

TEST REPORT

On behalf of

JOHNSON INDUSTRIES(SHANGHAI) CO.,LTD.

Product Name: Console

Model No.: XER

FCC ID: 2AOTTXER

Prepared For: JOHNSON INDUSTRIES(SHANGHAI) CO.,LTD.
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Report No. : ACI-F18025
Date of Test : 2018.01.12-17
Date of Report : 2018.01.19

The statement is based on a single evaluation of one sample of the above-mentioned products. It does not imply an assessment of the whole production and does not permit the use of the test lab logo.
The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

TABLE OF CONTENTS

	Page
1 SUMMARY OF STANDARDS AND RESULTS.....	5
1.1 Description of Standards and Results.....	5
2 GENERAL INFORMATION.....	6
2.1 Description of Equipment Under Test.....	6
2.2 Description of Test Facility	7
2.3 Measurement Uncertainty	7
3 CONDUCTED EMISSION TEST	8
3.1 Test Equipment.....	8
3.2 Block Diagram of Test Setup	8
3.3 Conducted Emission Limits [FCC Part 15 Subpart C 15.207].....	9
3.4 Test Configuration.....	9
3.5 Operating Condition of EUT	9
3.6 Test Procedures	9
3.7 Test Results	10
4 RADIATED EMISSION TEST.....	11
4.1 Test Equipment.....	11
4.2 Block Diagram of Test Setup	11
4.3 Radiated Emission Limit [FCC Part 15 Subpart C 15.209]	12
4.4 Test Configuration.....	12
4.5 Operating Condition of EUT	13
4.6 Test Procedures	13
4.7 Test Results	14
5 6 dB BANDWIDTH MEASUREMENT.....	23
5.1 Test Equipment.....	23
5.2 Block Diagram of Test Setup	23
5.3 Specification Limits (§15.247(a)(2)).....	23
5.4 Operating Condition of EUT	23
5.5 Test Procedure	23
5.6 Test Results	24
6 MAXIMUM PEAK OUTPUT POWER MEASUREMENT.....	30
6.1 Test Equipment.....	30
6.2 Block Diagram of Test Setup	30
6.3 Specification Limits ((§15.247(b)(3))	30
6.4 Operating Condition of EUT	30
6.5 Test Procedure	30
6.6 Test Results	31
7 EMISSION LIMITATIONS MEASUREMENT.....	37
7.1 Test Equipment.....	37
7.2 Block Diagram of Test Setup	37
7.3 Specification Limits (§15.247(d))	37
7.4 Operating Condition of EUT	37
7.5 Test Procedure	37
7.6 Test Results	38
8 BAND EDGES MEASUREMENT	66

8.1	Test Equipment.....	66
8.2	Block Diagram of Test Setup	66
8.3	Specification Limits (§15.247(d))	66
8.4	Operating Condition of EUT	66
8.5	Test Procedure.....	66
8.6	Test Results	66
9	POWER SPECTRAL DENSITY MEASUREMENT	70
9.1	Test Equipment.....	70
9.2	Block Diagram of Test Setup	70
9.3	Specification Limits (§15.247(e))	70
9.4	Operating Condition of EUT	70
9.5	Test Procedure.....	70
9.6	Test Results	70
10	DEVIATION TO TEST SPECIFICATIONS	76

TEST REPORT

Applicant : JOHNSON INDUSTRIES(SHANGHAI) CO.,LTD.
EUT Description : Console
(A) Model No. : XER
(B) Power Supply : AC 120V, 60Hz
(C) Test Voltage : AC 120V, 60Hz

Test Procedure Used:

*FCC RULES AND REGULATIONS PART 15 SUBPART C
AND ANSI C63.10-2013*

The device described above is tested by Audix Technology (Shanghai) Co., Ltd. to determine the maximum emission levels emanating from the device. The maximum emission levels are compared to the FCC Part 15 Subpart C limits.

The test results are contained in this test report and Audix Technology (Shanghai) Co., Ltd. is assumed full responsibility for the accuracy and completeness of these measurements. This report also shows that the EUT, which was tested on 2018.01.12-17 is technically compliance with the FCC limits.

This report applies to above tested Sample only. This report shall not be reproduced in part without written approval of Audix Technology (Shanghai) Co., Ltd.

Date of Test : 2018.01.12-17 Date of Report : 2018.01.19

Producer : Alan He
ALAN HE / Assistant

Review : Byron Wu
BYRON WU / Deputy Assistant Manager

AUDIX[®] For and on behalf of
Audix Technology (Shanghai) Co., Ltd.

Signatory : Byron Kwo
Authorized Signature(s) BYRON KWO/Assistant General Manager

1 SUMMARY OF STANDARDS AND RESULTS

1.1 Description of Standards and Results

The EUT have been tested according to the applicable standards as referenced below:

Description / Test Item	Test Standard	Results	Meets Limit
EMISSION			
Conducted Emission	FCC RULES AND REGULATIONS PART 15 SUBPART C AND ANSI C63.10:2013	Pass	15.207
Radiated Emission	FCC RULES AND REGULATIONS PART 15 SUBPART C AND ANSI C63.10:2013	Pass	15.209(a) 15.205(a)(c)
6 dB Bandwidth Measurement	FCC RULES AND REGULATIONS PART 15 SUBPART C AND ANSI C63.10:2013	Pass	15.247(a)(2)
Maximum Peak Output Power Measurement	FCC RULES AND REGULATIONS PART 15 SUBPART C AND ANSI C63.10:2013	Pass	15.247(b)(3)
Emission Limitations Measurement	FCC RULES AND REGULATIONS PART 15 SUBPART C AND ANSI C63.10:2013	Pass	15.247(d)
Band Edge Measurement	FCC RULES AND REGULATIONS PART 15 SUBPART C AND ANSI C63.10:2013	Pass	15.247(d)
Power Spectral Density Measurement	FCC RULES AND REGULATIONS PART 15 SUBPART C AND ANSI C63.10:2013	Pass	15.247(e)
N/A is an abbreviation for Not Applicable.			

2 GENERAL INFORMATION

2.1 Description of Equipment Under Test

Description : Console

Type of EUT ☒ Production ☐ Pre-product ☐ Pro-type

Model Number : XER

Radio Tech : IEEE 802.11b/g/n (802.11n is 2.4GHz HT20 only)
Bluetooth V4.0

Channel Freq. : IEEE 802.11b/g/n, 2412MHz ~ 2462MHz (Ch1-Ch11)
Bluetooth V4.0, 2402MHz-2480MHz(Ch79)

Tested Freq. : 2412MHz(CH1), 2437MHz(CH6), 2462MHz(CH11)

Modulation : DQPSK, DBPSK, CCK, OFDM/64-QAM, 16-QAM
QPSK, BPSK, FHSS, GFSK, DPSK

Antenna Type : SMA interface Small antenna(Cu)
Note: According to KDB 353028 D01 A 2) b) ii) (3)
antenna connector comply with 15.203

Connectoe Type : SMA Connector

Antenna Gain : 2dBi

Applicant : JOHNSON INDUSTRIES(SHANGHAI) CO.,LTD.
A1 NO.4500 BAOQIAN ROAD, ZHUQIAO TOWN,
JIADING DISTRICT, SHANGHAI.

Manufacturer : Same as Applicant

Factory : Same as Applicant

2.2 Tested Supporting System Details

2.2.1 Earphone

Manufacturer : EDIFIER
Model Number : H210

2.2.2 Mobile Phone

Manufacturer : SAMSUNG
Model Number : GT-I9100G
Serial Number : 69351520011519
Certificate : CE/EMC

2.3 Description of Test Facility

Name of Firm : Audix Technology (Shanghai) Co., Ltd.

Site Location : 3F and 4F, 34Bldg, 680 Guiping Rd.,
Caohejing Hi-Tech Park,
Shanghai 200233, China.

Accredited by NVLAP, Lab Code : 200371-0

FCC Designation Number : CN5027

Test Firm Registration Number : 954668

2.4 Measurement Uncertainty

Conducted Emission Expanded Uncertainty : $U = 3.4\text{dB}$

Radiated Emission Expanded Uncertainty (30-1000MHz):
 $U = 3.99\text{dB}$

Radiated Emission Expanded Uncertainty (1000M-26.5GHz):
 $U = 4.98\text{dB}$

6 dB Bandwidth Expanded Uncertainty : $U = 1 \times 10^{-8}\text{MHz}$

Maximum Peak Output Power Expanded Uncertainty : $U = 1.56\text{ dB}$

Power Spectral Density Expanded Uncertainty : $U = 0.38\text{ dB}$

Spurious RF Conducted Emissions Expanded Uncertainty : $U = 1.20\text{ dB}$

3 CONDUCTED EMISSION TEST

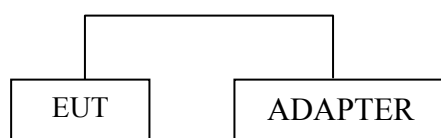
3.1 Test Equipment

The following test equipments are used during the conducted emission test in a shielded room:

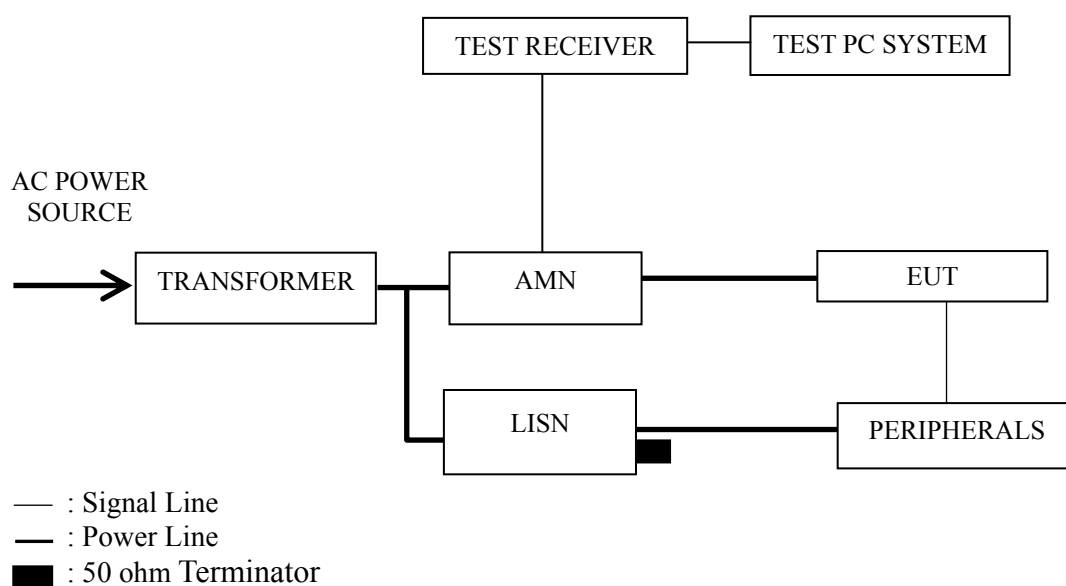
Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Test Receiver	R&S	ESCI	101303	May 07, 2017	May 06, 2018
2.	Artificial Mains Network (AMN)	R&S	ENV4200	100125	Jun 24, 2017	Jun 23, 2018
3.	Line Impedance Stabilization Network (LISN)	Kyoritsu	KNW-407	8-1280-4	Mar 17, 2017	Mar 16, 2018
4.	50Ω Terminator	Anritsu	BNC	001	Mar 18, 2017	Mar 17, 2018
5.	Software	Audix	e3	6.111206	--	--

3.2 Block Diagram of Test Setup

3.2.1 EUT & Peripherals



3.2.2 Conducted Disturbance Test Setup



3.3 Conducted Emission Limits [FCC Part 15 Subpart C 15.207]

Frequency Range (MHz)	Limits dB(μ V)	
	Quasi-peak	Average
0.15 ~ 0.5	66~56	56~46
0.5 ~ 5	56	46
5 ~ 30	60	50
NOTE 1 – The lower limit shall apply at the transition frequencies. NOTE 2 – The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz~0.50 MHz		

3.4 Test Configuration

The EUT (listed in Sec.2.1) was installed as shown on Sec.3.2 to meet FCC requirement and operating in a manner which tends to maximize its emission level in a normal application.

3.5 Operating Condition of EUT

3.5.1 Setup the EUT as shown in Sec.3.2.

3.5.2 Turn on the power of the EUT and then test.

3.6 Test Procedures

The EUT was placed upon a non-metallic table, which is 0.8 m above the horizontal conducting ground plane and 0.4 m from a vertical reference plane. The EUT was connected to the power mains through an Artificial Mains Network (AMN) to provide a 50 Ω coupling impedance for the measuring equipment. Both sides of AC line (Line & Neutral) were checked to find out the maximum conducted emission according to FCC Part 15 (CLASS B) regulations during conducted disturbance test.

The I.F. bandwidth of Test Receiver ESCI was set at 9 kHz.

The frequency range from 150 kHz to 30 MHz was checked

Test with a dummy load in lieu of the antenna to determine compliance with Section 15.207 limits within the transmitter's fundamental emission band. (According to KDB 174176 D01 Line Conducted FAQ)

The test modes were done on conducted disturbance test and all the test results are listed in Sec. 3.7

3.7 Test Results

< **PASS** > Meets 15.207(a)

The frequency and amplitude of the highest conducted emission relative to the limit is reported. All emissions not reported below are too low against the prescribed limits

NOTE 1 – “QP” means “Quasi-Peak” values, “AV” means “Average” values.

NOTE 2 – The worst emission is detected at 0.1507 MHz (Quasi-Peak Value), with corrected signal level of 59.89 dB(μV) (limit is 65.96 dB(μV)), when the Neutral of the EUT is connected to AMN

EUT : Console Temperature : 22°C

Model No. : XER Humidity : 48%RH

Test Mode : Transmitting Date of Test : 2018.02.10

Test Line	Frequency (MHz)	Meter Reading dB(μV)	Factor (dB)	Emission Level dB(μV)	Limits dB(μV)	Margin (dB)	Remark
Neutral	0.1507	49.29	10.6	59.89	65.96	6.07	QP
	0.48375	30.25	10.39	40.64	56.27	15.63	
	1.071	30.69	10.39	41.08	56	14.92	
	2.474	27.46	10.42	37.88	56	18.12	
	5.362	24.49	10.47	34.96	60	25.04	
	15.885	29.38	10.45	39.83	60	20.17	
	0.1507	35.6	10.6	46.2	55.96	9.76	AV
	0.48375	20.1	10.39	30.49	46.27	15.78	
	1.071	19.4	10.39	29.79	46	16.21	
	2.474	18.1	10.42	28.52	46	17.48	
	5.362	17.8	10.47	28.27	50	21.73	
	15.885	24.3	10.45	34.75	50	15.25	
Line	0.1502	49.19	10.6	59.79	65.99	6.20	QP
	0.17961	40.24	10.56	50.8	64.5	13.70	
	0.67902	29.54	10.38	39.92	56	16.08	
	1.043	30.07	10.39	40.46	56	15.54	
	2.554	27.36	10.42	37.78	56	18.22	
	14.986	28.01	10.46	38.47	60	21.53	
	0.1502	35.7	10.6	46.3	55.99	9.69	AV
	0.17961	34.24	10.56	44.8	54.5	9.70	
	0.67902	24.54	10.38	34.92	46	11.08	
	1.043	24.07	10.39	34.46	46	11.54	
	2.554	21.36	10.42	31.78	46	14.22	
	14.986	22.01	10.46	32.47	50	17.53	

TEST ENGINEER: Byron WU

4 RADIATED EMISSION TEST

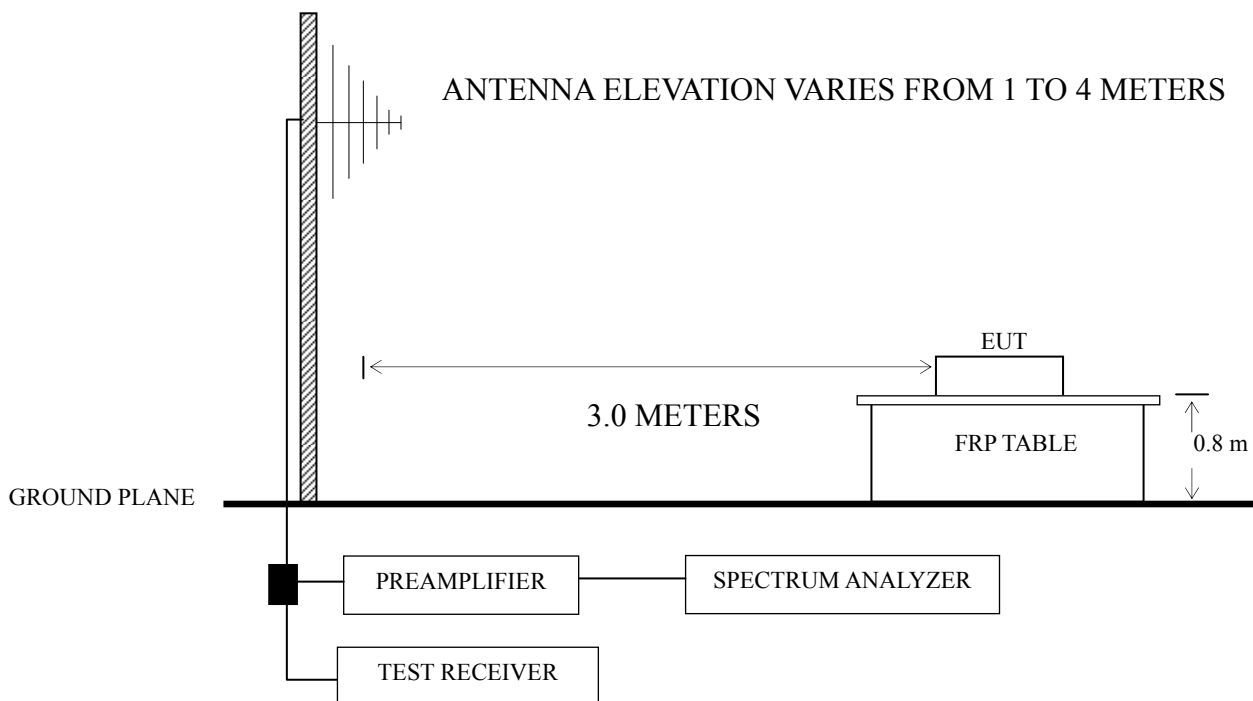
4.1 Test Equipment

The following test equipment are used during the radiated emission test in a semi-anechoic chamber:

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Preamplifier	Agilent	8447D	2944A06664	Apr 27, 2017	Apr 26, 2018
2.	Preamplifier	HP	8449B	3008A00864	Mar 20, 2017	Mar 19, 2018
3.	Spectrum Analyzer	Agilent	N9010A	MY52221182	May 25, 2017	May 24, 2018
4.	Test Receiver	R&S	ESCI	101303	May 07, 2017	May 06, 2018
5.	Bi-log Antenna	Schwarz beck	VULB 9168	708	Jul 20, 2017	Jul 19, 2018
6.	Horn Antenna	EMCO	3115	9607-4878	Jun 02, 2017	Jun 01, 2018
7.	Horn Antenna	EMCO	3116	00062643	Sep 08, 2017	Sep 08, 2019
8.	50Ω Coaxial Switch	Anritsu	MP59B	6200426390	Sep 17, 2017	Mar 17, 2018
9.	Software	Audix	E3	SET00200 9912M295-2	--	--

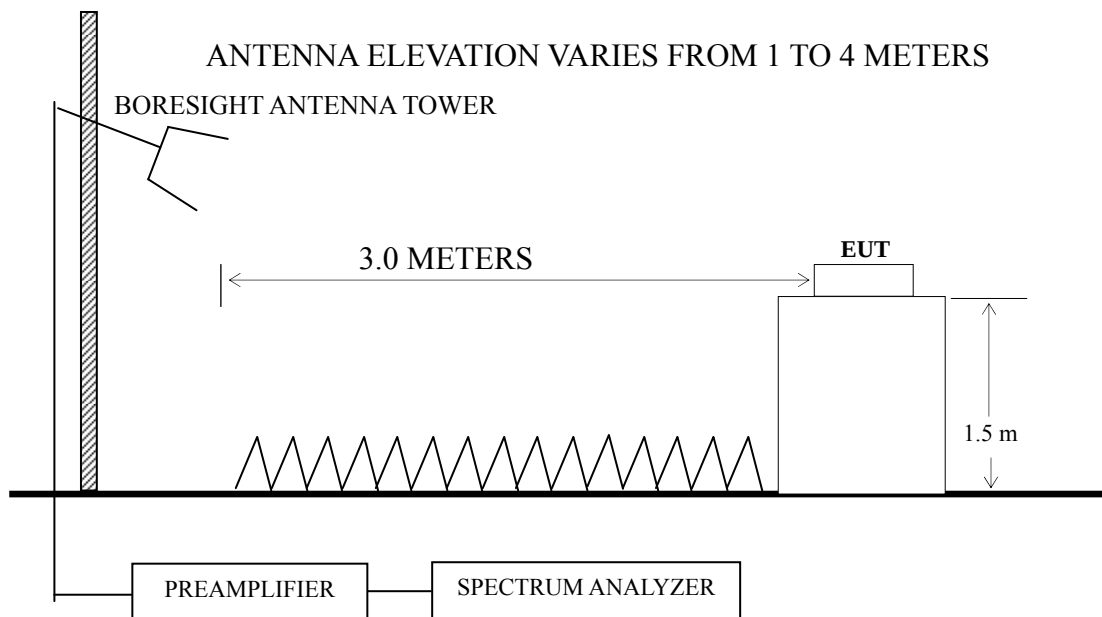
4.2 Block Diagram of Test Setup

4.2.1 Below 1GHz



■ : 50 ohm Coaxial Switch

4.2.2 Above 1GHz



4.3 Radiated Emission Limit [FCC Part 15 Subpart C 15.209]

Frequency (MHz)	Distance (m)	Field strength limits ($\mu\text{V/m}$)	
		($\mu\text{V/m}$)	$\text{dB}(\mu\text{V/m})$
30 ~ 88	3	100	40.0
88 ~ 216	3	150	43.5
216 ~ 960	3	200	46.0
Above 960	3	500	54.0

NOTE 1 - Emission Level $\text{dB}(\mu\text{V/m}) = 20 \log \text{Emission Level}(\mu\text{V/m})$

NOTE 2 - The tighter limit applies at the band edges.

NOTE 3 - Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

NOTE 4 - The limits shown are based on Quasi-peak value detector below or equal to 1GHz and Average value detector above 1GHz.

NOTE 5 - Above 1 GHz, the limit on peak emission is 20 dB above the maximum permitted average emission limit applicable to the EUT

4.4 Test Configuration

The EUT (listed in Sec.2.1) and the simulators (listed in Sec.2.2) were installed as shown on Sec.3.2 to meet FCC requirements and operating in a manner that tends to maximize its emission level in a normal application.

4.5 Operating Condition of EUT

4.5.1 Setup the EUT as shown in Sec. 3.2.

4.5.2 Turn on the power of all equipment.

4.5.3 Turn the EUT on the test mode, and then test.

4.6 Test Procedures

Radiated emission test applies to harmonics/spurs that fall in the restricted bands listed in Section 15.205. The maximum permitted average field strength is listed in Section 15.209. A pre-amp is necessary for this measurement. For measurement above 1 GHz, set RBW = 1MHz, VBW = 10 Hz, Sweep: Auto. If the emission is pulsed, modify the unit for continuous operation; use the settings shown above, then correct the reading by subtracting the peak-average correction factor, derived from the appropriate duty cycle calculation.

The EUT was placed on a turntable. Below 1 GHz, the table height is 80 cm above the reference ground plane. Above 1 GHz, the table height is 1.5 m. The turntable rotated 360 degrees to determine the position of the maximum emission level. The EUT was set 3 meters away from the receiving antenna, which was mounted on an antenna tower. The antenna moved up and down between 1 meter and 4 meters to find out the maximum emission level. Broadband antenna (Calibrated Bilog Antenna) or Horn antenna was used as receiving antenna. Both horizontal and vertical polarizations of the antenna were set on measurement. In order to find the maximum emission, all of the interference cables were manipulated according to ANSI C63.10: 2013 requirements during radiated emission test.

The bandwidth of Test Receiver R&S ESCI was set at 120 kHz from 30MHz to 1000MHz.

The bandwidth of the VBW was set at 1MHz and RBW was set at 1MHz for peak emission measurement above 1GHz and 1MHz RBW, 10Hz VBW for average emission above 1GHz for Spectrum Agilent N9010A.

The frequency range from 30 MHz to 25 GHz (Up to 10th harmonics from fundamental frequency) was checked.

All the test results are listed in Sec.3.7.

4.7 Test Results

<PASS>

The frequency and amplitude of the highest radiated emission relative the limit is reported. All the emissions not reported below are too low against the FCC limit.

The EUT with following test modes were pre-scanned

Test Mode
802.11b(01 06 11)+BT
802.11g(01 06 11)+BT
802.11n(01 06 11)+BT

Finally, the under test mode is demonstrated compliance with the standards in the report.

No.	Operation	Modulation	Channel	Frequency	Data Page	
1.	Transmitting	Worst case emission < 1GHz			P15	
2.		802.11b	01	2412 MHz	P16	
3.			06	2437 MHz		
4.			11	2462 MHz		
5.		802.11g	01	2412 MHz	P17	
6.			06	2437 MHz		
7.			11	2462 MHz		
8.		802.11n	01	2412 MHz	P18	
9.			06	2437 MHz		
10.			11	2462 MHz		
11.	Receiving	--	--		P19	
13.		802.11b	01	2412 MHz	Restricted Frequency bands	P20
14.			11	2462 MHz		
15.		802.11g	01	2412 MHz		P21
16.			11	2462 MHz		
17.		802.11n	01	2412 MHz		P22
18.			11	2462 MHz		

NOTE 1 – Level = Read Level + Antenna Factor + Cable Loss (<1GHz)

NOTE 2 – Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor (>1GHz)

NOTE 3 – All reading are Quasi-Peak values below or equal to 1GHz, Peak and Average values above 1GHz.

For above 1GHz test, if the peak measured value complies with the average limit, it is unnecessary to perform an average measurement.

Worst case emission < 1GHz

EUT : Console Temperature : 21℃

Model No. : XER Humidity : 50%RH

Test Mode : Transmitting(802.11b
CH01+BT) Date of Test : 2018.02.09

Polarization	Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
Horizontal	67.913	17.08	7.35	0.81	25.24	40	14.76	QP
	84.999	16.69	10.3	0.9	27.89	40	12.11	
	181.92	24.65	9.93	1.42	36	43.5	7.50	
	207.85	21.88	10.26	1.52	33.66	43.5	9.84	
	234.168	17	11.62	1.6	30.22	46	15.78	
	599.321	16.55	19.5	2.5	38.55	46	7.45	
Vertical	51.481	22.29	7.83	0.73	30.85	40	9.15	QP
	77.865	20.06	8.96	0.85	29.87	40	10.13	
	141.826	19.24	12.27	1.24	32.75	43.5	10.75	
	207.85	22.8	10.26	1.52	34.58	43.5	8.92	
	599.321	14.39	19.5	2.5	36.39	46	9.61	
	719.2	16.34	20.48	2.73	39.55	46	6.45	

TEST ENGINEER: Sunny

Radiated Emission > 1GHz

EUT : Console Temperature : 21℃

Model No. : XER Humidity : 50%RH

Test Mode : Transmitting Date of Test : 2018.02.09

802.11b**CH01 (2412MHz)**

Polarization	Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
Horizontal	1577.611	45.5	26.24	4.13	35.68	40.19	74	33.81	Peak
	5164.164	43.58	34.4	7.9	33.95	51.93	74	22.07	Peak
	8871.561	42.75	38.4	10.2	35.46	55.89	74	18.11	Peak
	8871.561	30.64	38.4	10.2	35.46	43.78	54	10.22	Average
Vertical	1104.079	46.36	23.78	3.42	36.24	37.32	74	36.68	Peak
	1581.248	45.85	26.26	4.13	35.67	40.57	74	33.43	Peak
	5308.844	43.67	34.58	8	34	52.25	74	21.75	Peak

CH06 (2437MHz)

Polarization	Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
Horizontal	1106.624	46.48	23.8	3.42	36.24	37.46	74	36.54	Peak
	2570.396	45.3	29.07	5.31	35.24	44.44	74	29.56	Peak
	6324.119	42.29	35.84	8.64	34.57	52.2	74	21.80	Peak
Vertical	1412.538	45.2	25.48	3.92	35.86	38.74	74	35.26	Peak
	3926.449	43.22	32.55	6.67	34.27	48.17	74	25.83	Peak
	8669.619	42.79	38.08	10.12	35.56	55.43	74	18.57	Peak
	8669.619	30.02	38.08	10.12	35.56	42.66	54	11.34	Average

CH11 (2462MHz)

Polarization	Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
Horizontal	1088.93	46.1	23.68	3.39	36.27	36.9	74	37.10	Peak
	1931.968	44.39	27.57	4.55	35.36	41.15	74	32.85	Peak
	4965.923	43.36	34.17	7.72	33.91	51.34	74	22.66	Peak
Vertical	1389.953	45.93	25.38	3.87	35.88	39.3	74	34.70	Peak
	3589.219	44.56	31.89	6.36	34.58	48.23	74	25.77	Peak
	8590.135	43.21	37.96	10.03	35.6	55.6	74	18.40	Peak
	8590.135	29.98	37.96	10.03	35.6	42.37	54	11.63	Average

802.11g+BT**CH01 (2412MHz)**

Polarization	Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
Horizontal	1330.454	45.7	25.08	3.78	35.95	38.61	74	35.39	Peak
	4045.759	44.85	32.81	6.79	34.19	50.26	74	23.74	Peak
	7906.786	44.27	38.54	9.54	35.84	56.51	74	17.49	Peak
	7906.786	32.21	38.54	9.54	35.84	44.45	54	9.55	Average
Vertical	1202.264	45.23	24.38	3.57	36.11	37.07	74	36.93	Peak
	3605.786	44.71	31.93	6.36	34.56	48.44	74	25.56	Peak
	8590.135	42.74	37.96	10.03	35.6	55.13	74	18.87	Peak
	8590.135	31.32	37.96	10.03	35.6	43.71	54	10.29	Average

CH06 (2437MHz)

Polarization	Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
Horizontal	1510.08	45.72	25.96	4.04	35.75	39.97	74	34.03	Peak
	3999.448	45.74	32.7	6.72	34.2	50.96	74	23.04	Peak
	8413.951	42.56	37.93	9.95	35.69	54.75	74	19.25	Peak
	8413.951	30.14	37.93	9.95	35.69	42.33	54	11.67	Average
Vertical	1667.247	45.12	26.6	4.25	35.59	40.38	74	33.62	Peak
	2606.154	45.31	29.18	5.35	35.23	44.61	74	29.39	Peak
	6025.596	43.22	35.24	8.48	34.22	52.72	74	21.28	Peak

CH11 (2462MHz)

Polarization	Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
Horizontal	1083.927	47.07	23.66	3.36	36.27	37.82	74	36.18	Peak
	3664.376	45.61	32.04	6.41	34.51	49.55	74	24.45	Peak
	7691.304	43.28	38.17	9.41	35.72	55.14	74	18.86	Peak
	7691.304	30.30	38.17	9.41	35.72	42.16	54	11.84	Average
Vertical	1588.547	45.12	26.28	4.16	35.67	39.89	74	34.11	Peak
	3689.776	45.48	32.1	6.46	34.48	49.56	74	24.44	Peak
	7396.053	42.68	37.65	9.28	35.55	54.06	74	19.94	Peak
	7396.053	30.65	37.65	9.28	35.55	42.03	54	11.97	Average

802.11n**CH01 (2412MHz)**

Polarization	Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
Horizontal	1071.519	46.48	23.58	3.36	36.29	37.13	74	36.87	Peak
	2328.091	44.64	28.48	5.04	35.26	42.9	74	31.10	Peak
	8241.381	43.08	38.23	9.78	35.77	55.32	74	18.68	Peak
	8241.381	31.96	38.23	9.78	35.77	44.2	54	9.8	Average
Vertical	1241.652	46.3	24.6	3.66	36.06	38.5	74	35.50	Peak
	2523.481	44.3	28.88	5.27	35.24	43.21	74	30.79	Peak
	6338.697	42.51	35.88	8.64	34.6	52.43	74	21.57	Peak

CH06 (2437MHz)

Polarization	Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
Horizontal	1199.499	46.5	24.36	3.57	36.11	38.32	74	35.68	Peak
	3311.311	44.26	31.27	6.06	34.86	46.73	74	27.27	Peak
	9183.326	42.61	38.67	10.37	35.38	56.27	74	17.73	Peak
	9183.326	30.01	38.67	10.37	35.38	43.67	54	10.33	Average
Vertical	1475.707	46.15	25.8	4.01	35.78	40.18	74	33.82	Peak
	3741.106	45.03	32.19	6.52	34.43	49.31	74	24.69	Peak
	9015.711	41.85	38.61	10.29	35.4	55.35	74	18.65	Peak
	9015.711	29.32	38.61	10.29	35.4	42.82	54	11.18	Average

CH11 (2462MHz)

Polarization	Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
Horizontal	1188.502	45.68	24.3	3.57	36.12	37.43	74	36.57	Peak
	2666.859	44.02	29.39	5.39	35.23	43.57	74	30.43	Peak
	7979.947	43.49	38.7	9.61	35.89	55.91	74	18.09	Peak
	7979.947	30.28	38.7	9.61	35.89	42.7	54	11.3	Average
Vertical	1303.167	45.23	24.94	3.75	35.98	37.94	74	36.06	Peak
	3069.022	44.76	30.68	5.8	35.12	46.12	74	27.88	Peak
	7328.245	43.69	37.57	9.21	35.5	54.97	74	19.03	Peak
	7328.245	30.33	37.57	9.21	35.5	41.61	54	12.39	Average

TEST ENGINEER: Sunny

EUT : Console Temperature : 21℃

Model No. : XER Humidity : 50%RH

Test Mode : Receiving Date of Test : 2018.02.09

Polarization	Frequency (MHz)	Meter Reading dB (μV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
Horizontal	33.095	3.02	17.27	0.58	0	20.87	40	19.13	QP
	85.898	14.93	10.37	0.91	0	26.21	40	13.79	
	100.934	10.71	12.82	1.01	0	24.54	43.5	18.96	
	337.216	4.64	15.01	1.89	0	21.54	46	24.46	
	633.907	3.96	19.73	2.57	0	26.26	46	19.74	
	932.272	4.36	21.3	3.1	0	28.76	46	17.24	
	1339.677	46.59	25.12	3.81	35.94	39.58	74	34.42	PK
	3126.079	44.85	30.82	5.85	35.05	46.47	74	27.53	
	8570.379	43.61	37.92	10.03	35.6	55.96	74	18.04	
	8570.379	31.31	37.92	10.03	35.6	43.66	54	10.34	Average
Vertical	32.52	5.81	17.49	0.58	0	23.88	40	16.12	QP
	77.321	18.69	8.84	0.85	0	28.38	40	11.62	
	105.272	13.21	12.89	1.04	0	27.14	43.5	16.36	
	375.939	5.13	15.97	1.99	0	23.09	46	22.91	
	539.478	4.07	18.6	2.38	0	25.05	46	20.95	
	821.71	3.22	20.9	2.89	0	27.01	46	18.99	
	1452.112	46.05	25.68	3.95	35.81	39.87	74	34.13	PK
	2636.331	45.19	29.29	5.39	35.23	44.64	74	29.36	
	5701.643	45.15	34.96	8.27	34.11	54.27	74	19.73	
	5701.643	32.48	34.96	8.27	34.11	41.6	54	12.4	Average

TEST ENGINEER: Sunny

Radiated Band Edge measurement:**802.11b****CH01 (2412MHz)**

Polarization	Frequency (MHz)	Meter Reading dB (μV)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
Horizontal	2389.89	57.87	5.12	28.59	35.26	56.32	74	17.68	PK
	2483.485	53.47	5.19	28.77	35.25	52.18	74	21.82	
	2389.89	42.1	5.12	28.59	35.26	40.55	54	13.45	AV
	2483.485	34.95	5.19	28.77	35.25	33.66	54	20.34	
Vertical	2390.13	57.59	5.12	28.59	35.26	56.04	74	17.96	PK
	2483.5	54.48	5.19	28.77	35.25	53.19	74	20.81	
	2390.13	42.5	5.12	28.59	35.26	40.95	54	13.05	AV
	2483.5	33.52	5.19	28.77	35.25	32.23	54	21.77	

CH11 (2462MHz)

Polarization	Frequency (MHz)	Meter Reading dB (μV)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
Horizontal	2389.996	55.5	5.12	28.59	35.26	53.95	74	20.05	PK
	2483.513	59.82	5.19	28.77	35.25	58.53	74	15.47	
	2389.996	35.11	5.12	28.59	35.26	33.56	54	20.44	AV
	2483.513	46.12	5.19	28.77	35.25	44.83	54	9.17	
Vertical	2389.27	54.66	5.12	28.59	35.26	53.11	74	20.89	PK
	2483.523	60.34	5.19	28.77	35.25	59.05	74	14.95	
	2389.27	37.28	5.12	28.59	35.26	35.73	54	18.27	AV
	2483.523	45.13	5.19	28.77	35.25	43.84	54	10.16	

802.11g**CH01 (2412MHz)**

Polarization	Frequency (MHz)	Meter Reading dB (μV)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamplifier Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
Horizontal	2389.234	59.04	5.12	28.59	35.26	57.49	74	16.51	PK
	2483.52	53.69	5.19	28.77	35.25	52.4	74	21.60	
	2389.234	46.23	5.12	28.59	35.26	44.68	54	9.32	AV
	2483.52	35.12	5.19	28.77	35.25	33.83	54	20.17	
Vertical	2389.726	59.07	5.12	28.59	35.26	57.52	74	16.48	PK
	2483.502	54.01	5.19	28.77	35.25	52.72	74	21.28	
	2389.762	45.33	5.12	28.59	35.26	43.78	54	10.22	AV
	2483.502	34.63	5.19	28.77	35.25	33.34	54	20.66	

CH11 (2462MHz)

Polarization	Frequency (MHz)	Meter Reading dB (μV)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamplifier Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
Horizontal	2389.916	54.64	5.12	28.59	35.26	53.09	74	20.91	PK
	2483.47	55.62	5.19	28.77	35.25	54.33	74	19.67	
	2389.916	35.41	5.12	28.59	35.26	33.86	54	20.14	AV
	2483.47	41.12	5.19	28.77	35.25	39.83	54	14.17	
Vertical	2390.036	54.79	5.12	28.59	35.26	53.24	74	20.76	PK
	2483.033	60.08	5.19	28.77	35.25	58.79	74	15.21	
	2390.036	34.38	5.12	28.59	35.26	32.83	54	21.17	AV
	2483.033	45.03	5.19	28.77	35.25	43.74	54	10.26	

802.11n**CH01 (2412MHz)**

Polarization	Frequency (MHz)	Meter Reading dB (μV)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamplifier Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
Horizontal	2390.11	63.77	5.12	28.59	35.26	62.22	74	11.78	PK
	2483.32	53.82	5.19	28.77	35.25	52.53	74	21.47	
	2390.11	49.1	5.12	28.59	35.26	47.55	54	6.45	AV
	2483.32	38.75	5.19	28.77	35.25	37.46	54	16.54	
Vertical	2390.05	59.14	5.12	28.59	35.26	57.59	74	16.41	PK
	2483.485	50.24	5.19	28.77	35.25	48.95	74	25.05	
	2390.05	46.6	5.12	28.59	35.26	45.05	54	8.95	AV
	2483.485	35.12	5.19	28.77	35.25	33.83	54	20.17	

CH11 (2462MHz)

Polarization	Frequency (MHz)	Meter Reading dB (μV)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamplifier Factor (dB)	Emission Level dB (μV/m)	Limits dB (μV/m)	Margin (dB)	Remark
Horizontal	2390.006	53.62	5.12	28.59	35.26	52.07	74	21.93	PK
	2483.545	62.85	5.19	28.77	35.25	61.56	74	12.44	
	2390.006	35.02	5.12	28.59	35.26	33.47	54	20.53	AV
	2483.545	49.12	5.19	28.77	35.25	47.83	54	6.17	
Vertical	2390.11	54.14	5.12	28.59	35.26	52.59	74	21.41	PK
	2483.625	59.93	5.19	28.77	35.25	58.64	74	15.36	
	2390.11	35.03	5.12	28.59	35.26	33.48	54	20.52	AV
	2483.625	49.21	5.19	28.77	35.25	47.92	54	6.08	

TEST ENGINEER: Sunny

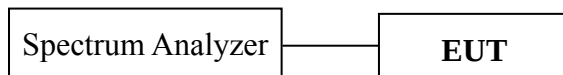
5 6 dB BANDWIDTH MEASUREMENT

5.1 Test Equipment

The following test equipment was used during the Emission Bandwidth measurement:

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Spectrum Analyzer	Agilent	N9010A	MY52221182	May 25, 2017	May 24, 2018

5.2 Block Diagram of Test Setup



5.3 Specification Limits (§15.247(a)(2))

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

5.4 Operating Condition of EUT

The switch ON/OFF was used to enable the EUT to change the channel one by one.

5.5 Test Procedure

The transmitter output was connected to the spectrum analyzer. The bandwidth of the fundamental frequency was measure by spectrum analyzer with 100 kHz RBW / 300 kHz VBW.

The 6 dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 6 dB .

The test procedure is defined in ANSI C63.10-2013 (the 11.8.2 Measurement Procedure “Option 2” was used).

5.6 Test Results

PASSED.

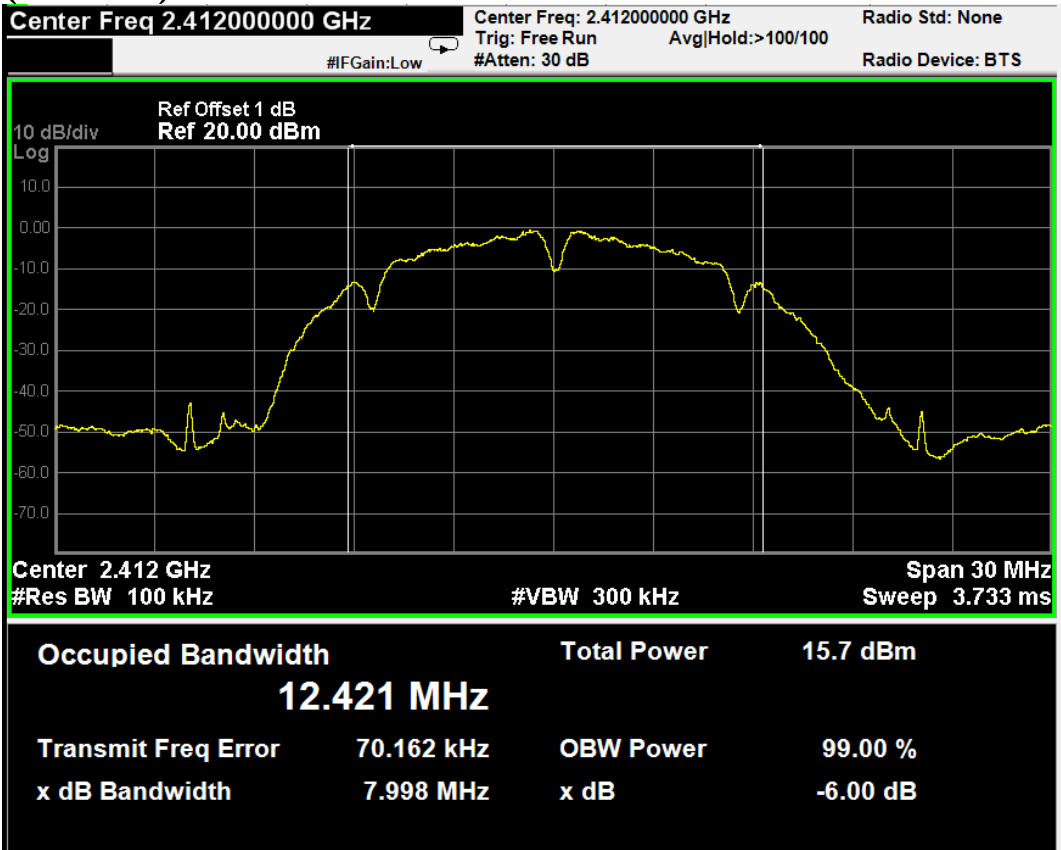
All the test results are attached in next pages.

(Test Date: 2018.02.08 Temperature: 22℃ Humidity: 52 %)

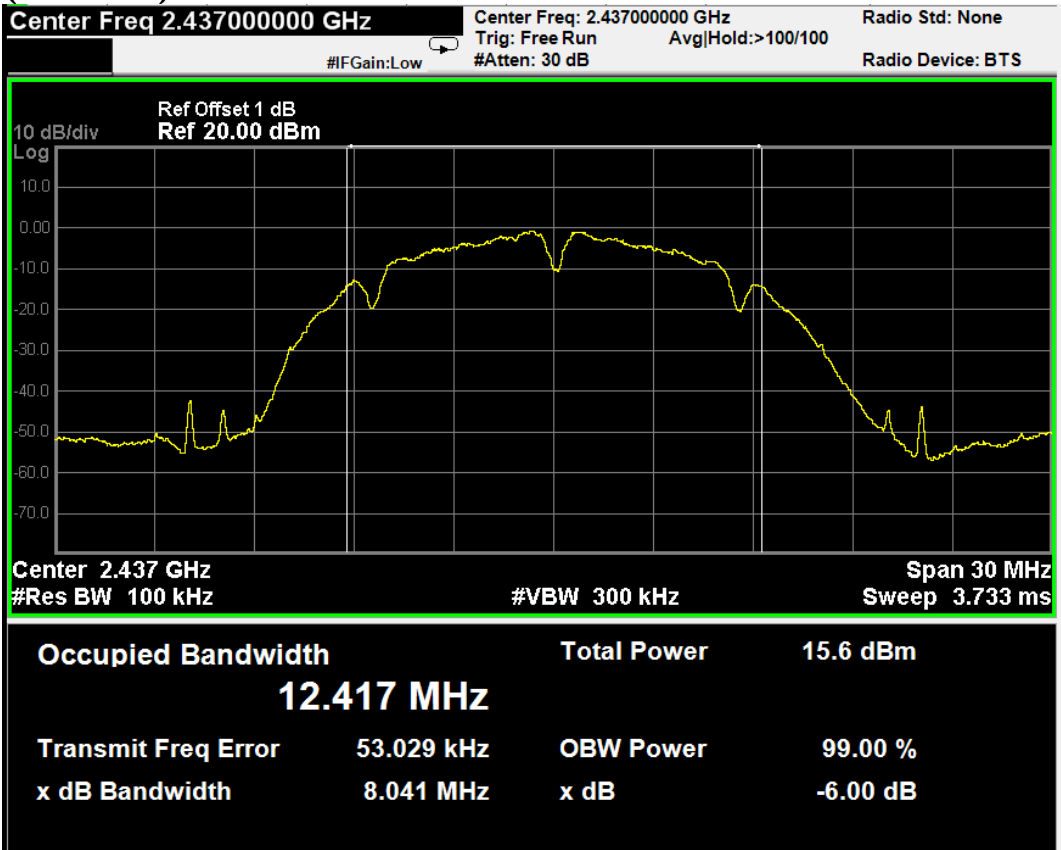
Modulation	Channel	Frequency	6dB Bandwidth
802.11b	01	2412 MHz	7.99 MHz
	06	2437 MHz	8.04 MHz
	11	2462 MHz	8.01 MHz
802.11g	01	2412 MHz	16.36MHz
	06	2437 MHz	16.33 MHz
	11	2462 MHz	16.37 MHz
802.11n	01	2412 MHz	16.64 MHz
	06	2437 MHz	16.31 MHz
	11	2462 MHz	17.29 MHz

802.11b

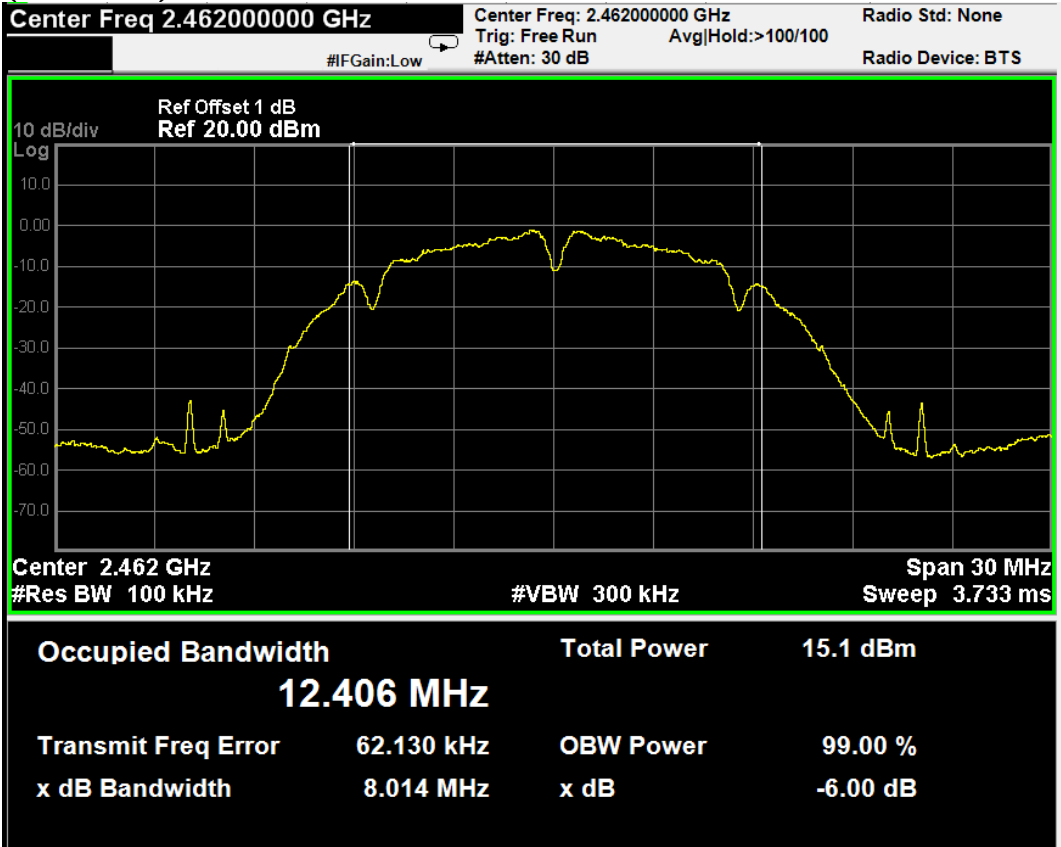
CH01 (2412 MHz)



CH06 (2437 MHz)

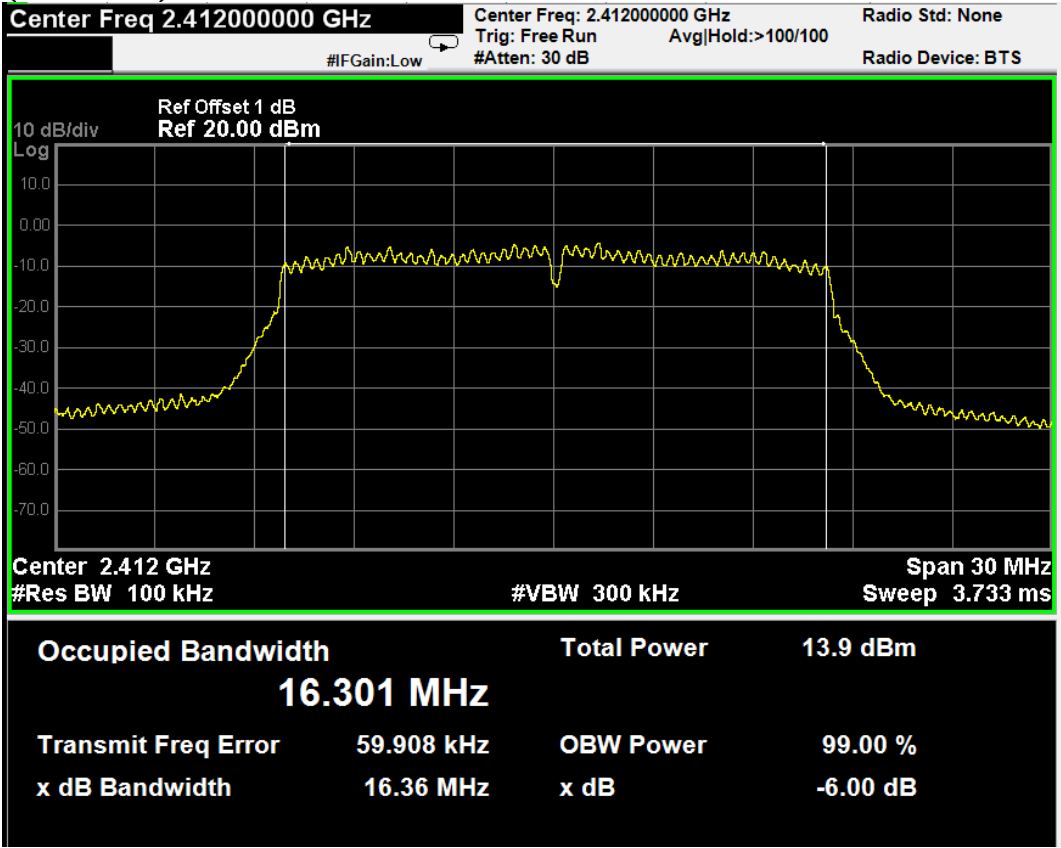


CH11 (2462 MHz)

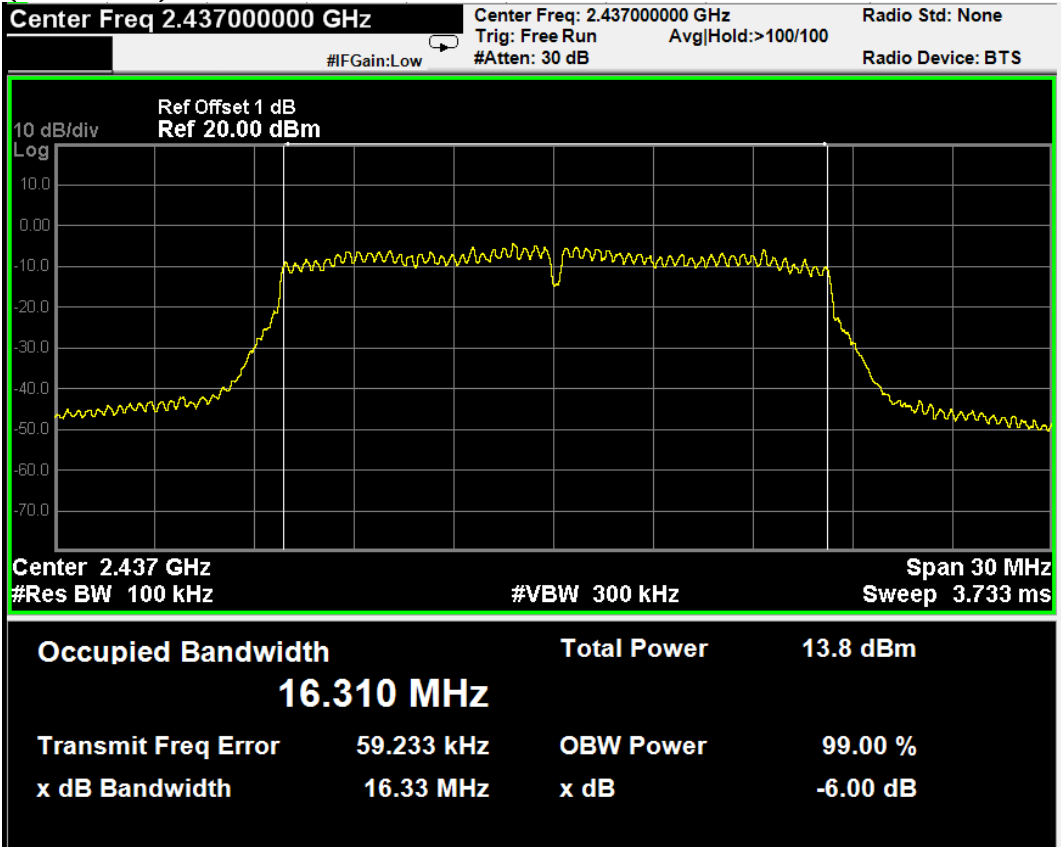


802.11g

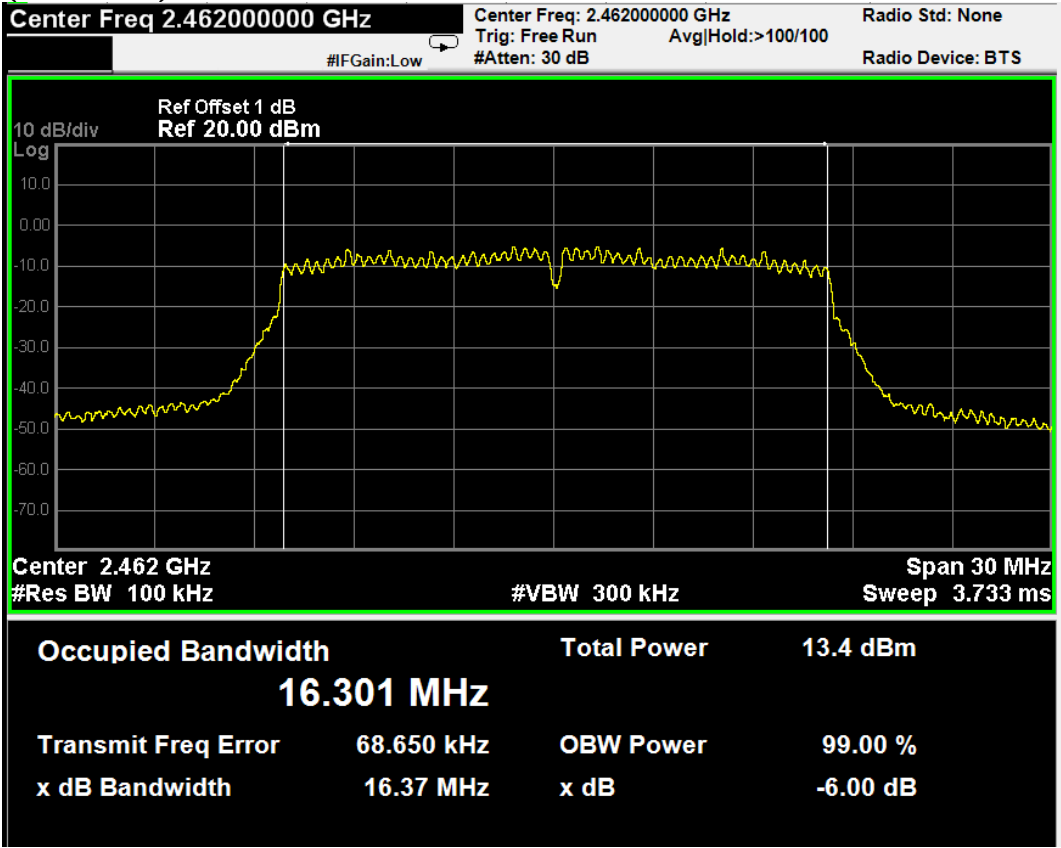
CH01 (2412 MHz)



CH06 (2437 MHz)

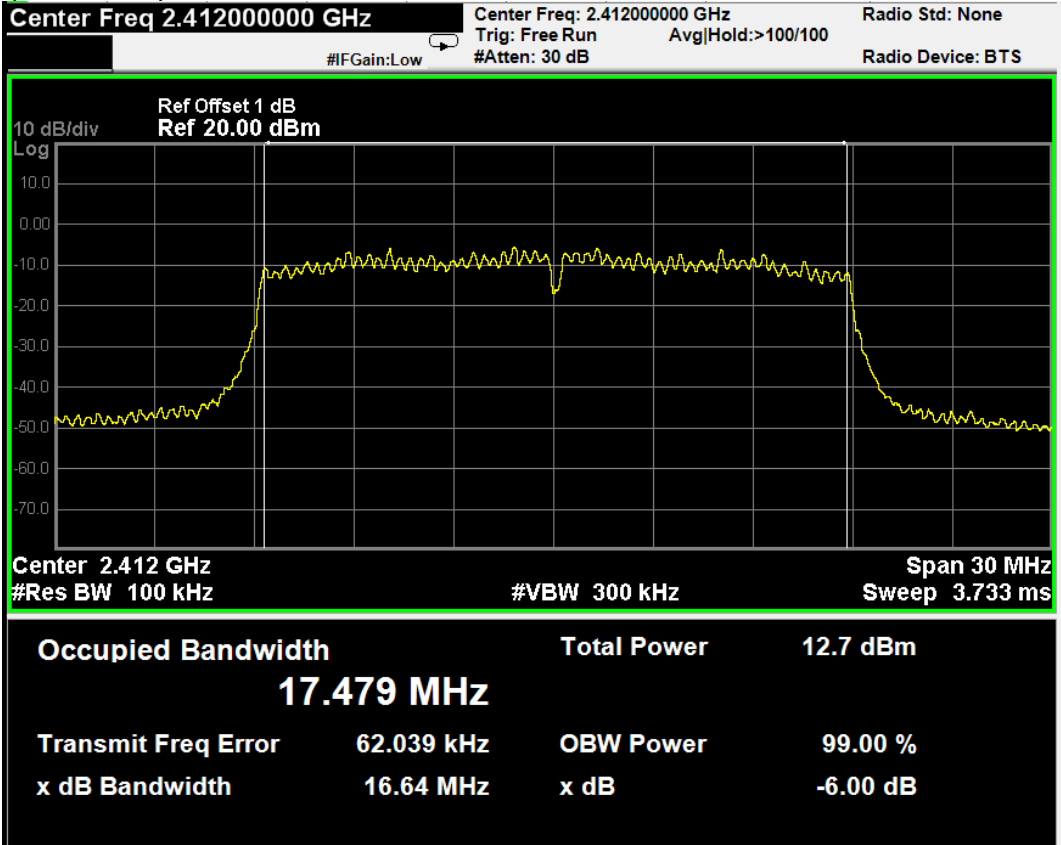


CH11 (2462 MHz)

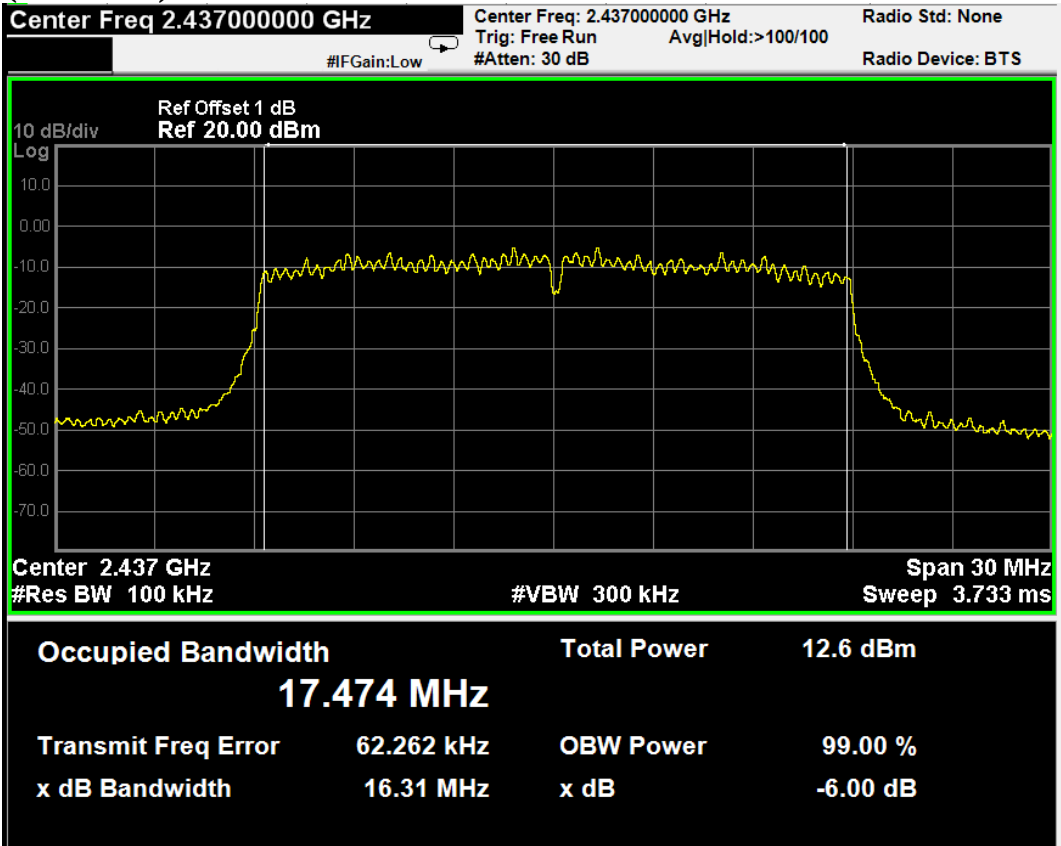


802.11n

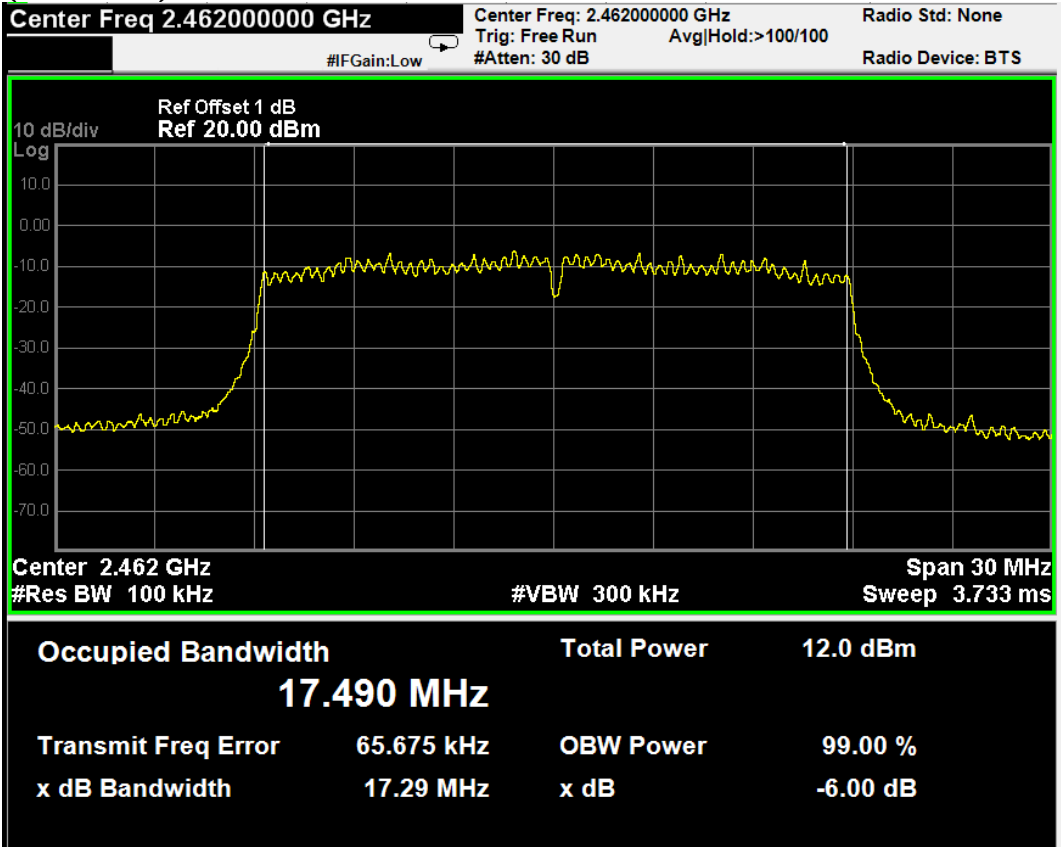
CH01 (2412 MHz)



CH06 (2437 MHz)



CH11 (2462 MHz)



6 MAXIMUM PEAK OUTPUT POWER MEASUREMENT

6.1 Test Equipment

The following test equipment was used during the maximum peak output power measurement:

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Spectrum Analyzer	Agilent	N9010A	MY52221182	May 25, 2017	May 24, 2018

6.2 Block Diagram of Test Setup

The Same as Section. 4.2.

6.3 Specification Limits ((§15.247(b)(3))

The Limits of maximum Peak Output Power for digital modulation in 2400-2483.5 MHz is: 1 Watt. (30 dBm)

6.4 Operating Condition of EUT

The switch ON/OFF was used to enable the EUT to change the channel one by one.

6.5 Test Procedure

The following procedure can be used when the maximum available RBW of the instrument is less than the DTS bandwidth:

- Set the RBW = 1 MHz.
- Set the VBW $\geq$ [3 RBW].
- Set the span $\geq$ [1.5 DTS bandwidth].
- Detector = peak.
- Sweep time = auto couple.
- Trace mode = max hold.
- Allow trace to fully stabilize.
- Use the instrument's band/channel power measurement function with the band limits set equal to the DTS bandwidth edges (for some instruments, this may require a manual override to select the peak detector). If the instrument does not have a band power function, then sum the spectrum levels (in linear power units) at intervals equal to the RBW extending across the DTS channel bandwidth

6.6 Test Results

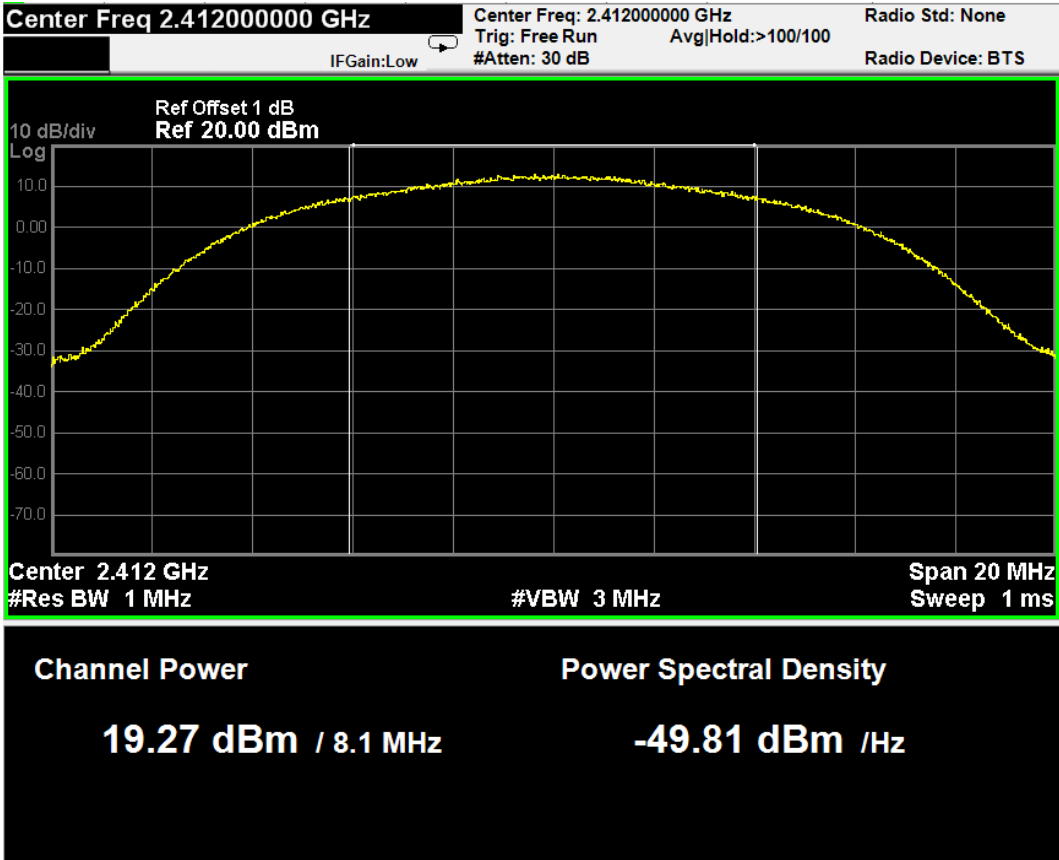
PASSED. All the test results are listed below.

(Test Date: 2018.01.15 Temperature: 22℃ Humidity: 52 %)

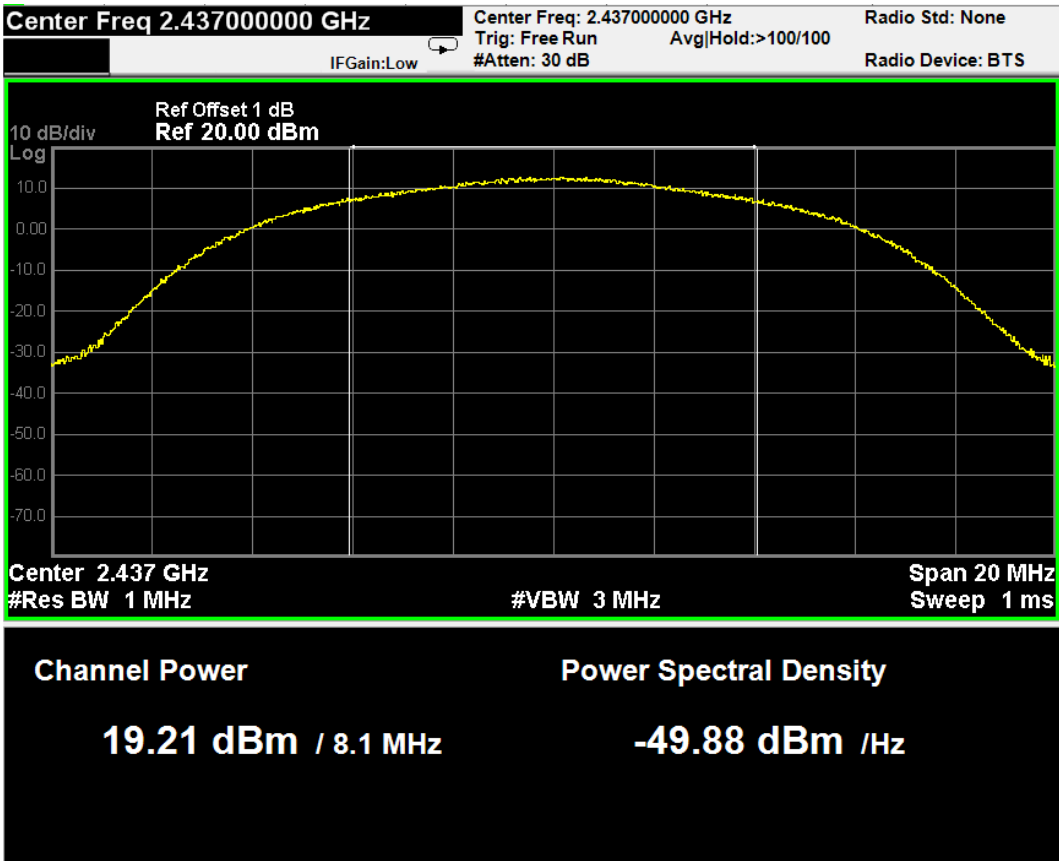
Modulation	Channel	Frequency	Peak Output Power	Limit
802.11b	01	2412 MHz	19.27 dBm	30 dBm
	06	2437 MHz	19.21 dBm	30 dBm
	11	2462 MHz	19.02 dBm	30 dBm
802.11g	01	2412 MHz	20.18 dBm	30 dBm
	06	2437 MHz	20.24 dBm	30 dBm
	11	2462 MHz	19.70 dBm	30 dBm
802.11n	01	2412 MHz	18.55 dBm	30 dBm
	06	2437 MHz	18.30 dBm	30 dBm
	11	2462 MHz	17.82 dBm	30 dBm

802.11b

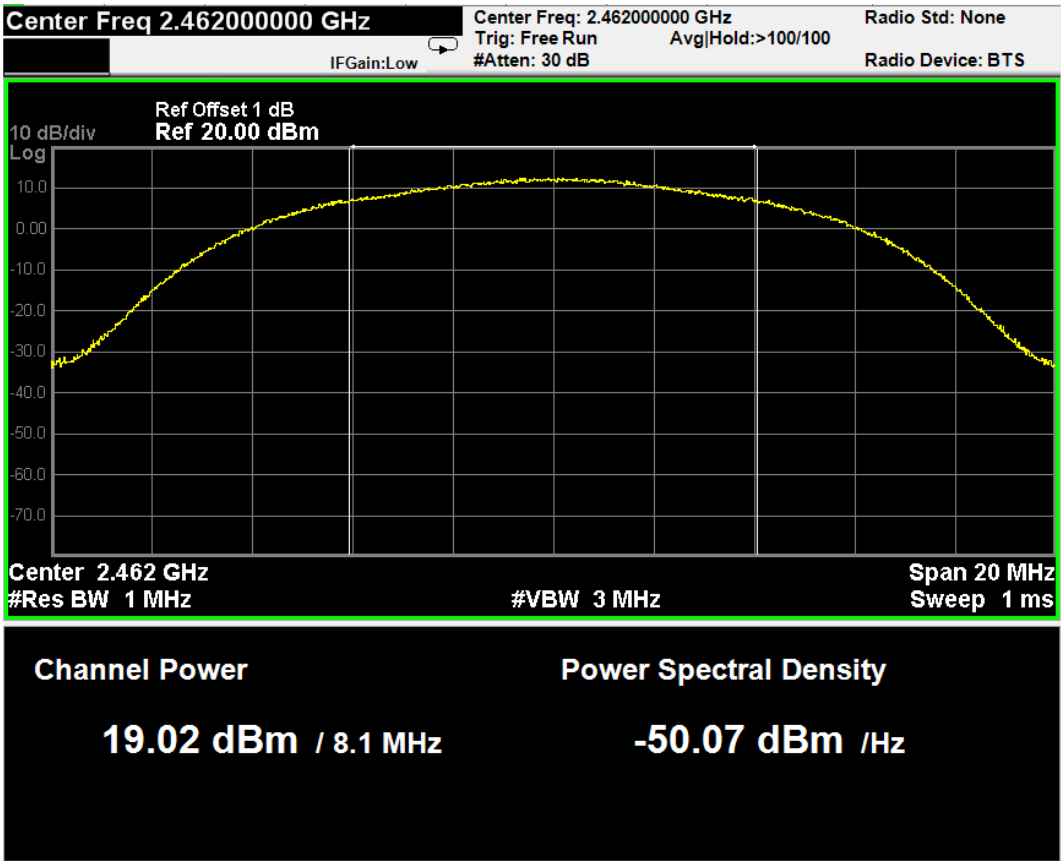
CH01 (2412 MHz)



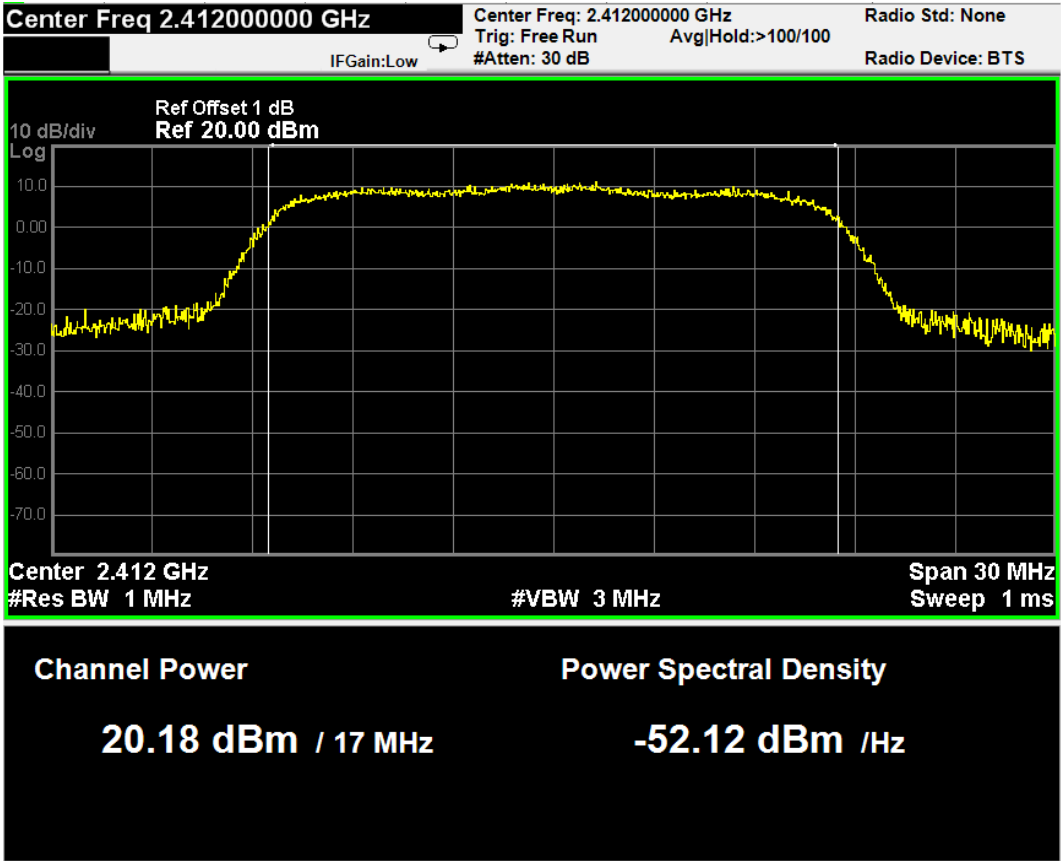
CH06 (2437 MHz)



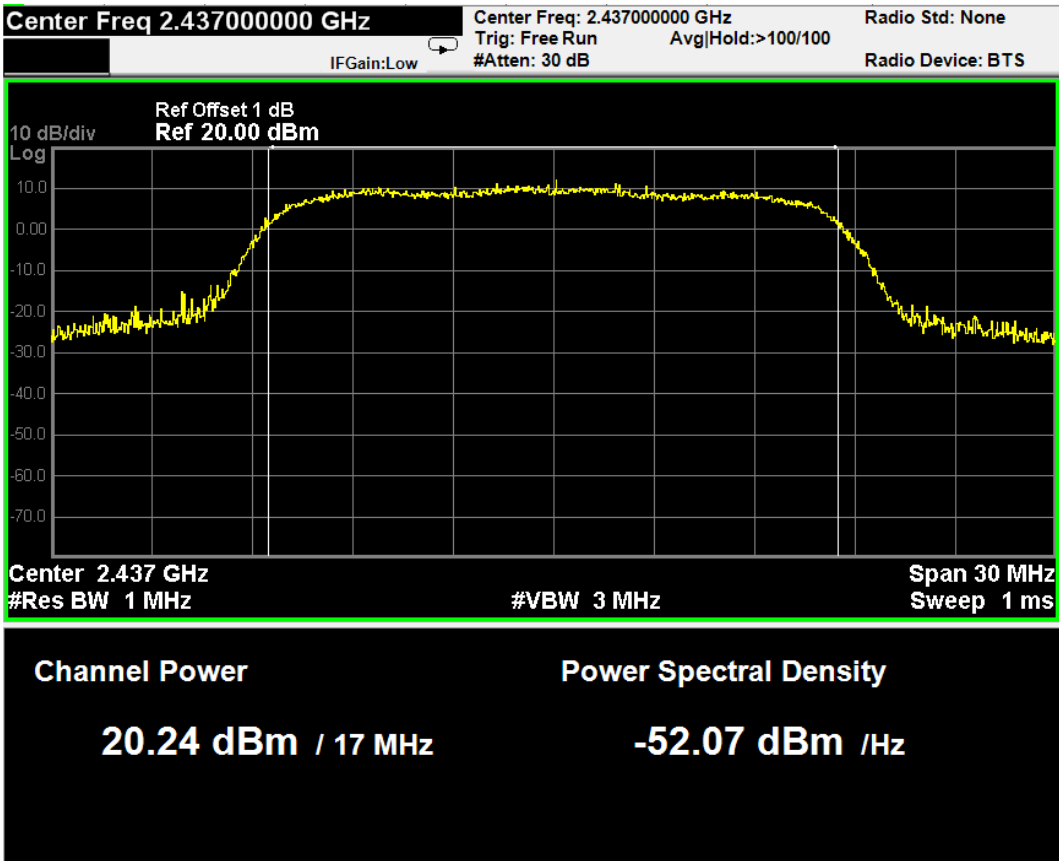
CH11 (2462 MHz)



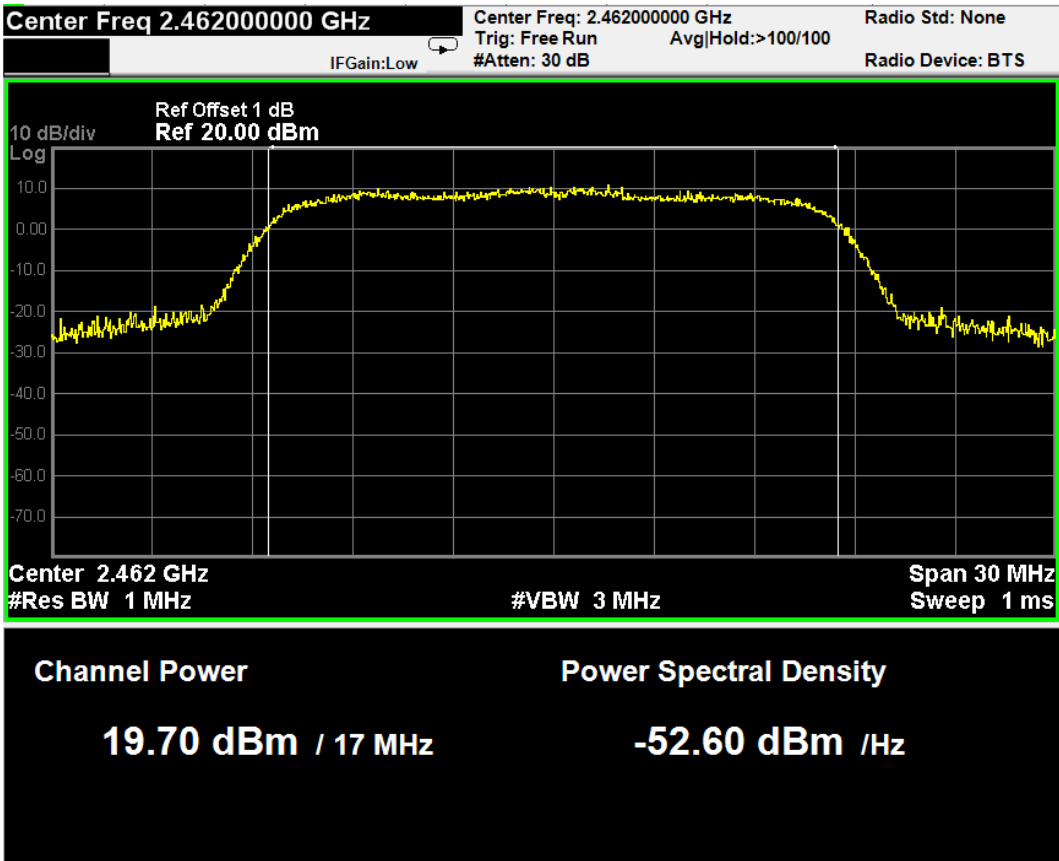
802.11g
CH01 (2412 MHz)



CH06 (2437 MHz)

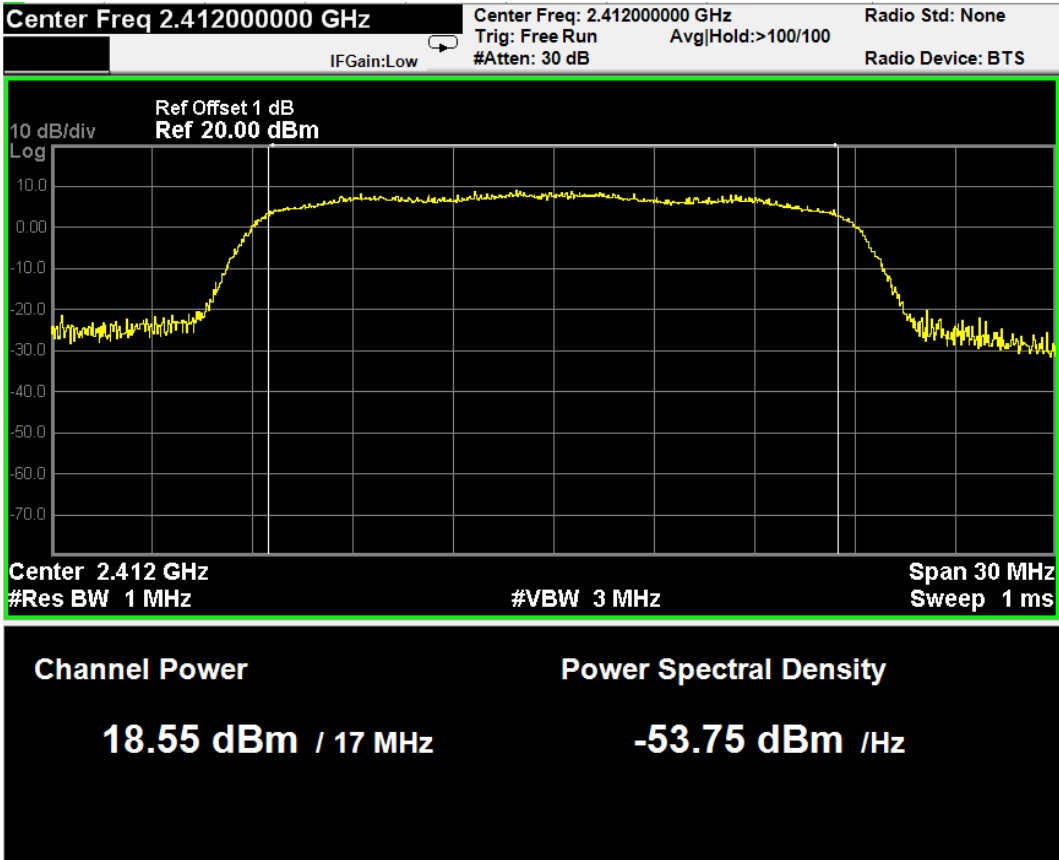


CH11 (2462 MHz)

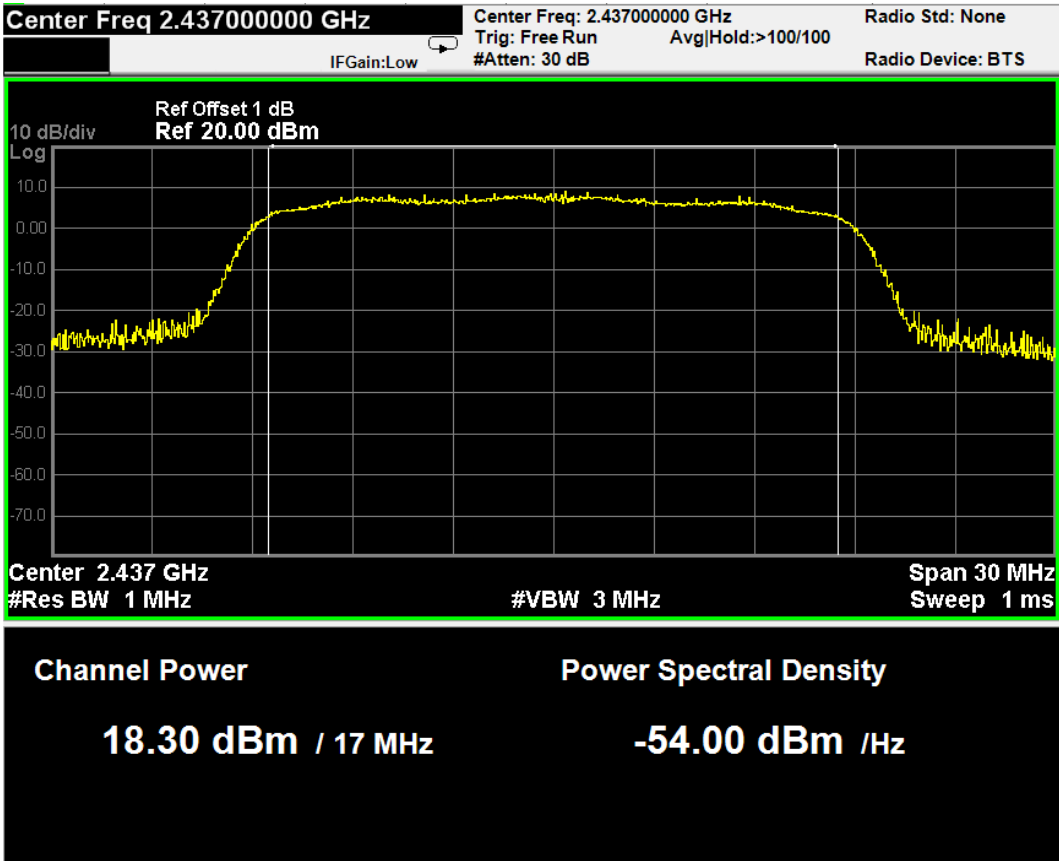


802.11n

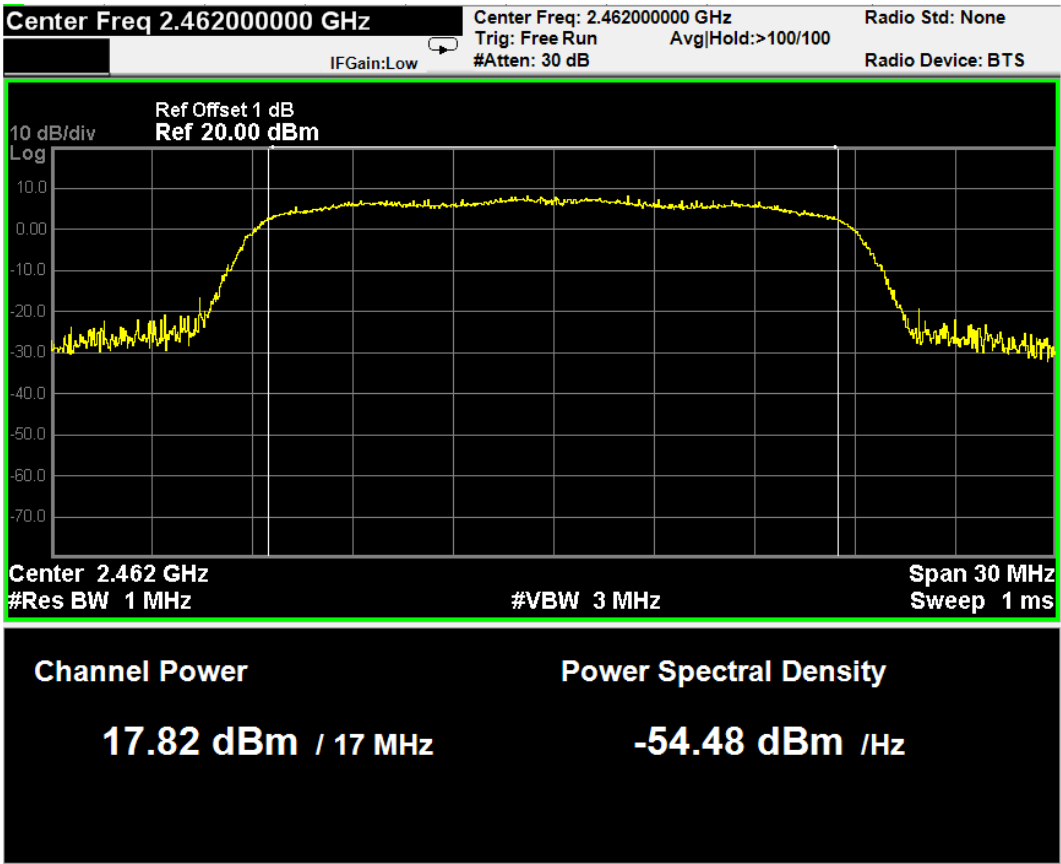
CH01 (2412 MHz)



CH06 (2437 MHz)



CH11 (2462 MHz)



7 EMISSION LIMITATIONS MEASUREMENT

7.1 Test Equipment

The following test equipment was used during the emission limitations test :

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Spectrum Analyzer	Agilent	N9010A	MY52221182	May 25, 2017	May 24, 2018

7.2 Block Diagram of Test Setup

The Same as Section. 4.2.

7.3 Specification Limits (§15.247(d))

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required.

In addition, radiated emissions which fall in restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (See Section 15.205(c)).(※This test result attaching to Section. 4.7)

7.4 Operating Condition of EUT

The switch ON/OFF was used to enable the EUT to change the channel one by one.

7.5 Test Procedure

The transmitter output was connected to the Test Receiver. Set RBW = 100 kHz, VBW $\geq$ 300 kHz, scan up through 10th harmonic. All harmonics/spurs must be at least 20 dB down from the highest emission level within the authorized band as measured with a 100 kHz RBW.

The test procedure is defined in ANSI C63.10-2013 (11.11.2 Reference level measurement and 11.11.3 Emission level measurement was used).

7.6 Test Results

PASSED.

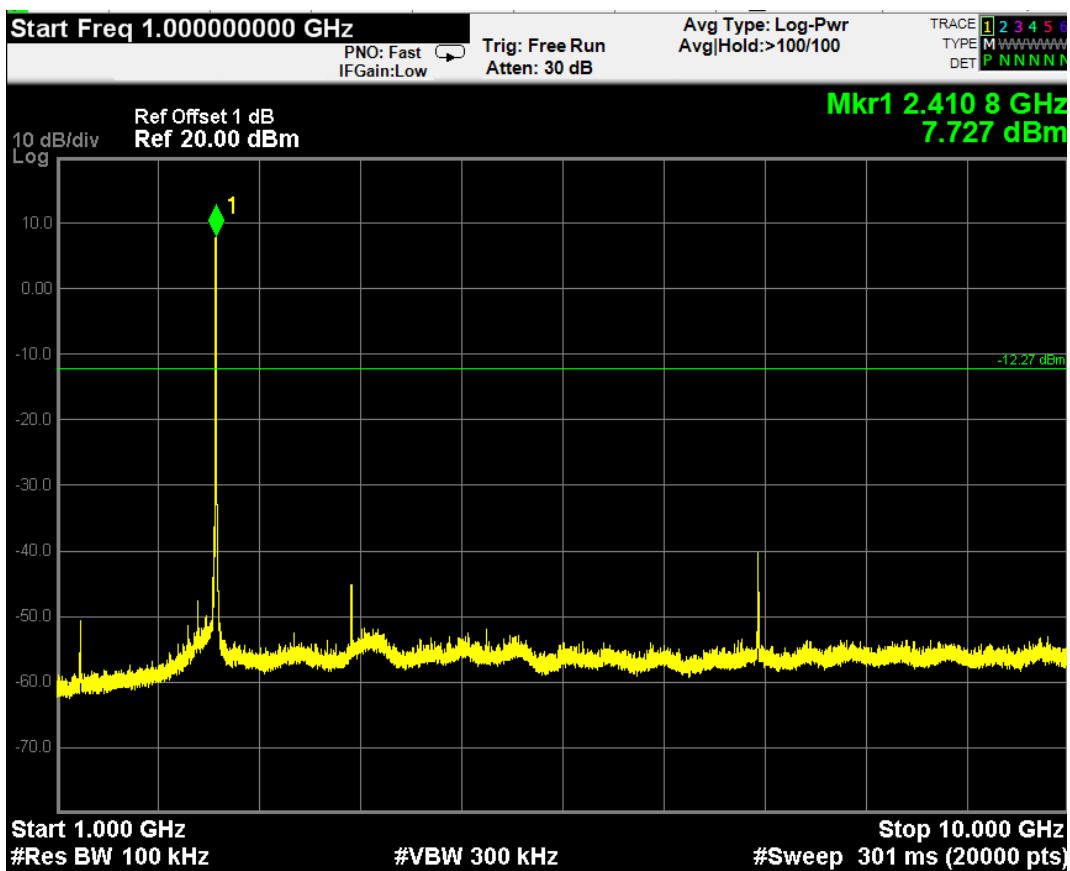
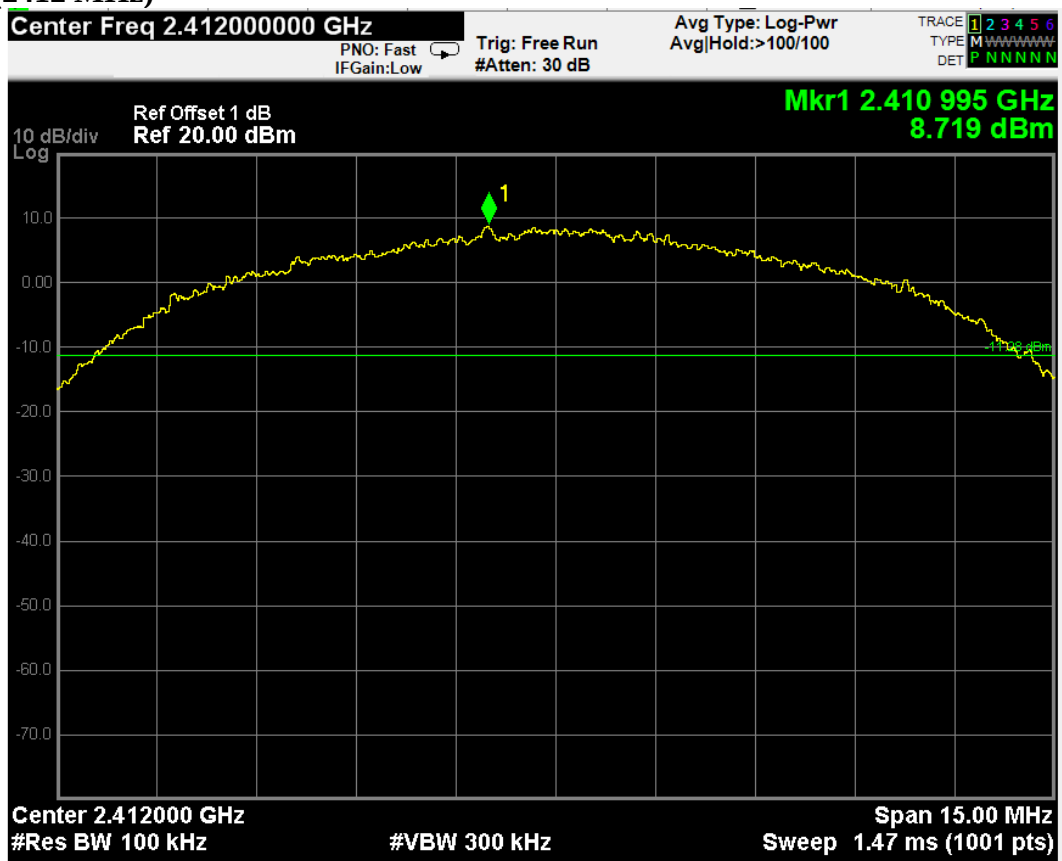
The test data was attached in the next pages.

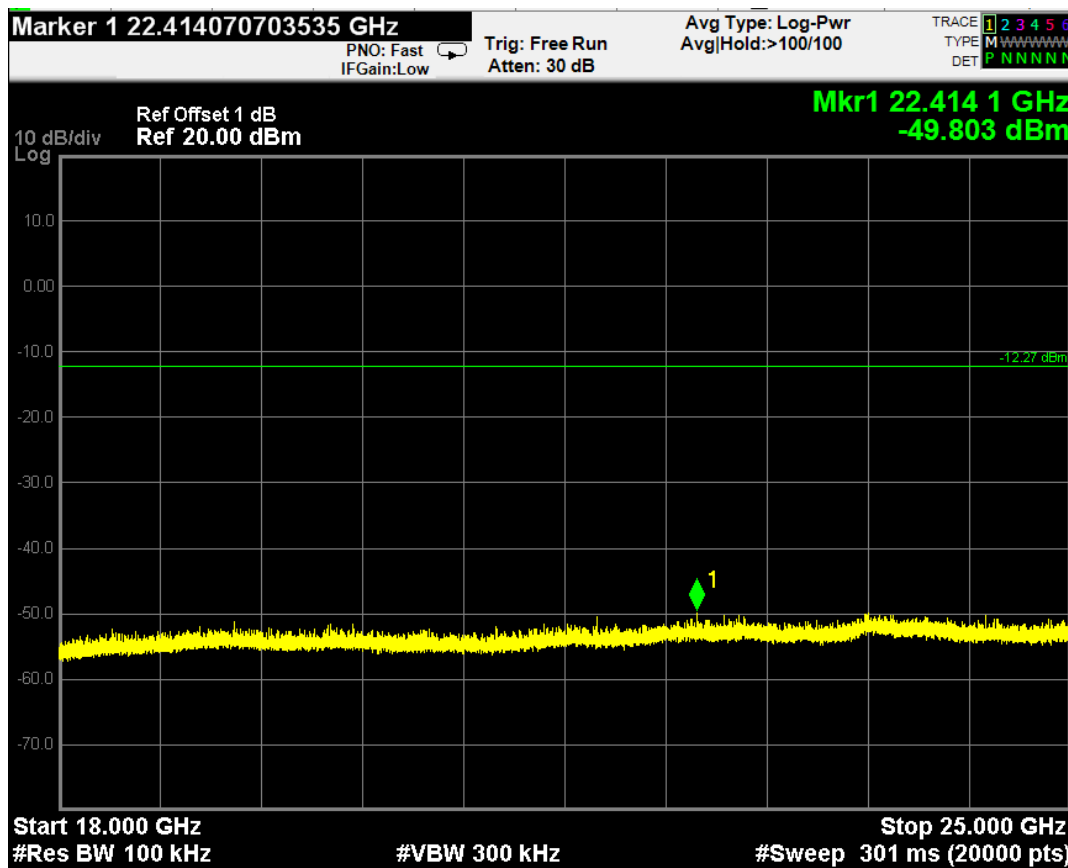
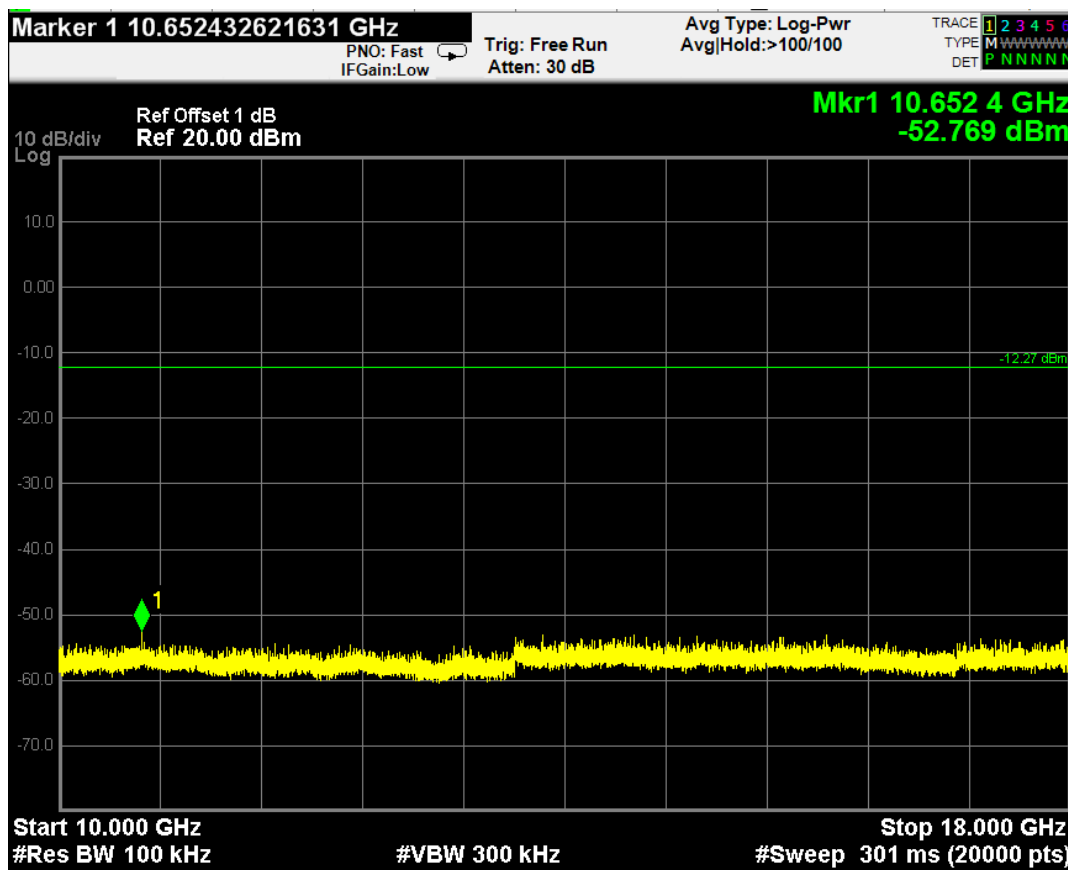
(Test Date: 2018.01.15 Temperature: 22℃ Humidity: 52 %)

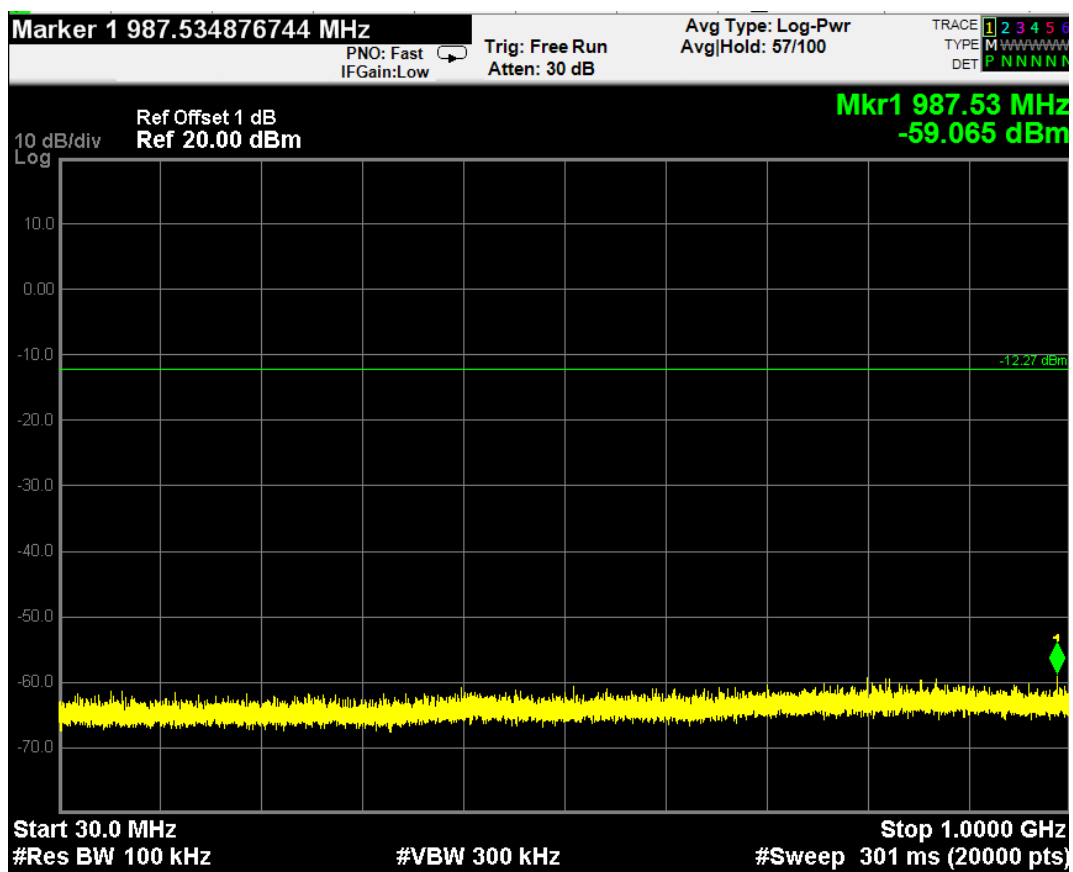
Modulation	Channel	Data Page
802.11b	01	P39-41
	06	P42-44
	11	P45-47
802.11g	01	P48-50
	06	P51-53
	11	P54-56
802.11n	01	P57-59
	06	P60-62
	11	P63-

802.11b

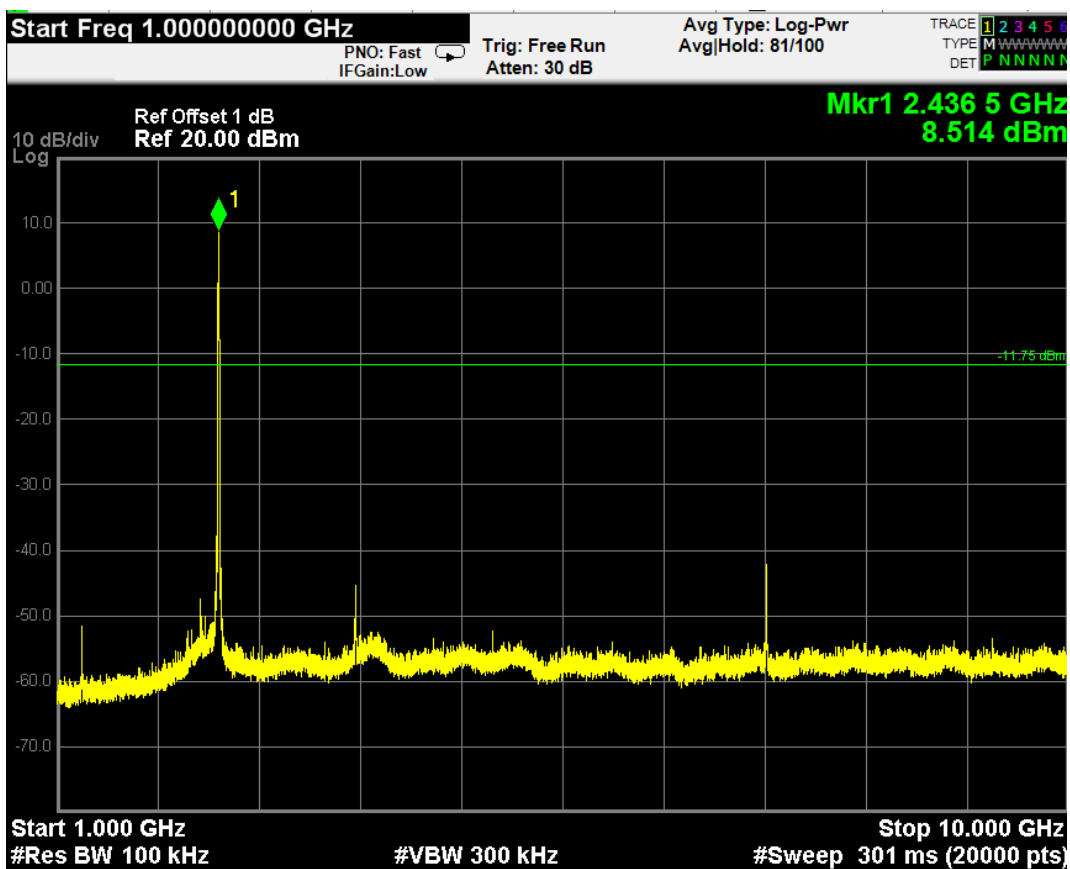
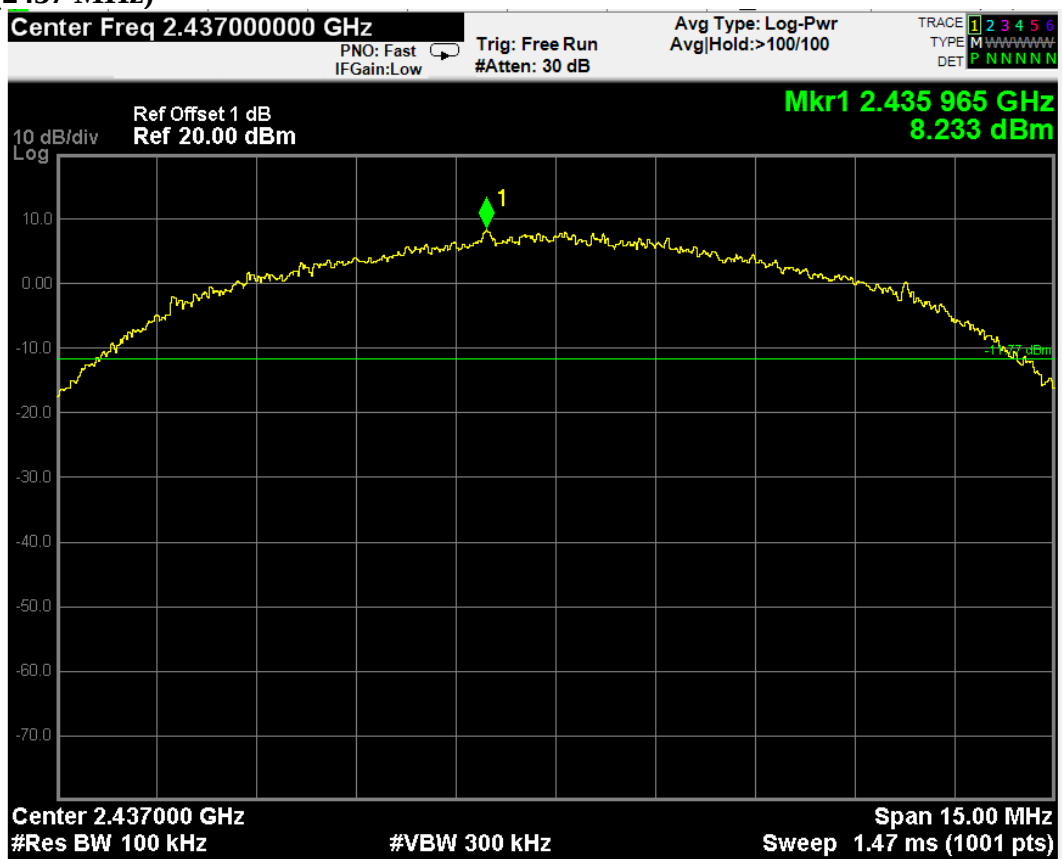
CH01 (2412 MHz)

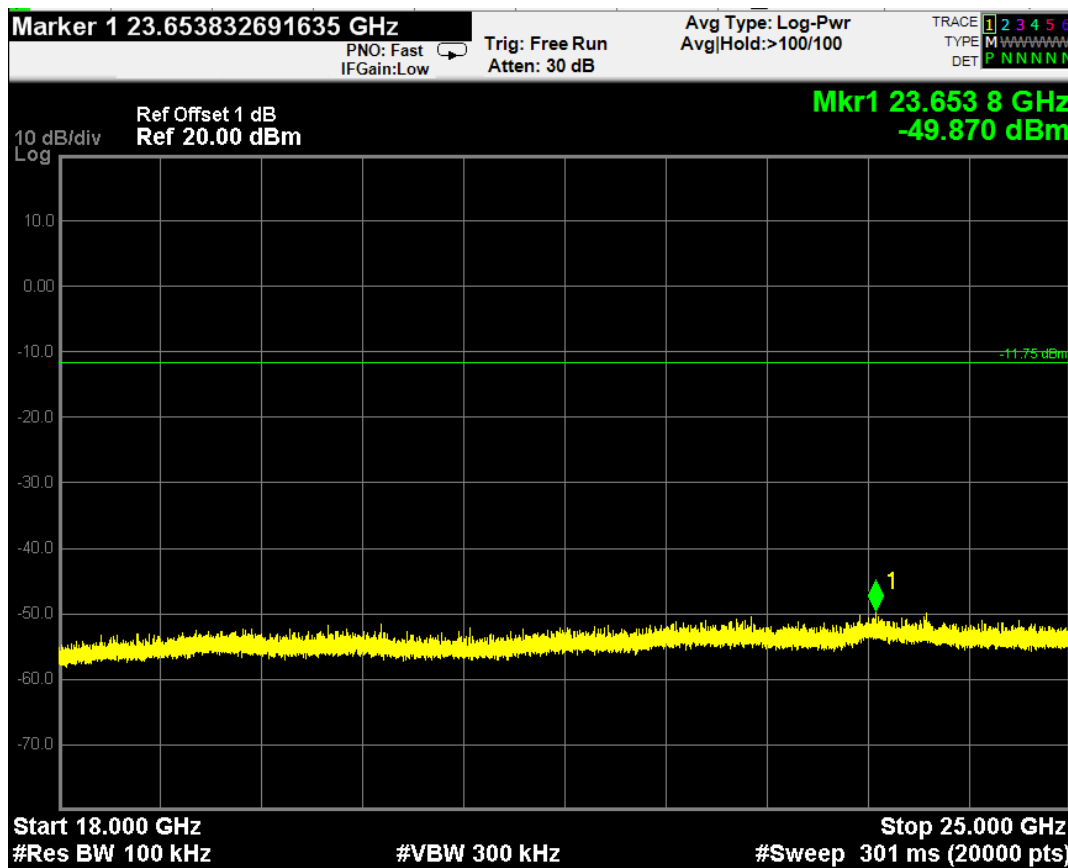
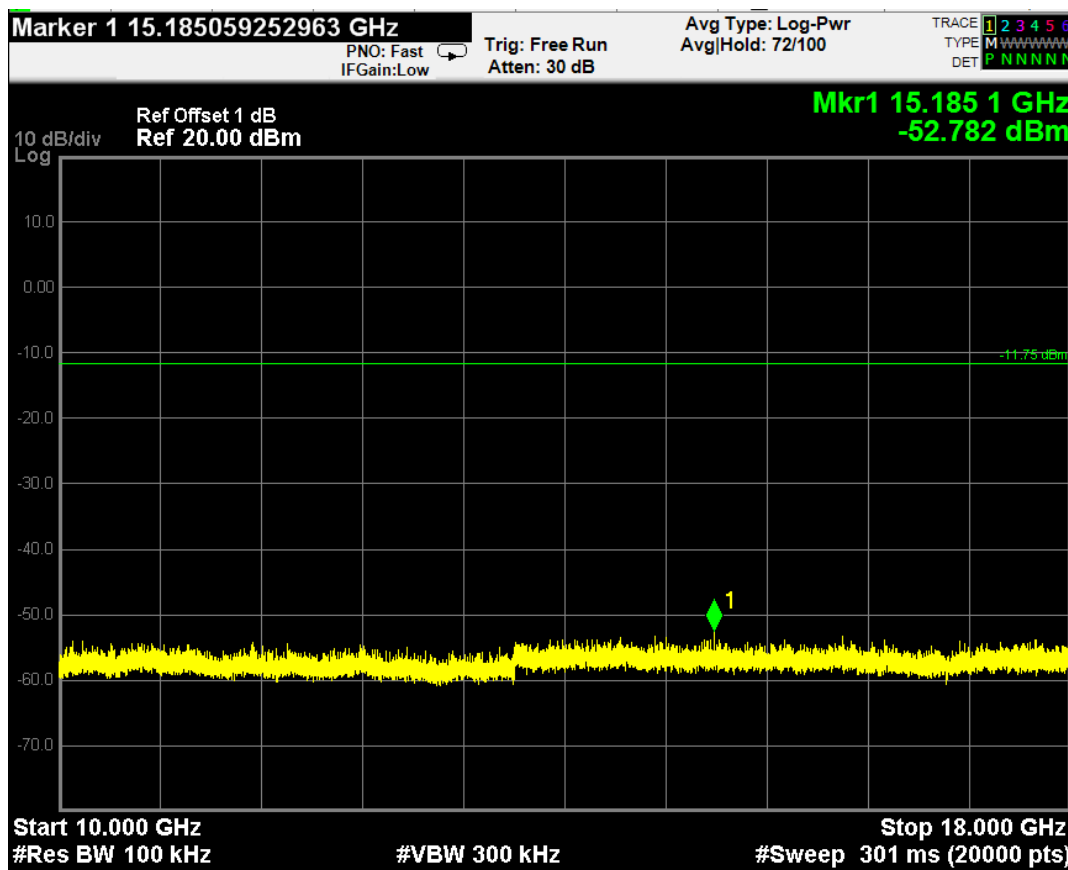


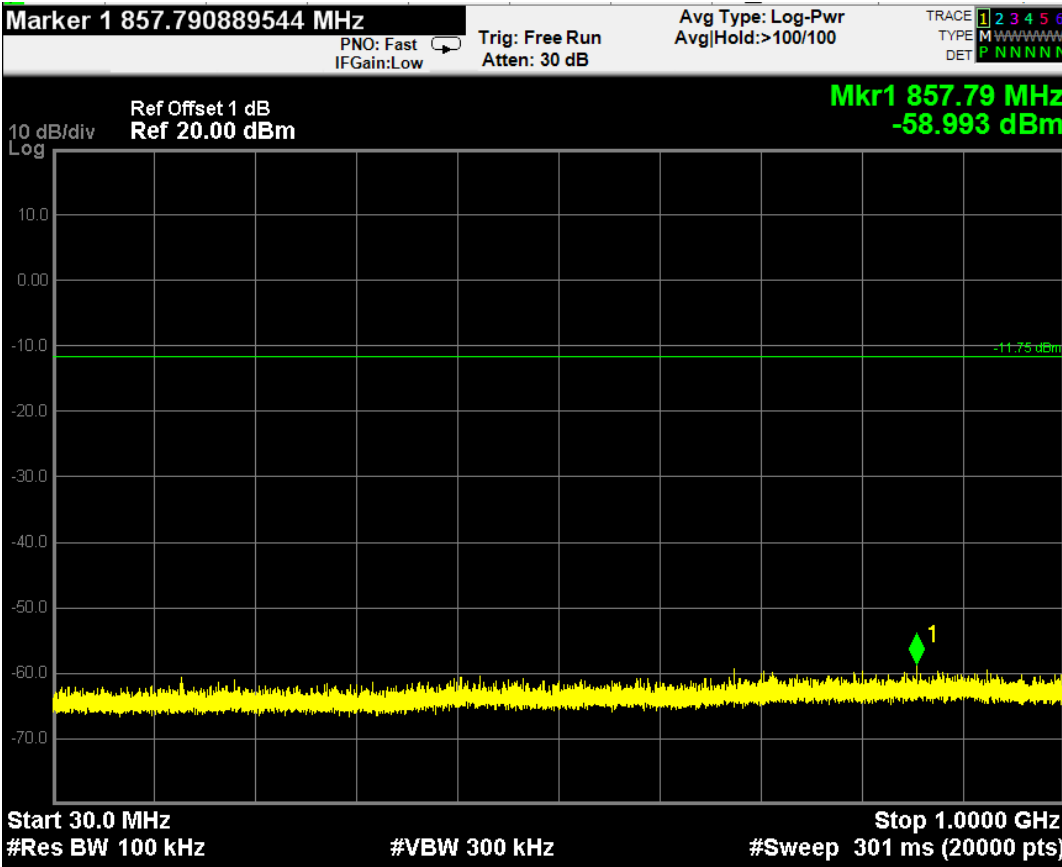




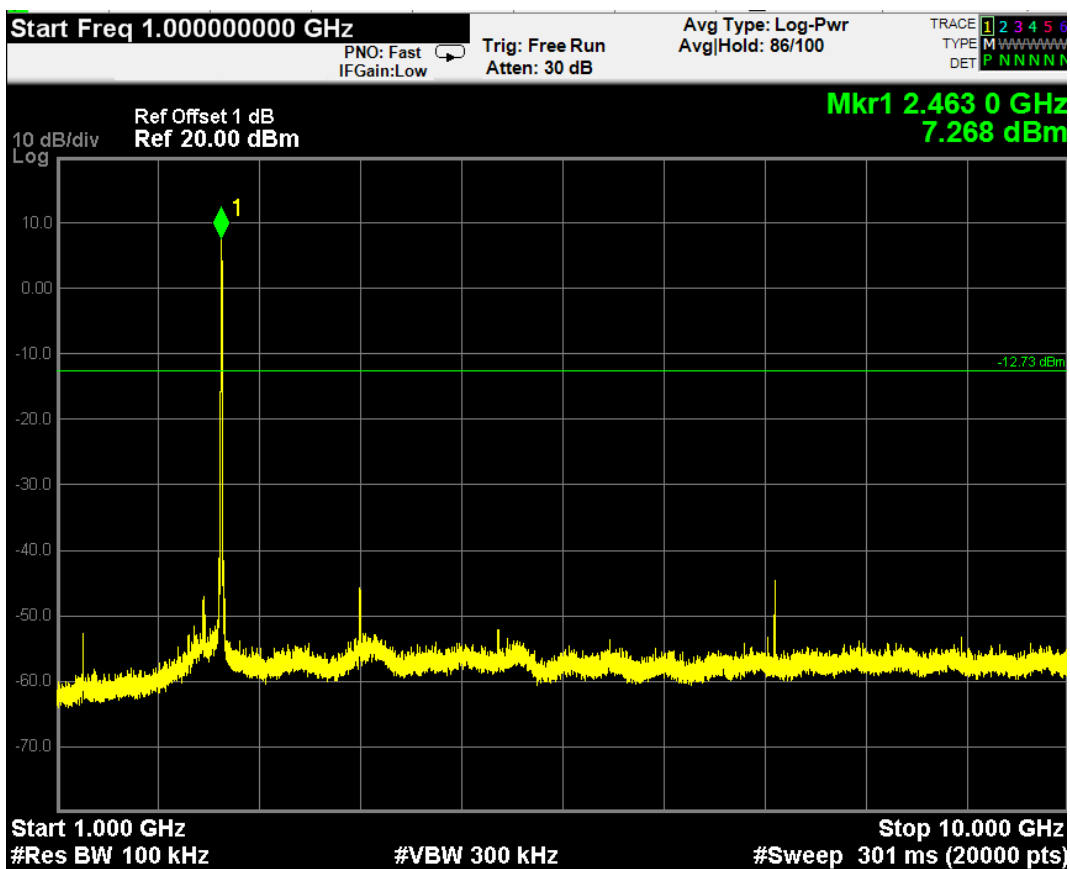
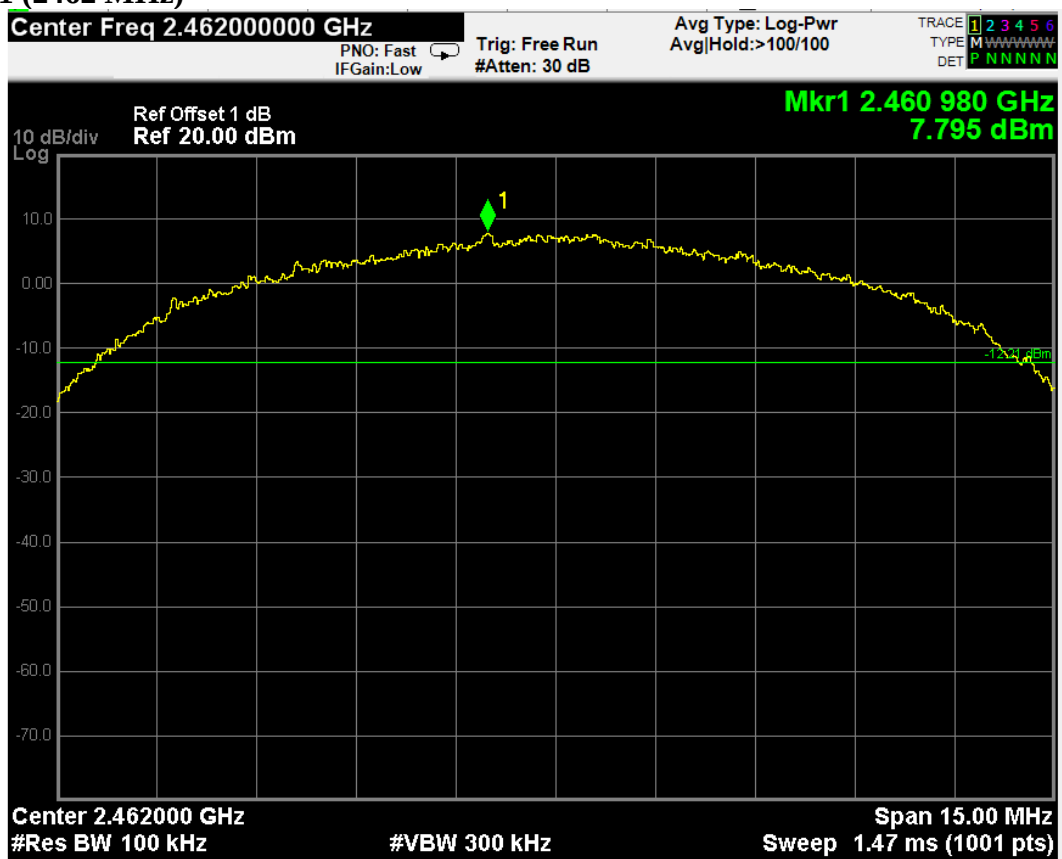
CH06 (2437 MHz)

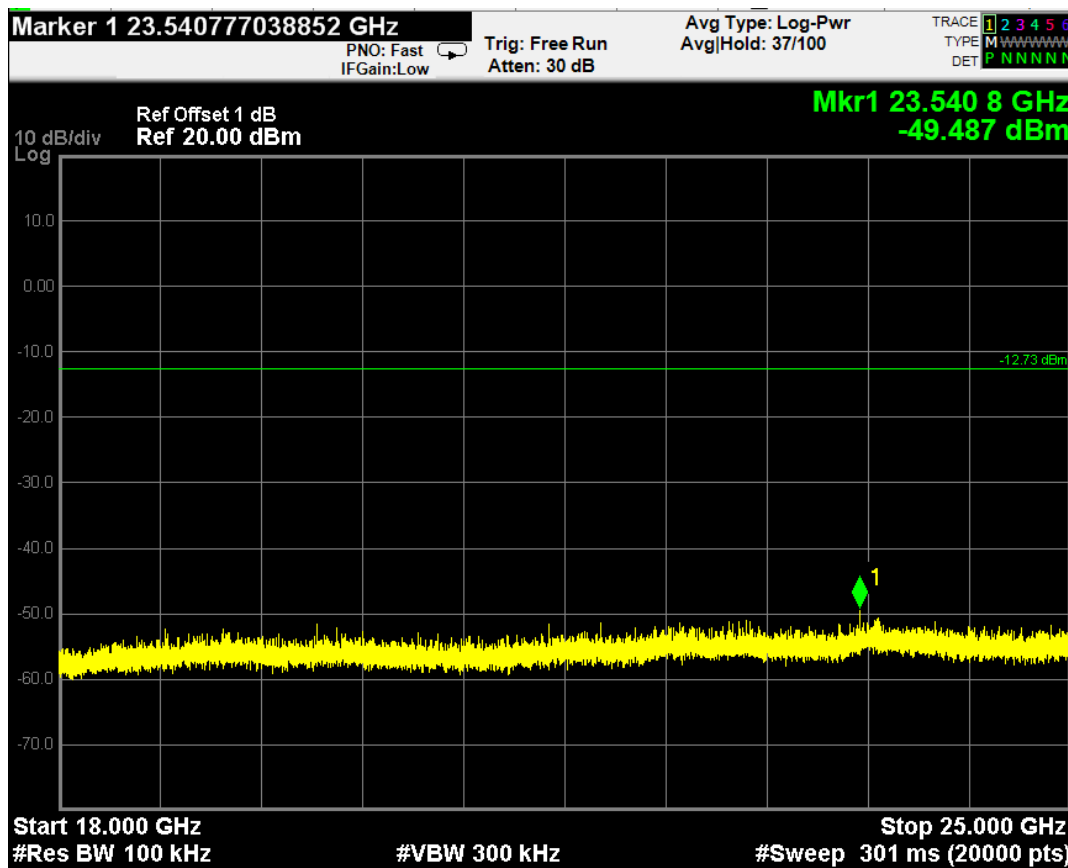
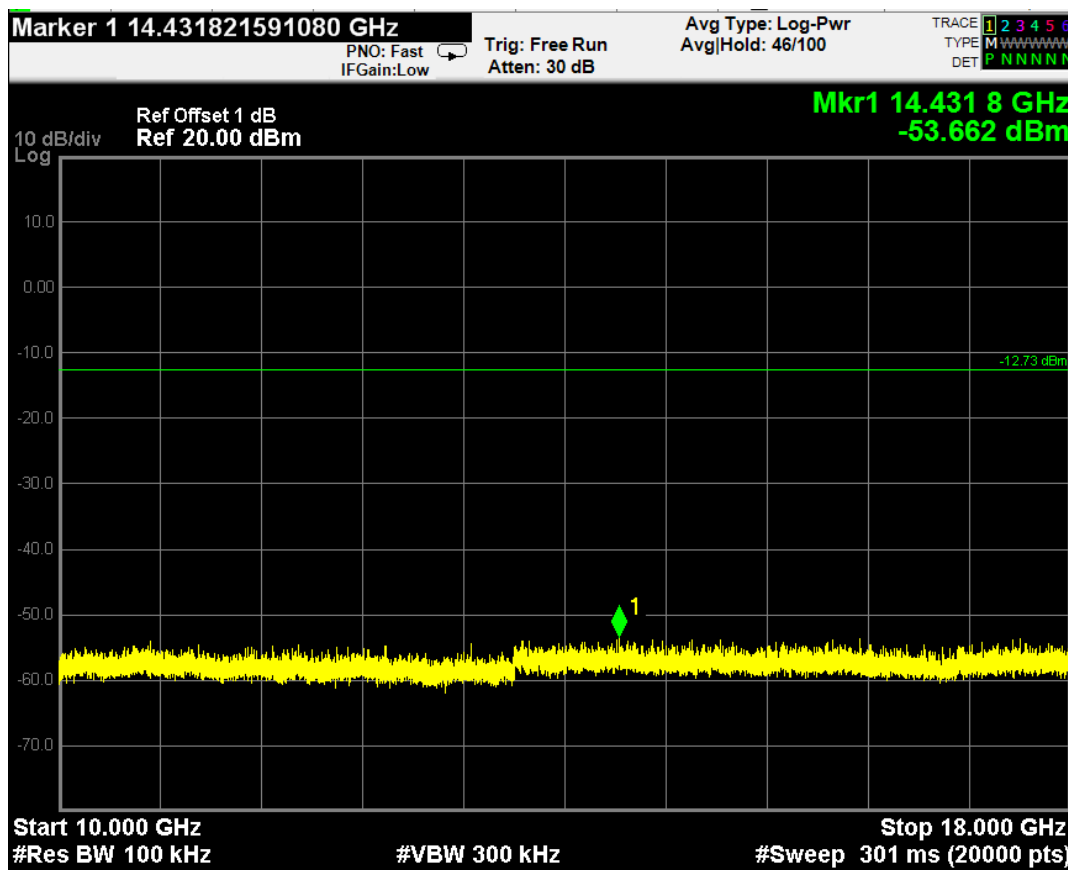


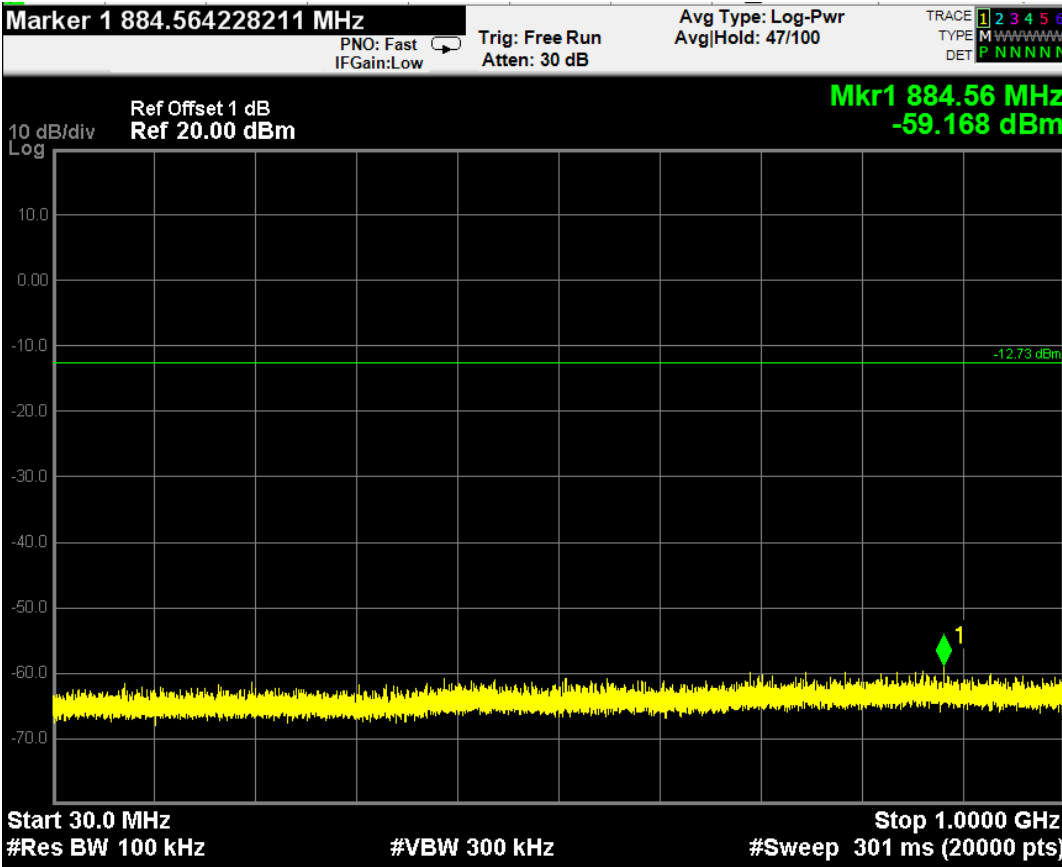


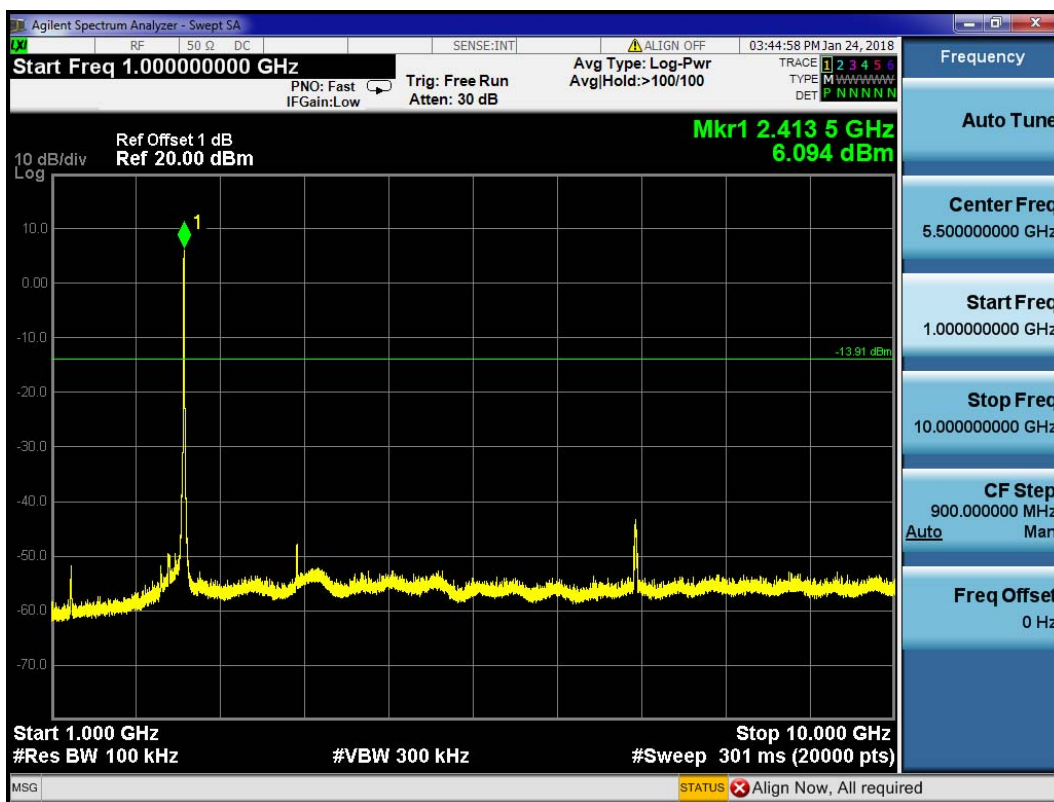
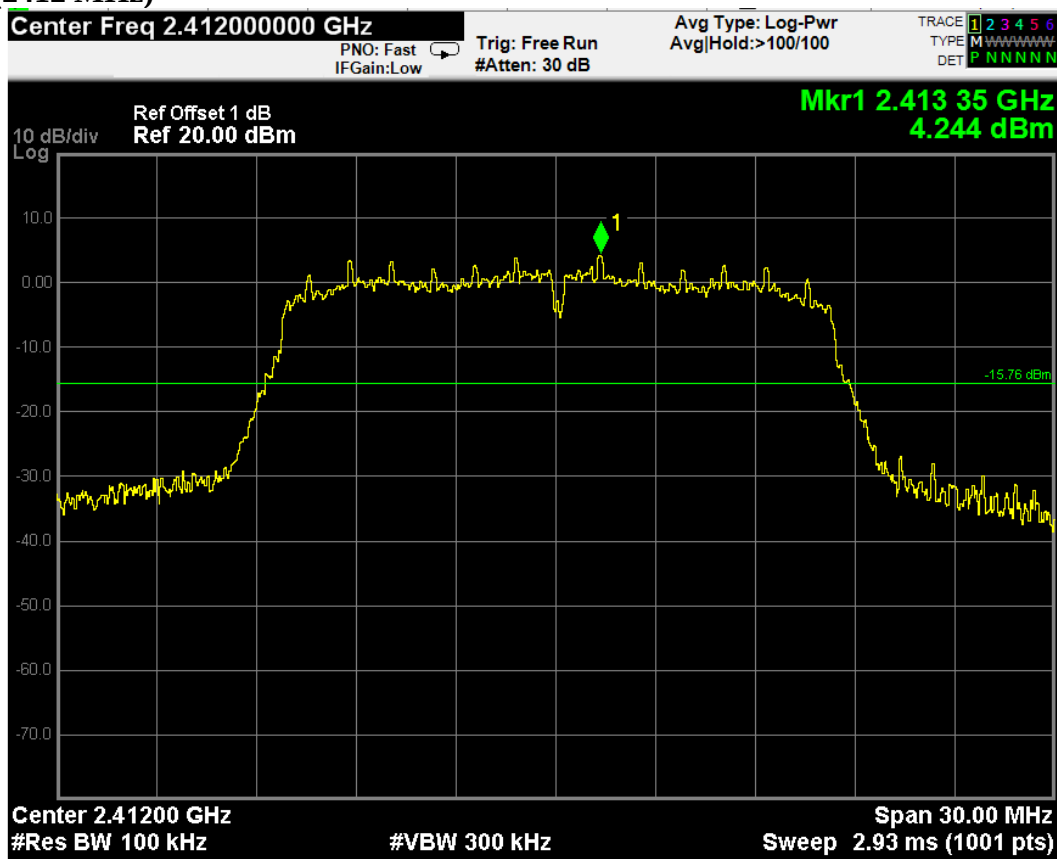


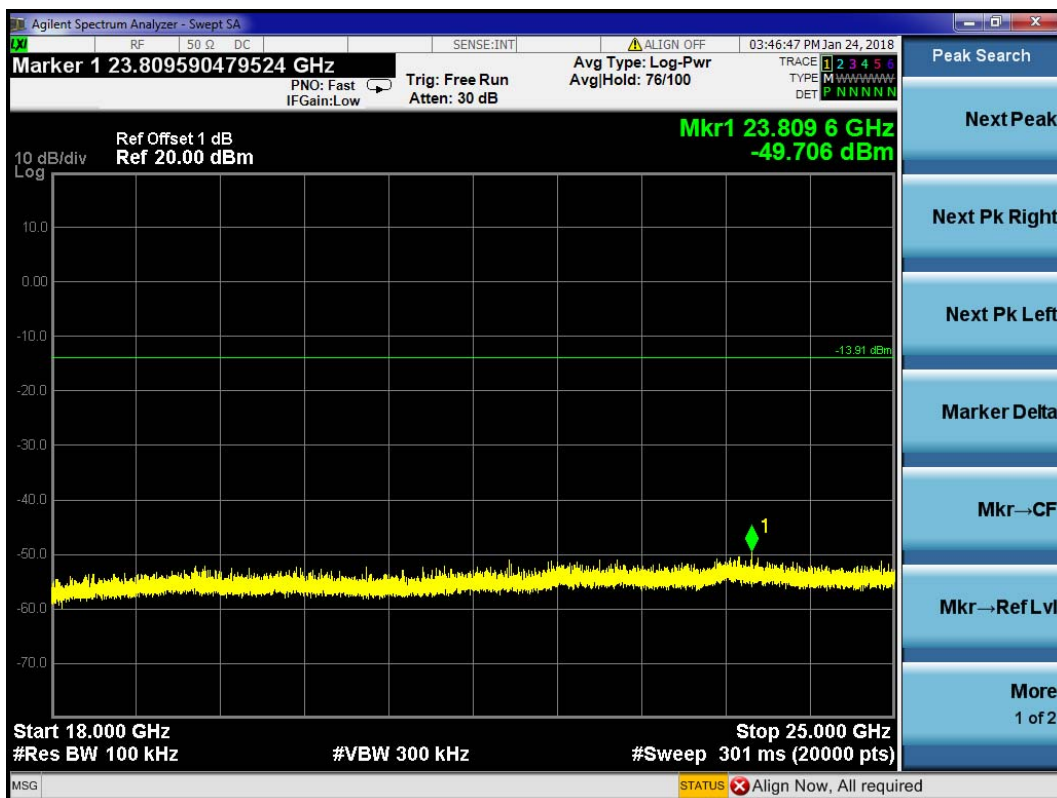
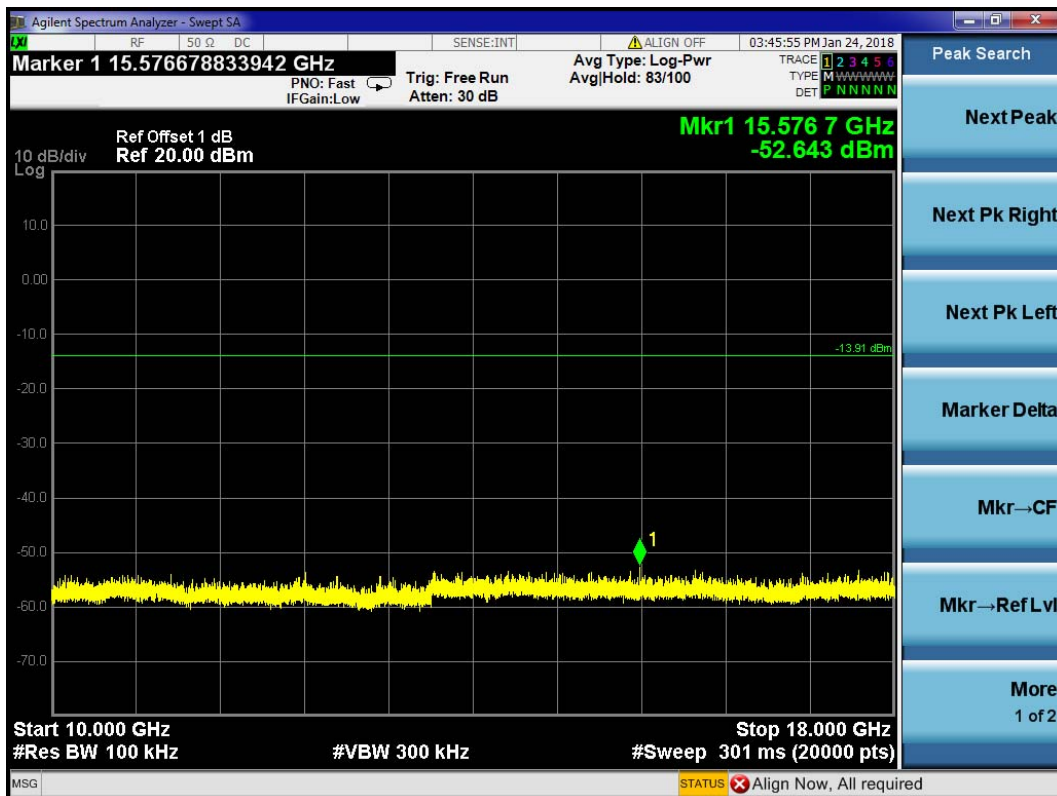
CH11 (2462 MHz)

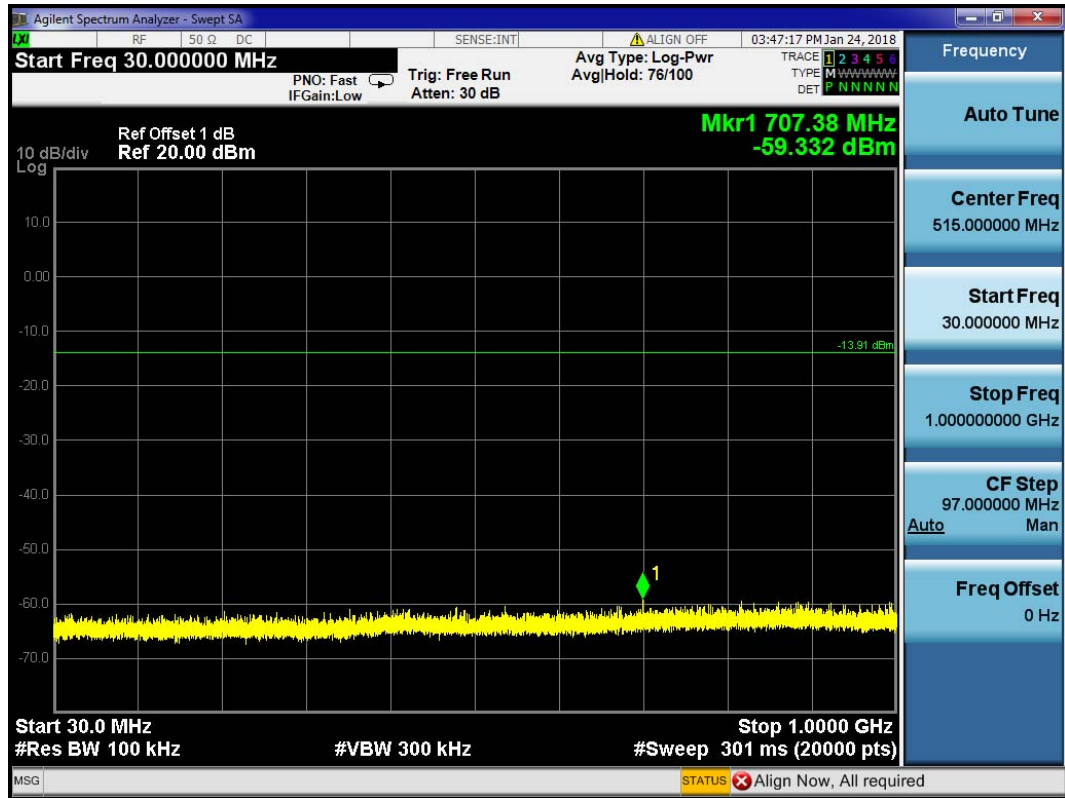




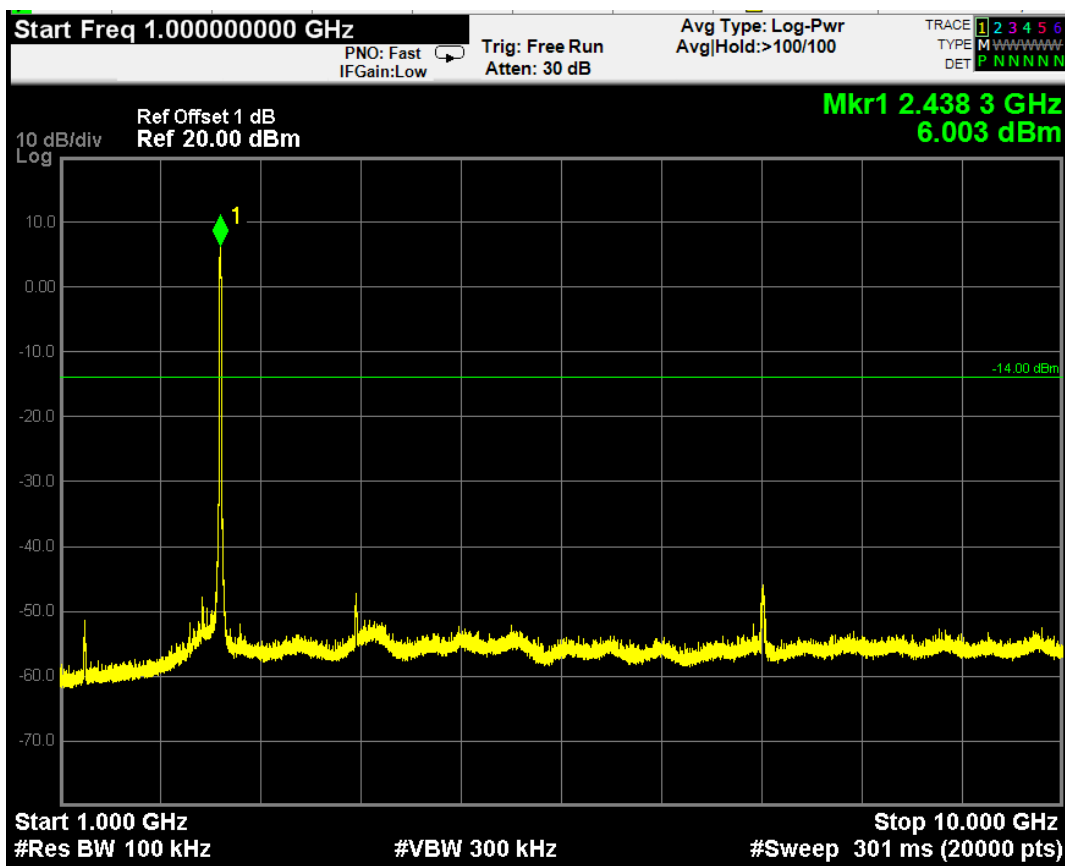
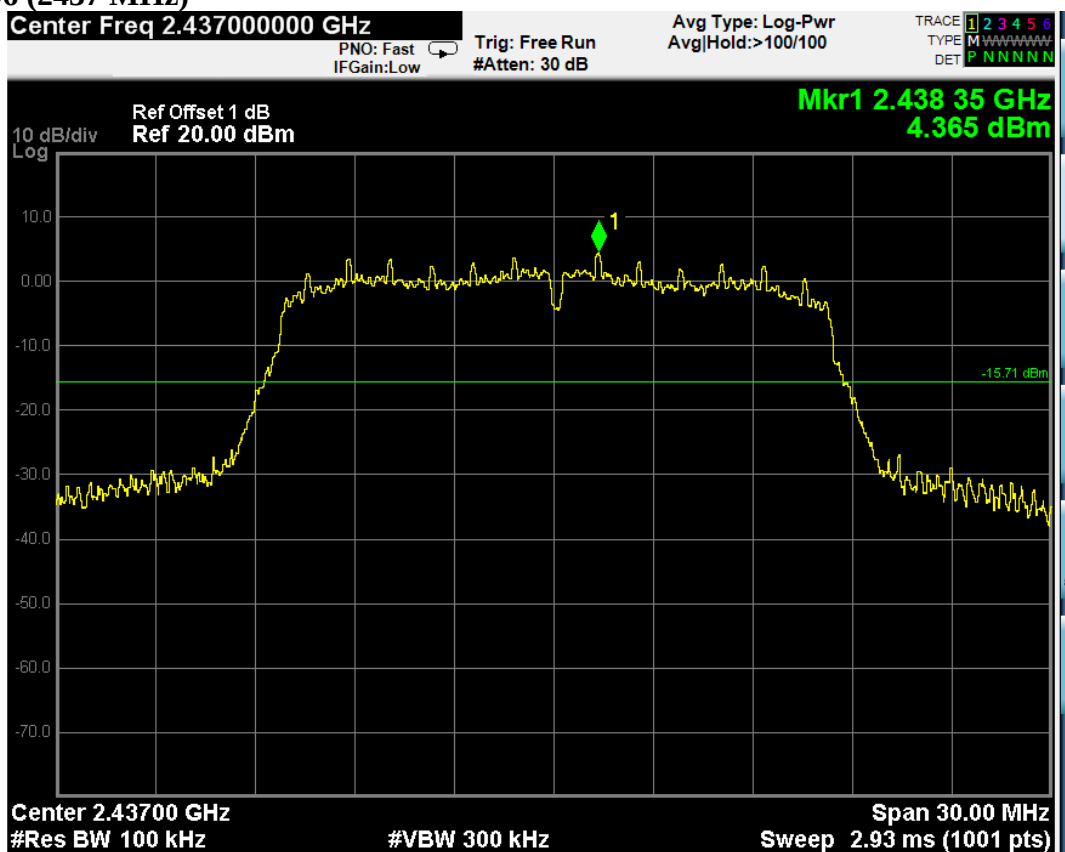


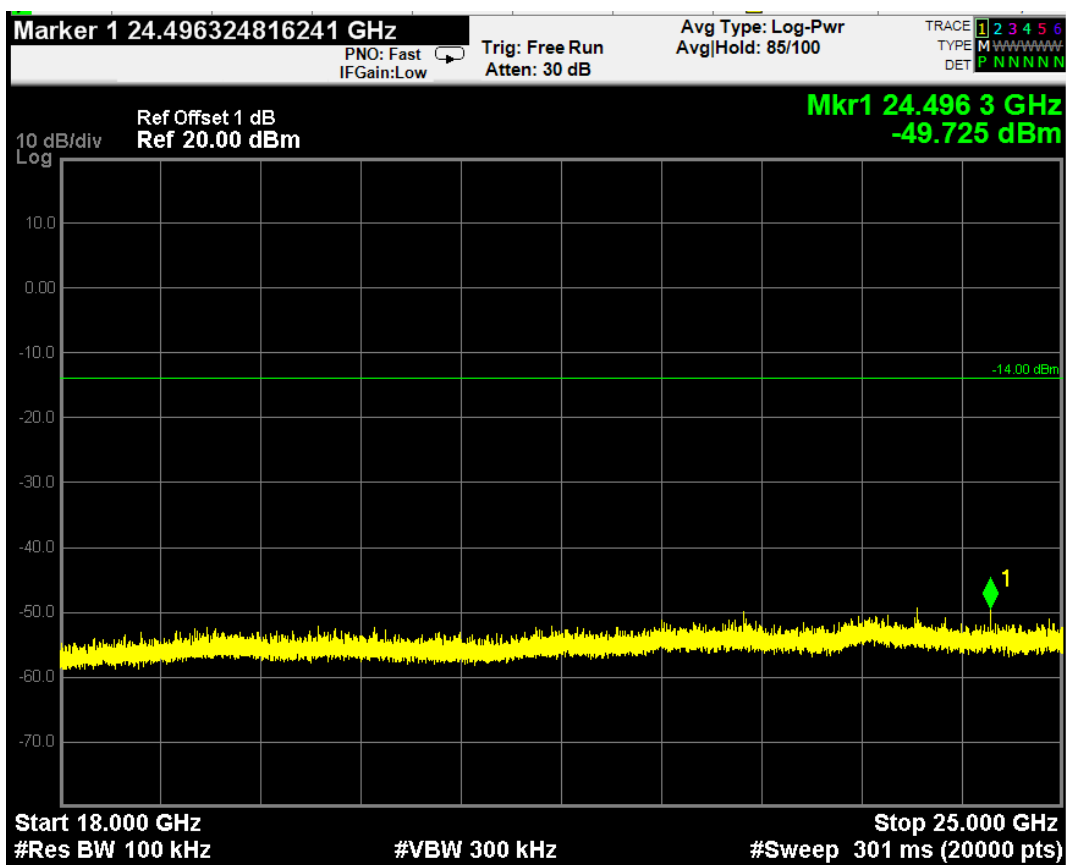
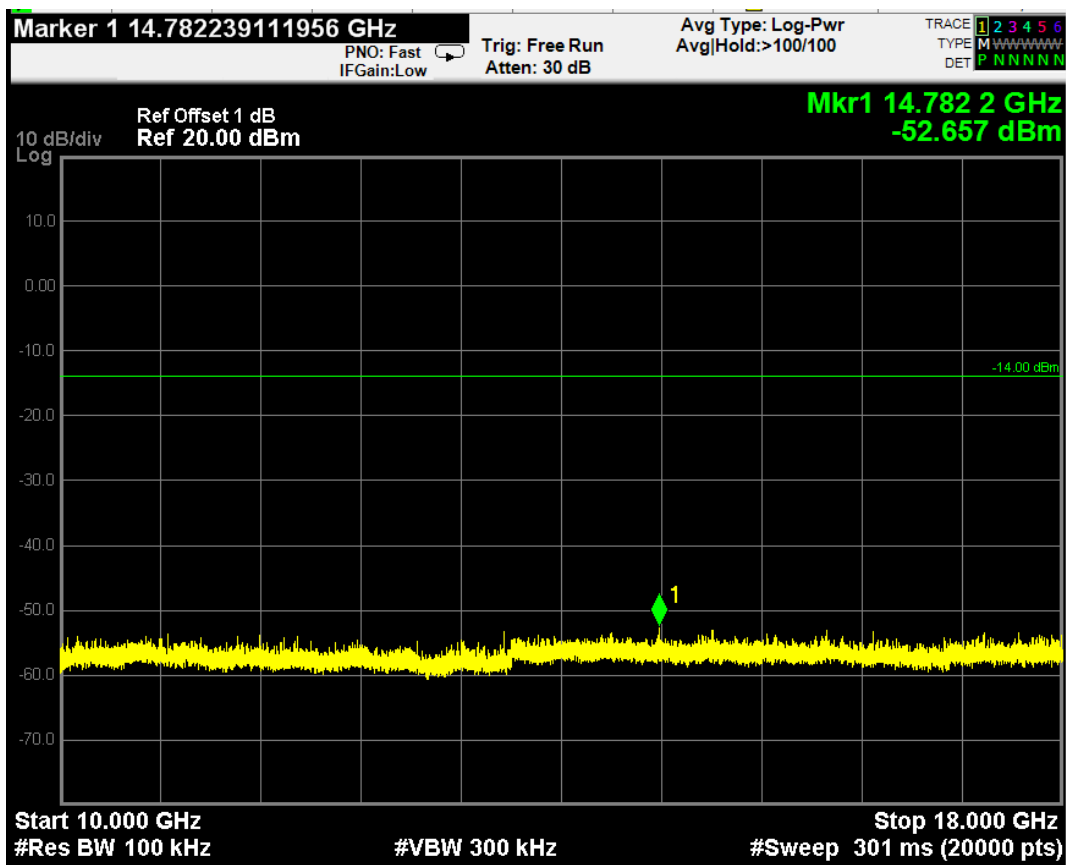
802.11g
CH01 (2412 MHz)

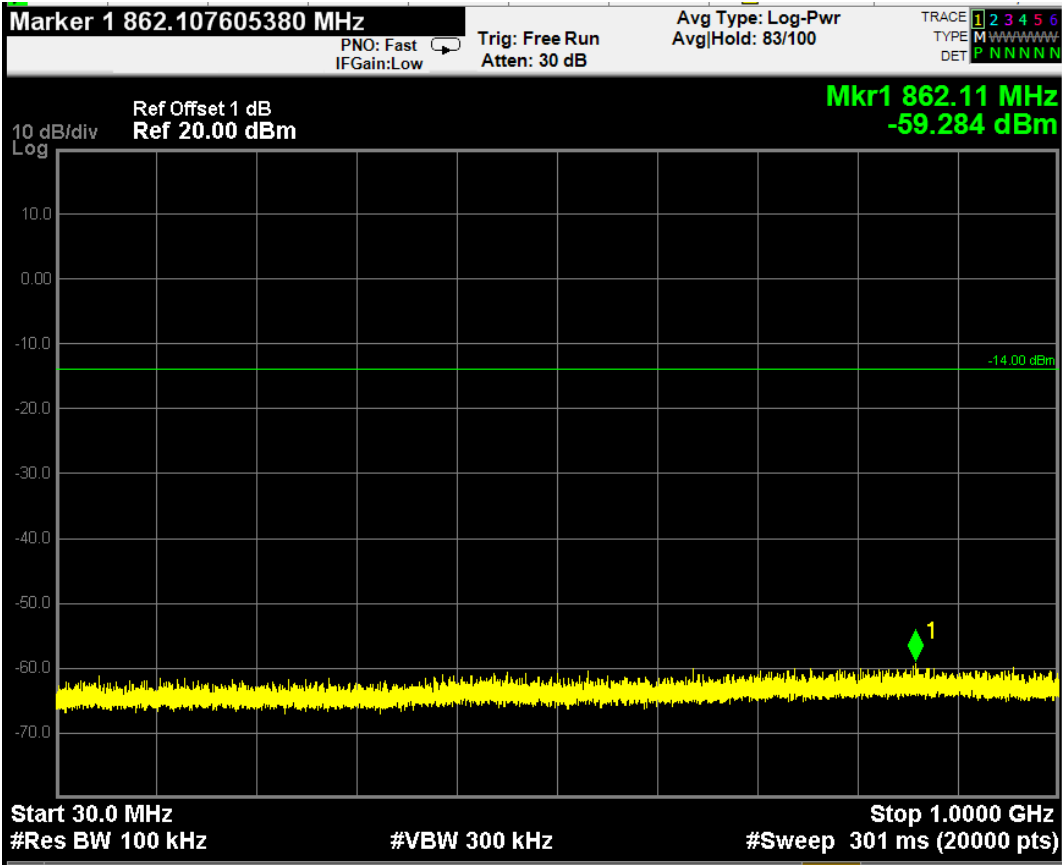




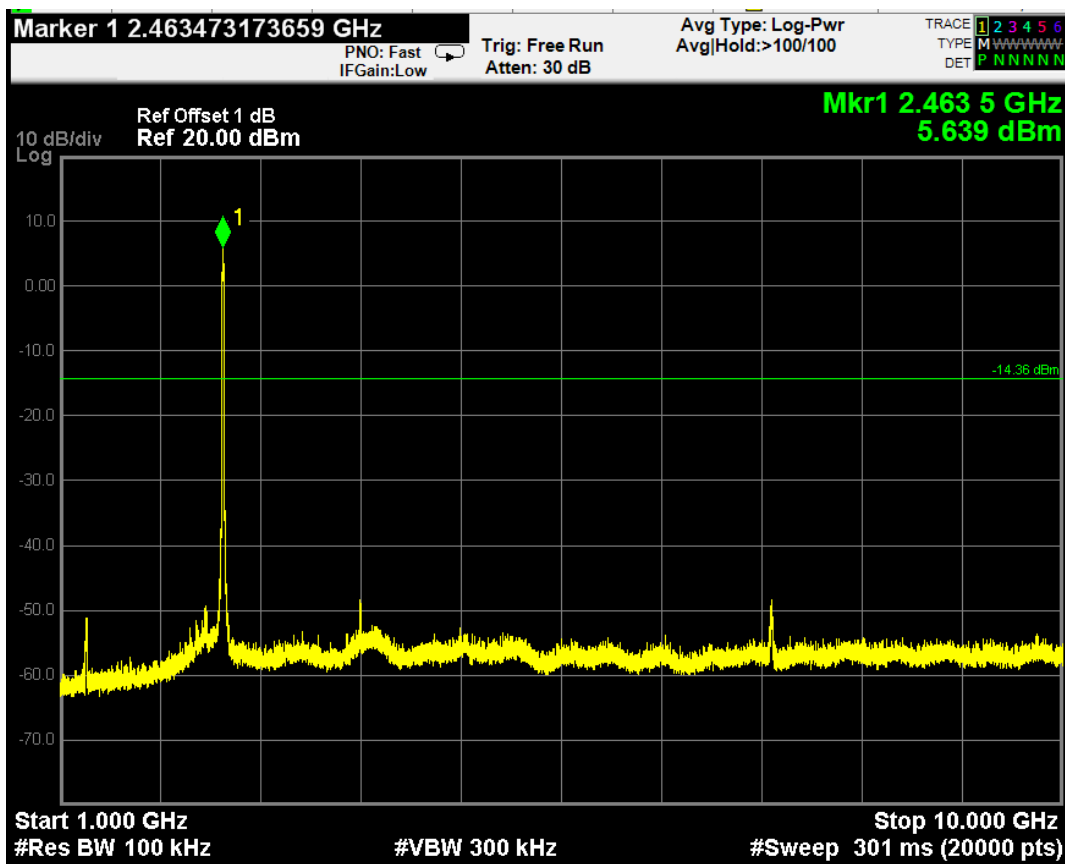
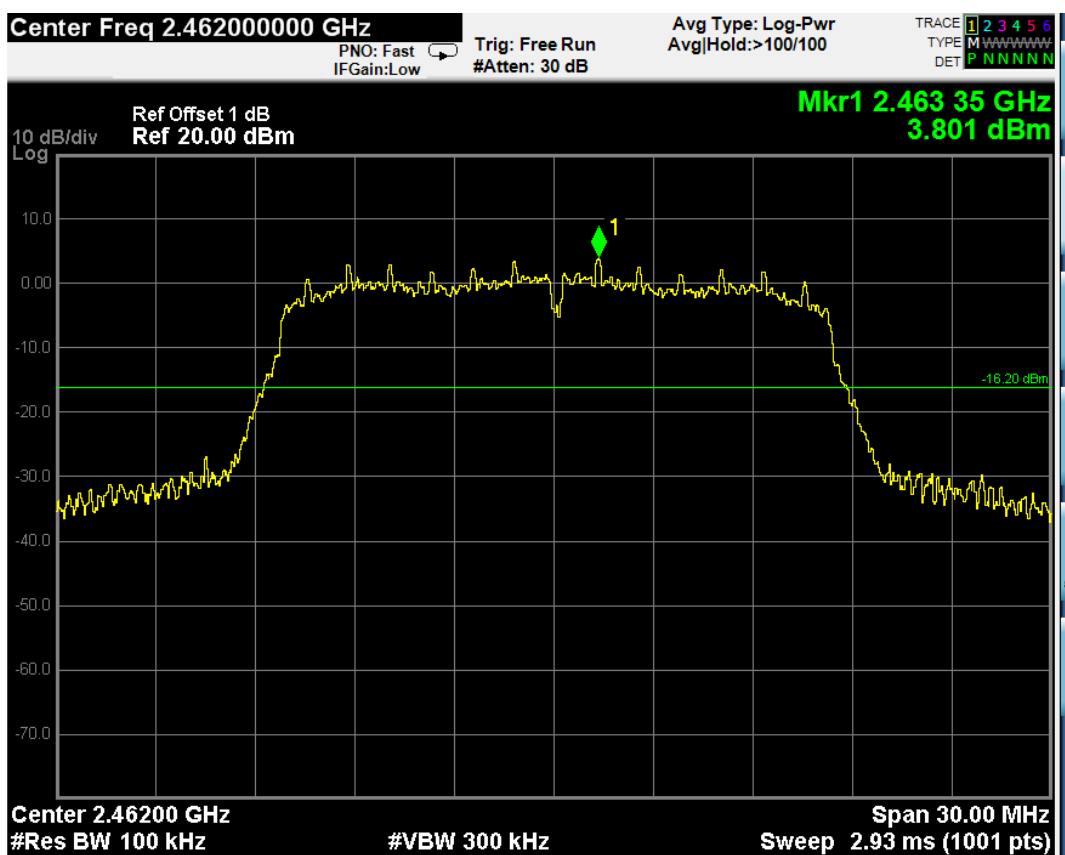
CH06 (2437 MHz)

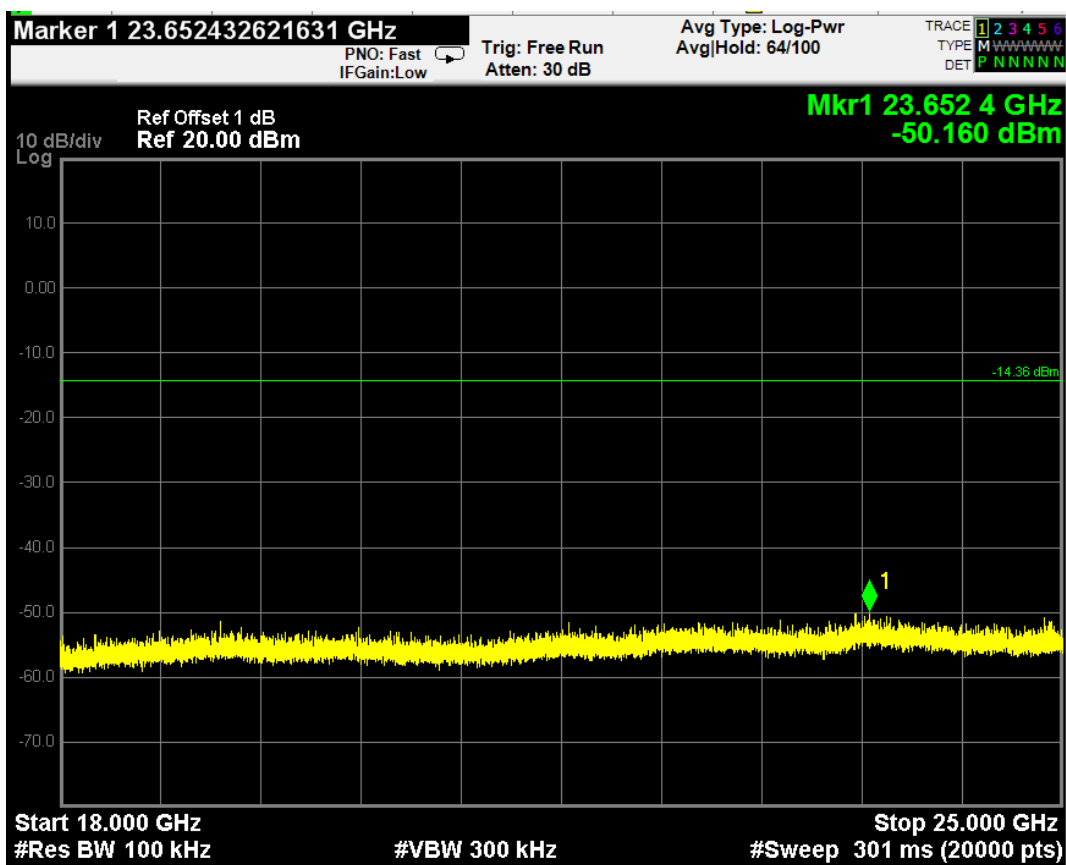
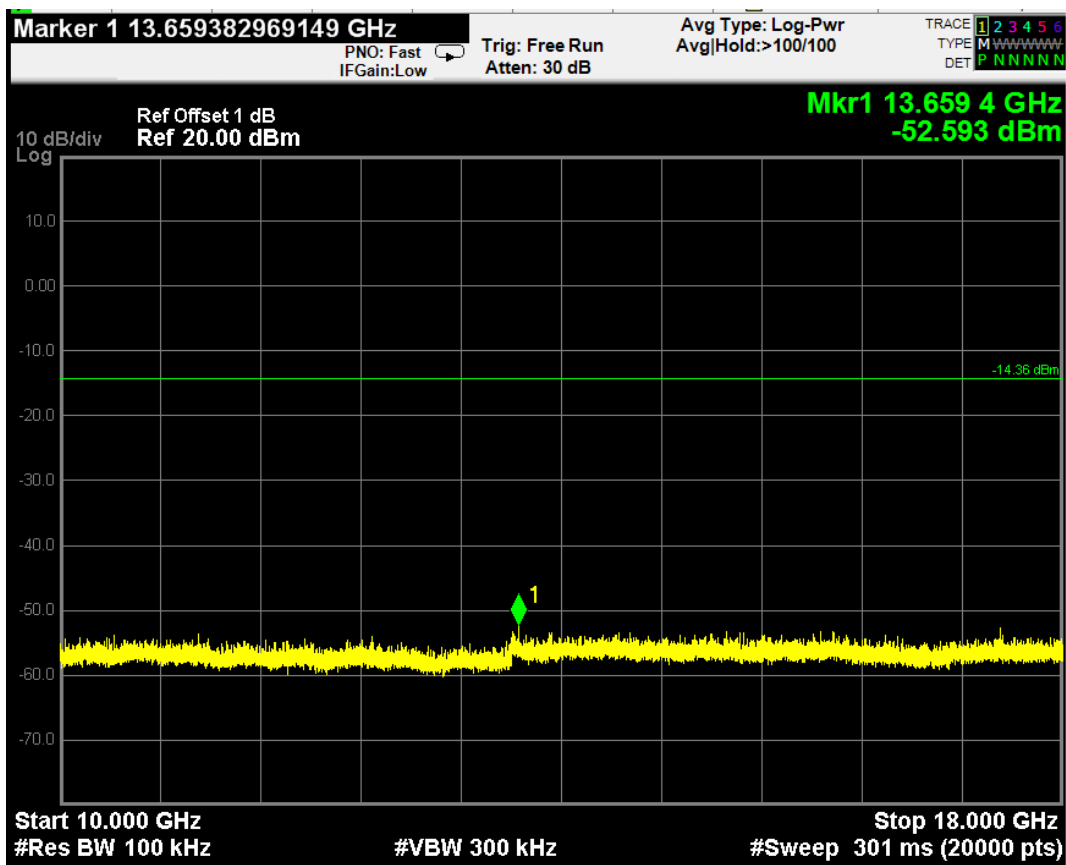


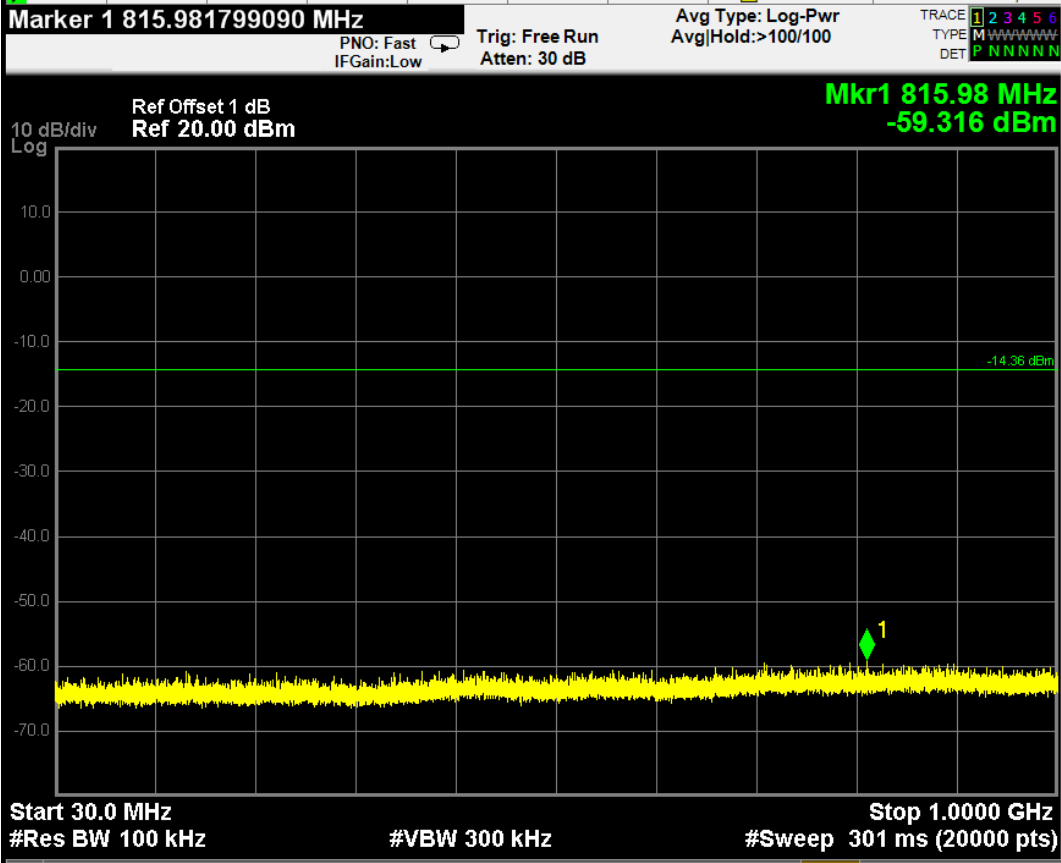




CH11 (2462 MHz)

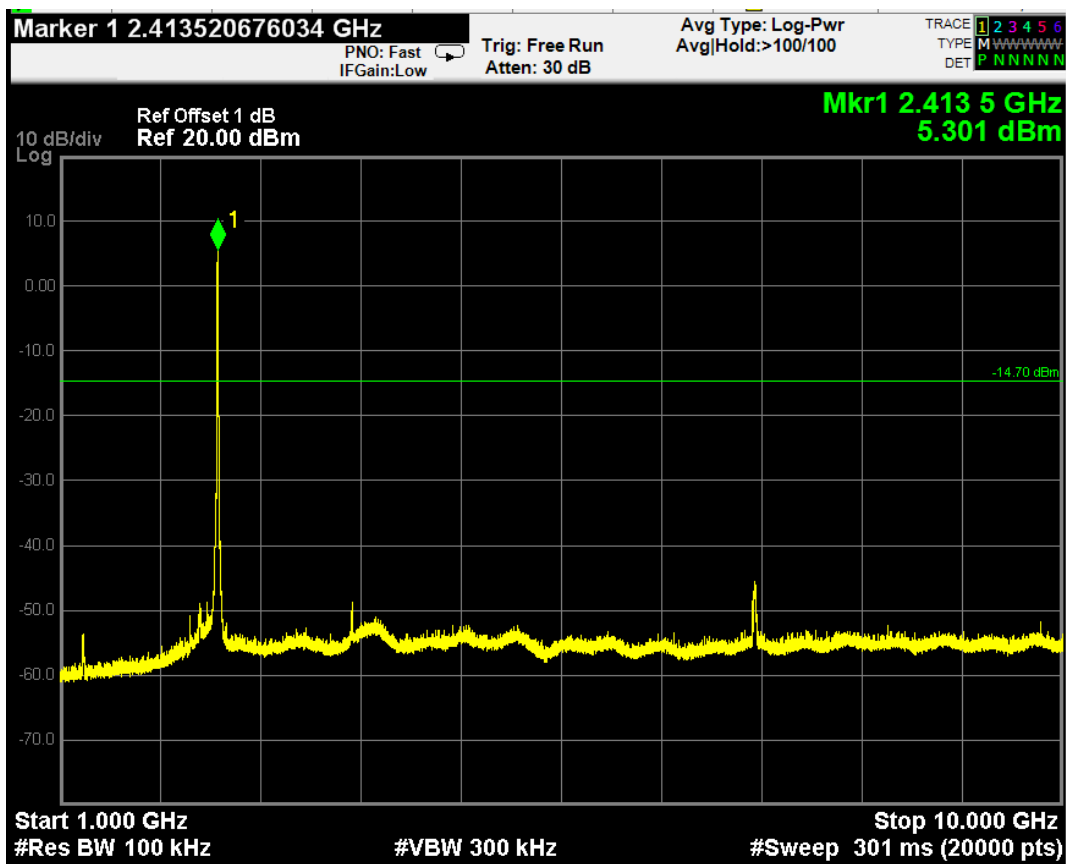
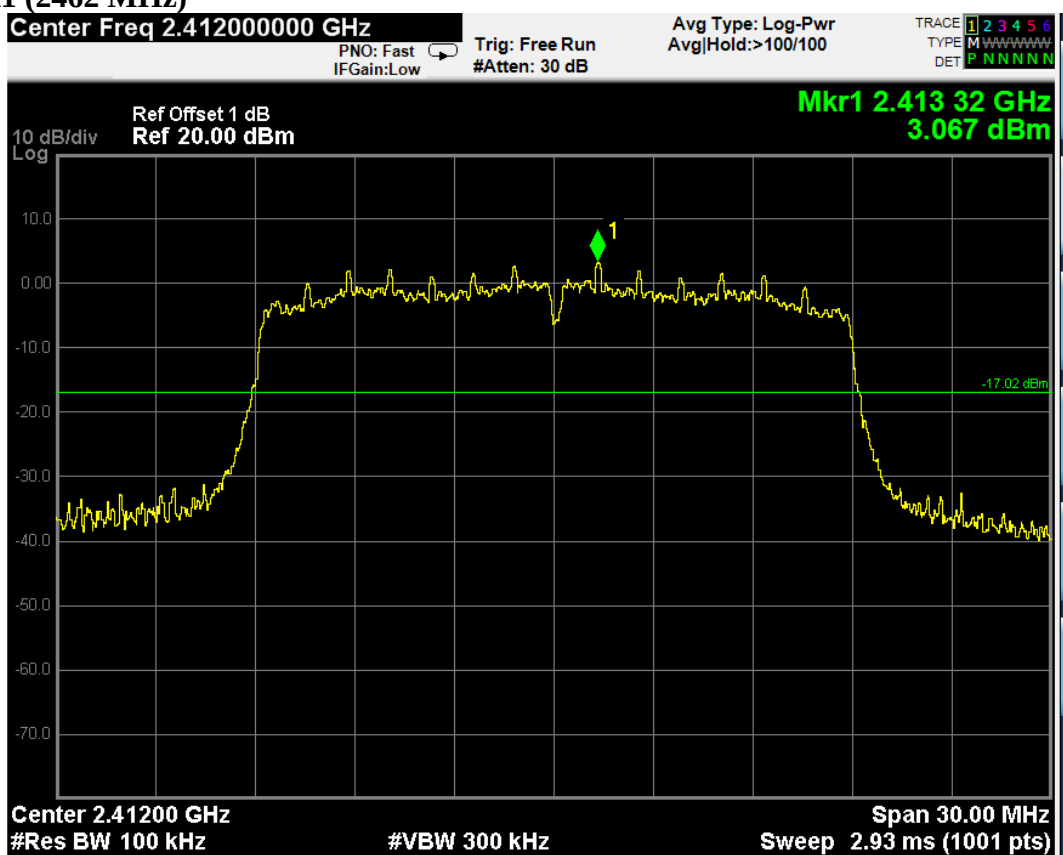


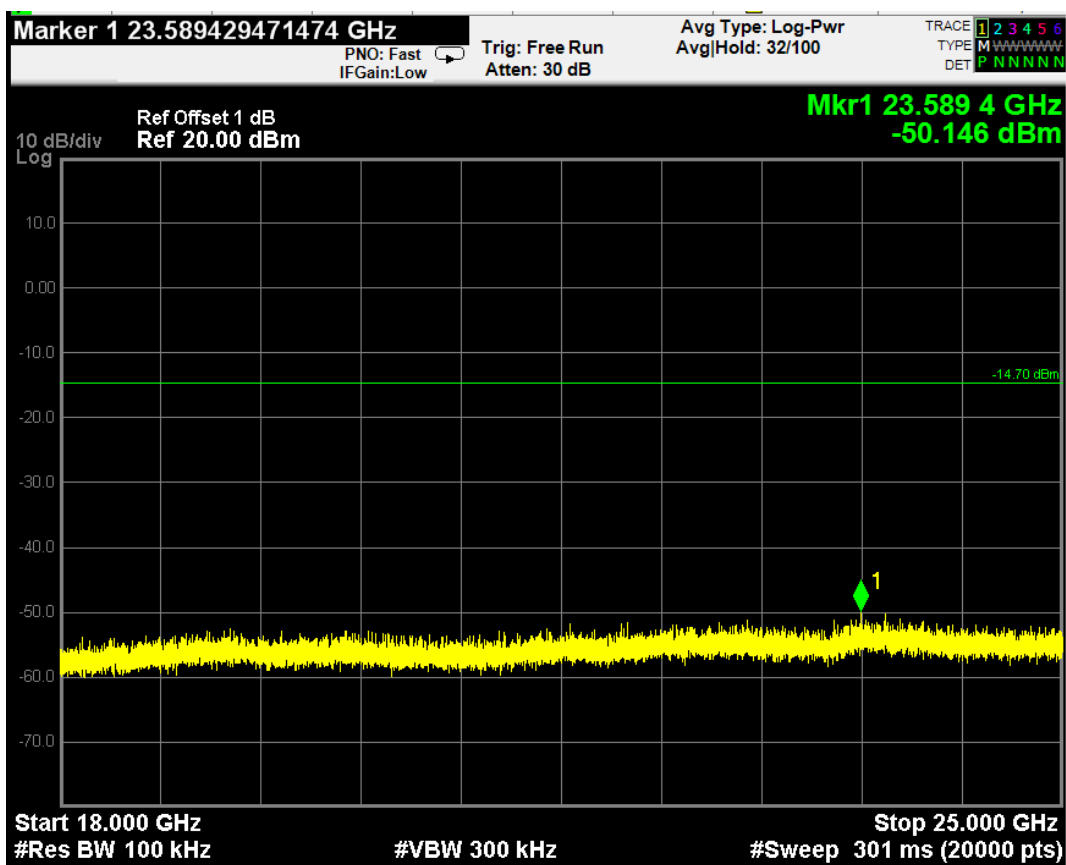
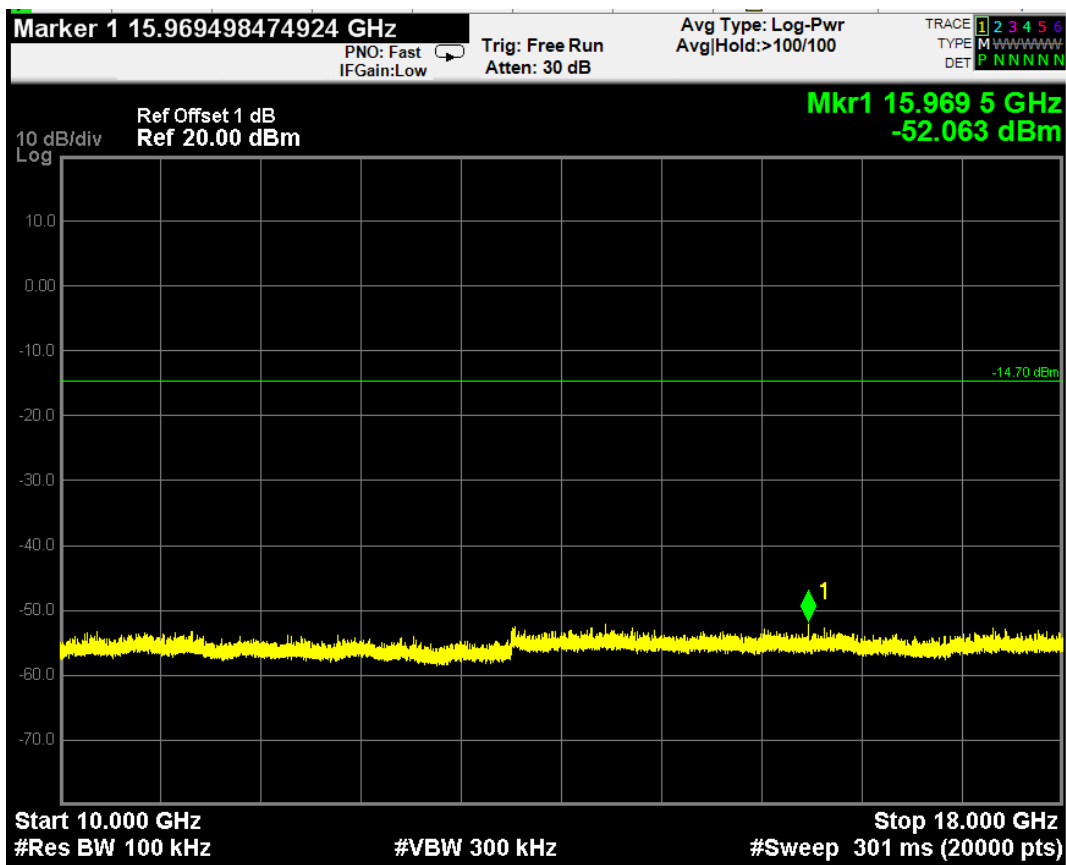


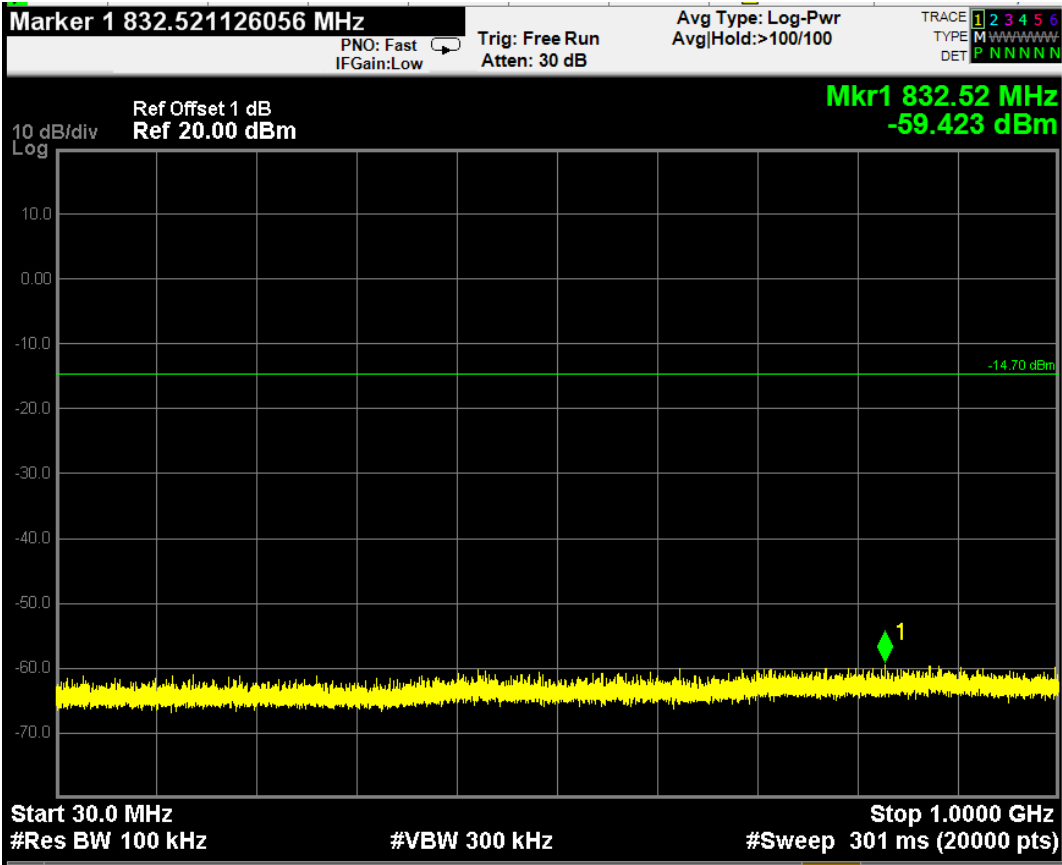


802.11n

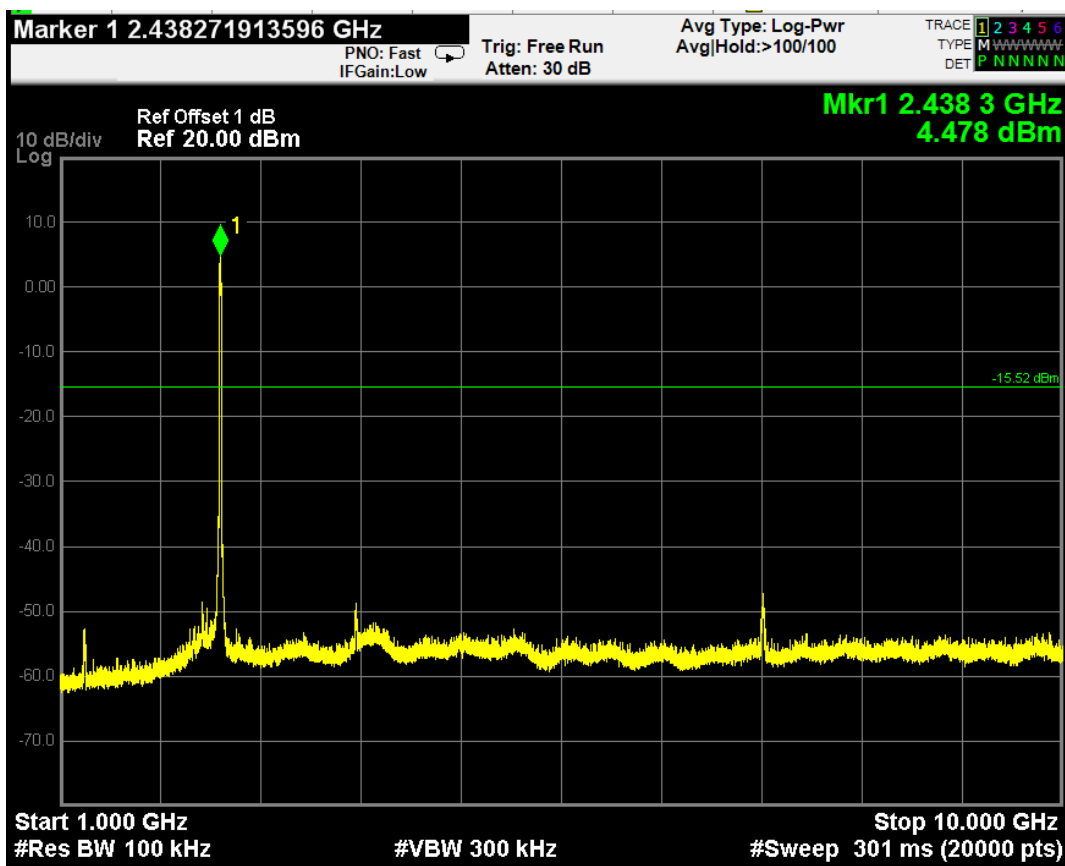
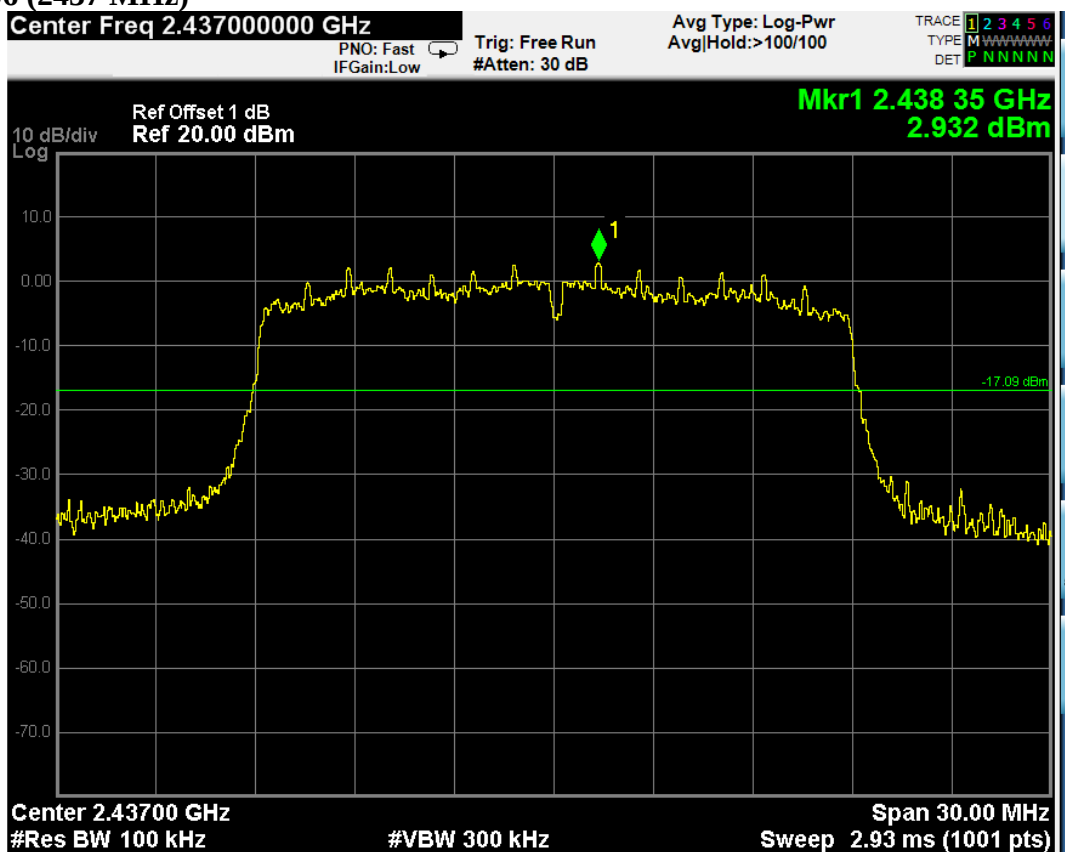
CH11 (2462 MHz)

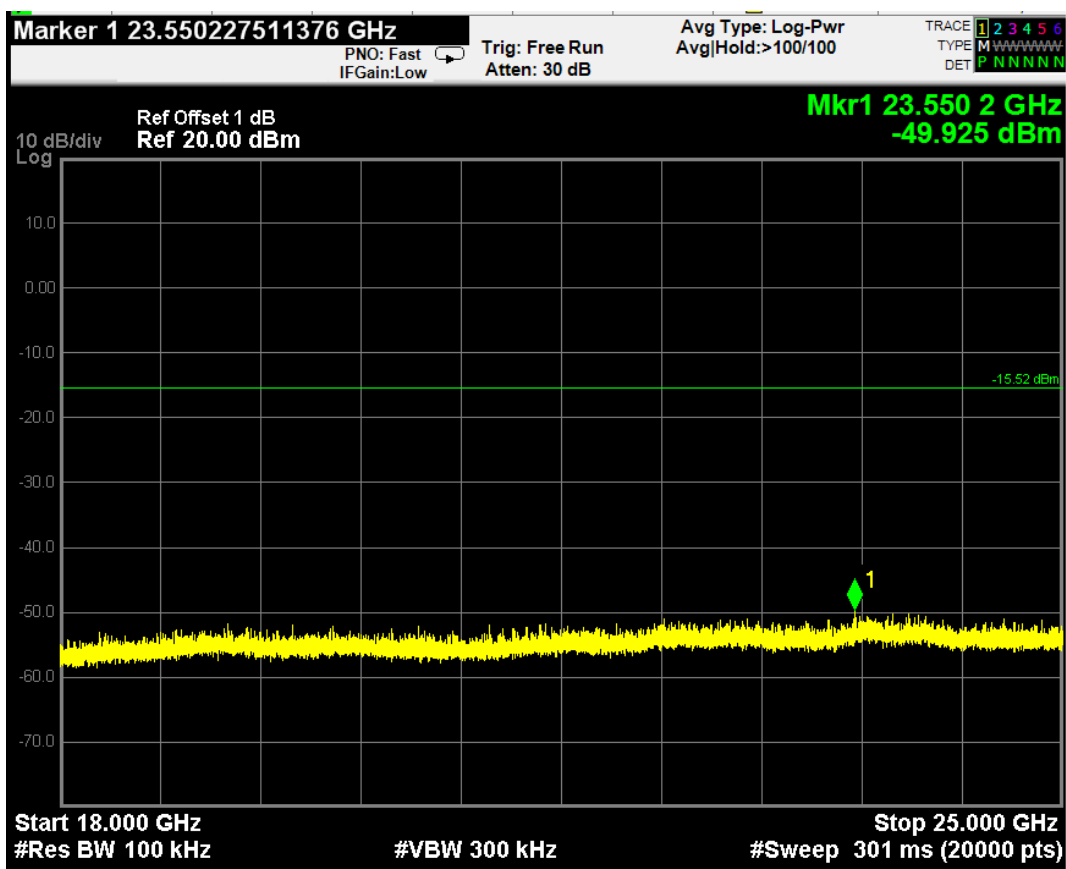
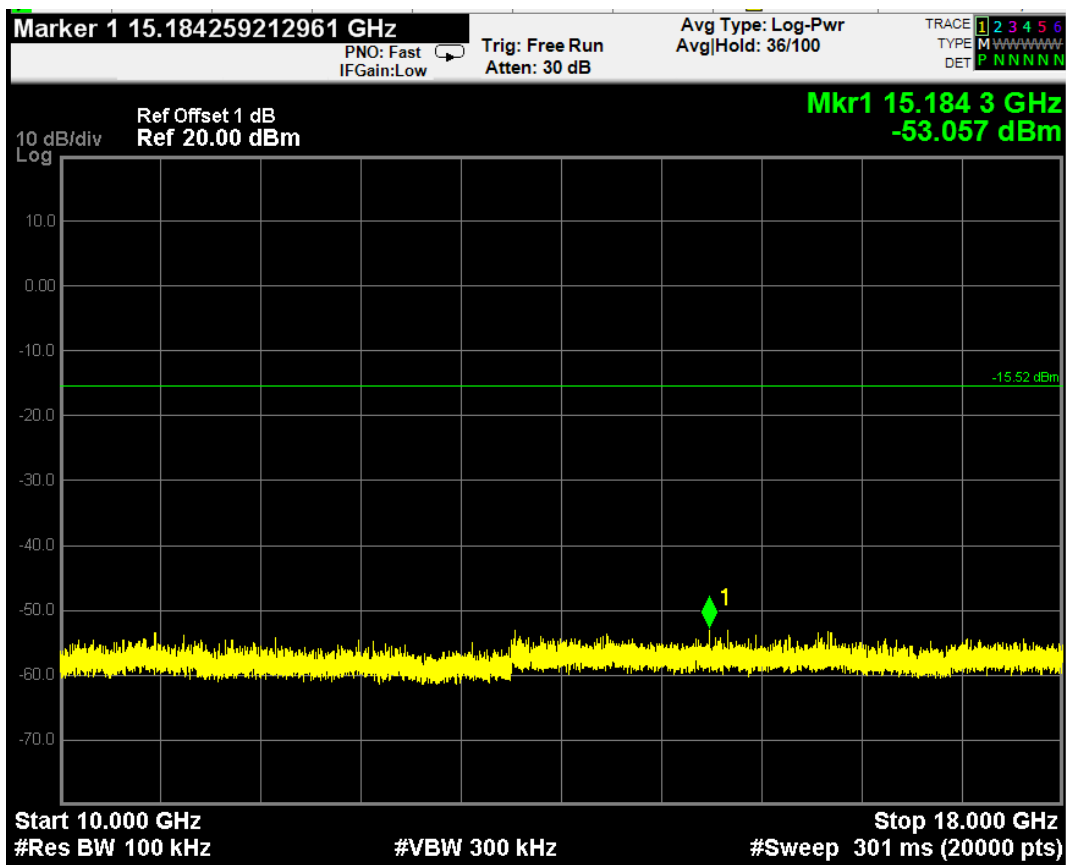


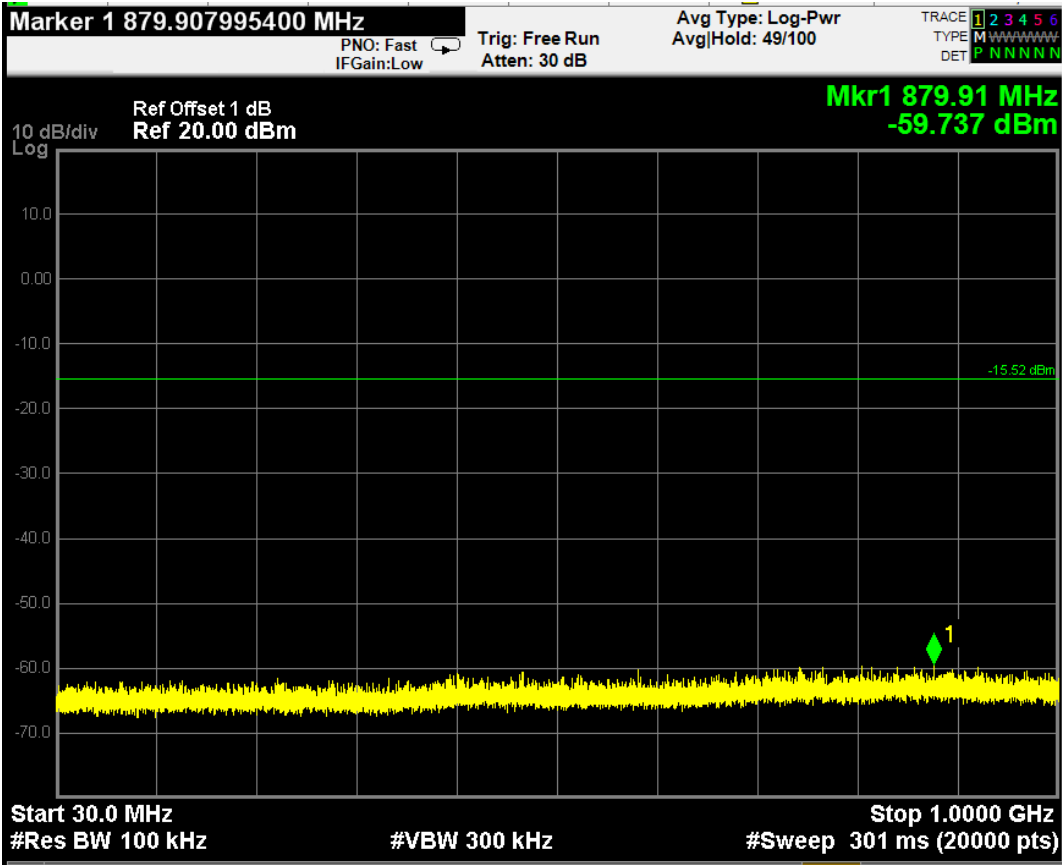




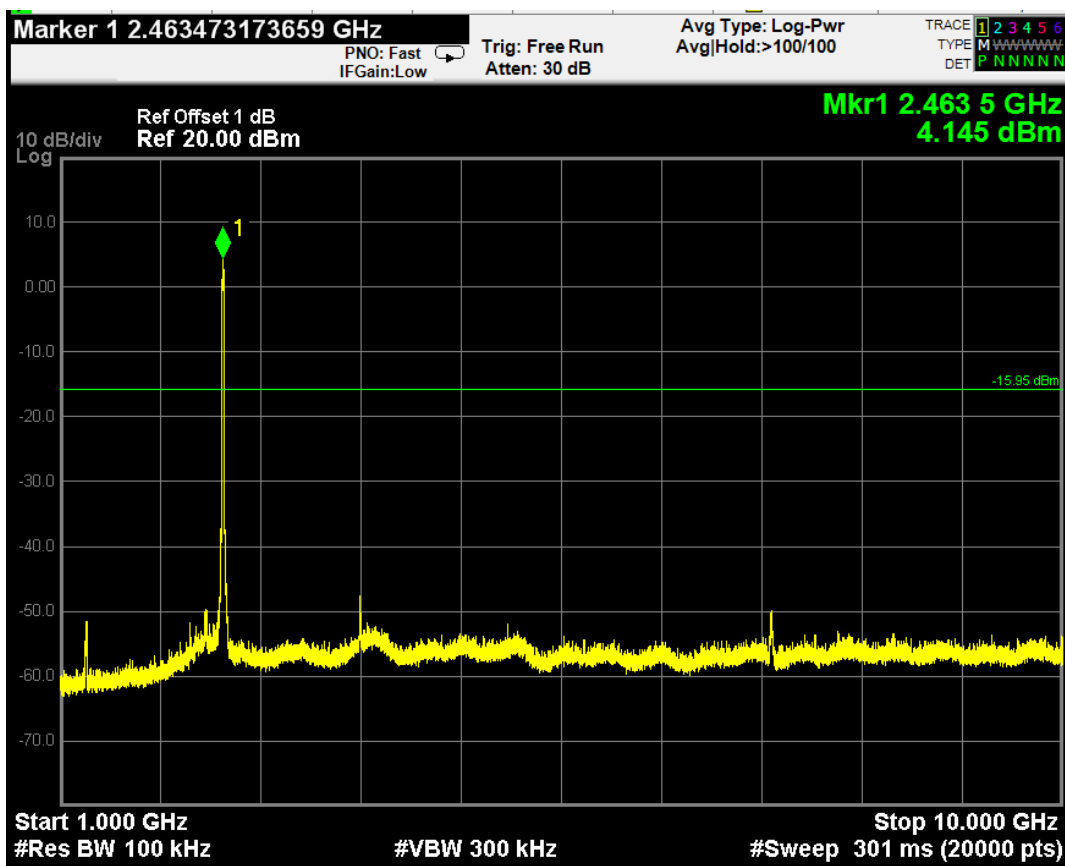
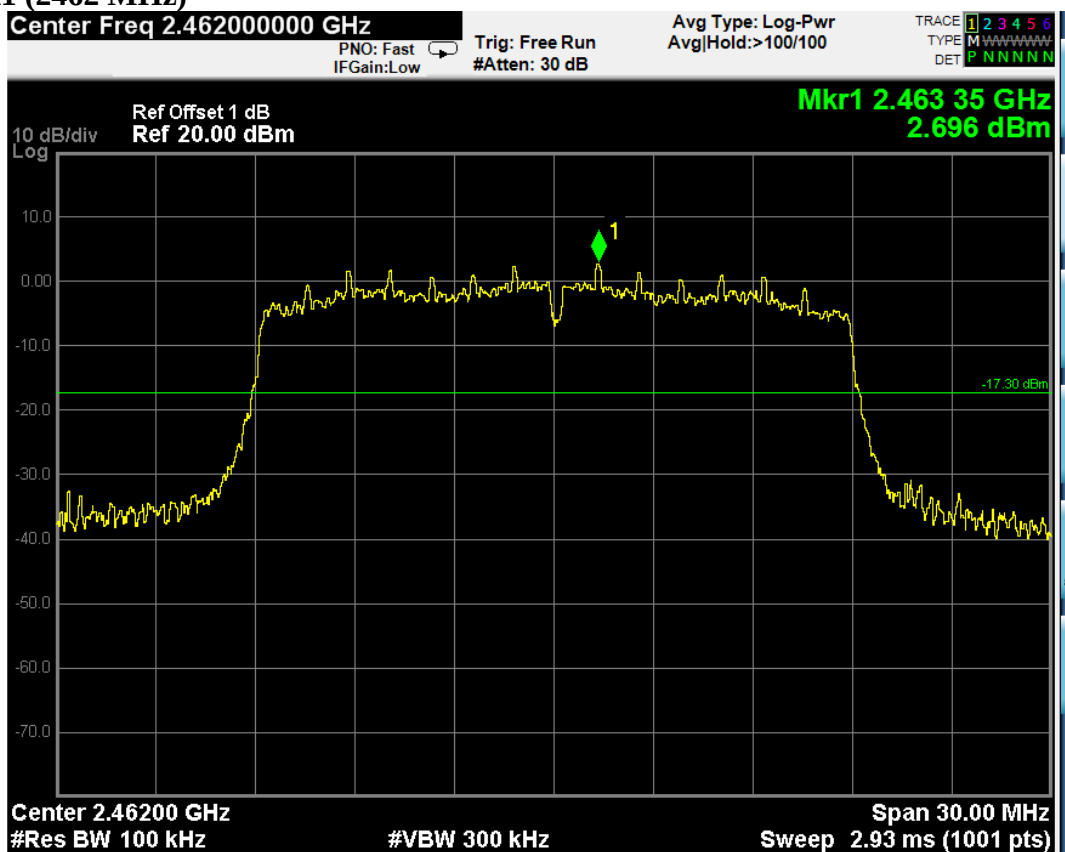
CH06 (2437 MHz)

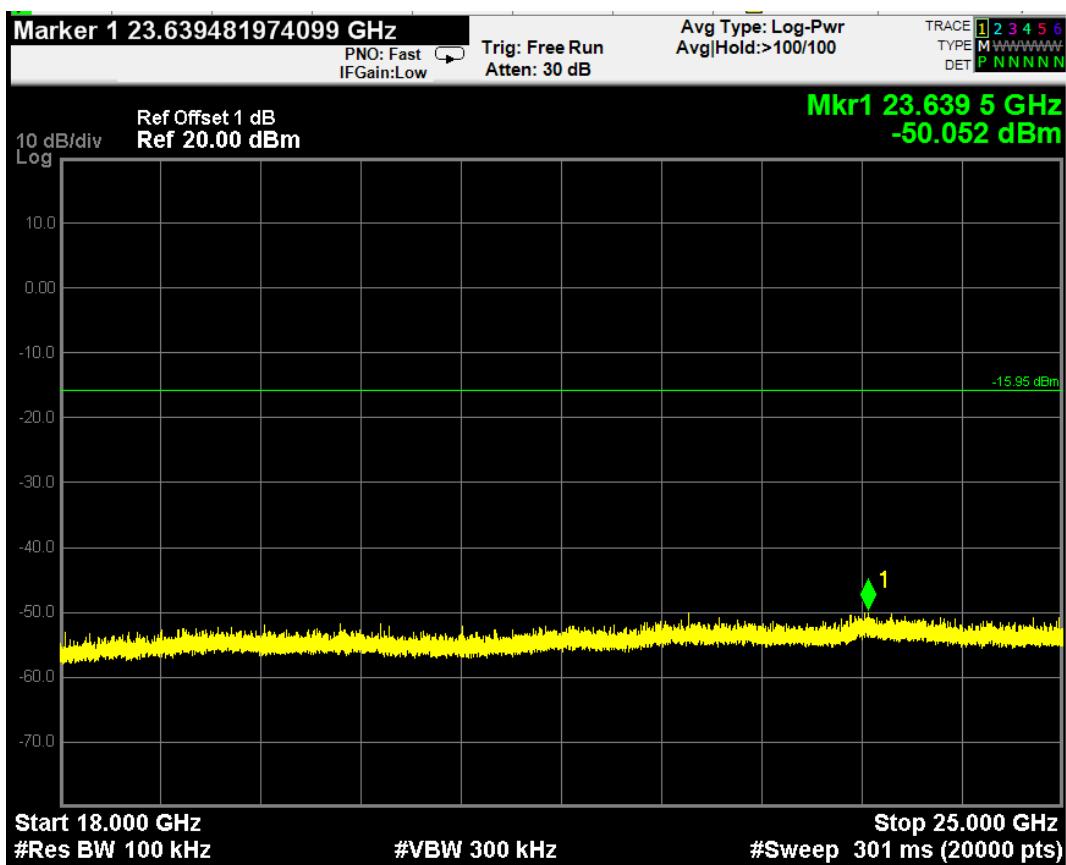
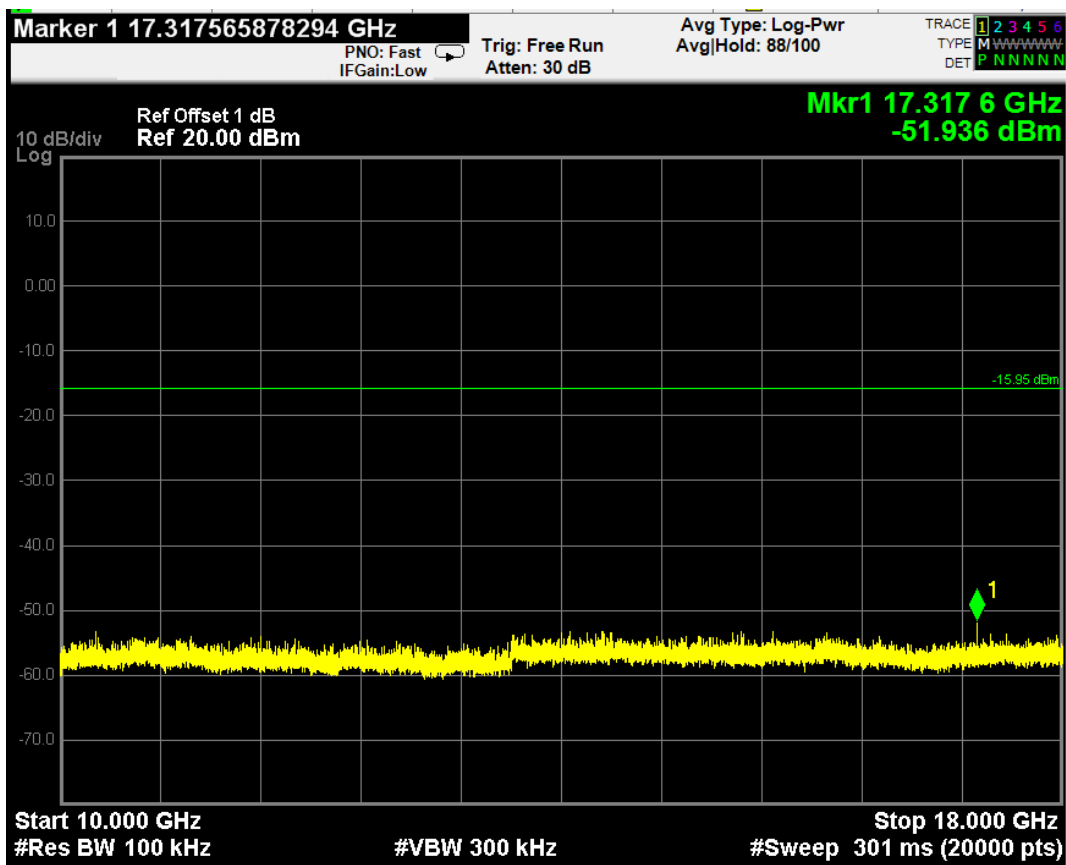


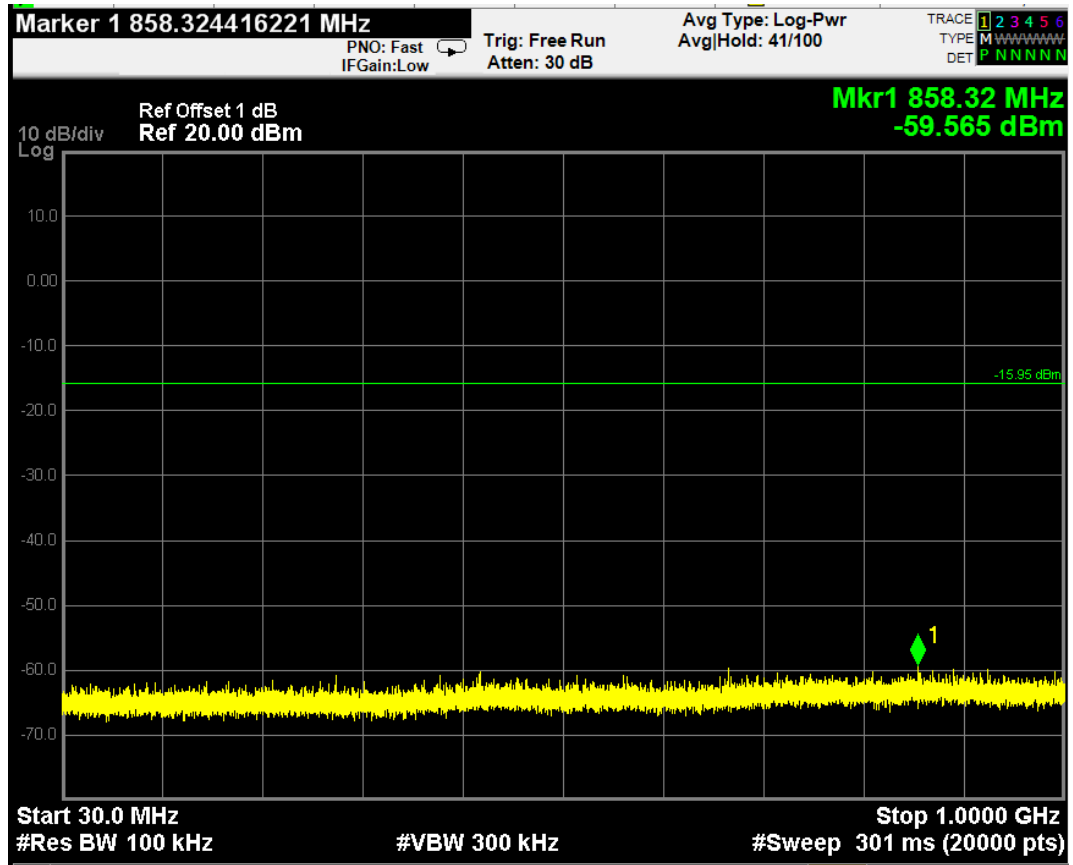




CH11 (2462 MHz)







8 BAND EDGES MEASUREMENT

8.1 Test Equipment

The following test equipment was used during the band edges measurement:

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Spectrum Analyzer	Agilent	N9010A	MY52221182	May 25, 2017	May 24, 2018

8.2 Block Diagram of Test Setup

The Same as section.4.2.

8.3 Specification Limits (§15.247(d))

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits.

8.4 Operating Condition of EUT

The switch ON/OFF was used to enable the EUT to change the channel one by one.

8.5 Test Procedure

The transmitter output was connected to the Test Receiver. Set RBW of Test Receiver to 100kHz and VBW to 300kHz with suitable frequency span including 100kHz bandwidth from band edge.

The test procedure is defined in ANSI C63.10-2013 (11.11.3 Emission level measurement was used).

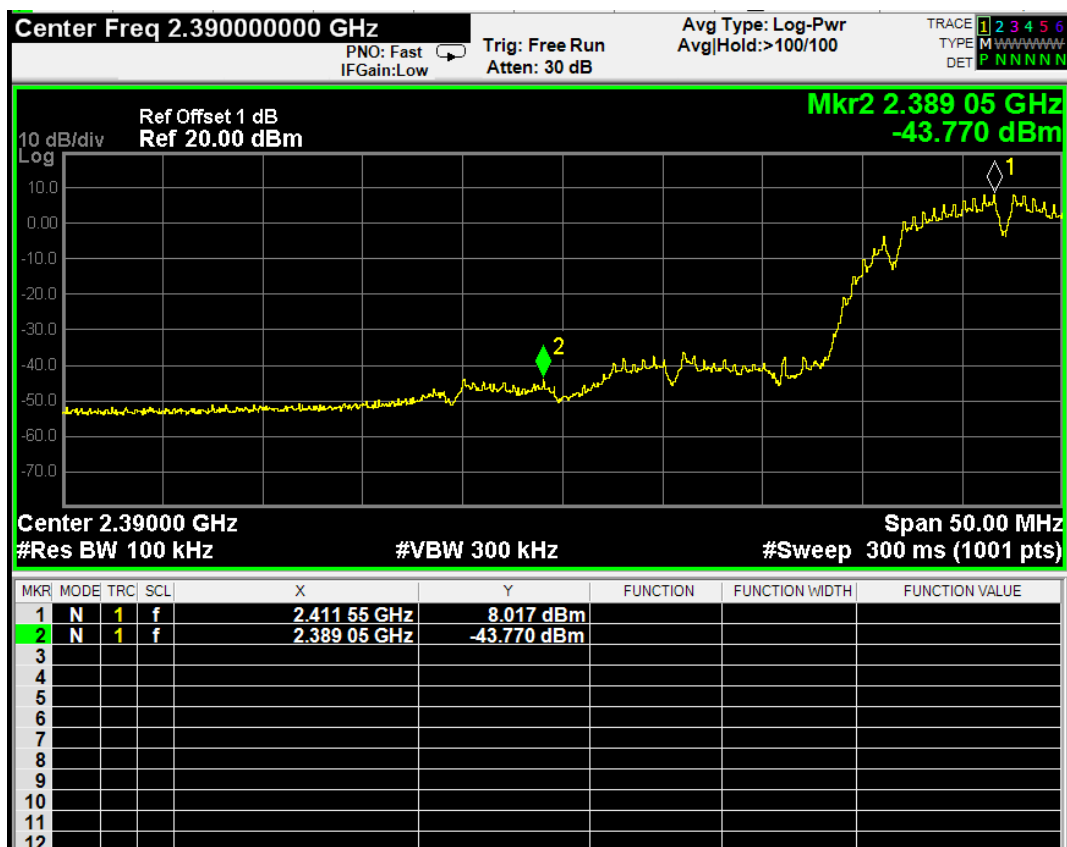
8.6 Test Results

PASSED. All the test results are attached in next pages.

(Test Date: 2018.01.15 Temperature: 22°C Humidity: 52 %)

Modulation	Location	Channel	Frequency	Delta Marker	Result
802.11b	Below Band Edge	01	2412 MHz	43.770 dB	More than 20 dB below the highest level of the desired power
	Upper Band Edge	11	2462 MHz	52.176 dB	
802.11g	Below Band Edge	01	2412 MHz	38.899 dB	
	Upper Band Edge	11	2462 MHz	43.635 dB	
802.11n	Below Band Edge	01	2412 MHz	42.733 dB	
	Upper Band Edge	11	2462 MHz	45.424 dB	

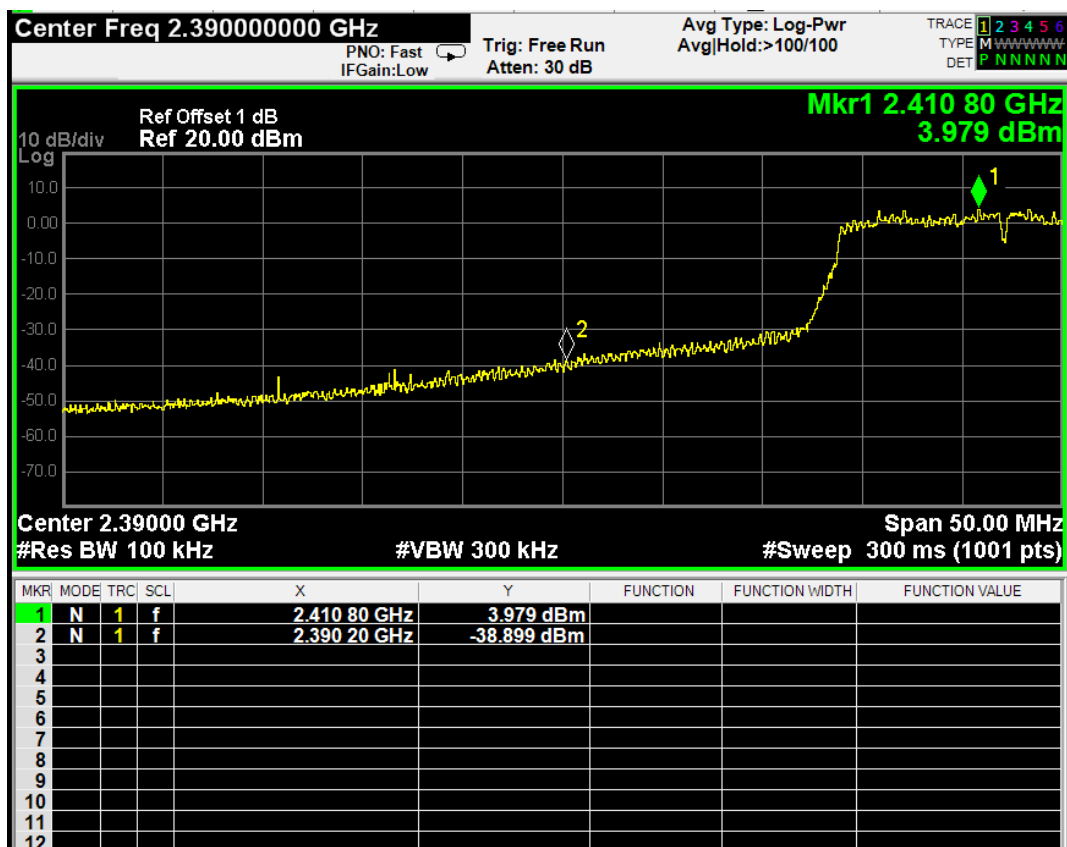
802.11b CH01 2412MHz (Below Edge 2390 MHz)



CH11 2462MHz (Upper Edge 2483.5 MHz)



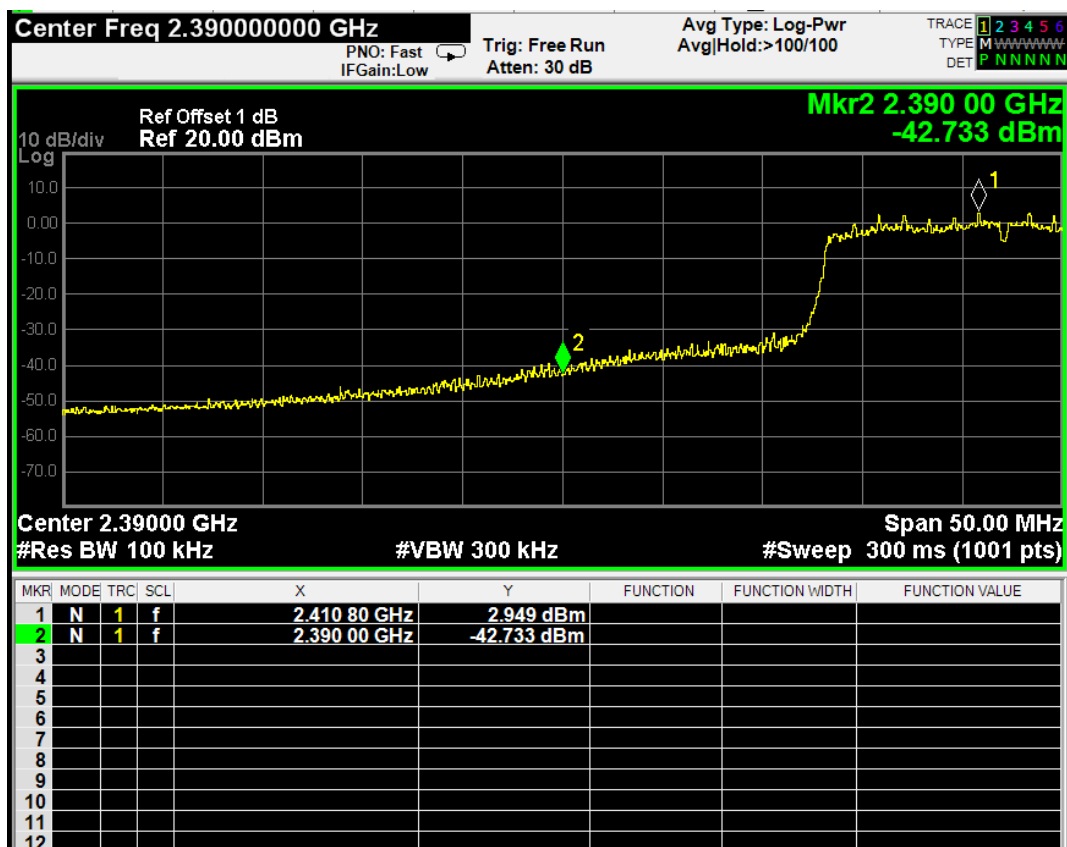
802.11g CH01 2412MHz (Below Edge 2390 MHz)



CH11 2462MHz (Upper Edge 2483.5 MHz)



802.11n CH01 2412MHz (Below Edge 2390 MHz)



CH11 2462MHz (Upper Edge 2483.5 MHz)



9 POWER SPECTRAL DENSITY MEASUREMENT

9.1 Test Equipment

The following test equipment was used during the power spectral density measurement:

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Spectrum Analyzer	Agilent	N9010A	MY52221182	May 25, 2017	May 24, 2018

9.2 Block Diagram of Test Setup

The Same as section 4.2.

9.3 Specification Limits (§15.247(e))

The peak power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band.

9.4 Operating Condition of EUT

The switch ON/OFF was used to enable the EUT to change the channel one by one.

9.5 Test Procedure

The transmitter output was connected to the Test Receiver. The Test Receiver was set as $3\text{kHz} \leq \text{RBW} \leq 100\text{kHz}$, $\text{VBW} \geq 3 \times \text{RBW}$, span = 1.5 times the DTS channel bandwidth.

The test procedure is defined in ANSI C63.10-2013 (11.10.2 Measurement Procedure “Method PKPSD (peak PSD)” was used).

9.6 Test Results

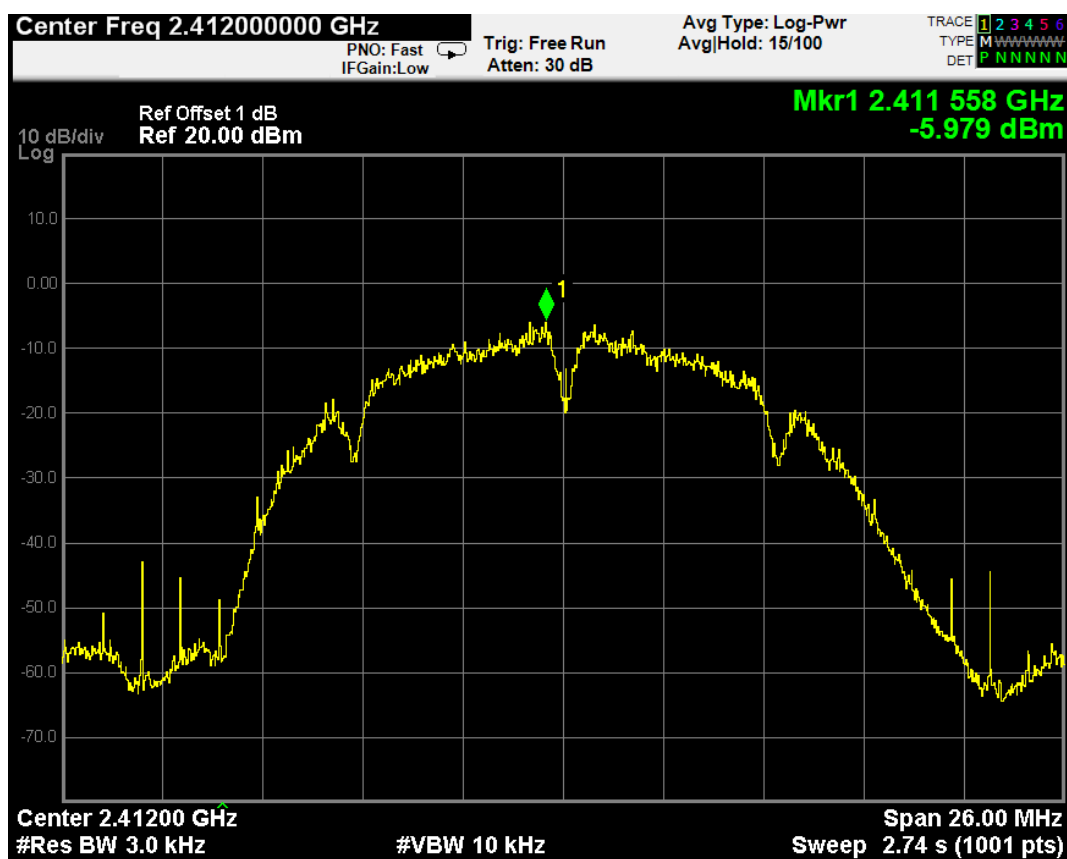
PASSED. All the test results are attached in next pages.

(Test Date: 2018.01.15 Temperature: 22°C Humidity: 52 %)

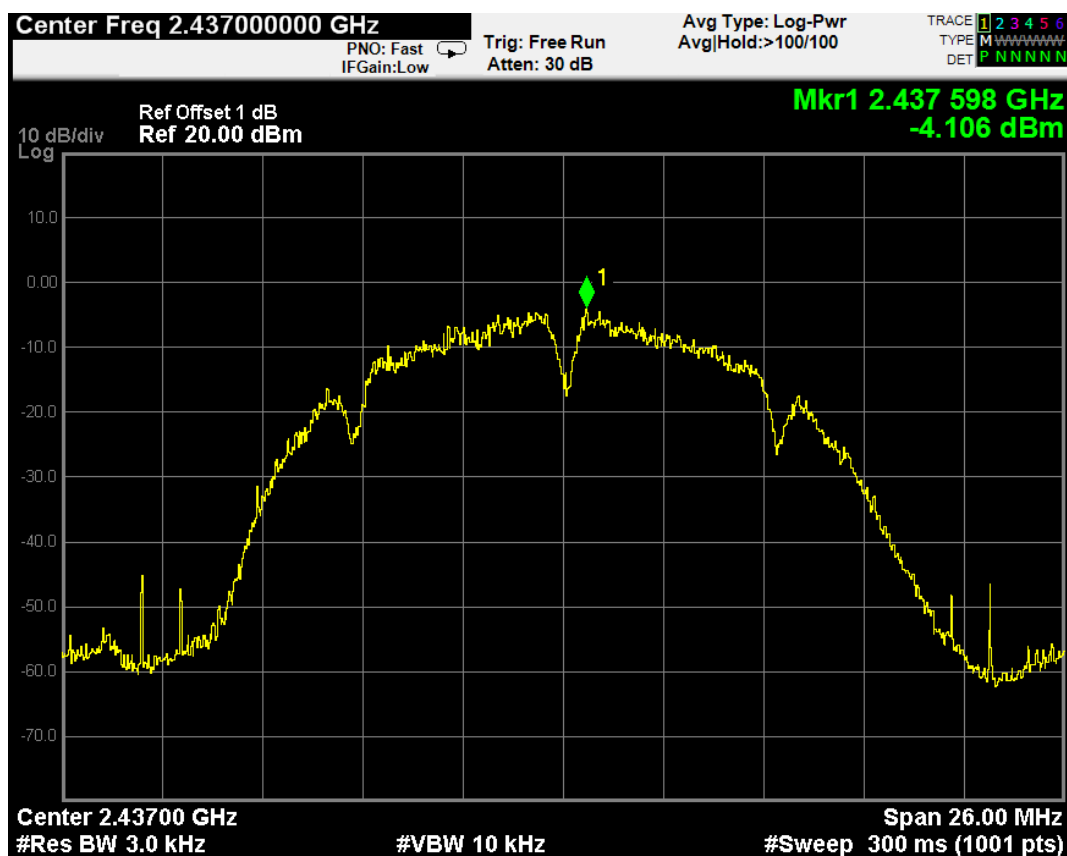
Modulation	Channel	Frequency	Power Spectral Density	Limit
802.11b	01	2412 MHz	-5.979 dBm	8dBm
	06	2437 MHz	-4.106 dBm	8dBm
	11	2462 MHz	-4.479 dBm	8dBm
802.11g	01	2412 MHz	-8.474 dBm	8dBm
	06	2437 MHz	-7.549 dBm	8dBm
	11	2462 MHz	-8.943 dBm	8dBm
802.11n	01	2412 MHz	-8.418 dBm	8dBm
	06	2437 MHz	-9.035 dBm	8dBm
	11	2462 MHz	-8.816 dBm	8dBm

802.11b

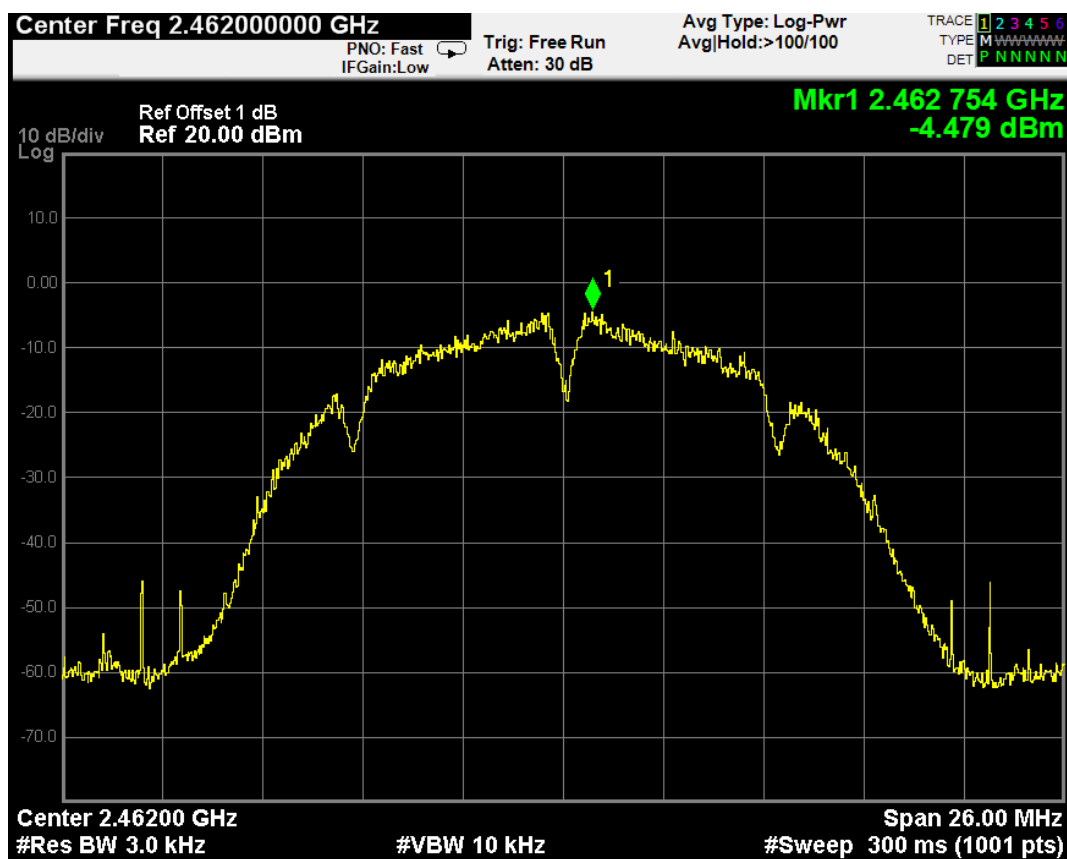
CH01 (2412 MHz)



CH06 (2437 MHz)

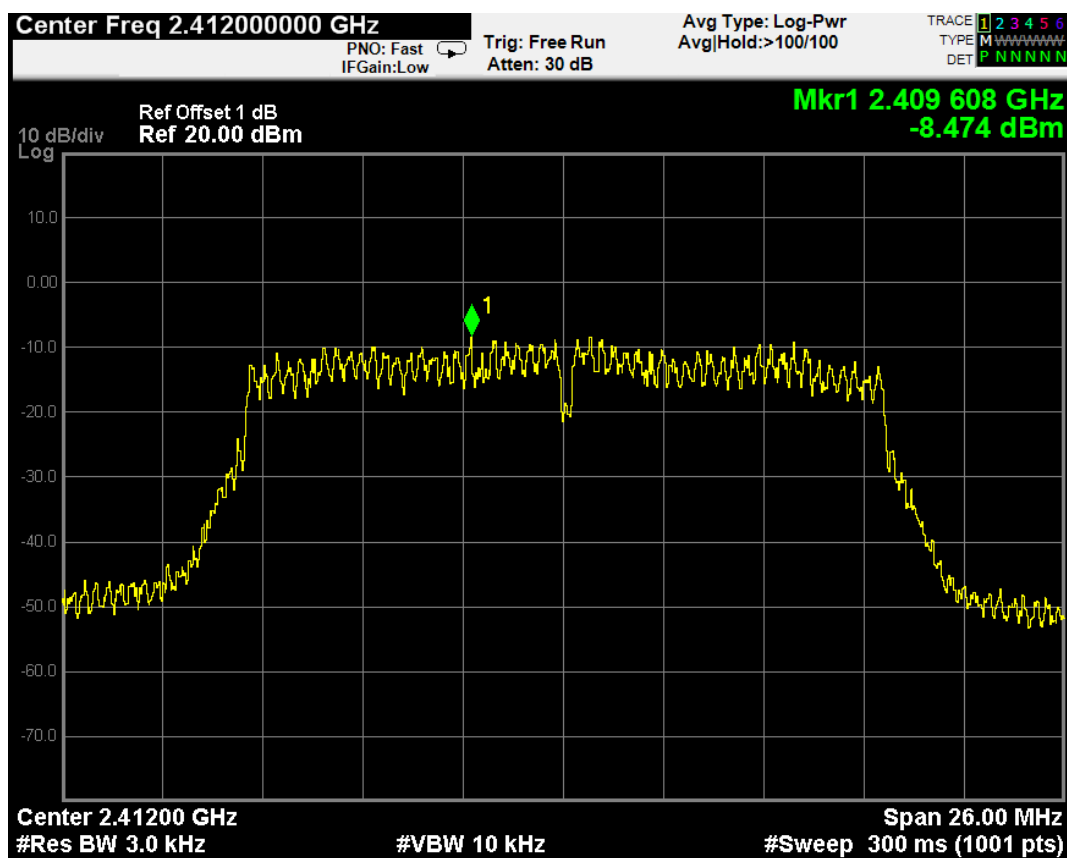


CH11 (2462 MHz)

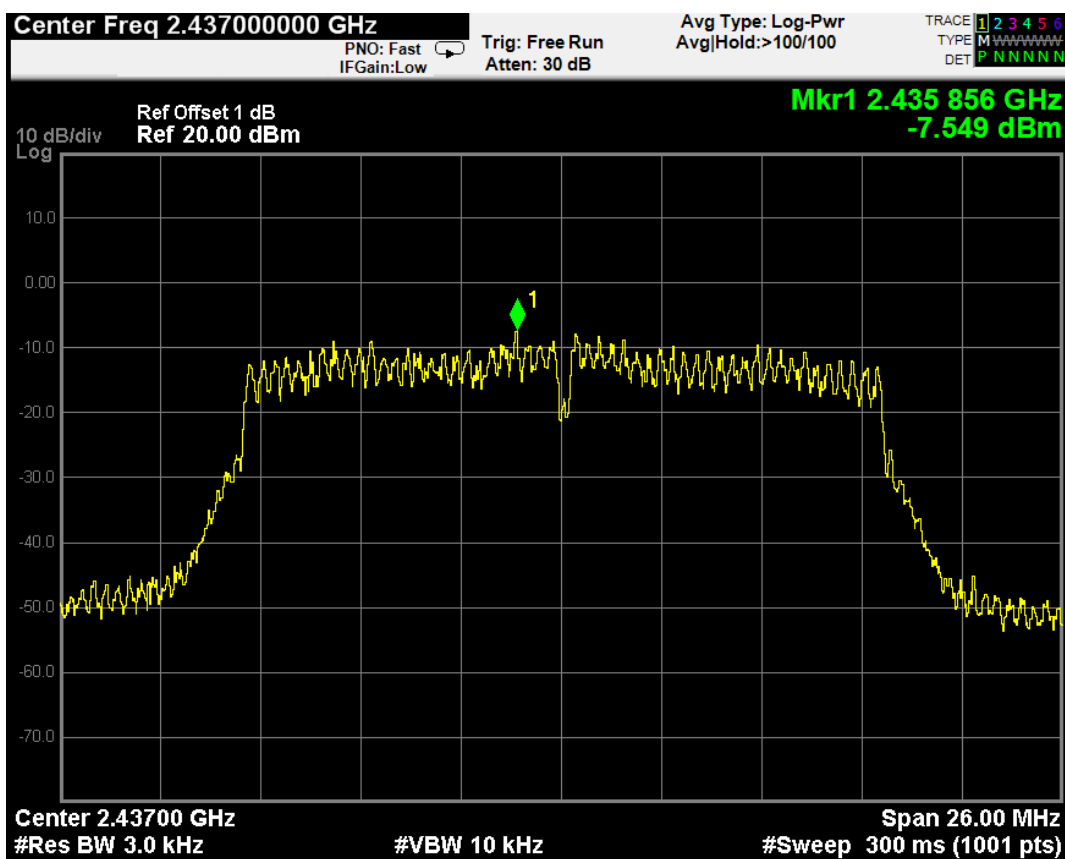


802.11g

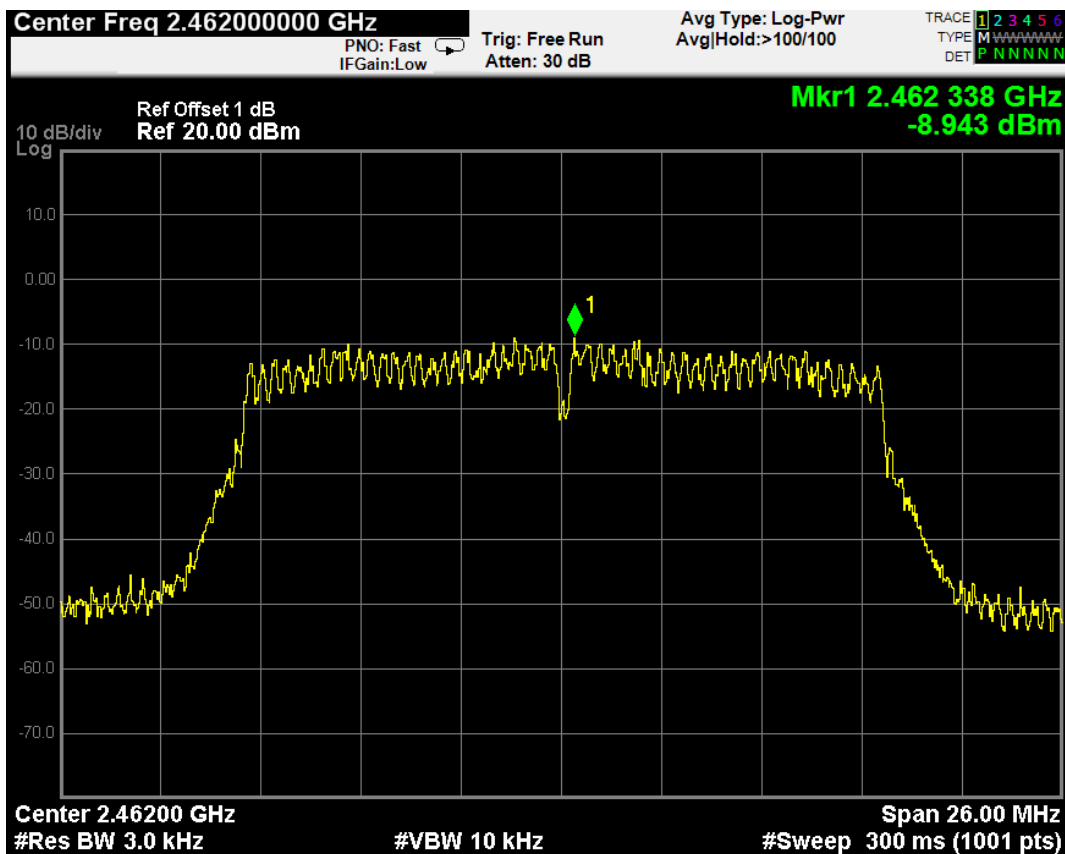
CH01 (2412 MHz)



CH06 (2437 MHz)

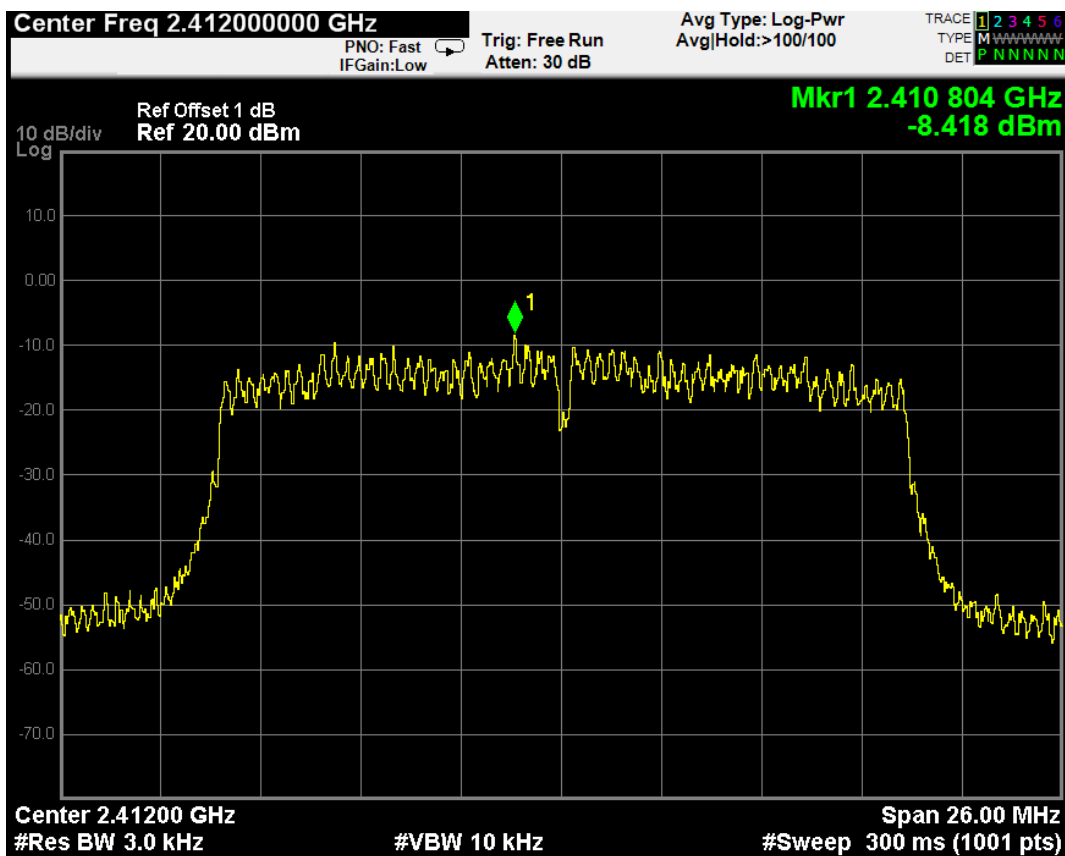


CH11 (2462 MHz)

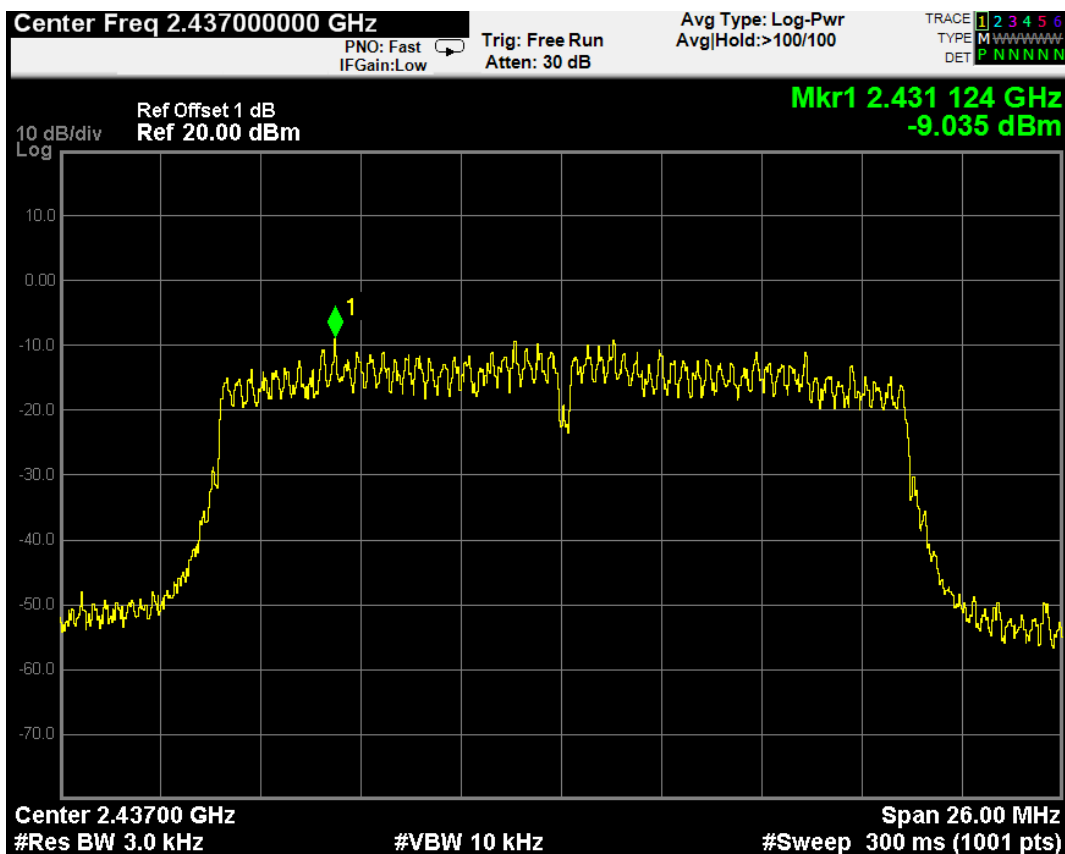


802.11n

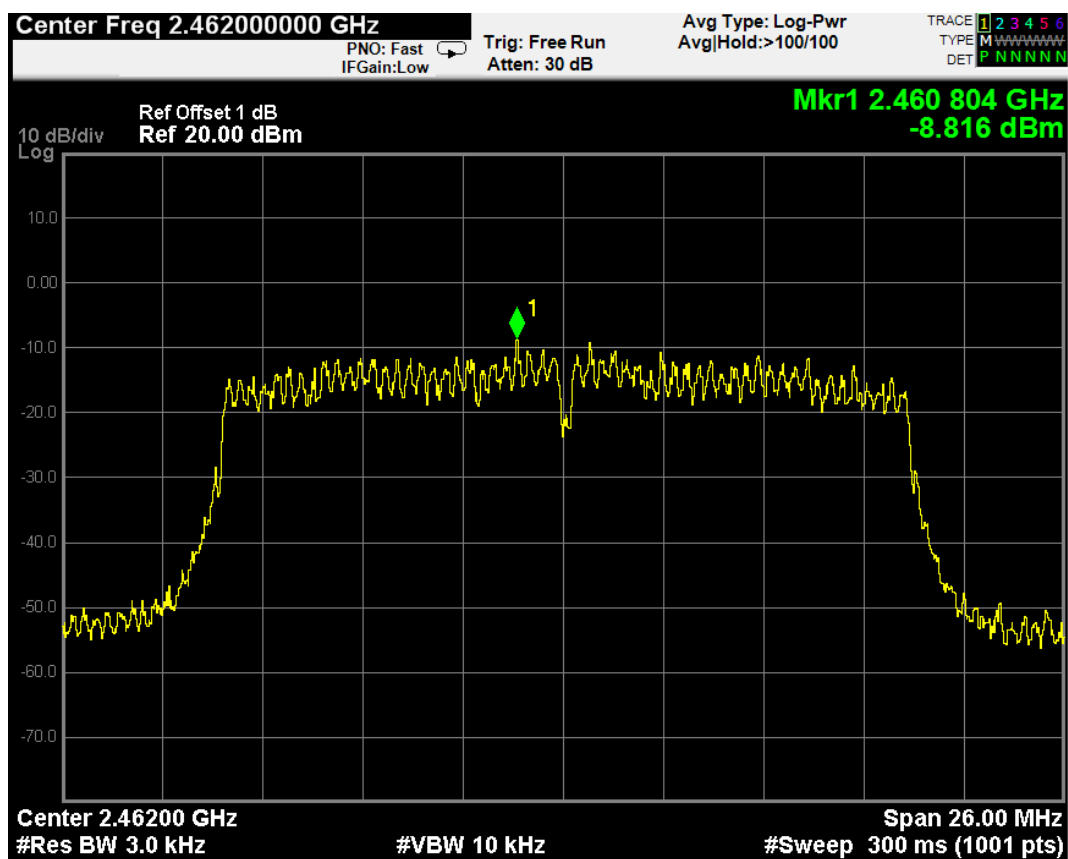
CH01 (2412 MHz)



CH06 (2437 MHz)



CH11 (2462 MHz)



10 DEVIATION TO TEST SPECIFICATIONS

None.