TEST REPORT

Applicant	:	Shanghai Sunmi Technology Co.,Ltd.
Address of Applicant	:	Room 505, KIC Plaza, No.388 Song Hu Road, Yang Pu District, Shanghai, China
Product Name	:	Smart POS System
Model No.	:	T6800
Sample No.	:	E19110042-01#01 E19110042-02#01
FCC ID	:	2AH25T6800
Standards	:	FCC CFR47 Part 15, Subpart C
Date of Receipt	:	2019-11-22
Date of Test	:	2019-11-22 ~ 2019-11-25
Date of Issue	:	2019-11-25

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: Adrian Shi (Adrian Shi) Approved by: Guoyou Chi (Authorized signatory: Guoyou Chi)

Revision Record			
Version	**Date**	**Revisions**	**Revised By**
1.0	2019-11-25	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	Shanghai Sunmi Technology Co.,Ltd.
Address	Room 505, KIC Plaza, No.388 Song Hu Road, Yang Pu District, Shanghai, China
Contact Person	Zhang Wentang
Telephone	18721763396
Email	zhangwentang@sunmi.com

1.3 Details of EUT

Product Name	Smart POS System
Brand Name	SUNMI
Model No.	T6800
FCC ID	2AH25T6800
Mode of Operation	WLAN 802.11b/g/n(HT20)
Frequency Range	2400MHz ~ 2483.5MHz
Channel Separation	5 MHz
Modulation Type	DSSS, OFDM
Antenna Type	Internal Antenna
Antenna Gain	0.81 dBi
Extreme Temperature Range	-10℃~ +45℃
Test Voltage	DC 3.8V

1.4 Test Methodology

47 CFR Part 15, Subpart C (11-21-19 Edition)	Miscellaneous Wireless Communications Services
KDB Publication 558074 D01 v05r02	15.247 Meas Guidance.
KDB Publication 662911 D01 v02r01	Emissions Testing of Transmitters with Multiple Outputs in the Same Band (e.g., MIMO, Smart Antenna, etc)
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.

2 Test Condition

2.1 Test Facility

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

The Federal Communications Commission has reviewed the technical characteristics of the radiated and conducted emission facility, and has found these test facilities to be in compliance with the requirements of section 2.948 of the FCC rules. The description of the test facility is listed under FCC registration number 246204.

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)

Channel	Frequency
The lowest channel(CH1)	2412MHz
The middle channel(CH6)	2437MHz
The Highest channel(CH11)	2462MHz

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
802.11b	11Mbps
802.11g	54Mbps
802.11n(20M)	MCS7

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

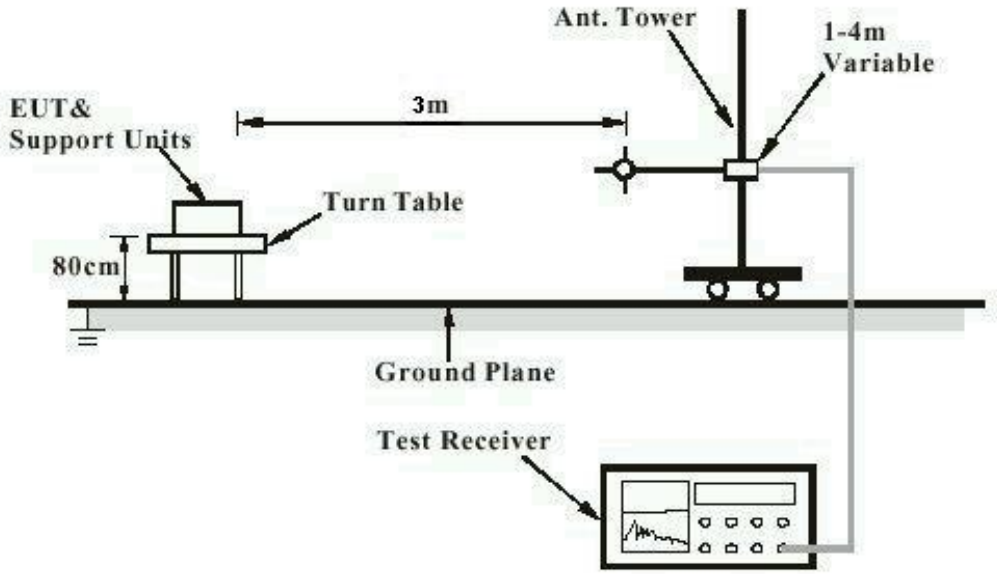
Description	Manufacturer	Model No.	Serial No.
Laptop	Lenovo	TP00083A	N/A

3.3 Support Software

Description	Manufacturer	Software Name
Software	Qualcomm	QRCT

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

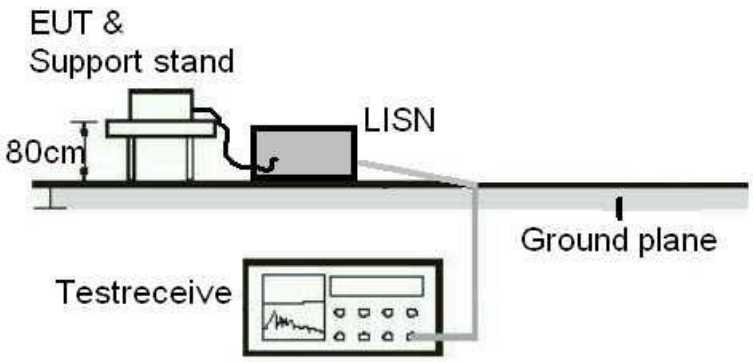
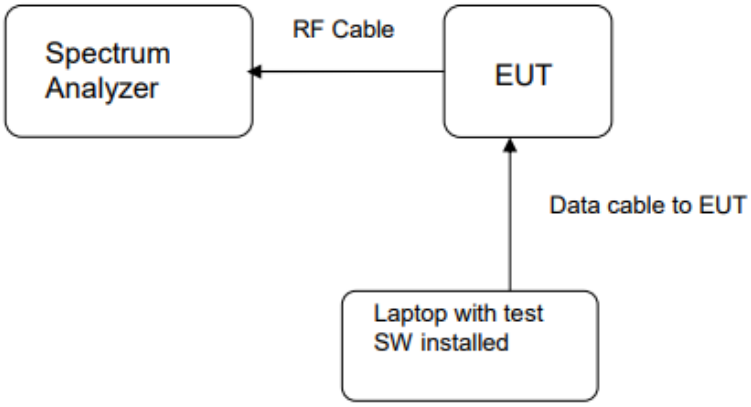


Diagram of Measurement Equipment Configuration for Transmitter Measurement



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 RSS-247 5.4(6)
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 0.81 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°C
Relative humidity	:	52%

Table 1: Peak Output Power

Test Mode	Test Channel (MHz)	Measured Peak Power		Limit (W)
		(dBm)	(mW)	
802.11b	2412	11.63	14.55	< 1
	2437	11.86	15.35	
	2462	11.00	12.59	
802.11g	2412	10.41	10.99	
	2437	11.32	13.55	
	2462	10.17	10.40	
802.11n(HT20)	2412	8.24	6.67	
	2437	8.88	7.73	
	2462	8.62	7.28	

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°C
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)
802.11b	2412	8.515	12.859	0.5
	2437	8.992	12.908	
	2462	8.589	13.044	
802.11g	2412	16.410	16.538	
	2437	16.530	16.489	
	2462	16.520	16.479	
802.11n(HT20)	2412	17.750	17.660	
	2437	17.750	17.662	
	2462	17.760	17.673	

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

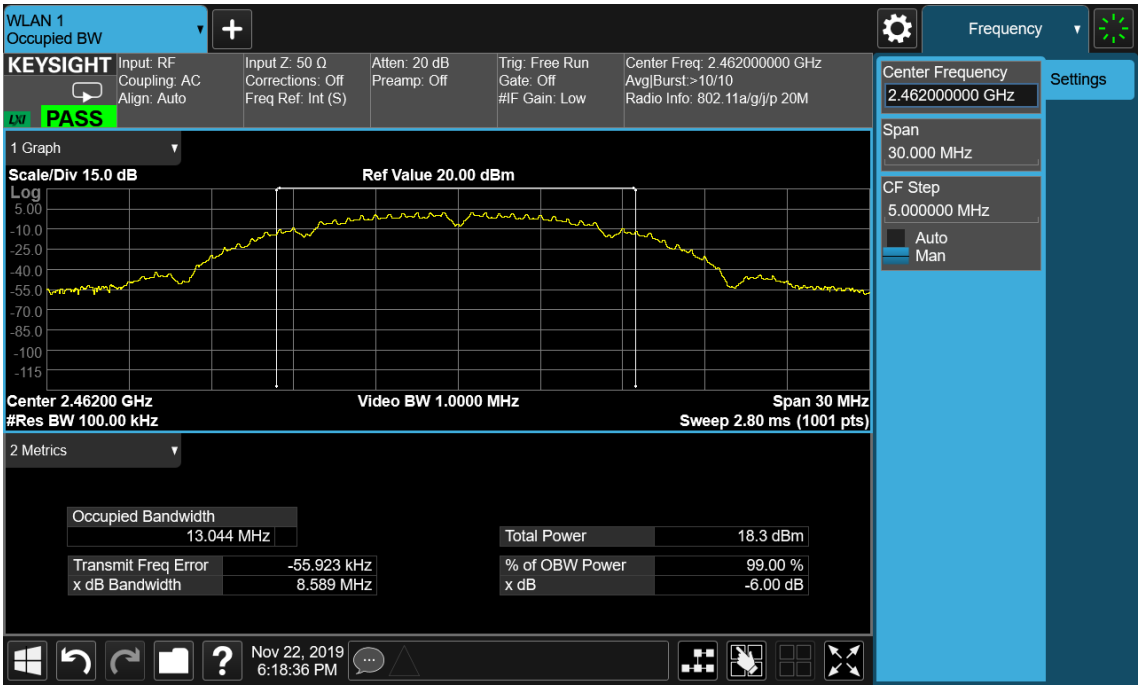


Figure 4: 6dB Bandwidth and 99% Bandwidth, 802.11g, 2412MHz

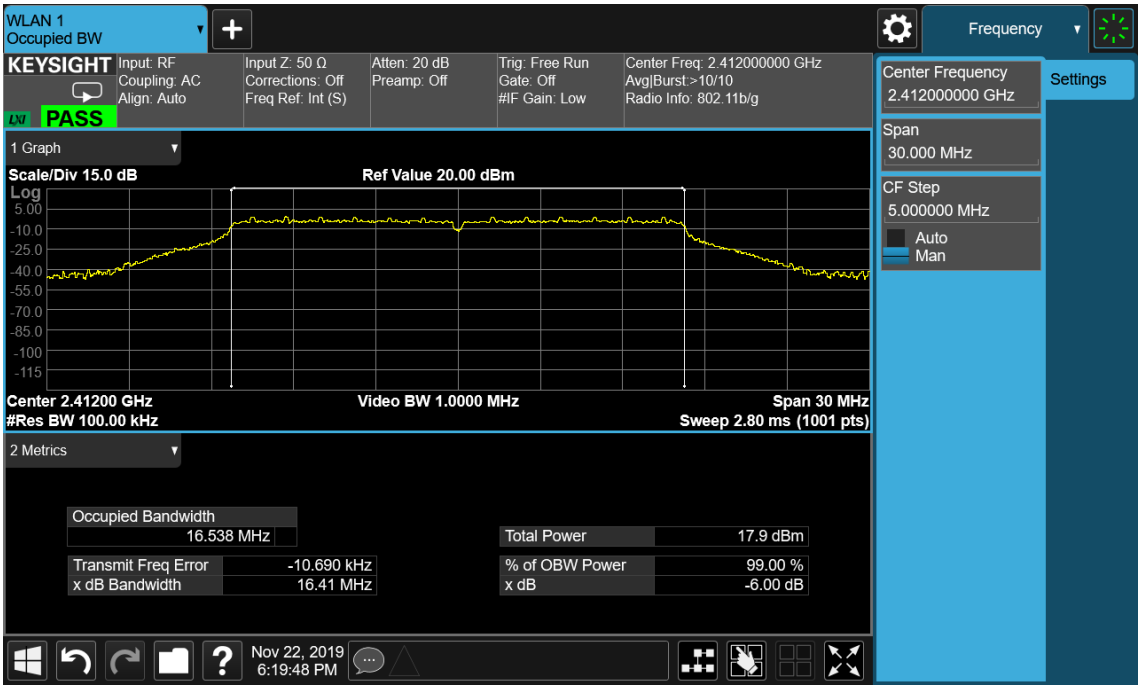


Figure 5: 6dB Bandwidth and 99% Bandwidth, 802.11g, 2437MHz

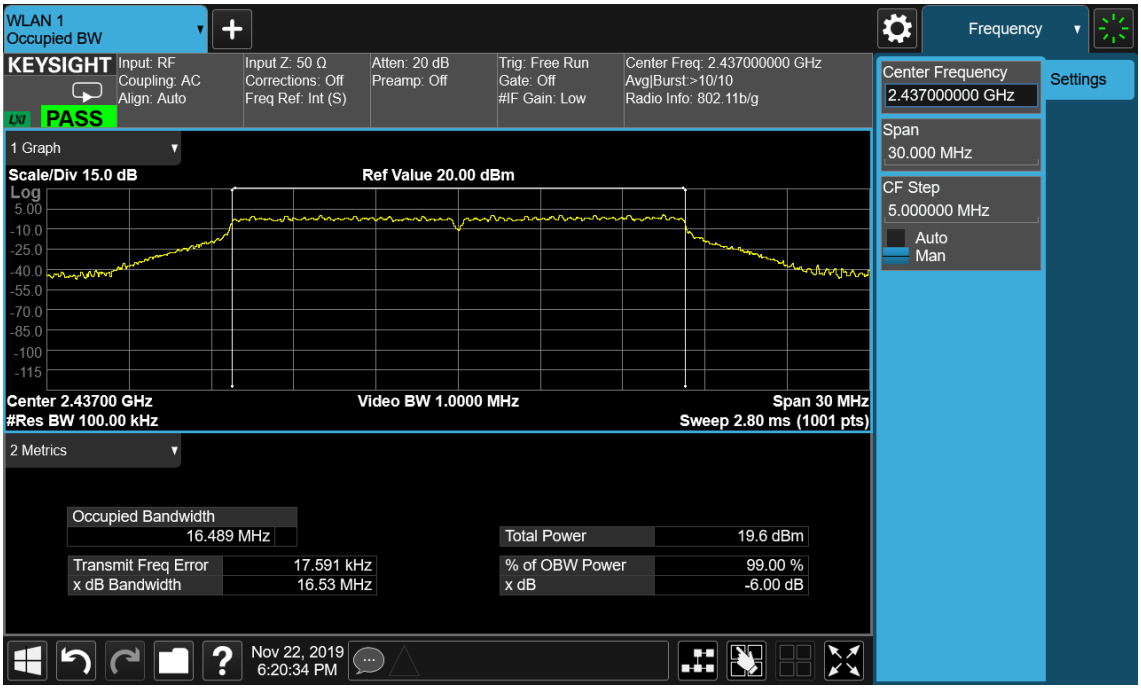


Figure 6: 6dB Bandwidth and 99% Bandwidth, 802.11g, 2462MHz

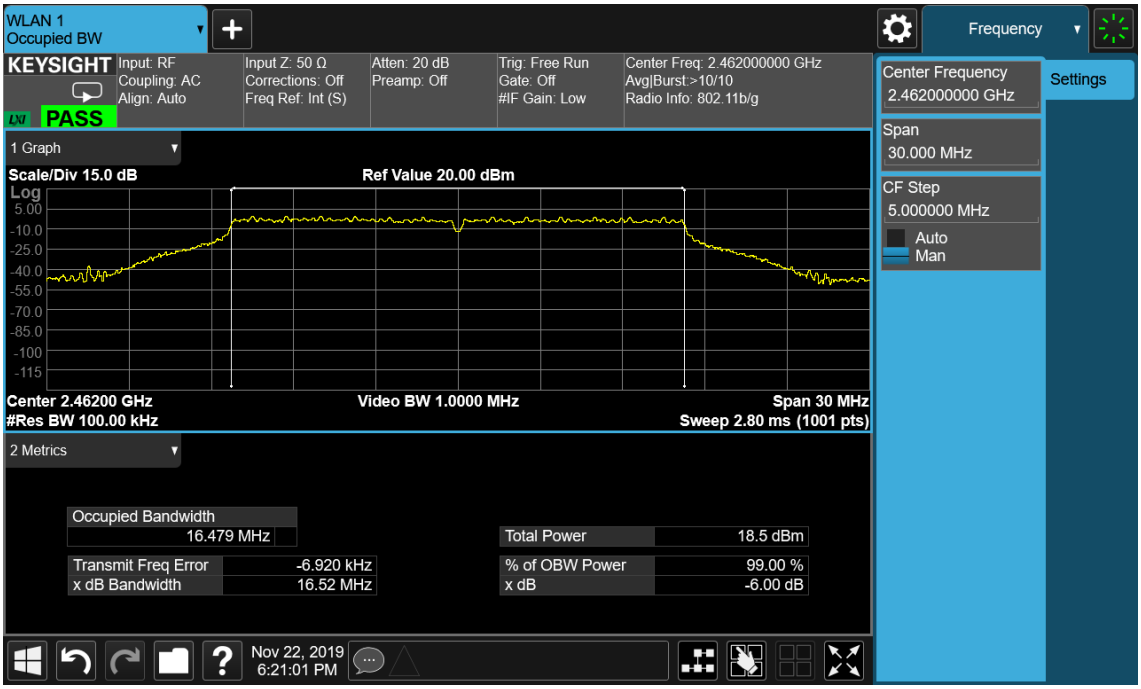


Figure 7: 6dB Bandwidth and 99% Bandwidth, 802.11n(HT20), 2412MHz

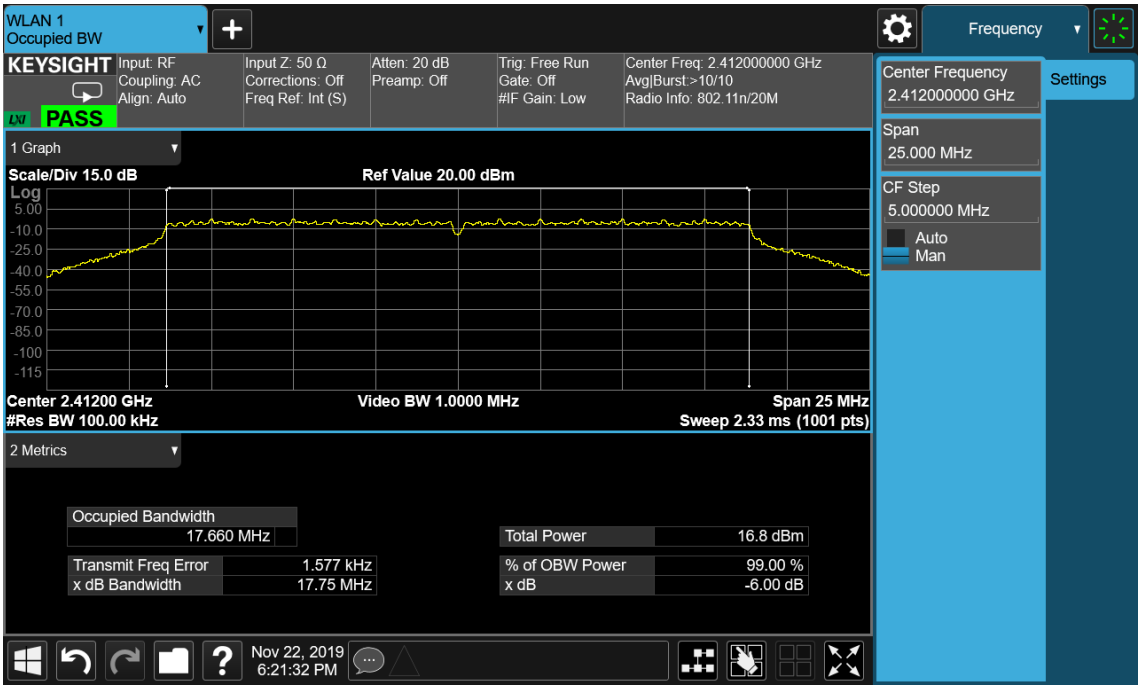


Figure 8: 6dB Bandwidth and 99% Bandwidth, 802.11n(HT20), 2437MHz

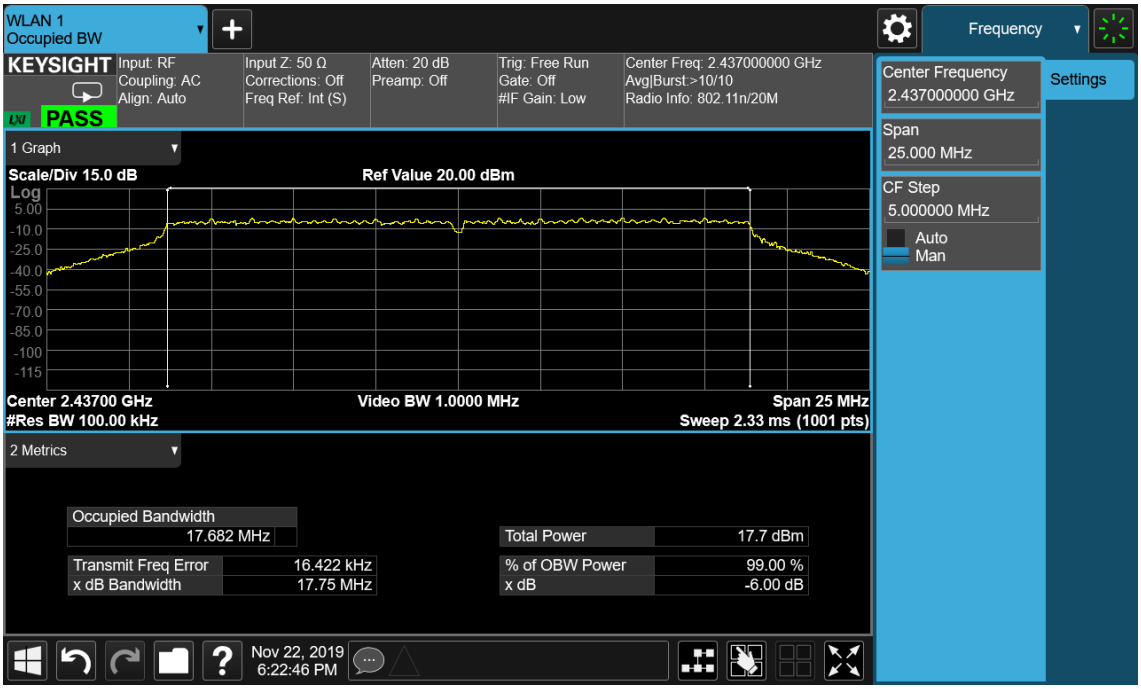
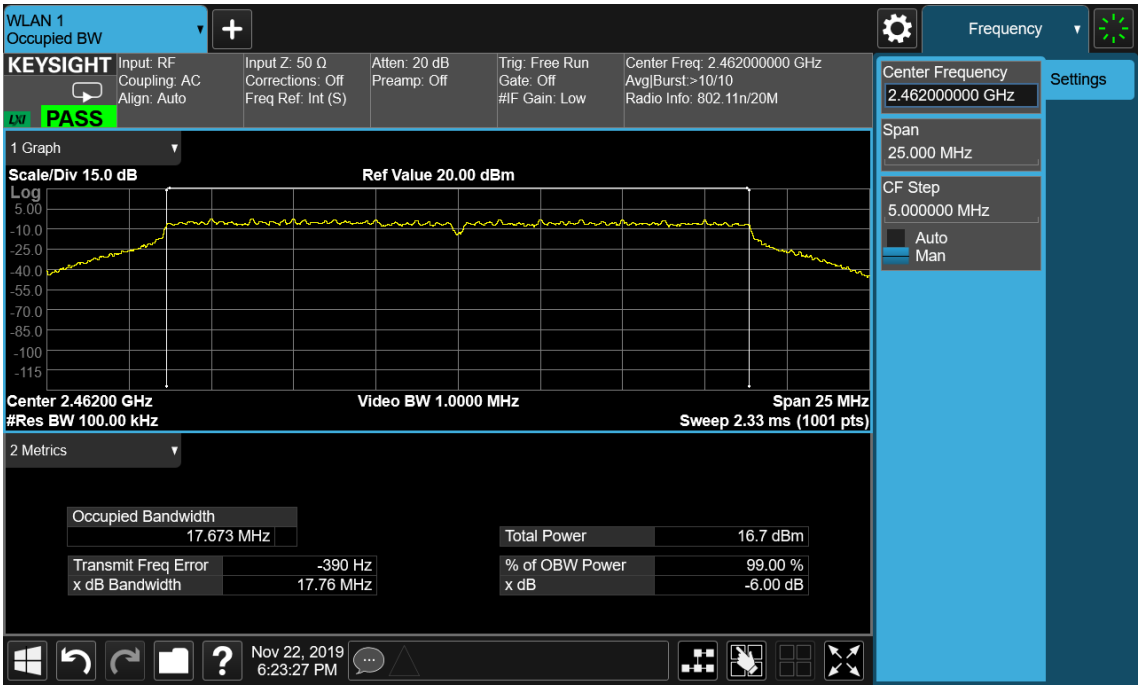


Figure 9: 6dB Bandwidth and 99% Bandwidth, 802.11n(HT20), 2462MHz



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°C
Relative humidity	:	52%

Table 3: Power Spectral Density

Test Mode	Test Channel (MHz)	Measured Result (dBm/3kHz)	Limit (dBm/3kHz)
802.11b	2412	-10.32	8
	2437	-10.13	
	2462	-11.54	
802.11g	2412	-10.86	
	2437	-14.08	
	2462	-14.95	
802.11n(HT20)	2412	-16.60	
	2437	-14.72	
	2462	-15.17	

Figure 10: Power Spectral Density, 802.11b, 2412MHz

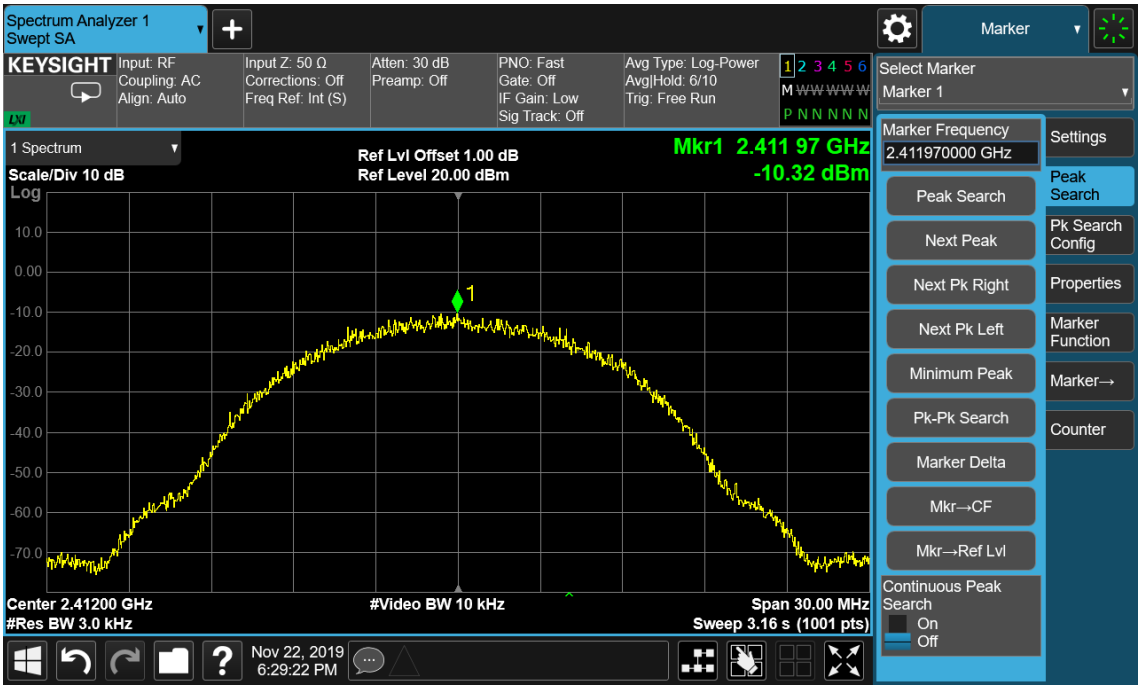


Figure 11: Power Spectral Density, 802.11b, 2437MHz

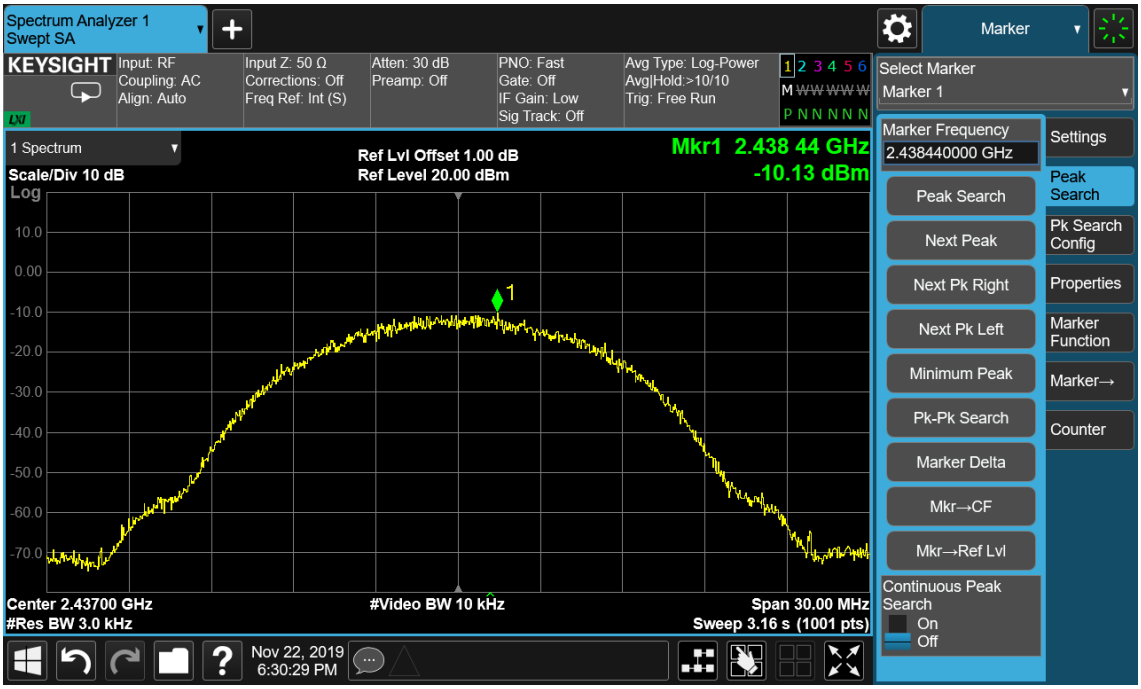


Figure 12: Power Spectral Density, 802.11b, 2462MHz

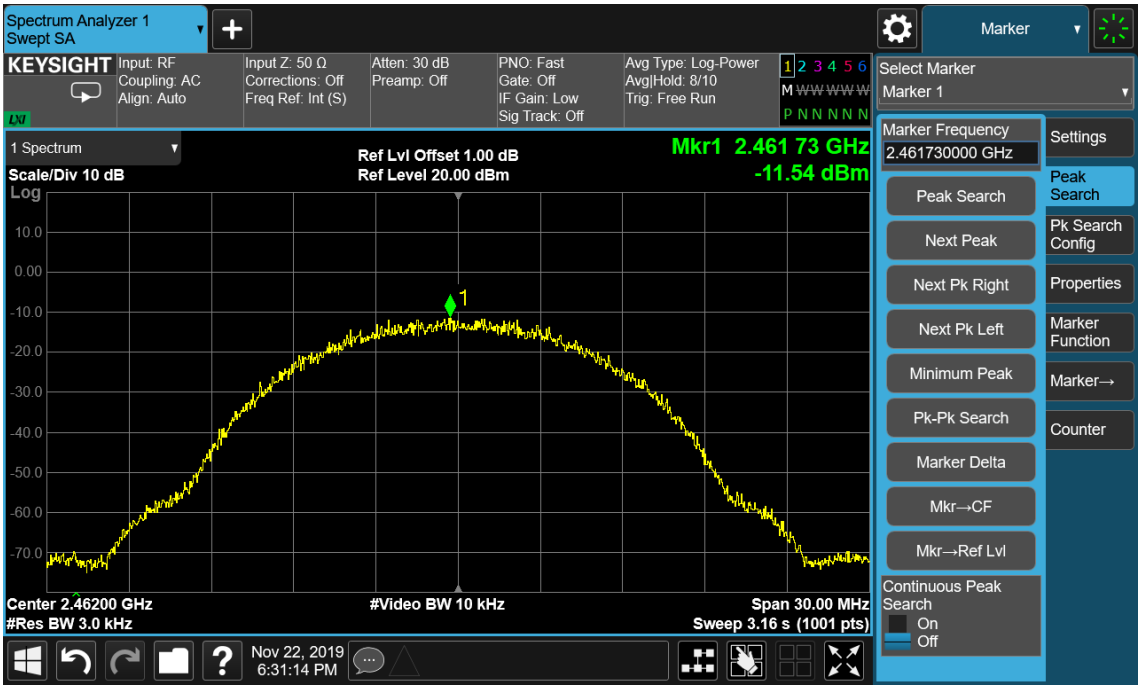


Figure 13: Power Spectral Density, 802.11g, 2412MHz

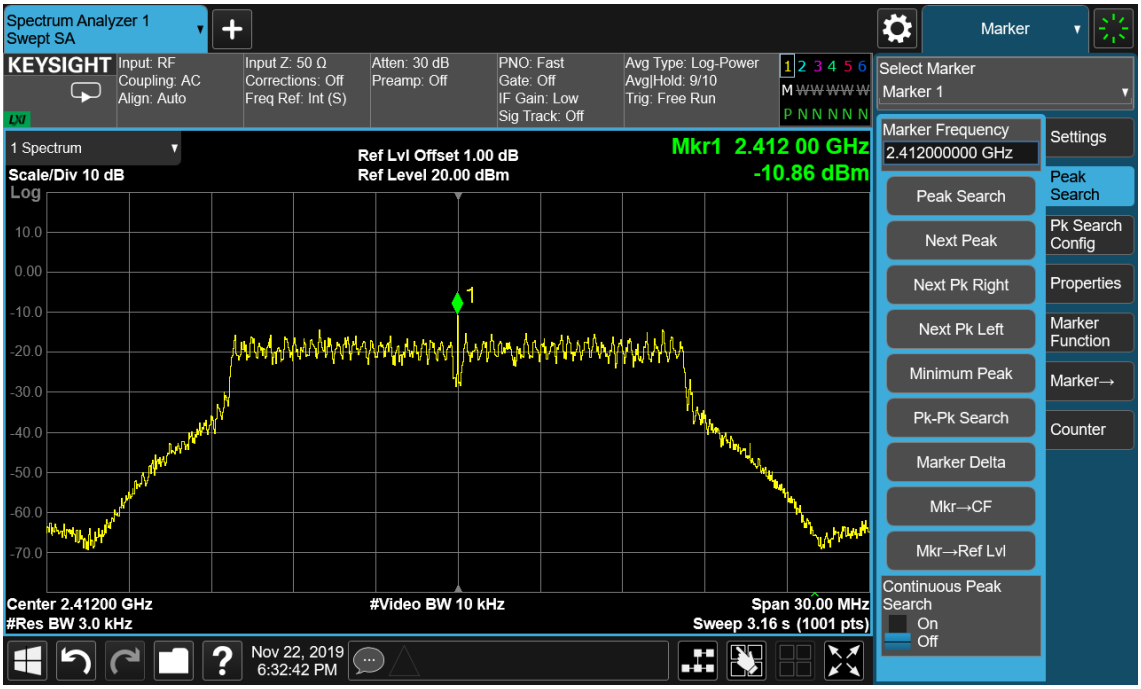


Figure 14: Power Spectral Density, 802.11g, 2437MHz

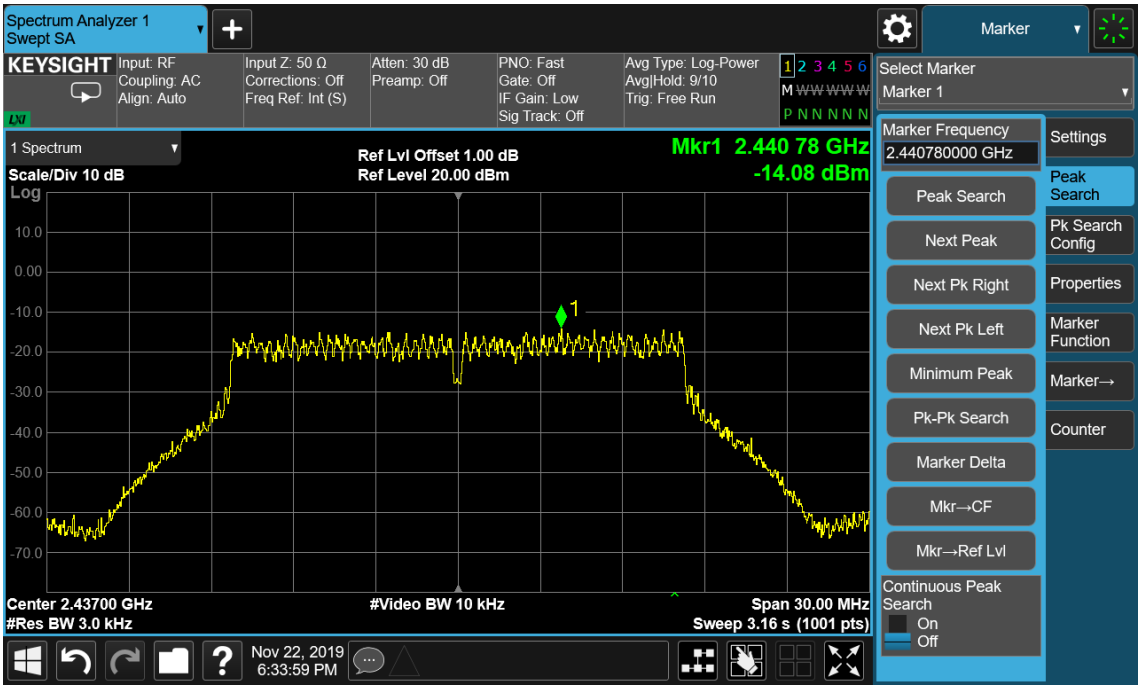


Figure 15: Power Spectral Density, 802.11g, 2462MHz

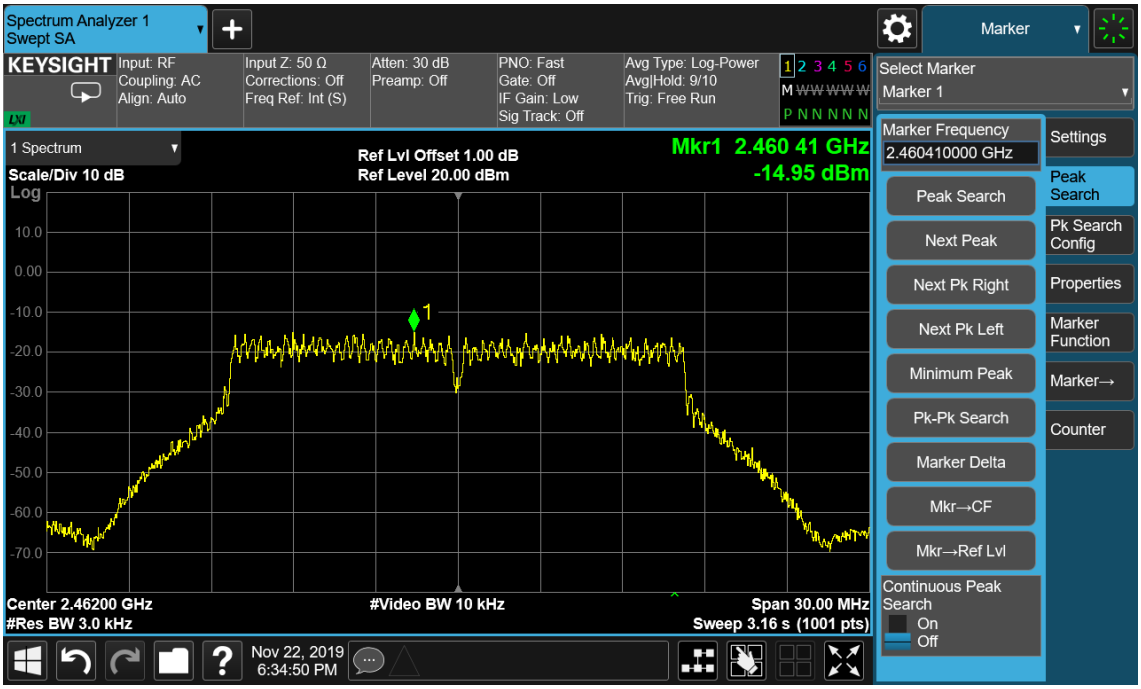


Figure 16: Power Spectral Density, 802.11n(HT20), 2412MHz

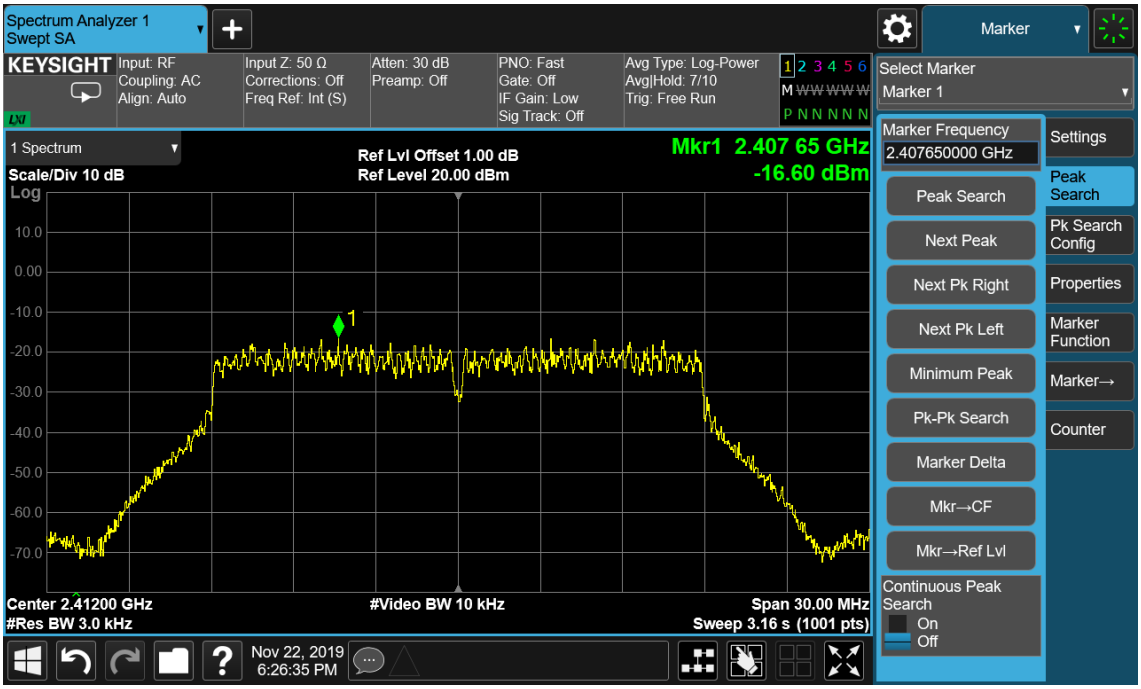


Figure 17: Power Spectral Density, 802.11n(HT20), 2437MHz

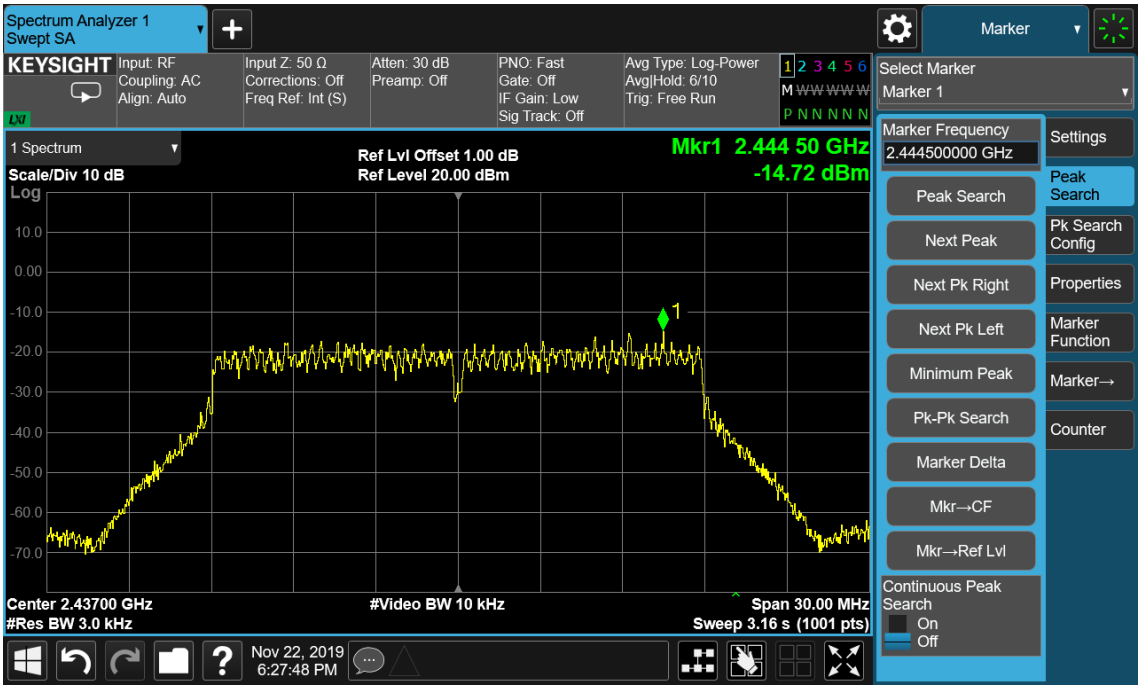
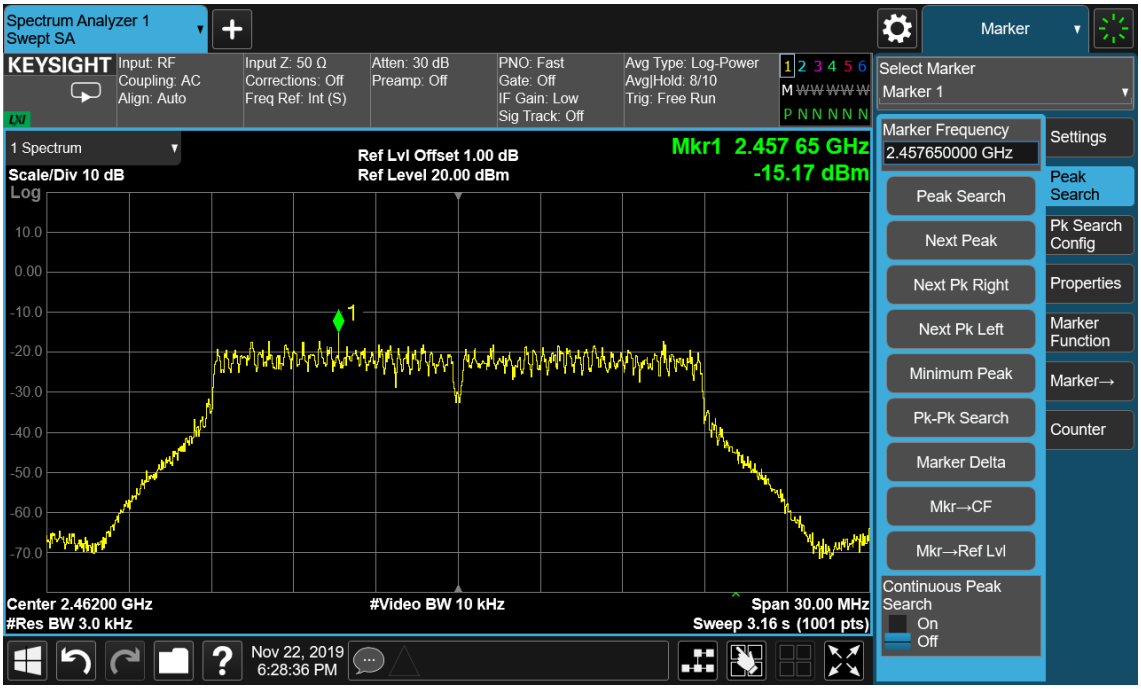


Figure 18: Power Spectral Density, 802.11n(HT20), 2462MHz



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

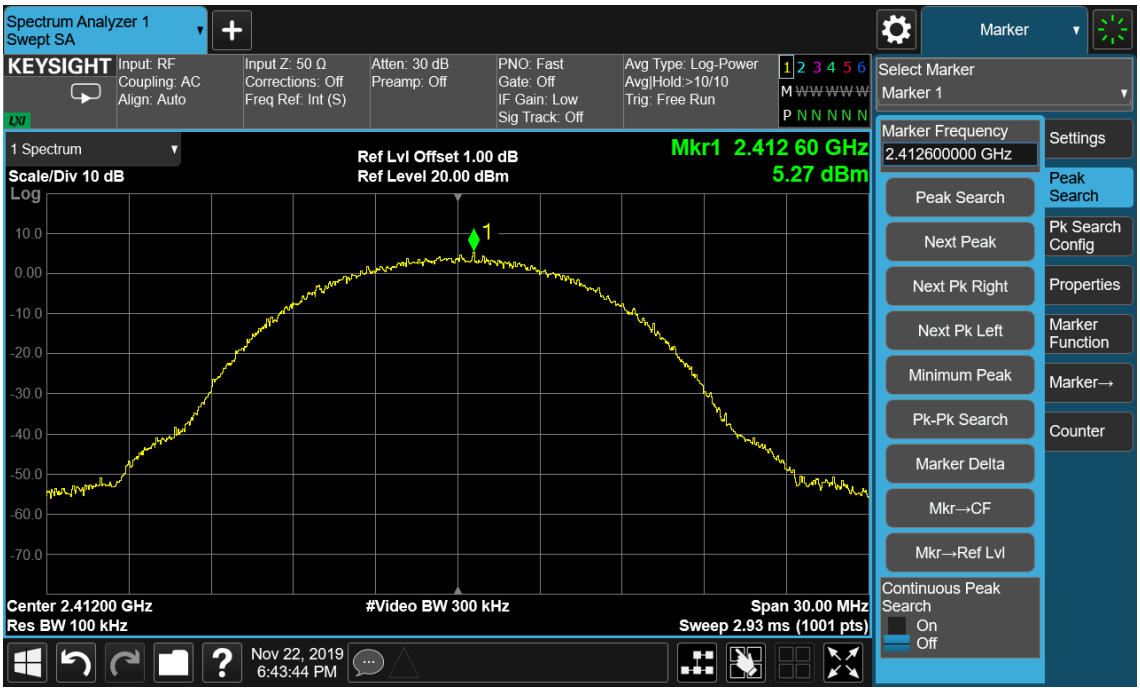
Test setup

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

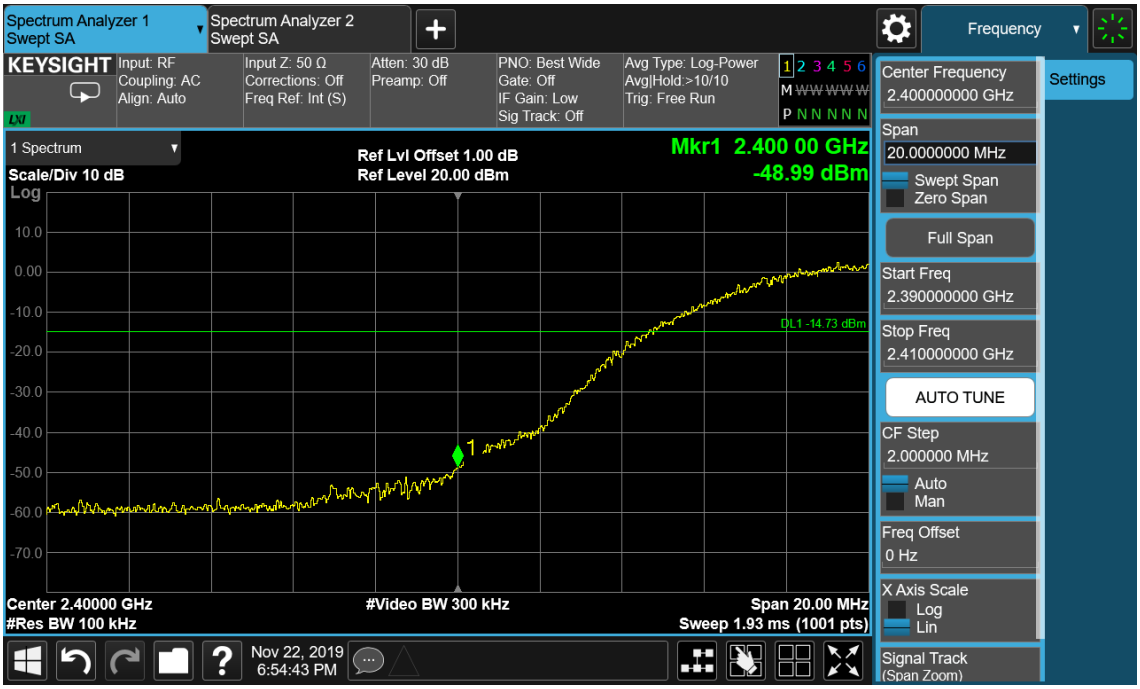
For details refer to following test plot.

Figure 19: Conducted Spurious Emission & Authorized-band band-edge, 802.11b, 2412MHz

Carrier Level



Band Edge



Conducted spurious emissions 30MHz-25GHz

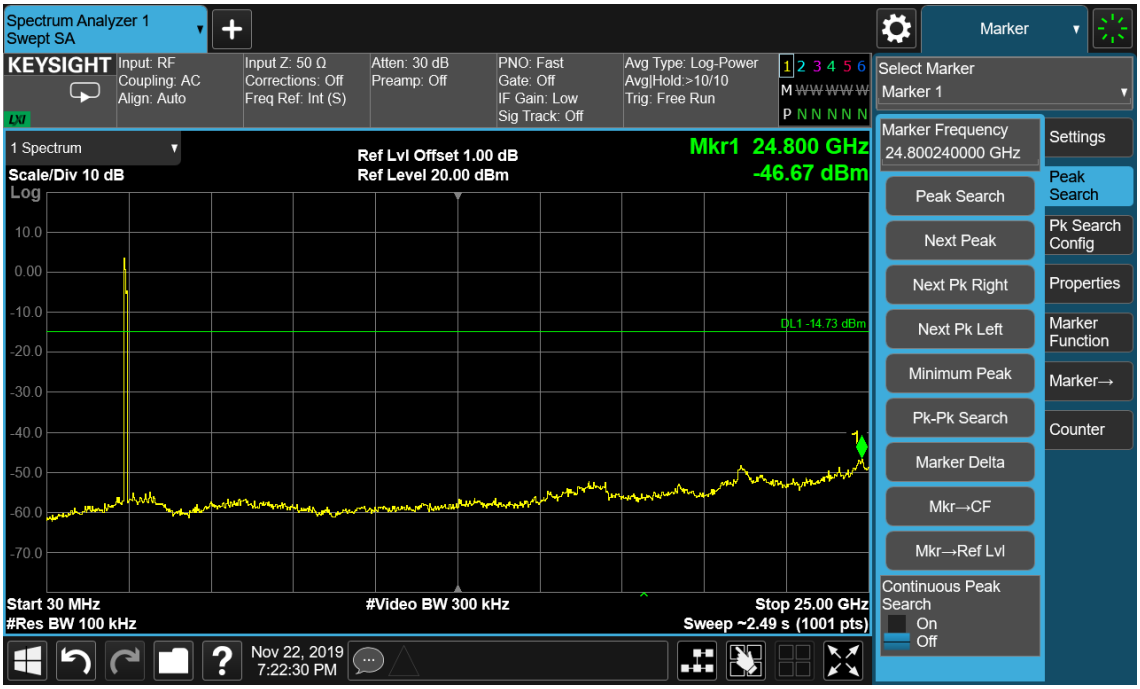
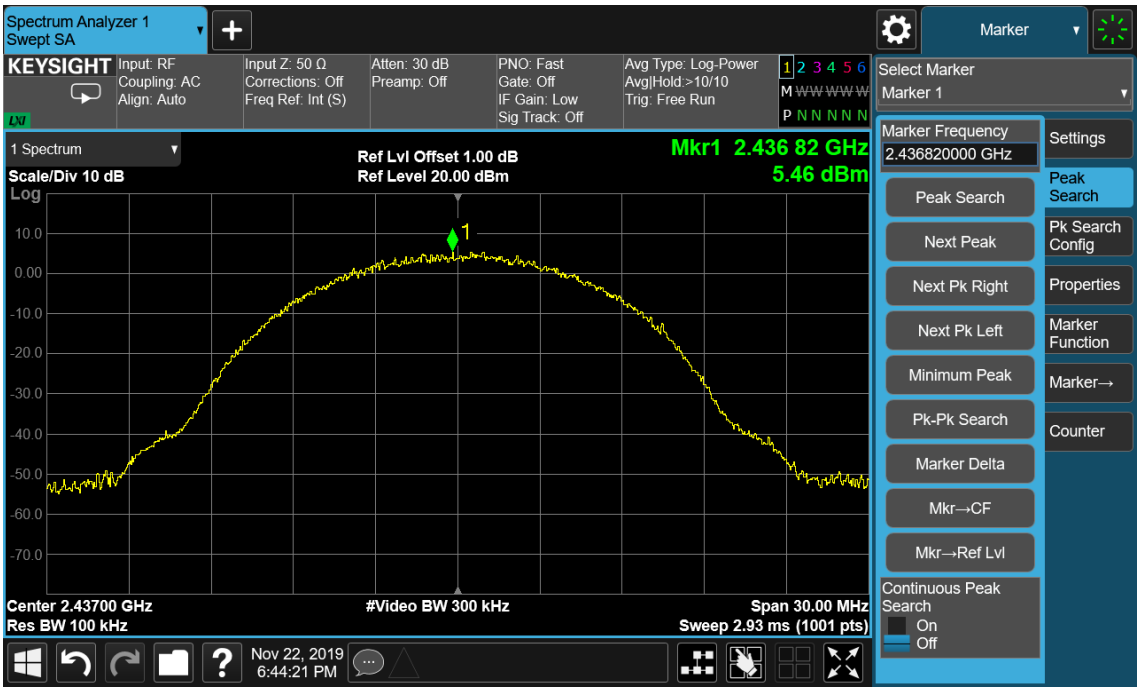
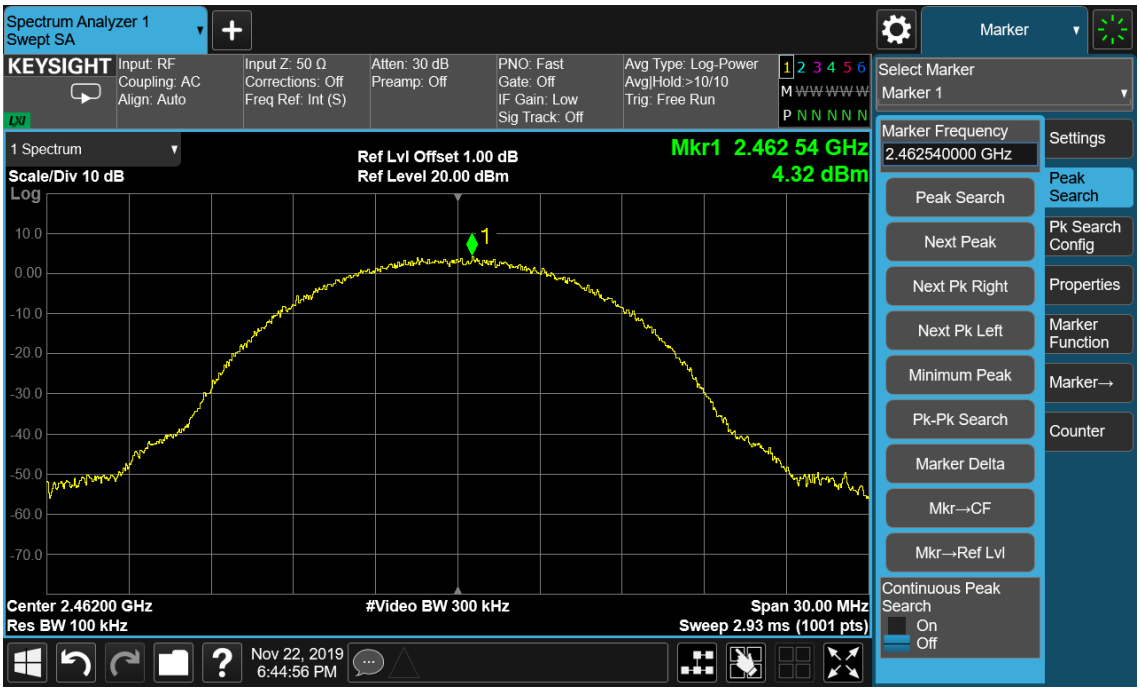


Figure 20: Conducted Spurious Emission & Authorized-band band-edge, 802.11b, 2437MHz Carrier Level

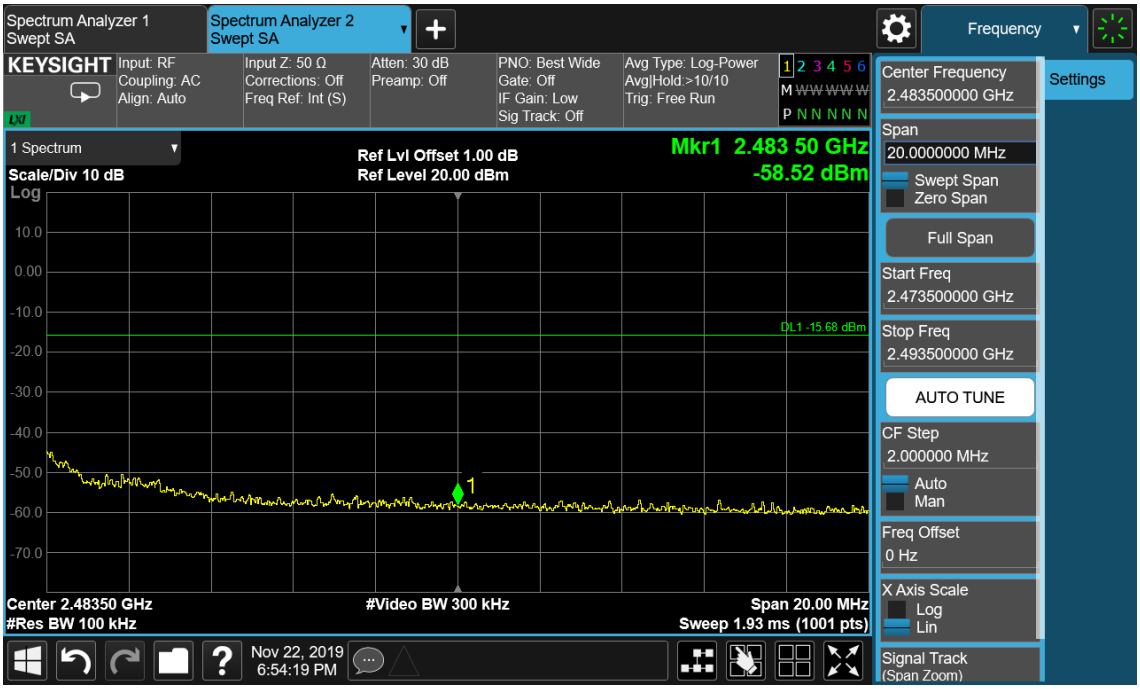


Conducted spurious emissions 30MHz-25GHz

Figure 21: Conducted Spurious Emission & Authorized-band band-edge, 802.11b, 2462MHz Carrier Level



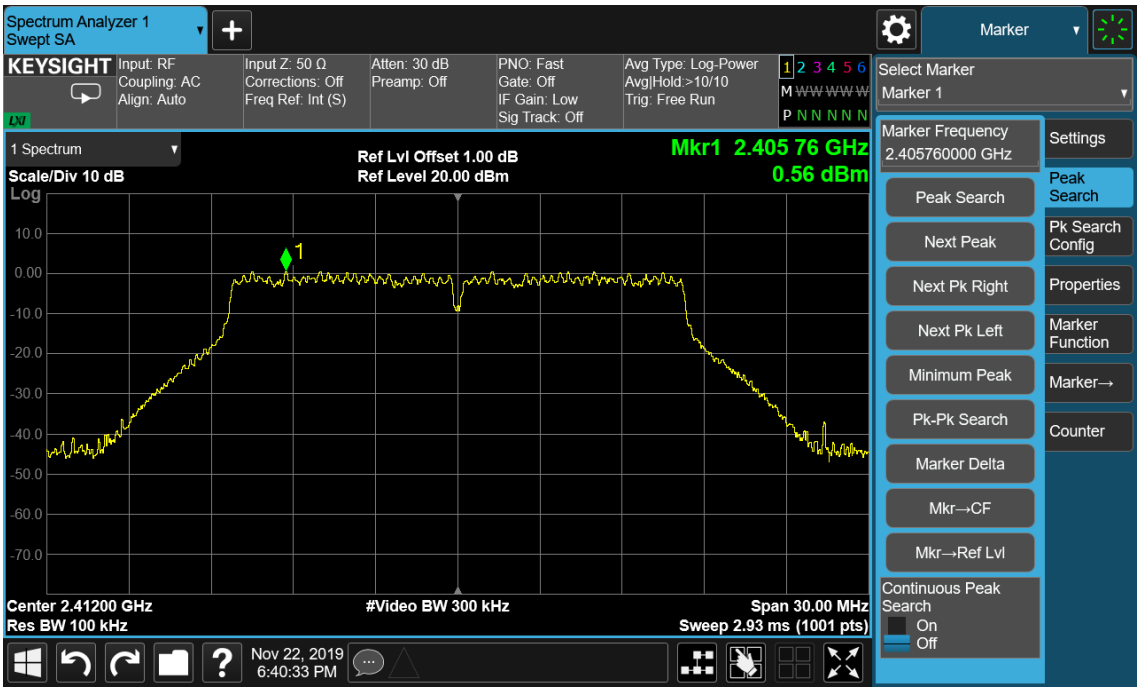
Band Edge



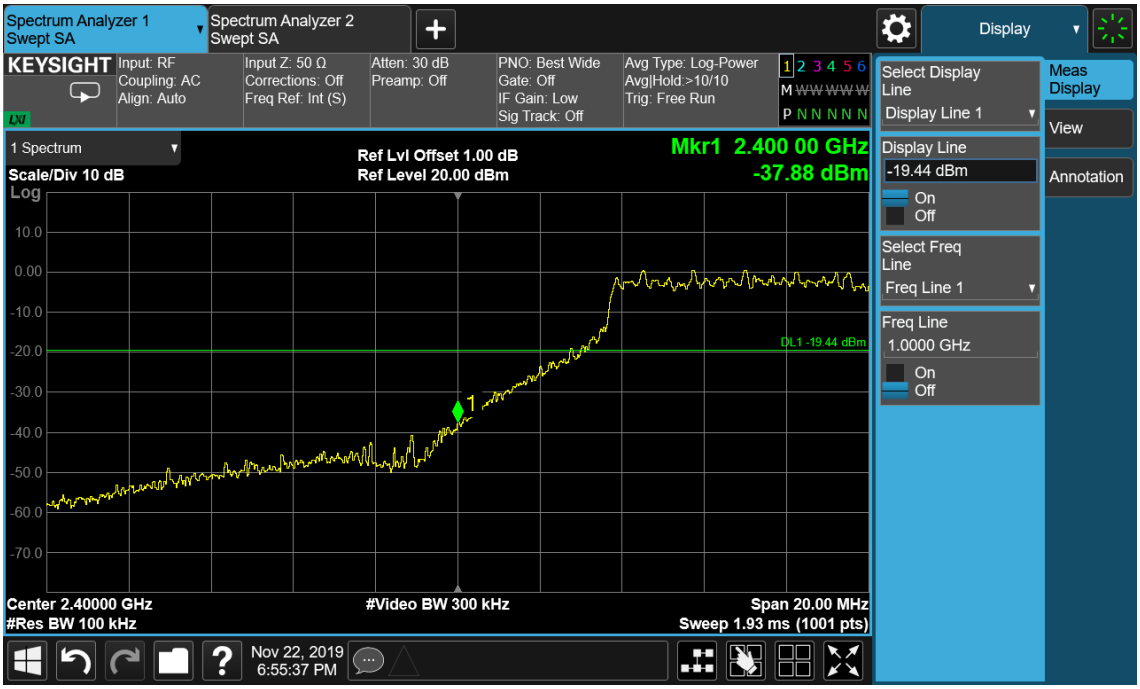
Conducted spurious emissions 30MHz-25GHz

Figure 22: Conducted Spurious Emission & Authorized-band band-edge, 802.11g, 2412MHz

Carrier Level

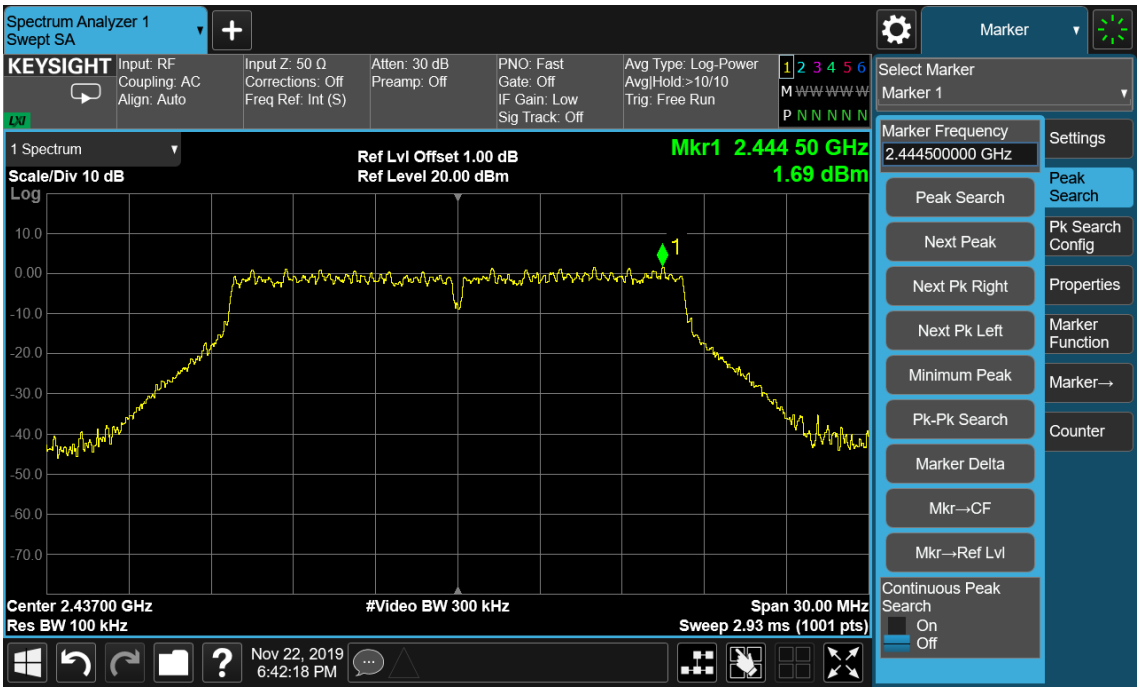


Band Edge



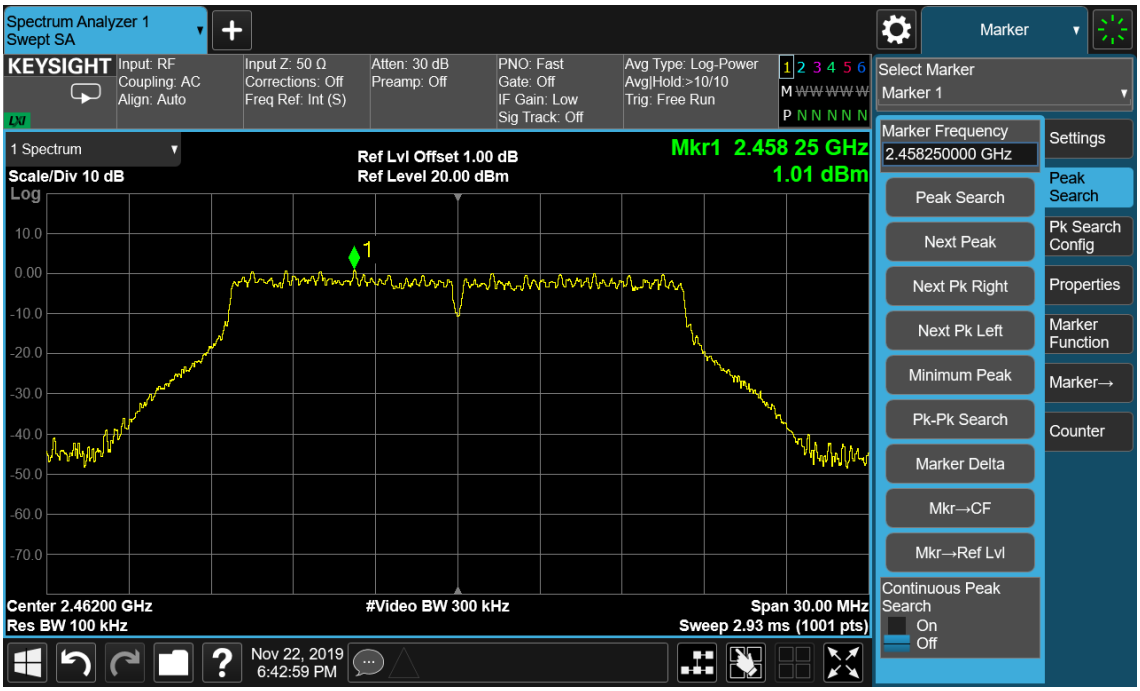
Conducted spurious emissions 30MHz-25GHz

Figure 23: Conducted Spurious Emission & Authorized-band band-edge, 802.11g, 2437MHz Carrier Level

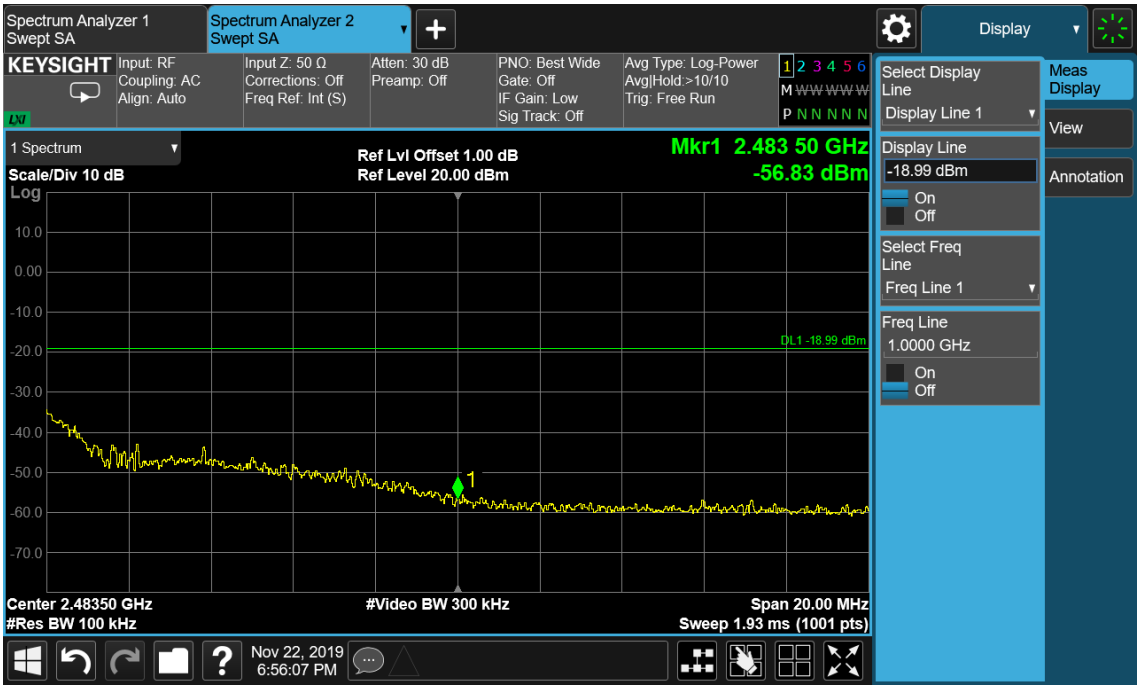


Conducted spurious emissions 30MHz-25GHz

Figure 24: Conducted Spurious Emission & Authorized-band band-edge, 802.11g, 2462MHz Carrier Level



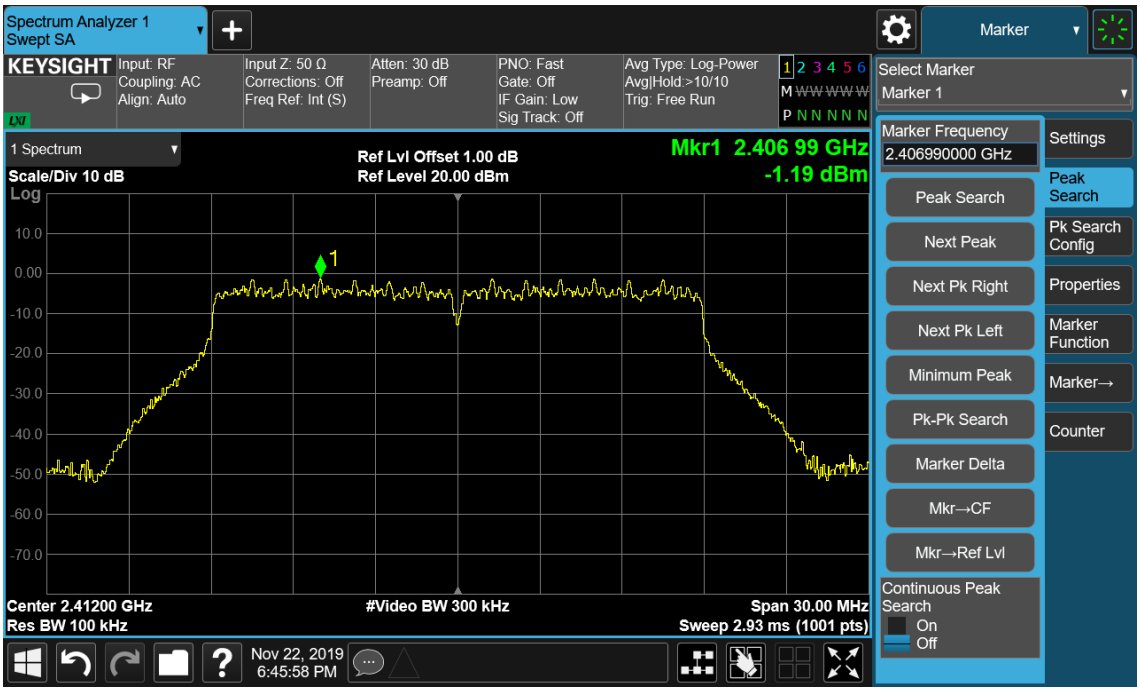
Band Edge



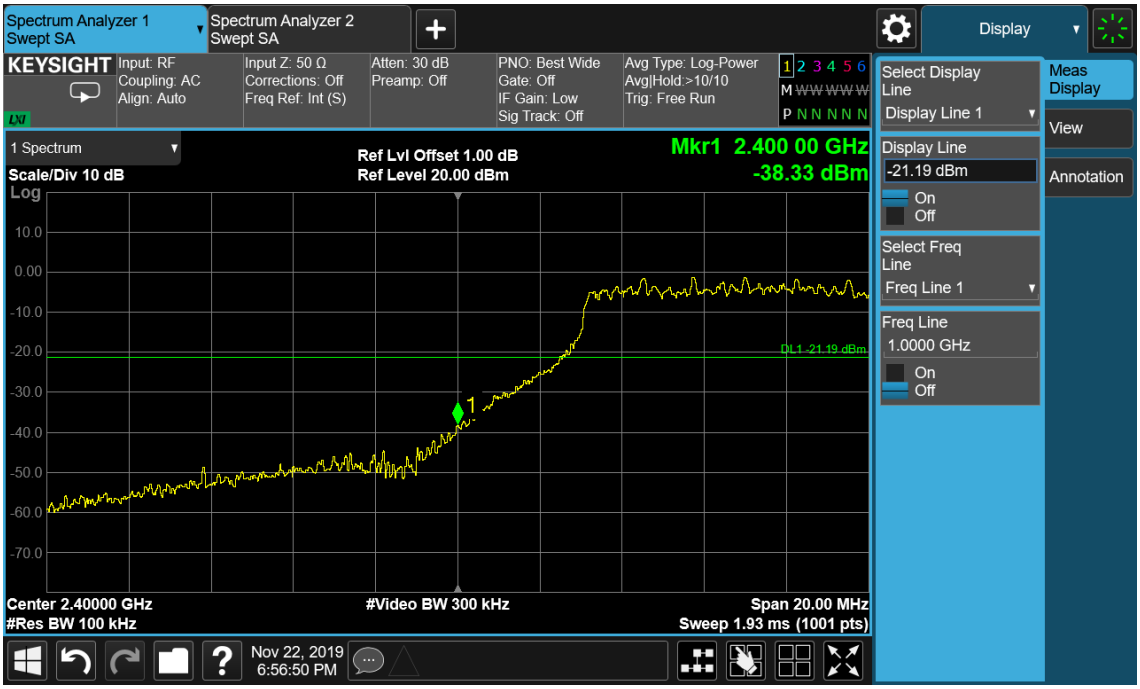
Conducted spurious emissions 30MHz-25GHz

Figure 25: Conducted Spurious Emission & Authorized-band band-edge, 802.11n(HT20), 2412MHz

Carrier Level

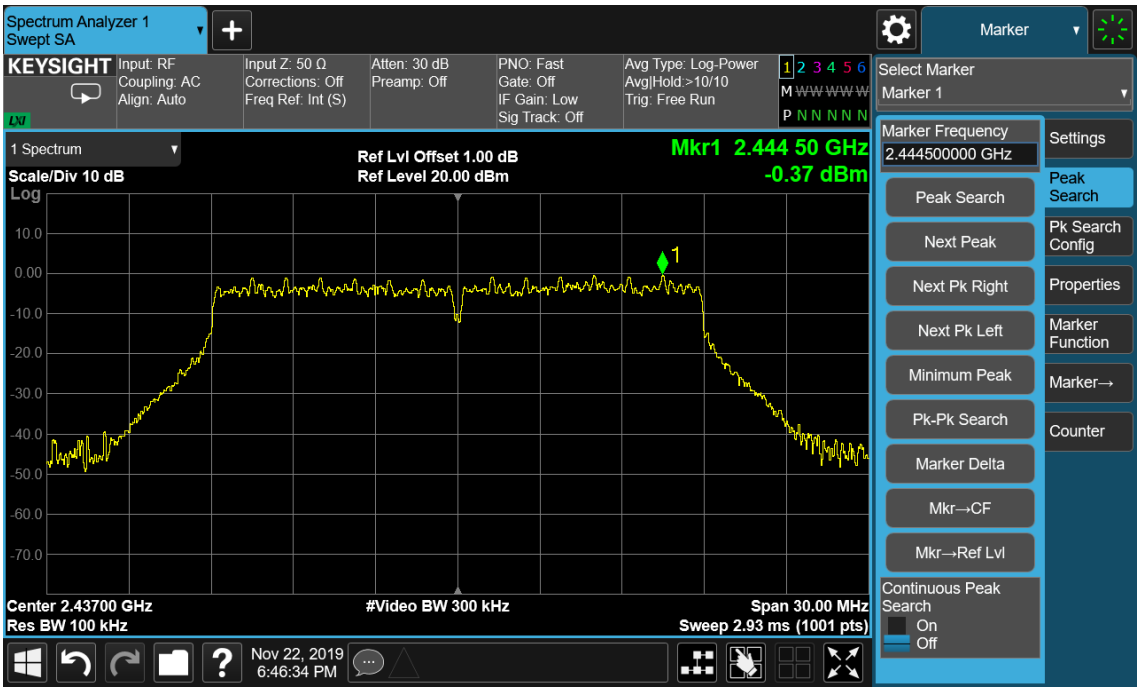


Band Edge



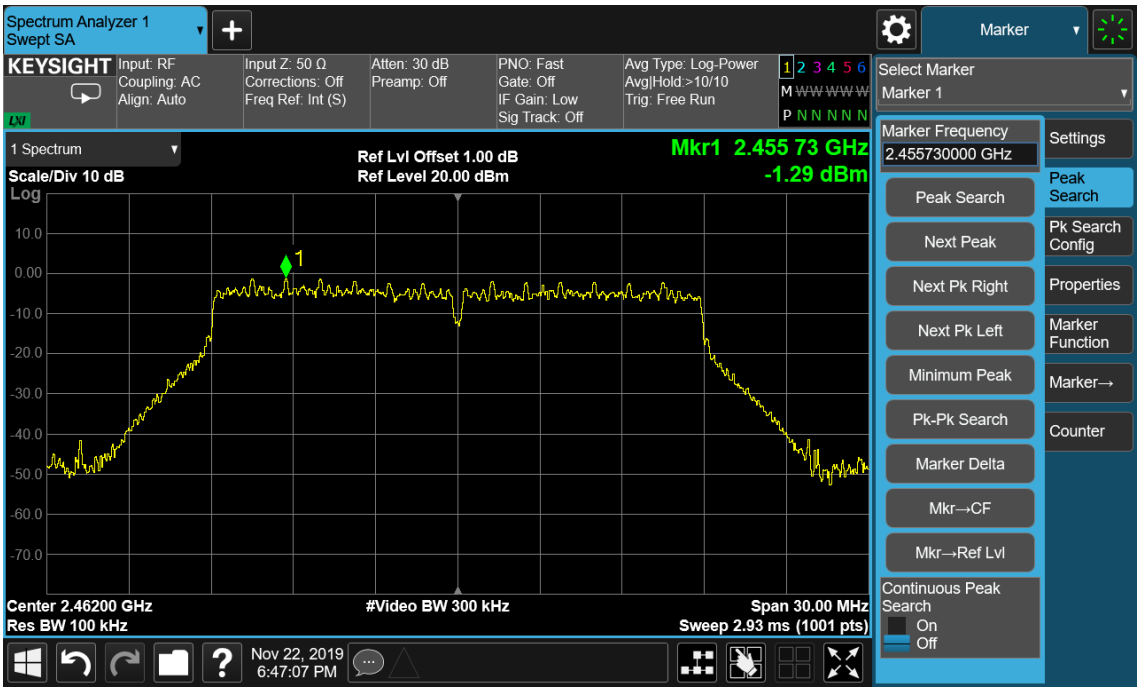
Conducted spurious emissions 30MHz-25GHz

Figure 26: Conducted Spurious Emission & Authorized-band band-edge, 802.11n(HT20), 2437MHz Carrier Level

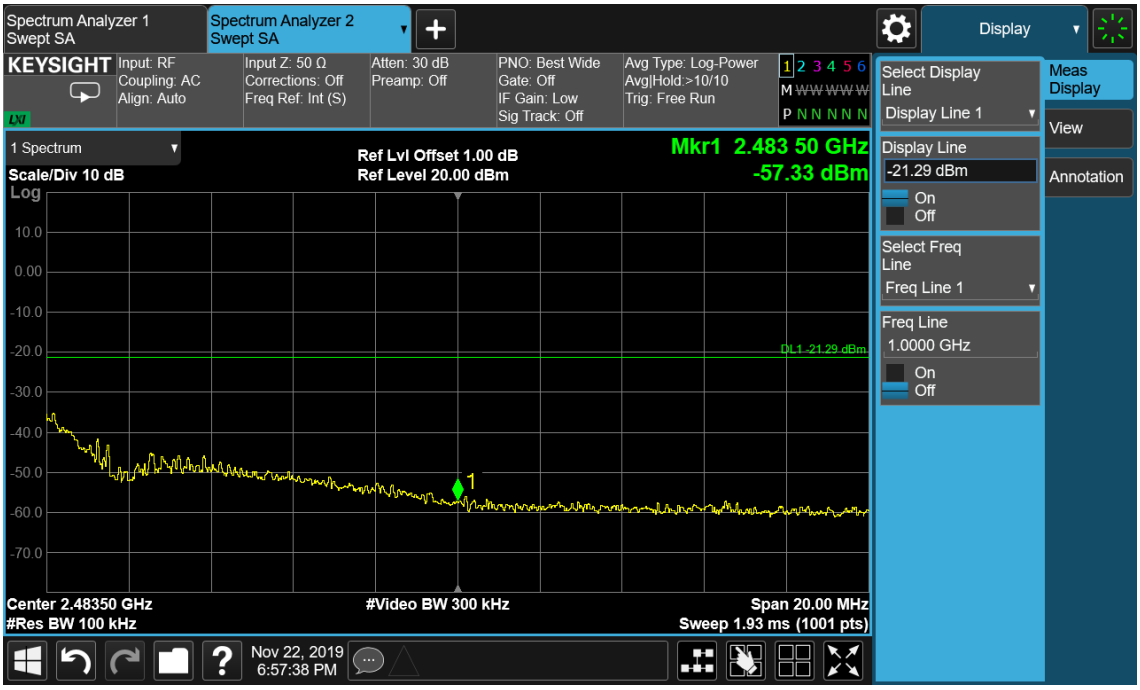


Conducted spurious emissions 30MHz-25GHz

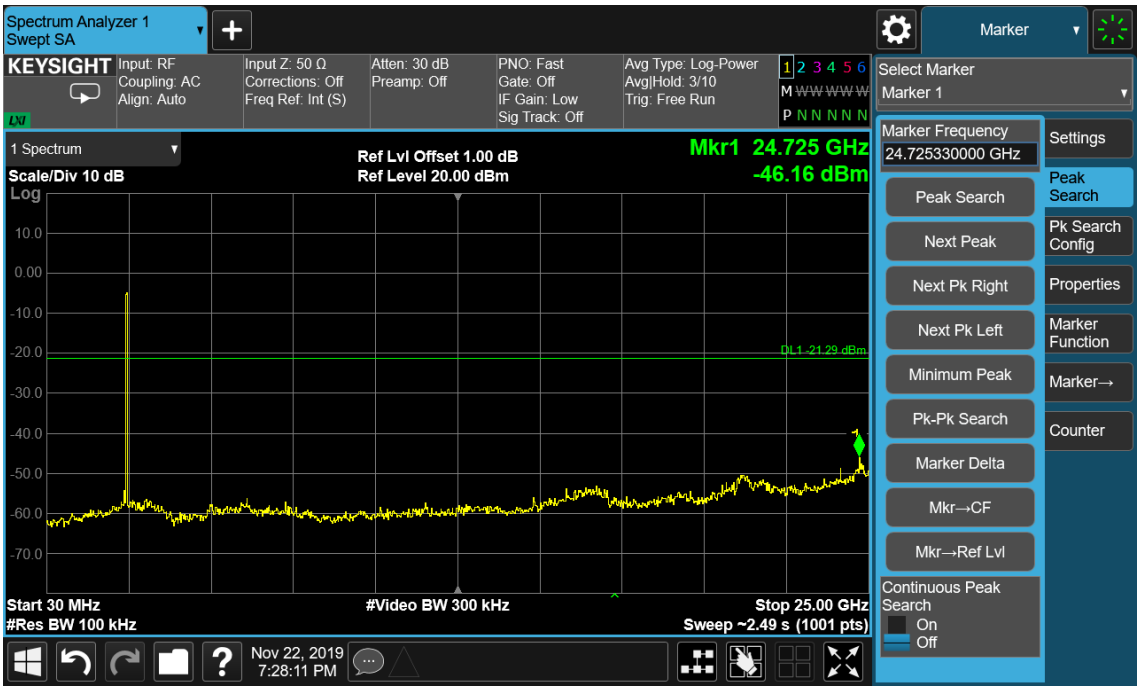
Figure 27: Conducted Spurious Emission & Authorized-band band-edge, 802.11n(HT20), 2462MHz Carrier Level



Band Edge



Conducted spurious emissions 30MHz-25GHz



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°C
Relative humidity	:	52%

Notes:

1. Test plots please refer to the annex document "EXHIBIT A of SHE19110042-01AE".

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.

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°C
Relative humidity	:	52%

Notes:

1. Test plots please refer to the annex document "EXHIBIT A of SHE19110042-01AE".

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

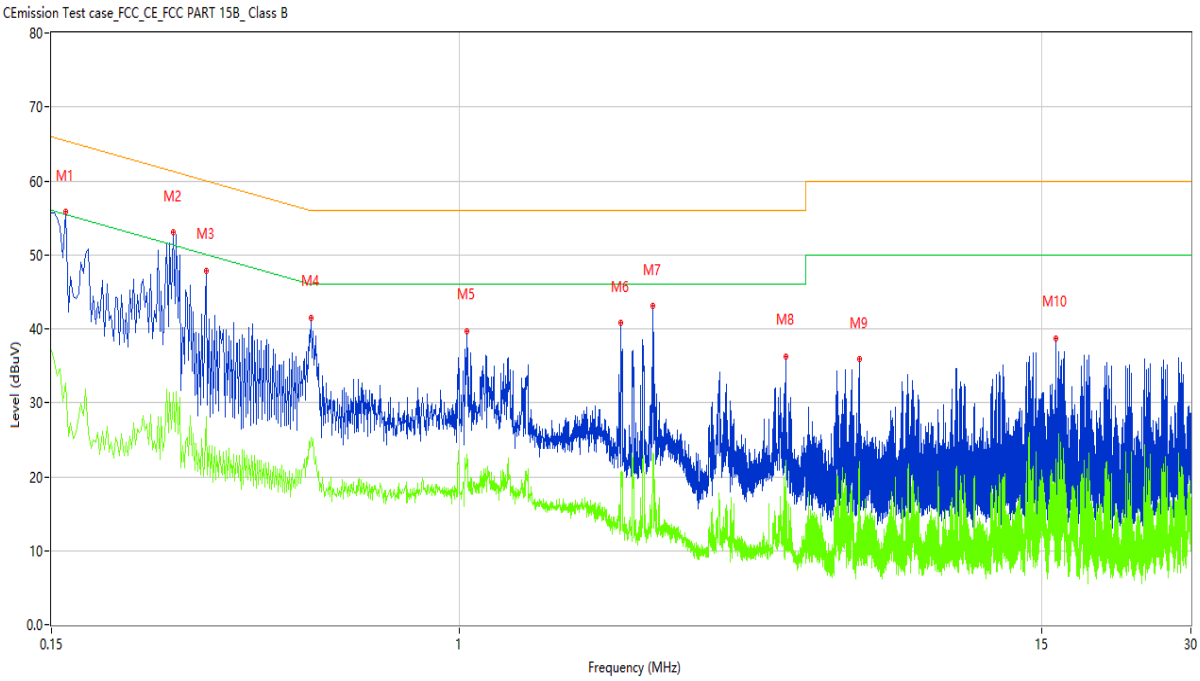
Input Voltage	:	AC 120V, 60Hz; AC 240V, 50Hz
Operation Mode	:	A
Earthing	:	Not Connected
Ambient temperature	:	25°C
Relative humidity	:	52%

For details refer to following test plot.

Note：

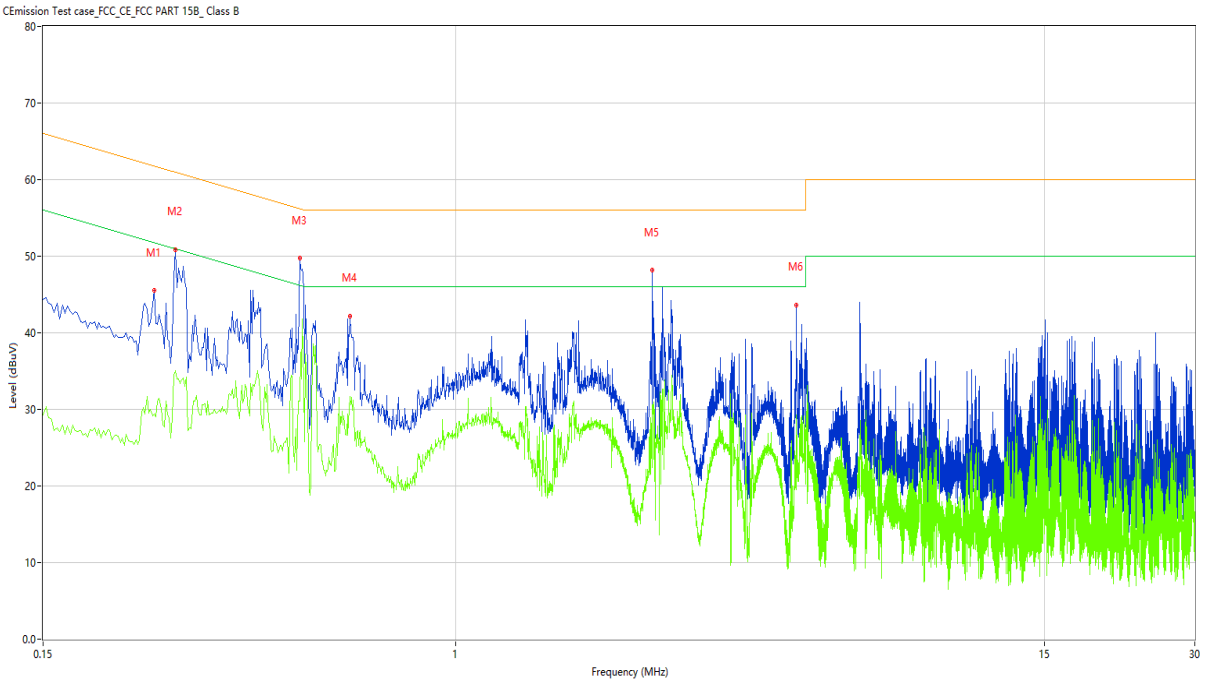
The all configurations were tested respectively, but only the worst configuration shown here.

Figure 28: Conducted Emission on AC Mains, L Phase



No.	Frequency (MHz)	Results (dBuV)	Factor (dB)	Limit (dBuV)	Over Limit (dB)	Detector	Line	Verdict
1	0.160	55.79	10.15	65.46	-9.67	Peak	L	Pass
1**	0.160	32.70	10.15	55.46	-22.76	AV	L	Pass
2	0.264	52.30	10.14	61.30	-9.00	Peak	L	Pass
2**	0.264	31.37	10.14	51.30	-19.93	AV	L	Pass
3	0.308	47.84	10.14	60.02	-12.18	Peak	L	Pass
3**	0.308	28.03	10.14	50.02	-21.99	AV	L	Pass
4	0.502	41.50	10.15	56.00	-14.50	Peak	L	Pass
4**	0.502	25.35	10.15	46.00	-20.65	AV	L	Pass
5	1.036	39.69	10.15	56.00	-16.31	Peak	L	Pass
5**	1.036	23.04	10.15	46.00	-22.96	AV	L	Pass
6	2.120	40.74	10.18	56.00	-15.26	Peak	L	Pass
6**	2.120	20.62	10.18	46.00	-25.38	AV	L	Pass
7	2.452	42.88	10.19	56.00	-13.12	Peak	L	Pass
7**	2.452	21.25	10.19	46.00	-24.75	AV	L	Pass
8	4.562	36.30	10.25	56.00	-19.70	Peak	L	Pass
8**	4.562	19.88	10.25	46.00	-26.12	AV	L	Pass

Figure 29: Conducted Emission on AC Mains, N Phase



No.	Frequency (MHz)	Results (dBuV)	Factor (dB)	Limit (dBuV)	Over Limit (dB)	Detector	Line	Verdict
1	0.250	50.71	10.14	61.76	-11.05	Peak	N	Pass
1*	0.250	42.01	10.14	61.76	-19.75	QP	N	Pass
1**	0.250	29.37	10.14	51.76	-22.39	AV	N	Pass
2	0.276	50.43	10.14	60.94	-10.51	Peak	N	Pass
2*	0.276	40.20	10.14	60.94	-20.74	QP	N	Pass
2**	0.276	35.09	10.14	50.94	-15.85	AV	N	Pass
3	0.488	50.06	10.15	56.20	-6.14	Peak	N	Pass
3*	0.488	42.88	10.15	56.20	-13.32	QP	N	Pass
3**	0.488	31.10	10.15	46.20	-15.10	AV	N	Pass
4	0.616	43.41	10.15	56.00	-12.59	Peak	N	Pass
4*	0.616	34.11	10.15	56.00	-21.89	QP	N	Pass
4**	0.616	31.72	10.15	46.00	-14.28	AV	N	Pass
5	2.476	45.86	10.19	56.00	-10.14	Peak	N	Pass
5*	2.476	33.88	10.19	56.00	-22.12	QP	N	Pass
5**	2.476	30.59	10.19	46.00	-15.41	AV	N	Pass
6	4.790	42.89	10.25	56.00	-13.11	Peak	N	Pass
6*	4.790	30.48	10.25	56.00	-25.52	QP	N	Pass
6**	4.790	29.31	10.25	46.00	-16.69	AV	N	Pass

5 Appendixes

5.1 Photographs of the Sample

Front of the sample

Rear of the sample

5.2 Set-up for Conducted Emissions

5.3 Set-up for Conducted RF test at Antenna Port

5.4 Set-up for Spurious Emissions below 1GHz

Below 1 GHz

5.5 Set-up for Spurious Emissions above 1GHz

Above 1GHz

End of the report