

# TEST REPORT

**Product** : WiFi Speaker  
**Trade mark** : OPURES  
**Model/Type reference** : OP1100, OP1200, OP1300, OP1500, OP1600, OP1101, OP1102, OP1201, OP1202, OP1301, OP1302, OP1501, OP1502, OP1601, OP1602  
**Serial Number** : N/A  
**Report Number** : EED32I000355  
**FCC ID** : 2AIFX-OP1100  
**Date of Issue** : May 17, 2016  
**Test Standards** : 47 CFR Part 15 Subpart C (2015)  
**Test result** : PASS

Prepared for:

**SHENZHEN OPURES TECHNOLOGY CO., LTD**  
Room 807, the Changsheng Building, Huaqiangbei road, Huaqiangbei street, Futian District, Shenzhen city, China.

Prepared by:

**Centre Testing International Group Co., Ltd.**  
**Hongwei Industrial Zone, Bao'an 70 District,**  
**Shenzhen, Guangdong, China**

TEL: +86-755-3368 3668

FAX: +86-755-3368 3385

Compiled by:

*Kevin Lan*

Reviewed by:

*Emon - Li*

Approved by:

*Sheek , Luo*

Date:

May 17, 2016



Sheek Luo

Lab supervisor

Check No.: 2384303577

## 2 Version

Version No.	Date	Description
00	May 17, 2016	Original

### 3 Test Summary

Test Item	Test Requirement	Test method	Result
<b>Antenna Requirement</b>	47 CFR Part 15 Subpart C Section 15.203/15.247 (c)	ANSI C63.10-2013	PASS
<b>AC Power Line Conducted Emission</b>	47 CFR Part 15 Subpart C Section 15.207	ANSI C63.10-2013	PASS
<b>Conducted Peak Output Power</b>	47 CFR Part 15 Subpart C Section 15.247 (b)(3)	ANSI C63.10-2013	PASS
<b>6dB Occupied Bandwidth</b>	47 CFR Part 15 Subpart C Section 15.247 (a)(2)	ANSI C63.10-2013	PASS
<b>Power Spectral Density</b>	47 CFR Part 15 Subpart C Section 15.247 (e)	ANSI C63.10-2013	PASS
<b>Band-edge for RF Conducted Emissions</b>	47 CFR Part 15 Subpart C Section 15.247(d)	ANSI C63.10-2013	PASS
<b>RF Conducted Spurious Emissions</b>	47 CFR Part 15 Subpart C Section 15.247(d)	ANSI C63.10-2013	PASS
<b>Radiated Spurious Emissions</b>	47 CFR Part 15 Subpart C Section 15.205/15.209	ANSI C63.10-2013	PASS
<b>Restricted bands around fundamental frequency (Radiated Emission)</b>	47 CFR Part 15 Subpart C Section 15.205/15.209	ANSI C63.10-2013	PASS

Remark:

Test according to ANSI C63.4-2014 & ANSI C63.10-2013.

The tested samples and the sample information are provided by the client.

Model No.: OP1100, OP1200, OP1300, OP1500, OP1600, OP1101, OP1102, OP1201, OP1202, OP1301, OP1302, OP1501, OP1502, OP1601, OP1602

Only the model OP1100 was tested, since the electrical circuit design, layout, components used and internal wiring were identical for the above models, with difference being color, brand, and model name.

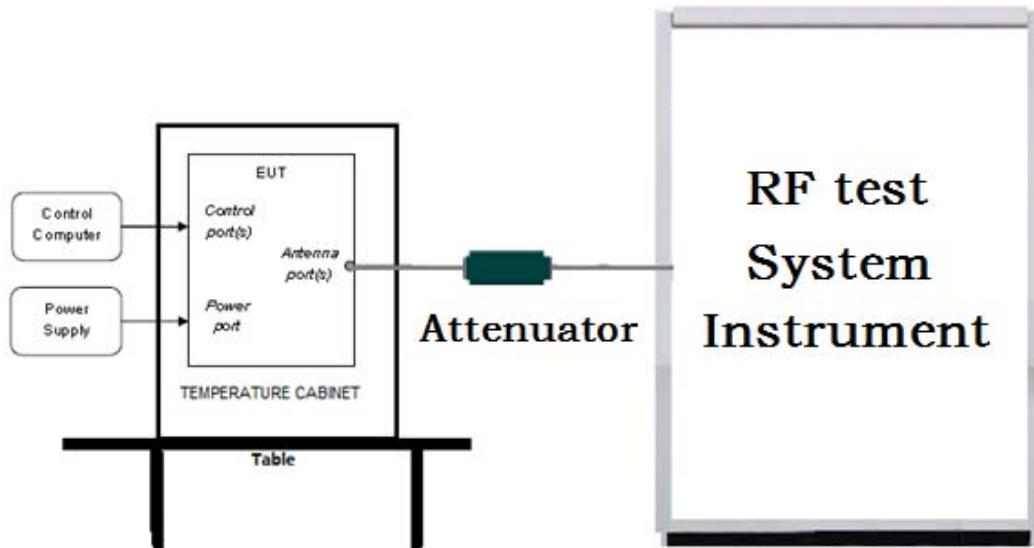
## 4 Content

<b>1 COVER PAGE.....</b>	<b>1</b>
<b>2 VERSION.....</b>	<b>2</b>
<b>3 TEST SUMMARY.....</b>	<b>3</b>
<b>4 CONTENT.....</b>	<b>4</b>
<b>5 TEST REQUIREMENT.....</b>	<b>5</b>
5.1 TEST SETUP.....	5
5.1.1 For Conducted test setup.....	5
5.1.2 For Radiated Emissions test setup.....	5
5.1.3 For Conducted Emissions test setup.....	6
5.2 TEST ENVIRONMENT.....	6
5.3 TEST CONDITION.....	6
<b>6 GENERAL INFORMATION.....</b>	<b>8</b>
6.1 CLIENT INFORMATION.....	8
6.2 GENERAL DESCRIPTION OF EUT.....	8
6.3 PRODUCT SPECIFICATION SUBJECTIVE TO THIS STANDARD.....	8
6.4 DESCRIPTION OF SUPPORT UNITS.....	9
6.5 TEST LOCATION.....	9
6.6 TEST FACILITY.....	9
6.7 DEVIATION FROM STANDARDS.....	10
6.8 ABNORMALITIES FROM STANDARD CONDITIONS.....	10
6.9 OTHER INFORMATION REQUESTED BY THE CUSTOMER.....	10
6.10 MEASUREMENT UNCERTAINTY (95% CONFIDENCE LEVELS, K=2).....	11
<b>7 EQUIPMENT LIST.....</b>	<b>12</b>
<b>8 RADIO TECHNICAL REQUIREMENTS SPECIFICATION.....</b>	<b>15</b>
Appendix A): Conducted Peak Output Power.....	16
Appendix B): 6dB Occupied Bandwidth.....	29
Appendix C): Band-edge for RF Conducted Emissions.....	42
Appendix D): RF Conducted Spurious Emissions.....	51
Appendix E): Power Spectral Density.....	76
Appendix F): Antenna Requirement.....	89
Appendix G): AC Power Line Conducted Emission.....	90
Appendix H): Restricted bands around fundamental frequency (Radiated).....	93
Appendix I): Radiated Spurious Emissions.....	98
<b>PHOTOGRAPHS OF TEST SETUP.....</b>	<b>116</b>
<b>PHOTOGRAPHS OF EUT CONSTRUCTIONAL DETAILS.....</b>	<b>118</b>

## 5 Test Requirement

### 5.1 Test setup

#### 5.1.1 For Conducted test setup



#### 5.1.2 For Radiated Emissions test setup

Radiated Emissions setup:

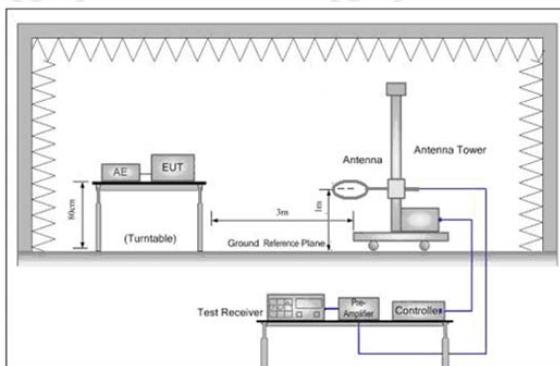


Figure 1. Below 30MHz

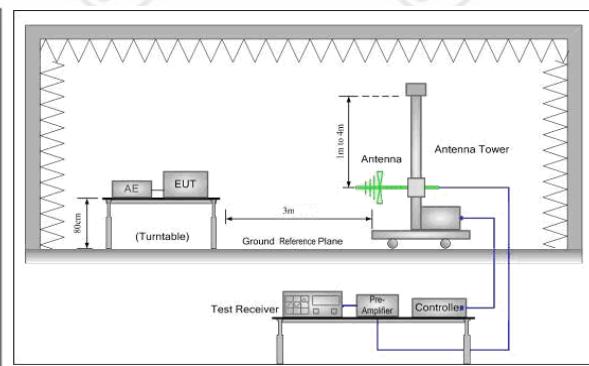


Figure 2. 30MHz to 1GHz

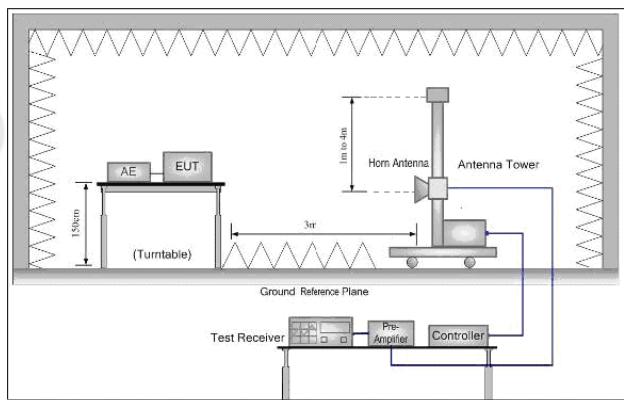
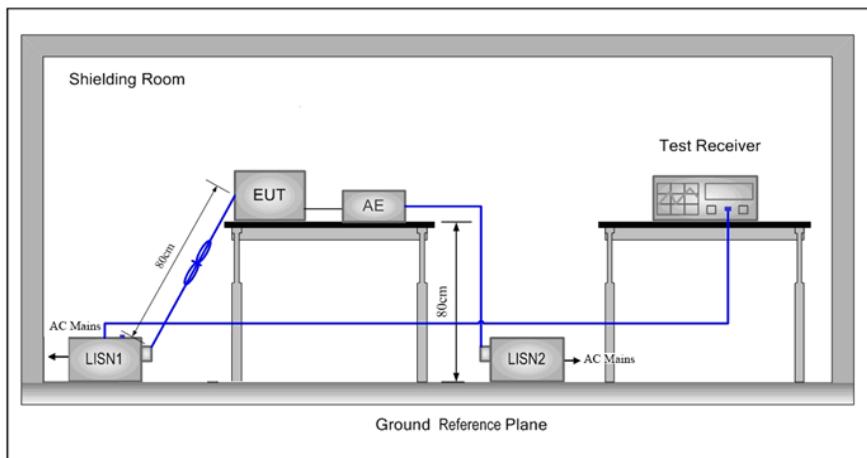


Figure 3. Above 1GHz

### 5.1.3 For Conducted Emissions test setup

#### Conducted Emissions setup



## 5.2 Test Environment

### Operating Environment:

Temperature:	24°C
Humidity:	50% RH
Atmospheric Pressure:	1010mbar

## 5.3 Test Condition

Test channel:

Test Mode	Tx/Rx	RF Channel		
		Low(L)	Middle(M)	High(H)
802.11b/g/n(HT20)	2412MHz ~2462 MHz	Channel 1	Channel 6	Channel11
		2412MHz	2437MHz	2462MHz
802.11n(HT40)	2422MHz ~2452 MHz	Channel 1	Channel 4	Channel7
		2422MHz	2437MHz	2452MHz
Transmitting mode:	Keep the EUT in transmitting mode with all kind of modulation and all kind of data rate.			

Test mode:

**Pre-scan under all rate at lowest channel of Antenna 1**

Mode	802.11b								
Data Rate	1Mbps	2Mbps	5.5Mbps	11Mbps					
Power(dBm)	16.97	16.85	16.98	17.04					
Mode	802.11g								
Data Rate	6Mbps	9Mbps	12Mbps	18Mbps	24Mbps	36Mbps	48Mbps	54Mbps	
Power(dBm)	15.97	15.92	15.89	15.83	15.78	15.84	15.88	15.90	
Mode	802.11n (HT20)								
Data Rate	6.5Mbps	13Mbps	19.5Mbps	26Mbps	39Mbps	52Mbps	58.5Mbps	65Mbps	
Power(dBm)	14.78	14.71	14.69	14.57	14.69	14.73	14.66	14.70	
Mode	802.11n (HT40)								
Data Rate	13.5Mbps	27Mbps	40.5Mbps	54Mbps	81Mbps	108Mbps	121.5Mbps	135Mbps	
Power(dBm)	13.62	13.55	13.46	13.60	13.49	13.54	13.48	13.59	

Through Pre-scan, 11Mbps of rate is the worst case of 802.11b; 6Mbps of rate is the worst case of 802.11g; 6.5Mbps of rate is the worst case of 802.11n(HT20); 13.5Mbps of rate is the worst case of 802.11n(HT40).

## 6 General Information

### 6.1 Client Information

Applicant:	SHENZHEN OPURES TECHNOLOGY CO., LTD
Address of Applicant:	Room 807, the Changsheng Building, Huaqiangbei road, Huaqiangbei street, Futian District, Shenzhen city, China.
Manufacturer:	SHENZHEN OPURES TECHNOLOGY CO., LTD
Address of Manufacturer:	Room 807, the Changsheng Building, Huaqiangbei road, Huaqiangbei street, Futian District, Shenzhen city, China.
Factory:	SHENZHEN OPURES TECHNOLOGY CO., LTD
Address of Factory:	Room 807, the Changsheng Building, Huaqiangbei road, Huaqiangbei street, Futian District, Shenzhen city, China.

### 6.2 General Description of EUT

Product Name:	WiFi Speaker
Model No.:	OP1100, OP1200, OP1300, OP1500, OP1600, OP1101, OP1102, OP1201, OP1202, OP1301, OP1302, OP1501, OP1502, OP1601, OP1602
Test Model No.:	OP1100
Trade Mark:	OPURES
EUT Supports Radios application:	Wlan 2.4GHz 802.11b/g/n(HT20&HT40)
Power Supply:	Adapter: Model: HJ-AD24-120200 Input: AC 100-240V, 50/60Hz, 0.7A Output: 12V=2000mA
AC adapter Power Line:	120cm (Unshielded)
Sample Received Date:	Mar. 03, 2016
Sample tested Date:	Mar. 03, 2016 to Apr. 15, 2016

### 6.3 Product Specification subjective to this standard

Operation Frequency:	IEEE 802.11b/g/n(HT20): 2412MHz to 2462MHz IEEE 802.11n(HT40): 2422MHz to 2452MHz
Channel Numbers:	IEEE 802.11b/g, IEEE 802.11n HT20: 11 Channels IEEE 802.11n HT40: 7 Channels
Channel Separation:	5MHz
duty cycle:	>98%
Type of Modulation:	IEEE for 802.11b: DSSS(CCK,DQPSK,DBPSK) IEEE for 802.11g : OFDM(64QAM, 16QAM, QPSK, BPSK) IEEE for 802.11n(HT20 and HT40) : OFDM (64QAM, 16QAM, QPSK, BPSK)
Test Power Grade:	(manufacturer declare) 802.11b:Ant1:20;Ant2:18. 802.11g:Ant1:11;Ant2:0C. 802.11n(HT20 ):Ant1:0E;Ant2:0A. 802.11n(HT40 ):Ant1:0F;Ant2:0A.
Test Software of EUT:	(manufacturer declare ) QA Tool_Dbg.exe
Hardware Version:	20151215 (manufacturer declare)
Software Version:	20151223 (manufacturer declare)
Antenna Type and Gain:	Type: Internal antenna Gain: 3dBi ( Per ant )
Test Voltage:	AC 120V/60Hz

Operation Frequency each of channel(802.11b/g/n HT20)							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	2412MHz	4	2427MHz	7	2442MHz	10	2457MHz
2	2417MHz	5	2432MHz	8	2447MHz	11	2462MHz
3	2422MHz	6	2437MHz	9	2452MHz		

Remark: 802.11b/g support SISO , Only 802.11n HT20 supported both SISO and MIMO

Operation Frequency each of channel(802.11n HT40)					
Channel	Frequency	Channel	Frequency	Channel	Frequency
1	2422MHz	4	2437MHz	7	2452MHz
2	2427MHz		2442MHz		
3	2432MHz		2447MHz		

Remark: 802.11n HT40 supported Both SISO and MIMO

## 6.4 Description of Support Units

The EUT has been tested independently.

## 6.5 Test Location

All tests were performed at:

Centre Testing International Group Co., Ltd.

Hongwei Industrial Zone, Bao'an 70 District, Shenzhen, Guangdong, China 518101

Telephone: +86 (0) 755 3368 3668 Fax:+86 (0) 755 3368 3385

No tests were sub-contracted.

## 6.6 Test Facility

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

### CNAS-Lab Code: L1910

Centre Testing International Group Co., Ltd. has been assessed and proved to be in compliance with CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC 17025: 2005 General Requirements) for the Competence of Testing and Calibration Laboratories..

### A2LA-Lab Cert. No. 3061.01

Centre Testing International Group Co., Ltd. EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

### FCC-Registration No.: 565659

Centre Testing International Group Co., Ltd. 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 our files. Registration 565659.

### IC-Registration No.: 7408A

The 3m Alternate Test Site of Centre Testing International Group Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 7408A .

**IC-Registration No.: 7408B**

The 10m Alternate Test Site of Centre Testing International Group Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 7408B.

**NEMKO-Aut. No.: ELA503**

Centre Testing International Group Co., Ltd. has been assessed the quality assurance system, the testing facilities, qualifications and testing practices of the relevant parts of the organization. The quality assurance system of the Laboratory has been validated against ISO/IEC 17025 or equivalent. The laboratory also fulfils the conditions described in Nemko Document NLA-10.

**VCCI**

The Radiation 3 & 10 meters site of Centre Testing International Group Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-4096.

Main Ports Conducted Interference Measurement of Centre Testing International Group Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: C-4563.

Telecommunication Ports Conducted Disturbance Measurement of Centre Testing International Group Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: T-2146.

The Radiation 3 meters site of Centre Testing International Group Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-758

## 6.7 Deviation from Standards

None.

## 6.8 Abnormalities from Standard Conditions

None.

## 6.9 Other Information Requested by the Customer

None.

## 6.10 Measurement Uncertainty (95% confidence levels, k=2)

No.	Item	Measurement Uncertainty
1	Radio Frequency	$7.9 \times 10^{-8}$
2	RF power, conducted	0.31dB (30MHz-1GHz)
		0.57dB (1GHz-18GHz)
3	Radiated Spurious emission test	4.5dB (30MHz-1GHz)
		4.8dB (1GHz-12.75GHz)
4	Conduction emission	3.6dB (9kHz to 150kHz)
		3.2dB (150kHz to 30MHz)
5	Temperature test	0.64°C
6	Humidity test	2.8%
7	DC power voltages	0.025%

## 7 Equipment List

RF test system					
Equipment	Manufacturer	Mode No.	Serial Number	Cal. Date (mm-dd-yyyy)	Cal. Due date (mm-dd-yyyy)
Signal Generator	Keysight	E8257D	MY53401106	04-02-2015	04-01-2016
Signal Generator	Keysight	E8257D	MY53401106	04-01-2016	03-31-2017
Communication test set test set	Agilent	N4010A	MY51400230	04-02-2015	04-01-2016
Communication test set test set	Agilent	N4010A	MY51400230	04-01-2016	03-31-2017
Spectrum Analyzer	Keysight	N9010A	MY54510339	04-02-2015	04-01-2016
Spectrum Analyzer	Keysight	N9010A	MY54510339	04-01-2016	03-31-2017
Signal Generator	Keysight	N5182B	MY53051549	04-02-2015	04-01-2016
Signal Generator	Keysight	N5182B	MY53051549	04-01-2016	03-31-2017
High-pass filter(3-18GHz)	Sinoscite	FL3CX03WG18 NM12-0398-002	---	01-12-2016	01-11-2017
High-pass filter(6-18GHz)	MICRO-TRONICS	SPA-F-63029-4	---	01-12-2016	01-11-2017
band rejection filter (GSM900)	Sinoscite	FL5CX01CA09C L12-0395-001	---	01-12-2016	01-11-2017
band rejection filter (GSM850)	Sinoscite	FL5CX01CA08C L12-0393-001	---	01-12-2016	01-11-2017
band rejection filter (GSM1800)	Sinoscite	FL5CX02CA04C L12-0396-002	---	01-12-2016	01-11-2017
band rejection filter (GSM1900)	Sinoscite	FL5CX02CA03C L12-0394-001	---	01-12-2016	01-11-2017
DC Power	Keysight	E3642A	MY54436035	04-02-2015	04-01-2016
DC Power	Keysight	E3642A	MY54436035	04-01-2016	03-31-2017
PC-1	Lenovo	R4960d	---	04-02-2015	04-01-2016
PC-1	Lenovo	R4960d	---	04-01-2016	03-31-2017
BT&WI-FI Automatic control	R&S	OSP120	101374	04-02-2015	04-01-2016
BT&WI-FI Automatic control	R&S	OSP120	101374	04-01-2016	03-31-2017
RF control unit	JS Tonscend	JS0806-2	158060006	04-02-2015	04-01-2016
RF control unit	JS Tonscend	JS0806-2	158060006	04-01-2016	03-31-2017
BT&WI-FI Automatic test software	JS Tonscend	JS1120-2	---	04-02-2015	04-01-2016
BT&WI-FI Automatic test software	JS Tonscend	JS1120-2	---	04-01-2016	03-31-2017

3M Semi/full-anechoic Chamber					
Equipment	Manufacturer	Mode No.	Serial Number	Cal. date (mm-dd-yyyy)	Cal. Due date (mm-dd-yyyy)
3M Chamber & Accessory Equipment	TDK	SAC-3	---	06-02-2013	06-01-2016
TRILOG Broadband Antenna	SCHWARZBEC K	VULB9163	9163-484	05-25-2015	05-23-2016
Microwave Preamplifier	Agilent	8449B	3008A02425	02-04-2016	02-03-2017
Horn Antenna	ETS-LINDGREN	3117	00057410	06-30-2015	06-28-2018
Loop Antenna	ETS	6502	00071730	07-30-2015	07-28-2017
Spectrum Analyzer	R&S	FSP40	100416	06-30-2015	06-28-2016
Receiver	R&S	ESCI	100435	06-30-2015	06-28-2016
Multi device Controller	maturo	NCD/070/10711 112	---	01-12-2016	01-11-2017
LISN	schwarzbeck	NNBM8125	81251547	06-30-2015	06-28-2016
LISN	schwarzbeck	NNBM8125	81251548	06-30-2015	06-28-2016
Signal Generator	Agilent	E4438C	MY45095744	04-02-2015	04-01-2016
Signal Generator	Agilent	E4438C	MY45095744	04-01-2016	03-31-2017
Signal Generator	Keysight	E8257D	MY53401106	04-02-2015	04-01-2016
Signal Generator	Keysight	E8257D	MY53401106	04-01-2016	03-31-2017
Temperature/ Humidity Indicator	TAYLOR	1451	1905	07-08-2015	07-06-2016
Communication test set	Agilent	E5515C	GB47050534	04-02-2015	04-01-2016
Communication test set	Agilent	E5515C	GB47050534	04-01-2016	03-31-2017
Cable line	Fulai(7M)	SF106	5219/6A	01-12-2016	01-11-2017
Cable line	Fulai(6M)	SF106	5220/6A	01-12-2016	01-11-2017
Cable line	Fulai(3M)	SF106	5216/6A	01-12-2016	01-11-2017
Cable line	Fulai(3M)	SF106	5217/6A	01-12-2016	01-11-2017
Communication test set	R&S	CMW500	152394	04-02-2015	04-01-2016
Communication test set	R&S	CMW500	152394	04-01-2016	03-31-2017
High-pass filter(3-18GHz)	Sinoscite	FL3CX03WG18 NM12-0398-002	---	01-12-2016	01-11-2017
High-pass filter(6-18GHz)	MICRO-TRONICS	SPA-F-63029-4	---	01-12-2016	01-11-2017
band rejection filter	Sinoscite	FL5CX01CA09 CL12-0395-001	---	01-12-2016	01-11-2017
band rejection filter	Sinoscite	FL5CX01CA08 CL12-0393-001	---	01-12-2016	01-11-2017
band rejection filter	Sinoscite	FL5CX02CA04 CL12-0396-002	---	01-12-2016	01-11-2017
band rejection filter	Sinoscite	FL5CX02CA03 CL12-0394-001	---	01-12-2016	01-11-2017

<b>Conducted disturbance Test</b>					
<b>Equipment</b>	<b>Manufacturer</b>	<b>Mode No.</b>	<b>Serial Number</b>	<b>Cal. date (mm-dd-yyyy)</b>	<b>Cal. Due date (mm-dd-yyyy)</b>
Receiver	R&S	ESCI	100009	06-30-2015	06-28-2016
Temperature/ Humidity Indicator	Belida	TT-512	101	07-09-2015	07-07-2016
Communication test set	Agilent	E5515C	GB47050534	04-02-2015	04-01-2016
Communication test set	Agilent	E5515C	GB47050534	04-01-2016	03-31-2017
Communication test set	R&S	CMW500	152394	04-02-2015	04-01-2016
Communication test set	R&S	CMW500	152394	04-01-2016	03-31-2017
LISN	R&S	ENV216	100098	06-30-2015	06-28-2016
LISN	schwarzbeck	NNLK8121	8121-529	06-30-2015	06-28-2016
Voltage Probe	R&S	ESH2-Z3	100042	07-09-2014	07-08-2017
Current Probe	R&S	EZ17	100106	07-09-2014	07-08-2017
ISN	TESEQ GmbH	ISN T800	30297	01-29-2015	01-27-2017

## 8 Radio Technical Requirements Specification

### Reference documents for testing:

No.	Identity	Document Title
1	FCC Part15C (2015)	Subpart C-Intentional Radiators
2	ANSI C63.10-2013	American National Standard for Testing Unlicensed Wireless Devices

### Test Results List:

Test Requirement	Test method	Test item	Verdict	Note
Part15C Section 15.247 (b)(3)	ANSI C63.10	Conducted Peak Output Power	PASS	Appendix A)
Part15C Section 15.247 (a)(2)	ANSI C63.10	6dB Occupied Bandwidth	PASS	Appendix B)
Part15C Section 15.247(d)	ANSI C63.10	Band-edge for RF Conducted Emissions	PASS	Appendix C)
Part15C Section 15.247(d)	ANSI C63.10	RF Conducted Spurious Emissions	PASS	Appendix D)
Part15C Section 15.247 (e)	ANSI C63.10	Power Spectral Density	PASS	Appendix E)
Part15C Section 15.203/15.247 (c)	ANSI C63.10	Antenna Requirement	PASS	Appendix F)
Part15C Section 15.207	ANSI C63.10	AC Power Line Conducted Emission	PASS	Appendix G)
Part15C Section 15.205/15.209	ANSI C63.10	Restricted bands around fundamental frequency (Radiated Emission)	PASS	Appendix H)
Part15C Section 15.205/15.209	ANSI C63.10	Radiated Spurious Emissions	PASS	Appendix I)

## Appendix A): Conducted Output Power

**Result Table**

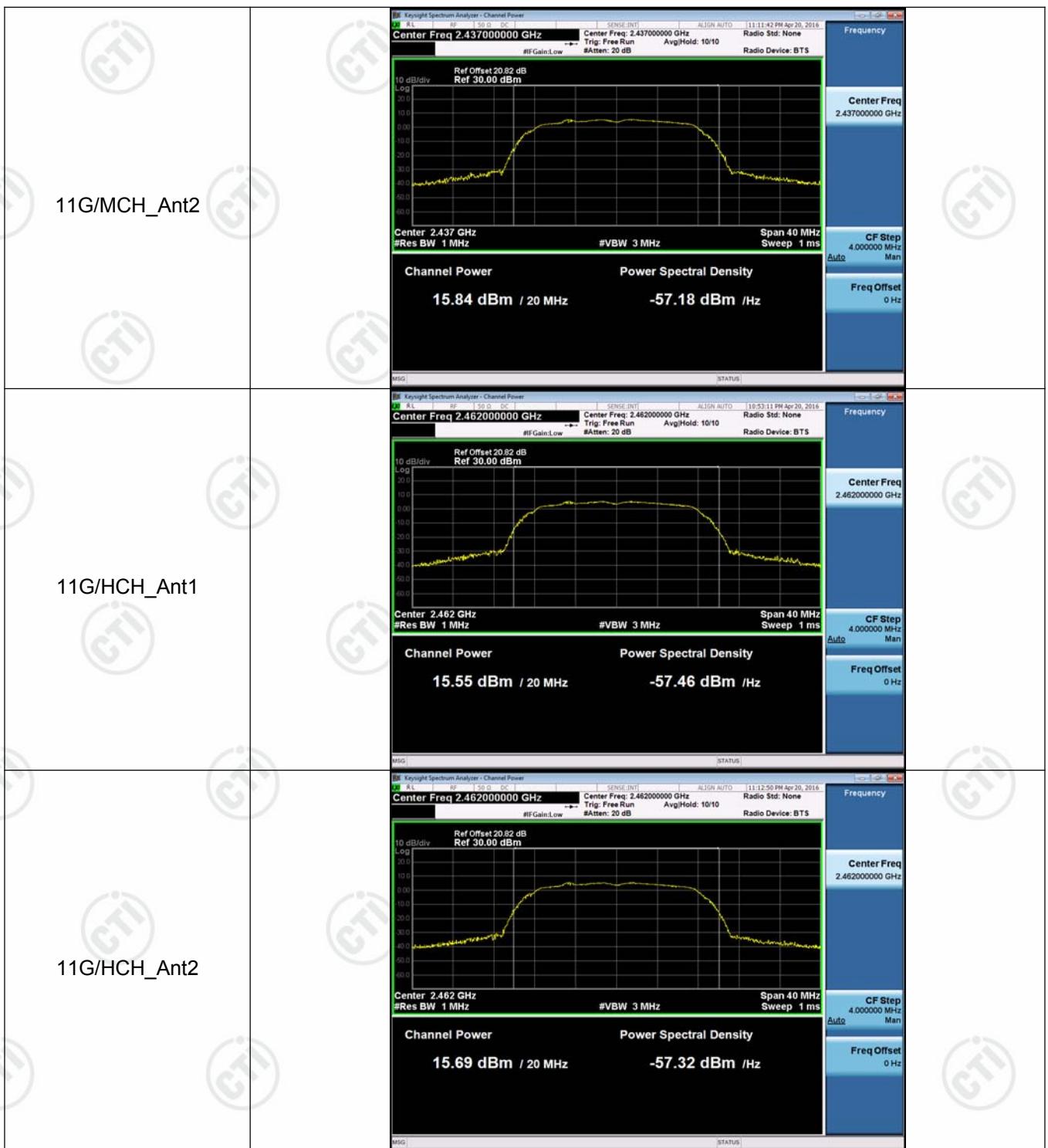
Mode	Antenna	Channel	Conducted Output Power [dBm]	Verdict	Remark
11B	Ant1	LCH	17.04	PASS	RMS detector
11B	Ant2	LCH	17.72	PASS	
11B	Ant1	MCH	17.72	PASS	
11B	Ant2	MCH	17.10	PASS	
11B	Ant1	HCH	16.38	PASS	
11B	Ant2	HCH	16.99	PASS	
11G	Ant1	LCH	15.97	PASS	
11G	Ant2	LCH	15.24	PASS	
11G	Ant1	MCH	15.72	PASS	
11G	Ant2	MCH	15.84	PASS	
11G	Ant1	HCH	15.55	PASS	
11G	Ant2	HCH	15.69	PASS	
11N20SISO	Ant1	LCH	14.78	PASS	
11N20SISO	Ant2	LCH	14.04	PASS	
11N20SISO	Ant1	MCH	15.00	PASS	
11N20SISO	Ant2	MCH	14.66	PASS	
11N20SISO	Ant1	HCH	14.93	PASS	
11N20SISO	Ant2	HCH	14.52	PASS	
11N20MIMO	Ant1	LCH	13.16	PASS	
11N20MIMO	Ant2	LCH	14.81	PASS	
11N20MIMO	Ant1+ Ant2	LCH	17.07	PASS	
11N20MIMO	Ant1	MCH	13.49	PASS	
11N20MIMO	Ant2	MCH	14.93	PASS	
11N20MIMO	Ant1+ Ant2	MCH	17.28	PASS	
11N20MIMO	Ant1	HCH	14.33	PASS	
11N20MIMO	Ant2	HCH	14.76	PASS	
11N20MIMO	Ant1+ Ant2	HCH	17.56	PASS	
11N40SISO	Ant1	LCH	13.62	PASS	
11N40SISO	Ant2	LCH	13.23	PASS	
11N40SISO	Ant1	MCH	13.74	PASS	
11N40SISO	Ant2	MCH	13.78	PASS	
11N40SISO	Ant1	HCH	13.64	PASS	
11N40SISO	Ant2	HCH	13.77	PASS	
11N40MIMO	Ant1	LCH	14.20	PASS	
11N40MIMO	Ant2	LCH	13.80	PASS	
11N40MIMO	Ant1+ Ant2	LCH	17.01	PASS	
11N40MIMO	Ant1	MCH	13.57	PASS	
11N40MIMO	Ant2	MCH	14.89	PASS	
11N40MIMO	Ant1+ Ant2	MCH	17.29	PASS	
11N40MIMO	Ant1	HCH	13.55	PASS	
11N40MIMO	Ant2	HCH	14.26	PASS	
11N40MIMO	Ant1+ Ant2	HCH	16.93	PASS	

## Test Graph

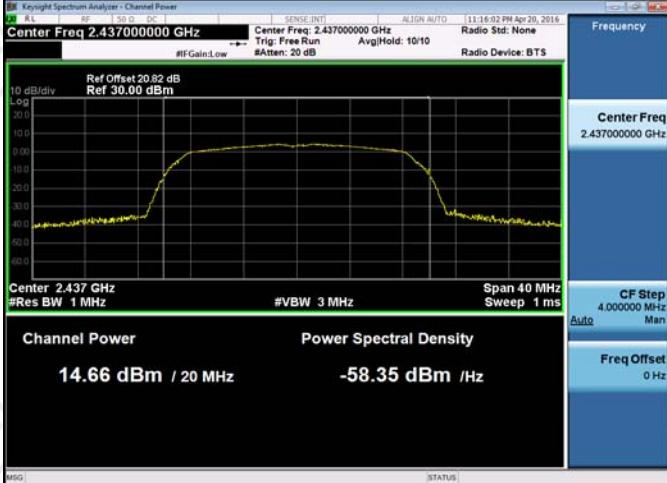
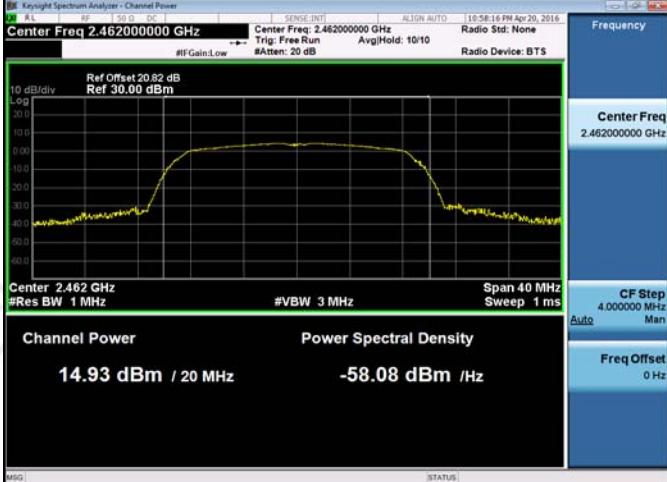
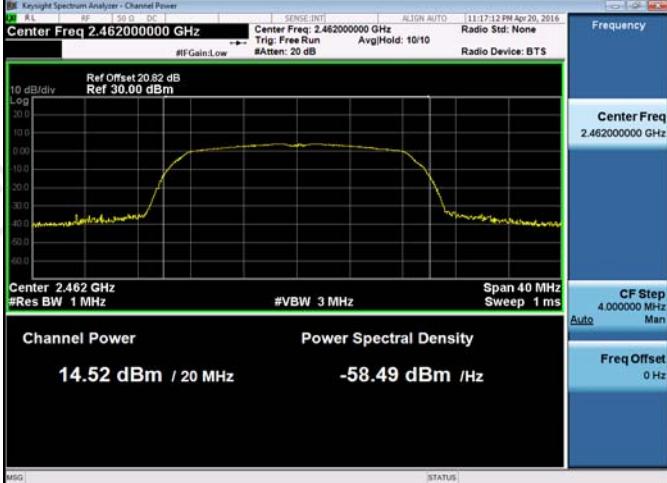


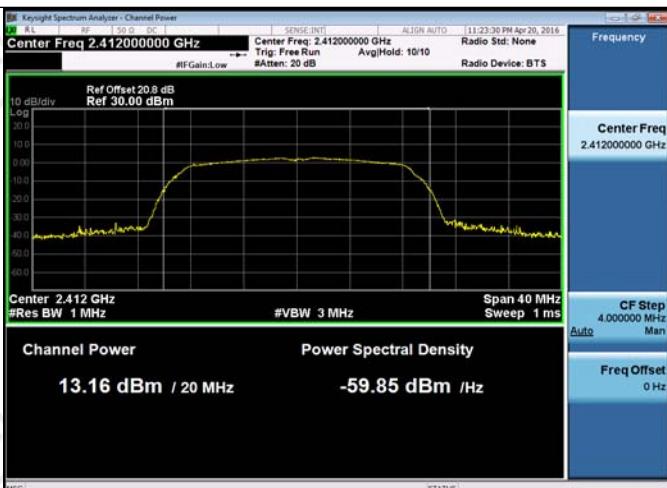
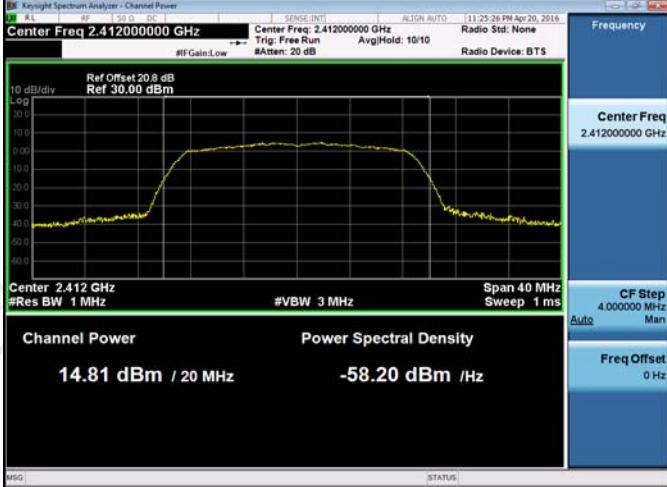
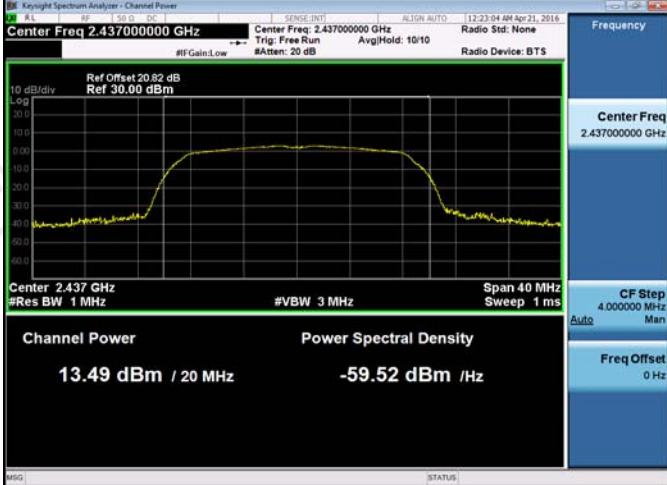






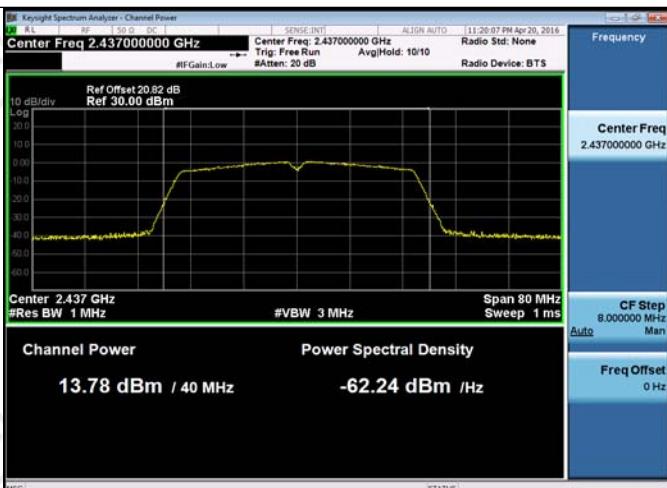
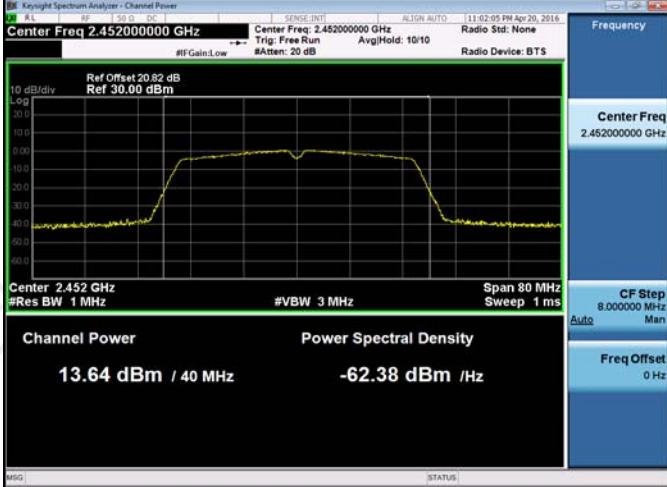
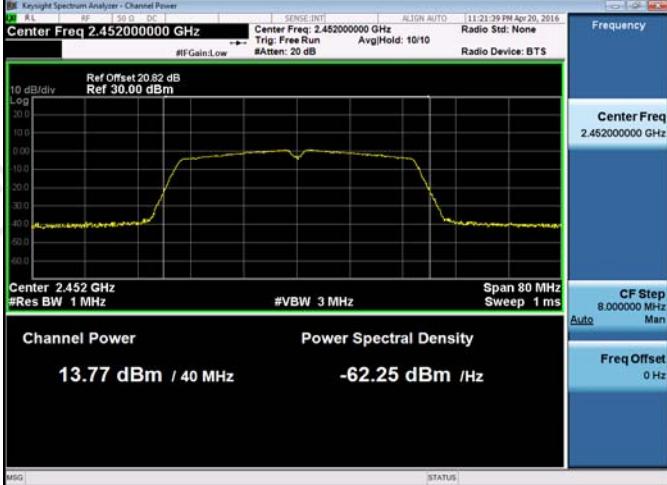


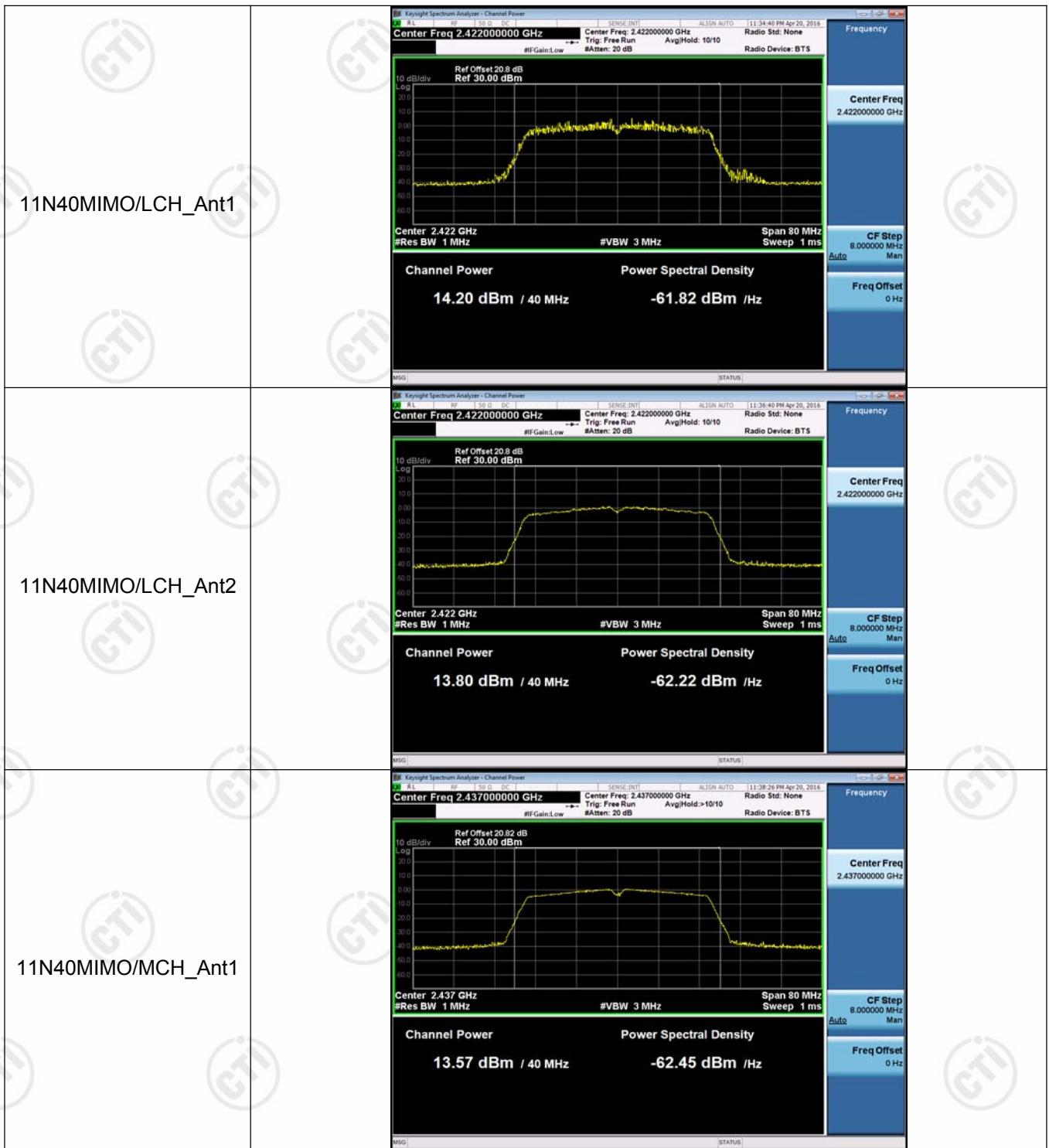
11N20SISO/MCH_Ant2	
11N20SISO/HCH_Ant1	
11N20SISO/HCH_Ant2	

11N20MIMO/LCH_Ant1	
11N20MIMO/LCH_Ant2	
11N20MIMO/MCH_Ant1	





11N40SISO/MCH_Ant2	
11N40SISO/HCH_Ant1	
11N40SISO/HCH_Ant2	



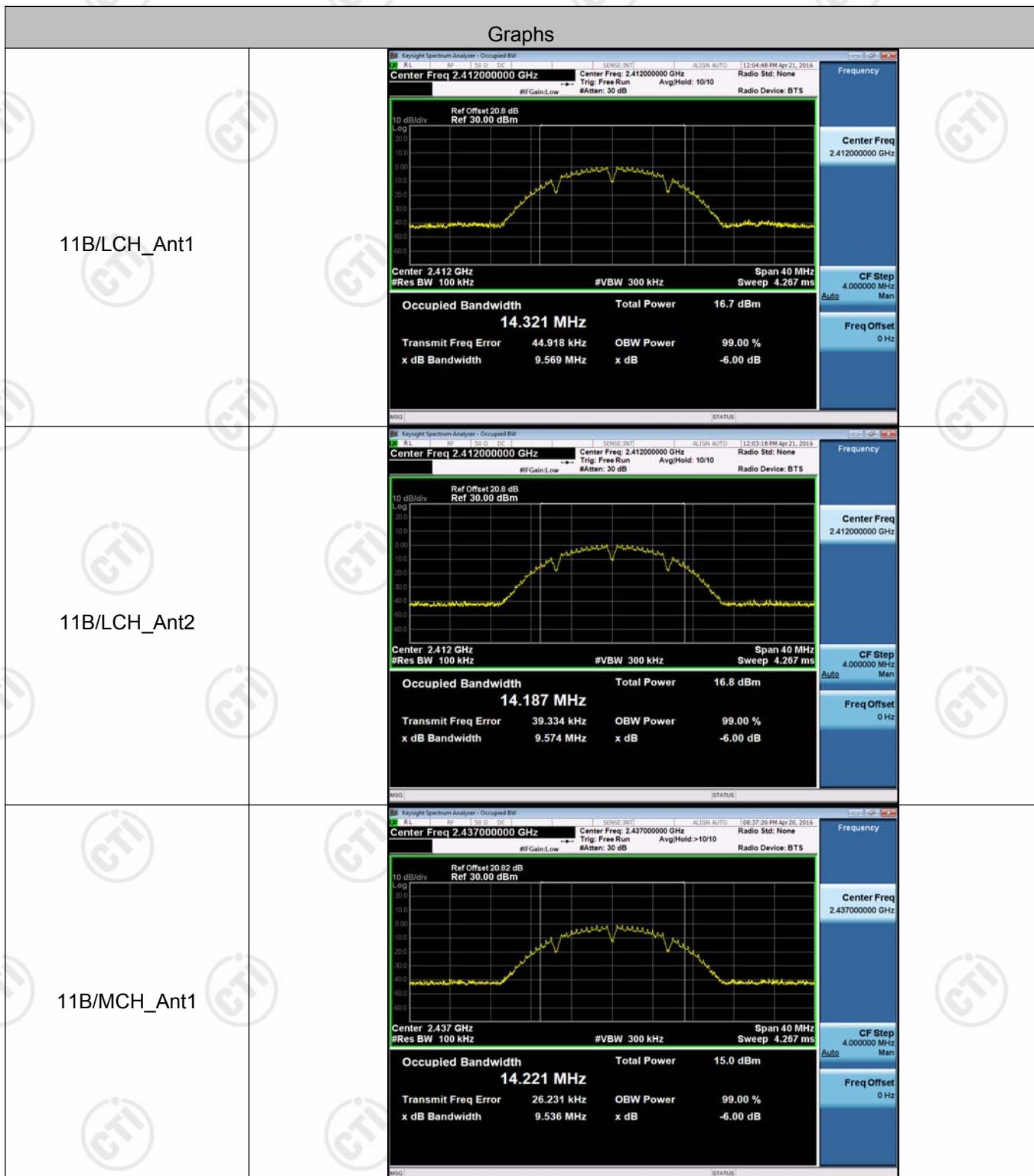


## Appendix B): 6dB Occupied Bandwidth

**Result Table**

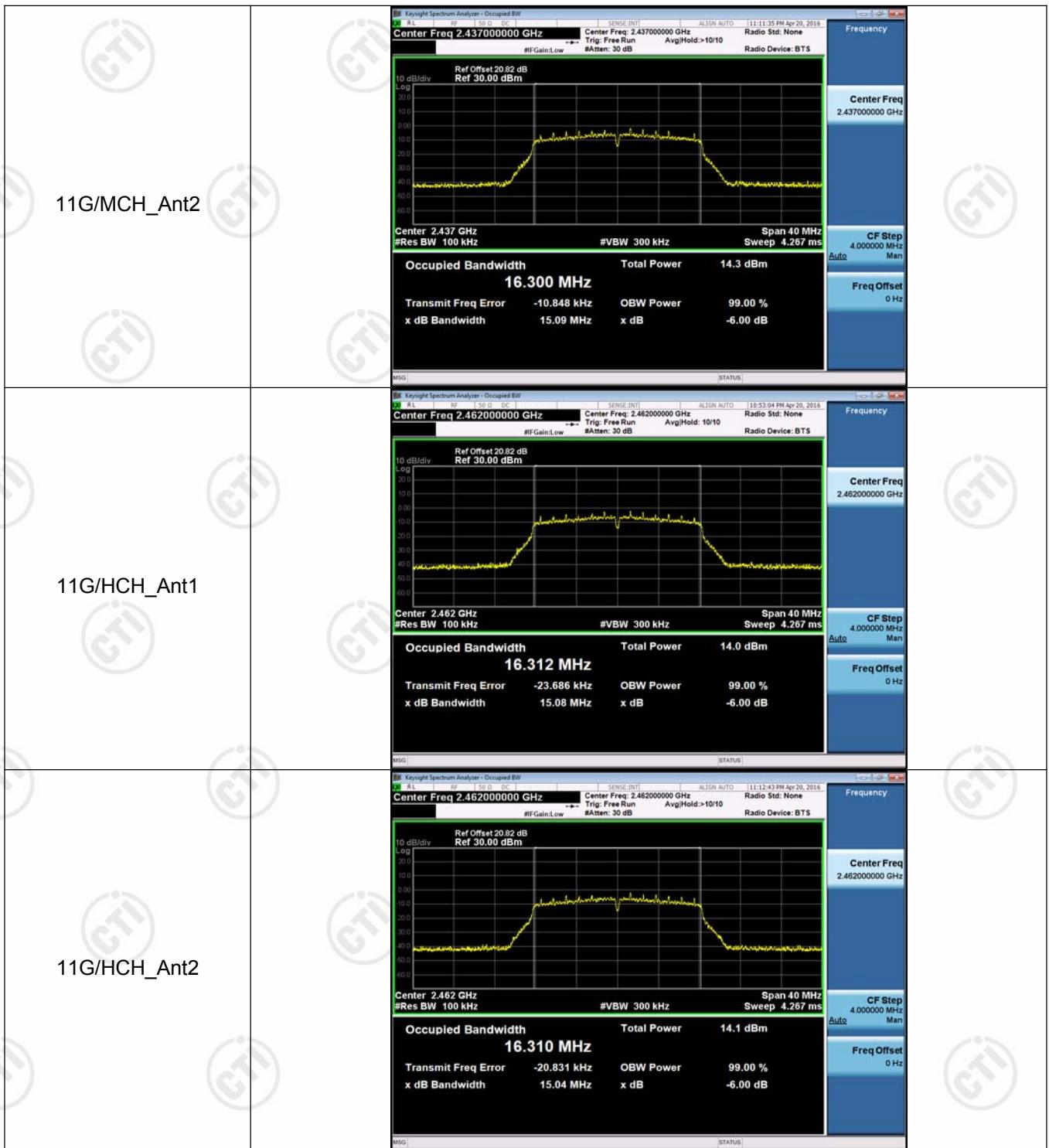
Mode	Antenna	Channel	6dB Bandwidth [MHz]	99% OBW [MHz]	Verdict	Remark
11B	Ant1	LCH	9.569	14.321	PASS	
11B	Ant2	LCH	9.574	14.187	PASS	
11B	Ant1	MCH	9.536	14.221	PASS	
11B	Ant2	MCH	9.550	14.135	PASS	
11B	Ant1	HCH	10.02	14.327	PASS	
11B	Ant2	HCH	9.993	14.228	PASS	
11G	Ant1	LCH	15.08	16.310	PASS	
11G	Ant2	LCH	15.08	16.308	PASS	
11G	Ant1	MCH	15.06	16.313	PASS	
11G	Ant2	MCH	15.09	16.300	PASS	
11G	Ant1	HCH	15.08	16.312	PASS	
11G	Ant2	HCH	15.04	16.310	PASS	
11N20SISO	Ant1	LCH	15.08	17.496	PASS	
11N20SISO	Ant2	LCH	15.08	17.498	PASS	
11N20SISO	Ant1	MCH	15.11	17.495	PASS	
11N20SISO	Ant2	MCH	15.10	17.488	PASS	
11N20SISO	Ant1	HCH	15.12	17.489	PASS	
11N20SISO	Ant2	HCH	13.82	17.485	PASS	
11N20MIMO	Ant1	LCH	15.08	17.505	PASS	
11N20MIMO	Ant2	LCH	17.53	17.536	PASS	
11N20MIMO	Ant1	MCH	15.11	17.503	PASS	
11N20MIMO	Ant2	MCH	15.09	17.480	PASS	
11N20MIMO	Ant1	HCH	15.13	17.489	PASS	
11N20MIMO	Ant2	HCH	15.09	17.487	PASS	
11N40SISO	Ant1	LCH	35.04	35.816	PASS	
11N40SISO	Ant2	LCH	35.05	35.814	PASS	
11N40SISO	Ant1	MCH	33.80	35.781	PASS	
11N40SISO	Ant2	MCH	35.06	35.765	PASS	
11N40SISO	Ant1	HCH	35.05	35.793	PASS	
11N40SISO	Ant2	HCH	35.09	35.784	PASS	
11N40MIMO	Ant1	LCH	30.38	36.023	PASS	
11N40MIMO	Ant2	LCH	35.05	35.814	PASS	
11N40MIMO	Ant1	MCH	35.06	35.862	PASS	
11N40MIMO	Ant2	MCH	35.07	35.753	PASS	
11N40MIMO	Ant1	HCH	35.06	35.788	PASS	
11N40MIMO	Ant2	HCH	33.84	35.781	PASS	Peak detector

### Test Graph



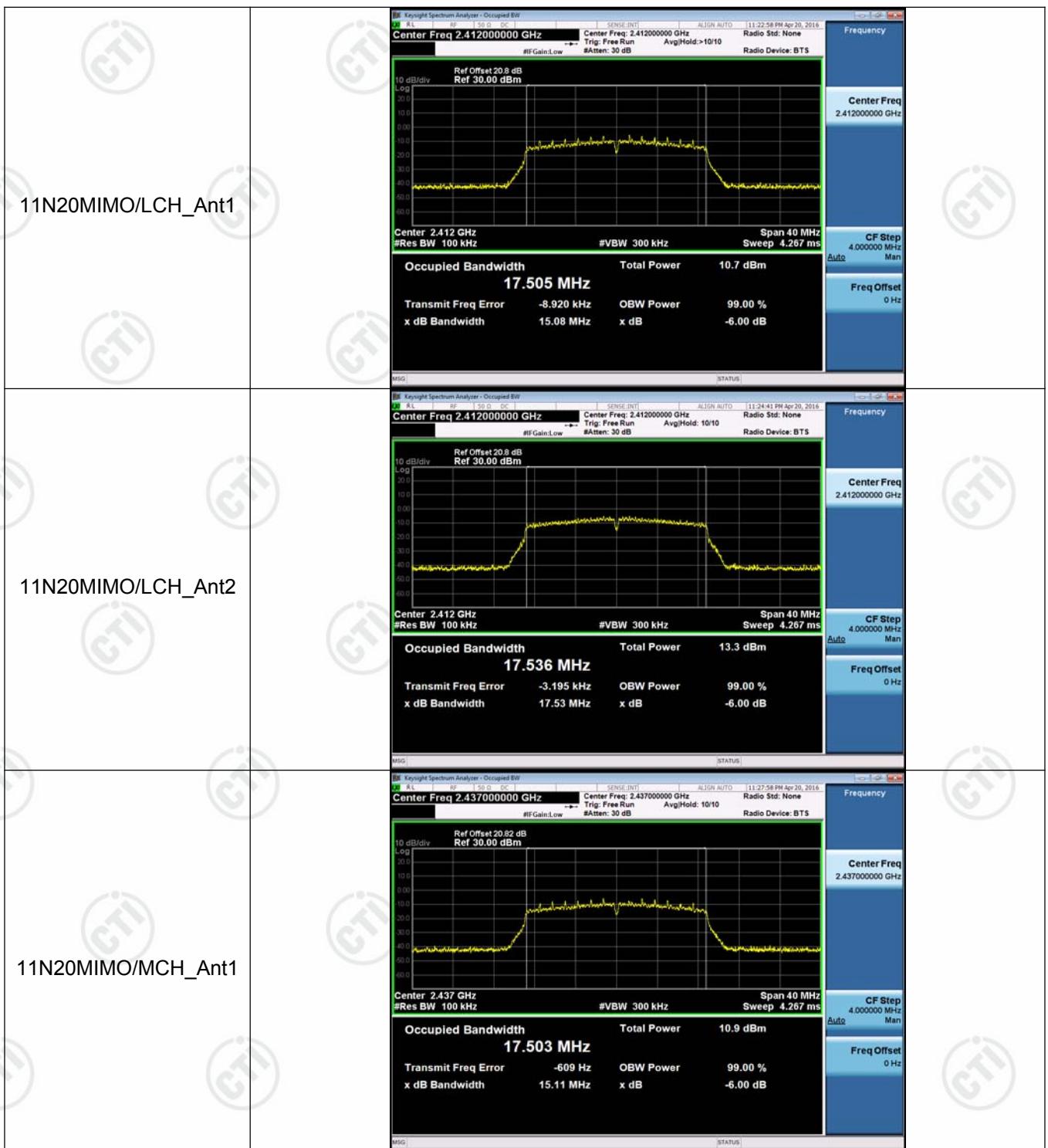


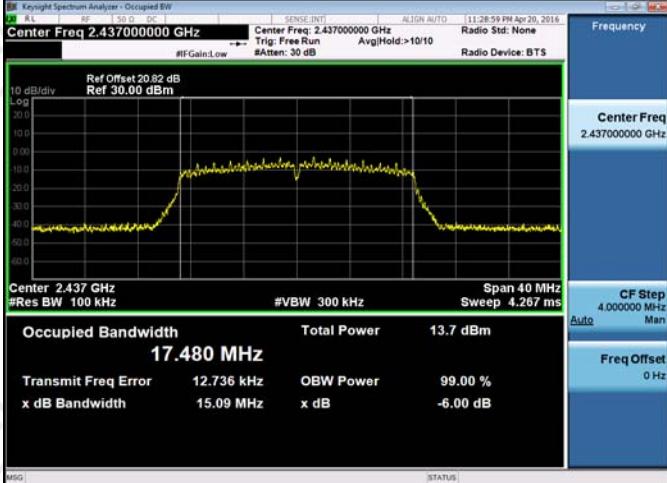
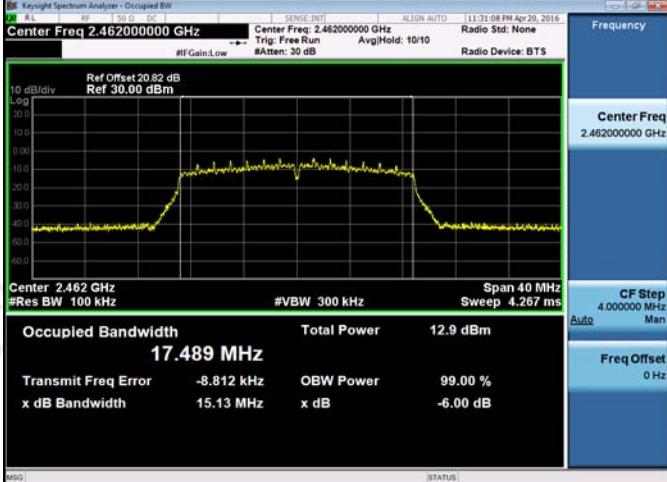
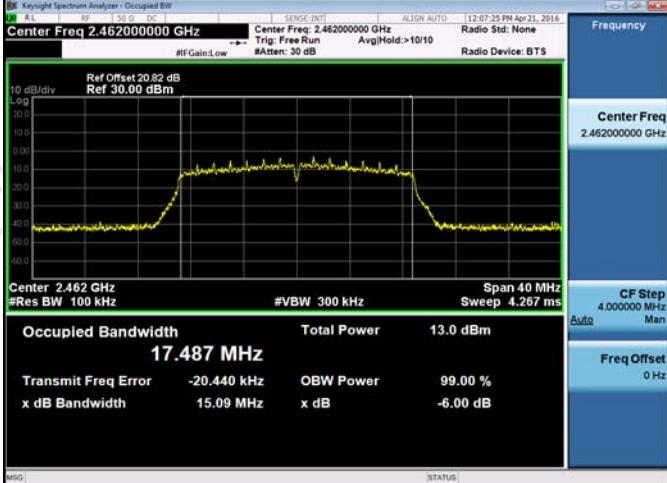


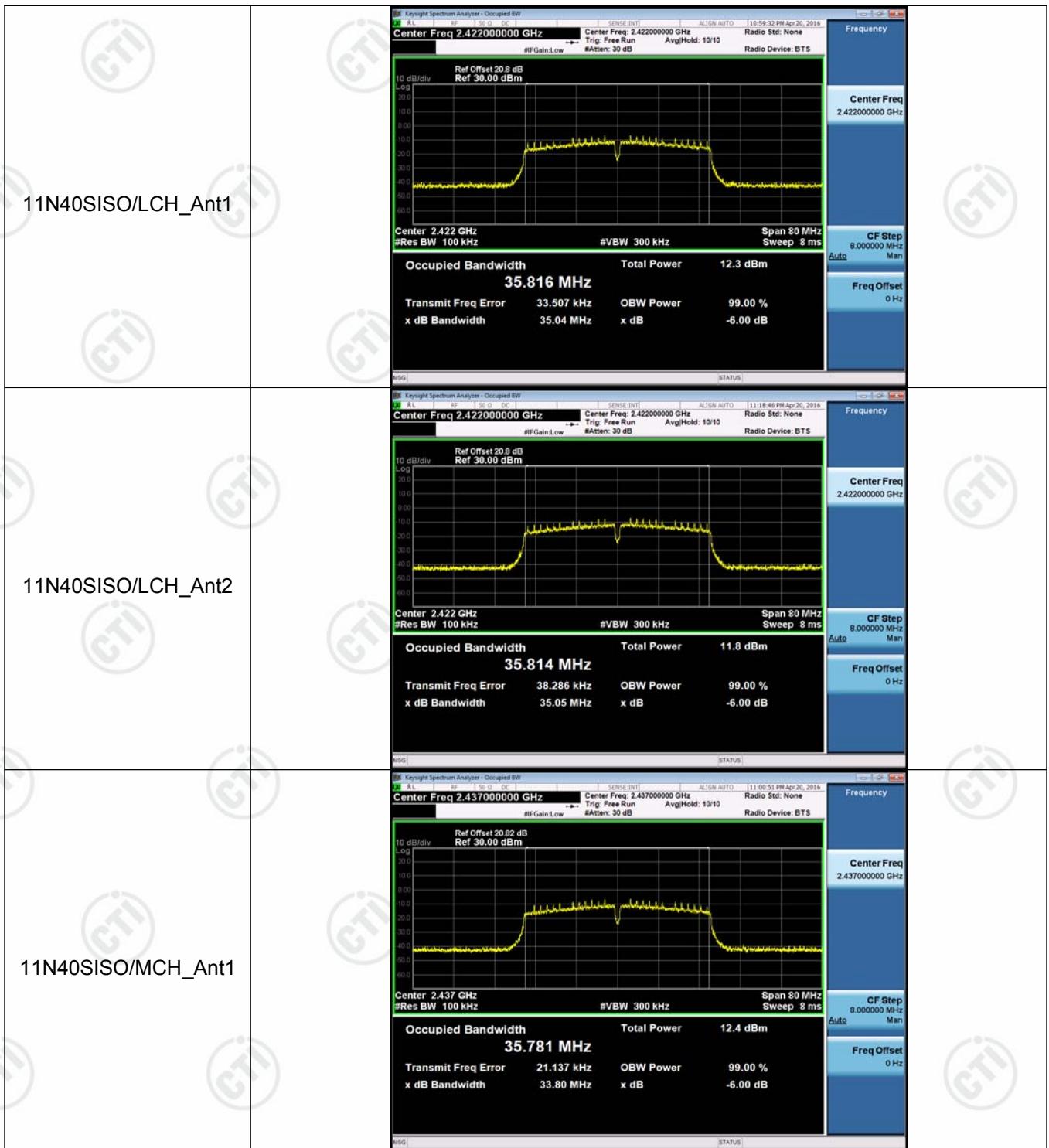


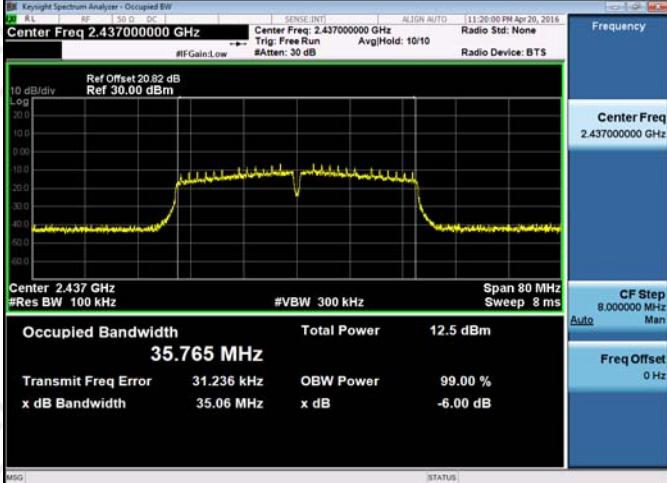
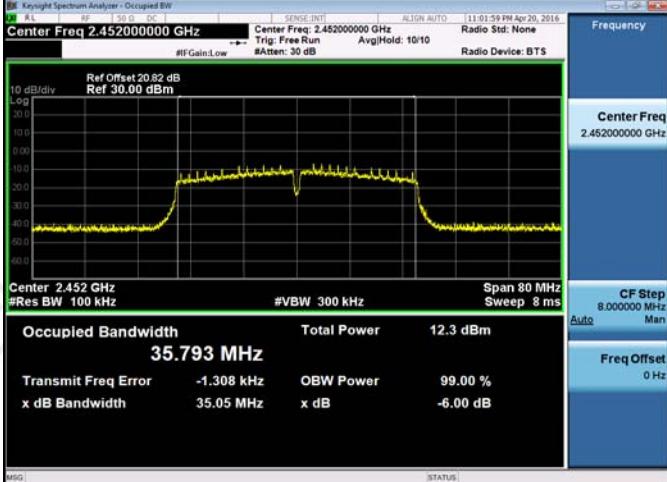
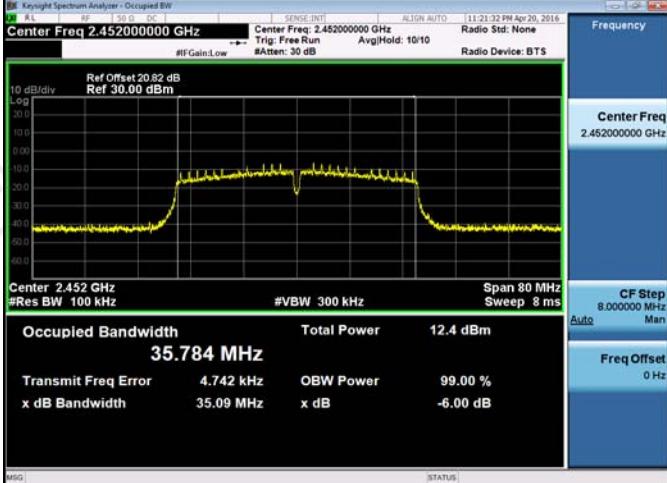




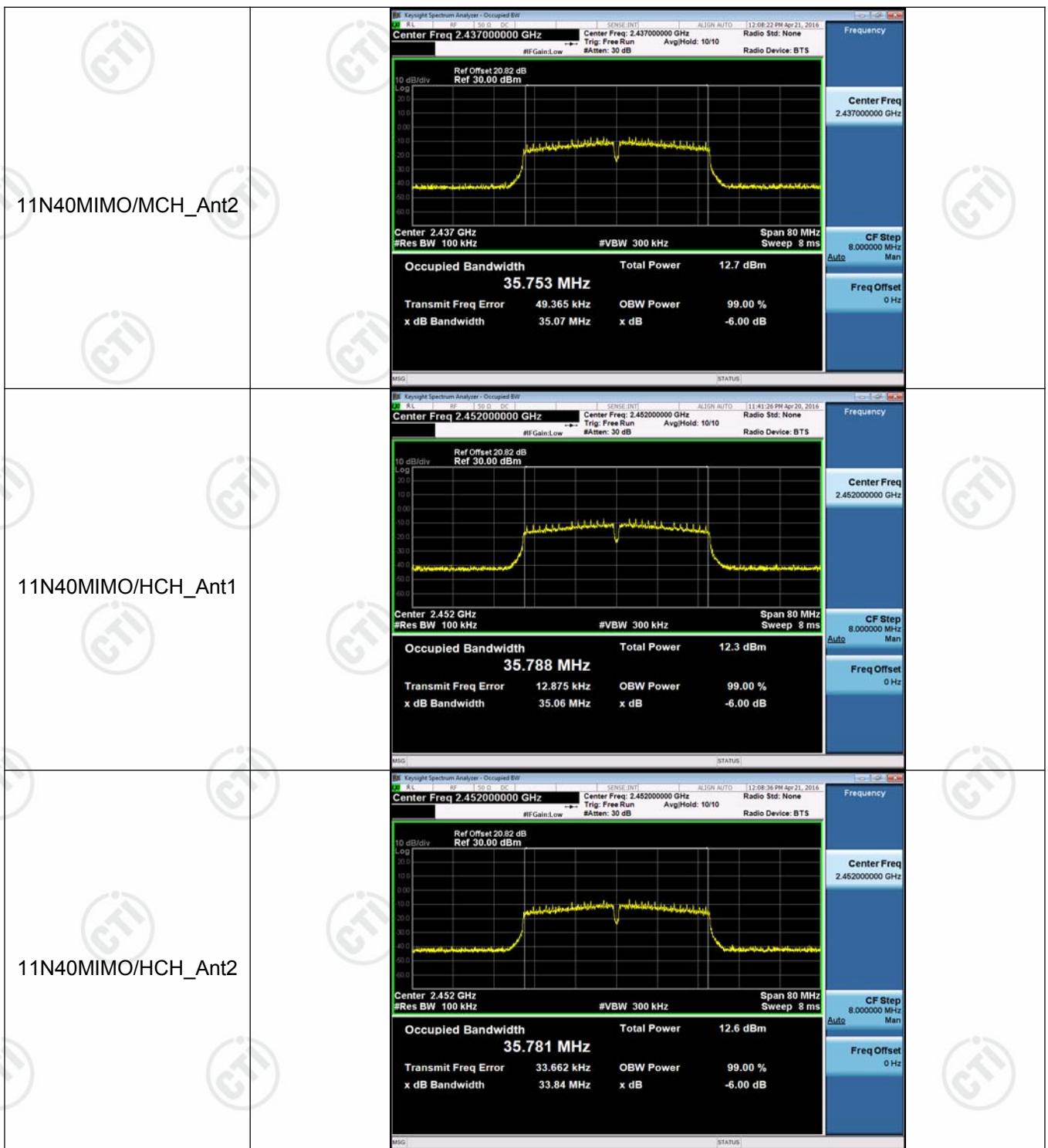


11N20MIMO/MCH_Ant2	
11N20MIMO/HCH_Ant1	
11N20MIMO/HCH_Ant2	



11N40SISO/MCH_Ant2	
11N40SISO/HCH_Ant1	
11N40SISO/HCH_Ant2	





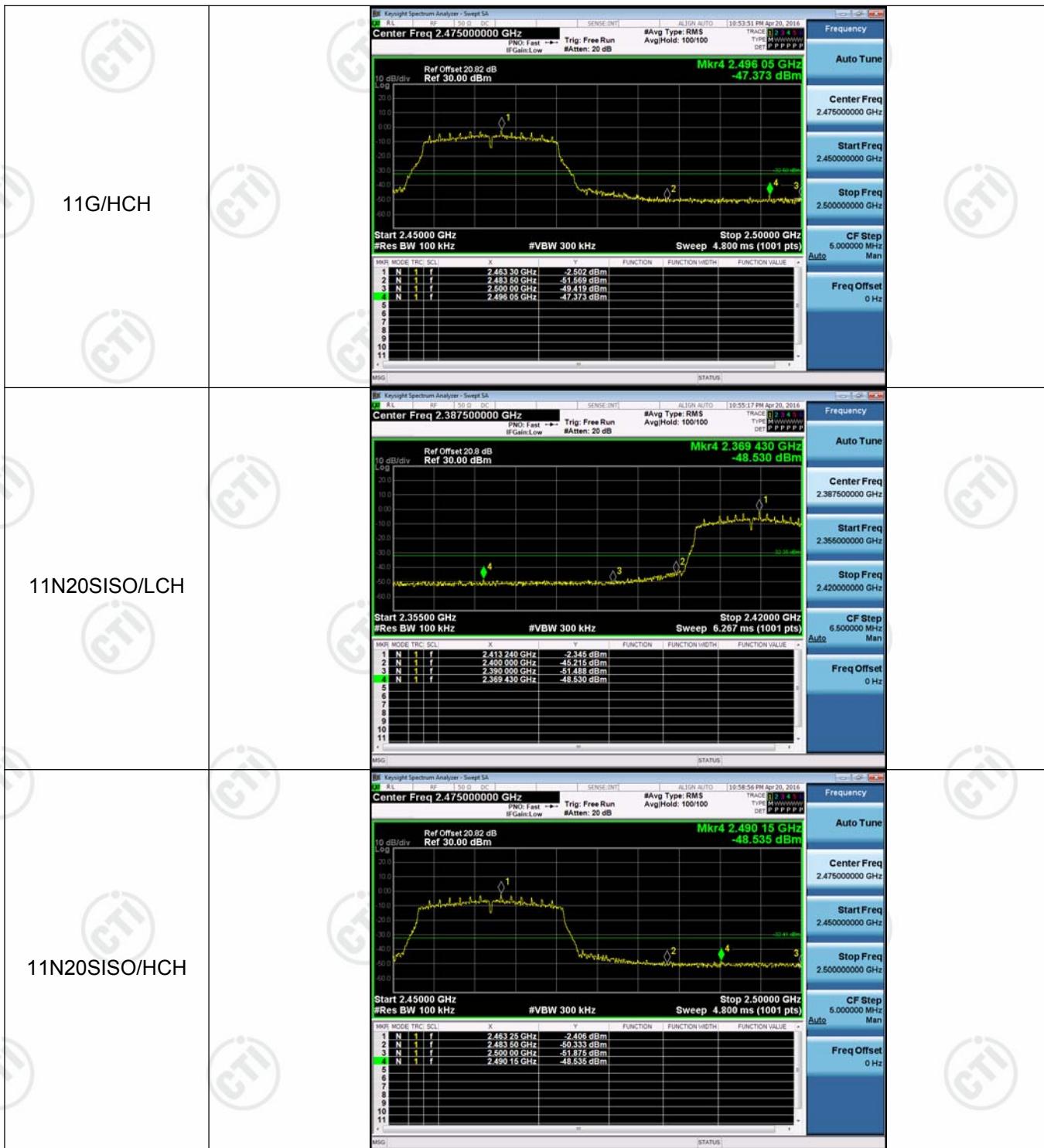
## Appendix C): Band-edge for RF Conducted Emissions

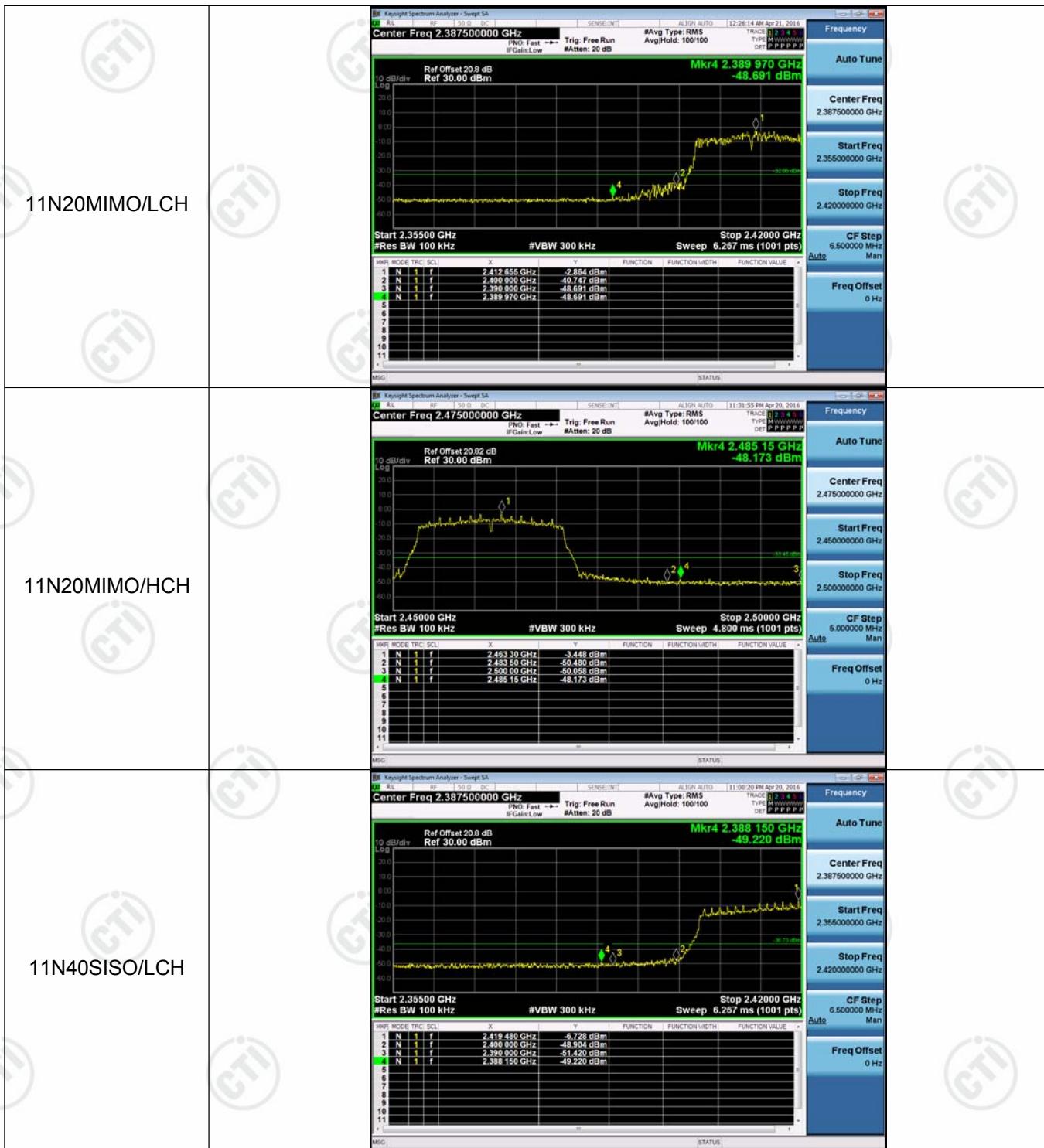
**Result :** Comply with 30dBc requirement

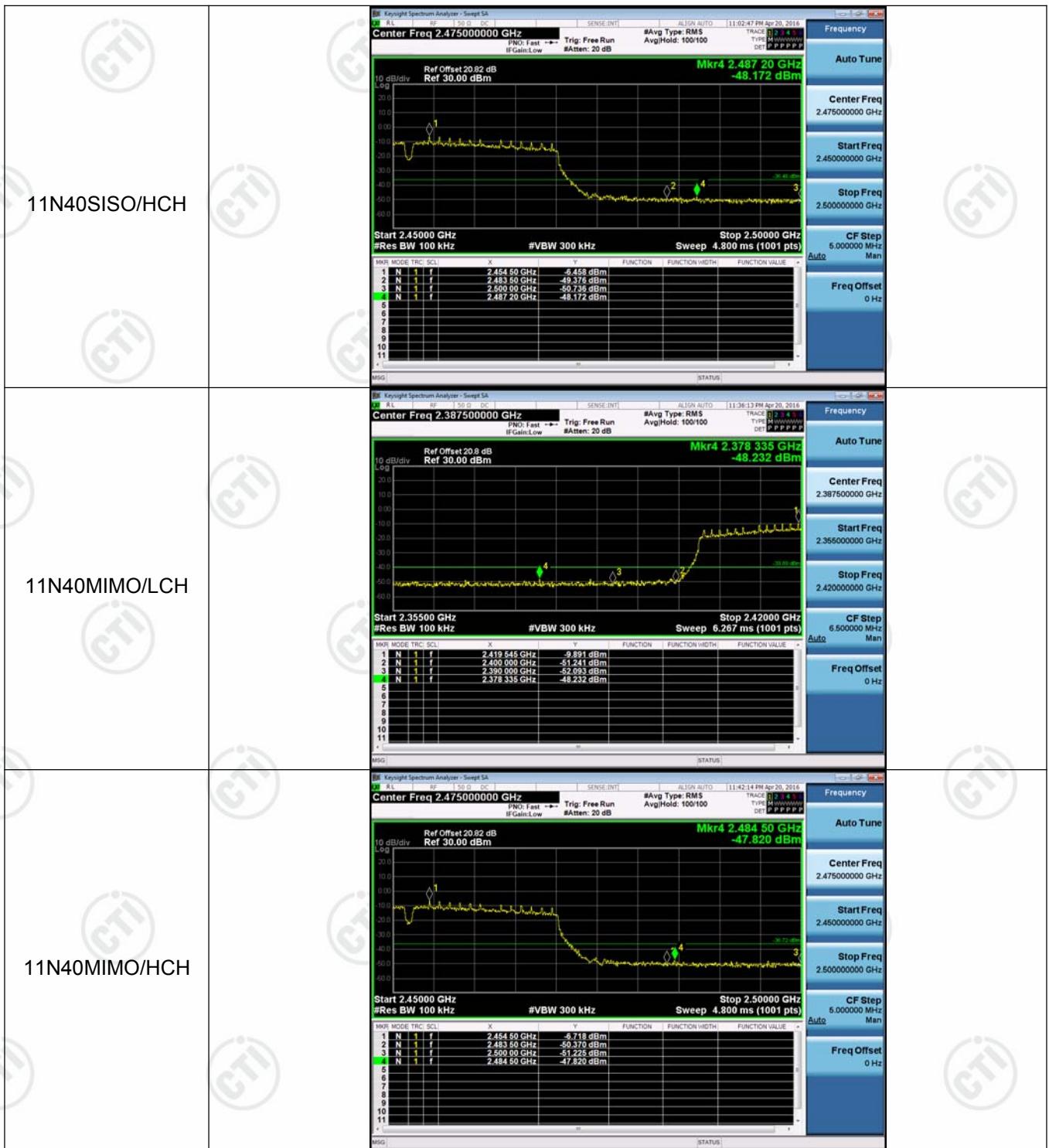
Mode	Antenna	Channel	Carrier Power[dBm]	Max.Spurious Level [dBm]	Limit [dBm]	Verdict
11B	Ant1	LCH	5.349	-46.191	-24.65	PASS
11B	Ant2	LCH	5.100	-49.020	-24.9	PASS
11B	Ant1	HCH	5.661	-47.601	-24.34	PASS
11B	Ant2	HCH	4.441	-48.406	-25.56	PASS
11G	Ant1	LCH	-1.540	-48.376	-31.54	PASS
11G	Ant2	LCH	-3.073	-48.336	-33.07	PASS
11G	Ant1	HCH	-2.502	-47.373	-32.5	PASS
11G	Ant2	HCH	-2.256	-47.850	-32.26	PASS
11N20SISO	Ant1	LCH	-2.345	-48.530	-32.35	PASS
11N20SISO	Ant2	LCH	-4.036	-48.533	-34.04	PASS
11N20SISO	Ant1	HCH	-2.406	-48.535	-32.41	PASS
11N20SISO	Ant2	HCH	-3.634	-48.396	-33.63	PASS
11N20MIMO	Ant1	LCH	-2.864	-48.691	-32.86	PASS
11N20MIMO	Ant2	LCH	-3.775	-48.064	-33.78	PASS
11N20MIMO	Ant1	HCH	-3.448	-48.173	-33.45	PASS
11N20MIMO	Ant2	HCH	-3.745	-48.624	-33.75	PASS
11N40SISO	Ant1	LCH	-6.728	-49.220	-36.73	PASS
11N40SISO	Ant2	LCH	-7.566	-49.113	-37.57	PASS
11N40SISO	Ant1	HCH	-6.458	-48.172	-36.46	PASS
11N40SISO	Ant2	HCH	-6.737	-48.760	-36.74	PASS
11N40MIMO	Ant1	LCH	-9.891	-48.232	-39.89	PASS
11N40MIMO	Ant2	LCH	-7.053	-49.369	-37.05	PASS
11N40MIMO	Ant1	HCH	-6.718	-47.820	-36.72	PASS
11N40MIMO	Ant2	HCH	-7.335	-48.641	-37.34	PASS

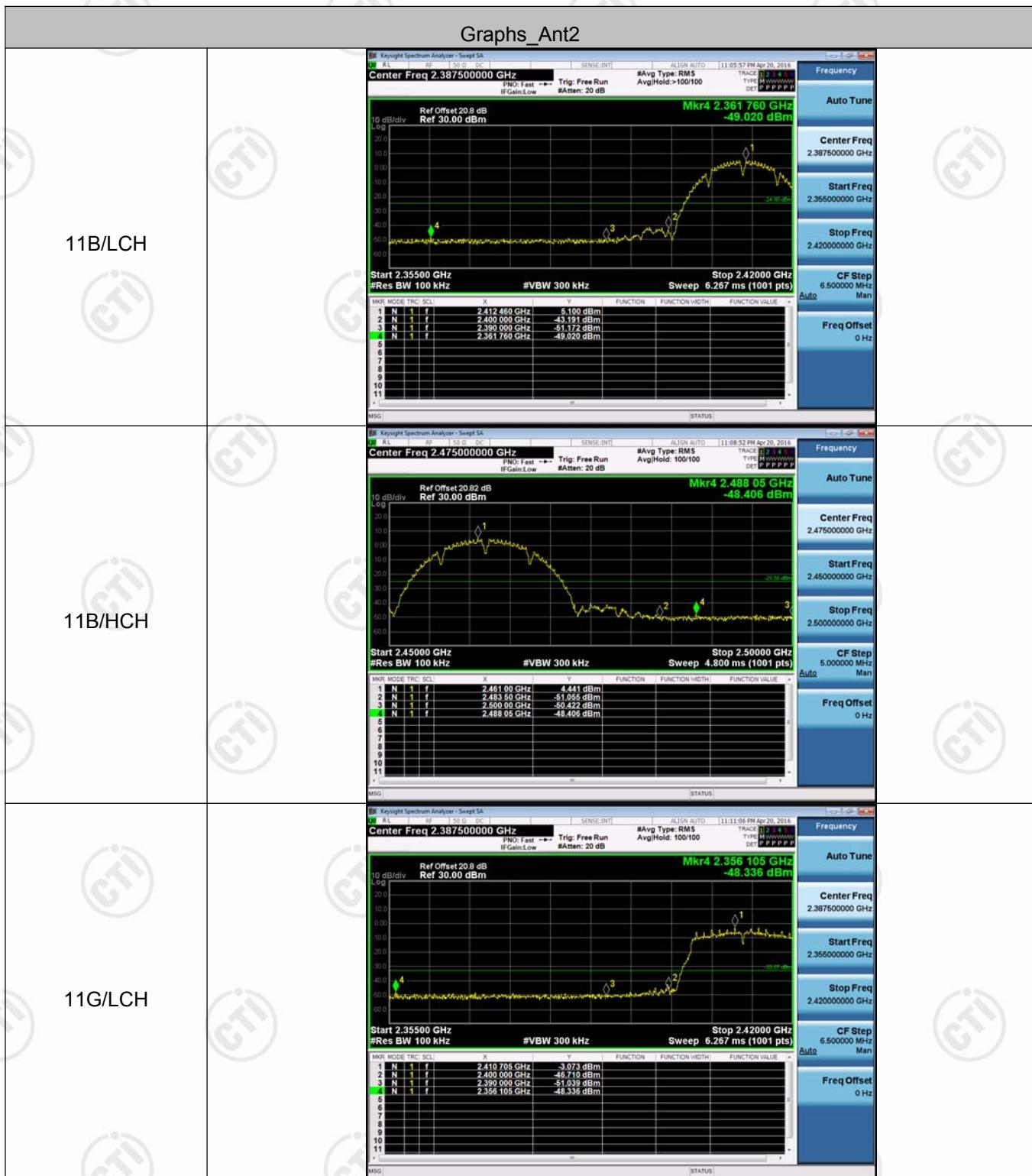
### Test Graph

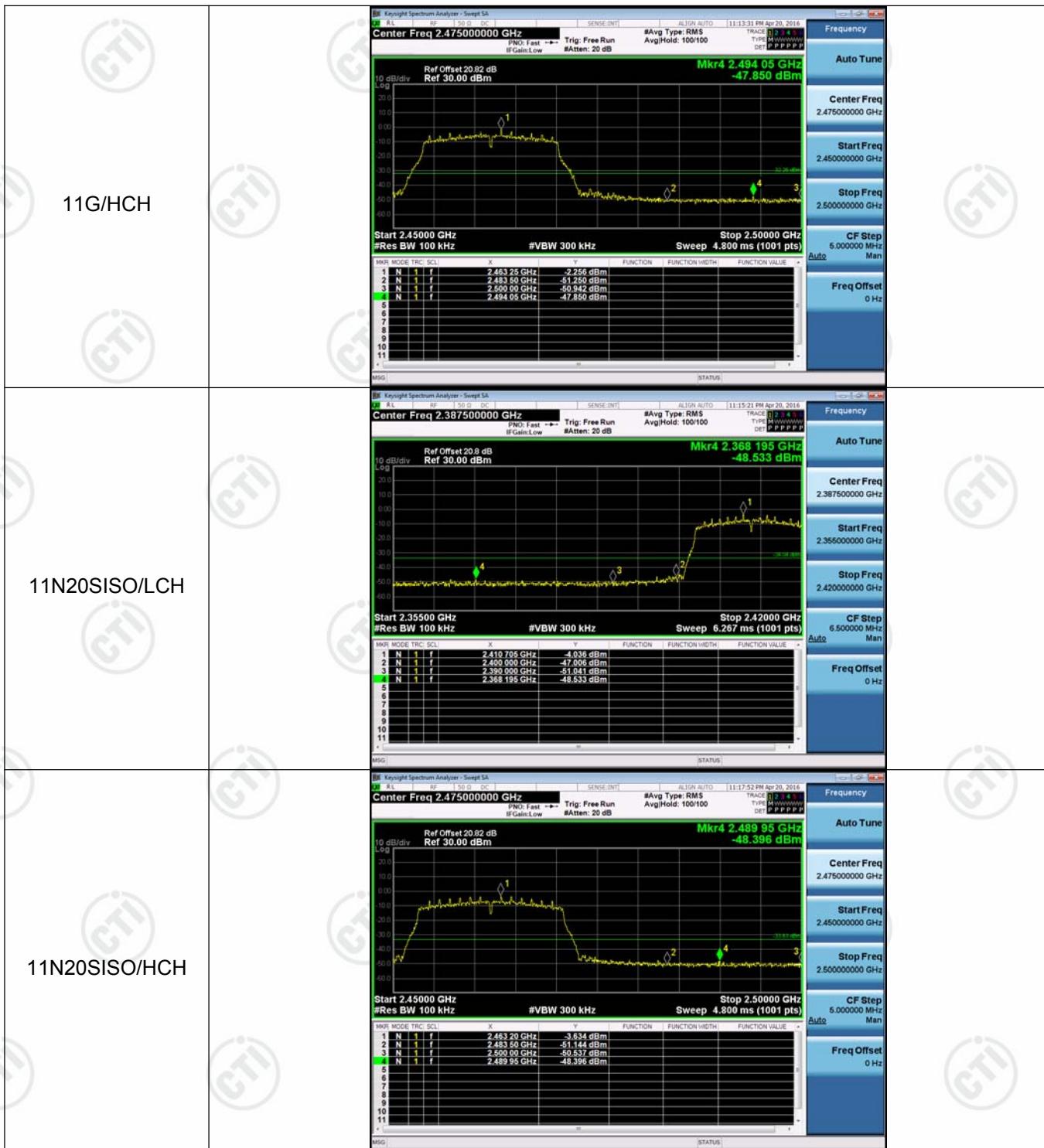


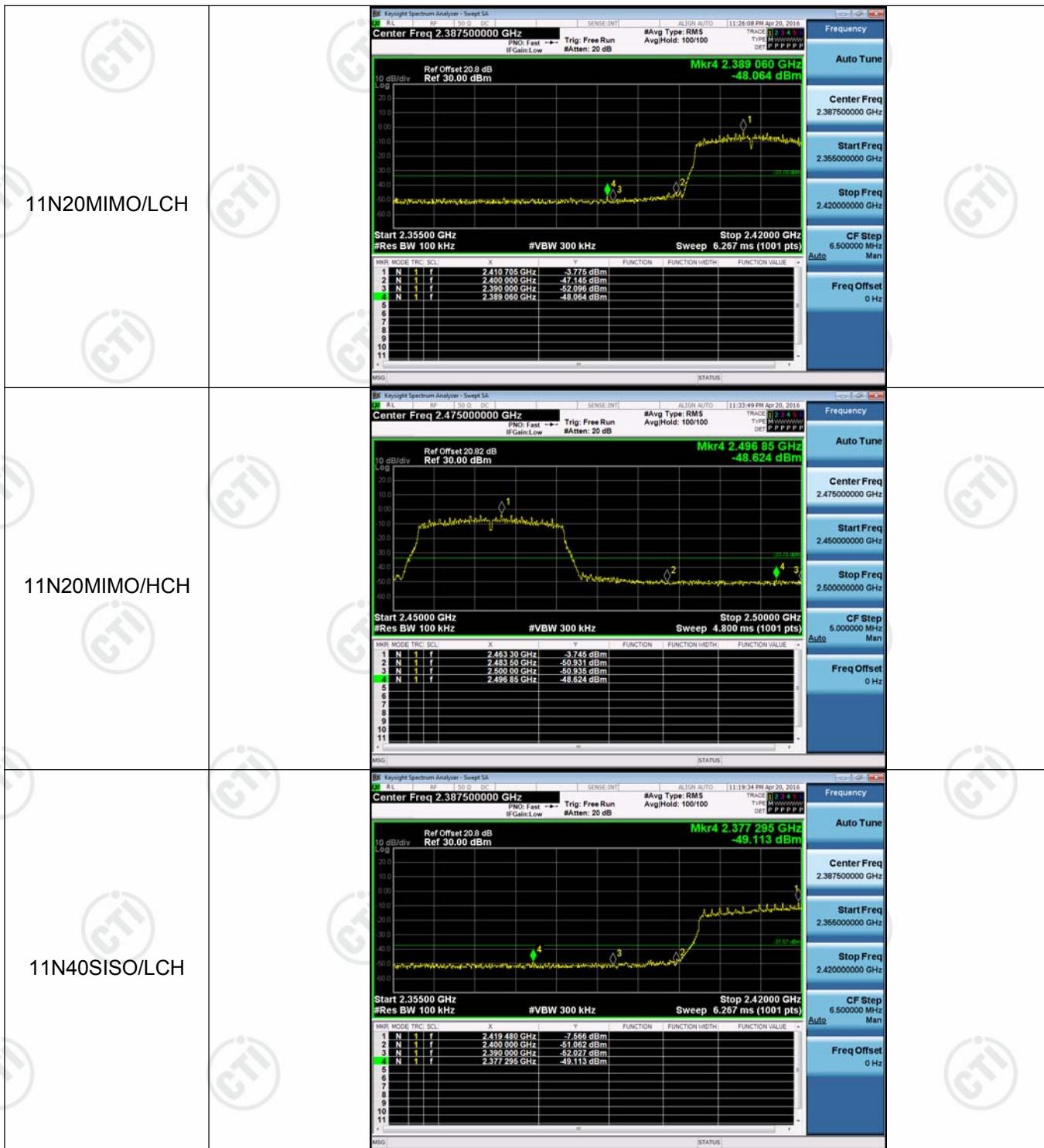


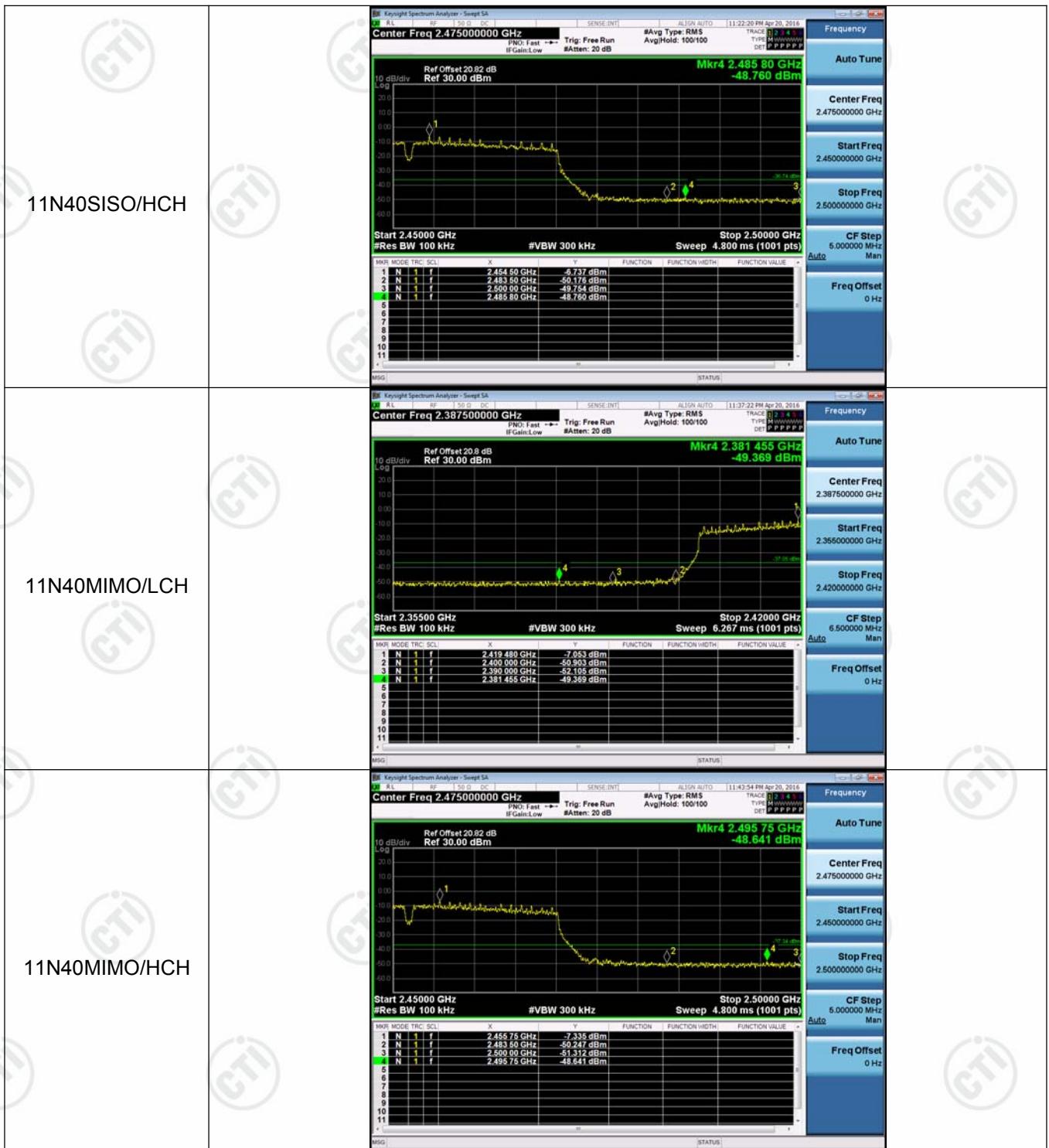










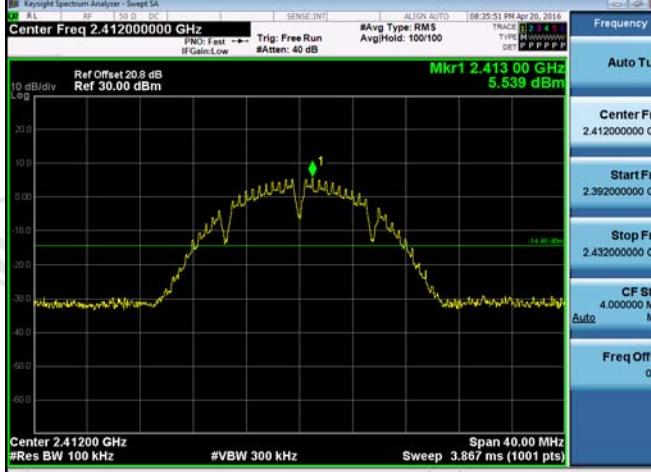
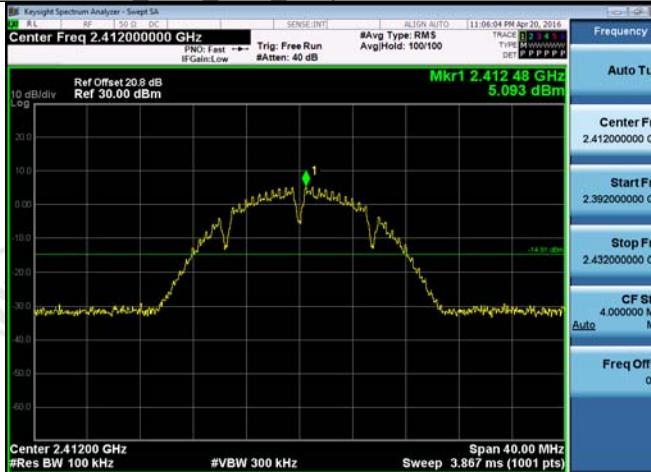


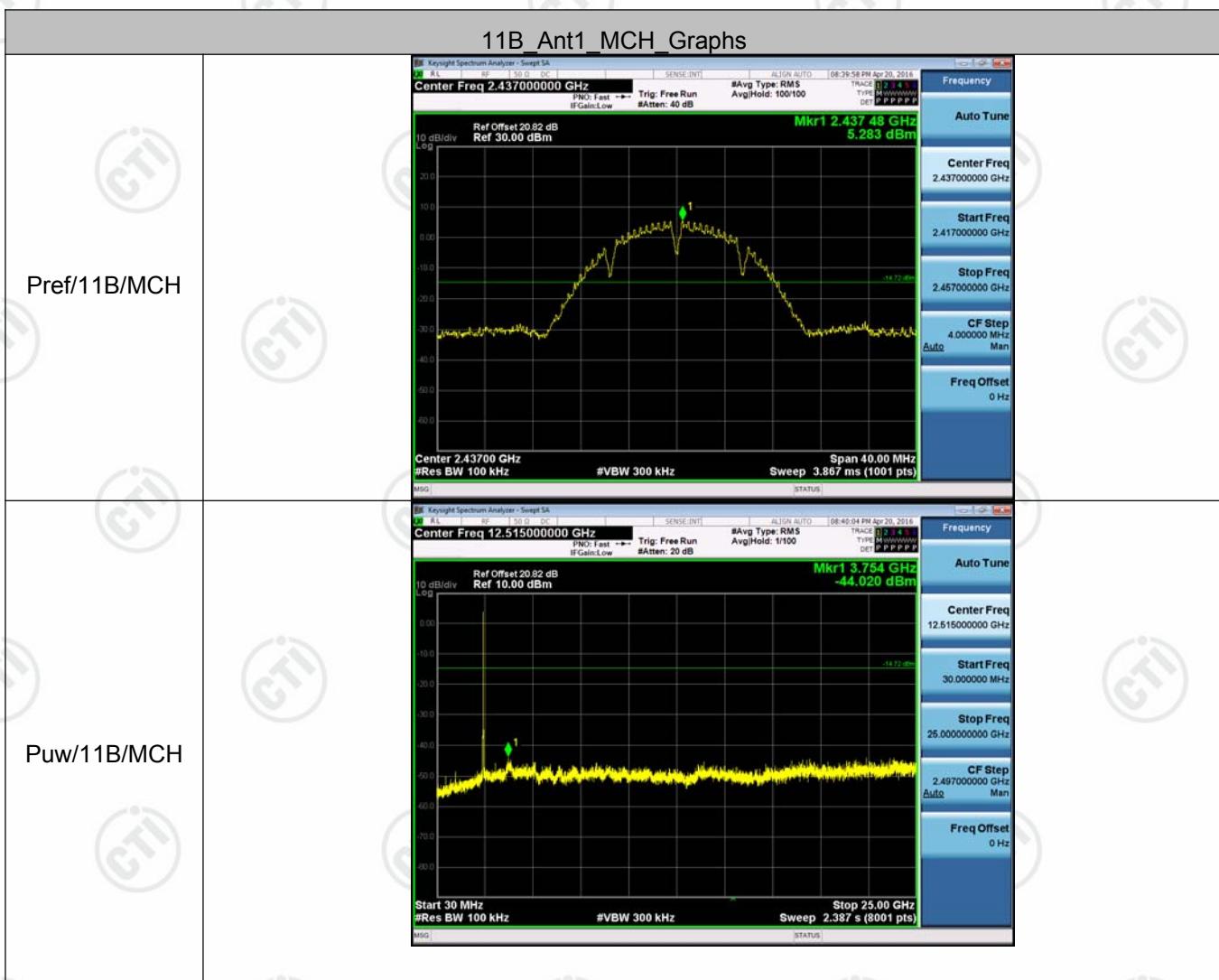
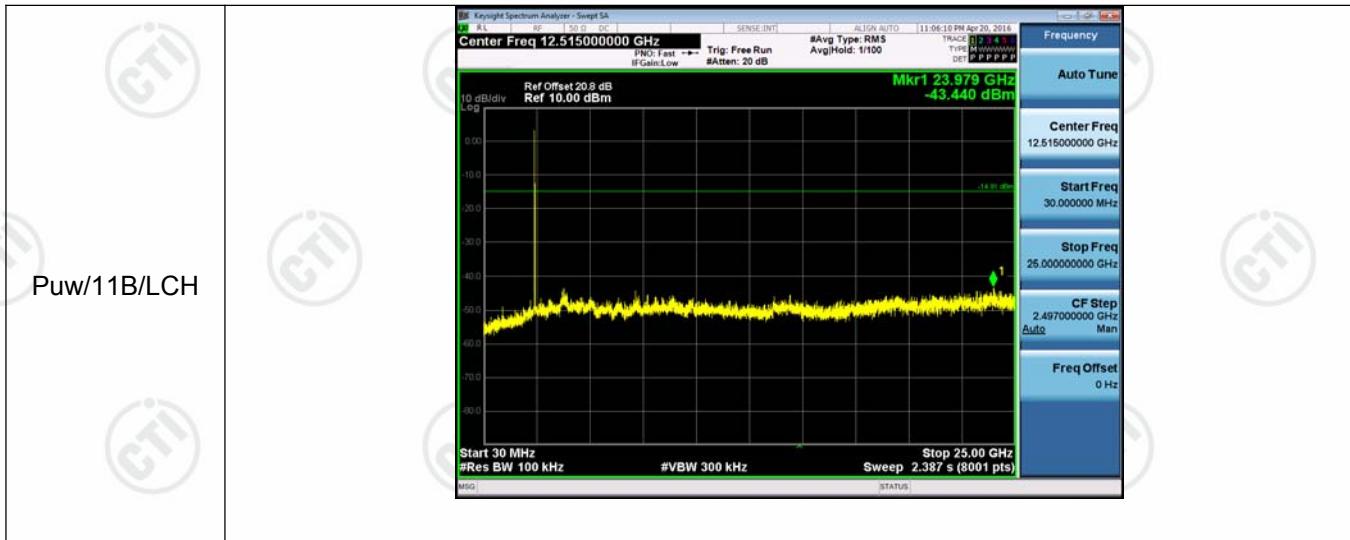
## Appendix D): RF Conducted Spurious Emissions

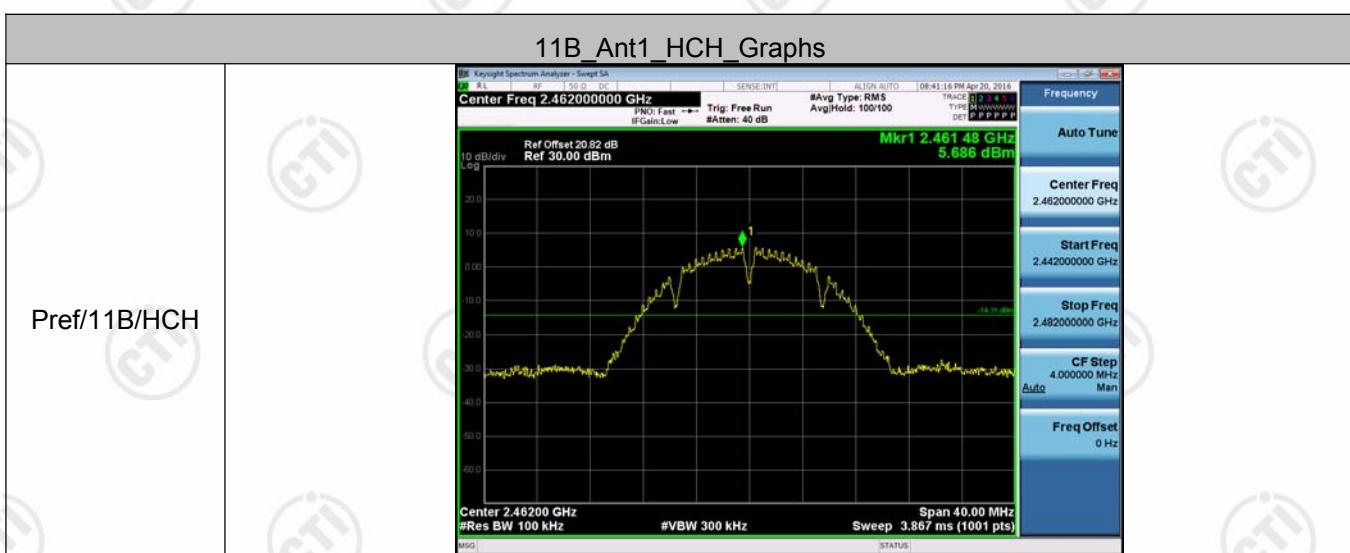
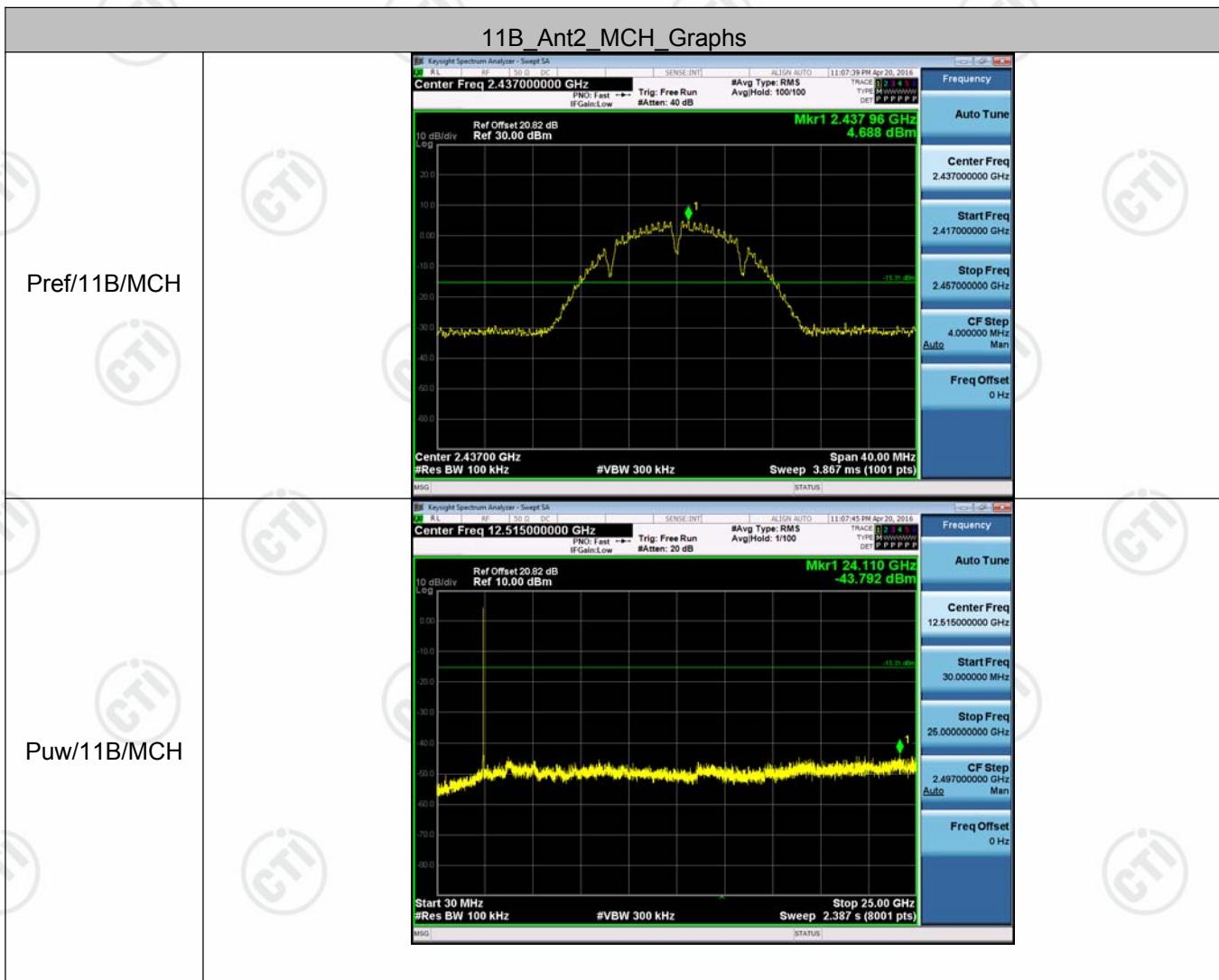
**Result :** Comply with 30dBc requirement

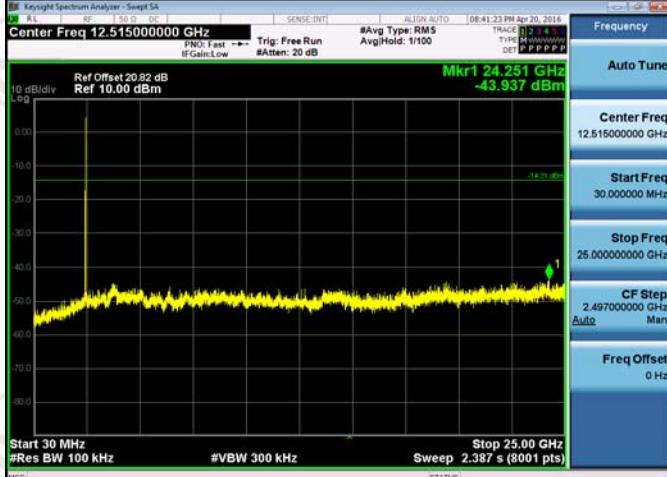
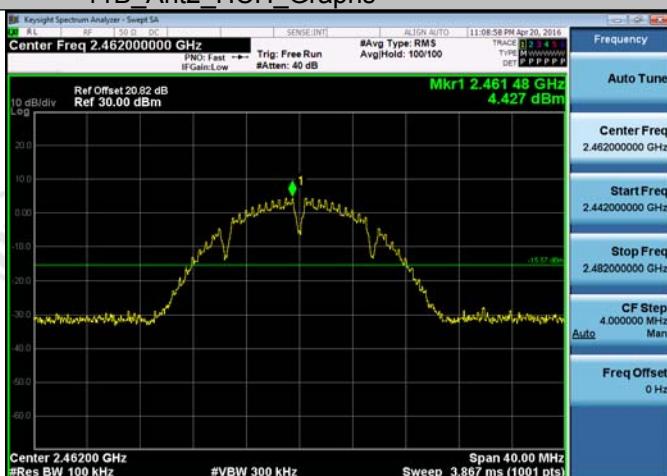
Mode	Antenna	Channel	Pref [dBm]	Puw[dBm]	Verdict
11B	Ant1	LCH	5.539	<Limit	PASS
11B	Ant2	LCH	5.093	<Limit	PASS
11B	Ant1	MCH	5.283	<Limit	PASS
11B	Ant2	MCH	4.688	<Limit	PASS
11B	Ant1	HCH	5.686	<Limit	PASS
11B	Ant2	HCH	4.427	<Limit	PASS
11G	Ant1	LCH	-1.921	<Limit	PASS
11G	Ant2	LCH	-2.447	<Limit	PASS
11G	Ant1	MCH	-2.071	<Limit	PASS
11G	Ant2	MCH	-1.7	<Limit	PASS
11G	Ant1	HCH	-2.636	<Limit	PASS
11G	Ant2	HCH	-1.875	<Limit	PASS
11N20SISO	Ant1	LCH	-2.452	<Limit	PASS
11N20SISO	Ant2	LCH	-4.095	<Limit	PASS
11N20SISO	Ant1	MCH	-2.478	<Limit	PASS
11N20SISO	Ant2	MCH	-2.631	<Limit	PASS
11N20SISO	Ant1	HCH	-3.305	<Limit	PASS
11N20SISO	Ant2	HCH	-2.792	<Limit	PASS
11N20MIMO	Ant1	LCH	-2.068	<Limit	PASS
11N20MIMO	Ant2	LCH	-3.901	<Limit	PASS
11N20MIMO	Ant1	MCH	-5.323	<Limit	PASS
11N20MIMO	Ant2	MCH	-2.502	<Limit	PASS
11N20MIMO	Ant1	HCH	-3.381	<Limit	PASS
11N20MIMO	Ant2	HCH	-3.446	<Limit	PASS
11N40SISO	Ant1	LCH	-6.949	<Limit	PASS
11N40SISO	Ant2	LCH	-7.412	<Limit	PASS
11N40SISO	Ant1	MCH	-6.6	<Limit	PASS
11N40SISO	Ant2	MCH	-6.172	<Limit	PASS
11N40SISO	Ant1	HCH	-6.681	<Limit	PASS
11N40SISO	Ant2	HCH	-6.446	<Limit	PASS
11N40MIMO	Ant1	LCH	-6.705	<Limit	PASS
11N40MIMO	Ant2	LCH	-6.824	<Limit	PASS
11N40MIMO	Ant1	MCH	-6.876	<Limit	PASS
11N40MIMO	Ant2	MCH	-5.711	<Limit	PASS
11N40MIMO	Ant1	HCH	-6.812	<Limit	PASS
11N40MIMO	Ant2	HCH	-6.033	<Limit	PASS

### Test Graph

11B_Ant1_LCH_Graphs	
Pref/11B/LCH	 <p>Keystream Spectrum Analyzer - Sweep SA</p> <p>SENSE(INT) ALTN AUTO 08:35:51 PM Apr 20, 2016</p> <p>Center Freq 2.412000000 GHz</p> <p>Ref Offset 20.8 dB</p> <p>Ref 30.00 dBm</p> <p>#Avg Type: RMS</p> <p>Avg/Hold: 100/100</p> <p>Trig: Free Run</p> <p>#Atten: 40 dB</p> <p>If Gain/Low</p> <p>Mkr1 2.413 00 GHz 5.539 dBm</p> <p>Frequency</p> <p>Auto Tune</p> <p>Center Freq 2.412000000 GHz</p> <p>Start Freq 2.392000000 GHz</p> <p>Stop Freq 2.432000000 GHz</p> <p>CF Step 4.000000 MHz Man</p> <p>Freq Offset 0 Hz</p> <p>MSG</p> <p>STATUS</p>
Puw/11B/LCH	 <p>Keystream Spectrum Analyzer - Sweep SA</p> <p>SENSE(INT) ALTN AUTO 08:35:57 PM Apr 20, 2016</p> <p>Center Freq 12.515000000 GHz</p> <p>Ref Offset 20.8 dB</p> <p>Ref 10.00 dBm</p> <p>#Avg Type: RMS</p> <p>Avg/Hold: 1/100</p> <p>Trig: Free Run</p> <p>#Atten: 20 dB</p> <p>If Gain/Low</p> <p>Mkr1 23.886 GHz -43.491 dBm</p> <p>Frequency</p> <p>Auto Tune</p> <p>Center Freq 12.515000000 GHz</p> <p>Start Freq 30.000000 MHz</p> <p>Stop Freq 25.000000000 GHz</p> <p>CF Step 2.497000000 GHz Man</p> <p>Freq Offset 0 Hz</p> <p>Start 30 MHz</p> <p>#Res BW 100 kHz</p> <p>#VBW 300 kHz</p> <p>Sweep 2.387 s (8001 pts)</p> <p>MSG</p> <p>STATUS</p>
11B_Ant2_LCH_Graphs	
Pref/11B/LCH	 <p>Keystream Spectrum Analyzer - Sweep SA</p> <p>SENSE(INT) ALTN AUTO 11:06:04 PM Apr 20, 2016</p> <p>Center Freq 2.412000000 GHz</p> <p>Ref Offset 20.8 dB</p> <p>Ref 30.00 dBm</p> <p>#Avg Type: RMS</p> <p>Avg/Hold: 100/100</p> <p>Trig: Free Run</p> <p>#Atten: 40 dB</p> <p>If Gain/Low</p> <p>Mkr1 2.412 48 GHz 5.093 dBm</p> <p>Frequency</p> <p>Auto Tune</p> <p>Center Freq 2.412000000 GHz</p> <p>Start Freq 2.392000000 GHz</p> <p>Stop Freq 2.432000000 GHz</p> <p>CF Step 4.000000 MHz Man</p> <p>Freq Offset 0 Hz</p> <p>Center 2.41200 GHz</p> <p>#Res BW 100 kHz</p> <p>#VBW 300 kHz</p> <p>Sweep 3.867 ms (1001 pts)</p> <p>MSG</p> <p>STATUS</p>





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