



**CFR 47 FCC PART 15 SUBPART C  
ISED RSS-247 ISSUE 2**

**TEST REPORT**

*For*

**Conbox**

**MODEL NUMBER: SR-700**

**FCC ID: 2ATCV-SR700  
IC: 25038-SR700**

**REPORT NUMBER: 4788821505-1**

**ISSUE DATE: May 22, 2019**

*Prepared for*

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Revision History

Rev.	Issue Date	Revisions	Revised By
V0	05/22/2019	Initial Issue	



Summary of Test Results			
Clause	Test Items	FCC/IC Rules	Test Results
1	6dB Bandwidth and 99% Occupied Bandwidth	FCC Part 15.247 (a) (2) RSS-247 Clause 5.2 (a) ISED RSS-Gen Clause 6.7	Pass
2	Peak Conducted Output Power	FCC Part 15.247 (b) (3) RSS-247 Clause 5.4 (d)	Pass
3	Power Spectral Density	FCC Part 15.247 (e) RSS-247 Clause 5.2 (b)	Pass
4	Conducted Bandedge and Spurious Emission	FCC Part 15.247 (d) RSS-247 Clause 5.5	Pass
5	Radiated Bandedge and Spurious Emission	FCC Part 15.247 (d) FCC Part 15.209 FCC Part 15.205 RSS-247 Clause 5.5 RSS-GEN Clause 8.9	Pass
6	Conducted Emission Test For AC Power Port	FCC Part 15.207 RSS-GEN Clause 8.8	Pass
7	Antenna Requirement	FCC Part 15.203 RSS-GEN Clause 8.3	Pass
<p>1) For this product, it has two antennas, antenna1 and antenna2, the 802.11B SISO&amp;802.11G SISO modes are use the SISO technical, but the ant1 and ant2 can transmitter in the same time under these modes. The 802.11N (HT20 &amp; HT40) uses both the SISO and MIMO technical.</p> <p>2) Pre-testing Antenna 1 and Antenna2, and pre-testing SISO and MIMO modes, only the data of the worse case is shown in this test repot.</p>			



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## 1. ATTESTATION OF TEST RESULTS

### Applicant Information

Company Name: Shanghai Gaussian Automation Technology Development Co.,LTD  
Address: No.899 Dangui Rd., Pudong District Shanghai, 201203,China

### Manufacturer Information

Company Name: Shanghai Gaussian Automation Technology Development Co.,LTD  
Address: No.899 Dangui Rd., Pudong District Shanghai, 201203,China

### Factory Information

Company Name: Suzhou Gaozhixian Automation Technology Co., Ltd  
Address: Workshop No.2, No.1 Jifu Road, Korea Industrial Park, Fenghuang Town, Zhangjiagang City, Jiangsu Province, China

### EUT Description

EUT Name: Conbox  
Model: SR-700  
Sample Status: Good  
Sample Received Date: February 26, 2019  
Date of Tested: February 26~ May 22, 2019

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 FCC PART 15 SUBPART C	PASS
ISED RSS-247 Issue 2	PASS
ISED RSS-GEN Issue 5	PASS

Prepared By:

Checked By:

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Laboratory Leader

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Laboratory Manager



## 2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with KDB 558074 D01 15.247 Meas Guidance v05r02, KDB 414788 D01 Radiated Test Site v01r01, CFR 47 FCC Part 2, CFR 47 FCC Part 15, ANSI C63.10-2013, ISED RSS-247 Issue 2 and ISED RSS-GEN Issue 5.

## 3. FACILITIES AND ACCREDITATION

Accreditation Certificate	<p><b>A2LA (Certificate No.: 4102.01)</b> UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. has been assessed and proved to be in compliance with A2LA.</p> <p><b>FCC (FCC Designation No.: CN1187)</b> UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. Has been recognized to perform compliance testing on equipment subject to the Commission's Declaration of Conformity (DoC) and Certification rules</p> <p><b>IC(Company No.: 21320)</b> UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. has been registered and fully described in a report filed with ISED. The Company Number is 21320.</p> <p><b>VCCI (Registration No.: G-20019, R-20004, C-20012 and T-20011)</b> UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch. has been assessed and proved to be in compliance with VCCI, the Membership No. is 3793. Facility Name: Chamber D, the VCCI registration No. is G-20019 and R-20004 Shielding Room B, the VCCI registration No. is C-20012 and T-20011</p>
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Note 1: All tests measurement facilities use to collect the measurement data are located at Building 10, Innovation Technology Park, Song Shan Lake Hi tech Development Zone, Dongguan, 523808, China

Note 2: The test anechoic chamber in UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch had been calibrated and compared to the open field sites and the test anechoic chamber is shown to be equivalent to or worst case from the open field site.

Note 3: For below 30MHz, lab had performed measurements at test anechoic chamber and comparing to measurements obtained on an open field site. And these measurements below 30MHz had been correlated to measurements performed on an OFS.



## 4. CALIBRATION AND UNCERTAINTY

### 4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognize national standards.

### 4.2. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

Test Item	Uncertainty
Conduction emission	3.62dB
Radiation Emission test(include Fundamental emission) (9kHz-30MHz)	2.2dB
Radiation Emission test(include Fundamental emission) (30MHz-1GHz)	4.00dB
Radiation Emission test (1GHz to 26GHz)( include Fundamental emission)	5.78dB (1GHz-18Gz)
	5.23dB (18GHz-26Gz)
Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.	





## 5. EQUIPMENT UNDER TEST

### 5.1. DESCRIPTION OF EUT

EUT Name	Conbox
Model	SR-700
Radio Technology	IEEE802.11b/g/n HT20&HT40
Operation frequency	IEEE 802.11b: 2412MHz—2462MHz IEEE 802.11g: 2412MHz—2462MHz IEEE 802.11n HT20: 2412MHz—2462MHz IEEE 802.11n HT40: 2422MHz—2452MHz
Modulation	IEEE 802.11b: DSSS(CCK) IEEE 802.11g: OFDM(64QAM, 16QAM, QPSK, BPSK) IEEE 802.11n HT20: OFDM (64QAM, 16QAM, QPSK,BPSK) IEEE 802.11n HT40: OFDM (64QAM, 16QAM, QPSK,BPSK)
Power Supply	DC 5V



## 5.2. MAXIMUM OUTPUT POWER

Number of Transmit Chains (NTX)	IEE Std. 802.11	Frequency (MHz)	Channel Number	Max PK Conducted Power (dBm)
2	IEEE 802.11b Ant1+Ant2	2412-2462	1-11[11]	17.29
2	IEEE 802.11g Ant1+Ant2	2412-2462	1-11[11]	21.29
2	IEEE 802.11nHT20 MIMO	2412-2462	1-11[11]	17.21
2	IEEE 802.11nHT40 MIMO	2422-2452	3-9[7]	18.73

Remark: For this product, it has two antennas, antenna1 and antenna2, the 802.11B SISO&802.11G SISO modes are use the SISO technical, but the ant1 and ant2 can transmitter in the same time under these modes. The 802.11N (HT20 & HT40) uses both the SISO and MIMO technical.



### 5.3. CHANNEL LIST

Channel List for 802.11b/g/n (20 MHz)							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2412	4	2427	7	2442	10	2457
2	2417	5	2432	8	2447	11	2462
3	2422	6	2437	9	2452	/	/

Channel List for 802.11n (40 MHz)							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
3	2422	5	2432	7	2442	9	2452
4	2427	6	2437	8	2447	/	/

### 5.4. TEST CHANNEL CONFIGURATION

Test Mode	Test Channel	Frequency
WiFi TX(802.11b)	CH 1, CH 6, CH 11	2412MHz, 2437MHz, 2462MHz
WiFi TX(802.11g)	CH 1, CH 6, CH 11	2412MHz, 2437MHz, 2462MHz
WiFi TX(802.11n HT20)	CH 1, CH 6, CH 11	2412MHz, 2437MHz, 2462MHz
WiFi TX(802.11n HT40)	CH 3, CH 6, CH 9	2422MHz, 2437MHz, 2452MHz

### 5.5. THE WORSE CASE CONFIGURATIONS

The Worst Case Power Setting Parameter under 2400 ~ 2483.5MHz Band							
Test Software		MT7662 QAV1.0.2.8					
Modulation Mode	Transmit Antenna Number	Test Channel					
		NCB: 20MHz			NCB: 40MHz		
		CH 1	CH 6	CH 11	CH 3	CH 6	CH 9
802.11b	1	13	13	13	/		
	2	13	13	13			
802.11g	1	11	11	11			
	2	11	11	11			
802.11n HT20	1	9	9	9			
	2	9	9	9			
802.11n HT40	1	/			9	9	9
	2				9	9	9



## 5.6. DESCRIPTION OF AVAILABLE ANTENNAS

Antenna	Frequency (MHz)	Antenna Type	MAX Antenna Gain (dBi)
1	2412-2462	PCB Antenna	3.00
2	2412-2462	PCB Antenna	3.00

Note: Directional gain=  $10\log[(10^{G1/20} + 10^{G2/20})^2 / N_{ANT}] = 6.01 > 6\text{dBi}$   
 $N_{ANT}$ : the number of Antenna

Test Mode	Transmit and Receive Mode	Description
IEEE 802.11b	<input checked="" type="checkbox"/> 2TX, 2RX	ANT 1, 2 can be used as transmitting/receiving antenna.
IEEE 802.11g	<input checked="" type="checkbox"/> 2TX, 2RX	ANT 1, 2 can be used as transmitting/receiving antenna.
IEEE 802.11n HT20	<input checked="" type="checkbox"/> 2TX, 2RX	ANT 1, 2 can be used as transmitting/receiving antenna.
IEEE 802.11n HT40	<input checked="" type="checkbox"/> 2TX, 2RX	ANT 1, 2 can be used as transmitting/receiving antenna.
Note: 1. Only 802.11n HT20/HT40 support MIMO mode 2. WLAN 2.4G & WLAN 5G can't transmit simultaneously. (declared by client)		

## 5.7. THE WORSE CASE CONFIGURATIONS

For SISO modes, there are two transmission antennas. The antenna used in any given time can be either ANTENNA 1 or ANTENNA 2. All antenna ports have the same power; and the ANTENNA1 and ANTENNA2 can transmit at the same time, so only the worst data for antenna1+antenna2 are recorded in the report.

For 2TX MIMO modes, ANTENNA 1 and ANTENNA 2, used at the same time and have the same power setting, so only the worst MIMO mode test data were recorded in the report.

Worst-case data rates as provided by the client were:

802.11b mode: 1 Mbps  
802.11b mode: 6 Mbps  
802.11n HT20 mode: MCS0  
802.11n HT40 mode: MCS0



## 5.8. DESCRIPTION OF TEST SETUP

### SUPPORT EQUIPMENT

Item	Equipment	Brand Name	Model Name	P/N
1	Laptop	ThinkPad	E550c	N/A

### I/O CABLES

Cable No	Port	Connector Type	Cable Type	Cable Length(m)	Remarks
1	LAN	LAN	N/A	1	N/A
2	USB	N/A	N/A	1	N/A

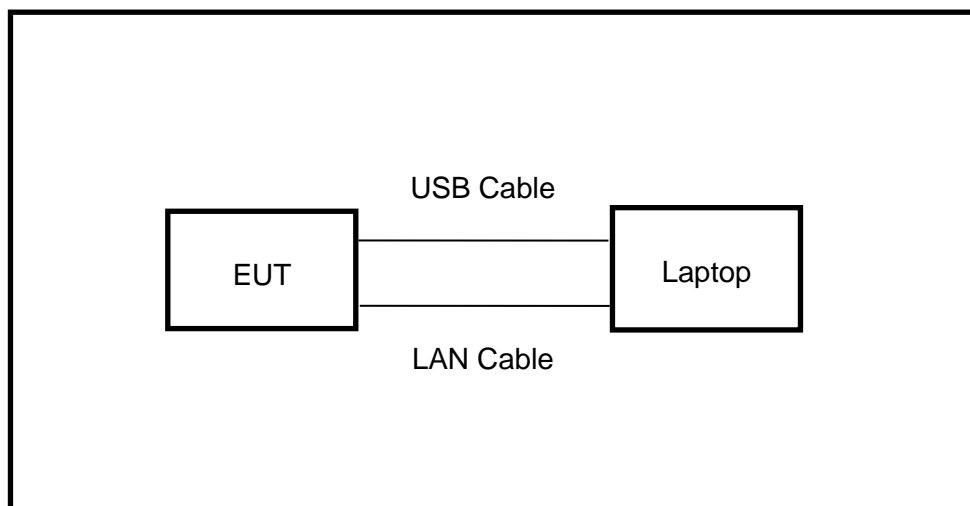
### ACCESSORIES

Item	Accessory	Brand Name	Model Name	Description
1	N/A	N/A	N/A	N/A

### TEST SETUP

The EUT can work in engineering mode with a software through a Laptop.

### SETUP DIAGRAM FOR TESTS





## 6. MEASURING INSTRUMENT AND SOFTWARE USED

Conducted Emissions						
Instrument						
Used	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
<input checked="" type="checkbox"/>	EMI Test Receiver	R&S	ESR3	101961	Dec.10,2018	Dec.10,2019
<input checked="" type="checkbox"/>	Two-Line V-Network	R&S	ENV216	101983	Dec.10,2018	Dec.10,2019
<input checked="" type="checkbox"/>	Artificial Mains Networks	Schwarzbeck	NSLK 8126	8126465	Dec.10,2018	Dec.10,2019
Software						
Used	Description		Manufacturer	Name		Version
<input checked="" type="checkbox"/>	Test Software for Conducted disturbance		Farad	EZ-EMC		Ver. UL-3A1
Radiated Emissions						
Instrument						
Used	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
<input checked="" type="checkbox"/>	MXE EMI Receiver	KESIGHT	N9038A	MY56400036	Dec.10,2018	Dec.10,2019
<input checked="" type="checkbox"/>	Hybrid Log Periodic Antenna	TDK	HLP-3003C	130960	Sep.17, 2018	Sep.17, 2021
<input checked="" type="checkbox"/>	Preamplifier	HP	8447D	2944A09099	Dec.10,2018	Dec.10,2019
<input checked="" type="checkbox"/>	EMI Measurement Receiver	R&S	ESR26	101377	Dec.10,2018	Dec.10,2019
<input checked="" type="checkbox"/>	Horn Antenna	TDK	HRN-0118	130939	Sep.17, 2018	Sep.17, 2021
<input checked="" type="checkbox"/>	High Gain Horn Antenna	Schwarzbeck	BBHA-9170	691	Aug.11, 2018	Aug.11, 2021
<input checked="" type="checkbox"/>	Preamplifier	TDK	PA-02-0118	TRS-305-00066	Dec.10,2018	Dec.10,2019
<input checked="" type="checkbox"/>	Preamplifier	TDK	PA-02-2	TRS-307-00003	Dec.10,2018	Dec.10,2019
<input checked="" type="checkbox"/>	Loop antenna	Schwarzbeck	1519B	00008	Jan.07, 2019	Jan.07, 2022
<input checked="" type="checkbox"/>	Band Reject Filter	Wainwright	WRCJV8-2350-2400-2483.5-2533.5-40SS	4	Dec.10,2018	Dec.10,2019
<input checked="" type="checkbox"/>	High Pass Filter	Wi	WHKX10-2700-3000-18000-40SS	23	Dec.10,2018	Dec.10,2019
Software						
Used	Description		Manufacturer	Name		Version
<input checked="" type="checkbox"/>	Test Software for Radiated disturbance		Farad	EZ-EMC		Ver. UL-3A1
Other instruments						



Used	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
<input checked="" type="checkbox"/>	Spectrum Analyzer	Keysight	N9030A	MY55410512	Dec.10,2018	Dec.10,2019
<input checked="" type="checkbox"/>	Power Meter	Keysight	N1911A	MY55416024	Dec.10,2018	Dec.10,2019
<input checked="" type="checkbox"/>	Power Sensor	Keysight	U2021XA	MY5100022	Dec.10,2018	Dec.10,2019



## 7. MEASUREMENT METHODS

No.	Test Item	KDB Name	Section
1	6dB Bandwidth	KDB 558074 D01 15.247 Meas Guidance v05r02	8.2
2	Peak Output Power	KDB 558074 D01 15.247 Meas Guidance v05r02	8.3.1.3/8.3.2.3
3	Power Spectral Density	KDB 558074 D01 15.247 Meas Guidance v05r02	8.4
4	Out-of-band emissions in non-restricted bands	KDB 558074 D01 15.247 Meas Guidance v05r02	8.5
5	Out-of-band emissions in restricted bands	KDB 558074 D01 15.247 Meas Guidance v05r02	8.6
6	Band-edge	KDB 558074 D01 15.247 Meas Guidance v05r02	8.7
7	Conducted Emission Test For AC Power Port	ANSI C63.10-2013	6.2
8	99% Bandwidth	ANSI C63.10-2013	6.9.3





## 8. ANTENNA PORT TEST RESULTS

### 8.1. ON TIME AND DUTY CYCLE

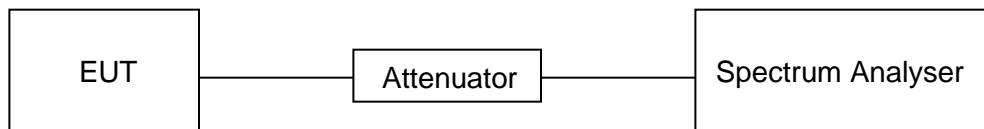
#### LIMITS

None; for reporting purposes only

#### PROCEDURE

KDB 558074 Zero-Span Spectrum Analyzer Method

#### TEST SETUP



#### TEST ENVIRONMENT

Temperature	20°C	Relative Humidity	56%
Atmosphere Pressure	101kPa	Test Voltage	DC 5.0V

#### RESULTS

##### ANTENNA1

Mode	On Time (msec)	Period (msec)	Duty Cycle x (Linear)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	1/T Minimum VBW (KHz)	Final setting For VBW (KHz)
11b 1TX	20.27	20.27	1	100	0	0.049	0.01
11g 1TX	20.27	20.27	1	100	0	0.049	0.01
11n HT20	20.27	20.27	1	100	0	0.049	0.01
11n HT40	20.27	20.27	1	100	0	0.049	0.01

Note:

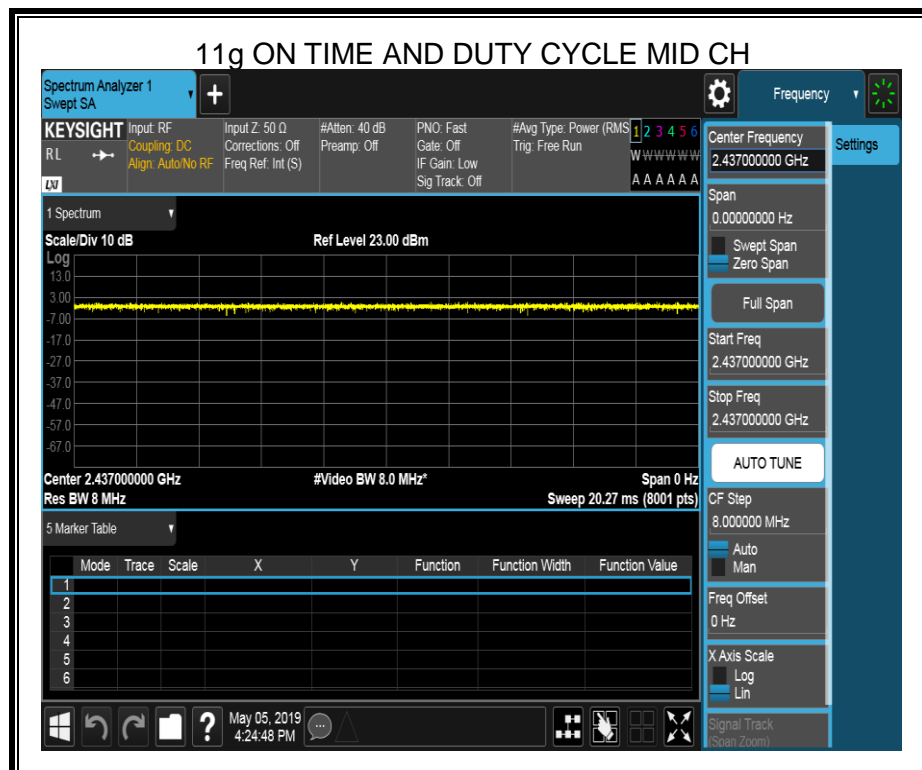
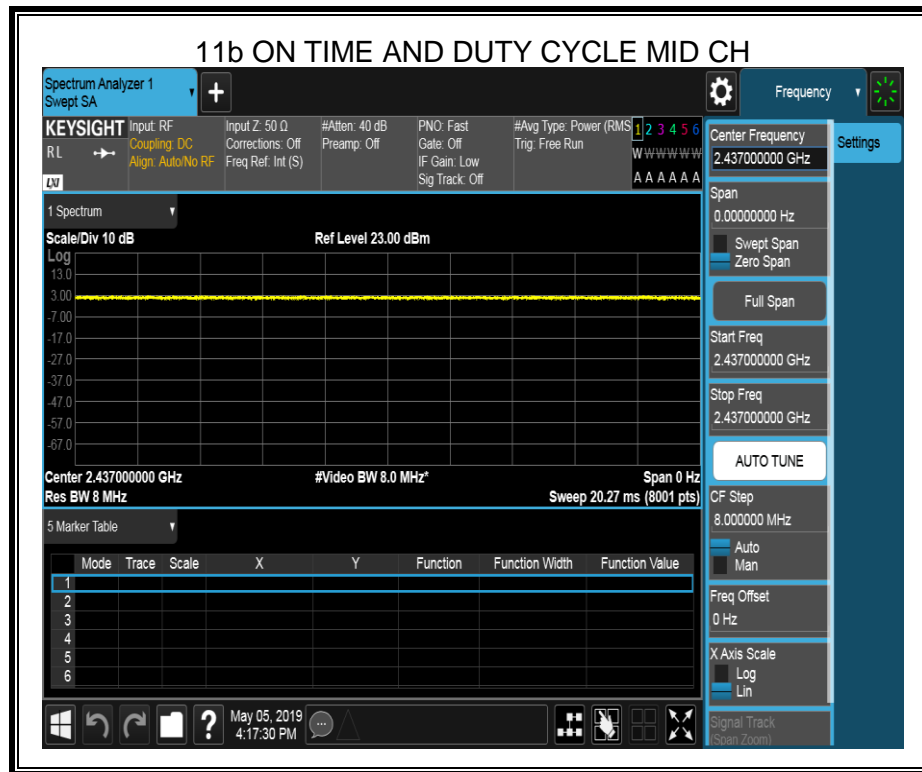
Duty Cycle Correction Factor=10log (1/x).

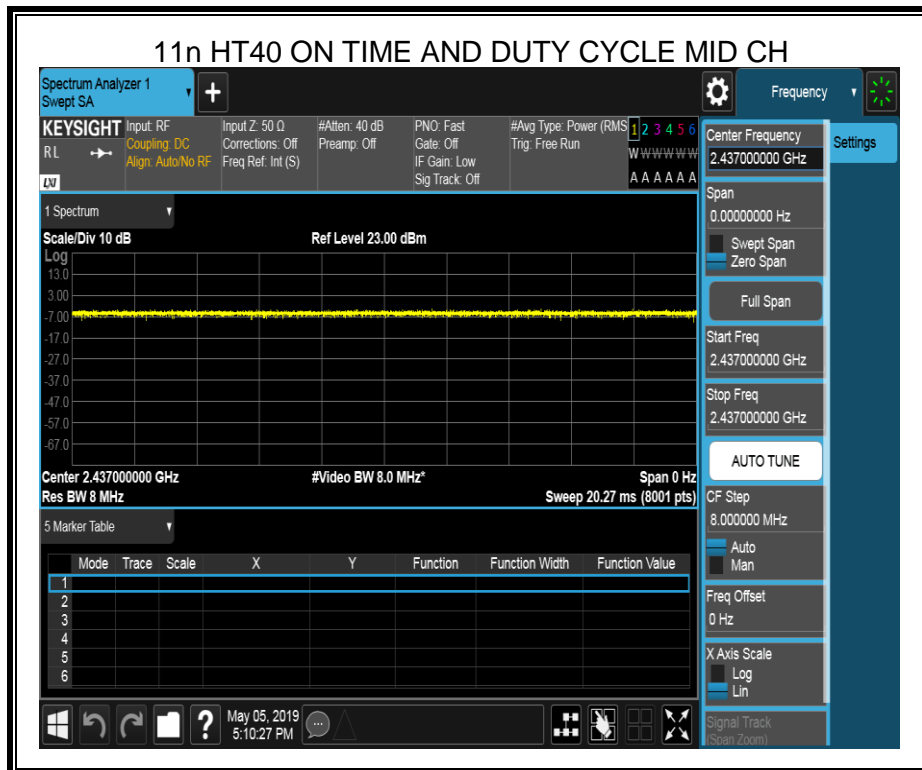
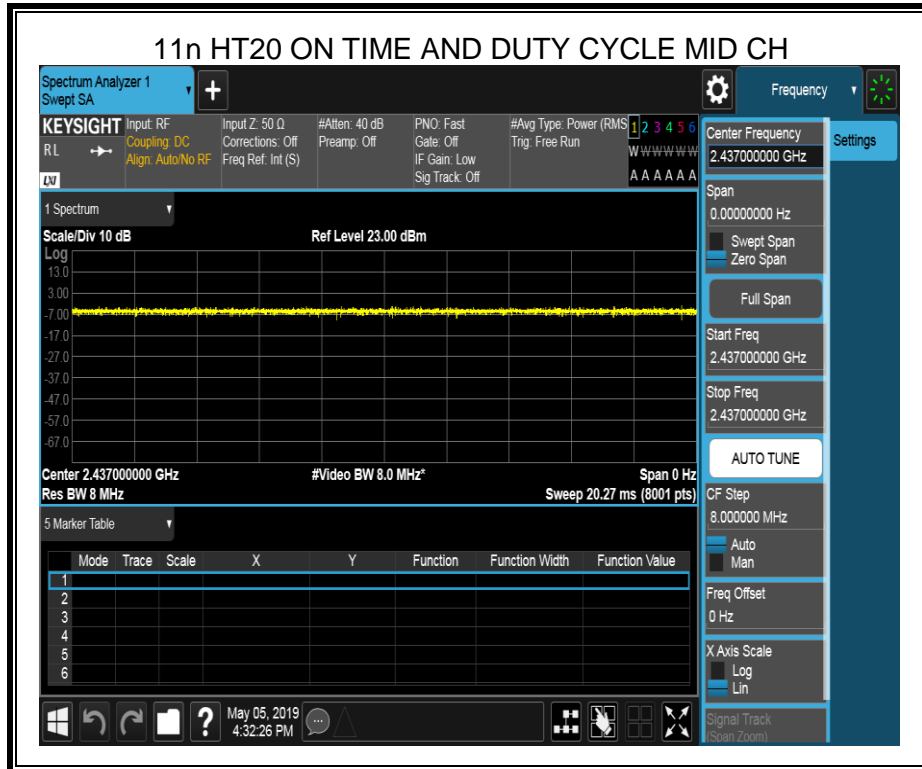
Where: x is Duty Cycle (Linear)

Where: T is On Time

If that calculated VBW is not available on the analyzer then the next higher value should be used.

Antenna 1 and Antenna 2 has the same duty cycle, only ANT 1 data show here.







## 8.2. 6 dB DTS BANDWIDTH AND 99% OCCUPIED BANDWIDTH

### LIMITS

CFR 47 FCC Part15 (15.247) Subpart C ISED RSS-247 ISSUE 2			
Section	Test Item	Limit	Frequency Range (MHz)
CFR 47 FCC 15.247(a)(2) ISED RSS-247 5.2 (a)	6 dB Bandwidth	$\geq 500\text{KHz}$	2400-2483.5
ISED RSS-Gen Clause 6.7	99% Occupied Bandwidth	For reporting purposes only.	2400-2483.5

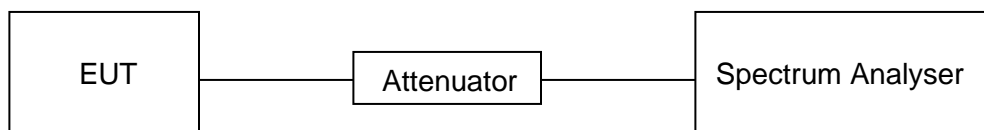
### TEST PROCEDURE

Connect the UUT to the spectrum analyser and use the following settings:

Center Frequency	The centre frequency of the channel under test
Detector	Peak
RBW	For 6dB Bandwidth :100K For 99% Occupied Bandwidth :1% to 5% of the occupied bandwidth
VBW	For 6dB Bandwidth : $\geq 3 \times \text{RBW}$ For 99% Occupied Bandwidth : approximately $3 \times \text{RBW}$
Trace	Max hold
Sweep	Auto couple

Allow the trace to stabilize and measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB and 99% relative to the maximum level measured in the fundamental emission.

### TEST SETUP





## TEST ENVIRONMENT

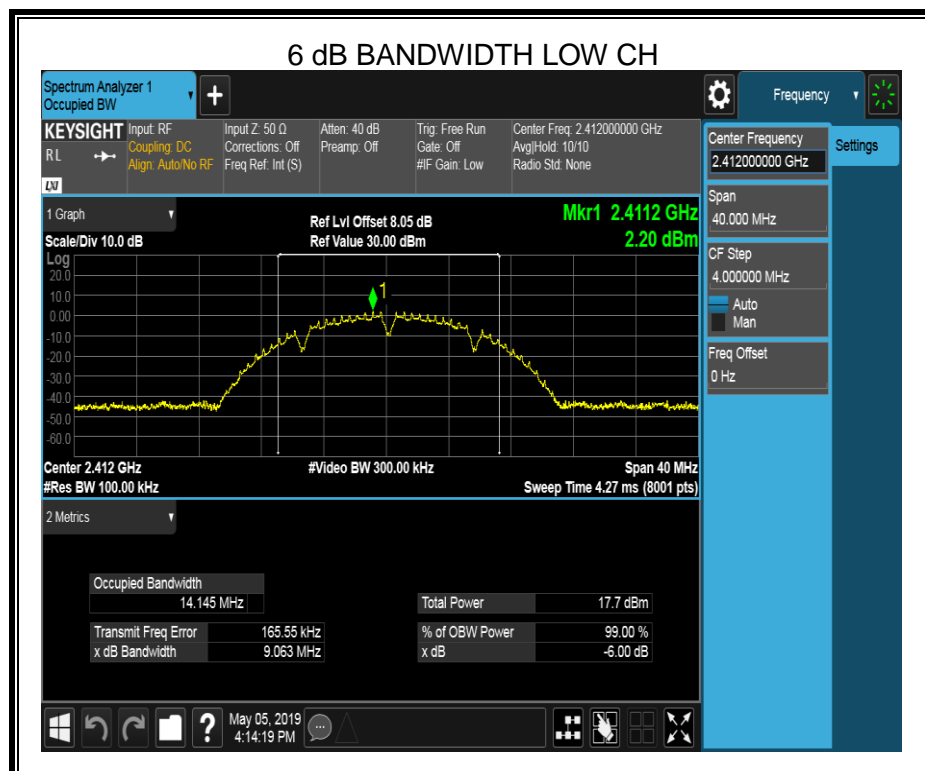
Temperature	20°C	Relative Humidity	56%
Atmosphere Pressure	101kPa	Test Voltage	DC 5.0V

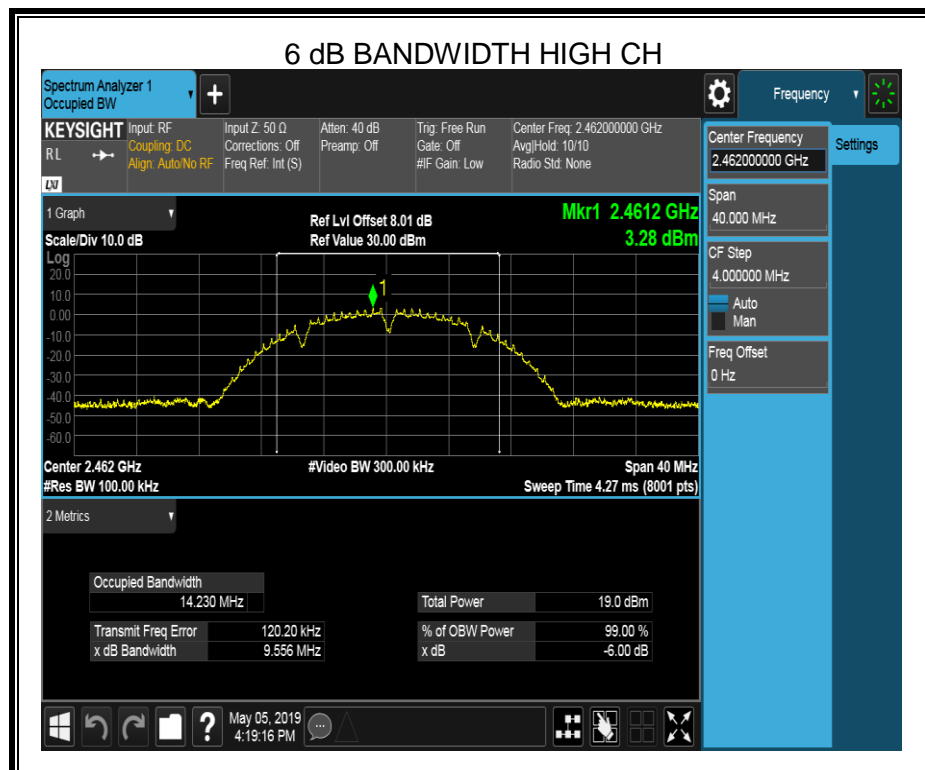
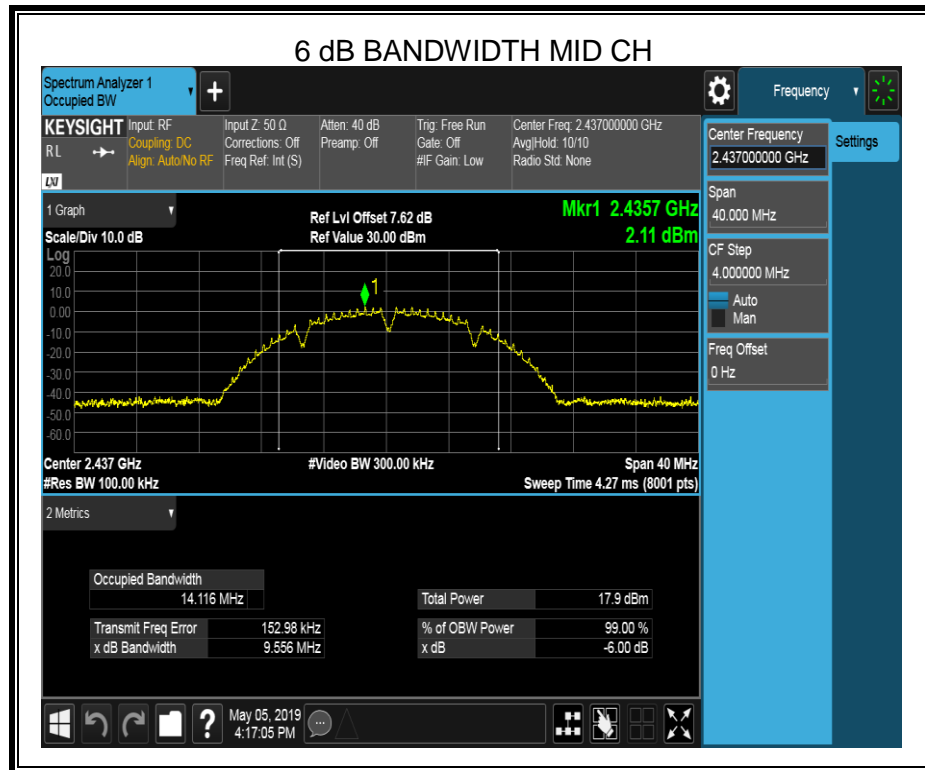
## RESULTS

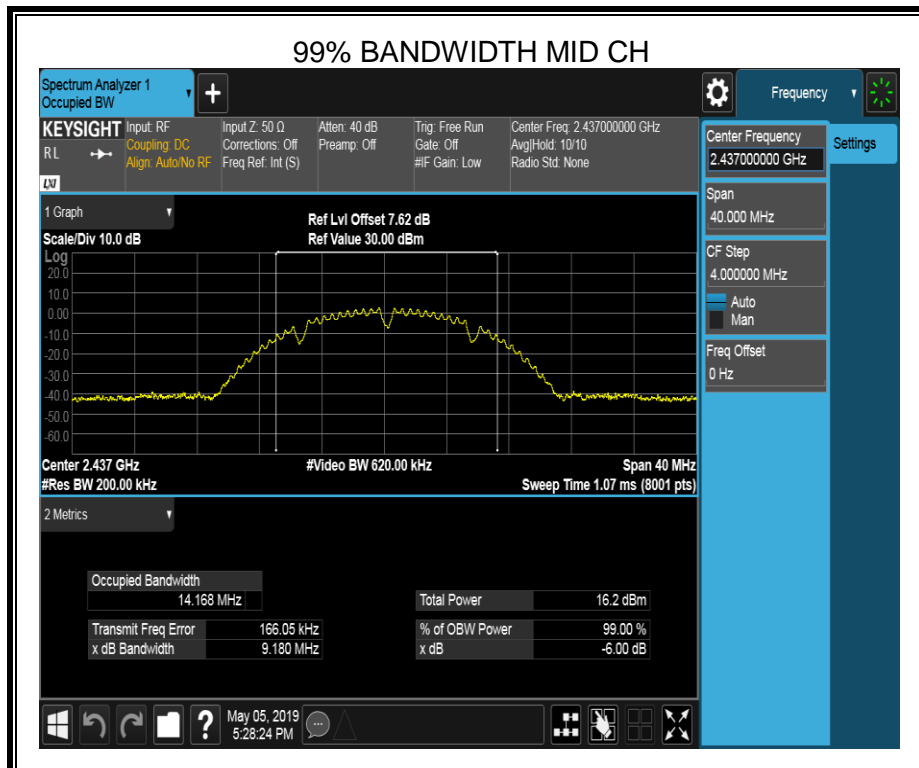
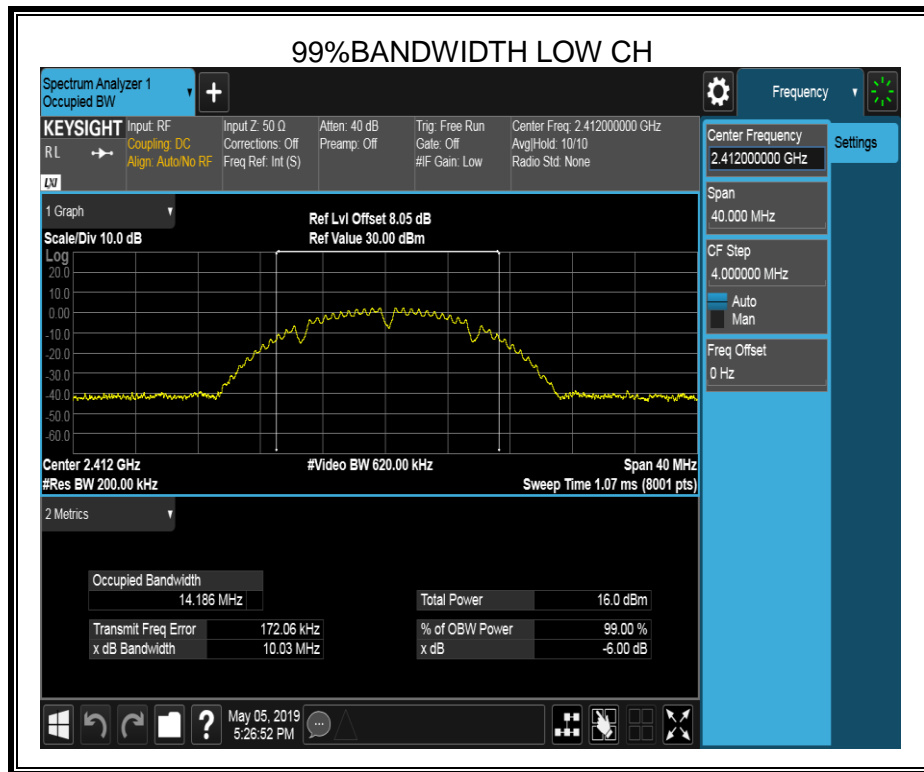
### 8.2.1. 802.11b SISO MODE

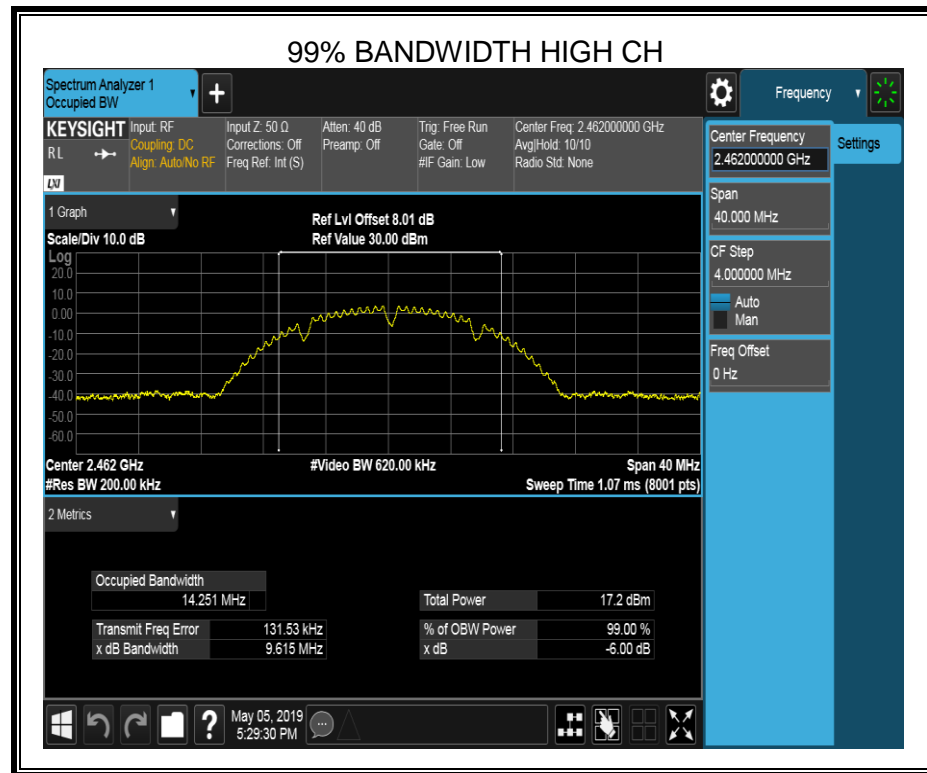
#### ANTENNA1

Channel	6dB bandwidth (MHz)	99% bandwidth (MHz)	Limit (kHz)	Result
Low	9.063	14.19	≥500	Pass
Middle	9.556	14.17	≥500	Pass
High	9.556	14.25	≥500	Pass







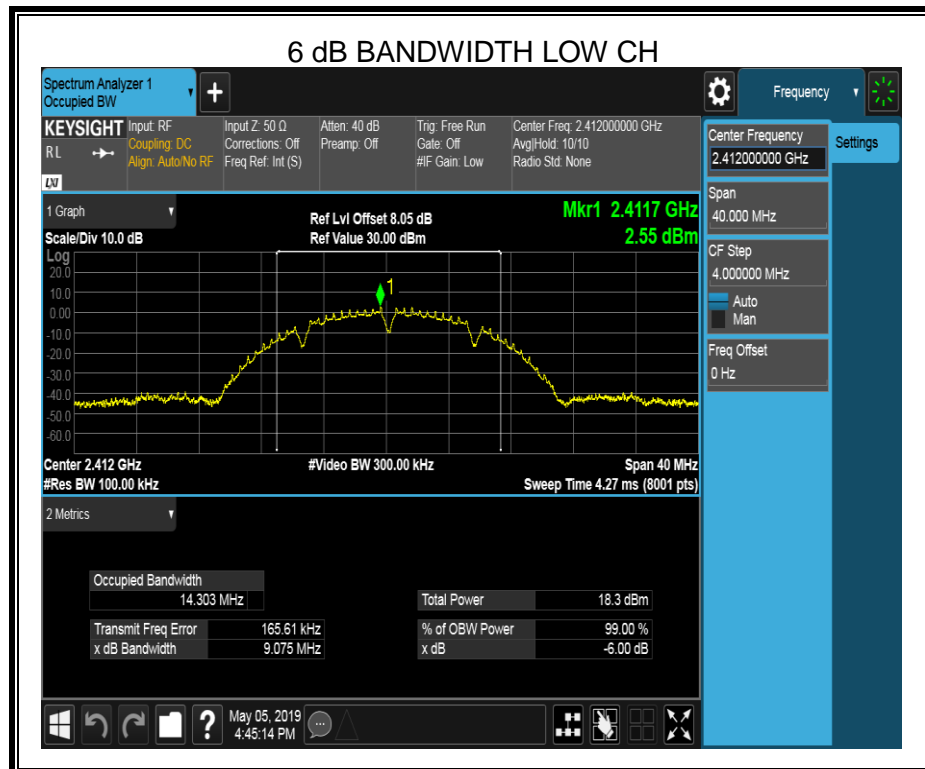


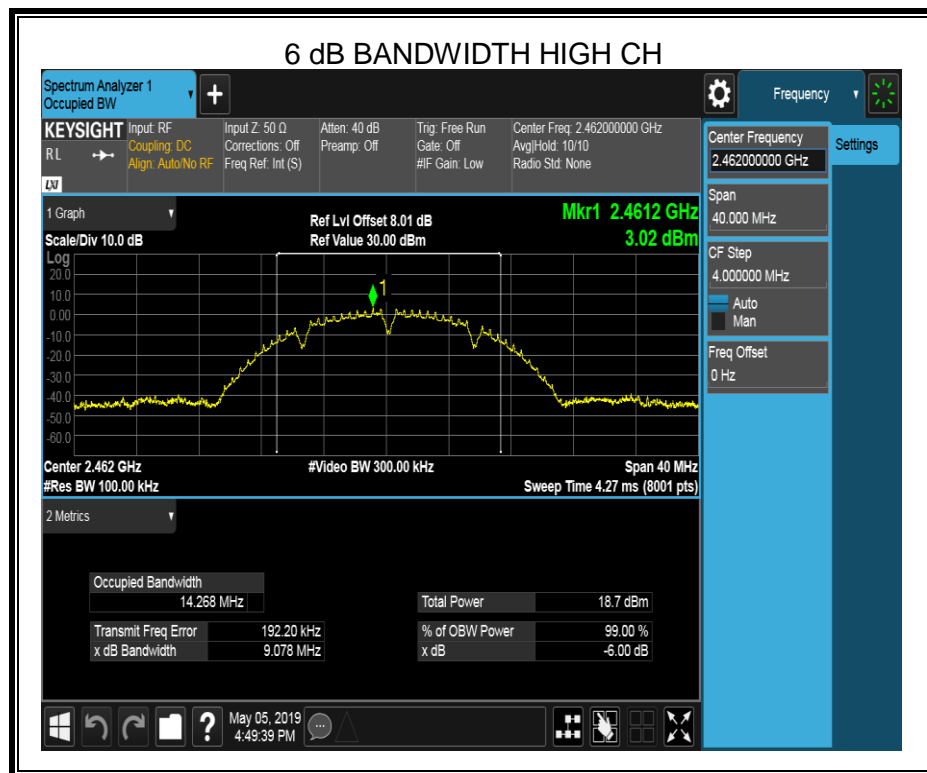
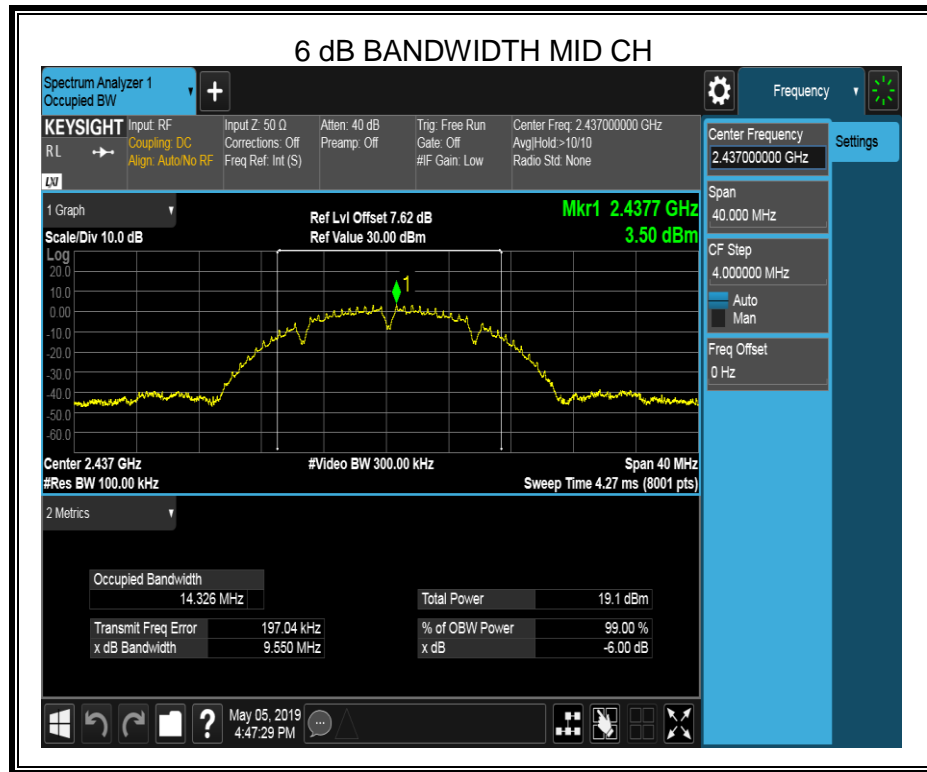


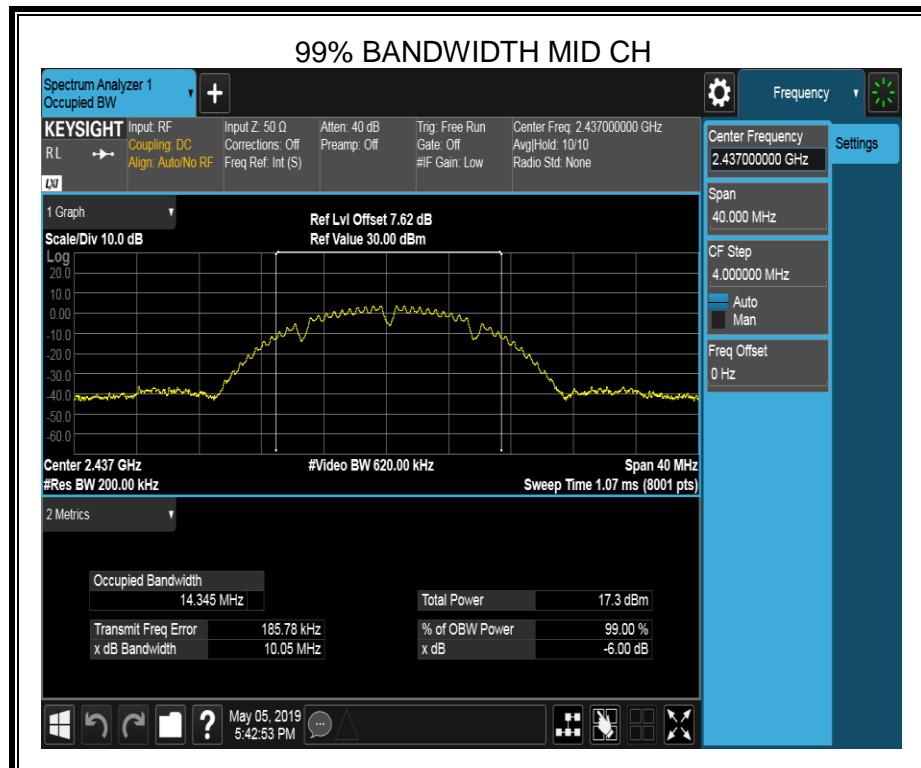
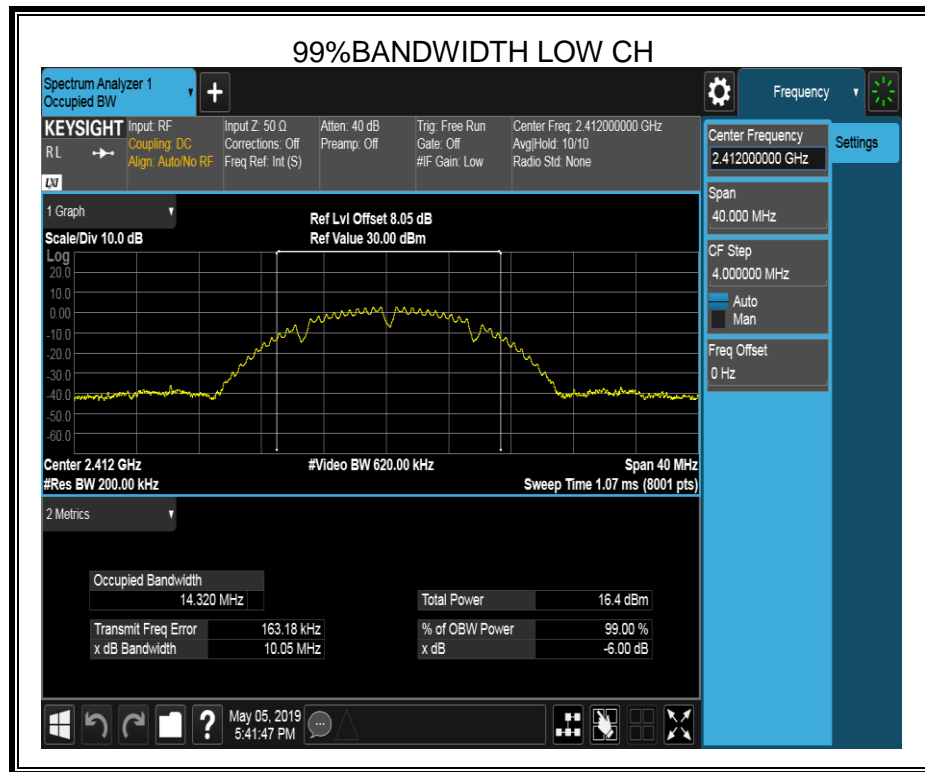


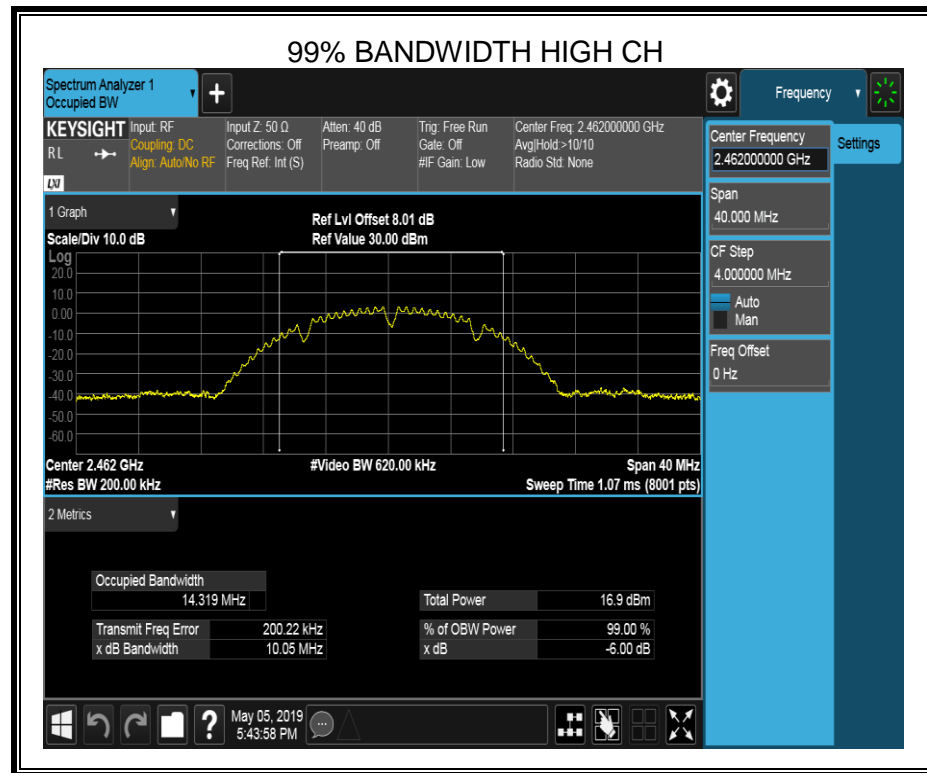
### ANTENNA2

Channel	6dB bandwidth (MHz)	99% bandwidth (MHz)	Limit (kHz)	Result
Low	9.063	14.32	≥500	Pass
Middle	9.556	14.35	≥500	Pass
High	9.556	14.32	≥500	Pass





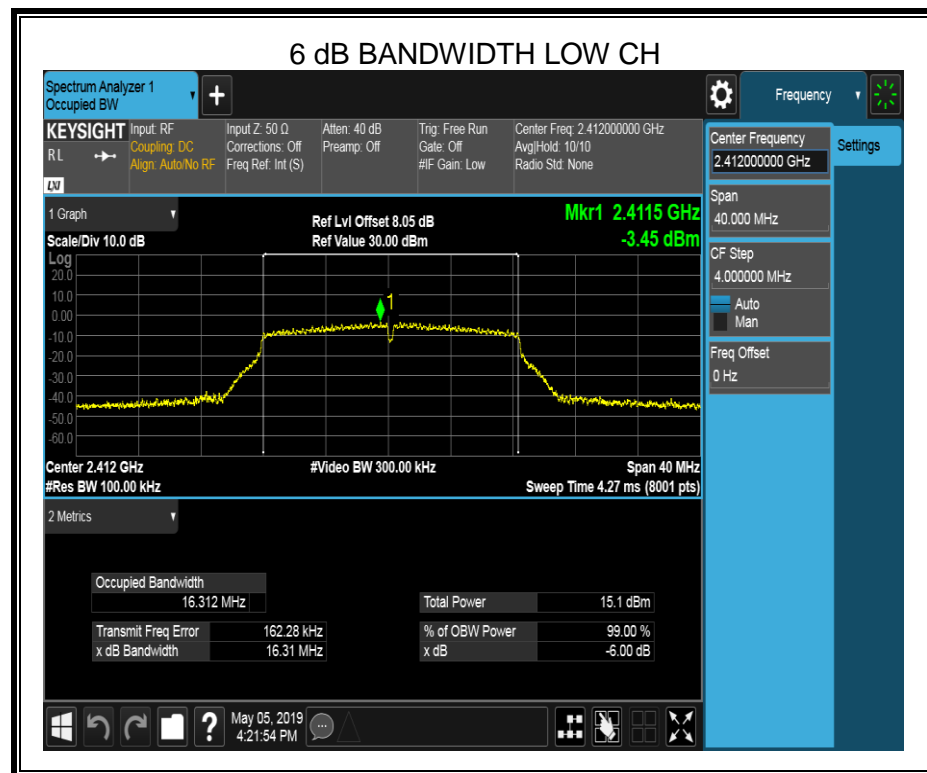


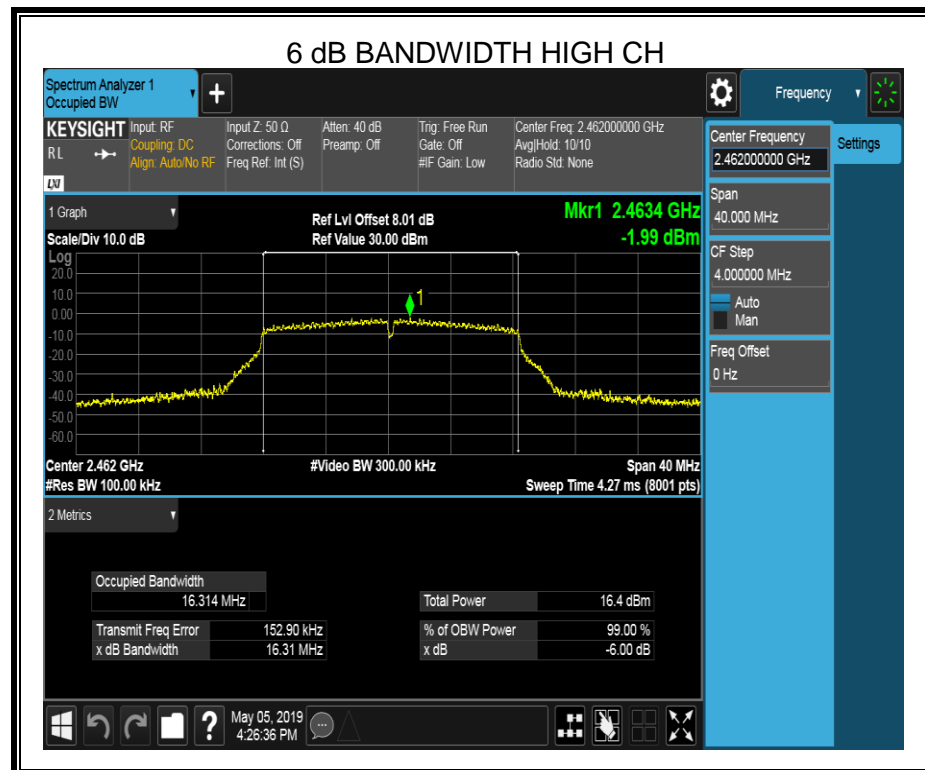
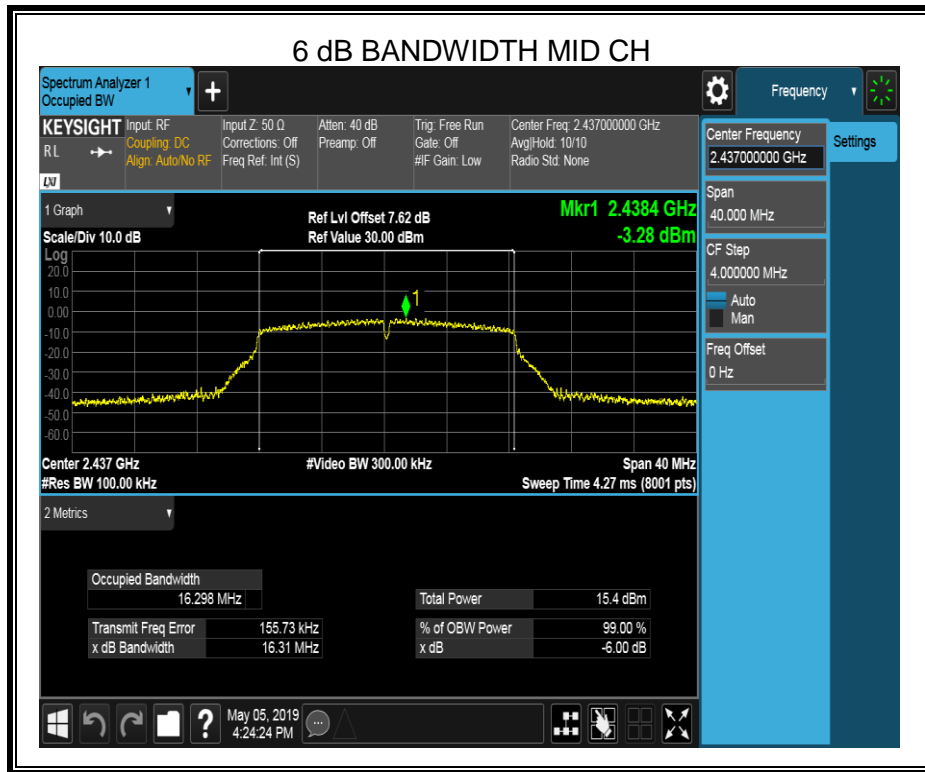


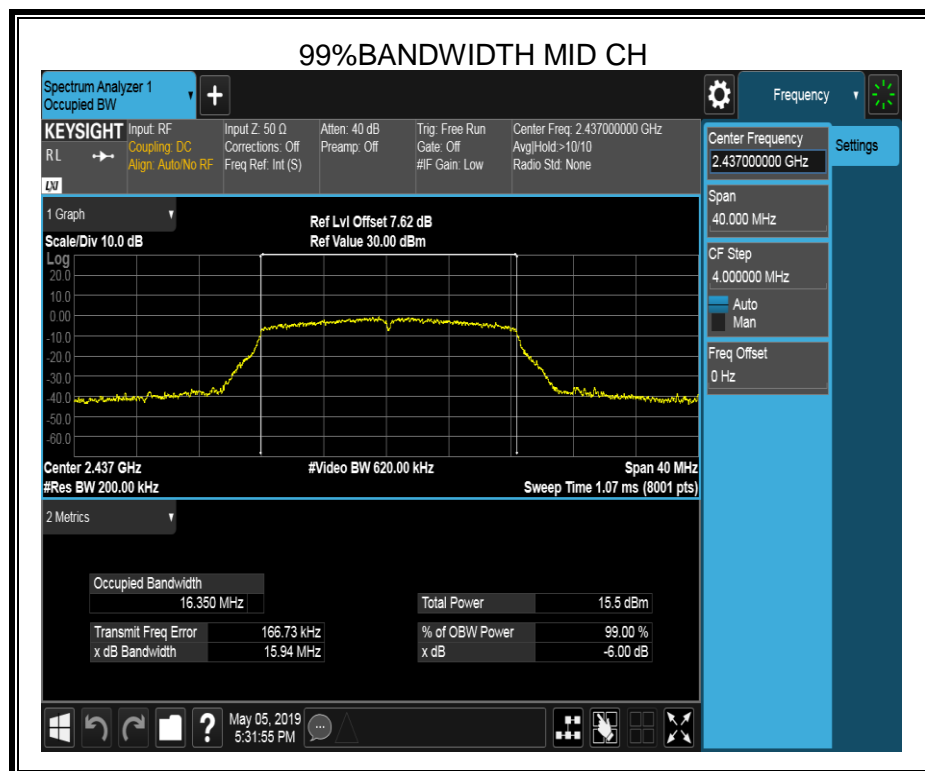
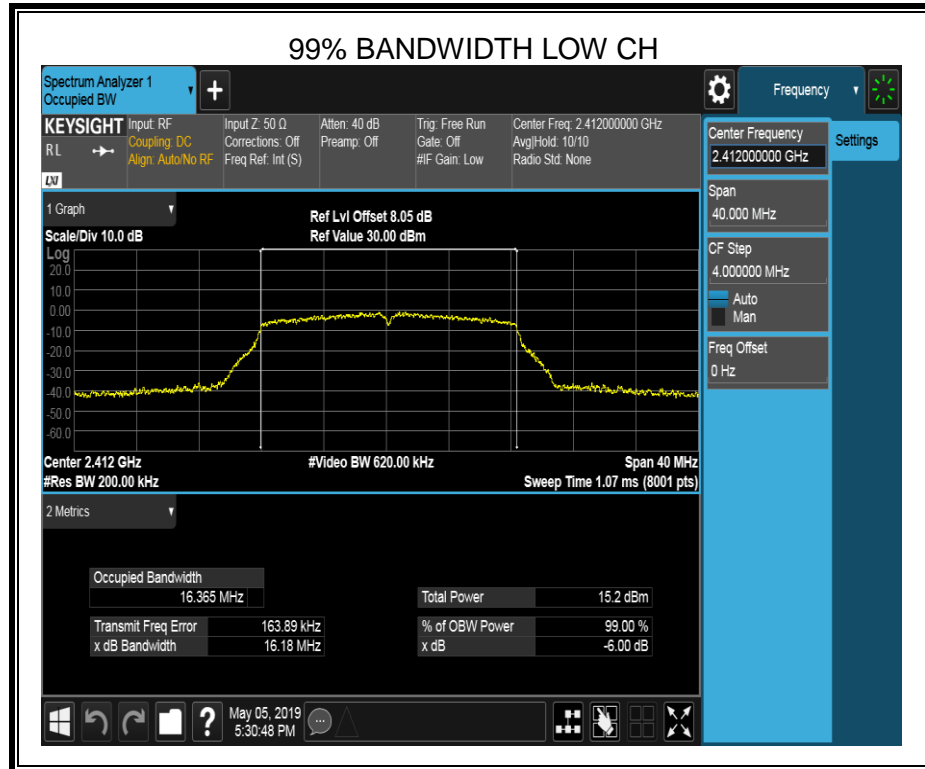
## 8.2.2. 802.11g SISO MODE

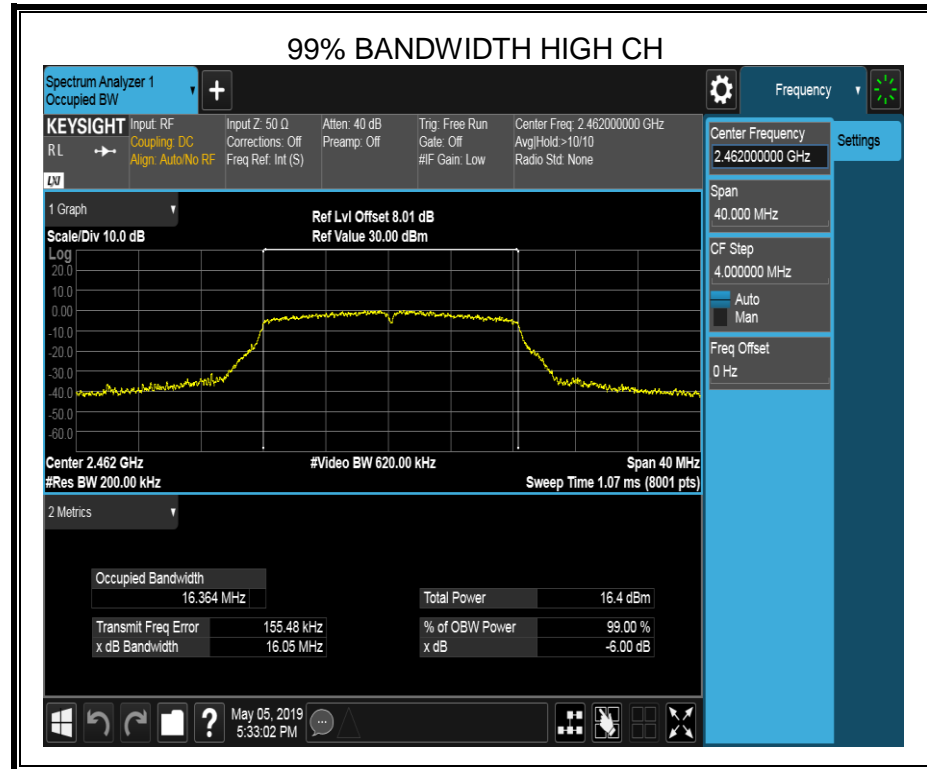
### ANTENNA1

Channel	6dB bandwidth (MHz)	99% bandwidth (MHz)	Limit (kHz)	Result
Low	16.31	16.37	≥500	Pass
Middle	16.31	16.35	≥500	Pass
High	16.31	16.36	≥500	Pass







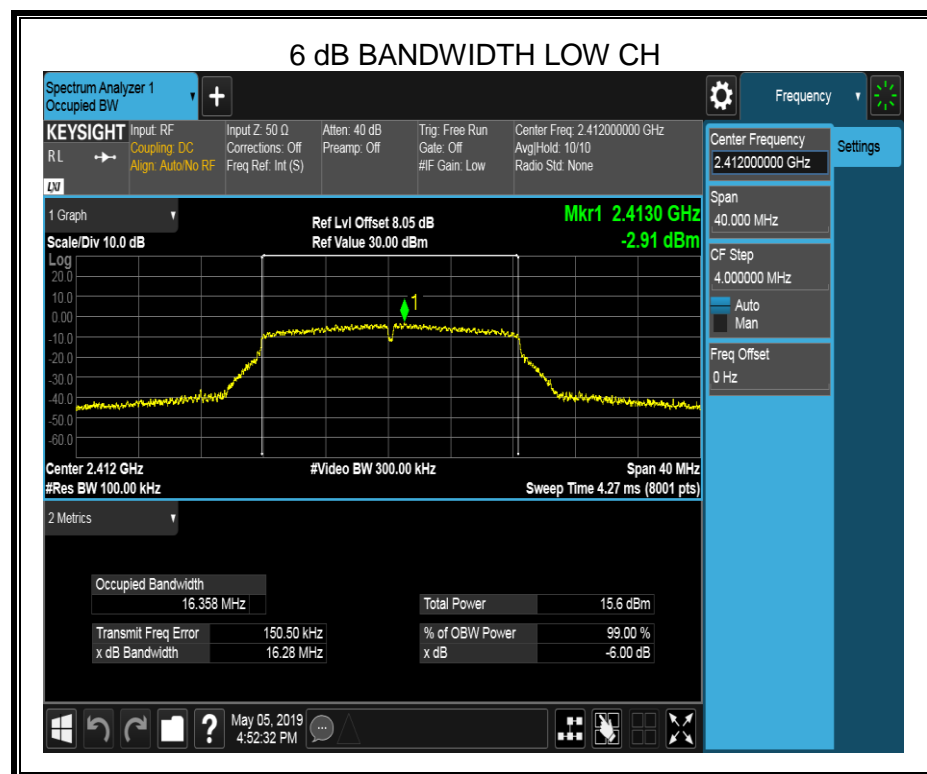


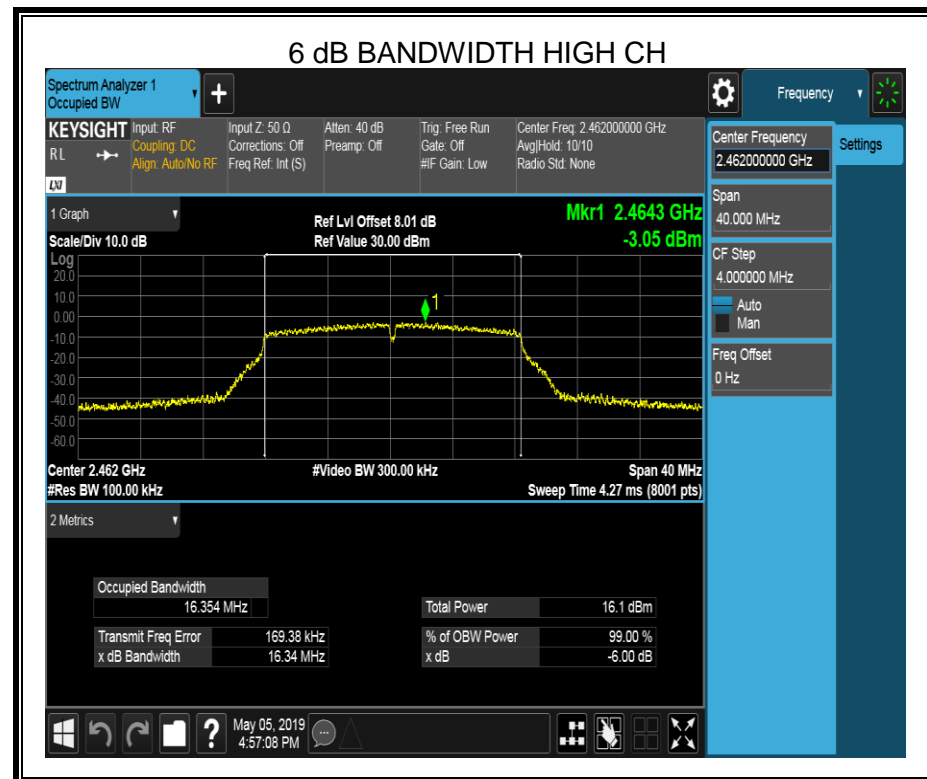
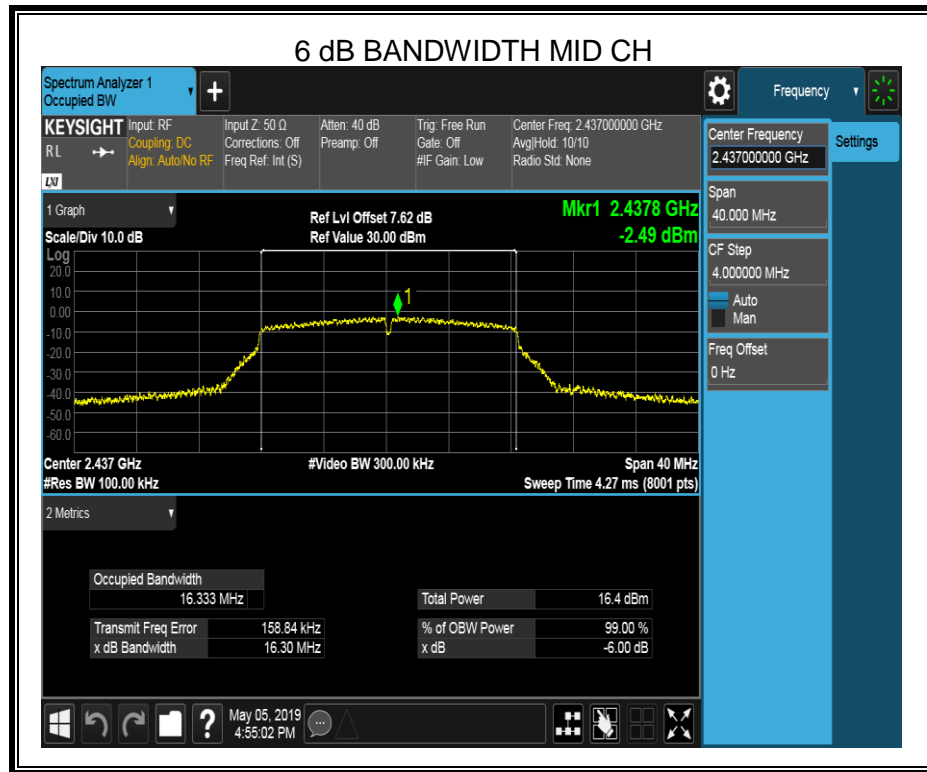


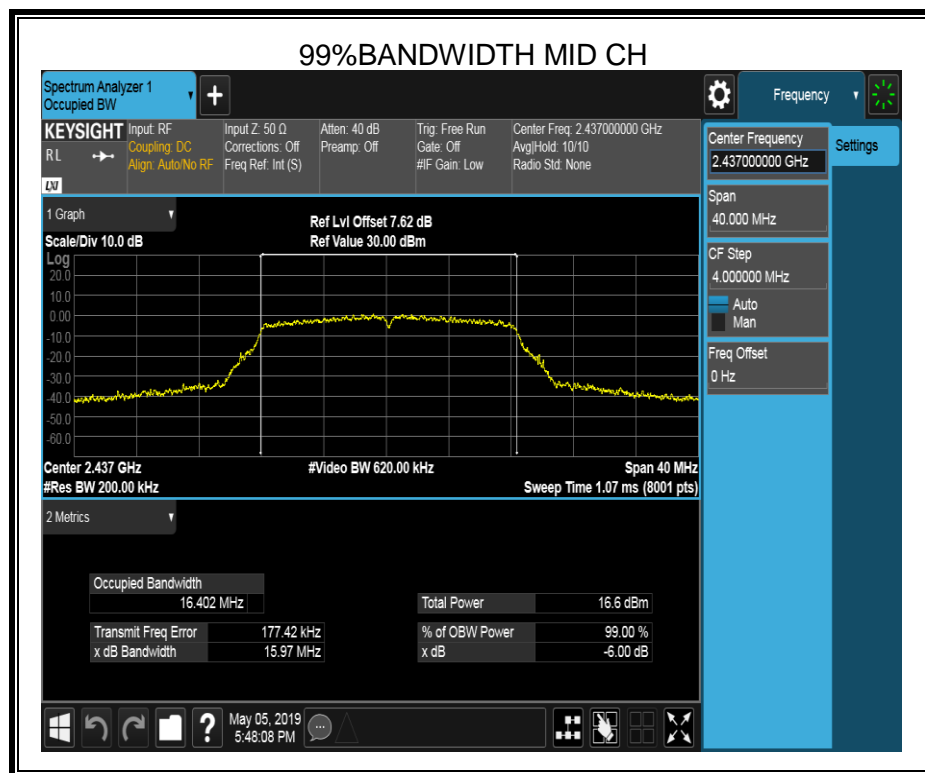
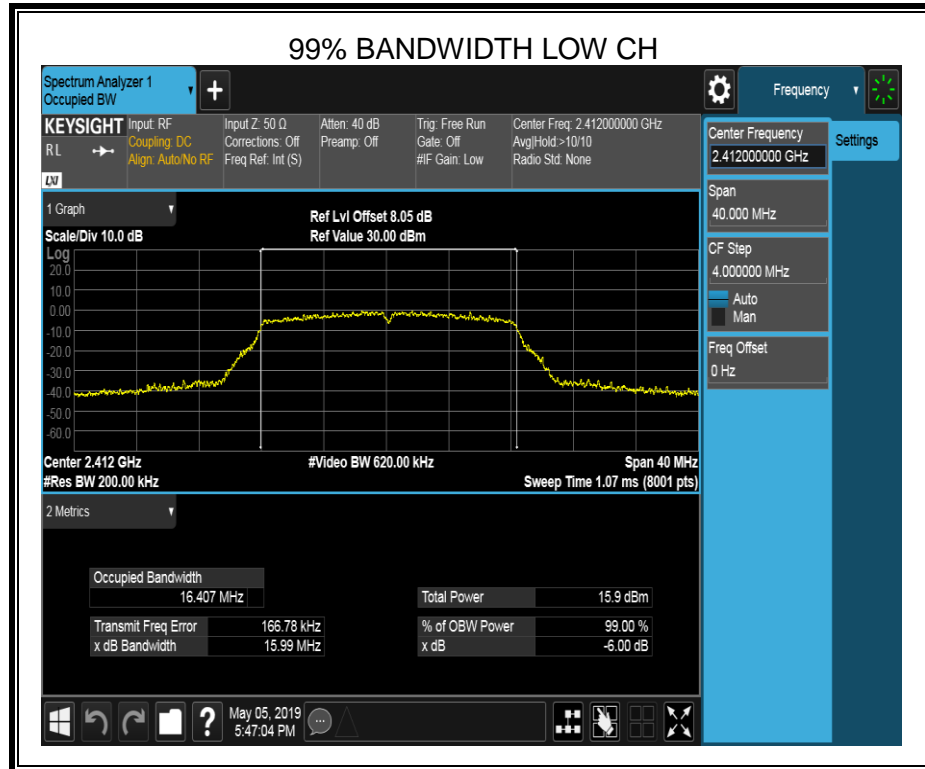


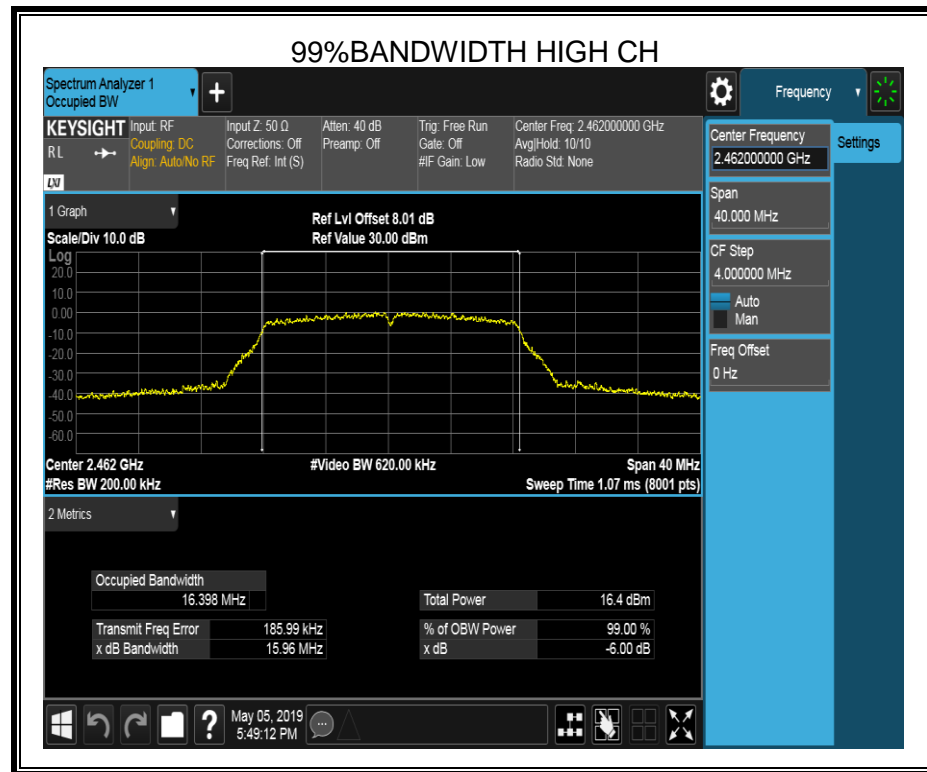
### ANTENNA2

Channel	6dB bandwidth (MHz)	99% bandwidth (MHz)	Limit (kHz)	Result
Low	16.28	16.41	≥500	Pass
Middle	16.30	16.40	≥500	Pass
High	16.34	16.40	≥500	Pass





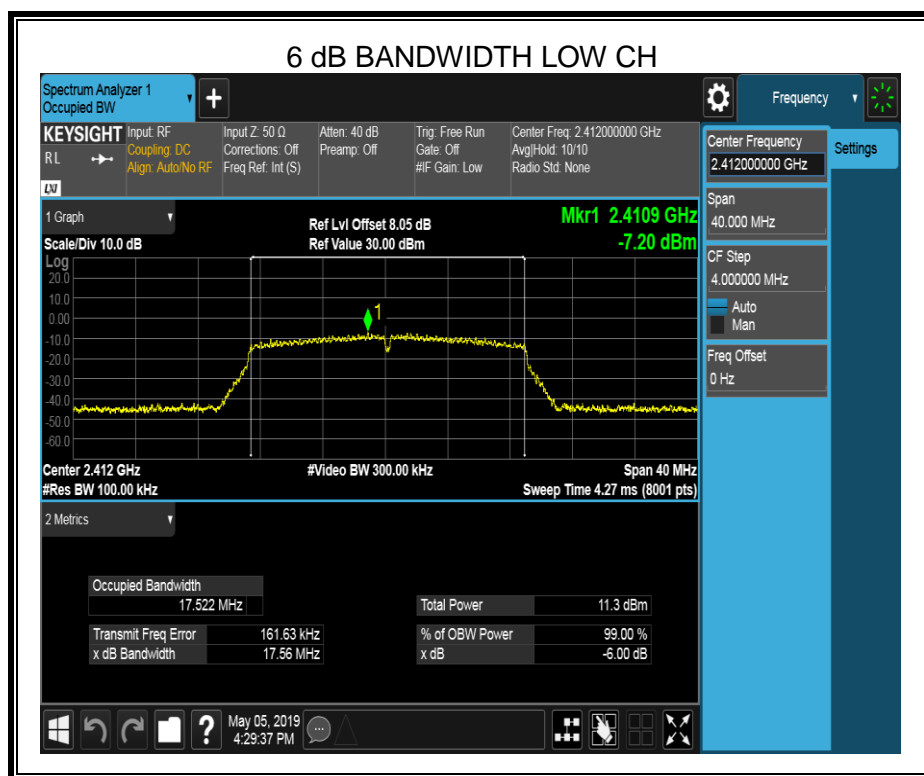


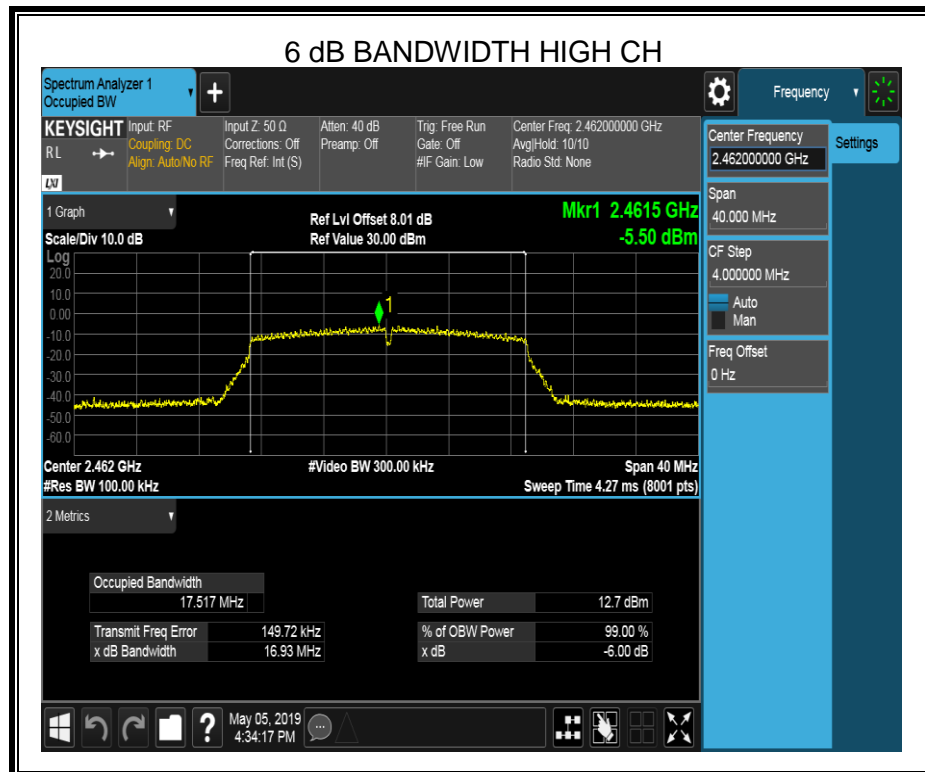
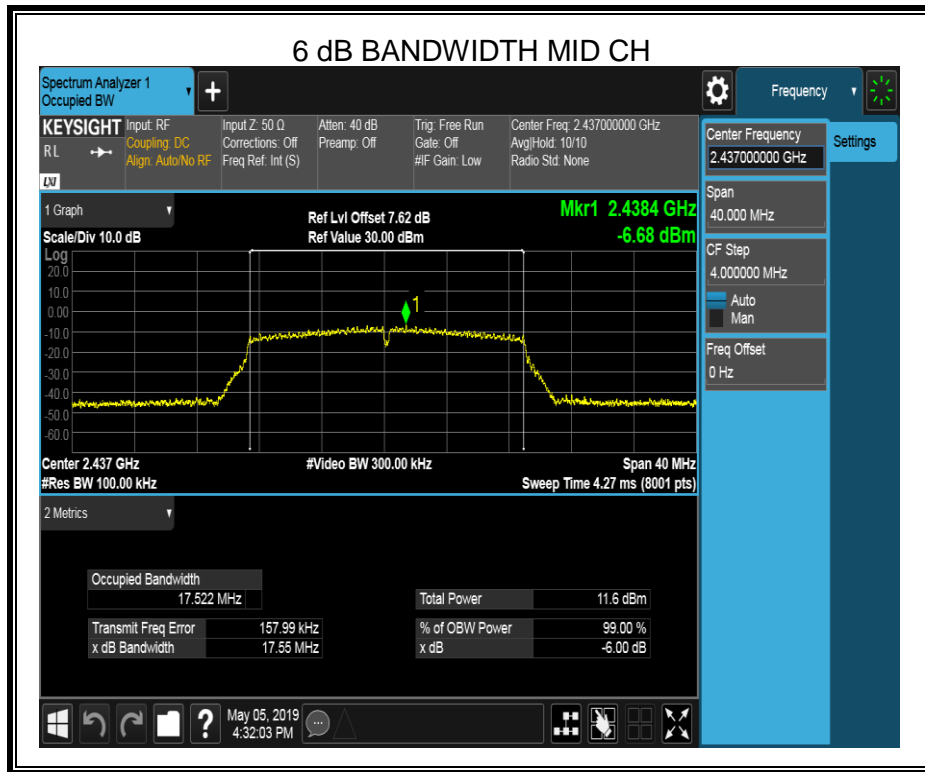


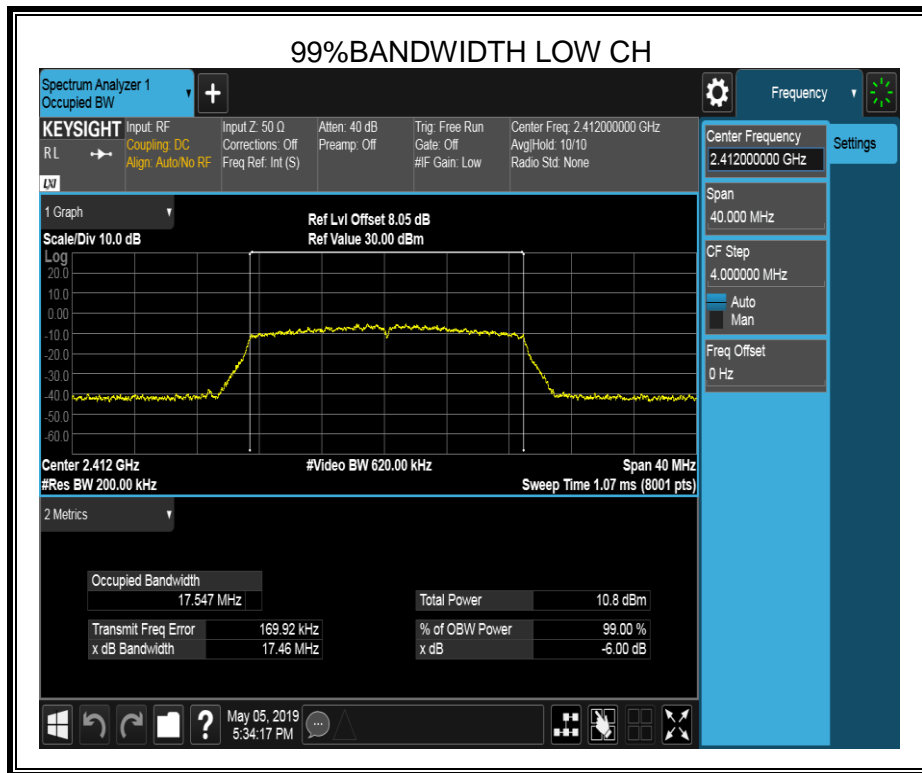
### 8.2.3. 802.11n HT20 MIMO MODE

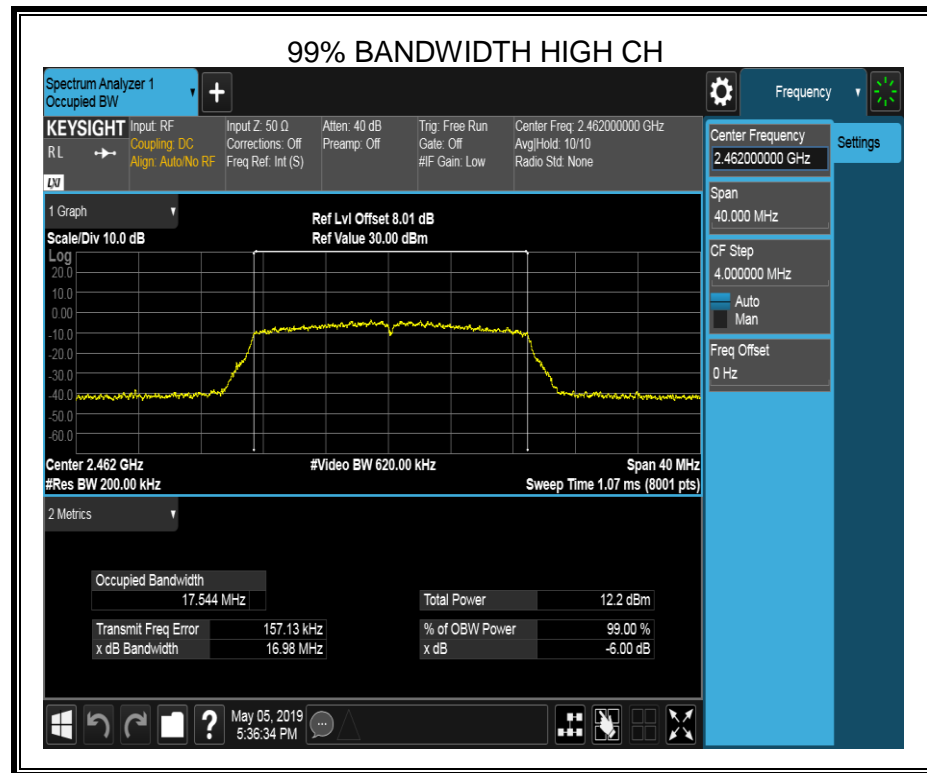
#### ANTENNA1

Channel	6dB bandwidth (MHz)	99% bandwidth (MHz)	Limit (kHz)	Result
Low	17.56	17.5	≥500	Pass
Middle	17.55	17.56	≥500	Pass
High	16.93	17.54	≥500	Pass







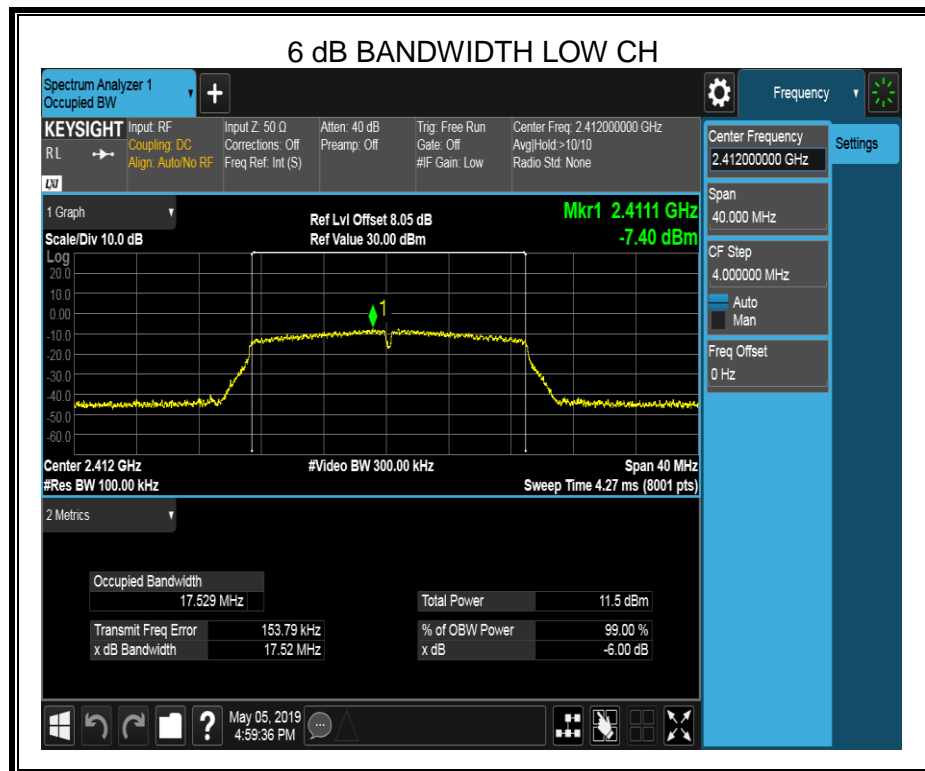


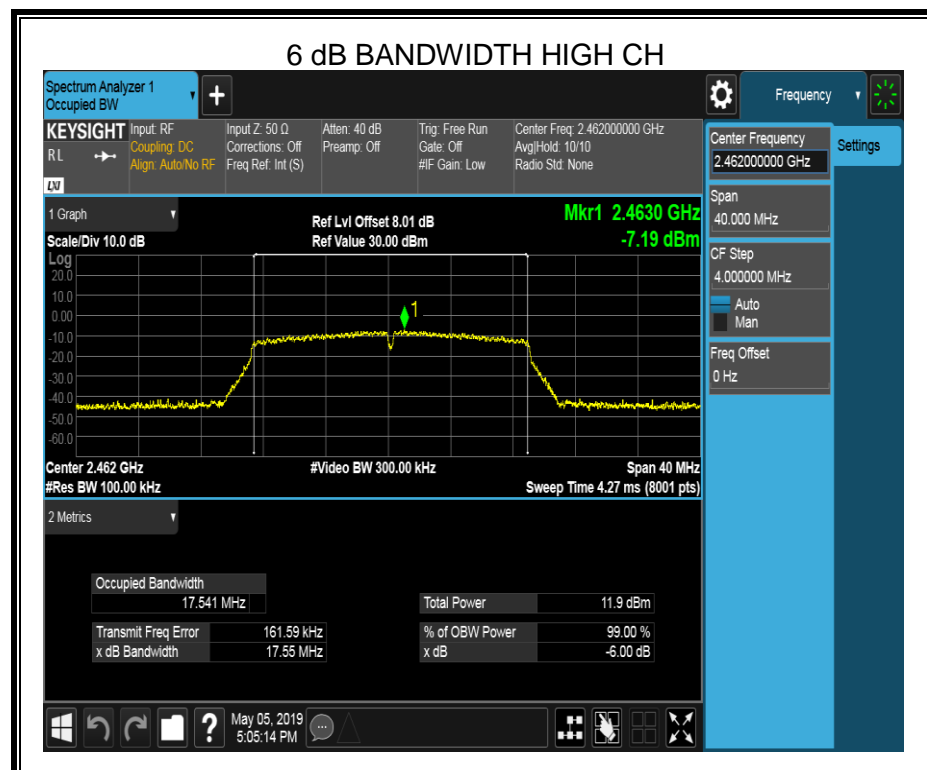
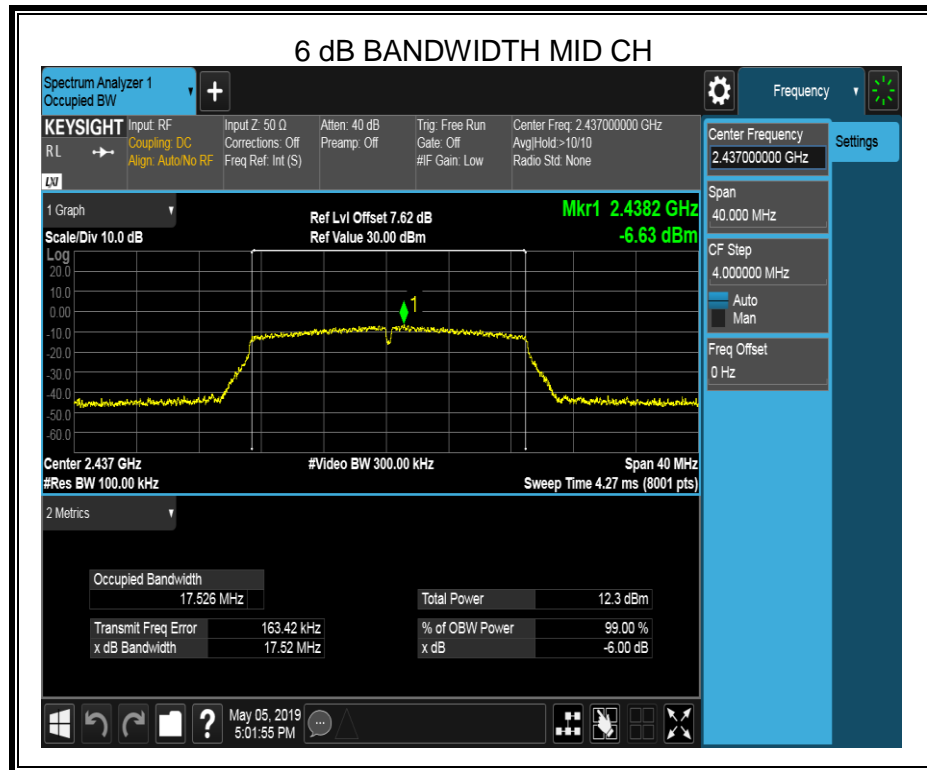


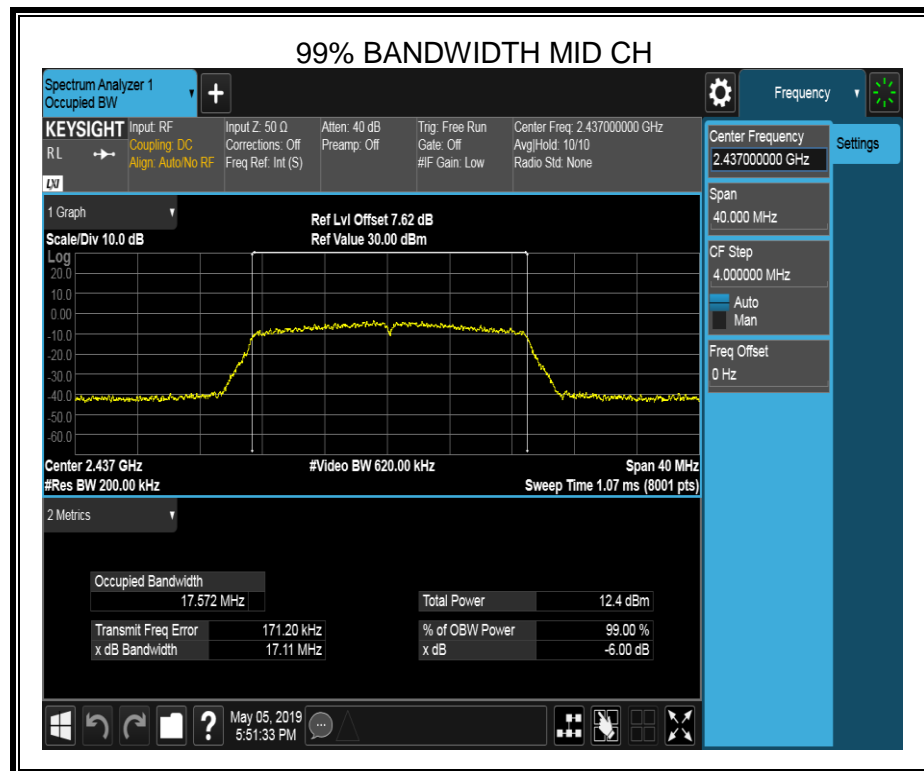
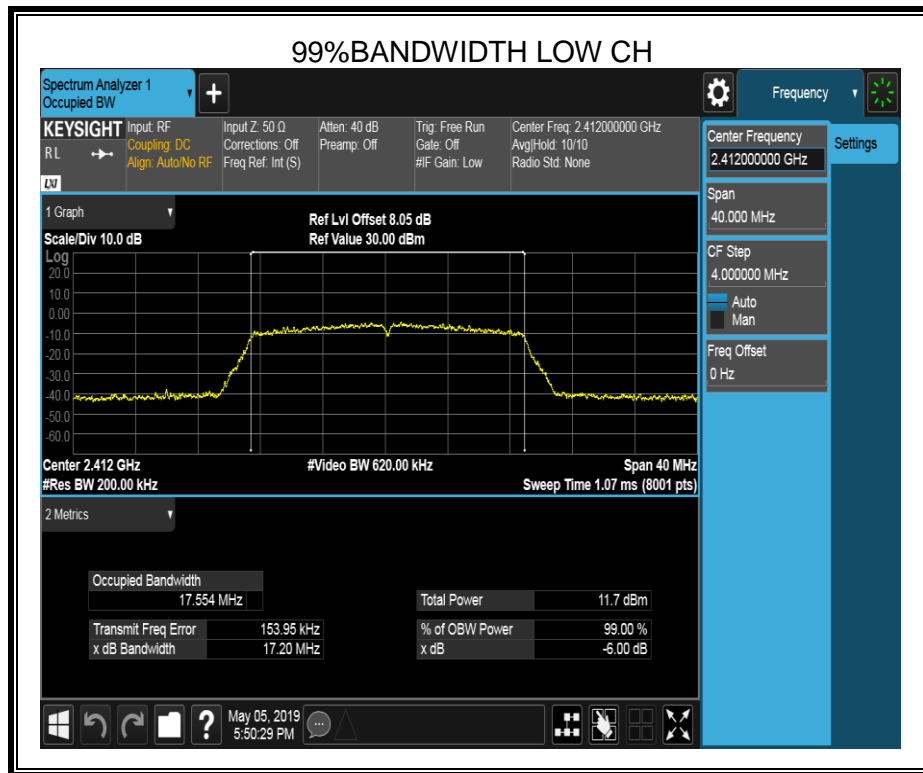


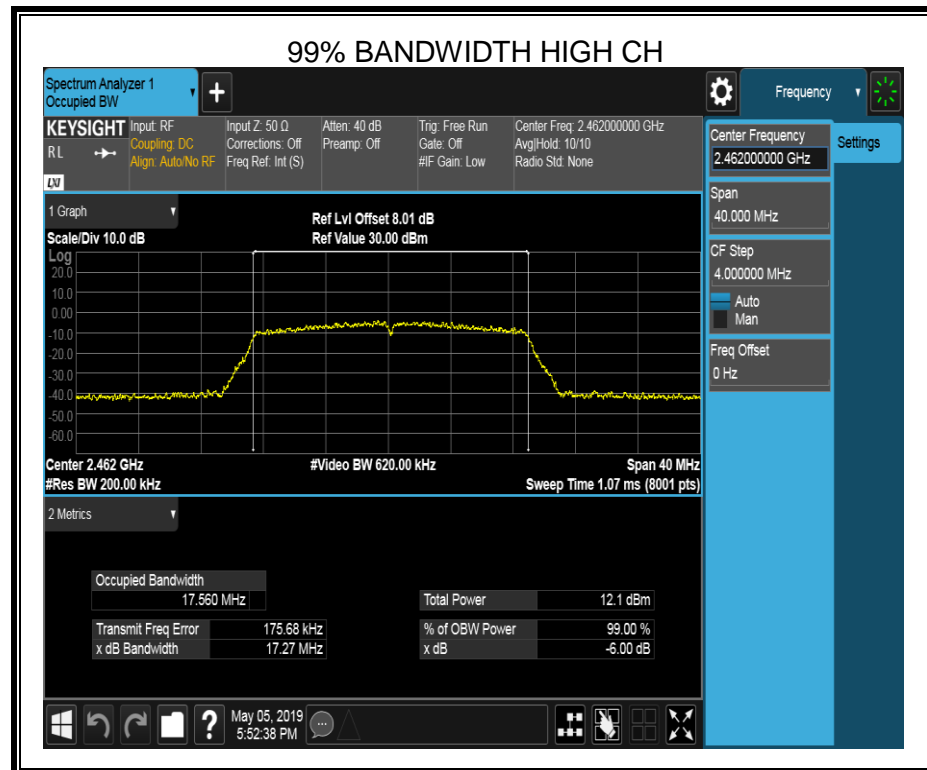
### ANTENNA2

Channel	6dB bandwidth (MHz)	99% bandwidth (MHz)	Limit (kHz)	Result
Low	17.52	17.55	≥500	Pass
Middle	17.52	17.57	≥500	Pass
High	17.55	17.56	≥500	Pass











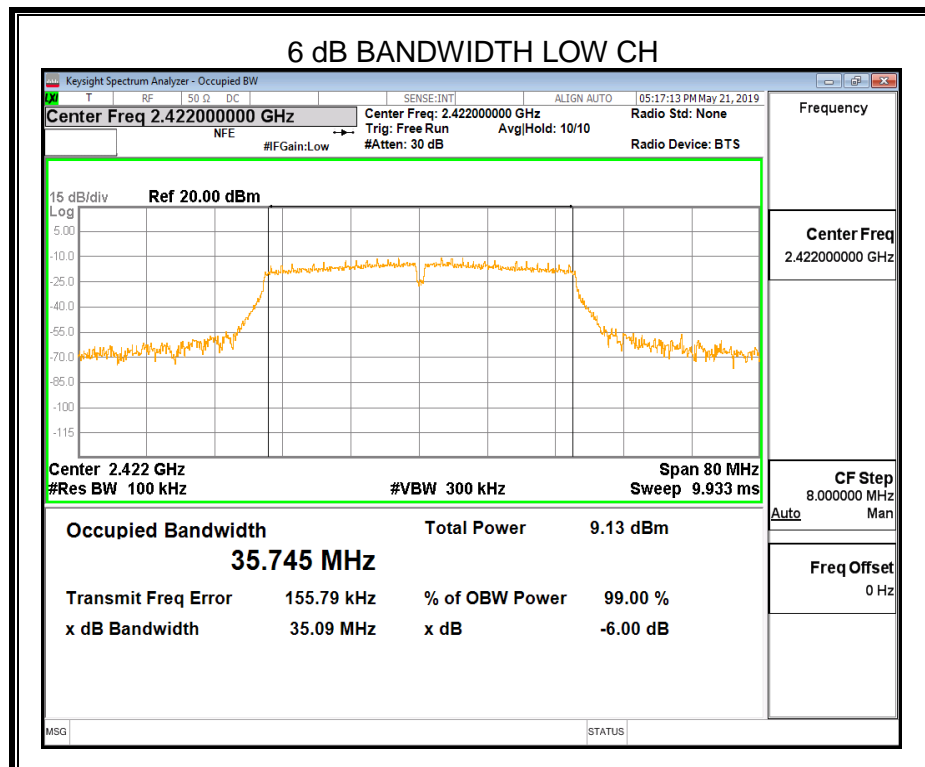
#### 8.2.4. 802.11n HT40 MIMO MODE

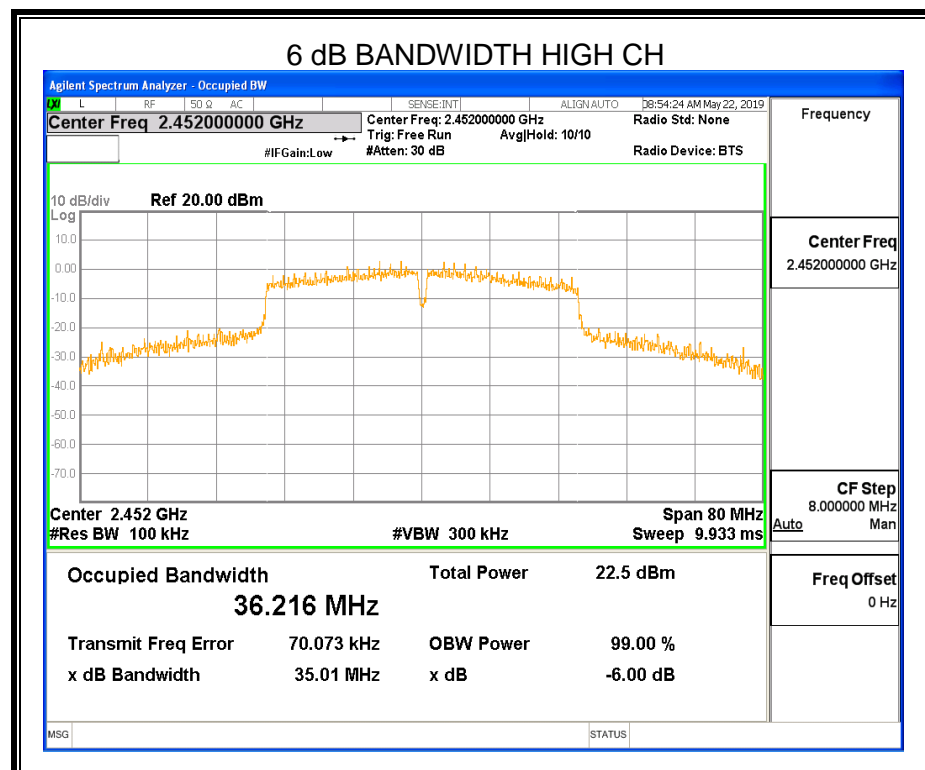
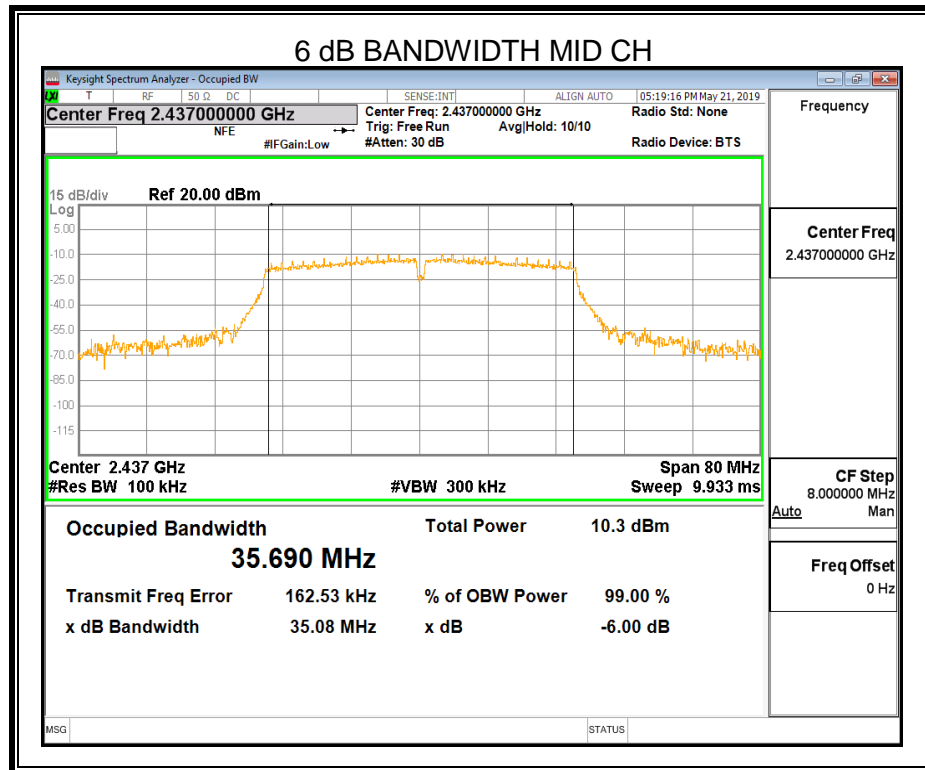
##### ANTENNA1

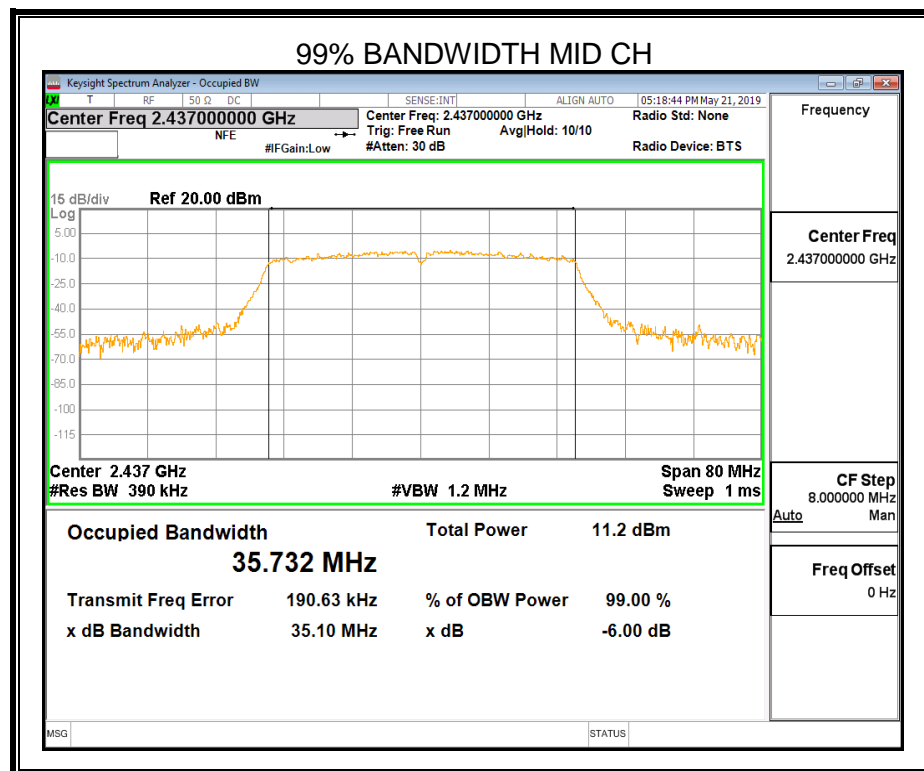
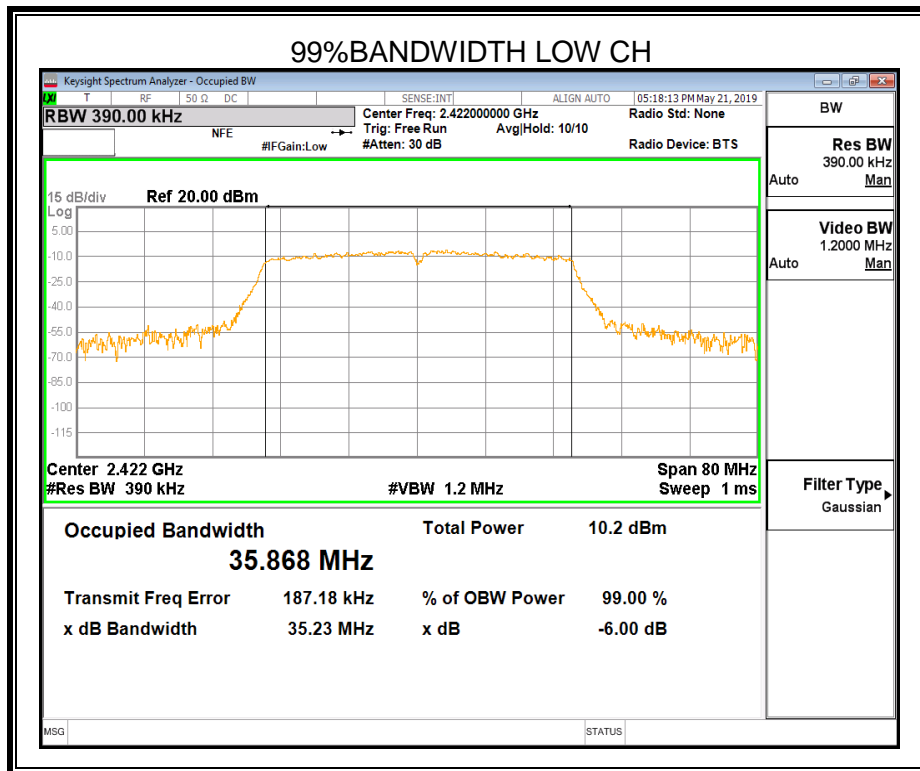
Channel	6dB bandwidth (MHz)	99% bandwidth (MHz)	Limit (kHz)	Result
Low	35.09	35.868	≥500	Pass
Middle	35.08	35.732	≥500	Pass
High	35.01	36.437	≥500	Pass

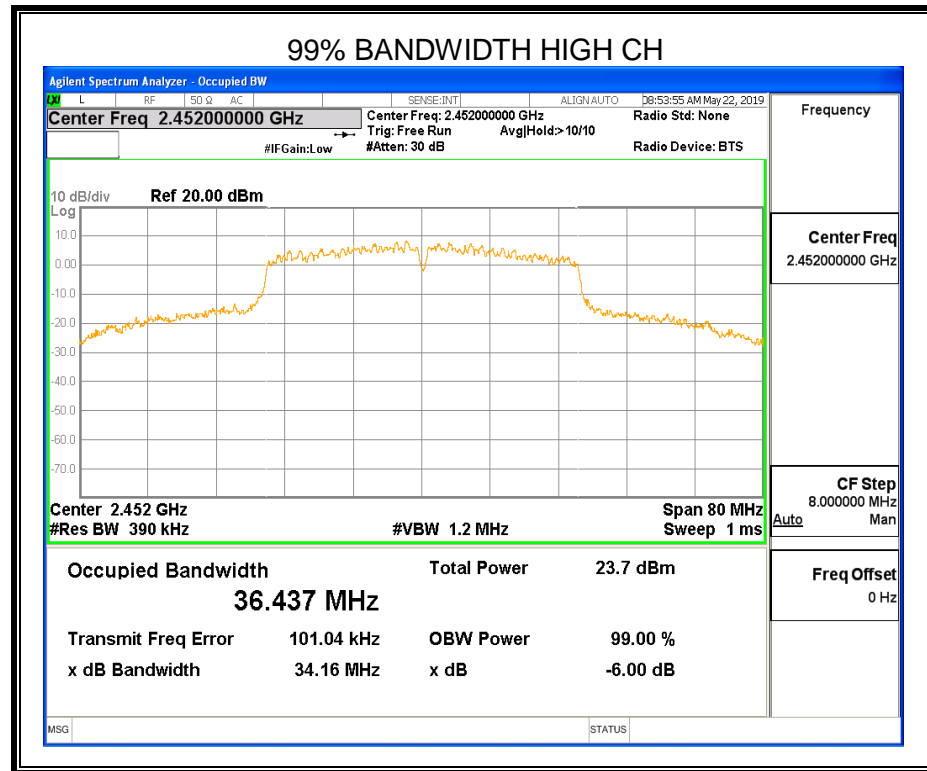
Remark:

The antenna1 and antenna2 can transmit at the same time during work at 802.11N40 mode, so only the data of worse case is shown in the test report.













### 8.3. PEAK CONDUCTED OUTPUT POWER

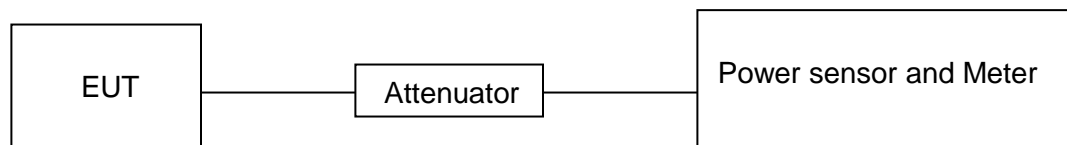
#### LIMITS

CFR 47 FCC Part15 (15.247) Subpart C ISED RSS-247 ISSUE 2			
Section	Test Item	Limit	Frequency Range (MHz)
CFR 47 FCC 15.247(b)(3) ISED RSS-247 5.4 (d)	Peak Output Power	1 watt or 30dBm (See note1/2)	2400-2483.5
<b>Note:</b> 1. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi. 2. Directional gain = $10\log[(10^{G1/20} + 10^{G2/20})^2 / N_{ANT}] = 6.01 > 6\text{dBi}$ , where $N_{ANT}$ is the number of outputs, $G_{1/2}$ is the Antenna gain. So the power limit shall be reduced to $30 - (6.01 - 6) = 29.99 \text{ dBm}$ .			

#### TEST PROCEDURE

Place the EUT on the table and set it in the transmitting mode.  
Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the Power sensor.  
Measure the power of each channel.  
Peak Detector use for Peak result.  
AVG Detector use for AVG result.

#### TEST SETUP



#### TEST ENVIRONMENT

Temperature	20°C	Relative Humidity	56%
Atmosphere Pressure	101kPa	Test Voltage	DC 5.0V



## RESULTS

### 8.3.1. 802.11b SISO MODE

Test Channel	ANT.	Maximum Conducted Output Power(PK) (dBm)		Maximum Conducted Output Power(AV) (dBm)		LIMIT
		Single	Total	Single	Total	dBm
Low	1	13.18	16.42	10.73	13.92	29.9
	2	13.63		11.09		
Middle	1	13.42	17.07	10.85	14.49	29.9
	2	14.61		12.03		
High	1	14.48	17.29	11.90	14.75	29.9
	2	14.07		11.57		

### 8.3.2. 802.11g SISO MODE

Test Channel	ANT.	Maximum Conducted Output Power(PK) (dBm)		Maximum Conducted Output Power(AV) (dBm)		LIMIT
		Single	Total	Single	Total	dBm
Low	1	17.44	20.39	8.86	12.09	29.9
	2	17.31		9.29		
Middle	1	17.73	20.92	9.13	12.65	29.9
	2	18.08		10.09		
High	1	18.70	21.29	10.07	12.96	29.9
	2	17.81		9.82		



### 8.3.3. 802.11n HT20 MIMO MODE

Test Channel	ANT.	Maximum Conducted Output Power(PK) (dBm)		Maximum Conducted Output Power(AV) (dBm)		LIMIT
		Single	Total	Single	Total	
Low	1	13.31	16.26	4.48	7.84	29.9
	2	13.18		5.16		
Middle	1	13.61	16.80	4.49	8.27	29.9
	2	13.97		5.91		
High	1	14.68	17.21	5.83	8.73	29.9
	2	13.65		5.61		

### 8.3.4. 802.11n HT40 MIMO MODE

Test Channel	ANT.	Maximum Conducted Output Power(PK) (dBm)		Maximum Conducted Output Power(AV) (dBm)		LIMIT
		Single	Total	Single	Total	
Low	1	15.27	18.47	6.04	9.60	29.9
	2	15.65		7.08		
Middle	1	14.69	18.48	6.76	10.54	29.9
	2	16.13		8.19		
High	1	15.21	18.73	6.95	10.68	29.9
	2	16.18		8.28		



## 8.4. POWER SPECTRAL DENSITY

### LIMITS

CFR 47 FCC Part15 (15.247) Subpart C ISED RSS-247 ISSUE 2			
Section	Test Item	Limit	Frequency Range (MHz)
CFR 47 FCC §15.247 (e) ISED RSS-247 5.2 (b)	Power Spectral Density	8 dBm/3 kHz (See note1/2)	2400-2483.5
<b>Note:</b> 1. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi. 2. Directional gain = $10\log[(10G1/20 + 10G2/20)^2 / NANT] = 3.74 < 6\text{dBi}$ , where NANT is the number of outputs, G1/2 is the Antenna gain. . So the power spectral density limit shall be reduced to $8 - (6.01 - 6) = 7.99 \text{ dBm/3kHz}$ . 3. According to the test data, the worst case of the result is the HCH of 11B mode ,the worst case of PSD: $10\log(10^{(-1/10)} + 10^{(-0.75/10)}) = 2.12\text{dBm} < 7.99\text{dBm}$			

### TEST PROCEDURE

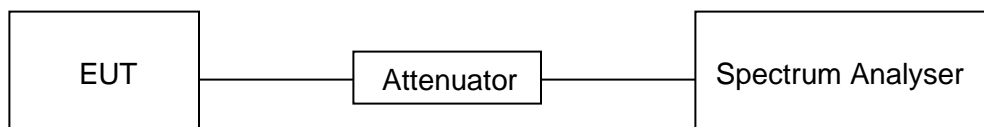
Connect the UUT to the spectrum analyser and use the following settings:

Center Frequency	The centre frequency of the channel under test
Detector	Peak
RBW	$3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$
VBW	$\geq 3 \times \text{RBW}$
Span	1.5 x DTS bandwidth
Trace	Max hold
Sweep time	Auto couple.

Allow trace to fully stabilize and use the peak marker function to determine the maximum amplitude level within the RBW.

If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

### TEST SETUP





**TEST ENVIRONMENT**

Temperature	20°C	Relative Humidity	56%
Atmosphere Pressure	101kPa	Test Voltage	DC 5.0V

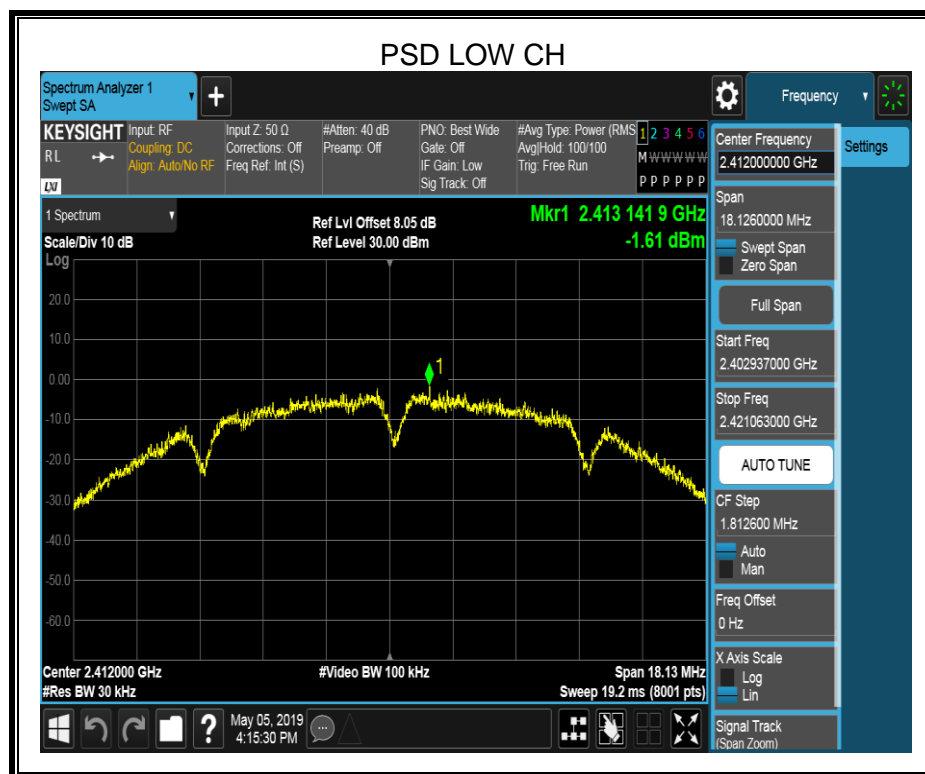


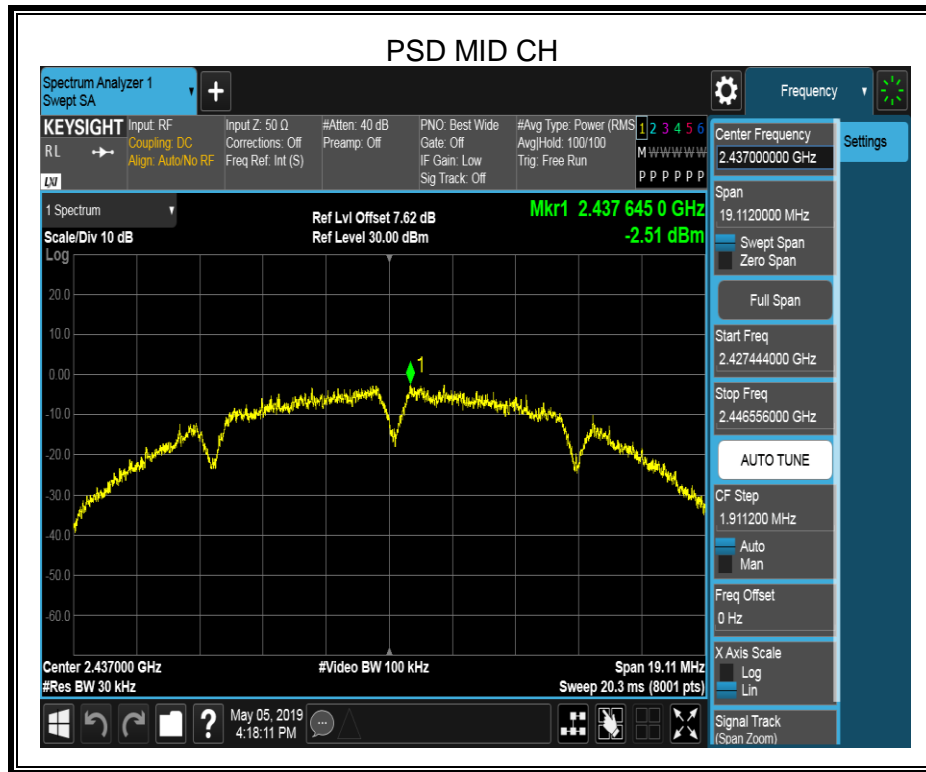
## RESULTS

### 8.4.1. 802.11b SISO MODE

#### ANTENNA1

Test Channel	Power Spectral Density (dBm/30kHz)	Limit (dBm/3kHz)	Result
Low	-1.61	7.99	PASS
Middle	-2.51	7.99	PASS
High	-1.00	7.99	PASS





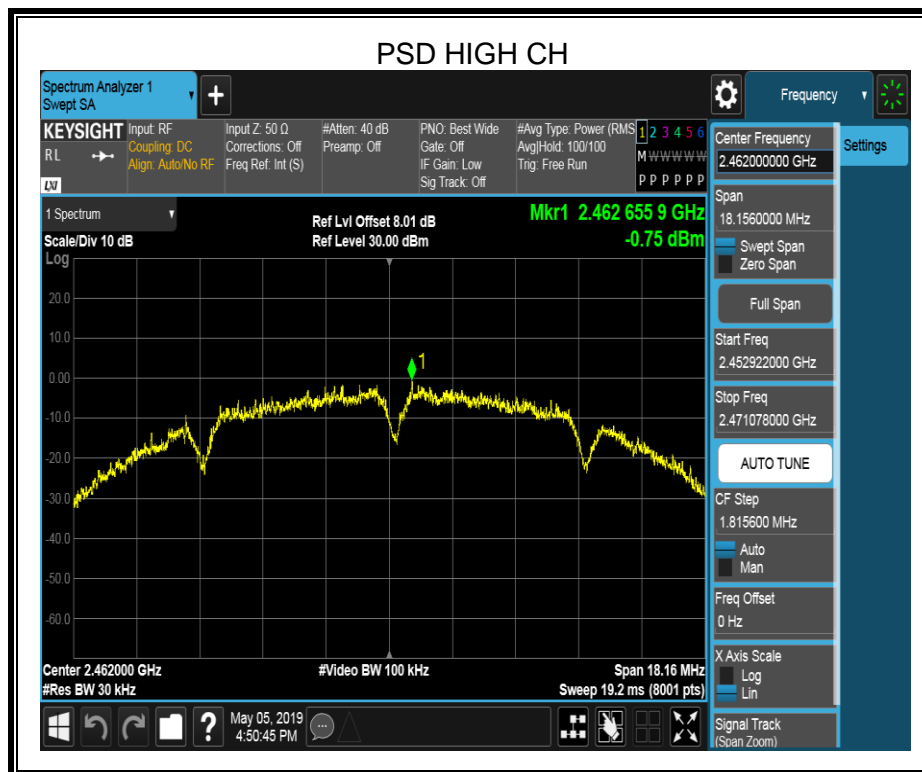
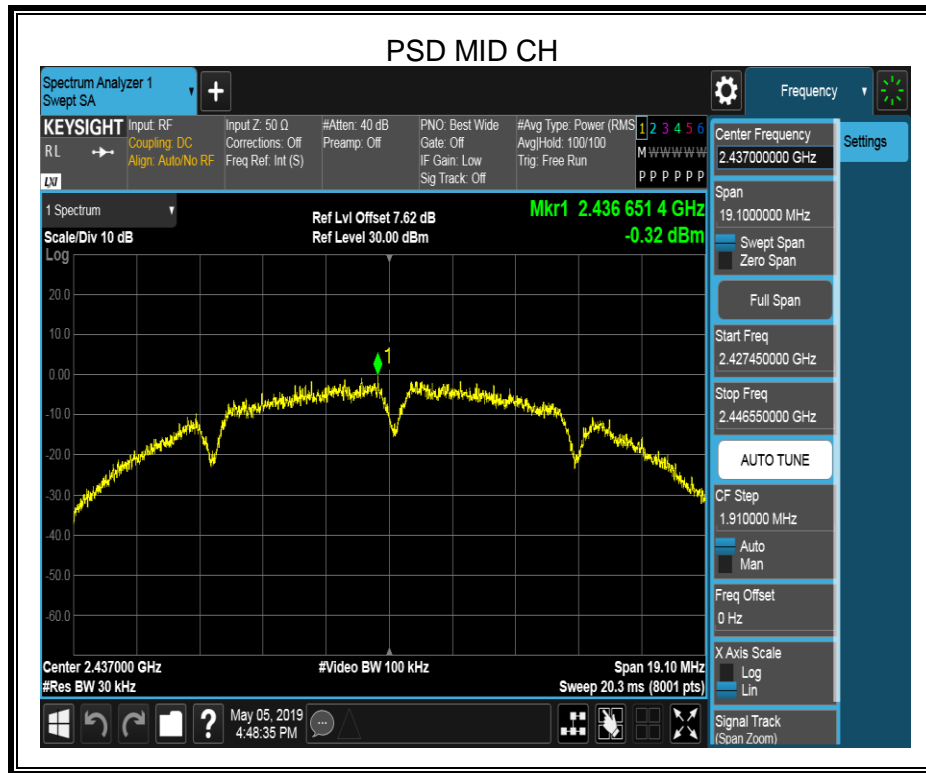


## ANTENNA2

Test Channel	Power Spectral Density (dBm/30kHz)	Limit (dBm/3kHz)	Result
Low	-1.35	7.99	PASS
Middle	-0.32	7.99	PASS
High	-0.75	7.99	PASS



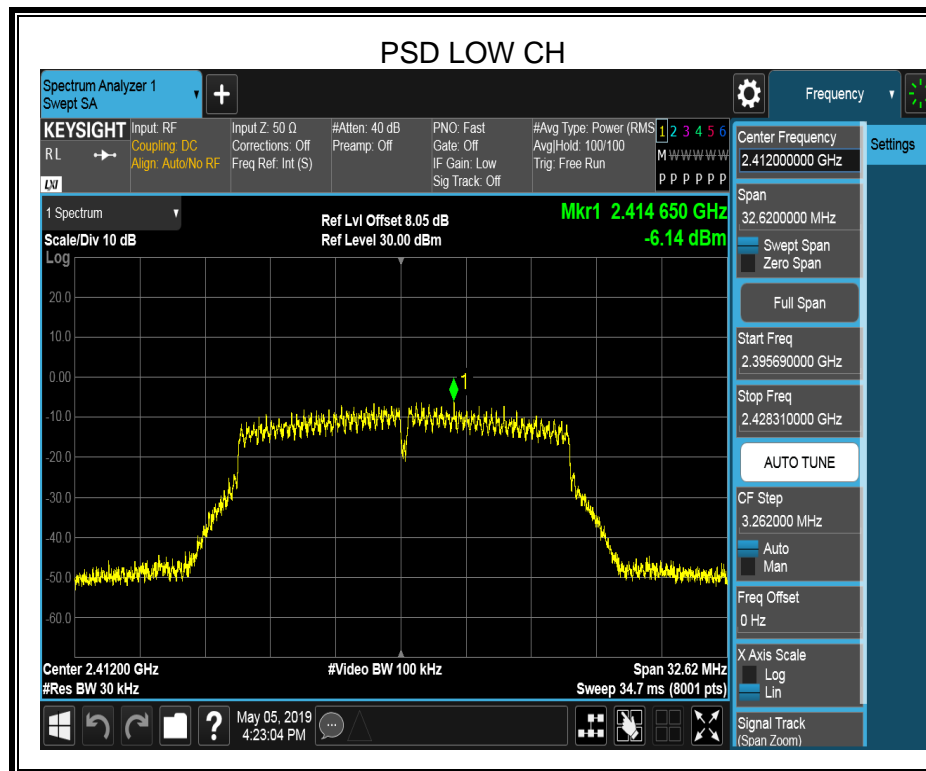


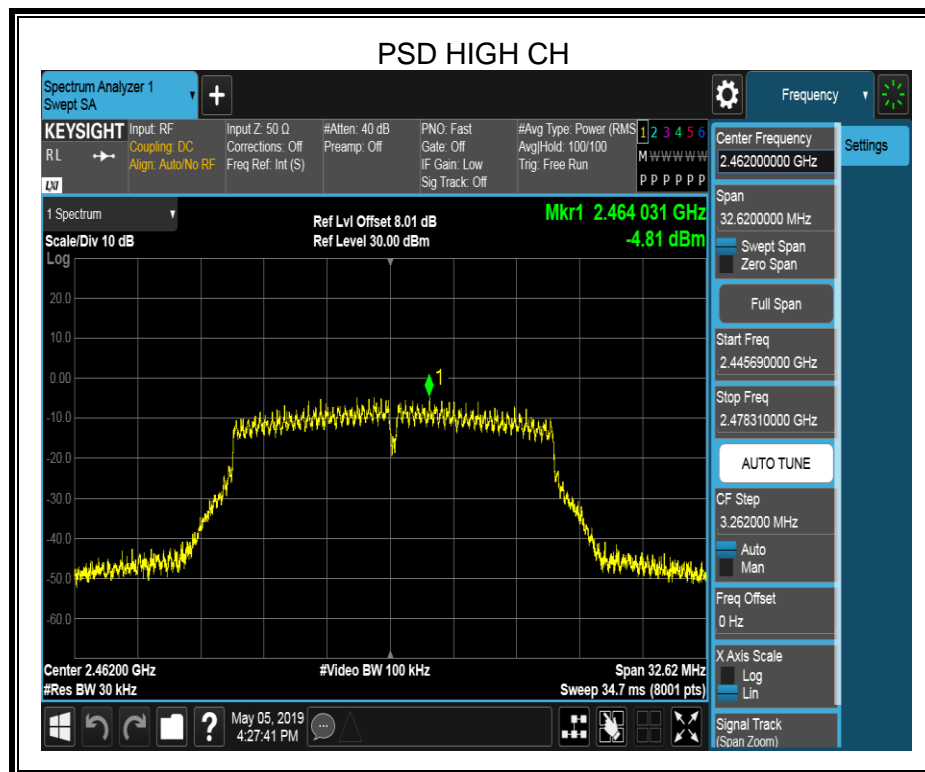
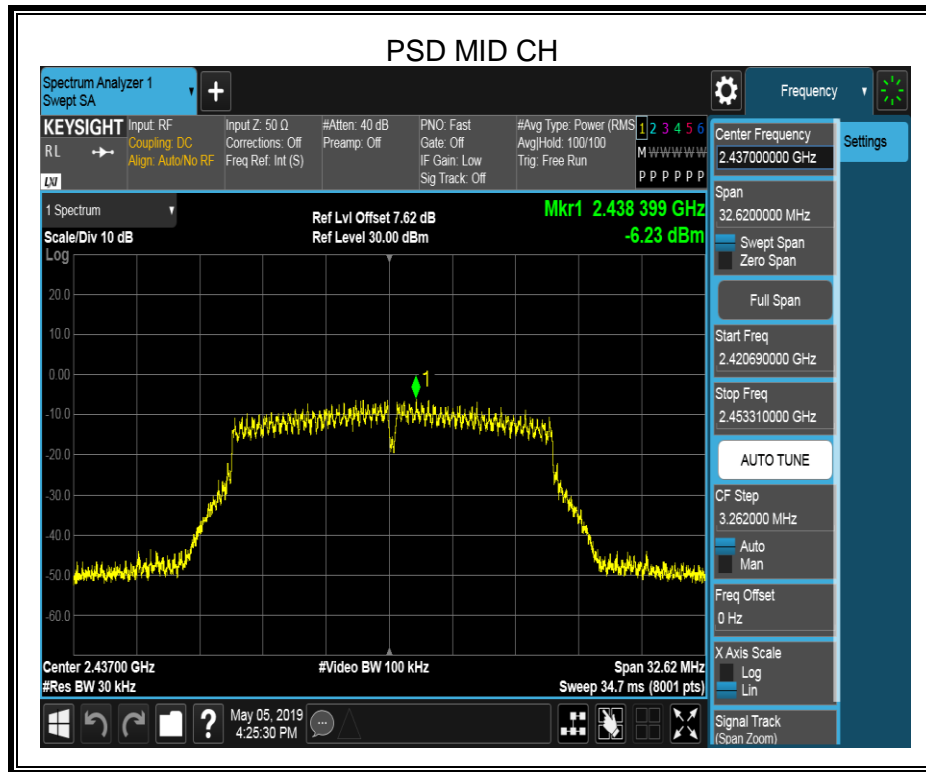


### 8.4.2. 802.11g SISO MODE

#### ANTENNA1

Test Channel	Power Spectral Density (dBm/30kHz)	Limit (dBm/3kHz)	Result
Low	-6.14	7.99	PASS
Middle	-6.23	7.99	PASS
High	-4.81	7.99	PASS





# ANTENNA2

Test Channel	Power Spectral Density (dBm/30kHz)	Limit (dBm/3kHz)	Result
Low	-5.12	7.99	PASS
Middle	-4.45	7.99	PASS
High	-5.27	7.99	PASS

