



**FCC 47 CFR PART 15 SUBPART C**

**TEST REPORT**

**For**

**Wireless Network Camera**

**Model: RC8025xxxxxxxx (x= 0~9, A~Z, Blank or any Character)**

**Trade Name: SerComm**

*Issued to*

**SerComm Corporation**

**8F, No. 3-1, YuanQu St., NanKang, Taipei 115, Taiwan, R.O.C.**

*Issued by*

**Compliance Certification Services Inc.**

**No.81-1, Lane 210, Bade 2nd Rd., Lujhu Township,**

**Taoyuan County 33841, Taiwan, R.O.C.**

**TEL: 886-3-324-0332**

**FAX: 886-3-324-5235**

**<http://www.ccsrf.com>**

**[service@ccsrf.com](mailto:service@ccsrf.com)**



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**Revision History**

Rev.	Issue Date	Revisions	Effect Page	Revised By
00	July 27, 2012	Initial Issue	ALL	Jill Shiao



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## 1. TEST RESULT CERTIFICATION

**Applicant:** SerComm Corporation  
8F, No. 3-1, YuanQu St., NanKang, Taipei 115, Taiwan, R.O.C.

**Manufacturer:** SerComm Corporation  
8F, No. 3-1, YuanQu St., NanKang, Taipei 115, Taiwan, R.O.C.

**Equipment Under Test:** Wireless Network Camera

**Trade Name:** SerComm

**Model:** RC8025xxxxxxxx (x= 0~9, A~Z, Blank or any Character)

**Date of Test:** July 17 ~ 25, 2012

APPLICABLE STANDARDS	
STANDARD	TEST RESULT
FCC 47 CFR Part 15 Subpart C	No non-compliance noted

### We hereby certify that:

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 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.

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

**Approved by:**

Stan Lin  
Section Manager

**Reviewed by:**

Jill Shiao  
Section Manager



## 2. EUT DESCRIPTION

<b>Product</b>	Wireless Network Camera		
<b>Trade Name</b>	SerComm		
<b>Model Number</b>	RC8025xxxxxxx (x= 0~9, A~Z, Blank or any Character)		
<b>Model Discrepancy</b>	<ol style="list-style-type: none"> <li>1. The mean of "X (x= 0~9, A~Z, Blank or any Character)" on model number just for marketing purpose only.</li> <li>2. Client consigns only one model sample to test (model number: RC8025). Therefore, the testing Lab. just guarantees the unit, which has been tested.</li> </ol>		
<b>EUT Power Rating</b>	12VDC, 1.0A		
<b>Power Adapter</b>	Sunny	<b>Model</b>	SYS1381-1212-W2
	LET	<b>Model</b>	MU12-G120100-A1
<b>RF Module Manufacturer</b>	Ralink	<b>Model</b>	RT3092L
<b>Operating Frequency Range</b>	IEEE 802.11 b/g/HT 20MHz: 2412 ~ 2462 MHz IEEE 802.11 HT 40MHz: 2422 ~ 2452 MHz		
<b>Transmit Power</b>	IEEE 802.11b mode: 21.01 dBm (0.12618W) IEEE 802.11g mode: 24.41 dBm (0.21928W) draft 802.11n 20 MHz Channel mode: 26.00 dBm (0.39796W) draft 802.11n 40 MHz Channel mode: 25.64 dBm (0.36678W)		
<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) draft 802.11n 20 MHz Channel mode: OFDM (6.5, 7.2, 13, 14.4, 14.44, 19.5, 21.7, 26, 28.89, 28.9, 39, 43.3, 43.33, 52, 57.78, 57.8, 58.5, 65.0, 72.2, 78, 86.67, 104, 115.56, 117, 130, 144.44 Mbps) draft 802.11n 40 MHz Channel mode: OFDM (13.5, 15, 27, 30, 40.5, 45, 54, 60, 81, 90, 108, 120, 121.5, 135, 150, 162, 180, 216, 240, 243, 270, 300 Mbps)		
<b>Number of Channels</b>	IEEE 802.11b/g mode: 11 Channels draft 802.11n 20 MHz Channel mode: 11 Channels draft 802.11n 40 MHz Channel mode: 7 Channels		
<b>Antenna Specification</b>	PCB Antenna / Gain: Ant. 1: 3.32dBi; Ant. 2: 3.58dBi		

**Remark:**

1. The sample selected for test was production product and was provided by manufacturer.
2. This submittal(s) (test report) is intended for FCC ID: **P27RC8025** 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 Part 2, Part 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 is a 2Tx2R MIMO transmitter.

Software used to control the EUT for staying in continuous transmitting mode was programmed.

The worst case data rate is determined as the data rate with highest output power.

After verification, all tests were carried out with the worst case test modes as shown below except radiated spurious emission below 1GHz, which worst case was in normal link mode only.

MU12-G120100-A1 & SYS1381-1212-W2 have been pre-scanned during the test, and the model MU12-G120100-A1 was selected as the worst case for final test.

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

Channel Low (2412MHz), Channel Mid (2437MHz) and Channel High (2462MHz) with 1Mbps data rate was chosen for full testing.

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

Channel Low (2412MHz), Channel Mid (2437MHz) and Channel High (2462MHz) with 6Mbps data rate was chosen for full testing.

#### **draft 802.11n 20 MHz Channel mode:**

Channel Low (2412MHz), Channel Mid (2437MHz) and Channel High (2462MHz) with 13.5Mbps data rate were chosen for full testing.

#### **draft 802.11n 40 MHz Channel mode:**

Channel Low (2422MHz), Channel Mid (2437MHz) and Channel High (2452MHz) with 13.5Mbps data rate were chosen for full testing.





## 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.

### 4.2 MEASUREMENT EQUIPMENT USED

#### 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	MY48250064	12/25/2012
Spectrum Analyzer	R&S	FSEB	825829/011	12/18/2012
Power meter	Anritsu	ML2495A	1033009	08/18/2012
Power Sensor	Anritsu	MA2411B	0917221	08/18/2012

3M Semi Anechoic Chamber				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	MY48250064	12/25/2012
Pre-Amplifier	HP	8447D	2944A06530	01/03/2013
Pre-Amplifier	HP	8449B	3008A01738	04/17/2013
Pre-Amplifier	MITEQ	AMF-6F-26040 0-40-8P	985646	05/20/2013
EMI Test Receiver	SCHAFFNER	SCR 3501	430	01/11/2013
Loop Antenna	EMCO	6502	2356	06/11/2013
Bilog Antenna	SCHWAZBECK	VULB9160	3084	10/03/2012
Horn Antenna	EMCO	3115	9602-4659	06/14/2013
Horn Antenna	EMCO	3116	00026370	10/04/2012
Antenna Tower	CCS	CC-A-1F	N/A	N.C.R
Turn Table	CCS	CC-T-1F	N/A	N.C.R
Test S/W	LabVIEW 6.1 (Wugu Chamber EMI Test V1_4.5.3)			

Powerline Conducted Emissions Test Site				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
TEST RECEIVER	R&S	ESCI	100234	06/11/2013
LISN (EUT)	FCC	FCC-LISN-50-3 2-2	08009	03/26/2013
LISN	SCHWARZBEC K	NSLK 8127	8127382	01/02/2013
BNC CABLE	EMCI	CFD300-NL	BNC B4	03/15/2013
Pulse Limiter	R&S	ESH3-Z2	100374	01/08/2013
THERMO- HYGRO METER	WISEWIND	201A	No. 05	06/12/2013
Test S/W	EZ-EMC			



### 4.3 MEASUREMENT UNCERTAINTY

Parameter	Uncertainty
Powerline Conducted Emission	$\pm 1.2900$
3M Semi Anechoic Chamber / 30MHz ~ 1GHz	$\pm 3.7046$
3M Semi Anechoic Chamber / Above 1GHz	$\pm 3.0958$

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



## **5. FACILITIES AND ACCREDITATIONS**

### **5.1 FACILITIES**

All measurement facilities used to collect the measurement data are located at

- No. 163-1, Jhongsheng Rd., Sindien District, Taipei City 23151, Taiwan  
(For Powerline measurement)

Tel: 886-2-2217-0894 / Fax: 886-2-2217-1029

- No 11, Wugong 6th Rd, Wugu District, New Taipei City 24891, Taiwan (R.O.C)

Tel: 886-2-2299-9720 / Fax: 886-2-2298-4045

- No.81-1, Lane 210, Bade 2nd Rd., Lujhu Township, Taoyuan County 33841, Taiwan, R.O.C.

Tel: 886-3-324-0332 / Fax: 886-3-324-5235

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 TABLE OF ACCREDITATIONS AND LISTINGS**

Country	Agency	Scope of Accreditation	Logo
USA	A2LA	CFR 47, FCC Part15/18, CISPR 22, EN 55022, ICES-003, AS/NZS CISPR 22, VCCI V-3, EN 55011, CISPR 11, IEC/EN 61000-4-2/3/4/5/6/8/11, EN 61000-6-1/2/3/4, EN 55024, CISPR 24, AS/NZS CISPR 24, AS/NZS 61000.6.2, EN 55014-1/-2, ETSI EN 300 386 v1.3.2/v1.3.3, IEC/EN 61000-3-2, AS/NZS 61000.3.2, IEC/EN 61000-3-3, AS/NZS 61000.3.3	 TESTING CERT #0824.01
USA	FCC MRA	3/10 meter Open Area Test Sites to perform FCC Part 15/18 measurements	
Japan	VCCI	3/10 meter Open Area Test Sites and conducted test sites to perform radiated/conducted measurements	<b>VCCI</b> R-2882/2541/2798/725/1868 C-402/747/912 T-1930/1646
Taiwan	TAF	EN 55014-1, CISPR 14, CNS 13781-1, EN 55013, CISPR 13, CNS 13439, EN 55011, CISPR 11, CNS 13803, PLMN09, IS2045-0, LP0002 FCC Part 27/90, Part 15B/C/D/E, RSS-192/193/210/310 ETSI EN 300 328/ 300 220-1/ 300 220-2/ 301 893/ 301 489-01/ 301 489-03/ 301 489-07 / 301 489-17/ 300 440-1/ 300 440-2 AS/NZS 4268, AS/NZS 4771 CISPR 22, EN 55022, CNS 13438, AS/NZS CISPR 22, VCCI, IEC/EN 61000-4-2/3/4/5/6/8/11, CNS 14676-2/3/4/5/6/8, CNS 14934-2/3, CNS 13783-1, CNS 13439, CNS 13803	
Taiwan	BSMI	CNS 13438, CNS 13783-1, CNS 13439, CNS 14115	SL2-IS-E-0014 / IN-E-0014 /A1-E-0014 /R1-E-0014 /R2-E-0014 /L1-E-0014
Canada	Industry Canada	RSS-Gen Issue 3	 IC 2324C-5

**Note:** No part of this report may be used to claim or imply product endorsement by A2LA, TAF or other government agency.



## 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

For Conducted:							
No.	Device Type	Brand	Model	Series No.	FCC ID	Data Cable	Power Cord
1.	Notebook PC	DELL	D400	0932RY	E2K24GBRL	LAN Cable: Unshielded, 10m	AC I/P: Unshielded, 1.8m DC O/P: Unshielded, 1.8m with a core

For Radiated Emission measurement:							
No.	Device Type	Brand	Model	Series No.	FCC ID	Data Cable	Power Cord
1.	Notebook PC (Remote)	DELL	D400	0932RY	E2K24GBRL	LAN Cable: Unshielded, 10m	AC I/P: Unshielded, 1.8m DC O/P: Unshielded, 1.8m with a core

For Power line conducted emission measurement:							
No.	Device Type	Brand	Model	Series No.	FCC ID	Data Cable	Power Cord
1.	Server PC	HP	HD075AV	SGH947PR25	FCC DoC	Unshielded, 2.0m	Unshielded, 1.8m

**Remark:** Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.



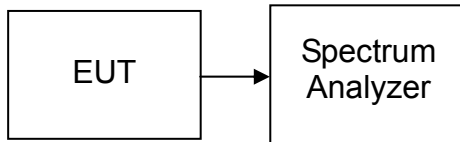
## **7. FCC PART 15.247 REQUIREMENTS**

### **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 6 dB bandwidth shall be at least 500 kHz.

#### **TEST CONFIGURATION**



#### **TEST PROCEDURE**

1. Place the EUT on the table and set it in the transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set the spectrum analyzer as RBW = 100kHz, VBW = 300kHz, Span = 30MHz or 50MHz, Sweep = auto.
4. Mark the peak frequency and -6dB (upper and lower) frequency.
5. Repeat until all the rest channels are investigated.

#### **TEST RESULTS**

*No non-compliance noted*



**TEST DATA**

**Test mode: IEEE 802.11b mode**

Channel	Frequency (MHz)	Bandwidth (MHz)	Limit (kHz)	Result
Low	2412	11.363	>500	PASS
Mid	2437	11.543		PASS
High	2462	11.363		PASS

**Test mode: IEEE 802.11g mode**

Channel	Frequency (MHz)	Bandwidth (MHz)	Limit (kHz)	Result
Low	2412	16.473	>500	PASS
Mid	2437	16.473		PASS
High	2462	16.485		PASS

**Test mode: draft 802.11n 20 MHz Channel mode**

Channel	Frequency (MHz)	Bandwidth (MHz)		Limit (kHz)	Result
		Chain 0	Chain 1		
Low	2412	17.663	17.537	>500	PASS
Mid	2437	17.591	17.657		PASS
High	2462	17.537	17.657		PASS

**Test mode: draft 802.11n 40 MHz Channel mode**

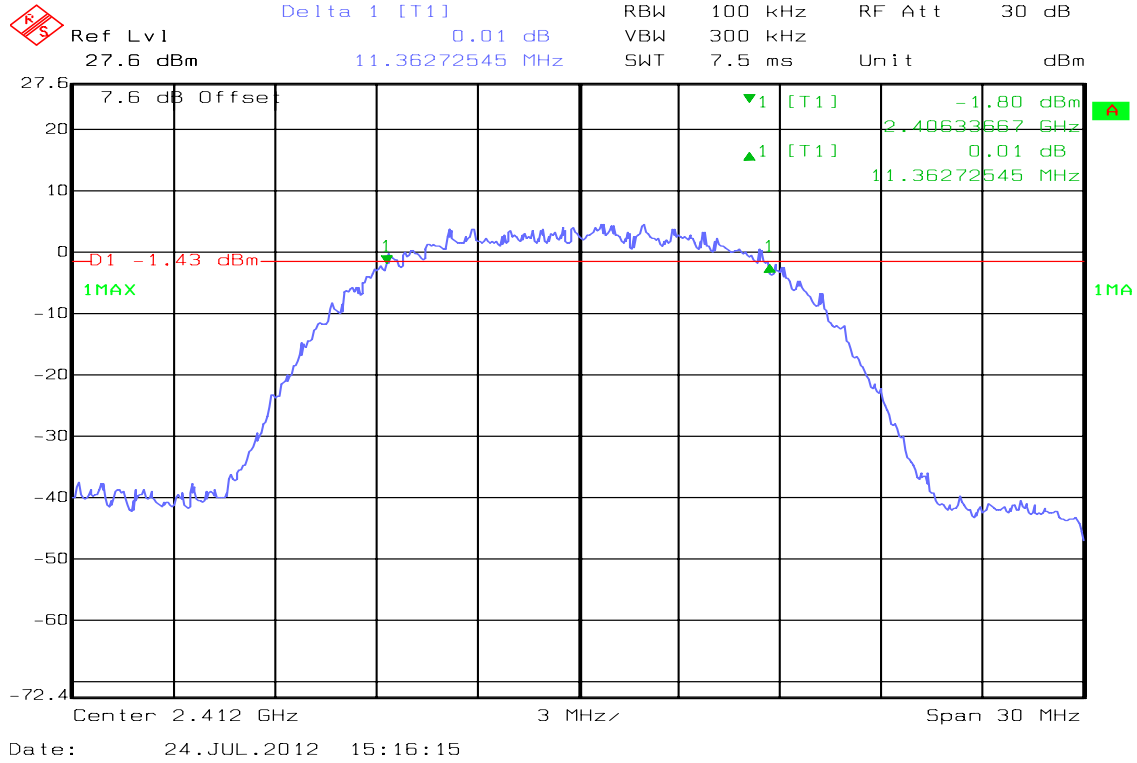
Channel	Frequency (MHz)	Bandwidth (MHz)		Limit (kHz)	Result
		Chain 0	Chain 1		
Low	2422	36.273	36.102	>500	PASS
Mid	2437	36.202	36.303		PASS
High	2452	36.242	36.303		PASS



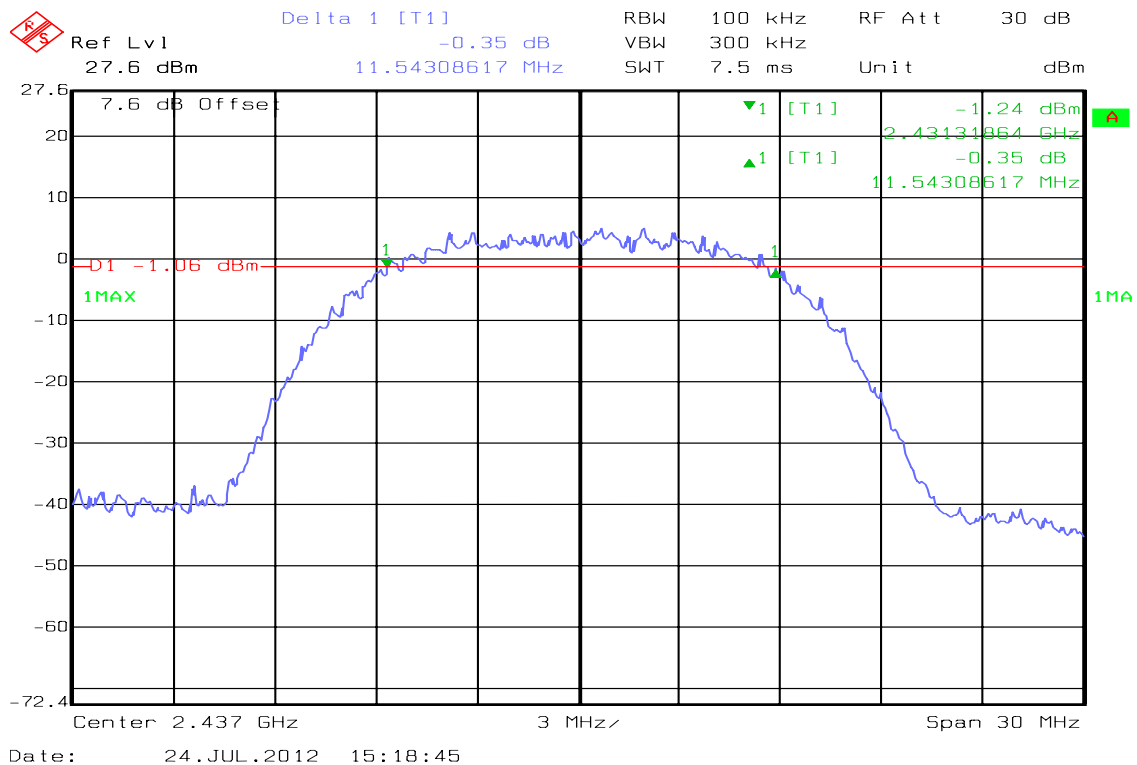
**Test Plot**

**IEEE 802.11b mode**

**6dB Bandwidth (CH Low)**



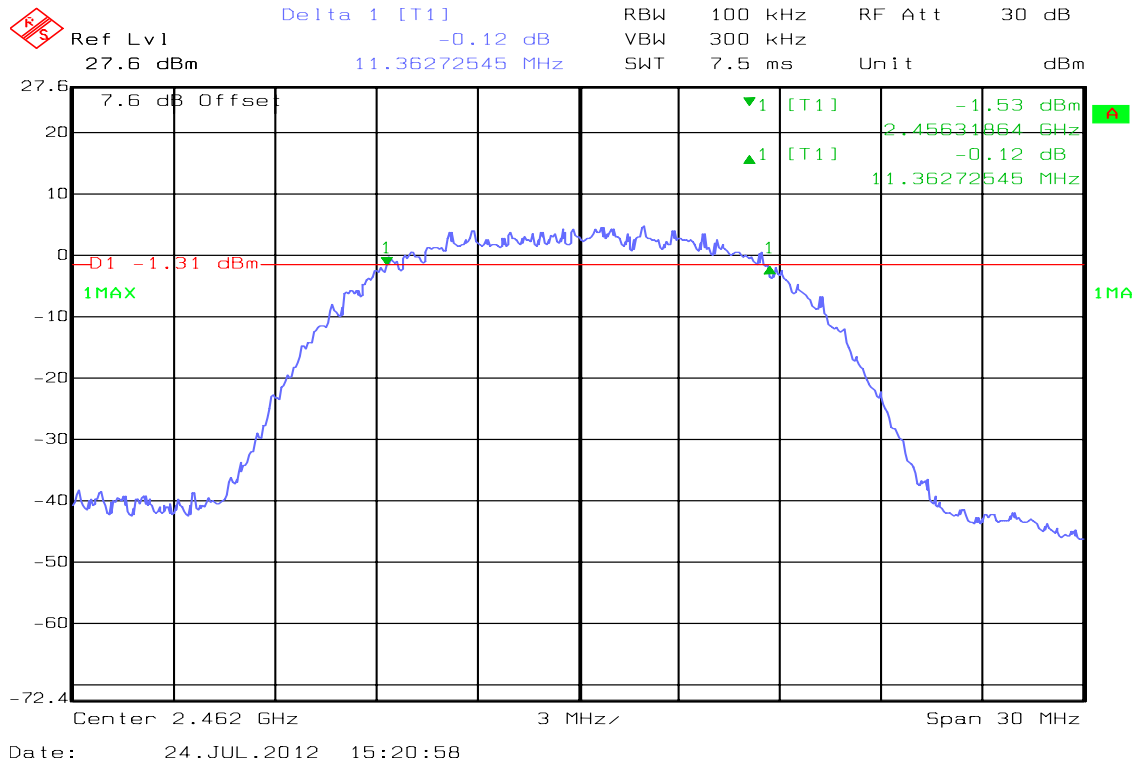
**6dB Bandwidth (CH Mid)**





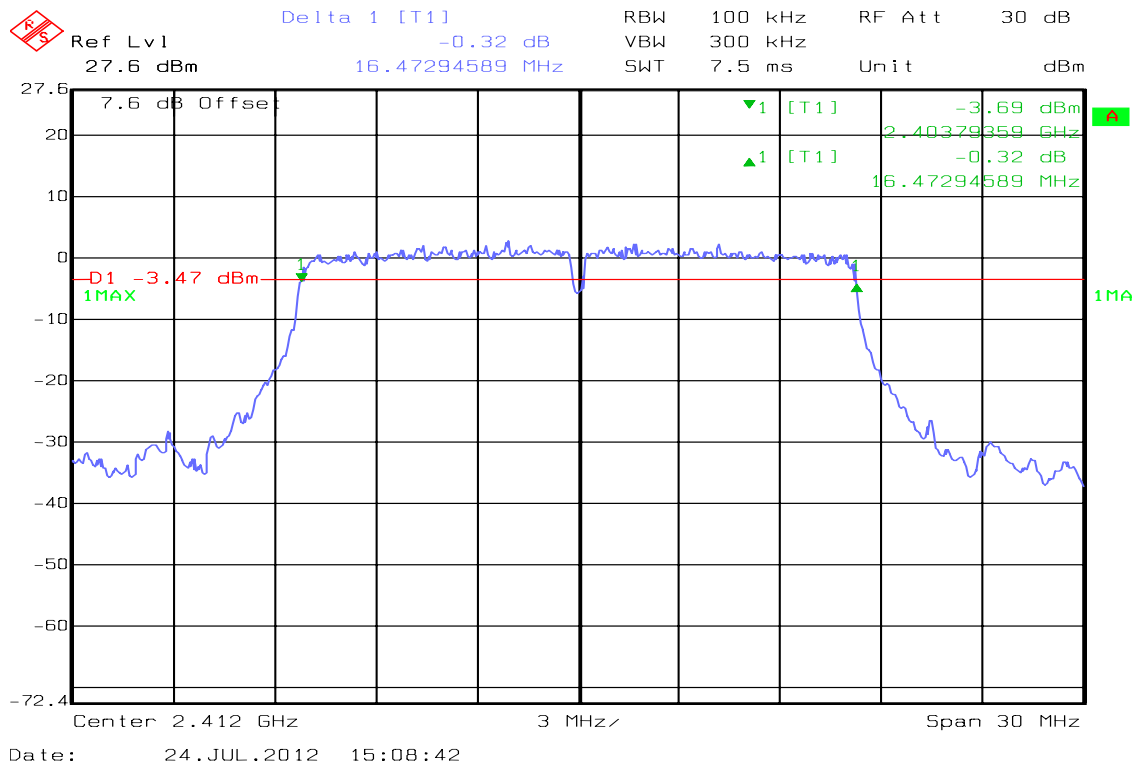


### 6dB Bandwidth (CH High)



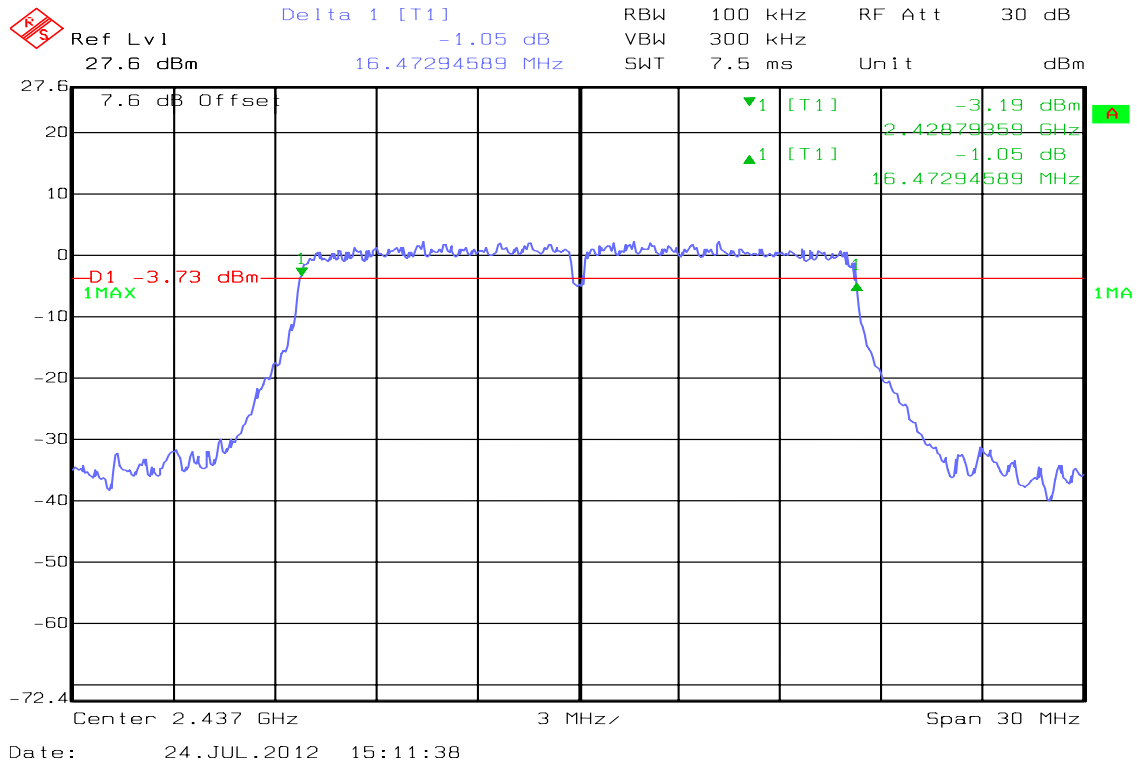
### IEEE 802.11g mode

### 6dB Bandwidth (CH Low)

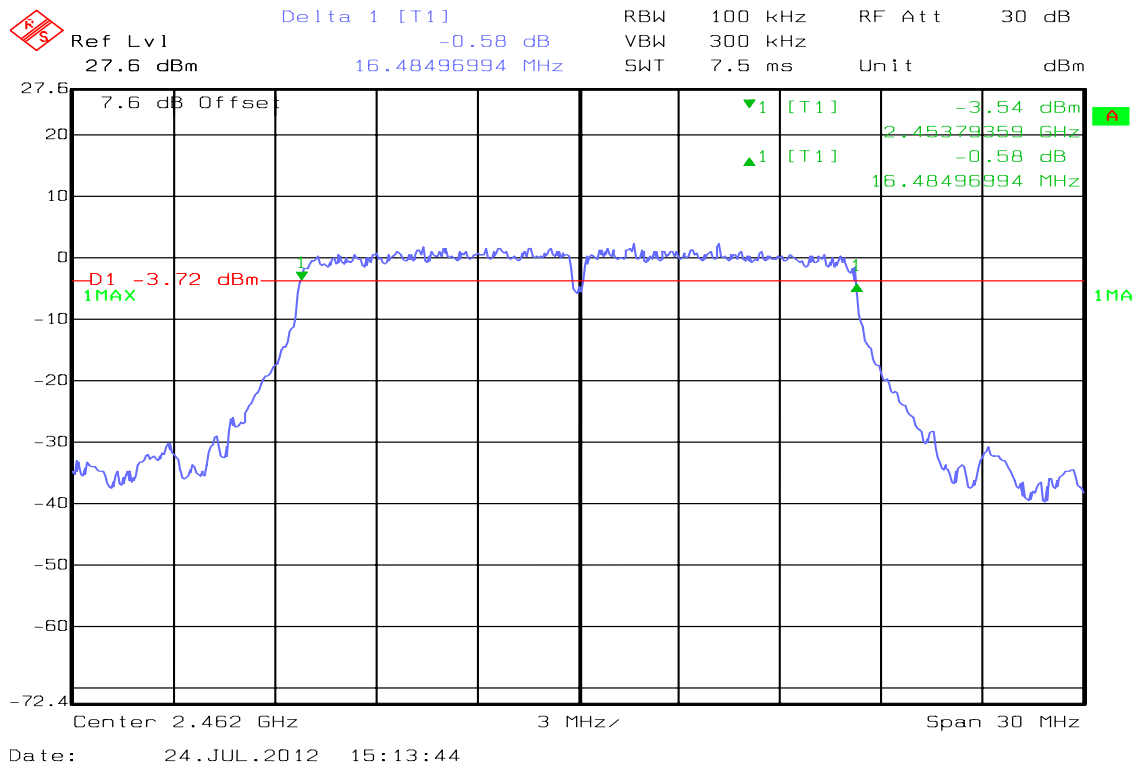




### 6dB Bandwidth (CH Mid)



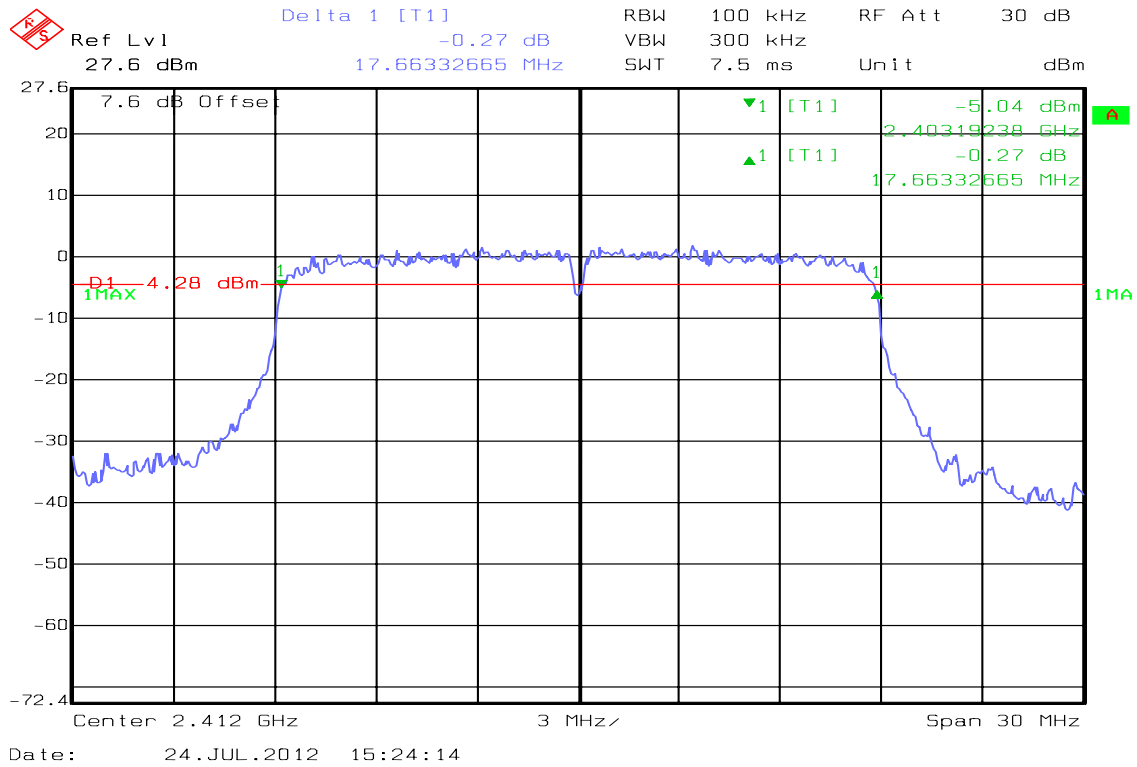
### 6dB Bandwidth (CH High)



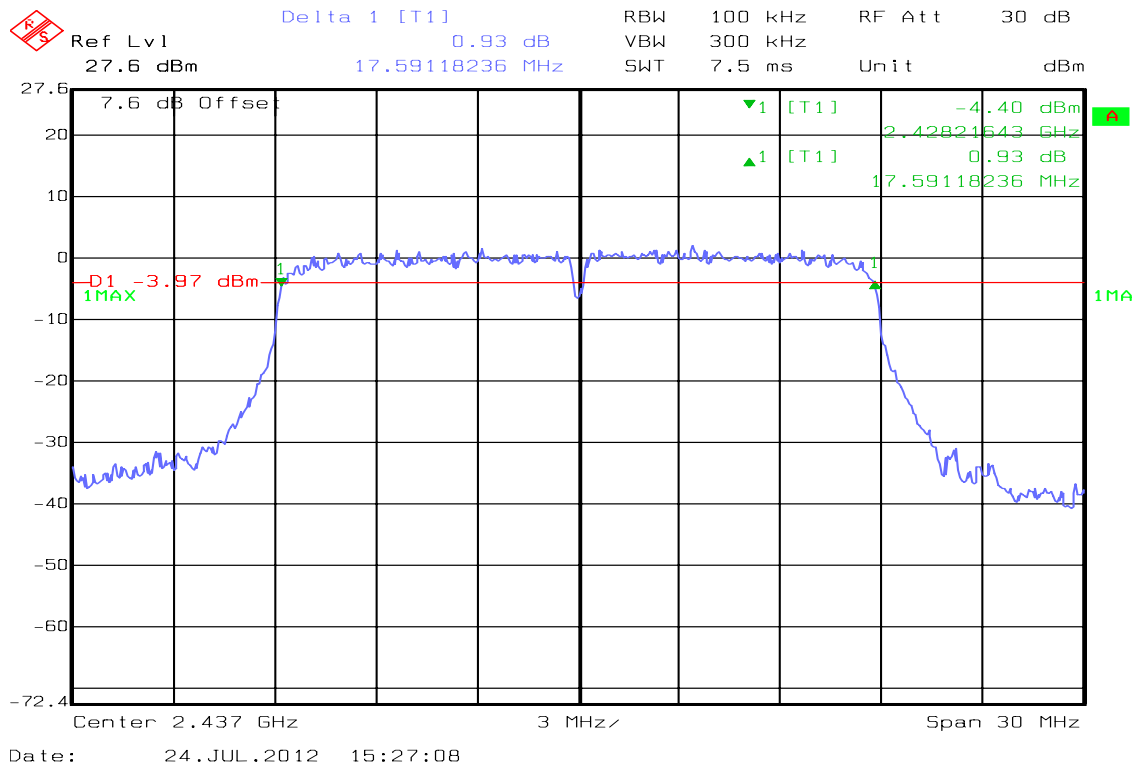


**draft 802.11n 20 MHz Channel mode / Chain 0**

**6dB Bandwidth (CH Low)**

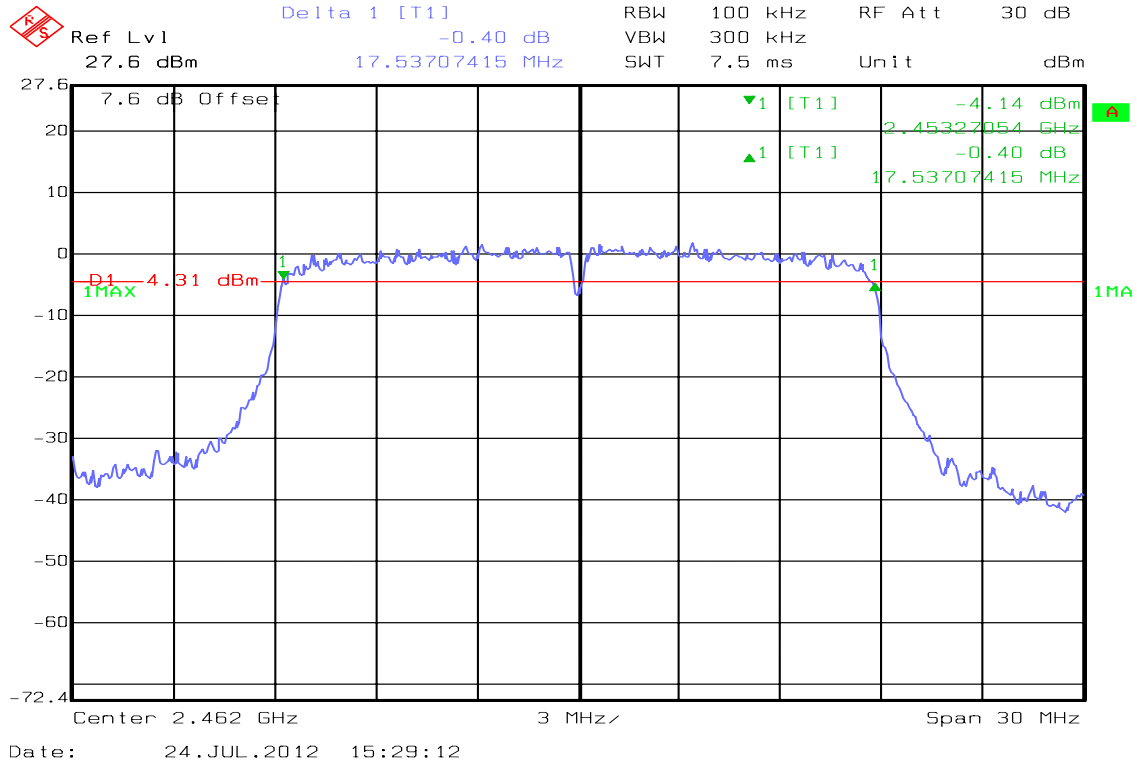


**6dB Bandwidth (CH Mid)**



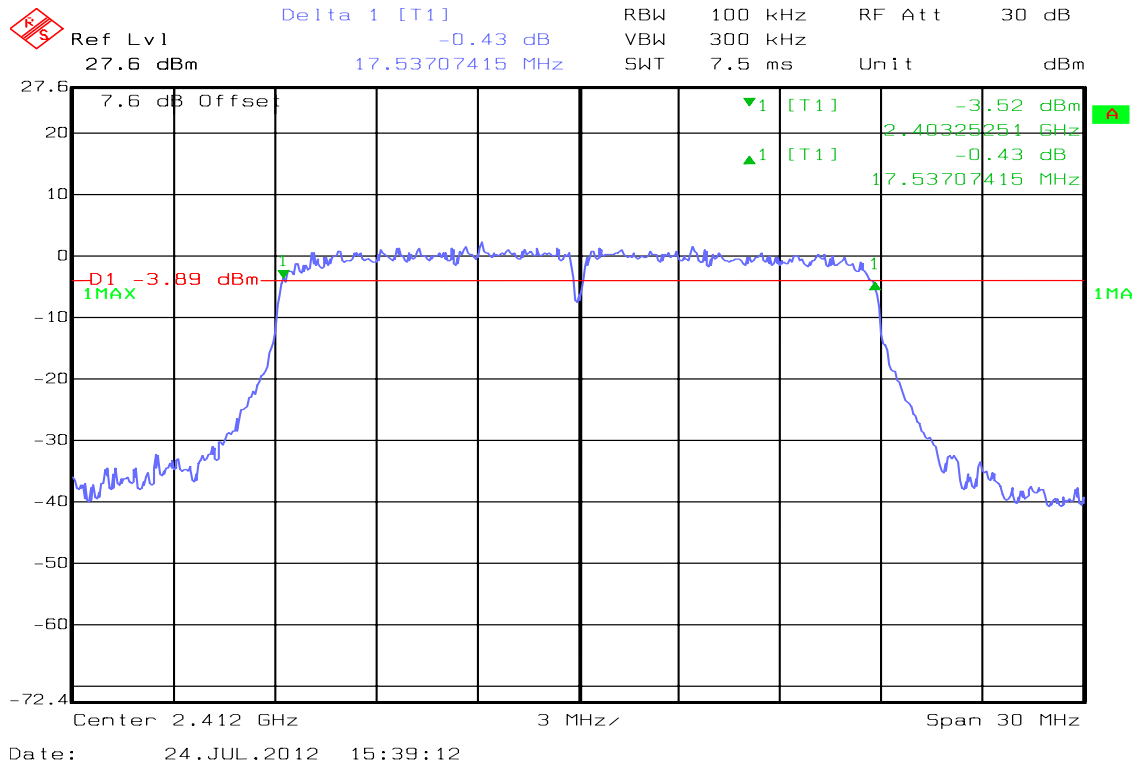


### 6dB Bandwidth (CH High)



### draft 802.11n 20 MHz Channel mode / Chain 1

### 6dB Bandwidth (CH Low)

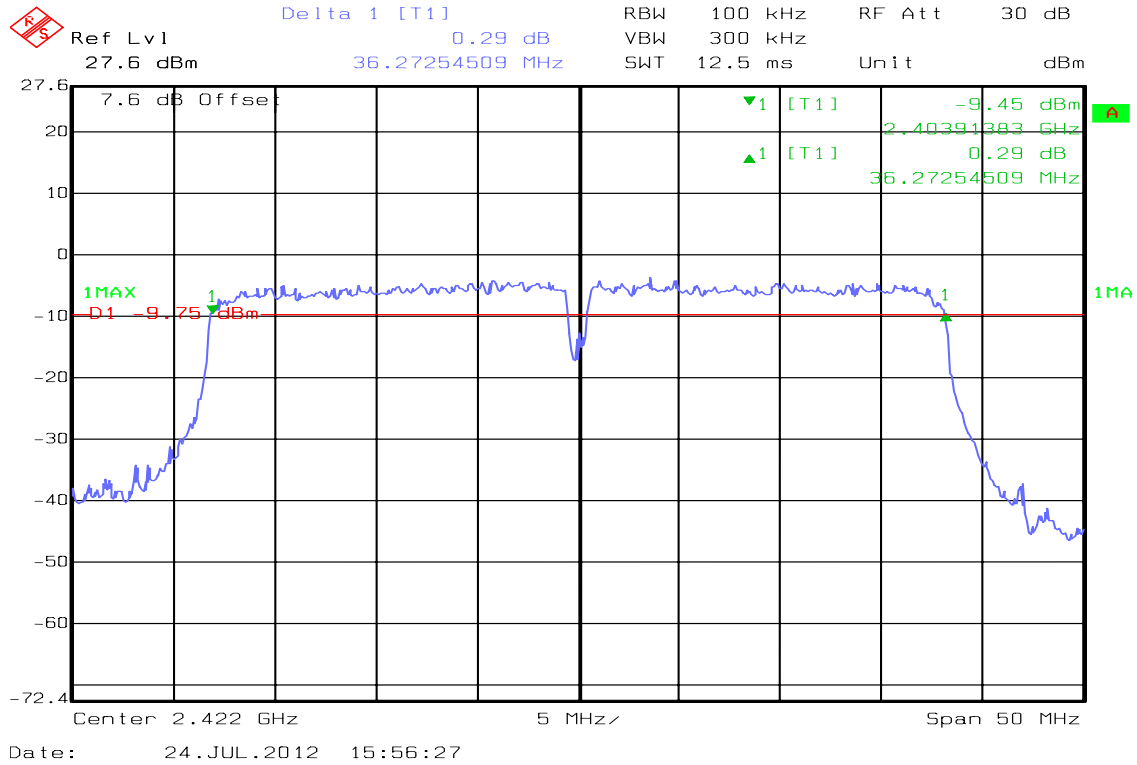




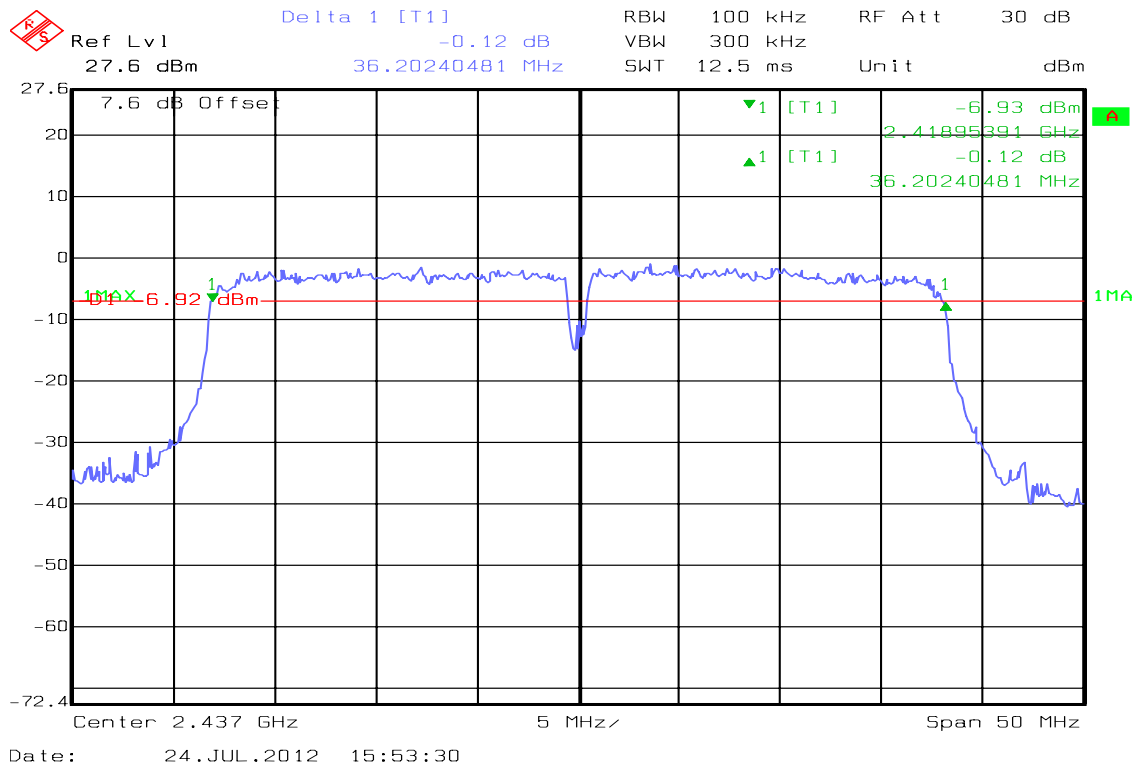


**draft 802.11n 40 MHz Channel mode / Chain 0**

**6dB Bandwidth (CH Low)**

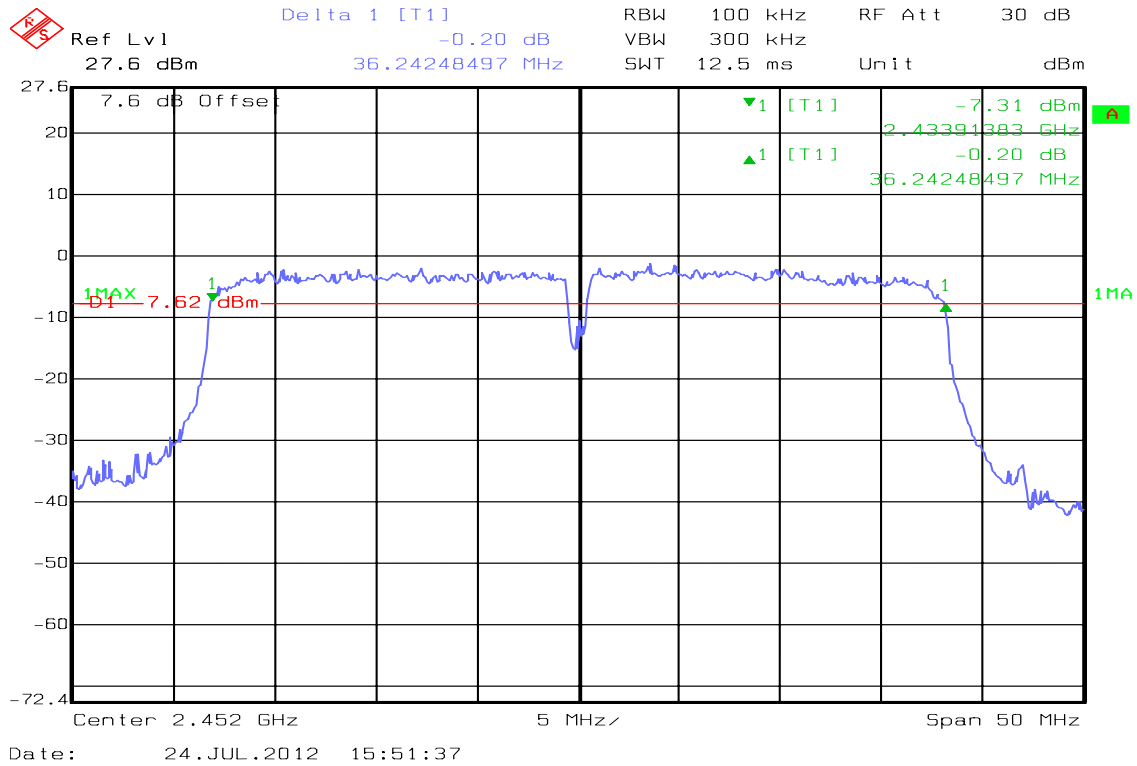


**6dB Bandwidth (CH Mid)**



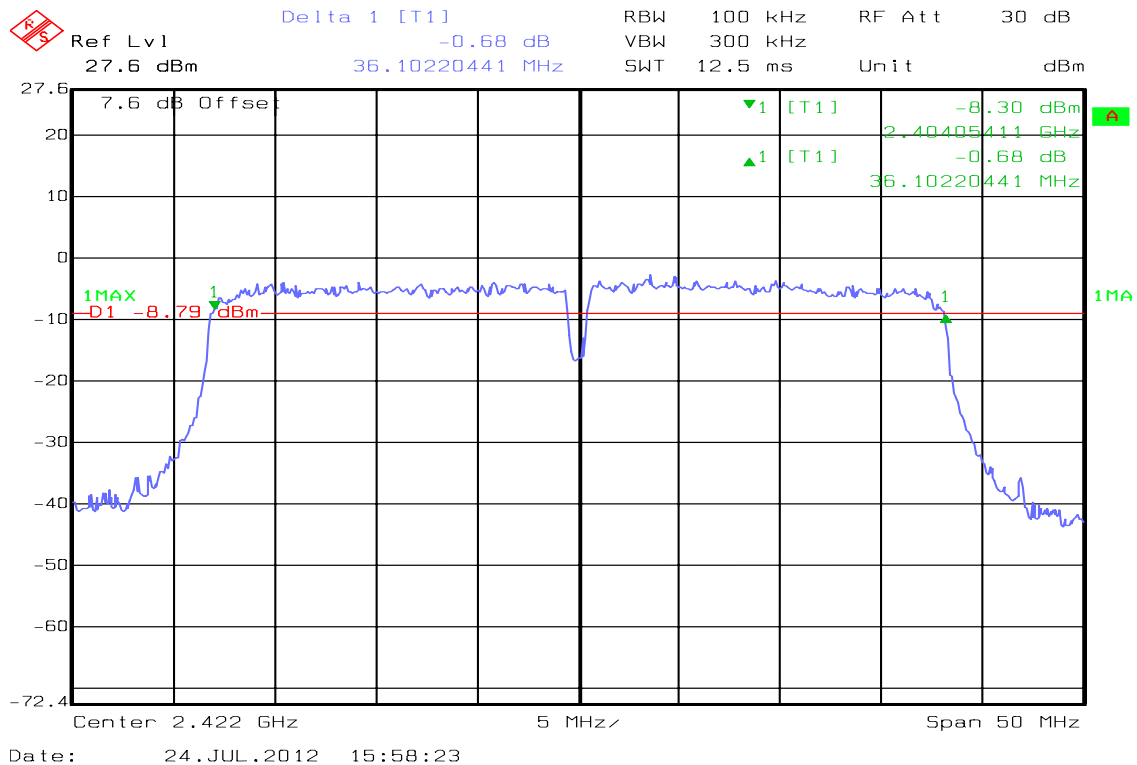


### 6dB Bandwidth (CH High)



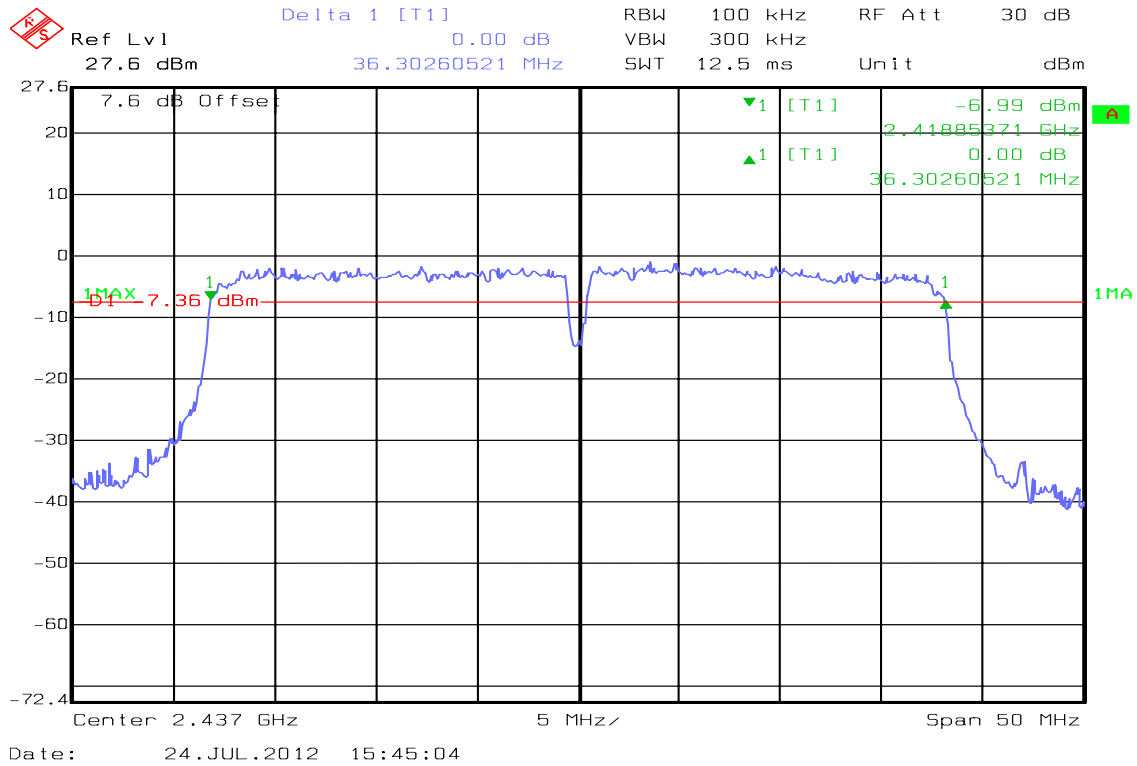
### draft 802.11n 40 MHz Channel mode / Chain 1

### 6dB Bandwidth (CH Low)

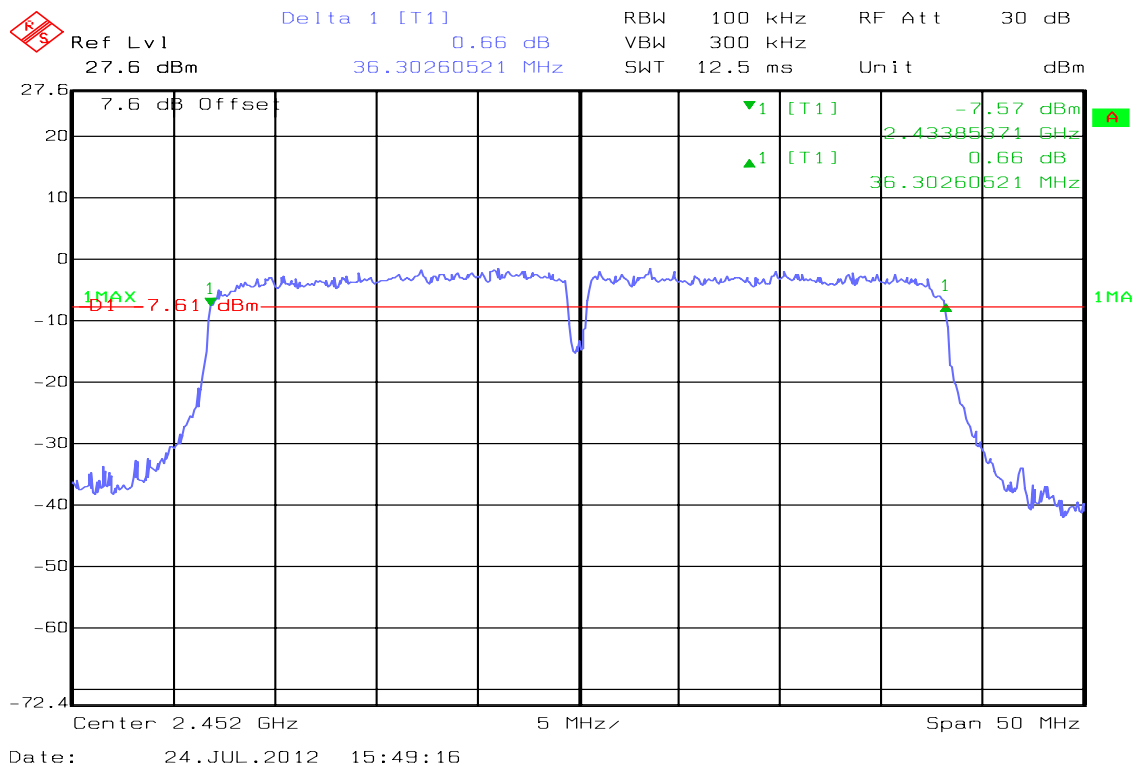




### 6dB Bandwidth (CH Mid)



### 6dB Bandwidth (CH High)







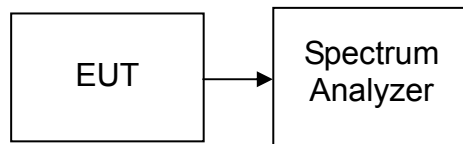
## **7.2 PEAK POWER**

### **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**

**Per KDB 558074 5.2.1.2/ or 5.2.2.1.**

The transmitter output is connected to the spectrum analyzer. Set the RBW = 1MHz, VBW = 3MHz, Detector = Peak, Trace mode = max hold, Sweep = auto couple. Record the max reading.

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)	Output Power (dBm)	Output Power (W)	Limit (W)	Result
Low	2412	20.66	0.11641	0.7943	PASS
Mid	2437	21.01	0.12618		PASS
High	2462	20.97	0.12503		PASS

**Test mode: IEEE 802.11g mode**

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)	Result
Low	2412	23.40	0.21878	0.7943	PASS
Mid	2437	23.41	0.21928		PASS
High	2462	22.88	0.19409		PASS

**Test mode: draft 802.11n 20 MHz Channel mode**

Channel	Frequency (MHz)	Output Power (dBm)			Output Power (W)			Limit (W)	Result
		Chain 0	Chain 1	Total	Chain 0	Chain 1	Total		
Low	2412	22.50	23.08	25.81	0.17783	0.20324	0.38106	0.7943	PASS
Mid	2437	22.91	23.03	25.98	0.19543	0.20091	0.39634		PASS
High	2462	22.82	23.15	26.00	0.19143	0.20654	0.39796		PASS

**Test mode: draft 802.11n 40 MHz Channel mode**

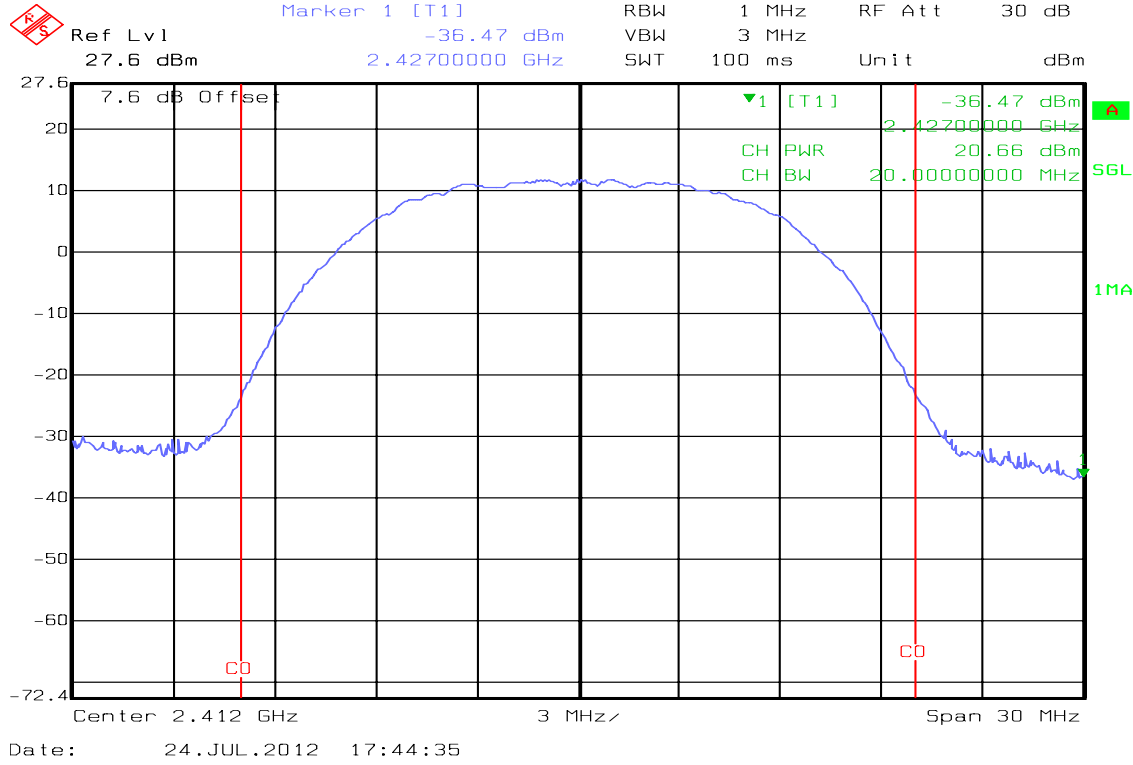
Channel	Frequency (MHz)	Output Power (dBm)			Output Power (W)			Limit (W)	Result
		Chain 0	Chain 1	Total	Chain 0	Chain 1	Total		
Low	2422	20.00	20.62	23.33	0.10000	0.11535	0.21535	0.7943	PASS
Mid	2437	22.81	22.45	25.64	0.19099	0.17579	0.36678		PASS
High	2452	22.25	22.62	25.45	0.16788	0.18281	0.35069		PASS



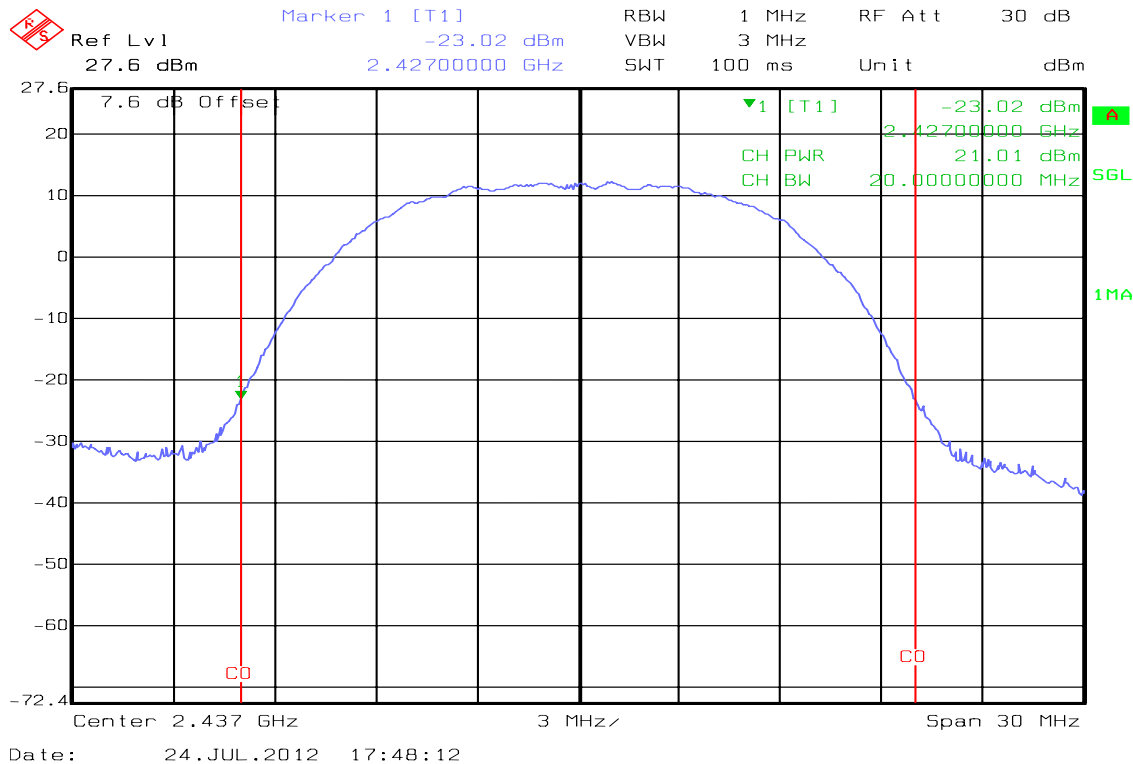
# TEST PLOT

## IEEE 802.11b mode

### CH Low

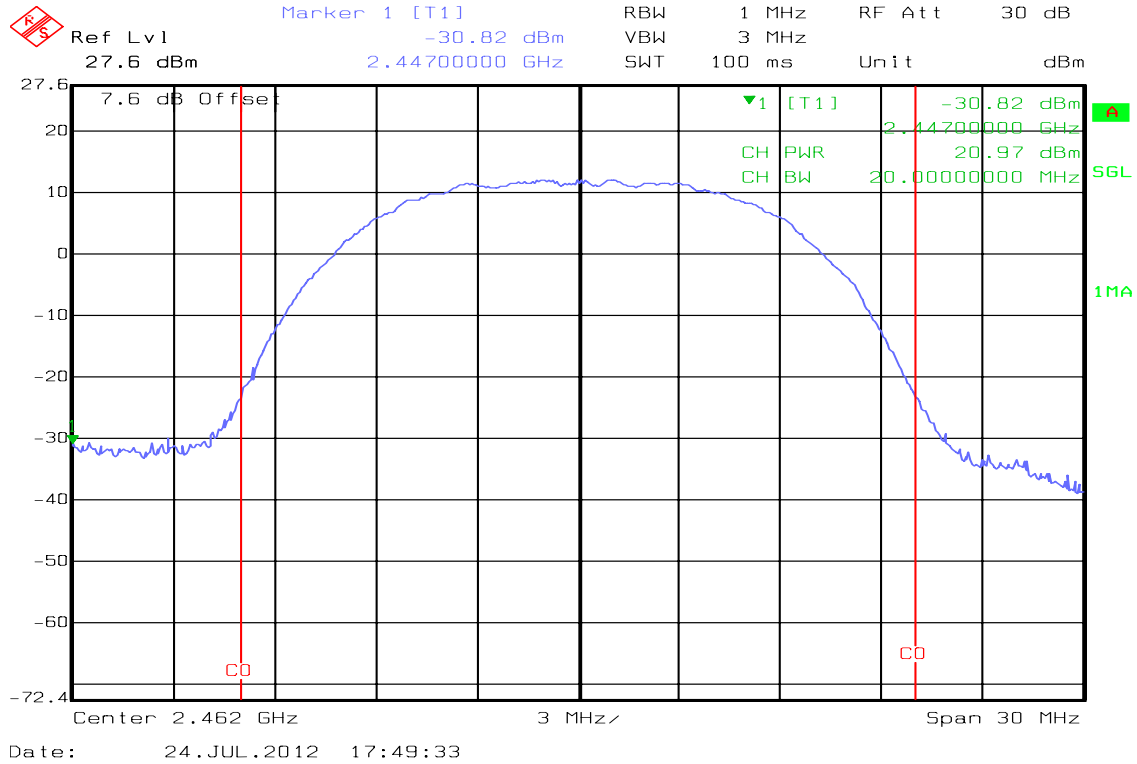


### CH Mid



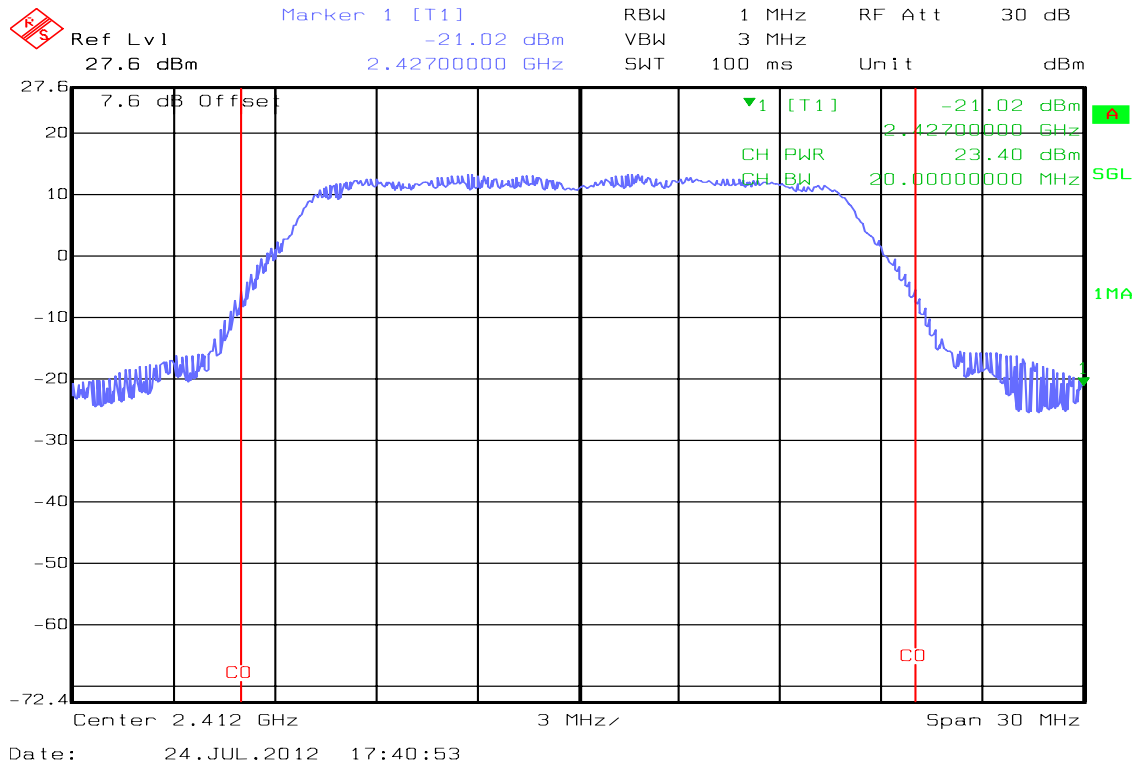


### CH High



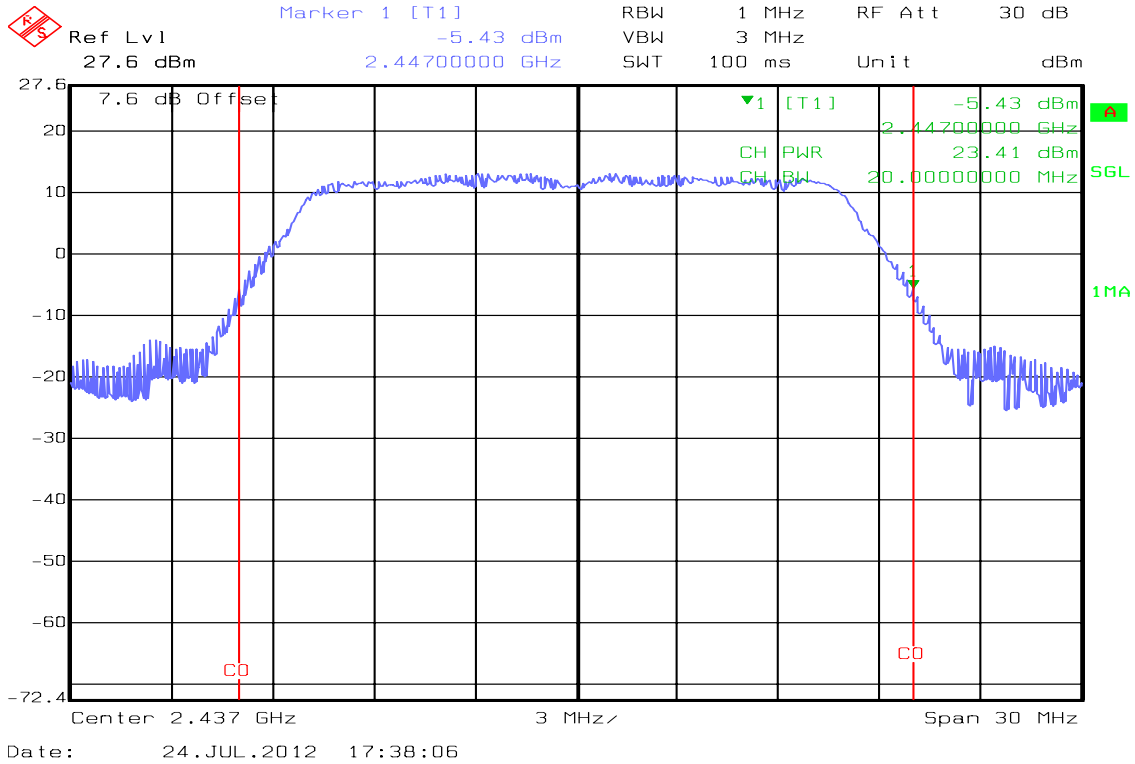
### IEEE 802.11g mode

#### CH Low

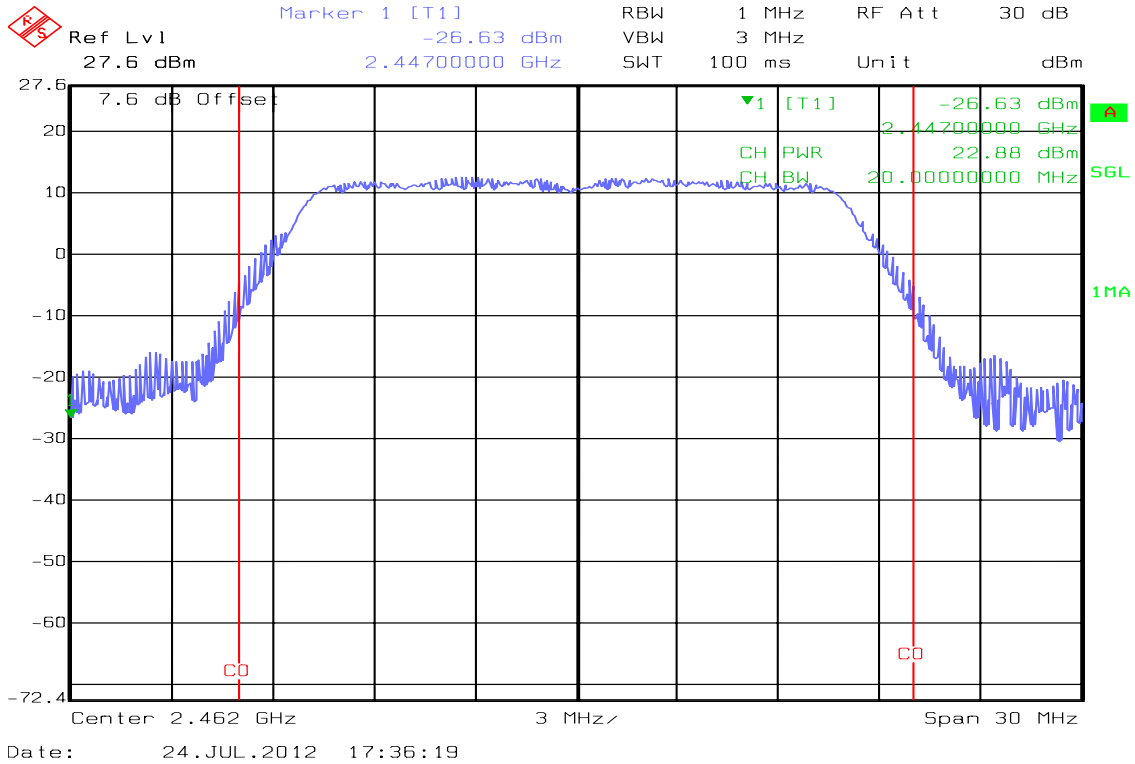




### CH Mid



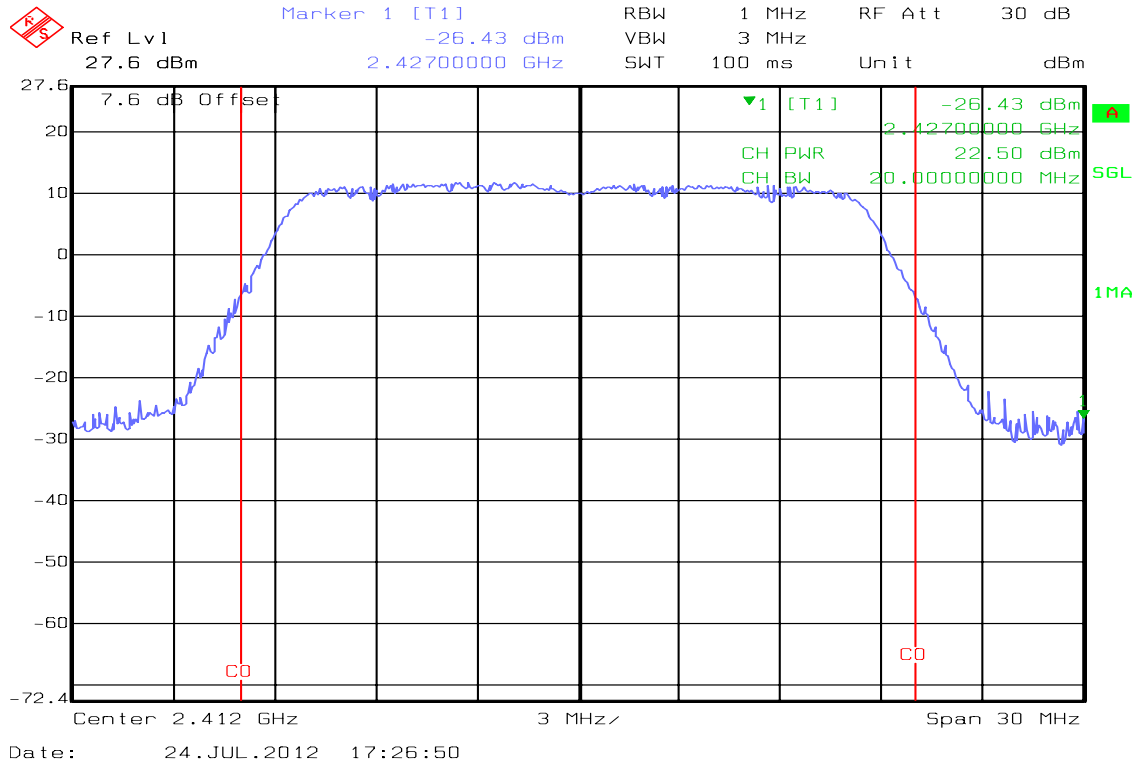
### CH High



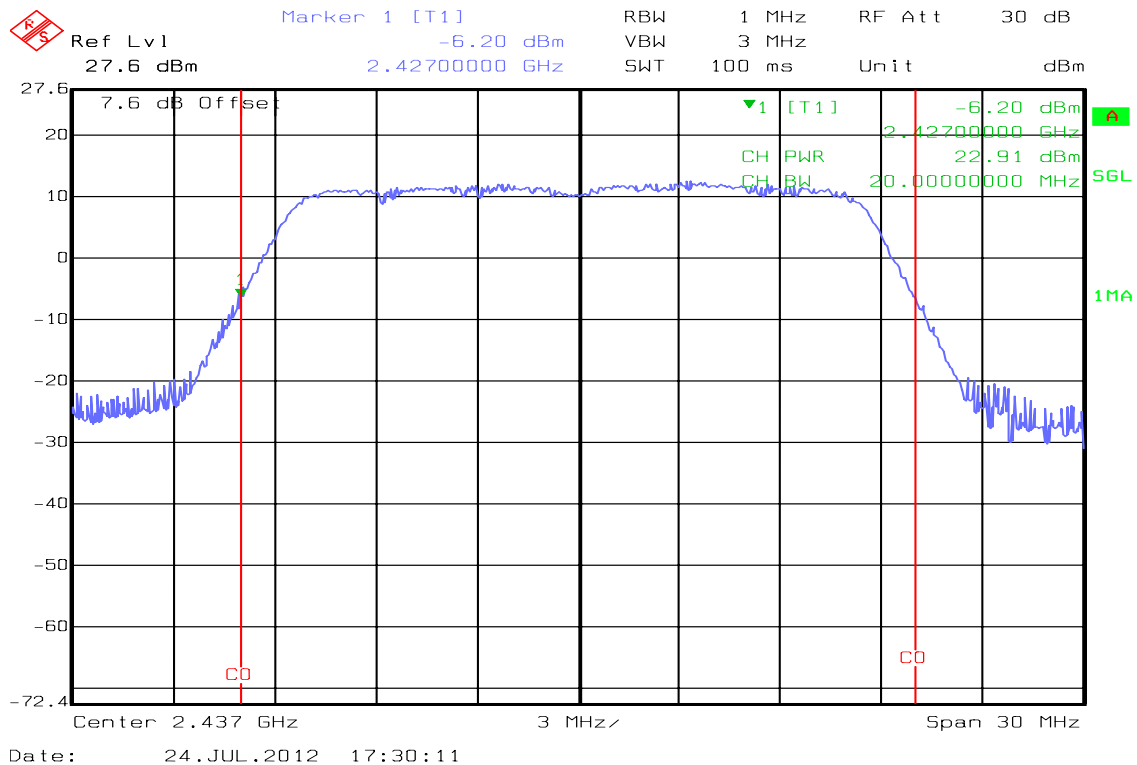


**IEEE 802.11n HT20 mode / Chain 0:**

**CH Low**

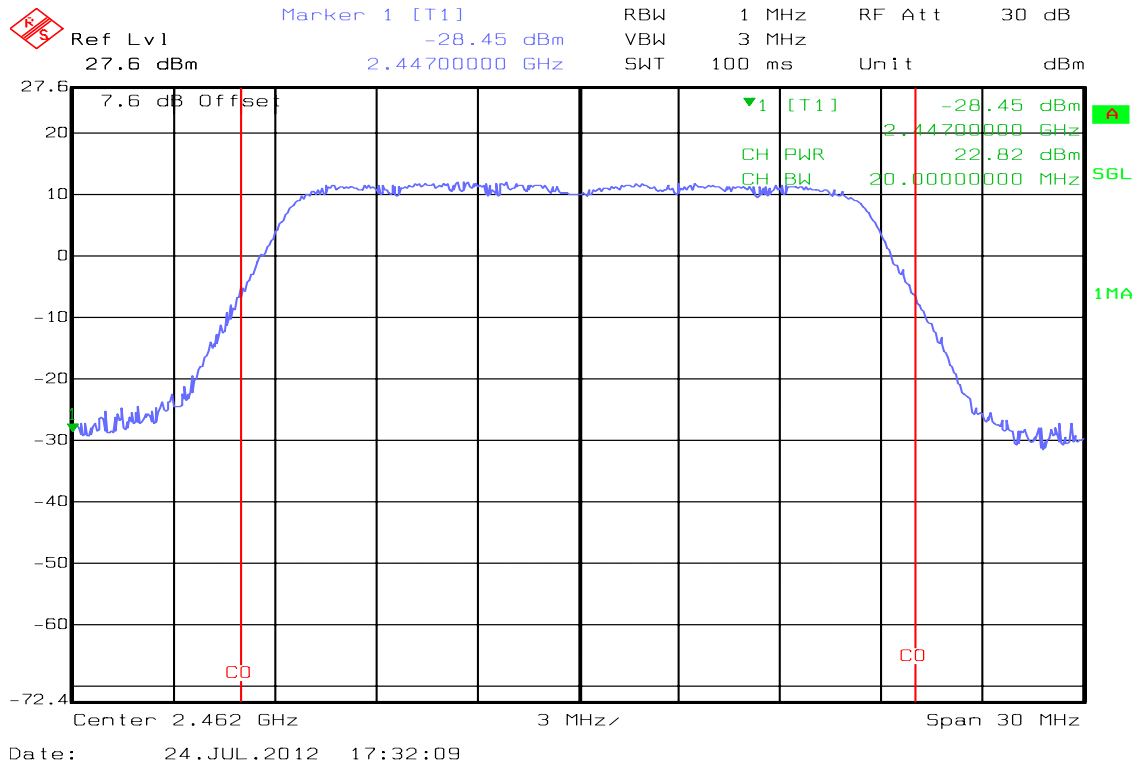


**CH Mid**



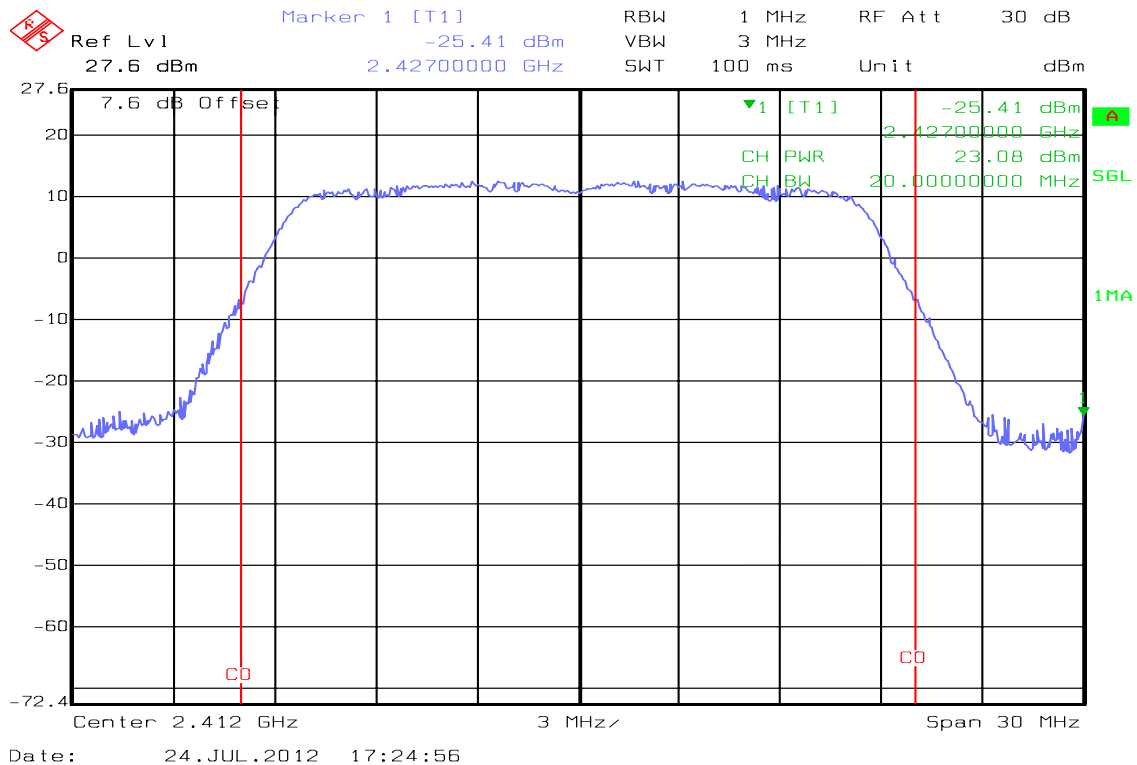


### CH High



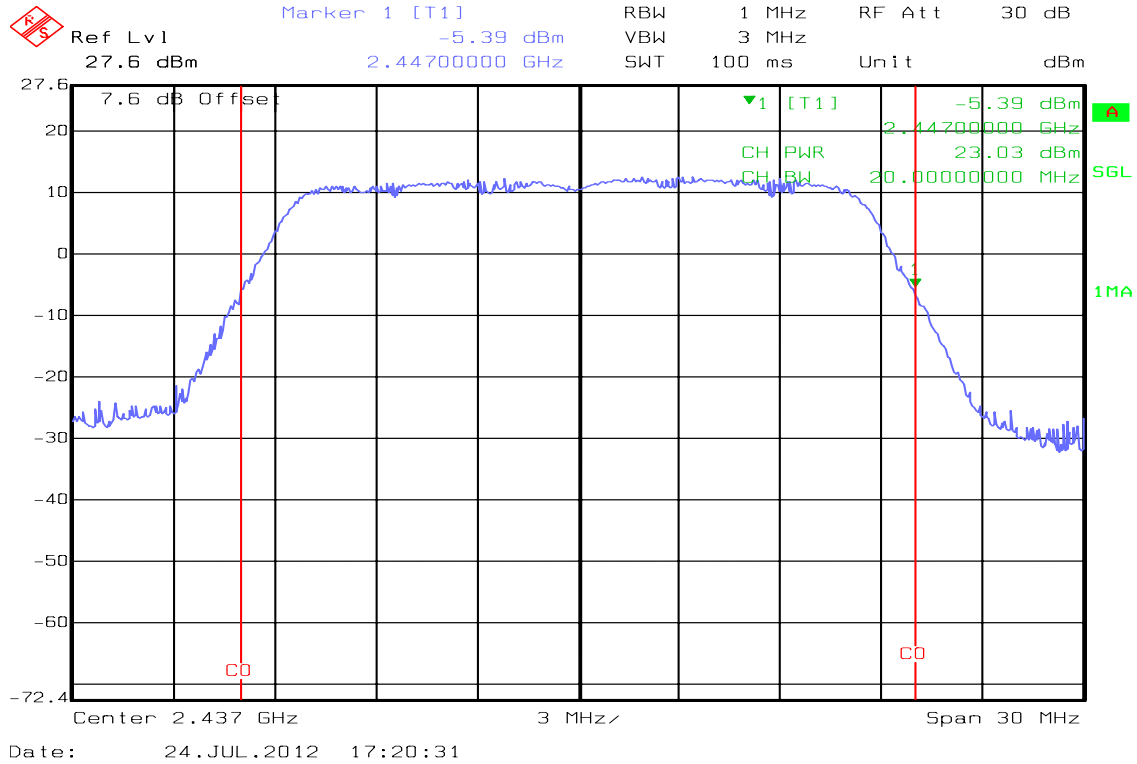
### IEEE 802.11n HT20 mode / Chain 1:

#### CH Low

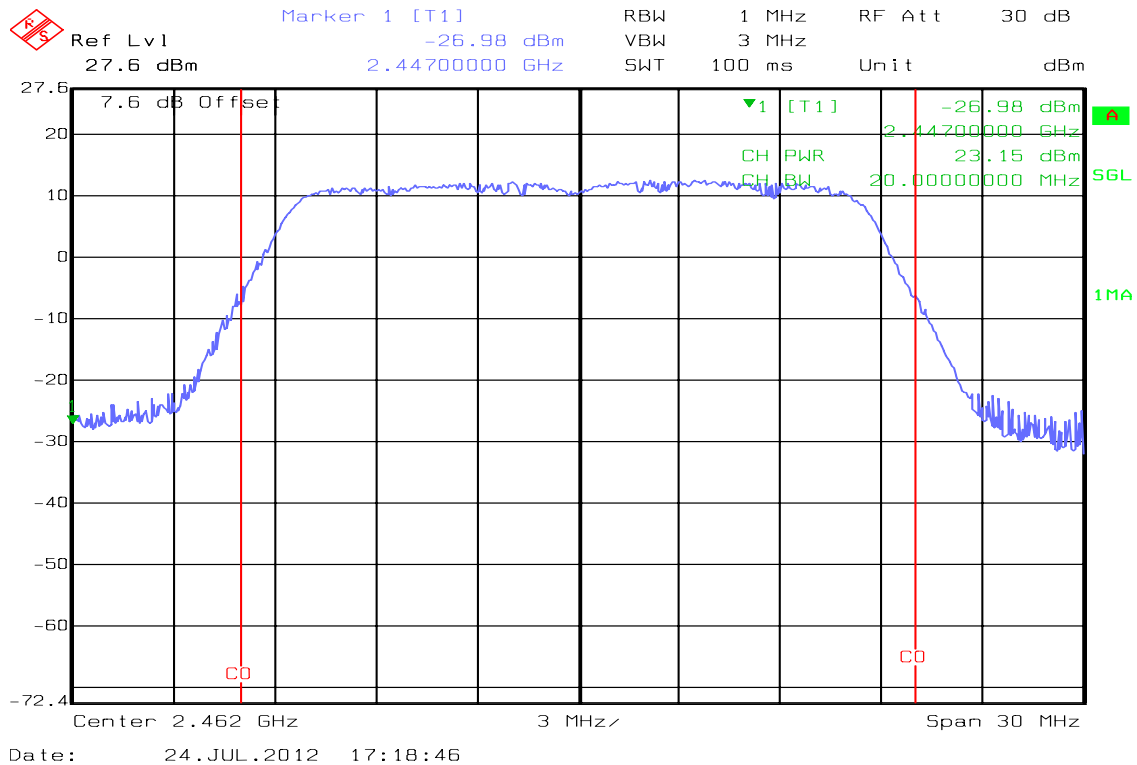




### CH Mid



### CH High

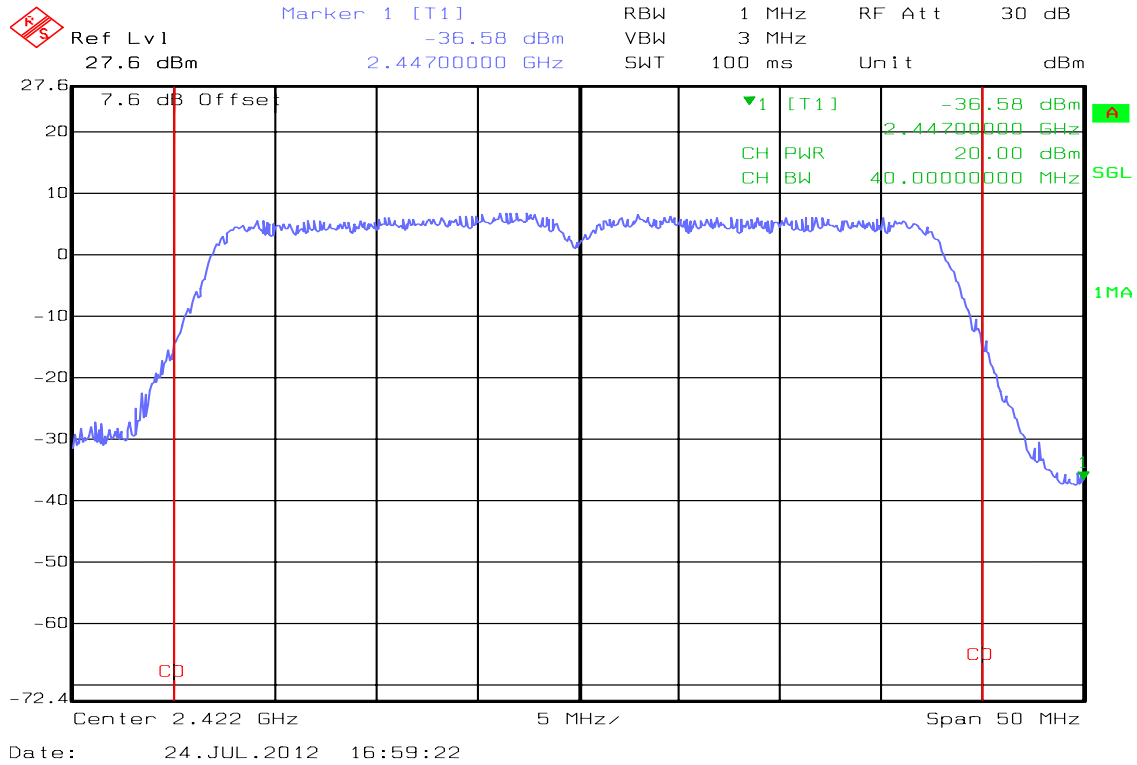




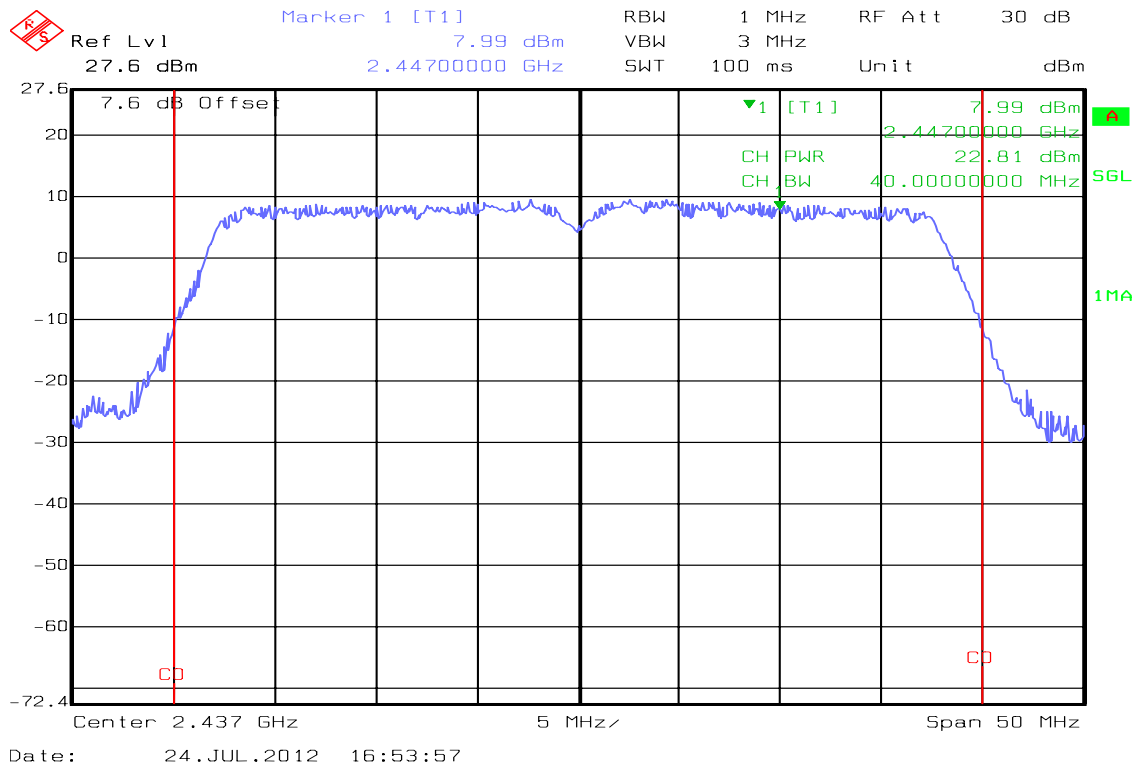


**IEEE 802.11n HT40 mode / Chain 0:**

**CH Low**

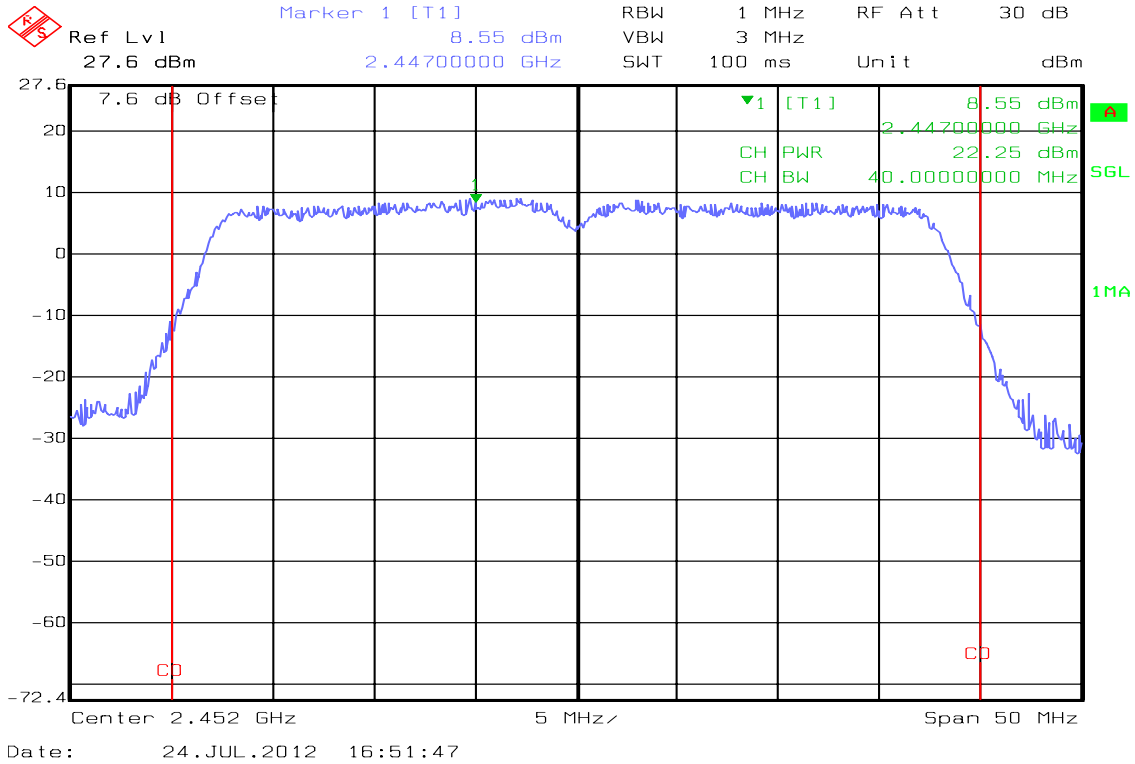


**CH Mid**



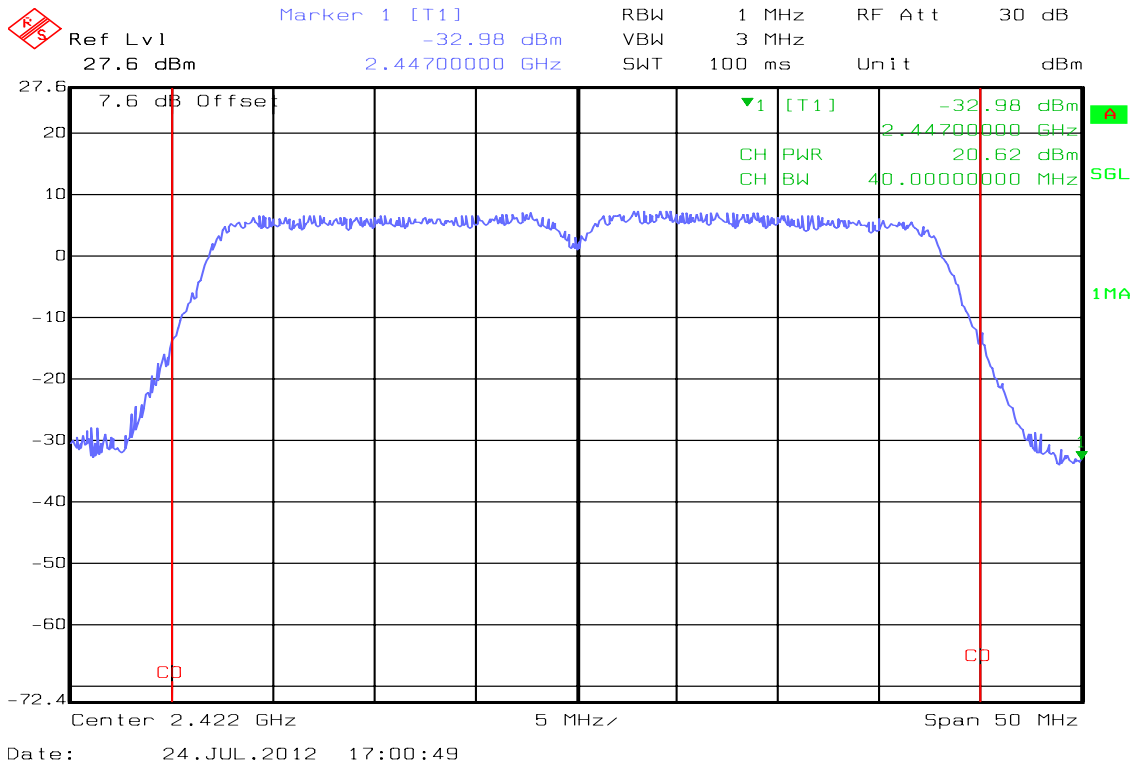


### CH High



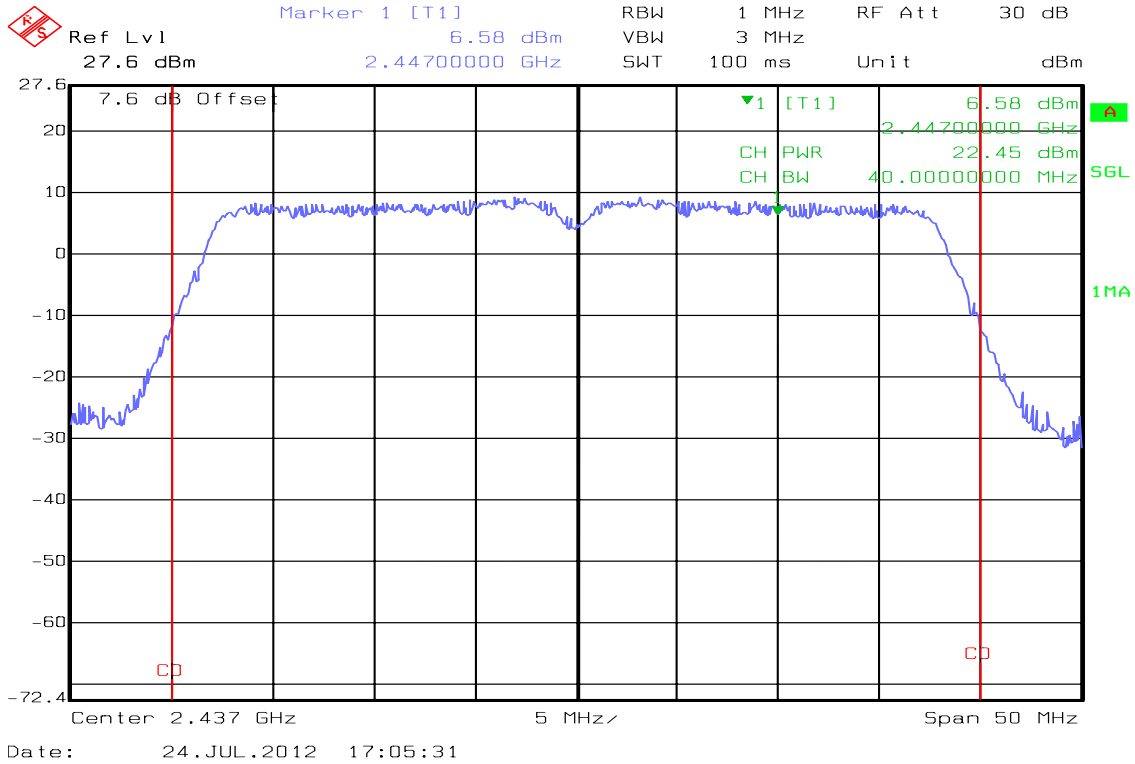
### IEEE 802.11n HT40 mode / Chain 1:

#### CH Low

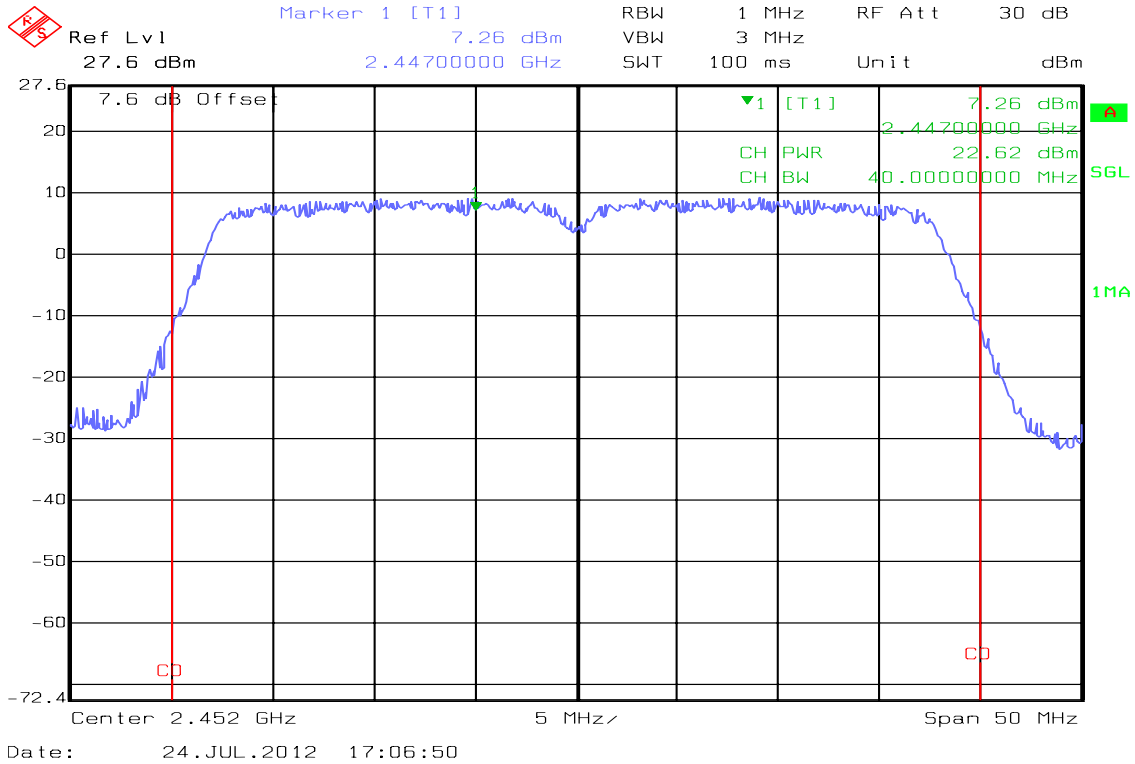




### CH Mid



### CH High



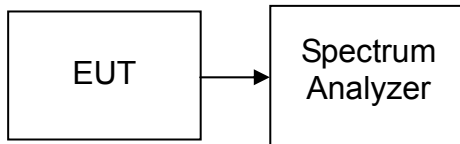


## **7.3 AVERAGE POWER**

### **LIMIT**

None; for reporting purposes only.

### **TEST CONFIGURATION**



### **TEST PROCEDURE**

**Per KDB 558074 5.2.1.2/ or 5.2.2.1.**

The transmitter output is connected to the spectrum analyzer. Set the RBW = 1MHz, VBW = 3MHz, Detector = Average, Sweep = auto couple. Record the reading.

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)	Output Power (dBm)	Output Power (W)
Low	2412	14.82	0.03034
Mid	2437	15.23	0.03334
High	2462	15.03	0.03184

#### Test mode: IEEE 802.11g mode

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)
Low	2412	16.15	0.04121
Mid	2437	15.98	0.03963
High	2462	15.67	0.03690

#### Test mode: draft 802.11n 20 MHz Channel mode

Channel	Frequency (MHz)	Output Power (dBm)			Output Power (W)		
		Chain 0	Chain 1	Total	Chain 0	Chain 1	Total
Low	2412	15.05	15.84	18.47	0.03199	0.03837	0.07036
Mid	2437	15.63	15.39	18.52	0.03656	0.03459	0.07115
High	2462	15.15	15.71	18.45	0.03273	0.03724	0.06997

#### Test mode: draft 802.11n 40 MHz Channel mode

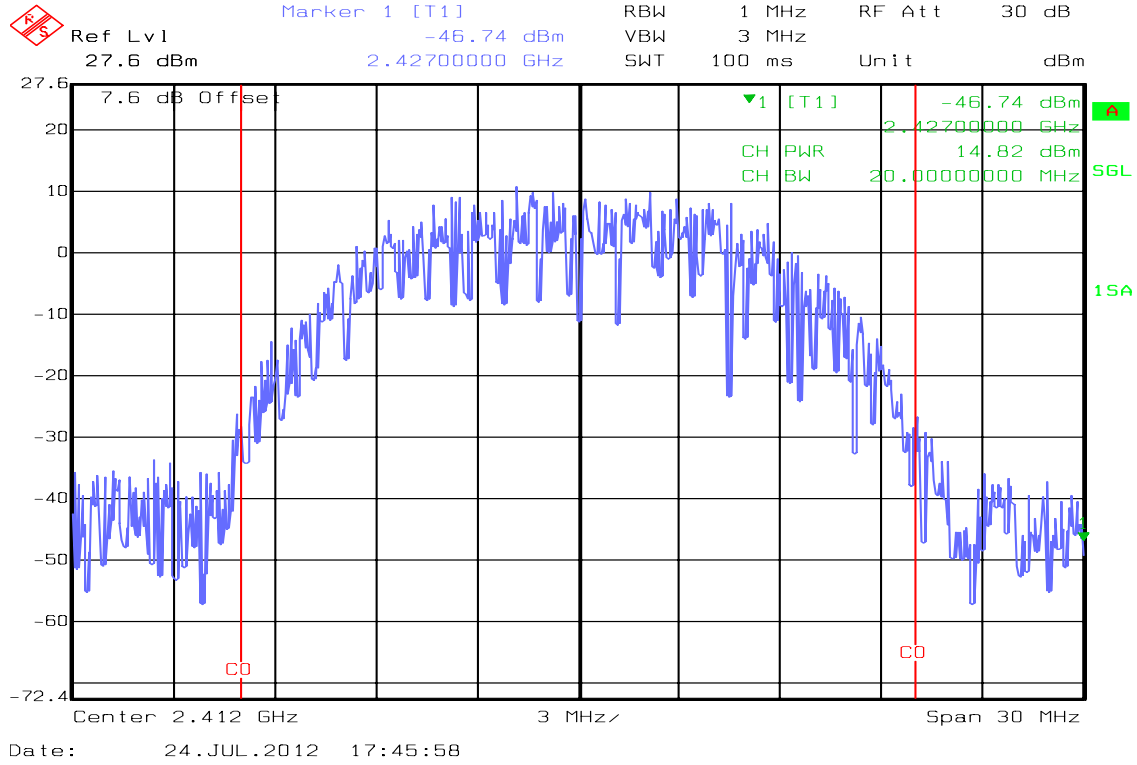
Channel	Frequency (MHz)	Output Power (dBm)			Output Power (W)		
		Chain 0	Chain 1	Total	Chain 0	Chain 1	Total
Low	2422	13.06	13.21	16.15	0.02023	0.02094	0.04117
Mid	2437	15.15	15.68	18.43	0.03273	0.03698	0.06972
High	2452	14.97	15.10	18.05	0.03141	0.03236	0.06376



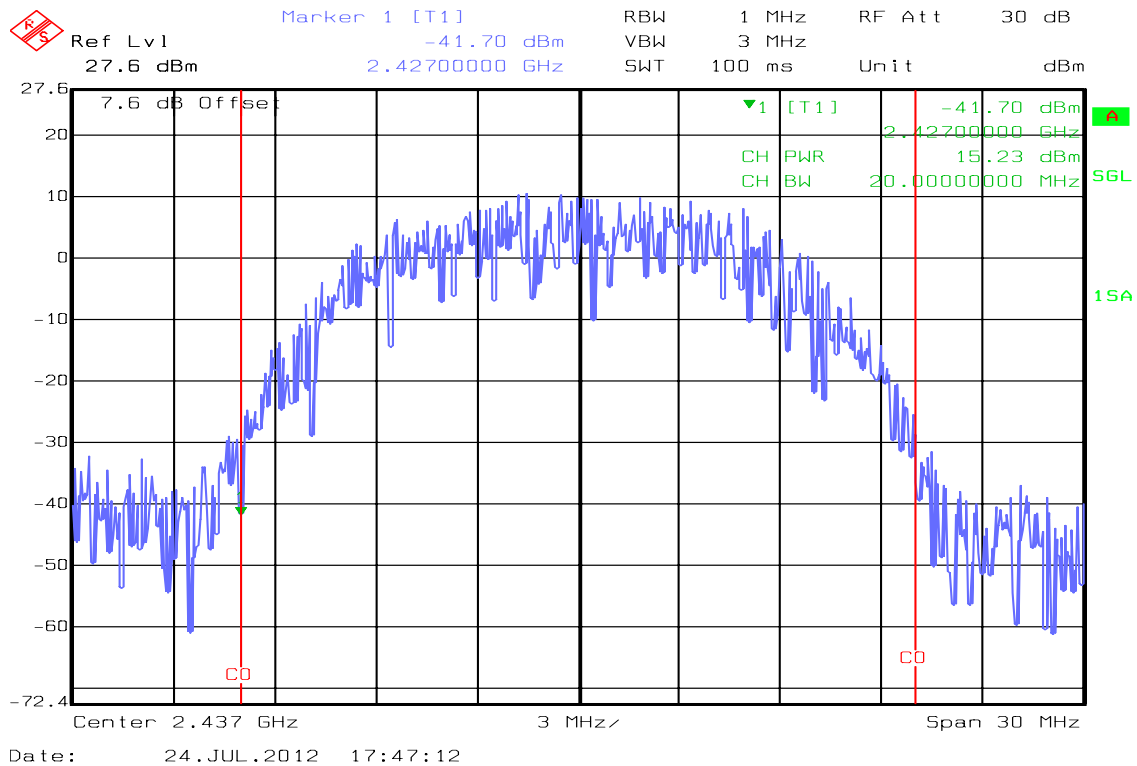
**Test Plot**

**IEEE 802.11b mode**

**CH Low**

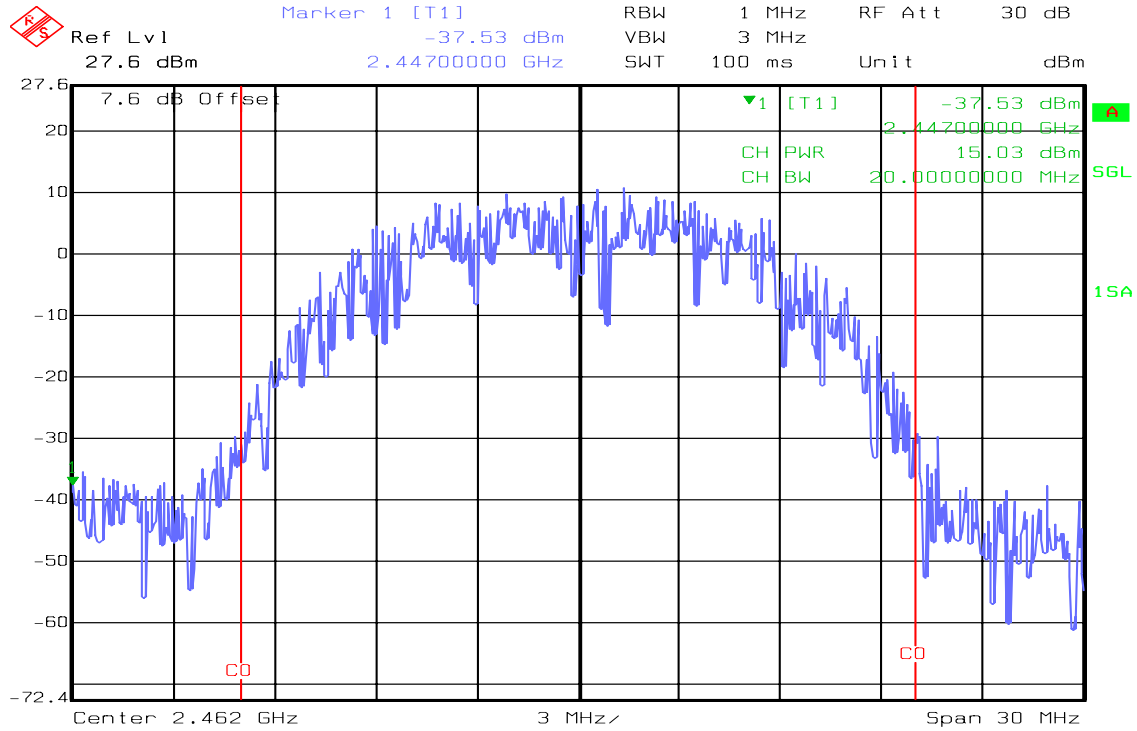


**CH Mid**





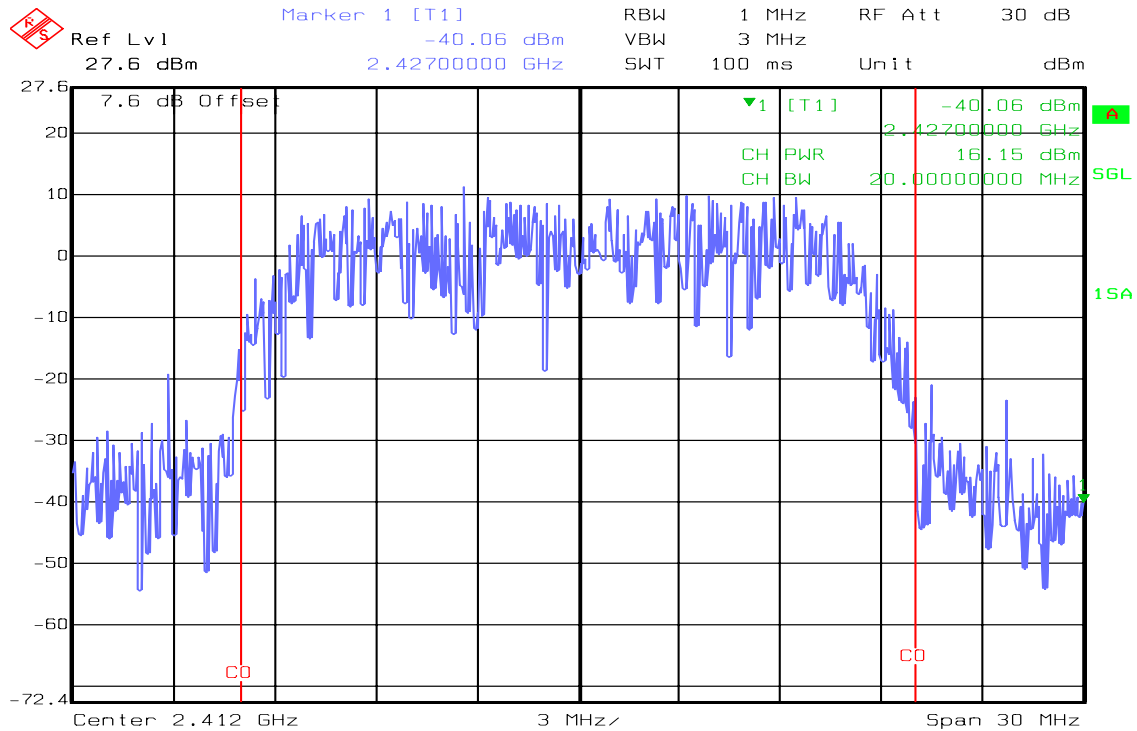
### CH High



Date: 24.JUL.2012 17:50:32

### IEEE 802.11g mode

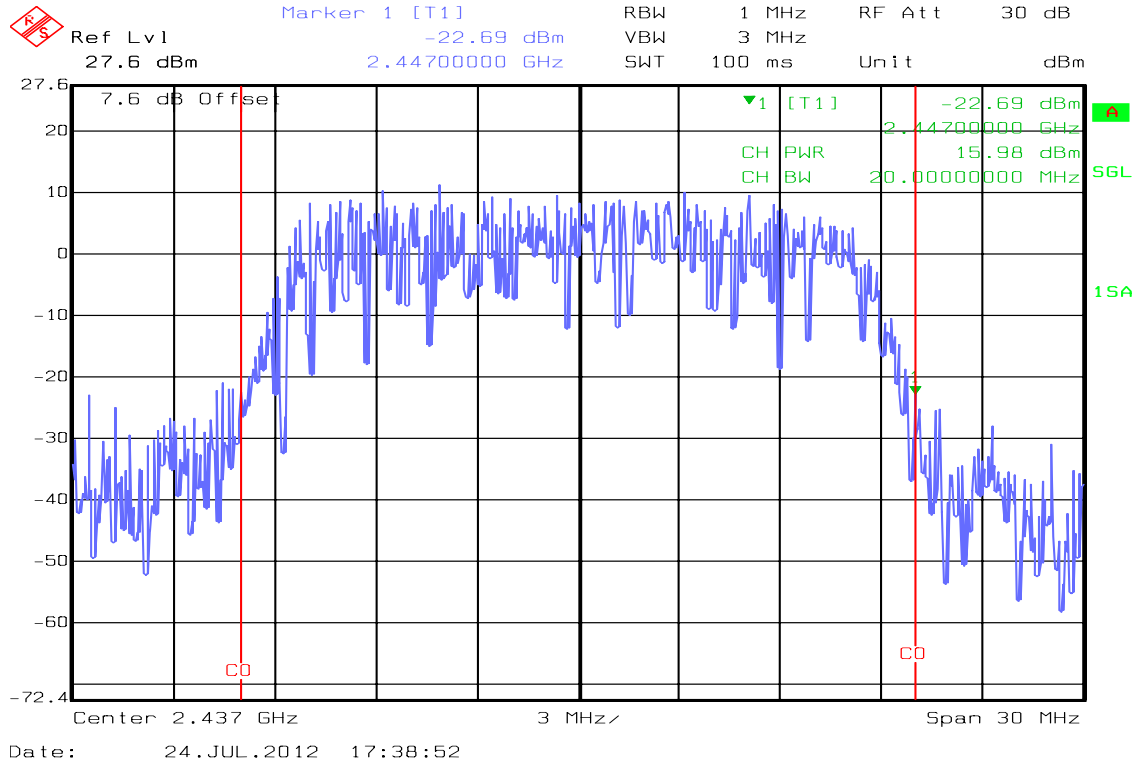
### CH Low



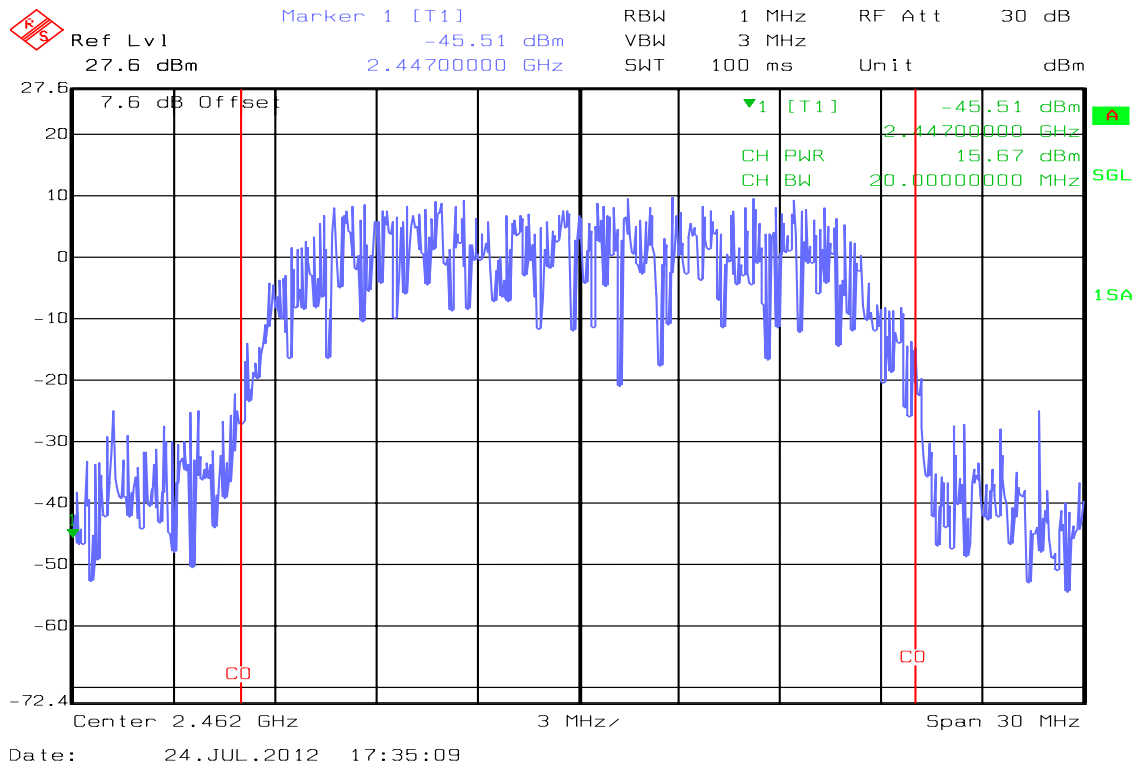
Date: 24.JUL.2012 17:40:14



### CH Mid



### CH High

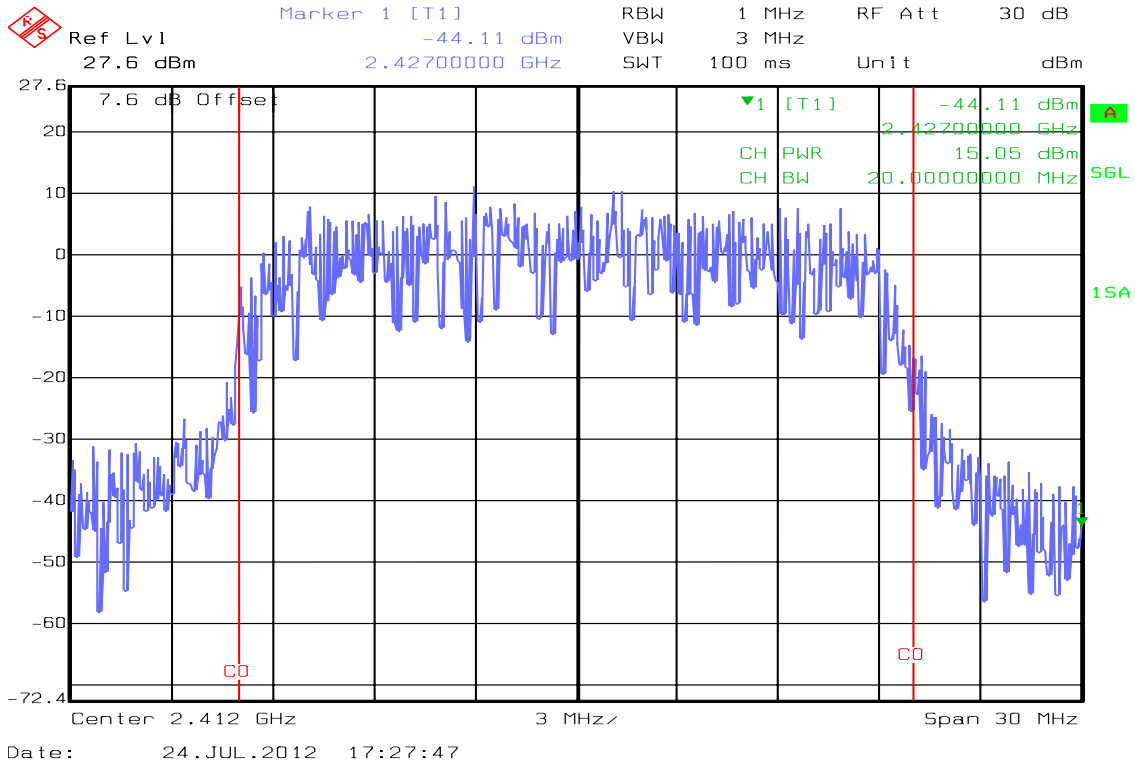




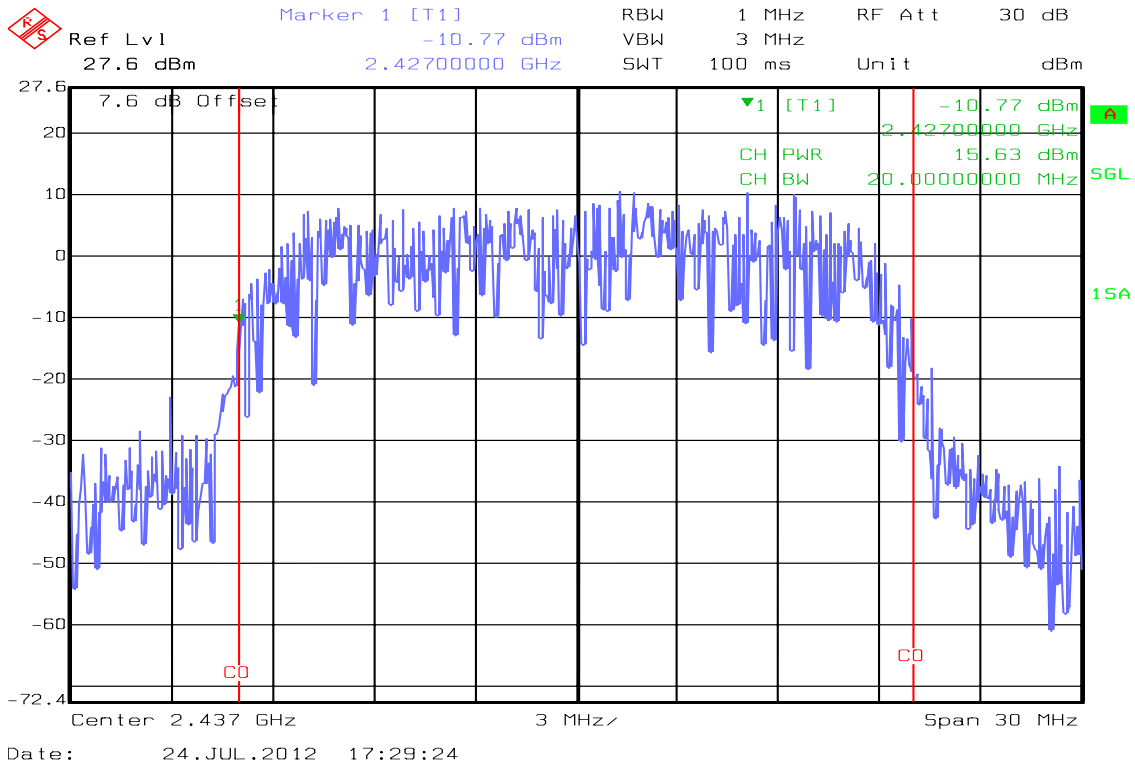


**IEEE 802.11n HT20 mode / Chain 0:**

**CH Low**

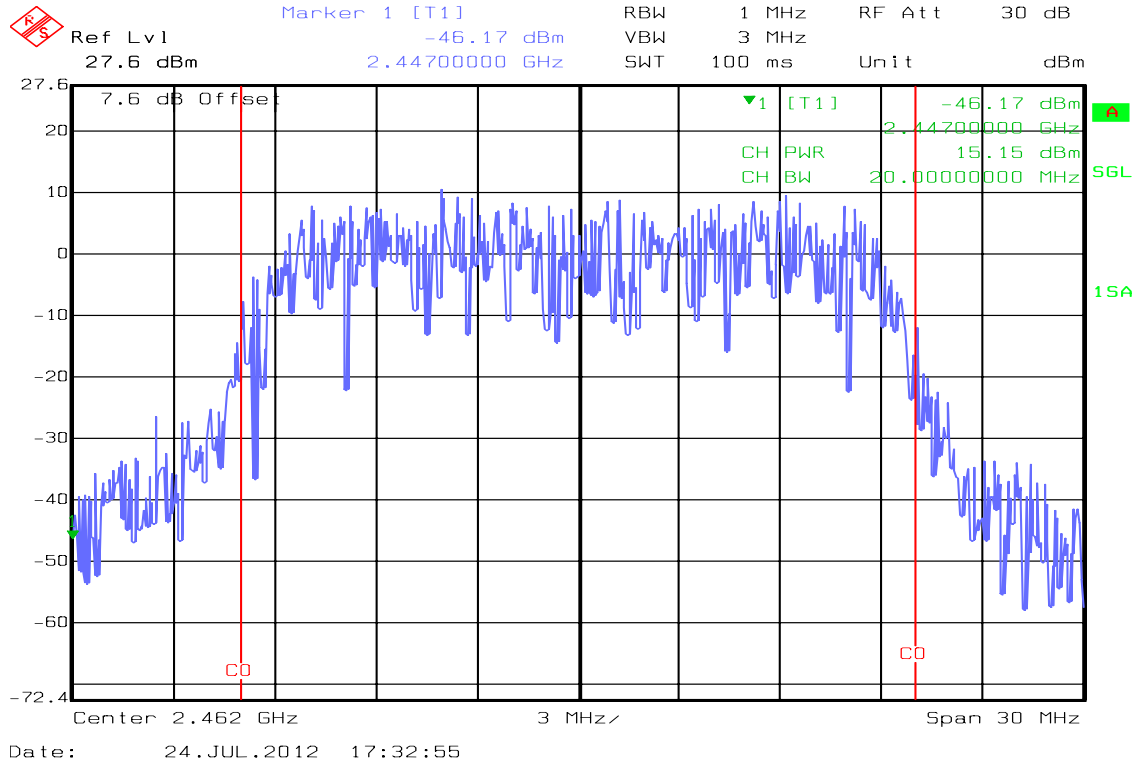


**CH Mid**



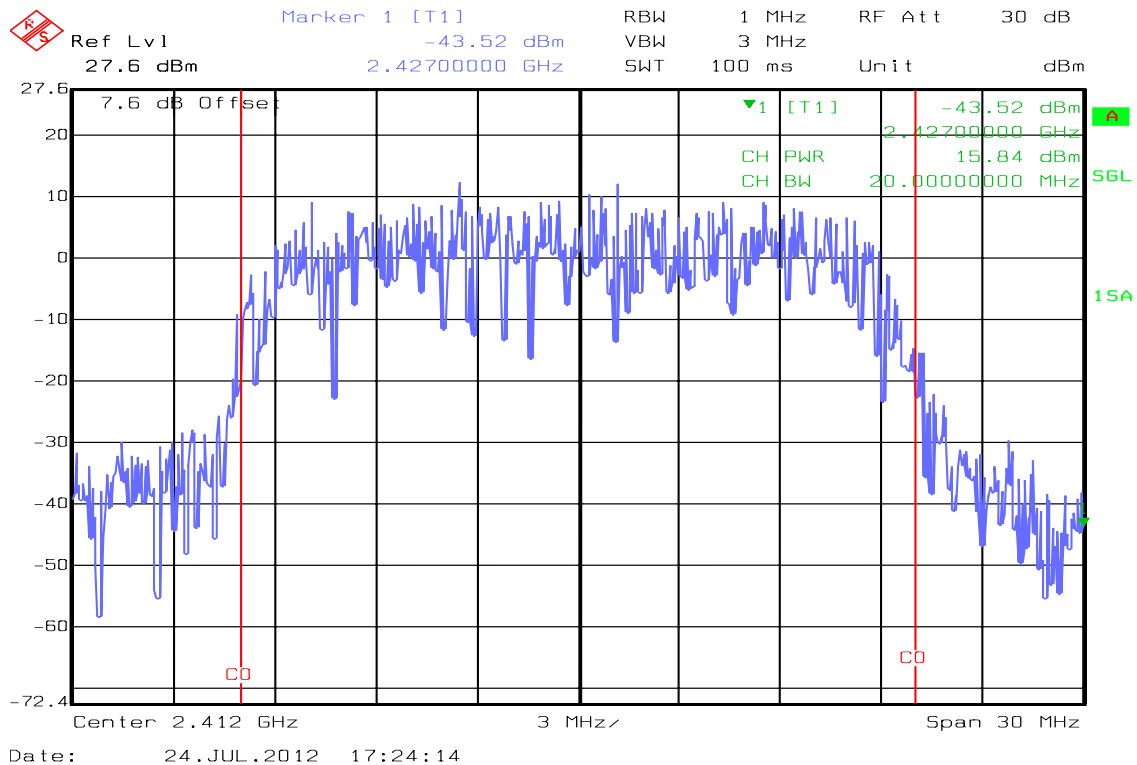


### CH High



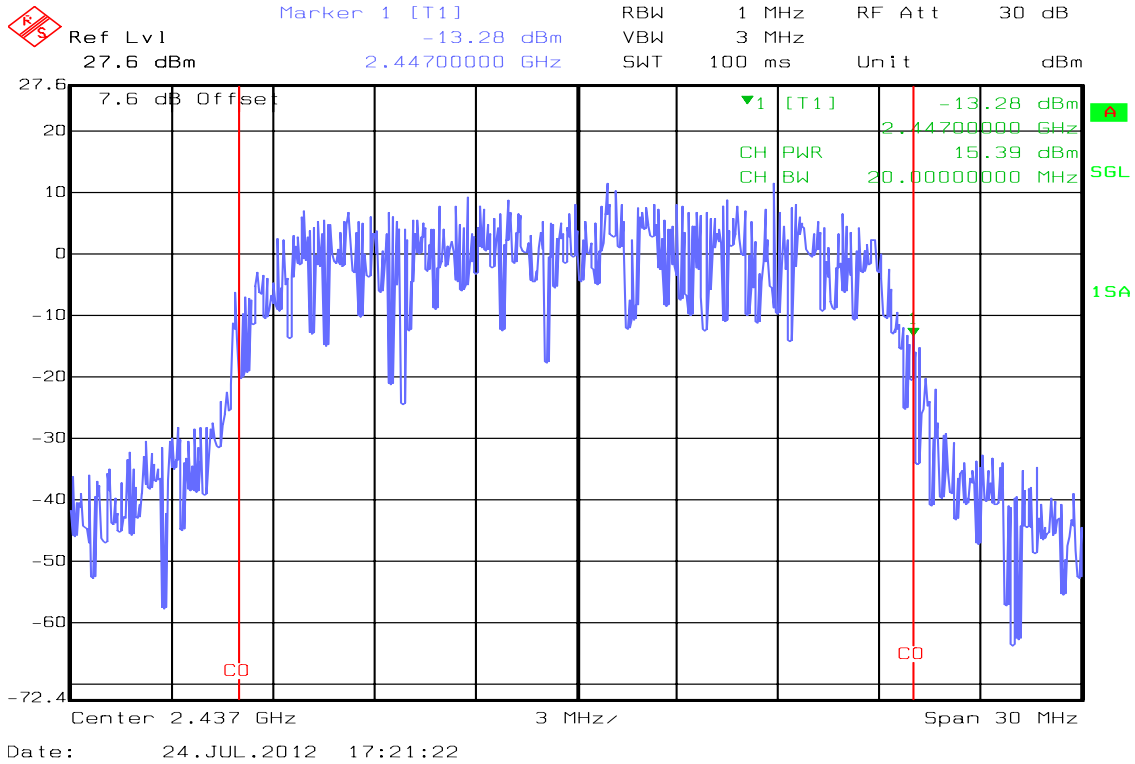
### IEEE 802.11n HT20 mode / Chain 1:

#### CH Low

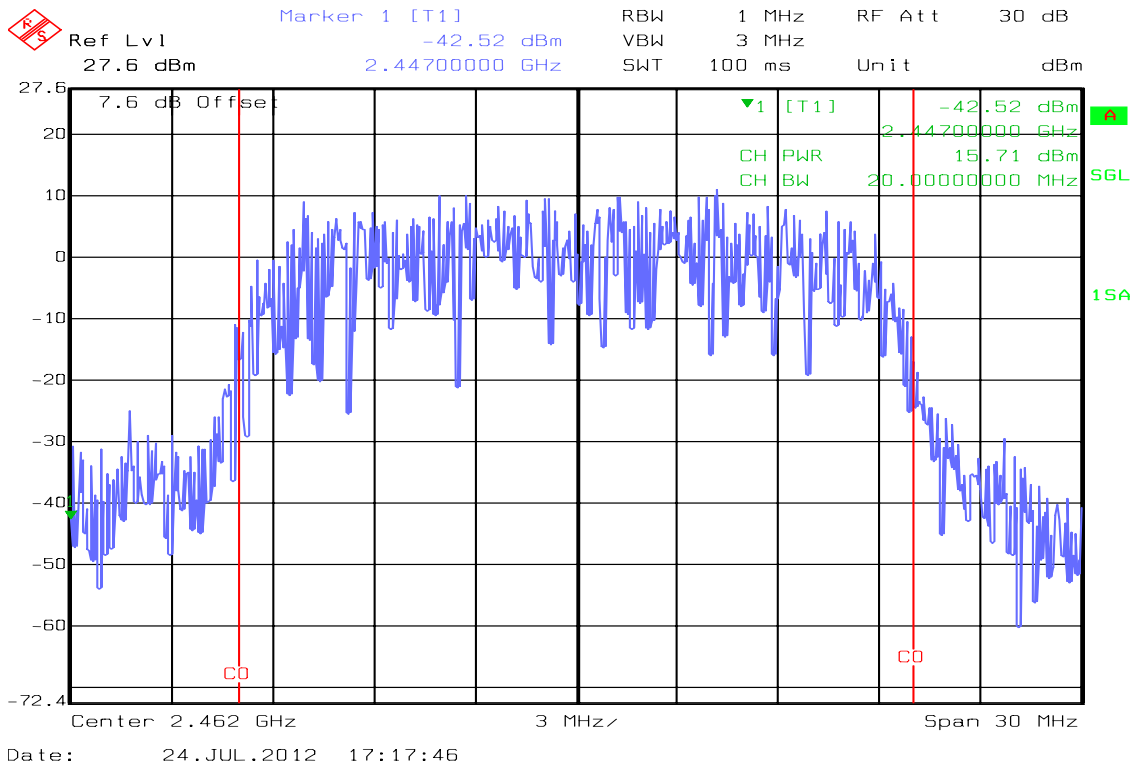




### CH Mid



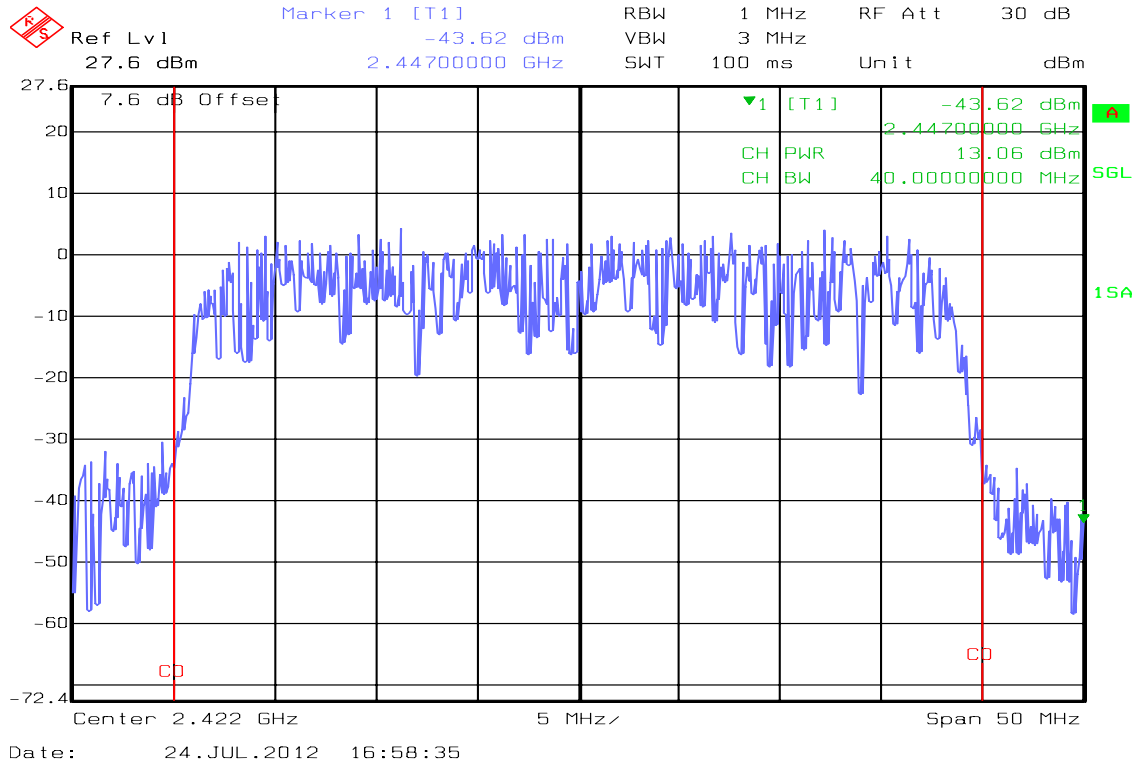
### CH High



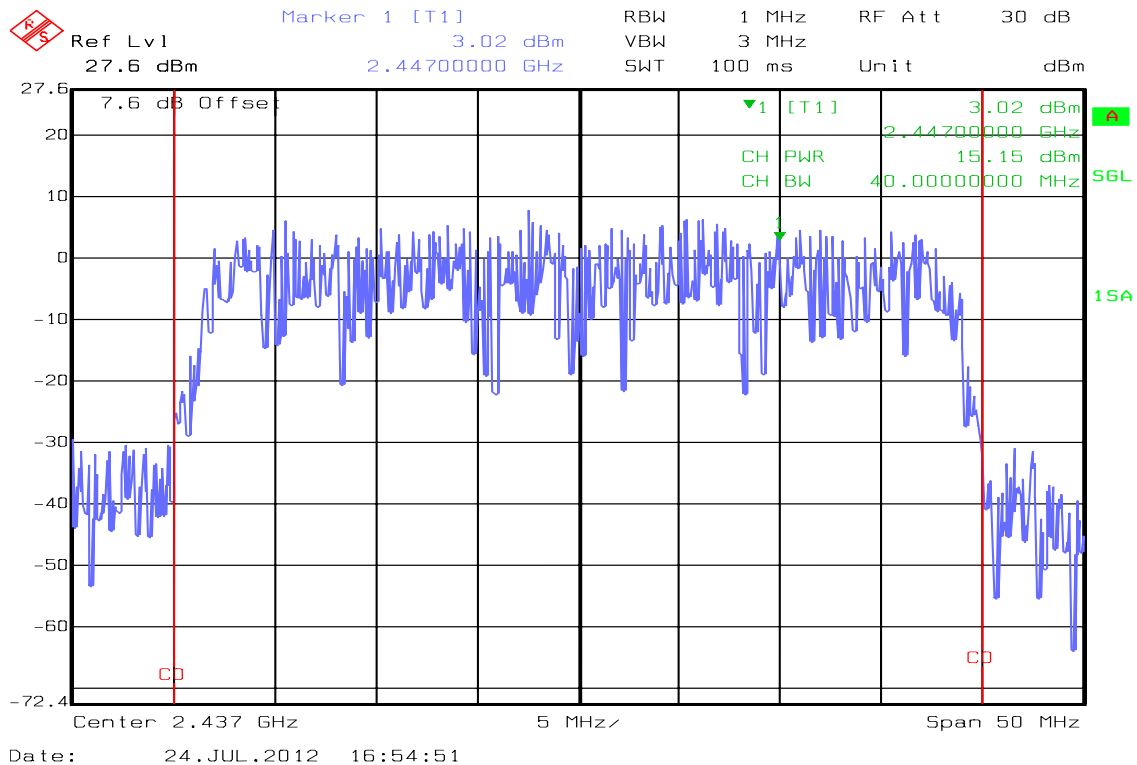


**IEEE 802.11n HT40 mode / Chain 0:**

**CH Low**

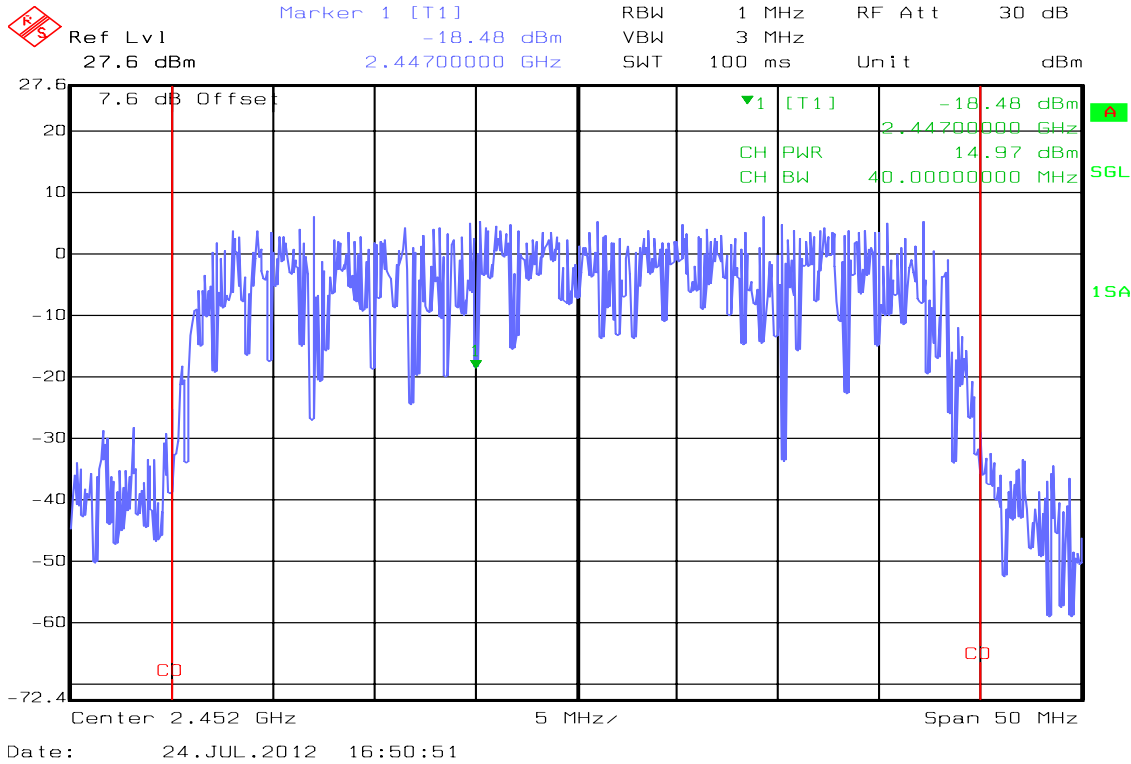


**CH Mid**



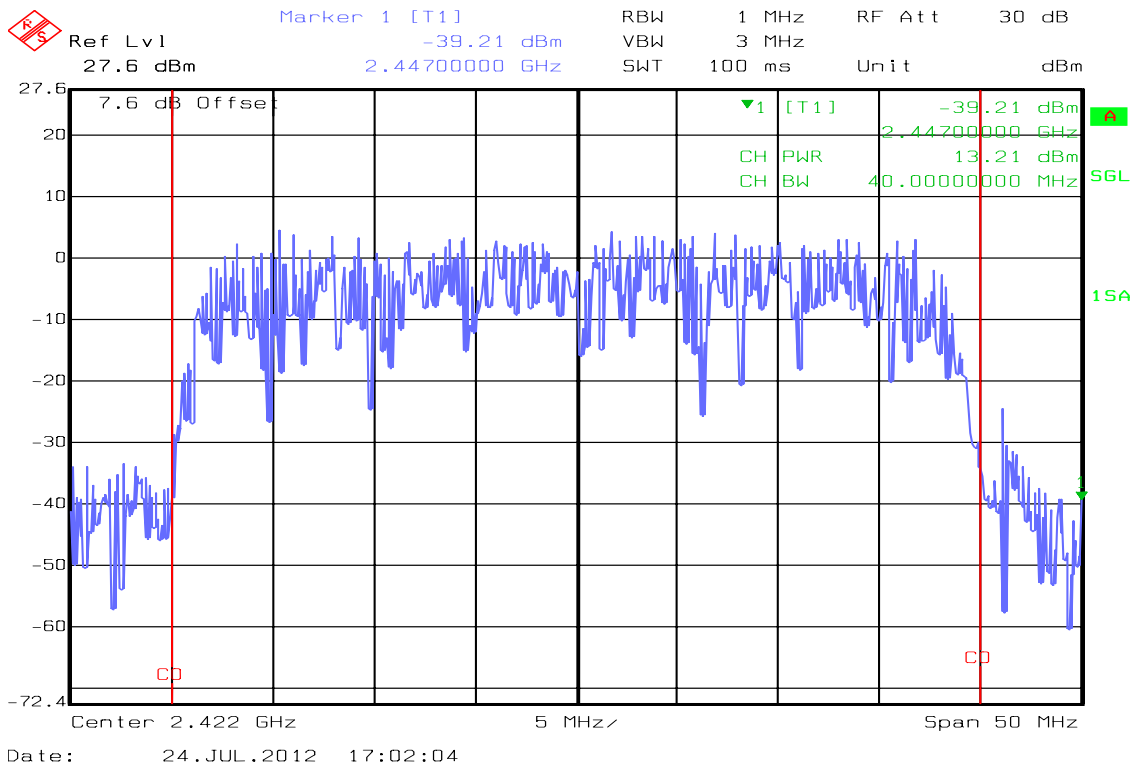


### CH High



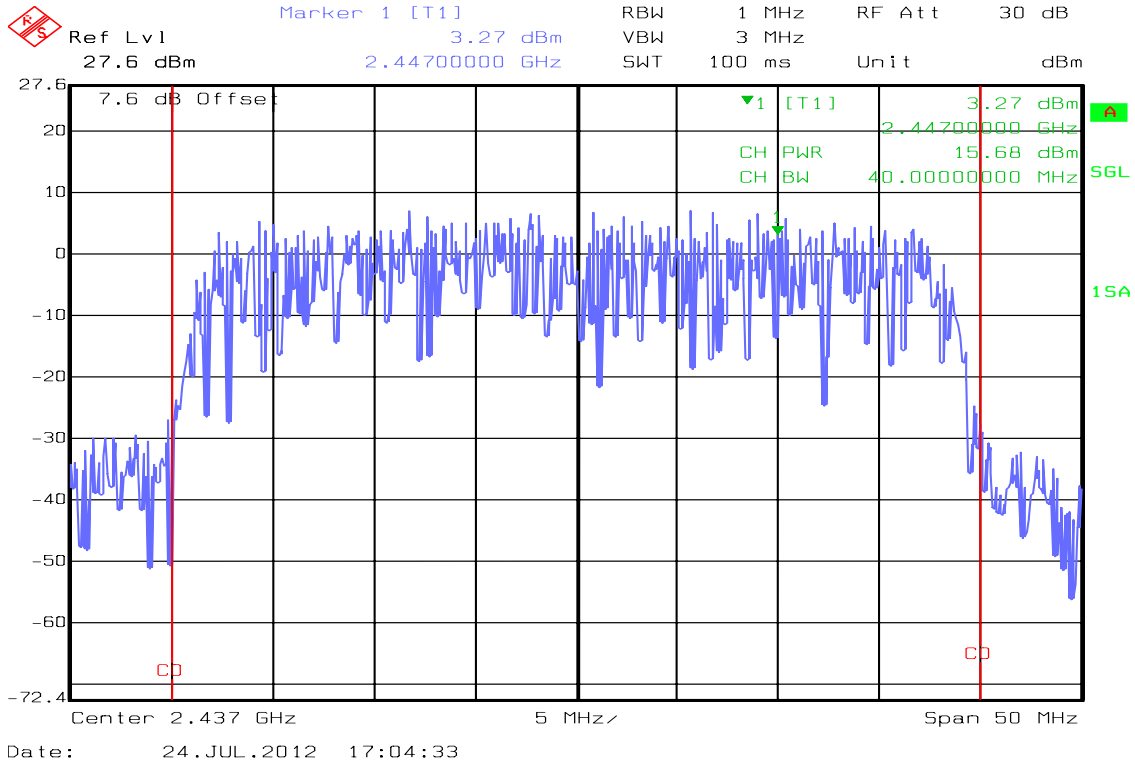
### IEEE 802.11n HT40 mode / Chain 1:

#### CH Low

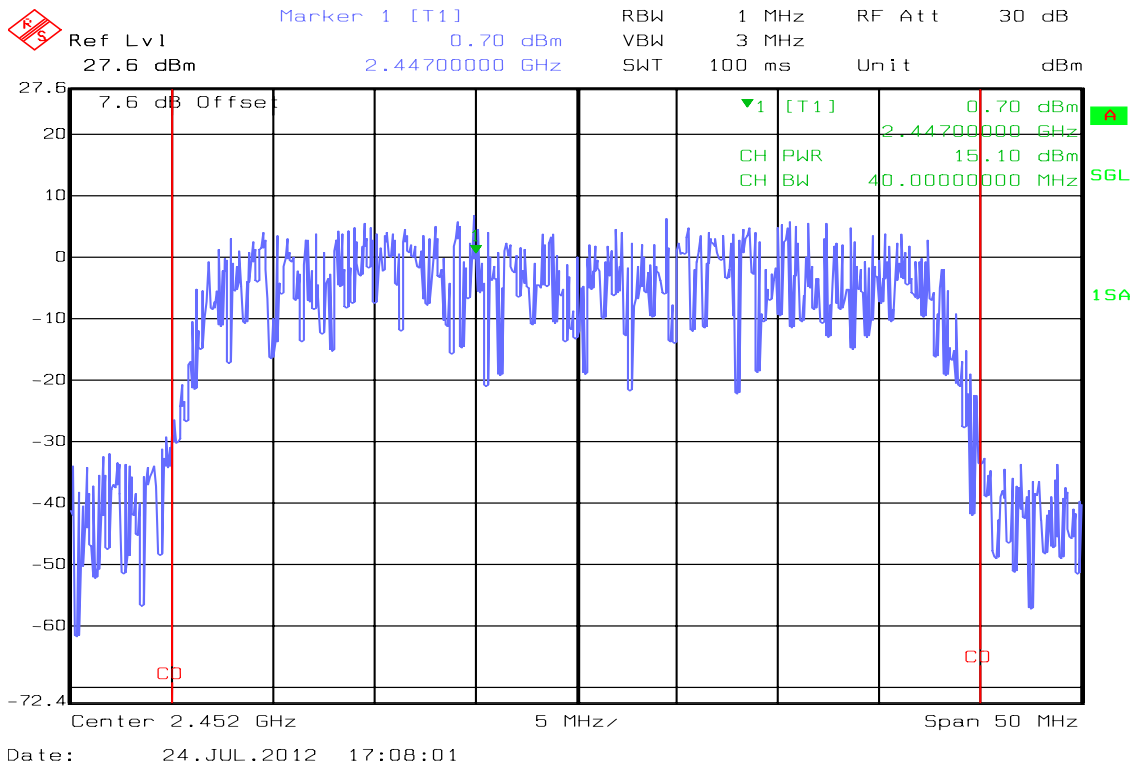




### CH Mid



### CH High



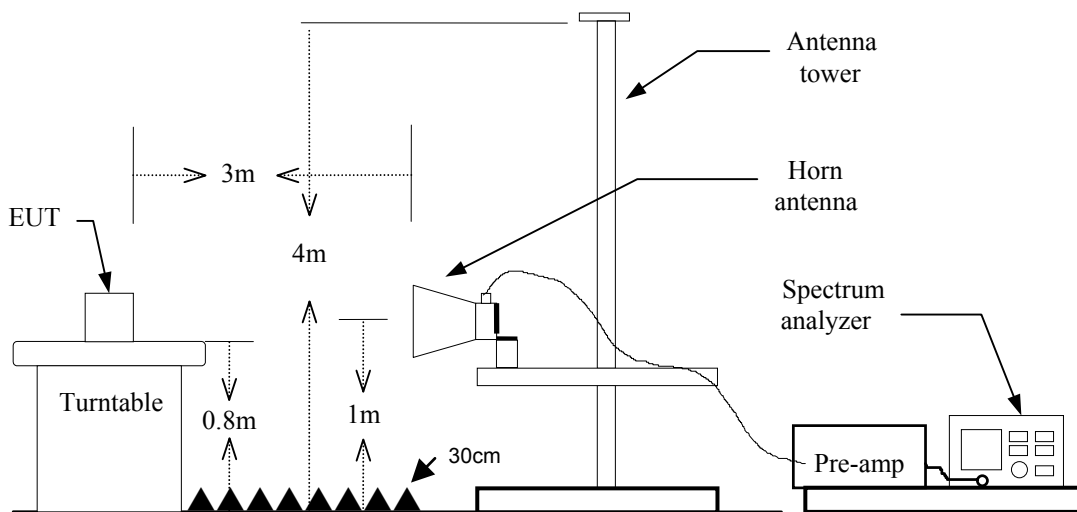


## 7.4 BAND EDGES MEASUREMENT

### 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)).

### TEST CONFIGURATION



### TEST PROCEDURE

1. The EUT is placed on a turntable, which is 0.8m above the 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 emission.
4. Set the spectrum analyzer in the following setting in order to capture the lower and upper band-edges of the emission:
  - (a) PEAK: RBW=VBW=1MHz / Sweep=100ms
  - (b) AVERAGE: RBW=1MHz / VBW=10Hz / Sweep=AUTO
5. Repeat the procedures until all the PEAK and AVERAGE versus POLARIZATION are measured.

### TEST RESULTS

Refer to attach spectrum analyzer data chart.



**Test Plot**

**Band Edges (IEEE 802.11b mode / CH Low)**

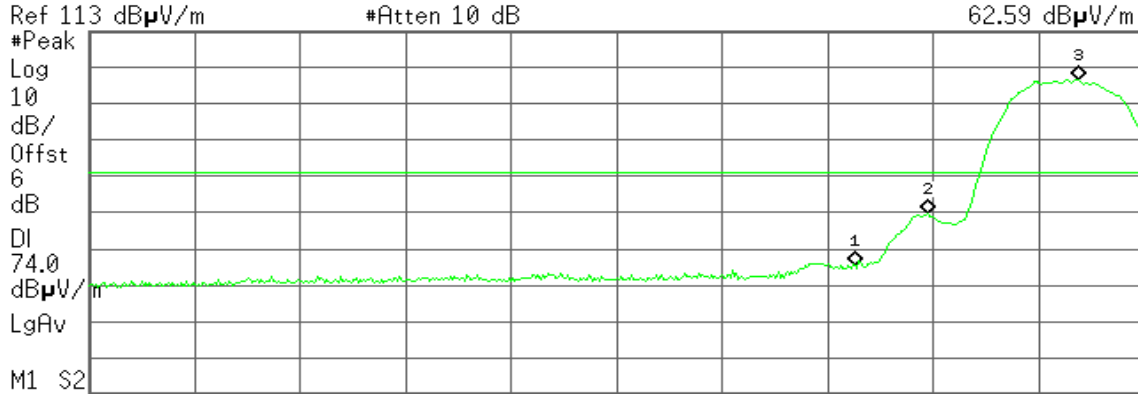
**Detector mode: Peak**

**Polarity: Vertical**

Agilent 14:34:33 Jul 18, 2012

R L

Mkr2 2.397 45 GHz  
62.59 dBµV/m



Start 2.310 00 GHz Stop 2.420 00 GHz  
#Res BW 1 MHz #VBW 1 MHz #Sweep 100 ms (601 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.390 00 GHz	48.67 dBµV/m
2	(1)	Freq	2.397 45 GHz	62.59 dBµV/m
3	(1)	Freq	2.413 22 GHz	99.64 dBµV/m

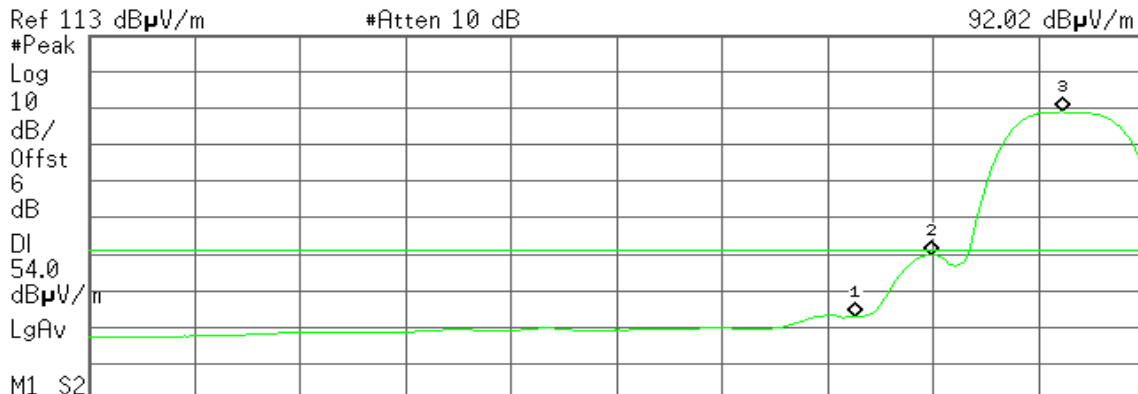
**Detector mode: Average**

**Polarity: Vertical**

Agilent 14:36:49 Jul 18, 2012

R L

Mkr3 2.411 57 GHz  
92.02 dBµV/m



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	35.90 dBµV/m
2	(1)	Freq	2.397 82 GHz	52.66 dBµV/m
3	(1)	Freq	2.411 57 GHz	92.02 dBµV/m



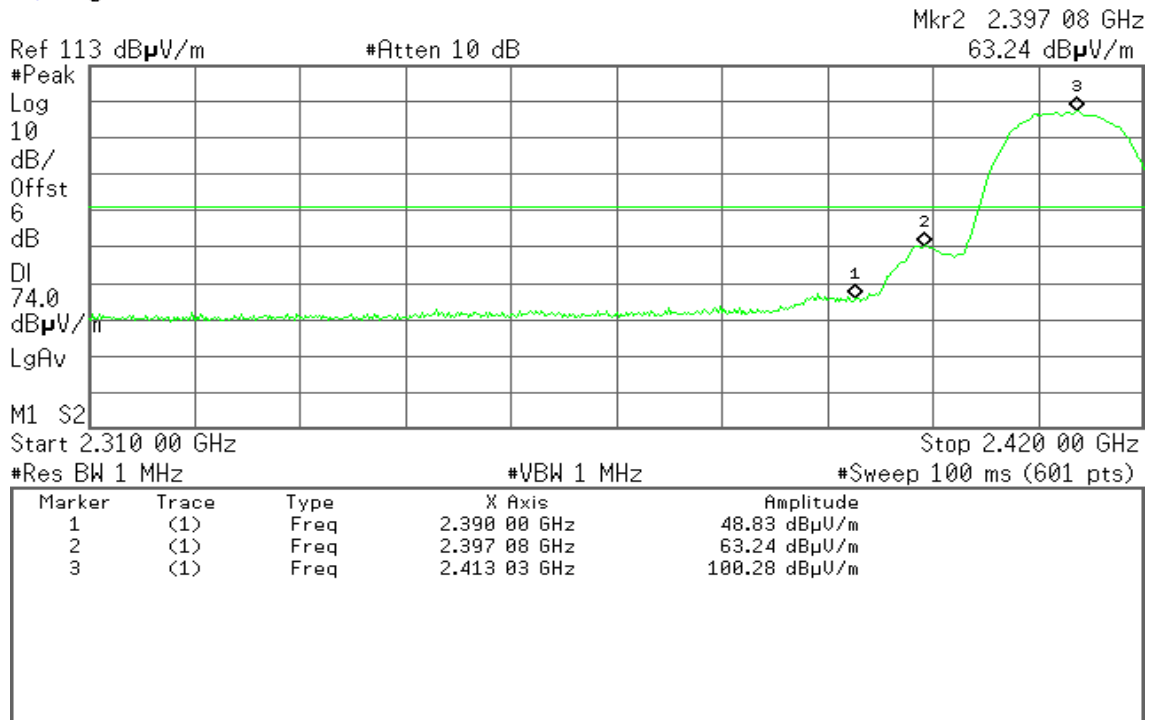


Detector mode: Peak

Polarity: Horizontal

Agilent 14:40:15 Jul 18, 2012

R L

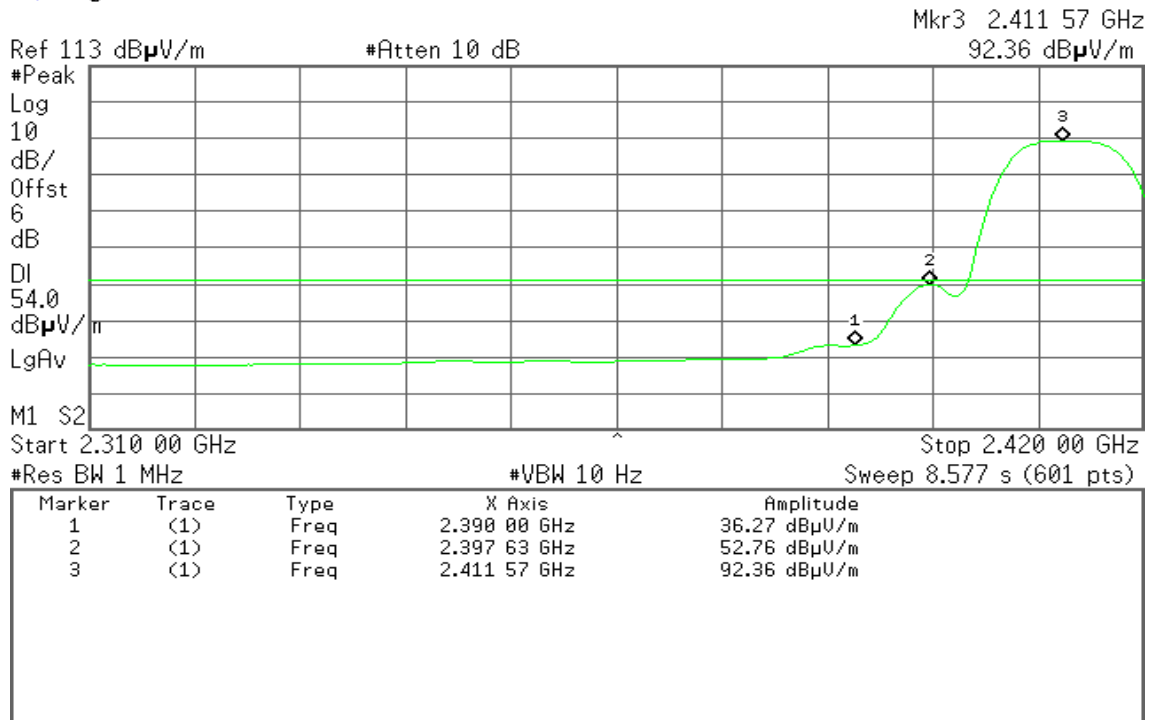


Detector mode: Average

Polarity: Horizontal

Agilent 14:46:17 Jul 18, 2012

R L





### Band Edges (IEEE 802.11b mode / CH High)

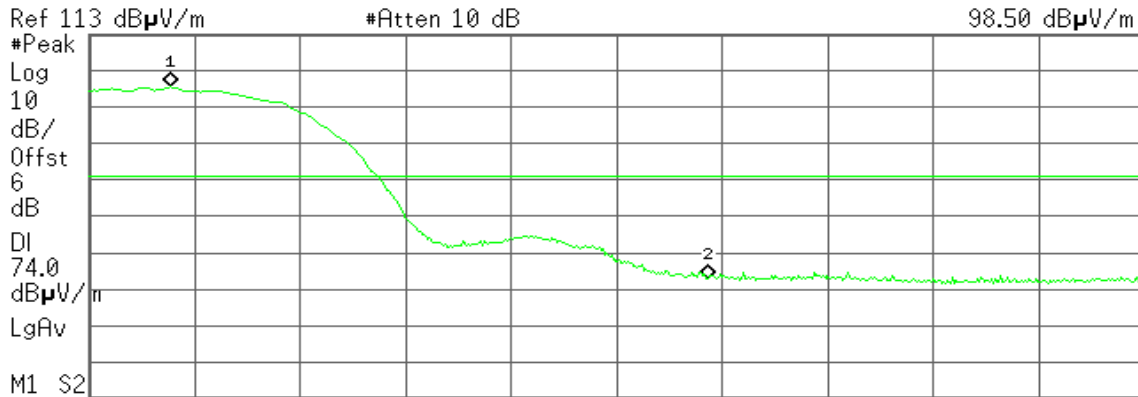
Detector mode: Peak

Polarity: Vertical

Agilent 16:05:15 Jul 18, 2012

R L

Mkr1 2.463 07 GHz  
98.50 dBμV/m



Start 2.460 00 GHz Stop 2.500 00 GHz  
#Res BW 1 MHz #VBW 1 MHz #Sweep 100 ms (601 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.463 07 GHz	98.50 dBμV/m
2	(1)	Freq	2.483 50 GHz	45.86 dBμV/m

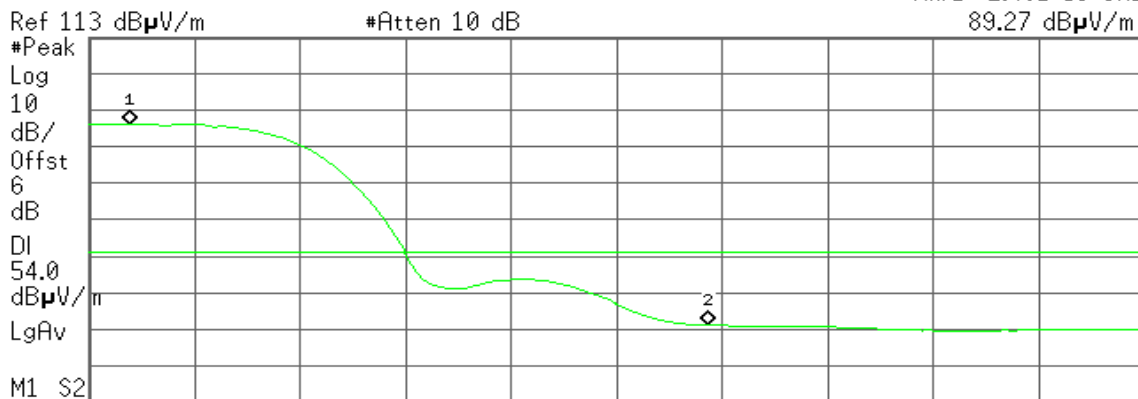
Detector mode: Average

Polarity: Vertical

Agilent 16:07:55 Jul 18, 2012

R L

Mkr1 2.461 53 GHz  
89.27 dBμV/m



Start 2.460 00 GHz Stop 2.500 00 GHz  
#Res BW 1 MHz #VBW 10 Hz Sweep 3.119 s (601 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.461 53 GHz	89.27 dBμV/m
2	(1)	Freq	2.483 50 GHz	34.13 dBμV/m



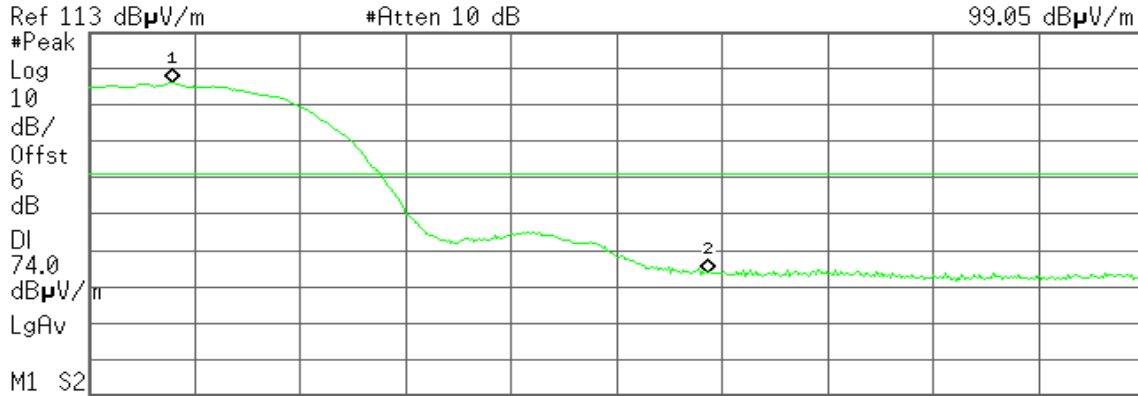
Detector mode: Peak

Polarity: Horizontal

Agilent 15:59:54 Jul 18, 2012

R L

Mkr1 2.463 13 GHz  
99.05 dBμV/m



Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.463 13 GHz	99.05 dBμV/m
2	(1)	Freq	2.483 50 GHz	46.90 dBμV/m

#Res BW 1 MHz #VBW 1 MHz #Sweep 100 ms (601 pts)

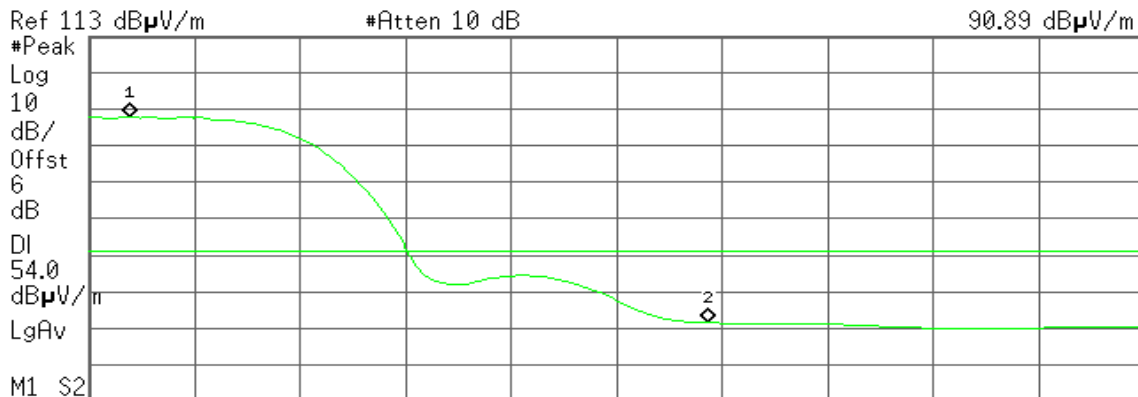
Detector mode: Average

Polarity: Horizontal

Agilent 16:01:13 Jul 18, 2012

R L

Mkr1 2.461 53 GHz  
90.89 dBμV/m



Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.461 53 GHz	90.89 dBμV/m
2	(1)	Freq	2.483 50 GHz	34.52 dBμV/m

#Res BW 1 MHz #VBW 10 Hz Sweep 3.119 s (601 pts)



Band Edges (IEEE 802.11g mode / CH Low)

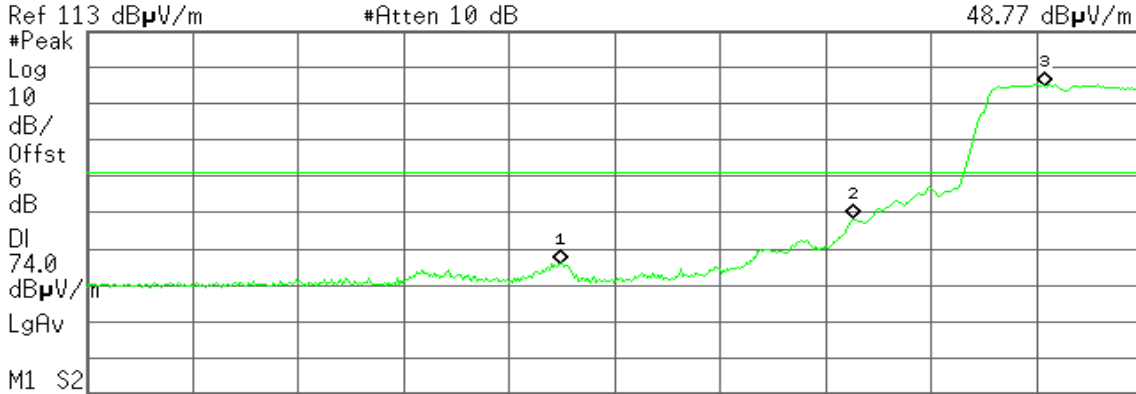
Detector mode: Peak

Polarity: Vertical

Agilent 15:12:12 Jul 18, 2012

R L

Mkr1 2.359 38 GHz  
48.77 dBµV/m



Start 2.310 00 GHz Stop 2.420 00 GHz  
#Res BW 1 MHz #VBW 1 MHz #Sweep 100 ms (601 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.359 38 GHz	48.77 dBµV/m
2	(1)	Freq	2.390 00 GHz	61.26 dBµV/m
3	(1)	Freq	2.409 92 GHz	97.90 dBµV/m

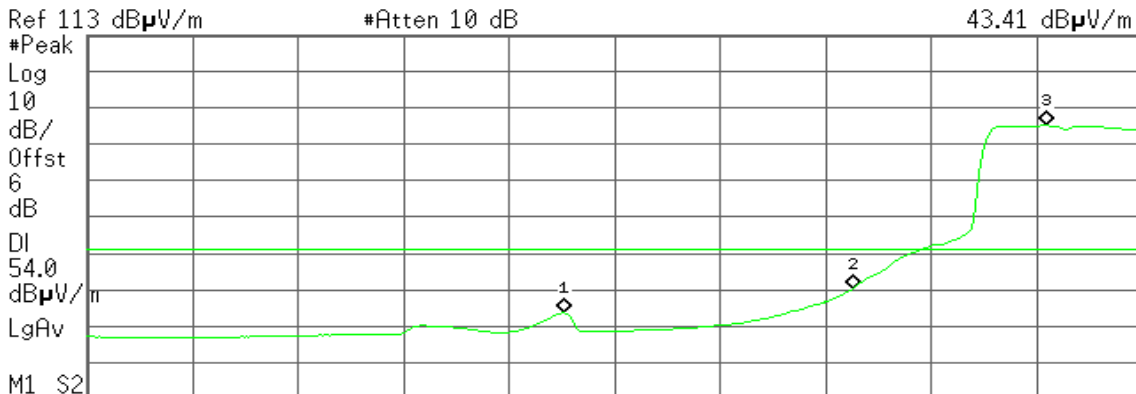
Detector mode: Average

Polarity: Vertical

Agilent 15:14:08 Jul 18, 2012

R L

Mkr2 2.390 00 GHz  
43.41 dBµV/m



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	2.359 75 GHz	36.70 dBµV/m
2	(1)	Freq	2.390 00 GHz	43.41 dBµV/m
3	(1)	Freq	2.410 10 GHz	88.28 dBµV/m

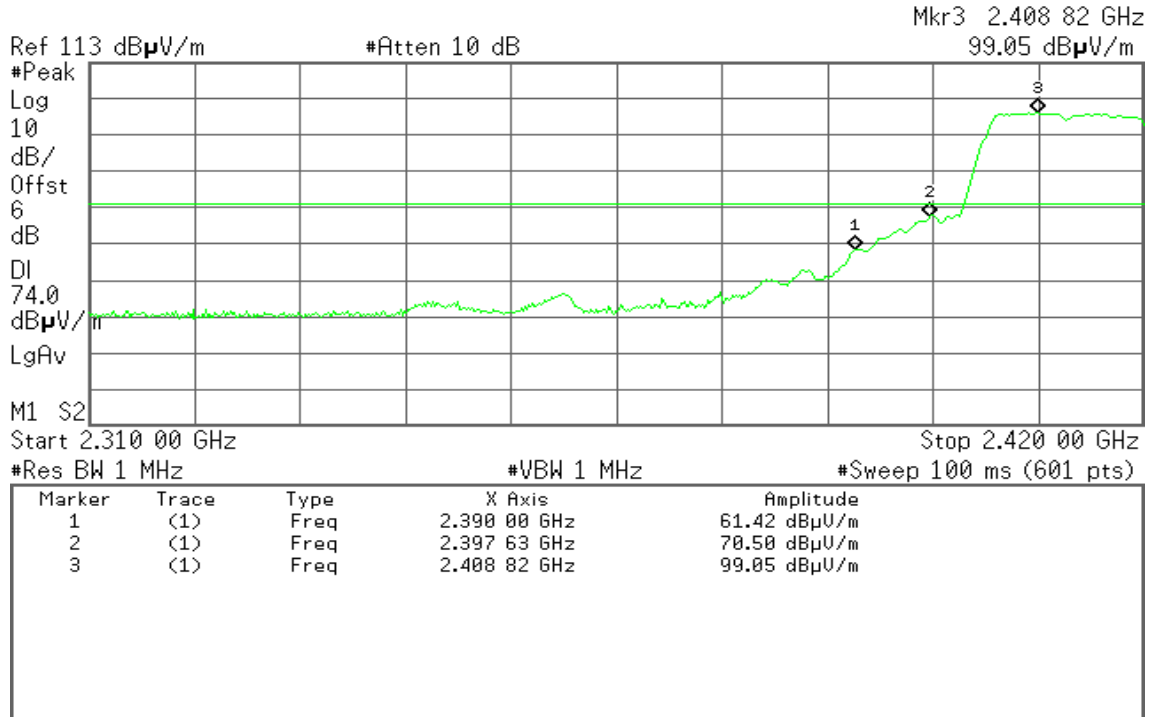


Detector mode: Peak

Polarity: Horizontal

Agilent 14:52:20 Jul 18, 2012

R T

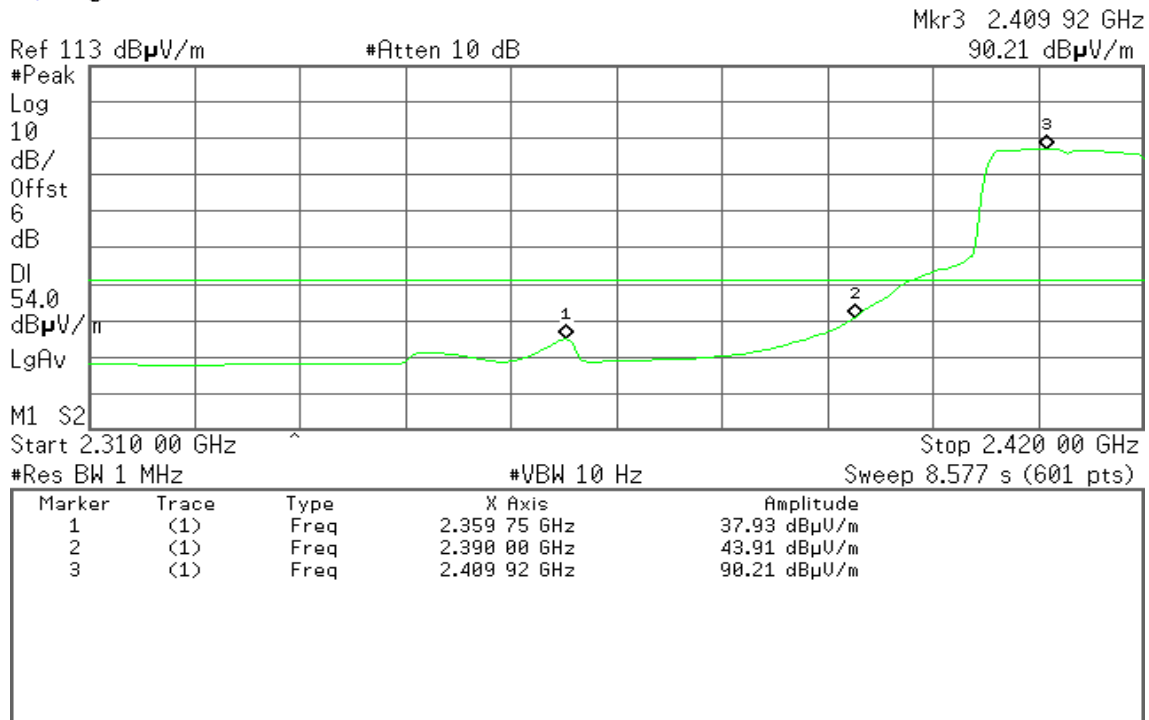


Detector mode: Average

Polarity: Horizontal

Agilent 15:06:54 Jul 18, 2012

R L





Band Edges (IEEE 802.11g mode / CH High)

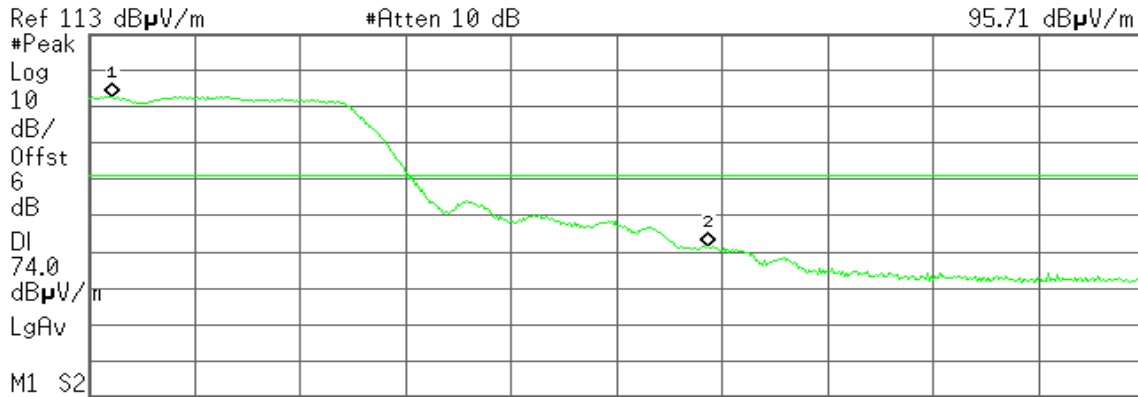
Detector mode: Peak

Polarity: Vertical

Agilent 15:45:43 Jul 18, 2012

R L

Mkr1 2.460 87 GHz  
95.71 dBµV/m



Start 2.460 00 GHz Stop 2.500 00 GHz  
#Res BW 1 MHz #VBW 1 MHz #Sweep 100 ms (601 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.460 87 GHz	95.71 dBµV/m
2	(1)	Freq	2.483 50 GHz	54.44 dBµV/m

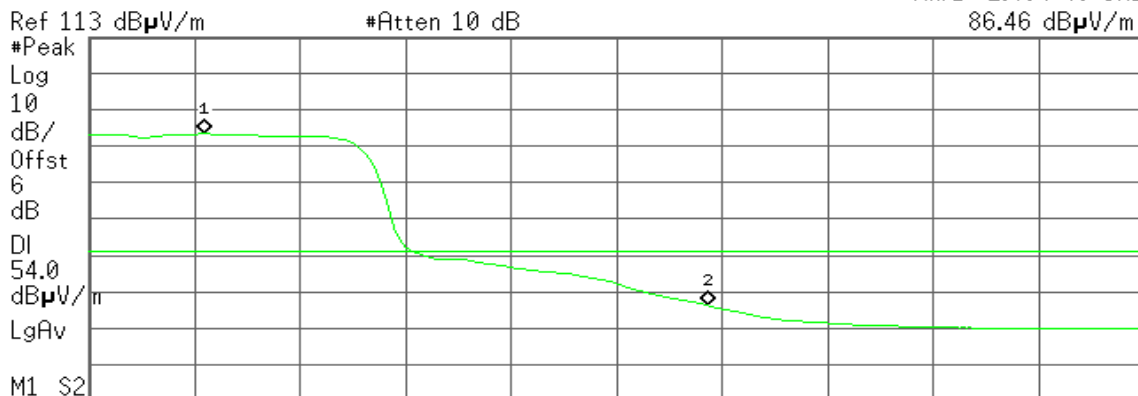
Detector mode: Average

Polarity: Vertical

Agilent 15:51:38 Jul 18, 2012

R L

Mkr1 2.464 40 GHz  
86.46 dBµV/m



Start 2.460 00 GHz Stop 2.500 00 GHz  
#Res BW 1 MHz #VBW 10 Hz Sweep 3.119 s (601 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.464 40 GHz	86.46 dBµV/m
2	(1)	Freq	2.483 50 GHz	39.29 dBµV/m



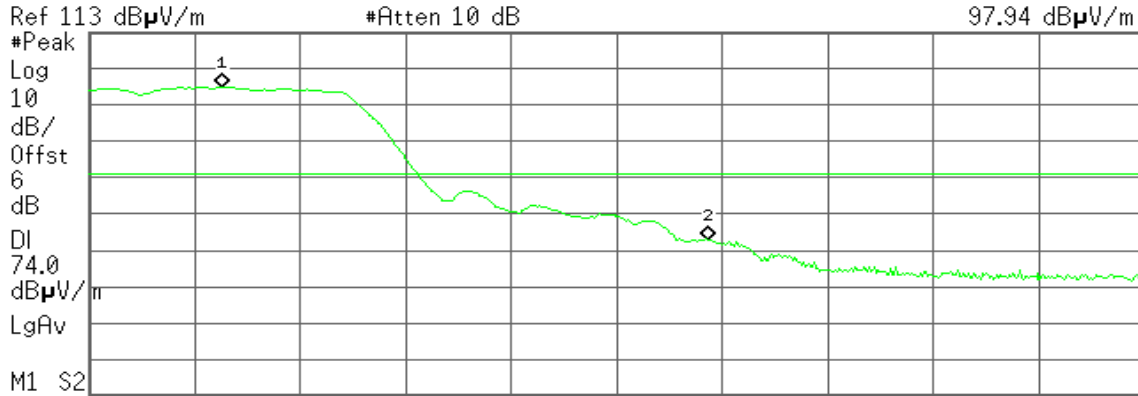
Detector mode: Peak

Polarity: Horizontal

Agilent 15:54:12 Jul 18, 2012

R L

Mkr1 2.465 07 GHz  
97.94 dBµV/m



Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.465 07 GHz	97.94 dBµV/m
2	(1)	Freq	2.483 50 GHz	55.75 dBµV/m

#Res BW 1 MHz #VBW 1 MHz #Sweep 100 ms (601 pts)

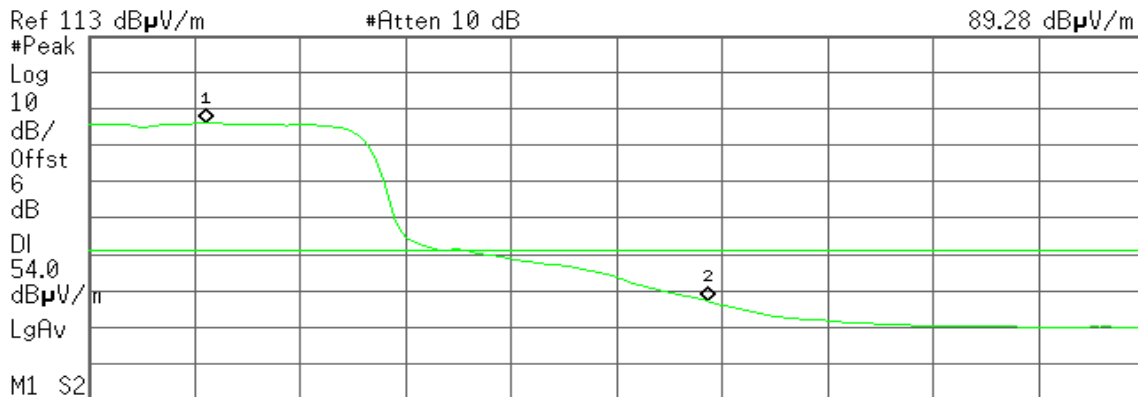
Detector mode: Average

Polarity: Horizontal

Agilent 15:55:58 Jul 18, 2012

R L

Mkr1 2.464 47 GHz  
89.28 dBµV/m



Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.464 47 GHz	89.28 dBµV/m
2	(1)	Freq	2.483 50 GHz	40.19 dBµV/m

#Res BW 1 MHz #VBW 10 Hz Sweep 3.119 s (601 pts)



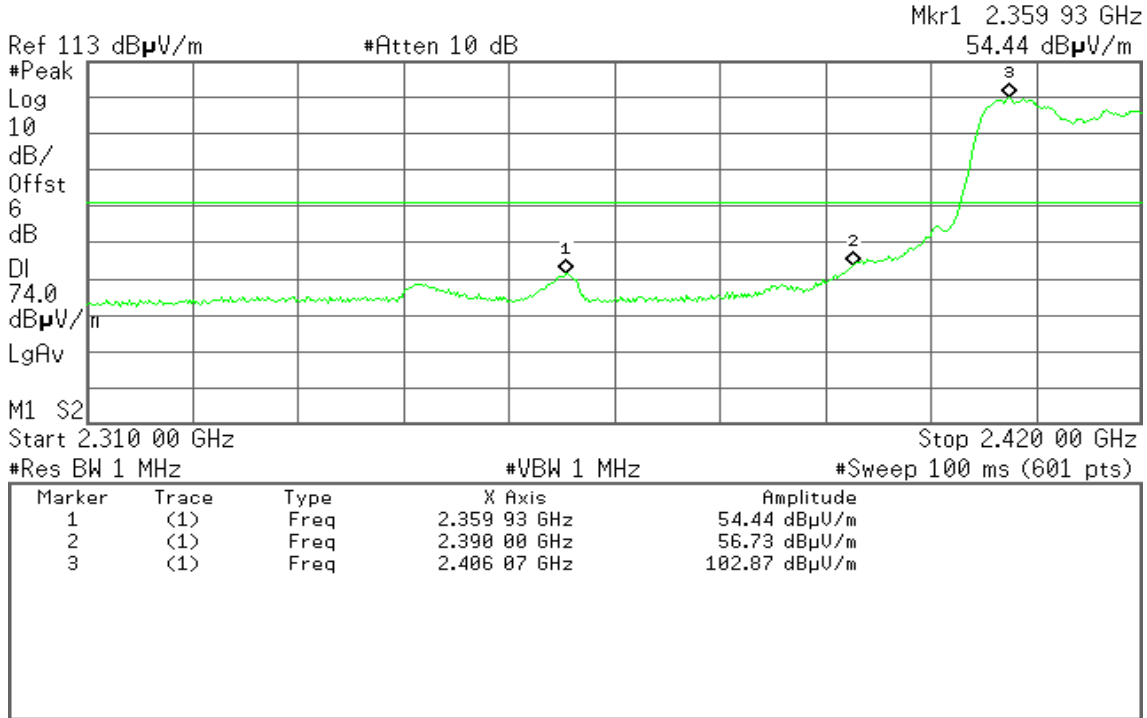
Band Edges (draft 802.11n 20 MHz Channel mode / CH Low)

Detector mode: Peak

Polarity: Vertical

Agilent 15:20:18 Jul 18, 2012

R L

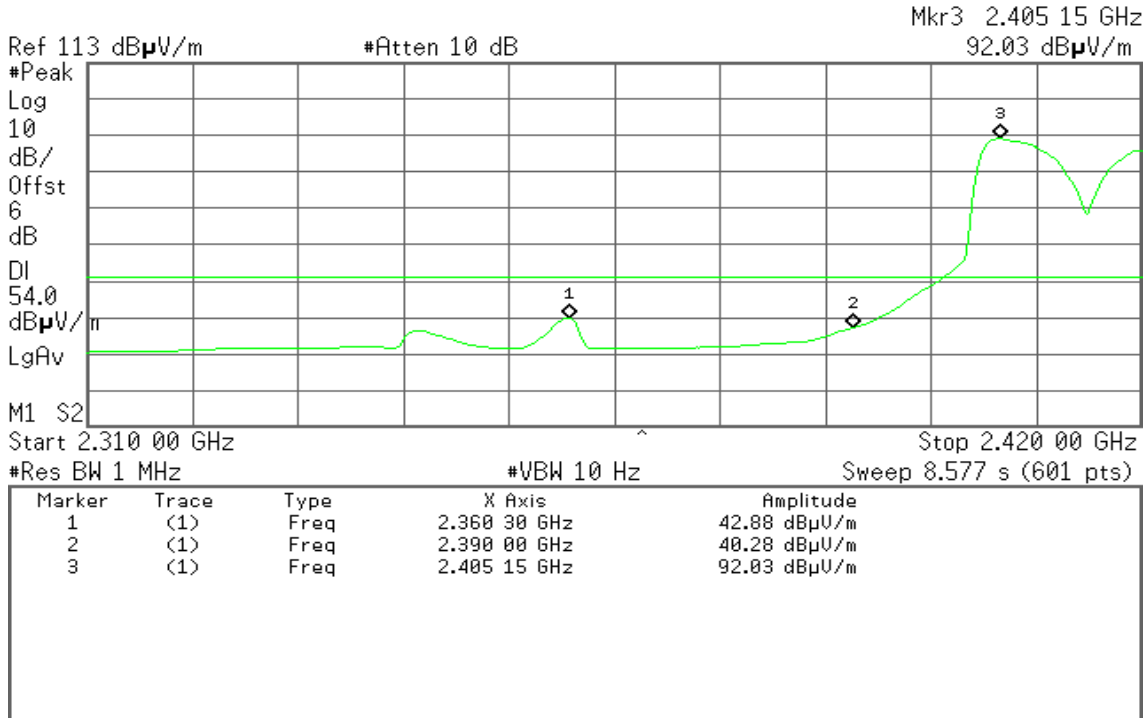


Detector mode: Average

Polarity: Vertical

Agilent 15:22:03 Jul 18, 2012

R L





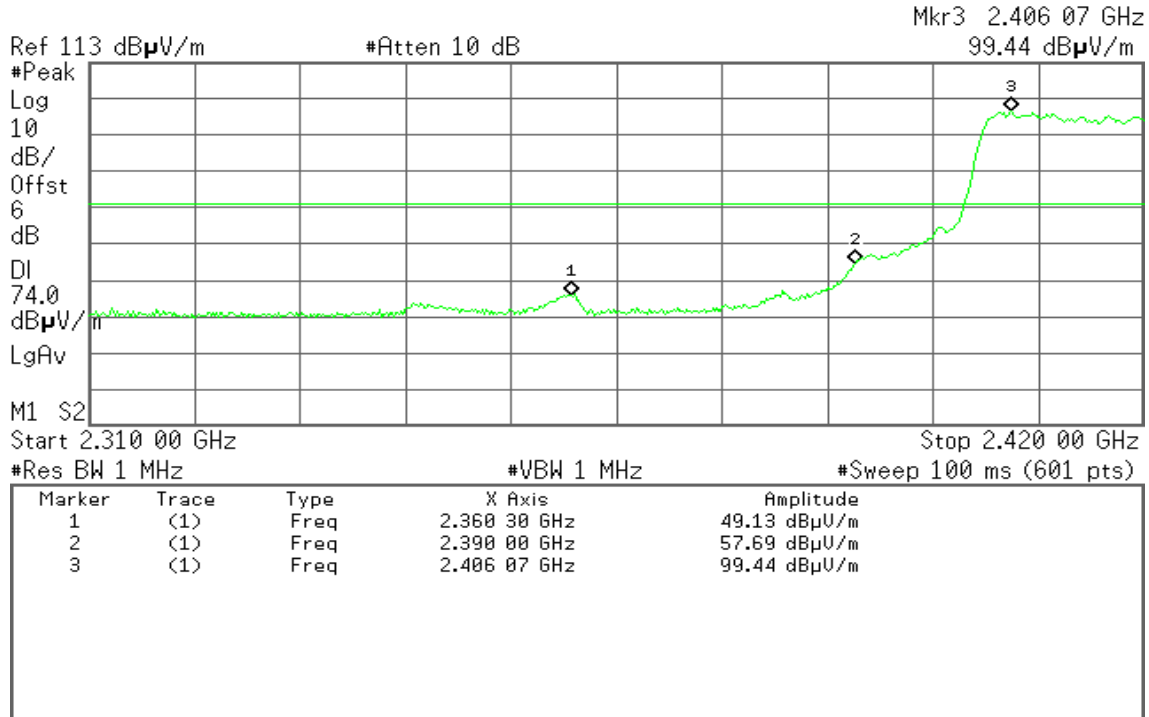


Detector mode: Peak

Polarity: Horizontal

Agilent 15:25:47 Jul 18, 2012

R L

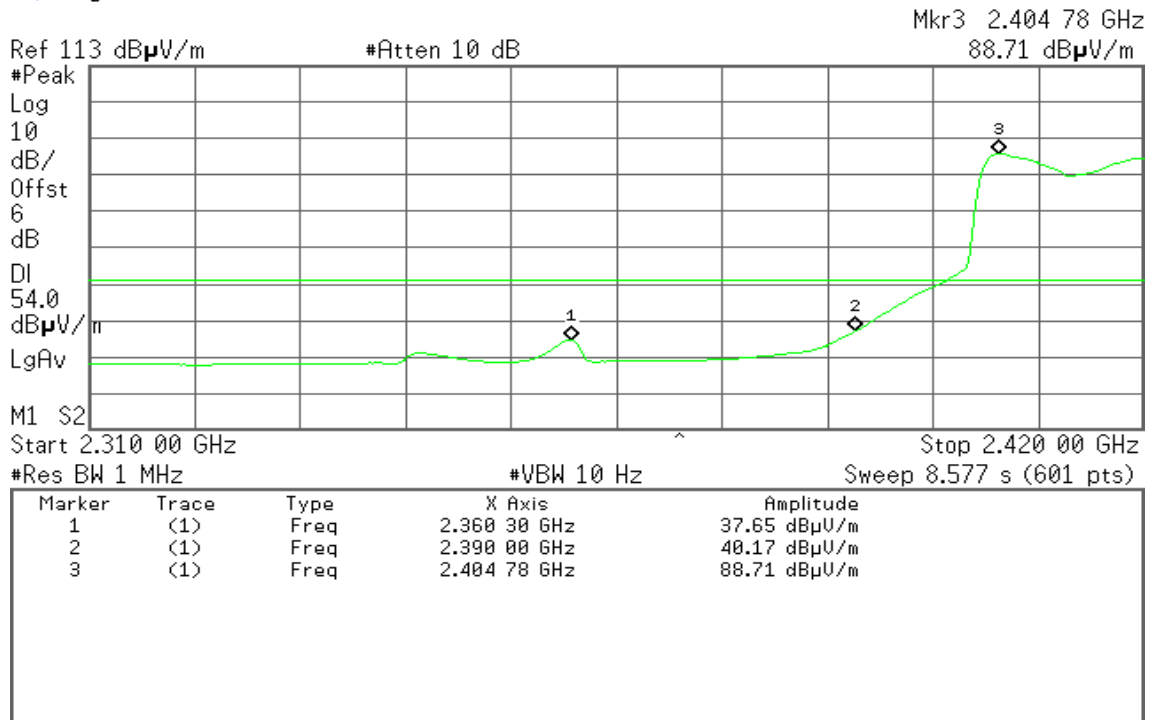


Detector mode: Average

Polarity: Horizontal

Agilent 15:27:33 Jul 18, 2012

R L





Band Edges (draft 802.11n 20 MHz Channel mode / CH High)

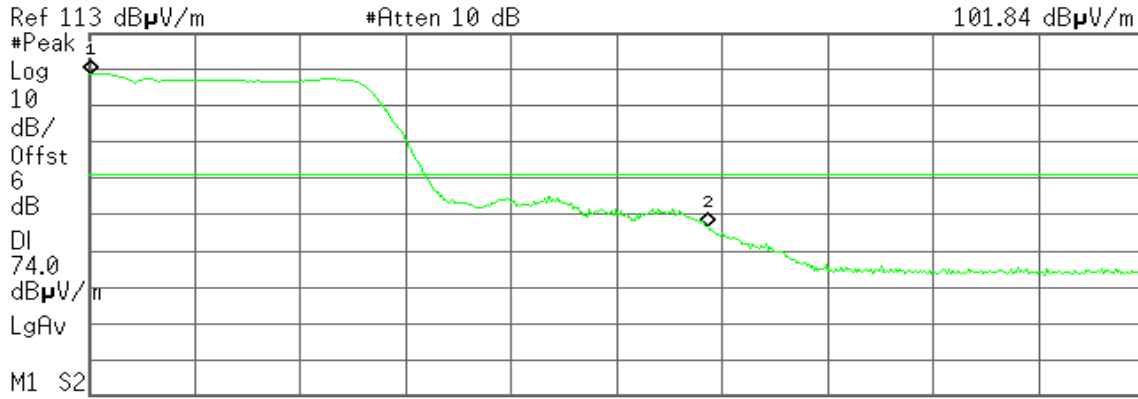
Detector mode: Peak

Polarity: Vertical

Agilent 15:39:39 Jul 18, 2012

R T

Mkr1 2.460 07 GHz  
101.84 dBμV/m



Start 2.460 00 GHz Stop 2.500 00 GHz  
#Res BW 1 MHz #VBW 1 MHz #Sweep 100 ms (601 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.460 07 GHz	101.84 dBμV/m
2	(1)	Freq	2.483 50 GHz	59.65 dBμV/m

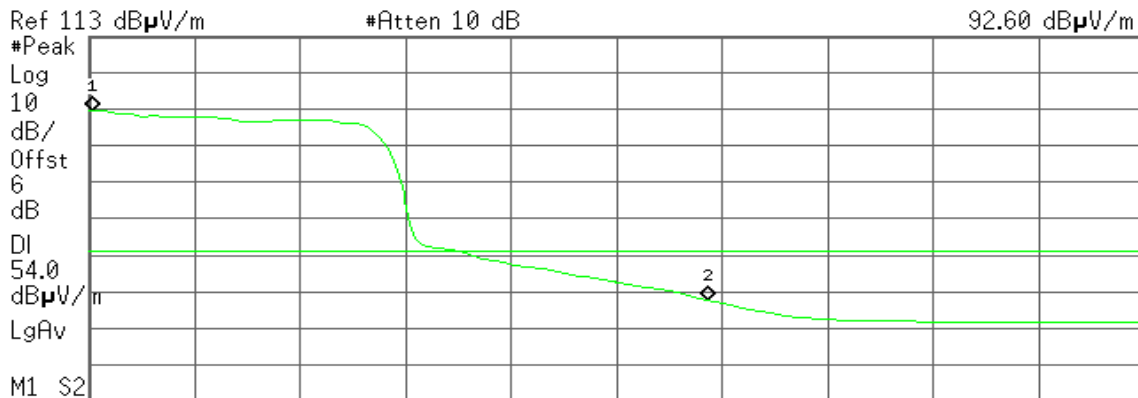
Detector mode: Average

Polarity: Vertical

Agilent 15:41:01 Jul 18, 2012

R L

Mkr1 2.460 13 GHz  
92.60 dBμV/m



Start 2.460 00 GHz Stop 2.500 00 GHz  
#Res BW 1 MHz #VBW 10 Hz Sweep 3.119 s (601 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.460 13 GHz	92.60 dBμV/m
2	(1)	Freq	2.483 50 GHz	40.65 dBμV/m



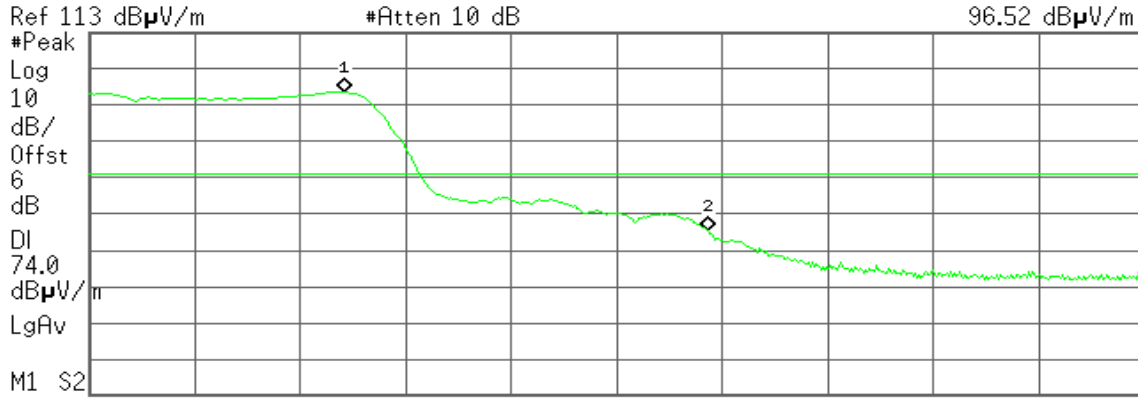
Detector mode: Peak

Polarity: Horizontal

Agilent 15:35:13 Jul 18, 2012

R L

Mkr1 2.469 67 GHz  
96.52 dBµV/m



Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.469 67 GHz	96.52 dBµV/m
2	(1)	Freq	2.483 50 GHz	58.39 dBµV/m

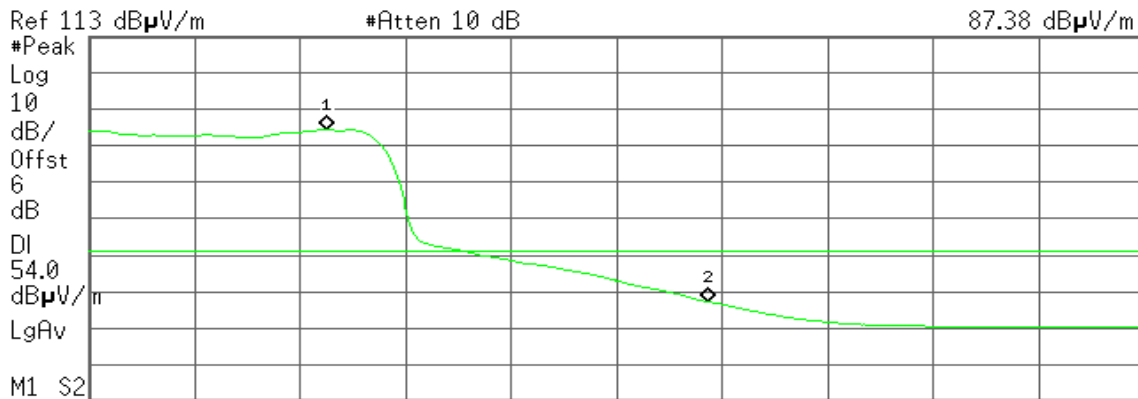
Detector mode: Average

Polarity: Horizontal

Agilent 15:36:41 Jul 18, 2012

R L

Mkr1 2.469 00 GHz  
87.38 dBµV/m



Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.469 00 GHz	87.38 dBµV/m
2	(1)	Freq	2.483 50 GHz	40.24 dBµV/m



Band Edges (draft 802.11n 40 MHz Channel mode / CH Low)

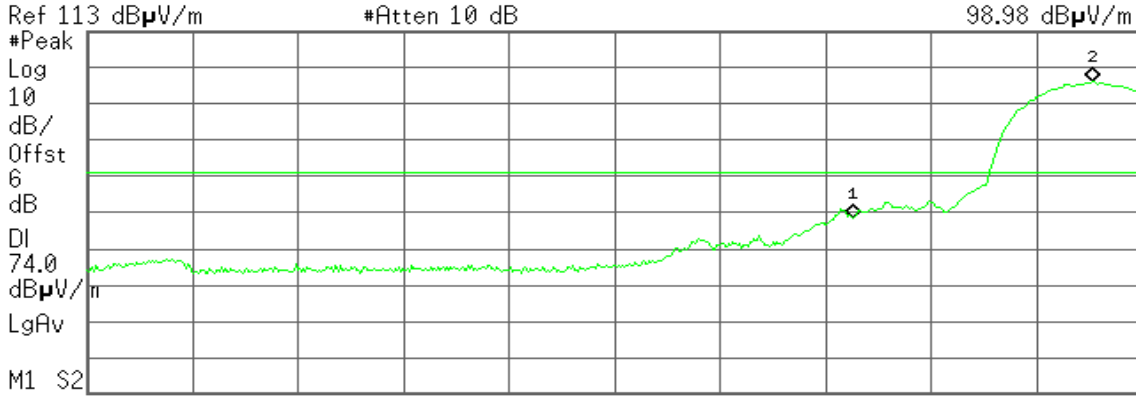
Detector mode: Peak

Polarity: Vertical

Agilent 14:11:59 Jul 18, 2012

R L

Mkr2 2.414 87 GHz  
98.98 dBμV/m



Ref 113 dBμV/m #Atten 10 dB

Start 2.310 00 GHz Stop 2.420 00 GHz

#Res BW 1 MHz #VBW 1 MHz #Sweep 100 ms (601 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.390 00 GHz	61.40 dBμV/m
2	(1)	Freq	2.414 87 GHz	98.98 dBμV/m

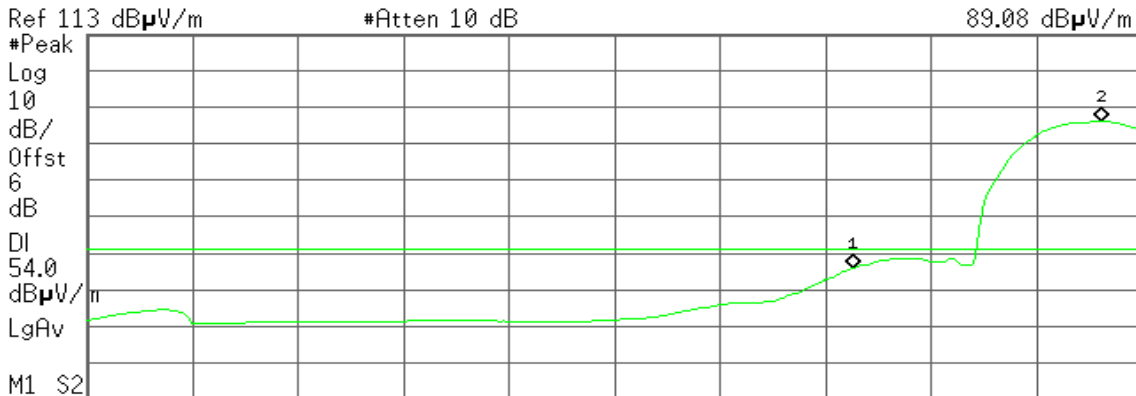
Detector mode: Average

Polarity: Vertical

Agilent 14:27:44 Jul 18, 2012

R L

Mkr2 2.415 78 GHz  
89.08 dBμV/m



Ref 113 dBμV/m #Atten 10 dB

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	48.92 dBμV/m
2	(1)	Freq	2.415 78 GHz	89.08 dBμV/m



Detector mode: Peak

Polarity: Horizontal

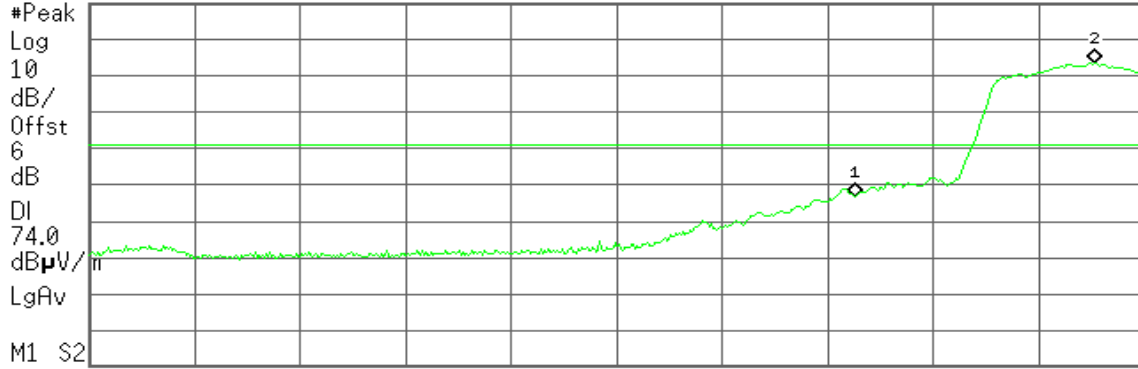
Agilent 14:18:17 Jul 18, 2012

R L

Mkr2 2.414 87 GHz  
96.40 dBµV/m

Ref 113 dBµV/m

#Atten 10 dB



Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.390 00 GHz	59.70 dBµV/m
2	(1)	Freq	2.414 87 GHz	96.40 dBµV/m

Detector mode: Average

Polarity: Horizontal

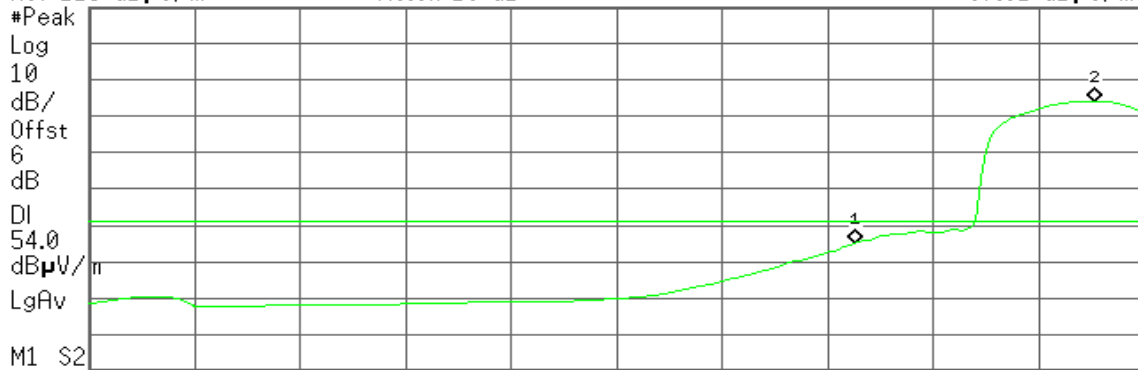
Agilent 14:20:31 Jul 18, 2012

R L

Mkr2 2.414 87 GHz  
87.01 dBµV/m

Ref 113 dBµV/m

#Atten 10 dB



Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.390 00 GHz	48.18 dBµV/m
2	(1)	Freq	2.414 87 GHz	87.01 dBµV/m



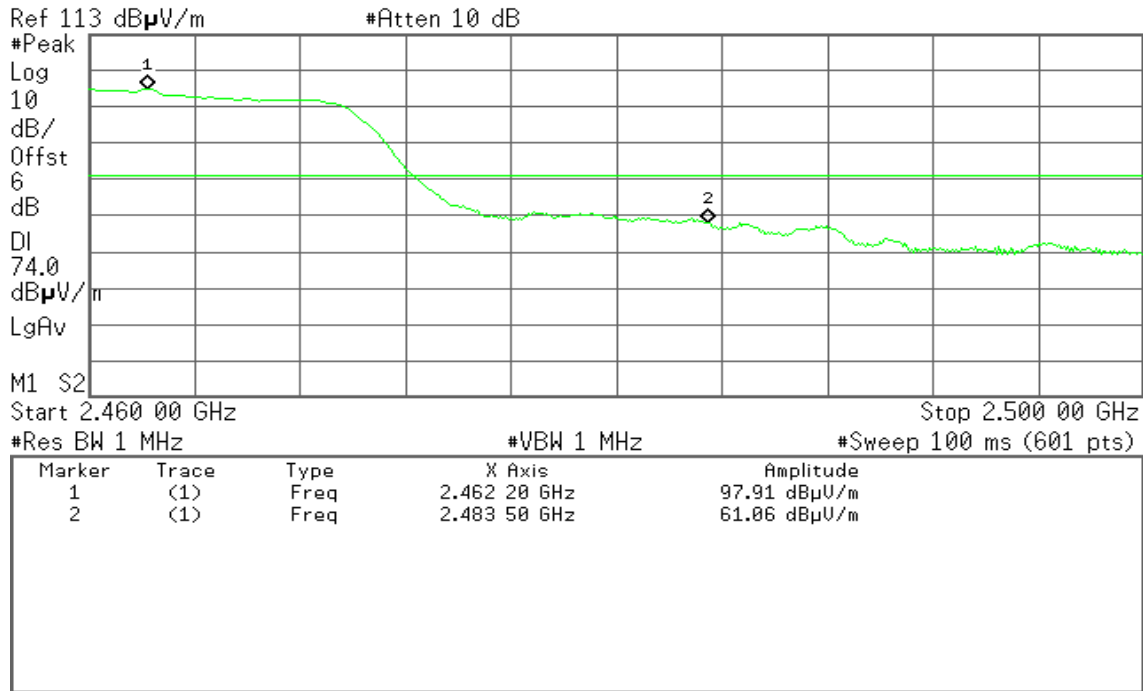
**Band Edges (draft 802.11n 40 MHz Channel mode / CH High)**

**Detector mode: Peak**

**Polarity: Vertical**

Agilent 12:56:07 Jul 18, 2012

R L



**Detector mode: Average**

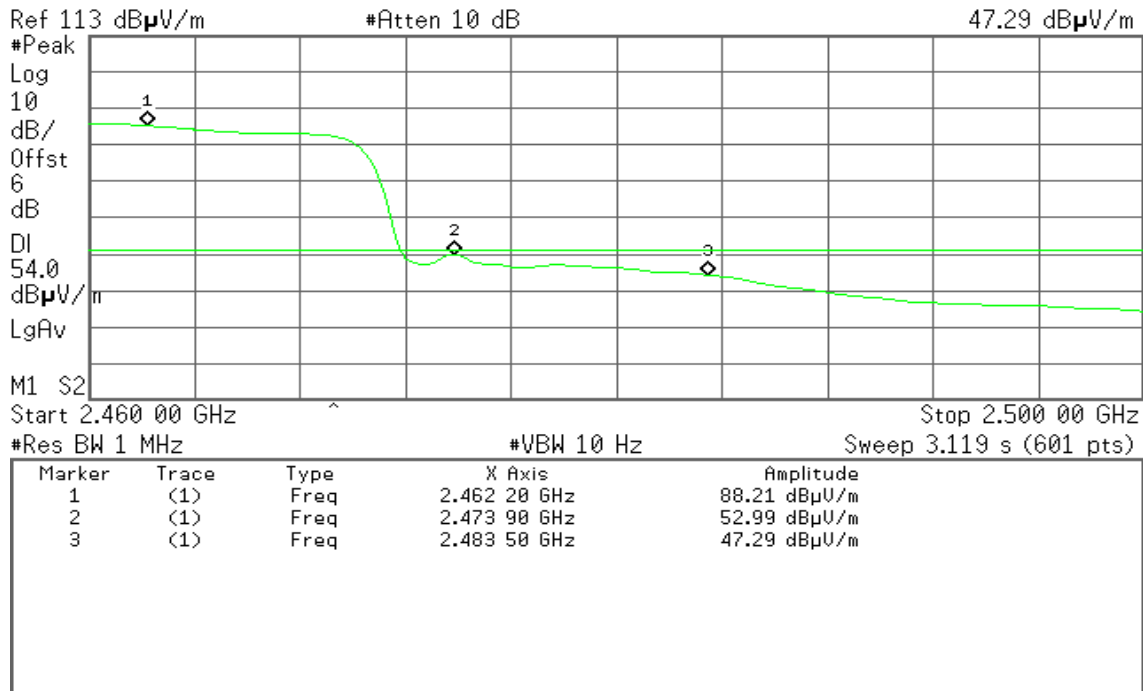
**Polarity: Vertical**

Agilent 12:58:01 Jul 18, 2012

R L

Mkr3 2.483 50 GHz

47.29 dB $\mu$ V/m





Detector mode: Peak

Polarity: Horizontal

Agilent 12:50:59 Jul 18, 2012

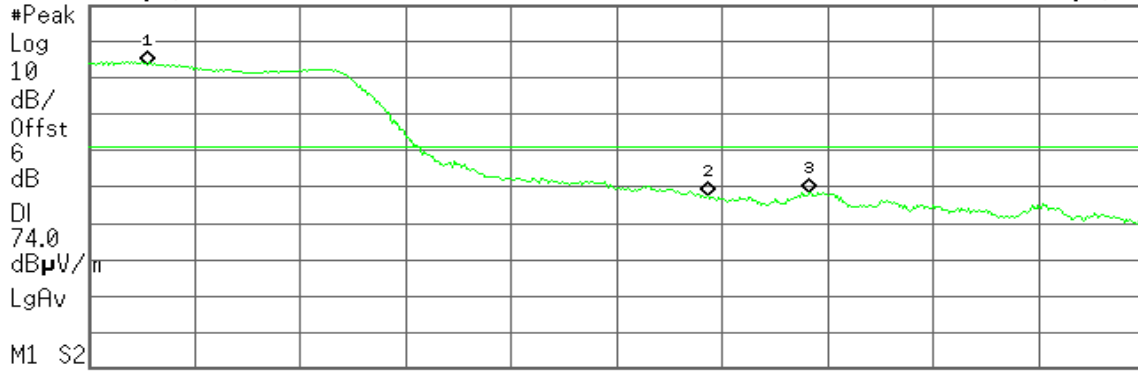
R L

Mkr3 2.487 27 GHz

Ref 113 dBµV/m

#Atten 10 dB

61.51 dBµV/m



Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.462 20 GHz	96.48 dBµV/m
2	(1)	Freq	2.483 50 GHz	68.77 dBµV/m
3	(1)	Freq	2.487 27 GHz	61.51 dBµV/m

Detector mode: Average

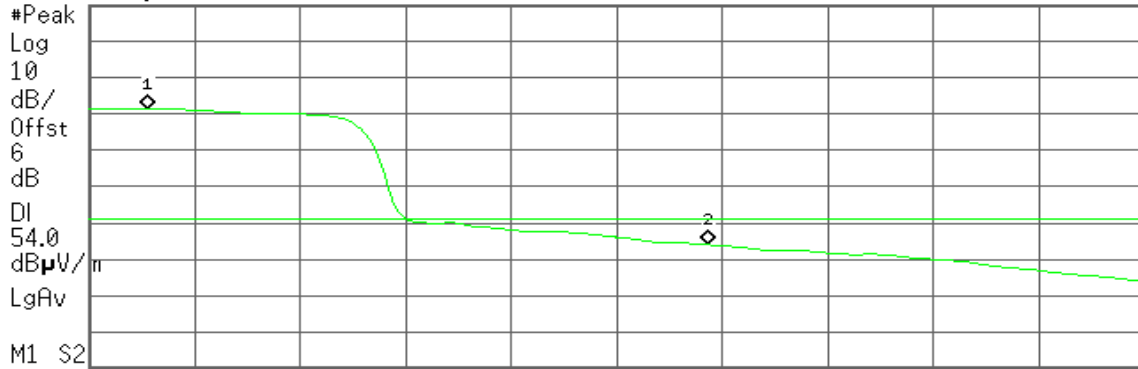
Polarity: Horizontal

Agilent 12:53:10 Jul 18, 2012

R L

Ref 113 dBµV/m

#Atten 10 dB



Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.462 20 GHz	84.51 dBµV/m
2	(1)	Freq	2.483 50 GHz	47.01 dBµV/m

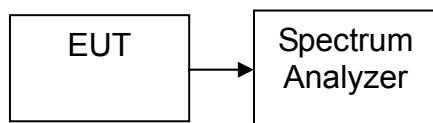


## **7.5 PEAK POWER SPECTRAL DENSITY**

### **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**

**Per KDB 558074 5.2.1.2/ or 5.2.2.1.**

The transmitter output is connected to a spectrum analyzer. Set the RBW = 100 kHz, VBW ≥ 300 kHz, span 5-30% greater than EBW, Detector = peak, Trace mode = max hold, Sweep = auto couple. Scale the observed power level to an equivalent value in 3 kHz by adjusting (reducing) the measured power by a bandwidth correction factor (BWCF) where  $BWCF = 10\log(3\text{ kHz}/100\text{ kHz} = -15.2\text{ dB})$ . Record the maximum reading. 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)	100kHz PPSD (dBm)	3kHz PPSD (dBm)	Limit (dBm)	Result
Low	2412	5.08	-10.12	7.00	PASS
Mid	2437	5.01	-10.19		
High	2462	4.77	-10.43		

**Test mode: IEEE 802.11g mode**

Channel	Frequency (MHz)	100kHz PPSD (dBm)	3kHz PPSD (dBm)	Limit (dBm)	Result
Low	2412	2.22	-12.98	7.00	PASS
Mid	2437	1.79	-13.41		
High	2462	2.28	-12.92		

**Test mode: draft 802.11n 20 MHz Channel mode**

Channel	Frequency (MHz)	100kHz PPSD (dBm)			3kHz PPSD (dBm)		Limit (dBm)	Result
		Chain 0	Chain 1	Max	Chain 0	Chain 1		
Low	2412	1.73	1.62	2.03	-13.47	-13.58	7.00	PASS
Mid	2437	1.69	2.17	2.47	-13.51	-13.03		PASS
High	2462	1.74	1.47	2.04	-13.46	-13.73		PASS

**Test mode: draft 802.11n 40 MHz Channel mode**

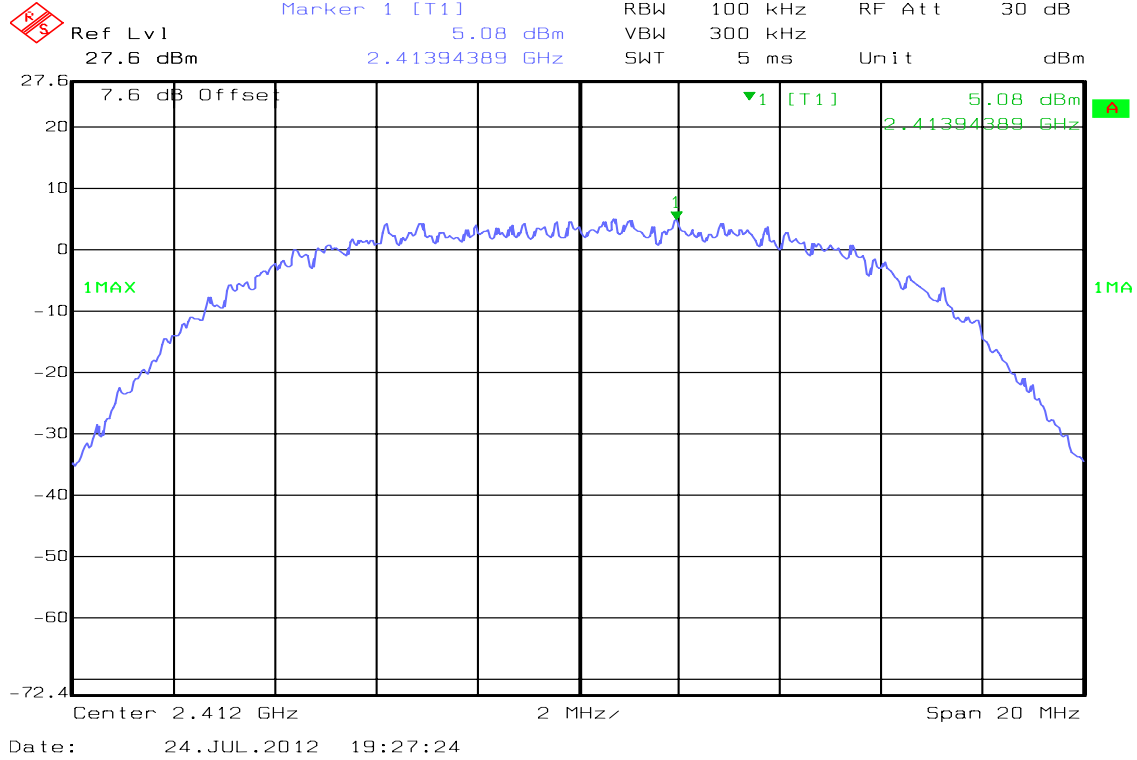
Channel	Frequency (MHz)	100kHz PPSD (dBm)			3kHz PPSD (dBm)		Limit (dBm)	Result
		Chain 0	Chain 1	Max	Chain 0	Chain 1		
Low	2422	-6.18	-3.88	-3.58	-21.38	-19.08	7.00	PASS
Mid	2437	-1.09	-1.33	-0.79	-16.29	-16.53		PASS
High	2452	-1.25	-1.39	-0.95	-16.45	-16.59		PASS



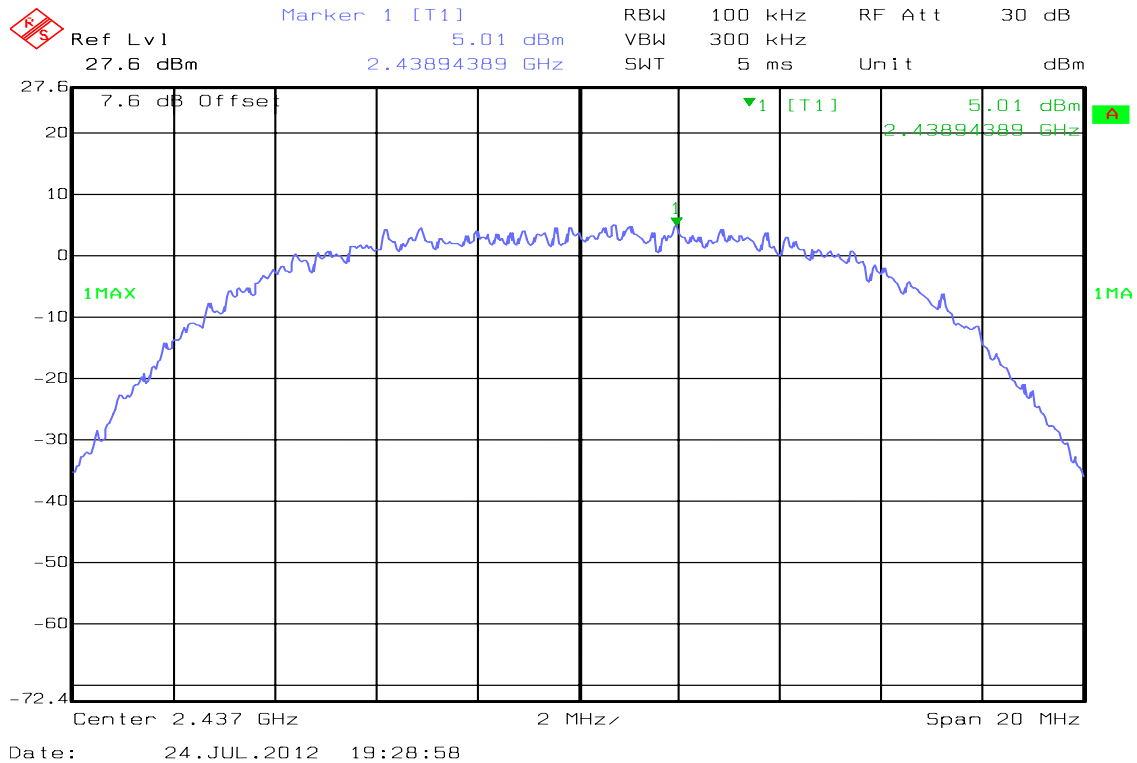
**Test Plot**

**IEEE 802.11b mode**

**PPSD (CH Low)**

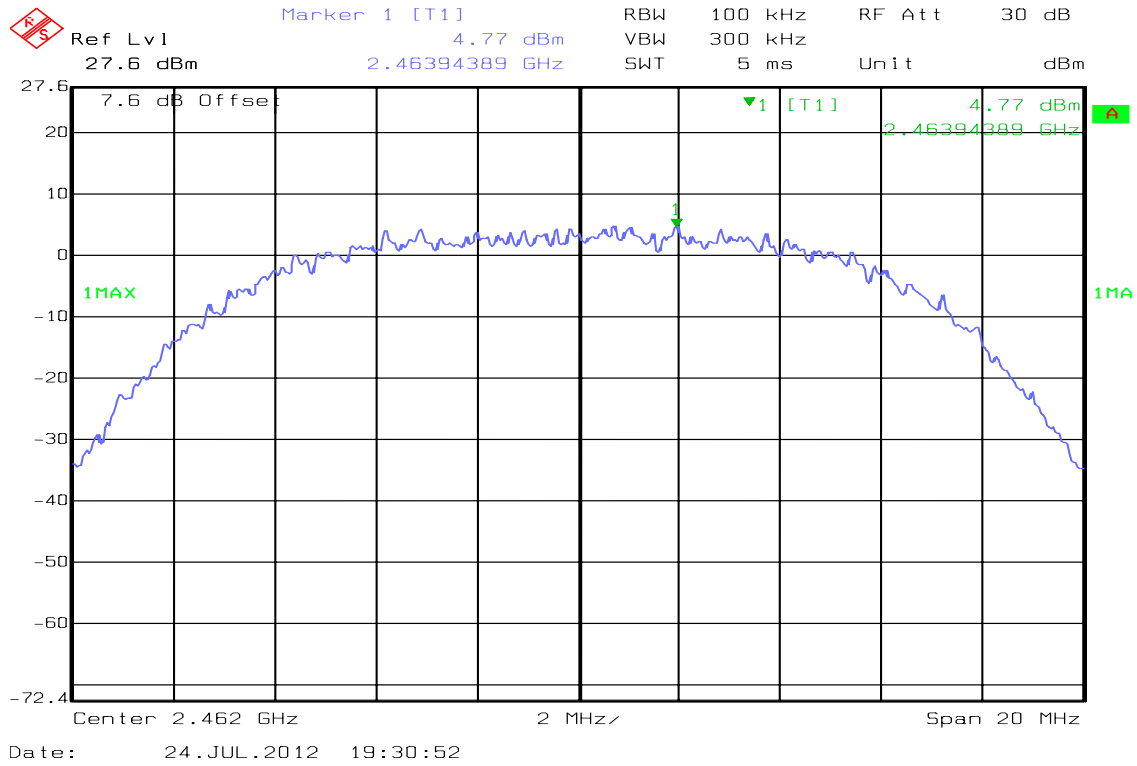


**PPSD (CH Mid)**



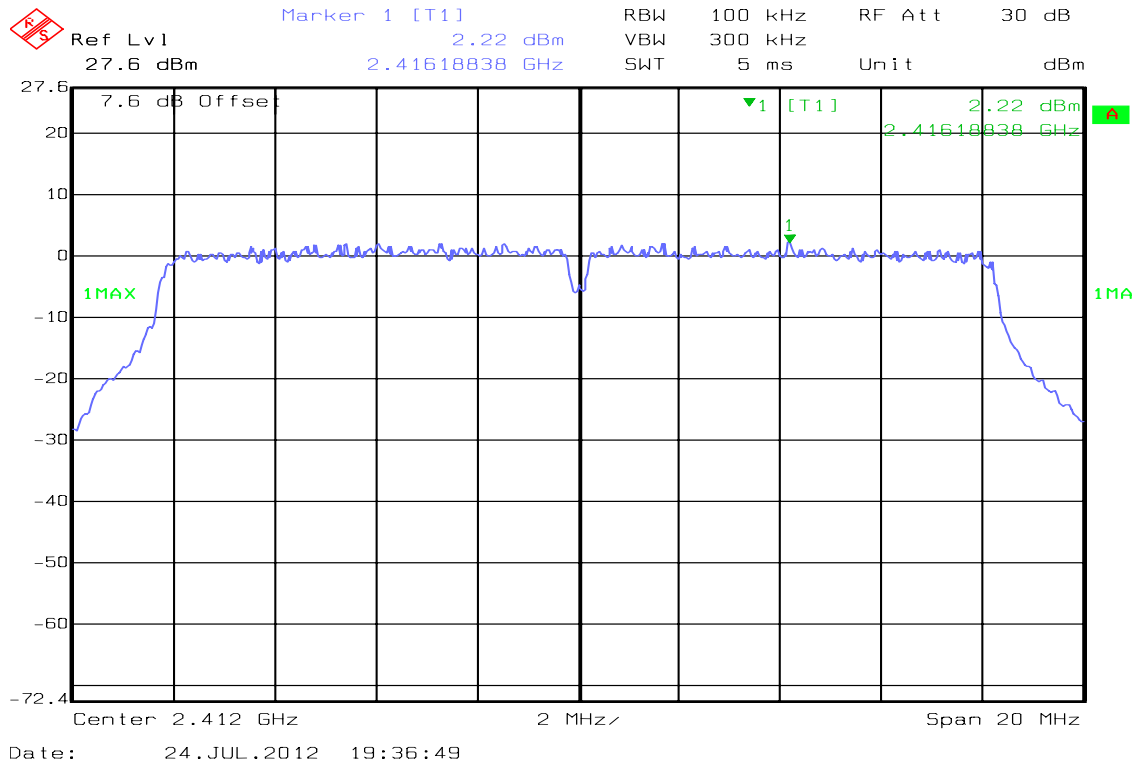


### PPSD (CH High)



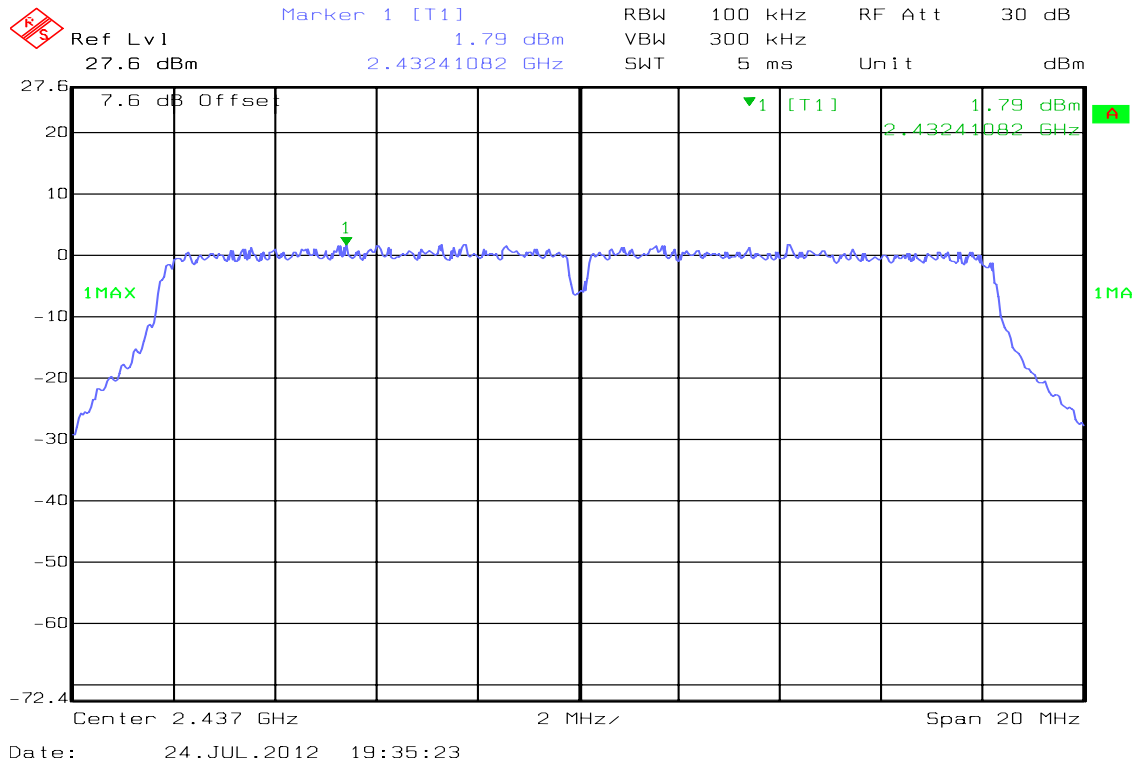
### IEEE 802.11g mode

### PPSD (CH Low)

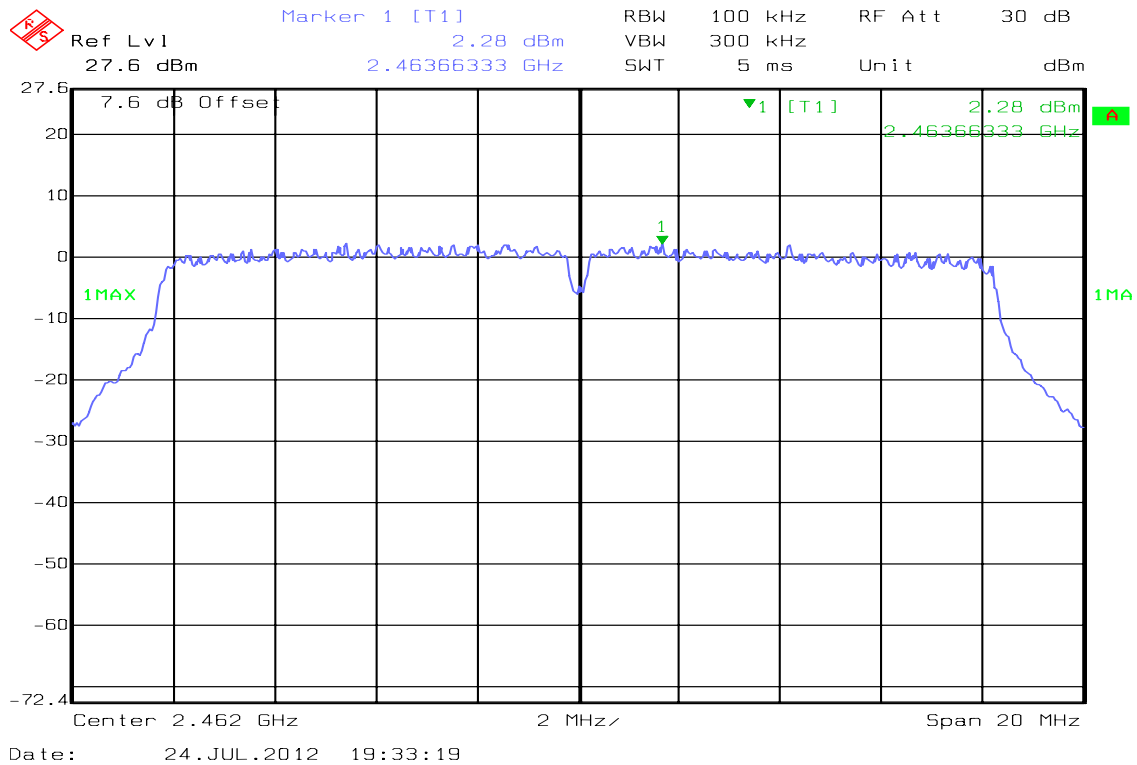




### PPSD (CH Mid)



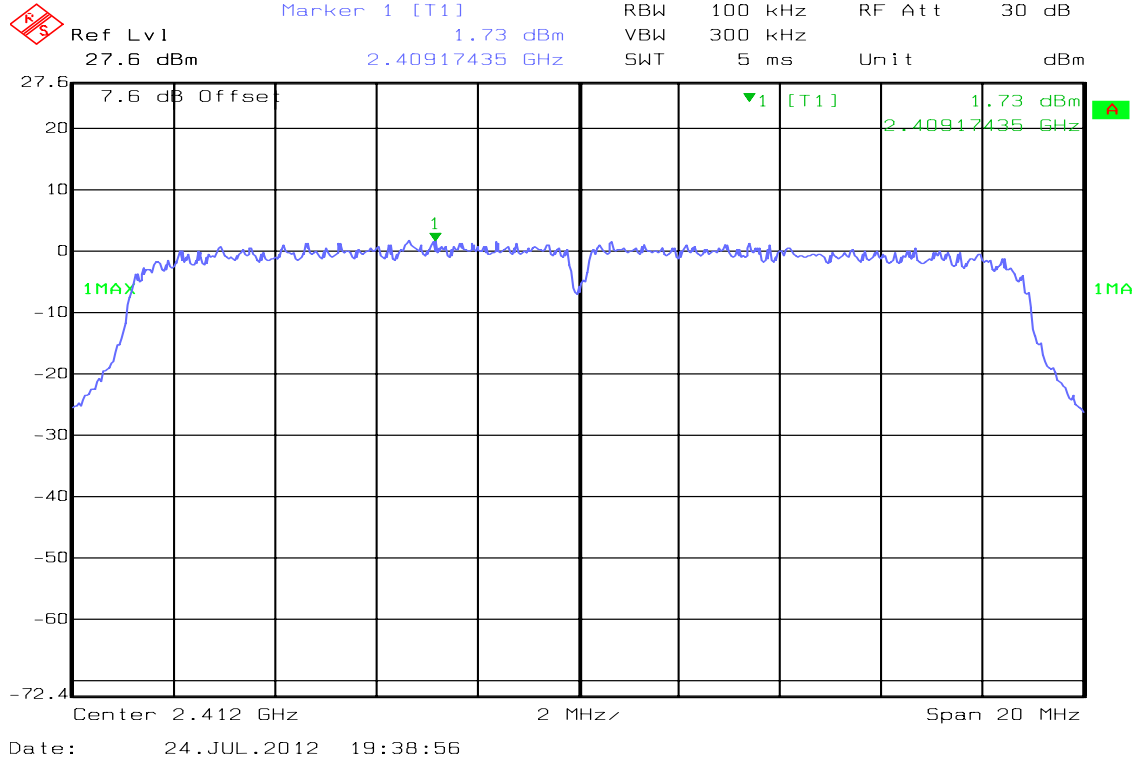
### PPSD (CH High)



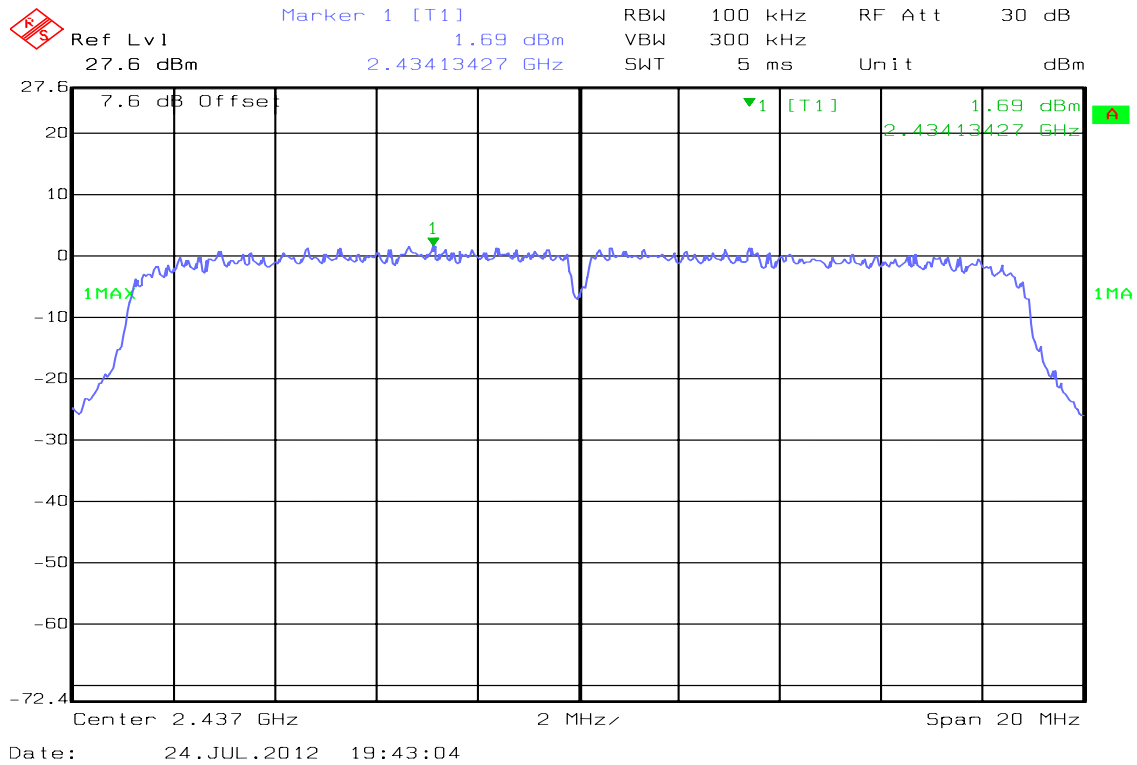


**draft 802.11n 20 MHz Channel mode / Chain 0**

**PPSD (CH Low)**

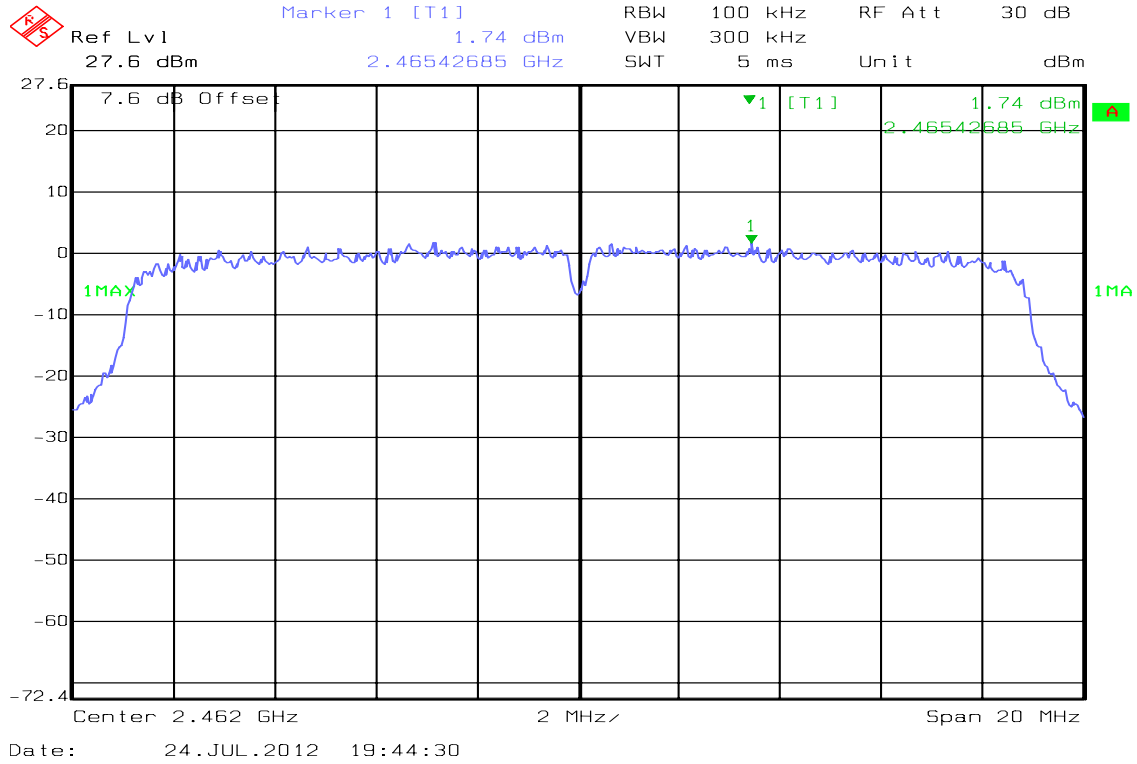


**PPSD (CH Mid)**



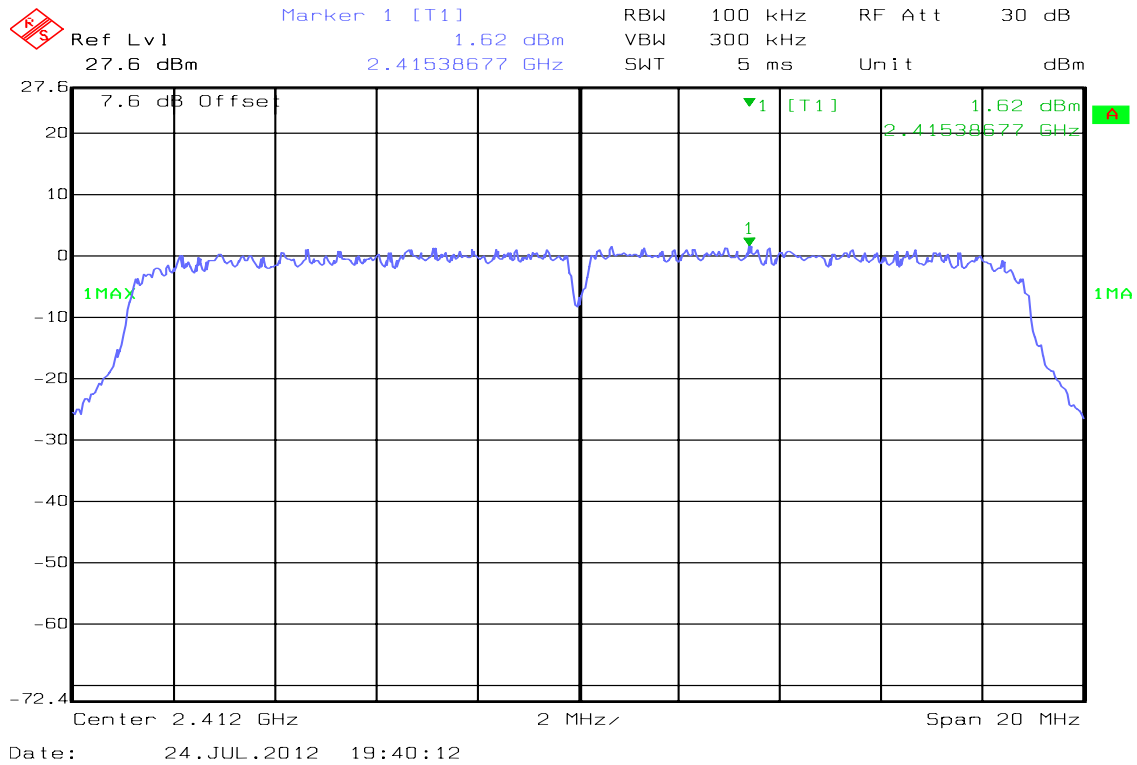


### PPSD (CH High)



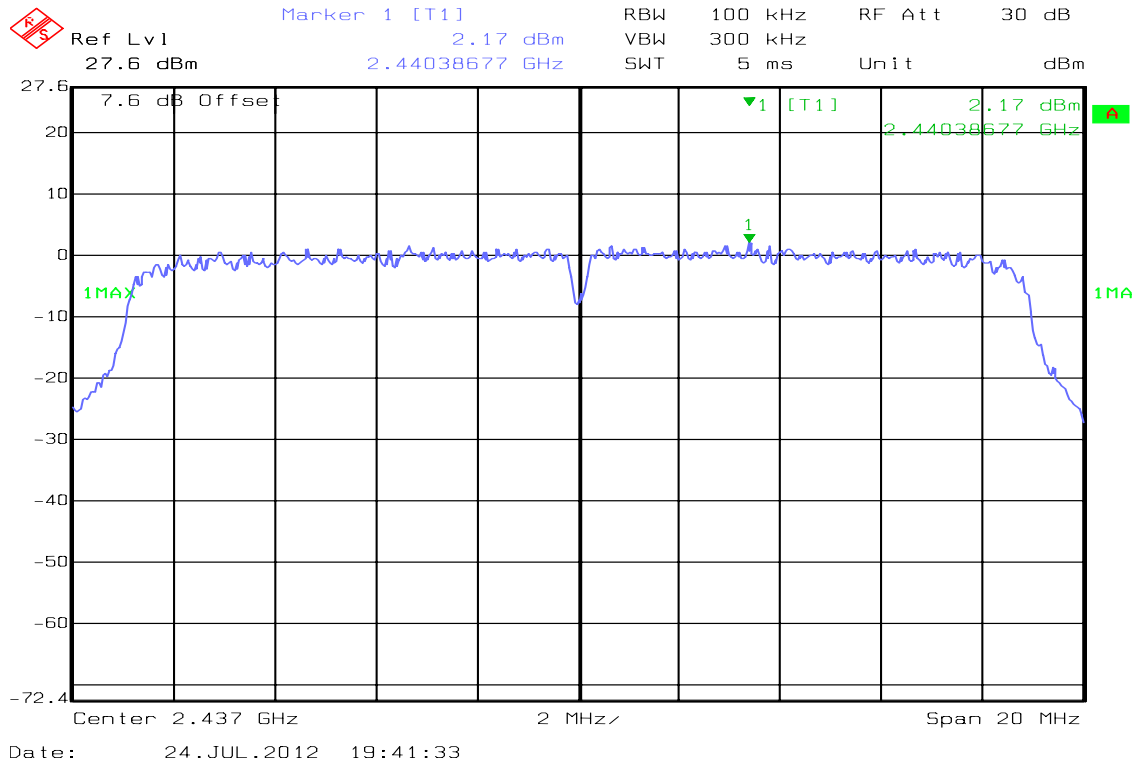
### draft 802.11n 20 MHz Channel mode / Chain 1

### PPSD (CH Low)

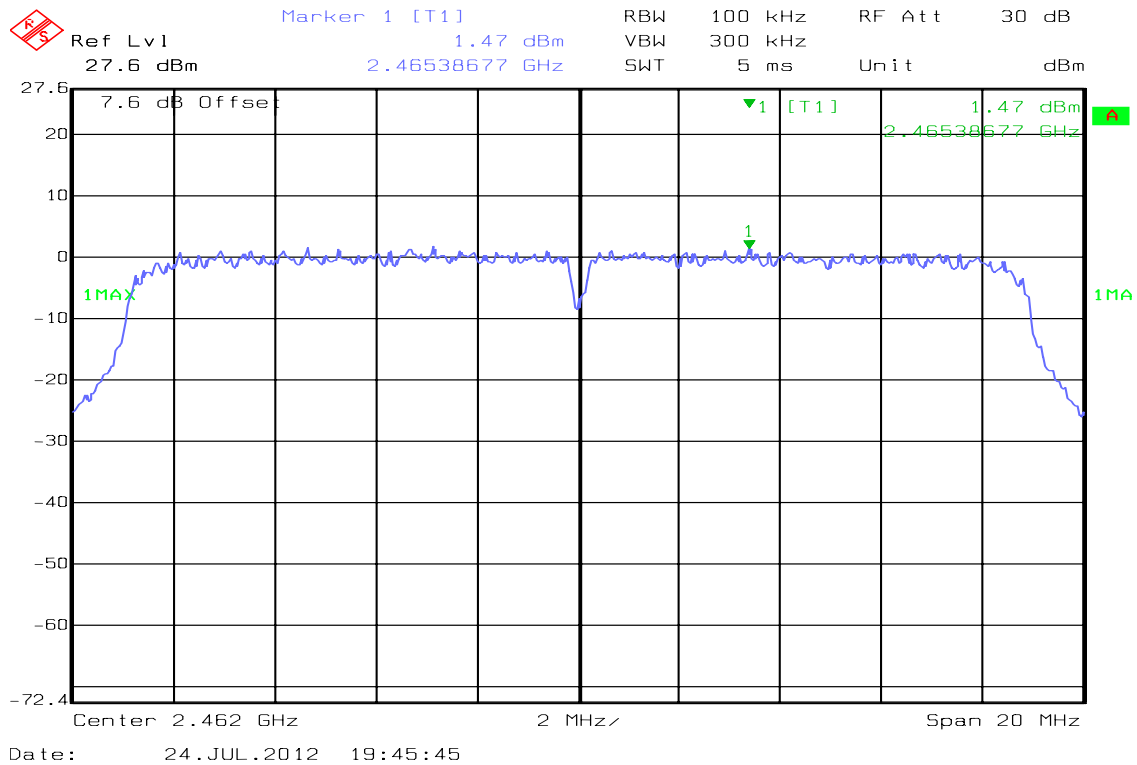




### PPSD (CH Mid)



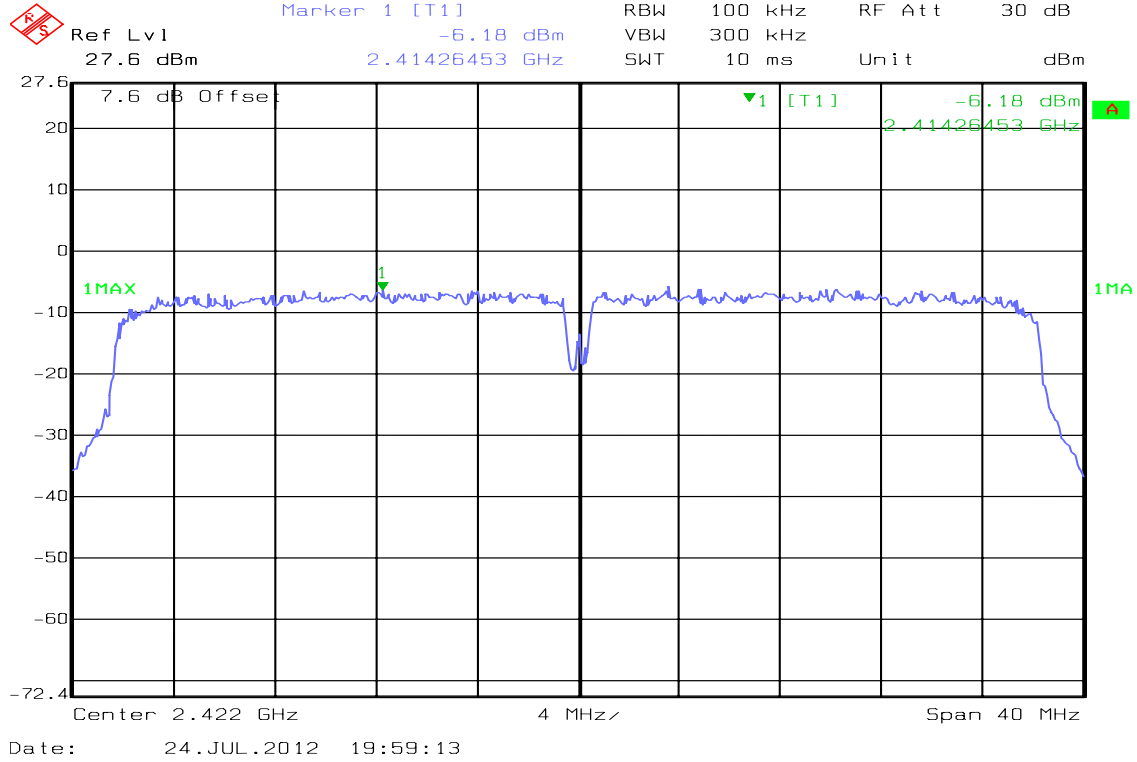
### PPSD (CH High)



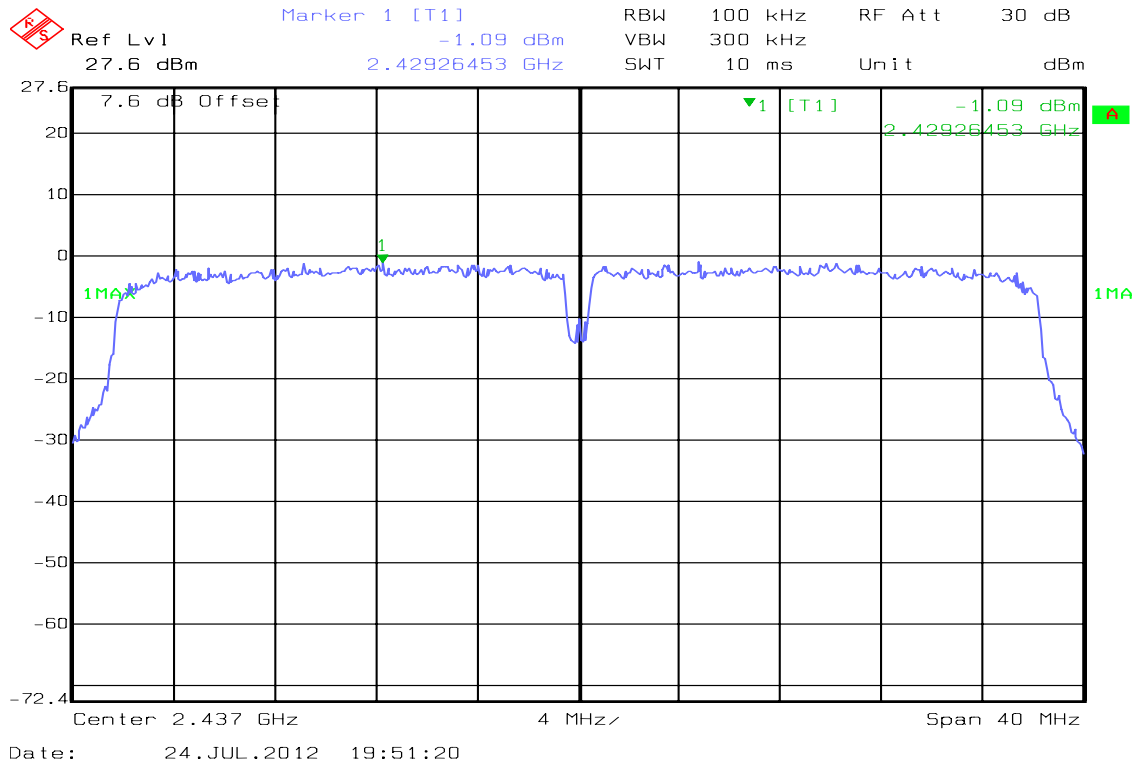


**draft 802.11n 40 MHz Channel mode / Chain 0**

**PPSD (CH Low)**



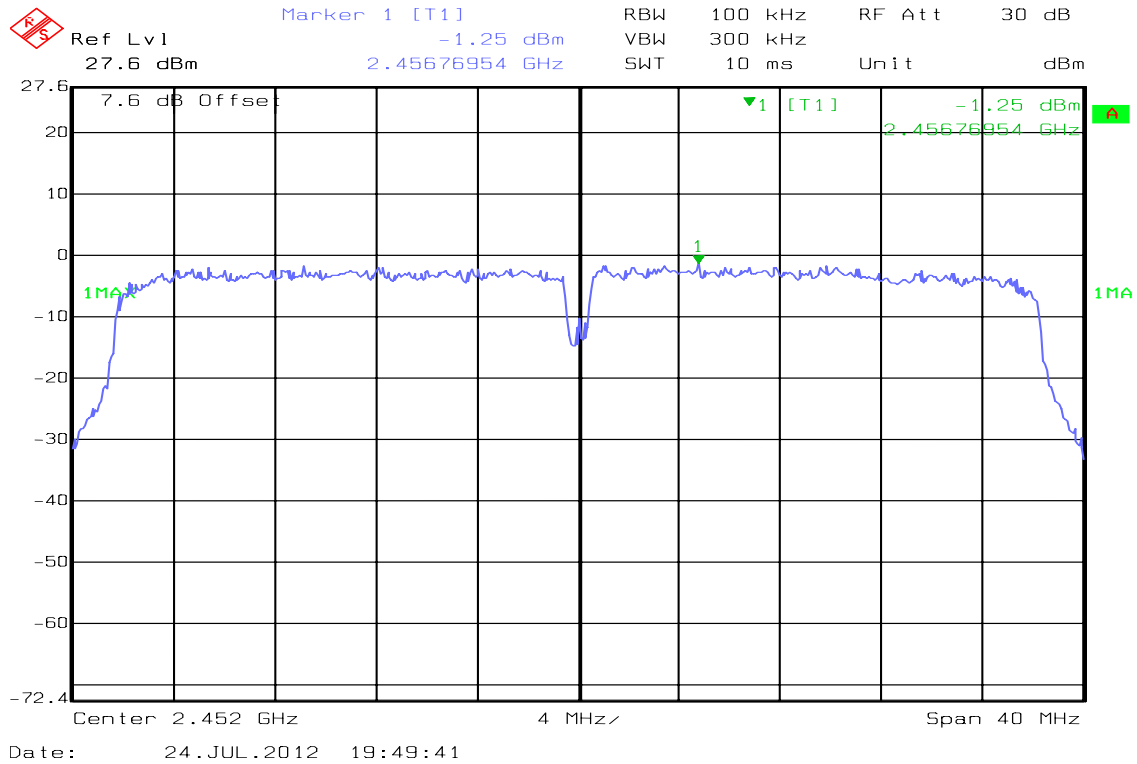
**PPSD (CH Mid)**





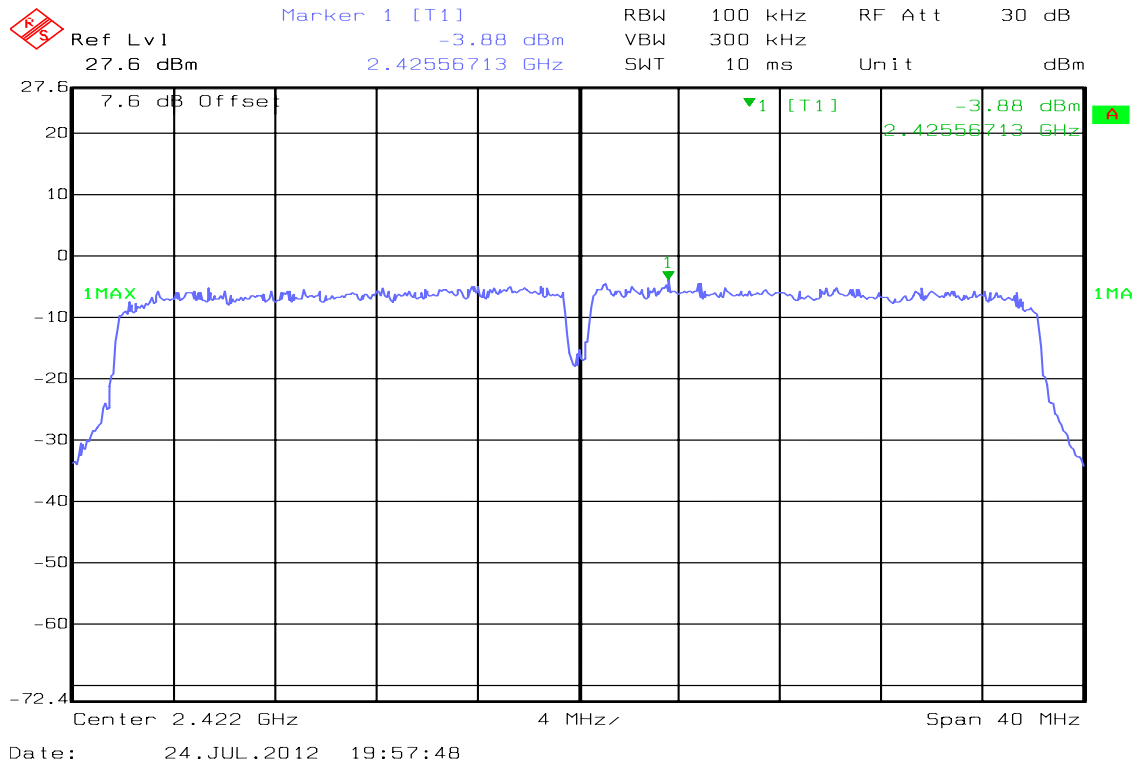


### PPSD (CH High)



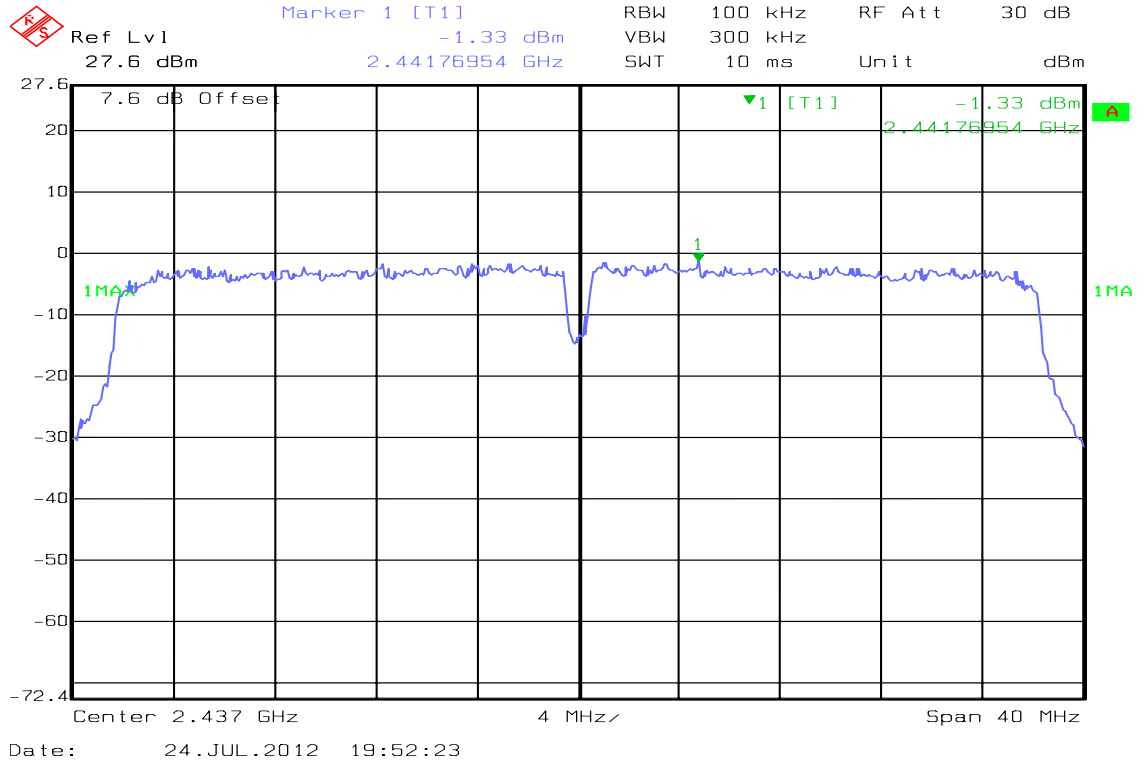
### draft 802.11n 40 MHz Channel mode / Chain 1

### PPSD (CH Low)

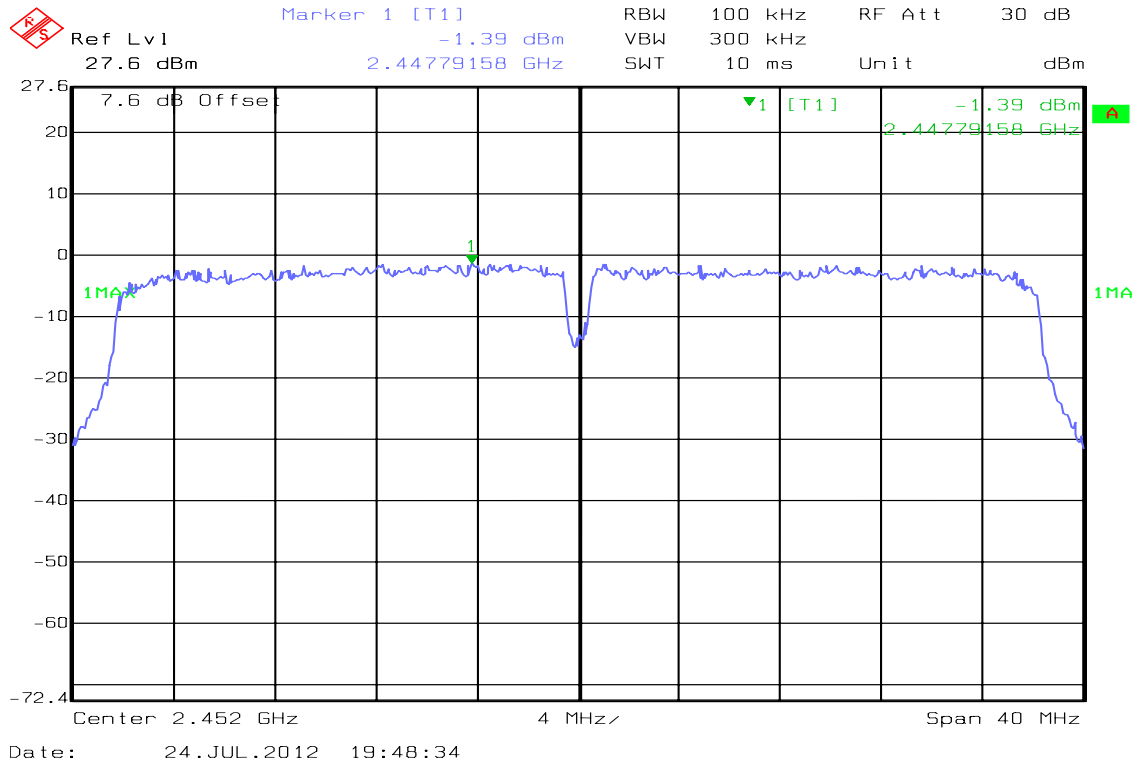




### PPSD (CH Mid)



### PPSD (CH High)





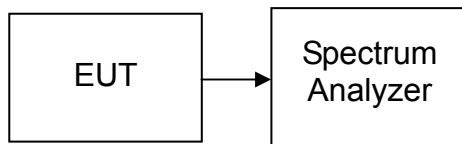
## **7.6 SPURIOUS EMISSIONS**

### **7.6.1 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)).

#### **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 100 kHz.

Measurements are made over the 30MHz to 26GHz range with the transmitter set to the lowest, middle, and highest channels.

#### **TEST RESULTS**

*No non-compliance noted.*



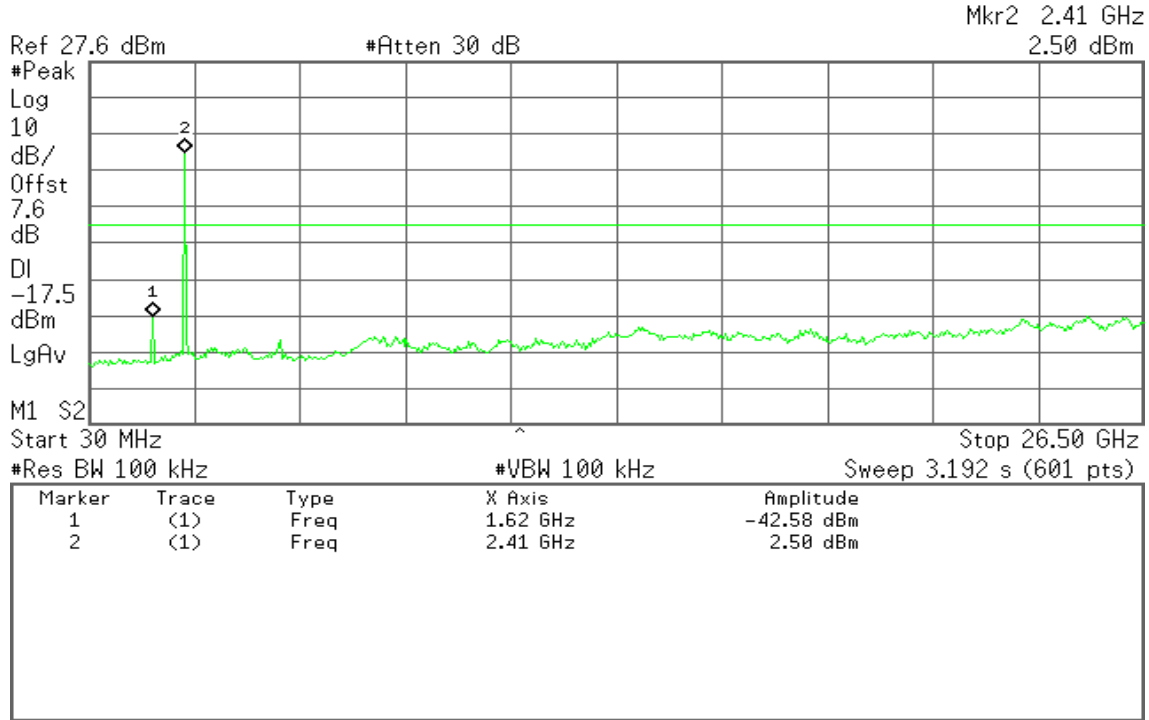
**Test Plot**

**Spurious Emissions**

**IEEE 802.11b mode**

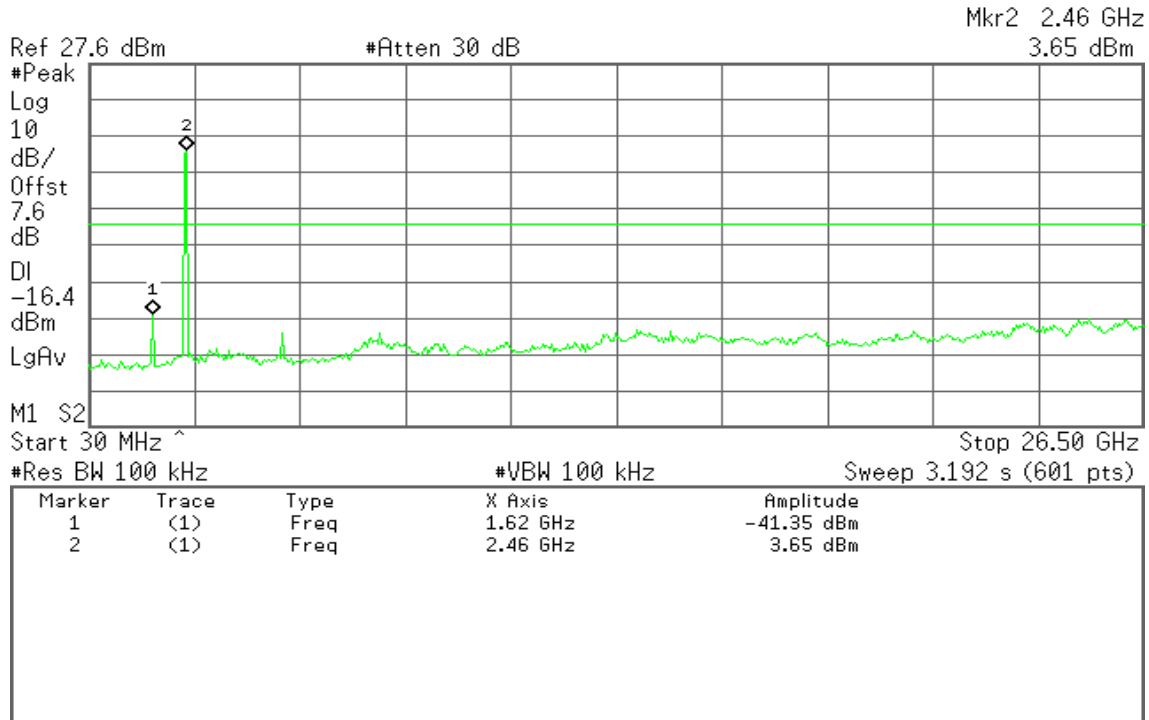
Agilent 21:39:49 Jul 24, 2012

R T



Agilent 21:44:34 Jul 24, 2012

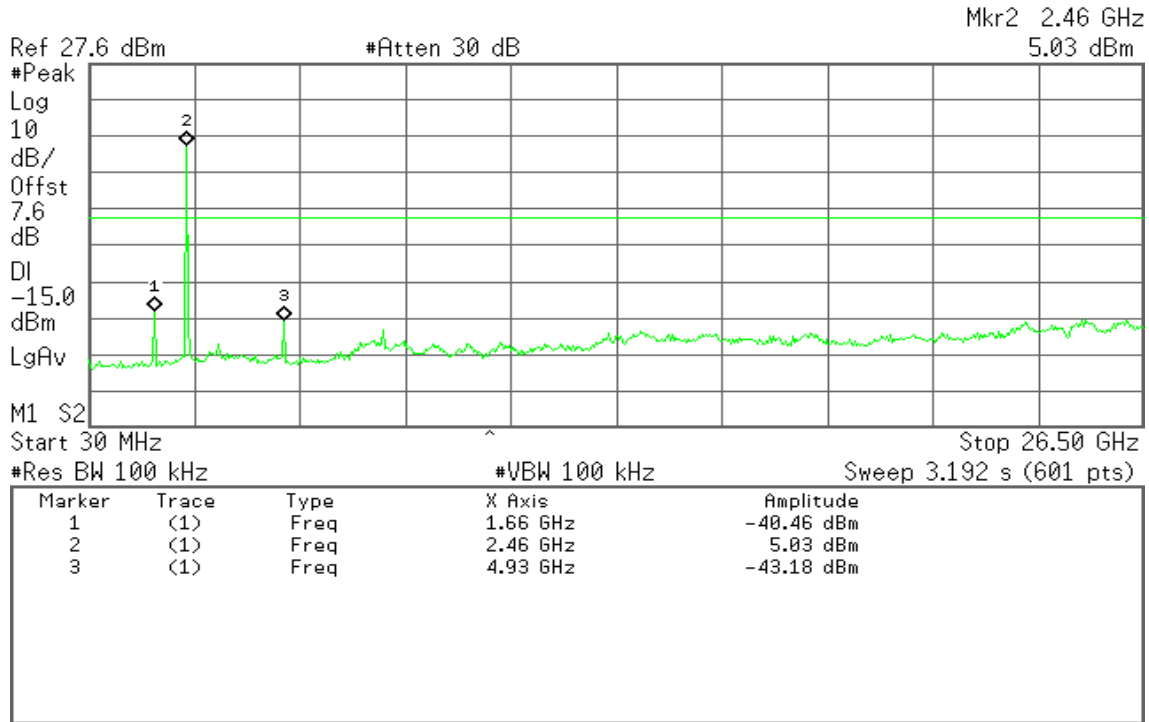
R T





Agilent 21:47:26 Jul 24, 2012

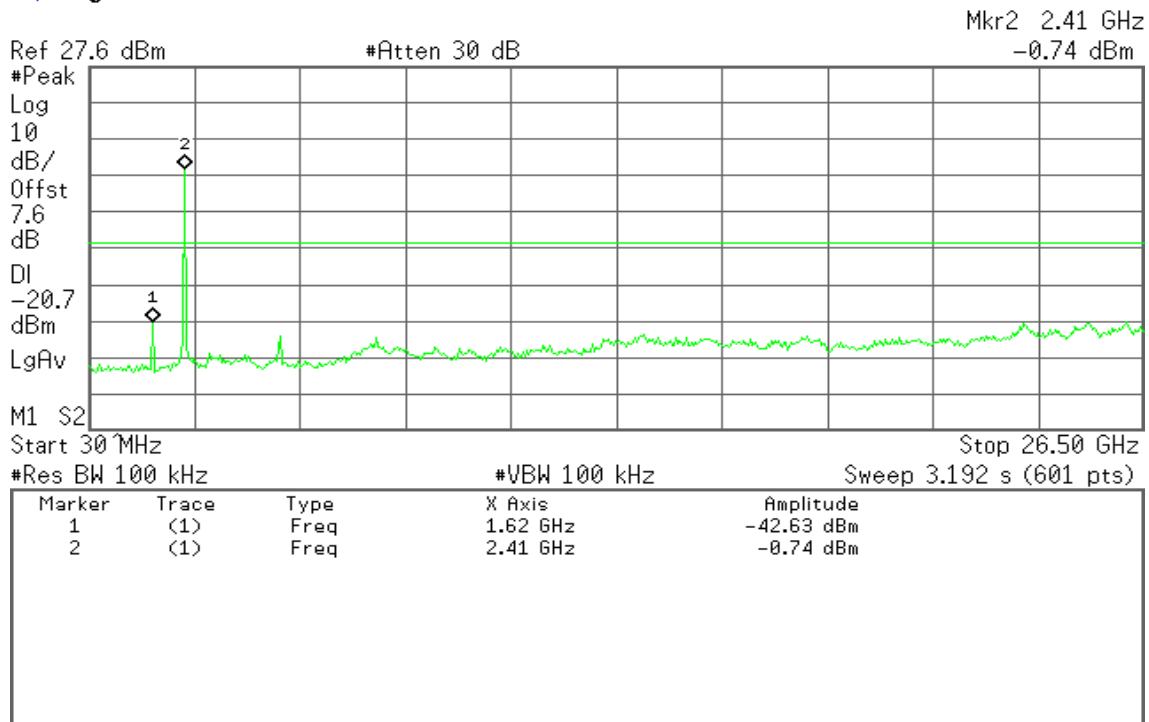
R T



**IEEE 802.11g mode**

Agilent 21:59:40 Jul 24, 2012

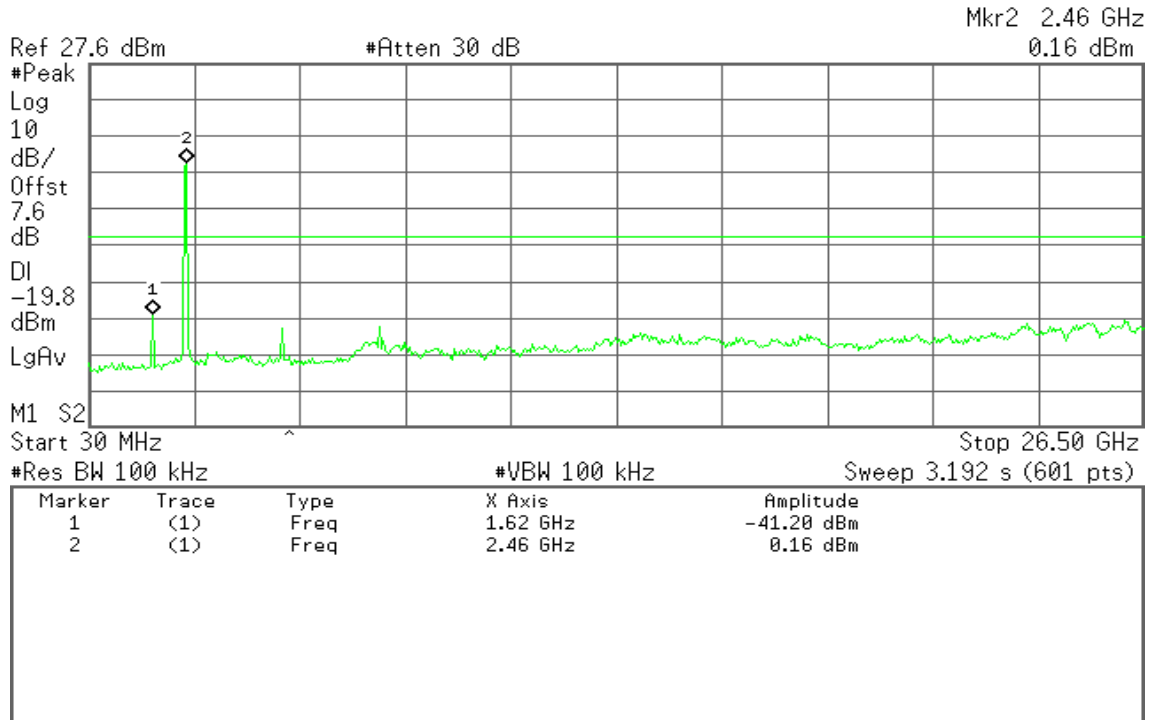
R T





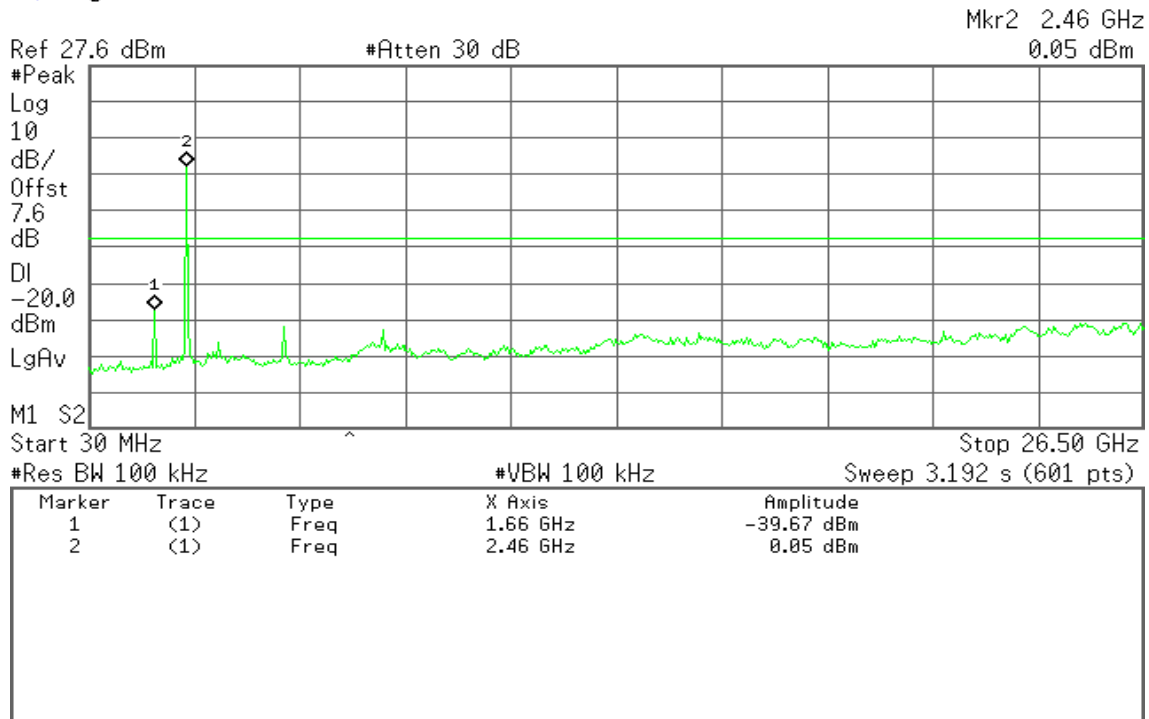
Agilent 21:54:30 Jul 24, 2012

R T



Agilent 21:56:45 Jul 24, 2012

R T



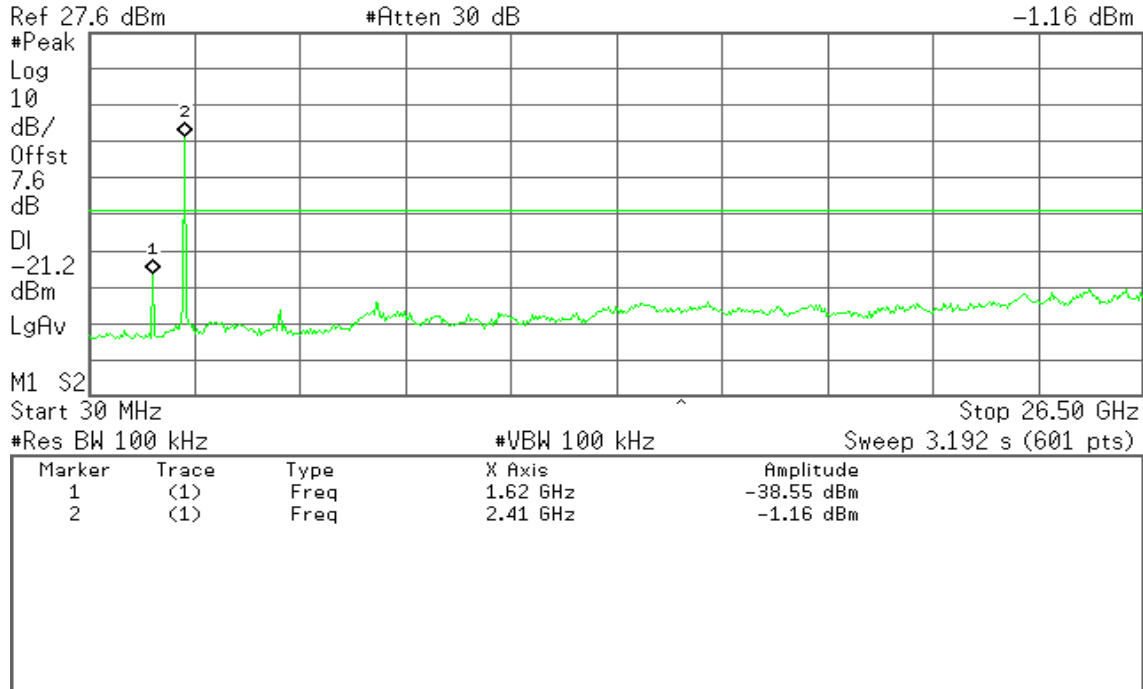


**draft 802.11n 20 MHz Channel mode / Chain 0**

Agilent 22:08:18 Jul 24, 2012

R T

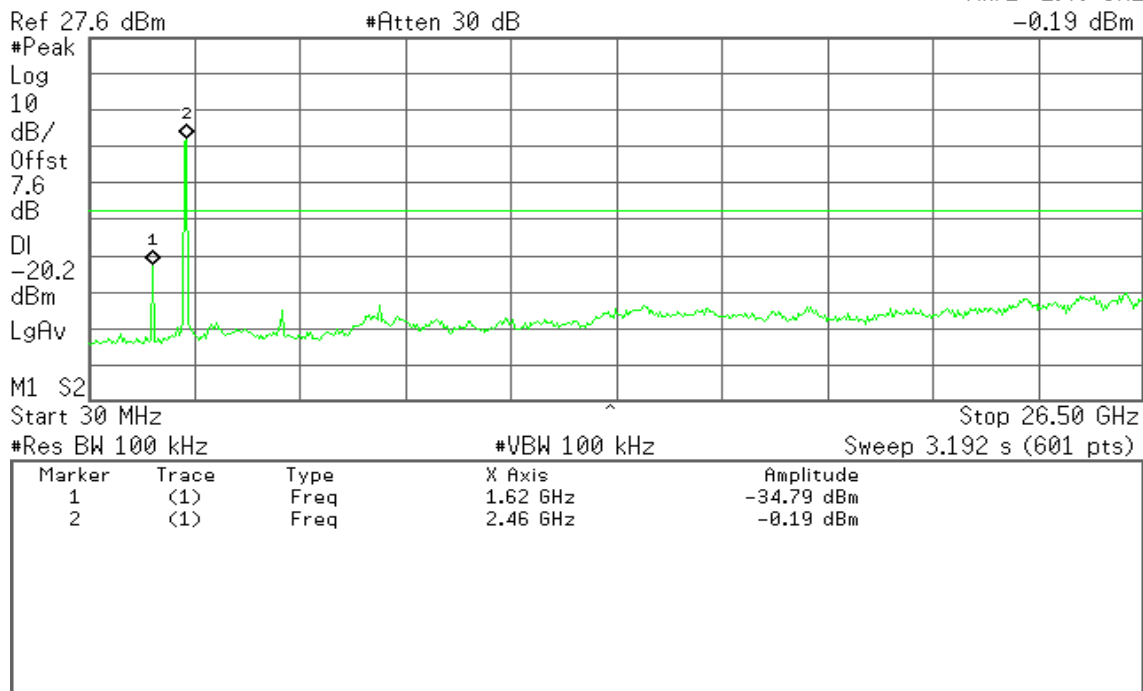
Mkr2 2.41 GHz  
-1.16 dBm



Agilent 22:10:19 Jul 24, 2012

R T

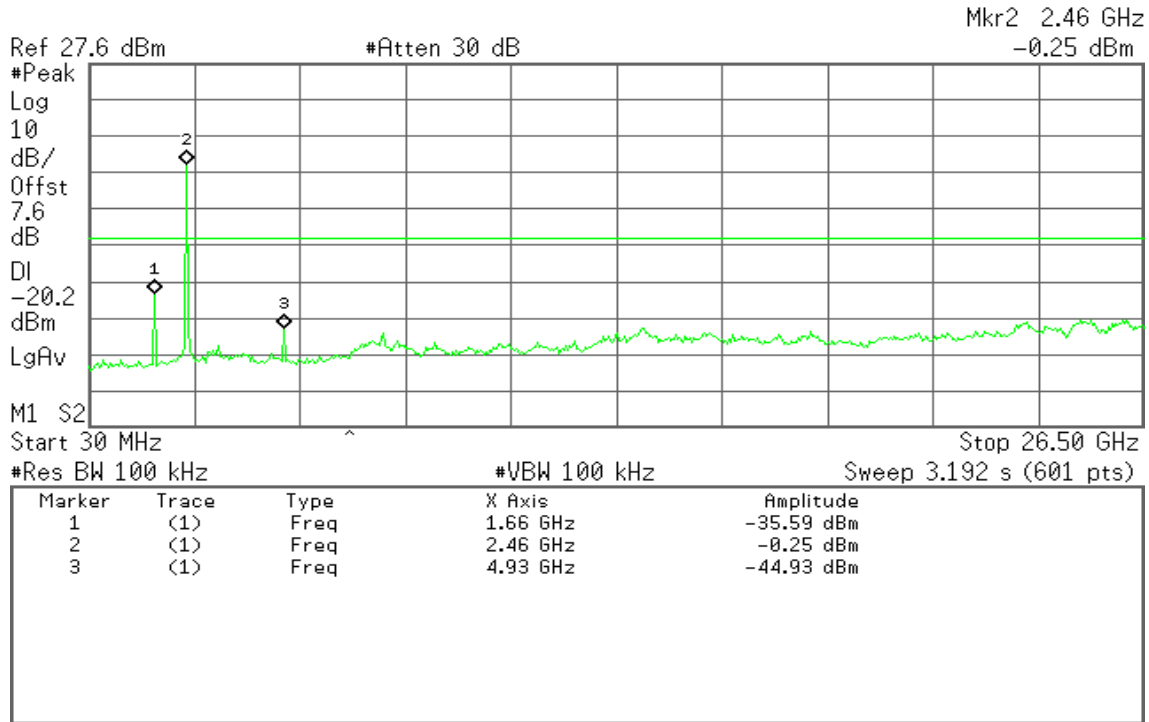
Mkr2 2.46 GHz  
-0.19 dBm





Agilent 22:15:33 Jul 24, 2012

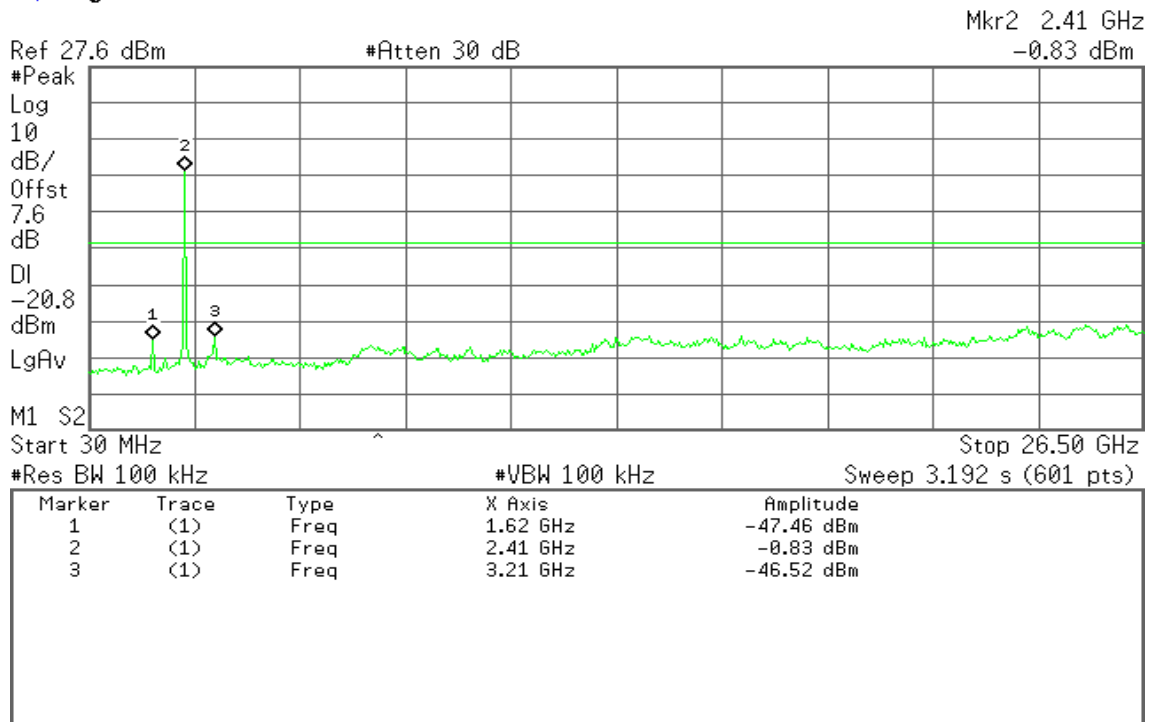
R T



**draft 802.11n 20 MHz Channel mode / Chain 1**

Agilent 22:20:48 Jul 24, 2012

R T

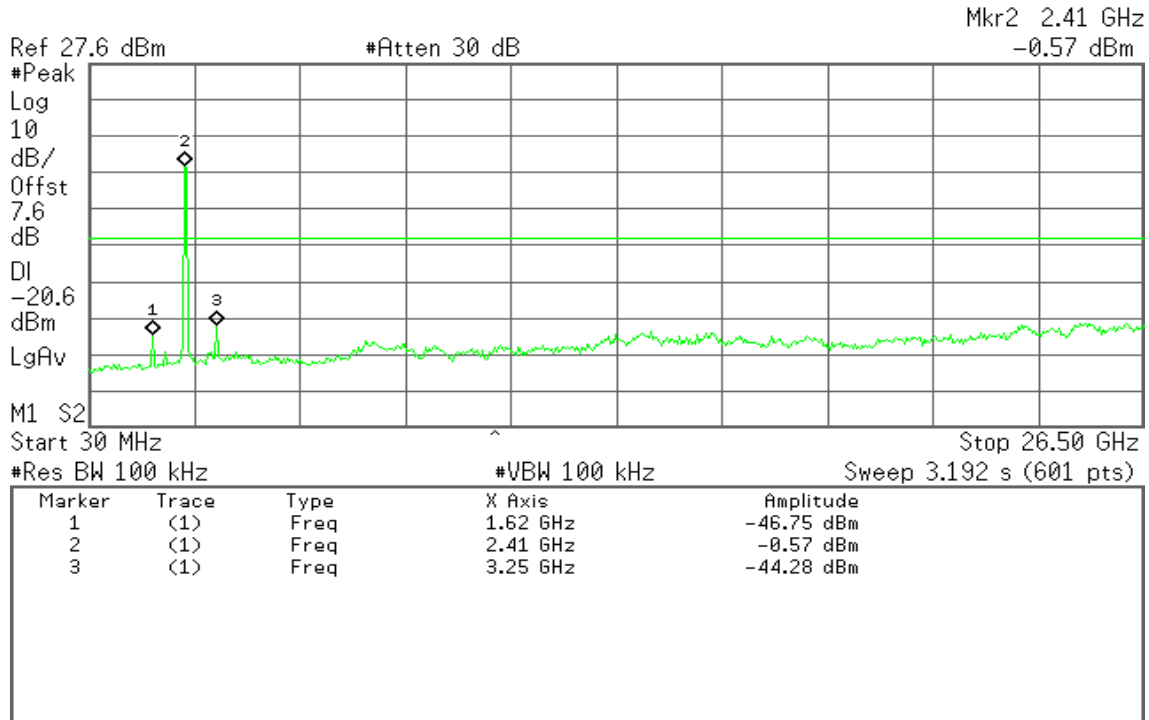






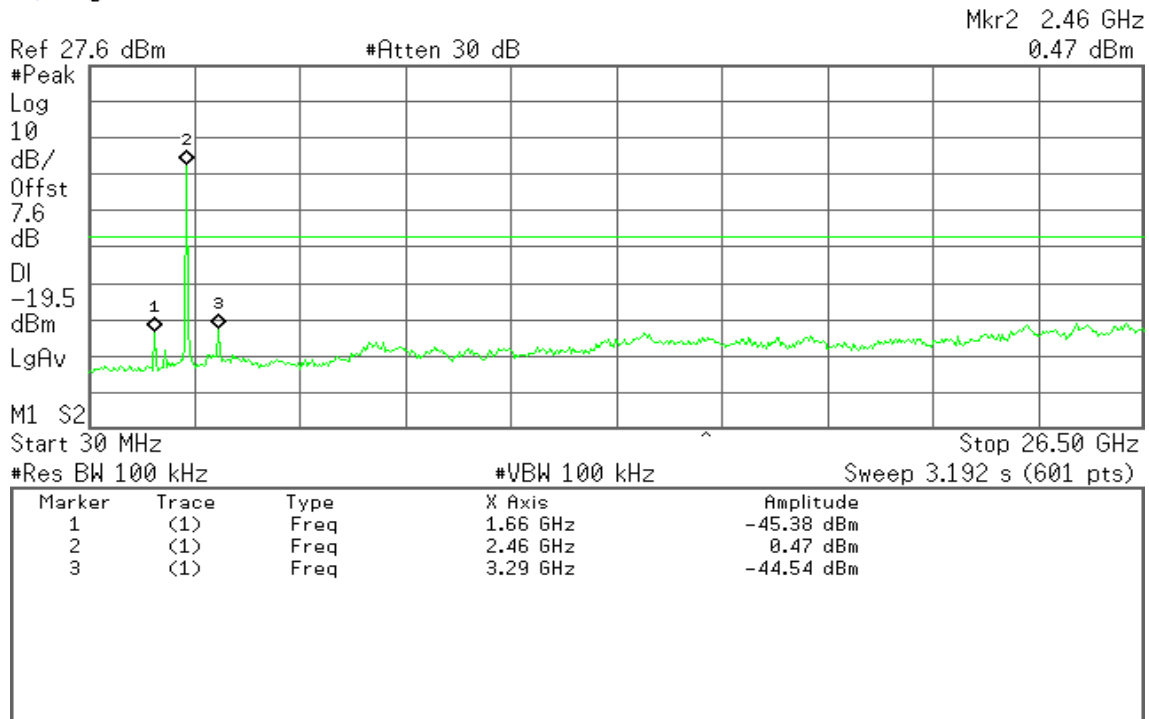
Agilent 22:19:09 Jul 24, 2012

R T



Agilent 22:17:26 Jul 24, 2012

R T



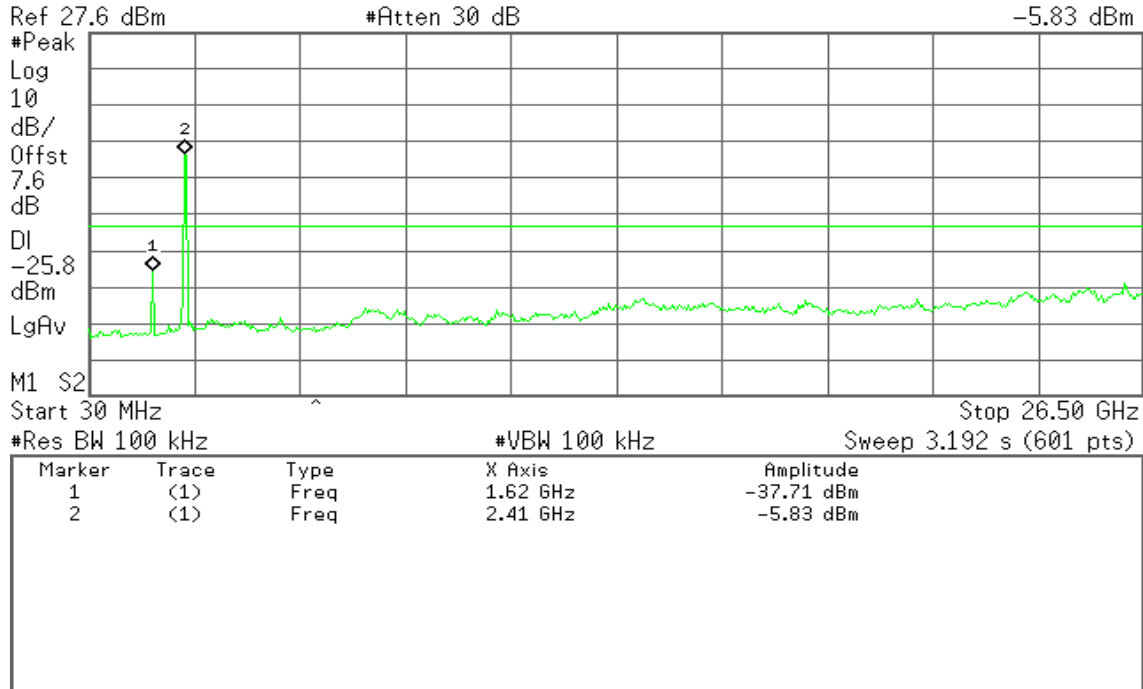


**draft 802.11n 40 MHz Channel mode / Chain 0**

Agilent 22:42:55 Jul 24, 2012

R T

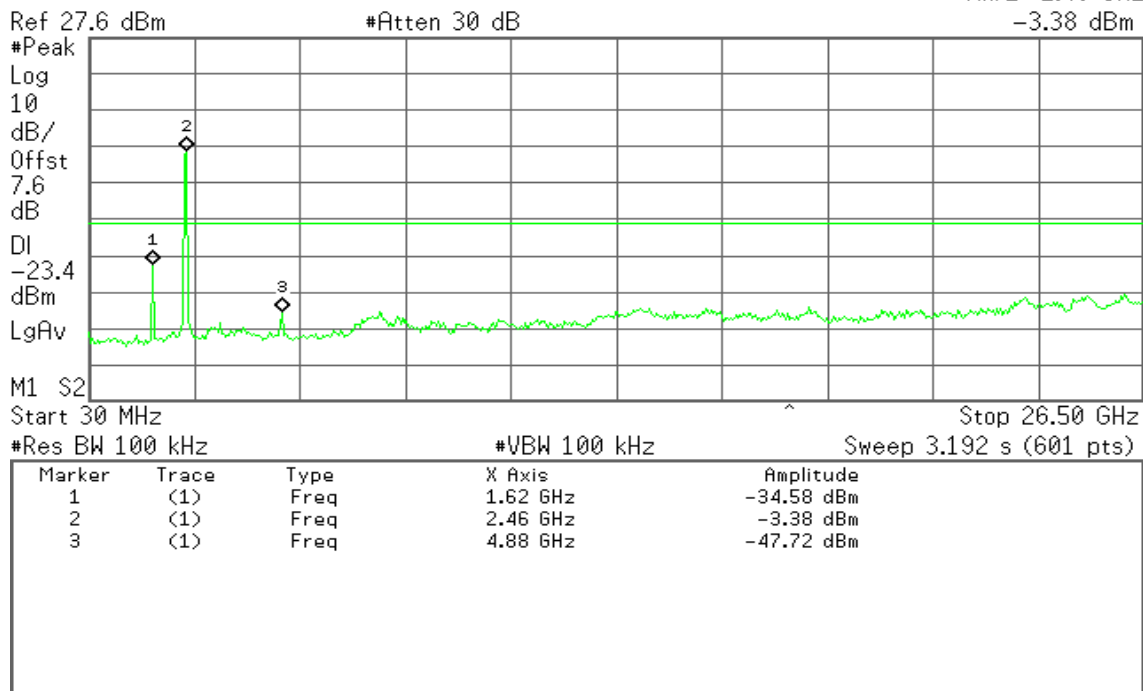
Mkr2 2.41 GHz  
-5.83 dBm



Agilent 22:33:25 Jul 24, 2012

R T

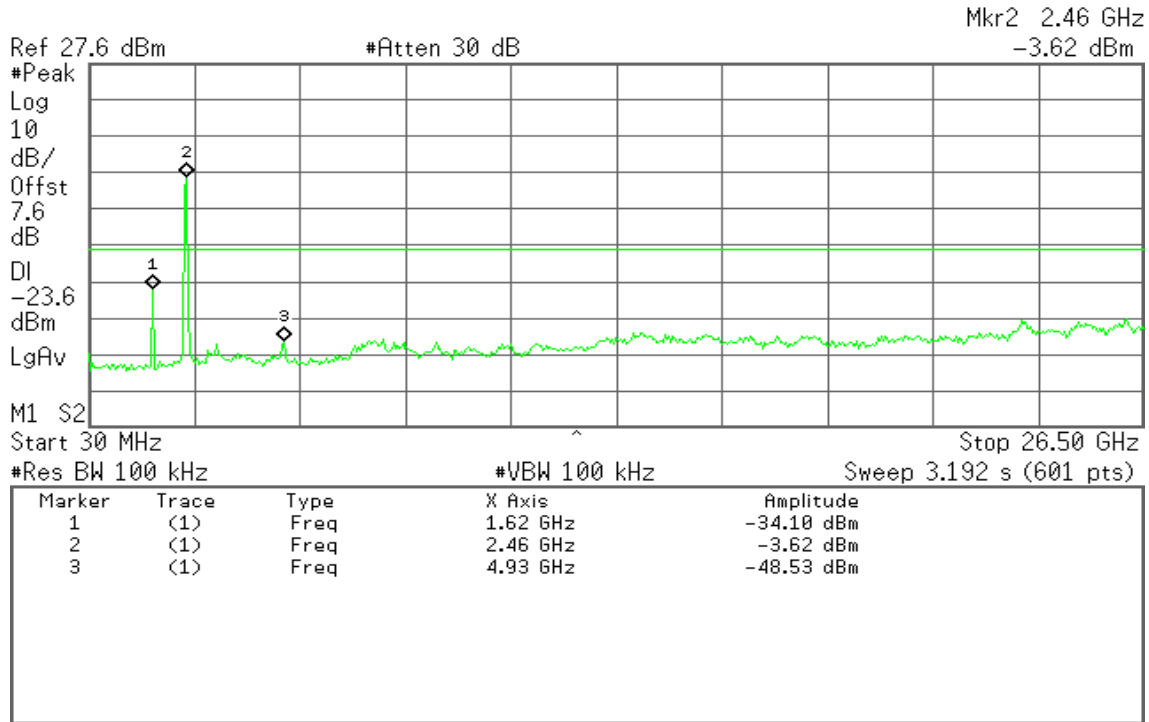
Mkr2 2.46 GHz  
-3.38 dBm





Agilent 22:30:44 Jul 24, 2012

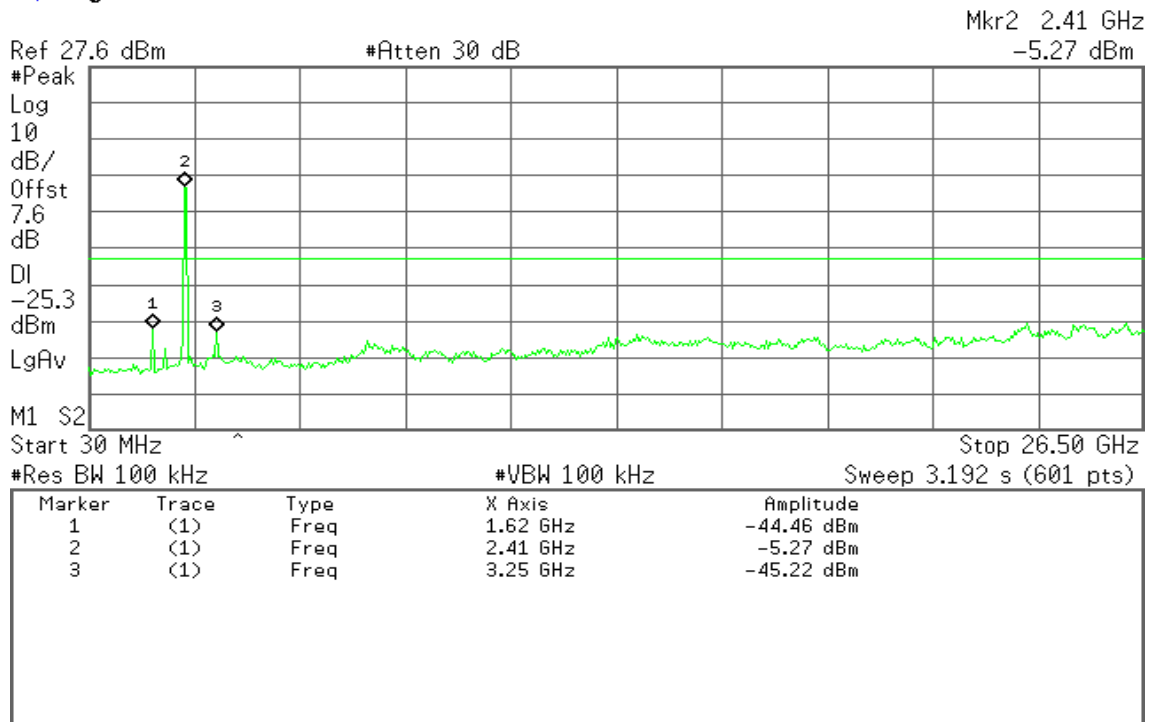
R T



**draft 802.11n 40 MHz Channel mode / Chain 1**

Agilent 22:23:40 Jul 24, 2012

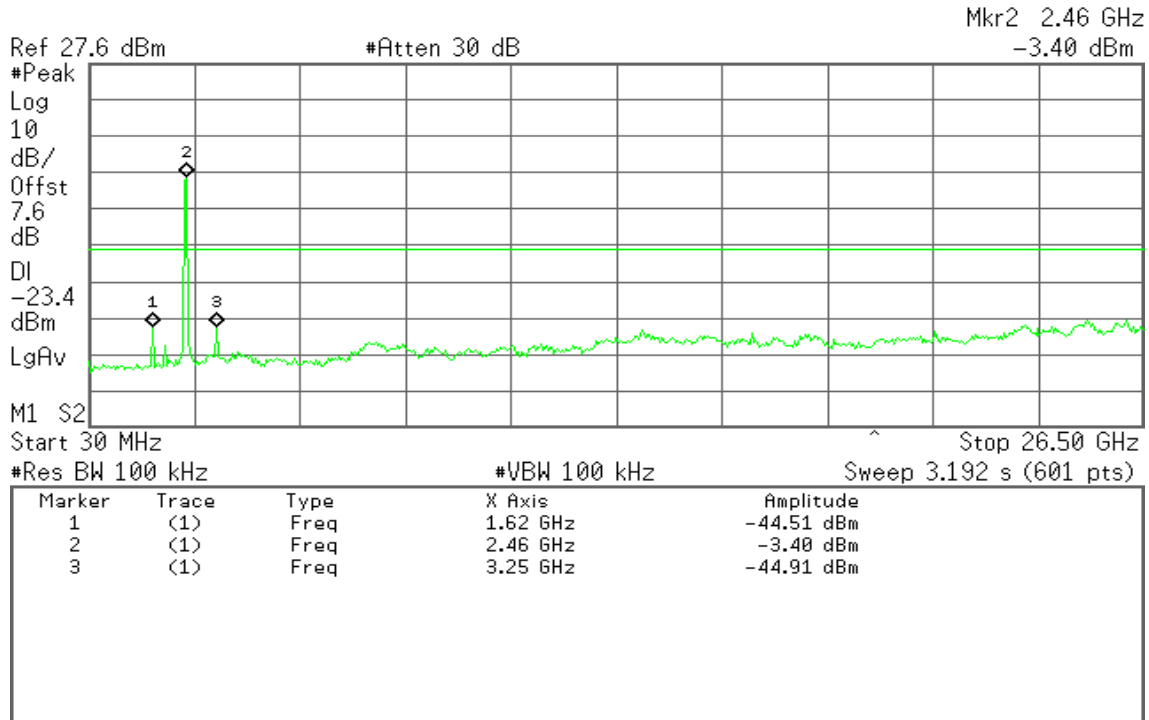
R T





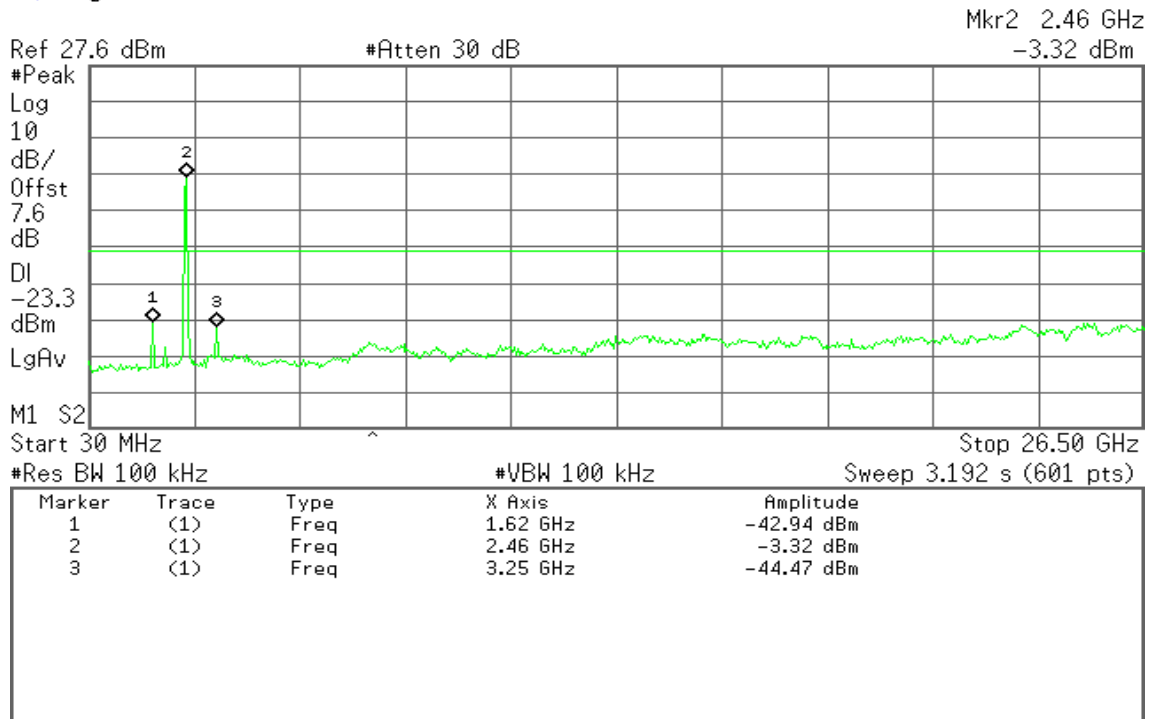
Agilent 22:35:13 Jul 24, 2012

R T



Agilent 22:28:08 Jul 24, 2012

R T

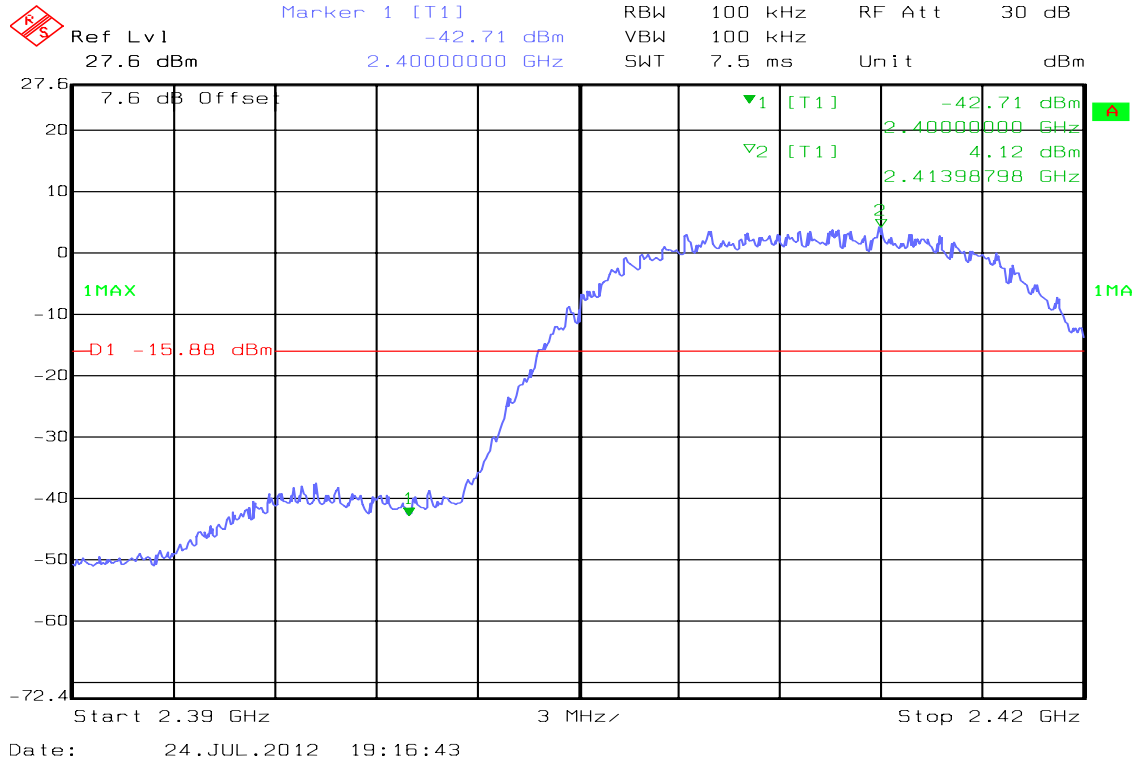




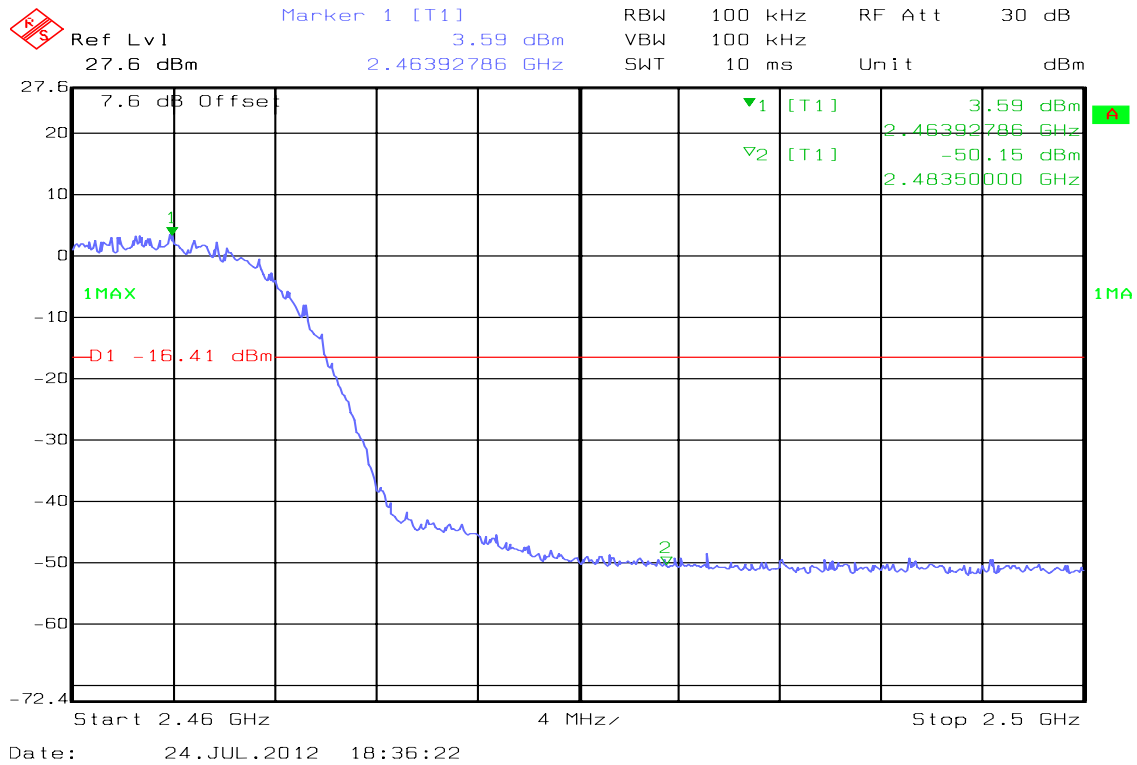
**Conducted band-edge**

**IEEE 802.11b mode**

**CH Low**



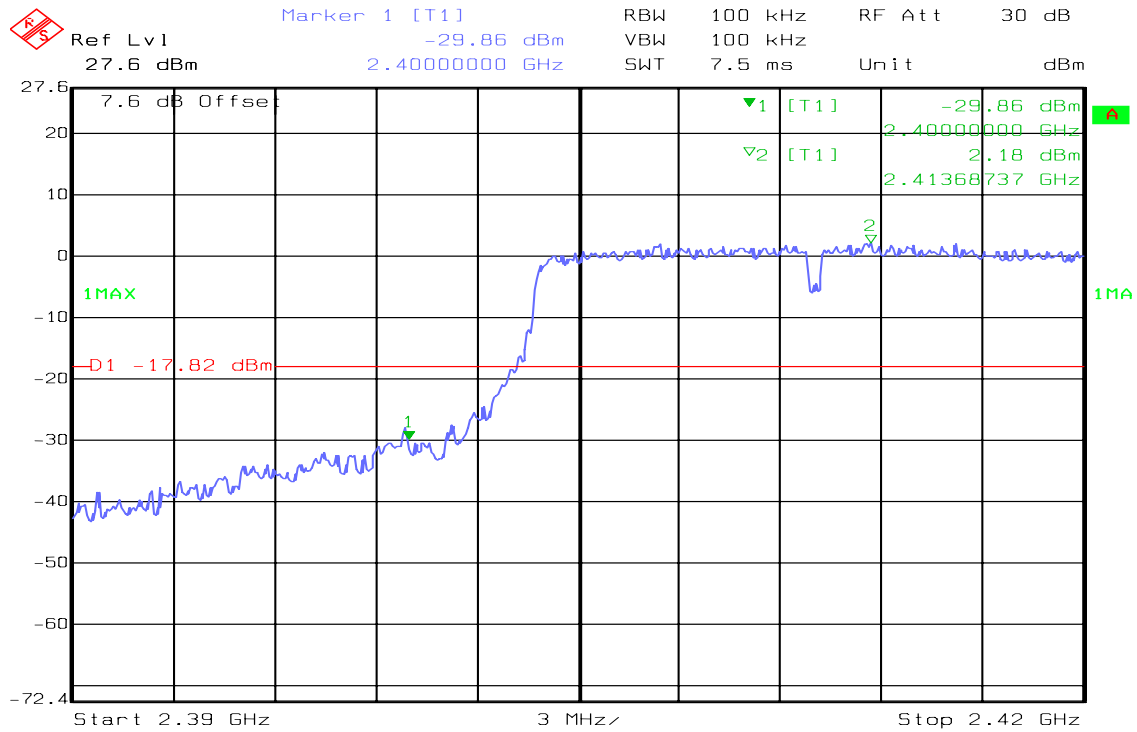
**CH High**





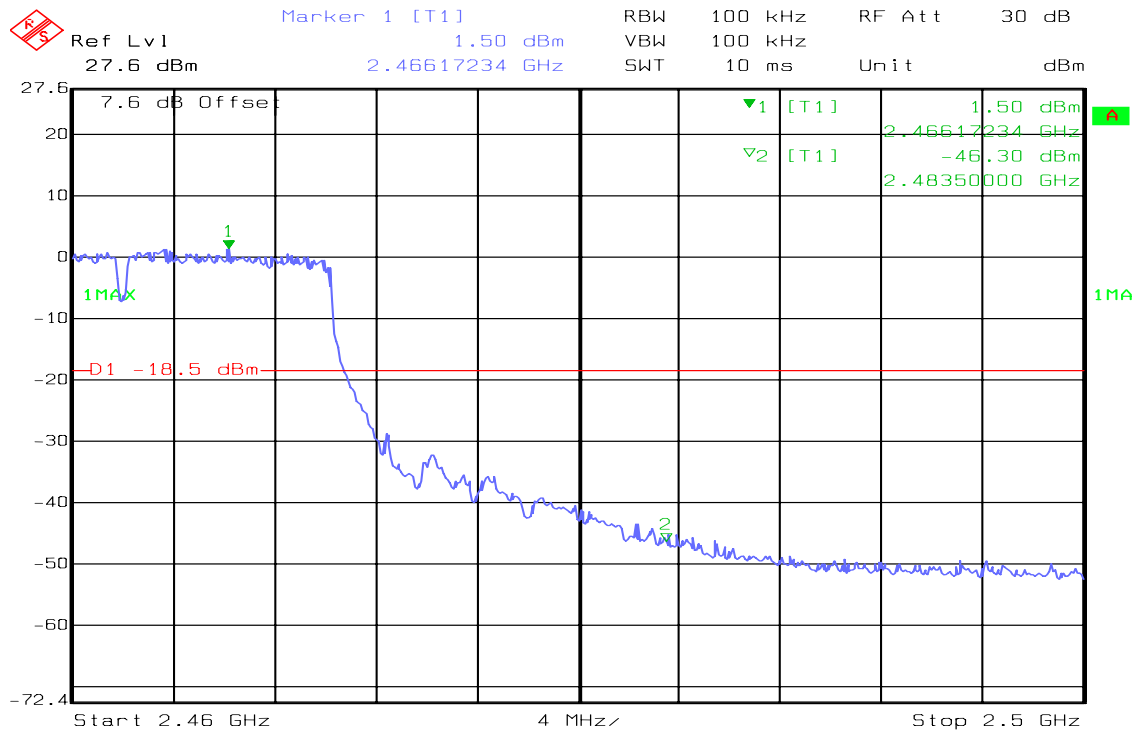
**IEEE 802.11g mode**

**CH Low**



Date: 24.JUL.2012 19:13:01

**CH High**

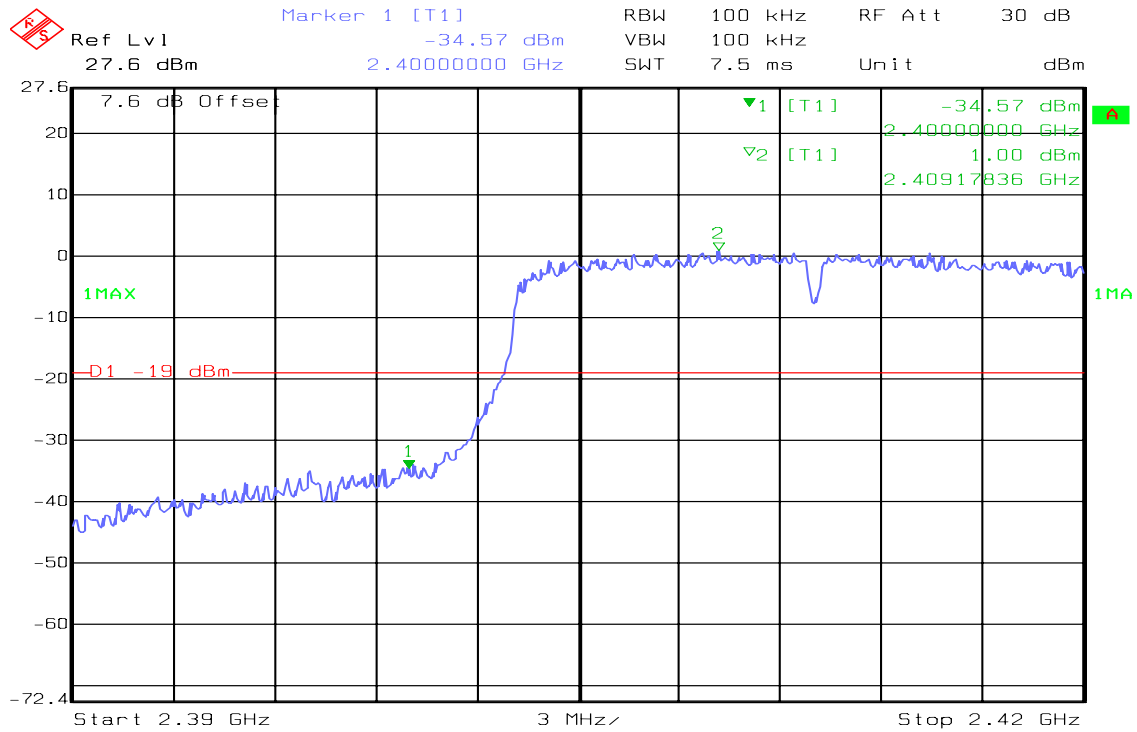


Date: 24.JUL.2012 18:39:50

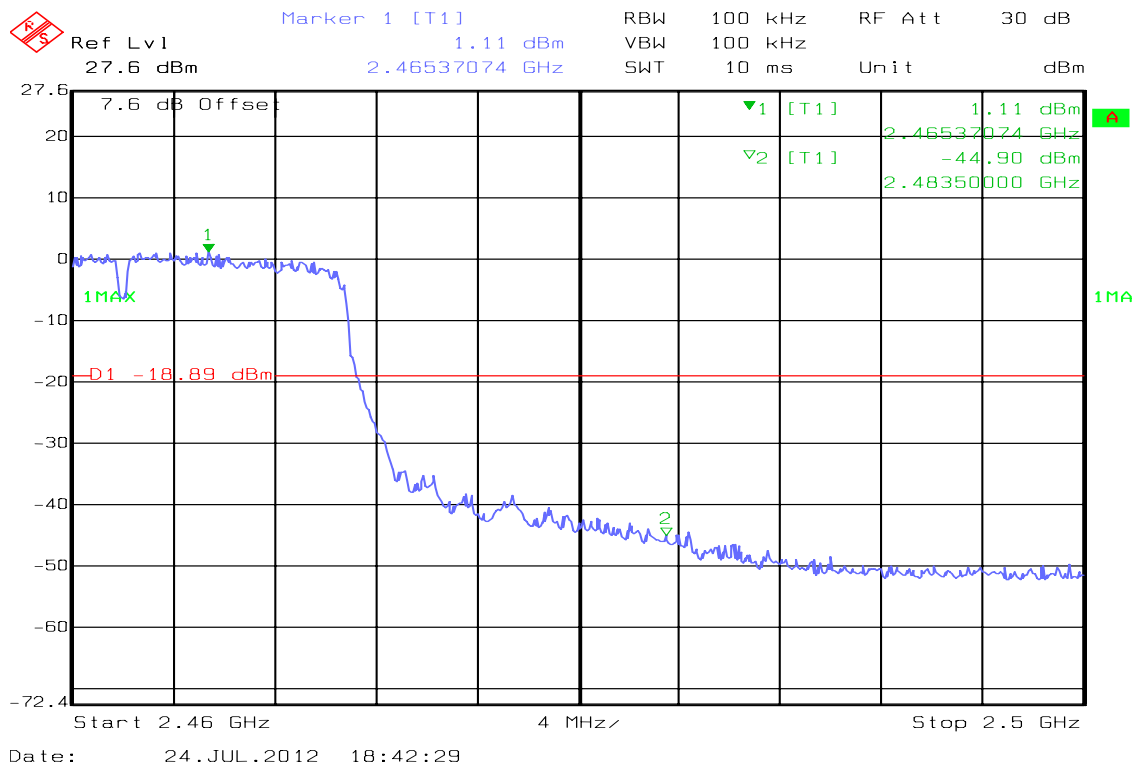


### IEEE 802.11n HT20 mode / Chain 0

#### CH Low



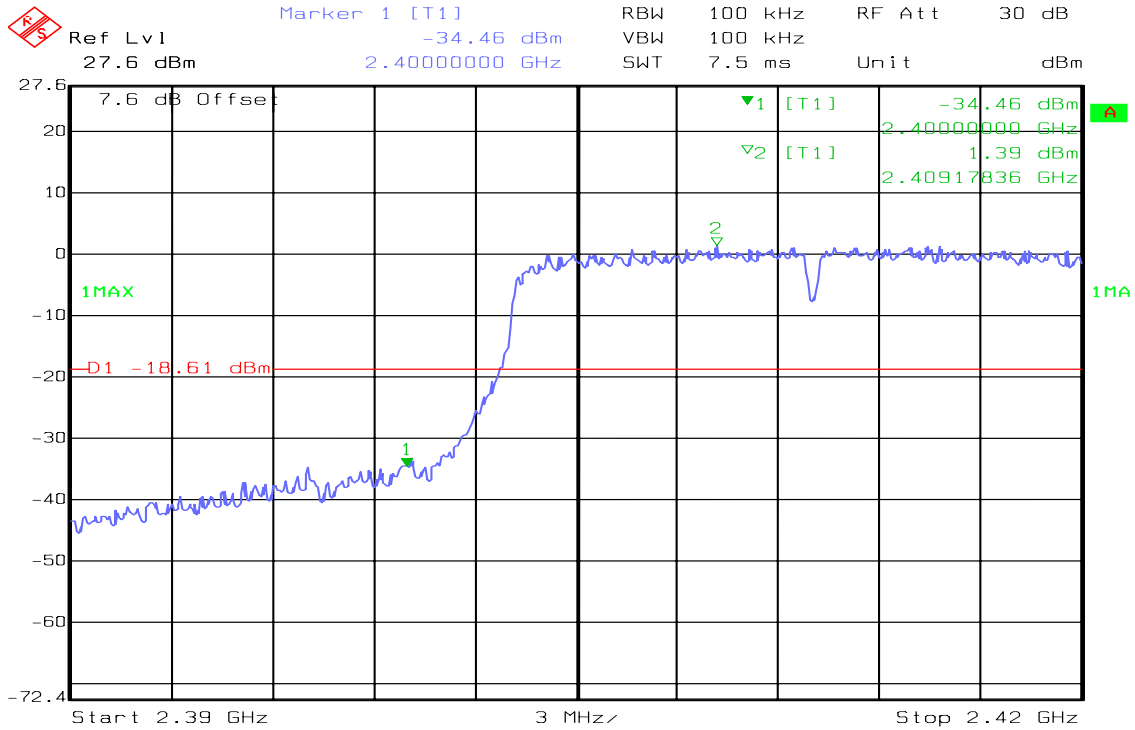
#### CH High





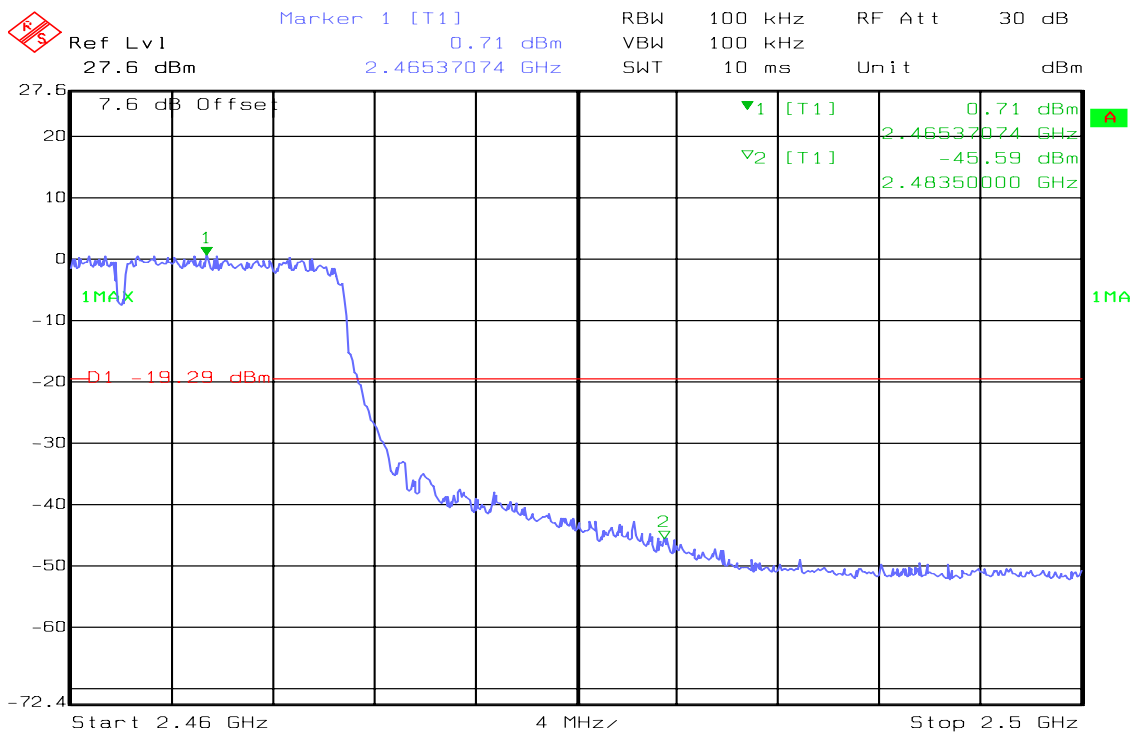
IEEE 802.11n HT20 mode / Chain 1

CH Low



Date: 24.JUL.2012 19:06:57

CH High



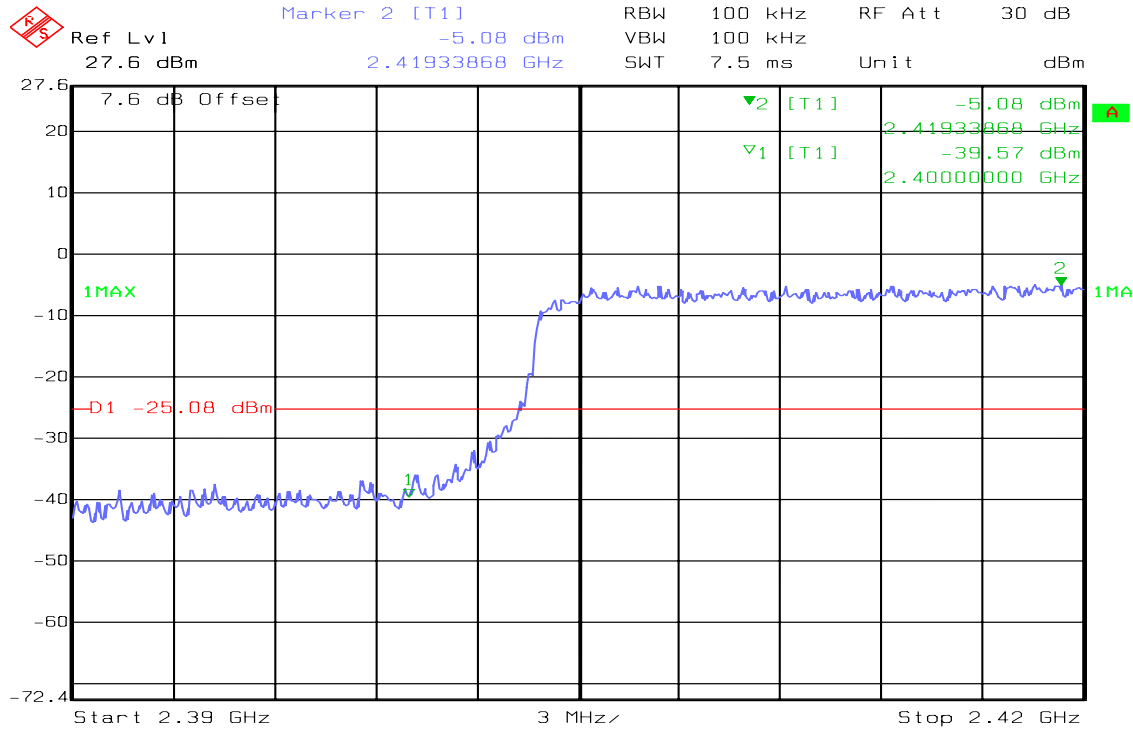
Date: 24.JUL.2012 18:45:20





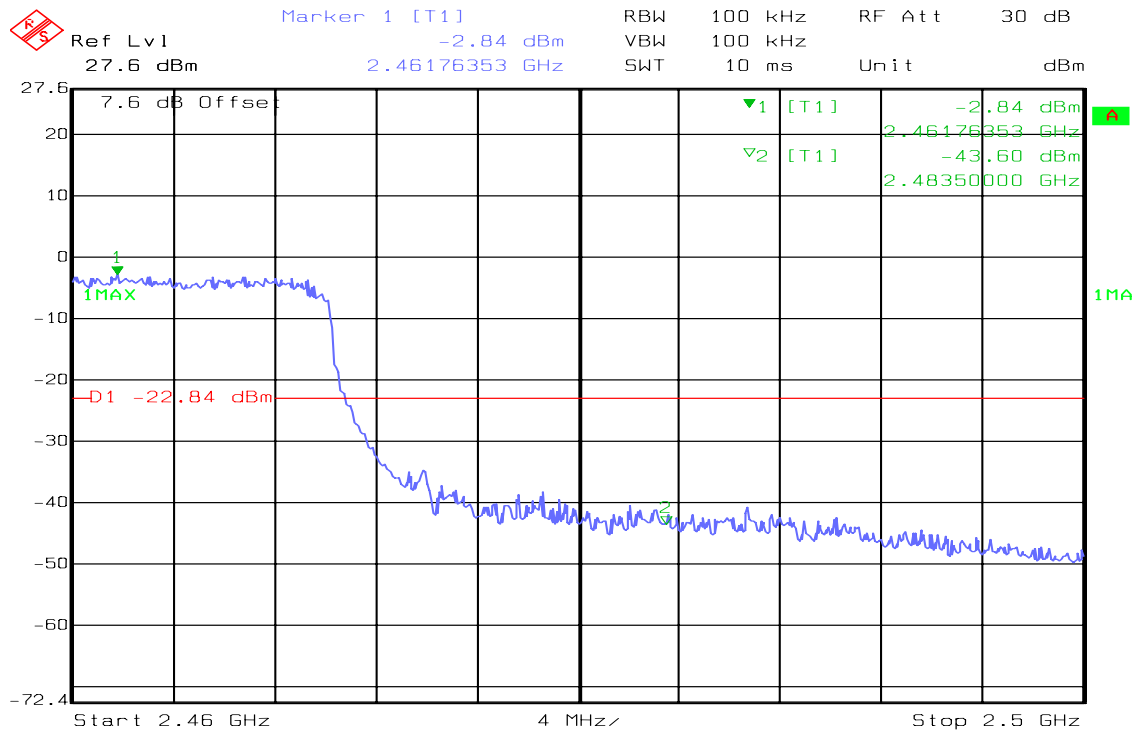
IEEE 802.11n HT40 mode / Chain 0

CH Low



Date: 24.JUL.2012 18:59:50

CH High

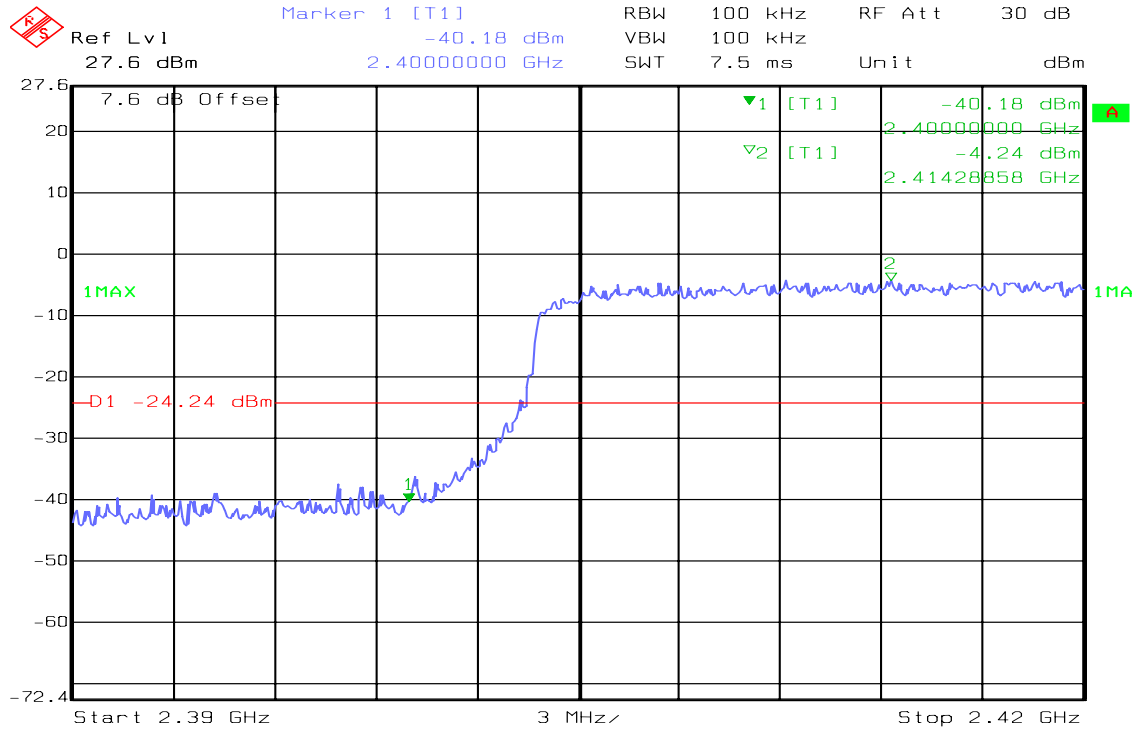


Date: 24.JUL.2012 18:55:51

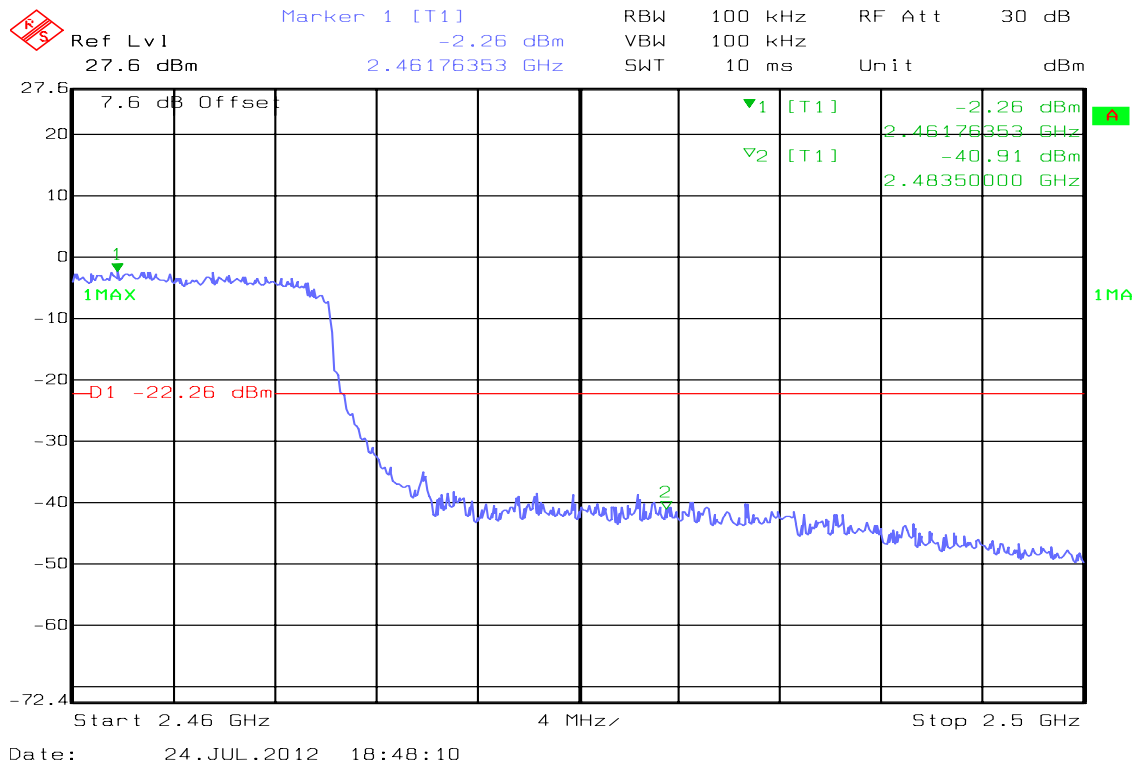


IEEE 802.11n HT40 mode / Chain 1

CH Low



CH High





## 7.6.2 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 ( $\mu\text{V/m}$ )	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.

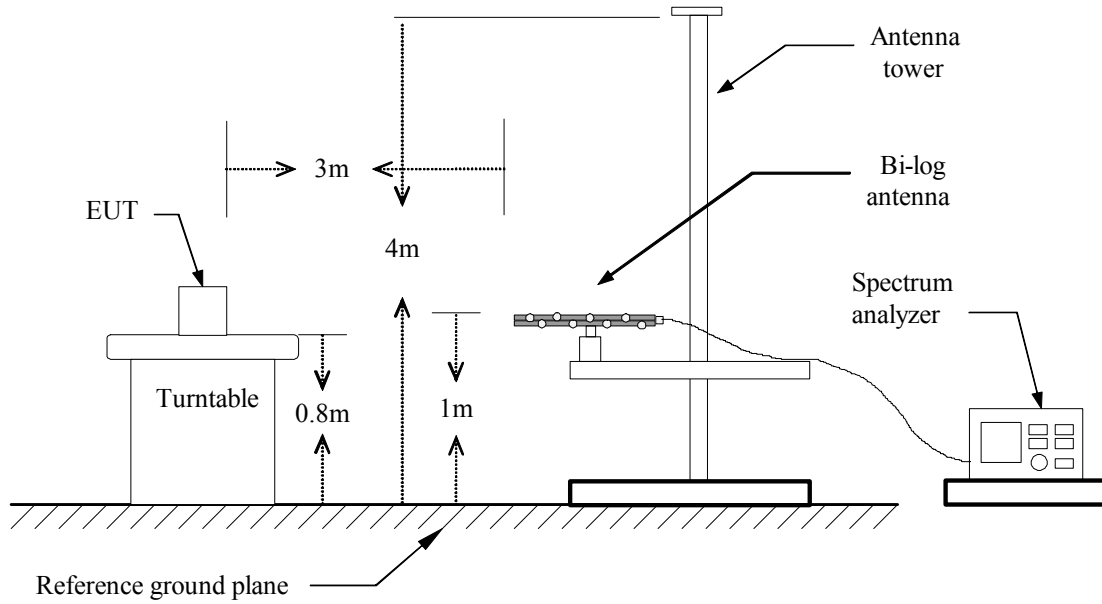
2. In the emission table above, the tighter limit applies at the band edges.

Frequency (MHz)	Field Strength ( $\mu\text{V/m}$ at 3-meter)	Field Strength (dB $\mu\text{V/m}$ at 3-meter)
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

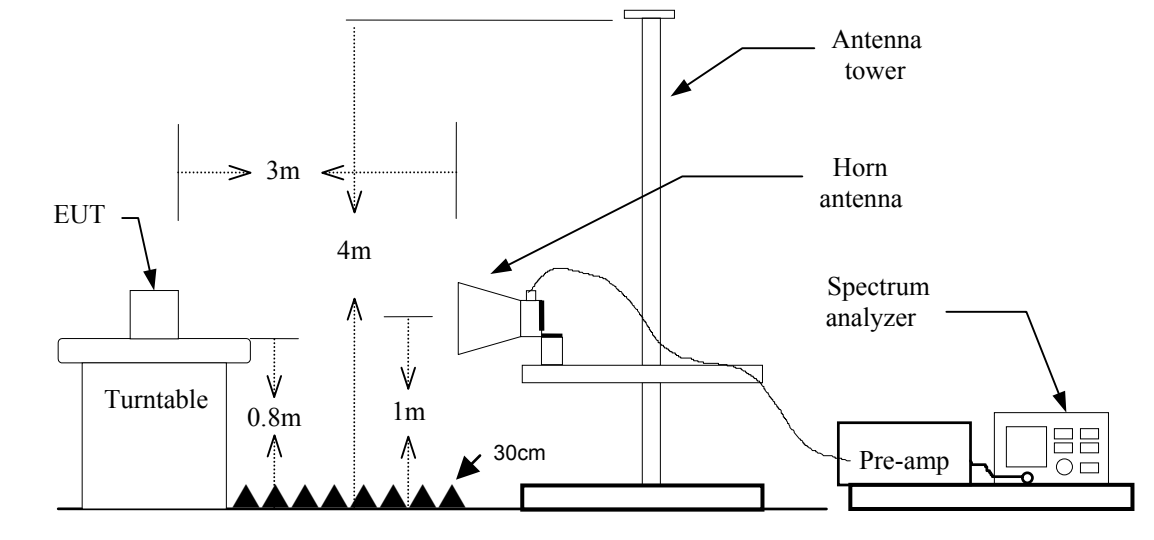


## TEST CONFIGURATION

### 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 30MHz**

RBW=9kHz / VBW=300kHz / Sweep=AUTO

### **30 ~ 1000MHz:**

RBW=120kHz / VBW=3MHz / 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**

*No non-compliance noted.*



**TEST DATA**

**Below 1GHz**

**Operation Mode:** Transmitting      **Test Date:** July 25, 2012  
**Temperature:** 26°C      **Tested by:** Clark Su  
**Humidity:** 56% RH      **Polarity:** Ver. / Hor.

Frequency (MHz)	Reading (dBUV)	Correction Factor (dB/m)	Result (dBUV/m)	Limit (dBUV/m)	Margin (dB)	Ant. Pol. (H/V)	Remark
120.2099	44.26	-13.96	30.30	43.50	-13.20	V	QP
250.1899	48.63	-12.46	36.17	46.00	-9.83	V	QP
269.5899	47.58	-11.47	36.11	46.00	-9.89	V	QP
421.8799	48.38	-8.63	39.75	46.00	-6.25	V	QP
749.7400	38.16	-2.17	35.99	46.00	-10.01	V	QP
810.8500	41.09	-1.10	39.99	46.00	-6.01	V	QP
120.2100	43.91	-13.96	29.95	43.50	-13.55	H	QP
250.1900	49.07	-12.46	36.61	46.00	-9.39	H	QP
312.2700	45.82	-9.23	36.59	46.00	-9.41	H	QP
420.9100	45.77	-8.68	37.09	46.00	-8.91	H	QP
749.7400	38.65	-2.17	36.48	46.00	-9.52	H	QP
809.8800	37.34	-1.11	36.23	46.00	-9.77	H	QP

**Remark:**

1. No emission found between lowest internal used / generated frequency to 30 MHz. (9kHz ~ 30MHz)
2. Measuring frequencies from 9 kHz to the 1GHz.
3. Radiated emissions measured in the measured frequency range were made with an instrument using peak detector or quasi-peak detector mode.
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. The IF bandwidth of SPA between 30MHz to 1GHz was 100kHz.



**Above 1 GHz**

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

**Test Date:** July 18, 2012

**Temperature:** 26°C

**Tested by:** Clark Su

**Humidity:** 56 % RH

**Polarity:** Ver. / Hor.

Freq. (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Ant. Pol H/V	Remark
1350.000	56.45	-7.63	48.82	74.00	-25.18	V	Peak
1948.000	50.21	-2.12	48.09	74.00	-25.91	V	Peak
2144.000	51.42	-2.58	48.84	74.00	-25.16	V	Peak
2658.000	48.78	-1.76	47.02	74.00	-26.98	V	Peak
4825.000	53.88	2.68	56.56	74.00	-17.44	V	Peak
4825.000	42.80	2.68	45.48	54.00	-8.52	V	AVG
7235.000	50.85	10.21	61.06	74.00	-12.94	V	Peak
7235.000	38.53	10.21	48.74	54.00	-5.26	V	AVG
1390.000	50.75	-7.16	43.59	74.00	-30.41	H	Peak
2764.000	49.61	-2.80	46.81	74.00	-27.19	H	Peak
4825.000	56.91	5.88	62.79	74.00	-11.21	H	Peak
4825.000	45.43	5.88	51.31	54.00	-2.69	H	AVG
7240.000	42.89	11.02	53.91	74.00	-20.09	H	Peak
7240.000	36.34	11.02	47.36	54.00	-6.64	H	AVG
N/A							

**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.



Operation Mode: TX / IEEE 802.11b / CH Mid

Test Date: July 18, 2012

Temperature: 26°C

Tested by: Clark Su

Humidity: 56 % RH

Polarity: Ver. / Hor.

Freq. (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Ant. Pol H/V	Remark
1624.000	51.41	-4.99	46.42	74.00	-27.58	V	Peak
1990.000	49.39	-1.46	47.93	74.00	-26.07	V	Peak
2834.000	48.95	-1.61	47.34	74.00	-26.66	V	Peak
4875.000	48.03	3.81	51.84	74.00	-22.16	V	Peak
N/A							
1390.000	50.75	-7.16	43.59	74.00	-30.41	H	Peak
2764.000	49.61	-2.80	46.81	74.00	-27.19	H	Peak
4825.000	56.91	5.88	62.79	74.00	-11.21	H	Peak
4825.000	45.43	5.88	51.31	54.00	-2.69	H	AVG
7240.000	42.89	11.02	53.91	74.00	-20.09	H	Peak
7240.000	36.34	11.02	47.36	54.00	-6.64	H	AVG
N/A							

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.





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

**Test Date:** July 18, 2012

**Temperature:** 26°C

**Tested by:** Clark Su

**Humidity:** 56 % RH

**Polarity:** Ver. / Hor.

Freq. (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Ant. Pol H/V	Remark
1956.000	49.62	-2.00	47.62	74.00	-26.38	V	Peak
2686.000	48.90	-1.57	47.33	74.00	-26.67	V	Peak
4930.000	47.03	4.66	51.69	74.00	-22.31	V	Peak
7390.000	46.09	11.22	57.31	74.00	-16.69	V	Peak
7390.000	35.10	11.22	46.32	54.00	-7.68	V	AVG
N/A							
1642.000	54.84	-8.74	46.10	74.00	-27.90	H	Peak
1716.000	52.29	-7.49	44.80	74.00	-29.20	H	Peak
1738.000	52.51	-7.29	45.22	74.00	-28.78	H	Peak
1892.000	54.10	-5.88	48.22	74.00	-25.78	H	Peak
4925.000	53.47	7.26	60.73	74.00	-13.27	H	Peak
4925.000	41.98	7.26	49.24	54.00	-4.76	H	AVG
7385.000	44.32	11.39	55.71	74.00	-18.29	H	Peak
7385.000	34.10	11.39	45.49	54.00	-8.51	H	AVG
N/A							

**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.



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

**Test Date:** July 18, 2012

**Temperature:** 26°C

**Tested by:** Clark Su

**Humidity:** 56 % RH

**Polarity:** Ver. / Hor.

Freq. (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Ant. Pol H/V	Remark
1892.000	53.78	-3.07	50.71	74.00	-23.29	V	Peak
2360.000	53.73	-1.62	52.11	74.00	-21.89	V	Peak
2464.000	51.96	-1.20	50.76	74.00	-23.24	V	Peak
2584.000	49.89	-1.97	47.92	74.00	-26.08	V	Peak
4825.000	49.95	2.68	52.63	74.00	-21.37	V	Peak
4825.000	39.00	2.68	41.68	54.00	-12.32	V	AVG
7230.000	50.85	10.19	61.04	74.00	-12.96	V	Peak
7230.000	38.10	10.19	48.29	54.00	-5.71	V	AVG
1350.000	58.09	-8.19	49.90	74.00	-24.10	H	Peak
1738.000	52.31	-7.29	45.02	74.00	-28.98	H	Peak
2108.000	50.41	-3.76	46.65	74.00	-27.35	H	Peak
2360.000	53.62	-6.35	47.27	74.00	-26.73	H	Peak
2464.000	53.60	-4.72	48.88	74.00	-25.12	H	Peak
4825.000	52.89	5.88	58.77	74.00	-15.23	H	Peak
4825.000	44.00	5.88	49.88	54.00	-4.12	H	AVG
7230.000	45.97	10.89	56.86	74.00	-17.14	H	Peak
7230.000	37.90	10.89	48.79	54.00	-5.21	H	AVG

**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.



**Operation Mode:** TX / IEEE 802.11g / CH Mid

**Test Date:** July 18, 2012

**Temperature:** 26°C

**Tested by:** Clark Su

**Humidity:** 56 % RH

**Polarity:** Ver. / Hor.

Freq. (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Ant. Pol H/V	Remark
1740.000	52.94	-5.47	47.47	74.00	-26.53	V	Peak
2384.000	55.96	-1.65	54.31	74.00	-19.69	V	Peak
2384.000	46.10	-1.65	44.45	54.00	-9.55	V	AVG
2656.000	49.11	-1.78	47.33	74.00	-26.67	V	Peak
3250.000	47.29	-0.01	47.28	74.00	-26.72	V	Peak
4870.000	47.95	3.70	51.65	74.00	-22.35	V	Peak
7310.000	45.95	10.56	56.51	74.00	-17.49	V	Peak
7310.000	38.30	10.56	48.86	54.00	-5.14	V	AVG
1624.000	52.48	-9.09	43.39	74.00	-30.61	H	Peak
2384.000	55.95	-6.35	49.60	74.00	-24.40	H	Peak
2552.000	50.26	-3.58	46.68	74.00	-27.32	H	Peak
4875.000	49.44	6.73	56.17	74.00	-17.83	H	Peak
4875.000	39.10	6.73	45.83	54.00	-8.17	H	AVG
7310.000	44.80	11.77	56.57	74.00	-17.43	H	Peak
7310.000	36.20	11.77	47.97	54.00	-6.03	H	AVG
N/A							

**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.



**Operation Mode:** TX / IEEE 802.11g / CH High

**Test Date:** July 18, 2012

**Temperature:** 26°C

**Tested by:** Clark Su

**Humidity:** 56 % RH

**Polarity:** Ver. / Hor.

Freq. (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Ant. Pol H/V	Remark
1988.000	49.75	-1.49	48.26	74.00	-25.74	V	Peak
2214.000	50.86	-1.36	49.50	74.00	-24.50	V	Peak
2410.000	53.57	-1.60	51.97	74.00	-22.03	V	Peak
2868.000	49.12	-1.12	48.00	74.00	-26.00	V	Peak
3285.000	48.62	0.62	49.24	74.00	-24.76	V	Peak
4915.000	41.99	4.51	46.50	74.00	-27.50	V	Peak
N/A							
1642.000	55.22	-8.74	46.48	74.00	-27.52	H	Peak
2410.000	54.28	-6.10	48.18	74.00	-25.82	H	Peak
2514.000	51.31	-3.75	47.56	74.00	-26.44	H	Peak
3285.000	47.52	1.24	48.76	74.00	-25.24	H	Peak
4915.000	45.88	7.22	53.10	74.00	-20.90	H	Peak
4915.000	38.20	7.22	45.42	54.00	-8.58	H	AVG
7390.000	43.34	11.36	54.70	74.00	-19.30	H	Peak
7390.000	37.20	11.36	48.56	54.00	-5.44	H	AVG
N/A							

**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.



Operation Mode: TX / draft 802.11n 20 MHz Channel mode / CH Low

Test Date: July 18, 2012

Temperature: 26°C

Tested by: Clark Su

Humidity: 55 % RH

Polarity: Ver. / Hor.

Freq. (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Ant. Pol H/V	Remark
1608.000	53.49	-4.86	48.63	74.00	-25.37	V	Peak
1894.000	52.84	-3.02	49.82	74.00	-24.18	V	Peak
2348.000	58.03	-1.61	56.42	74.00	-17.58	V	Peak
2348.000	48.70	-1.61	47.09	54.00	-6.91	V	AVG
2360.000	58.87	-1.62	57.25	74.00	-16.75	V	Peak
2360.000	50.50	-1.62	48.88	54.00	-5.12	V	AVG
2464.000	56.76	-1.20	55.56	74.00	-18.44	V	Peak
2464.000	45.70	-1.20	44.50	54.00	-9.50	V	AVG
2476.000	53.70	-1.11	52.59	74.00	-21.41	V	Peak
2476.000	42.40	-1.11	41.29	54.00	-12.71	V	AVG
4825.000	50.19	2.68	52.87	74.00	-21.13	V	Peak
4825.000	40.50	2.68	43.18	54.00	-10.82	V	AVG
7250.000	49.39	10.27	59.66	74.00	-14.34	V	Peak
7250.000	35.60	10.27	45.87	54.00	-8.13	V	AVG
1608.000	55.36	-9.40	45.96	74.00	-28.04	H	Peak
2464.000	55.65	-4.72	50.93	74.00	-23.07	H	Peak
4825.000	54.79	5.88	60.67	74.00	-13.33	H	Peak
4825.000	43.24	5.88	49.12	54.00	-4.88	H	AVG
7230.000	47.56	10.89	58.45	74.00	-15.55	H	Peak
7230.000	35.40	10.89	46.29	54.00	-7.71	H	AVG
N/A							

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.



**Operation Mode:** TX / draft 802.11n 20 MHz Channel mode / CH Mid

**Test Date:** July 18, 2012

**Temperature:** 26°C

**Tested by:** Clark Su

**Humidity:** 56 % RH

**Polarity:** Ver. / Hor.

Freq. (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Ant. Pol H/V	Remark
1624.000	54.22	-4.99	49.23	74.00	-24.77	V	Peak
2310.000	53.26	-1.56	51.70	74.00	-22.30	V	Peak
2384.000	61.21	-1.65	59.56	74.00	-14.44	V	Peak
2384.000	51.60	-1.65	49.95	54.00	-4.05	V	AVG
2490.000	55.84	-1.00	54.84	74.00	-19.16	V	Peak
2490.000	46.80	-1.00	45.80	54.00	-8.20	V	AVG
3250.000	47.47	-0.01	47.46	74.00	-26.54	V	Peak
4870.000	48.07	3.70	51.77	74.00	-22.23	V	Peak
7300.000	44.31	10.48	54.79	74.00	-19.21	V	Peak
7300.000	35.00	10.48	45.48	54.00	-8.52	V	AVG
1624.000	56.98	-9.09	47.89	74.00	-26.11	H	Peak
2386.000	56.47	-6.35	50.12	74.00	-23.88	H	Peak
2490.000	52.57	-4.06	48.51	74.00	-25.49	H	Peak
3250.000	45.96	1.18	47.14	74.00	-26.86	H	Peak
4875.000	52.25	6.73	58.98	74.00	-15.02	H	Peak
4875.000	39.20	6.73	45.93	54.00	-8.07	H	AVG
7300.000	43.18	11.82	55.00	74.00	-19.00	H	Peak
7300.000	35.10	11.82	46.92	54.00	-7.08	H	AVG
N/A							

**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.



**Operation Mode:** TX / draft 802.11n 20 MHz Channel mode / CH High      **Test Date:** July 18, 2012  
**Temperature:** 26°C      **Tested by:** Clark Su  
**Humidity:** 56 % RH      **Polarity:** Ver. / Hor.

Freq. (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Ant. Pol H/V	Remark
1642.000	54.28	-5.15	49.13	74.00	-24.87	V	Peak
2410.000	57.56	-1.60	55.96	74.00	-18.04	V	Peak
2410.000	49.50	-1.60	47.90	54.00	-6.10	V	AVG
2516.000	54.18	-1.13	53.05	74.00	-20.95	V	Peak
2516.000	45.10	-1.13	43.97	54.00	-10.03	V	AVG
3285.000	49.04	0.62	49.66	74.00	-24.34	V	Peak
4925.000	42.35	4.61	46.96	74.00	-27.04	V	Peak
7380.000	43.56	11.14	54.70	74.00	-19.30	V	Peak
7380.000	35.00	11.14	46.14	54.00	-7.86	V	AVG
1642.000	57.33	-8.74	48.59	74.00	-25.41	H	Peak
2410.000	55.63	-6.10	49.53	74.00	-24.47	H	Peak
2514.000	51.04	-3.75	47.29	74.00	-26.71	H	Peak
3285.000	48.35	1.24	49.59	74.00	-24.41	H	Peak
4920.000	45.25	7.24	52.49	74.00	-21.51	H	Peak
4920.000	36.20	7.24	43.44	54.00	-10.56	H	AVG
7380.000	43.64	11.41	55.05	74.00	-18.95	H	Peak
7380.000	35.30	11.41	46.71	54.00	-7.29	H	AVG

**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.



**Operation Mode:** TX / draft 802.11n 40 MHz Channel mode / CH Low      **Test Date:** July 18, 2012

**Temperature:** 26°C      **Tested by:** Clark Su

**Humidity:** 56 % RH      **Polarity:** Ver. / Hor.

Freq. (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Ant. Pol H/V	Remark
1350.000	55.34	-7.63	47.71	74.00	-26.29	V	peak
1614.000	51.97	-4.91	47.06	74.00	-26.94	V	peak
2318.000	55.01	-1.57	53.44	74.00	-20.56	V	peak
2318.000	46.10	-1.57	44.53	54.00	-9.47	V	AVG
2386.000	67.77	-1.65	66.12	74.00	-7.88	V	Peak
2386.000	53.60	-1.65	51.95	54.00	-2.05	V	AVG
2466.000	59.38	-1.18	58.20	74.00	-15.80	V	Peak
2466.000	45.60	-1.18	44.42	54.00	-9.58	V	AVG
3230.000	47.07	-0.36	46.71	74.00	-27.29	V	Peak
4850.000	47.93	3.25	51.18	74.00	-22.82	V	Peak
7270.000	44.01	10.35	54.36	74.00	-19.64	V	Peak
7270.000	35.30	10.35	45.65	54.00	-8.35	V	AVG
1400.000	50.11	-6.90	43.21	74.00	-30.79	H	Peak
1614.000	52.75	-9.28	43.47	74.00	-30.53	H	Peak
2386.000	65.67	-6.35	59.32	74.00	-14.68	H	Peak
2386.000	51.50	-6.35	45.15	54.00	-8.85	H	AVG
4850.000	49.18	6.30	55.48	74.00	-18.52	H	Peak
4850.000	36.30	6.30	42.60	54.00	-11.40	H	AVG
7280.000	43.50	11.55	55.05	74.00	-18.95	H	Peak
7280.000	34.80	11.55	46.35	54.00	-7.65	H	AVG
N/A							

**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.





Operation Mode: TX / draft 802.11n 40 MHz Channel mode / CH Mid

Test Date: July 18, 2012

Temperature: 26°C

Tested by: Clark Su

Humidity: 56 % RH

Polarity: Ver. / Hor.

Freq. (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Ant. Pol H/V	Remark
1624.000	53.54	-4.99	48.55	74.00	-25.45	V	Peak
2302.000	53.50	-1.55	51.95	74.00	-22.05	V	Peak
2302.000	41.30	-1.55	39.75	54.00	-14.25	V	AVG
2332.000	55.37	-1.59	53.78	74.00	-20.22	V	Peak
2332.000	41.60	-1.59	40.01	54.00	-13.99	V	AVG
2474.000	67.18	-1.12	66.06	74.00	-7.94	V	Peak
2474.000	53.50	-1.12	52.38	54.00	-1.62	V	AVG
3250.000	47.73	-0.01	47.72	74.00	-26.28	V	Peak
4880.000	49.70	3.92	53.62	74.00	-20.38	V	Peak
4880.000	35.80	3.92	39.72	54.00	-14.28	V	AVG
7305.000	51.63	10.52	62.15	74.00	-11.85	V	Peak
7305.000	36.90	10.52	47.42	54.00	-6.58	V	AVG
1624.000	53.83	-9.09	44.74	74.00	-29.26	H	Peak
2176.000	50.23	-3.61	46.62	74.00	-27.38	H	Peak
2780.000	49.02	-2.66	46.36	74.00	-27.64	H	Peak
3250.000	46.20	1.18	47.38	74.00	-26.62	H	Peak
4880.000	51.28	6.81	58.09	74.00	-15.91	H	Peak
4880.000	37.80	6.81	44.61	54.00	-9.39	H	AVG
7330.000	46.75	11.67	58.42	74.00	-15.58	H	Peak
7330.000	36.00	11.67	47.67	54.00	-6.33	H	AVG
N/A							

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.



**Operation Mode:** TX / draft 802.11n 40 MHz Channel mode / CH High **Test Date:** July 18, 2012  
**Temperature:** 26°C **Tested by:** Clark Su  
**Humidity:** 56 % RH **Polarity:** Ver. / Hor.

Freq. (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Ant. Pol H/V	Remark
1634.000	54.04	-5.08	48.96	74.00	-25.04	V	Peak
2350.000	58.03	-1.61	56.42	74.00	-17.58	V	Peak
2350.000	48.30	-1.61	46.69	54.00	-7.31	V	AVG
2412.000	68.58	-1.58	67.00	74.00	-7.00	V	Peak
2412.000	54.80	-1.58	53.22	54.00	-0.78	V	AVG
2494.000	60.67	-0.97	59.70	74.00	-14.30	V	Peak
2494.000	44.20	-0.97	43.23	54.00	-10.77	V	AVG
3270.000	48.86	0.35	49.21	74.00	-24.79	V	Peak
4895.000	44.76	4.26	49.02	74.00	-24.98	V	Peak
7350.000	44.94	10.89	55.83	74.00	-18.17	V	Peak
7350.000	35.10	10.89	45.99	54.00	-8.01	V	AVG
1634.000	55.38	-8.90	46.48	74.00	-27.52	H	Peak
1890.000	53.33	-5.90	47.43	74.00	-26.57	H	Peak
2496.000	59.78	-3.91	55.87	74.00	-18.13	H	Peak
2496.000	45.30	-3.91	41.39	54.00	-12.61	H	AVG
4905.000	48.18	7.17	55.35	74.00	-18.65	H	Peak
4905.000	35.50	7.17	42.67	54.00	-11.33	H	AVG
7365.000	45.68	11.49	57.17	74.00	-16.83	H	Peak
7365.000	34.60	11.49	46.09	54.00	-7.91	H	AVG
N/A							

**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.



## 7.7 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 II 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.

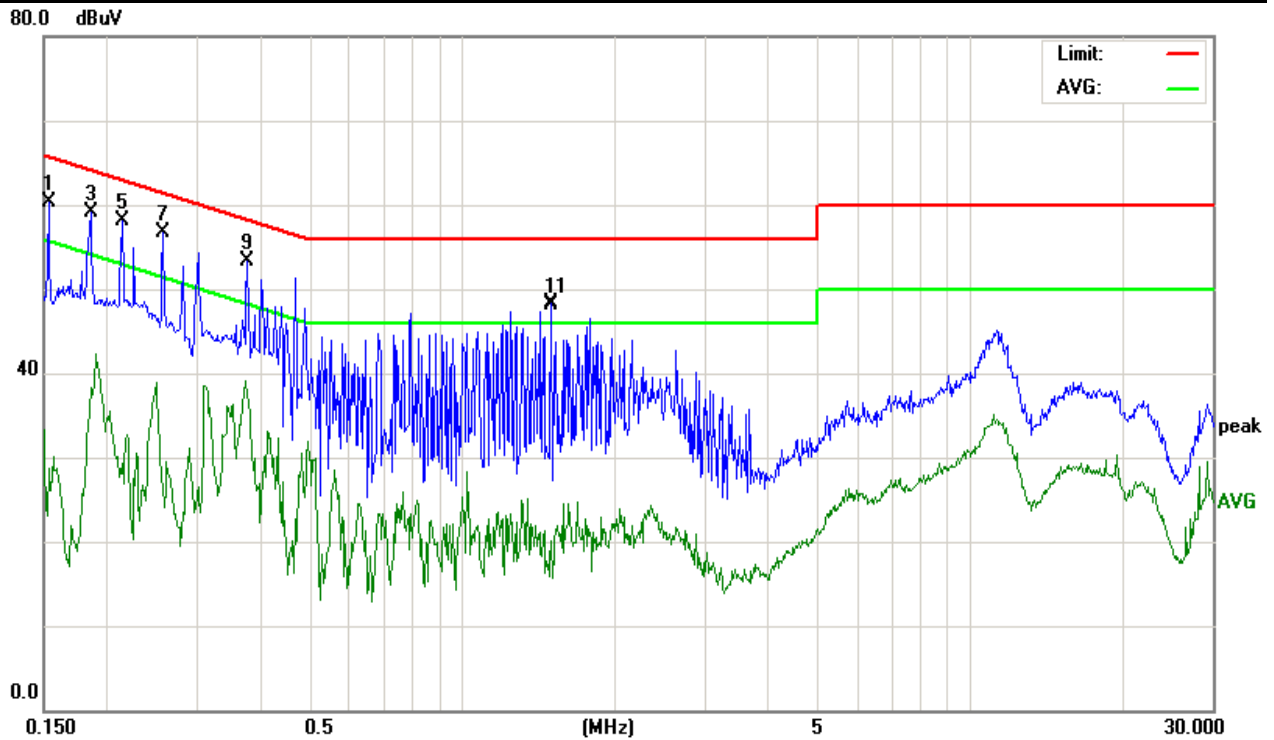
### TEST RESULTS

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**

<b>Test Mode</b>	Charging	<b>6dB Bandwidth</b>	9 kHz
<b>Environmental Conditions</b>	24°C, 60% RH	<b>Test Date:</b>	July 17, 2012
<b>Tested By</b>	David Cheng	<b>Line</b>	L1

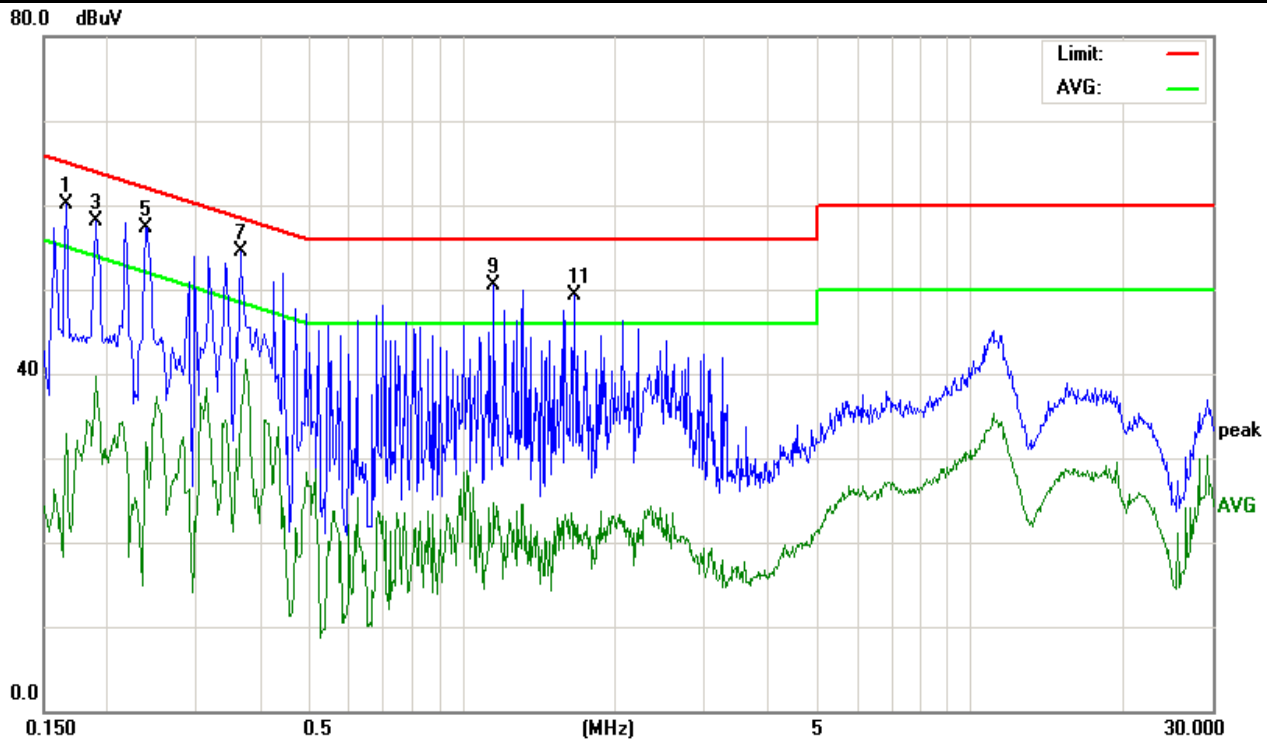


No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Remark
1	0.1539	49.98	10.28	60.26	65.78	-5.52	peak	
2	0.1539	15.83	10.28	26.11	55.78	-29.67	AVG	
3	0.1860	48.79	10.23	59.02	64.21	-5.19	peak	
4	0.1860	32.12	10.23	42.35	54.21	-11.86	AVG	
5	0.2140	47.82	10.20	58.02	63.04	-5.02	peak	
6	0.2140	22.53	10.20	32.73	53.04	-20.31	AVG	
7	0.2580	46.55	10.20	56.75	61.49	-4.74	peak	
8	0.2580	19.23	10.20	29.43	51.49	-22.06	AVG	
9	0.3780	43.16	10.14	53.30	58.32	-5.02	peak	
10	0.3780	28.89	10.14	39.03	48.32	-9.29	AVG	
11	1.4980	38.05	10.15	48.20	56.00	-7.80	peak	
12	1.4980	14.40	10.15	24.55	46.00	-21.45	AVG	

REMARKS: L1 = Line One (Live Line)



<b>Test Mode</b>	Charging	<b>6dB Bandwidth</b>	9 kHz
<b>Environmental Conditions</b>	24°C, 60% RH	<b>Test Date:</b>	July 17, 2012
<b>Tested By</b>	David Cheng	<b>Line</b>	L2



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Remark
1	0.1660	49.47	10.63	60.10	65.15	-5.05	peak	
2	0.1660	22.24	10.63	32.87	55.15	-22.28	AVG	
3	0.1900	47.62	10.58	58.20	64.03	-5.83	peak	
4	0.1900	29.02	10.58	39.60	54.03	-14.43	AVG	
5	0.2380	46.81	10.55	57.36	62.16	-4.80	peak	
6	0.2380	26.85	10.55	37.40	52.16	-14.76	AVG	
7	0.3660	43.92	10.51	54.43	58.59	-4.16	peak	
8	0.3660	31.29	10.51	41.80	48.59	-6.79	AVG	
9	1.1580	40.04	10.52	50.56	56.00	-5.44	peak	
10	1.1580	14.09	10.52	24.61	46.00	-21.39	AVG	
11	1.6700	38.75	10.55	49.30	56.00	-6.70	peak	
12	1.6700	13.00	10.55	23.55	46.00	-22.45	AVG	

REMARKS: L2 = Line Two (Neutral Line)