

# ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

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

OF

**Product Name:** Tablet PC

**Brand Name:** hp

**Model No.:** HSTNN-Q93C

**FCC ID:** B94HNQ93CSPNAC

**Report No.:** E2/2015/30020

**Issue Date:** Apr. 30, 2015

**FCC Rule Part:** §15.247, Cat: DTS

**Prepared for:** Hewlett-Packard Company  
1501 Page Mill Road, M/S1419, Palo Alto, CA  
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SGS Taiwan Ltd.

**Prepared by:** Electronics & Communication Laboratory  
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## VERIFICATION OF COMPLIANCE

**Applicant:** Hewlett-Packard Company  
 1501 Page Mill Road, M/S1419, Palo Alto, CA, 94304, United States

**Product Name:** Tablet PC

**Brand Name:** hp

**Model No.:** HSTNN-Q93C

**FCC ID:** B94HNQ93CSPNAC

**File Number:** E2/2015/30020

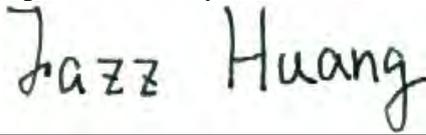
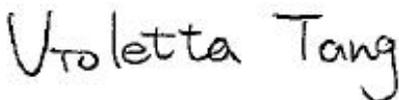
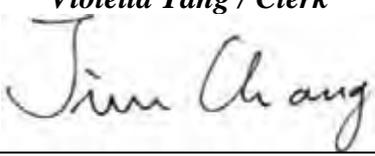
**Date of test:** Mar. 16, 2015 ~ Apr. 13, 2015

**Date of EUT Received:** Mar. 16, 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.

<b>Test By:</b>		<b>Date</b>	Apr. 30, 2015
	_____ <i>Jazz Huang / Asst. Supervisor</i>		_____
<b>Prepared By:</b>		<b>Date</b>	Apr. 30, 2015
	_____ <i>Violetta Tang / Clerk</i>		_____
<b>Approved By:</b>		<b>Date</b>	Apr. 30, 2015
	_____ <i>Jim Chang / Asst. Manager</i>		_____

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## Revision History

Report Number	Revision	Description	Issue Date
E2/2015/30020	Rev.00	Initial creation of document	Apr. 30, 2015

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# 1 GENERAL INFORMATION

## 1.1 Product description

General:

Product Name:	Tablet PC		
Brand Name:	hp		
Model No.:	HSTNN-Q93C		
Product SW/HW version	Win 8.1 / 1.0		
Radio SW/HW version	7.7.2.0 / 1.0		
Power Supply:	3.8Vdc form Rechargeable Li-ion Battery or 5.25V from AC/DC Adapter		
	Battery:	1. Model No.: HSTNH-C408M-SD, Supplier: Dynapack	
		2. Model No.: HSTNH-C408M-SS, Supplier: SDI (SQ)	
	Adapter:	1. Model No.: TPN-AA01, Supplier: AcBel	
		2. Model No.: TPN-DA01, Supplier: Delta	
		3. Model No.: TPN-LA01, Supplier: Lite-On	

WLAN 2.4GHz:

Wi-Fi	Frequency Range	Channels	Rated Power	Modulation Technology
11b/g	2412-2462	11	b: 18.81dBm g: 21.16dBm	DSSS, OFDM
11n	HT20 2412-2462	11	HT20: 21.15dBm	OFDM
11n	HT40 2422-2452	9	HT40: 21.02dBm	OFDM
Antenna Designation:	PIFA Antenna, Gain: 0.37dBi (Main) Part No.: DQ6R15GAV00, Supplier: Wistron Neweb Corp PIFA Antenna, Gain: -3.79dBi (Aux) Part No.: DQ6R15GAW00, Supplier: Wistron Neweb Corp			
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 65Mbps 802.11 n_40MHz: up to 135Mbps			

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## 1.2 Product Feature of Equipment Under Test

The equipment under Test (Hereafter Called: EUT) is Tablet PC supporting, GSM / WCDMA / CDMA / LTE, Wi-Fi 802.11abgn & ac, Bluetooth with NFC and GPS features, and below is details of information.

Product Feature	
Product Name:	Tablet PC
Brand Name:	hp
Model No.:	HSTNN-Q93C
FCC ID	B94HNQ93CSPNAC
GSM Operating Band(s)	GSM 850/1900MHz
GPRS / EGPRS Multi Slot Class	GPRS Class 12 / Class 12
CDMA / EVDO	BC0 / BC1
WCDMA Operating Band(s)	FDD Band II / IV / V
WCDMA Rel. Version	Rel.8
LTE Operating Band(s)	FCC Band 2 / 4 / 5 / 13 / 17 / 25
LTE Rel. Version	Rel.9
Wi-Fi Specification	802.11 a/b/g/n/ac
Bluetooth Version	V4.0 dual mode + HS
NFC Specification	NFC

**Note:** The above EUT information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

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### 1.3 Test Methodology of Applied Standards

FCC Part 15, Subpart C §15.247

FCC KDB 558074 D01 DTS Meas. Guidance V03r02

FCC KDB 662311 D01 Multiple Transmitter Output V02r01

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 the certification procedure.
3. The EUT was placed 1.5m height for frequency above 1GHz in accordance with ANSI C63.10 :2013

### 1.4 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: 628985

Canada Registration Number: 4620A-5

### 1.5 Special Accessories

There are no special accessories used while test was conducted.

### 1.6 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 a placed on as 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 §15.107. 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 a placed on as turn table which is 0.8 m above ground plane. 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.

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## 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 1.2 dB and 10 dB attenuator.

Offset = RF cable loss (dB)+ attenuation factor(dB) =1.2+10=11.2(dB)

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## 2.5 Configuration of Tested System

**Fig. 2-1 Radiated Emission**



**Fig. 2-2 Conducted (Antenna Port) Configuration**



**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	DRTU	N/A	N/A	N/A	N/A
2.	DC Power Supply	Agilent	E3640A	MY53140006	N/A	N/A

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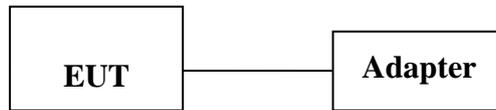
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**Fig. 2-3 AC Power Line Conducted Emission**



**Table 2-2 Equipment Used in Tested System**

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Data Cable	Power Cord
1.	WLAN Test Software	DRTU	N/A	N/A	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 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		

9 channels are provided for 802.11n\_HT40

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		
5	2432 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
802.11n (HT40)	3 to 9	3, 6, 9	OFDM	13.5	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	6.5	MAIN
802.11n (HT40)	3 to 9	3, 6, 9	OFDM	13.5	MAIN

**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 H 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	6.5	MAIN
802.11n (HT40)	3 to 9	3, 6, 9	OFDM	13.5	MAIN

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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	+/- 1.55 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 3	101311	06/20/2014	06/19/2015
Coaxial Cables	N/A	N30N30-1042-150c m	N/A	01/06/2015	01/07/2016
LISN	Schwarzbeck	NSLK 8127	8127-648	06/10/2014	06/09/2015
LISN	Rolf-Heine	NNB-2/16Z	99012	03/26/2014	03/25/2015
Test Software	Farad	EZ-EMC	Ver. SGS-03A2	N.C.R.	N.C.R.

### 6.3 EUT Setup

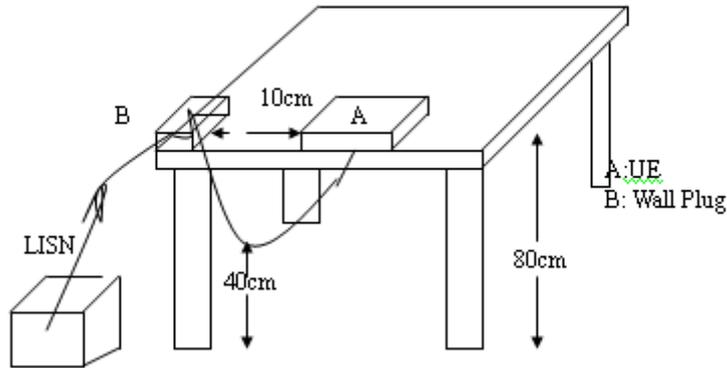
1. The conducted emission tests were performed in the test site, using the setup in accordance with the ANSI C63.4:2013.
2. The AC/DC Power adaptor of EUT was plug-in LISN. The EUT was placed flushed with the rear of the table.
3. The LISN was connected with 120Vac/60Hz power source.

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#### 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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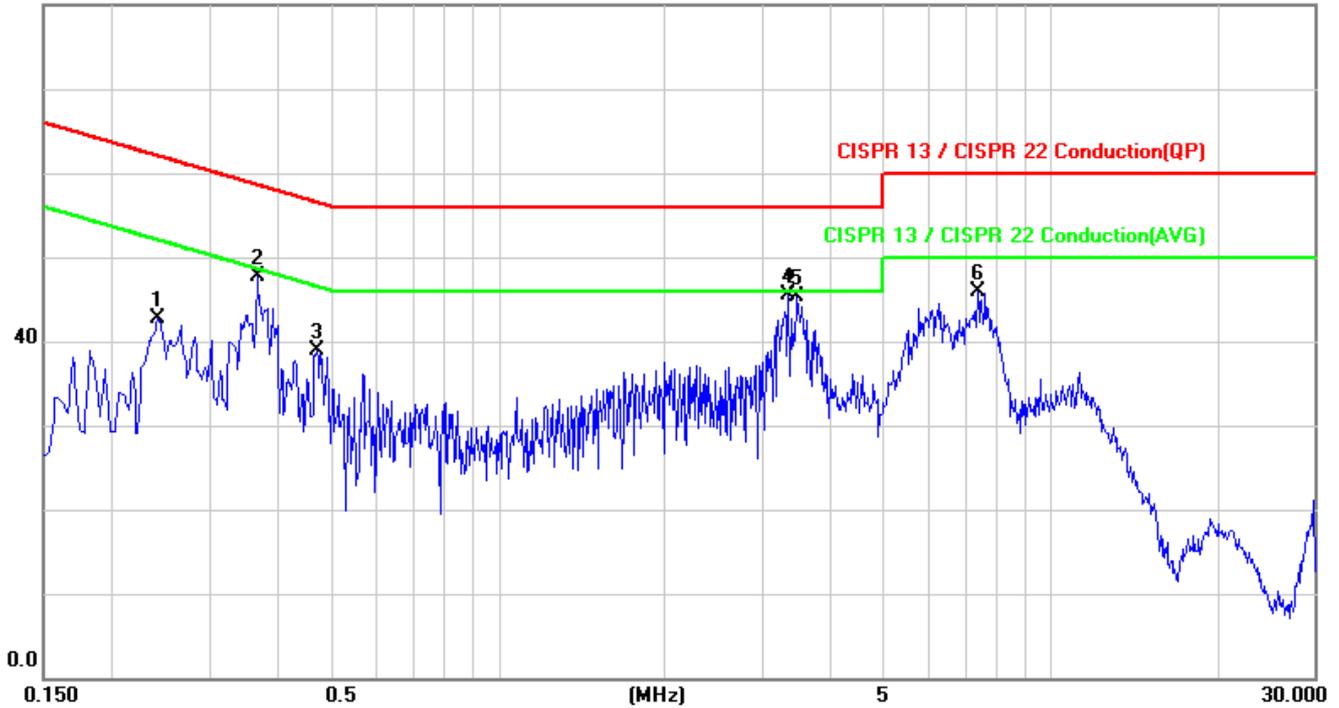
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### AC POWER LINE CONDUCTED EMISSION TEST DATA

Operation Mode:	Operation mode			Test Date:	Apr. 10, 2015
Temperature:	20	Humidity:	64 %	Test By:	Ashton
Adapter Model No.:	TPN-AA01				

80.0 dBuV



No.	Mk.	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Comment
		(MHz)	dBuV	(dB)	(dBuV)	(dBuV)	(dB)		
1		0.2420	42.53	0.10	42.63	62.03	-19.40	peak	
2		0.3660	47.52	0.15	47.67	58.59	-10.92	peak	
3		0.4700	38.63	0.21	38.84	56.51	-17.67	peak	
4	*	3.3620	44.84	0.60	45.44	56.00	-10.56	peak	
5		3.4740	44.75	0.60	45.35	56.00	-10.65	peak	
6		7.4020	45.27	0.65	45.92	60.00	-14.08	peak	

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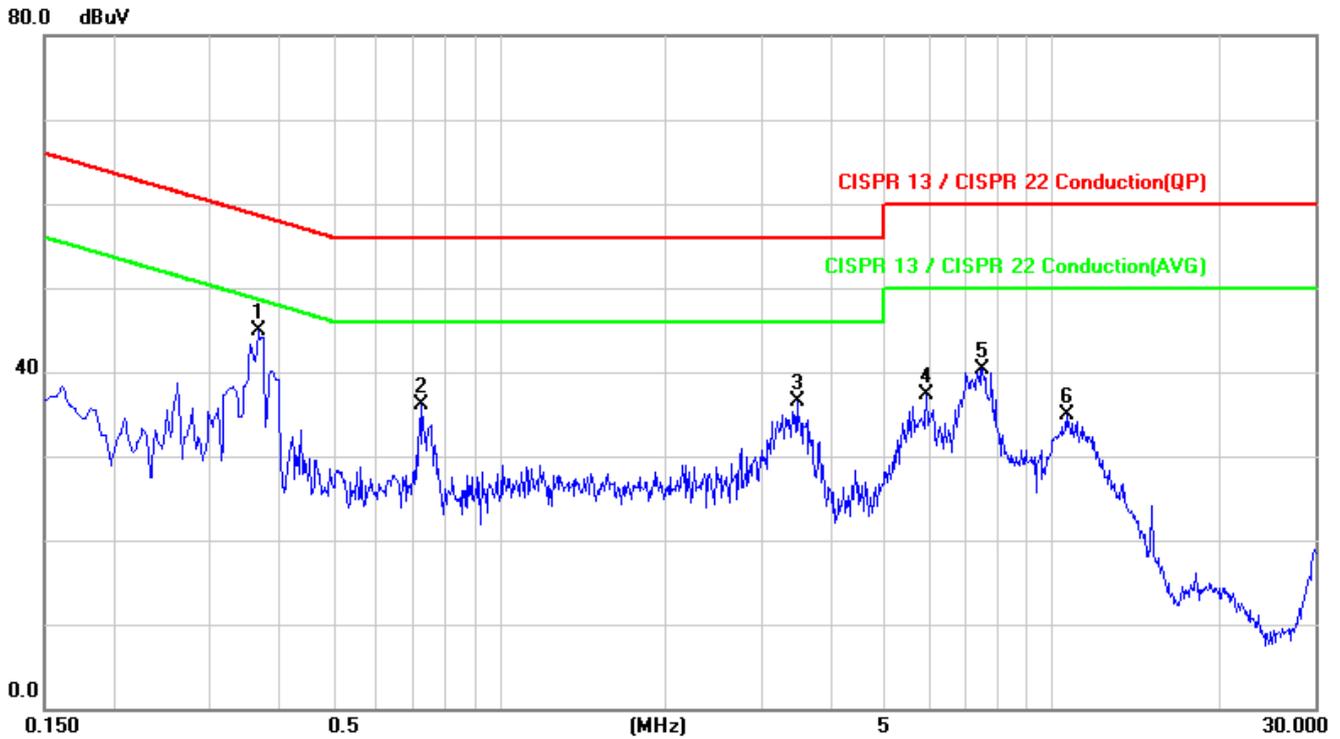
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No.	Mk.	Freq. (MHz)	Reading dBuV	Factor (dB)	Measurement (dBuV)	Limit (dBuV)	Over (dB)	Detector	Comment
1	*	0.3660	44.81	0.16	44.97	58.59	-13.62	peak	
2		0.7260	35.72	0.33	36.05	56.00	-19.95	peak	
3		3.4620	35.82	0.60	36.42	56.00	-19.58	peak	
4		5.9420	36.59	0.63	37.22	60.00	-22.78	peak	
5		7.5140	39.71	0.66	40.37	60.00	-19.63	peak	
6		10.6620	34.14	0.68	34.82	60.00	-25.18	peak	

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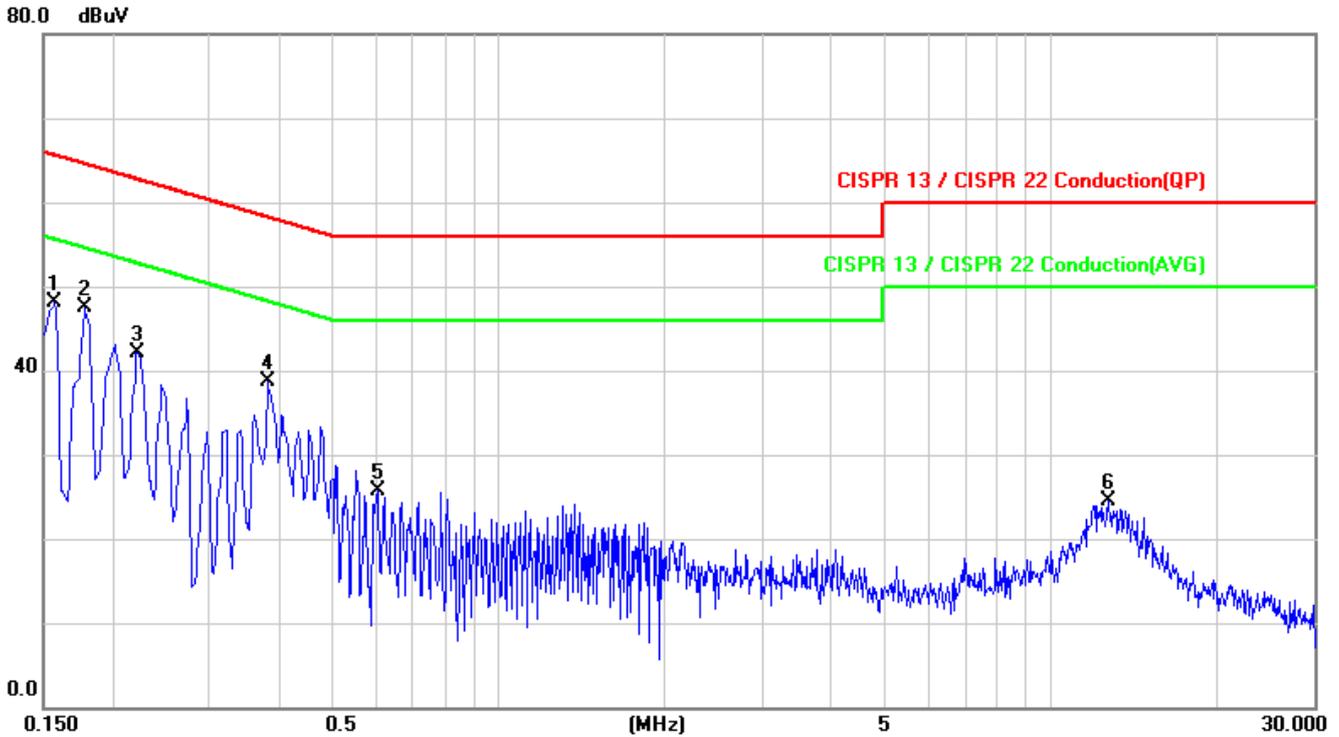
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Operation Mode:	Operation mode			Test Date:	Apr. 10, 2015
Temperature:	20	Humidity:	64 %	Test By:	Ashton
Adapter Model No.:	TPN-DA01				



No.	Mk.	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Comment
		(MHz)	dBuV	(dB)	(dBuV)	(dBuV)	(dB)		
1		0.1580	48.00	0.09	48.09	65.57	-17.48	peak	
2	*	0.1780	47.38	0.10	47.48	64.58	-17.10	peak	
3		0.2220	42.02	0.10	42.12	62.74	-20.62	peak	
4		0.3820	38.54	0.17	38.71	58.24	-19.53	peak	
5		0.6060	25.40	0.26	25.66	56.00	-30.34	peak	
6		12.7180	23.82	0.64	24.46	60.00	-35.54	peak	

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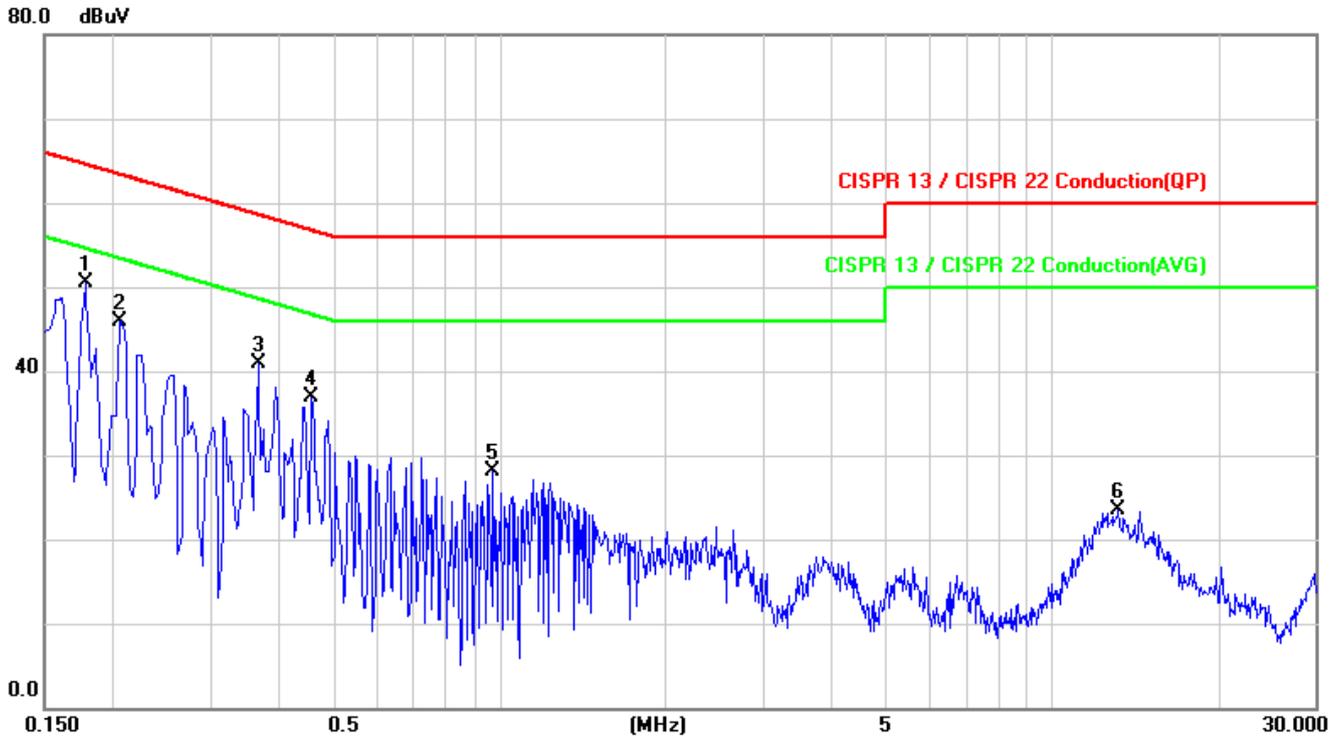
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No.	Mk.	Freq. (MHz)	Reading dBuV	Factor (dB)	Measurement (dBuV)	Limit (dBuV)	Over (dB)	Detector	Comment
1	*	0.1780	50.39	0.10	50.49	64.58	-14.09	peak	
2		0.2060	45.87	0.09	45.96	63.37	-17.41	peak	
3		0.3660	40.72	0.16	40.88	58.59	-17.71	peak	
4		0.4580	36.77	0.21	36.98	56.73	-19.75	peak	
5		0.9780	27.75	0.42	28.17	56.00	-27.83	peak	
6		13.2140	22.81	0.64	23.45	60.00	-36.55	peak	

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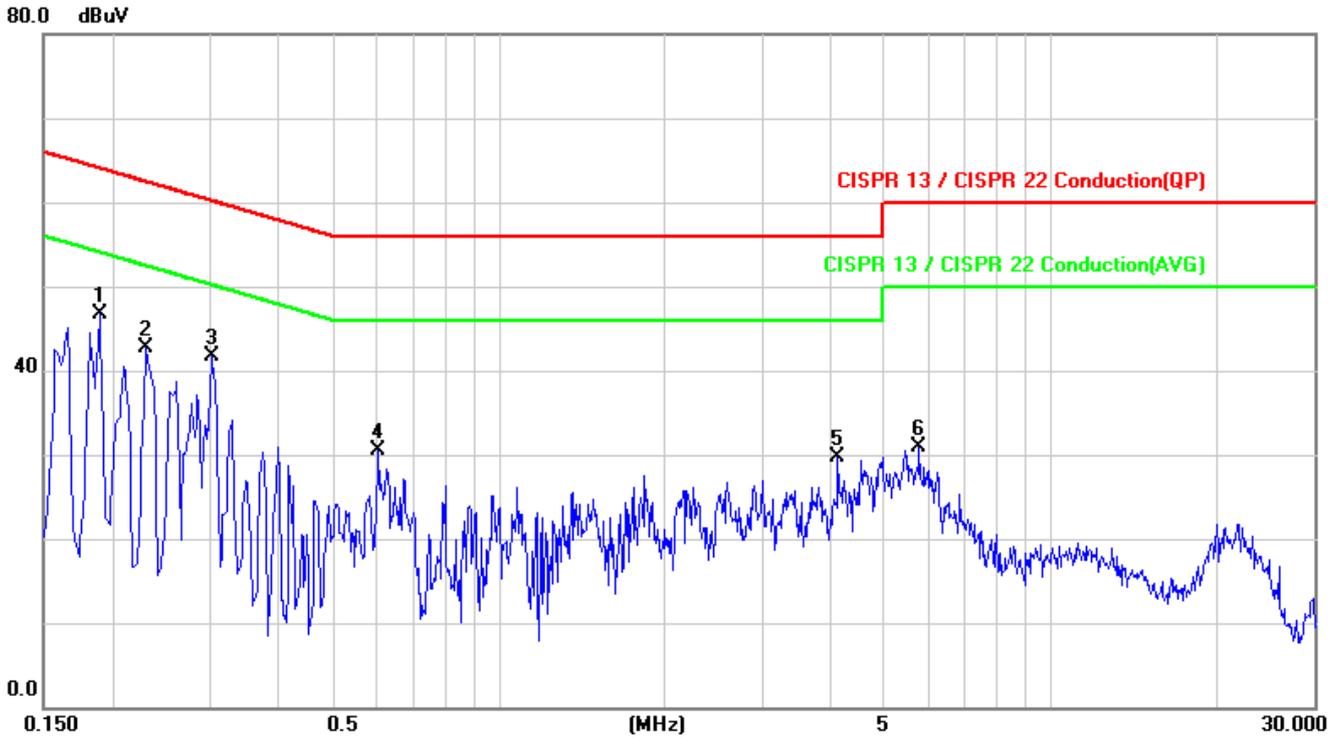
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Operation Mode:	Operation mode			Test Date:	Apr. 10, 2015
Temperature:	20	Humidity:	64 %	Test By:	Ashton
Adapter Model No.:	TPN-LA01				



No.	Mk.	Freq. (MHz)	Reading dBuV	Factor (dB)	Measurement (dBuV)	Limit (dBuV)	Over (dB)	Detector	Comment
1	*	0.1900	46.71	0.09	46.80	64.04	-17.24	peak	
2		0.2300	42.63	0.10	42.73	62.45	-19.72	peak	
3		0.3020	41.61	0.13	41.74	60.19	-18.45	peak	
4		0.6060	30.31	0.26	30.57	56.00	-25.43	peak	
5		4.1140	29.09	0.61	29.70	56.00	-26.30	peak	
6		5.8020	30.32	0.62	30.94	60.00	-29.06	peak	

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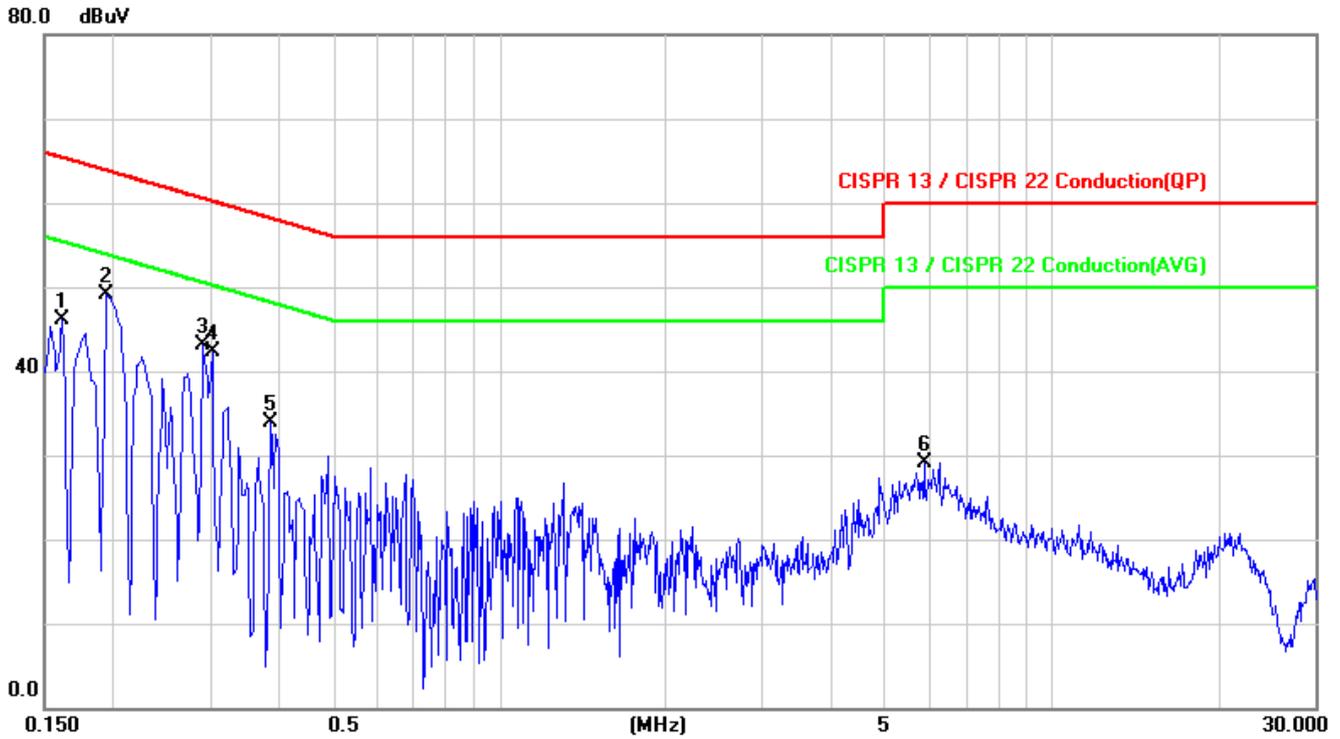
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No.	Mk.	Freq. (MHz)	Reading dBuV	Factor (dB)	Measurement (dBuV)	Limit (dBuV)	Over (dB)	Detector	Comment
1		0.1620	46.02	0.09	46.11	65.36	-19.25	peak	
2	*	0.1940	49.05	0.09	49.14	63.86	-14.72	peak	
3		0.2900	42.97	0.13	43.10	60.52	-17.42	peak	
4		0.3020	42.17	0.13	42.30	60.19	-17.89	peak	
5		0.3860	33.64	0.17	33.81	58.15	-24.34	peak	
6		5.8860	28.45	0.62	29.07	60.00	-30.93	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	99.00%	0.04
802.11g	98.90%	0.05
802.11n_20	98.82%	0.05
802.11n_40	97.27%	0.12

$$\text{Duty Cycle Factor: } 10 * \log (1/0.99) = 0.04$$

$$\text{Duty Cycle Factor: } 10 * \log (1/0.9890) = 0.05$$

$$\text{Duty Cycle Factor: } 10 * \log (1/0.9882) = 0.05$$

$$\text{Duty Cycle Factor: } 10 * \log (1/0.9727) = 0.12$$

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### 7.1 DUTY CYCLE TEST SIGNAL Measurement Result

802.11 b



802.11 g

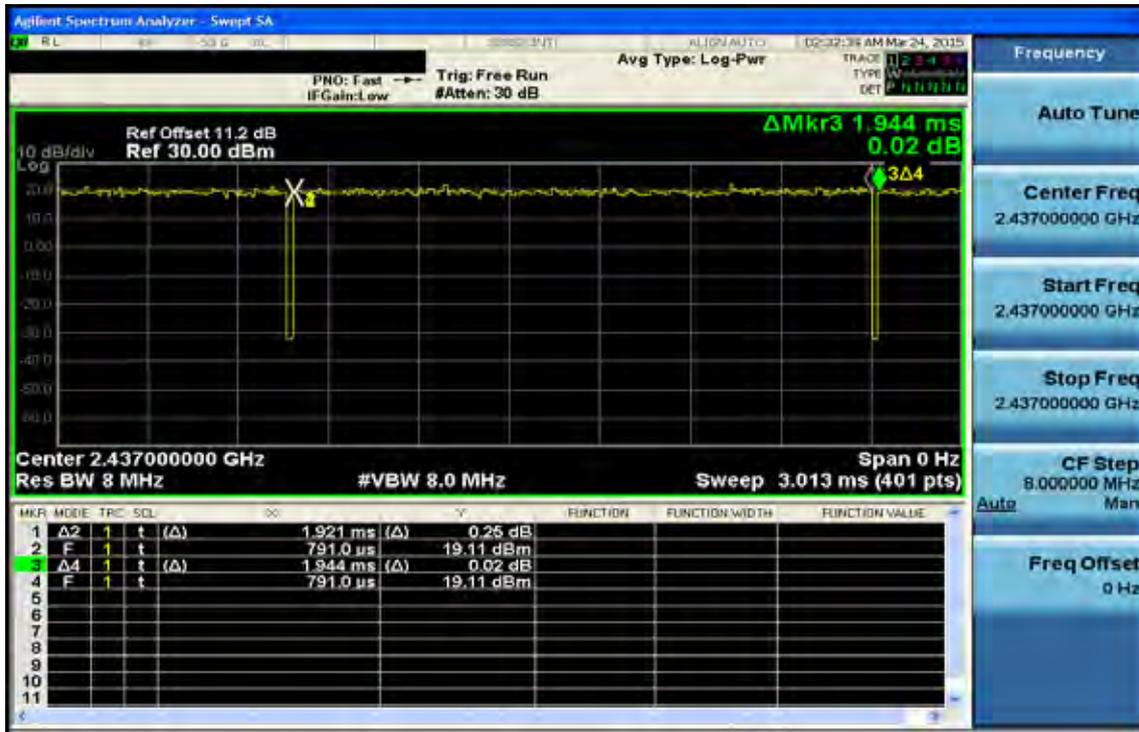


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802.11 n\_20 MHz



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 form 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.

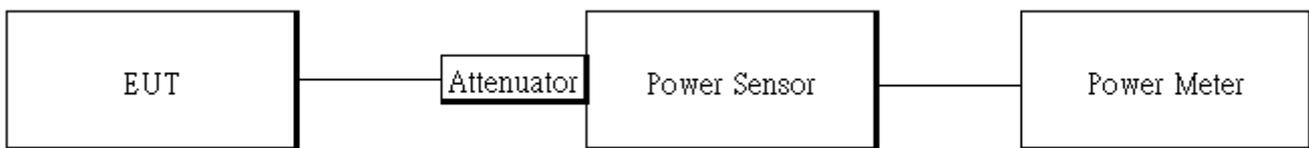
In case of point-to-point operation, the limit has to be reduced by 1dB for every 3dB that the directional gain of Antenna exceeds 6dBi.

### 8.2 Measurement Equipment Used

Conducted Emission Test Site					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Power Meter	Anritsu	ML2495A	1005007	12/20/2014	12/19/2015
Power Sensor	Anritsu	MA2411B	917032	12/20/2014	12/19/2015
DC Block	Mini-Circuits	BLK-18-S+	1	01/02/2015	01/01/2016
Attenuator	Mini-Circuit	BW-S10W2+	002	01/02/2015	01/01/2016

### 8.3 Test Set-up

Power Meter:



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### 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 V03r02.
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.

### 8.5 Measurement Result

**802.11b**

CH	Frequency (MHz)	DATA RATE	Peak Output Power		REQUIRED LIMIT (dBm)	RESULT
			TOTAL POWER (dBm)	TOTAL POWER (mW)		
1	2412	1	18.79	75.683	1 W = 30 dBm	PASS
6	2437	1	18.61	72.611	1 W = 30 dBm	PASS
11	2462	1	<b>18.81</b>	<b>76.033</b>	1 W = 30 dBm	PASS

CH	Frequency (MHz)	DATA RATE	Avg. Output Power		REQUIRED LIMIT (dBm)	RESULT
			TOTAL POWER (dBm)	TOTAL POWER (mW)		
1	2412	1	15.95	39.355	1 W = 30 dBm	PASS
6	2437	1	15.67	36.898	1 W = 30 dBm	PASS
11	2462	1	15.81	38.107	1 W = 30 dBm	PASS

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802.11g

CH	Frequency (MHz)	DATA RATE	Peak Output Power		REQUIRED LIMIT (dBm)	RESULT
			TOTAL POWER (dBm)	TOTAL POWER (mW)		
1	2412	6	18.98	79.068	1 W = 30 dBm	PASS
6	2437	6	<b>21.16</b>	<b>130.617</b>	1 W = 30 dBm	PASS
11	2462	6	17.22	52.723	1 W = 30 dBm	PASS

CH	Frequency (MHz)	DATA RATE	Avg. Output Power		REQUIRED LIMIT (dBm)	RESULT
			TOTAL POWER (dBm)	TOTAL POWER (mW)		
1	2412	6	13.95	24.831	1 W = 30 dBm	PASS
6	2437	6	16.32	42.855	1 W = 30 dBm	PASS
11	2462	6	12.22	16.672	1 W = 30 dBm	PASS

802.11n\_HT20

CH	Frequency (MHz)	DATA RATE	Peak Output Power		REQUIRED LIMIT (dBm)	RESULT
			TOTAL POWER (dBm)	TOTAL POWER (mW)		
1	2412	HT0	19.00	79.433	1 W = 30 dBm	PASS
6	2437	HT0	<b>21.15</b>	<b>130.317</b>	1 W = 30 dBm	PASS
11	2462	HT0	17.25	53.088	1 W = 30 dBm	PASS

CH	Frequency (MHz)	DATA RATE	Avg. Output Power		REQUIRED LIMIT (dBm)	RESULT
			TOTAL POWER (dBm)	TOTAL POWER (mW)		
1	2412	HT0	13.86	24.322	1 W = 30 dBm	PASS
6	2437	HT0	16.22	41.879	1 W = 30 dBm	PASS
11	2462	HT0	12.14	16.368	1 W = 30 dBm	PASS

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802.11n\_HT40

CH	Frequency (MHz)	DATA RATE	Peak Output Power		REQUIRED LIMIT (dBm)	RESULT
			TOTAL POWER (dBm)	TOTAL POWER (mW)		
3	2422	HT0	18.27	67.143	1 W = 30 dBm	PASS
6	2437	HT0	<b>21.02</b>	<b>126.474</b>	1 W = 30 dBm	PASS
9	2452	HT0	17.20	52.481	1 W = 30 dBm	PASS

CH	Frequency (MHz)	DATA RATE	Avg. Output Power		REQUIRED LIMIT (dBm)	RESULT
			TOTAL POWER (dBm)	TOTAL POWER (mW)		
3	2422	HT0	13.37	21.727	1 W = 30 dBm	PASS
6	2437	HT0	16.27	42.364	1 W = 30 dBm	PASS
9	2452	HT0	12.22	16.672	1 W = 30 dBm	PASS

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## 9 6dB BANDWIDTH

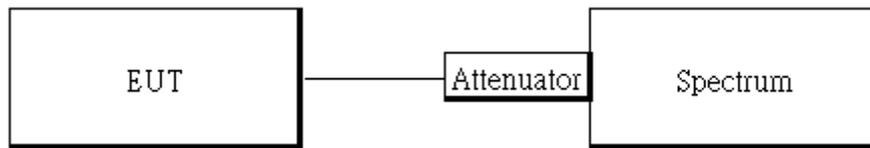
### 9.1 Standard Applicable

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	Agilent	E4446A	MY51100003	05/19/2014	05/18/2015
DC Block	Mini-Circuits	BLK-18-S+	1	01/02/2015	01/01/2016
Attenuator	Mini-Circuit	BW-S10W2+	002	01/02/2015	01/01/2016

### 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 V03r02.
3. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set the spectrum analyzer as RBW = 100 kHz, VBW = 3\*RBW, Span = 30M/50MHz, Detector=Peak, Sweep=auto.
4. Mark the peak frequency and -6dB (upper and lower) frequency.
5. Repeat above procedures until all frequency of interest measured was complete.

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### 9.5 Measurement Result

Frequency (MHz)	Bandwidth (kHz)	Limit (kHz)	Result
802.11b			
2412	10090	> 500	PASS
2437	10090	> 500	PASS
2462	10090	> 500	PASS
802.11g			
2412	15160	> 500	PASS
2437	15470	> 500	PASS
2462	15160	> 500	PASS
802.11n_HT20			
2412	15160	> 500	PASS
2437	15150	> 500	PASS
2462	15340	> 500	PASS
802.11n_HT40			
2422	35170	> 500	PASS
2437	35160	> 500	PASS
2452	35170	> 500	PASS

*\*Refer to next page for plots*

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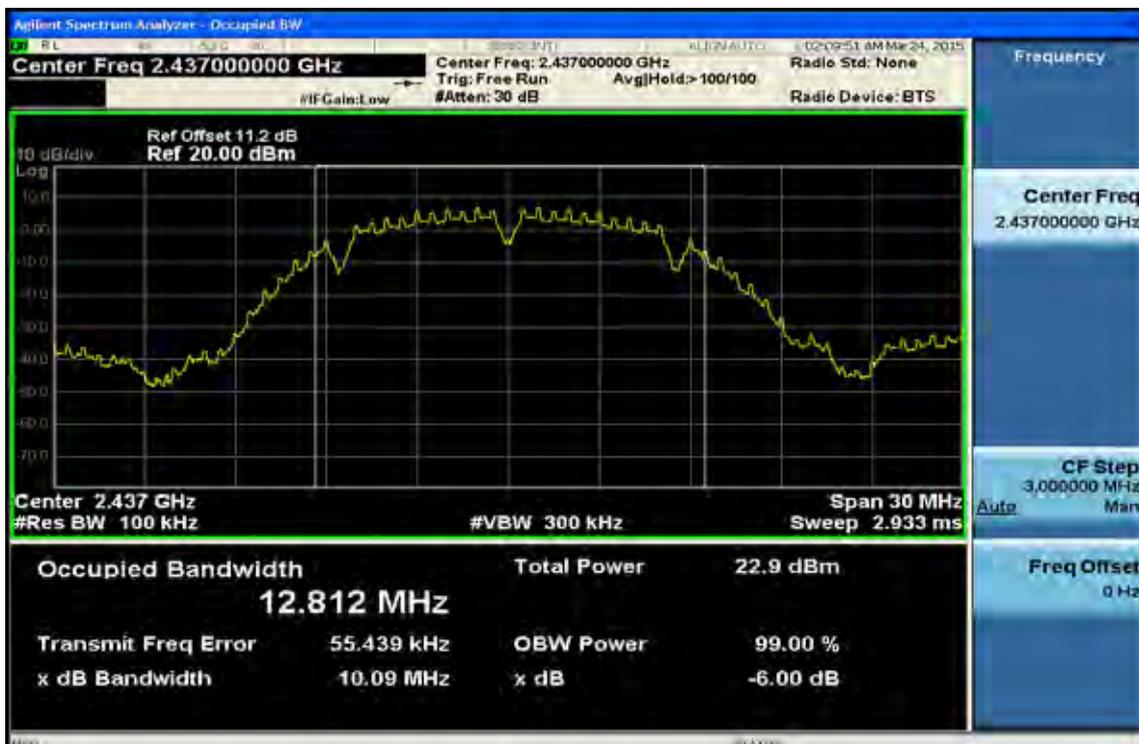
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802.11b

6dB Band Width Test Data CH-Low



6dB Band Width Test Data CH-Mid



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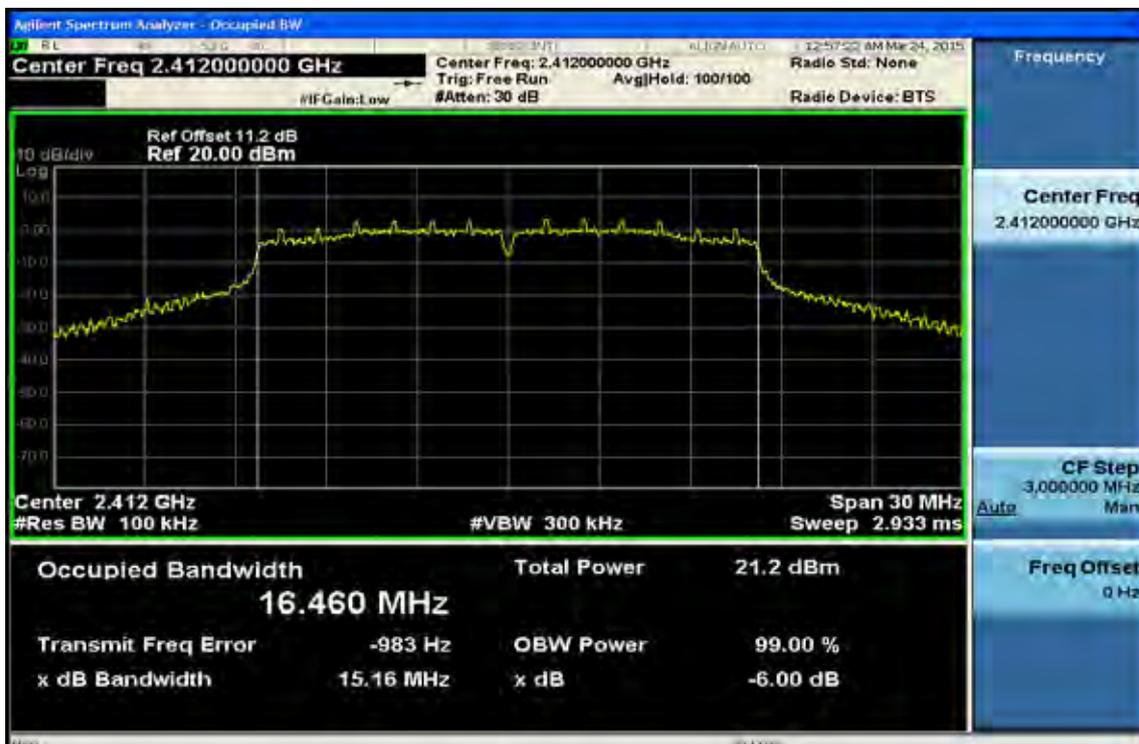
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### 6dB Band Width Test Data CH-High



### 802.11g

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



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



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



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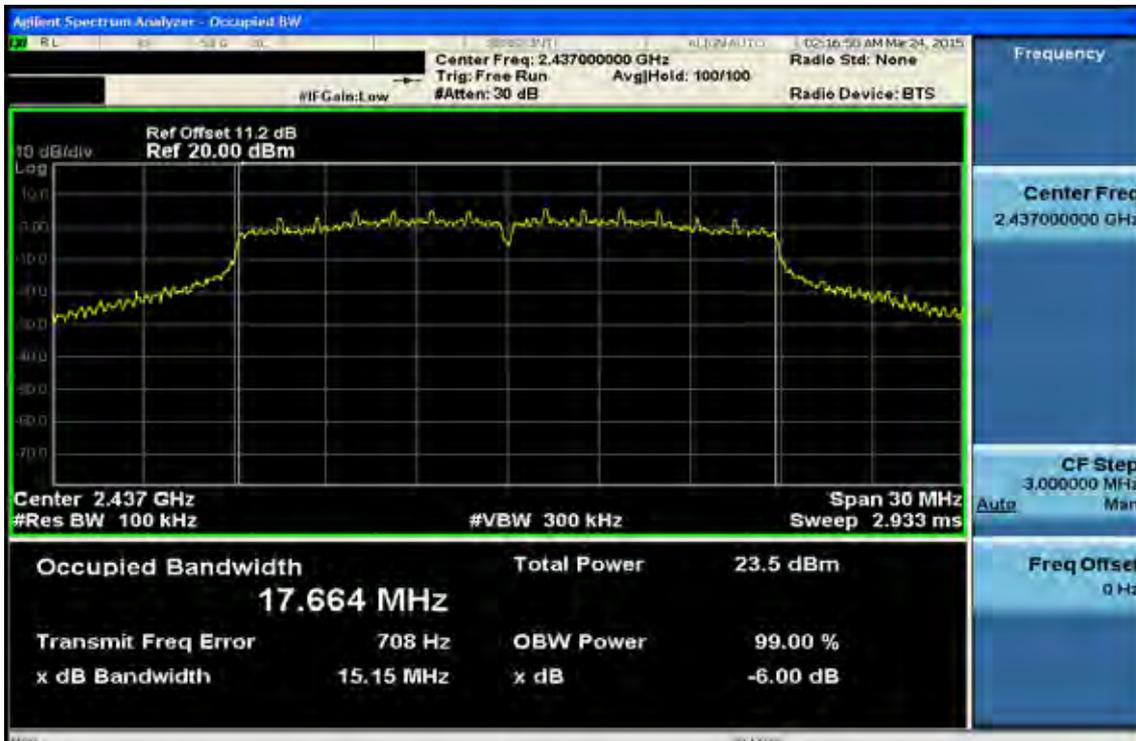
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802.11n\_20M

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



### 802.11 n\_40M

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



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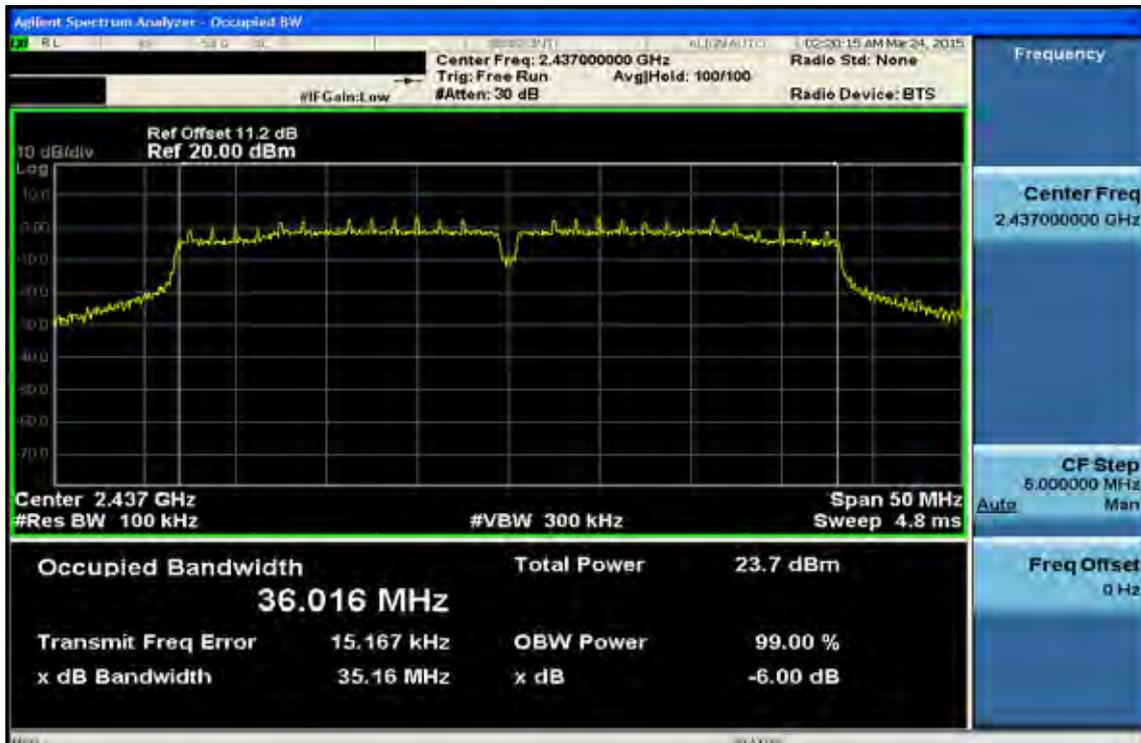
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### 6dB Band Width Test Data CH-Mid



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



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## 10 CONDUCTED BAND EDGES AND SPURIOUS EMISSION MEASUREMENT

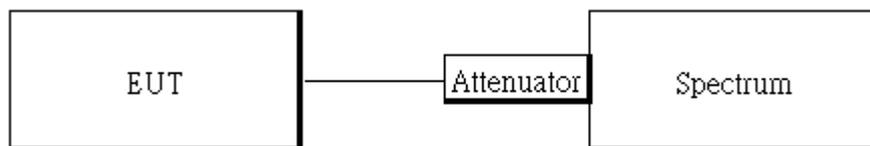
### 10.1 Standard Applicable

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).

### 10.2 Measurement Equipment Used

Conducted Emission Test Site					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	Agilent	E4446A	MY51100003	05/19/2014	05/18/2015
DC Block	Mini-Circuits	BLK-18-S+	1	01/02/2015	01/01/2016
Attenuator	Mini-Circuit	BW-S10W2+	002	01/02/2015	01/01/2016

### 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 V03r02.
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, VBW=300KHz, 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 V03r02.
3. Set RBW = 100K & VBW  $\geq$ 300K, 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.

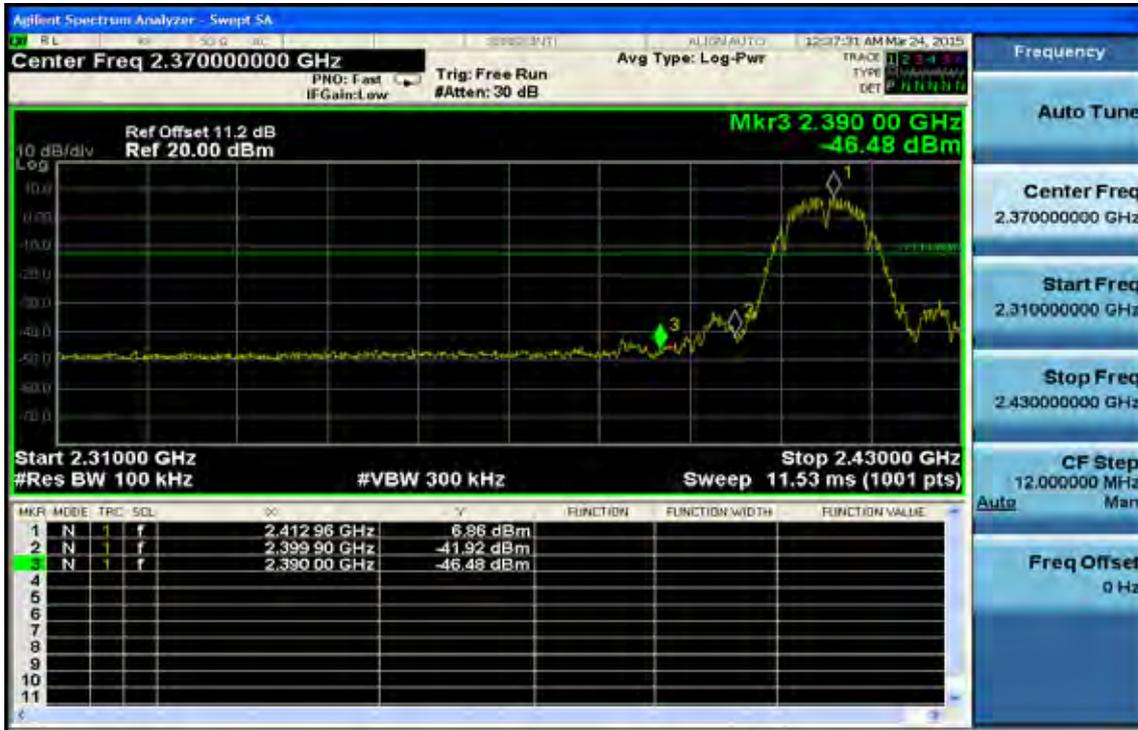
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802.11b

Band Edges Test Data CH-Low



Band Edges Test Data CH-High



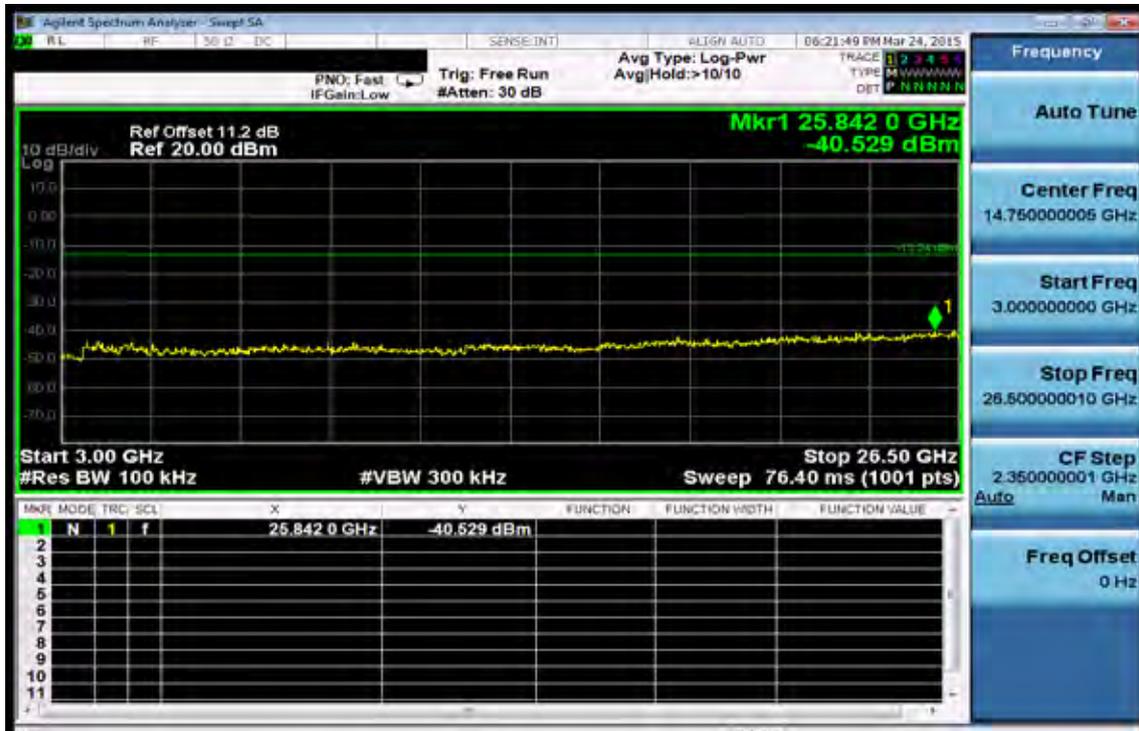
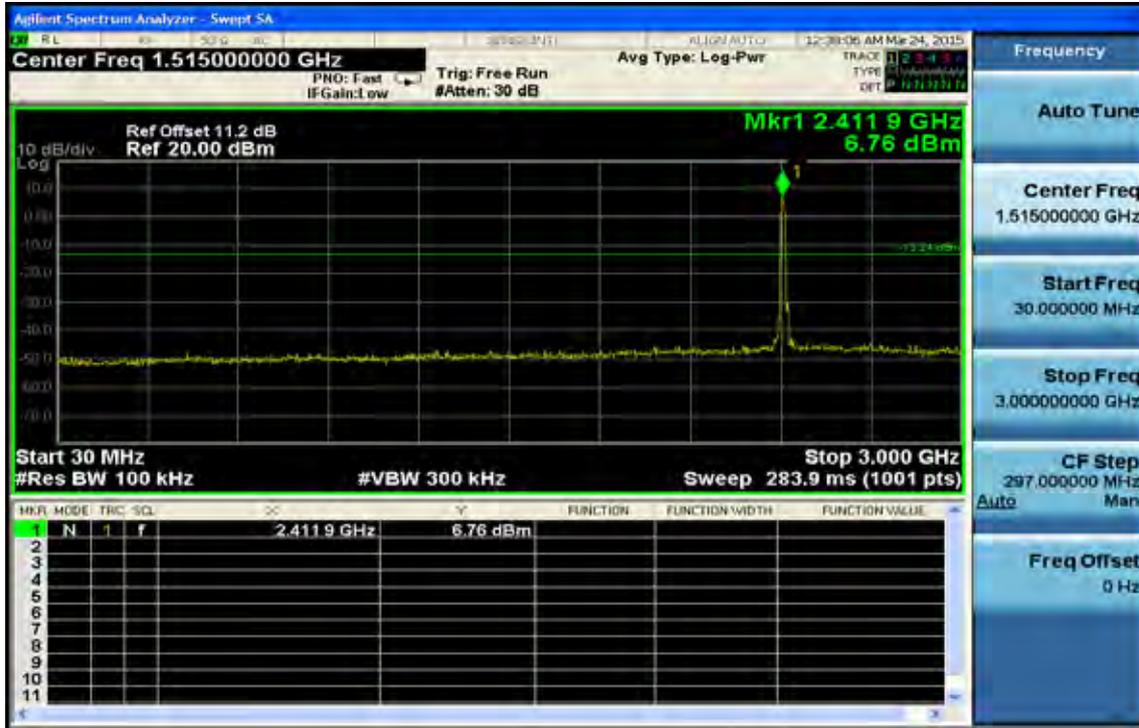
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Spurious Emission Test Data CH-Low

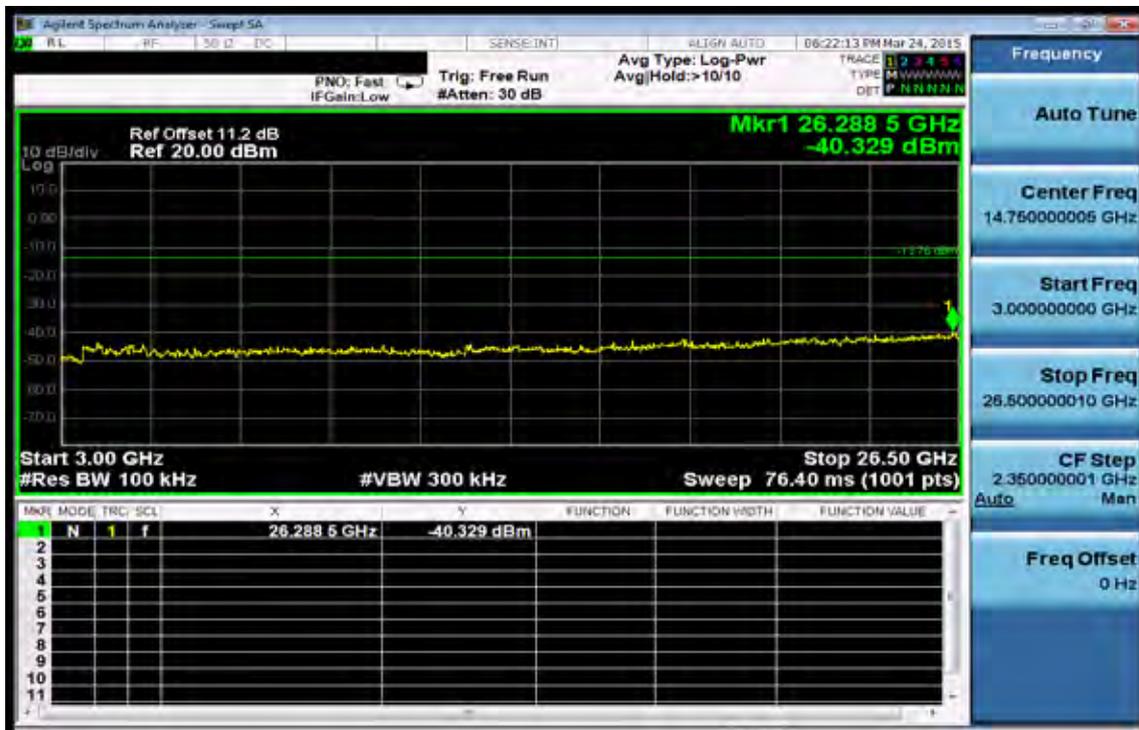
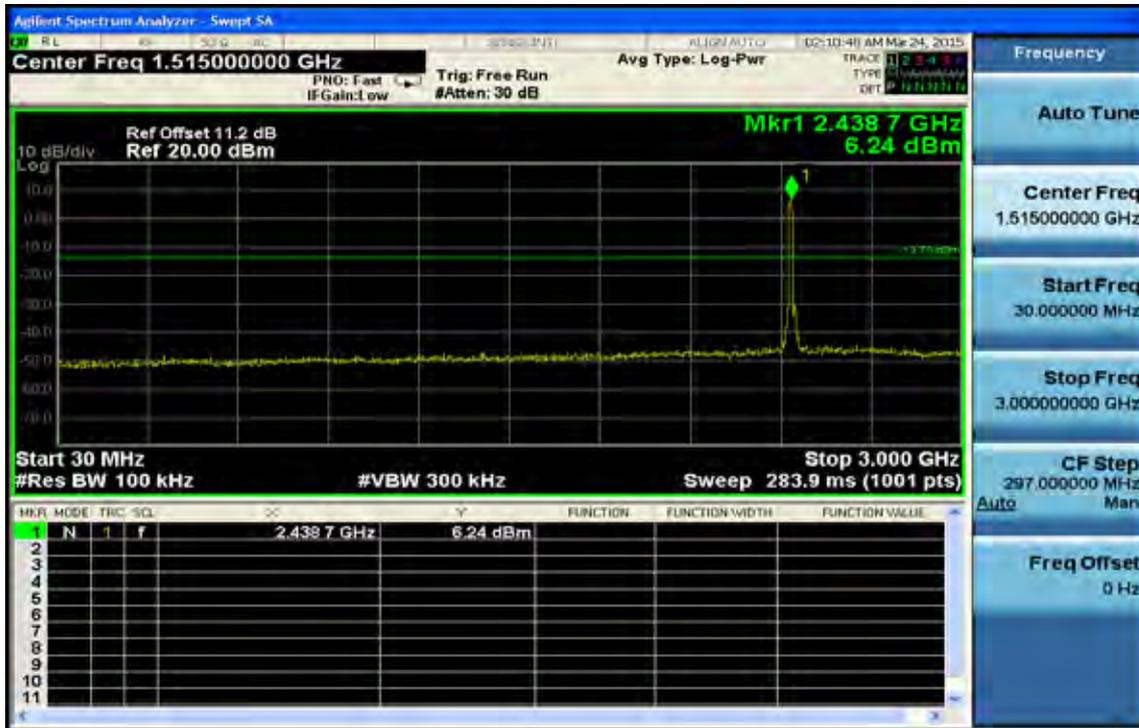


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### Spurious Emission Test Data CH-Mid



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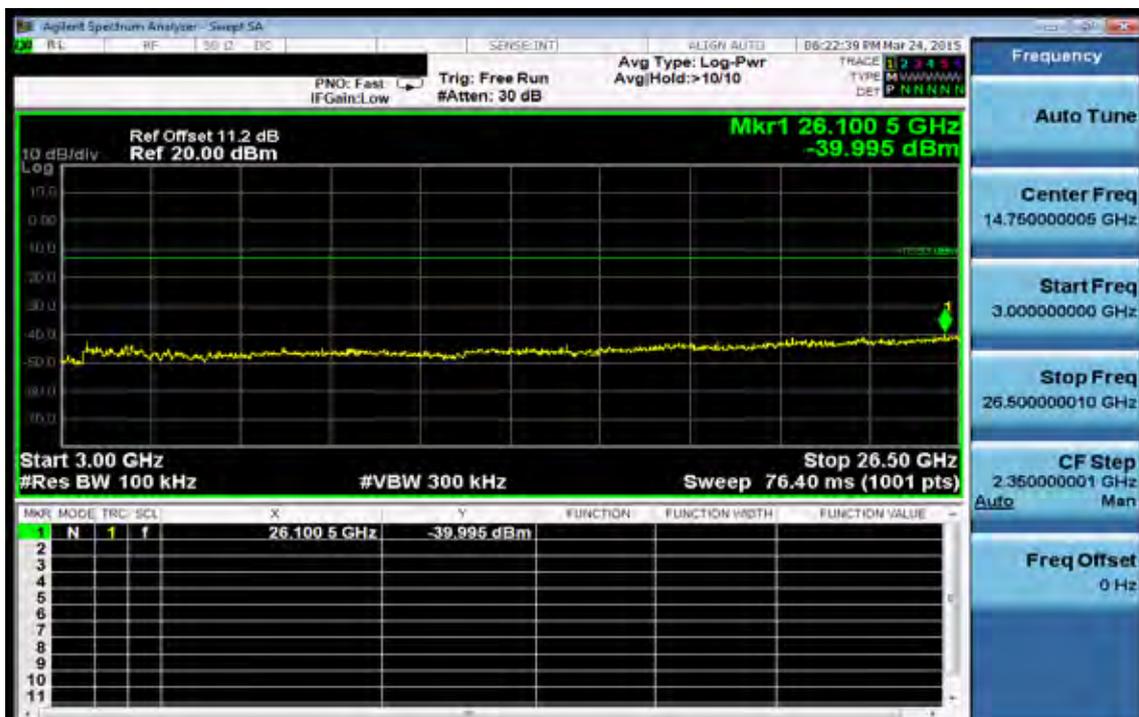
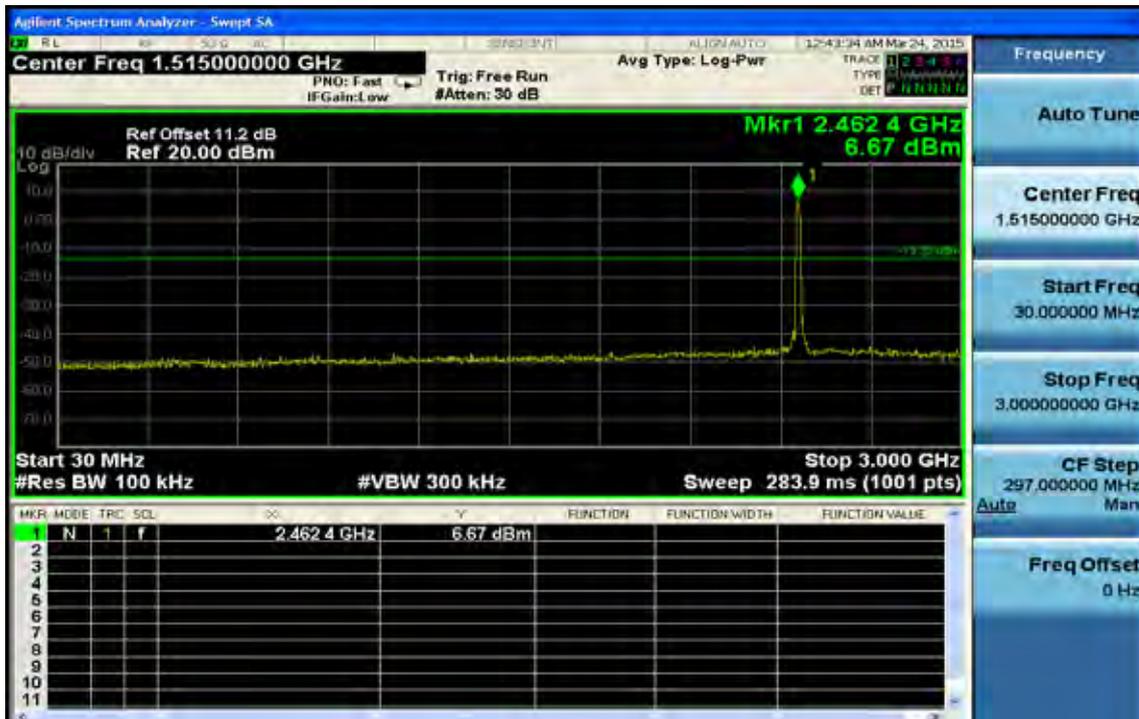
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### Spurious Emission Test Data CH-High



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802.11g

Band Edges Test Data CH-Low



Band Edges Test Data CH-High



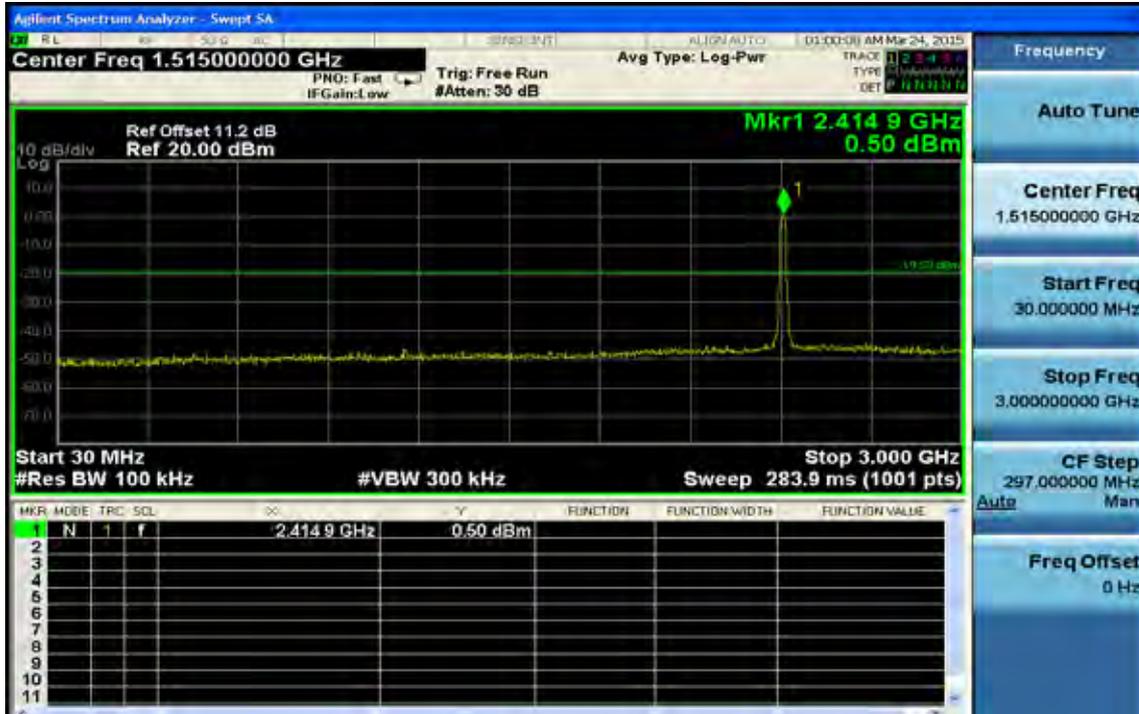
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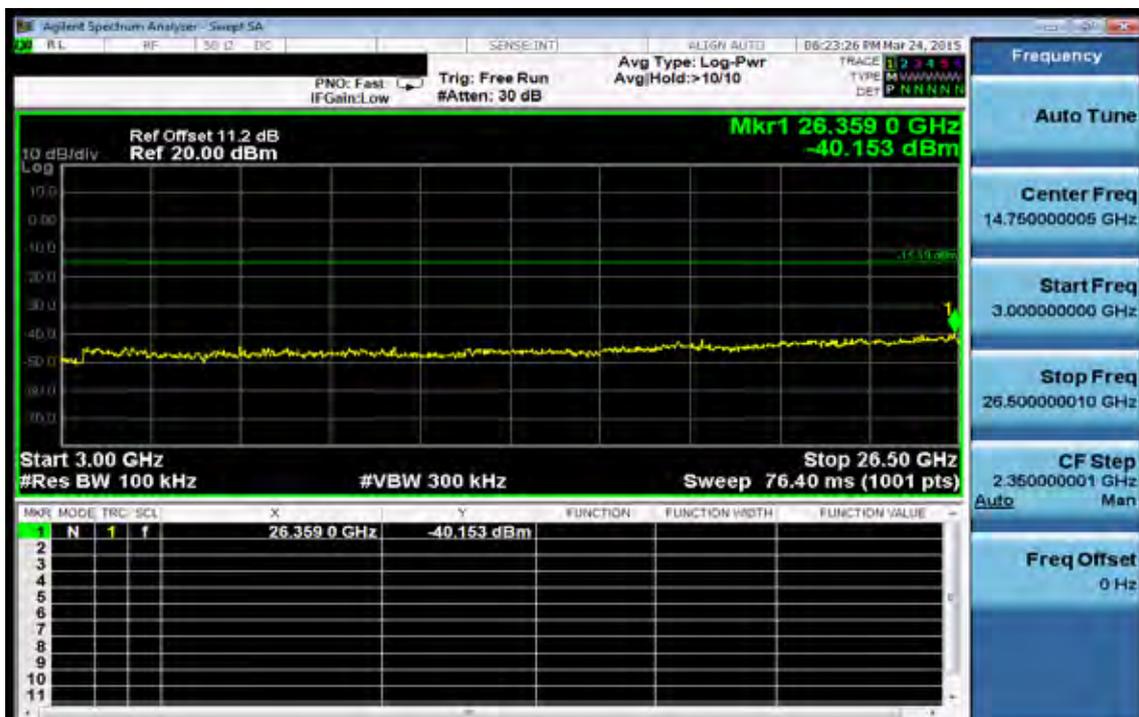
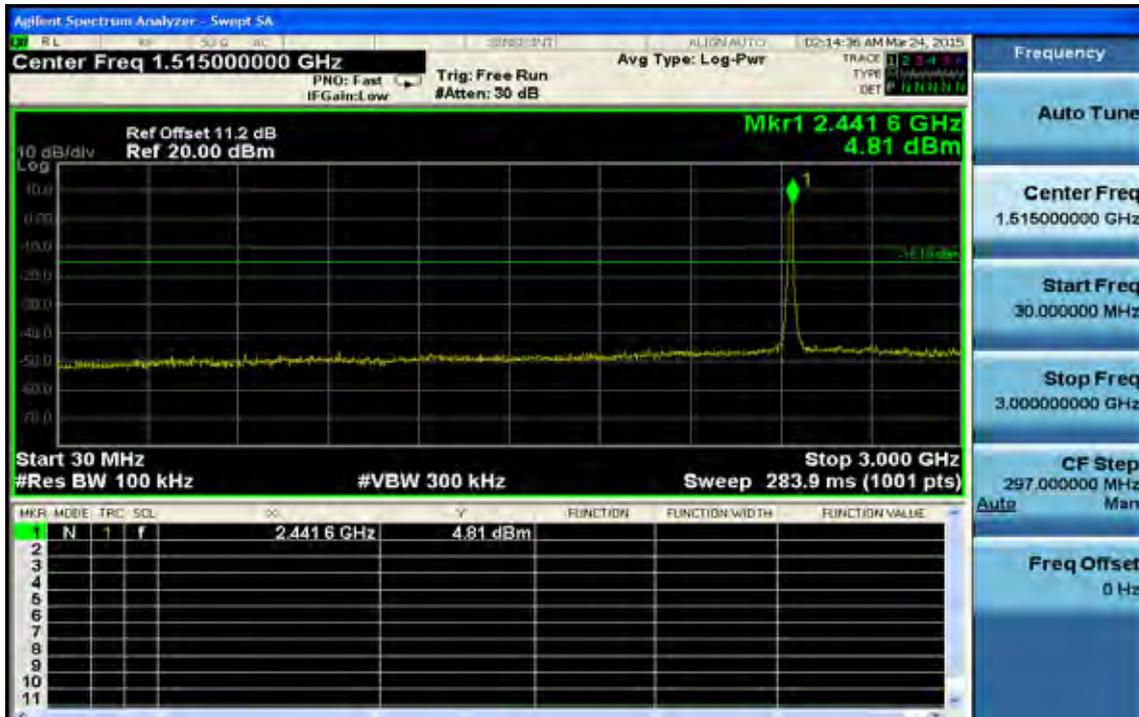
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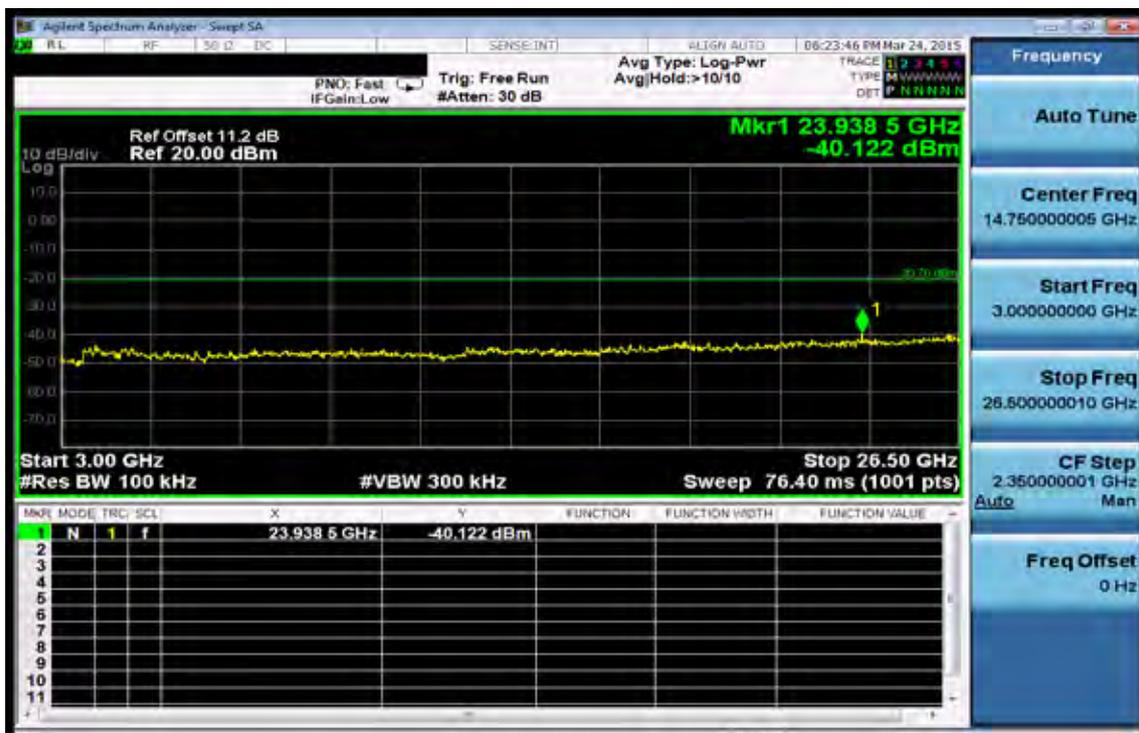
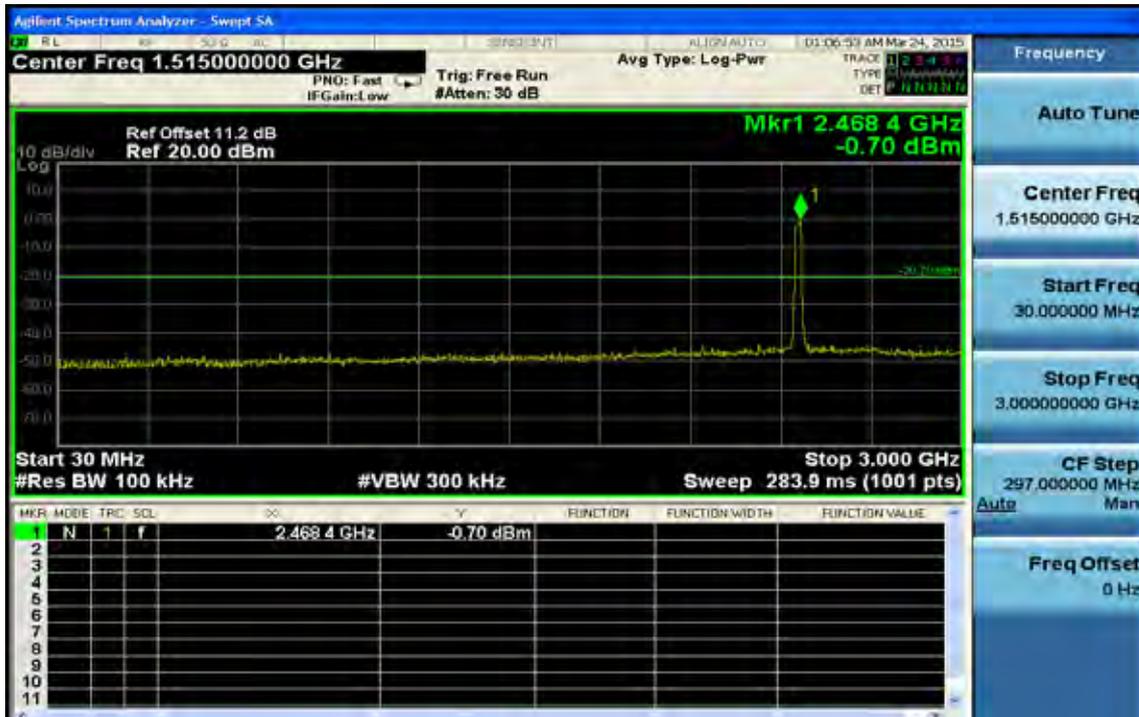
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Band Edges Test Data CH-Low



Band Edges Test Data CH-High



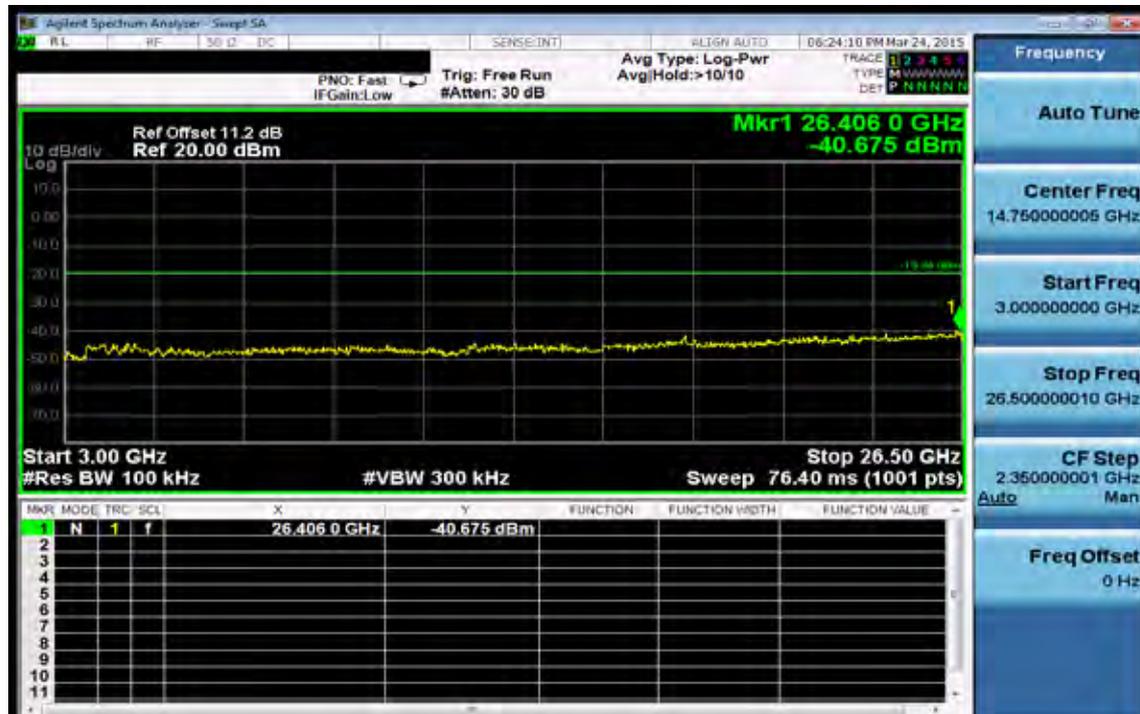
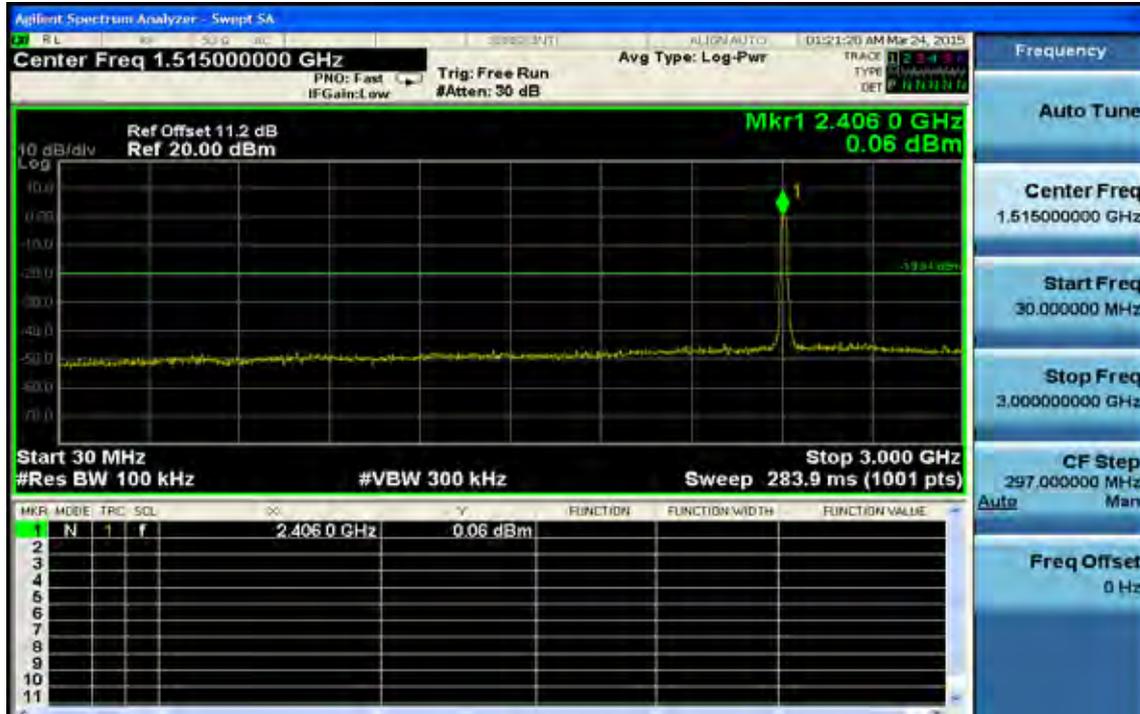
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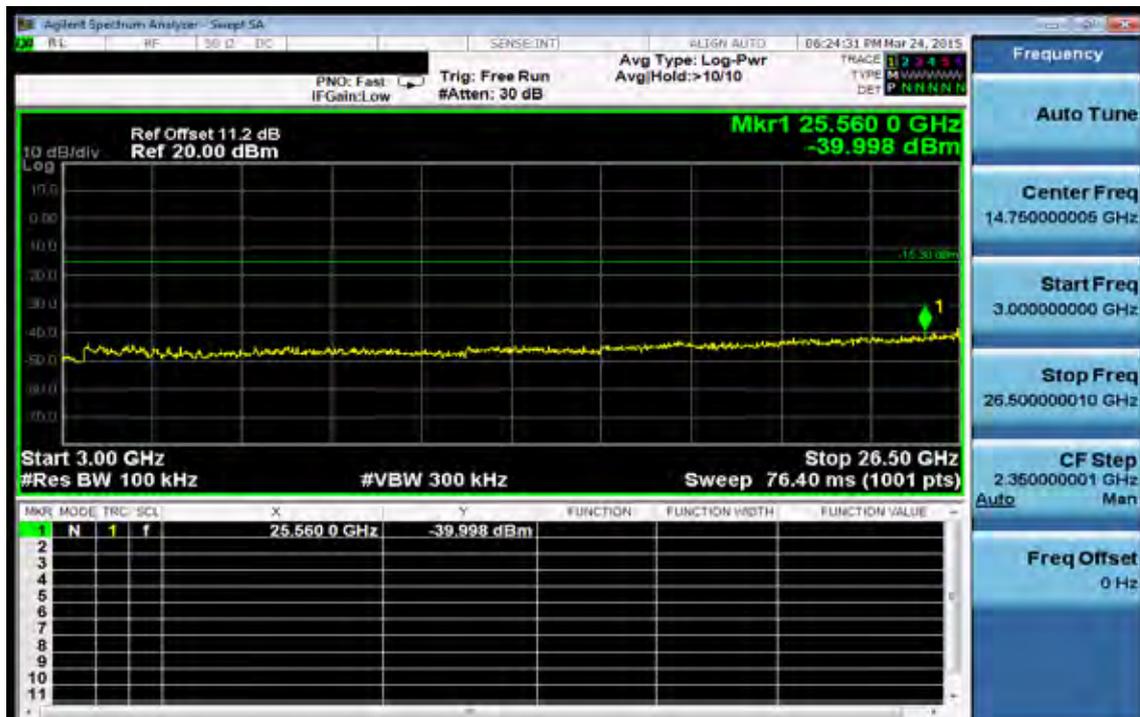
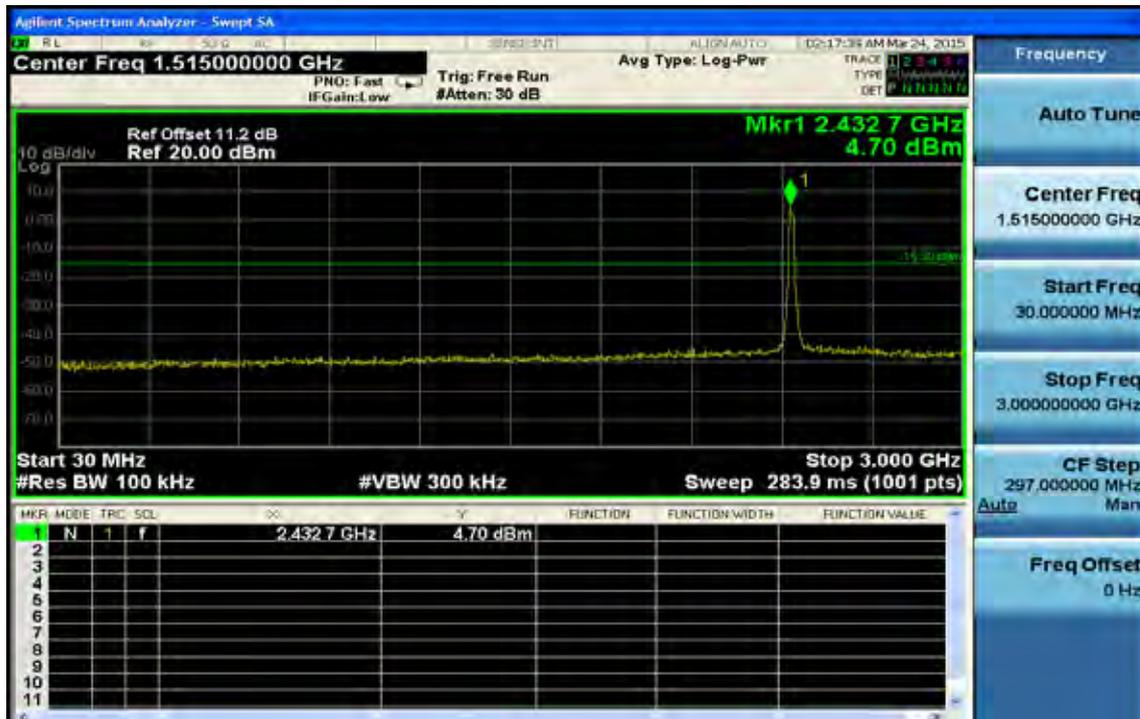
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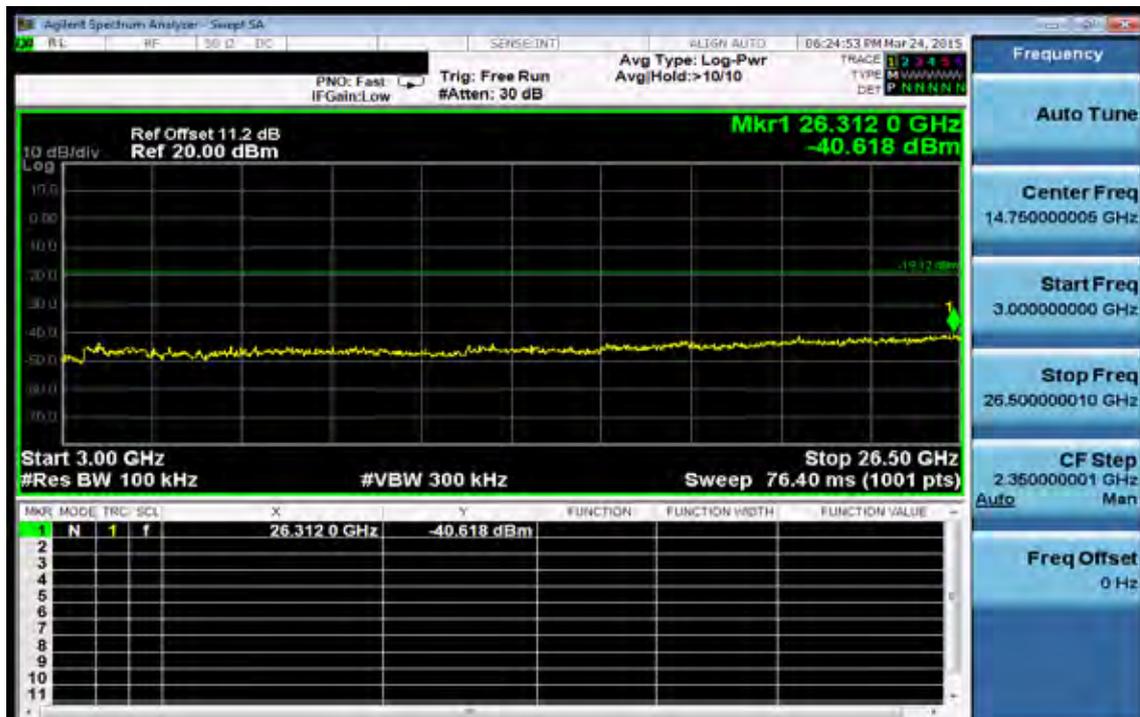
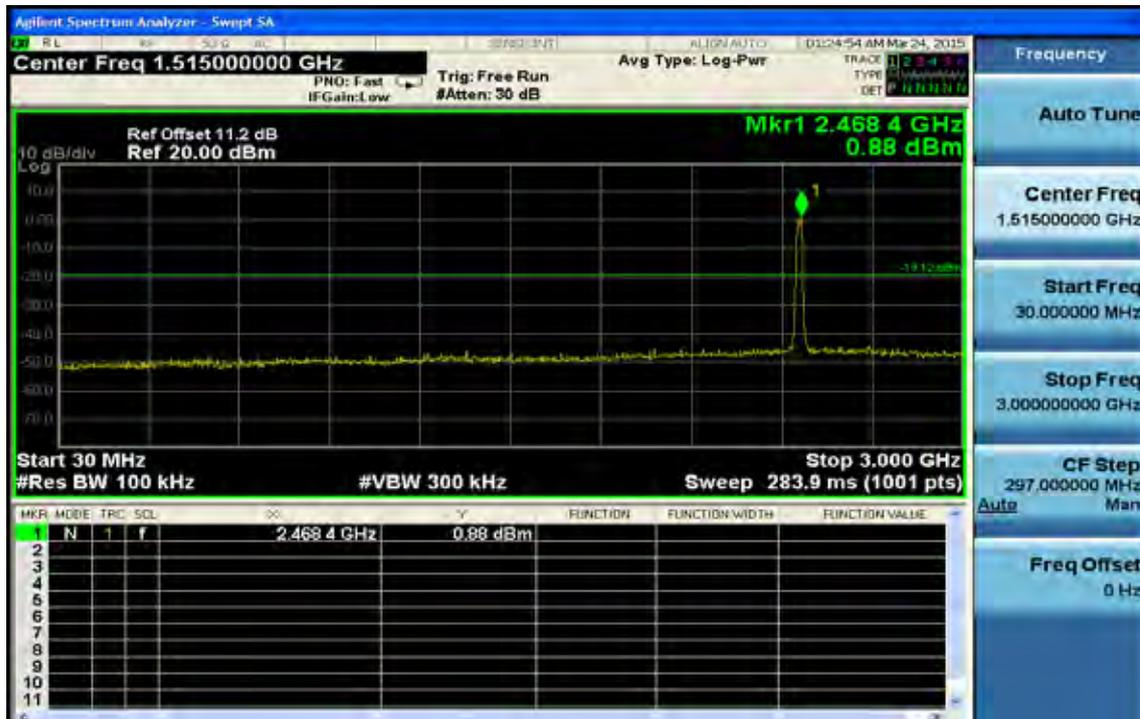
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### 802.11n\_HT40

### Band Edges Test Data CH-Low



### Band Edges Test Data CH-High



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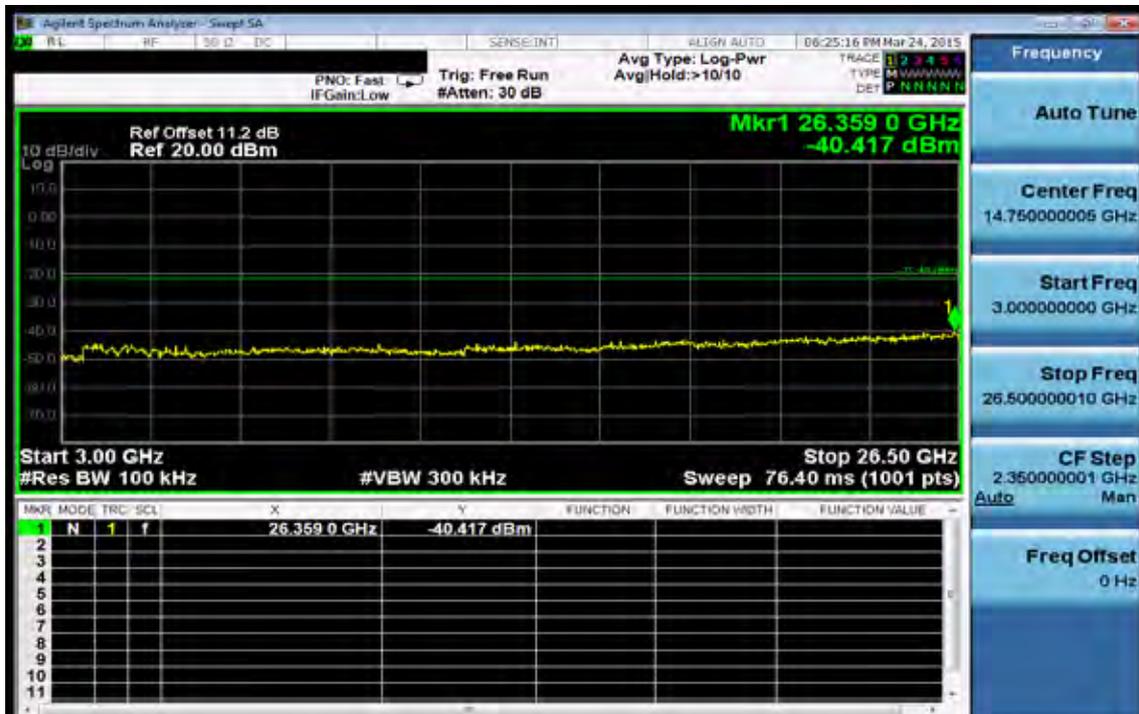
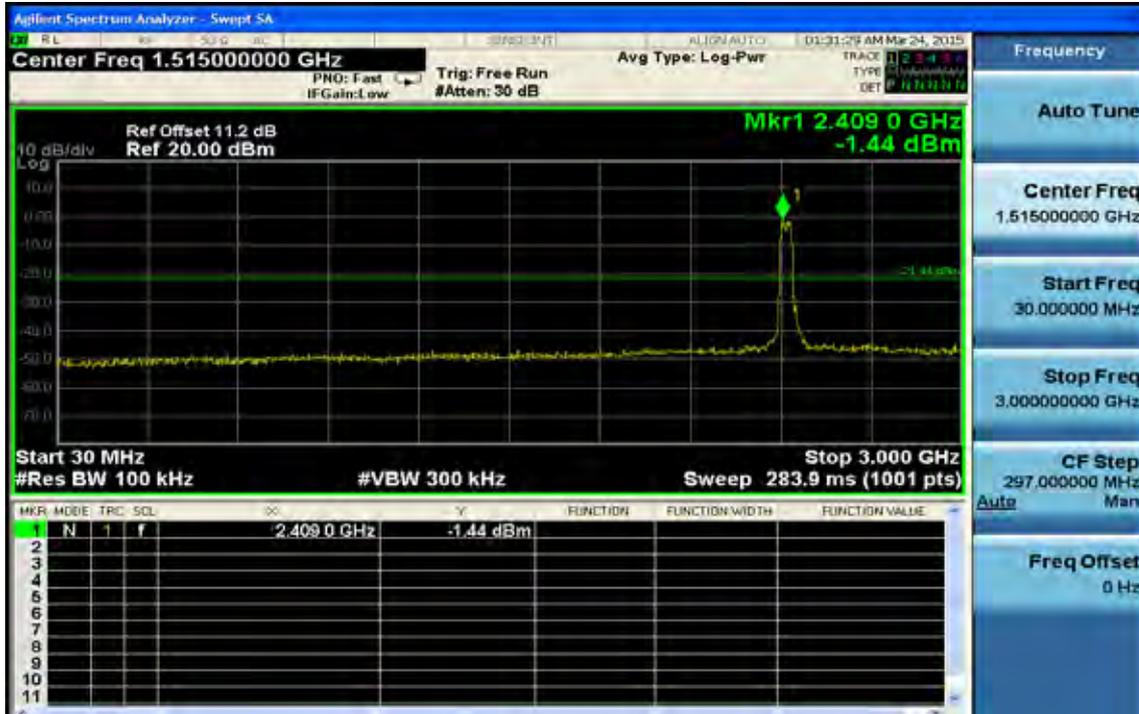
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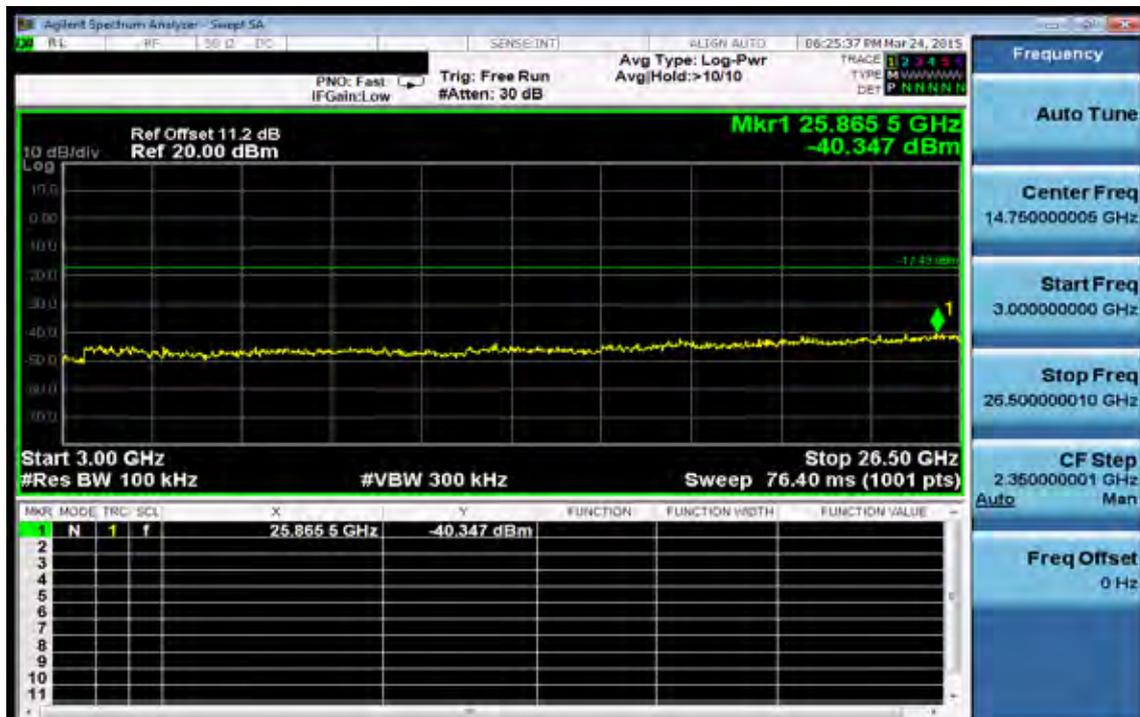
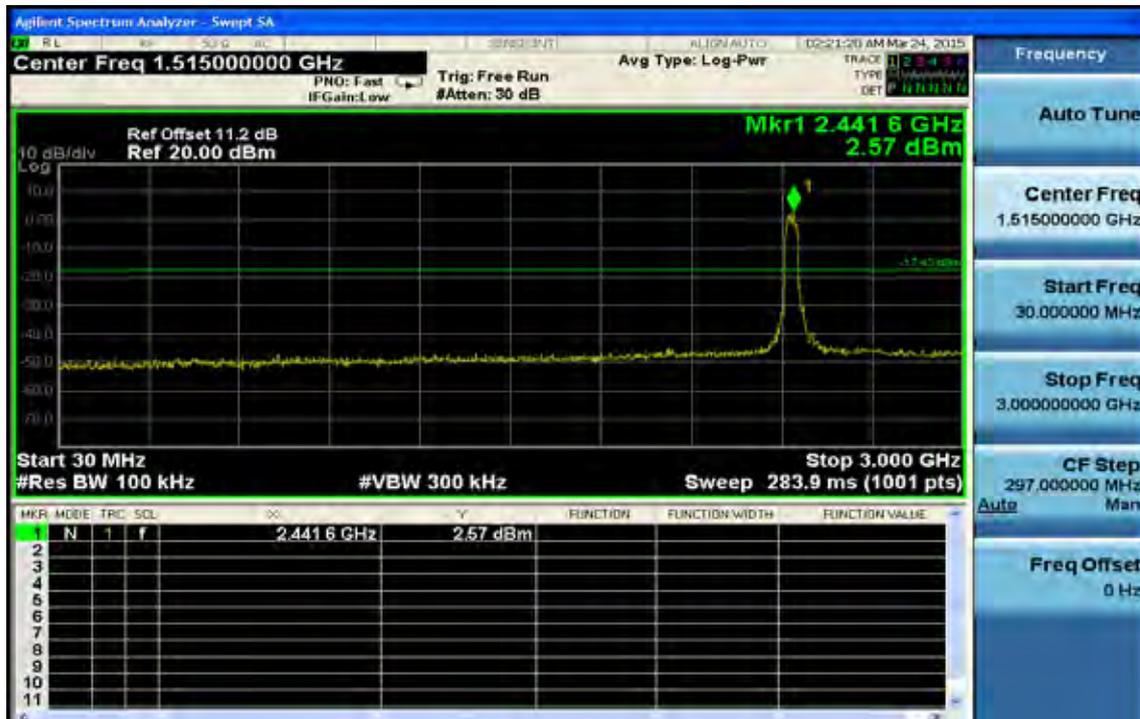
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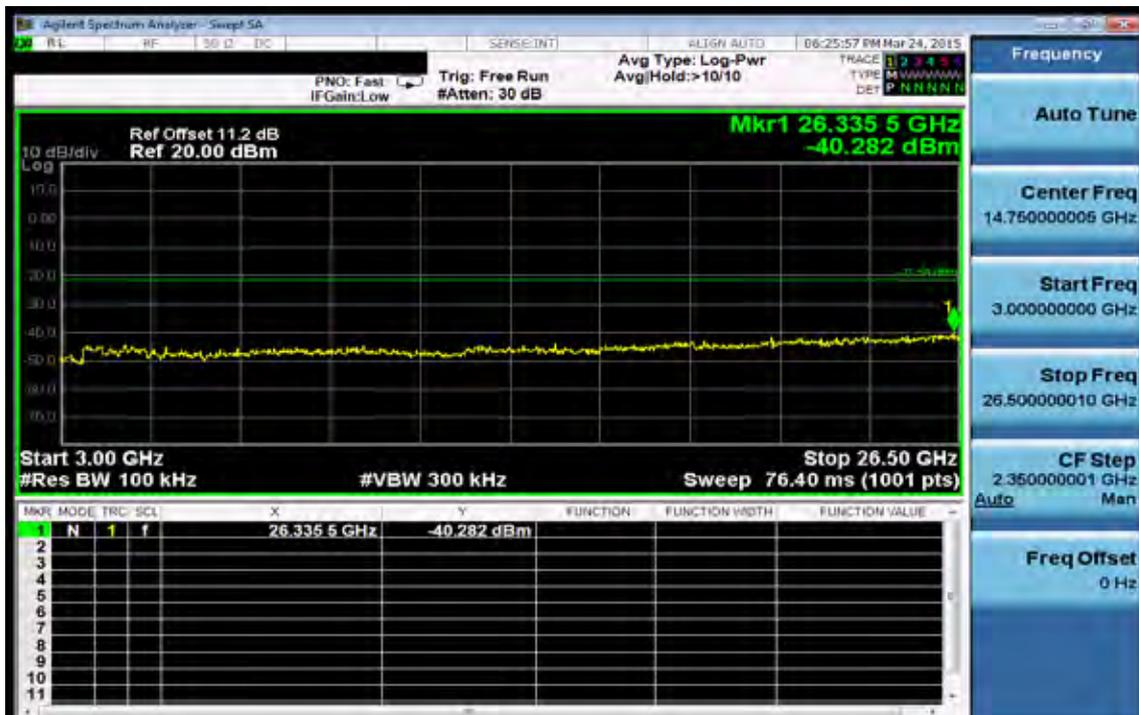
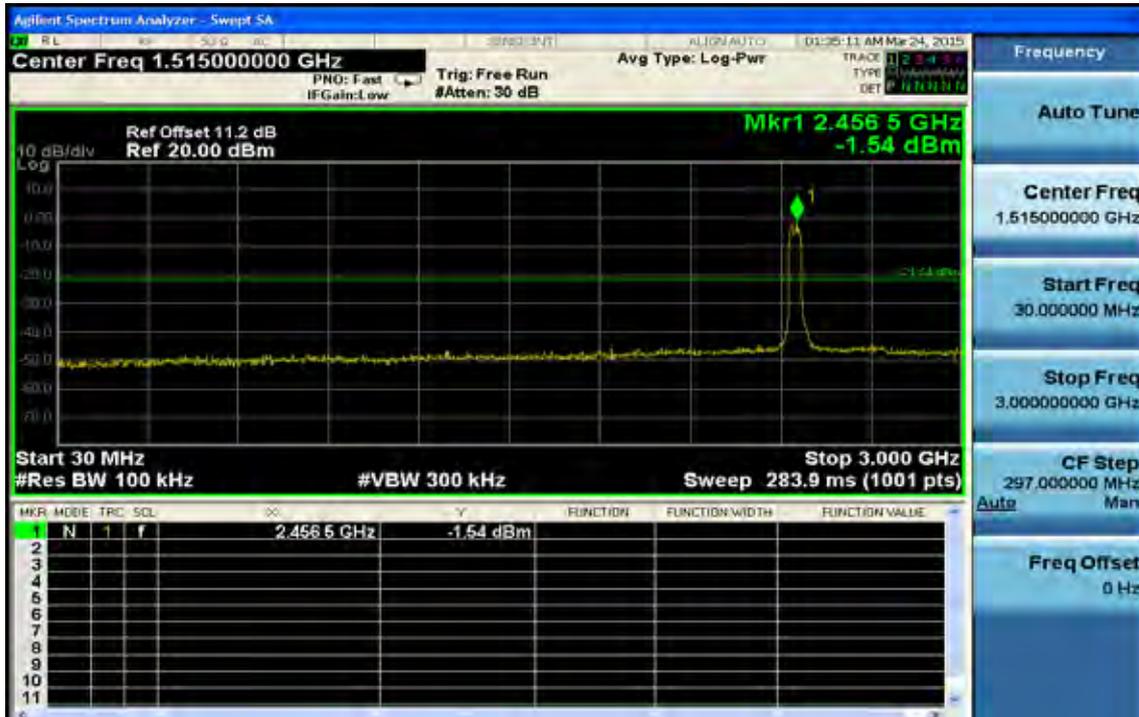
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## 11 RADIATED BANDEDGE AND SPURIOUS EMISSION MEASUREMENT

### 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 (dBμV/m) = 20 log Emission level (dBμV/m)

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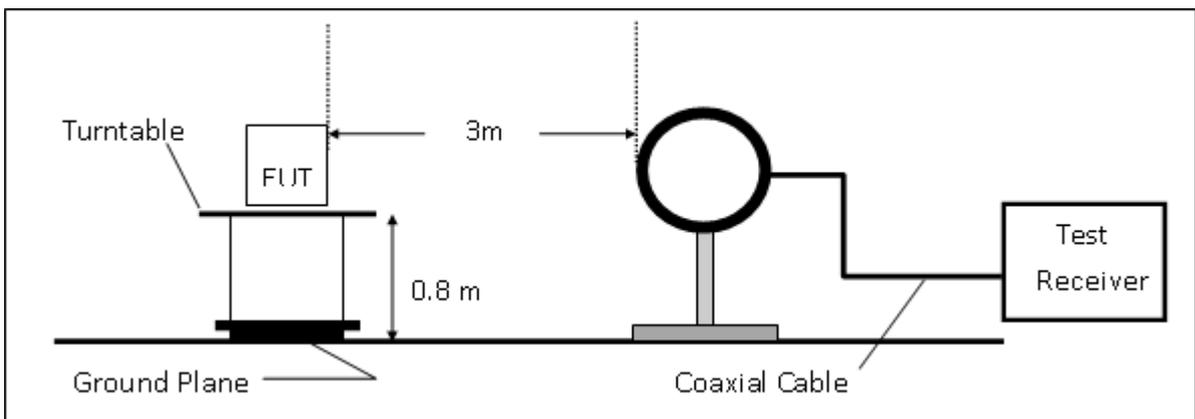
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**11.2 Measurement Equipment Used:**

966 Chamber					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
EMI Test Receiver	R&S	ESC17	100760	05/26/2014	05/25/2015
EXA Spectrum Analyzer	Agilent	N9010A	MY50420195	12/22/2014	12/21/2015
Spectrum Analyzer	R&S	FSV-30	101398	10/07/2014	10/06/2015
Loop Antenna	ETS.LINDGREN	6502	00148045	07/03/2014	07/02/2015
Bilog Antenna	SCHWAZBECK	VULB9168	378	12/23/2014	12/22/2015
Horn antenna	ETS.LINDGREN	3117	123995	05/19/2014	05/18/2015
Horn Antenna	Schwarzbeck	BBHA9170	184	12/25/2014	12/24/2015
Pre-Amplifier	Agilent	8447D	2944A07676	01/02/2015	01/01/2016
Pre-Amplifier	Agilent	8449B	3008A00578	01/02/2015	01/01/2016
Pre-Amplifier	EMC Instruments Corp.	EMC184045	980135	01/02/2015	01/01/2016
Filter 2400-2483.5 MHz	EWT	EWT-14-0166	M2	01/02/2015	01/01/2016
Attenuator	Mini-Circuit	BW-S10W2+	004	01/02/2015	01/01/2016
Turn Table	HD	DT420	N/A	N.C.R	N.C.R
Antenna Tower	HD	MA240-N	240/657	N.C.R	N.C.R
Controller	HD	HD100	N/A	N.C.R	N.C.R
Low Loss Cable	Huber Suhner	966_Rx	9	01/02/2015	01/01/2016

**11.3 Test SET-UP**

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

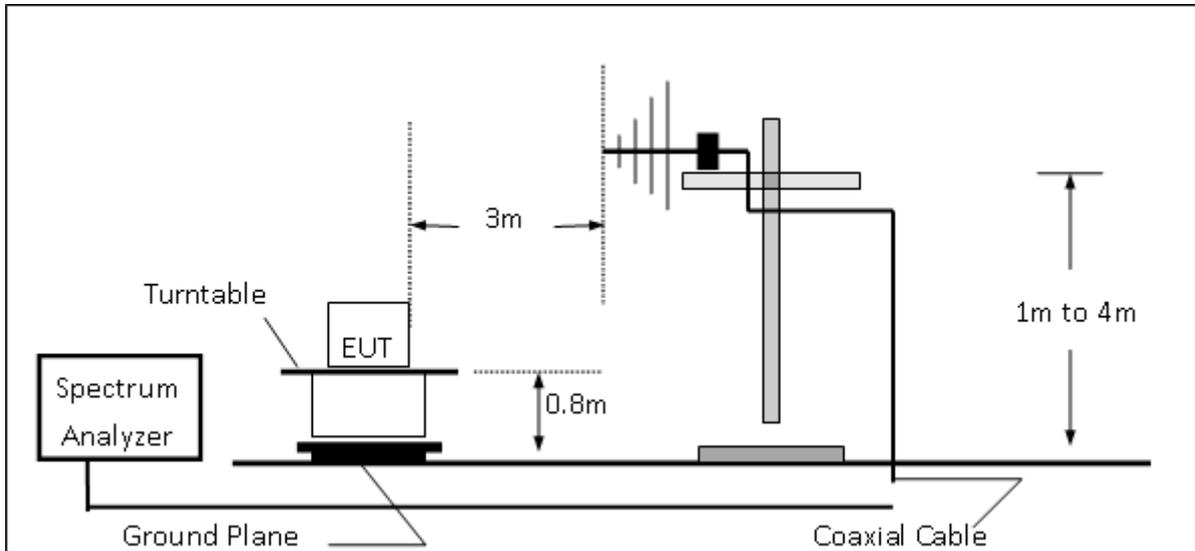


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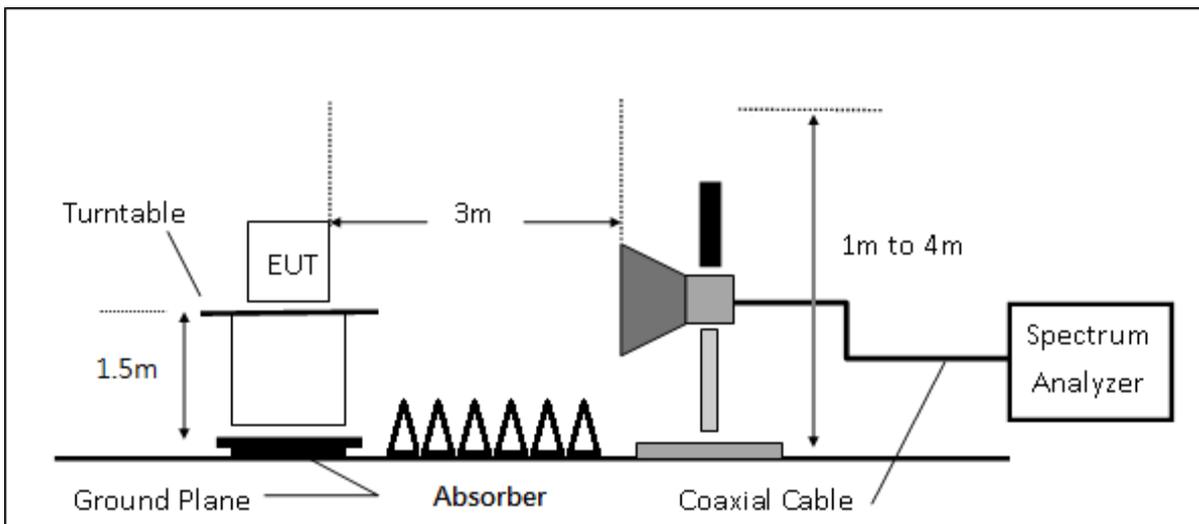
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(B) Radiated Emission Test Set-Up, Frequency form 30MHz to 1000MHz



(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 V03r02.
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 ≥ 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(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV/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 Band	:802.11 b	Test Date	:2015-04-10
Fundamental Frequency	:2412 MHz	Temp./Humi.	: 24.8deg_C/74RH
Operation Mode	:Band Edge LOW	Engineer	: Ashton
EUT Pol.	:H Plane	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	Average	35.17	6.62	41.79	54.00	-12.21
2390.00	E	Peak	50.08	6.62	56.70	74.00	-17.30

Operation Band	:802.11 b	Test Date	:2015-04-10
Fundamental Frequency	:2412 MHz	Temp./Humi.	: 24.8deg_C/74RH
Operation Mode	:Band Edge LOW	Engineer	: Ashton
EUT Pol.	:H Plane	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	Average	37.02	6.62	43.64	54.00	-10.36
2390.00	E	Peak	49.89	6.62	56.51	74.00	-17.49

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Operation Band	:802.11 b	Test Date	:2015-04-10
Fundamental Frequency	:2462 MHz	Temp./Humi.	: 24.8deg_C/74RH
Operation Mode	:Band Edge HIGH	Engineer	: Ashton
EUT Pol.	:H Plane	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	dBμV	dB	dBμV/m	dBμV/m	dB
2483.50	E	Average	35.13	6.96	42.09	54.00	-11.91
2483.50	E	Peak	50.26	6.96	57.22	74.00	-16.78

Operation Band	:802.11 b	Test Date	:2015-04-10
Fundamental Frequency	:2462 MHz	Temp./Humi.	: 24.8deg_C/74RH
Operation Mode	:Band Edge HIGH	Engineer	: Ashton
EUT Pol.	:H Plane	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	dBμV	dB	dBμV/m	dBμV/m	dB
2483.50	E	Average	36.69	6.96	43.65	54.00	-10.35
2483.50	E	Peak	51.64	6.96	58.60	74.00	-15.40

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

Operation Band	:802.11 g	Test Date	:2015-04-10
Fundamental Frequency	:2412 MHz	Temp./Humi.	: 24.8deg_C/74RH
Operation Mode	:Band Edge LOW	Engineer	: Ashton
EUT Pol.	:H Plane	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	dBµV	dB	dBµV/m	dBµV/m	dB
2390.00	E	Average	35.23	6.62	41.85	54.00	-12.15
2390.00	E	Peak	49.27	6.62	55.89	74.00	-18.11

Operation Band	:802.11 g	Test Date	:2015-04-10
Fundamental Frequency	:2412 MHz	Temp./Humi.	: 24.8deg_C/74RH
Operation Mode	:Band Edge LOW	Engineer	: Ashton
EUT Pol.	:H Plane	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	dBµV	dB	dBµV/m	dBµV/m	dB
2383.68	S	Average	36.76	6.62	43.38	54.00	-10.62
2383.68	S	Peak	54.20	6.62	60.82	74.00	-13.18
2390.00	E	Average	37.19	6.62	43.81	54.00	-10.19
2390.00	E	Peak	52.00	6.62	58.61	74.00	-15.39

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Operation Band	:802.11 g	Test Date	:2015-04-10
Fundamental Frequency	:2462 MHz	Temp./Humi.	: 24.8deg_C/74RH
Operation Mode	:Band Edge HIGH	Engineer	: Ashton
EUT Pol.	:H Plane	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	Average	36.21	6.96	43.17	54.00	-10.83
2483.50	E	Peak	51.82	6.96	58.79	74.00	-15.21

Operation Band	:802.11 g	Test Date	:2015-04-10
Fundamental Frequency	:2462 MHz	Temp./Humi.	: 24.8deg_C/74RH
Operation Mode	:Band Edge HIGH	Engineer	: Ashton
EUT Pol.	:H Plane	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	Average	40.96	6.96	47.92	54.00	-6.08
2483.50	E	Peak	58.18	6.96	65.15	74.00	-8.85
2483.70	S	Average	40.73	6.96	47.69	54.00	-6.31
2483.70	S	Peak	59.68	6.96	66.64	74.00	-7.36

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

Operation Band	:802.11 n20M	Test Date	:2015-04-10
Fundamental Frequency	:2412 MHz	Temp./Humi.	: 24.8deg_C/74RH
Operation Mode	:Band Edge LOW	Engineer	: Ashton
EUT Pol.	:H Plane	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	Average	36.07	6.62	42.69	54.00	-11.31
2390.00	E	Peak	50.29	6.62	56.91	74.00	-17.09

Operation Band	:802.11 n20M	Test Date	:2015-04-10
Fundamental Frequency	:2412 MHz	Temp./Humi.	: 24.8deg_C/74RH
Operation Mode	:Band Edge LOW	Engineer	: Ashton
EUT Pol.	:H Plane	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
2383.56	S	Average	36.48	6.62	43.10	54.00	-10.90
2383.56	S	Peak	54.82	6.62	61.43	74.00	-12.57
2390.00	E	Average	37.17	6.62	43.79	54.00	-10.21
2390.00	E	Peak	53.25	6.62	59.87	74.00	-14.13

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Operation Band	:802.11 n20M	Test Date	:2015-04-10
Fundamental Frequency	:2462 MHz	Temp./Humi.	: 24.8deg_C/74RH
Operation Mode	:Band Edge HIGH	Engineer	: Ashton
EUT Pol.	:H Plane	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	dBµV	dB	dBµV/m	dBµV/m	dB
2483.50	E	Average	36.07	6.96	43.03	54.00	-10.97
2483.50	E	Peak	51.45	6.96	58.41	74.00	-15.59

Operation Band	:802.11 n20M	Test Date	:2015-04-10
Fundamental Frequency	:2462 MHz	Temp./Humi.	: 24.8deg_C/74RH
Operation Mode	:Band Edge HIGH	Engineer	: Ashton
EUT Pol.	:H Plane	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	dBµV	dB	dBµV/m	dBµV/m	dB
2483.50	E	Average	40.74	6.96	47.70	54.00	-6.30
2483.50	E	Peak	58.78	6.96	65.74	74.00	-8.26
2485.30	S	Average	39.49	6.97	46.46	54.00	-7.54
2485.30	S	Peak	59.95	6.97	66.92	74.00	-7.08

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

Operation Band	:802.11 n40M	Test Date	:2015-04-10
Fundamental Frequency	:2422 MHz	Temp./Humi.	: 24.8deg_C/74RH
Operation Mode	:Band Edge LOW	Engineer	: Ashton
EUT Pol.	:H Plane	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	Average	35.55	6.62	42.17	54.00	-11.83
2390.00	E	Peak	49.75	6.62	56.37	74.00	-17.63

Operation Band	:802.11 n40M	Test Date	:2015-04-10
Fundamental Frequency	:2422 MHz	Temp./Humi.	: 24.8deg_C/74RH
Operation Mode	:Band Edge LOW	Engineer	: Ashton
EUT Pol.	:H Plane	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	Average	37.39	6.62	44.01	54.00	-9.99
2390.00	E	Peak	51.94	6.62	58.55	74.00	-15.45

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Operation Band	:802.11 n40M	Test Date	:2015-04-10
Fundamental Frequency	:2452 MHz	Temp./Humi.	: 24.8deg_C/74RH
Operation Mode	:Band Edge HIGH	Engineer	: Ashton
EUT Pol.	:H Plane	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	dBμV	dB	dBμV/m	dBμV/m	dB
2483.50	E	Average	37.64	6.96	44.60	54.00	-9.40
2483.50	E	Peak	52.13	6.96	59.09	74.00	-14.91
2485.40	S	Average	37.29	6.97	44.26	54.00	-9.74
2485.40	S	Peak	54.14	6.97	61.11	74.00	-12.89

Operation Band	:802.11 n40M	Test Date	:2015-04-10
Fundamental Frequency	:2452 MHz	Temp./Humi.	: 24.8deg_C/74RH
Operation Mode	:Band Edge HIGH	Engineer	: Ashton
EUT Pol.	:H Plane	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	dBμV	dB	dBμV/m	dBμV/m	dB
2483.50	E	Average	44.83	6.96	51.79	54.00	-2.21
2483.50	E	Peak	59.48	6.96	66.44	74.00	-7.56

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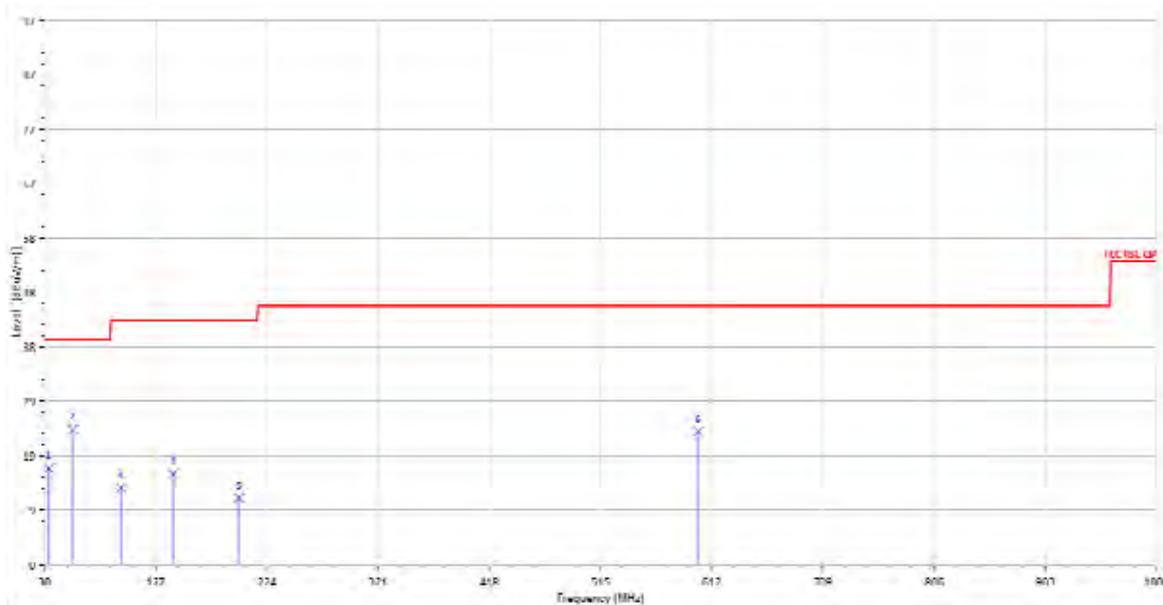
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**Radiated Spurious Emission Measurement Result (802.11 g)**

**Below 1GHz Worst-Case Data:**

Operation Band	:802.11 g	Test Date	:2015-04-10
Fundamental Frequency	:2412 MHz	Temp./Humi.	: 24.8deg_C/74RH
Operation Mode	:TX LOW	Engineer	: Ashton
EUT Pol.	:H Plane	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
33.88	S	Peak	32.36	-15.22	17.14	40.00	-22.86
54.25	S	Peak	50.86	-26.79	24.07	40.00	-15.93
96.93	S	Peak	38.03	-24.36	13.67	43.50	-29.83
142.52	S	Peak	38.00	-21.92	16.09	43.50	-27.41
199.75	S	Peak	35.16	-23.28	11.88	43.50	-31.62
600.36	S	Peak	36.12	-12.45	23.67	46.00	-22.33

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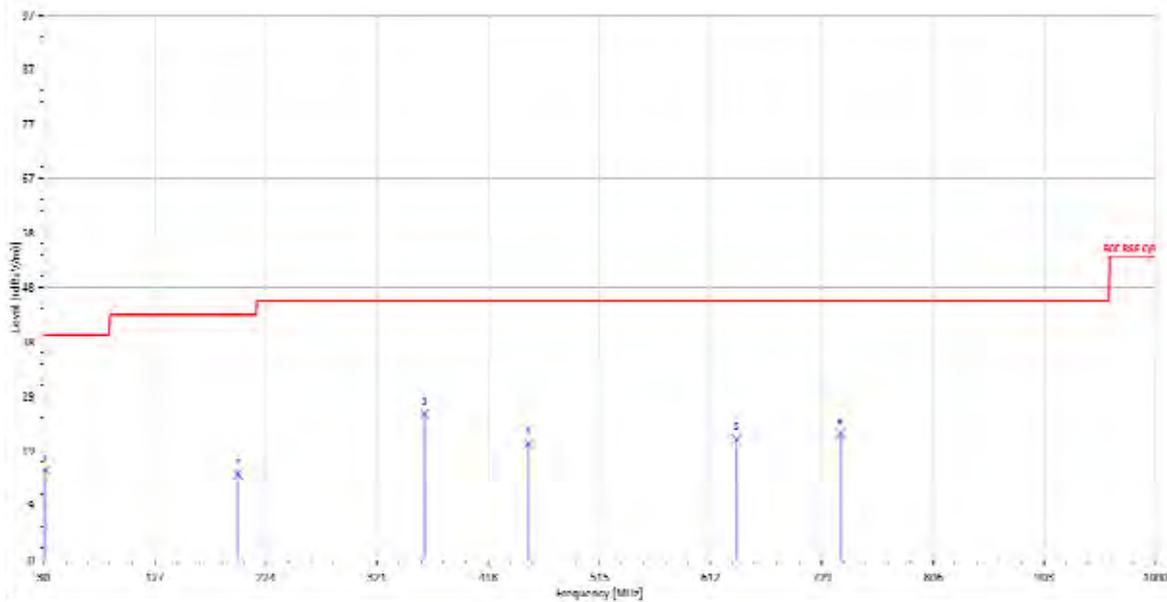
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Operation Band	:802.11 g	Test Date	:2015-04-10
Fundamental Frequency	:2412 MHz	Temp./Humi.	: 24.8deg_C/74RH
Operation Mode	:TX LOW	Engineer	: Ashton
EUT Pol.	:H Plane	Measurement Antenna Pol.	:HORIZONTAL



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
31.94	S	Peak	30.08	-14.17	15.92	40.00	-24.08
199.75	S	Peak	38.51	-23.28	15.23	43.50	-28.27
362.71	S	Peak	43.05	-17.11	25.93	46.00	-20.07
452.92	S	Peak	35.52	-14.83	20.69	46.00	-25.31
634.31	S	Peak	33.05	-11.62	21.42	46.00	-24.58
725.49	S	Peak	33.05	-10.71	22.34	46.00	-23.66

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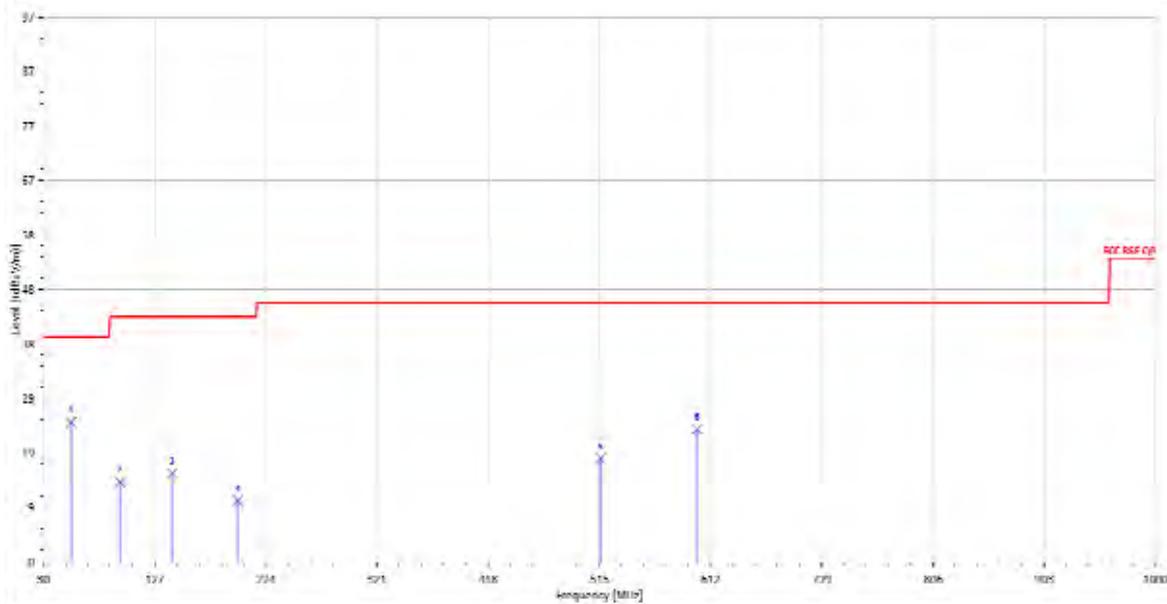
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Operation Band	:802.11 g	Test Date	:2015-04-10
Fundamental Frequency	:2437 MHz	Temp./Humi.	: 24.8deg_C/74RH
Operation Mode	:TX MID	Engineer	: Ashton
EUT Pol.	:H Plane	Measurement Antenna Pol.	:VERTICAL



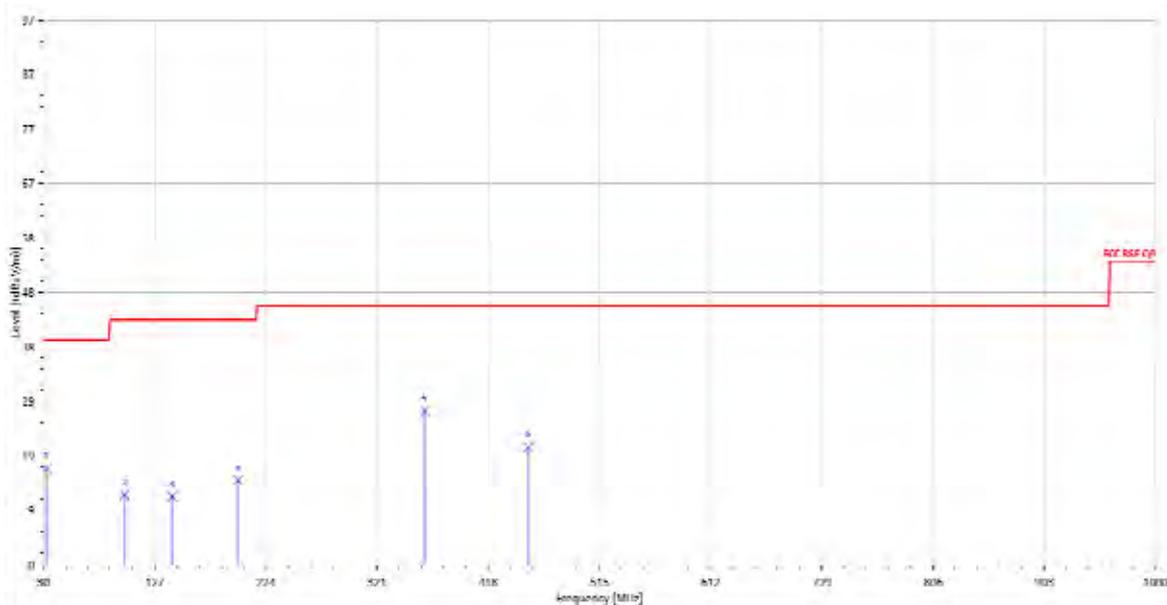
Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
54.25	S	Peak	51.57	-26.79	24.77	40.00	-15.23
96.93	S	Peak	38.53	-24.36	14.16	43.50	-29.34
142.52	S	Peak	37.59	-21.92	15.68	43.50	-27.82
199.75	S	Peak	34.10	-23.28	10.83	43.50	-32.67
515.97	S	Peak	31.92	-13.63	18.28	46.00	-27.72
600.36	S	Peak	35.98	-12.45	23.52	46.00	-22.48

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Operation Band	:802.11 g	Test Date	:2015-04-10
Fundamental Frequency	:2437 MHz	Temp./Humi.	: 24.8deg_C/74RH
Operation Mode	:TX MID	Engineer	: Ashton
EUT Pol.	:H Plane	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
32.91	S	Peak	31.82	-14.69	17.12	40.00	-22.88
100.81	S	Peak	36.06	-23.69	12.37	43.50	-31.13
142.52	S	Peak	34.01	-21.92	12.09	43.50	-31.41
199.75	S	Peak	38.26	-23.28	14.99	43.50	-28.51
362.71	S	Peak	44.53	-17.11	27.42	46.00	-18.58
452.92	S	Peak	35.78	-14.83	20.96	46.00	-25.04

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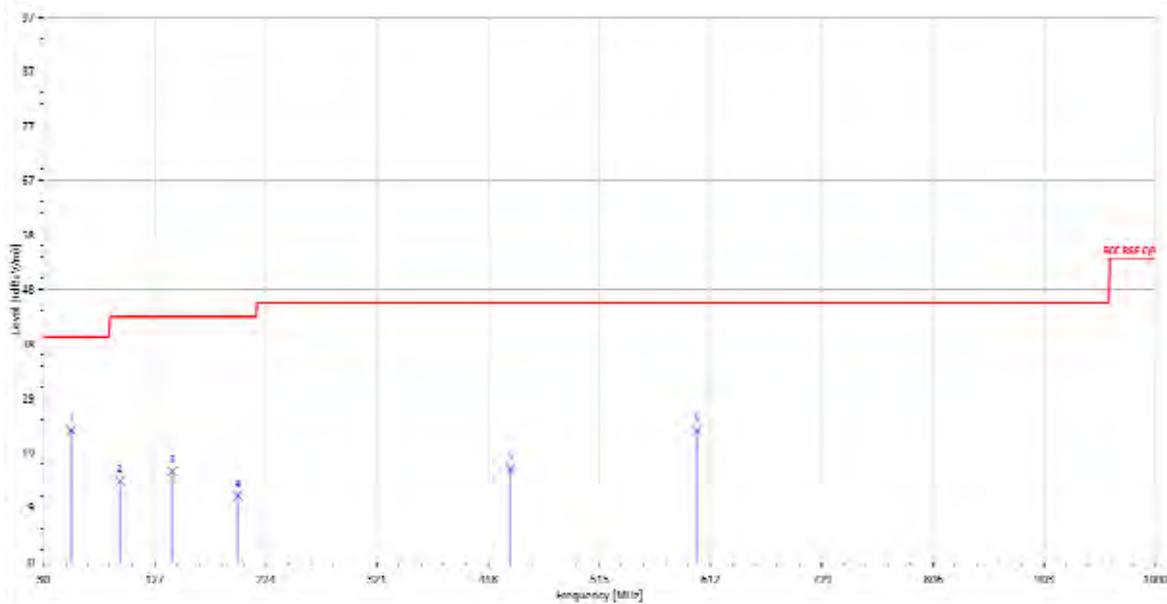
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Operation Band	:802.11 g	Test Date	:2015-04-10
Fundamental Frequency	:2462 MHz	Temp./Humi.	: 24.8deg_C/74RH
Operation Mode	:TX HIGH	Engineer	: Ashton
EUT Pol.	:H Plane	Measurement Antenna Pol.	:VERTICAL



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
54.25	S	Peak	50.21	-26.79	23.42	40.00	-16.58
96.93	S	Peak	38.74	-24.36	14.37	43.50	-29.13
142.52	S	Peak	37.93	-21.92	16.02	43.50	-27.48
199.75	S	Peak	35.04	-23.28	11.76	43.50	-31.74
437.40	S	Peak	31.86	-15.28	16.58	46.00	-29.42
600.36	S	Peak	35.83	-12.45	23.37	46.00	-22.63

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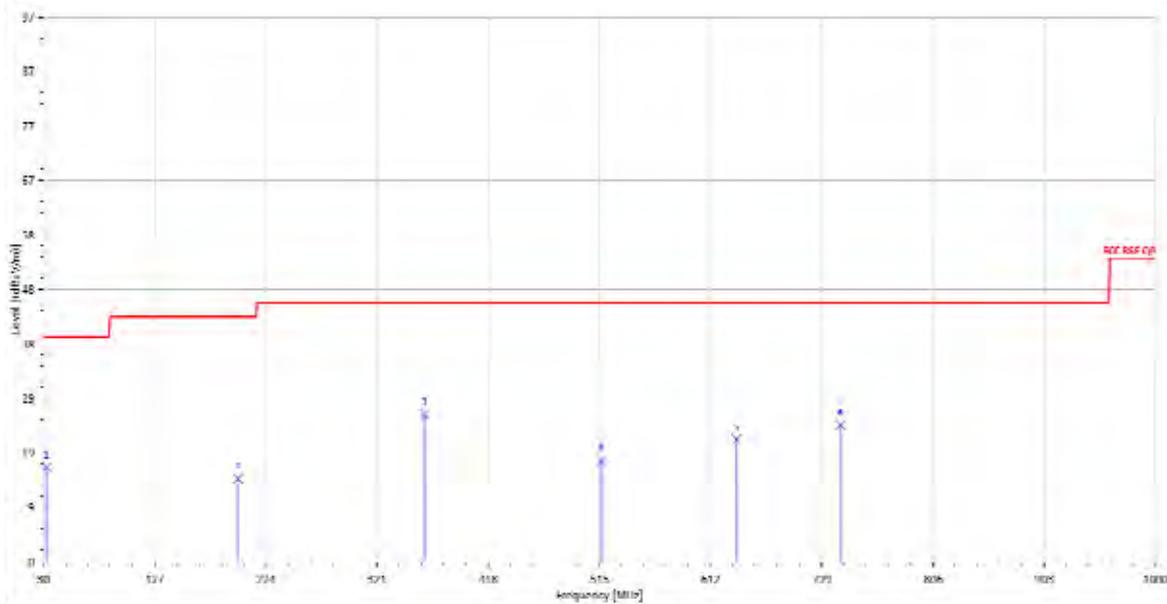
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Operation Band	:802.11 g	Test Date	:2015-04-10
Fundamental Frequency	:2462 MHz	Temp./Humi.	: 24.8deg_C/74RH
Operation Mode	:TX HIGH	Engineer	: Ashton
EUT Pol.	:H Plane	Measurement Antenna Pol.	:HORIZONTAL



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
32.91	S	Peak	31.44	-14.69	16.74	40.00	-23.26
199.75	S	Peak	38.02	-23.28	14.74	43.50	-28.76
362.71	S	Peak	43.34	-17.11	26.23	46.00	-19.77
516.94	S	Peak	31.64	-13.62	18.03	46.00	-27.97
634.31	S	Peak	33.36	-11.62	21.74	46.00	-24.26
725.49	S	Peak	35.06	-10.71	24.36	46.00	-21.65

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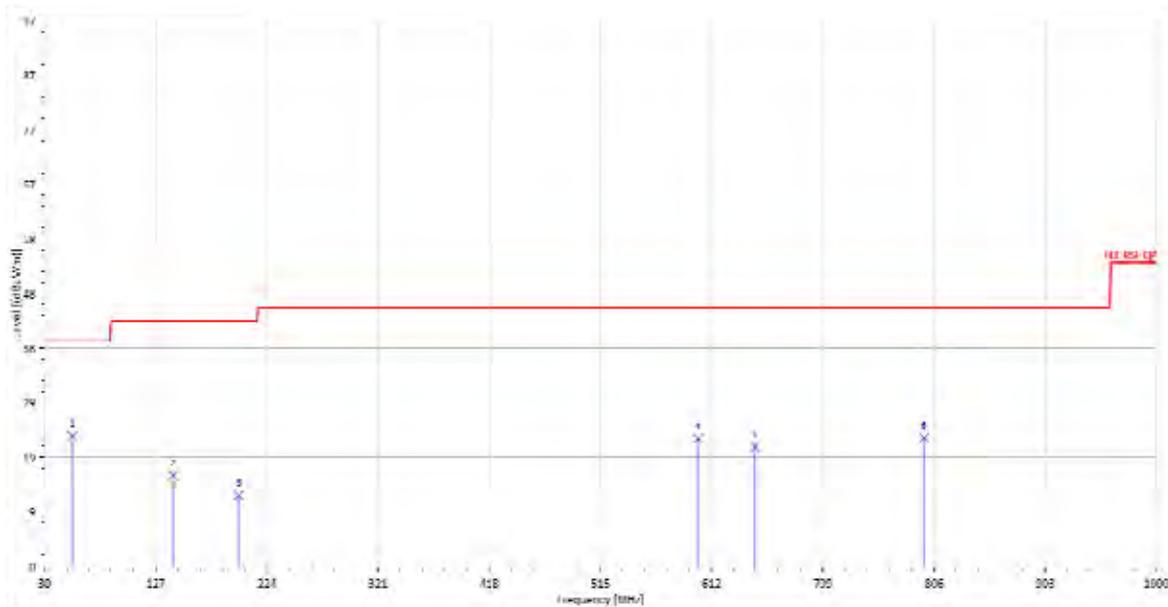
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### Radiated Spurious Emission Measurement Result (802.11\_HT40)

Operation Band	: 802.11 n40M	Test Date	: 2015-04-10
Fundamental Frequency	: 2422 MHz	Temp./Humi.	: 24.8deg_C/74RH
Operation Mode	: TX LOW	Engineer	: Ashton
EUT Pol.	: H Plane	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
54.25	S	Peak	49.92	-26.79	23.12	40.00	-16.88
142.52	S	Peak	38.07	-21.92	16.16	43.50	-27.34
199.75	S	Peak	35.85	-23.28	12.57	43.50	-30.93
600.36	S	Peak	35.10	-12.45	22.64	46.00	-23.36
649.83	S	Peak	32.52	-11.20	21.33	46.00	-24.67
797.27	S	Peak	32.37	-9.59	22.78	46.00	-23.22

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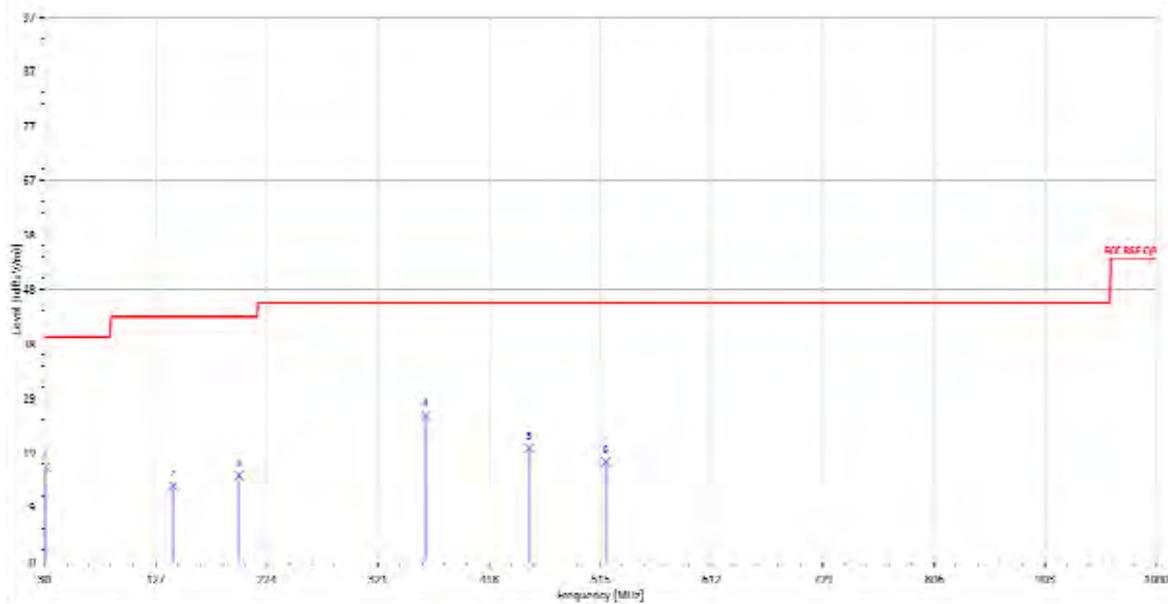
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Operation Band	: 802.11 n40M	Test Date	: 2015-04-10
Fundamental Frequency	: 2422 MHz	Temp./Humi.	: 24.8deg_C/74RH
Operation Mode	: TX LOW	Engineer	: Ashton
EUT Pol.	: H Plane	Measurement Antenna Pol.	: HORIZONTAL



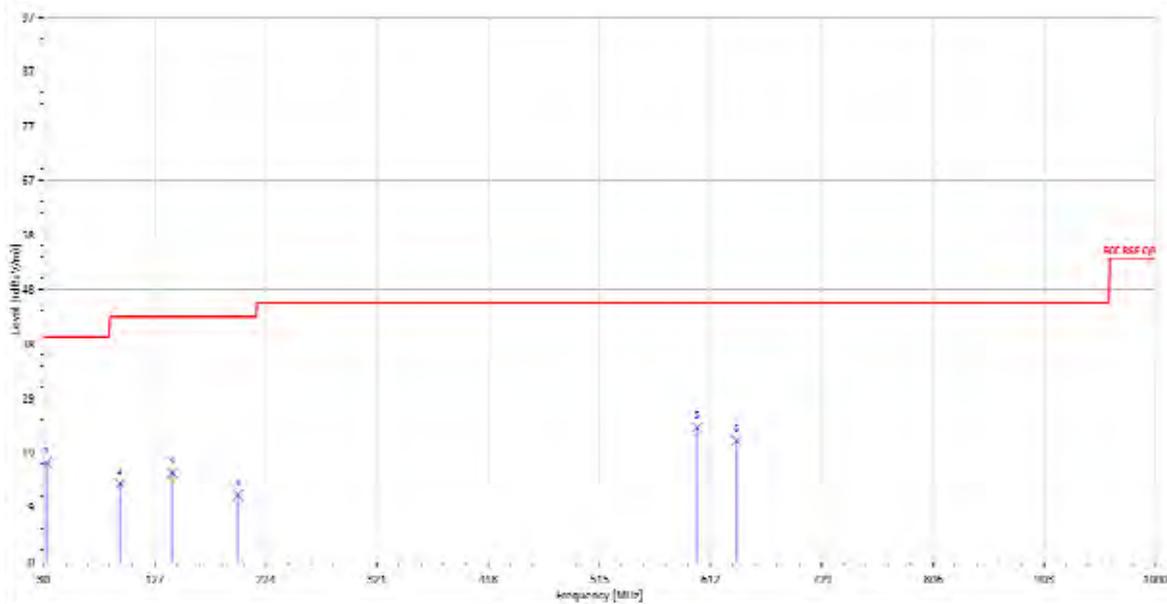
Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
30.97	S	Peak	30.52	-13.64	16.88	40.00	-23.12
142.52	S	Peak	35.38	-21.92	13.47	43.50	-30.03
199.75	S	Peak	38.59	-23.28	15.31	43.50	-28.19
362.71	S	Peak	43.00	-17.11	25.88	46.00	-20.12
452.92	S	Peak	35.01	-14.83	20.18	46.00	-25.82
519.85	S	Peak	31.35	-13.57	17.78	46.00	-28.22

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Operation Band	: 802.11 n40M	Test Date	: 2015-04-10
Fundamental Frequency	: 2437 MHz	Temp./Humi.	: 24.8deg_C/74RH
Operation Mode	: TX MID	Engineer	: Ashton
EUT Pol.	: H Plane	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
32.91	S	Peak	32.32	-14.69	17.63	40.00	-22.37
96.93	S	Peak	38.25	-24.36	13.89	43.50	-29.61
142.52	S	Peak	37.71	-21.92	15.80	43.50	-27.70
199.75	S	Peak	35.17	-23.28	11.89	43.50	-31.61
600.36	S	Peak	36.28	-12.45	23.83	46.00	-22.17
634.31	S	Peak	33.16	-11.62	21.54	46.00	-24.46

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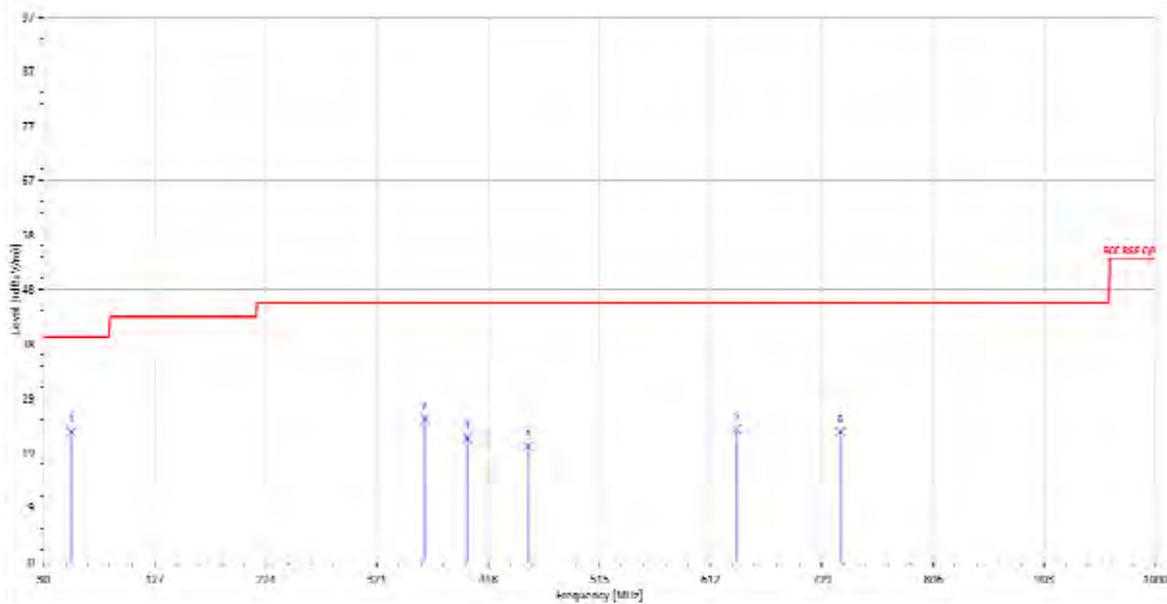
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Operation Band	: 802.11 n40M	Test Date	: 2015-04-10
Fundamental Frequency	: 2437 MHz	Temp./Humi.	: 24.8deg_C/74RH
Operation Mode	: TX MID	Engineer	: Ashton
EUT Pol.	: H Plane	Measurement Antenna Pol.	: HORIZONTAL



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
54.25	S	Peak	49.83	-26.79	23.04	40.00	-16.96
362.71	S	Peak	42.62	-17.11	25.50	46.00	-20.50
399.57	S	Peak	37.89	-15.88	22.01	46.00	-23.99
452.92	S	Peak	35.38	-14.83	20.56	46.00	-25.44
634.31	S	Peak	35.26	-11.62	23.63	46.00	-22.37
725.49	S	Peak	33.79	-10.71	23.08	46.00	-22.92

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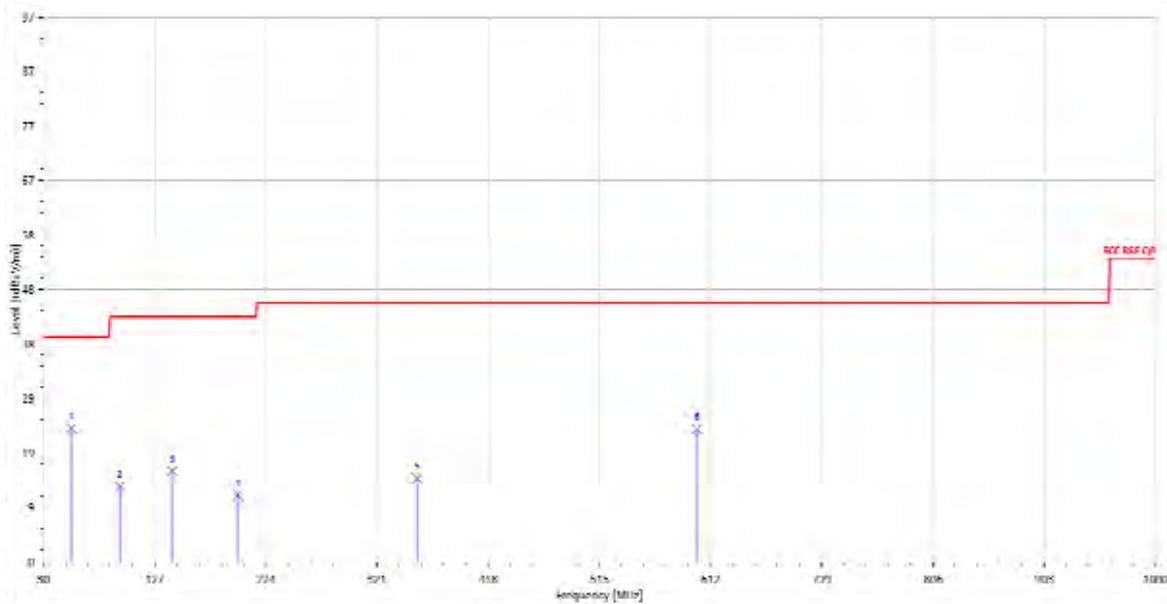
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Operation Band :802.11 n40M  
 Fundamental Frequency :2452 MHz  
 Operation Mode :TX HIGH  
 EUT Pol. :H Plane

Test Date :2015-04-10  
 Temp./Humi. : 24.8deg\_C/74RH  
 Engineer : Ashton  
 Measurement Antenna Pol. :VERTICAL



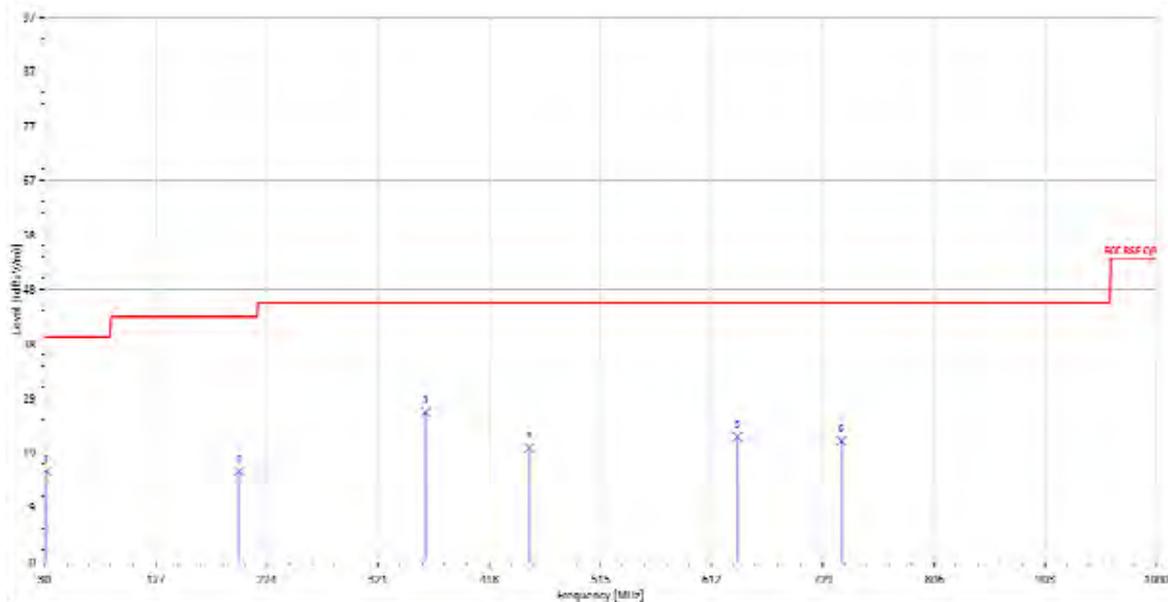
Freq. MHz	Note F/H/E/S	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
54.25	S	Peak	50.51	-26.79	23.71	40.00	-16.29
96.93	S	Peak	37.70	-24.36	13.33	43.50	-30.17
142.52	S	Peak	38.02	-21.92	16.10	43.50	-27.40
199.75	S	Peak	35.14	-23.28	11.86	43.50	-31.64
355.92	S	Peak	32.08	-17.29	14.79	46.00	-31.21
600.36	S	Peak	36.02	-12.45	23.57	46.00	-22.43

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Operation Band	:802.11 n40M	Test Date	:2015-04-10
Fundamental Frequency	:2452 MHz	Temp./Humi.	: 24.8deg_C/74RH
Operation Mode	:TX HIGH	Engineer	: Ashton
EUT Pol.	:H Plane	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
31.94	S	Peak	30.16	-14.17	16.00	40.00	-24.00
199.75	S	Peak	39.26	-23.28	15.98	43.50	-27.52
362.71	S	Peak	43.64	-17.11	26.53	46.00	-19.47
452.92	S	Peak	35.07	-14.83	20.25	46.00	-25.75
634.31	S	Peak	33.83	-11.62	22.20	46.00	-23.80
725.49	S	Peak	32.17	-10.71	21.46	46.00	-24.54

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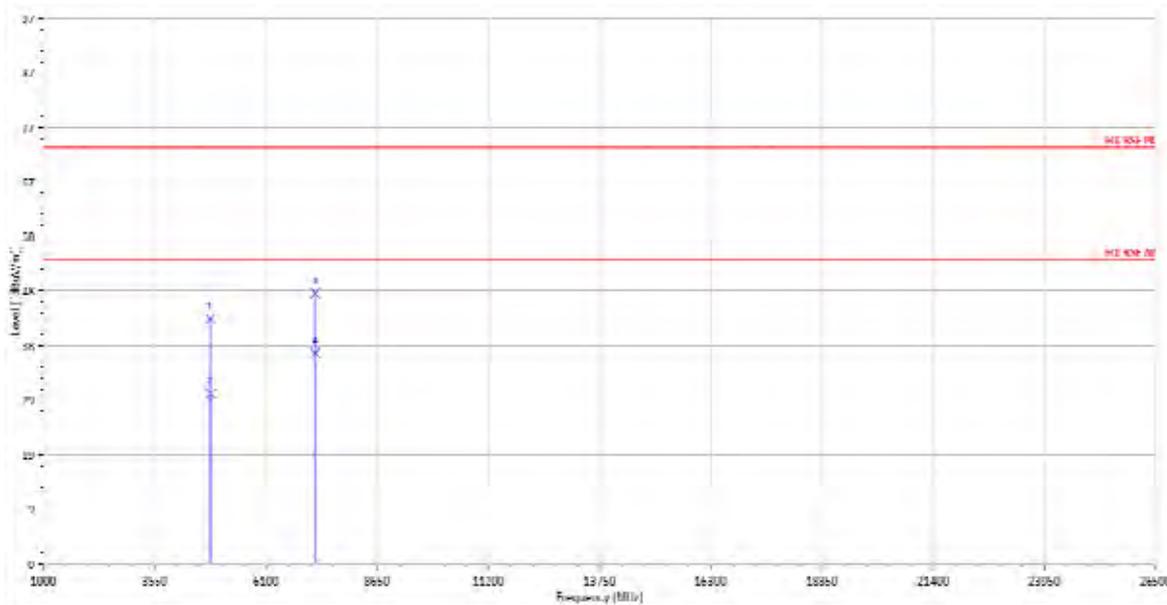
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**Radiated Spurious Emission Measurement Result (802.11 b)**

**Above 1GHz Worst-Case Data:**

Operation Band	:802.11 b	Test Date	:2015-04-10
Fundamental Frequency	:2412 MHz	Temp./Humi.	: 24.8deg_C/74RH
Operation Mode	:TX LOW	Engineer	: Ashton
EUT Pol.	:H Plane	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	Average	19.32	10.97	30.29	54.00	-23.71
4824.00	H	Peak	32.65	10.97	43.62	74.00	-30.38
7236.00	H	Average	22.25	15.27	37.52	54.00	-16.48
7236.00	H	Peak	32.84	15.27	48.11	74.00	-25.89

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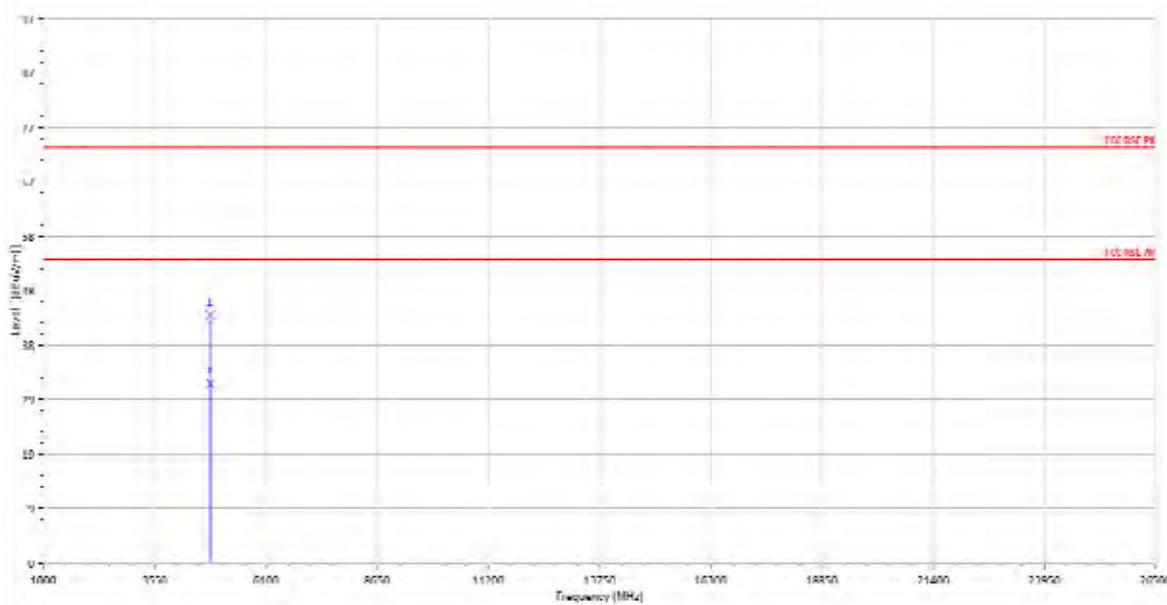
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Operation Band	:802.11 b	Test Date	:2015-04-10
Fundamental Frequency	:2412 MHz	Temp./Humi.	: 24.8deg_C/74RH
Operation Mode	:TX LOW	Engineer	: Ashton
EUT Pol.	:H Plane	Measurement Antenna Pol.	:HORIZONTAL



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	Average	20.95	10.97	31.92	54.00	-22.08
4824.00	H	Peak	33.22	10.97	44.20	74.00	-29.80

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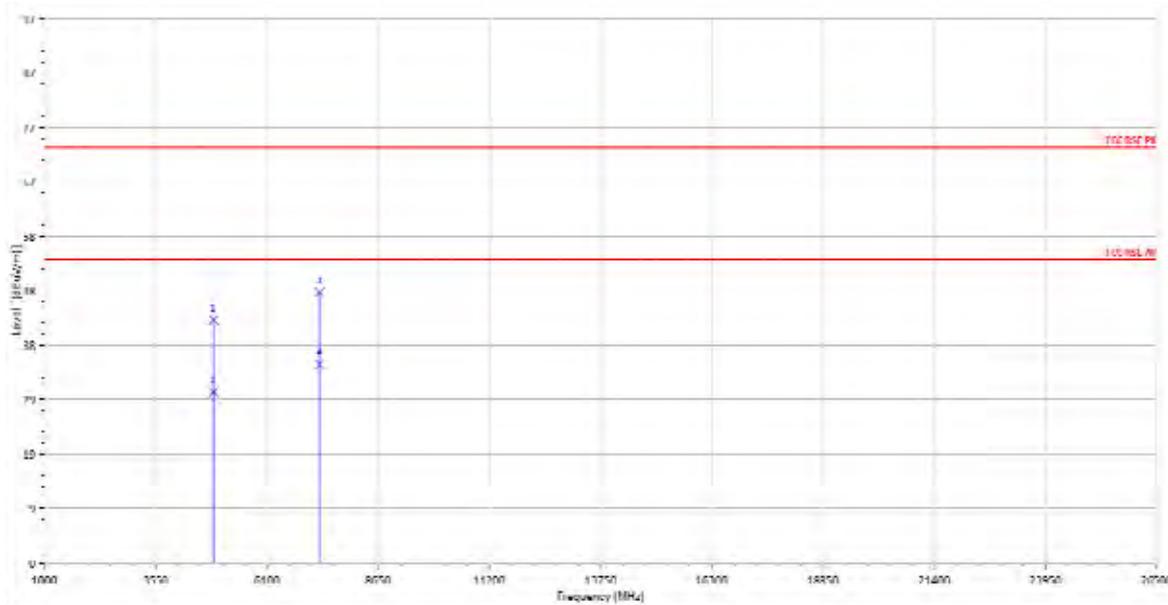
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Operation Band	:802.11 b	Test Date	:2015-04-10
Fundamental Frequency	:2437 MHz	Temp./Humi.	: 24.8deg_C/74RH
Operation Mode	:TX MID	Engineer	: Ashton
EUT Pol.	:H Plane	Measurement Antenna Pol.	:VERTICAL



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	Average	19.54	10.89	30.43	54.00	-23.57
4874.00	H	Peak	32.36	10.89	43.25	74.00	-30.75
7311.00	H	Average	20.06	15.29	35.35	54.00	-18.65
7311.00	H	Peak	32.91	15.29	48.19	74.00	-25.81

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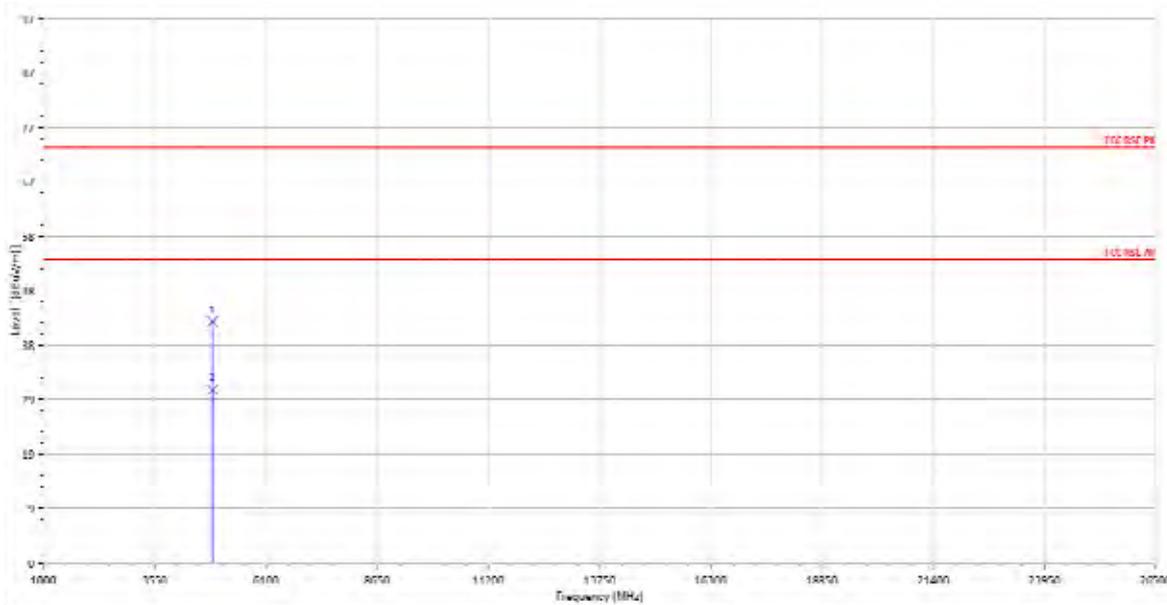
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Operation Band	:802.11 b	Test Date	:2015-04-10
Fundamental Frequency	:2437 MHz	Temp./Humi.	: 24.8deg_C/74RH
Operation Mode	:TX MID	Engineer	: Ashton
EUT Pol.	:H Plane	Measurement Antenna Pol.	:HORIZONTAL



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	Average	19.92	10.89	30.81	54.00	-23.19
4874.00	H	Peak	32.06	10.89	42.95	74.00	-31.05

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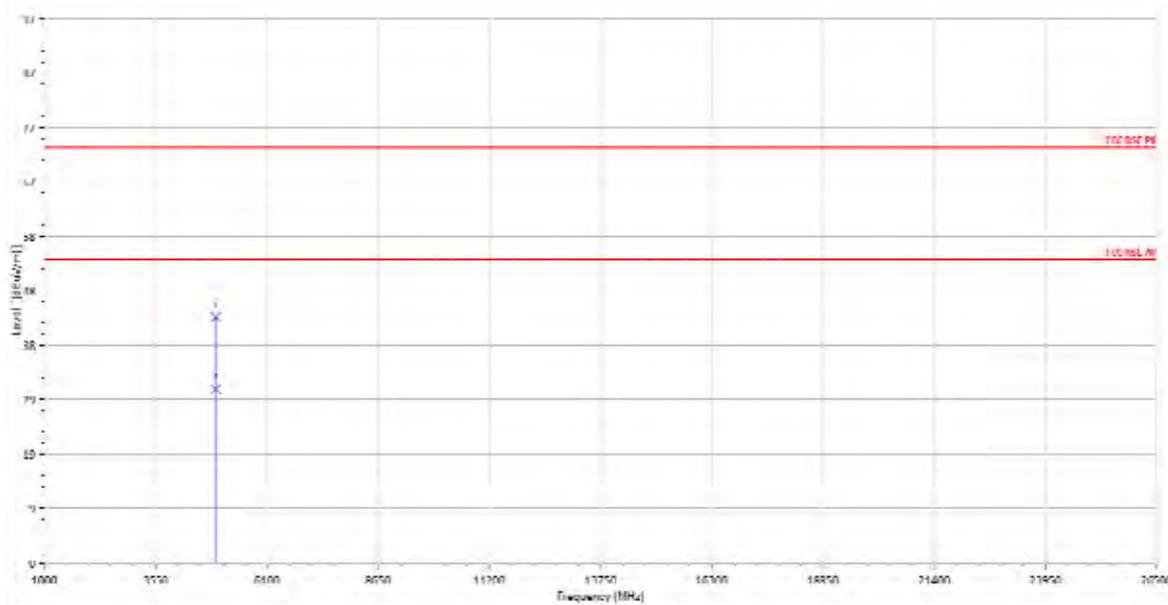
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Operation Band	:802.11 b	Test Date	:2015-04-10
Fundamental Frequency	:2462 MHz	Temp./Humi.	: 24.8deg_C/74RH
Operation Mode	:TX HIGH	Engineer	: Ashton
EUT Pol.	:H Plane	Measurement Antenna Pol.	:VERTICAL



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	Average	19.97	10.98	30.95	54.00	-23.05
4924.00	H	Peak	32.77	10.98	43.75	74.00	-30.25

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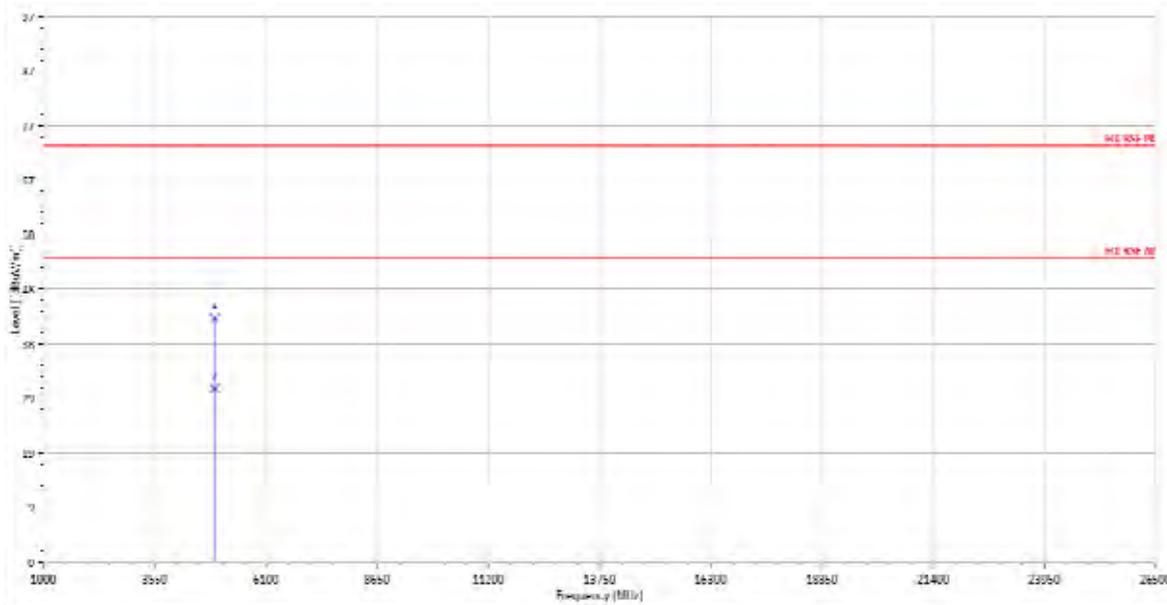
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Operation Band	:802.11 b	Test Date	:2015-04-10
Fundamental Frequency	:2462 MHz	Temp./Humi.	: 24.8deg_C/74RH
Operation Mode	:TX HIGH	Engineer	: Ashton
EUT Pol.	:H Plane	Measurement Antenna Pol.	:HORIZONTAL



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
4924.00	H	Average	19.89	10.98	30.87	54.00	-23.13
4924.00	H	Peak	32.38	10.98	43.36	74.00	-30.64

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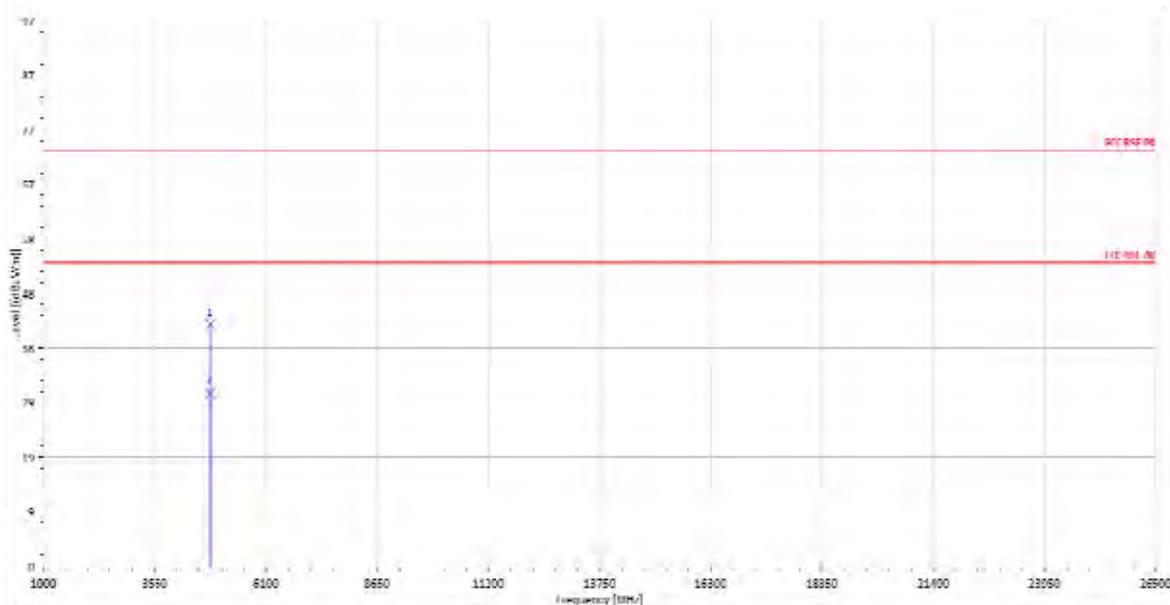
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### Radiated Spurious Emission Measurement Result (802.11g)

Operation Band	:802.11 g	Test Date	:2015-04-10
Fundamental Frequency	:2412 MHz	Temp./Humi.	: 24.8deg_C/74RH
Operation Mode	:TX LOW	Engineer	: Ashton
EUT Pol.	:H Plane	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	Average	19.77	10.97	30.74	54.00	-23.26
4824.00	H	Peak	32.05	10.97	43.02	74.00	-30.98

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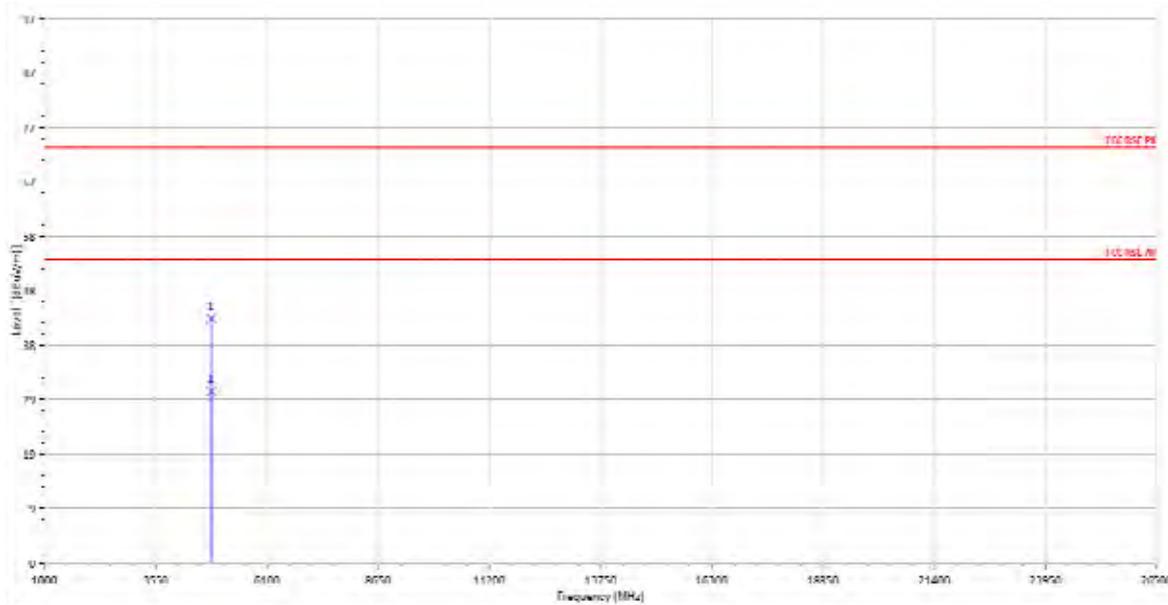
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Operation Band	:802.11 g	Test Date	:2015-04-10
Fundamental Frequency	:2412 MHz	Temp./Humi.	: 24.8deg_C/74RH
Operation Mode	:TX LOW	Engineer	: Ashton
EUT Pol.	:H Plane	Measurement Antenna Pol.	:HORIZONTAL



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	Average	19.57	10.97	30.54	54.00	-23.46
4824.00	H	Peak	32.59	10.97	43.56	74.00	-30.44

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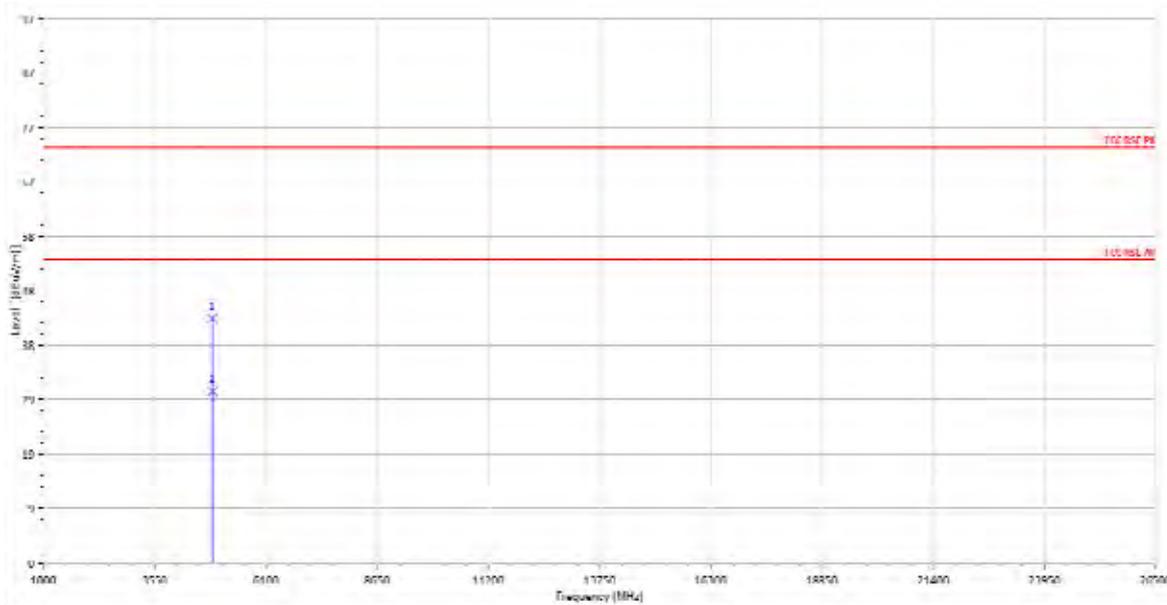
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Operation Band	:802.11 g	Test Date	:2015-04-10
Fundamental Frequency	:2437 MHz	Temp./Humi.	: 24.8deg_C/74RH
Operation Mode	:TX MID	Engineer	: Ashton
EUT Pol.	:H Plane	Measurement Antenna Pol.	:VERTICAL



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	Average	19.65	10.89	30.54	54.00	-23.46
4874.00	H	Peak	32.62	10.89	43.51	74.00	-30.49

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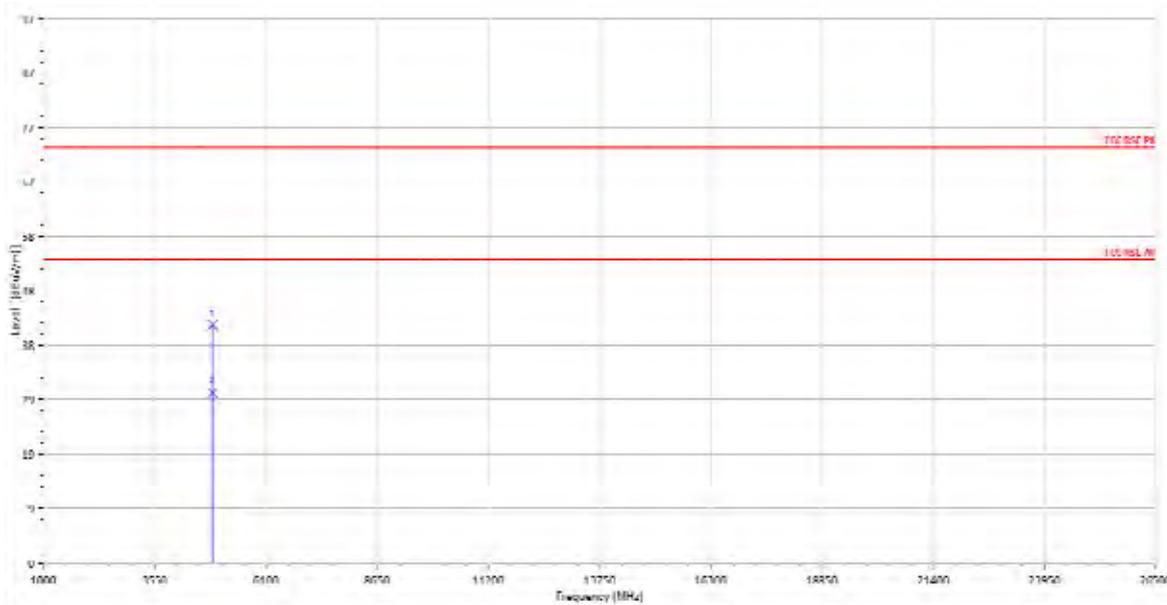
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Operation Band	:802.11 g	Test Date	:2015-04-10
Fundamental Frequency	:2437 MHz	Temp./Humi.	: 24.8deg_C/74RH
Operation Mode	:TX MID	Engineer	: Ashton
EUT Pol.	:H Plane	Measurement Antenna Pol.	:HORIZONTAL



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	Average	19.41	10.89	30.30	54.00	-23.70
4874.00	H	Peak	31.53	10.89	42.42	74.00	-31.58

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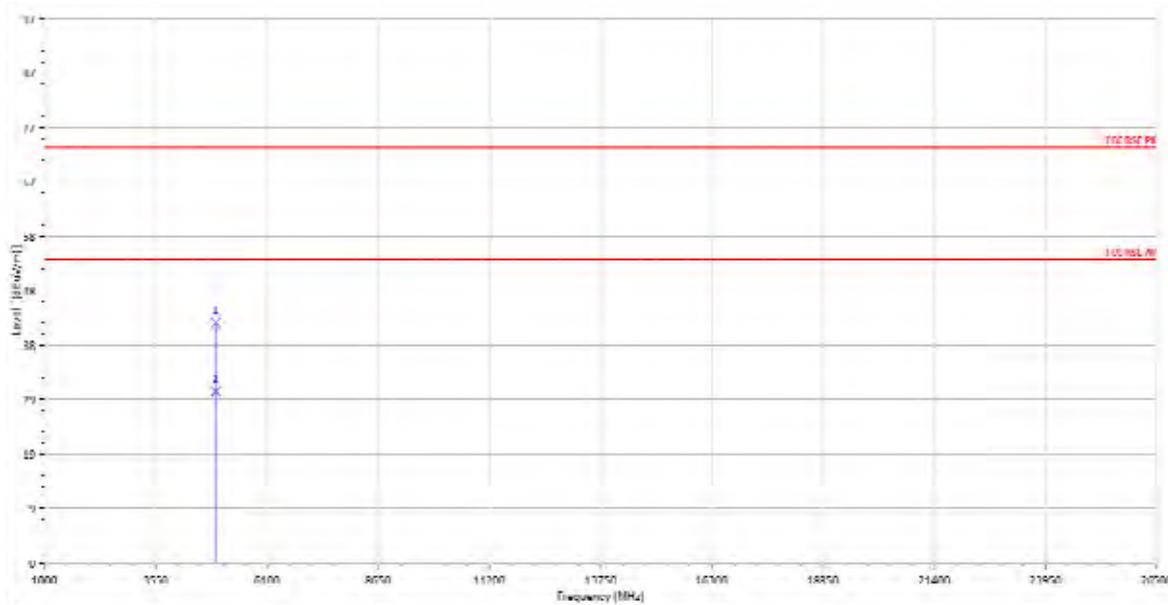
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Operation Band	:802.11 g	Test Date	:2015-04-10
Fundamental Frequency	:2462 MHz	Temp./Humi.	: 24.8deg_C/74RH
Operation Mode	:TX HIGH	Engineer	: Ashton
EUT Pol.	:H Plane	Measurement Antenna Pol.	:VERTICAL



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	Average	19.53	10.98	30.51	54.00	-23.49
4924.00	H	Peak	31.77	10.98	42.75	74.00	-31.25

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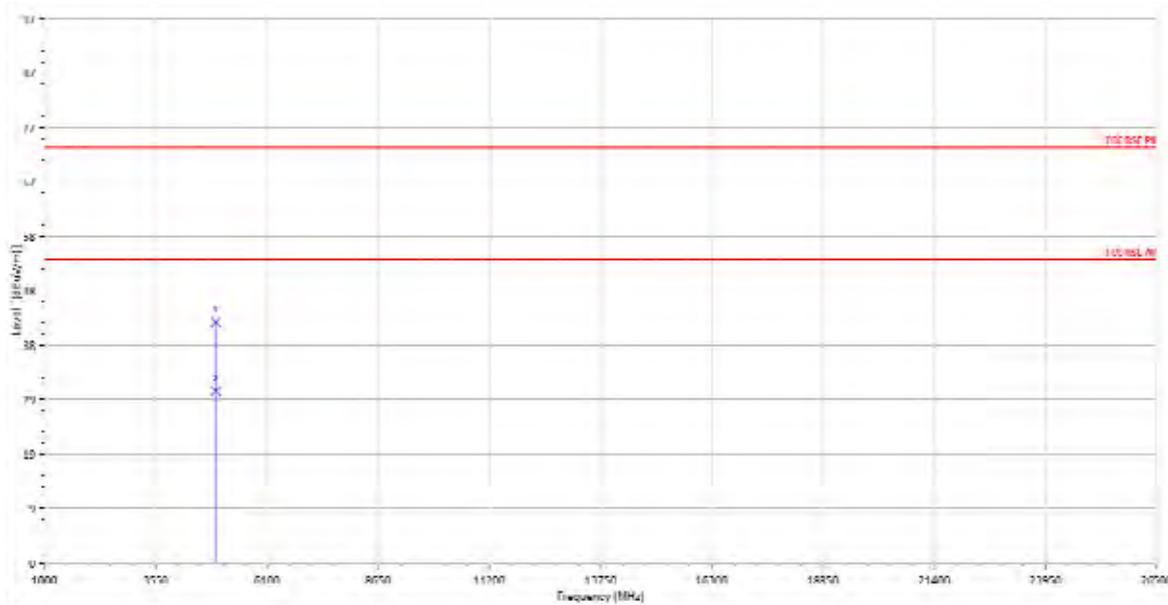
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Operation Band	:802.11 g	Test Date	:2015-04-10
Fundamental Frequency	:2462 MHz	Temp./Humi.	: 24.8deg_C/74RH
Operation Mode	:TX HIGH	Engineer	: Ashton
EUT Pol.	:H Plane	Measurement Antenna Pol.	:HORIZONTAL



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
4924.00	H	Average	19.65	10.98	30.63	54.00	-23.37
4924.00	H	Peak	31.92	10.98	42.90	74.00	-31.10

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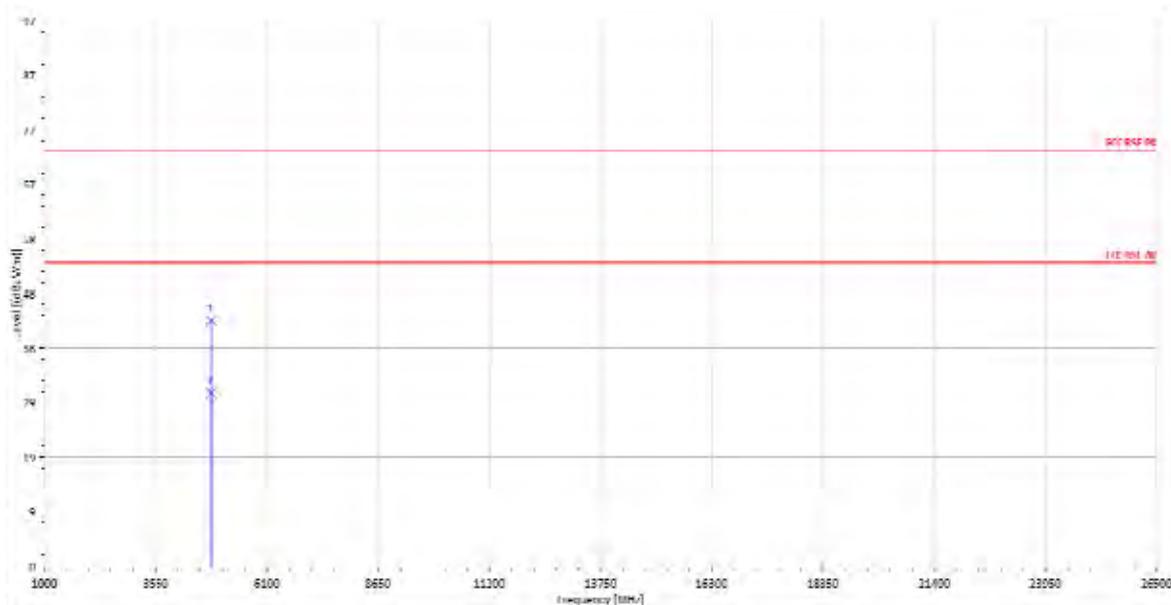
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### Radiated Spurious Emission Measurement Result (802.11n\_20M)

Operation Band	:802.11 n20M	Test Date	:2015-04-10
Fundamental Frequency	:2412 MHz	Temp./Humi.	: 24.8deg_C/74RH
Operation Mode	:TX LOW	Engineer	: Ashton
EUT Pol.	:H Plane	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	Average	19.89	10.97	30.86	54.00	-23.14
4824.00	H	Peak	32.74	10.97	43.72	74.00	-30.28

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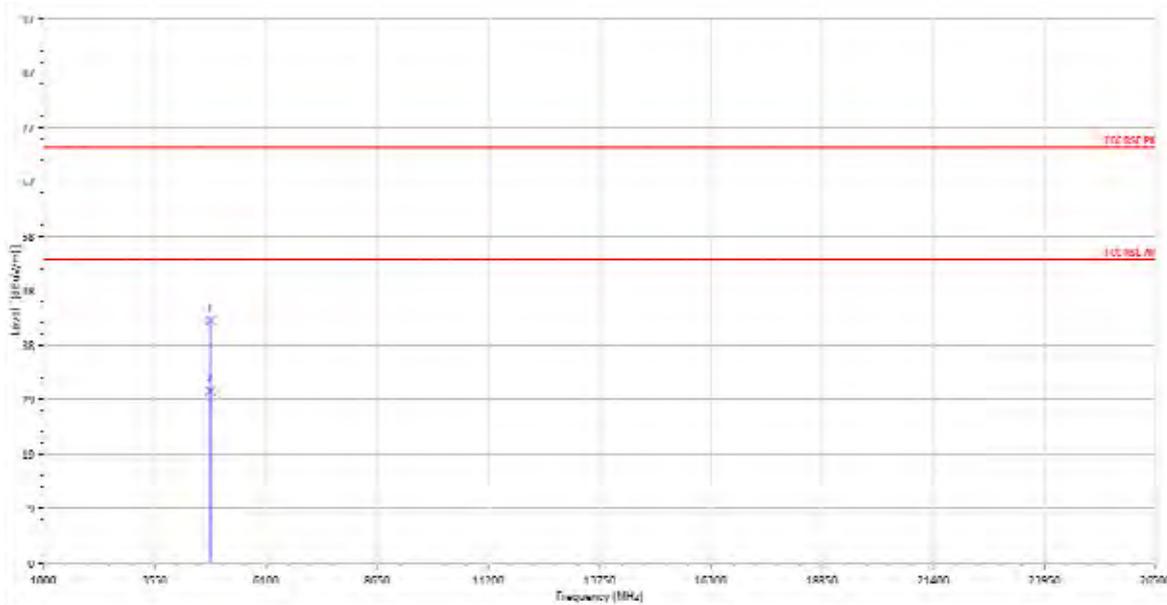
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Operation Band	:802.11 n20M	Test Date	:2015-04-10
Fundamental Frequency	:2412 MHz	Temp./Humi.	: 24.8deg_C/74RH
Operation Mode	:TX LOW	Engineer	: Ashton
EUT Pol.	:H Plane	Measurement Antenna Pol.	:HORIZONTAL



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	Average	19.71	10.97	30.68	54.00	-23.32
4824.00	H	Peak	32.17	10.97	43.14	74.00	-30.86

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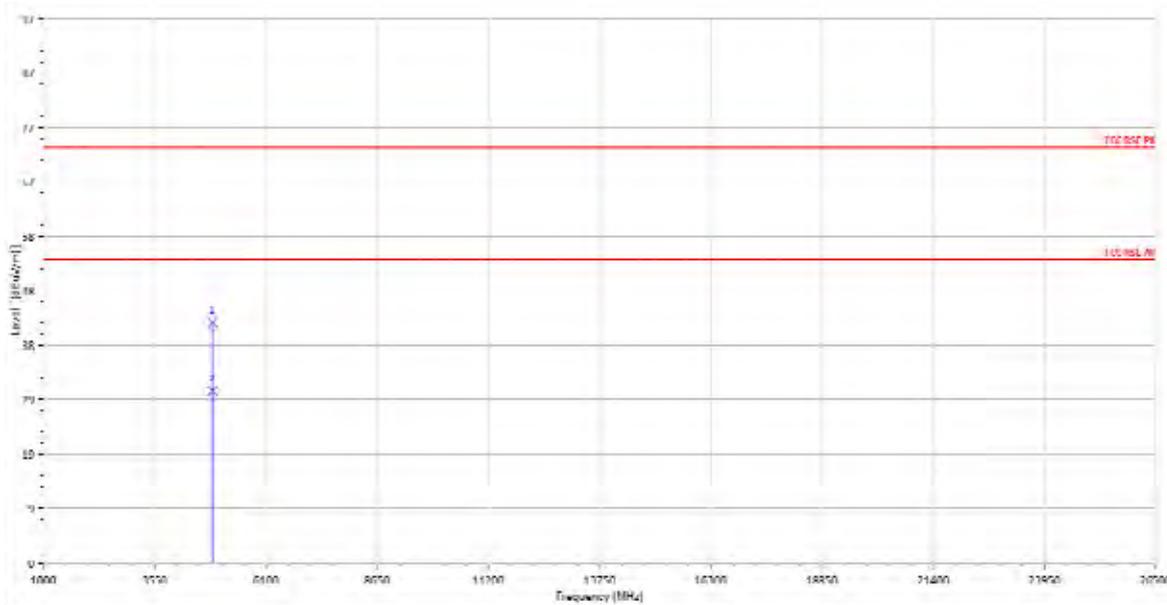
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Operation Band	:802.11 n20M	Test Date	:2015-04-10
Fundamental Frequency	:2437 MHz	Temp./Humi.	: 24.8deg_C/74RH
Operation Mode	:TX MID	Engineer	: Ashton
EUT Pol.	:H Plane	Measurement Antenna Pol.	:VERTICAL



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	Average	19.72	10.89	30.61	54.00	-23.39
4874.00	H	Peak	31.95	10.89	42.84	74.00	-31.16

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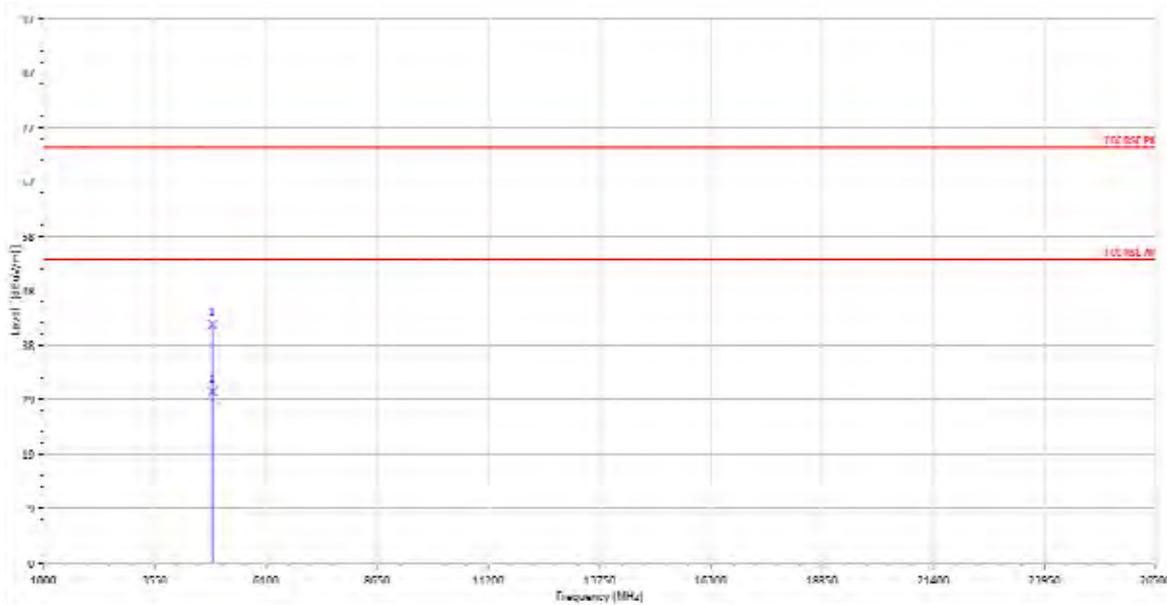
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Operation Band	:802.11 n20M	Test Date	:2015-04-10
Fundamental Frequency	:2437 MHz	Temp./Humi.	: 24.8deg_C/74RH
Operation Mode	:TX MID	Engineer	: Ashton
EUT Pol.	:H Plane	Measurement Antenna Pol.	:HORIZONTAL



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
4878.00	H	Average	19.61	10.89	30.50	54.00	-23.50
4878.00	H	Peak	31.59	10.89	42.47	74.00	-31.53

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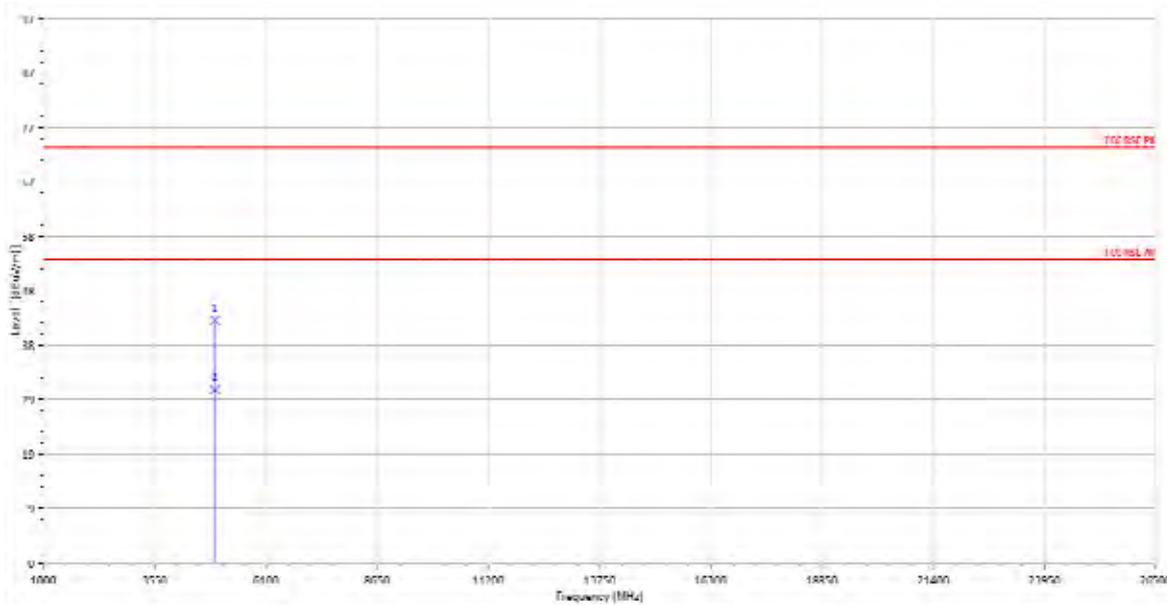
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Operation Band	:802.11 n20M	Test Date	:2015-04-10
Fundamental Frequency	:2462 MHz	Temp./Humi.	: 24.8deg_C/74RH
Operation Mode	:TX HIGH	Engineer	: Ashton
EUT Pol.	:H Plane	Measurement Antenna Pol.	:VERTICAL



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	Average	19.87	10.98	30.85	54.00	-23.15
4924.00	H	Peak	32.22	10.98	43.19	74.00	-30.81

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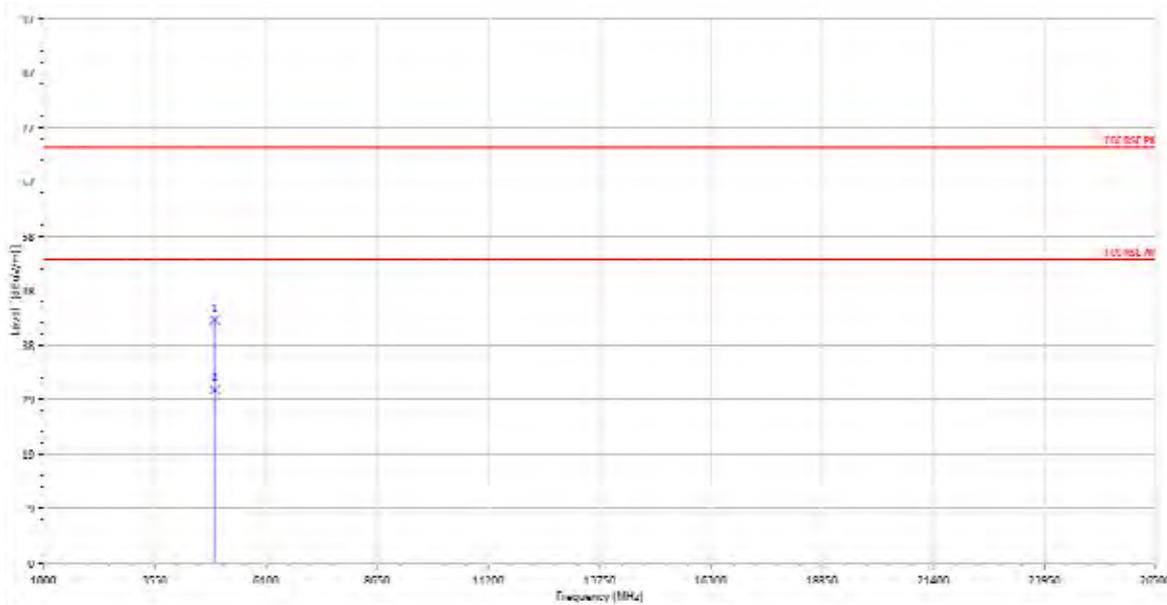
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Operation Band	:802.11 n20M	Test Date	:2015-04-10
Fundamental Frequency	:2462 MHz	Temp./Humi.	: 24.8deg_C/74RH
Operation Mode	:TX HIGH	Engineer	: Ashton
EUT Pol.	:H Plane	Measurement Antenna Pol.	:HORIZONTAL



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
4924.00	H	Average	19.81	10.98	30.79	54.00	-23.21
4924.00	H	Peak	32.29	10.98	43.27	74.00	-30.73

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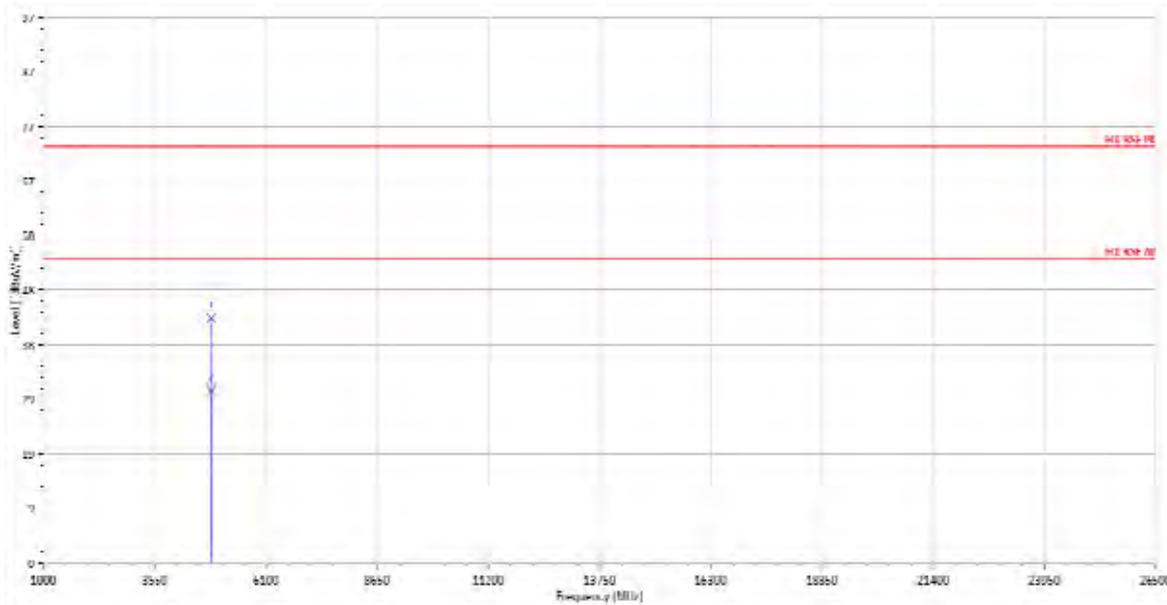
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**Radiated Spurious Emission Measurement Result (802.11n\_40M)**

Operation Band	:802.11 n40M	Test Date	:2015-04-10
Fundamental Frequency	:2422 MHz	Temp./Humi.	: 24.8deg_C/74RH
Operation Mode	:TX LOW	Engineer	: Ashton
EUT Pol.	:H Plane	Measurement Antenna Pol.	:VERTICAL

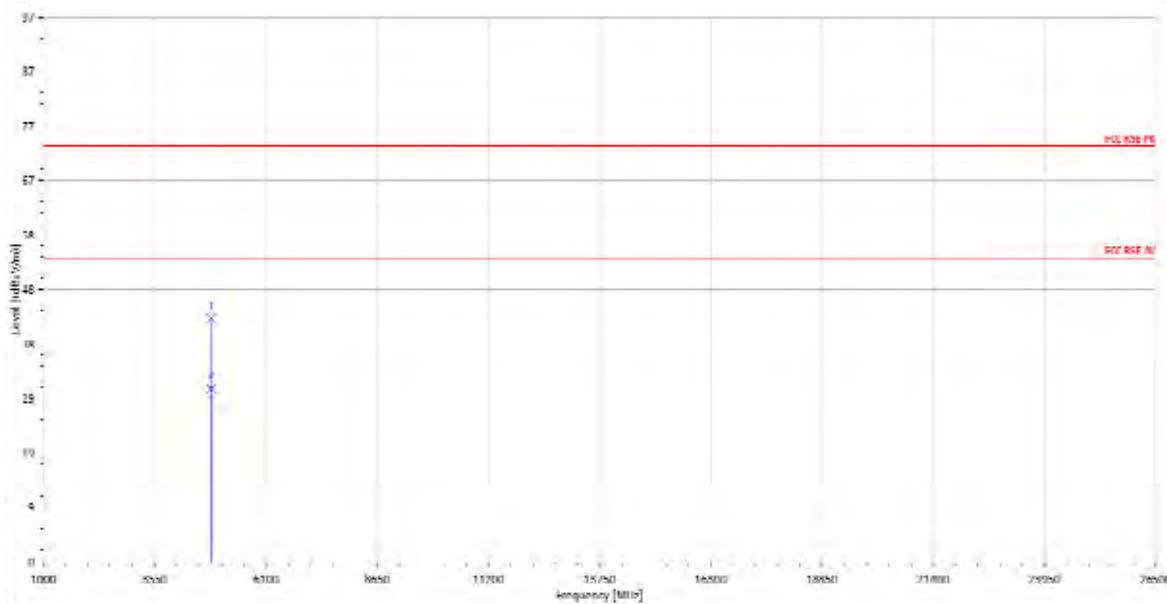


Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dB $\mu$ V	dB	dB $\mu$ V/m	dB $\mu$ V/m	dB
4844.00	H	Average	19.81	10.93	30.74	54.00	-23.26
4844.00	H	Peak	32.61	10.93	43.54	74.00	-30.46

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Operation Band	:802.11 n40M	Test Date	:2015-04-10
Fundamental Frequency	:2422 MHz	Temp./Humi.	: 24.8deg_C/74RH
Operation Mode	:TX LOW	Engineer	: Ashton
EUT Pol.	:H Plane	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
4844.00	H	Average	19.88	10.93	30.81	54.00	-23.19
4844.00	H	Peak	32.27	10.93	43.21	74.00	-30.79

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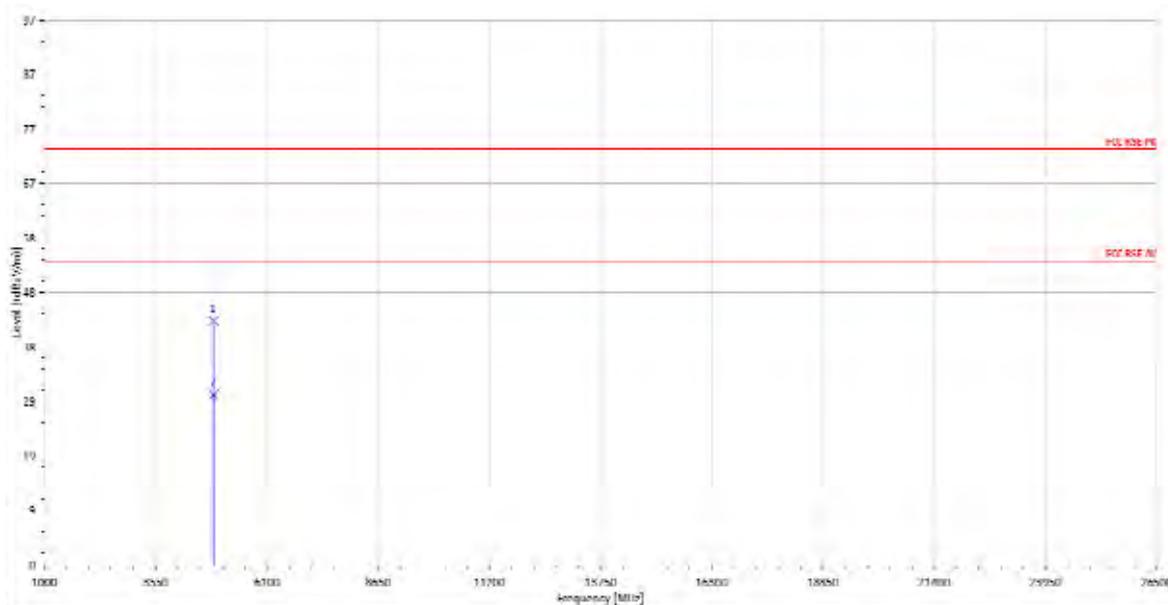
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Operation Band	:802.11 n40M	Test Date	:2015-04-10
Fundamental Frequency	:2437 MHz	Temp./Humi.	: 24.8deg_C/74RH
Operation Mode	:TX MID	Engineer	: Ashton
EUT Pol.	:H Plane	Measurement Antenna Pol.	:VERTICAL



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	Average	19.33	10.89	30.22	54.00	-23.78
4874.00	H	Peak	32.45	10.89	43.34	74.00	-30.66

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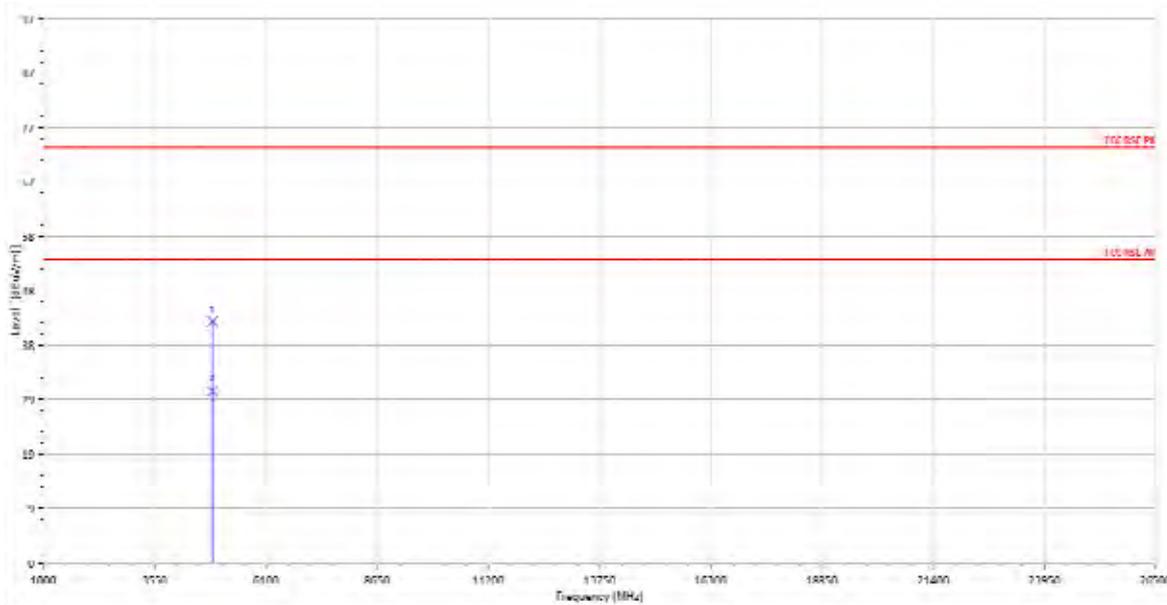
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Operation Band	:802.11 n40M	Test Date	:2015-04-10
Fundamental Frequency	:2437 MHz	Temp./Humi.	: 24.8deg_C/74RH
Operation Mode	:TX MID	Engineer	: Ashton
EUT Pol.	:H Plane	Measurement Antenna Pol.	:HORIZONTAL



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	Average	19.70	10.89	30.59	54.00	-23.41
4874.00	H	Peak	32.10	10.89	42.99	74.00	-31.01

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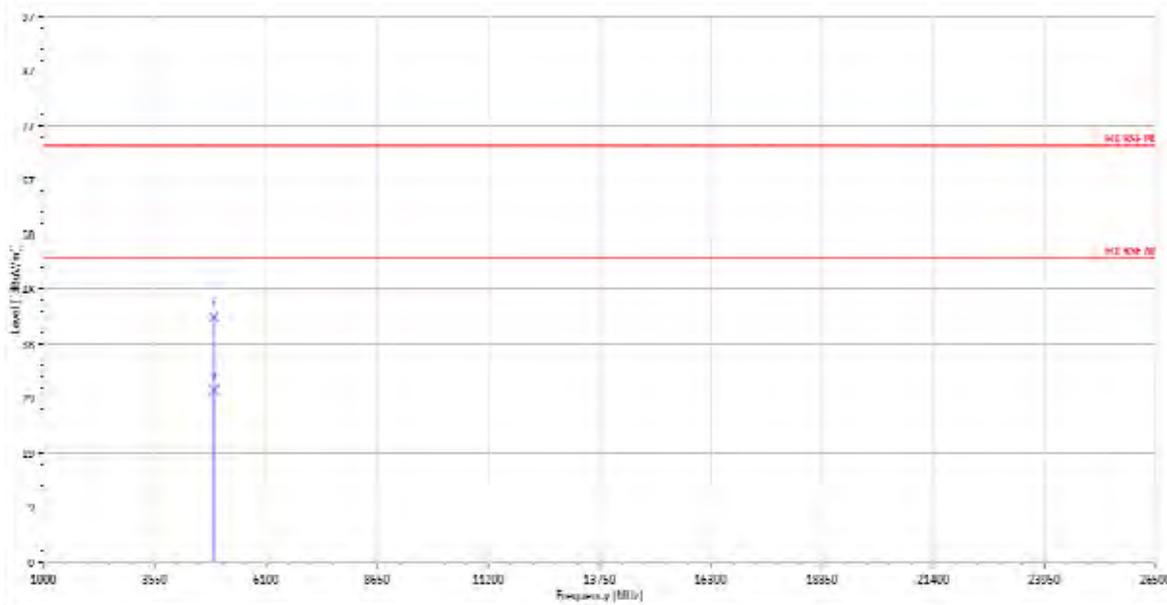
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Operation Band	:802.11 n40M	Test Date	:2015-04-10
Fundamental Frequency	:2452 MHz	Temp./Humi.	: 24.8deg_C/74RH
Operation Mode	:TX HIGH	Engineer	: Ashton
EUT Pol.	:H Plane	Measurement Antenna Pol.	:VERTICAL



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	Average	19.65	10.98	30.63	54.00	-23.37
4904.00	H	Peak	32.63	10.98	43.60	74.00	-30.40

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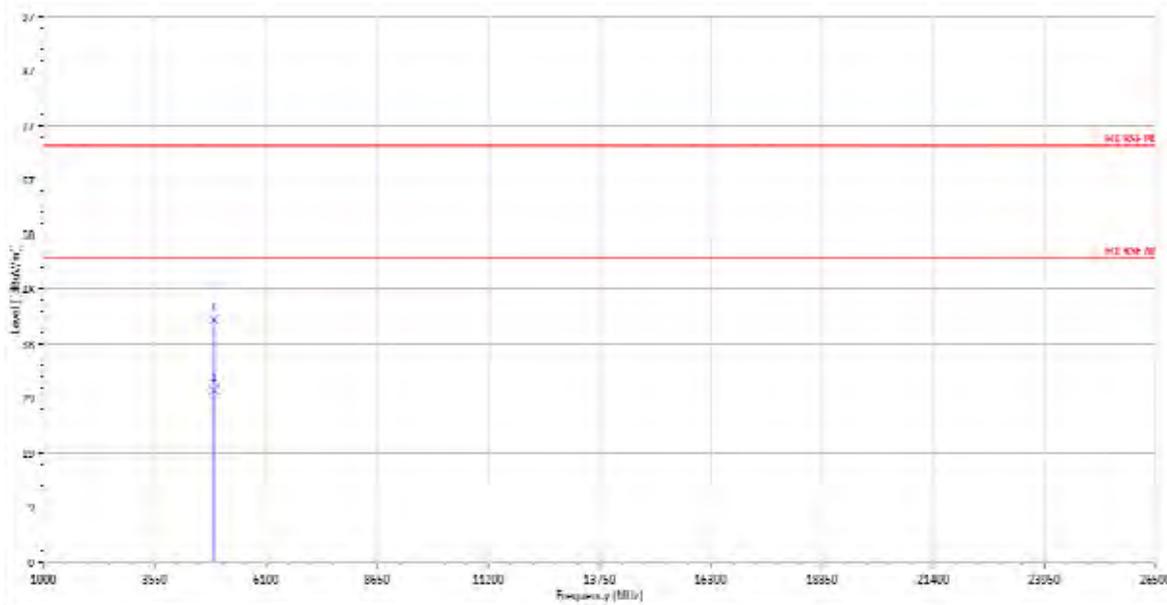
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Operation Band	:802.11 n40M	Test Date	:2015-04-10
Fundamental Frequency	:2452 MHz	Temp./Humi.	: 24.8deg_C/74RH
Operation Mode	:TX HIGH	Engineer	: Ashton
EUT Pol.	:H Plane	Measurement Antenna Pol.	:HORIZONTAL



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	Average	19.58	10.98	30.56	54.00	-23.44
4904.00	H	Peak	32.07	10.98	43.05	74.00	-30.95

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## 12 PEAK POWER SPECTRAL DENSITY

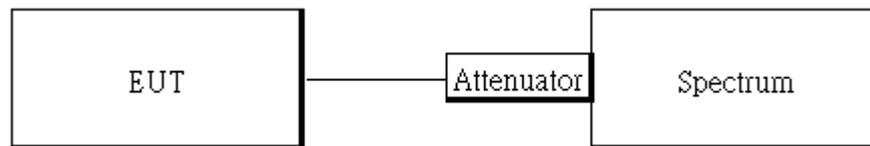
### 12.1 Standard Applicable

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.

### 12.2 Measurement Equipment Used

Conducted Emission Test Site					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	Agilent	E4446A	MY51100003	05/19/2014	05/18/2015
DC Block	Mini-Circuits	BLK-18-S+	1	01/02/2015	01/01/2016
Attenuator	Mini-Circuit	BW-S10W2+	002	01/02/2015	01/01/2016

### 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 V03r02.
3. Set the span to 1.5 times the DTS channel bandwidth.
4. Set the RBW  $\geq 3$  kHz.
5. Set the VBW  $\geq 3 \times$  RBW.
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

Frequency (MHz)	RF Power Density (dBm)	Maximum Limit (dBm)	Result
802.11b			
2412	-7.88	8	PASS
2437	-8.39	8	PASS
2462	-7.96	8	PASS
802.11g			
2412	-11.48	8	PASS
2437	-9.44	8	PASS
2462	-13.38	8	PASS
802.11n_HT20			
2412	-11.30	8	PASS
2437	-9.56	8	PASS
2462	-13.43	8	PASS
802.11n_HT40			
2422	-14.65	8	PASS
2437	-12.86	8	PASS
2452	-16.46	8	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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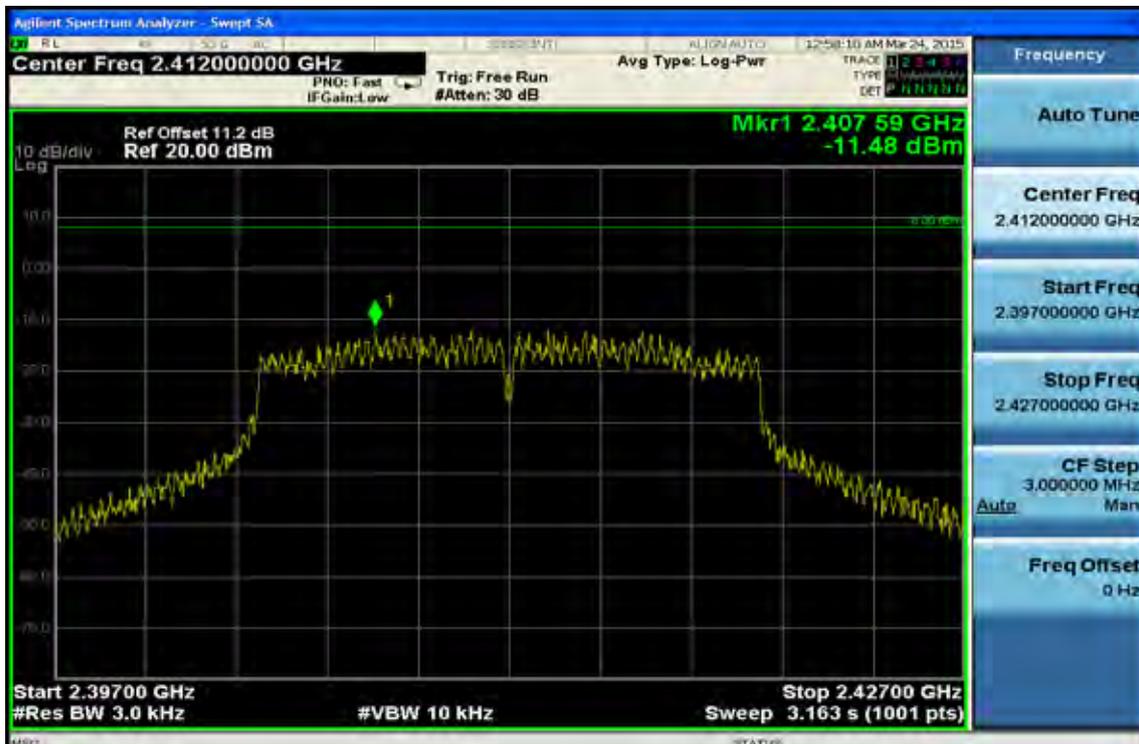
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**Power Spectral Density Test Plot (CH-High)**



**802.11g**

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



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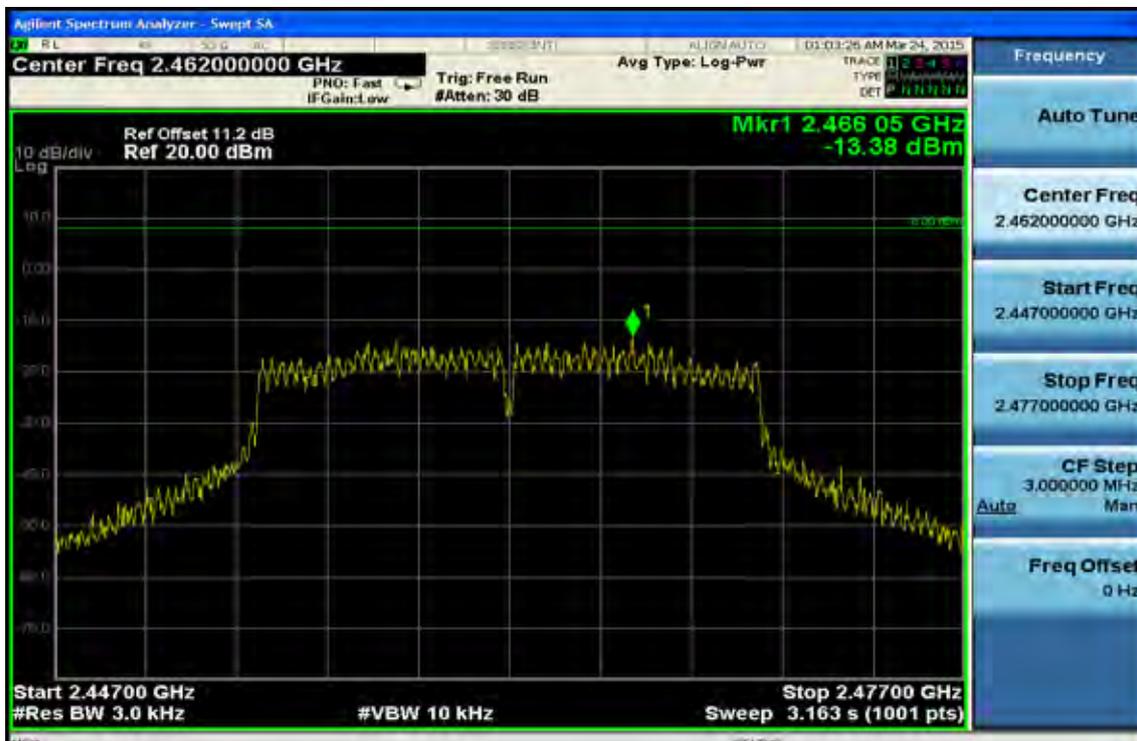
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**Power Spectral Density Test Plot (CH-Mid)**



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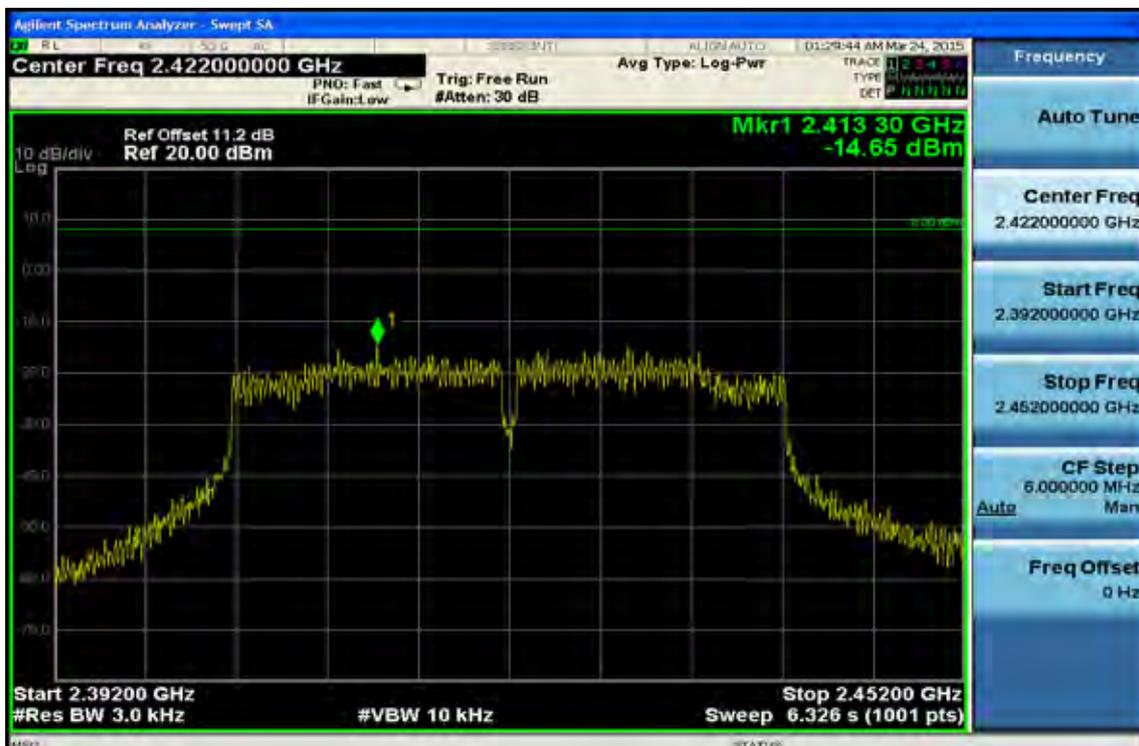
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### Power Spectral Density Test Plot (CH-High)



### 802.11n\_HT40

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



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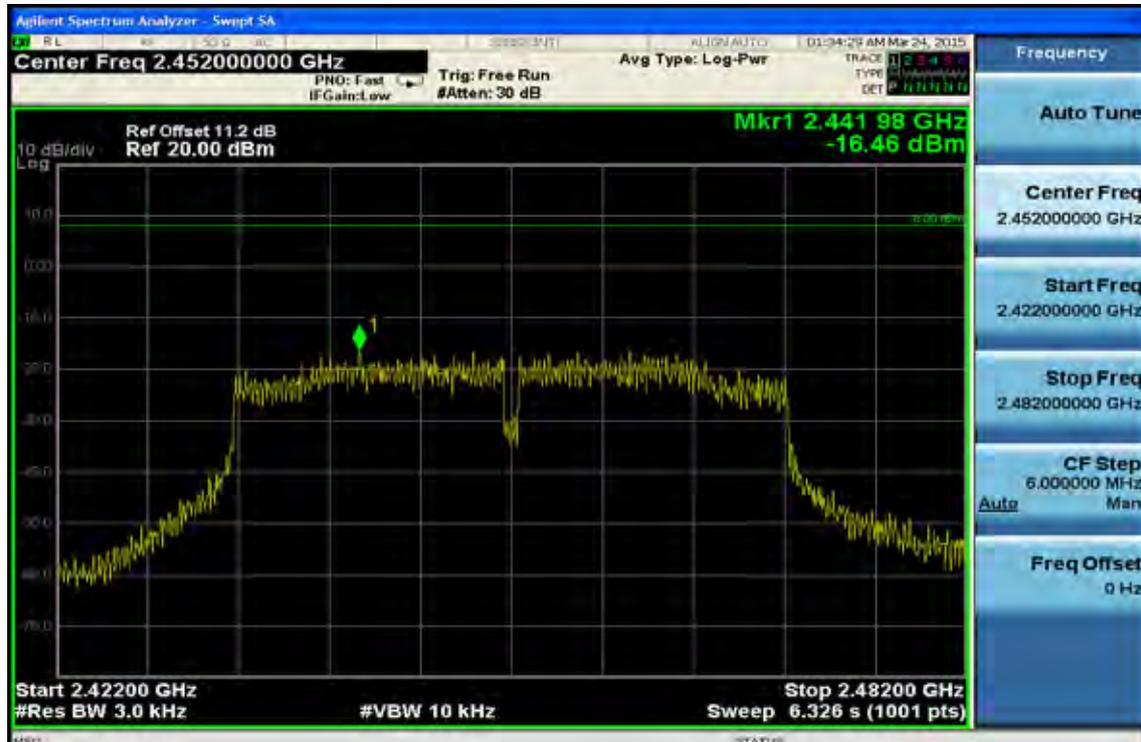
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### Power Spectral Density Test Plot (CH-Mid)



### 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.

In case of point-to-point operation, the power shall be reduced by the one dB for every 3 dB that the directional gain of antenna exceeds 6dBi.

### 13.2 Antenna Connected Construction

A PIFA antenna design is used.

The antenna is designed with permanent attached 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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