



**FCC TEST REPORT for DTS Device (2.4G Band)**  
**No. 140901611SHA-001R2**

Applicant : Aruba Networks, Inc  
1344 Crossman Ave. Sunnyvale, CA,94089  
Manufacturer : Aruba Networks, Inc  
1344 Crossman Ave. Sunnyvale, CA,94089  
Equipment : Access Point  
Type/Model : APEX0102

**SUMMARY**

The equipment complies with the requirements according to the following standard(s):

**47CFR Part 15 (2014):** Radio Frequency Devices

**ANSI C63.4 (2003):** American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz

Date of issue: Oct 17, 2014

Prepared by:

Wakeyou Wang (*Project Engineer*)

Reviewed by:

Daniel Zhao (*Reviewer*)



**FCC ID: Q9DAPEX0102**  
**IC: 4675A-APEX0102**

## **Description of Test Facility**

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Address: Building 86, No. 1198 Qinzhou Rd., North, Shanghai 200233, P.R. China

FCC Registration Number: 236597  
IC Assigned Code: 2042B-1

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## **1. General Information**

### **1.1 Applicant Information**

Applicant : Aruba Networks, Inc  
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Name of contact : Robert Hastings  
Tel : 408-419-4093  
Fax : /  
Manufacturer : Aruba Networks, Inc  
1344 Crossman Ave. Sunnyvale, CA,94089  
Sample received date : Sep 25, 2014  
Date of test : Sep 25, 2014 ~ Oct 12 , 2014

### **1.2 Identification of the EUT**

Equipment : Access Point  
Type/model : APEX0102  
FCC ID : Q9DAPEX0102  
IC : 4675A-APEX0102



### 1.3 Technical specification

Operation Frequency Band: 2400 – 2483.5 MHz

Modulation: DBPSK  
DQPSK  
CCK  
BPSK  
QPSK  
16-QAM  
64-QAM

Gain of Antenna: Directional Antenna, Internal

Antenna Type	Applied Chain	Gain of antenna
AC-PUMORI-ANT-2014	3	2.4GHz band: 7.4dBi
		5GHz band: 9.1dBi

Rating: AC100-240V 50/60Hz 0.6A; DC 48V,0.6A (PoE)

Declared Temperature range: -40°C ~ 65°C

Description of EUT: The EUT is a wireless access point.

Port identification: Power × 1, Console USB × 1; RJ45 ports × 2

Category of EUT: Class B

EUT type:  Table top  Floor standing

EUT Modes: 802.11a/b/g/n20/n40/ac80  
(802.11b/g/n20/n40 assessed in this report)

Channel Number: 11 channels for 2412~2462MHz  
7 channels for 2422~2452MHz for 11n HT40;

Channel Description: The channel spacing is 5MHz.

#### ***MIMO Function Description:***

Modulation	Transmission / Idle			Beam forming	Beam forming gain
	Port 0	Port 1	Port 2		
802.11b	Transmission	Transmission	Transmission	NO	0 dBi
802.11g	Transmission	Transmission	Transmission	NO	0 dBi
802.11 n20	Transmission	Transmission	Transmission	Port 0 & Port 1	3 dBi
802.11 n40	Transmission	Transmission	Transmission	Port 0 & Port 1	3 dBi

### 1.4 Mode of operation during the test / Test peripherals used

While testing transmitting mode of EUT, the internal modulation was applied.

The lowest, middle and highest channel were tested as representatives.

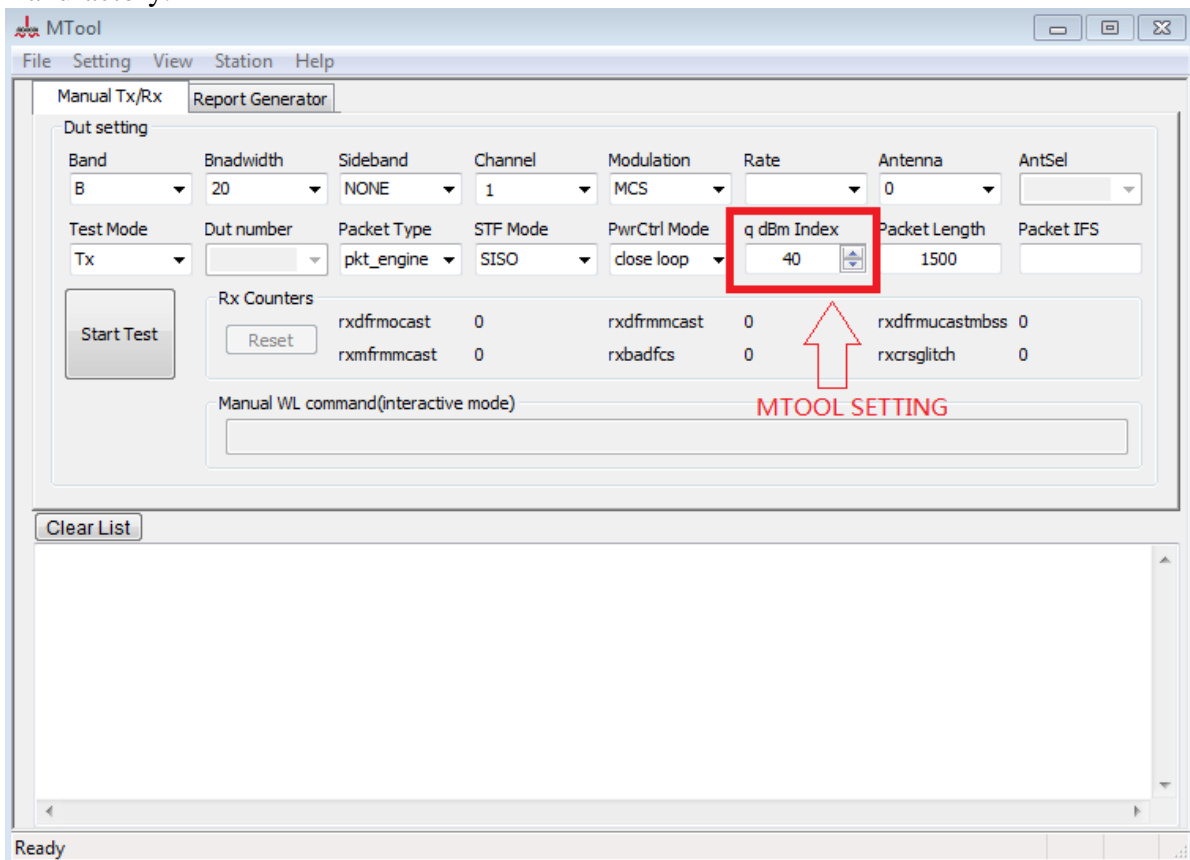
Freq. Band	Modulation	Lowest(MHz)	Middle(MHz)	Highest(MHz)
2400 – 2483.5MHz	802.11b	2412	2437	2462
	802.11g	2412	2437	2462
	802.11n HT20	2412	2437	2462
	802.11n HT40	2422	2437	2452

Test Peripherals:

PC: HP ProBook 6450b

### Test software setting:

The power level setting for 802.11a/b/g/n/ac is used with MTOOL software offered by the manufactory.





Mode 1	Frequency (MHz)	Mtool Setting	Power Expected (dBm)
802.11b	2412	70	17.5
	2437	72	18
	2462	72	18
802.11g	2412	42	10.5
	2437	44	11
	2462	42	10.5
802.11n20	2412	36	9
	2437	36	9
	2462	34	8.5
802.11n40	2422	34	8.5
	2437	32	8
	2452	32	8

**Data rate VS Power**

The pre-scan for the conducted power with all rates in each modulation and bands was used, and the worst case was found and used in all test cases.

After this pre-scan, we choose the following table of the data rata as the worst case.

Mode	Worst case data rate
802.11b	1Mbps
802.11g	6Mbps
802.11 n20	MCS16
802.11 n40	MCS16



## 2. Test Specification

### 2.1 Instrument list

Equipment	Type	Manu.	Internal no.	Cal. Date	Due date
Test Receiver	ESCS 30	R&S	EC 2107	2013-10-21	2014-10-20
Test Receiver	ESIB 26	R&S	EC 3045	2013-10-20	2014-10-19
A.M.N.	ESH2-Z5	R&S	EC 3119	2014-1-9	2015-1-8
Bilog Antenna	CBL 6112D	TESEQ	EC 4206	2013-4-28	2015-4-27
Horn antenna	HF 906	R&S	EC 3049	2013-4-28	2015-4-27
Pre-amplifier	Pre-amp 18	R&S	EC 3222	2014-4-12	2015-4-11
Semi-anechoic chamber	-	Albatross project	EC 3048	2014-5-12	2015-5-11
Power sensor / Power meter	N1911A/N1921A	Agilent	EC4318	2014-04-12	2015-04-11
Loop Antenna	FMZB 1516	SCHWARZB ECK	/	2013-11-29	2014-11-28
Temperature Camber	SETH-E	tayasaf	EC4315	2014-4-9	2015-4-9
High Pass Filter	WHKX 1.0/15G-10SS	Wainwright	EC4297-1	2014-1-8	2015-1-7
High Pass Filter	WHKX 2.8/18G-12SS	Wainwright	EC4297-2	2014-1-8	2015-1-7
High Pass Filter	WHKX 7.0/1.8G-8SS	Wainwright	EC4297-3	2014-1-8	2015-1-7
Band Reject Filter	WRCGV 2400/2483-2390/2493-35/10SS	Wainwright	EC4297-4	2014-1-8	2015-1-7

### 2.2 Test Standard

47CFR Part 15 (2014)

ANSI C63.4: 2003

KDB 558074 (V03R02)

KDB 662911 D01 Multiple Transmitter Output v02r01.





### 2.3 Test Summary

**This report applies to tested sample only. This report shall not be reproduced in part without written approval of Intertek Testing Service Shanghai Limited.**

TEST ITEM	FCC REFERANCE	RESULT
Minimum 6dB Bandwidth	15.247(a)(2)	Pass
Maximum peak output power	15.247(b)	Pass
Power spectrum density	15.247(e)	Pass
Radiated emission	15.205 & 15.209	Pass
Emission outside the frequency band	15.247(d)	Pass
Power line conducted emission	15.207	Pass

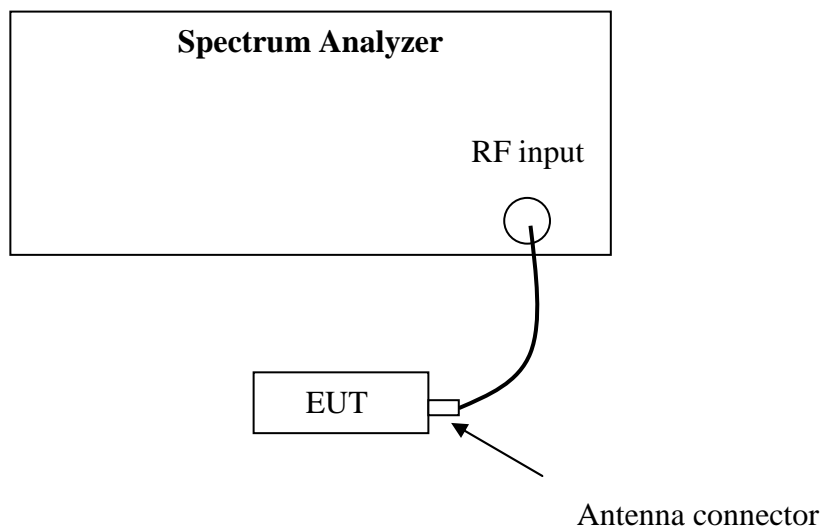
### 3. Minimum 6dB Bandwidth

Test result: PASS

#### 3.1 Limit

For systems using digital modulation techniques that may operate in the 902 - 928 MHz, 2400 - 2483.5 MHz and 5725 - 5850 MHz bands, the minimum 6 dB bandwidth shall be at least 500 kHz.

#### 3.2 Test Configuration



#### 3.3 Test Procedure and test setup

The minimum 6dB bandwidth per FCC §15.247(a)(2) is measured using the Spectrum Analyzer according to DTS test procedure of “KDB558074 D01 DTS Meas Guidance v03r02” for compliance to FCC 47CFR 15.247 requirements (clause 8.2).

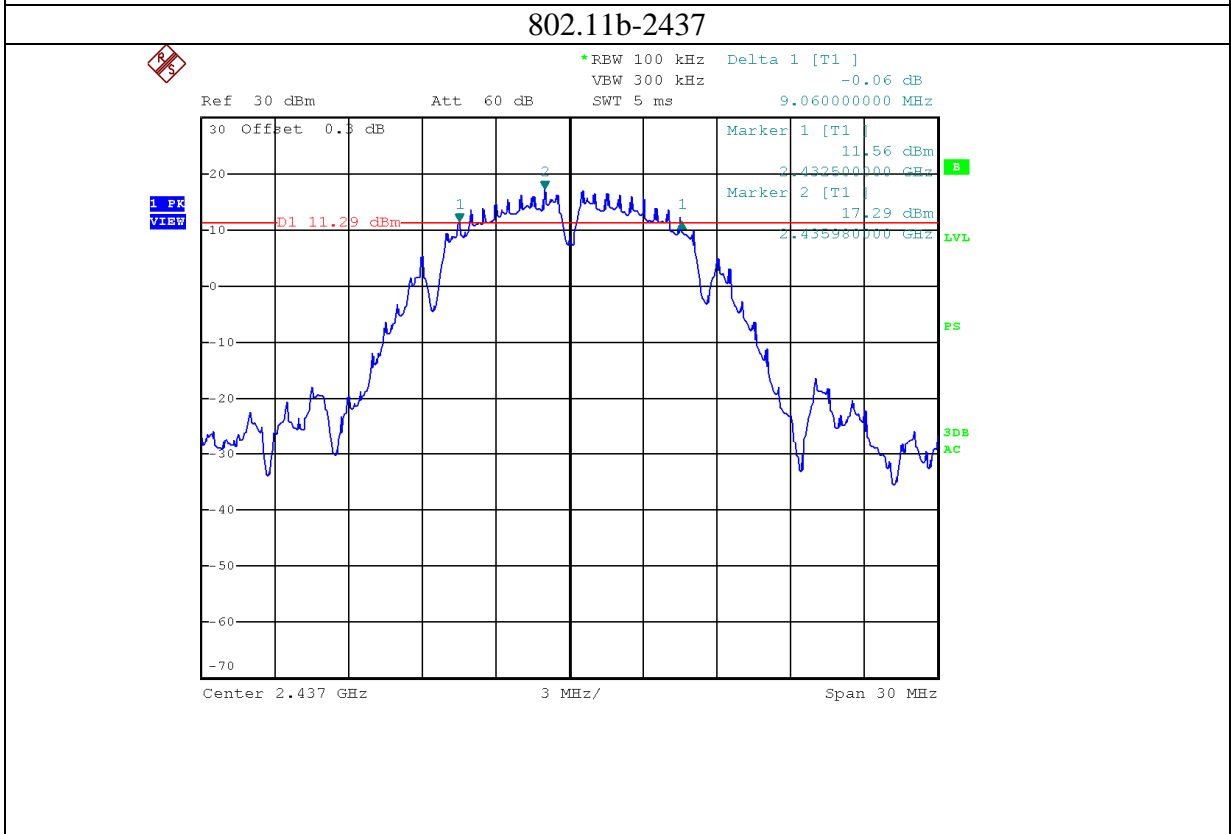
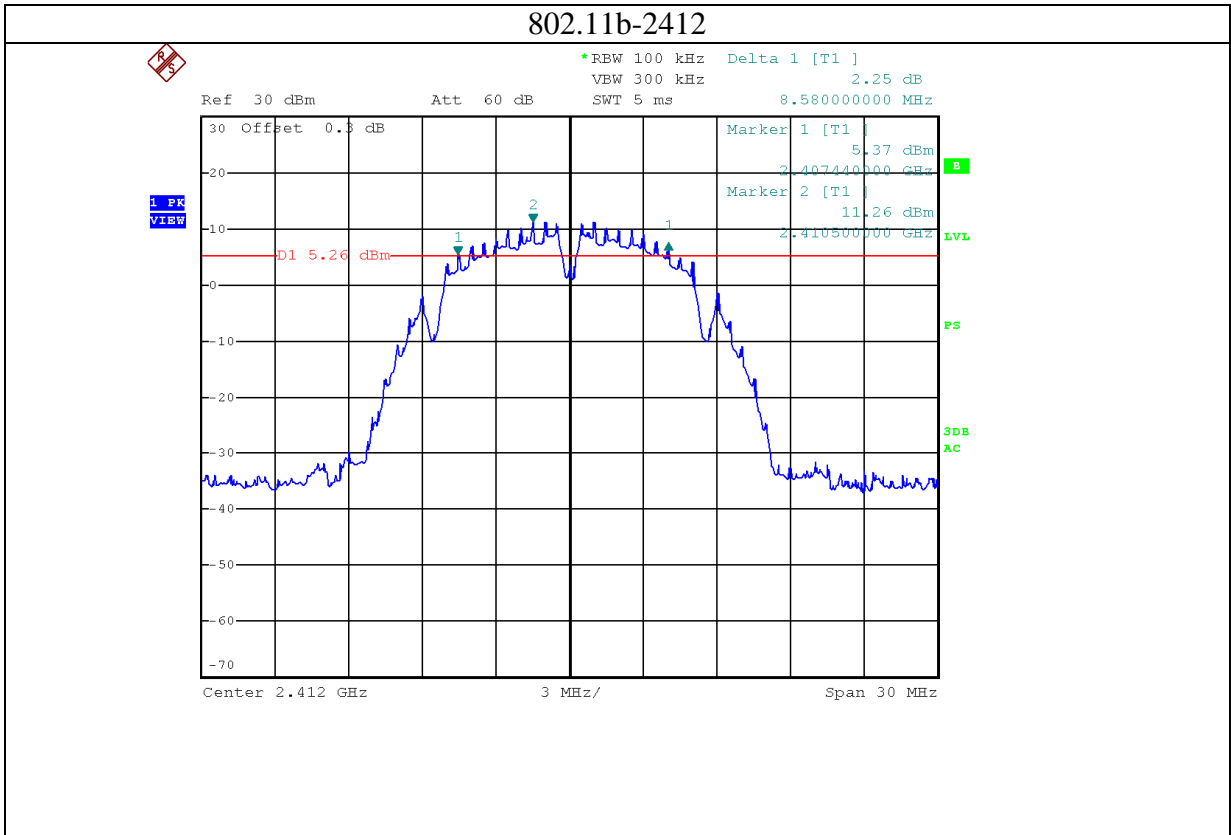


### 3.4 Test Protocol

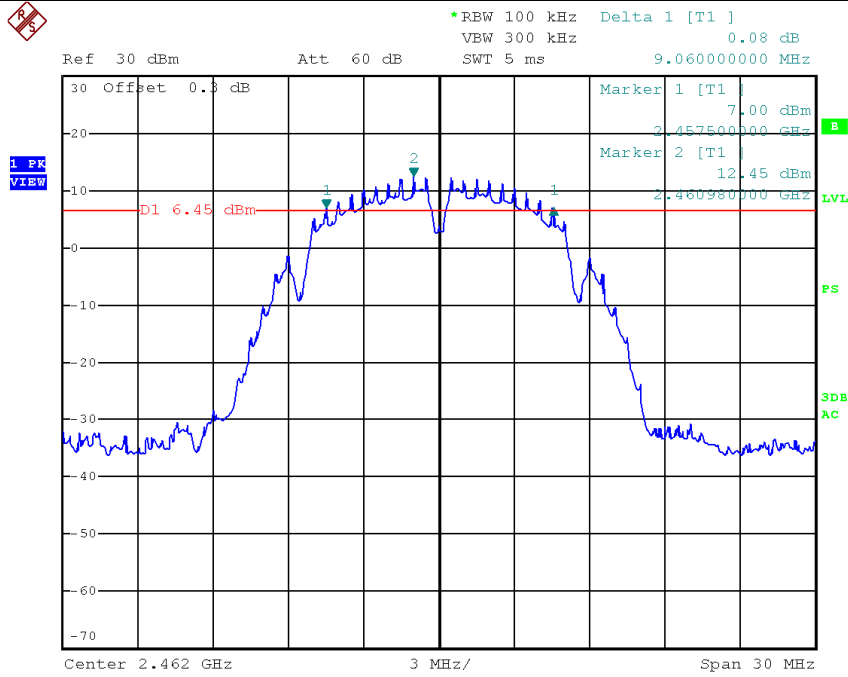
Temperature : 25°C  
Relative Humidity : 55%

Modulation	Frequency (MHz)	Minimum 6dB Bandwidth (MHz)			Limits (MHz)
		Port0	Port 1	Port 2	
802.11b	2412	8.58	9.00	8.04	> 0.5
	2437	9.06	8.52	8.58	> 0.5
	2462	9.06	8.64	8.58	> 0.5
802.11g	2412	16.32	16.38	16.32	> 0.5
	2437	16.38	16.32	16.32	> 0.5
	2462	16.32	16.38	16.32	> 0.5
802.11n20	2412	17.64	17.64	17.62	> 0.5
	2437	17.34	17.64	17.64	> 0.5
	2462	17.46	17.64	17.64	> 0.5
802.11n40	2422	36.48	36.12	35.92	> 0.5
	2437	36.36	36.48	36.08	> 0.5
	2452	36.08	36.12	36.32	> 0.5

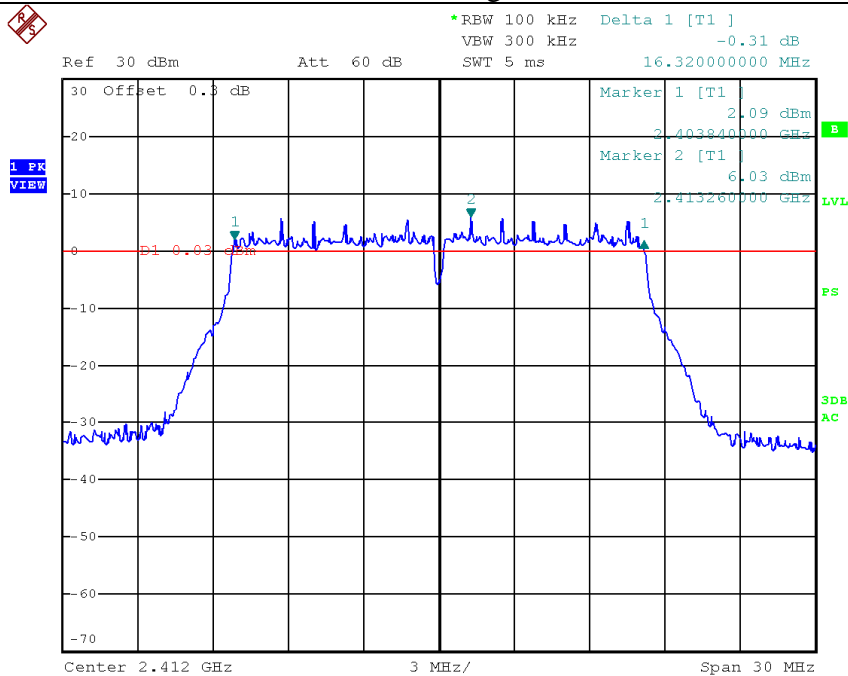
Port 0

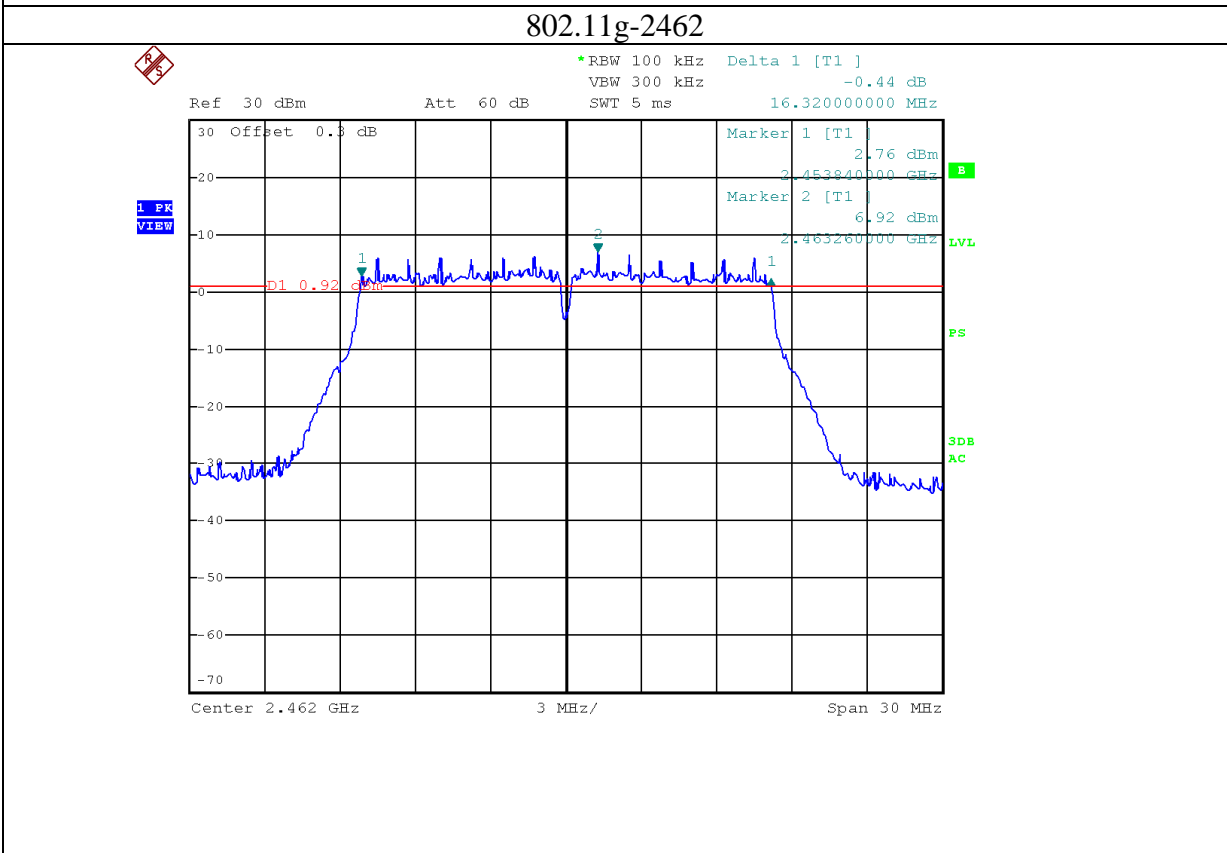
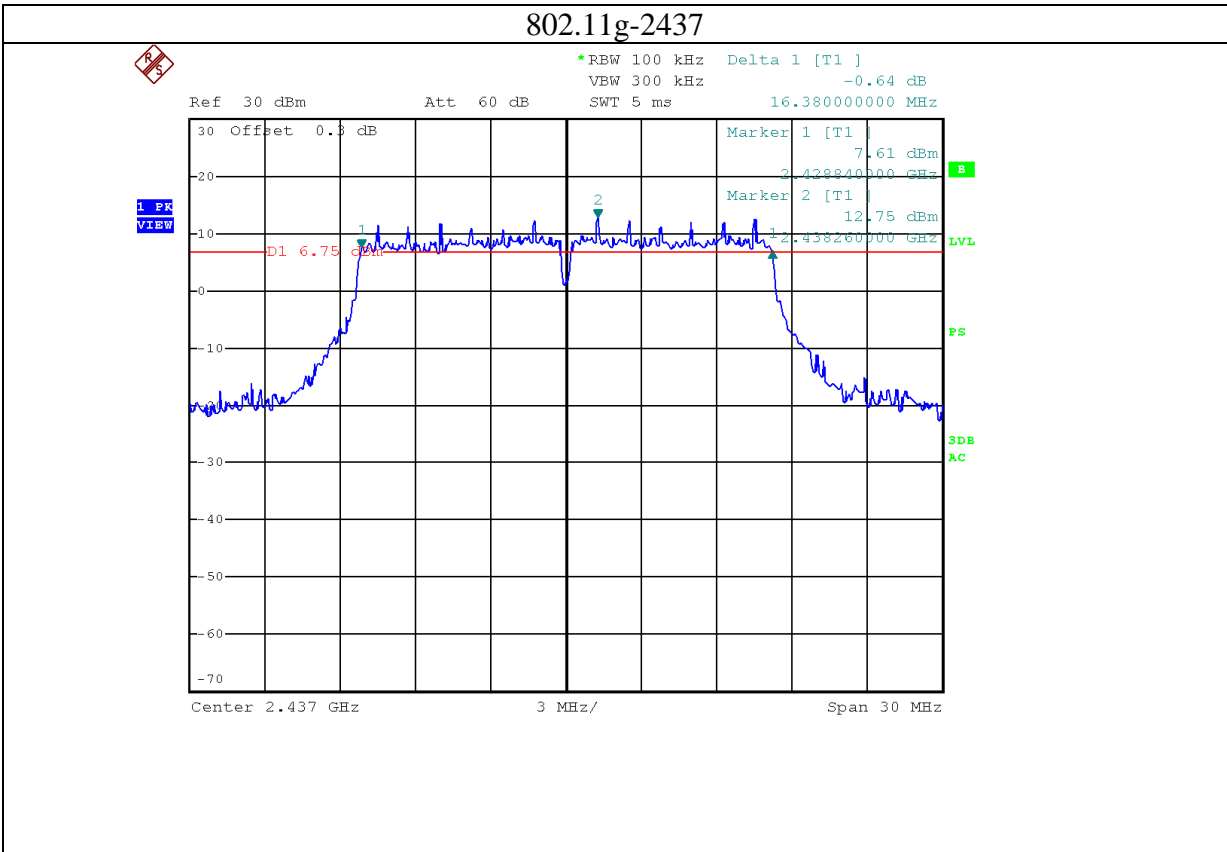


802.11b-2462

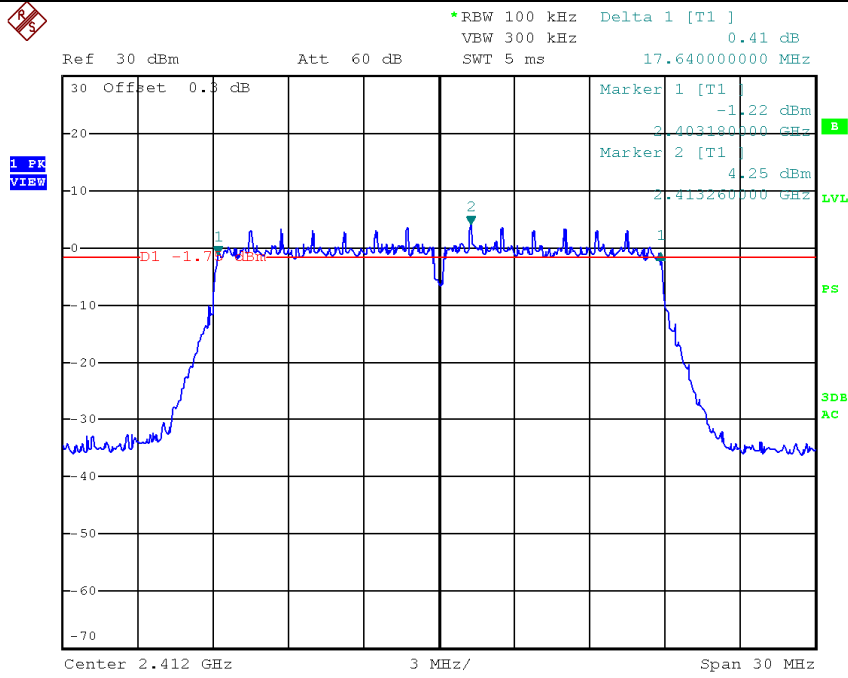


802.11g-2412

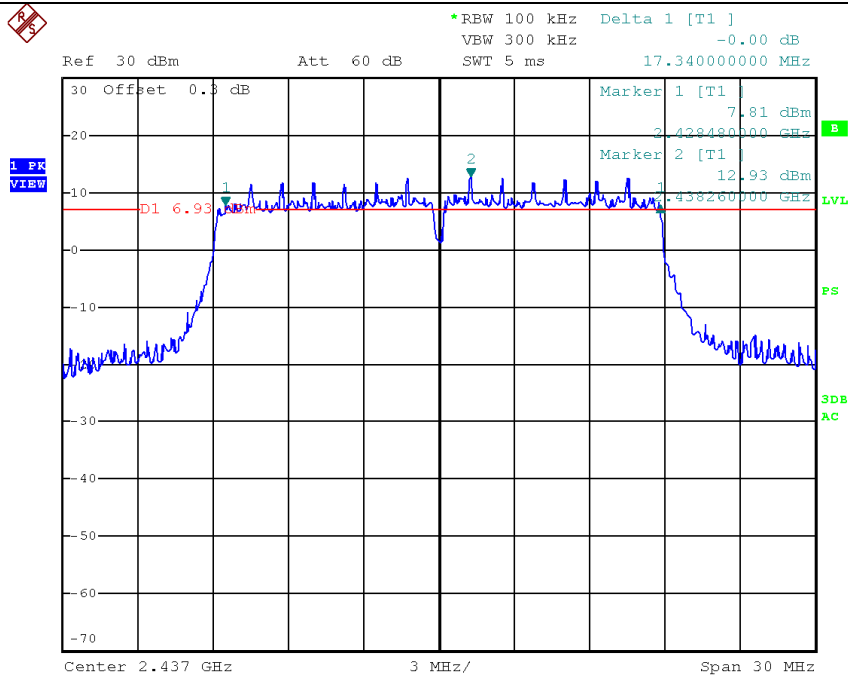




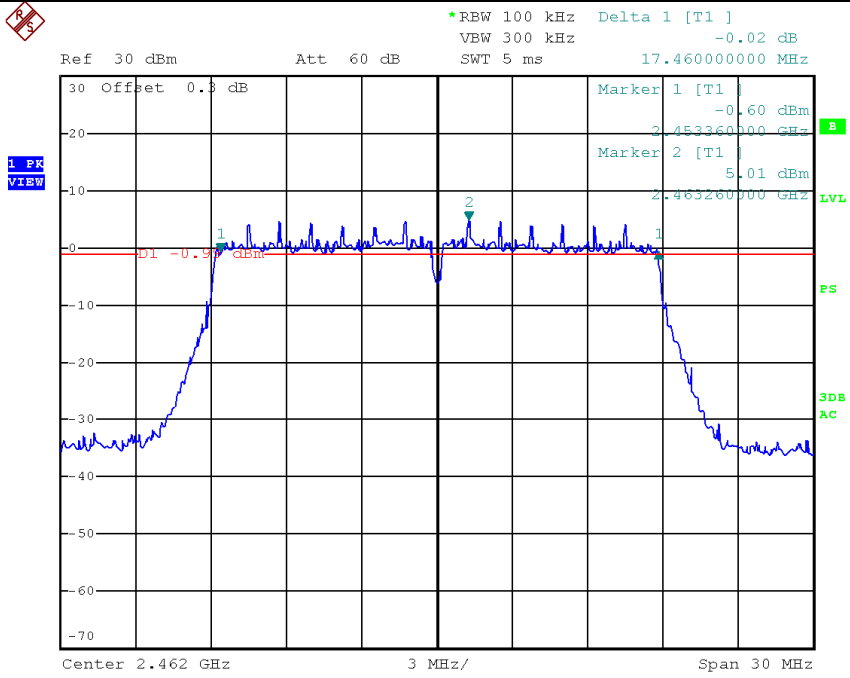
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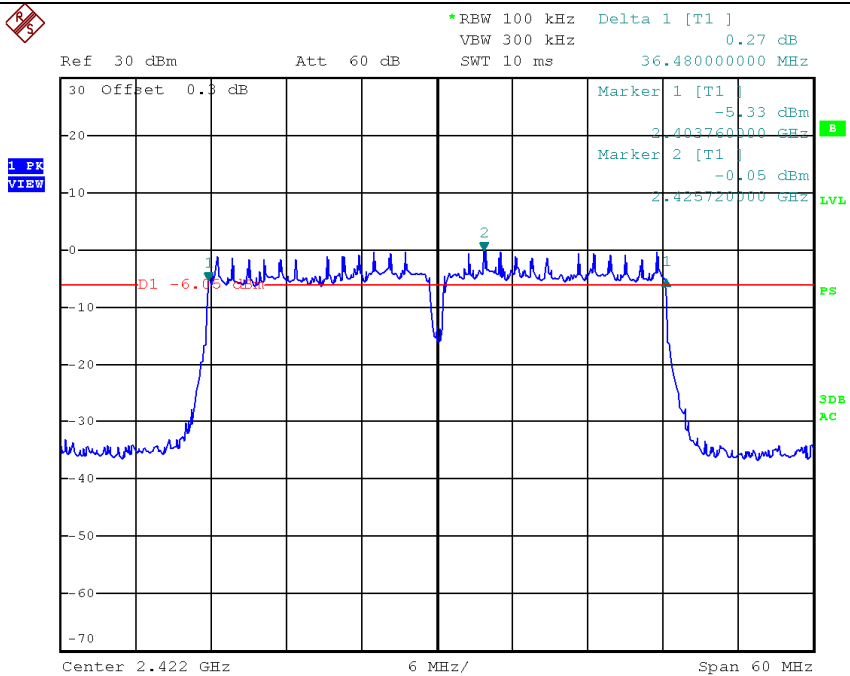
**802.11n20-2437**



802.11n20-2462

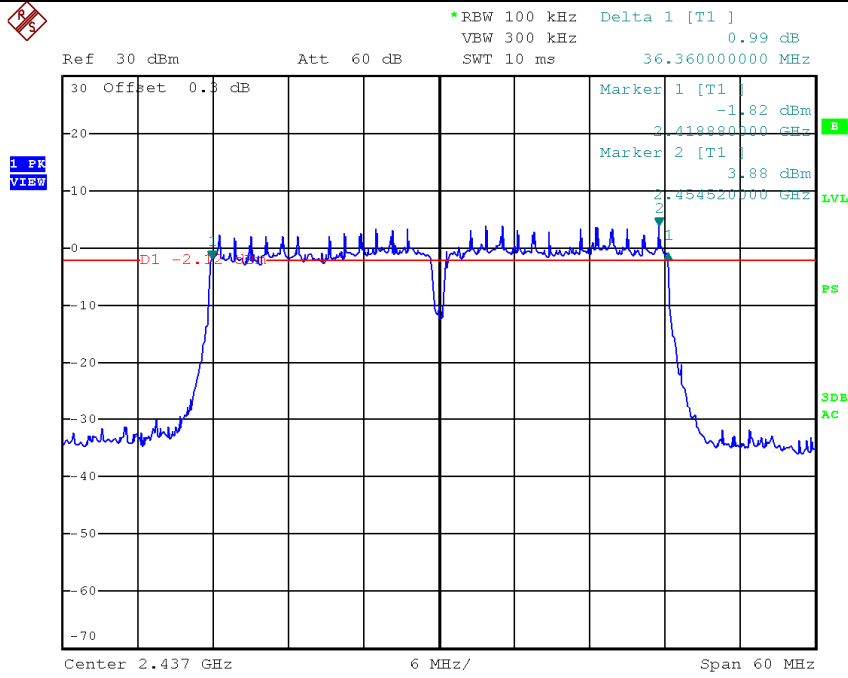


802.11n40-2422

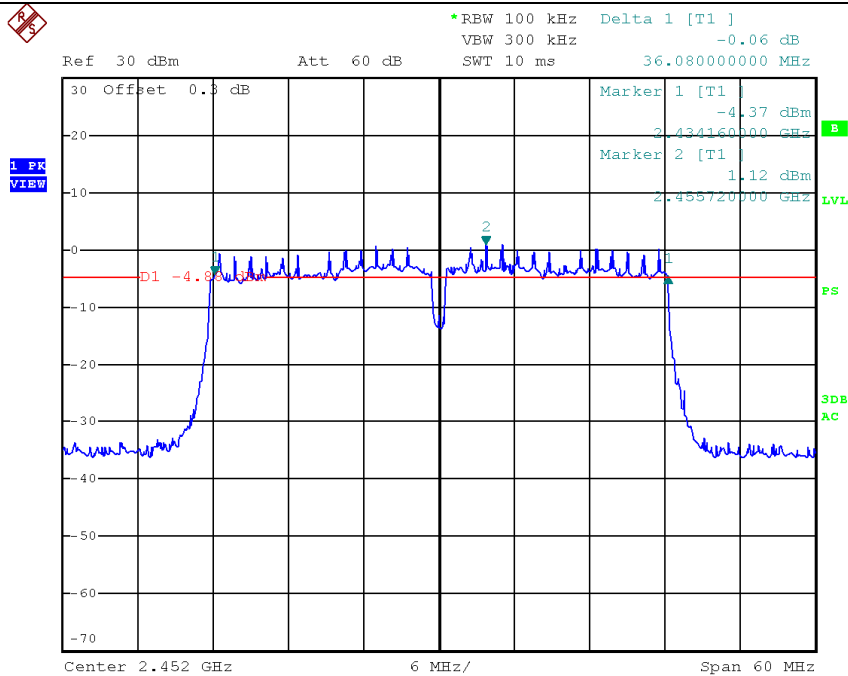




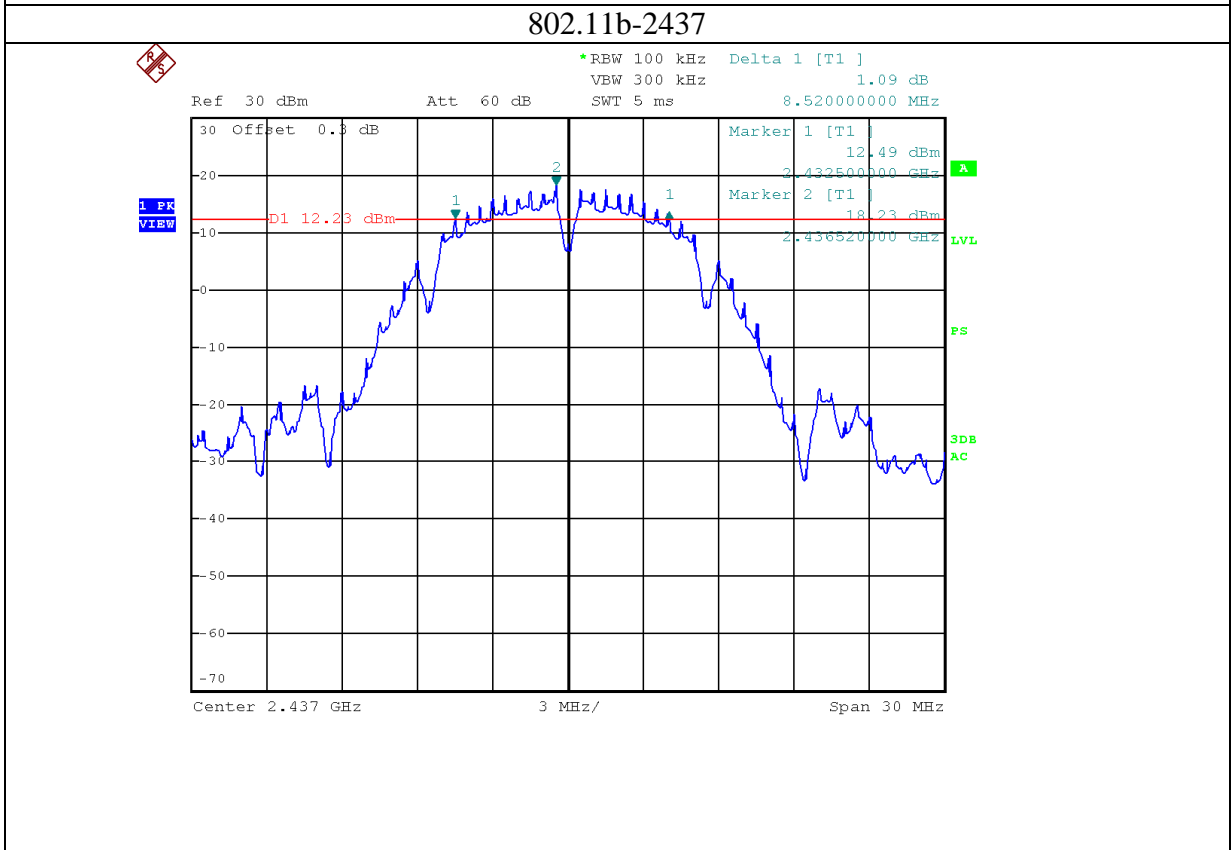
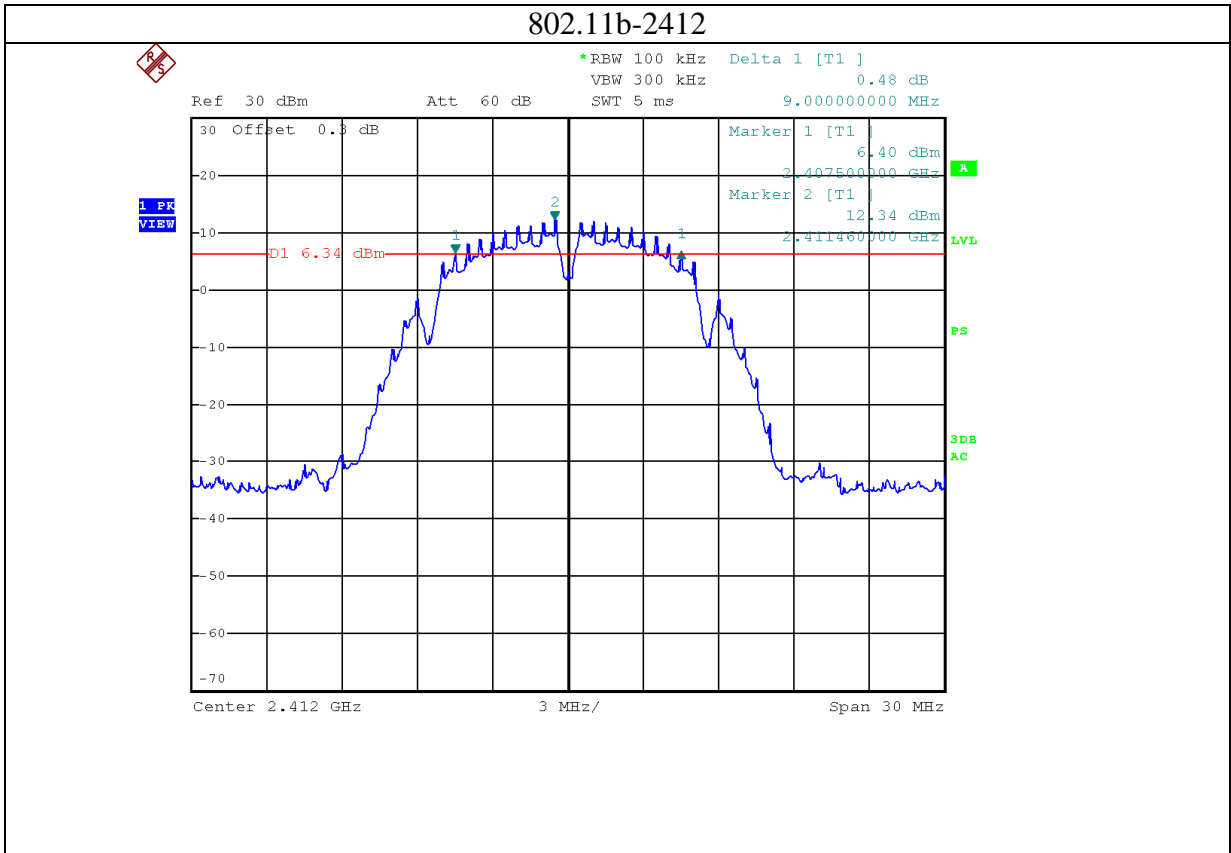
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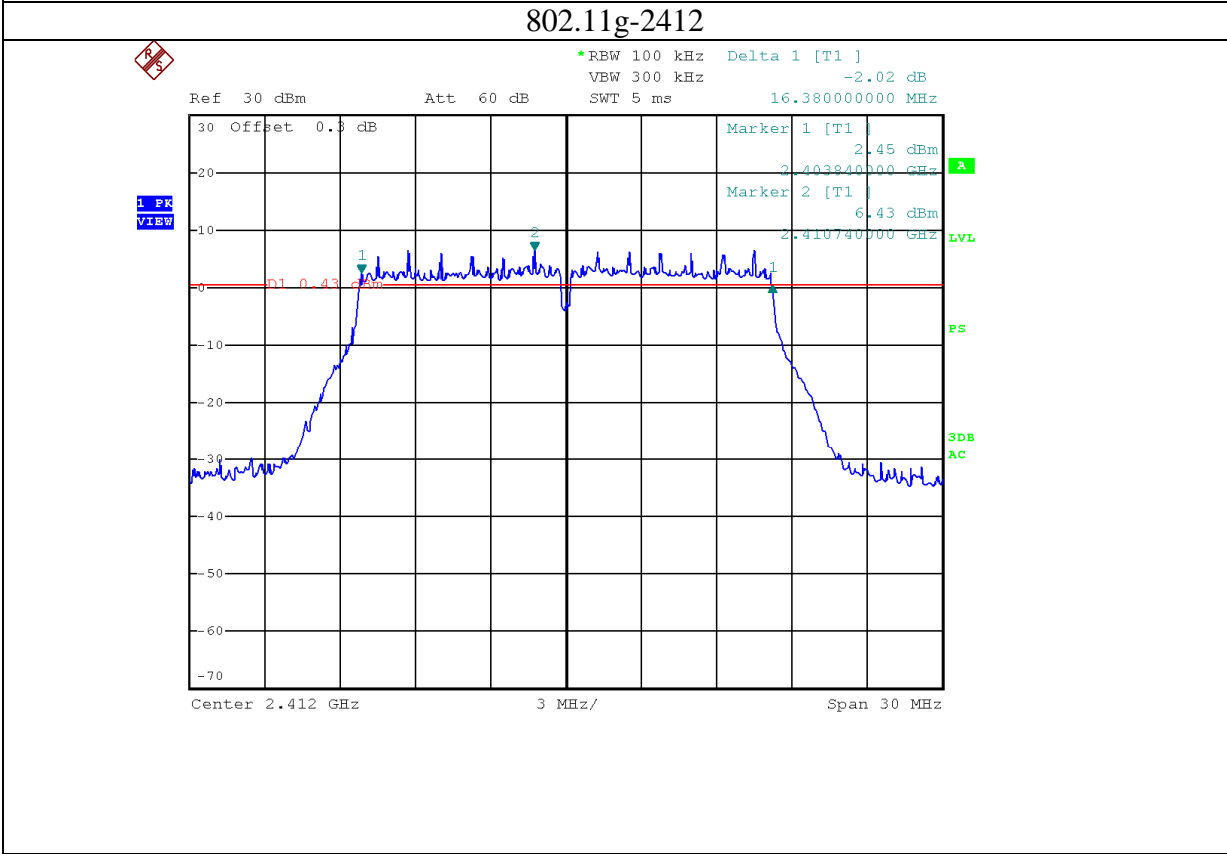
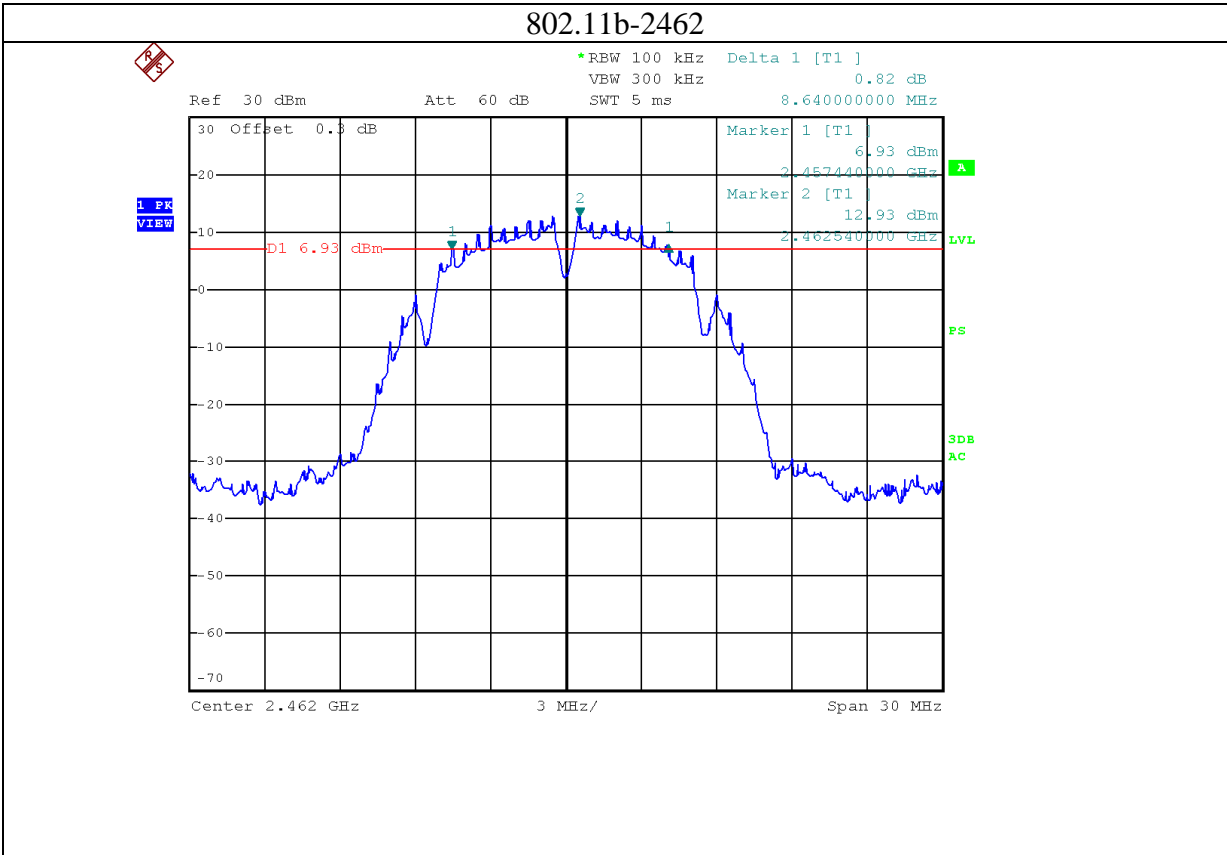


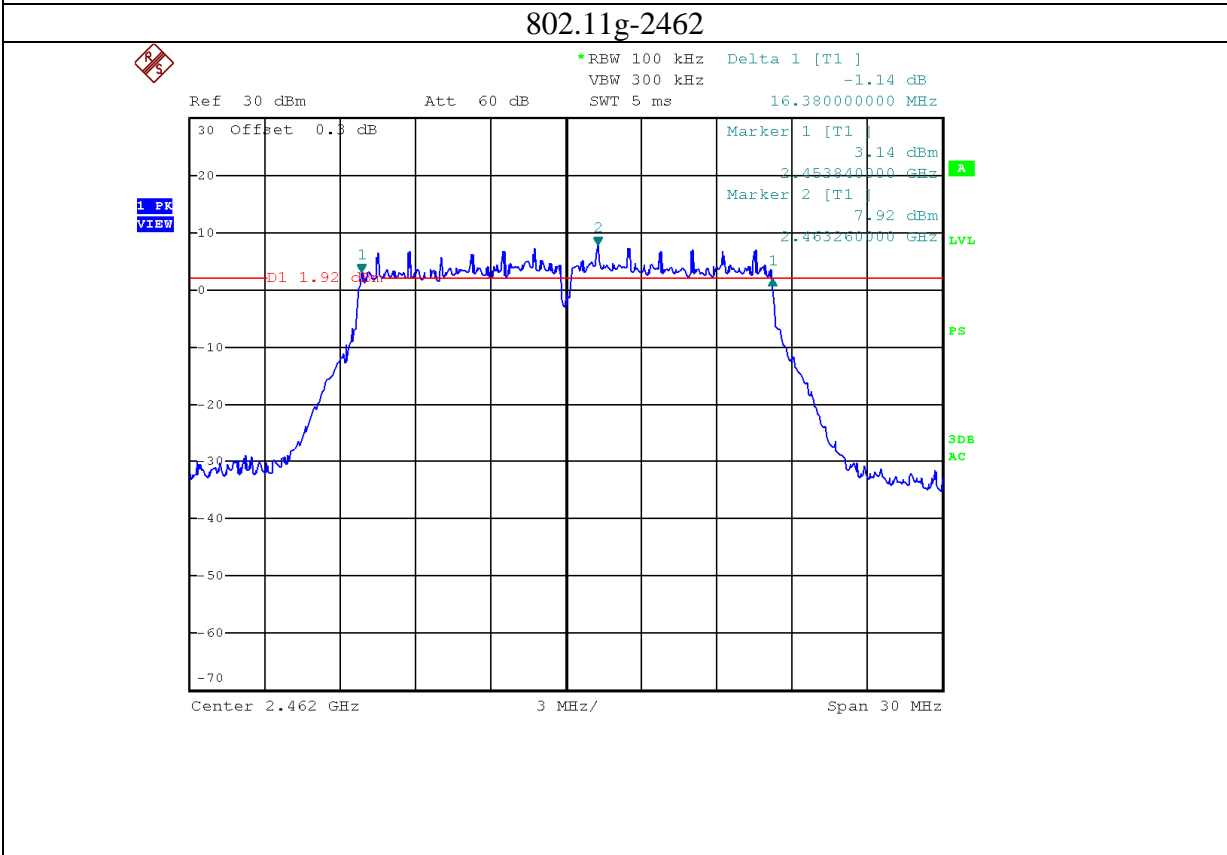
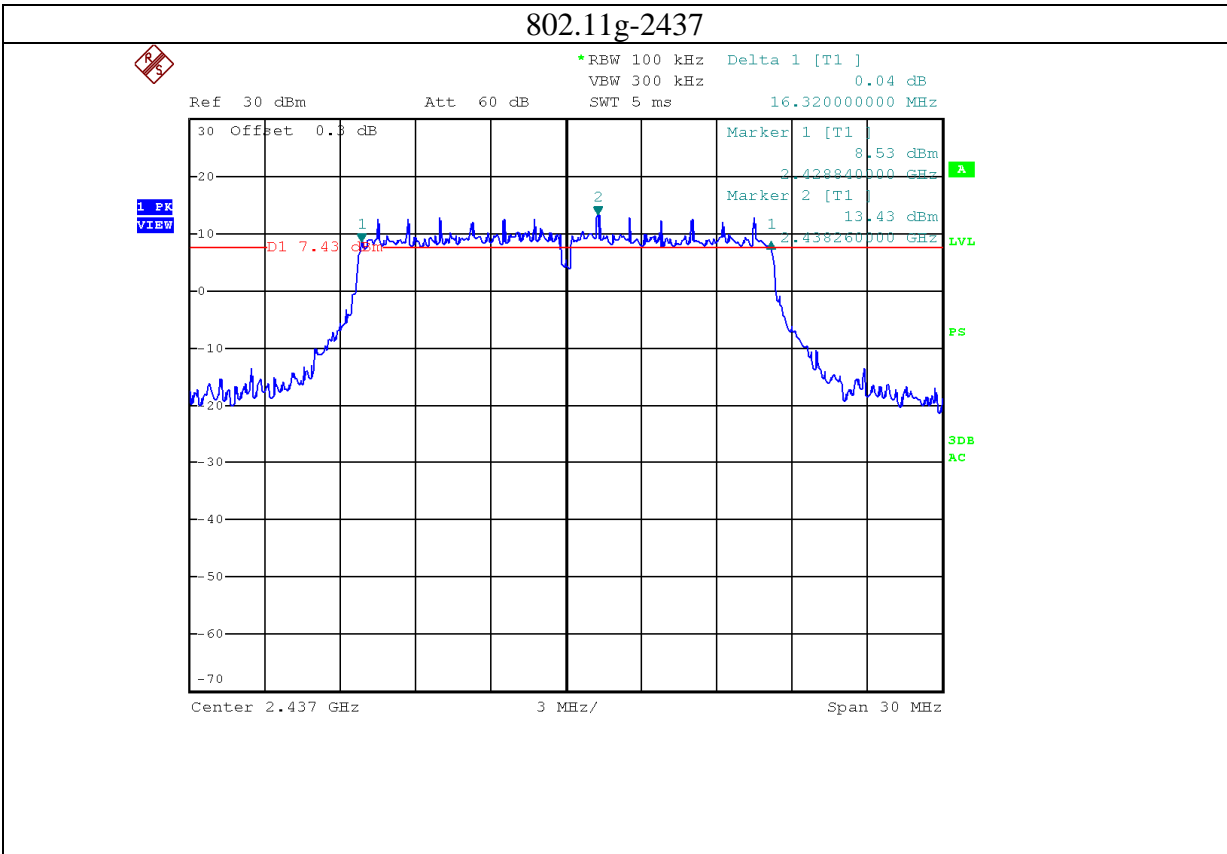
**802.11n40-2452**

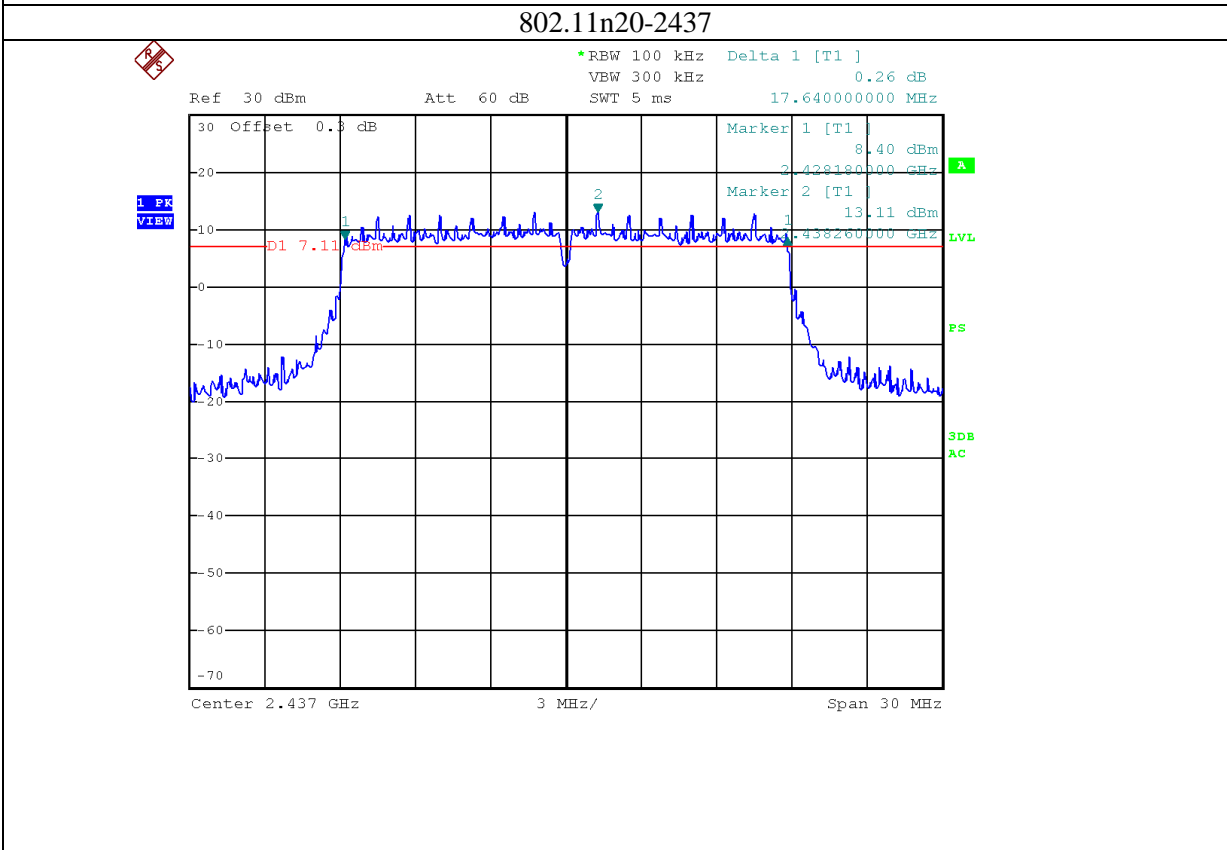
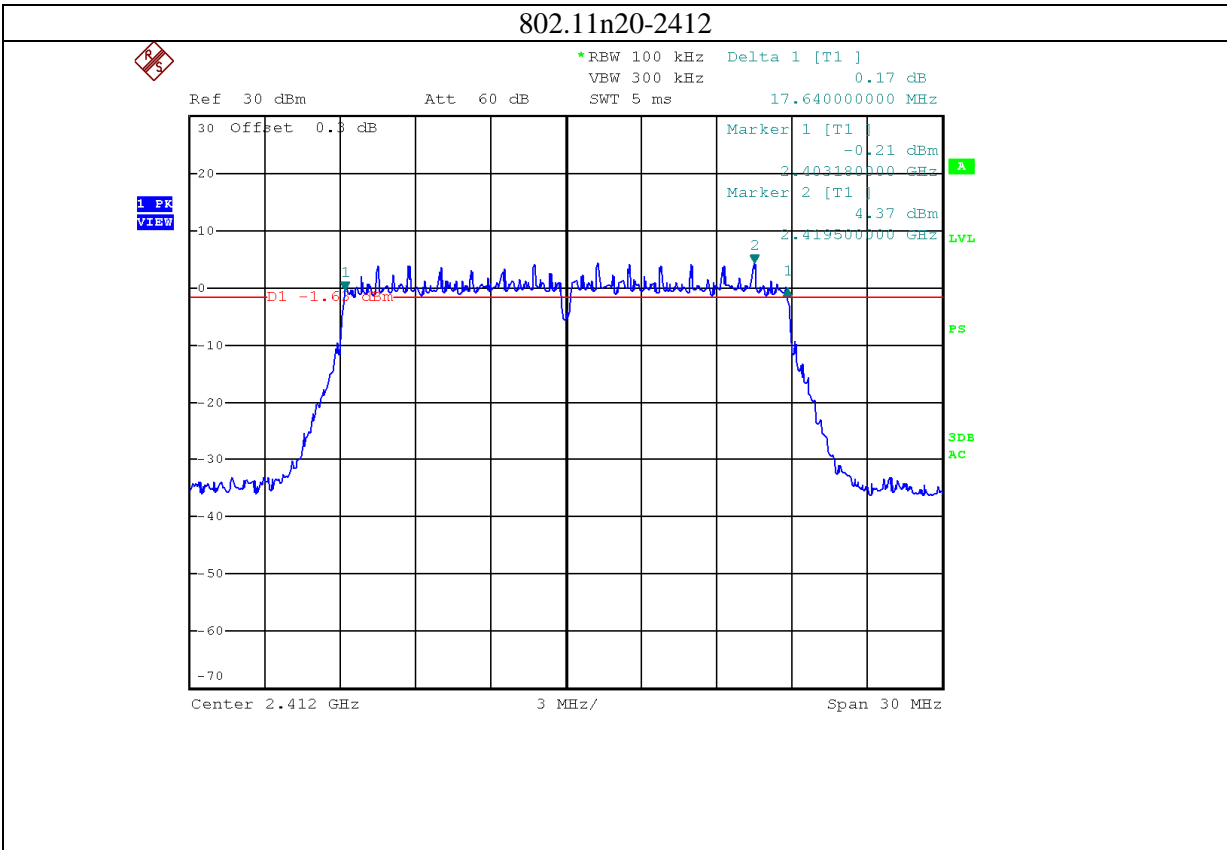


Port 1

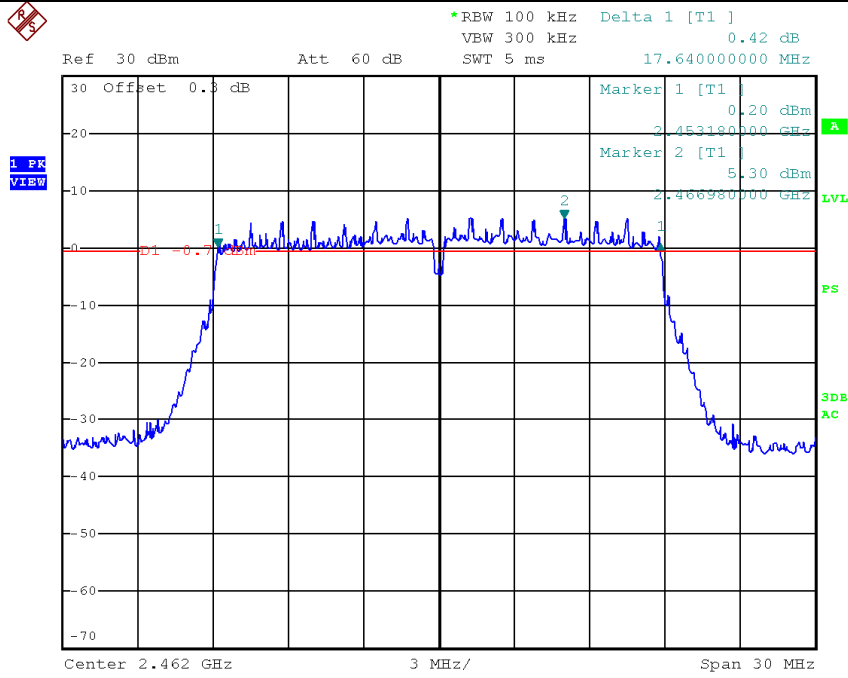




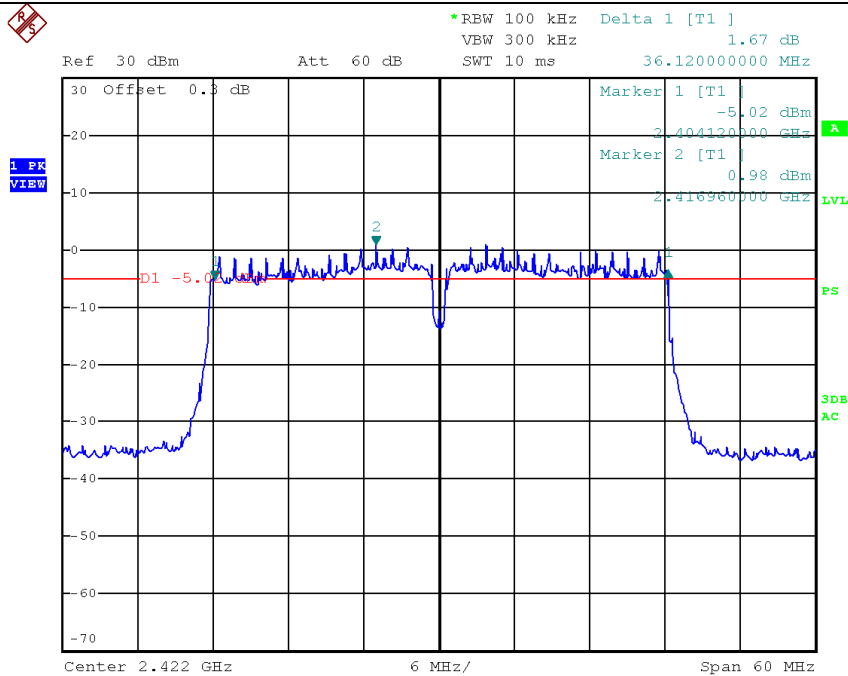




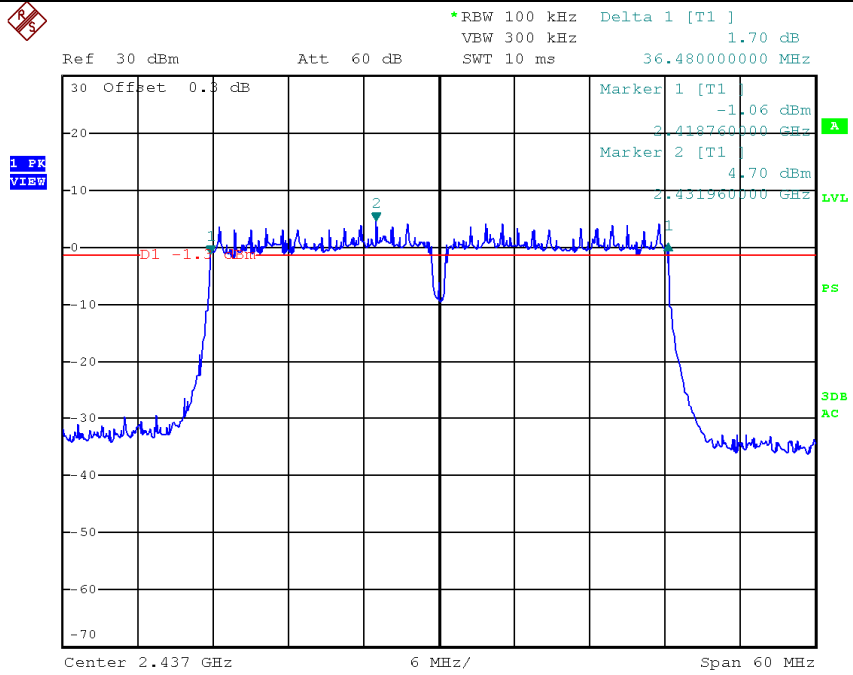
**802.11n20-2462**



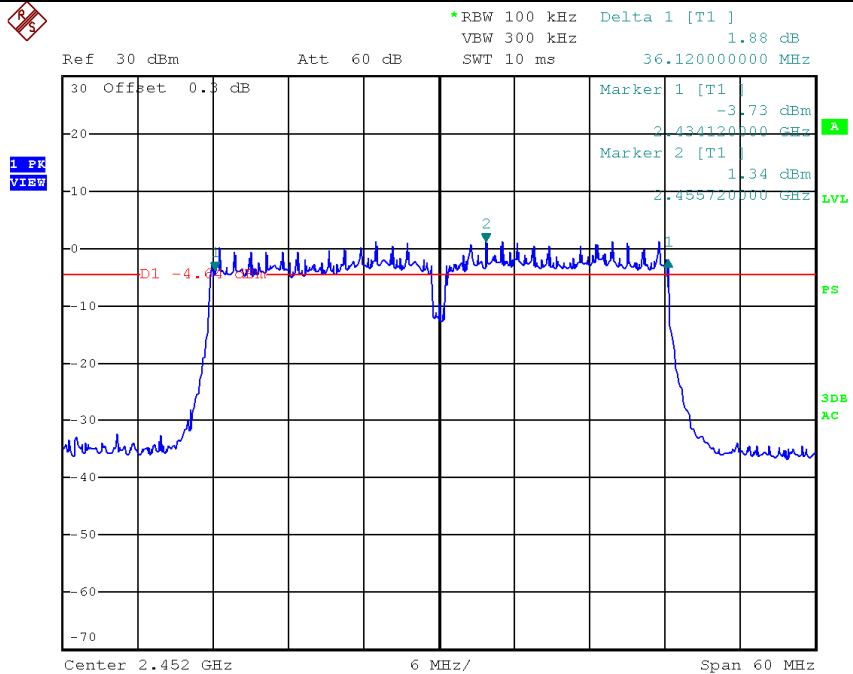
**802.11n40-2422**



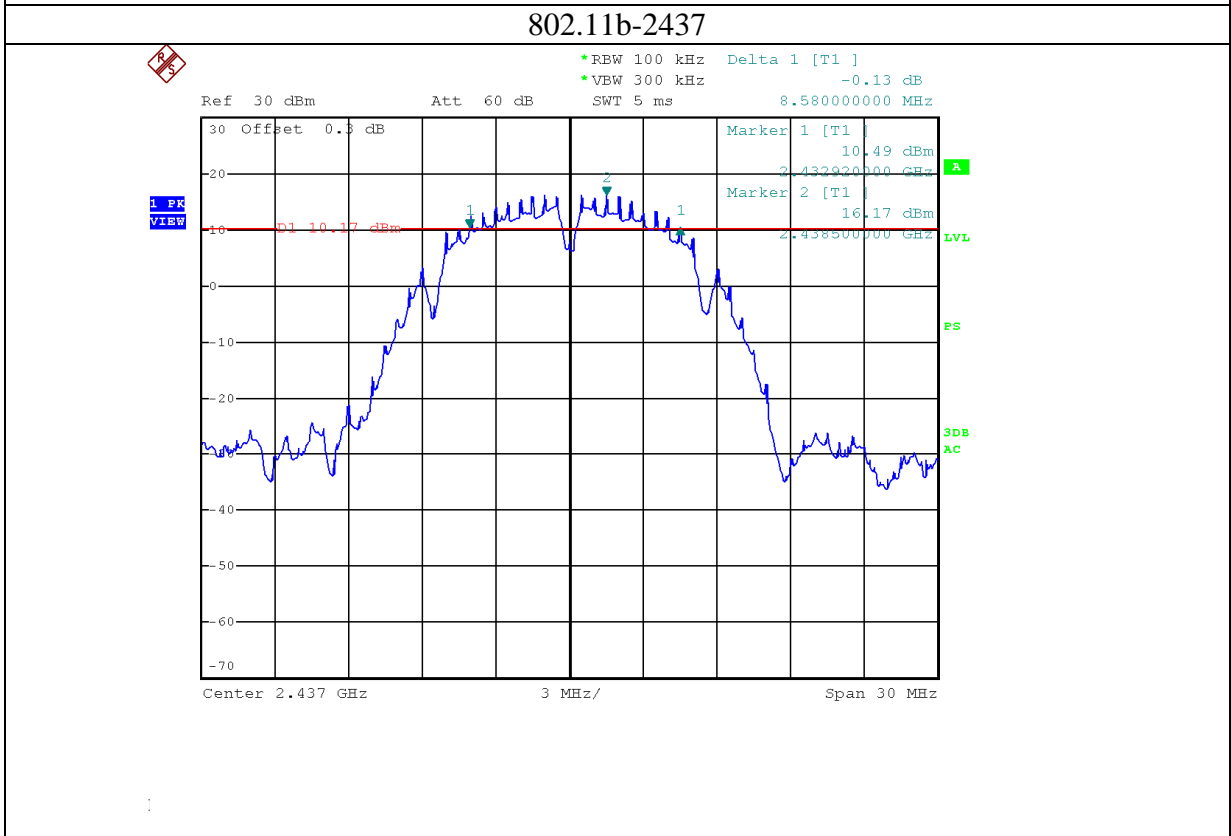
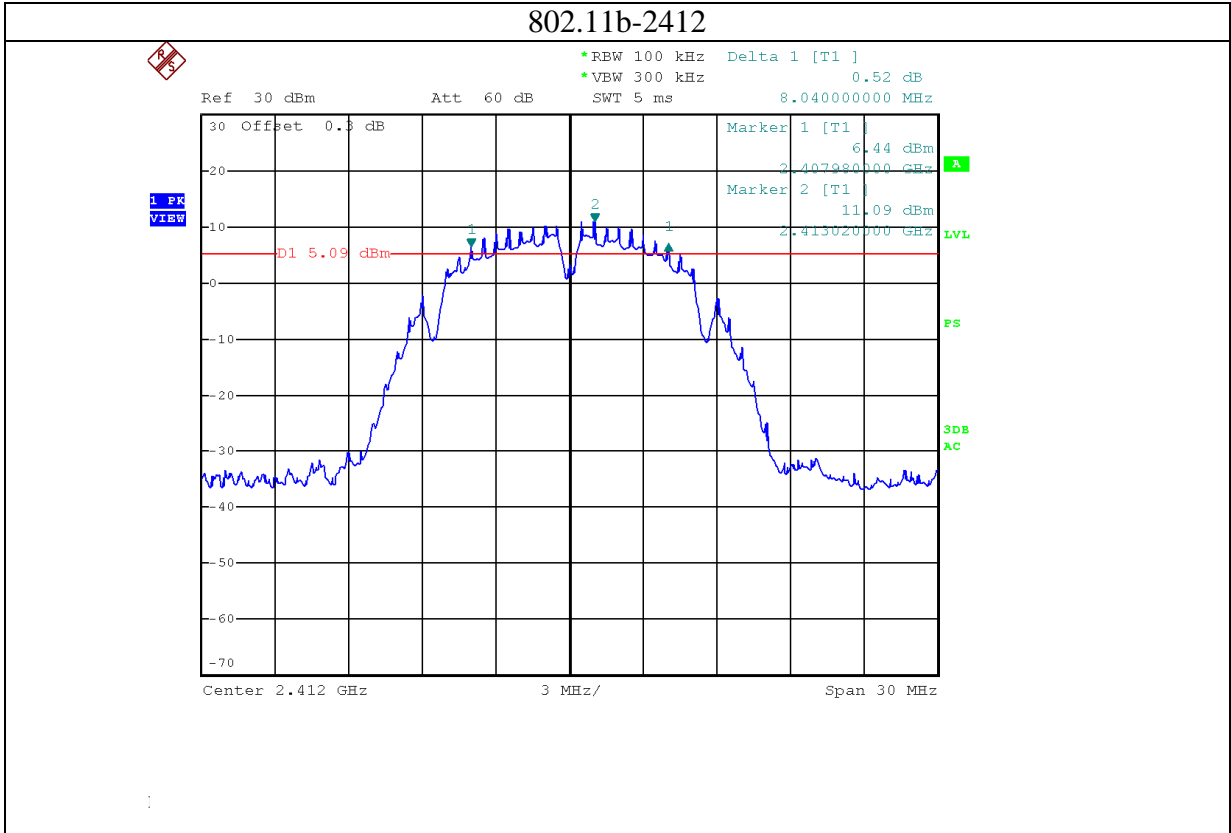
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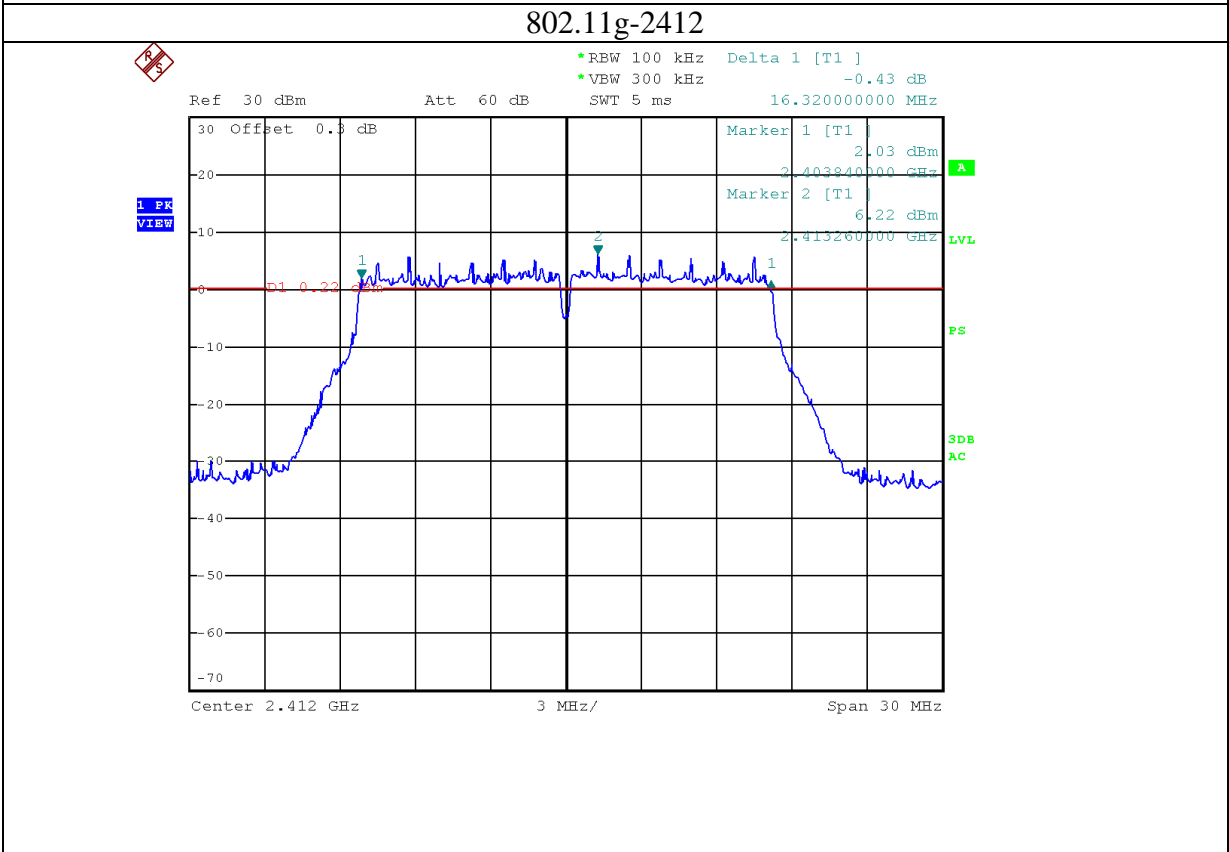
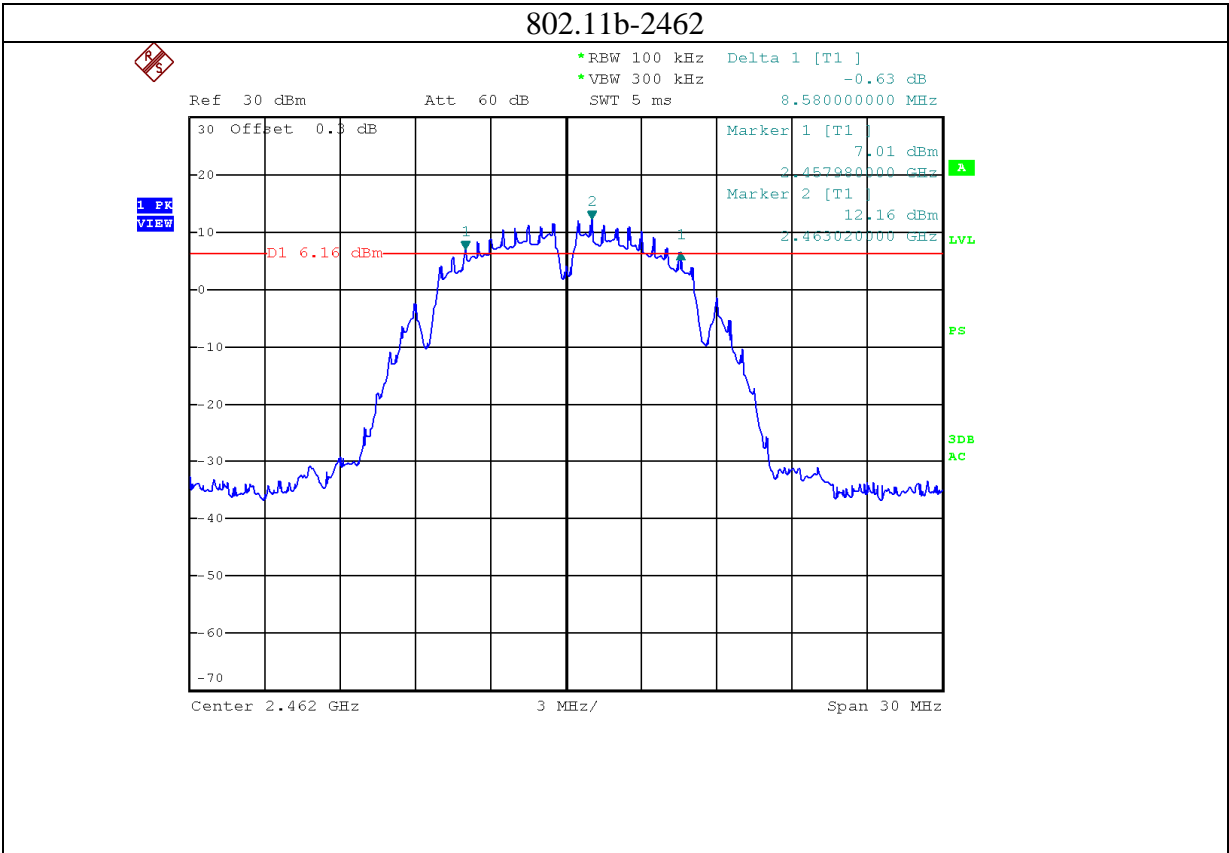
**802.11n40-2452**

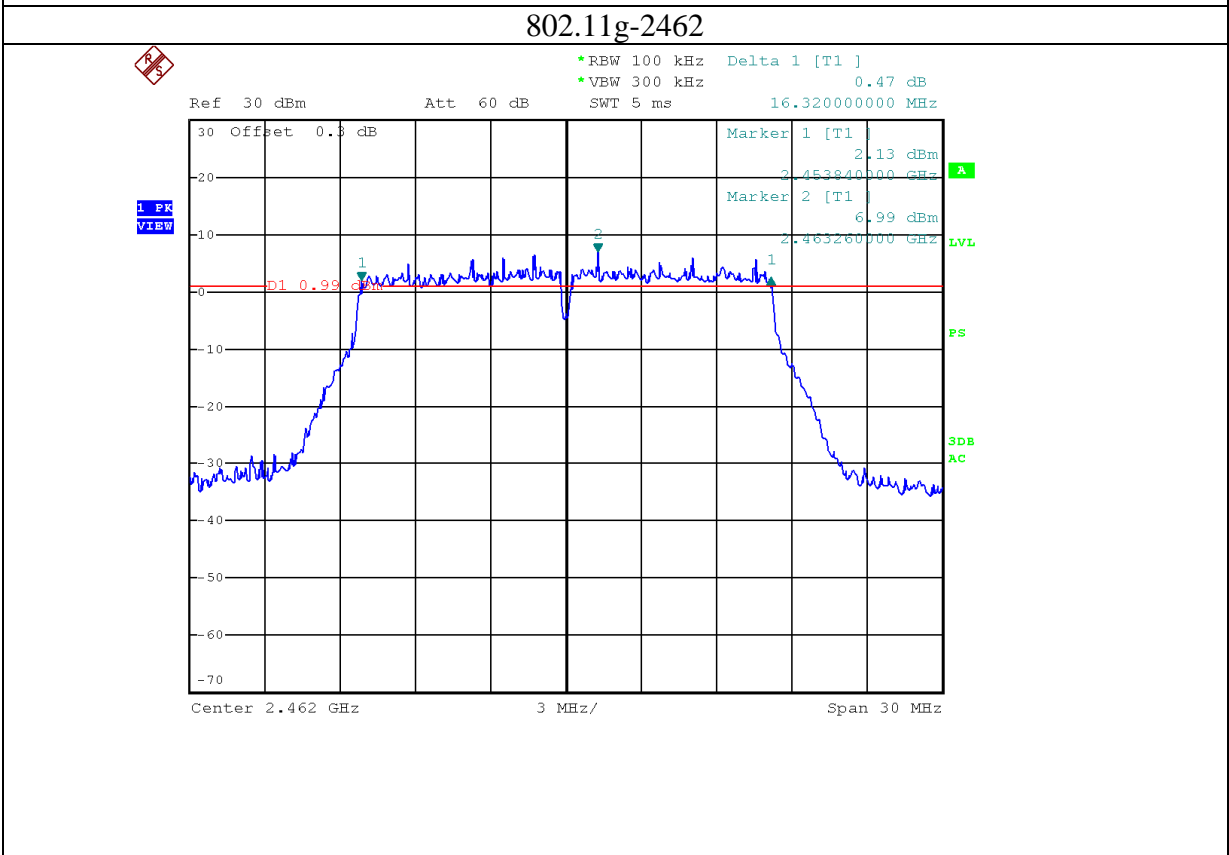
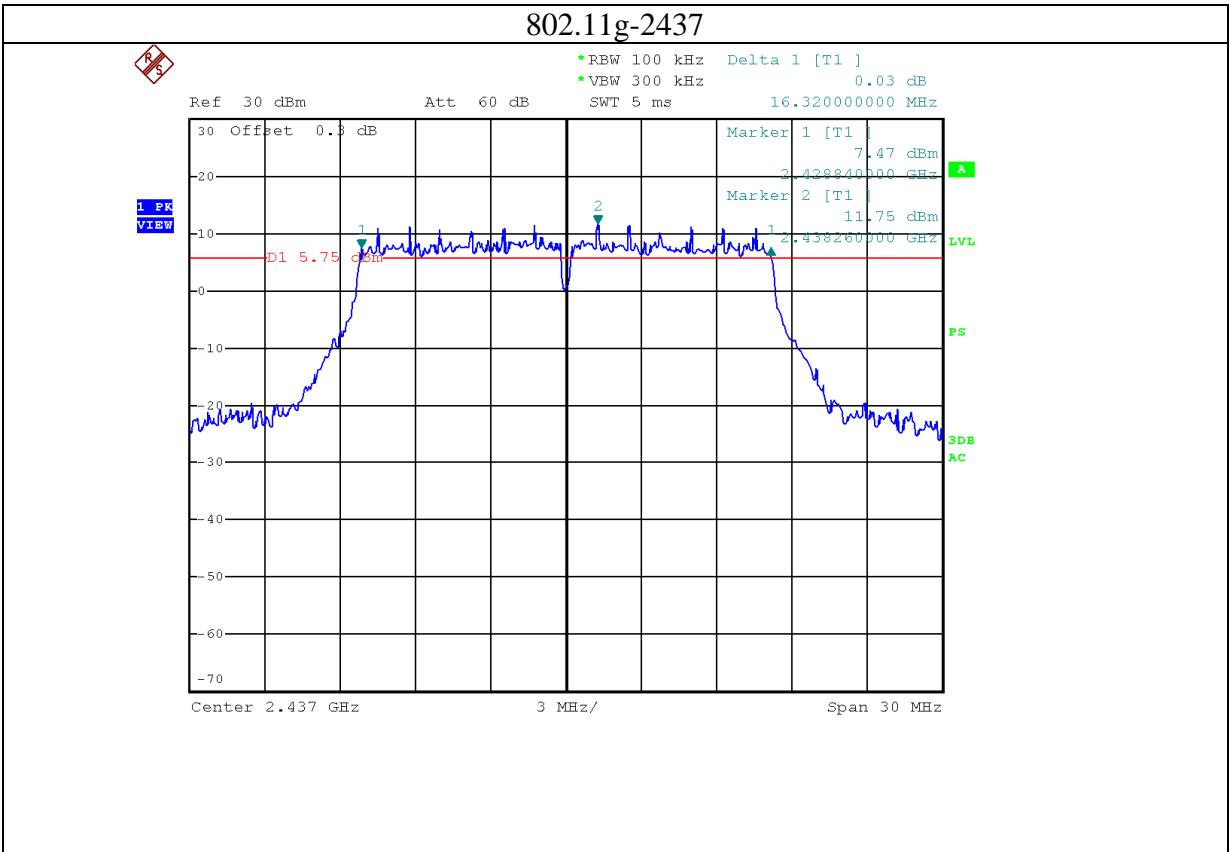


Port 2

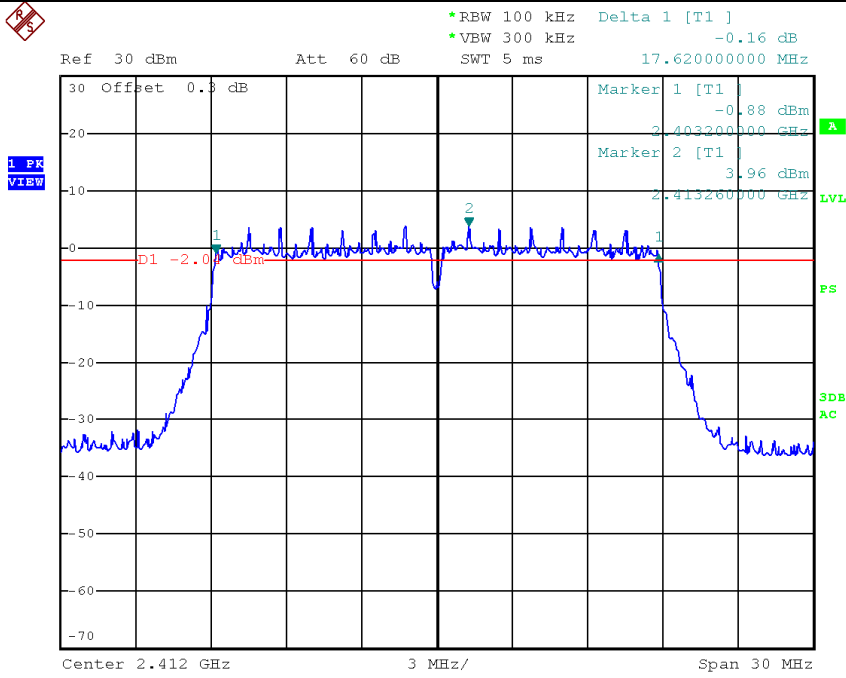




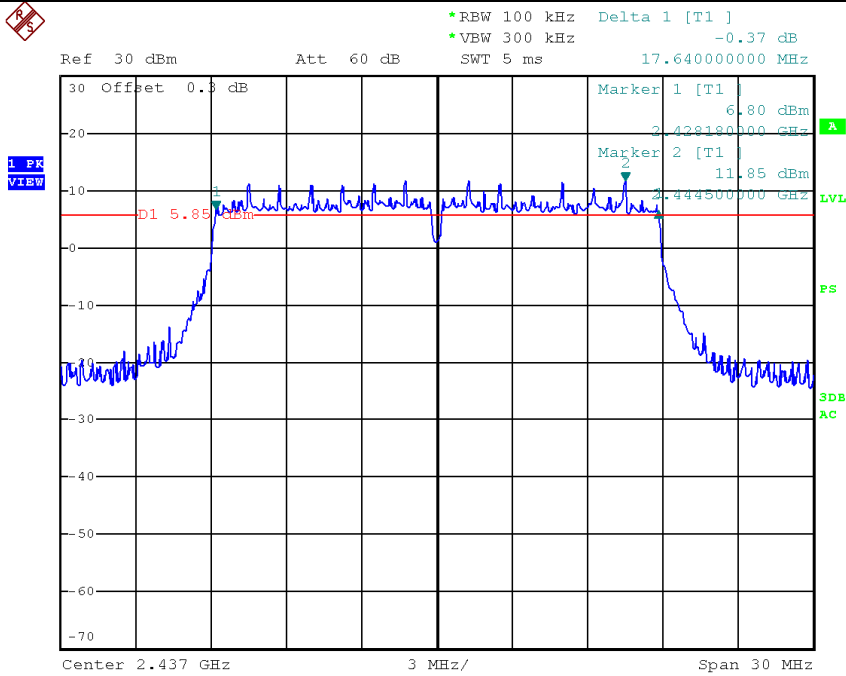




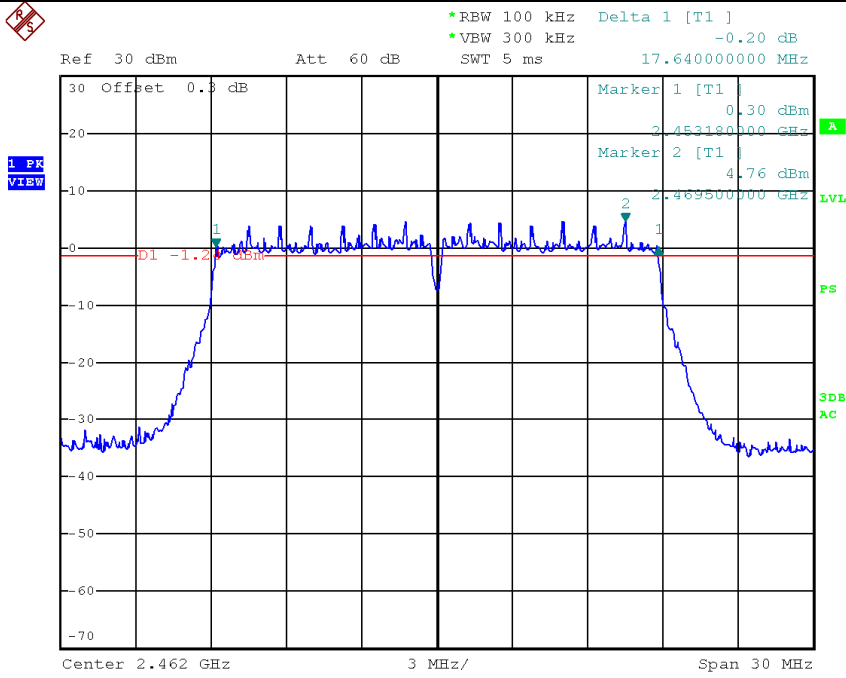
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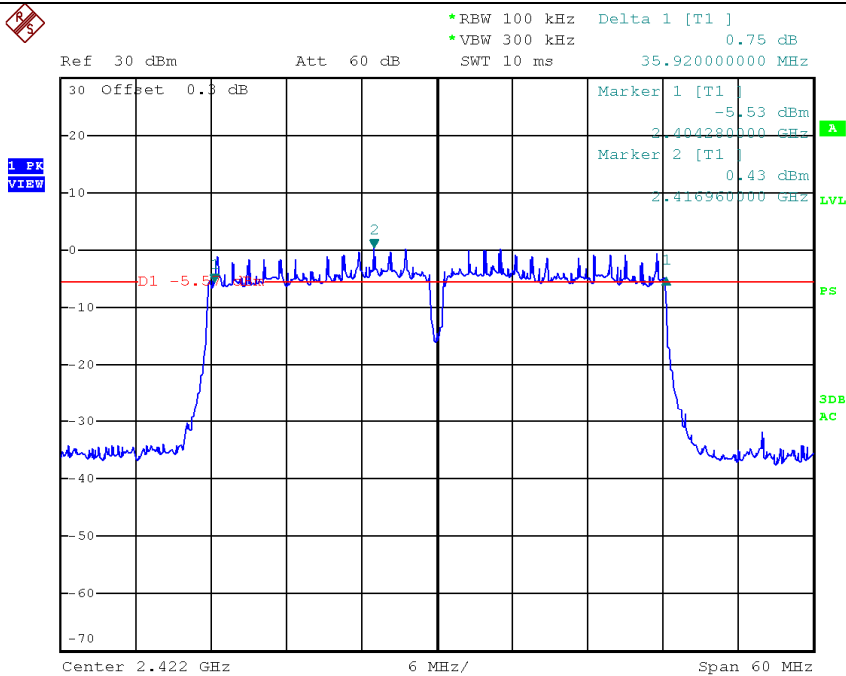
802.11n20-2437



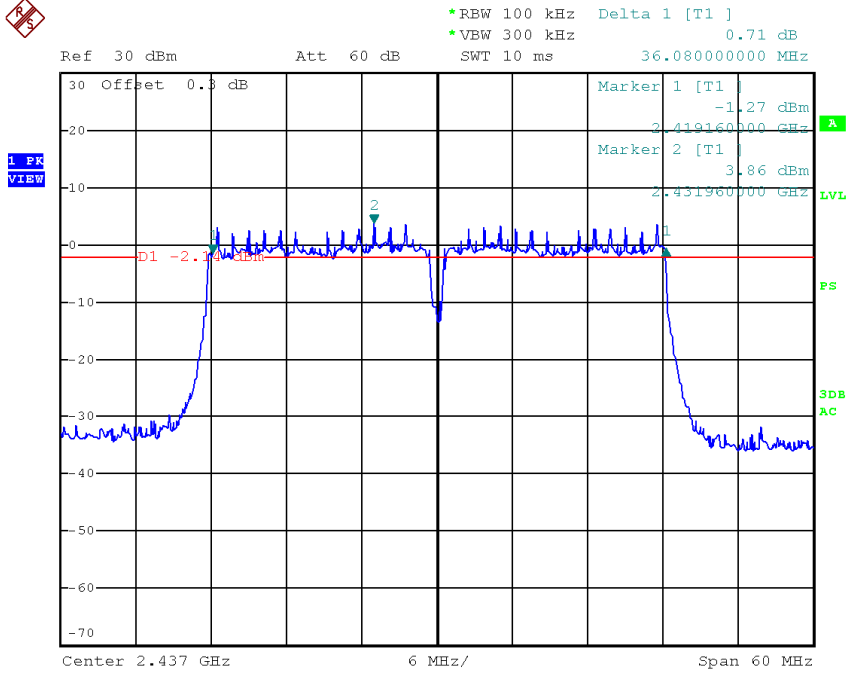
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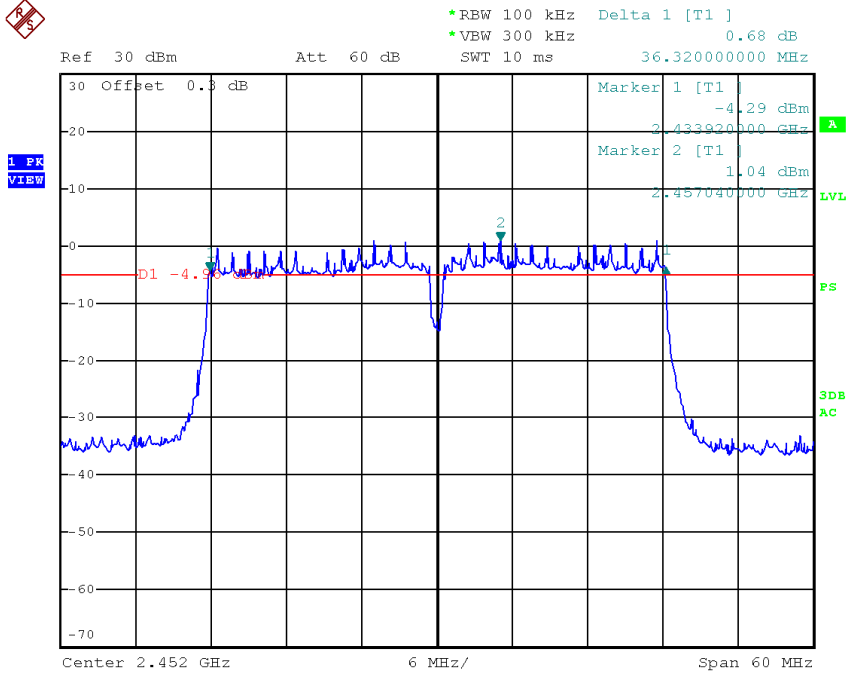
**802.11n40-2422**



**802.11n40-2437**



**802.11n40-2452**



#### 4. Maximum peak output power

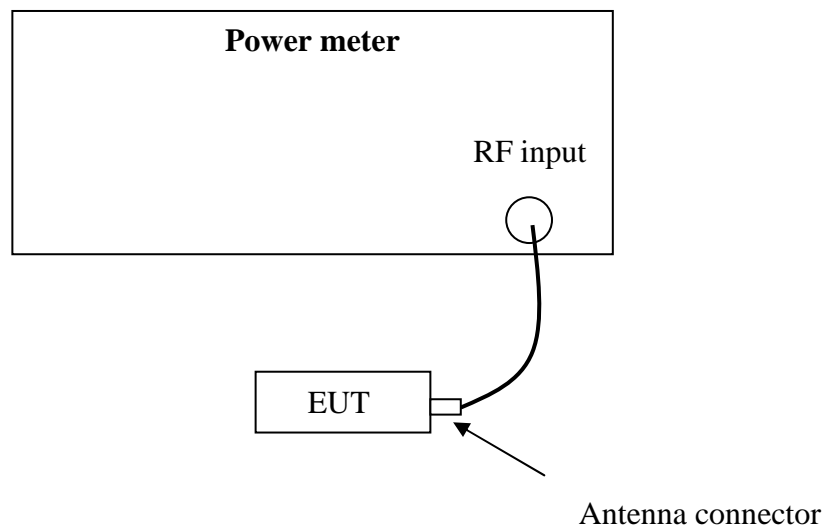
Test result: Pass

##### 4.1 Test limit

- For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt
- For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts
- For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt.

If the transmitting antenna of directional gain greater than 6dBi is used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi. If there have a beamforming type, the limit should be the minimum of 30dBm and 30+ (6 –antenna gain-beamforming gain).

##### 4.2 Test Configuration



##### 4.3 Test procedure and test setup

The EUT was tested according to DTS test procedure of “KDB558074 D01 DTS Meas Guidance v03r02” for compliance to FCC 47CFR 15.247 requirements (clause 9.1.2).

#### 4.4 Test protocol

Temperature : 25 °C

Relative Humidity : 55 %

Mode	Freq (MHz)	Factor (dB)	Reading (dBm)			Total power (dBm)	Limit (dBm)
			Port 0	Port 1	Port 2		
802.11b	2412	0.4	22.56	21.98	22.46	27.11	28.60
	2437	0.4	23.40	23.10	24.03	28.30	28.60
	2462	0.4	22.65	22.69	23.12	27.60	28.60
802.11g	2412	0.4	22.56	22.75	23.04	27.56	28.60
	2437	0.4	23.30	23.10	23.61	28.11	28.60
	2462	0.4	22.98	23.04	23.38	27.91	28.60
802.11n20	2412	0.4	20.28	20.30	20.68	25.20	25.60
	2437	0.4	20.30	20.56	20.76	25.32	25.60
	2462	0.4	20.16	20.21	20.57	25.09	25.60
802.11n40	2422	0.4	20.27	20.23	20.67	25.17	25.60
	2437	0.4	20.67	20.30	20.78	25.36	25.60
	2452	0.4	20.16	20.01	20.56	25.02	25.60

Note: 1. Peak power meter is applied.

2. Factor = Cable loss

3. For antenna gain = 7.4dBi and with beamforming, the limit should be corrected.

4. Total power =  $10 * \lg(10^{\text{port } 0 / 10} + 10^{\text{port } 1 / 10} + 10^{\text{port } 2 / 10})$

## 5. Power spectrum density

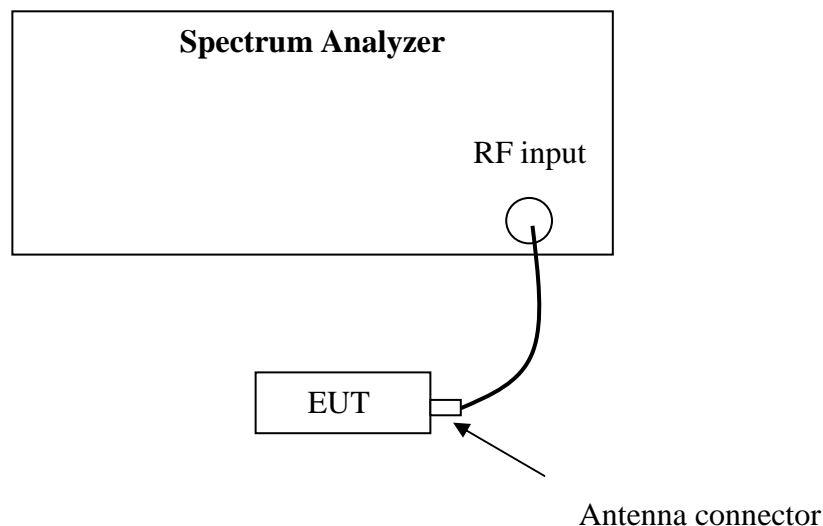
**Test result:** Pass

### 5.1 Test limit

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

If the transmitting antenna of directional gain greater than 6dBi is used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi. If there have a beamforming type, the limit should be the minimum of 8dBm/MHz and  $8 + (6 - \text{antenna gain} - \text{beamforming gain})$ .

### 5.2 Test Configuration



### 5.3 Test procedure and test setup

The power output per FCC §15.247(e) was tested according to DTS test procedure of “KDB558074 D01 DTS Meas Guidance v03r02” (clause 10.2) for compliance to FCC 47CFR 15.247 requirements.





**5.4 Test Protocol**

Temperature : 25 °C  
Relative Humidity: 55 %

Mode	Freq (MHz)	Factor (dB)	Reading (dBm / 3kHz)			Total PSD (dBm / 3kHz)	Limit (dBm/MHz)
			Port 0	Port 1	Port 2		
802.11b	2412	0.4	-4.09	-4.69	-3.81	0.59	6.60
	2437	0.4	-4.22	-3.06	-4.14	1.00	6.60
	2462	0.4	-3.31	-1.73	-2.76	2.22	6.60
802.11g	2412	0.4	-12.89	-13.04	-12.56	-8.06	6.60
	2437	0.4	-12.51	-12.91	-12.32	-7.80	6.60
	2462	0.4	-11.93	-13.13	-12.22	-7.63	6.60
802.11n20	2412	0.4	-15.54	-14.44	-14.10	-9.88	3.60
	2437	0.4	-14.81	-15.05	-14.10	-9.86	3.60
	2462	0.4	-14.97	-14.25	-15.61	-10.14	3.60
802.11n40	2422	0.4	-17.26	-17.74	-15.68	-12.03	3.60
	2437	0.4	-19.25	-17.66	-18.61	-13.68	3.60
	2452	0.4	-18.63	-17.55	-18.31	-13.37	3.60

Note: 1. Factor = Cable loss

2. For antenna gain = 7.4dBi and with beamforming, the limit should be corrected.

3. Total PSD =  $10 * \lg(10^{\text{port } 0 / 10} + 10^{\text{port } 1 / 10} + 10^{\text{port } 2 / 10})$

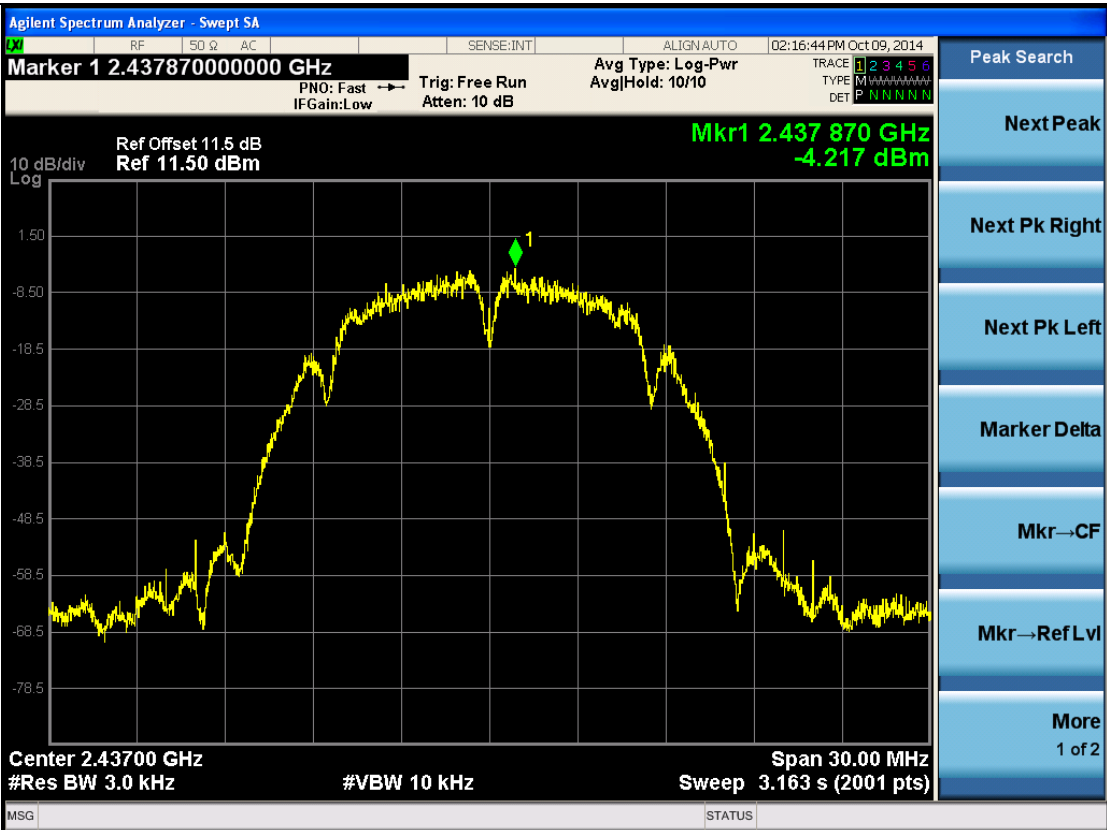


Port 0

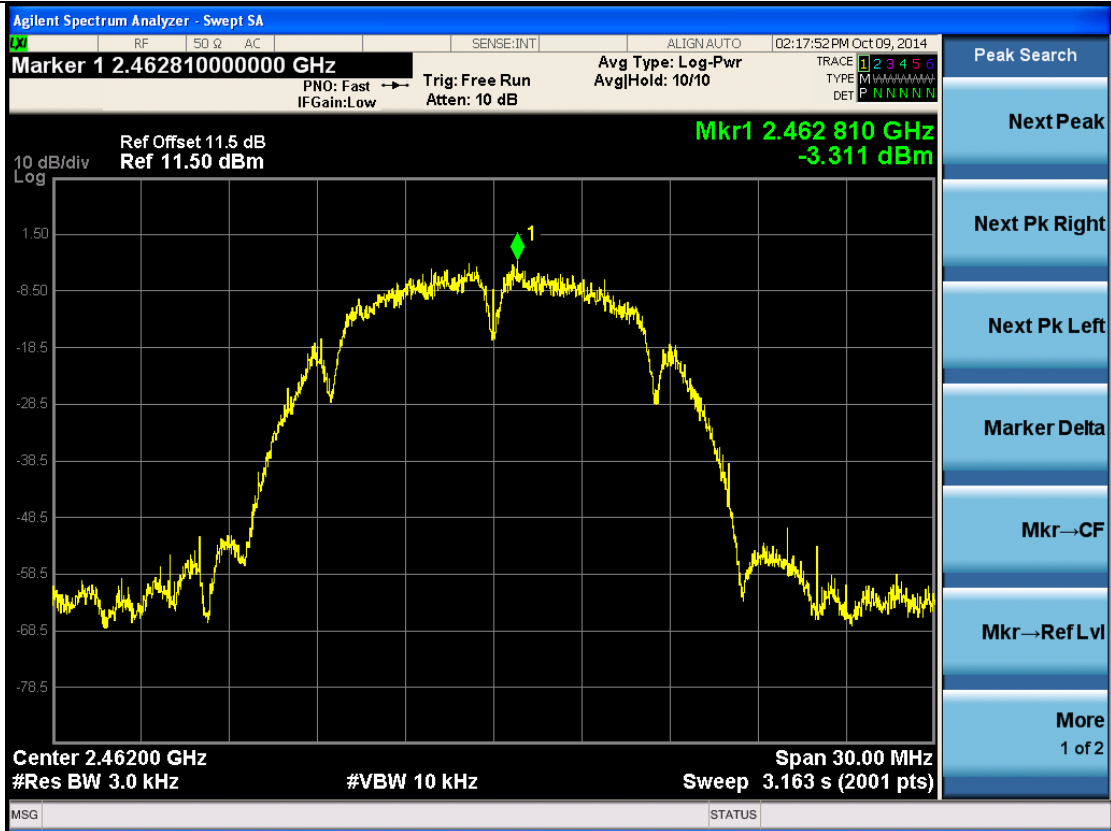
802.11b-2412



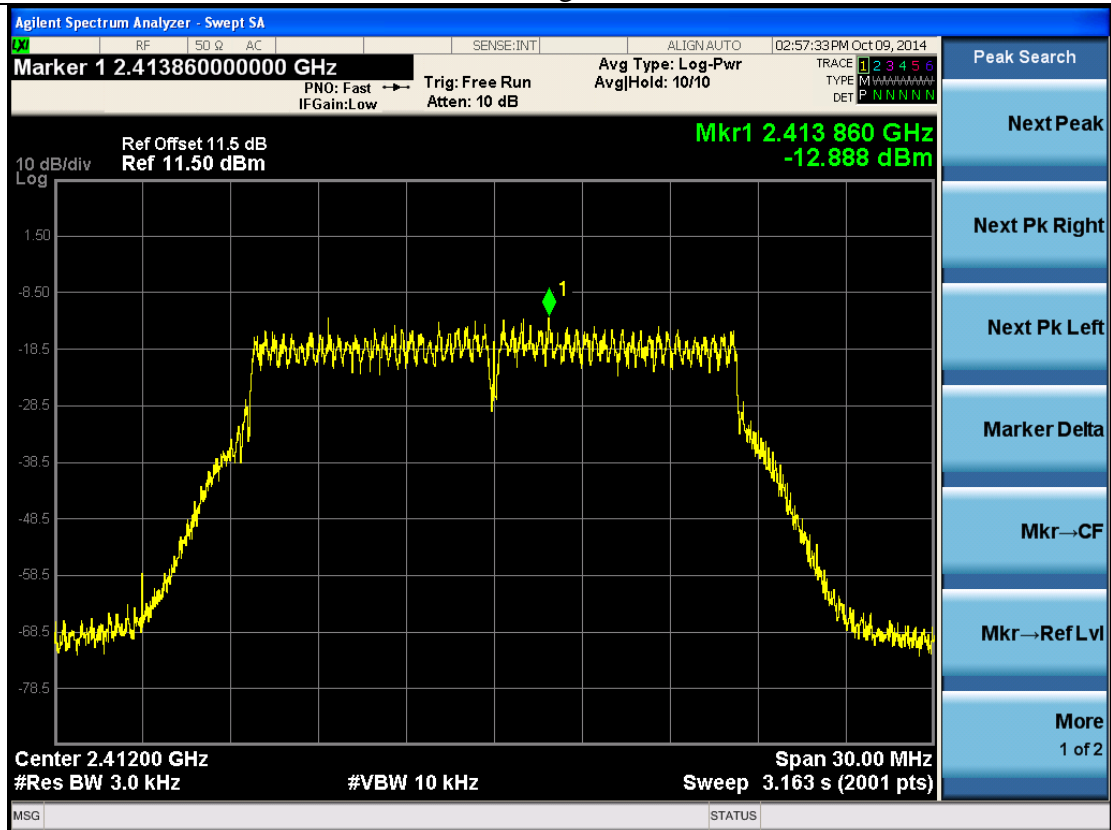
802.11b-2437



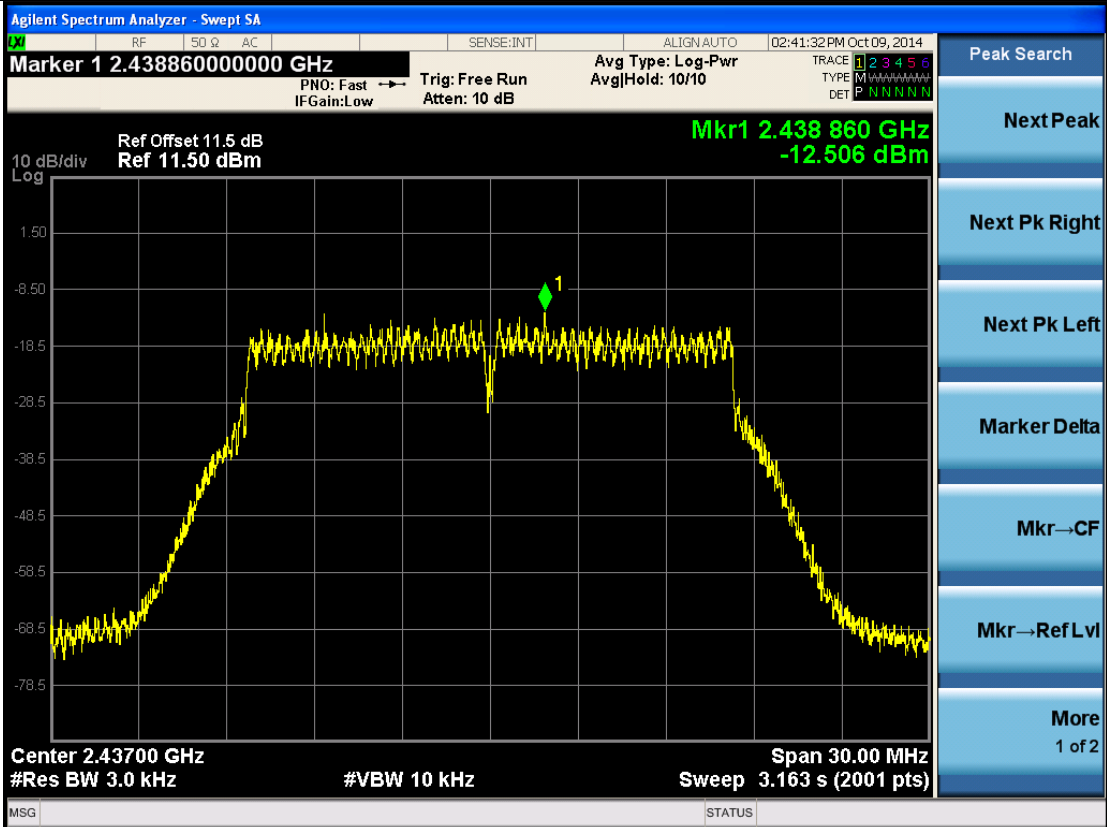
802.11b-2462



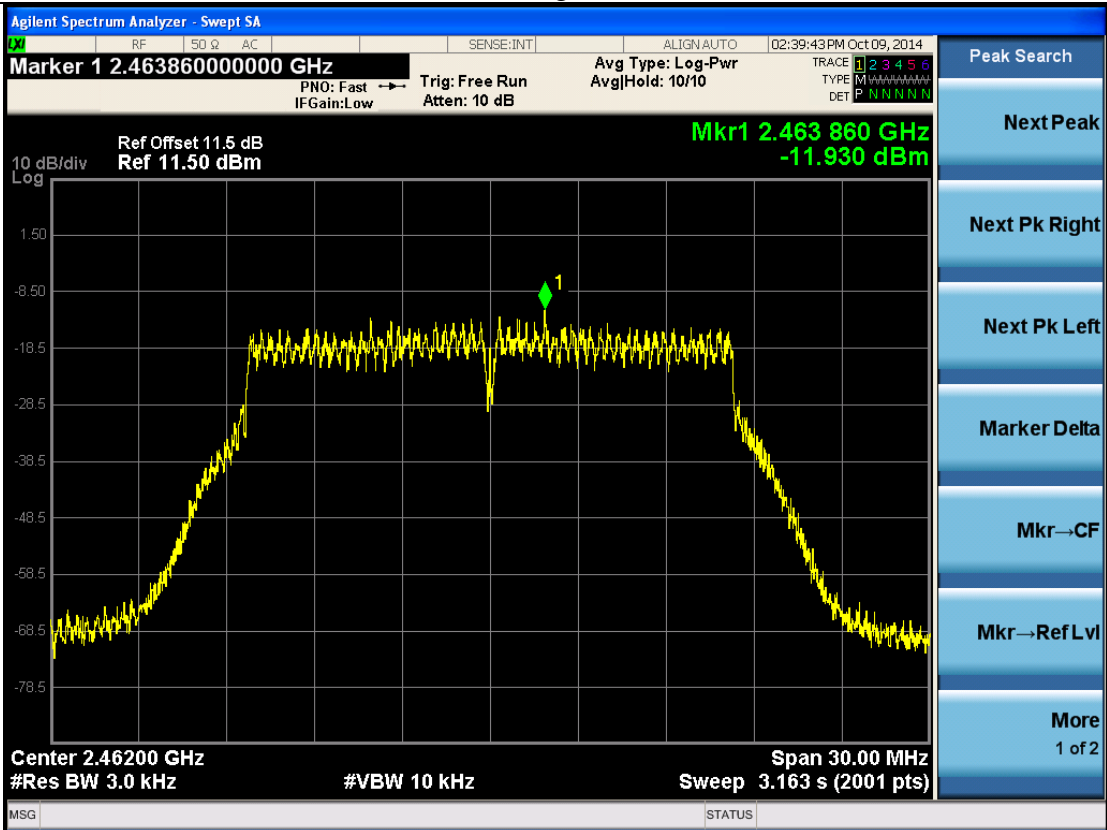
802.11g-2412



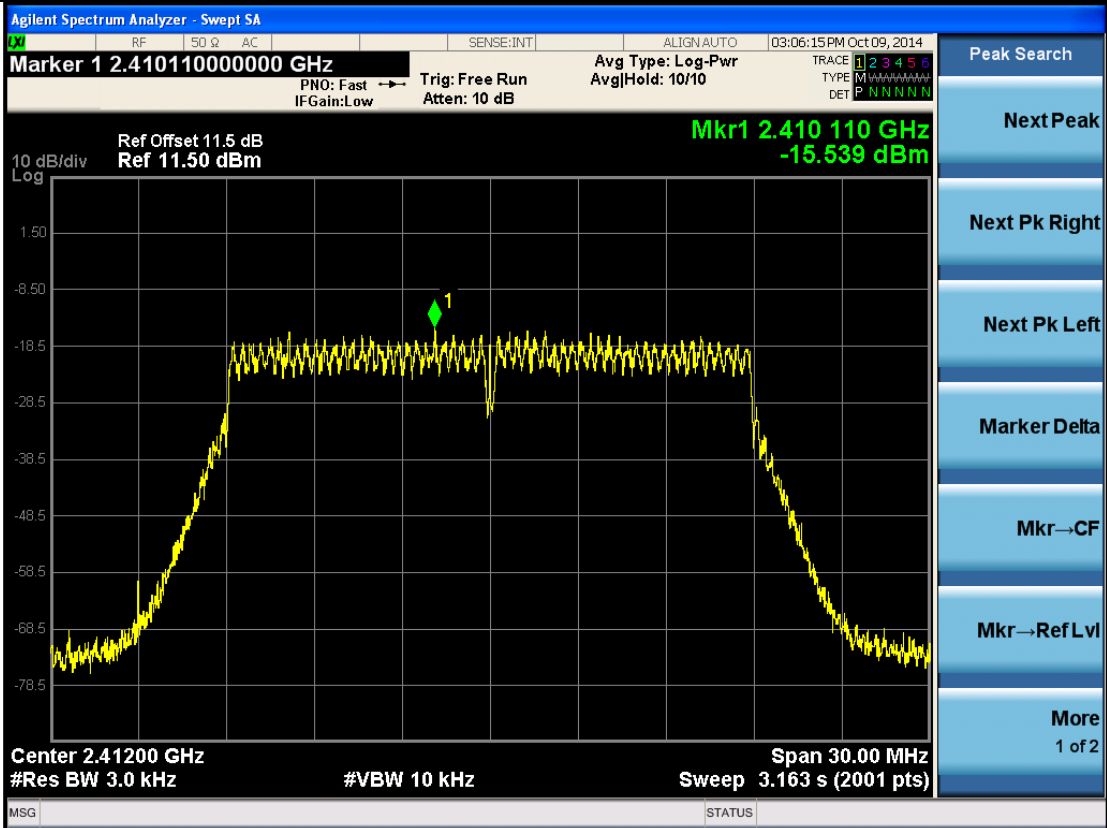
802.11g-2437



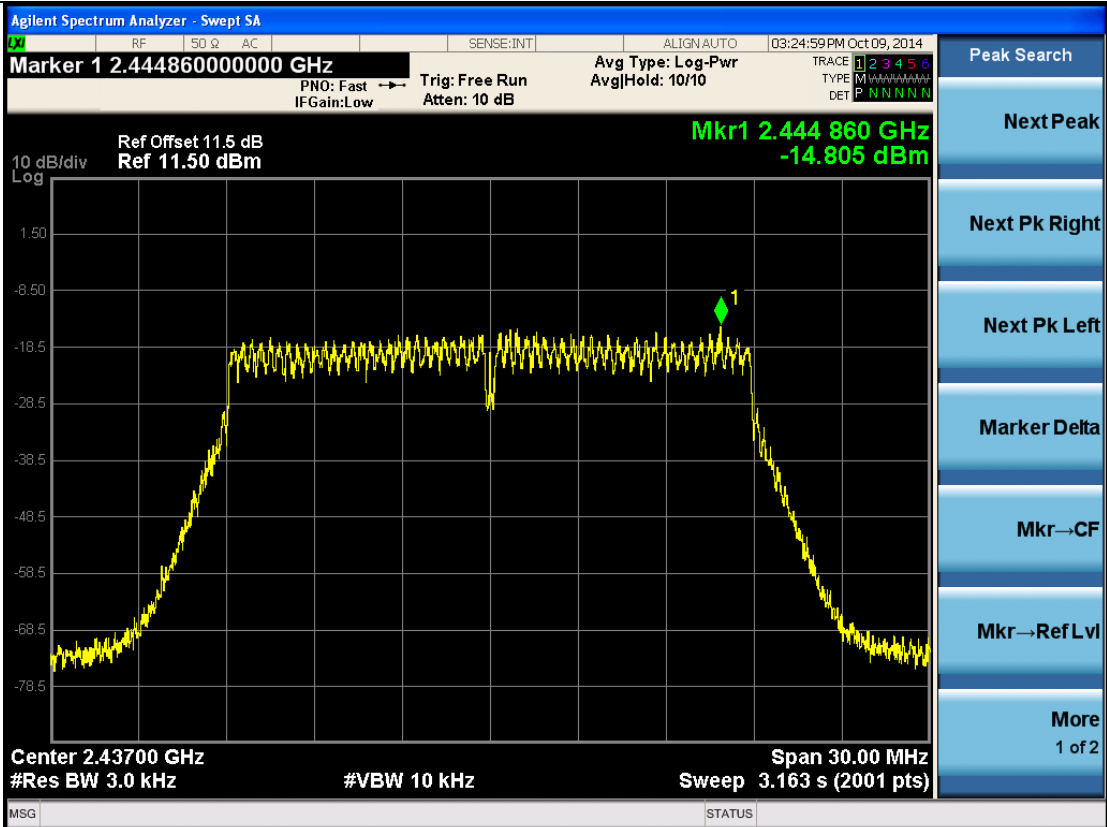
802.11g-2462



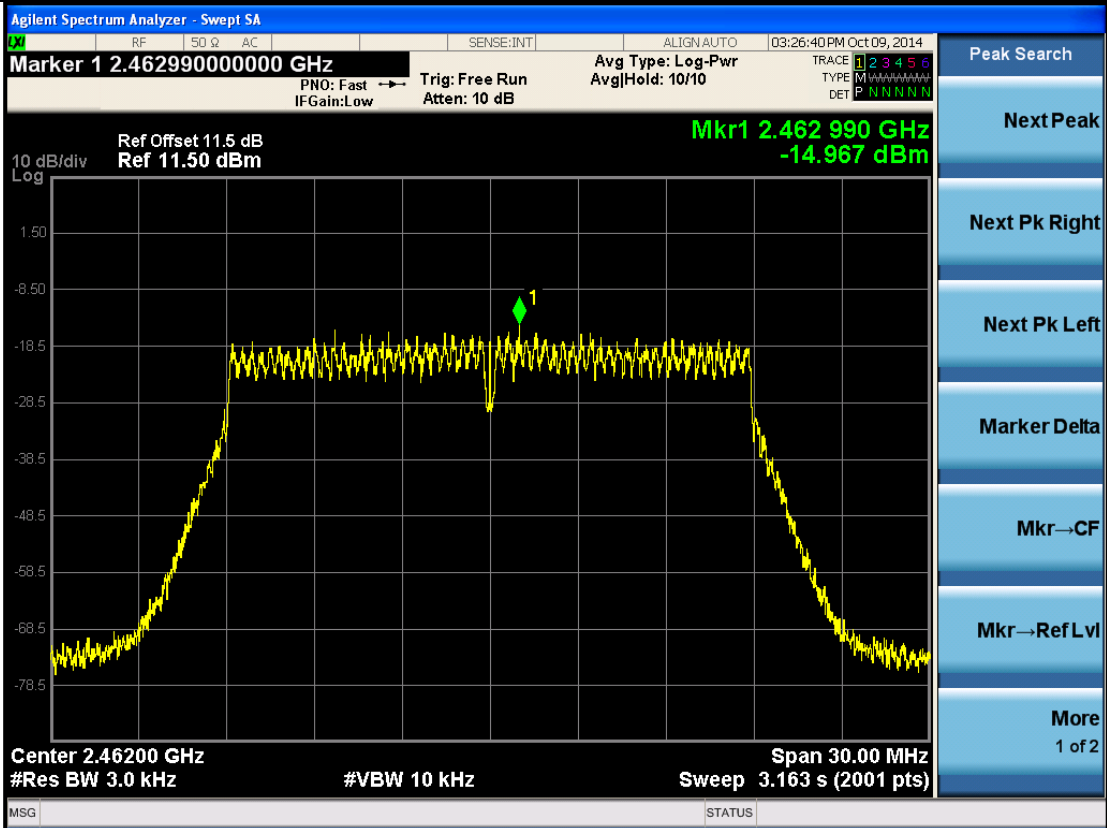
802.11n20-2412



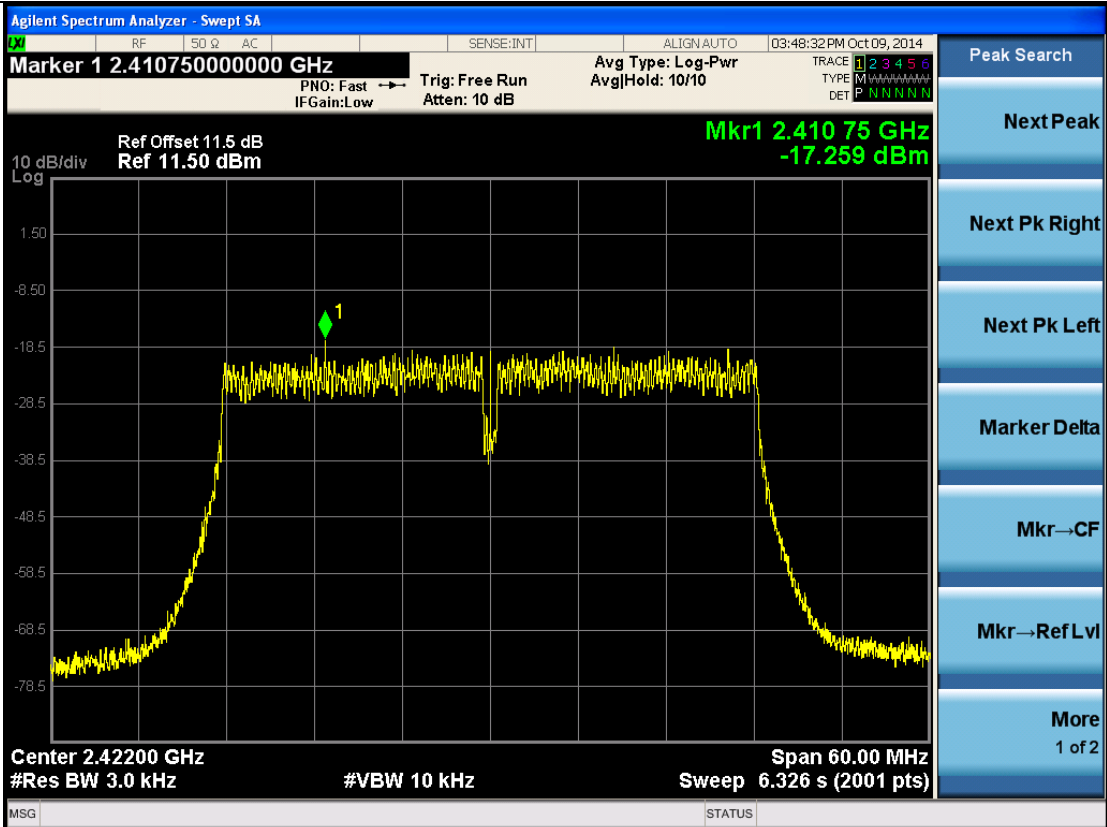
802.11n20-2437

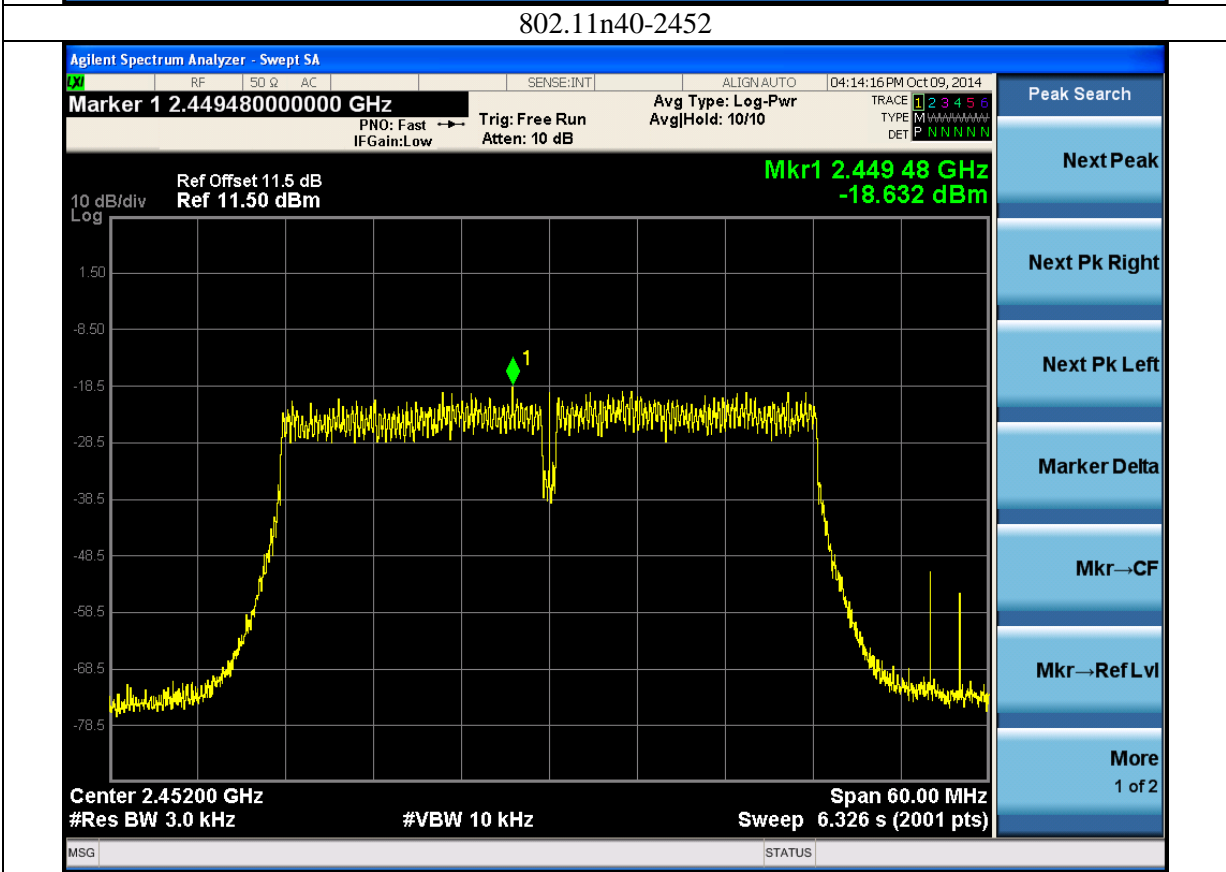
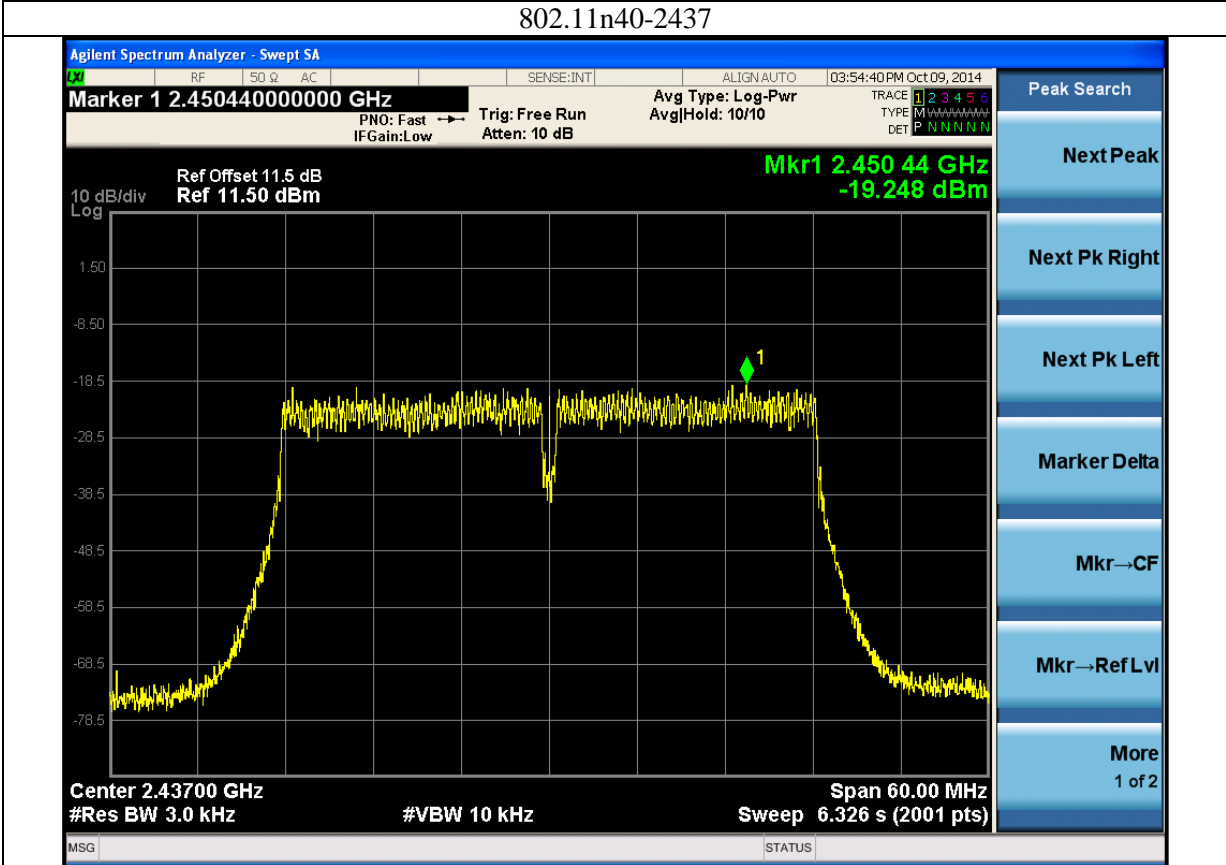


802.11n20-2462



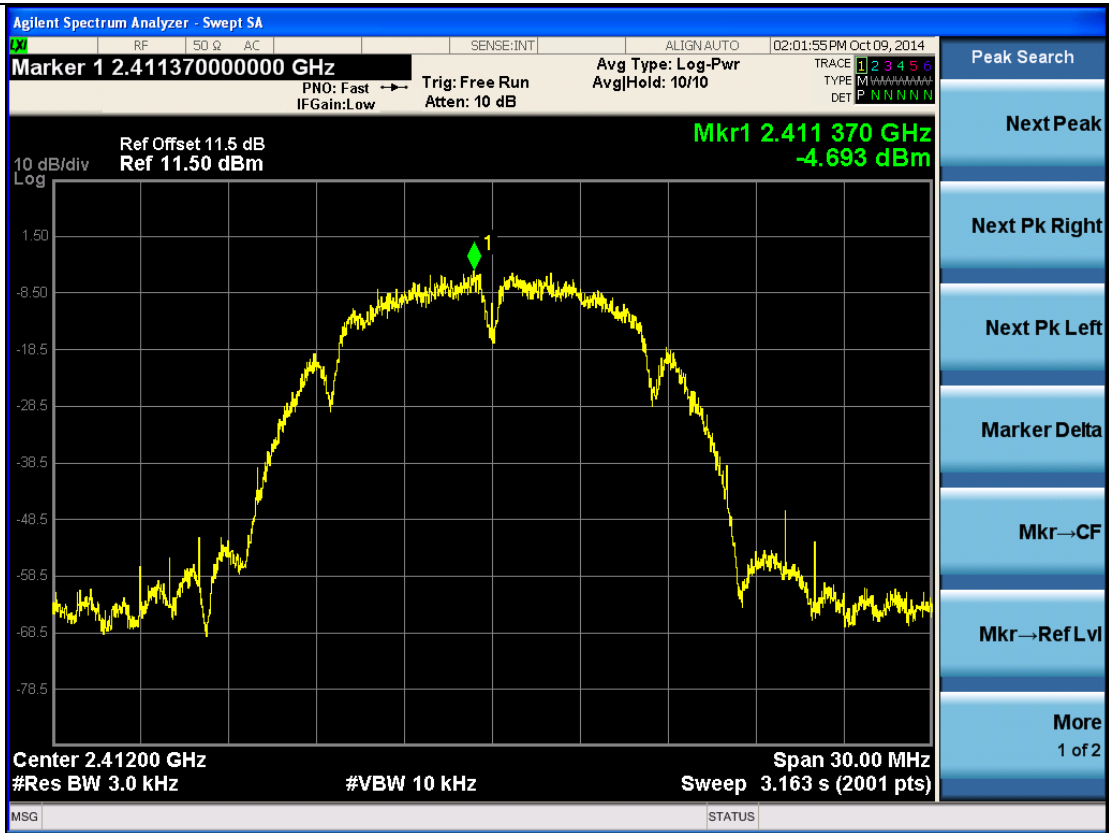
802.11n40-2422





Port 1

802.11b-2412



802.11b-2437



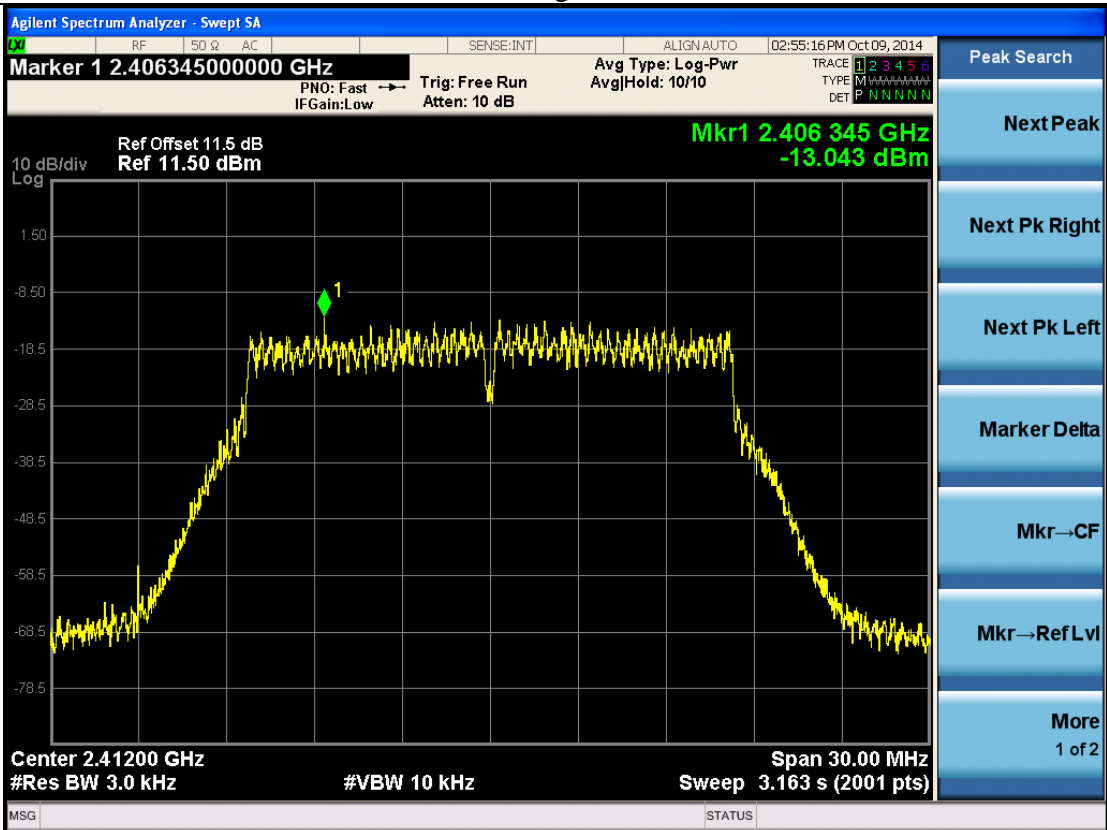




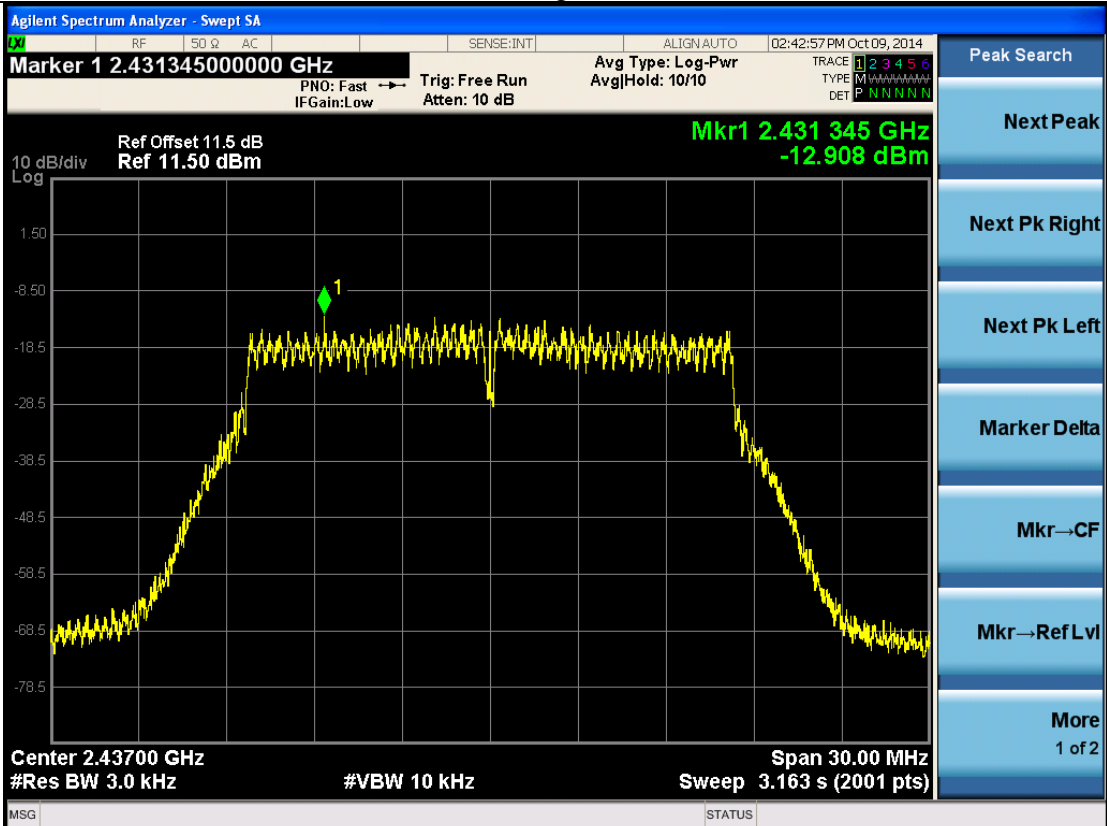
802.11b-2462



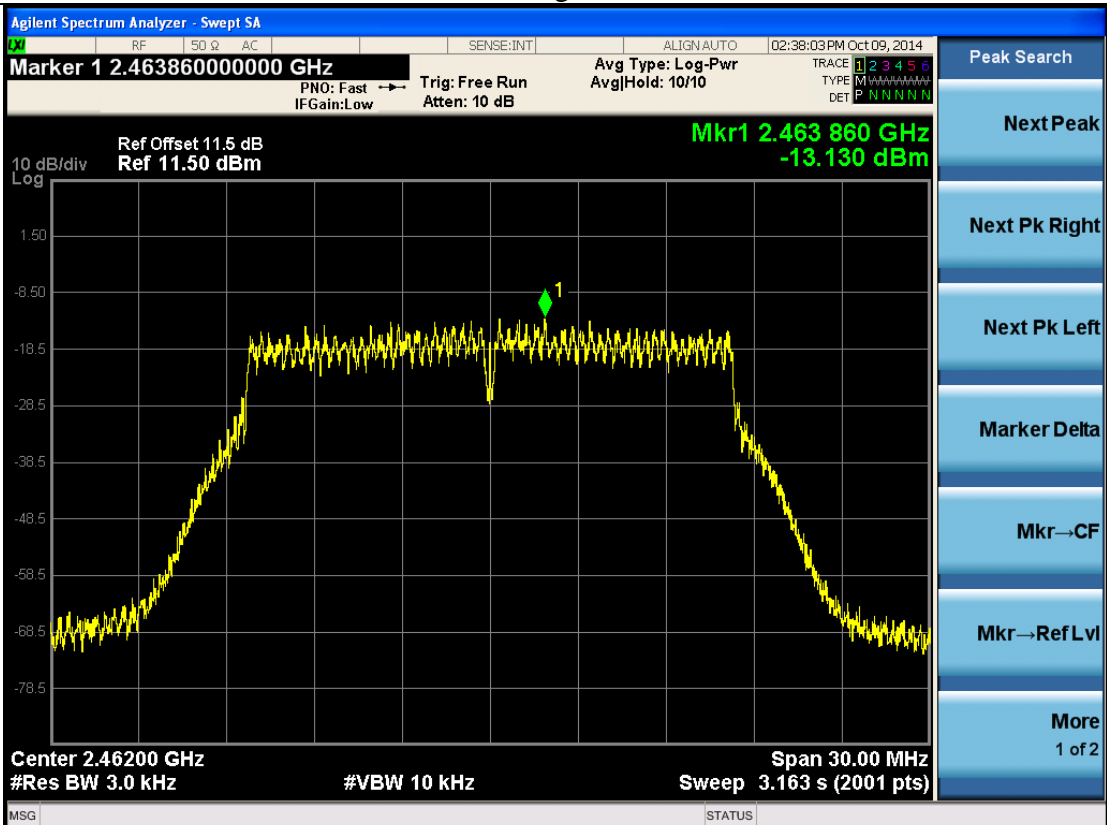
802.11g-2412



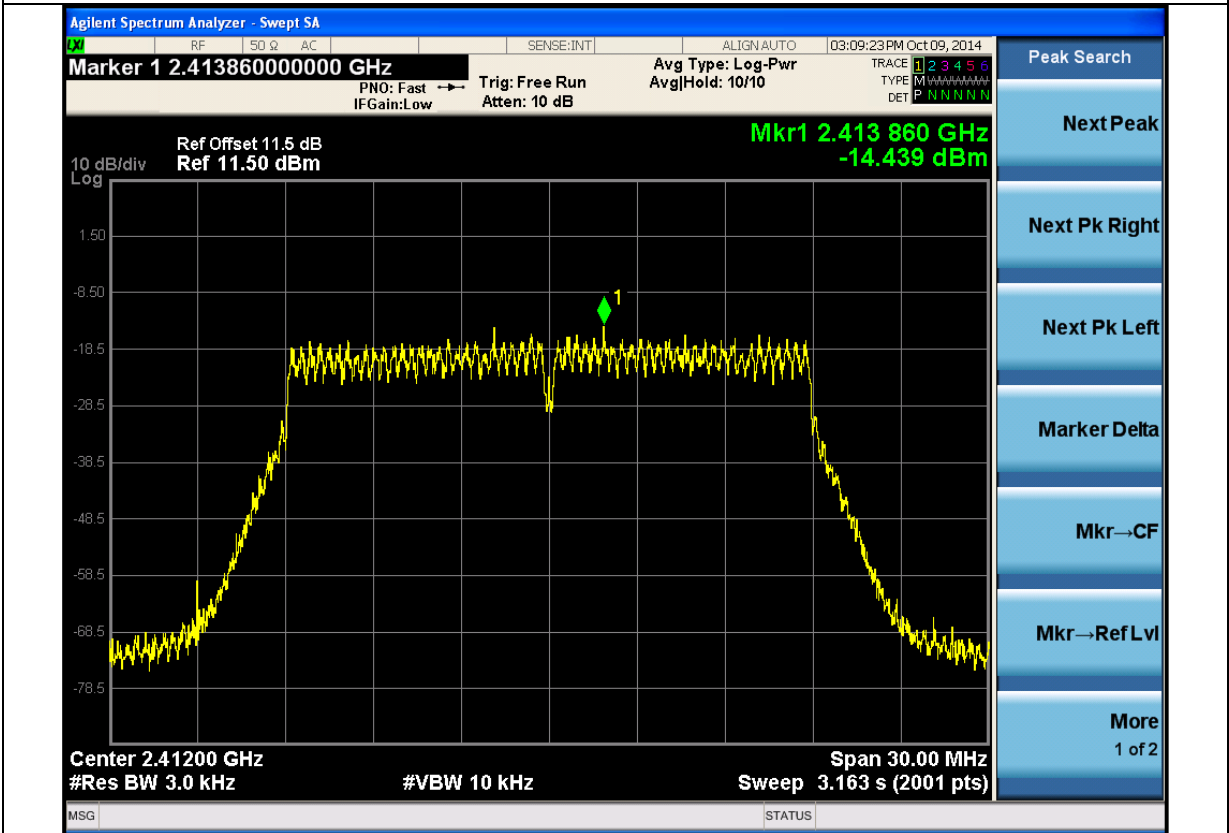
802.11g-2437



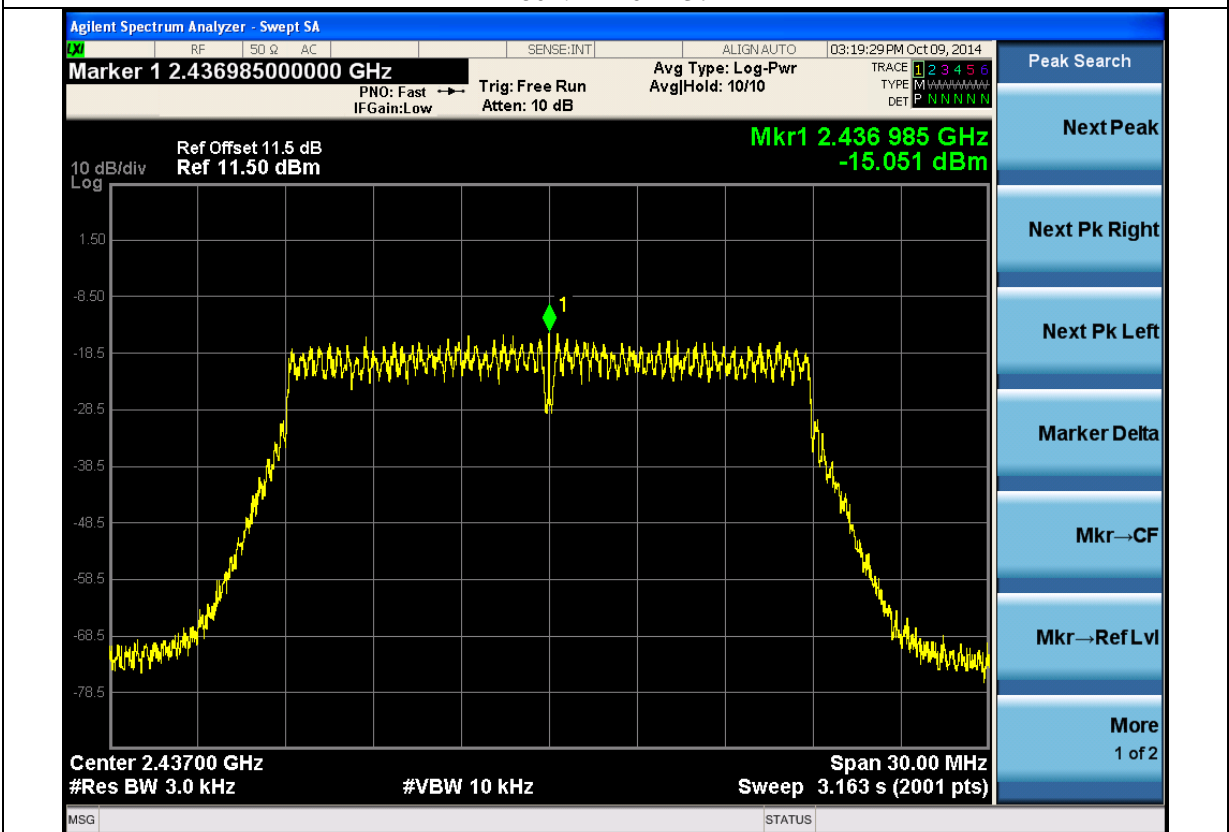
802.11g-2462



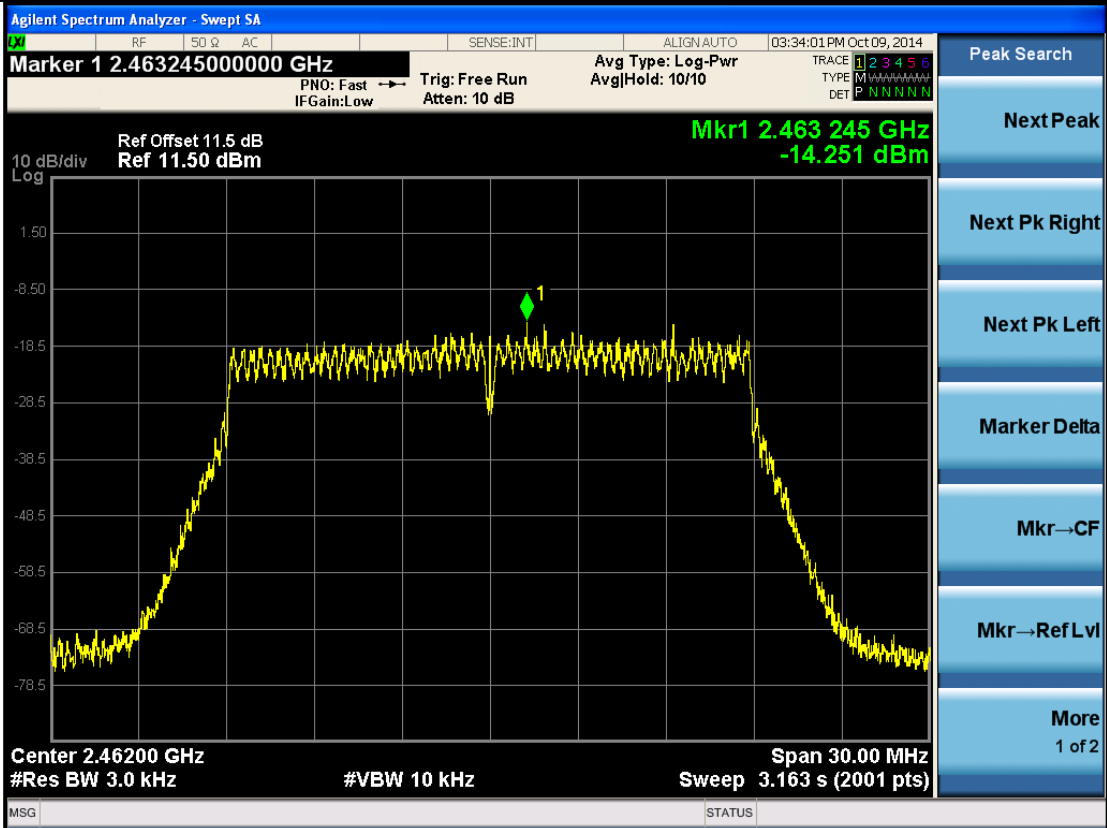
802.11n20-2412



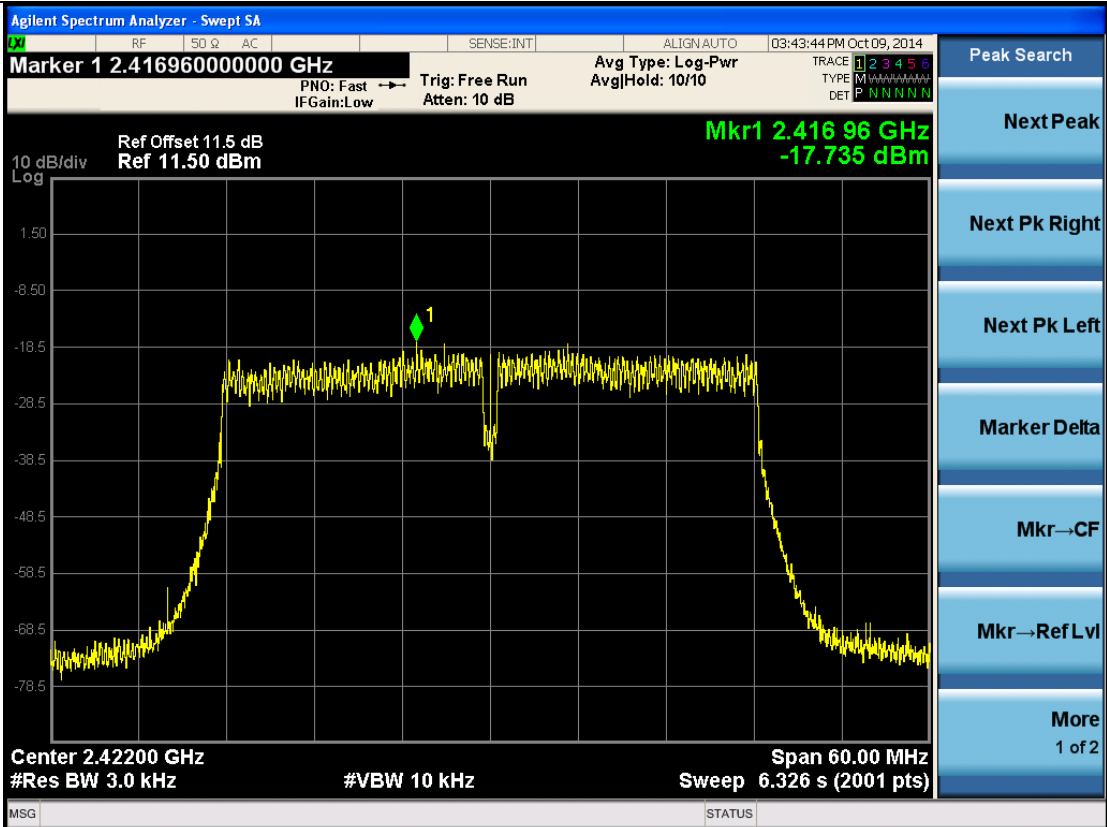
802.11n20-2437



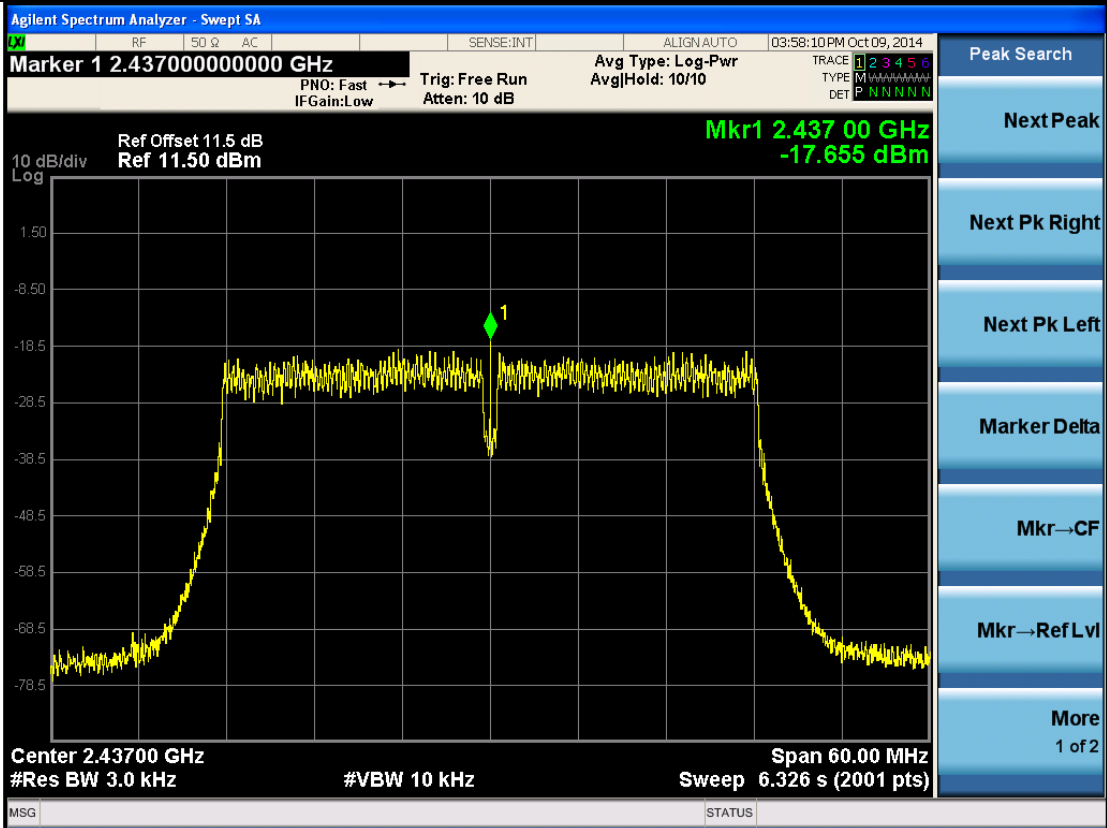
802.11n20-2462



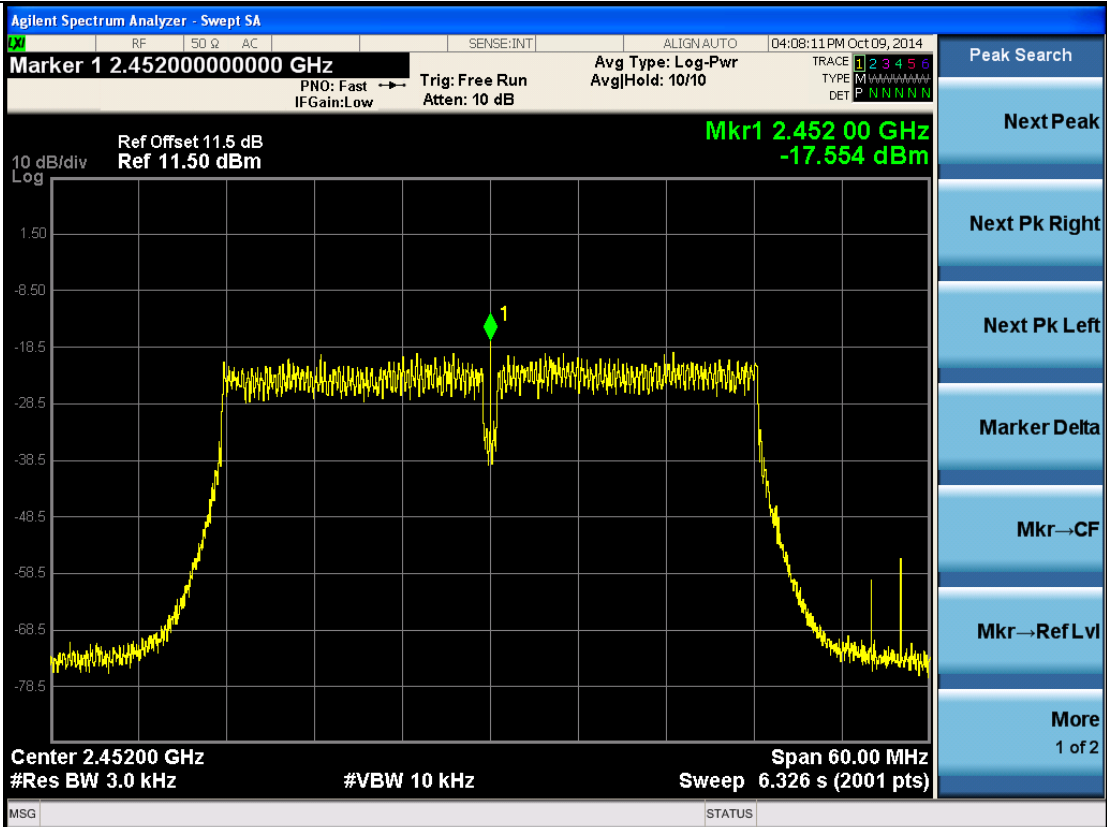
802.11n40-2422



802.11n40-2437

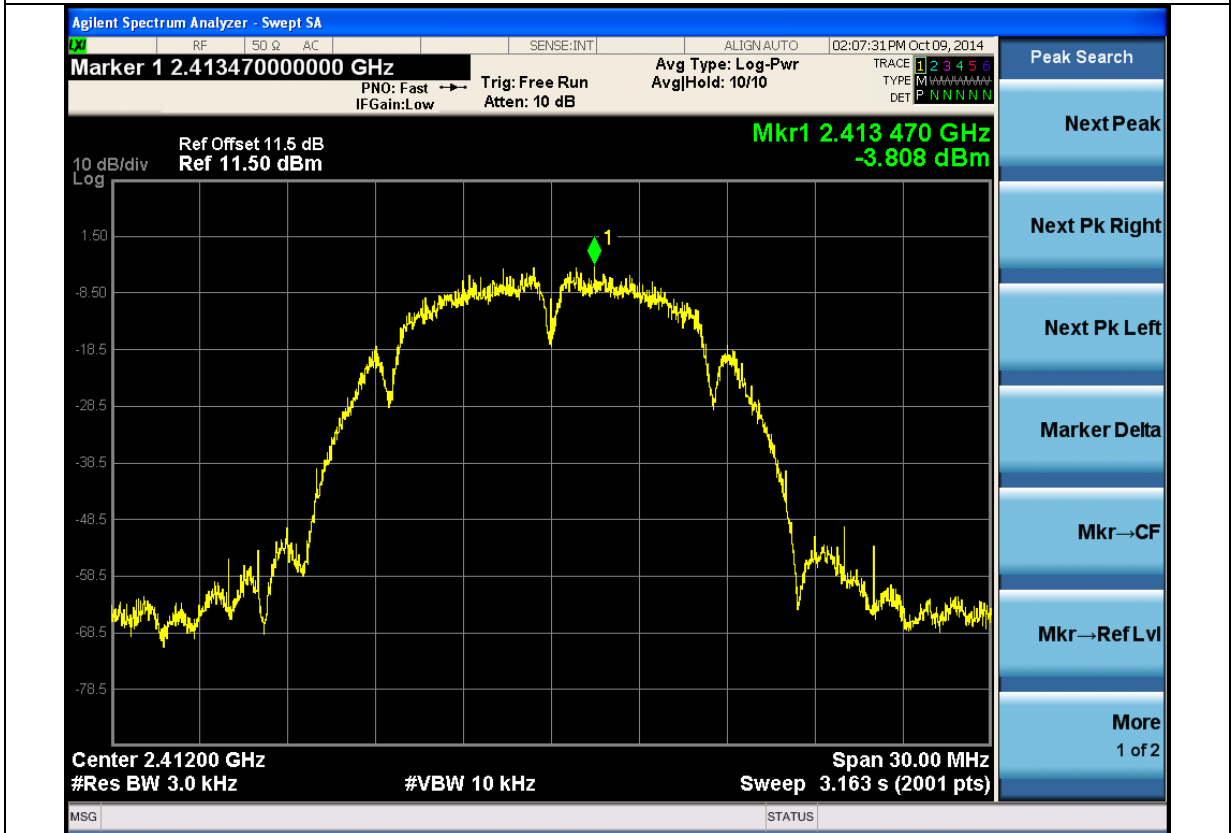


802.11n40-2452



Port 2

802.11b-2412



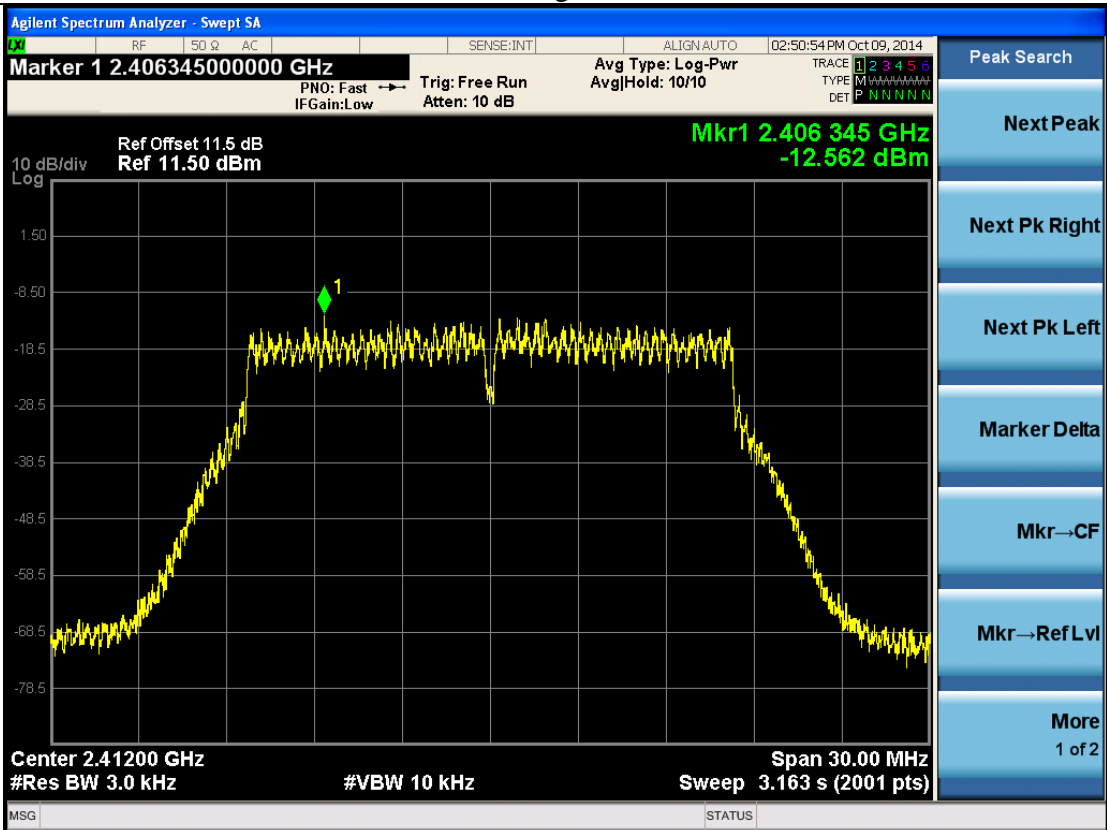
802.11b-2437



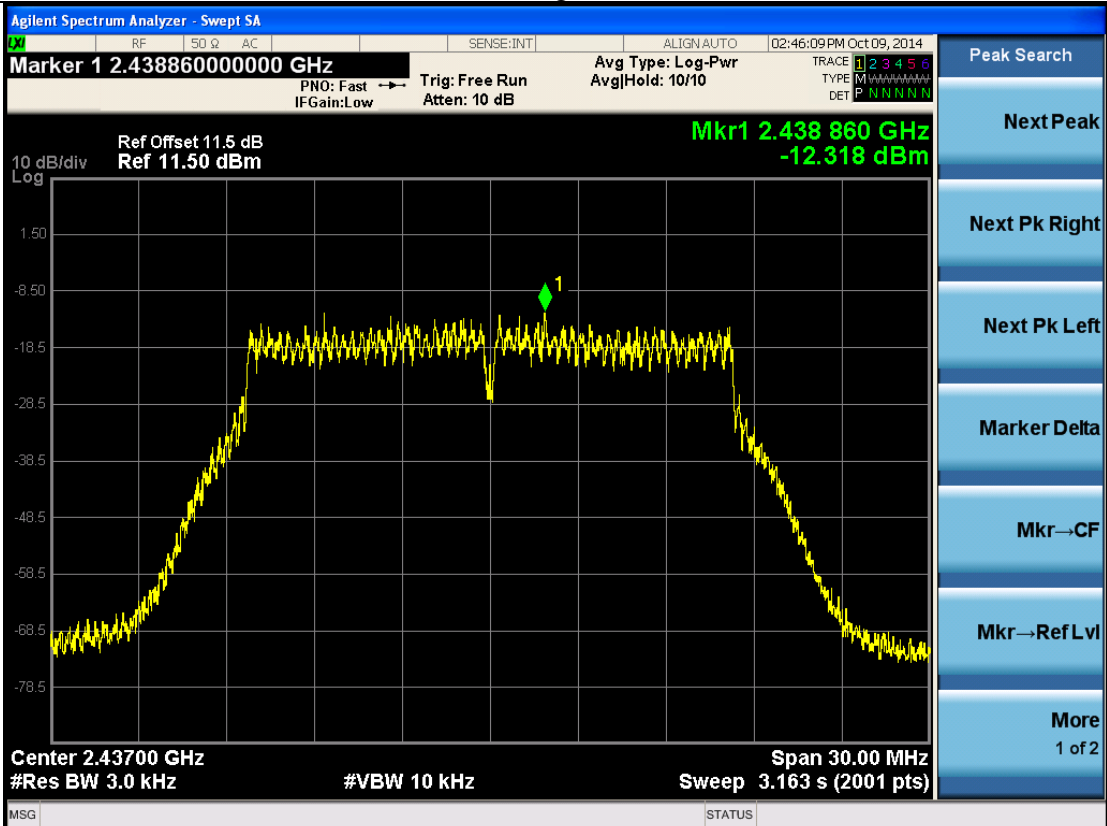
802.11b-2462



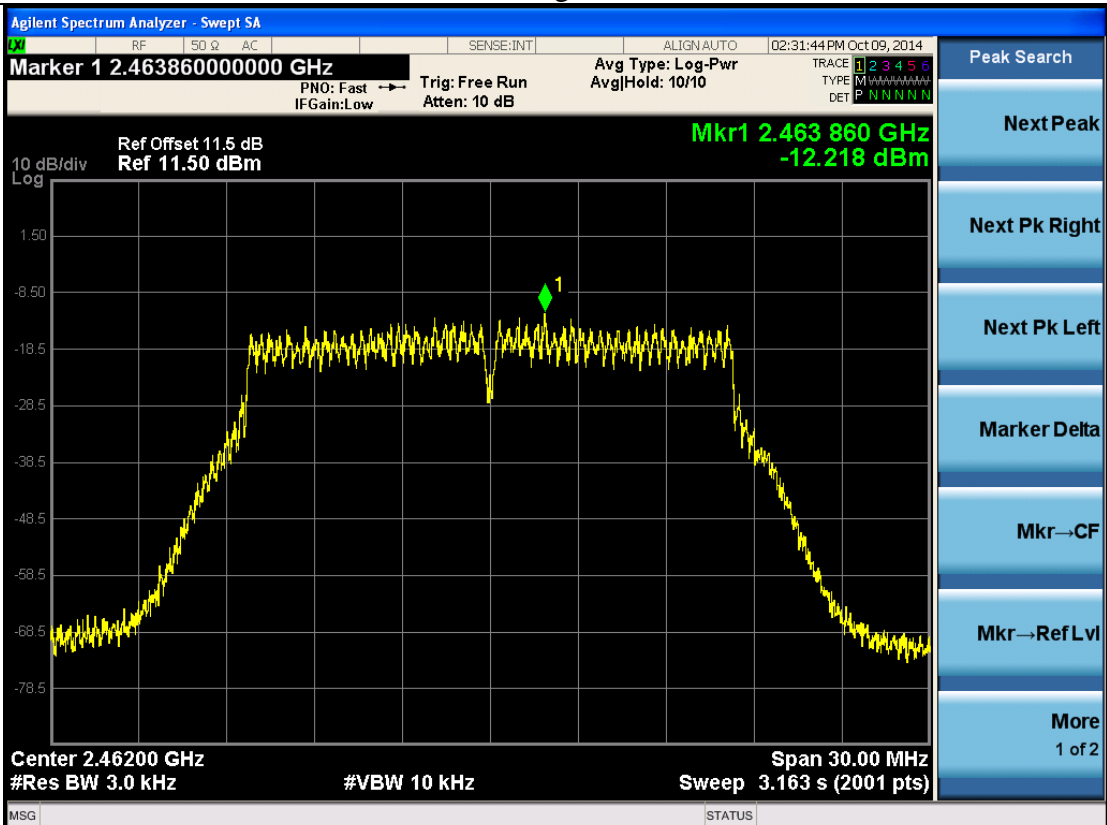
802.11g-2412



802.11g-2437

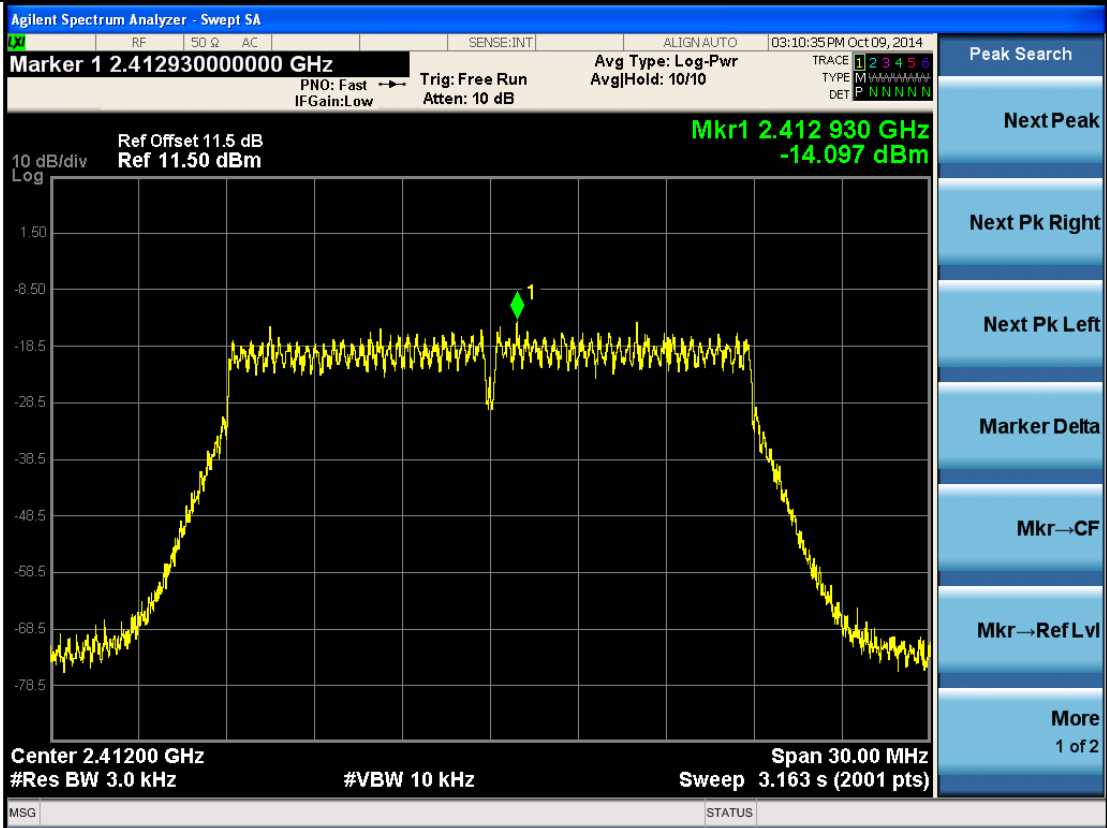


802.11g-2462

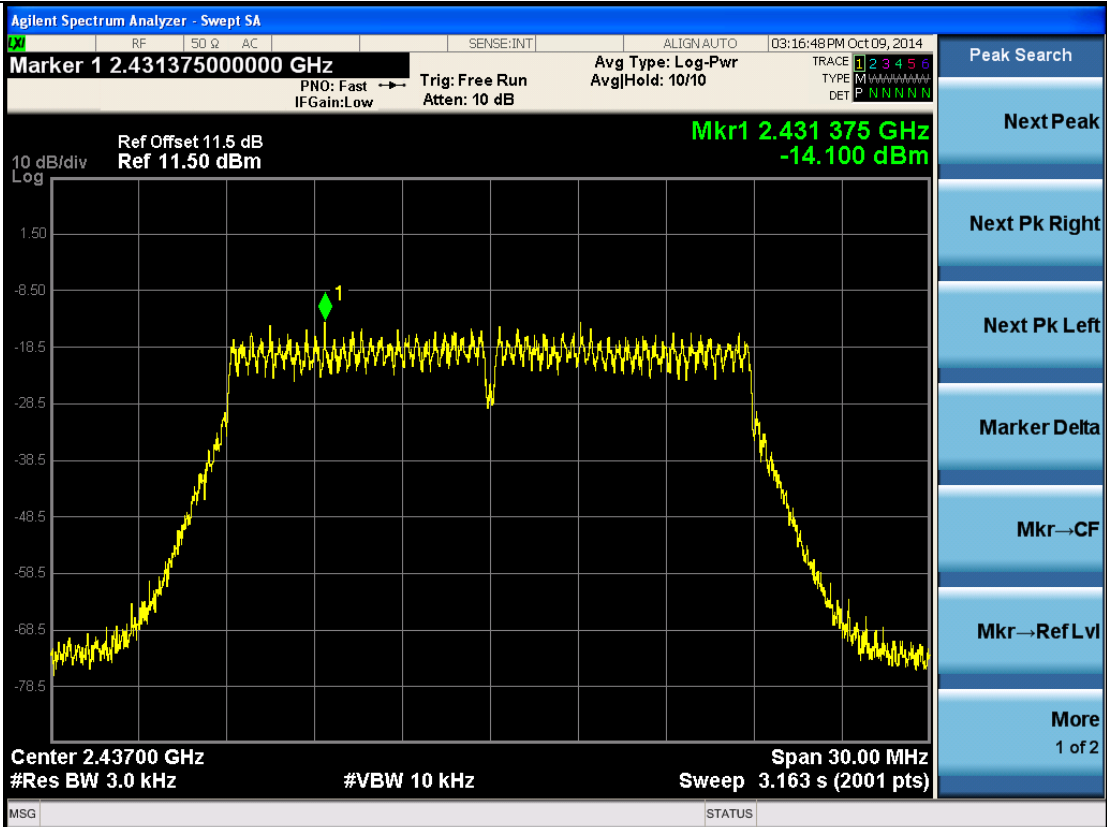




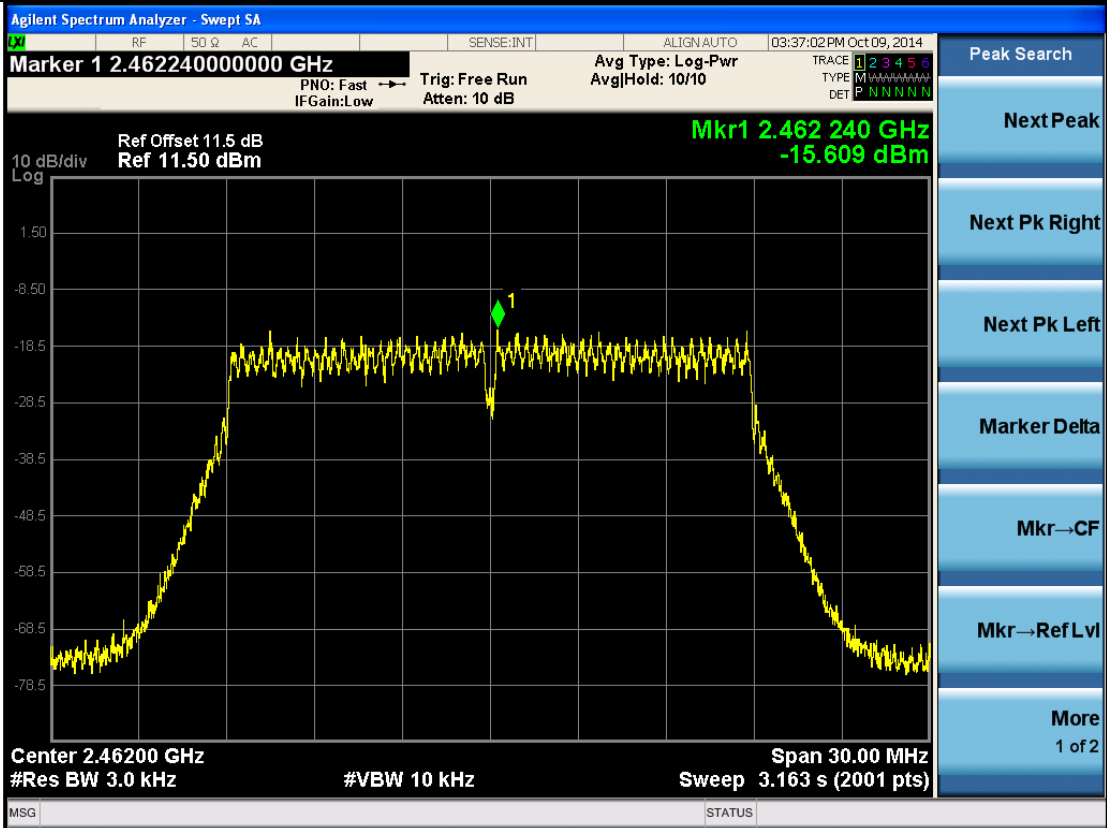
802.11n20-2412



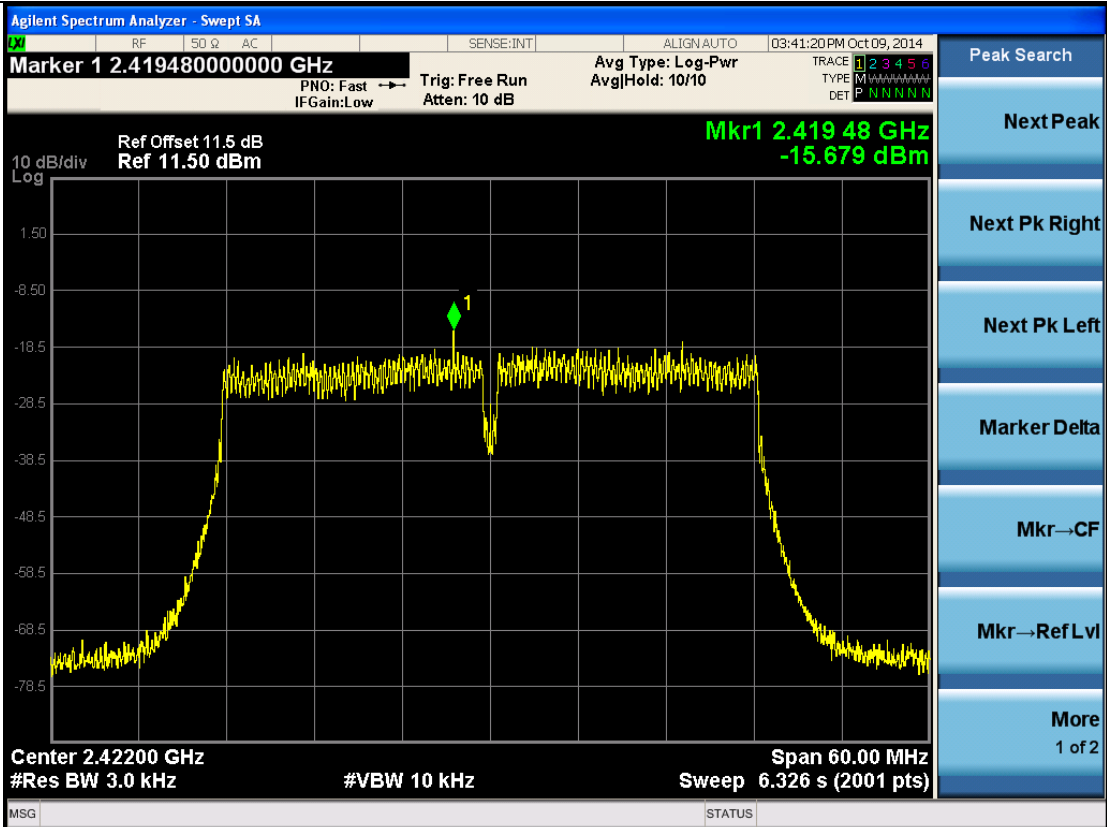
802.11n20-2437



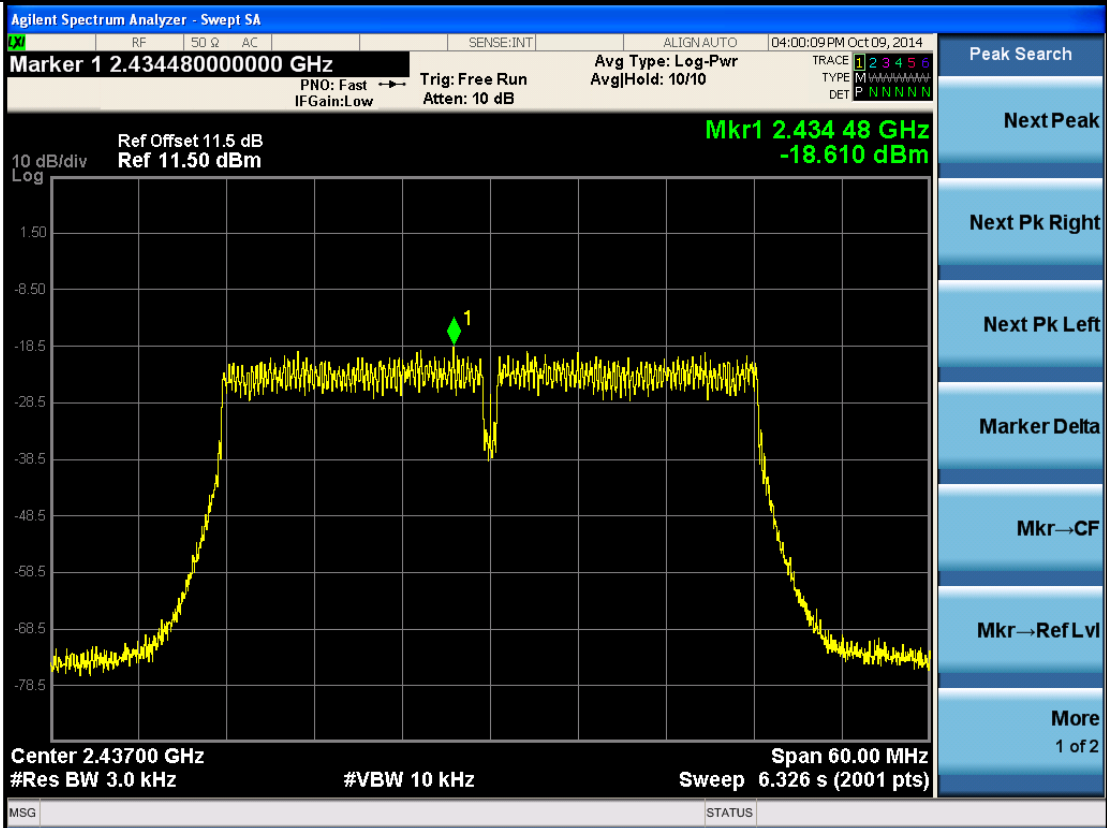
802.11n20-2462



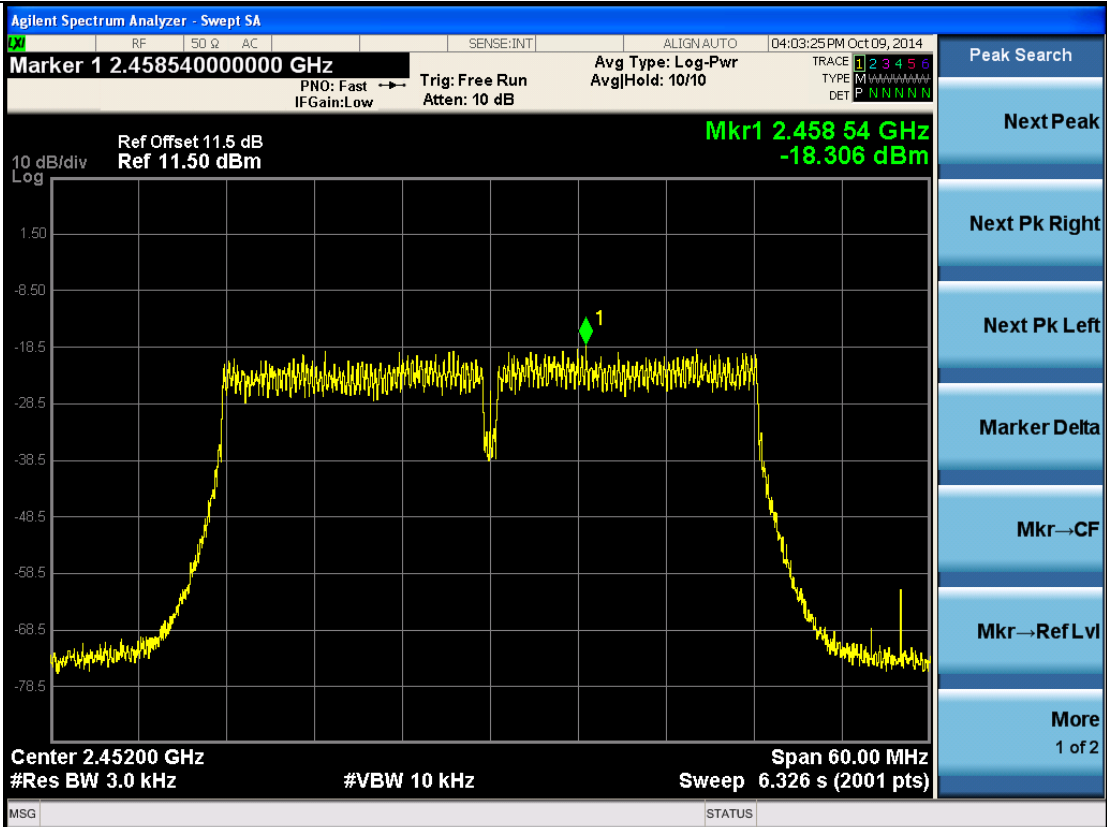
802.11n40-2422



802.11n40-2437



802.11n40-2452



## 6. Radiated emission in the restricted bands

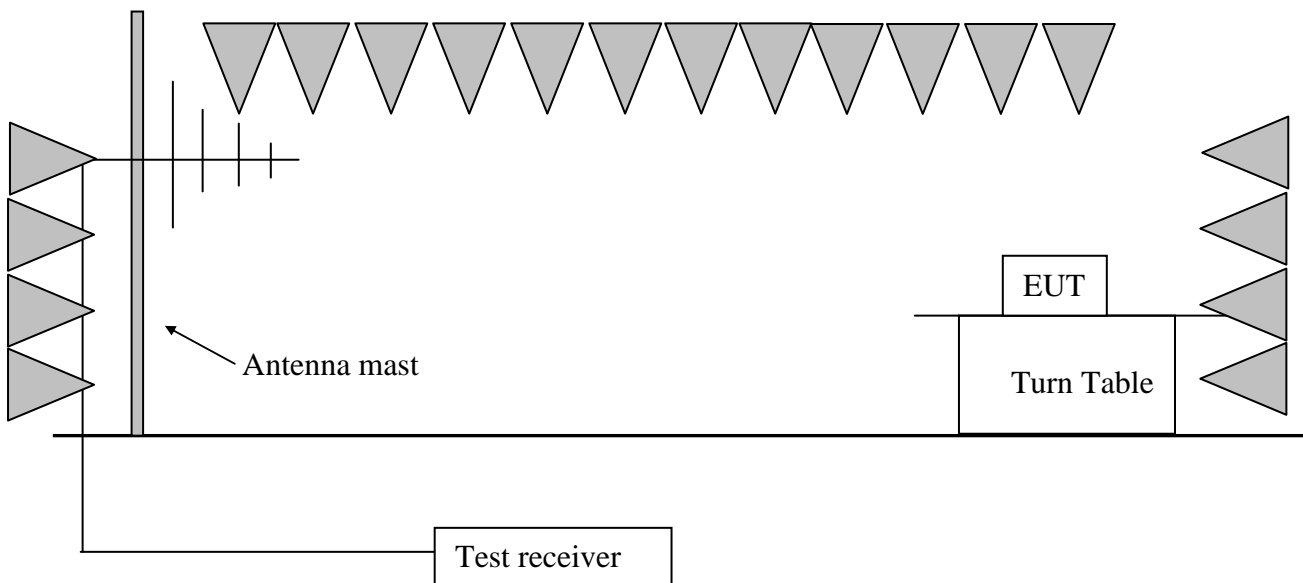
Test result: **PASS**

### 6.1 Test limit

The radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) showed as below:

Frequency (MHz)	Field Strength (dBuV/m)	Measurement Distance (m)
30 - 88	40.0	3
88 - 216	43.5	3
216 - 960	46.0	3
Above 960	54.0	3

### 6.2 Test Configuration





### **6.3 Test procedure and test setup**

The measurement was applied in a semi-anechoic chamber. While testing for spurious emission higher than 1GHz, if applied, the pre-amplifier would be equipped just at the output terminal of the antenna.

The EUT and simulators were placed on a 0.8m high wooden turntable above the horizontal metal ground plane. The turn table 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 mast. The antenna moved up and down between from 1meter to 4 meters to find out the maximum emission level.

The EUT was tested according to DTS test procedure of KDB558074 D01 DTS “Meas Guidance v03r02” (clause 12) for compliance to FCC 47CFR 15.247 requirements.



**6.4 Test protocol**

Temperature : 25 °C  
Relative Humidity : 55 %

Mode 802.11b

Freq (MHz)	Antenna	Frequency (MHz)	Correct Factor (dB/m)	Corrected Reading (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
2412	V	2411.81	37.80	119.70	/	/	PK
	V	115.53	13.40	31.00	43.50	12.50	PK
	H	163.24	13.80	29.30	43.50	14.20	PK
	H	170.57	12.10	20.90	43.50	22.60	PK
	V	2390.00	37.69	63.90	74.00	10.10	PK
	V	2390.00	37.69	52.90	54.00	1.10	AV
	H	4824.00	9.84	40.50	54.00	13.50	PK
	H	7238.00	11.87	51.60	54.00	2.40	PK
2437	V	2439.02	37.89	120.90	/	/	PK
	V	115.53	13.40	31.00	43.50	12.50	PK
	H	163.24	13.80	29.30	43.50	14.20	PK
	H	170.57	12.10	20.90	43.50	22.60	PK
	H	4016.03	9.10	38.90	54.00	15.10	PK
	V	4874.00	10.17	41.10	54.00	12.90	PK
	H	7311.00	11.99	39.20	54.00	14.80	PK
2462	V	2461.98	38.05	119.70	/	/	PK
	V	115.53	13.40	31.00	43.50	12.50	PK
	H	163.24	13.80	29.30	43.50	14.20	PK
	H	170.57	12.10	20.90	43.50	22.60	PK
	V	2483.50	38.15	64.80	74.00	9.20	PK
	V	2483.50	38.15	52.50	54.00	1.50	AV
	V	4951.99	10.46	40.50	54.00	13.50	PK
	V	7386.00	12.09	39.70	54.00	14.30	PK



Mode 802.11g

Freq (MHz)	Antenna	Frequency (MHz)	Correct Factor (dB/m)	Corrected Reading (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
2412	V	2413.26	37.71	121.50	/	/	PK
	V	115.53	13.40	31.00	43.50	12.50	PK
	H	163.24	13.80	29.30	43.50	14.20	PK
	H	170.57	12.10	20.90	43.50	22.60	PK
	V	2387.28	37.68	70.70	74.00	3.30	PK
	V	2390.00	37.69	53.20	54.00	0.80	AV
	H	4824.00	9.84	41.10	54.00	12.90	PK
	V	7236.00	11.87	39.10	54.00	14.90	PK
2437	V	2440.29	37.89	121.80	/	/	PK
	V	115.53	13.40	31.00	43.50	12.50	PK
	H	163.24	13.80	29.30	43.50	14.20	PK
	H	170.57	12.10	20.90	43.50	22.60	PK
	H	4016.03	9.10	38.60	54.00	15.40	PK
	H	4874.00	10.17	40.80	74.00	33.20	PK
	V	7311.00	11.99	38.90	54.00	15.10	PK
2462	V	2463.23	38.05	119.80	/	/	PK
	V	115.53	13.40	31.00	43.50	12.50	PK
	H	163.24	13.80	29.30	43.50	14.20	PK
	H	170.57	12.10	20.90	43.50	22.60	PK
	V	2483.50	38.15	68.50	74.00	5.50	PK
	V	2483.50	38.15	53.30	54.00	0.70	AV
	V	4924.00	10.43	41.30	54.00	12.70	PK
	H	7386.00	12.09	41.20	54.00	12.80	PK



Mode 802.11n20

Freq (MHz)	Antenna	Frequency (MHz)	Correct Factor (dB/m)	Corrected Reading (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
2412	V	2412.98	37.81	118.60	/	/	PK
	V	115.53	13.40	31.00	43.50	12.50	PK
	H	163.24	13.80	29.30	43.50	14.20	PK
	H	170.57	12.10	20.90	43.50	22.60	PK
	V	2390.00	37.69	69.40	74.00	4.60	PK
	V	2390.00	34.40	53.20	54.00	0.80	AV
	V	4824.00	9.84	40.90	54.00	13.10	PK
	H	7236.00	11.87	39.00	54.00	15.00	PK
2437	H	2440.29	37.89	119.20	/	/	PK
	V	115.53	13.40	31.00	43.50	12.50	PK
	H	163.24	13.80	29.30	43.50	14.20	PK
	H	170.57	12.10	20.90	43.50	22.60	PK
	H	4016.03	9.10	38.70	54.00	15.30	PK
	H	4874.00	10.17	41.20	54.00	12.80	PK
	H	7311.00	11.99	39.30	54.00	14.70	PK
2462	V	2462.94	38.05	118.40	/	/	PK
	V	115.53	13.40	31.00	43.50	12.50	PK
	H	163.24	13.80	29.30	43.50	14.20	PK
	H	170.57	12.10	20.90	43.50	22.60	PK
	V	2483.50	38.15	66.50	74.00	7.50	PK
	V	2483.50	38.15	52.70	54.00	1.30	AV
	H	4924.00	10.43	41.80	54.00	12.20	PK
	V	7386.00	12.09	39.10	54.00	14.90	PK





Mode 802.11n40

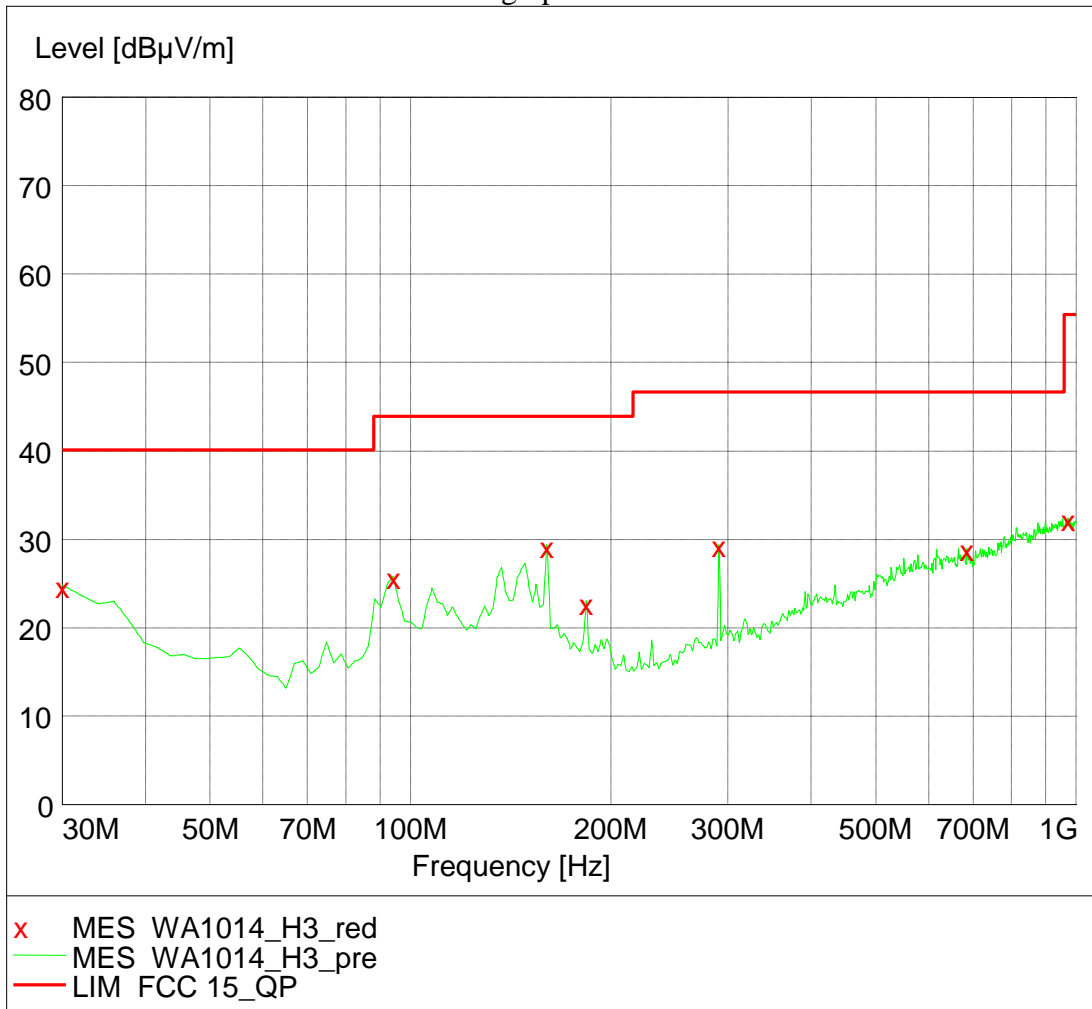
Freq (MHz)	Antenna	Frequency (MHz)	Correct Factor (dB/m)	Corrected Reading (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
2422	V	2427.48	37.88	114.00	/	/	PK
	V	115.53	13.40	31.00	43.50	12.50	PK
	H	163.24	13.80	29.30	43.50	14.20	PK
	H	170.57	12.10	20.90	43.50	22.60	PK
	V	2387.88	37.68	69.40	74.00	4.60	PK
	V	2390.00	37.69	52.80	54.00	1.20	AV
	V	4844.00	9.98	40.40	54.00	13.60	PK
	V	7266.00	11.92	38.60	54.00	15.40	PK
2437	V	2440.29	37.89	114.10	/	/	PK
	V	115.53	13.40	31.00	43.50	12.50	PK
	H	163.24	13.80	29.30	43.50	14.20	PK
	H	170.57	12.10	20.90	43.50	22.60	PK
	H	4016.03	9.10	38.50	54.00	15.50	PK
	V	4874.00	10.17	40.20	54.00	13.80	PK
	V	7311.00	11.99	38.90	54.00	15.10	PK
2452	V	2457.57	38.03	113.40	/	/	PK
	V	115.53	13.40	31.00	43.50	12.50	PK
	H	163.24	13.80	29.30	43.50	14.20	PK
	H	170.57	12.10	20.90	43.50	22.60	PK
	V	2484.16	38.15	72.70	74.00	1.30	PK
	V	2483.50	38.15	52.70	54.00	1.30	AV
	H	4904.00	10.37	41.90	54.00	12.10	PK
	V	7356.00	12.03	39.10	54.00	14.90	PK



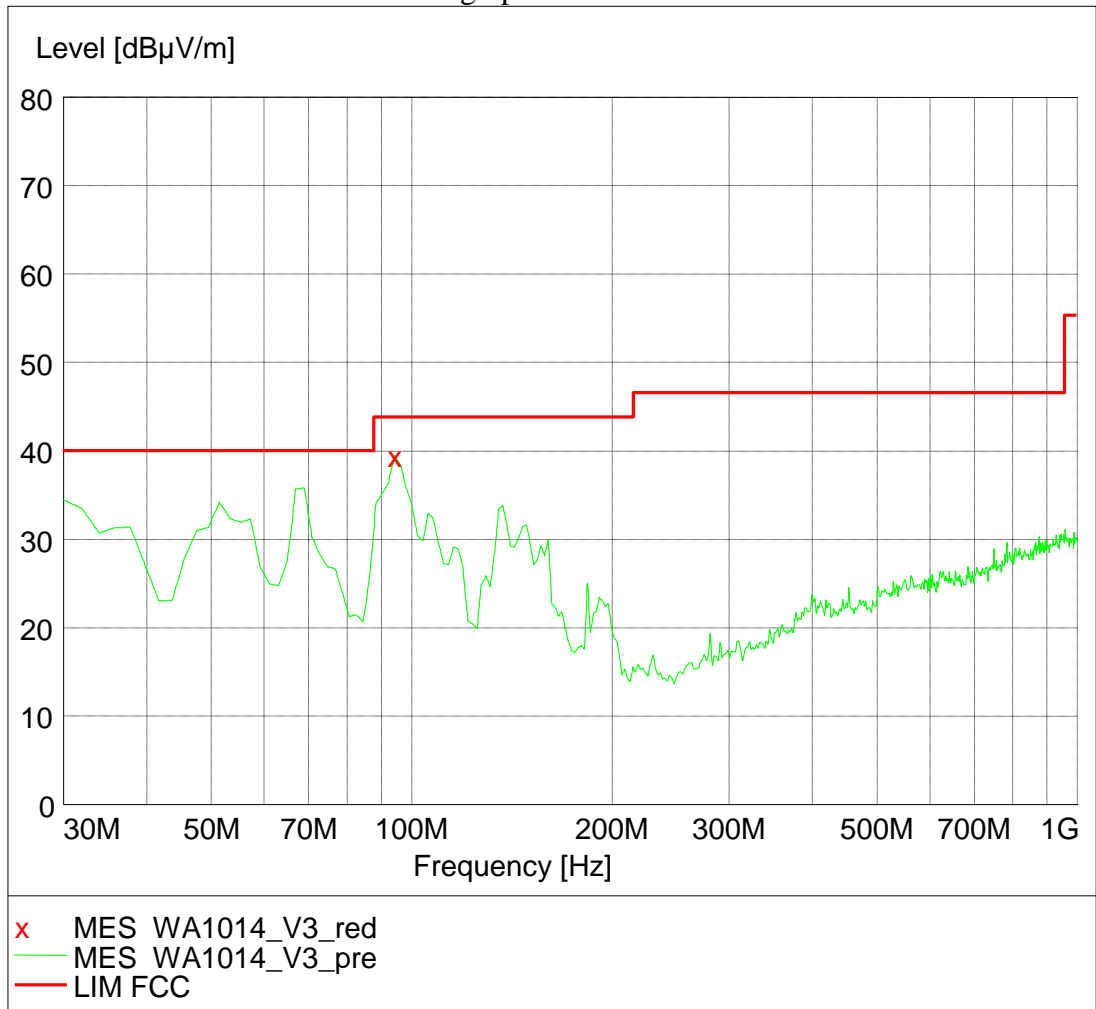
- Remark: 1. Correct Factor = Antenna Factor + Cable Loss (-Amplifier, is employed)  
2. Corrected Reading = Original Receiver Reading + Correct Factor  
3. Margin = limit – Corrected Reading

Example: Assuming Antenna Factor = 30.20dB/m, Cable Loss = 2.00dB,  
Original Receiver Reading = 10dBuV.  
Then Correct Factor = 30.20 + 2.00 = 32.20dB/m; Corrected Reading = 10dBuV +  
32.20dB/m = 42.20dBuV/m  
Assuming limit = 54dBuV/m, Corrected Reading = 42.20dBuV/m, then Margin =  
54 - 42.20 = 11.80dBuV/m

Horizontal test graph for lower than 1GHz



Vertical test graph for lower than 1GHz



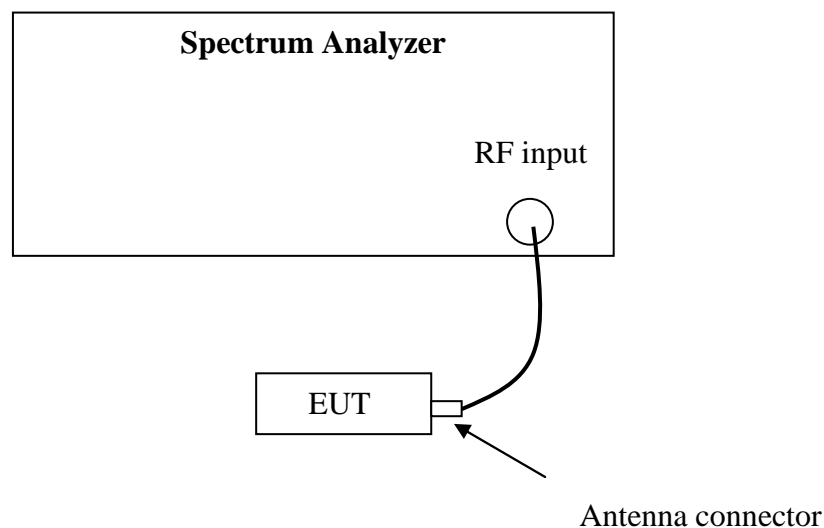
## 7. Emission outside the frequency Band

Test result: PASS

### 7.1 Limit

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum 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.

### 7.2 Test Configuration



### 7.3 Test procedure and test setup

The Emission outside the frequency Band per FCC §15.247(d) is measured using the Spectrum Analyzer with the resolutions bandwidth set at 100kHz, the video bandwidth set at 300kHz, and the SPAN>>RBW.

The EUT was tested according to DTS test procedure of “KDB558074 D01 DTS Meas Guidance v03r02” (clause 11.0) for compliance to FCC 47CFR 15.247 requirements.



### 7.4 Test protocol

Temperature : 25 °C  
Relative Humidity : 55 %

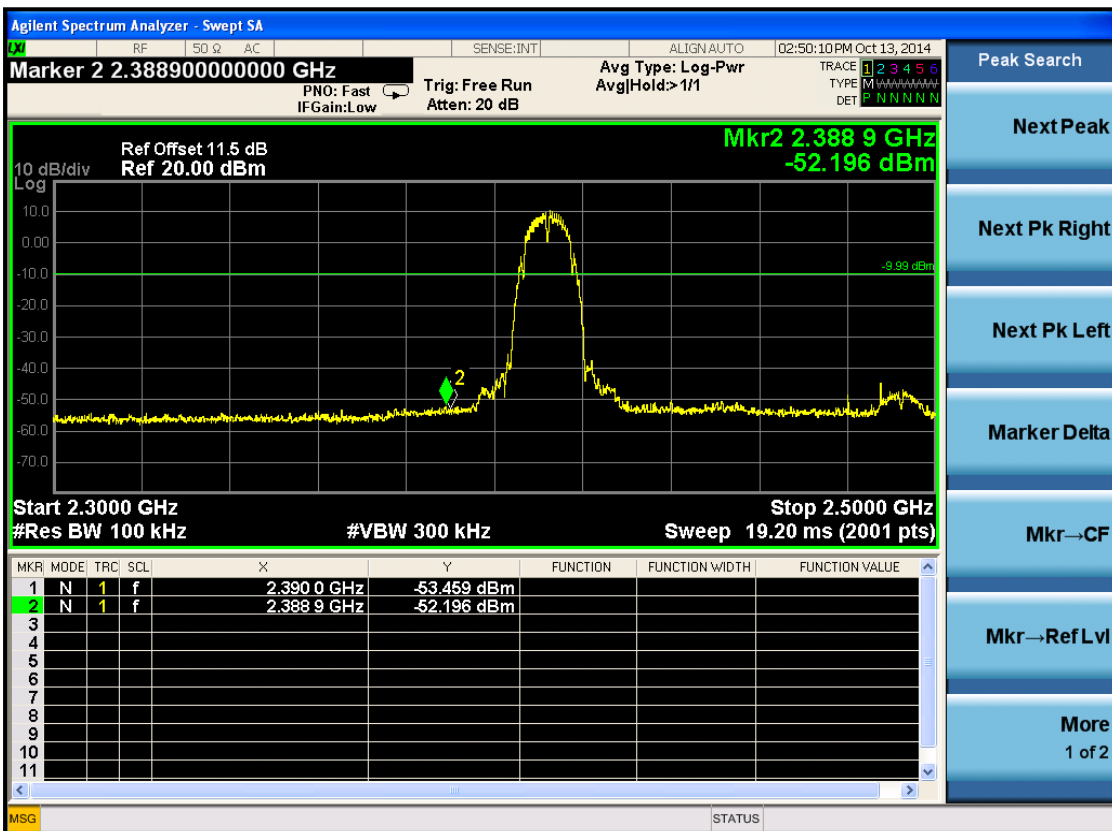
Modulation	Frequency (MHz)	Out of band emission (dB)			Limits (dB)
		Port0	Port 1	Port 2	
802.11b	2412	Pass	Pass	Pass	> 20
	2437	Pass	Pass	Pass	> 20
	2462	Pass	Pass	Pass	> 20
802.11g	2412	Pass	Pass	Pass	> 20
	2437	Pass	Pass	Pass	> 20
	2462	Pass	Pass	Pass	> 20
802.11n20	2412	Pass	Pass	Pass	> 20
	2437	Pass	Pass	Pass	> 20
	2462	Pass	Pass	Pass	> 20
802.11n40	2422	Pass	Pass	Pass	> 20
	2437	Pass	Pass	Pass	> 20
	2452	Pass	Pass	Pass	> 20

Port 0

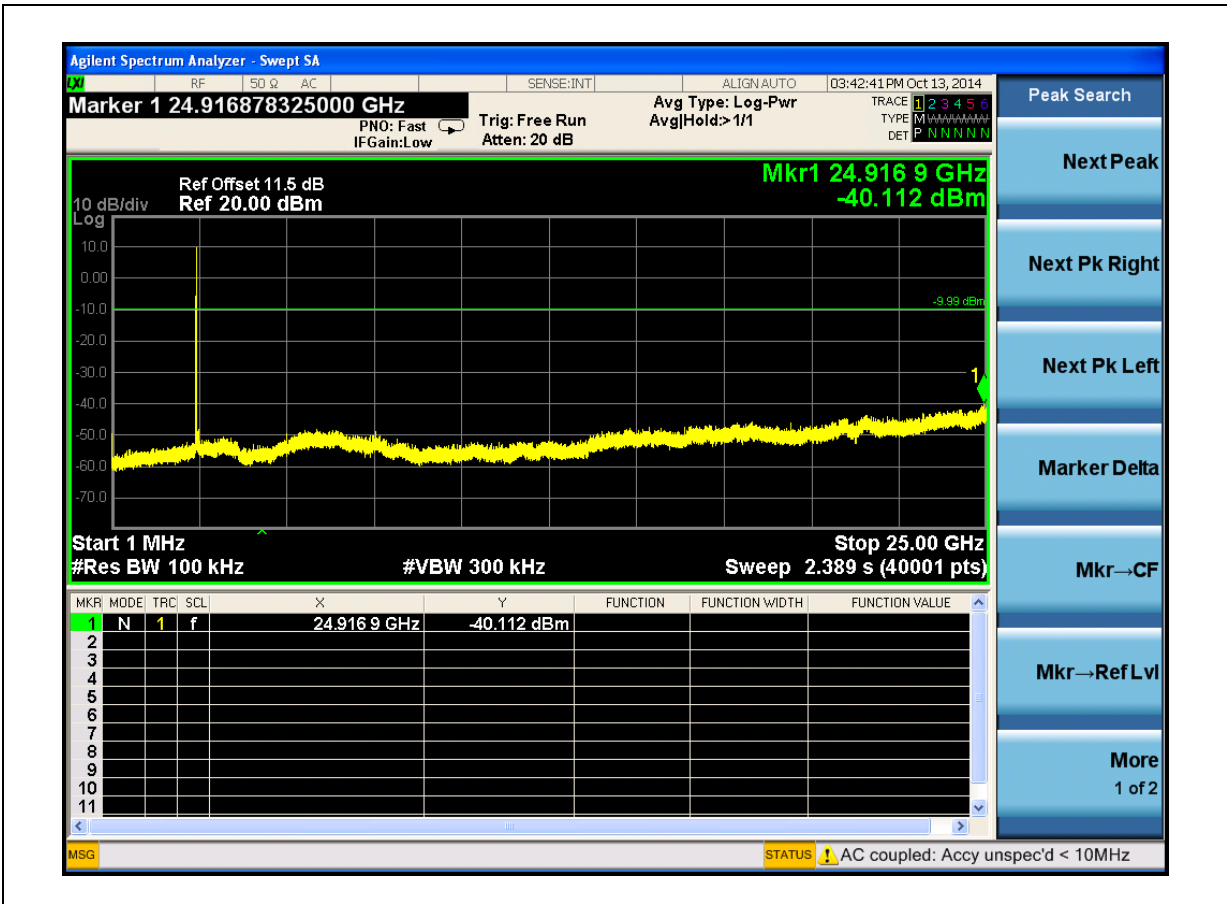
802.11b-2412



- Peak Search
- Next Peak
- Next Pk Right
- Next Pk Left
- Marker Delta
- Mkr→CF
- Mkr→Ref Lvl
- More 1 of 2



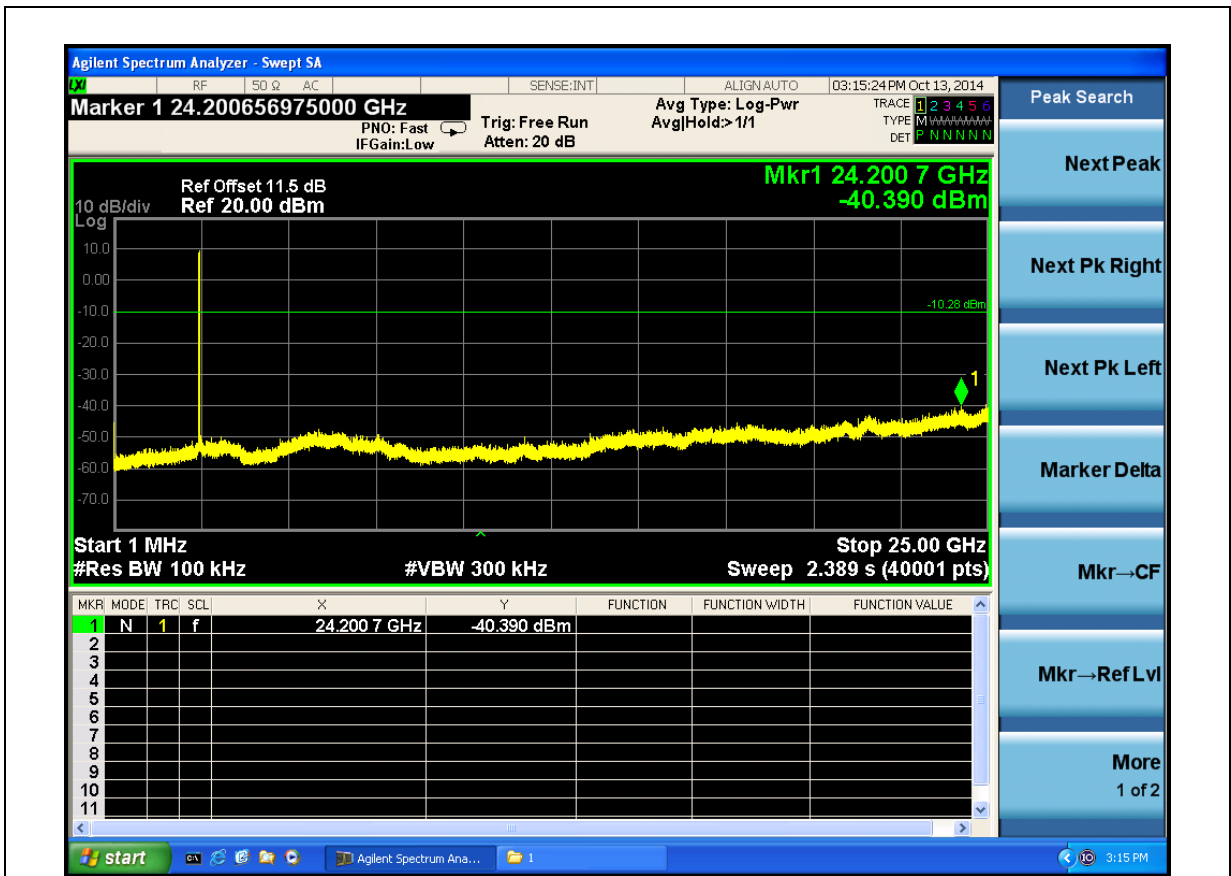
- Peak Search
- Next Peak
- Next Pk Right
- Next Pk Left
- Marker Delta
- Mkr→CF
- Mkr→Ref Lvl
- More 1 of 2



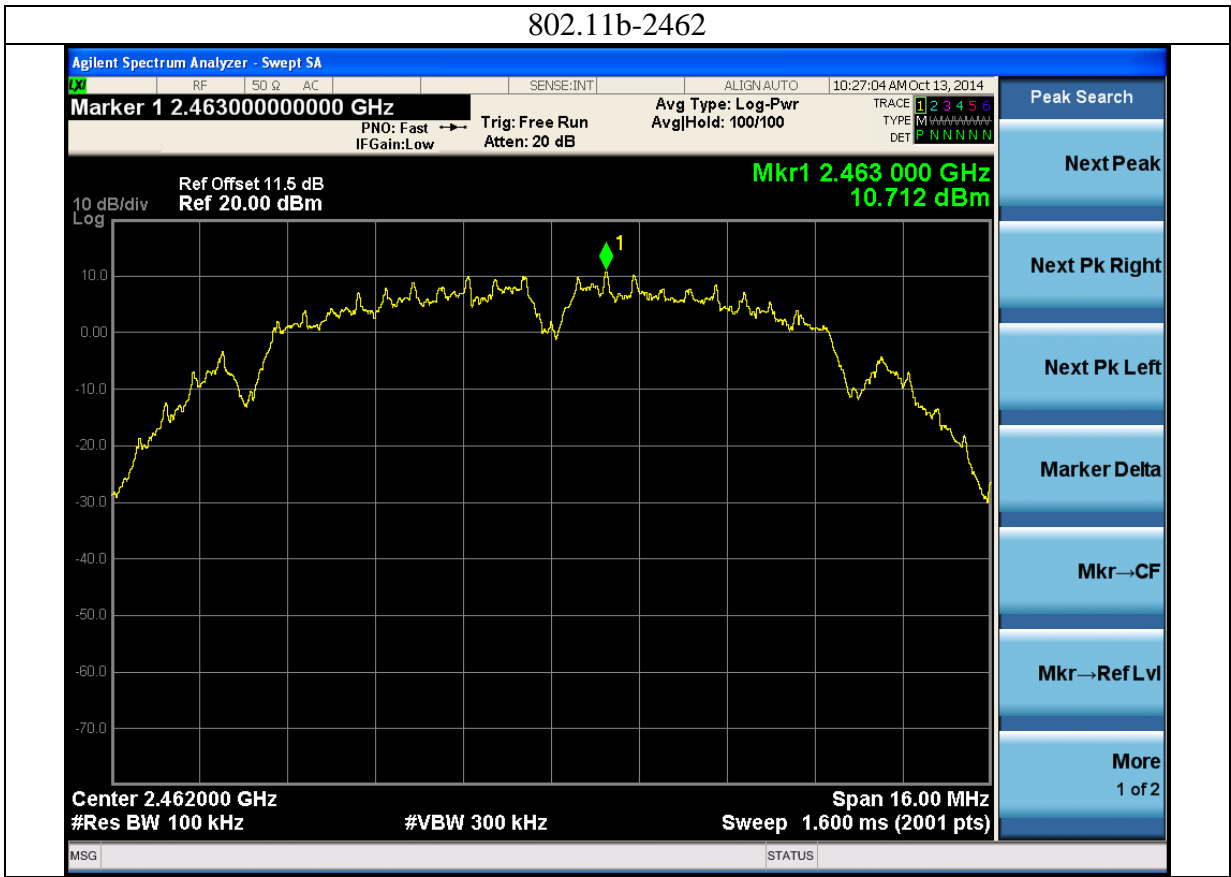
802.11b-2437

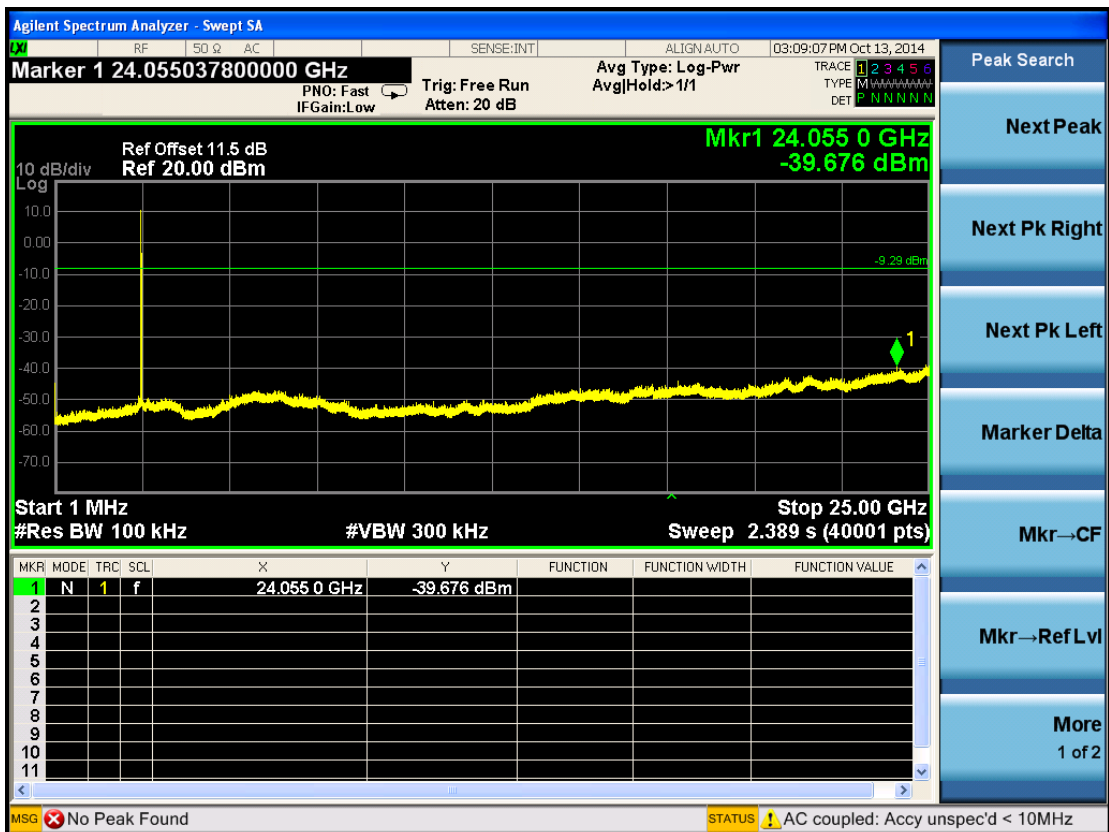
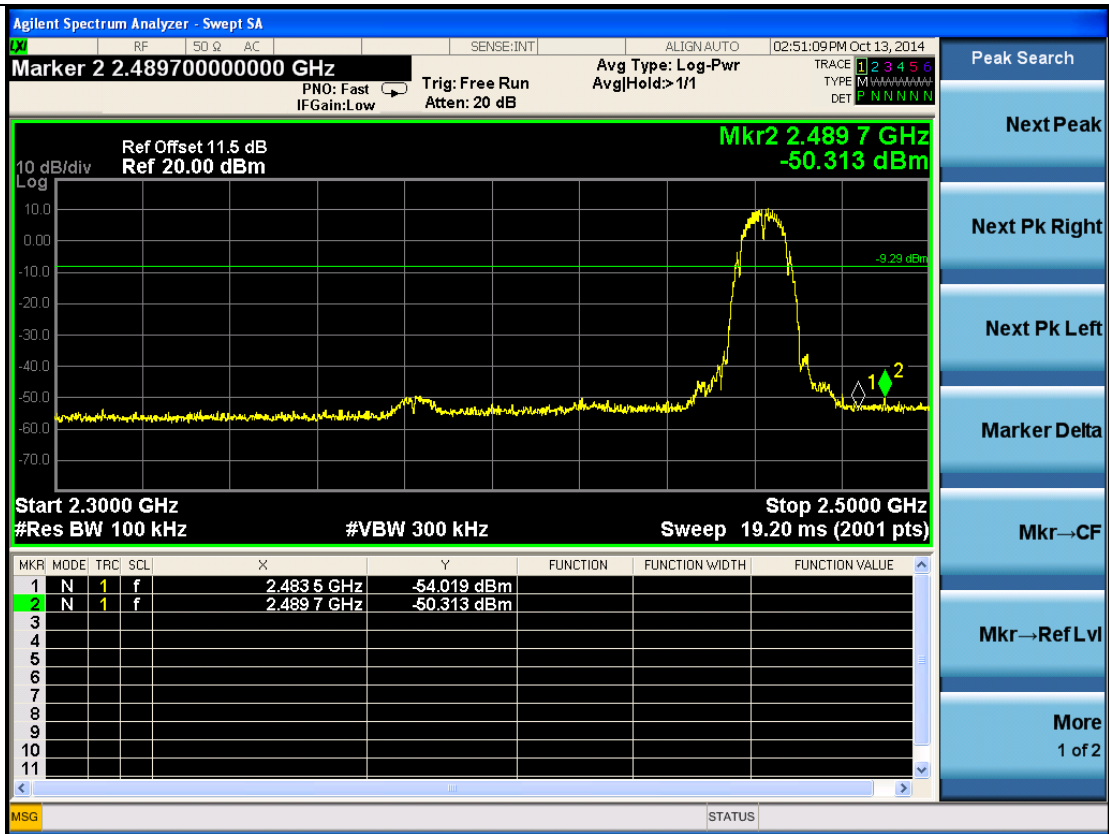




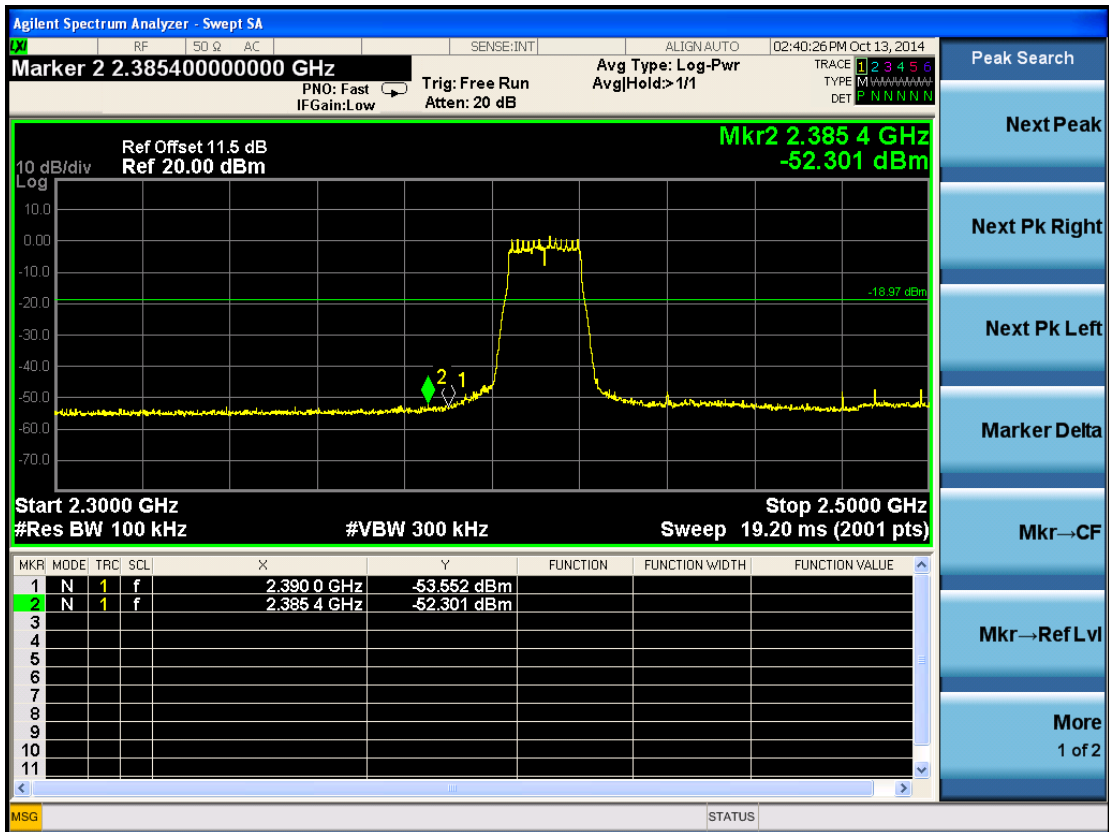
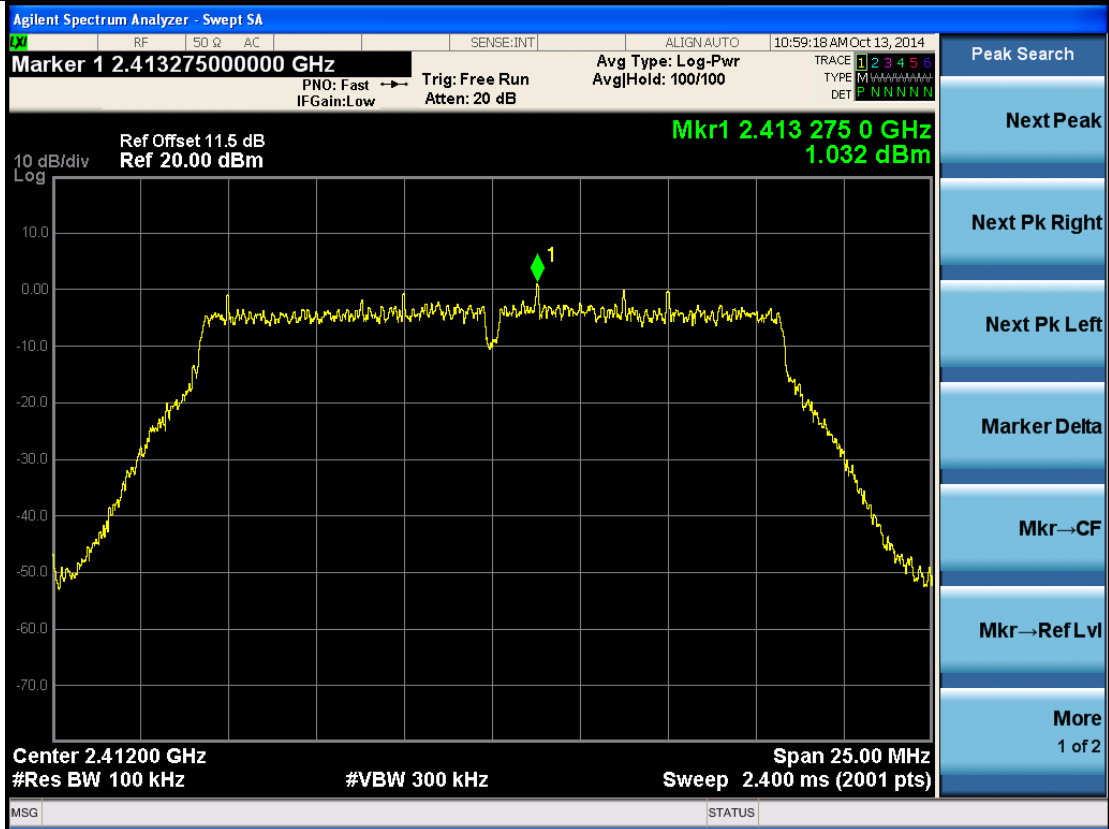


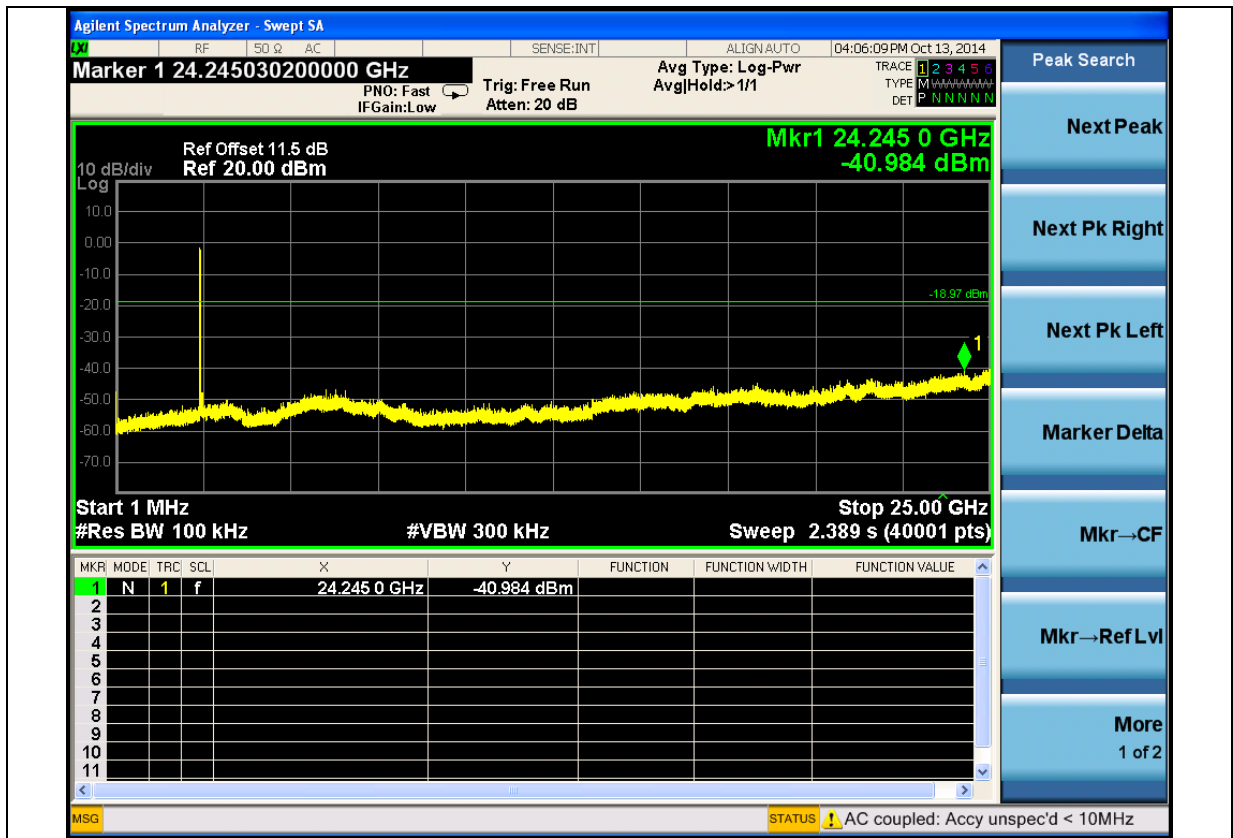
802.11b-2462



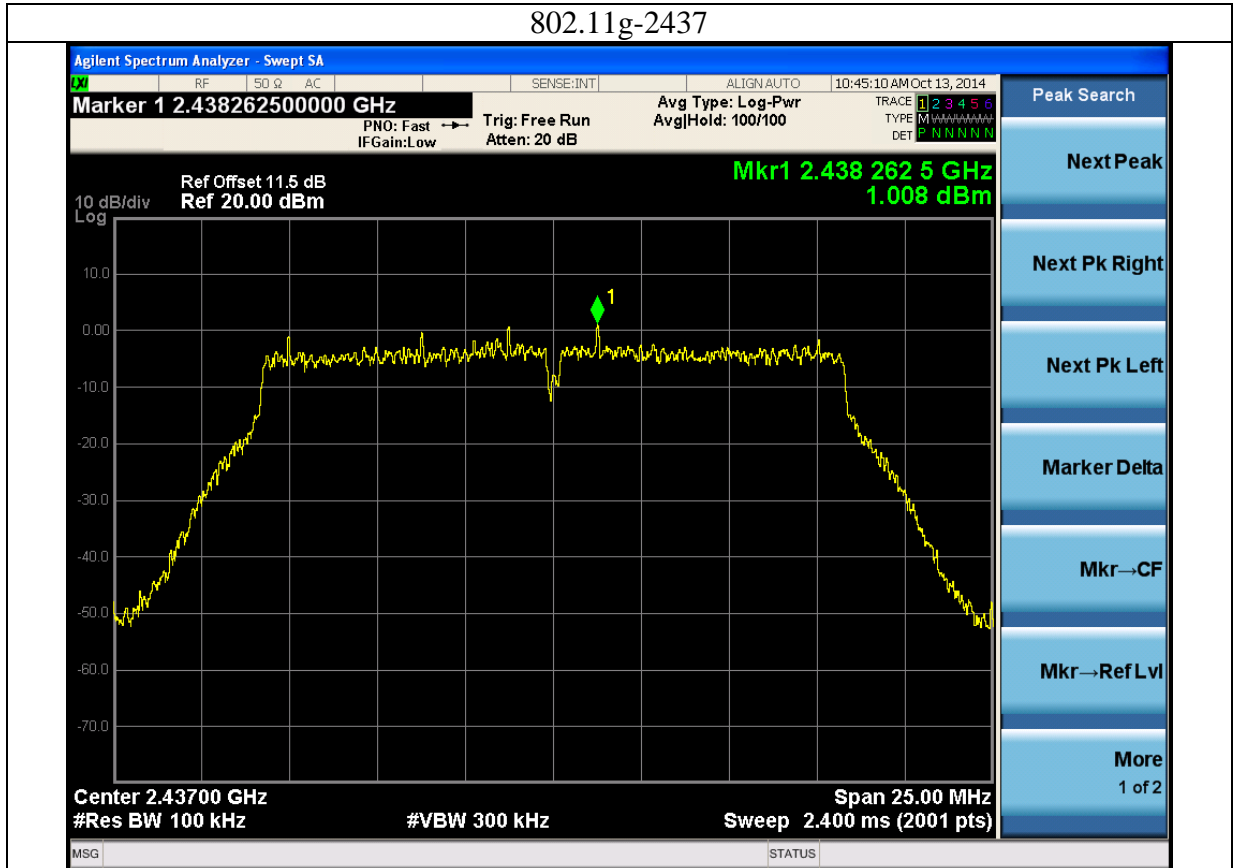


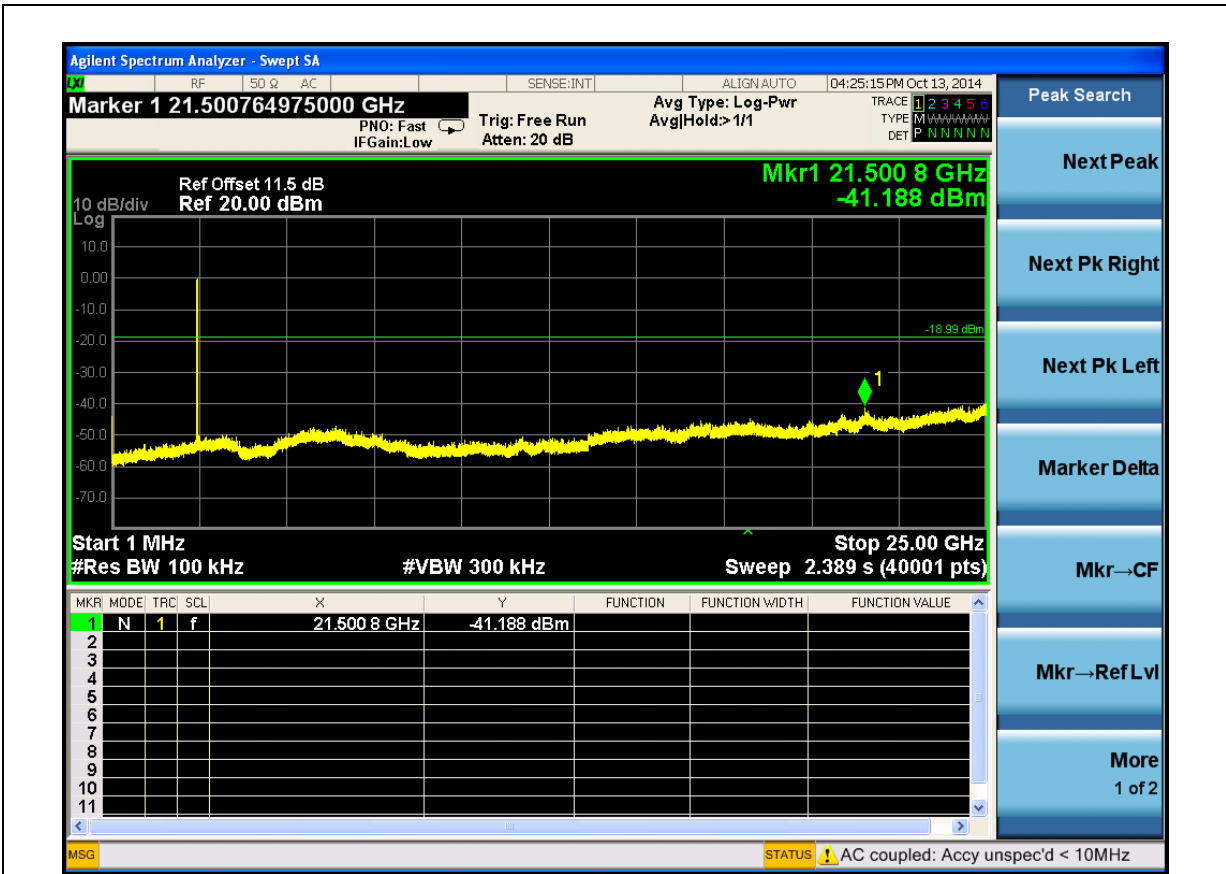
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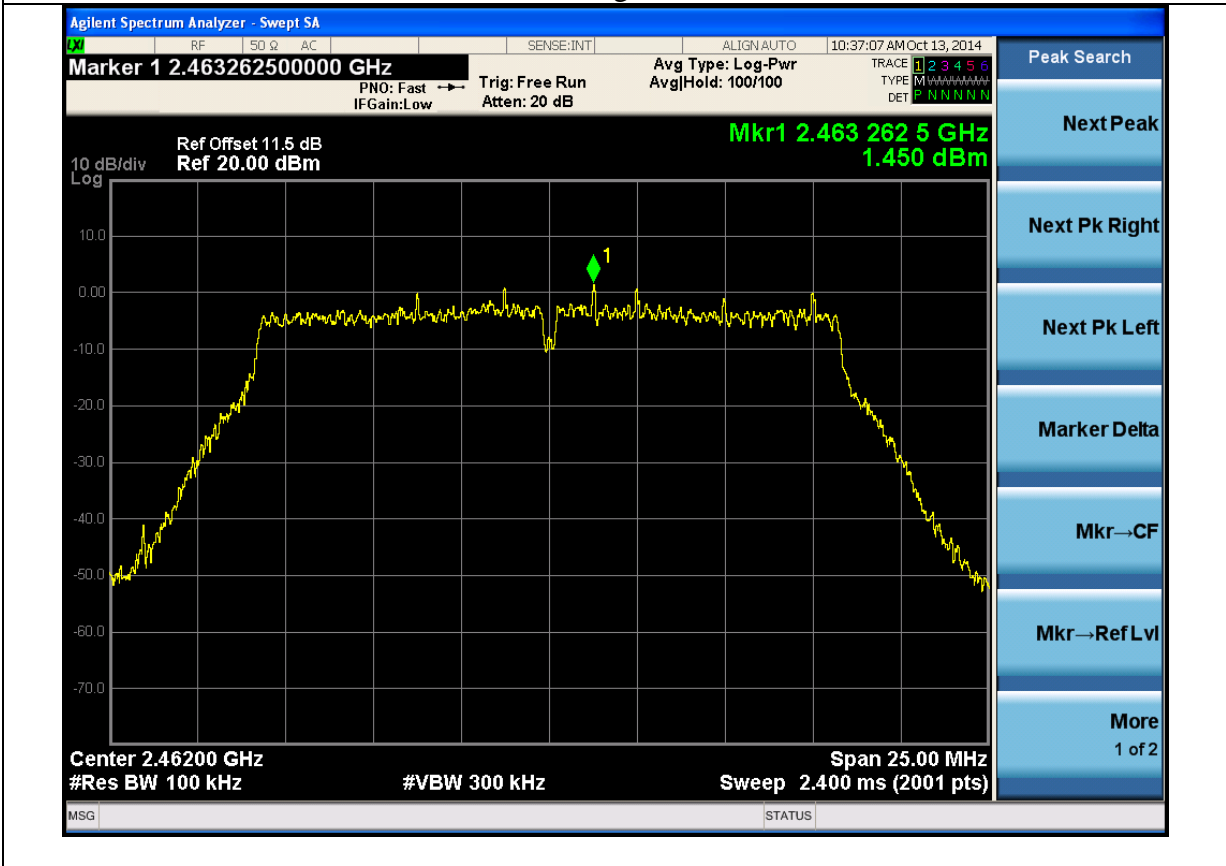


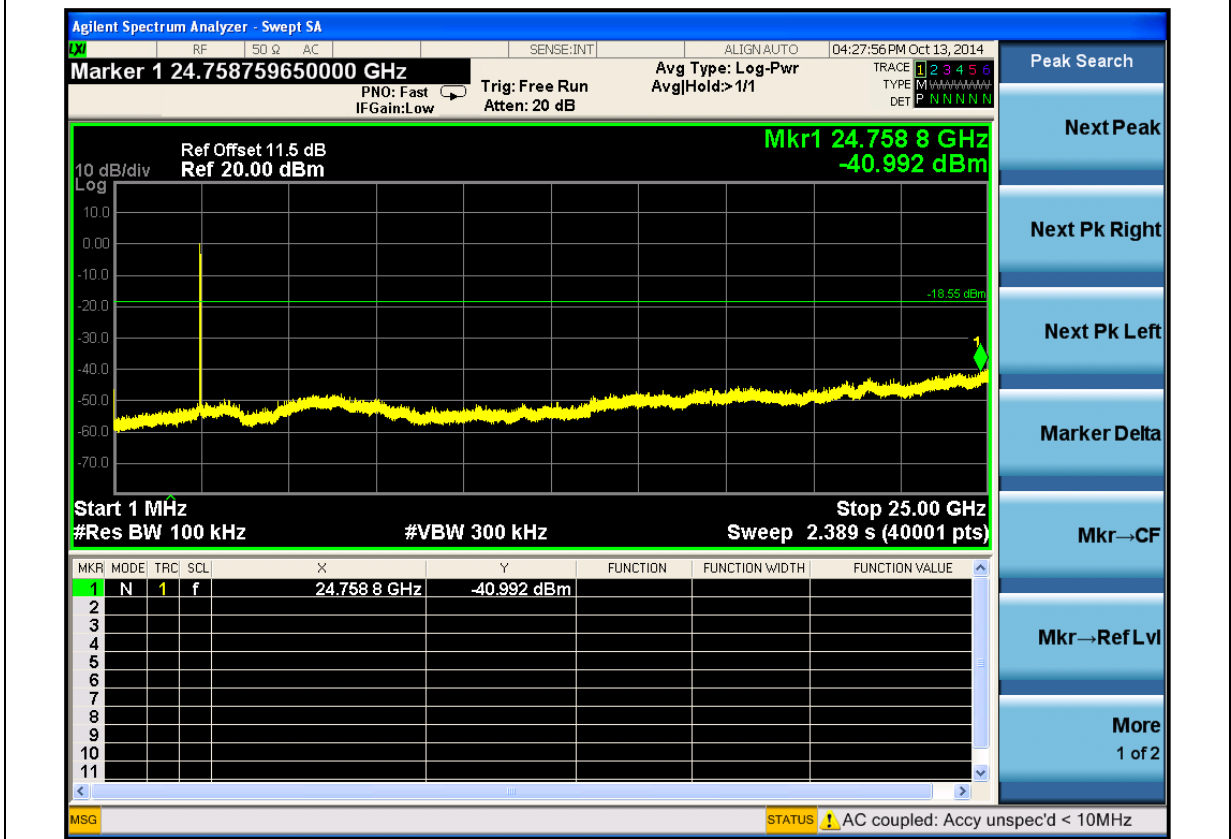
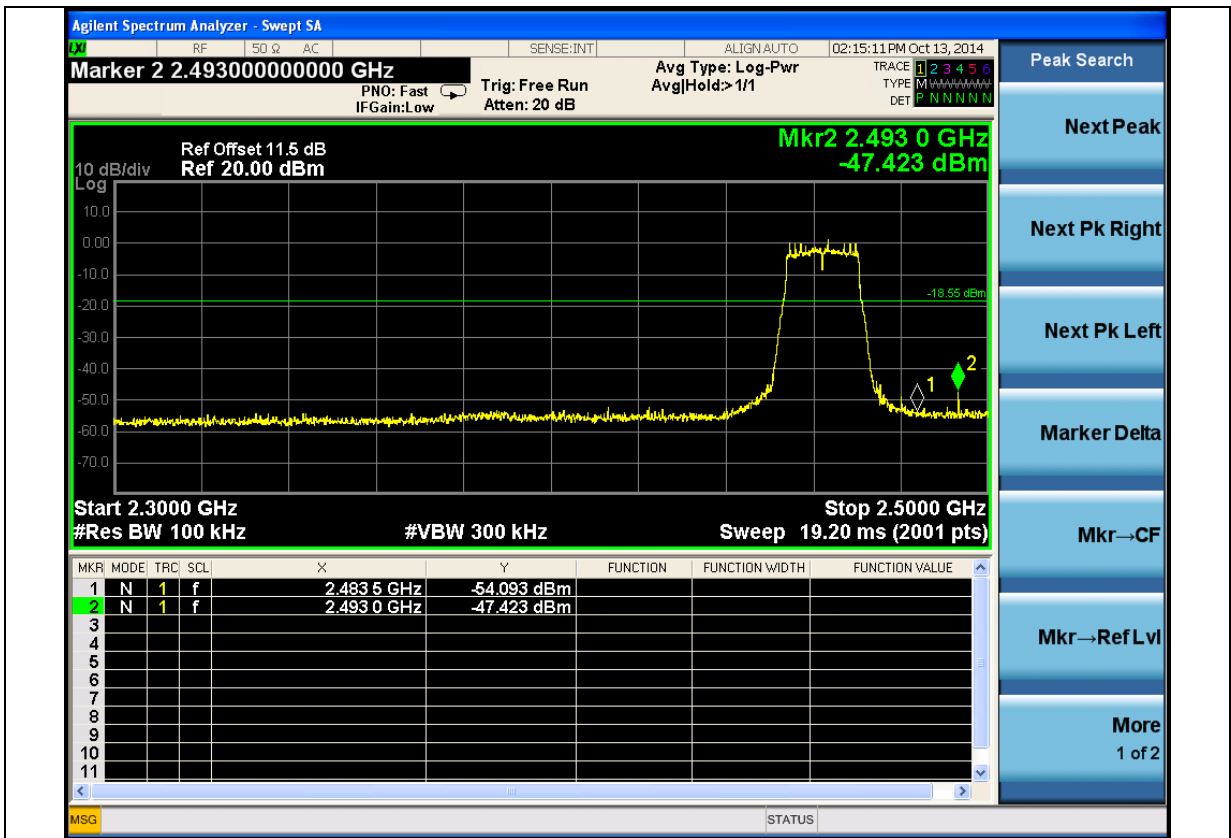
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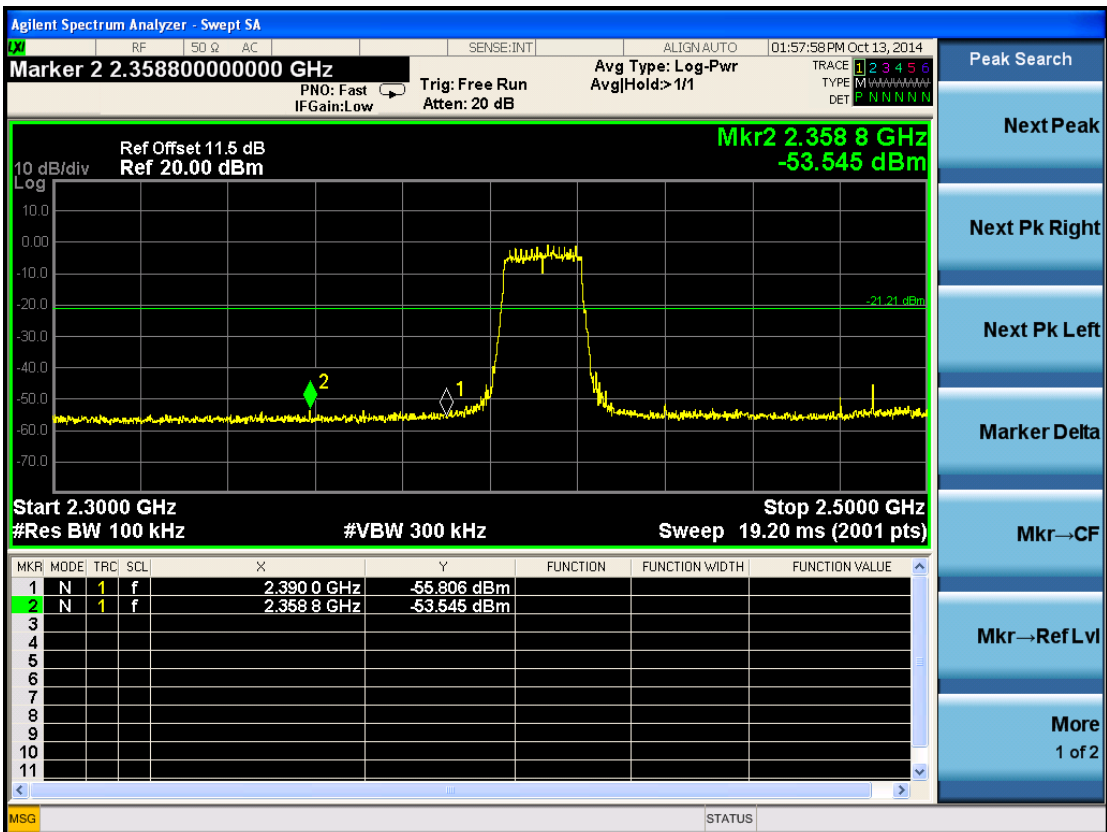


802.11g-2462

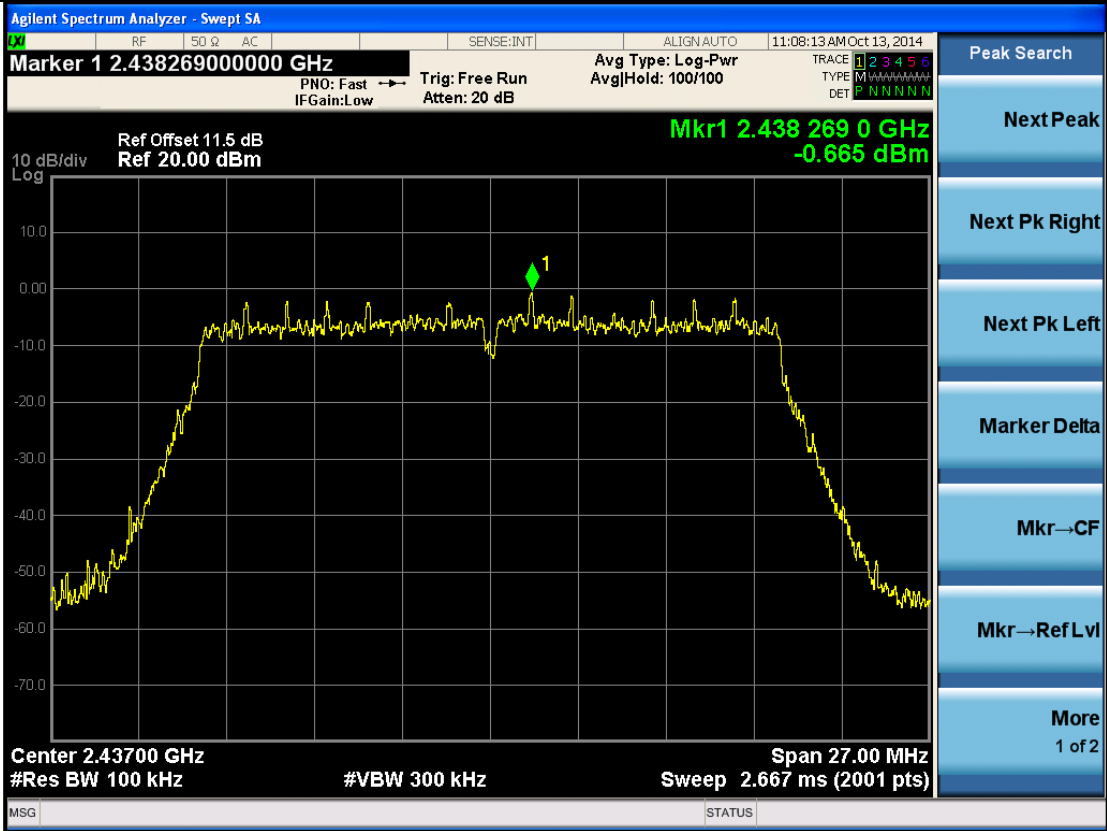




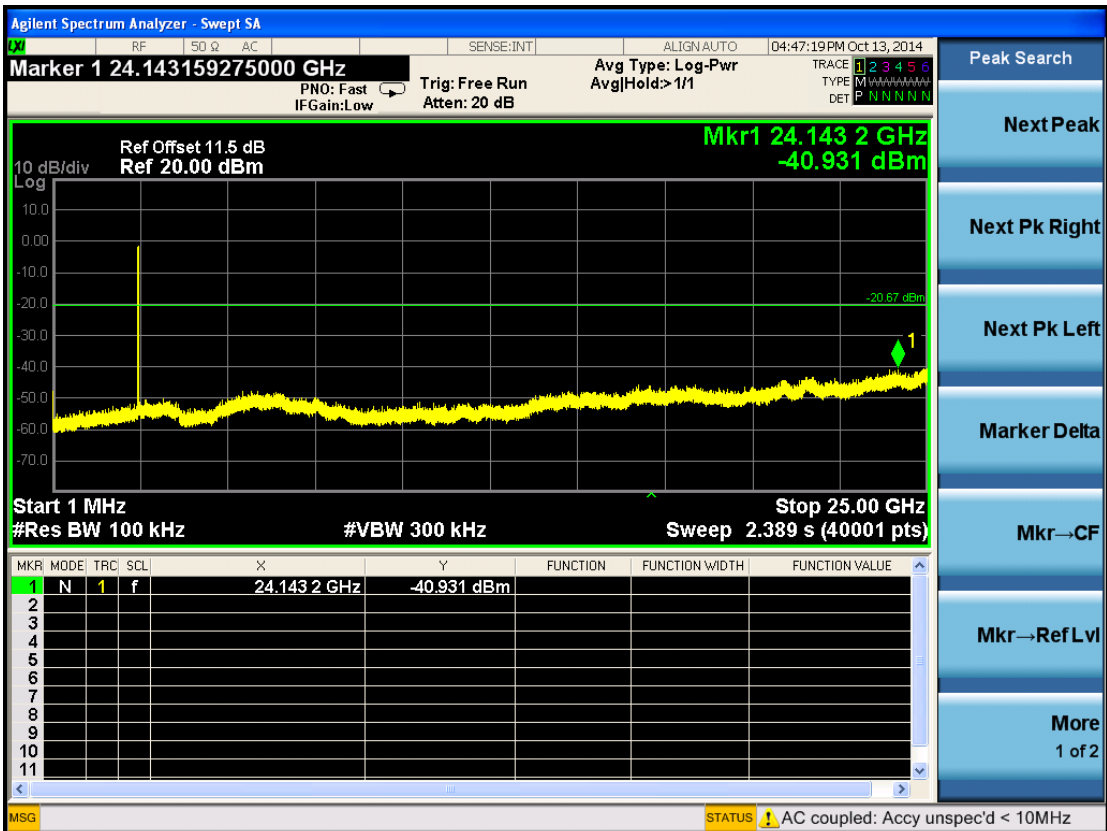
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802.11n20-2437



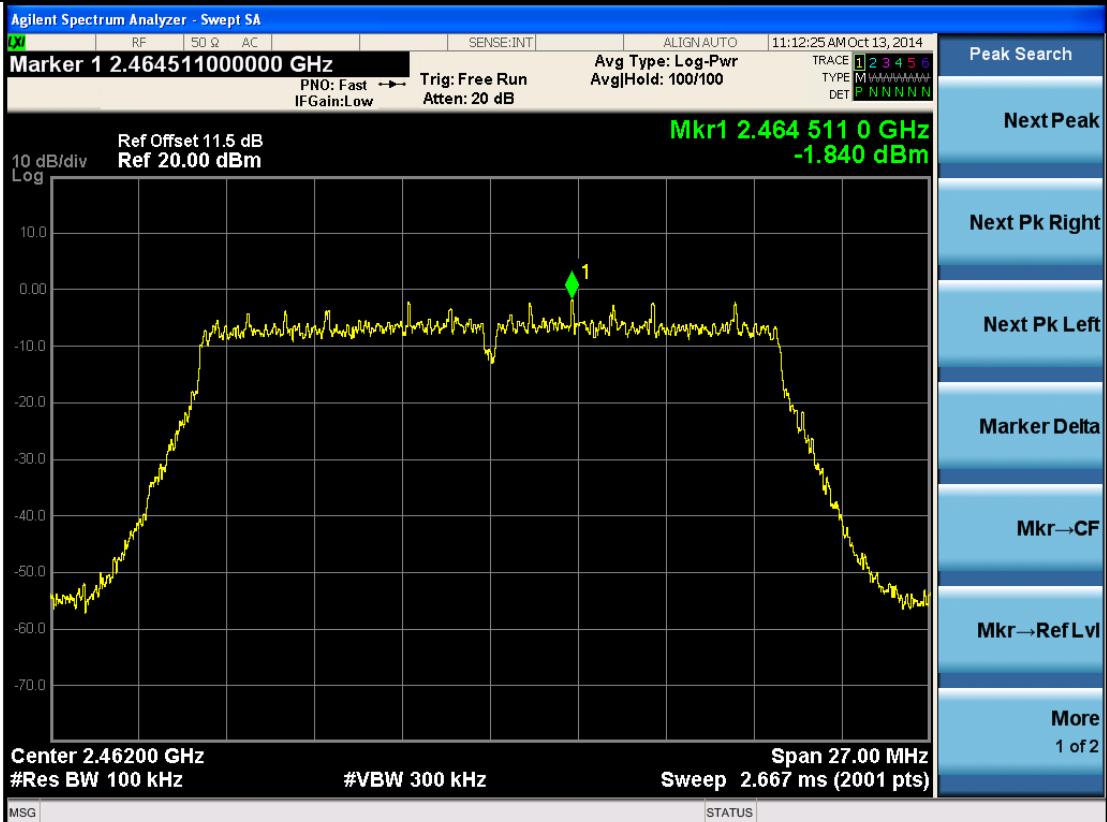
- Peak Search
- Next Peak
- Next Pk Right
- Next Pk Left
- Marker Delta
- Mkr→CF
- Mkr→Ref Lvl
- More 1 of 2



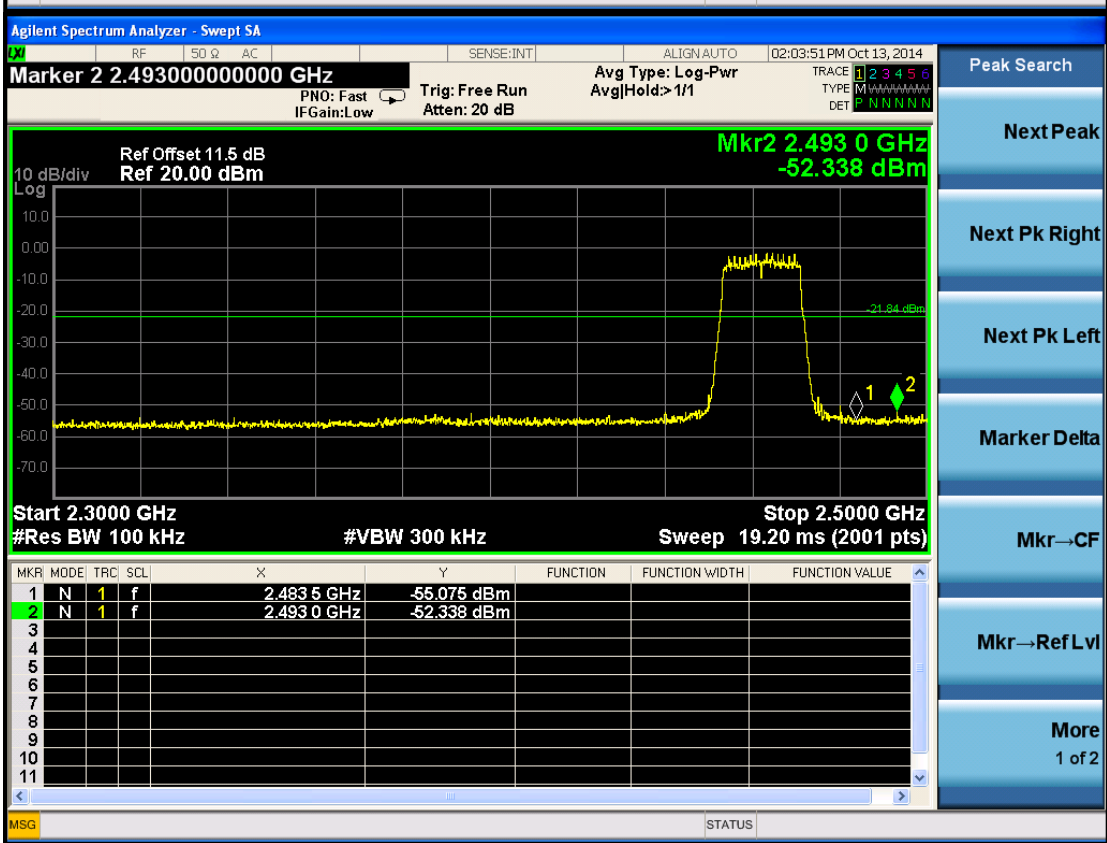
- Peak Search
- Next Peak
- Next Pk Right
- Next Pk Left
- Marker Delta
- Mkr→CF
- Mkr→Ref Lvl
- More 1 of 2



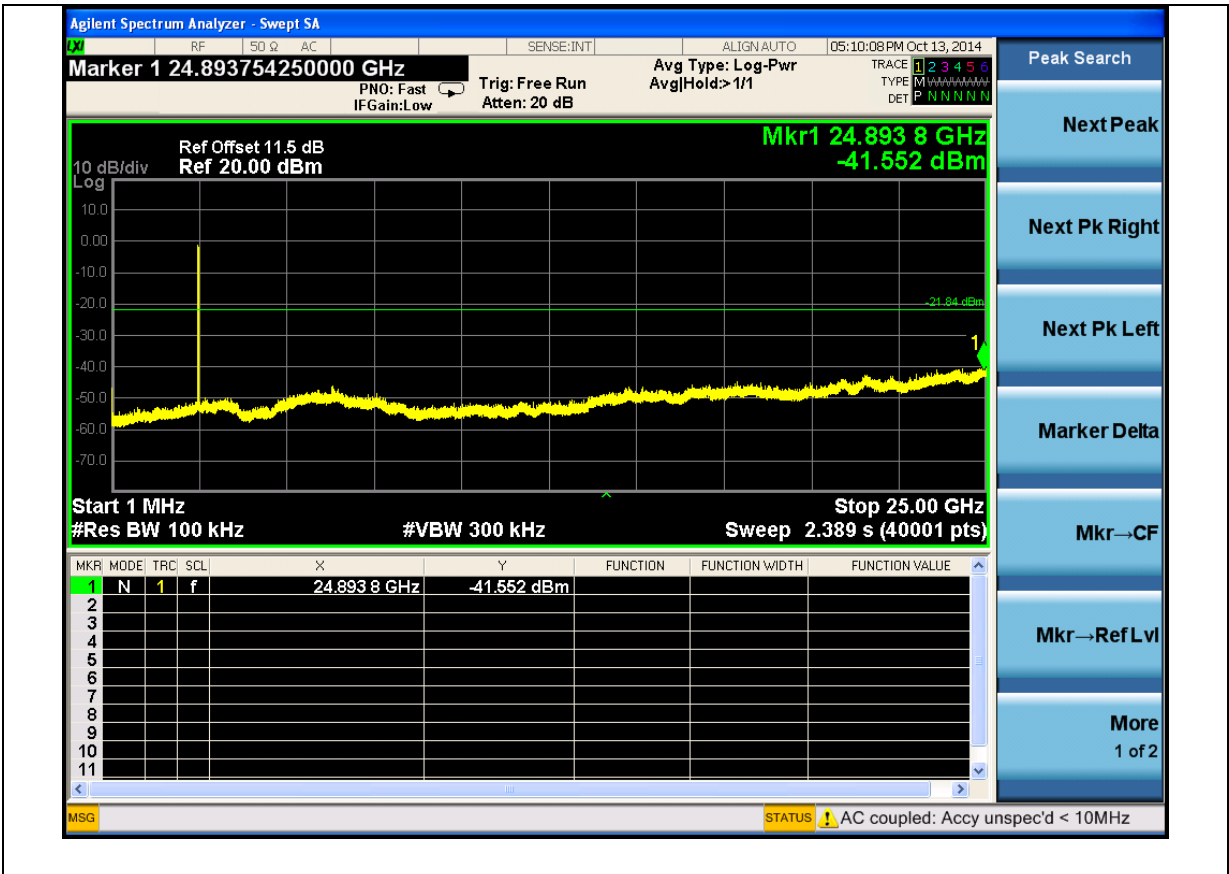
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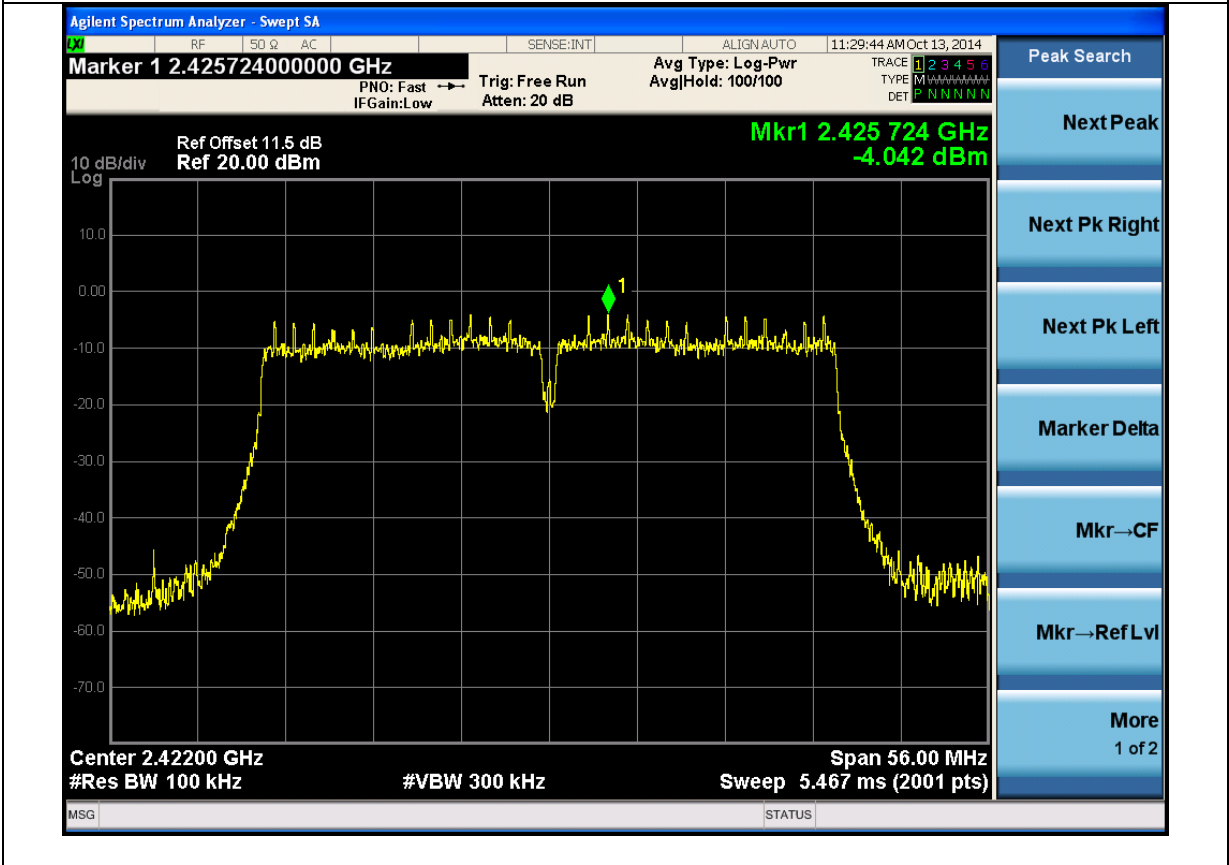
- Peak Search
- Next Peak
- Next Pk Right
- Next Pk Left
- Marker Delta
- Mkr→CF
- Mkr→Ref Lvl
- More 1 of 2

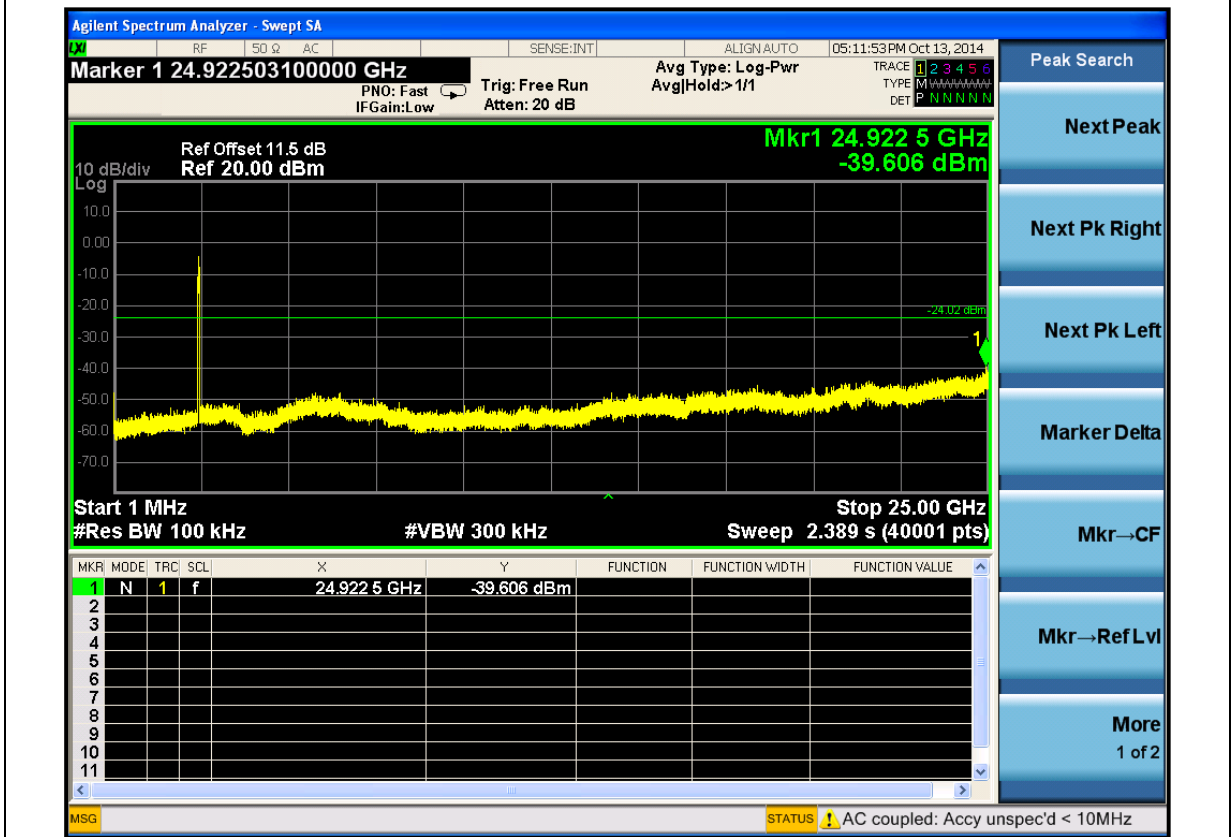
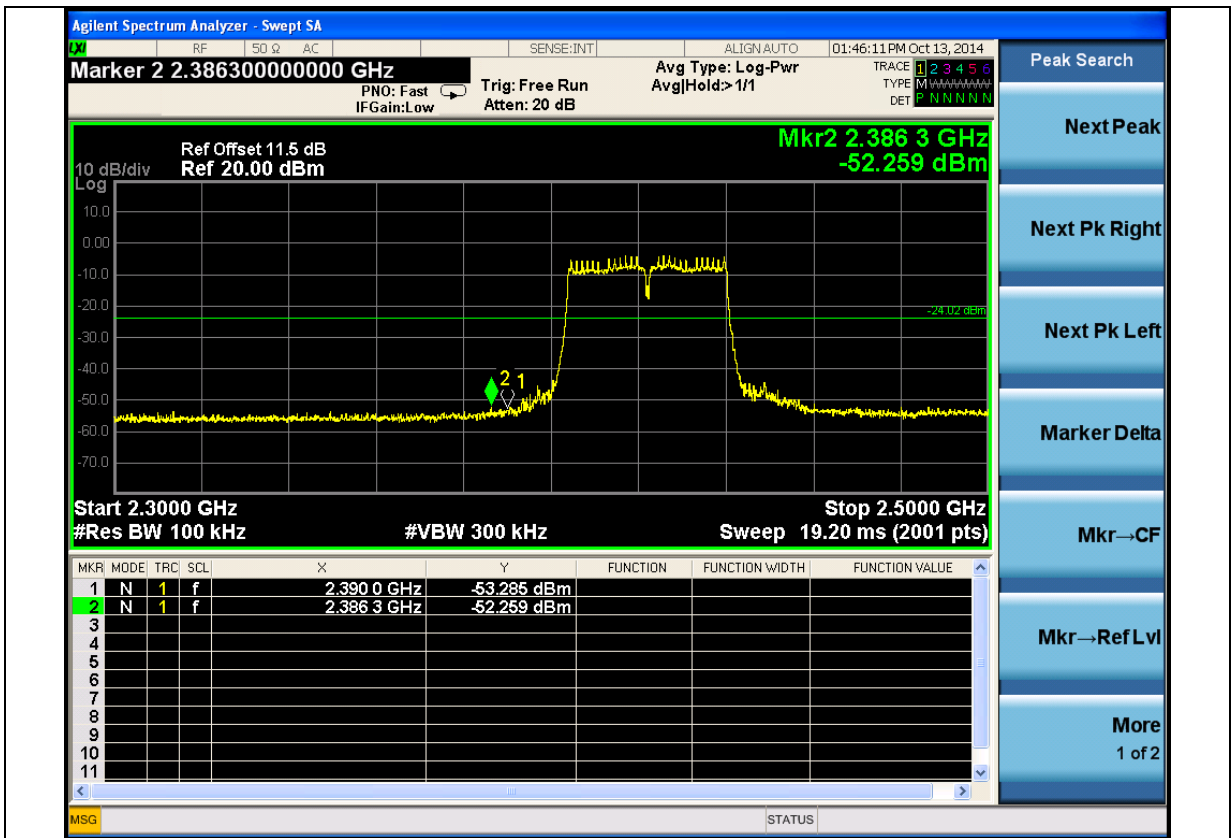


- Peak Search
- Next Peak
- Next Pk Right
- Next Pk Left
- Marker Delta
- Mkr→CF
- Mkr→Ref Lvl
- More 1 of 2

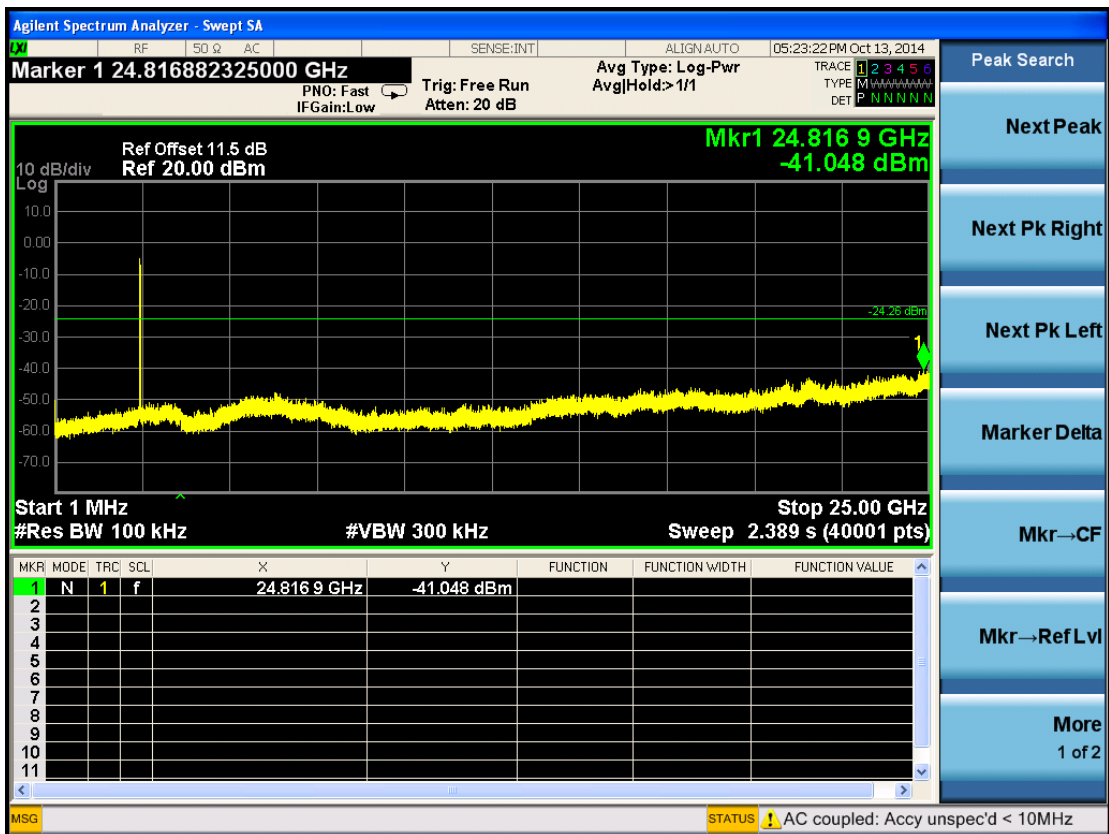
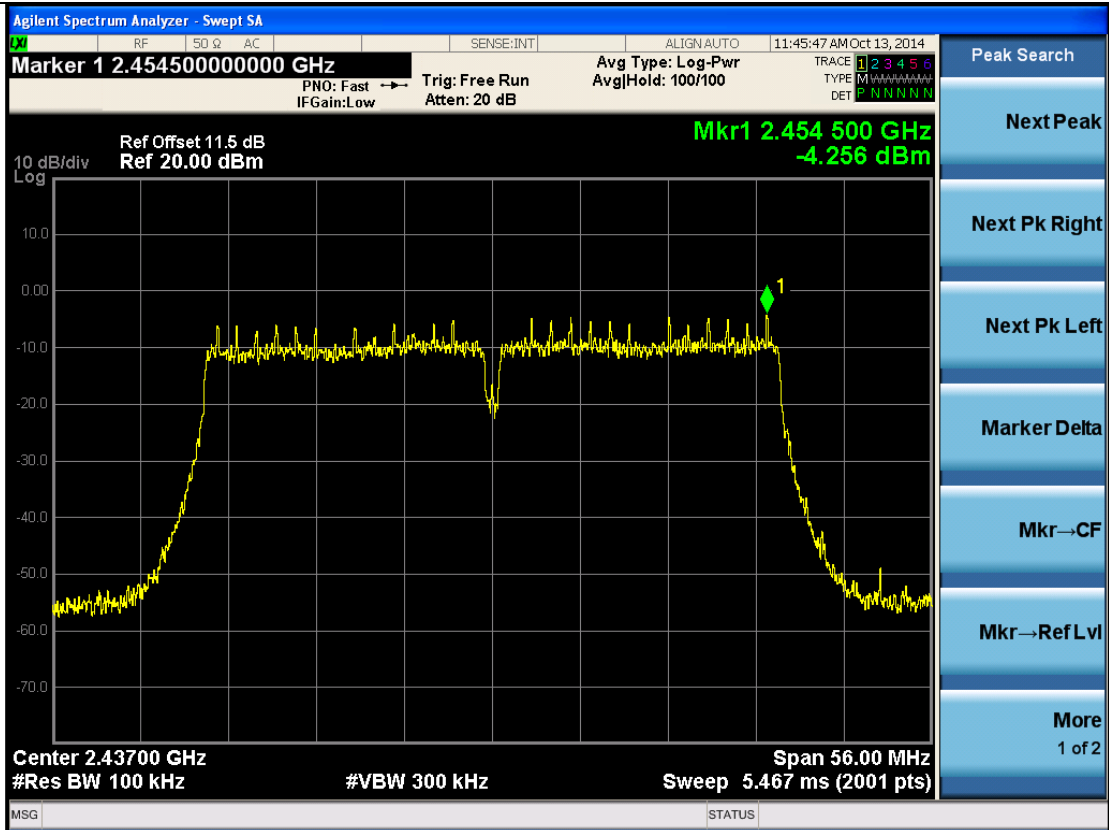


802.11n40-2422

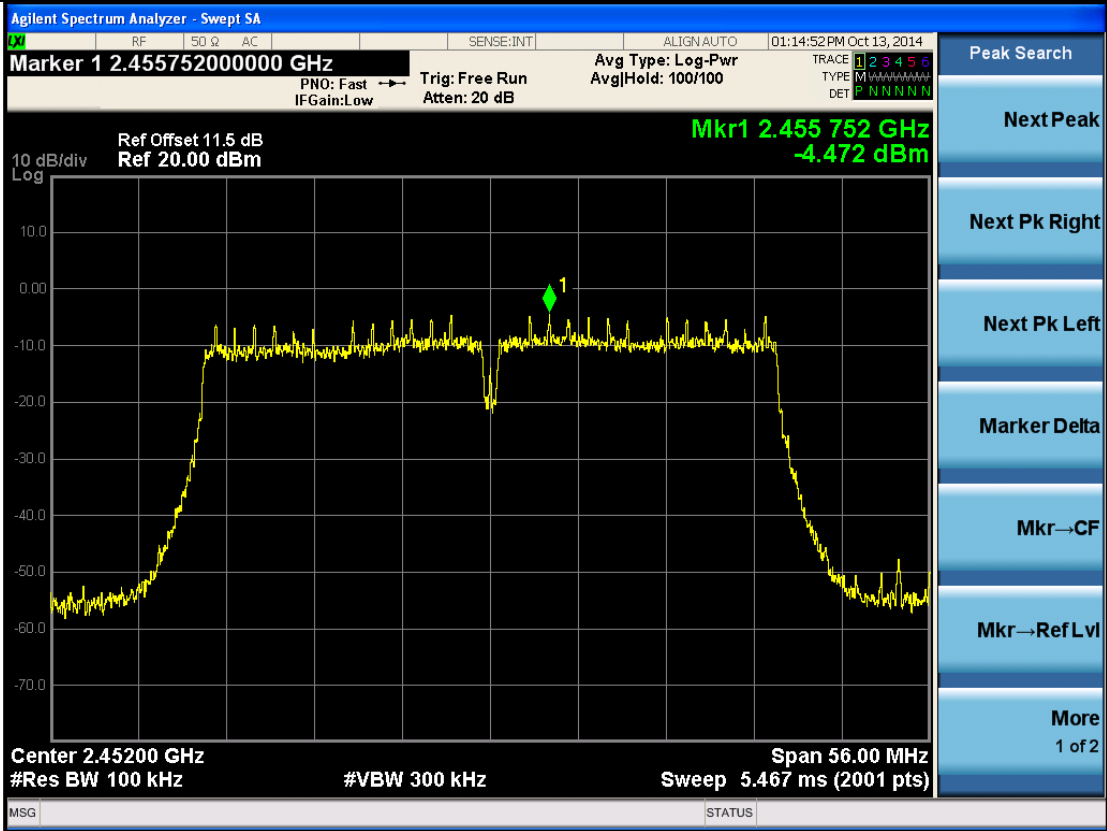




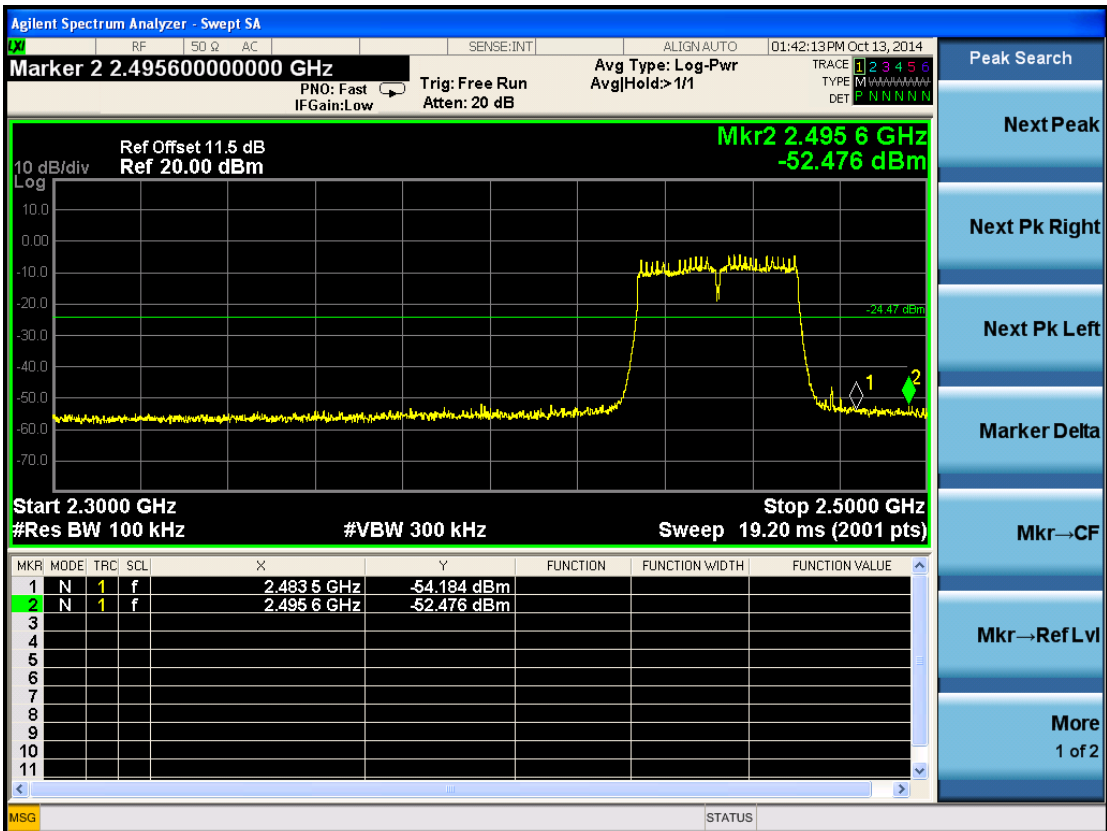
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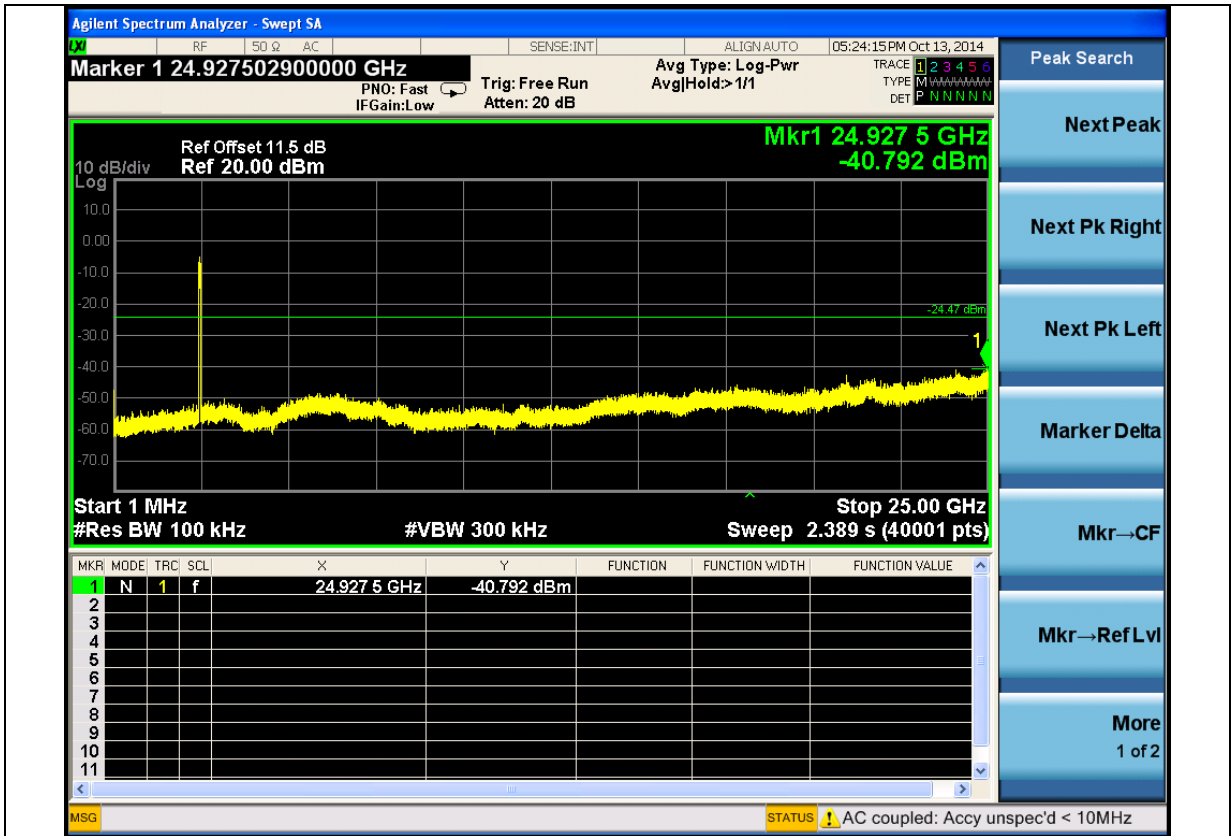
802.11n40-2452



- Peak Search
- Next Peak
- Next Pk Right
- Next Pk Left
- Marker Delta
- Mkr→CF
- Mkr→Ref Lvl
- More 1 of 2



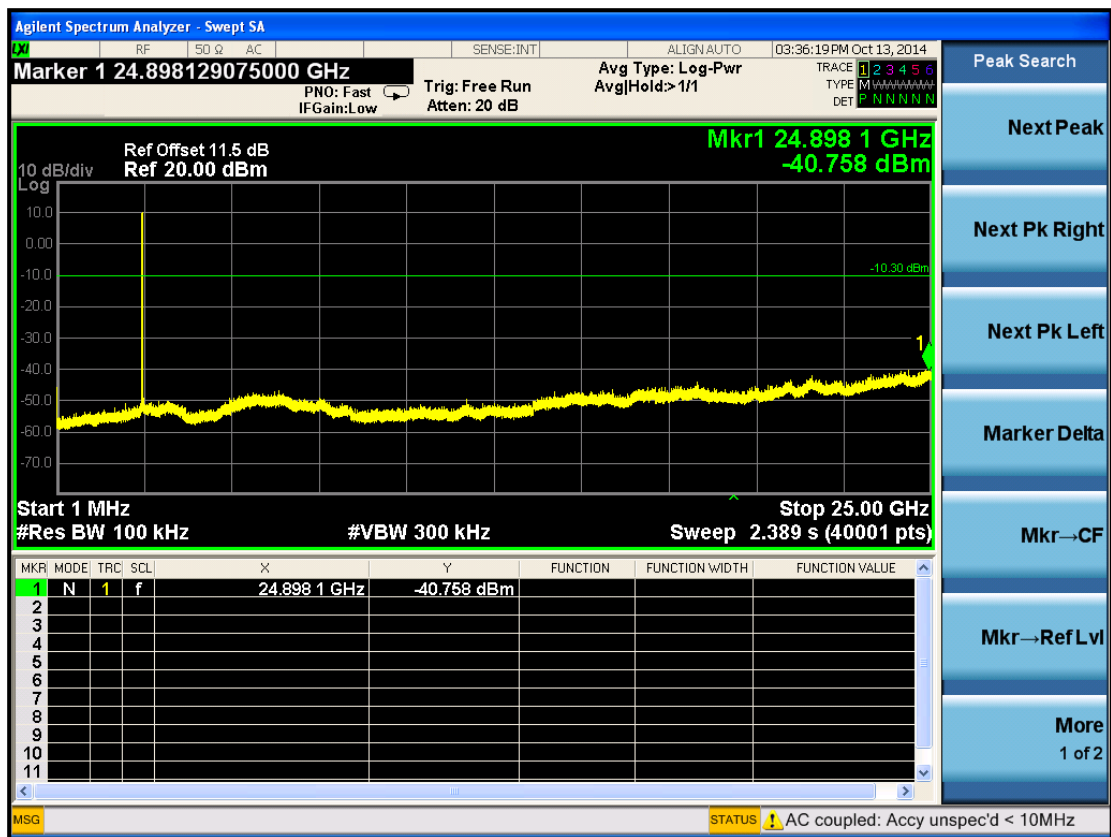
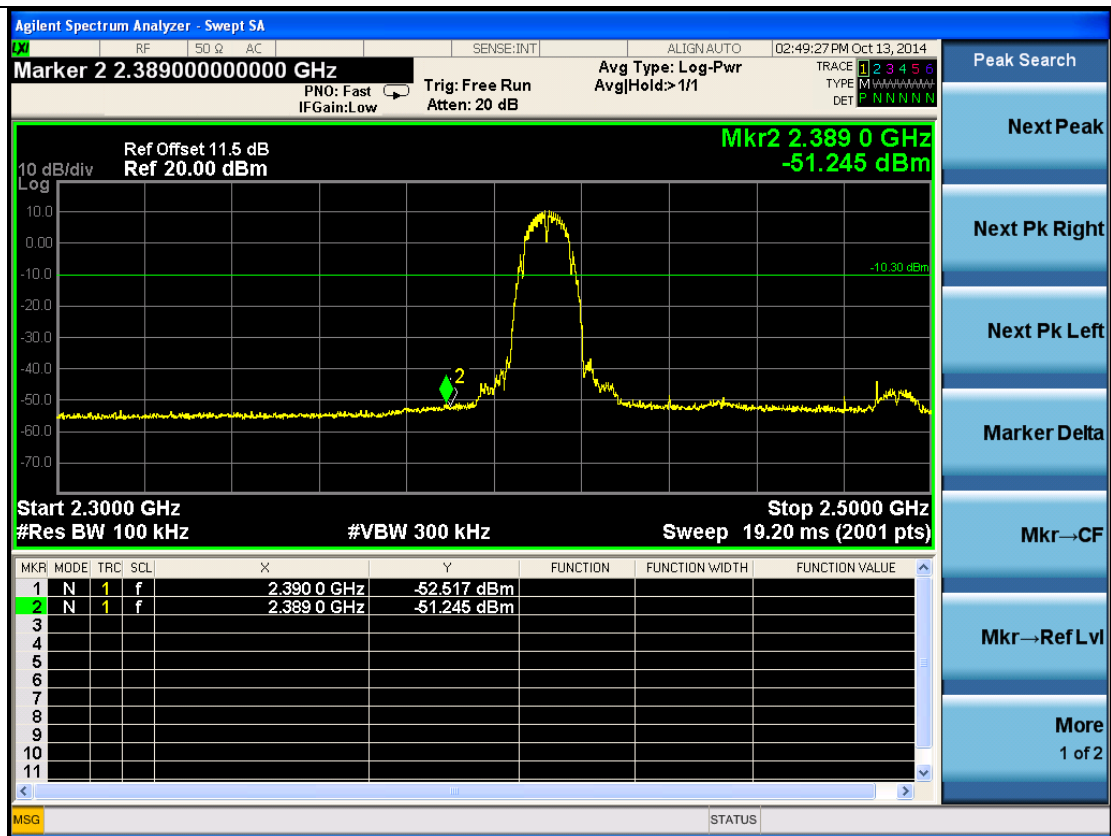
- Peak Search
- Next Peak
- Next Pk Right
- Next Pk Left
- Marker Delta
- Mkr→CF
- Mkr→Ref Lvl
- More 1 of 2



Port 1

802.11b-2412





802.11b-2437

