

# **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-0871-BV			
Model Difference:	N/A			
FCC ID:	PY7-PM0871			
Report No.:	ER/2015/50042			
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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# VERIFICATION OF COMPLIANCE

Applicant:	Sony Mobile Communications AB Nya Vattentornet 22188 Lund/Sweden
Product Name:	PDA Phone
Brand Name:	Sony
Type No.:	PM-0871-BV
Model Difference:	N/A
FCC ID:	PY7-PM0871
<b>Report Number:</b>	ER/2015/50042
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 Tiffany Kao	Date	Jun. 05, 2015
Approved By:	Tiffany Kao / Clerk	Date	Jun. 05, 2015

Jim Chang / Asst. Manager

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# **Revision History**

Report Number	Revision	Description	Issue Date
ER/2015/50042	Rev.00	Initial creation of document	Jun. 05, 2015

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### **GENERAL INFORMATION** 1

#### **Product description** 1.1

### General:

Product Name:	PDA Phone		
Brand Name:	Sony		
Type No.:	PM-0871-	BV	
Model Difference:	N/A		
Data Cable (USB):		.: EC450, Supplier: K-one 242-6715.3, Length: 100 cm	
Simple Hands-Free (SHF-White):	Model No Type No.:	.: MH410c, Supplier: Foster Electric AG-1100	
Car Charger:		.: AN400, Supplier: Salcomp CAA-0003013	
BT PHF:	Model No.: MW600, Supplier: BALDA Type No.: DDA-0002029.B coupling with Simple Hands Free (Model No.: : MH755, Supplier: BALDA, Type No.: AG-0502)		
Product SW/HW version:	30.0.B.1.10 / A		
Radio SW/HW version:	30.0.B.1.1	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	signation:	PIFA Antenna, Gain: -3.80dBi			
Modulation t	Modulation type:		CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM		
Transition R	ate:	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-0871-BV		
Model Difference:	N/A		
FCC ID	PY7-PM0871		
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 2 / 4 / 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 V03r02

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.

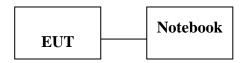
Offset = RF cable loss (dB)+ attenuation factor(dB) =0.7+10=10.7(dB)

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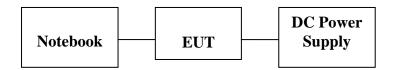


#### 2.5 **Configuration of Tested System**

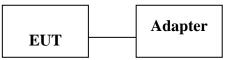
## Fig. 2-1 Radiated Emission



### 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		

#### The Worst Test Modes and Channel Details 4.2

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

### **RADIATED EMISSION TEST:**

	RADIATED	EMISSION TES	ST (BELOW 1 GH	[ <b>z</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.

	001.200122				
		CONDUCTED	TEST		
MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)	ANTENNA PORT
802.11b	1 to 11	1, 6, 11	DSSS	1	MAIN
802.11g	1 to 11	1, 6, 11	OFDM	6	MAIN
802.11n (HT20)	1 to 11	1, 6, 11	OFDM	6.5	MAIN
802.11n (HT40)	3 to 9	3, 6, 9	OFDM	13.5	MAIN

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

Note: Type no, PM-0871-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-0871-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		
Maagunan ant un agetaintu	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 t	ransition frequencies			

The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.

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

	Conducted Emission Test Site							
EQUIPMENT	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

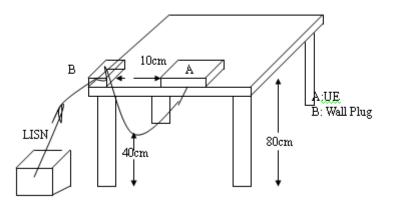
- 1. The conducted emission tests were performed in the test site, using the setup in accordance with the ANSI 63.10:2009.
- 2. The AC/DC Power adaptor of EUT was plug-in LISN. The EUT was placed flushed with the rear of the table.
- 3. The LISN was connected with 120Vac/60Hz power source.

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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

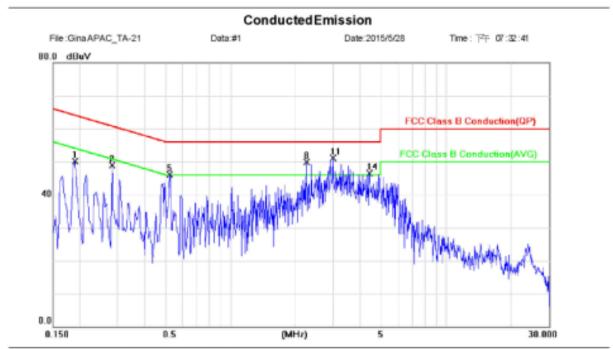
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## AC POWER LINE CONDUCTED EMISSION TEST DATA

Operation Mode:	Operation mode			Test Date:	May 28, 2015
Temperature:	24	Humidity:	66 %	Test By:	Marcus
Model No.:	Adapter: EP800, S	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	dB	dBuV	dBulV	dB	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	AVG	

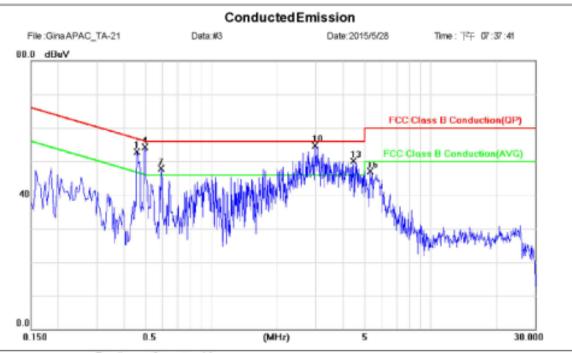
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Operation Mode:	Operation mode			Test Date:	May 28, 2015
Temperature:	24	Humidity:	66 %	Test By:	Marcus
Model No.:	Adapter: EP800, S	upplier: Phihong	Phase:	Ν	



MHz         dBi//         dB         dBi//           1         0.4580         52.82         0.06         52.88           2         0.4580         39.90         0.06         39.96           3         0.4580         28.80         0.06         28.86           4         0.4960         54.26         0.06         54.32           5         0.4960         46.40         0.06         33.16	dBuV 56.73	ďB	Detector	
2         0.4580         39.90         0.06         39.96           3         0.4580         28.80         0.06         28.86           4         0.4980         54.26         0.06         54.32           5         0.4980         46.40         0.06         46.46	56.73		000000	Comment
3         0.4580         28.80         0.06         28.86           4         0.4980         54.26         0.06         54.32           5         0.4980         46.40         0.06         46.46		-3.85	peak	
4 0.4980 54.26 0.06 54.32 5 0.4980 46.40 0.06 46.46	56.73	-16.77	œ	
5 0.4960 46.40 0.06 46.46	46.73	-17.87	AVG	
	56.03	-1.71	peak	
6 0.4960 33.10 0.06 33.16	56.03	-9.57	œ	
	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				

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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		

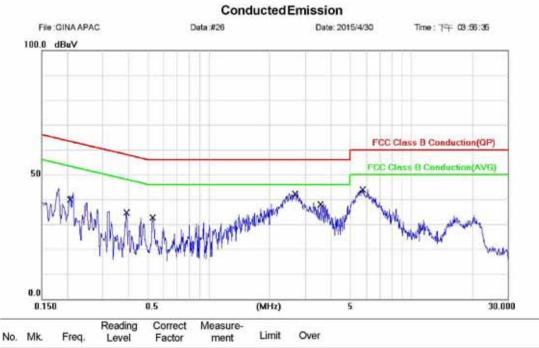
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Operation Mode:	Operation mode			Test Date:	Apr. 30, 2015
Temperature:	24	Humidity:	66 %	Test By:	Tin
Model No.:	Adapter: EP800, S	upplier: Salcomp		Phase:	L1



	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	

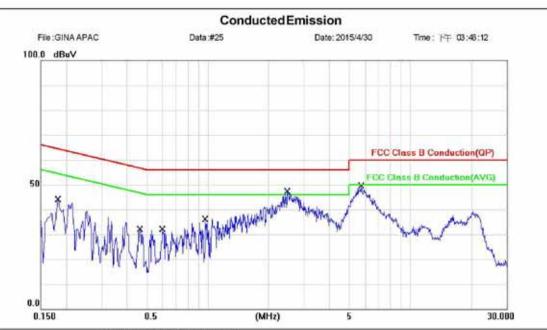
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Operation Mode:	Operation mode			Test Date:	Apr. 30, 2015
Temperature:	24	Humidity:	66 %	Test By:	Tin
Model No.:	Adapter: EP800, S	upplier: Salcomp		Phase:	Ν



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBJV	dB	Detector	Comment
1	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		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		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:**

- 1. Set span = Zero
- 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:  $10 * \log (1/0.99) = 0.04$ 

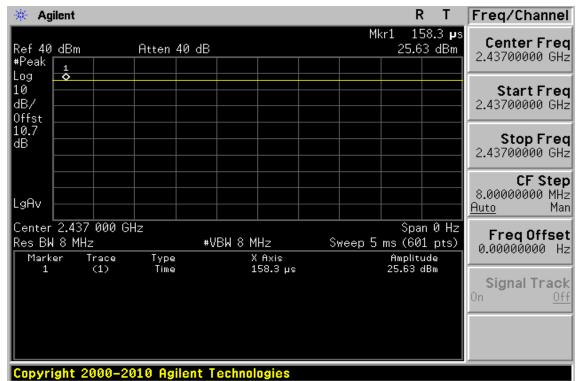
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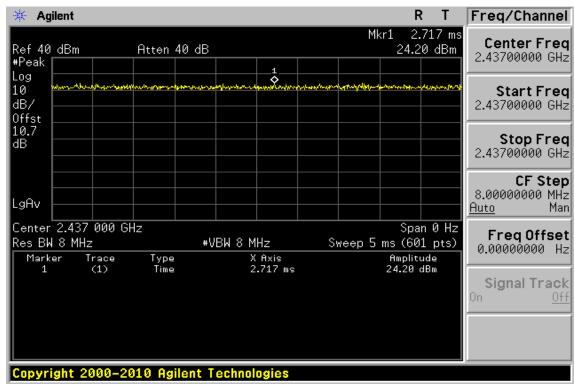


### DUTY CYCLE TEST SIGNAL Measurement Result 7.1

### 802.11 b



### 802.11 g

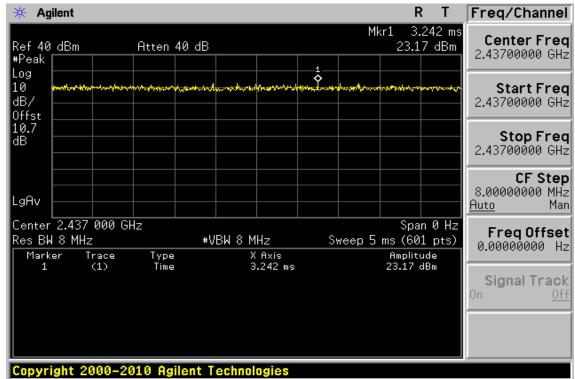


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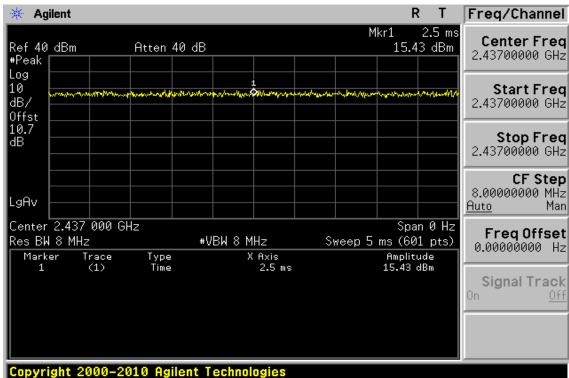
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### 802.11 n 20 MHz



### 802.11 n 40 MHz



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### 8 PEAK OUTPUT POWER MEASUREMENT

#### 8.1 **Standard Applicable**

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

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

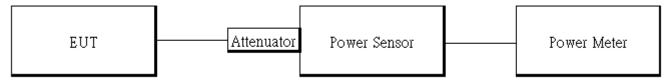
In case of point-to-point operation, the limit has to be reduced by 1dB for every 3dB that the directional gain of Antenna exceeds 6dBi.

#### **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 V03r02.
- 3. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the power meter.

### **Power Meter:**

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

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

#### 8.5 **Measurement Result**

### 802.11b

СН	Frequency (MHz)	Data Rate	a 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)	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 Rate	Avg. Output Power (dBm)	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

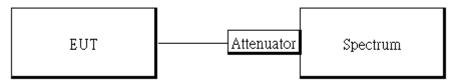
### 9.1 **Standard Applicable**

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.		
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		

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



#### 9.4 **Measurement Procedure**

- 1. Place the EUT on the table and set it in transmitting mode.
- 2. The testing follows the Measurement Procedure of FCC KDB 558074 D01 DTS Meas. Guidance V03r02.
- 3. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
- 3. Set the spectrum analyzer as RBW = 100 kHz, VBW = 3\*RBW, Span = 30M/50MHz, Detector=Peak, Sweep=auto.
- 4. Mark the peak frequency and -6dB (upper and lower) frequency.
- 5. Repeat above procedures until all frequency of interest measured was complete.

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#### 9.5 **Measurement Result**

Frequency	Bandwidth	Limit	Result					
(MHz)	(kHz)	(kHz)	Kesult					
	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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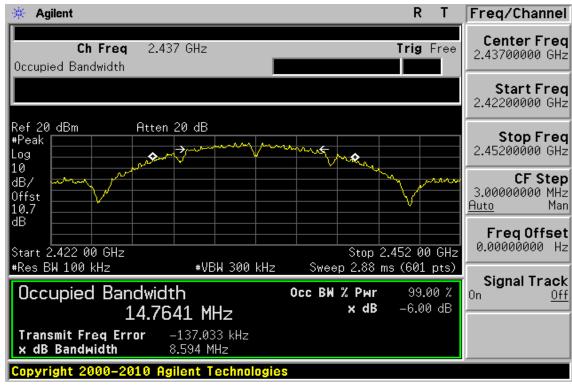
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## 802.11b 6dB Band Width Test Data CH-Low



## 6dB Band Width Test Data CH-Mid

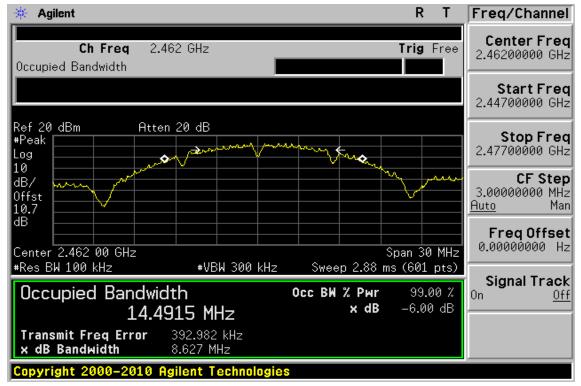


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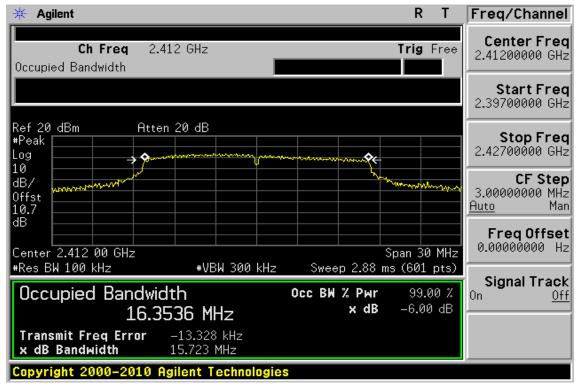


## 6dB Band Width Test Data CH-High



## 802.11g

## 6dB Band Width Test Data CH-Low

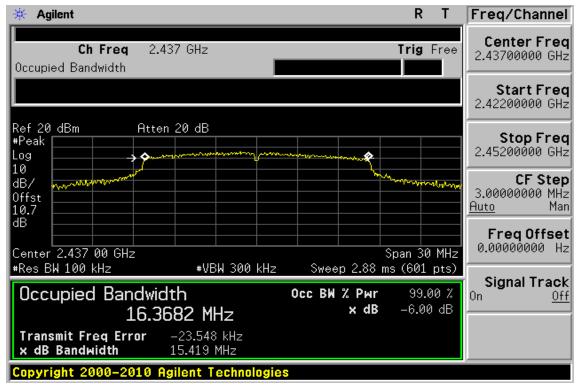


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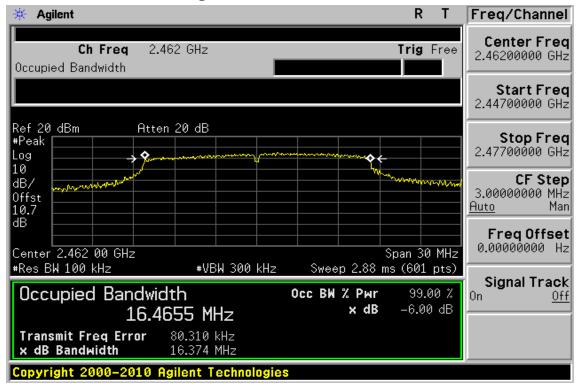
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## 6dB Band Width Test Data CH-Mid



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

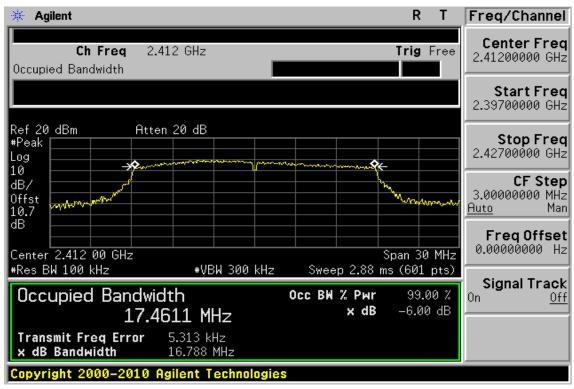


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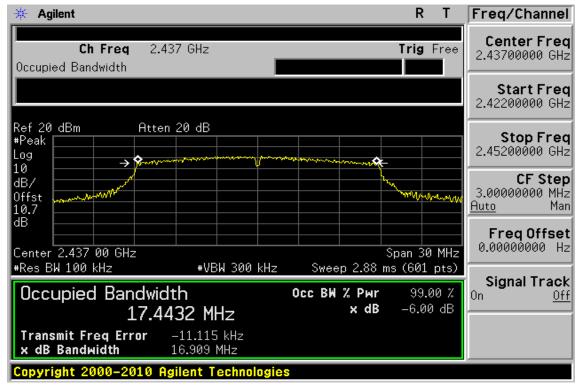
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## 802.11n 20M 6dB Band Width Test Data CH-Low



## 6dB Band Width Test Data CH-Mid



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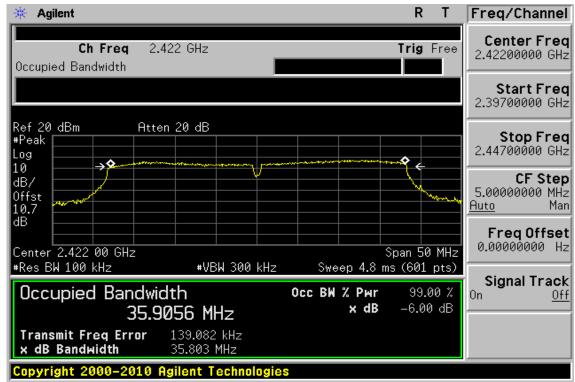


# 6dB Band Width Test Data CH-High



# 802.11 n 40M

# 6dB Band Width Test Data CH-Low

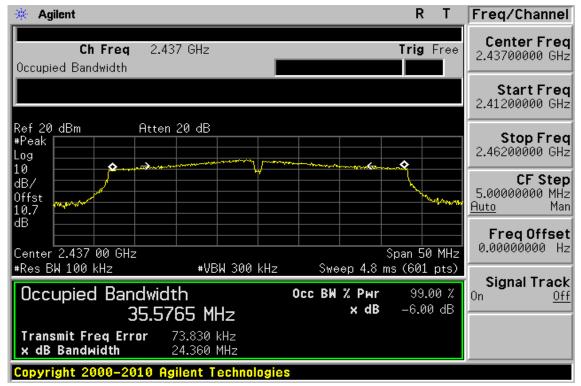


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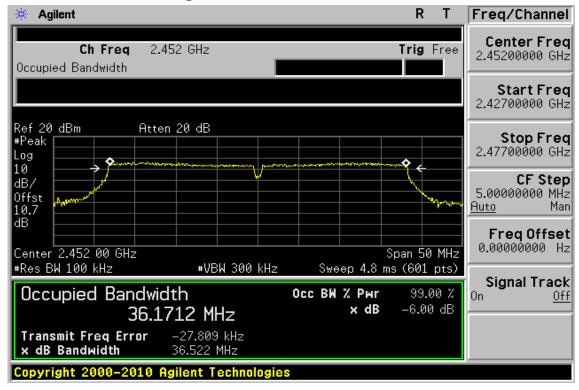
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# 6dB Band Width Test Data CH-Mid



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



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# 10 CONDUCTED BAND EDGES AND SPURIOUS EMISSION MEASUREMENT

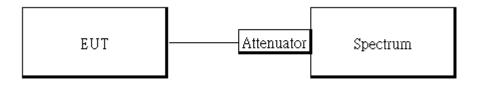
# 10.1 Standard Applicable

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 V03r02.
- 3. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
- 4. Set start to edge frequency, and stop frequency of spectrum analyzer so as to encompass the spectrum to be examined.
- 5. Set the spectrum analyzer as RBW, VBW=300KHz, Detector = Peak, Sweep = auto
- 6. Mark the highest reading of the emission as the reference level measurement.
- 7. Set DL as the limit = reading on marker 1 20dBm
- 8. Marker on frequency, 2.3999GHz and 2.4836GHz, and examine shall 100 KHz immediately outside the authorized (2400~2483.5) be attenuated by 20dB at least relative to the maximum emission of power.
- 9. Repeat above procedures until all default test channel (low, middle, and high) was complete.

### **Conducted Spurious Emission:**

- 1. To connect Antenna Port of EUT to Spectrum
- 2. The testing follows the Measurement Procedure of FCC KDB 558074 D01 DTS Meas. Guidance V03r02.
- 3. Set RBW =  $100K \& VBW \ge 300K$ , 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.

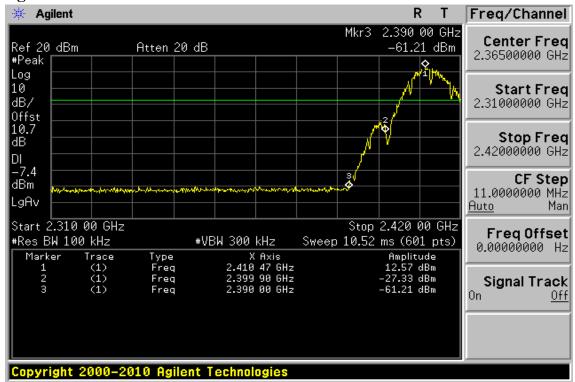
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# 802.11b **Band Edges Test Data CH-Low**







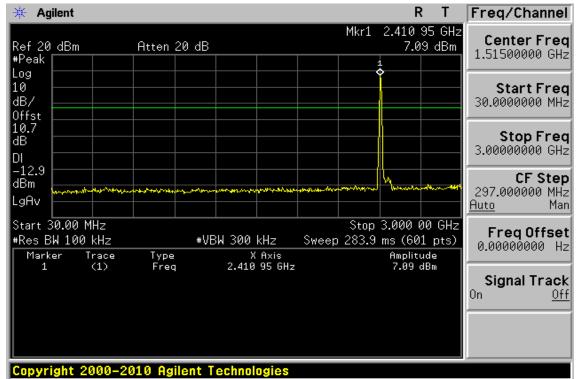
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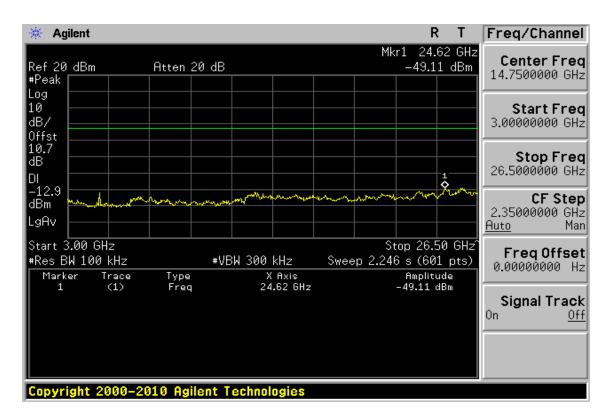
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# 802.11b

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

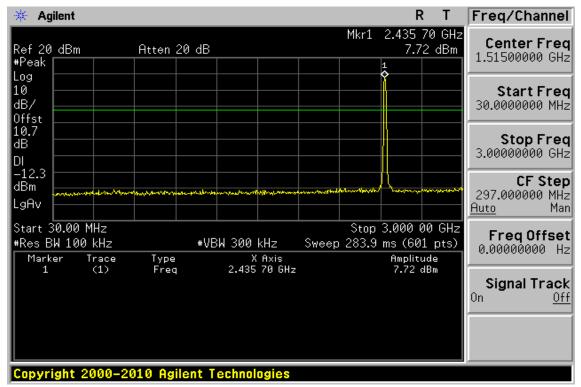


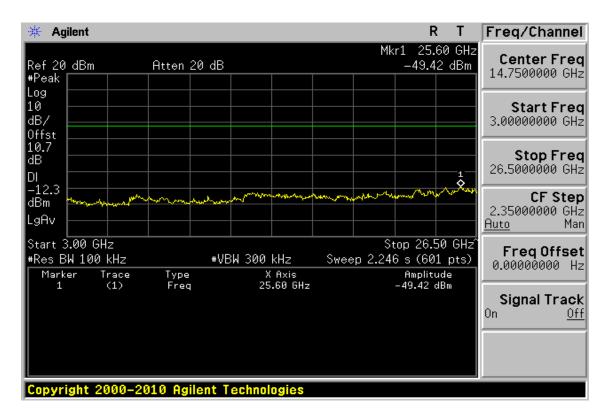


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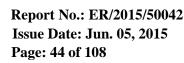


#### **Spurious Emission Test Data CH-Mid**



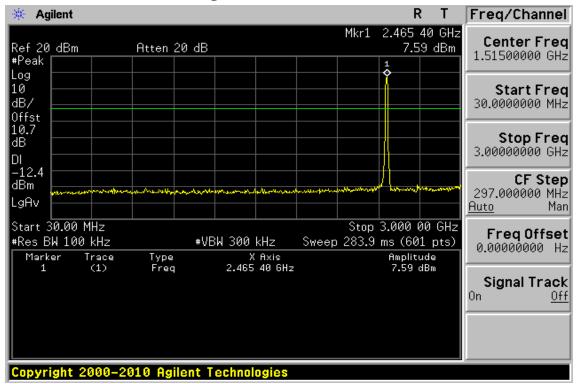


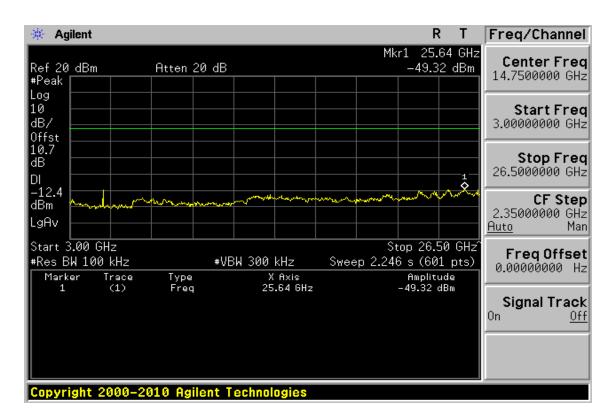
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#### **Spurious Emission Test Data CH-High**

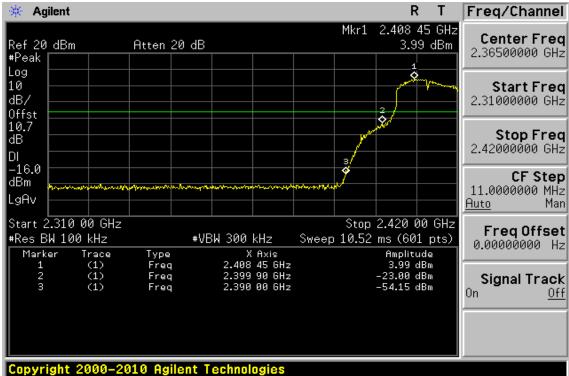


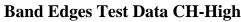


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# 802.11g **Band Edges Test Data CH-Low**





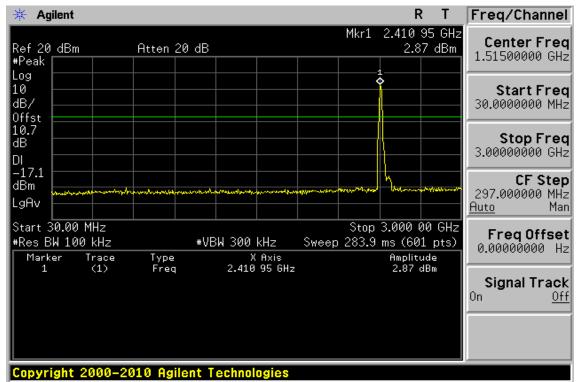


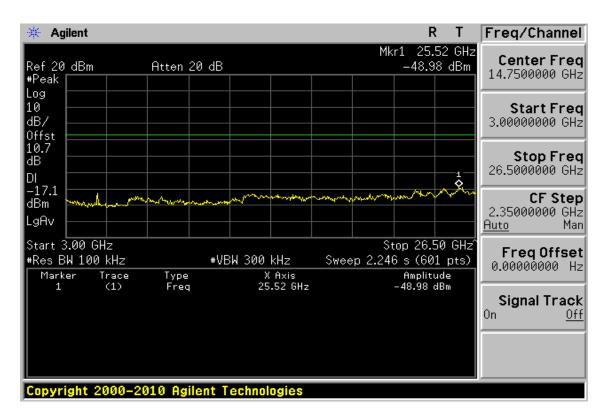
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# 802.11g **Spurious Emission Test Data CH-Low**

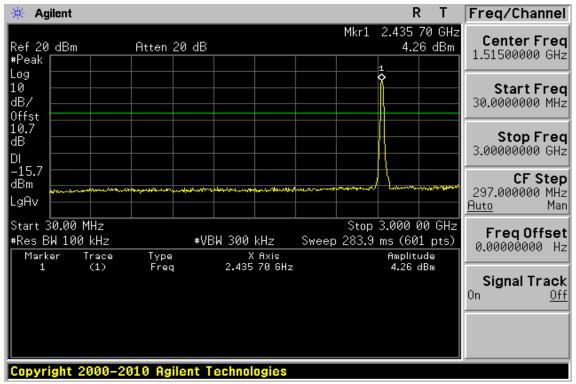


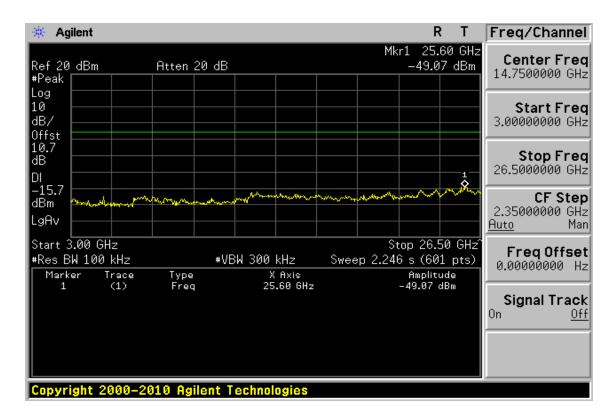


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#### **Spurious Emission Test Data CH-Mid**

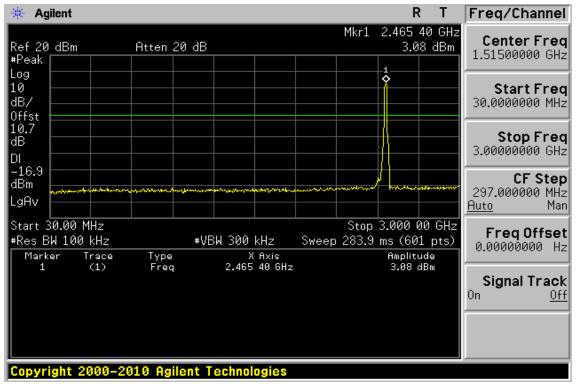


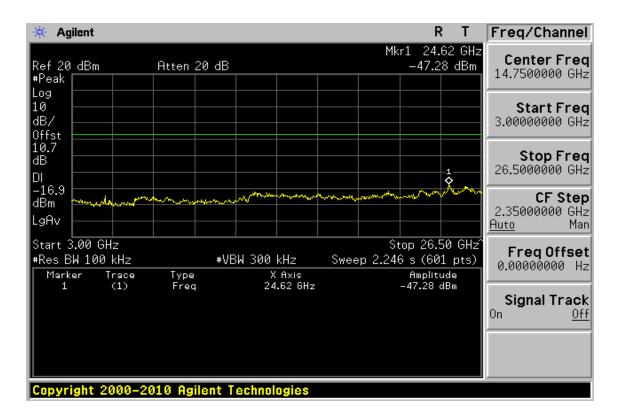


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#### **Spurious Emission Test Data CH-High**

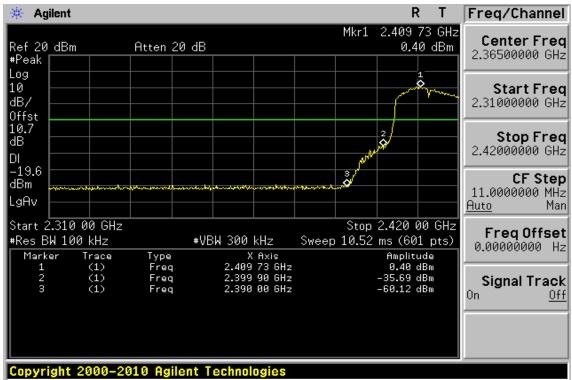


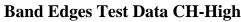


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# 802.11n\_HT20 **Band Edges Test Data CH-Low**







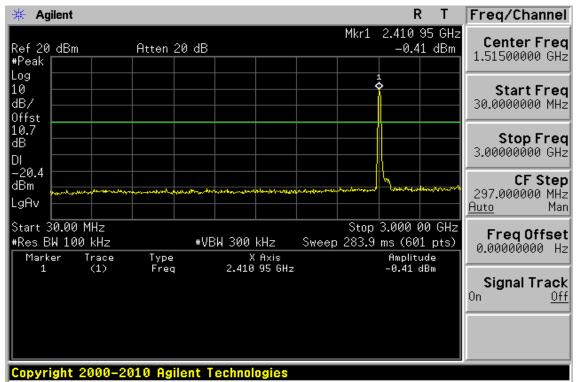
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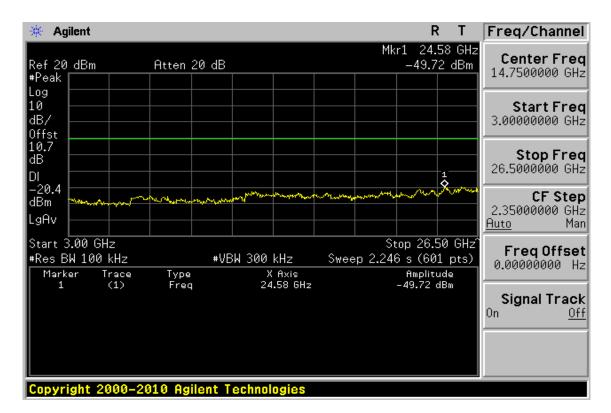
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# 802.11n HT20

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

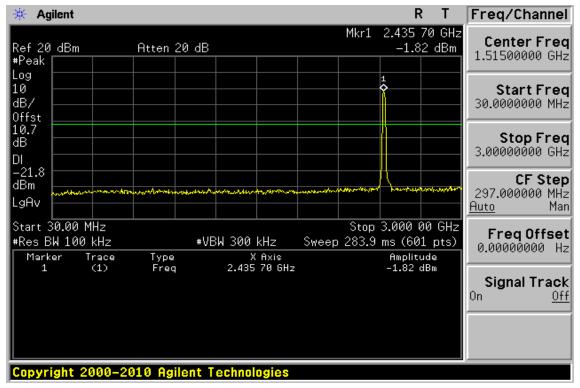


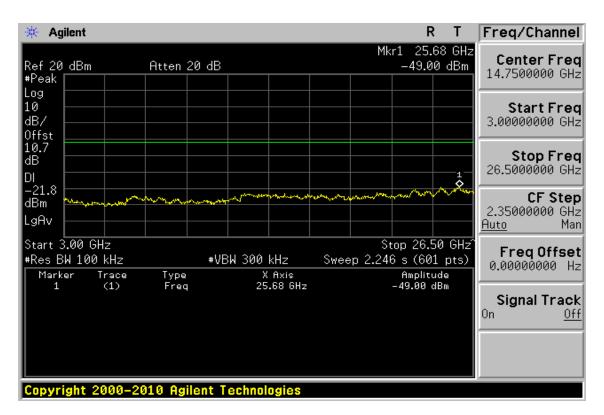


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#### **Spurious Emission Test Data CH-Mid**



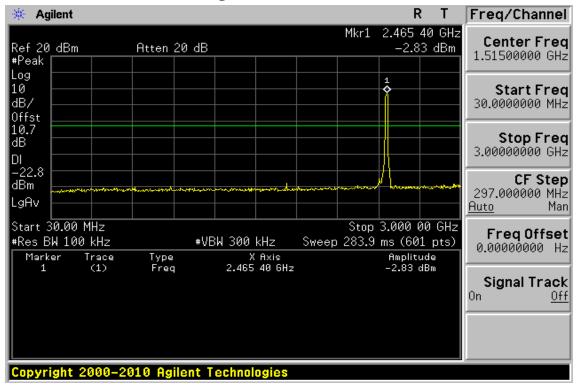


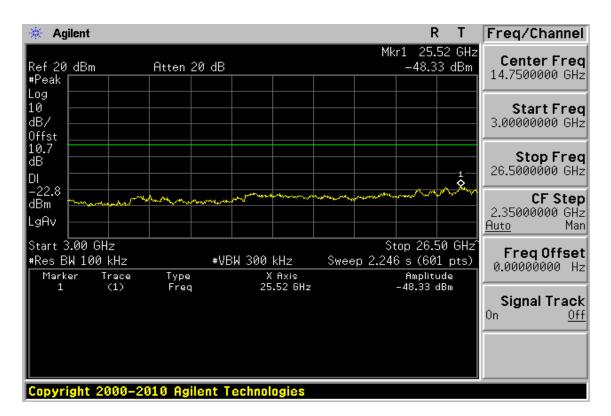
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# **Spurious Emission Test Data CH-High**





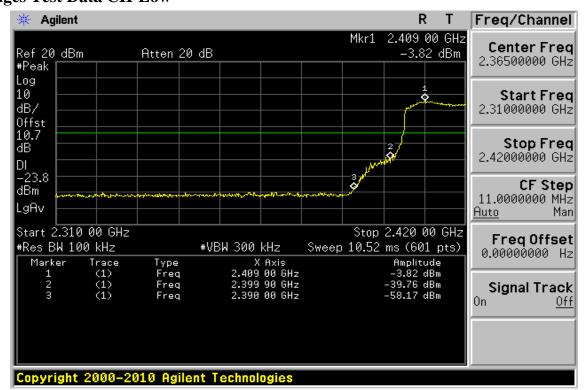
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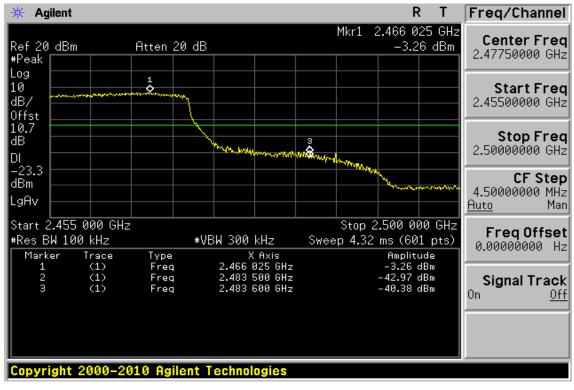
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# 802.11n HT40 **Band Edges Test Data CH-Low**







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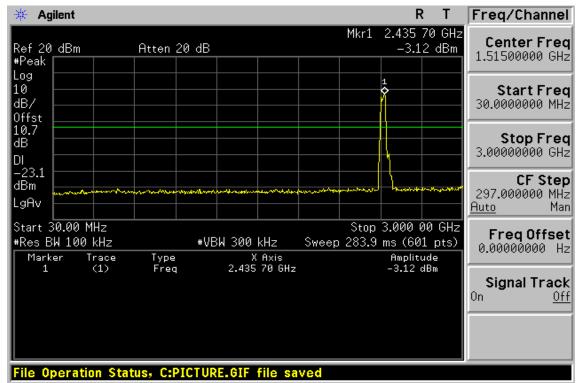
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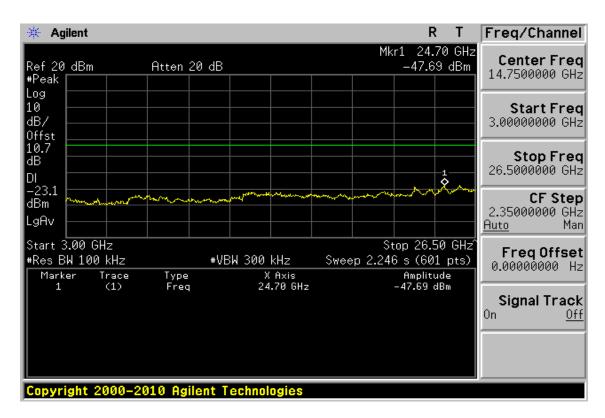




# 802.11n HT40

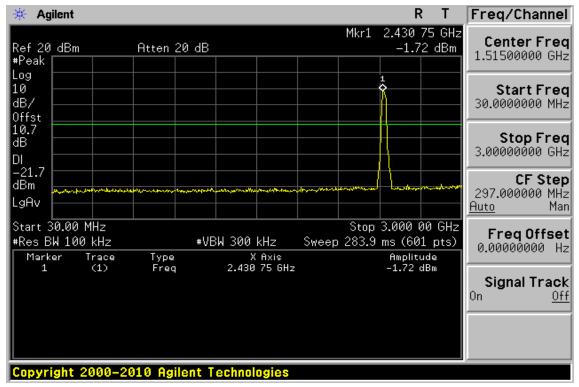
# **Spurious Emission Test Data CH-Low**

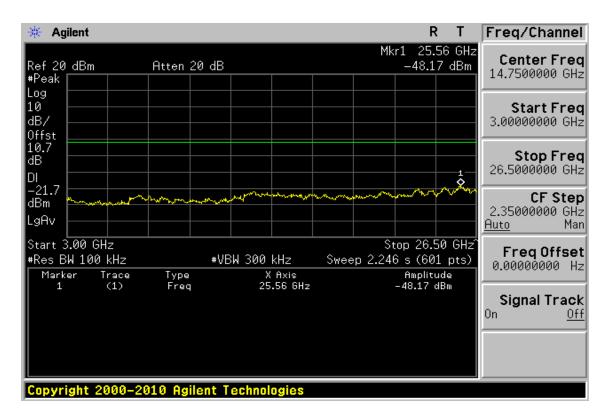




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#### **Spurious Emission Test Data CH-Mid**





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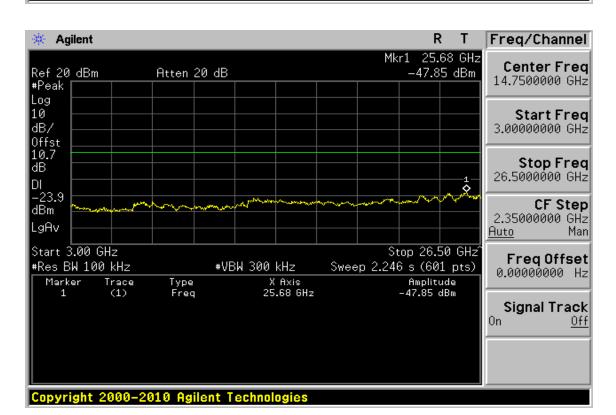
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#### Agilent Freq/Channel \*\* R Т Mkr1 2.465 40 GHz Center Freq Ref 20 dBm Atten 20 dB -3.90 dBm 1.51500000 GHz #Peak Log 1 10 Start Freq ¢ dB/ 30.0000000 MHz Offst 10.7 Stop Frea dB 3.00000000 GHz DI -23.9 dBm CF Step 297.000000 MHz LgAv Man Auto Start 3<mark>0.00 MH</mark>z Stop 3.000 00 GHz Freq Offset #VBW 300 kHz #Res BW 100 kHz Sweep 283.9 ms (601 pts) 0.00000000 Hz Trace (1) Type Freq Marker X Axis 2.465 40 GHz Amplitude -3.90 dBm 1 Signal Track 0n Off Copyright 2000-2010 Agilent Technologies





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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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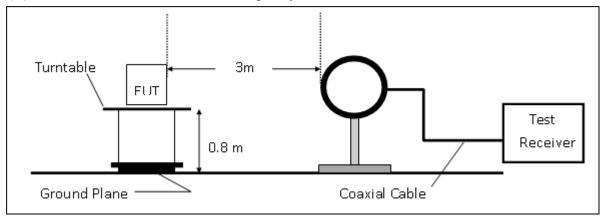


#### **11.2 Measurement Equipment Used:**

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

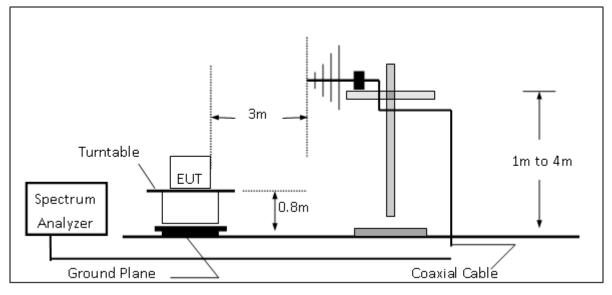
(A) Radiated Emission Test Set-UP Frequency Below 30MHz.



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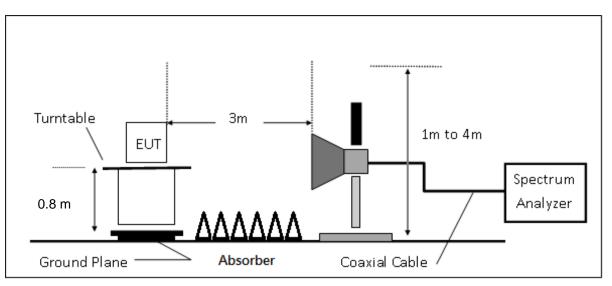
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#### (B) Radiated Emission Test Set-Up, Frequency form 30MHz to 1000MHz

(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 V03r02.
- 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 Plane	LOW	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∕n	
2390.00	E	Average	30.16	5.16	35.32	54.00	-18.68
2390.00	E	Peak	43.64	5.16	48.80	74.00	-25.20
Operation Ban Fundamental H Operation Mod EUT Pol.	Frequency	:802.11 b :2412 MHz :Band Edge I :E2 Plane	LOW	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
2390.00	Е	Average	30.27	5.16	35.43	54.00	-18.57

44.01

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.

Peak

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5.16

49.17

74.00

-24.83



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Fundamental Frequency:2462 MHzTemp./Humi.:21 ofOperation Mode:Band Edge HIGHEngineer:Cur	15-05-26 deg_C / 61 RH urry ERTICAL
Freq.NoteDetectorSpectrumFactorActualLimitModeReading LevelFS@3mMHzF/H/E/SPK/QP/AVdBµVdBdBµV/mdBµV/m	Margin dB
$\frac{2483.50}{2483.50} = \frac{E}{E} + \frac{Average}{30.29} = \frac{30.29}{6.01} = \frac{6.01}{36.30} = \frac{36.30}{54.00}$	-17.70
2483.50         E         Peak         43.80         6.01         49.81         74.00	-24.19
Fundamental Frequency:2462 MHzTemp./Humi.:21 ofOperation Mode:Band Edge HIGHEngineer:Cur	15-05-26 deg_C / 61 RH urry DRIZONTAL
Freq. Note Detector Spectrum Factor Actual Limit	Margin
Mode Reading Level FS @3m	
$\begin{tabular}{cccc} MHz & F/H/E/S & PK/QP/AV & dB\mu V & dB & dB\mu V/m & dB\mu V/m \end{tabular}$	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)**

Fundamental Frequency :2		:802.11 g :2412 MHz :Band Edge I	:2412 MHz :Band Edge LOW		Date ./Humi. neer	:2015-05-26 :21 deg_C / 61 RH :Curry	
EUT Pol.		:E2 Plane		Meas	urement Antenn	na Pol.	:VERTICAL
Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB dBµV∕m d		dBµV∕n	n dB
2390.00	Е	Average	30.85	5.16	36.01	54.00	-17.99
2390.00	Е	Peak	48.35	5.16	53.51	74.00	-20.49
Operation Ban	nd	:802.11 g		Test I	Date		:2015-05-26
Fundamental Frequency:2412 MHzOperation Mode:Band Edge LOW		LOW	Temp Engir	./Humi. neer		:21 deg_C / 61 RH :Curry	
EUT Pol. :E2 Plane		C C			: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	32.84	5.16	38.00	54.00	-16.00
2390.00	Е	Peak	53.80	5.16	58.96	74.00	-15.04

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Operation Bar Fundamental I Operation Mo EUT Pol.	Frequency	:802.11 g :2462 MHz :Band Edge I :E2 Plane	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 1 dB
2483.50	E	Average	32.97	6.01	38.98	54.00	-15.02
2483.50	E	Peak	56.83	6.01	62.84	74.00	-11.16
Operation Bar Fundamental I Operation Mo EUT Pol.	Frequency	:802.11 g :2462 MHz :Band Edge I :E2 Plane	HIGH	Test Date Temp./Humi. Engineer Measurement An		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	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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#### Radiated Band Edge Measurement Result (802.11\_HT20)

Operation Bar Fundamental I Operation Mo	nd Frequency	:802.11 n20N :2412 MHz :Band Edge I		Test Date Temp./Humi. Engineer			:2015-05-26 :21 deg_C / 61 RH :Curry		
EUT Pol.		:E2 Plane		Meas	urement Anteni	na Pol.	:VERTICAL		
Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin		
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV∕n	n dB		
2390.00	Е	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 Bar Fundamental 1 Operation Mo	Frequency	:802.11 n20N :2412 MHz :Band Edge I		Test I Temp Engin	./Humi.		:2015-05-26 :21 deg_C / 61 RH :Curry		
EUT Pol.		:E2 Plane		Meas	urement Anteni	na Pol.	:HORIZONTAL		
Freq.	Note	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	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
2390.00	Е	Peak	44.32	5.16	49.48	74.00	-24.52



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Operation Ban Fundamental I Operation Mod EUT Pol.	Frequency	:802.11 n20N :2462 MHz :Band Edge I :E2 Plane		Engin	./Humi.	na 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/n	n dB
2483.50	Е	Average	31.61	6.01	37.62	54.00	-16.38
2483.50	Е	Peak	53.18	6.01	59.19	74.00	-14.81
Operation Ban Fundamental H Operation Mod EUT Pol.	Frequency :2462 MHz		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 Ban Fundamental F Operation Mod EUT Pol.	Frequency	:802.11 n40M :2422 MHz :Band Edge LOW :E2 Plane		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 dB	
2390.00	E	Average	30.11	5.16	35.27	54.00	-18.73	
2390.00	E	Peak	43.53	5.16	48.69	74.00	-25.31	
Operation Band Fundamental Frequency Operation Mode EUT Pol.		:802.11 n40N :2422 MHz :Band Edge I :E2 Plane		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	
2390.00	Е	Average	30.93	5.16	36.09	54.00	-17.91	
2390.00	E	Peak	49.84	5.16	55.00	74.00	-19.00	



#### **FCC ID: PY7-PM0871**

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Operation Ban Fundamental I Operation Mo EUT Pol.	Frequency	:802.11 n40M :2452 MHz :Band Edge HIGH :E2 Plane		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∕n	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 n40N :2452 MHz :Band Edge I :E2 Plane		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	38.98	6.01	44.99	54.00	-9.01
2483.50	Е	Peak	63.28	6.01	69.29	74.00	-4.71

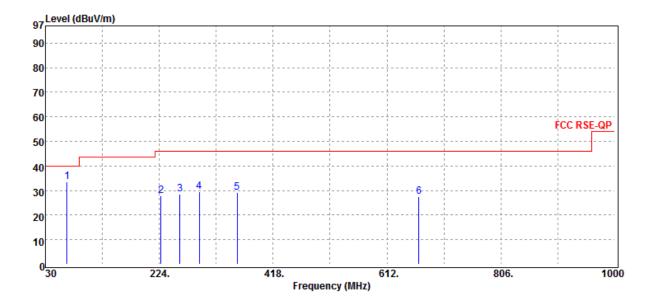
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#### **Radiated Spurious Emission Measurement Result**

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

Delott I GILL TTOIDE Cus	e Butur		
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 Plane	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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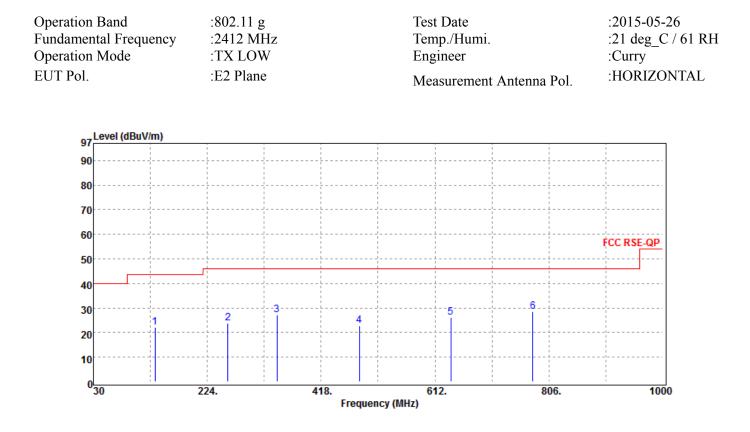
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Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
134.76	S	Peak	32.33	-10.25	22.08	43.50	-21.42
258.92	S	Peak	33.31	-9.60	23.71	46.00	-22.29
342.34	S	Peak	34.58	-7.41	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

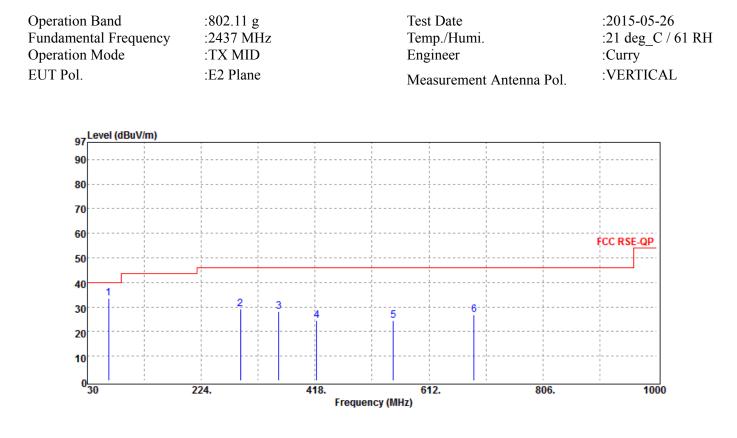
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#### **FCC ID: PY7-PM0871**

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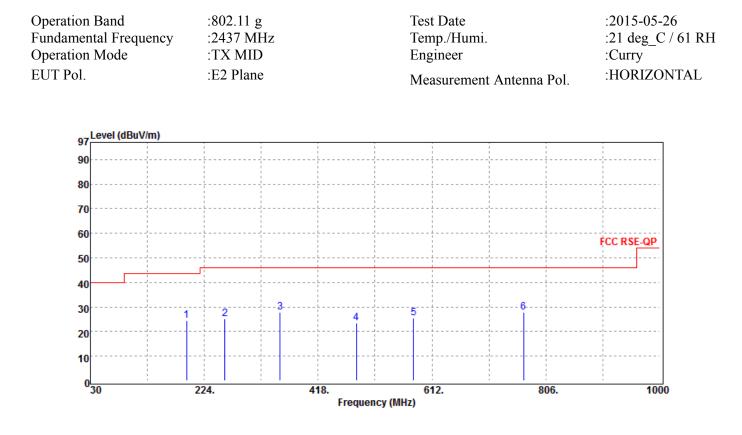
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
65.89	S	Peak	44.48	-11.07	33.41	40.00	-6.59
290.93	S	Peak	37.47	-8.18	29.29	46.00	-16.71
355.92	S	Peak	35.15	-7.08	28.07	46.00	-17.93
420.91	S	Peak	30.14	-5.67	24.47	46.00	-21.53
550.89	S	Peak	28.61	-4.05	24.56	46.00	-21.44
688.63	S	Peak	27.70	-0.84	26.86	46.00	-19.14

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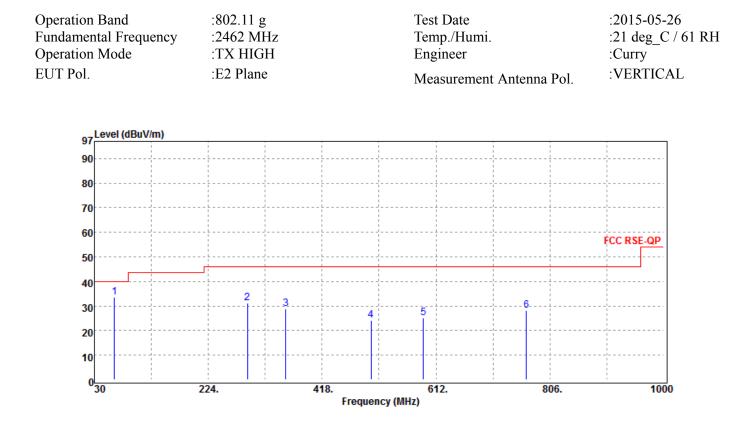
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
193.93	S	Peak	36.29	-11.69	24.60	43.50	-18.90
258.92	S	Peak	34.67	-9.60	25.07	46.00	-20.93
353.01	S	Peak	35.00	-7.11	27.89	46.00	-18.11
482.99	S	Peak	28.02	-4.46	23.56	46.00	-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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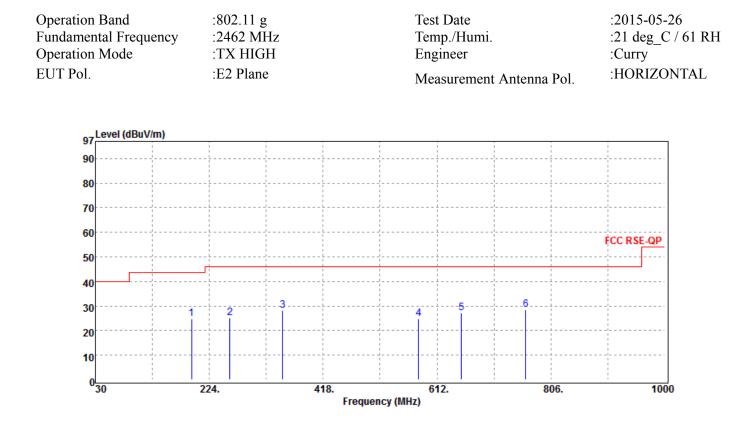
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
63.95	S	Peak	44.20	-10.79	33.41	40.00	-6.59
290.93	S	Peak	39.51	-8.18	31.33	46.00	-14.67
355.92	S	Peak	36.07	-7.08	28.99	46.00	-17.01
501.42	S	Peak	28.67	-4.34	24.33	46.00	-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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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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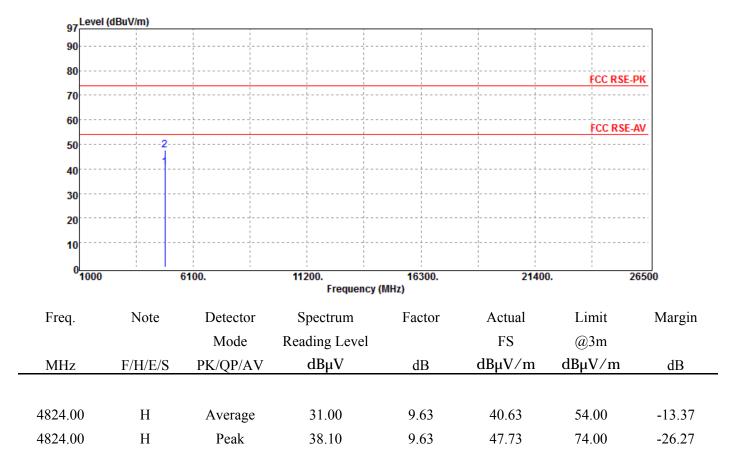
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#### **Radiated Spurious Emission Measurement Result**

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

	e Butur		
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 Plane	Measurement Antenna Pol.	:VERTICAL



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Operation Ban Fundamental F Operation Mod EUT Pol.	requency	:802.11 b :2412 MHz :TX LOW :E2 Plane		Test Date Temp./Humi. Engineer Measurement Antenna Pol.		:Curry	g_C / 61 RH
97	(dBuV/m)						
90					· · · · · · · · · · · · · · · · · · ·		
80						FCC RSE-	<u>PK</u>
70				       	· <sup>1</sup>	 	
60					· · · · · · · · · · · · · · · · · · ·	FCC RSE-	AV
50	2				· · · · · · · · · · · · · · · · · · ·		
40							
30					·		
20						         	
10				       		       	
0 1000		5100.	11200. Frequency (I	11200. 16300. Frequency (MHz)		. 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	31.87	9.63	41.50	54.00	-12.50
4824.00	Н	Peak	37.94	9.63	47.57	74.00	-26.43



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Operation Band Fundamental F Operation Mod EUT Pol.	requency	:802.11 b :2437 MHz :TX MID :E2 Plane		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						 	
10						 	
0 <mark></mark>		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



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Operation Band Fundamental F Operation Mod EUT Pol.	requency	:802.11 b :2437 MHz :TX MID :E2 Plane		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					· <sup>1</sup>	 	
60					· · · · · · · · · · · · · · · · · · ·	FCC RSI	E-AV
50	2						
40							
30					·		
20						       	
10					·		
0		5100.	11200.	16300.	21400		26500
1000	,		Frequency (I		21400		20300
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



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Operation Band Fundamental F Operation Mod EUT Pol.	requency	:802.11 b :2462 MHz :TX HIGH :E2 Plane		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 <sup>L</sup> 1000		5100.	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	27.85	9.86	37.71	54.00	-16.29
4924.00	Н	Peak	37.05	9.86	46.91	74.00	-27.09



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Operation Band Fundamental F Operation Mod EUT Pol.	amental Frequency:2462 MHzation Mode:TX HIGH			Test Date Temp./Humi. Engineer Measurement Antenna Pol.			:2015-05-26 :21 deg_C / 61 RH :Curry :HORIZONTAL	
97	(dBuV/m)							
90								
80						FCC RSE-	PK	
70								
60						FCC RSE-	AV	
50	2					 	·	
40						 		
30								
20				· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·			
10				· · · · · · · · · · · · · · · · · · ·				
0		5100.	11200. Frequency (			400. 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	33.31	9.86	43.17	54.00	-10.83	
4924.00	Н	Peak	40.49	9.86	50.35	74.00	-23.65	

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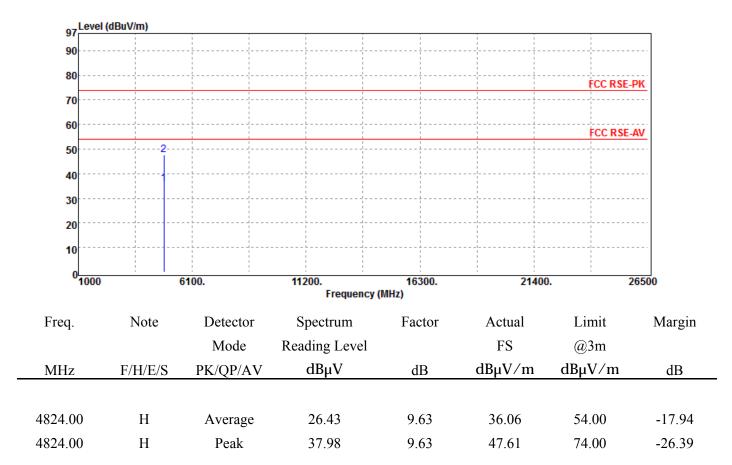
#### Radiated Spurious Emission Measurement Result (802.11 g)

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

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

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

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



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Operation Band Fundamental F Operation Mod EUT Pol.	requency	:802.11 g :2412 MHz :TX LOW :E2 Plane		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 <mark></mark>		5100.	11200. Frequency (I	. 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
4034.00	TT	<b>A - · · · · · · ·</b>	20.27	0.(2	20.00	54.00	14.10
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



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Operation Band Fundamental F Operation Mod EUT Pol.	requency	:802.11 g :2437 MHz :TX MID :E2 Plane		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 <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
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



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Operation Ban Fundamental F Operation Mod EUT Pol.	requency	:802.11 g :2437 MHz :TX MID :E2 Plane		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	- <b>PK</b>
70							
60						FCC RSE	-AV
50	2						
40							
30				       		 	
20				         			
10							
0 1000		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



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Operation Band Fundamental F Operation Mod EUT Pol.	requency	:802.11 g :2462 MHz :TX HIGH :E2 Plane		Test Date Temp./Humi. Engineer Measurement Antenna Pol.		:21 de :Curr	-05-26 eg_C / 61 RH y TICAL
97	dBuV/m)						
90					· · · · · · · · · · · · · · · · · · ·		
80						FCC RSI	<u>-PK</u>
70							
60						FCC RSI	E-AV
50	2				· <sup>1</sup>	 	
40					· <sup>1</sup>		
30					·		
20					·		
10						       	
0 <mark></mark>	: 6	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
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

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#### **FCC ID: PY7-PM0871**

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Operation Band Fundamental Frequency Operation Mode EUT Pol.	:802.11 g :2462 MHz :TX HIGH :E2 Plane		Test Date Temp./Humi. Engineer Measurement Antenna Pol.		:21 de :Curry	05-26 g_C / 61 RH izontal
97 Level (dBuV/m)						
90				·		
80				·	FCC RSE	- <u>PK</u>
70						
60				· <sup>1</sup>	FCC RSE	-AV
50	2	<sup>1</sup>				
40						
30						
20						
10						
0 <sup>L</sup> 1000	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
4924.00 H	Average	26.56	9.86	36.42	54.00	-17.58
4924.00 H	Peak	38.04	9.86	47.90	74.00	-26.10

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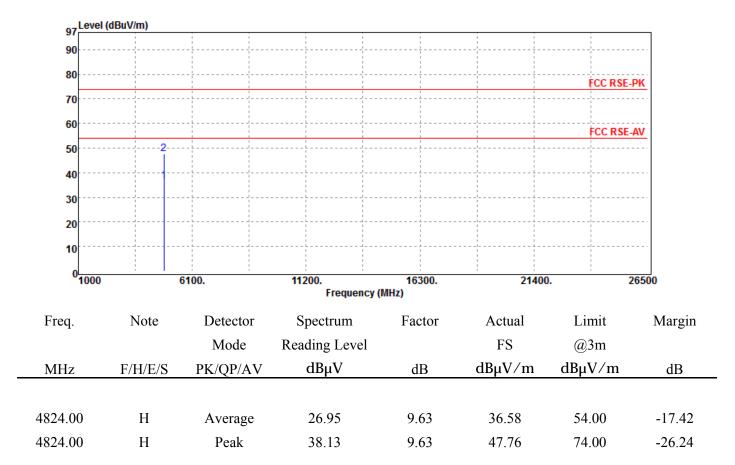
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#### Radiated Spurious Emission Measurement Result (802.11\_HT20)

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

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

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



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#### **FCC ID: PY7-PM0871**

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Operation Band Fundamental F Operation Mod EUT Pol.	requency	:802.11 n20N :2412 MHz :TX LOW :E2 Plane	Л	Test Date Temp./Humi. Engineer Measurement Antenna Pol.		:21 de :Curry	-05-26 g_C / 61 RH / IZONTAL
97	(dBu\//m)						
90							
80						FCC RSE	PK
70					1 1 <sup>1</sup> 1		
60						   	
	2					FCC RSE	<u>-AV</u>
50							
40						 	
30						   	
20						   	
10							
0 <mark></mark> 1000		5100.	11200. Frequency (	16300. (MHz)	21400	).	26500
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
*		Mode	Reading Level		FS	@3m	č
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



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Operation Band Fundamental Freq Operation Mode EUT Pol.	uency	:802.11 n20M :2437 MHz :TX MID :E2 Plane	1	Test Date Temp./Humi. Engineer Measurement Antenna Pol.		Temp./Humi. Engineer		:Curry	g_C / 61 RH
97	V/m)								
90									
80						FCC RSE-	PK		
70									
60		· · · · · · · · · · · · · · · · · · ·							
50						FCC RSE-	AV		
50									
40		- L							
30									
20									
10						   			
0 <sup>L</sup> 1000	61	100.	11200. Frequency	16300. (MHz)	21400	. 2	6500		
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin		
_		Mode	Reading Level		FS	@3m	-		
MHz F	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		

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Operation Ban Fundamental Operation Mo	Frequency	:2437 MHz Temp./Humi. :21 deg_C :TX MID Engineer :Curry					g_C / 61 RH
EUT Pol.		:E2 Plane		Measuren	nent Antenna Po	ol. :HOR	IZONTAL
97	l (dBuV/m)		i i		i i		
90				·			
80				·		FCC RSE	DK
70				·			
60				·		FCC RSE	
50				·			<u>-AV</u>
40				1 1 1 1			
30				·			
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
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

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Operation Ban Fundamental Operation Mo	Frequency	:2462 MHz Temp./Humi. :21				:2462 MHz Temp./Humi. :21 deg_C		
EUT Pol.		:E2 Plane		Measurement Antenna Po		ol. :VERT	<b>FICAL</b>	
	l (dBuV/m)			1		1		
90	 I I I			·			·	
80				·		FCC RSE	PK	
70				·				
60						FCC RSE	AV	
50	2			·	· · · · · · · · · · · · · · · · · · ·			
40				·				
30								
20								
10				1				
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	
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	



#### FCC ID: PY7-PM0871

Test Date

:802.11 n20M

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:2015-05-26

Fundamental F Operation Mod EUT Pol.		:2462 MHz :TX HIGH :E2 Plane		Temp./Hu Engineer Measuren	ımi. nent Antenna Po	:Curry	g_C / 61 RH , IZONTAL
97	(dBuV/m)						
90				·			
80	·			·		FCC RSE	-PK
70							
60				·		FCC RSE	-AV
50	2			·			
40				·			
30					· · · · · · · · · · · · · · · · · · ·		
20							
10							
0		6100.	11200.	16300.	21400		26500
1000		0100.	Frequency (I		21400		20500
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	26.92	9.86	36.78	54.00	-17.22
4924.00	Н	Peak	38.53	9.86	48.39	74.00	-25.61

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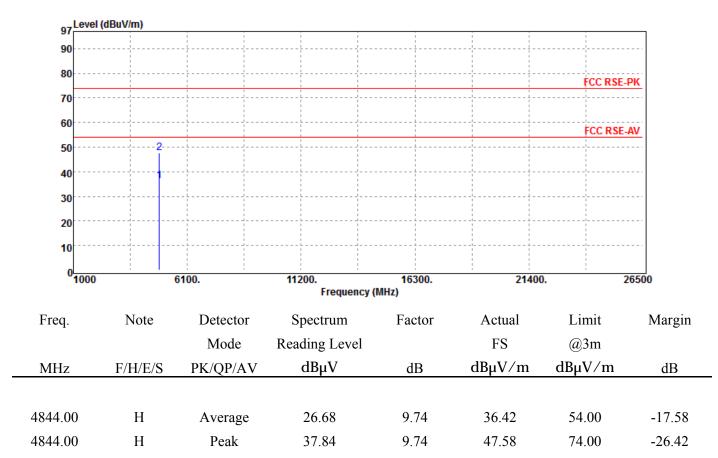
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#### Radiated Spurious Emission Measurement Result (802.11\_HT40)

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

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

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



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#### **FCC ID: PY7-PM0871**

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Operation Band Fundamental Frequency Operation Mode EUT Pol.		:802.11 n40N :2422 MHz :TX LOW :E2 Plane	Л	Test Date Temp./Humi. Engineer Measurement Antenna Pol.		:21 de :Curry	-05-26 g_C / 61 RH / IZONTAL
97	dBuV/m)						
90							
80						FCC RSE	-PK
70						 	
60						too per	
50	g			     		FCC RSE	<u>-AV</u>
40							
30							
20							
10							
0 <mark></mark> 1000	(	5100.	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

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Operation Ban Fundamental F Operation Mod	requency	:802.11 n40N :2437 MHz :TX MID	Л	Test Date Temp./Humi. Engineer			-05-26 eg_C / 61 RH
EUT Pol.		:E2 Plane		Measuren	nent Antenna Po	ol. :VER	TICAL
Level	(dBuV/m)						
90				·			
80				·		FCC RSE	- <b>PK</b>
70						 	
60						FCC RSI	- 0.1
50	2	·	           	·			
40						     	
30							
20				     		       	
10				·			
0 <mark></mark>		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	26.83	9.85	36.68	54.00	-17.32
4874.00	Н	Peak	37.65	9.85	47.50	74.00	-26.50



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Operation Ban Fundamental I Operation Mod	Frequency	:802.11 n40MTest Date:2437 MHzTemp./Humi.:TX MIDEngineer					-05-26 g_C / 61 RH
EUT Pol.		:E2 Plane		Measuren	nent Antenna Po	ol. :HOR	IZONTAL
o7 Level	(dBuV/m)						
90							
80						FCC DCF	DV
70						FCC RSE	<u>-PK</u>
60						FCC RSE	
50	2						<u>-AV</u>
40							
30							
20		· · · · · · · · · · · · · · · · · · ·		·			
10						       	
0 <mark></mark>		6100.	11200.	16300.	21400		26500
1000			Frequency (		2140		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
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



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:802.11 n40M

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:2015-05-26

Fundamental Frequency Operation Mode			Temp./Humi. Engineer			
EUT Pol.	:E2 Plane		Measuren	nent Antenna Po	ol. :VERT	TICAL (1997)
97 Level (dBuV/m)						
90				·		
80					FCC RSE-	DK
70	- L					
60				· · · · · · · · · · · · · · · · · · ·	FCC RSE-	A)/
50 2				· · · · · · · · · · · · · · · · · · ·	FUC K3E-	<u>AV</u>
40		L				
30						
20				· · · · · · · · · · · · · · · · · · ·	       	
10					       	
<sup>0</sup> 1000 6 <sup>4</sup>	100.	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
4904.00 H	Average	26.51	9.84	36.35	54.00	-17.65
TJUT.00 II		ZU .71	2.04	50.55	J <del>1</del> .00	-1/.03



#### FCC ID: PY7-PM0871

Test Date

:802.11 n40M

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:2015-05-26

Fundamental F Operation Mod		:2452 MHz :TX HIGH		Temp./Humi. Engineer		:21 de :Curry	g_C / 61 RH
EUT Pol.		:E2 Plane		Measurement Antenna Pol		ol. :HOR	IZONTAL
97	(dBuV/m)						
90				·	· · · · · · · · · · · · · · · · · · ·		
80				·		FCC DCL	DI
70						FCC RSE	<u>-PK</u>
60							
50	2			·		FCC RSE	<u>-AV</u>
40				·			
30				·			
20				·			
10				·		       	
0							
°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
4004.00			26.52	0.04	26.26	54.00	17.64
4904.00	Н	Average	26.52	9.84	36.36	54.00	-17.64
4904.00	Н	Peak	38.10	9.84	47.94	74.00	-26.06



# **12 PEAK POWER SPECTRAL DENSITY**

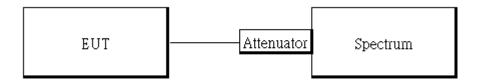
# 12.1 Standard Applicable

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.	
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	

### 12.3 Test Set-up



### 12.4 Measurement Procedure

- 1. Set analyzer center frequency to DTS channel center frequency.
- 2. The testing follows the Measurement Procedure of FCC KDB 558074 D01 DTS Meas. Guidance V03r02.
- 3. Set the span to 1.5 times the DTS channel bandwidth.
- 4. Set the RBW  $\geq$  3 kHz.
- 5. Set the VBW  $\geq$  3 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	RF Power Density Maximum Limit		Result			
(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			

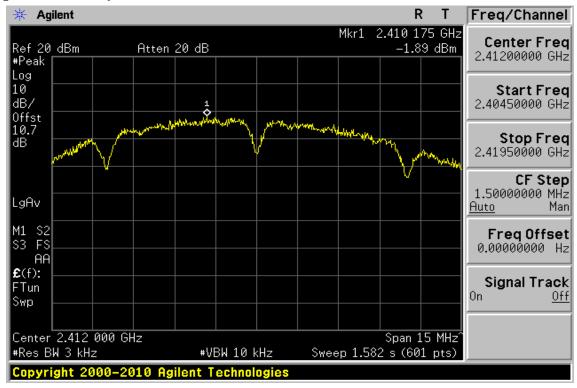
\*Refer to next page for plots

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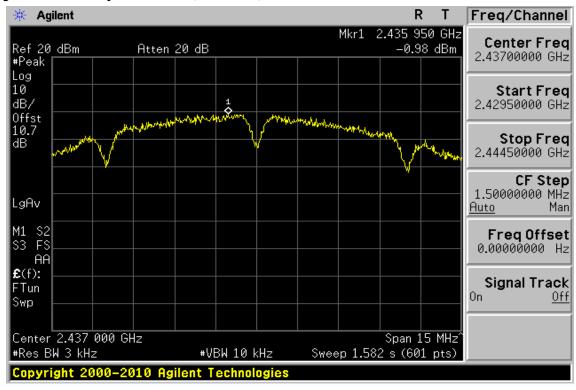
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# 802.11b **Power Spectral Density Test Plot (CH-Low)**



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



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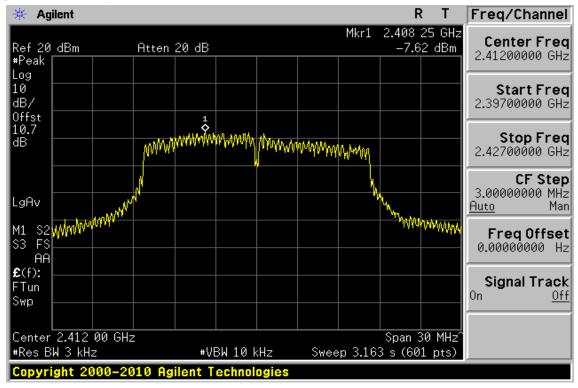


#### 🔆 Agilent Freg/Channel R Т Mkr1 2.461 175 GHz Center Freq Ref 20 dBm -0.50 dBm Atten 20 dB 2.46200000 GHz #Peak Log 10 Start Freq dB/ 2.45450000 GHz Offst 10.7 Hundred when Stop Freq dB 2.46950000 GHz CF Step 1.50000000 MHz LgAv <u>Auto</u> Man Μ1 S2 Freq Offset S3 FS 0.00000000 Hz AA £(f): Signal Track FTun 0n Off Swp Center 2.462 000 GHz Span 15 MHz #Res BW 3 kHz #VBW 10 kHz Sweep 1.582 s (601 pts) File Operation Status, C:PICTURE.GIF file saved

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

#### 802.11g

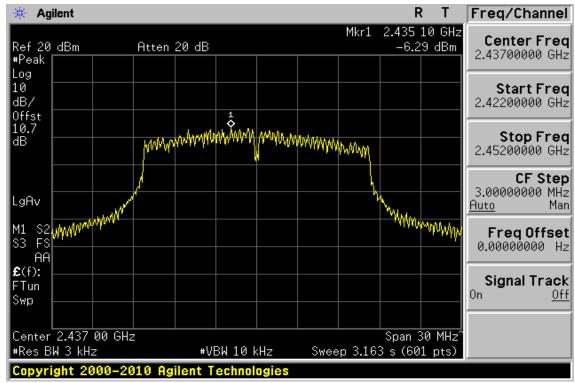
### **Power Spectral Density Test Plot (CH-Low)**



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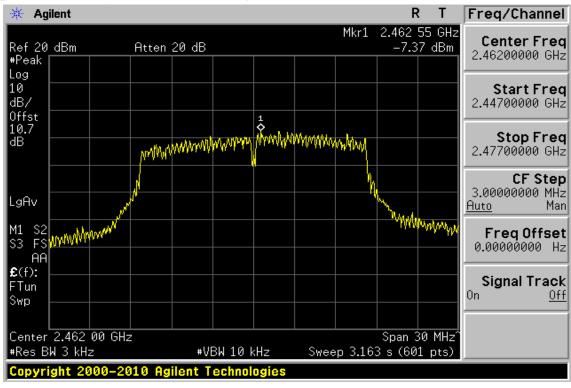
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# **Power Spectral Density Test Plot (CH-Mid)**

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



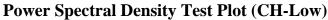
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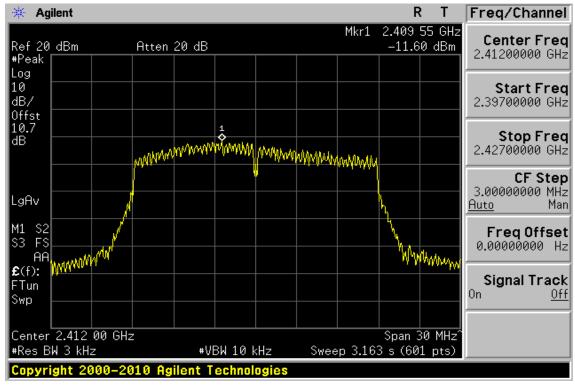
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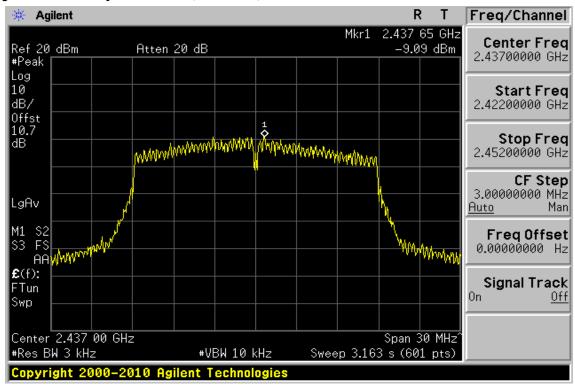
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# 802.11n HT20





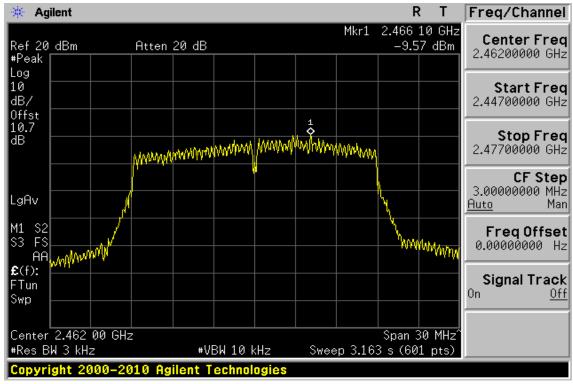
**Power Spectral Density Test Plot (CH-Mid)** 



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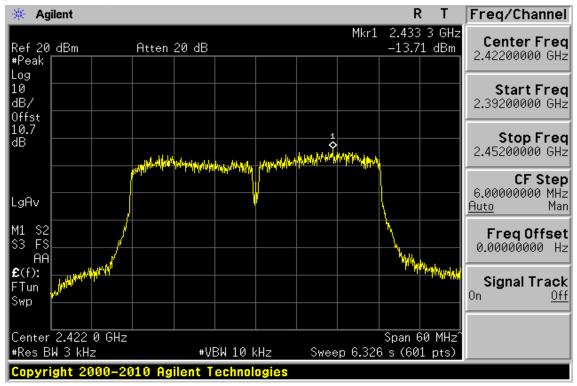




# **Power Spectral Density Test Plot (CH-High)**

# 802.11n HT40

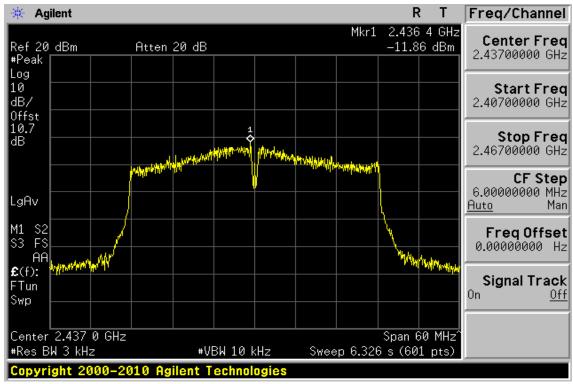
### **Power Spectral Density Test Plot (CH-Low)**



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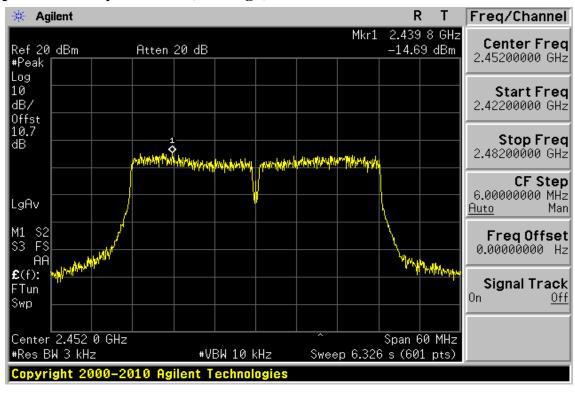
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# **Power Spectral Density Test Plot (CH-Mid)**

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



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# **13 ANTENNA REQUIREMENT**

# 13.1 Standard Applicable

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

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

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

# 13.2 Antenna Connected Construction

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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