

## ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

### INTENTIONAL RADIATOR CERTIFICATION TO FCC PART 15 SUBPART C REQUIREMENT

OF

**Product Name:** AC1900 High Power Dual Band Wireless USB Adapter  
**Brand Name:** TRENDnet  
**Marketing Name:** TEW-809UB AC1900 High Power Wireless Dual Band USB Adapter  
**Model No.:** TEW-809UB  
**Model Difference:** N/A  
**FCC ID:** XU8TEW809UB  
**Report No.:** E2/2015/C0042  
**Issue Date:** Mar. 28, 2016  
**FCC Rule Part:** §15.247, Cat: DTS  
**Prepared for:** TRENDNET, Inc.  
20675 Manhattan Place Torrance, CA 90501 USA  
**Prepared by:** SGS Taiwan Ltd.  
Electronics & Communication Laboratory  
No.2, Keji 1st Rd., Guishan District,  
Taoyuan City, Taiwan 333



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## VERIFICATION OF COMPLIANCE

**Applicant:** TRENDNET, Inc.  
20675 Manhattan Place Torrance, CA 90501 USA

**Product Name:** AC1900 High Power Dual Band Wireless USB Adapter

**Brand Name:** TRENDnet

**Marketing Name:** TEW-809UB AC1900 High Power Wireless Dual Band USB Adapter

**Model No.:** TEW-809UB

**Model Difference:** N/A

**FCC ID:** XU8TEW809UB

**Report Number:** E2/2015/C0042

**Date of test:** Dec. 14, 2015 ~ Mar. 15, 2016

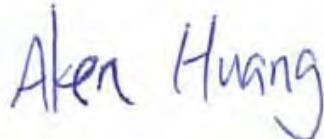
**Date of EUT Received:** Dec. 14, 2015

### We hereby certify that:

The above equipment was tested by SGS Taiwan Ltd. Electronics & Communication Laboratory. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.10:2013 and the energy emitted by the sample EUT tested as described in this report is in compliance with conducted and radiated emission limits.

The test results of this report relate only to the tested sample identified in this report.

**Test By:**

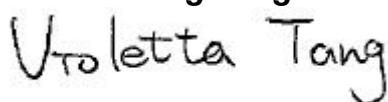


**Date:**

Mar. 28, 2016

*Aken Huang / Engineer*

**Prepared By:**

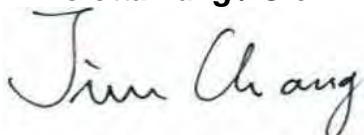


**Date:**

Mar. 28, 2016

*Violetta Tang / Clerk*

**Approved By:**



**Date:**

Mar. 28, 2016

*Jim Chang / Asst. Manager*

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## Revision History

Report Number	Revision	Description	Issue Date
E2/2015/C0042	Rev.00	Initial creation of document	Mar. 28, 2016

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## Contents

<b>1 GENERAL INFORMATION</b>	<b>6</b>
1.1 Product description	6
1.2 Test Methodology of Applied Standards	7
1.3 Test Facility	7
1.4 Special Accessories	7
1.5 Equipment Modifications	7
<b>2 SYSTEM TEST CONFIGURATION</b>	<b>8</b>
2.1 EUT Configuration	8
2.2 EUT Exercise	8
2.3 Test Procedure	8
2.4 Measurement Results Explanation Example	8
2.5 Configuration of Tested System	9
<b>3 SUMMARY OF TEST RESULTS</b>	<b>11</b>
<b>4 DESCRIPTION OF TEST MODES</b>	<b>12</b>
4.1 Operated in 2400 ~ 2483.5MHz Band	12
4.2 The Worst Test Modes and Channel Details	13
<b>5 MEASUREMENT UNCERTAINTY</b>	<b>15</b>
<b>6 CONDUCTED EMISSION TEST</b>	<b>16</b>
6.1 Standard Applicable	16
6.2 Measurement Equipment Used	16
6.3 EUT Setup	16
6.4 Test SET-UP (Block Diagram of Configuration)	17
6.5 Measurement Procedure	17
6.6 Measurement Result	17
<b>7 DUTY CYCLE OF TEST SIGNAL</b>	<b>20</b>
7.1 DUTY CYCLE TEST SIGNAL Measurement Result	21
<b>8 PEAK OUTPUT POWER MEASUREMENT</b>	<b>23</b>
8.1 Standard Applicable	23
8.2 Measurement Equipment Used	24
8.3 Test Set-up	24
8.4 Measurement Procedure	24
8.5 Measurement Result	25

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<b>9 6dB BANDWIDTH MEASUREMENT .....</b>	<b>29</b>
9.1 Standard Applicable .....	29
9.2 Measurement Equipment Used .....	29
9.3 Test Set-up .....	29
9.4 Measurement Procedure .....	29
9.5 Measurement Result .....	30
<b>10 CONDUCTED BAND EDGES AND SPURIOUS EMISSION MEASUREMENT .....</b>	<b>56</b>
10.1 Standard Applicable .....	56
10.2 Measurement Equipment Used .....	56
10.3 Test SET-UP .....	56
10.4 Measurement Result .....	57
<b>11 RADIATED BANEDGE AND SPURIOUS EMISSION MEASUREMENT .....</b>	<b>74</b>
11.1 Standard Applicable .....	74
11.2 Measurement Equipment Used: .....	75
11.3 Test SET-UP .....	76
11.5 Test Results of Radiated Spurious Emissions form 9 kHz to 30 MHz .....	78
11.6 Measurement Result .....	78
<b>12 PEAK POWER SPECTRAL DENSITY .....</b>	<b>117</b>
12.1 Standard Applicable .....	117
12.2 Measurement Equipment Used .....	117
12.3 Test Set-up .....	118
12.4 Measurement Procedure .....	118
12.5 Measurement Result .....	119
<b>13 ANTENNA REQUIREMENT .....</b>	<b>126</b>
13.1 Standard Applicable .....	126
13.2 Antenna Connected Construction .....	126

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## 1 GENERAL INFORMATION

### 1.1 Product description

General:

Product Name:	AC1900 High Power Dual Band Wireless USB Adapter
Brand Name:	TRENDnet
Marketing Name:	TEW-809UB AC1900 High Power Wireless Dual Band USB Adapter
Model No.:	TEW-809UB
Model Difference:	N/A
Product SW/HW version:	1.0 / 1.0
Radio SW/HW version:	1.0 / 1.0
Test SW Version:	N/A
RF power setting in TEST SW:	N/A
Power Supply:	5Vdc form USB Port

WLAN 2.4GHz:

Wi-Fi	Frequency Range	Channels	Rated Power (Peak)	Modulation Technology
11b/g	2412-2462	11	b: 24.82dBm g: 24.14dBm	DSSS, OFDM
11n	HT20 2412-2462	11	24.40dBm	OFDM
11n	HT40 2422-2452	7	21.59dBm	OFDM
Antenna Designation:		1. Dipole Antenna, Part No.: L142-000047, Gain: 5.44dBi 2. Dipole Antenna, Part No.: L142-082450-016, Gain: 5.44dBi 3. Dipole Antenna, Part No.: S142-082450-016, Gain: 5.44dBi		
Modulation type:		CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM		
Transition Rate:		802.11 b: up to 11 Mbps; 802.11 g: up to 54 Mbps 802.11 n_20MHz: up to 216.7Mbps 802.11 n_40MHz: up to 450Mbps		

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## 1.2 Test Methodology of Applied Standards

FCC Part 15, Subpart C §15.247

FCC KDB 558074 D01 DTS Meas. Guidance

FCC KDB 662911 D01 Multiple Transmitter Output

ANSI C63.10:2013

Note:

1. All test items have been performed and record as per the above standards.
2. The composite system is compliance with FCC Subpart B is authorized under a DoC procedure.

## 1.3 Test Facility

SGS Taiwan Ltd. Electronics & Communication Laboratory No.2, Keji 1st Rd., Guishan District, Taoyuan City, Taiwan 333. (TAF code 0513)

FCC Registration Numbers are: 735305

Canada Registration Number: 4620A-5.

## 1.4 Special Accessories

There are no special accessories used while test was conducted.

## 1.5 Equipment Modifications

There was no modification incorporated into the EUT.

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## 2 SYSTEM TEST CONFIGURATION

### 2.1 EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

### 2.2 EUT Exercise

An engineering test mode (software/firmware) that applicant provided was utilized to manipulate the EUT into transmit, selection of the test channel, and modulation scheme.

### 2.3 Test Procedure

#### 2.3.1 Conducted Emissions

The EUT is placed on a turn table which is 0.8 m above ground plane. Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz,. The CISPR Quasi-Peak and Average detector mode is employed according to §15.207. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

#### 2.3.2 Radiated Emissions

The EUT is placed on a turn table. For emissions testing at or below 1 GHz, the table height shall be 0.8 m above the reference ground plane. For emission measurements above 1 GHz, the table height shall be 1.5 m. The turn table shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this hand-held transmitter (EUT) was rotated through three orthogonal axes and measurement procedures for electric field radiated emissions above 1 GHz the EUT measurement is to be made "while keeping the antenna in the 'cone of radiation' from that area and pointed at the area both in azimuth and elevation, with polarization oriented for maximum response." is still within the 3dB illumination BW of the measurement antenna.

### 2.4 Measurement Results Explanation Example

#### For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuation factor between EUT conducted port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly EUT RF output level.

#### Note:

The spectrum analyzer offset is derived from RF cable loss and attenuator factor. Following shows an offset computation example with cable loss 0.7dB and 10dB attenuator. \*Offset = RF cable loss (dB)+ attenuation factor(dB)=10.7(dB)

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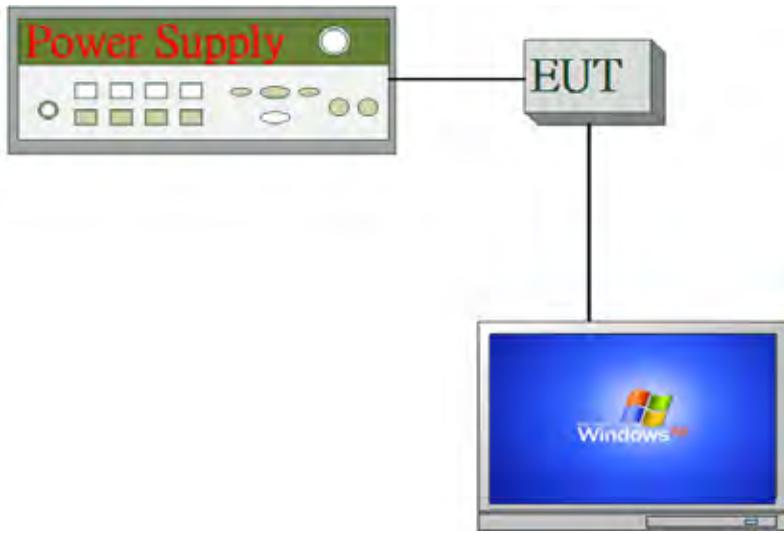
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## 2.5 Configuration of Tested System

**Fig. 2-1 Radiated Emission**



**Fig. 2-2 Conducted Emission**



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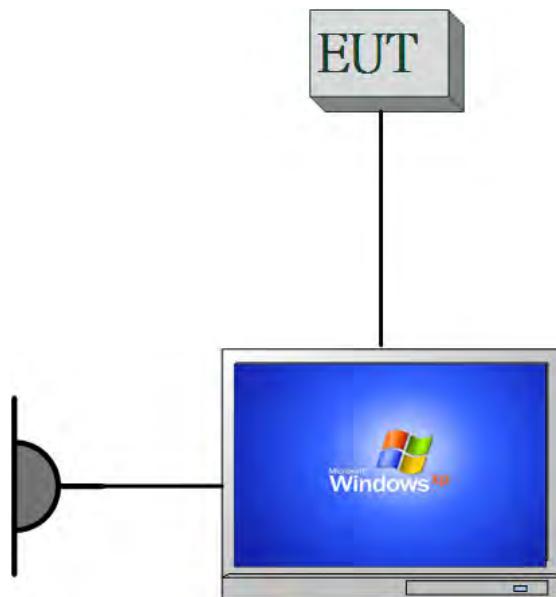
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**Fig. 2-3 AC Power Line Conducted Emission****Table 2-1 Equipment Used in Tested System**

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Data Cable	Power Cord
1.	WLAN Test Software	N/A	N/A	N/A	N/A	N/A
2.	Notebook	Lenovo	L412	LR-027LM	N/A	N/A
3.	DC Power Supply	Agilent	E3640A	MY53140006	N/A	N/A

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### 3 SUMMARY OF TEST RESULTS

FCC Rules	Description Of Test	Result
§15.207(a)	AC Power Line Conducted Emission	Compliant
§15.247(b) (3)	Peak Output Power	Compliant
§15.247(a)(2)	6dB Emission Bandwidth	Compliant
§15.247(d)	Conducted Band Edge and Spurious Emission	Compliant
§15.247(d)	Radiated Band Edge and Spurious Emission	Compliant
§15.247(e)	Power Spectral Density	Compliant
§15.203 §15.247(b)	Antenna Requirement	Compliant

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## 4 DESCRIPTION OF TEST MODES

### 4.1 Operated in 2400 ~ 2483.5MHz Band

11 channels are provided for 802.11b, 802.11g and 802.11n\_HT20

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
1	2412 MHz	7	2442 MHz
2	2417 MHz	8	2447 MHz
3	2422 MHz	9	2452 MHz
4	2427 MHz	10	2457 MHz
5	2432 MHz	11	2462 MHz
6	2437 MHz		

7 channels are provided for 802.11n\_HT40

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
3	2422 MHz	7	2442 MHz
4	2427 MHz	8	2447 MHz
5	2432 MHz	9	2452 MHz
6	2437 MHz		

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## 4.2 The Worst Test Modes and Channel Details

1. The EUT has been tested under operating condition.
2. Test program used to control the EUT for staying in continuous transmitting and receiving mode is programmed.
3. Investigation has been done on all the possible configurations for searching the worst case.

### RADIATED EMISSION TEST:

RADIATED EMISSION TEST (BELOW 1 GHz)					
MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)	ANTENNA PORT
802.11g	1 to 11	1,6,11	OFDM	6	MAIN
RADIATED EMISSION TEST (ABOVE 1 GHz)					
MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)	ANTENNA PORT
802.11b	1 to 11	1, 6, 11	DSSS	1	MAIN
802.11g	1 to 11	1, 6, 11	OFDM	6	MAIN
802.11n (HT20)	1 to 11	1, 6, 11	OFDM	MCS8	MIMO
802.11n (HT40)	3 to 9	3, 6, 9	OFDM	MCS8	MIMO

#### Note:

The field strength of radiation emission was measured as EUT stand-up position (H mode) and lie down position (E1, E2 mode) for 802.11b/g/n WLAN Transmitter for channel Low, Mid and High, the worst case E2 position was reported.

### ANTENNA PORT CONDUCTED MEASUREMENT:

CONDUCTED TEST					
MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)	ANTENNA PORT
802.11b	1 to 11	1, 6, 11	DSSS	1	MAIN
802.11g	1 to 11	1, 6, 11	OFDM	6	MAIN
802.11n (HT20)	1 to 11	1, 6, 11	OFDM	MCS8	MIMO
802.11n (HT40)	3 to 9	3, 6, 9	OFDM	MCS8	MIMO

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## Directional gain (MIMO)

The Tx transmission to construct MIMO operation is cyclic delay diversity, and the following deduction to obtain the array gain of MIMO operation is based on the approach given by KDB 662911 D01.

Array gain = 4.77dBi (peak spectral density, conducted spurious emission)

Gain that is combined with different magnitude of two antennas:

(ii) If antenna gains are not equal, the user may use either of the following methods to calculate directional gain, provided that each transmit antenna is driven by only one spatial stream:

- Directional gain may be calculated by using the formulas applicable to equal gain antennas with  $G_{ANT}$  set equal to the gain of the antenna having the highest gain; or,

$$\text{DirectionalGain} = 10 \cdot \log \left[ \frac{\sum_{j=1}^{N_{SS}} \left\{ \sum_{k=1}^{N_{ANT}} g_{j,k} \right\}^2}{N_{ANT}} \right]$$

where

Each antenna is driven by no more than one spatial stream;

$N_{SS}$  = the number of independent spatial streams of data;

$N_{ANT}$  = the total number of antennas

$g_{j,k} = 10^{G_k/20}$  if the  $k$ th antenna is being fed by spatial stream  $j$ , or zero if it is not;  
 $G_k$  is the gain in dBi of the  $k$ th antenna.

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## 5 MEASUREMENT UNCERTAINTY

Test Items	Uncertainty
AC Power Line Conducted Emission	+/- 2.586 dB
Peak Output Power	+/- 0.84 dB
6dB Bandwidth	+/- 51.33 Hz
100 KHz Bandwidth Of Frequency Band Edges	+/- 0.84 dB
Peak Power Density	+/- 1.3 dB
Temperature	+/- 0.65 °C
Humidity	+/- 4.6 %
DC / AC Power Source	DC= +/- 0.13%, AC= +/- 0.2%

Radiated Spurious Emission:

Measurement uncertainty (Polarization : <b>Vertical</b> )	30MHz - 180MHz: +/- 3.37dB
	180MHz -417MHz: +/- 3.19dB
	0.417GHz-1GHz: +/- 3.19dB
	1GHz - 18GHz: +/- 4.04dB
	18GHz - 40GHz: +/- 4.04dB

Measurement uncertainty (Polarization : <b>Horizontal</b> )	30MHz - 167MHz: +/- 4.22dB
	167MHz -500MHz: +/- 3.44dB
	0.5GHz-1GHz: +/- 3.39dB
	1GHz - 18GHz: +/- 4.08dB
	18GHz - 40GHz: +/- 4.08dB

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

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## 6 CONDUCTED EMISSION TEST

### 6.1 Standard Applicable

Frequency range within 150kHz to 30MHz shall not exceed the Limit table as below.

Frequency range MHz	Limits dB(uV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50

#### Note

- 1.The lower limit shall apply at the transition frequencies
- 2.The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.

### 6.2 Measurement Equipment Used

Conducted Emission Test Site					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
EMI Test Receiver	R&S	ESCI 7	100950	12/12/2015	12/11/2016
Coaxial Cables	N/A	N30N30-1042-150cm	N/A	01/06/2016	01/07/2017
LISN	Schwarzbeck	NSLK 8127	8127-648	06/09/2015	06/08/2016
LISN	Rolf-Heine	NNB-2/16Z	99012	03/04/2015	03/03/2016
Test Software	Farad	EZ-EMC	Ver. SGS-03A2	N.C.R.	N.C.R.

### 6.3 EUT Setup

1. The conducted emission tests were performed in the test site, using the setup in accordance with the ANSI 63.10:2013.
2. The AC/DC Power adaptor of EUT was plug-in LISN. The EUT was placed flushed with the rear of the table.
3. The LISN was connected with 120Vac/60Hz power source.

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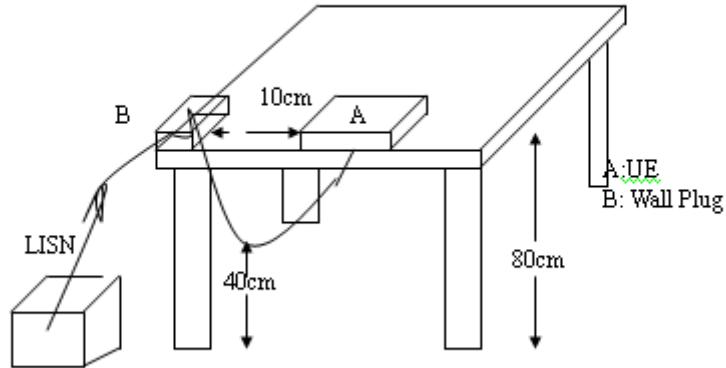
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## 6.4 Test SET-UP (Block Diagram of Configuration)



## 6.5 Measurement Procedure

1. The EUT was placed on a table which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all phases of power being supplied by given UE are completed

## 6.6 Measurement Result

Note: Refer to next page for measurement data and plots.

Note2: The \* reveals the worst-case results that closet to the limit

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## AC POWER LINE CONDUCTED EMISSION TEST DATA

Operation Mode:	Operation mode			Test Date:	Jan. 25, 2016
Temperature:	16	Humidity:	43 %	Test By:	Aken

Site : Conduction Room Phase: **L1** Temperature: 15 °C  
Limit: CISPR 13 / CISPR 22 Conduction (QP) Power: AC 120V/60Hz Humidity: 43 %

### Note:

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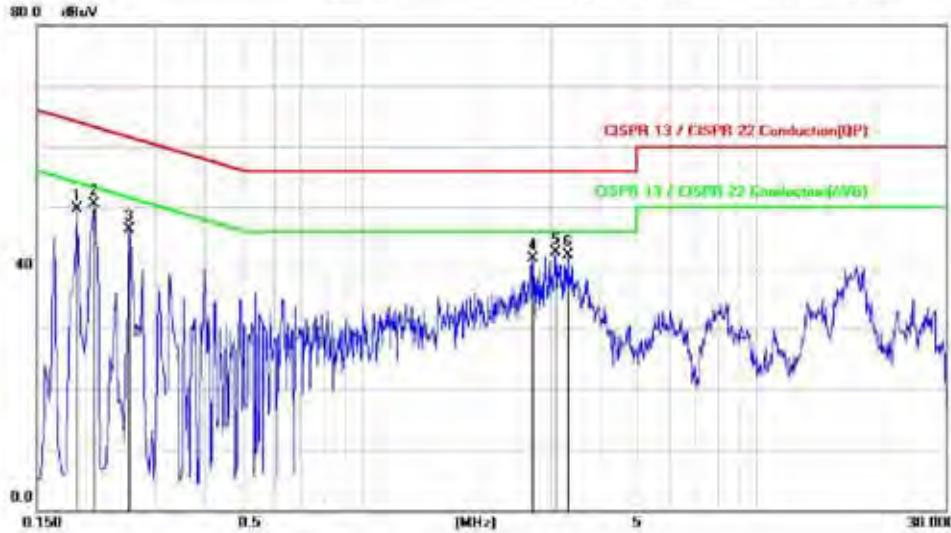
## Conducted Emission

## File :Condition

Data #334

Date: 2016/1/25

Time: 下午 08:35:07



No.	Mk.	Reading Level		Correct Factor	Measure- ment	Limit	Over	
		MHz	dBuV		dB		dB	Detector
1	0.1900	49.56	0.07	49.63	64.04	-14.41	peak	
2 *	0.2100	50.46	0.07	50.53	63.21	-12.68	peak	
3	0.2580	46.20	0.10	46.30	61.50	-15.20	peak	
4	2.7100	40.91	0.59	41.50	56.00	-14.50	peak	
5	3.0940	41.88	0.60	42.48	56.00	-13.52	peak	
6	3.3220	41.48	0.60	42.08	56.00	-13.92	peak	

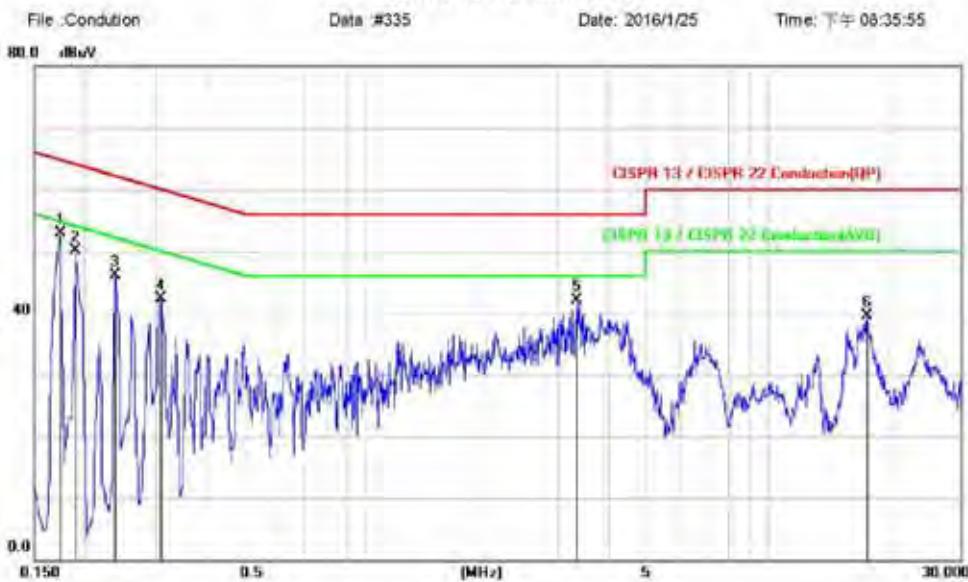
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Site: Conduction Room  
Phase: N  
Temperature: 16 °C  
Limit: CISPR 13 / CISPR 22 Conduction(QP)  
Power: AC 120V/60Hz  
Humidity: 43 %  
Mode:  
Note:

### Conducted Emission



No.	Mk	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dB	Over dB	Over	
								Detector	Comment
1	*	0.1740	52.76	0.14	52.90	64.77	-11.87	peak	
2		0.1900	49.89	0.13	50.02	64.04	-14.02	peak	
3		0.2380	45.91	0.15	46.06	62.17	-16.11	peak	
4		0.3100	42.20	0.18	42.38	59.97	-17.59	peak	
5		3.3620	41.36	0.65	42.01	56.00	-13.99	peak	
6		17.6420	38.96	0.61	39.57	60.00	-20.43	peak	

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## 7 DUTY CYCLE OF TEST SIGNAL

Pre-analysis Check: While conducting average power measurement, duty cycle of each mode shall be checked to ensure its duty cycle in order to compensate for the loss due to insufficient ratio of duty cycle.

All duty cycle is pre-scanned, and result as obtained below shows only the most representative ones where duty cycle is conducted as the given transmission with given virtual operation that expresses the percentage.

### Formula:

$$\text{Duty Cycle} = \text{Ton} / (\text{Ton} + \text{Toff})$$

### Measurement Procedure:

1. Set span = Zero
2. RBW = 8MHz
3. VBW = 8MHz,
4. Detector = Peak

### Duty Cycle:

	Duty Cycle (%)	Duty Factor (dB)
802.11b	99.60	0.02
802.11g	96.28	0.16
802.11n_20	89.94	0.46
802.11n_40	82.00	0.86

Duty Cycle Factor:  $10 * \log (1/\text{Duty cycle})$

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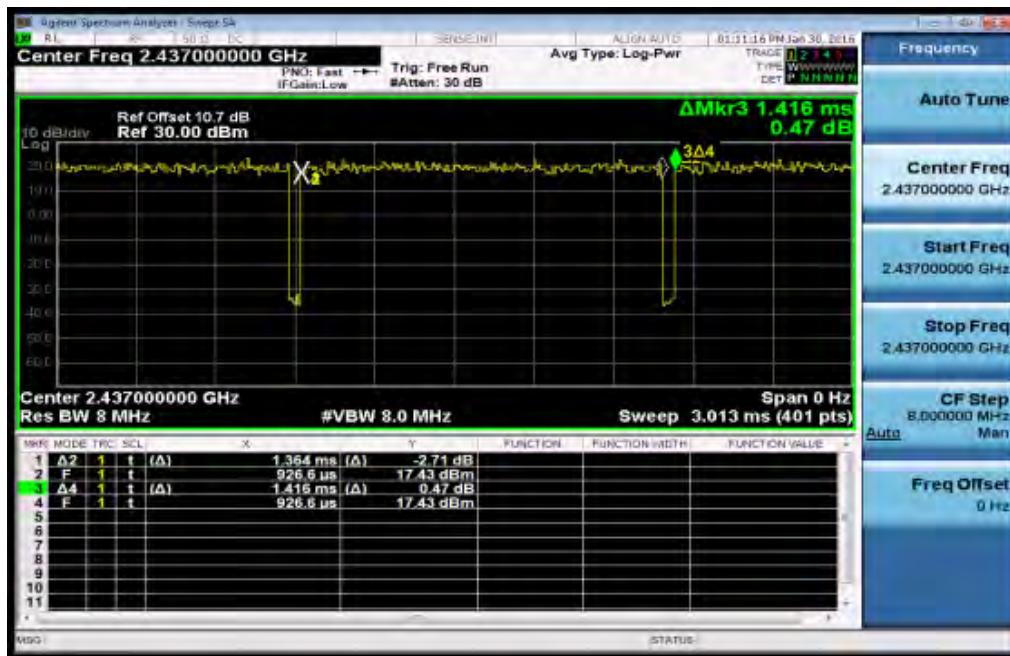
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## 7.1 DUTY CYCLE TEST SIGNAL Measurement Result

802.11 b



802.11 g



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## 802.11 n\_20 MHz



## 802.11 n\_40 MHz



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## 8 PEAK OUTPUT POWER MEASUREMENT

### 8.1 Standard Applicable

For systems using digital modulation in the 2400-2483.5 MHz bands, the limit for peak output power is 1Watt.

If the transmitting antenna of directional gain greater than 6dBi are used the peak output power from the intentional radiator shall be reduced below the above stated value by the amount in dB that the directional gain of the Antenna exceeds 6dBi.

In case of point-to-point operation, the limit has to be reduced by 1dB for every 3dB that the directional gain of Antenna exceeds 6dBi.

**Note:**

Antenna Gain:	5.44 dBi
Number Antenna:	3 pcs
Limit:	30 dBm

*The antenna gain is grater than 6dBi in MIMO mode the limit reduce as below:*

*Directional gain = gain of antenna element + 10 log (# of TX antenna elements)*

*Effective Legacy Gain (dBi) = 5.44+4.77=10.21dBi*

*Limit: 30dBm - (10.21- 6dBi)=25.79dBm*

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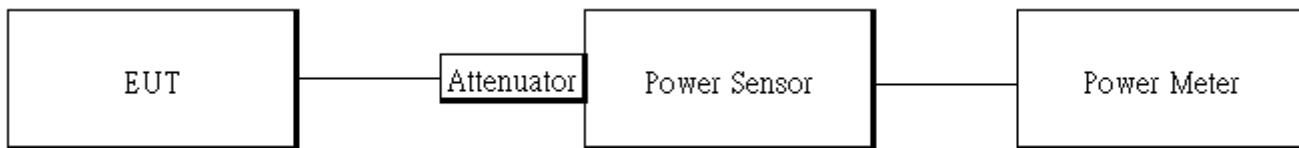
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## 8.2 Measurement Equipment Used

Conducted Emission Test Site					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Power Meter	Anritsu	ML2496A	1326001	06/23/2015	06/22/2016
Power Sensor	Anritsu	MA2411B	1315048	06/23/2015	06/22/2016
Spectrum Analyzer	KEYSIGHT	N9010A	MY54510568	04/14/2015	04/13/2016
DC Block	PASTERNACK	PE8210	RF29	12/19/2015	12/18/2016
Splitter	RF-LAMBAD	RFLT2W1G18G	RF35	12/19/2015	12/18/2016
Attenuator	WOKEN	218FS-10	RF23	12/19/2015	12/18/2016

## 8.3 Test Set-up

Power Meter:



## 8.4 Measurement Procedure

1. Place the EUT on the table and set it in transmitting mode.
2. The testing follows the Measurement Procedure of FCC KDB 558074 D01 DTS Meas. Guidance.
3. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the power meter.

### Power Meter:

It is used as the auxiliary test equipment to conduct the output power measurement.

4. Record the max. Reading as observed from Spectrum or Power Meter.
5. Repeat above procedures until all frequency of interest measured was complete.

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## 8.5 Measurement Result

802.11b_Main						
CH	Frequency (MHz)	Data Rate	Peak Output Power (dBm)	Peak Output Power (mW)	Limit	RESULT
1	2412	1	24.23	264.85	1 Watt = 30.00 dBm	PASS
6	2437	1	<b>24.67</b>	<b>293.09</b>	1 Watt = 30.00 dBm	PASS
11	2462	1	22.91	195.43	1 Watt = 30.00 dBm	PASS
802.11b_Main						
CH	Frequency (MHz)	Data Rate	Avg. Output Power (dBm)	Avg. Output Power (mW)	Limit	RESULT
1	2412	1	22.76	188.80	1 Watt = 30.00 dBm	PASS
6	2437	1	<b>22.93</b>	<b>196.34</b>	1 Watt = 30.00 dBm	PASS
11	2462	1	20.89	122.74	1 Watt = 30.00 dBm	PASS
802.11g_Main						
CH	Frequency (MHz)	Data Rate	Peak Output Power (dBm)	Peak Output Power (mW)	Limit	RESULT
1	2412	6	23.57	227.51	1 Watt = 30.00 dBm	PASS
6	2437	6	<b>23.87</b>	<b>243.78</b>	1 Watt = 30.00 dBm	PASS
11	2462	6	23.42	219.79	1 Watt = 30.00 dBm	PASS
802.11g_Main						
CH	Frequency (MHz)	Data Rate	Avg. Output Power (dBm)	Avg. Output Power (mW)	Limit	RESULT
1	2412	6	15.52	35.65	1 Watt = 30.00 dBm	PASS
6	2437	6	<b>15.72</b>	<b>37.33</b>	1 Watt = 30.00 dBm	PASS
11	2462	6	15.31	33.96	1 Watt = 30.00 dBm	PASS

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## 802.11b\_Aux-1

CH	Frequency (MHz)	Data Rate	Peak Output Power (dBm)	Peak Output Power (mW)	Limit	RESULT
1	2412	1	24.59	287.74	1 Watt = 30.00 dBm	PASS
6	2437	1	<b>24.82</b>	<b>303.39</b>	1 Watt = 30.00 dBm	PASS
11	2462	1	23.14	206.06	1 Watt = 30.00 dBm	PASS

## 802.11b\_Aux-1

CH	Frequency (MHz)	Data Rate	Avg. Output Power (dBm)	Avg. Output Power (mW)	Limit	RESULT
1	2412	1	22.83	191.87	1 Watt = 30.00 dBm	PASS
6	2437	1	<b>23.18</b>	<b>207.97</b>	1 Watt = 30.00 dBm	PASS
11	2462	1	21.18	131.22	1 Watt = 30.00 dBm	PASS

## 802.11g\_Aux-1

CH	Frequency (MHz)	Data Rate	Peak Output Power (dBm)	Peak Output Power (mW)	Limit	RESULT
1	2412	6	23.77	238.23	1 Watt = 30.00 dBm	PASS
6	2437	6	<b>24.14</b>	<b>259.42</b>	1 Watt = 30.00 dBm	PASS
11	2462	6	23.57	227.51	1 Watt = 30.00 dBm	PASS

## 802.11g\_Aux-1

CH	Frequency (MHz)	Data Rate	Avg. Output Power (dBm)	Avg. Output Power (mW)	Limit	RESULT
1	2412	6	15.56	35.97	1 Watt = 30.00 dBm	PASS
6	2437	6	<b>16.01</b>	<b>39.90</b>	1 Watt = 30.00 dBm	PASS
11	2462	6	15.46	35.16	1 Watt = 30.00 dBm	PASS

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## 802.11b Aux2

CH	Frequency (MHz)	Data Rate	Peak Output Power (dBm)	Peak Output Power (mW)	Limit	RESULT
1	2412	1	24.15	260.02	1 Watt = 30.00 dBm	PASS
6	2437	1	<b>24.46</b>	<b>279.25</b>	1 Watt = 30.00 dBm	PASS
11	2462	1	22.76	188.80	1 Watt = 30.00 dBm	PASS

## 802.11b Aux2

CH	Frequency (MHz)	Data Rate	Avg. Output Power (dBm)	Avg. Output Power (mW)	Limit	RESULT
1	2412	1	22.63	183.23	1 Watt = 30.00 dBm	PASS
6	2437	1	<b>22.76</b>	<b>188.80</b>	1 Watt = 30.00 dBm	PASS
11	2462	1	20.71	117.76	1 Watt = 30.00 dBm	PASS

## 802.11g Aux2

CH	Frequency (MHz)	Data Rate	Peak Output Power (dBm)	Peak Output Power (mW)	Limit	RESULT
1	2412	6	23.43	220.29	1 Watt = 30.00 dBm	PASS
6	2437	6	<b>23.68</b>	<b>233.35</b>	1 Watt = 30.00 dBm	PASS
11	2462	6	23.34	215.77	1 Watt = 30.00 dBm	PASS

## 802.11g Aux2

CH	Frequency (MHz)	Data Rate	Avg. Output Power (dBm)	Avg. Output Power (mW)	Limit	RESULT
1	2412	6	15.32	34.04	1 Watt = 30.00 dBm	PASS
6	2437	6	<b>15.64</b>	<b>36.64</b>	1 Watt = 30.00 dBm	PASS
11	2462	6	15.22	33.27	1 Watt = 30.00 dBm	PASS

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**802.11n\_20M 3TX**

CH	Frequency (MHz)	Data Rate	Peak Output Power (dBm)			Total Peak Output Power (dBm)	Total Peak Output Power (mW)	Limit	RESULT
			CHAIN 1	CHAIN 2	CHAIN 3				
1	2412	mcs16	19.03	19.18	18.92	23.82	240.76	1 Watt = 25.79 dBm	PASS
6	2437	mcs16	19.68	19.83	19.36	<b>24.40</b>	<b>275.36</b>	1 Watt = 25.79 dBm	PASS
11	2462	mcs16	18.36	18.55	18.25	23.16	207.00	1 Watt = 25.79 dBm	PASS

**802.11n\_20M 3TX**

CH	Frequency (MHz)	Data Rate	Avg. Output Power (dBm)			Total Peak Output Power (dBm)	Total Peak Output Power (mW)	Limit	RESULT
			CHAIN 1	CHAIN 2	CHAIN 3				
1	2412	mcs16	15.34	16.34	14.73	20.29	106.97	1 Watt = 25.79 dBm	PASS
6	2437	mcs16	15.69	16.75	15.15	<b>20.69</b>	<b>117.12</b>	1 Watt = 25.79 dBm	PASS
11	2462	mcs16	15.32	15.39	14.72	19.92	98.28	1 Watt = 25.79 dBm	PASS

**802.11n\_40M 3TX**

CH	Frequency (MHz)	Data Rate	Peak Output Power (dBm)			Total Peak Output Power (dBm)	Total Peak Output Power (mW)	Limit	RESULT
			CHAIN 1	CHAIN 2	CHAIN 3				
3	2422	mcs16	16.84	17.03	16.59	<b>21.59</b>	<b>144.38</b>	1 Watt = 25.79 dBm	PASS
6	2437	mcs16	16.66	16.79	16.55	21.44	139.28	1 Watt = 25.79 dBm	PASS
9	2452	mcs16	16.51	16.62	16.42	21.29	134.54	1 Watt = 25.79 dBm	PASS

**802.11n\_40M 3TX**

CH	Frequency (MHz)	Data Rate	Avg. Output Power (dBm)			Total Peak Output Power (dBm)	Total Peak Output Power (mW)	Limit	RESULT
			CHAIN 1	CHAIN 2	CHAIN 3				
3	2422	mcs16	13.36	13.42	12.6	<b>17.91</b>	<b>61.85</b>	1 Watt = 25.79 dBm	PASS
6	2437	mcs16	13.29	13.31	12.52	17.83	60.62	1 Watt = 25.79 dBm	PASS
9	2452	mcs16	13.01	13.21	12.22	17.61	57.61	1 Watt = 25.79 dBm	PASS

**\* Note: The duty cycle factor is compensated to obtain the maximum value of measurement in average.**

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## 9 6dB BANDWIDTH MEASUREMENT

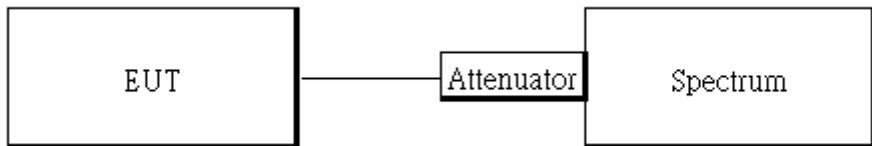
### 9.1 Standard Applicable

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

### 9.2 Measurement Equipment Used

Conducted Emission Test Site					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	KEYSIGHT	N9010A	MY54510568	04/14/2015	04/13/2016
DC Block	PASTERNAK	PE8210	RF29	12/19/2015	12/18/2016
Attenuator	WOKEN	218FS-10	RF23	12/19/2015	12/18/2016

### 9.3 Test Set-up



### 9.4 Measurement Procedure

1. Place the EUT on the table and set it in transmitting mode.
2. The testing follows the Measurement Procedure of FCC KDB 558074 D01 DTS Meas. Guidance V03r03.
3. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
4. For 6dB Bandwidth:  
Set the spectrum analyzer as RBW = 100 kHz, VBW = 3\*RBW, Span = 30M/50MHz, Detector=peak, Sweep=auto.
5. Mark the peak frequency and -6dB (upper and lower) frequency.
6. For 99% Bandwidth:  
Set the spectrum analyzer as RBW=1%, VBW = 3\*RBW, Span = 30M/50MHz, Detector=Sample, Sweep=auto.
7. Turn on the 99% bandwidth function, max reading.
8. Repeat above procedures until all frequency of interest measured was complete.

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## 9.5 Measurement Result

### 802.11b Main

Frequency (MHz)	6dB Bandwidth (kHz)	Limit (kHz)	Result
2412	<b>10060</b>	> 500	PASS
2437	10055	> 500	PASS
2462	10058	> 500	PASS

### 802.11g Main

Frequency (MHz)	6dB Bandwidth (kHz)	Limit (kHz)	Result
2412	16360	> 500	PASS
2437	16334	> 500	PASS
2462	<b>16364</b>	> 500	PASS

### 802.11\_n\_HT20 Main

Frequency (MHz)	6dB Bandwidth (kHz)	Limit (kHz)	Result
2412	17580	> 500	PASS
2437	<b>17591</b>	> 500	PASS
2462	17586	> 500	PASS

### 802.11\_n\_HT40 Main

Frequency (MHz)	6dB Bandwidth (kHz)	Limit (kHz)	Result
2422	35839	> 500	PASS
2437	35942	> 500	PASS
2452	<b>35987</b>	> 500	PASS

### 802.11b Aux1

Frequency (MHz)	6dB Bandwidth (kHz)	Limit (kHz)	Result
2412	10057	> 500	PASS
2437	<b>10070</b>	> 500	PASS
2462	9578.4	> 500	PASS

### 802.11g Aux1

Frequency (MHz)	6dB Bandwidth (kHz)	Limit (kHz)	Result
2412	16340	> 500	PASS
2437	<b>16386</b>	> 500	PASS
2462	16344	> 500	PASS

### 802.11\_n\_HT20 Aux1

Frequency (MHz)	6dB Bandwidth (kHz)	Limit (kHz)	Result
2412	17564	> 500	PASS
2437	<b>17595</b>	> 500	PASS
2462	17591	> 500	PASS

### 802.11\_n\_HT40 Aux1

Frequency (MHz)	6dB Bandwidth (kHz)	Limit (kHz)	Result
2422	35794	> 500	PASS
2437	35848	> 500	PASS
2452	<b>36314</b>	> 500	PASS

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## 802.11b Aux2

Frequency (MHz)	6dB Bandwidth (kHz)	Limit (kHz)	Result
2412	10080	> 500	PASS
2437	<b>11050</b>	> 500	PASS
2462	10040	> 500	PASS

## 802.11g Aux2

Frequency (MHz)	6dB Bandwidth (kHz)	Limit (kHz)	Result
2412	16410	> 500	PASS
2437	<b>16420</b>	> 500	PASS
2462	16330	> 500	PASS

## 802.11\_n\_HT20 Aux2

Frequency (MHz)	6dB Bandwidth (kHz)	Limit (kHz)	Result
2412	<b>17600</b>	> 500	PASS
2437	17570	> 500	PASS
2462	17590	> 500	PASS

## 802.11\_n\_HT40 Aux2

Frequency (MHz)	6dB Bandwidth (kHz)	Limit (kHz)	Result
2422	<b>36360</b>	> 500	PASS
2437	35780	> 500	PASS
2452	35950	> 500	PASS

\*Refer to next page for plots

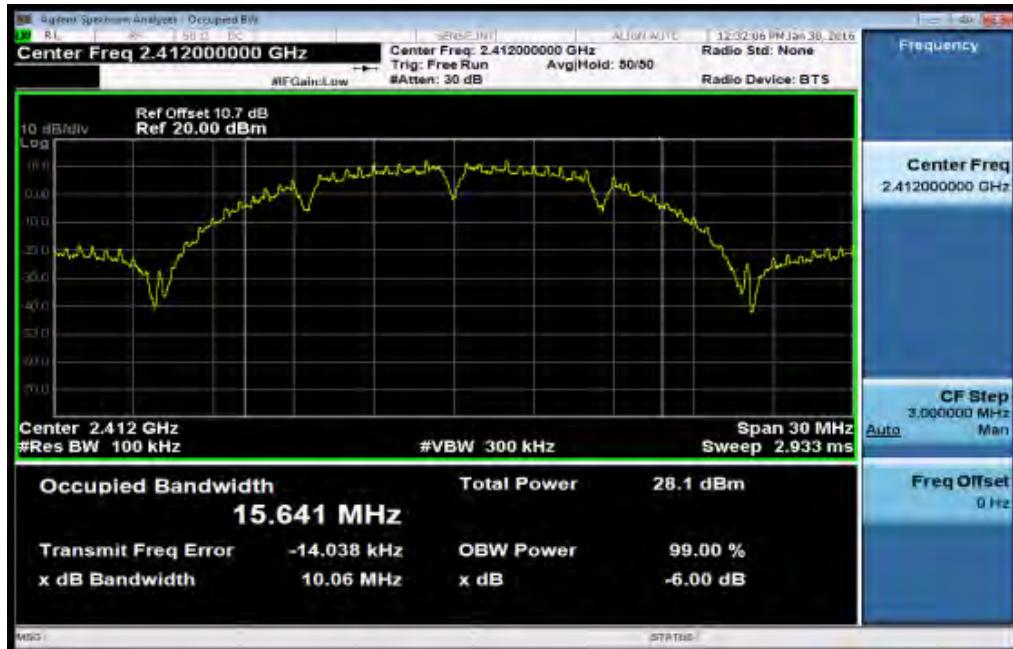
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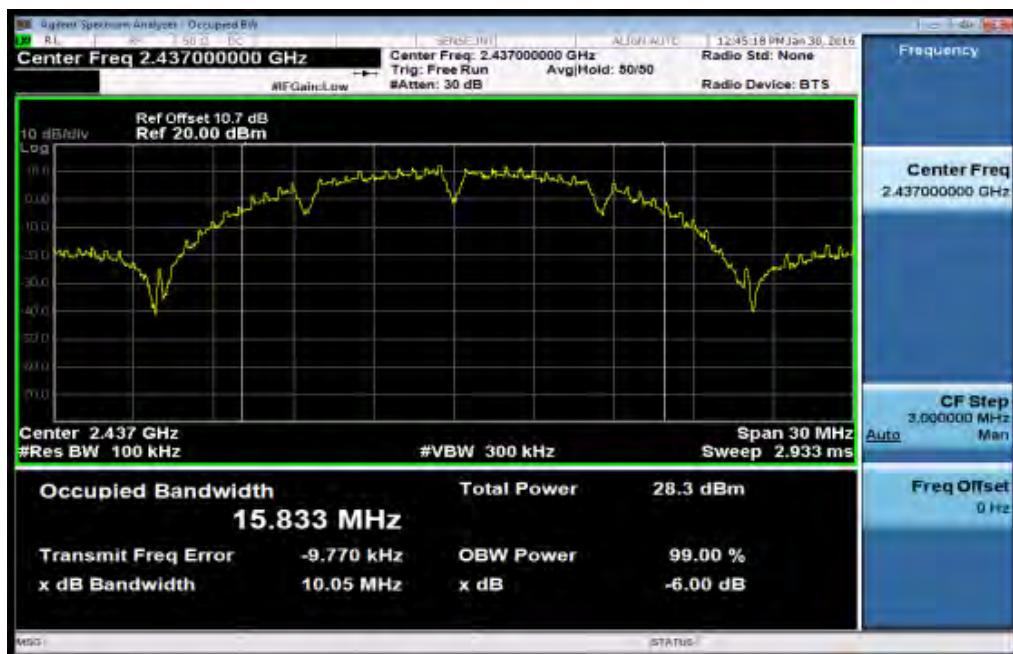
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## 802.11b (Main)

### 6dB Band Width Test Data CH-Low



### 6dB Band Width Test Data CH-Mid



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## 6dB Band Width Test Data CH-High



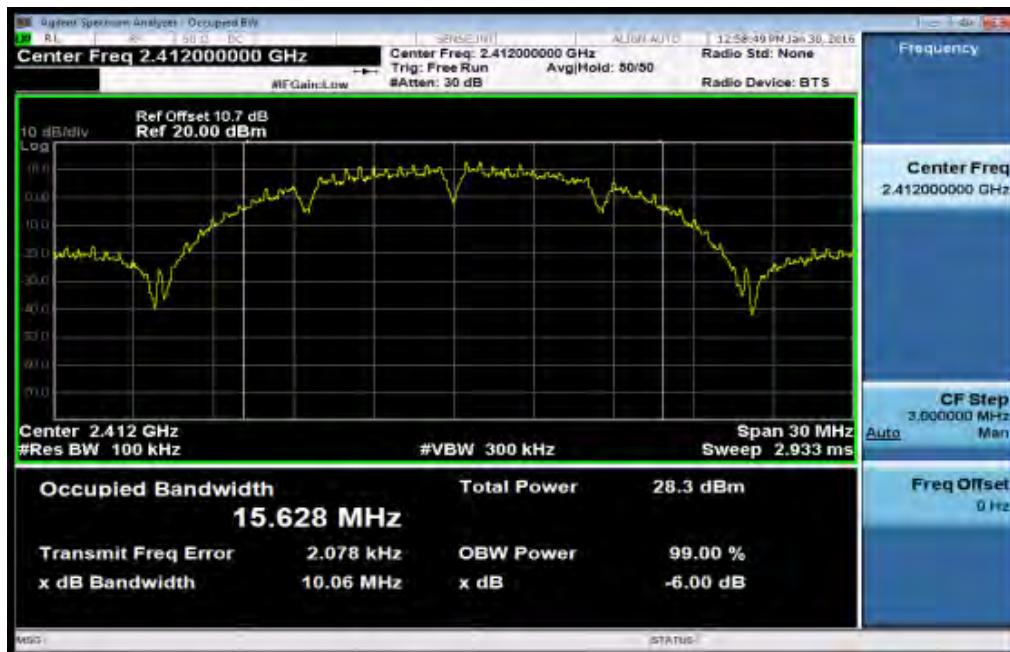
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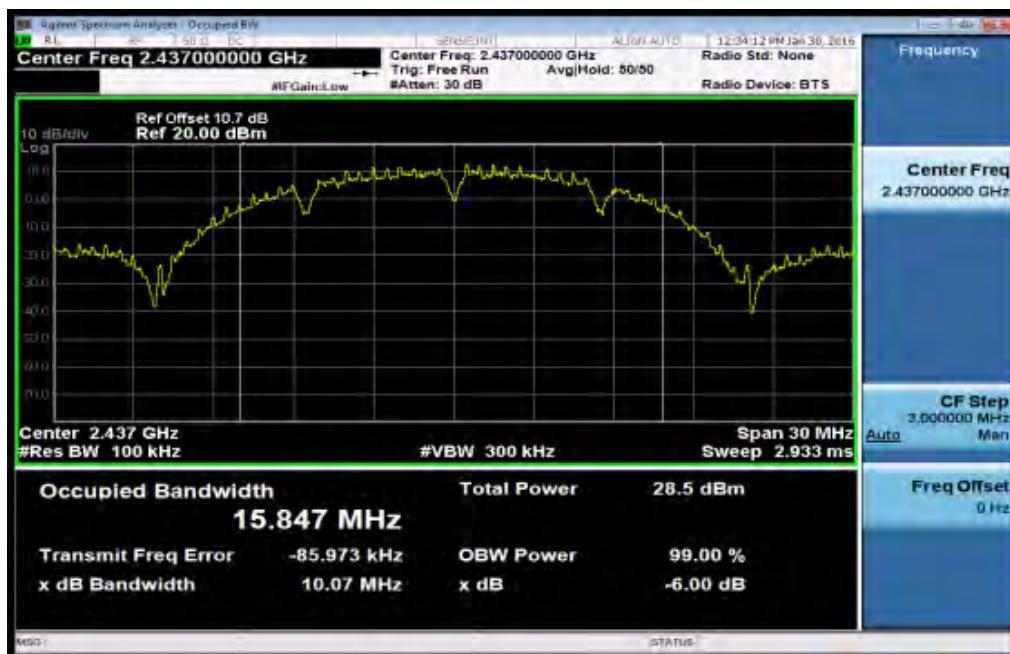
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## 802.11b (AUX1)

### 6dB Band Width Test Data CH-Low



### 6dB Band Width Test Data CH-Mid

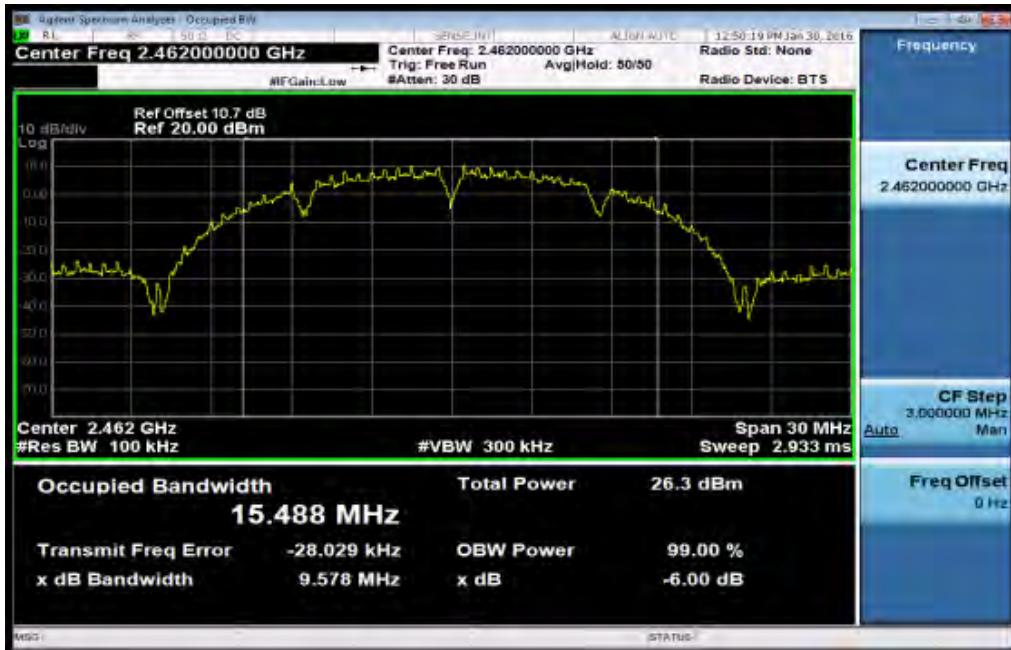


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## 6dB Band Width Test Data CH-High



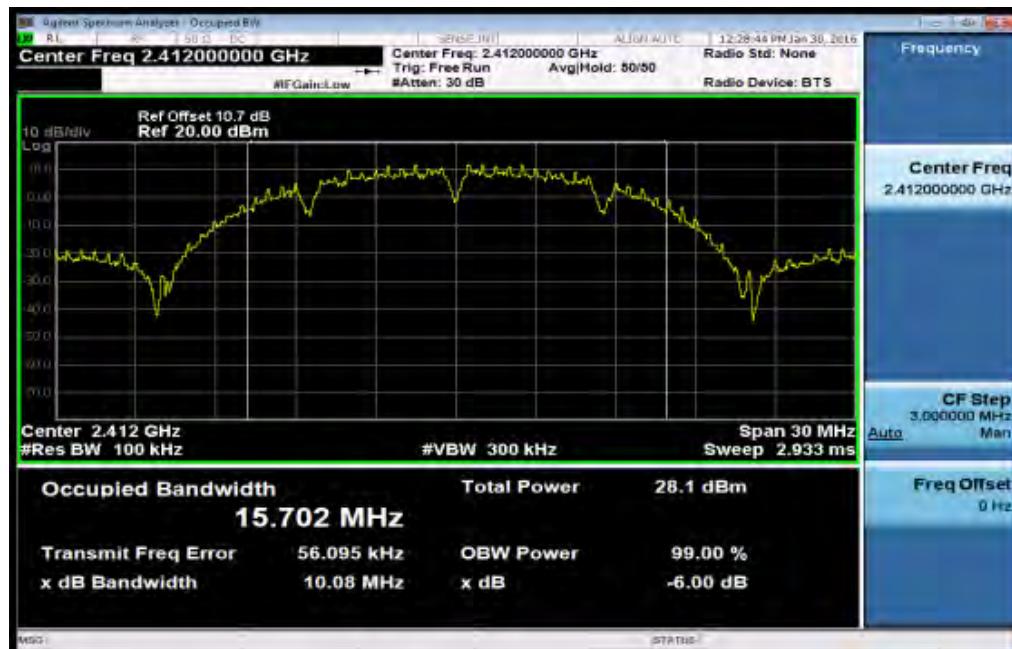
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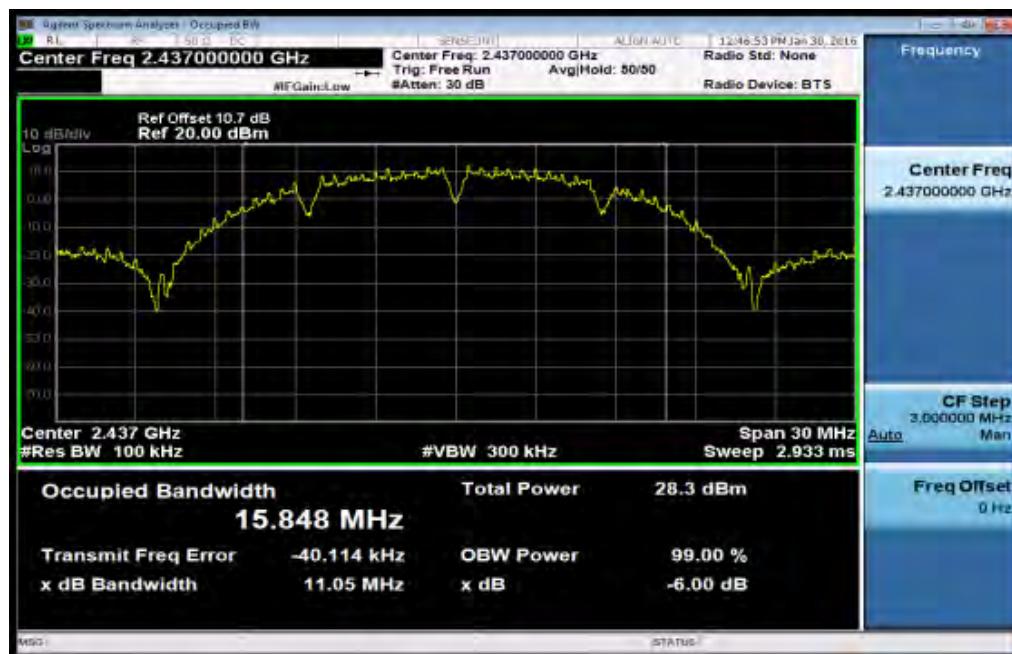
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## 802.11b (AUX2)

## 6dB Band Width Test Data CH-Low



## 6dB Band Width Test Data CH-Mid



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## 6dB Band Width Test Data CH-High



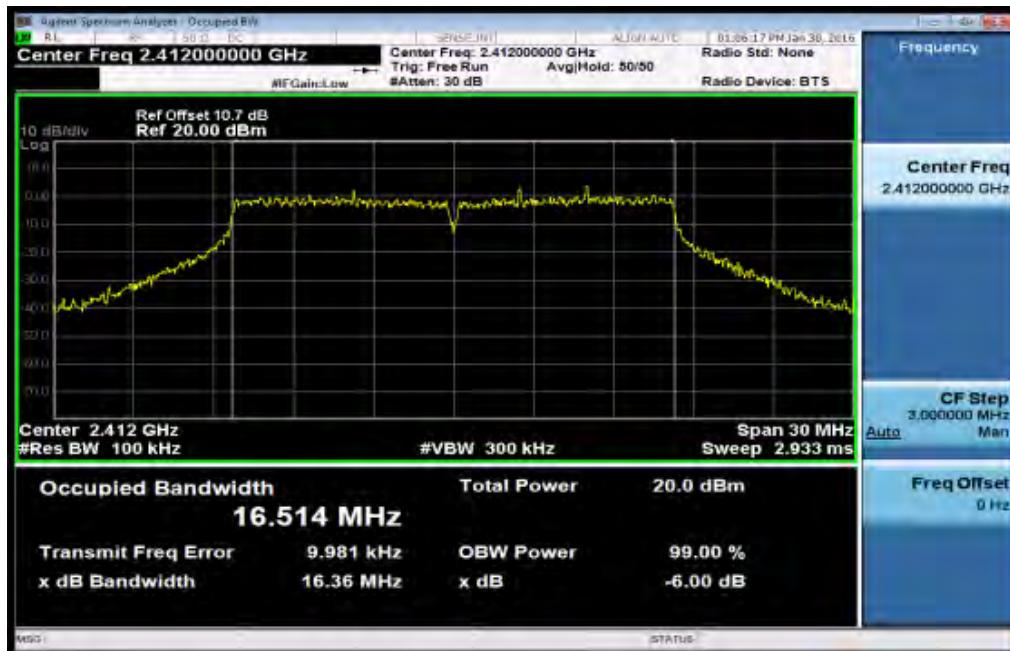
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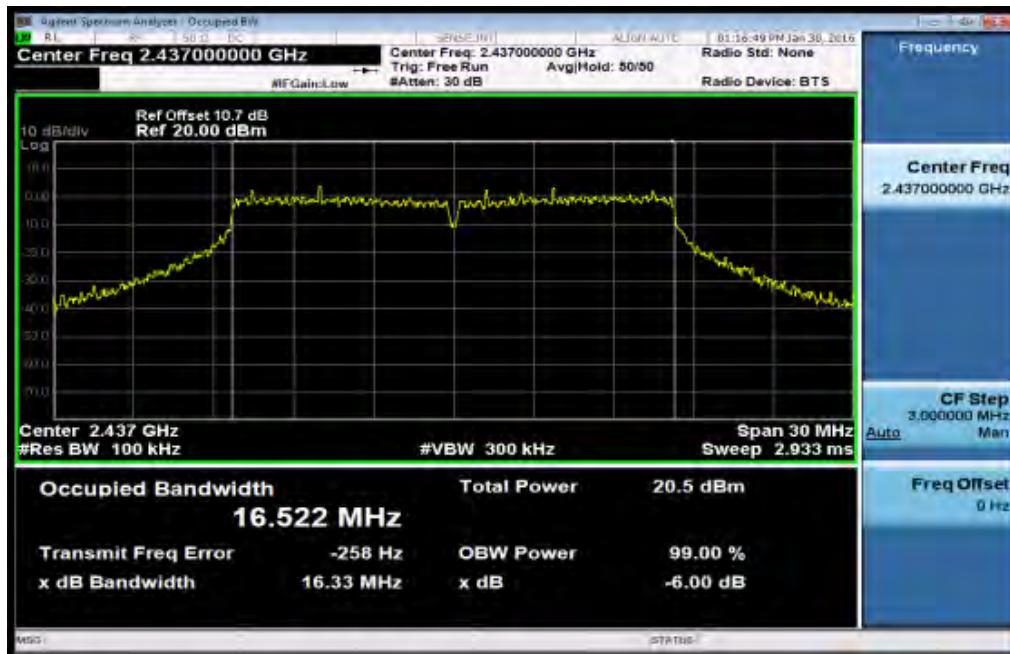
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## 802.11g (Main)

## 6dB Band Width Test Data CH-Low



## 6dB Band Width Test Data CH-Mid

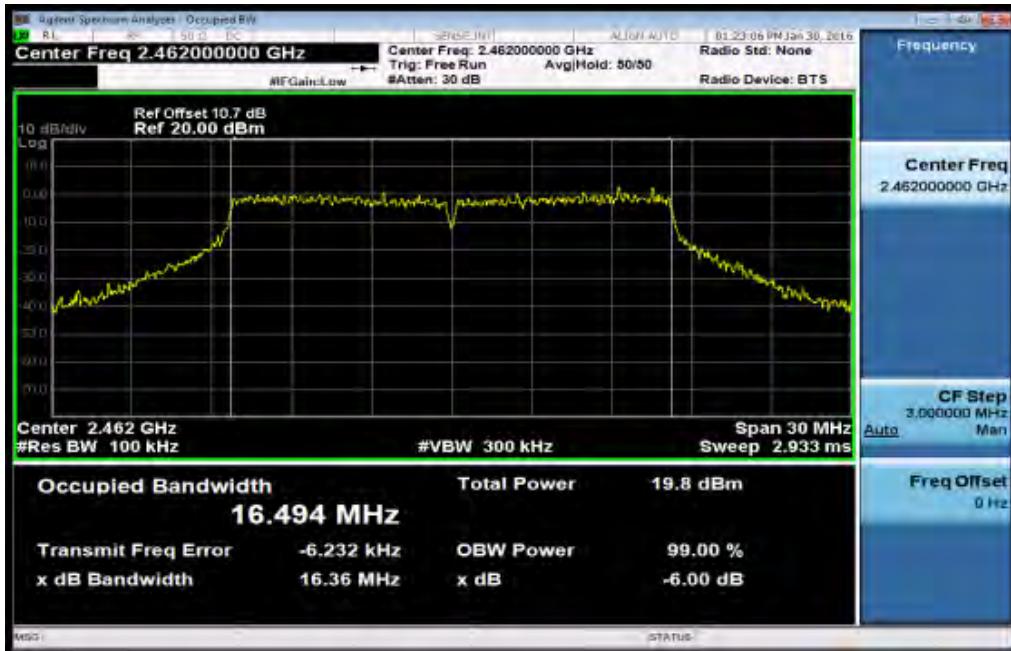


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## 6dB Band Width Test Data CH-High



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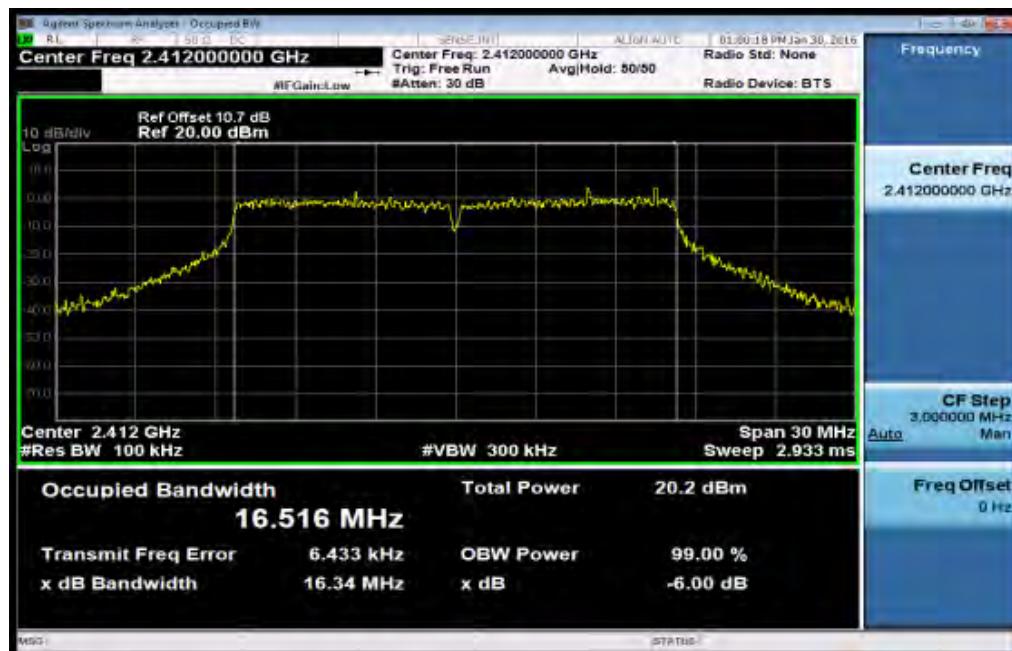
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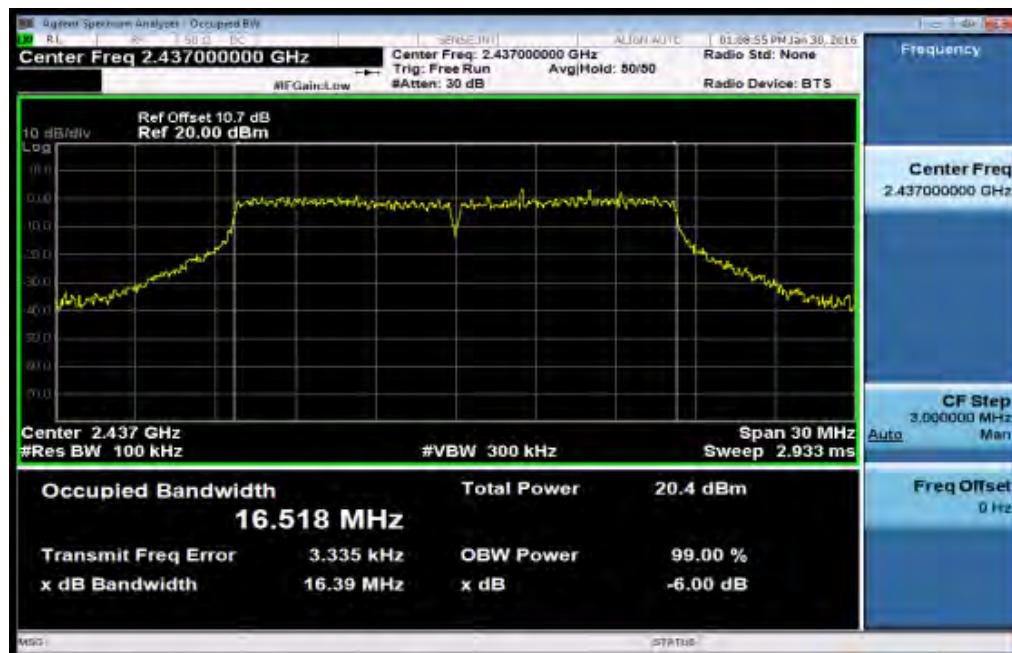
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## 802.11g (AUX1)

## 6dB Band Width Test Data CH-Low



## 6dB Band Width Test Data CH-Mid

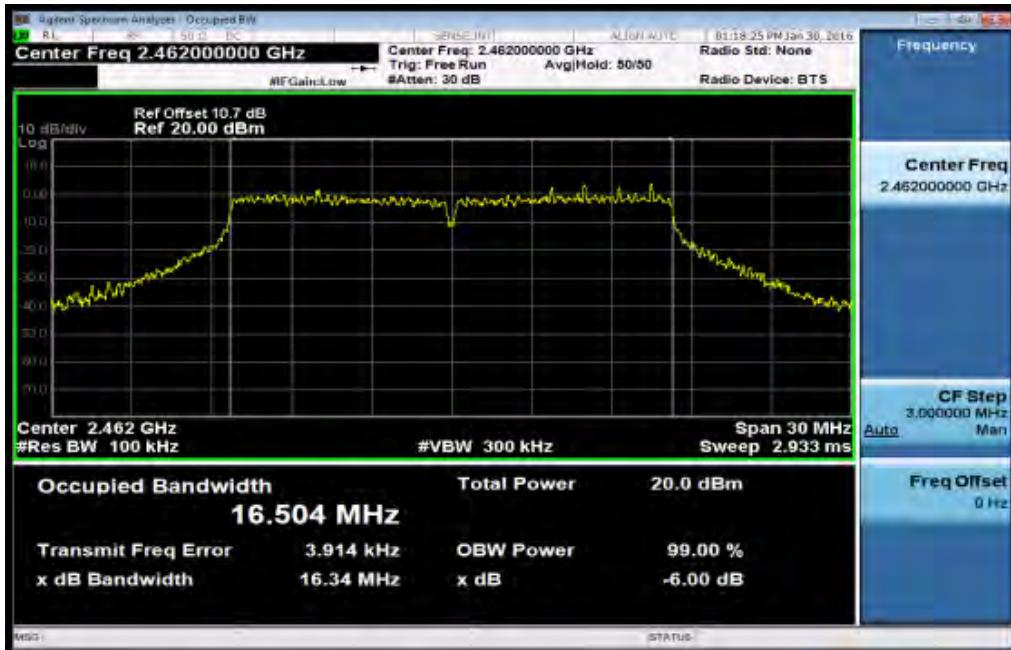


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## 6dB Band Width Test Data CH-High



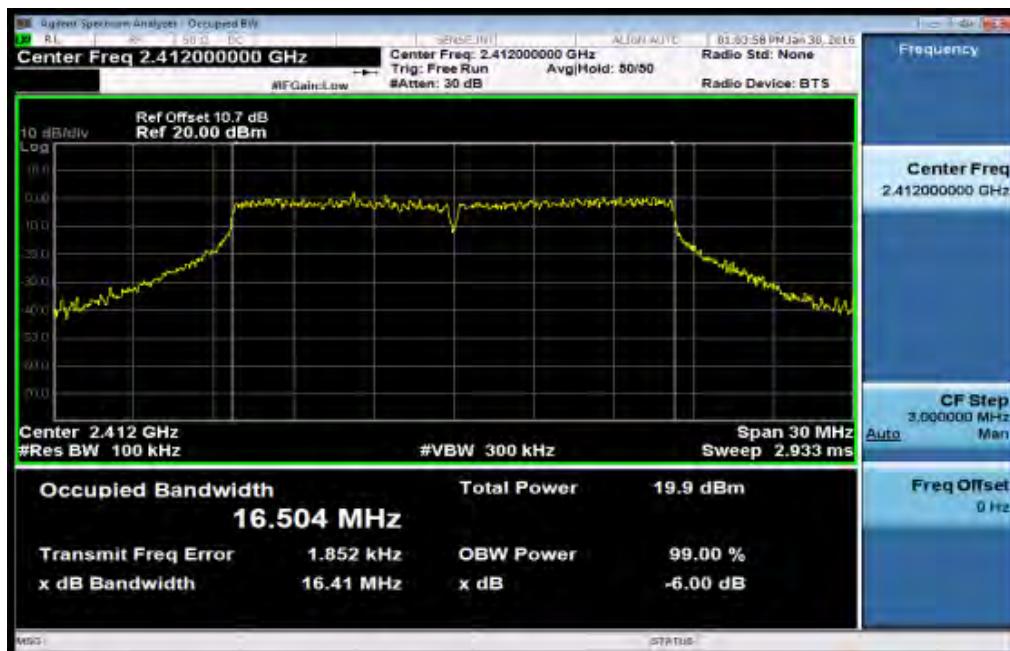
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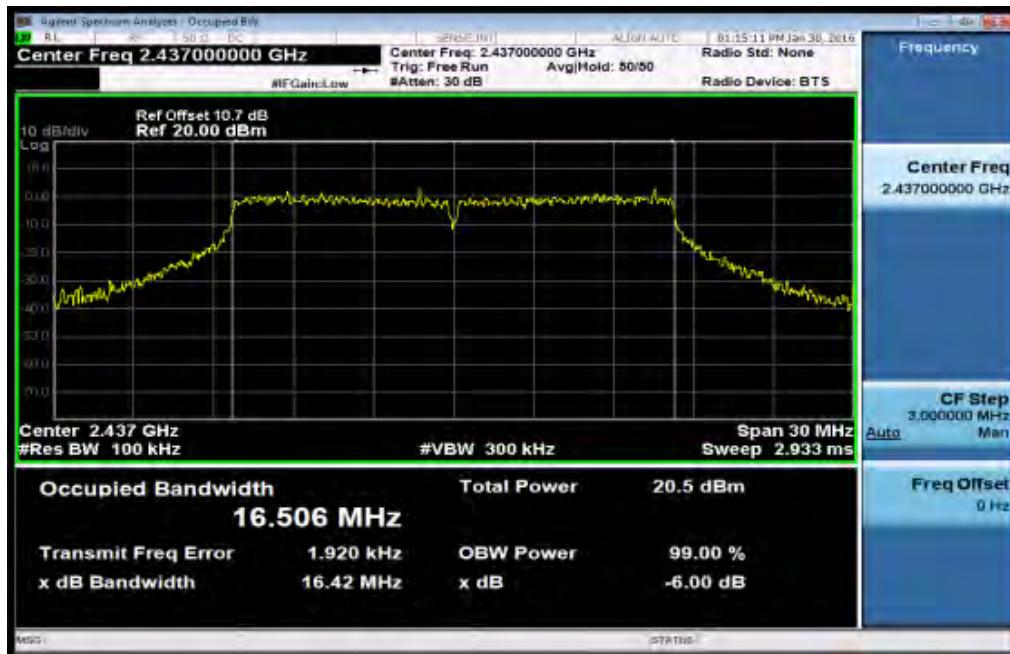
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## 802.11g (AUX2)

## 6dB Band Width Test Data CH-Low



## 6dB Band Width Test Data CH-Mid

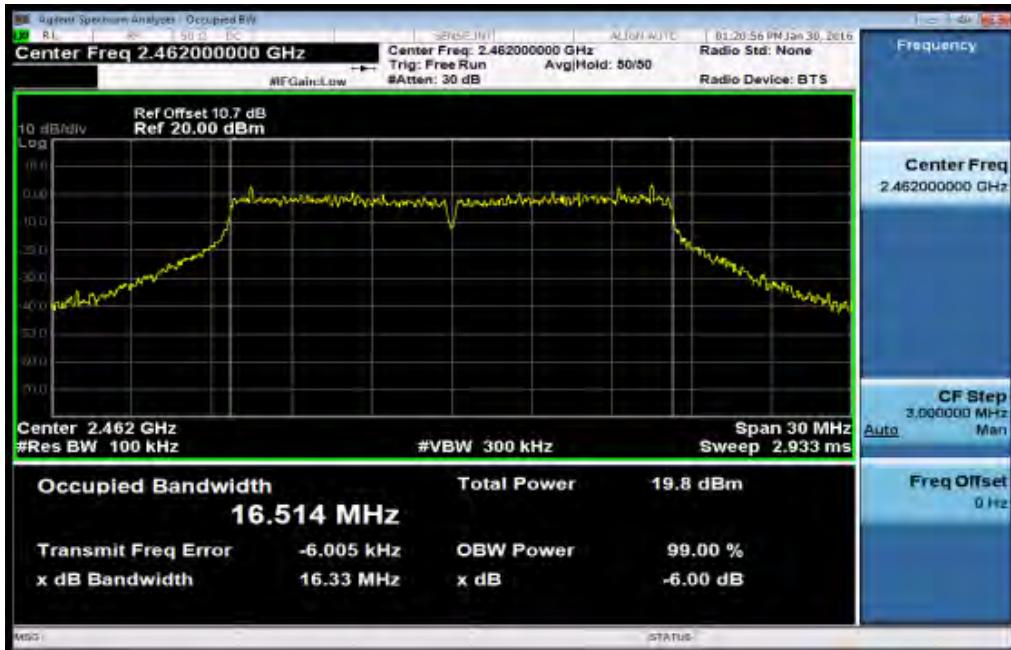


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## 6dB Band Width Test Data CH-High



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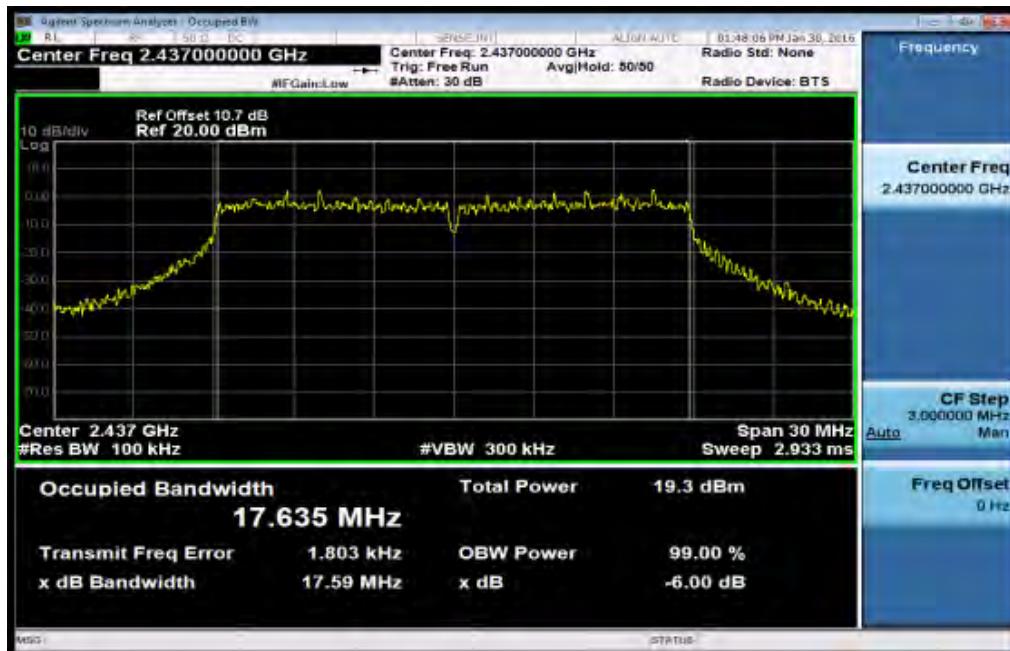
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## 802.11n\_20M (Main)

## 6dB Band Width Test Data CH-Low



## 6dB Band Width Test Data CH-Mid



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## 6dB Band Width Test Data CH-High



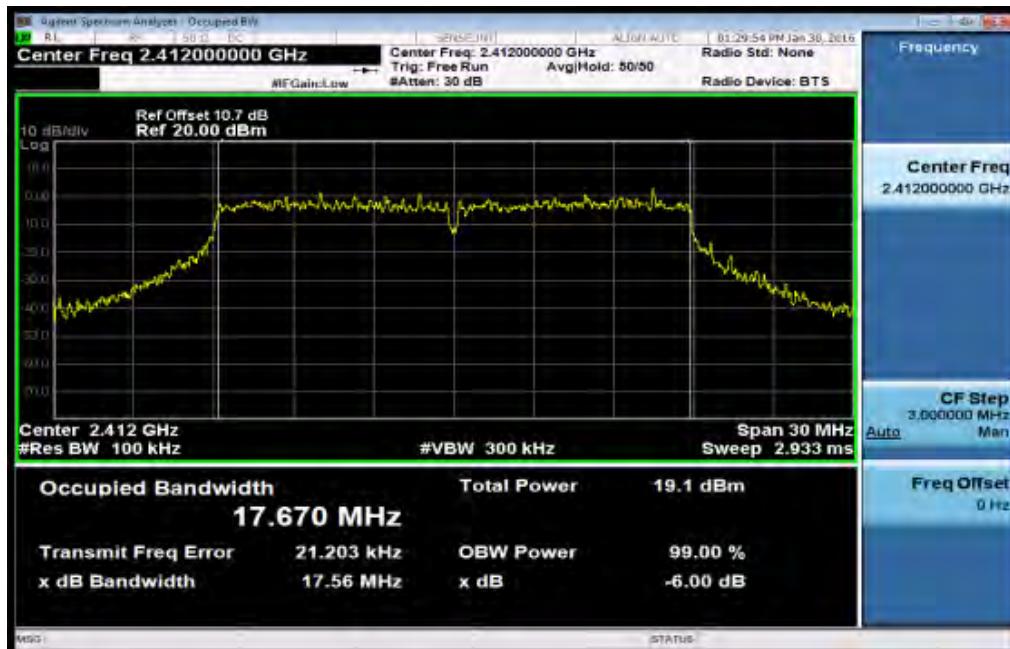
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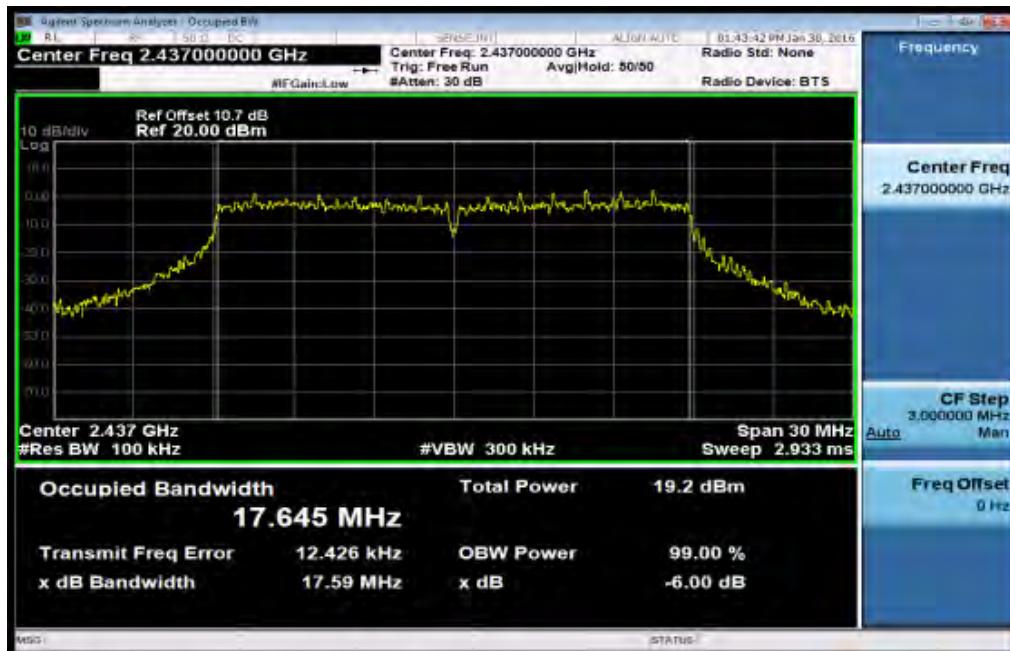
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## 802.11n\_20M (AUX1)

### 6dB Band Width Test Data CH-Low



### 6dB Band Width Test Data CH-Mid



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## 6dB Band Width Test Data CH-High



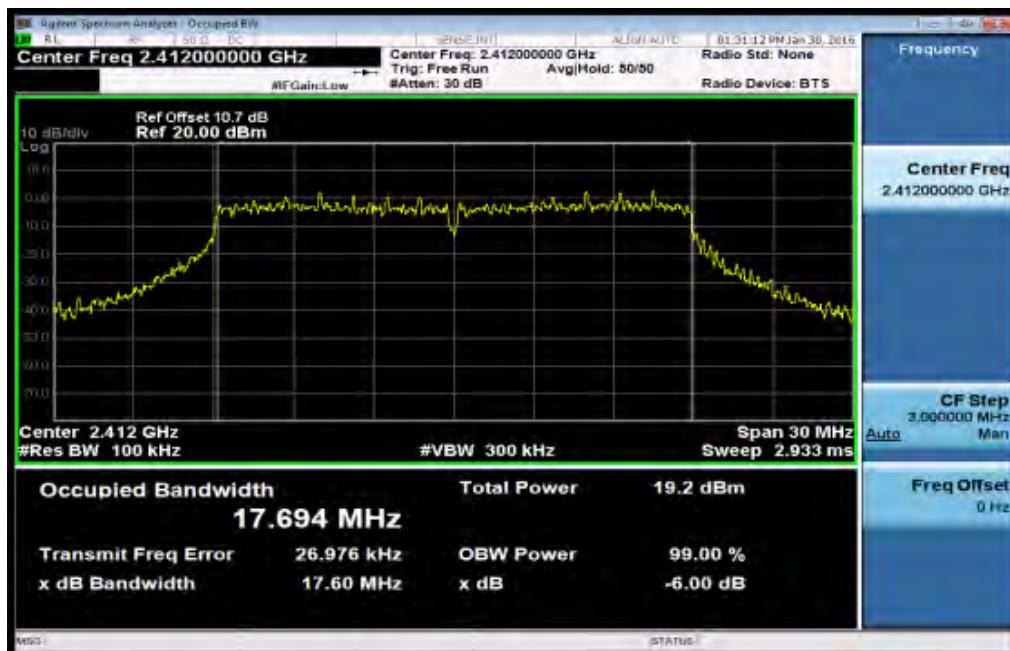
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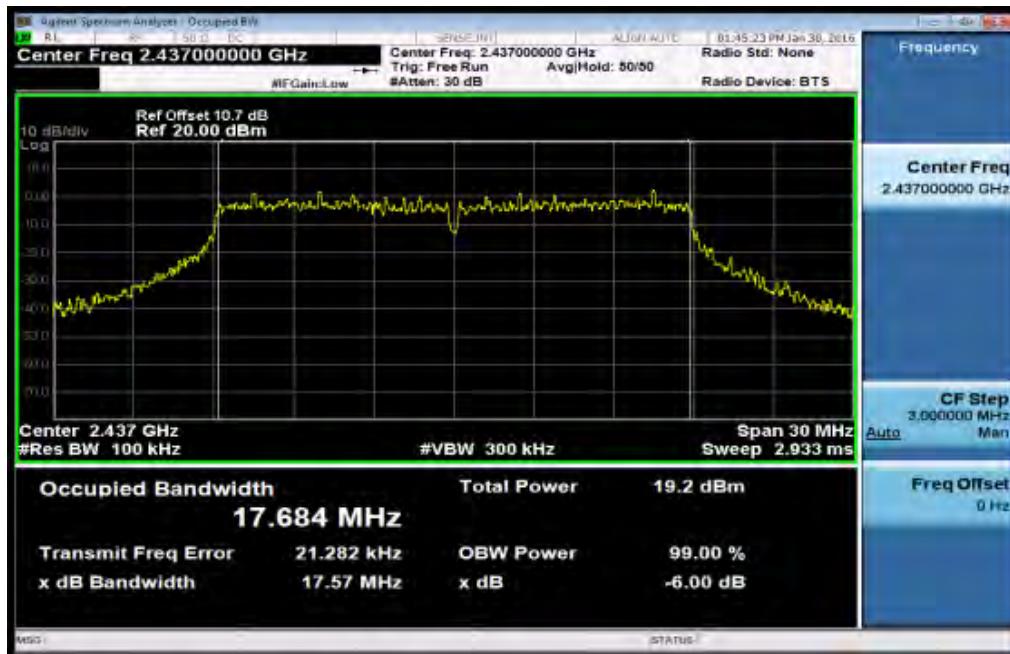
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## 802.11n\_20M (AUX2)

### 6dB Band Width Test Data CH-Low



### 6dB Band Width Test Data CH-Mid

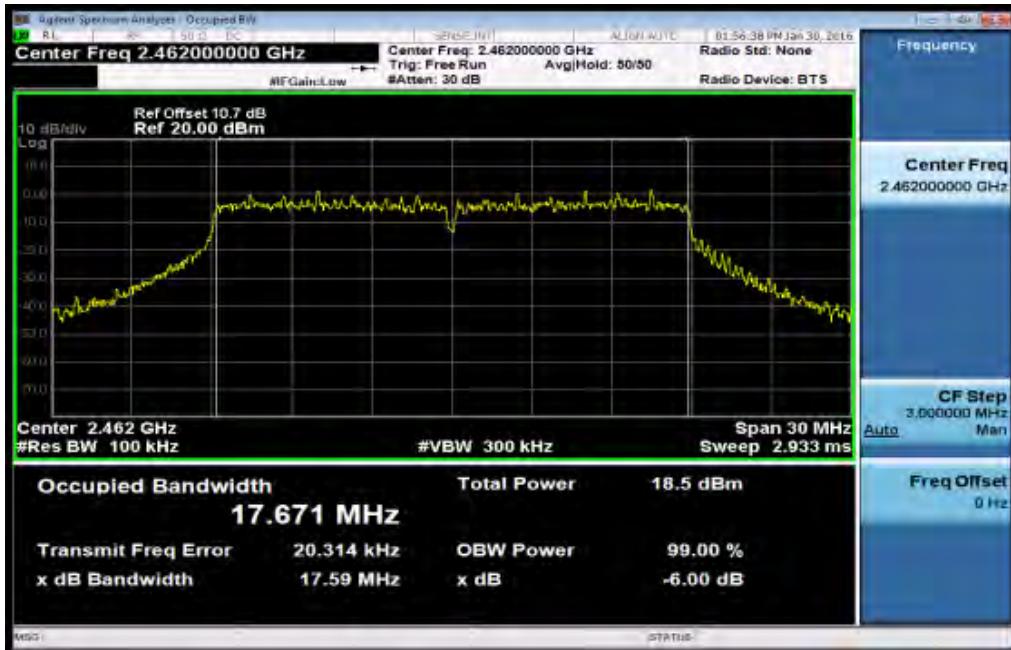


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## 6dB Band Width Test Data CH-High



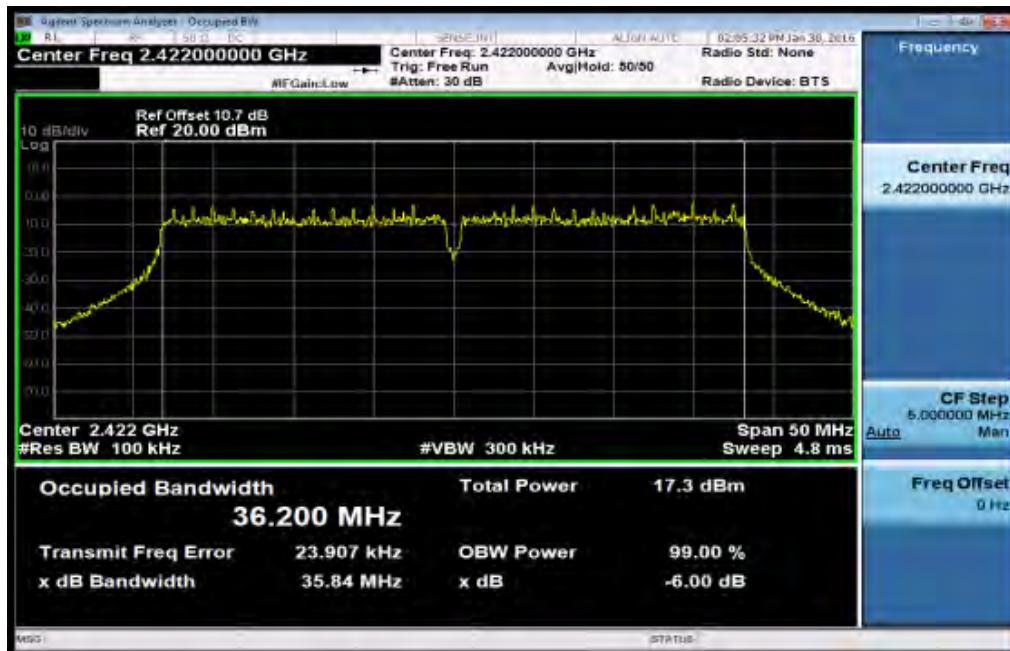
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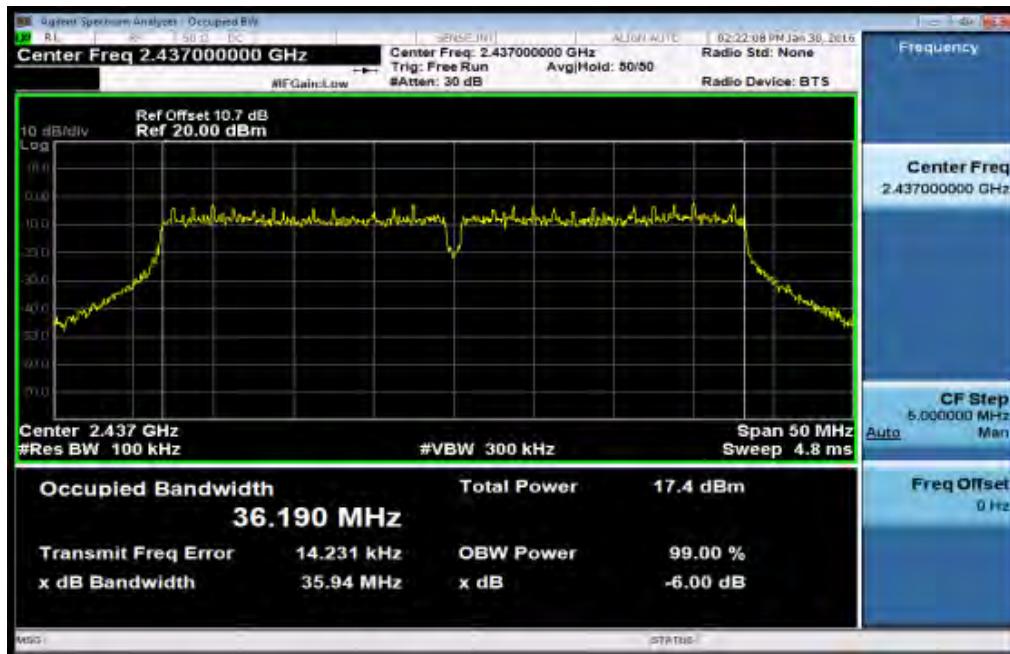
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## 802.11n\_40M (Main)

## 6dB Band Width Test Data CH-Low



## 6dB Band Width Test Data CH-Mid



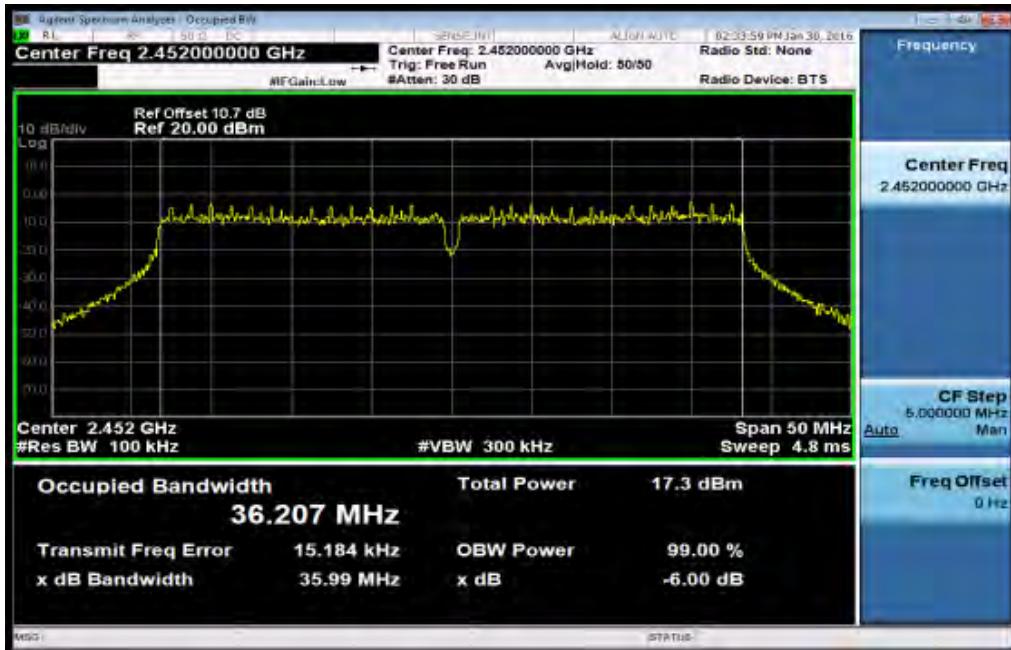
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## 6dB Band Width Test Data CH-High



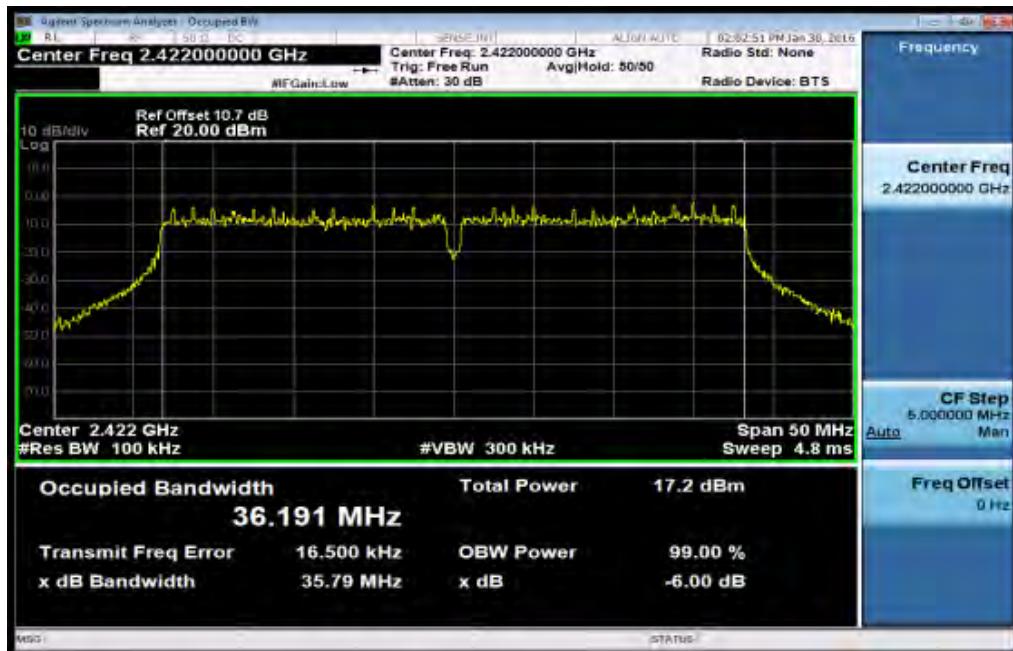
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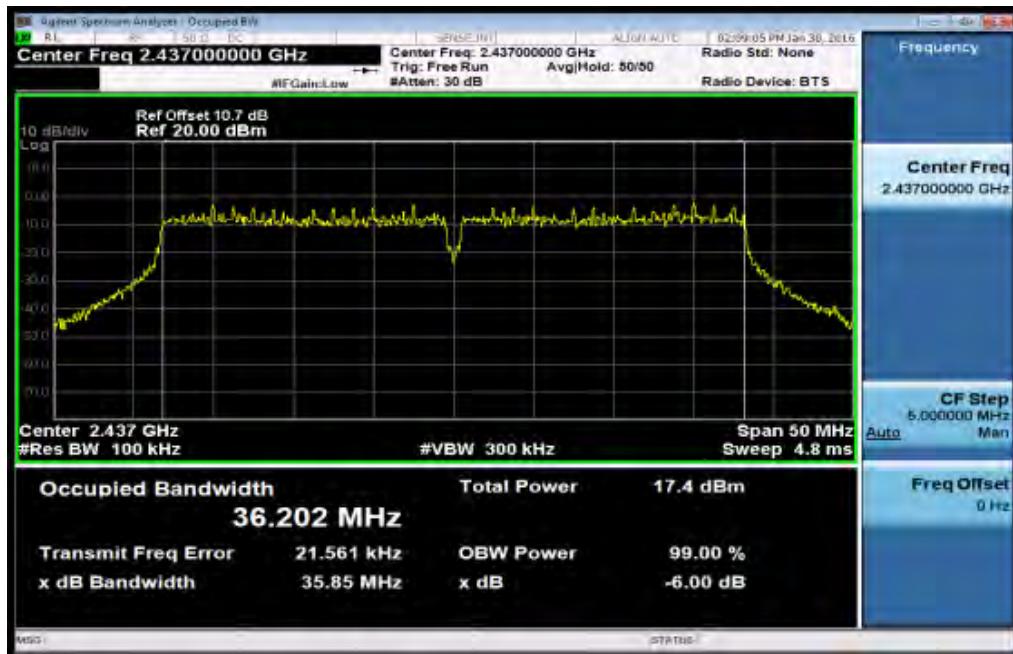
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## 802.11n\_40M (AUX1)

### 6dB Band Width Test Data CH-Low



### 6dB Band Width Test Data CH-Mid

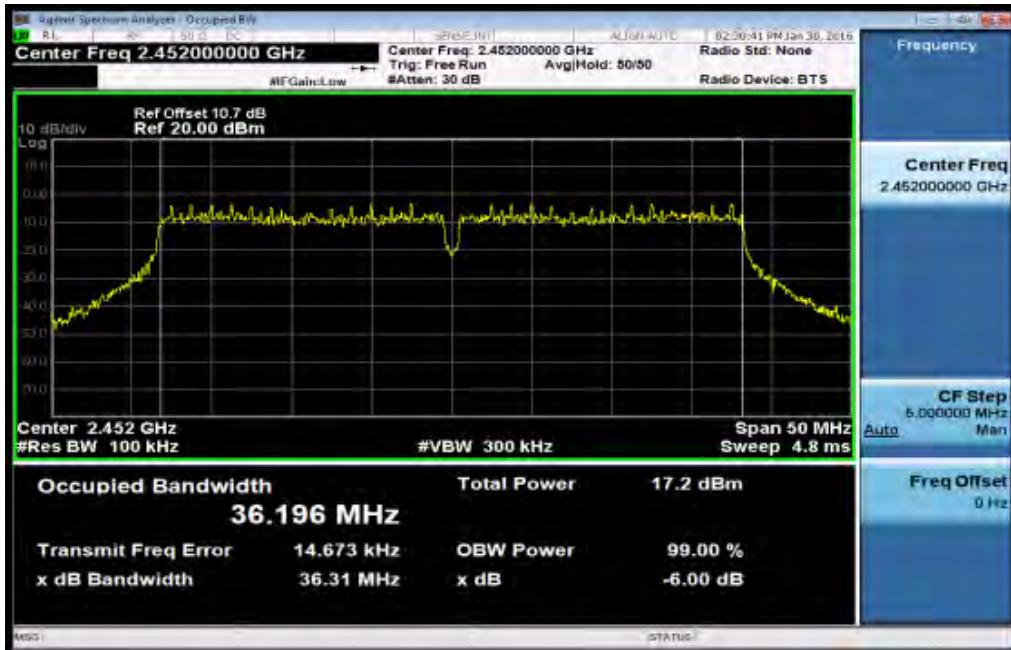


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## 6dB Band Width Test Data CH-High



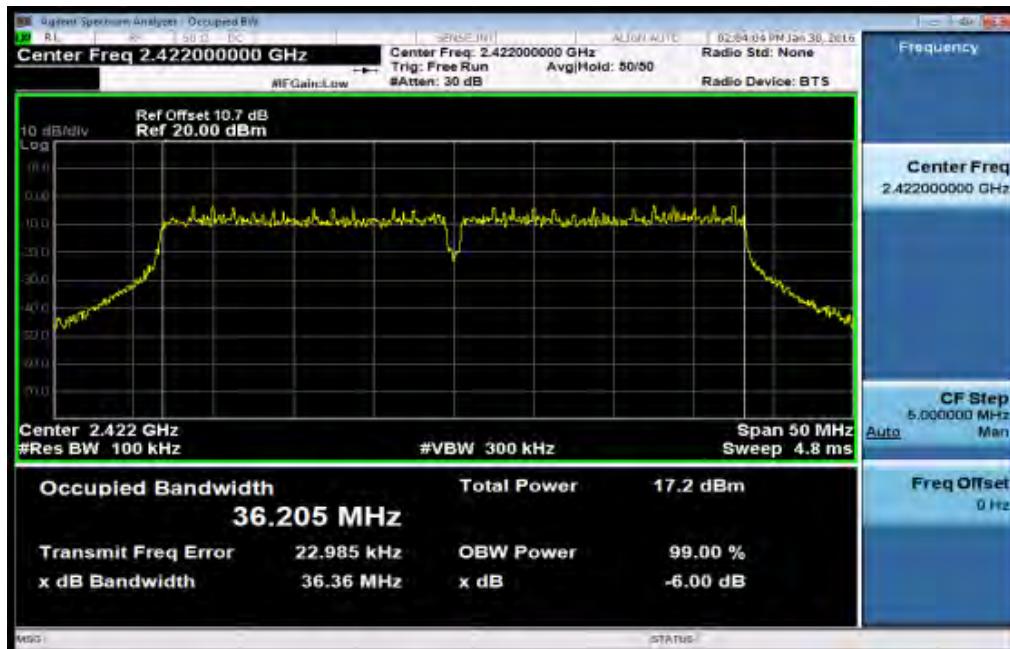
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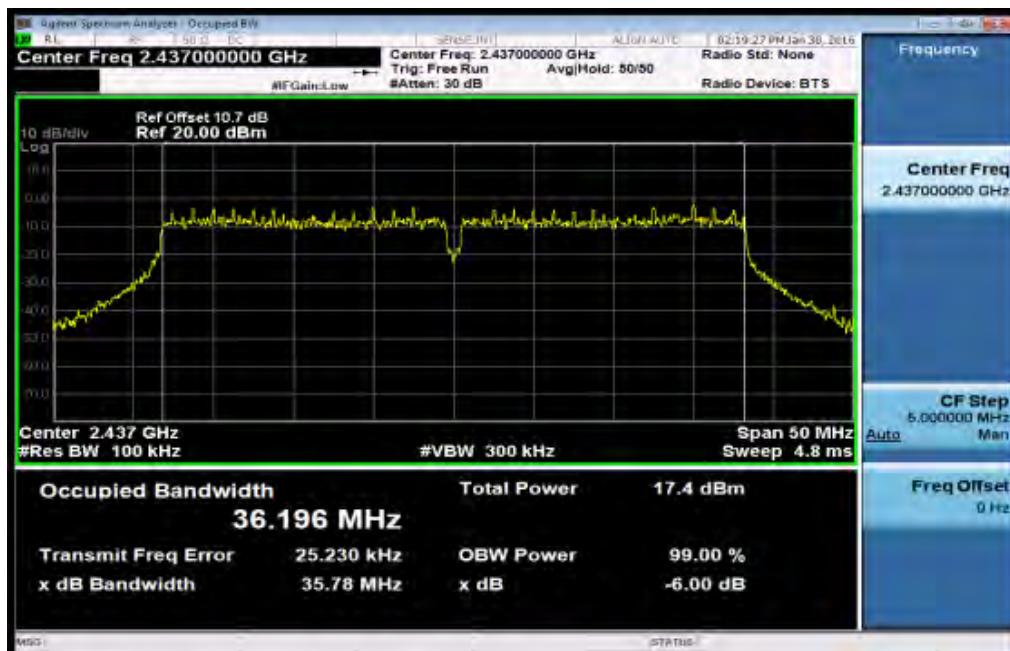
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## 802.11n\_40M (AUX2)

### 6dB Band Width Test Data CH-Low



### 6dB Band Width Test Data CH-Mid

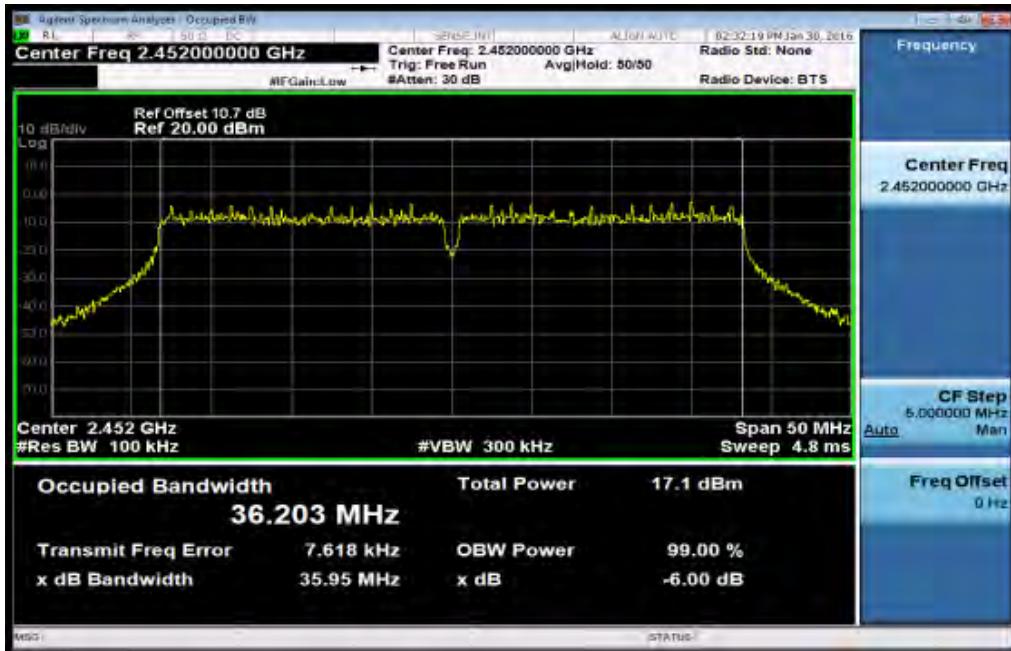


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## 6dB Band Width Test Data CH-High



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## 10 CONDUCTED BAND EDGES AND SPURIOUS EMISSION MEASUREMENT

### 10.1 Standard Applicable

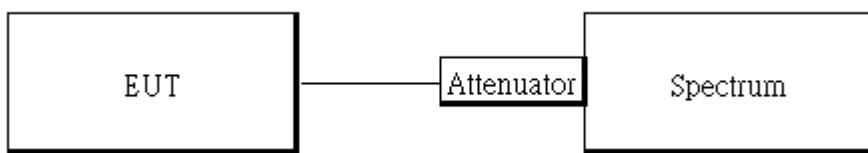
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the 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. In addition, 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).

If the transmitter complies with the conducted power limits based on the use of root-mean-square averaging over a time interval, as permitted under Section 5.4(4), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general field strength limits specified in RSS-Gen is not required.

### 10.2 Measurement Equipment Used

Conducted Emission Test Site					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	KEYSIGHT	N9010A	MY54510568	04/14/2015	04/13/2016
DC Block	PASTERNACK	PE8210	RF29	12/19/2015	12/18/2016
Attenuator	WOKEN	218FS-10	RF23	12/19/2015	12/18/2016

### 10.3 Test SET-UP



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### 10.3.1 Measurement Procedure

#### Conducted Band Edge:

1. To connect Antenna Port of EUT to Spectrum.
2. The testing follows the Measurement Procedure of FCC KDB 558074 D01 DTS Meas. Guidance.
3. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
4. Set start to edge frequency, and stop frequency of spectrum analyzer so as to encompass the spectrum to be examined.
5. Set the spectrum analyzer as RBW=100 kHz, VBW=300 kHz, Detector = Peak, Sweep = auto
6. Mark the highest reading of the emission as the reference level measurement.
7. Set DL as the limit = reading on marker 1 – 20dBm
8. Marker on frequency, 2.3999GHz and 2.4836GHz, and examine shall 100 kHz immediately outside the authorized (2400~2483.5) be attenuated by 20dB at least relative to the maximum emission of power.
9. Repeat above procedures until all default test channel (low, middle, and high) was complete.

#### Conducted Spurious Emission:

1. To connect Antenna Port of EUT to Spectrum
2. The testing follows the Measurement Procedure of FCC KDB 558074 D01 DTS Meas. Guidance.
3. Set RBW = 100 kHz & VBW= 300 kHz, Detector =Peak, Sweep = Auto.
4. Allow trace to fully stabilize.
5. Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.
6. Repeat above procedures until all default test channel measured were complete.

### 10.4 Measurement Result

Note: Refer to next page spectrum analyzer data chart and tabular data sheets.

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## 802.11b

## Band Edges Test Data CH-Low



## Band Edges Test Data CH-High



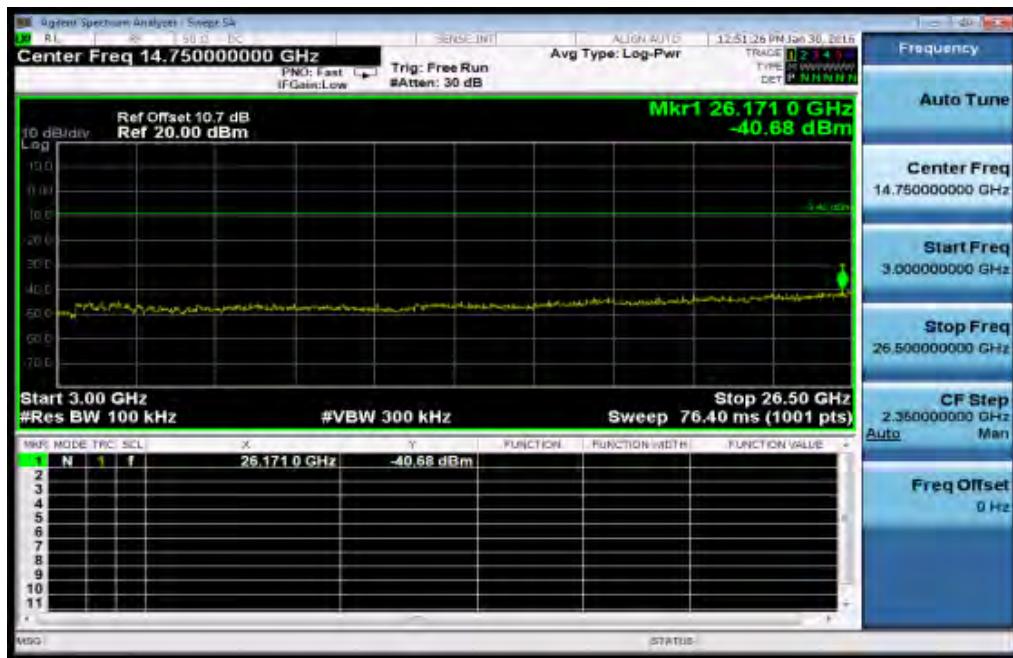
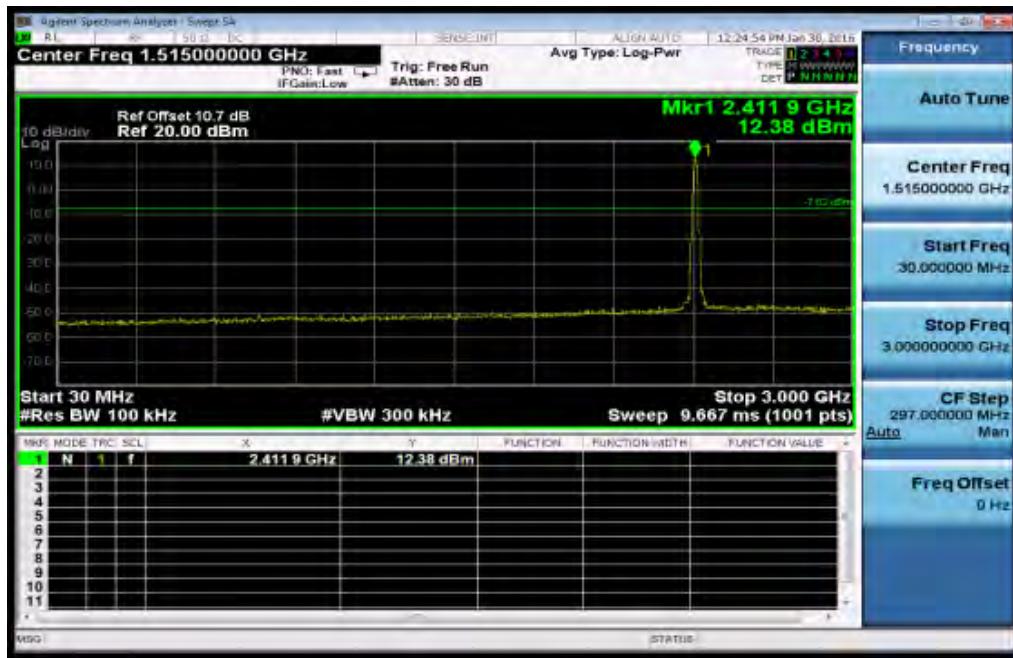
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## 802.11b

## Spurious Emission Test Data CH-Low

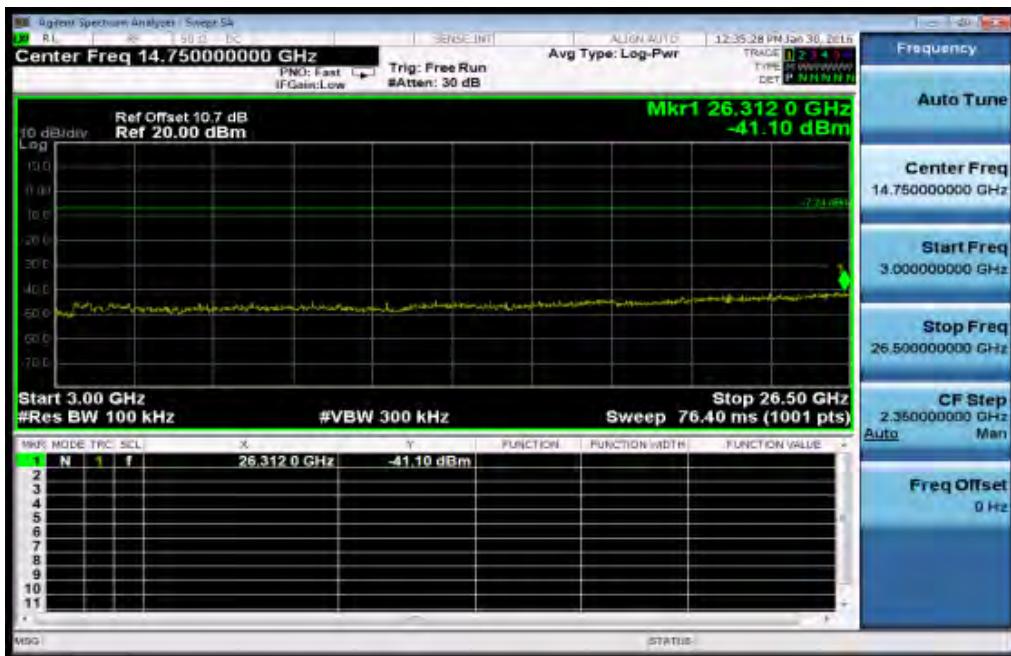
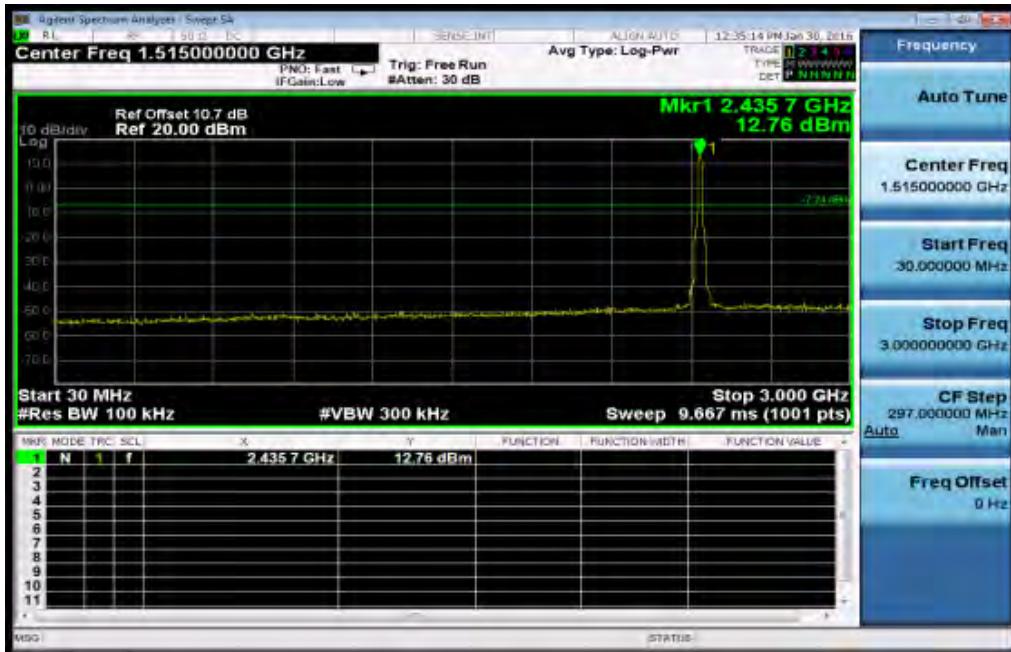


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## Spurious Emission Test Data CH-Mid

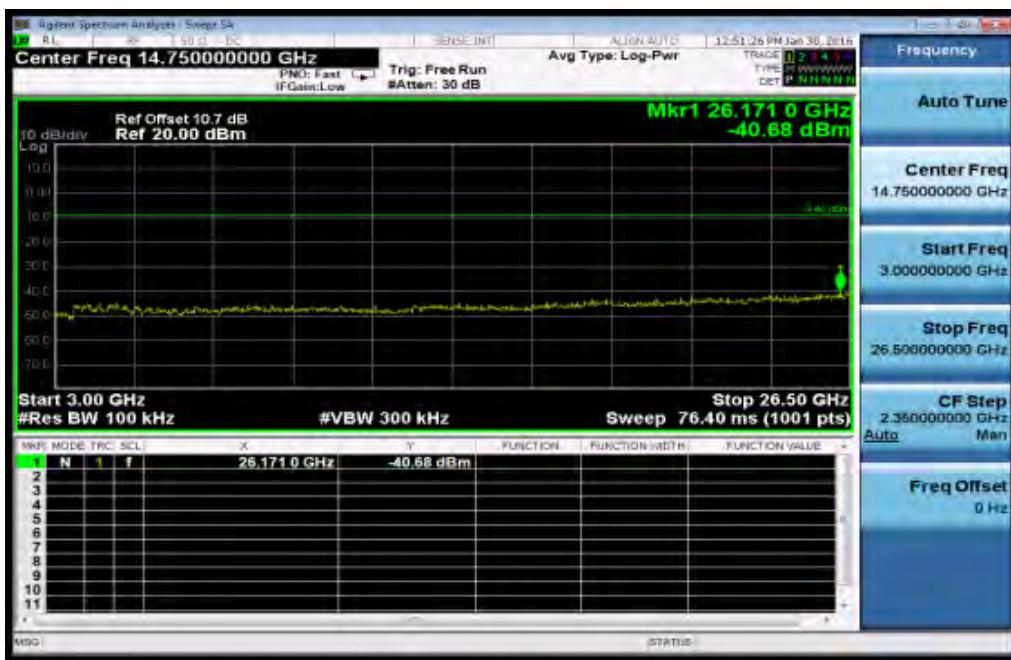
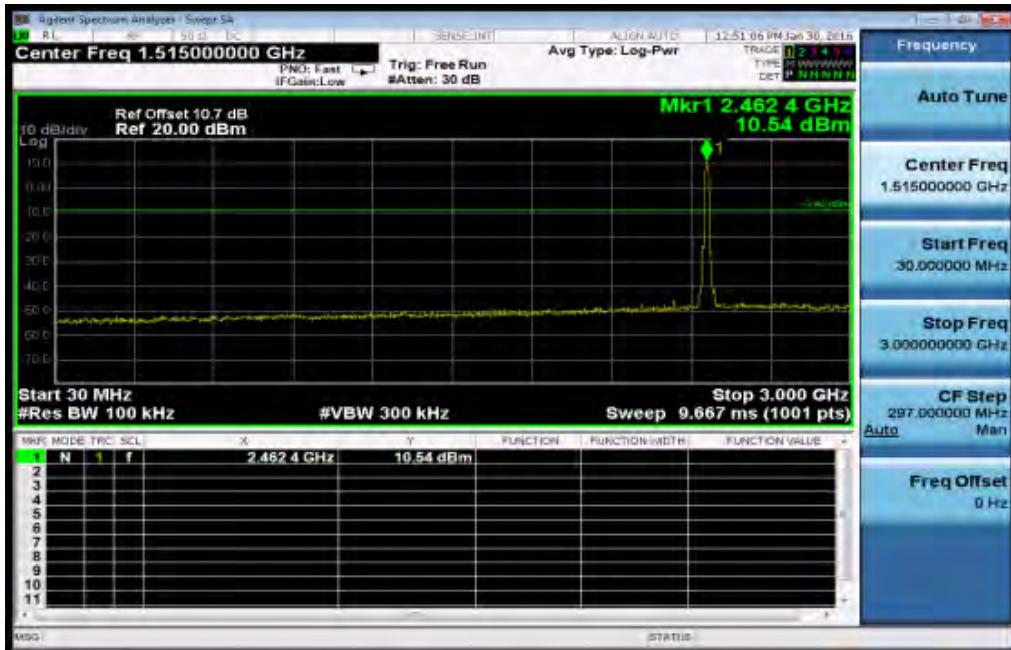


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## Spurious Emission Test Data CH-High



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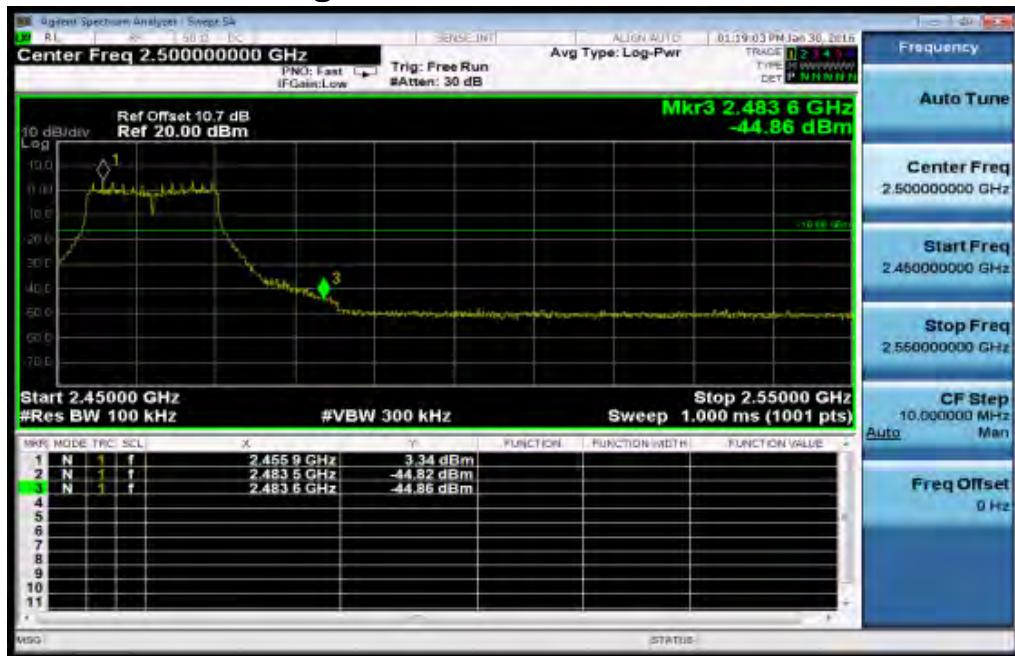
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## 802.11g

### Band Edges Test Data CH-Low



### Band Edges Test Data CH-High



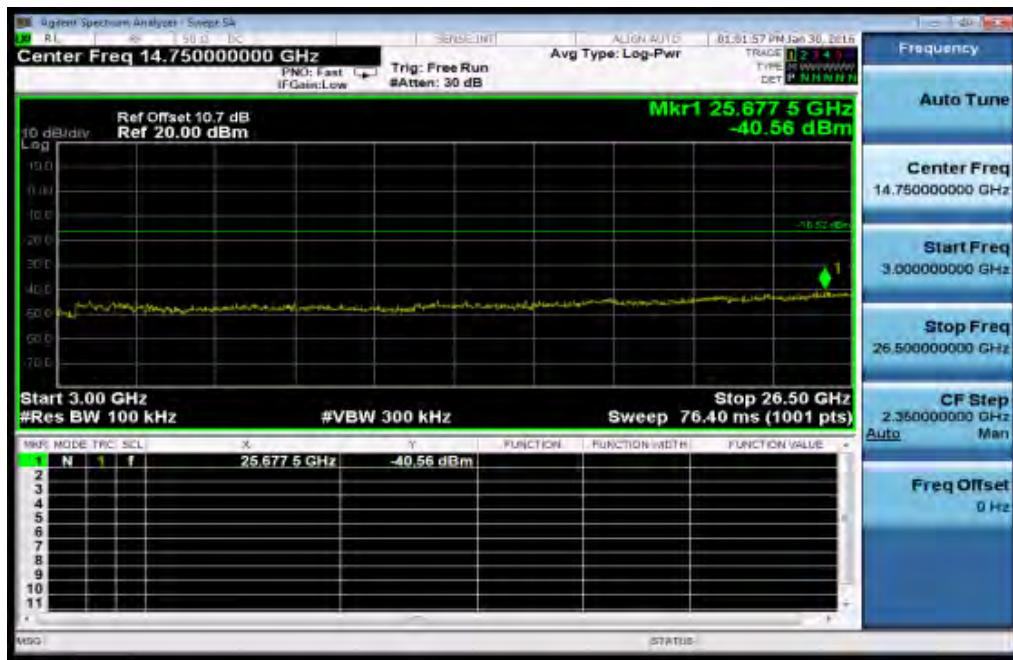
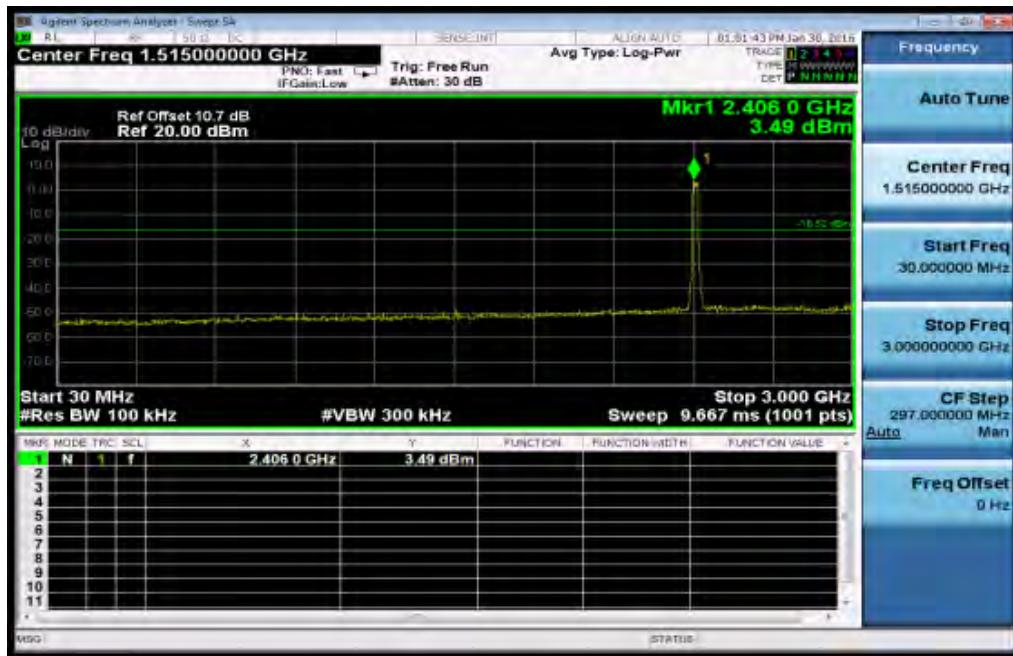
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## 802.11g

### Spurious Emission Test Data CH-Low

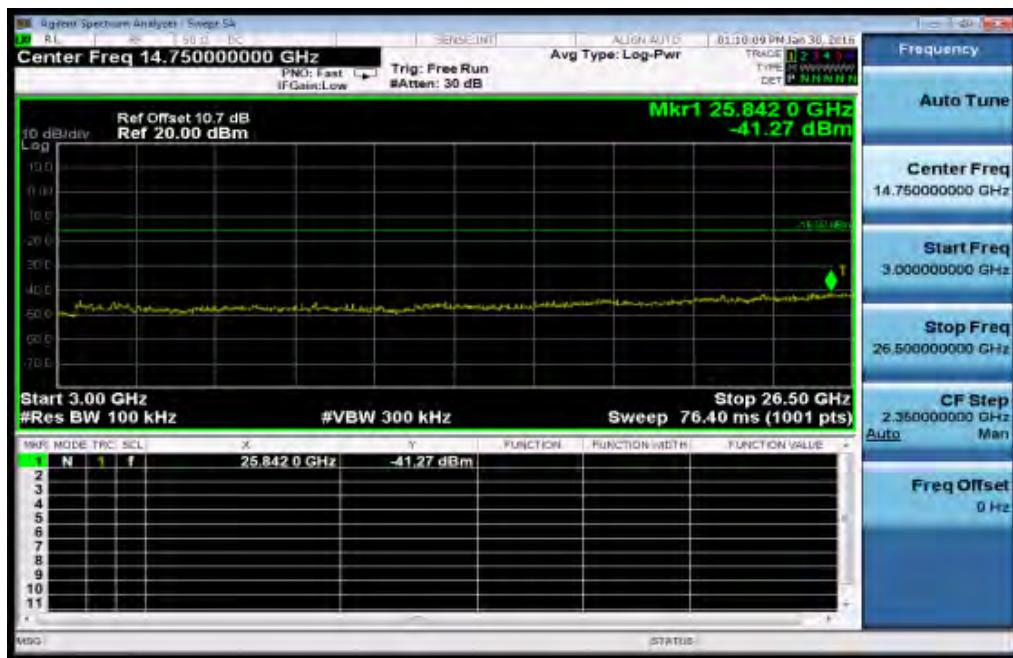


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## Spurious Emission Test Data CH-Mid

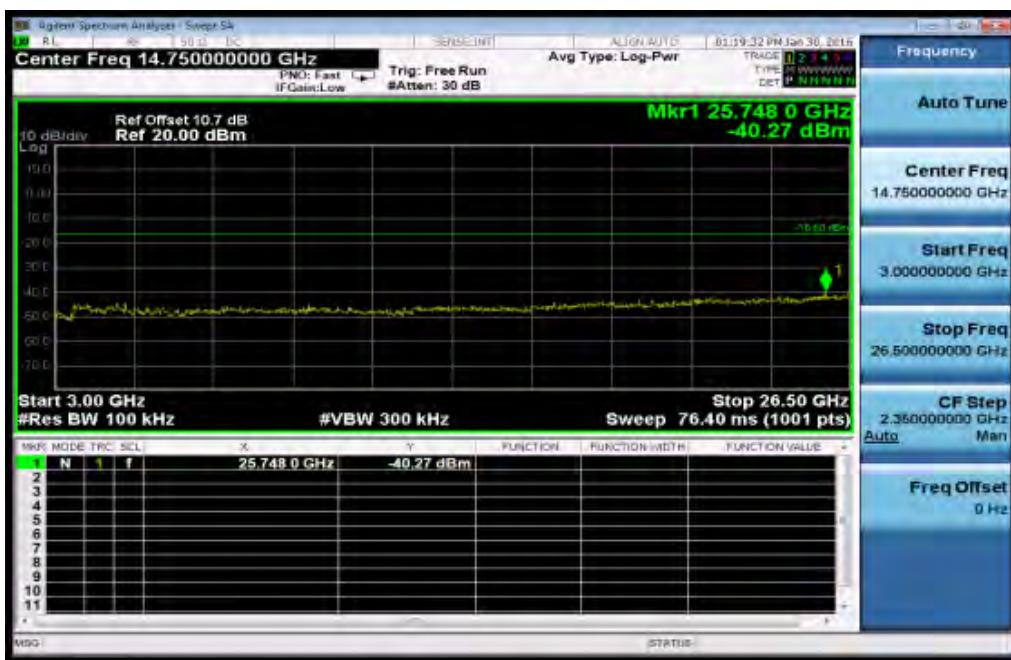
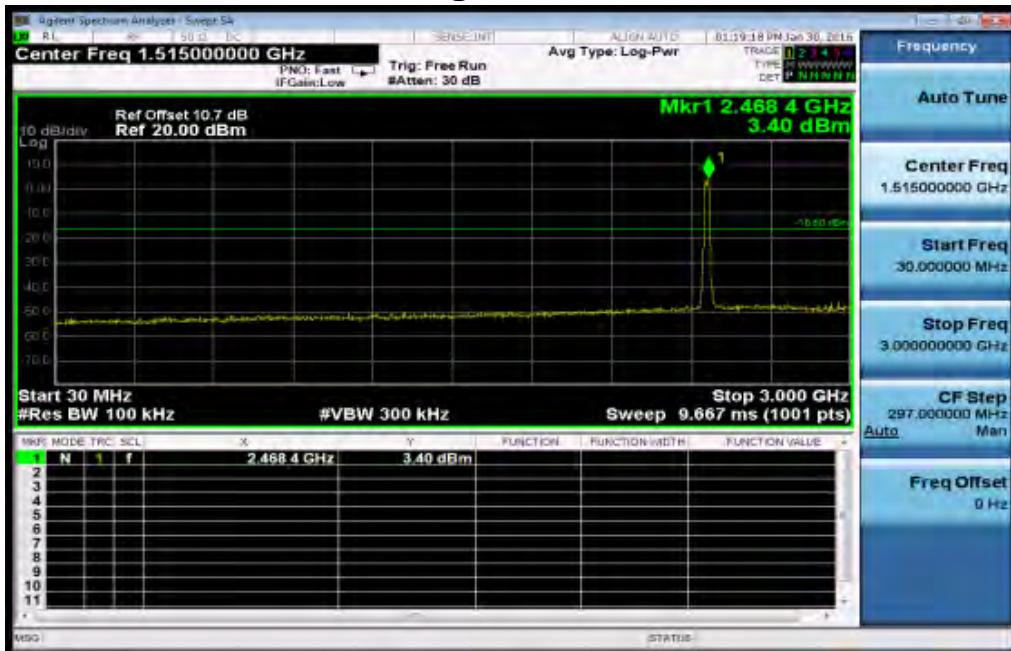


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## Spurious Emission Test Data CH-High



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## 802.11n\_HT20

## Band Edges Test Data CH-Low



## Band Edges Test Data CH-High



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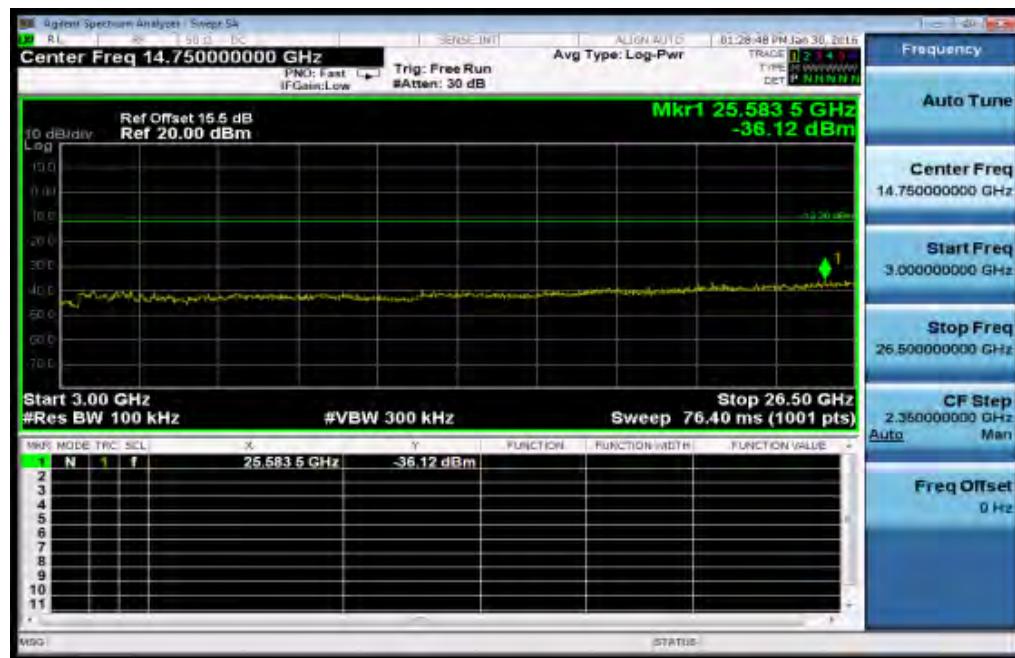
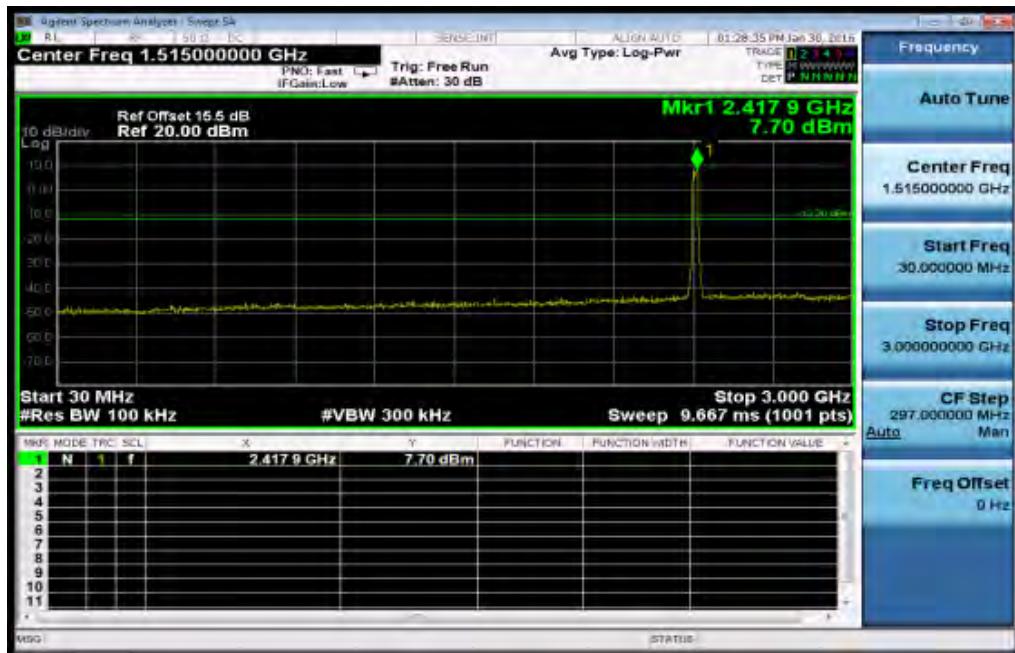
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## 802.11n\_HT20

## Spurious Emission Test Data CH-Low



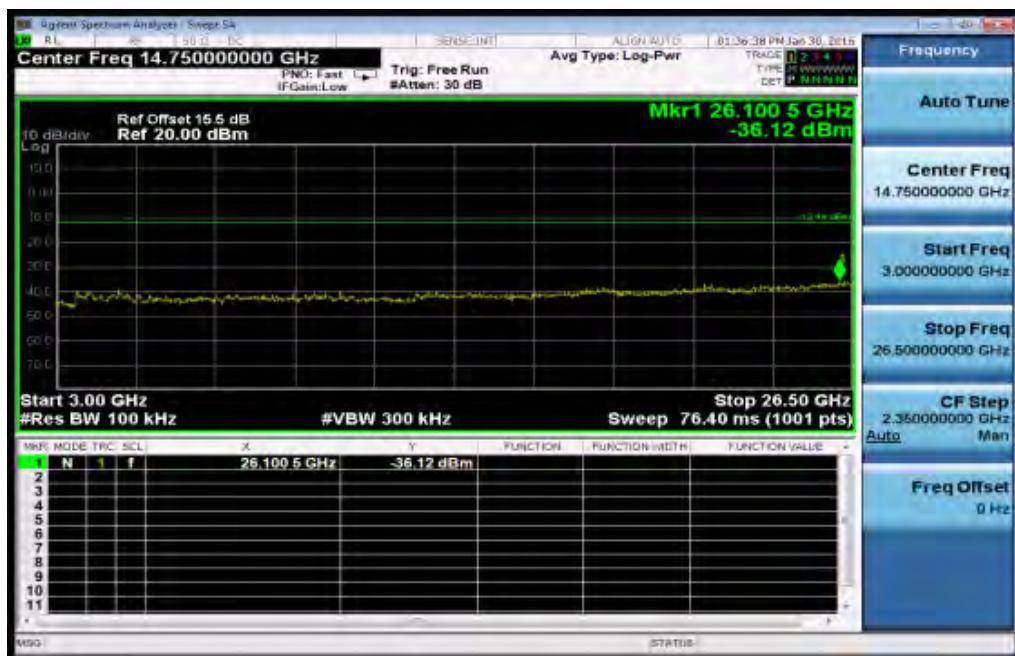
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## Spurious Emission Test Data CH-Mid

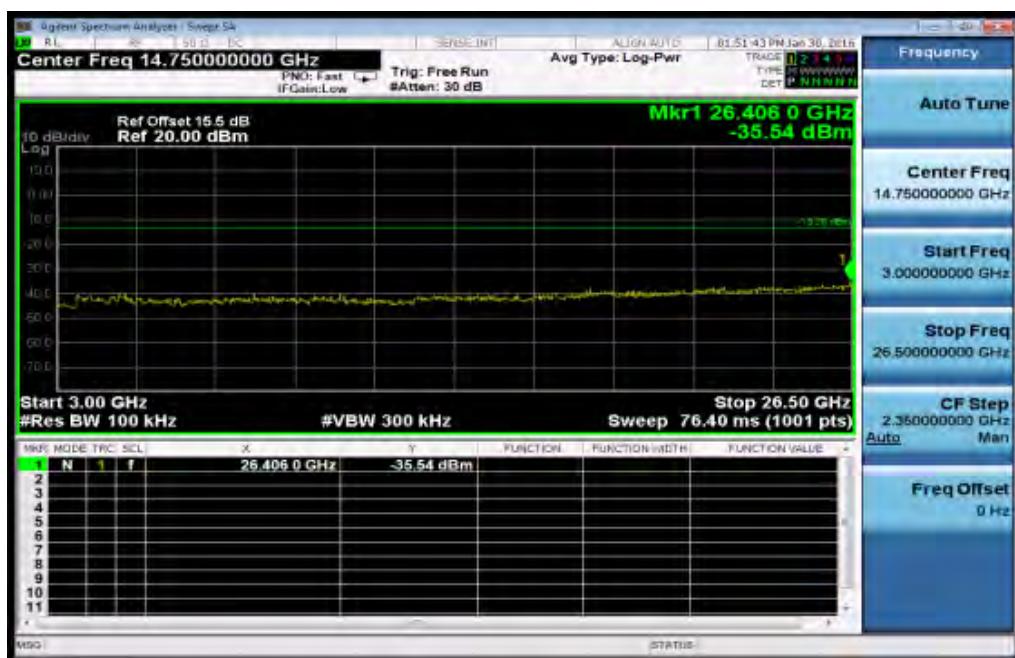


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## Spurious Emission Test Data CH-High



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## 802.11n\_HT40

## Band Edges Test Data CH-Low



## Band Edges Test Data CH-High



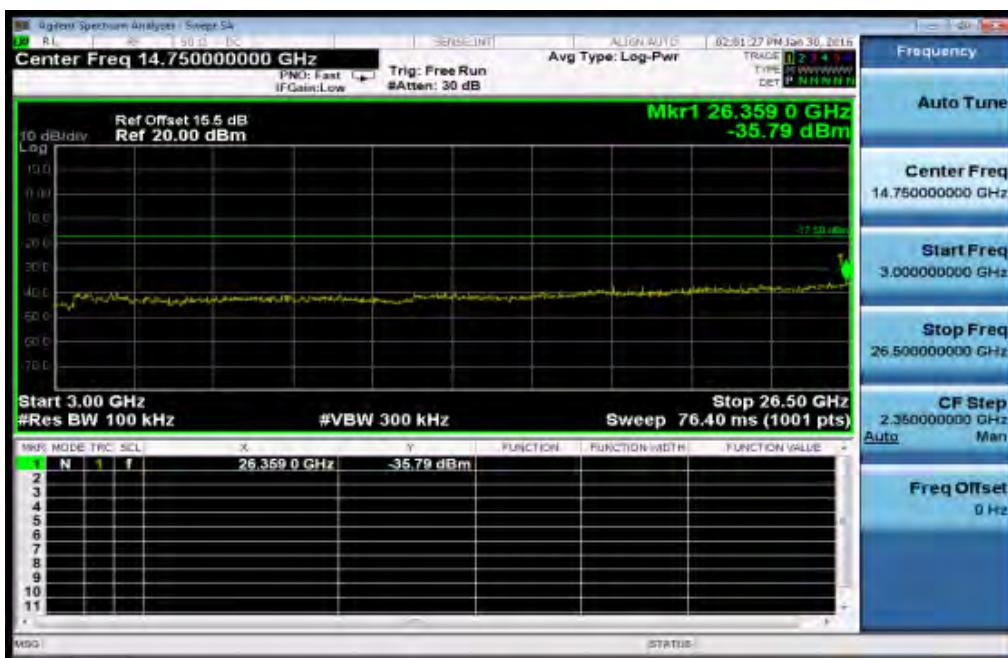
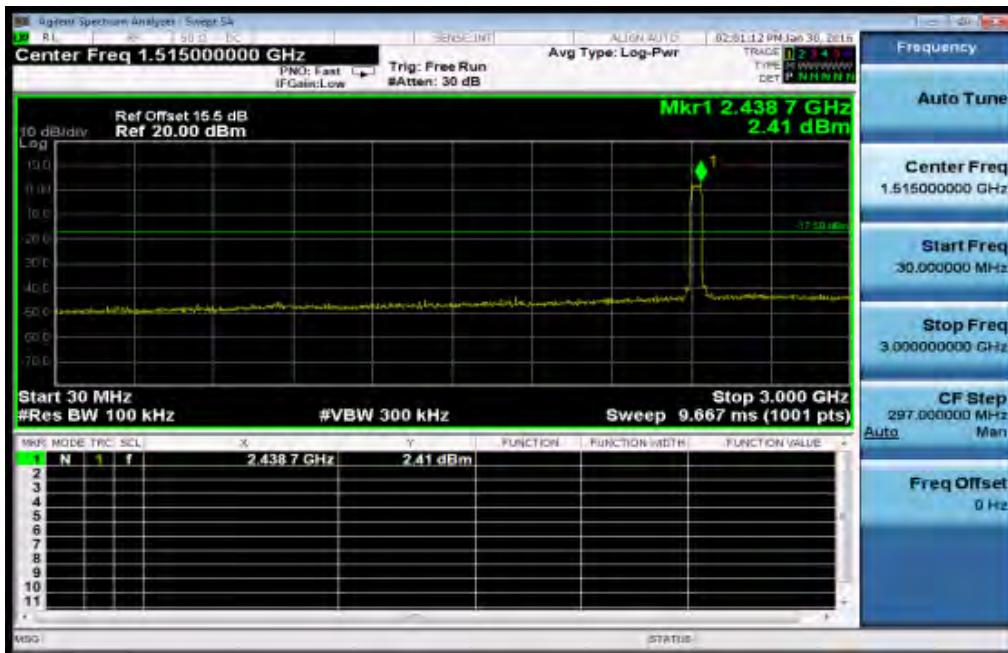
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## 802.11n\_HT40

## Spurious Emission Test Data CH-Low

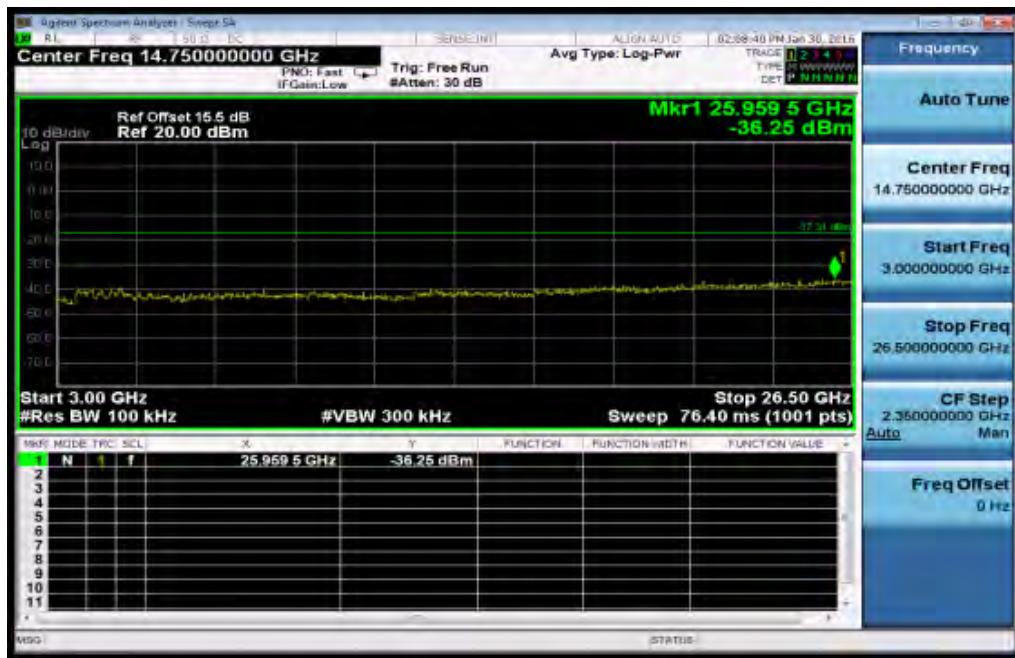
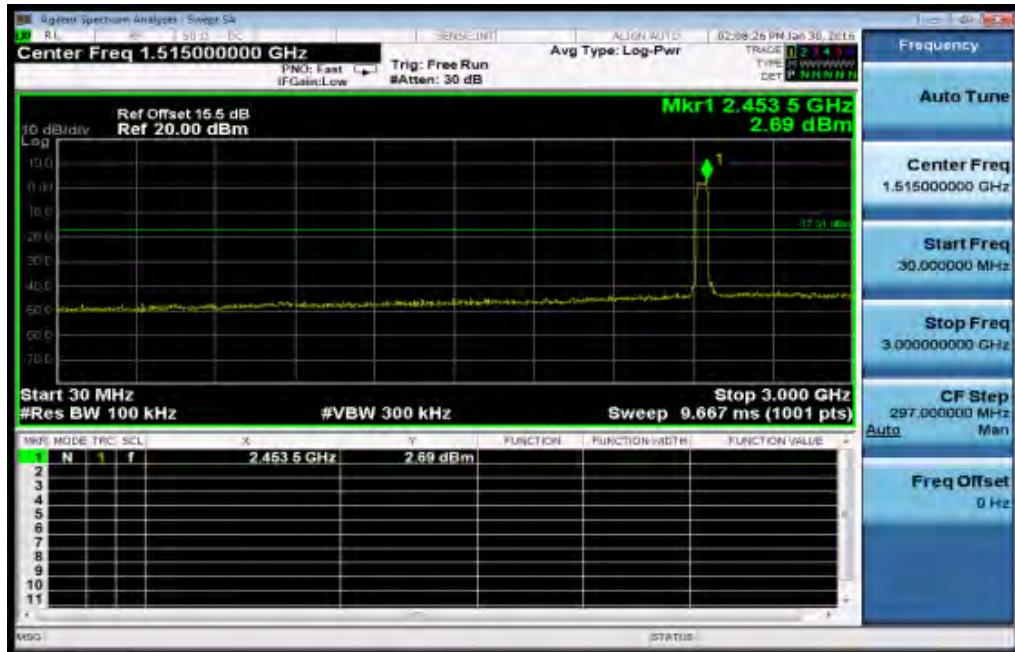


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## Spurious Emission Test Data CH-Mid

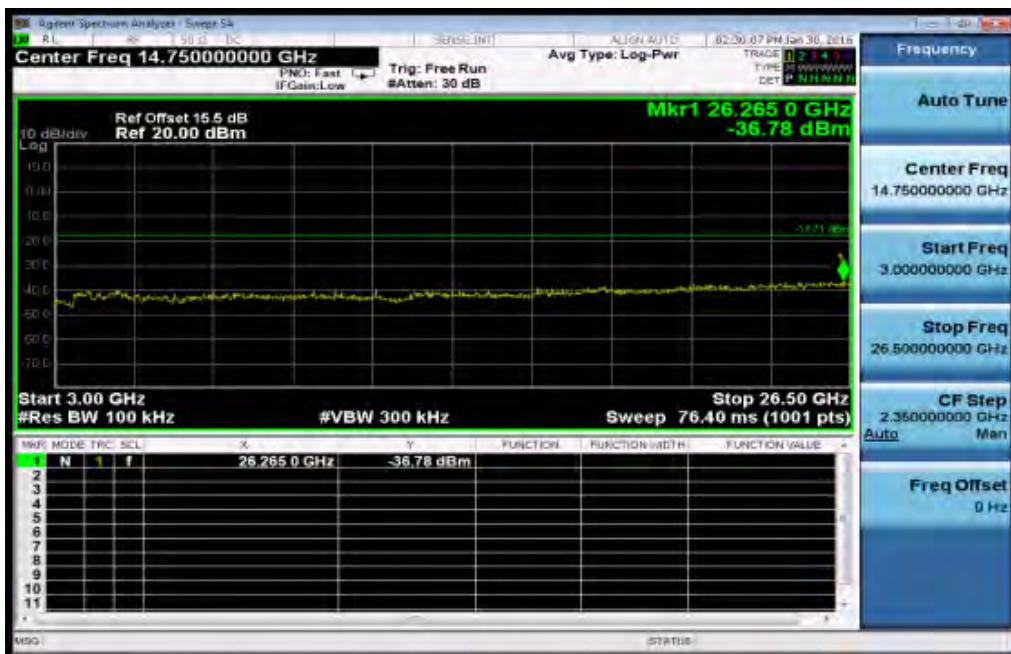
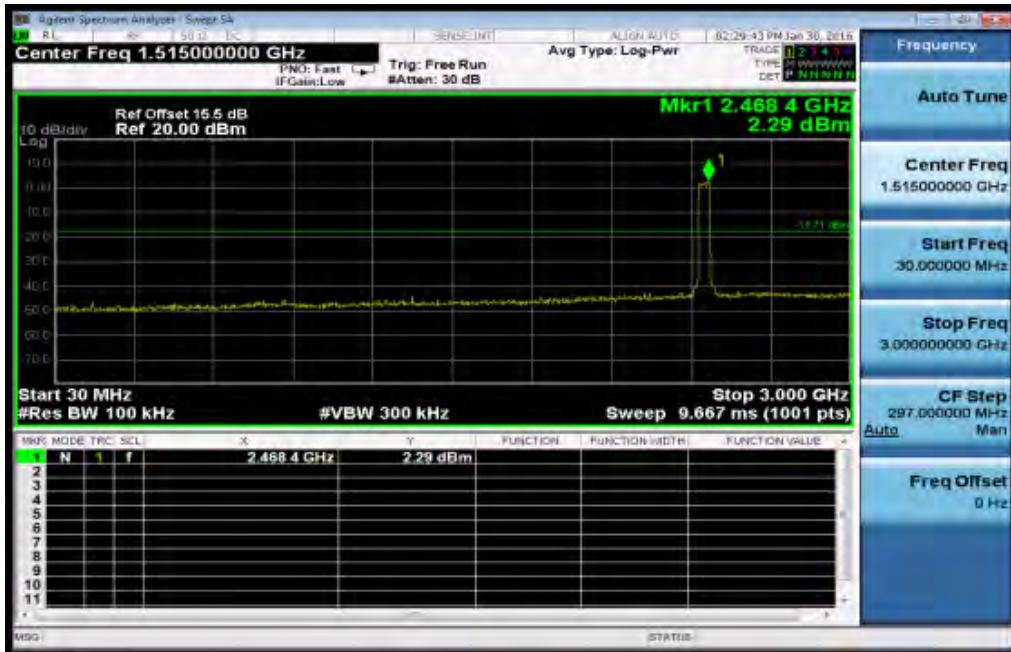


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## 11 RADIATED BANDEDGE AND SPURIOUS EMISSION MEASUREMENT

### 11.1 Standard Applicable

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. In addition, radiated emissions which fall in the restricted bands must also comply with the §15.209 limit as below.

And according to §15.33(a) (1), for an intentional radiator operates below 10GHz, the frequency range of measurements: to the tenth harmonic of the highest fundamental frequency or to 40GHz, whichever is lower.

Frequency (MHz)	Field strength (microvolts/meter)	Distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

**Note:**

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dB $\mu$ V/m) = 20 log Emission level (dB $\mu$ V/m)

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## 11.2 Measurement Equipment Used:

SGS 966 Chamber No.C					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
EMI Test Receiver	R&S	ESU 40	100363	04/09/2015	04/08/2016
Loop Antenna	ETS-Lindgren	6502	00143303	12/09/2015	12/08/2016
Broadband Antenna	TESEQ	CBL 6112D	35240	12/05/2015	12/04/2016
Horn Antenna	ETS-Lindgren	3117	00143272	12/08/2015	12/07/2016
Horn Antenna	Schwarzbeck	BBHA9170	185	07/25/2015	07/24/2016
Pre Amplifier	EMC Instruments	EMC330	980096	12/19/2015	12/18/2016
Pre Amplifier	EMC Instruments	EMC0011830	980199	12/19/2015	12/18/2016
Pre Amplifier	R&S	SCU-18	10204	12/19/2015	12/18/2016
Pre Amplifier	R&S	SCU-26	100780	12/19/2015	12/18/2016
Coaxial Cable	Huber+Suhner	RG 214/U	966Rx 9K-30M	12/19/2015	12/18/2016
Coaxial Cable	Huber+Suhner	RG 214/U SUCOFLEX 104	966Rx 30M-3G	12/19/2015	12/18/2016
Coaxial Cable	Huber+Suhner	SUCOFLEX 104	966Rx 1G-18G	12/19/2015	12/18/2016
Coaxial Cable	Huber+Suhner	mini 141-12 SUCOFLEX 104	966Rx 18G-40G	12/19/2015	12/18/2016
Coaxial Cable	Huber+Suhner	SUCOFLEX 104	966Tx 30M-18G	12/19/2015	12/18/2016
Coaxial Cable	Huber+Suhner	SUCOFLEX 102	966Tx 18G-40G	12/19/2015	12/18/2016
Attenuator	WOKEN	218FS-10	RF27	12/19/2015	12/18/2016
Site NSA	SGS	966 Chamber C	SAC-C	03/04/2015	03/03/2016
Site VSWR	SGS	966 Chamber C	SAC-C	03/04/2015	03/03/2016
DC Power Supply	HOLA	DP-3003	D7070035	05/04/2015	05/03/2016
Controller	MF	MF-7802	N/A	N.C.R.	N.C.R.
Antenna Master	MF	N/A	N/A	N.C.R.	N.C.R.
Turn Table	MF	N/A	N/A	N.C.R.	N.C.R.
Test Software	World-Pallas	Dr. E	V 3.0 Lite	N.C.R.	N.C.R.

NOTE: N.C.R refers to Not Calibrated Required.

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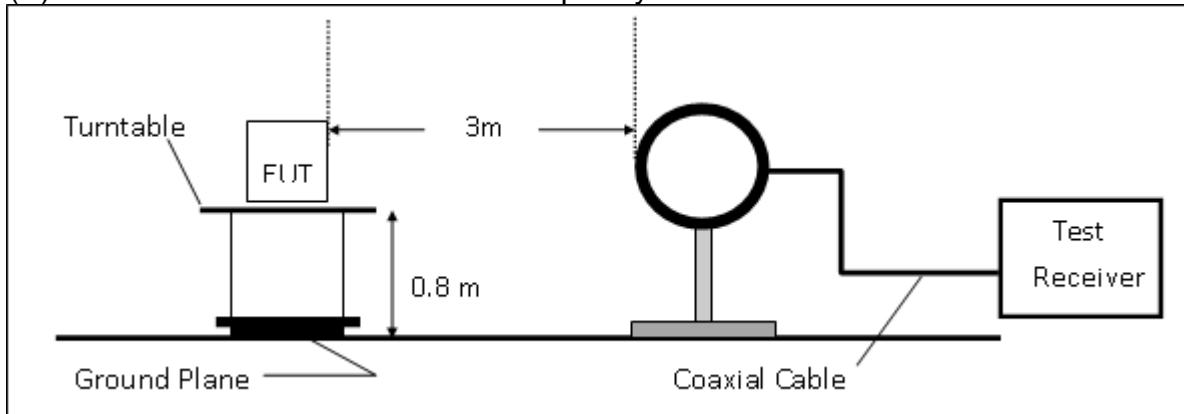
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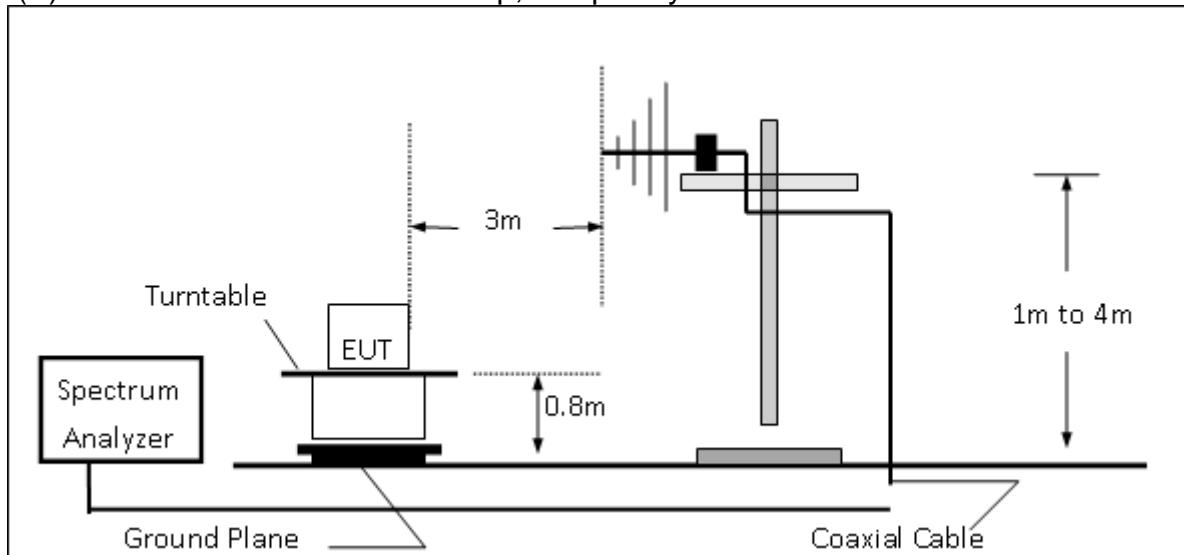
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### 11.3 Test SET-UP

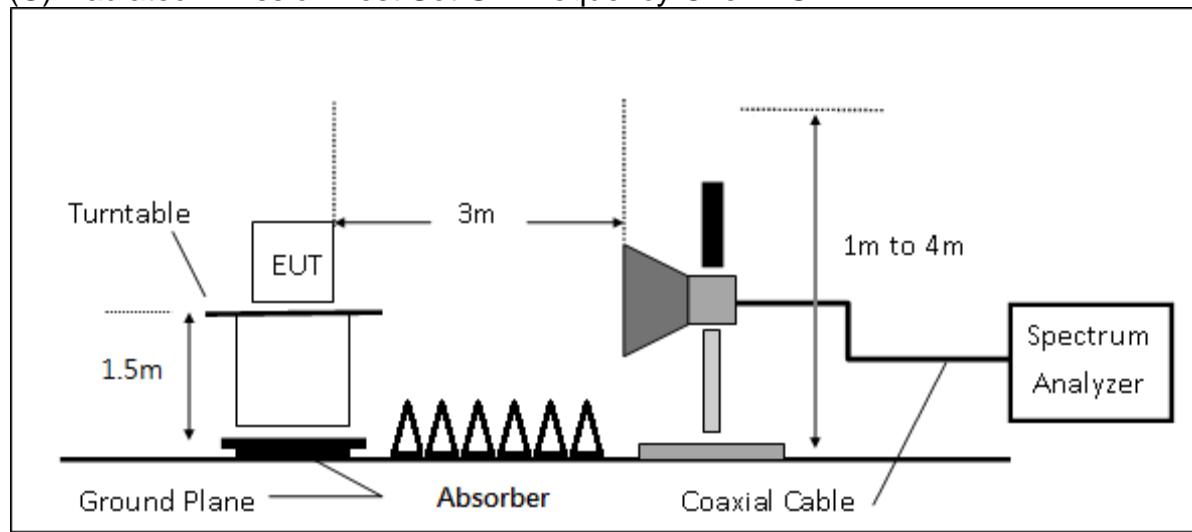
#### (A) Radiated Emission Test Set-UP Frequency Below 30MHz.



#### (B) Radiated Emission Test Set-UP, Frequency from 30MHz to 1000MHz



#### (C) Radiated Emission Test Set-UP Frequency Over 1 GHz



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### 11.3.1 Measurement Procedure

1. The testing follows the Measurement Procedure of FCC KDB 558074 D01 DTS Meas. Guidance.
2. The EUT was placed on a turn table with 0.8m for frequency < 1GHz and 1.5m for frequency > 1GHz above ground plane.
3. The turn table shall rotate 360 degrees to determine the position of maximum emission level.
4. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emissions.
5. When measurement procedures for electric field radiated emissions above 1 GHz the EUT measurement is to be made “while keeping the antenna in the ‘cone of radiation’ from that area and pointed at the area both in azimuth and elevation, with polarization oriented for maximum response.” is still within the 3dB illumination BW of the measurement antenna.
6. Set the spectrum analyzer as RBW=120 kHz and VBW=300 kHz for Peak Detector (PK) and Quasi-peak (QP) at frequency below 1 GHz.
7. Set the spectrum analyzer as RBW=1 MHz, VBW=3 MHz for Peak Detector at frequency above 1 GHz.
8. Set the spectrum analyzer as RBW=1 MHz, VBW=10 Hz (Duty cycle > 98%) or VBW  $\geq$  1/T (Duty cycle < 98%) for Average Detector at frequency above 1 GHz.
9. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
10. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
11. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. On spectrum, change spectrum mode in linear display mode, and reduce VBW = 10Hz if average reading is measured.
12. Repeat above procedures until all default test channel measured were complete.

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## 11.4 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor (if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF - CL - AG$$

Where	FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
	RA = Reading Amplitude	AG = Amplifier Gain
	AF = Antenna Factor	

Actual FS(dB $\mu$ V/m) = SPA. Reading level(dB $\mu$ V) + Factor(dB)

Factor(dB) = Antenna Factor(dB $\mu$ V/m) + Cable Loss(dB) – Pre\_Amplifier Gain(dB)

### Note :

“F” : denotes Fundamental Frequency. ; “H” : denotes Harmonic Frequency.

“E” : denotes Band Edge Frequency. ; “S” : denotes Spurious Frequency.

## 11.5 Test Results of Radiated Spurious Emissions form 9 kHz to 30 MHz

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit per 15.31(o) was not reported.

## 11.6 Measurement Result

Note: Refer to next page spectrum analyzer data chart and tabular data sheets.

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### Radiated Band Edge Measurement Result (802.11b)

Operation Mode : 802.11b Test Date : 2016/1/22  
Fundamental Frequency : 2412 MHz Temp. / Humi. : 22.7deg\_C/57RH  
Operation Band : BE CH Low Test Engineer : Pony  
EUT Pol. : E2 Measurement Antenna Pol. : Vertical

Freq.	Note	Detector	Spectrum		Factor	Actual	Limit	Margin
			Mode	Reading Level				
MHz	F/H/E/S	PK/QP/AV	dB $\mu$ V	dB	dB $\mu$ V/m	dB $\mu$ V/m	dB	
2388.48	S	Peak	61.00	6.62	67.61	74	-6.39	
2388.48	S	Average	45.48	6.62	52.10	54	-1.90	
2390.00	E	Peak	59.40	6.62	66.02	74	-7.98	
2390.00	E	Average	46.55	6.62	53.17	54	-0.83	

Operation Mode : 802.11b Test Date : 2016/1/22  
Fundamental Frequency : 2412 MHz Temp. / Humi. : 22.7deg\_C/57RH  
Operation Band : BE CH Low Test Engineer : Pony  
EUT Pol. : E2 Measurement Antenna Pol. : Horizontal

Freq.	Note	Detector	Spectrum		Factor	Actual	Limit	Margin
			Mode	Reading Level				
MHz	F/H/E/S	PK/QP/AV	dB $\mu$ V	dB	dB $\mu$ V/m	dB $\mu$ V/m	dB	
2390.00	E	Peak	53.48	6.62	60.10	74	-13.90	
2390.00	E	Average	40.13	6.62	46.75	54	-7.25	

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Operation Mode : 802.11b Test Date : 2016/1/22  
Fundamental Frequency : 2462 MHz Temp. / Humi. : 22.7deg\_C/57RH  
Operation Band : BE CH High Test Engineer : Pony  
EUT Pol. : E2 Measurement Antenna Pol. : Vertical

Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dB $\mu$ V	dB	dB $\mu$ V/m	dB $\mu$ V/m	dB
2483.50	E	Peak	59.47	6.96	66.43	74	-7.57
2483.50	E	Average	46.44	6.96	53.40	54	-0.60

Operation Mode : 802.11b Test Date : 2016/1/22  
Fundamental Frequency : 2462 MHz Temp. / Humi. : 22.7deg\_C/57RH  
Operation Band : BE CH High Test Engineer : Pony  
EUT Pol. : E2 Measurement Antenna Pol. : Horizontal

Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dB $\mu$ V	dB	dB $\mu$ V/m	dB $\mu$ V/m	dB
2483.50	E	Peak	48.25	6.96	55.21	74	-18.79
2483.50	E	Average	36.21	6.96	43.17	54	-10.83
2484.30	S	Peak	50.09	6.97	57.05	74	-16.95
2484.30	S	Average	35.55	6.97	42.52	54	-11.48

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### Radiated Band Edge Measurement Result (802.11g)

Operation Mode : 802.11g Test Date : 2016/1/5  
Fundamental Frequency : 2412 MHz Temp. / Humi. : 22.7deg\_C/57RH  
Operation Band : BE CH Low Test Engineer : Pony  
EUT Pol. : E2 Measurement Antenna Pol. : Vertical

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
			dB $\mu$ V				
2390.00	E	Peak	65.98	6.62	72.60	74	-1.40
2390.00	E	Average	45.47	6.62	52.09	54	-1.91

Operation Mode : 802.11g Test Date : 2016/1/5  
Fundamental Frequency : 2412 MHz Temp. / Humi. : 22.7deg\_C/57RH  
Operation Band : BE CH Low Test Engineer : Pony  
EUT Pol. : E2 Measurement Antenna Pol. : Horizontal

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
			dB $\mu$ V				
2390.00	E	Peak	56.71	6.62	63.33	74	-10.67
2390.00	E	Average	37.64	6.62	44.26	54	-9.74

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Operation Mode : 802.11g Test Date : 2016/1/5  
Fundamental Frequency : 2462 MHz Temp. / Humi. : 22.7deg\_C/57RH  
Operation Band : BE CH High Test Engineer : Pony  
EUT Pol. : E2 Measurement Antenna Pol. : Vertical

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
			dB $\mu$ V				
2483.50	E	Peak	65.51	6.96	72.48	74	-1.52
2483.50	E	Average	45.14	6.96	52.10	54	-1.90

Operation Mode : 802.11g Test Date : 2016/1/5  
Fundamental Frequency : 2462 MHz Temp. / Humi. : 22.7deg\_C/57RH  
Operation Band : BE CH High Test Engineer : Pony  
EUT Pol. : E2 Measurement Antenna Pol. : Horizontal

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
			dB $\mu$ V				
2483.50	E	Peak	56.54	6.96	63.50	74	-10.50
2483.50	E	Average	37.83	6.96	44.79	54	-9.21

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**Radiated Band Edge Measurement Result (802.11\_HT20)**

Operation Mode : 802.11n20 Test Date : 2016/1/5  
Fundamental Frequency : 2412 MHz Temp. / Humi. : 22.7deg\_C/57RH  
Operation Band : BE CH Low Test Engineer : Pony  
EUT Pol. : E2 Measurement Antenna Pol. : Vertical

Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dB $\mu$ V	dB	dB $\mu$ V/m	dB $\mu$ V/m	dB
2390.00	E	Peak	66.09	6.62	72.71	74	-1.29
2390.00	E	Average	45.51	6.62	52.13	54	-1.87

Operation Mode : 802.11n20 Test Date : 2016/1/5  
Fundamental Frequency : 2412 MHz Temp. / Humi. : 22.7deg\_C/57RH  
Operation Band : BE CH Low Test Engineer : Pony  
EUT Pol. : E2 Measurement Antenna Pol. : Horizontal

Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dB $\mu$ V	dB	dB $\mu$ V/m	dB $\mu$ V/m	dB
2390.00	E	Peak	54.16	6.62	60.78	74	-13.22
2390.00	E	Average	36.44	6.62	43.06	54	-10.94

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Operation Mode : 802.11n20 Test Date : 2016/1/5  
Fundamental Frequency : 2462 MHz Temp. / Humi. : 22.7deg\_C/57RH  
Operation Band : BE CH High Test Engineer : Pony  
EUT Pol. : E2 Measurement Antenna Pol. : Vertical

Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dB $\mu$ V	dB	dB $\mu$ V/m	dB $\mu$ V/m	dB
2483.50	E	Peak	64.03	6.96	70.99	74	-3.01
2483.50	E	Average	43.94	6.96	50.90	54	-3.10

Operation Mode :	802.11n20	Test Date :	2016/1/5
Fundamental Frequency :	2462 MHz	Temp. / Humi. :	22.7deg_C/57RH
Operation Band :	BE CH High	Test Engineer :	Pony
EUT Pol. :	E2	Measurement Antenna Pol. :	Horizontal

Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dB $\mu$ V	dB	dB $\mu$ V/m	dB $\mu$ V/m	dB
2483.50	E	Peak	52.86	6.96	59.82	74	-14.18
2483.50	E	Average	34.93	6.96	41.89	54	-12.11

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**Radiated Band Edge Measurement Result (802.11\_HT40)**

Operation Mode : 802.11n40 Test Date : 2016/1/5  
Fundamental Frequency : 2422 MHz Temp. / Humi. : 22.7deg\_C/57RH  
Operation Band : BE CH Low Test Engineer : Pony  
EUT Pol. : E2 Measurement Antenna Pol. : Vertical

Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dB $\mu$ V	dB	dB $\mu$ V/m	dB $\mu$ V/m	dB
2385.00	S	Peak	66.58	6.62	73.20	74	-0.80
2385.00	S	Average	39.39	6.62	46.01	54	-7.99
2390.00	E	Peak	61.98	6.62	68.60	74	-5.40
2390.00	E	Average	40.36	6.62	46.98	54	-7.02

Operation Mode : 802.11n40 Test Date : 2016/1/5  
Fundamental Frequency : 2422 MHz Temp. / Humi. : 22.7deg\_C/57RH  
Operation Band : BE CH Low Test Engineer : Pony  
EUT Pol. : E2 Measurement Antenna Pol. : Horizontal

Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dB $\mu$ V	dB	dB $\mu$ V/m	dB $\mu$ V/m	dB
2385.60	S	Peak	53.91	6.62	60.53	74	-13.47
2385.60	S	Average	34.42	6.62	41.04	54	-12.96
2390.00	E	Peak	50.42	6.62	57.04	74	-16.96
2390.00	E	Average	34.88	6.62	41.50	54	-12.50

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Operation Mode : 802.11n40 Test Date : 2016/1/5  
Fundamental Frequency : 2452 MHz Temp. / Humi. : 22.7deg\_C/57RH  
Operation Band : BE CH High Test Engineer : Pony  
EUT Pol. : E2 Measurement Antenna Pol. : Vertical

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
2483.50	E	Peak	64.68	6.96	71.65	74	-2.35
2483.50	E	Average	41.06	6.96	48.02	54	-5.98
2487.70	S	Peak	64.04	6.98	71.02	74	-2.98
2487.70	S	Average	40.09	6.98	47.07	54	-6.93

Operation Mode : 802.11n40 Test Date : 2016/1/5  
Fundamental Frequency : 2452 MHz Temp. / Humi. : 22.7deg\_C/57RH  
Operation Band : BE CH High Test Engineer : Pony  
EUT Pol. : E2 Measurement Antenna Pol. : Horizontal

Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
2483.50	E	Peak	53.14	6.96	60.10	74	-13.90
2483.50	E	Average	35.19	6.96	42.15	54	-11.85

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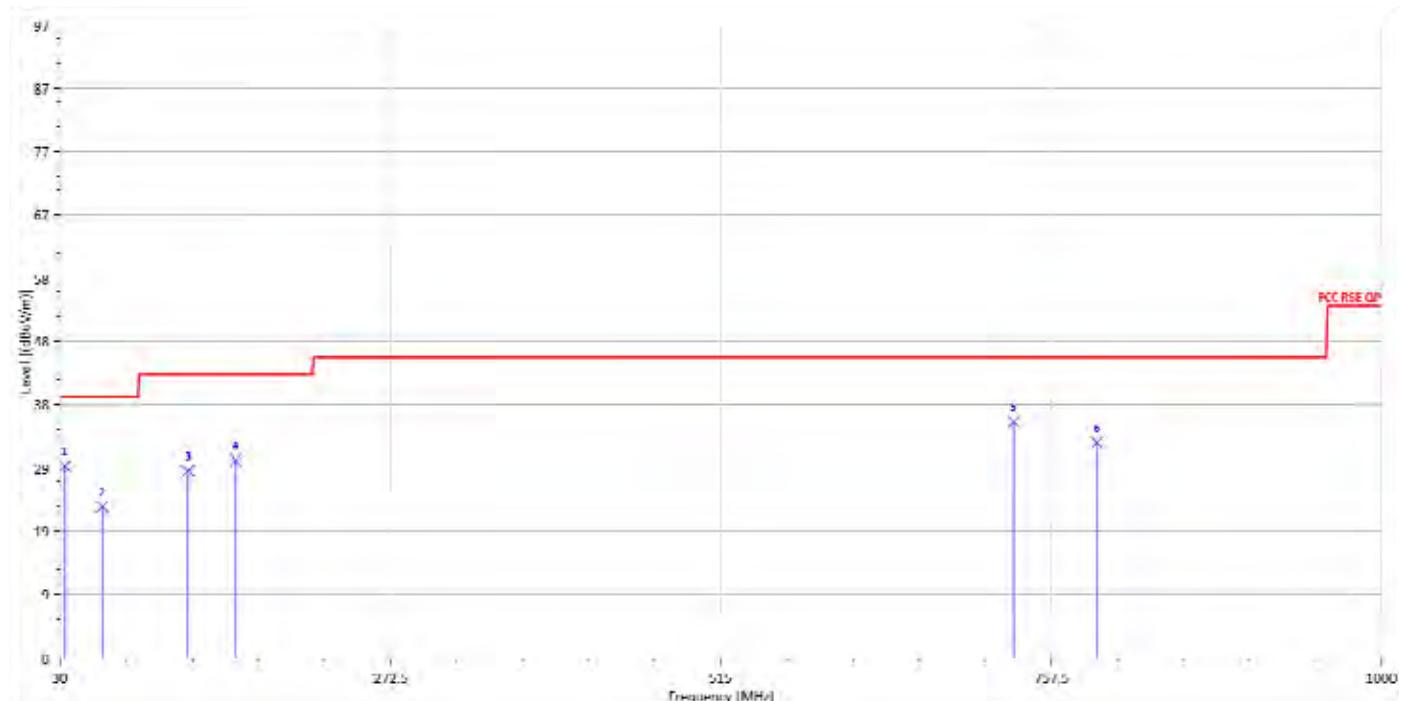
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## Radiated Spurious Emission Measurement Result (802.11 g)

## Below 1GHz Worst-Case Data:

Operation Mode : 802.11g Test Date : 2016/1/25  
 Fundamental Frequency : 2412 MHz Temp. / Humi. : 22.7deg\_C/57RH  
 Operation Band : Tx CH Low Test Engineer : Ashton  
 EUT Pol. : E2 Measurement Antenna Pol. : Vertical



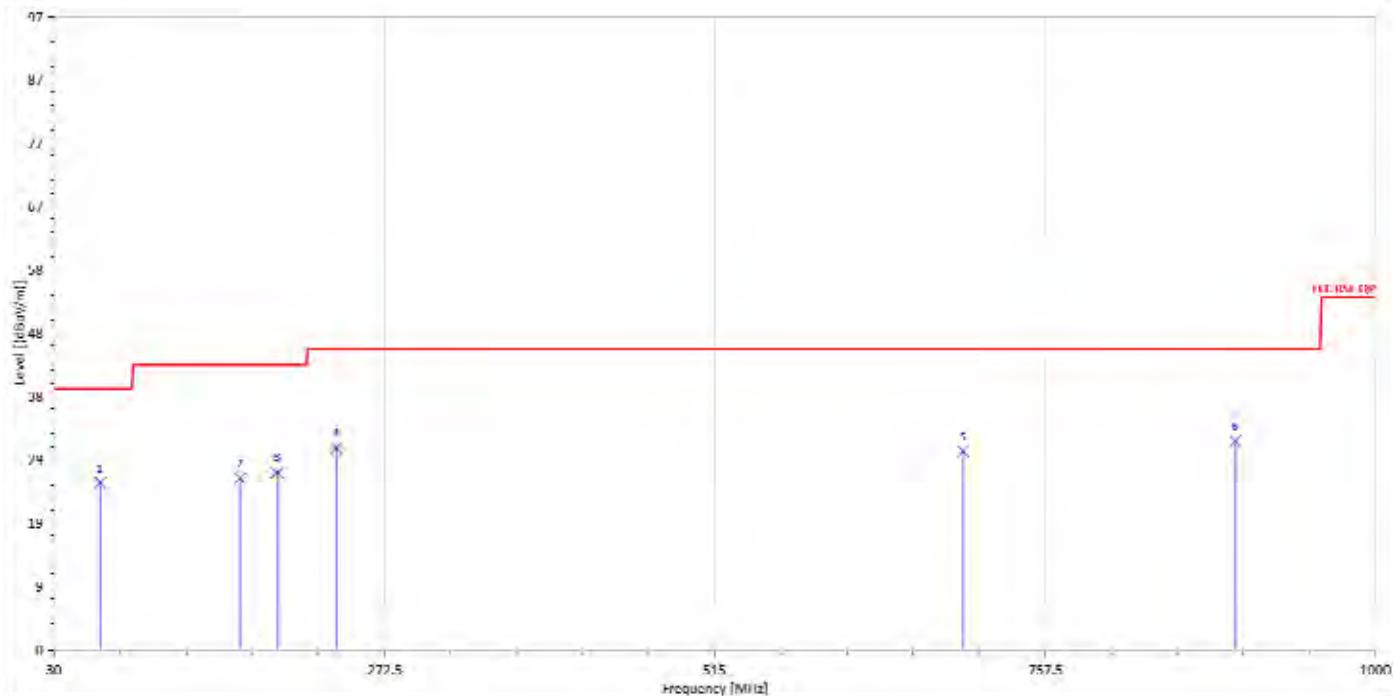
Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
33.88	S	Peak	44.65	-15.22	29.43	40	-10.57
61.04	S	Peak	51.60	-28.42	23.18	40	-16.82
124.09	S	Peak	50.09	-21.39	28.70	43.5	-14.80
159.01	S	Peak	53.42	-23.10	30.33	43.5	-13.17
730.34	S	Peak	46.82	-10.64	36.18	46	-9.82
791.45	S	Peak	42.70	-9.76	32.95	46	-13.05

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Operation Mode : 802.11g      Test Date : 2016/1/25  
 Fundamental Frequency : 2412 MHz      Temp. / Humi. : 22.7deg\_C/57RH  
 Operation Band : Tx CH Low      Test Engineer : Ashton  
 EUT Pol. : E2      Measurement Antenna Pol. : Horizontal



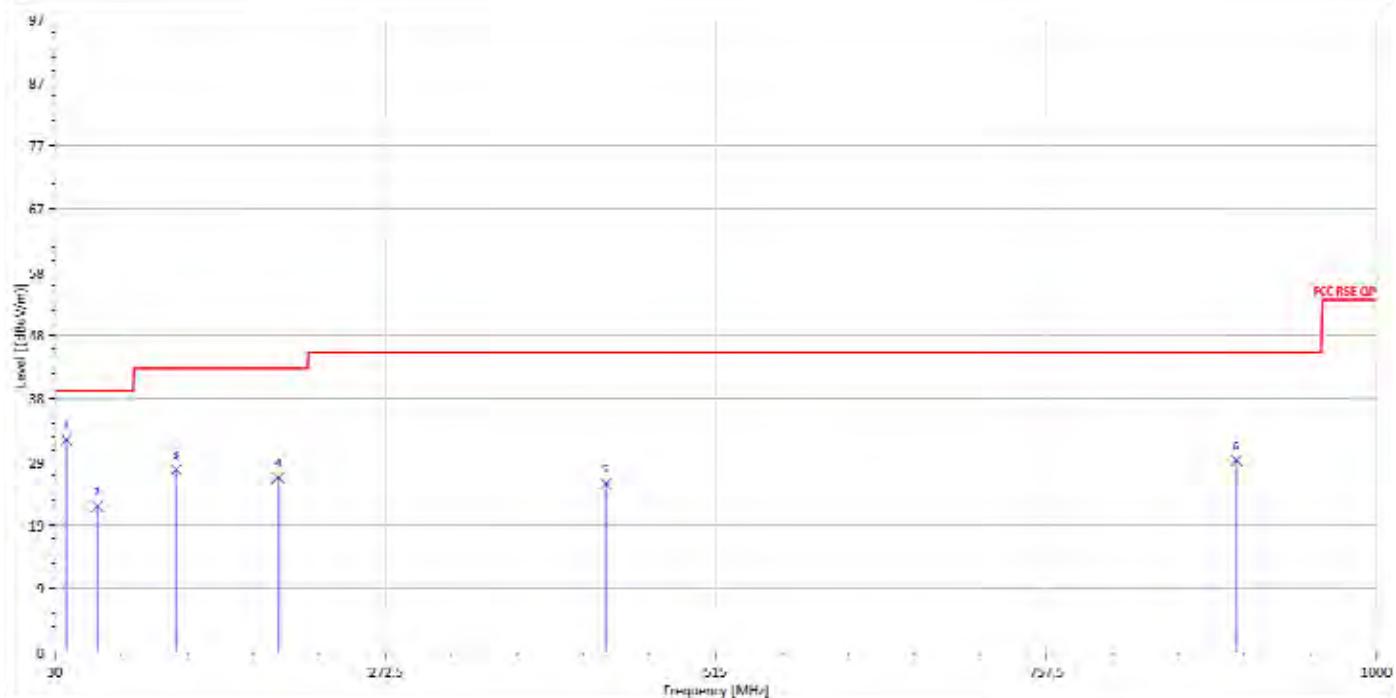
Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
63.95	S	Peak	53.83	-28.21	25.62	40	-14.38
166.77	S	Peak	49.93	-23.63	26.29	43.5	-17.21
193.93	S	Peak	50.95	-23.82	27.13	43.5	-16.37
237.58	S	Peak	52.28	-21.41	30.87	46	-15.13
697.36	S	Peak	41.40	-11.09	30.31	46	-15.69
897.18	S	Peak	40.14	-8.23	31.91	46	-14.09

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Operation Mode : 802.11g      Test Date : 2016/1/25  
 Fundamental Frequency : 2437 MHz      Temp. / Humi. : 22.7deg\_C/57RH  
 Operation Band : Tx CH Mid      Test Engineer : Ashton  
 EUT Pol. : E2      Measurement Antenna Pol. : Vertical



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @ 3m dB $\mu$ V/m	Margin dB
38.73	S	Peak	50.77	-18.19	32.58	40	-7.42
61.04	S	Peak	50.76	-28.42	22.34	40	-17.66
119.24	S	Peak	49.51	-21.51	28.00	43.5	-15.50
193.93	S	Peak	50.53	-23.82	26.71	43.5	-16.79
434.49	S	Peak	41.22	-15.43	25.79	46	-20.21
897.18	S	Peak	37.65	-8.23	29.42	46	-16.58

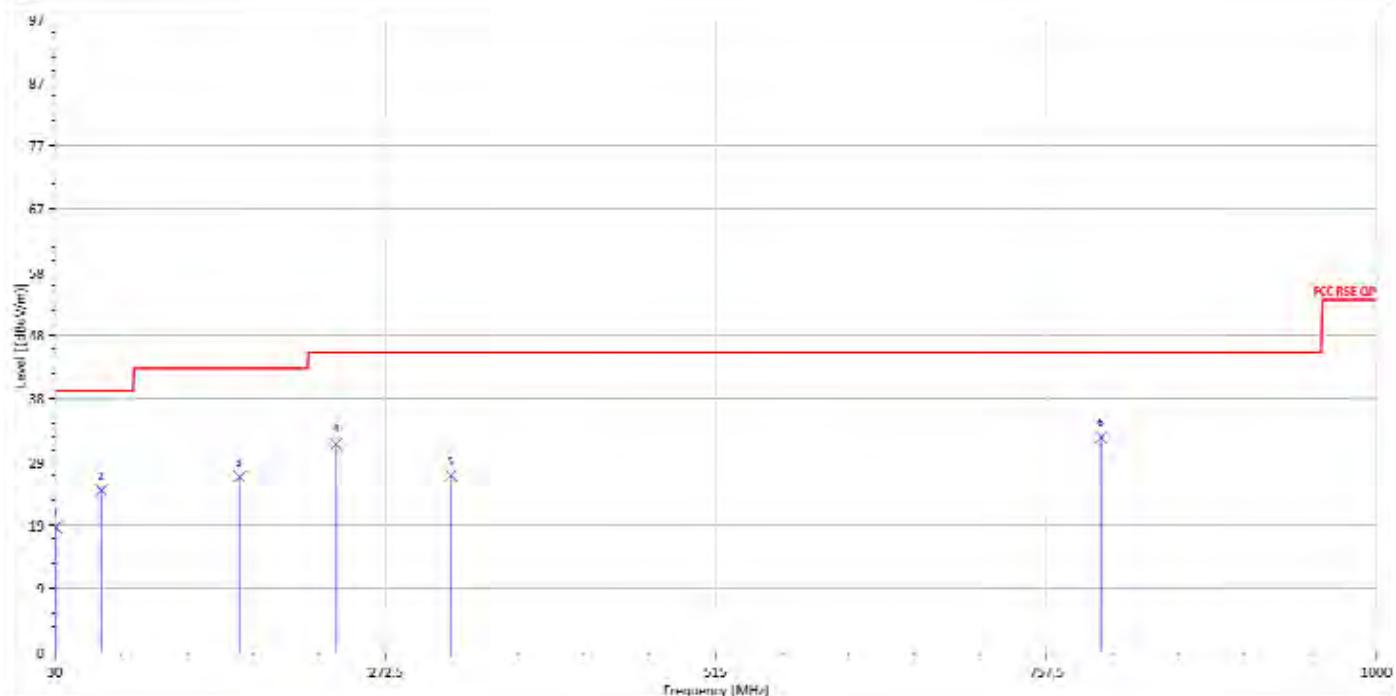
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Operation Mode : 802.11g      Test Date : 2016/1/25  
 Fundamental Frequency : 2437 MHz      Temp. / Humi. : 22.7deg\_C/57RH  
 Operation Band : Tx CH Mid      Test Engineer : Ashton  
 EUT Pol. : E2      Measurement Antenna Pol. : Horizontal



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
30.97	S	Peak	32.73	-13.64	19.09	40	-20.91
63.95	S	Peak	52.99	-28.21	24.78	40	-15.22
165.80	S	Peak	50.44	-23.56	26.88	43.5	-16.62
236.61	S	Peak	53.42	-21.50	31.92	46	-14.08
321.00	S	Peak	45.65	-18.59	27.06	46	-18.94
798.24	S	Peak	42.47	-9.55	32.92	46	-13.08

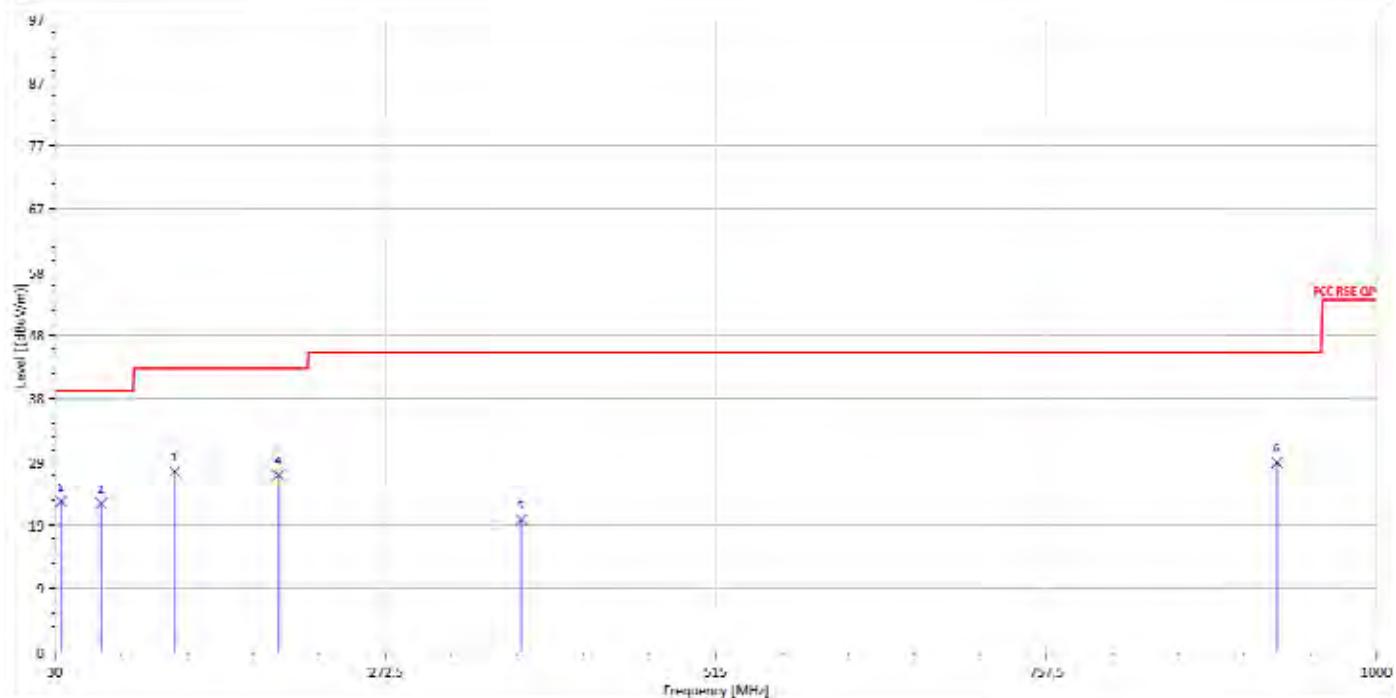
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Operation Mode : 802.11g Test Date : 2016/1/25  
 Fundamental Frequency : 2462 MHz Temp. / Humi. : 22.7deg\_C/57RH  
 Operation Band : Tx CH High Test Engineer : Ashton  
 EUT Pol. : E2 Measurement Antenna Pol. : Vertical



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @ 3m dB $\mu$ V/m	Margin dB
34.85	S	Peak	38.83	-15.75	23.08	40	-16.92
63.95	S	Peak	50.94	-28.21	22.73	40	-17.27
118.27	S	Peak	49.27	-21.60	27.67	43.5	-15.83
193.93	S	Peak	50.95	-23.82	27.13	43.5	-16.37
372.41	S	Peak	36.95	-16.73	20.22	46	-25.78
927.25	S	Peak	36.72	-7.64	29.08	46	-16.92

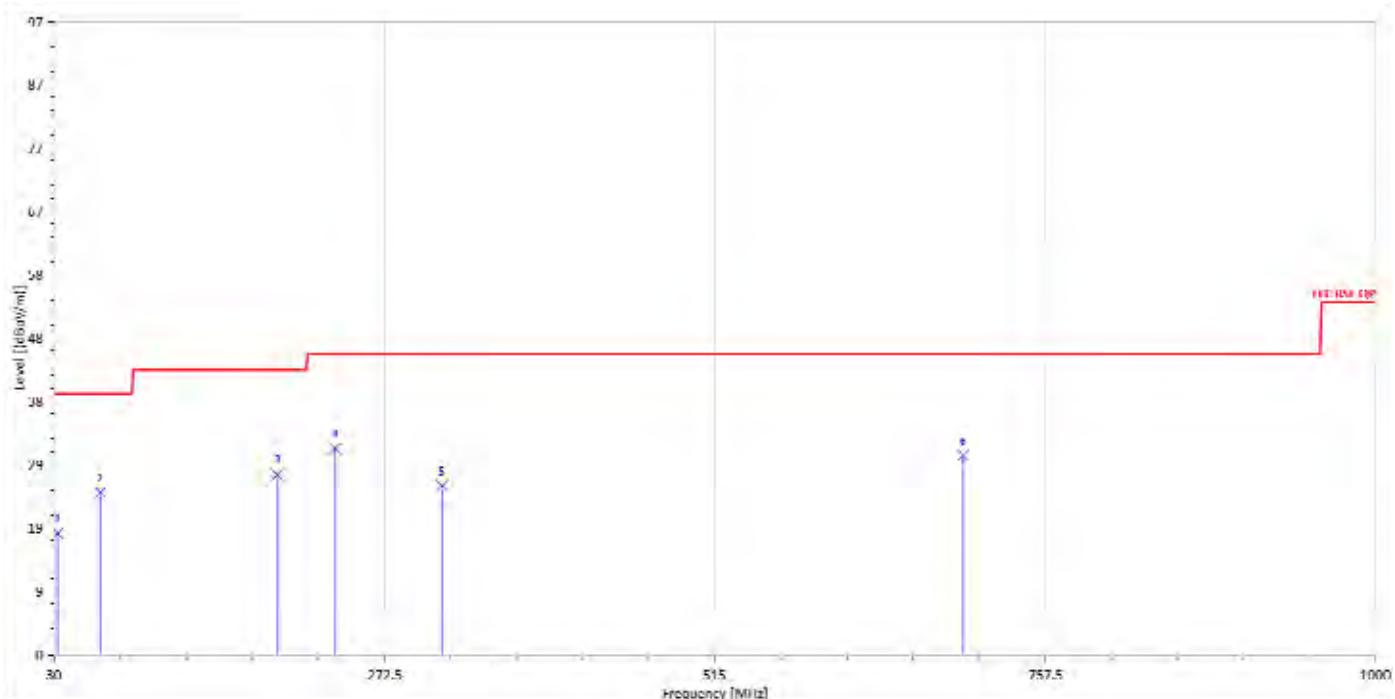
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Operation Mode : 802.11g Test Date : 2016/1/25  
 Fundamental Frequency : 2462 MHz Temp. / Humi. : 22.7deg\_C/57RH  
 Operation Band : Tx CH High Test Engineer : Ashton  
 EUT Pol. : E2 Measurement Antenna Pol. : Horizontal



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
32.91	S	Peak	33.24	-14.69	18.55	40	-21.45
63.95	S	Peak	53.07	-28.21	24.85	40	-15.15
193.93	S	Peak	51.40	-23.82	27.58	43.5	-15.92
236.61	S	Peak	52.99	-21.50	31.49	46	-14.51
315.18	S	Peak	44.48	-18.60	25.87	46	-20.13
697.36	S	Peak	41.54	-11.09	30.45	46	-15.55

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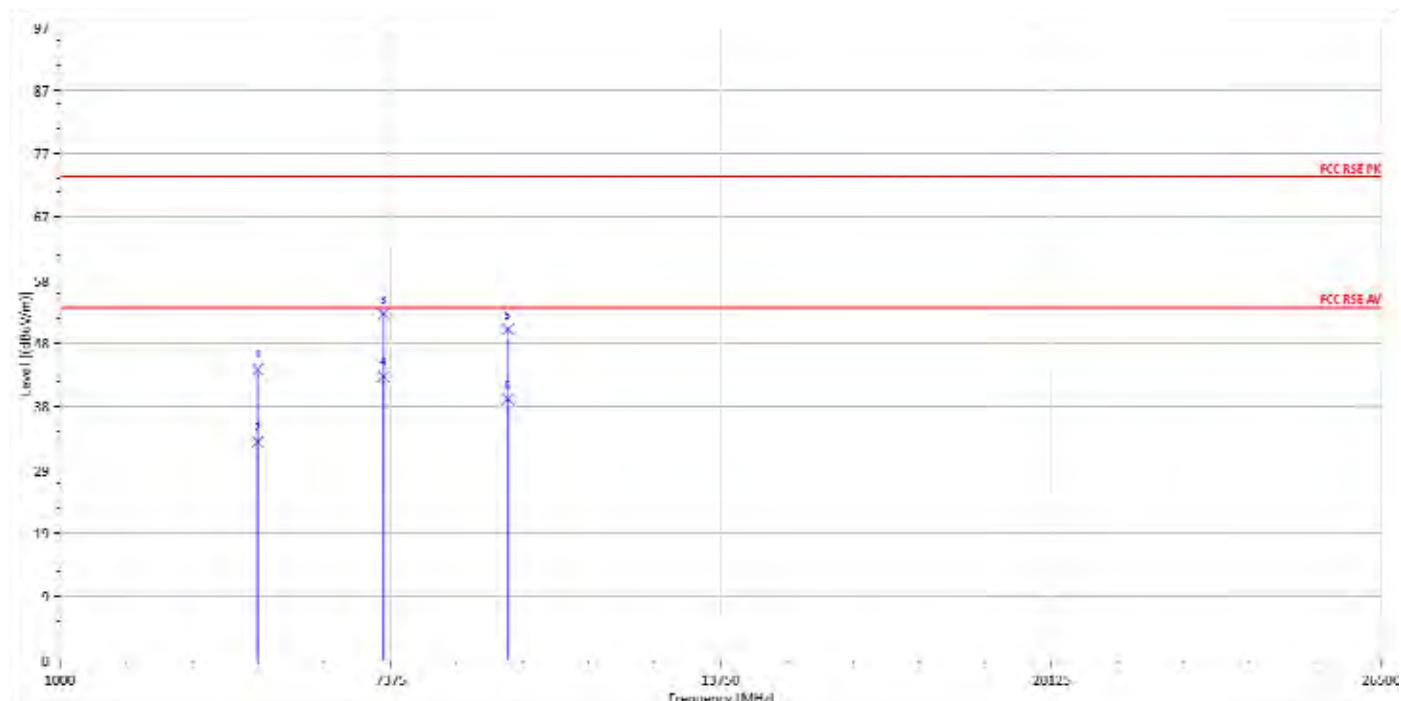
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## Radiated Spurious Emission Measurement Result (802.11 b)

## Above 1GHz Worst-Case Data:

Operation Mode : 802.11b Test Date : 2016/1/22  
 Fundamental Frequency : 2412 MHz Temp. / Humi. : 22.7deg\_C/57RH  
 Operation Band : Tx CH Low Test Engineer : Ashton  
 EUT Pol. : E2 Measurement Antenna Pol. : Vertical



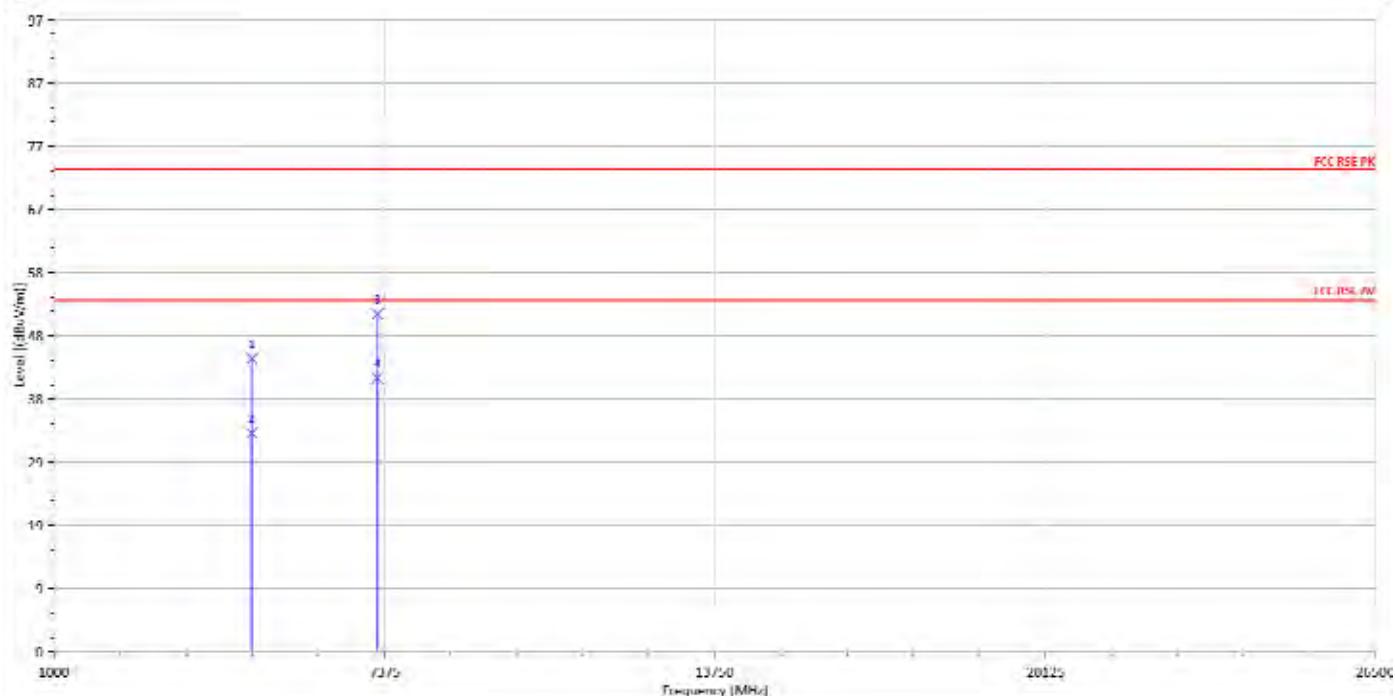
Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
4824.00	H	Peak	33.56	10.97	44.53	74	-29.47
4824.00	H	Average	22.38	10.97	33.35	54	-20.65
7236.00	H	Peak	37.80	15.27	53.07	74	-20.93
7236.00	H	Average	28.24	15.27	43.51	54	-10.49
9648.00	H	Peak	32.97	17.72	50.70	74	-23.30
9648.00	H	Average	22.26	17.72	39.98	54	-14.02

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Operation Mode : 802.11b      Test Date : 2016/1/22  
 Fundamental Frequency : 2412 MHz      Temp. / Humi. : 22.7deg\_C/57RH  
 Operation Band : Tx CH Low      Test Engineer : Ashton  
 EUT Pol. : E2      Measurement Antenna Pol. : Horizontal



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
4824.00	H	Peak	33.98	10.97	44.95	74	-29.05
4824.00	H	Average	22.57	10.97	33.54	54	-20.46
7236.00	H	Peak	36.60	15.27	51.87	74	-22.13
7236.00	H	Average	26.68	15.27	41.95	54	-12.05

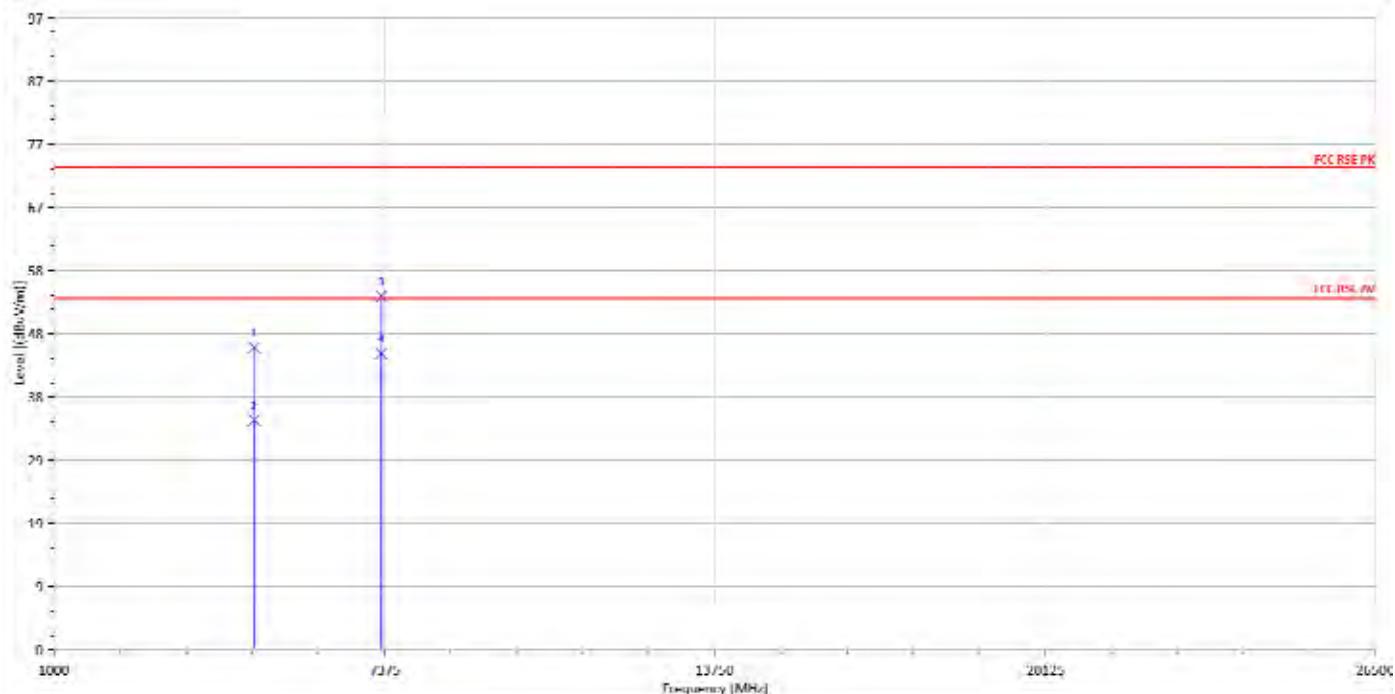
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Operation Mode : 802.11b      Test Date : 2016/1/22  
 Fundamental Frequency : 2437 MHz      Temp. / Humi. : 22.7deg\_C/57RH  
 Operation Band : Tx CH Mid      Test Engineer : Ashton  
 EUT Pol. : E2      Measurement Antenna Pol. : Vertical



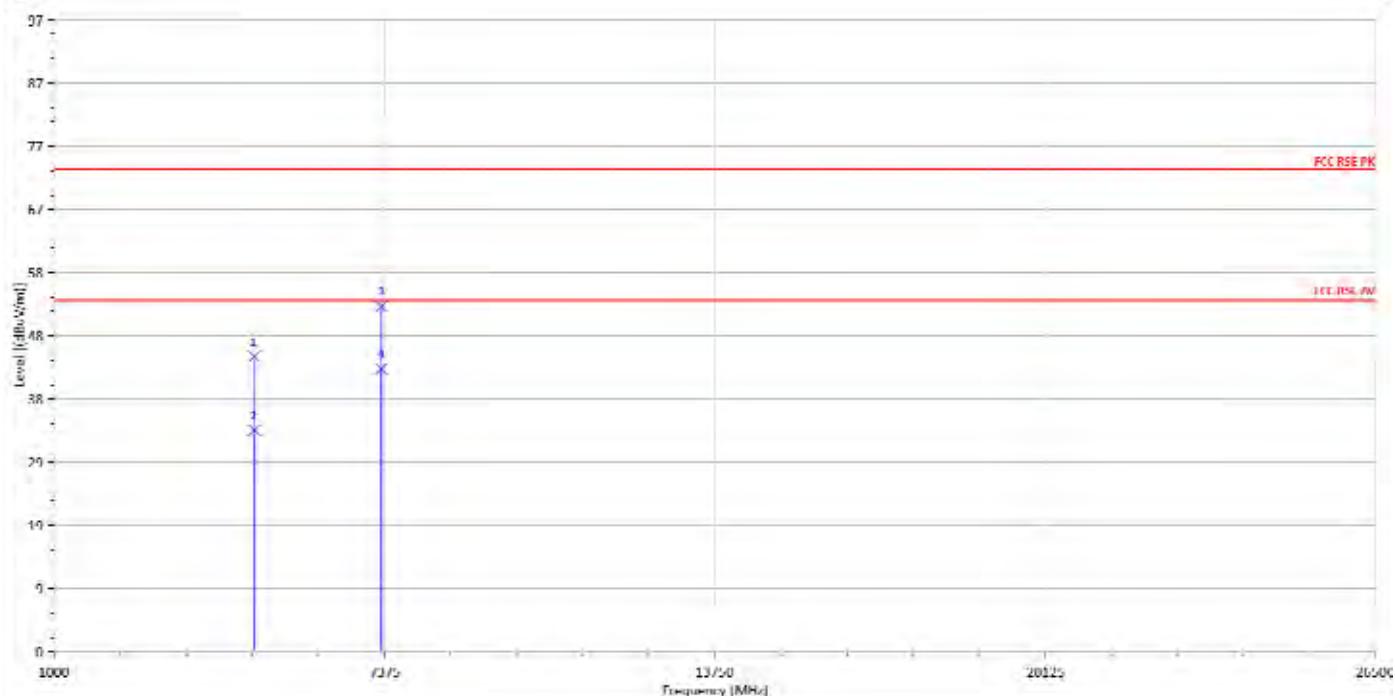
Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
4874.00	H	Peak	35.46	10.89	46.35	74	-27.65
4874.00	H	Average	24.37	10.89	35.26	54	-18.74
7311.00	H	Peak	38.95	15.29	54.24	74	-19.76
7311.00	H	Average	30.16	15.29	45.45	54	-8.55

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Operation Mode : 802.11b      Test Date : 2016/1/22  
 Fundamental Frequency : 2437 MHz      Temp. / Humi. : 22.7deg\_C/57RH  
 Operation Band : Tx CH Mid      Test Engineer : Ashton  
 EUT Pol. : E2      Measurement Antenna Pol. : Horizontal



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
4874.00	H	Peak	34.42	10.89	45.31	74	-28.69
4874.00	H	Average	23.09	10.89	33.98	54	-20.02
7311.00	H	Peak	37.78	15.29	53.07	74	-20.93
7311.00	H	Average	28.06	15.29	43.35	54	-10.65

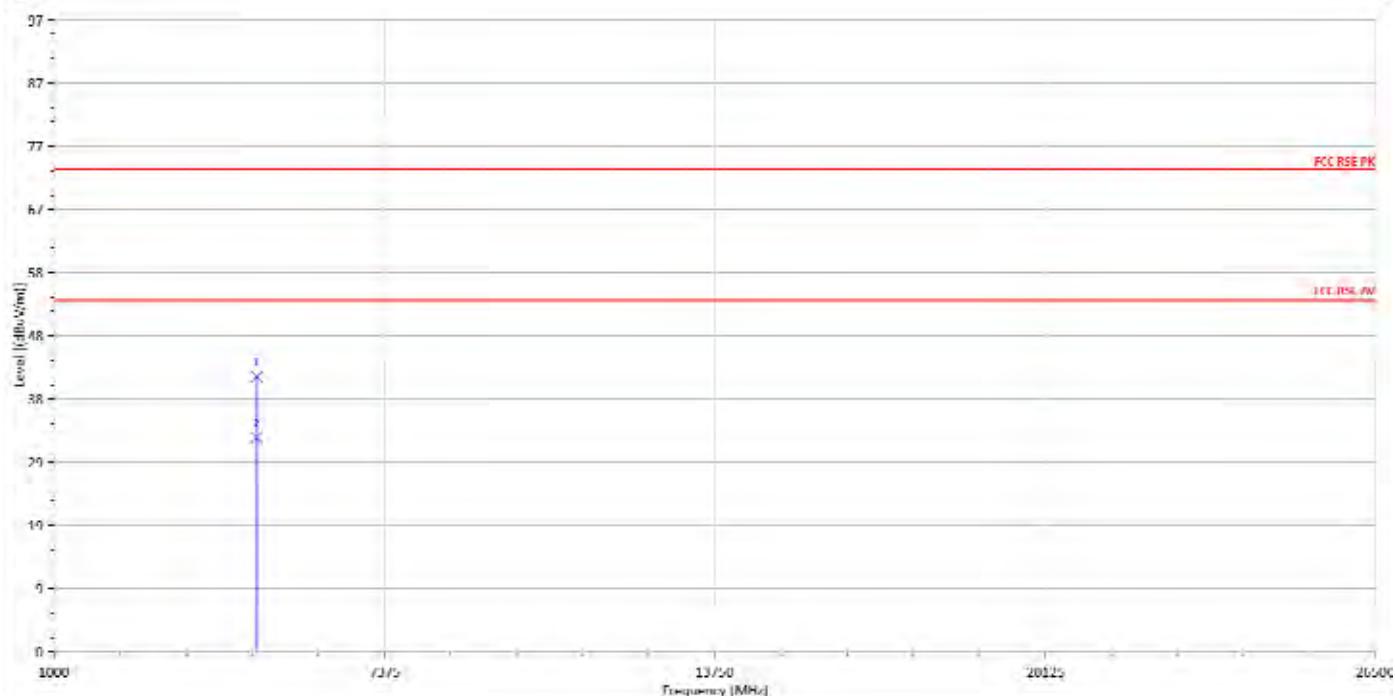
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Operation Mode : 802.11b      Test Date : 2016/1/22  
 Fundamental Frequency : 2462 MHz      Temp. / Humi. : 22.7deg\_C/57RH  
 Operation Band : Tx CH High      Test Engineer : Ashton  
 EUT Pol. : E2      Measurement Antenna Pol. : Vertical



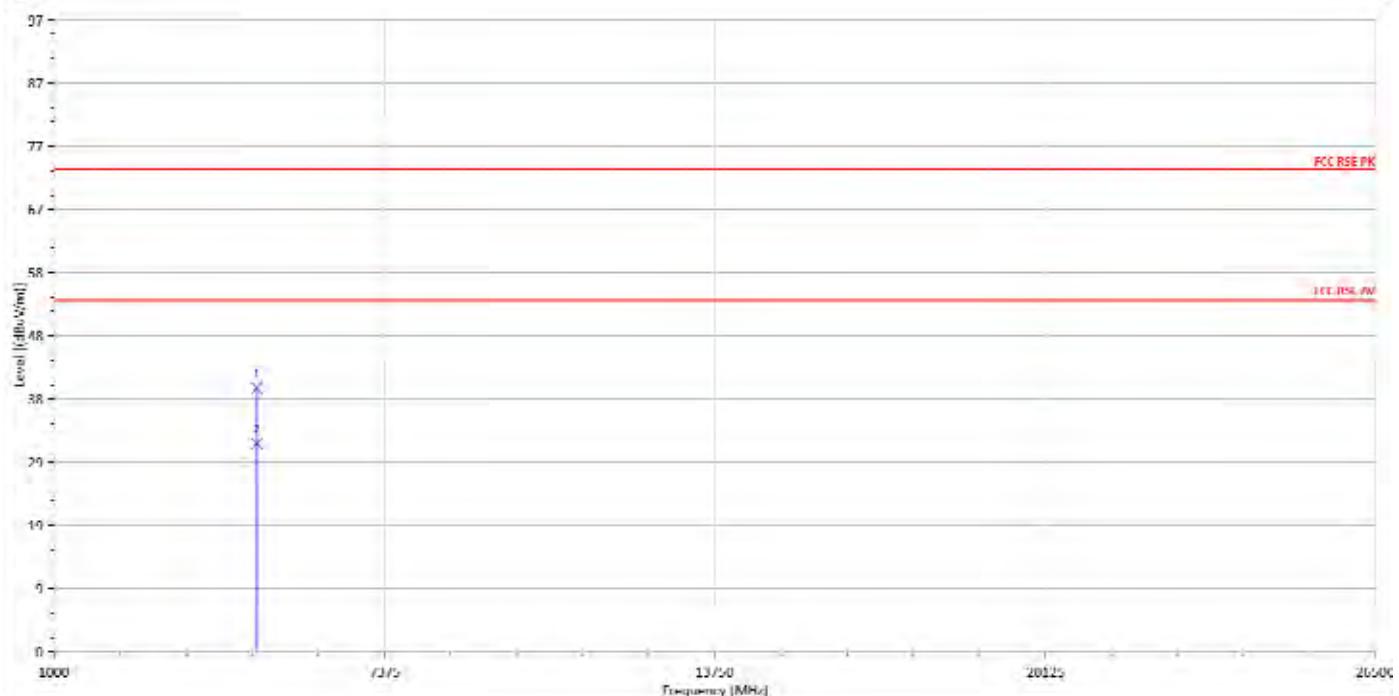
Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
4924.00	H	Peak	31.21	10.98	42.18	74	-31.82
4924.00	H	Average	21.90	10.98	32.88	54	-21.12

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Operation Mode : 802.11b Test Date : 2016/1/22  
 Fundamental Frequency : 2462 MHz Temp. / Humi. : 22.7deg\_C/57RH  
 Operation Band : Tx CH High Test Engineer : Ashton  
 EUT Pol. : E2 Measurement Antenna Pol. : Horizontal



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
4924.00	H	Peak	29.48	10.98	40.45	74	-33.55
4924.00	H	Average	20.95	10.98	31.93	54	-22.07

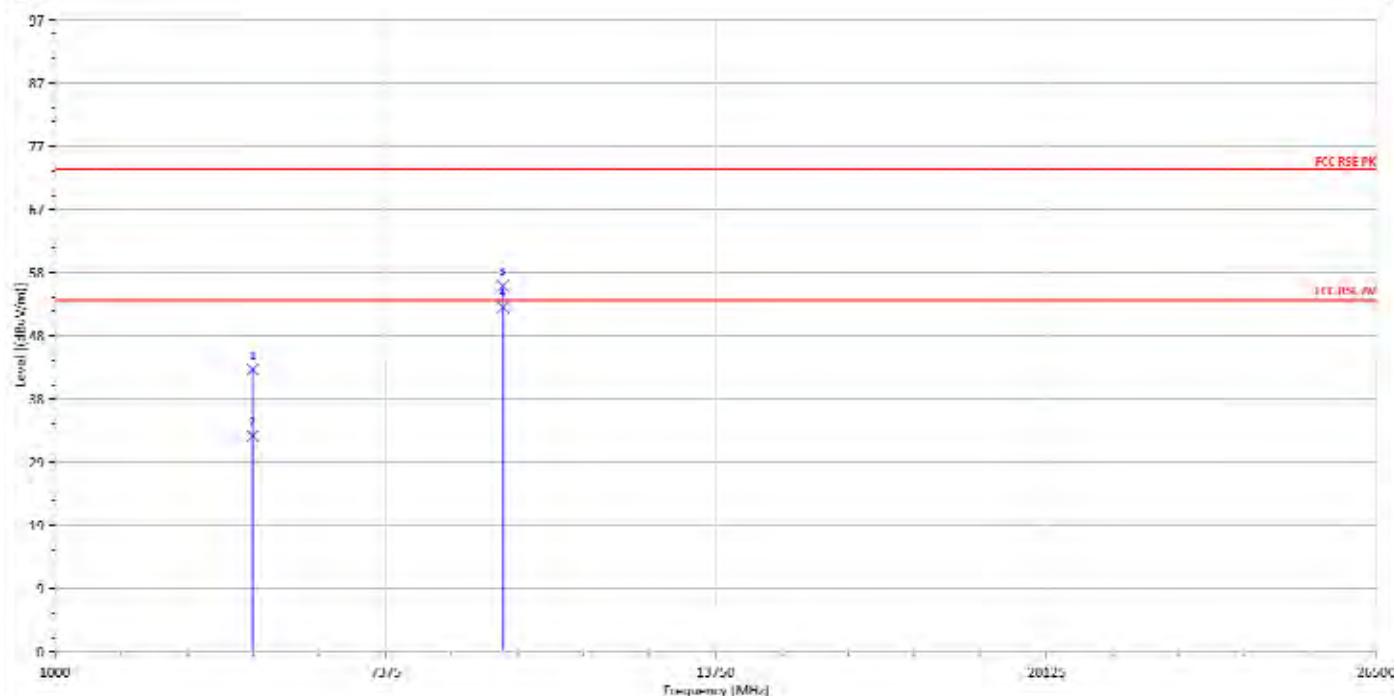
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## Radiated Spurious Emission Measurement Result (802.11 g)

Operation Mode : 802.11 g Test Date : 2016/1/25  
 Fundamental Frequency : 2412 MHz Temp. / Humi. : 22.7deg\_C/57RH  
 Operation Band : Tx CH Low Test Engineer : Ashton  
 EUT Pol. : E2 Measurement Antenna Pol. : Vertical



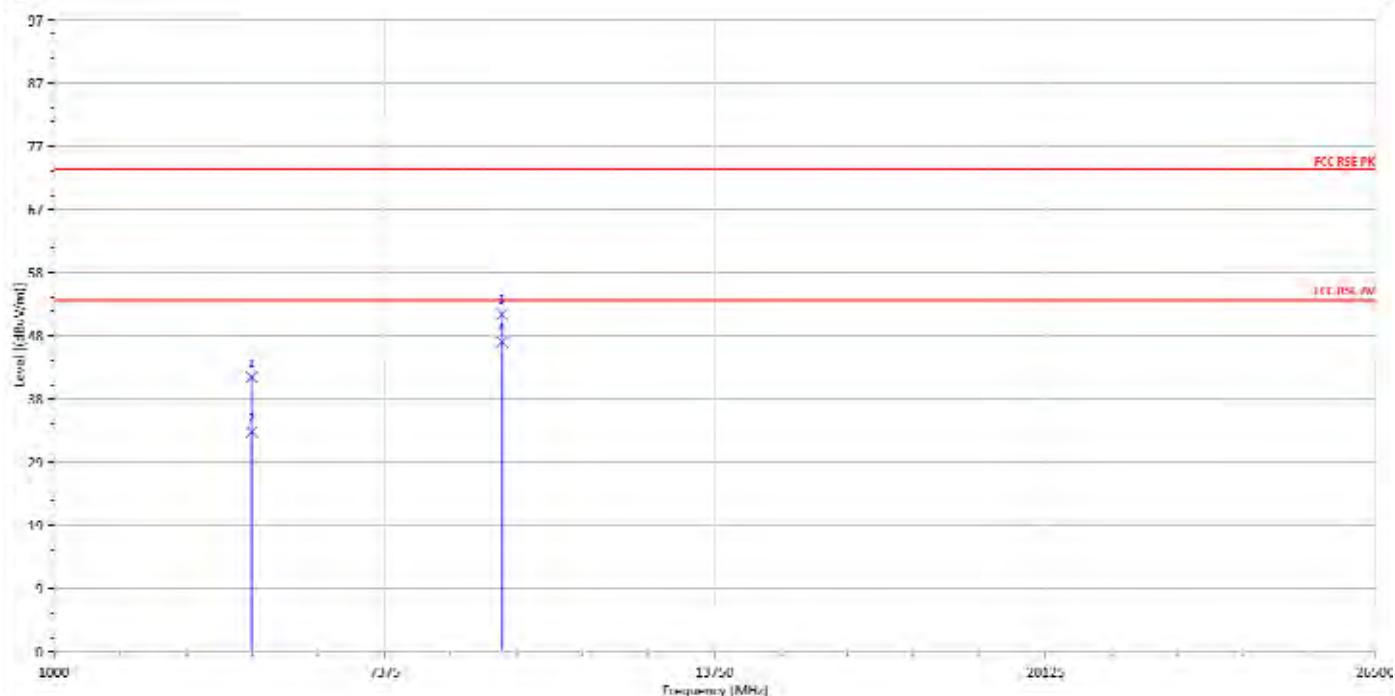
Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
4824.00	H	Peak	32.30	10.97	43.27	74	-30.73
4824.00	H	Average	22.13	10.97	33.10	54	-20.90
9648.00	H	Peak	38.38	17.72	56.10	74	-17.90
9648.00	H	Average	35.19	17.72	52.91	54	-1.09

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Operation Mode : 802.11g Test Date : 2016/1/22  
 Fundamental Frequency : 2412 MHz Temp. / Humi. : 22.7deg\_C/57RH  
 Operation Band : Tx CH Low Test Engineer : Ashton  
 EUT Pol. : E2 Measurement Antenna Pol. : Horizontal



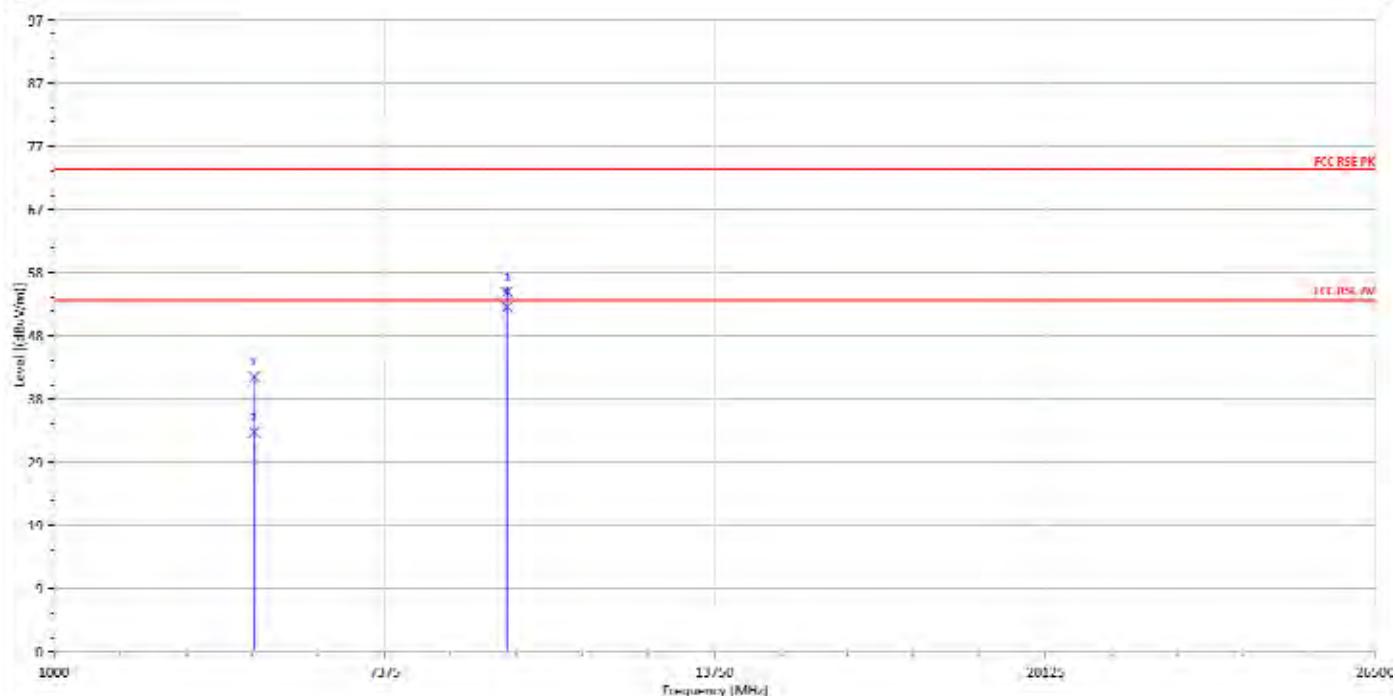
Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
4824.00	H	Peak	31.12	10.97	42.09	74	-31.91
4824.00	H	Average	22.76	10.97	33.73	54	-20.27
9648.00	H	Peak	34.09	17.72	51.81	74	-22.19
9648.00	H	Average	29.83	17.72	47.55	54	-6.45

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Operation Mode : 802.11g Test Date : 2016/1/25  
 Fundamental Frequency : 2437 MHz Temp. / Humi. : 22.7deg\_C/57RH  
 Operation Band : Tx CH Mid Test Engineer : Ashton  
 EUT Pol. : E2 Measurement Antenna Pol. : Vertical



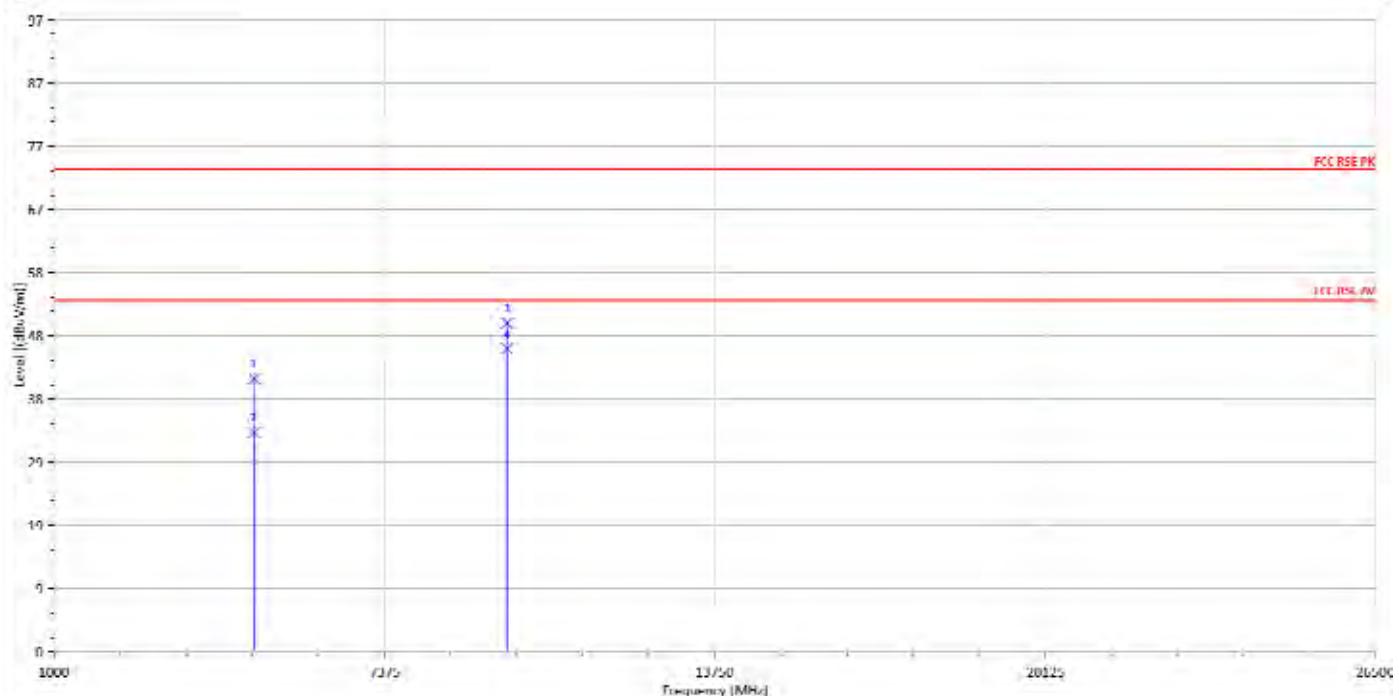
Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
4874.00	H	Peak	31.23	10.89	42.11	74	-31.89
4874.00	H	Average	22.81	10.89	33.70	54	-20.30
9748.00	H	Peak	37.26	17.89	55.14	74	-18.86
9748.00	H	Average	35.10	17.89	52.99	54	-1.01

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Operation Mode : 802.11g Test Date : 2016/1/22  
 Fundamental Frequency : 2437 MHz Temp. / Humi. : 22.7deg\_C/57RH  
 Operation Band : Tx CH Mid Test Engineer : Ashton  
 EUT Pol. : E2 Measurement Antenna Pol. : Horizontal



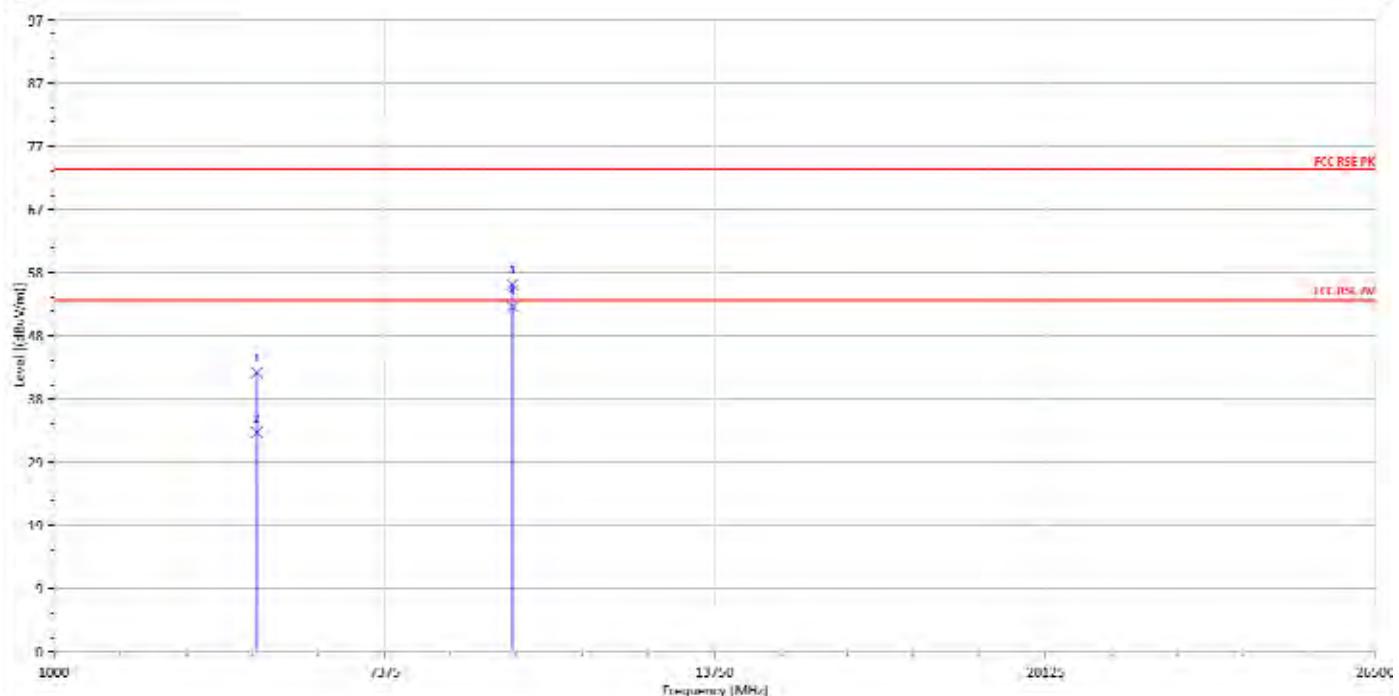
Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
4874.00	H	Peak	31.01	10.89	41.89	74	-32.11
4874.00	H	Average	22.76	10.89	33.65	54	-20.35
9748.00	H	Peak	32.57	17.89	50.46	74	-23.54
9748.00	H	Average	28.64	17.89	46.53	54	-7.47

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Operation Mode : 802.11g Test Date : 2016/1/22  
 Fundamental Frequency : 2462 MHz Temp. / Humi. : 22.7deg\_C/57RH  
 Operation Band : Tx CH High Test Engineer : Ashton  
 EUT Pol. : E2 Measurement Antenna Pol. : Vertical



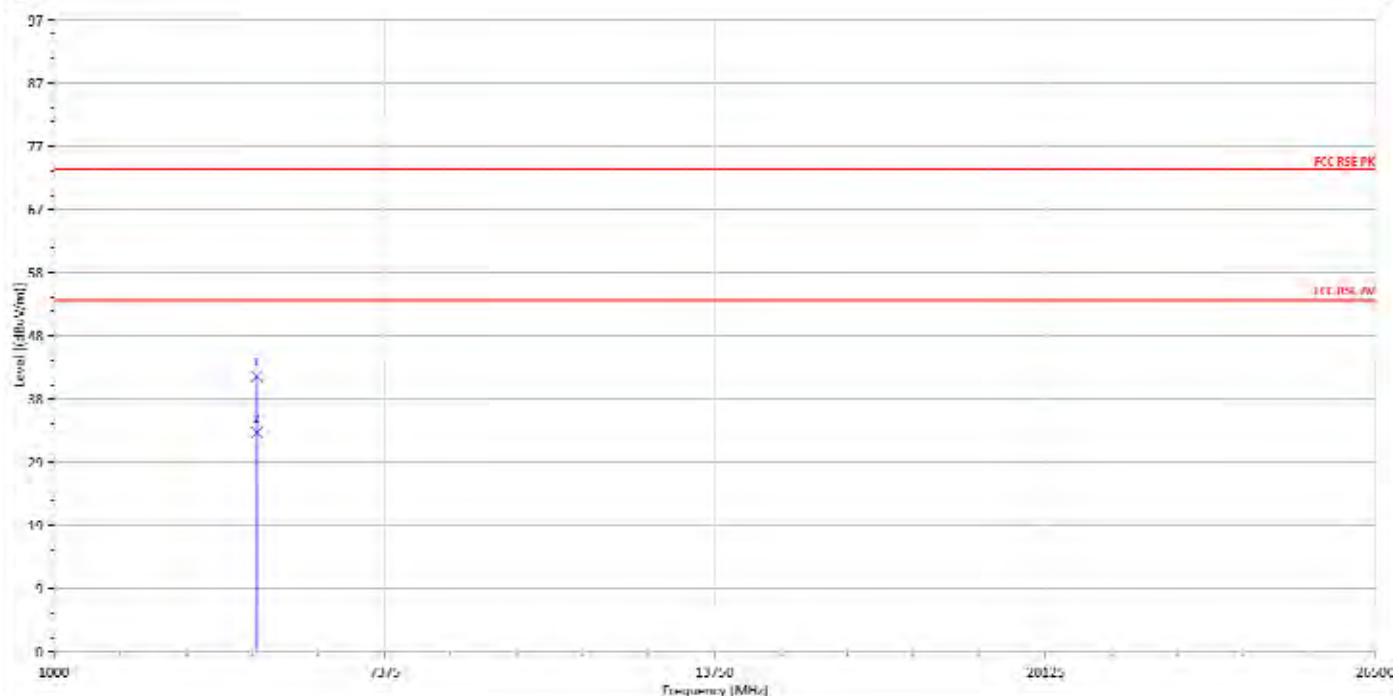
Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
4924.00	H	Peak	31.82	10.98	42.79	74	-31.21
4924.00	H	Average	22.66	10.98	33.64	54	-20.36
9848.00	H	Peak	38.19	18.11	56.29	74	-17.71
9848.00	H	Average	34.89	18.11	53.00	54	-1.00

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Operation Mode : 802.11g Test Date : 2016/1/22  
 Fundamental Frequency : 2462 MHz Temp. / Humi. : 22.7deg\_C/57RH  
 Operation Band : Tx CH High Test Engineer : Ashton  
 EUT Pol. : E2 Measurement Antenna Pol. : Horizontal



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
4924.00	H	Peak	31.23	10.98	42.21	74	-31.79
4924.00	H	Average	22.63	10.98	33.61	54	-20.39

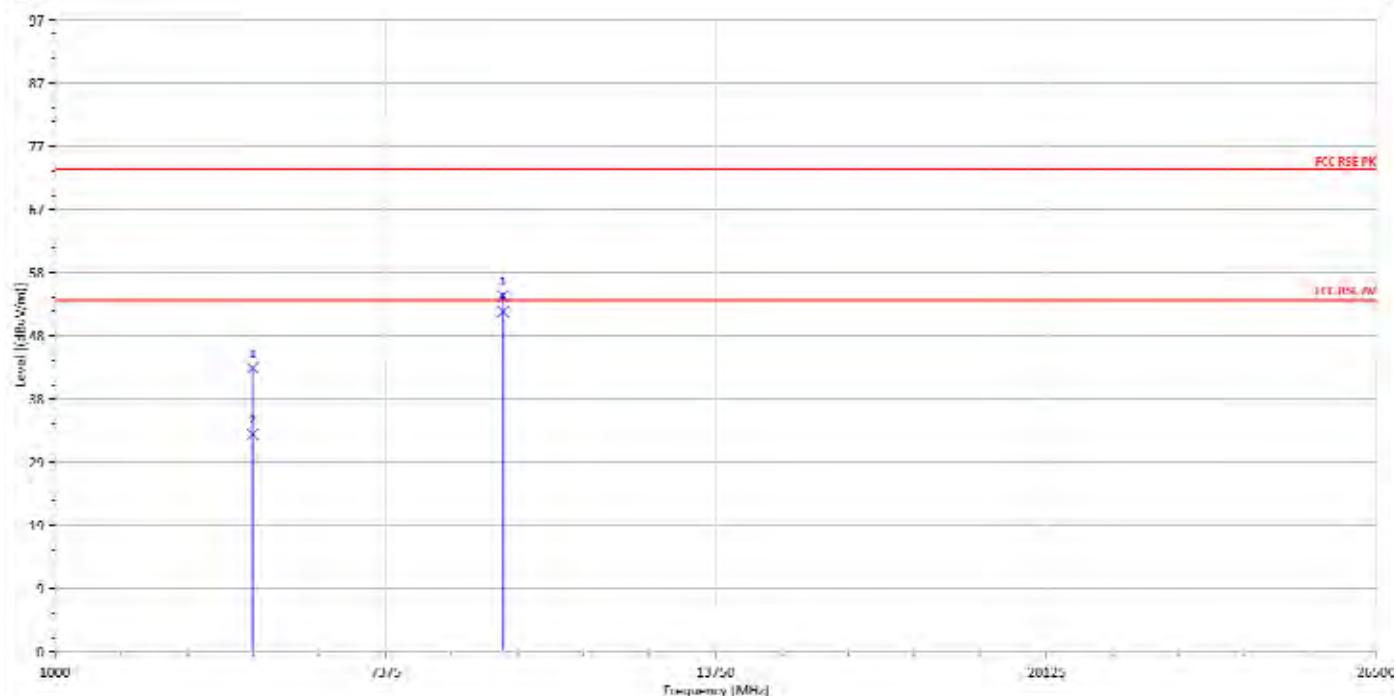
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## Radiated Spurious Emission Measurement Result (802.11\_HT20)

Operation Mode : 802.11 n20 Test Date : 2016/1/22  
 Fundamental Frequency : 2412 MHz Temp. / Humi. : 22.7deg\_C/57RH  
 Operation Band : Tx CH Low Test Engineer : Ashton  
 EUT Pol. : E2 Measurement Antenna Pol. : Vertical



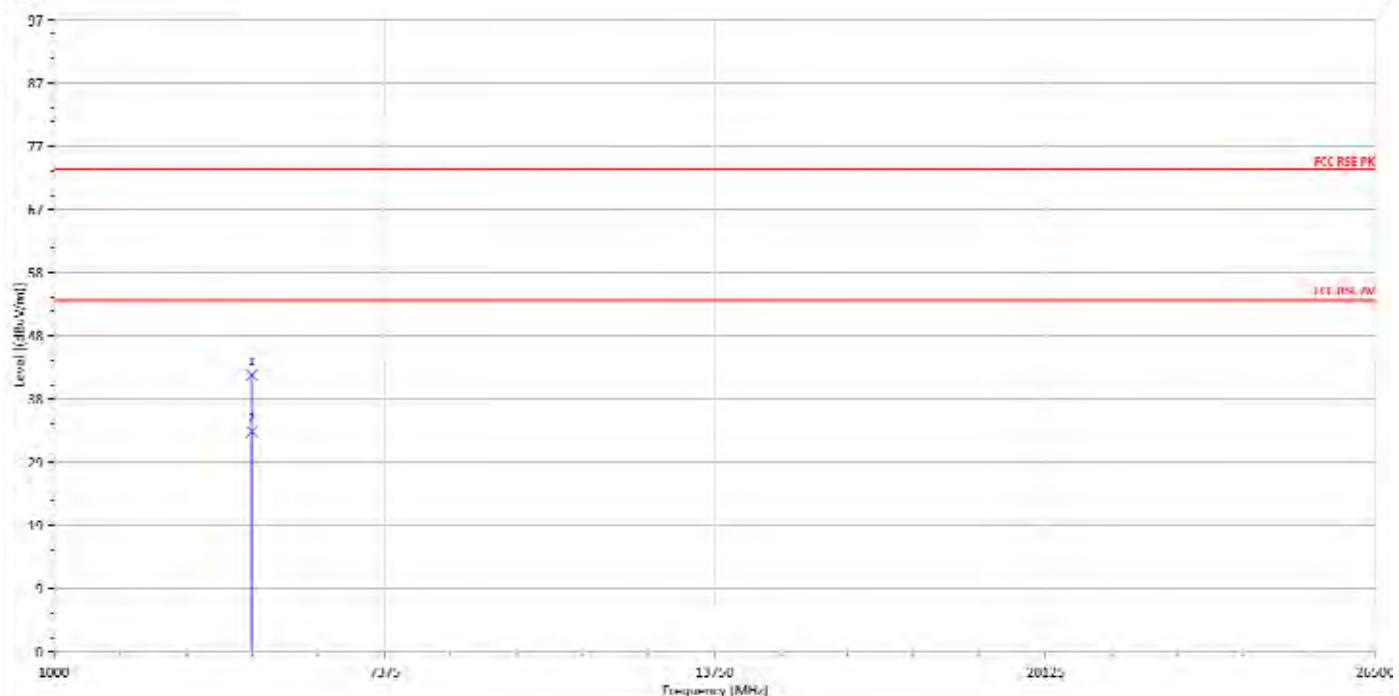
Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
4824.00	H	Peak	32.53	10.97	43.50	74	-30.50
4824.00	H	Average	22.41	10.97	33.38	54	-20.62
9648.00	H	Peak	36.85	17.72	54.57	74	-19.43
9648.00	H	Average	34.52	17.72	52.24	54	-1.76

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Operation Mode : 802.11 n20      Test Date : 2016/1/22  
 Fundamental Frequency : 2412 MHz      Temp. / Humi. : 22.7deg\_C/57RH  
 Operation Band : Tx CH Low      Test Engineer : Ashton  
 EUT Pol. : E2      Measurement Antenna Pol. : Horizontal



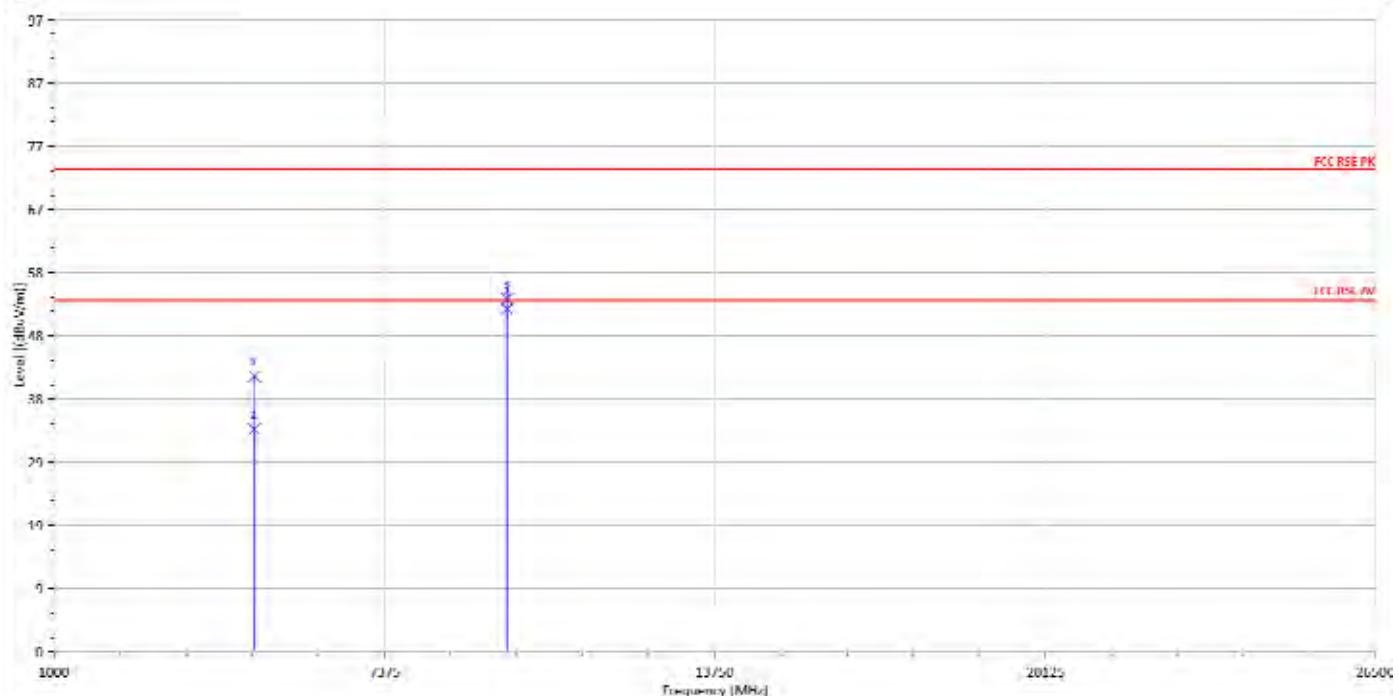
Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
4824.00	H	Peak	31.41	10.97	42.38	74	-31.62
4824.00	H	Average	22.80	10.97	33.77	54	-20.23

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Operation Mode : 802.11 n20      Test Date : 2016/1/22  
 Fundamental Frequency : 2437 MHz      Temp. / Humi. : 22.7deg\_C/57RH  
 Operation Band : Tx CH Mid      Test Engineer : Ashton  
 EUT Pol. : E2      Measurement Antenna Pol. : Vertical



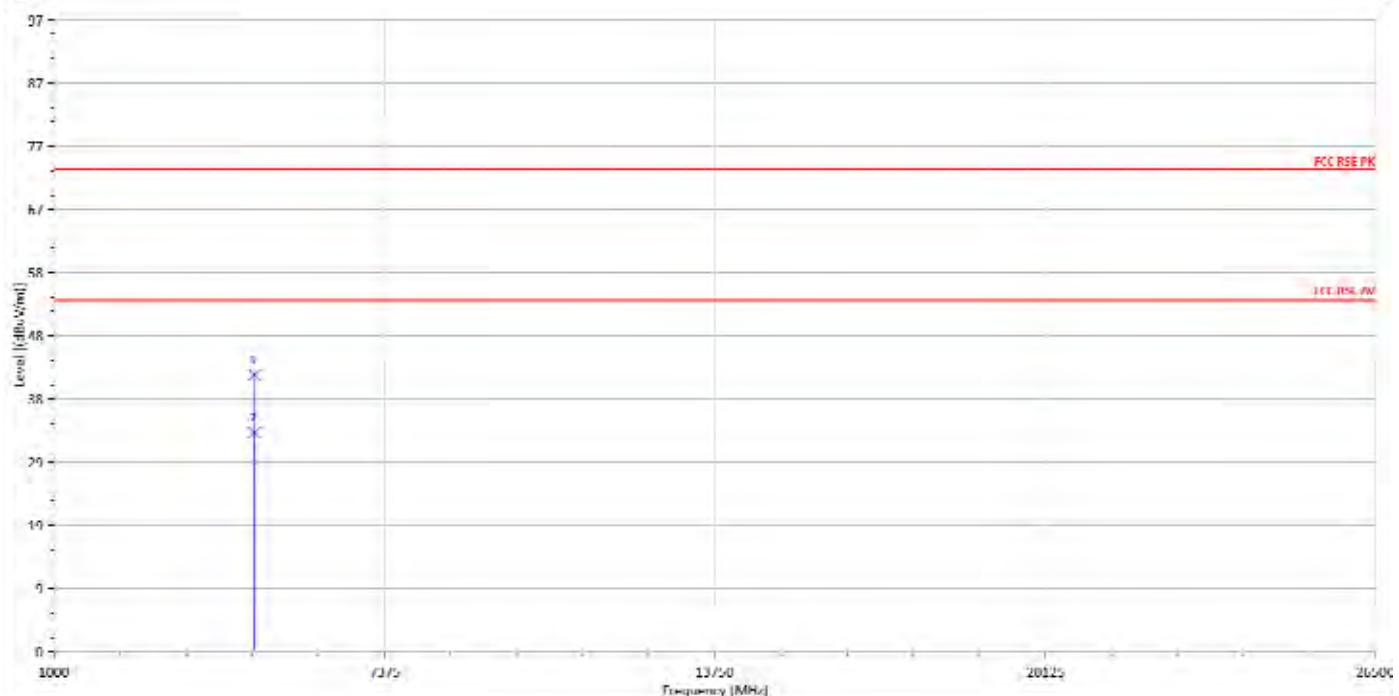
Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
4874.00	H	Peak	31.29	10.89	42.18	74	-31.82
4874.00	H	Average	23.28	10.89	34.17	54	-19.83
9748.00	H	Peak	36.25	17.89	54.13	74	-19.87
9748.00	H	Average	34.80	17.89	52.69	54	-1.31

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Operation Mode : 802.11 n20      Test Date : 2016/1/22  
 Fundamental Frequency : 2437 MHz      Temp. / Humi. : 22.7deg\_C/57RH  
 Operation Band : Tx CH Mid      Test Engineer : Ashton  
 EUT Pol. : E2      Measurement Antenna Pol. : Vertical



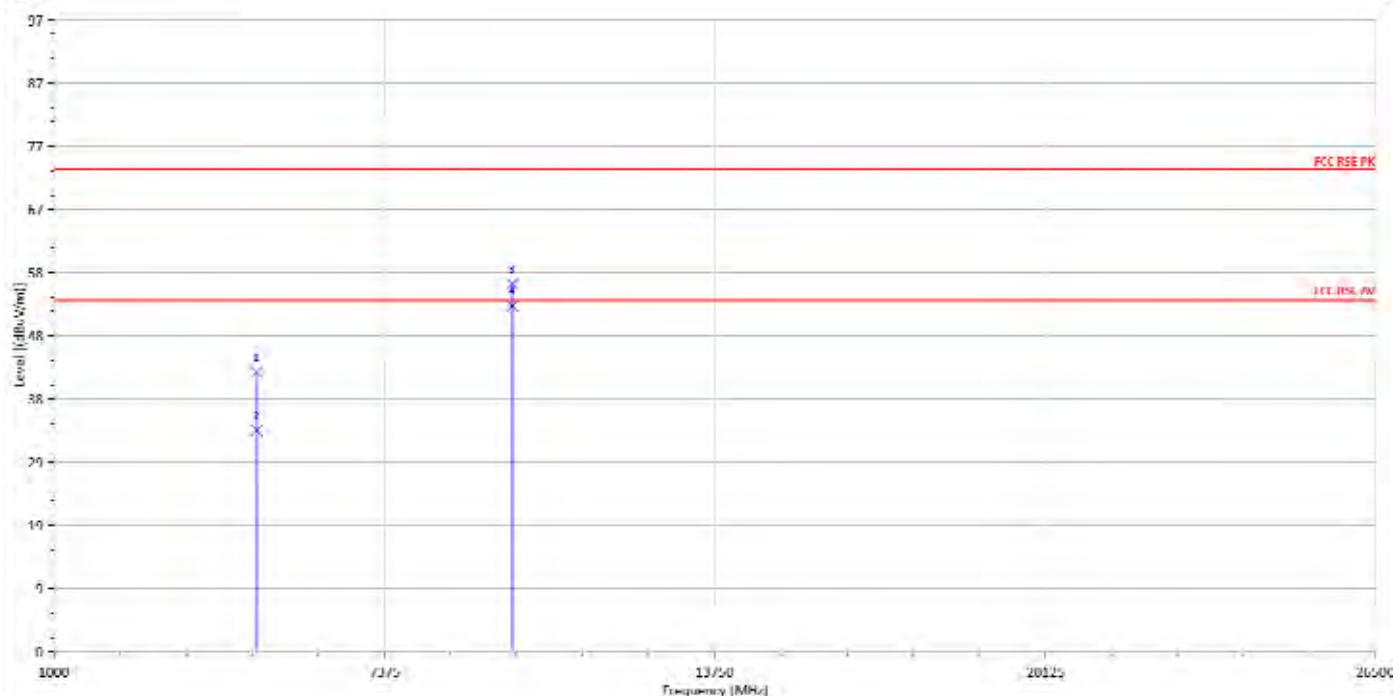
Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
4874.00	H	Peak	31.29	10.89	42.18	74	-31.82
4874.00	H	Average	23.28	10.89	34.17	54	-19.83
9748.00	H	Peak	36.25	17.89	54.13	74	-19.87
9748.00	H	Average	34.80	17.89	52.69	54	-1.31

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Operation Mode : 802.11 n20      Test Date : 2016/1/22  
 Fundamental Frequency : 2462 MHz      Temp. / Humi. : 22.7deg\_C/57RH  
 Operation Band : Tx CH High      Test Engineer : Ashton  
 EUT Pol. : E2      Measurement Antenna Pol. : Vertical



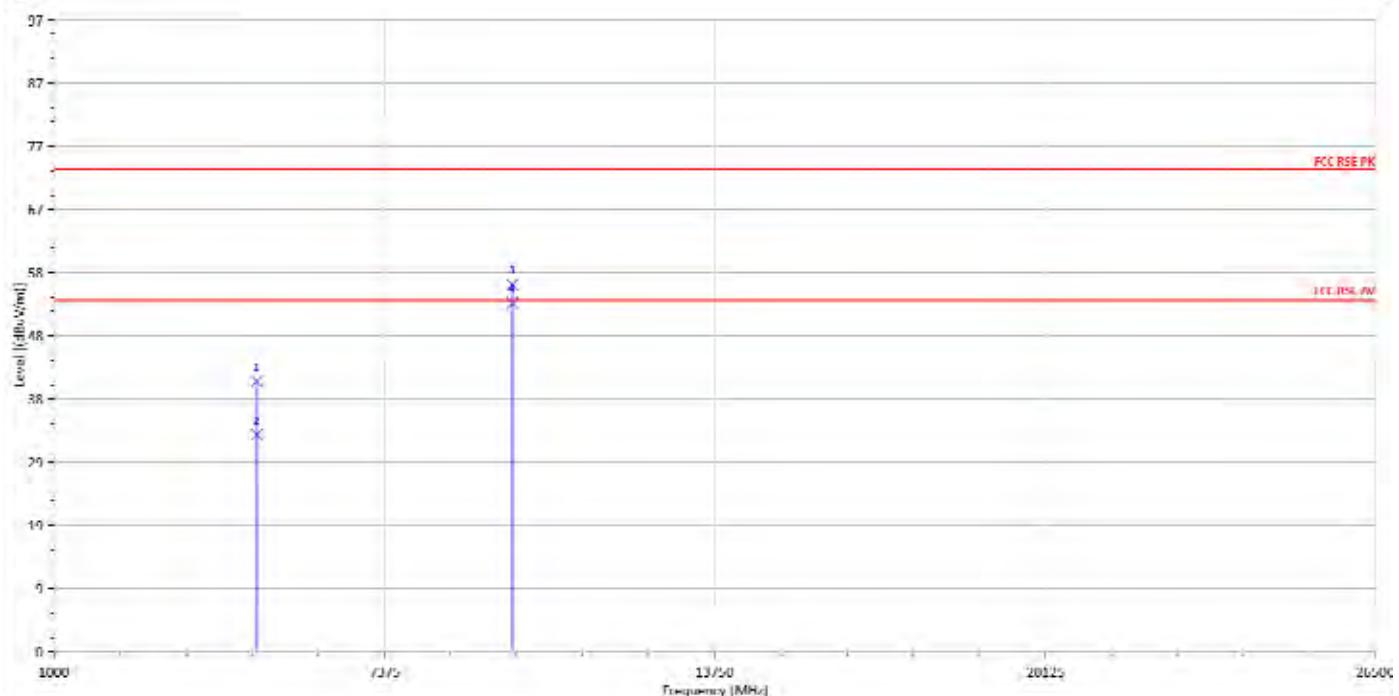
Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
4924.00	H	Peak	31.89	10.98	42.86	74	-31.14
4924.00	H	Average	23.03	10.98	34.01	54	-19.99
9848.00	H	Peak	38.30	18.11	56.41	74	-17.59
9848.00	H	Average	35.03	18.11	53.14	54	-0.86

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Operation Mode : 802.11 n20      Test Date : 2016/1/22  
 Fundamental Frequency : 2462 MHz      Temp. / Humi. : 22.7deg\_C/57RH  
 Operation Band : Tx CH High      Test Engineer : Ashton  
 EUT Pol. : E2      Measurement Antenna Pol. : Horizontal



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
4924.00	H	Peak	30.44	10.98	41.42	74	-32.58
4924.00	H	Average	22.35	10.98	33.33	54	-20.67
9848.00	H	Peak	38.20	18.11	56.30	74	-17.70
9848.00	H	Average	35.44	18.11	53.55	54	-0.45

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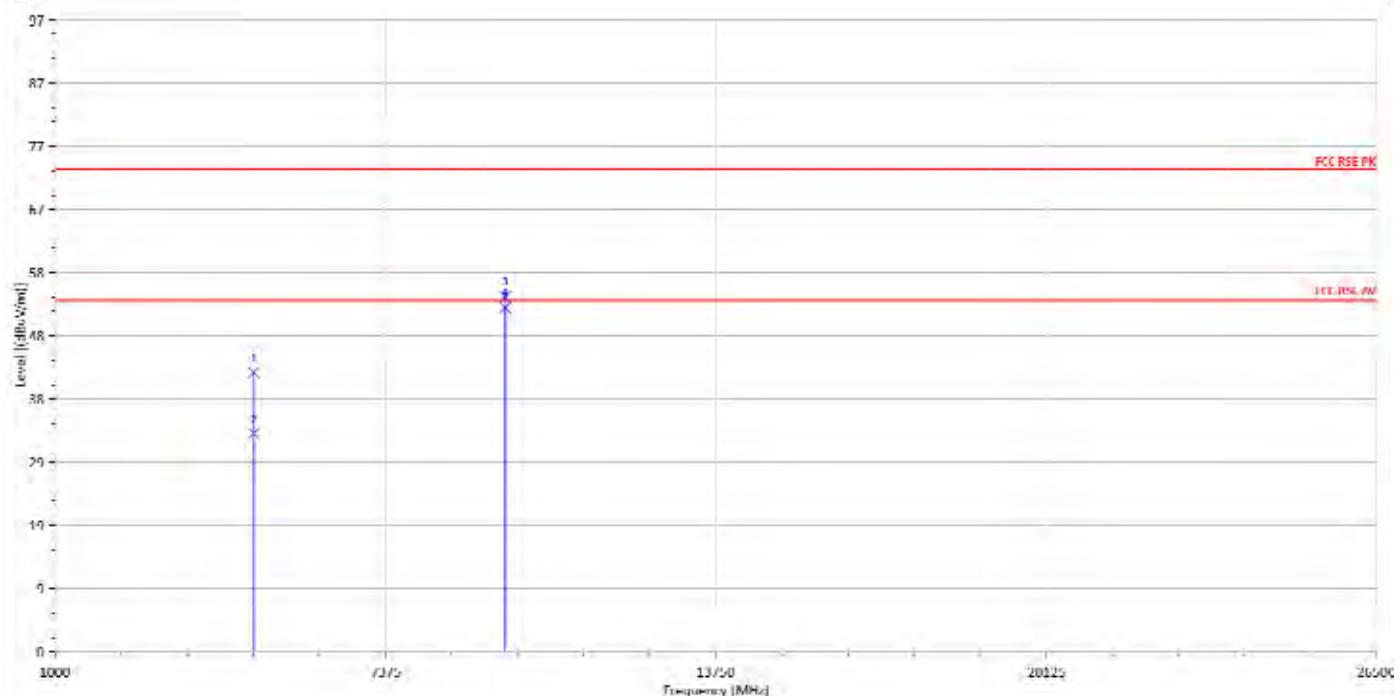
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## Radiated Spurious Emission Measurement Result (802.11\_HT40)

Operation Mode : 802.11 n40 Test Date : 2016/1/25  
 Fundamental Frequency : 2422 MHz Temp. / Humi. : 22.7deg\_C/57RH  
 Operation Band : Tx CH Low Test Engineer : Ashton  
 EUT Pol. : E2 Measurement Antenna Pol. : Vertical



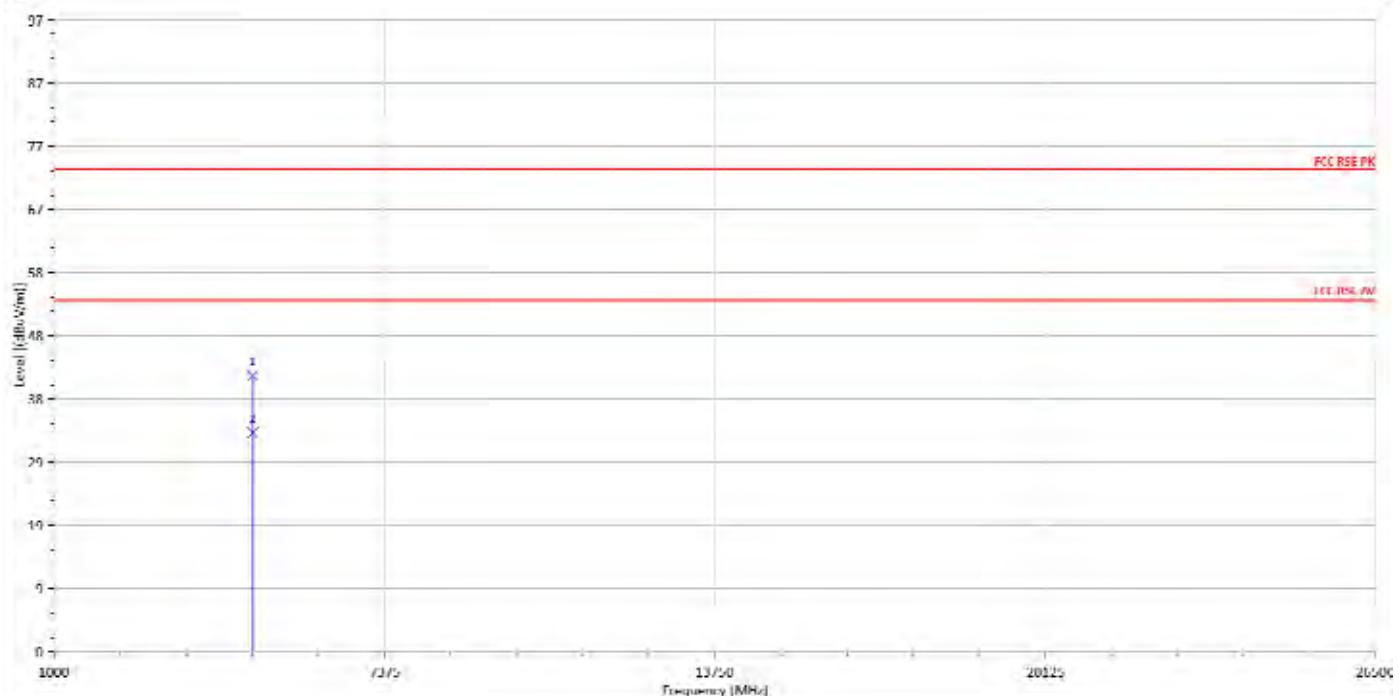
Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
4844.00	H	Peak	31.87	10.93	42.80	74	-31.20
4844.00	H	Average	22.56	10.93	33.49	54	-20.51
9688.00	H	Peak	36.62	17.88	54.50	74	-19.50
9688.00	H	Average	34.97	17.88	52.85	54	-1.15

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Operation Mode : 802.11 n40      Test Date : 2016/1/22  
 Fundamental Frequency : 2422 MHz      Temp. / Humi. : 22.7deg\_C/57RH  
 Operation Band : Tx CH Low      Test Engineer : Ashton  
 EUT Pol. : E2      Measurement Antenna Pol. : Horizontal



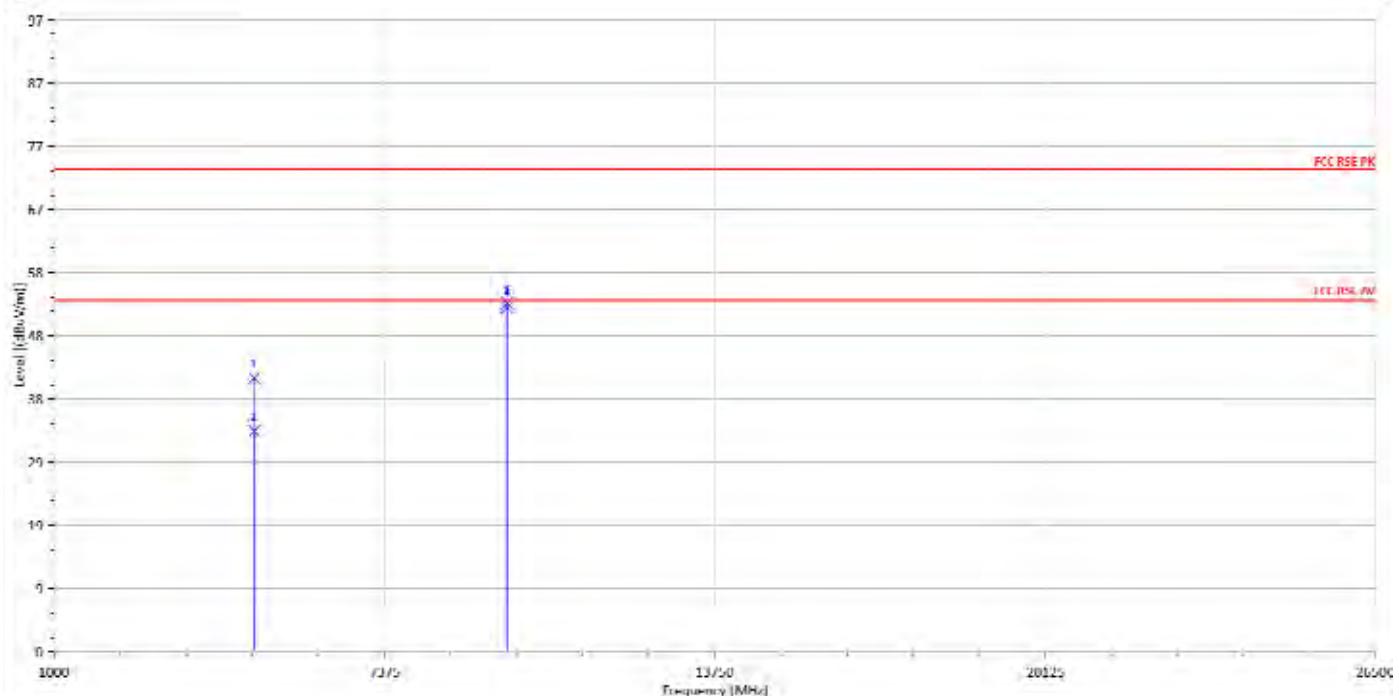
Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
4844.00	H	Peak	31.36	10.93	42.29	74	-31.71
4844.00	H	Average	22.67	10.93	33.60	54	-20.40

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Operation Mode : 802.11 n40      Test Date : 2016/1/22  
 Fundamental Frequency : 2437 MHz      Temp. / Humi. : 22.7deg\_C/57RH  
 Operation Band : Tx CH Mid      Test Engineer : Ashton  
 EUT Pol. : E2      Measurement Antenna Pol. : Vertical



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dB $\mu$ V	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
4874.00	H	Peak	31.05	10.89	41.94	74	-32.06
4874.00	H	Average	22.97	10.89	33.86	54	-20.14
9748.00	H	Peak	35.64	17.89	53.52	74	-20.48
9748.00	H	Average	34.98	17.89	52.87	54	-1.13

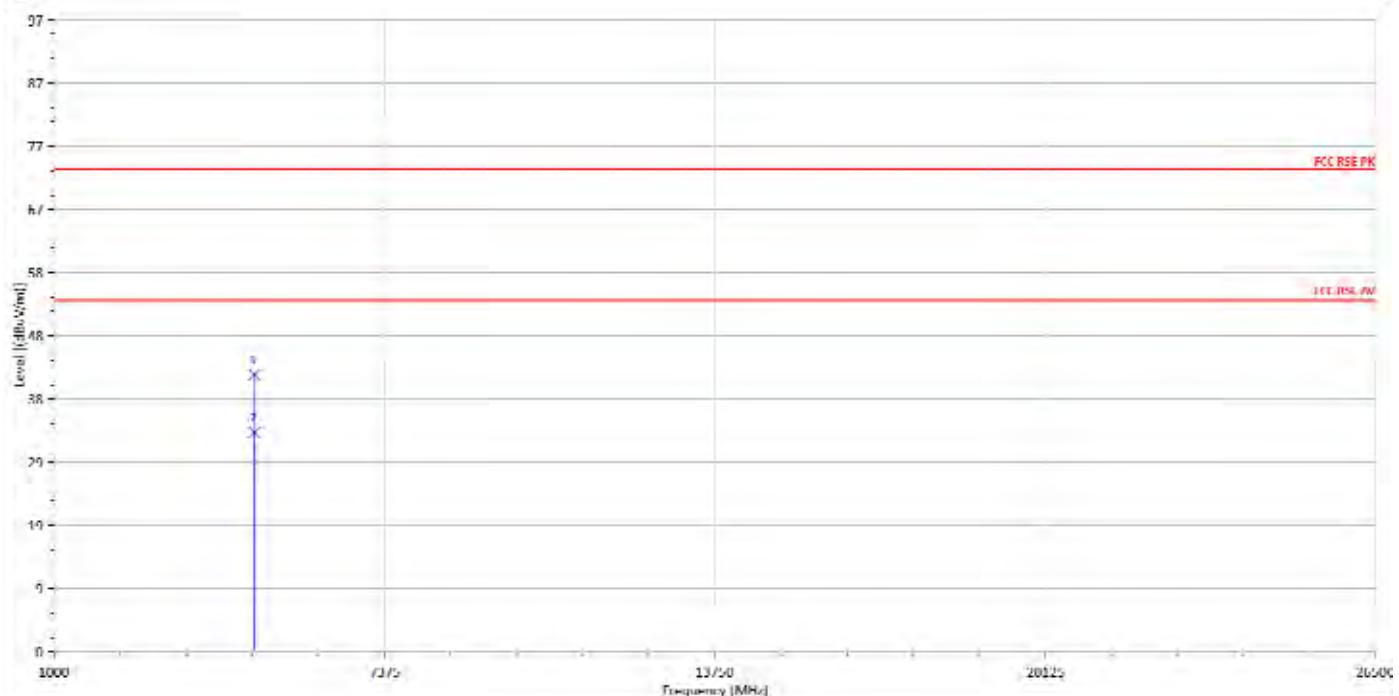
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Operation Mode : 802.11 n40      Test Date : 2016/1/22  
 Fundamental Frequency : 2437 MHz      Temp. / Humi. : 22.7deg\_C/57RH  
 Operation Band : Tx CH Mid      Test Engineer : Ashton  
 EUT Pol. : E2      Measurement Antenna Pol. : Vertical



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
4874.00	H	Peak	31.05	10.89	41.94	74	-32.06
4874.00	H	Average	22.97	10.89	33.86	54	-20.14
9748.00	H	Peak	35.64	17.89	53.52	74	-20.48
9748.00	H	Average	34.98	17.89	52.87	54	-1.13

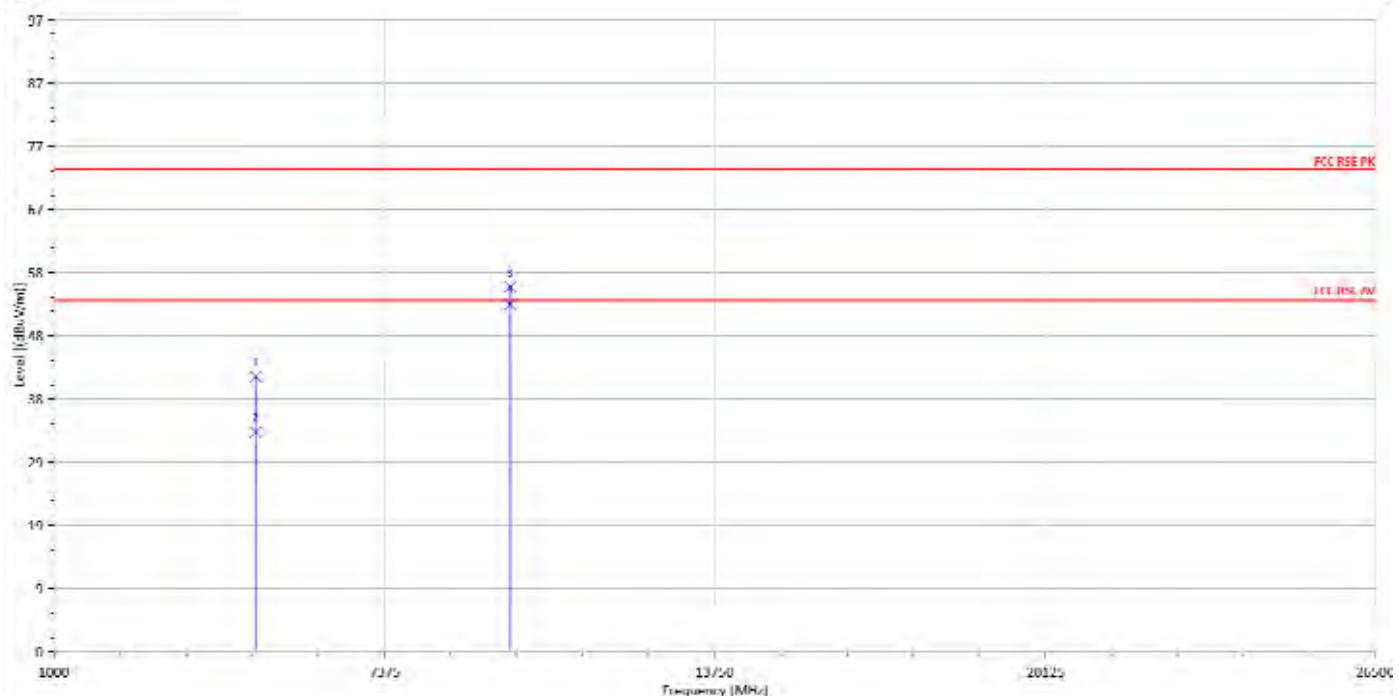
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Operation Mode : 802.11 n40      Test Date : 2016/1/22  
 Fundamental Frequency : 2452 MHz      Temp. / Humi. : 22.7deg\_C/57RH  
 Operation Band : Tx CH High      Test Engineer : Ashton  
 EUT Pol. : E2      Measurement Antenna Pol. : Vertical



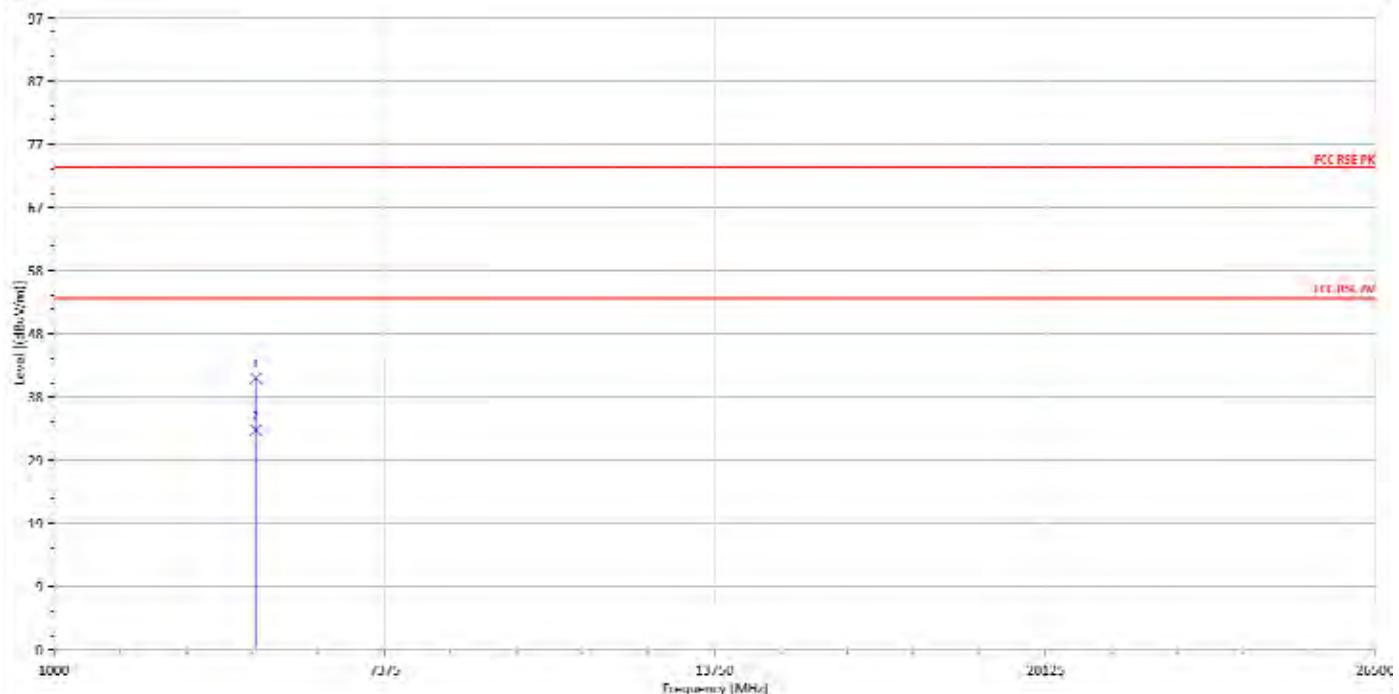
Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
4904.00	H	Peak	31.19	10.98	42.16	74	-31.84
4904.00	H	Average	22.69	10.98	33.67	54	-20.33
9808.00	H	Peak	37.90	18.02	55.92	74	-18.08
9808.00	H	Average	35.32	18.02	53.34	54	-0.66

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Operation Mode : 802.11 n40      Test Date : 2016/1/22  
 Fundamental Frequency : 2452 MHz      Temp. / Humi. : 22.7deg\_C/57RH  
 Operation Band : Tx CH High      Test Engineer : Ashton  
 EUT Pol. : E2      Measurement Antenna Pol. : Horizontal



Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
4904.00	H	Peak	30.63	10.98	41.60	74	-32.40
4904.00	H	Average	22.70	10.98	33.68	54	-20.32

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## 12 PEAK POWER SPECTRAL DENSITY

### 12.1 Standard Applicable

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.

#### Note:

Antenna Gain: 5.44 dBi

Number Antenna: 3 pcs

Limit: 8 dBm

*The antenna gain is grater than 6dBi in MIMO mode the limit reduce as below*

*Directional gain = gain of antenna element + 10 log (# of TX antenna elements)*

*Effective Legacy Gain (dBi) = 5.44+4.77=10.21dBi*

*Limit: 8dBm - (10.21- 6dBi)=3.79dBm*

### 12.2 Measurement Equipment Used

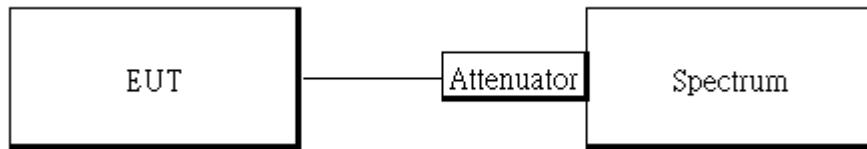
Conducted Emission Test Site					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	KEYSIGHT	N9010A	MY54510568	04/14/2015	04/13/2016
DC Block	PASTERNACK	PE8210	RF29	12/19/2015	12/18/2016
Attenuator	WOKEN	218FS-10	RF23	12/19/2015	12/18/2016

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## 12.3 Test Set-up



## 12.4 Measurement Procedure

1. Set analyzer center frequency to DTS channel center frequency.
2. The testing follows the Measurement Procedure of FCC KDB 558074 D01 DTS Meas. Guidance.
3. Set the span to 1.5 times the DTS channel bandwidth.
4. Set the RBW = 3 kHz.
5. Set the VBW = 10 kHz.
6. Detector = peak.
7. Sweep time = auto couple.
8. Trace mode = max hold.
9. Allow trace to fully stabilize.
10. Use the peak marker function to determine the maximum amplitude level.
11. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

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## 12.5 Measurement Result

POWER DENSITY 802.11b MODE			
Frequency (MHz)	RF Power Density (dBm)	Maximum Limit (dBm)	Result
2412	-1.51	8.00	PASS
2437	-0.99	8.00	PASS
2462	-3.59	8.00	PASS

POWER DENSITY 802.11g MODE			
Frequency (MHz)	RF Power Density (dBm)	Maximum Limit (dBm)	Result
2412	-10.50	8.00	PASS
2437	-10.04	8.00	PASS
2462	-10.74	8.00	PASS

POWER DENSITY 802.11n HT20 MODE			
Frequency (MHz)	RF Power Density (dBm)	Maximum Limit (dBm)	Result
2412	-7.55	3.79	PASS
2437	-7.66	3.79	PASS
2462	-8.48	3.79	PASS

POWER DENSITY 802.11n HT40 MODE			
Frequency (MHz)	RF Power Density (dBm)	Maximum Limit (dBm)	Result
2422	-12.67	3.79	PASS
2437	-12.22	3.79	PASS
2452	-12.27	3.79	PASS

\*Refer to next page for plots

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## 802.11b

## Power Spectral Density Test Plot (CH-Low)



## Power Spectral Density Test Plot (CH-Mid)



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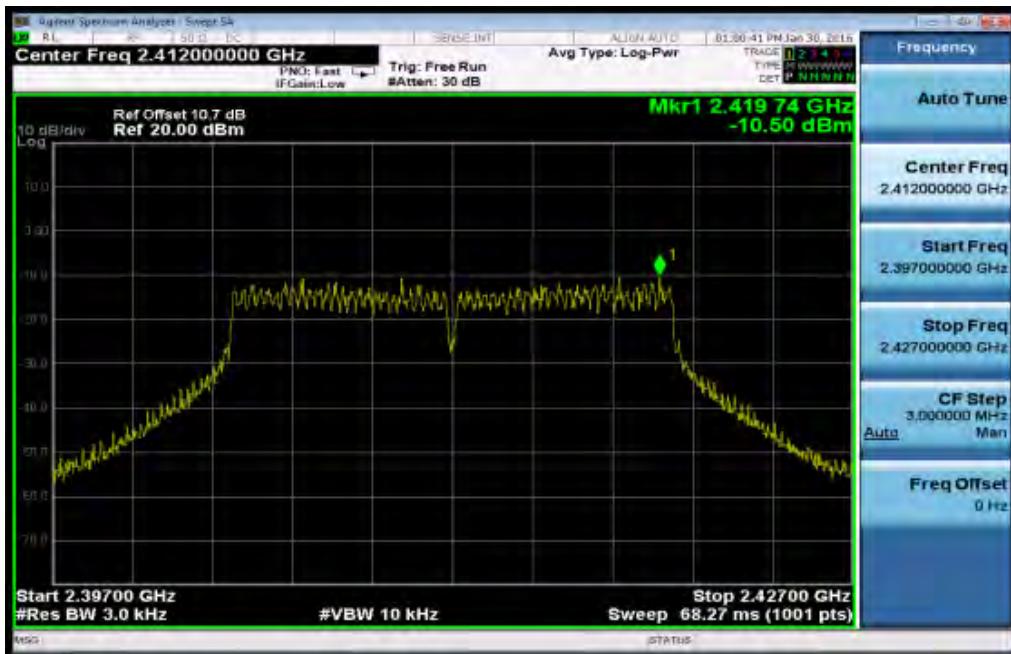
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## Power Spectral Density Test Plot (CH-High)



## 802.11g

## Power Spectral Density Test Plot (CH-Low)



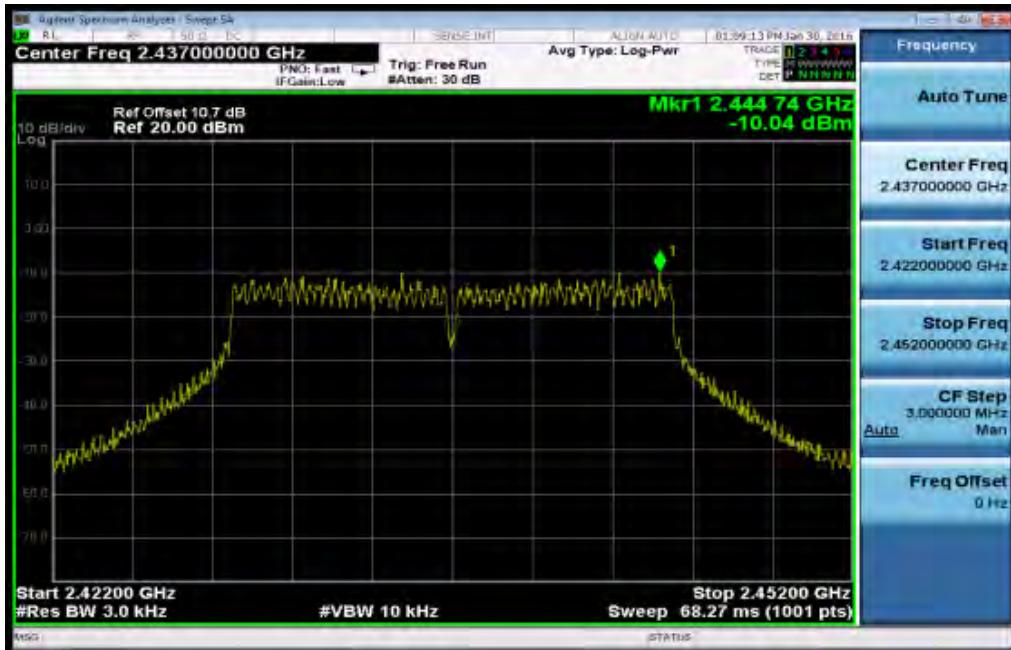
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## Power Spectral Density Test Plot (CH-Mid)



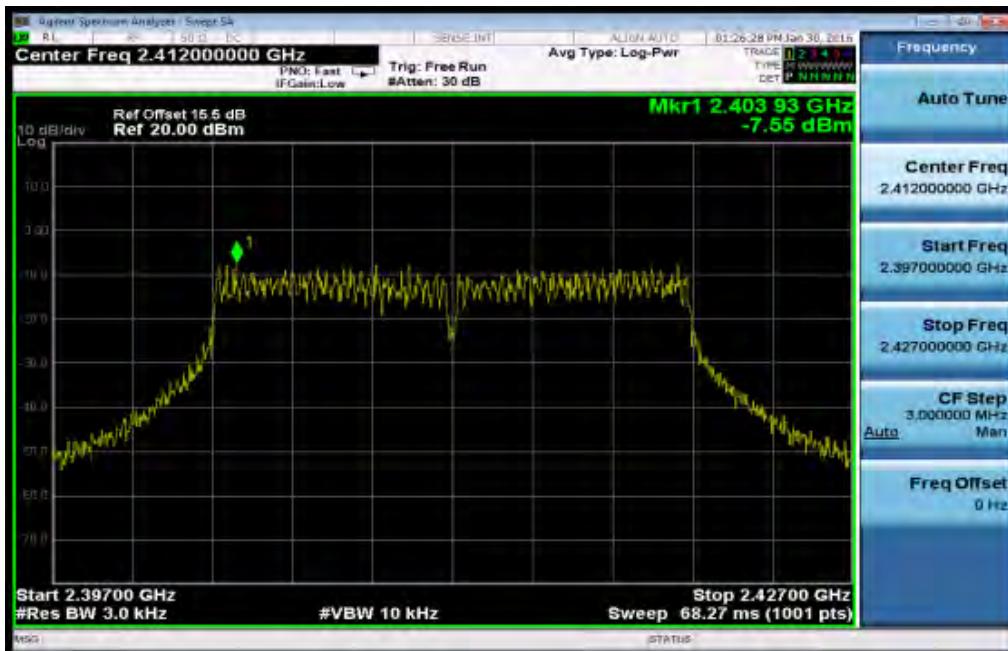
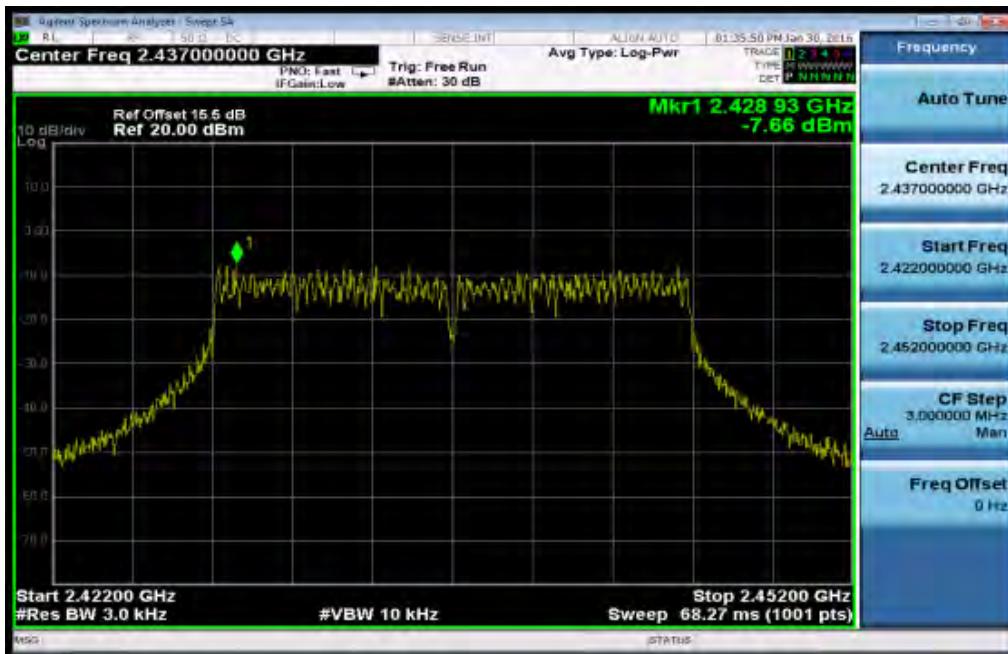
## Power Spectral Density Test Plot (CH-High)



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**802.11n\_HT20****Power Spectral Density Test Plot (CH-Low)****Power Spectral Density Test Plot (CH-Mid)**

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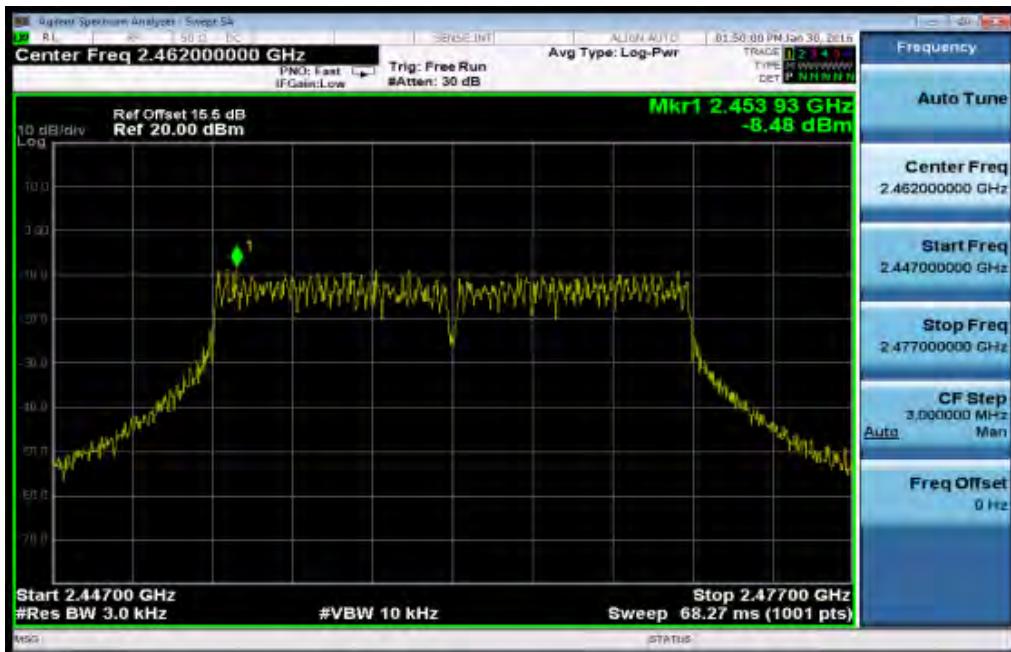
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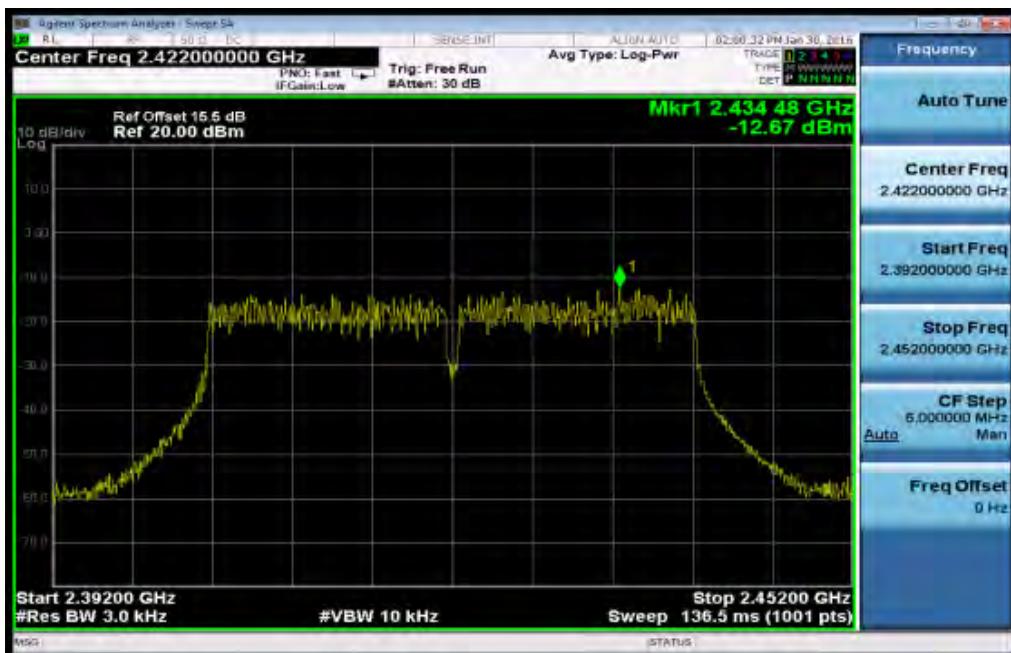
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## Power Spectral Density Test Plot (CH-High)



## 802.11n\_HT40

## Power Spectral Density Test Plot (CH-Low)

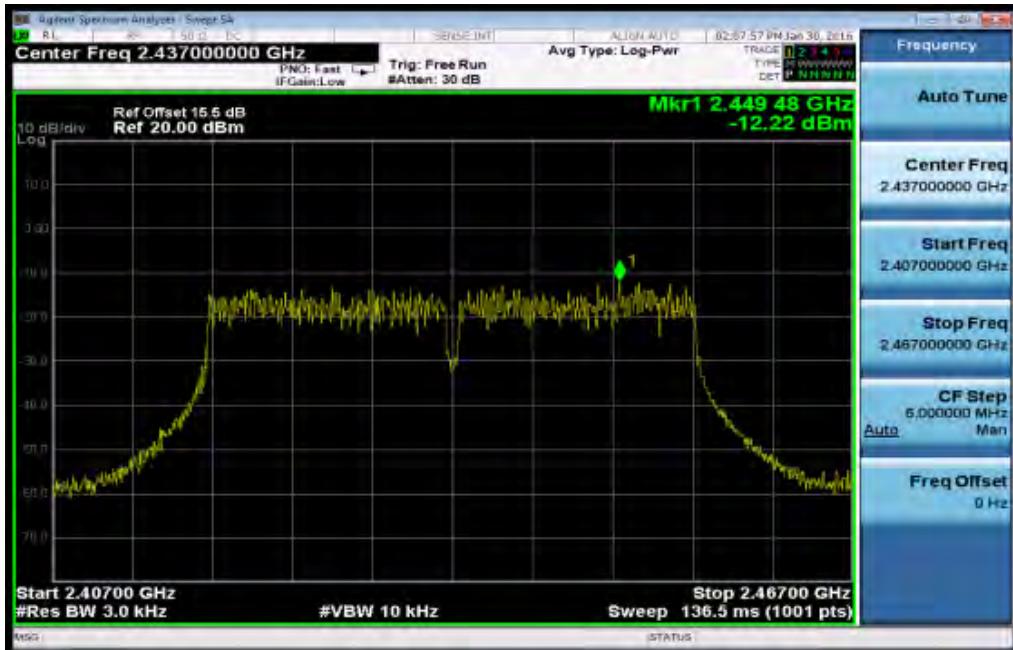


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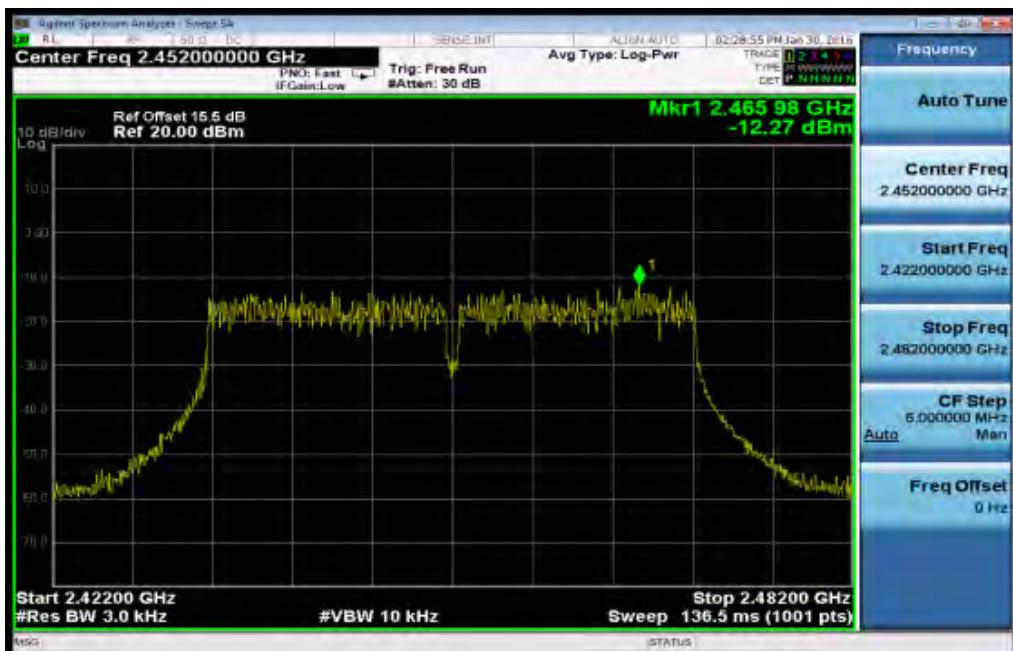
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## Power Spectral Density Test Plot (CH-Mid)



## Power Spectral Density Test Plot (CH-High)



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## 13 ANTENNA REQUIREMENT

### 13.1 Standard Applicable

For intentional device, according to §15.203, an intentional radiator shall be designed to ensure that no antenna other than furnished by the responsible party shall be used with the device.

If the transmitting antenna is greater than 6dBi, the power shall be reduced by the same level in dB comparing to gain minus 6dBi.

### 13.2 Antenna Connected Construction

Dipole antenna designs are used.

The antenna connector is designed with unique type RF connector and no consideration of replacement. Please see EUT photo and antenna spec. for details.

The antenna gain is less than 6dBi. Therefore, it is not necessary to reduce maximum output power limit.

*~ End of Report ~*

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