

# ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

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

OF

**Product Name:** WLAN 11ac USB Adapter,1T1R

**Brand Name:** CC&C

**Marketing Name:** WLAN 11ac USB Adapter,1T1R

**Model No.:** WL-8211-V1

**Model Difference:** N/A

**FCC ID:** PANWL8211

**Report No.:** ER/2013/80083

**Issue Date:** Oct. 03, 2013

**FCC Rule Part:** §15.247, Cat: DTS

**Prepared for:**  
CC&C Technologies, Inc.  
8F, No. 150, Jian Yi Road, Chung Ho City, Tai-  
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**Prepared by:**  
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Electronics & Communication Laboratory  
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24803



Testing Laboratory  
0513

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## VERIFICATION OF COMPLIANCE

**Applicant:** CC&C Technologies, Inc.  
8F, No. 150, Jian Yi Road, Chung Ho City, Taipei County, Taiwan 235, R. O. C

**Product Name:** WLAN 11ac USB Adapter,1T1R

**Brand Name:** CC&C

**Marketing Name:** WLAN 11ac USB Adapter,1T1R

**Model No.:** WL-8211-V1

**Model Difference:** N/A

**FCC ID:** PANWL8211

**File Number:** ER/2013/80083

**Date of test:** Aug. 29, 2013 ~ Oct. 01, 2013

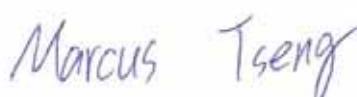
**Date of EUT Received:** Aug. 29, 2013

**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 C63.4:2009 the energy emitted by the sample EUT tested as described in this report is in compliance with conducted and radiated emission limits of FCC Rules Part 15.247.

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

**Test By:**

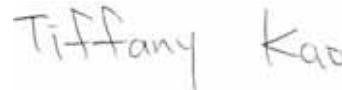


**Date**

Oct. 03, 2013

*Marcus Tseng / Engineer*

**Prepared By:**

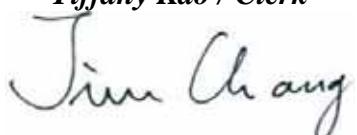


**Date**

Oct. 03, 2013

*Tiffany Kao / Clerk*

**Approved By:**



**Date**

Oct. 03, 2013

*Jim Chang / Supervisor*

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## Version

Version No.	Date	Description
00	Oct. 03, 2013	Initial creation of document

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## 1 GENERAL INFORMATION

### 1.1 Product description

General:

Product Name:	WLAN 11ac USB Adapter,1T1R
Brand Name:	CC&C
Marketing Name:	WLAN 11ac USB Adapter,1T1R
Model No.:	WL-8211-V1
Model Difference:	N/A
Hardware Version:	289G133000-B0
Software Version:	00-033000-01[F/W, WL-8211-V1]
Power Supply:	5Vdc from USB Port

WLAN 2.4GHz+5.7GHz:

Wi-Fi	Frequency Range	Channels	Rated Power (Peak)	Modulation Technology
11b/g	2412-2462	11	b: 10.41dBm g: 17.18dBm	DSSS OFDM
11n (2.4GHz)	HT20 2412-2462	11	n: 17.29dBm	OFDM
11n (2.4GHz)	HT40 2422-2452	9	n: 17.27dBm	OFDM

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Wi-Fi	Frequency Range	Channels	Rated Power	Modulation Technology	
11a	5725-5850	5	a: 16.75dBm	OFDM	
11n (5GHz)	HT20 5725-5850	5	n: 16.95dBm		
11n (5GHz)	HT40 5725-5850	2	n: 16.75dBm		
Antenna Designation:		PIFA Antenna: 2.4GHz: 0.1dBi / 5GHz: 4.7dBi			
Modulation type		CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM			
Transition Rate:		802.11 a: 6/9/12/18/24/36/48/54 Mbps; 802.11 b: 1/2/5.5/11 Mbps; 802.11 g: 6/9/12/18/24/36/48/54 Mbps 802.11 n_20MHz: 6.5 – 72.2Mbps 802.11 n_40MHz: 13.5 – 150Mbps			

The 2.4G max antenna gain is 0.1dBi which was choosing for Radiated Spurious Emission test.

The 5G max antenna gain is 4.7dBi which was choosing for Radiated Spurious Emission test.

The EUT is in compliance with FCC §15.247 at which the frequency band of 2400~2483.5, and 5725~5850MHz has been tested.

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**IEEE 802.11n Spec:**

MCS Index	Nss	Modulation	R	NBPSC	NCBPS		NDBPS		Datarate(Mbps)			
					20MHz		40MHz		20MHz		40MHz	
					20MHz	40MHz	20MHz	40MHz	20MHz	40MHz	20MHz	40MHz
0	1	BPSK	1/2	1	52	108	26	54	6.5	13.5	7.200	15
1	1	QPSK	1/2	2	104	216	52	108	13.0	27.0	14.400	30
2	1	QPSK	3/4	2	104	216	78	162	19.5	40.5	21.700	45
3	1	16-QAM	1/2	4	208	432	104	216	26.0	54.0	28.900	60
4	1	16-QAM	3/4	4	208	432	156	324	39.0	81.0	43.300	90
5	1	64-QAM	2/3	6	312	648	208	432	52.0	108.0	57.800	120
6	1	64-QAM	3/4	6	312	648	234	486	58.5	121.5	65.000	135
7	1	64-QAM	5/6	6	312	648	260	540	65.0	135.0	72.200	150

Symbol	Explanation
NSS	Number of spatial streams
R	Code rate
NBPSC	Number of coded bite per single carrier
NCBPS	Number of coded bite per symbol
NDBPS	Number of data bite per symbol
GI	Guard interval

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## 1.2 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for **FCC ID: PANWL8211** filing to comply with Section 15.247 of the FCC Part 15, Subpart C Rules. The composite system (digital device) is compliance with Subpart B under the DoC procedure.

## 1.3 Test Methodology

Both conducted and radiated testing was performed according to the procedures in ANSI C63.4:2009. Radiated testing was performed at an antenna to EUT distance 3 meters.

Tested in accordance with Apr 2013 KDB558074 D01 V03 for compliance to FCC 47CFR 15.247 requirements.

## 1.4 Test Facility

The measurement facilities used to collect the 3m Radiated Emission and AC power line conducted data are located on the address of SGS Taiwan Ltd. Electronics & Communication Laboratory No.134, Wu Kung Road, Wuku Industrial Zone, Taipei County, Taiwan which are constructed and calibrated to meet the FCC requirements in documents ANSI C63.4:2009. FCC Registration Number is: 990257. Canada Registration Number: 4620A-4.

The 10 m Open Area Test Sites located on the address of SGS Taiwan Ltd. Electronics & Communication Laboratory No. 29, Pau-Tou-Tsuo Valley Chia-Pau Tsuen, Linkou Hsiang, Taipei county, which is constructed and calibrated to meet the CISPR 22/EN 55022 requirements. SGS Site No. 1(3 &10 meters) and FCC Registration Number: 94644.

## 1.5 Special Accessories

There are no special accessories used while test was conducted.

## 1.6 Equipment Modifications

There was no modification incorporated into the EUT.

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## 2 SYSTEM TEST CONFIGURATION

### 2.1 EUT Configuration

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

### 2.2 EUT Exercise

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

### 2.3 Test Procedure

#### 2.3.1 Conducted Emissions

The EUT is placed on a turn table which is 0.8 m above ground plane. According to the general criterion in Section 7.1 of ANSI C63.4:2009. Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz, and the measurement procedure 7.3 in ANSI 63.4:2009 is followed to carry out the test. The CISPR Quasi-Peak and Average detector mode is employed according to §15.107

#### 2.3.2 Radiated Emissions

The EUT is placed on a turn table which is 0.8 m above ground plane. The turn table shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this hand-held transmitter (EUT) was rotated through three orthogonal axes and measurement procedures for electric field radiated emissions above 1 GHz the EUT measurement is to be made “while keeping the antenna in the ‘cone of radiation’ from that area and pointed at the area both in azimuth and elevation, with polarization oriented for maximum response.” is still within the 3dB illumination BW of the measurement antenna. according to the requirements in Section 8 and 13 and of ANSI C63.4:2009,

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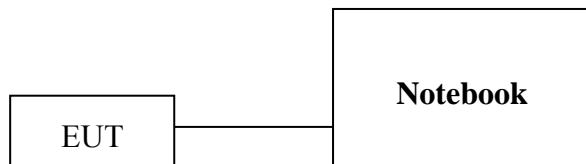
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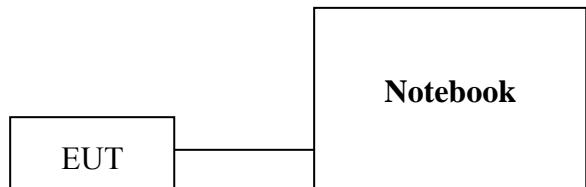
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## 2.4 Configuration of Tested System

**Fig. 2-1 Radiated Emission & Conducted (Antenna Port) Configuration**



**Fig. 2-2 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.	Notebook	DELL	E5400	3704625136	Shield	Un-shield

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### 3 SUMMARY OF TEST RESULTS

FCC Rules	Description Of Test	Result
§15.207(a)	AC Power Line Conducted Emission	Compliant
§15.247(b) (3)	Peak Output Power	Compliant
§15.247(a)(2)	6dB Bandwidth	Compliant
§15.247(d)	100 KHz Bandwidth Of Frequency Band Edges	Compliant
§15.247(d)	Spurious Emission	Compliant
§15.247(e)	Peak Power Density	Compliant
§15.203	Antenna Requirement	Compliant

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## 4 DESCRIPTION OF TEST MODES

The EUT has been tested under operating condition.

Test program used to control the EUT for staying in continuous transmitting and receiving mode is programmed.

802.11 b mode: Channel low (2412MHz), mid (2437MHz) and high (2462MHz) with 1Mbps lowest data rate are chosen for full testing.

802.11 g mode: Channel low (2412MHz), mid (2437MHz) and high (2462MHz) with 6Mbps lowest data rate are chosen for full testing.

802.11 n\_20MHz mode: Channel low (2412MHz), mid (2437MHz) and high (2462MHz) with 6.5Mbps lowest data rate are chosen for full testing.

802.11 a mode: Channel low (5745MHz), mid (5785MHz) and high (5825MHz) with 6Mbps lowest data rate are chosen for full testing.

802.11 n (5GHz) \_20MHz: Lowest (5745MHz), Mid (5785MHz) and high (5825MHz) with 6.5 Mbps lowest data rate are chosen for full testing.

802.11 n (5GHz) \_40MHz: Lowest (5755MHz) and high (5795MHz) with 13.5 Mbps lowest data rate are chosen for full testing.

The worst case is determined by the output power that generates the highest emission. As examined in the section of output power measurement, the section 7.5, the lowest data rate at a/b/g/n\_HT20/n\_HT40 resulted the highest level of fundamental emission, and therefore, the lowest data rate is chosen as the worst-case to conduct the remaining of other mandatory test cases.

The field strength of radiation emission was measured as EUT stand-up position (H mode) and lie down position (E1, E2 mode) for 802.11a/b/g/n WLAN Transmitter for channel Low, Mid and High, the worst case H position was tested as resulted in pre-scanned measurement with respect to 2.4GHz 802.11b/g/n, and 5.8GHz 802.11a/n\_HT20/n\_HT40.

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## 5 MEASUREMENT UNCERTAINTY

Test Items	Uncertainty
AC Power Line Conducted Emission	+/- 2.586 dB
Peak Output Power	+/- 1.55dB (for Spectrum) +/- 1.42 dB (for Power Meter)
6dB Bandwidth	+/- 123.36 Hz
100 KHz Bandwidth Of Frequency Band Edges	+/- 1.55 dB
Peak Power Density	+/- 1.55 dB
Temperature	+/- 0.8 °C
Humidity	+/- 4.7 %
DC / AC Power Source	DC= +/- 1%, AC=+/- 0.2%

Radiated Spurious Emission:

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

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

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

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## 6 CONDUCTED EMISSION TEST

### 6.1 Standard Applicable:

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

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

#### Note

1. The lower limit shall apply at the transition frequencies

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

### 6.2 Measurement Equipment Used:

Conducted Emission Test Site					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
EMI Test Receiver	R&S	ESCI7	100760	05/27/2013	05/26/2014
LISN	Rolf-Heine	NNB-2/16Z	99012	03/23/2013	03/22/2014
LISN	FCC	FCC-LISN-50/250-25-2-01	04034	03/23/2013	03/22/2014
Coaxial Cables	N/A	WK CE Cable	N/A	01/05/2013	01/04/2014

### 6.3 EUT Setup:

1. The conducted emission tests were performed in the test site, using the setup in accordance with the ANSI C63.4:2009.
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.

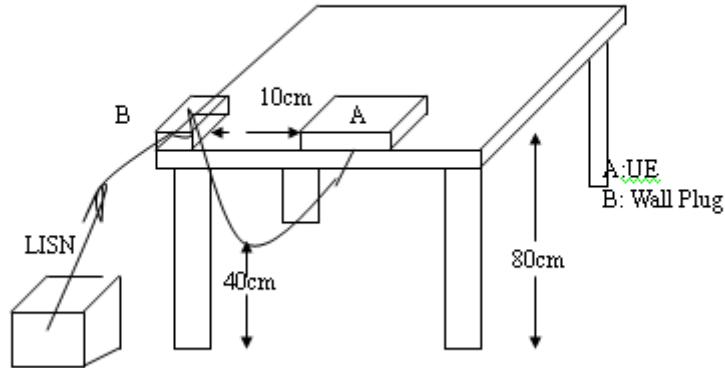
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## 6.4 Test SET-UP (Block Diagram of Configuration)



## 6.5 Measurement Procedure:

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

## 6.6 Measurement Result:

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

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

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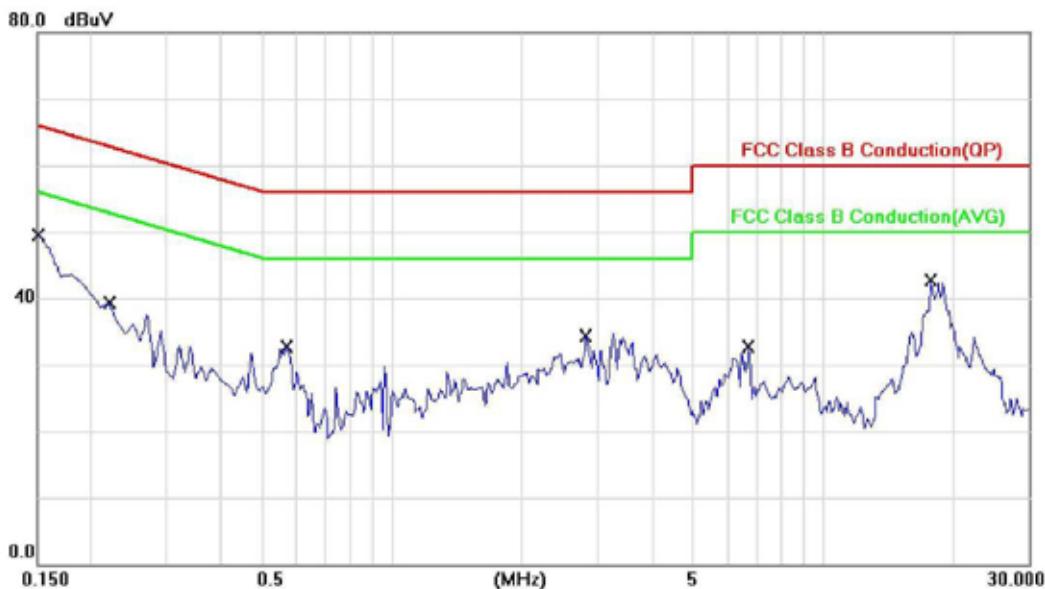
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## AC POWER LINE CONDUCTED EMISSION TEST DATA

Operation Mode:	Operation mode			Test Date:	Sep. 18, 2013
Temperature:	26	Humidity:	60 %	Test By:	Marcus
				Probe:	L1/N

Site: ConductionRoom  
 Phase: **L1** Temperature: 26 °C  
 Limit: FCC Class B Conduction(QP) Power: AC 120V/60Hz Humidity: 60%  
 EUT: WLAN 11ac USB Adapter,1T1R Distance:  
 M/N: WL-8211-V1 Mode: Operationmode  
 Note:

## Conducted Emission



No.	Mk.	Freq. MHz	Reading Level	Correct Factor	Measure- ment	Limit	Over	Detector	Comment
			dBuV	dB	dBuV	dB			
1	*	0.1500	49.44	0.16	49.60	66.00	-16.40	QP	
2		0.2200	39.09	0.16	39.25	62.82	-23.57	QP	
3		0.5700	32.62	0.17	32.79	56.00	-23.21	QP	
4		2.8200	34.01	0.23	34.24	56.00	-21.76	QP	
5		6.7200	32.30	0.31	32.61	60.00	-27.39	QP	
6		17.6800	42.32	0.42	42.74	60.00	-17.26	QP	

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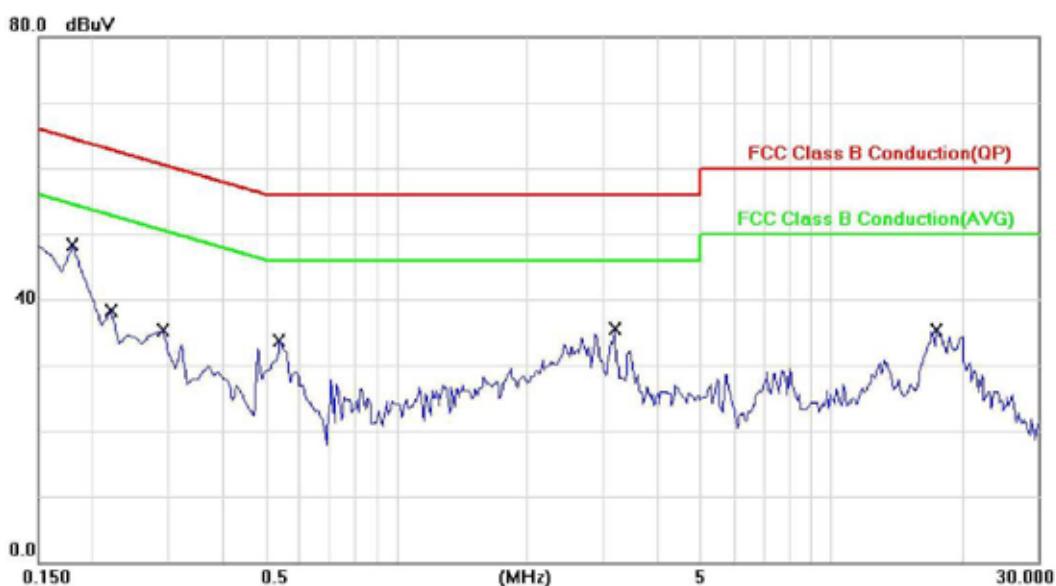
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Site: ConductionRoom  
 Limit: FCC Class B Conduction(QP)  
 EUT: WLAN 11ac USB Adapter,1T1R  
 M/N: WL-8211-V1  
 Note:

Phase: **N** Temperature: 26 °C  
 Power: AC 120V/60Hz Humidity: 60%  
 Distance:  
 Mode: Operationmode

### Conducted Emission



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1	*	0.1800	48.07	0.19	48.26	64.49	-16.23	QP	
2		0.2200	38.05	0.19	38.24	62.82	-24.58	QP	
3		0.2900	35.07	0.20	35.27	60.52	-25.25	QP	
4		0.5400	33.57	0.19	33.76	56.00	-22.24	QP	
5		3.1800	35.13	0.28	35.41	56.00	-20.59	QP	
6		17.5200	34.68	0.53	35.21	60.00	-24.79	QP	

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## 7 PEAK OUTPUT POWER MEASUREMENT

### 7.1 Standard Applicable:

According to §15.247 (b)

(3) For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signalling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.

(4) The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

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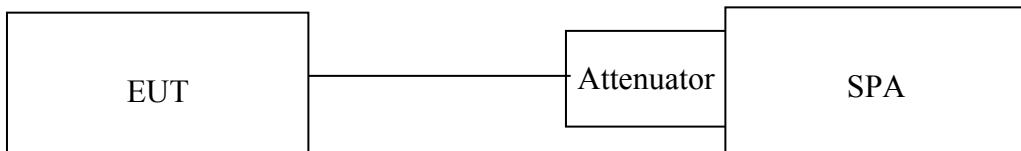
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## 7.2 Measurement Equipment Used:

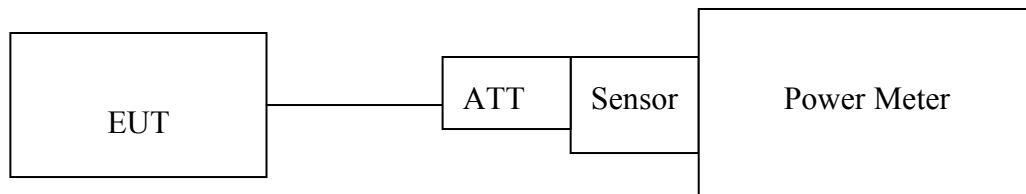
Conducted Emission Test Site					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Power Meter	Anritsu	ML2495A	1005007	02/08/2012	02/07/2014
Power Sensor	Anritsu	MA2411B	917032	02/08/2012	02/07/2014
Spectrum Analyzer	Agilent	E4446A	MY51100003	05/30/2013	05/29/2014
Spectrum Analyzer	Agilent	E4440A	MY45304525	03/15/2013	03/14/2014
DC Block	Mini-Circuits	BLK-18-S+	1	02/28/2013	02/27/2014
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA	N/A	01/05/2013	01/04/2014
Attenuator	Mini-Circuit	BW-S10W2+	002	02/28/2013	02/27/2014
Splitter	Agilent	11636B	N/A	02/28/2013	02/27/2014

## 7.3 Test Set-up:

Spectrum:



Power Meter:



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## 7.4 Measurement Procedure:

1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the power meter or spectrum. **(Peak power setting on Spectrum):** Channel power function, RBW = 1MHz, VBW = 3MHz, Span: 30/60MHz, Detector =peak, Sweep = Auto. Setting on spectrum is adjusted based on the mandatory procedure in 9.1.2 of the KDB558074). Power Meter is used as the auxiliary test equipment to conduct the output power measurement. 9.1.3 in KDB558074 is followed.  
**(Avg. power setting on Spectrum):** Channel power function, RBW = 1MHz, VBW = 3MHz, Span: 30/60MHz, Detector =Avg., Trace avg =100, Sweep = Auto, Setting on spectrum is adjusted based on the mandatory procedure in 9.2.2.4 of the KDB558074). Power Meter is used as the auxiliary test equipment to conduct the output power measurement. 9.2.3, option 3 in KDB558074 is followed.
3. Record the max. Reading as observed from Spectrum or Power Meter.
4. Repeat above procedures until all frequency of interest measured was complete.

*Pre-analysis Check: While conducting average power measurement, duty cycle of each mode (a/n\_ht20,n\_ht40) 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, resulted as obtained below, and showed only the most representative ones*

*Tabular results as indicates below entails the results of duty factor for all supported modes.*

**Formula:**

$$\text{Duty Cycle} = T_{on} / (T_{on} + T_{off})$$

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**Test Procedure:**

Set span = 0, RBW = 1MHz, VBW = 3MHz, Detector = Peak

**Duty Cycle:**

	<b>Duty Cycle</b>	<b>Duty Factor (dBm)</b>
802.11b	100%	0
802.11g	100%	0
802.11n_20 (2.4G)	100%	0
802.11a	100%	0
802.11n_20 (5G)	100%	0
802.11n_40 (5G)	100%	0

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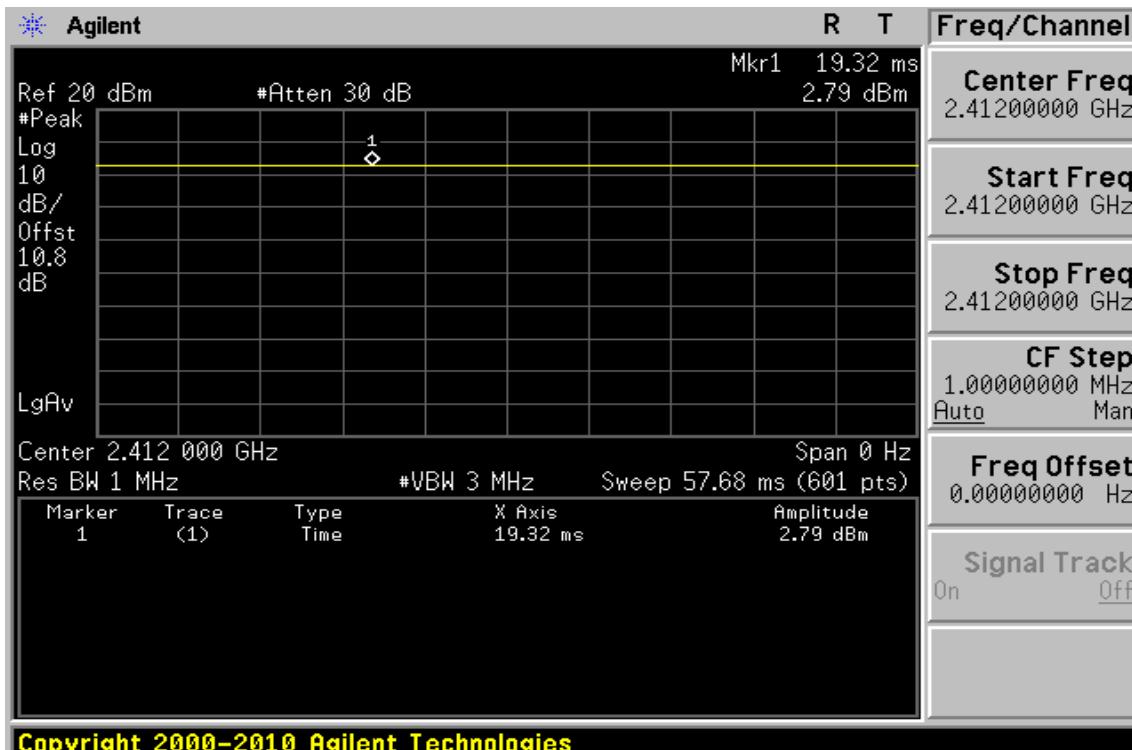
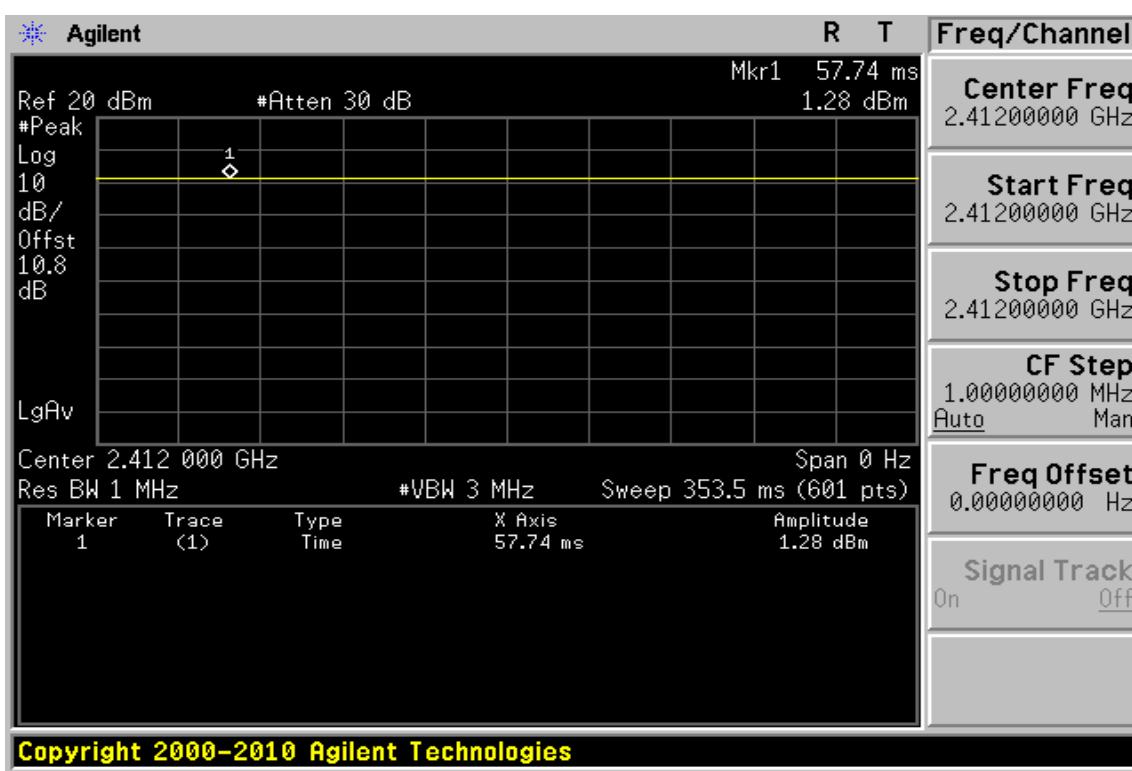
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**Duty Factor:****802.11 b****802.11 g**

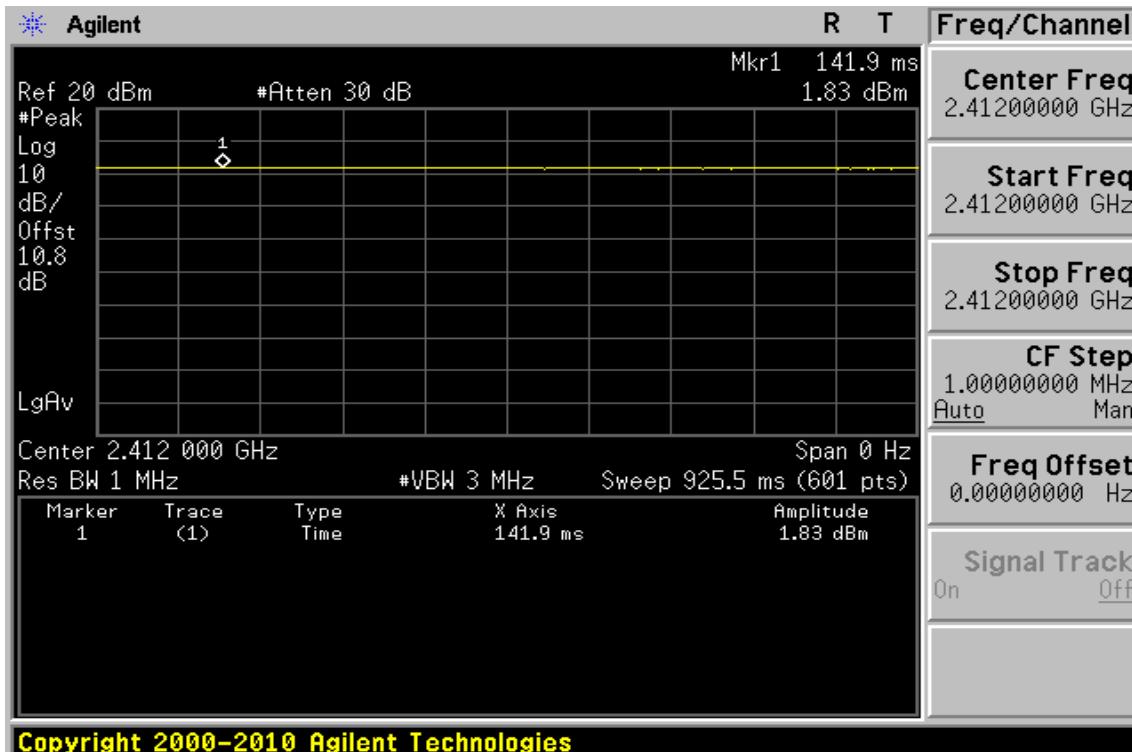
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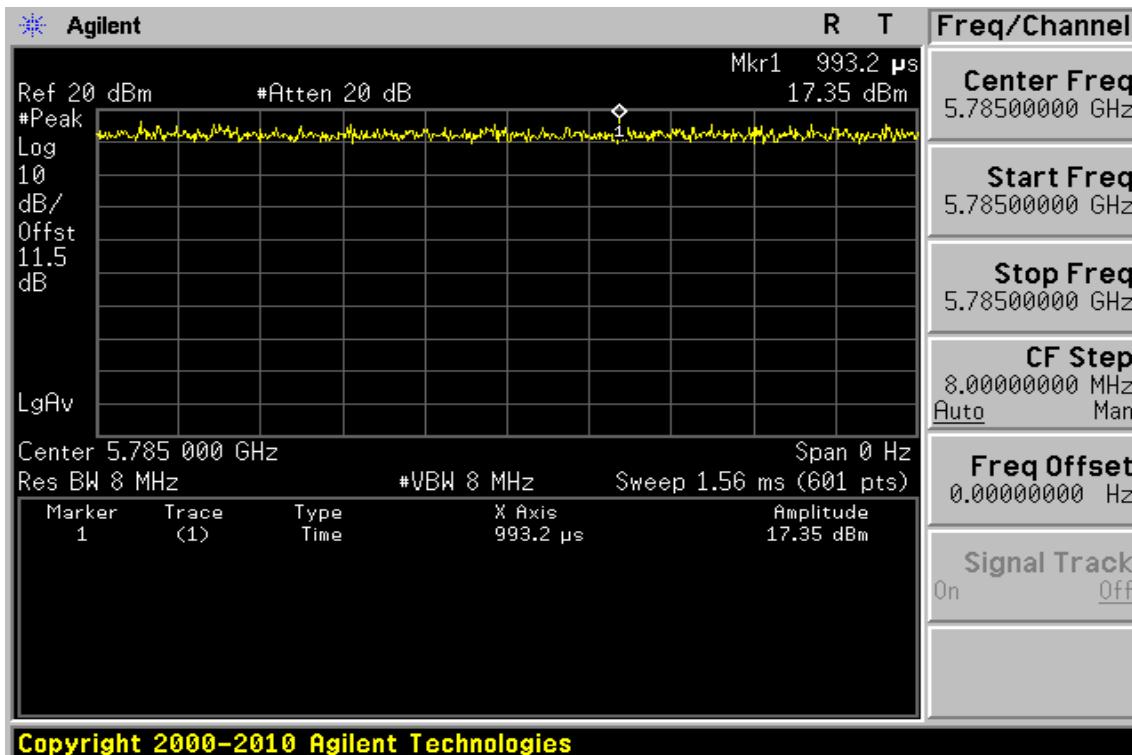
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## 802.11 n\_20 MHz



## 802.11a



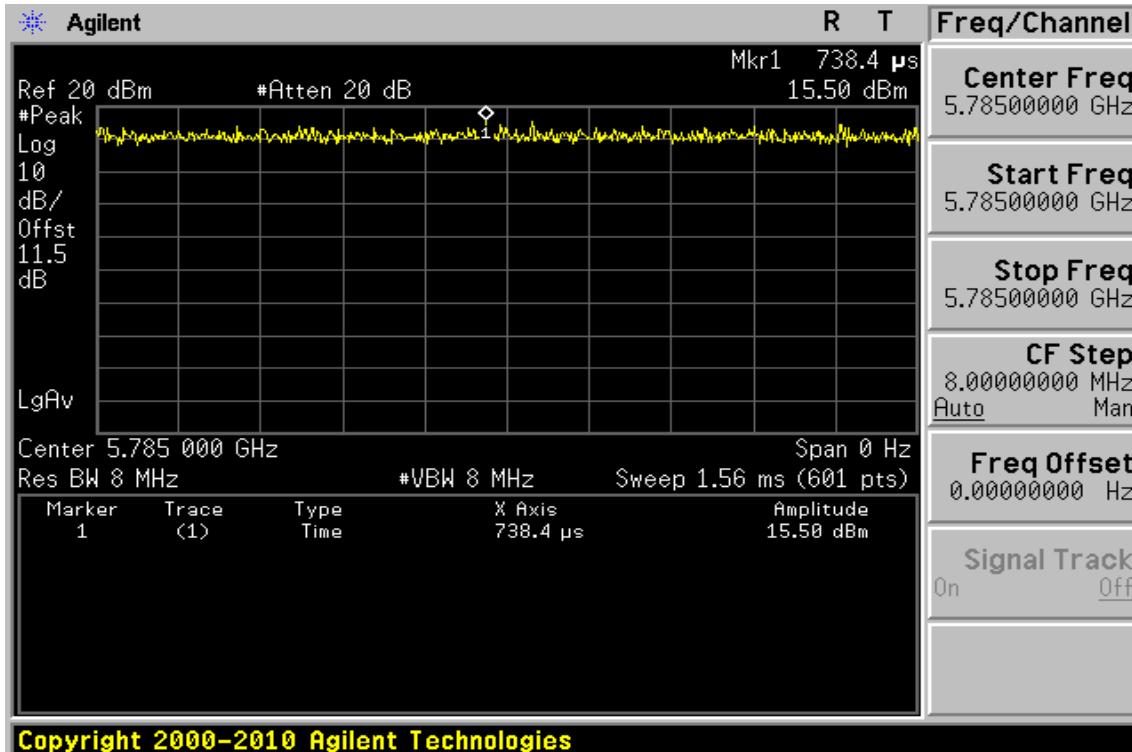
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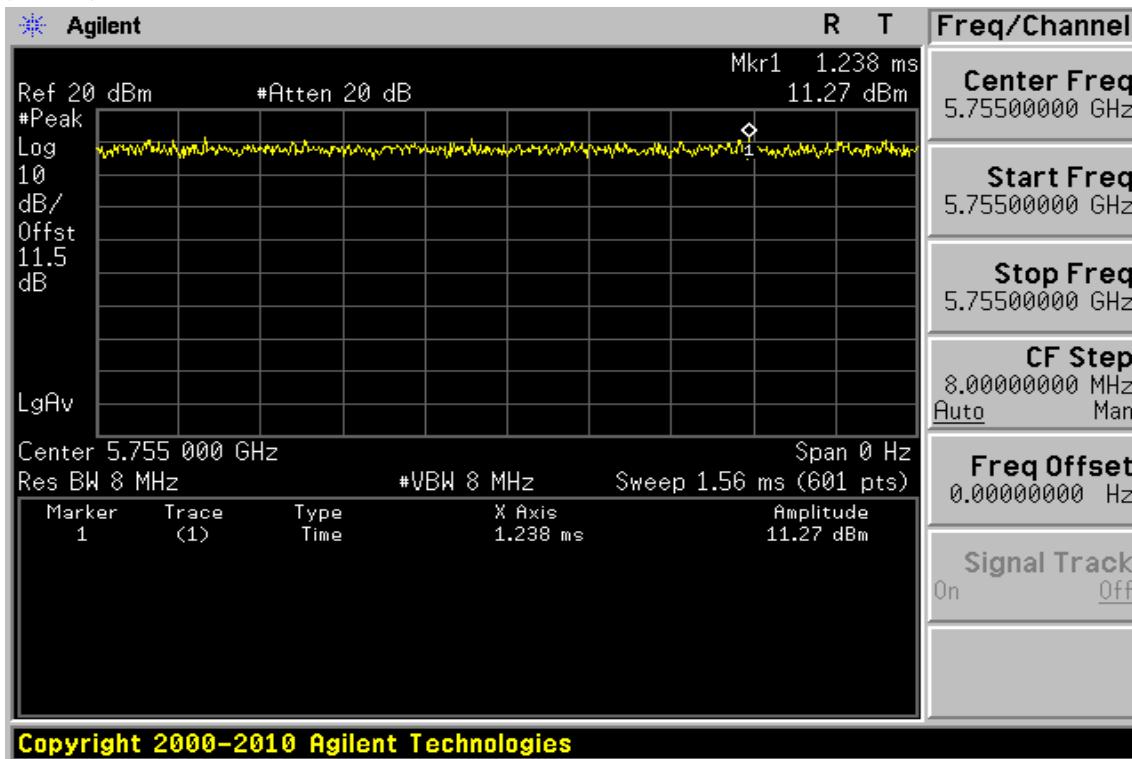
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## 802.11 n (5GHz)\_20M



## 802.11 n (5GHz)\_40M



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## 7.5 Measurement Result:

### 802.11b

		Peak Power Output (dBm)				Required Limit	
CH	Frequency (MHz)	Data Rate					
		1	2	5.5	11		
1	2412	10.16	10.10	10.08	10.04	1 Watt = 30 dBm	
6	2437	10.41	10.40	10.31	10.25	1 Watt = 30 dBm	
11	2462	10.25	10.24	10.19	10.19	1 Watt = 30 dBm	

		Average Power Output (dBm)				Required Limit	
CH	Frequency (MHz)	Data Rate					
		1	2	5.5	11		
1	2412	7.74	7.67	7.62	7.57	1 Watt = 30 dBm	
6	2437	7.98	7.94	7.92	7.91	1 Watt = 30 dBm	
11	2462	7.85	7.85	7.80	7.76	1 Watt = 30 dBm	

### 802.11g

		Peak Power Output(dBm)								Required Limit	
CH	Frequency (MHz)	Data Rate									
		6	9	12	18	24	36	48	54		
1	2412	17.62	17.61	17.57	17.55	17.51	17.49	17.48	17.41	1 Watt = 30 dBm	
6	2437	17.70	17.65	17.64	17.64	17.58	17.55	17.51	17.48	1 Watt = 30 dBm	
11	2462	17.78	17.75	17.66	17.57	17.56	17.51	17.48	17.47	1 Watt = 30 dBm	

		Average Power Output(dBm)								Required Limit	
CH	Frequency (MHz)	Data Rate									
		6	9	12	18	24	36	48	54		
1	2412	7.88	7.87	7.80	7.74	7.73	7.66	7.65	7.60	1 Watt = 30 dBm	
6	2437	7.80	7.75	7.70	7.66	7.61	7.52	7.45	7.41	1 Watt = 30 dBm	
11	2462	7.96	7.91	7.91	7.87	7.80	7.75	7.67	7.61	1 Watt = 30 dBm	

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**802.11n\_20M (2.4G)**

		Peak Power Output(dBm)								
CH	Frequency (MHz)	Data Rate								Required Limit
		MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	
1	2412	16.81	16.78	16.75	16.73	16.68	16.61	16.52	16.43	1 Watt = 30 dBm
6	2437	16.54	16.47	16.46	16.38	16.35	16.28	16.23	16.16	1 Watt = 30 dBm
11	2462	17.29	17.28	17.27	17.19	17.18	17.18	17.12	17.03	1 Watt = 30 dBm

		Average Power Output(dBm)								
CH	Frequency (MHz)	Data Rate								Required Limit
		MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	
1	2412	7.85	7.78	7.77	7.72	7.68	7.62	7.55	7.48	1 Watt = 30 dBm
6	2437	7.67	7.58	7.52	7.48	7.43	7.40	7.34	7.31	1 Watt = 30 dBm
11	2462	7.84	7.83	7.77	7.70	7.67	7.63	7.61	7.60	1 Watt = 30 dBm

**802.11n\_40M (2.4G)**

		Peak Power Output(dBm)								
CH	Frequency (MHz)	Data Rate								Required Limit
		MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	
3	2422	17.05	17.00	16.96	16.89	16.80	16.76	16.73	16.69	1 Watt = 30 dBm
6	2437	17.25	17.24	17.18	17.12	17.08	17.05	17.02	16.95	1 Watt = 30 dBm
9	2452	17.27	17.26	17.22	17.20	17.15	17.09	17.05	17.04	1 Watt = 30 dBm

		Average Power Output(dBm)								
CH	Frequency (MHz)	Data Rate								Required Limit
		MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	
3	2422	7.65	7.62	7.58	7.55	7.54	7.52	7.48	7.44	1 Watt = 30 dBm
6	2437	7.99	7.93	7.90	7.88	7.79	7.78	7.75	7.69	1 Watt = 30 dBm
9	2452	7.99	7.94	7.87	7.81	7.74	7.66	7.63	7.63	1 Watt = 30 dBm

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**802.11a**

		Peak Power Output (dBm)								
CH	Frequency (MHz)	Data Rate								Required Limit
		6	9	12	18	24	36	48	54	
149	5745	16.67	16.62	16.60	16.59	16.50	16.43	16.37	16.33	1 Watt = 30 dBm
157	5785	16.75	16.73	16.71	16.63	16.56	16.55	16.47	16.46	1 Watt = 30 dBm
165	5825	16.52	16.43	16.40	16.38	16.34	16.33	16.25	16.22	1 Watt = 30 dBm

		Average Power Output(dBm)								
CH	Frequency (MHz)	Data Rate								Required Limit
		6	9	12	18	24	36	48	54	
149	5745	7.93	7.88	7.85	7.81	7.78	7.74	7.70	7.66	1 Watt = 30 dBm
157	5785	7.94	7.91	7.87	7.83	7.79	7.68	7.62	7.59	1 Watt = 30 dBm
165	5825	7.62	7.61	7.55	7.47	7.39	7.36	7.35	7.34	1 Watt = 30 dBm

**802.11n (5GHz)\_20M**

		Peak Power Output(dBm)								
CH	Frequency (MHz)	Data Rate								Required Limit
		MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	
149	5745	16.55	16.49	16.43	16.39	16.39	16.35	16.28	16.25	1 Watt = 30 dBm
157	5785	16.95	16.94	16.92	16.88	16.86	16.83	16.82	16.81	1 Watt = 30 dBm
165	5825	16.38	16.35	16.27	16.23	16.21	16.20	16.15	16.11	1 Watt = 30 dBm

		Average Power Output(dBm)								
CH	Frequency (MHz)	Data Rate								Required Limit
		MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	
149	5745	7.90	7.88	7.86	7.80	7.79	7.76	7.75	7.71	1 Watt = 30 dBm
157	5785	7.77	7.70	7.69	7.69	7.64	7.64	7.61	7.53	1 Watt = 30 dBm
165	5825	7.71	7.67	7.63	7.60	7.56	7.50	7.43	7.35	1 Watt = 30 dBm

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## 802.11n (5GHz) \_40M

		Peak Power Output(dBm)								
CH	Frequency (MHz)	Data Rate								Required Limit
		MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	
151	5755	16.75	16.73	16.67	16.61	16.58	16.55	16.51	16.49	1 Watt = 30 dBm
159	5795	16.51	16.45	16.43	16.39	16.34	16.25	16.16	16.09	1 Watt = 30 dBm

		Average Power Output(dBm)								
CH	Frequency (MHz)	Data Rate								Required Limit
		MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	
151	5755	7.93	7.90	7.87	7.82	7.78	7.75	7.71	7.68	1 Watt = 30 dBm
159	5795	7.94	7.91	7.88	7.84	7.80	7.77	7.72	7.69	1 Watt = 30 dBm

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

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## 8 6dB BANDWIDTH

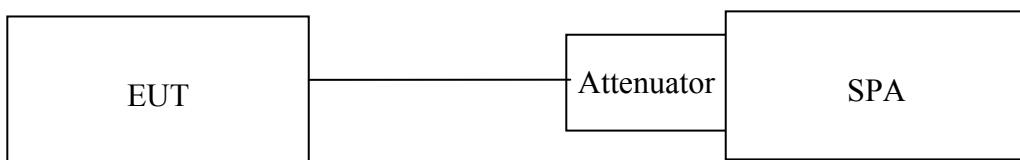
### 8.1 Standard Applicable:

According to §15.247(a)(2), Systems using digital modulation techniques may operate in the 902 - 928 MHz, 2400 - 2483.5 MHz, and 5725 - 5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500kHz.

### 8.2 Measurement Equipment Used:

Conducted Emission Test Site					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Power Meter	Anritsu	ML2495A	1005007	02/08/2012	02/07/2014
Power Sensor	Anritsu	MA2411B	917032	02/08/2012	02/07/2014
Spectrum Analyzer	Agilent	E4446A	MY51100003	05/30/2013	05/29/2014
Spectrum Analyzer	Agilent	E4440A	MY45304525	03/15/2013	03/14/2014
DC Block	Mini-Circuits	BLK-18-S+	1	02/28/2013	02/27/2014
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA	N/A	01/05/2013	01/04/2014
Attenuator	Mini-Circuit	BW-S10W2+	002	02/28/2013	02/27/2014
Splitter	Agilent	11636B	N/A	02/28/2013	02/27/2014

### 8.3 Test Set-up:



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#### 8.4 Measurement Procedure:

1. Place the EUT on the table and set it in transmitting mode.
2. 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, the setting on spectrum is adjusted based on the procedure as guide in 8.1 option 1 of KDB558074.
4. Mark the peak frequency and -6dB (upper and lower) frequency.
5. Repeat above procedures until all frequency of interest measured was complete.

#### 8.5 Measurement Result:

##### 802.11b

Frequency (MHz)	Bandwidth (kHz)	Limit (kHz)	Result
2412	10159	> 500	PASS
2437	10149	> 500	PASS
2462	10155	> 500	PASS

##### 802.11g

Frequency (MHz)	Bandwidth (kHz)	Limit (kHz)	Result
2412	16599	> 500	PASS
2437	16618	> 500	PASS
2462	16579	> 500	PASS

##### 802.11n\_20M (2.4G)

Frequency (MHz)	Bandwidth (kHz)	Limit (kHz)	Result
2412	17777	> 500	PASS
2437	17785	> 500	PASS
2462	17732	> 500	PASS

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**802.11n\_40M (2.4G)**

Frequency (MHz)	Bandwidth (kHz)	Limit (kHz)	Result
2422	36488	> 500	PASS
2437	36489	> 500	PASS
2452	36494	> 500	PASS

**802.11a**

Frequency (MHz)	Bandwidth (kHz)	Limit (kHz)	Result
5745	16606	> 500	PASS
5785	16598	> 500	PASS
5825	16551	> 500	PASS

**802.11n (5GHz)\_20M**

Frequency (MHz)	Bandwidth (kHz)	Limit (kHz)	Result
5745	17812	> 500	PASS
5785	17825	> 500	PASS
5825	17773	> 500	PASS

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**802.11n (5GHz)\_40M**

Frequency (MHz)	Bandwidth (kHz)	Limit (kHz)	Result
5755	36553	> 500	PASS
5795	36538	> 500	PASS

\* Note: Offset 10.8dB for 2.4G 802.11b/g; and 2.4G 802.11n\_20/n\_40

Offset 11.5dB for 5G 802.11a; 5G 802.11n\_20/n\_40

\* Note: The diamond reveals X decibel level

\*Refer to next page for plots

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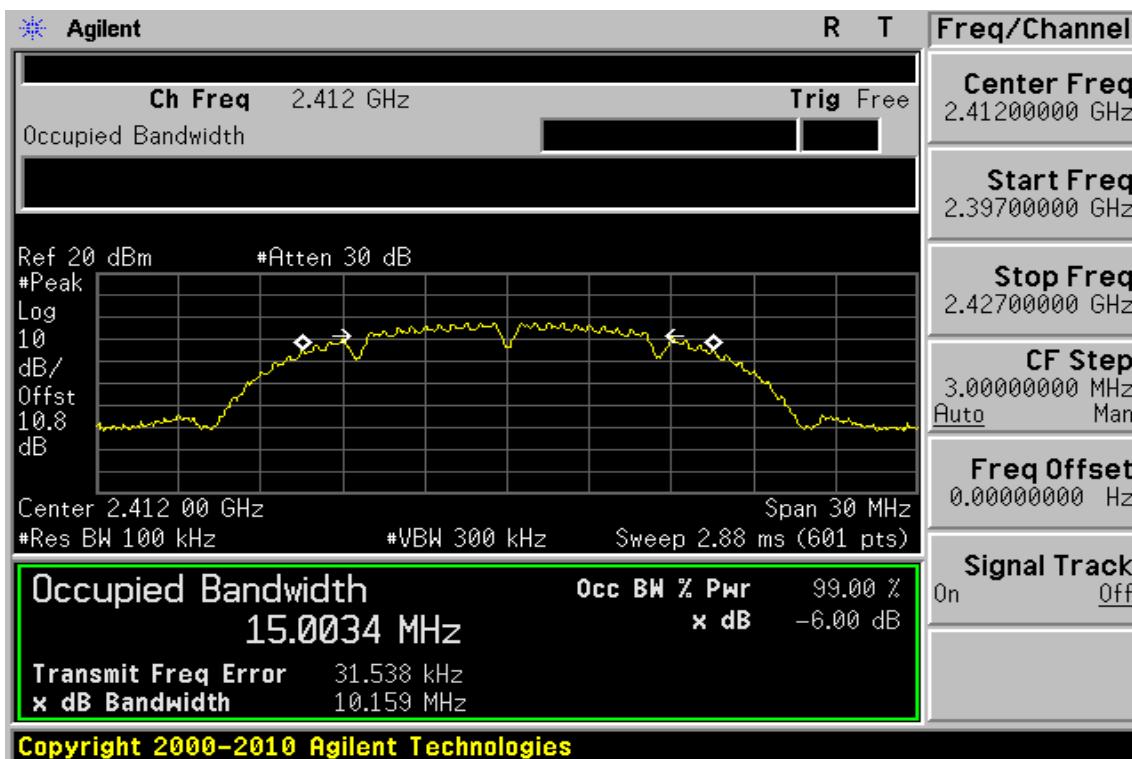
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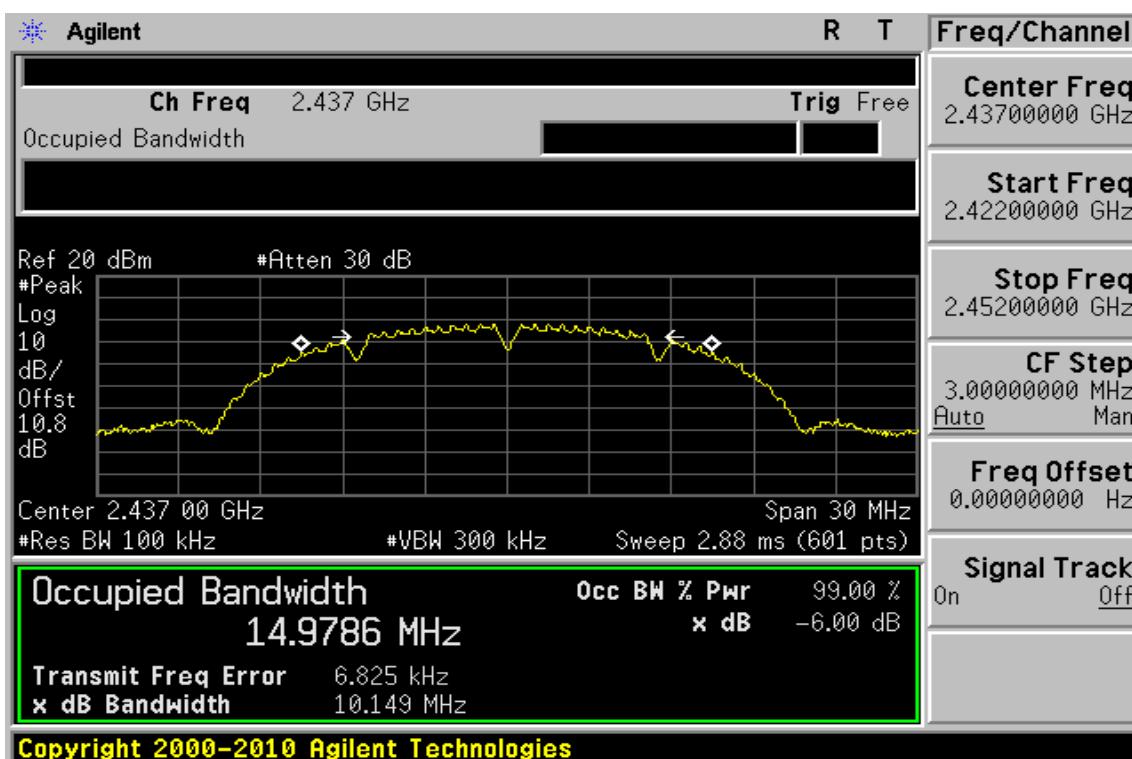
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## 802.11b

## 6dB Band Width Test Data CH-Low



## 6dB Band Width Test Data CH-Mid



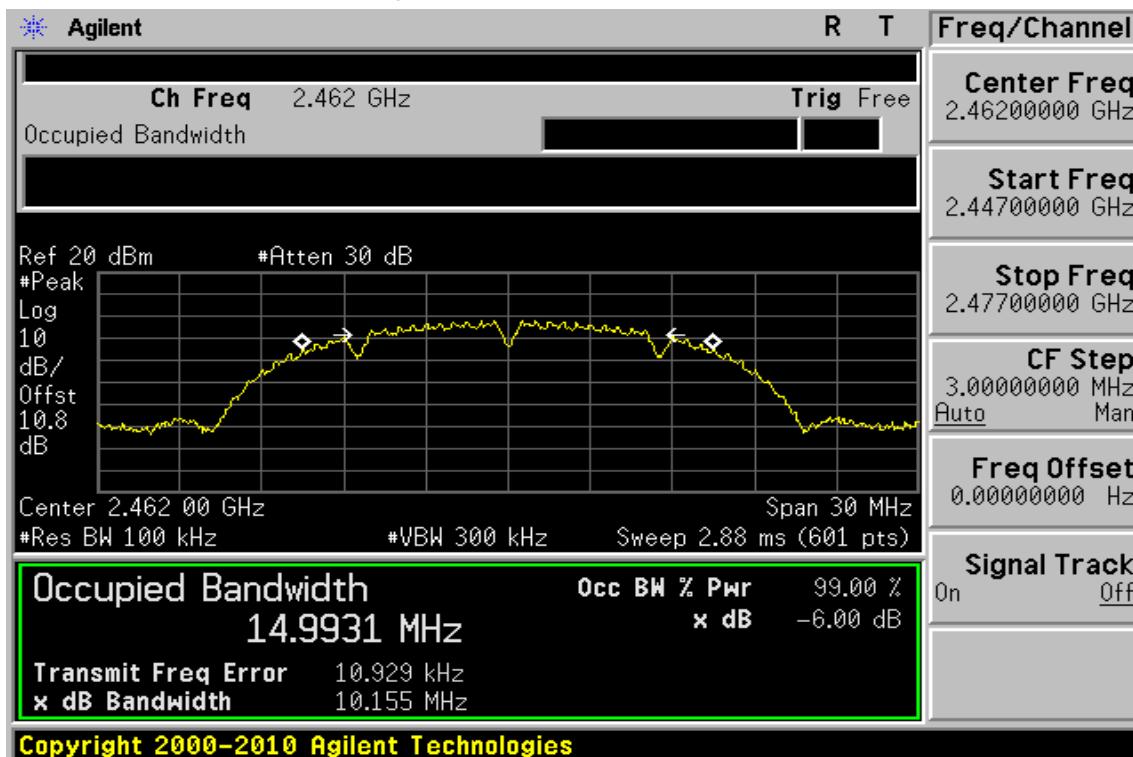
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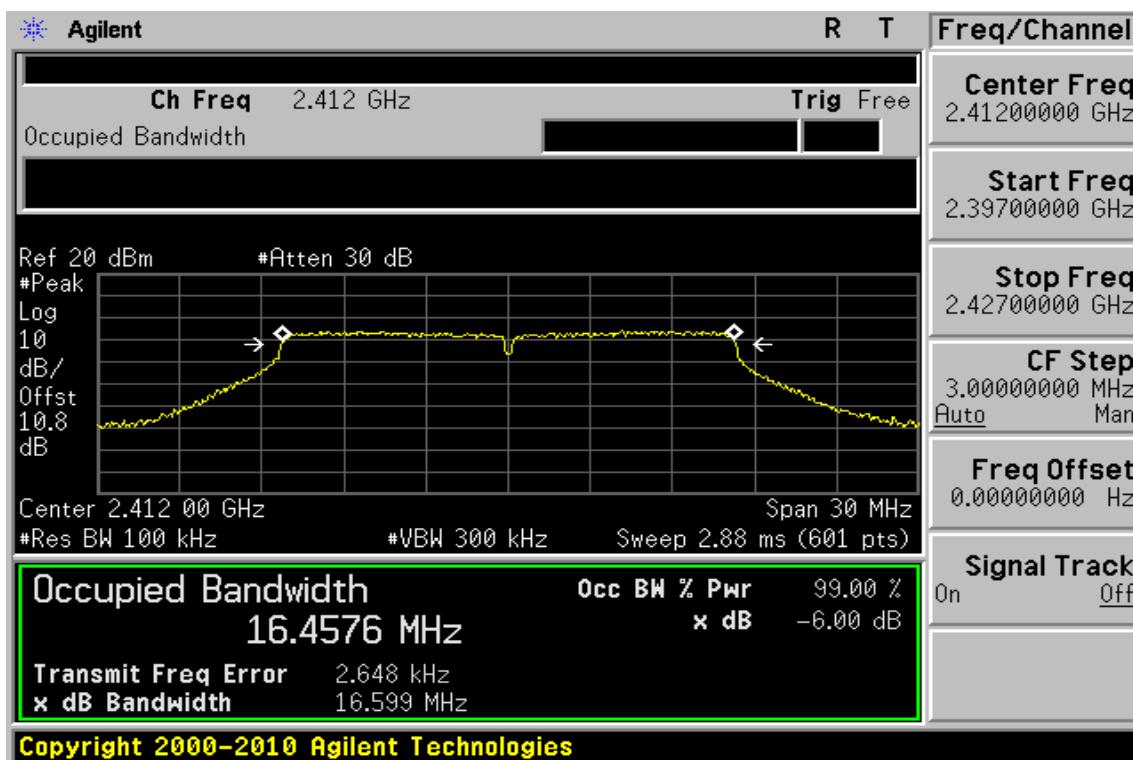
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## 6dB Band Width Test Data CH-High



## 802.11g

## 6dB Band Width Test Data CH-Low

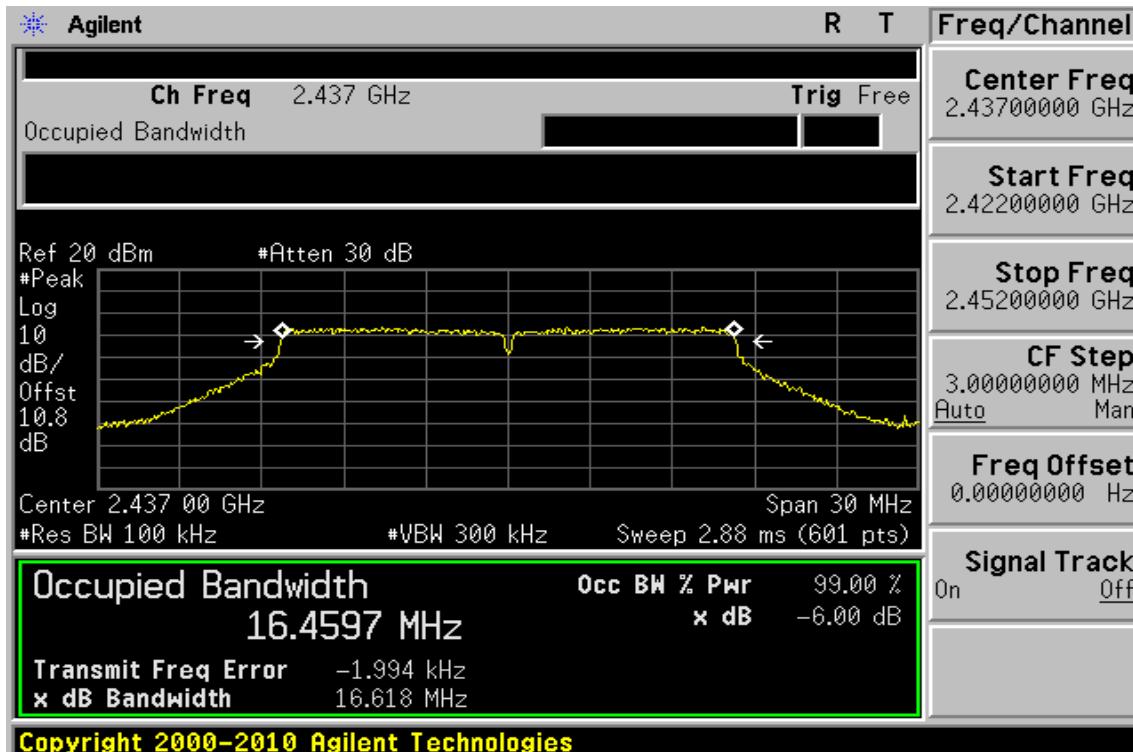


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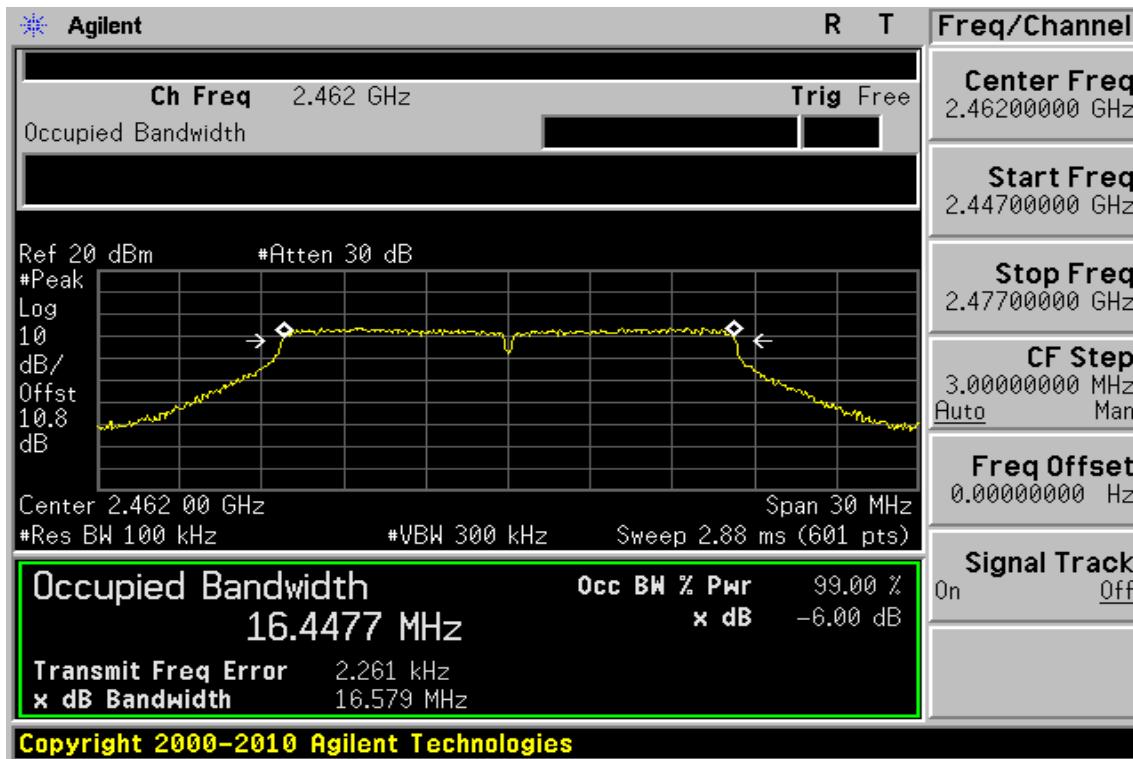
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## 6dB Band Width Test Data CH-Mid



## 6dB Band Width Test Data CH-High



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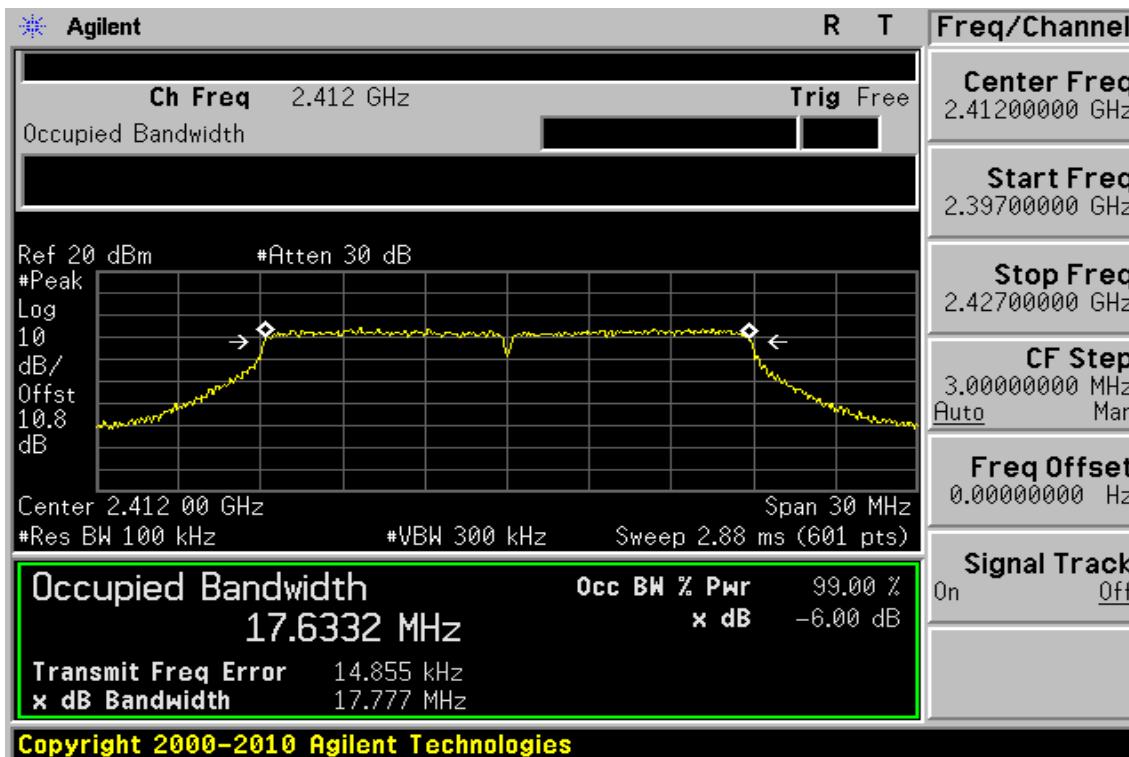
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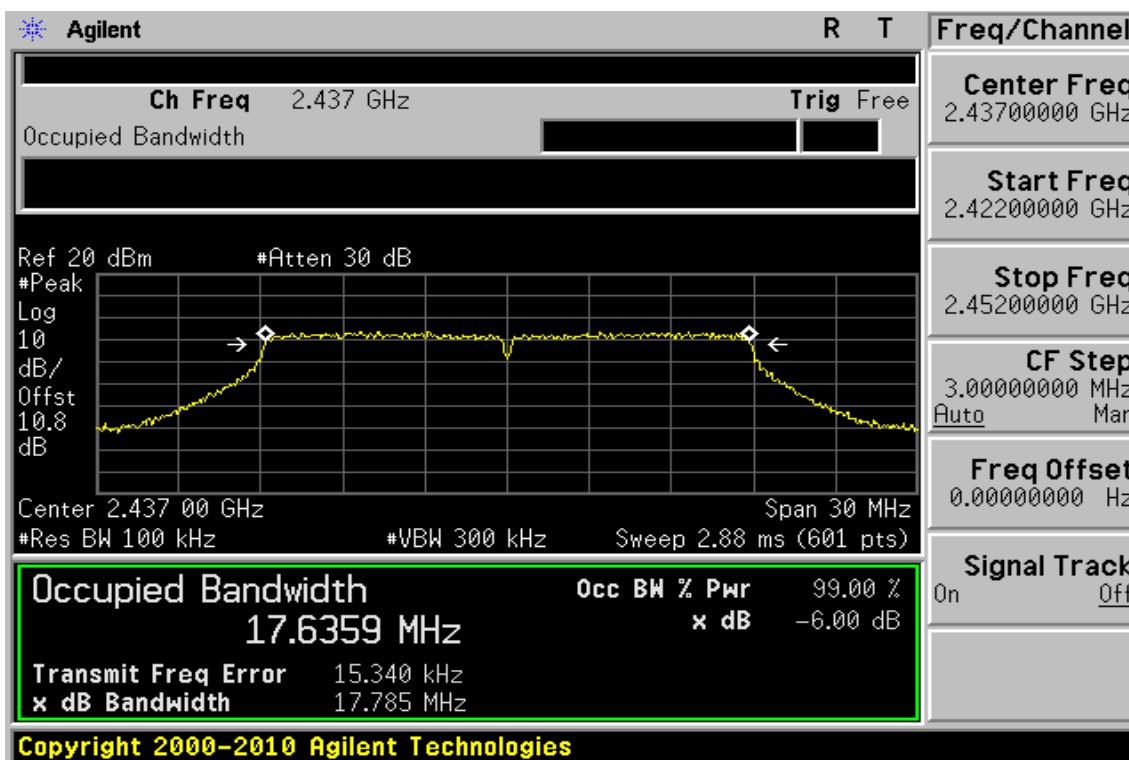
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## 802.11n\_20M (2.4GHz)

## 6dB Band Width Test Data CH-Low



## 6dB Band Width Test Data CH-Mid



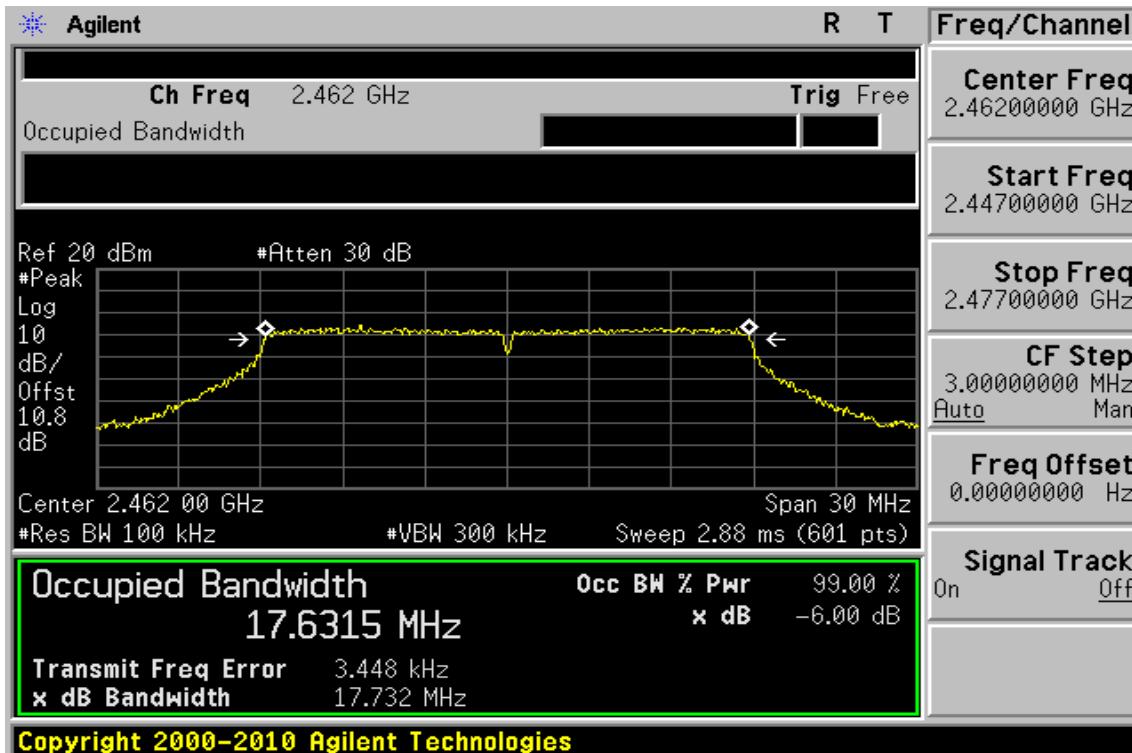
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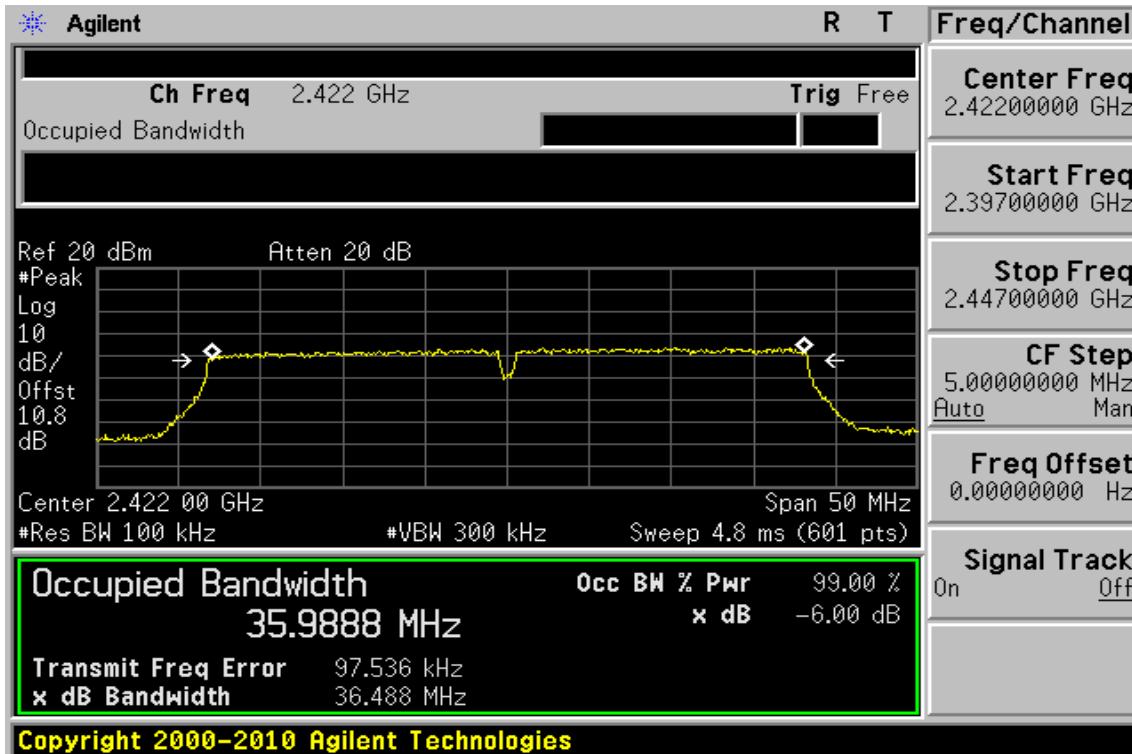
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## 6dB Band Width Test Data CH-High



## 802.11n\_40M (2.4GHz)

## 6dB Band Width Test Data CH-Low



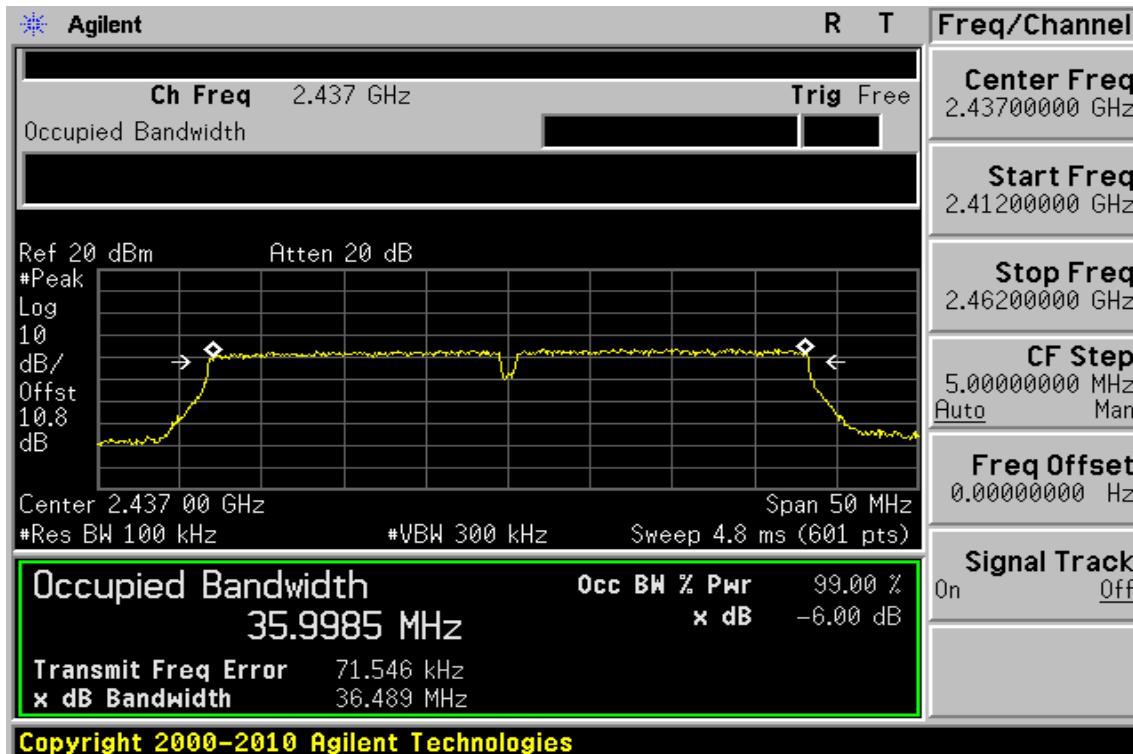
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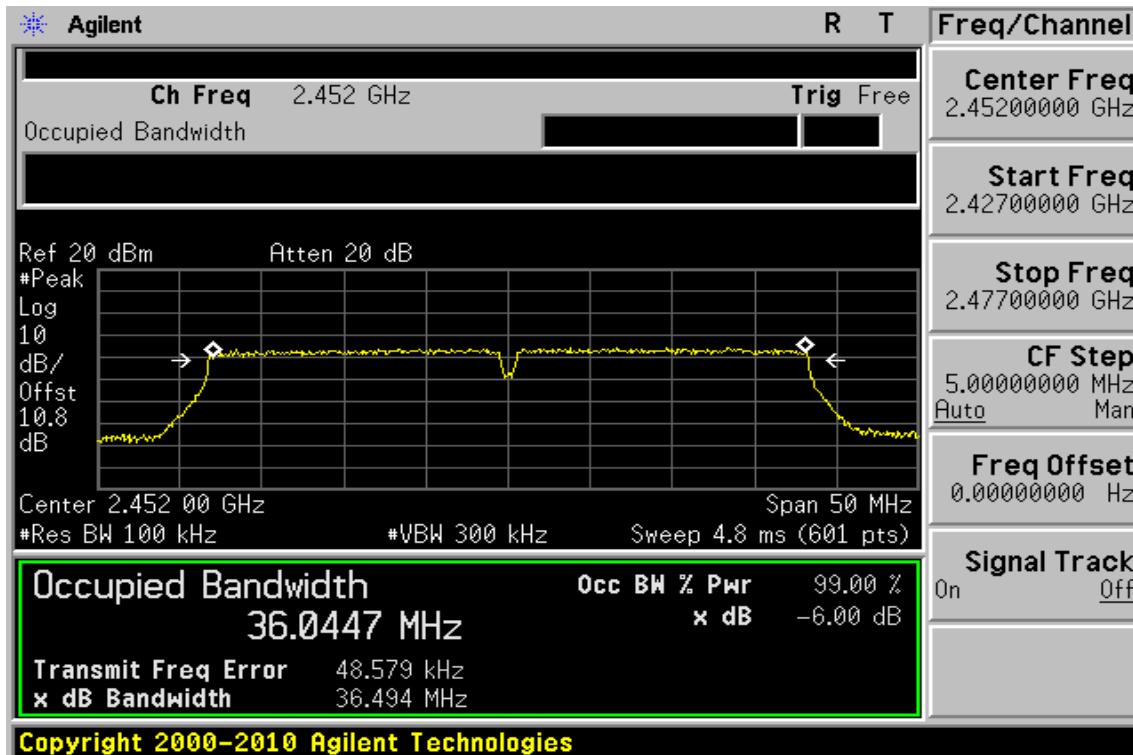
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## 6dB Band Width Test Data CH-Mid



## 6dB Band Width Test Data CH-High



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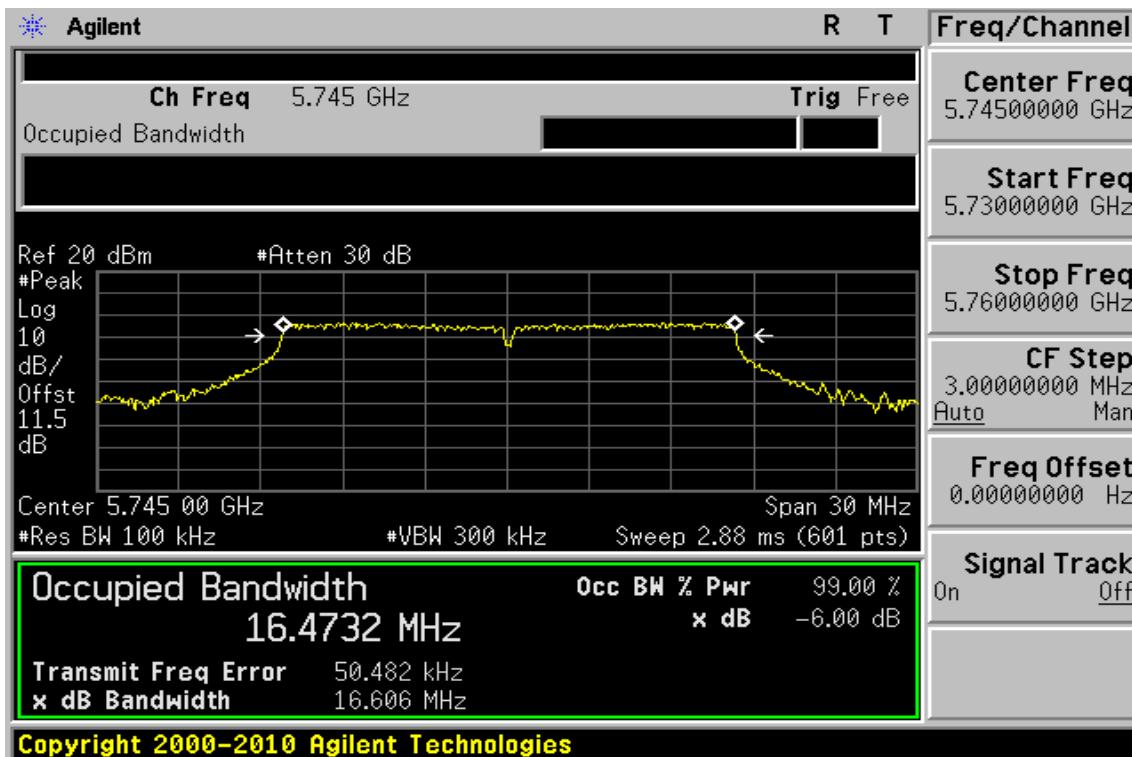
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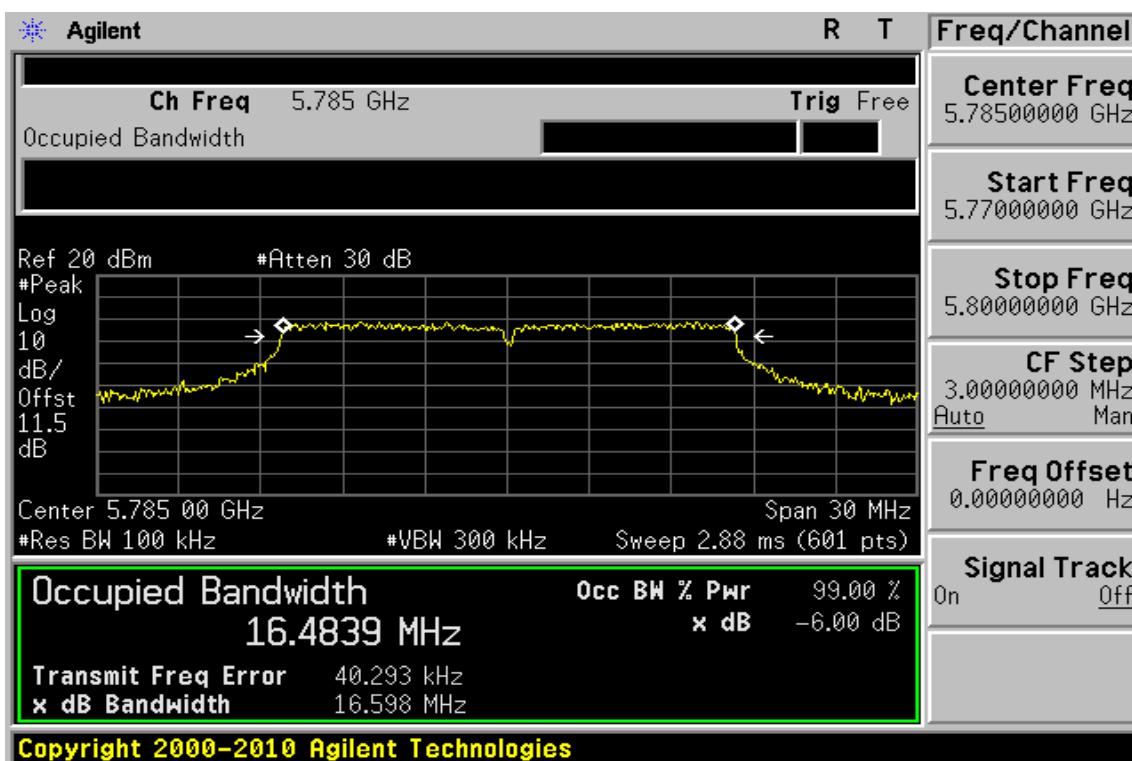
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## 802.11a

## 6dB Band Width Test Data CH-Low



## 6dB Band Width Test Data CH-Mid



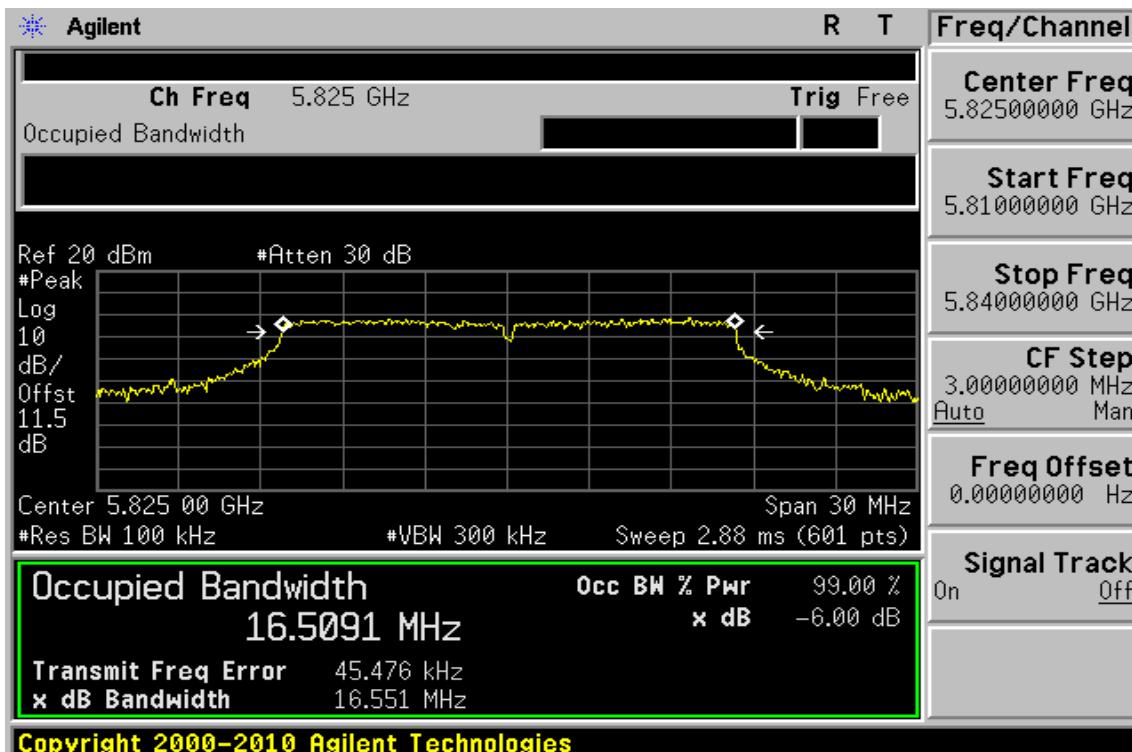
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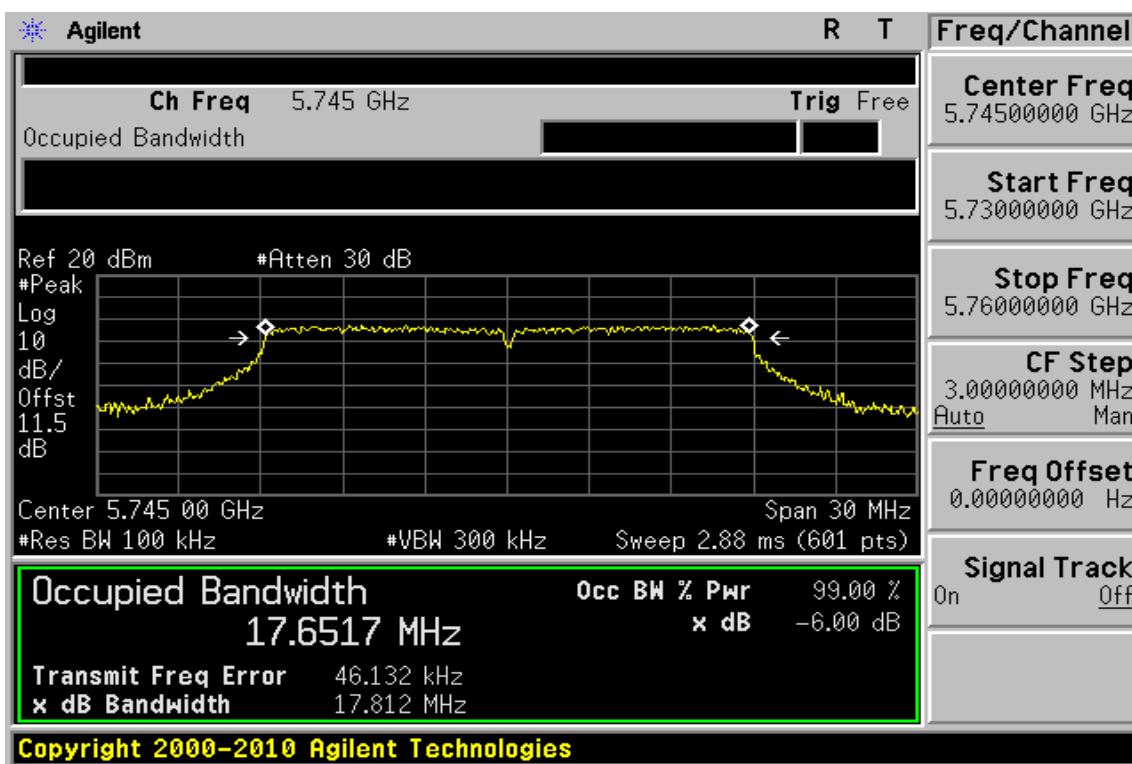
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## 6dB Band Width Test Data CH-High



## 802.11n (5GHz)\_20M

## 6dB Band Width Test Data CH-Low

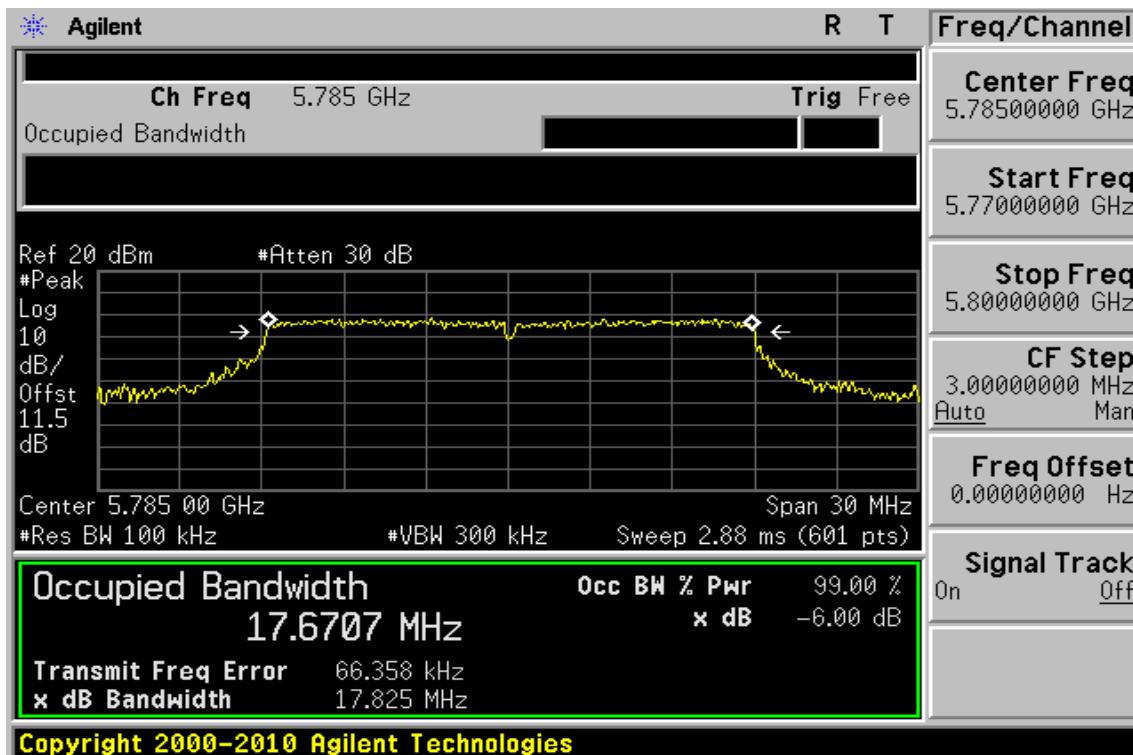


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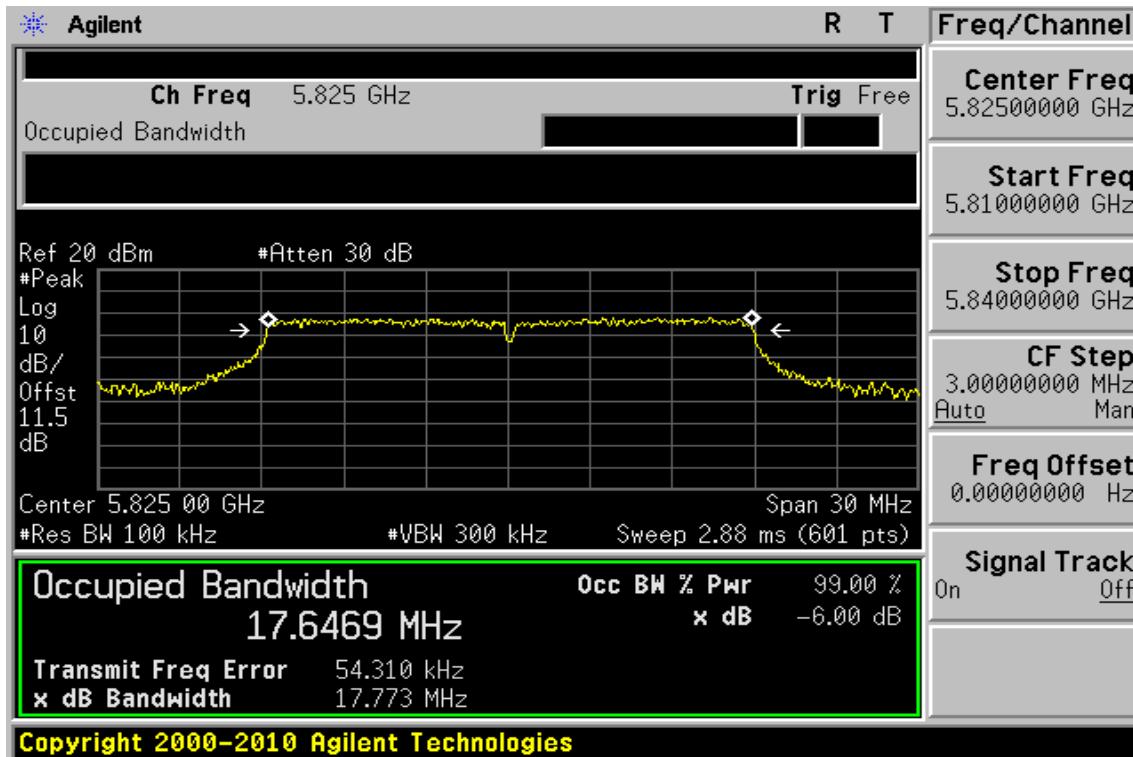
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## 6dB Band Width Test Data CH-Mid



## 6dB Band Width Test Data CH-High

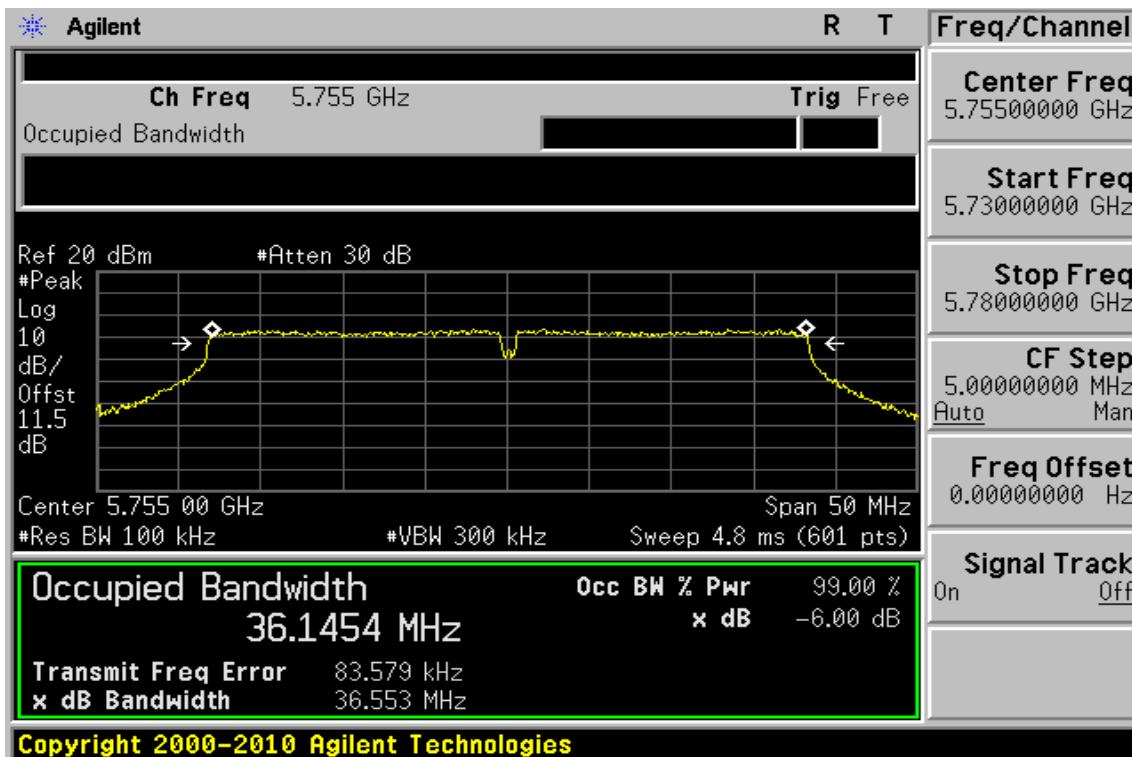
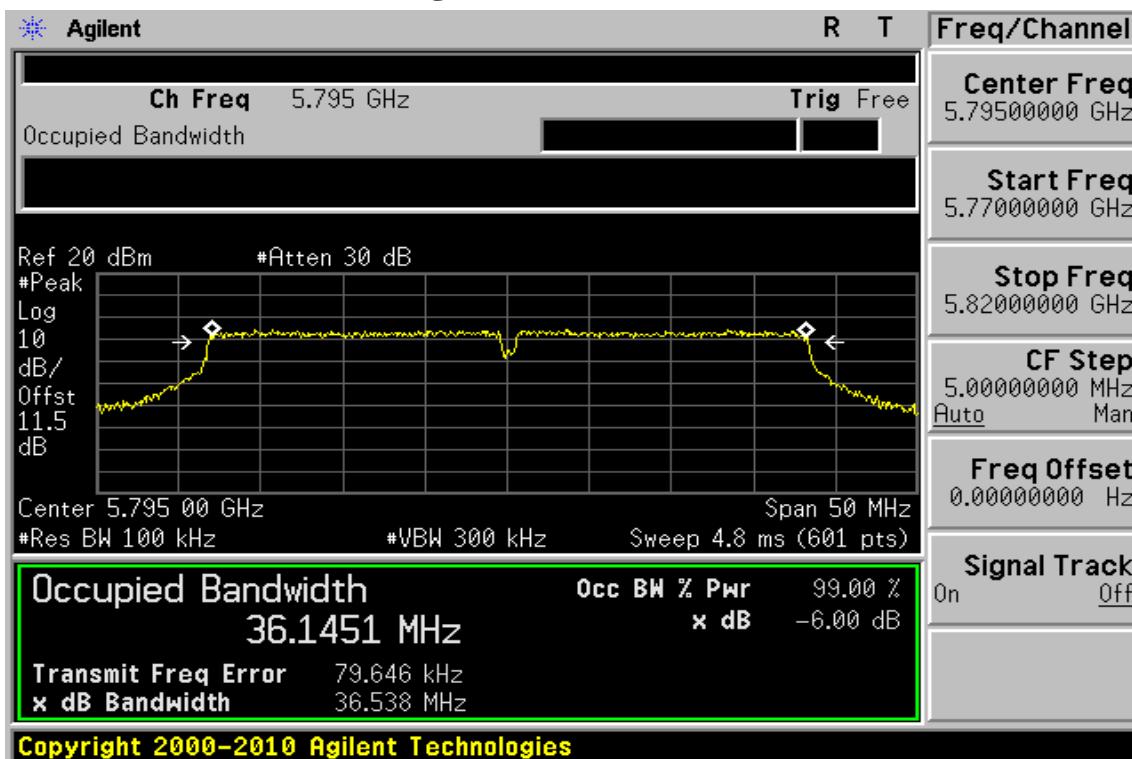


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**802.11n (5GHz)\_40M****6dB Band Width Test Data CH-Low****6dB Band Width Test Data CH-High**

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## 9 BAND EDGES MEASUREMENT

### 9.1 Standard Applicable:

According to §15.247(d), in any 100 kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power. 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).

### 9.2 Measurement Equipment Used:

#### 9.2.1 Conducted Emission at antenna port:

Refer to section 7.2 for details.

#### 9.2.2 Radiated emission:

966 Chamber					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
EMI Test Receiver	R&S	ESCI7	100759	02/08/2013	02/07/2014
Spectrum Analyzer	Agilent	E4446A	MY51100003	05/30/2013	05/29/2014
EXA Spectrum Analyzer	Agilent	N9010A	MY50420195	02/06/2013	02/07/2014
Spectrum Analyzer	R&S	FSV-30	101398	10/18/2011	10/17/2013
Bilog Antenna	SCHWAZBECK	VULB9168	378	01/10/2012	01/09/2014
Horn antenna	ETS.LINDGREN	3117	123995	05/31/2013	05/30/2014
Horn Antenna	Schwarzbeck	BBHA9170	184	01/17/2012	01/16/2014
Pre-Amplifier	Agilent	8447D	2944A07676	01/04/2013	01/03/2014
Pre-Amplifier	EMC Instruments Corp.	EMC0126530	980038	01/04/2013	01/03/2014
Filter 2400-2483.5 MHz	EWT	EWT-14-0166	M2	02/28/2013	02/28/2014
Attenuator	Mini-Circuit	BW-S10W2+	004	02/28/2013	02/27/2014
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	01/04/2013	01/03/2014
3m Site NSA	SGS	966 chamber	N/A	07/15/2013	07/14/2014

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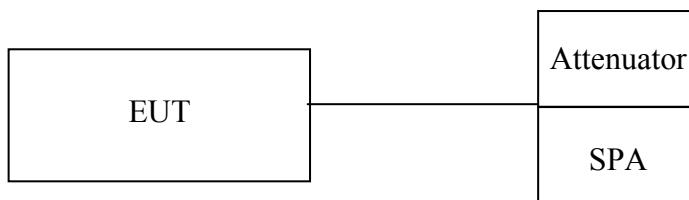
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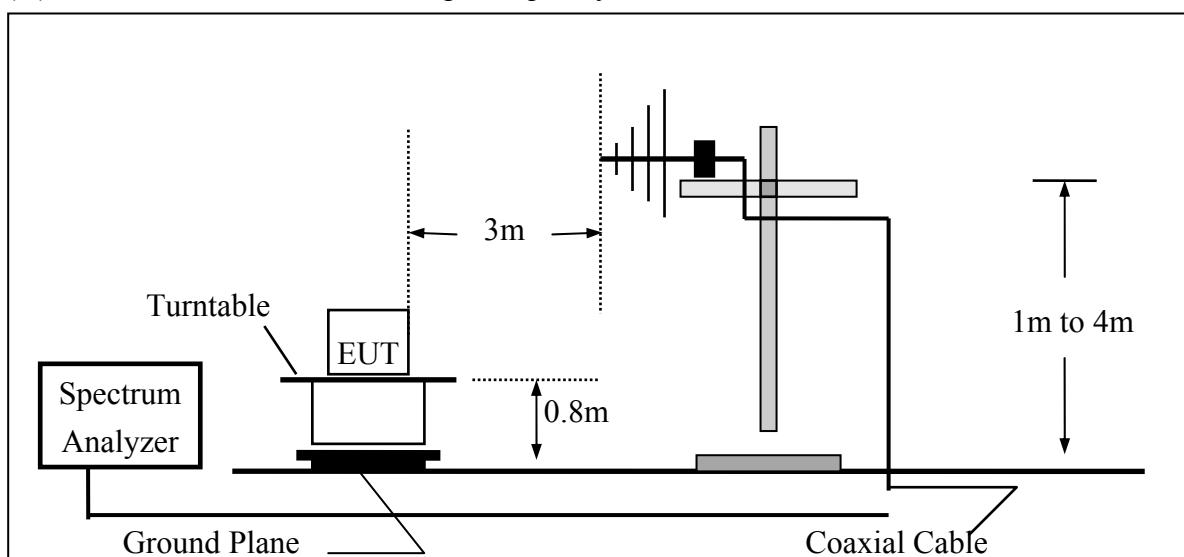
### 9.3 Test SET-UP:

#### 9.3.1 Conducted Emission at antenna port:

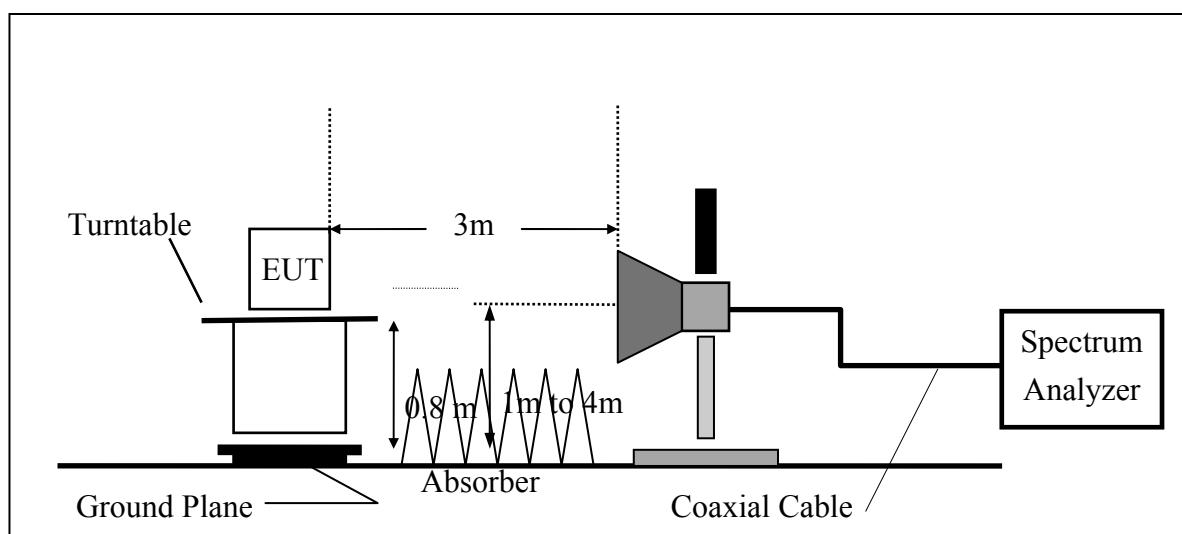


#### 9.3.2 Radiated emission:

##### (A) Radiated Emission Test Set-Up, Frequency Below 1000MHz



##### (B) Radiated Emission Test Set-Up Frequency Over 1 GHz



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#### 9.4 Measurement Procedure:

Unwanted Emissions into Non-Restricted Frequency Bands, Measurement Procedure followed by 11.1 of KDB558074 D01

1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set start to edge frequency, and stop frequency of spectrum analyzer so as to encompass the spectrum to be examined.
4. Set the spectrum analyzer as RBW, VBW=300KHz, Detector = Peak, Sweep = auto
5. Mark the highest reading of the emission as the reference level measurement.
6. Set DL as the limit = reading on marker 1 – 20dBm
7. 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.
8. Repeat above procedures until all default test channel (low, middle, and high) was complete.

Unwanted Emission falling into Restricted Frequency Bands, Measurement Procedure followed by 12.1 of KDB558074 D01

1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. The turn table shall rotate 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emissions.
4. 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.
5. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
6. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
7. On spectrum, following 8.1.2, and RBW = 1MHz, VBW = 3MHz, & Marker 2390MHz, and 2483.5MHz (Peak Measurement). Average Measurement: following 8.2 with the modification span to 1MHz, & RBW = 1MHz, VBW = 3MHz and peak marker function to obtain the highest reading on 2390, and 2483.5MHz.
8. Repeat above procedures until all default test channel (low, middle, and high) was complete

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## 9.5 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		

## 9.6 Measurement Result:

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

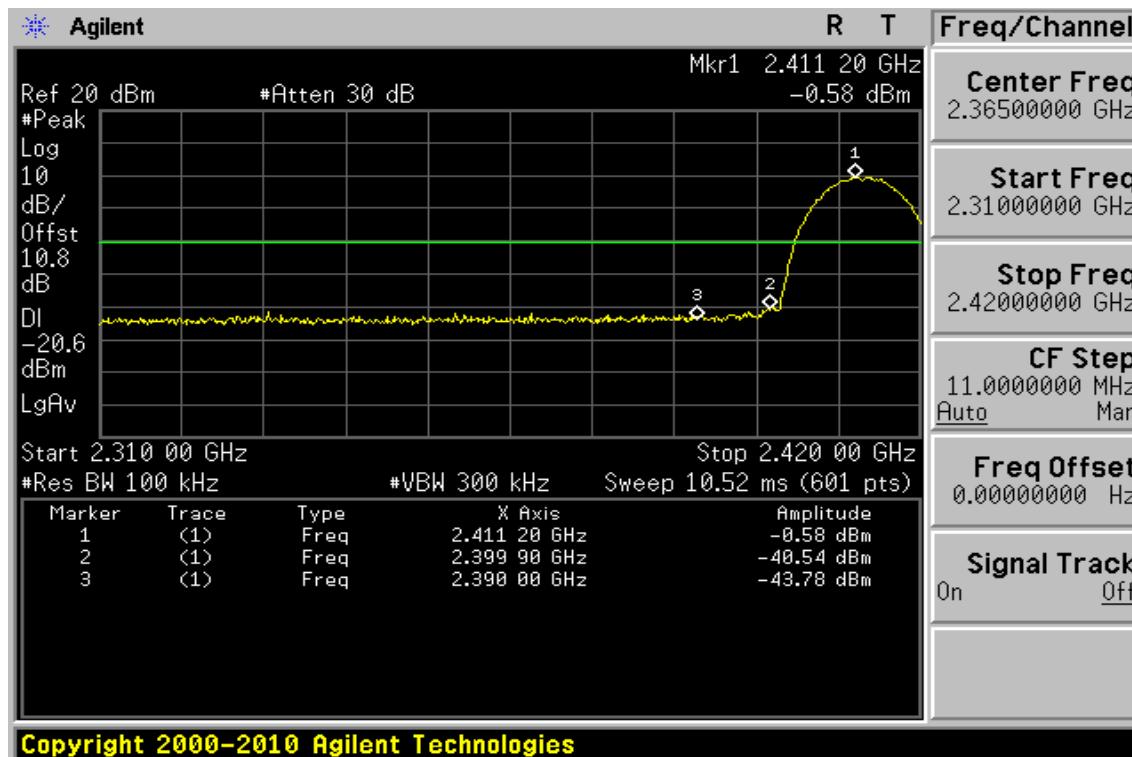
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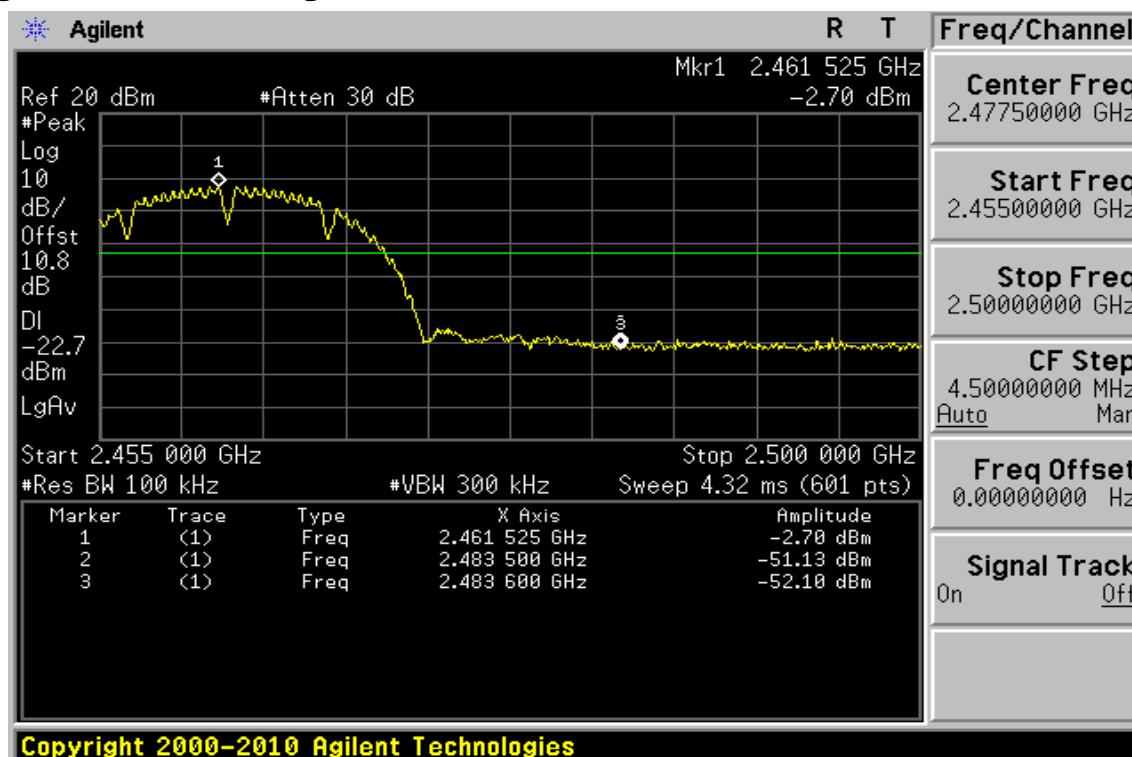
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## 802.11b - Unwanted Emissions into Non-Restricted Frequency Bands

## Band Edges Test Data CH-Low



## Band Edges Test Data CH-High



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**Radiated Emission:**

(Unwanted Emissions into Restricted Frequency Bands): 802.11 b mode

Operation Band	:802.11 b	Test Date	:2013-09-17
Fundamental Frequency	:2412 MHz	Temp./Humi.	:25.6 deg_C / 58 RH
Operation Mode	:Bandedge LOW	Engineer	:Allen
EUT Pol.	:H PLAN	Measurement Antenna Pol.	:VERTICAL

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.

The trace on RE(radiation emission) plot is as colored blue, and the detection manner we've employed is peak detector.

Freq.	Note	Detector	Spectrum		Factor	Actual	Limit	Margin
			Mode	Reading Level				
MHz	F/H/E/S	PK/QP/AV	dB $\mu$ V	dB	dB $\mu$ V/m	dB $\mu$ V/m	dB	
2390.00	E	Peak	45.68	2.51	48.19	74.00	-25.81	
2390.00	E	Average	32.19	2.51	34.70	54.00	-19.30	

Operation Band	:802.11 b	Test Date	:2013-09-17
Fundamental Frequency	:2412 MHz	Temp./Humi.	:25.6 deg_C / 58 RH
Operation Mode	:Bandedge LOW	Engineer	:Allen
EUT Pol.	:H PLAN	Measurement Antenna Pol.	:HORIZONTAL

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.

The trace on RE(radiation emission) plot is as colored blue, and the detection manner we've employed is peak detector.

Freq.	Note	Detector	Spectrum		Factor	Actual	Limit	Margin
			Mode	Reading Level				
MHz	F/H/E/S	PK/QP/AV	dB $\mu$ V	dB	dB $\mu$ V/m	dB $\mu$ V/m	dB	
2390.00	E	Peak	44.11	3.13	47.24	74.00	-26.76	
2390.00	E	Average	32.12	3.13	35.25	54.00	-18.75	

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Operation Band	:802.11 b	Test Date	:2013-09-17
Fundamental Frequency	:2462 MHz	Temp./Humi.	:25.6 deg_C / 58 RH
Operation Mode	:Bandedge HIGH	Engineer	:Allen
EUT Pol.	:H PLAN	Measurement Antenna Pol.	:VERTICAL

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.

The trace on RE(radiation emission) plot is as colored blue, and the detection manner we've employed is peak detector.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
			Mode			FS	@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	Peak	43.58	2.87	46.45	74.00	-27.55
2483.50	E	Average	30.91	2.87	33.78	54.00	-20.22

Operation Band	:802.11 b	Test Date	:2013-09-17
Fundamental Frequency	:2462 MHz	Temp./Humi.	:25.6 deg_C / 58 RH
Operation Mode	:Bandedge HIGH	Engineer	:Allen
EUT Pol.	:H PLAN	Measurement Antenna Pol.	:HORIZONTAL

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.

The trace on RE(radiation emission) plot is as colored blue, and the detection manner we've employed is peak detector.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
			Mode			FS	@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	Peak	43.03	3.90	46.93	74.00	-27.07
2483.50	E	Average	30.70	3.90	34.60	54.00	-19.40

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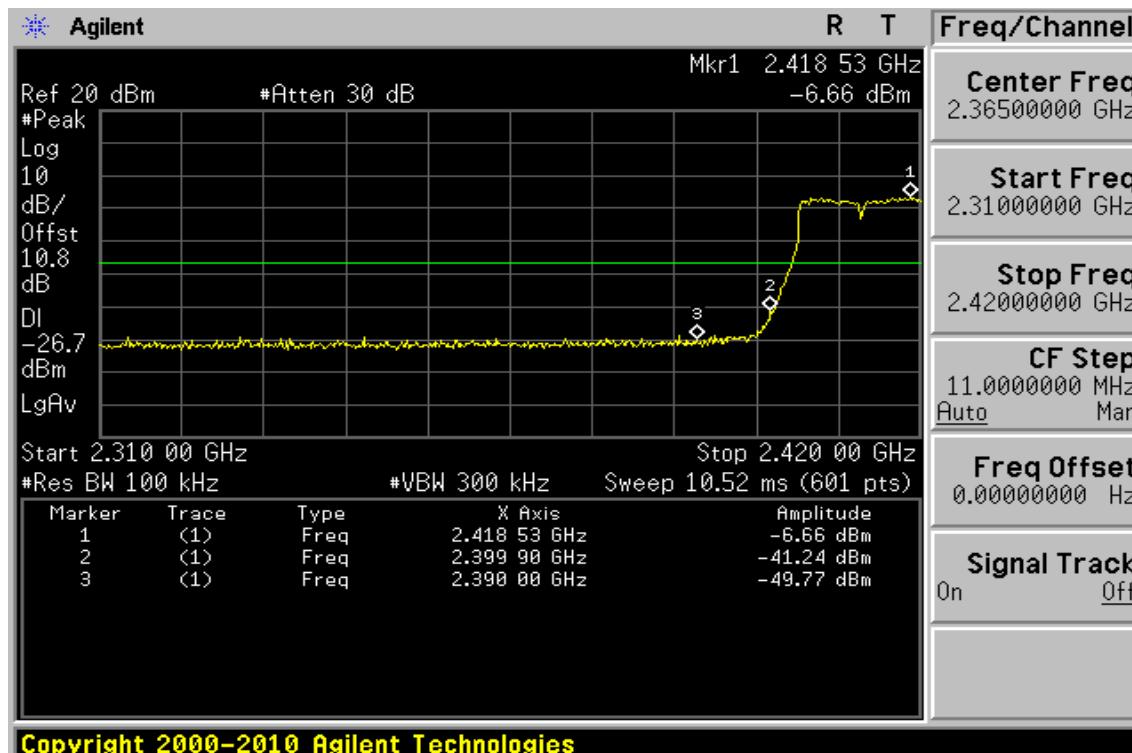
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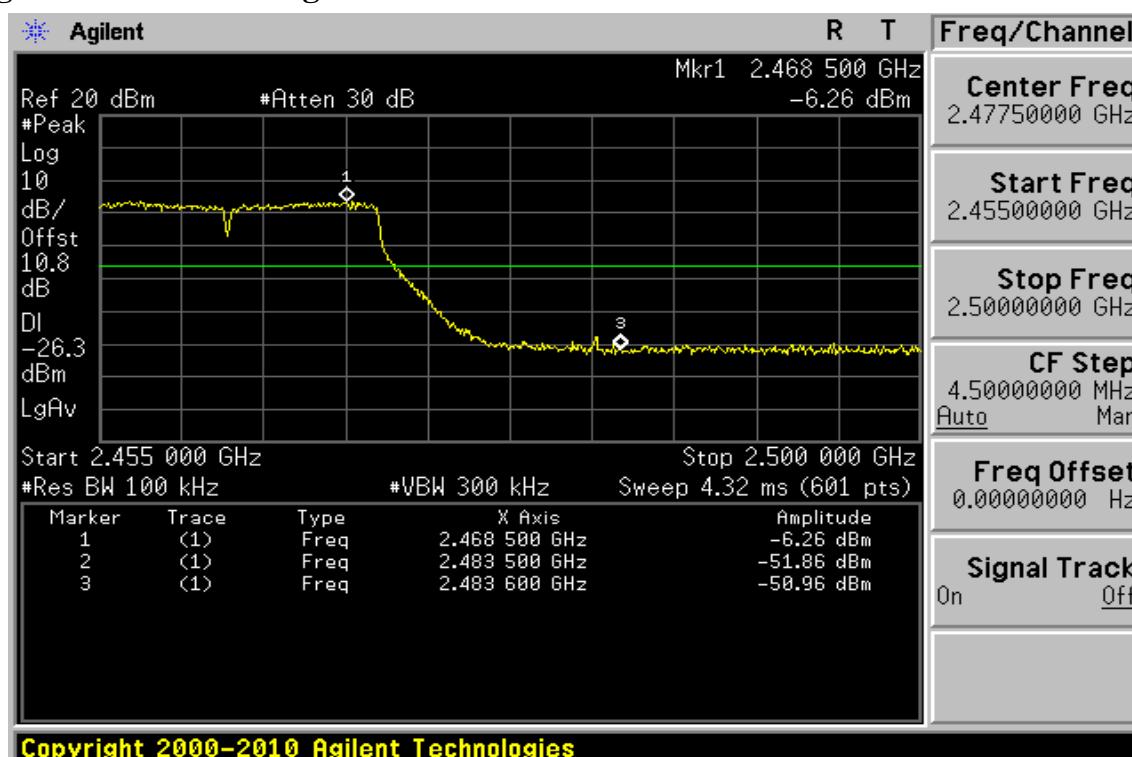
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## 802.11g - Unwanted Emissions into Non-Restricted Frequency Bands

## Band Edges Test Data CH-Low



## Band Edges Test Data CH-High



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## Radiated Emission:

(Unwanted Emissions into Restricted Frequency Bands): 802.11 g mode

Operation Band	:802.11 g	Test Date	:2013-09-17
Fundamental Frequency	:2412 MHz	Temp./Humi.	:25.6 deg_C / 58 RH
Operation Mode	:Bandedge LOW	Engineer	:Allen
EUT Pol.	:H PLAN	Measurement Antenna Pol.	:VERTICAL

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.

The trace on RE(radiation emission) plot is as colored blue, and the detection manner we've employed is peak detector.

Freq.	Note	Detector	Spectrum		Factor	Actual	Limit	Margin
			Mode	Reading Level				
MHz	F/H/E/S	PK/QP/AV	dB $\mu$ V	dB	dB $\mu$ V/m	dB $\mu$ V/m	dB	
2390.00	E	Peak	45.87	2.51	48.38	74.00	-25.62	
2390.00	E	Average	32.03	2.51	34.54	54.00	-19.46	

Operation Band	:802.11 g	Test Date	:2013-09-17
Fundamental Frequency	:2412 MHz	Temp./Humi.	:25.6 deg_C / 58 RH
Operation Mode	:Bandedge LOW	Engineer	:Allen
EUT Pol.	:H PLAN	Measurement Antenna Pol.	:HORIZONTAL

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.

The trace on RE(radiation emission) plot is as colored blue, and the detection manner we've employed is peak detector.

Freq.	Note	Detector	Spectrum		Factor	Actual	Limit	Margin
			Mode	Reading Level				
MHz	F/H/E/S	PK/QP/AV	dB $\mu$ V	dB	dB $\mu$ V/m	dB $\mu$ V/m	dB	
2390.00	E	Peak	44.86	3.13	47.99	74.00	-26.01	
2390.00	E	Average	31.50	3.13	34.63	54.00	-19.37	

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Operation Band	:802.11 g	Test Date	:2013-09-17
Fundamental Frequency	:2462 MHz	Temp./Humi.	:25.6 deg_C / 58 RH
Operation Mode	:Bandedge HIGH	Engineer	:Allen
EUT Pol.	:H PLAN	Measurement Antenna Pol.	:VERTICAL

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.

The trace on RE(radiation emission) plot is as colored blue, and the detection manner we've employed is peak detector.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
			Mode			FS	@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	Peak	46.19	2.87	49.06	74.00	-24.94
2483.50	E	Average	33.05	2.87	35.92	54.00	-18.08

Operation Band	:802.11 g	Test Date	:2013-09-17
Fundamental Frequency	:2462 MHz	Temp./Humi.	:25.6 deg_C / 58 RH
Operation Mode	:Bandedge HIGH	Engineer	:Allen
EUT Pol.	:H PLAN	Measurement Antenna Pol.	:HORIZONTAL

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.

The trace on RE(radiation emission) plot is as colored blue, and the detection manner we've employed is peak detector.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
			Mode			FS	@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	Peak	45.08	3.90	48.98	74.00	-25.02
2483.50	E	Average	33.10	3.90	37.00	54.00	-17.00

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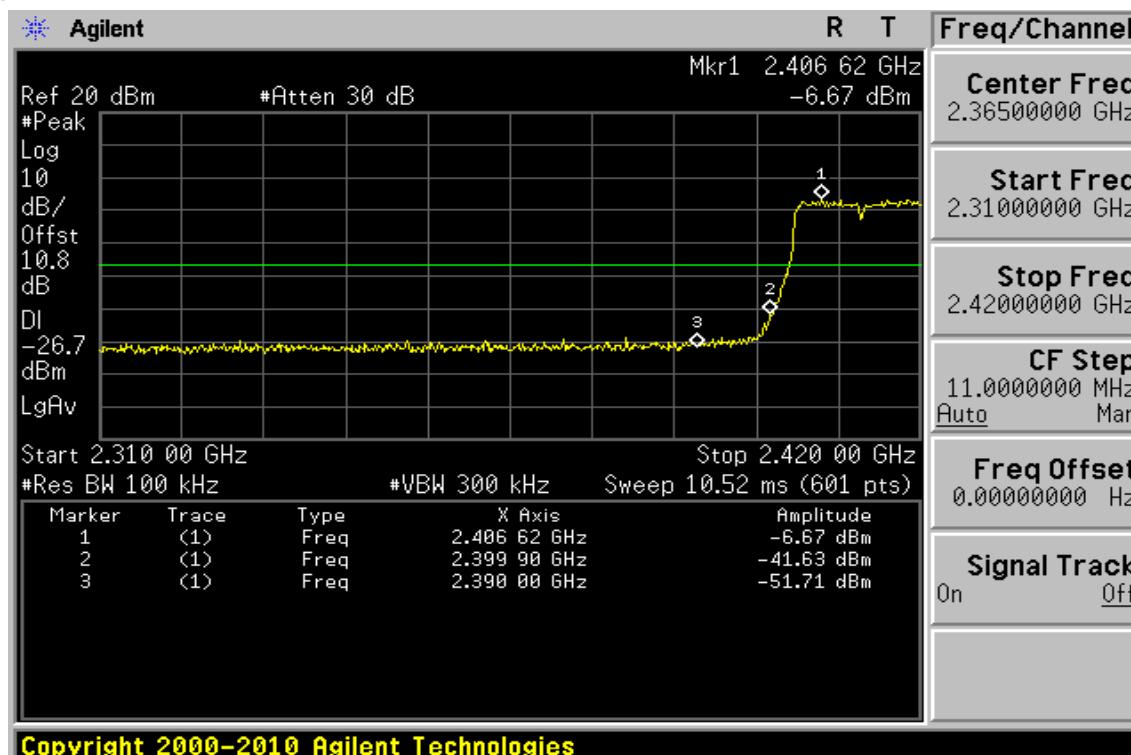
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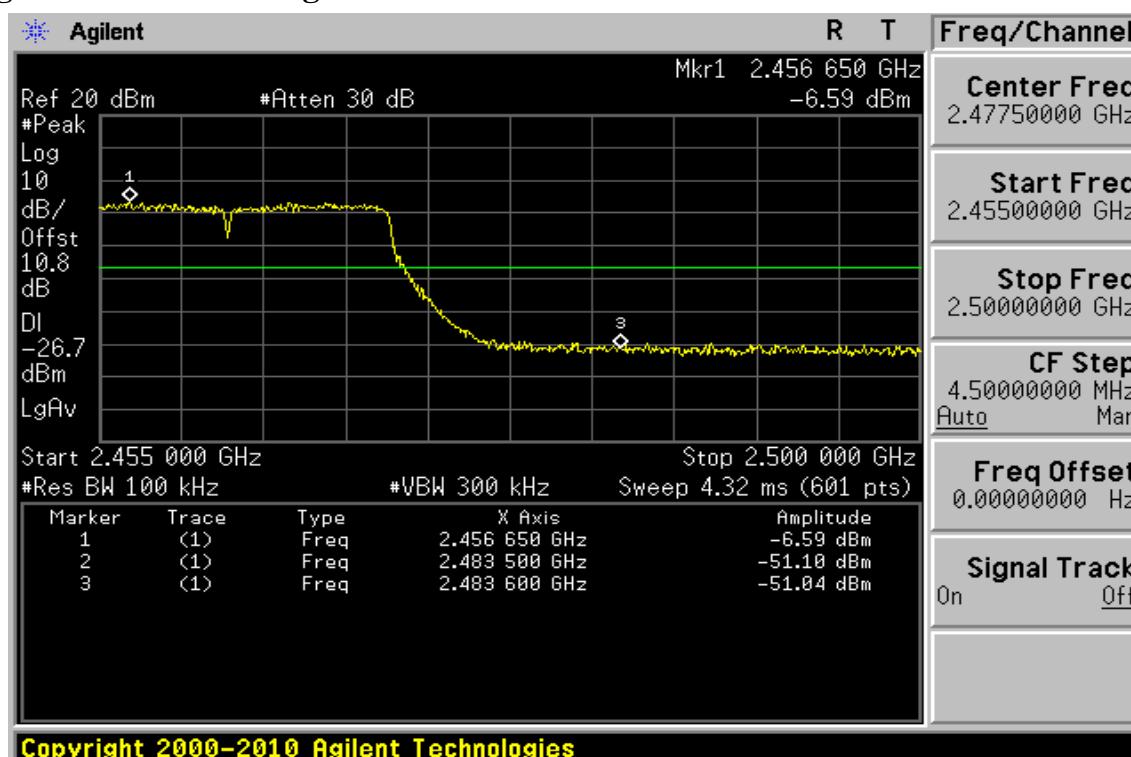
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## **802.11n\_20M (2.4GHz) - Unwanted Emissions into Non-Restricted Frequency Bands Band Edges Test Data CH-Low**



## Band Edges Test Data CH-High



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## Radiated Emission:

(Unwanted Emissions into Restricted Frequency Bands): 802.11 n\_20M mode

Operation Band	:802.11 n20M	Test Date	:2013-09-17
Fundamental Frequency	:2412 MHz	Temp./Humi.	:25.6 deg_C / 58 RH
Operation Mode	:Bandedge LOW	Engineer	:Allen
EUT Pol.	:H PLAN	Measurement Antenna Pol.	:VERTICAL

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.

The trace on RE(radiation emission) plot is as colored blue, and the detection manner we've employed is peak detector.

Freq.	Note	Detector	Spectrum		Factor	Actual	Limit	Margin
			Mode	Reading Level				
MHz	F/H/E/S	PK/QP/AV	dB $\mu$ V	dB	dB $\mu$ V/m	dB $\mu$ V/m	dB	
2390.00	E	Peak	47.44	2.51	49.95	74.00	-24.05	
2390.00	E	Average	33.14	2.51	35.65	54.00	-18.35	

Operation Band	:802.11 n20M	Test Date	:2013-09-17
Fundamental Frequency	:2412 MHz	Temp./Humi.	:25.6 deg_C / 58 RH
Operation Mode	:Bandedge LOW	Engineer	:Allen
EUT Pol.	:H PLAN	Measurement Antenna Pol.	:HORIZONTAL

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.

The trace on RE(radiation emission) plot is as colored blue, and the detection manner we've employed is peak detector.

Freq.	Note	Detector	Spectrum		Factor	Actual	Limit	Margin
			Mode	Reading Level				
MHz	F/H/E/S	PK/QP/AV	dB $\mu$ V	dB	dB $\mu$ V/m	dB $\mu$ V/m	dB	
2390.00	E	Peak	45.88	3.13	49.01	74.00	-24.99	
2390.00	E	Average	31.80	3.13	34.93	54.00	-19.07	

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Operation Band	:802.11 n20M	Test Date	:2013-09-17
Fundamental Frequency	:2462 MHz	Temp./Humi.	:25.6 deg_C / 58 RH
Operation Mode	:Bandedge HIGH	Engineer	:Allen
EUT Pol.	:H PLAN	Measurement Antenna Pol.	:VERTICAL

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.

The trace on RE(radiation emission) plot is as colored blue, and the detection manner we've employed is peak detector.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
			Mode			FS	@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	Peak	45.79	2.87	48.66	74.00	-25.34
2483.50	E	Average	32.20	2.87	35.07	54.00	-18.93

Operation Band	:802.11 n20M	Test Date	:2013-09-17
Fundamental Frequency	:2462 MHz	Temp./Humi.	:25.6 deg_C / 58 RH
Operation Mode	:Bandedge HIGH	Engineer	:Allen
EUT Pol.	:H PLAN	Measurement Antenna Pol.	:HORIZONTAL

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.

The trace on RE(radiation emission) plot is as colored blue, and the detection manner we've employed is peak detector.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
			Mode			FS	@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	Peak	45.83	3.90	49.73	74.00	-24.27
2483.50	E	Average	31.87	3.90	35.77	54.00	-18.23

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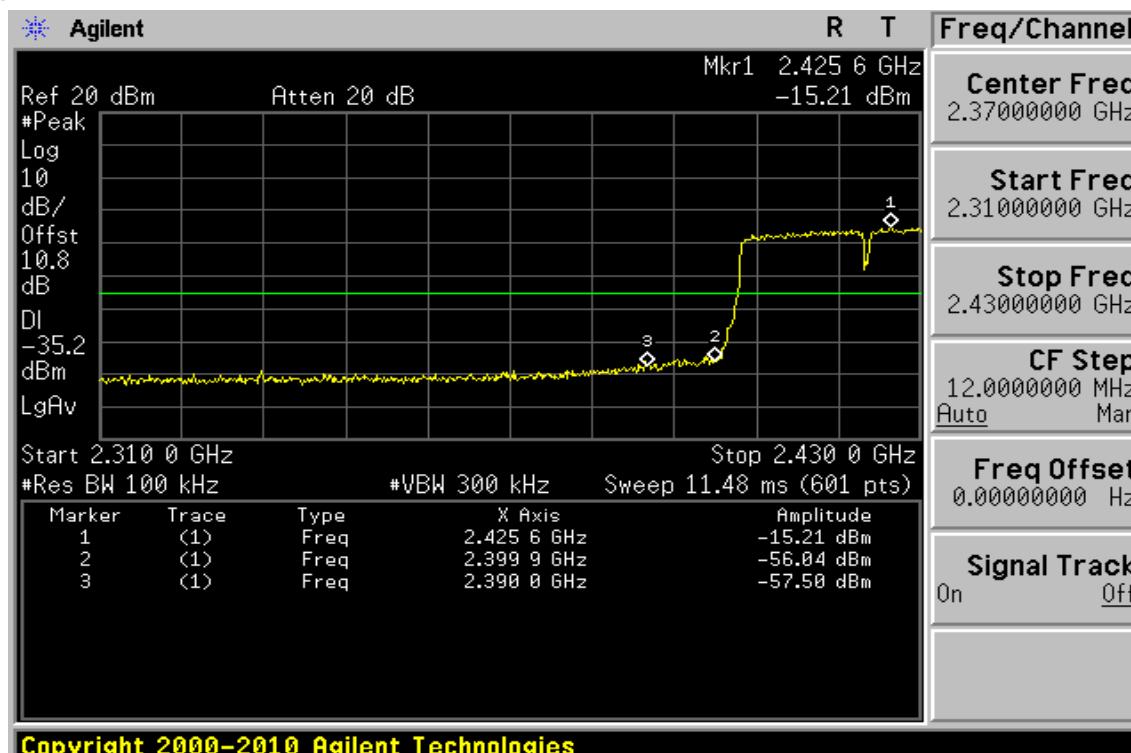
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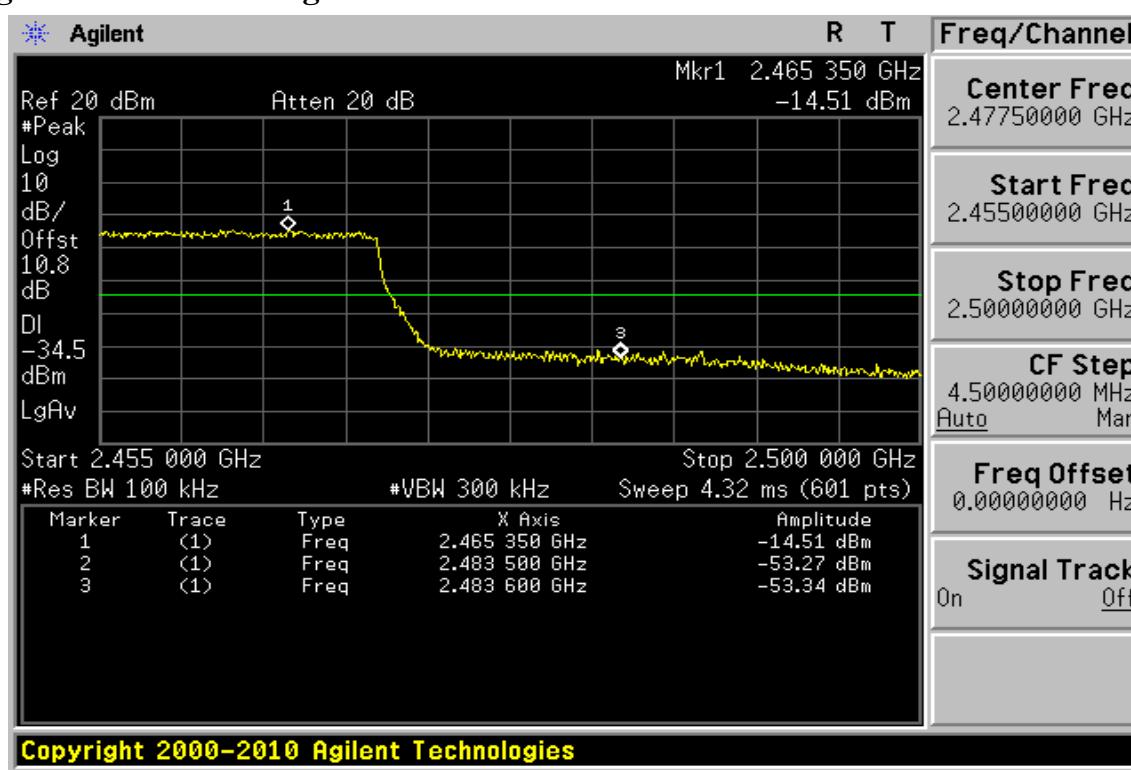
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## 802.11n\_40M (2.4GHz) - Unwanted Emissions into Non-Restricted Frequency Bands

### Band Edges Test Data CH-Low



### Band Edges Test Data CH-High



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## Radiated Emission:

(Unwanted Emissions into Restricted Frequency Bands): 802.11 n\_40M mode

Operation Band	:802.11 n40M	Test Date	:2013-09-17
Fundamental Frequency	:2422 MHz	Temp./Humi.	:25.6 deg_C / 58 RH
Operation Mode	:Bandedge LOW	Engineer	:Allen
EUT Pol.	:H PLAN	Measurement Antenna Pol.	:VERTICAL

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.

The trace on RE(radiation emission) plot is as colored blue, and the detection manner we've employed is peak detector.

Freq.	Note	Detector	Spectrum		Factor	Actual	Limit	Margin
			Mode	Reading Level				
MHz	F/H/E/S	PK/QP/AV	dB $\mu$ V	dB	dB $\mu$ V/m	dB $\mu$ V/m	dB	
2390.00	E	Peak	50.07	2.51	52.58	74.00	-21.42	
2390.00	E	Average	37.52	2.51	40.03	54.00	-13.97	

Operation Band	:802.11 n40M	Test Date	:2013-09-17
Fundamental Frequency	:2422 MHz	Temp./Humi.	:25.6 deg_C / 58 RH
Operation Mode	:Bandedge LOW	Engineer	:Allen
EUT Pol.	:H PLAN	Measurement Antenna Pol.	:HORIZONTAL

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.

The trace on RE(radiation emission) plot is as colored blue, and the detection manner we've employed is peak detector.

Freq.	Note	Detector	Spectrum		Factor	Actual	Limit	Margin
			Mode	Reading Level				
MHz	F/H/E/S	PK/QP/AV	dB $\mu$ V	dB	dB $\mu$ V/m	dB $\mu$ V/m	dB	
2390.00	E	Peak	47.37	3.13	50.50	74.00	-23.50	
2390.00	E	Average	35.38	3.13	38.51	54.00	-15.49	

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Operation Band	:802.11 n40M	Test Date	:2013-09-17
Fundamental Frequency	:2452 MHz	Temp./Humi.	:25.6 deg_C / 58 RH
Operation Mode	:Bandedge HIGH	Engineer	:Allen
EUT Pol.	:H PLAN	Measurement Antenna Pol.	:VERTICAL

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.

The trace on RE(radiation emission) plot is as colored blue, and the detection manner we've employed is peak detector.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
			Mode			FS	@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	Peak	52.24	2.87	55.11	74.00	-18.89
2483.50	E	Average	39.14	2.87	42.01	54.00	-11.99

Operation Band	:802.11 n40M	Test Date	:2013-09-17
Fundamental Frequency	:2452 MHz	Temp./Humi.	:25.6 deg_C / 58 RH
Operation Mode	:Bandedge HIGH	Engineer	:Allen
EUT Pol.	:H PLAN	Measurement Antenna Pol.	:HORIZONTAL

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.

The trace on RE(radiation emission) plot is as colored blue, and the detection manner we've employed is peak detector.

Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
			Mode			FS	@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	Peak	50.70	3.90	54.60	74.00	-19.40
2483.50	E	Average	39.19	3.90	43.09	54.00	-10.91

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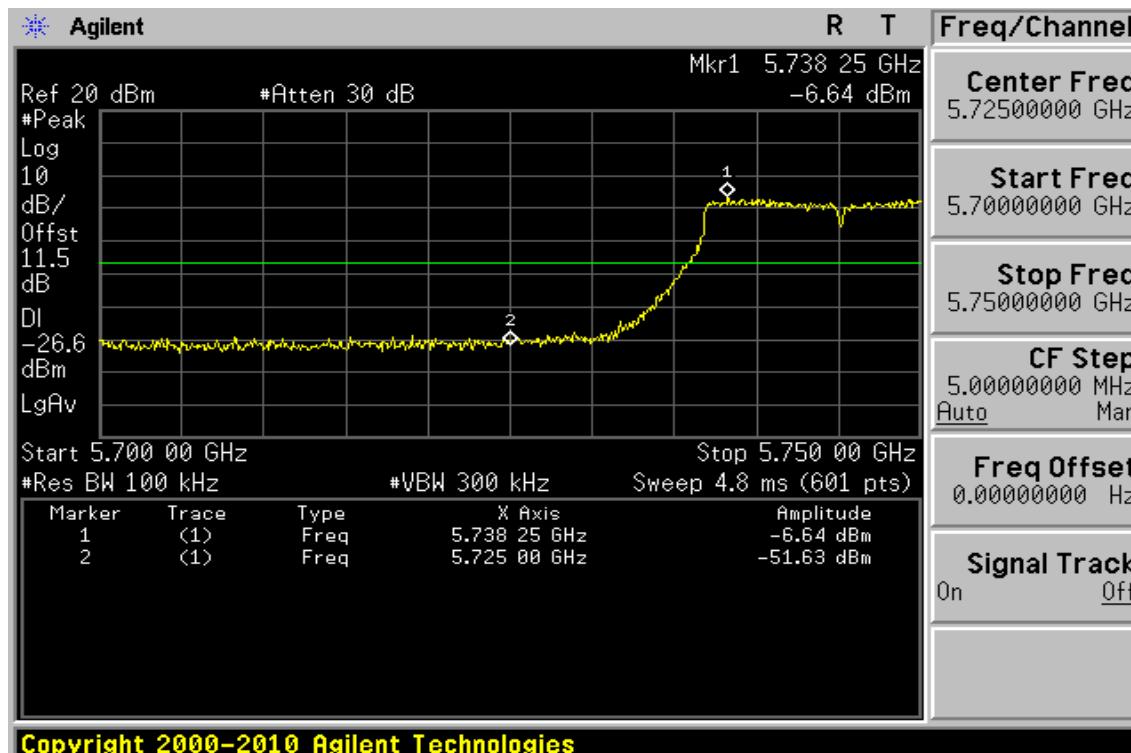
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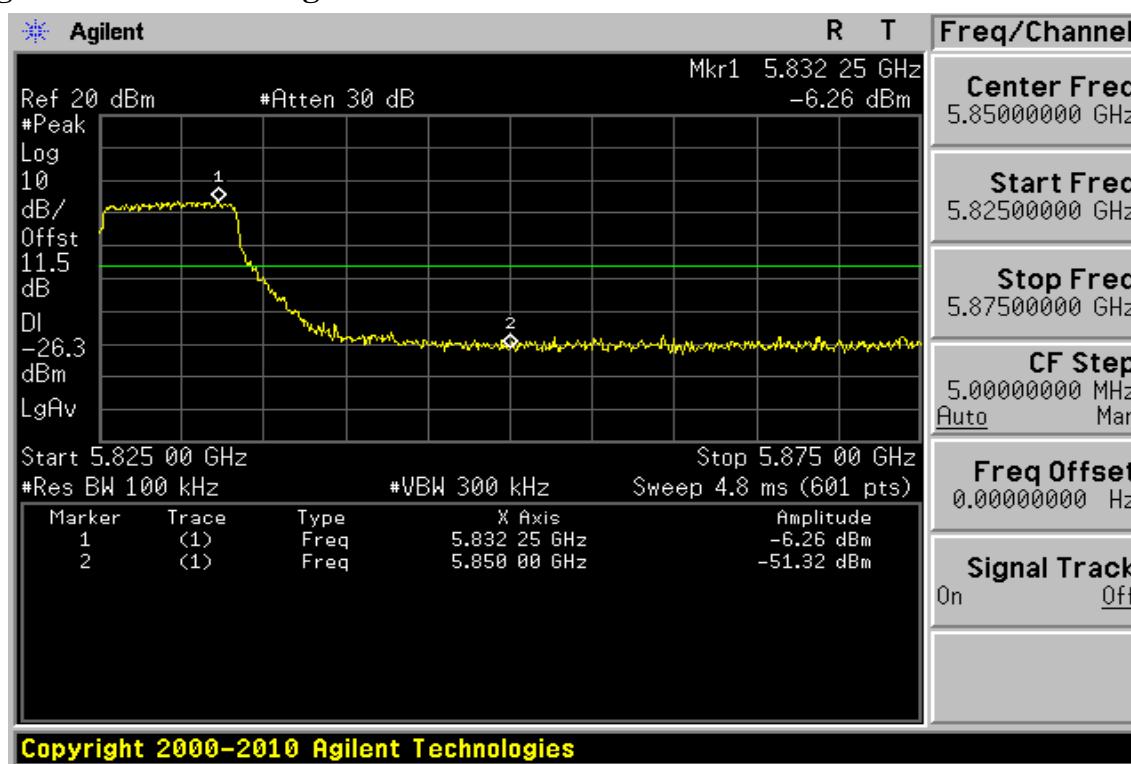
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## 802.11a - Unwanted Emissions into Non-Restricted Frequency Bands

## Band Edges Test Data CH-Low



## Band Edges Test Data CH-High



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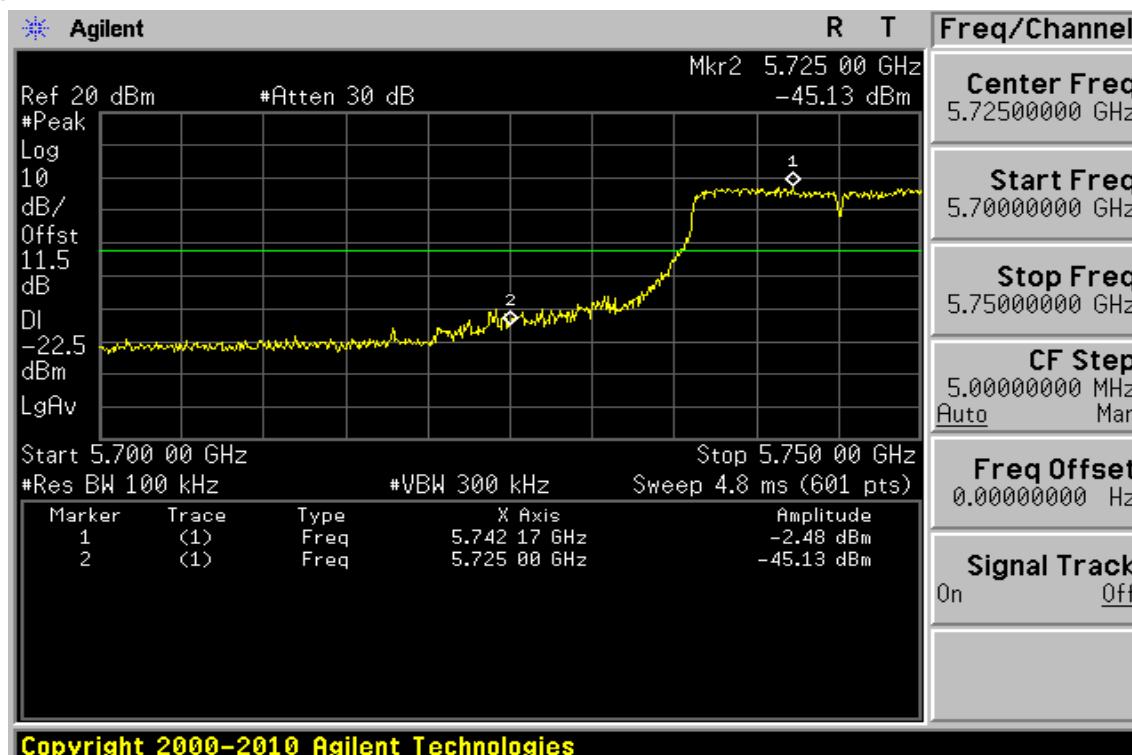
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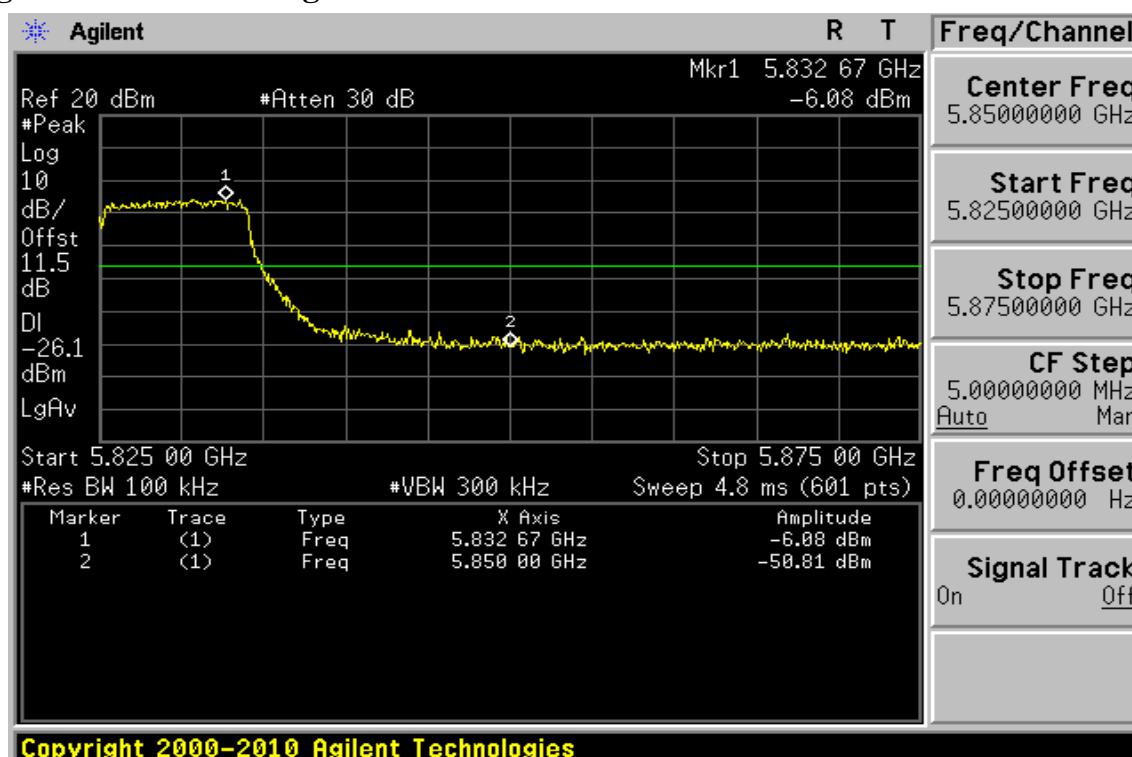
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## 802.11n (5GHz)\_20M - Unwanted Emissions into Non-Restricted Frequency Bands

### Band Edges Test Data CH-Low



### Band Edges Test Data CH-High



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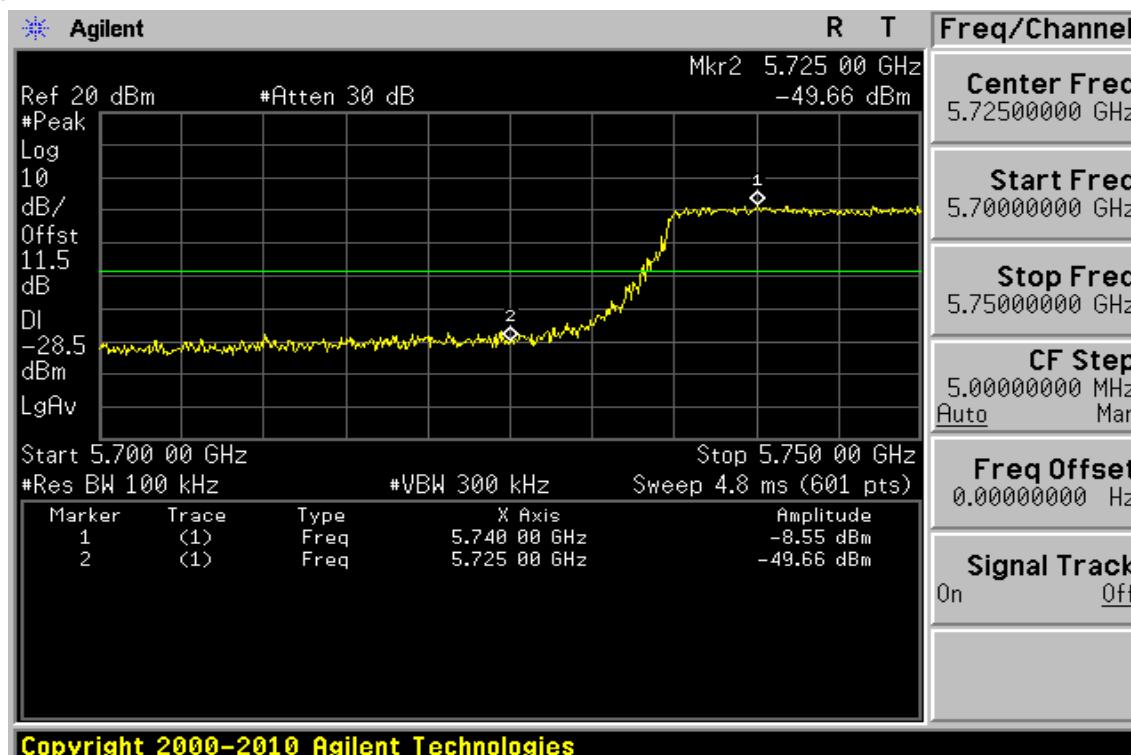
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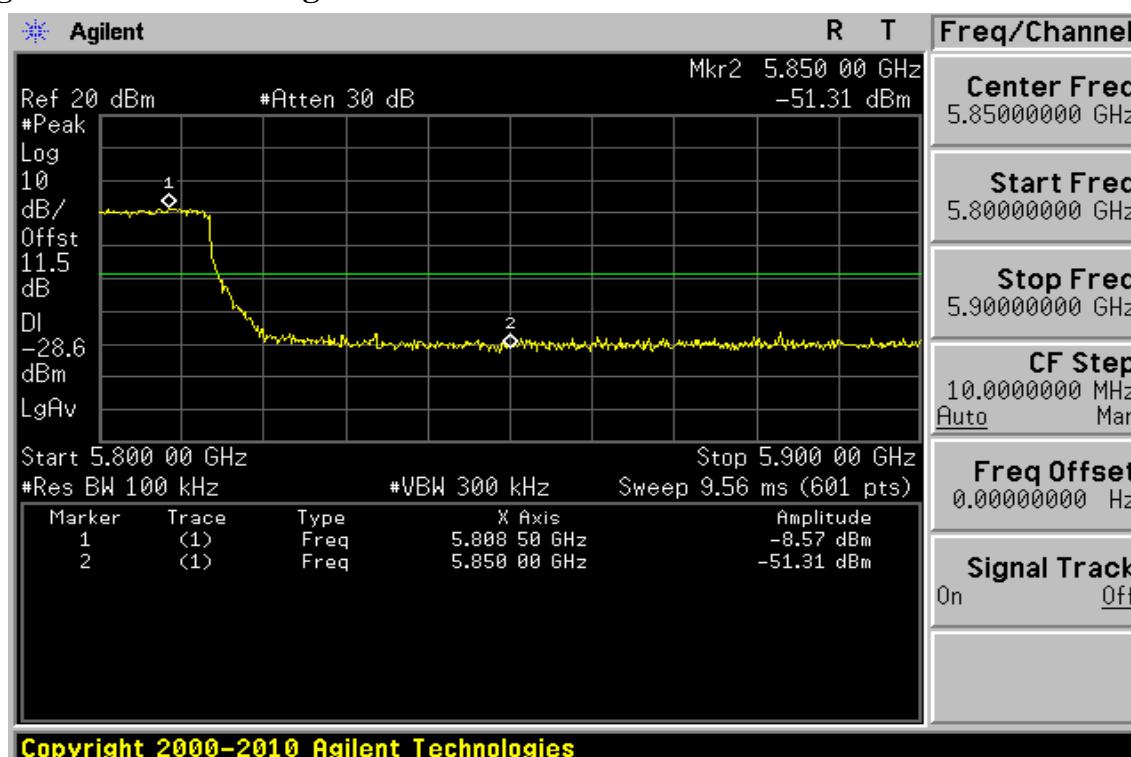
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## 802.11n (5GHz)\_40M - Unwanted Emissions into Non-Restricted Frequency Bands

### Band Edges Test Data CH-Low



### Band Edges Test Data CH-High



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## 10 SPURIOUS EMISSION TEST

### 10.1 Standard Applicable

According to §15.247(d),

Emission at antenna port:

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. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.

### Radiated Spurious Emission

Attenuation below the general limits specified in § 15.209(a) is not required. 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) (see § 15.205(c)).

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.

### 10.2 Measurement Equipment Used:

#### 10.2.1 Conducted Emission at antenna port:

Refer to section 7.2 for details.

#### 10.2.2 Radiated emission:

Refer to section 9.2.2 for details.

### 10.3 Test SET-UP:

#### 10.3.1 Conducted Emission at antenna port:

Refer to section 7.3 for details.

#### 10.3.2 Radiated emission:

Refer to section 9.3.2 for details.

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## 10.4 Measurement Procedure:

### Radiated Emission:

1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. The turn table shall rotate 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emissions.
4. 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.
5. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
6. 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.
7. Repeat above procedures until all default test channel measured were complete.

### Conducted Emission:

1. To connect Antenna Port of EUT to Spectrum.
2. Set RBW = 100K & VBW = 300K on Spectrum.
3. Sweep the frequency to determine spurious emission as seen on spectrum from span of 30 to 3G, 3G to 8G, 8G to 13G, 13G to 18G and 18G to 26.5GHz, 18G to 40GHz (applicable if operation mode is 5GHz)
4. Via Software, combine 5 spans of frequency range into one plot
5. Repeat above procedures until all default test channel measured were complete.

## 10.5 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	

## 10.6 Measurement Result:

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

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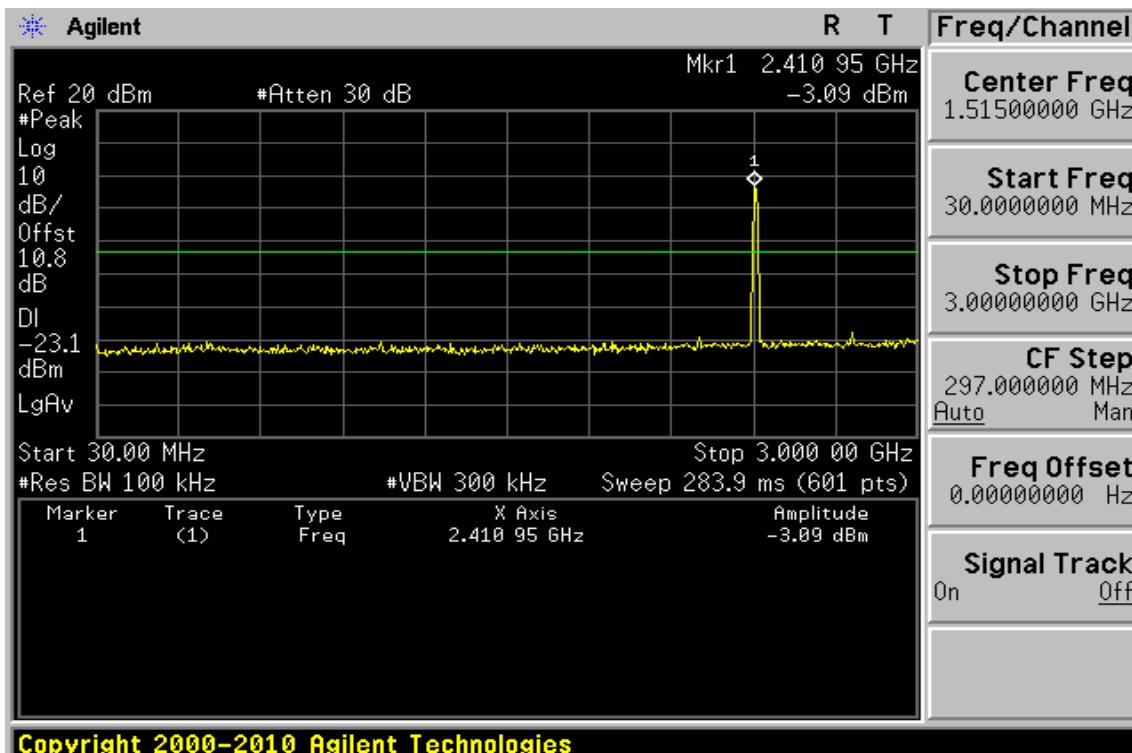
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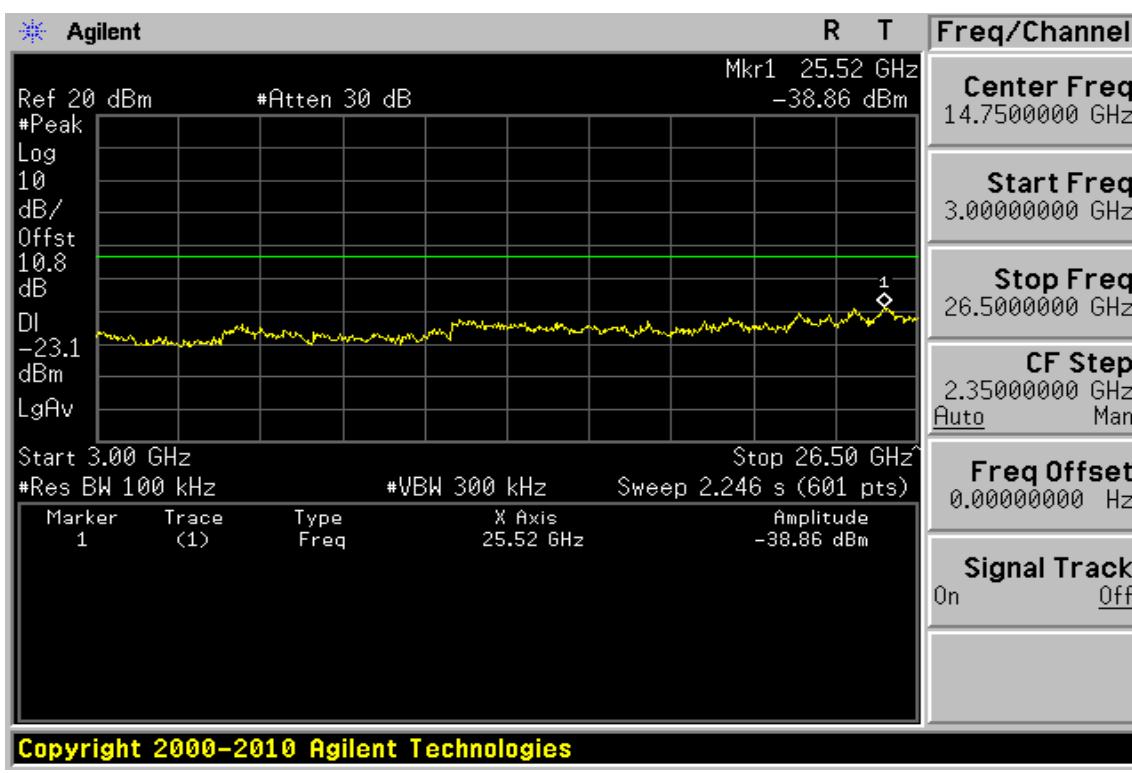
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## Conducted Spurious Emission Measurement Result (802.11b)

## Ch Low 30MHz – 3GHz



## Ch Low 3GHz – 26.5GHz



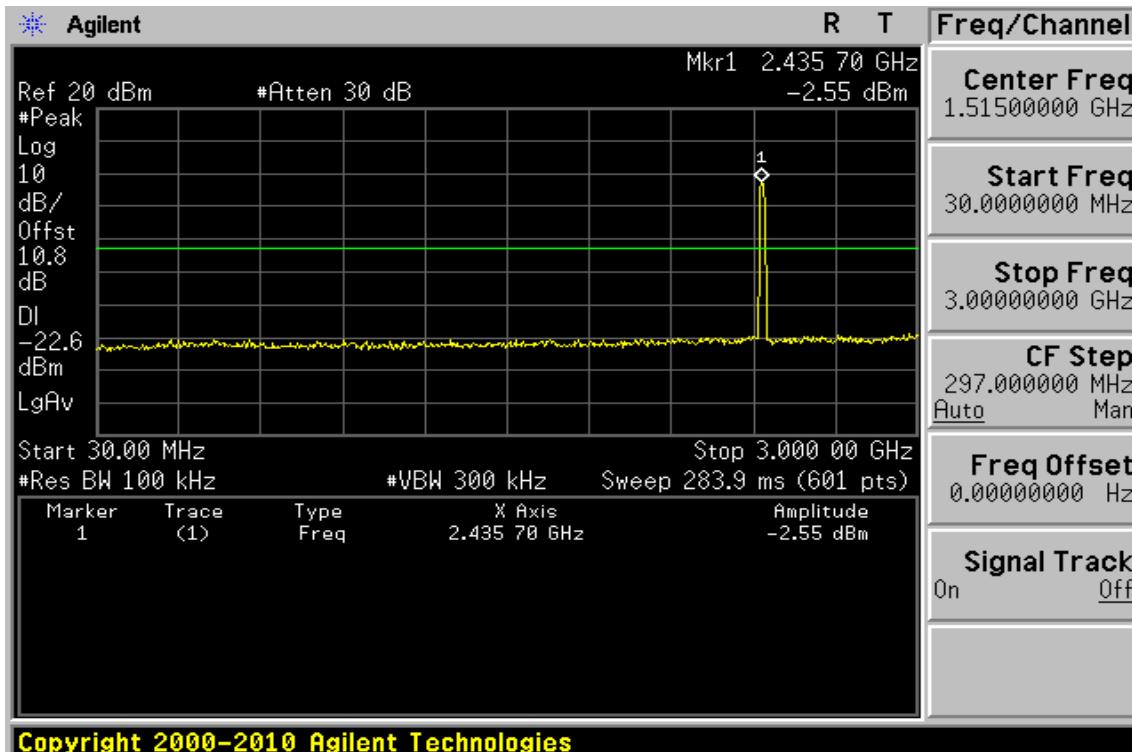
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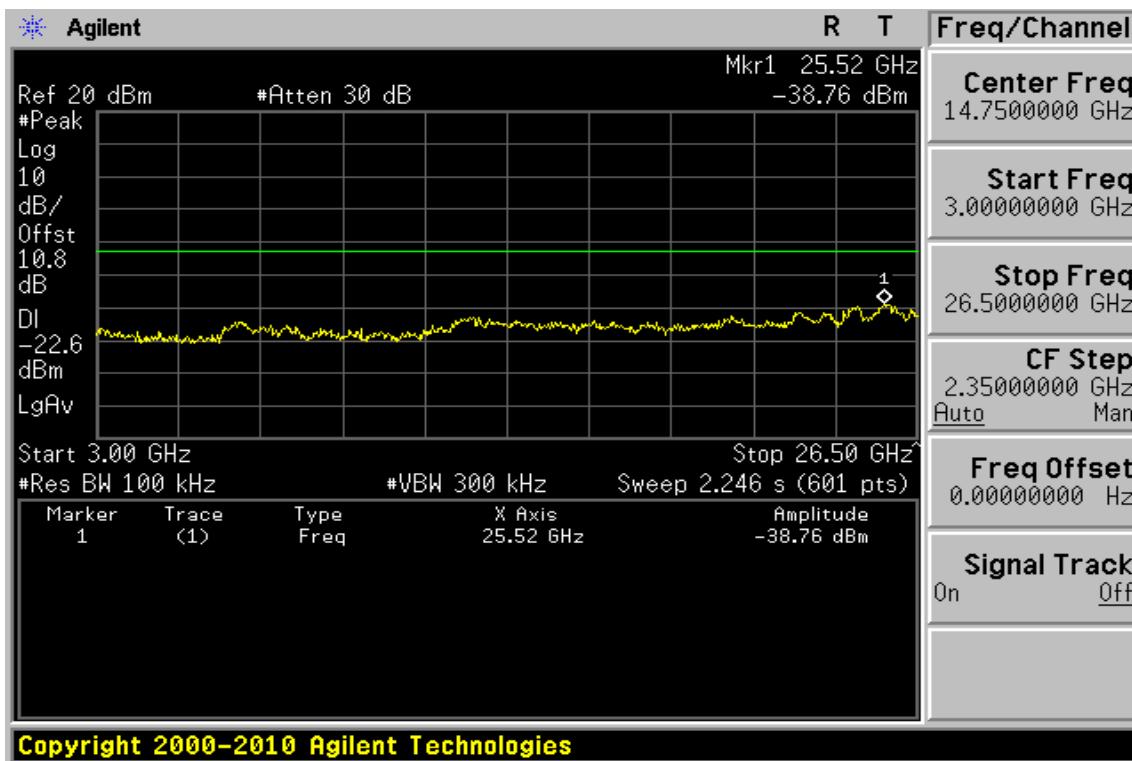
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## Ch Mid 30MHz – 3GHz



## Ch Mid 3GHz – 26.5GHz



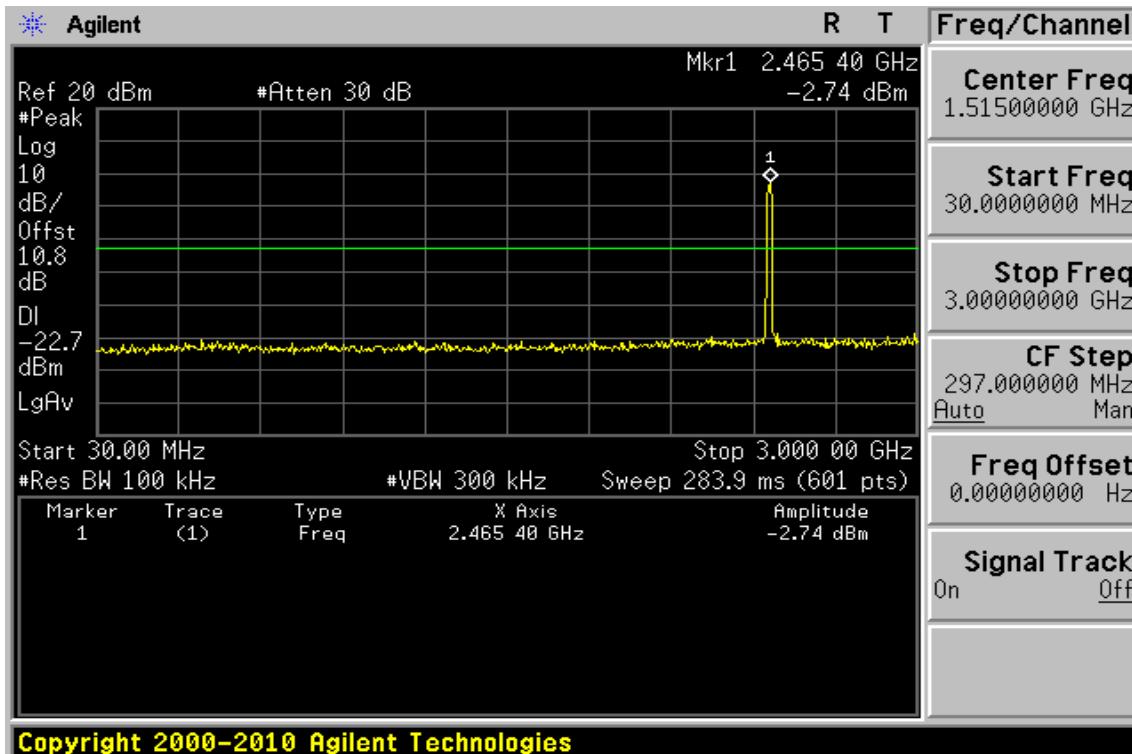
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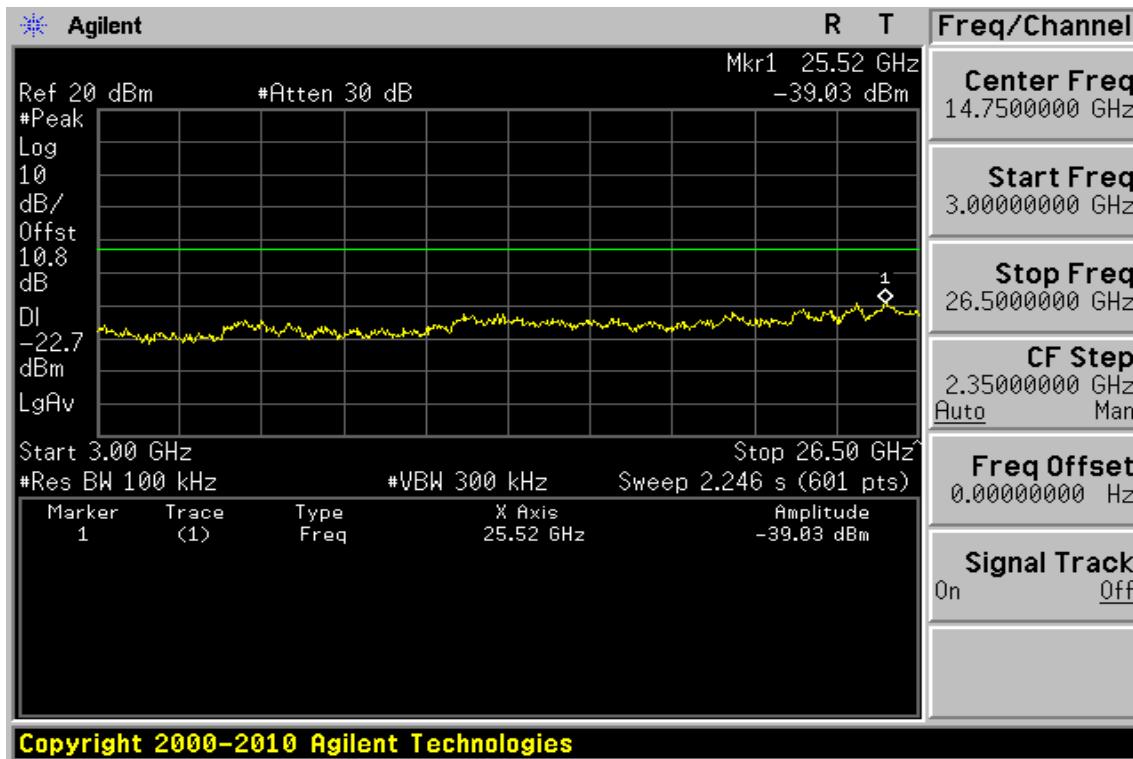
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## Ch High 30MHz – 3GHz



## Ch High 3GHz – 26.5GHz



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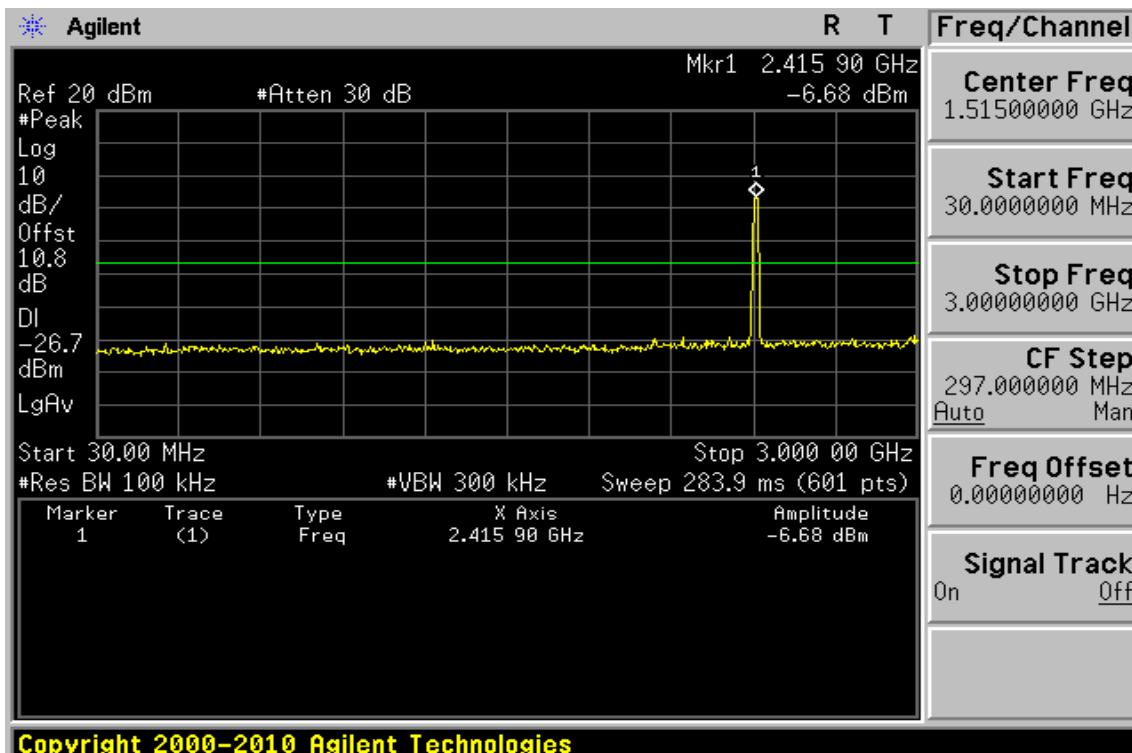
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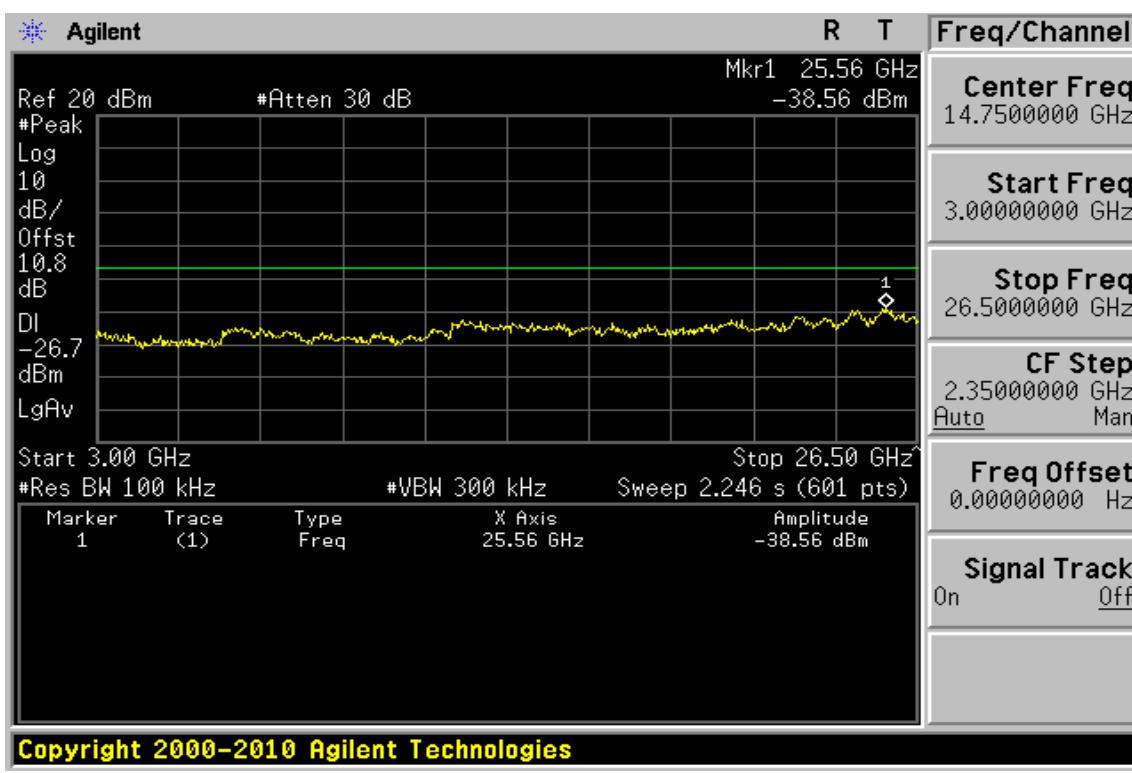
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## Conducted Spurious Emission Measurement Result (802.11g)

## Ch Low 30MHz – 3GHz



## Ch Low 3GHz – 26.5GHz



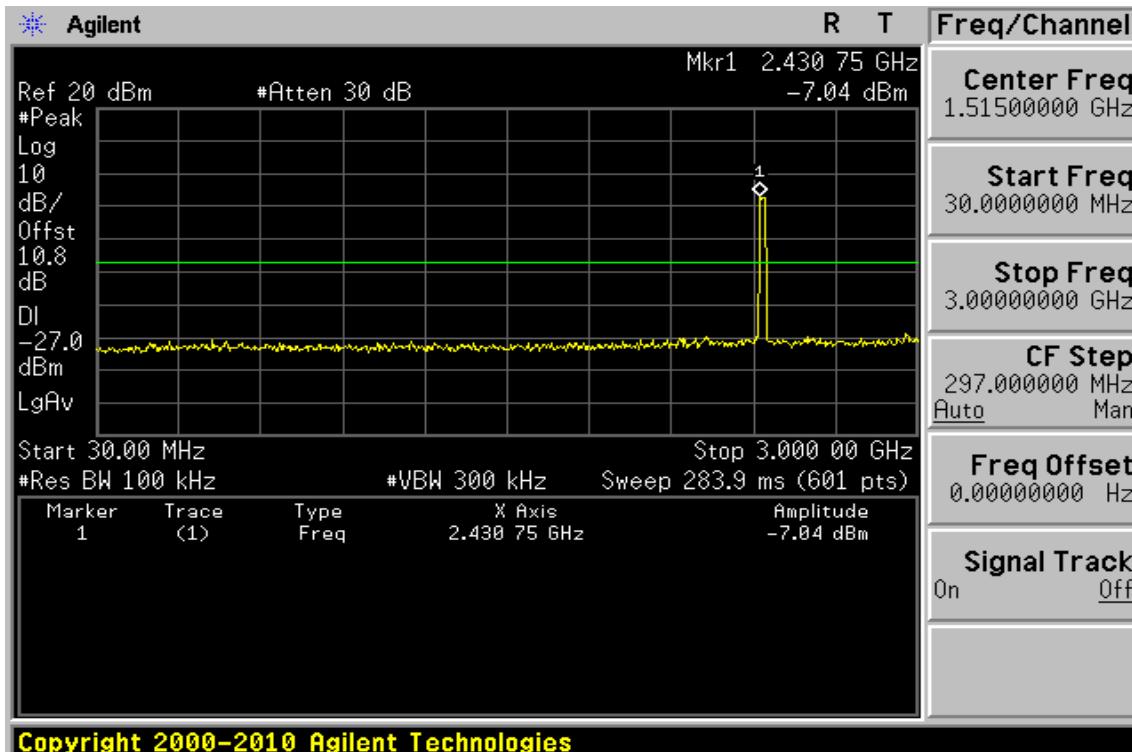
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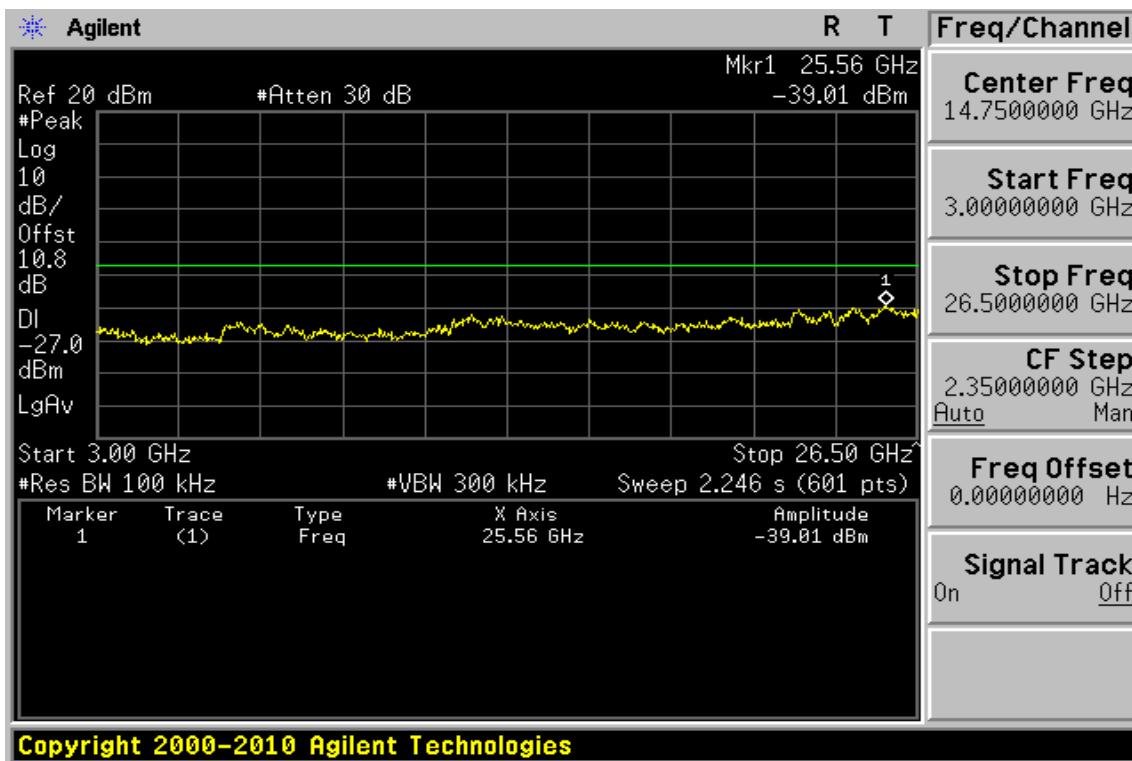
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## Ch Mid 30MHz – 3GHz



## Ch Mid 3GHz – 26.5GHz



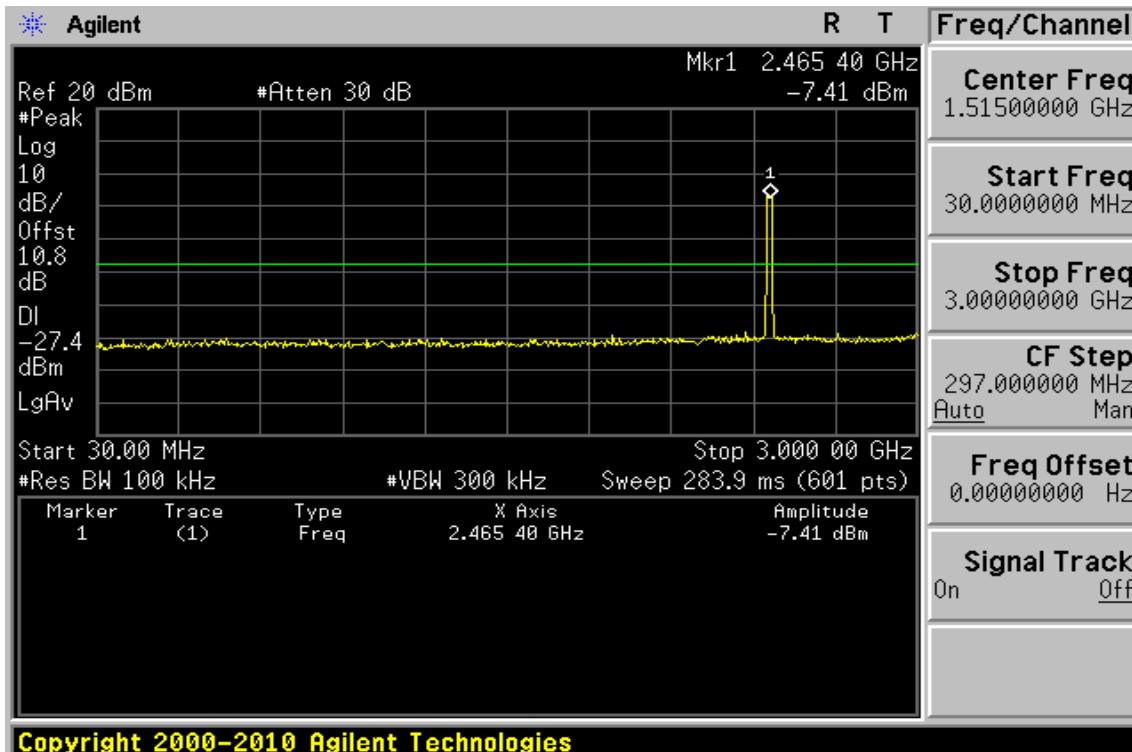
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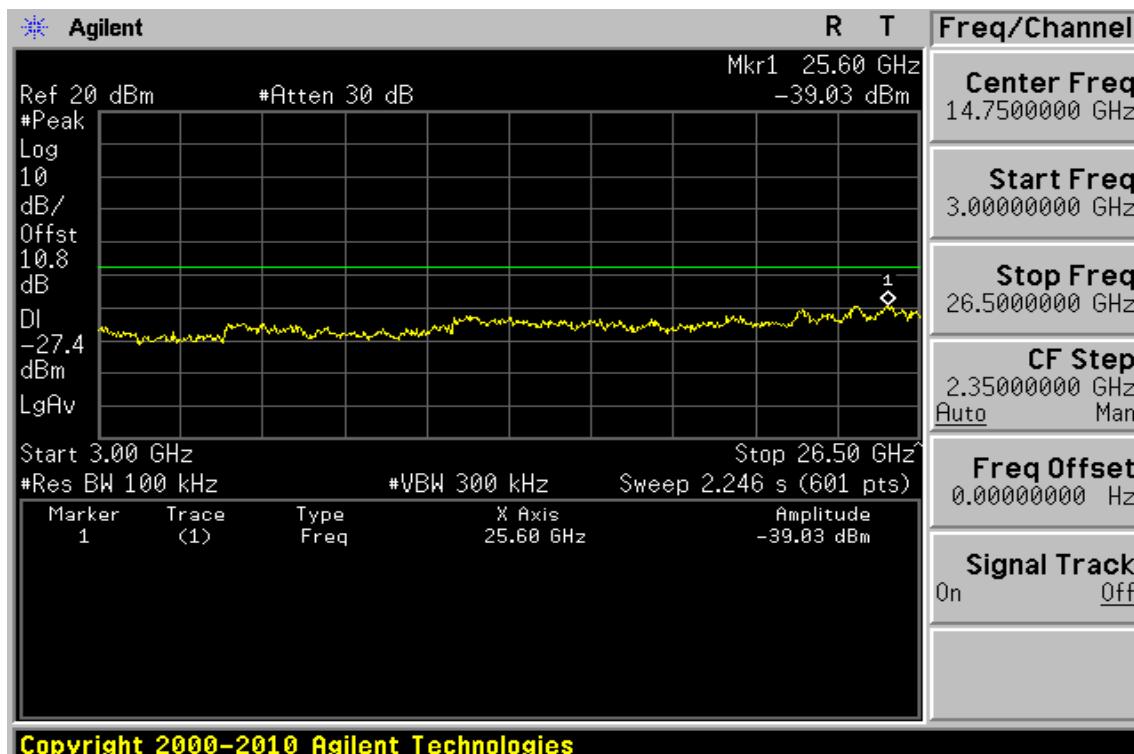
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## Ch High 30MHz – 3GHz



## Ch High 3GHz – 26.5GHz



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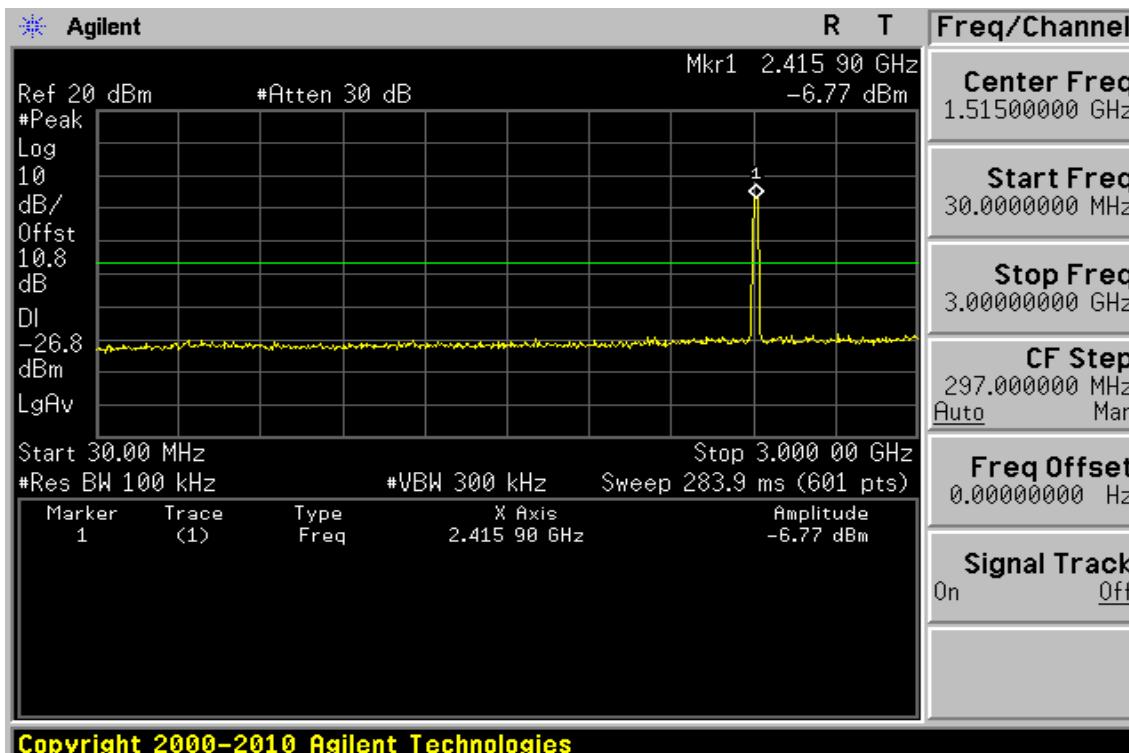
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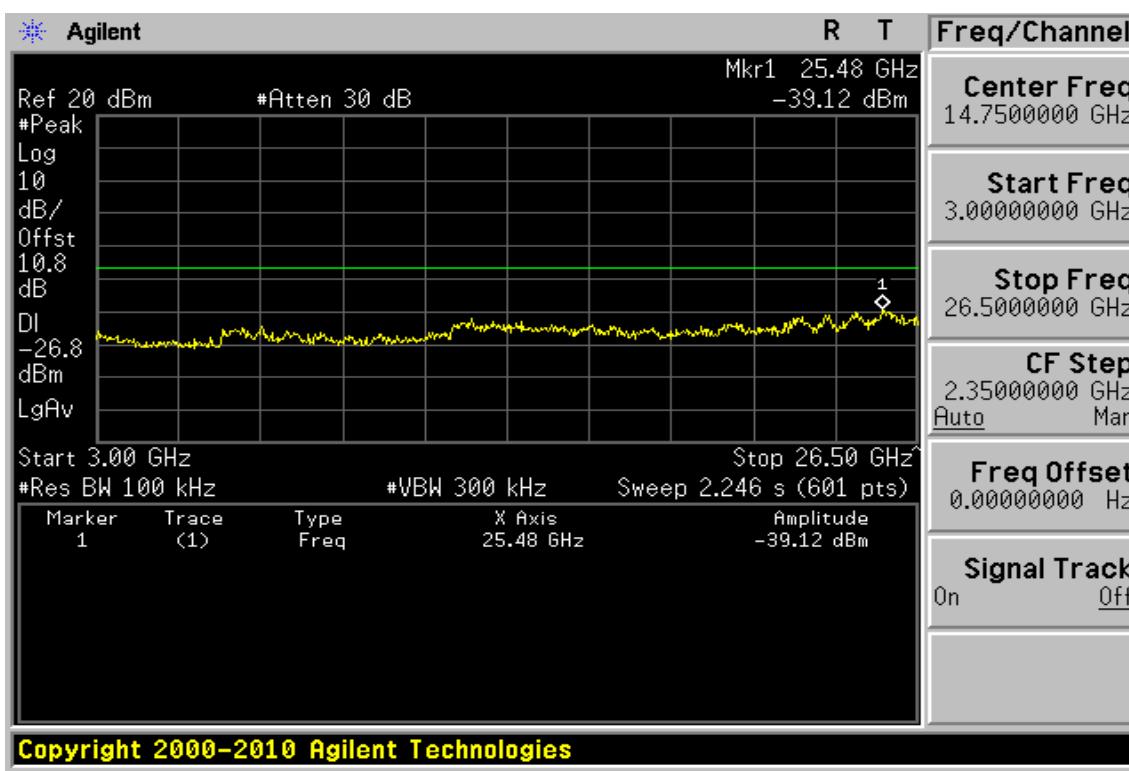
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## Conducted Spurious Emission Measurement Result (802.11n\_20M) (2.4GHz)

### Ch Low 30MHz – 3GHz



### Ch Low 3GHz – 26.5GHz

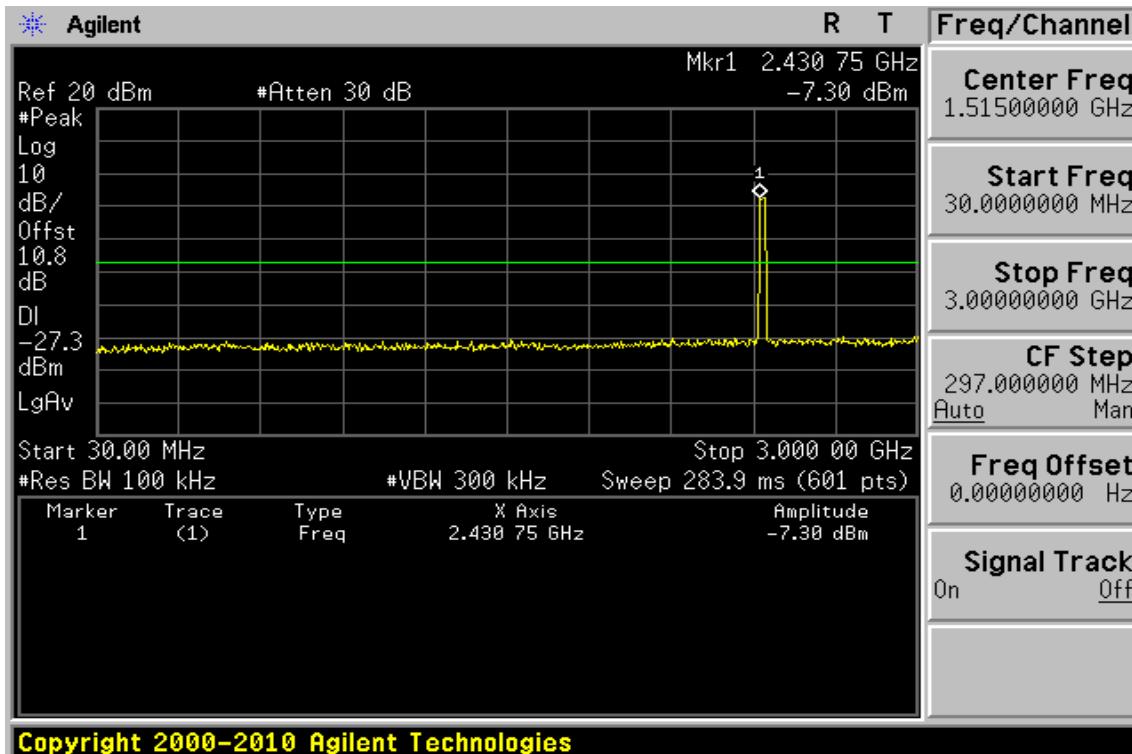


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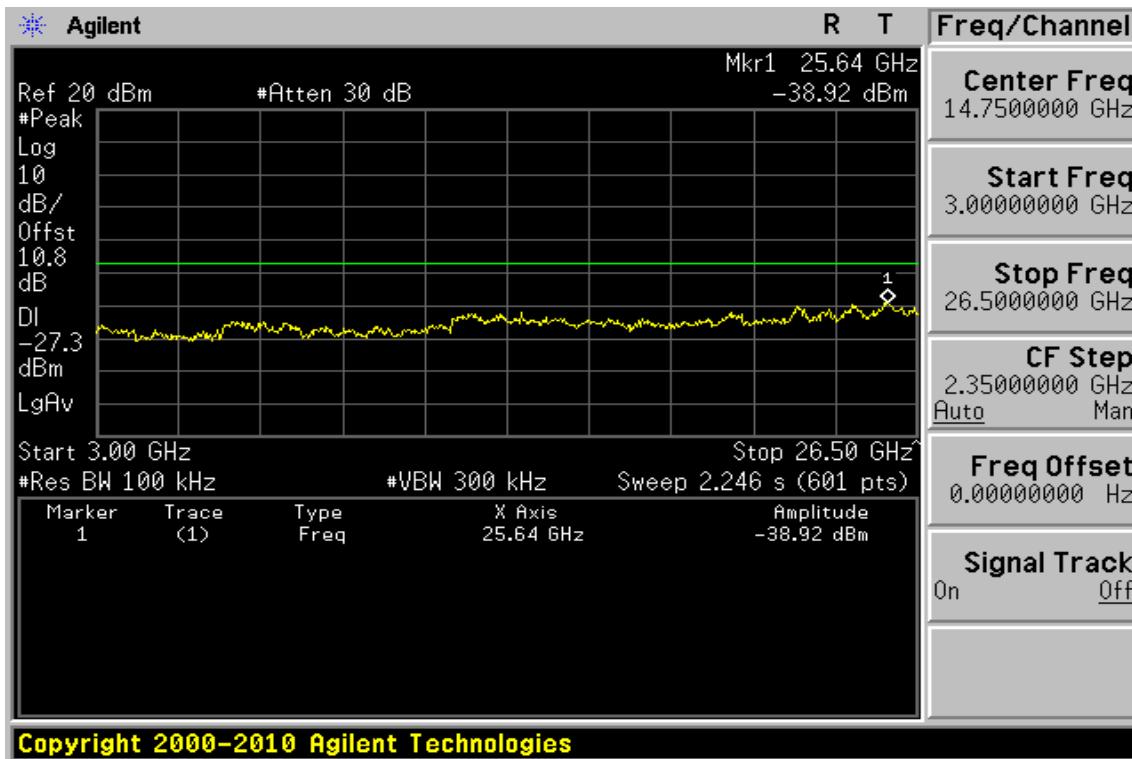
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## Ch Mid 30MHz – 3GHz



## Ch Mid 3GHz – 26.5GHz



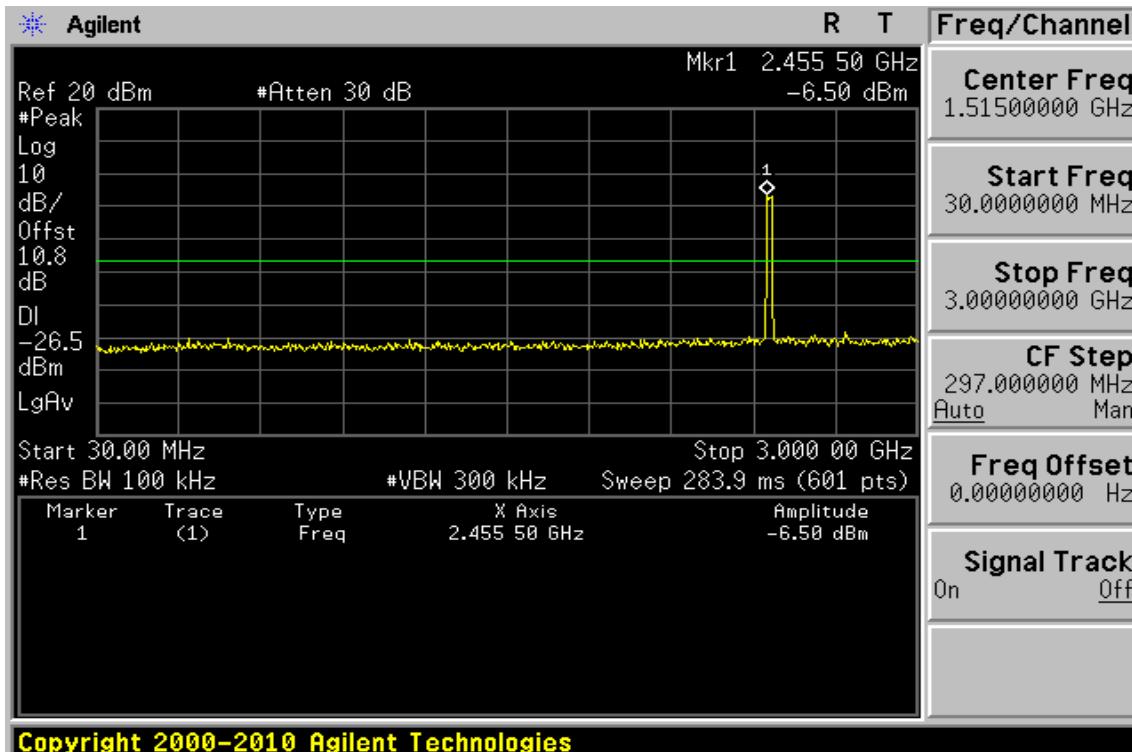
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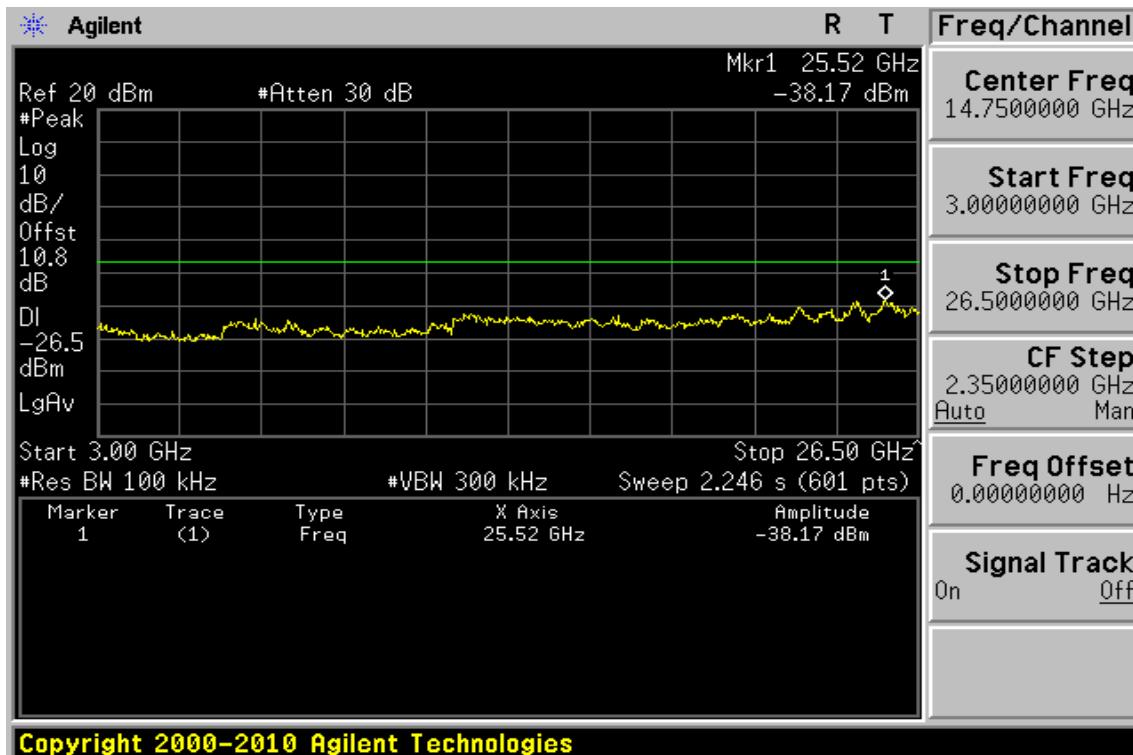
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## Ch High 30MHz – 3GHz



## Ch High 3GHz – 26.5GHz



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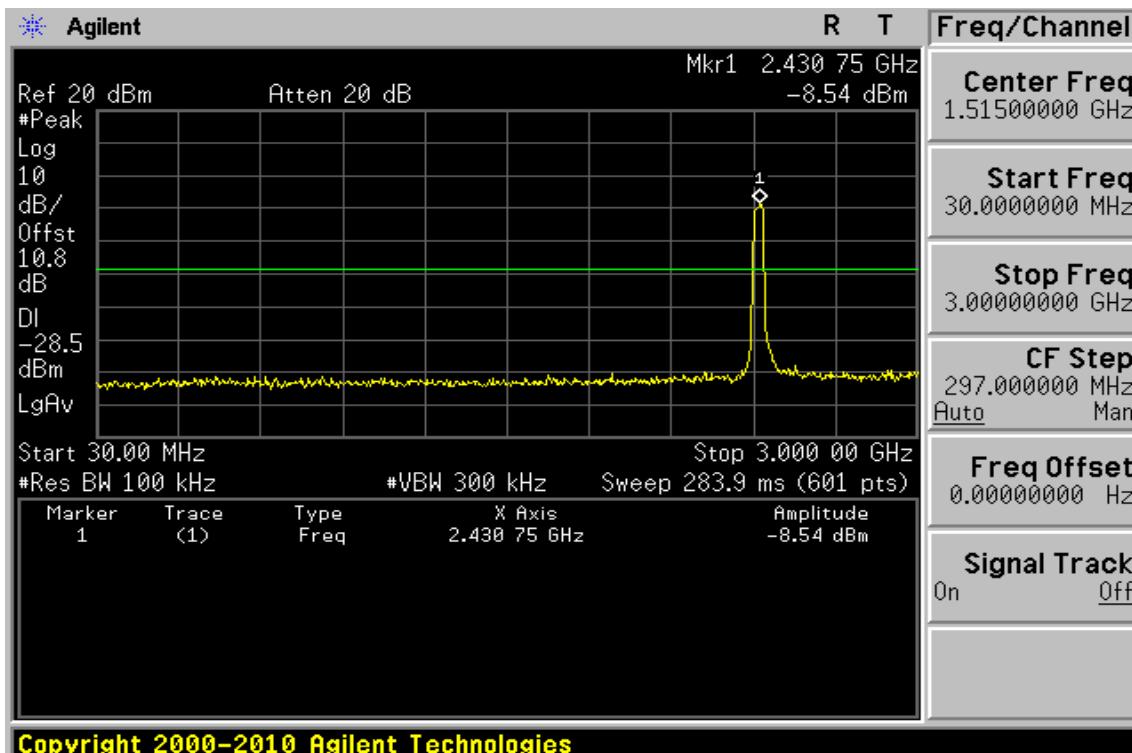
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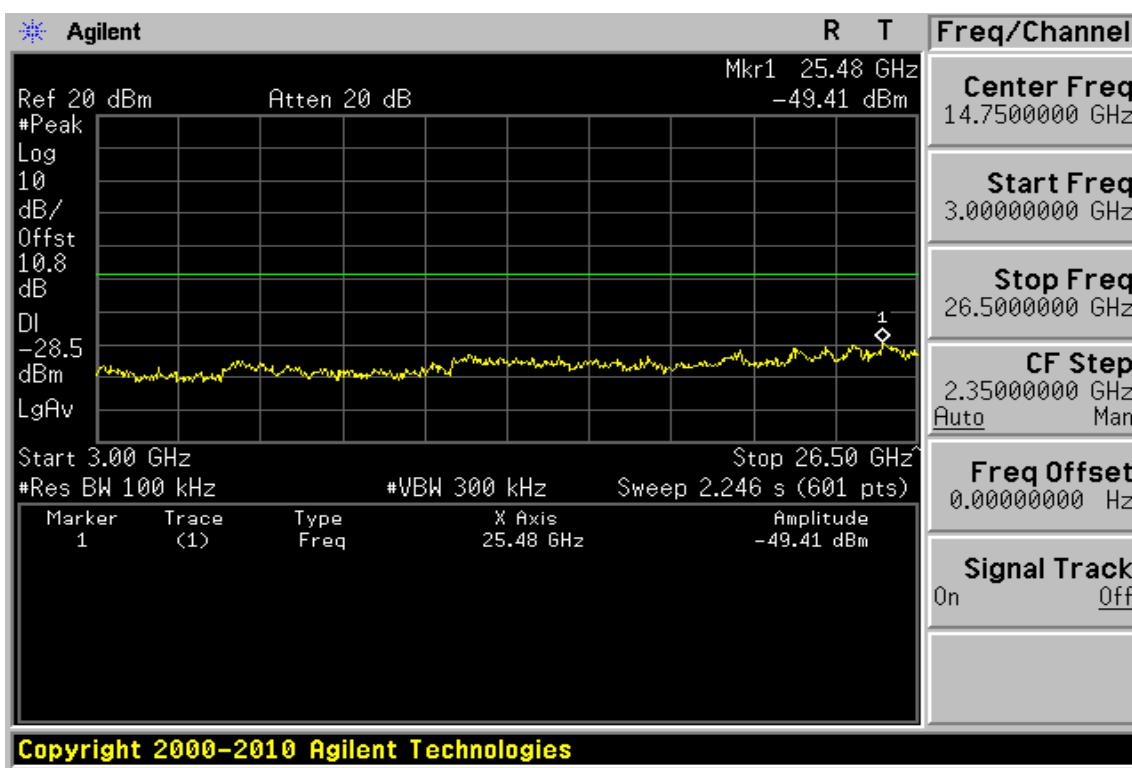
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## Conducted Spurious Emission Measurement Result (802.11n\_40M) (2.4GHz)

### Ch Low 30MHz – 3GHz



### Ch Low 3GHz – 26.5GHz



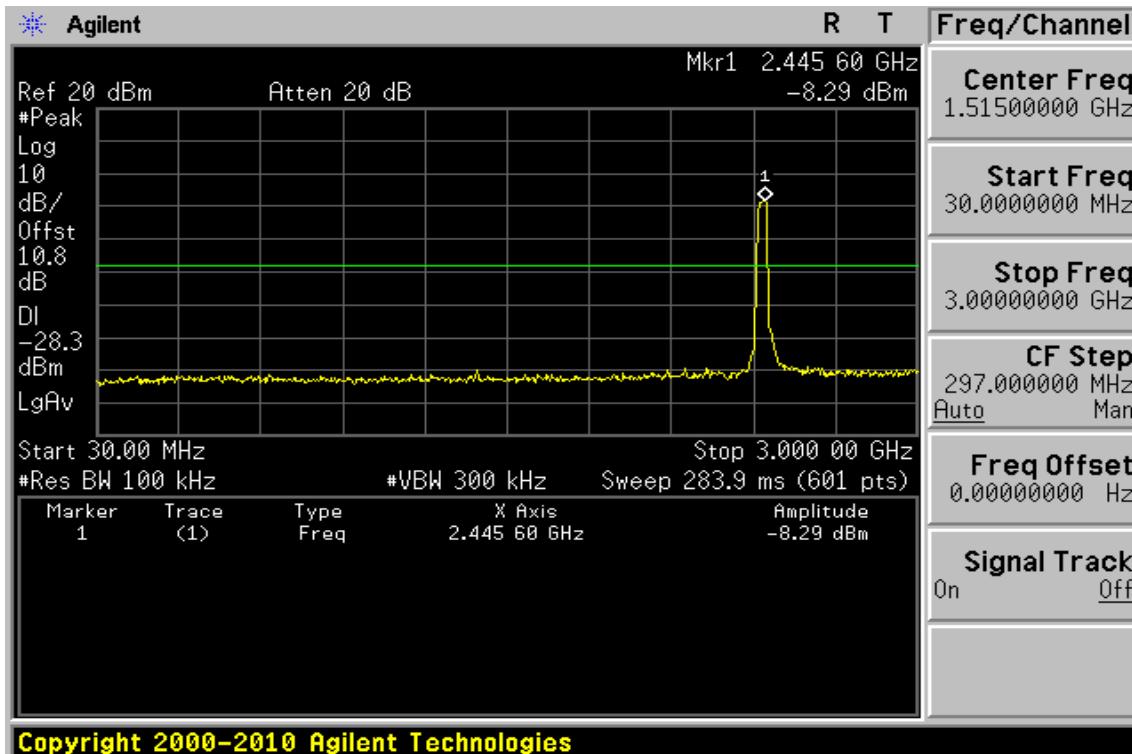
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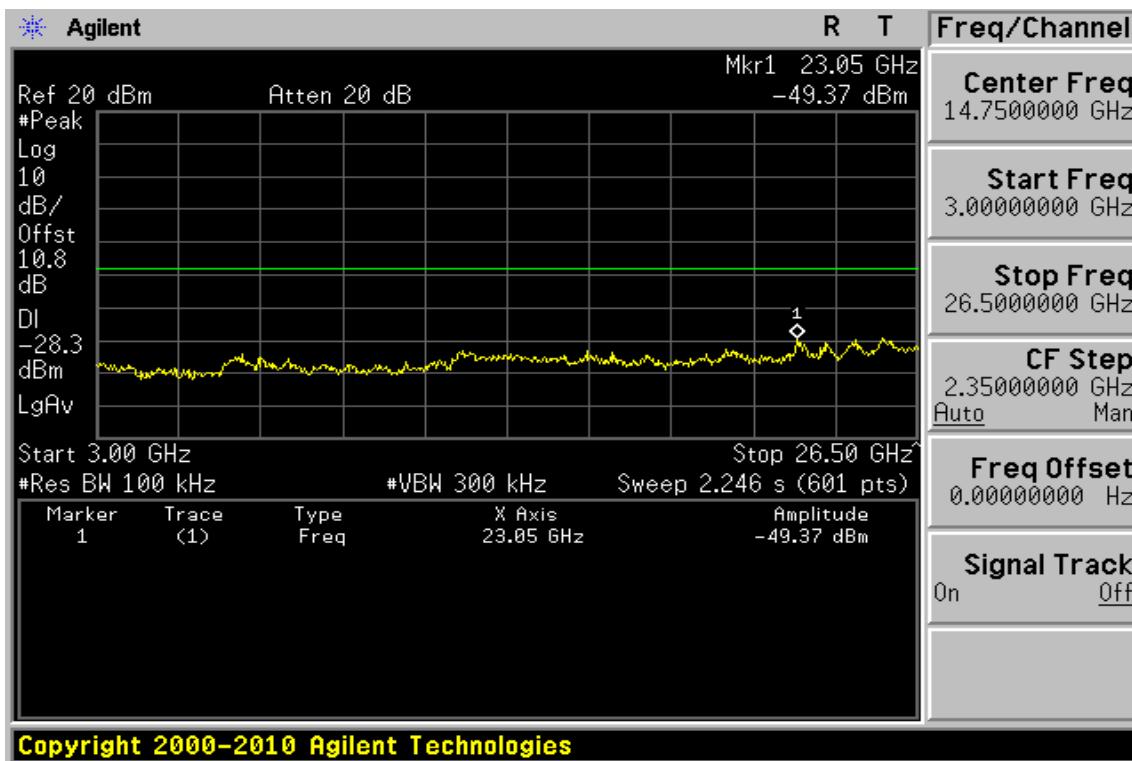
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## Ch Mid 30MHz – 3GHz



## Ch Mid 3GHz – 26.5GHz



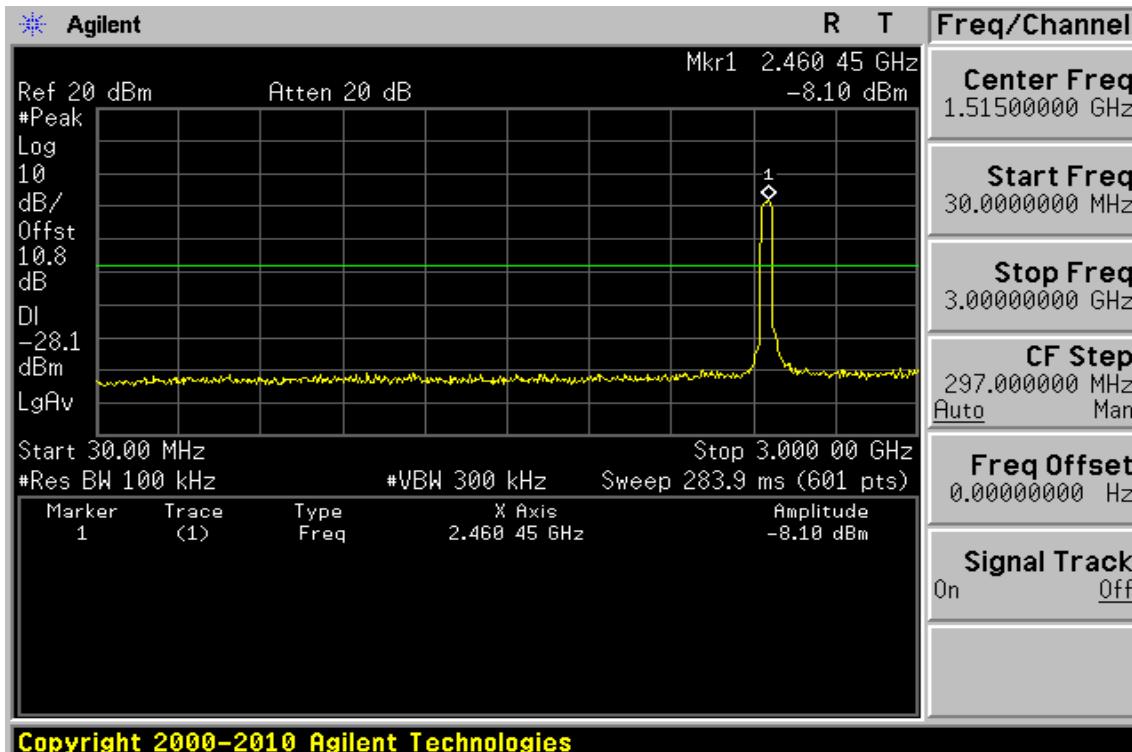
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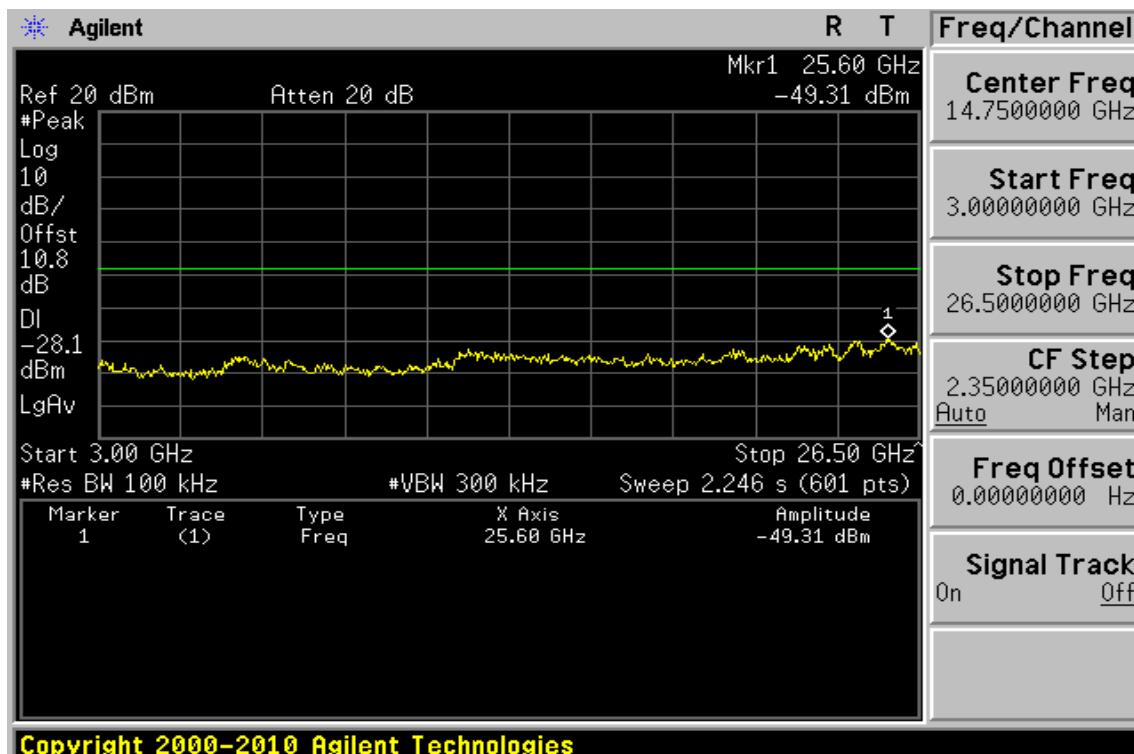
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## Ch High 30MHz – 3GHz



## Ch High 3GHz – 26.5GHz



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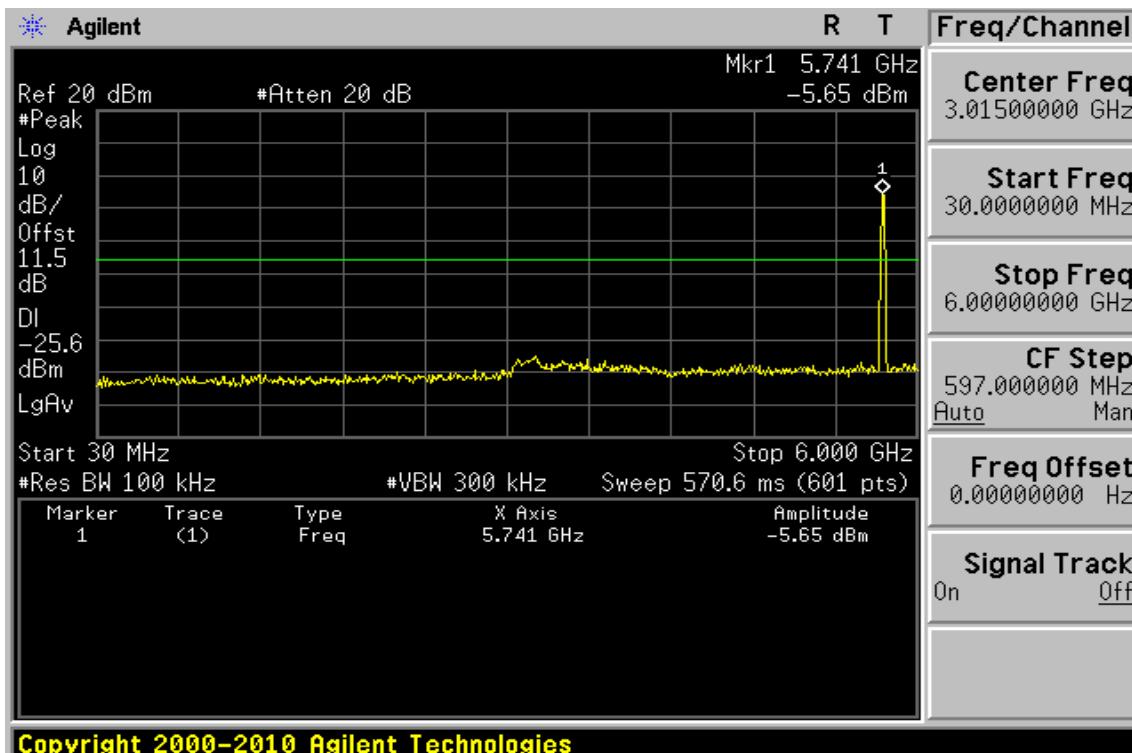
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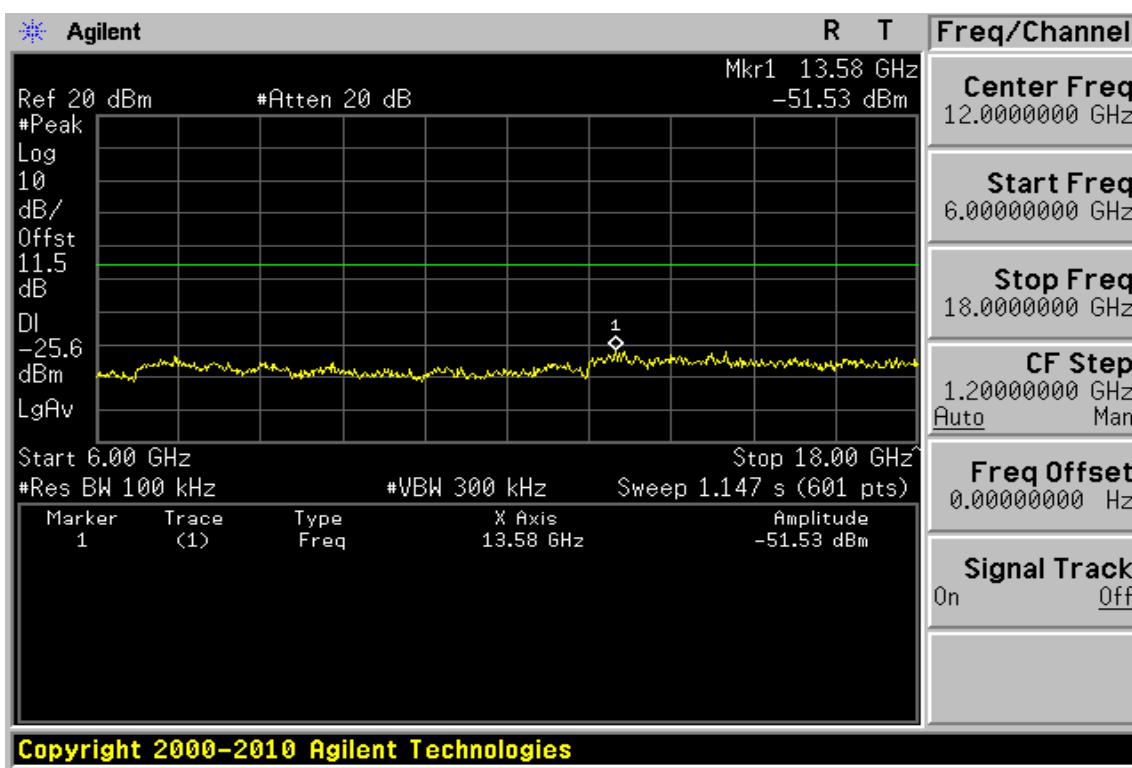
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## Conducted Spurious Emission Measurement Result (802.11a)

## Ch Low 30MHz – 6GHz



## Ch Low 6GHz – 18GHz



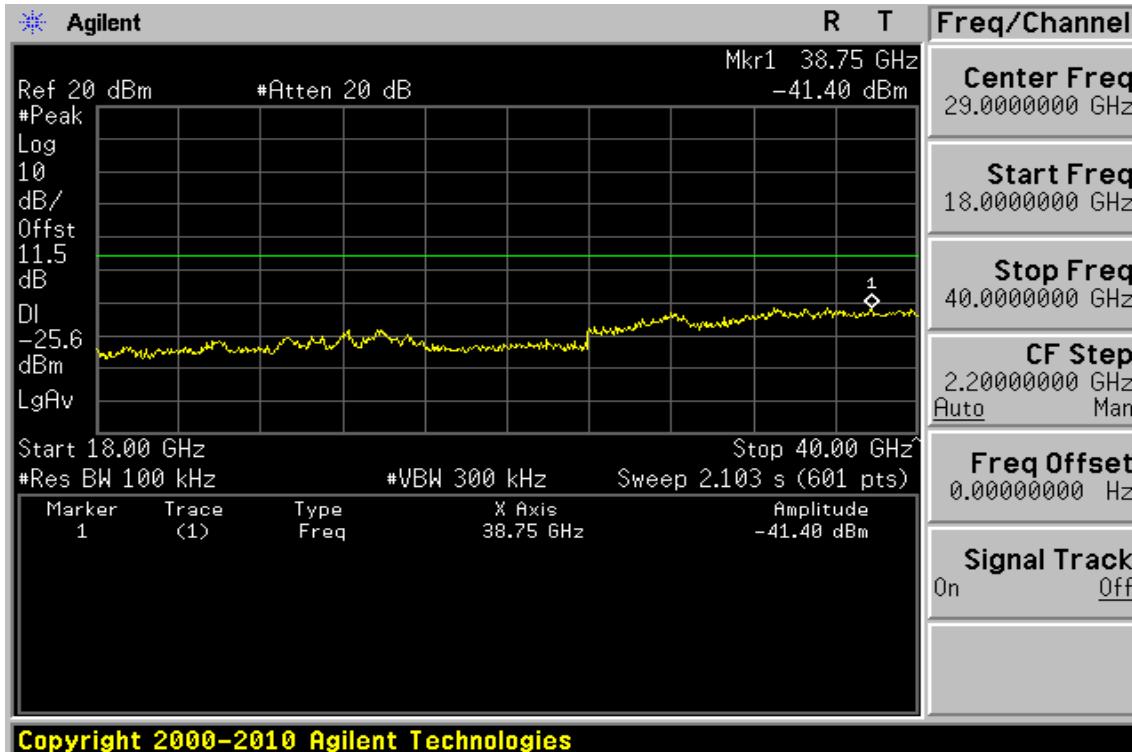
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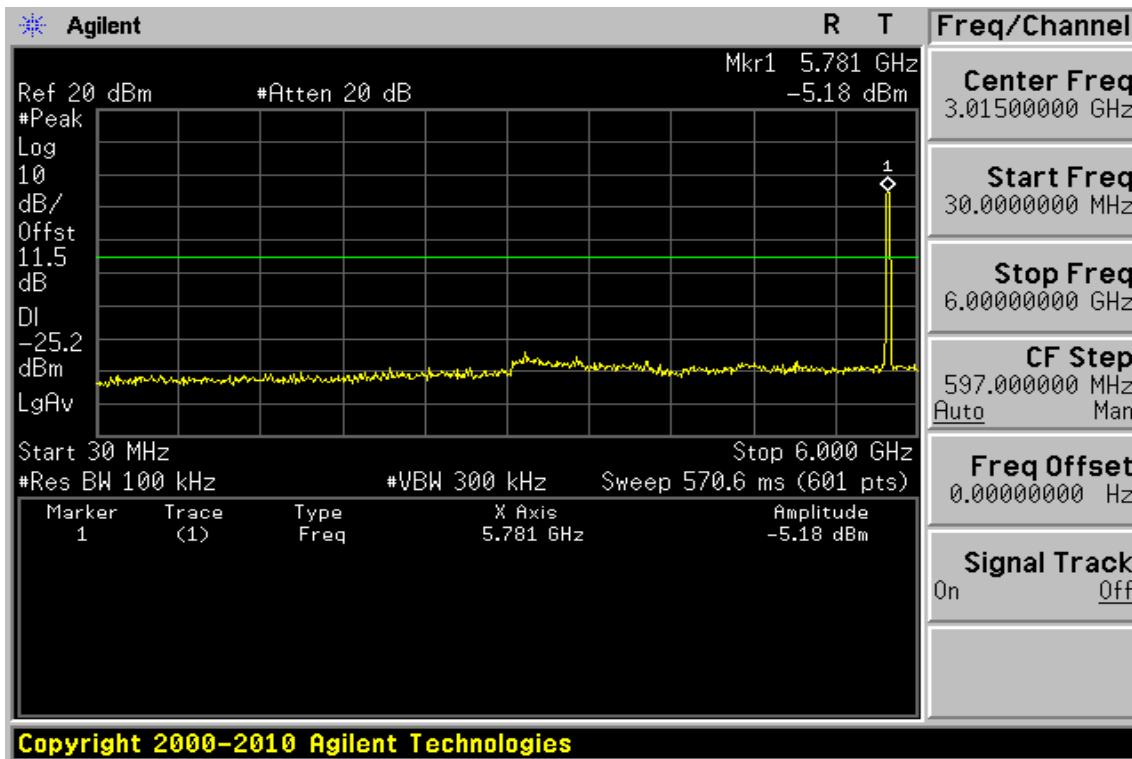
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## Ch Low 18GHz – 40GHz



## Ch Mid 30MHz – 6GHz



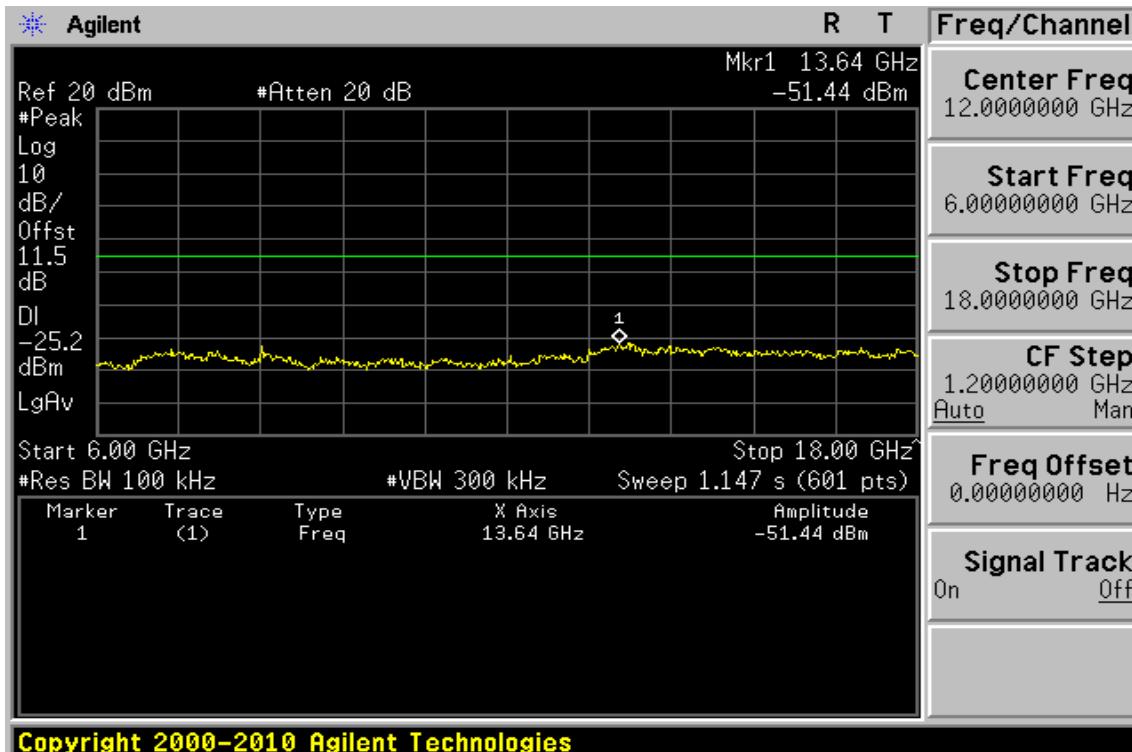
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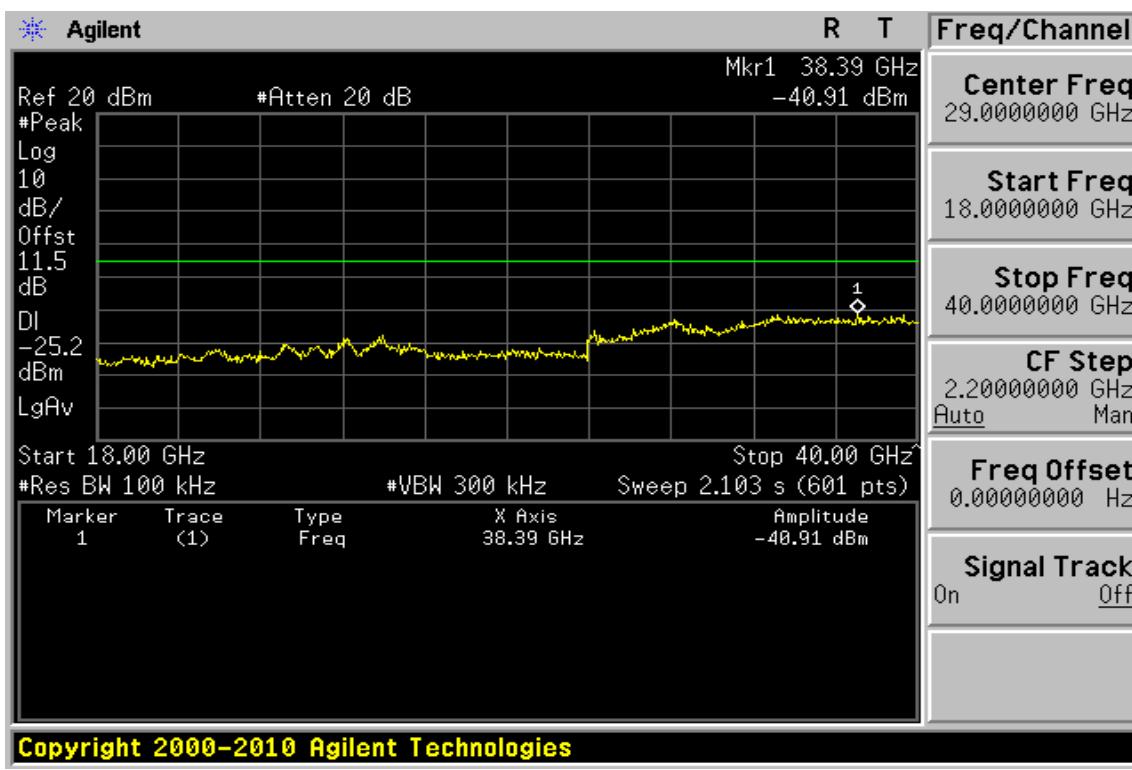
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## Ch Mid 6GHz – 18GHz



## Ch Mid 18GHz – 40GHz



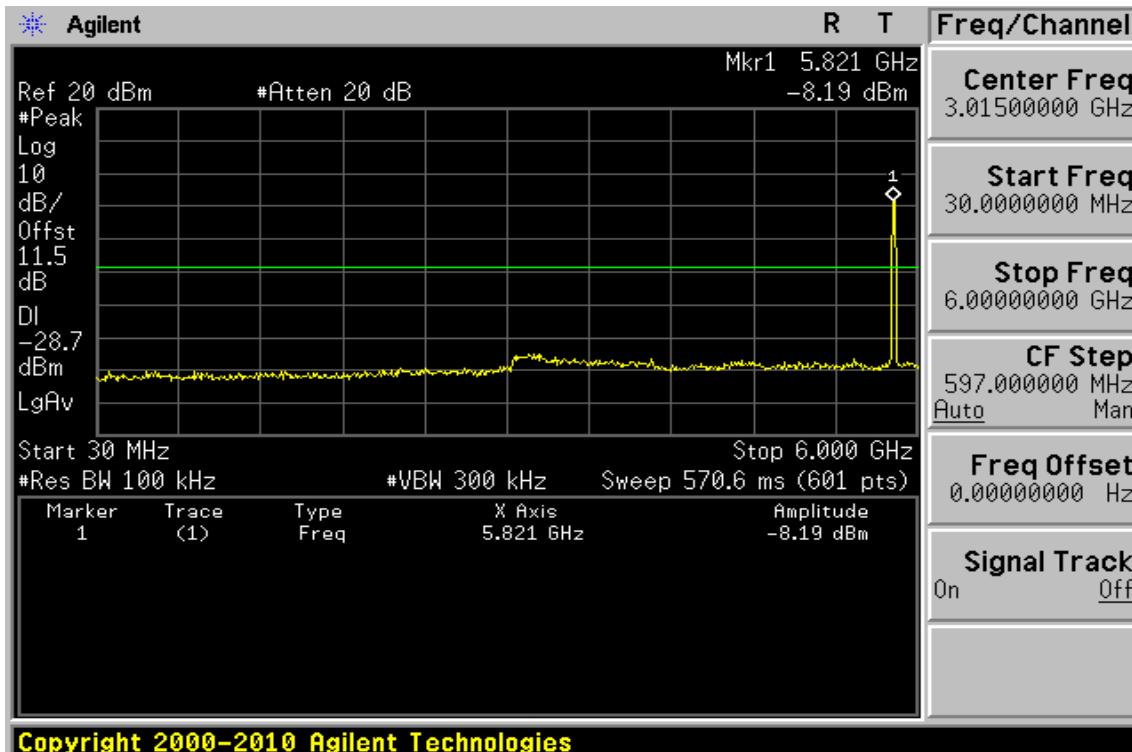
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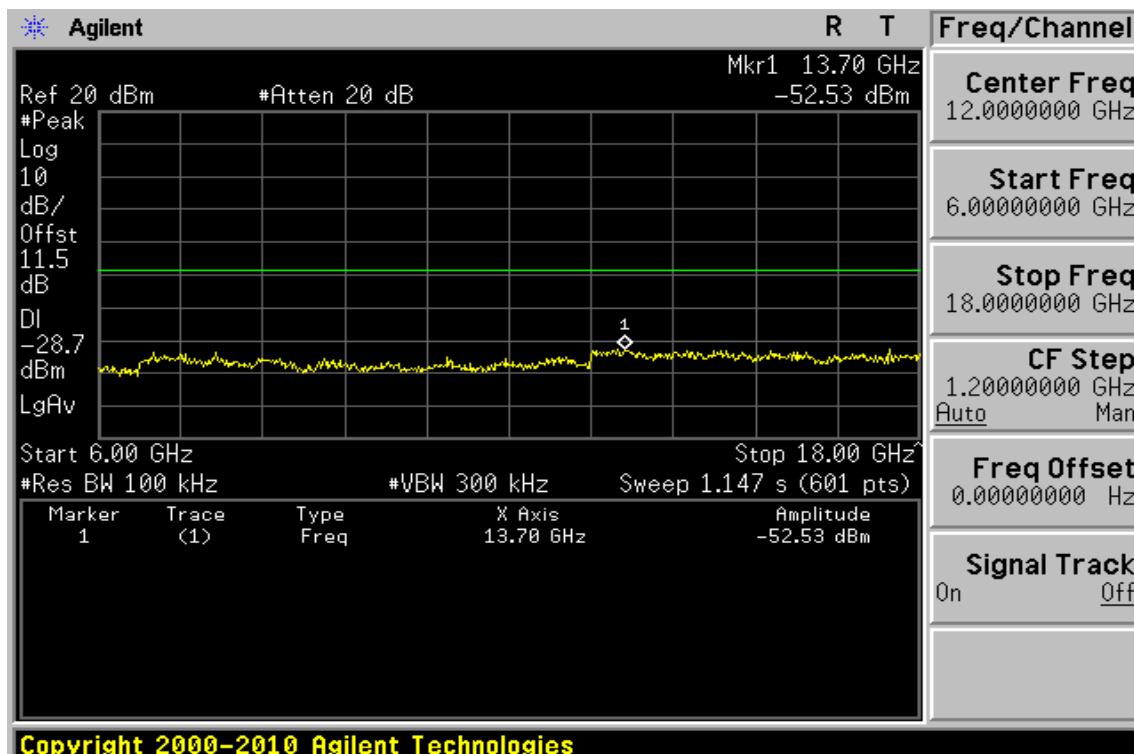
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## Ch High 30MHz – 6GHz



## Ch High 6GHz – 18GHz

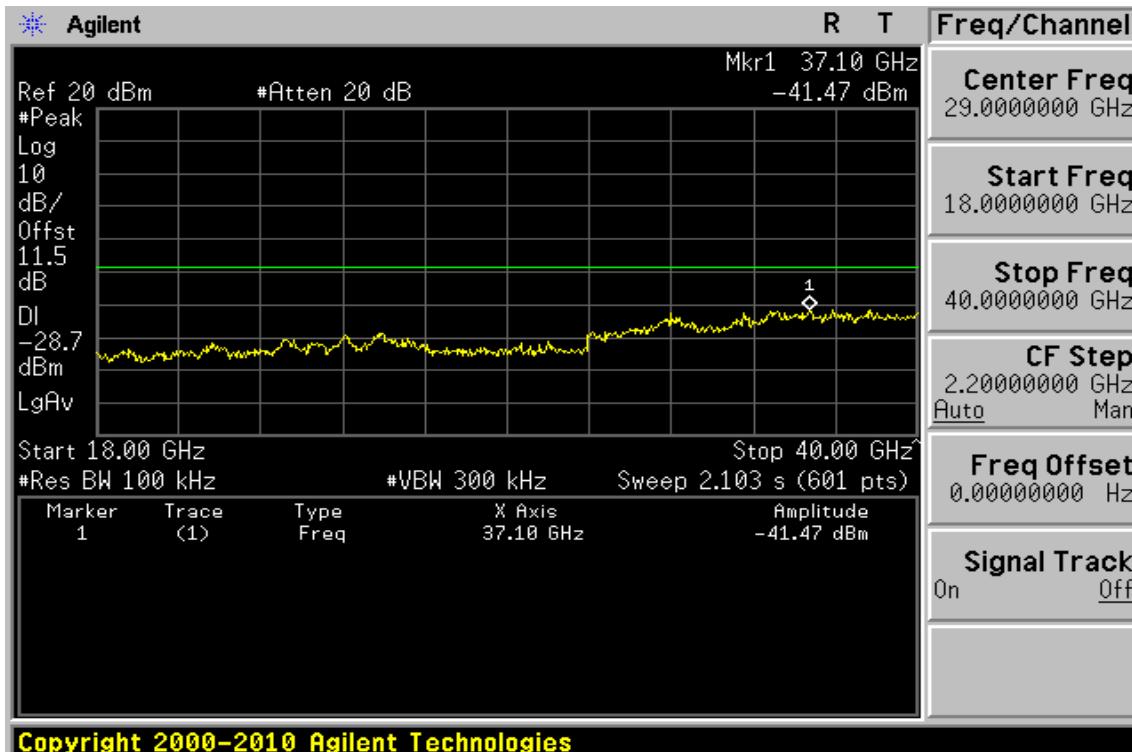


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**Ch High 18GHz – 40GHz**

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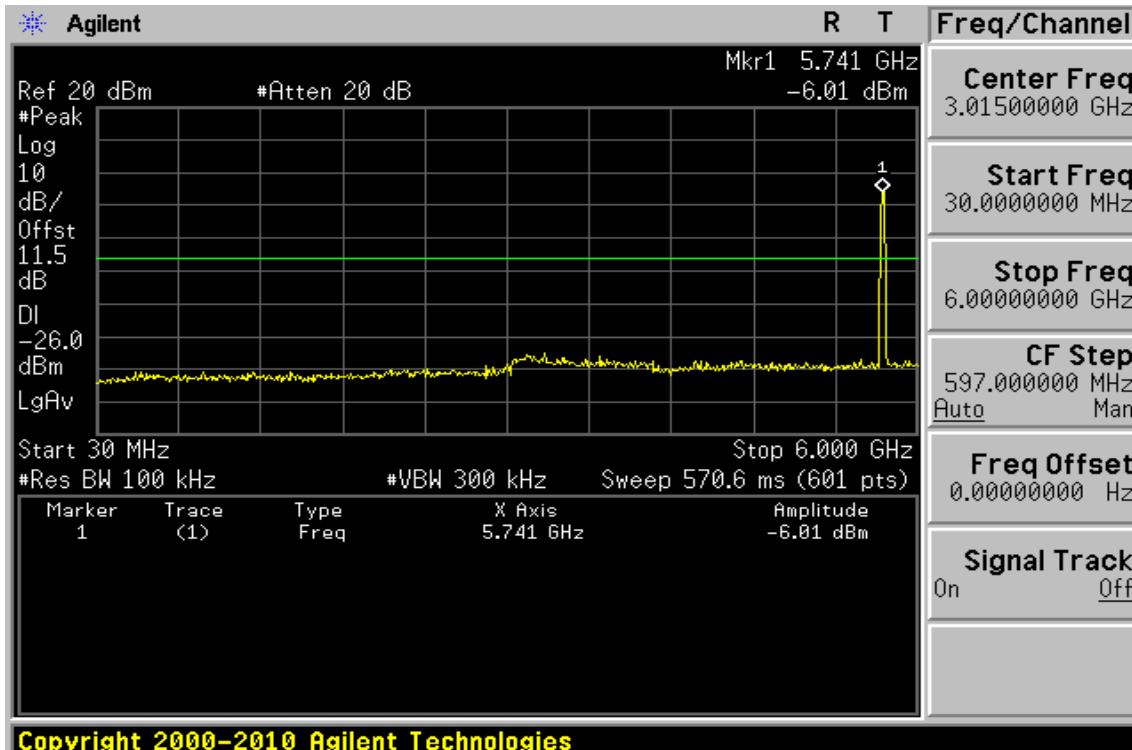
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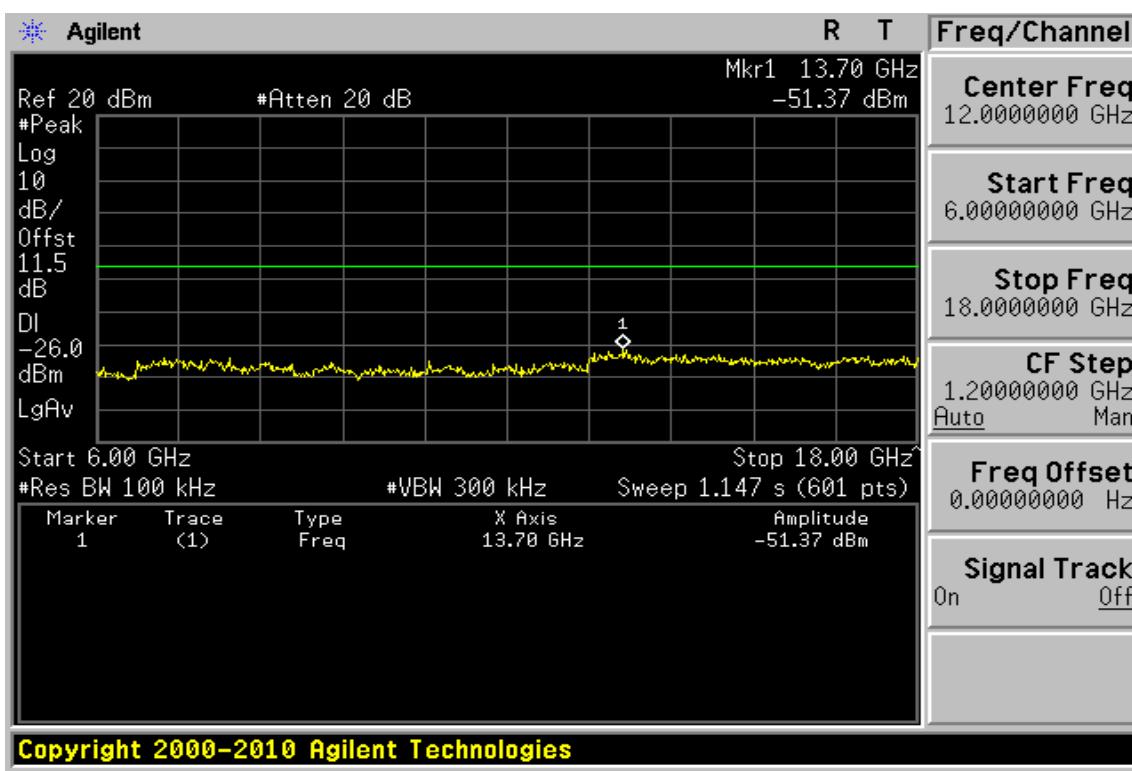
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## Conducted Spurious Emission Measurement Result (802.11n (5GHz)\_20M)

## Ch Low 30MHz – 6GHz



## Ch Low 6GHz – 18GHz



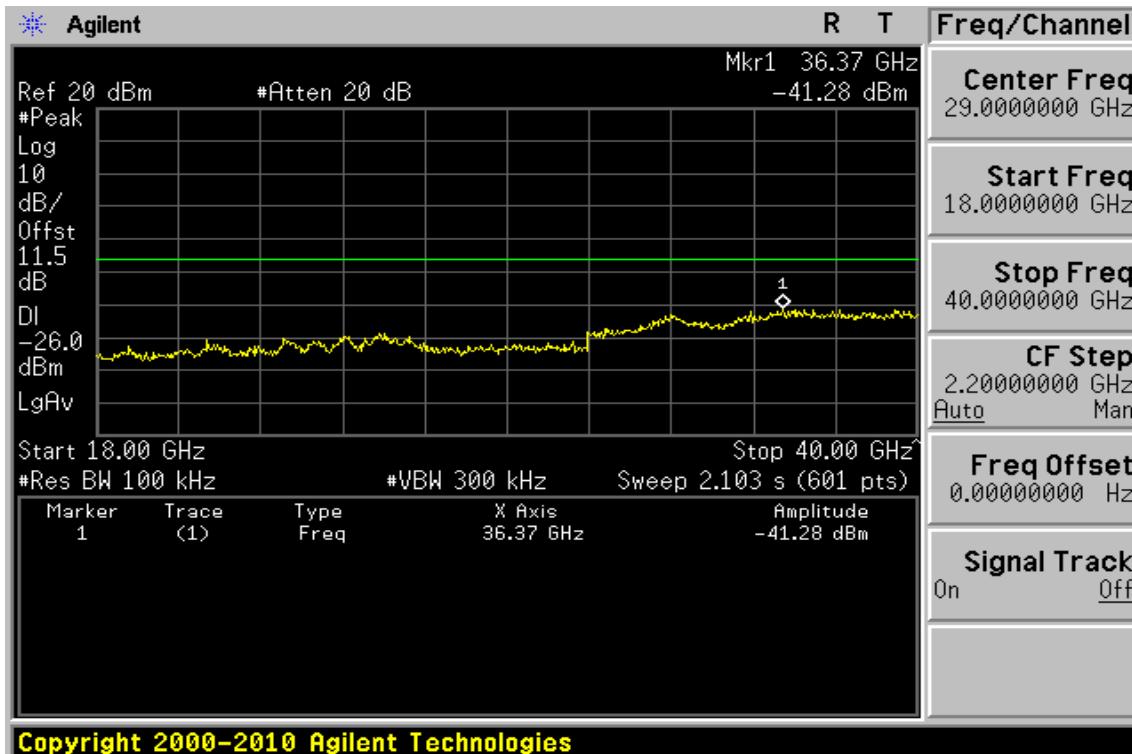
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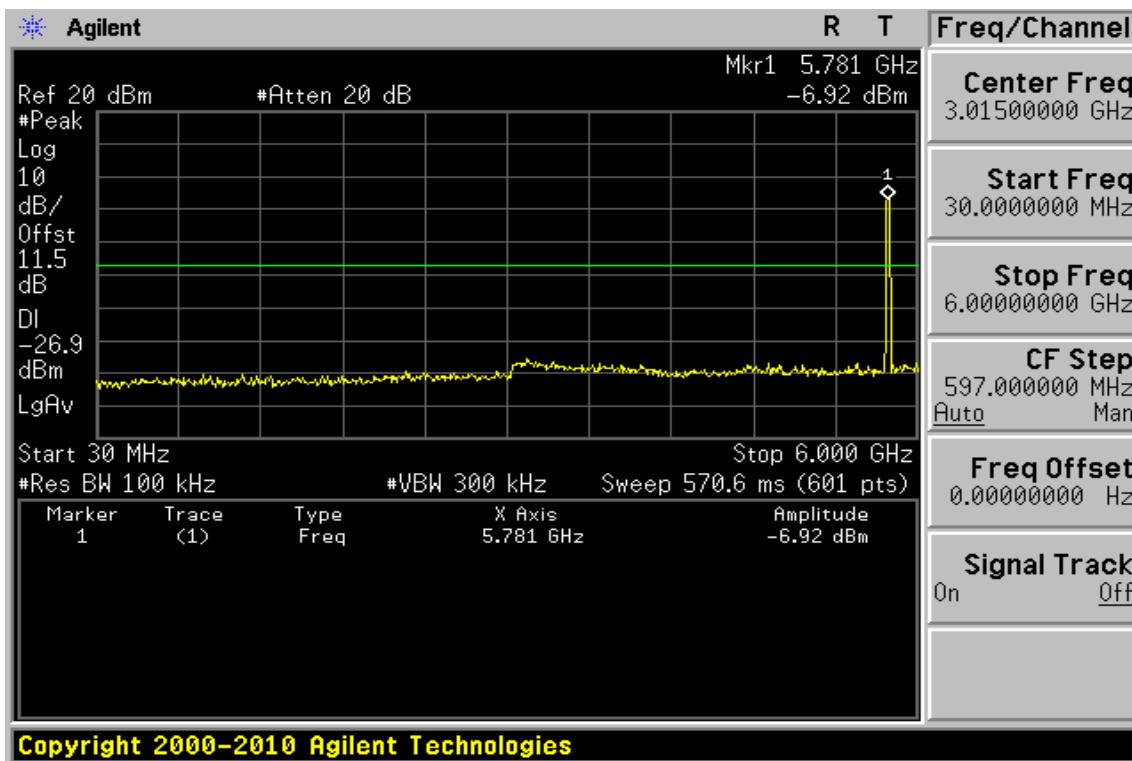
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## Ch Low 18GHz – 40GHz



## Ch Mid 30MHz – 6GHz



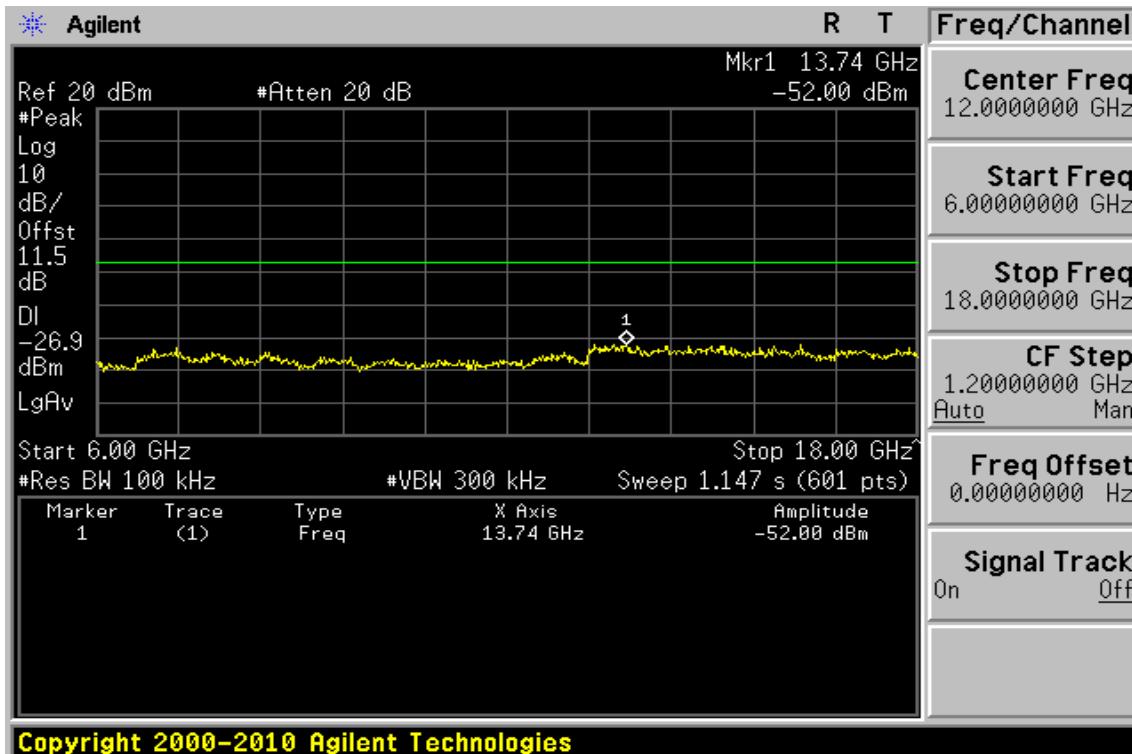
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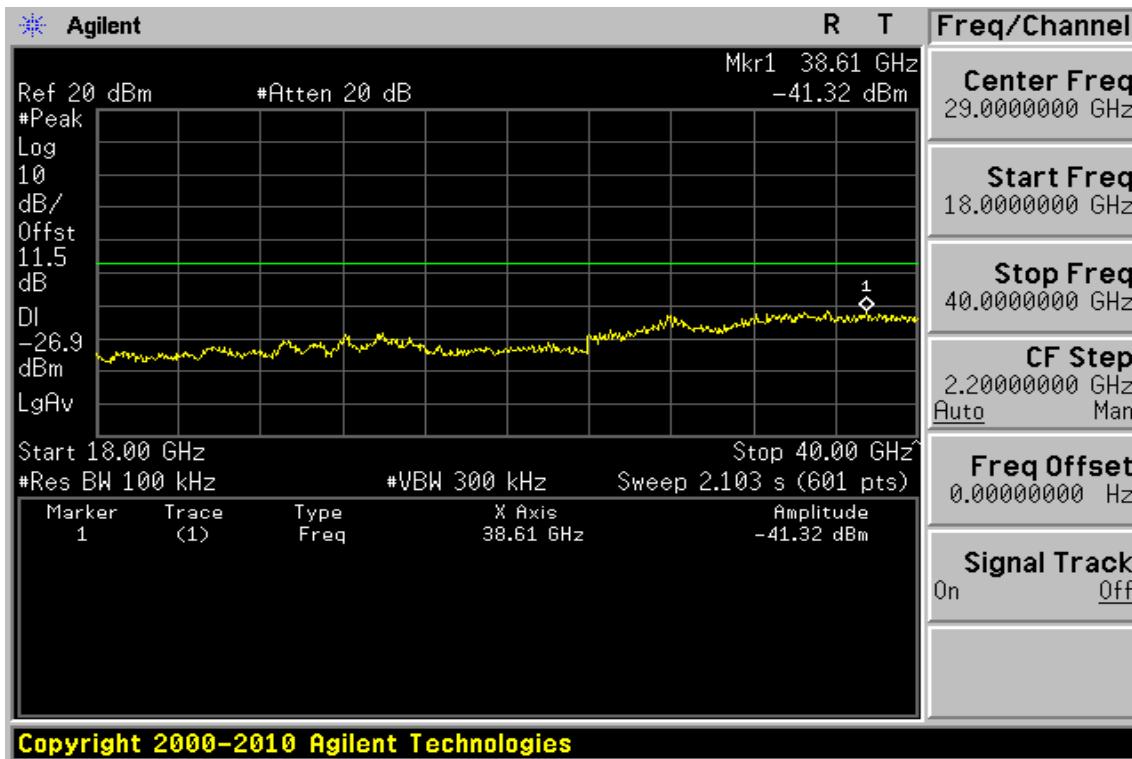
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## Ch Mid 6GHz – 18GHz



## Ch Mid 18GHz – 40GHz



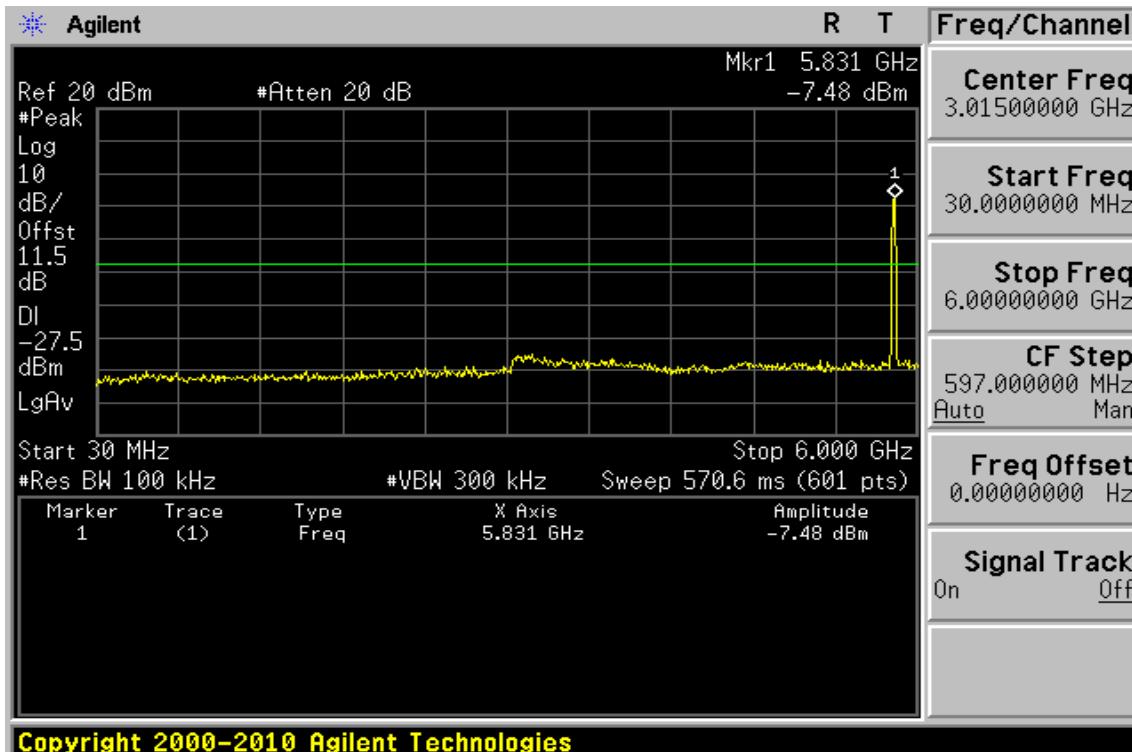
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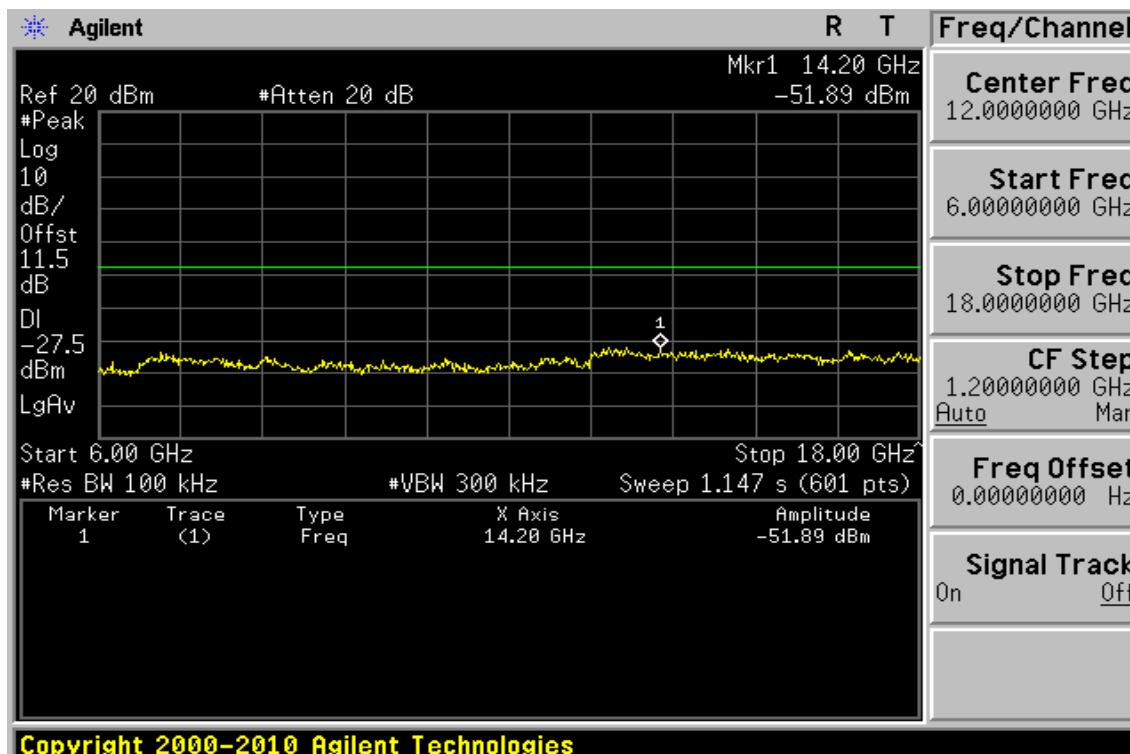
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## Ch High 30MHz – 6GHz



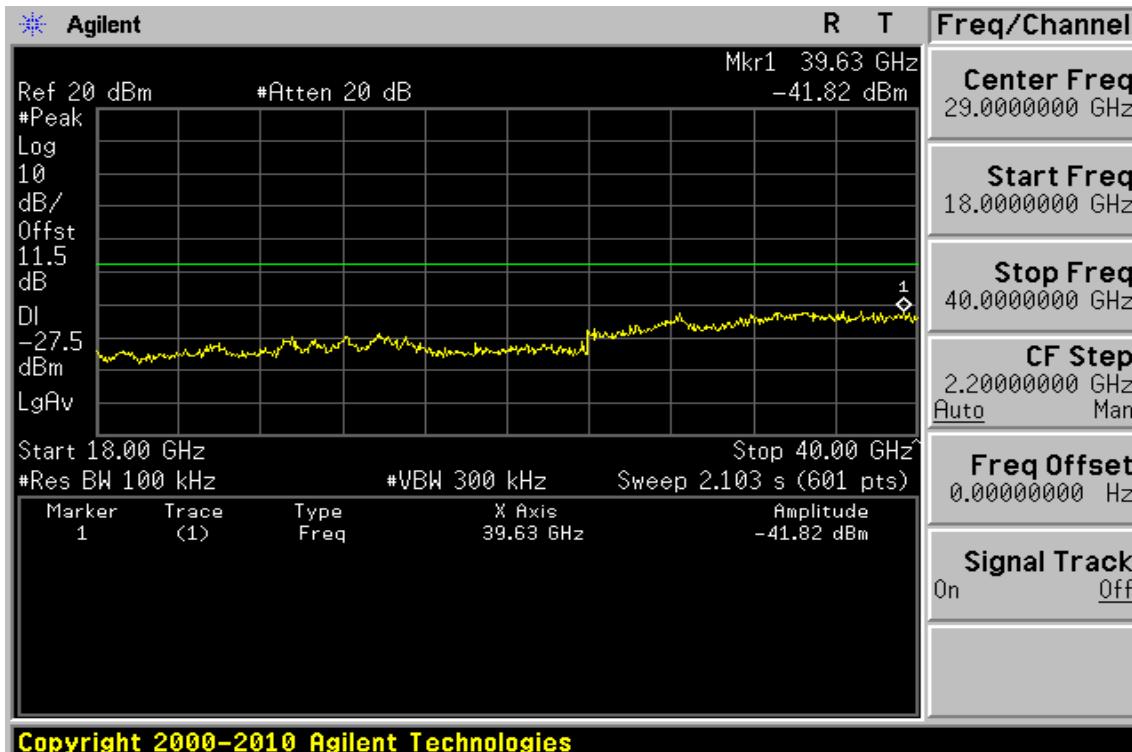
## Ch High 6GHz – 18GHz



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**Ch High 18GHz – 40GHz**

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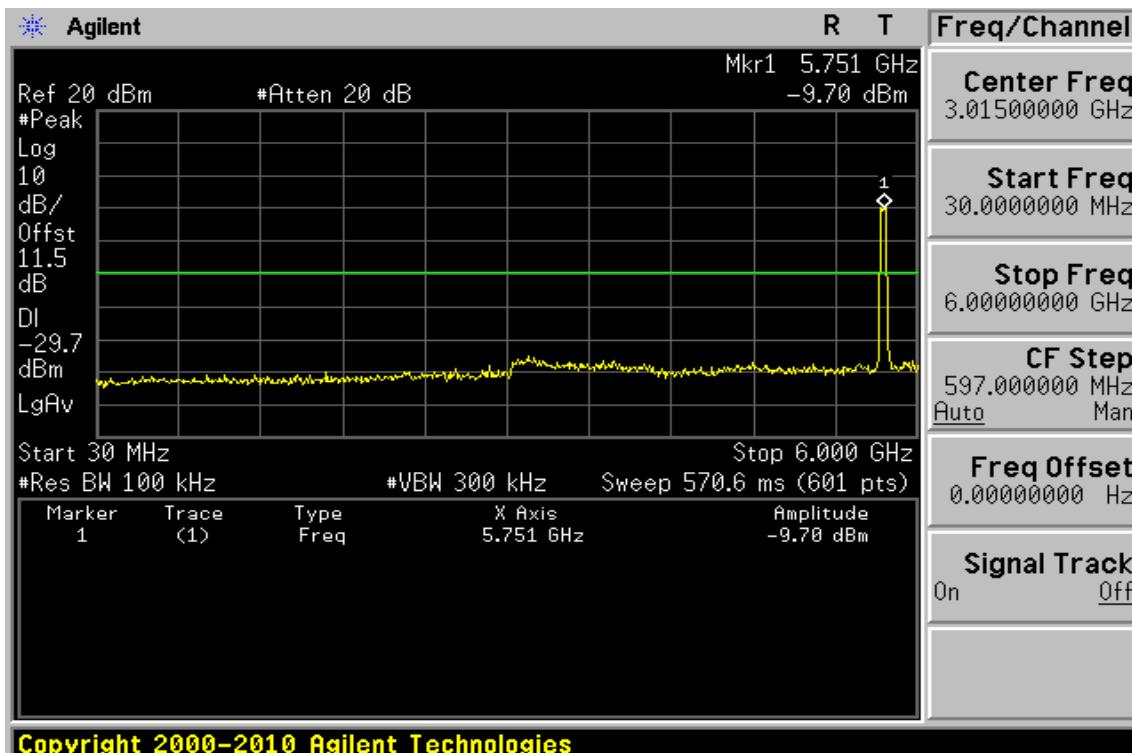
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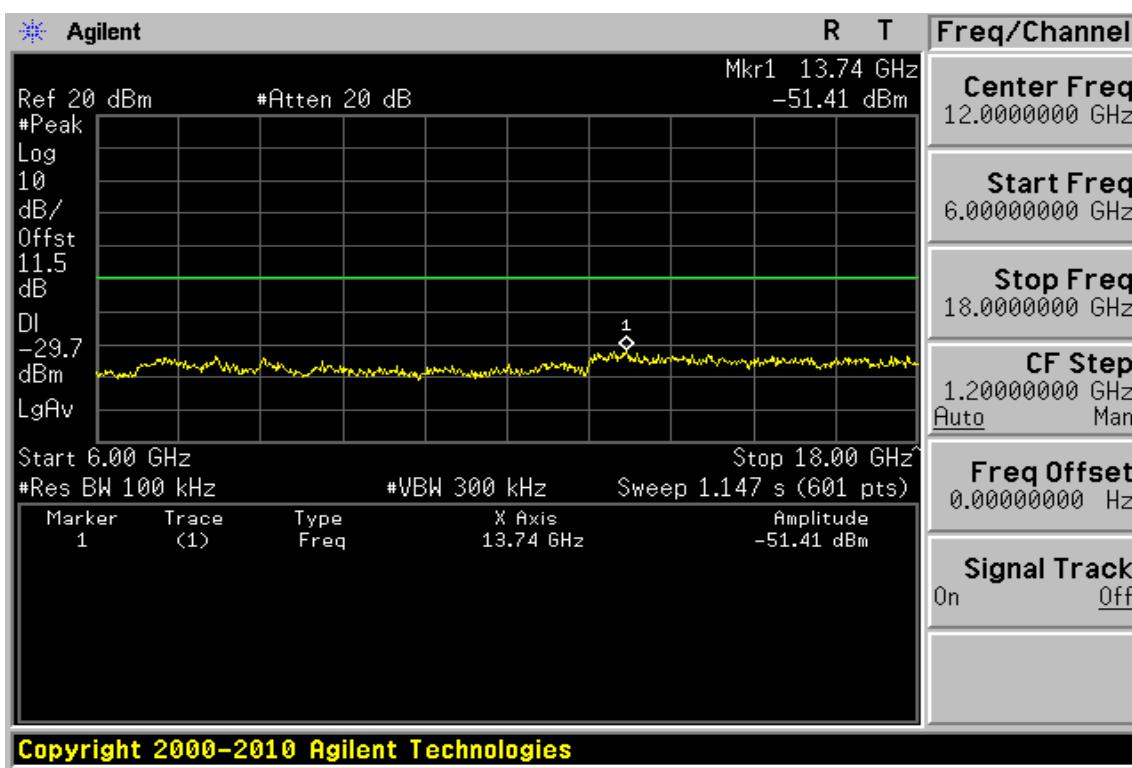
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## Conducted Spurious Emission Measurement Result (802.11n (5GHz)\_40M)

### Ch Low 30MHz – 6GHz



### Ch Low 6GHz – 18GHz



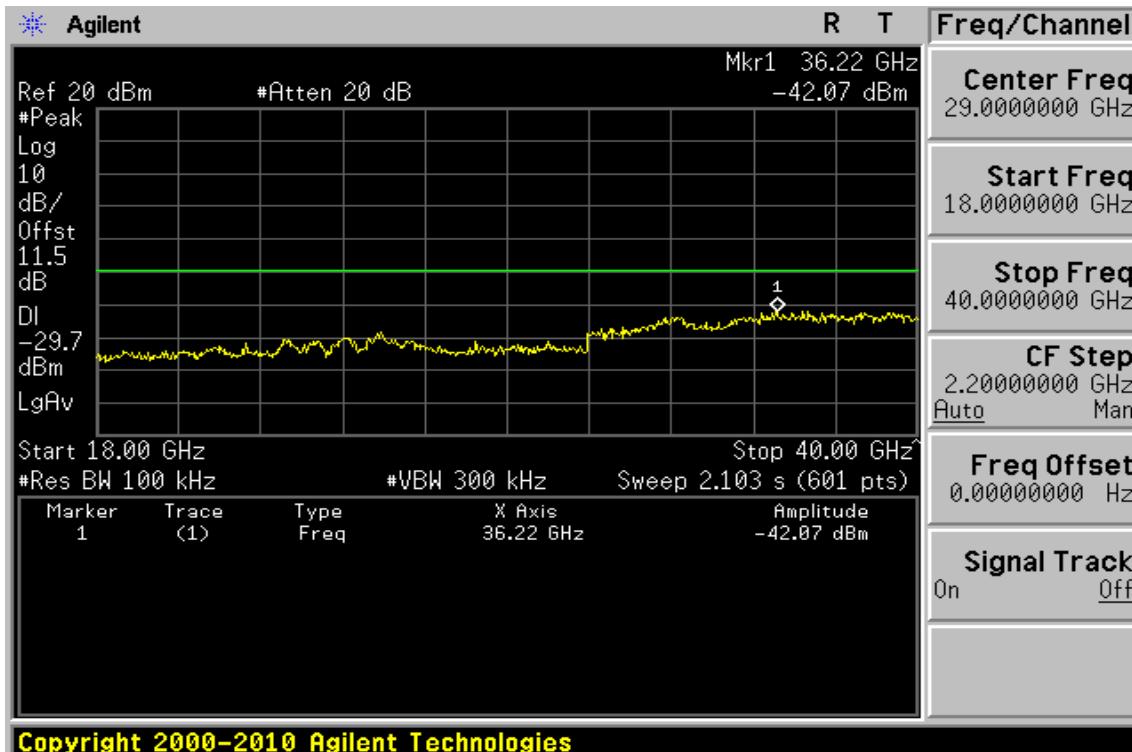
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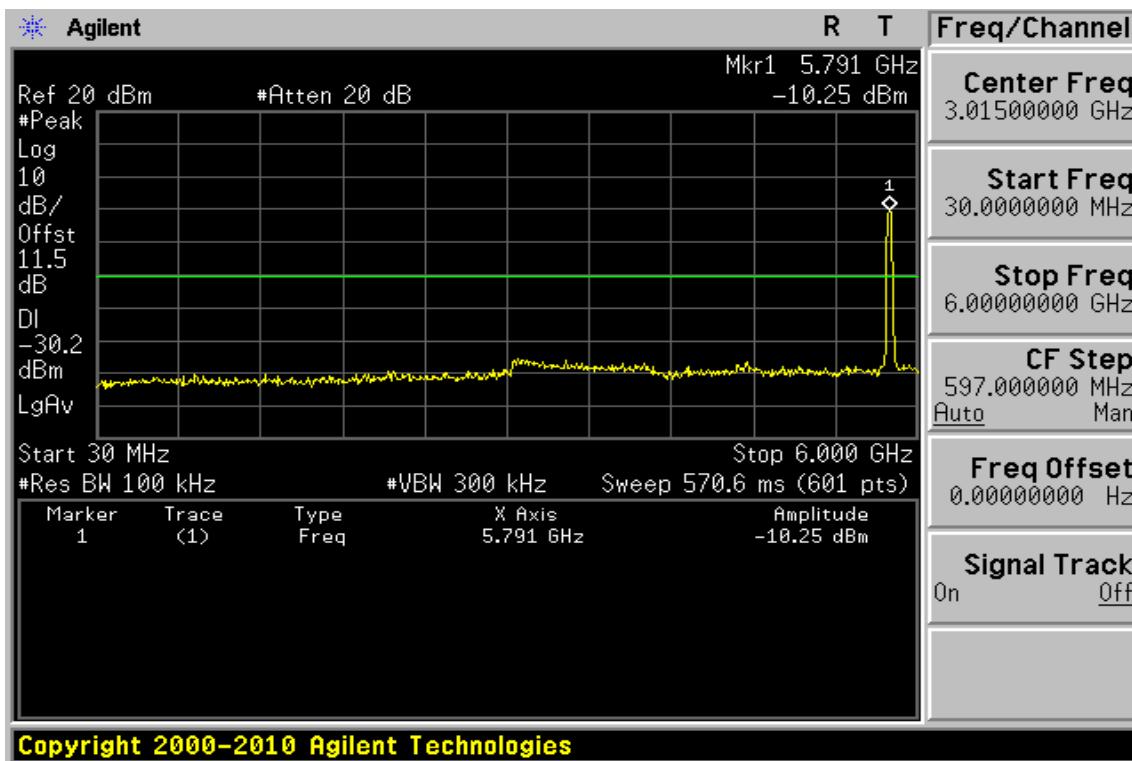
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## Ch Low 18GHz – 40GHz



## Ch High 30MHz – 6GHz



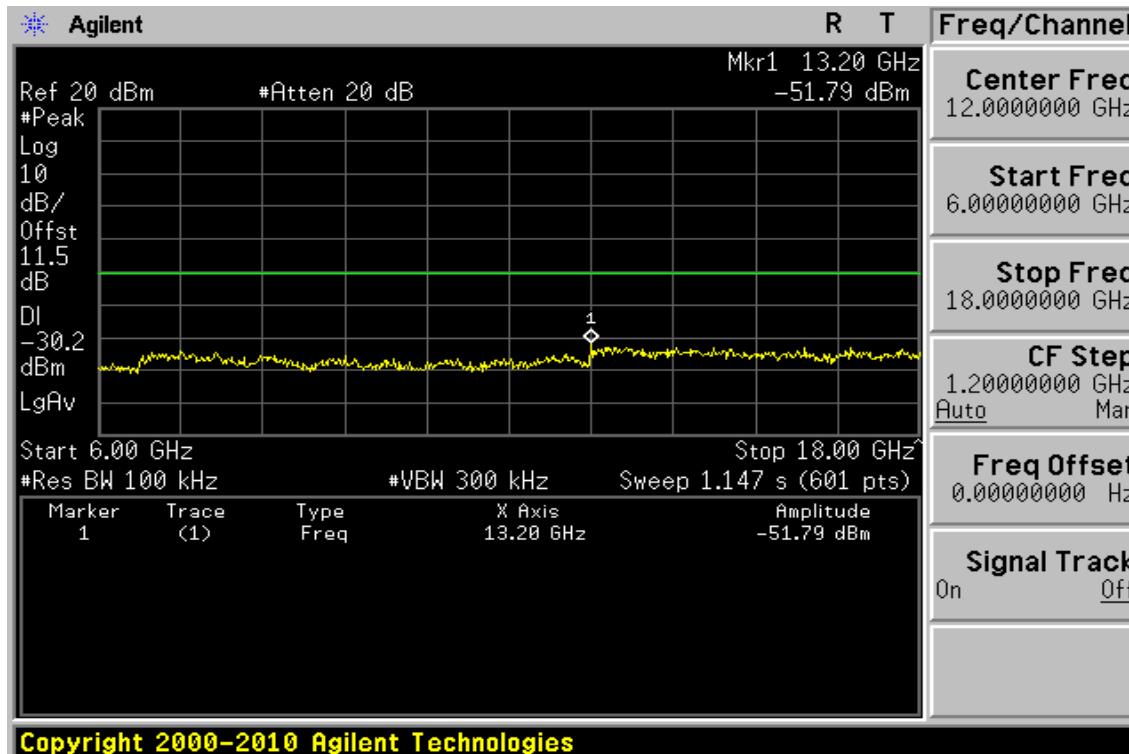
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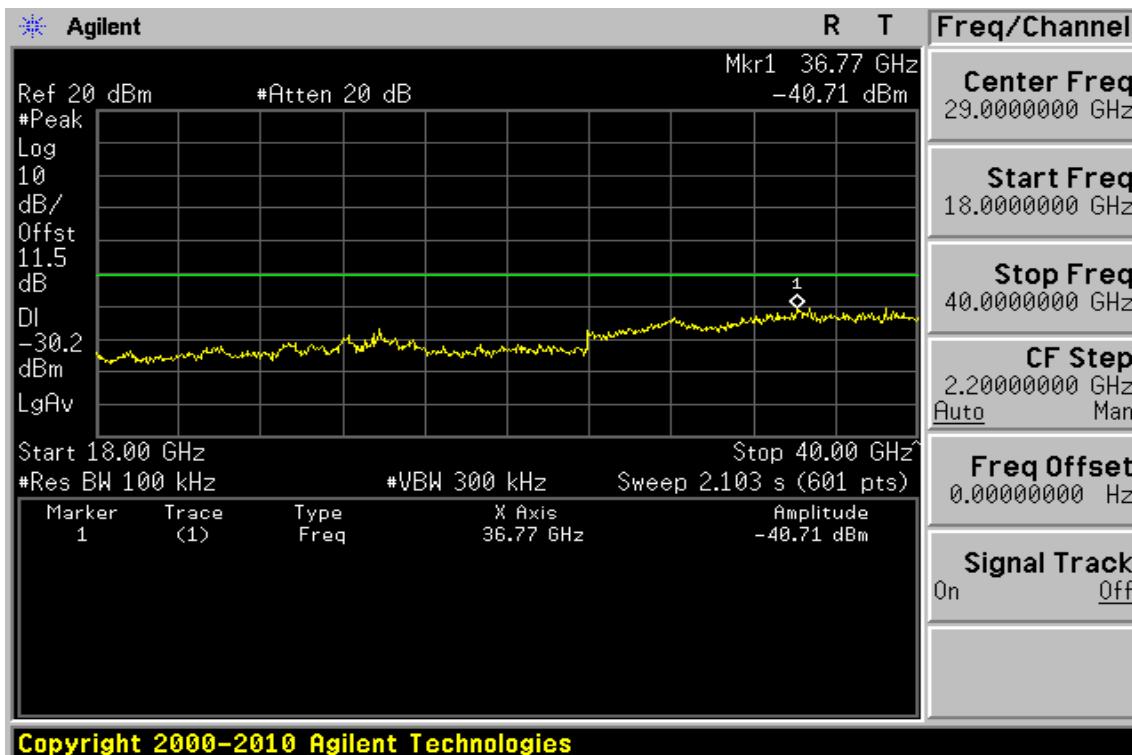
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## Ch High 6GHz – 18GHz



## Ch High 18GHz – 40GHz



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

Operation Band	:802.11 b	Test Date	:2013-09-17
Fundamental Frequency	:2412 MHz	Temp./Humi.	:25.6 deg_C / 58 RH
Operation Mode	:TX LOW	Engineer	:Allen
EUT Pol.	:H PLAN	Measurement Antenna Pol.	:VERTICAL

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.

“---” : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode	Spectrum Reading Level	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
70.74	S	Peak	38.08	-16.35	21.73	40.00	-18.27
186.17	S	Peak	36.85	-14.94	21.91	43.50	-21.59
269.59	S	Peak	43.36	-13.17	30.19	46.00	-15.81
495.60	S	Peak	33.57	-9.03	24.54	46.00	-21.46
719.67	S	Peak	29.17	-4.57	24.60	46.00	-21.40
960.23	S	Peak	28.09	-1.68	26.41	54.00	-27.59
4824.00	H	Peak	39.29	7.27	46.56	74.00	-27.44
4824.00	H	Average	35.09	7.27	42.36	54.00	-11.64
7236.00	H	---					
9648.00	H	---					
12060.00	H	---					
14472.00	H	---					
16884.00	H	---					
19296.00	H	---					
21708.00	H	---					
24120.00	H	---					

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Operation Band	:802.11 b	Test Date	:2013-09-17
Fundamental Frequency	:2412 MHz	Temp./Humi.	:25.6 deg_C / 58 RH
Operation Mode	:TX LOW	Engineer	:Allen
EUT Pol.	:H PLAN	Measurement Antenna Pol.	:HORIZONTAL

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.

“--“ : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode	Spectrum Reading Level	Factor dB	Actual FS dB $\mu$ V	Limit @3m dB $\mu$ V/m	Margin dB
			dB $\mu$ V				
78.50	S	Peak	37.96	-17.51	20.45	40.00	-19.55
191.99	S	Peak	47.39	-15.48	31.91	43.50	-11.59
260.86	S	Peak	40.84	-13.51	27.33	46.00	-18.67
466.50	S	Peak	35.67	-9.37	26.30	46.00	-19.70
718.70	S	Peak	32.68	-4.58	28.10	46.00	-17.90
926.28	S	Peak	28.90	-2.02	26.88	46.00	-19.12
4824.00	H	Peak	37.11	7.28	44.39	74.00	-29.61
4824.00	H	Average	28.68	7.28	35.96	54.00	-18.04
7236.00	H	---					
9648.00	H	---					
12060.00	H	---					
14472.00	H	---					
16884.00	H	---					
19296.00	H	---					
21708.00	H	---					
24120.00	H	---					

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Operation Band :802.11 b  
Fundamental Frequency :2437 MHz  
Operation Mode :TX MID  
EUT Pol. :H PLAN  
Test Date :2013-09-17  
Temp./Humi. :25.6 deg\_C / 58 RH  
Engineer :Allen  
Measurement Antenna Pol. :VERTICAL

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.

“---” : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode	Spectrum Reading Level	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
71.71	S	Peak	38.69	-16.50	22.19	40.00	-17.81
185.20	S	Peak	37.30	-14.84	22.46	43.50	-21.04
259.89	S	Peak	42.38	-13.55	28.83	46.00	-17.17
499.48	S	Peak	33.94	-8.99	24.95	46.00	-21.05
669.23	S	Peak	30.94	-5.30	25.64	46.00	-20.36
960.23	S	Peak	29.13	-1.68	27.45	54.00	-26.55
4874.00	H	Peak	40.55	7.47	48.02	74.00	-25.98
4874.00	H	Average	35.73	7.47	43.20	54.00	-10.80
7311.00	H	---					
9748.00	H	---					
12185.00	H	---					
14622.00	H	---					
17059.00	H	---					
19496.00	H	---					
21933.00	H	---					
24370.00	H	---					

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**Operation Band** :802.11 b  
**Fundamental Frequency** :2437 MHz  
**Operation Mode** :TX MID  
**EUT Pol.** :H PLAN

**Test Date** :2013-09-17  
**Temp./Humi.** :25.6 deg\_C / 58 RH  
**Engineer** :Allen  
**Measurement Antenna Pol.** :HORIZONTAL

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.

“---” : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode	Spectrum Reading Level	Factor dB	Actual FS dB $\mu$ V	Limit @3m dB $\mu$ V/m	Margin dB
78.50	S	Peak	37.25	-17.51	19.74	40.00	-20.26
185.20	S	Peak	47.10	-14.84	32.26	43.50	-11.24
263.77	S	Peak	39.60	-13.40	26.20	46.00	-19.80
461.65	S	Peak	36.55	-9.41	27.14	46.00	-18.86
718.70	S	Peak	33.17	-4.58	28.59	46.00	-17.41
960.23	S	Peak	28.53	-1.68	26.85	54.00	-27.15
4874.00	H	Peak	37.76	7.42	45.18	74.00	-28.82
4874.00	H	Average	29.95	7.42	37.37	54.00	-16.63
7311.00	H	---					
9748.00	H	---					
12185.00	H	---					
14622.00	H	---					
17059.00	H	---					
19496.00	H	---					
21933.00	H	---					
24370.00	H	---					

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Operation Band :802.11 b  
Fundamental Frequency :2462 MHz  
Operation Mode :TX HIGH  
EUT Pol. :H PLAN  
Test Date :2013-09-17  
Temp./Humi. :25.6 deg\_C / 58 RH  
Engineer :Allen  
Measurement Antenna Pol. :VERTICAL

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.

“---” : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode	Spectrum Reading Level	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
70.74	S	Peak	38.18	-16.35	21.83	40.00	-18.17
185.20	S	Peak	36.62	-14.84	21.78	43.50	-21.72
269.59	S	Peak	41.88	-13.17	28.71	46.00	-17.29
480.08	S	Peak	33.82	-9.23	24.59	46.00	-21.41
716.76	S	Peak	30.31	-4.61	25.70	46.00	-20.30
960.23	S	Peak	28.86	-1.68	27.18	54.00	-26.82
4924.00	H	Peak	43.71	7.61	51.32	74.00	-22.68
4924.00	H	Average	42.08	7.61	49.69	54.00	-4.31
7386.00	H	---					
9848.00	H	---					
12310.00	H	---					
14772.00	H	---					
17234.00	H	---					
19696.00	H	---					
22158.00	H	---					
24620.00	H	---					

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Operation Band	:802.11 b	Test Date	:2013-09-17
Fundamental Frequency	:2462 MHz	Temp./Humi.	:25.6 deg_C / 58 RH
Operation Mode	:TX HIGH	Engineer	:Allen
EUT Pol.	:H PLAN	Measurement Antenna Pol.	:HORIZONTAL

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.

“---” : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode	Spectrum Reading Level	Factor dB	Actual FS	Limit @3m	Margin
			dB $\mu$ V		dB $\mu$ V/m	dB $\mu$ V/m	dB
77.53	S	Peak	37.42	-17.37	20.05	40.00	-19.95
184.23	S	Peak	46.30	-14.73	31.57	43.50	-11.93
263.77	S	Peak	40.60	-13.40	27.20	46.00	-18.80
480.08	S	Peak	37.47	-9.23	28.24	46.00	-17.76
719.67	S	Peak	33.53	-4.57	28.96	46.00	-17.04
960.23	S	Peak	28.91	-1.68	27.23	54.00	-26.77
4924.00	H	Peak	38.62	7.50	46.12	74.00	-27.88
4924.00	H	Average	32.92	7.50	40.42	54.00	-13.58
7386.00	H	---					
9848.00	H	---					
12310.00	H	---					
14772.00	H	---					
17234.00	H	---					
19696.00	H	---					
22158.00	H	---					
24620.00	H	---					

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

Operation Band	:802.11 g	Test Date	:2013-09-17
Fundamental Frequency	:2412 MHz	Temp./Humi.	:25.6 deg_C / 58 RH
Operation Mode	:TX LOW	Engineer	:Allen
EUT Pol.	:H PLAN	Measurement Antenna Pol.	:VERTICAL

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.

“---” : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode	Spectrum Reading Level	Factor dB	Actual FS dB $\mu$ V	Limit @3m dB $\mu$ V/m	Margin dB
			dB $\mu$ V				
70.74	S	Peak	38.18	-16.35	21.83	40.00	-18.17
183.26	S	Peak	36.81	-14.62	22.19	43.50	-21.31
256.98	S	Peak	41.93	-13.63	28.30	46.00	-17.70
495.60	S	Peak	33.38	-9.03	24.35	46.00	-21.65
664.38	S	Peak	30.72	-5.37	25.35	46.00	-20.65
953.44	S	Peak	28.15	-1.73	26.42	46.00	-19.58
4824.00	H	Peak	38.89	7.27	46.16	74.00	-27.84
4824.00	H	Average	26.50	7.27	33.77	54.00	-20.23
7236.00	H	---					
9648.00	H	---					
12060.00	H	---					
14472.00	H	---					
16884.00	H	---					
19296.00	H	---					
21708.00	H	---					
24120.00	H	---					

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**Operation Band** :802.11 g  
**Fundamental Frequency** :2412 MHz  
**Operation Mode** :TX LOW  
**EUT Pol.** :H PLAN

**Test Date** :2013-09-17  
**Temp./Humi.** :25.6 deg\_C / 58 RH  
**Engineer** :Allen  
**Measurement Antenna Pol.** :HORIZONTAL

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.

“--“ : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode	Spectrum Reading Level	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
77.53	S	Peak	38.99	-17.37	21.62	40.00	-18.38
185.20	S	Peak	47.21	-14.84	32.37	43.50	-11.13
266.68	S	Peak	40.25	-13.28	26.97	46.00	-19.03
457.77	S	Peak	35.01	-9.45	25.56	46.00	-20.44
717.73	S	Peak	33.34	-4.59	28.75	46.00	-17.25
939.86	S	Peak	32.17	-1.86	30.31	46.00	-15.69
4824.00	H	Peak	36.87	7.28	44.15	74.00	-29.85
4824.00	H	Average	24.36	7.28	31.64	54.00	-22.36
7236.00	H	---					
9648.00	H	---					
12060.00	H	---					
14472.00	H	---					
16884.00	H	---					
19296.00	H	---					
21708.00	H	---					
24120.00	H	---					

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Operation Band :802.11 g  
 Fundamental Frequency :2437 MHz  
 Operation Mode :TX MID  
 EUT Pol. :H PLAN

Test Date :2013-09-17  
 Temp./Humi. :25.6 deg\_C / 58 RH  
 Engineer :Allen  
 Measurement Antenna Pol. :VERTICAL

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.

“---” : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode	Spectrum Reading Level	Factor dB	Actual FS dB $\mu$ V	Limit @3m dB $\mu$ V/m	Margin dB
71.71	S	Peak	39.50	-16.50	23.00	40.00	-17.00
191.99	S	Peak	37.80	-15.48	22.32	43.50	-21.18
270.56	S	Peak	42.36	-13.14	29.22	46.00	-16.78
480.08	S	Peak	38.80	-9.23	29.57	46.00	-16.43
713.85	S	Peak	29.17	-4.64	24.53	46.00	-21.47
995.15	S	Peak	27.53	-1.47	26.06	54.00	-27.94
4874.00	H	Peak	38.49	7.47	45.96	74.00	-28.04
4874.00	H	Average	27.49	7.47	34.96	54.00	-19.04
7311.00	H	---					
9748.00	H	---					
12185.00	H	---					
14622.00	H	---					
17059.00	H	---					
19496.00	H	---					
21933.00	H	---					
24370.00	H	---					

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Operation Band	:802.11 g	Test Date	:2013-09-17
Fundamental Frequency	:2437 MHz	Temp./Humi.	:25.6 deg_C / 58 RH
Operation Mode	:TX MID	Engineer	:Allen
EUT Pol.	:H PLAN	Measurement Antenna Pol.	:HORIZONTAL

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.

“---” : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode	Spectrum Reading Level	Factor dB	Actual FS	Limit @3m	Margin
			dB $\mu$ V		dB $\mu$ V/m	dB $\mu$ V/m	dB
77.53	S	Peak	37.23	-17.37	19.86	40.00	-20.14
184.23	S	Peak	47.37	-14.73	32.64	43.50	-10.86
262.80	S	Peak	40.64	-13.44	27.20	46.00	-18.80
480.08	S	Peak	36.82	-9.23	27.59	46.00	-18.41
717.73	S	Peak	33.60	-4.59	29.01	46.00	-16.99
931.13	S	Peak	28.59	-1.97	26.62	46.00	-19.38
4874.00	H	Peak	37.10	7.42	44.52	74.00	-29.48
4874.00	H	Average	25.66	7.42	33.08	54.00	-20.92
7311.00	H	---					
9748.00	H	---					
12185.00	H	---					
14622.00	H	---					
17059.00	H	---					
19496.00	H	---					
21933.00	H	---					
24370.00	H	---					

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Operation Band :802.11 g  
 Fundamental Frequency :2462 MHz  
 Operation Mode :TX HIGH  
 EUT Pol. :H PLAN

Test Date :2013-09-17  
 Temp./Humi. :25.6 deg\_C / 58 RH  
 Engineer :Allen  
 Measurement Antenna Pol. :VERTICAL

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.

“---” : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode	Spectrum Reading Level	Factor dB	Actual FS dB $\mu$ V	Limit @3m dB $\mu$ V/m	Margin dB
70.74	S	Peak	38.76	-16.35	22.41	40.00	-17.59
185.20	S	Peak	37.22	-14.84	22.38	43.50	-21.12
271.53	S	Peak	41.94	-13.12	28.82	46.00	-17.18
499.48	S	Peak	32.95	-8.99	23.96	46.00	-22.04
696.39	S	Peak	29.40	-4.88	24.52	46.00	-21.48
960.23	S	Peak	29.23	-1.68	27.55	54.00	-26.45
4924.00	H	Peak	38.78	7.61	46.39	74.00	-27.61
4924.00	H	Average	26.16	7.61	33.77	54.00	-20.23
7386.00	H	---					
9848.00	H	---					
12310.00	H	---					
14772.00	H	---					
17234.00	H	---					
19696.00	H	---					
22158.00	H	---					
24620.00	H	---					

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Operation Band :802.11 g  
 Fundamental Frequency :2462 MHz  
 Operation Mode :TX HIGH  
 EUT Pol. :H PLAN

Test Date :2013-09-17  
 Temp./Humi. :25.6 deg\_C / 58 RH  
 Engineer :Allen  
 Measurement Antenna Pol. :HORIZONTAL

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.

“--“ : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode	Spectrum Reading Level	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
71.71	S	Peak	36.24	-16.50	19.74	40.00	-20.26
185.20	S	Peak	46.17	-14.84	31.33	43.50	-12.17
258.92	S	Peak	40.39	-13.57	26.82	46.00	-19.18
495.60	S	Peak	35.48	-9.03	26.45	46.00	-19.55
717.73	S	Peak	32.92	-4.59	28.33	46.00	-17.67
960.23	S	Peak	28.37	-1.68	26.69	54.00	-27.31
4924.00	H	Peak	36.25	7.50	43.75	74.00	-30.25
4924.00	H	Average	23.92	7.50	31.42	54.00	-22.58
7386.00	H	---					
9848.00	H	---					
12310.00	H	---					
14772.00	H	---					
17234.00	H	---					
19696.00	H	---					
22158.00	H	---					
24620.00	H	---					

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**Radiated Spurious Emission Measurement Result (802.11n\_20M) (2.4GHz)**

Operation Band	:802.11 n20M	Test Date	:2013-09-17
Fundamental Frequency	:2412 MHz	Temp./Humi.	:25.6 deg_C / 58 RH
Operation Mode	:TX LOW	Engineer	:Allen
EUT Pol.	:H PLAN	Measurement Antenna Pol.	:VERTICAL

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.

“---” : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode	Spectrum Reading Level	Factor dB	Actual FS dB $\mu$ V	Limit @3m dB $\mu$ V/m	Margin dB
			PK/QP/AV				
70.74	S	Peak	38.24	-16.35	21.89	40.00	-18.11
186.17	S	Peak	36.89	-14.94	21.95	43.50	-21.55
262.80	S	Peak	42.97	-13.44	29.53	46.00	-16.47
499.48	S	Peak	33.06	-8.99	24.07	46.00	-21.93
580.96	S	Peak	33.14	-7.16	25.98	46.00	-20.02
960.23	S	Peak	29.04	-1.68	27.36	54.00	-26.64
4824.00	H	Peak	39.19	7.27	46.46	74.00	-27.54
4824.00	H	Average	26.62	7.27	33.89	54.00	-20.11
7236.00	H	---					
9648.00	H	---					
12060.00	H	---					
14472.00	H	---					
16884.00	H	---					
19296.00	H	---					
21708.00	H	---					
24120.00	H	---					

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Operation Band :802.11 n20M Test Date :2013-09-17  
Fundamental Frequency :2412 MHz Temp./Humi. :25.6 deg\_C / 58 RH  
Operation Mode :TX LOW Engineer :Allen  
EUT Pol. :H PLAN Measurement Antenna Pol. :HORIZONTAL

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.

“---” : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode	Spectrum Reading Level	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
77.53	S	Peak	37.12	-17.37	19.75	40.00	-20.25
184.23	S	Peak	47.96	-14.73	33.23	43.50	-10.27
262.80	S	Peak	41.04	-13.44	27.60	46.00	-18.40
495.60	S	Peak	34.87	-9.03	25.84	46.00	-20.16
719.67	S	Peak	32.43	-4.57	27.86	46.00	-18.14
944.71	S	Peak	27.78	-1.82	25.96	46.00	-20.04
4824.00	H	Average	24.74	7.28	32.02	54.00	-21.98
4824.00	H	Peak	37.01	7.28	44.29	74.00	-29.71
7236.00	H	---					
9648.00	H	---					
12060.00	H	---					
14472.00	H	---					
16884.00	H	---					
19296.00	H	---					
21708.00	H	---					
24120.00	H	---					

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Operation Band :802.11 n20M      Test Date :2013-09-17  
 Fundamental Frequency :2437 MHz      Temp./Humi. :25.6 deg\_C / 58 RH  
 Operation Mode :TX MID      Engineer :Allen  
 EUT Pol. :H PLAN      Measurement Antenna Pol. :VERTICAL

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.

“---” : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode	Spectrum Reading Level	Factor dB	Actual FS dB $\mu$ V	Limit @3m dB $\mu$ V/m	Margin dB
71.71	S	Peak	39.12	-16.50	22.62	40.00	-17.38
185.20	S	Peak	36.37	-14.84	21.53	43.50	-21.97
261.83	S	Peak	42.67	-13.47	29.20	46.00	-16.80
480.08	S	Peak	33.60	-9.23	24.37	46.00	-21.63
715.79	S	Peak	28.86	-4.62	24.24	46.00	-21.76
887.48	S	Peak	33.25	-2.68	30.57	46.00	-15.43
4874.00	H	Average	26.73	7.47	34.20	54.00	-19.80
4874.00	H	Peak	39.12	7.47	46.59	74.00	-27.41
7311.00	H	---					
9748.00	H	---					
12185.00	H	---					
14622.00	H	---					
17059.00	H	---					
19496.00	H	---					
21933.00	H	---					
24370.00	H	---					

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Operation Band :802.11 n20M      Test Date :2013-09-17  
 Fundamental Frequency :2437 MHz      Temp./Humi. :25.6 deg\_C / 58 RH  
 Operation Mode :TX MID      Engineer :Allen  
 EUT Pol. :H PLAN      Measurement Antenna Pol. :HORIZONTAL

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.

“---” : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode	Spectrum Reading Level	Factor dB	Actual FS dB $\mu$ V	Limit @3m dB $\mu$ V/m	Margin dB
						Factor dB	Actual FS dB $\mu$ V/m
78.50	S	Peak	37.47	-17.51	19.96	40.00	-20.04
185.20	S	Peak	47.39	-14.84	32.55	43.50	-10.95
247.28	S	Peak	40.84	-13.87	26.97	46.00	-19.03
459.71	S	Peak	35.55	-9.43	26.12	46.00	-19.88
719.67	S	Peak	32.93	-4.57	28.36	46.00	-17.64
954.41	S	Peak	27.36	-1.72	25.64	46.00	-20.36
4874.00	H	Average	25.33	7.42	32.75	54.00	-21.25
4874.00	H	Peak	37.45	7.42	44.87	74.00	-29.13
7311.00	H	---					
9748.00	H	---					
12185.00	H	---					
14622.00	H	---					
17059.00	H	---					
19496.00	H	---					
21933.00	H	---					
24370.00	H	---					

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Operation Band :802.11 n20M      Test Date :2013-09-17  
 Fundamental Frequency :2462 MHz      Temp./Humi. :25.6 deg\_C / 58 RH  
 Operation Mode :TX HIGH      Engineer :Allen  
 EUT Pol. :H PLAN      Measurement Antenna Pol. :VERTICAL

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.

“---” : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode	Spectrum Reading Level	Factor dB	Actual FS dB $\mu$ V	Limit @3m dB $\mu$ V/m	Margin dB
71.71	S	Peak	39.81	-16.50	23.31	40.00	-16.69
191.99	S	Peak	38.77	-15.48	23.29	43.50	-20.21
260.86	S	Peak	43.09	-13.51	29.58	46.00	-16.42
480.08	S	Peak	36.58	-9.23	27.35	46.00	-18.65
718.70	S	Peak	28.82	-4.58	24.24	46.00	-21.76
960.23	S	Peak	28.83	-1.68	27.15	54.00	-26.85
4924.00	H	Average	26.00	7.61	33.61	54.00	-20.39
4924.00	H	Peak	37.53	7.61	45.14	74.00	-28.86
7386.00	H	---					
9848.00	H	---					
12310.00	H	---					
14772.00	H	---					
17234.00	H	---					
19696.00	H	---					
22158.00	H	---					
24620.00	H	---					

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Operation Band :802.11 n20M      Test Date :2013-09-17  
 Fundamental Frequency :2462 MHz      Temp./Humi. :25.6 deg\_C / 58 RH  
 Operation Mode :TX HIGH      Engineer :Allen  
 EUT Pol. :H PLAN      Measurement Antenna Pol. :HORIZONTAL

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.

“---” : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode	Spectrum Reading Level	Factor dB	Actual FS dB $\mu$ V	Limit @3m dB $\mu$ V/m	Margin dB
77.53	S	Peak	37.41	-17.37	20.04	40.00	-19.96
183.26	S	Peak	47.80	-14.62	33.18	43.50	-10.32
265.71	S	Peak	41.71	-13.33	28.38	46.00	-17.62
499.48	S	Peak	34.82	-8.99	25.83	46.00	-20.17
716.76	S	Peak	34.18	-4.61	29.57	46.00	-16.43
927.25	S	Peak	31.38	-2.00	29.38	46.00	-16.62
4924.00	H	Average	24.14	7.50	31.64	54.00	-22.36
4924.00	H	Peak	36.82	7.50	44.32	74.00	-29.68
7386.00	H	---					
9848.00	H	---					
12310.00	H	---					
14772.00	H	---					
17234.00	H	---					
19696.00	H	---					
22158.00	H	---					
24620.00	H	---					

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**Radiated Spurious Emission Measurement Result (802.11n\_40M) (2.4GHz)**

Operation Band	:802.11 n40M	Test Date	:2013-09-17
Fundamental Frequency	:2422 MHz	Temp./Humi.	:25.6 deg_C / 58 RH
Operation Mode	:TX LOW	Engineer	:Allen
EUT Pol.	:H PLAN	Measurement Antenna Pol.	:VERTICAL

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.

“---” : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode	Spectrum Reading Level		Factor dB	Actual FS dB $\mu$ V	Limit @3m dB $\mu$ V/m	Margin dB
			PK/QP/AV	dB $\mu$ V				
71.71	S	Peak		38.09	-16.50	21.59	40.00	-18.41
191.99	S	Peak		37.68	-15.48	22.20	43.50	-21.30
261.83	S	Peak		42.05	-13.47	28.58	46.00	-17.42
499.48	S	Peak		32.83	-8.99	23.84	46.00	-22.16
693.48	S	Peak		29.76	-4.92	24.84	46.00	-21.16
992.24	S	Peak		28.05	-1.49	26.56	54.00	-27.44
4844.00	H	Average		26.42	7.35	33.77	54.00	-20.23
4844.00	H	Peak		37.53	7.35	44.88	74.00	-29.12
7266.00	H	---						
9688.00	H	---						
12110.00	H	---						
14532.00	H	---						
16954.00	H	---						
19376.00	H	---						
21798.00	H	---						
24220.00	H	---						

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Operation Band	:802.11 n40M	Test Date	:2013-09-17
Fundamental Frequency	:2422 MHz	Temp./Humi.	:25.6 deg_C / 58 RH
Operation Mode	:TX LOW	Engineer	:Allen
EUT Pol.	:H PLAN	Measurement Antenna Pol.	:HORIZONTAL

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.

“--“ : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode	Spectrum Reading Level	Factor dB	Actual FS	Limit @3m	Margin
			dB $\mu$ V		dB $\mu$ V/m	dB $\mu$ V/m	dB
77.53	S	Peak	37.38	-17.37	20.01	40.00	-19.99
191.99	S	Peak	48.00	-15.48	32.52	43.50	-10.98
256.01	S	Peak	39.18	-13.65	25.53	46.00	-20.47
461.65	S	Peak	34.62	-9.41	25.21	46.00	-20.79
717.73	S	Peak	33.49	-4.59	28.90	46.00	-17.10
884.57	S	Peak	31.47	-2.73	28.74	46.00	-17.26
4844.00	H	Average	25.02	7.33	32.35	54.00	-21.65
4844.00	H	Peak	37.44	7.33	44.77	74.00	-29.23
7266.00	H	---					
9688.00	H	---					
12110.00	H	---					
14532.00	H	---					
16954.00	H	---					
19376.00	H	---					
21798.00	H	---					
24220.00	H	---					

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Operation Band :802.11 n40M Test Date :2013-09-17  
Fundamental Frequency :2437 MHz Temp./Humi. :25.6 deg\_C / 58 RH  
Operation Mode :TX MID Engineer :Allen  
EUT Pol. :H PLAN Measurement Antenna Pol. :VERTICAL

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.

“---” : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode	Spectrum Reading Level	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
70.74	S	Peak	38.86	-16.35	22.51	40.00	-17.49
191.99	S	Peak	37.45	-15.48	21.97	43.50	-21.53
259.89	S	Peak	42.46	-13.55	28.91	46.00	-17.09
499.48	S	Peak	32.73	-8.99	23.74	46.00	-22.26
719.67	S	Peak	28.67	-4.57	24.10	46.00	-21.90
960.23	S	Peak	27.86	-1.68	26.18	54.00	-27.82
4874.00	H	Average	26.73	7.47	34.20	54.00	-19.80
4874.00	H	Peak	37.65	7.47	45.12	74.00	-28.88
7311.00	H	---					
9748.00	H	---					
12185.00	H	---					
14622.00	H	---					
17059.00	H	---					
19496.00	H	---					
21933.00	H	---					
24370.00	H	---					

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Operation Band :802.11 n40M Test Date :2013-09-17  
 Fundamental Frequency :2437 MHz Temp./Humi. :25.6 deg\_C / 58 RH  
 Operation Mode :TX MID Engineer :Allen  
 EUT Pol. :H PLAN Measurement Antenna Pol. :HORIZONTAL

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.

“---” : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode	Spectrum Reading Level	Factor dB	Actual FS dB $\mu$ V	Limit @3m dB $\mu$ V/m	Margin dB
78.50	S	Peak	36.65	-17.51	19.14	40.00	-20.86
184.23	S	Peak	46.96	-14.73	32.23	43.50	-11.27
262.80	S	Peak	41.48	-13.44	28.04	46.00	-17.96
462.62	S	Peak	35.87	-9.40	26.47	46.00	-19.53
719.67	S	Peak	32.34	-4.57	27.77	46.00	-18.23
960.23	S	Peak	28.32	-1.68	26.64	54.00	-27.36
4874.00	H	Average	25.30	7.42	32.72	54.00	-21.28
4874.00	H	Peak	37.38	7.42	44.80	74.00	-29.20
7311.00	H	---					
9748.00	H	---					
12185.00	H	---					
14622.00	H	---					
17059.00	H	---					
19496.00	H	---					
21933.00	H	---					
24370.00	H	---					

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Operation Band :802.11 n40M      Test Date :2013-09-17  
 Fundamental Frequency :2452 MHz      Temp./Humi. :25.6 deg\_C / 58 RH  
 Operation Mode :TX HIGH      Engineer :Allen  
 EUT Pol. :H PLAN      Measurement Antenna Pol. :VERTICAL

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.

“---” : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode	Spectrum Reading Level	Factor dB	Actual FS dB $\mu$ V	Limit @3m dB $\mu$ V/m	Margin dB
71.71	S	Peak	39.42	-16.50	22.92	40.00	-17.08
186.17	S	Peak	37.04	-14.94	22.10	43.50	-21.40
266.68	S	Peak	42.72	-13.28	29.44	46.00	-16.56
480.08	S	Peak	37.29	-9.23	28.06	46.00	-17.94
664.38	S	Peak	29.73	-5.37	24.36	46.00	-21.64
960.23	S	Peak	27.63	-1.68	25.95	54.00	-28.05
4904.00	H	Average	26.36	7.55	33.91	54.00	-20.09
4904.00	H	Peak	38.64	7.55	46.19	74.00	-27.81
7356.00	H	---					
9808.00	H	---					
12260.00	H	---					
14712.00	H	---					
17164.00	H	---					
19616.00	H	---					
22068.00	H	---					
24520.00	H	---					

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Operation Band :802.11 n40M      Test Date :2013-09-17  
 Fundamental Frequency :2452 MHz      Temp./Humi. :25.6 deg\_C / 58 RH  
 Operation Mode :TX HIGH      Engineer :Allen  
 EUT Pol. :H PLAN      Measurement Antenna Pol. :HORIZONTAL

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.

“---” : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode	Spectrum Reading Level	Factor dB	Actual FS dB $\mu$ V	Limit @3m dB $\mu$ V/m	Margin dB
70.74	S	Peak	35.63	-16.35	19.28	40.00	-20.72
184.23	S	Peak	47.36	-14.73	32.63	43.50	-10.87
259.89	S	Peak	40.87	-13.55	27.32	46.00	-18.68
462.62	S	Peak	35.54	-9.40	26.14	46.00	-19.86
716.76	S	Peak	33.24	-4.61	28.63	46.00	-17.37
900.09	S	Peak	29.65	-2.48	27.17	46.00	-18.83
4904.00	H	Average	24.87	7.47	32.34	54.00	-21.66
4904.00	H	Peak	36.97	7.47	44.44	74.00	-29.56
7356.00	H	---					
9808.00	H	---					
12260.00	H	---					
14712.00	H	---					
17164.00	H	---					
19616.00	H	---					
22068.00	H	---					
24520.00	H	---					

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

Operation Band	:802.11 a	Test Date	:2013-09-17
Fundamental Frequency	:5745 MHz	Temp./Humi.	:25.6 deg_C / 58 RH
Operation Mode	:TX LOW	Engineer	:Allen
EUT Pol.	:H PLAN	Measurement Antenna Pol.	:VERTICAL

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.

“---” : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode	Spectrum Reading Level	Factor dB	Actual FS dB $\mu$ V	Limit @3m dB $\mu$ V/m	Margin dB
70.74	S	Peak	37.07	-16.35	20.72	40.00	-19.28
186.17	S	Peak	38.17	-14.94	23.23	43.50	-20.27
262.80	S	Peak	42.79	-13.44	29.35	46.00	-16.65
320.03	S	Peak	40.87	-11.85	29.02	46.00	-16.98
532.46	S	Peak	32.30	-8.23	24.07	46.00	-21.93
798.24	S	Peak	31.35	-3.76	27.59	46.00	-18.41
11490.00	H	Average	21.91	17.98	39.89	54.00	-14.11
11490.00	H	Peak	22.26	17.98	40.24	74.00	-33.76
17235.00	H	---					
22980.00	H	---					
28725.00	H	---					
34470.00	H	---					

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Operation Band :802.11 a  
 Fundamental Frequency :5745 MHz  
 Operation Mode :TX LOW  
 EUT Pol. :H PLAN

Test Date :2013-09-17  
 Temp./Humi. :25.6 deg\_C / 58 RH  
 Engineer :Allen  
 Measurement Antenna Pol. :HORIZONTAL

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.

“---” : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode	Spectrum Reading Level	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
185.20	S	Peak	48.01	-14.84	33.17	43.50	-10.33
266.68	S	Peak	40.43	-13.28	27.15	46.00	-18.85
320.03	S	Peak	38.64	-11.85	26.79	46.00	-19.21
499.48	S	Peak	34.60	-8.99	25.61	46.00	-20.39
716.76	S	Peak	32.46	-4.61	27.85	46.00	-18.15
797.27	S	Peak	34.99	-3.77	31.22	46.00	-14.78
11490.00	H	Average	21.90	17.78	39.68	54.00	-14.32
11490.00	H	Peak	22.83	17.78	40.61	74.00	-33.39
17235.00	H	---					
22980.00	H	---					
28725.00	H	---					
34470.00	H	---					

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Operation Band :802.11 a  
 Fundamental Frequency :5785 MHz  
 Operation Mode :TX MID  
 EUT Pol. :H PLAN

Test Date :2013-09-17  
 Temp./Humi. :25.6 deg\_C / 58 RH  
 Engineer :Allen  
 Measurement Antenna Pol. :VERTICAL

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.

“---” : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode	Spectrum Reading Level	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
71.71	S	Peak	38.14	-16.50	21.64	40.00	-18.36
186.17	S	Peak	37.53	-14.94	22.59	43.50	-20.91
262.80	S	Peak	44.21	-13.44	30.77	46.00	-15.23
320.03	S	Peak	39.37	-11.85	27.52	46.00	-18.48
495.60	S	Peak	33.58	-9.03	24.55	46.00	-21.45
531.49	S	Peak	33.11	-8.25	24.86	46.00	-21.14
11570.00	H	Average	23.11	18.14	41.25	54.00	-12.75
11570.00	H	Peak	24.13	18.14	42.27	74.00	-31.73
17355.00	H	---					
23140.00	H	---					
28925.00	H	---					
34710.00	H	---					

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Operation Band	:802.11 a	Test Date	:2013-09-17
Fundamental Frequency	:5785 MHz	Temp./Humi.	:25.6 deg_C / 58 RH
Operation Mode	:TX MID	Engineer	:Allen
EUT Pol.	:H PLAN	Measurement Antenna Pol.	:HORIZONTAL

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.

“--“ : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode	Spectrum Reading Level	Factor dB	Actual FS dB $\mu$ V	Limit @3m dB $\mu$ V/m	Margin dB
			dB $\mu$ V				
186.17	S	Peak	48.52	-14.94	33.58	43.50	-9.92
261.83	S	Peak	40.22	-13.47	26.75	46.00	-19.25
320.03	S	Peak	41.05	-11.85	29.20	46.00	-16.80
495.60	S	Peak	33.56	-9.03	24.53	46.00	-21.47
721.61	S	Peak	33.24	-4.53	28.71	46.00	-17.29
798.24	S	Peak	32.05	-3.76	28.29	46.00	-17.71
11570.00	H	Average	22.24	17.94	40.18	54.00	-13.82
11570.00	H	Peak	22.52	17.94	40.46	74.00	-33.54
17355.00	H	---					
23140.00	H	---					
28925.00	H	---					
34710.00	H	---					

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Operation Band :802.11 a  
 Fundamental Frequency :5825 MHz  
 Operation Mode :TX HIGH  
 EUT Pol. :H PLAN

Test Date :2013-09-17  
 Temp./Humi. :25.6 deg\_C / 58 RH  
 Engineer :Allen  
 Measurement Antenna Pol. :VERTICAL

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.

“---” : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode	Spectrum Reading Level	Factor dB	Actual FS dB $\mu$ V	Limit @3m dB $\mu$ V/m	Margin dB
70.74	S	Peak	38.62	-16.35	22.27	40.00	-17.73
186.17	S	Peak	38.14	-14.94	23.20	43.50	-20.30
257.95	S	Peak	43.21	-13.61	29.60	46.00	-16.40
320.03	S	Peak	41.50	-11.85	29.65	46.00	-16.35
480.08	S	Peak	32.71	-9.23	23.48	46.00	-22.52
531.49	S	Peak	32.98	-8.25	24.73	46.00	-21.27
11650.00	H	Average	21.31	18.25	39.56	54.00	-14.44
11650.00	H	Peak	22.07	18.25	40.32	74.00	-33.68
17475.00	H	---					
23300.00	H	---					
29125.00	H	---					
34950.00	H	---					

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Operation Band	:802.11 a	Test Date	:2013-09-17
Fundamental Frequency	:5825 MHz	Temp./Humi.	:25.6 deg_C / 58 RH
Operation Mode	:TX HIGH	Engineer	:Allen
EUT Pol.	:H PLAN	Measurement Antenna Pol.	:HORIZONTAL

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.

“---” : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode	Spectrum Reading Level	Factor dB	Actual FS	Limit @3m	Margin
			dB $\mu$ V		dB $\mu$ V/m	dB $\mu$ V/m	dB
77.53	S	Peak	36.75	-17.37	19.38	40.00	-20.62
185.20	S	Peak	47.05	-14.84	32.21	43.50	-11.29
254.07	S	Peak	39.74	-13.71	26.03	46.00	-19.97
320.03	S	Peak	40.92	-11.85	29.07	46.00	-16.93
495.60	S	Peak	34.65	-9.03	25.62	46.00	-20.38
717.73	S	Peak	33.73	-4.59	29.14	46.00	-16.86
11650.00	H	Average	21.39	18.05	39.44	54.00	-14.56
11650.00	H	Peak	23.40	18.05	41.45	74.00	-32.55
17475.00	H	---					
23300.00	H	---					
29125.00	H	---					
34950.00	H	---					

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**Radiated Spurious Emission Measurement Result (802.11n (5GHz)\_20M)**

Operation Band	:802.11 n20M	Test Date	:2013-09-17
Fundamental Frequency	:5745 MHz	Temp./Humi.	:25.6 deg_C / 58 RH
Operation Mode	:TX LOW	Engineer	:Allen
EUT Pol.	:H PLAN	Measurement Antenna Pol.	:HORIZONTAL

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.

“---” : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode	Spectrum Reading Level	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
185.20	S	Peak	47.52	-14.84	32.68	43.50	-10.82
320.03	S	Peak	41.11	-11.85	29.26	46.00	-16.74
499.48	S	Peak	33.59	-8.99	24.60	46.00	-21.40
541.19	S	Peak	33.28	-8.04	25.24	46.00	-20.76
717.73	S	Peak	32.74	-4.59	28.15	46.00	-17.85
799.21	S	Peak	33.64	-3.75	29.89	46.00	-16.11
11490.00	H	Average	21.95	17.98	39.93	54.00	-14.07
11490.00	H	Peak	23.28	17.98	41.26	74.00	-32.74
17235.00	H	---					
22980.00	H	---					
28725.00	H	---					
34470.00	H	---					

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Operation Band	:802.11 n20M	Test Date	:2013-09-17
Fundamental Frequency	:5745 MHz	Temp./Humi.	:25.6 deg_C / 58 RH
Operation Mode	:TX LOW	Engineer	:Allen
EUT Pol.	:H PLAN	Measurement Antenna Pol.	:VERTICAL

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.

“---” : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode	Spectrum Reading Level	Factor dB	Actual FS dB $\mu$ V	Limit @3m dB $\mu$ V/m	Margin dB
71.71	S	Peak	38.24	-16.50	21.74	40.00	-18.26
185.20	S	Peak	37.52	-14.84	22.68	43.50	-20.82
261.83	S	Peak	43.06	-13.47	29.59	46.00	-16.41
320.03	S	Peak	41.16	-11.85	29.31	46.00	-16.69
495.60	S	Peak	32.68	-9.03	23.65	46.00	-22.35
798.24	S	Peak	32.83	-3.76	29.07	46.00	-16.93
11490.00	H	Average	22.04	17.78	39.82	54.00	-14.18
11490.00	H	Peak	23.15	17.78	40.93	74.00	-33.07
17235.00	H	---					
22980.00	H	---					
28725.00	H	---					
34470.00	H	---					

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Operation Band :802.11 n20M      Test Date :2013-09-17  
 Fundamental Frequency :5785 MHz      Temp./Humi. :25.6 deg\_C / 58 RH  
 Operation Mode :TX MID      Engineer :Allen  
 EUT Pol. :H PLAN      Measurement Antenna Pol. :VERTICAL

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.

“---” : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode	Spectrum Reading Level	Factor dB	Actual FS dB $\mu$ V	Limit @3m dB $\mu$ V/m	Margin dB
71.71	S	Peak	39.07	-16.50	22.57	40.00	-17.43
185.20	S	Peak	38.57	-14.84	23.73	43.50	-19.77
265.71	S	Peak	42.71	-13.33	29.38	46.00	-16.62
320.03	S	Peak	41.53	-11.85	29.68	46.00	-16.32
499.48	S	Peak	33.36	-8.99	24.37	46.00	-21.63
533.43	S	Peak	33.63	-8.21	25.42	46.00	-20.58
11570.00	H	Average	21.98	18.14	40.12	54.00	-13.88
11570.00	H	Peak	22.99	18.14	41.13	74.00	-32.87
17355.00	H	---					
23140.00	H	---					
28925.00	H	---					
34710.00	H	---					

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Operation Band :802.11 n20M Test Date :2013-09-17  
 Fundamental Frequency :5785 MHz Temp./Humi. :25.6 deg\_C / 58 RH  
 Operation Mode :TX MID Engineer :Allen  
 EUT Pol. :H PLAN Measurement Antenna Pol. :HORIZONTAL

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.

“---” : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode	Spectrum Reading Level	Factor dB	Actual FS dB $\mu$ V	Limit @3m dB $\mu$ V/m	Margin dB
184.23	S	Peak	47.79	-14.73	33.06	43.50	-10.44
256.98	S	Peak	40.76	-13.63	27.13	46.00	-18.87
320.03	S	Peak	41.15	-11.85	29.30	46.00	-16.70
480.08	S	Peak	34.58	-9.23	25.35	46.00	-20.65
719.67	S	Peak	33.84	-4.57	29.27	46.00	-16.73
796.30	S	Peak	32.96	-3.77	29.19	46.00	-16.81
11570.00	H	Average	21.76	17.94	39.70	54.00	-14.30
11570.00	H	Peak	22.74	17.94	40.68	74.00	-33.32
17355.00	H	---					
23140.00	H	---					
28925.00	H	---					
34710.00	H	---					

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Operation Band :802.11 n20M      Test Date :2013-09-17  
 Fundamental Frequency :5825 MHz      Temp./Humi. :25.6 deg\_C / 58 RH  
 Operation Mode :TX HIGH      Engineer :Allen  
 EUT Pol. :H PLAN      Measurement Antenna Pol. :VERTICAL

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.

“---” : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode	Spectrum Reading Level	Factor dB	Actual FS dB $\mu$ V	Limit @3m dB $\mu$ V/m	Margin dB
70.74	S	Peak	38.03	-16.35	21.68	40.00	-18.32
268.62	S	Peak	43.09	-13.21	29.88	46.00	-16.12
320.03	S	Peak	41.76	-11.85	29.91	46.00	-16.09
480.08	S	Peak	34.60	-9.23	25.37	46.00	-20.63
533.43	S	Peak	33.24	-8.21	25.03	46.00	-20.97
666.32	S	Peak	31.85	-5.34	26.51	46.00	-19.49
11650.00	H	Average	21.39	18.25	39.64	54.00	-14.36
11650.00	H	Peak	22.95	18.25	41.20	74.00	-32.80
17475.00	H	---					
23300.00	H	---					
29125.00	H	---					
34950.00	H	---					

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Operation Band :802.11 n20M Test Date :2013-09-17  
 Fundamental Frequency :5825 MHz Temp./Humi. :25.6 deg\_C / 58 RH  
 Operation Mode :TX HIGH Engineer :Allen  
 EUT Pol. :H PLAN Measurement Antenna Pol. :HORIZONTAL

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.

“---” : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode	Spectrum Reading Level	Factor dB	Actual FS dB $\mu$ V	Limit @3m dB $\mu$ V/m	Margin dB
						Factor dB	Actual FS dB $\mu$ V/m
185.20	S	Peak	47.46	-14.84	32.62	43.50	-10.88
260.86	S	Peak	41.22	-13.51	27.71	46.00	-18.29
320.03	S	Peak	40.65	-11.85	28.80	46.00	-17.20
499.48	S	Peak	34.05	-8.99	25.06	46.00	-20.94
717.73	S	Peak	33.92	-4.59	29.33	46.00	-16.67
798.24	S	Peak	34.84	-3.76	31.08	46.00	-14.92
11650.00	H	Average	21.47	18.05	39.52	54.00	-14.48
11650.00	H	Peak	22.09	18.05	40.14	74.00	-33.86
17475.00	H	---					
23300.00	H	---					
29125.00	H	---					
34950.00	H	---					

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**Radiated Spurious Emission Measurement Result (802.11n (5GHz)\_40M)**

Operation Band	:802.11 n40M	Test Date	:2013-09-17
Fundamental Frequency	:5755 MHz	Temp./Humi.	:25.6 deg_C / 58 RH
Operation Mode	:TX LOW	Engineer	:Allen
EUT Pol.	:H PLAN	Measurement Antenna Pol.	:VERTICAL

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.

“---” : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode	Spectrum Reading Level	Factor dB	Actual FS dB $\mu$ V/m	Limit @3m dB $\mu$ V/m	Margin dB
77.53	S	Peak	38.08	-17.37	20.71	40.00	-19.29
184.23	S	Peak	37.33	-14.73	22.60	43.50	-20.90
272.50	S	Peak	43.43	-13.07	30.36	46.00	-15.64
320.03	S	Peak	41.25	-11.85	29.40	46.00	-16.60
480.08	S	Peak	33.52	-9.23	24.29	46.00	-21.71
533.43	S	Peak	33.64	-8.21	25.43	46.00	-20.57
11510.00	H	Average	21.98	18.04	40.02	54.00	-13.98
11510.00	H	Peak	22.53	18.04	40.57	74.00	-33.43
17265.00	H	---					
23020.00	H	---					
28775.00	H	---					
34530.00	H	---					

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Operation Band :802.11 n40M Test Date :2013-09-17  
 Fundamental Frequency :5755 MHz Temp./Humi. :25.6 deg\_C / 58 RH  
 Operation Mode :TX LOW Engineer :Allen  
 EUT Pol. :H PLAN Measurement Antenna Pol. :HORIZONTAL

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.

“---” : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode	Spectrum Reading Level	Factor dB	Actual FS dB $\mu$ V	Limit @3m dB $\mu$ V/m	Margin dB
136.70	S	Peak	36.37	-13.03	23.34	43.50	-20.16
185.20	S	Peak	46.99	-14.84	32.15	43.50	-11.35
260.86	S	Peak	40.52	-13.51	27.01	46.00	-18.99
320.03	S	Peak	42.66	-11.85	30.81	46.00	-15.19
499.48	S	Peak	35.14	-8.99	26.15	46.00	-19.85
717.73	S	Peak	32.82	-4.59	28.23	46.00	-17.77
11510.00	H	Average	22.13	17.84	39.97	54.00	-14.03
11510.00	H	Peak	23.14	17.84	40.98	74.00	-33.02
17265.00	H	---					
23020.00	H	---					
28775.00	H	---					
34530.00	H	---					

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Operation Band :802.11 n40M      Test Date :2013-09-17  
 Fundamental Frequency :5795 MHz      Temp./Humi. :25.6 deg\_C / 58 RH  
 Operation Mode :TX HIGH      Engineer :Allen  
 EUT Pol. :H PLAN      Measurement Antenna Pol. :VERTICAL

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.

“---” : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode	Spectrum Reading Level	Factor dB	Actual FS dB $\mu$ V	Limit @3m dB $\mu$ V/m	Margin dB
184.23	S	Peak	37.35	-14.73	22.62	43.50	-20.88
257.95	S	Peak	43.32	-13.61	29.71	46.00	-16.29
320.03	S	Peak	40.69	-11.85	28.84	46.00	-17.16
533.43	S	Peak	33.60	-8.21	25.39	46.00	-20.61
666.32	S	Peak	32.80	-5.34	27.46	46.00	-18.54
709.00	S	Peak	38.13	-4.71	33.42	46.00	-12.58
11590.00	H	Average	21.63	18.16	39.79	54.00	-14.21
11590.00	H	Peak	22.86	18.16	41.02	74.00	-32.98
17385.00	H	---					
23180.00	H	---					
28975.00	H	---					
34770.00	H	---					

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Operation Band :802.11 n40M Test Date :2013-09-17  
 Fundamental Frequency :5795 MHz Temp./Humi. :25.6 deg\_C / 58 RH  
 Operation Mode :TX HIGH Engineer :Allen  
 EUT Pol. :H PLAN Measurement Antenna Pol. :HORIZONTAL

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.

“---” : denotes Noise Floor.

Freq. MHz	Note F/H/E/S	Detector Mode	Spectrum Reading Level	Factor dB	Actual FS dB $\mu$ V	Limit @3m dB $\mu$ V/m	Margin dB
182.29	S	Peak	46.21	-14.50	31.71	43.50	-11.79
260.86	S	Peak	40.98	-13.51	27.47	46.00	-18.53
320.03	S	Peak	42.44	-11.85	30.59	46.00	-15.41
480.08	S	Peak	38.58	-9.23	29.35	46.00	-16.65
720.64	S	Peak	33.46	-4.56	28.90	46.00	-17.10
798.24	S	Peak	33.20	-3.76	29.44	46.00	-16.56
11590.00	H	Average	21.69	17.96	39.65	54.00	-14.35
11590.00	H	Peak	22.35	17.96	40.31	74.00	-33.69
17385.00	H	---					
23180.00	H	---					
28975.00	H	---					
34770.00	H	---					

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## 11 PEAK POWER SPECTRAL DENSITY

### 11.1 Standard Applicable:

According to §15.247(e) For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

### 11.2 Measurement Equipment Used:

Refer to section 7.2 for details.

### 11.3 Test Set-up:

Refer to section 7.3 for details. (Spectrum Option)

### 11.4 Measurement Procedure (following the measurement procedure 10.2 of KDB558074):

1. Set analyzer center frequency to DTS channel center frequency.
2. Set the span to 1.5 times the DTS channel bandwidth.
3. Set the RBW  $\geq$  3 kHz.
4. Set the VBW  $\geq$  3 x RBW.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum amplitude level.
10. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

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**11.5 Measurement Result:****802.11b**

<b>Frequency MHz</b>	<b>RF Power Density</b>	<b>Maximum Limit</b>
	<b>Reading (dBm)</b>	<b>(dBm)</b>
2412	-22.96	8
2437	-22.55	8
2462	-22.33	8

**802.11g**

<b>Frequency MHz</b>	<b>RF Power Density</b>	<b>Maximum Limit</b>
	<b>Reading (dBm)</b>	<b>(dBm)</b>
2412	-19.71	8
2437	-20.15	8
2462	-20.92	8

**802.11n\_20M (2.4GHz)**

<b>Frequency MHz</b>	<b>RF Power Density</b>	<b>Maximum Limit</b>
	<b>Reading (dBm)</b>	<b>(dBm)</b>
2412	-20.48	8
2437	-20.03	8
2462	-20.31	8

**802.11n\_40M (2.4GHz)**

<b>Frequency MHz</b>	<b>RF Power Density</b>	<b>Maximum Limit</b>
	<b>Reading (dBm)</b>	<b>(dBm)</b>
2422	-20.40	8
2437	-21.64	8
2452	-19.60	8

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**802.11a**

<b>Frequency</b> <b>MHz</b>	<b>RF Power Density</b>	<b>Maximum Limit</b>
	<b>Reading (dBm)</b>	<b>(dBm)</b>
5745	-19.01	8
5785	-19.85	8
5825	-21.41	8

**802.11n (5GHz)\_20M**

<b>Frequency</b> <b>MHz</b>	<b>RF Power Density</b>	<b>Maximum Limit</b>
	<b>Reading (dBm)</b>	<b>(dBm)</b>
5745	-16.64	8
5785	-17.45	8
5825	-17.94	8

**802.11n (5GHz)\_40M**

<b>Frequency</b> <b>MHz</b>	<b>RF Power Density</b>	<b>Maximum Limit</b>
	<b>Reading (dBm)</b>	<b>(dBm)</b>
5755	-18.71	8
5795	-16.99	8

\*Note: Offset 10.8dB for 2.4G 802.11b/g; 2.4G 802.11n\_20 and 2.4G 802.11n\_40

Offset 11.5dB for 5G 802.11a; Offset 11.5dB for 5G 802.11/n\_20/n\_40.

\*Refer to next page for plots

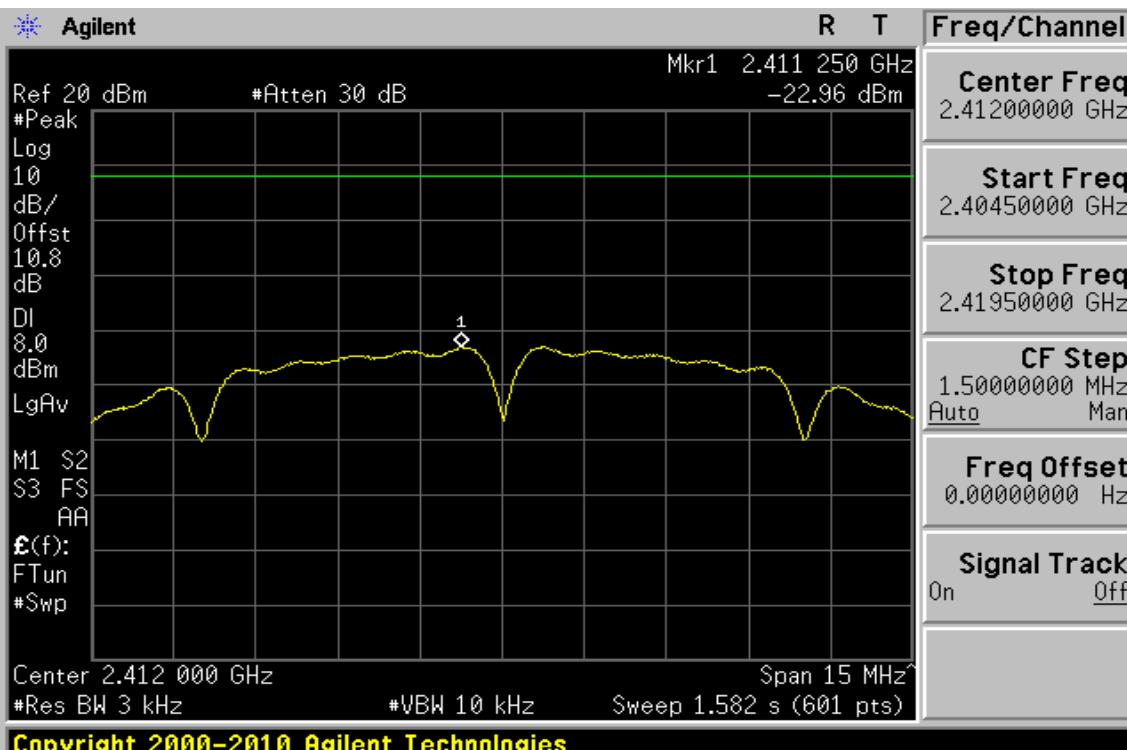
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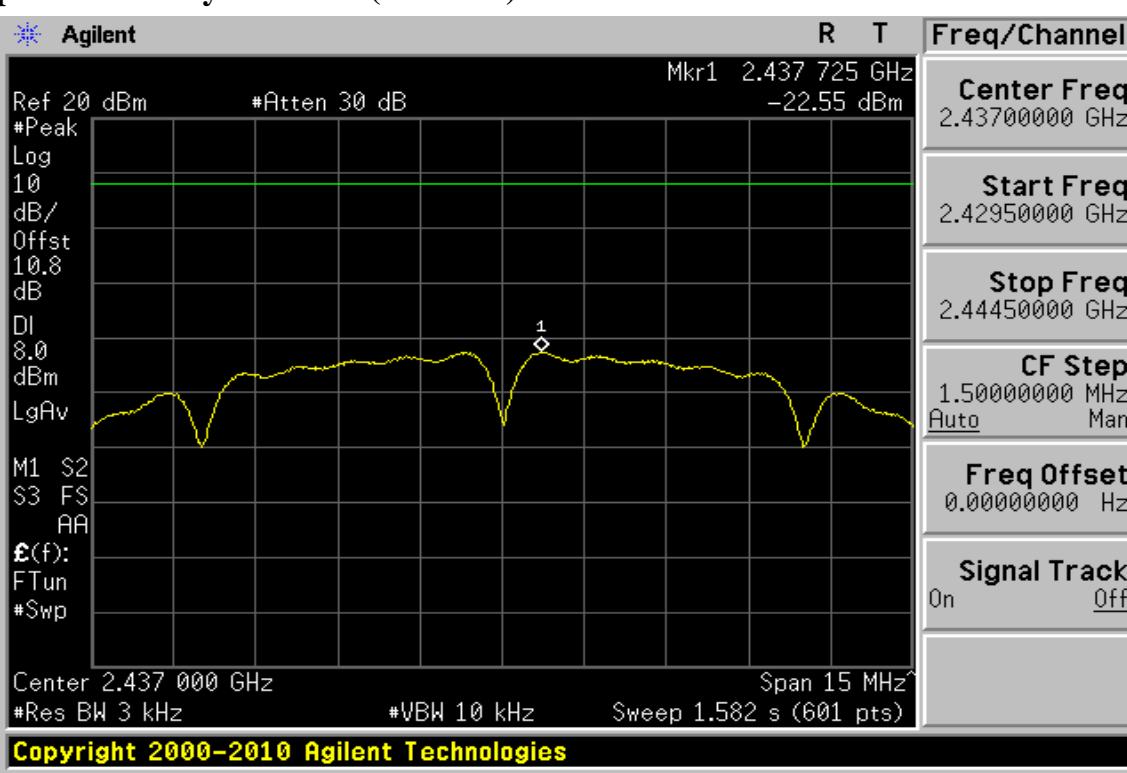
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## 802.11b

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



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



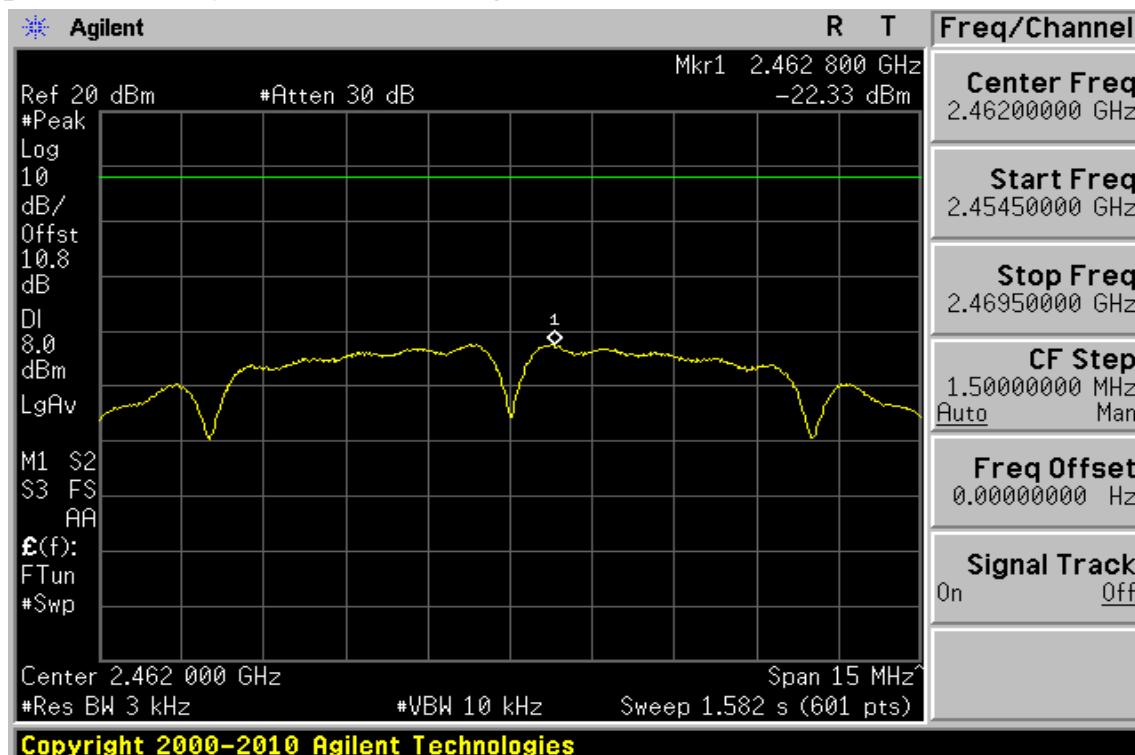
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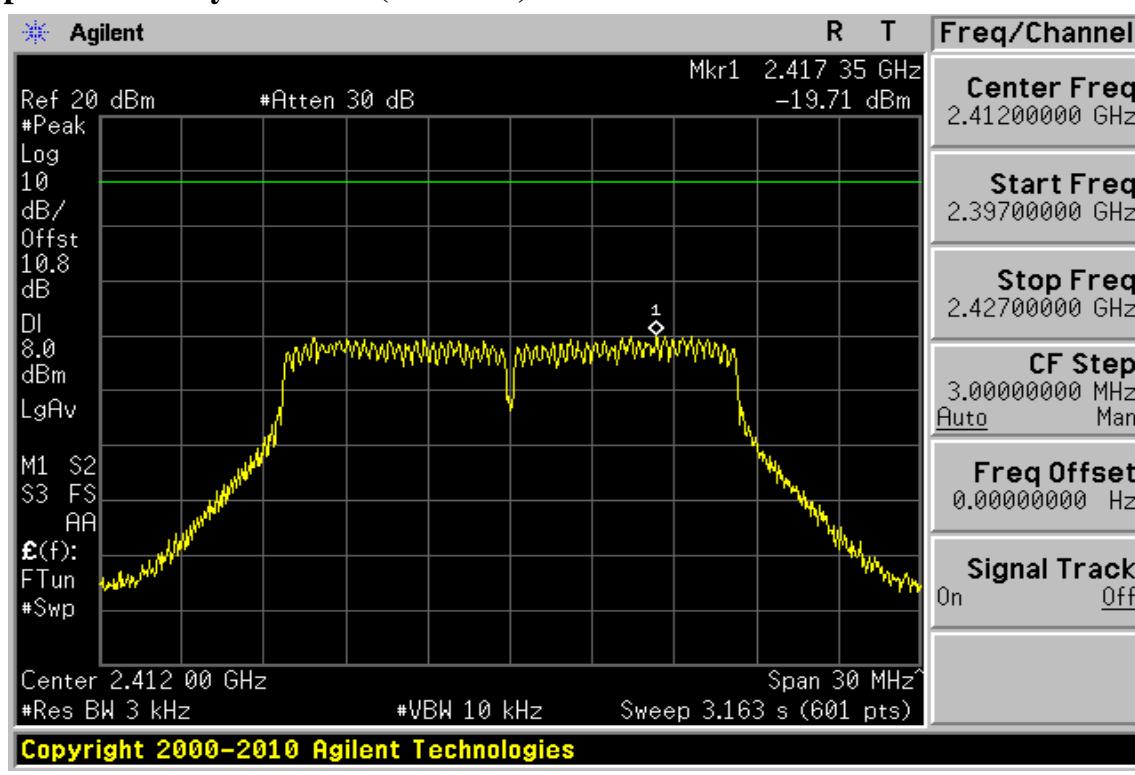
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## Power Spectral Density Test Plot (CH-High)



802.11g

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



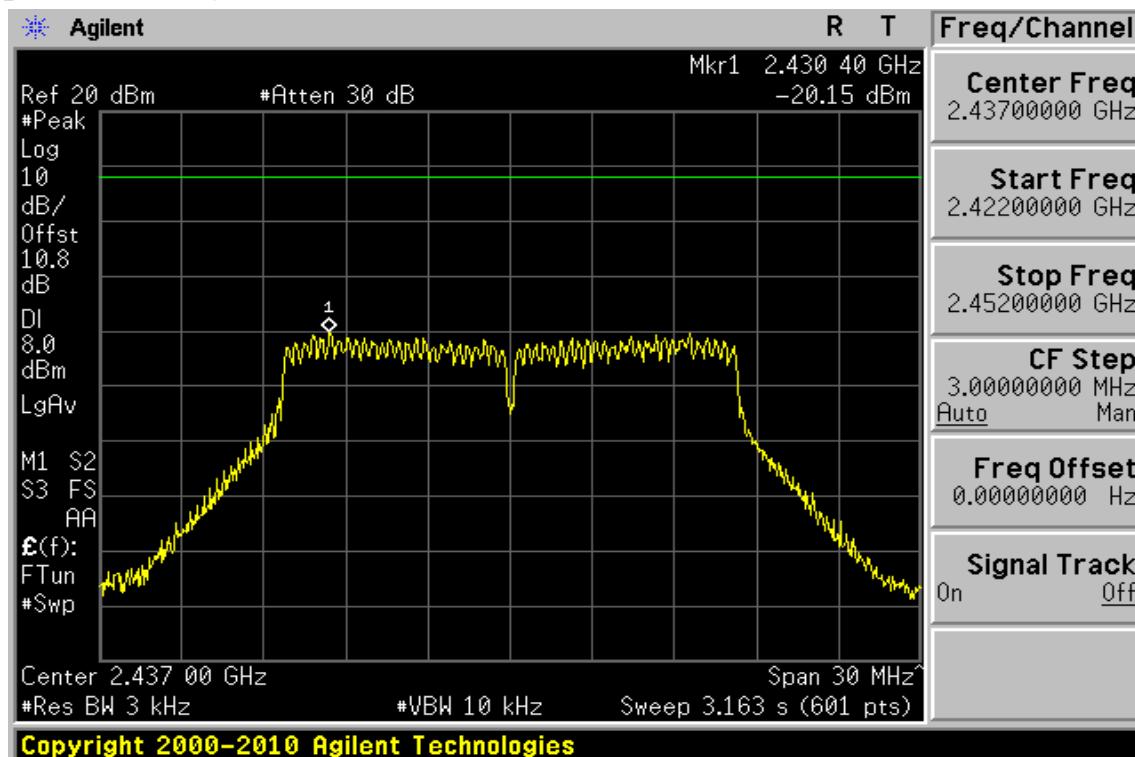
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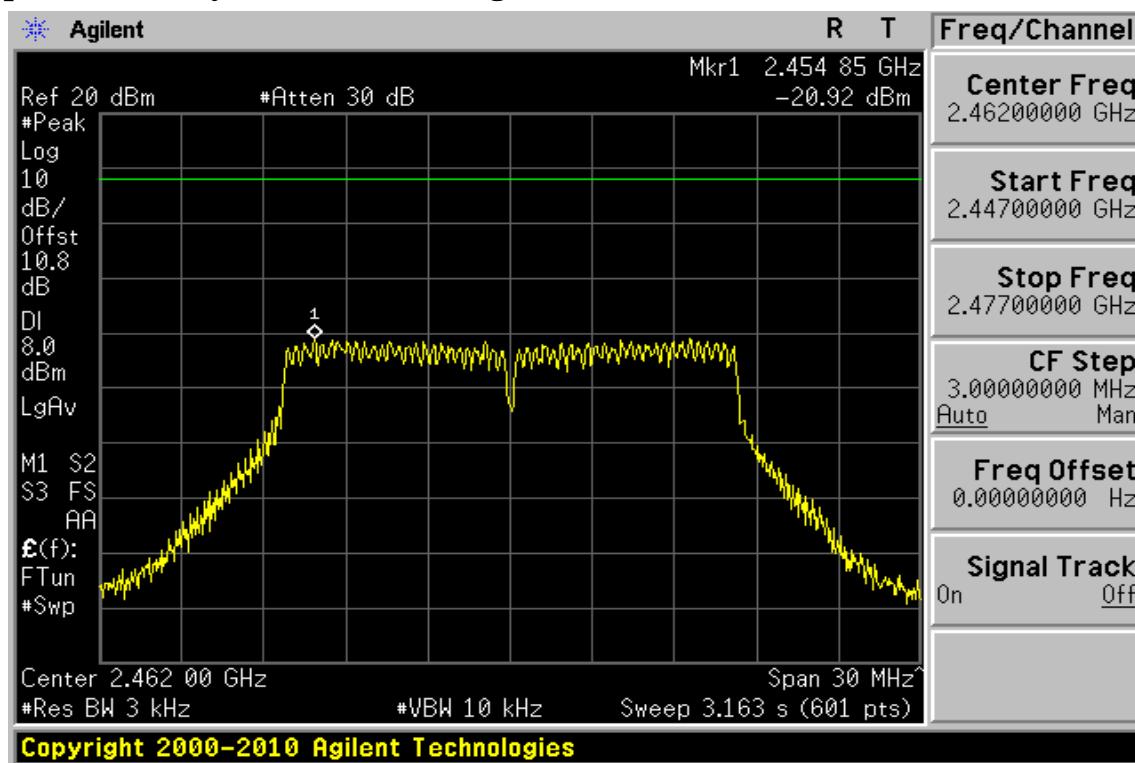
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### Power Spectral Density Test Plot (CH-Mid)



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



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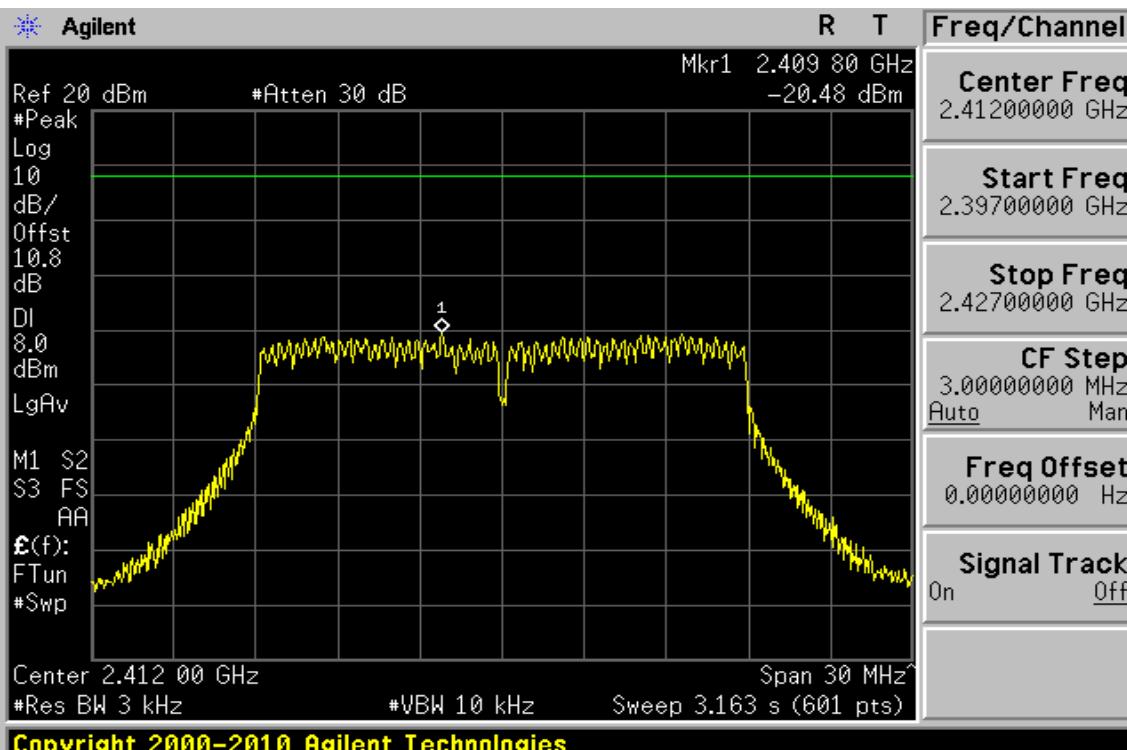
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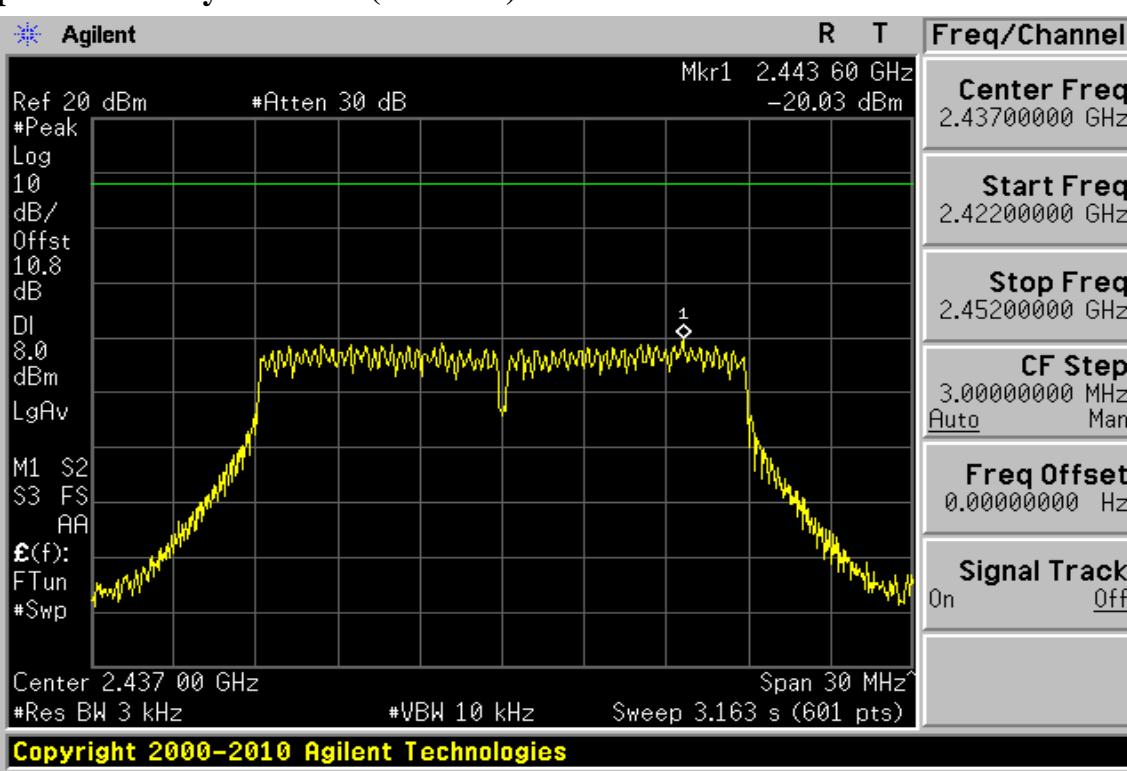
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## 802.11n\_20M (2.4GHz)

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



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



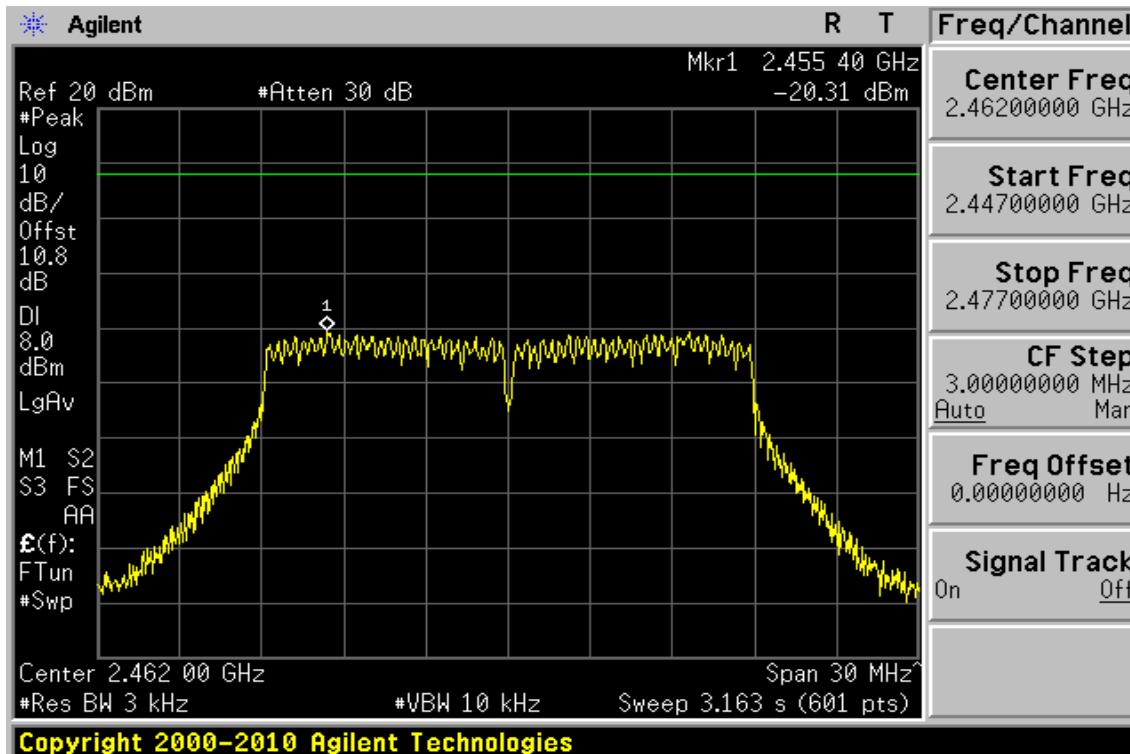
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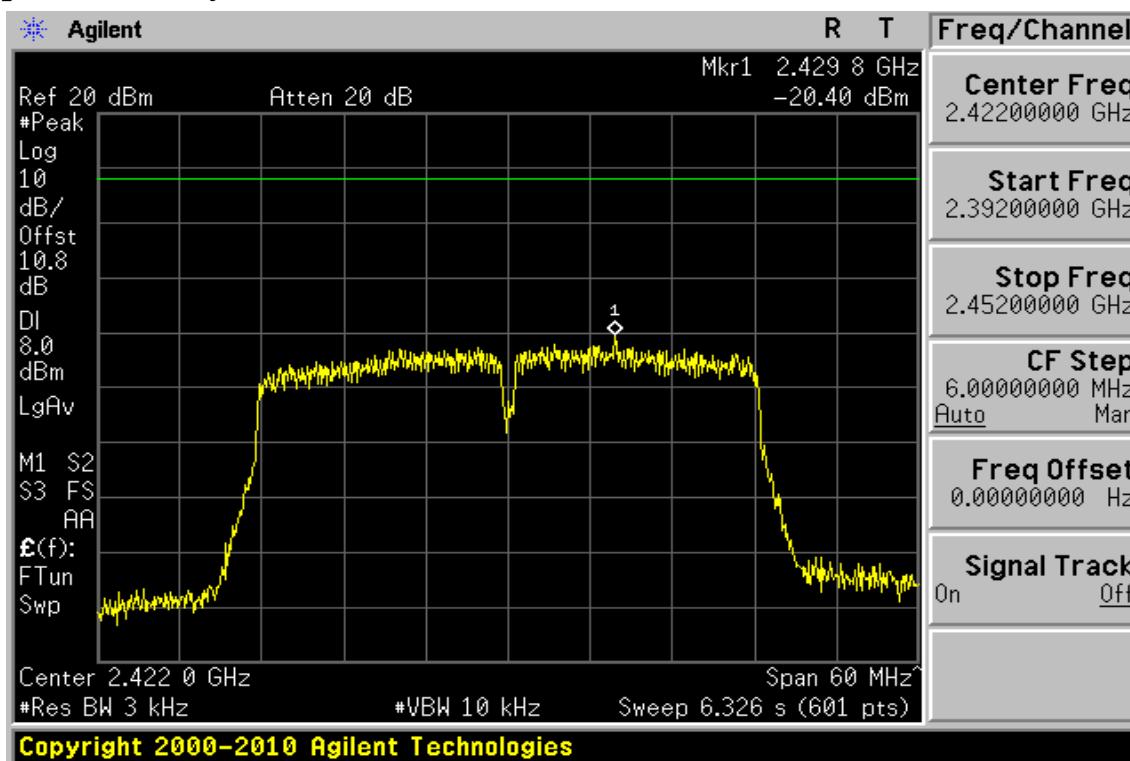
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### Power Spectral Density Test Plot (CH-High)



### 802.11n\_40M (2.4GHz)

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



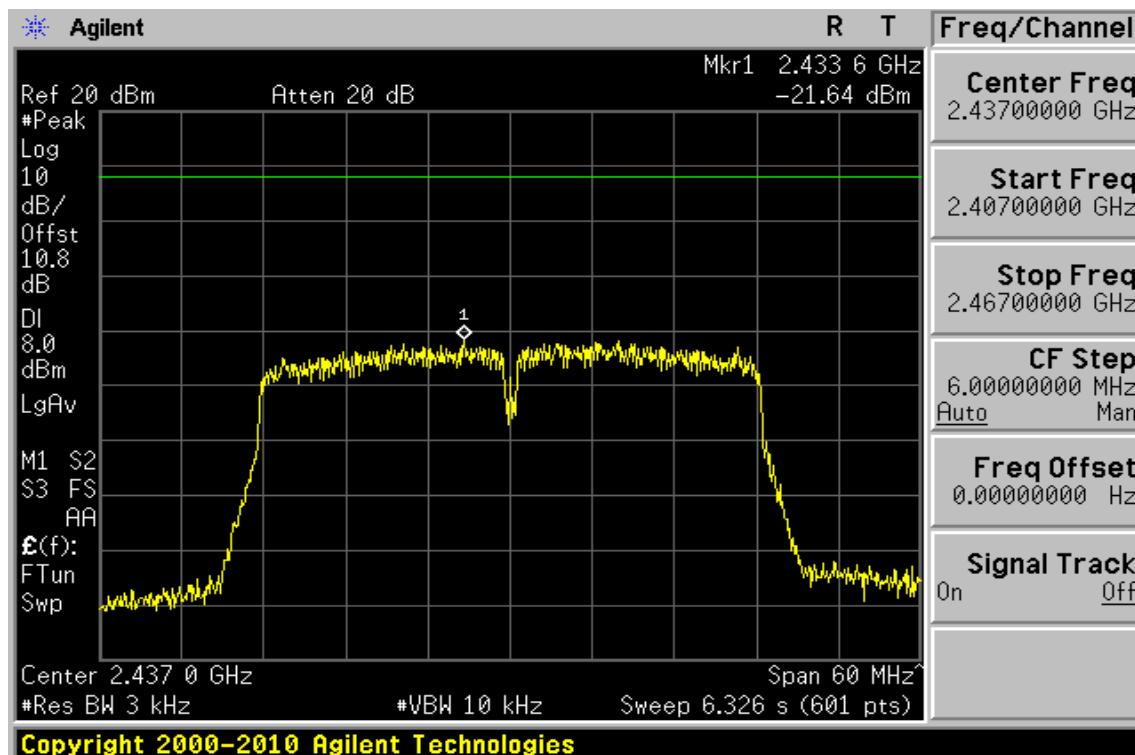
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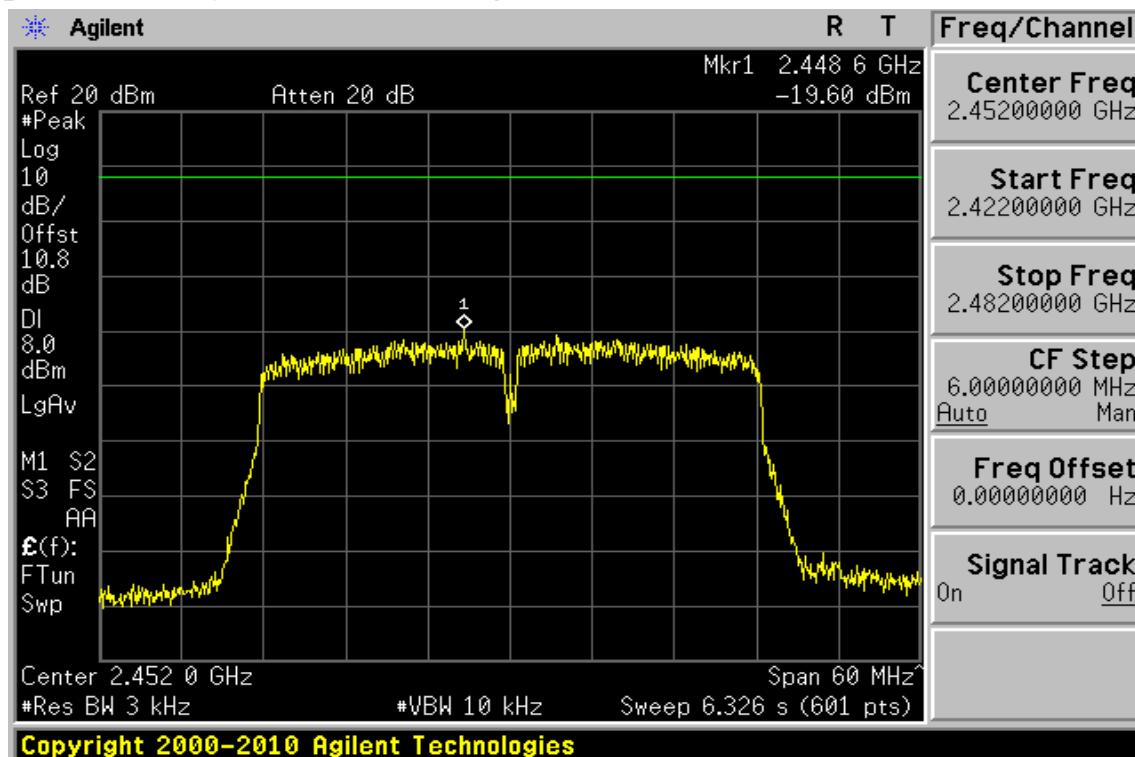
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## Power Spectral Density Test Plot (CH-Mid)



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



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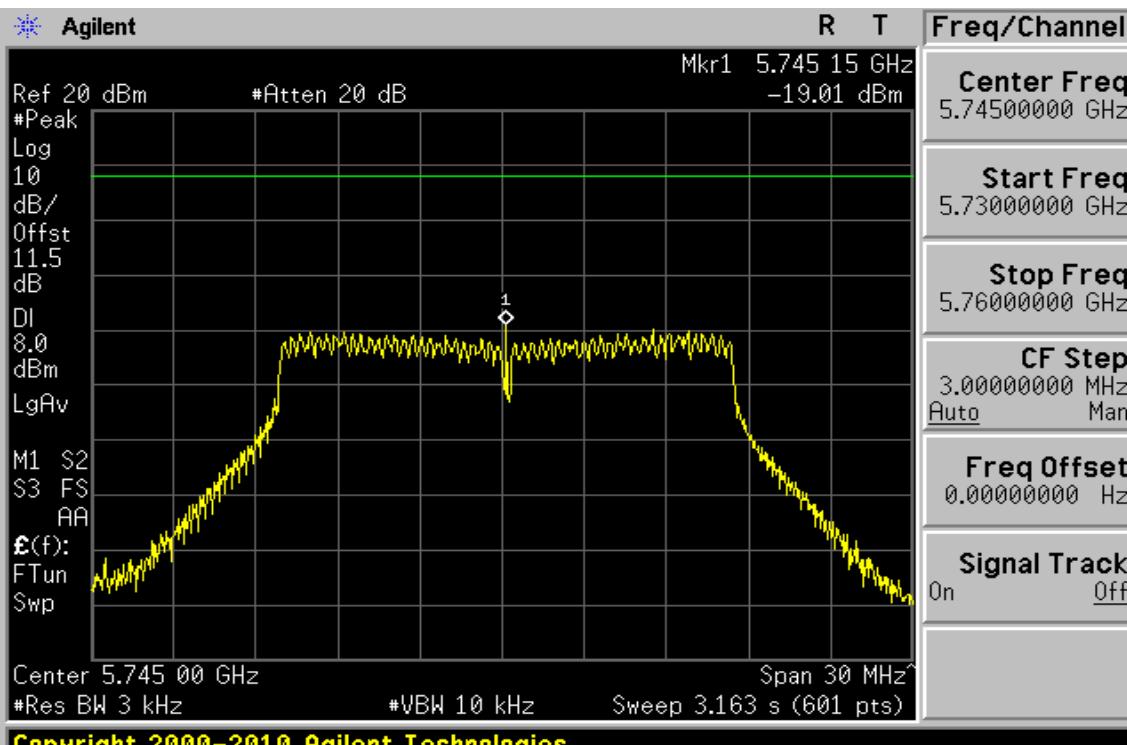
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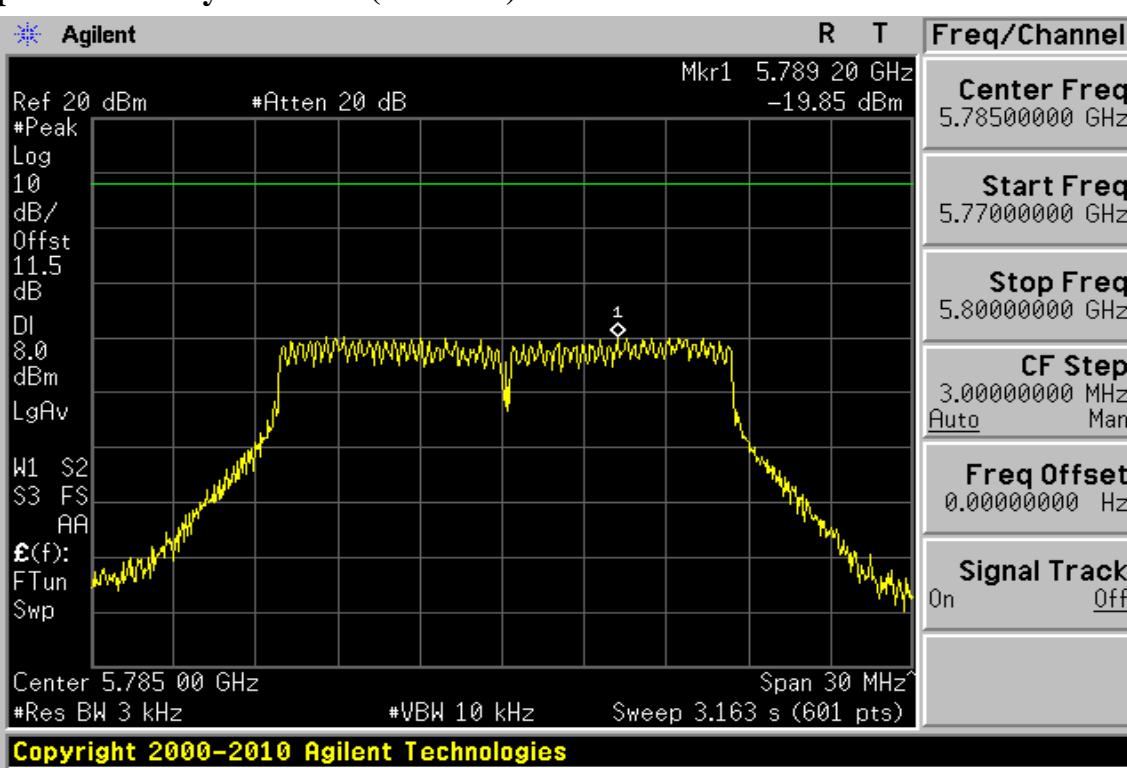
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## 802.11a

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



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



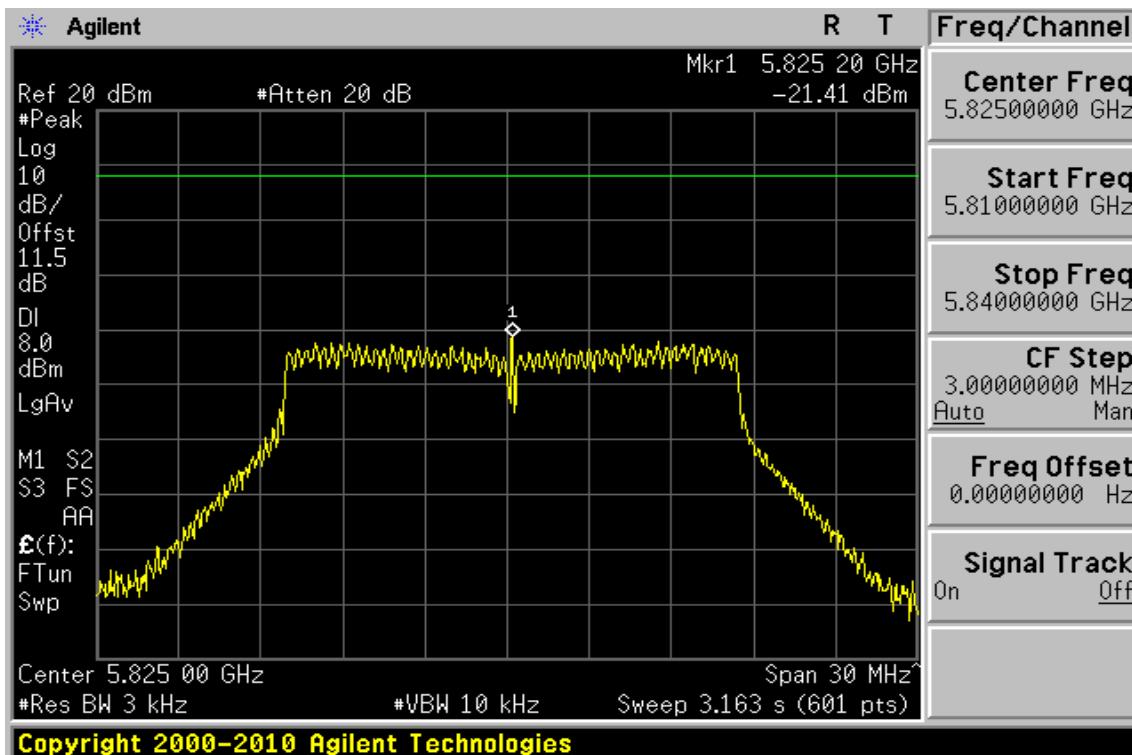
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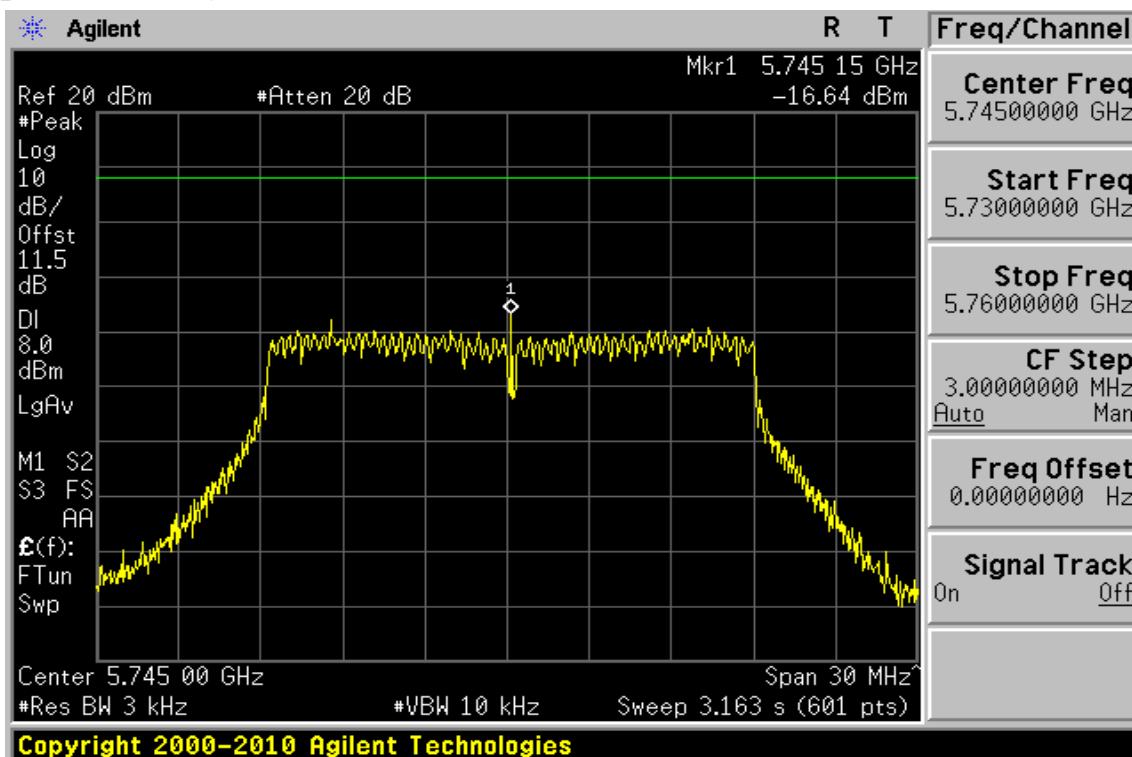
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## Power Spectral Density Test Plot (CH-High)



## 802.11n (5GHz)\_20M

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



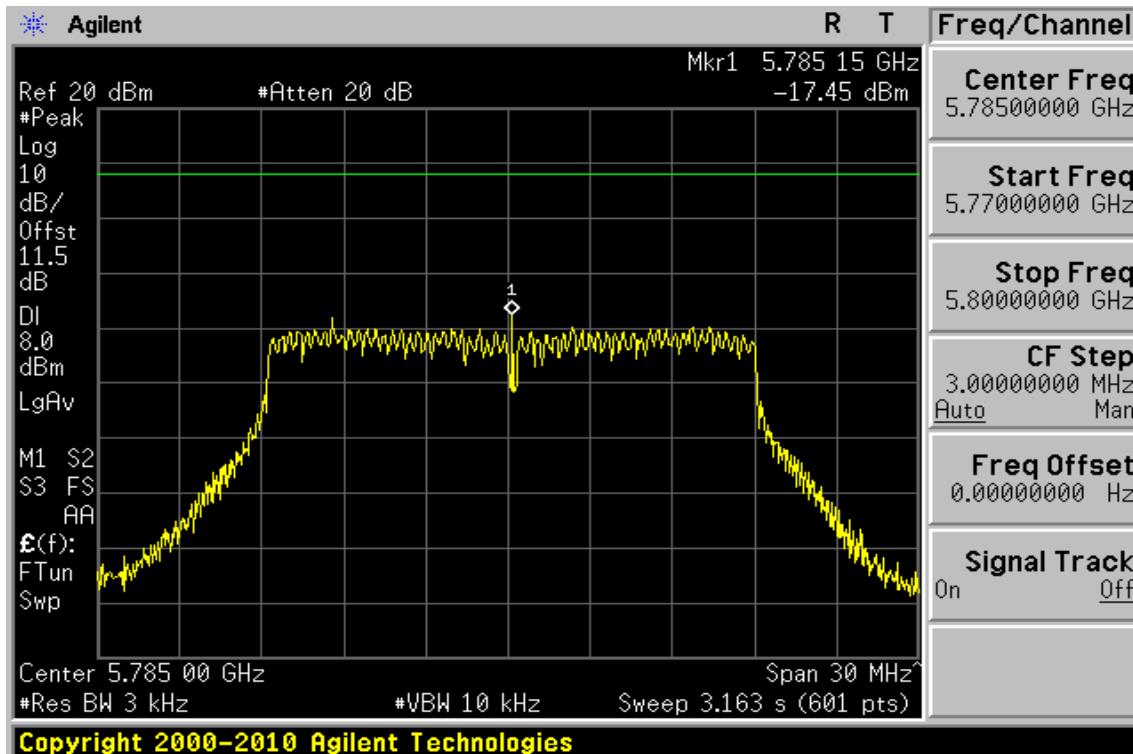
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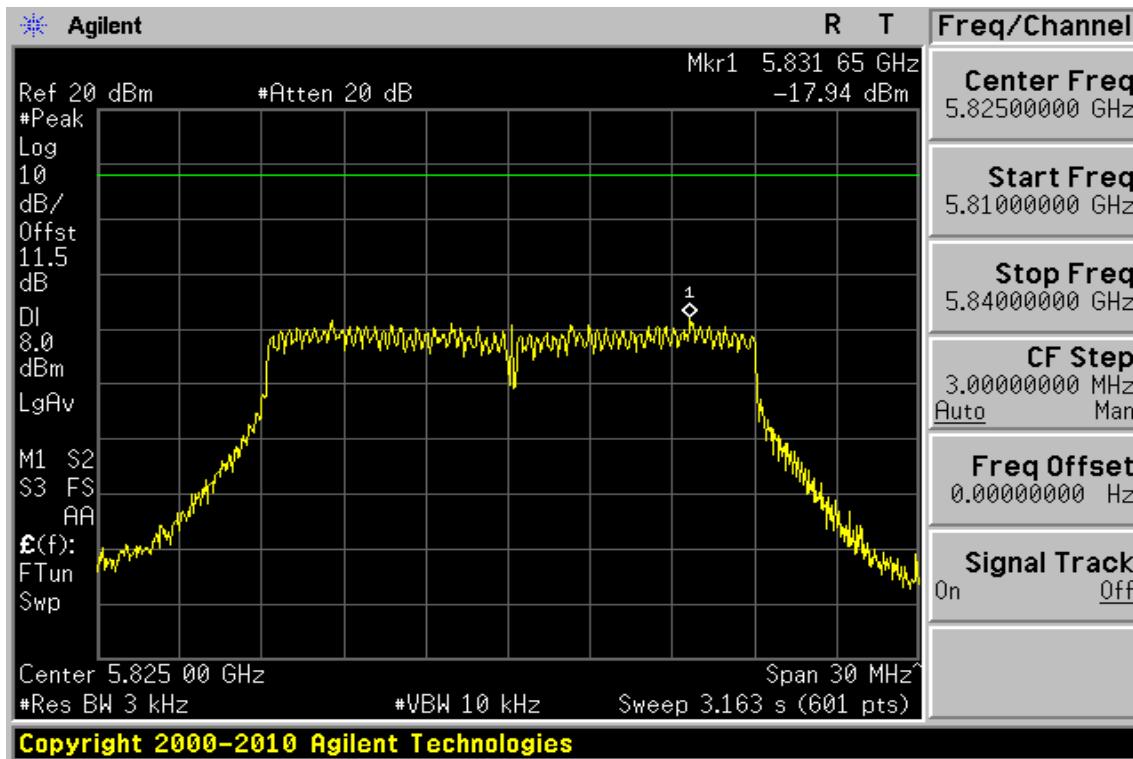
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## Power Spectral Density Test Plot (CH-Mid)



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



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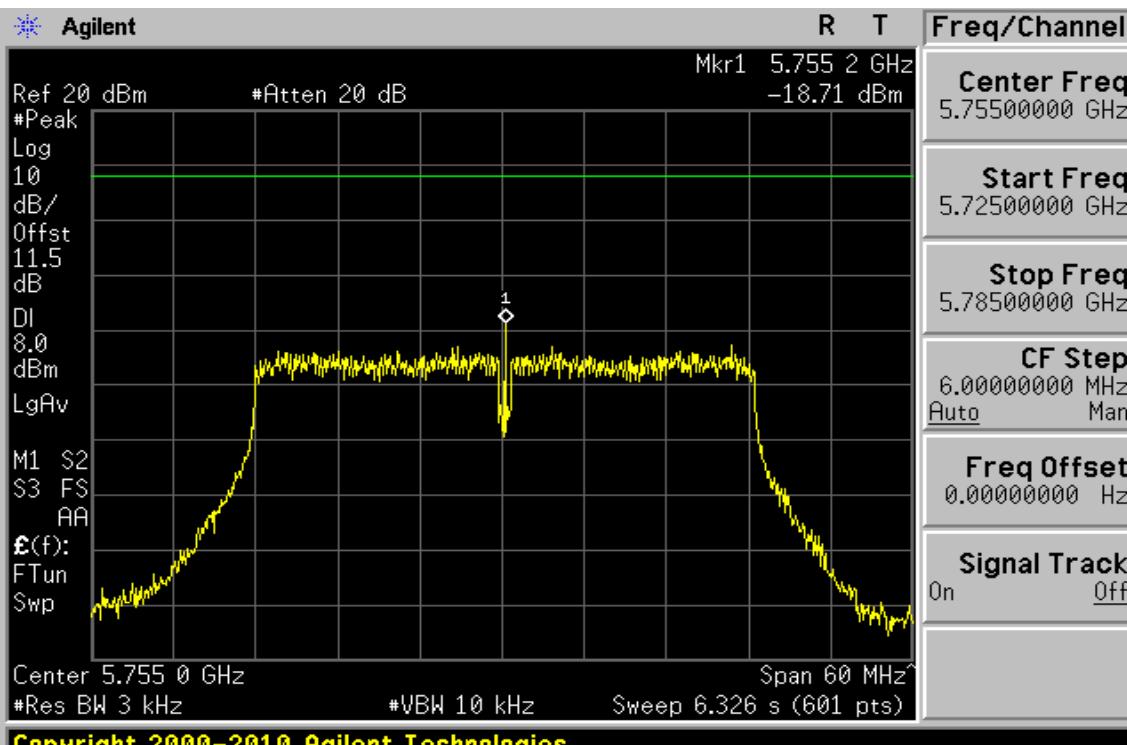
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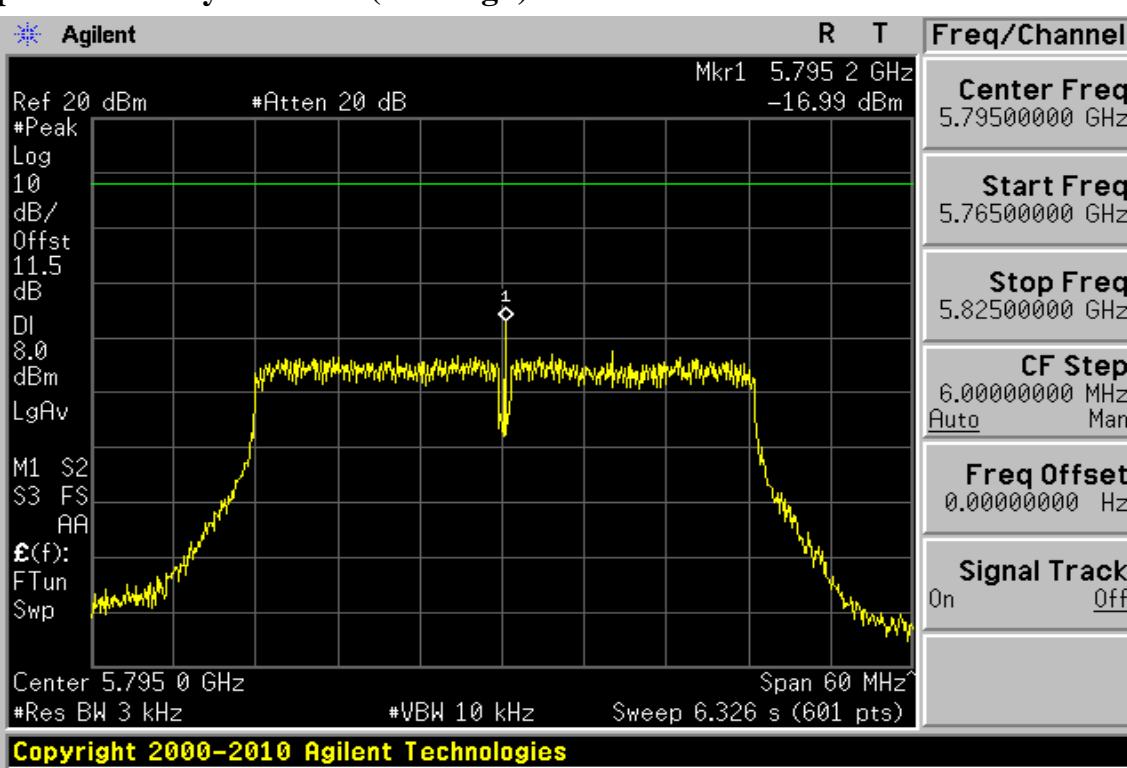
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## 802.11n (5GHz)\_40M

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



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



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## 12 ANTENNA REQUIREMENT

### 12.1 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.

### 12.2 Antenna Connected Construction:

The directional gains of antenna used for transmitting is 0.1dBi for 2.4GHz and 4.7dBi for 5725-5850 MHz.

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

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## 13 RF EXPOSURE

### 13.1 Standard Applicable:

According to §1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensure that the public is not exposed to radio frequency energy level in excess of the Commission's guideline.

This is a Portable device with its physical nature to be used nearby, the distance between radiating structure and human is less than 20cm.

As per KDB 447498 D01 §4.3.1, The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances  $\leq 50$  mm are determined by:

$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})}] \leq 3.0 \text{ for 1-g SAR and } \leq 7.5 \text{ for 10-g extremity SAR, where}$

$f(\text{GHz})$  is the RF channel transmit frequency in GHz

Power and distance are rounded to the nearest mW and mm before calculation

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### 13.2 Measurement Result:

Step 1: (<50mW)

802.11b:

This is a portable device and the Max peak output power is (6.28mW) lower than the threshold given and derived as formula given above, where

$$= 6.28 \text{ (mW)}/5 \text{ (mm)} * \sqrt{2437 \text{ (GHz)}} = 1.96 < 3.0$$

Frequency	Power (avg in dBm)	Power (avg mw)	Distance (mm)	Threshold (<5mm)								
2437	7.98	6.280583588	5	1.960910447								
<table border="1"><thead><tr><th>Frequency (MHz)</th><th>Reading Power (dBm)</th><th>Output Power (W)</th><th>Limit (W)</th></tr></thead><tbody><tr><td>2437</td><td>7.98</td><td>0.00628</td><td><b>1 Watt = 30 dBm</b></td></tr></tbody></table>					Frequency (MHz)	Reading Power (dBm)	Output Power (W)	Limit (W)	2437	7.98	0.00628	<b>1 Watt = 30 dBm</b>
Frequency (MHz)	Reading Power (dBm)	Output Power (W)	Limit (W)									
2437	7.98	0.00628	<b>1 Watt = 30 dBm</b>									

802.11g:

This is a portable device and the Max peak output power is (6.25mW) lower than the threshold given and derived as formula given above, where

$$= 6.25 \text{ (mW)}/5 \text{ (mm)} * \sqrt{2462 \text{ (GHz)}} = 1.96 < 3.0$$

Frequency	Power (avg in dBm)	Power (avg mw)	Distance (mm)	Threshold (<5mm)								
2462	7.96	6.251726928	5	1.961887138								
<table border="1"><thead><tr><th>Frequency (MHz)</th><th>Reading Power (dBm)</th><th>Output Power (W)</th><th>Limit (W)</th></tr></thead><tbody><tr><td>2462</td><td>7.96</td><td>0.00625</td><td><b>1 Watt = 30 dBm</b></td></tr></tbody></table>					Frequency (MHz)	Reading Power (dBm)	Output Power (W)	Limit (W)	2462	7.96	0.00625	<b>1 Watt = 30 dBm</b>
Frequency (MHz)	Reading Power (dBm)	Output Power (W)	Limit (W)									
2462	7.96	0.00625	<b>1 Watt = 30 dBm</b>									

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## 802.11n\_20M (2.4GHz):

This is a portable device and the Max peak output power is (6.10mW) lower than the threshold given and derived as formula given above, where

$$= 6.10 \text{ (mW)} / 5 \text{ (mm)} * \sqrt{2462 \text{ (GHz)}} = 1.89 < 3.0$$

Frequency	Power (avg in dBm)	Power (avg mw)	Distance (mm)	Threshold (<5mm)
2412	7.85	6.095368972	5	1.893296567

Frequency (MHz)	Reading Power (dBm)	Output Power (W)	Limit (W)
2412	7.85	0.00610	<b>1 Watt = 30 dBm</b>

## 802.11n\_40M (2.4GHz):

This is a portable device and the Max peak output power is (6.30mW) lower than the threshold given and derived as formula given above, where

$$= 6.30 \text{ (mW)} / 5 \text{ (mm)} * \sqrt{2452 \text{ (GHz)}} = 1.97 < 3.0$$

Frequency	Power (avg in dBm)	Power (avg mw)	Distance (mm)	Threshold (<5mm)
2452	7.99	6.295061829	5	1.971470253

Frequency (MHz)	Reading Power (dBm)	Output Power (W)	Limit (W)
2452	7.99	0.00630	<b>1 Watt = 30 dBm</b>

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802.11a:

This is a portable device and the Max peak output power is (6.22mW) lower than the threshold given and derived as formula given above, where

$$= 6.22 \text{ (mW)}/5 \text{ (mm)} * \sqrt{5785 \text{ (GHz)}} = 2.99 < 3.0$$

Frequency	Power (avg in dBm)	Power (avg mw)	Distance (mm)	Threshold (<5mm)
5785	7.94	6.223002852	5	2.993516645

Frequency (MHz)	Reading Power (dBm)	Output Power (W)	Limit (W)
5785	7.94	0.00622	<b>1 Watt = 30 dBm</b>

802.11n (5GHz)\_20M:

This is a portable device and the Max peak output power is (6.17mW) lower than the threshold given and derived as formula given above, where

$$= 6.17 \text{ (mW)}/5 \text{ (mm)} * \sqrt{5745 \text{ (GHz)}} = 2.96 < 3.0$$

Frequency	Power (avg in dBm)	Power (avg mw)	Distance (mm)	Threshold (<5mm)
5745	7.9	6.165950019	5	2.955799778

Frequency (MHz)	Reading Power (dBm)	Output Power (W)	Limit (W)
5745	7.90	0.00617	<b>1 Watt = 30 dBm</b>

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802.11n (5GHz)\_40M:

This is a portable device and the Max peak output power is (6.22mW) lower than the threshold given and derived as formula given above, where

$$= 6.22 \text{ (mW)} / 5 \text{ (mm)} * \sqrt{5795 \text{ (GHz)}} = 2.99 < 3.0$$

Frequency	Power (avg in dBm)	Power (avg mw)	Distance (mm)	Threshold (<5mm)
5795	7.94	6.223002852	5	2.996102837
<b>Frequency (MHz)</b>				
5795	7.94	0.00622	<b>1 Watt = 30 dBm</b>	

As the result of calculation result indicates, the RF exposure generating from given transmitter (transmitter employed digital modulation) can be excluded from SAR measurement, and is deemed compliant with RF exposure as per FCC.

### The table of quick reference in terms of power threshold

#### SAR Test Exclusion Thresholds for 100 MHz – 6 GHz and $\leq 50$ mm

Approximate SAR Test Exclusion Power Thresholds at Selected Frequencies and Test Separation Distances are illustrated in the following Table.

MHz	5	10	15	20	25	mm
150	39	77	116	155	194	SAR Test Exclusion Threshold (mW)
300	27	55	82	110	137	
450	22	45	67	89	112	
835	16	33	49	66	82	
900	16	32	47	63	79	
1500	12	24	37	49	61	
1900	11	22	33	44	54	
2450	10	19	29	38	48	
3600	8	16	24	32	40	
5200	7	13	20	26	33	
5400	6	13	19	26	32	
5800	6	12	19	25	31	

Note that the table present above is the table of quick reference, indexing the level of power threshold with respect to the corresponding frequency. The value of the index may be deviated, and therefore, the derivation of exemption based on KDB447498 D01 is used in this test report, relevantly.

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