RADIO TEST REPORT
FCC 47 CFR PART 15 SUBPART C

Test Standard	**FCC Part 15.247**
Product name	**ASTROS Station**
Brand Name	**ASTROS**
Model No.	**AS-201, AWIP-201, WPS-201, AS-101, AWIP-101, WPS-101**
Test Result	**Pass**
Statements of Conformity	**Determination of compliance is based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.**

The test Result was tested by Compliance Certification Services Inc. The test data, data evaluation, test procedures, and equipment configurations shown in this report were given in ANSI C63.10: 2013 and compliance standards.

The test results of this report relate only to the tested sample (EUT) identified in this report.
The test Report of full or partial shall not copy. Without written approval of Compliance Certification Services Inc. (Wugu Laboratory).

Approved by:

Kevin Tsai
Deputy Manager

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.
除非另有說明，此報告結果僅對測試之樣品負責，同時此樣品僅保留90天。本報告未經本公司書面許可，不可部份複製。
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Revision History

Rev.	Issue Date	Revisions	Effect Page	Revised By
00	April 22, 2021	Initial Issue	ALL	Doris Chu
01	May 4, 2021	See the following Note Rev. (01)	P.6, P.13, P39, P.52-53, P.58, P.61	Doris Chu
02	May 11, 2021	See the following Note Rev. (02)	P.4	Doris Chu

Rev. (01)
1.Revised notes 2 in section 1.3.
2.Added AC conducted emission test mode in section 3.2.
3.Revised Test Procedure in section 4.4.2.
4.Revised spurious emission plot in page 52, 53, 58 and 61.

Rev. (02)
1.Revised Model Discrepancy.

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APPENDIX 1 - PHOTOGRAPHS OF EUT A-1

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1. GENERAL INFORMATION

1.1 EUT INFORMATION

Applicant	Astrogate Inc. 11F-6, No. 120, Qiaohe Rd., Zhonghe Dist., New Taipei City 235, Taiwan
Manufacturer	Astrogate Inc. 11F-6, No. 120, Qiaohe Rd., Zhonghe Dist., New Taipei City 235, Taiwan
Equipment	ASTROS Station
Model Name	AS-201, AWIP-201, WPS-201, AS-101, AWIP-101, WPS-101
Model Discrepancy	

Model	color	spec
AS-101	Black	Simultaneous sources x2
AWIP-101		
WPS-101		
AS-201	Silver	Simultaneous sources x4
AWIP-201		
WPS-201		
All the above models are identical except for the designation of trade names and model numbers.		

Trade Name	ASTROS
Received Date	January 6, 2021
Date of Test	January 29 ~ May 4, 2021

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Power Supply	1. Power from Power Adapter. Brand: ENG Electric Co., LTD., Model: 6A-242WP12 I/P: 100-240V, 50-60 Hz, 0.8A O/P: 12V, 2.0A, 24W 2. Power from Battery. (DC 3V) Brand: Hitachi Maxell Energy, Ltd., Model: CR2032
HW Version	DVT
SW Version	FW94
EUT Serial #	AS201WWXXXXXXXXX

Remark:

1. Disclaimer: Antenna information is provided by the applicant, test results of this report are applicable to the sample EUT received.
2. Disclaimer: The variant model numbers / trademarks are assessed as identical in hardware and software to each other, hence all variants are fully covered by the test results in this test report without further verification test.

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1.2 EUT CHANNEL INFORMATION

Frequency Range	802.11b/g/n HT 20: 2412MHz ~ 2462MHz 802.11n HT 40: 2422MHz ~ 2452MHz
Modulation Type	1. IEEE 802.11b mode: CCK 2. IEEE 802.11g mode: OFDM 3. IEEE 802.11n HT 20 MHz mode : OFDM 4. IEEE 802.11n HT 40 MHz mode : OFDM
Number of channel	1. IEEE 802.11b mode: 11 Channels 2. IEEE 802.11g mode: 11 Channels 3. IEEE 802.11n HT 20 MHz mode : 11 Channels 4. IEEE 802.11n HT 40 MHz mode : 7 Channels

Remark:
Refer as ANSI C63.10: 2013 clause 5.6.1 Table 4 for test channels

Number of frequencies to be tested		
Frequency range in which device operates	**Number of frequencies**	**Location in frequency range of operation**
☐ 1 MHz or less	1	Middle
☐ 1 MHz to 10 MHz	2	1 near top and 1 near bottom
☒ More than 10 MHz	3	1 near top, 1 near middle, and 1 near bottom

1.3 ANTENNA INFORMATION

Antenna Specification	☐ PIFA ☐ PCB ☒ Dipole ☐ Coils
Antenna Gain	Dipole Antenna / Chain 0: Gain: 2 dBi Chain 1: Gain: 2 dBi Power Directional Gain: 5.01 dBi
Antenna connector	N/A

Notes:
1. Power Directional Gain = 10*log { [10^(Ant1/20) + 10^(Ant2/20) + … + 10^(Ant N /20)]^2 / N ANT} dBi
2. Two dipole detachable Antennas used which uses a unique coupling to the EUT meeting rule 15.203.

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1.4 MEASUREMENT UNCERTAINTY

PARAMETER	UNCERTAINTY
AC Powerline Conducted Emission	+/- 1.2575
Emission bandwidth, 20dB bandwidth	+/- 0.0014
RF output power, conducted	+/- 1.14
Power density, conducted	+/- 1.40
3M Semi Anechoic Chamber / 30M~200M	+/- 4.12
3M Semi Anechoic Chamber / 200M~1000M	+/- 4.68
3M Semi Anechoic Chamber / 1G~8G	+/- 5.18
3M Semi Anechoic Chamber / 8G~18G	+/- 5.47
3M Semi Anechoic Chamber / 18G~26G	+/- 3.81
3M Semi Anechoic Chamber / 26G~40G	+/- 3.87

Remark:
1.This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2
2. ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report.

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1.5 FACILITIES AND TEST LOCATION

All measurement facilities used to collect the measurement data are located at

No.11, Wugong 6th Rd., Wugu Dist., New Taipei City, Taiwan. (R.O.C.)

Test site	Test Engineer	Remark
AC Conduction Room	Jerry Chang	-
Radiation	Ray Li	-
RF Conducted	Lance Chen	-

Remark: The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22.

1.6 INSTRUMENT CALIBRATION

RF Conducted Test Site					
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Date**	**Calibration Due**
Coaxial Cable	Woken	WC12	CC003	06/29/2020	06/28/2021
Coaxial Cable	Woken	WC12	CC001	06/29/2020	06/28/2021
EXA Signal Analyzer	KEYSIGHT	N9010B	MY55460167	09/07/2020	09/06/2021
Power Meter	Anritsu	ML2487A	6K00003260	05/21/2020	05/20/2021
Power Seneor	Anritsu	MA2490A	032910	05/21/2020	05/20/2021
Software	N/A				

3M 966 Chamber Test Site					
Equipment	**Manufacturer**	**Model**	**S/N**	**Cal Date**	**Cal Due**
Band Reject Filters	MICRO TRONICS	BRM 50702	120	02/25/2020	02/24/2021
Bilog Antenna	Sunol Sciences	JB3	A030105	07/24/2020	07/23/2021
Coaxial Cable	HUBER SUHNER	SUCOFLEX 104PEA	20995	02/25/2020	02/24/2021
Coaxial Cable	EMCI	EMC105	190914+327109/4	09/19/2020	09/18/2021
Digital Thermo-Hygro Meter	WISEWIND	1206	D07	01/06/2021	01/05/2022
double Ridged Guide Horn Antenna	ETC	MCTD 1209	DRH13M02003	09/30/2020	09/29/2021
Loop Ant	COM-POWER	AL-130	121051	03/27/2020	03/26/2021
Pre-Amplifier	EMEC	EM330	060609	02/25/2020	02/24/2021
Pre-Amplifier	HP	8449B	3008A00965	02/25/2020	02/24/2021
PSA Series Spectrum Analyzer	Agilent	E4446A	MY46180323	07/24/2020	07/23/2021
Antenna Tower	CCS	CC-A-1F	N/A	N.C.R	N.C.R
Controller	CCS	CC-C-1F	N/A	N.C.R	N.C.R
Turn Table	CCS	CC-T-1F	N/A	N.C.R	N.C.R
Software	e3 6.11-20180413				

Remark: Each piece of equipment is scheduled for calibration once a year.

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For test date: March 3, 2021

3M 966 Chamber Test Site					
Equipment	**Manufacturer**	**Model**	**S/N**	**Cal Date**	**Cal Due**
Band Reject Filters	MICRO TRONICS	BRM 50702	120	02/08/2021	02/07/2022
Bilog Antenna	Sunol Sciences	JB3	A030105	07/24/2020	07/23/2021
Coaxial Cable	HUBER SUHNER	SUCOFLEX 104PEA	20995	02/24/2021	02/23/2022
Coaxial Cable	EMCI	EMC105	190914+327109/4	09/19/2020	09/18/2021
Digital Thermo-Hygro Meter	WISEWIND	1206	D07	01/06/2021	01/05/2022
double Ridged Guide Horn Antenna	ETC	MCTD 1209	DRH13M02003	09/30/2020	09/29/2021
Loop Ant	COM-POWER	AL-130	121051	03/27/2020	03/26/2021
Pre-Amplifier	EMEC	EM330	060609	02/24/2021	02/23/2022
Pre-Amplifier	HP	8449B	3008A00965	02/25/2020	02/24/2021
PSA Series Spectrum Analyzer	Agilent	E4446A	MY46180323	07/24/2020	07/23/2021
Antenna Tower	CCS	CC-A-1F	N/A	N.C.R	N.C.R
Controller	CCS	CC-C-1F	N/A	N.C.R	N.C.R
Turn Table	CCS	CC-T-1F	N/A	N.C.R	N.C.R
Software	e3 6.11-20180413				

AC Power Line Conducted Emission Test Room					
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Date**	**Calibration Due**
CABLE	EMCI	CFD300-NL	CERF	06/29/2020	06/28/2021
EMI Test Receiver	R&S	ESCI	100064	07/17/2020	07/16/2021
LISN	SCHAFFNER	NNB 41	03/10013	02/02/2021	02/01/2022
Software	EZ-EMC(CCS-3A1-CE)				

Remark: Each piece of equipment is scheduled for calibration once a year.

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1.7 SUPPORT AND EUT ACCESSORIES EQUIPMENT

Support Equipment					
No.	**Equipment**	**Brand**	**Model**	**Series No.**	**FCC ID**
	N/A				

Support Equipment					
No.	**Equipment**	**Brand**	**Model**	**Series No.**	**FCC ID**
1	NB(J)	TOSHIBA	PT345T-00L002	N/A	DoC

1.8 TEST METHODOLOGY AND APPLIED STANDARDS

The test methodology, setups and results comply with all requirements in accordance with ANSI C63.10:2013, FCC Part 2, FCC Part 15.247, KDB 662911 D01.

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2. TEST SUMMARY

FCC Standard Section	Report Section	Test Item	Result
15.203	1.3	Antenna Requirement	Pass
15.207(a)	4.1	AC Conducted Emission	Pass
15.247(a)(2)	4.2	6 dB Bandwidth	Pass
-	4.2	Occupied Bandwidth (99%)	Pass
15.247(b)	4.3	Output Power Measurement	Pass
15.247(e)	4.4	Power Spectral Density	Pass
15.247(d)	4.5	Conducted Band Edge	Pass
15.247(d)	4.5	Conducted Spurious Emission	Pass
15.247(d)	4.6	Radiation Band Edge	Pass
15.247(d)	4.6	Radiation Spurious Emission	Pass

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3. DESCRIPTION OF TEST MODES

3.1 THE WORST MODE OF OPERATING CONDITION

Operation mode	IEEE 802.11b mode :1Mbps IEEE 802.11g mode :6Mbps IEEE 802.11n HT20 mode :MCS8 IEEE 802.11n HT40 mode :MCS8
Test Channel Frequencies	**IEEE 802.11b mode :** 1. Lowest Channel : 2412MHz 2. Middle Channel : 2437MHz 3. Highest Channel : 2462MHz **IEEE 802.11g mode :** 1. Lowest Channel : 2412MHz 2. Middle Channel : 2437MHz 3. Highest Channel : 2462MHz **IEEE 802.11n HT20 mode :** 1. Lowest Channel : 2412MHz 2. Middle Channel : 2437MHz 3. Highest Channel : 2462MHz **IEEE 802.11n HT40 mode :** 1. Lowest Channel : 2422MHz 2. Middle Channel : 2437MHz 3. Highest Channel : 2452MHz
Operation Transmitter	IEEE 802.11b mode : 2T2R IEEE 802.11g mode : 2T2R IEEE 802.11n HT20 mode : 2T2R IEEE 802.11n HT40 mode : 2T2R

Remark:
1. EUT pre-scanned data rate of output power for each mode, the worst data rate were recorded in this report.

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3.2 THE WORST MODE OF MEASUREMENT

AC Power Line Conducted Emission	
Test Condition	AC Power line conducted emission for line and neutral
Power supply Mode	Mode 1: EUT power by Adapter (AS-201) Mode 2: EUT power by Adapter (AS-101)
Worst Mode	☒ Mode 1 ☐ Mode 2 ☐ Mode 3 ☐ Mode 4

Radiated Emission Measurement Above 1G	
Test Condition	Radiated Emission Above 1G
Power supply Mode	Mode 1: EUT power by Adapter(AS-201) Mode 2: EUT power by Adapter(AS-101)
Worst Mode	☒ Mode 1 ☐ Mode 2 ☐ Mode 3 ☐ Mode 4
Worst Position	☐ Placed in fixed position. ☐ Placed in fixed position at X-Plane (E2-Plane) ☐ Placed in fixed position at Y-Plane (E1-Plane) ☒ Placed in fixed position at Z-Plane (H-Plane)

Radiated Emission Measurement Below 1G	
Test Condition	Radiated Emission Below 1G
Power supply Mode	Mode 1: EUT power by Adapter(AS-201) Mode 2: EUT power by Adapter(AS-101)
Worst Mode	☒ Mode 1 ☐ Mode 2 ☐ Mode 3 ☐ Mode 4

Remark:
1. The worst mode was record in this test report.
2. EUT pre-scanned in three axis ,X,Y, Z and two polarity, for radiated measurement. The worst case(Z-Plane) were recorded in this report

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3.3 EUT DUTY CYCLE

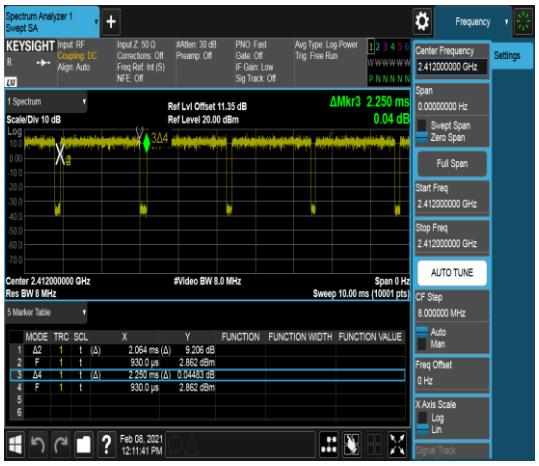
Temperature: 22.9℃ **Humidity:** 52.5% RH

Tested by: Lance Chen **Test date:** February 8, 2021

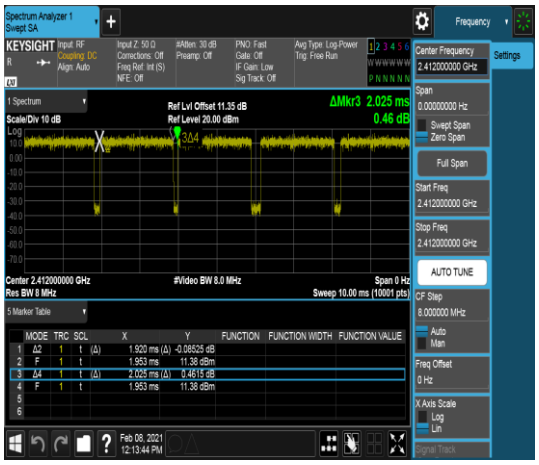
Duty Cycle				
Configuration	Duty Cycle (%)	Duty Factor (dB) =10*log (1/Duty Cycle)	1/T (kHz)	VBW setting (kHz)
802.11b	96.52	0.15	0.08	1.00
802.11g	91.73	0.37	0.48	1.00
802.11n HT20	94.81	0.23	0.52	1.00
802.11n HT40	82.23	0.85	1.06	2.00

802.11b

802.11g



802.11n HT20



802.11n HT40

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4. TEST RESULT

4.1 AC POWER LINE CONDUCTED EMISSION

4.1.1 Test Limit

According to §15.207(a)(2),

Frequency Range (MHz)	Limits(dBμV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56*	56 to 46*
0.50 to 5	56	46
5 to 30	60	50

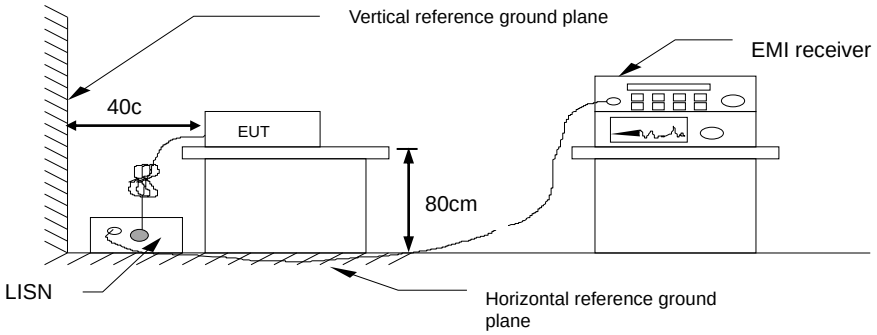
* Decreases with the logarithm of the frequency.

4.1.2 Test Procedure

Test method Refer as ANSI C63.10: 2013 clause 6.2,

1. The EUT was placed on a non-conducted table, which is 0.8m above horizontal ground plane and 0.4m above vertical ground plane.
2. EUT connected to the line impedance stabilization network (LISN)
3. Receiver set RBW of 9kHz and Detector Peak, and note as quasi-peak and average.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. Recorded Line for Neutral and Line.

4.1.3 Test Setup



4.1.4 Test Result

Pass.

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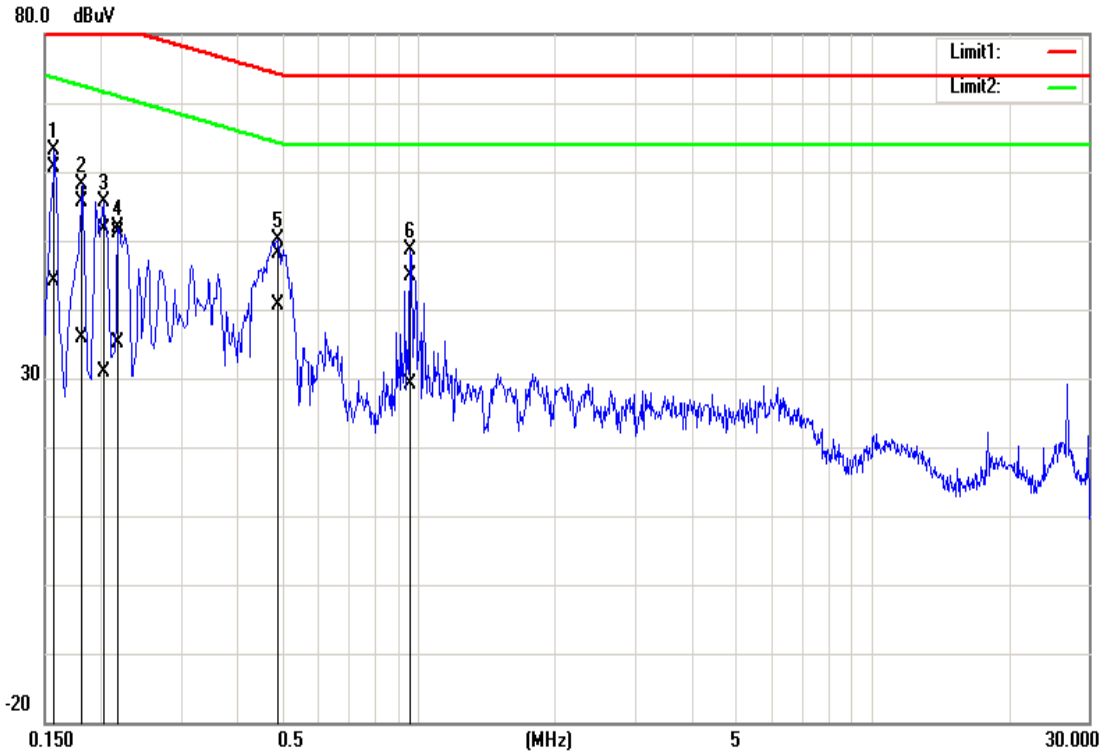
Test Data

Test Mode:	Mode 1	Temp/Hum	20.1(℃)/ 57%RH
Phase:	Line	Test Date	February 12, 2021
Test Voltage:	120Vac, 60Hz	Test Engineer	Jerry Chang



Frequency (MHz)	Quasi Peak reading (dBuV)	Average reading (d uV)	Correction factor (dB)	Quasi Peak result (dBuV)	Average result (dBuV)	Quasi Peak limit (dBuV)	Average limit (dBuV)	Quasi Peak margin (dB)	Average margin (dB)	Remark
0.1580	50.49	34.03	10.21	60.70	44.24	83.56	73.57	-22.86	-29.33	Pass
0.1819	45.54	25.71	10.21	55.75	35.92	82.39	72.40	-26.64	-36.48	Pass
0.2020	41.45	20.77	10.21	51.66	30.98	81.52	71.53	-29.86	-40.55	Pass
0.2180	40.99	24.99	10.21	51.20	35.20	80.89	70.89	-29.69	-35.69	Pass
0.4900	37.85	30.39	10.22	48.07	40.61	74.17	64.17	-26.10	-23.56	Pass
0.9620	34.64	18.92	10.24	44.88	29.16	74.00	64.00	-29.12	-34.84	Pass

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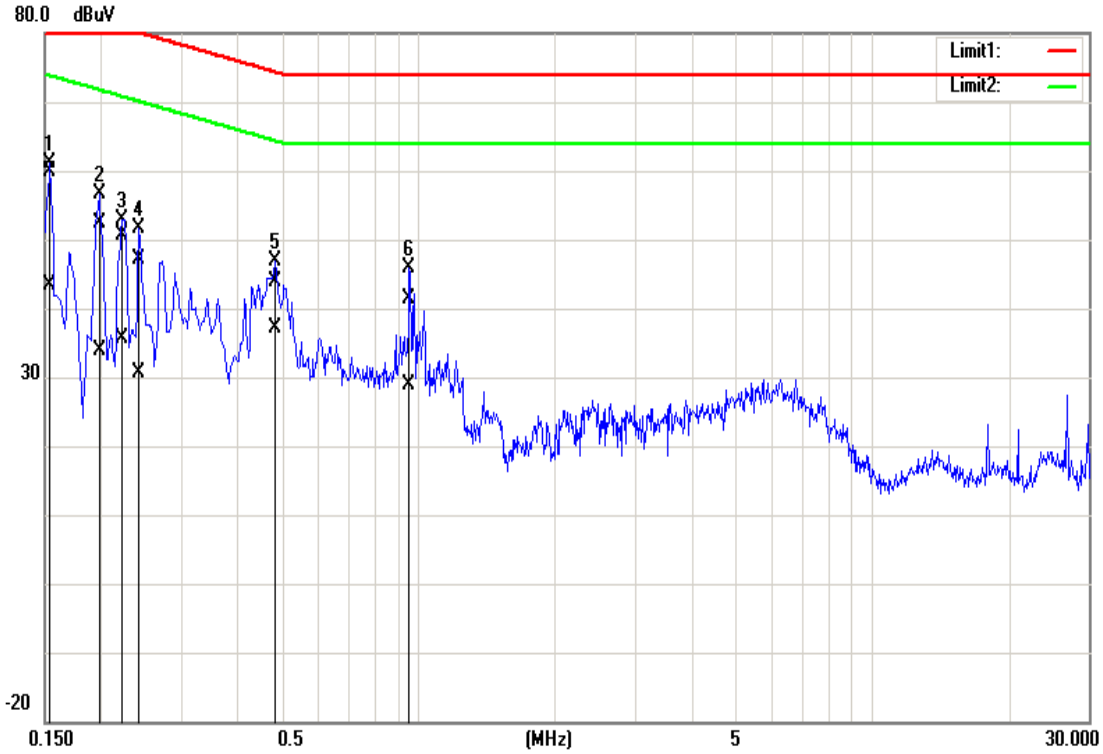
Test Mode:	Mode 1	Temp/Hum	20.1(℃)/ 57%RH
Phase:	Neutral	Test Date	February 12, 2021
Test Voltage:	120Vac, 60Hz	Test Engineer	Jerry Chang



Frequency (MHz)	Quasi Peak reading dBuV)	Average reading (dBuV)	Correction factor (dB)	Quasi Peak result (dBuV)	Average result (dBuV)	Quasi Peak limit (dBuV)	Average limit (dBuV)	Quasi Peak margin (dB)	Average margin (dB)	Remark
0.1540	49.75	33.13	10.18	59.93	43.31	83.78	73.78	-23.85	-30.47	Pass
0.1980	42.23	23.73	10.19	52.42	33.92	81.69	71.69	-29.27	-37.77	Pass
0.2220	40.34	25.42	10.19	50.53	35.61	80.74	70.74	-30.21	-35.13	Pass
0.2420	36.97	20.33	10.19	47.16	30.52	80.03	70.03	-32.87	-39.51	Pass
0.4820	33.69	27.05	10.19	43.88	37.24	74.30	64.30	-30.42	-27.06	Pass
0.9580	31.12	18.56	10.21	41.33	28.77	74.00	64.00	-32.67	-35.23	Pass

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4.2 6dB BANDWIDTH AND OCCUPIED BANDWIDTH (99%)

4.2.1 Test Limit

According to §15.247(a)(2),

6 dB Bandwidth ：

Limit	Shall be at least 500kHz

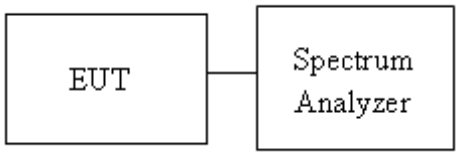
Occupied Bandwidth(99%) ： For reporting purposes only.

4.2.2 Test Procedure

Test method Refer as ANSI C63.10: 2013,

1. The EUT RF output connected to the spectrum analyzer by RF cable.
2. Setting maximum power transmit of EUT
3. SA set RBW = 100kHz, VBW = 300kHz and Detector = Peak, to measurement 6 dB Bandwidth.
4. SA set RBW = 1% ~ 5% OBW, VBW = three times the RBW and Detector = Peak, to measurement 99% Bandwidth
5. Measure and record the result of 6 dB Bandwidth and 99% Bandwidth. in the test report.

4.2.3 Test Setup



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4.2.4 Test Result

Temperature:	22.9℃	**Humidity:**	52.5% RH
Tested by:	Lance Chen	**Test date:**	February 8, 2021
Temperature:	23.0℃	**Humidity:**	51.1% RH
Tested by:	Lance Chen	**Test date:**	February 10, 2021

Test mode: IEEE 802.11b mode / 2412-2462 MHz						
Channel	**Frequency (MHz)**	**Chain 0 OBW(99%) (MHz)**	**Chain 1 OBW(99%) (MHz)**	**Chain 0 6dB BW (kHz)**	**Chain 1 6dB BW (kHz)**	**6dB limit (kHz)**
Low	2412	14.627	14.653	10.13	10.13	≥500
Mid	2437	14.710	14.677	10.14	10.14	
High	2462	14.705	14.674	10.13	10.13	

Test mode: IEEE 802.11g mode / 2412-2462 MHz						
Channel	**Frequency (MHz)**	**Chain 0 OBW(99%) (MHz)**	**Chain 1 OBW(99%) (MHz)**	**Chain 0 6dB BW (kHz)**	**Chain 1 6dB BW (kHz)**	**6dB limit (kHz)**
Low	2412	16.709	16.432	15.68	16.32	≥500
Mid	2437	16.671	16.467	15.70	16.32	
High	2462	16.506	16.480	15.72	16.06	

Test mode: IEEE 802.11n HT 20 MHz mode / 2412-2462 MHz						
Channel	**Frequency (MHz)**	**Chain 0 OBW(99%) (MHz)**	**Chain 1 OBW(99%) (MHz)**	**Chain 0 6dB BW (kHz)**	**Chain 1 6dB BW (kHz)**	**6dB limit (kHz)**
Low	2412	17.710	17.719	16.00	15.77	≥500
Mid	2437	17.745	17.726	16.18	16.78	
High	2462	17.652	17.650	16.28	16.03	

Test mode: IEEE 802.11n HT 40 MHz mode / 2422-2452 MHz						
Channel	**Frequency (MHz)**	**Chain 0 OBW(99%) (MHz)**	**Chain 1 OBW(99%) (MHz)**	**Chain 0 6dB BW (kHz)**	**Chain 1 6dB BW (kHz)**	**6dB limit (kHz)**
Low	2422	36.166	36.156	35.19	35.17	≥500
Mid	2437	36.279	36.300	35.18	35.18	
High	2452	36.170	36.159	35.19	35.18	

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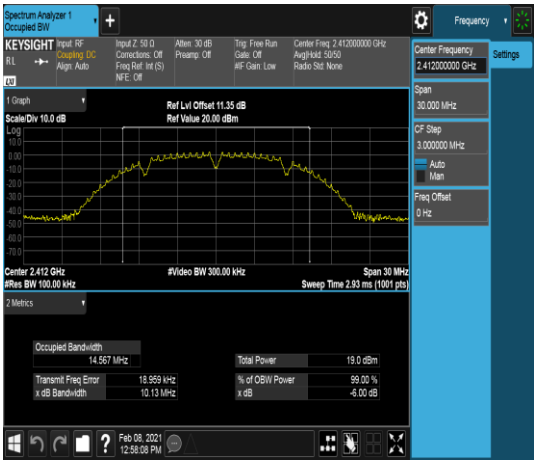
Test Data

6dB BANDWIDTH

IEEE 802.11b mode- chain 0	
Low CH	**Mid CH**
	
High CH	

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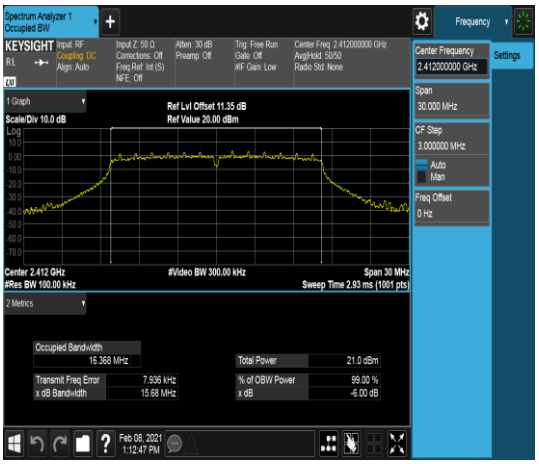
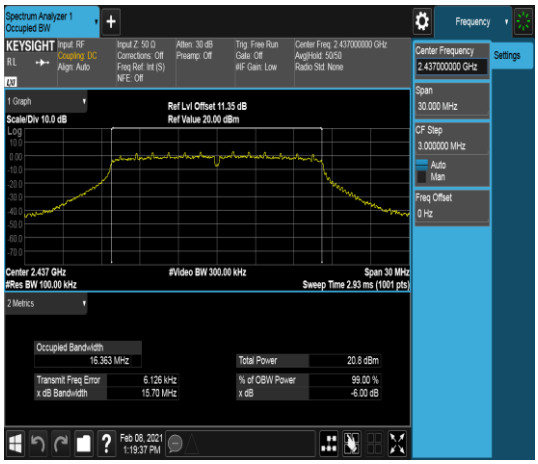
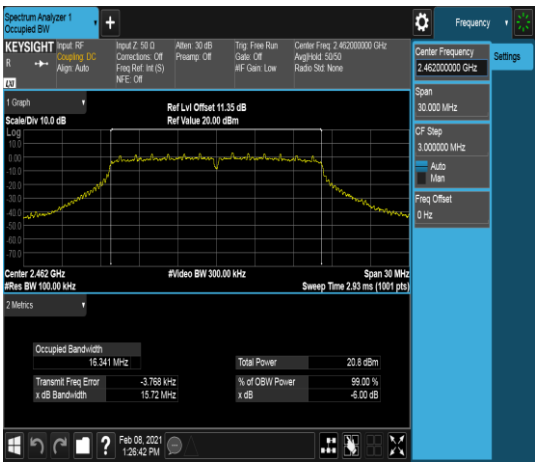
IEEE 802.11g mode- chain 0	
Low CH	**Mid CH**
	
High CH	
	

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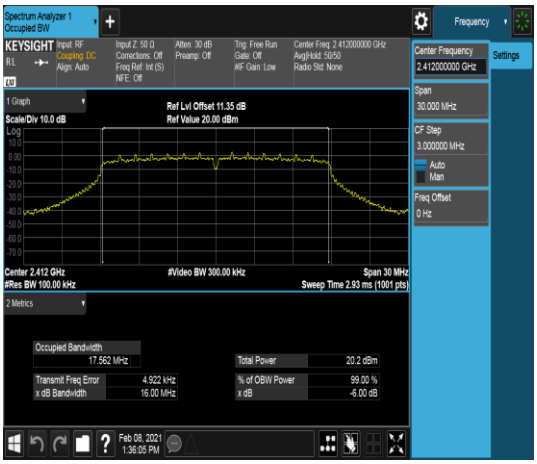
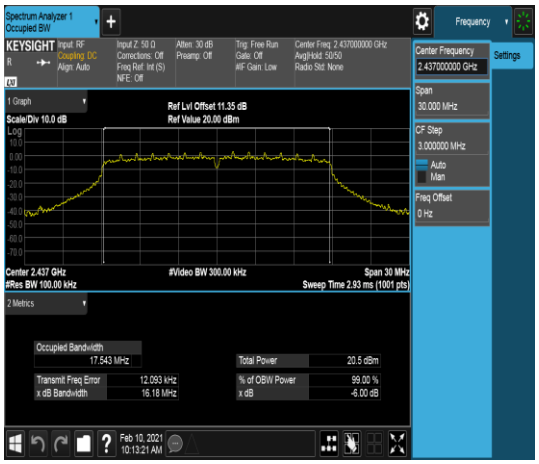
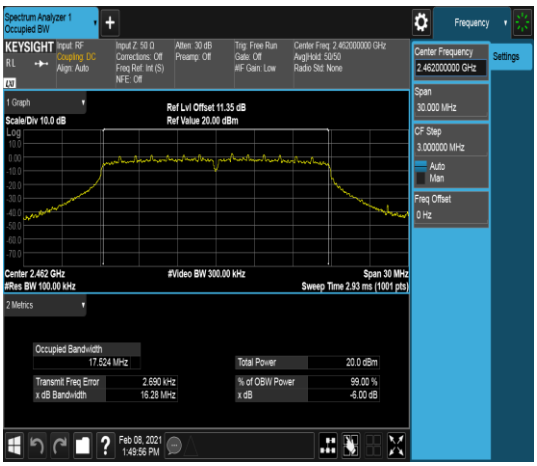
IEEE 802.11n HT20 mode- chain 0	
Low CH	**Mid CH**
	
High CH	
	

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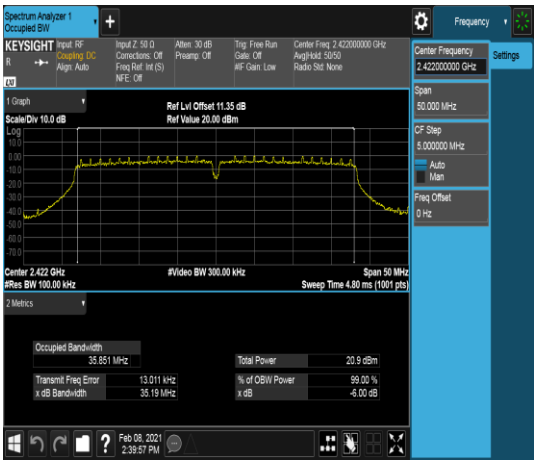
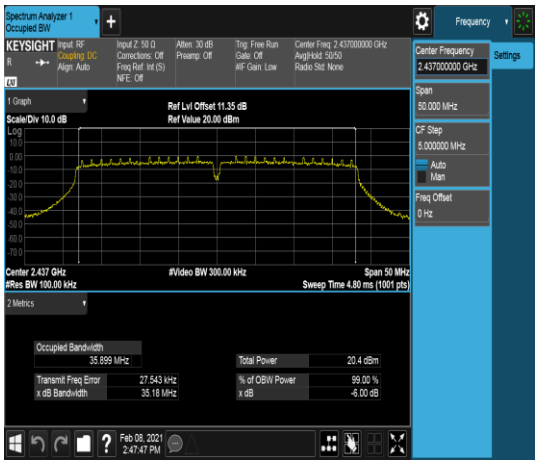
IEEE 802.11n HT40 mode- chain 0	
Low CH	**Mid CH**
	
High CH	

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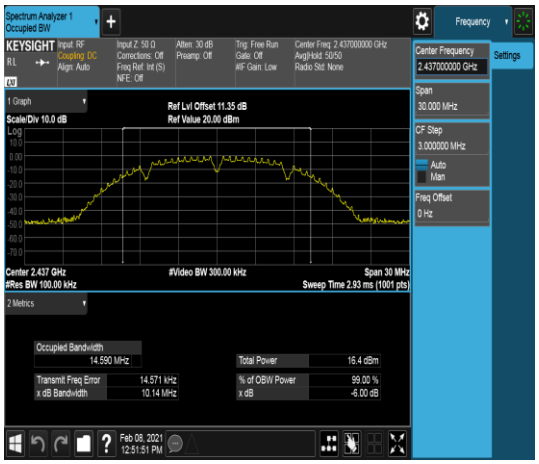
IEEE 802.11b mode- chain 1	
Low CH	**Mid CH**
	
High CH	

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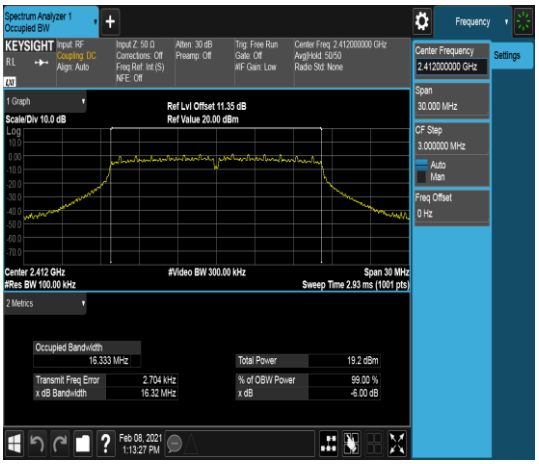
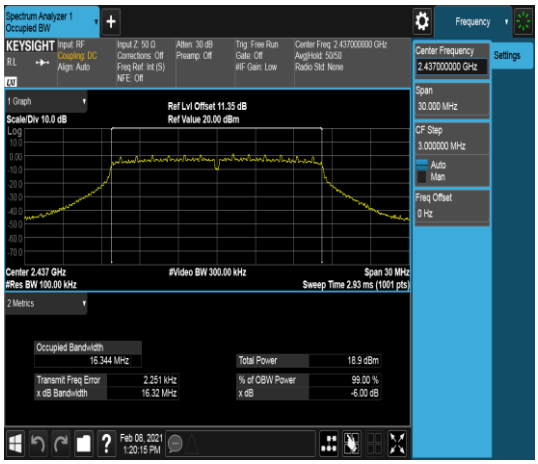
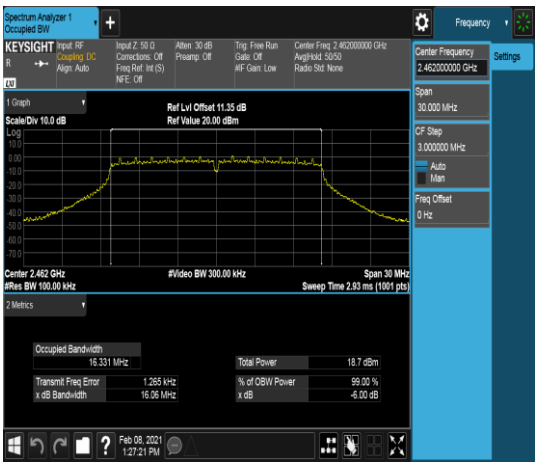
IEEE 802.11g mode- chain 1	
Low CH	**Mid CH**
	
High CH	
	

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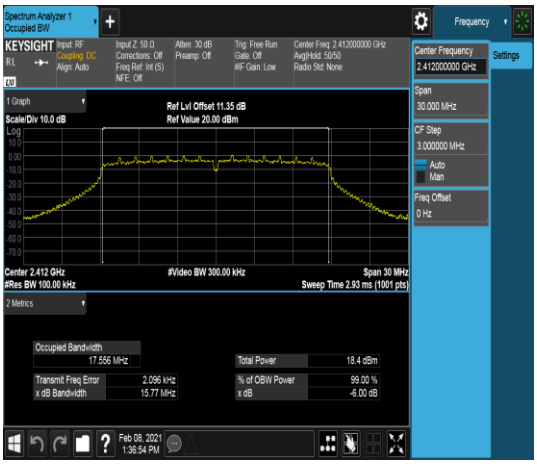
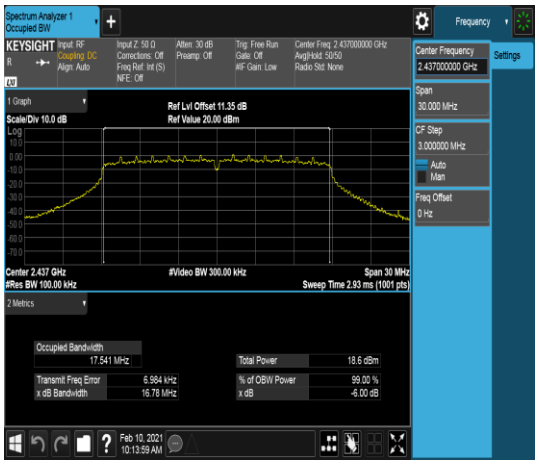
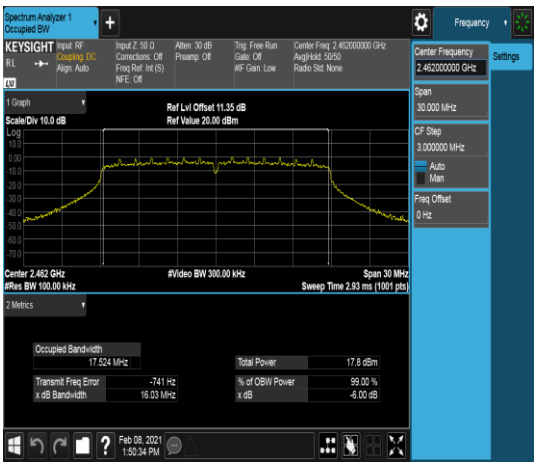
IEEE 802.11n HT20 mode- chain 1	
Low CH	**Mid CH**
	
High CH	
	

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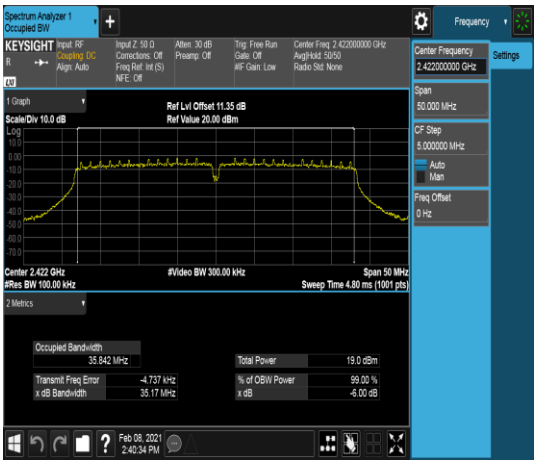
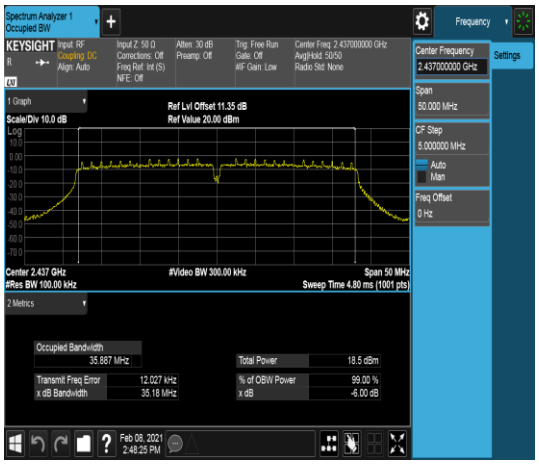
IEEE 802.11n HT40 mode- chain 1	
Low CH	**Mid CH**
	
High CH	

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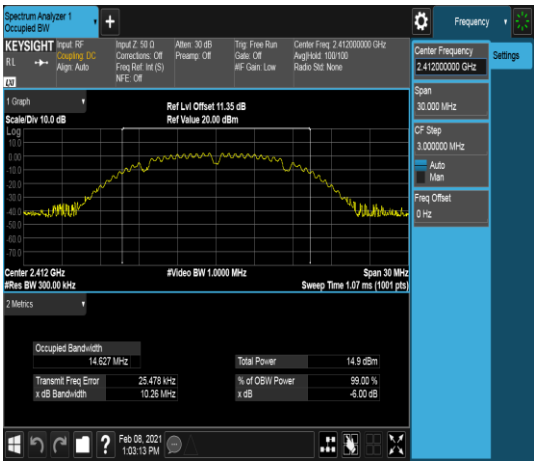
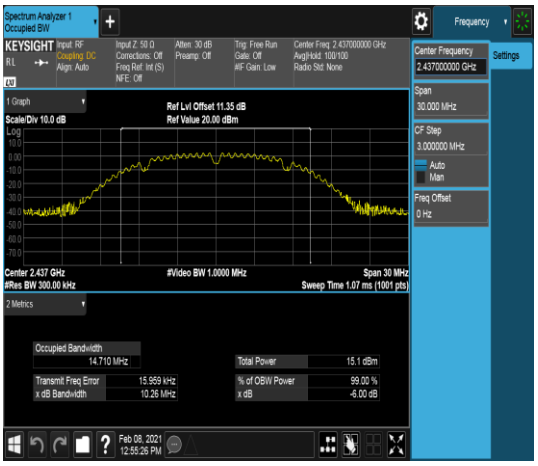
Test Data

BANDWIDTH 99%

IEEE 802.11b mode- chain 0	
Low CH	**Mid CH**
	
High CH	

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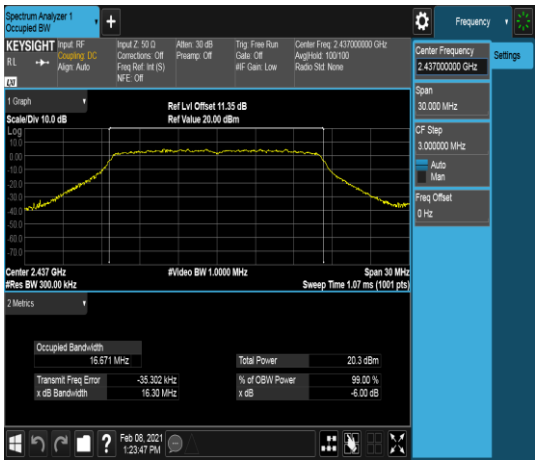
IEEE 802.11g mode- chain 0	
Low CH	**Mid CH**
	
High CH	

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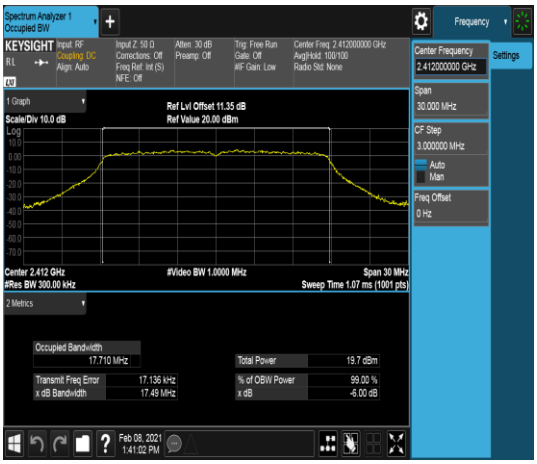
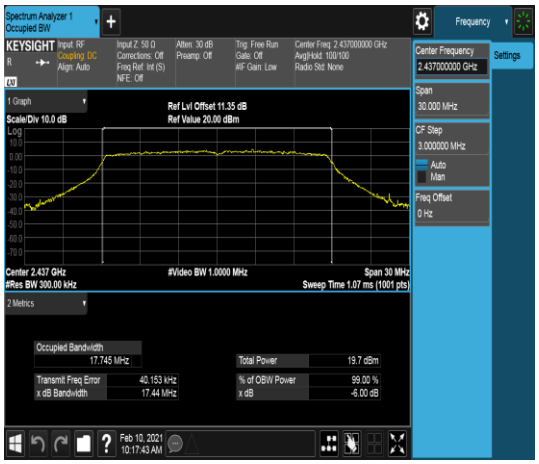
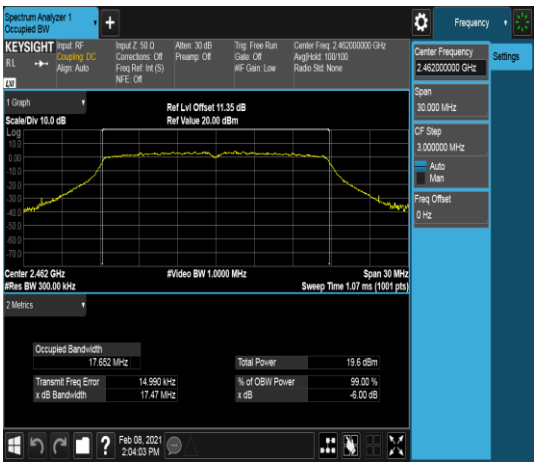
IEEE 802.11n HT20 mode- chain 0	
Low CH	**Mid CH**
	
High CH	
	

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IEEE 802.11n HT40 mode- chain 0	
Low CH	**Mid CH**
High CH	

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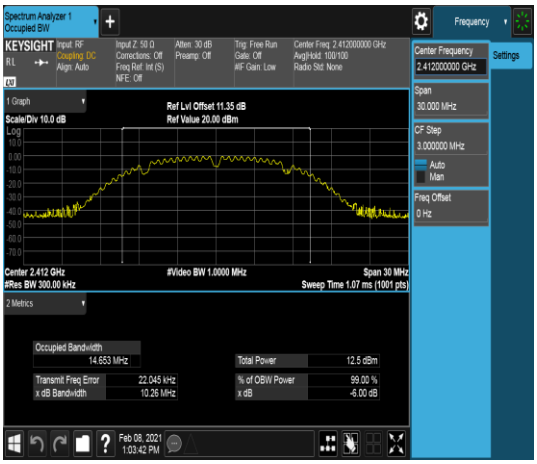
IEEE 802.11b mode- chain 1	
Low CH	**Mid CH**
	
High CH	

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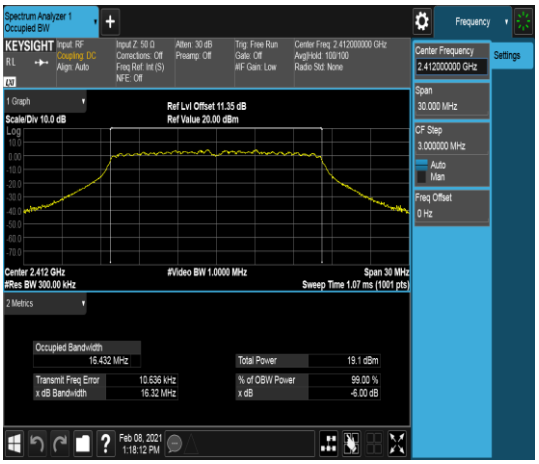
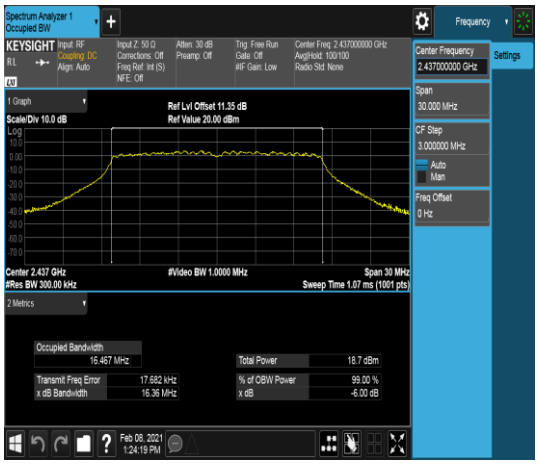
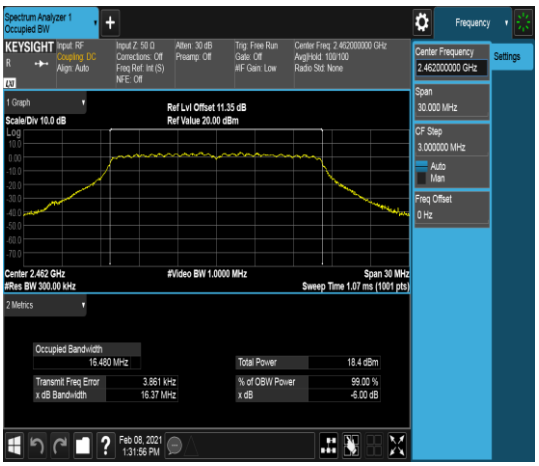
IEEE 802.11g mode- chain 1	
Low CH	**Mid CH**
	
High CH	
	

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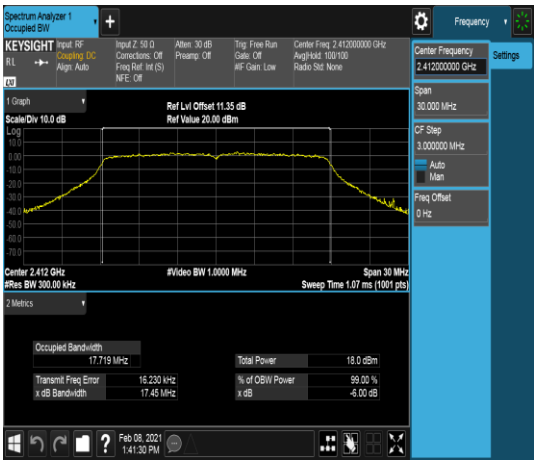
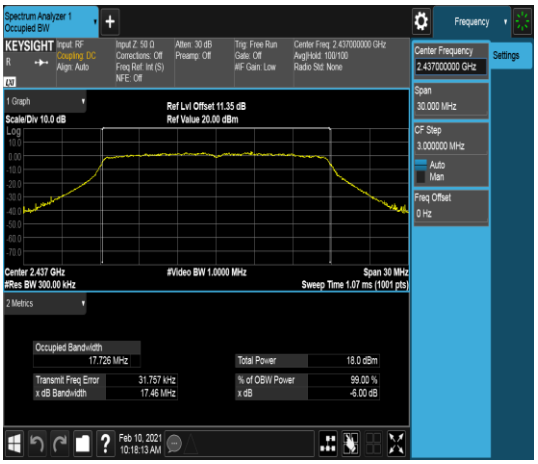
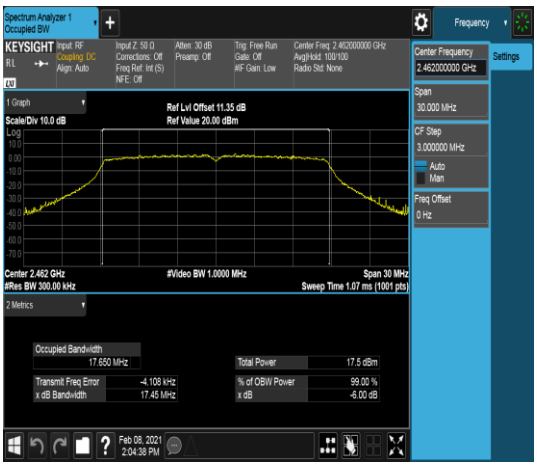
IEEE 802.11n HT20 mode- chain 1	
Low CH	**Mid CH**
	
High CH	
	

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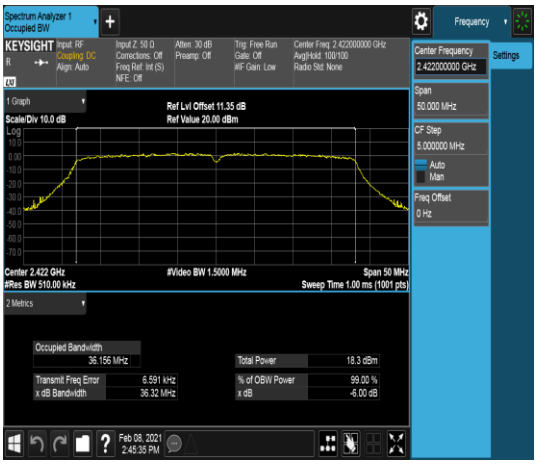
IEEE 802.11n HT40 mode- chain 1

Low CH



Mid CH

High CH

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4.3 OUTPUT POWER MEASUREMENT

4.3.1 Test Limit

According to §15.247(b),

Peak output power：

For systems using digital modulation in the 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt(30 dBm) and the e.i.r.p. shall not exceed 4Watt(36 dBm), base on the use of antennas with directional gain not exceed 6 dBi If transmitting antennas of directional gain greater than 6dBi are used the peak output power the conducted output power from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. In case of point-to-point operation, the limit has to be reduced by 1dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.

Limit	☐ Antenna not exceed 6 dBi：30dBm ☒ Antenna with DG greater than 6 dBi： [Limit = 30 – (DG – 6)] ☐ Point-to-point operation：

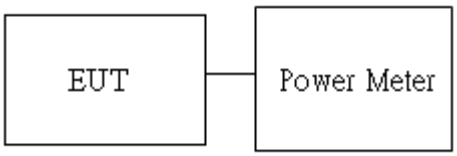
Average output power：For reporting purposes only.

4.3.2 Test Procedure

Test method Refer as ANSI C63.10:2013.

1. The EUT RF output connected to the power meter by RF cable.
2. Setting maximum power transmit of EUT.
3. The path loss was compensated to the results for each measurement.
4. Measure and record the result of Peak output power and Average output power. in the test report.

4.3.3 Test Setup



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4.3.4 Test Result

Temperature: 22.9℃ **Humidity:** 52.5% RH

Tested by: Lance Chen **Test date:** February 8, 2021

Peak output power：

Test Mode: IEEE 802.11b Mode

CH	Freq. (MHz)	Data Rate	Power Set	Peak Output Power (dBm)		Total Peak Output Power (dBm)	Limit (dBm)	RESULT
				Chain0	Chain1	(dBm)		
1	2412	1	63	14.62	11.96	16.50	30	PASS
6	2437	1	63	14.58	11.76	16.41		PASS
11	2462	1	63	14.75	11.82	**16.54**		PASS

Test Mode: IEEE 802.11g Mode

CH	Freq. (MHz)	Data Rate	Power Set	Peak Output Power (dBm)		Total Peak Output Power (dBm)	Limit (dBm)	RESULT
				Chain0	Chain1	(dBm)		
1	2412	6	63	24.32	23.09	**26.76**	30	PASS
6	2437	6	63	23.98	22.64	26.37		PASS
11	2462	6	63	23.52	22.35	25.98		PASS

Test Mode: IEEE 802.11n HT 20 MHz Mode

CH	Freq. (MHz)	Data Rate	Power Set	Peak Output Power (dBm)		Total Peak Output Power (dBm)	Limit (dBm)	RESULT
				Chain0	Chain1	(dBm)		
1	2412	MCS8	60	23.56	21.98	**25.85**	30	PASS
6	2437	MCS8	60	22.46	22.16	25.32		PASS
11	2462	MCS8	60	22.33	21.11	24.77		PASS

Test Mode: IEEE 802.11n HT 40 MHz Mode

CH	Freq. (MHz)	Data Rate	Power Set	Peak Output Power (dBm)		Total Peak Output Power (dBm)	Limit (dBm)	RESULT
				Chain0	Chain1	(dBm)		
3	2422	MCS8	60	23.41	22.15	**25.84**	30	PASS
6	2437	MCS8	60	22.29	20.91	24.66		PASS
9	2452	MCS8	60	21.36	21.63	24.51		PASS

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Average output power：

Test Mode: IEEE 802.11b Mode

CH	Freq. (MHz)	Data Rate	Power Set	Avg. Output Power (dBm)		Max. Avg. Output include tune up tolerance Power (dBm)	Limit (dBm)	RESULT
				Chain0	Chain1	(dBm)		
1	2412	1	63	12.66	9.79	14.62	30	PASS
6	2437	1	63	12.97	9.86	**14.85**		PASS
11	2462	1	63	12.42	9.63	14.41		PASS

Test Mode: IEEE 802.11g Mode

CH	Freq. (MHz)	Data Rate	Power Set	Avg. Output Power (dBm)		Max. Avg. Output include tune up tolerance Power (dBm)	Limit (dBm)	RESULT
				Chain0	Chain1	(dBm)		
1	2412	6	63	14.21	12.74	16.92	30	PASS
6	2437	6	63	13.95	12.42	16.64		PASS
11	2462	6	63	14.75	12.17	**17.03**		PASS

Test Mode: IEEE 802.11n HT 20 MHz Mode

CH	Freq. (MHz)	Data Rate	Power Set	Avg. Output Power (dBm)		Max. Avg. Output include tune up tolerance Power (dBm)	Limit (dBm)	RESULT
				Chain0	Chain1	(dBm)		
1	2412	MCS8	60	13.21	12.06	**15.91**	30	PASS
6	2437	MCS8	60	13.06	11.83	15.73		PASS
11	2462	MCS8	60	12.97	11.72	15.63		PASS

Test Mode: IEEE 802.11n HT 40 MHz Mode

CH	Freq. (MHz)	Data Rate	Power Set	Avg. Output Power (dBm)		Max. Avg. Output include tune up tolerance Power (dBm)	Limit (dBm)	RESULT
				Chain0	Chain1	(dBm)		
3	2422	MCS8	60	13.09	11.26	**16.13**	30	PASS
6	2437	MCS8	60	12.76	10.96	15.81		PASS
9	2452	MCS8	60	12.56	10.76	15.61		PASS

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4.4 POWER SPECTRAL DENSITY

4.4.1 Test Limit

According to §15.247(e),

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

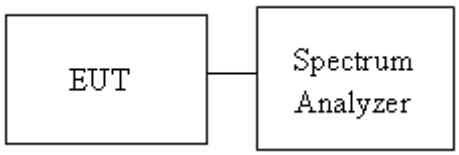
Limit	☐ Antenna not exceed 6 dBi：8dBm ☒ Antenna with DG greater than 6 dBi： [Limit = 8 – (DG – 6)] ☐ Point-to-point operation：

4.4.2 Test Procedure

Test method Refer as ANSI C63.10:2013,

1. The EUT RF output connected to the spectrum analyzer by RF cable.
2. Setting maximum power transmit of EUT
3. SA set RBW = 3kHz, VBW = 10kHz, Span = 1.5 times DTS Bandwidth (6 dB BW), Detector = Peak, Sweep Time = Auto and Trace = Max hold.
4. The path loss and Duty Factor were compensated to the results for each measurement by SA.
5. Mark the maximum level.
6. Measure and record the result of power spectral density. in the test report.

4.4.3 Test Setup



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4.4.4 Test Result

Temperature:	22.9℃	**Humidity:**	52.5% RH
Tested by:	Lance Chen	**Test date:**	February 8, 2021
Temperature:	23.0℃	**Humidity:**	51.1% RH
Tested by:	Lance Chen	**Test date:**	February 10, 2021

Test mode: IEEE 802.11b mode / 2412-2462 MHz					
Channel	**Frequency (MHz)**	**Chain 0 PPSD (dBm)**	**Chain 1 PPSD (dBm)**	**Total PPSD (dBm/3kHz)**	**Limit (dBm/3kHz)**
Low	2412	-11.84	-13.62	-9.48	8
Mid	2437	-12.81	-14.97	-10.59	
High	2462	-11.63	-14.59	-9.70	

Test mode: IEEE 802.11g mode / 2412-2462 MHz					
Channel	**Frequency (MHz)**	**Chain 0 PPSD (dBm)**	**Chain 1 PPSD (dBm)**	**Total PPSD (dBm/3kHz)**	**Limit (dBm/3kHz)**
Low	2412	-11.40	-12.47	-8.52	8
Mid	2437	-11.77	-13.27	-9.07	
High	2462	-11.68	-13.59	-9.15	

Test mode: IEEE 802.11n HT 20 MHz mode / 2412-2462 MHz					
Channel	**Frequency (MHz)**	**Chain 0 PPSD (dBm)**	**Chain 1 PPSD (dBm)**	**Total PPSD (dBm/3kHz)**	**Limit (dBm/3kHz)**
Low	2412	-9.46	-13.53	-7.79	8
Mid	2437	-12.31	-14.57	-10.05	
High	2462	-12.57	-14.54	-10.20	

Test mode: IEEE 802.11n HT 40 MHz mode / 2422-2452 MHz					
Channel	**Frequency (MHz)**	**Chain 0 PPSD (dBm)**	**Chain 1 PPSD (dBm)**	**Total PPSD (dBm/3kHz)**	**Limit (dBm/3kHz)**
Low	2422	-15.15	-16.93	-12.09	8
Mid	2437	-15.78	-16.94	-12.46	
High	2452	-16.23	-18.05	-13.19	

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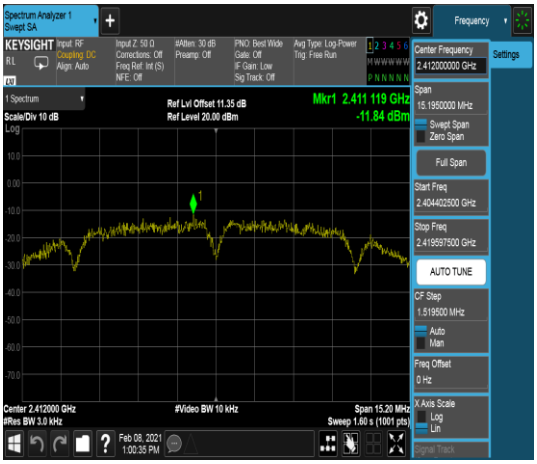
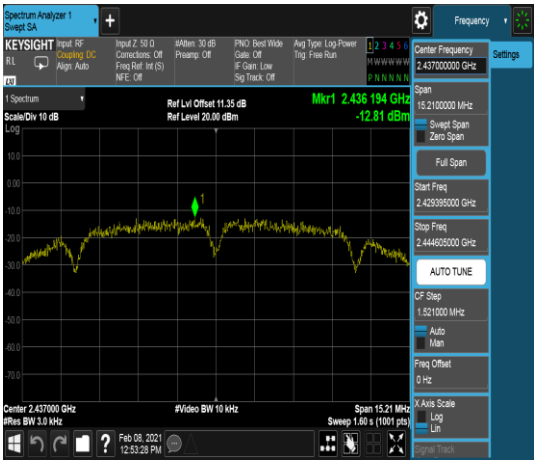
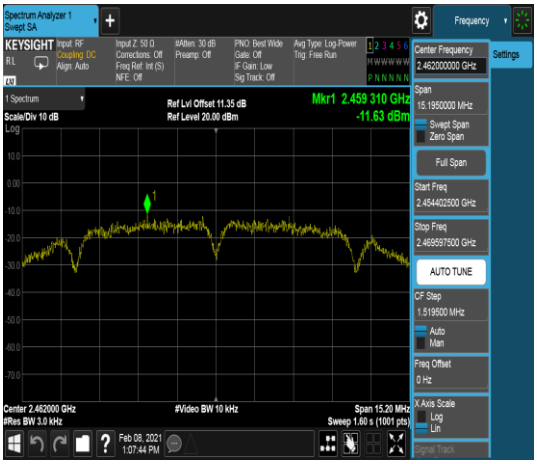
Test Data

IEEE 802.11b mode- chain 0	
Low CH	**Mid CH**
	
High CH	
	

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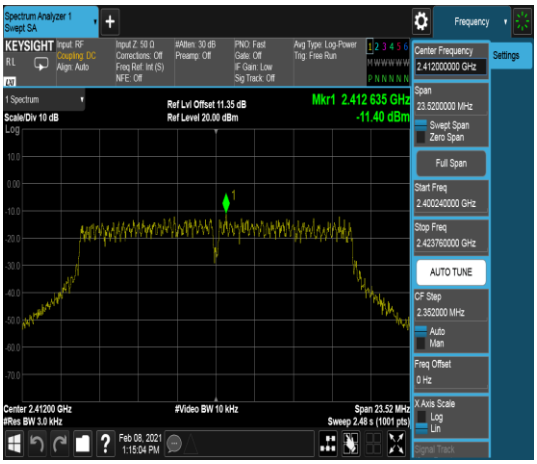
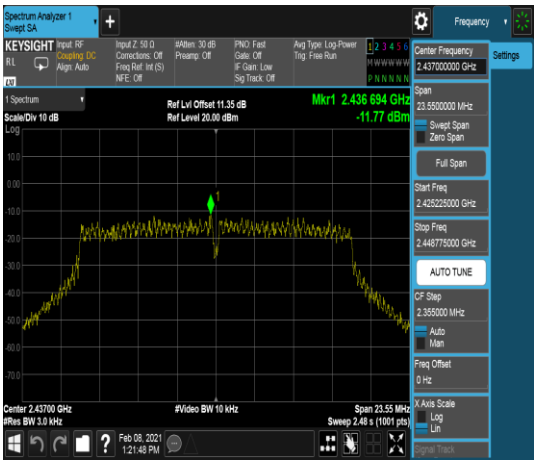
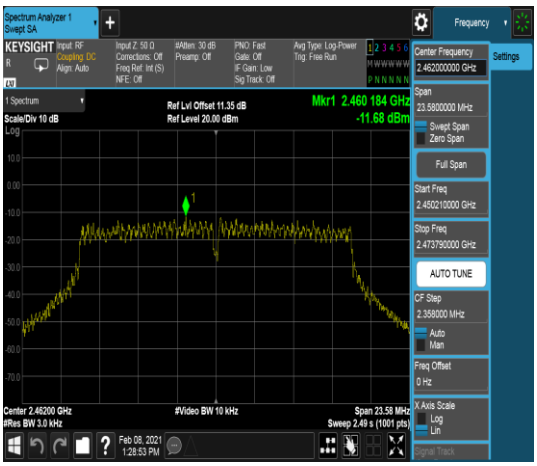
IEEE 802.11g mode- chain 0	
Low CH	**Mid CH**
	
High CH	
	

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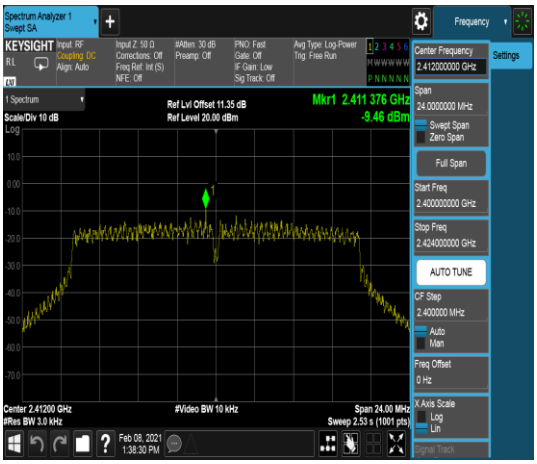
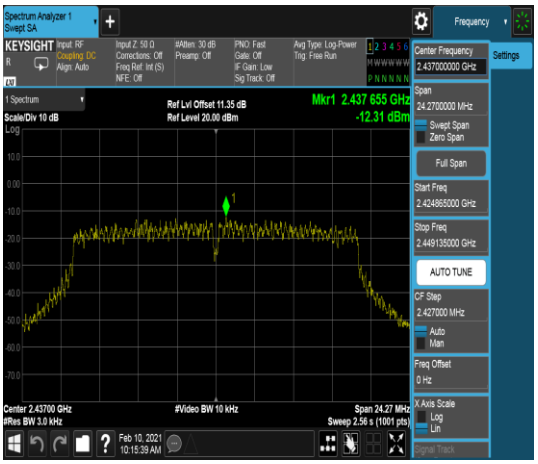
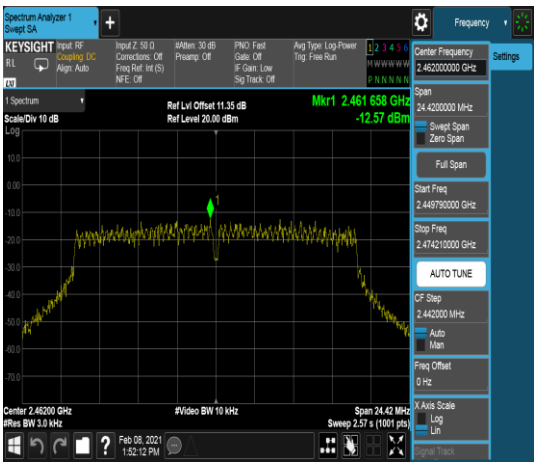
IEEE 802.11n HT20 mode- chain 0	
Low CH	**Mid CH**
	
High CH	
	

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