



## **FCC 47 CFR PART 15 SUBPART C TEST REPORT**

**For**

**Surf N300 Wireless N Router**

**Model No.: F7D2301 v3,F7D6301 v3**

**Trade Name: BELKIN**

**FCC ID: K7SF7D6301V3**

**Test Report Number:  
KS100614A01-RP**

**Issued for**

**Belkin International Inc.  
12045 East Waterfront Drive, Playa Vista, CA 90094, USA**

**Issued by:**

**Compliance Certification Services Inc.  
Kun shan Laboratory  
No.10 Weiye Rd., Innovation park, Eco&Tec,  
Development Zone, Kunshan City, Jiangsu, China  
TEL: 86-512-57355888  
FAX: 86-512-57370818  
Issued Date: Aug 12, 2010**



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## **Revision History**

Rev.	IssueDate	Revisions	Effect Page	Revised By
00	August 12, 2010	Initial Issue	ALL	Miro Chueh



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## 1. TEST RESULT CERTIFICATION

**Product name:** Surf N300 Wireless N Router

**Model Number:** F7D2301 v3,F7D6301 v3

**Trade Name:** BELKIN

**FCC ID:** K7SF7D6301V3

**Device Category:** Production unit

**Date of Test:** July 28,2010

**Applicant:** **Belkin International Inc.**  
12045 East Waterfront Drive, Playa Vista, CA 90094, USA

**Manufacturer:** **Belkin International Inc.**  
12045 East Waterfront Drive, Playa Vista, CA 90094, USA

APPLICABLE STANDARDS	
STANDARD	STANDARD
FCC 47 CFR Part 15 Subpart C	No non-compliance noted
Deviation from Applicable Standard	
None	
<p><b>We hereby certify that:</b></p> <p>The above equipment was tested by Compliance Certification Services Inc. 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: 2003 and the energy emitted by the sample EUT tested as described in this report is in compliance with the requirements of FCC Rules Part 15.207, 15.209, 15.247.</p> <p>The test results of this report relate only to the tested sample EUT identified in this report.</p>	

**Approved by:**

Miro Chueh  
RF Manager  
Compliance Certification Service Inc.

**Reviewed by:**

Spring Zhou  
RF Section Manager  
Compliance Certification Service Inc.



## 2. EUT DESCRIPTION

<b>Product name</b>	Surf N300 Wireless N Router
<b>Model Number</b>	F7D2301 v3,F7D6301 v3
<b>Model Discrepancy</b>	All the above models are identical except the model designation for different market.
<b>Trade Name</b>	BELKIN
<b>FCC ID</b>	K7SF7D6301V3
<b>Tx/Rx Frequency Range</b>	2412 MHz ~ 2462 MHz 2422 MHz ~ 2452 MHz
<b>Maximum Output Power to Antenna</b>	IEEE 802.11b mode: 18.94dBm IEEE 802.11g mode: 14.05dBm IEEE 802.11gn Standard-20 MHz Channel mode: 15.28 dBm IEEE 802.11gn Wide-40 MHz Channel mode: 15.24 dBm (the EUT transmitting and receiving with two antennas simultaneously working at n mode)
<b>Modulation Technique</b>	IEEE 802.11b mode: DSSS (1, 2, 5.5 and 11 Mbps) IEEE 802.11g mode: OFDM (6, 9, 12, 18, 24, 36, 48 and 54 Mbps) IEEE 802.11n Standard-20 MHz Channel mode: OFDM (MCS 0~15) IEEE 802.11n Wide-40 MHz Channel mode: OFDM (MCS 0~15)
<b>Number of Channels</b>	IEEE 802.11b/g mode: 11 Channels IEEE 802.11n Standard-20 MHz Channel mode: 11 Channels IEEE 802.11n Wide-40 MHz Channel mode: 7 Channels
<b>Antenna Specification</b>	two antennas for 2.4GHz Gain 3.12dBi /Total gain 6.13 dBi
<b>Antenna designation</b>	Two TX&RX Pifi antennas and PCB antennas for 2.4GHz

**Remark:**

1. The sample selected for test was engineering sample that approximated to production product and was provided by manufacturer.
2. This submittal(s) (test report) is intended for FCC ID: K7SF7D6301V3 filing to comply with Section 15.207, 15.209 and 15.247 of the FCC Part 15, Subpart C Rules.



### **3. TEST METHODOLOGY**

The tests documented in this report were performed in accordance with ANSI C63.4 and FCC CFR 47 2.1046, 2.1047, 2.1049, 2.1051, 2.1053, 2.1055, 2.1057, 15.207, 15.209 and 15.247.

#### **3.1 EUT CONFIGURATION**

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

#### **3.2 EUT EXERCISE**

The EUT was operated in the engineering mode to fix the TX frequency that was for the purpose of the measurements.

According to its specifications, the EUT must comply with the requirements of the Section 15.207, 15.209 and 15.247 under the FCC Rules Part 15 Subpart C.

#### **3.3 GENERAL TEST PROCEDURES**

##### **Conducted Emissions**

The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in Section 13.1.4.1 of ANSI C63.4 Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-peak and average detector modes.

##### **Radiated Emissions**

The EUT is placed on a turn table, which is 0.8 m above ground plane. The turntable 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 maximum emissions, exploratory radiated emission measurements were made according to the requirements in Section 13.1.4.1 of ANSI C63.4.



### 3.4 FCC PART 15.205 RESTRICTED BANDS OF OPERATIONS

- (a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
<sup>1</sup> 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 -	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.52525	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	156.7 - 156.9	3260 - 3267	23.6 - 24.0
12.29 - 12.293	162.0125 - 167.17	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	167.72 - 173.2	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	240 - 285	3600 - 4400	( <sup>2</sup> )
13.36 - 13.41	322 - 335.4		

<sup>1</sup> Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

<sup>2</sup> Above 38.6

- (b) Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.



### **3.5 DESCRIPTION OF TEST MODES**

The EUT transmitting and receiving with one (chain 0) antenna working at b/g mode, so one antenna working configuration was used for b/g mode testing in this report.

The EUT transmitting and receiving with two antennas simultaneously working at n mode, so 2x2 configuration was used for all testing in this report.

The worst-case data rates are determined to be as follows for each mode based on investigation by measuring the average power, peak power and PPSD across all data rates, bandwidths, and modulations.

The worst-case data rates:

IEEE802.11b mode: Channel Low (2412MHz), Channel Mid (2437MHz) and Channel High (2462MHz) with 1Mbps data rate were chosen for full testing.

IEEE802.11g mode: Channel Low (2412MHz), Channel Mid (2437MHz) and Channel High (2462MHz) with 6Mbps data rate were chosen for full testing.

IEEE 802.11gn Standard-20 MHz Channel mode: Channel Low (2412MHz), Channel Mid (2437MHz) and Channel High (2462MHz) with MCS8 data rate were chosen for full testing.

IEEE 802.11gn Wide-40 MHz Channel mode: Channel Low (2422MHz), Channel Mid (2437MHz) and Channel High (2452MHz) with MCS8 data rate were chosen for full testing.

The following test mode was scanned during the preliminary test:

Mode 1: Pifi antenna

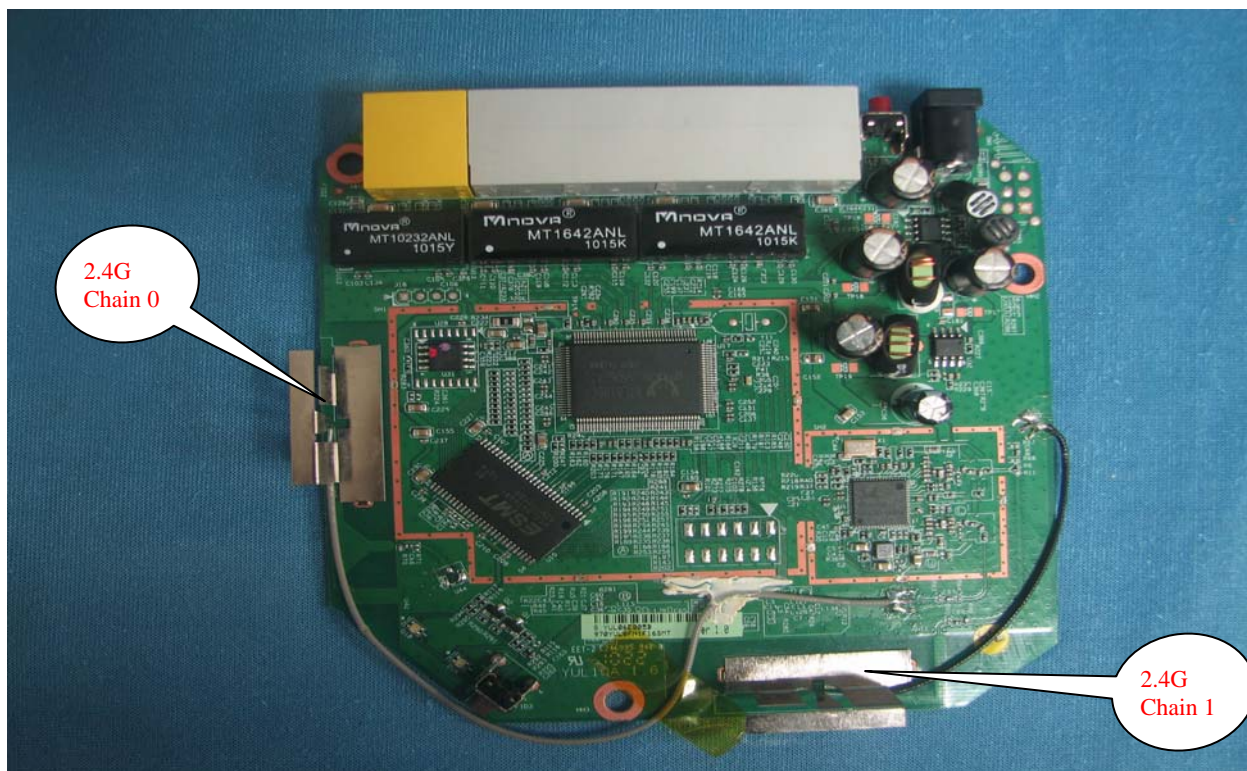
Mode 2: PCB antenna.

After the preliminary scan, the following test mode was found to produce the highest emission level.

Mode 1: Pifi antenna.

Then, the EUT configuration and cable configuration of the above highest emission mode was recorded for all final test items.







## 4. INSTRUMENT CALIBRATION

### 4.1 MEASURING INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment, which is traceable to recognized national standards.

#### Equipment Used for Emissions Measurement

**Remark:** Each piece of equipment is scheduled for calibration once a year.

Conducted Emissions Test Site				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	MY44020154	11/12/2010
Peak and Avg Power Sensor	Agilent	E9327A	US40441788	09/11/2010
EPM-P Series Power Meter	Agilent	E4416A	QB41292714	09/11/2010

3M Semi Anechoic Chamber				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	MY44020154	11/12/2010
Pre-Amplifier	Miteq	NSP4000-NF	870731	01/21/2011
Horn Antenna	Austriah	BBHA9120D	D267	05/09/2011
SHF-EHF Horn Antenna	Schwarzbeck	BBHA9170	BBHA9170171	04/12/2011
Turn Table	CT	CT123	4162	N.C.R
Antenna Tower	CT	CTERG23	3253	N.C.R
Controller	CT	CT100	95635	N.C.R
Coax Switch	Anitsu	MP 598	M 80094	N/A
Site NSA	CCS Lab.	N/A	N/A	12/11/2010
ESPI3 EMI RECEIVER	R&S	ESPI3	101026	05/06/2011
Pre-Amplifier	MINI	ZFL-1000VH2	d041703	02/28/2011
Bilog Antenna	Sunol Sciences	JB1	A110204-2	11/22/2010
Loop Antenna	ARA	PLA-1030/B	1029	02/24/2011

**Remark:** The measurement uncertainty is less than  $\pm 2.0065\text{dB}$  (30MHz ~ 1GHz),  $\pm 3.0958\text{dB}$  (Above 1GHz) which is evaluated as per the NAMAS NIS 81 and CISPR/A/291/CDV. The measurement uncertainty is less than  $\pm 2.50\text{dB}$  (30MHz ~ 1GHz),  $\pm 3.169\text{dB}$  (Above 1GHz)

Power Line Conducted Emission Test Site A				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
EMI Test Receiver	SCHAFFNER	SCR3501	343	04/22/2011
V (V-LISN)	Schwarzbeck	NNLK 8129	8129-143	04/11/2011
LISN (EUT)	FCC	FCC-LISN-50/25 0-50-2-02	SN:05012	04/11/2011
TRANSIENT LIMITER	SCHAFFNER	CFL9206	1710	04/06/2011

**Remark:** The measurement uncertainty is less than  $\pm 2.81\text{dB}$ , which is evaluated as per the NAMAS NIS 81 and CISPR/A/291/CDV.



## **5. FACILITIES AND ACCREDITATIONS**

### **5.1 FACILITIES**

All measurement facilities used to collect the measurement data are located at CCS China Kunshan Lab at 10#Weiye Rd, Innovation Park Eco. & Tec. Development Zone Kunshan city JiangSu, (215300), CHINA.

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22.

### **5.2 EQUIPMENT**

Radiated emissions are measured with one or more of the following types of linearly polarized antennas: tuned dipole, biconical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with pre-selectors and quasi-peak detectors are used to perform radiated measurements.

Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers.



Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

### **5.3 LABORATORY ACCREDITATIONS AND LISTING**

The test facilities used to perform radiated and conducted emissions tests are accredited by American Association for Laboratory Accreditation Program for the specific scope accreditation under Lab Code: **2541.01** to perform Electromagnetic Interference tests according to FCC Part 15 and CISPR 22 requirements. In addition, the test facilities are listed with Industry Canada, Certification and Engineering Bureau, **Site# 2324E-1** for 10m chamber 3/10m, **Site# 2324E-2** for 3m chamber 3m.

**5.4 TABLE OF ACCREDITATIONS AND LISTINGS**

Country	Agency	Scope of Accreditation	Logo
USA	A2LA	47 CFR FCC Part 15/18 (using ANSI C63.4:2003); VCCI V3; CNS 13438; CNS 13439; CNS 13803; CISPR 11; EN 55011; CISPR 13; EN 55013; CISPR 22:2005; CISPR 22:1997 +A1 :2000+A2 :2002; EN 55022:2006; EN55022 :1998 +A1 :2001+A2 :2003; EN 61000-6-3 (excluding discontinuous interference); EN 61000-6-4; AS/NZS CISPR 22; CAN/CSA-CEI/IEC CISPR 22; EN 61000-3-2; EN 61000-3-3; EN550024; EN 61000-4-2; EN 61000-4-3; EN61000-4-4; EN 61000-4-5; EN 61000-4-6; IEC 61000-4-8; EN 61000-4-11; IEC61000-3-2; IEC61000-3-3; IEC 61000-4-2; IEC 61000-4-3; IEC 61000-4-4; IEC 61000-4-5; IEC 61000-4-6; IEC 61000-4-8; IEC 61000-4-11; EN 300 220-3; EN 300 328; EN 300 330-2; EN 300 440-1; EN 300-440-2; EN 300 893; EN 301 489-01; EN 301 489-3; EN 301 489-07; EN 301 489-17; 47 CFR FCC Part 15, 22, 24	
USA	FCC	3/10 meter Sites to perform FCC Part 15/18 measurements	 93105, 90471
Japan	VCCI	3/10 meter Sites and conducted test sites to perform radiated/conducted measurements	<b>VCCI</b> R-1600 C-1707

*\* No part of this report may be used to claim or imply product endorsement by A2LA or any agency of the US Government.*



## **6. SETUP OF EQUIPMENT UNDER TEST**

### **6.1 SETUP CONFIGURATION OF EUT**

See test photographs attached in Appendix 1 for the actual connections between EUT and support equipment.

### **6.2 SUPPORT EQUIPMENT**

No.	Device Type	Brand	Model	Series No.	FCC ID	Data Cable	Power Cord
1.	Notebook pc	IBM	X31	NA	NA	NA	NA
2.	Notebook pc	DELL	4150	NA	NA	NA	NA

**Remark:**

- 1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.*
- 2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.*



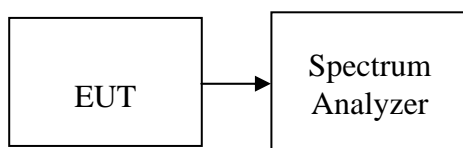
## **7. FCC PART 15.247 REQUIREMENTS**

### **7.1 6DB BANDWIDTH**

#### **LIMIT**

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 6dB bandwidth shall be at least 500 kHz.

#### **Test Configuration**



#### **TEST PROCEDURE**

The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the selected span. The VBW is set to 3 times the RBW. The sweep time is occupied.

**TEST RESULTS***No non-compliance noted***Test Data****IEEE 802.11b mode**

Channel	Frequency (MHz)	Bandwidth (MHz)	Limit (kHz)	Result
Low	2412	10.145	>500	PASS
Mid	2437	10.144		PASS
High	2462	10.146		PASS

**IEEE 802.11g mode**

Channel	Frequency (MHz)	Bandwidth (MHz)	Limit (kHz)	Result
Low	2412	16.608	>500	PASS
Mid	2437	16.620		PASS
High	2462	16.593		PASS

**TRANSMIT CHAIN 0****IEEE 802.11n Standard-20 MHz Channel mode**

Channel	Frequency (MHz)	Bandwidth (MHz)	Limit (kHz)	Result
Low	2412	17.829	>500	PASS
Mid	2437	17.783		PASS
High	2462	17.826		PASS

**IEEE 802.11n Wide-40 MHz Channel mode**

Channel	Frequency (MHz)	Bandwidth (MHz)	Limit (kHz)	Result
Low	2422	36.427	>500	PASS
Mid	2437	36.409		PASS
High	2452	36.443		PASS

**TRANSMIT CHAIN 1****IEEE 802.11n Standard-20 MHz Channel mode**

Channel	Frequency (MHz)	Bandwidth (MHz)	Limit (kHz)	Result
Low	2412	17.786	>500	PASS
Mid	2437	17.832		PASS
High	2462	17.811		PASS

**IEEE 802.11n Wide-40 MHz Channel mode**

Channel	Frequency (MHz)	Bandwidth (MHz)	Limit (kHz)	Result
Low	2422	36.496	>500	PASS
Mid	2437	36.491		PASS
High	2452	36.479		PASS

**TRANSMIT CHAIN 0+ CHAIN 1****IEEE 802.11gn Standard-20 MHz Channel mode**

Channel	Frequency (MHz)	Bandwidth (MHz)	Limit (kHz)	Result
Low	2412	17.810	>500	PASS
Mid	2437	17.780		PASS
High	2462	17.776		PASS

**IEEE 802.11n Wide-40 MHz Channel mode**

Channel	Frequency (MHz)	Bandwidth (MHz)	Limit (kHz)	Result
Low	2422	36.458	>500	PASS
Mid	2437	36.456		PASS
High	2452	36.440		PASS





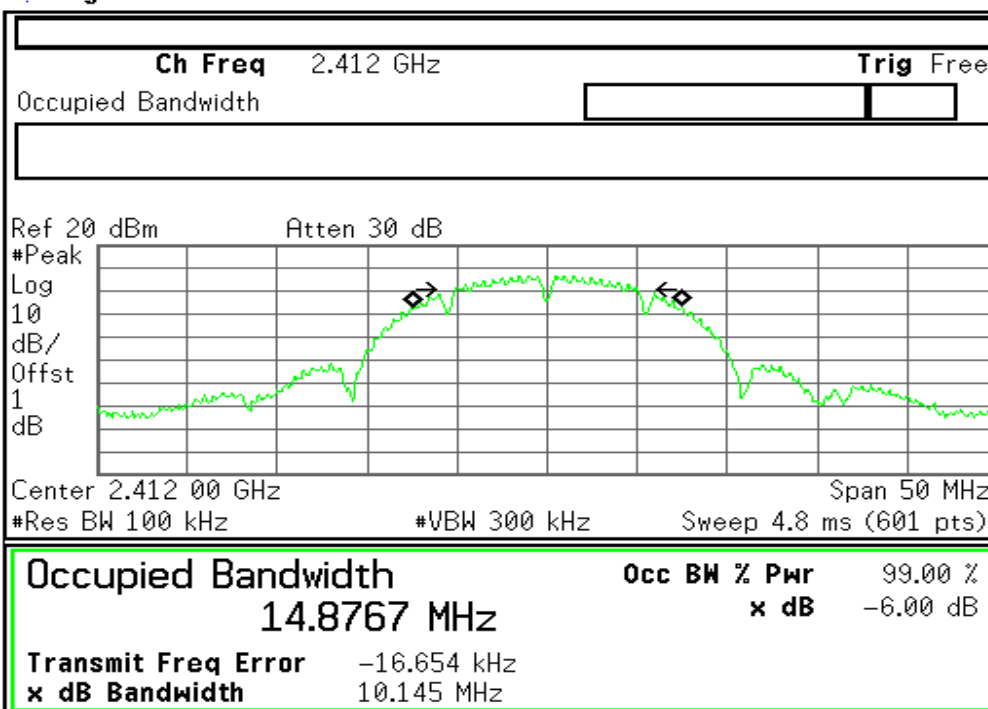
## Test Plot

### IEEE 802.11b MODE

#### 6dB Bandwidth (CH Low)

Agilent

R T



Freq/Channel

Center Freq 2.41200000 GHz

Start Freq 2.38700000 GHz

Stop Freq 2.43700000 GHz

CF Step 5.00000000 MHz  
Auto Man

Freq Offset 0.00000000 Hz

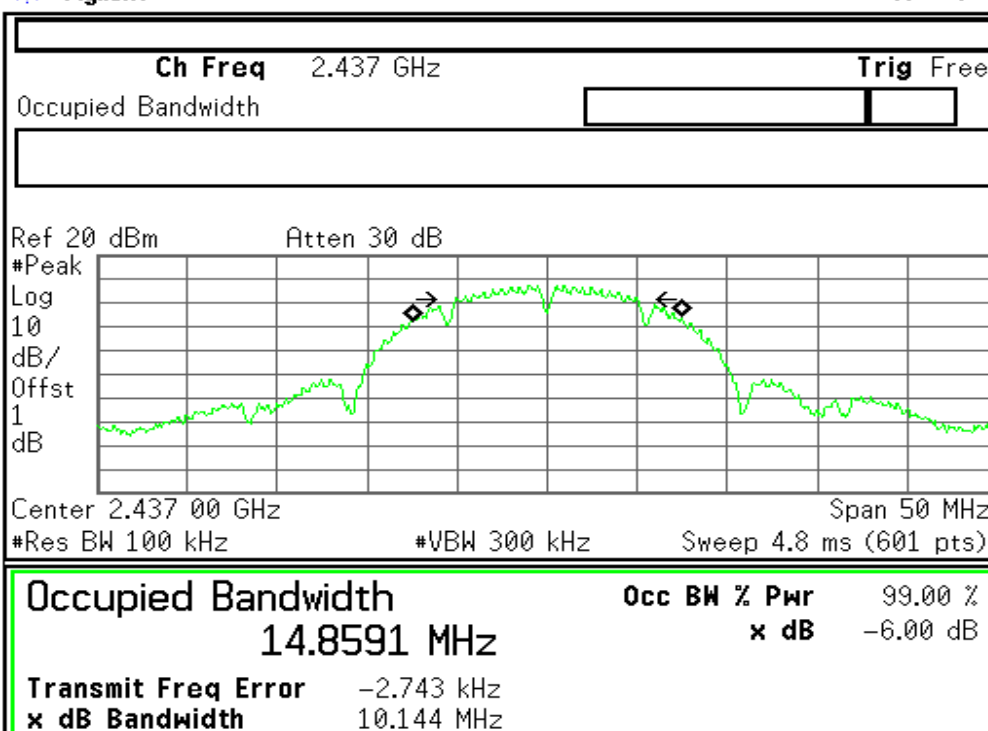
Signal Track On Off

Copyright 2000-2008 Agilent Technologies

#### 6dB Bandwidth (CH Mid)

Agilent

R T



Freq/Channel

Center Freq 2.43700000 GHz

Start Freq 2.41200000 GHz

Stop Freq 2.46200000 GHz

CF Step 5.00000000 MHz  
Auto Man

Freq Offset 0.00000000 Hz

Signal Track On Off

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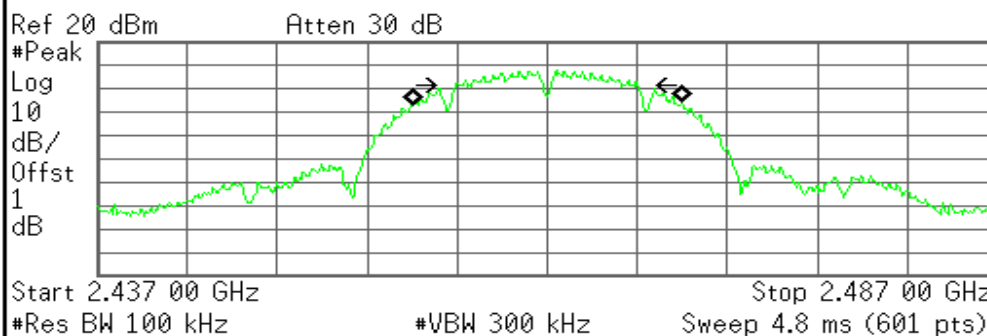
**6dB Bandwidth (CH High)**

Agilent

R T

Freq/Channel

<b>Ch Freq</b> 2.462 GHz	<b>Trig</b> Free
Occupied Bandwidth	

**Center Freq**  
2.46200000 GHz**Start Freq**  
2.43700000 GHz**Stop Freq**  
2.48700000 GHz**CF Step**  
5.00000000 MHz  
Auto Man**Freq Offset**  
0.00000000 Hz**Signal Track**  
On Off**Occupied Bandwidth****Occ BW % Pwr** 99.00 %

14.8445 MHz

**x dB** -6.00 dB**Transmit Freq Error** -9.042 kHz**x dB Bandwidth** 10.146 MHz

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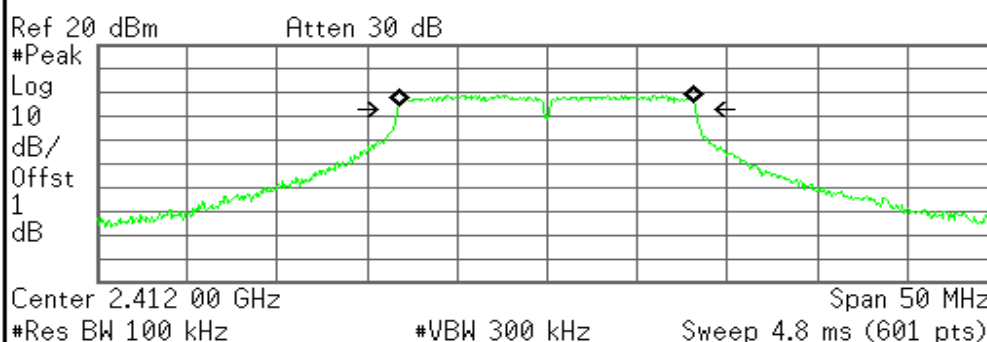
**IEEE 802.11g MODE****6dB Bandwidth (CH Low)**

Agilent

R T

Freq/Channel

<b>Ch Freq</b> 2.412 GHz	<b>Trig</b> Free
Occupied Bandwidth	

**Center Freq**  
2.41200000 GHz**Start Freq**  
2.38700000 GHz**Stop Freq**  
2.43700000 GHz**CF Step**  
5.00000000 MHz  
Auto Man**Freq Offset**  
0.00000000 Hz**Signal Track**  
On Off**Occupied Bandwidth****Occ BW % Pwr** 99.00 %

16.4633 MHz

**x dB** -6.00 dB**Transmit Freq Error** -41.992 kHz**x dB Bandwidth** 16.608 MHz

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## 6dB Bandwidth (CH Mid)

Agilent

R T

Freq/Channel

Ch Freq 2.437 GHz Trig Free

Occupied Bandwidth

Center Freq  
2.43700000 GHzStart Freq  
2.41200000 GHzStop Freq  
2.46200000 GHzCF Step  
5.00000000 MHz  
Auto ManFreq Offset  
0.00000000 HzSignal Track  
On Off

Ref 20 dBm

Atten 30 dB

#Peak

Log

10

dB/

Offst

1

dB

Center 2.437 00 GHz

Span 50 MHz

#Res BW 100 kHz

#VBW 300 kHz

Sweep 4.8 ms (601 pts)

Occupied Bandwidth

Occ BW % Pwr 99.00 %

16.4755 MHz

x dB -6.00 dB

Transmit Freq Error -45.574 kHz

x dB Bandwidth 16.620 MHz

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## 6dB Bandwidth (CH High)

Agilent

R T

Freq/Channel

Ch Freq 2.462 GHz Trig Free

Occupied Bandwidth

Center Freq  
2.46200000 GHzStart Freq  
2.43700000 GHzStop Freq  
2.48700000 GHzCF Step  
5.00000000 MHz  
Auto ManFreq Offset  
0.00000000 HzSignal Track  
On Off

Ref 20 dBm

Atten 30 dB

#Peak

Log

10

dB/

Offst

1

dB

Start 2.437 00 GHz

Stop 2.487 00 GHz

#Res BW 100 kHz

#VBW 300 kHz

Sweep 4.8 ms (601 pts)

Occupied Bandwidth

Occ BW % Pwr 99.00 %

16.4653 MHz

x dB -6.00 dB

Transmit Freq Error -43.221 kHz

x dB Bandwidth 16.593 MHz

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## IEEE 802.11n Standard-20 MHz Channel mode / Chain 0

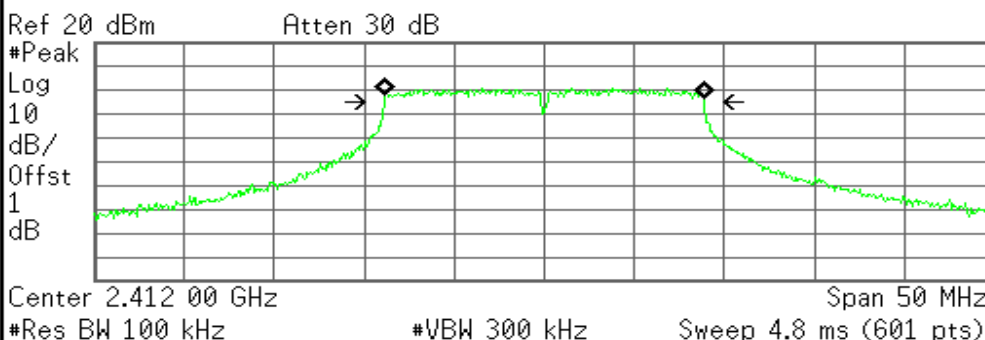
## 6dB Bandwidth (CH Low)

Agilent

R T

Freq/Channel

<b>Ch Freq</b> 2.412 GHz	<b>Trig</b> Free
Occupied Bandwidth	

Center Freq  
2.41200000 GHzStart Freq  
2.38700000 GHzStop Freq  
2.43700000 GHzCF Step  
5.00000000 MHz  
Auto ManFreq Offset  
0.00000000 HzSignal Track  
On Off

Occupied Bandwidth

Occ BW % Pwr 99.00 %  
x dB -6.00 dB

17.6485 MHz

Transmit Freq Error -23.868 kHz  
x dB Bandwidth 17.829 MHz

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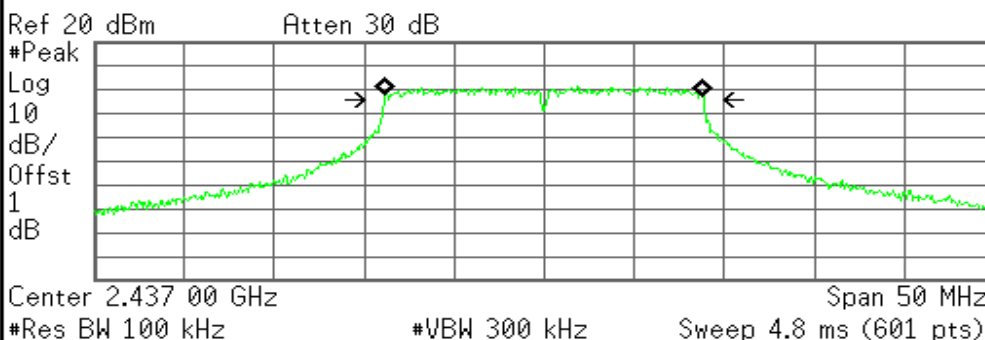
## 6dB Bandwidth (CH Mid)

Agilent

R T

Freq/Channel

<b>Ch Freq</b> 2.437 GHz	<b>Trig</b> Free
Occupied Bandwidth	

Center Freq  
2.43700000 GHzStart Freq  
2.41200000 GHzStop Freq  
2.46200000 GHzCF Step  
5.00000000 MHz  
Auto ManFreq Offset  
0.00000000 HzSignal Track  
On Off

Occupied Bandwidth

Occ BW % Pwr 99.00 %  
x dB -6.00 dB

17.6245 MHz

Transmit Freq Error -31.387 kHz  
x dB Bandwidth 17.783 MHz

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**6dB Bandwidth (CH High)**

Agilent

R T

Freq/Channel

Ch Freq 2.462 GHz Trig Free

Occupied Bandwidth

Center Freq  
2.46200000 GHz

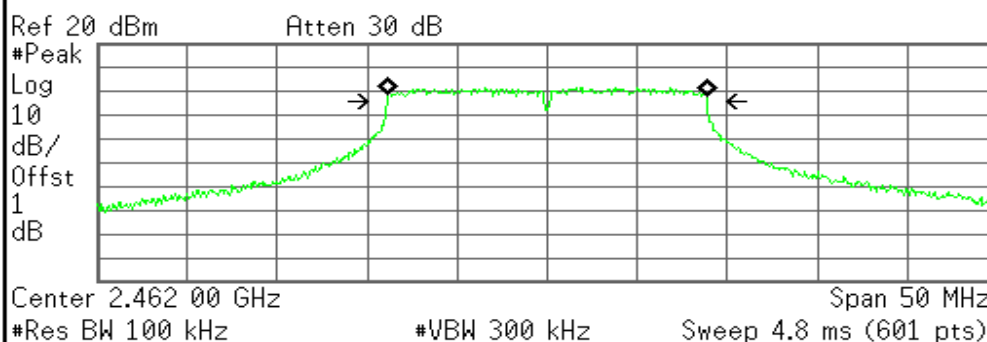
Start Freq  
2.43700000 GHz

Stop Freq  
2.48700000 GHz

CF Step  
5.00000000 MHz  
Auto Man

Freq Offset  
0.00000000 Hz

Signal Track  
On Off

**Occupied Bandwidth**

Occ BW % Pwr 99.00 %

17.6477 MHz

x dB -6.00 dB

Transmit Freq Error -29.098 kHz

x dB Bandwidth 17.826 MHz

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**IEEE 802.11n Standard-20 MHz Channel mode / Chain 1****6dB Bandwidth (CH Low)**

Agilent

R T

Freq/Channel

Ch Freq 2.412 GHz Trig Free

Occupied Bandwidth

Center Freq  
2.41200000 GHz

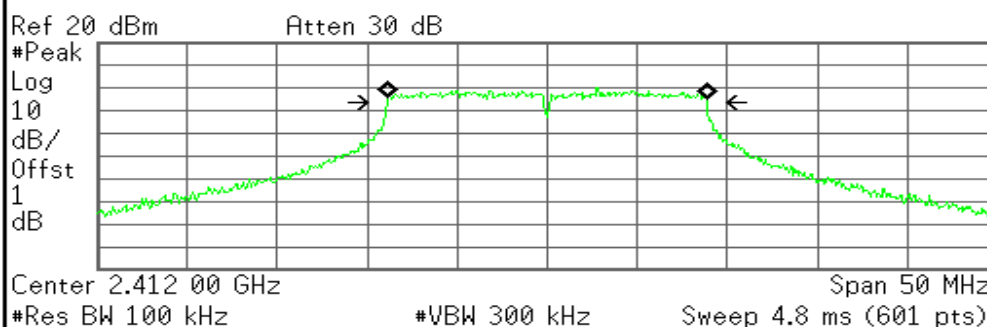
Start Freq  
2.38700000 GHz

Stop Freq  
2.43700000 GHz

CF Step  
5.00000000 MHz  
Auto Man

Freq Offset  
0.00000000 Hz

Signal Track  
On Off

**Occupied Bandwidth**

Occ BW % Pwr 99.00 %

17.6701 MHz

x dB -6.00 dB

Transmit Freq Error -30.305 kHz

x dB Bandwidth 17.786 MHz

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## 6dB Bandwidth (CH Mid)

Agilent

R T

Freq/Channel

Ch Freq 2.437 GHz Trig Free

Occupied Bandwidth

Center Freq  
2.43700000 GHzStart Freq  
2.41200000 GHzStop Freq  
2.46200000 GHzCF Step  
5.00000000 MHz  
Auto ManFreq Offset  
0.00000000 HzSignal Track  
On Off

Ref 20 dBm

Atten 30 dB

#Peak

Log

10

dB/

Offset

1

dB

Center 2.437 00 GHz

Span 50 MHz

#Res BW 100 kHz

#VBW 300 kHz

Sweep 4.8 ms (601 pts)

Occupied Bandwidth

Occ BW % Pwr 99.00 %

17.6717 MHz

x dB -6.00 dB

Transmit Freq Error -24.654 kHz

x dB Bandwidth 17.832 MHz

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## 6dB Bandwidth (CH High)

Agilent

R T

Freq/Channel

Ch Freq 2.462 GHz Trig Free

Occupied Bandwidth

Center Freq  
2.46200000 GHzStart Freq  
2.43700000 GHzStop Freq  
2.48700000 GHzCF Step  
5.00000000 MHz  
Auto ManFreq Offset  
0.00000000 HzSignal Track  
On Off

Ref 20 dBm

Atten 30 dB

#Peak

Log

10

dB/

Offset

1

dB

Center 2.462 00 GHz

Span 50 MHz

#Res BW 100 kHz

#VBW 300 kHz

Sweep 4.8 ms (601 pts)

Occupied Bandwidth

Occ BW % Pwr 99.00 %

17.6557 MHz

x dB -6.00 dB

Transmit Freq Error -31.120 kHz

x dB Bandwidth 17.811 MHz

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**IEEE 802.11n Wide-40 MHz Channel mode / Chain 0****6dB Bandwidth (CH Low)**

\* Agilent

R T

Freq/Channel

Ch Freq 2.422 GHz Trig Free

Center Freq  
2.42200000 GHz

Occupied Bandwidth

Start Freq  
2.39700000 GHz

Ref 20 dBm

Atten 30 dB

#Peak

Log

10

dB/

Offst

1

dB

Center 2.422 00 GHz

Span 50 MHz

#Res BW 100 kHz

#VBW 300 kHz

Sweep 4.8 ms (601 pts)

Stop Freq  
2.44700000 GHzCF Step  
5.00000000 MHz  
Auto ManFreq Offset  
0.00000000 HzSignal Track  
On Off**Occupied Bandwidth**

Occ BW % Pwr 99.00 %

**35.9831 MHz**

x dB -6.00 dB

Transmit Freq Error

-12.879 kHz

x dB Bandwidth

36.427 MHz

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**6dB Bandwidth (CH Mid)**

\* Agilent

R T

Freq/Channel

Ch Freq 2.437 GHz Trig Free

Center Freq  
2.43700000 GHz

Occupied Bandwidth

Start Freq  
2.41200000 GHz

Ref 20 dBm

Atten 30 dB

#Peak

Log

10

dB/

Offst

1

dB

Center 2.437 00 GHz

Span 50 MHz

#Res BW 100 kHz

#VBW 300 kHz

Sweep 4.8 ms (601 pts)

Stop Freq  
2.46200000 GHzCF Step  
5.00000000 MHz  
Auto ManFreq Offset  
0.00000000 HzSignal Track  
On Off**Occupied Bandwidth**

Occ BW % Pwr 99.00 %

**35.9445 MHz**

x dB -6.00 dB

Transmit Freq Error

4.031 kHz

x dB Bandwidth

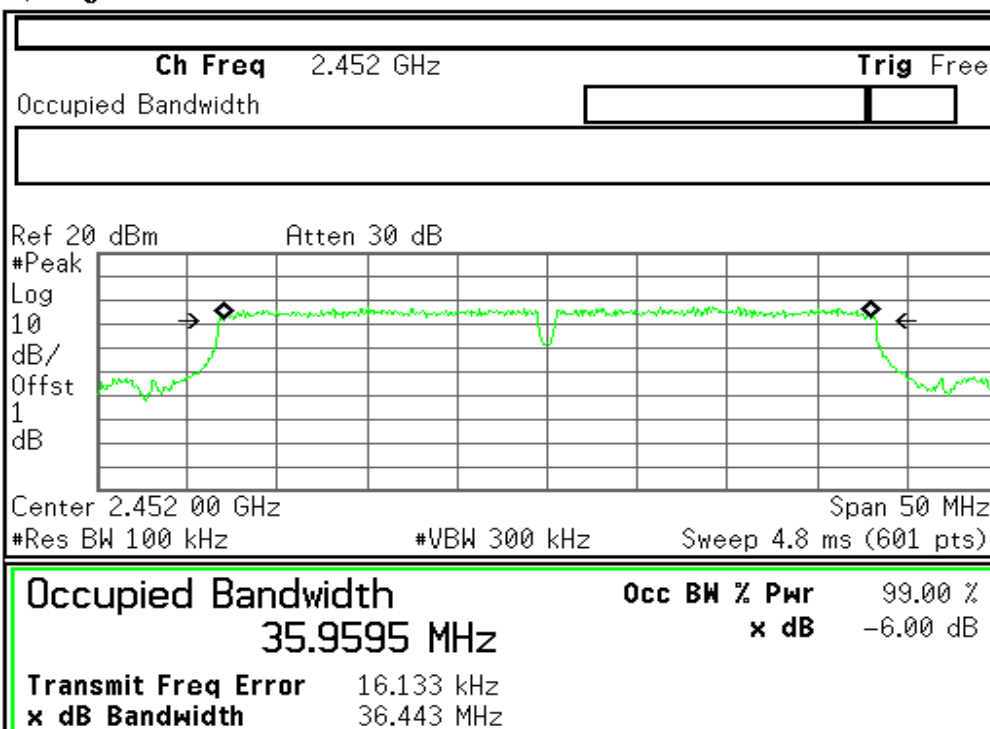
36.409 MHz

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**6dB Bandwidth (CH High)**

Agilent

R T



Freq/Channel

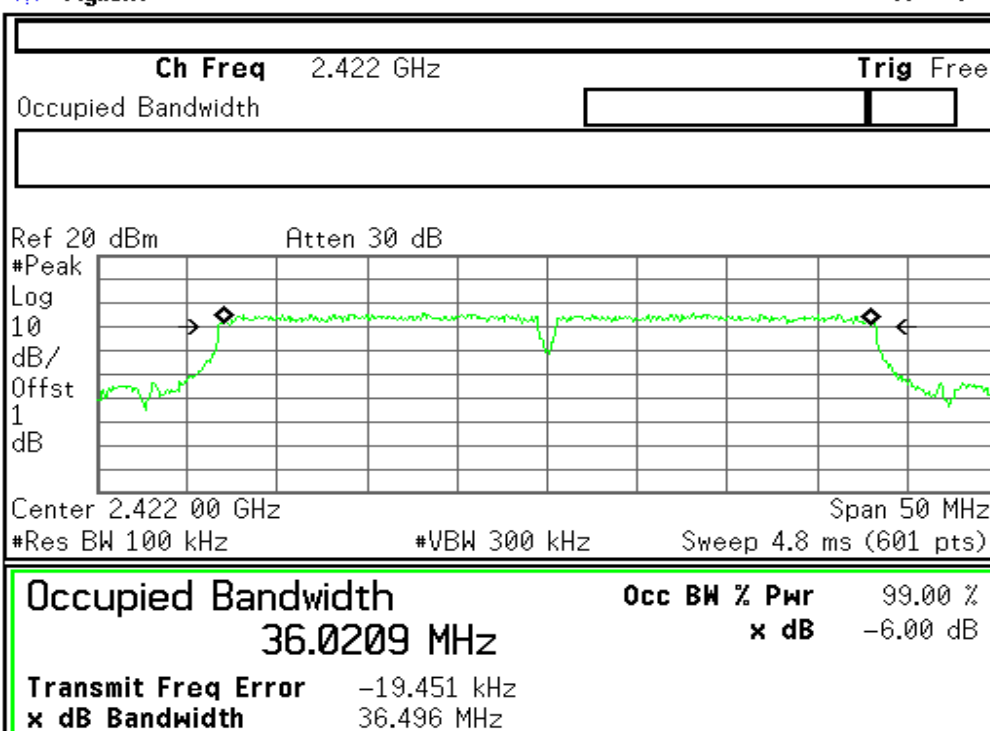
Center Freq  
2.45200000 GHzStart Freq  
2.42700000 GHzStop Freq  
2.47700000 GHzCF Step  
5.00000000 MHz  
Auto ManFreq Offset  
0.00000000 HzSignal Track  
On Off

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**IEEE 802.11n Wide-40 MHz Channel mode / Chain 1****6dB Bandwidth (CH Low)**

Agilent

R T



Freq/Channel

Center Freq  
2.42200000 GHzStart Freq  
2.39700000 GHzStop Freq  
2.44700000 GHzCF Step  
5.00000000 MHz  
Auto ManFreq Offset  
0.00000000 HzSignal Track  
On Off

Copyright 2000-2008 Agilent Technologies



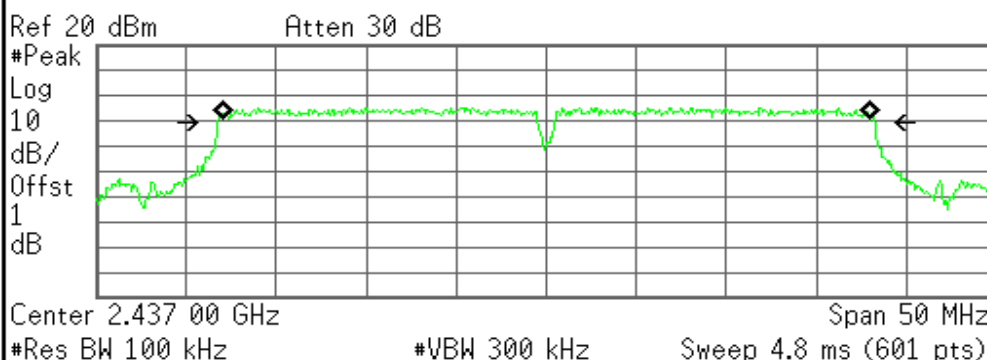
**6dB Bandwidth (CH Mid)**

\* Agilent

R T

Freq/Channel

<b>Ch Freq</b> 2.437 GHz	<b>Trig</b> Free
Occupied Bandwidth	

**Center Freq**  
2.43700000 GHz**Start Freq**  
2.41200000 GHz**Stop Freq**  
2.46200000 GHz**CF Step**  
5.00000000 MHz  
Auto Man**Freq Offset**  
0.00000000 Hz**Signal Track**  
On Off**Occupied Bandwidth**  
36.0273 MHz**Occ BW % Pwr** 99.00 %  
**x dB** -6.00 dB**Transmit Freq Error** 240.386 Hz  
**x dB Bandwidth** 36.491 MHz

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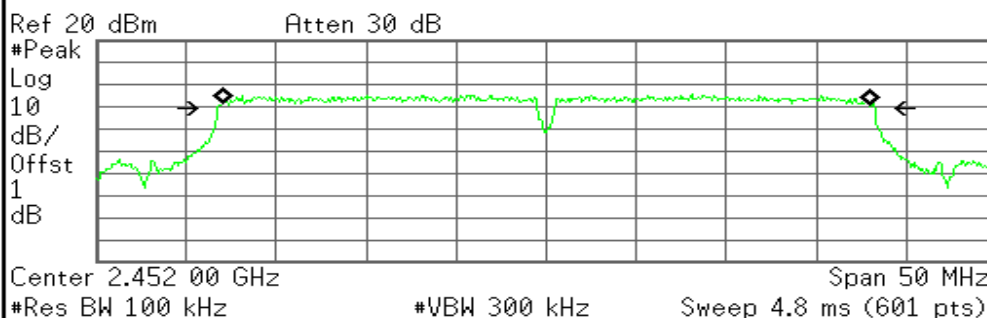
**6dB Bandwidth (CH High)**

\* Agilent

R T

Freq/Channel

<b>Ch Freq</b> 2.452 GHz	<b>Trig</b> Free
Occupied Bandwidth	

**Center Freq**  
2.45200000 GHz**Start Freq**  
2.42700000 GHz**Stop Freq**  
2.47700000 GHz**CF Step**  
5.00000000 MHz  
Auto Man**Freq Offset**  
0.00000000 Hz**Signal Track**  
On Off**Occupied Bandwidth**  
35.9722 MHz**Occ BW % Pwr** 99.00 %  
**x dB** -6.00 dB**Transmit Freq Error** -11.363 kHz  
**x dB Bandwidth** 36.479 MHz

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## IEEE 802.11gn Standard-20 MHz Channel mode / Chain 0+ Chain 1

## 6dB Bandwidth (CH Low)

Agilent

R T

Freq/Channel

Ch Freq 2.412 GHz Trig Free

Occupied Bandwidth

Center Freq  
2.41200000 GHz

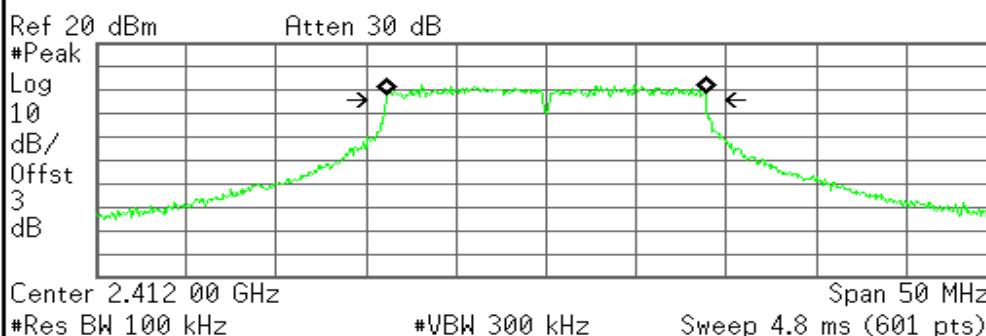
Start Freq  
2.38700000 GHz

Stop Freq  
2.43700000 GHz

CF Step  
5.00000000 MHz  
Auto Man

Freq Offset  
0.00000000 Hz

Signal Track  
On Off



Occupied Bandwidth

Occ BW % Pwr 99.00 %

17.6559 MHz

x dB -6.00 dB

Transmit Freq Error -25.060 kHz

x dB Bandwidth 17.810 MHz

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## 6dB Bandwidth (CH Mid)

Agilent

R T

Freq/Channel

Ch Freq 2.437 GHz Trig Free

Occupied Bandwidth

Center Freq  
2.43700000 GHz

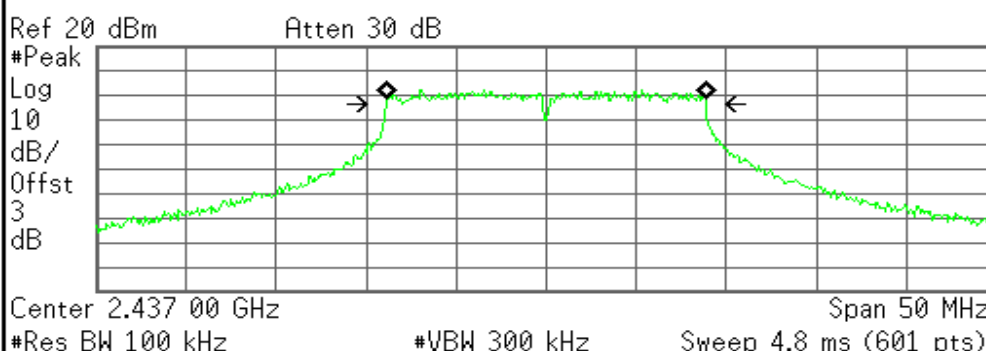
Start Freq  
2.41200000 GHz

Stop Freq  
2.46200000 GHz

CF Step  
5.00000000 MHz  
Auto Man

Freq Offset  
0.00000000 Hz

Signal Track  
On Off



Occupied Bandwidth

Occ BW % Pwr 99.00 %

17.6423 MHz

x dB -6.00 dB

Transmit Freq Error -29.094 kHz

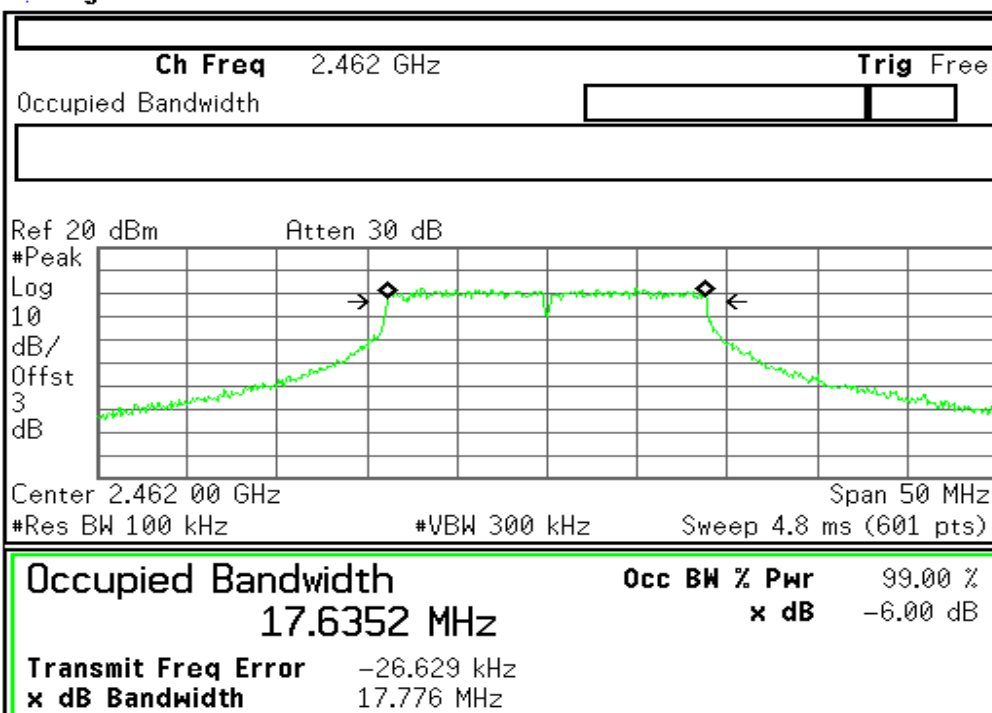
x dB Bandwidth 17.780 MHz

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**6dB Bandwidth (CH High)**

Agilent

R T



Freq/Channel

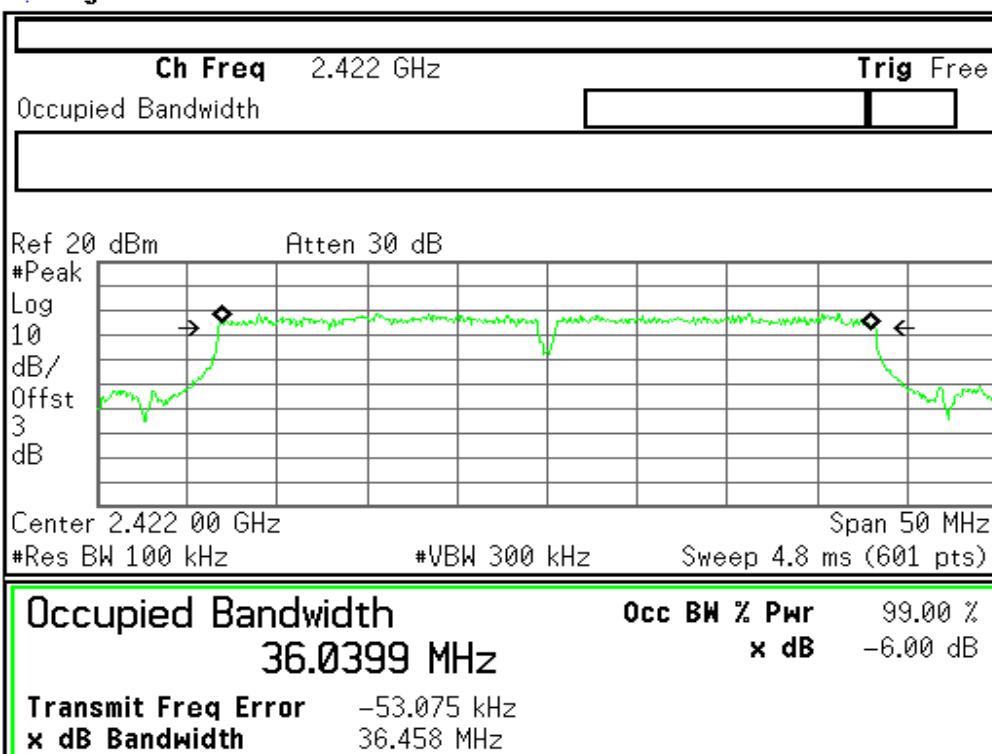
Center Freq  
2.46200000 GHzStart Freq  
2.43700000 GHzStop Freq  
2.48700000 GHzCF Step  
5.00000000 MHz  
Auto ManFreq Offset  
0.00000000 HzSignal Track  
On Off

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**IEEE 802.11n Wide-40 MHz Channel mode / Chain 0+ Chain 1****6dB Bandwidth (CH Low)**

Agilent

R T



Freq/Channel

Center Freq  
2.42200000 GHzStart Freq  
2.39700000 GHzStop Freq  
2.44700000 GHzCF Step  
5.00000000 MHz  
Auto ManFreq Offset  
0.00000000 HzSignal Track  
On Off

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**6dB Bandwidth (CH Mid)**

\* Agilent

R T

**Freq/Channel**

Ch Freq 2.437 GHz Trig Free  
Occupied Bandwidth

Center Freq  
2.43700000 GHz

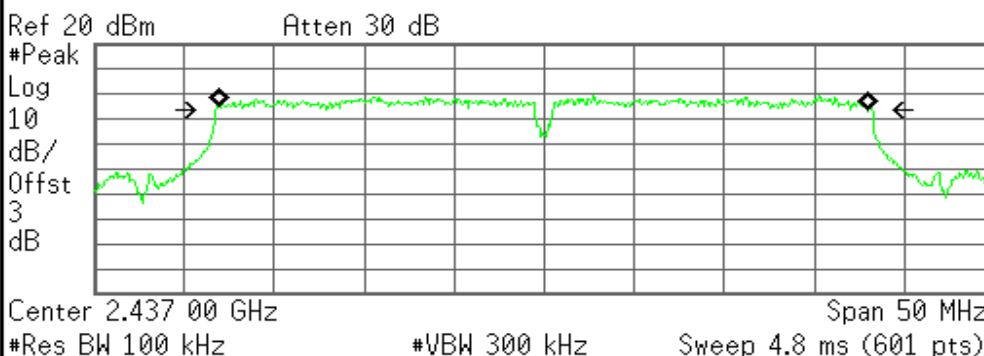
Start Freq  
2.41200000 GHz

Stop Freq  
2.46200000 GHz

CF Step  
5.00000000 MHz  
Auto Man

Freq Offset  
0.00000000 Hz

Signal Track  
On Off

**Occupied Bandwidth**

Occ BW % Pwr 99.00 %  
x dB -6.00 dB

**36.0427 MHz**

Transmit Freq Error -39.813 kHz

x dB Bandwidth 36.456 MHz

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**6dB Bandwidth (CH High)**

\* Agilent

R T

**Freq/Channel**

Ch Freq 2.452 GHz Trig Free  
Occupied Bandwidth

Center Freq  
2.45200000 GHz

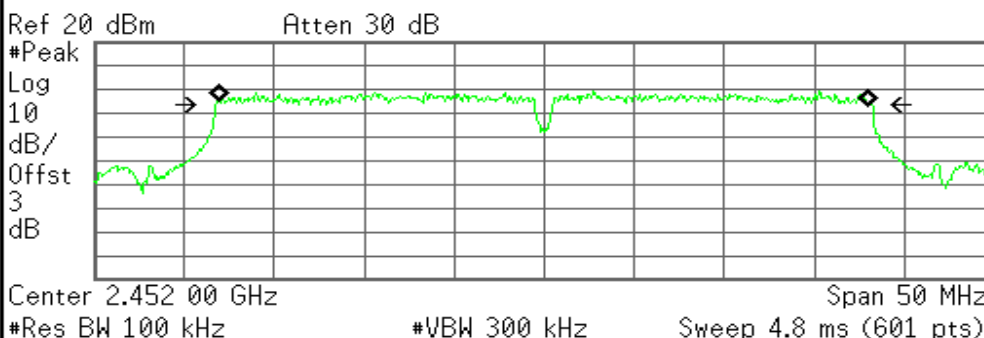
Start Freq  
2.42700000 GHz

Stop Freq  
2.47700000 GHz

CF Step  
5.00000000 MHz  
Auto Man

Freq Offset  
0.00000000 Hz

Signal Track  
On Off

**Occupied Bandwidth**

Occ BW % Pwr 99.00 %  
x dB -6.00 dB

**36.0540 MHz**

Transmit Freq Error -49.456 kHz

x dB Bandwidth 36.440 MHz

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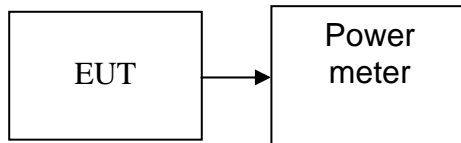
## **7.2 PEAK POWER**

### **LIMIT**

The maximum peak output power of the intentional radiator shall not exceed the following:

1. According to §15.247(b)(3), for systems using digital modulation in the bands of 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz: 1 Watt.
2. According to §15.247(b)(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.

### **Test Configuration**



### **TEST PROCEDURE**

The transmitter output is connected to the Power meter.



## **TEST RESULTS**

*No non-compliance noted*

### **Test Data**

#### **Test mode: IEEE 802.11b mode**

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)	Result
Low	2412	18.47	0.0703	1.00	PASS
Mid	2437	18.88	0.0773		PASS
High	2462	18.94	0.0783		PASS

#### **Test mode: IEEE 802.11g mode**

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)	Result
Low	2412	14.05	0.0254	1.00	PASS
Mid	2437	13.58	0.0228		PASS
High	2462	13.98	0.0250		PASS

#### **Test mode: IEEE 802.11gn Standard-20 MHz Channel mode**

Channel	Frequency (MHz)	Chain 0 Output Power (dBm)	Chain 1 Output Power (dBm)	Output Power (dBm)	Output Power (W)	Limit (W)	Result
Low	2412	12.66	11.84	15.28	0.0337	1.00	PASS
Mid	2437	12.47	11.45	15.00	0.0316		PASS
High	2462	12.33	11.27	14.84	0.0305		PASS

#### **Test mode: IEEE 802.11gn Wide-40 MHz Channel mode**

Channel	Frequency (MHz)	Chain 0 Output Power (dBm)	Chain 1 Output Power (dBm)	Output Power (dBm)	Output Power (W)	Limit (W)	Result
Low	2422	12.74	11.66	15.24	0.0334	1.00	PASS
Mid	2437	12.55	11.34	15.00	0.0316		PASS
High	2452	12.41	11.15	14.84	0.0305		PASS

#### **Test mode: IEEE 802.11gn Standard-20 MHz Channel mode / Chain 0+ Chain 1**

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)	Result
Low	2412	14.24	0.0265	1.00	PASS
Mid	2437	14.08	0.0256		PASS
High	2462	13.94	0.0248		PASS



**Test mode: IEEE 802.11gn Wide-40 MHz Channel mode / Chain 0+ Chain 1**

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)	Result
Low	2422	13.81	0.0240	1.00	PASS
Mid	2437	13.52	0.0225		PASS
High	2452	13.27	0.0212		PASS

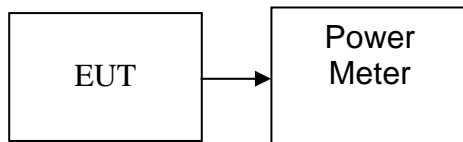


## **7.3 AVERAGE POWER**

### **LIMIT**

None; for reporting purposes only.

### **Test Configuration**



### **TEST PROCEDURE**

The transmitter output is connected to the Power meter.





## **TEST RESULTS**

*No non-compliance noted*

### **Test Data**

#### **Test mode: IEEE 802.11b mode**

Channel	Frequency (MHz)	Output Power (dBm)
Low	2412	16.34
Mid	2437	16.75
High	2462	16.82

#### **Test mode: IEEE 802.11g mode**

Channel	Frequency (MHz)	Output Power (dBm)
Low	2412	12.89
Mid	2437	12.33
High	2462	12.86

#### **Test mode: IEEE 802.11gn Standard-20 MHz Channel mode**

Channel	Frequency (MHz)	Chain 0 Output Power (dBm)	Chain 1 Output Power (dBm)	Output Power (dBm)
Low	2412	10.01	9.32	12.69
Mid	2437	9.92	9.07	12.53
High	2462	9.88	8.79	12.38

#### **Test mode: IEEE 802.11gn Wide-40 MHz Channel mode**

Channel	Frequency (MHz)	Chain 0 Output Power (dBm)	Chain 1 Output Power (dBm)	Output Power (dBm)
Low	2422	10.25	9.14	12.74
Mid	2437	10.03	8.97	12.54
High	2452	9.96	8.71	12.39

#### **Test mode: IEEE 802.11gn Standard-20 MHz Channel mode / Chain 0+ Chain 1**

Channel	Frequency (MHz)	Output Power (dBm)
Low	2412	11.75
Mid	2437	11.47
High	2462	11.23



**Test mode: IEEE 802.11gn Wide-40 MHz Channel mode / Chain 0+ Chain 1**

Channel	Frequency (MHz)	Output Power (dBm)
Low	2422	11.29
Mid	2437	11.05
High	2452	10.88

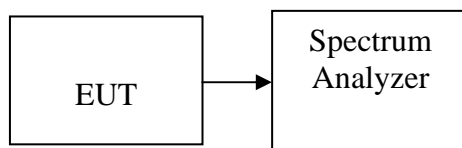


## **7.4 PEAK POWER SPECTRAL DENSITY**

### **LIMIT**

1. 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 8 dBm in any 3 kHz band during any time interval of continuous transmission.
2. According to §15.247(f), the digital modulation operation of the hybrid system, with the frequency hopping turned off, shall comply with the power density requirements of paragraph (d) of this section.

### **Test Configuration**



### **TEST PROCEDURE**

1. Place the EUT on the table and set it in transmitting mode.  
Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
2. Set the spectrum analyzer as RBW = 3 kHz, VBW = 10 kHz, Span = 300 kHz, Sweep = 100 s
3. Record the max reading.
4. Repeat the above procedure until the measurements for all frequencies are completed.



## **TEST RESULTS**

*No non-compliance noted*

### **Test Data**

#### **Test mode: IEEE 802.11b mode**

Channel	Frequency (MHz)	PPSD Total (dBm)	Limit (dBm)	Result
Low	2412	-14.11	8.00	PASS
Mid	2437	-13.95	8.00	PASS
High	2462	-14.63	8.00	PASS

#### **Test mode: IEEE 802.11g mode**

Channel	Frequency (MHz)	PPSD Total (dBm)	Limit (dBm)	Result
Low	2412	-13.68	8.00	PASS
Mid	2437	-13.78	8.00	PASS
High	2462	-13.77	8.00	PASS

#### **Test mode: IEEE 802.11n Standard-20 MHz Channel mode**

Channel	Frequency (MHz)	PPSD Chain 0 (dBm)	PPSD Chain 1 (dBm)	PPSD Total (dBm)	Limit (dBm)	Result
Low	2412	-17.95	-15.69	-13.66	8.00	PASS
Mid	2437	-18.19	-15.90	-13.89	8.00	PASS
High	2462	-18.52	-16.07	-14.11	8.00	PASS

#### **Test mode: IEEE 802.11n Wide-40 MHz Channel mode**

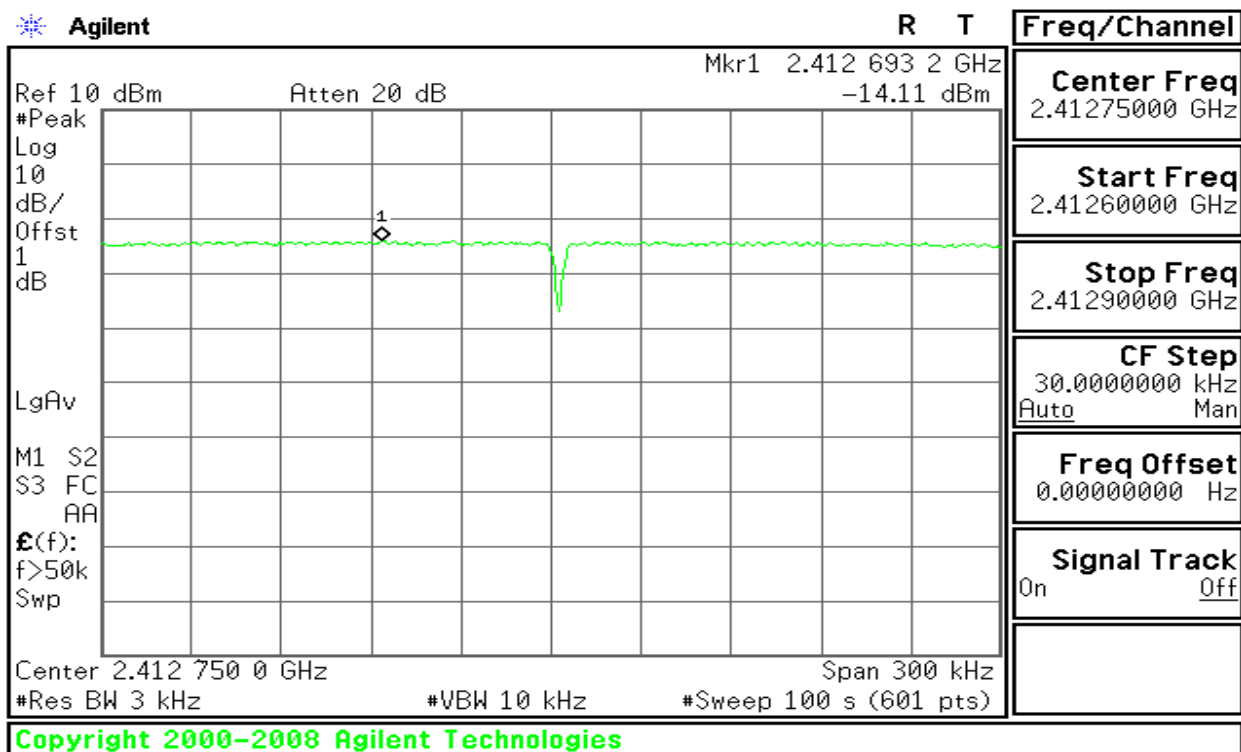
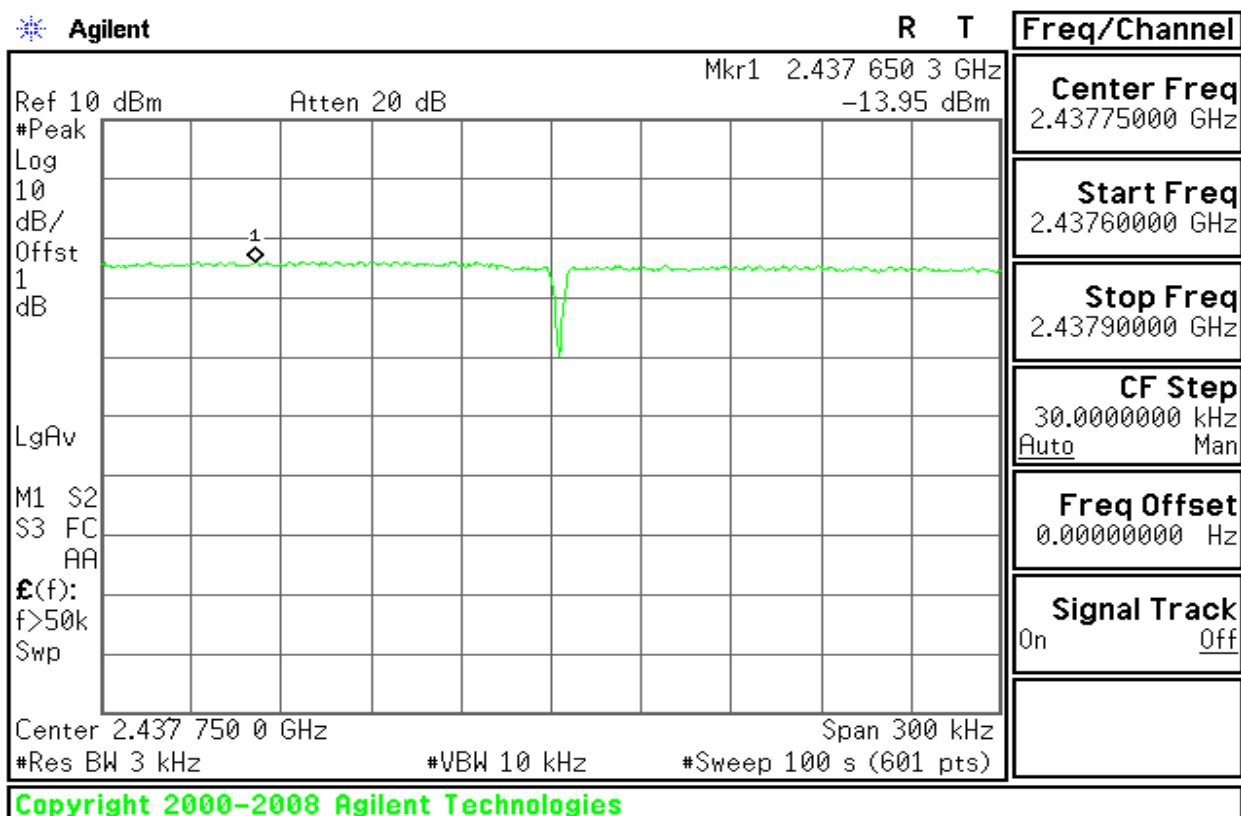
Channel	Frequency (MHz)	PPSD Chain 0 (dBm)	PPSD Chain 1 (dBm)	PPSD Total (dBm)	Limit (dBm)	Result
Low	2422	-21.32	-19.12	-17.07	8.00	PASS
Mid	2437	-21.33	-19.32	-17.20	8.00	PASS
High	2452	-21.08	-18.98	-16.89	8.00	PASS

**Test mode: IEEE 802.11gn Standard-20 MHz Channel mode / Chain 0+ Chain 1**

Channel	Frequency (MHz)	PPSD Total (dBm)	Limit (dBm)	Result
Low	2412	-16.75	8.00	PASS
Mid	2437	-16.32	8.00	PASS
High	2462	-15.98	8.00	PASS

**Test mode: IEEE 802.11gn Wide-40 MHz Channel mode / Chain 0+ Chain 1**

Channel	Frequency (MHz)	PPSD Total (dBm)	Limit (dBm)	Result
Low	2422	-19.15	8.00	PASS
Mid	2437	-18.93	8.00	PASS
High	2452	-18.75	8.00	PASS

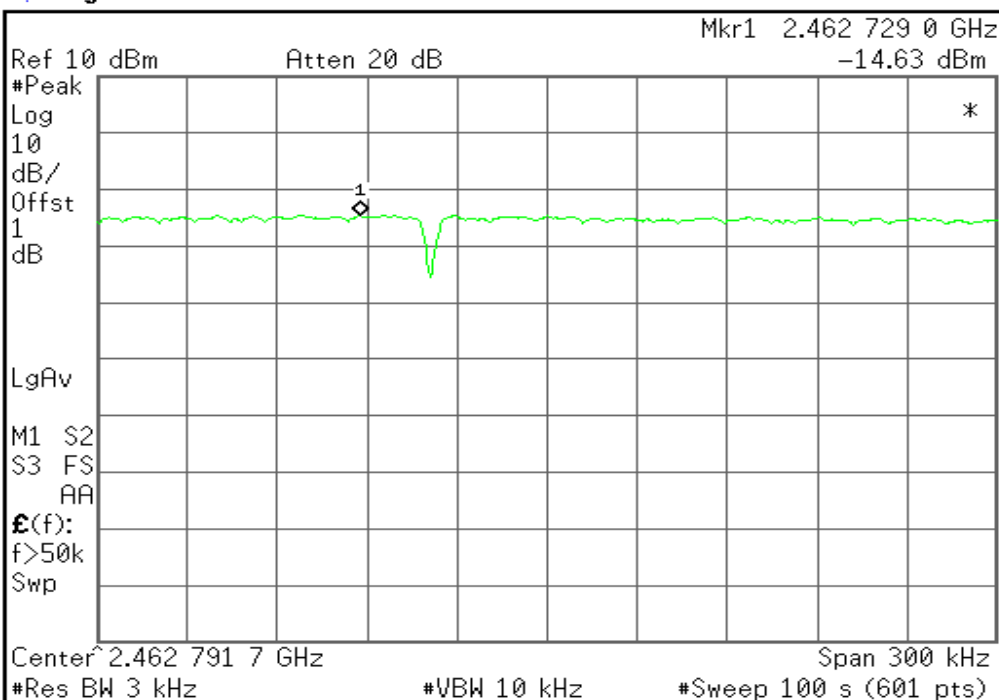
**Test Plot****IEEE 802.11b mode****PPSD (CH Low)****PPSD (CH Mid)**

**PPSD (CH High)**

Agilent

R T

Freq/Channel



<b>Center Freq</b> 2.46279167 GHz
<b>Start Freq</b> 2.46264167 GHz
<b>Stop Freq</b> 2.46294167 GHz
<b>CF Step</b> 30.0000000 kHz Auto Man
<b>Freq Offset</b> 0.00000000 Hz
<b>Signal Track</b> On Off

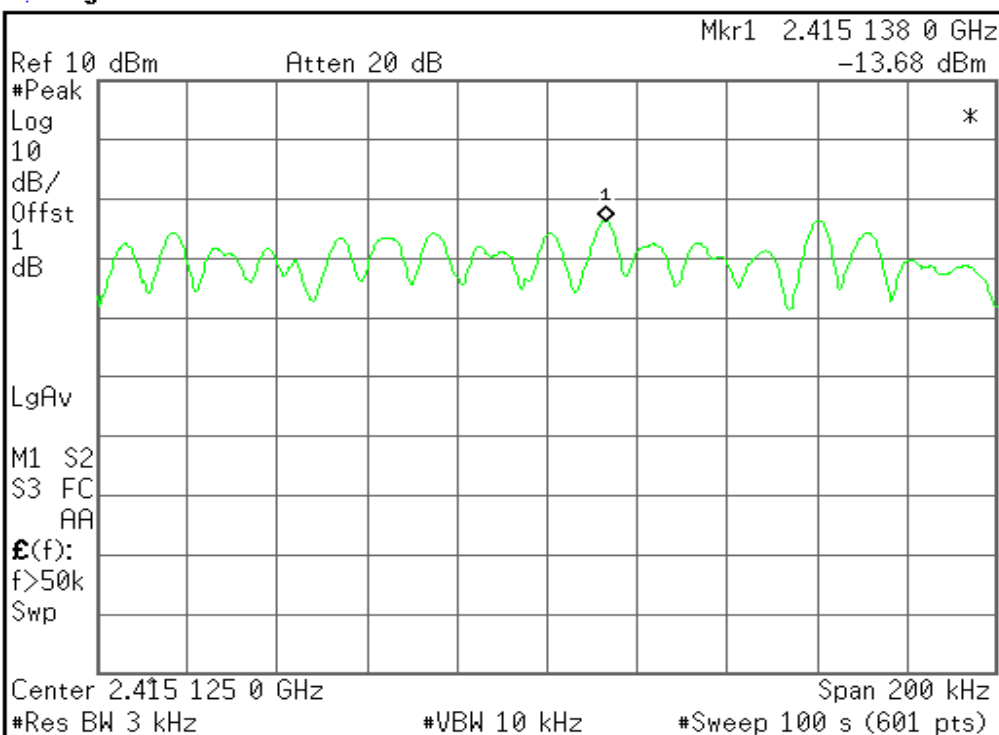
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**IEEE 802.11g mode****PPSD (CH Low)**

Agilent

R T

Freq/Channel



<b>Center Freq</b> 2.41512500 GHz
<b>Start Freq</b> 2.41502500 GHz
<b>Stop Freq</b> 2.41522500 GHz
<b>CF Step</b> 20.0000000 kHz Auto Man
<b>Freq Offset</b> 0.00000000 Hz
<b>Signal Track</b> On Off

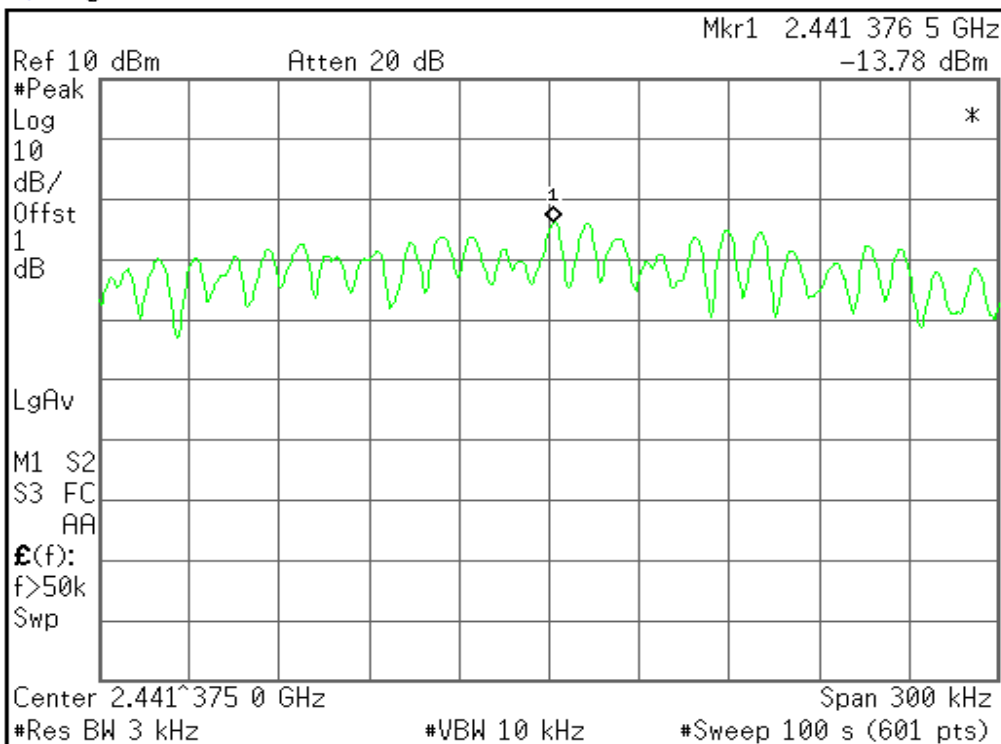
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**PPSD (CH Mid)**

\* Agilent

R T

Freq/Channel

**Center Freq**  
2.44137500 GHz**Start Freq**  
2.44122500 GHz**Stop Freq**  
2.44152500 GHz**CF Step**  
30.0000000 kHz  
Auto Man**Freq Offset**  
0.00000000 Hz**Signal Track**  
On Off

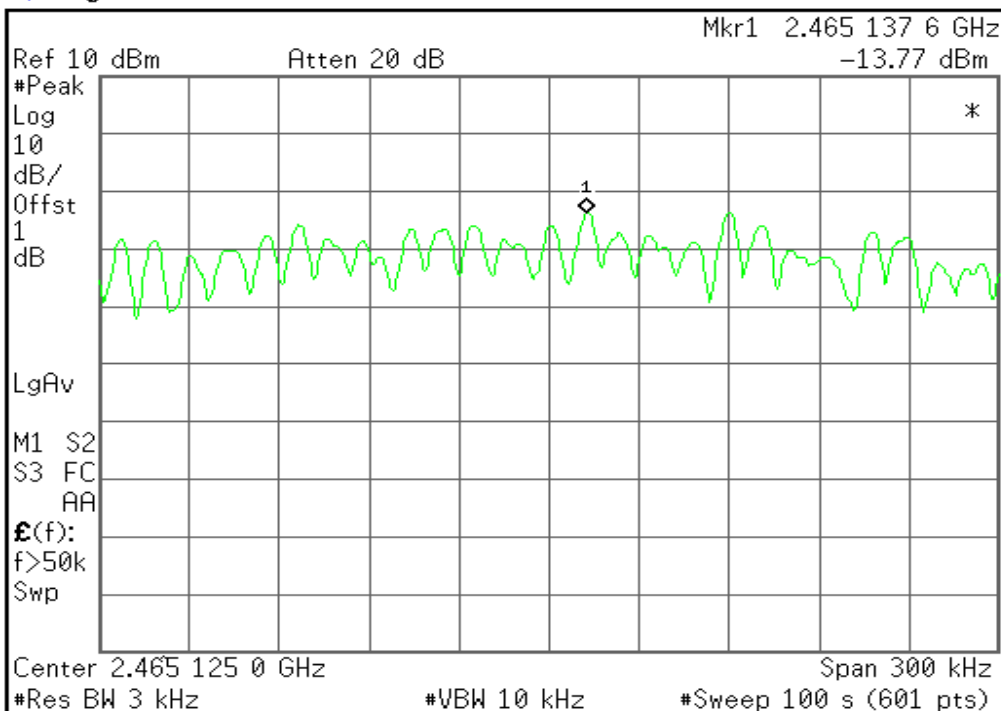
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**PPSD (CH High)**

\* Agilent

R T

Freq/Channel

**Center Freq**  
2.46512500 GHz**Start Freq**  
2.46497500 GHz**Stop Freq**  
2.46527500 GHz**CF Step**  
30.0000000 kHz  
Auto Man**Freq Offset**  
0.00000000 Hz**Signal Track**  
On Off

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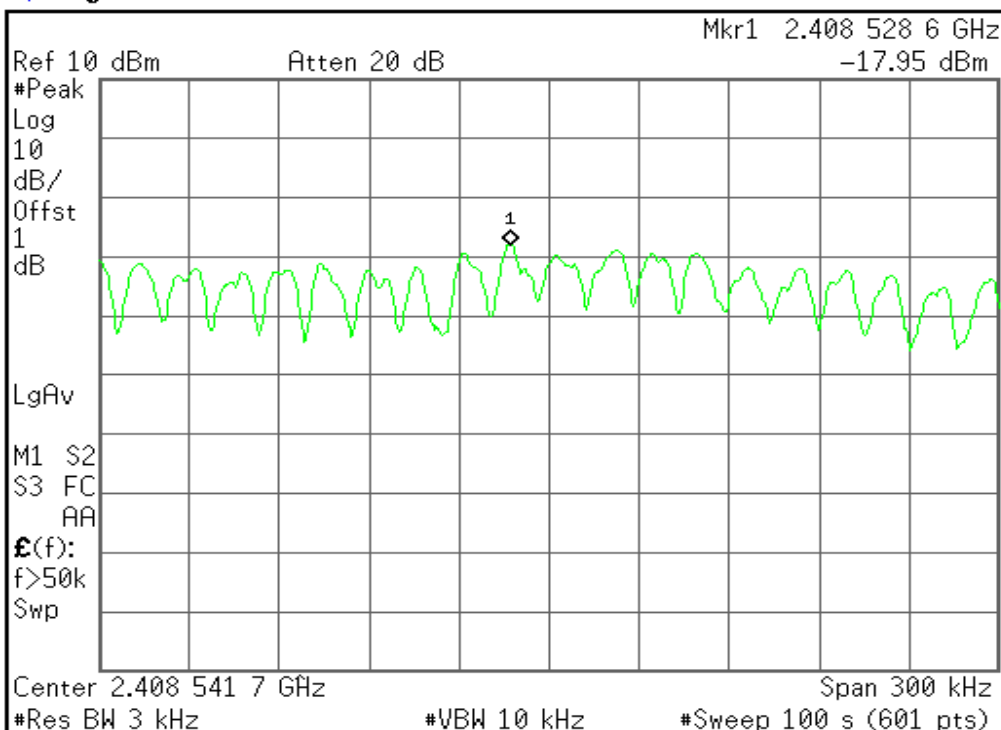


**IEEE 802.11n Standard-20 MHz Channel mode / Chain 0****PPSD (CH Low)**

\* Agilent

R T

Freq/Channel

**Center Freq**  
2.40854167 GHz**Start Freq**  
2.40839167 GHz**Stop Freq**  
2.40869167 GHz**CF Step**  
30.0000000 kHz  
Auto Man**Freq Offset**  
0.00000000 Hz**Signal Track**  
On Off

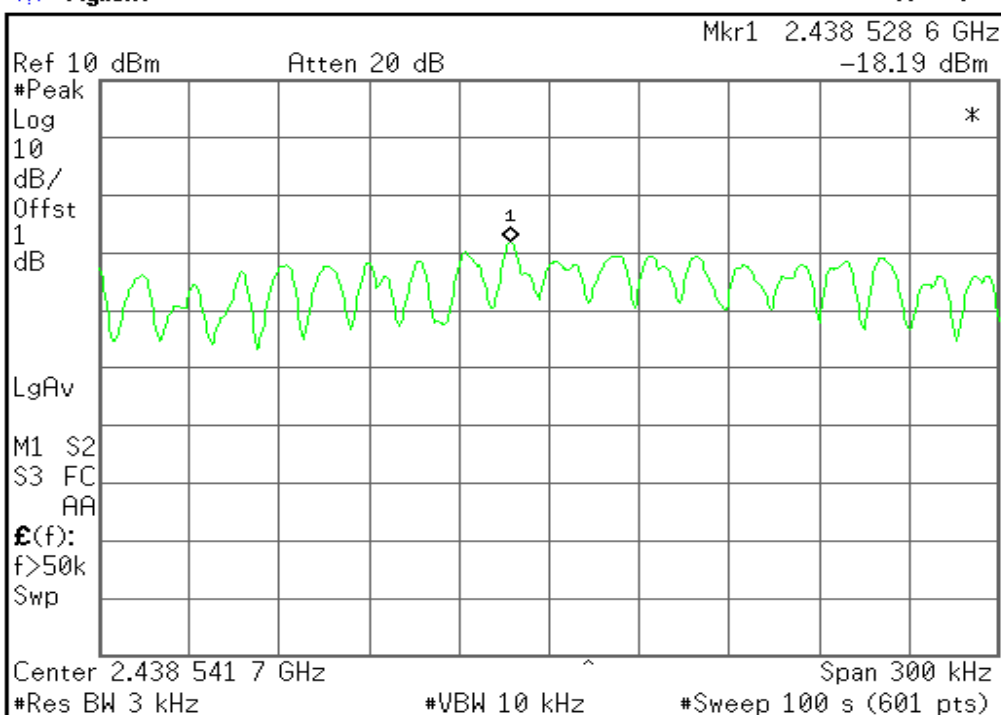
Copyright 2000-2008 Agilent Technologies

**PPSD (CH Mid)**

\* Agilent

R T

Freq/Channel

**Center Freq**  
2.43854167 GHz**Start Freq**  
2.43839167 GHz**Stop Freq**  
2.43869167 GHz**CF Step**  
30.0000000 kHz  
Auto Man**Freq Offset**  
0.00000000 Hz**Signal Track**  
On Off

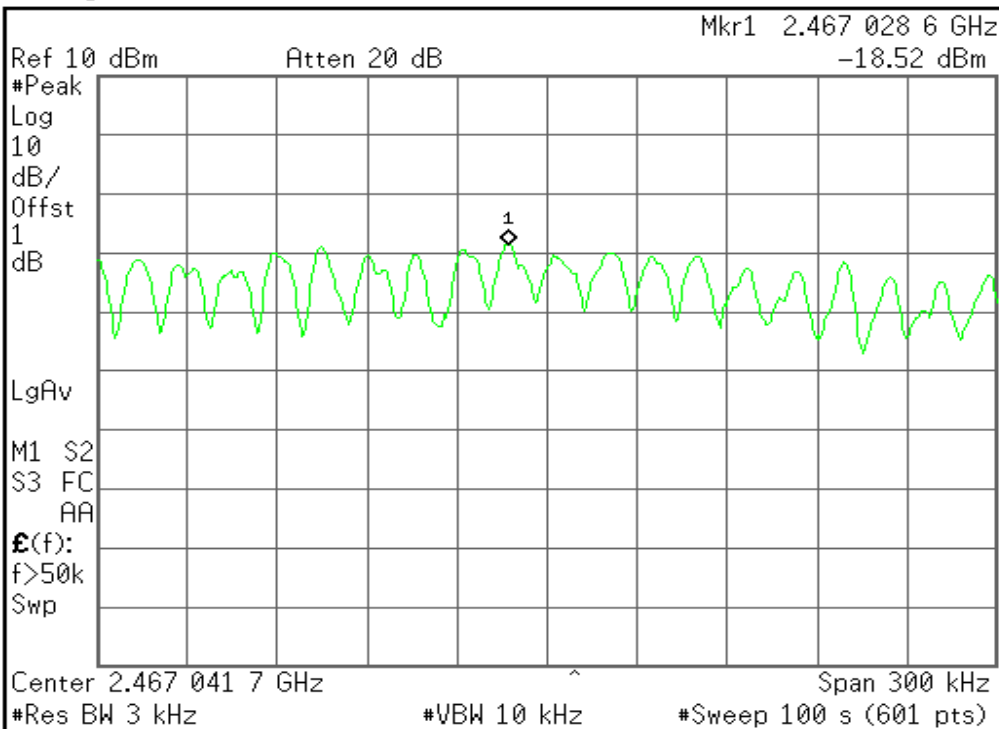
Copyright 2000-2008 Agilent Technologies

**PPSD (CH High)**

\* Agilent

R T

Freq/Channel



<b>Center Freq</b> 2.46704167 GHz
<b>Start Freq</b> 2.46689167 GHz
<b>Stop Freq</b> 2.46719167 GHz
<b>CF Step</b> 30.0000000 kHz Auto Man
<b>Freq Offset</b> 0.00000000 Hz
<b>Signal Track</b> On Off

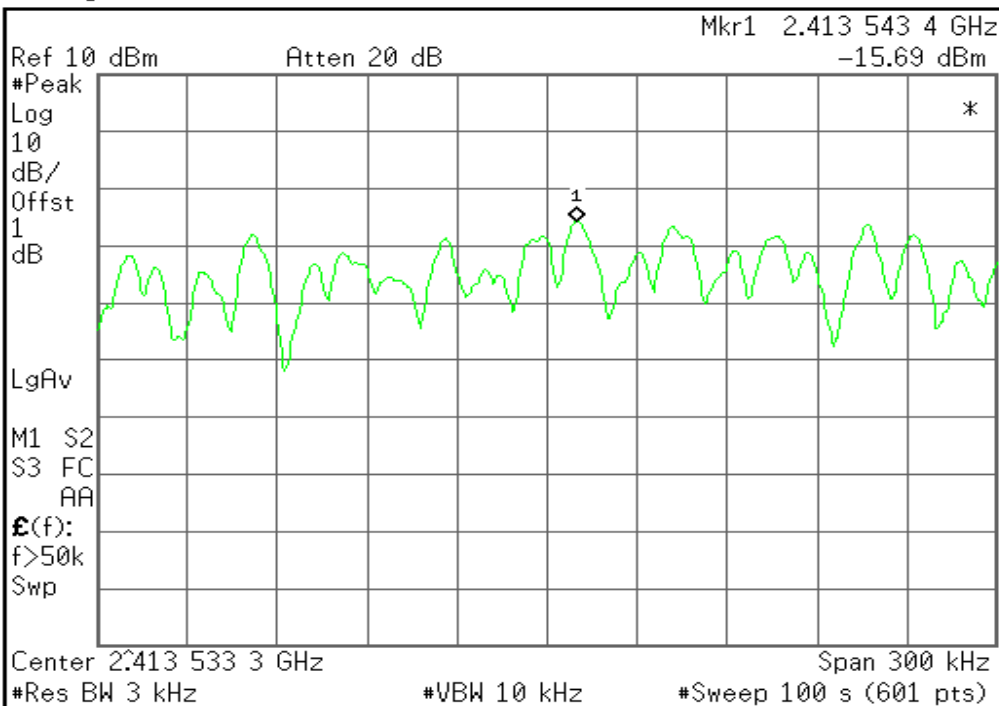
Copyright 2000–2008 Agilent Technologies

**IEEE 802.11n Standard-20 MHz Channel mode / Chain 1****PPSD (CH Low)**

\* Agilent

R T

Freq/Channel



<b>Center Freq</b> 2.41353333 GHz
<b>Start Freq</b> 2.41338333 GHz
<b>Stop Freq</b> 2.41368333 GHz
<b>CF Step</b> 30.0000000 kHz Auto Man
<b>Freq Offset</b> 0.00000000 Hz
<b>Signal Track</b> On Off

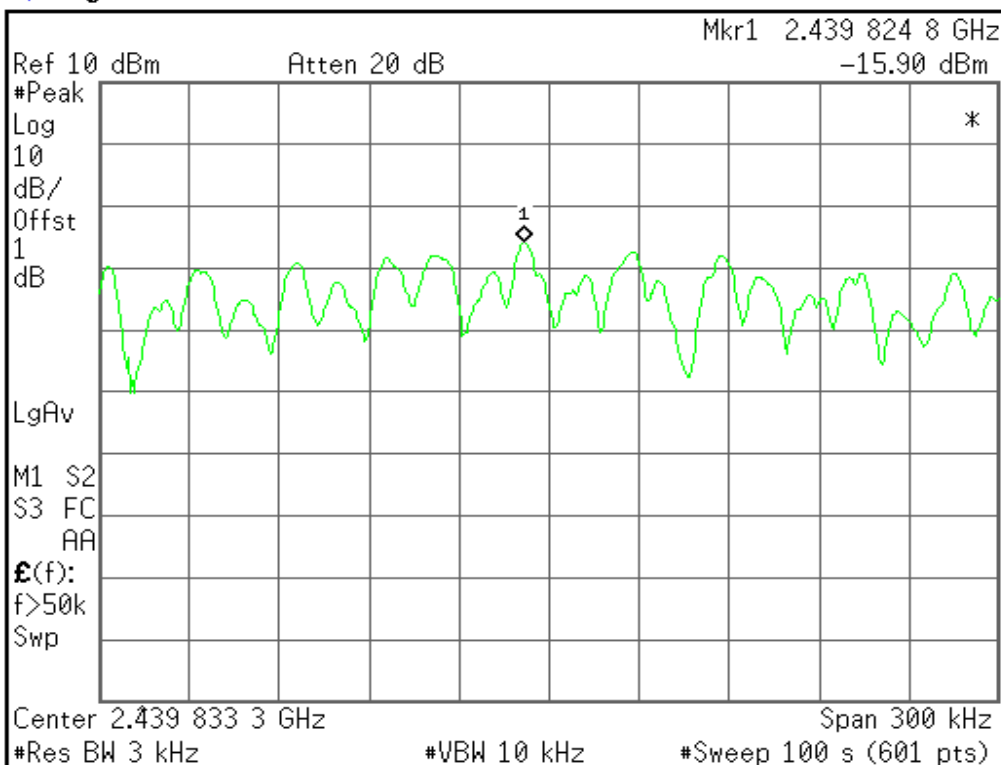
Copyright 2000–2008 Agilent Technologies

**PPSD (CH Mid)**

\* Agilent

R T

Freq/Channel

**Center Freq**  
2.43983333 GHz**Start Freq**  
2.43968333 GHz**Stop Freq**  
2.43998333 GHz**CF Step**  
30.0000000 kHz  
Auto Man**Freq Offset**  
0.00000000 Hz**Signal Track**  
On Off

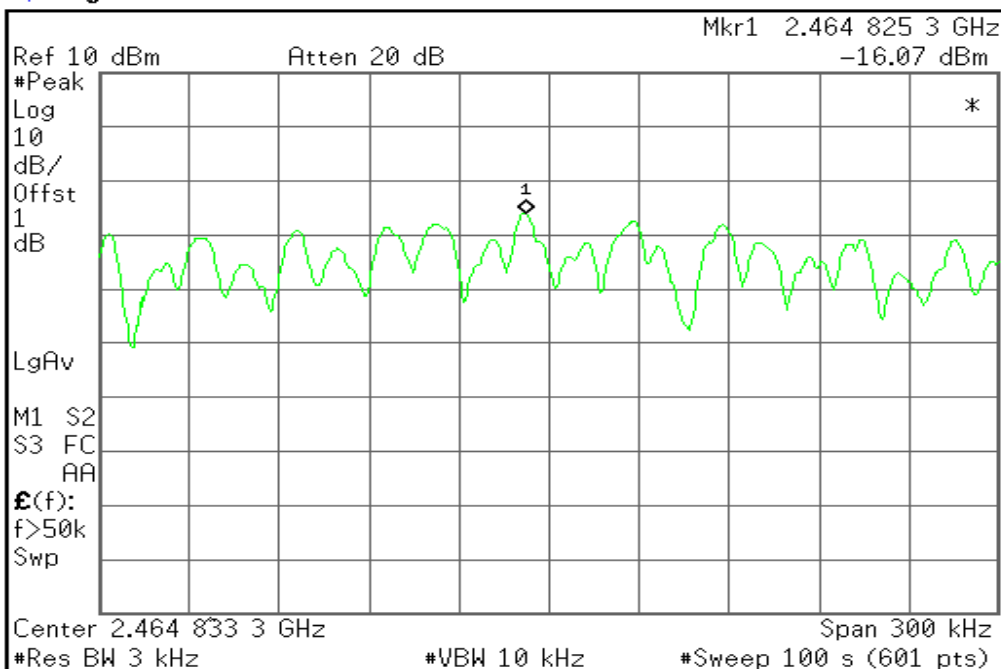
Copyright 2000-2008 Agilent Technologies

**PPSD (CH High)**

\* Agilent

R T

Freq/Channel

**Center Freq**  
2.46483333 GHz**Start Freq**  
2.46468333 GHz**Stop Freq**  
2.46498333 GHz**CF Step**  
30.0000000 kHz  
Auto Man**Freq Offset**  
0.00000000 Hz**Signal Track**  
On Off

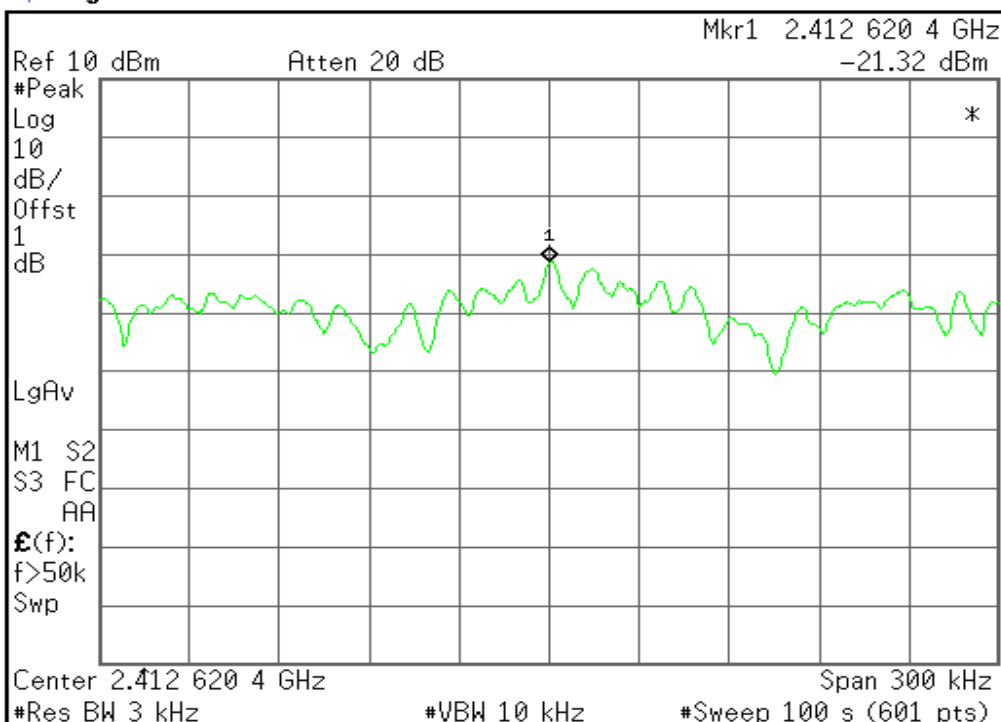
Copyright 2000-2008 Agilent Technologies

**IEEE 802.11n Wide-40 MHz Channel mode / Chain 0****PPSD (CH Low)**

Agilent

R T

Freq/Channel

**Center Freq**  
2.41262045 GHz**Start Freq**  
2.41247045 GHz**Stop Freq**  
2.41277045 GHz**CF Step**  
30.0000000 kHz  
Auto Man**Freq Offset**  
0.00000000 Hz**Signal Track**  
On Off

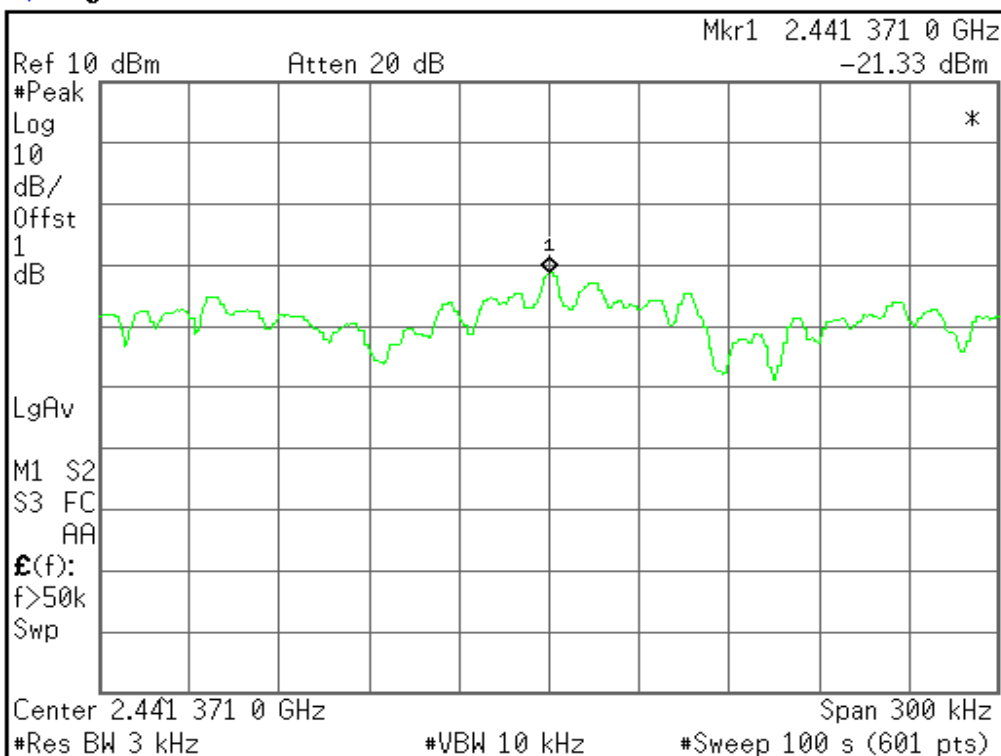
Copyright 2000-2008 Agilent Technologies

**PPSD (CH Mid)**

Agilent

R T

Freq/Channel

**Center Freq**  
2.44137102 GHz**Start Freq**  
2.44122102 GHz**Stop Freq**  
2.44152102 GHz**CF Step**  
30.0000000 kHz  
Auto Man**Freq Offset**  
0.00000000 Hz**Signal Track**  
On Off

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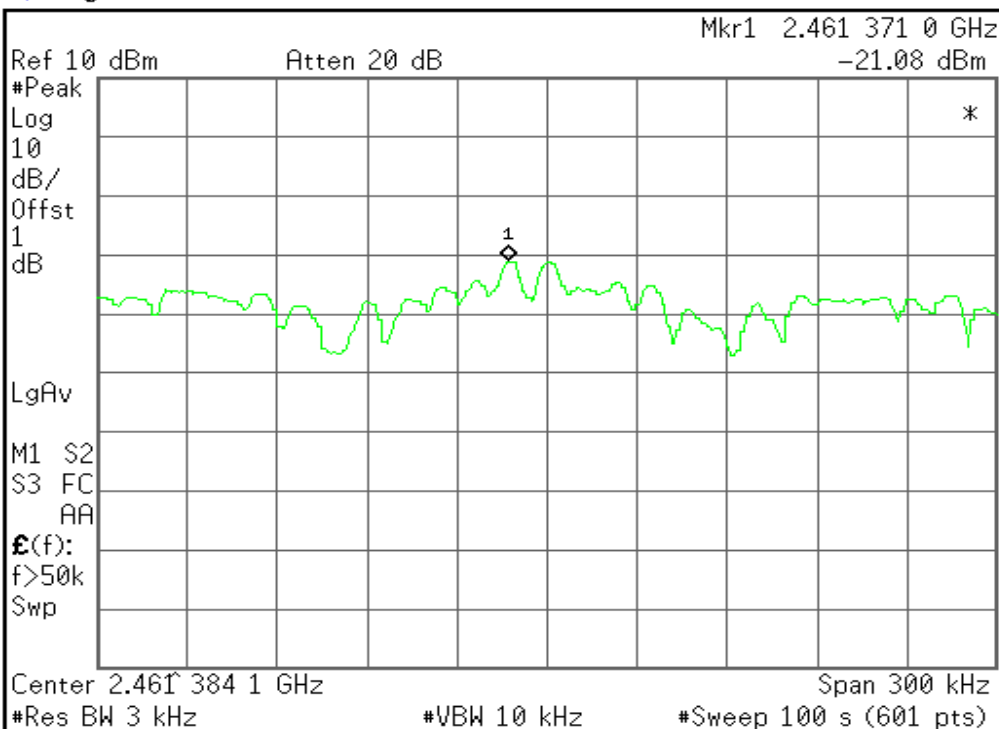


## PPSD (CH High)

Agilent

R T

Freq/Channel



Center Freq  
2.46138409 GHz

Start Freq  
2.46123409 GHz

Stop Freq  
2.46153409 GHz

CF Step  
30.0000000 kHz  
Auto Man

Freq Offset  
0.00000000 Hz

Signal Track  
On Off

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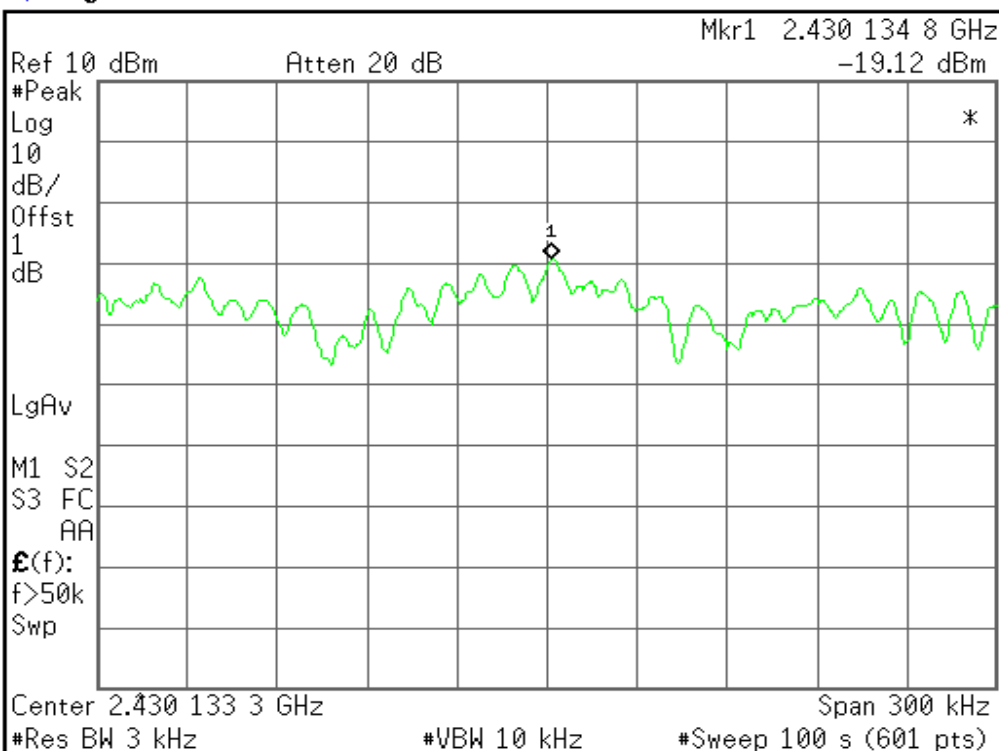
## IEEE 802.11n Wide-40 MHz Channel mode / Chain 1

## PPSD (CH Low)

Agilent

R T

Freq/Channel



Center Freq  
2.43013333 GHz

Start Freq  
2.42998333 GHz

Stop Freq  
2.43028333 GHz

CF Step  
30.0000000 kHz  
Auto Man

Freq Offset  
0.00000000 Hz

Signal Track  
On Off

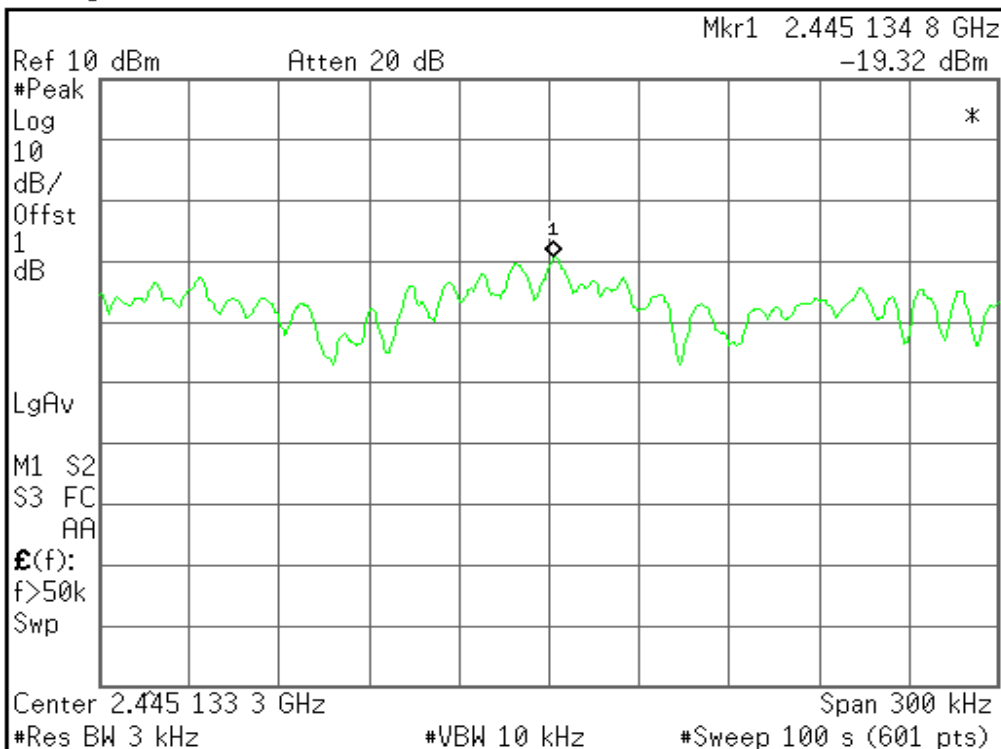
Copyright 2000-2008 Agilent Technologies

**PPSD (CH Mid)**

\* Agilent

R T

Freq/Channel

**Center Freq**  
2.44513333 GHz**Start Freq**  
2.44498333 GHz**Stop Freq**  
2.44528333 GHz**CF Step**  
30.0000000 kHz  
Auto Man**Freq Offset**  
0.00000000 Hz**Signal Track**  
On Off

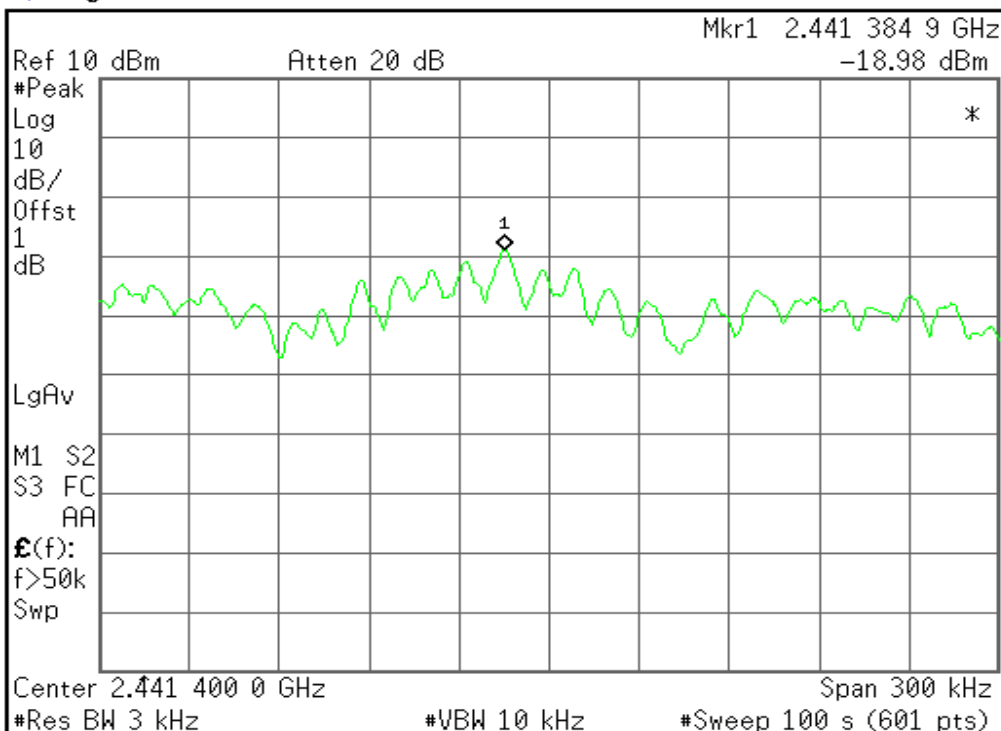
Copyright 2000-2008 Agilent Technologies

**PPSD (CH High)**

\* Agilent

R T

Freq/Channel

**Center Freq**  
2.44140000 GHz**Start Freq**  
2.44125000 GHz**Stop Freq**  
2.44155000 GHz**CF Step**  
30.0000000 kHz  
Auto Man**Freq Offset**  
0.00000000 Hz**Signal Track**  
On Off

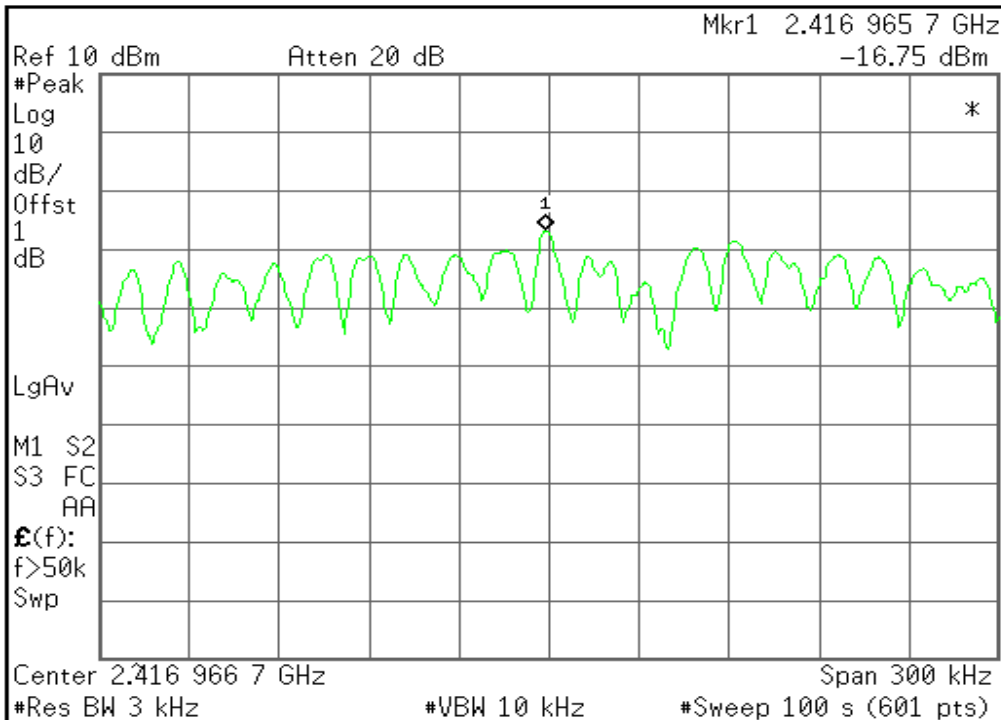
Copyright 2000-2008 Agilent Technologies

**IEEE 802.11n Standard-20 MHz Channel mode / Chain 0+ Chain 1****PPSD (CH Low)**

Agilent

R T

Freq/Channel

**Center Freq**  
2.41696667 GHz**Start Freq**  
2.41681667 GHz**Stop Freq**  
2.41711667 GHz**CF Step**  
30.0000000 kHz  
Auto Man**Freq Offset**  
0.00000000 Hz**Signal Track**  
On Off

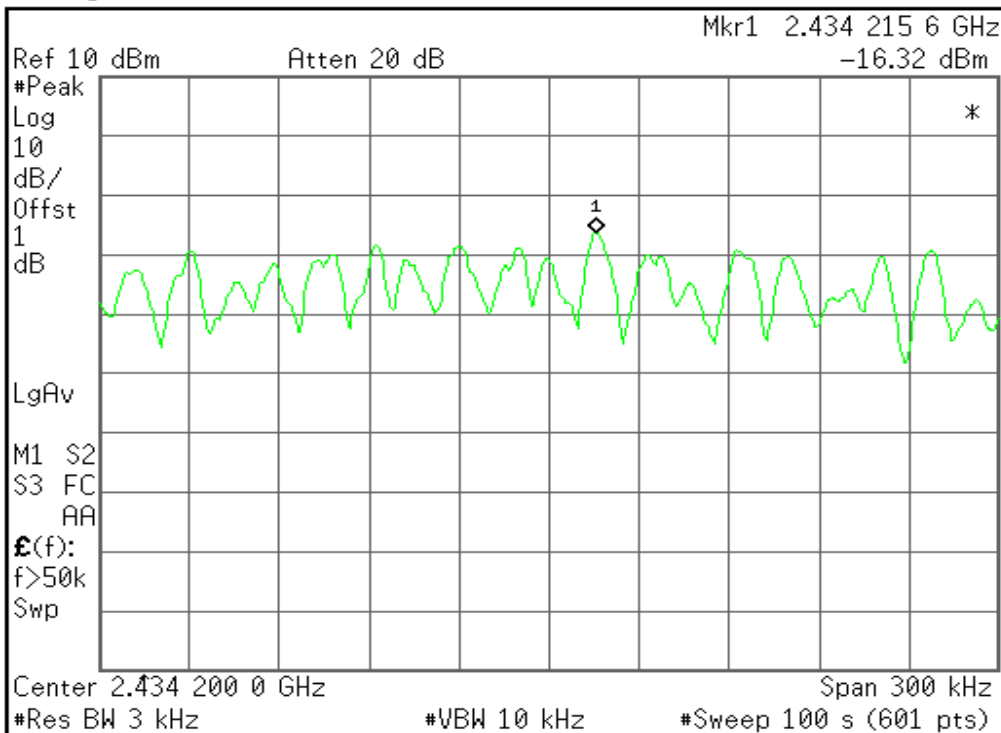
Copyright 2000-2008 Agilent Technologies

**PPSD (CH Mid)**

Agilent

R T

Freq/Channel

**Center Freq**  
2.43420000 GHz**Start Freq**  
2.43405000 GHz**Stop Freq**  
2.43435000 GHz**CF Step**  
30.0000000 kHz  
Auto Man**Freq Offset**  
0.00000000 Hz**Signal Track**  
On Off

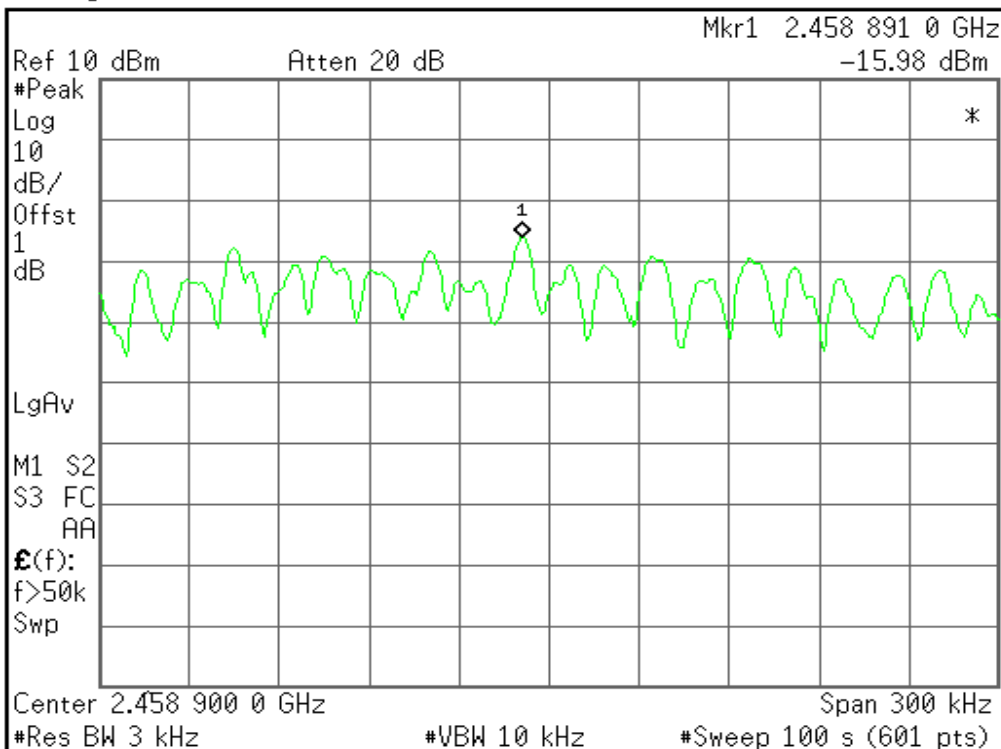
Copyright 2000-2008 Agilent Technologies

**PPSD (CH High)**

Agilent

R T

Freq/Channel

**Center Freq**  
2.45890000 GHz**Start Freq**  
2.45875000 GHz**Stop Freq**  
2.45905000 GHz**CF Step**  
30.0000000 kHz  
Auto Man**Freq Offset**  
0.00000000 Hz**Signal Track**  
On Off

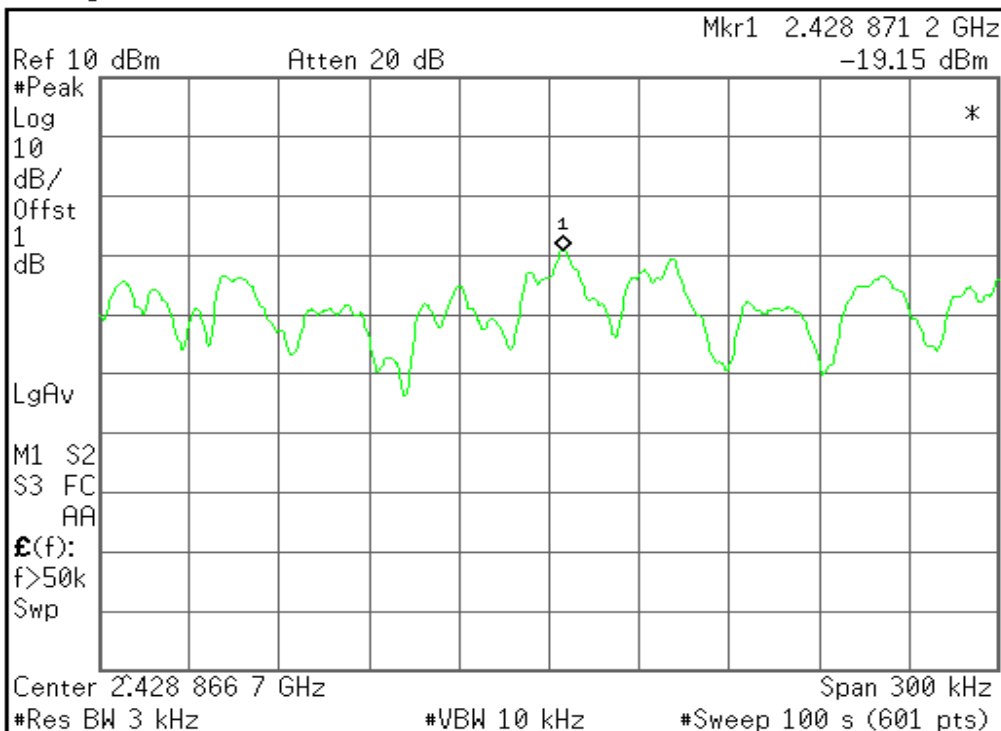
Copyright 2000-2008 Agilent Technologies

**IEEE 802.11n Wide-40 MHz Channel mode / Chain 0+ Chain 1****PPSD (CH Low)**

Agilent

R T

Freq/Channel

**Center Freq**  
2.42886667 GHz**Start Freq**  
2.42871667 GHz**Stop Freq**  
2.42901667 GHz**CF Step**  
30.0000000 kHz  
Auto Man**Freq Offset**  
0.00000000 Hz**Signal Track**  
On Off

Copyright 2000-2008 Agilent Technologies

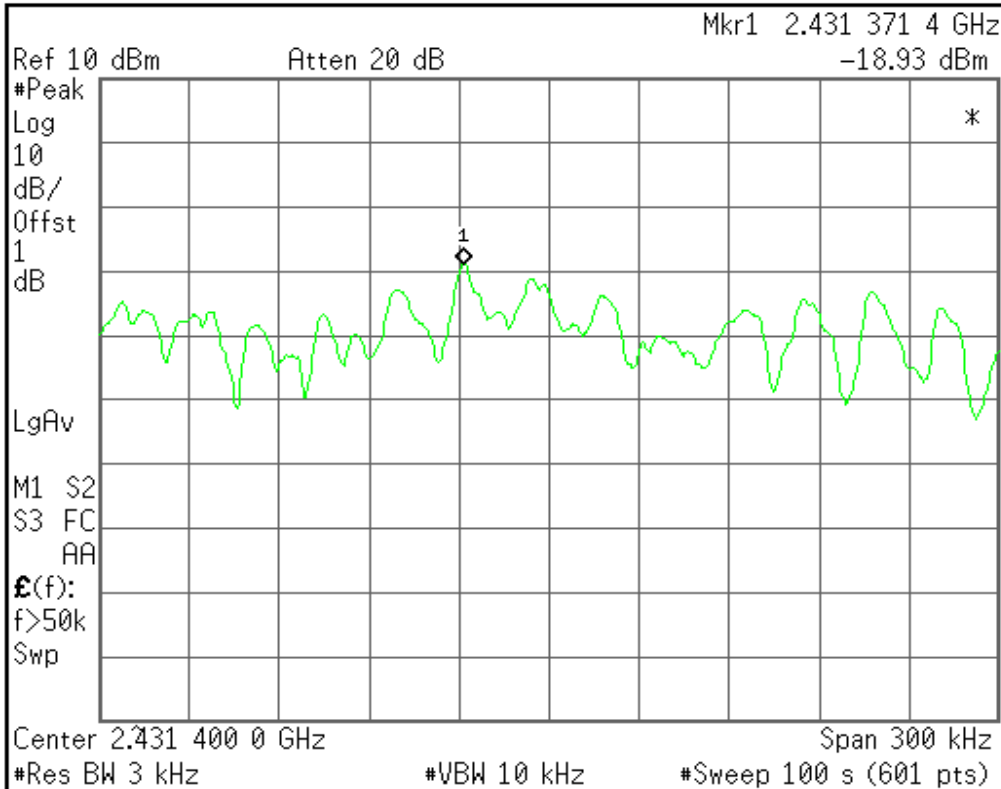


**PPSD (CH Mid)**

\* Agilent

R T

Freq/Channel

**Center Freq**  
2.43140000 GHz**Start Freq**  
2.43125000 GHz**Stop Freq**  
2.43155000 GHz**CF Step**  
30.0000000 kHz  
Auto Man**Freq Offset**  
0.00000000 Hz**Signal Track**  
On Off

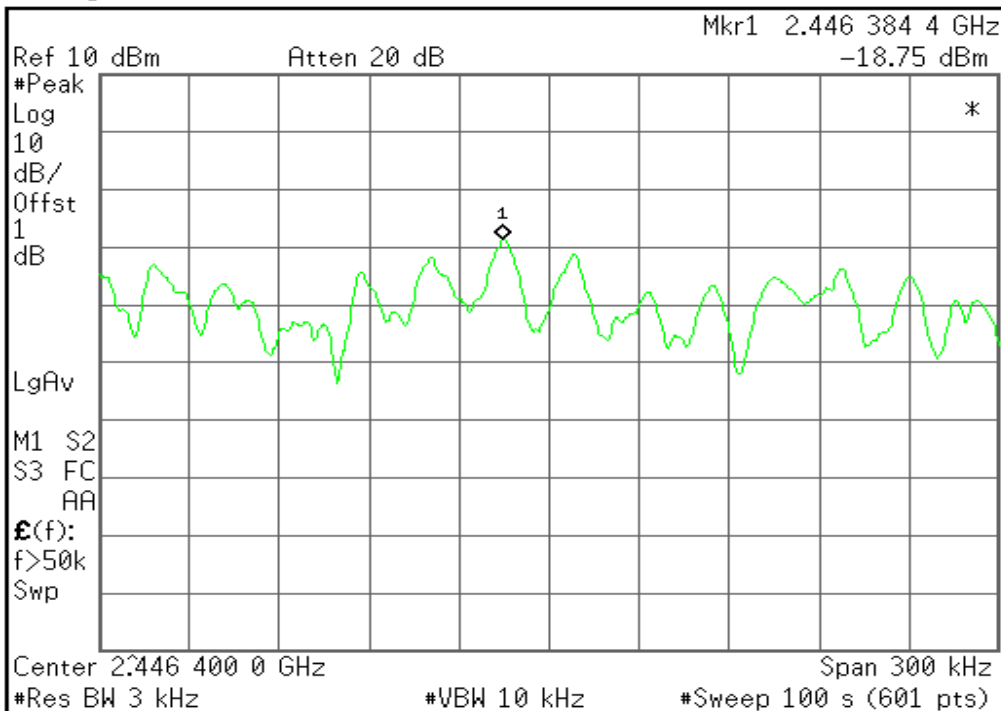
Copyright 2000-2008 Agilent Technologies

**PPSD (CH High)**

\* Agilent

R T

Freq/Channel

**Center Freq**  
2.44640000 GHz**Start Freq**  
2.44625000 GHz**Stop Freq**  
2.44655000 GHz**CF Step**  
30.0000000 kHz  
Auto Man**Freq Offset**  
0.00000000 Hz**Signal Track**  
On Off

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## **7.5 SPURIOUS EMISSIONS**

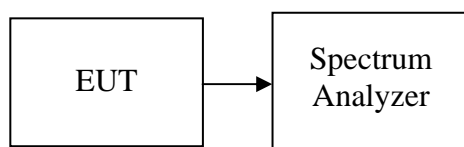
### **7.5.1 CONDUCTED MEASUREMENT**

#### **LIMIT**

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 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in 15.209(a) (see Section 15.205(c)).

Conducted power was measured based on the use of RMS averaging over a time interval, therefore the required attenuation is 30 dB.

#### **Test Configuration**



#### **TEST PROCEDURE**

Conducted RF measurements of the transmitter output were made to confirm that the EUT antenna port conducted emissions meet the specified limit and to identify any spurious signals that require further investigation or measurements on the radiated emissions site.

The transmitter output is connected to the spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

Measurements are made over the 30MHz to 40GHz range with the transmitter set to the lowest, middle, and highest channels.

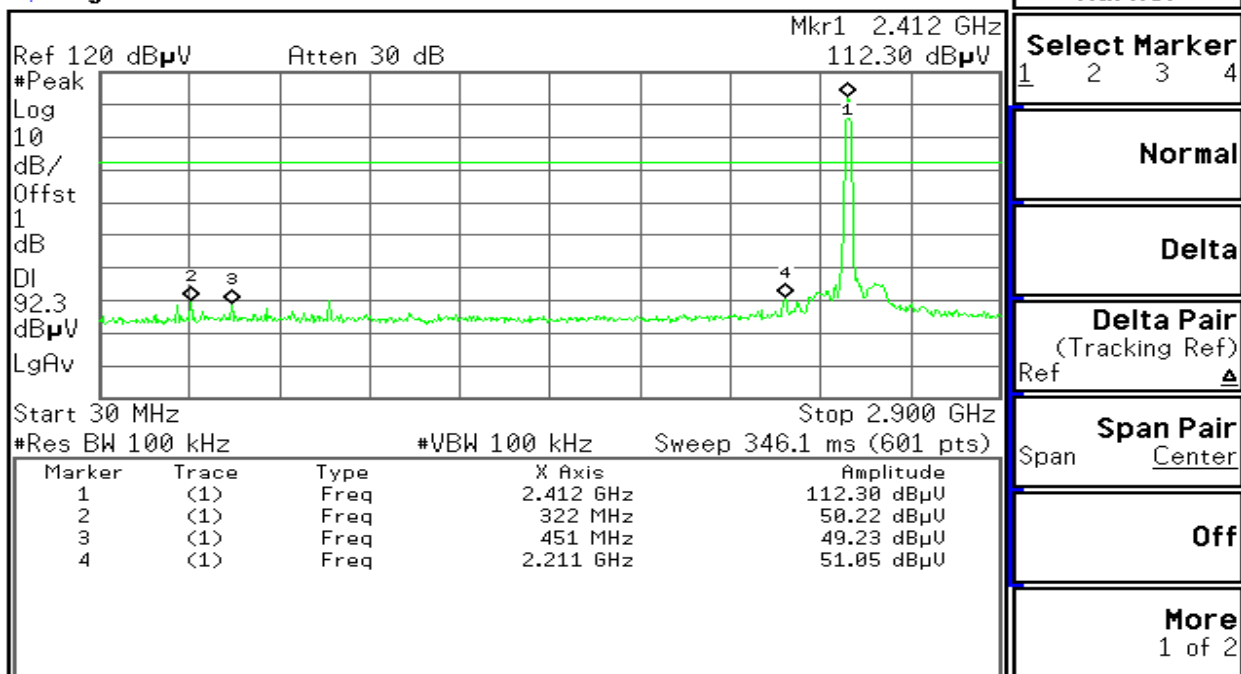
#### **TEST RESULTS**

*No non-compliance noted*

**Test Plot****IEEE 802.11b mode****CH Low**

Agilent

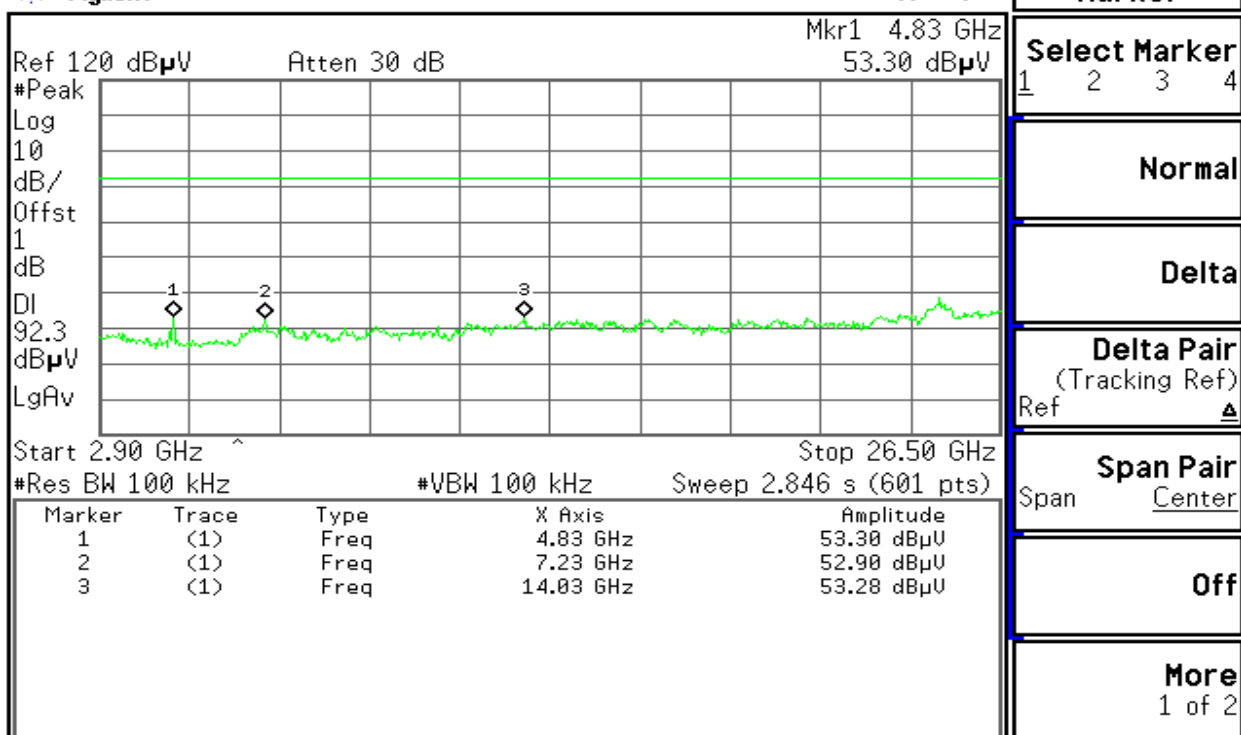
R T



Copyright 2000-2008 Agilent Technologies

Agilent

R T



Copyright 2000-2008 Agilent Technologies

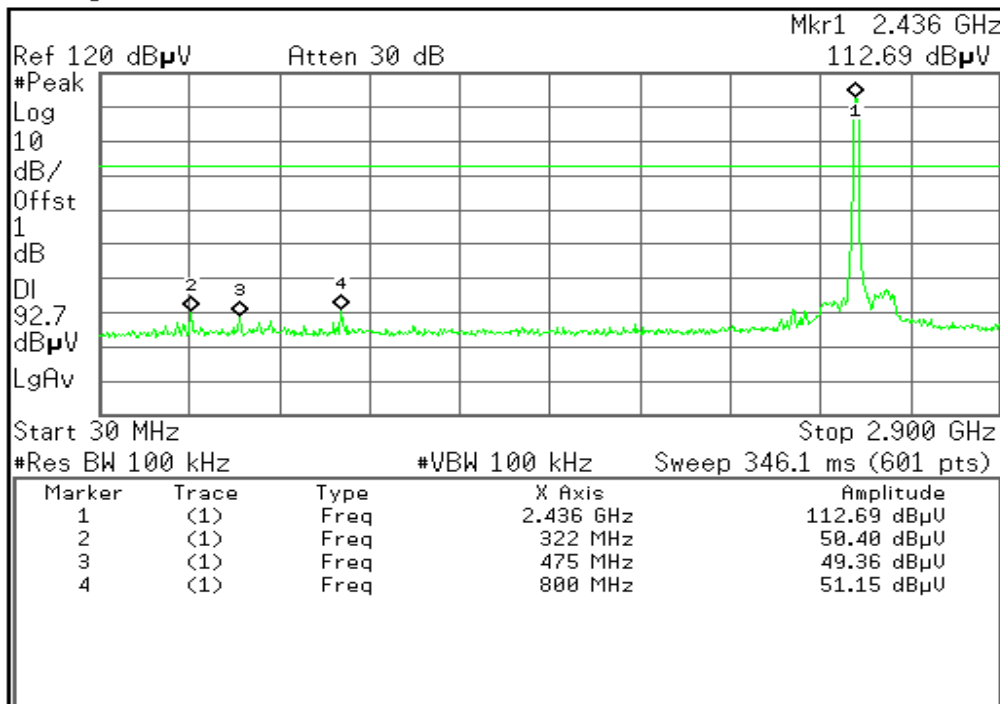


## CH Mid

Agilent

R T

Marker



Select Marker

1 2 3 4

Normal

Delta

Delta Pair

(Tracking Ref)

Ref

Span Pair

Span Center

Off

More

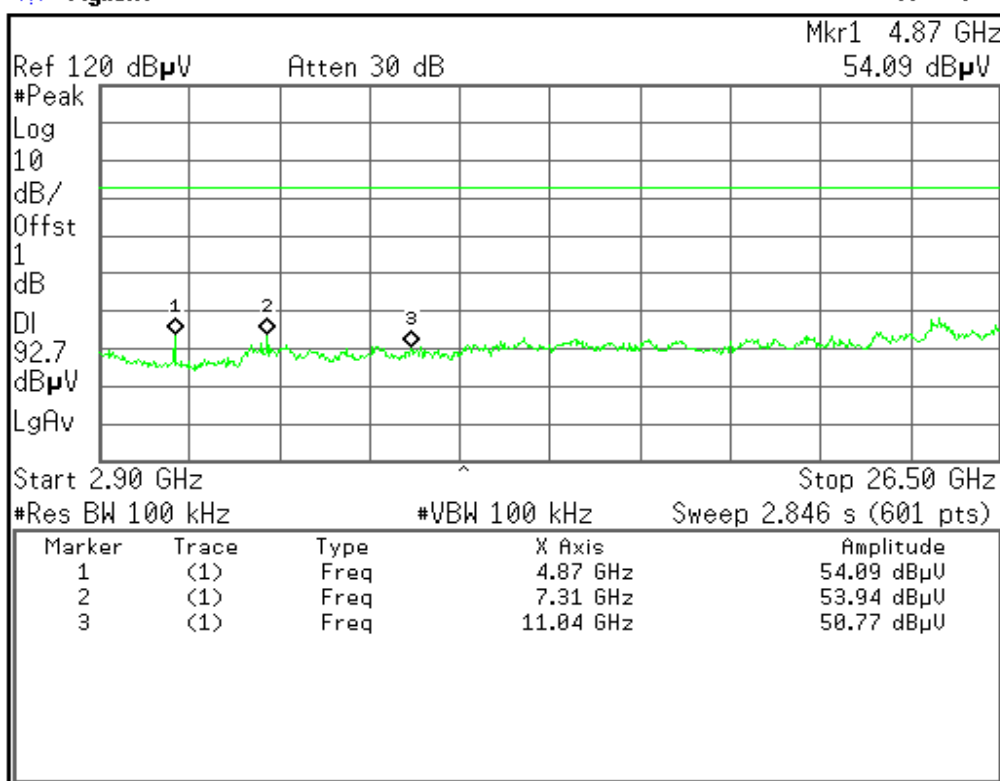
1 of 2

Copyright 2000-2008 Agilent Technologies

Agilent

R T

Marker



Select Marker

1 2 3 4

Normal

Delta

Delta Pair

(Tracking Ref)

Ref

Span Pair

Span Center

Off

More

1 of 2

Copyright 2000-2008 Agilent Technologies

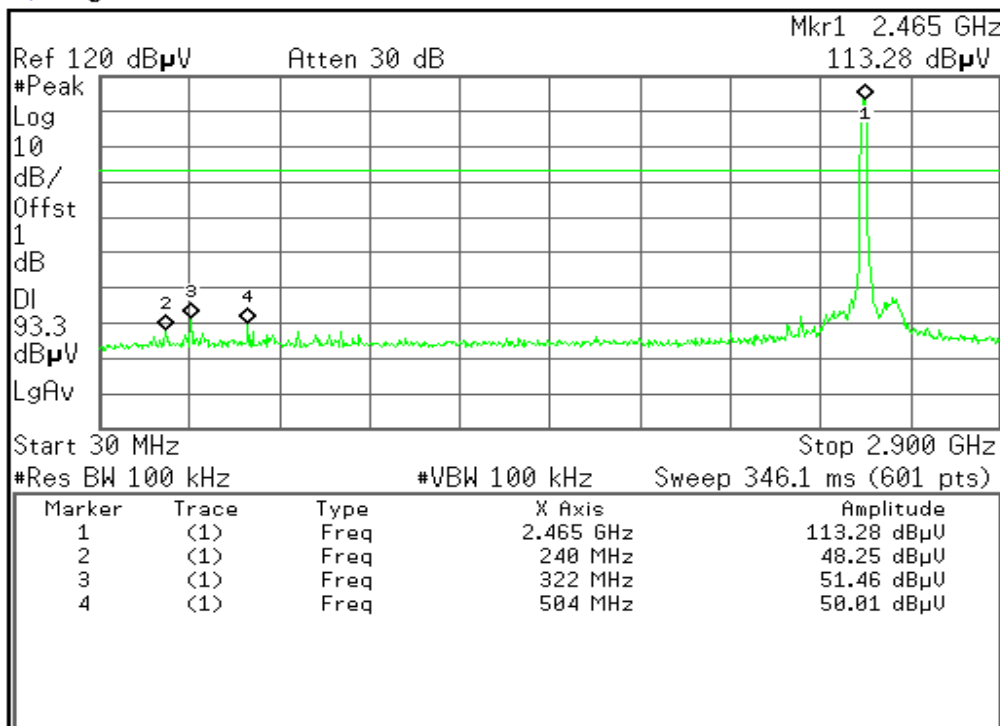


# CH High

Agilent

R T

Marker



Select Marker

1 2 3 4

Normal

Delta

Delta Pair

(Tracking Ref)

Ref

Span Pair

Span Center

Off

More

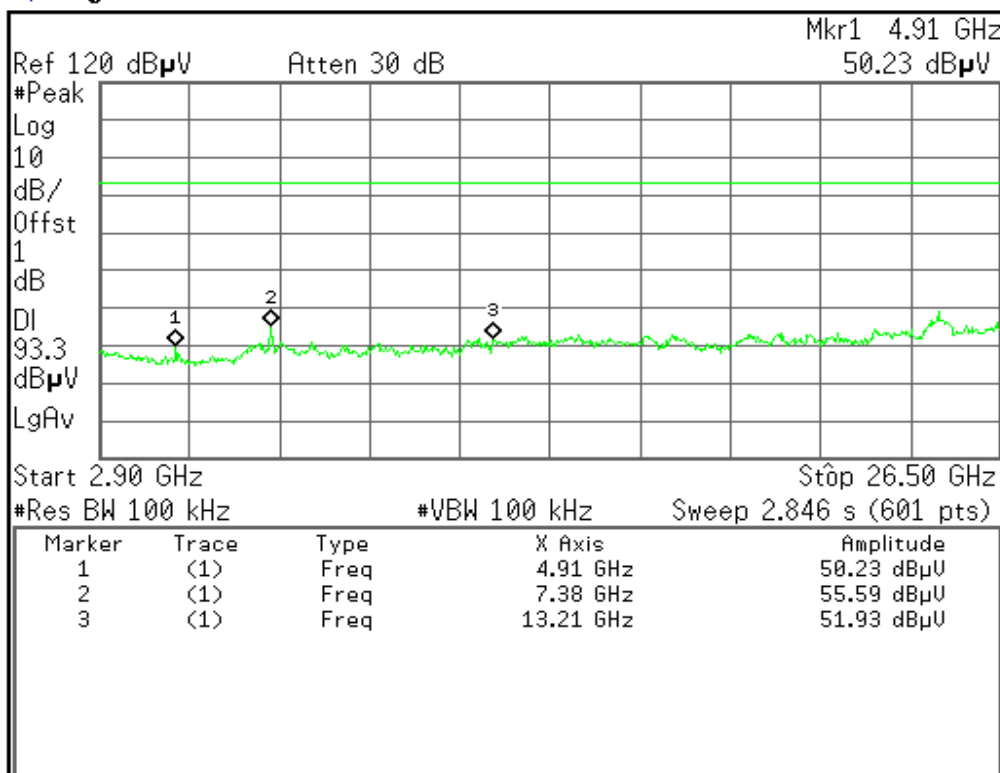
1 of 2

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Agilent

R T

Marker



Select Marker

1 2 3 4

Normal

Delta

Delta Pair

(Tracking Ref)

Ref

Span Pair

Span Center

Off

More

1 of 2

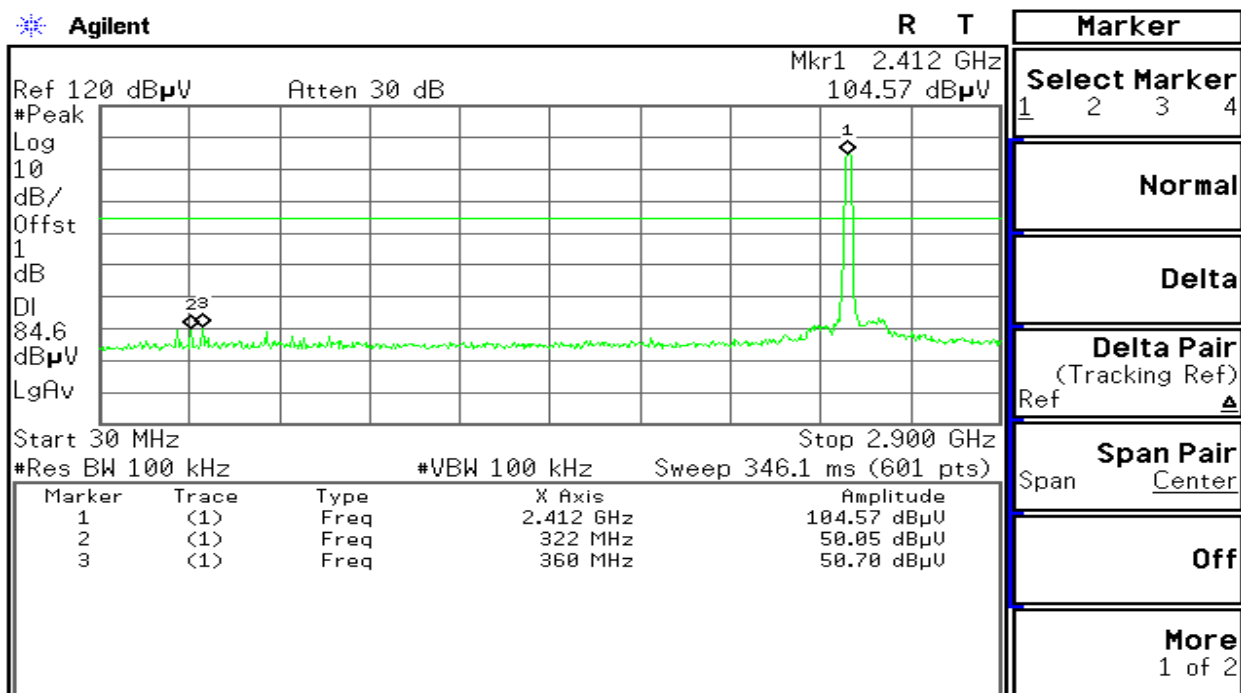
Copyright 2000-2008 Agilent Technologies



# IEEE 802.11g mode

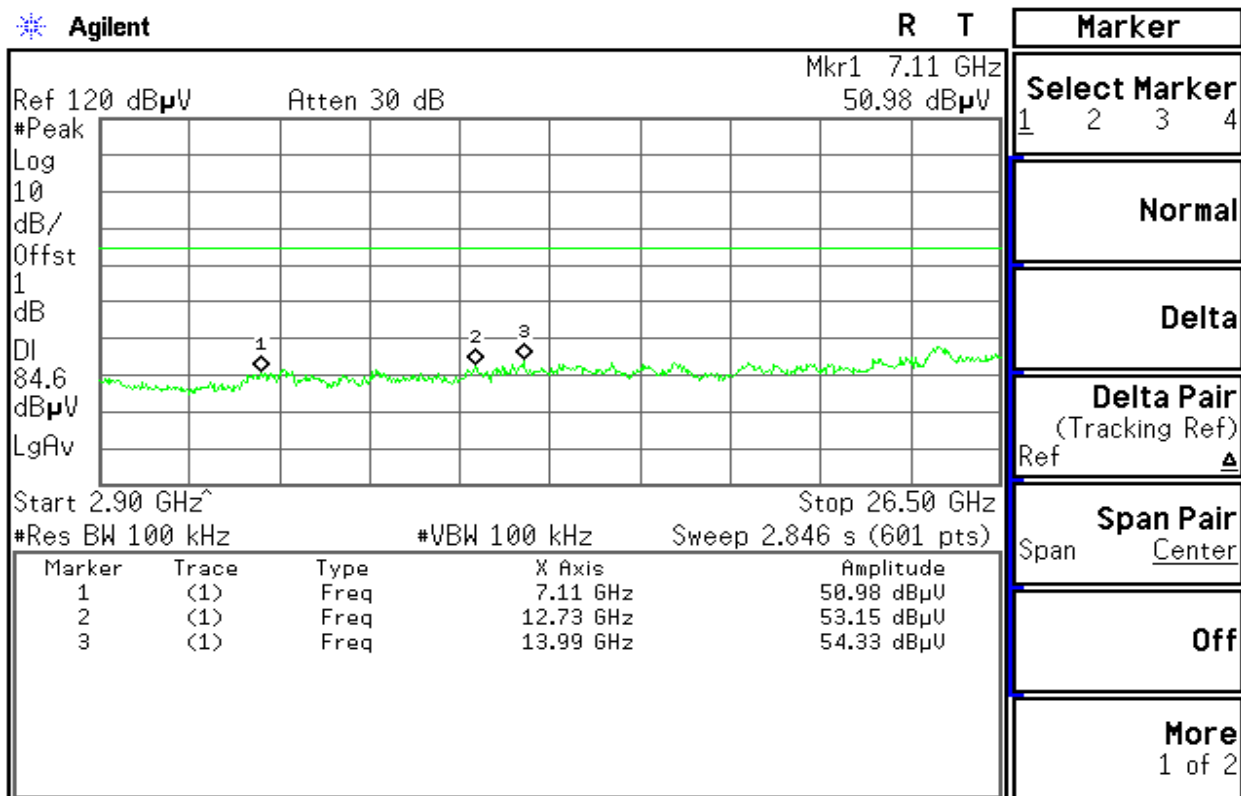
## CH Low

Agilent



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Agilent



Copyright 2000-2008 Agilent Technologies

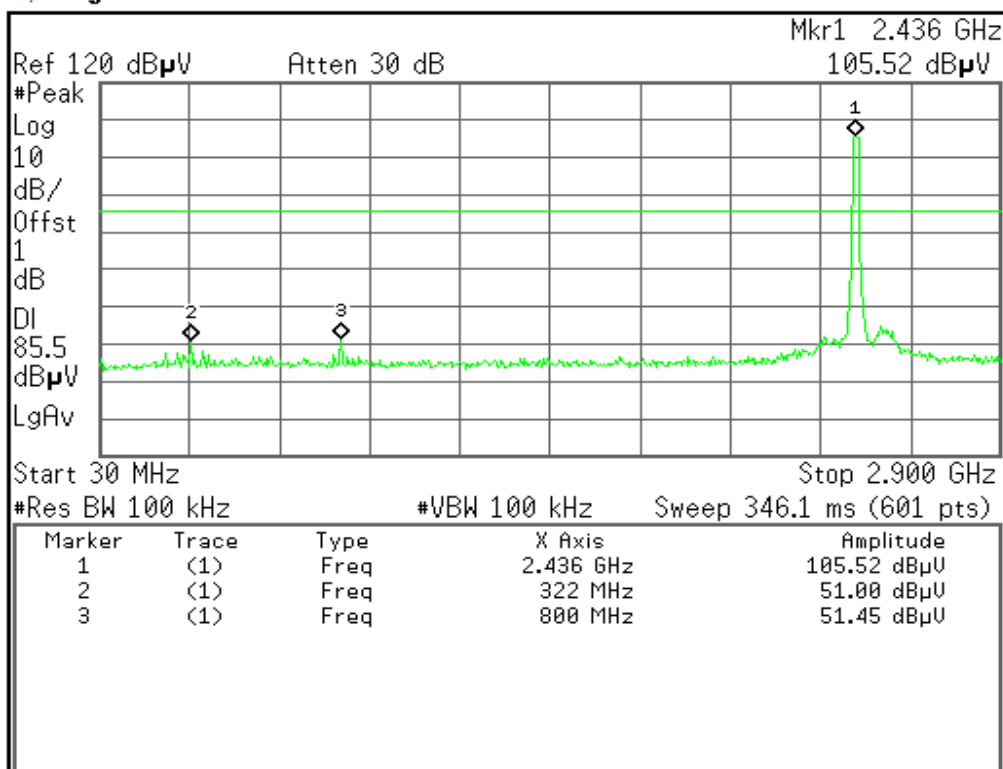


## CH Mid

Agilent

R T

Marker



Select Marker

1 2 3 4

Normal

Delta

Delta Pair

(Tracking Ref)

Ref

Span Pair

Span Center

Off

More

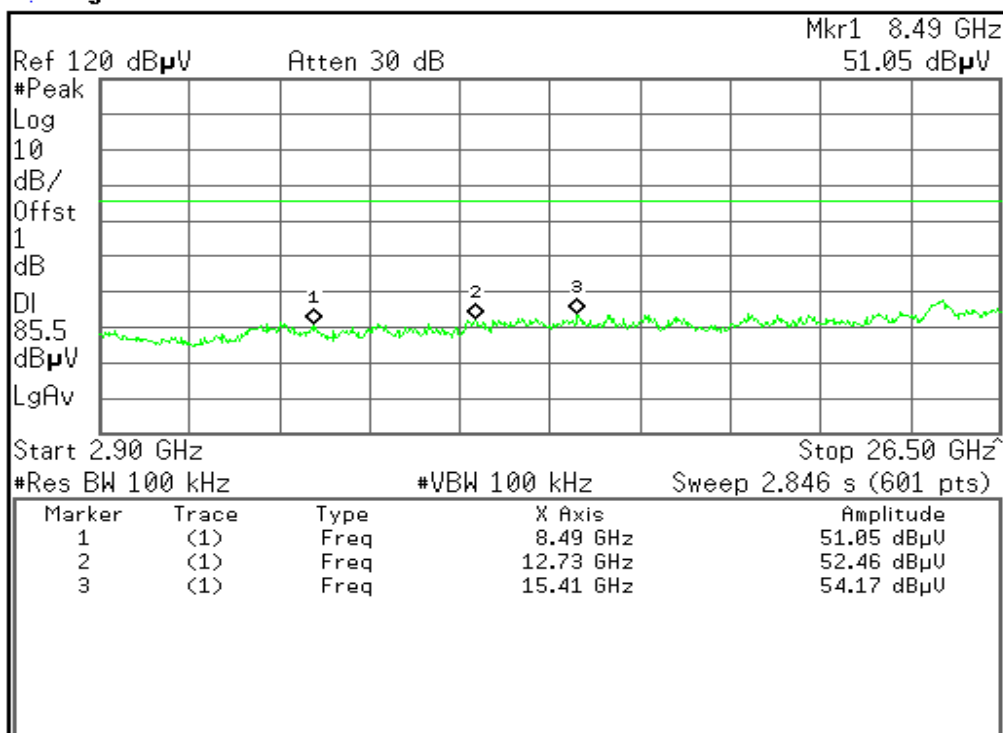
1 of 2

Copyright 2000-2008 Agilent Technologies

Agilent

R T

Marker



Select Marker

1 2 3 4

Normal

Delta

Delta Pair

(Tracking Ref)

Ref

Span Pair

Span Center

Off

More

1 of 2

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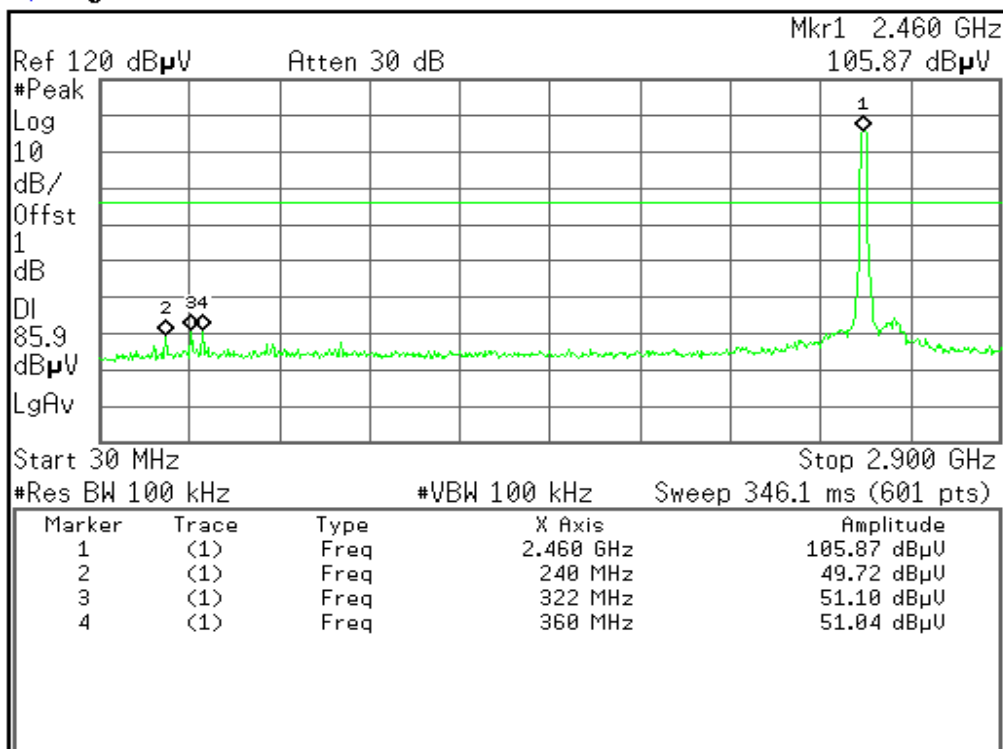


## CH High

Agilent

R T

Marker



Select Marker

1 2 3 4

Normal

Delta

Delta Pair

(Tracking Ref)

Ref

Span Pair

Span Center

Off

More

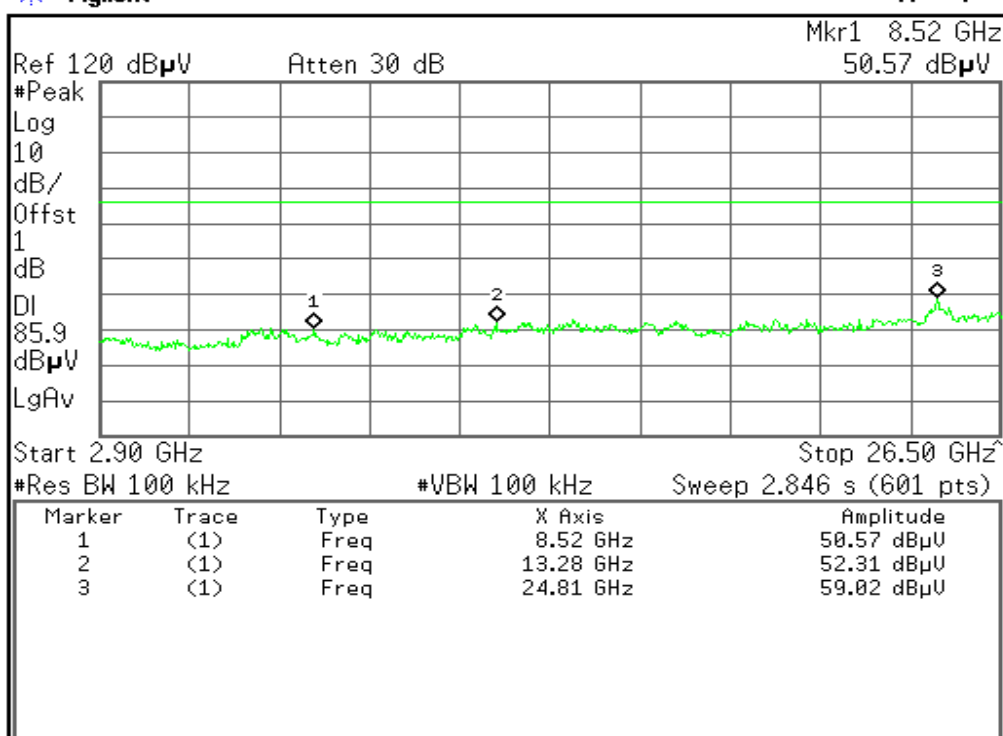
1 of 2

Copyright 2000–2008 Agilent Technologies

Agilent

R T

Marker



Select Marker

1 2 3 4

Normal

Delta

Delta Pair

(Tracking Ref)

Ref

Span Pair

Span Center

Off

More

1 of 2

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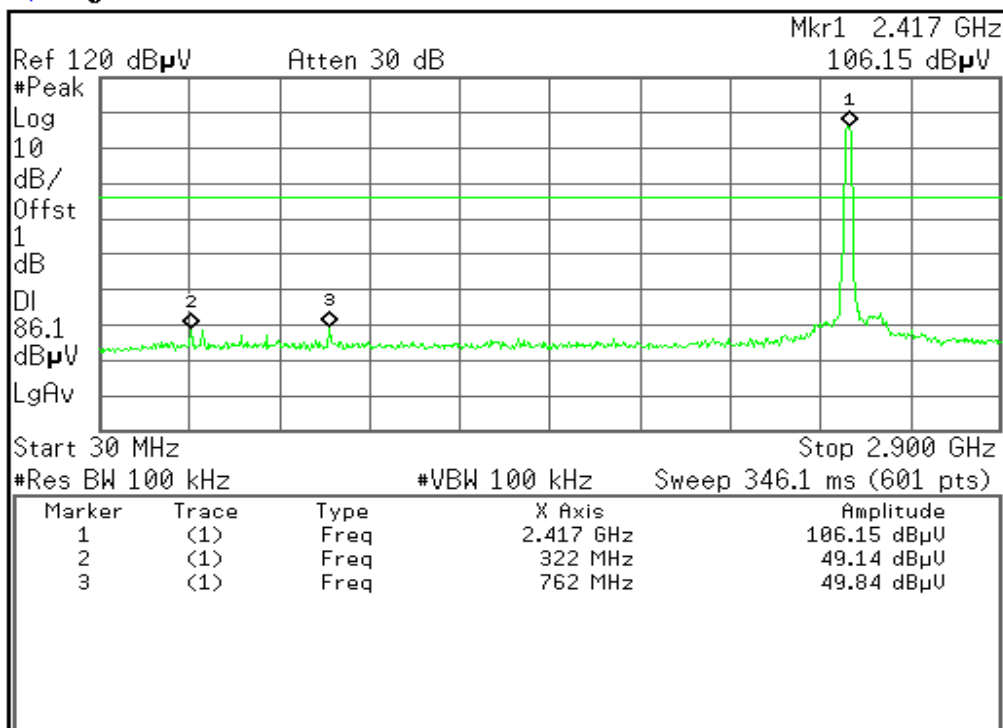


**IEEE 802.11n Standard-20 MHz Channel mode / Chain 0****CH Low**

\* Agilent

R T

Marker

Select Marker  
1 2 3 4

Normal

Delta

Delta Pair  
(Tracking Ref)  
RefSpan Pair  
Center

Off

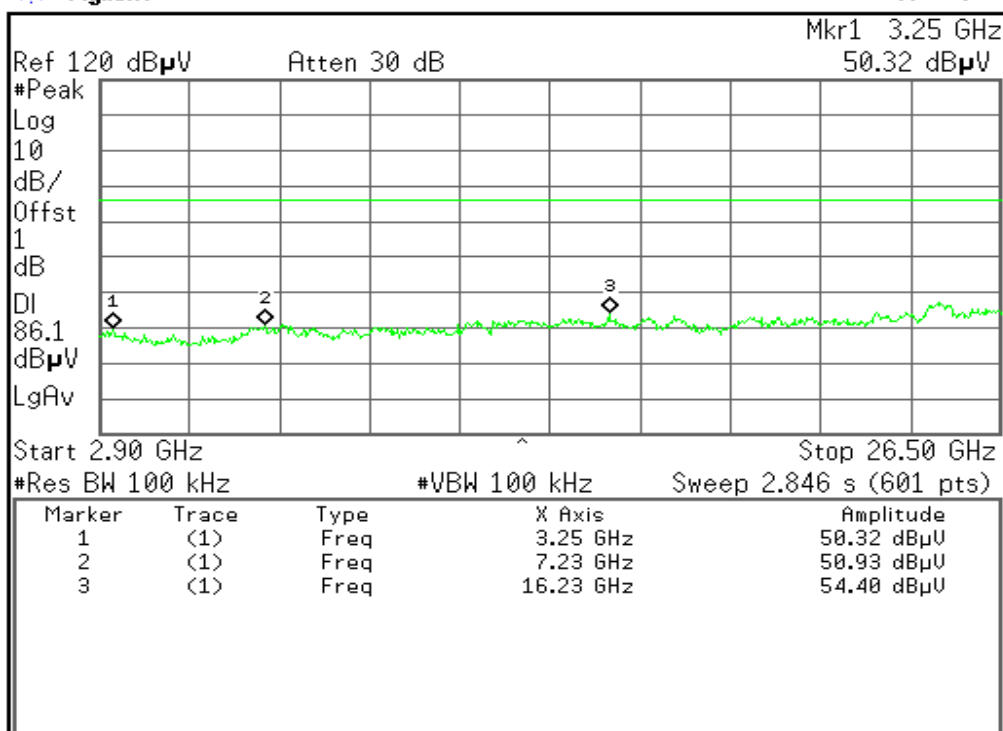
More  
1 of 2

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\* Agilent

R T

Marker

Select Marker  
1 2 3 4

Normal

Delta

Delta Pair  
(Tracking Ref)  
RefSpan Pair  
Center

Off

More  
1 of 2

Copyright 2000–2008 Agilent Technologies

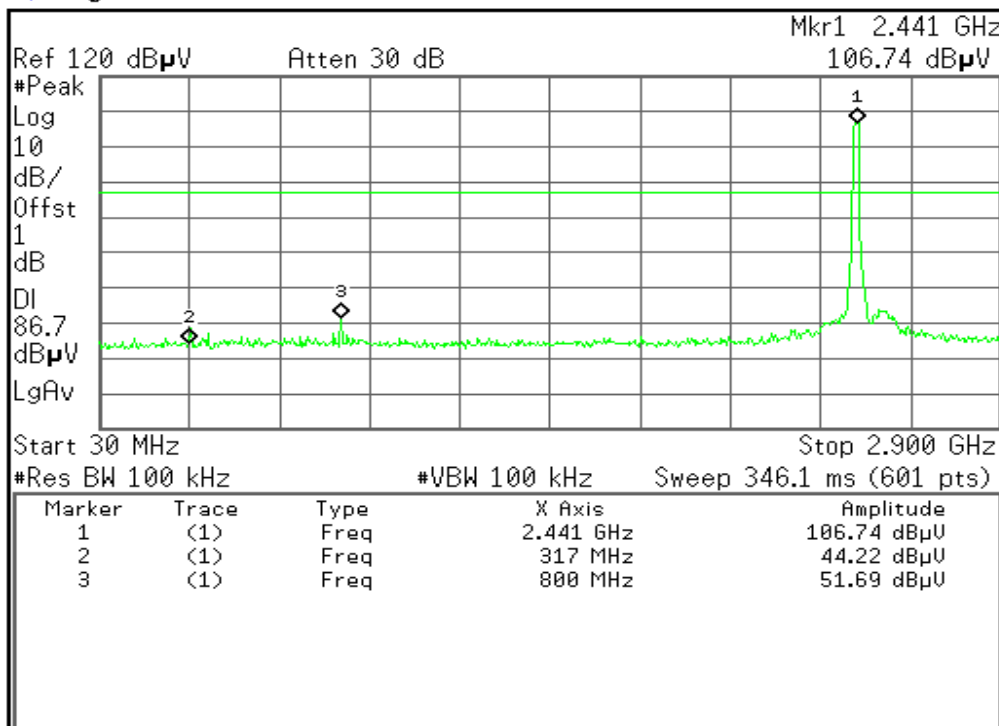


# CH Mid

Agilent

R T

Marker



Select Marker

1 2 3 4

Normal

Delta

Delta Pair

(Tracking Ref)

Ref

Span Pair

Span Center

Off

More

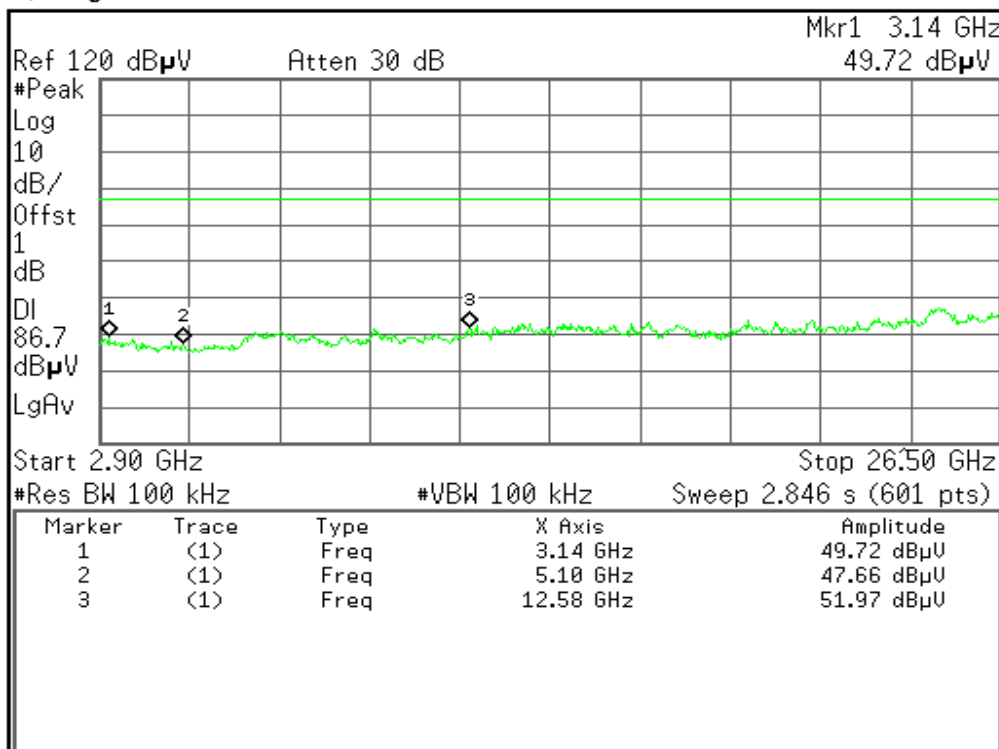
1 of 2

Copyright 2000-2008 Agilent Technologies

Agilent

R T

Marker



Select Marker

1 2 3 4

Normal

Delta

Delta Pair

(Tracking Ref)

Ref

Span Pair

Span Center

Off

More

1 of 2

Copyright 2000-2008 Agilent Technologies

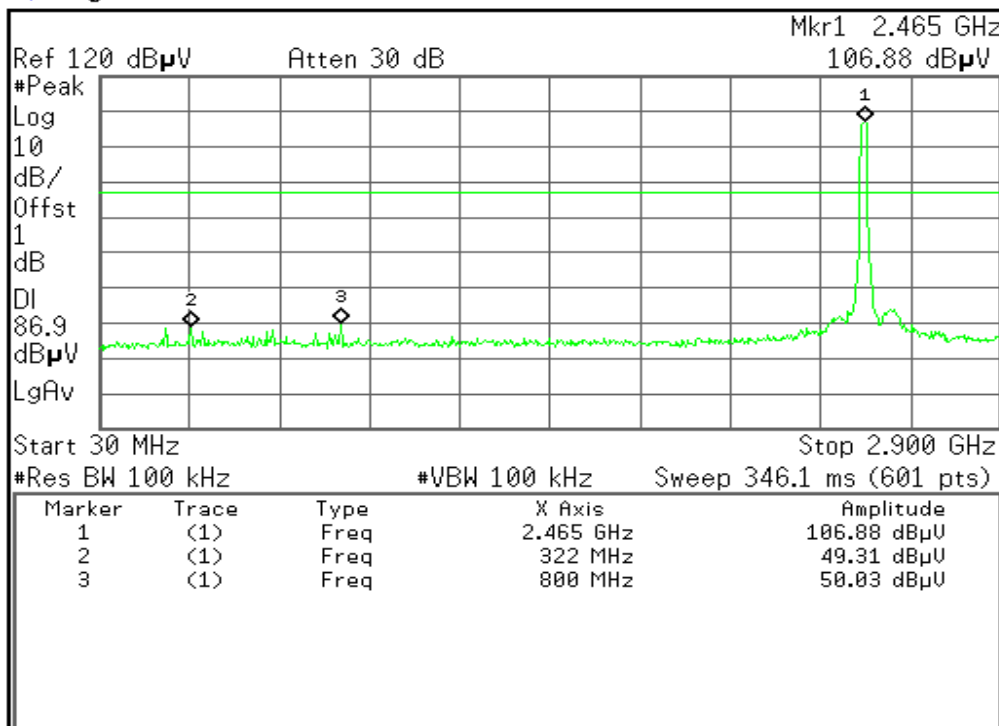


# CH High

Agilent

R T

Marker



Select Marker

1 2 3 4

Normal

Delta

Delta Pair

(Tracking Ref)

Ref

Span Pair

Span Center

Off

More

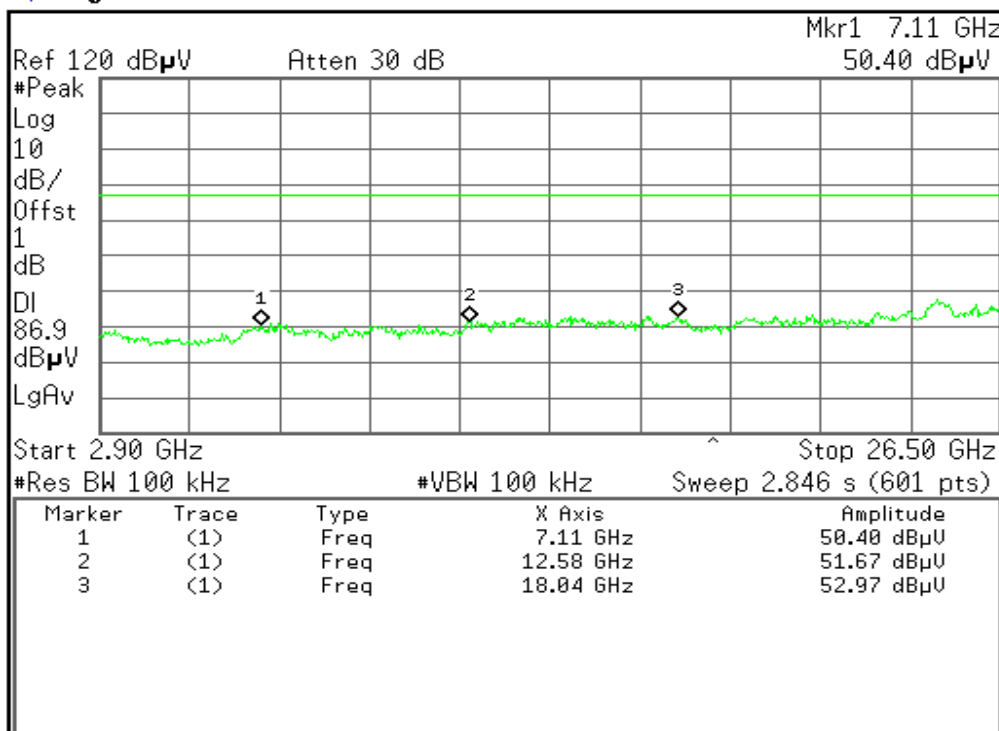
1 of 2

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Agilent

R T

Marker



Select Marker

1 2 3 4

Normal

Delta

Delta Pair

(Tracking Ref)

Ref

Span Pair

Span Center

Off

More

1 of 2

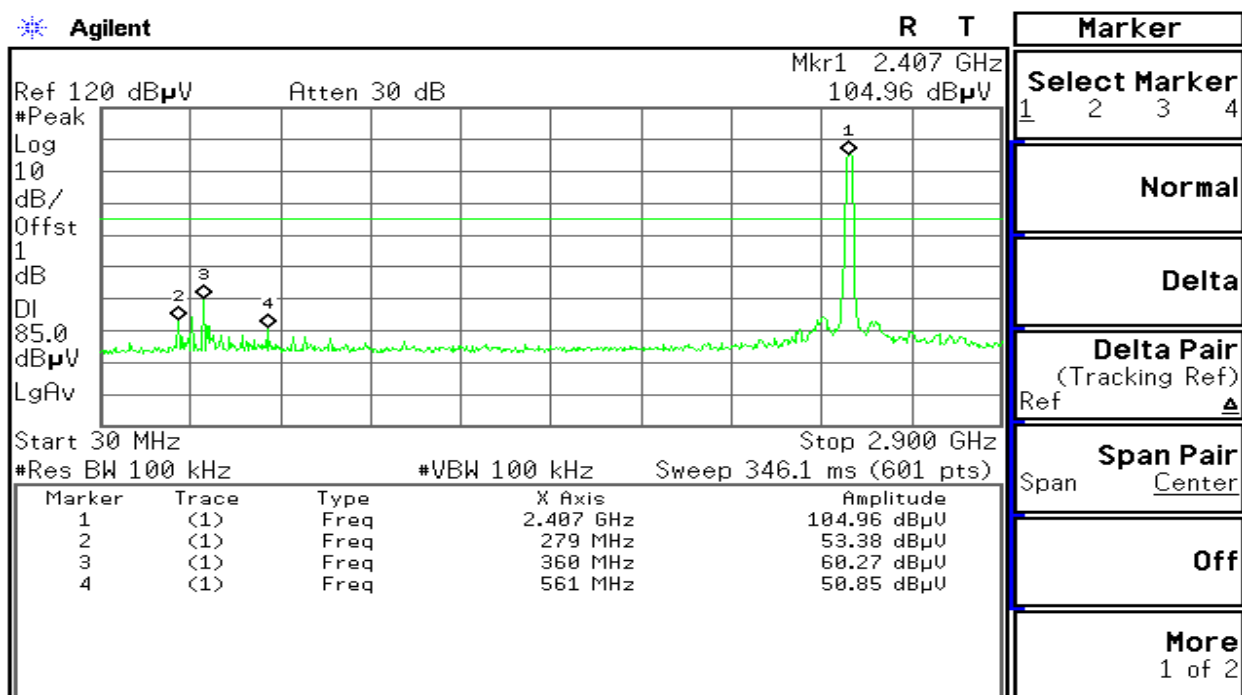
Copyright 2000-2008 Agilent Technologies



# IEEE 802.11n Standard-20 MHz Channel mode / Chain 1

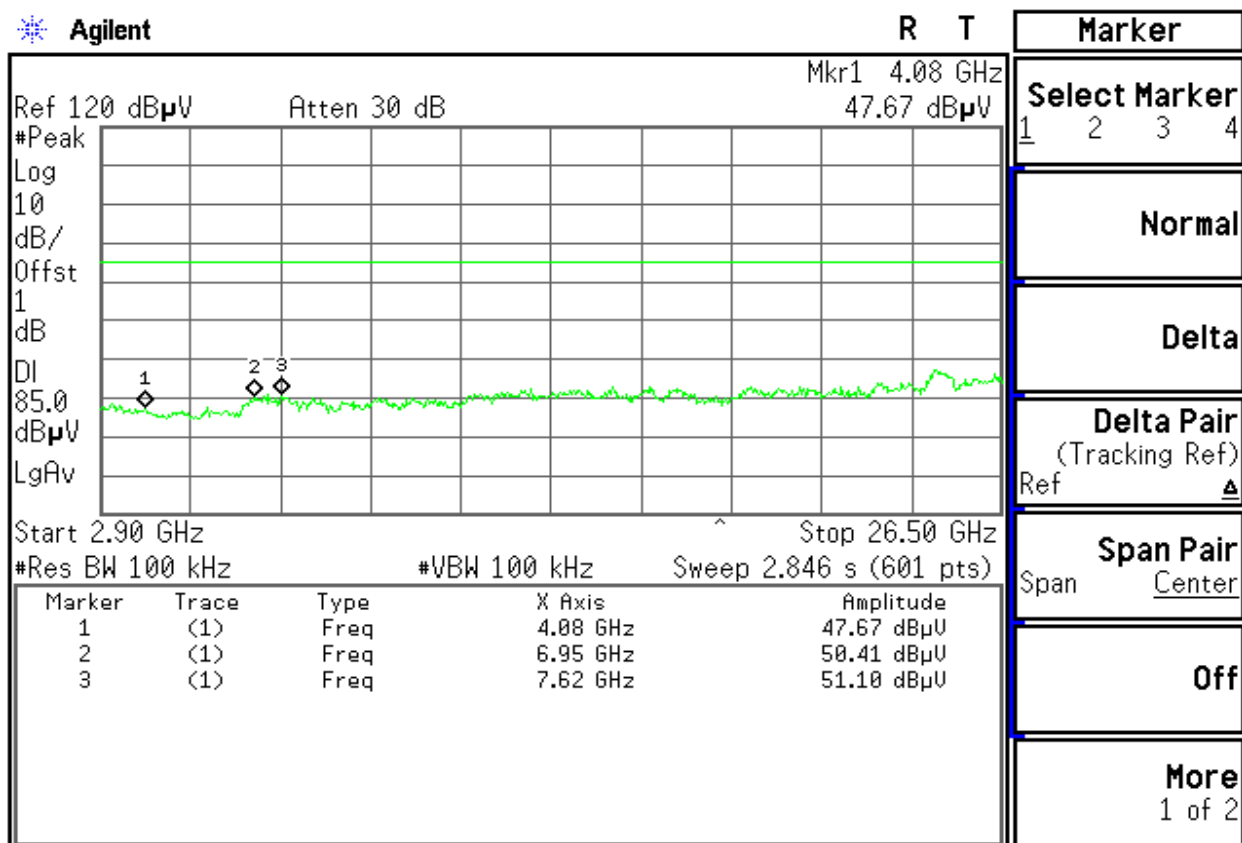
## CH Low

Agilent



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Agilent



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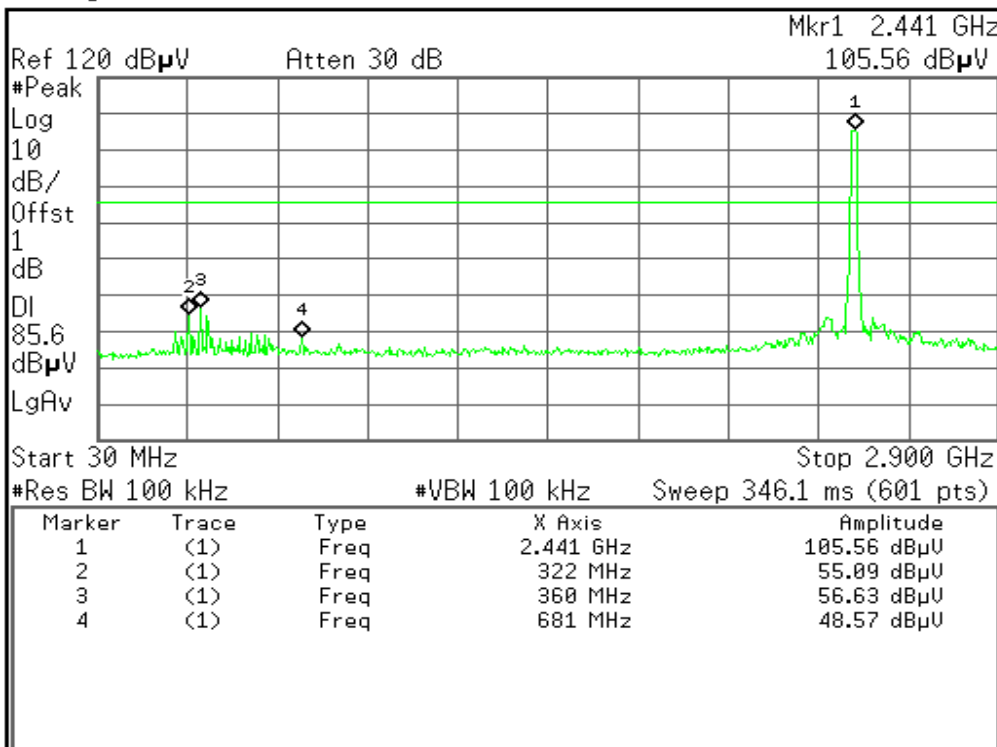


# CH Mid

Agilent

R T

Marker



Select Marker

1 2 3 4

Normal

Delta

Delta Pair

(Tracking Ref)

Ref

Span Pair

Span Center

Off

More

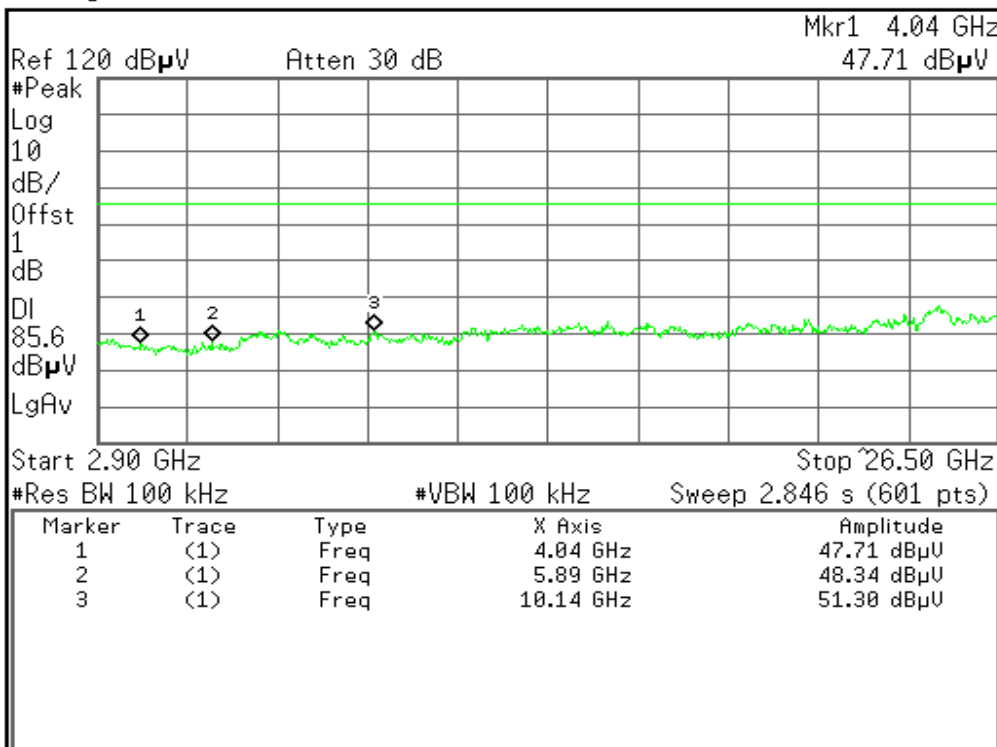
1 of 2

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Agilent

R T

Marker



Select Marker

1 2 3 4

Normal

Delta

Delta Pair

(Tracking Ref)

Ref

Span Pair

Span Center

Off

More

1 of 2

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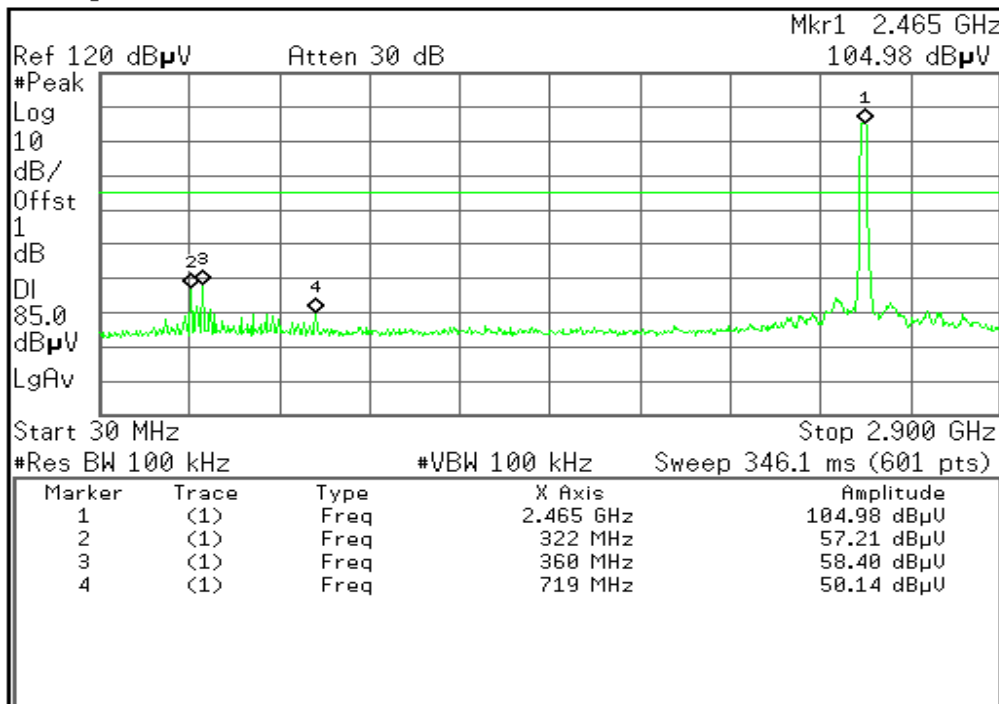


# CH High

Agilent

R T

Marker



Select Marker  
1 2 3 4

Normal

Delta

Delta Pair  
(Tracking Ref)  
Ref  $\Delta$

Span Pair  
Span Center

Off

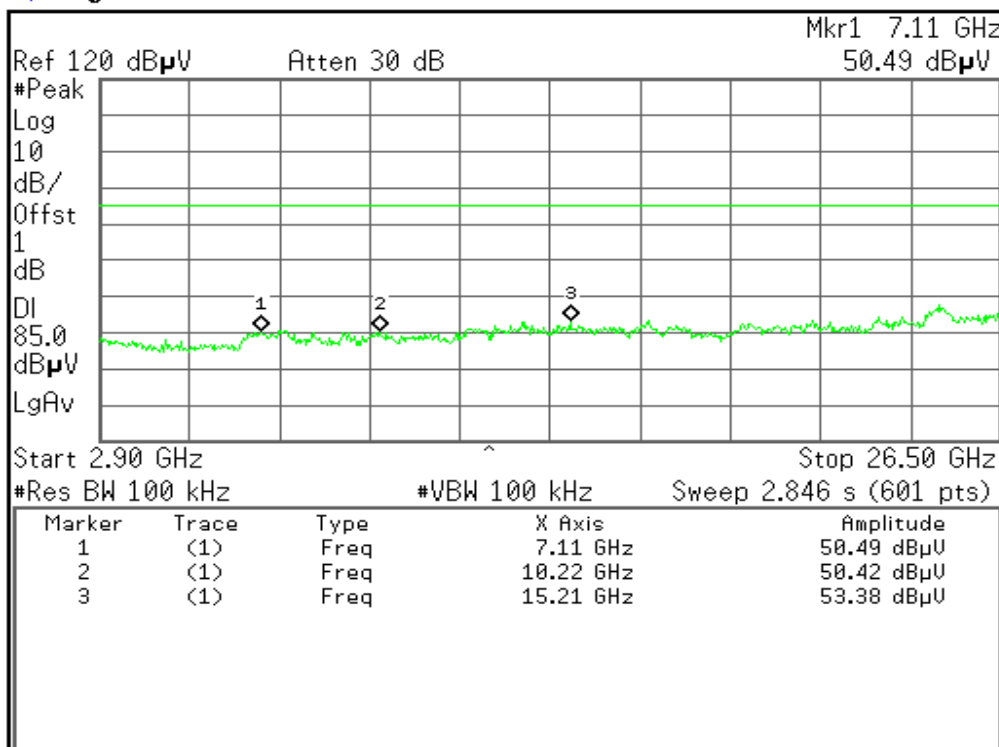
More  
1 of 2

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Agilent

R T

Marker



Select Marker  
1 2 3 4

Normal

Delta

Delta Pair  
(Tracking Ref)  
Ref  $\Delta$

Span Pair  
Span Center

Off

More  
1 of 2

Copyright 2000-2008 Agilent Technologies



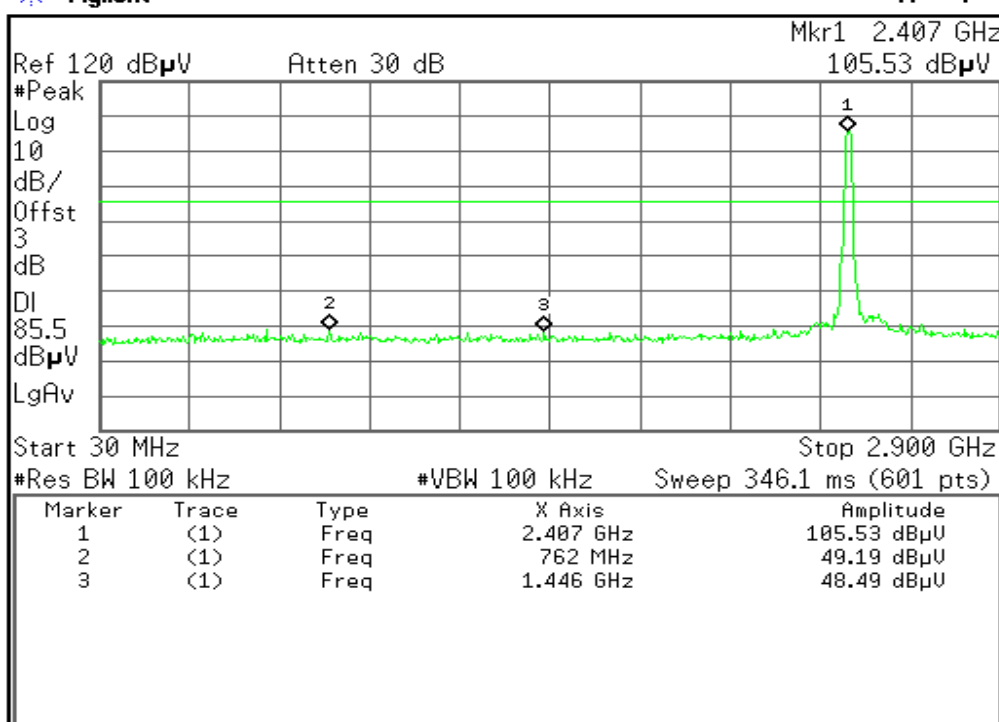
## IEEE 802.11n Standard-20 MHz Channel mode / Chain 0+ Chain 1

## CH Low

Agilent

R T

Marker



Select Marker

1 2 3 4

Normal

Delta

Delta Pair

(Tracking Ref)

Ref

Span Pair

Span Center

Off

More

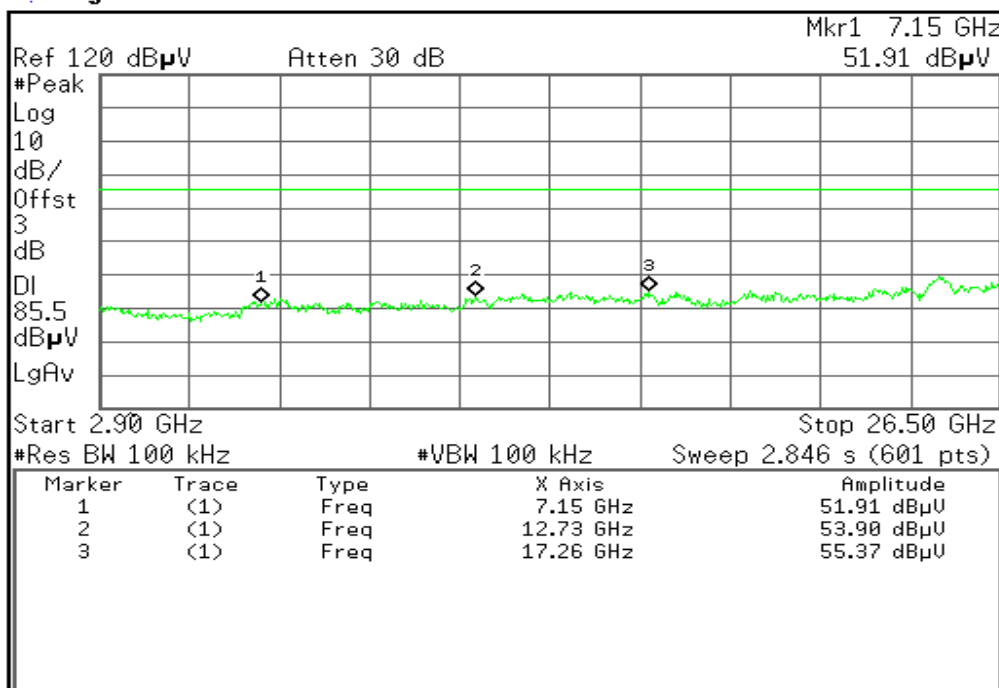
1 of 2

Copyright 2000-2008 Agilent Technologies

Agilent

R T

Marker



Select Marker

1 2 3 4

Normal

Delta

Delta Pair

(Tracking Ref)

Ref

Span Pair

Span Center

Off

More

1 of 2

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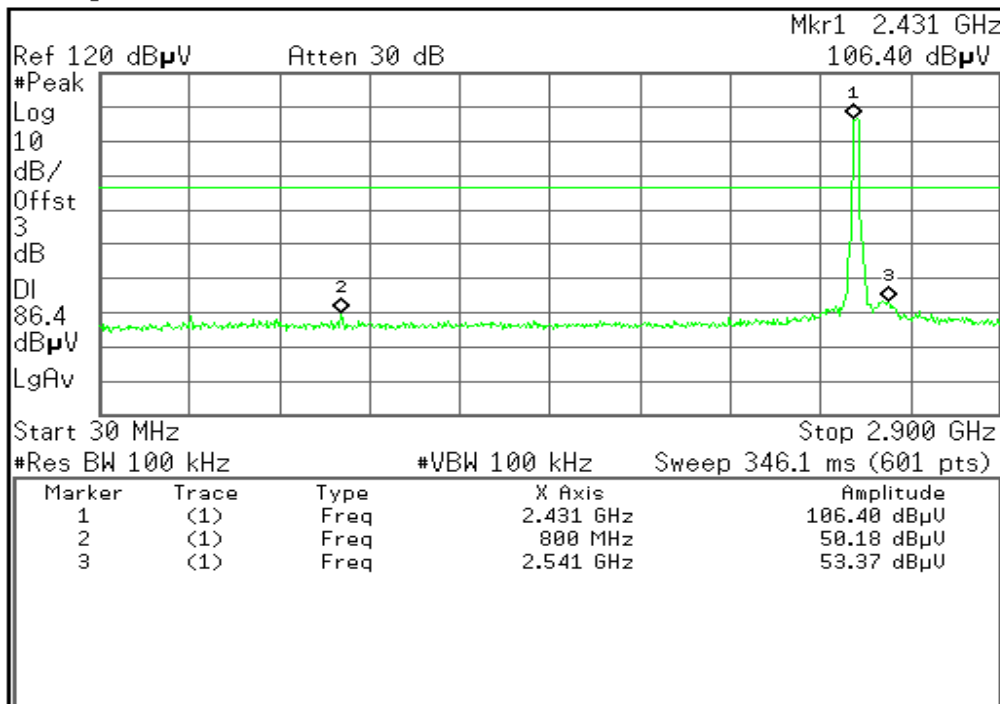


## CH Mid

Agilent

R T

Marker

Select Marker  
1 2 3 4

Normal

Delta

Delta Pair  
(Tracking Ref)  
Ref  $\Delta$ Span Pair  
Span Center

Off

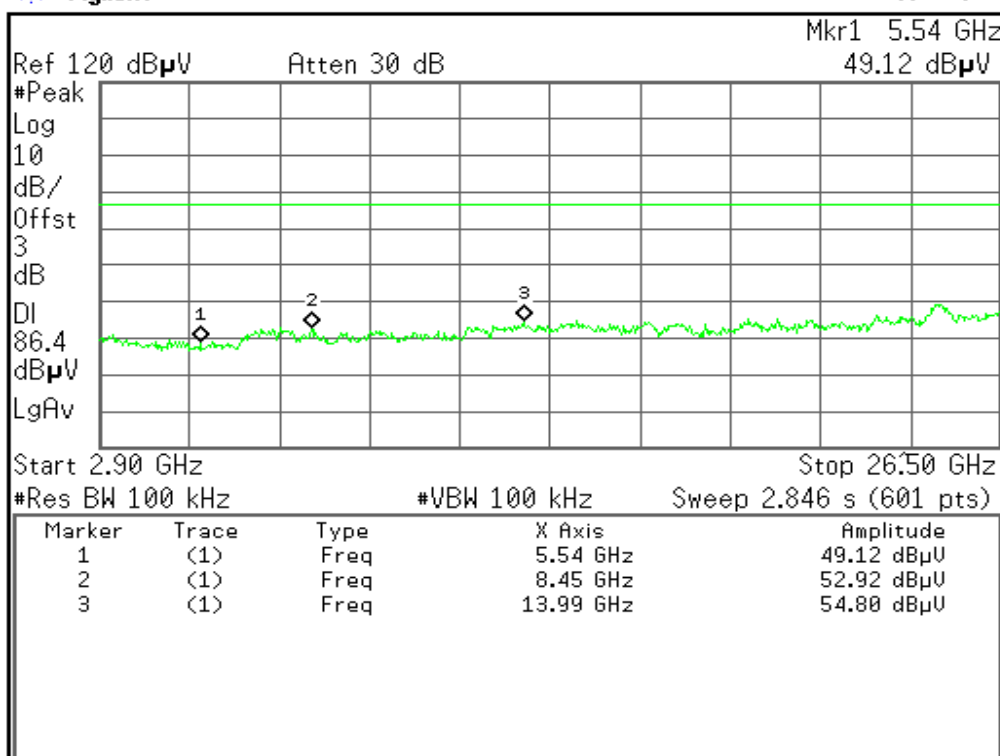
More  
1 of 2

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Agilent

R T

Marker

Select Marker  
1 2 3 4

Normal

Delta

Delta Pair  
(Tracking Ref)  
Ref  $\Delta$ Span Pair  
Span Center

Off

More  
1 of 2

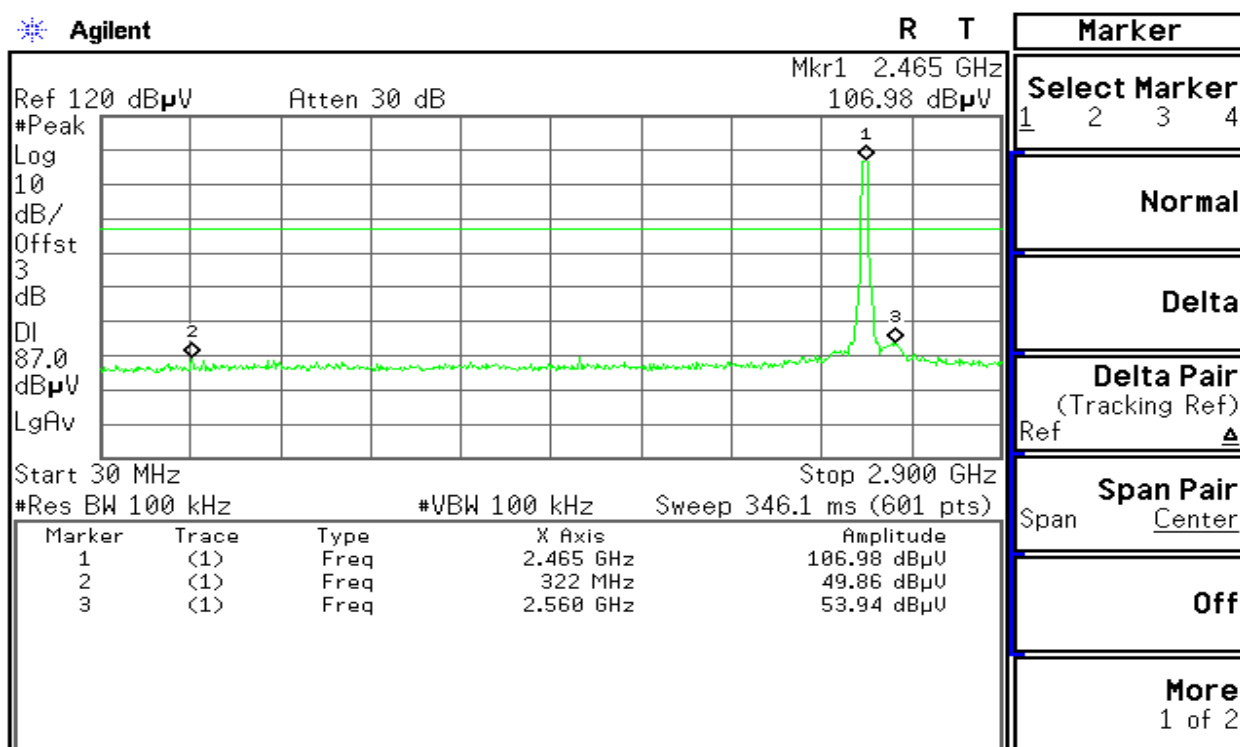
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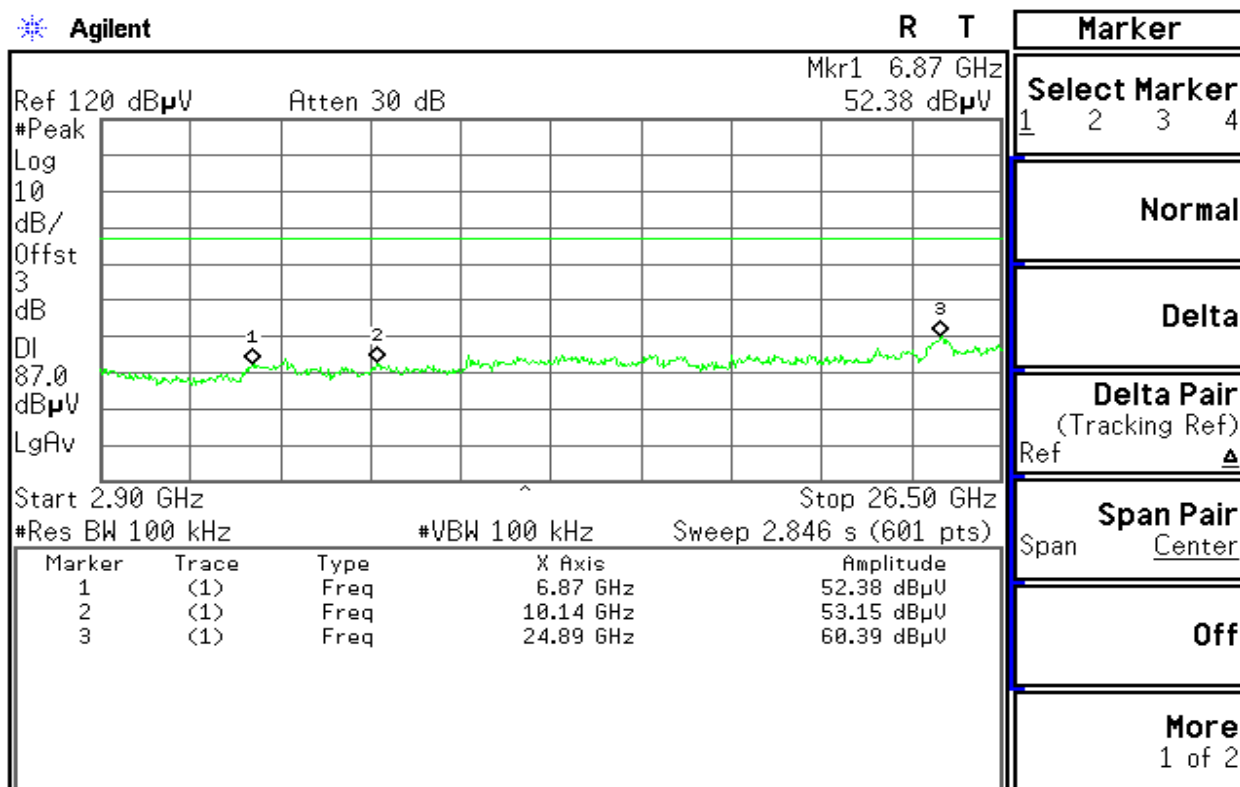
# CH High

Agilent



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Agilent



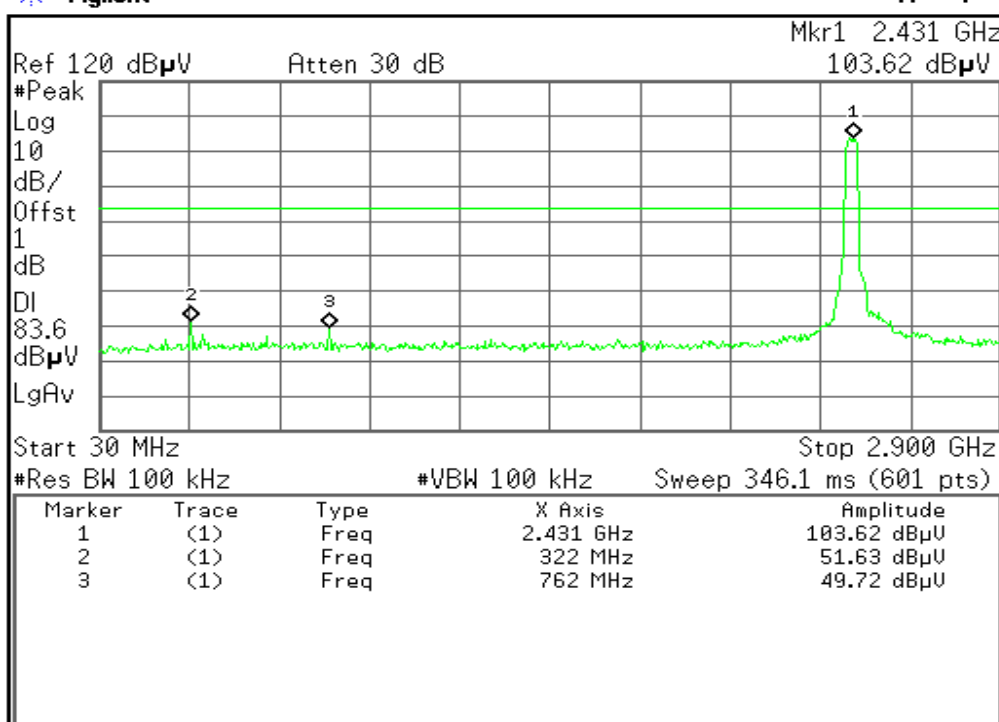
Copyright 2000-2008 Agilent Technologies

**IEEE 802.11n Wide-40 MHz Channel mode / Chain 0****CH Low**

Agilent

R T

Marker

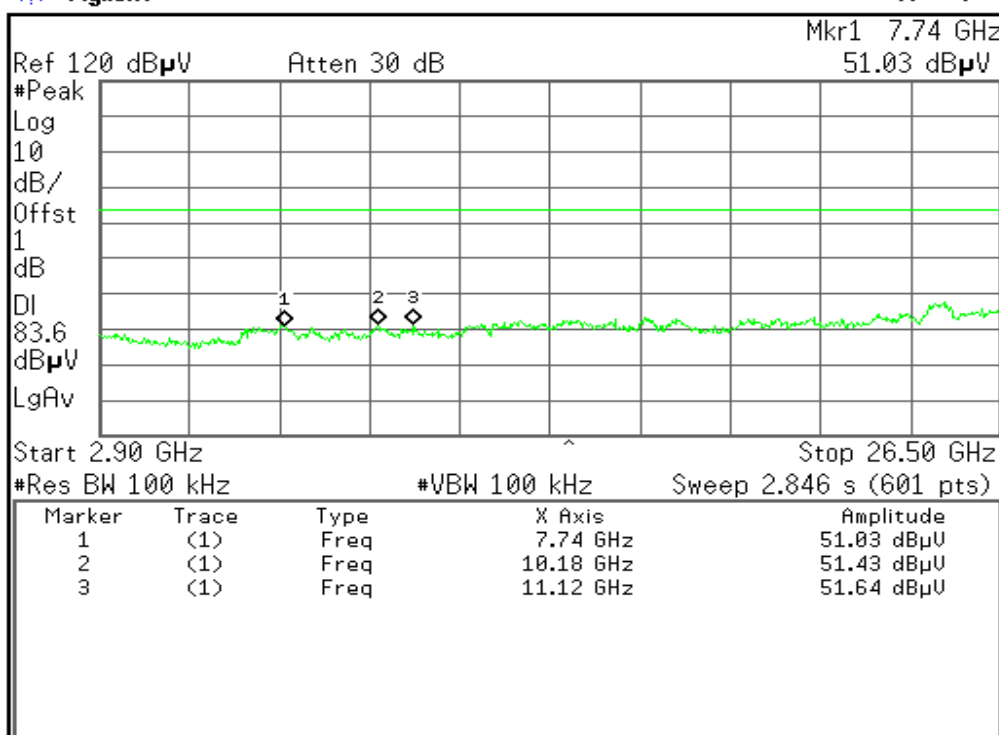


Copyright 2000-2008 Agilent Technologies

Agilent

R T

Marker



Copyright 2000-2008 Agilent Technologies

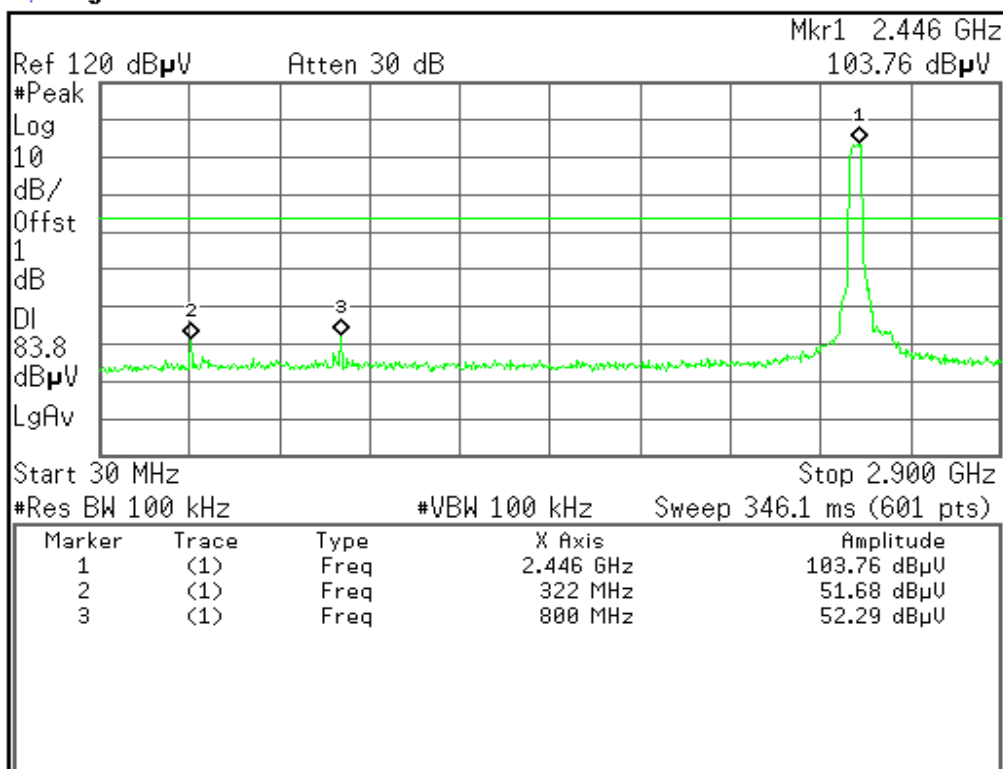


## CH Mid

Agilent

R T

Marker



Select Marker

1 2 3 4

Normal

Delta

Delta Pair

(Tracking Ref)

Ref

Span Pair

Span Center

Off

More

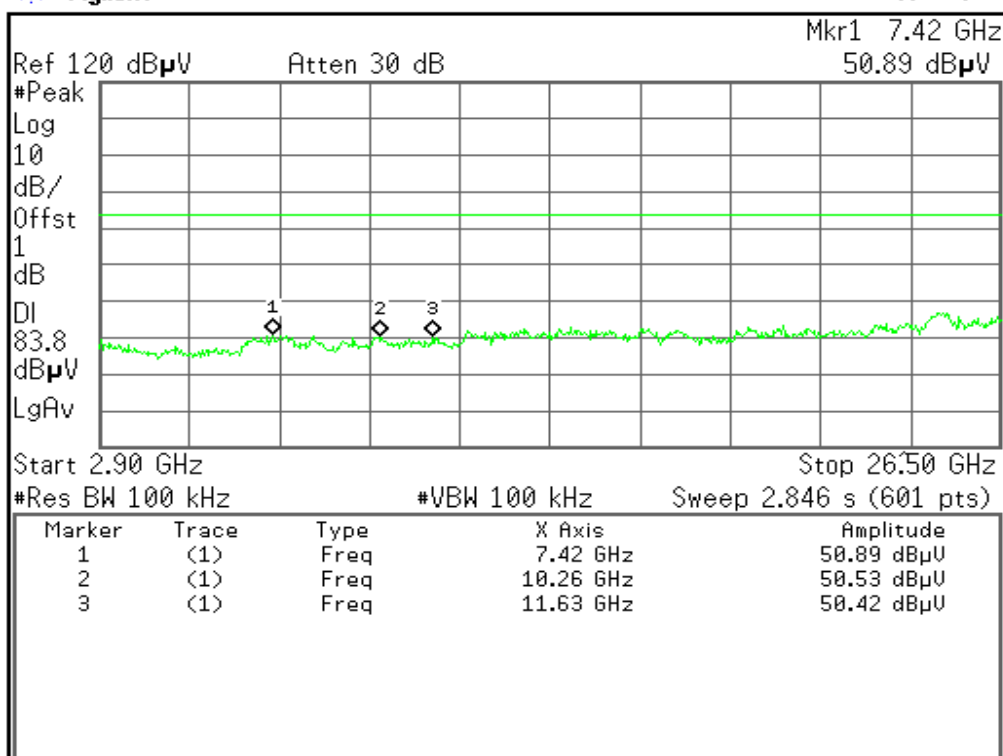
1 of 2

Copyright 2000-2008 Agilent Technologies

Agilent

R T

Freq/Channel



Center Freq

14.7000000 GHz

Start Freq

2.90000000 GHz

Stop Freq

26.5000000 GHz

CF Step

2.36000000 GHz

Auto Man

Freq Offset

0.00000000 Hz

Signal Track

On Off

Copyright 2000-2008 Agilent Technologies

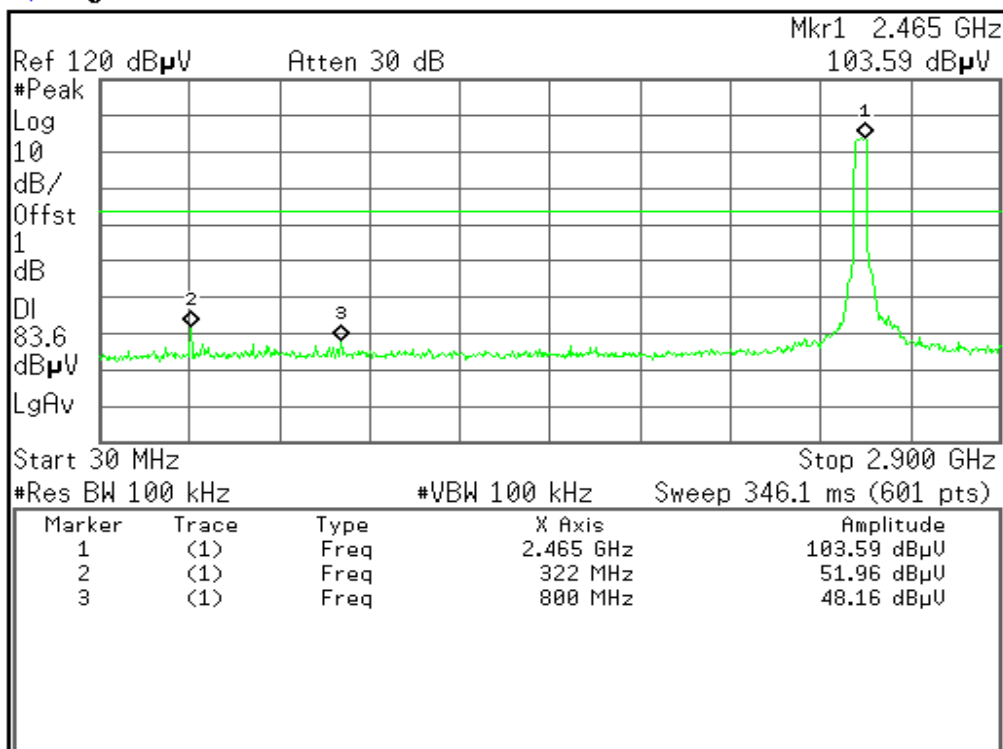


# CH High

Agilent

R T

Marker



Select Marker

1 2 3 4

Normal

Delta

Delta Pair

(Tracking Ref)

Ref

Span Pair

Span Center

Off

More

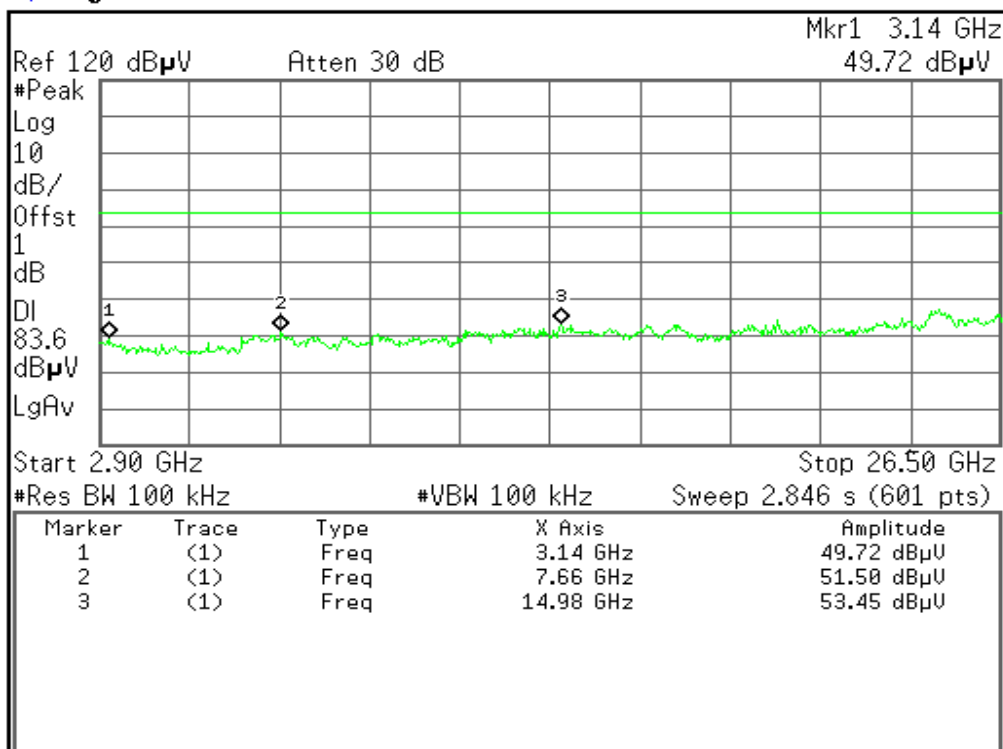
1 of 2

Copyright 2000-2008 Agilent Technologies

Agilent

R T

Marker



Select Marker

1 2 3 4

Normal

Delta

Delta Pair

(Tracking Ref)

Ref

Span Pair

Span Center

Off

More

1 of 2

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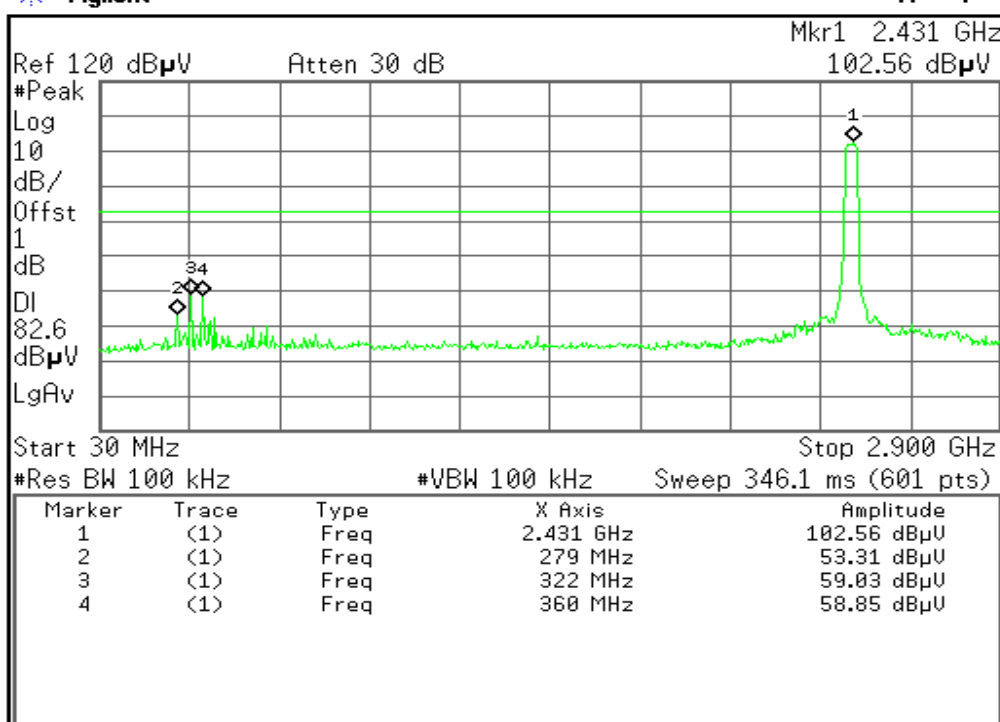
## IEEE 802.11n Wide-40 MHz Channel mode / Chain 1

## CH Low

Agilent

R T

Marker



Select Marker

1 2 3 4

Normal

Delta

Delta Pair

(Tracking Ref)

Ref

Span Pair

Span Center

Off

More

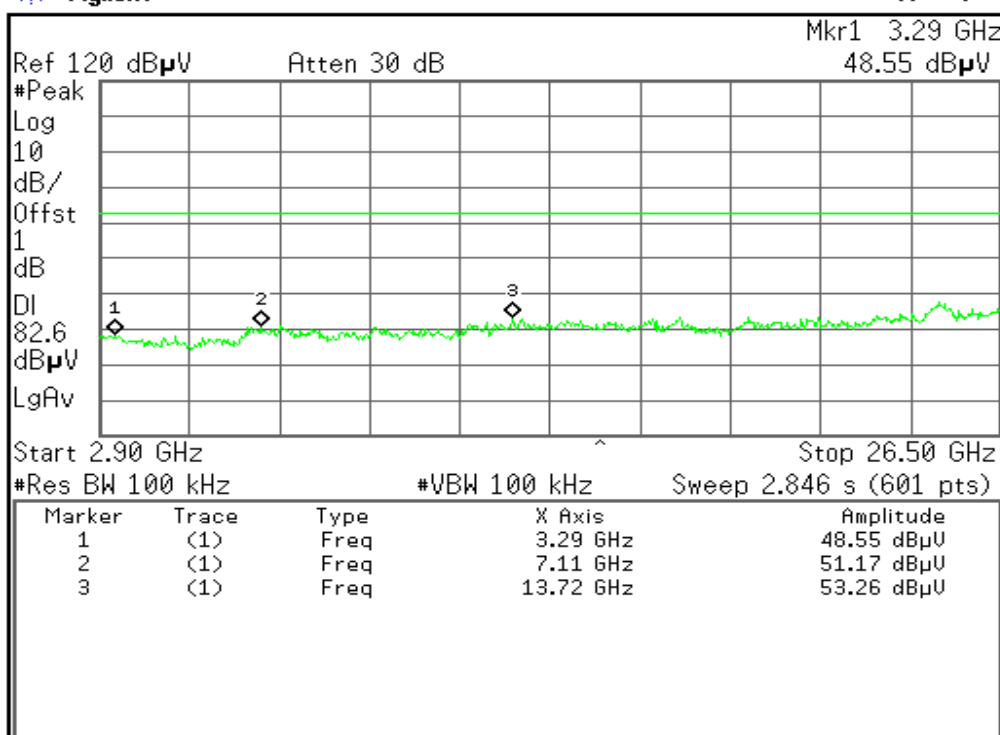
1 of 2

Copyright 2000-2008 Agilent Technologies

Agilent

R T

Marker



Select Marker

1 2 3 4

Normal

Delta

Delta Pair

(Tracking Ref)

Ref

Span Pair

Span Center

Off

More

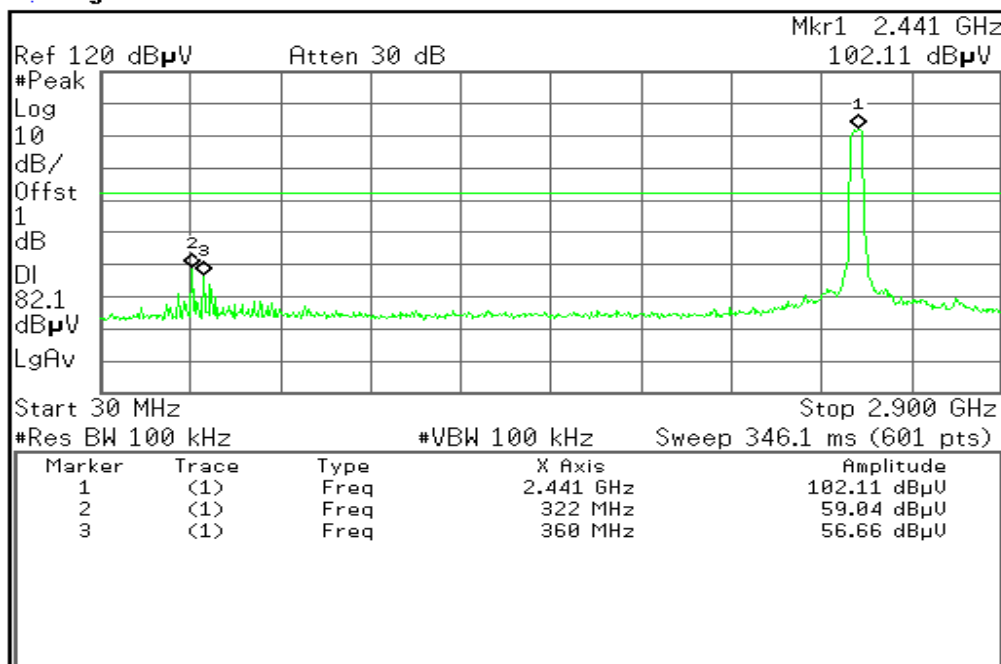
1 of 2

Copyright 2000-2008 Agilent Technologies

**CH Mid**

Agilent

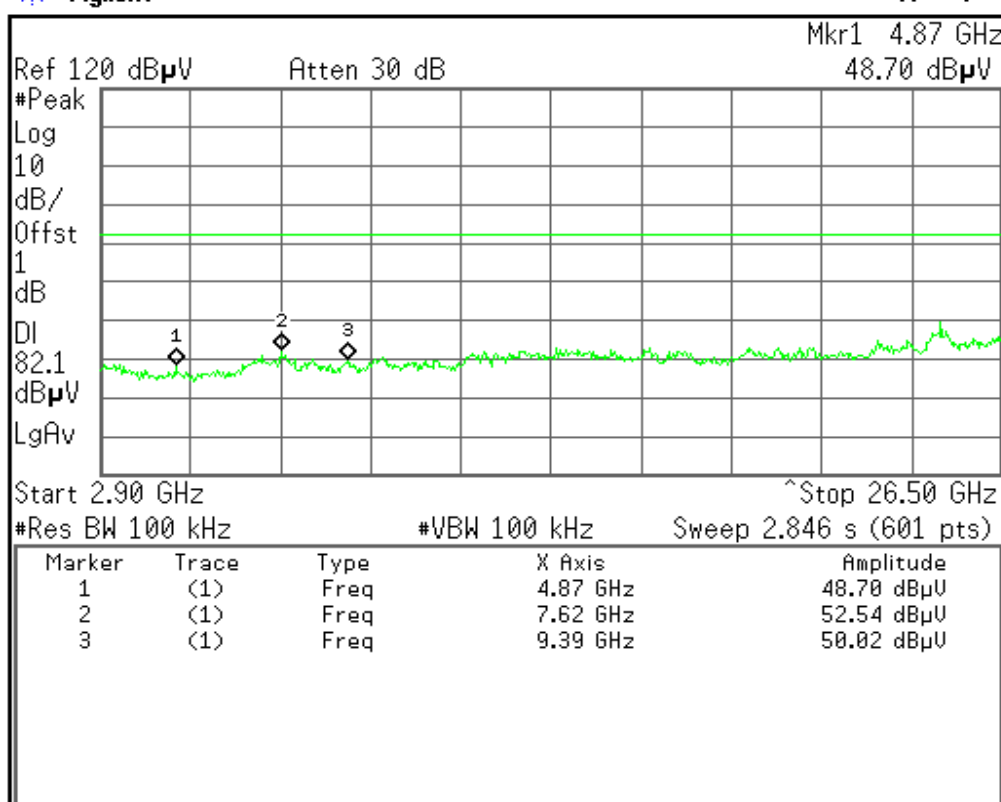
R T



Copyright 2000-2008 Agilent Technologies

Agilent

R T



Copyright 2000-2008 Agilent Technologies

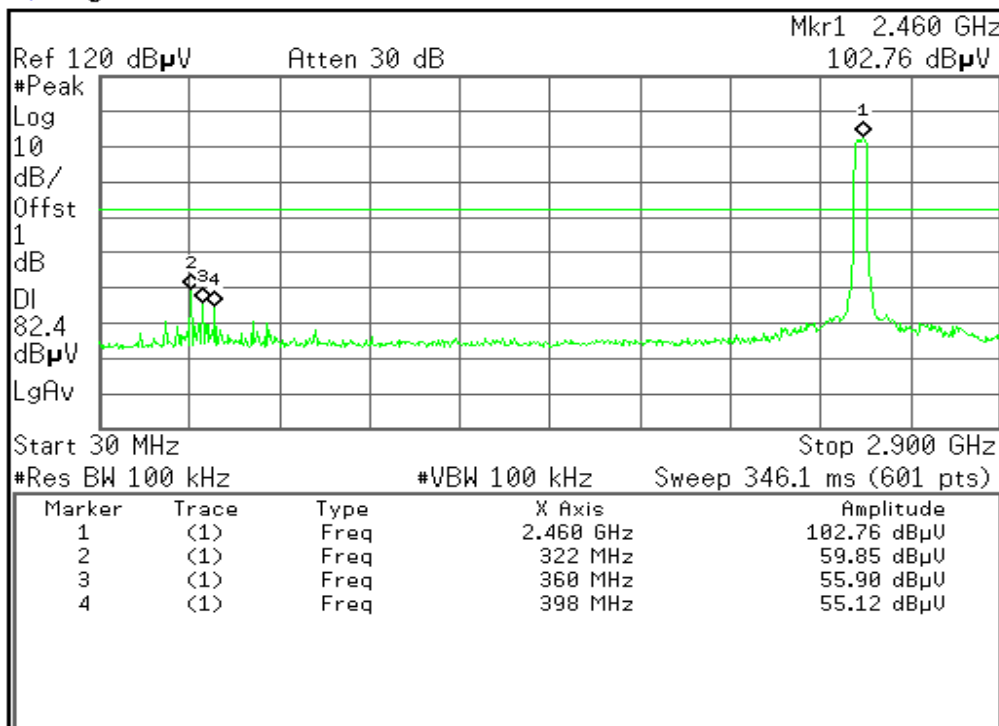


# CH High

Agilent

R T

Marker



Select Marker

1 2 3 4

Normal

Delta

Delta Pair  
(Tracking Ref)

Ref

Span Pair  
Center

Off

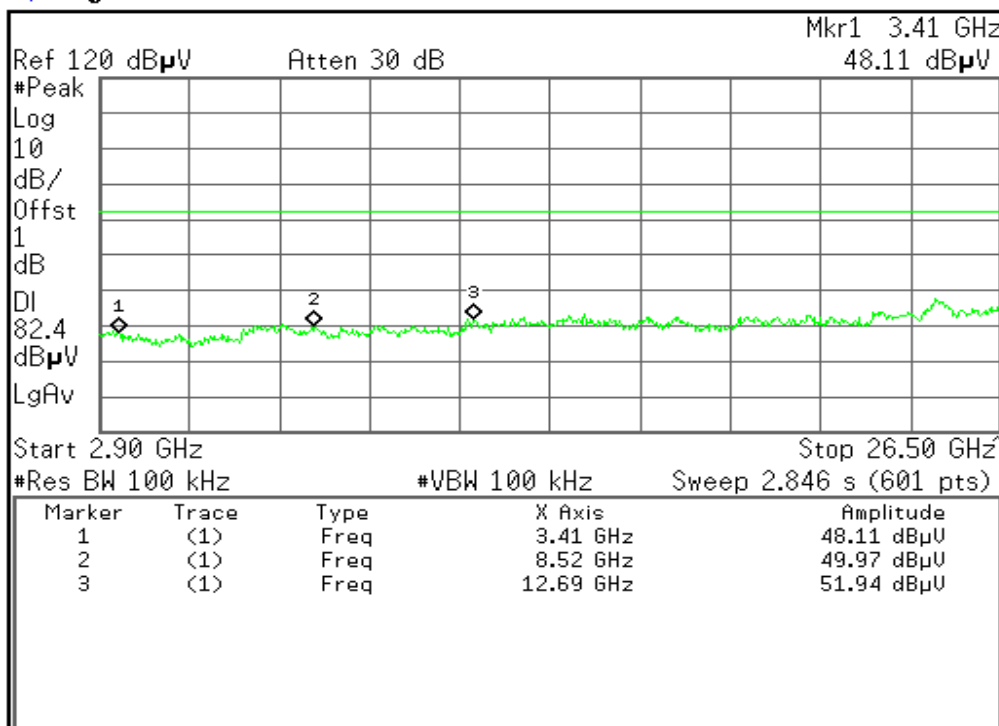
More  
1 of 2

Copyright 2000-2008 Agilent Technologies

Agilent

R T

Marker



Select Marker

1 2 3 4

Normal

Delta

Delta Pair  
(Tracking Ref)

Ref

Span Pair  
Center

Off

More  
1 of 2

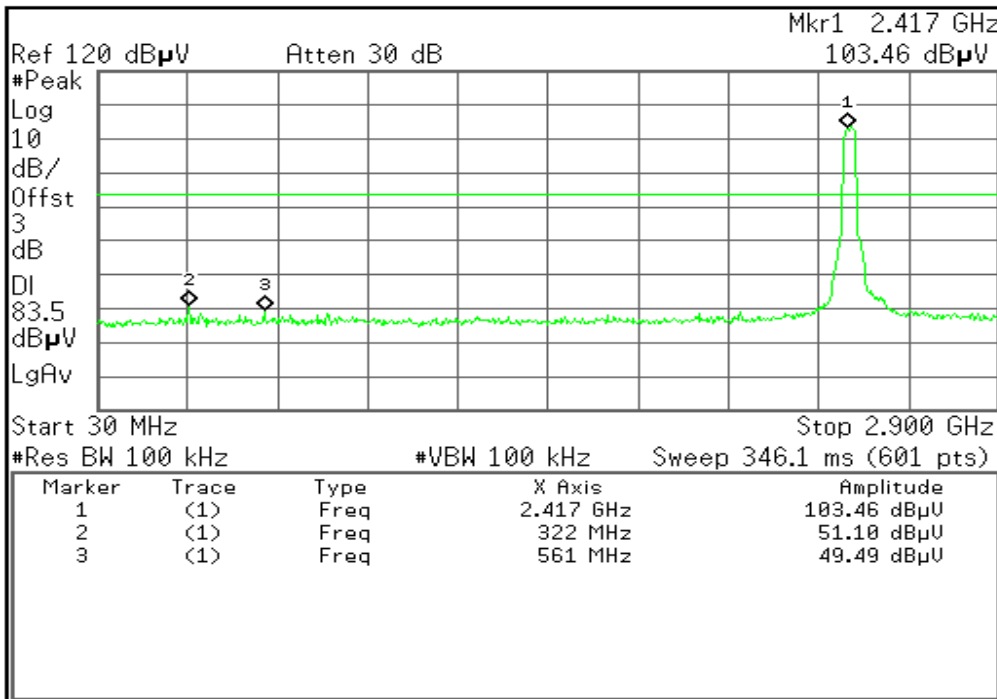
Copyright 2000-2008 Agilent Technologies

**IEEE 802.11n Wide-40 MHz Channel mode / Chain 0+ Chain 1****CH Low**

\* Agilent

R T

Marker

Select Marker  
1 2 3 4

Normal

Delta

Delta Pair  
(Tracking Ref)  
RefSpan Pair  
Span Center

Off

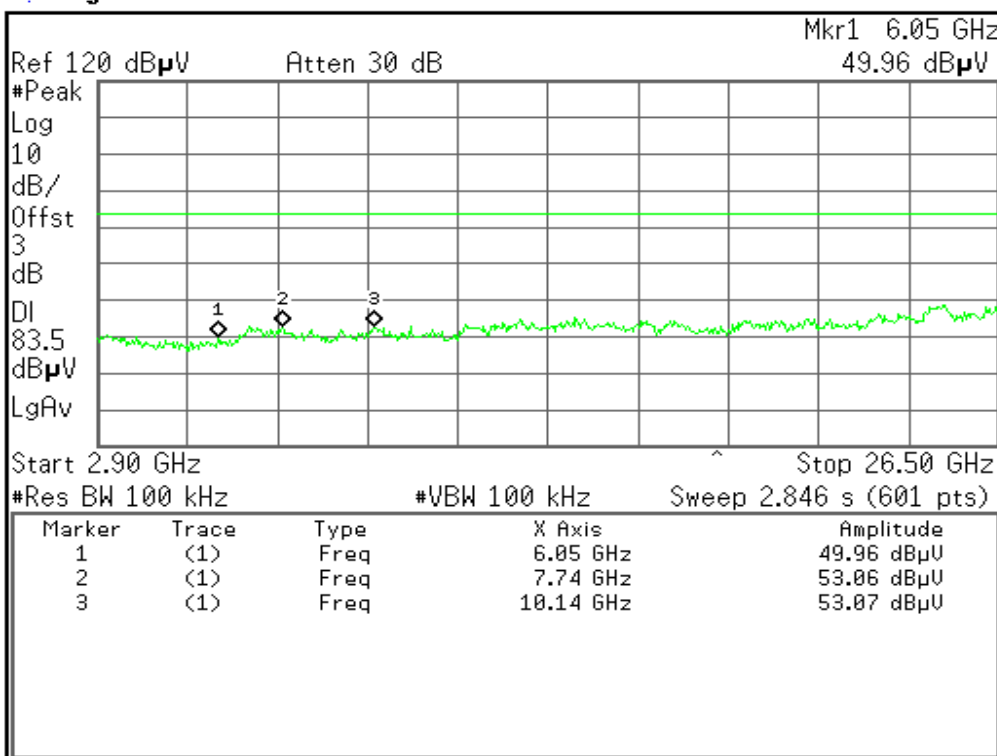
More  
1 of 2

Copyright 2000–2008 Agilent Technologies

\* Agilent

R T

Marker

Select Marker  
1 2 3 4

Normal

Delta

Delta Pair  
(Tracking Ref)  
RefSpan Pair  
Span Center

Off

More  
1 of 2

Copyright 2000–2008 Agilent Technologies



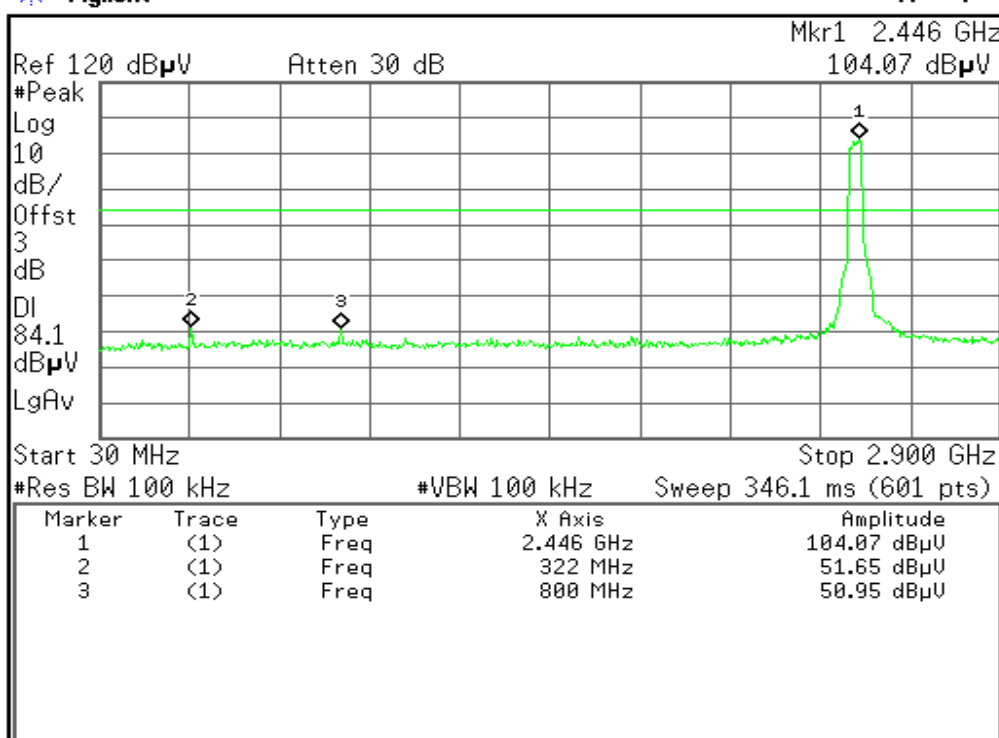


# CH Mid

Agilent

R T

Marker



Select Marker

1 2 3 4

Normal

Delta

Delta Pair

(Tracking Ref)

Ref

Span Pair

Span Center

Off

More

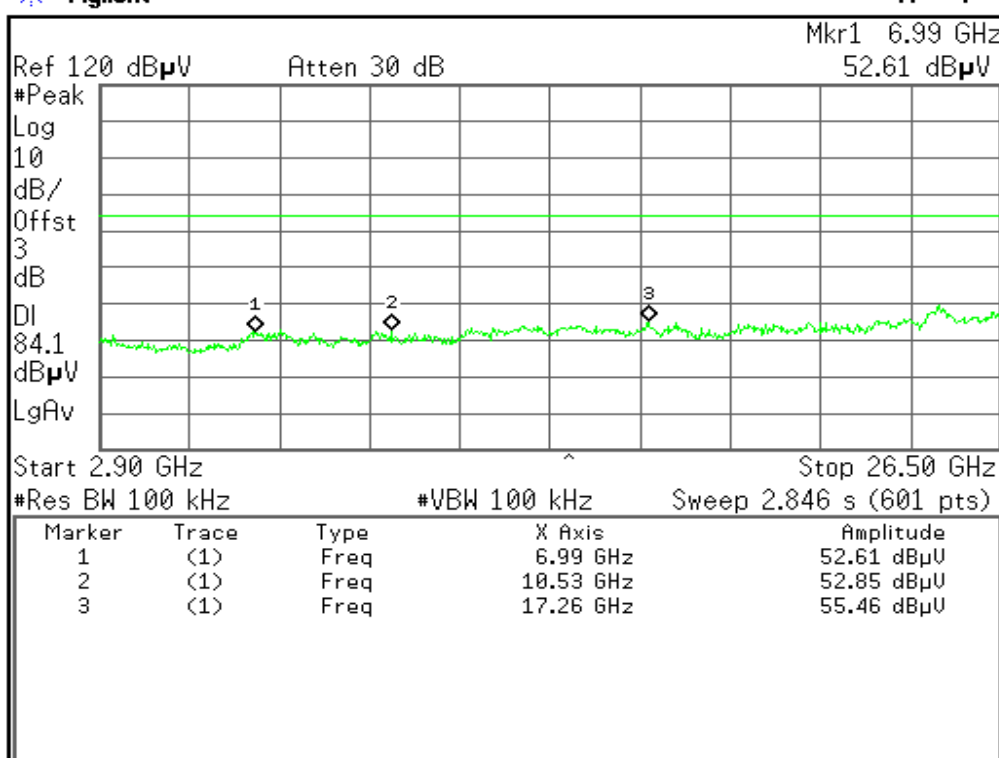
1 of 2

Copyright 2000-2008 Agilent Technologies

Agilent

R T

Marker



Select Marker

1 2 3 4

Normal

Delta

Delta Pair

(Tracking Ref)

Ref

Span Pair

Span Center

Off

More

1 of 2

Copyright 2000-2008 Agilent Technologies

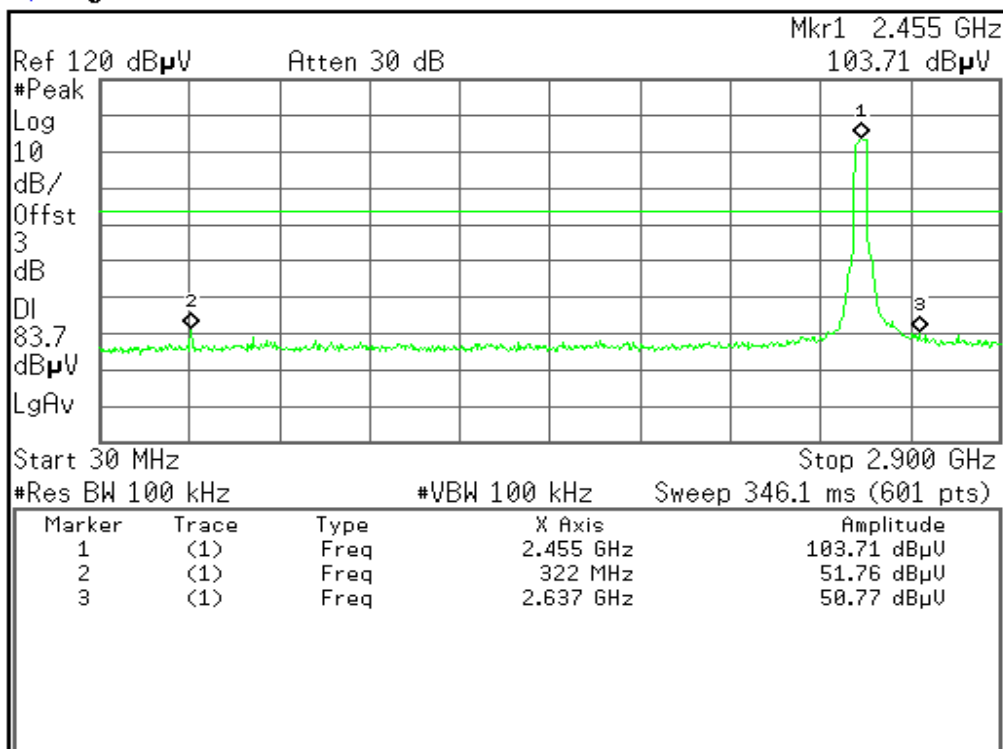


## CH High

Agilent

R T

Marker



Select Marker

1 2 3 4

Normal

Delta

Delta Pair

(Tracking Ref)

Ref

Span Pair

Span Center

Off

More

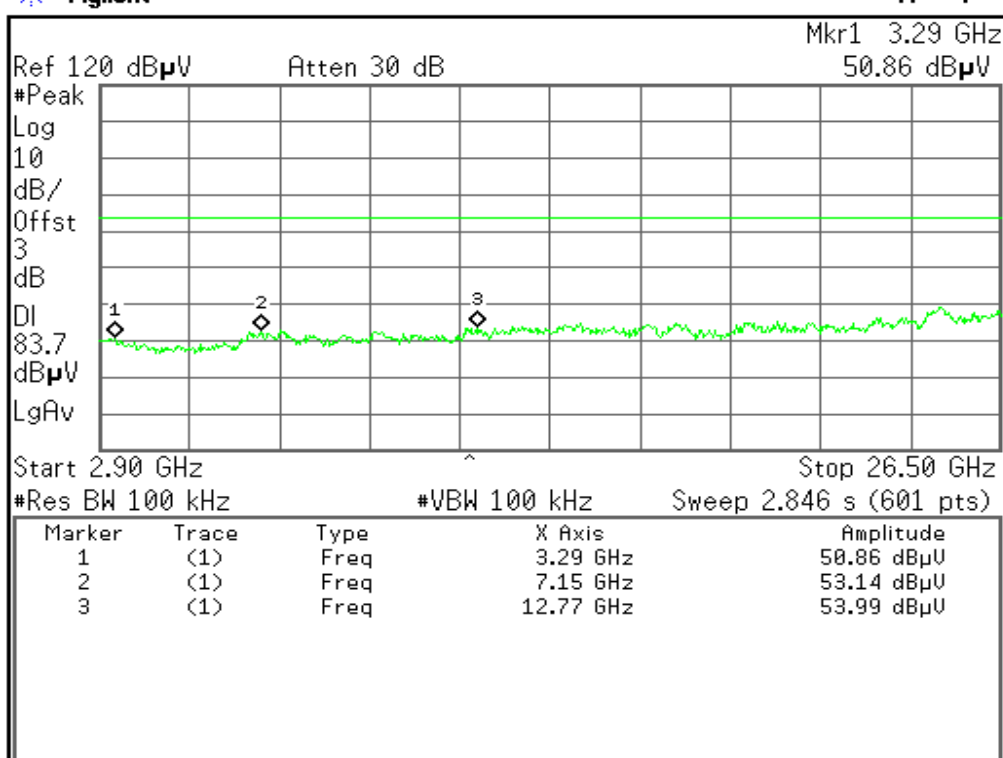
1 of 2

Copyright 2000-2008 Agilent Technologies

Agilent

R T

Marker



Select Marker

1 2 3 4

Normal

Delta

Delta Pair

(Tracking Ref)

Ref

Span Pair

Span Center

Off

More

1 of 2

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## 7.5.2 RADIATED EMISSIONS

### LIMIT

1. According to §15.209(a), except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength (μV/m)	Measurement Distance (m)
30-88	100*	3
88-216	150*	3
216-960	200*	3
Above 960	500	3

**Remark:** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

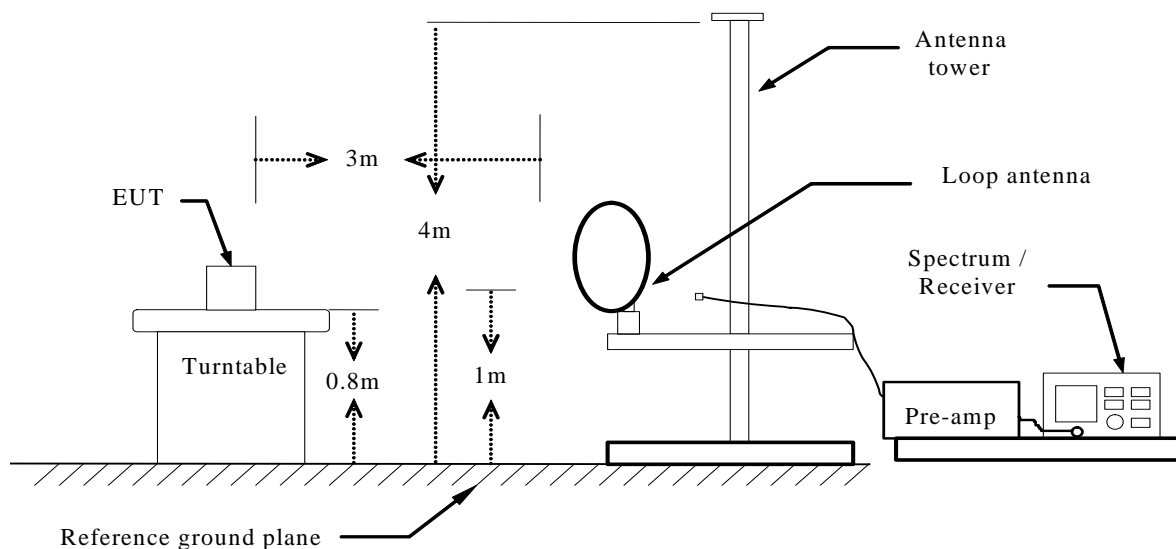
2. In the emission table above, the tighter limit applies at the band edges.

Frequency (MHz)	Field Strength (μV/m at 3-meter)	Field Strength (dBμV/m at 3-meter)
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

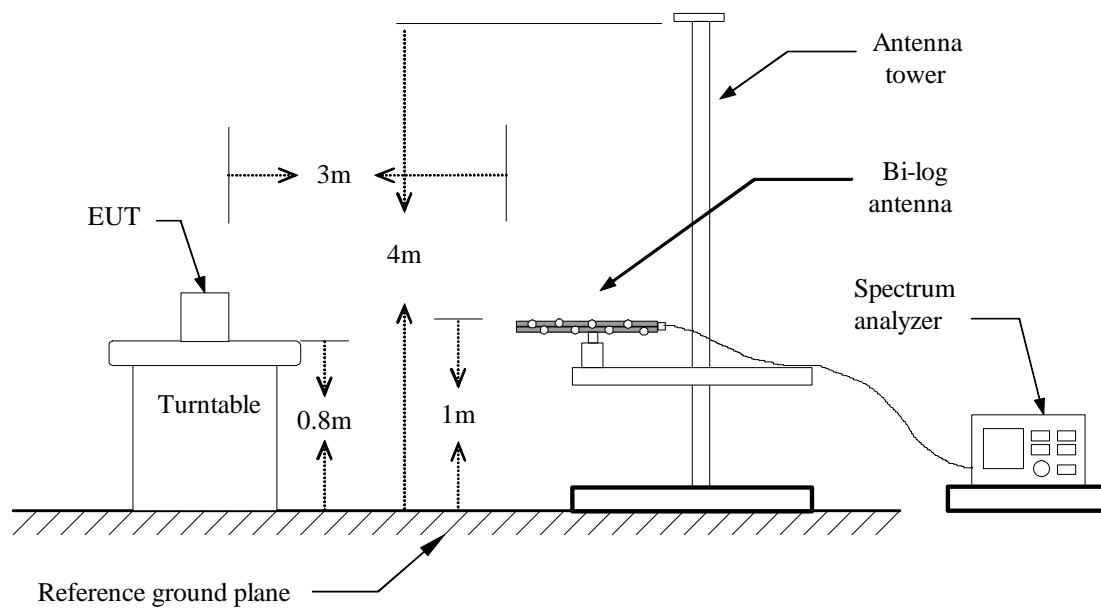


## **Test Configuration**

### **Below 30MHz**

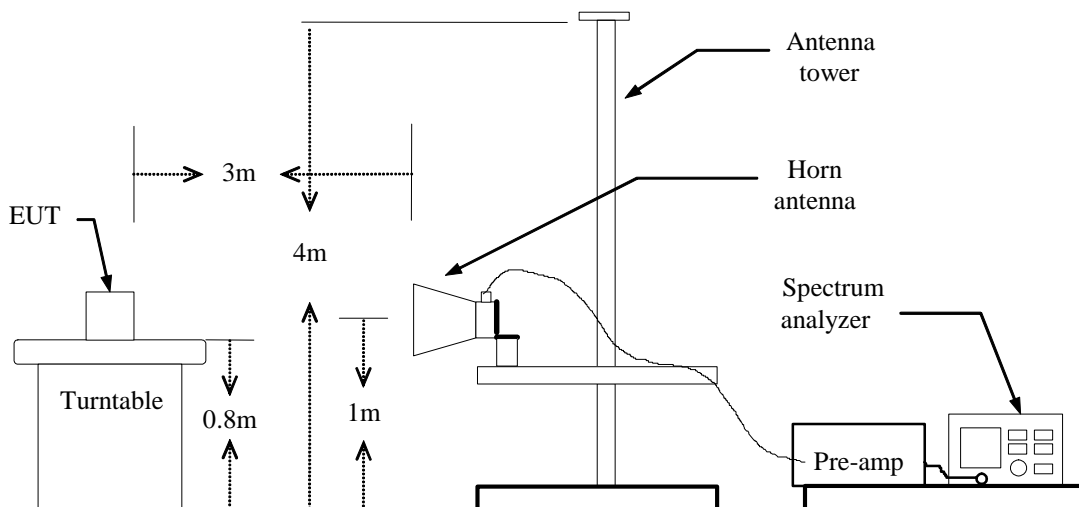


### **Below 1 GHz**





**Above 1 GHz**





## **TEST PROCEDURE**

1. The EUT is placed on a turntable, which is 0.8m above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Set the spectrum analyzer in the following setting as:  
Below 1GHz:  
RBW=100kHz / VBW=300kHz / Sweep=AUTO  
Above 1GHz:  
(a) PEAK: RBW=VBW=1MHz / Sweep=AUTO  
(b) AVERAGE: RBW=1MHz / VBW=10Hz / Sweep=AUTO
7. Repeat above procedures until the measurements for all frequencies are complete.

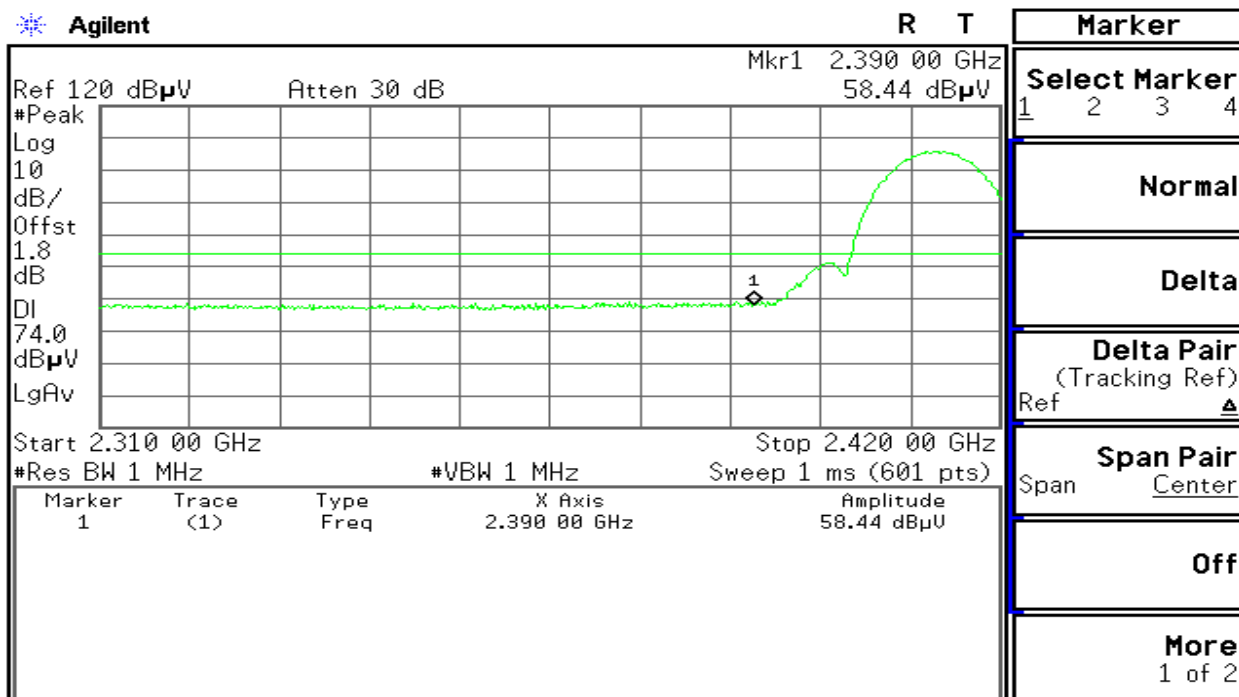


## TEST RESULTS

### RESTRICTED BANDEDGE (b Mode, Low Channel, Horizontal)

#### PEAK

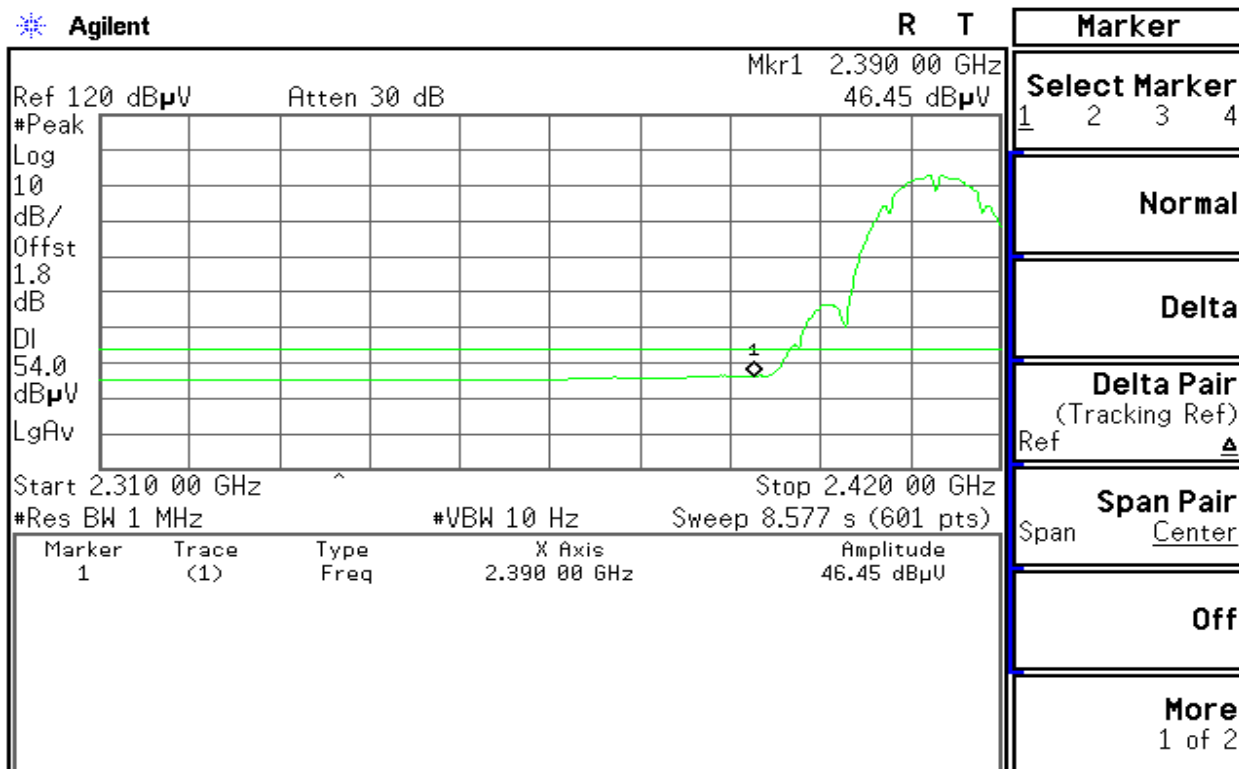
Agilent



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#### AVG

Agilent



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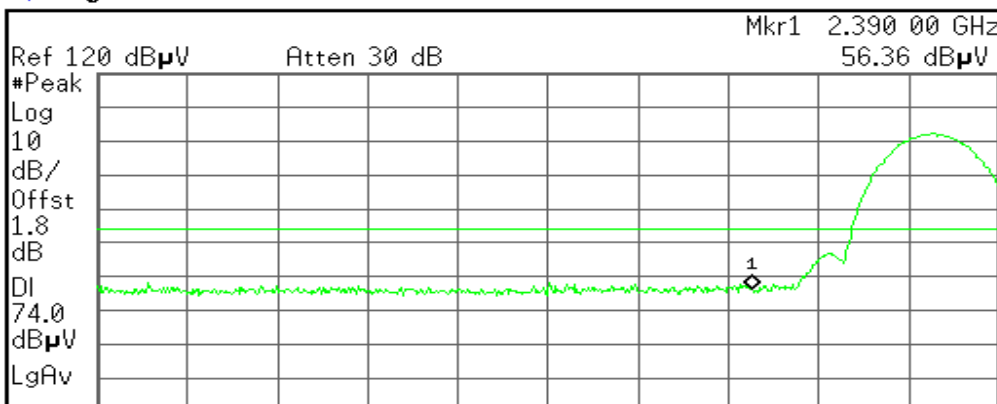
RESTRICTED BANDEDGE (b Mode, Low Channel, Vertical)

PEAK

Agilent

R T

Marker



Select Marker

1 2 3 4

Normal

Delta

Delta Pair

(Tracking Ref)

Ref

Span Pair

Span

Center

Off

More

1 of 2

Start 2.310 00 GHz Stop 2.420 00 GHz  
#Res BW 1 MHz #VBW 1 MHz Sweep 1 ms (601 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.390 00 GHz	56.36 dB $\mu$ V

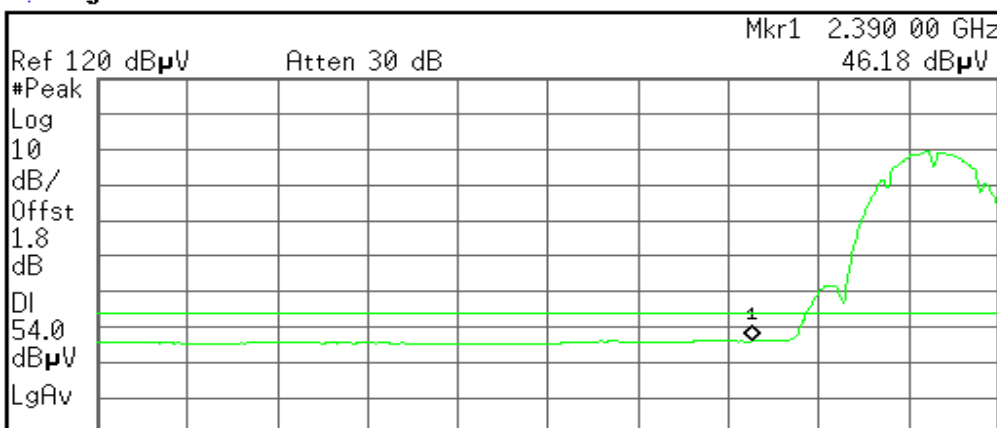
Copyright 2000-2008 Agilent Technologies

AVG

Agilent

R T

Marker



Select Marker

1 2 3 4

Normal

Delta

Delta Pair

(Tracking Ref)

Ref

Span Pair

Span

Center

Off

More

1 of 2

Start 2.310 00 GHz Stop 2.420 00 GHz  
#Res BW 1 MHz #VBW 10 Hz Sweep 8.577 s (601 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.390 00 GHz	46.18 dB $\mu$ V

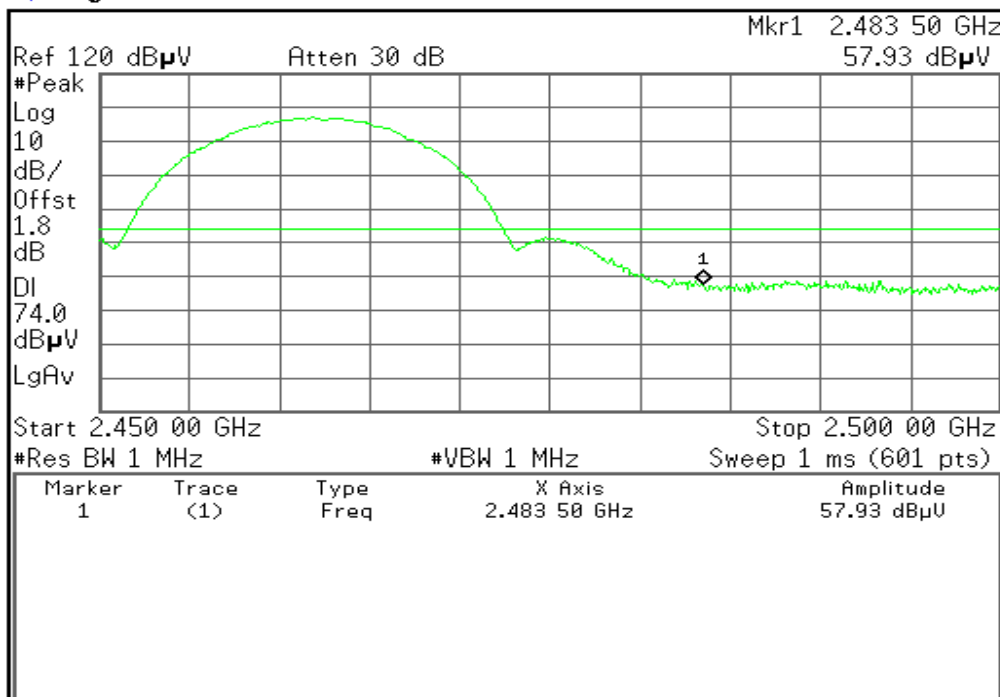
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**RESTRICTED BANDEDGE (b Mode, High Channel, Horizontal)****PEAK**

Agilent

R T



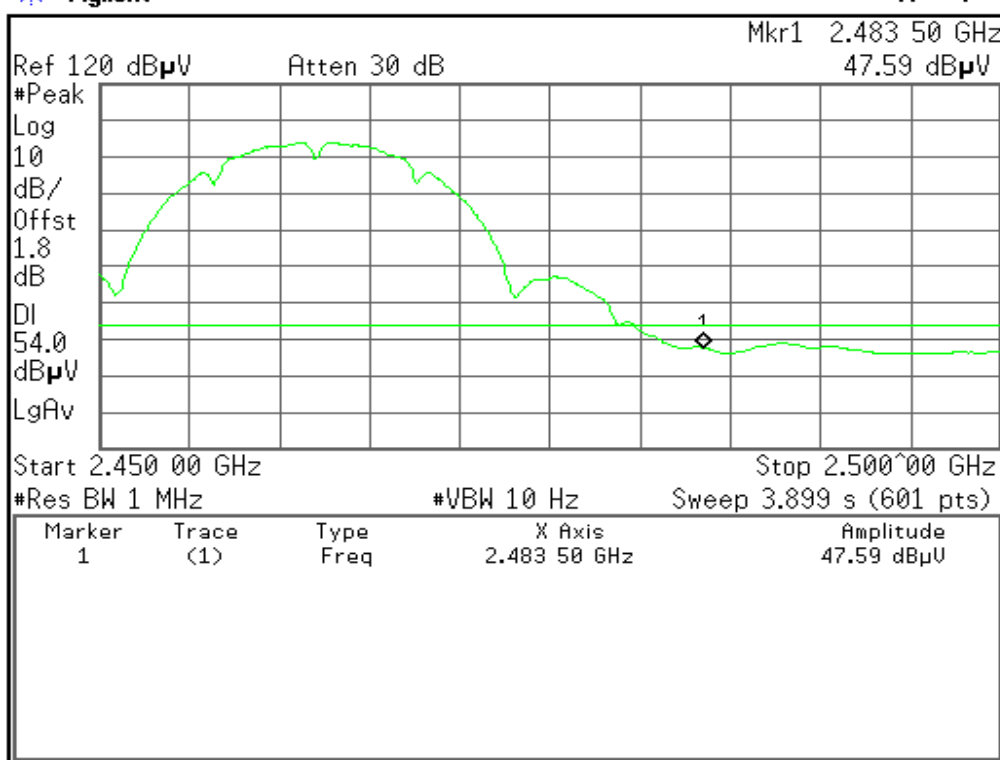
Marker				
Select Marker				
1	2	3	4	
Normal				
Delta				
Delta Pair (Tracking Ref)				
Ref				
Span Pair				
Span				
Center				
Off				
More				
1 of 2				

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**AVG**

Agilent

R T



Marker				
Select Marker				
1	2	3	4	
Normal				
Delta				
Delta Pair (Tracking Ref)				
Ref				
Span Pair				
Span				
Center				
Off				
More				
1 of 2				

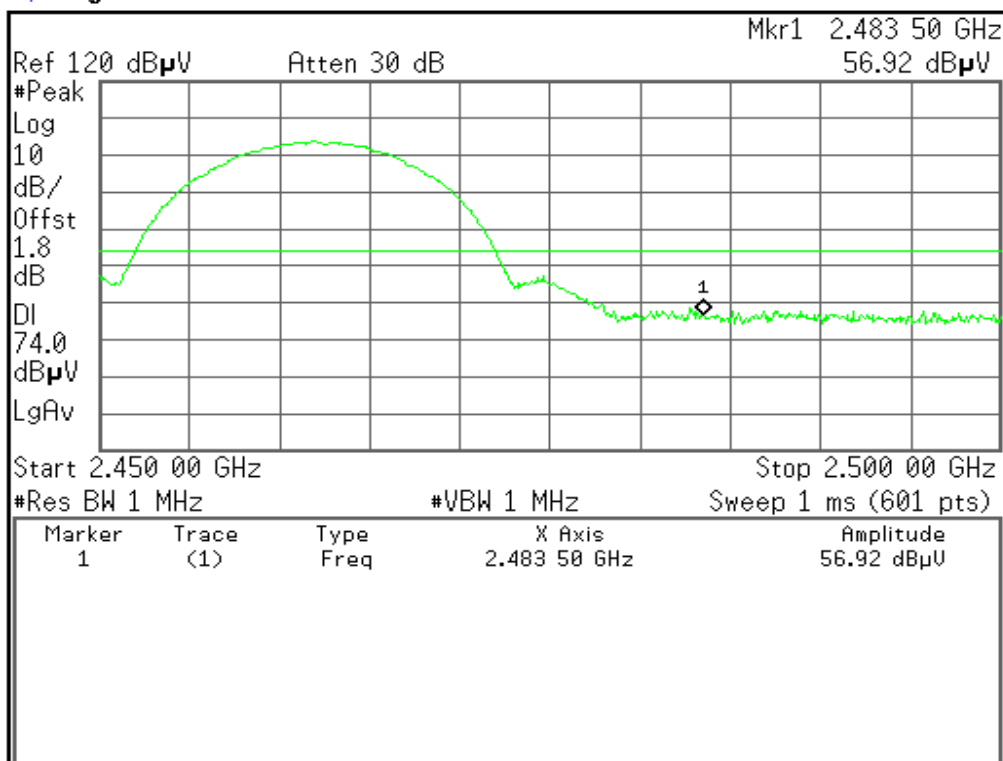
Copyright 2000–2008 Agilent Technologies

**RESTRICTED BANDEDGE (b Mode, High Channel, Vertical)****PEAK**

Agilent

R T

Marker



Select Marker

1 2 3 4

Normal

Delta

Delta Pair  
(Tracking Ref)  
Ref  $\Delta$ Span Pair  
Span Center

Off

More  
1 of 2

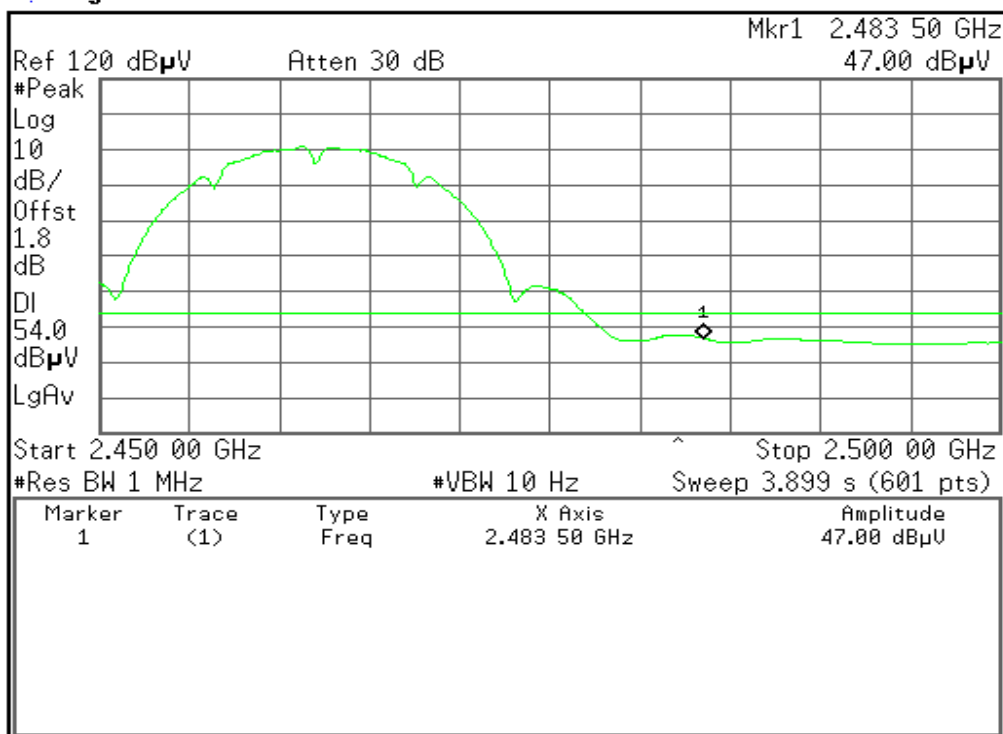
Copyright 2000-2008 Agilent Technologies

**AVG**

Agilent

R T

Marker



Select Marker

1 2 3 4

Normal

Delta

Delta Pair  
(Tracking Ref)  
Ref  $\Delta$ Span Pair  
Span Center

Off

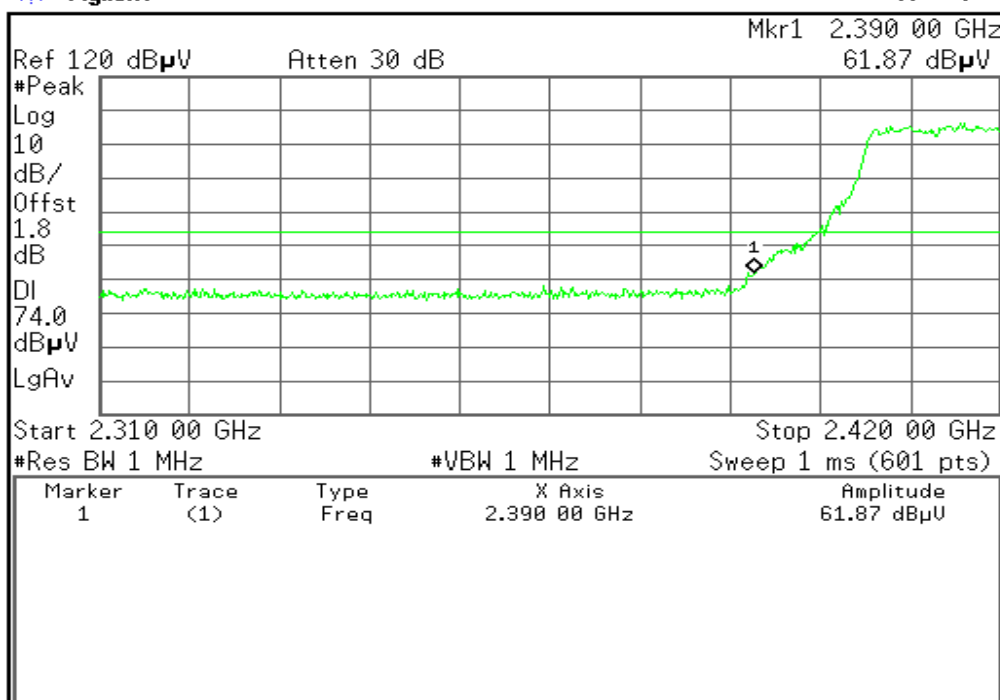
More  
1 of 2

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**RESTRICTED    BANDEDGE (g Mode, Low Channel, Horizontal)****PEAK**

\* Agilent

R   T



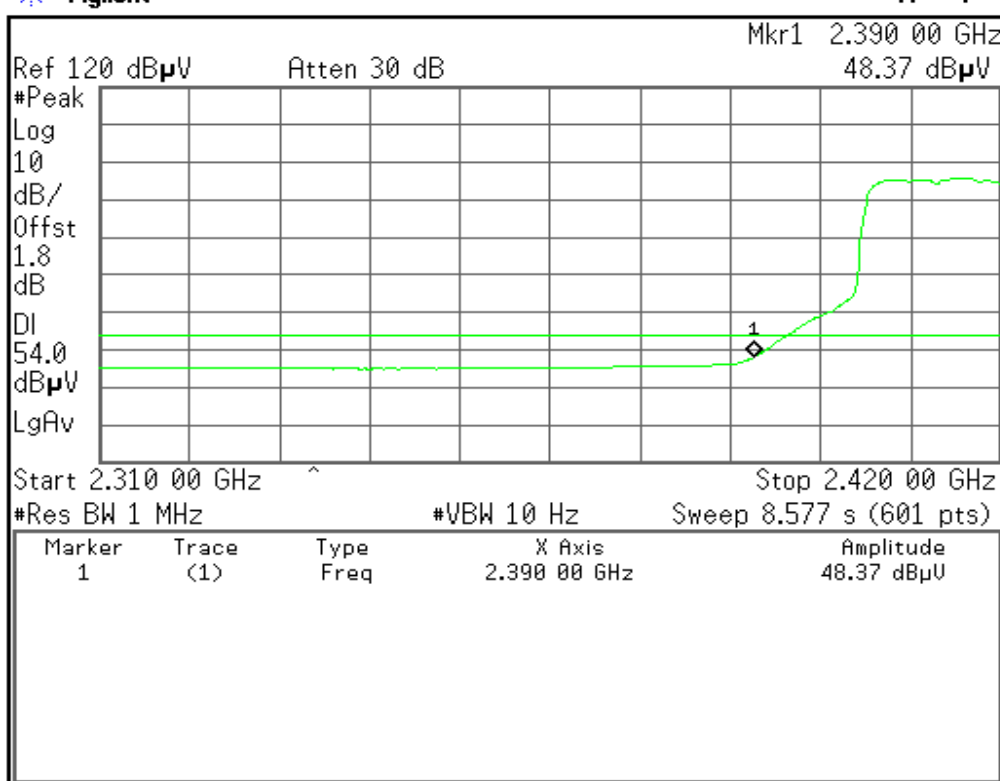
Marker			
Select Marker			
1	2	3	4
Normal			
Delta			
Delta Pair (Tracking Ref)			
Ref			
Span Pair			
Center			
Off			
More			
1 of 2			

Copyright 2000–2008 Agilent Technologies

**AVG**

\* Agilent

R   T



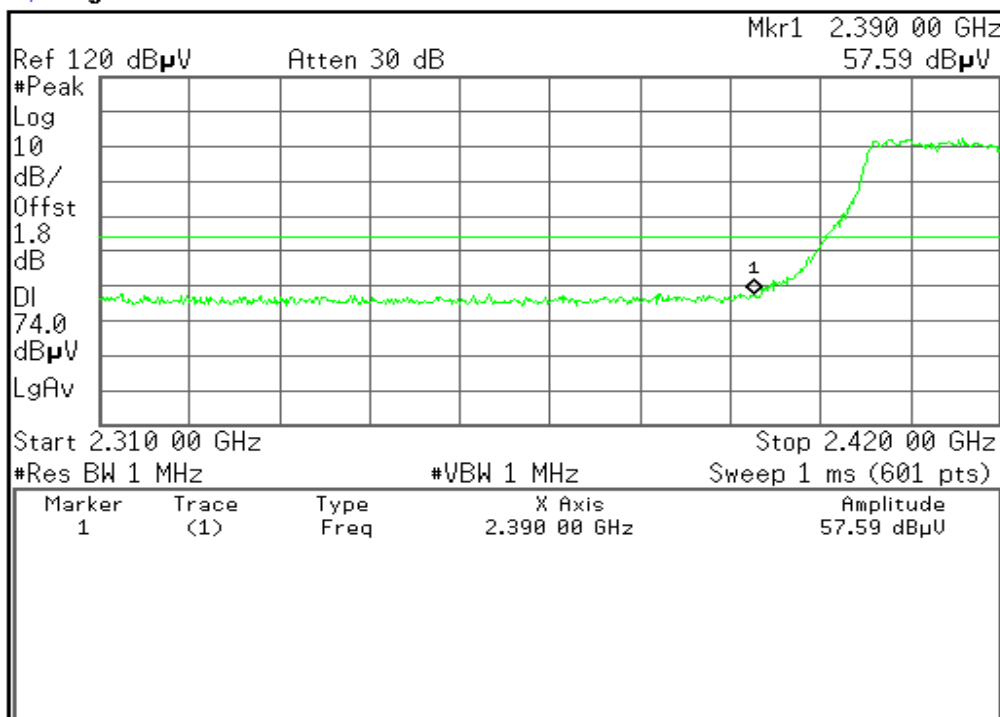
Marker			
Select Marker			
1	2	3	4
Normal			
Delta			
Delta Pair (Tracking Ref)			
Ref			
Span Pair			
Center			
Off			
More			
1 of 2			

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**RESTRICTED BANDEDGE (g Mode, Low Channel, Vertical)****PEAK**

Agilent

R T



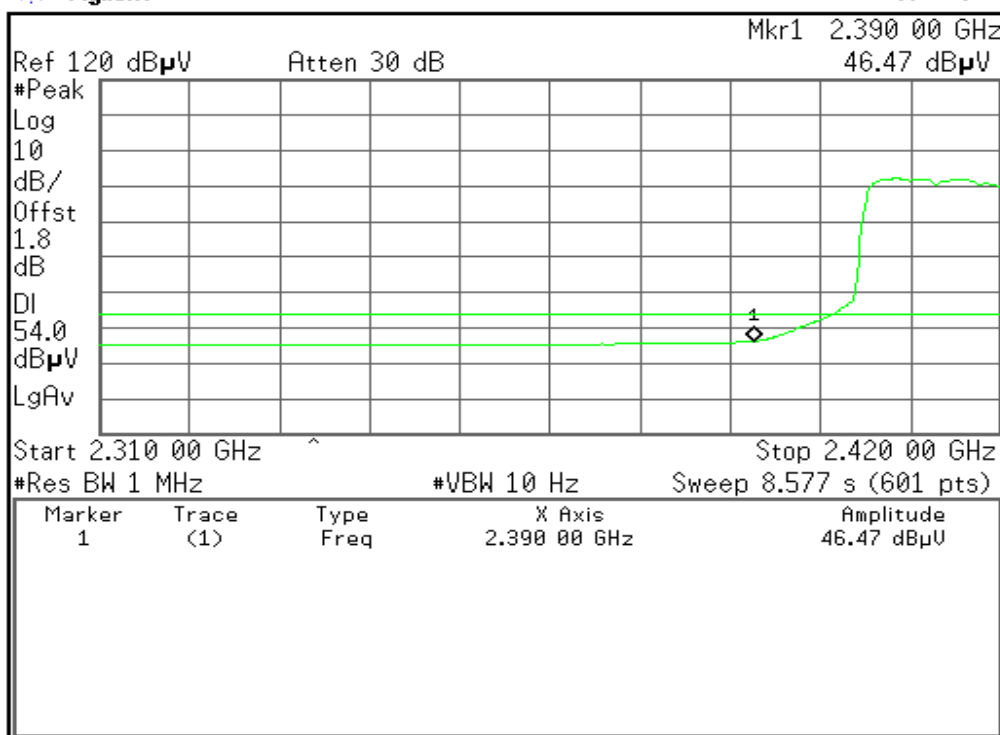
Marker
Select Marker
1 2 3 4
Normal
Delta
Delta Pair (Tracking Ref)
Ref
Span Pair
Center
Off
More
1 of 2

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**AVG**

Agilent

R T



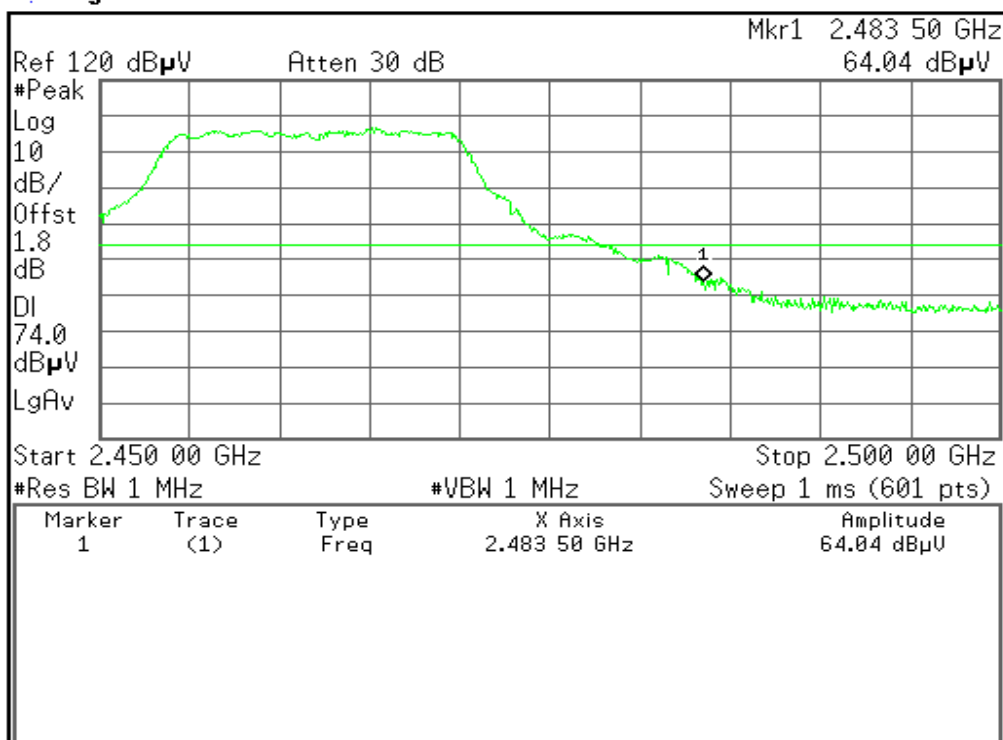
Marker
Select Marker
1 2 3 4
Normal
Delta
Delta Pair (Tracking Ref)
Ref
Span Pair
Center
Off
More
1 of 2

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**RESTRICTED BANDEDGE (g Mode, High Channel, Horizontal)****PEAK**

\* Agilent

R T



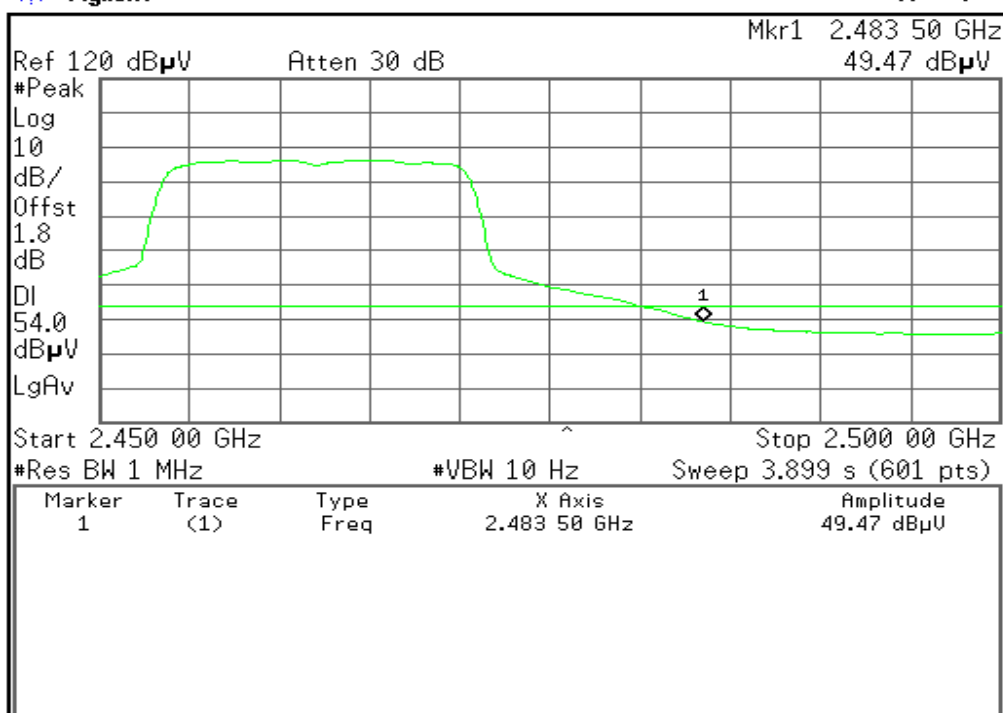
Marker			
<b>Select Marker</b>			
1	2	3	4
Normal			
Delta			
Delta Pair (Tracking Ref)			
Ref			
Span Pair			
Span <u>Center</u>			
Off			
More			
1 of 2			

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**AVG**

\* Agilent

R T



Marker			
<b>Select Marker</b>			
1	2	3	4
Normal			
Delta			
Delta Pair (Tracking Ref)			
Ref			
Span Pair			
Span <u>Center</u>			
Off			
More			
1 of 2			

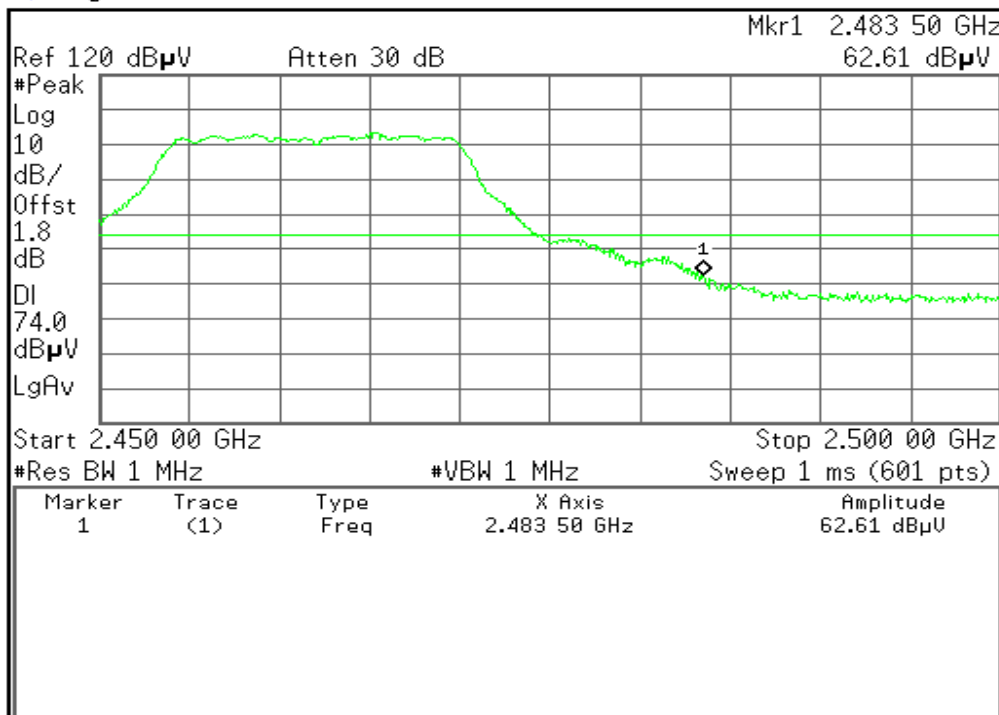
Copyright 2000–2008 Agilent Technologies

**RESTRICTED BANDEDGE (g Mode, High Channel, Vertical)****PEAK**

Agilent

R T

Marker



Select Marker

1 2 3 4

Normal

Delta

Delta Pair  
(Tracking Ref)  
Ref  $\Delta$ Span Pair  
Center

Off

More  
1 of 2

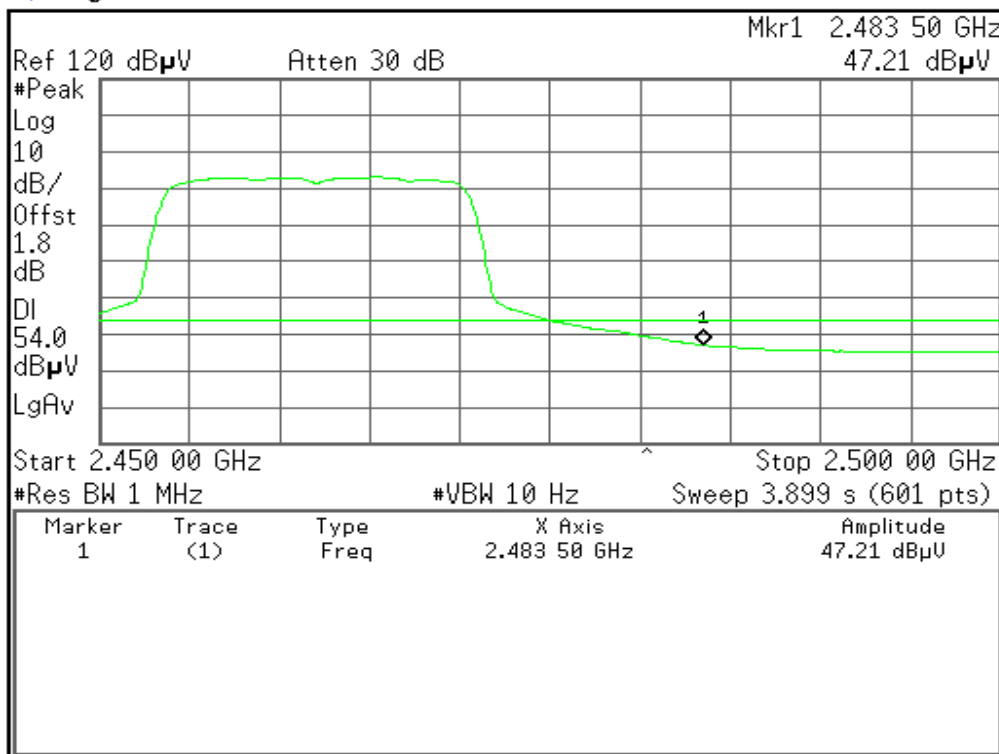
Copyright 2000–2008 Agilent Technologies

**AVG**

Agilent

R T

Marker



Select Marker

1 2 3 4

Normal

Delta

Delta Pair  
(Tracking Ref)  
Ref  $\Delta$ Span Pair  
Center

Off

More  
1 of 2

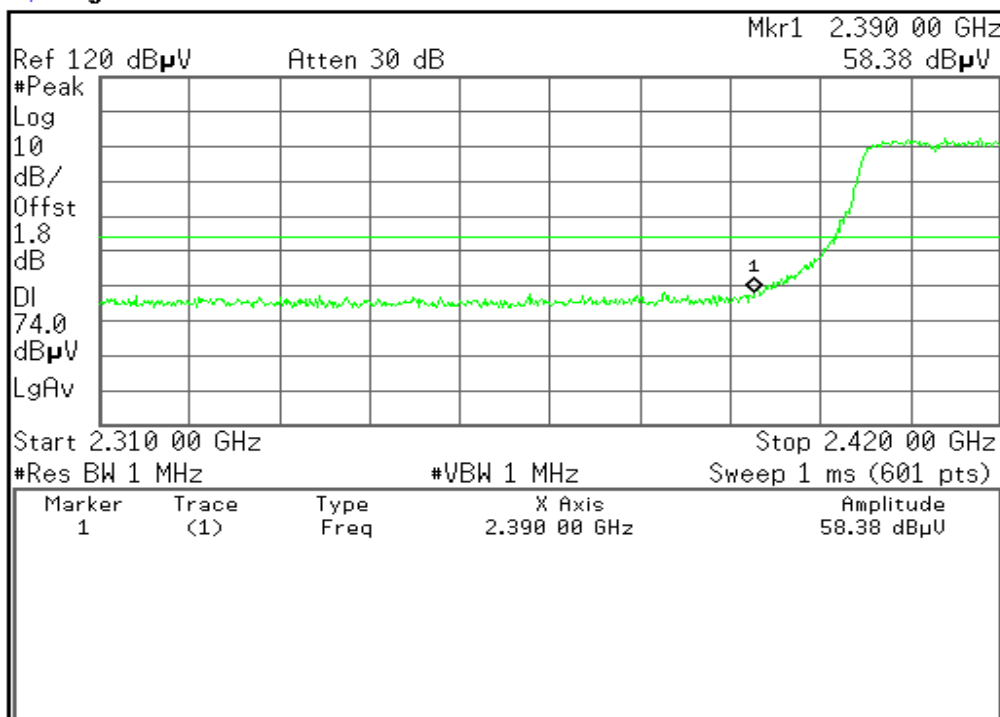
Copyright 2000–2008 Agilent Technologies

**RESTRICTED BANDEDGE** (IEEE 802.11n Standard-20 MHz Channel mode, Low Channel, Horizontal)**PEAK**

\* Agilent

R T

Marker



Select Marker

1 2 3 4

Normal

Delta

Delta Pair  
(Tracking Ref)  
Ref  $\Delta$ Span Pair  
Center

Off

More  
1 of 2

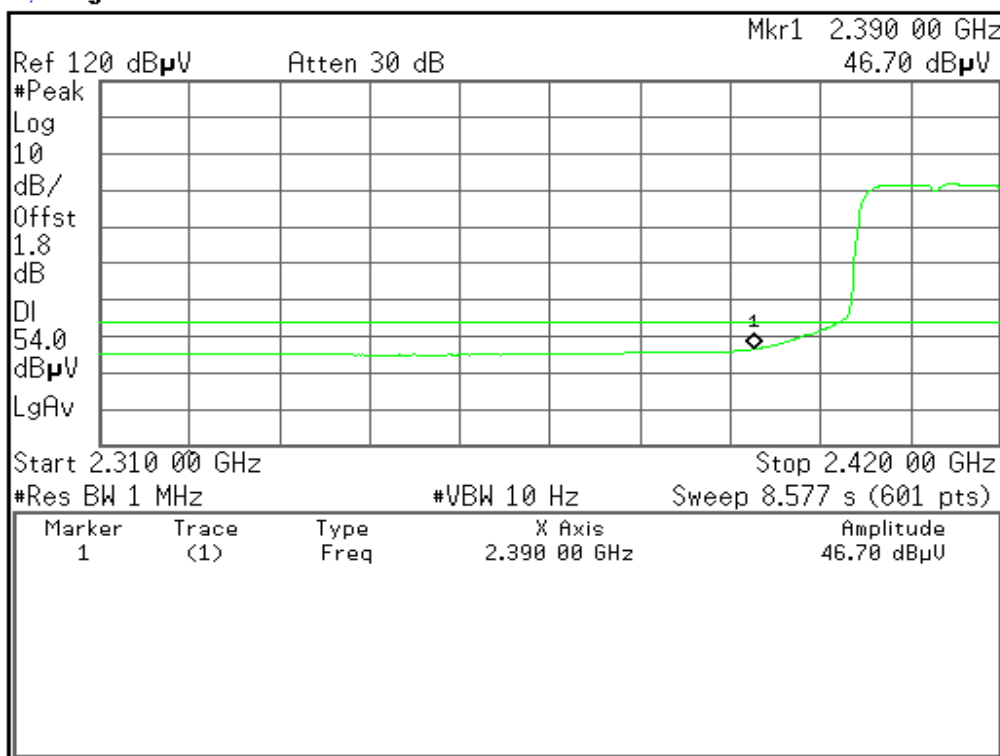
Copyright 2000-2008 Agilent Technologies

**AVG**

\* Agilent

R T

Marker



Select Marker

1 2 3 4

Normal

Delta

Delta Pair  
(Tracking Ref)  
Ref  $\Delta$ Span Pair  
Center

Off

More  
1 of 2

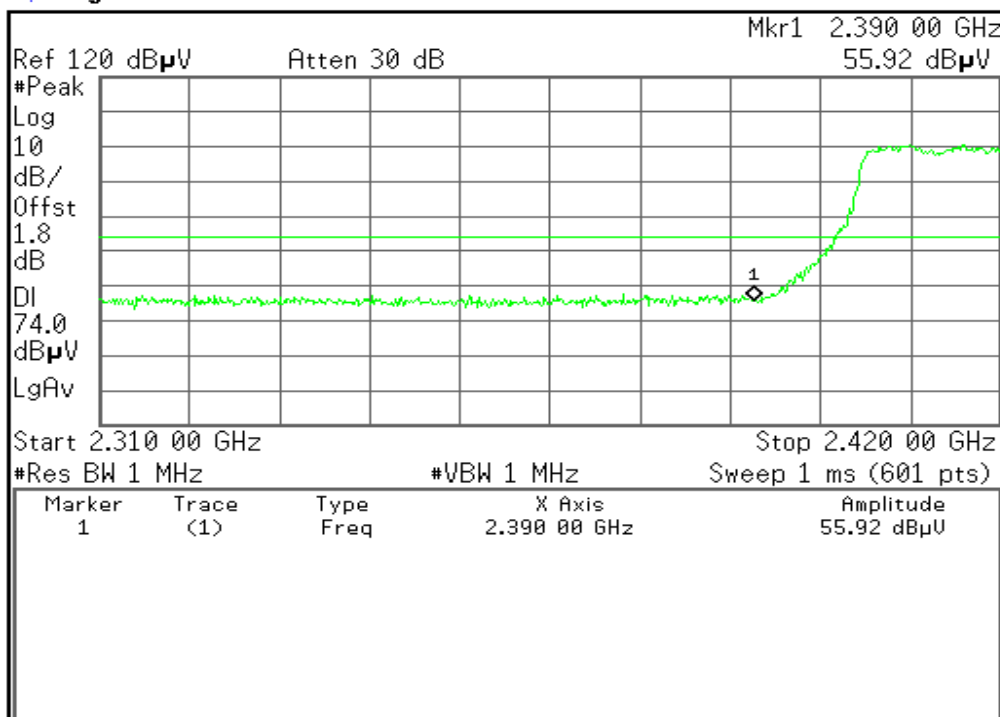
Copyright 2000-2008 Agilent Technologies

**RESTRICTED BANDEDGE** (IEEE 802.11n Standard-20 MHz Channel mode, Low Channel, Vertical)**PEAK**

\* Agilent

R T

Marker



Select Marker

1 2 3 4

Normal

Delta

Delta Pair  
(Tracking Ref)  
Ref Span Pair  
Center

Off

More  
1 of 2

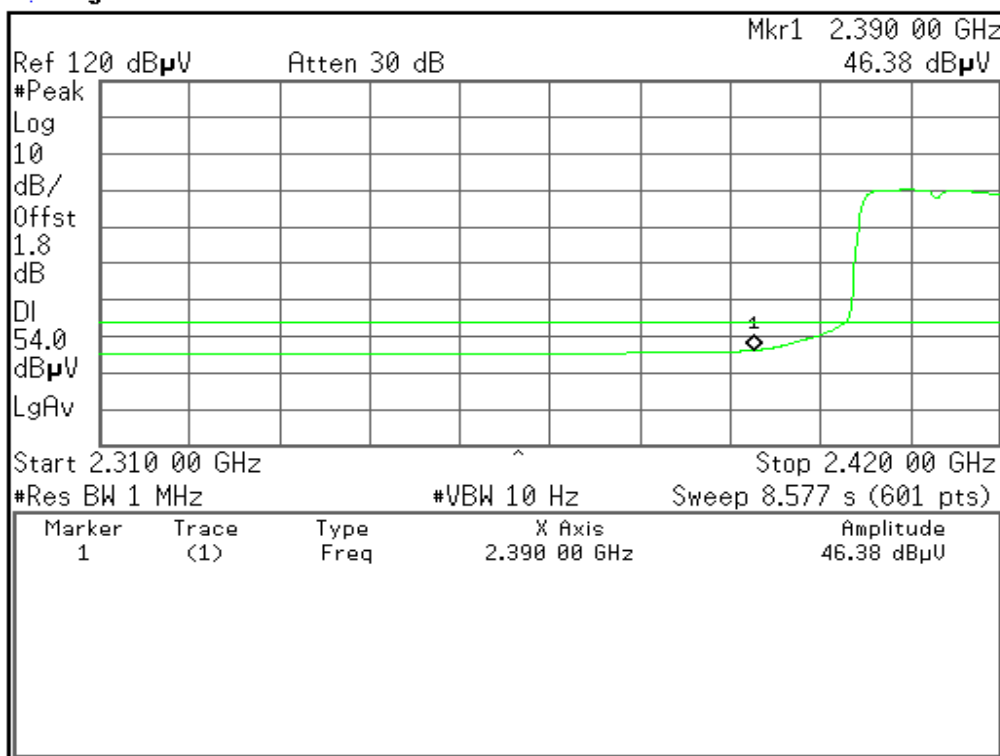
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**AVG**

\* Agilent

R T

Marker



Select Marker

1 2 3 4

Normal

Delta

Delta Pair  
(Tracking Ref)  
Ref Span Pair  
Center

Off

More  
1 of 2

Copyright 2000-2008 Agilent Technologies

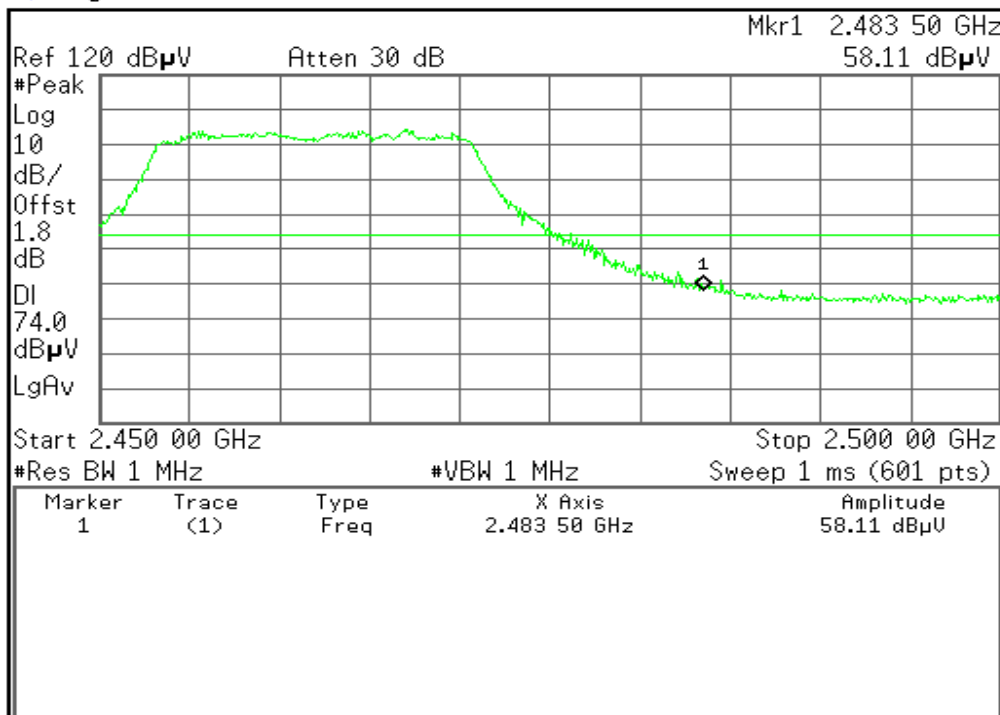


**RESTRICTED BANDEDGE** (IEEE 802.11n Standard-20 MHz Channel mode, High Channel, Horizontal)**PEAK**

Agilent

R T

Marker



Select Marker

1 2 3 4

Normal

Delta

Delta Pair  
(Tracking Ref)  
RefSpan Pair  
Center

Off

More  
1 of 2

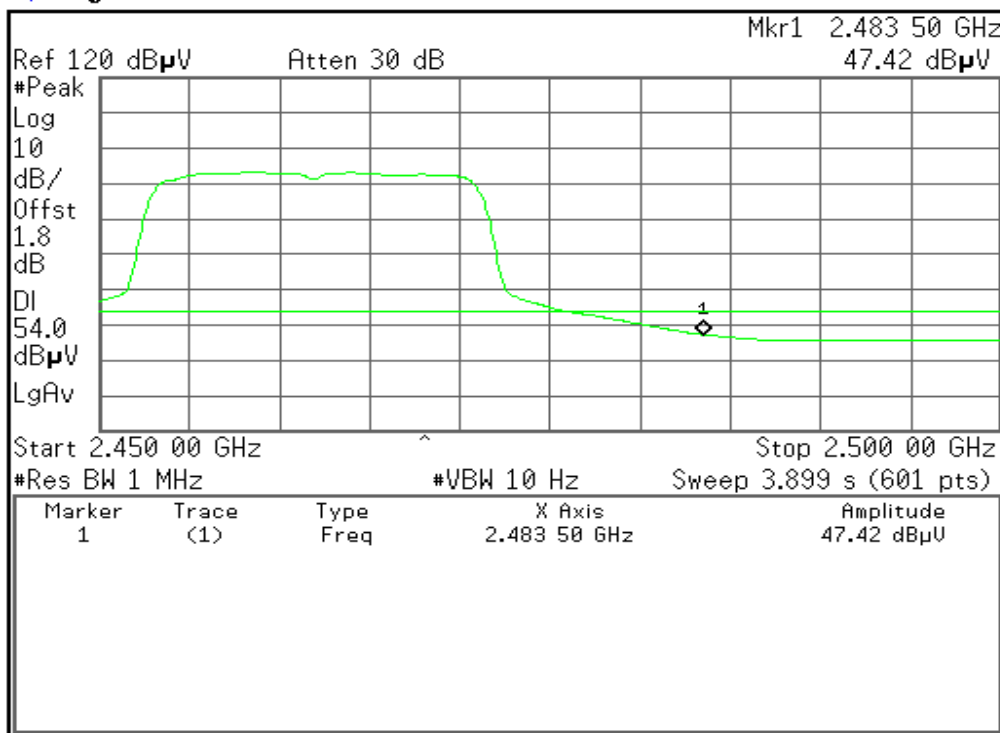
Copyright 2000-2008 Agilent Technologies

**AVG**

Agilent

R T

Marker



Select Marker

1 2 3 4

Normal

Delta

Delta Pair  
(Tracking Ref)  
RefSpan Pair  
Center

Off

More  
1 of 2

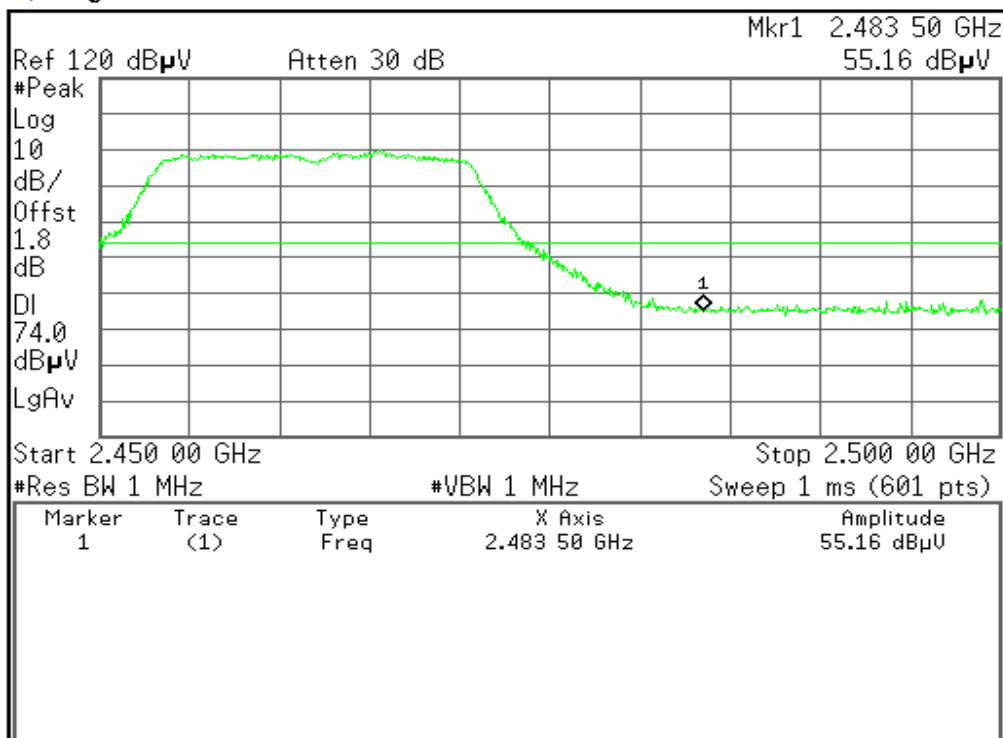
Copyright 2000-2008 Agilent Technologies

**RESTRICTED BANDEDGE** (IEEE 802.11n Standard-20 MHz Channel mode, High Channel, Vertical)**PEAK**

Agilent

R T

Marker



Select Marker

1 2 3 4

Normal

Delta

Delta Pair  
(Tracking Ref)  
RefSpan Pair  
Center

Off

More  
1 of 2

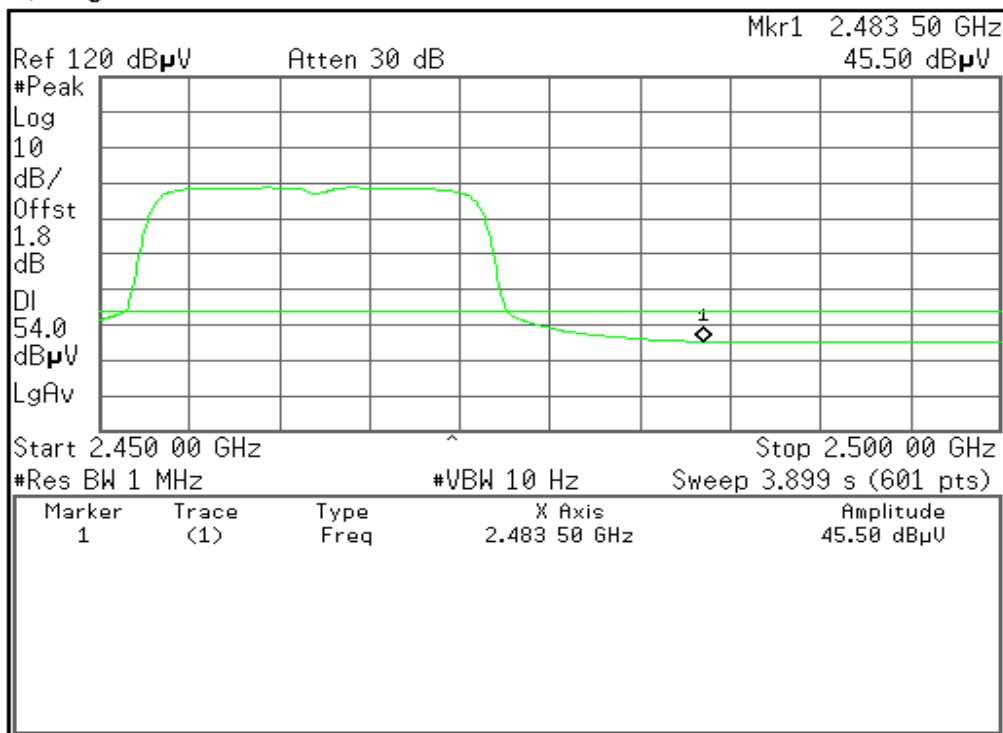
Copyright 2000–2008 Agilent Technologies

**AVG**

Agilent

R T

Marker



Select Marker

1 2 3 4

Normal

Delta

Delta Pair  
(Tracking Ref)  
RefSpan Pair  
Center

Off

More  
1 of 2

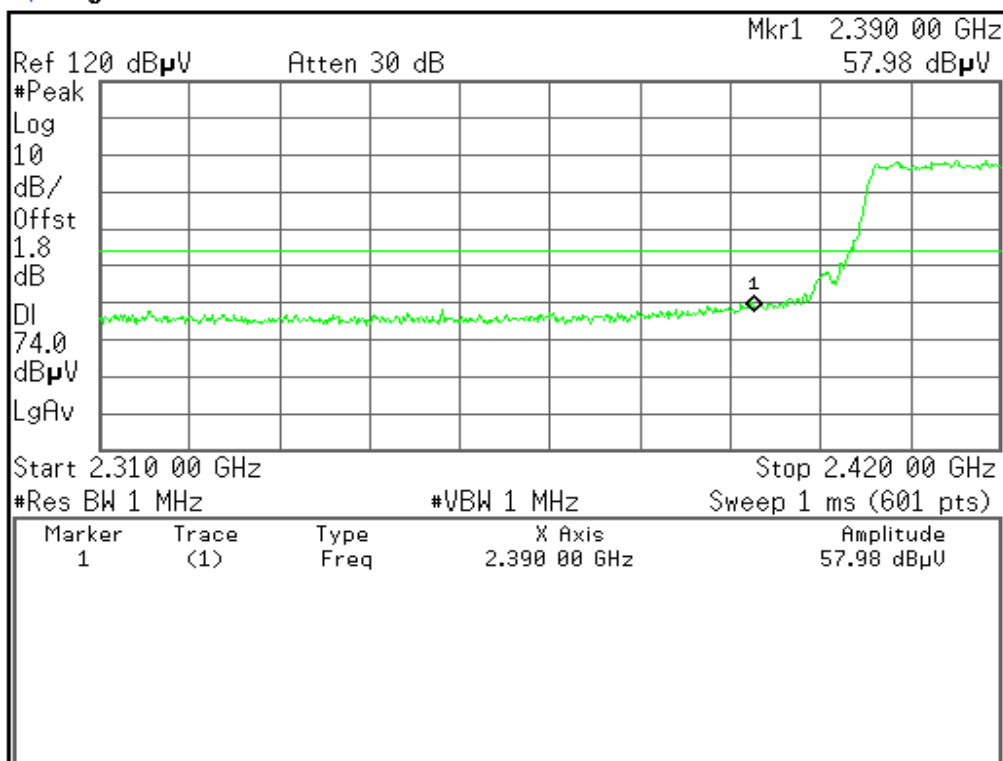
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**RESTRICTED BANDEDGE** (IEEE 802.11n Wide -40 MHz Channel mode, Low Channel, Horizontal)**PEAK**

\* Agilent

R T

Marker



Select Marker

1 2 3 4

Normal

Delta

Delta Pair  
(Tracking Ref)  
Ref  $\Delta$ Span Pair  
Center

Off

More  
1 of 2

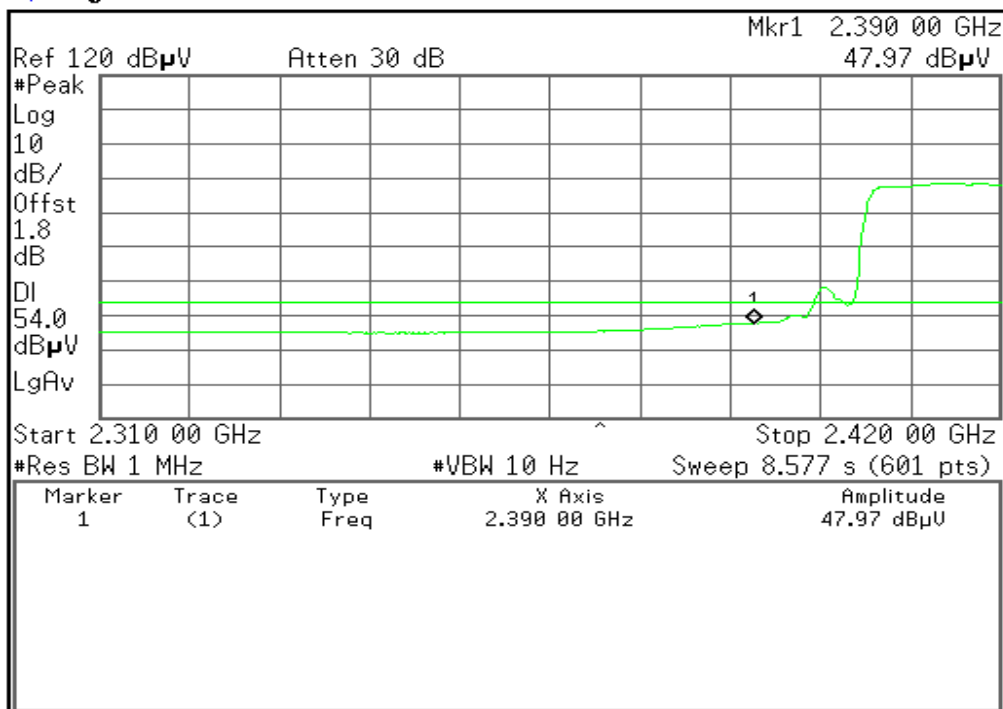
Copyright 2000-2008 Agilent Technologies

**AVG**

\* Agilent

R T

Marker



Select Marker

1 2 3 4

Normal

Delta

Delta Pair  
(Tracking Ref)  
Ref  $\Delta$ Span Pair  
Center

Off

More  
1 of 2

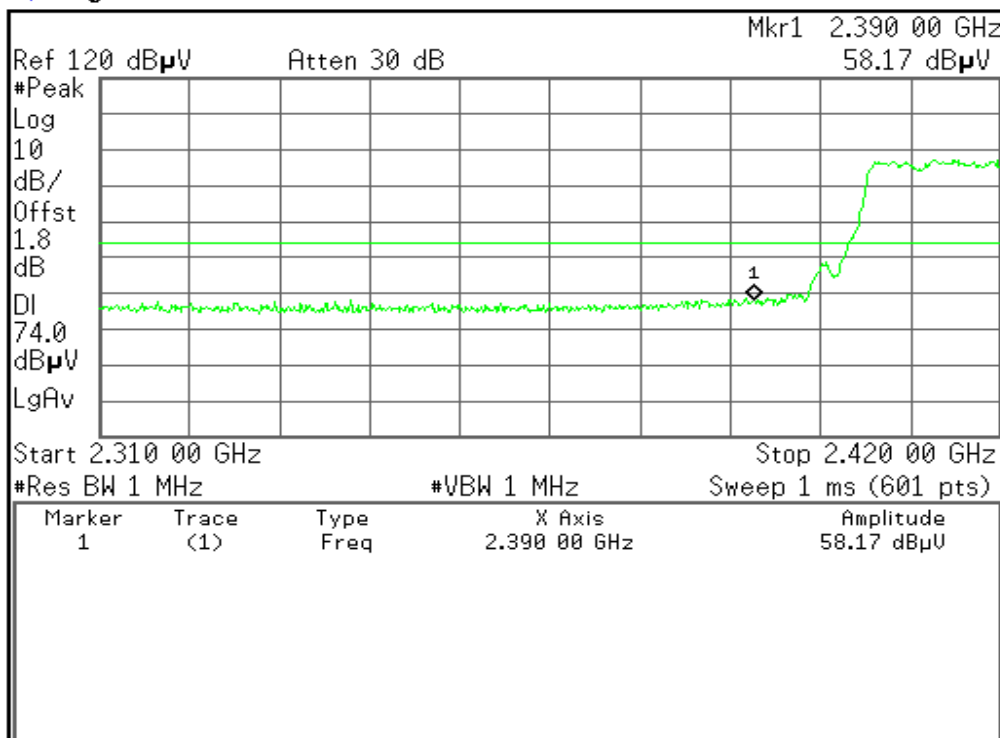
Copyright 2000-2008 Agilent Technologies

**RESTRICTED BANDEDGE** (IEEE 802.11n Wide -40 MHz Channel mode, Low Channel, Vertical)**PEAK**

\* Agilent

R T

Marker



Select Marker

1 2 3 4

Normal

Delta

Delta Pair  
(Tracking Ref)  
RefSpan Pair  
Center

Off

More  
1 of 2

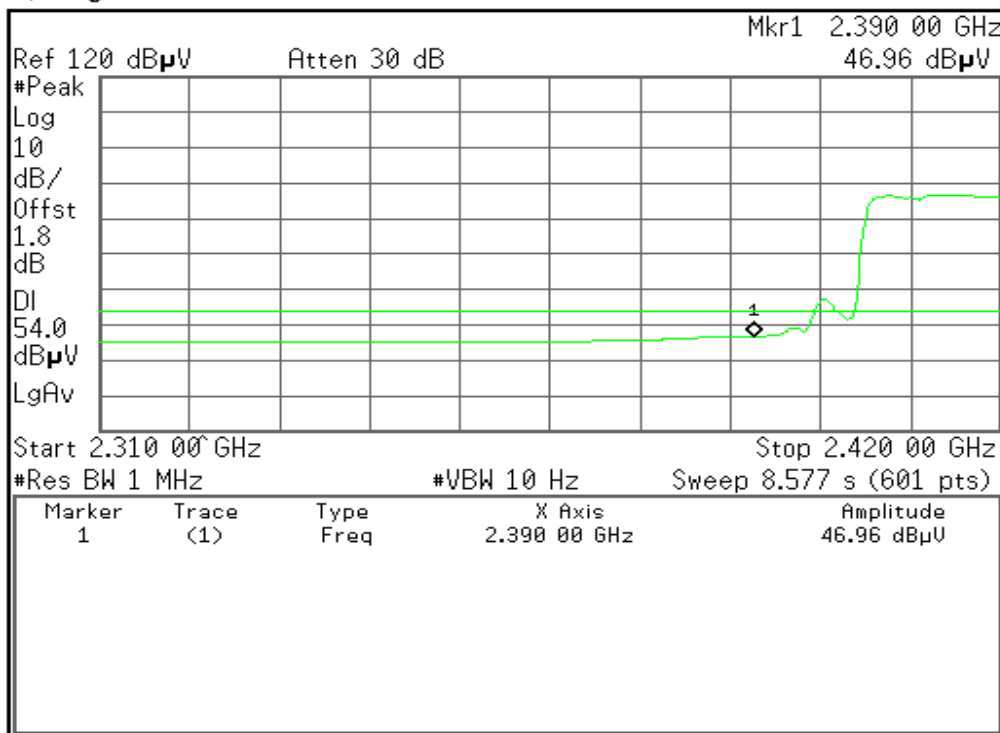
Copyright 2000–2008 Agilent Technologies

**AVG**

\* Agilent

R T

Marker



Select Marker

1 2 3 4

Normal

Delta

Delta Pair  
(Tracking Ref)  
RefSpan Pair  
Center

Off

More  
1 of 2

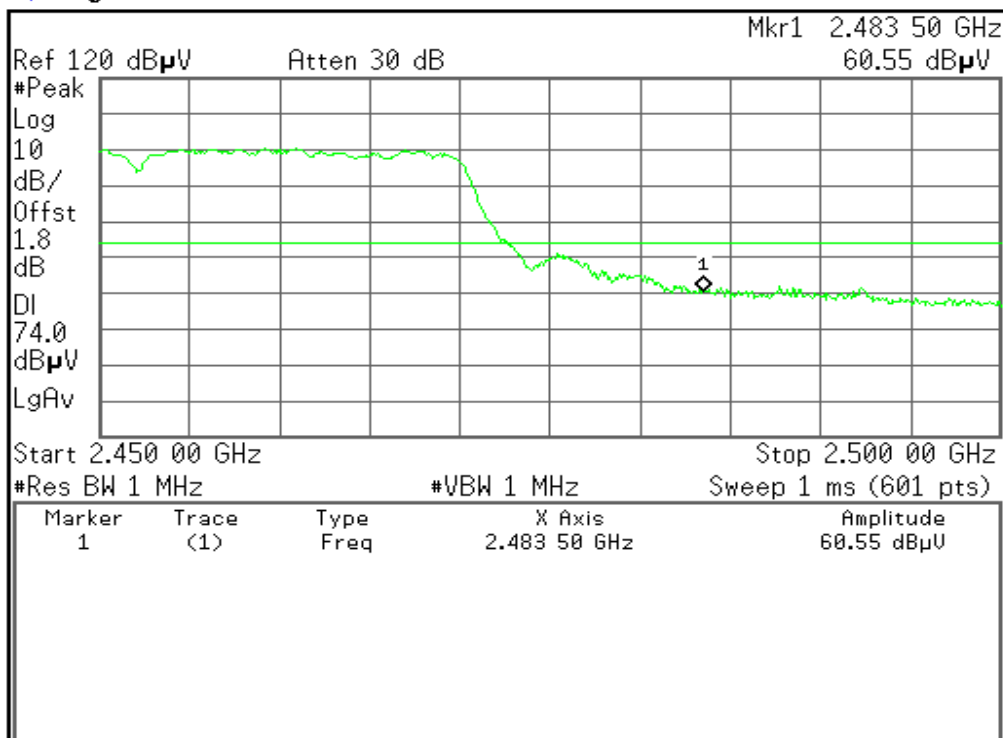
Copyright 2000–2008 Agilent Technologies

**RESTRICTED BANDEDGE (IEEE 802.11n Wide -40 MHz Channel mode, High Channel, Horizontal)****PEAK**

\* Agilent

R T

Marker



Select Marker

1 2 3 4

Normal

Delta

Delta Pair  
(Tracking Ref)  
RefSpan Pair  
Center

Off

More  
1 of 2

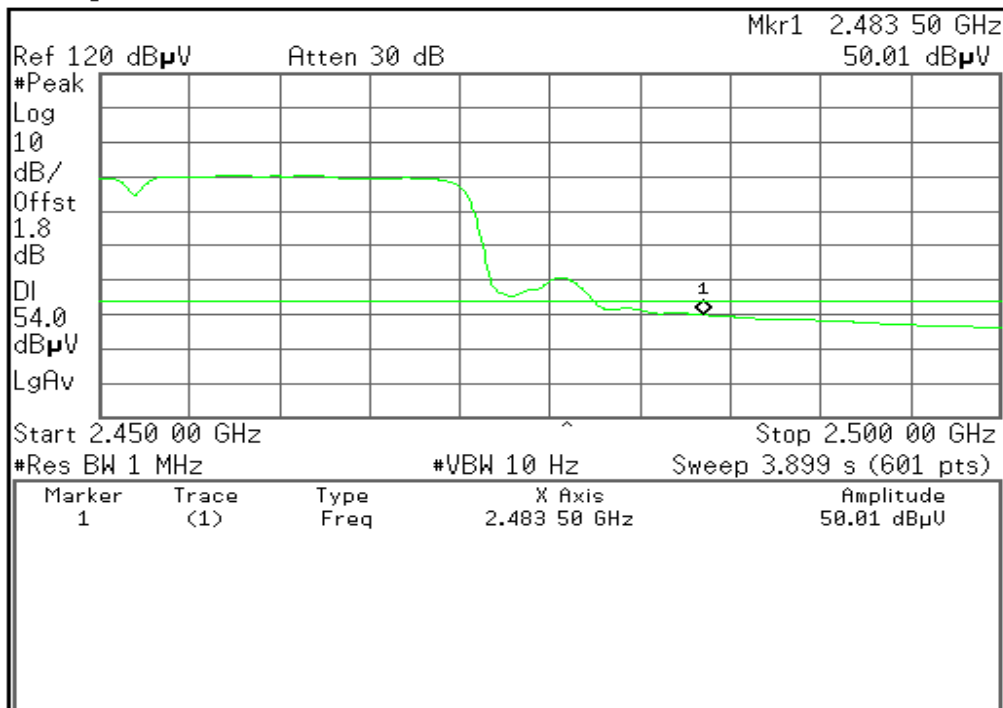
Copyright 2000-2008 Agilent Technologies

**AVG**

\* Agilent

R T

Marker



Select Marker

1 2 3 4

Normal

Delta

Delta Pair  
(Tracking Ref)  
RefSpan Pair  
Center

Off

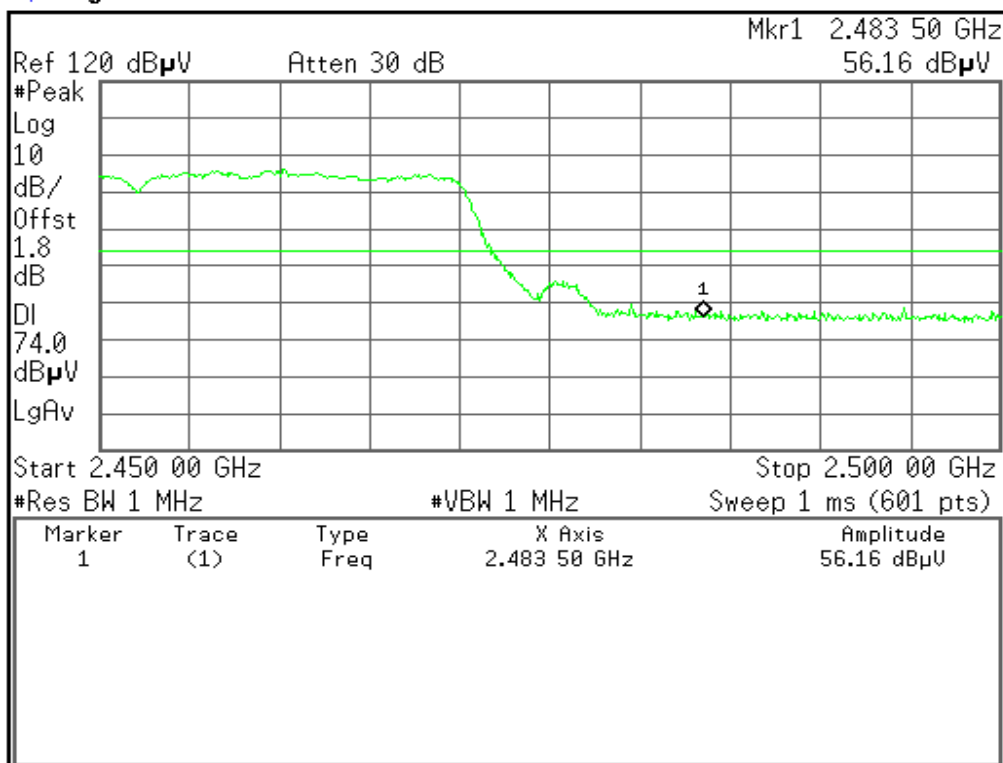
More  
1 of 2

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**RESTRICTED BANDEDGE (IEEE 802.11n Wide -40 MHz Channel mode, High Channel, Vertical)****PEAK**

\* Agilent

R T



Marker

Select Marker

1 2 3 4

Normal

Delta

Delta Pair  
(Tracking Ref)  
Ref  $\Delta$ Span Pair  
Span Center

Off

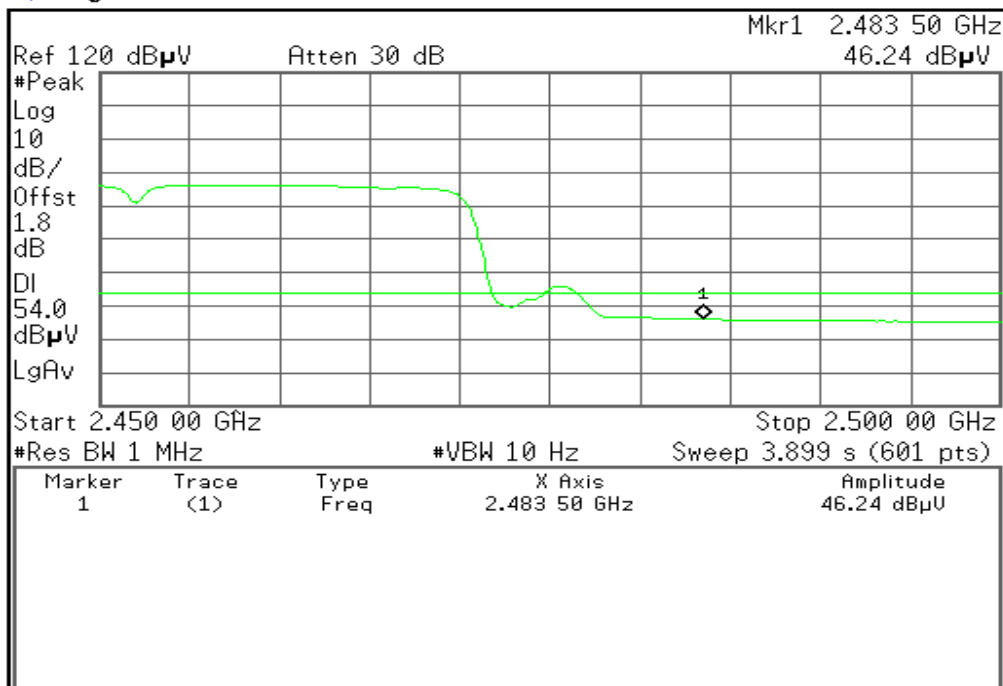
More  
1 of 2

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**AVG**

\* Agilent

R T



Marker

Select Marker

1 2 3 4

Normal

Delta

Delta Pair  
(Tracking Ref)  
Ref  $\Delta$ Span Pair  
Span Center

Off

More  
1 of 2

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**Below 1GHz****Operation Mode:** Normal Link**Test Date:** August 2, 2010**Temperature:** 22°C**Tested by:** Jeff Fang**Humidity:** 48% RH**Polarity:** Ver. / Hor.

Freq. (MHz)	Ant.Pol. H/V	Detector Mode (PK/QP)	Reading (dBuV)	Factor (dB)	Actual FS (dBuV/m)	Limit 3m (dBuV/m)	Safe Margin (dB)
39.19	V	Peak	43.26	-8.2	35.06	40.0	-4.94
71.12	V	Peak	47.95	-13.7	34.25	40.0	-5.75
133.34	V	Peak	46.28	-7.03	39.25	43.5	-4.25
266.99	V	Peak	48.77	-7.19	41.58	46.0	-4.42
667.53	V	Peak	36.95	2.18	39.13	46.0	-6.87
723.64	V	Peak	37.59	2.95	40.54	46.0	-5.46
72.2	H	Peak	50.26	-13.67	36.59	43.5	-6.91
137.13	H	Peak	46.52	-7.13	39.39	43.5	-4.11
222.08	H	Peak	48.99	-8.73	40.26	46.0	-5.74
828.85	H	Peak	37.62	4.12	41.74	46.0	-4.26
935.47	H	Peak	34.57	6.42	40.99	46.0	-5.01
980.36	H	Peak	41.08	6.98	48.06	54.0	-5.94

**Remark:**

1. Measuring frequencies from 9 KHz to the 1GHz, No emission found between lowest internal used/generated frequency to 30 MHz.
2. Radiated emissions measured in frequency range from 9 KHz to 1000MHz were made with an instrument using Peak detector mode.
3. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
4. The IF bandwidth of SPA between 30MHz to 1GHz was 100kHz.

## Above 1 GHz

**Operation Mode:** TX / IEEE 802.11b / CH Low

**Test Date:** August 2, 2010

**Temperature:** 22°C

**Tested by:**Jeff Fang

Humidity: 48 % RH

**Polarity:** Ver. / Hor.

[illegible]

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
3. Average test would be performed if the peak result were greater than the average limit or as required by the applicant.
4. Data of measurement within this frequency range shown “ --- ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with “ N/A ” remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
6.  $\text{Margin (dB)} = \text{Remark result (dBuV/m)} - \text{Average limit (dBuV/m)}.$



**Operation Mode:** TX / IEEE 802.11b / CH Mid**Test Date:** August 2, 2010**Temperature:** 22°C**Tested by:** Jeff Fang**Humidity:** 48 % RH**Polarity:** Ver. / Hor.

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
					Peak (dBuV/m)	AV (dBuV/m)				
4874.66	V	41.52	30.02	11.02	52.54	41.04	74	54	-12.96	average
7311.23	V	40.85	26.77	18.58	59.43	45.35	74	54	-8.65	average
4875.23	H	40.69	29.89	11.02	51.71	40.91	74	54	-13.09	average
7312.23	H	40.11	26.5	18.58	58.69	45.08	74	54	-8.92	average

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
3. Average test would be performed if the peak result were greater than the average limit or as required by the applicant.
4. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
6. Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).

**Operation Mode:** TX / IEEE 802.11b / CH High**Test Date:** August 2, 2010**Temperature:** 22°C**Tested by:** Jeff Fang**Humidity:** 48 % RH**Polarity:** Ver. / Hor.

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
					Peak (dBuV/m)	AV (dBuV/m)				
4925.32	V	42.63	30.15	11.14	53.77	41.29	74	54	-12.71	average
7385.66	V	41.28	27.05	18.64	59.92	45.69	74	54	-8.31	average
4925.00	H	41.98	30.06	11.14	53.12	41.2	74	54	-12.8	average
7384.96	H	40.89	26.75	18.64	59.53	45.39	74	54	-8.61	average

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
3. Average test would be performed if the peak result were greater than the average limit or as required by the applicant.
4. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
6. Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).

**Operation Mode:** TX / IEEE 802.11g / CH Low**Test Date:** August 2, 2010**Temperature:** 24°C**Tested by:** Jeff Fang**Humidity:** 48 % RH**Polarity:** Ver. / Hor.

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
					Peak (dBuV/m)	AV (dBuV/m)				
4824.56	V	42.35	30.08	10.93	53.28	41.01	74	54	-12.99	average
7233.64	V	40.08	27.11	18.51	58.59	45.62	74	54	-8.38	average
4825.00	H	41.89	29.89	10.93	52.82	40.82	74	54	-13.18	average
7232.69	H	39.82	26.18	18.51	58.33	44.69	74	54	-9.31	average

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
3. Average test would be performed if the peak result were greater than the average limit or as required by the applicant.
4. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
6. Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).

**Operation Mode:** TX / IEEE 802.11g / CH Mid**Test Date:** August 2, 2010**Temperature:** 24°C**Tested by:** Jeff Fang**Humidity:** 48 % RH**Polarity:** Ver. / Hor.

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
					Peak (dBuV/m)	AV (dBuV/m)				
4875.00	V	41.35	30.06	11.02	52.37	41.08	74	54	-12.92	average
7311.25	V	39.77	26.14	18.58	58.35	44.72	74	54	-9.28	average
4874.69	H	40.89	29.98	11.02	51.91	41	74	54	-13	average
7311.24	H	39.52	25.8	18.58	58.10	44.38	74	54	-9.62	average

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
3. Average test would be performed if the peak result were greater than the average limit or as required by the applicant.
4. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
6. Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).

**Operation Mode:** TX / IEEE 802.11g / CH High**Test Date:** August 2, 2010**Temperature:** 24°C**Tested by:** Jeff Fang**Humidity:** 48 % RH**Polarity:** Ver. / Hor.

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
					Peak (dBuV/m)	AV (dBuV/m)				
4925.00	V	42.03	29.88	11.14	53.17	41.02	74	54	-12.98	average
7385.65	V	40.85	25.75	18.64	59.49	44.39	74	54	-9.61	average
4924.66	H	41.86	28.97	11.14	53.00	40.11	74	54	-13.89	average
7384.68	H	40.36	25.41	18.64	59.00	44.05	74	54	-9.95	average

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
3. Average test would be performed if the peak result were greater than the average limit or as required by the applicant.
4. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
6. Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).

**Operation Mode:** TX / IEEE 802.11gn Standard-20 MHz  
Channel mode (Chain 0 + Chain 1 )/ CH Low**Test Date:** August 2, 2010**Temperature:** 24°C**Tested by:** Jeff Fang**Humidity:** 48 % RH**Polarity:** Ver. / Hor.

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
					Peak (dBuV/m)	AV (dBuV/m)				
4825.00	V	43.26	30.58	10.93	54.19	41.51	74	54	-12.49	average
7235.36	V	41.55	27.34	18.51	60.06	45.85	74	54	-8.15	average
4825.00	H	42.98	30.19	10.85	53.83	41.04	74	54	-12.96	average
7233.45	H	40.89	27.05	18.37	59.26	45.42	74	54	-8.58	average

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
3. Average test would be performed if the peak result were greater than the average limit or as required by the applicant.
4. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
6. Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).

**Operation Mode:** TX / IEEE 802.11gn Standard-20 MHz  
Channel mode (Chain 0 + Chain 1) / CH Mid**Test Date:** August 2, 2010**Temperature:** 24°C**Tested by:** Jeff Fang**Humidity:** 48 % RH**Polarity:** Ver. / Hor.

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
					Peak (dBuV/m)	AV (dBuV/m)				
4873.56	V	42.36	30.59	11.02	53.38	41.61	74	54	-12.39	average
7310.12	V	39.77	26.53	18.58	58.35	45.11	74	54	-8.89	average
4874.23	H	42.15	30.24	11.02	53.17	41.26	74	54	-12.74	average
7311.33	H	39.44	26.13	18.58	58.02	44.71	74	54	-9.29	average

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
3. Average test would be performed if the peak result were greater than the average limit or as required by the applicant.
4. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
6. Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).

**Operation Mode:** TX / IEEE 802.11gn Standard-20 MHz  
Channel mode (Chain 0 + Chain 1) / CH High**Test Date:** August 2, 2010**Temperature:** 24°C**Tested by:** Jeff Fang**Humidity:** 48 % RH**Polarity:** Ver. / Hor.

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
					Peak (dBuV/m)	AV (dBuV/m)				
4925.00	V	43.35	32.16	11.14	54.49	43.30	74	54	-10.70	average
7384.65	V	41.85	28.01	18.64	60.49	46.65	74	54	-7.35	average
4925.00	H	42.97	31.64	11.14	54.11	42.78	74	54	-11.22	average
7386.24	H	41.64	27.55	18.64	60.28	46.19	74	54	-7.81	average

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
3. Average test would be performed if the peak result were greater than the average limit or as required by the applicant.
4. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
6. Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).



**Operation Mode:** TX / IEEE 802.11gn Wide-40 MHz Channel mode (Chain 0 + Chain 1) / CH Low**Test Date:** August 2, 2010**Temperature:** 24°C**Tested by:** Jeff Fang**Humidity:** 48 % RH**Polarity:** Ver. / Hor.

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
					Peak (dBuV/m)	AV (dBuV/m)				
4844.67	V	42.67	31.32	10.95	53.62	42.27	74	54	-11.73	average
7265.65	V	40.69	28.05	18.53	59.22	46.58	74	54	-7.42	average
4845.00	H	41.87	30.97	10.95	52.82	41.92	74	54	-12.08	average
7265.34	H	40.25	26.88	18.53	58.78	45.41	74	54	-8.59	average

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
3. Average test would be performed if the peak result were greater than the average limit or as required by the applicant.
4. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
6. Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).

**Operation Mode:** TX / IEEE 802.11gn Wide-40 MHz Channel mode (Chain 0 + Chain 1) / CH Mid**Test Date:** August 2, 2010**Temperature:** 24°C**Tested by:** Jeff Fang**Humidity:** 48 % RH**Polarity:** Ver. / Hor.

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
					Peak (dBuV/m)	AV (dBuV/m)				
4874.34	V	42.57	30.44	11.02	53.59	41.46	74	54	-12.54	average
7311.26	V	40.16	27.48	18.58	58.74	46.06	74	54	-7.94	average
4875.02	H	42.33	29.78	11.02	53.35	40.8	74	54	-13.2	average
7312.34	H	39.64	26.57	18.58	58.22	45.15	74	54	-8.85	average

**Remark:**

- Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
- Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
- Average test would be performed if the peak result were greater than the average limit or as required by the applicant.
- Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
- $\text{Margin (dB)} = \text{Remark result (dBuV/m)} - \text{Average limit (dBuV/m)}$ .

**Operation Mode:** TX / IEEE 802.11gn Wide-40 MHz Channel mode (Chain 0 + Chain 1) / CH High**Test Date:** August 2, 2010**Temperature:** 24°C**Tested by:** Jeff Fang**Humidity:** 48 % RH**Polarity:** Ver. / Hor.

Freq. (MHz)	Ant. Pol H/V	Peak Reading (dBuV)	AV Reading (dBuV)	Ant. / CL CF (dB)	Actual Fs		Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Margin (dB)	Remark
					Peak (dBuV/m)	AV (dBuV/m)				
4905.12	V	42.85	32.04	11.11	53.96	43.15	74	54	-10.85	average
7356.24	V	40.78	25.64	18.62	59.40	44.26	74	54	-9.74	average
4904.67	H	41.64	31.25	11.11	52.75	42.36	74	54	-11.64	average
7355.66	H	39.66	24.8	18.62	58.28	43.42	74	54	-10.58	average

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
3. Average test would be performed if the peak result were greater than the average limit or as required by the applicant.
4. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
6. Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).



## 7.6 POWERLINE CONDUCTED EMISSIONS

### LIMIT

According to §15.207(a), except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50  $\mu$ H/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

Frequency Range (MHz)	Limits (dB $\mu$ V)	
	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

\* Decreases with the logarithm of the frequency.

### Test Configuration

See test photographs attached in Appendix 1 for the actual connections between EUT and support equipment.

### TEST 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 frequency measured were complete.

**TEST RESULTS**

The initial step in collecting conducted data is a spectrum analyzer peak scan of the measurement range. Significant peaks are then marked as shown on the following data page, and these signals are then quasi-peaked.

**Test Data**

**Operation Mode:** Normal Link                      **Test Date:** August 2, 2010  
**Temperature:** 23°C                                      **Tested by:** Jeff Fang  
**Humidity:** 50% RH

Freq. (MHz)	Q.P. Raw reading (dBuV)	AVG Raw reading (dBuV)	Correction factor(dB)	Q.P. Ampd. (dBuV)	AVG Ampd. (dBuV)	Q.P. Limit (dBuV)	AVG Limit (dBuV)	Q.P. Margin (dB)	AVG Margin (dB)	Line/Neutral
0.179	38.48	26.63	10.08	48.56	36.71	65.15	55.15	-16.59	-18.44	Line
0.238	38.74	28.87	10.17	48.91	39.04	63.46	53.46	-14.55	-14.42	Line
0.375	31.21	22.18	10.38	41.59	32.56	59.55	49.55	-17.96	-16.99	Line
0.553	30.20	20.98	10.85	41.05	31.83	56.00	46.00	-14.95	-14.17	Line
2.816	33.74	19.51	11.14	44.88	30.65	56.00	46.00	-11.12	-15.35	Line
4.080	23.97	13.01	11.17	35.14	24.18	56.00	46.00	-20.86	-21.82	Line
0.179	40.29	19.89	10.17	50.46	30.06	65.15	55.15	-14.69	-25.09	Neutral
0.497	31.84	12.25	10.14	41.98	22.39	56.06	46.06	-14.08	-23.67	Neutral
0.764	29.94	12.77	10.15	40.09	22.92	56.00	46.00	-15.91	-23.08	Neutral
1.122	29.60	12.12	10.25	39.85	22.37	56.00	46.00	-16.15	-23.63	Neutral
2.832	38.67	18.92	10.73	49.40	29.65	56.00	46.00	-6.60	-16.35	Neutral
4.072	29.44	16.45	10.85	40.29	27.30	56.00	46.00	-15.71	-18.70	Neutral

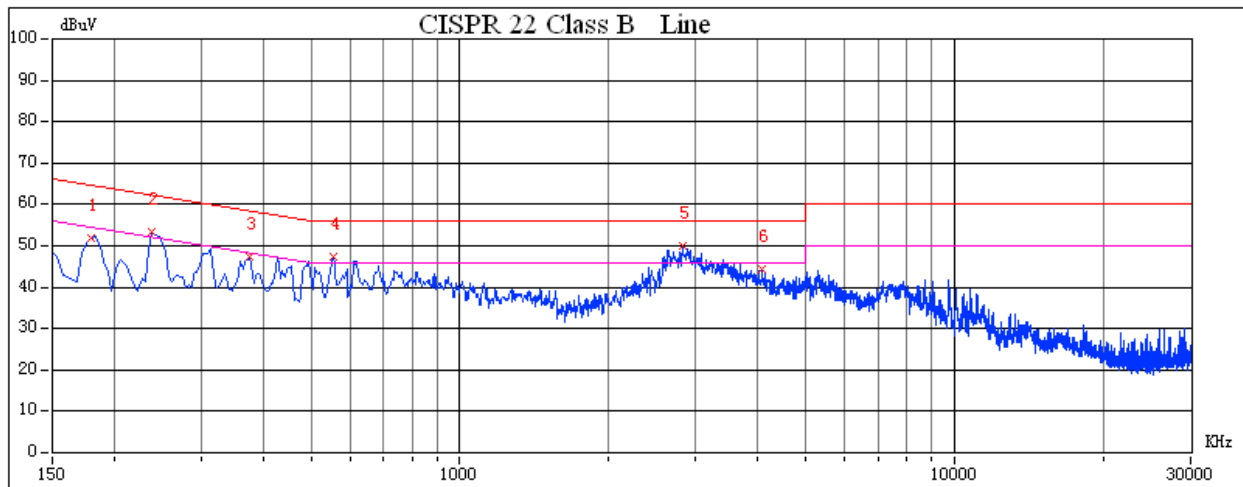
**Remark:**

1. Measuring frequencies from 0.15 MHz to 30MHz.
2. The emissions measured in frequency range from 0.15 MHz to 30MHz were made with an instrument using Quasi-peak detector and average detector.
3. The IF bandwidth of SPA between 0.15MHz and 30MHz was 10 kHz; the IF bandwidth of Test Receiver between 0.15MHz and 30MHz was 9 kHz;
4. L1 = Line One (Live Line) / L2 = Line Two (Neutral Line)

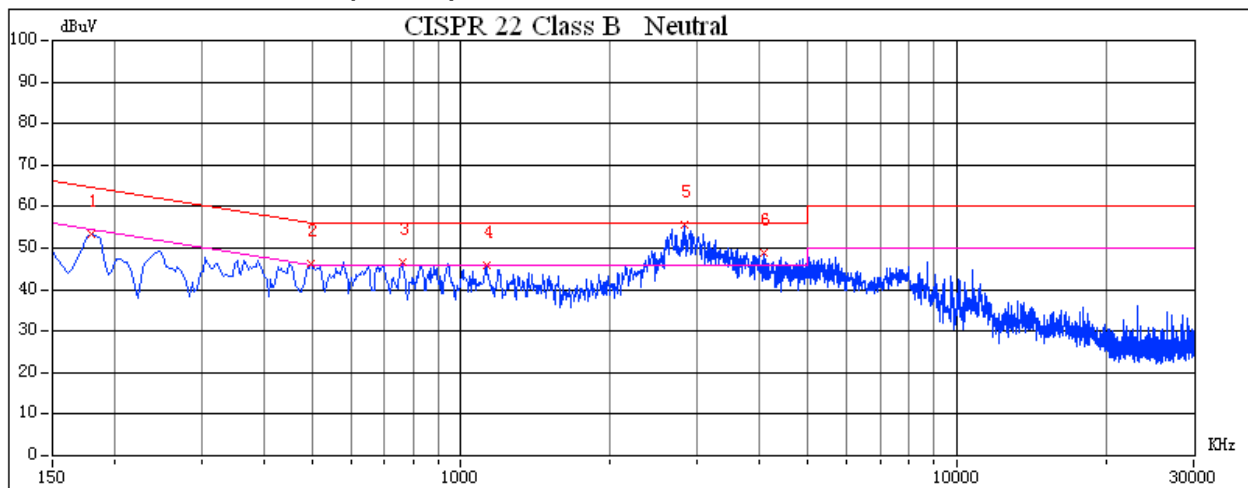


## **Test Plots**

### ***Conducted emissions (Line 1)***



### ***Conducted emissions (Line 2)***





## 8 APPENDIX 1 RADIO FREQUENCY EXPOSURE

### LIMIT

According to §15.247(i), systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess of the Commission's guidelines. See § 1.1307(b)(1) of this chapter.

### EUT Specification

<b>EUT</b>	Surf N300 Wireless N Router
<b>Frequency band (Operating)</b>	<input checked="" type="checkbox"/> WLAN: 2.412GHz ~ 2.462GHz; 2.422GHz ~ 2.452GHz <input type="checkbox"/> WLAN: 5.18GHz ~ 5.32GHz / 5.50GHz ~ 5.70GHz <input type="checkbox"/> WLAN: 5.745GHz ~ 5.825GHz <input type="checkbox"/> Others
<b>Device category</b>	<input type="checkbox"/> Portable (<20cm separation) <input checked="" type="checkbox"/> Mobile (>20cm separation) <input type="checkbox"/> Others
<b>Exposure classification</b>	<input type="checkbox"/> Occupational/Controlled exposure ( $S = 5\text{mW}/\text{cm}^2$ ) <input checked="" type="checkbox"/> General Population/Uncontrolled exposure ( $S=1\text{mW}/\text{cm}^2$ )
<b>Antenna diversity</b>	<input type="checkbox"/> Single antenna <input checked="" type="checkbox"/> Multiple antennas <input type="checkbox"/> Tx diversity <input type="checkbox"/> Rx diversity <input checked="" type="checkbox"/> Tx/Rx diversity
<b>Max. output power</b>	IEEE 802.11b mode: 18.94dBm(78.34mW) IEEE 802.11g mode: 14.05dBm(25.41mW) IEEE 802.11gn Standard-20 MHz Channel mode: 15.28 dBm (33.73mW) IEEE 802.11gn Wide-40 MHz Channel mode: 15.24 dBm (33.42mW)
<b>Antenna gain (Max)</b>	Gain 3.12dBi(2.05)(2.4GHz) /Total gain 6.13(4.10)
<b>Evaluation applied</b>	<input checked="" type="checkbox"/> MPE Evaluation* <input type="checkbox"/> SAR Evaluation <input type="checkbox"/> N/A

### **Remark:**

1. The maximum output power is 18.94dBm (78.34mW) at 2462MHz (with 4.10 numeric antenna gain.)
2. DTS device is not subject to routine RF evaluation; MPE estimate is used to justify the compliance.
3. For mobile or fixed location transmitters, no SAR consideration applied. The maximum power density is 1.0 mW/cm<sup>2</sup> even if the calculation indicates that the power density would be larger.

## **TEST RESULTS**

No non-compliance noted.



### **Calculation**

Given  $E = \frac{\sqrt{30 \times P \times G}}{d}$  &  $S = \frac{E^2}{3770}$

Where  $E$  = Field strength in Volts / meter

$P$  = Power in Watts

$G$  = Numeric antenna gain

$d$  = Distance in meters

$S$  = Power density in milliwatts / square centimeter

Combining equations and re-arranging the terms to express the distance as a function of the remaining variables yields:

$$S = \frac{30 \times P \times G}{3770 d^2}$$

Changing to units of mW and cm, using:

$$P \text{ (mW)} = P \text{ (W)} / 1000 \text{ and}$$

$$d \text{ (cm)} = d \text{ (m)} / 100$$

Yields

$$S = \frac{30 \times (P/1000) \times G}{3770 \times (d/100)^2} = 0.0796 \times \frac{P \times G}{d^2} \quad \text{Equation 1}$$

Where  $d$  = Distance in cm

$P$  = Power in mW

$G$  = Numeric antenna gain

$S$  = Power density in mW / cm<sup>2</sup>

### **Maximum Permissible Exposure**

Substituting the MPE safe distance using  $d = 20$  cm into Equation 1:

Yields

$$S = 0.000199 \times P \times G$$

Where  $P$  = Power in mW

$G$  = Numeric antenna gain

$S$  = Power density in mW / cm<sup>2</sup>





**IEEE 802.11b:**

EUT output power = 78.34mW

Numeric Antenna gain = 4.10

→ Power density = 0.0639 mW / cm<sup>2</sup>

**IEEE 802.11g:**

EUT output power = 25.41mW

Numeric Antenna gain = 4.10

→ Power density = 0.0207 mW / cm<sup>2</sup>

**IEEE 802.11gn Standard-20 MHz Channel mode**

EUT output power = 33.73mW

Numeric Antenna gain = 4.10

→ Power density = 0.0275 mW / cm<sup>2</sup>

**IEEE 802.11gn Wide-40 MHz Channel mode**

EUT output power = 33.42mW

Numeric Antenna gain = 4.10

→ Power density = 0.0273 mW / cm<sup>2</sup>

(For mobile or fixed location transmitters, the maximum power density is 1.0 mW/cm<sup>2</sup> even if the calculation indicates that the power density would be larger.)