FCC RF Test Report

For

SHENZHEN GIEC DIGITAL CO., LTD

Test Standards:	Part 15C Subpart C §15.247
Product Description:	all in one
Tested Model:	GK-MWZE501
Additional Model No.:	WGC22T324S, TLGC22T324S
Brand Name:	N/A
FCC ID:	2AHYK09586AIO
Classification	(DTS) Digital Transmission System
Report No.:	GTS201901000080F03
Tested Date:	2019-02-14 to 2019-03-24
Issued Date:	2019-03-24
Prepared By:	
Approved By:	

Global United Technology Services Co., Ltd.

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Note: The test results in this report apply exclusively to the tested model / sample. Without written approval of Global United Technology Services Co., Ltd., the test report shall not be reproduced except in full.

Report Revise Record

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	2019.03.24	Valid	Original Report

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Summary Of Test Result

FCC Rule	Description	Limit	Result	Remark
15.247(a)(2)	6dB Bandwidth	≥ 0.5MHz	Pass	-
-	99% Bandwidth	-	Pass	-
15.247(b)(3)	Peak Output Power	≤ 30dBm	Pass	-
15.247(e)	Power Spectral Density	≤ 8dBm/3kHz	Pass	-
15.247(d)	Conducted Band Edges and Spurious Emission	≤ 20dBc	Pass	-
15.247(d)	Radiated Band Edges and Spurious Emission	15.209(a) & 15.247(d)	Pass	Under limit 2.48 dB at 199.7 MHz
15.207	AC Conducted Emission	15.207(a)	Pass	Under limit 5.05 dB at 4.926 MHz
15.203 & 15.247(b)	Antenna Requirement	N/A	Pass	-

1 Test Laboratory

1.1 Test facility

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

● **FCC —Registration No.: 381383**

Global United Technology Services 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 files. Registration 381383.

● **Industry Canada (IC) —Registration No.: 9079A-2**

The 3m Semi-anechoic chamber of Global United Technology Services Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 9079A-2.

● **NVLAP (LAB CODE:600179-0)**

Global United Technology Services Co., Ltd., is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP). LAB CODE:600179-0

2 General Description

2.1 Applicant

SHENZHEN GIEC DIGITAL CO., LTD
1st&3rd Building，No.26 Puzai Road，Pingdi，Longgang District, Shenzhen, China

2.2 Manufacturer

SHENZHEN GIEC DIGITAL CO., LTD
1st&3rd Building，No.26 Puzai Road，Pingdi，Longgang District, Shenzhen, China

2.3 General Description Of EUT

Product	all in one
Model No.	GK-MWZE501
Additional No.	WGC22T324S, TLGC22T324S
Difference Description	All above models are identical in the same PCB layout, interior structure and electrical circuits. The only differences are the colour and trade mark for commercial purpose.
FCC ID	2AHYK09586AIO
Power Supply	120Vdc (adapter or host equipment)
Modulation Technology	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
Modulation Type	802.11b : DSSS 802.11g/n : OFDM
Operating Frequency	2412-2462MHz
Number Of Channel	11
Max. Output Power	802.11b : 13.41 dBm (0.02195 W) 802.11g : 10.67 dBm (0.0117 W) 802.11n HT20 : 10.68 dBm (0.0117 W) 802.11n HT40 : 12.54 dBm (0.01795 W)
Antenna 1	FPC Antenna with 2.0±0.5dBi gain
Antenna 2	FPC Antenna with 2.0±0.5dBi gain
I/O Ports	Refer to user's manual

NOTE:

ADAPTER 1	
BRAND:	N/A
MODEL:	TAA0361200300HU
INPUT:	AC 100-240V, 50/60Hz,1A
OUTPUT:	DC 12V, 3000mA
DC LINE:	N/A

1. The EUT was powered by the following adapters:
2. For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.
3. For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report.
4. This product is a SISO device. Two antennas cannot transmit wifi signals at the same time. Only one antenna transmit a BT signal, and one antenna transmit a wifi signal.
5. The device has two antennas, the signals are sent by the same chip, both antennas are tested, and the test data is only the data of the worst mode ANT1.

2.4 Modification of EUT

No modifications are made to the EUT during all test items.

2.5 Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- FCC Part 15 Subpart C §15.247
- ANSI C63.10-2013
- FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v05r01

Remark:

1. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.

3 Test Configuration of Equipment Under Test

3.1 Descriptions of Test Mode

11 channels are provided for 802.11b, 802.11g and 802.11n(HT20):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
1	2412 MHz	7	2442 MHz
2	2417 MHz	8	2447 MHz
3	2422 MHz	9	2452 MHz
4	2427 MHz	10	2457 MHz
5	2432 MHz	11	2462 MHz
6	2437 MHz		

7 channels are provided for 802.11n(HT40):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
		7	2442 MHz
		8	2447 MHz
3	2422 MHz	9	2452 MHz
4	2427 MHz		
5	2432 MHz		
6	2437 MHz		

The transmitter has a maximum peak conducted output power as follows:

Frequency Range(MHz)	Mode	ANT	Output Power(dBm)
2412~2462	802.11b	1	13.41
2412~2462	802.11g	1	10.67
2412~2462	802.11n HT20	1	10.68
2422~2452	802.11n HT40	1	12.54
2412~2462	802.11b	2	13.12
2412~2462	802.11g	2	10.58
2412~2462	802.11n HT20	2	10.36
2422~2452	802.11n HT40	2	12.39

a. Radiated emission and power line conducted emission were performed with the EUT set to transmit at the channel with highest output power as worst-case scenario.

b. The fundamental of the EUT was investigated in three orthogonal orientations X, Y and Z it was determined that Y orientation was worst-case orientation; therefore, all final radiated testing was performed with the EUT in Y orientation.

c. Based on the pre-scan, the worst-case data rates were:

802.11b mode: 1 Mbps

802.11g mode: 6 Mbps

802.11n HT20 mode: MCS0

802.11n HT40 mode: MCS0

d. Based on the pre-scan, the worst-case Antenna were Ant 1.

3.2 Test Mode

3.2.1 Antenna Port Conducted Measurement

Summary table of Test Cases				
Test Item	**Modulation**			
	802.11 b	**802.11 g**	**802.11n HT20**	**802.11n HT40**
Conducted Test Cases	Mode 1: CH01 Mode 2: CH06 Mode 3: CH011	Mode 1: CH01 Mode 2: CH06 Mode 3: CH011	Mode 1: CH01 Mode 2: CH06 Mode 3: CH011	Mode 1: CH03 Mode 2: CH06 Mode 3: CH09

3.2.2 Radiated Emission Test (Below 1GHz)

Radiated Test Cases	Bluetooth Idel + WLAN Idel + Earphone + Cable (Charging from Adapter) + SD Card+ USB flash disk+ display

Note : 1. Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, XYZ axis, antenna ports (if EUT with antenna diversity architecture) and packet type.

2. Following channel(s) was (were) selected for the final test as listed above

3.2.3 Radiated Emission Test (Above 1GHz)

Test Item	**Modulation**			
	802.11 b	**802.11 g**	**802.11n HT20**	**802.11n HT40**
Radiated Test Cases	Mode 1: CH01 Mode 2: CH06 Mode 3: CH011	Mode 1: CH01 Mode 2: CH06 Mode 3: CH011	Mode 1: CH01 Mode 2: CH06 Mode 3: CH011	Mode 1: CH03 Mode 2: CH06 Mode 3: CH09

Note : 1. Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, XYZ axis, antenna ports (if EUT with antenna diversity architecture) and packet type.

2. Following channel(s) was (were) selected for the final test as listed above

3.2.4 Power Line Conducted Emission Test:

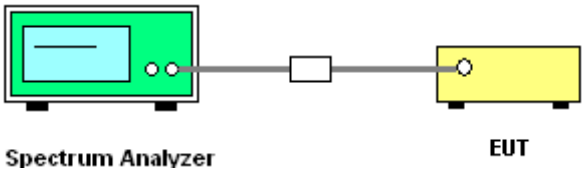
AC Conducted Emission	Mode 1 : Bluetooth Idel + WLAN Idel + Earphone + Cable (Charging from Adapter) + SD Card+USB flash disk+display

3.3 Support Equipment

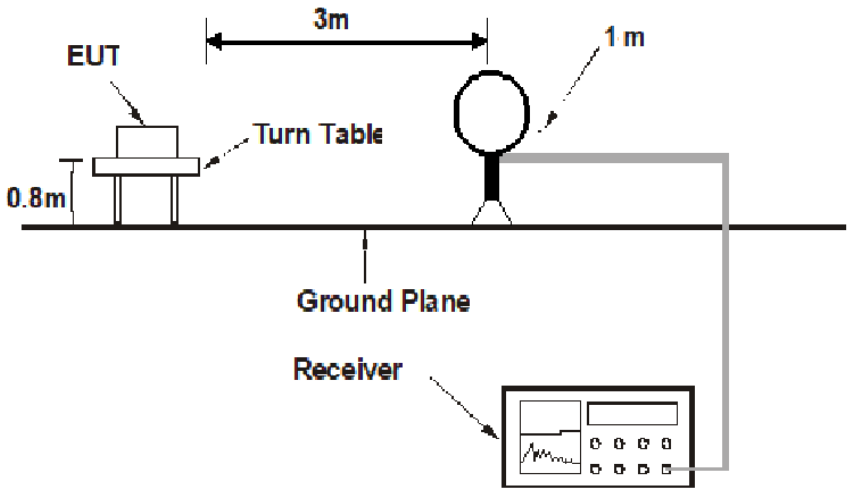
Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	System Simulator	Anritsu	MT8820C	N/A	N/A	Unshielded, 1.8 m
2.	Bluetooth Base Station	R&S	CBT	N/A	N/A	Unshielded, 1.8 m
3.	Bluetooth Earphone	Nokia	BH-108	PYAHS-107W	N/A	N/A
4.	WLAN AP	D-link	DIR-628	KA2DIR628A2	N/A	Unshielded, 1.8 m
5.	Micro SD Card	SanDisk	HC I	N/A	N/A	N/A
6.	USB flash disk	kingston	N/A	N/A	N/A	N/A
7.	displayer	DELL	P2317H	N/A	N/A	Unshielded, 1.8 m
8.	HDMI	UGREEN	N/A	N/A	Unshielded,1.5 m	N/A
9.	Notebook	Lenovo	Xiao xin cao 5000	N/A	N/A	shielded cable DC O/P 1.8 m unshielded AC I/P cable1.2 m

3.4 Test Setup

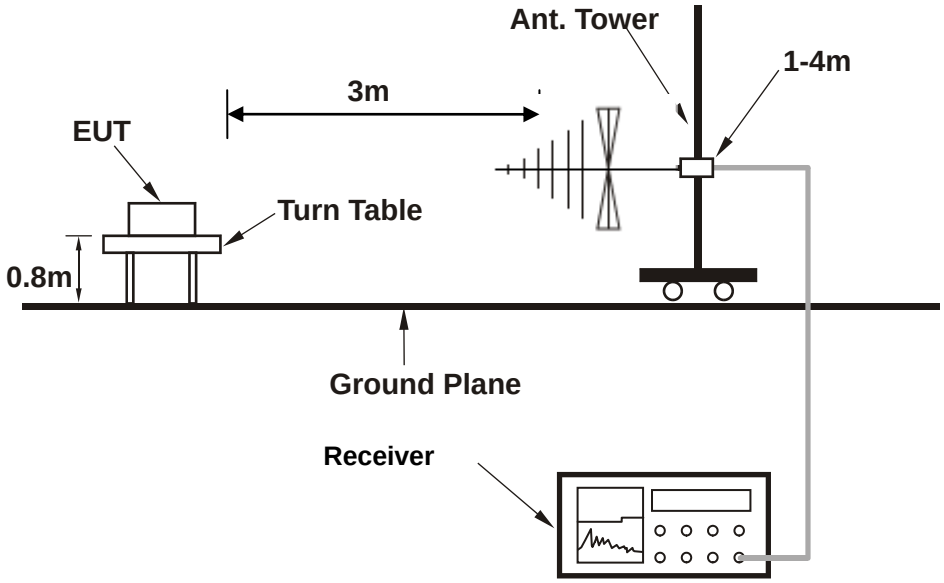
Setup diagram for Conducted Test



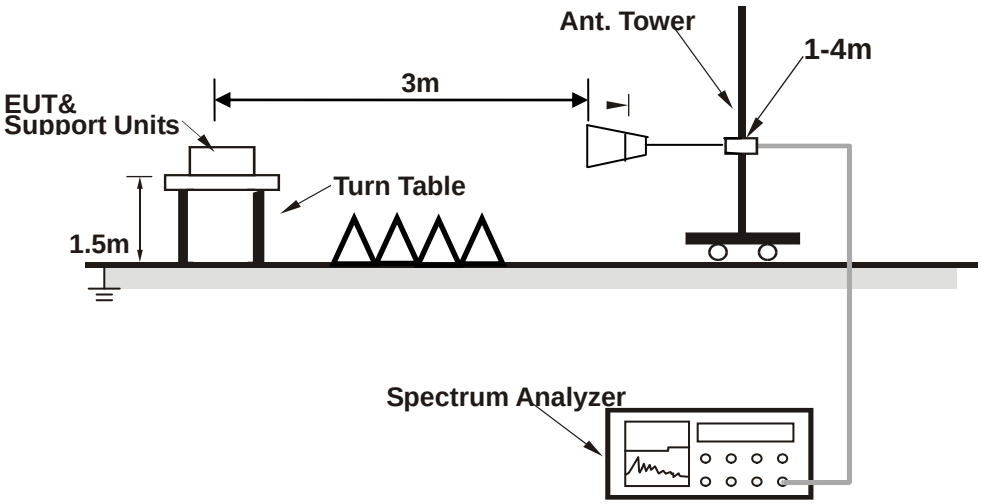
Setup diagram for Radiated (9KHz~30MHz) Test



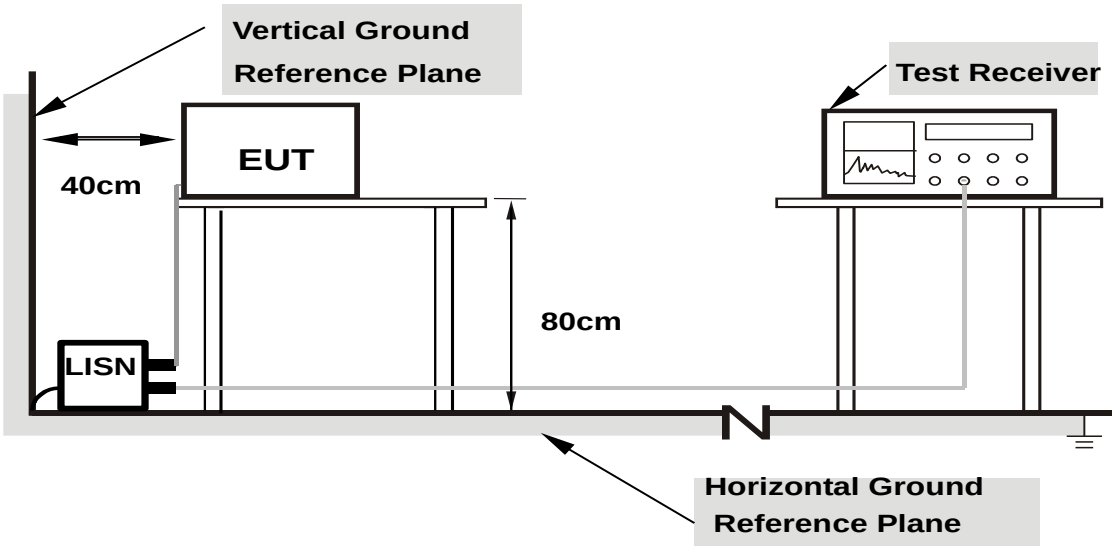
Setup diagram for Radiated (Below 1G) Test



Setup diagram for Radiated (Above1G) Test



Setup diagram for AC Conducted Emission Test



Note: 1.Support units were connected to second LISN.

2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

3.5 Measurement Results Explanation Example

For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuator factor between EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

Example:

The spectrum analyzer offset is derived from RF cable loss and attenuator factor.

Offset = RF cable loss + attenuator factor.

Following shows an offset computation example with cable loss 5 dB and 10dB attenuator.

Offset(dB) = RF cable loss(dB) + attenuator factor(dB).

= 5 + 10 = 15 (dB)

4 Test Result

4.1 6dB and 99% Bandwidth Measurement

4.1.1 Limit of 6dB and 99% Bandwidth

FCC §15.247 (a) (2)

The minimum 6 dB bandwidth shall be at least 500 kHz.

4.1.2 Test Procedures

1. The testing follows FCC KDB Publication No. 558074 DTS D01 Meas. Guidance v05r01.

Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.

Turn on the EUT and connect it to measurement instrument.

Set to the maximum power setting and enable the EUT transmit continuously

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 6 dB bandwidth must be greater than 500 kHz.

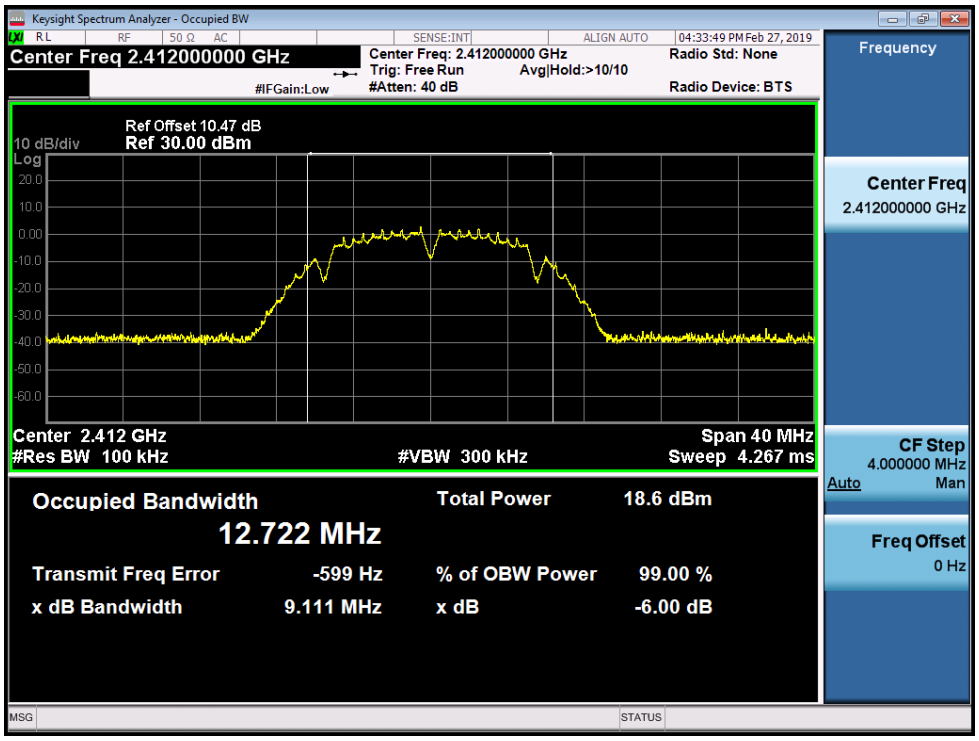
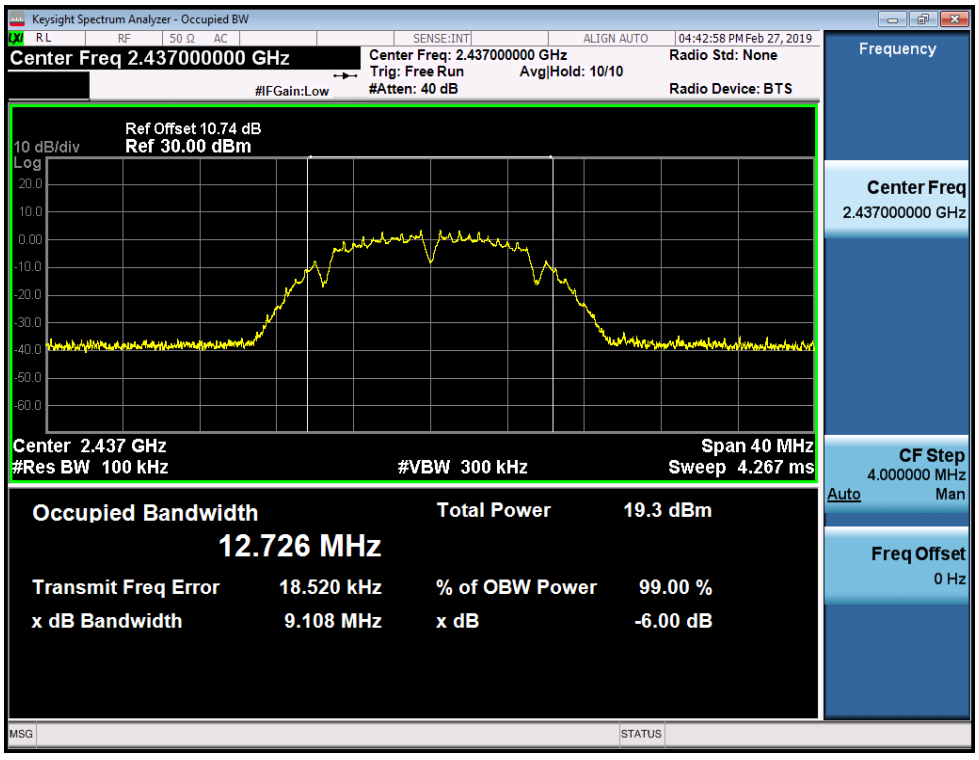
For 99% Bandwidth Measurement, the spectrum analyzer's resolution bandwidth (RBW) = 1MHz and set the Video bandwidth (VBW) = 3MHz.

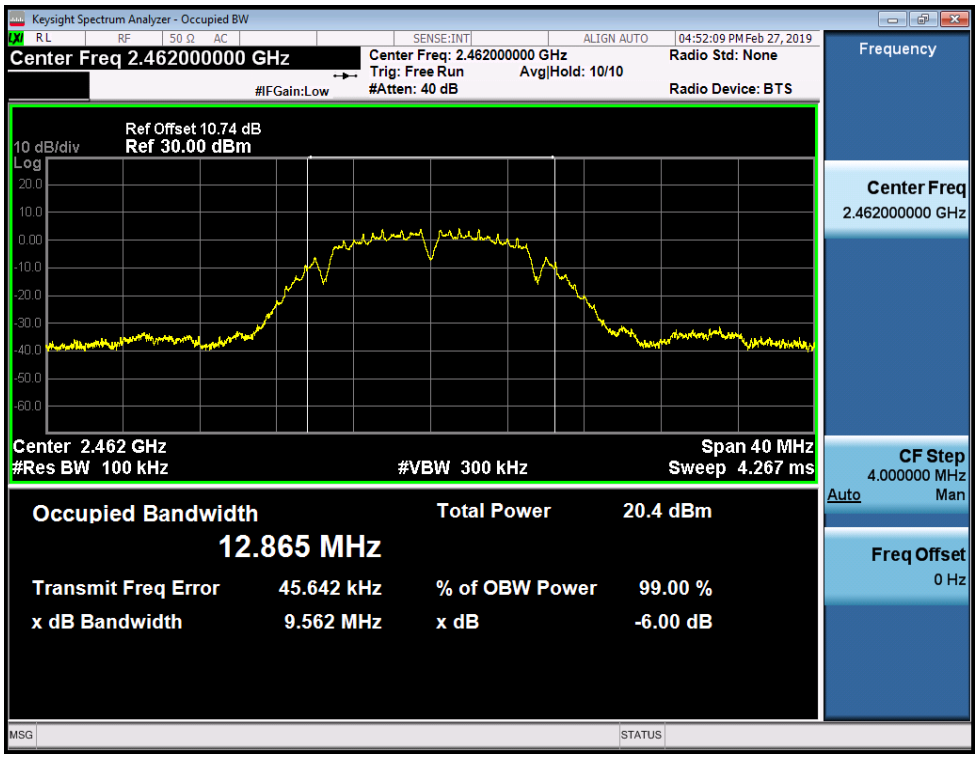
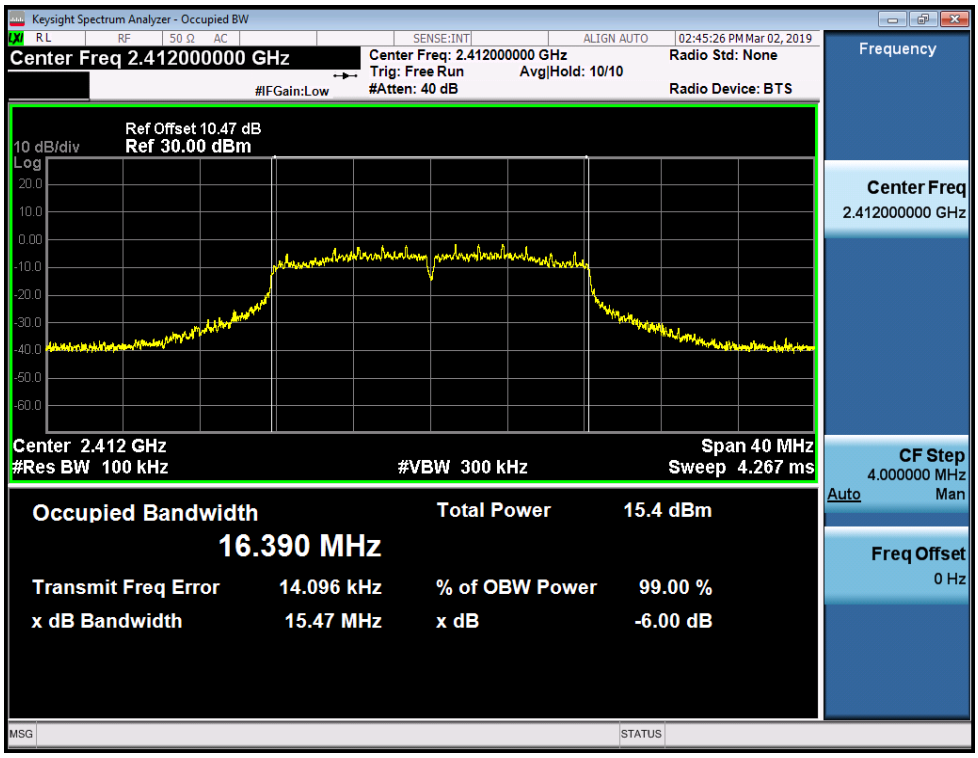
4.1.3 Test Result of 6dB and 99% Bandwidth

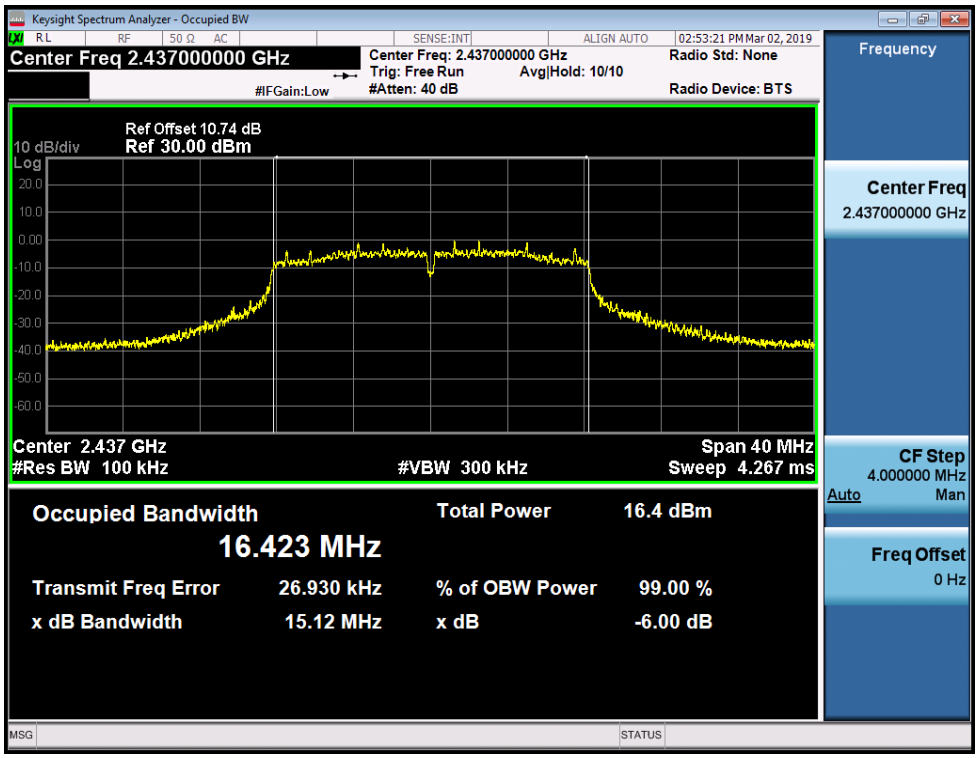
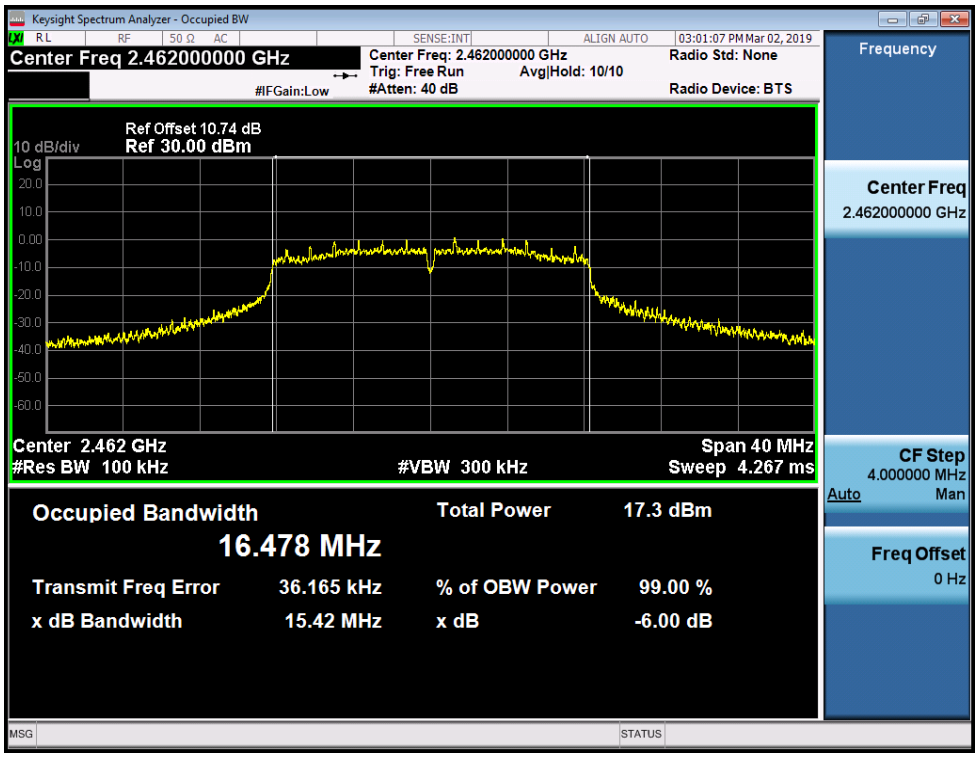
Test Mode :	2.4G WIFI	**Temperature :**	24~26℃
Test Engineer :	Damon Zhang	**Relative Humidity :**	50~53%

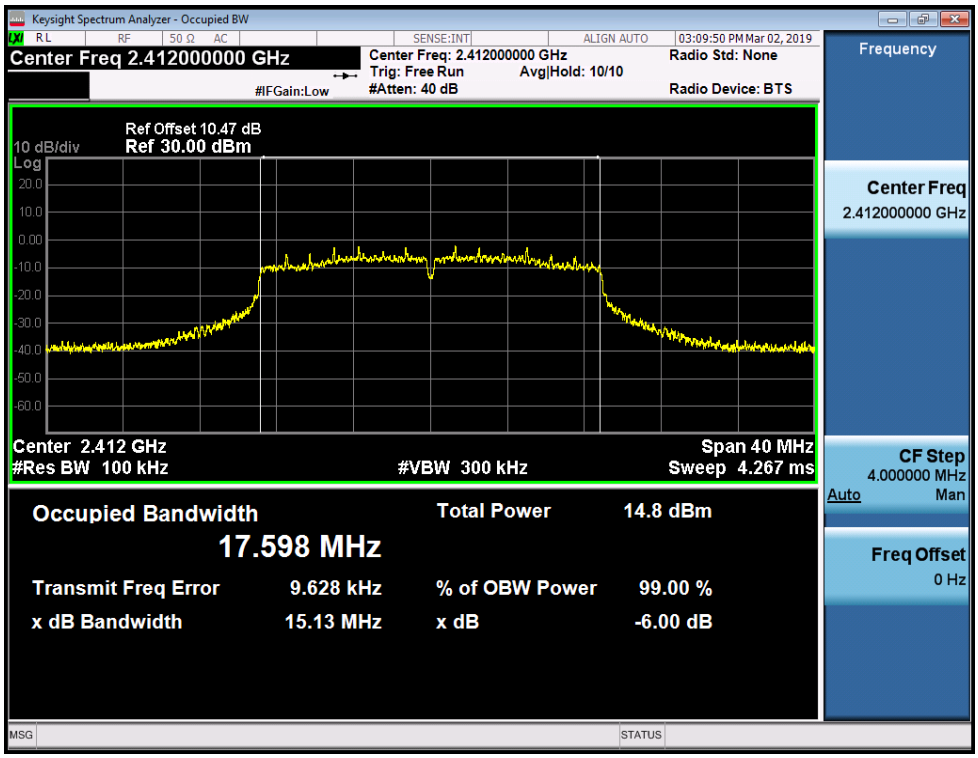
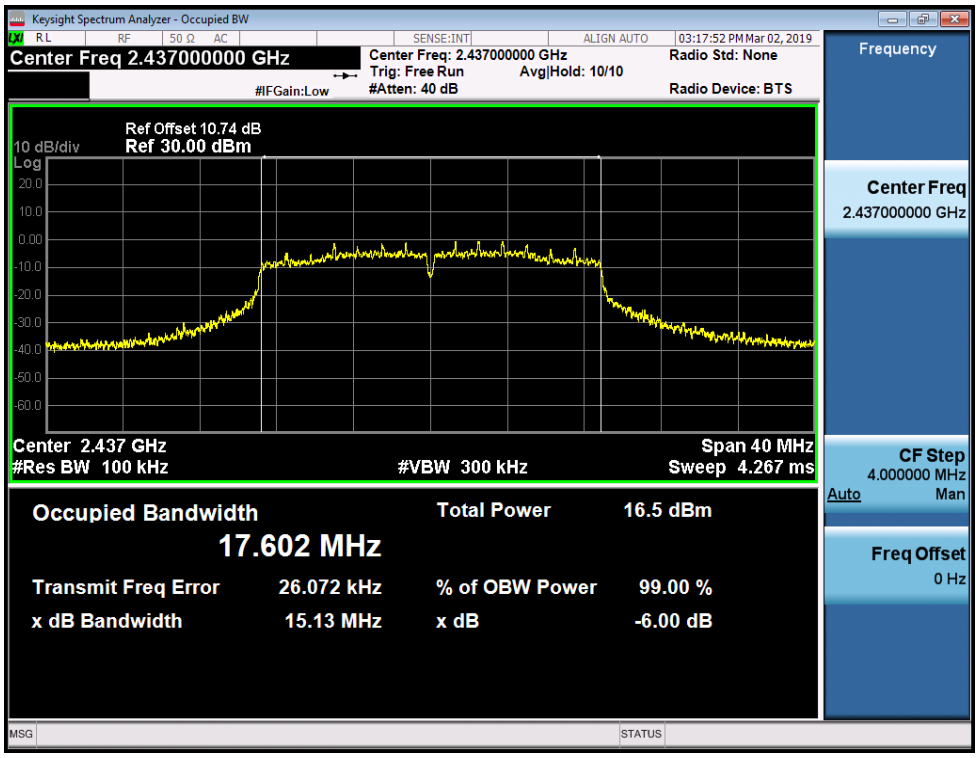
Mode	Channel	6dB Bandwidth [MHz]	99% OBW [MHz]	Verdict
11B	LCH	9.111	12.722	PASS
11B	MCH	9.108	12.726	PASS
11B	HCH	9.562	12.865	PASS
11G	LCH	15.47	16.390	PASS
11G	MCH	15.12	16.423	PASS
11G	HCH	15.42	16.478	PASS
11N20	LCH	15.13	17.598	PASS
11N20	MCH	15.13	17.602	PASS
11N20	HCH	15.09	17.649	PASS
11N40	LCH	35.10	35.953	PASS
11N40	MCH	35.11	35.958	PASS
11N40	HCH	35.12	35.982	PASS

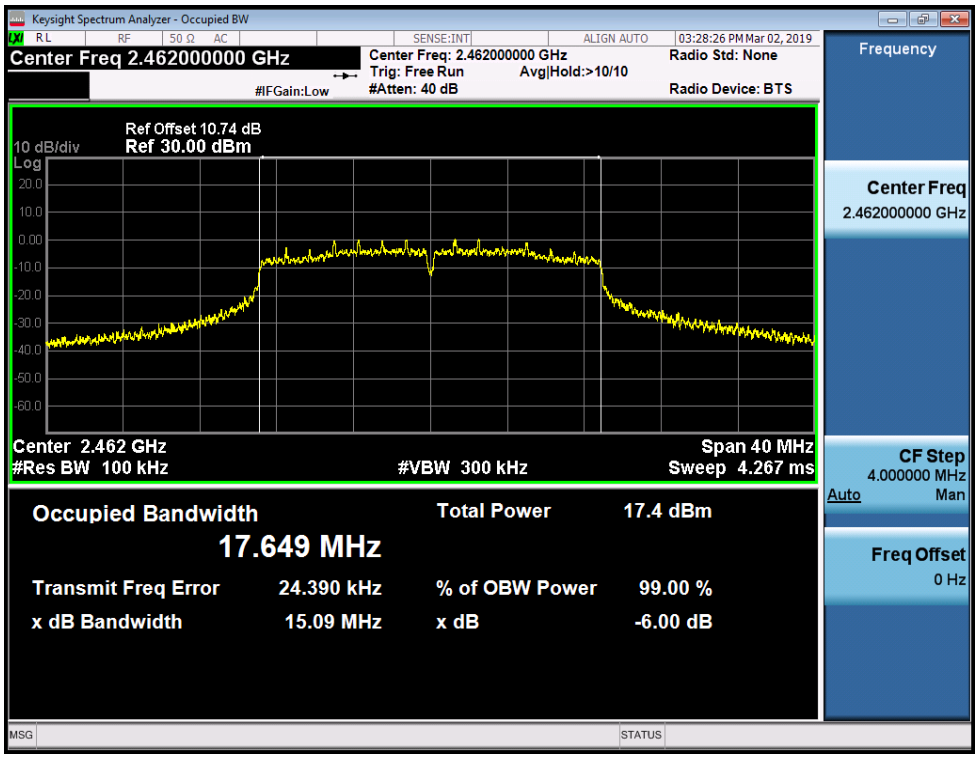
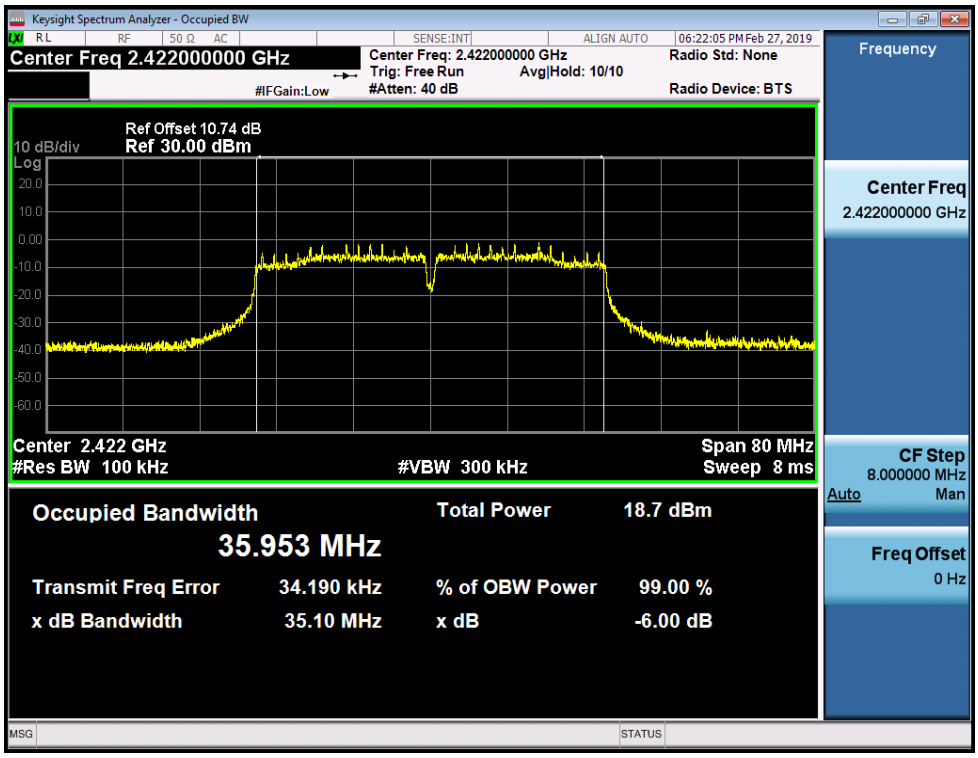
6dB and 99% Bandwidth Plot

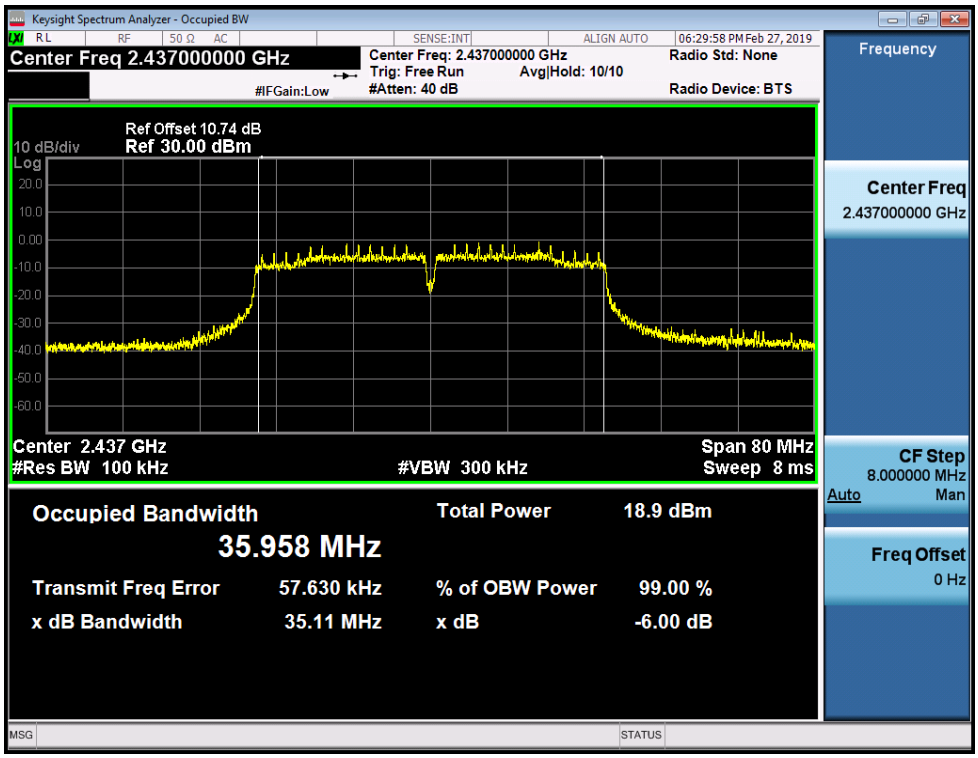
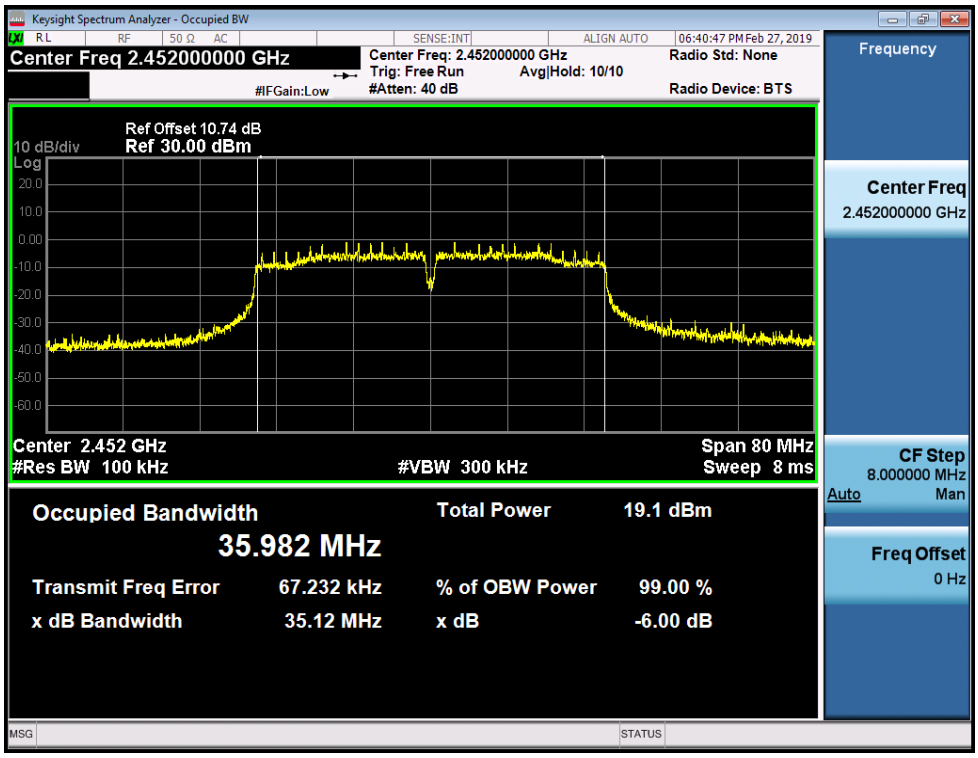
Graphs	
11B/LCH	
11B/MCH	

11B/HCH	
11G/LCH	

11G/MCH	
11G/HCH	

11N20/LCH	
11N20/MCH	

11N20/HCH	
11N40/LCH	

11N40/MCH	
11N40/HCH	

4.2 Output Power Measurement

4.2.1 Limit of Peak Output Power

FCC §15.247 (b)(3)

For systems using digital modulation in the 2400-2483.5 MHz bands: 30dBm.

4.2.2 Test Procedures

1. The testing follows the Measurement Procedure of FCC KDB No. 558074 DTS D01 Meas. Guidance v05r01 section 8.3.2.2 Measurement using a spectrum analyzer.
2. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.

Turn on the EUT and connect it to spectrum analyzer.

Set to the maximum power setting and enable the EUT transmit continuously

Measure the duty cycle, x, of the transmitter output signal as described in below:

a. Set the center frequency of the instrument to the center frequency of the transmission.
b. Set RBW to the largest available value.
c. Set detector = peak

Set span to at least 1.5*OBW.Set RBW=1MHz,VBW=3MHz, Number of points in sweep ≥ 2/3* span, Sweep time = auto. Detector = RMS

Allow the sweep to “free run”. Trace average 100 traces in RMS mode

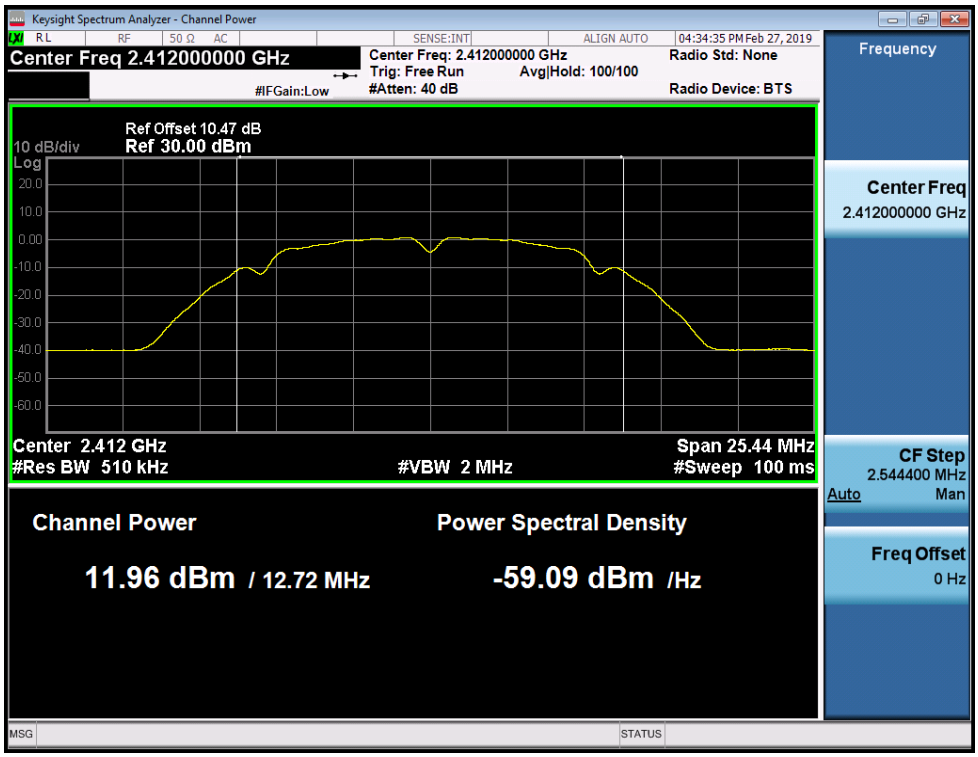
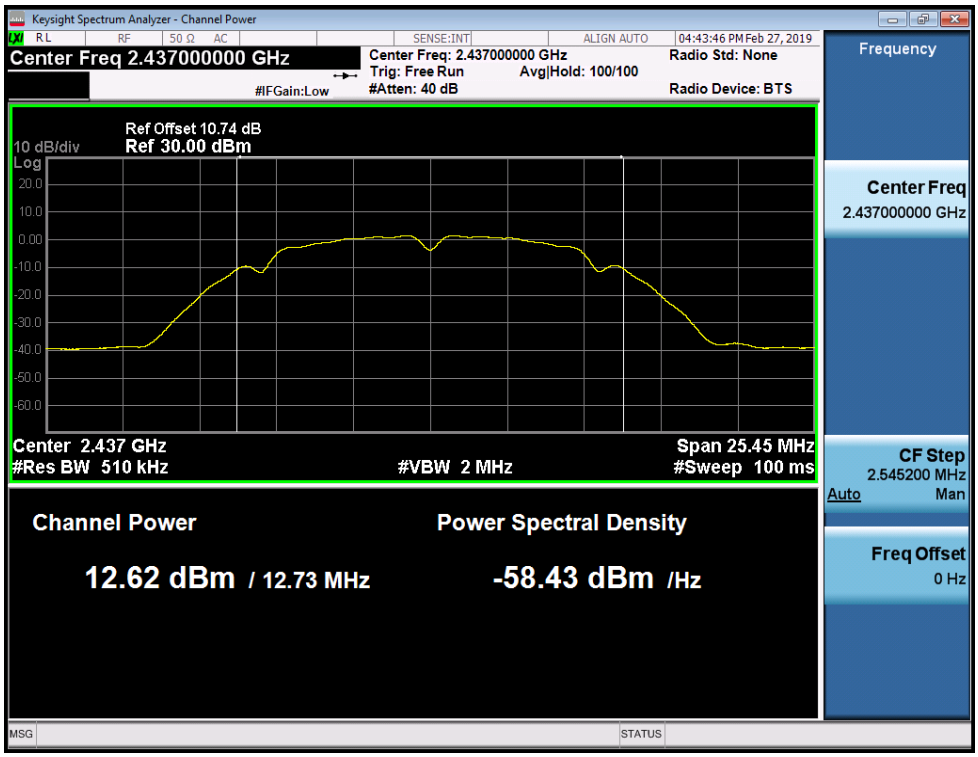
Compute power by integrating the spectrum across the OBW of the signal using the instrument’s Channel power measurement function with band limits set equal to the OBW band edges.

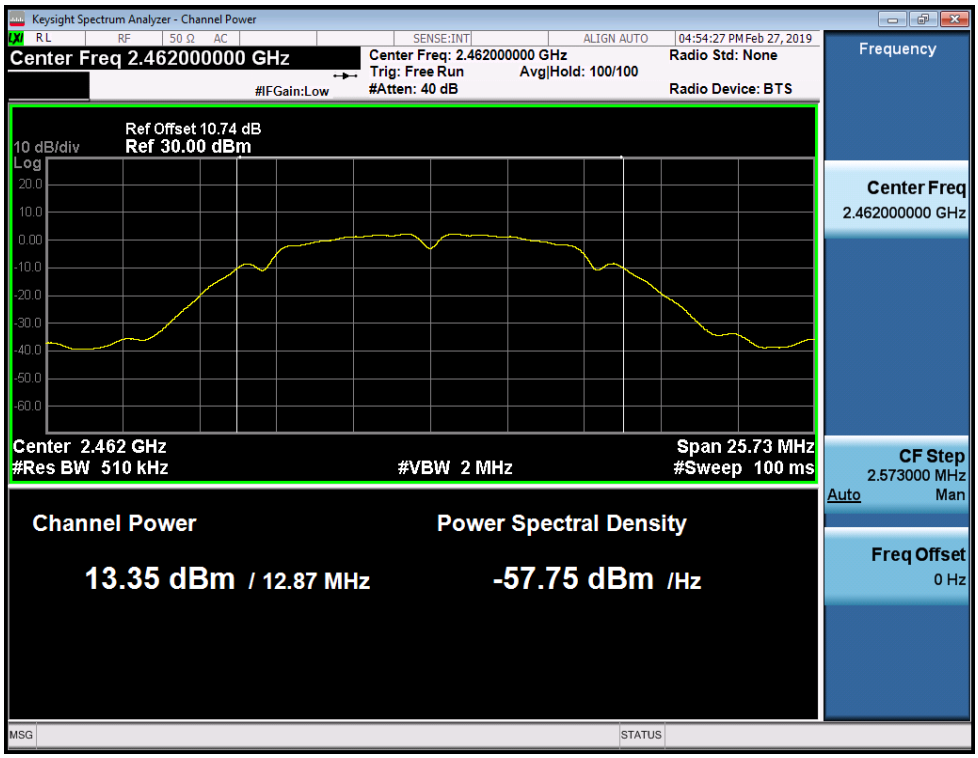
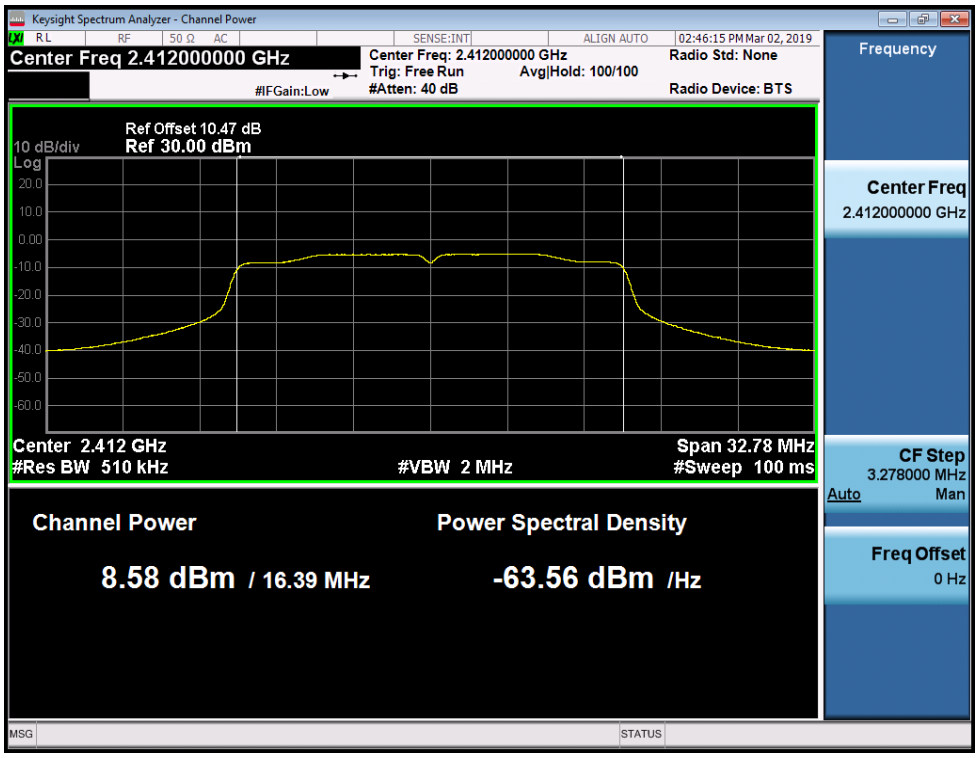
Add 10 log (1/x), where x is the duty cycle.

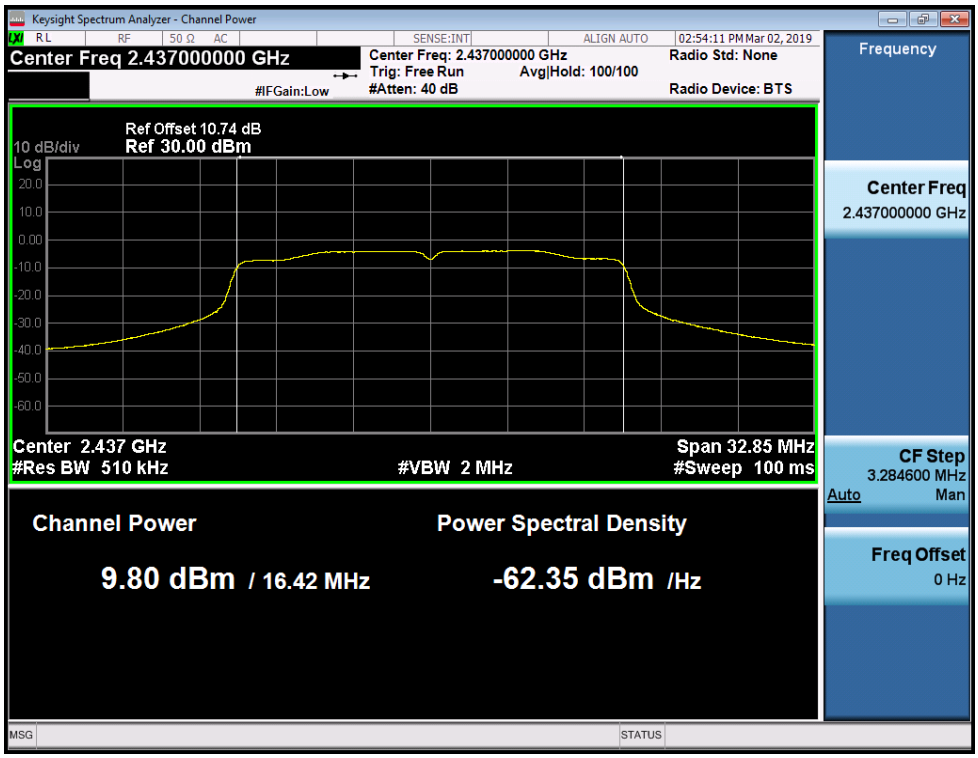
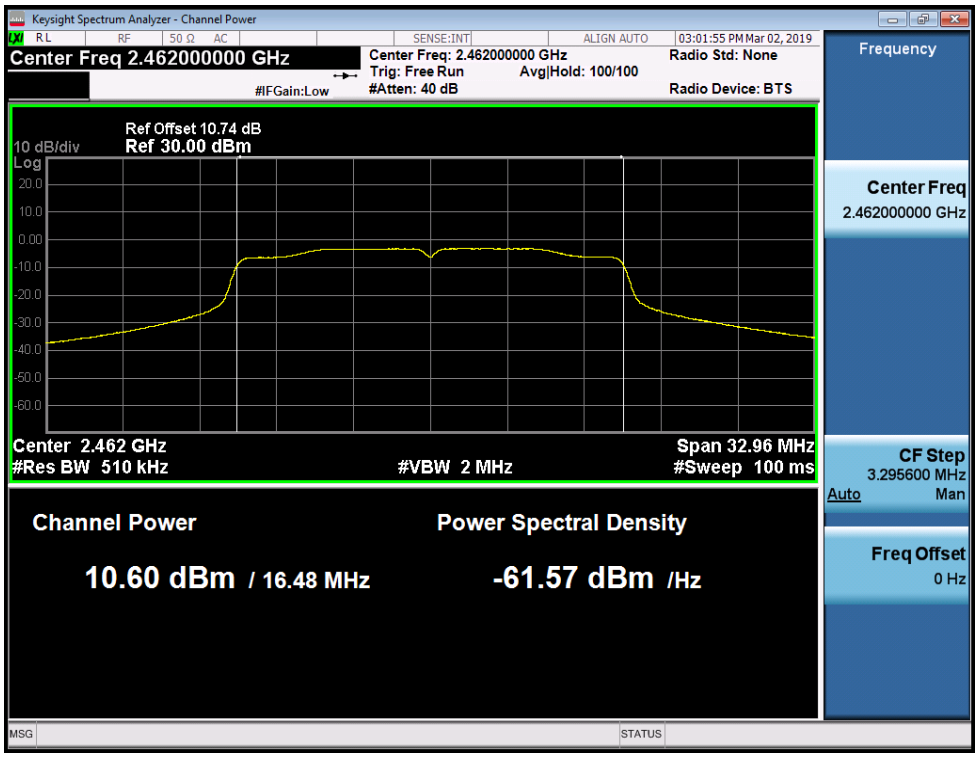
4.2.3 Test Result of Output Power

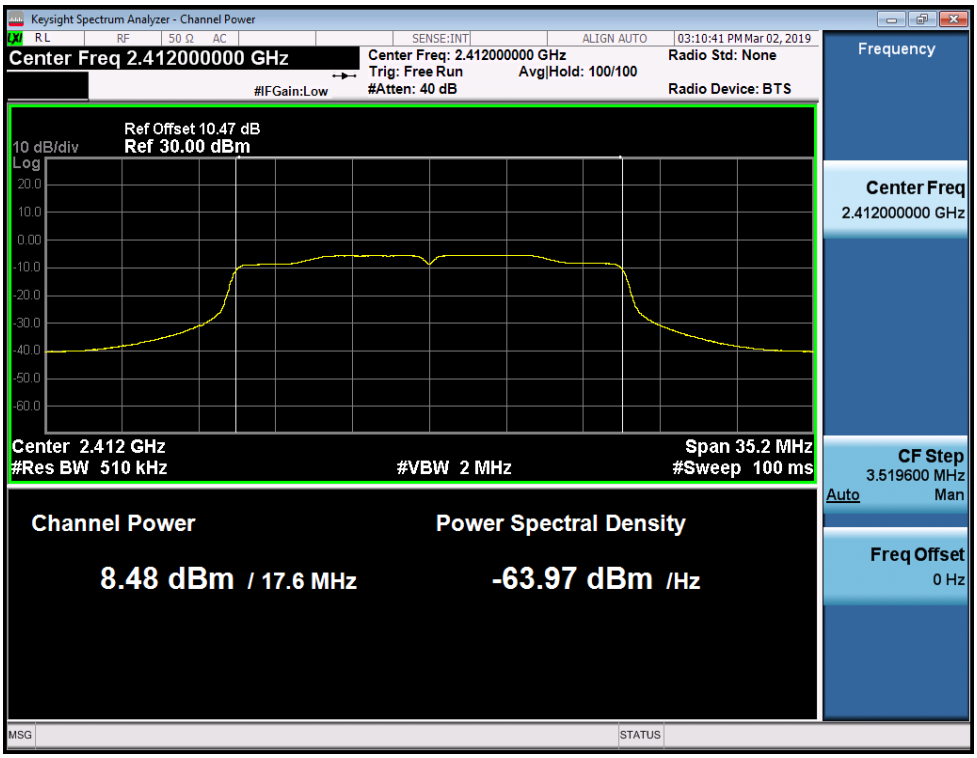
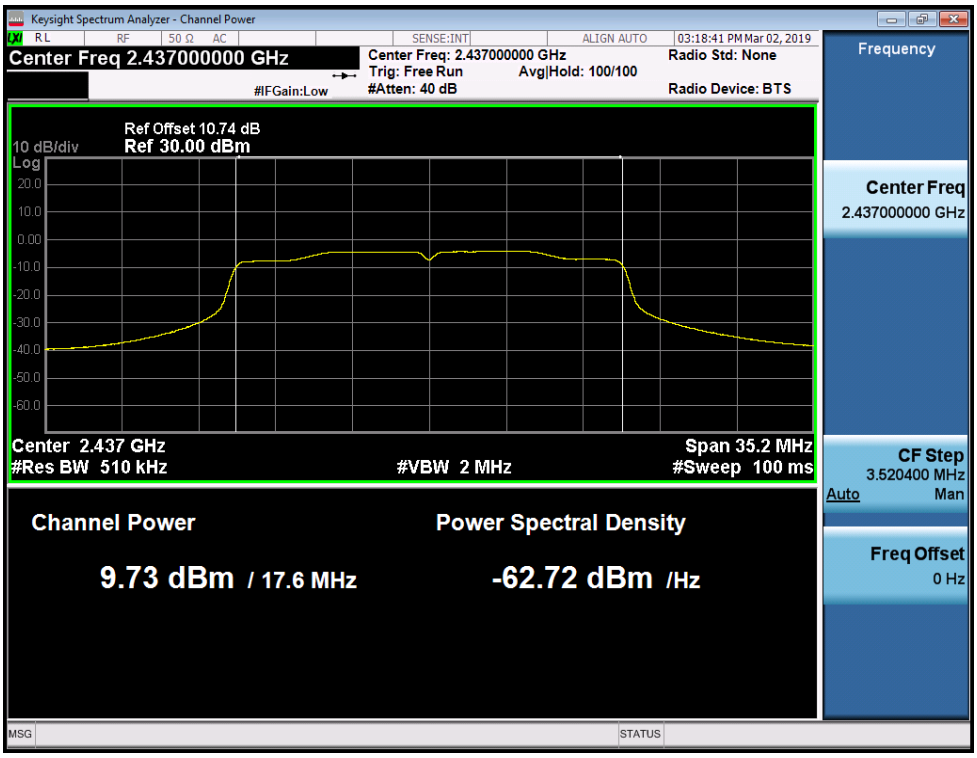
Test Mode :		2.4G WIFI	Temperature :		24~26℃	
Test Engineer :		Damon Zhang	Relative Humidity :		50~53%	
Mode	**Channel**	**Meas.Level [dBm]**	**DT**	**10 log (1/x)**	**AV.Power [dBm]**	**Verdict**
11B	LCH	11.96	98.65 %	0.06	12.02	PASS
11B	MCH	12.62	98.64 %	0.06	12.68	PASS
11B	HCH	13.35	98.53 %	0.06	13.41	PASS
11G	LCH	8.58	98.41 %	0.07	8.65	PASS
11G	MCH	9.8	98.41 %	0.07	9.87	PASS
11G	HCH	10.6	98.41 %	0.07	10.67	PASS
11N20	LCH	8.48	98.43 %	0.07	8.55	PASS
11N20	MCH	9.73	98.3 %	0.07	9.8	PASS
11N20	HCH	10.61	98.3 %	0.07	10.68	PASS
11N40	LCH	11.9	96.58 %	0.15	12.05	PASS
11N40	MCH	12.11	96.58 %	0.15	12.26	PASS
11N40	HCH	12.4	96.84 %	0.14	12.54	PASS

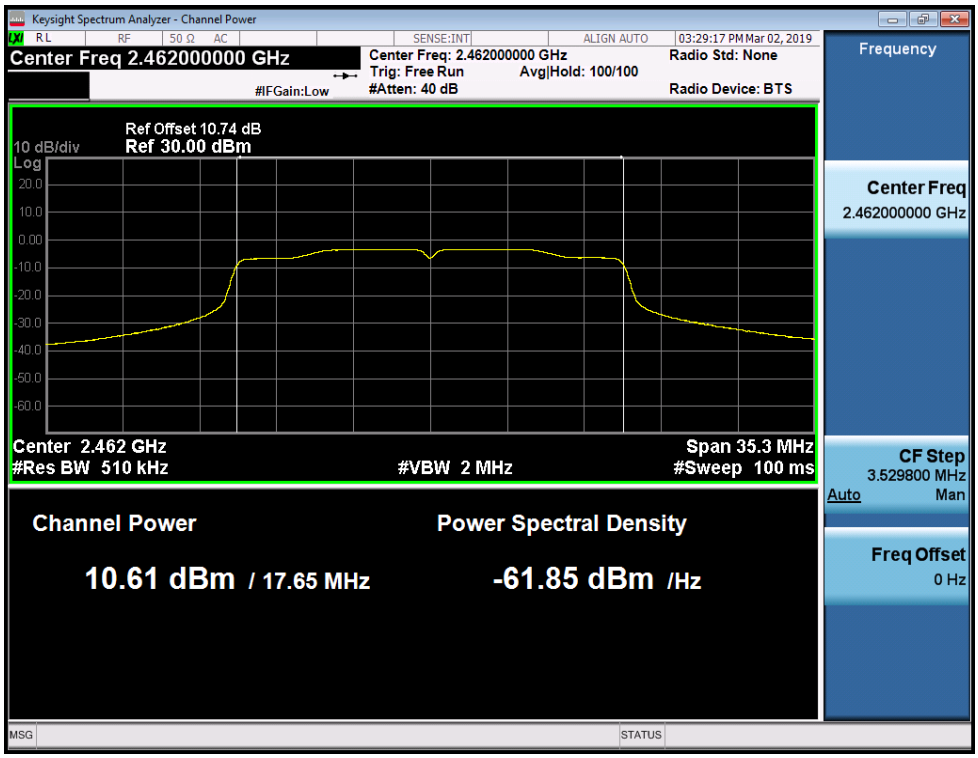
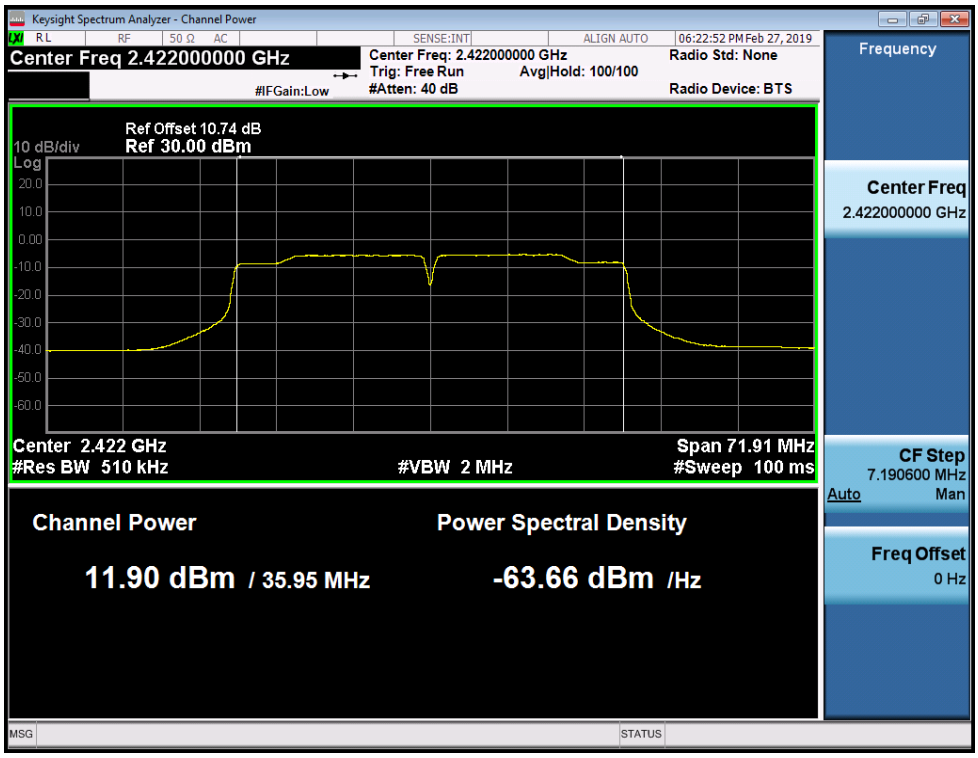
Meas.Level Plot

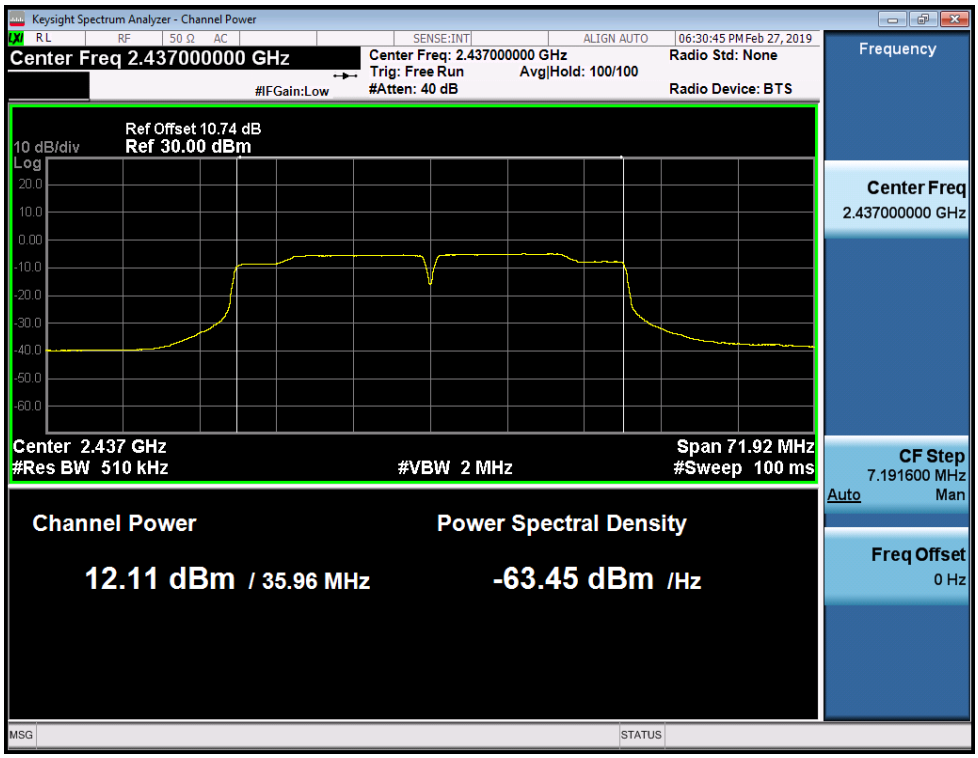
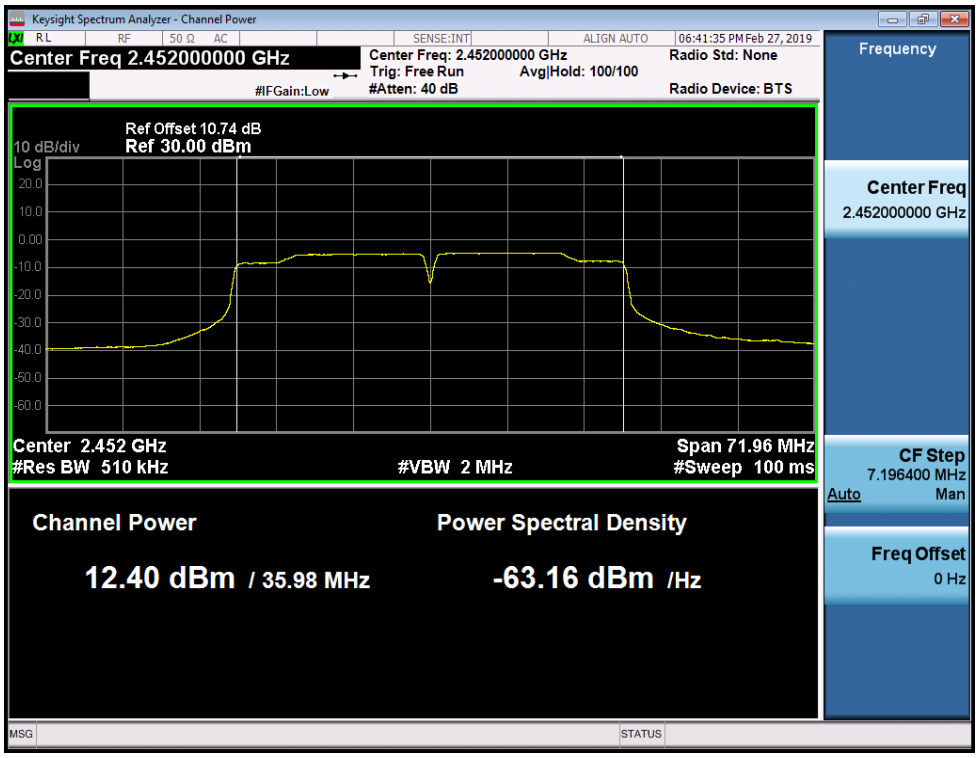
Graphs	
11B/LCH	
11B/MCH	

11B/HCH	
11G/LCH	

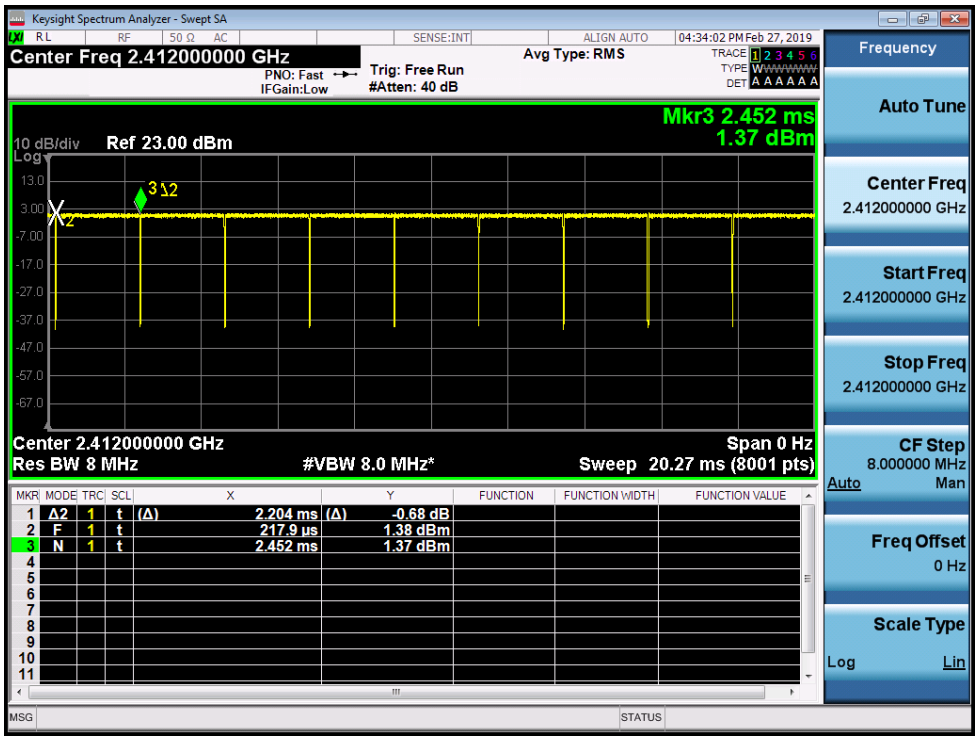
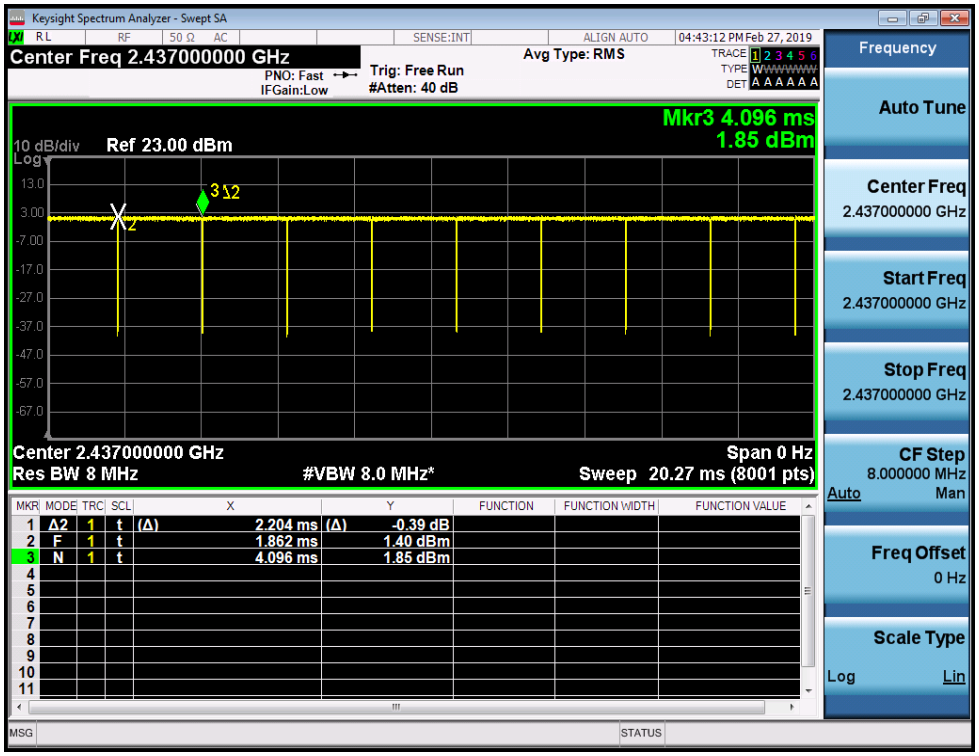
11G/MCH	
11G/HCH	

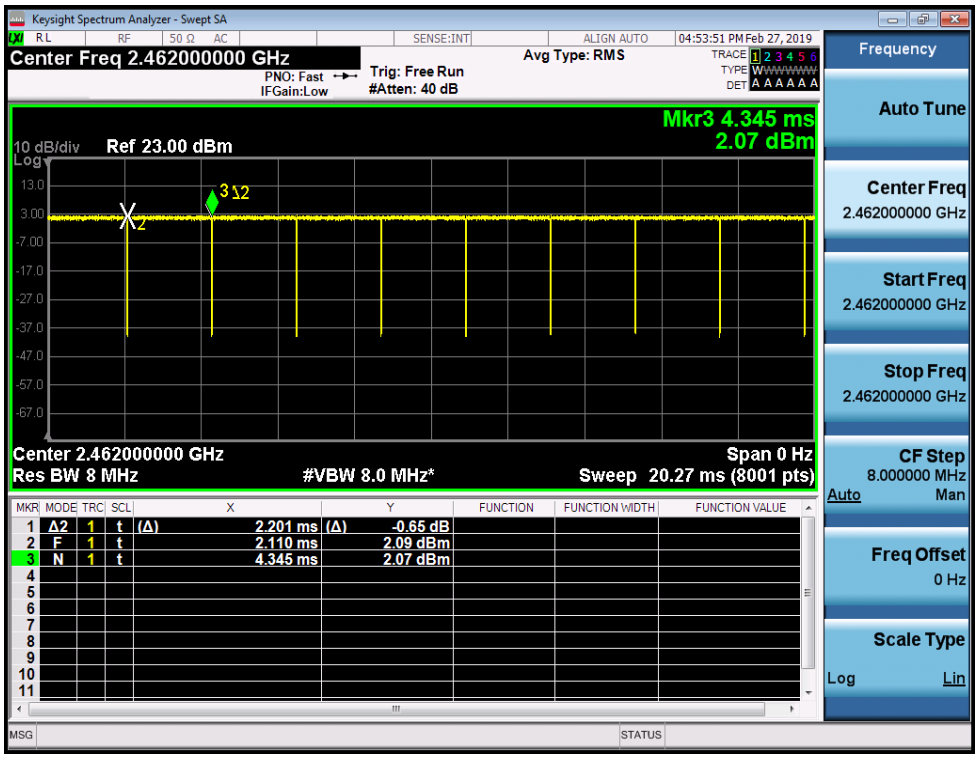
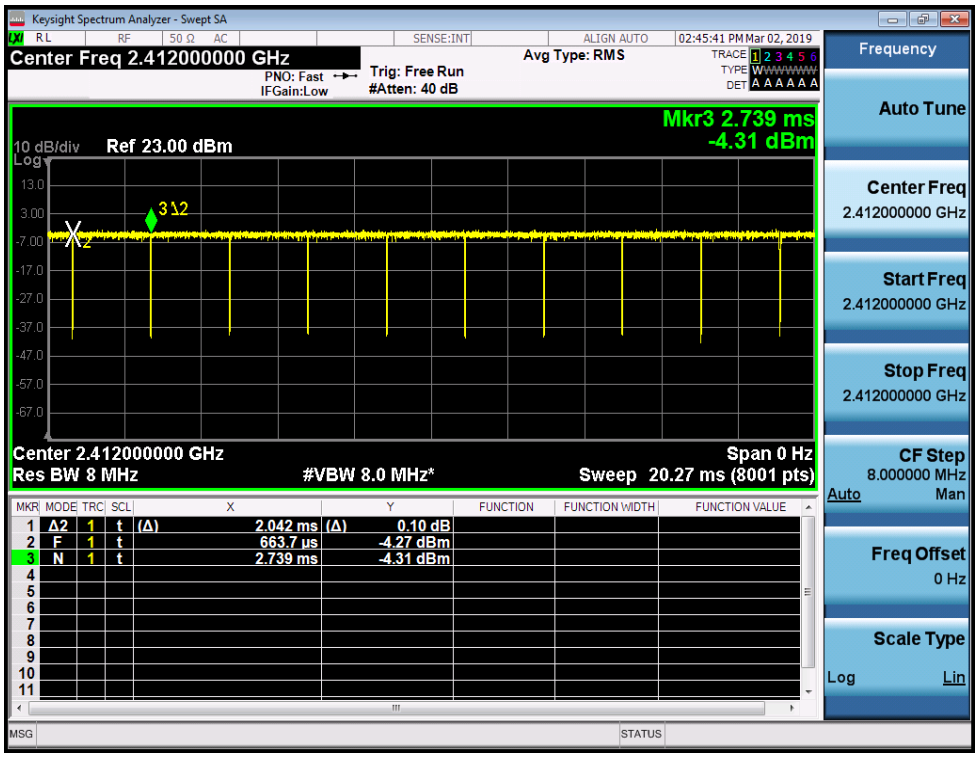
11N20/LCH	
11N20/MCH	

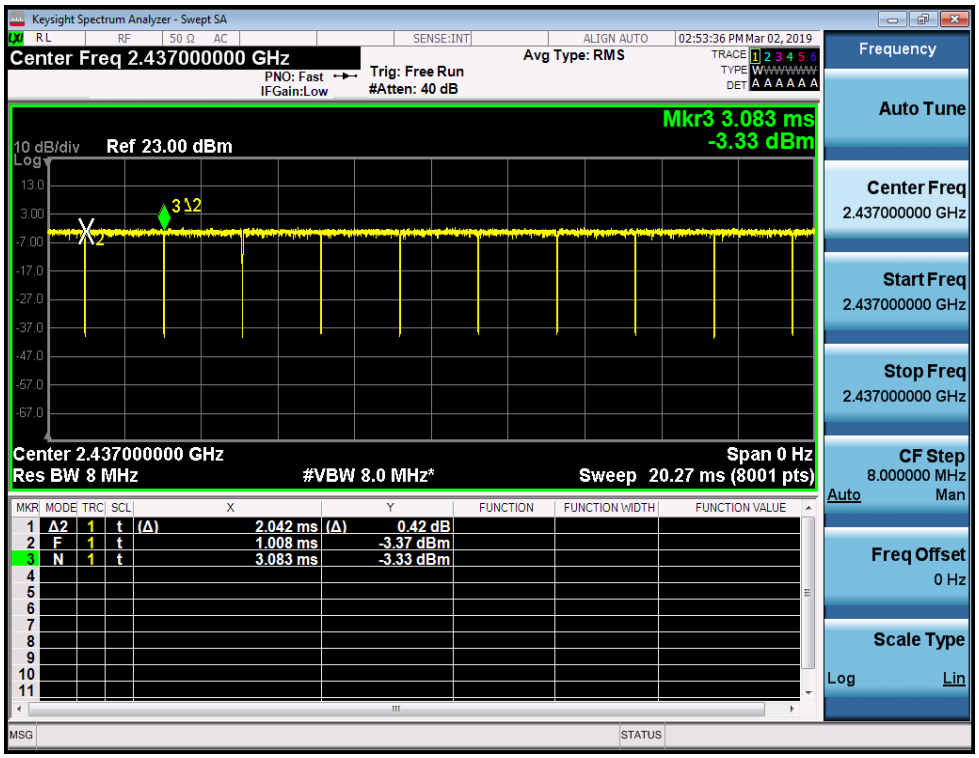
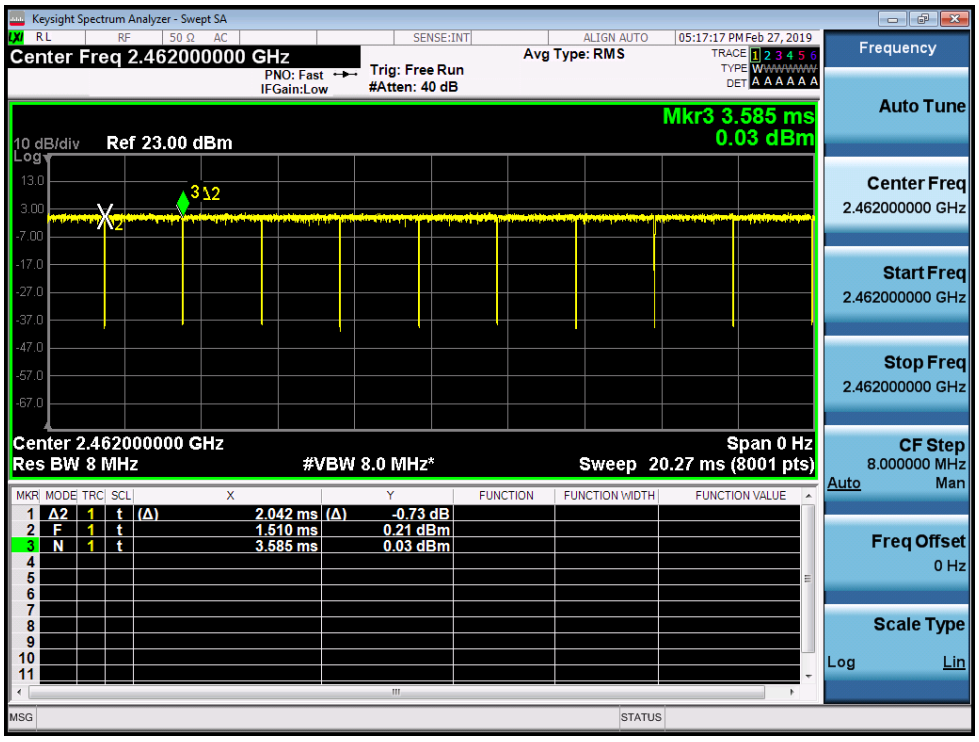
11N20/HCH	
11N40/LCH	

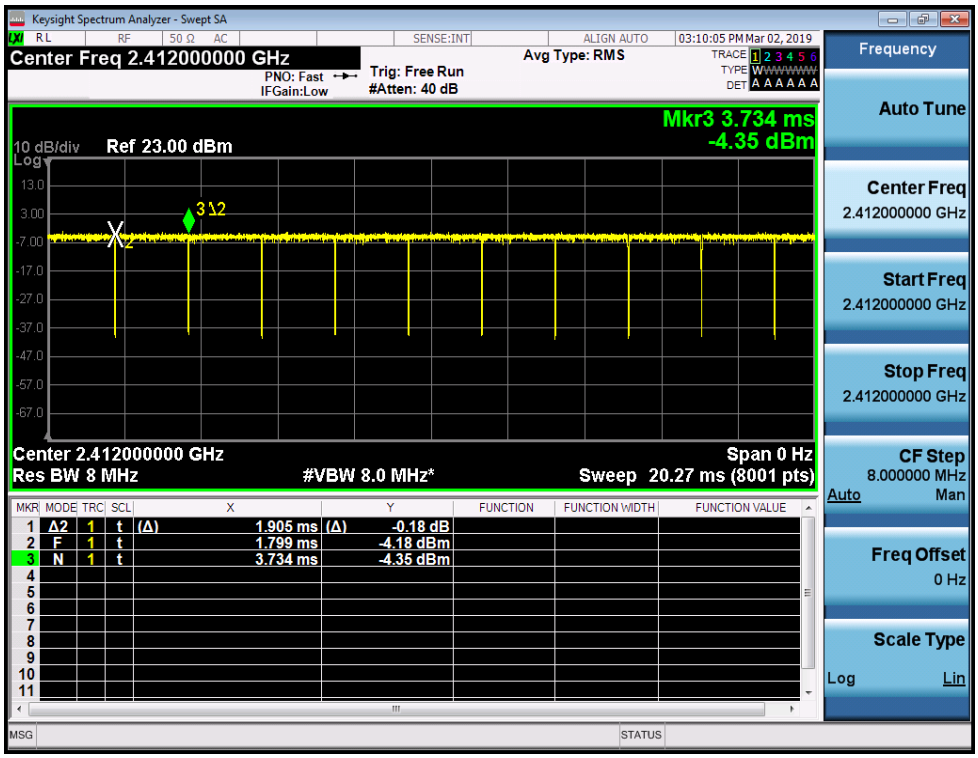
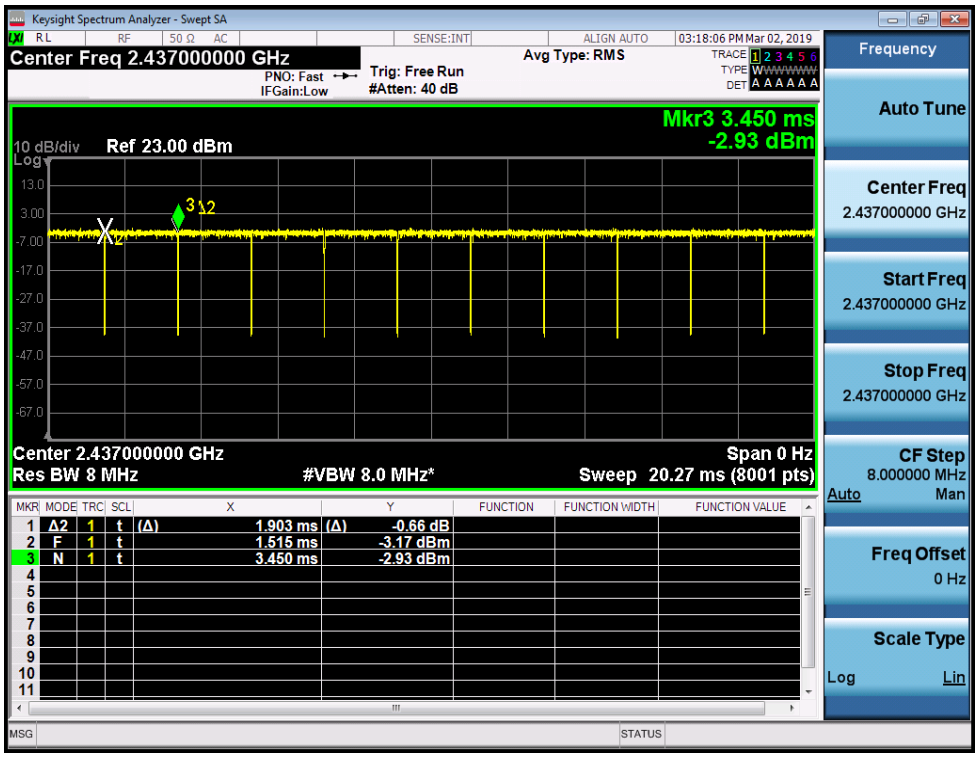
11N40/MCH	
11N40/HCH	

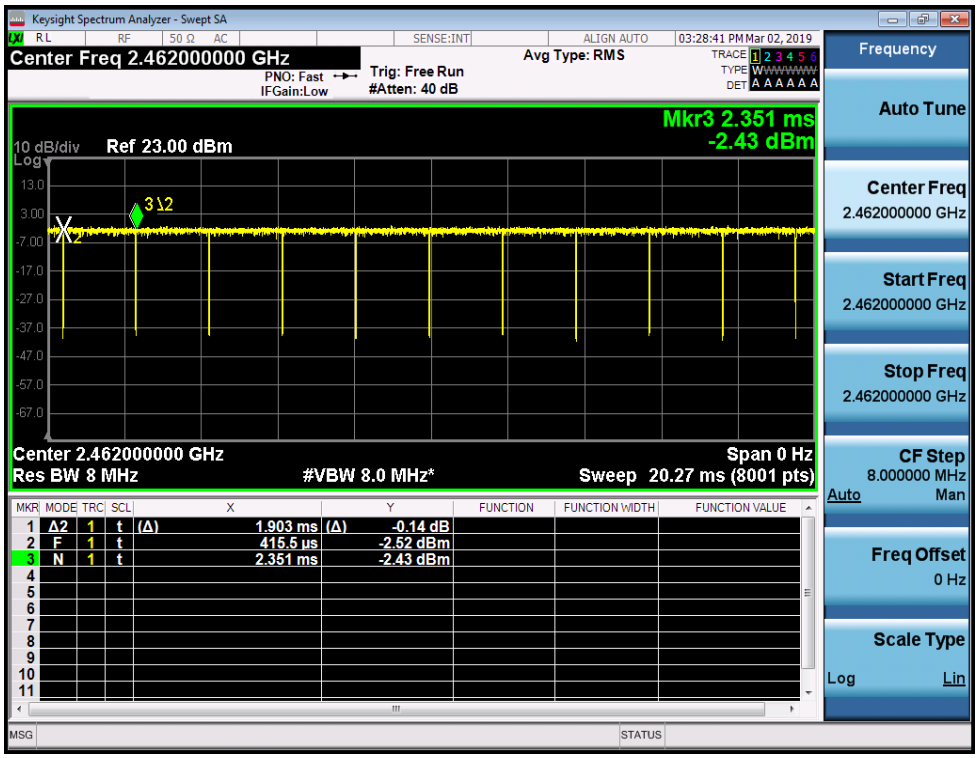
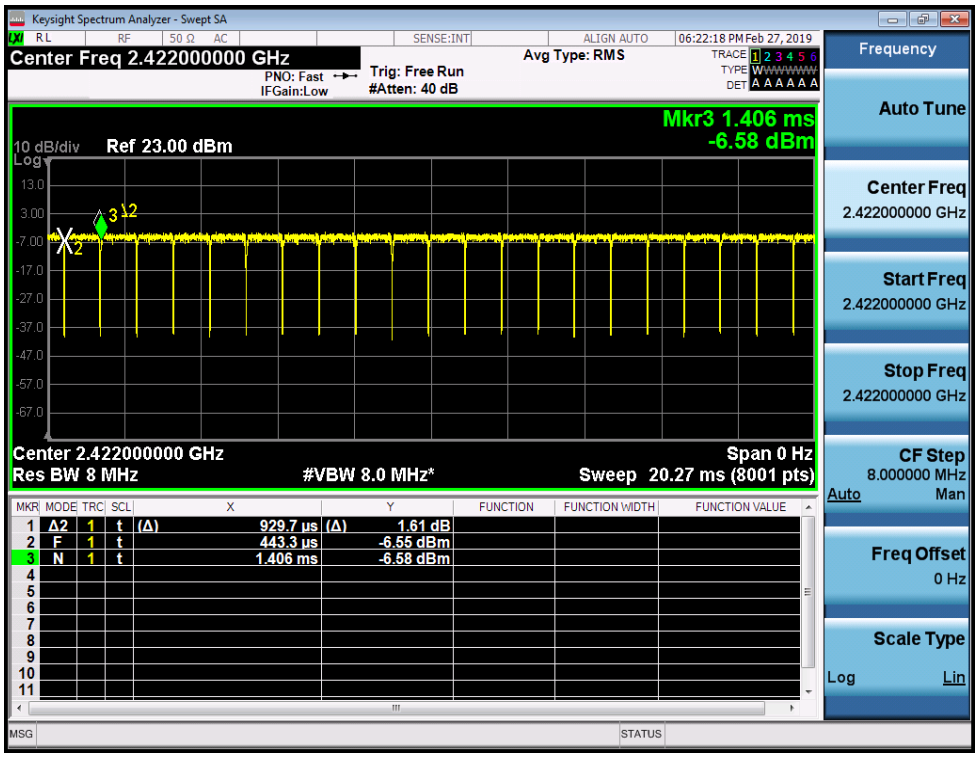
Duty cycle Plot

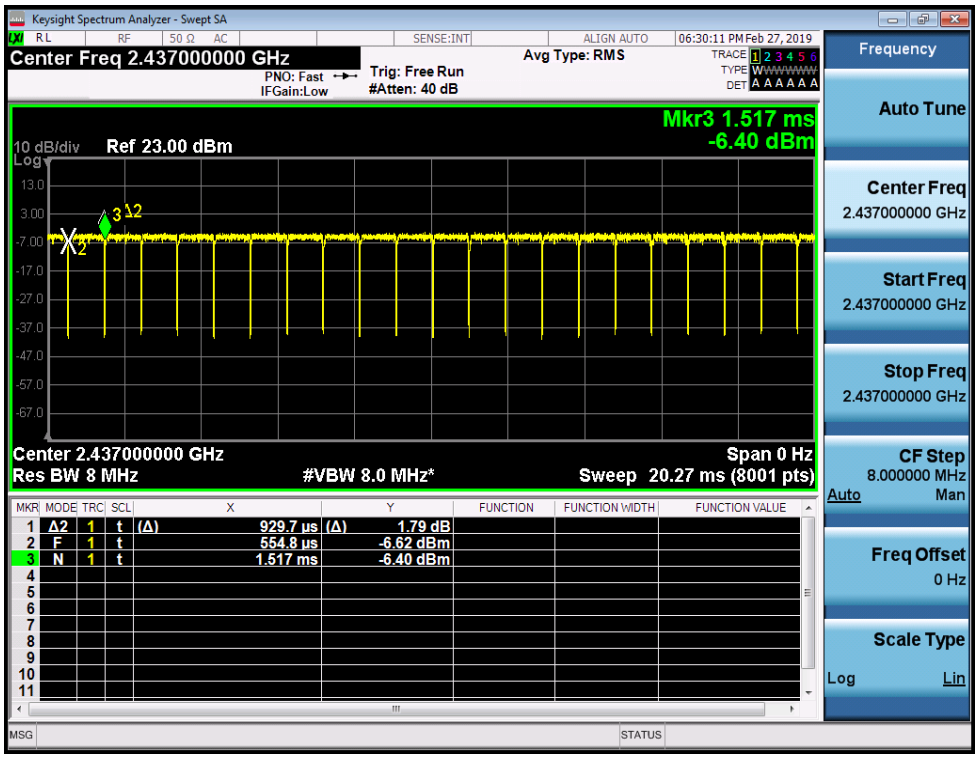
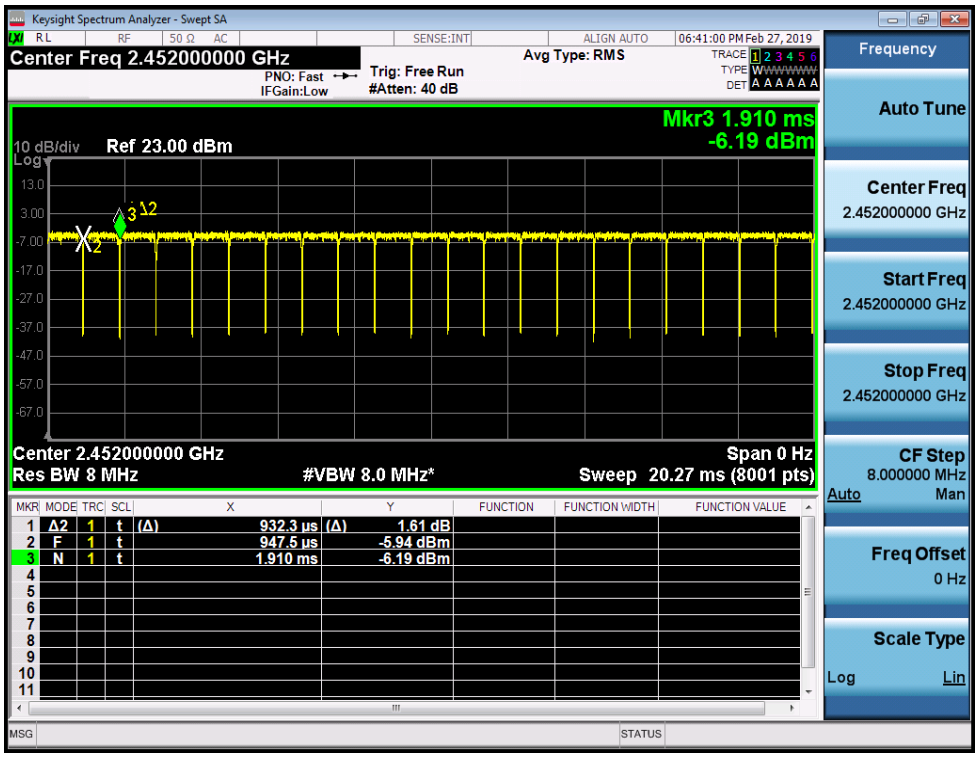
Graphs	
11B/LCH	
11B/MCH	

11B/HCH	
11G/LCH	

11G/MCH	
11G/HCH	

11N20/LCH	
11N20/MCH	

11N20/HCH	
11N40/LCH	

11N40/MCH	
11N40/HCH	

4.3 Power Spectral Density Measurement

4.3.1 Limits of Power Spectral Density

FCC § 15.247(e)

The peak power spectral density shall not be greater than 8dBm in any 3kHz band at any time interval of continuous transmission.

4.3.2 Test Procedure

1.The testing follows Measurement Procedure 8.4 DTS maximum power spectral density level in the fundamental emission of FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v05r01

2.Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.

3.Turn on the EUT and connect it to measurement instrument.

4.Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 30 kHz. Video bandwidth VBW = 100 kHz In order to make an accurate measurement, set the span to 1.5 times DTS Channel Bandwidth. (6dB BW)

5.Detector = power averaging (rms), Sweep time = auto couple, Trace mode = averaging (rms) mode over a minimum of 100 traces. Use the peak marker function to determine the maximum power level.

6.Measure and record the results in the test report.

7.The Measured power density (dBm)/ 100kHz is a reference level and used as 20dBc down limit line for Conducted Band Edges and Conducted Spurious Emission.

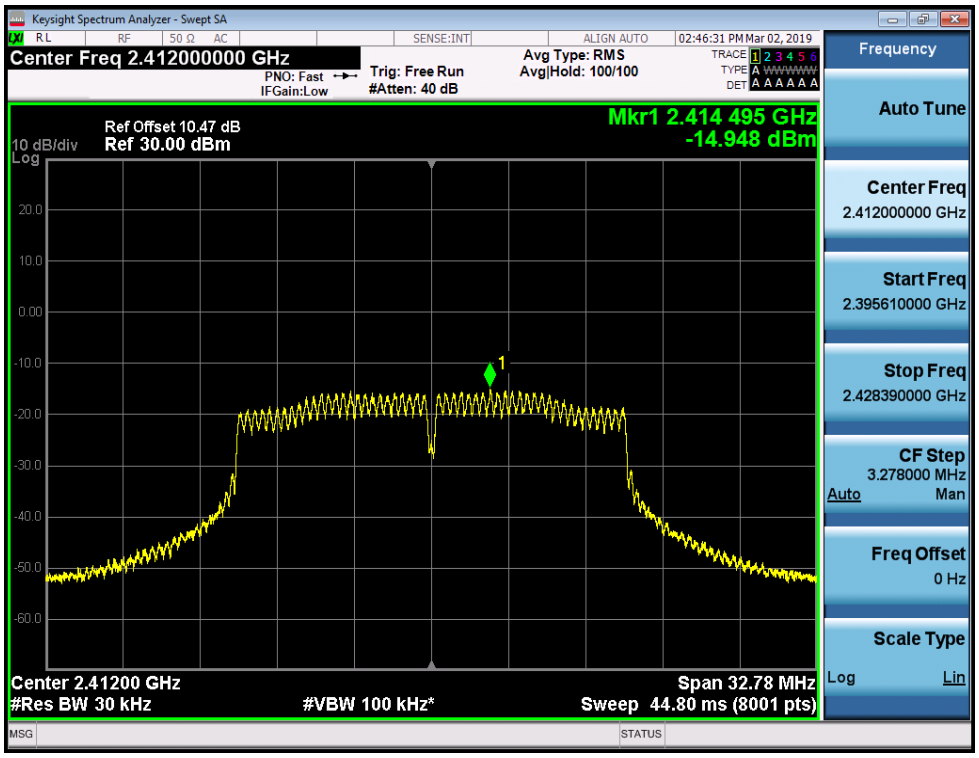
4.3.3 Test Result of Power Spectral Density

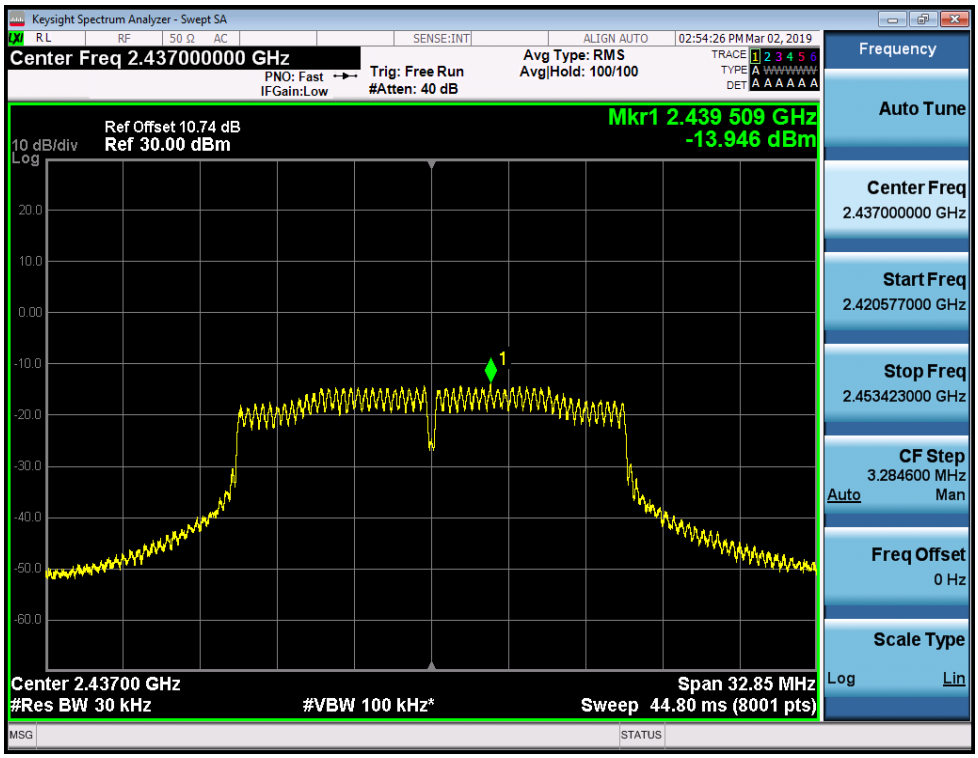
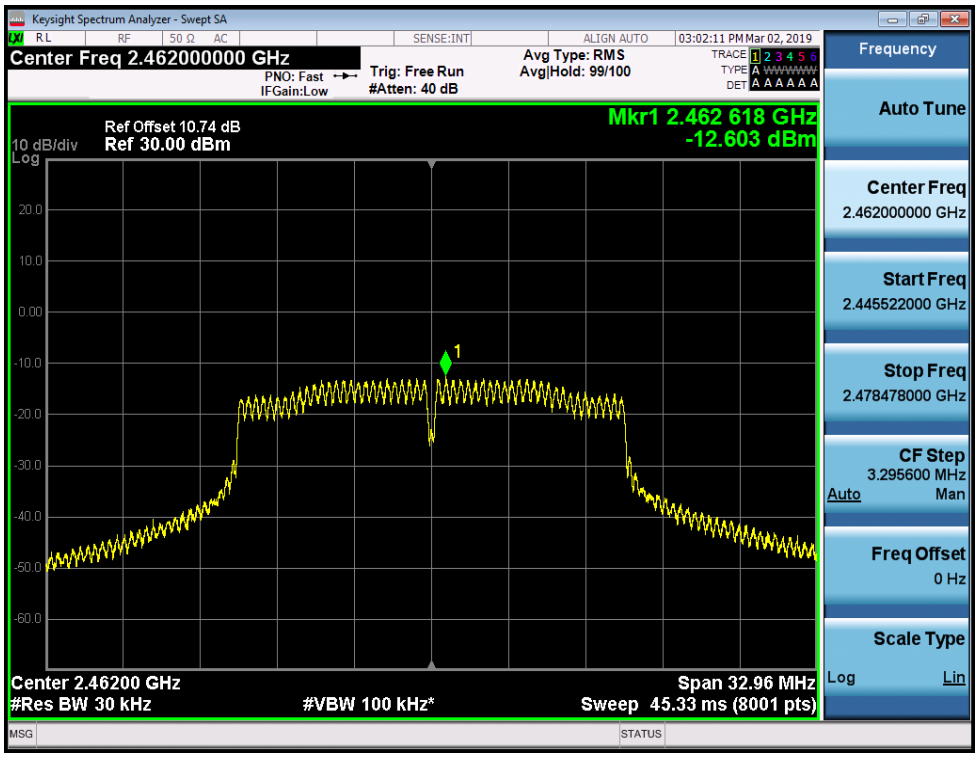
Test Mode :	2.4G WIFI	Temperature :	24~26℃
Test Engineer :	Damon Zhang	Relative Humidity :	50~53%

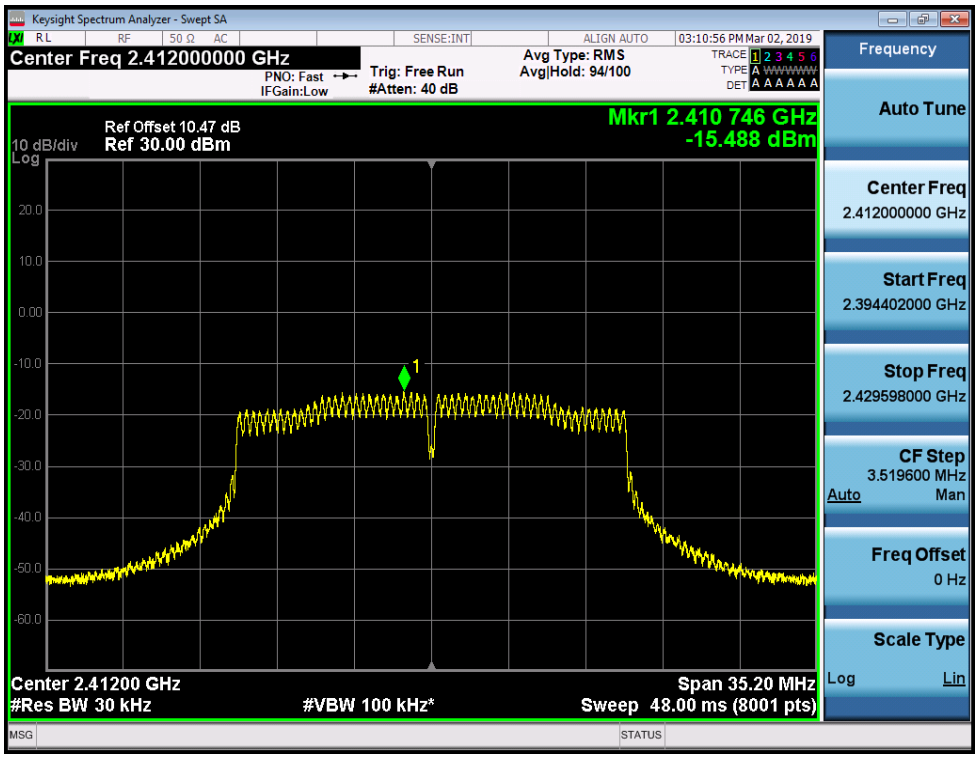
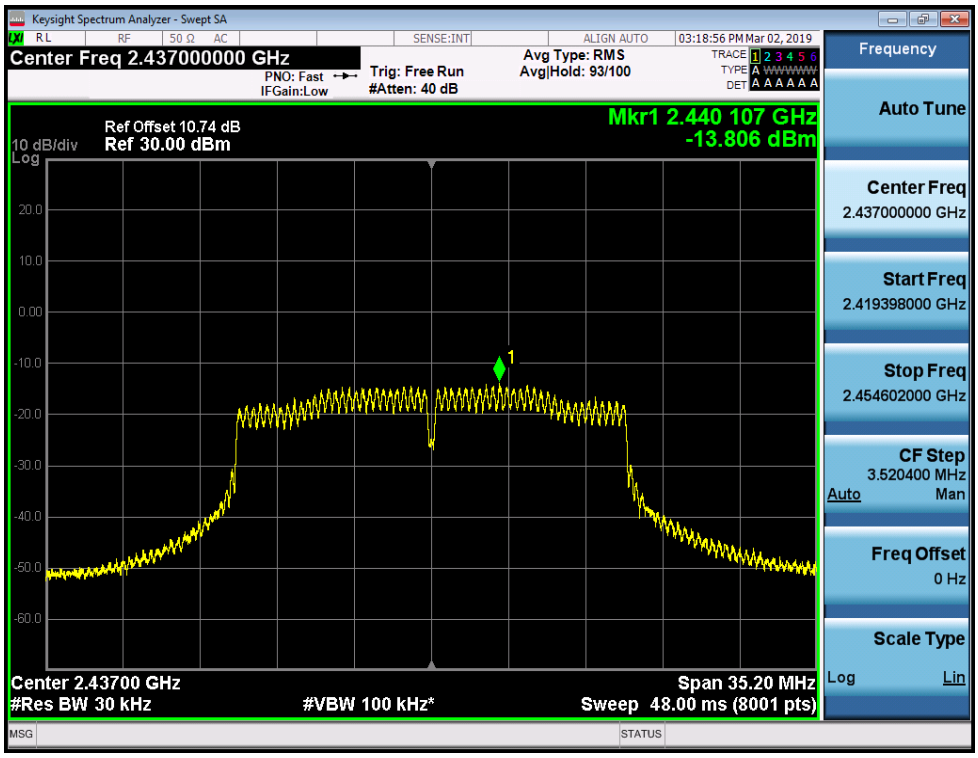
Mode	Channel	Meas.Level [dBm]	Av.PSD [dBm]	Verdict
11B	LCH	-10.101	-10.041	PASS
11B	MCH	-9.633	-9.573	PASS
11B	HCH	-8.512	-8.452	PASS
11G	LCH	-14.948	-14.843	PASS
11G	MCH	-13.946	-13.876	PASS
11G	HCH	-12.603	-12.603	PASS
11N20	LCH	-15.488	-15.418	PASS
11N20	MCH	-13.806	-13.736	PASS
11N20	HCH	-12.979	-12.909	PASS
11N40	LCH	-14.724	-14.574	PASS
11N40	MCH	-14.622	-14.472	PASS
11N40	HCH	-13.206	-13.066	PASS

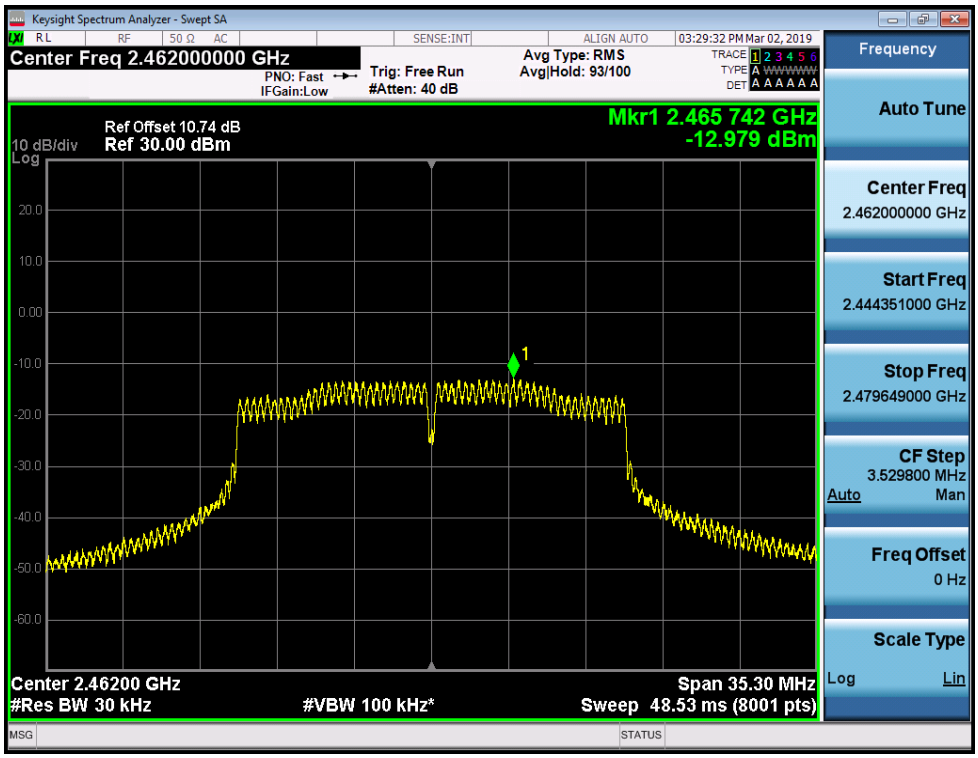
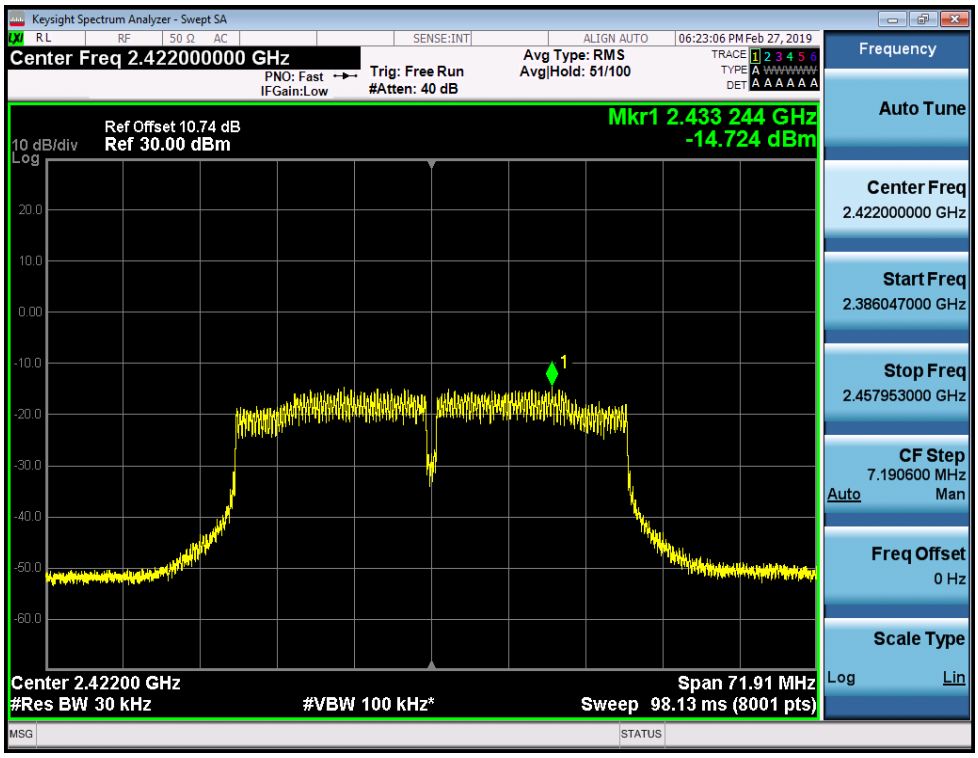
Power Spectral Density Plot

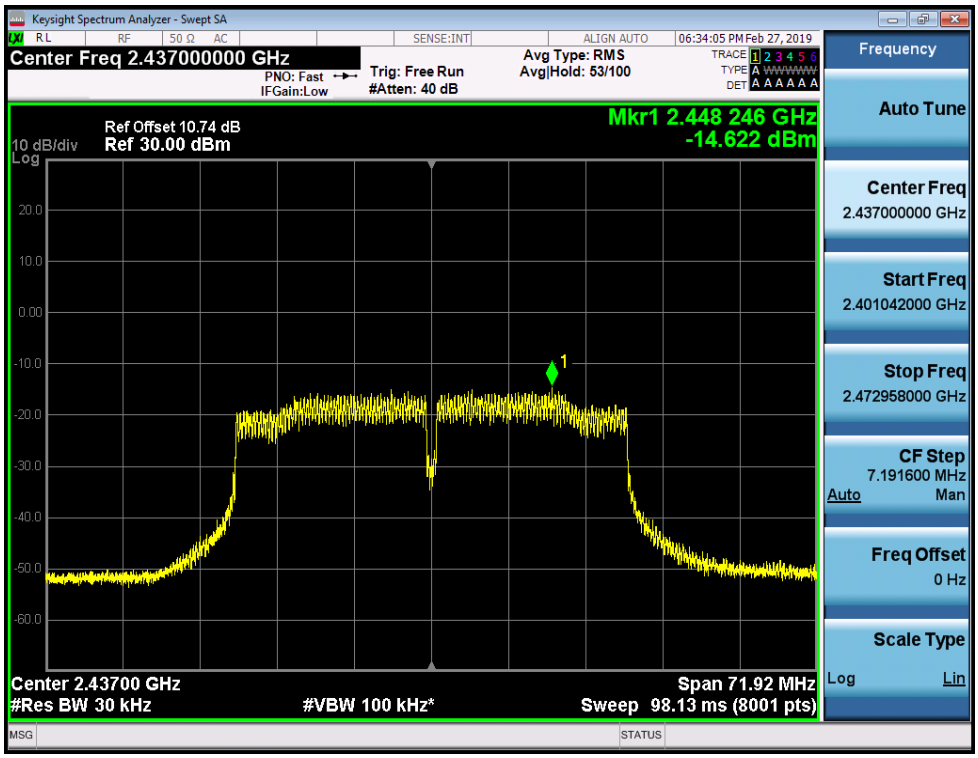
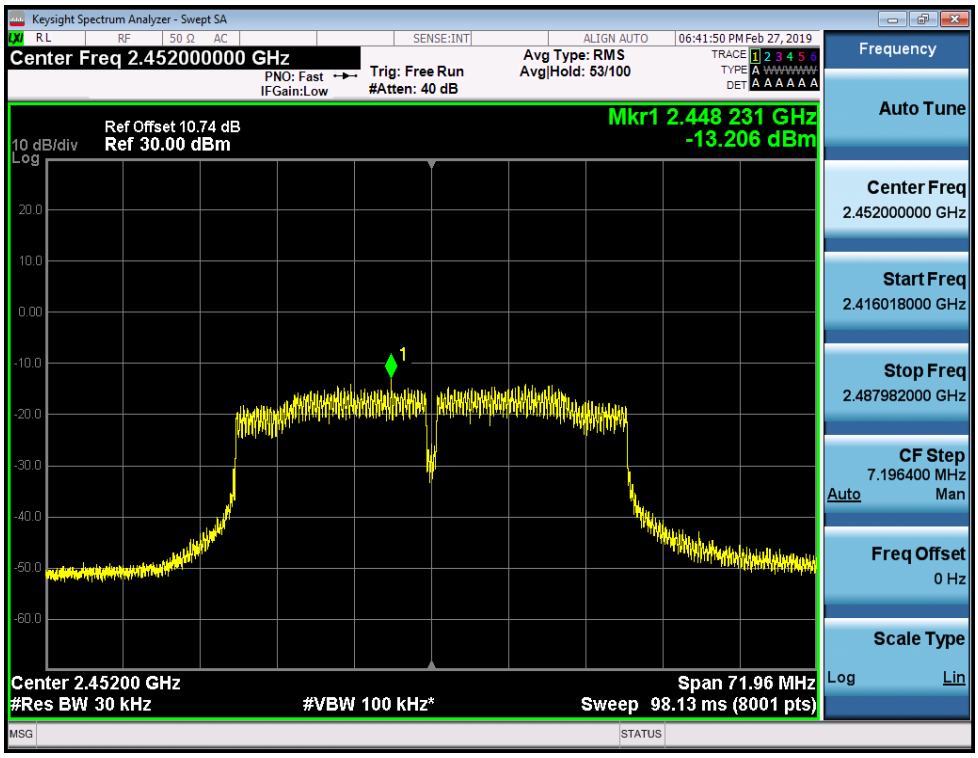
Graphs	
11B/LCH	
11B/MCH	

11B/HCH	
11G/LCH	

11G/MCH	
11G/HCH	

11N20/LCH	
11N20/MCH	

11N20/HCH	
11N40/LCH	

11N40/MCH	
11N40/HCH	

4.4 Conducted Band Edges and Spurious Emission Measurement

4.4.1 Limit of Conducted Band Edges and Spurious Emission

FCC §15.247 (d)

All harmonics/spurious must be at least 20 dB down from the highest emission level within the authorized band.

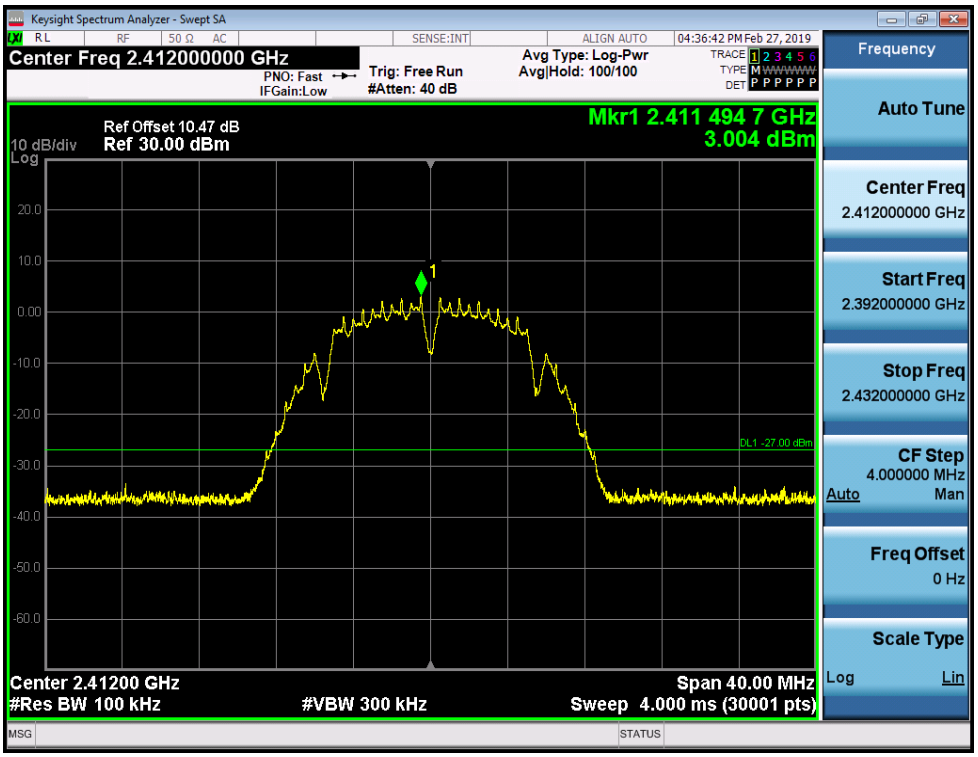
4.4.2 Test Procedures

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Turn on the EUT and connect it to measurement instrument.
3. Set RBW = 100 kHz, VBW=300 kHz, Peak Detector. Unwanted Emissions measured in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz when maximum peak conducted output power procedure is used. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB per 15.247(d).
4. Measure and record the results in the test report.
5. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

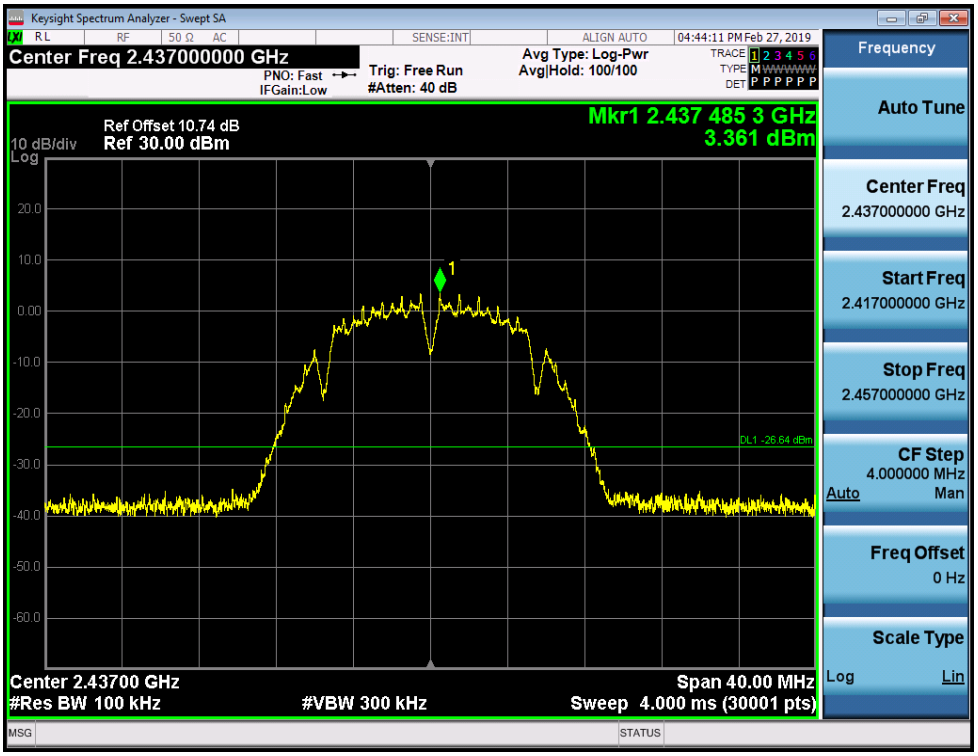
4.4.3 Test Result of Conducted Band Edges and Spurious Emission

Test Mode :		2.4G WIFI	Temperature :	24~26℃	
Test Engineer :		Damon Zhang	Relative Humidity :	50~53%	
Mode	Channel	Carrier Power[dBm]	Max.Spurious Level [dBm]	Limit [dBm]	Verdict
11B	LCH	2.673	-34.918	-27.33	PASS
11B	HCH	3.968	-35.250	-26.03	PASS
11G	LCH	-1.582	-32.676	-31.58	PASS
11G	HCH	0.689	-35.186	-29.31	PASS
11N20	LCH	-1.574	-33.075	-31.57	PASS
11N20	HCH	0.594	-34.515	-29.41	PASS
11N40	LCH	-1.300	-33.318	-31.3	PASS
11N40	HCH	-0.535	-29.457	-30.535	PASS

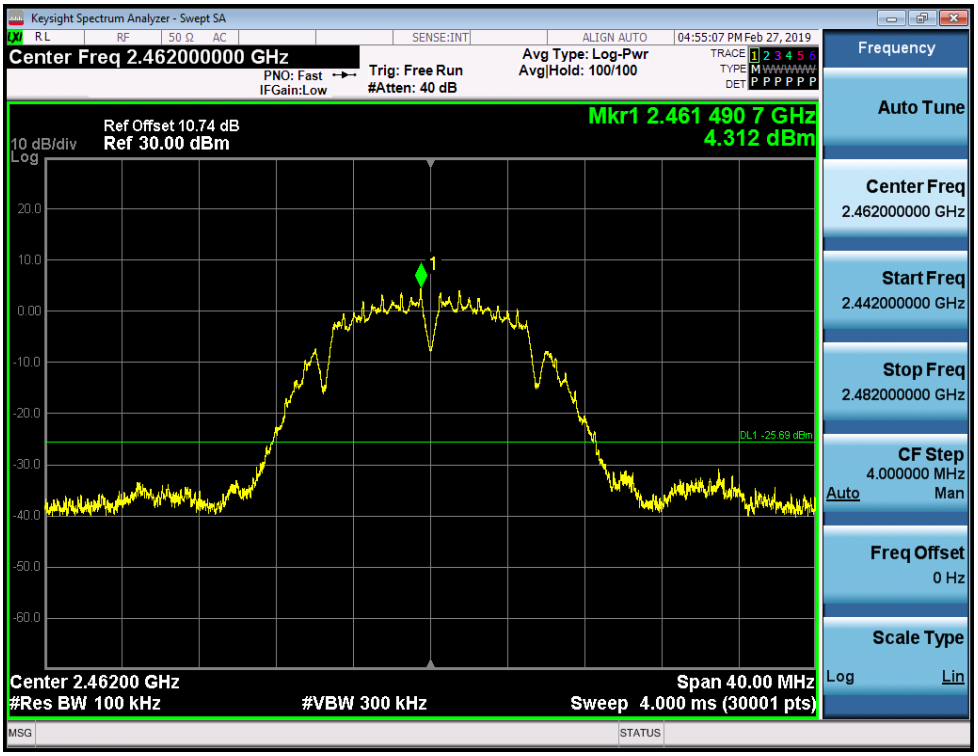
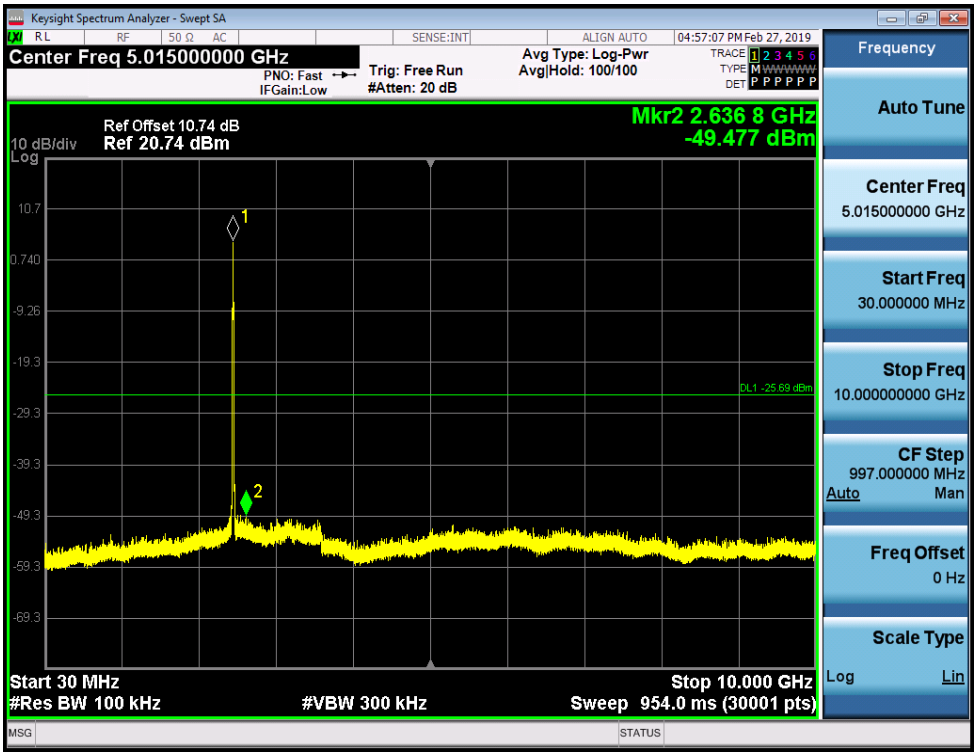
Conducted Band Edges and Spurious Emission Plot

11B_LCH_Graphs	
Pref/11B/LCH	
Puw/11B/LCH	


Keysight Spectrum Analyzer - Swept SA
RL
RF
50 Ω AC
SENSE:INT
ALIGN AUTO
04:42:10 PM Feb 27, 2019
Center Freq 18.000000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 20 dB
Avg Type: Log-Pwr
Avg|Hold: 100/100
TRACE 1 2 3 4 5 6
TYPE M
DET P P P P P
Frequency
Auto Tune
Ref Offset 10.47 dB
10 dB/div
Log
Ref 20.47 dBm
Mkr1 25.413 9 GHz
-35.179 dBm
10.5
0.470
-9.53
-19.5
-29.5
-39.5
-49.5
-59.5
-69.5
DL1 -27.00 dBm
1
Center Freq
18.000000000 GHz
Start Freq
10.000000000 GHz
Stop Freq
26.000000000 GHz
CF Step
1.600000000 GHz
Auto
Man
Freq Offset
0 Hz
Scale Type
Log
Lin
Start 10.000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 26.000 GHz
Sweep 1.530 s (30001 pts)
MSG
STATUS

11B_MCH_Graphs	
Pref/11B/MCH	
Puw/11B/MCH	


Keysight Spectrum Analyzer - Swept SA
RL
RF
50 Ω AC
SENSE:INT
ALIGN AUTO
04:49:40 PM Feb 27, 2019
Center Freq 18.000000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 20 dB
Avg Type: Log-Pwr
Avg|Hold: 100/100
TRACE 1 2 3 4 5 6
TYPE M WWWWW
DET P P P P P P
Ref Offset 10.74 dB
10 dB/div
Log
Ref 20.74 dBm
Mkr1 25.391 5 GHz
-35.350 dBm
10.7
0.740
-9.26
-19.3
-29.3
-39.3
-49.3
-59.3
-69.3
DL1 -26.64 dBm
1
Start 10.000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 26.000 GHz
Sweep 1.530 s (30001 pts)
MSG
STATUS
Frequency
Auto Tune
Center Freq
18.000000000 GHz
Start Freq
10.000000000 GHz
Stop Freq
26.000000000 GHz
CF Step
1.600000000 GHz
Auto
Man
Freq Offset
0 Hz
Scale Type
Log
Lin

11B_HCH_Graphs	
Pref/11B/HCH	
Puw/11B/HCH	


Keysight Spectrum Analyzer - Swept SA
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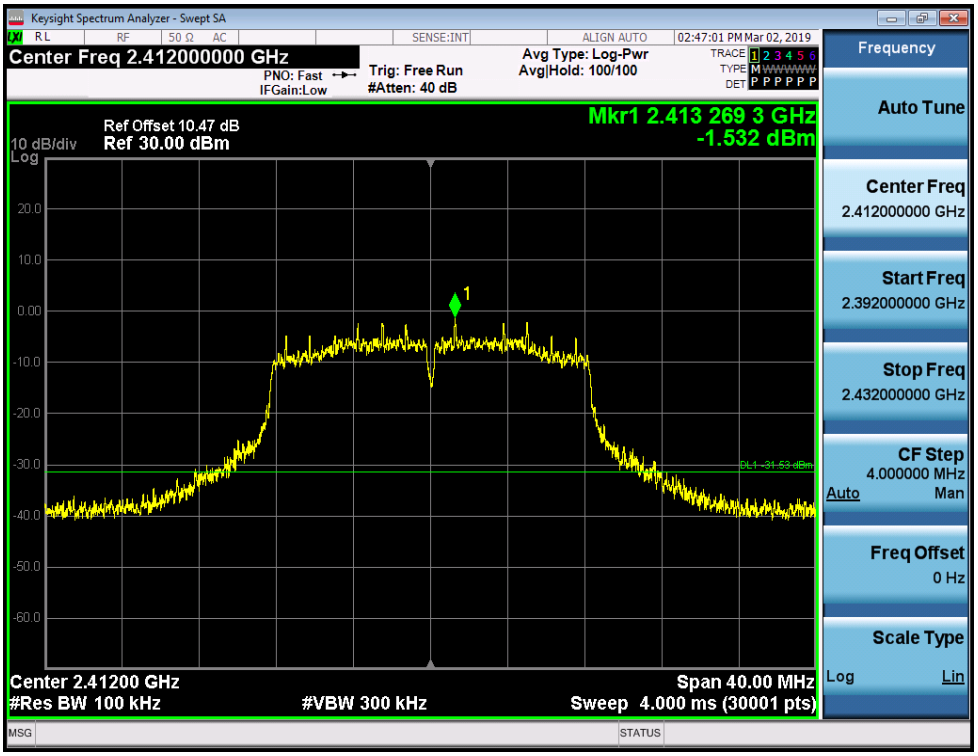
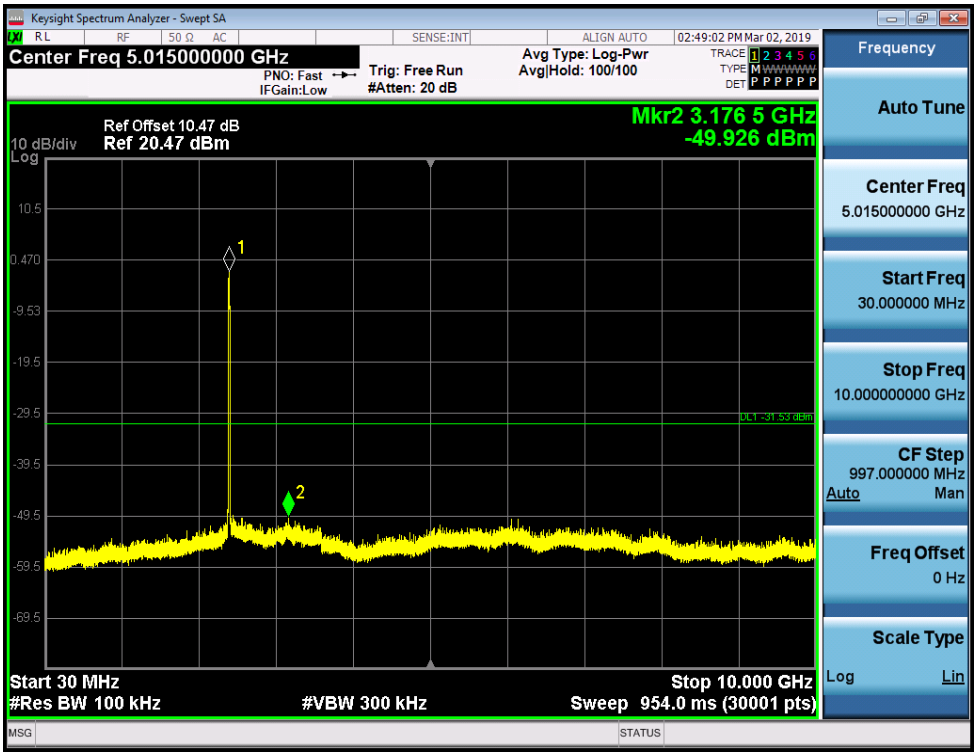
RF
50 Ω AC
SENSE:INT
ALIGN AUTO
05:00:35 PM Feb 27, 2019
Center Freq 18.000000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 20 dB
Avg Type: Log-Pwr
Avg|Hold: 100/100
TRACE 1 2 3 4 5 6
TYPE M
DET P P P P P
Ref Offset 10.74 dB
10 dB/div
Log
Ref 20.74 dBm
Mkr1 24.817 1 GHz
-35.230 dBm
10.7
0.740
-9.26
-19.3
-29.3
-39.3
-49.3
-59.3
-69.3
DL1 -25.69 dBm
1
Start 10.000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 26.000 GHz
Sweep 1.530 s (30001 pts)
MSG
STATUS
Frequency
Auto Tune
Center Freq
18.000000000 GHz
Start Freq
10.000000000 GHz
Stop Freq
26.000000000 GHz
CF Step
1.600000000 GHz
Auto
Man
Freq Offset
0 Hz
Scale Type
Log
Lin

11G_LCH_Graphs	
Pref/11G/LCH	
Puw/11G/LCH	


Keysight Spectrum Analyzer - Swept SA
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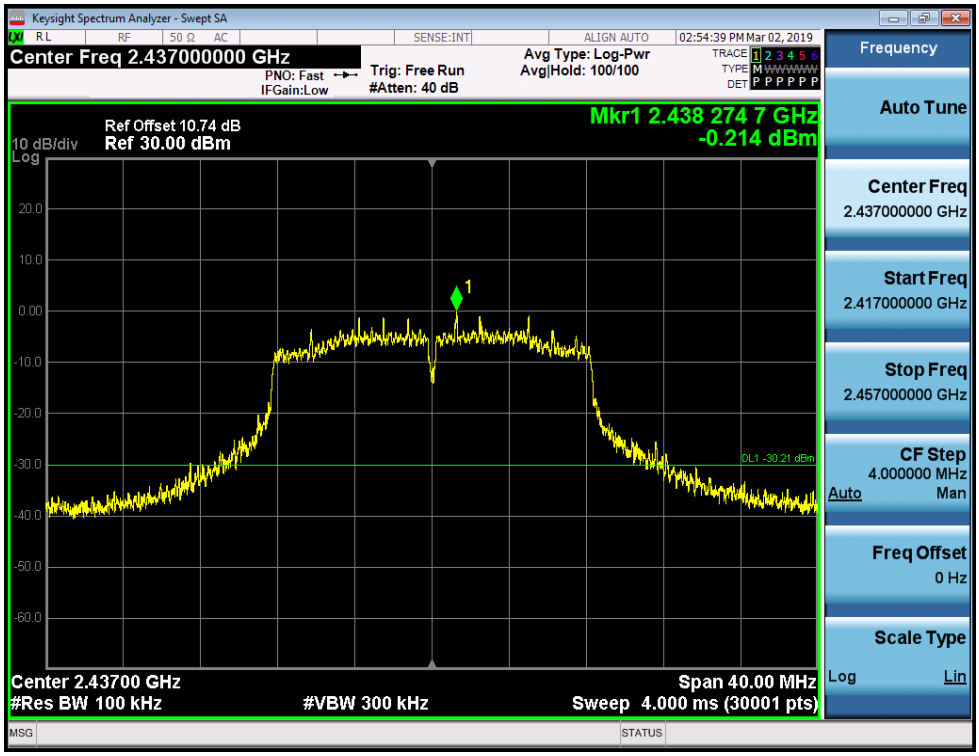
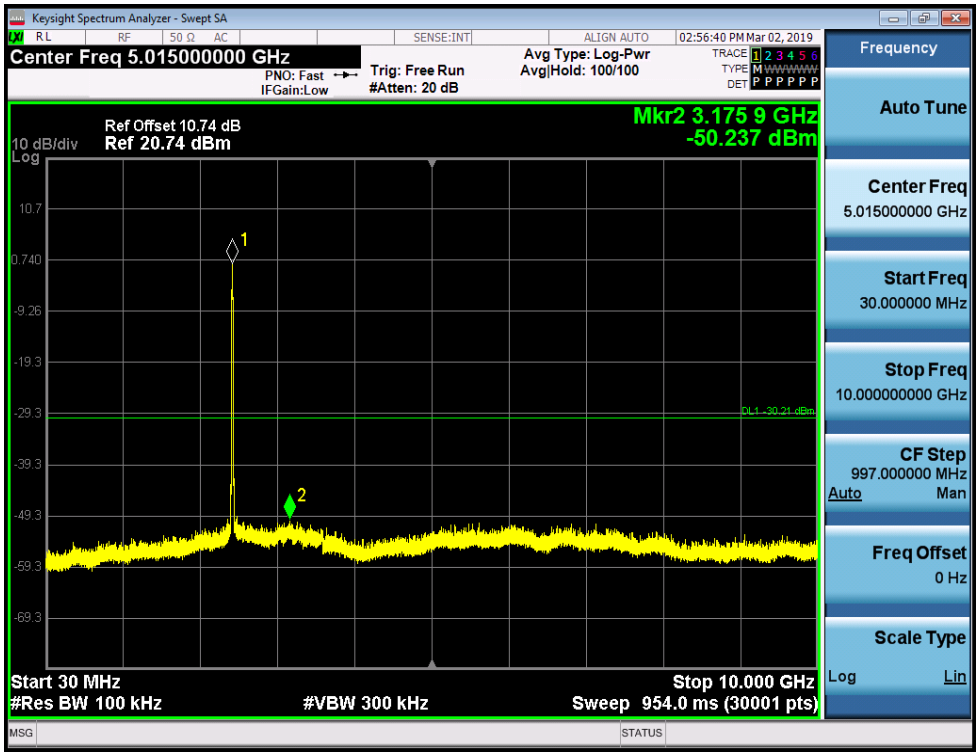
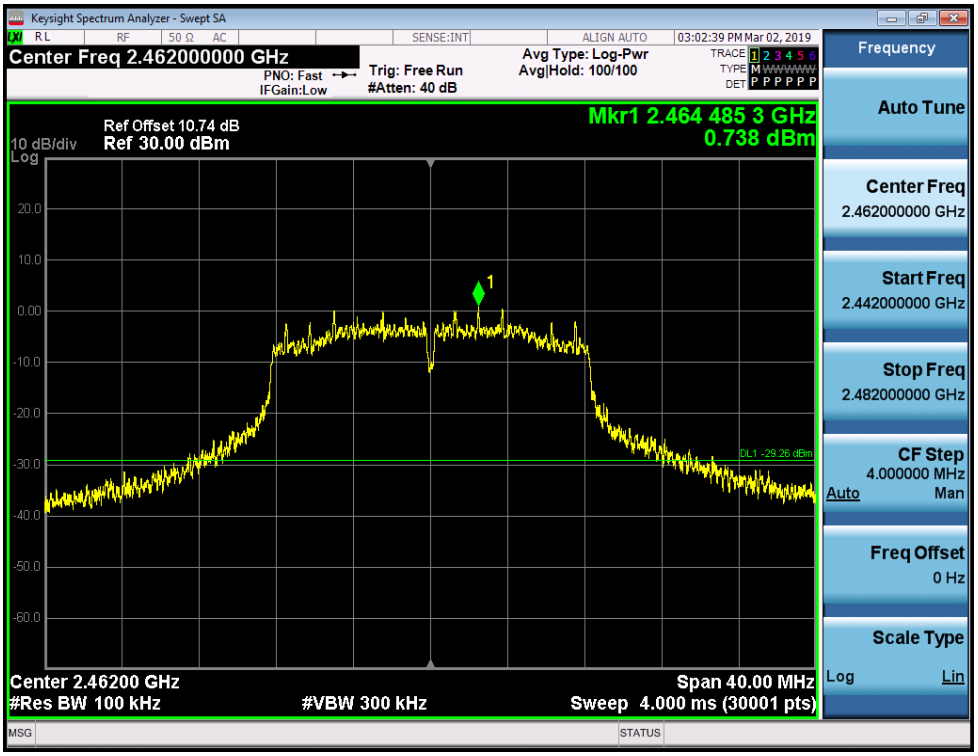
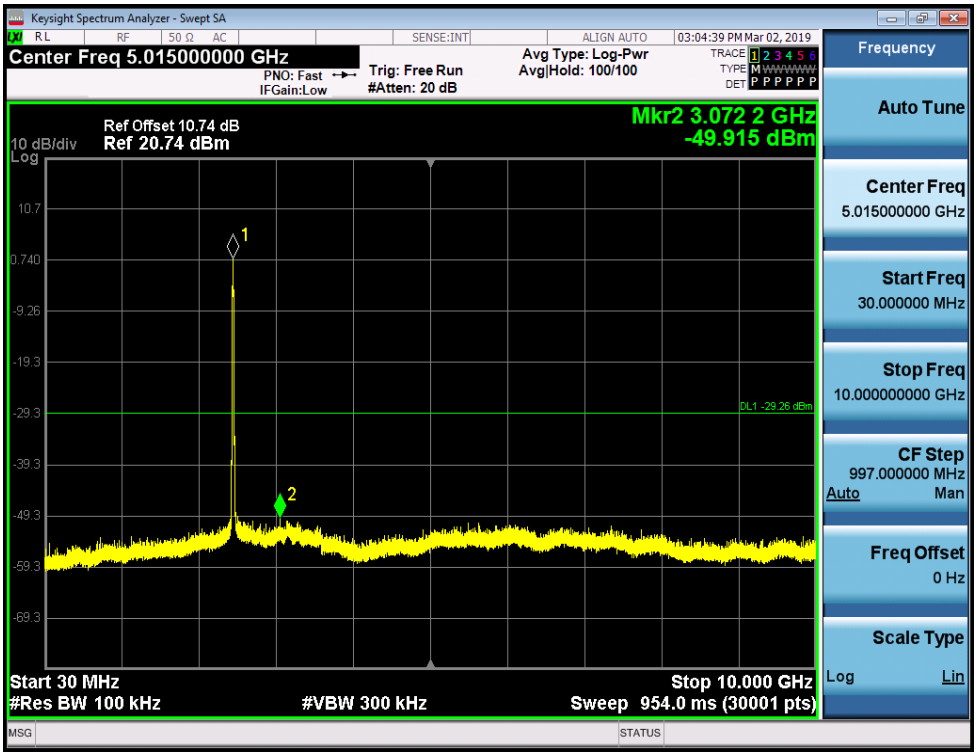
RF
50 Ω AC
SENSE:INT
ALIGN AUTO
02:52:30 PM Mar 02, 2019
Center Freq 18.000000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 20 dB
Avg Type: Log-Pwr
Avg|Hold: 100/100
TRACE 1 2 3 4 5 6
TYPE M
DET P P P P P P
Ref Offset 10.47 dB
10 dB/div
Log
Ref 20.47 dBm
Mkr1 24.735 5 GHz
-36.045 dBm
10.5
0.470
-9.53
-19.5
-29.5
-39.5
-49.5
-59.5
-69.5
1
-53 dBm
Start 10.000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 26.000 GHz
Sweep 1.530 s (30001 pts)
Frequency
Auto Tune
Center Freq
18.000000000 GHz
Start Freq
10.000000000 GHz
Stop Freq
26.000000000 GHz
CF Step
1.600000000 GHz
Auto
Man
Freq Offset
0 Hz
Scale Type
Log
Lin
MSG
STATUS

11G_MCH_Graphs	
Pref/11G/MCH	
Puw/11G/MCH	


Keysight Spectrum Analyzer - Swept SA
RL
RF
50 Ω AC
SENSE:INT
ALIGN AUTO
03:00:08 PM Mar 02, 2019
Center Freq 18.000000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 20 dB
Avg Type: Log-Pwr
Avg|Hold: 100/100
TRACE 1 2 3 4 5 6
TYPE M WWWWW
DET P P P P P
Ref Offset 10.74 dB
10 dB/div
Log
Ref 20.74 dBm
Mkr1 24.828 3 GHz
-36.167 dBm
10.7
0.740
-9.26
-19.3
-29.3
-39.3
-49.3
-59.3
-69.3
1
Start 10.000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 26.000 GHz
Sweep 1.530 s (30001 pts)
MSG
STATUS
Frequency
Auto Tune
Center Freq
18.000000000 GHz
Start Freq
10.000000000 GHz
Stop Freq
26.000000000 GHz
CF Step
1.600000000 GHz
Auto
Man
Freq Offset
0 Hz
Scale Type
Log
Lin

11G_HCH_Graphs	
Pref/11G/HCH	
Puw/11G/HCH	


Keysight Spectrum Analyzer - Swept SA
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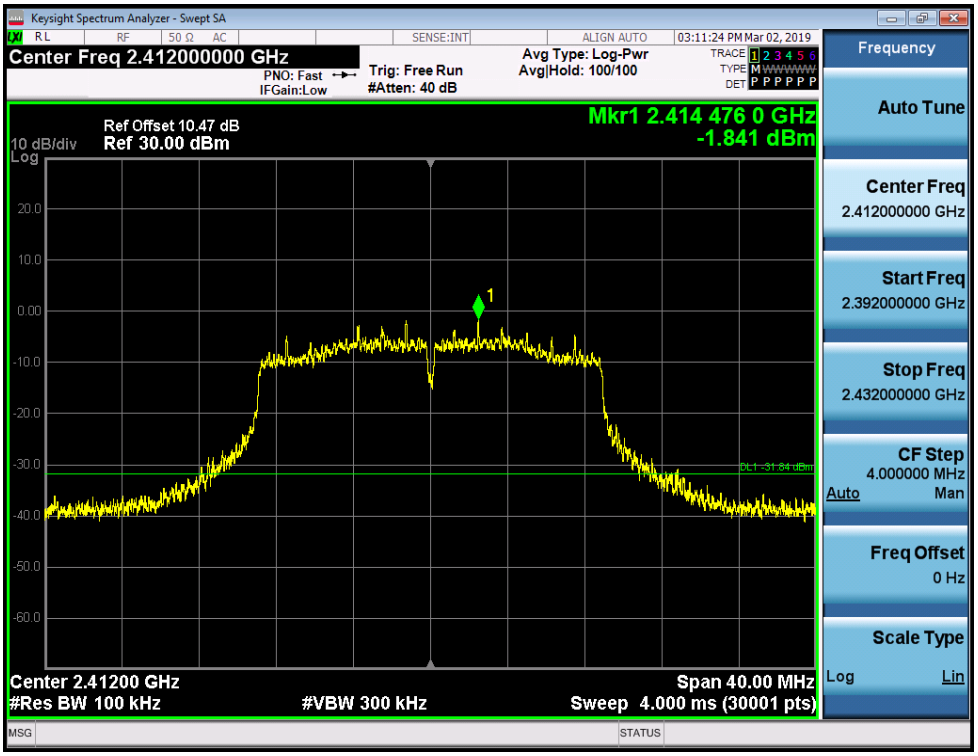
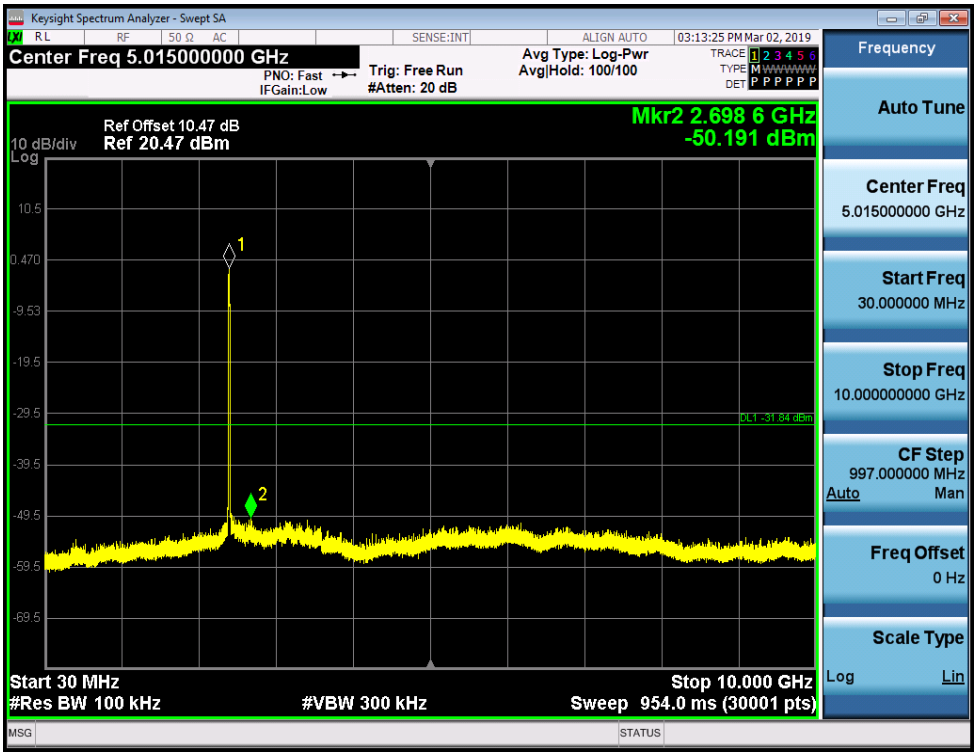
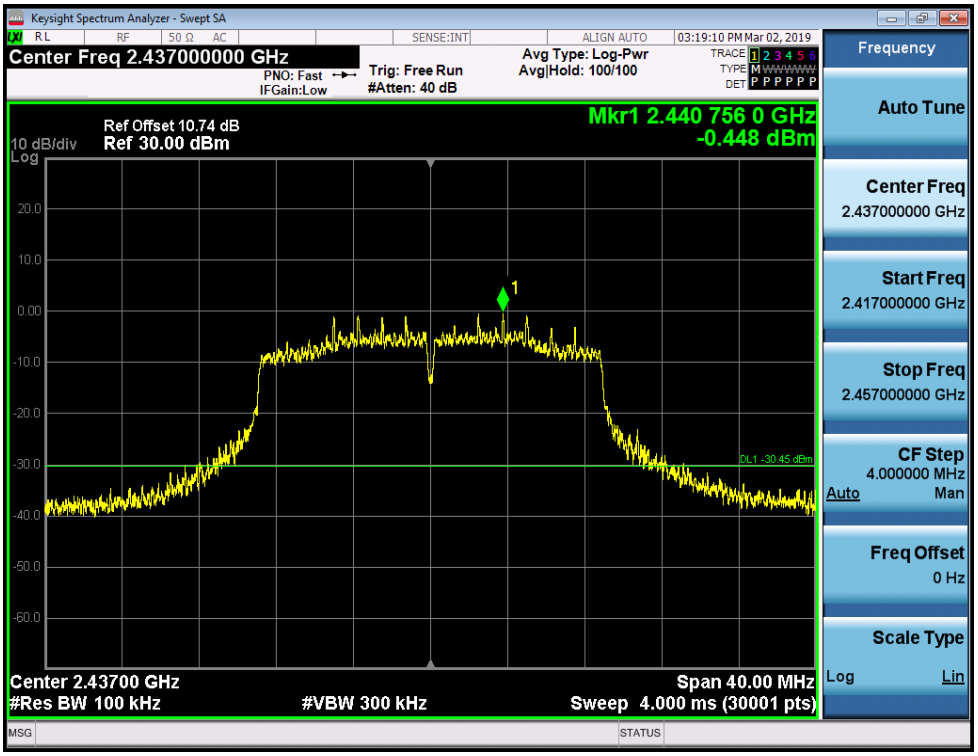
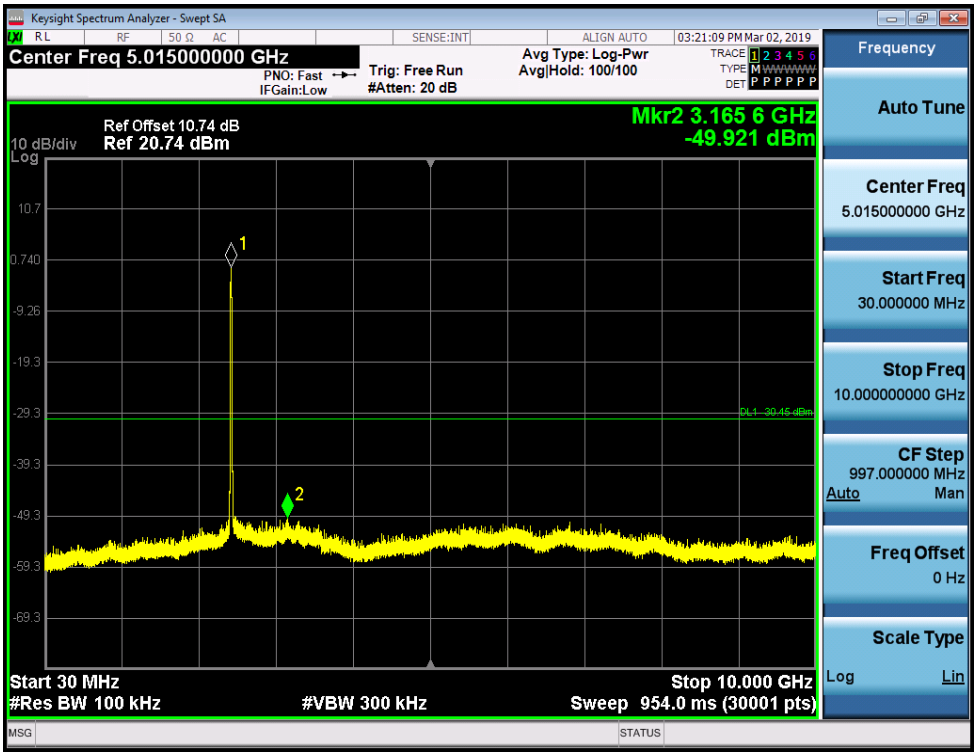
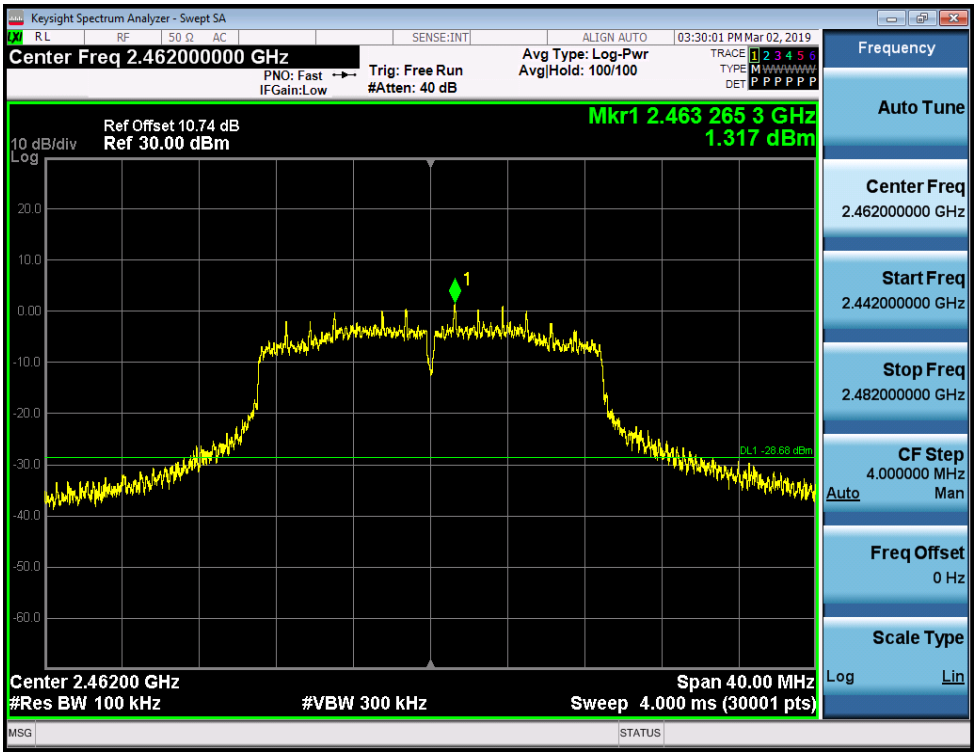
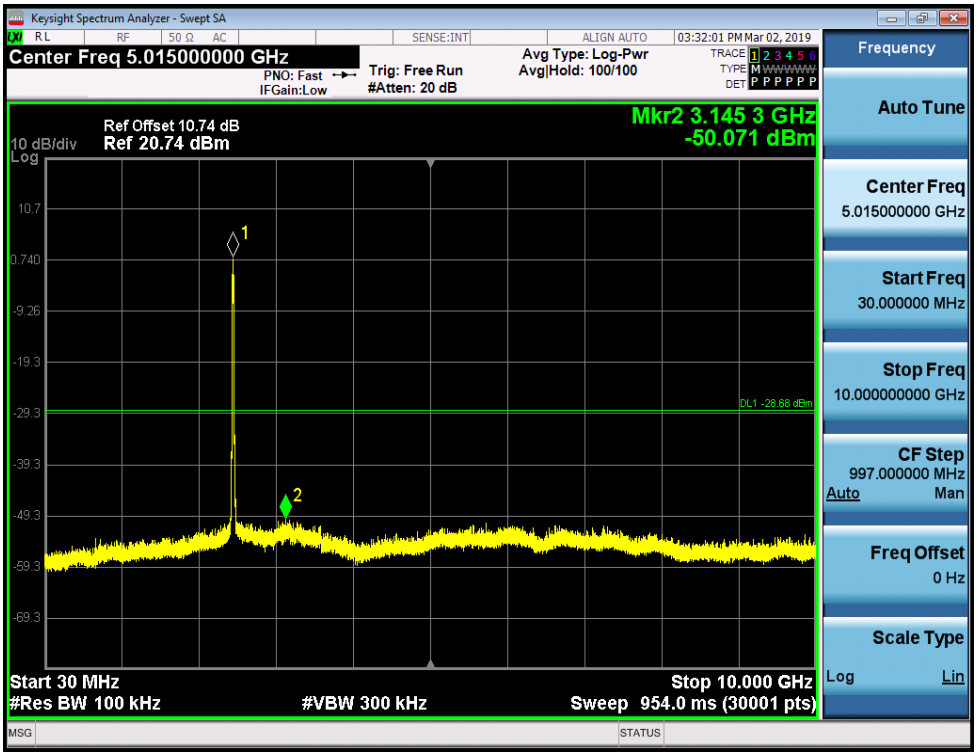
RF
50 Ω AC
SENSE:INT
ALIGN AUTO
03:08:08 PM Mar 02, 2019
Center Freq 18.000000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 20 dB
Avg Type: Log-Pwr
Avg|Hold: 100/100
TRACE 1 2 3 4 5 6
TYPE M
DET P P P P P
Ref Offset 10.74 dB
10 dB/div
Log
Ref 20.74 dBm
Mkr1 25.371 2 GHz
-35.632 dBm
10.7
0.740
-9.26
-19.3
-29.3
-39.3
-49.3
-59.3
-69.3
DL1 -29.26 dBm
1
Start 10.000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 26.000 GHz
Sweep 1.530 s (30001 pts)
MSG
STATUS
Frequency
Auto Tune
Center Freq
18.000000000 GHz
Start Freq
10.000000000 GHz
Stop Freq
26.000000000 GHz
CF Step
1.600000000 GHz
Auto
Man
Freq Offset
0 Hz
Scale Type
Log
Lin

11N20_LCH_Graphs	
Pref/11N20/LCH	
Puw/11N20/LCH	

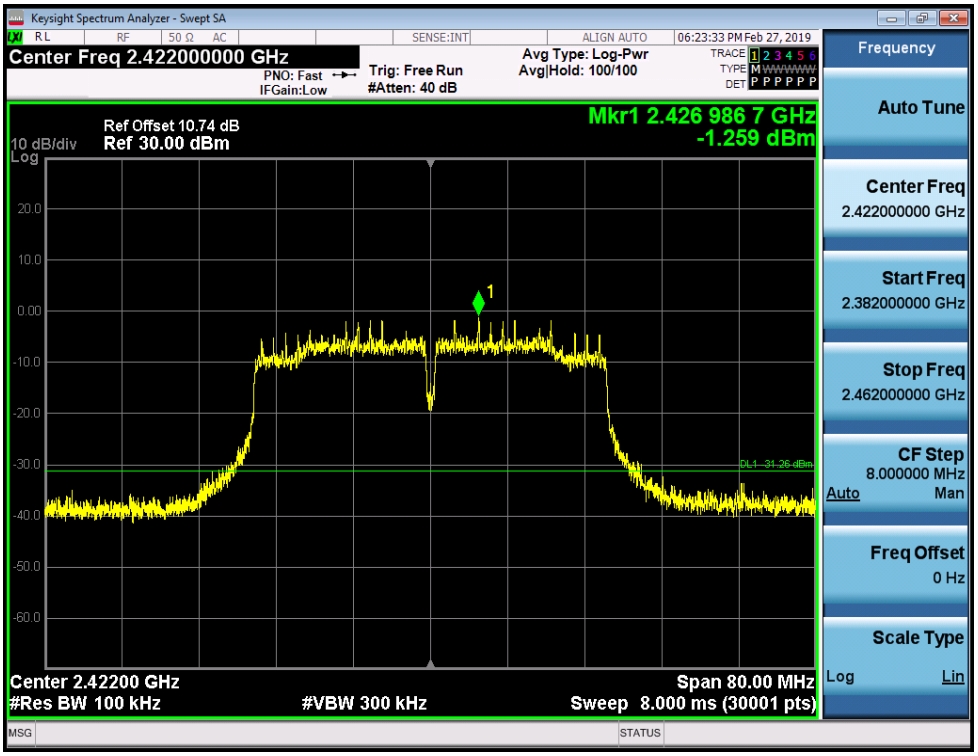
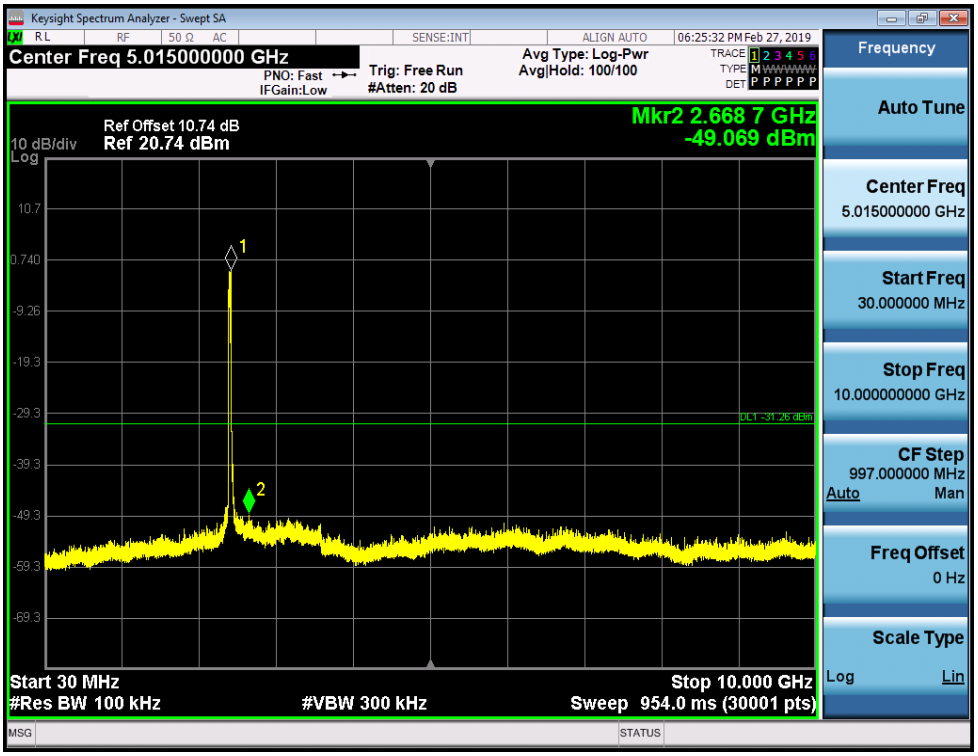

Keysight Spectrum Analyzer - Swept SA
RL
RF
50 Ω AC
SENSE:INT
ALIGN AUTO
03:16:53 PM Mar 02, 2019
Center Freq 18.000000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 20 dB
Avg Type: Log-Pwr
Avg|Hold: 100/100
TRACE 1 2 3 4 5 6
TYPE M WWWWW
DET P P P P P P
Ref Offset 10.47 dB
10 dB/div
Log
Ref 20.47 dBm
Mkr1 25.397 9 GHz
-35.999 dBm
10.5
0.470
-9.53
-19.5
-29.5
-39.5
-49.5
-59.5
-69.5
DL1 -31.84
Start 10.000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 26.000 GHz
Sweep 1.530 s (30001 pts)
Frequency
Auto Tune
Center Freq
18.000000000 GHz
Start Freq
10.000000000 GHz
Stop Freq
26.000000000 GHz
CF Step
1.600000000 GHz
Auto
Man
Freq Offset
0 Hz
Scale Type
Log
Lin
MSG
STATUS

11N20_MCH_Graphs	
Pref/11N20/MCH	
Puw/11N20/MCH	

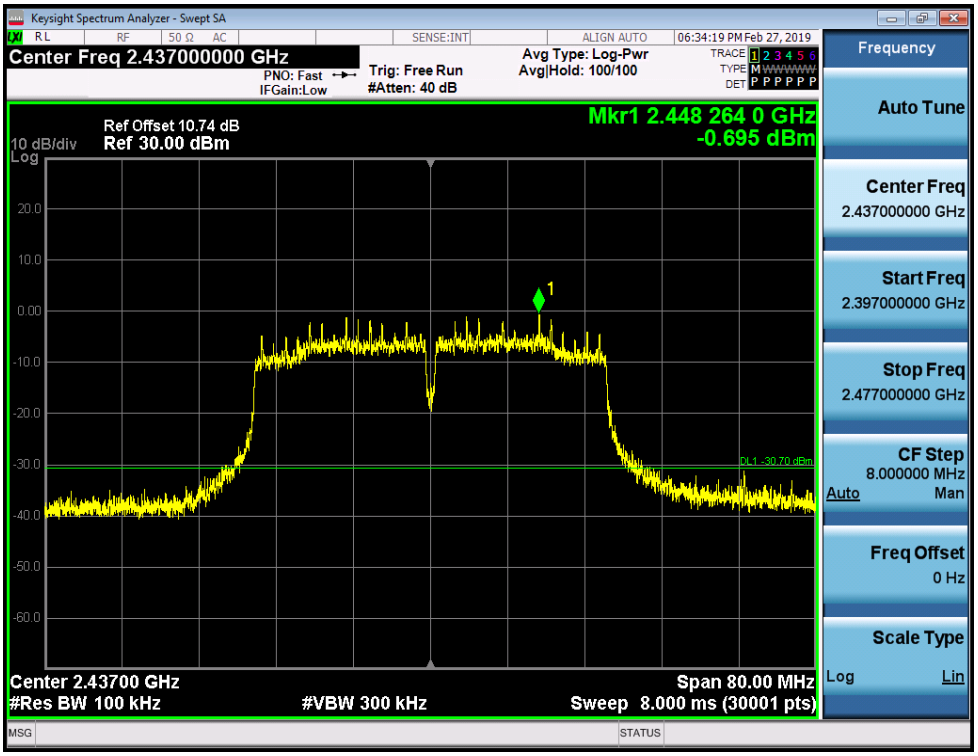
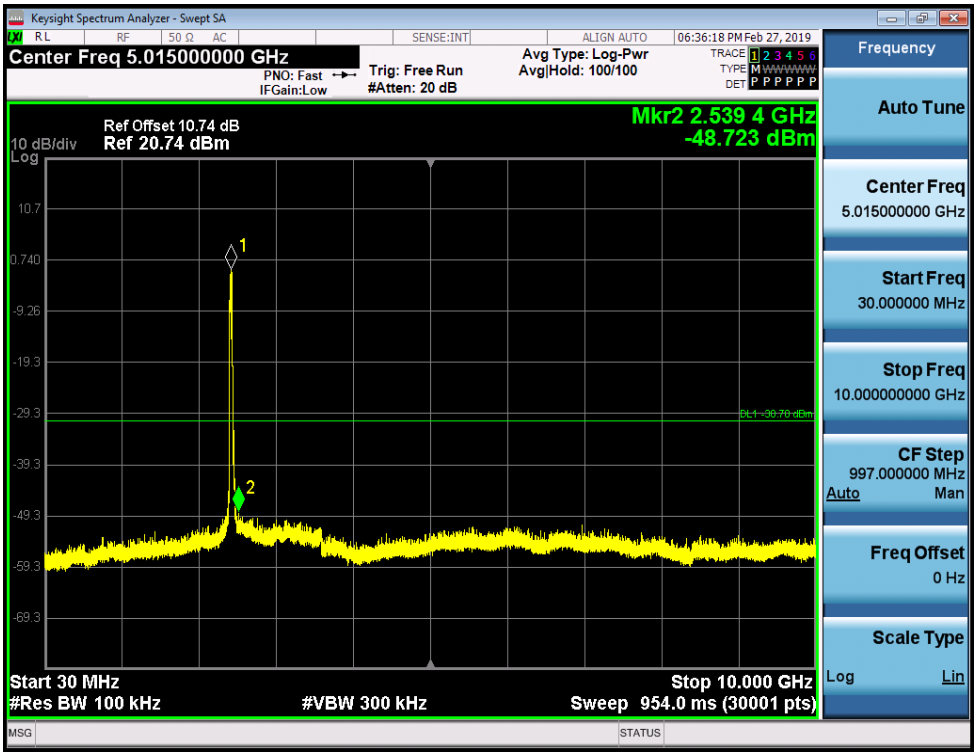

Keysight Spectrum Analyzer - Swept SA
RL
RF
50 Ω
AC
SENSE:INT
ALIGN AUTO
03:24:37 PM Mar 02, 2019
Center Freq 18.000000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 20 dB
Avg Type: Log-Pwr
Avg|Hold: 100/100
TRACE 1 2 3 4 5 6
TYPE M
DET P P P P P P
Ref Offset 10.74 dB
10 dB/div
Log
Ref 20.74 dBm
Mkr1 24.760 5 GHz
-35.928 dBm
10.7
0.740
-9.26
-19.3
-29.3
-39.3
-49.3
-59.3
-69.3
Start 10.000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 26.000 GHz
Sweep 1.530 s (30001 pts)
MSG
STATUS
Frequency
Auto Tune
Center Freq
18.000000000 GHz
Start Freq
10.000000000 GHz
Stop Freq
26.000000000 GHz
CF Step
1.600000000 GHz
Auto
Man
Freq Offset
0 Hz
Scale Type
Log
Lin

11N20_HCH_Graphs	
Pref/11N20/HCH	
Puw/11N20/HCH	

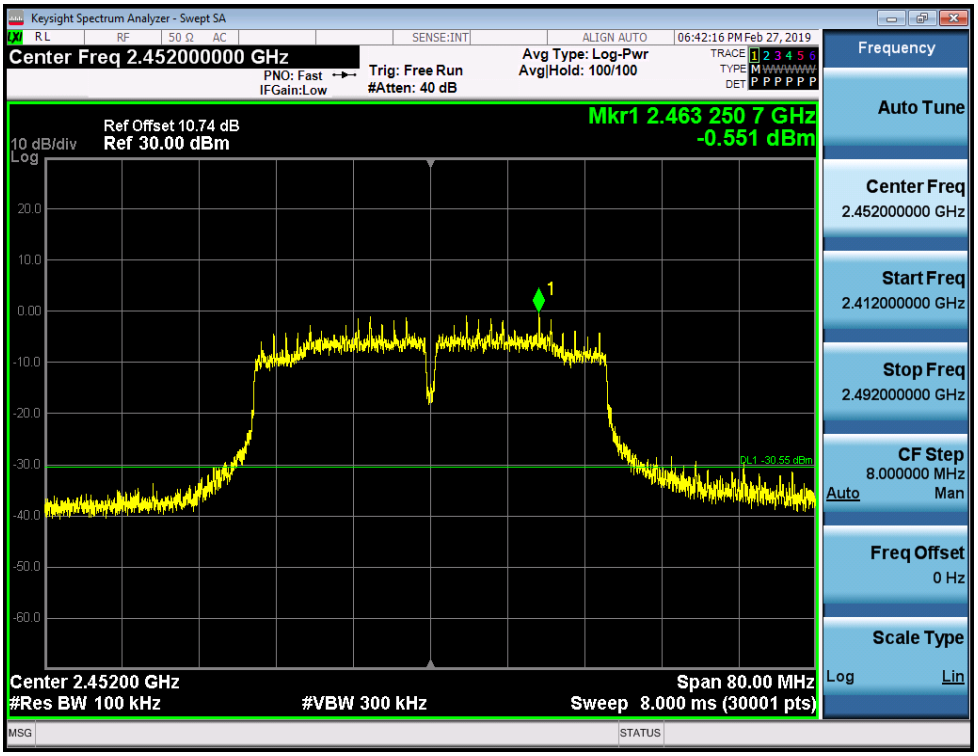
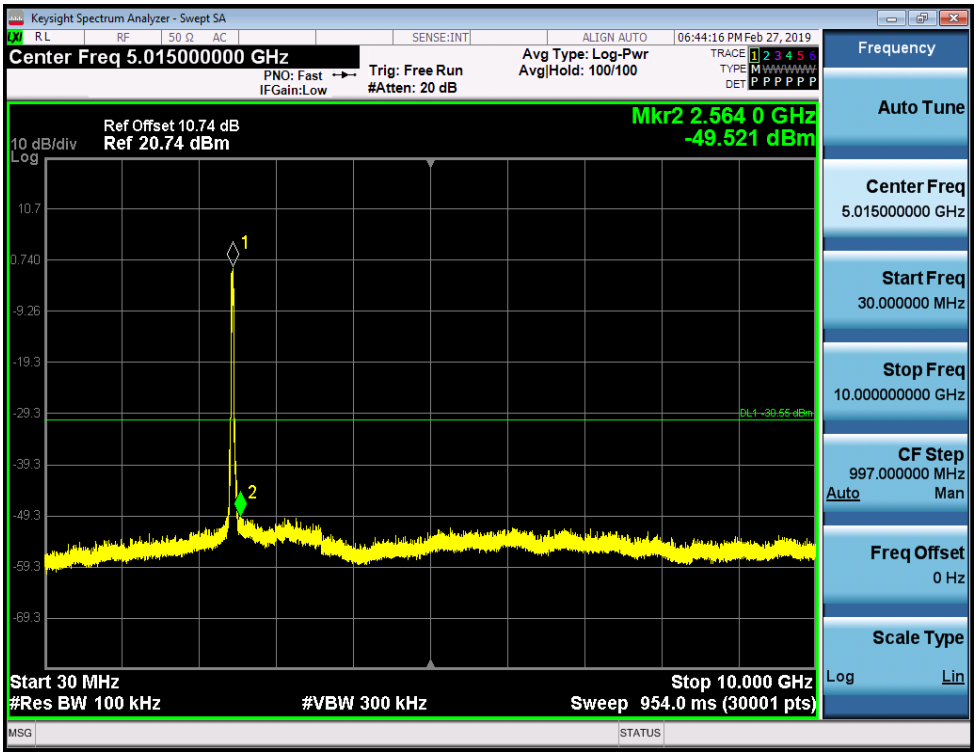

Keysight Spectrum Analyzer - Swept SA
RL
RF
50 Ω AC
SENSE:INT
ALIGN AUTO
03:35:29 PM Mar 02, 2019
Center Freq 18.000000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 20 dB
Avg Type: Log-Pwr
Avg|Hold: 100/100
TRACE 1 2 3 4 5 6
TYPE M WWWWW
DET P P P P P P
Ref Offset 10.74 dB
10 dB/div
Log
Ref 20.74 dBm
Mkr1 25.371 2 GHz
-35.762 dBm
10.7
0.740
-9.26
-19.3
-29.3
-39.3
-49.3
-59.3
-69.3
DL1 -28.68 dBm
1
Start 10.000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 26.000 GHz
Sweep 1.530 s (30001 pts)
MSG
STATUS
Frequency
Auto Tune
Center Freq
18.000000000 GHz
Start Freq
10.000000000 GHz
Stop Freq
26.000000000 GHz
CF Step
1.600000000 GHz
Auto
Man
Freq Offset
0 Hz
Scale Type
Log
Lin

11N40_LCH_Graphs	
Pref/11N40/LCH	
Puw/11N40/LCH	


Keysight Spectrum Analyzer - Swept SA
RL
RF
50 Ω
AC
SENSE:INT
ALIGN AUTO
06:29:00 PM Feb 27, 2019
Center Freq 18.000000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 20 dB
Avg Type: Log-Pwr
Avg|Hold: 100/100
TRACE 1 2 3 4 5 6
TYPE M
DET P P P P P
Frequency
Auto Tune
Mkr1 25.411 7 GHz
-35.383 dBm
Ref Offset 10.74 dB
10 dB/div
Log
Ref 20.74 dBm
10.7
0.740
-9.26
-19.3
-29.3
-39.3
-49.3
-59.3
-69.3
Center Freq
18.000000000 GHz
Start Freq
10.000000000 GHz
Stop Freq
26.000000000 GHz
CF Step
1.600000000 GHz
Auto
Man
Freq Offset
0 Hz
Scale Type
Log
Lin
Start 10.000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 26.000 GHz
Sweep 1.530 s (30001 pts)
MSG
STATUS

11N40_MCH_Graphs	
Pref/11N40/MCH	
Puw/11N40/MCH	


Keysight Spectrum Analyzer - Swept SA
RL
RF
50 Ω AC
SENSE:INT
ALIGN AUTO
06:39:47 PM Feb 27, 2019
Center Freq 18.000000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 20 dB
Avg Type: Log-Pwr
Avg|Hold: 100/100
TRACE 1 2 3 4 5 6
TYPE M
DET P P P P P P
Ref Offset 10.74 dB
10 dB/div
Log
Ref 20.74 dBm
Mkr1 25.326 9 GHz
-35.611 dBm
10.7
0.740
-9.26
-19.3
-29.3
-39.3
-49.3
-59.3
-69.3
Start 10.000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 26.000 GHz
Sweep 1.530 s (30001 pts)
Frequency
Auto Tune
Center Freq
18.000000000 GHz
Start Freq
10.000000000 GHz
Stop Freq
26.000000000 GHz
CF Step
1.600000000 GHz
Auto
Man
Freq Offset
0 Hz
Scale Type
Log
Lin
MSG
STATUS

11N40_HCH_Graphs	
Pref/11N40/HCH	
Puw/11N40/HCH	


Keysight Spectrum Analyzer - Swept SA
RL
RF
50 Ω
AC
SENSE:INT
ALIGN AUTO
06:47:45 PM Feb 27, 2019
Center Freq 18.000000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 20 dB
Avg Type: Log-Pwr
Avg|Hold: 100/100
TRACE 1 2 3 4 5 6
TYPE M
DET P P P P P P
Ref Offset 10.74 dB
10 dB/div
Log
Ref 20.74 dBm
Mkr1 24.821 3 GHz
-35.341 dBm
10.7
0.740
-9.26
-19.3
-29.3
-39.3
-49.3
-59.3
-69.3
D1
1
-55 dBm
Start 10.000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 26.000 GHz
Sweep 1.530 s (30001 pts)
MSG
STATUS
Frequency
Auto Tune
Center Freq
18.000000000 GHz
Start Freq
10.000000000 GHz
Stop Freq
26.000000000 GHz
CF Step
1.600000000 GHz
Auto
Man
Freq Offset
0 Hz
Scale Type
Log
Lin

4.5 Radiated Band Edges and Spurious Emission Measurement

4.5.1 Limit of Radiated Band Edges and Spurious Emission

FCC §15.247 (d)

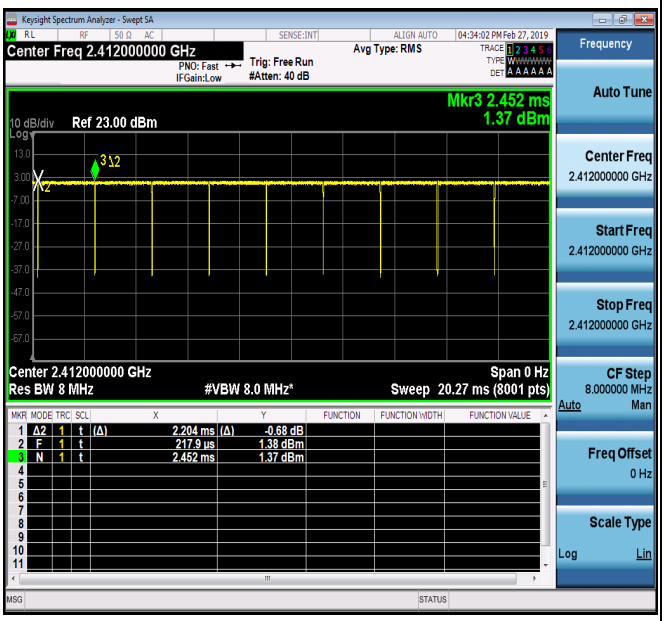
In any 100 kHz bandwidth outside the intentional radiator frequency band, all harmonics/spurious must be at least 20 dB below the highest emission level within the authorized band. In addition, radiated emissions which fall in the restricted bands must also comply with the FCC section 15.209 limits as below.

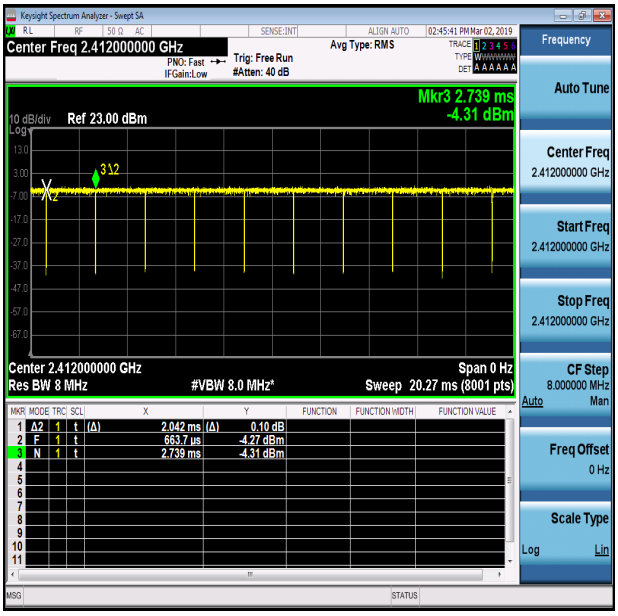
Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30.0	30	30
30 – 88	100	3
88 – 216	150	3
216 - 960	200	3
Above 960	500	3

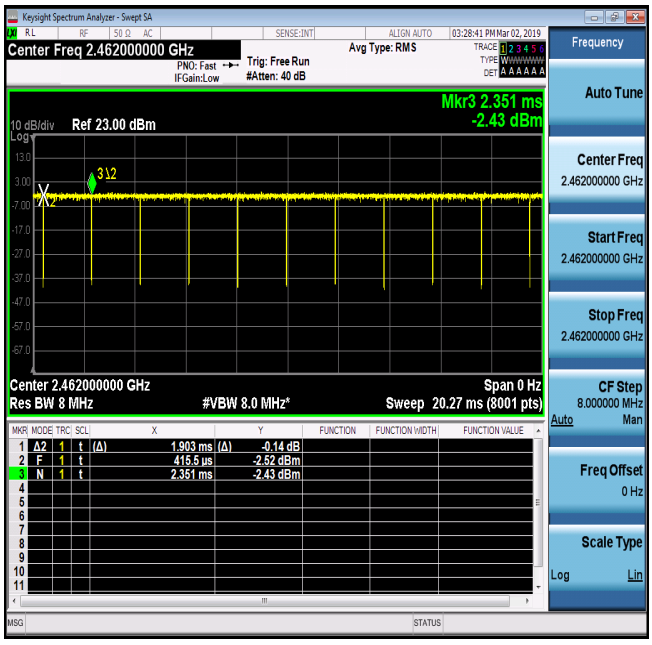
4.5.2 Test Procedures

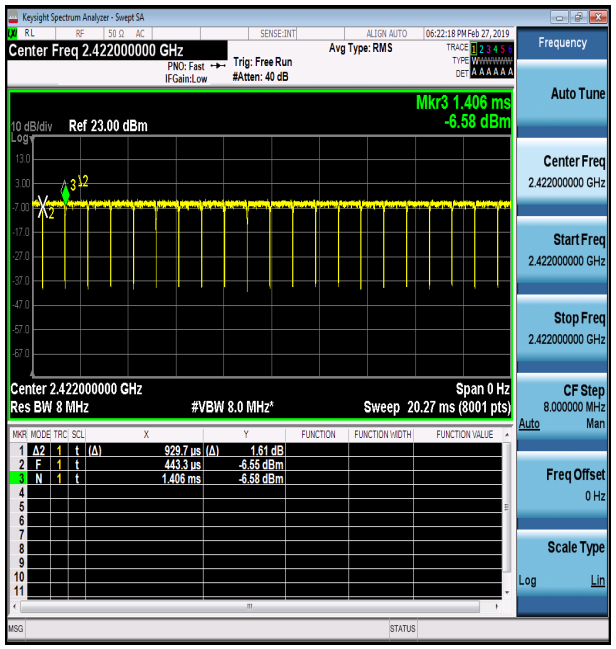
1. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
2. The measurement distance is 3 meter.
3. For each suspected emission, the EUT was arranged to its worst case and then tune the Antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level to comply with the guidelines.
4. Set to the maximum power setting and enable the EUT transmit continuously.
5. Use the following spectrum analyzer settings:
   (1)Span shall wide enough to fully capture the emission being measured;
   (2)Set RBW=120 kHz for f < 1 GHz, RBW=1MHz for f>1GHz ; VBW □ RBW; Sweep = auto; Detector function = peak; Trace = max hold for peak
   (3).For average measurement:
   VBW = 10 Hz, when duty cycle is no less than 98 percent.
   VBW ≥ 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

Band	Duty Cycle(%)	T(ms)	1/T(kHz)	VBW Setting
802.11b	98.7	2.204	0.45	10Hz
802.11g	98.5	2.042	0.49	10Hz
2.4GHz 802.11n HT20	98.3	1.903	0.53	10Hz
2.4GHz 802.11n HT40	96.6	0.9297	1.07	3kHz









Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level

4.5.3 Test Results of Radiated Spurious Emissions (9 kHz ~ 30 MHz)

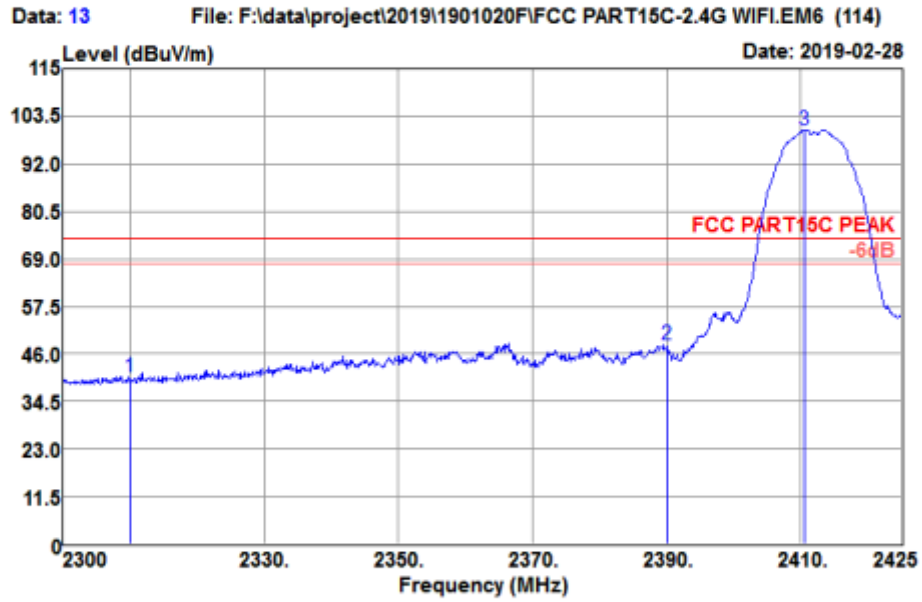
The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not reported.

4.5.4 Test Result of Radiated Spurious at Band Edges

11B Low channel:2412MHz

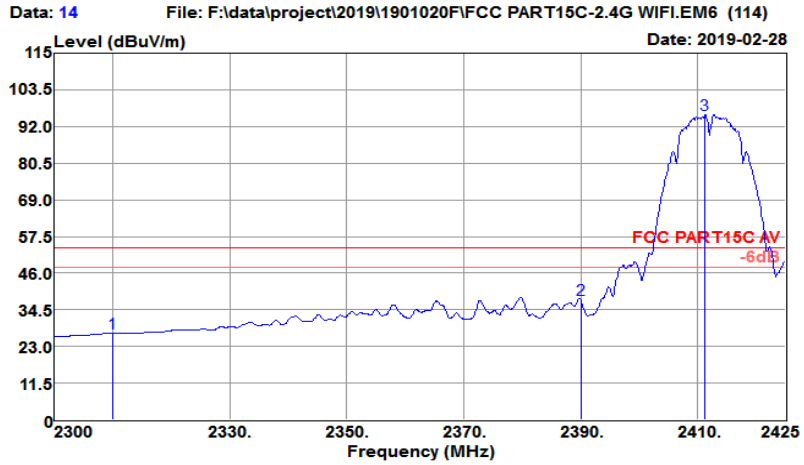
Horizontal::

Test Site	: 3m Chamber	Temp/Humi	: 21℃/63%
Tested by	: Damon	Power rating	: AC120V/60Hz
EUT	: all in one	Pol/Phase	: HORIZONTAL
Model No.	: GK-MWZE501		
Test Mode	: 802.11b CH01(2412MHz)		



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV	Limit level dBuV/m	Over limit dB	Remark
2310.000	45.87	26.91	3.56	35.87	40.47	74.00	-33.53	Peak
2390.000	53.44	27.11	3.64	36.08	48.11	74.00	-25.89	Peak
2410.625	105.56	27.17	3.65	36.13	100.25	74.00	26.25	Peak

Test Site	: 3m Chamber	Temp/Humi	: 21℃/63%
Tested by	: Damon	Power rating	: AC120V/60Hz
EUT	: all in one	Pol/Phase	: HORIZONTAL
Model No.	: GK-MWZE501		
Test Mode	: 802.11b CH01(2412MHz)		

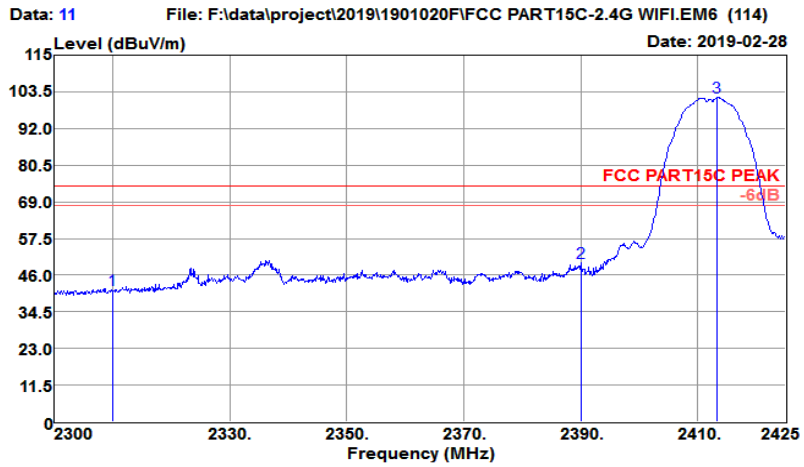


Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV	Limit level dBuV/m	Over limit dB	Remark
2310.000	32.47	26.91	3.56	35.87	27.07	54.00	-26.93	Average
2390.000	43.04	27.11	3.64	36.08	37.71	54.00	-16.29	Average
2411.250	100.97	27.17	3.65	36.14	95.65	54.00	41.65	Average

11B Low channel:2412MHz

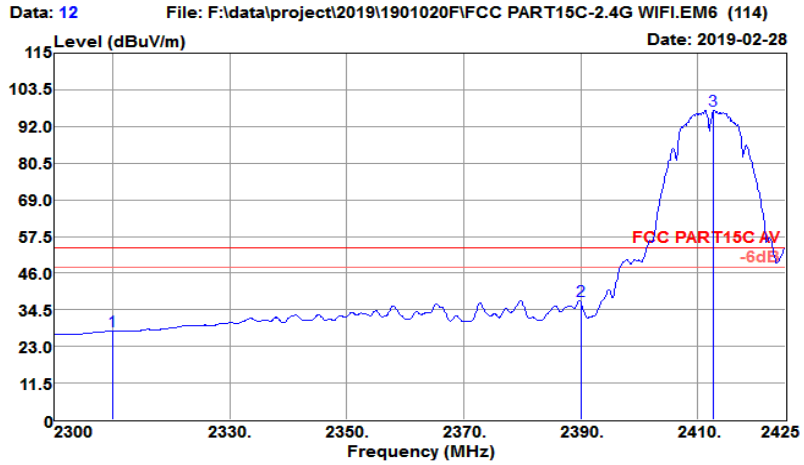
Vertical:

Test Site	: 3m Chamber	Temp/Humi	: 21℃/63%
Tested by	: Damon	Power rating	: AC120V/60Hz
EUT	: all in one	Pol/Phase	: VERTICAL
Model No.	: GK-MWZE501		
Test Mode	: 802.11b CH01(2412MHz)		



Freq	Reading level	Antenna factor	Cable loss	Preamp factor	level	Limit level	Over limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV	dBuV/m	dB	
2310.000	46.96	26.91	3.56	35.87	41.56	74.00	-32.44	Peak
2390.000	55.16	27.11	3.64	36.08	49.83	74.00	-24.17	Peak
2413.375	107.07	27.17	3.65	36.14	101.75	74.00	27.75	Peak

Test Site	: 3m Chamber	Temp/Humi	: 21℃/63%
Tested by	: Damon	Power rating	: AC120V/60Hz
EUT	: all in one	Pol/Phase	: VERTICAL
Model No.	: GK-MWZE501		
Test Mode	: 802.11b CH01(2412MHz)		

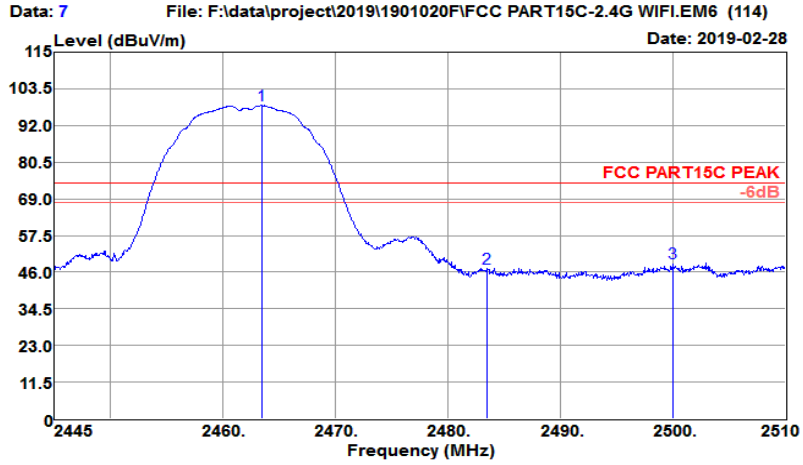


Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV	Limit level dBuV/m	Over limit dB	Remark
2310.000	33.23	26.91	3.56	35.87	27.83	54.00	-26.17	Average
2390.000	42.67	27.11	3.64	36.08	37.34	54.00	-16.66	Average
2412.750	102.41	27.17	3.65	36.14	97.09	54.00	43.09	Average

11B High channel:2462MHz

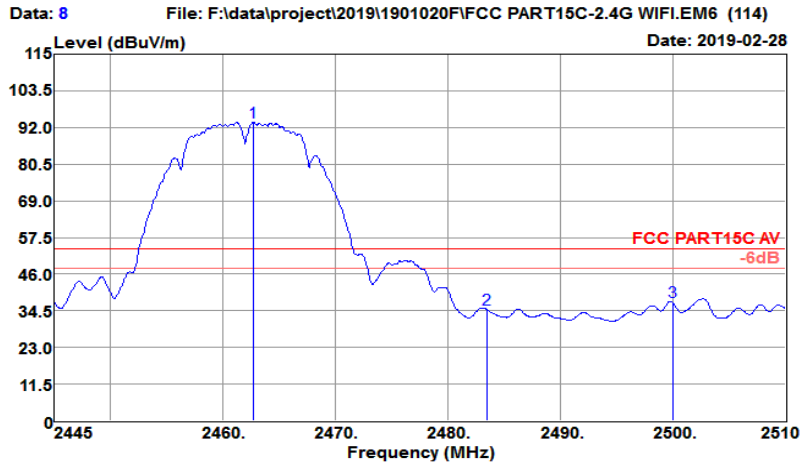
Horizontal:

Test Site	: 3m Chamber	Temp/Humi	: 21℃/63%
Tested by	: Damon	Power rating	: AC120V/60Hz
EUT	: all in one	Pol/Phase	: HORIZONTAL
Model No.	: GK-MWZE501		
Test Mode	: 802.11b CH11(2462MHz)		



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV	Limit level dBuV/m	Over limit dB	Remark
2463.460	103.55	27.30	3.67	36.27	98.25	74.00	24.25	Peak
2483.500	52.43	27.36	3.68	36.33	47.14	74.00	-26.86	Peak
2500.000	54.00	27.40	3.68	36.37	48.71	74.00	-25.29	Peak

Test Site	: 3m Chamber	Temp/Humi	: 21℃/63%
Tested by	: Damon	Power rating	: AC120V/60Hz
EUT	: all in one	Pol/Phase	: HORIZONTAL
Model No.	: GK-MWZE501		
Test Mode	: 802.11b CH11(2462MHz)		

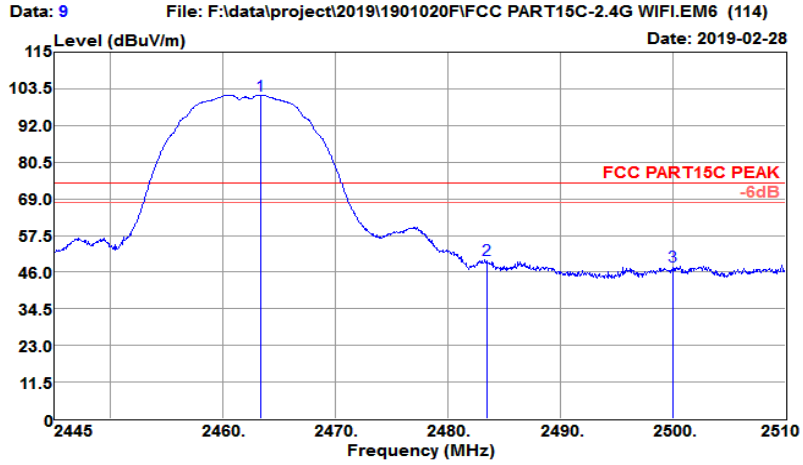


Freq	Reading level	Antenna factor	Cable loss	Preamp factor	level	Limit level	Over limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV	dBuV/m	dB	
2462.745	98.95	27.30	3.67	36.27	93.65	54.00	39.65	Average
2483.500	40.16	27.36	3.68	36.33	34.87	54.00	-19.13	Average
2500.000	42.78	27.40	3.68	36.37	37.49	54.00	-16.51	Average

11B High Low channel:2462MHz

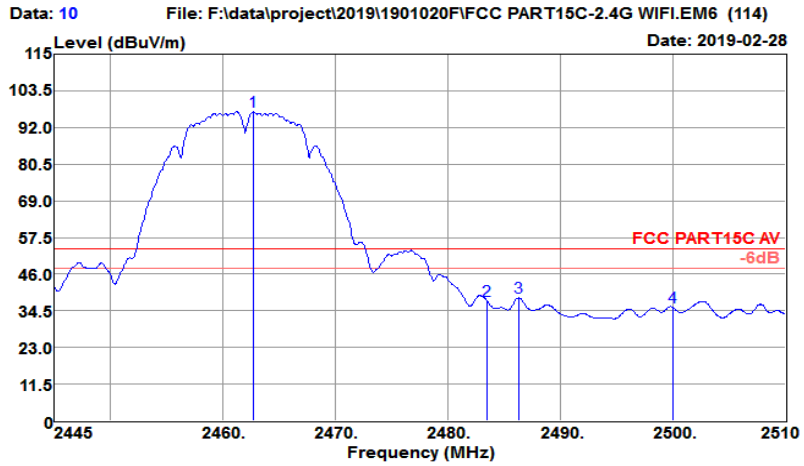
Vertical:

Test Site	: 3m Chamber	Temp/Humi	: 21℃/63%
Tested by	: Damon	Power rating	: AC120V/60Hz
EUT	: all in one	Pol/Phase	: VERTICAL
Model No.	: GK-MWZE501		
Test Mode	: 802.11b CH11(2462MHz)		



Freq	Reading level	Antenna factor	Cable loss	Preamp factor	level	Limit level	Over limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV	dBuV/m	dB	
2463.395	106.90	27.30	3.67	36.27	101.60	74.00	27.60	Peak
2483.500	55.06	27.36	3.68	36.33	49.77	74.00	-24.23	Peak
2500.000	53.19	27.40	3.68	36.37	47.90	74.00	-26.10	Peak

Test Site	: 3m Chamber	Temp/Humi	: 21℃/63%
Tested by	: Damon	Power rating	: AC120V/60Hz
EUT	: all in one	Pol/Phase	: VERTICAL
Model No.	: GK-MWZE501		
Test Mode	: 802.11b CH11(2462MHz)		

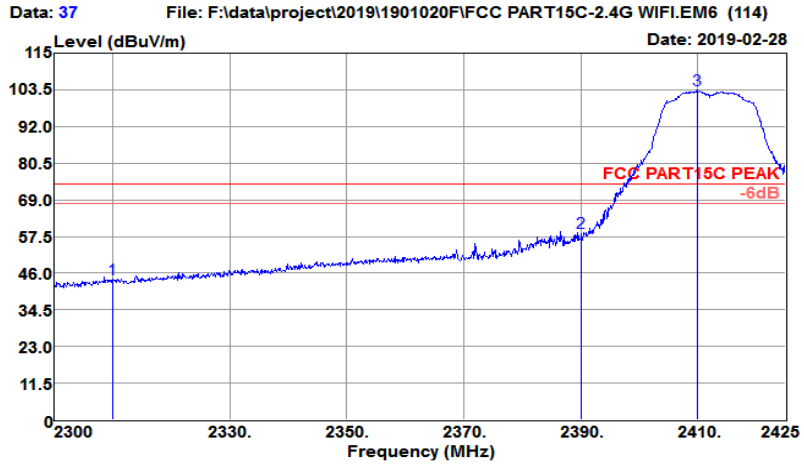


Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV	Limit level dBuV/m	Over limit dB	Remark
2462.745	102.25	27.30	3.67	36.27	96.95	54.00	42.95	Average
2483.480	42.99	27.36	3.68	36.33	37.70	54.00	-16.30	Average
2486.275	43.82	27.36	3.68	36.33	38.53	54.00	-15.47	Average
2499.990	40.84	27.40	3.68	36.37	35.55	54.00	-18.45	Average

11G Low channel:2412MHz

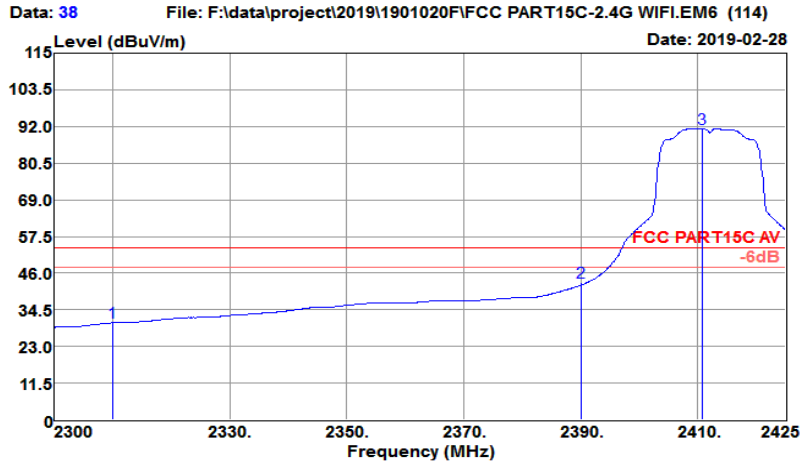
Horizontal:

Test Site	: 3m Chamber	Temp/Humi	: 21℃/63%
Tested by	: Damon	Power rating	: AC120V/60Hz
EUT	: all in one	Pol/Phase	: HORIZONTAL
Model No.	: GK-MWZE501		
Test Mode	: 802.11g CH01(2412MHz)		



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV	Limit level dBuV/m	Over limit dB	Remark
2310.000	49.46	26.91	3.56	35.87	44.06	74.00	-29.94	Peak
2390.000	64.14	27.11	3.64	36.08	58.81	74.00	-15.19	Peak
2409.875	108.64	27.17	3.65	36.13	103.33	74.00	29.33	Peak

Test Site	: 3m Chamber	Temp/Humi	: 21℃/63%
Tested by	: Damon	Power rating	: AC120V/60Hz
EUT	: all in one	Pol/Phase	: HORIZONTAL
Model No.	: GK-MWZE501		
Test Mode	: 802.11g CH01(2412MHz)		

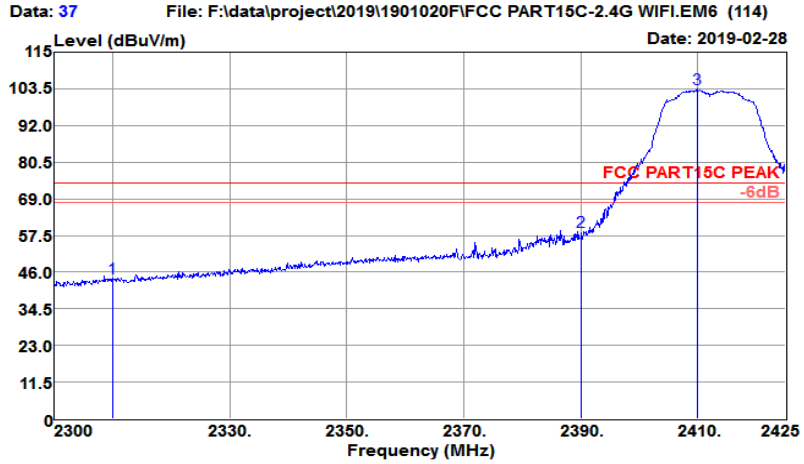


Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV	Limit level dBuV/m	Over limit dB	Remark
2310.000	35.88	26.91	3.56	35.87	30.48	54.00	-23.52	Average
2390.000	48.36	27.11	3.64	36.08	43.03	54.00	-10.97	Average
2410.750	96.62	27.17	3.65	36.13	91.31	54.00	37.31	Average

11G Low channel:2412MHz

Vertical:

Test Site	: 3m Chamber	Temp/Humi	: 21℃/63%
Tested by	: Damon	Power rating	: AC120V/60Hz
EUT	: all in one	Pol/Phase	: HORIZONTAL
Model No.	: GK-MWZE501		
Test Mode	: 802.11g CH01(2412MHz)		



Freq	Reading level	Antenna factor	Cable loss	Preamp factor	level	Limit level	Over limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV	dBuV/m	dB	
2310.000	49.46	26.91	3.56	35.87	44.06	74.00	-29.94	Peak
2390.000	64.14	27.11	3.64	36.08	58.81	74.00	-15.19	Peak
2409.875	108.64	27.17	3.65	36.13	103.33	74.00	29.33	Peak

Test Site	: 3m Chamber	Temp/Humi	: 21℃/63%
Tested by	: Damon	Power rating	: AC120V/60Hz
EUT	: all in one	Pol/Phase	: VERTICAL
Model No.	: GK-MWZE501		
Test Mode	: 802.11g CH01(2412MHz)		

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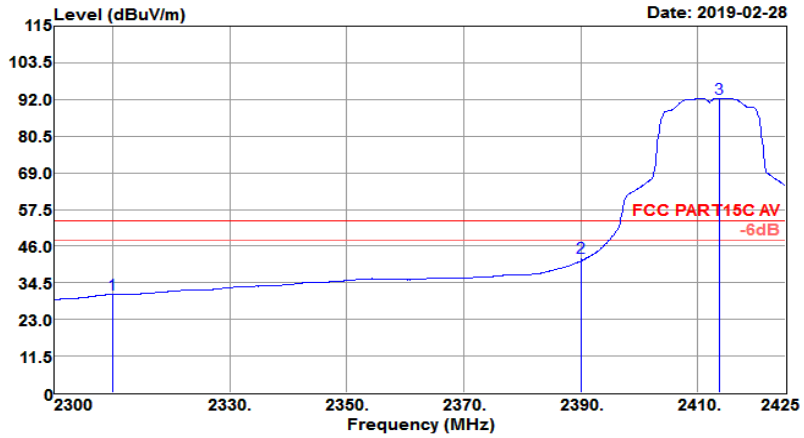
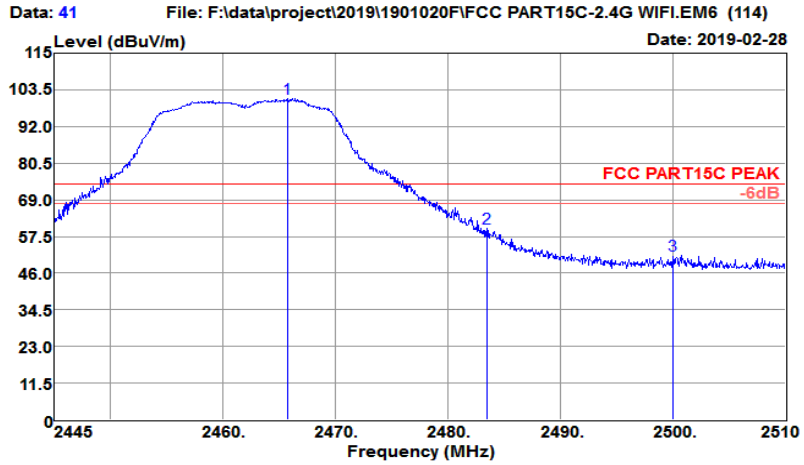


Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV	Limit level dBuV/m	Over limit dB	Remark
2310.000	36.27	26.91	3.56	35.87	30.87	54.00	-23.13	Average
2390.000	47.58	27.11	3.64	36.08	42.25	54.00	-11.75	Average
2413.625	97.72	27.18	3.65	36.14	92.41	54.00	38.41	Average

11G High channel:2462MHz

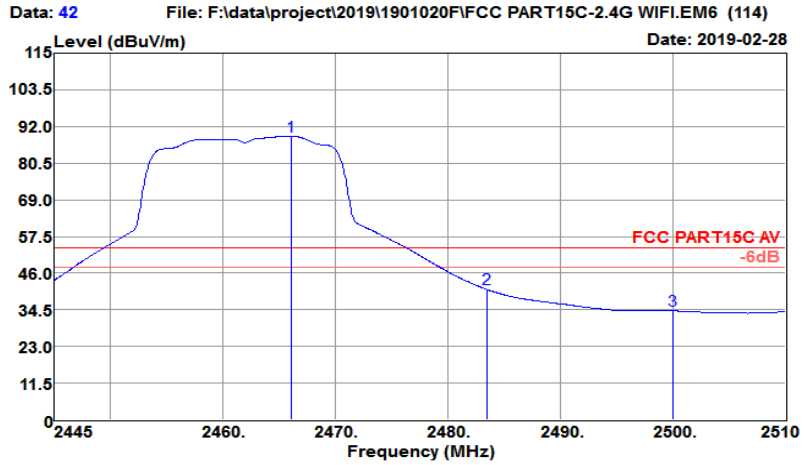
Horizontal:

Test Site	: 3m Chamber	Temp/Humi	: 21℃/63%
Tested by	: Damon	Power rating	: AC120V/60Hz
EUT	: all in one	Pol/Phase	: HORIZONTAL
Model No.	: GK-MWZE501		
Test Mode	: 802.11g CH11(2462MHz)		



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV	Limit level dBuV/m	Over limit dB	Remark
2465.735	106.12	27.31	3.67	36.28	100.82	74.00	26.82	Peak
2483.500	65.37	27.36	3.68	36.33	60.08	74.00	-13.92	Peak
2500.000	57.01	27.40	3.68	36.37	51.72	74.00	-22.28	Peak

Test Site	: 3m Chamber	Temp/Humi	: 21℃/63%
Tested by	: Damon	Power rating	: AC120V/60Hz
EUT	: all in one	Pol/Phase	: HORIZONTAL
Model No.	: GK-MWZE501		
Test Mode	: 802.11g CH11(2462MHz)		

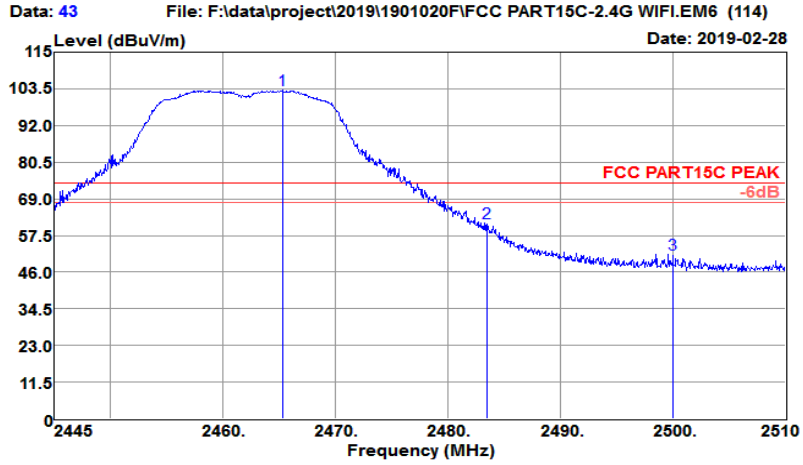


Freq	Reading level	Antenna factor	Cable loss	Preamp factor	level	Limit level	Over limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV	dBuV/m	dB	
2466.125	94.29	27.31	3.67	36.28	88.99	54.00	34.99	Average
2483.500	46.44	27.36	3.68	36.33	41.15	54.00	-12.85	Average
2500.000	39.57	27.40	3.68	36.37	34.28	54.00	-19.72	Average

11G High channel:2462MHz

Vertical:

Test Site	: 3m Chamber	Temp/Humi	: 21℃/63%
Tested by	: Damon	Power rating	: AC120V/60Hz
EUT	: all in one	Pol/Phase	: VERTICAL
Model No.	: GK-MWZE501		
Test Mode	: 802.11g CH11(2462MHz)		



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV	Limit level dBuV/m	Over limit dB	Remark
2465.345	108.34	27.31	3.67	36.28	103.04	74.00	29.04	Peak
2483.500	66.72	27.36	3.68	36.33	61.43	74.00	-12.57	Peak
2500.000	56.98	27.40	3.68	36.37	51.69	74.00	-22.31	Peak

Test Site	: 3m Chamber	Temp/Humi	: 21℃/63%
Tested by	: Damon	Power rating	: AC120V/60Hz
EUT	: all in one	Pol/Phase	: VERTICAL
Model No.	: GK-MWZE501		
Test Mode	: 802.11g CH11(2462MHz)		

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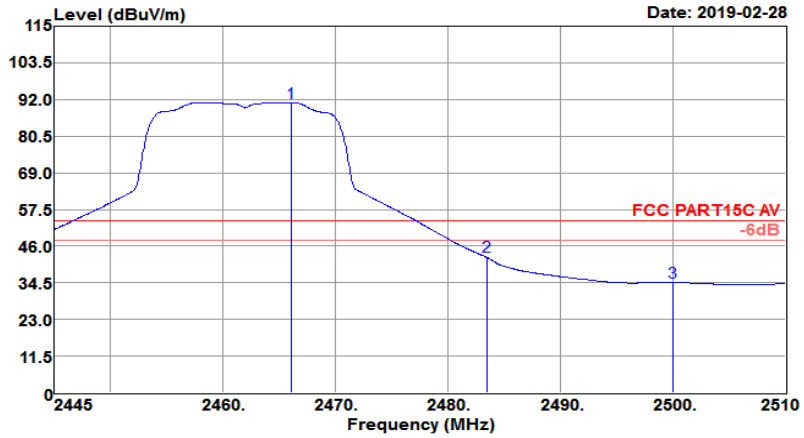
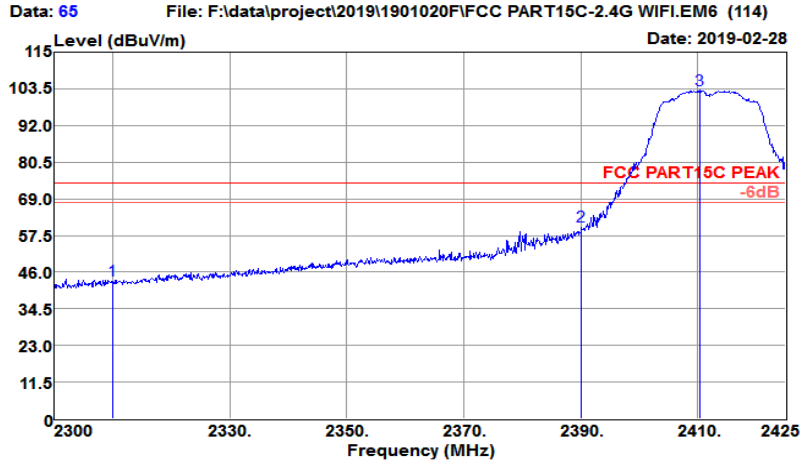


Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV	Limit level dBuV/m	Over limit dB	Remark
2466.125	96.35	27.31	3.67	36.28	91.05	54.00	37.05	Average
2483.500	48.16	27.36	3.68	36.33	42.87	54.00	-11.13	Average
2500.000	40.01	27.40	3.68	36.37	34.72	54.00	-19.28	Average

11N20 Low channel:2412MHz

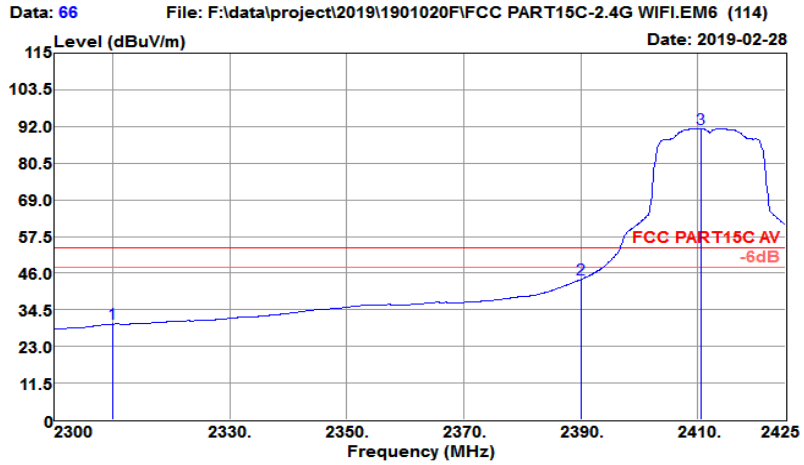
Horizontal:

Test Site	: 3m Chamber	Temp/Humi	: 21℃/63%
Tested by	: Damon	Power rating	: AC120V/60Hz
EUT	: all in one	Pol/Phase	: HORIZONTAL
Model No.	: GK-MWZE501		
Test Mode	: 802.11n HT20 CH01(2412MHz)		



Freq	Reading level	Antenna factor	Cable loss	Preamp factor	level	Limit level	Over limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV	dBuV/m	dB	
2310.000	48.96	26.91	3.56	35.87	43.56	74.00	-30.44	Peak
2390.000	65.57	27.11	3.64	36.08	60.24	74.00	-13.76	Peak
2410.375	108.33	27.17	3.65	36.13	103.02	74.00	29.02	Peak

Test Site	: 3m Chamber	Temp/Humi	: 21℃/63%
Tested by	: Damon	Power rating	: AC120V/60Hz
EUT	: all in one	Pol/Phase	: HORIZONTAL
Model No.	: GK-MWZE501		
Test Mode	: 802.11n HT20 CH01(2412MHz)		

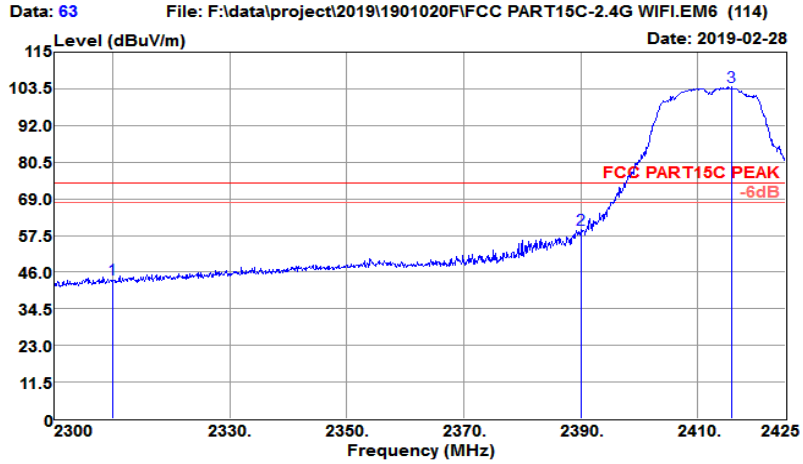


Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV	Limit level dBuV/m	Over limit dB	Remark
2310.000	35.44	26.91	3.56	35.87	30.04	54.00	-23.96	Average
2390.000	49.34	27.11	3.64	36.08	44.01	54.00	-9.99	Average
2410.500	96.61	27.17	3.65	36.13	91.30	54.00	37.30	Average

11N20 Low channel:2412MHz

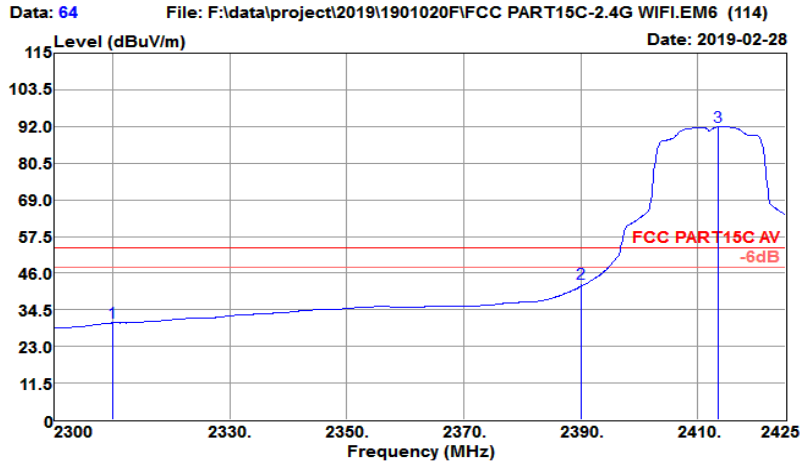
Vertical:

Test Site	: 3m Chamber	Temp/Humi	: 21℃/63%
Tested by	: Damon	Power rating	: AC120V/60Hz
EUT	: all in one	Pol/Phase	: VERTICAL
Model No.	: GK-MWZE501		
Test Mode	: 802.11n HT20 CH01(2412MHz)		



Freq	Reading level	Antenna factor	Cable loss	Preamp factor	level	Limit level	Over limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV	dBuV/m	dB	
2310.000	49.11	26.91	3.56	35.87	43.71	74.00	-30.29	Peak
2390.000	64.66	27.11	3.64	36.08	59.33	74.00	-14.67	Peak
2415.875	109.40	27.18	3.66	36.15	104.09	74.00	30.09	Peak

Test Site	: 3m Chamber	Temp/Humi	: 21℃/63%
Tested by	: Damon	Power rating	: AC120V/60Hz
EUT	: all in one	Pol/Phase	: VERTICAL
Model No.	: GK-MWZE501		
Test Mode	: 802.11n HT20 CH01(2412MHz)		

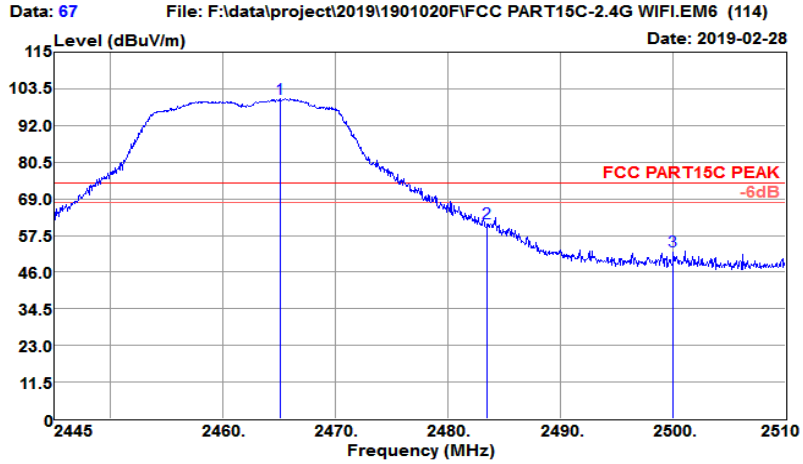


Freq	Reading level	Antenna factor	Cable loss	Preamp factor	level	Limit level	Over limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV	dBuV/m	dB	
2310.000	35.82	26.91	3.56	35.87	30.42	54.00	-23.58	Average
2390.000	48.12	27.11	3.64	36.08	42.79	54.00	-11.21	Average
2413.500	97.22	27.18	3.65	36.14	91.91	54.00	37.91	Average

11N20 High channel:2462MHz

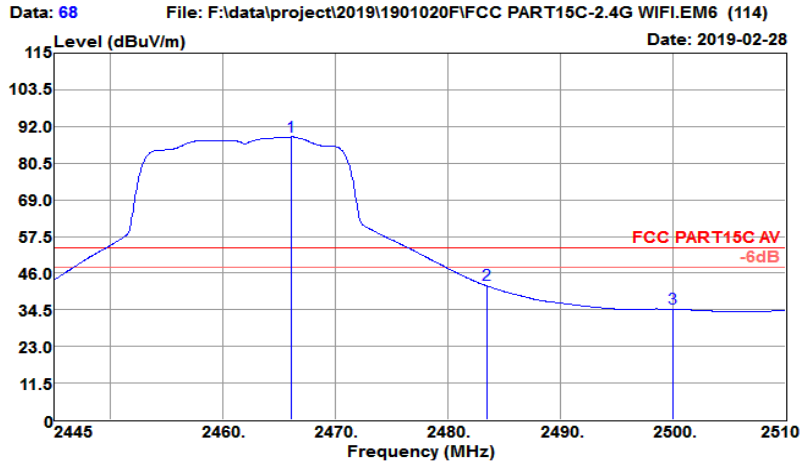
Hrizontal:

Test Site	: 3m Chamber	Temp/Humi	: 21℃/63%
Tested by	: Damon	Power rating	: AC120V/60Hz
EUT	: all in one	Pol/Phase	: HORIZONTAL
Model No.	: GK-MWZE501		
Test Mode	: 802.11n HT20 CH11(2462MHz)		



Freq	Reading level	Antenna factor	Cable loss	Preamp factor	level	Limit level	Over limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV	dBuV/m	dB	
2465.085	105.64	27.31	3.67	36.28	100.34	74.00	26.34	Peak
2483.500	66.63	27.36	3.68	36.33	61.34	74.00	-12.66	Peak
2500.000	57.93	27.40	3.68	36.37	52.64	74.00	-21.36	Peak

Test Site	: 3m Chamber	Temp/Humi	: 21℃/63%
Tested by	: Damon	Power rating	: AC120V/60Hz
EUT	: all in one	Pol/Phase	: HORIZONTAL
Model No.	: GK-MWZE501		
Test Mode	: 802.11n HT20 CH11(2462MHz)		

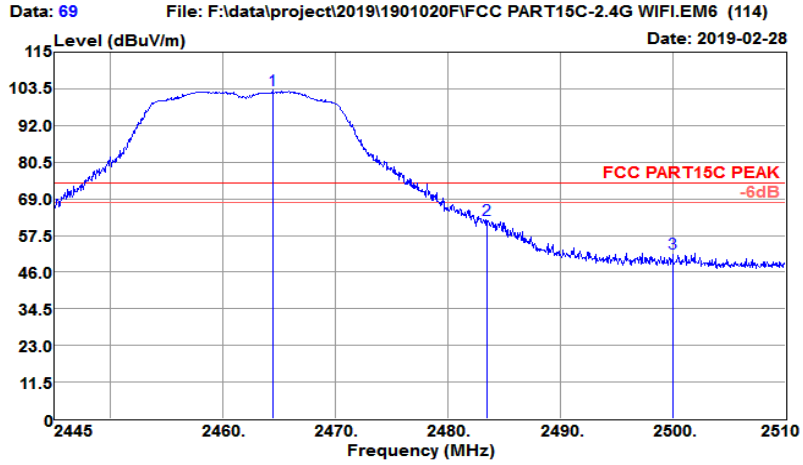


Freq	Reading level	Antenna factor	Cable loss	Preamp factor	level	Limit level	Over limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV	dBuV/m	dB	
2466.125	94.04	27.31	3.67	36.28	88.74	54.00	34.74	Average
2483.500	47.57	27.36	3.68	36.33	42.28	54.00	-11.72	Average
2500.000	40.09	27.40	3.68	36.37	34.80	54.00	-19.20	Average

11N20 High channel:2462MHz

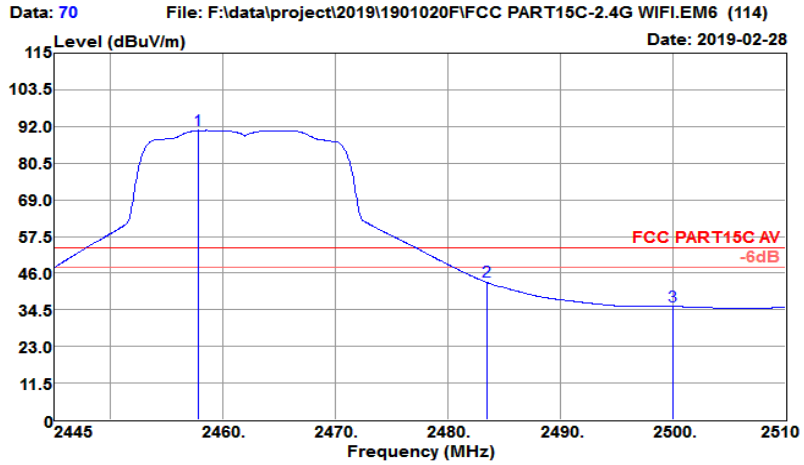
Vertical:

Test Site	: 3m Chamber	Temp/Humi	: 21℃/63%
Tested by	: Damon	Power rating	: AC120V/60Hz
EUT	: all in one	Pol/Phase	: VERTICAL
Model No.	: GK-MWZE501		
Test Mode	: 802.11n HT20 CH11(2462MHz)		



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV	Limit level dBuV/m	Over limit dB	Remark
2464.435	108.50	27.31	3.67	36.28	103.20	74.00	29.20	Peak
2483.500	67.76	27.36	3.68	36.33	62.47	74.00	-11.53	Peak
2500.000	57.14	27.40	3.68	36.37	51.85	74.00	-22.15	Peak

Test Site	: 3m Chamber	Temp/Humi	: 21℃/63%
Tested by	: Damon	Power rating	: AC120V/60Hz
EUT	: all in one	Pol/Phase	: VERTICAL
Model No.	: GK-MWZE501		
Test Mode	: 802.11n HT20 CH11(2462MHz)		

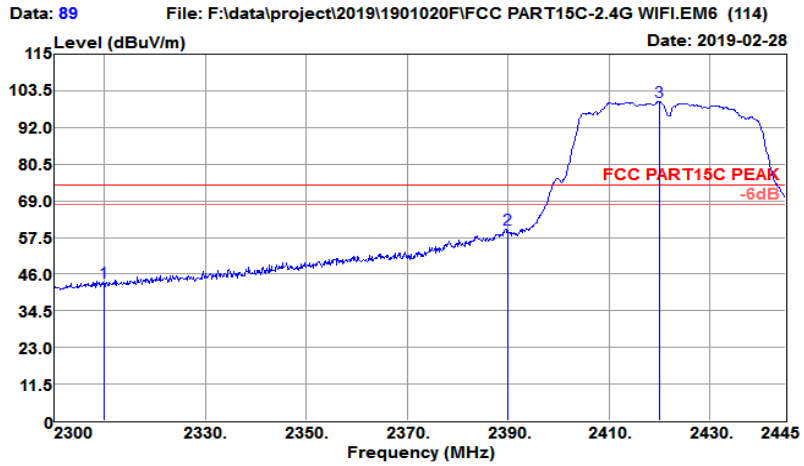


Freq	Reading level	Antenna factor	Cable loss	Preamp factor	level	Limit level	Over limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV	dBuV/m	dB	
2457.805	96.07	27.29	3.67	36.26	90.77	54.00	36.77	Average
2483.500	48.73	27.36	3.68	36.33	43.44	54.00	-10.56	Average
2500.000	40.92	27.40	3.68	36.37	35.63	54.00	-18.37	Average

11N40 Low channel:2422MHz

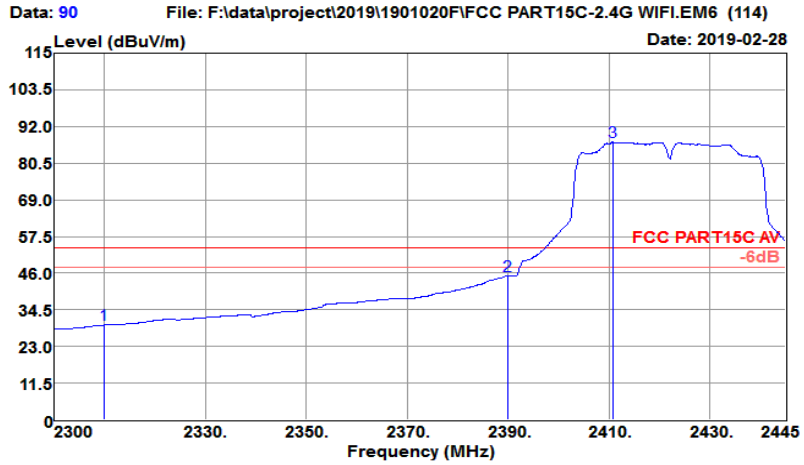
Hrizontal:

Test Site	: 3m Chamber	Temp/Humi	: 21℃/63%
Tested by	: Damon	Power rating	: AC120V/60Hz
EUT	: all in one	Pol/Phase	: HORIZONTAL
Model No.	: GK-MWZE501		
Test Mode	: 802.11n HT40 CH03(2422MHz)		



Freq	Reading level	Antenna factor	Cable loss	Preamp factor	level	Limit level	Over limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV	dBuV/m	dB	
2310.000	48.88	26.91	3.56	35.87	43.48	74.00	-30.52	Peak
2390.000	65.36	27.11	3.64	36.08	60.03	74.00	-13.97	Peak
2419.915	105.41	27.19	3.66	36.16	100.10	74.00	26.10	Peak

Test Site	: 3m Chamber	Temp/Humi	: 21℃/63%
Tested by	: Damon	Power rating	: AC120V/60Hz
EUT	: all in one	Pol/Phase	: HORIZONTAL
Model No.	: GK-MWZE501		
Test Mode	: 802.11n HT40 CH03(2422MHz)		

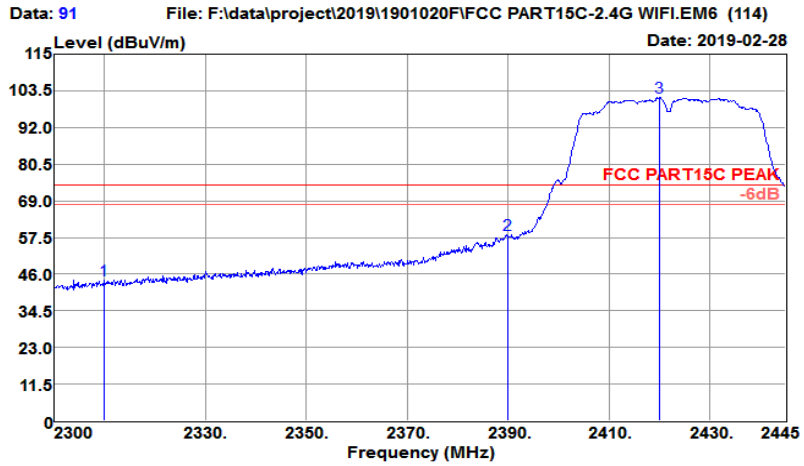


Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV	Limit level dBuV/m	Over limit dB	Remark
2310.000	35.16	26.91	3.56	35.87	29.76	54.00	-24.24	Average
2390.000	50.51	27.11	3.64	36.08	45.18	54.00	-8.82	Average
2410.780	92.38	27.17	3.65	36.13	87.07	54.00	33.07	Average

11N40 Low channel:2422MHz

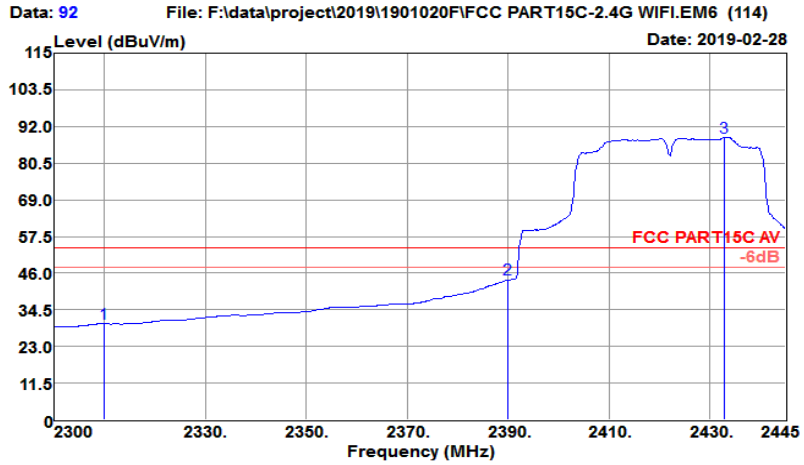
Vertical:

Test Site	: 3m Chamber	Temp/Humi	: 21℃/63%
Tested by	: Damon	Power rating	: AC120V/60Hz
EUT	: all in one	Pol/Phase	: VERTICAL
Model No.	: GK-MWZE501		
Test Mode	: 802.11n HT40 CH03(2422MHz)		



Freq	Reading level	Antenna factor	Cable loss	Preamp factor	level	Limit level	Over limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV	dBuV/m	dB	
2310.000	49.41	26.91	3.56	35.87	44.01	74.00	-29.99	Peak
2390.000	63.59	27.11	3.64	36.08	58.26	74.00	-15.74	Peak
2419.915	106.78	27.19	3.66	36.16	101.47	74.00	27.47	Peak

Test Site	: 3m Chamber	Temp/Humi	: 21℃/63%
Tested by	: Damon	Power rating	: AC120V/60Hz
EUT	: all in one	Pol/Phase	: VERTICAL
Model No.	: GK-MWZE501		
Test Mode	: 802.11n HT40 CH03(2422MHz)		

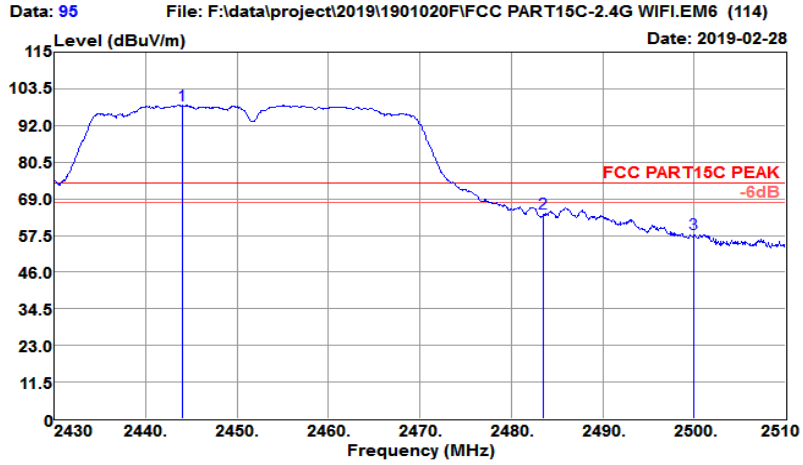


Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV	Limit level dBuV/m	Over limit dB	Remark
2310.000	35.56	26.91	3.56	35.87	30.16	54.00	-23.84	Average
2390.000	49.41	27.11	3.64	36.08	44.08	54.00	-9.92	Average
2432.965	93.89	27.23	3.66	36.19	88.59	54.00	34.59	Average

11N40 High channel:2452MHz

Hrizontal:

Test Site	: 3m Chamber	Temp/Humi	: 21℃/63%
Tested by	: Damon	Power rating	: AC120V/60Hz
EUT	: all in one	Pol/Phase	: HORIZONTAL
Model No.	: GK-MWZE501		
Test Mode	: 802.11n HT40 CH09(2452MHz)		



Freq	Reading level	Antenna factor	Cable loss	Preamp factor	level	Limit level	Over limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV	dBuV/m	dB	
2444.080	103.62	27.25	3.67	36.22	98.32	74.00	24.32	Peak
2483.500	69.80	27.36	3.68	36.33	64.51	74.00	-9.49	Peak
2500.000	63.48	27.40	3.68	36.37	58.19	74.00	-15.81	Peak