

# ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

# INTENTIONAL RADIATOR CERTIFICATION TO FCC PART 15 SUBPART C REQUIREMENT

	OF
Product Name:	PDA Phone
Brand Name:	Sony
Type No.:	PM-0870-BV
Model Difference:	N/A
FCC ID:	PY7-PM0870
Report No.:	ER/2015/50053
Issue Date:	Jun. 05, 2015
FCC Rule Part:	§15.247, Cat: DTS
Prepared for:	Sony Mobile Communications AB Nya Vattentornet 22188 Lund/Sweden
Prepared by:	SGS Taiwan Ltd. Electronics & Communication Laboratory No.134, Wu Kung Road, New Taipei Industrial Park, Wuku District, New Taipei City, Taiwan 24803
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Testing Laboratory

0513

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sonnel only, and shall be noted in the revision section of the



# VERIFICATION OF COMPLIANCE

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Product Name:	PDA Phone
Brand Name:	Sony
Type No.:	PM-0870-BV
Model Difference:	N/A
FCC ID:	PY7-PM0870
<b>Report Number:</b>	ER/2015/50053
Date of test:	Apr. 22, 2015 ~ Jun. 05, 2015
Date of EUT Received:	Apr. 22, 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 C63.10:2009 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:	Marcus Tseng	Date	Jun. 05, 2015
Prepared By:	Marcus Tseng / Engineer Karen Huang	Date	Jun. 05, 2015
Approved By:	Karen Huang / Clerk Jim Ch ang	Date	Jun. 05, 2015

Jim Chang / Asst. Manager

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# **Revision History**

Report Number	Revision	Description	Issue Date
ER/2015/50053	Rev.00	Initial creation of document	Jun. 05, 2015

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### **FCC ID: PY7-PM0870**

## **Table of Contents**

1	GEN	ERAL INFORMATION	
	1.1	Product description	
	1.2	Product Feature of Equipment Under Test	
	1.3	Test Methodology of Applied Standards	
	1.4	Test Facility	
	1.5	Special Accessories	
	1.6	Equipment Modifications	9
2	SYS	TEM TEST CONFIGURATION	
	2.1	EUT Configuration	
	2.2	EUT Exercise	
	2.3	Test Procedure	
	2.4	Measurement Results Explanation Example	
	2.5	Configuration of Tested System	
3	SUM	IMARY OF TEST RESULTS	
4	DES	CRIPTION OF TEST MODES	
	4.1	Operated in 2400 ~ 2483.5MHz Band	
	4.2	The Worst Test Modes and Channel Details	
5	MEA	ASUREMENT UNCERTAINTY	
6	CON	DUCTED EMISSION TEST	
	6.1	Standard Applicable	
	6.2	Measurement Equipment Used	
	6.3	EUT Setup	
	6.4	Test SET-UP (Block Diagram of Configuration)	
	6.5	Measurement Procedure	
	6.6	Measurement Result	
7	DUT	Y CYCLE OF TEST SIGNAL	24
	7.1	DUTY CYCLE TEST SIGNAL Measurement Result	
8	PEA	K OUTPUT POWER MEASUREMENT	27
	8.1	Standard Applicable	
	8.2	Measurement Equipment Used	
	8.3	Test Set-up	
	8.4	Measurement Procedure	
	8.5	Measurement Result	

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9	6dB I	BANDWIDTH	
	9.1	Standard Applicable	
	9.2	Measurement Equipment Used	
	9.3	Test Set-up	
	9.4	Measurement Procedure	
	9.5	Measurement Result	
10	CON	DUCTED BAND EDGES AND SPURIOUS EMISSION MEASUREMENT	
	10.1	Standard Applicable	39
	10.2	Measurement Equipment Used	39
	10.3	Test SET-UP	
	10.4	Measurement Result	40
11	RAD	IATED BANDEDGE AND SPURIOUS EMISSION MEASUREMENT	57
	11.1	Standard Applicable	57
	11.2	Measurement Equipment Used:	58
	11.3	Test SET-UP	58
	11.5	Test Results of Radiated Spurious Emissions form 9 KHz to 30 MHz	61
	11.6	Measurement Result	61
12	PEAI	K POWER SPECTRAL DENSITY	100
	12.1	Standard Applicable	100
	12.2	Measurement Equipment Used	100
	12.3	Test Set-up	100
	12.4	Measurement Procedure	100
	12.5	Measurement Result	101
13	ANT	ENNA REQUIREMENT	108
	13.1	Standard Applicable	108
	13.2	Antenna Connected Construction	108

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### **GENERAL INFORMATION** 1

#### **Product description** 1.1

### General:

Product Name:	PDA Phone		
Brand Name:	Sony		
Type No.:	PM-0870-	BV	
Model Difference:	N/A		
Data Cable (USB):		:: EC450, Supplier: K-one 1242-6715.3, Length: 100 cm	
Simple Hands-Free (SHF-White):	Model No. Type No.:	: MH410c, Supplier: Foster Electric AG-1100	
Car Charger:	Model No.: AN400, Supplier: Salcomp Type No.: CAA-0003013		
BT PHF:	Model No.: MW600, Supplier: BALDA Type No.: DDA-0002029.Bcoupling with Simple Hands Free (Model No.: MH755, Supplier: BALDA, Type No.: AG-0502)		
Product SW/HW version:	30.0.B.0.20 / A		
Radio SW/HW version:	30.0.B.0.2	0 / A	
Test SW Version:	WIFI Tool	for MT6630	
RF power setting in TEST SW:	N/A		
	3.8Vdc		
	Battery:	Model No.: AGPB016-A001, Supplier: Sony Type No.: N/A	
Power Supply:	Adapter:	<ol> <li>Model No.: EP800, Supplier: Phihong Type No.: AC-0300-US</li> <li>Model No.: EP800, Supplier: Salcomp Type No.: AC-0030-US</li> </ol>	

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WLAN 2.4GHz:

Wi-Fi	Frequency Range	Channels	Rated Power	Modulation Technology	
11b/g	2412-2462	11	b: 19.59dBm g: 22.96dBm	DSSS, OFDM	
11n	HT20 2412-2462	11	HT20: 21.96dBm	OFDM	
11n	HT40 2422-2452	7	HT40: 22.13dBm	OFDM	
Antenna Des	Antenna Designation:		PIFA Antenna, Gain: -3.80dBi		
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 72.2Mbps 802.11 n 40MHz: up to 135Mbps			

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#### **Product Feature of Equipment Under Test** 1.2

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

Product Feature			
Product Name:	PDA Phone		
Brand Name:	Sony		
Type No.:	PM-0870-BV		
Model Difference:	N/A		
FCC ID	PY7-PM0870		
GSM Operating Band(s)	GSM 850 / 1900MHz		
GPRS / EGPRS Multi Slot Class	Class 12		
WCDMA Operating Band(s)	FDD Band II / V		
WCDMA Rel. Version	Release 8		
LTE Operating Band(s)	FCC Band 5 / 7		
LTE Rel. Version	Release 9 / Category 4		
Wi-Fi Specification	802.11a/b/g/n		
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 V03r03

ANSI C63.10:2009

Note:

- All test items have been performed and record as per the above standards. 1.
- The composite system is compliance with FCC Subpart B is authorized under the certi-2. fication procedure.
- 3. The EUT was placed 0.8m height for frequency above 1GHz in accordance with ANSI C63. 10 :2009

#### **Test Facility** 1.4

SGS Taiwan Ltd. Electronics & Communication Laboratory No.134, Wu Kung Road, New Taipei Industrial Park, Wuku District, New Taipei City, Taiwan. (TAF code 0513)

FCC Registration Numbers are: 990257 (Wugu)

Canada Registration Number: 4620A-5.

#### **Special Accessories** 1.5

There are no special accessories used while test was conducted.

#### **Equipment Modifications** 1.6

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. 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 0.8 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 0.7 dB and 10 dB attenuator.

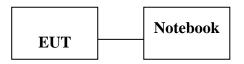
Offset = RF cable loss (dB)+ attenuation factor(dB) =0.7+10=10.7(dB)

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#### **Configuration of Tested System** 2.5

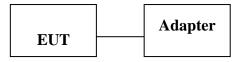
## Fig. 2-1 Radiated Emission



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



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	WIFI Tool for MT6630	N/A	N/A	N/A	N/A
2.	DC Power Supply	HP	E3640A	KR93300208	N/A	N/A
3.	Notebook	Lenovo	L420	LR-7HXZA	shielded	Un-shielded

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#### SUMMARY OF TEST RESULTS 3

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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### **DESCRIPTION OF TEST MODES** 4

#### Operated in 2400 ~ 2483.5MHz Band 4.1

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

#### 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:**

<b>RADIATED EMISSION TEST (BELOW 1 GHz)</b>									
MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)	ANTENNA PORT				
802.11g	1 to 11	1,6,11	OFDM	6	MAIN				

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<b>RADIATED EMISSION TEST (ABOVE 1 GHz)</b>								
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 E2 position was reported.

AITEANA I OKI CONDUCTED MEASUREMENT.										
	CONDUCTED TEST									
MODE	AVAILABLE TESTEI CHANNEL CHANNI		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					

### **ANTENNA PORT CONDUCTED MEASUREMENT:**

Note: Type no, PM-0870-BV, and Type no PM-0873-BV share the equivalently identical enclosure, material of coating, I/O function, PCB board, display, and power source. In addition, PM-0870-BV, and Type no.PM-0873-BV implement the same Bluetooth/WLAN chipset/module with the same antenna that operates with the same transmitted power level. Hence, this given test report contains the identical test results that inherent from PM-0873-BV.

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### **MEASUREMENT UNCERTAINTY** 5

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:

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

	30MHz - 167MHz: +/- 4.22dB
Measurement uncertainty	167MHz -500MHz: +/- 3.44dB
(Polarization : Horizontal)	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**

According to §15.207, frequency range within 150kHz to 30MHz shall not exceed the Limit table as below.

Frequency range	Limits dB(uV)						
MHz	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.

#### **Measurement Equipment Used** 6.2

Conducted Emission Test Site									
EQUIPMENT	MFR	MODEL	SERIAL	LAST	CAL DUE.				
ТҮРЕ		NUMBER	NUMBER	CAL.					
EMI Test Receiver	R&S	ESCI7	100760	05/04/2015	05/03/2016				
LISN	SCHWARZBECK	NSLK 8127	8127-649	05/15/2015	05/14/2016				
LISN	FCC	FCC-LISN-50/250- 25-2-01	04034	03/13/2015	03/12/2016				
Coaxial Cables	N/A	WK CE Cable	N/A	11/26/2014	11/25/2015				

#### **EUT Setup** 6.3

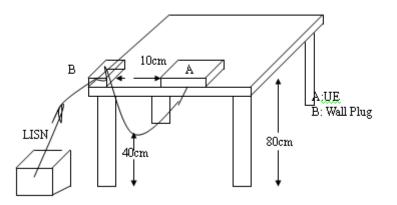
- 1. The conducted emission tests were performed in the test site, using the setup in accordance with the ANSI 63.10:2009.
- 2. The AC/DC Power adaptor of EUT was plug-in LISN. The EUT was placed flushed with the rear of the table.
- 3. The LISN was connected with 120Vac/60Hz power source.

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



#### **Measurement Procedure** 6.5

- 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

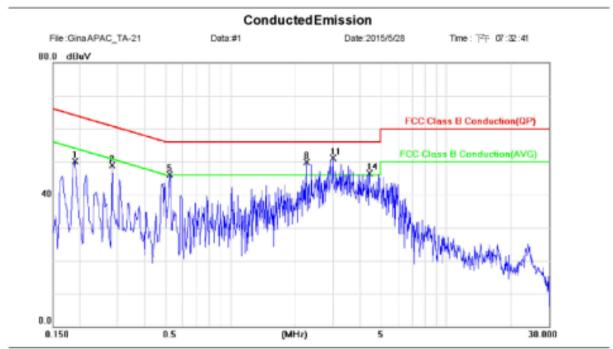
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## AC POWER LINE CONDUCTED EMISSION TEST DATA

Operation Mode:	Operation mode			Test Date:	May 28, 2015
Temperature:	24	Humidity:	66 %	Test By:	Marcus
Model No.:	Adapter: EP800, Supplier: Phihong			Phase:	L1



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		
		MHz	dBul√	œ	dBJV	dBJV	ďB	Detector	Comment
1		0.1900	50.03	0.06	50.09	64.04	-13.95	peak	
2		0.2820	48.78	0.06	48.84	60.76	-11.92	peak	
3		0.2820	34.60	0.06	34.66	60.76	-26.10	œ	
4		0.2820	23.70	0.06	23.76	50.76	-27.00	A/G	
5		0.5220	46.00	0.06	46.06	56.00	-9.94	peak	
6		0.5220	43.00	0.06	43.06	56.00	-12.94	œ	
7		0.5220	29.90	0.06	29.96	46.00	-16.04	A/G	
8		2.2580	49.88	0.10	49.98	56.00	-6.02	peak	
9		2.2580	33.90	0.10	34.00	56.00	-22.00	œ	
10		2.2580	25.40	0.10	25.50	46.00	-20.50	A/G	
11	•	2.9860	50.99	0.11	51.10	56.00	-4.90	peak	
12		2.9860	38.10	0.11	38.21	56.00	-17.79	œ	
13		2.9860	28.30	0.11	28.41	46.00	-17.59	A/G	

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No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		
_		MHz	dBJV	ďB	dBuV	dBulV	ďB	Detector	Comment
14		4.4300	46.33	0.15	46.48	56.00	-9.52	peak	
15		4.4300	35.60	0.15	35.75	56.00	-20.25	œ	
16		4.4300	24.80	0.15	24.95	46.00	-21.05	A/G	

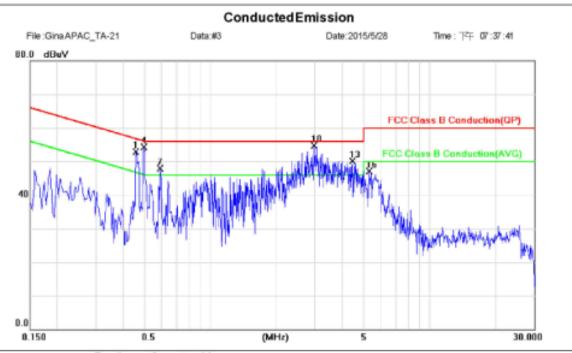
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Operation Mode:	Operation mode			Test Date:	May 28, 2015
Temperature:	24	Humidity:	66 %	Test By:	Marcus
Model No.:	Adapter: EP800, S	upplier: Phihong	Phase:	Ν	



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		
		MHz	dBuV	ďB	dBuV	dBuV	dB	Detector	Comment
1		0.4580	52.82	0.06	52.88	56.73	-3.85	peak	
2		0.4580	39.90	0.06	39.96	56.73	-16.77	œ	
3		0.4580	28.80	0.06	28.86	46.73	-17.87	AVG	
4		0.4980	54.26	0.06	54.32	56.03	-1.71	peak	
5		0.4960	46.40	0.06	46.46	56.03	-9.57	œ	
6		0.4960	33.10	0.06	33.16	46.03	-12.87	AVG	
7		0.5900	47.78	0.06	47.84	56.00	-8.16	peak	
8		0.5900	37.40	0.06	37.46	56.00	-18.54	œ	
9		0.5900	30.80	0.06	30.86	46.00	-15.14	AVG	
10	•	2.9660	54.56	0.11	54.67	56.00	-1.33	peak	
11		2.9660	43.30	0.11	43.41	56.00	-12.59	œ	
12		2.9660	33.20	0.11	33.31	46.00	-12.69	AVG	
13		4.4500	49.90	0.15	50.05	56.00	-5.95	peak	

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### **FCC ID: PY7-PM0870**

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over			
		MHz	dBuV	æ	dBJV	dBuV	æ	Detector	Comment	
14		4.4500	39.20	0.15	39.35	56.00	-16.65	œ		
15		4.4500	28.80	0.15	28.95	46.00	-17.05	AVG		
16		5.3300	46.99	0.16	47.15	60.00	-12.85	peak		
17		5.3300	35.20	0.16	35.36	60.00	-24.64	œ		
18		5.3300	24.60	0.16	24.76	50.00	-25.24	AVG		

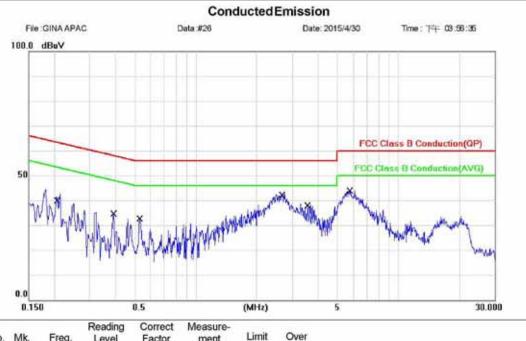
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Operation Mode:	Operation mode			Test Date:	Apr. 30, 2015
Temperature:	24	Humidity:	66 %	Test By:	Tin
Model No.:	Adapter: EP800, S	Supplier: Salcomp	Phase:	L1	



No. Mk.	Freq.	Level	Factor	ment	Limit	Over		
	MHz	dBuV	dB	dBuV	dBuV	dB	Delector	Comment
1	0.2100	34.20	9.94	44.14	63.21	-19.07	QP	
2	0.2100	19.60	9.94	29.54	53.21	-23.67	AVG	
3	0.3933	19.70	9.93	29.63	57.99	-28.36	QP	
4	0.3933	6.40	9.93	16.33	47.99	-31.66	AVG	
5	0.5303	15.90	9.93	25.83	56.00	-30.17	QP	
6	0.5303	12.50	9.93	22.43	46.00	-23.57	AVG	
7	2.6300	27.80	9.98	37.78	56.00	-18.22	QP	
8 .	2.6300	18.70	9.98	28.68	46.00	-17.32	AVG	
9	3.5880	18.60	9.99	28.59	56.00	-27.41	QP	
10	3.5880	9.90	9.99	19.89	46.00	-26.11	AVG	
11	5.6860	28.60	10.03	38.63	60.00	-21.37	QP	
12	5.6860	20.70	10.03	30.73	50.00	-19.27	AVG	

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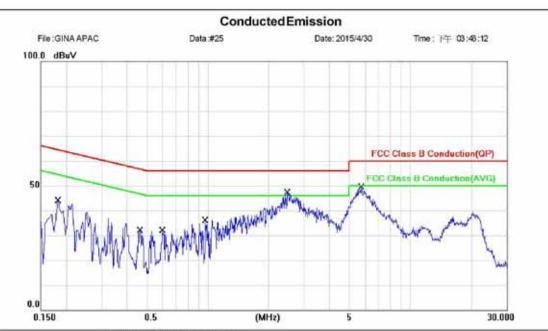
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### **FCC ID: PY7-PM0870**

Operation Mode:	Operation mode			Test Date:	Apr. 30, 2015
Temperature:	24	Humidity:	66 %	Test By:	Tin
Model No.:	Adapter: EP800, S	Supplier: Salcomp		Phase:	Ν



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1846	32.50	9.92	42.42	64.28	-21.86	QP	
2		0.1846	12.70	9.92	22.62	54.28	-31.66	AVG	
3		0.4652	19.20	9.92	29.12	56.60	-27.48	QP	
4	1	0.4652	9.00	9.92	18.92	46.60	-27.68	AVG	
5		0.5983	20.50	9.92	30.42	56.00	-25.58	QP	
6		0.5983	9.60	9.92	19.52	46.00	-26.48	AVG	
7		0.9827	22.80	9.93	32.73	56.00	-23.27	QP	
8	l.	0.9827	9.90	9.93	19.83	46.00	-26.17	AVG	
9	•	2.4830	34.60	9.96	44.56	56.00	-11.44	QP	
10		2.4830	21.80	9.96	31.76	46.00	-14.24	AVG	
11		5.7180	32.80	10.02	42.82	60.00	-17.18	QP	
12		5.7180	23.90	10.02	33.92	50.00	-16.08	AVG	

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### **DUTY CYCLE OF TEST SIGNAL** 7

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:

Duty Cycle = Ton / (Ton+Toff)

### **Measurement Procedure:**

- Set span = Zero1.
- 2. RBW = 8MHz
- 3. VBW = 8MHz,
- 4. Detector = Peak

### **Duty Cycle:**

	Duty Cycle	Duty Fator (dB)
802.11b	99%	0.04
802.11g	99%	0.04
802.11n_20	99%	0.04
802.11n_40	99%	0.04

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

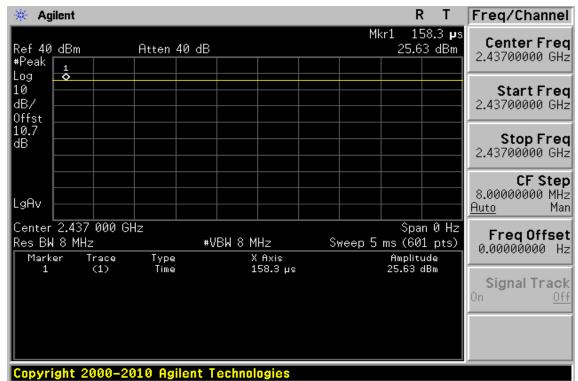
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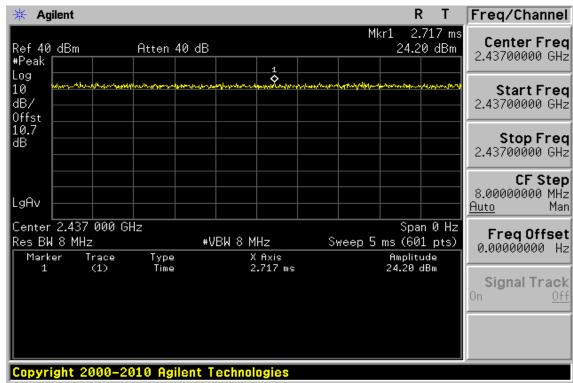


### 7.1 DUTY CYCLE TEST SIGNAL Measurement Result

### 802.11 b



### 802.11 g

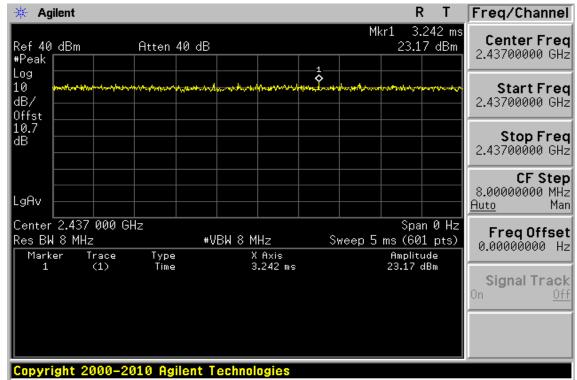


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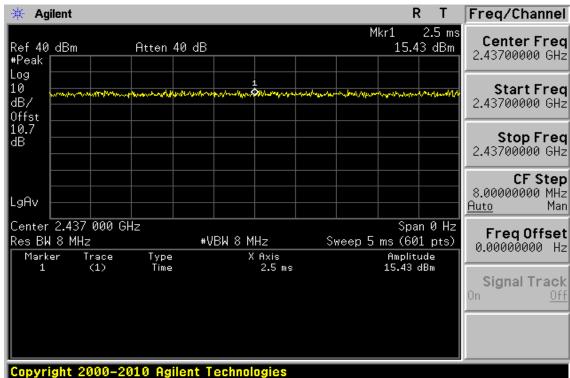
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### 802.11 n 20 MHz



### 802.11 n 40 MHz



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### PEAK OUTPUT POWER MEASUREMENT 8

### 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.

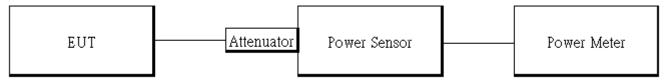
In case of point-to-point operation, the limit has to be reduced by 1dB for every 3dB that the directional gain of Antenna exceeds 6dBi.

#### **Measurement Equipment Used** 8.2

	Conducted Emission Test Site										
EQUIPMENT	MFR	MODEL	SERIAL	LAST	CAL DUE.						
ТҮРЕ		NUMBER	NUMBER	CAL.							
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						

#### Test Set-up 8.3

Power Meter:



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#### **Measurement Procedure** 8.4

- 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 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

СН	Frequency (MHz)	Data Rate	Peak Output Power (dBm)	Peak Output Power (mW)	Limit
1	2412	1	18.52	71.12	1 Watt = $30 \text{ dBm}$
6	2437	1	19.52	89.54	1 Watt = $30 \text{ dBm}$
11	2462	1	19.59	90.99	1 Watt = $30 \text{ dBm}$

СН	Frequency (MHz)	Data Rate	Avg. Output Power (dBm)	Avg. Output Power (mW)	Limit
1	2412	1	16.98	49.89	1 Watt = $30 \text{ dBm}$
6	2437	1	16.96	49.66	1 Watt = $30 \text{ dBm}$
11	2462	1	16.88	48.75	1 Watt = $30 \text{ dBm}$

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802.11g

СН	Frequency (MHz)	V     Data Rate     Peak Output Power (dBm)		Peak Output Power (mW)	Limit
1	2412	6	22.30	169.82	1 Watt = $30 \text{ dBm}$
6	2437	6	22.96	197.70	1 Watt = $30 \text{ dBm}$
11	2462	6	22.73	187.50	1 Watt = $30 \text{ dBm}$

СН	Frequency (MHz)Data RateAvg. Output Power (dBm)Avg. Output (mW)		Avg. Output Power (mW)	Limit	
1	2412	6	13.99	25.06	1 Watt = $30 \text{ dBm}$
6	2437	6	13.96	24.89	1 Watt = $30 \text{ dBm}$
11	2462	6	13.79	23.93	1 Watt = $30 \text{ dBm}$

### 802.11n\_HT20

СН	Frequency (MHz)	Data Rate	Peak Output Power (dBm)	Peak Output Power (mW)	Limit
1	2412	MCS0	21.56	143.22	1 Watt = $30 \text{ dBm}$
6	2437	MCS0	21.49	140.93	1 Watt = $30 \text{ dBm}$
11	2462	MCS0	21.96	157.04	1 Watt = $30 \text{ dBm}$

СН	Frequency (MHz)	Data Rate	Avg. Output Power (dBm)	Avg. Output Power (mW)	Limit
1	2412	MCS0	10.74	11.86	1 Watt = $30 \text{ dBm}$
6	2437	MCS0	10.69	11.72	1 Watt = $30 \text{ dBm}$
11	2462	MCS0	10.94	12.42	1 Watt = $30 \text{ dBm}$

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### 802.11n\_HT40

СН	Frequency (MHz)	Data Rate	Peak Output Power (dBm)	Peak Output Power (mW)	Limit
3	2422	MCS0	22.13	163.31	1 Watt = $30 \text{ dBm}$
6	2437	MCS0	21.83	152.41	1 Watt = $30 \text{ dBm}$
9	2452	MCS0	21.49	140.93	1 Watt = $30 \text{ dBm}$

СН	Frequency (MHz)	Data Rate	Avg. Output Power (dBm)	Avg. Output Power (mW)	Limit
3	2422	MCS0	10.98	12.53	1 Watt = $30 \text{ dBm}$
6	2437	MCS0	10.99	12.56	1 Watt = $30 \text{ dBm}$
9	2452	MCS0	10.97	12.50	1 Watt = $30 \text{ dBm}$

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

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### **6dB BANDWIDTH** 9

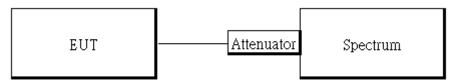
### 9.1 **Standard Applicable**

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

#### 9.2 **Measurement Equipment Used**

Conducted Emission Test Site							
EQUIPMENT	MFR	MODEL	SERIAL	LAST	CAL DUE.		
ТҮРЕ		NUMBER	NUMBER	CAL.			
Spectrum Analyzer	Agilent	E4446A	MY51100003	01/29/2015	01/28/2016		
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		

#### **Test Set-up** 9.3



#### 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.
- 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	Bandwidth	Limit	Result				
(MHz)	(kHz)	(kHz)					
802.11b							
2412	9076	> 500	PASS				
2437	8594	> 500	PASS				
2462	8627	> 500	PASS				
	802.	.11g					
2412	15723	> 500	PASS				
2437	15419	> 500	PASS				
2462	16374	> 500	PASS				
	802.11n_HT20						
2412	16788	> 500	PASS				
2437	16909	> 500	PASS				
2462	17004	> 500	PASS				
802.11n_HT40							
2422	35803	> 500	PASS				
2437	24360	> 500	PASS				
2452	36522	> 500	PASS				

\* Note: The arrow "->" reveals X decibel level

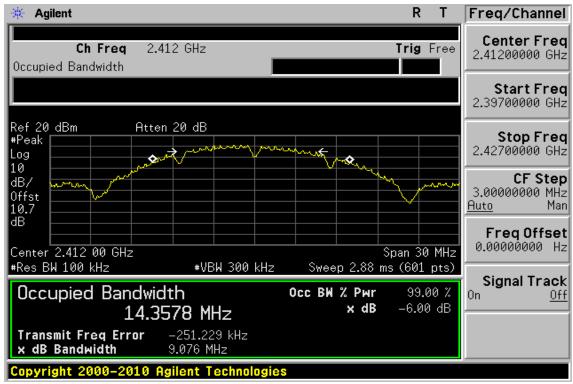
\*Refer to next page for plots

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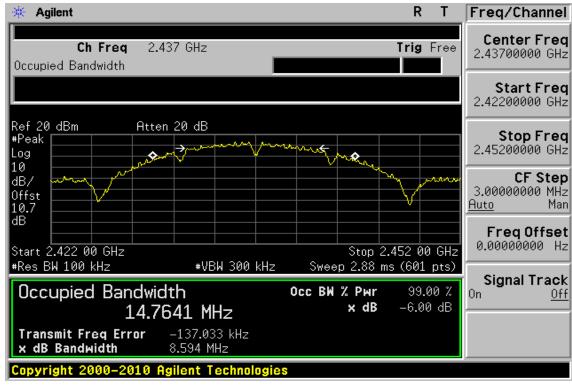
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## 802.11b 6dB Band Width Test Data CH-Low



## 6dB Band Width Test Data CH-Mid



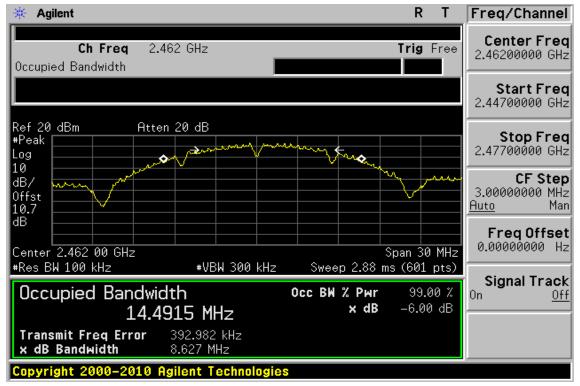
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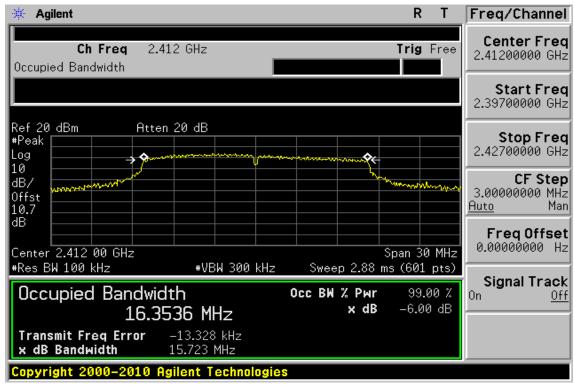


## 6dB Band Width Test Data CH-High



## 802.11g

## 6dB Band Width Test Data CH-Low

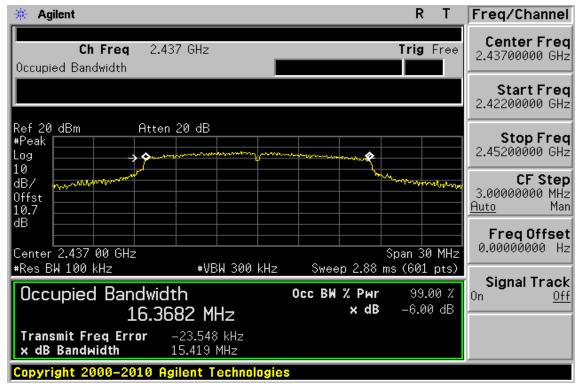


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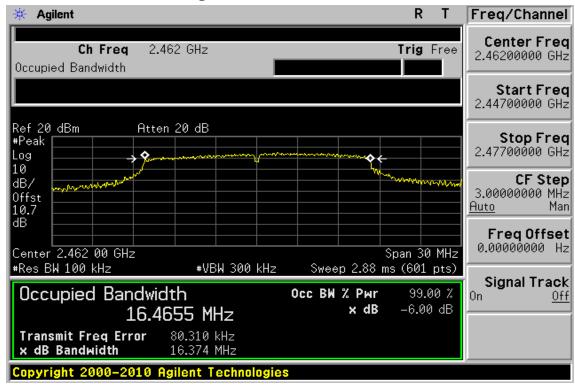
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## 6dB Band Width Test Data CH-Mid



## 6dB Band Width Test Data CH-High

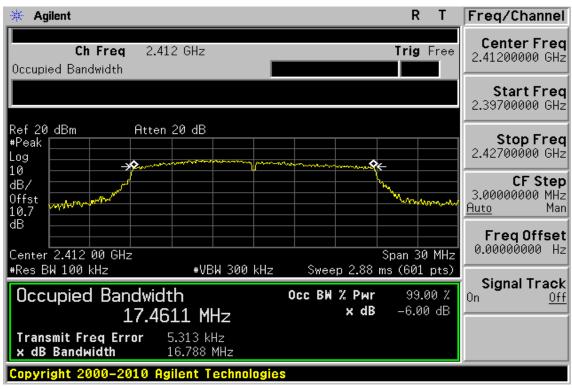


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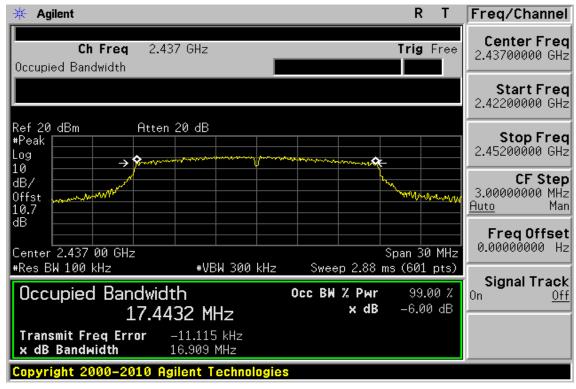
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## 802.11n 20M 6dB Band Width Test Data CH-Low



## 6dB Band Width Test Data CH-Mid

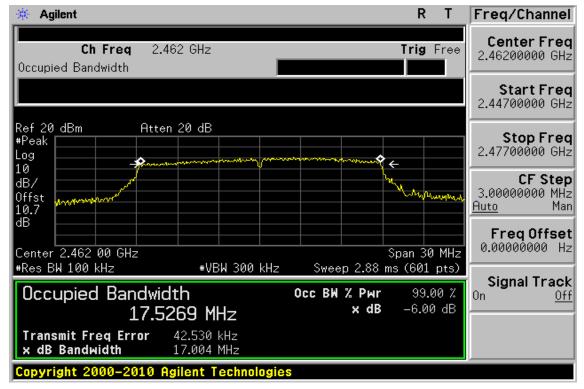


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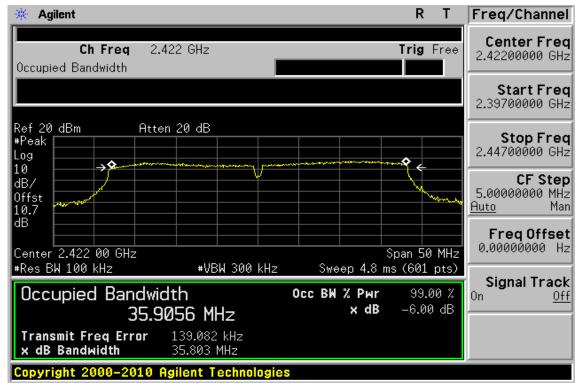


# 6dB Band Width Test Data CH-High



# 802.11 n 40M

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

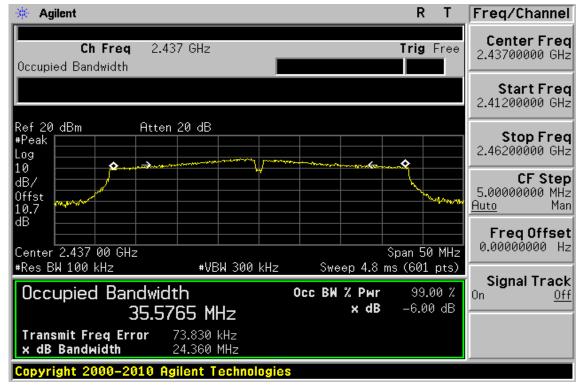


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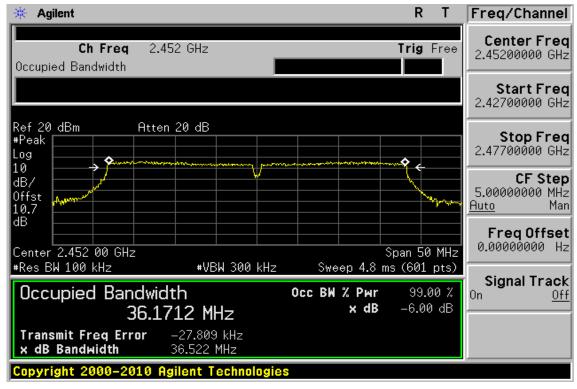
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# 6dB Band Width Test Data CH-Mid



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



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# 10 CONDUCTED BAND EDGES AND SPURIOUS EMISSION MEASUREMENT

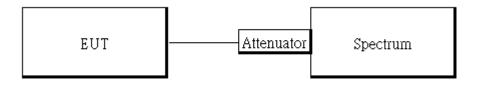
# 10.1 Standard Applicable

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	MFR	MODEL	SERIAL	LAST	CAL DUE.				
ТҮРЕ		NUMBER	NUMBER	CAL.					
Spectrum Analyzer	Agilent	E4446A	MY51100003	01/29/2015	01/28/2016				
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 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. 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 V03r03.
- 3. Set RBW = 100K & VBW ≥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.

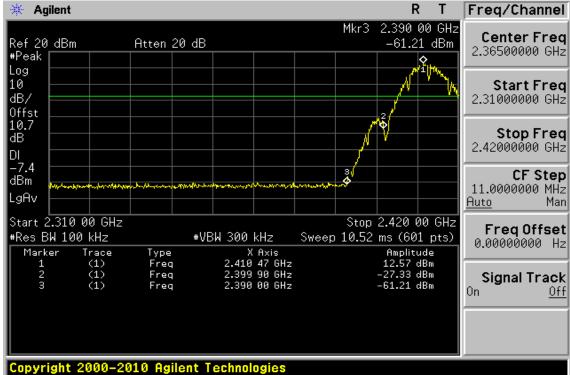
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# 802.11b **Band Edges Test Data CH-Low**







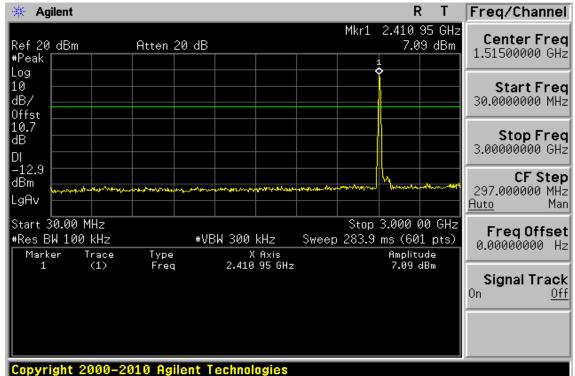
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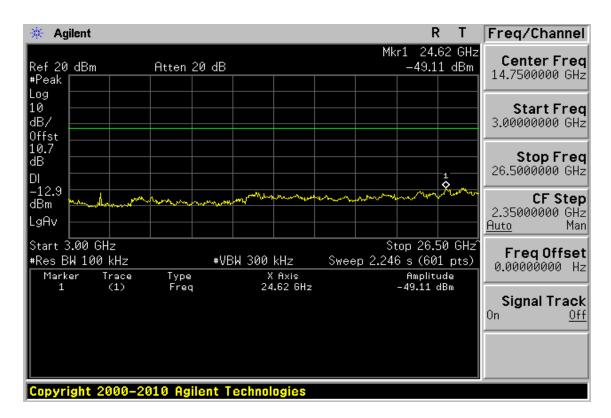
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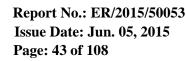
# 802.11b





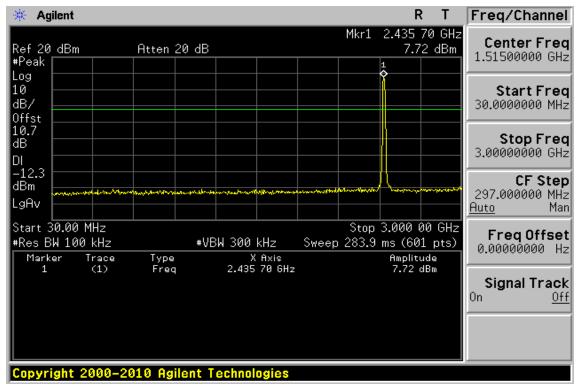


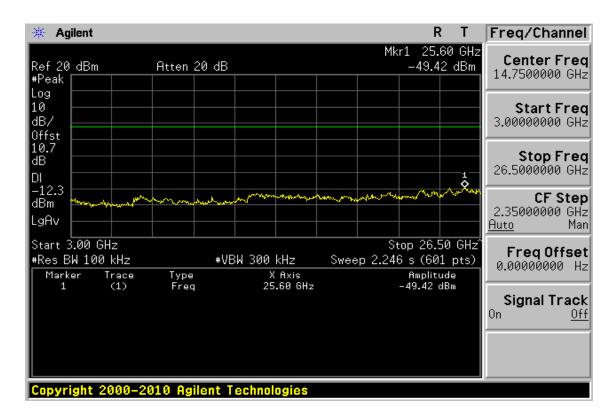
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#### **Spurious Emission Test Data CH-Mid**





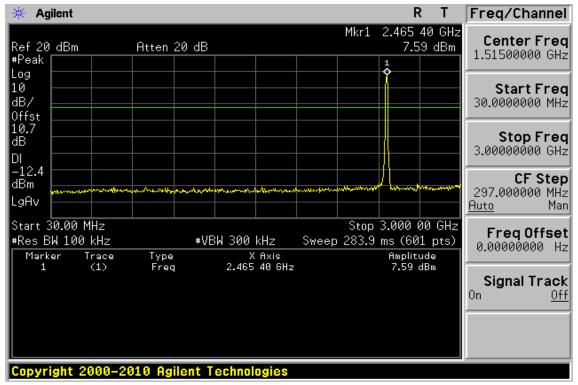
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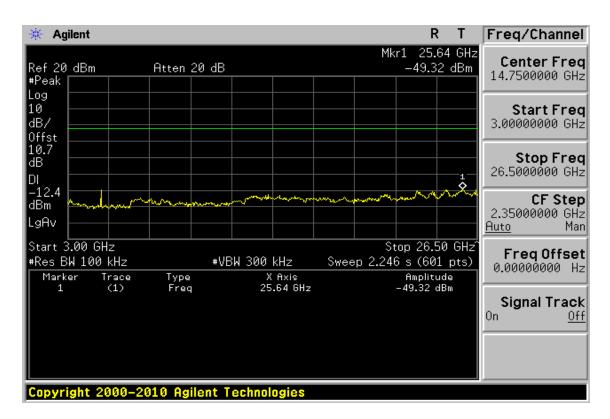
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#### **Spurious Emission Test Data CH-High**

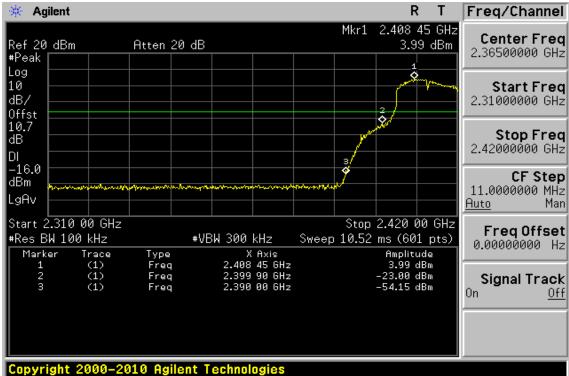


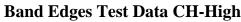


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# 802.11g **Band Edges Test Data CH-Low**





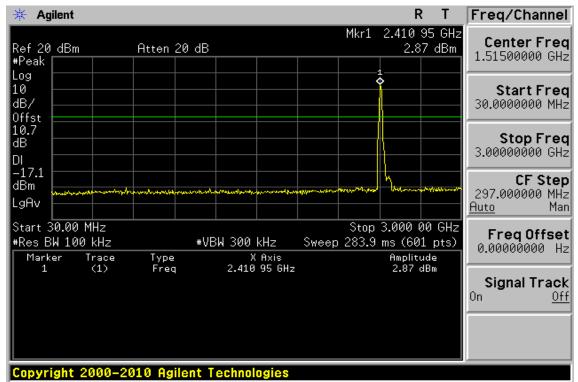


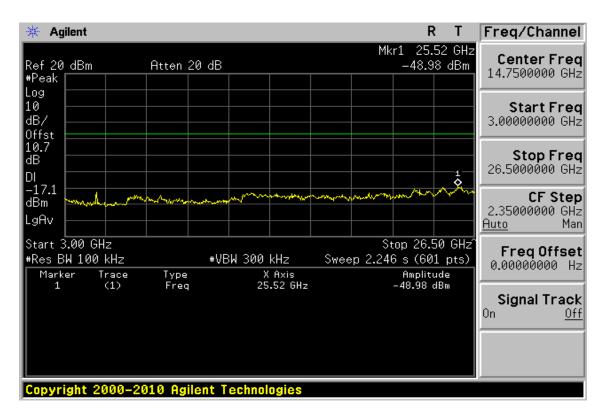
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# 802.11g **Spurious Emission Test Data CH-Low**

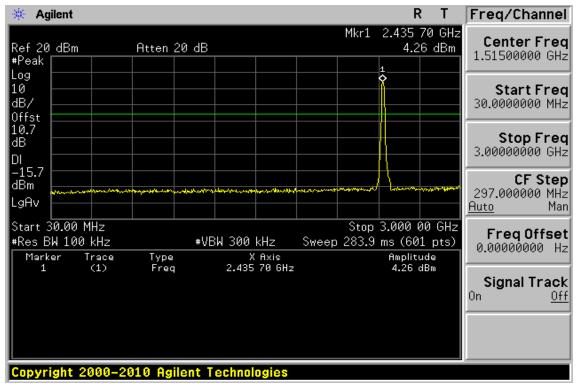


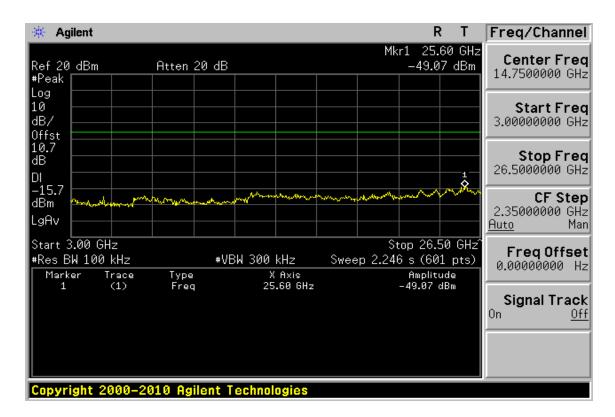


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#### **Spurious Emission Test Data CH-Mid**

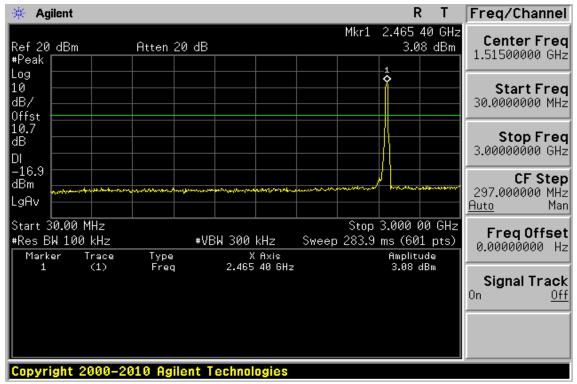


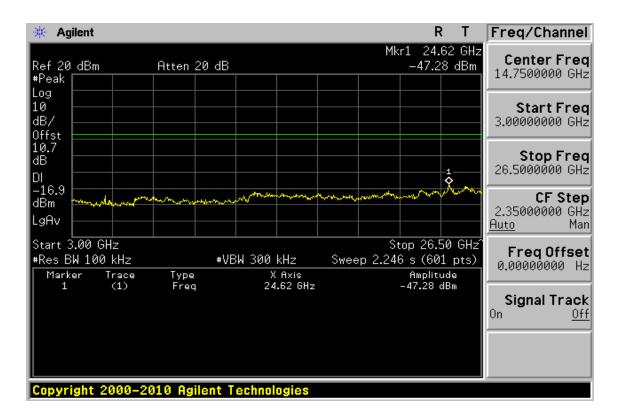


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#### **Spurious Emission Test Data CH-High**

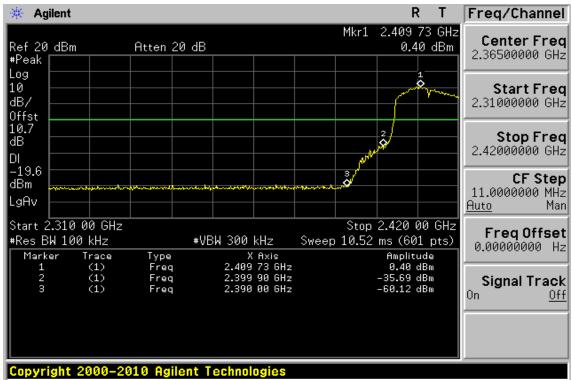


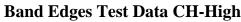


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# 802.11n\_HT20 **Band Edges Test Data CH-Low**







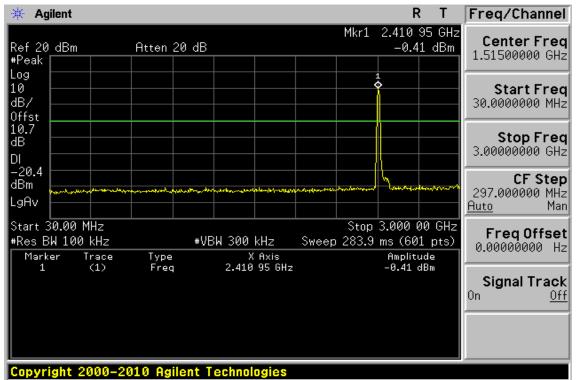
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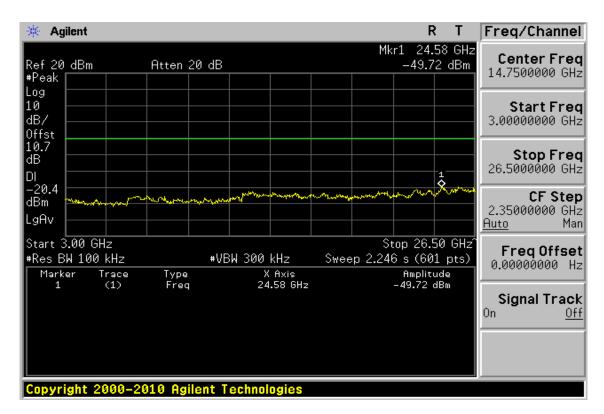
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# 802.11n HT20

# **Spurious Emission Test Data CH-Low**

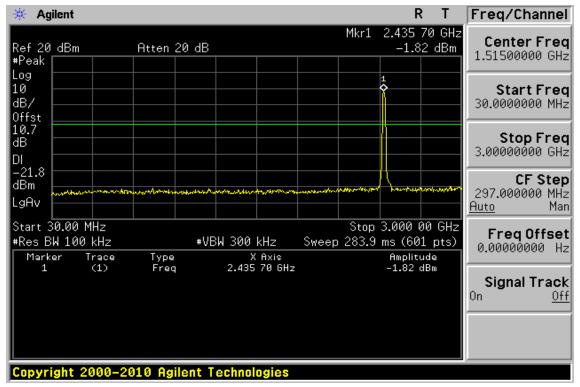


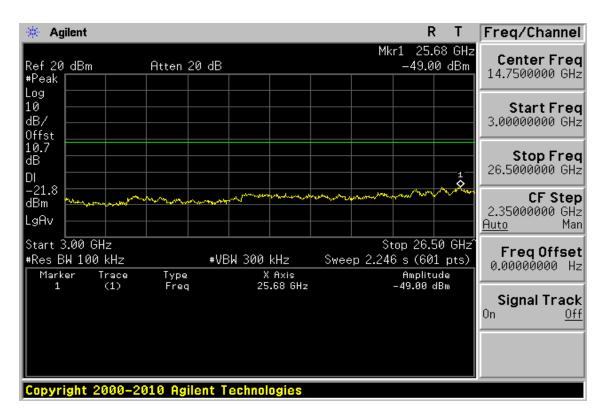


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#### **Spurious Emission Test Data CH-Mid**





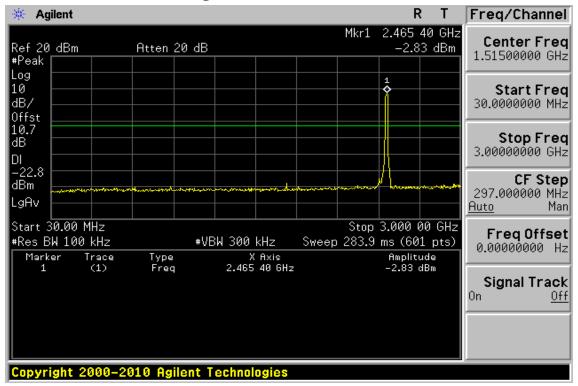
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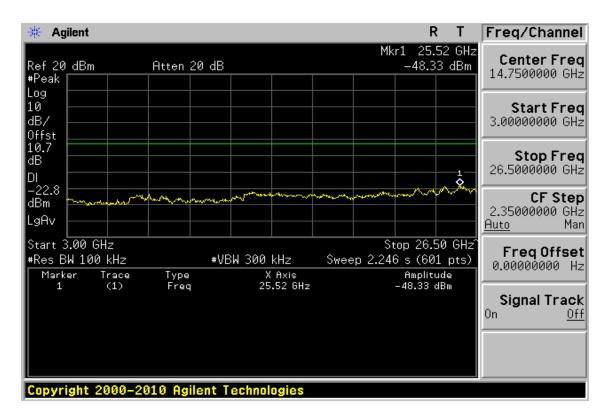
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#### **Spurious Emission Test Data CH-High**

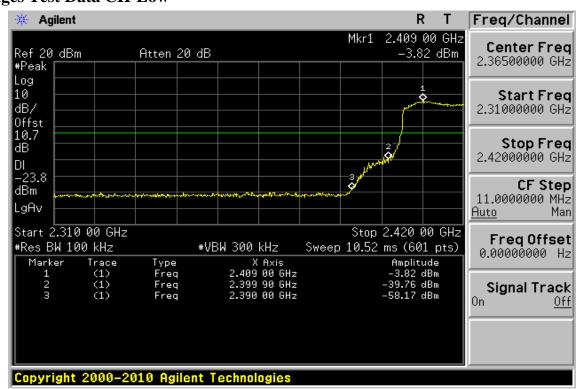




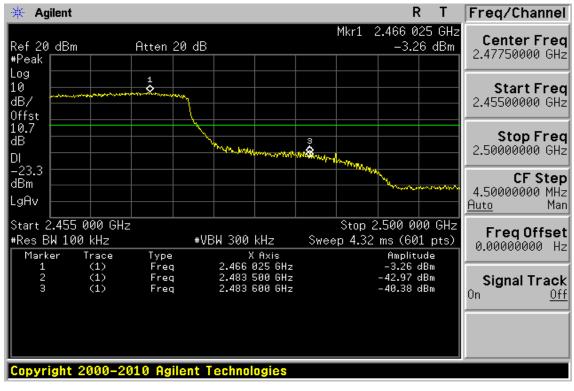
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# 802.11n HT40 **Band Edges Test Data CH-Low**







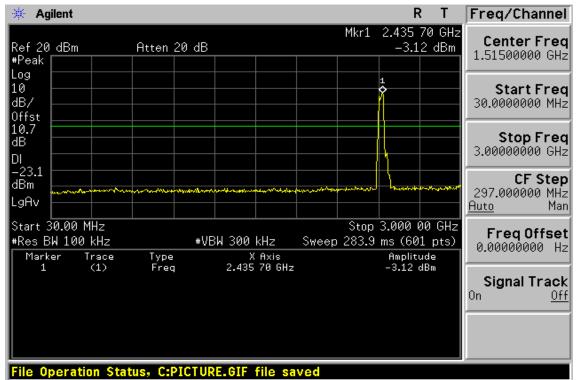
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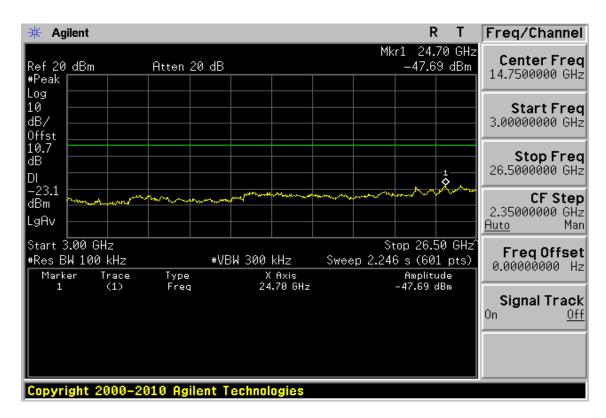
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# 802.11n HT40

# **Spurious Emission Test Data CH-Low**

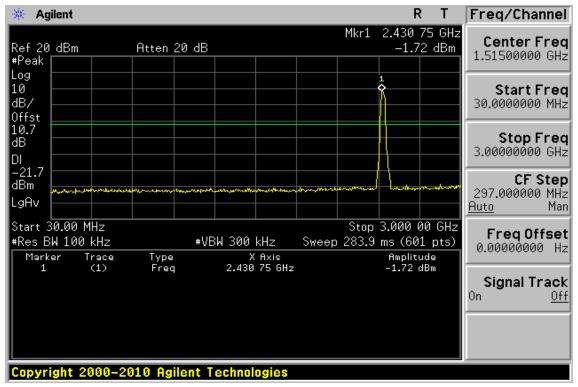


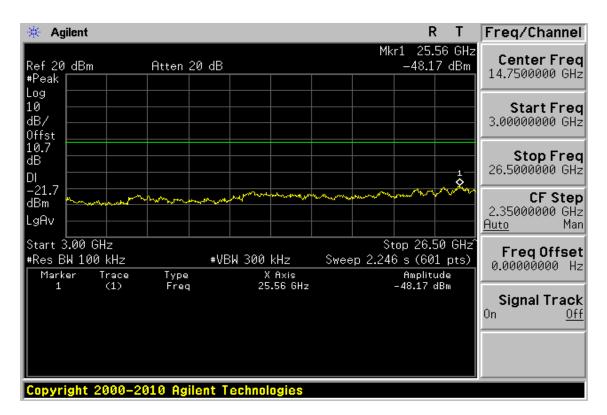


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#### **Spurious Emission Test Data CH-Mid**





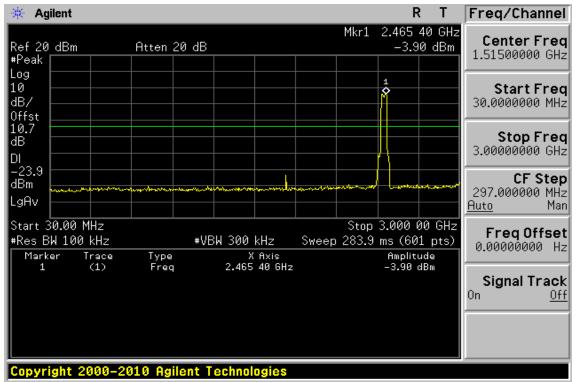
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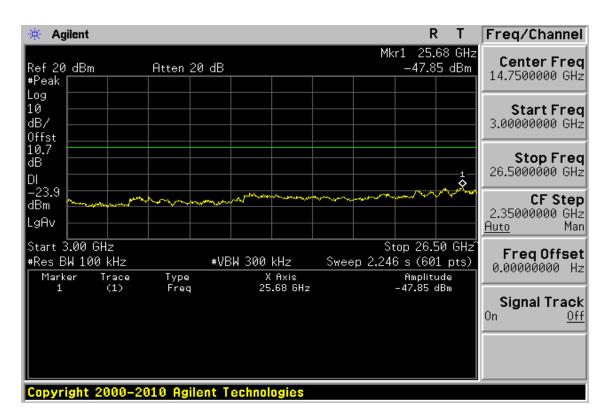
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#### **Spurious Emission Test Data CH-High**





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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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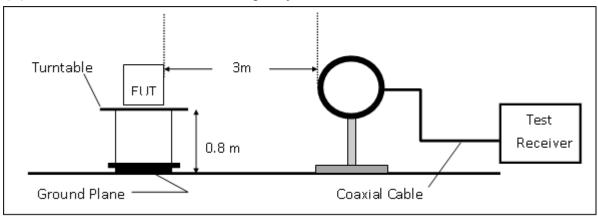


#### **11.2 Measurement Equipment Used:**

966 Chamber									
EQUIPMENT	MFR	MODEL	SERIAL	LAST	CAL DUE.				
ТҮРЕ		NUMBER	NUMBER	CAL.					
EMI Test Receiver	R&S	ESCI7	100760	05/04/2015	05/03/2016				
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	05/05/2015	05/04/2016				
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

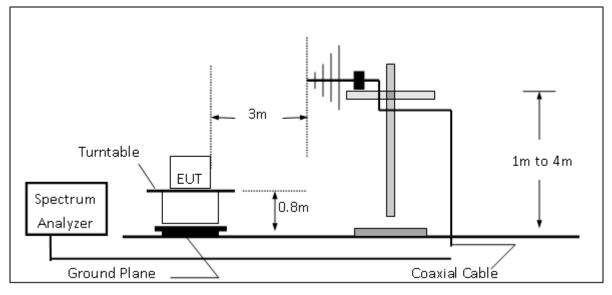
(A) Radiated Emission Test Set-UP Frequency Below 30MHz.



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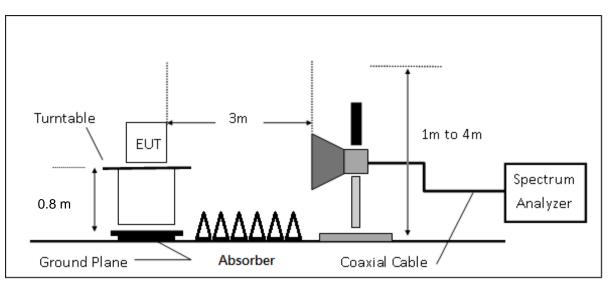
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### (B) Radiated Emission Test Set-Up, Frequency form 30MHz to 1000MHz

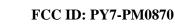
(C) Radiated Emission Test Set-UP Frequency Over 1 GHz



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# **11.3.1 Measurement Procedure**

- 1. The testing follows the Measurement Procedure of FCC KDB 558074 D01 DTS Meas. Guidance V03r03.
- 2. The EUT was placed on a turn table with 0.8m for frequency< 1GHz and 0.8m 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  $\ge$  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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2390.00

Е

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

Operation Ban Fundamental I Operation Mod EUT Pol.	Frequency	:802.11 b :2412 MHz :Band Edge I :E2 Plan	LOW	Test Date Temp./Humi. Engineer Measurement Antenna Po			:2015-05-26 :21 deg_C / 61 RH :Curry 1. :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	Е	Average	30.16	5.16	35.32	54.00	-18.68	
2390.00	Е	Peak	43.64	5.16	48.80	74.00	-25.20	
Operation Ban Fundamental I Operation Mo EUT Pol.	Frequency	:802.11 b :2412 MHz :Band Edge I :E2 Plan	LOW	Engir	./Humi.	na Pol.	:2015-05-26 :21 deg_C / 61 RH :Curry :HORIZONTAL	
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin	
		Mode	Reading Level		FS	@3m		
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB	
2390.00	Е	Average	30.27	5.16	35.43	54.00	-18.57	
	_							

44.01

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5.16

49.17

74.00

-24.83



#### **FCC ID: PY7-PM0870**

Report No.: ER/2015/50053 Issue Date: Jun. 05, 2015 Page: 63 of 108

Freq.NoteDetectorSpectrumFactorActualLimitMarginModeReading LevelFS $@3m$ MHzF/H/E/SPK/QP/AVdB $\mu$ VdBdB $\mu$ V/mdB $\mu$ V/mdB2483.50EAverage30.296.0136.3054.00-17.702483.50EPeak43.806.0149.8174.00-24.19
2483.50 E Average 30.29 6.01 36.30 54.00 -17.70
2483.50 E Peak 43.80 6.01 49.81 74.00 -24.19
Operation Band:802.11 bTest Date:2015-05-26Fundamental Frequency:2462 MHzTemp./Humi.:21 deg_C / 61 RHOperation Mode:Band Edge HIGHEngineer:CurryEUT Pol.:E2 PlanMeasurement Antenna Pol.:HORIZONTAL
Freq.NoteDetectorSpectrumFactorActualLimitMarginModeReading LevelFS@3m
$MHz F/H/E/S PK/QP/AV dB\mu V dB dB\mu V/m dB\mu V/m dB$
2483.50 E Average 33.14 6.01 39.15 54.00 -14.85
2483.50 E Peak 48.22 6.01 54.23 74.00 -19.77

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

Operation Band:802.11 gFundamental Frequency:2412 MHzOperation Mode:Band Edge LOWEUT Pol.:E2 Plan		Test Date Temp./Humi. Engineer Measurement Antenna Pol.			:2015-05-26 :21 deg_C / 61 RH :Curry :VERTICAL		
Freq.	Note	Detector Mode	Spectrum Reading Level dBµV	Factor	Actual FS dBµV∕m	Limit @3m dBµV/n	Margin
MHz	F/H/E/S	PK/QP/AV	•	dB	•	•	
2390.00	E	Average	30.85	5.16	36.01	54.00	-17.99
2390.00	E	Peak	48.35	5.16	53.51	74.00	-20.49
Operation Bar Fundamental Operation Mo EUT Pol.	Frequency	:802.11 g :2412 MHz :Band Edge I :E2 Plan	LOW	Engir	./Humi.	na Pol.	:2015-05-26 :21 deg_C / 61 RH :Curry :HORIZONTAL
Freq	Note	Detector	Spectrum	Factor	Actual	Limit	Margin

	Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin	
			Mode	Reading Level		FS	@3m		
_	MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB	_
	2390.00	Е	Average	32.84	5.16	38.00	54.00	-16.00	
	2390.00	Е	Peak	53.80	5.16	58.96	74.00	-15.04	



#### **FCC ID: PY7-PM0870**

Report No.: ER/2015/50053 Issue Date: Jun. 05, 2015 Page: 65 of 108

Operation Bar Fundamental I Operation Mo EUT Pol.	Frequency	:802.11 g :2462 MHz :Band Edge I :E2 Plan	HIGH	Engin	./Humi.	na Pol.	:2015-05-26 :21 deg_C / 61 RH :Curry :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
						•	
2483.50 2483.50	E E	Average Peak	32.97 56.83	6.01 6.01	38.98 62.84	54.00 74.00	-15.02 -11.16
Operation Bar Fundamental I Operation Mo EUT Pol.	Frequency	:802.11 g Test Date :2462 MHz Temp./Humi. :Band Edge HIGH Engineer :E2 Plan Measurement Antenr		na Pol.	:2015-05-26 :21 deg_C / 61 RH :Curry :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∕n	n dB
2483.50	Е	Average	39.15	6.01	45.16	54.00	-8.84
2483.50	Е	Peak	65.46	6.01	71.47	74.00	-2.53

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Е

2390.00

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

Operation Band:802.11 n20MFundamental Frequency:2412 MHzOperation Mode:Band Edge LOWEUT Pol.:E2 Plan			Test Date Temp./Humi. Engineer Measurement Antenna Pol.			:2015-05-26 :21 deg_C / 61 RH :Curry :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	30.02	5.16	35.18	54.00	-18.82
2390.00	Е	Peak	43.98	5.16	49.14	74.00	-24.86
Operation Ban Fundamental F Operation Mod EUT Pol.	Frequency	:802.11 n20N :2412 MHz :Band Edge I :E2 Plan		Engin	./Humi.		:2015-05-26 :21 deg_C / 61 RH :Curry :HORIZONTAL
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
2390.00	Е	Average	30.17	5.16	35.33	54.00	-18.67

44.32

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5.16

49.48

-24.52

74.00



#### **FCC ID: PY7-PM0870**

Report No.: ER/2015/50053 Issue Date: Jun. 05, 2015 Page: 67 of 108

Operation Ban Fundamental I Operation Mo EUT Pol.	Frequency	:802.11 n20N :2462 MHz :Band Edge I :E2 Plan		Engin	./Humi.	na Pol.	:2015-05-26 :21 deg_C / 61 RH :Curry :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/n	Margin n dB
2483.50	E		31.61	6.01	37.62	54.00	-16.38
2483.50 2483.50	E	Average Peak	53.18	6.01	59.19	74.00	-14.81
Operation Ban Fundamental I Operation Mo EUT Pol.	Frequency	:802.11 n20N :2462 MHz :Band Edge I :E2 Plan		Engin	./Humi.	na Pol.	:2015-05-26 :21 deg_C / 61 RH :Curry :HORIZONTAL
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV∕n	n dB
2483.50	Е	Average	36.20	6.01	42.21	54.00	-11.79
2483.50	Е	Peak	61.96	6.01	67.97	74.00	-6.03

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#### Radiated Band Edge Measurement Result (802.11\_HT40) **Operation Band** :802.11 n40M Test Date

Operation Bar Fundamental I Operation Mo EUT Pol.	Frequency	:802.11 n40N :2422 MHz :Band Edge I :E2 Plan		Test Date Temp./Humi. Engineer Measurement Antenna Pe			:2015-05-26 :21 deg_C / 61 RH :Curry :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/n	n dB
2390.00	Е	Average	30.11	5.16	35.27	54.00	-18.73
2390.00	Е	Peak	43.53	5.16	48.69	74.00	-25.31
Operation Bar Fundamental I Operation Mo EUT Pol.	Frequency	:802.11 n40N :2422 MHz :Band Edge I :E2 Plan		Test Date Temp./Humi. Engineer Measurement Anter		na Pol.	:2015-05-26 :21 deg_C / 61 RH :Curry :HORIZONTAL
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
Ĩ		Mode	Reading Level		FS	@3m	C
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV∕n	n dB
2390.00	Е	Average	30.93	5.16	36.09	54.00	-17.91
2390.00	Е	Peak	49.84	5.16	55.00	74.00	-19.00

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#### **FCC ID: PY7-PM0870**

Report No.: ER/2015/50053 Issue Date: Jun. 05, 2015 Page: 69 of 108

Operation Band Fundamental Frequency Operation Mode EUT Pol.		:802.11 n40M :2452 MHz :Band Edge HIGH :E2 Plan		Test Date Temp./Humi. Engineer Measurement Antenna Pol.			:2015-05-26 :21 deg_C / 61 RH :Curry :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 n dB
2483.50	Е	Average	33.35	6.01	39.36	54.00	-14.64
2483.50	Е	Peak	54.87	6.01	60.88	74.00	-13.12
Operation Band Fundamental Frequency Operation Mode EUT Pol.		:802.11 n40M :2452 MHz :Band Edge HIGH :E2 Plan		Test Date Temp./Humi. Engineer Measurement Antenn		:2015-05-26 :21 deg_C / 61 RH :Curry na Pol. :HORIZONTAL	
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
-		Mode	Reading Level		FS	@3m	-
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV∕n	n dB
2483.50	Е	Average	38.98	6.01	44.99	54.00	-9.01
2483.50	Е	Peak	63.28	6.01	69.29	74.00	-4.71

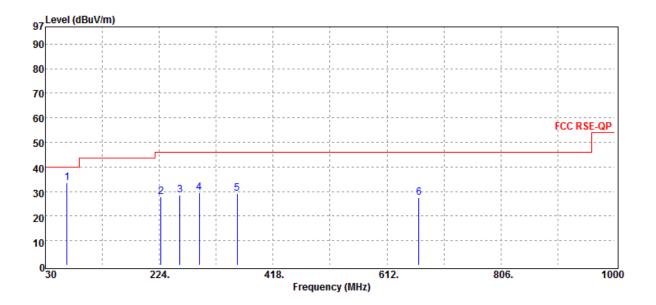
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#### **Radiated Spurious Emission Measurement Result**

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

Operation Band	:802.11 g	Test Date	:2015-05-26
Fundamental Frequency	:2412 MHz	Temp./Humi.	:21 deg_C / 61 RH
Operation Mode	:TX LOW	Engineer	:Curry
EUT Pol.	:E2 Plan	Measurement Antenna Pol.	:VERTICAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
66.86	S	Peak	44.66	-11.21	33.45	40.00	-6.55
226.91	S	Peak	38.83	-11.05	27.78	46.00	-18.22
258.92	S	Peak	38.09	-9.60	28.49	46.00	-17.51
291.90	S	Peak	37.86	-8.17	29.69	46.00	-16.31
356.89	S	Peak	36.21	-7.07	29.14	46.00	-16.86
666.32	S	Peak	28.86	-1.20	27.66	46.00	-18.34

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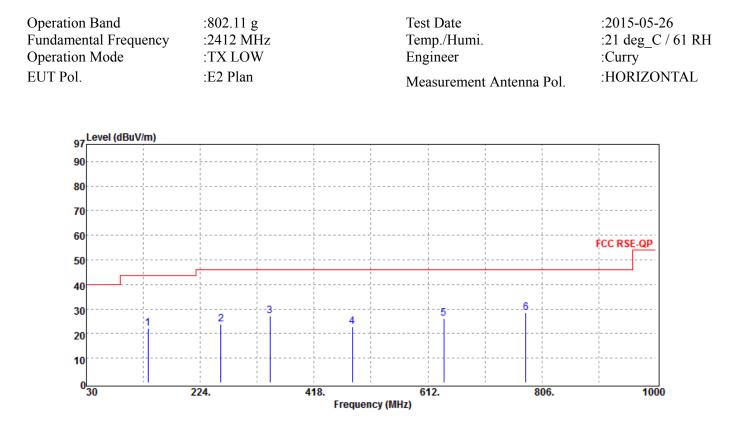
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#### **FCC ID: PY7-PM0870**

Report No.: ER/2015/50053 Issue Date: Jun. 05, 2015 Page: 71 of 108



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
134.76	S	Peak	32.33	-10.25	22.08	43.50	-21.42
258.92	S	Peak	33.31	-9.60	23.71	46.00	-22.29
342.34	S	Peak	34.58	-7.41	27.17	46.00	-18.83
482.99	S	Peak	27.38	-4.46	22.92	46.00	-23.08
639.16	S	Peak	28.24	-1.95	26.29	46.00	-19.71
778.84	S	Peak	28.01	0.45	28.46	46.00	-17.54

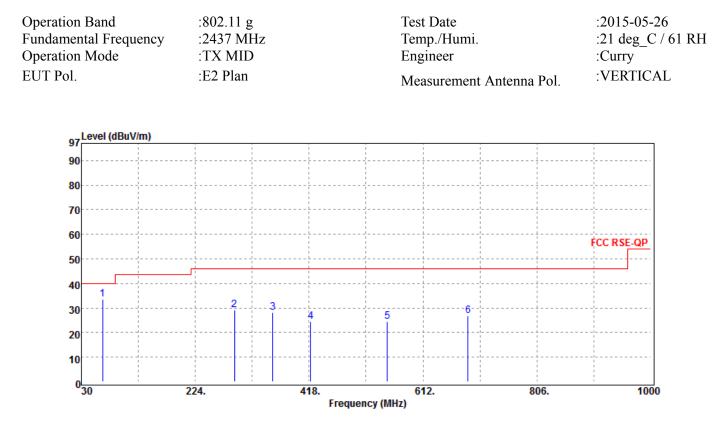
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#### **FCC ID: PY7-PM0870**

Report No.: ER/2015/50053 Issue Date: Jun. 05, 2015 Page: 72 of 108



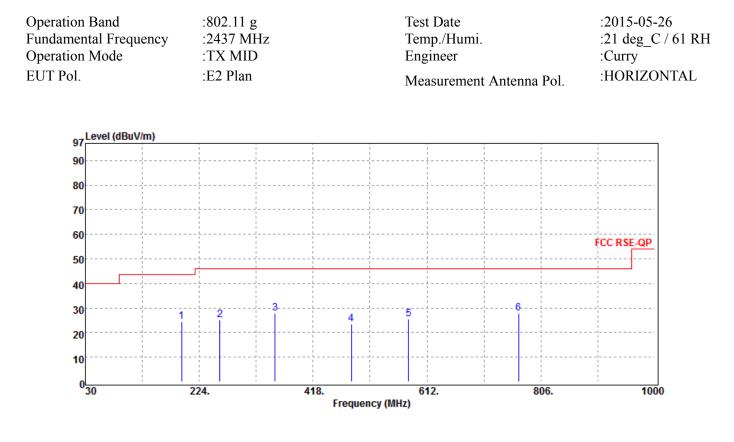
Note	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	
F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
S	Peak	44.48	-11.07	33.41	40.00	-6.59
S	Peak	37.47	-8.18	29.29	46.00	-16.71
S	Peak	35.15	-7.08	28.07	46.00	-17.93
S	Peak	30.14	-5.67	24.47	46.00	-21.53
S	Peak	28.61	-4.05	24.56	46.00	-21.44
S	Peak	27.70	-0.84	26.86	46.00	-19.14
	F/H/E/S S S S S S S	ModeF/H/E/SModeSPK/QP/AVSPeakSPeakSPeakSPeakSPeakSPeak	F/H/E/SModeReading LevelF/H/E/SPK/QP/AVdBµVSPeak44.48SPeak37.47SPeak35.15SPeak30.14SPeak28.61	Mode         Reading Level           F/H/E/S         PK/QP/AV         dBµV         dB           S         Peak         44.48         -11.07           S         Peak         37.47         -8.18           S         Peak         35.15         -7.08           S         Peak         30.14         -5.67           S         Peak         28.61         -4.05	Mode         Reading Level         FS           F/H/E/S         PK/QP/AV         dBµV         dB         dBµV/m           S         Peak         44.48         -11.07         33.41           S         Peak         37.47         -8.18         29.29           S         Peak         35.15         -7.08         28.07           S         Peak         30.14         -5.67         24.47           S         Peak         28.61         -4.05         24.56	Mode       Reading Level       FS       @3m         F/H/E/S       PK/QP/AV       dBµV       dB       dBµV/m       dBµV/m         S       Peak       44.48       -11.07       33.41       40.00         S       Peak       37.47       -8.18       29.29       46.00         S       Peak       35.15       -7.08       28.07       46.00         S       Peak       30.14       -5.67       24.47       46.00         S       Peak       28.61       -4.05       24.56       46.00

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Report No.: ER/2015/50053 Issue Date: Jun. 05, 2015 Page: 73 of 108



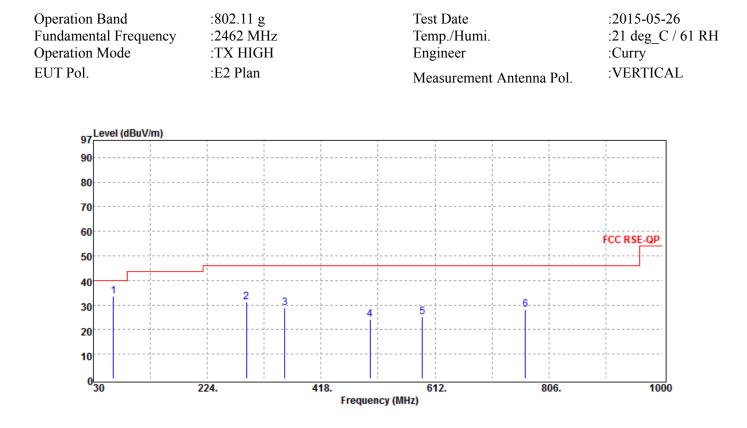
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
193.93	S	Peak	36.29	-11.69	24.60	43.50	-18.90
258.92	S	Peak	34.67	-9.60	25.07	46.00	-20.93
353.01	S	Peak	35.00	-7.11	27.89	46.00	-18.11
482.99	S	Peak	28.02	-4.46	23.56	46.00	-22.44
580.96	S	Peak	27.51	-2.04	25.47	46.00	-20.53
768.17	S	Peak	26.98	1.03	28.01	46.00	-17.99

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Report No.: ER/2015/50053 Issue Date: Jun. 05, 2015 Page: 74 of 108



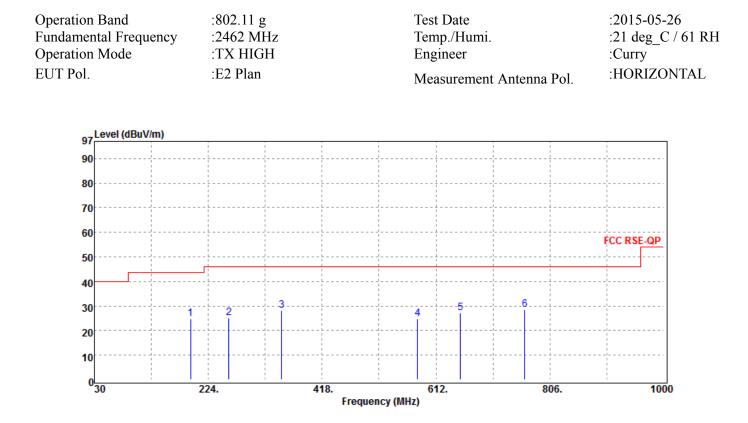
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
63.95	S	Peak	44.20	-10.79	33.41	40.00	-6.59
290.93	S	Peak	39.51	-8.18	31.33	46.00	-14.67
355.92	S	Peak	36.07	-7.08	28.99	46.00	-17.01
501.42	S	Peak	28.67	-4.34	24.33	46.00	-21.67
590.66	S	Peak	26.61	-1.53	25.08	46.00	-20.92
766.23	S	Peak	27.19	1.09	28.28	46.00	-17.72

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Report No.: ER/2015/50053 Issue Date: Jun. 05, 2015 Page: 75 of 108



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
193.93	S	Peak	36.47	-11.69	24.78	43.50	-18.72
258.92	S	Peak	34.87	-9.60	25.27	46.00	-20.73
349.13	S	Peak	35.30	-7.20	28.10	46.00	-17.90
580.96	S	Peak	26.98	-2.04	24.94	46.00	-21.06
653.71	S	Peak	28.34	-1.23	27.11	46.00	-18.89
763.32	S	Peak	27.37	1.14	28.51	46.00	-17.49

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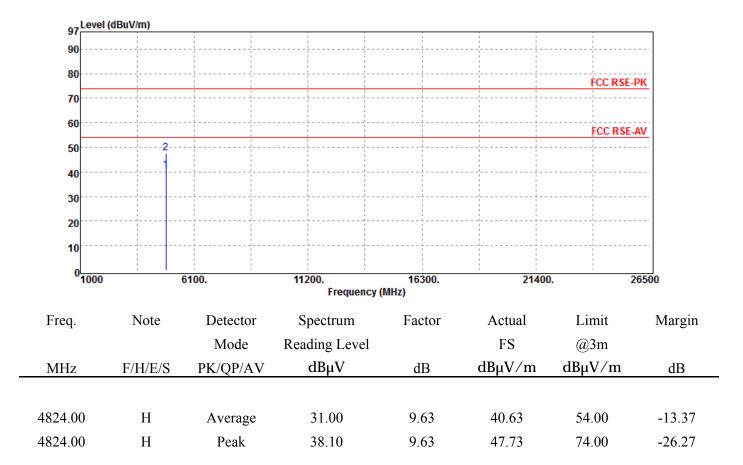
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### **Radiated Spurious Emission Measurement Result**

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

Operation Band	:802.11 b	Test Date	:2015-05-26
Fundamental Frequency	:2412 MHz	Temp./Humi.	:21 deg_C / 61 RH
Operation Mode	:TX LOW	Engineer	:Curry
EUT Pol.	:E2 Plan	Measurement Antenna Pol.	:VERTICAL



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### **FCC ID: PY7-PM0870**

Report No.: ER/2015/50053 Issue Date: Jun. 05, 2015 Page: 77 of 108

Operation Band Fundamental F Operation Mod EUT Pol.	requency	:802.11 b :2412 MHz :TX LOW :E2 Plan		Test Date Temp./Humi. Engineer Measurement Antenna Pol.		:Curry	g_C / 61 RH
97	(dBuV/m)						
90							
80						FCC RSE-	<u>PK</u>
70							
60						FCC RSE	AV
50	2						
40						 	
30							·
20							·
10							
0		5100.	11200. Frequency (I	200. 16300. Frequency (MHz)		. :	26500
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4824.00	Н	Average	31.87	9.63	41.50	54.00	-12.50
4824.00	Н	Peak	37.94	9.63	47.57	74.00	-26.43



Report No.: ER/2015/50053 Issue Date: Jun. 05, 2015 Page: 78 of 108

Operation Band Fundamental F Operation Mod EUT Pol.	requency	:802.11 b :2437 MHz :TX MID :E2 Plan		Test Date Temp./Humi. Engineer Measurement Antenna Pol.		:Curry	g_C / 61 RH
97	dBuV/m)						
90				·	·		
80						FCC RSE	<u>-PK</u>
70				·	· · · · · · · · · · · · · · · · · · ·		
60					· · · · · · · · · · · · · · · · · · ·	FCC RSE	-AV
50	1				· · · · · · · · · · · · · · · · · · ·		
40					· · · · · · · · · · · · · · · · · · ·		
30					· · · · · · · · · · · · · · · · · · ·		
20					ii i		
10							
0 <sup>L</sup> 1000	: 1	5100.	11200. Frequency (I	16300. MHz)	21400	; . :	26500
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4874.00	Н	Average	33.01	9.85	42.86	54.00	-11.14
4874.00	Н	Peak	40.15	9.85	50.00	74.00	-24.00



Report No.: ER/2015/50053 Issue Date: Jun. 05, 2015 Page: 79 of 108

Operation Band Fundamental F Operation Mod EUT Pol.	requency	:802.11 b :2437 MHz :TX MID :E2 Plan		Test Date Temp./Humi. Engineer Measurement Antenna Pol.		:21 de :Curr	-05-26 eg_C / 61 RH y IZONTAL	
97	dBuV/m)							
90								
80						FCC RSI	<u>-PK</u>	
70								
60						FCC RSI	-AV	
50	2			 		 		
40						 		
30					· · · · · · · · · · · · · · · · · · ·			
20								
10						         		
0 <mark></mark>		5100.	11200. Frequency (I	11200. 16300. Frequency (MHz)			26500	
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin	
		Mode	Reading Level		FS	@3m		
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB	
4874.00	Н	Average	33.17	9.85	43.02	54.00	-10.98	
4874.00	Н	Peak	38.97	9.85	48.82	74.00	-25.18	



### **FCC ID: PY7-PM0870**

Report No.: ER/2015/50053 Issue Date: Jun. 05, 2015 Page: 80 of 108

Operation Band Fundamental F Operation Mod EUT Pol.	requency	:802.11 b :2462 MHz :TX HIGH :E2 Plan		Test Date Temp./Humi. Engineer Measurement Antenna Pol.		:Curry	g_C / 61 RH	
97	(dBuV/m)							
97					· · · · · · · · · · · · · · · · · · ·			
80						FCC RSE-	PK	
70								
60	 				· · · · · · · · · · · · · · · · · · ·	FCC RSE	AV	
50	2							
40								
30							·	
20					·			
10						       		
0 <mark></mark>		5100.	11200. Frequency (I	16300. MHz)	21400	. 2	26500	
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin	
		Mode	Reading Level		FS	@3m		
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB	
4924.00	Н	Average	27.85	9.86	37.71	54.00	-16.29	
4924.00 4924.00	Н	Average Peak	37.05	9.80 9.86	46.91	34.00 74.00	-10.29	
4924.00	п	геак	57.05	9.00	40.91	/4.00	-27.09	

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only. 除非另有说明,此報告结果僅對測試之樣品負責,同時此樣品僅保留90天。本報告未經本公司書面許可,不可部分複製。 This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at <u>www.sgs.com/terms and conditions.htm</u> and, for elec-tronic format documents, subject to Terms and Conditions for Electronic Documents at <u>www.sgs.com/terms\_e-document.htm</u></u>. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or ap-pearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law. <u>SCGS Taiwan Ltd.</u> No.134. WuKungRoad NewTaipeiflustrialPark WukuDistrict NewTaipeifCity.Taiwan24803/新 the 5. Big M the 5. Big M



Report No.: ER/2015/50053 Issue Date: Jun. 05, 2015 Page: 81 of 108

Operation Band Fundamental F Operation Mod EUT Pol.	nental Frequency :2462 MHz ion Mode :TX HIGH			Test Date Temp./Hu Engineer Measurem	mi. nent Antenna Po	:21 deg :Curry	:2015-05-26 :21 deg_C / 61 RH :Curry :HORIZONTAL	
97	(dBuV/m)							
90								
80						FCC RSE-	<u>PK</u>	
70								
60						FCC RSE-	AV	
50								
40						 		
30								
20								
10								
0 <mark></mark> 1000		5100.	11200. Frequency (	16300. (MHz)	21400	. 2	6500	
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin	
_		Mode	Reading Level		FS	@3m	-	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV∕m	dB	
4924.00	Н	Average	33.31	9.86	43.17	54.00	-10.83	
4924.00	Н	Peak	40.49	9.86	50.35	74.00	-23.65	

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.



Report No.: ER/2015/50053 Issue Date: Jun. 05, 2015 Page: 82 of 108

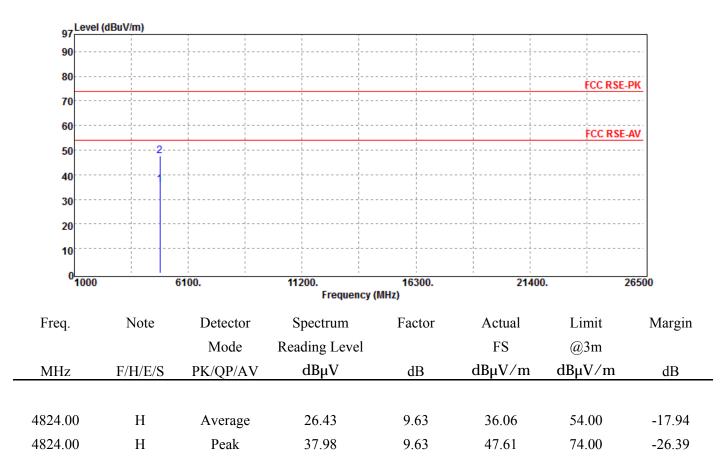
### Radiated Spurious Emission Measurement Result (802.11 g)

**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

:802.11 g :2412 MHz :TX LOW :E2 Plan

Test Date Temp./Humi. Engineer Measurement Antenna Pol.

:2015-05-26 :21 deg C / 61 RH :Curry :VERTICAL



Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.



Report No.: ER/2015/50053 Issue Date: Jun. 05, 2015 Page: 83 of 108

Operation Band Fundamental F Operation Mod EUT Pol.	requency	:802.11 g :2412 MHz :TX LOW :E2 Plan		Test Date Temp./Humi. Engineer Measurement Antenna Pol.		:Curry	g_C / 61 RH
97	(dBuV/m)						
90							
80						FCC RSE	<u>PK</u>
70							
60						FCC RSE	AV
50	2						
40						       	
30							
20							
10		· · · · · · · · · · · · · · · · · · ·					
0			44000	40000			
<sup>0</sup> 1000	t	5100.	11200. Frequency (I	16300. MHz)	21400		26500
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4824.00	Н	Average	30.27	9.63	39.90	54.00	-14.10
4824.00	Н	Peak	40.02	9.63	49.65	74.00	-24.35



### **FCC ID: PY7-PM0870**

Report No.: ER/2015/50053 Issue Date: Jun. 05, 2015 Page: 84 of 108

Operation Band Fundamental F Operation Mod EUT Pol.	requency	:802.11 g :2437 MHz :TX MID :E2 Plan		Test Date Temp./Humi. Engineer Measurement Antenna Pol.		:Curry	g_C / 61 RH
97	(dBuV/m)						
90							
80						FCC RSE-	<u>эк</u>
70 60						FCC RSE-	
50	2					FUC RSE-	
40							
30						 	
20						 	
10						 	
0 <mark></mark>		5100.	11200. Frequency (I	16300. MHz)	21400	. 2	6500
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4074.00	TT	<b>A a a a a a</b>	05.25	0.95	25.20	54.00	10.00
4874.00	Н	Average	25.35	9.85	35.20	54.00	-18.80
4874.00	Н	Peak	37.65	9.85	47.50	74.00	-26.50



### **FCC ID: PY7-PM0870**

Report No.: ER/2015/50053 Issue Date: Jun. 05, 2015 Page: 85 of 108

Operation Ban Fundamental F Operation Mod EUT Pol.	requency	:802.11 g :2437 MHz :TX MID :E2 Plan		Test Date Temp./Humi. Engineer Measurement Antenna Pol.		:21 de :Curry	-05-26 eg_C / 61 RH / IZONTAL
97	(dBuV/m)						
90							
80						FCC RSE	- <u>PK</u>
70						 	
60						FCC RSE	-AV
50	2					 	
40						 	
30							
20							
10							
0 <mark></mark>		5100.	11200. Frequency (I	11200. 16300. Frequency (MHz)			26500
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4874.00	Н	Average	26.10	9.85	35.95	54.00	-18.05
4874.00	Н	Peak	37.44	9.85	47.29	74.00	-26.71



### **FCC ID: PY7-PM0870**

Report No.: ER/2015/50053 Issue Date: Jun. 05, 2015 Page: 86 of 108

Operation Ban Fundamental F Operation Mod EUT Pol.	requency	:802.11 g :2462 MHz :TX HIGH :E2 Plan		Test Date Temp./Humi. Engineer Measurement Antenna Pol.		:Curry	g_C / 61 RH
97	(dBuV/m)						
90							
80				         		FCC RSE	PK
70				·			·
60				·		FCC RSE	-AV
50	2			·	· · · · · · · · · · · · · · · · · · ·		
40					·		·
30				       	· · · · · · · · · · · · · · · · · · ·		
20						   	
10				· · · · · · · · · · · · · · · · · · ·	·		
0		5100.	44200	16300.	24.400		26500
1000	,	5100.	11200. Frequency (I		21400	•	20000
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4924.00	Н	Average	26.08	9.86	35.94	54.00	-18.06
4924.00	Н	Peak	38.10	9.86	47.96	74.00	-26.04



Report No.: ER/2015/50053 Issue Date: Jun. 05, 2015 Page: 87 of 108

Operation Band Fundamental F Operation Mod EUT Pol.	requency	:802.11 g :2462 MHz :TX HIGH :E2 Plan		Test Date Temp./Humi. Engineer Measurement Antenna Pol.		:Curry	05-26 5_C / 61 RH ZONTAL
97	(dBuV/m)					,	
90							
80						FCC RSE-I	<u>×</u>
70				·			·
60				·		FCC RSE-	<u>v</u>
50	2		JJJJJJ	·			
40			JJJJJJ	·			
30				·			
20				·			
10				·			
0 <sup>L</sup> 1000	(	5100.	11200. Frequency (	16300. MHz)	21400	. 2	6500
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4924.00	Н	Average	26.56	9.86	36.42	54.00	-17.58
4924.00	Н	Peak	38.04	9.86	47.90	74.00	-26.10

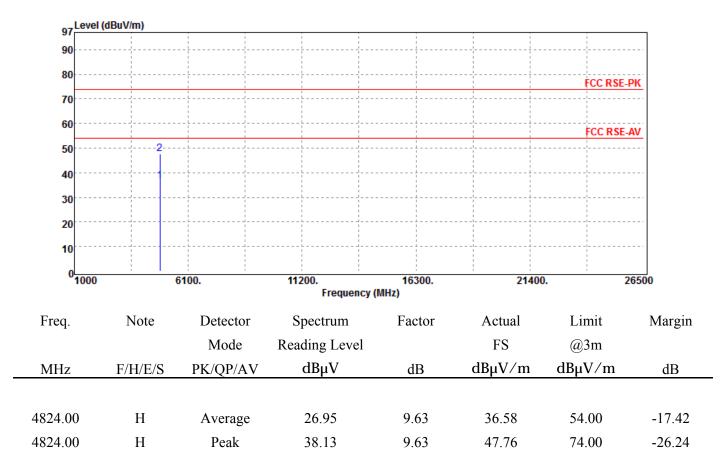


### Radiated Spurious Emission Measurement Result (802.11\_HT20)

**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

:802.11 n20M :2412 MHz :TX LOW :E2 Plan

Test Date Temp./Humi. Engineer Measurement Antenna Pol. :2015-05-26 :21 deg C / 61 RH :Curry :VERTICAL



Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.



Report No.: ER/2015/50053 Issue Date: Jun. 05, 2015 Page: 89 of 108

Operation Ban Fundamental Operation Mo	Frequency	:802.11 n20N :2412 MHz :TX LOW	И	Test Date Temp./Humi. Engineer		:2015- :21 deg :Curry	g_C / 61 RH
EUT Pol.		:E2 Plan		Measuren	nent Antenna Po	ol. :HORI	ZONTAL
97	l (dBuV/m)						
90				·			
80							
70						FCC RSE-	<u>PK</u>
60							
50	2	· · · · · · · · · · · · · · · · · · ·				FCC RSE-	<u>AV</u>
40							
30							
20						         	
10				·			
0 <mark>.</mark> 1000		6100.	11200. Frequency (	16300. MHz)	21400	). 2	26500
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4824.00	Н	Average	27.25	9.63	36.88	54.00	-17.12
4824.00	Н	Peak	40.19	9.63	49.82	74.00	-24.18



Report No.: ER/2015/50053 Issue Date: Jun. 05, 2015 Page: 90 of 108

Operation Ban Fundamental Operation Mo	Frequency	:802.11 n20N :2437 MHz :TX MID	Л	Test Date Temp./Humi. Engineer		:2015- :21 de :Curry	g_C / 61 RH
EUT Pol.		:E2 Plan		Measuren	nent Antenna Po	ol. :VER	ΓICAL
97 Leve	l (dBuV/m)					i	
90				·			
80				·		FCC RSE	PK
70							
60				·		FCC RSE	-01/
50	2			·			
40				·			
30				·	· · · · · · · · · · · · · · · · · · ·		
20				·			
10							
0 <mark>0</mark>		C400	44200	40200	24.40		20500
1000		6100.	11200. Frequency (	16300. MHz)	21400		26500
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4874.00	Н	Average	26.68	9.85	36.53	54.00	-17.47
4874.00	Н	Peak	37.69	9.85	47.54	74.00	-26.46



### **FCC ID: PY7-PM0870**

Test Date

:802.11 n20M

Report No.: ER/2015/50053 Issue Date: Jun. 05, 2015 Page: 91 of 108

:2015-05-26

	peration Mode		:2437 MHz :TX MID :E2 Plan		ımi. nent Antenna Po	:Curry	:21 deg_C / 61 RH :Curry :HORIZONTAL	
o- Level	(dBuV/m)							
90				·				
80								
70						FCC RSE	-PK	
60	2					FCC RSE	-AV	
50				·				
40								
30				·				
20				·		 		
10				·				
0 <mark></mark>	. I	6100.	11200. Frequency (I	16300. MHz)	21400	).	26500	
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin	
		Mode	Reading Level		FS	@3m		
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB	
4874.00	Н	Average	26.81	9.85	36.66	54.00	-17.34	
4874.00	Н	Peak	38.75	9.85	48.60	74.00	-25.40	



### **FCC ID: PY7-PM0870**

Test Date

:802.11 n20M

Report No.: ER/2015/50053 Issue Date: Jun. 05, 2015 Page: 92 of 108

:2015-05-26

Fundamental Frequency Operation Mode		:2462 MHz :TX HIGH		Temp./Hu Engineer	ımi.	:Curry	:21 deg_C / 61 RH :Curry	
EUT Pol.		:E2 Plan		Measuren	nent Antenna Po	ol. :VERT	TICAL	
97	(dBuV/m)							
90								
80				·		FCC RSE-	DK	
70				·		CC NJL-		
60				·		FCC RSE-	A)/	
50	2							
40								
30								
20				·		       		
10						       		
0								
<b>~1000</b>		6100.	11200. Frequency (	16300. MHz)	21400	). 2	26500	
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin	
		Mode	Reading Level		FS	@3m		
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB	
4924.00	Н	Average	26.37	9.86	36.23	54.00	-17.77	
4924.00	Н	Peak	36.92	9.86	46.78	74.00	-27.22	

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.



MHz

4924.00

4924.00

F/H/E/S

Η

Н

### **FCC ID: PY7-PM0870**

Test Date

:802.11 n20M

Report No.: ER/2015/50053 Issue Date: Jun. 05, 2015 Page: 93 of 108

:2015-05-26

dB

-17.22

-25.61

undamental Frequency Deration Mode		:2462 MHz :TX HIGH		Temp./Hur Engineer	ni.	:21 deg_C / 61 RH :Curry		
EUT Pol.		:E2 Plan	Measurement Antenna Pol. :HORIZO			:HORIZONTA		
97	lBuV/m)							
90								
80						FCC RSE-PK		
70								
60				       		FCC RSE-AV		
50	2		·					
40			·					
30			·					
20				         				
10				         				
0 <mark>1000</mark>	: I	6100.	11200. Frequency (I	16300. MHz)	21400.	26500		
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit Marg		
		Mode	Reading Level		FS	@3m		

dBµV

26.92

38.53

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.

PK/QP/AV

Average

Peak

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dBµV/m

36.78

48.39

dB

9.86

9.86

dBµV/m

54.00

74.00

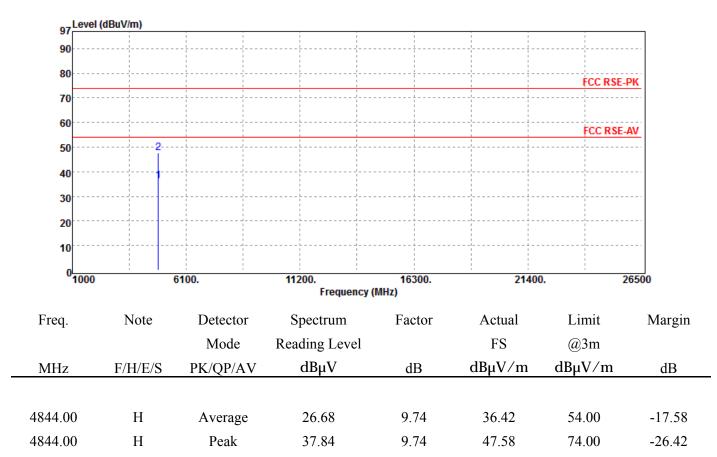


### Radiated Spurious Emission Measurement Result (802.11\_HT40)

**Operation Band** Fundamental Frequency **Operation Mode** EUT Pol.

:802.11 n40M :2422 MHz :TX LOW :E2 Plan

Test Date Temp./Humi. Engineer Measurement Antenna Pol. :2015-05-26 :21 deg C / 61 RH :Curry :VERTICAL



Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.



Report No.: ER/2015/50053 Issue Date: Jun. 05, 2015 Page: 95 of 108

Operation Bar Fundamental Operation Mc	Frequency	:802.11 n40N :2422 MHz :TX LOW	Л	Test Date Temp./Hu Engineer		:2015- :21 de; :Curry	g_C / 61 RH
EUT Pol.		:E2 Plan		Measuren	nent Antenna Po	ol. :HORI	ZONTAL
97	l (dBuV/m)			i			
90							·
80					· · · · · · · · · · · · · · · · · · ·	FCC RSE-	PK
70							
60						FCC RSE	AV/
50	2						
40							
30				1 1 1			
20							
10							
0 <mark>.</mark> 1000	)	6100.	11200. Frequency (	16300. MHz)	21400	). :	26500
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4844.00	Н	Average	26.91	9.74	36.65	54.00	-17.35
4844.00	Н	Peak	36.99	9.74	46.73	74.00	-27.27



Report No.: ER/2015/50053 Issue Date: Jun. 05, 2015 Page: 96 of 108

Operation Bar Fundamental D Operation Mo	Frequency	:802.11 n40N :2437 MHz :TX MID	Л	Test Date Temp./Humi. Engineer		:2015-05-26 :21 deg_C / 6 :Curry	
EUT Pol.		:E2 Plan		Measuren	nent Antenna Po	ol. :VER	TICAL
ozLevel	(dBuV/m)						
90							
80						FCC RSE	DK
70						FUC KSE	<u>-PN</u>
60						FCC RSE	AV
50	2						
40					· · · · · · · · · · · · · · · · · · ·		
30							
20						       	
10				·		         	
0		6100.	11200.	16300.	21400	).	26500
			Frequency (			-	
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4874.00	Н	Average	26.83	9.85	36.68	54.00	-17.32
4874.00	Н	Peak	37.65	9.85	47.50	74.00	-26.50



### **FCC ID: PY7-PM0870**

Test Date

:802.11 n40M

Report No.: ER/2015/50053 Issue Date: Jun. 05, 2015 Page: 97 of 108

:2015-05-26

	undamental Frequency peration Mode UT Pol.		:2437 MHz :TX MID :E2 Plan		imi. nent Antenna Po	:Curry	:21 deg_C / 61 RH :Curry :HORIZONTAL	
,_Level	(dBuV/m)							
90								
80								
						FCC RSE	-PK	
70				1 1 1 1				
60						FCC RSE	-AV	
50	2			·				
40				·			·	
30				·			·	
20				·				
10							·	
0								
0 <mark>1000</mark>		6100.	11200. Frequency (I	16300. MHz)	21400	).	26500	
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin	
		Mode	Reading Level		FS	@3m		
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB	
4874.00	Н	Average	27.10	9.85	36.95	54.00	-17.05	
4874.00	Н	Peak	37.95	9.85	47.80	74.00	-26.20	



### **FCC ID: PY7-PM0870**

Test Date

:802.11 n40M

Report No.: ER/2015/50053 Issue Date: Jun. 05, 2015 Page: 98 of 108

:2015-05-26

<u>_</u>
argin
dB
7.65
7.03
1



### **FCC ID: PY7-PM0870**

Test Date

:802.11 n40M

Report No.: ER/2015/50053 Issue Date: Jun. 05, 2015 Page: 99 of 108

:2015-05-26

Fundamental Frequency Operation Mode		:2452 MHz :TX HIGH		Temp./Hu Engineer	ımi.		:21 deg_C / 61 RH :Curry		
EUT Pol.		:E2 Plan		Measuren	nent Antenna Po	ol. :HORI	ZONTAL		
97 Level	(dBuV/m)								
90							·		
80						FOO DOF	DI		
70						FCC RSE-	<u>PK</u>		
60	J					     			
						FCC RSE-	AV		
50	2						·		
40									
30					· · · · · · · · · · · · · · · · · · ·		·		
20									
10					· · · · · · · · · · · · · · · · · · ·				
0									
01000		6100.	11200. Frequency (	16300. MHz)	21400	). 2	26500		
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin		
rreq.	1,000	Mode	Reading Level	1 40101	FS	@3m	in an Bill		
			-			-			
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB		
4904.00	Н	Average	26.52	9.84	36.36	54.00	-17.64		

38.10

Peak

Н

4904.00

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9.84

47.94

74.00

-26.06



# 12 PEAK POWER SPECTRAL DENSITY

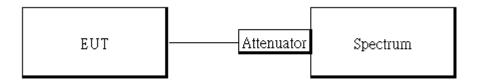
# **12.1 Standard Applicable**

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	MFR	MODEL	SERIAL	LAST	CAL DUE.		
TYPE		NUMBER	NUMBER	CAL.			
Spectrum Analyzer	Agilent	E4446A	MY51100003	01/29/2015	01/28/2016		
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 V03r03.
- 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 x 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	<b>RF Power Density</b>	Power Density Maximum Limit				
(MHz)	(dBm)	(dBm)				
802.11b						
2412	-1.89	8	PASS			
2437	-0.98	8	PASS			
2462	-0.50	8	PASS			
802.11g						
2412	-7.62	8	PASS			
2437	-6.29	8	PASS			
2462	-7.37	8	PASS			
802.11n_HT20						
2412	-11.60	8	PASS			
2437	-9.09	8	PASS			
2462	-9.57	8	PASS			
802.11n_HT40						
2422	-13.71	8	PASS			
2437	-11.86	8	PASS			
2452	-14.69	8	PASS			

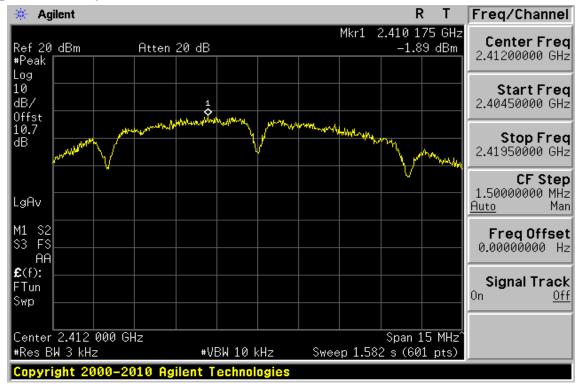
\*Refer to next page for plots

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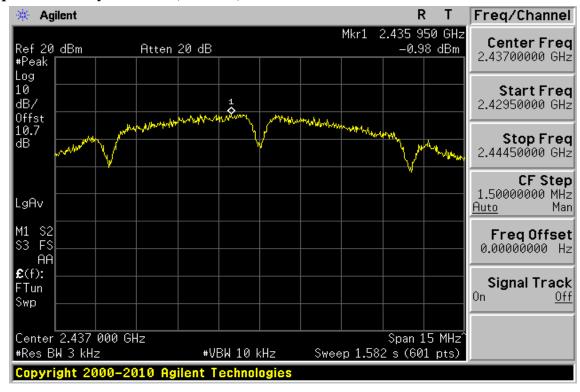


### 802.11b

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



Power Spectral Density Test Plot (CH-Mid)

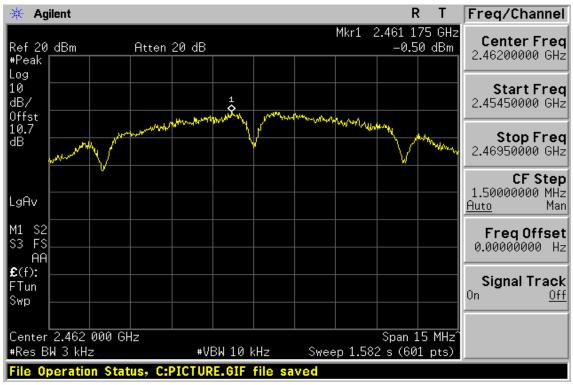


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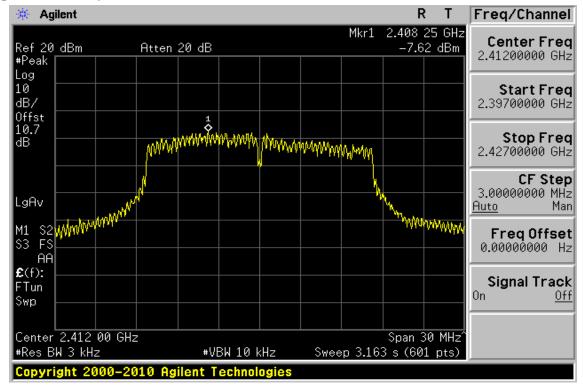


### Power Spectral Density Test Plot (CH-High)



### 802.11g

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



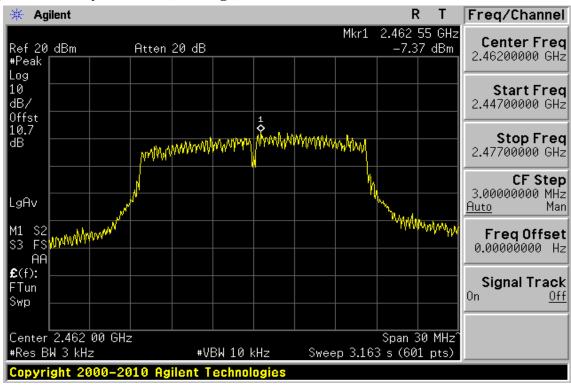
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#### 🔆 Agilent R Freq/Channel Т Mkr1 2.435 10 GHz Center Freq Ref 20 dBm Atten 20 dB -6.29 dBm 2.43700000 GHz #Peak Log 10 Start Freq dB/ 2.42200000 GHz Offst 1 **(** 10.7 Stop Freq dB **WWW** 2.45200000 GHz **CF** Step 3.00000000 MHz LgAv Man Auto WHIMW hww. "MMW M1 S2 Freq Offset \$3 FS 0.00000000 Hz AA £(f): Signal Track FTun 0n Off Swp Center 2.437 00 GHz Span 30 MHz #Res BW 3 kHz ₩VBW 10 kHz Sweep 3.163 s (601 pts) Copyright 2000-2010 Agilent Technologies

# Power Spectral Density Test Plot (CH-Mid)

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



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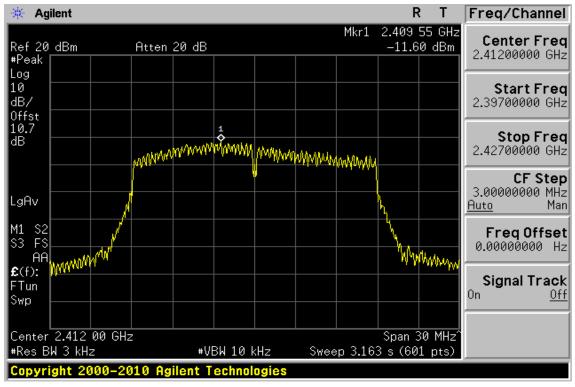
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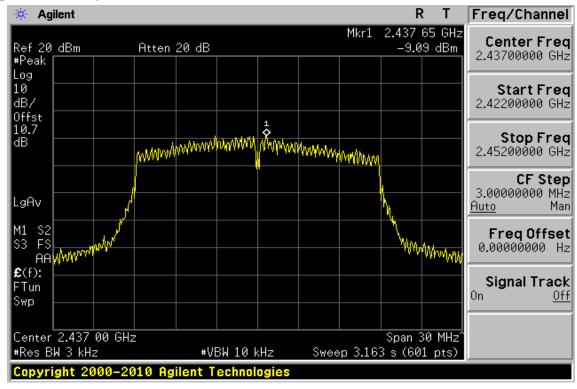
Report No.: ER/2015/50053 Issue Date: Jun. 05, 2015 Page: 105 of 108

### 802.11n HT20

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

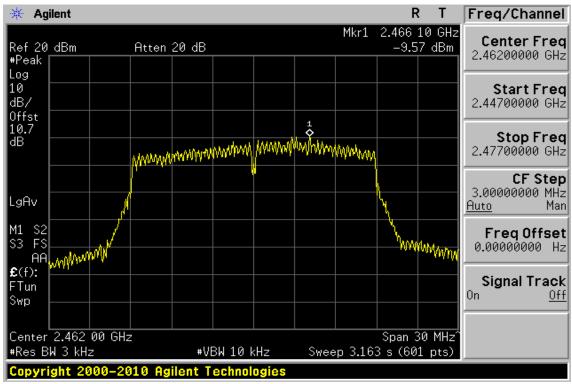


Power Spectral Density Test Plot (CH-Mid)



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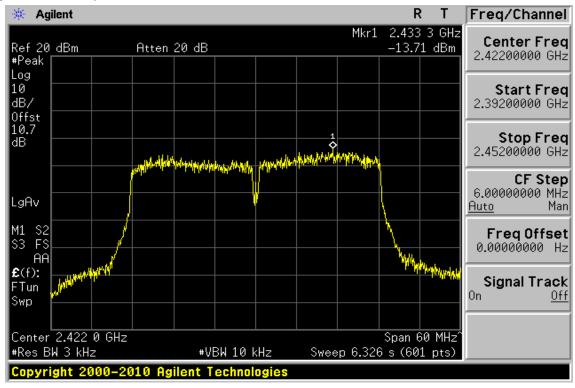




# Power Spectral Density Test Plot (CH-High)

### 802.11n HT40

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



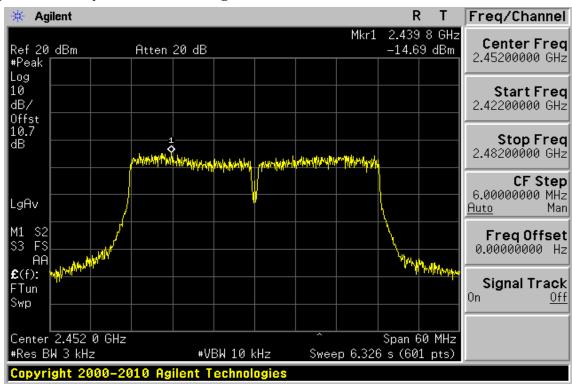
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#### 🔆 Agilent R Т Freq/Channel Mkr1 2.436 4 GHz Center Freq -11.86 dBm Ref 20 dBm Atten 20 dB 2.43700000 GHz #Peak Log 10 Start Freq dB/ 2.40700000 GHz Offst 10.7 Stop Freq dB MMM .... All of the party 2.46700000 GHz CF Step 6.00000000 MHz LgAv Man Auto S2 FS M1 Freq Offset \$3 0.00000000 Hz AA WYTHIN WAN £(f): Signal Track FTun 0n Off Swp Center 2.437 0 GHz Span 60 MHz #Res BW 3 kHz ₩VBW 10 kHz Sweep 6.326 s (601 pts) Copyright 2000-2010 Agilent Technologies

## 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

An embedded-in antenna design is 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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