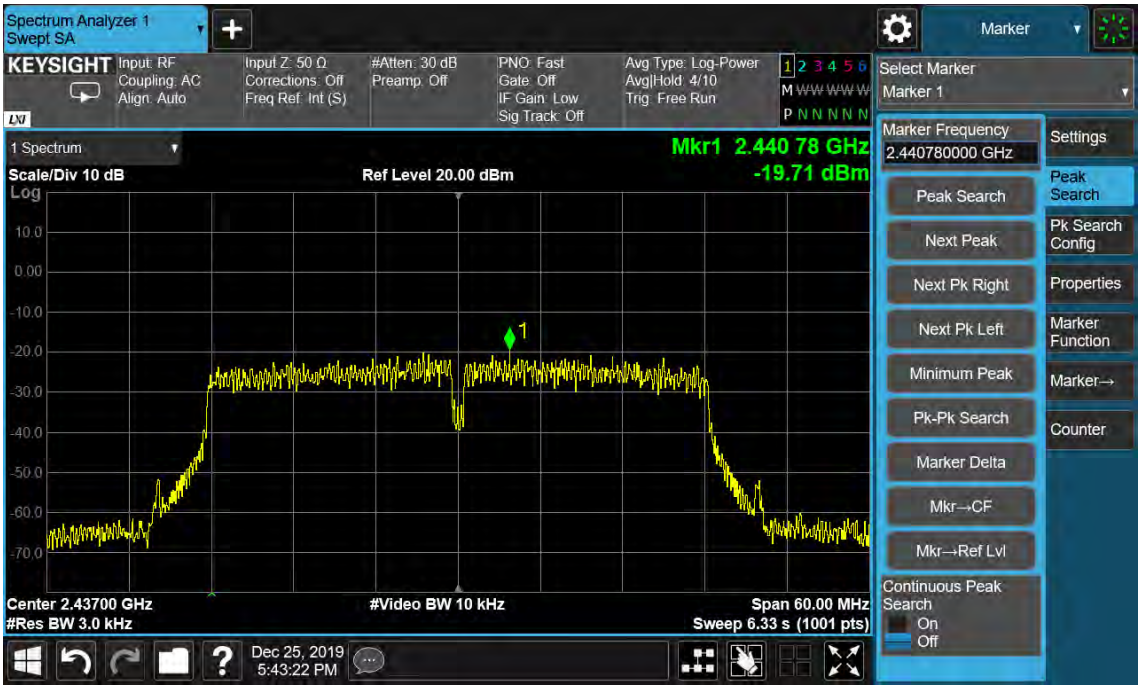
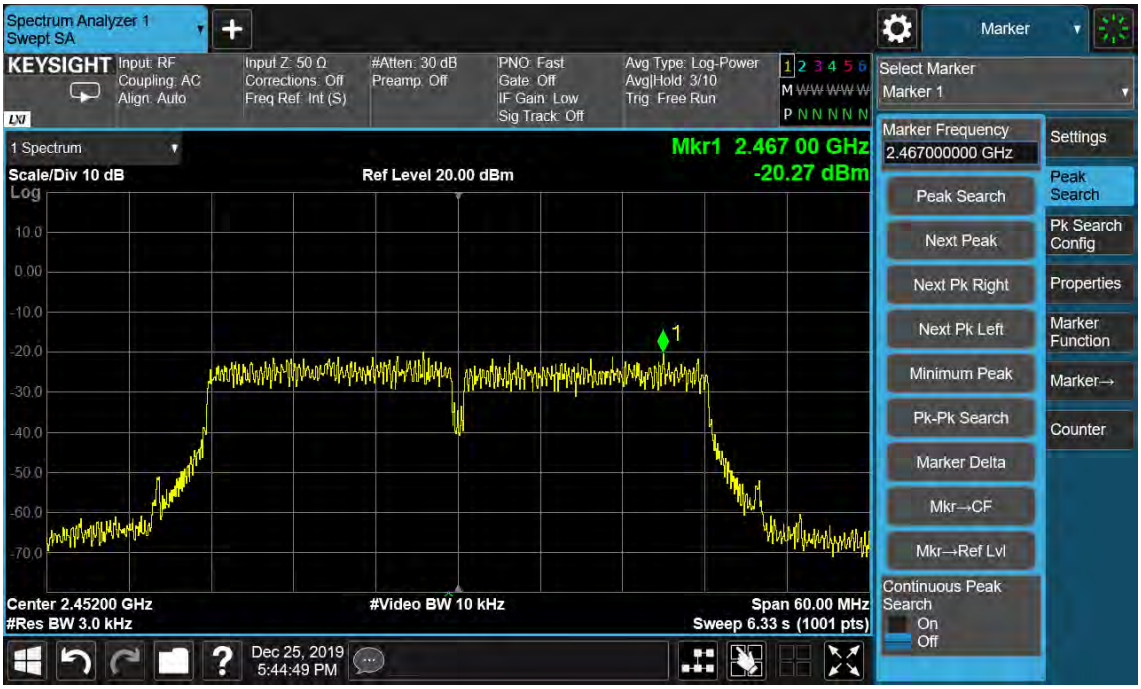


Figure 48: Power Spectral Density, 802.11n(HT40), 2452MHz



4.1.5 Conducted Spurious Emission & Authorized-band band-edge

RESULT: **PASS**

Test standard	:	FCC Part 15.247(d), 15.209
Requirement	:	ANSI C63.10-2013, KDB 558074
Kind of test site	:	Shielded room

Test setup

Test Channel	:	Low/Middle/High for spurious, Low/High for Band Edge
Operation Mode	:	A.1.a
Ambient temperature	:	25℃
Relative humidity	:	52%

For details refer to following test plot.

Note:

The all chains were tested respectively, but only the worst configuration shown here.

Figure 49: Conducted Spurious Emission & Authorized-band band-edge, 802.11b, 2412MHz Carrier Level

Band Edge

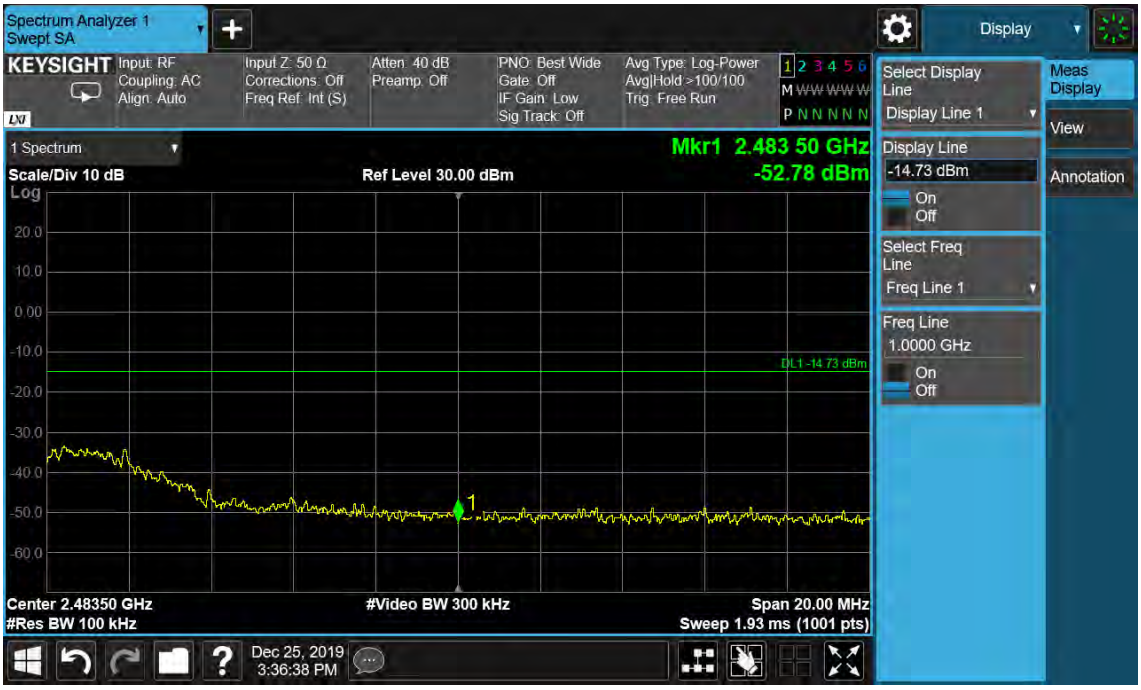
Conducted spurious emissions 30MHz-25GHz

Figure 50: Conducted Spurious Emission & Authorized-band band-edge, 802.11b, 2437MHz Carrier Level

Conducted spurious emissions 30MHz-25GHz

Figure 51: Conducted Spurious Emission & Authorized-band band-edge, 802.11b, 2462MHz Carrier Level

Band Edge



Conducted spurious emissions 30MHz-25GHz

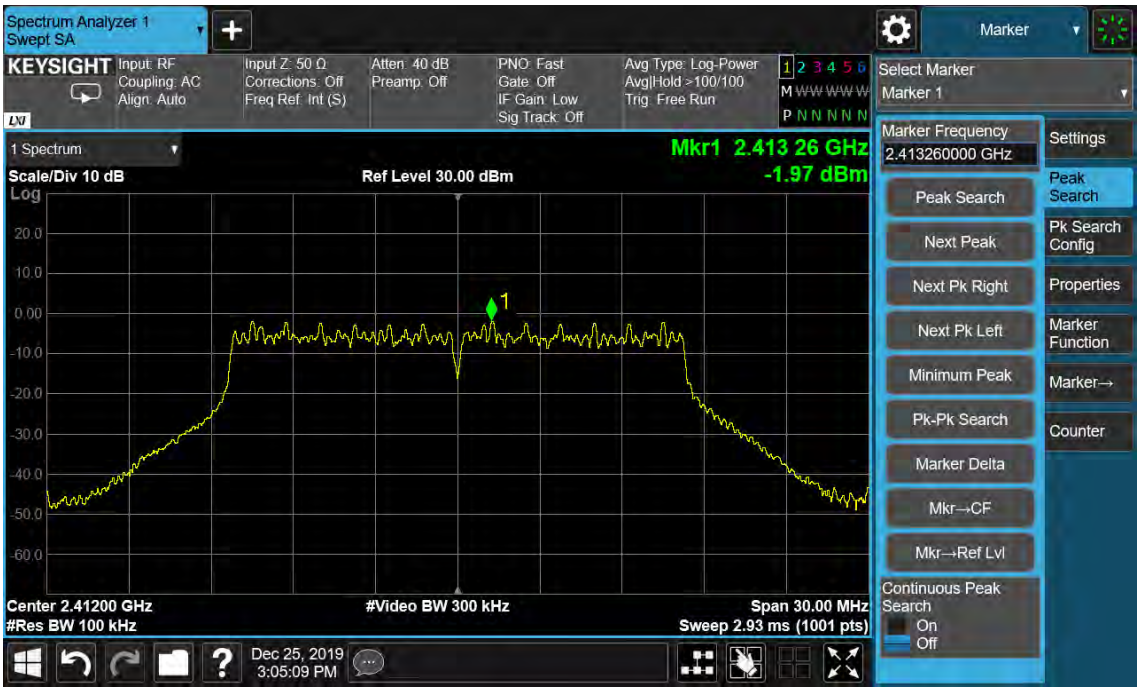
Figure 52: Conducted Spurious Emission & Authorized-band band-edge, 802.11b, 2472MHz

Carrier Level

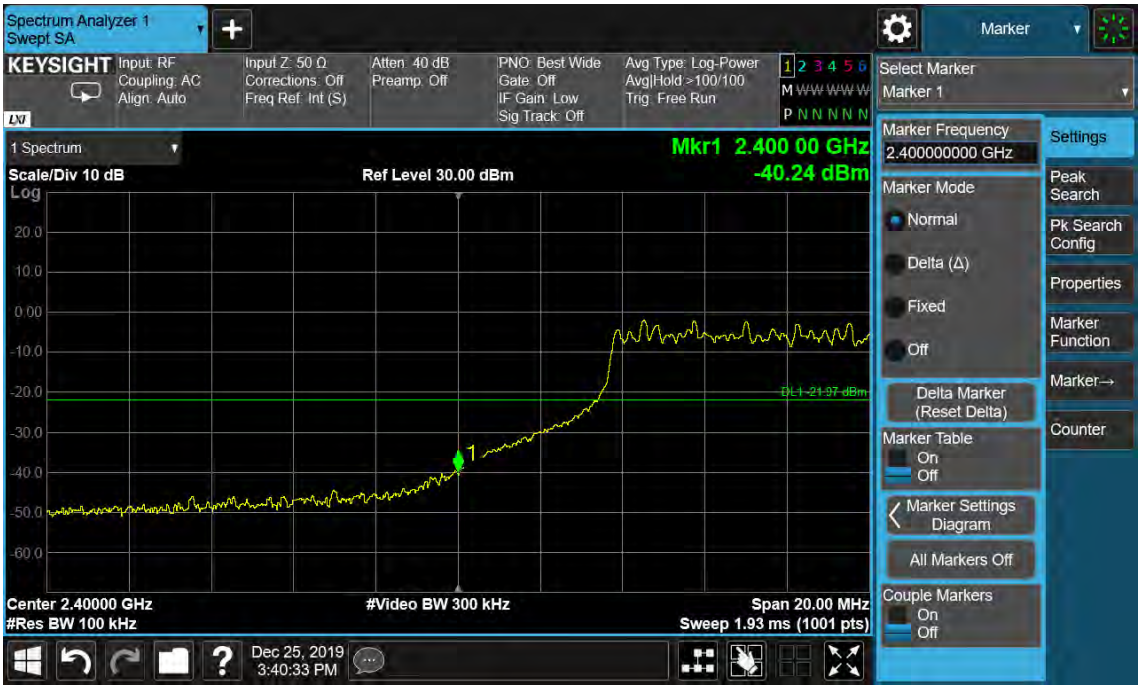
Band Edge

Figure 53: Conducted Spurious Emission & Authorized-band band-edge, 802.11g, 2412MHz

Carrier Level

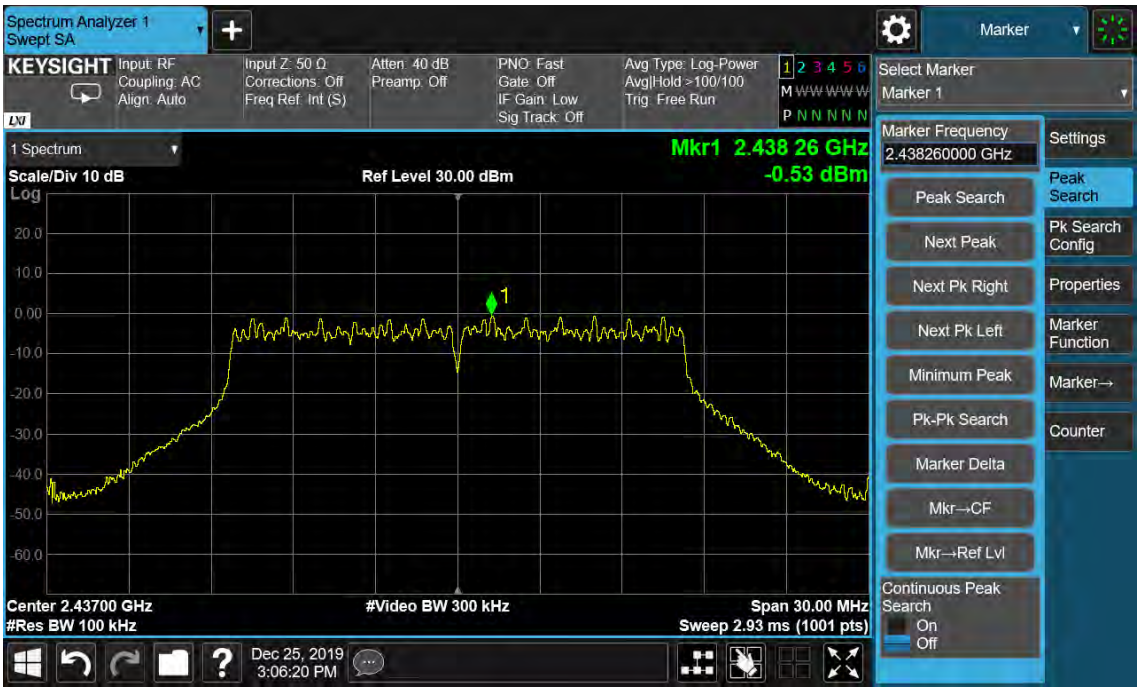


Band Edge



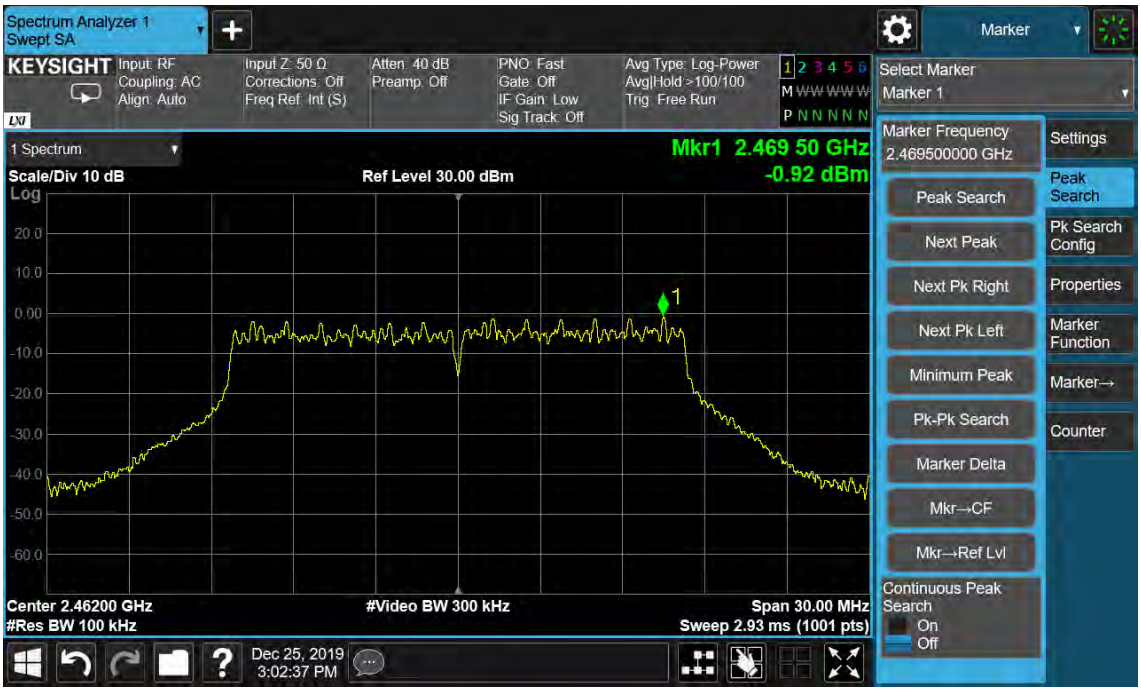
Conducted spurious emissions 30MHz-25GHz

Figure 54: Conducted Spurious Emission & Authorized-band band-edge, 802.11g, 2437MHz Carrier Level



Conducted spurious emissions 30MHz-25GHz

Figure 55: Conducted Spurious Emission & Authorized-band band-edge, 802.11g, 2462MHz Carrier Level



Band Edge

Conducted spurious emissions 30MHz-25GHz

Figure 56: Conducted Spurious Emission & Authorized-band band-edge, 802.11g, 2472MHz

Carrier Level

Band Edge

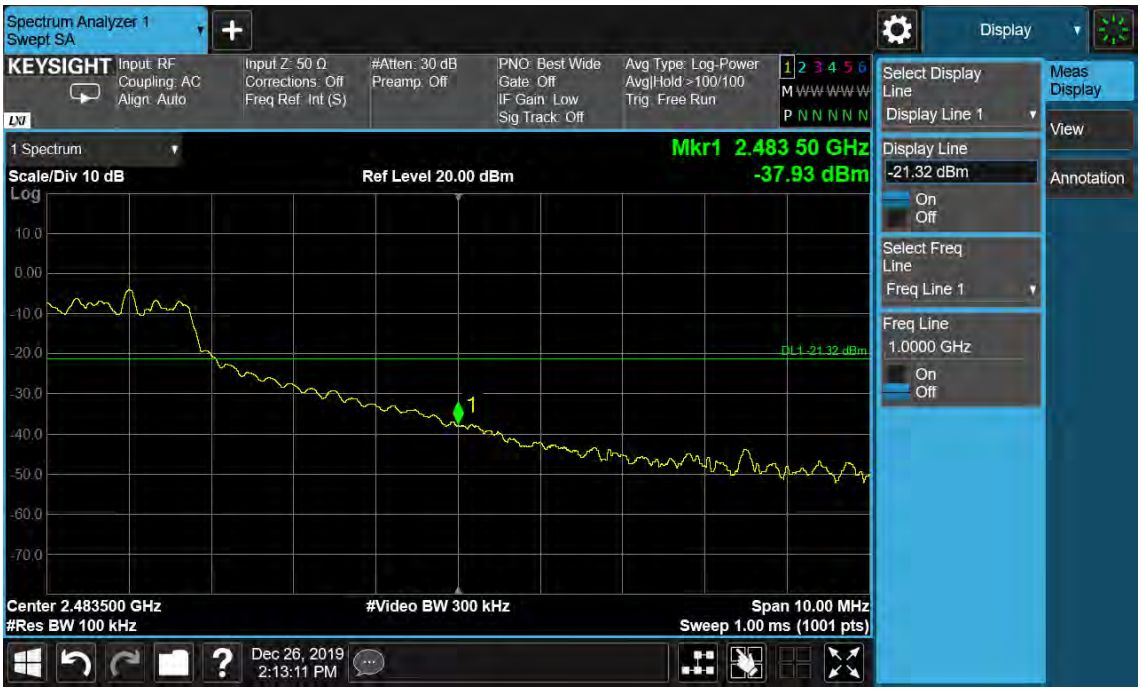
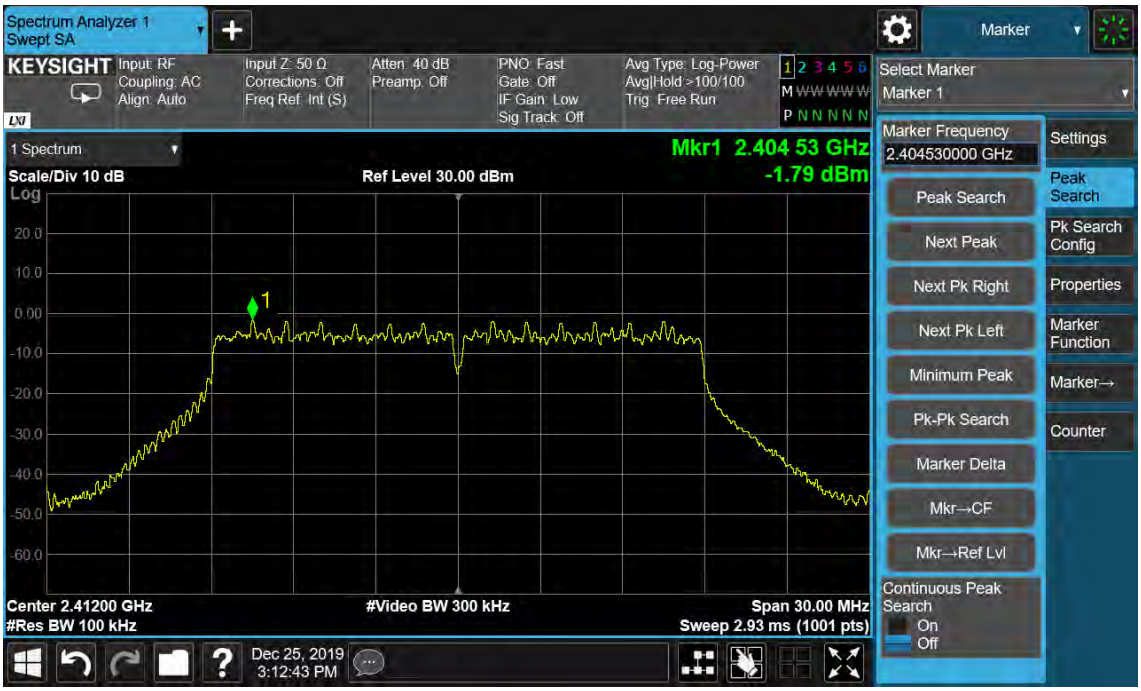
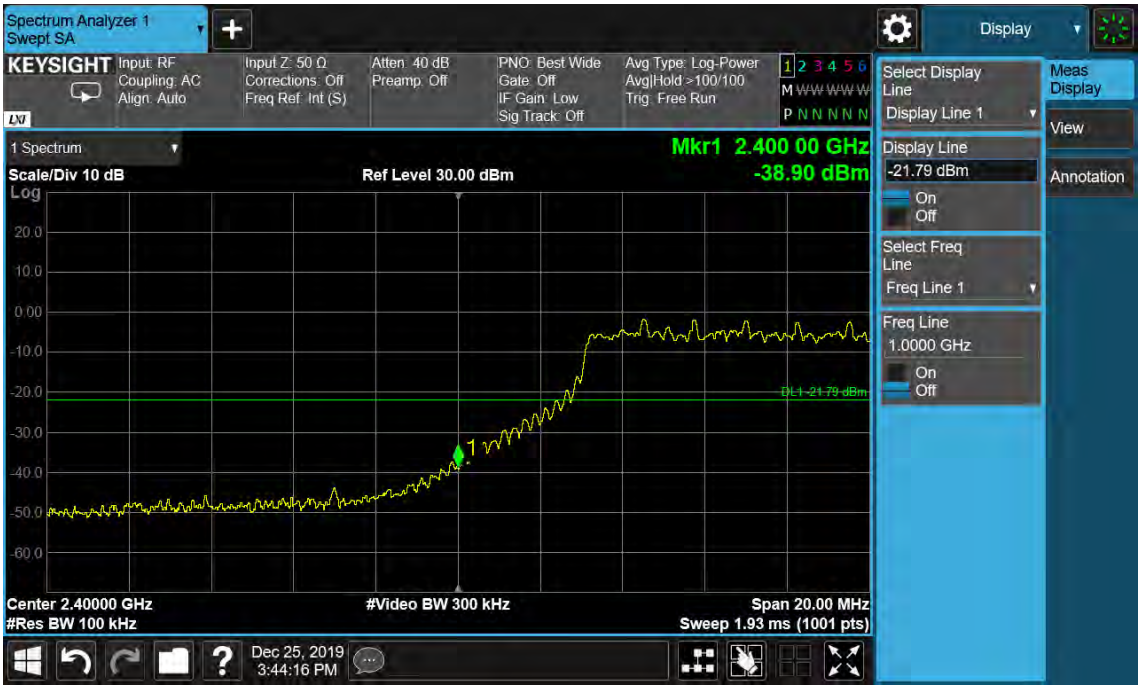


Figure 57: Conducted Spurious Emission & Authorized-band band-edge, 802.11n(HT20), 2412MHz

Carrier Level

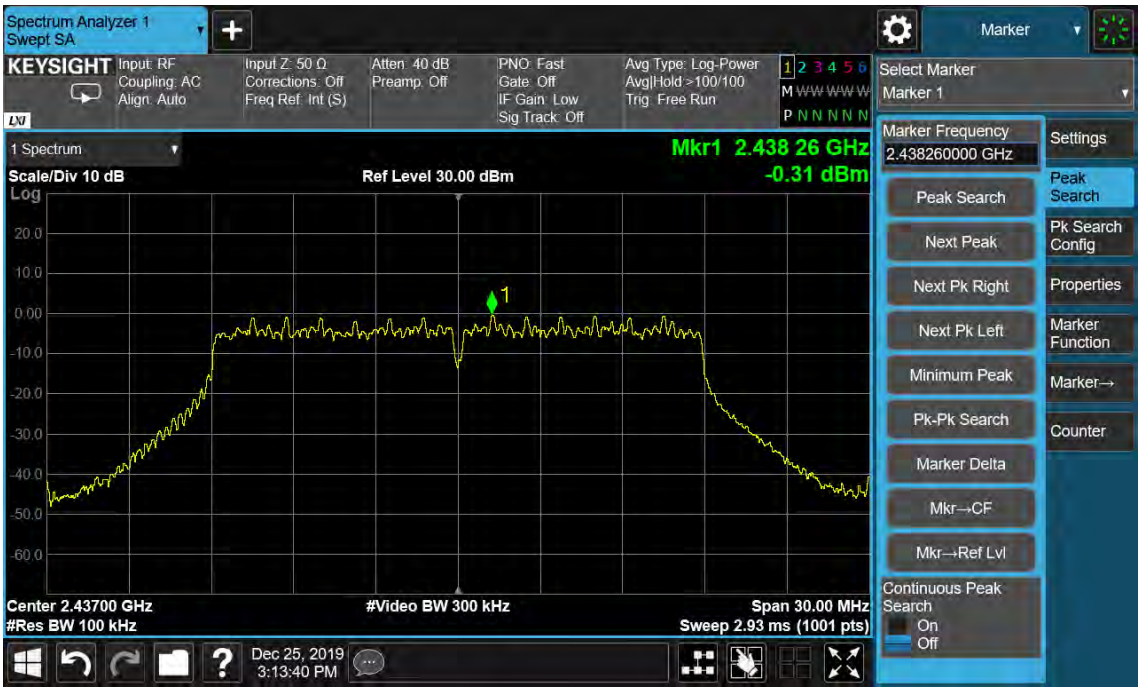


Band Edge



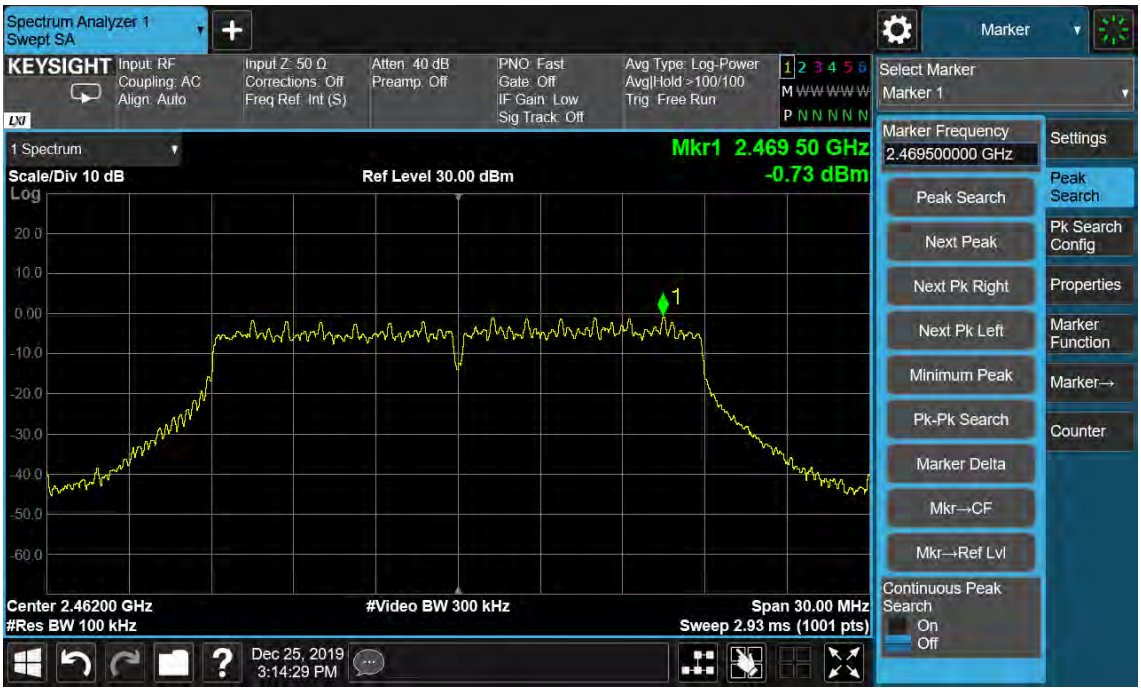
Conducted spurious emissions 30MHz-25GHz

Figure 58: Conducted Spurious Emission & Authorized-band band-edge, 802.11n(HT20), 2437MHz Carrier Level

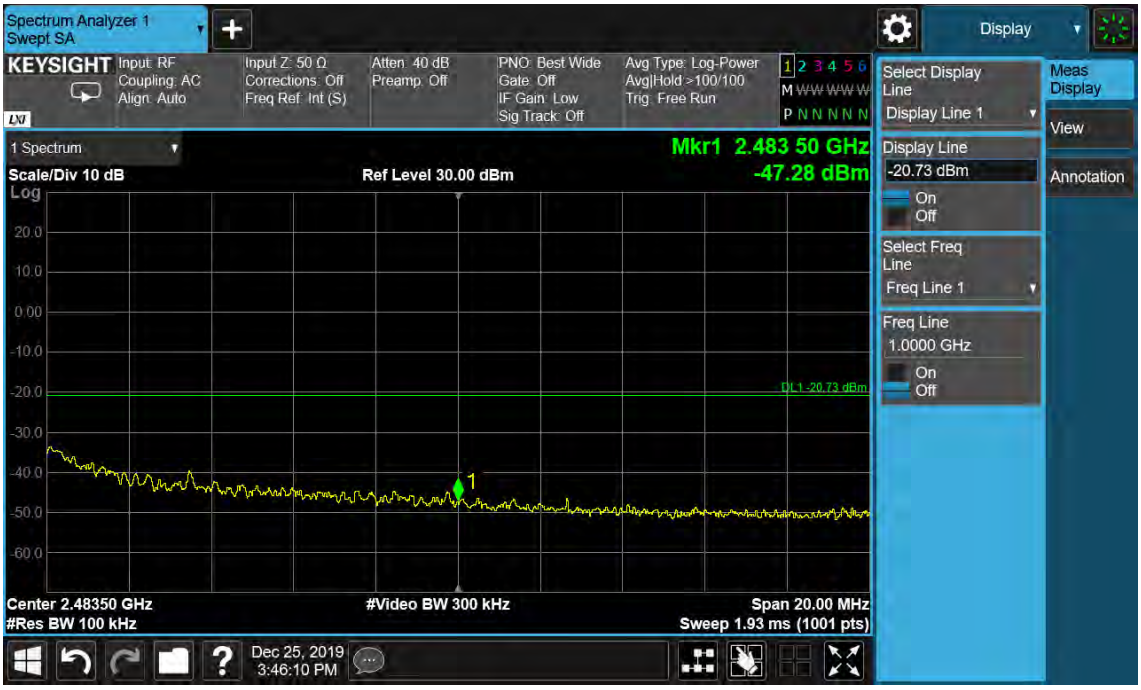


Conducted spurious emissions 30MHz-25GHz

Figure 59: Conducted Spurious Emission & Authorized-band band-edge, 802.11n(HT20), 2462MHz Carrier Level



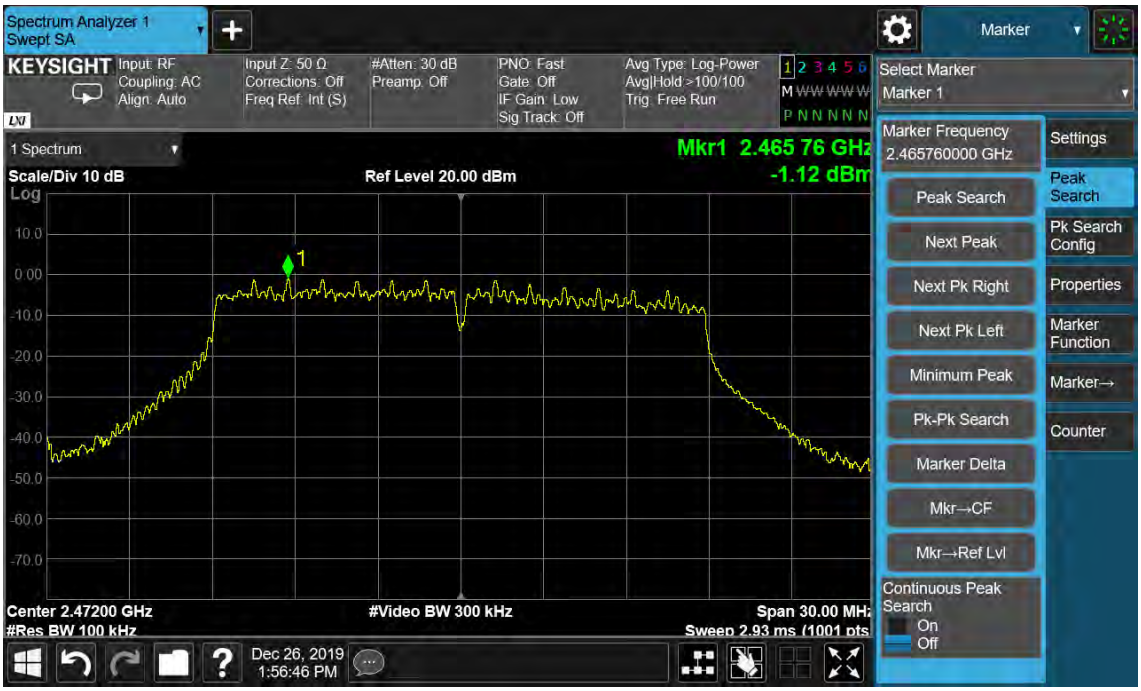
Band Edge



Conducted spurious emissions 30MHz-25GHz

Figure 60: Conducted Spurious Emission & Authorized-band band-edge, 802.11n(HT20), 2472MHz

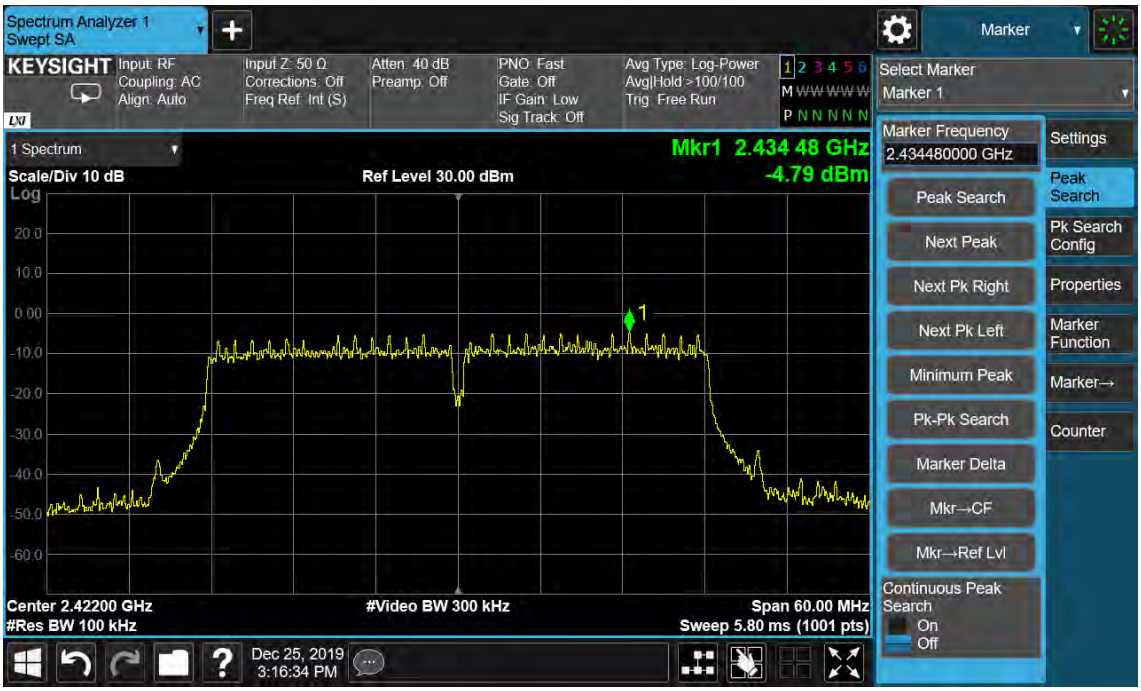
Carrier Level



Band Edge

Figure 61: Conducted Spurious Emission & Authorized-band band-edge, 802.11n(HT40), 2422MHz

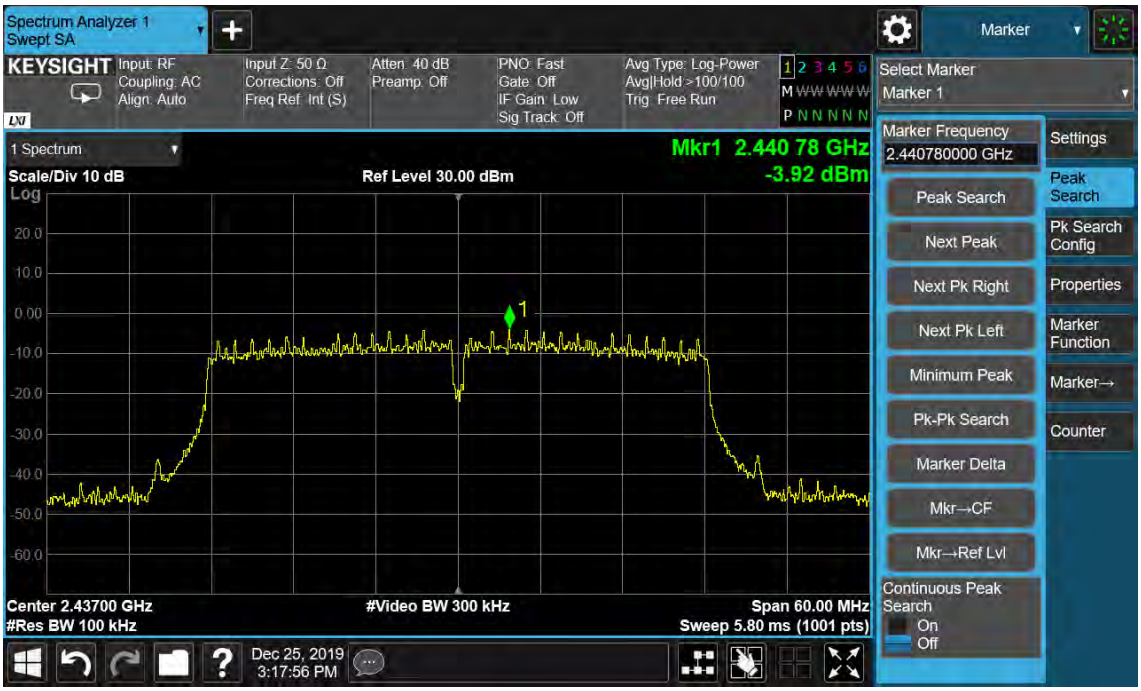
Carrier Level



Band Edge

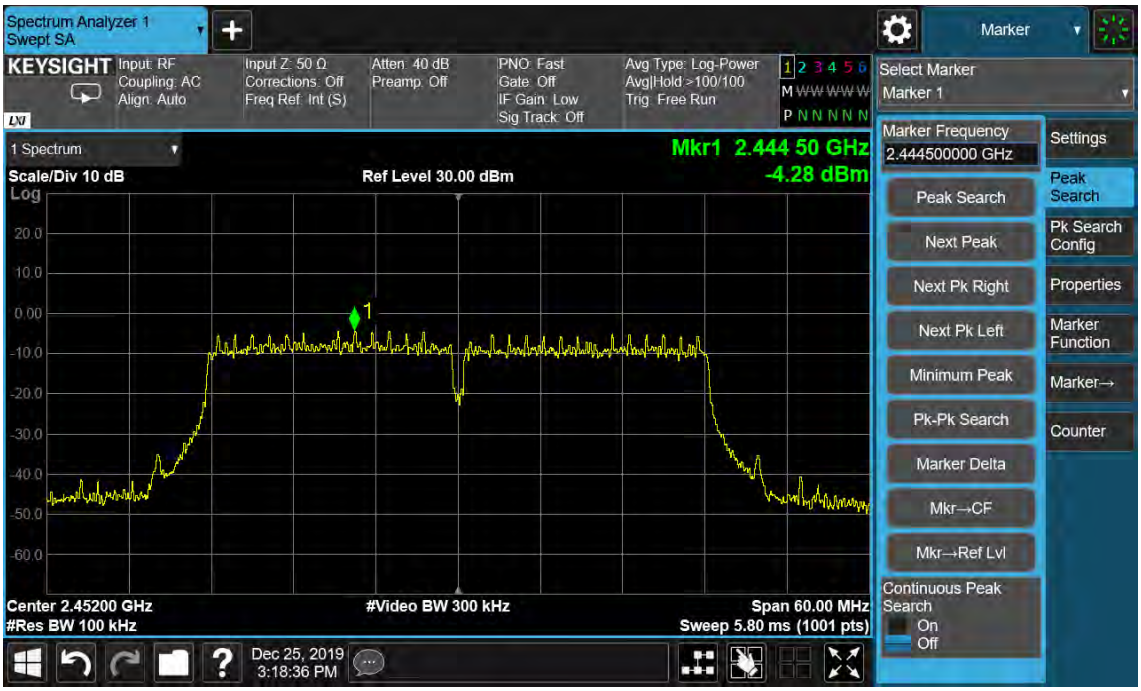
Conducted spurious emissions 30MHz-25GHz

Figure 62: Conducted Spurious Emission & Authorized-band band-edge, 802.11n(HT40), 2437MHz Carrier Level

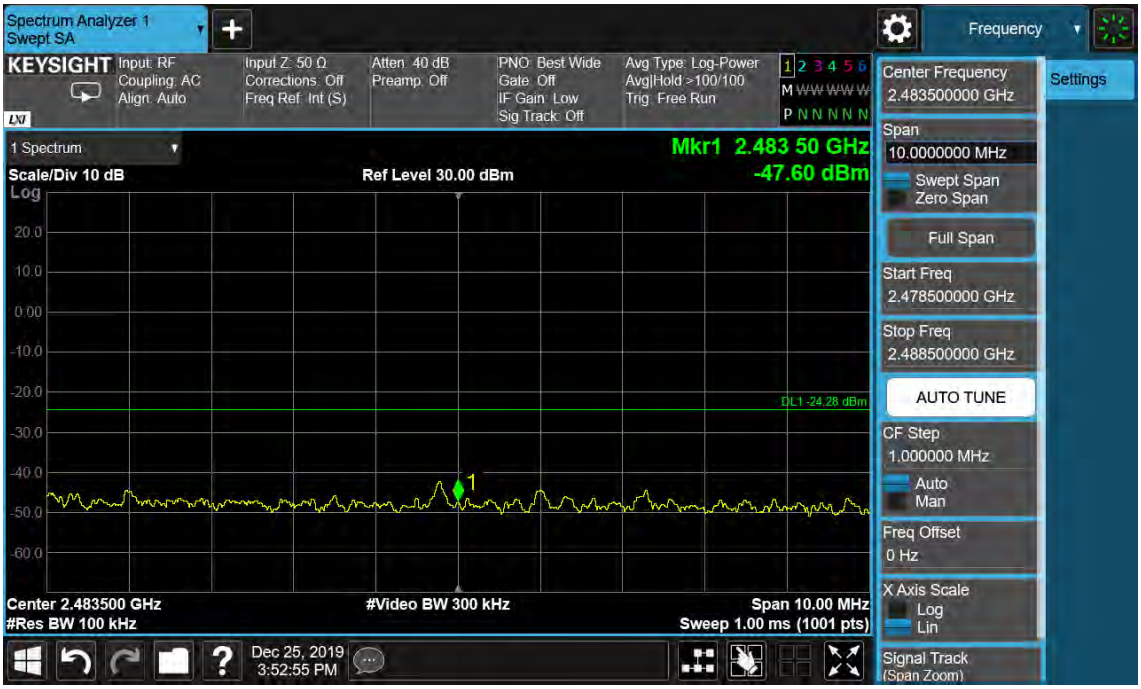


Conducted spurious emissions 30MHz-25GHz

Figure 63: Conducted Spurious Emission & Authorized-band band-edge, 802.11n(HT40), 2452MHz Carrier Level



Band Edge



Conducted spurious emissions 30MHz-25GHz

Figure 64: Conducted Spurious Emission & Authorized-band band-edge, 802.11n(HT40), 2462MHz Carrier Level

Band Edge

4.1.6 Spurious Emission

RESULT: **PASS**

Test standard	:	FCC Part 15.247(d), 15.205, 15.209
Requirement	:	ANSI C63.10-2013, KDB 558074
Kind of test site	:	3m Semi-Anechoic Chamber

Test setup

Test Channel	:	Low/Middle/High
Operation Mode	:	A
Ambient temperature	:	25℃
Relative humidity	:	52%

Notes:

1. Test plots please refer to the annex document "EXHIBIT A of SHE19110011-01CE".

2. For 9 kHz ~ 30 MHz, the amplitude of spurious emissions that are attenuated by more than 20dB below the permissible. The value has no need to be reported.

3. The spurious above 18GHz is noise only and 20dB below the limit. The value has no need to be reported.

4. The EUT is working in the Normal link mode below 1 GHz.

5. The all chains were tested respectively, but only the worst configuration shown here.

4.1.7 Band Edge (Restricted-band band-edge)

RESULT: **PASS**

Test standard	:	FCC Part 15.247(d), 15.205, 15.209
Requirement	:	ANSI C63.10-2013, KDB 558074
Kind of test site	:	3m Semi-Anechoic Chamber

Test setup

Test Channel	:	Low/Middle/High
Operation Mode	:	A.1
Ambient temperature	:	25℃
Relative humidity	:	52%

Note:

1. Test plots please refer to the annex document "EXHIBIT A of SHE19110011-01CE".

2. The all chains were tested respectively, but only the worst configuration shown here.

4.2 Mains Emissions

4.2.1 Conducted Emission on AC Mains

RESULT: **PASS**

Test standard	:	FCC Part 15.207(a)
Requirement	:	ANSI C63.10-2013
Kind of test site	:	Shielded room

Test setup

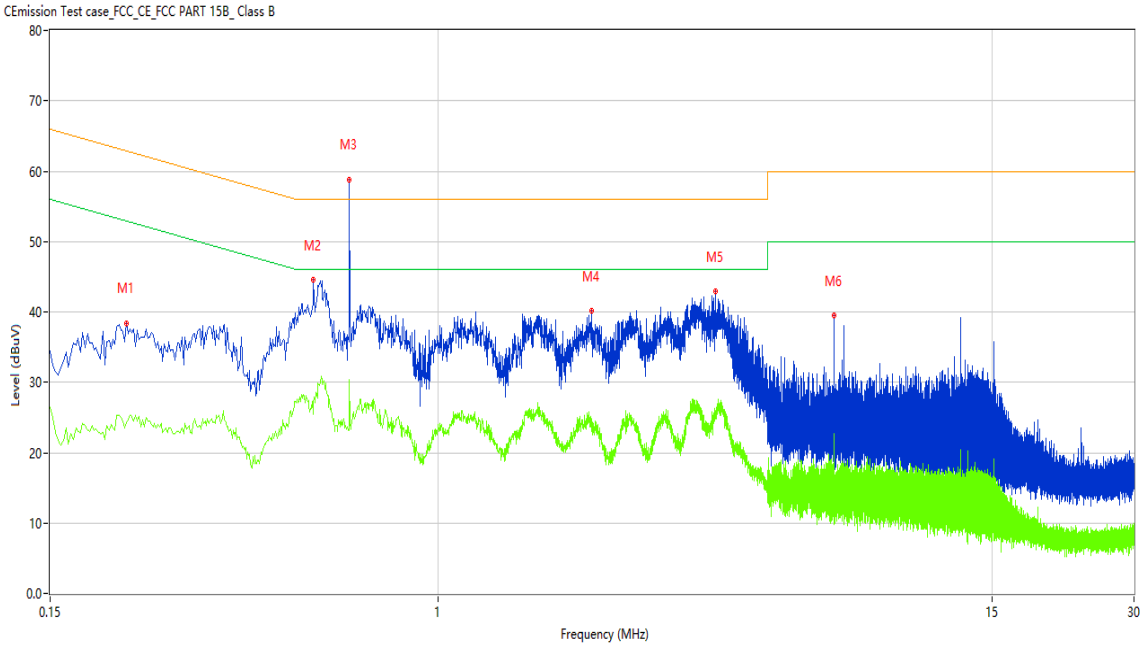
Input Voltage	:	AC 120V, 60Hz; AC 240V, 50Hz
Operation Mode	:	A
Earthing	:	Not Connected
Ambient temperature	:	25℃
Relative humidity	:	52%

For details refer to following test plot.

Note:

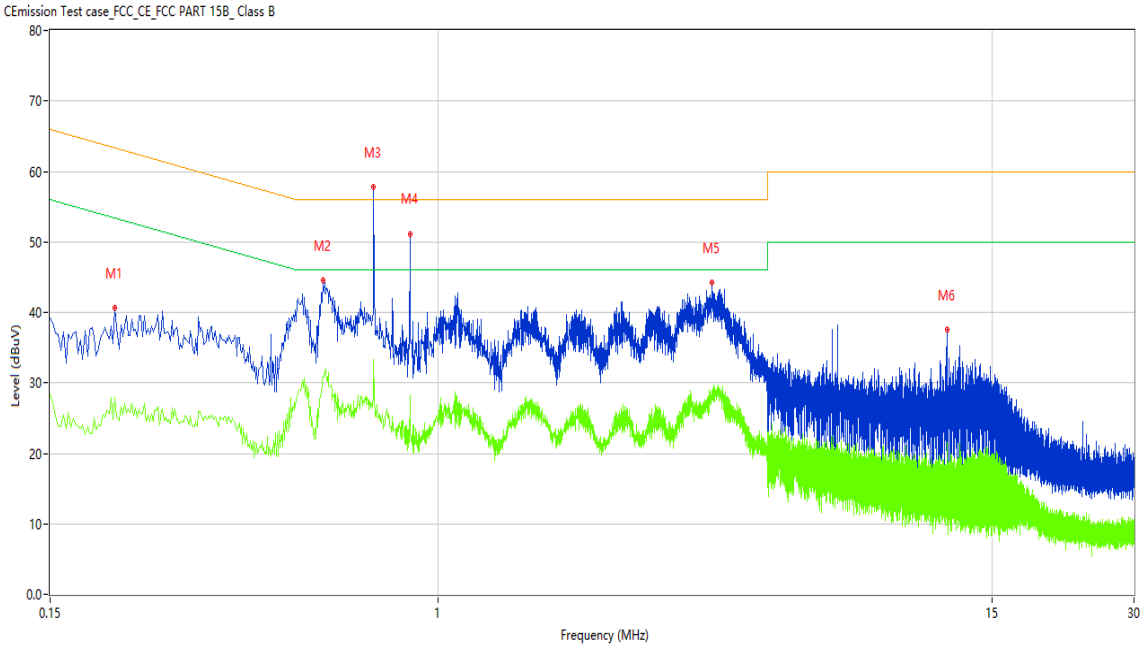
The all configurations were tested respectively, but only the worst configuration shown here.

Figure 10: Conducted Emission on AC Mains, L Phase



No.	Frequency (MHz)	Results (dBuV)	Factor (dB)	Limit (dBuV)	Over Limit (dB)	Detector	Line	Verdict
1	0.218	39.26	10.14	62.89	-23.63	Peak	L	Pass
1*	0.218	32.26	10.14	62.89	-30.63	QP	L	Pass
1**	0.218	24.27	10.14	52.89	-28.62	AV	L	Pass
2	0.544	49.73	10.15	56.00	-6.27	Peak	L	Pass
2*	0.544	38.05	10.15	56.00	-17.95	QP	L	Pass
2**	0.544	27.08	10.15	46.00	-18.92	AV	L	Pass
3	0.648	60.01	10.15	56.00	4.01	Peak	L	N/A
3*	0.648	42.28	10.15	56.00	-13.72	QP	L	Pass
3**	0.648	30.39	10.15	46.00	-15.61	AV	L	Pass
4	2.114	39.87	10.18	56.00	-16.13	Peak	L	Pass
4*	2.114	33.12	10.18	56.00	-22.88	QP	L	Pass
4**	2.114	24.89	10.18	46.00	-21.11	AV	L	Pass
5	3.882	43.24	10.24	56.00	-12.76	Peak	L	Pass
5*	3.882	35.00	10.24	56.00	-21.00	QP	L	Pass
5**	3.882	25.01	10.24	46.00	-20.99	AV	L	Pass
6	6.914	39.00	10.31	60.00	-21.00	Peak	L	Pass
6*	6.914	24.12	10.31	60.00	-35.88	QP	L	Pass
6**	6.914	22.67	10.31	50.00	-27.33	AV	L	Pass

Figure 66: Conducted Emission on AC Mains, N Phase



No.	Frequency (MHz)	Results (dBuV)	Factor (dB)	Limit (dBuV)	Over Limit (dB)	Detector	Line	Verdict
1	0.206	41.11	10.15	63.37	-22.26	Peak	N	Pass
1*	0.206	34.44	10.15	63.37	-28.93	QP	N	Pass
1**	0.206	27.86	10.15	53.37	-25.51	AV	N	Pass
2	0.570	51.82	10.15	56.00	-4.18	Peak	N	Pass
2*	0.570	40.48	10.15	56.00	-15.52	QP	N	Pass
2**	0.570	30.78	10.15	46.00	-15.22	AV	N	Pass
3	0.730	66.59	10.15	56.00	10.59	Peak	N	N/A
3*	0.730	44.33	10.15	56.00	-11.67	QP	N	Pass
3**	0.730	33.28	10.15	46.00	-12.72	AV	N	Pass
4	0.872	48.19	10.15	56.00	-7.81	Peak	N	Pass
4*	0.872	32.07	10.15	56.00	-23.93	QP	N	Pass
4**	0.872	28.19	10.15	46.00	-17.81	AV	N	Pass
5	3.814	44.01	10.24	56.00	-11.99	Peak	N	Pass
5*	3.814	38.66	10.24	56.00	-17.34	QP	N	Pass
5**	3.814	27.79	10.24	46.00	-18.21	AV	N	Pass
6	12.018	37.61	10.46	60.00	-22.39	Peak	N	Pass
6*	12.018	24.90	10.46	60.00	-35.10	QP	N	Pass
6**	12.018	21.49	10.46	50.00	-28.51	AV	N	Pass

End of the report