



**FCC 47 CFR PART 15 SUBPART C**

**TEST REPORT**

**For**

**300Mbps Wireless N ADSL2+ Modem Router**

**Model: DL4323; DL4323D**

**Trade Name:netis**

*Issued to*

**NETIS SYSTEMS CO., LTD  
4F&5F, R&D Building, Oriental Cyberport, High-Tech Industrial Park,  
Nanshan, Shenzhen, China**

*Issued by*

**Compliance Certification Services Inc.  
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**Revision History**

Rev.	Issue Date		Revisions	Effect Page	Revised By
00	April 23, 2014		Initial Issue	ALL	Landy Huang



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# 1. TEST RESULT CERTIFICATION

**Applicant:**                                **NETIS SYSTEMS CO., LTD**  
 4F&5F, R&D Building, Oriental Cyberport,  
 High-Tech Industrial Park, Nanshan, Shenzhen, China

**Manufacturer:**                            **Shenzhen Netcore Industrial Ltd.**  
 4F&5F, R&D Building, Oriental Cyberport,  
 High-Tech Industrial Park, Nanshan, Shenzhen, China

**Equipment Under Test:** 300Mbps Wireless N ADSL2+ Modem Router

**Trade Name:**                            netis

**Model:**                                    DL4323; DL4323D

**Date of Test:**                            April 2 ~ 7, 2014

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

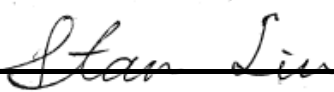
## We hereby certify that:

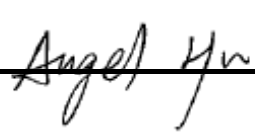
The above equipment was tested by Compliance Certification Services Inc. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.4 and the energy emitted by the sample EUT tested as described in this 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:**

**Reviewed by:**

  
 \_\_\_\_\_  
 Stan Lin  
 Section Manager

  
 \_\_\_\_\_  
 Angel Hu  
 Section Manager



## 2. EUT DESCRIPTION

<b>Product</b>	300Mbps Wireless N ADSL2+ Modem Router		
<b>Trade Name</b>	netis		
<b>Model Number</b>	DL4323; DL4323D		
<b>Model Discrepancy</b>	All the model numbers (list on this report) are identical, just formarketing purpose only except Antenna.		
	<b>Model Number</b>	<b>Antenna</b>	
	DL4323	Fixed	
	DL4323D	Detachable	
<b>EUT Power Rating</b>	12VDC, 0.5A		
<b>Power Adapter</b>	Tenpao	<b>Model</b>	NT120050UL
<b>Power Adapter Rating</b>	I/P: 100-240VAC, 50/60HZ, 0.2A O/P: 12VDC, 0.5A		
<b>RF Module Manufacturer</b>	Realtek	<b>Model</b>	RTL8192ER-CG
<b>Operating Frequency Range</b>	IEEE 802.11 b/g/HT20 mode: 2412 ~ 2462 MHz IEEE 802.11 HT40 mode: 2422 ~ 2452 MHz		
<b>Transmit Power</b>	IEEE 802.11b mode: 19.23dBm (0.0838W) IEEE 802.11g mode: 23.09dBm (0.2037W) IEEE 802.11n HT20 mode: 23.63dBm(0.2307W) IEEE 802.11n HT40 mode: 21.39dBm (0.1379W)		
<b>Modulation Technique</b>	IEEE 802.11b mode: DSSS (11, 5.5, 2, 1 Mbps) IEEE 802.11g mode: OFDM (54, 48, 36, 24, 18, 12, 11, 9, 6 Mbps) IEEE 802.11n HT20 mode: OFDM (6.5, 13, 19.5, 26, 39, 52, 58.5, 65, 78, 104, 117, 130 Mbps) IEEE 802.11n HT40 mode: OFDM (13.5, 27, 40.5, 54, 81, 108, 121.5, 135, 162, 216, 243, 270 Mbps)		
<b>Antenna Specification</b>	Chain 0: Dipole Antenna / Gain: 5.0dBi ( For IEEE 802.11b/g) Chain 1: Dipole Antenna / Gain: 5.0dBi( For IEEE 802.11b/g) (MIMO: $5.0+10\log(2)=8.01$ ) ( For IEEE 802.11n)		

**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: **T58DL4323R** 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.

The EUT (model: DL4323D) had been tested under operating condition and had been reported as worst case on this test report.

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

After verification, all tests were carried out with the worst case test modes as shown below except radiated spurious emission below 1GHz and power line conducted emissions below 30MHz, which worst case was in normal link mode and receiving radiated spurious emission above 1GHz, which worst case was in CH Mid mode only.

The field strength of spurious emission was measured in the following position: EUT stand-up position (Yaxis), lie-down position (X, Zaxis). The worst emission was found in lie-down position (Zaxis) and the worst case was recorded.

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

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

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

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

#### **IEEE 802.11n HT20:**

Channel Low (2412MHz), Channel Mid (2437MHz) and Channel High (2462MHz) with 6.5Mbps data rate were chosen for full testing.

#### **IEEE 802.11n HT40:**

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

Conducted Emissions Test Site				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	MY48250064	01/01/2015
Spectrum Analyzer	Agilent	N9010A	MY52220817	03/20/2015
Spectrum Analyzer	R&S	FSL	100837	11/11/2014
Power meter	Anritsu	ML2495A	1033009	09/29/2014
Power Sensor	Anritsu	MA2411B	0917221	09/29/2014

3MSemi Anechoic Chamber				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	MY48250064	01/01/2015
Spectrum Analyzer	R&S	FSL	100837	11/11/2014
Pre-Amplifier	HP	8447D	2944A06530	08/10/2014
Pre-Amplifier	EMEC	EM01M26G	060570	07/25/2014
Pre-Amplifier	MITEQ	AMF-6F-260400-4 0-8P	985646	08/08/2014
Pre-Amplifier	Agilent	8449B	3008A01738	08/10/2014
EMI Test Receiver	SCHAFFNER	SCR 3501	430	03/30/2015
Loop Antenna	EMCO	6502	2356	06/12/2014
Bilog Antenna	TESEQ	CBL 6112D	35378	09/11/2014
Horn Antenna	EMCO	3115	00022250	08/04/2014
Horn Antenna	EMCO	3116	00026370	12/29/2014
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	EZ-EMC			

**NOTE:** 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.  
 2. N.C.R = No Calibration Request.



Powerline Conducted Emissions Test Site#4				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
EMI Test Receiver	R&S	ESCI	100782	06/14/2014
LISN	R&S	ENV216	100066	02/06/2015
LISN	R&S	ENV 4200	830326/016	05/30/2014
ISN	FCC	FCC-TLISN-T2-02	20587	08/01/2014
ISN	TESEQ	ISN-T8	30843	08/16/2014
Current Probe	FCC	F-35	506	07/19/2014
ISN	TESEQ	ISN ST08	27907	09/30/2014
Test S/W	EZ-EMC			

**NOTE:** 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.  
 2. N.C.R = No Calibration Request.

### 4.3 MEASUREMENT UNCERTAINTY

Parameter	Uncertainty
Powerline Conducted Emission #1	±2.2107
3M Semi Anechoic Chamber / 30MHz ~ 200MHz	±3.5921
3M Semi Anechoic Chamber / 200MHz ~ 1GHz	±3.5657
3M Semi Anechoic Chamber / 1 ~ 8GHz	±2.5873
3M Semi Anechoic Chamber / 8 ~ 18GHz	±2.6646
3M Semi Anechoic Chamber / 18 ~ 26GHz	±2.9617
3M Semi Anechoic Chamber / 26 ~ 40GHz	±3.4250

**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

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 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	

**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 Radiated Emission (Below 1GHz) and Power line conducted emission measurement:							
No.	Device Type	Brand	Model	Series No.	FCC ID	Data Cable	Power Cord
1.	Notebook PC (Remote)	1706-A78	LV-L1870 06/09	FCC DOC	IBM	LAN Cable: Unshielded, 10m	AC I/P: Unshielded, 1.8m DC O/P: Unshielded, 1.8m with a core
2.	Notebook PC (Remote)	D400	0932RY	E2K24GBRL	DELL	LAN Cable: Unshielded, 10m	AC I/P: Unshielded, 1.8m DC O/P: Unshielded, 1.8m with a core
3.	Notebook PC (Remote)	ThinkPad T430u	PB-VZLGG 12/09	FCC DOC	LENOVO	LAN Cable: Unshielded, 10m	AC I/P: Unshielded, 1.8m DC O/P: Unshielded, 1.8m with a core
4.	Notebook PC (Remote)	ThinkPad T430u	PB-VZHMR 12/09	FCC DOC	LENOVO	LAN Cable: Unshielded, 10m	AC I/P: Unshielded, 1.8m DC O/P: Unshielded, 1.8m with a core
5.	Notebook PC (Remote)	TP00013A	LR-9XH2K	FCC DOC	LENOVO	LAN Cable: Unshielded, 10m	AC I/P: Unshielded, 1.8m DC O/P: Unshielded, 1.8m with a core
6.	Multi Services Access Node	IES-1000	N/A	N/A	Zyxel	RJ-11 Cable: Unshielded, 10m	Unshielded, 1.8m

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

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

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



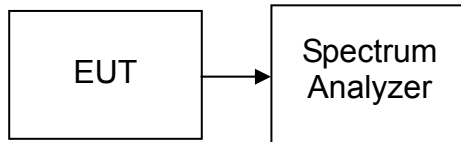
## **7. FCC PART 15.247 REQUIREMENTS**

### **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	10.10	>500	PASS
Mid	2437	10.10		PASS
High	2462	10.10		PASS

**Test mode: IEEE 802.11g mode**

Channel	Frequency (MHz)	Bandwidth(MHz)	Limit (kHz)	Result
Low	2412	16.40	>500	PASS
Mid	2437	16.40		PASS
High	2462	16.40		PASS

**Test mode: IEEE 802.11n HT20 mode**

Channel	Frequency (MHz)	Bandwidth(MHz)		Limit (kHz)	Result
		Chain 0	Chain 1		
Low	2412	17.70	17.70	>500	PASS
Mid	2437	17.70	17.70		PASS
High	2462	17.70	17.70		PASS

**Test mode: IEEE 802.11n HT40 mode**

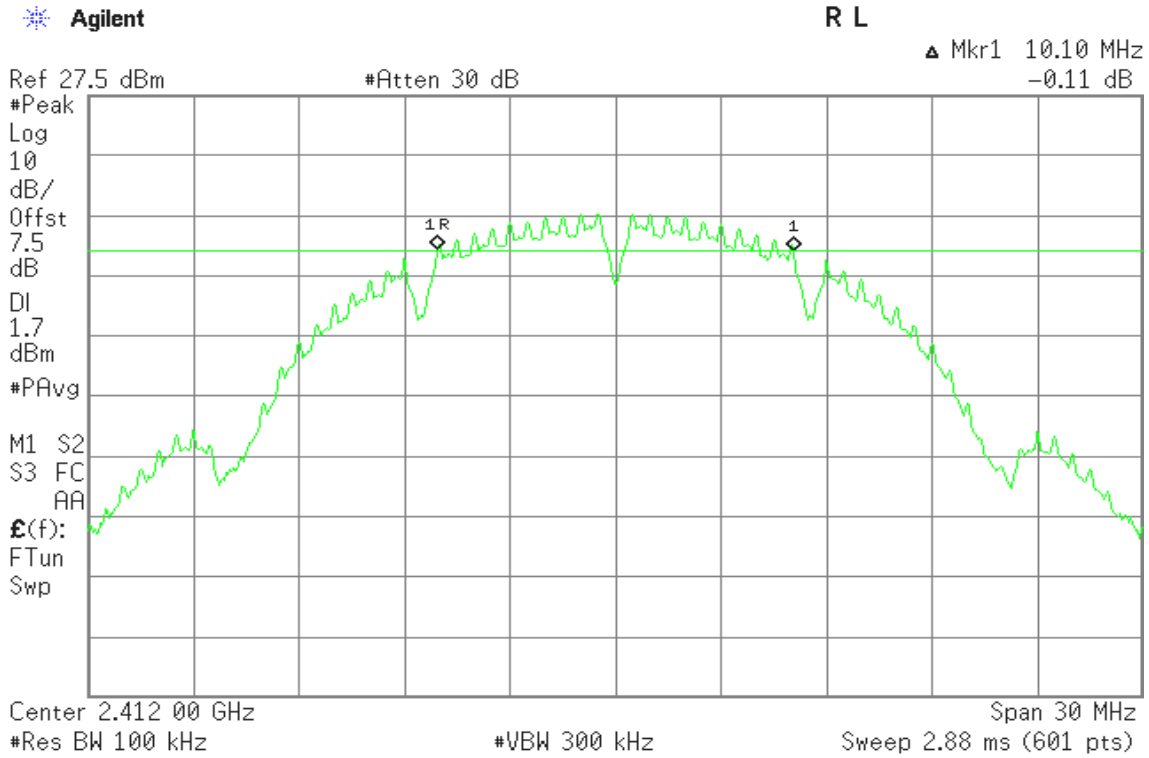
Channel	Frequency (MHz)	Bandwidth(MHz)		Limit (kHz)	Result
		Chain 0	Chain 1		
Low	2422	35.83	35.83	>500	PASS
Mid	2437	35.83	35.75		PASS
High	2452	35.83	35.75		PASS



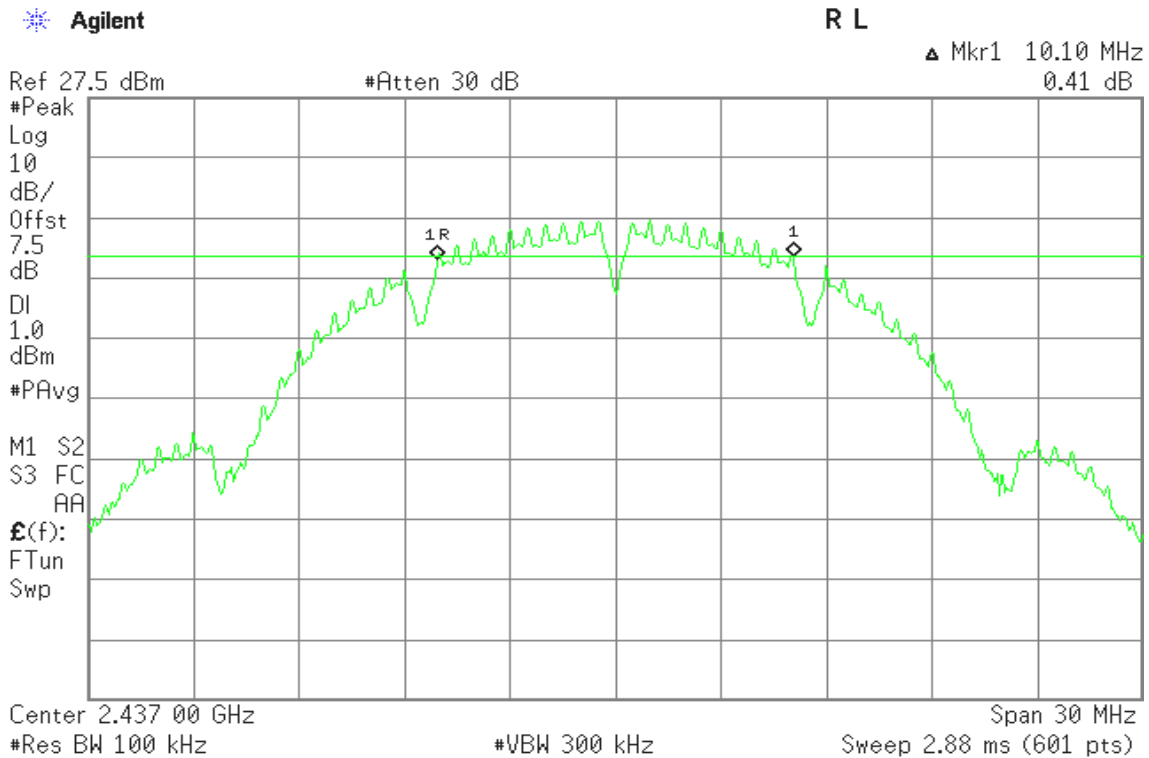
**Test Plot**

**IEEE 802.11b mode**

**6dB Bandwidth (CH Low)**



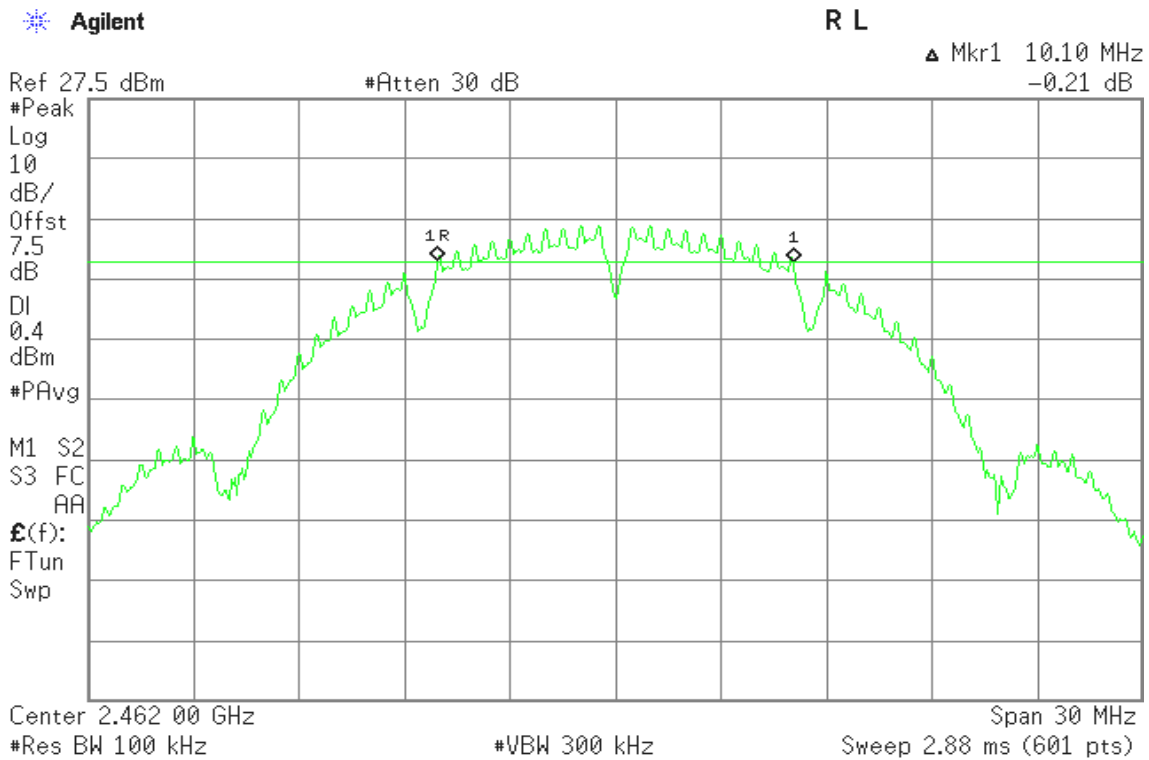
**6dB Bandwidth (CH Mid)**





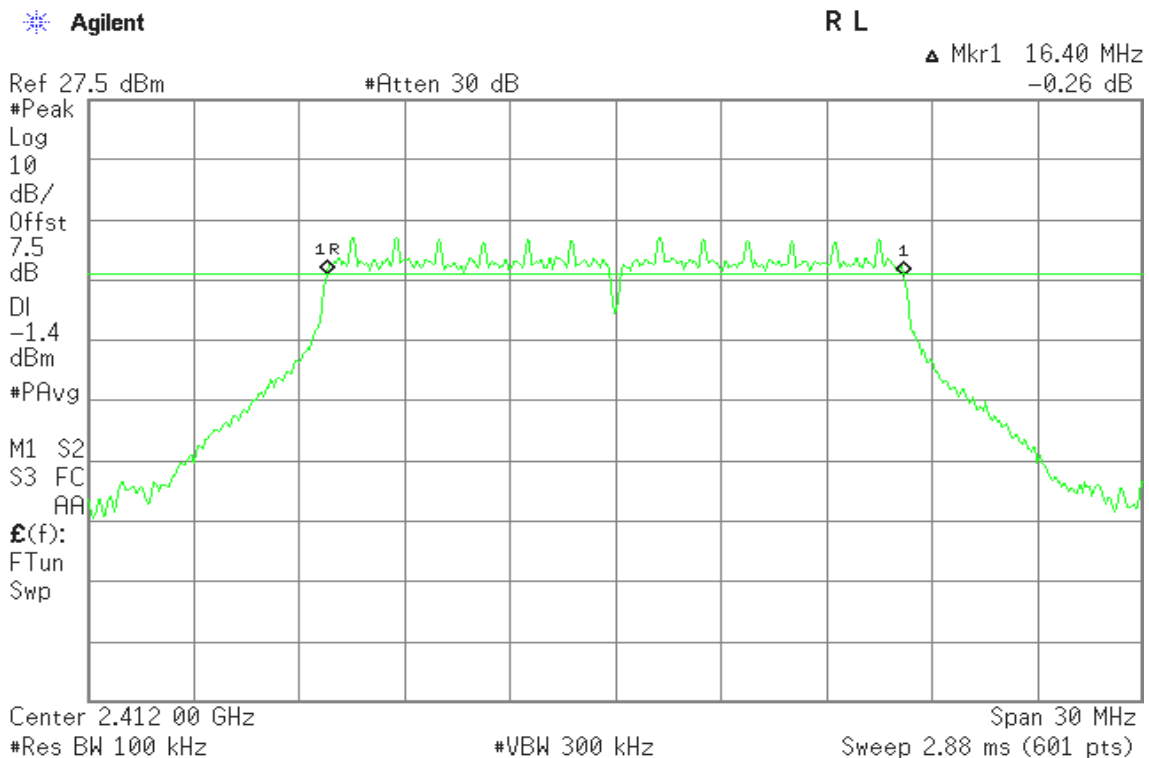


### 6dB Bandwidth (CH High)



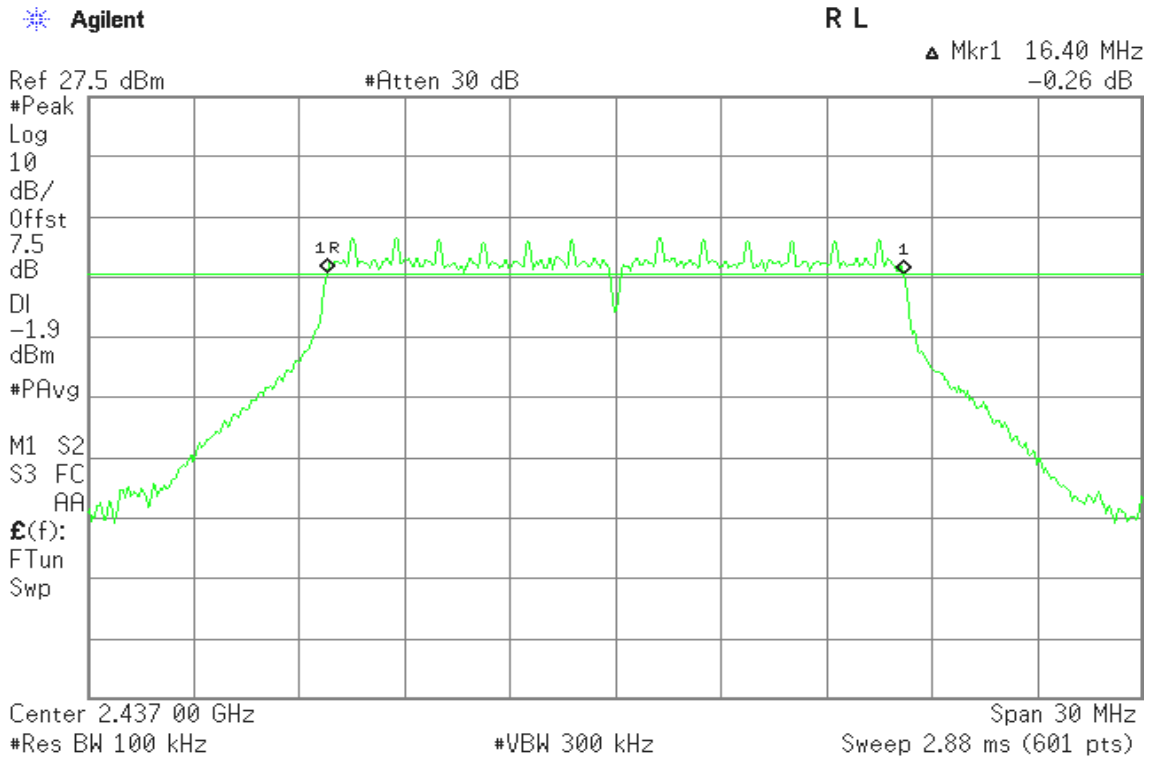
### IEEE 802.11g mode

### 6dB Bandwidth (CH Low)

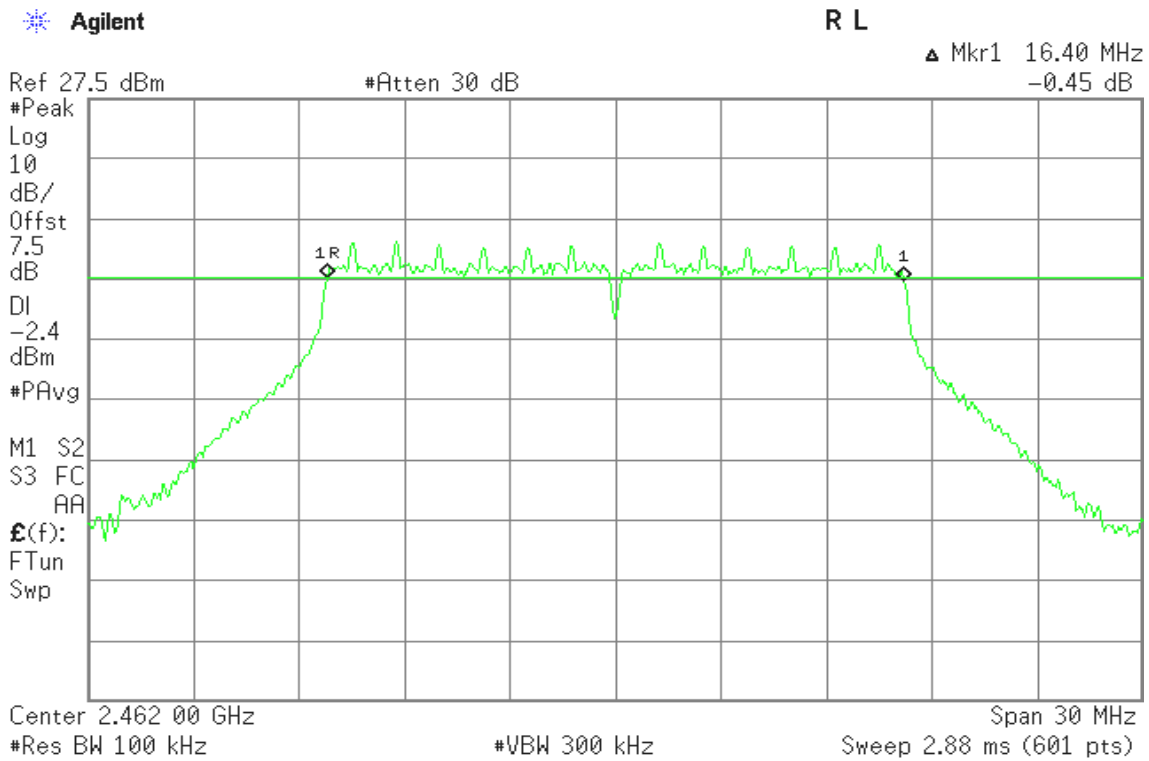




### 6dB Bandwidth (CH Mid)



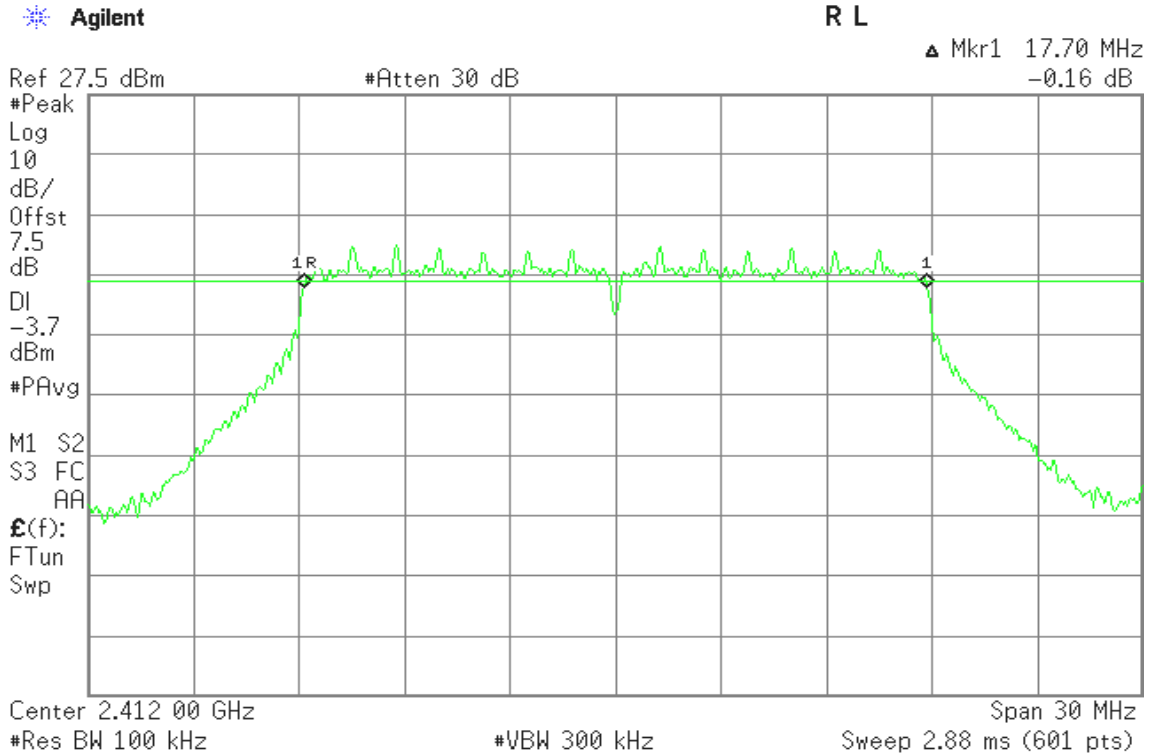
### 6dB Bandwidth (CH High)



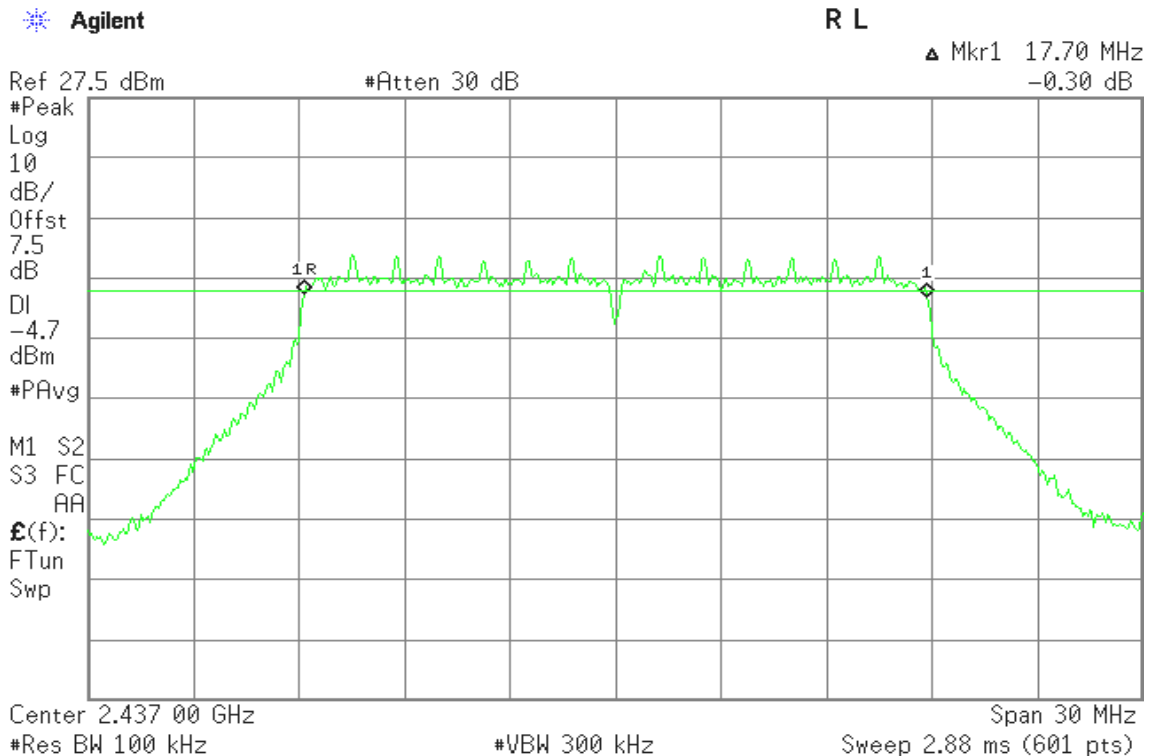


**IEEE 802.11n HT20 mode / Chain 0**

**6dB Bandwidth (CH Low)**

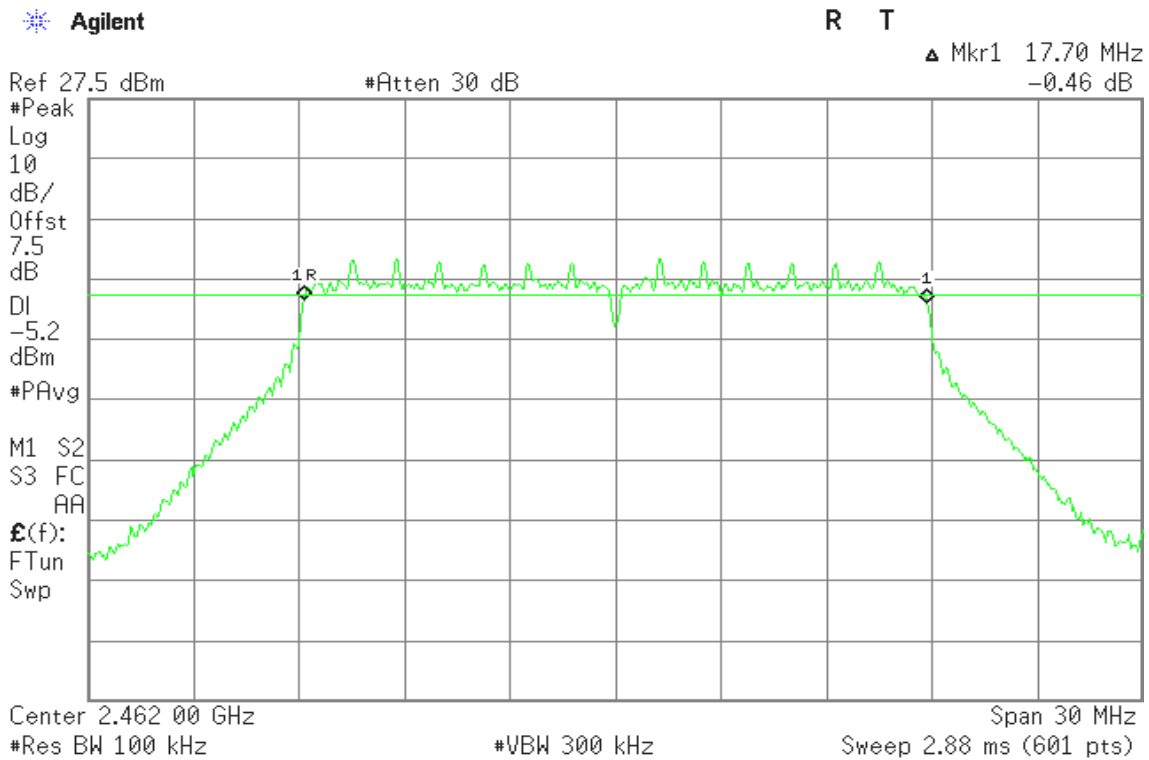


**6dB Bandwidth (CH Mid)**



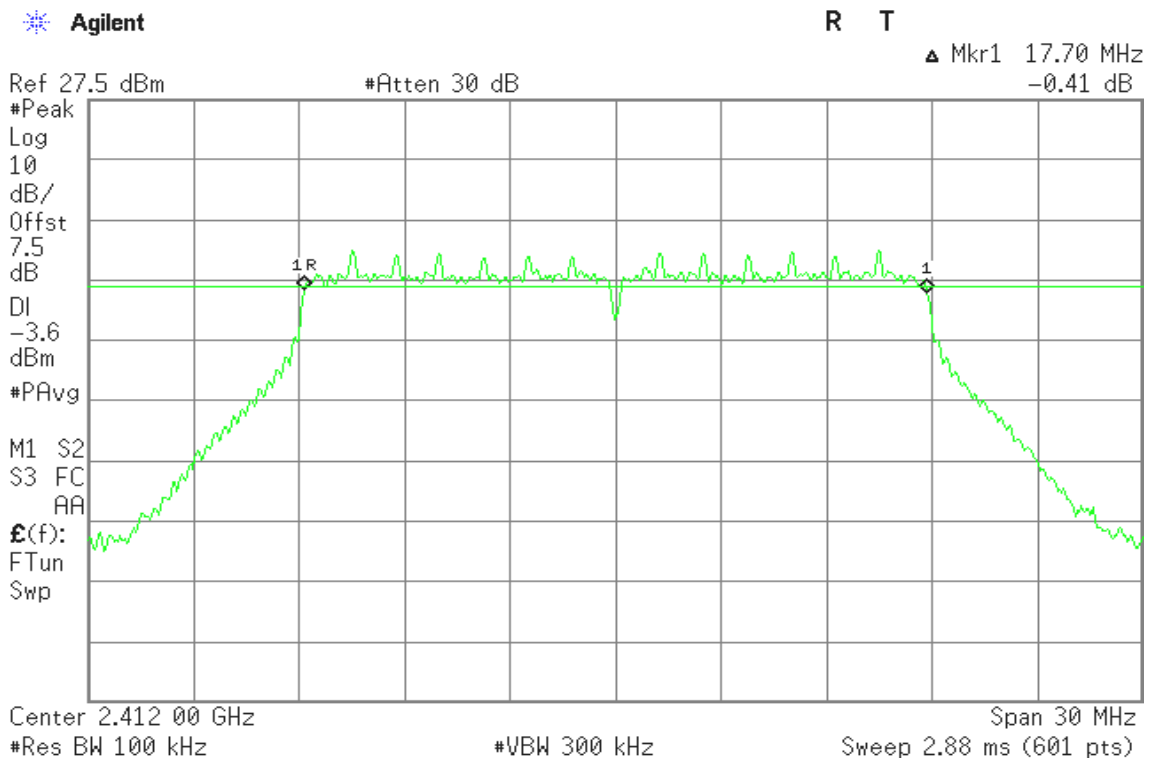


### 6dB Bandwidth (CH High)



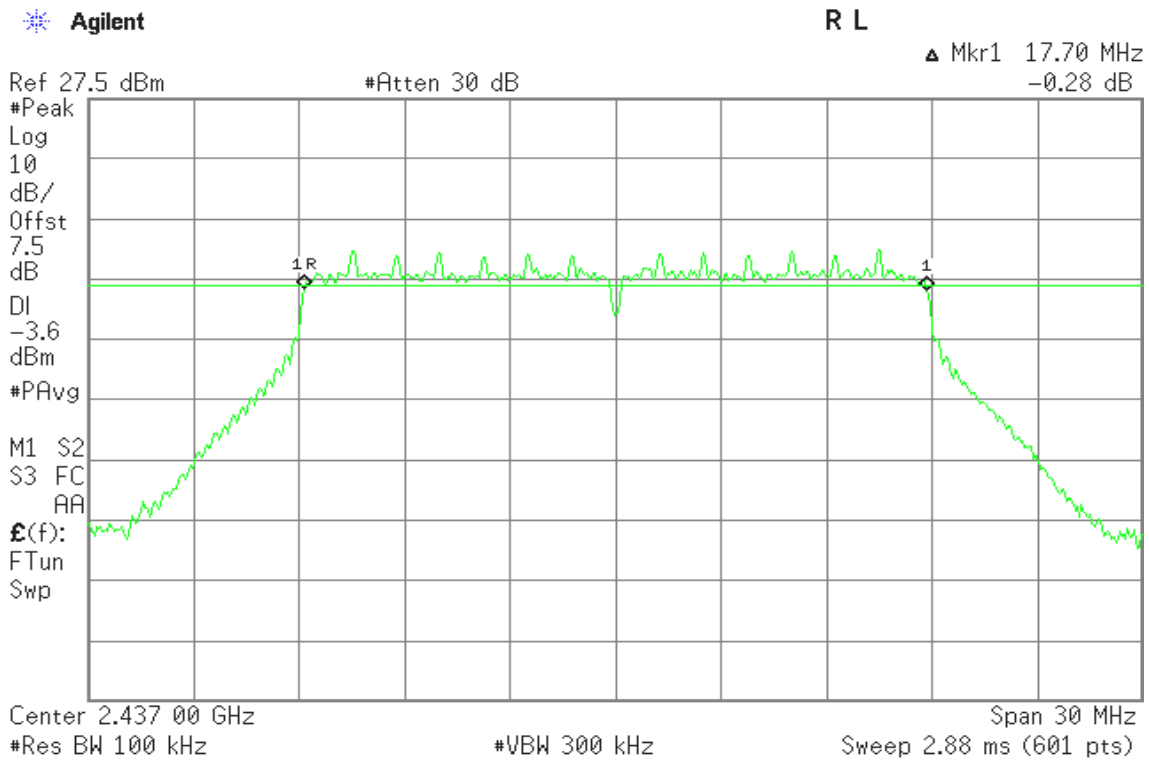
### IEEE 802.11n HT20 mode / Chain 1

### 6dB Bandwidth (CH Low)

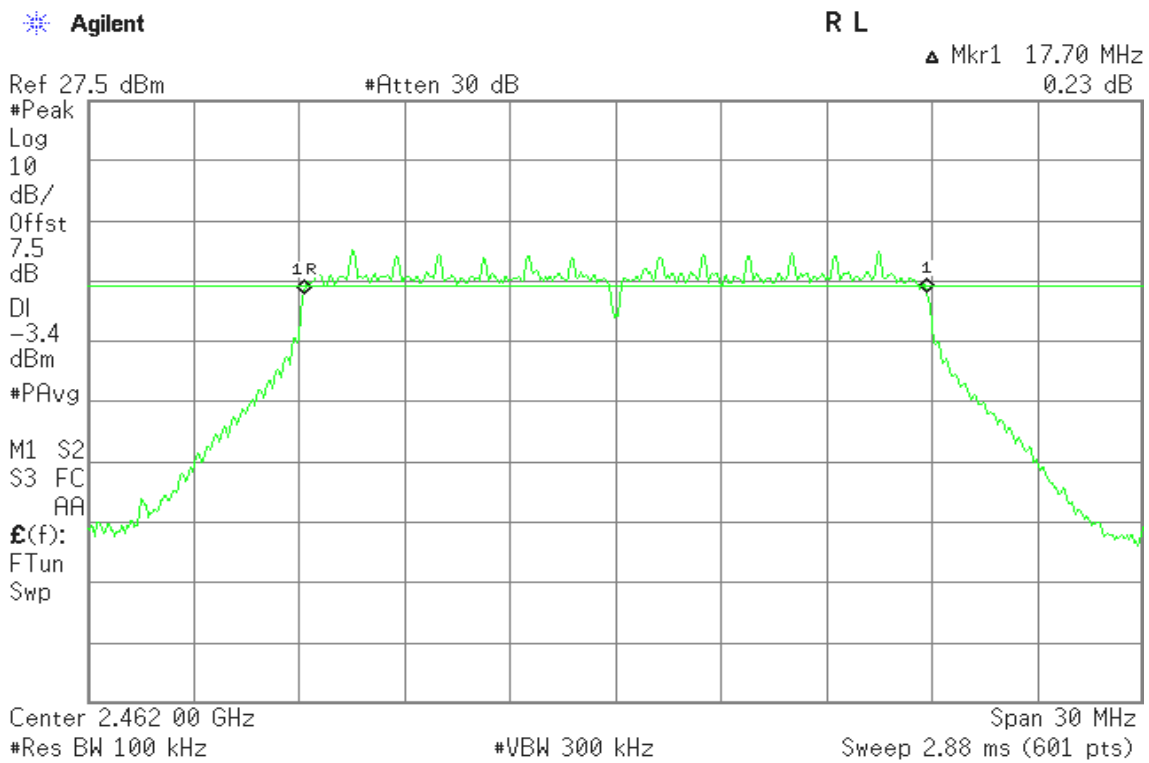




### 6dB Bandwidth (CH Mid)



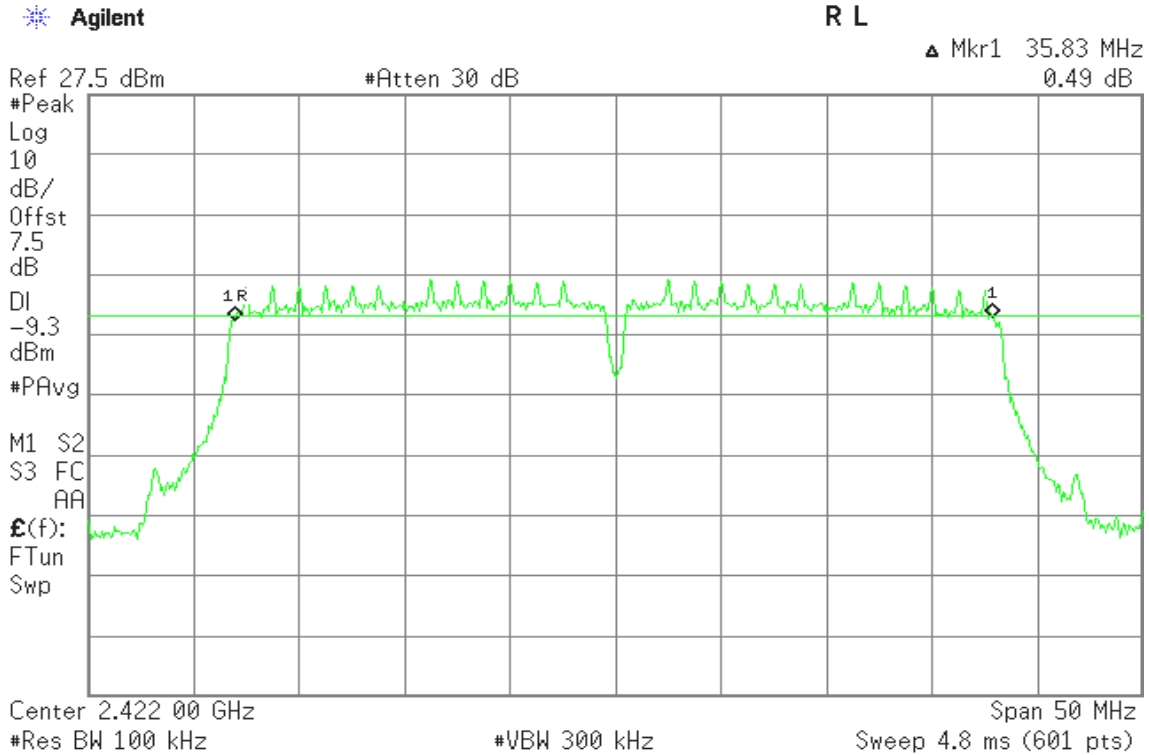
### 6dB Bandwidth (CH High)



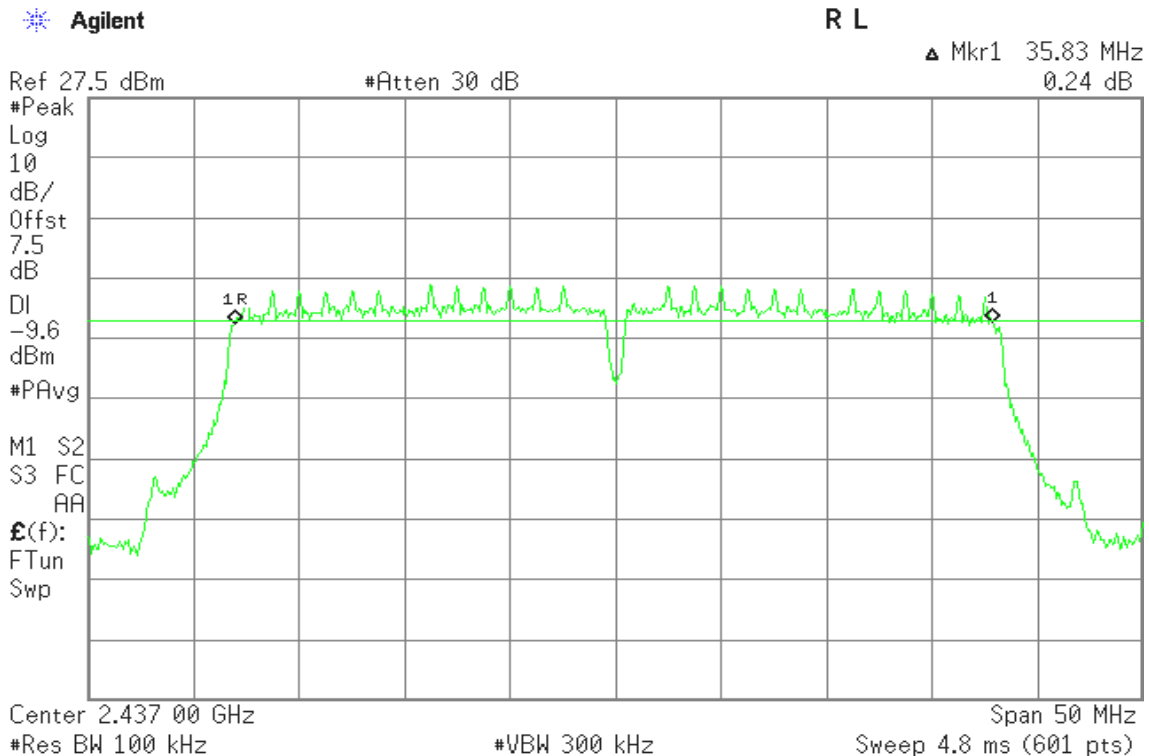


**IEEE 802.11n HT40 mode / Chain 0**

**6dB Bandwidth (CH Low)**

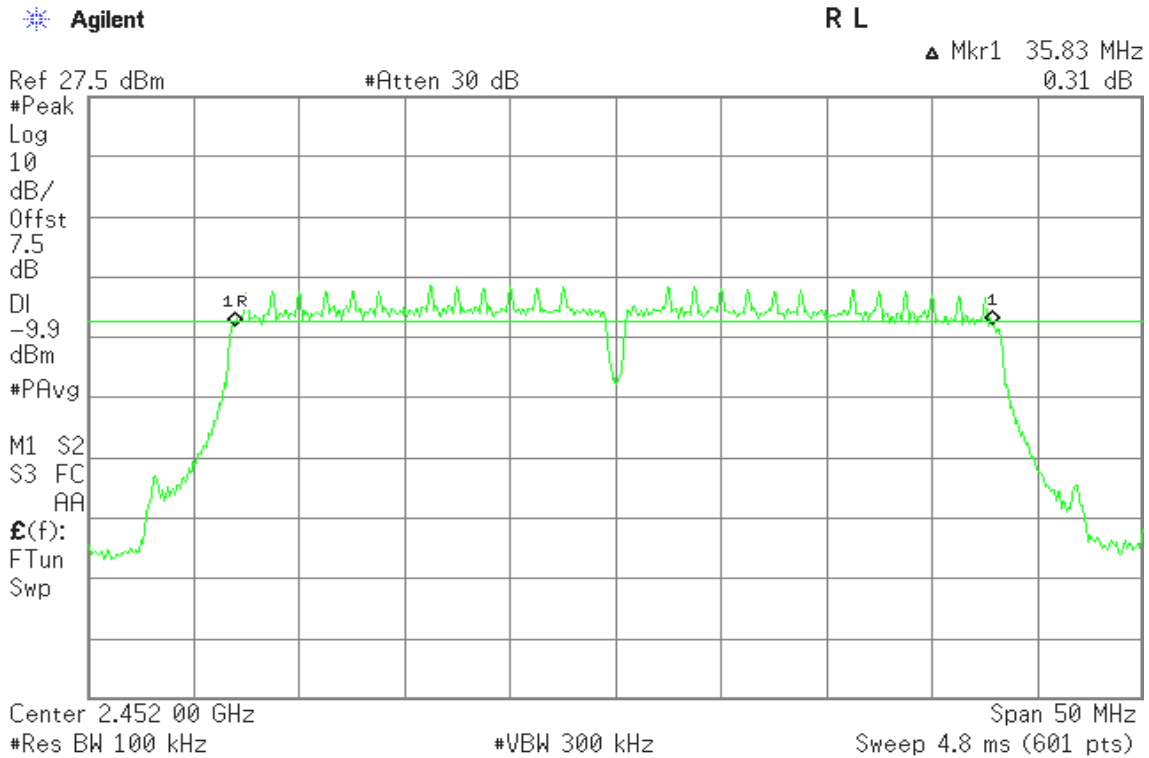


**6dB Bandwidth (CH Mid)**



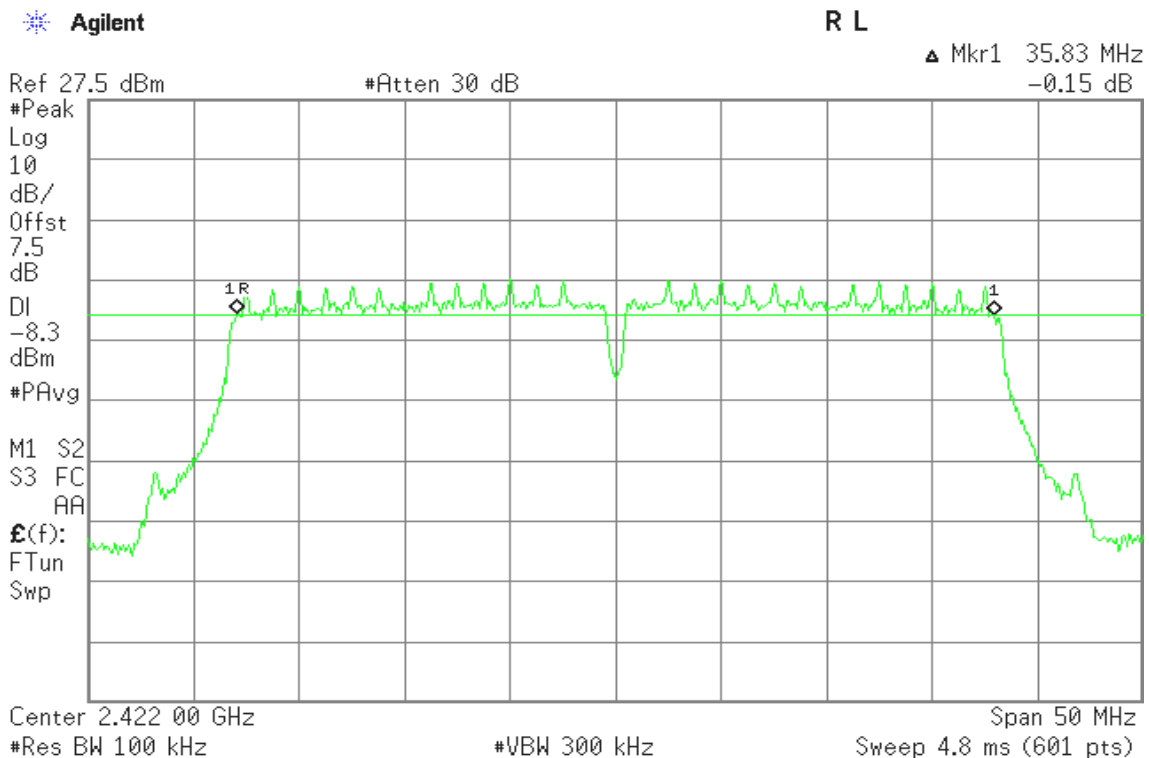


### 6dB Bandwidth (CH High)



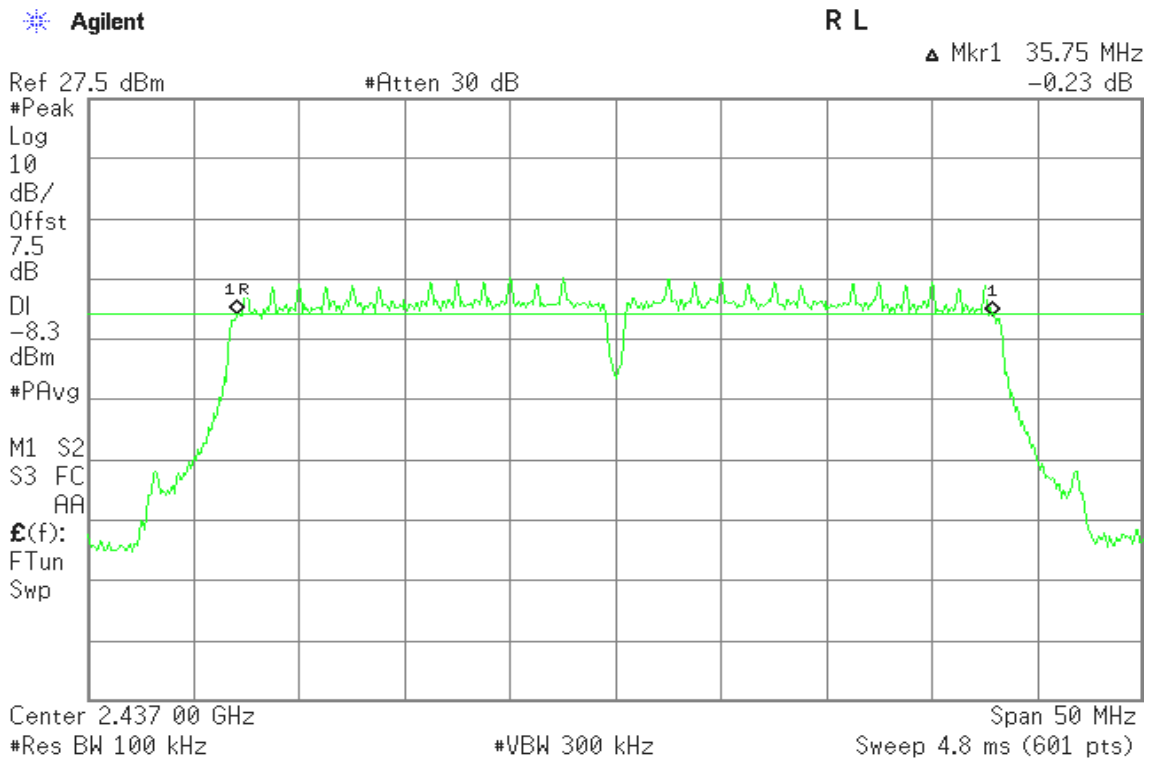
### IEEE 802.11n HT40 mode / Chain 1

### 6dB Bandwidth (CH Low)

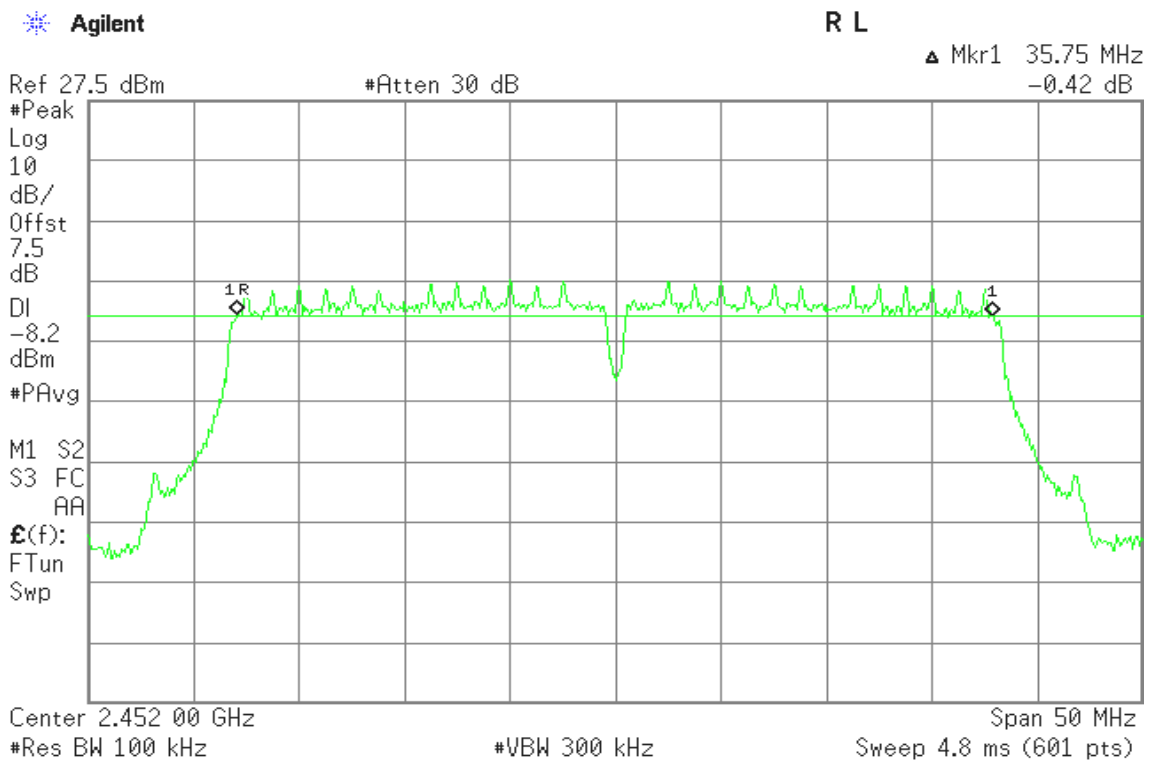




### 6dB Bandwidth (CH Mid)



### 6dB Bandwidth (CH High)







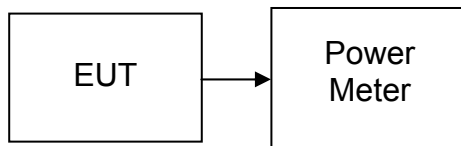
## **7.2 PEAK POWER**

### **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 558074v03r01**

The transmitter output is connected to the Power Meter. The Power Meter is set to the peak power detection.

### **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)	Test Result
Low	2412	19.23	0.0838	1	PASS
Mid	2437	18.48	0.0705		PASS
High	2462	17.99	0.0630		PASS

**Test mode: IEEE 802.11g mode**

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Limit (W)	Test Result
Low	2412	23.09	0.2037	1	PASS
Mid	2437	22.18	0.1652		PASS
High	2462	21.76	0.1500		PASS

**Test mode: IEEE 802.11n HT20 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	20.57	20.67	23.63	0.1140	0.1167	0.2307	0.6295	PASS
Mid	2437	19.53	20.57	23.09	0.0897	0.1140	0.2038		PASS
High	2462	19.36	20.54	23.00	0.0863	0.1132	0.1995		PASS

**Remark:**

- Total Output Power (w) = Chain 0 (10^(Output Power /10)/1000) + Chain 1 (10^(Output Power /10)/1000)
- The maximum antenna gain is 8.01dBi; therefore the reduction due to antenna gain is 2.01dBi, so the limit is 27.99dBm(0.0.6295W).

**Test mode: IEEE 802.11n HT40 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	18.82	17.90	21.39	0.0762	0.0617	0.1379	0.6295	PASS
Mid	2437	18.65	17.75	21.23	0.0733	0.0596	0.1328		PASS
High	2452	18.61	17.26	21.00	0.0726	0.0532	0.1258		PASS

**Remark:**

- Total Output Power (w) = Chain 0 (10^(Output Power /10)/1000) + Chain 1 (10^(Output Power /10)/1000)
- The maximum antenna gain is 8.01dBi; therefore the reduction due to antenna gain is 2.01dBi, so the limit is 27.99dBm(0.0.6295W).

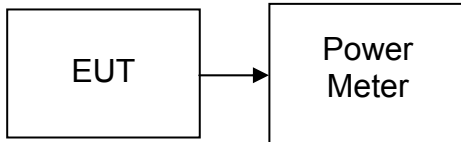


## **7.3 AVERAGE POWER**

### **LIMIT**

None; for reporting purposes only.

### **TEST CONFIGURATION**



### **TEST PROCEDURE**

**Per KDB 558074 v03r01**

The transmitter output is connected to the Power Meter. The Power Meter is set to the peak power detection.

### **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	16.18	0.0415
Mid	2437	15.43	0.0349
High	2462	14.91	0.0310

**Test mode: IEEE 802.11g mode**

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)
Low	2412	15.78	0.0378
Mid	2437	14.83	0.0304
High	2462	14.46	0.0279

**Test mode: IEEE 802.11n HT20 mode**

Channel	Frequency (MHz)	Output Power (dBm)			Output Power (W)		
		Chain 0	Chain 1	Total	Chain 0	Chain 1	Total
Low	2412	12.91	13.09	16.01	0.0195	0.0204	0.0399
Mid	2437	12.10	13.07	15.62	0.0162	0.0203	0.0365
High	2462	11.98	13.03	15.55	0.0158	0.0201	0.0359

**Test mode: IEEE 802.11n HT40 mode**

Channel	Frequency (MHz)	Output Power (dBm)			Output Power (W)		
		Chain 0	Chain 1	Total	Chain 0	Chain 1	Total
Low	2412	11.07	10.40	13.76	0.0128	0.0110	0.0238
Mid	2437	11.05	10.50	13.79	0.0127	0.0112	0.0240
High	2462	10.98	9.83	13.45	0.0125	0.0096	0.0221

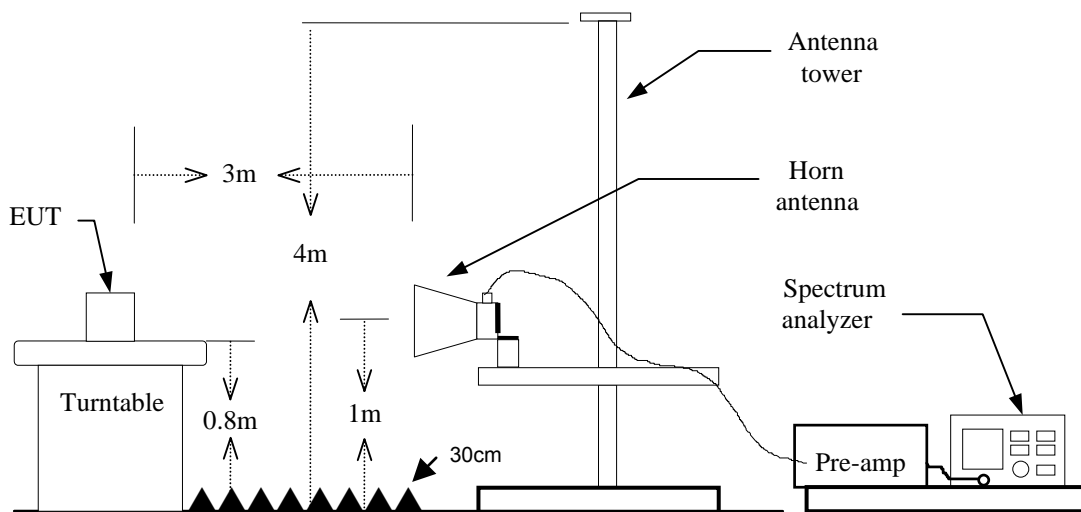


## 7.4 BAND EDGES MEASUREMENT

### 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 20dB below that in the 100kHz 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.

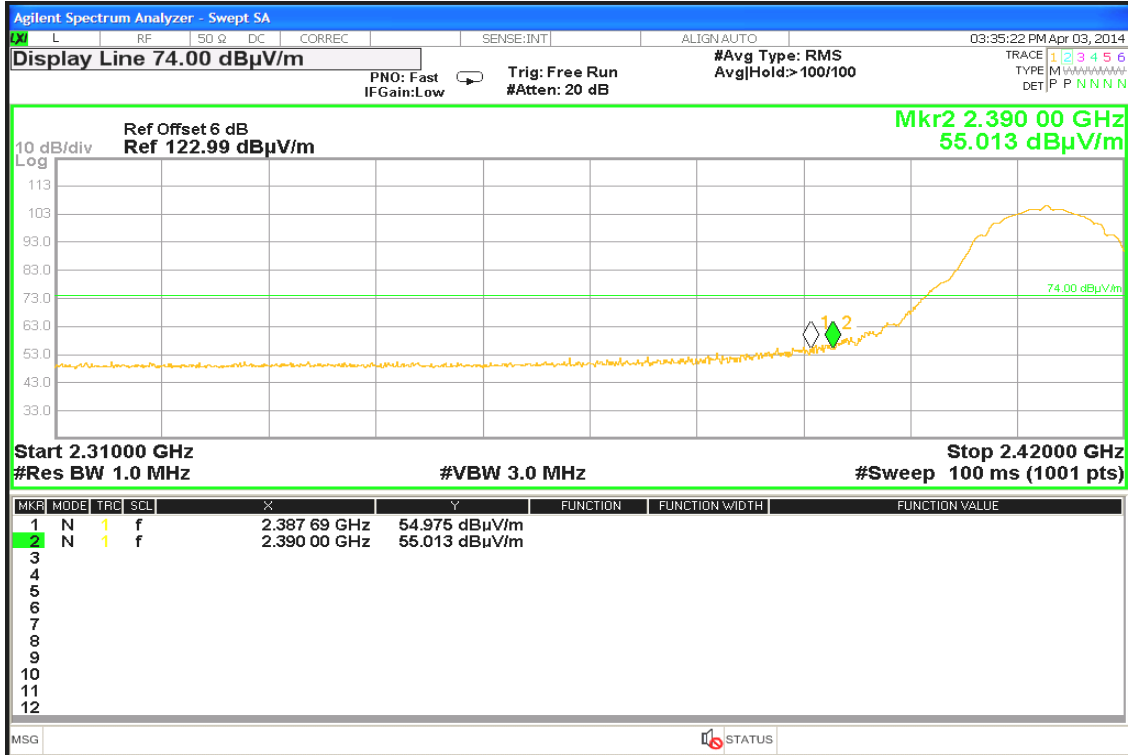


Test Plot

Band Edges (IEEE 802.11b mode/ CH Low)

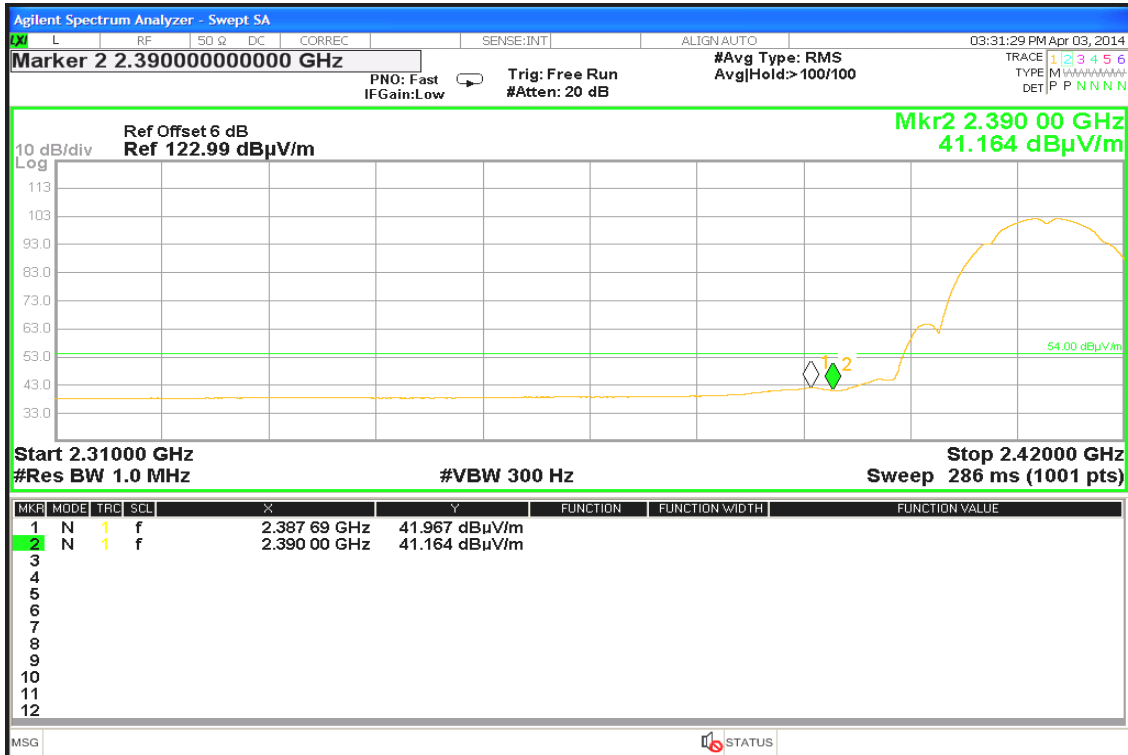
Detector mode: Peak

Polarity: Vertical



Detector mode: Average

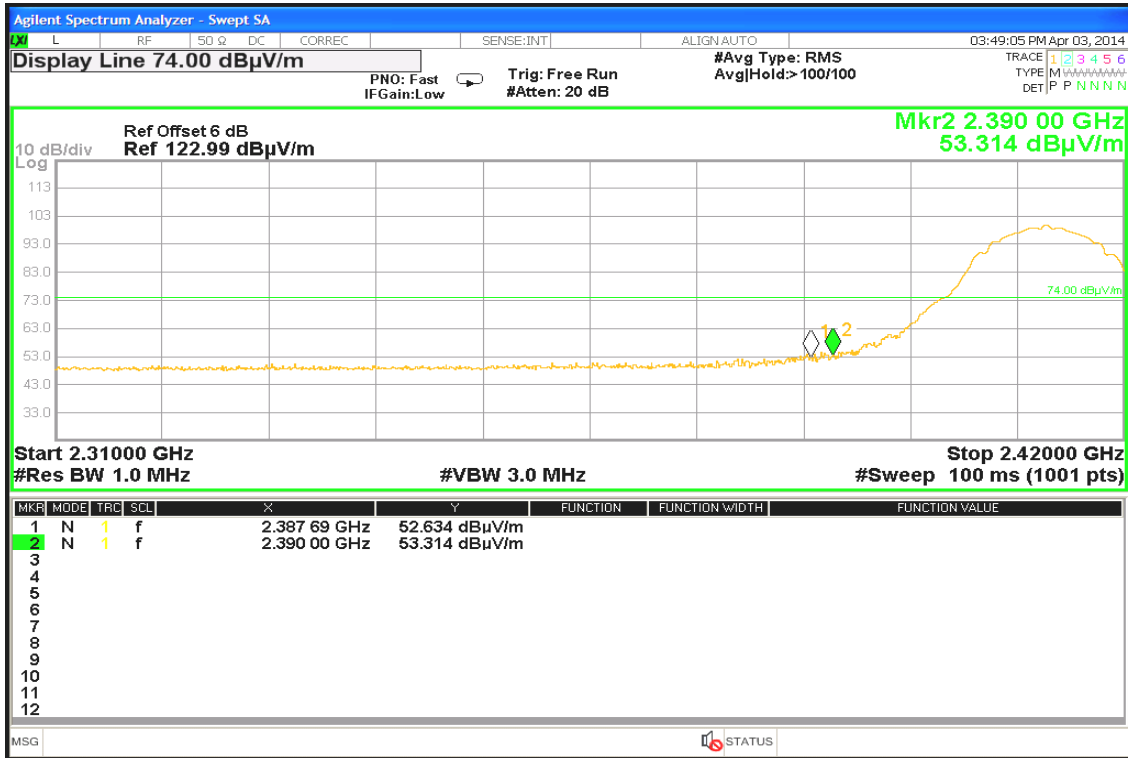
Polarity: Vertical





Detector mode: Peak

Polarity: Horizontal



Detector mode: Average

Polarity: Horizontal

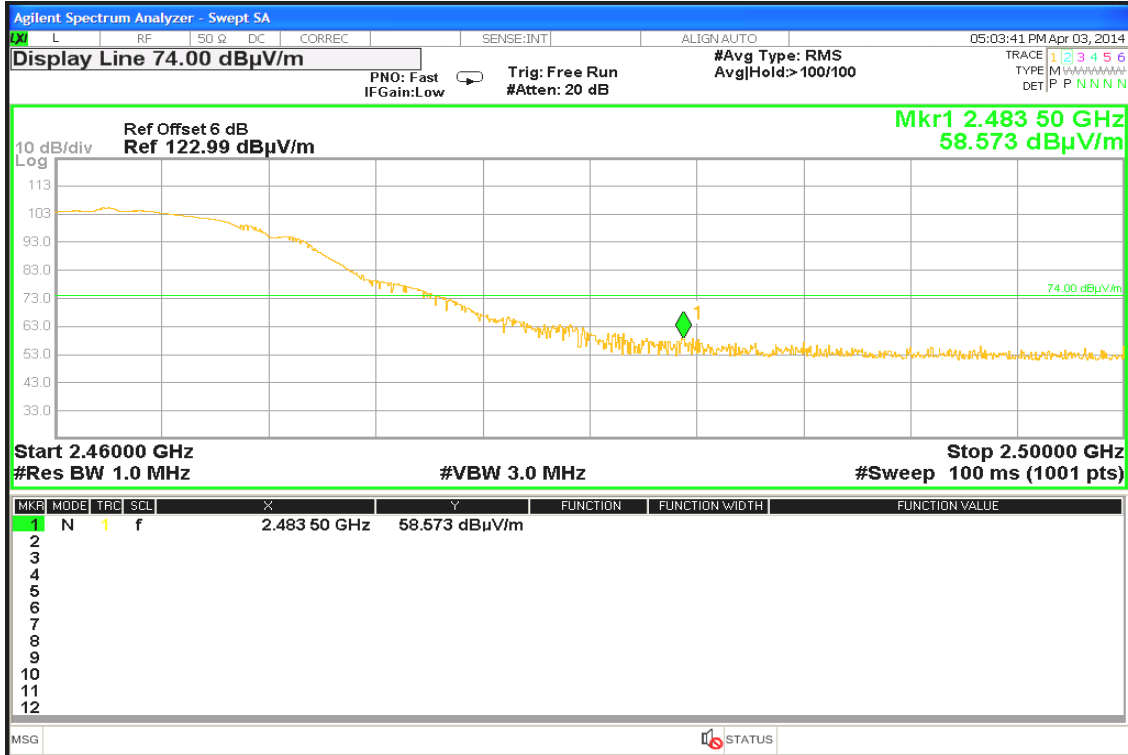




### Band Edges (IEEE 802.11b mode / CH High)

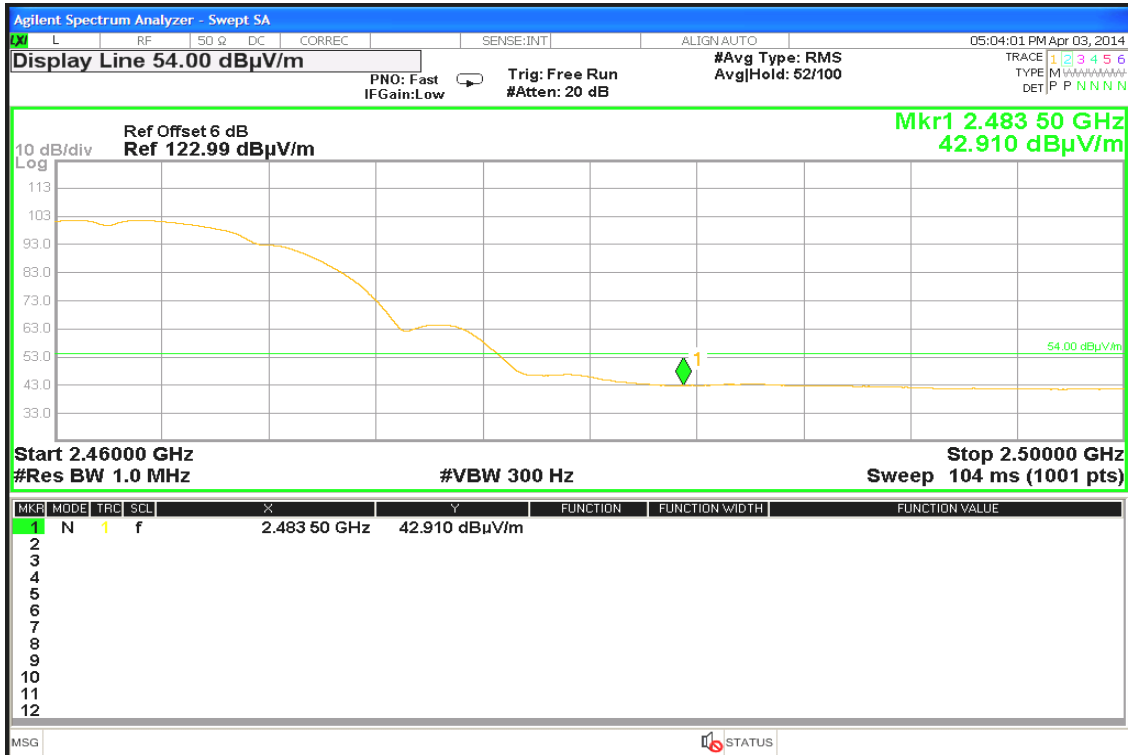
Detector mode: Peak

Polarity: Vertical



Detector mode: Average

Polarity: Vertical

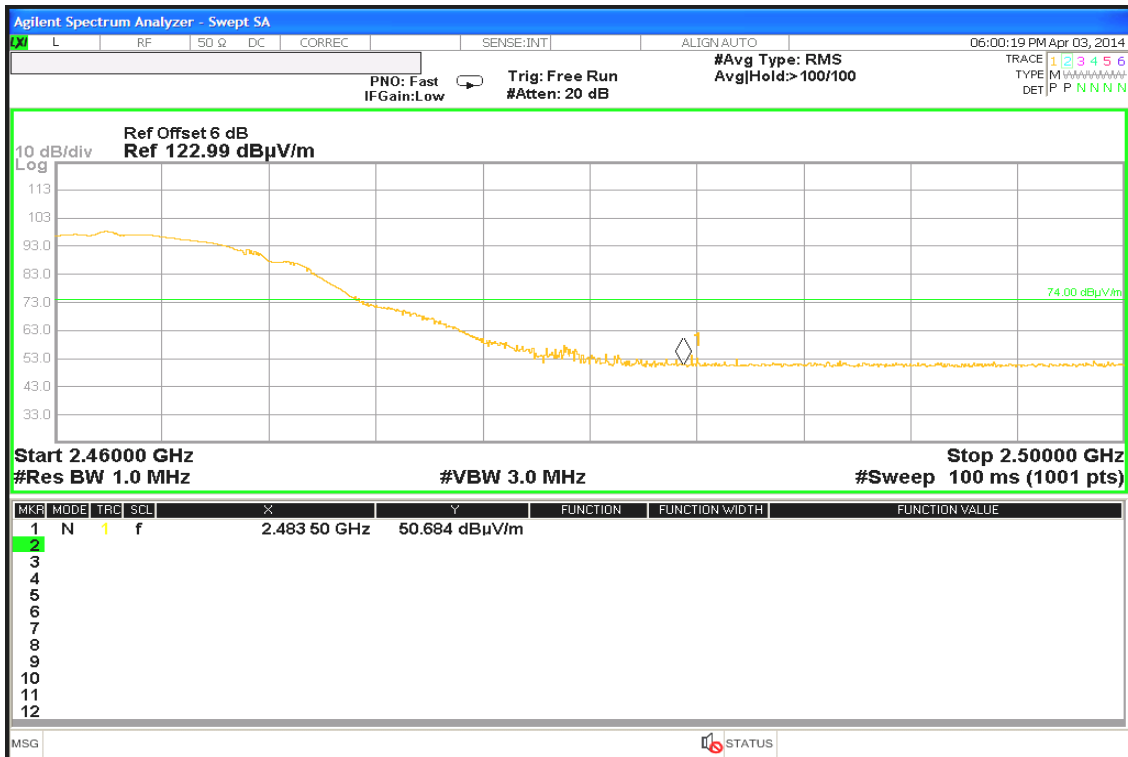






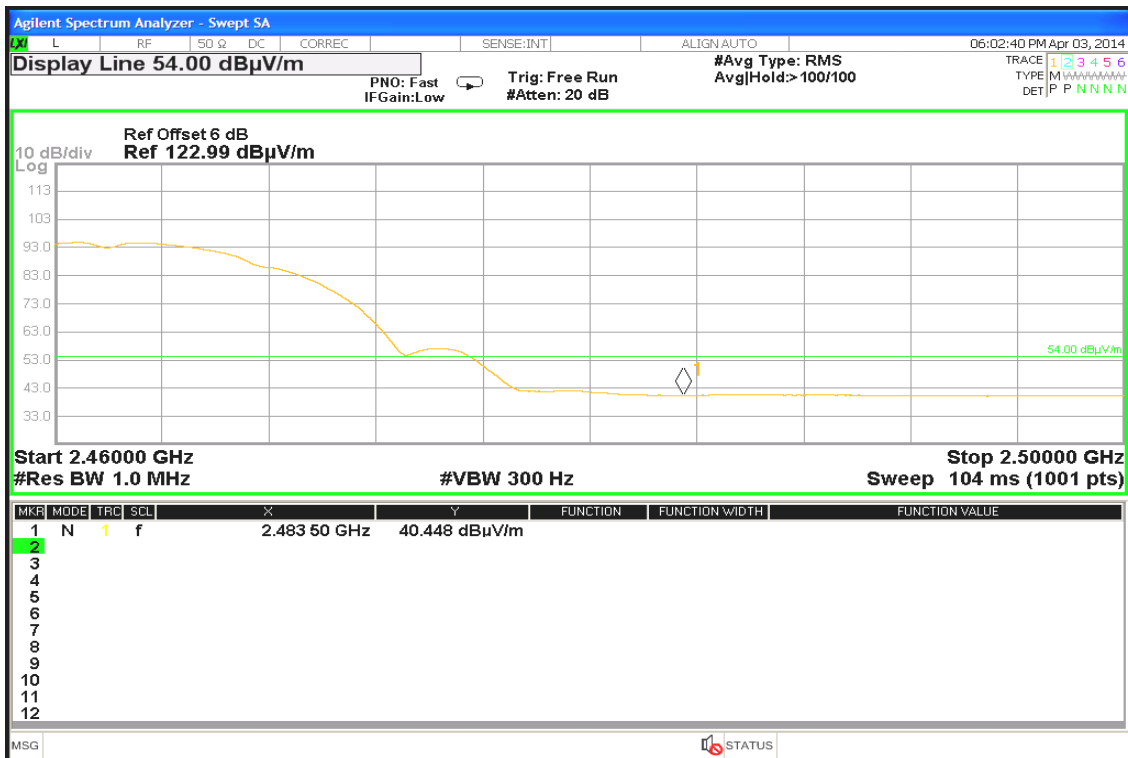
Detector mode: Peak

Polarity: Horizontal



Detector mode: Average

Polarity: Horizontal

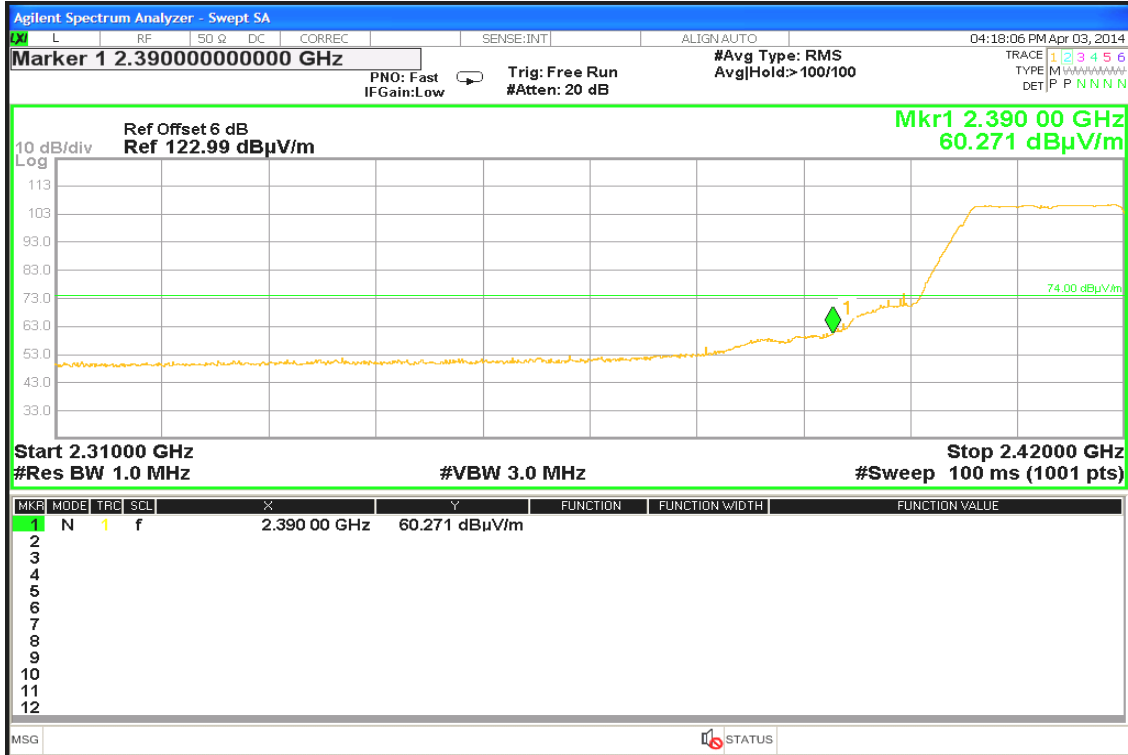




### Band Edges (IEEE 802.11g mode / CH Low)

Detector mode: Peak

Polarity: Vertical



Detector mode: Average

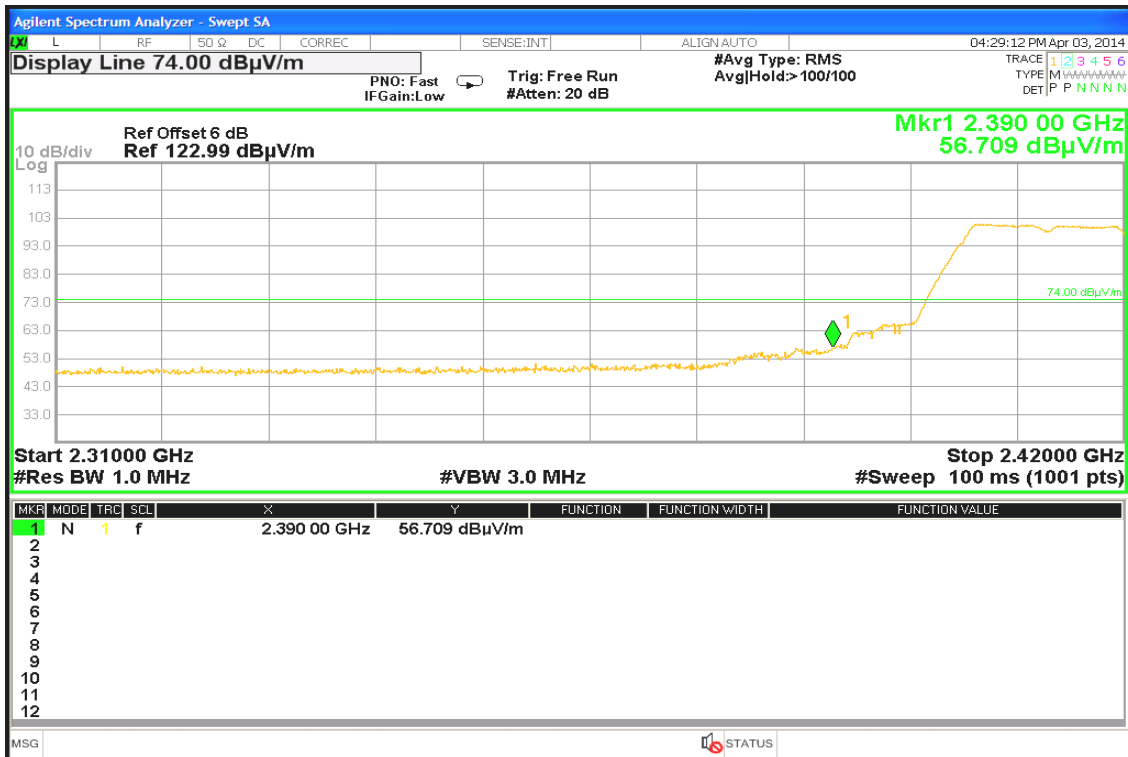
Polarity: Vertical





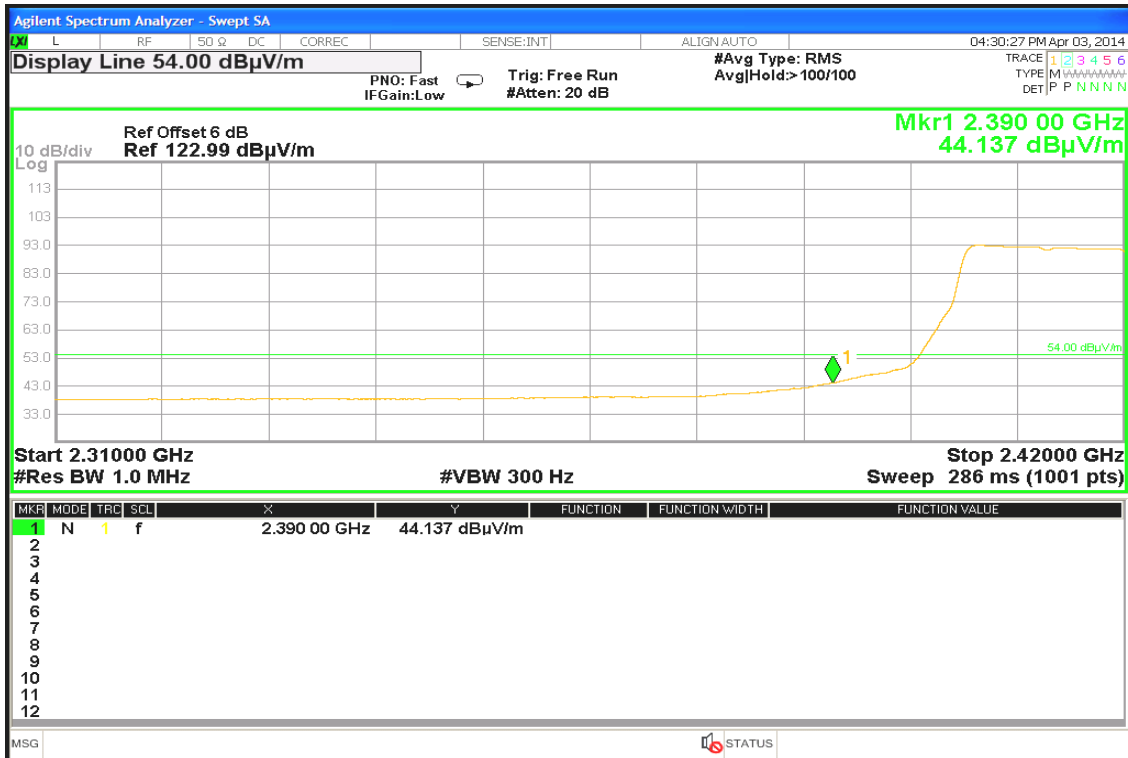
Detector mode: Peak

Polarity: Horizontal



Detector mode: Average

Polarity: Horizontal

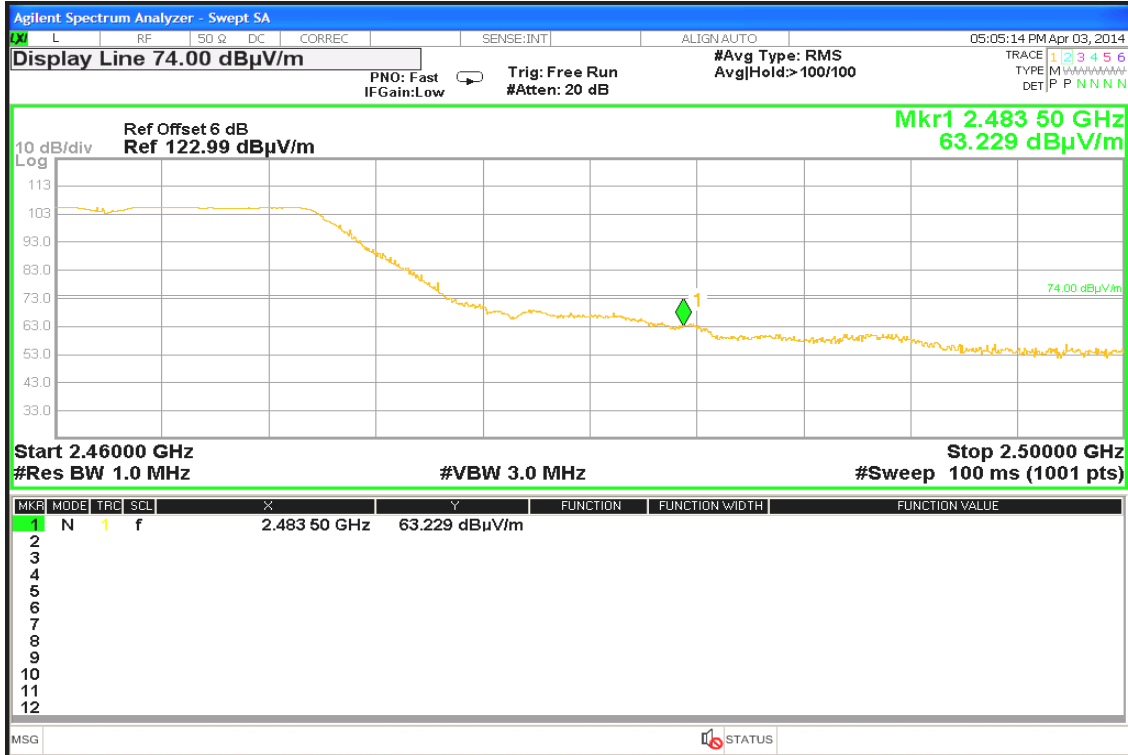




### Band Edges (IEEE 802.11g mode / CH High)

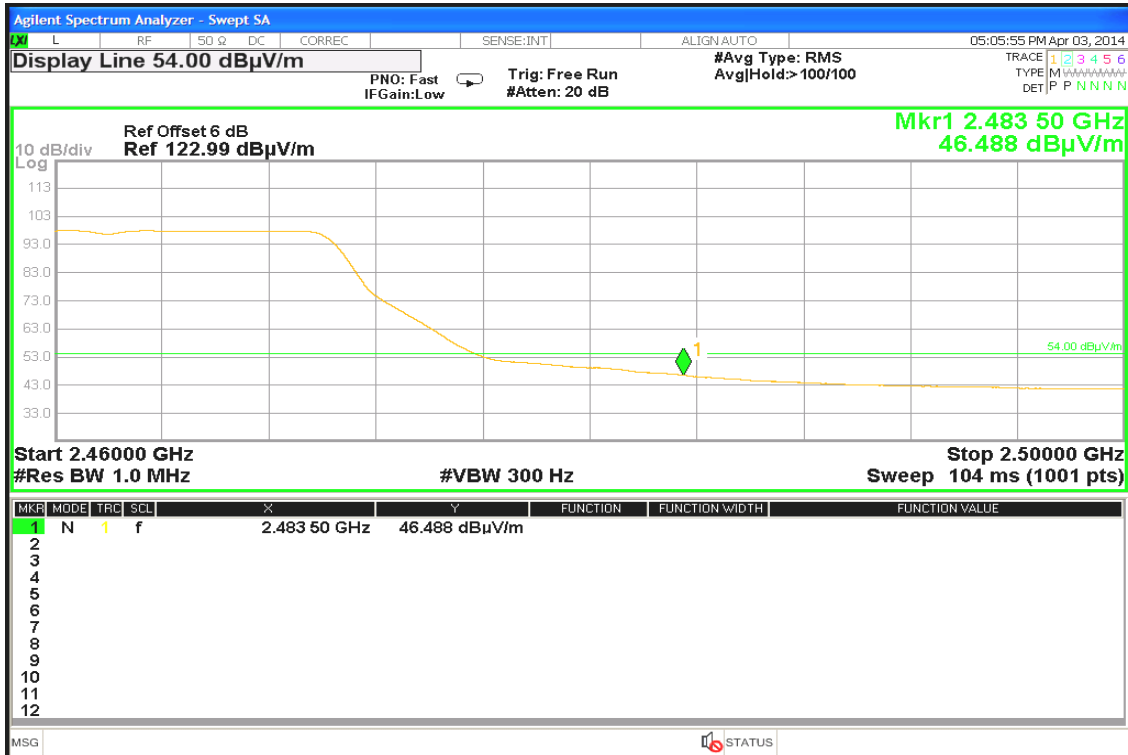
Detector mode: Peak

Polarity: Vertical



Detector mode: Average

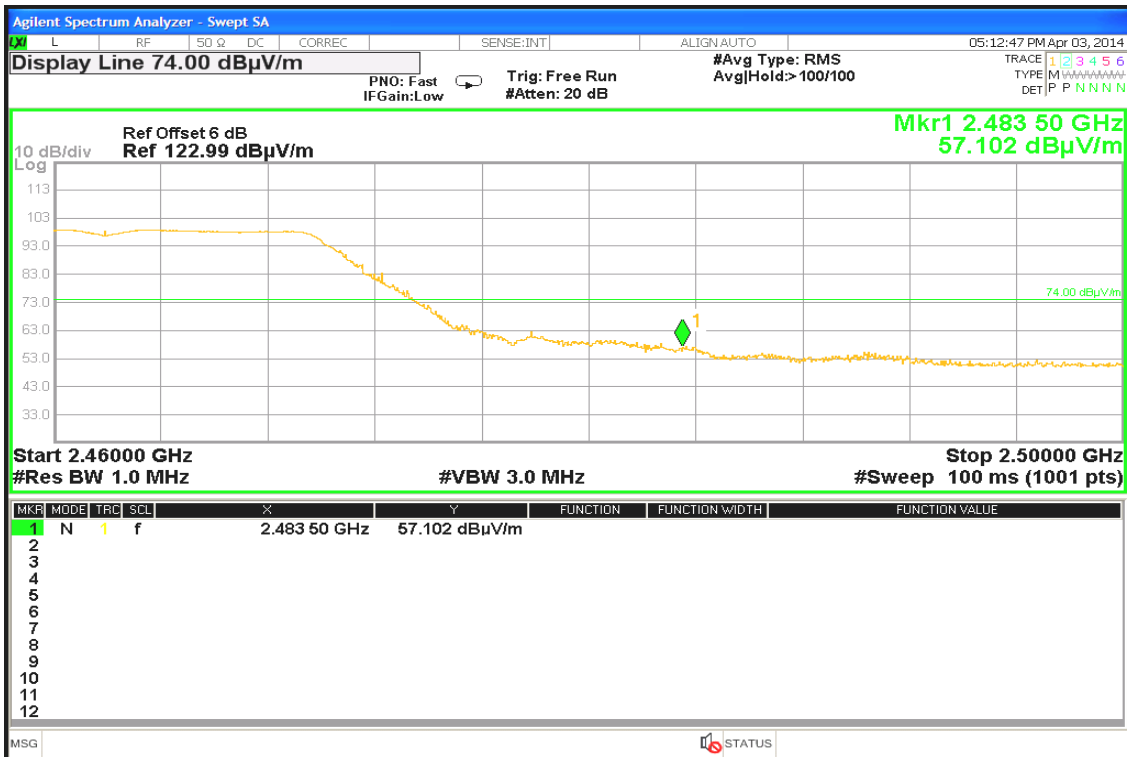
Polarity: Vertical





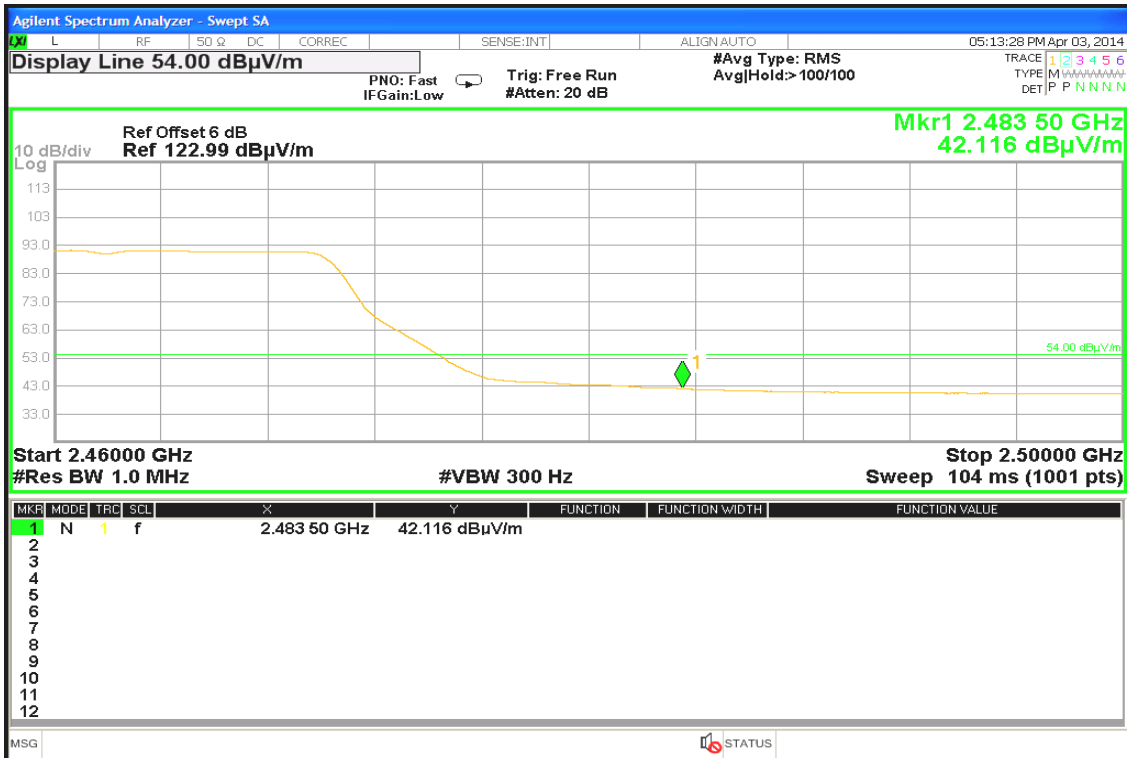
Detector mode: Peak

Polarity: Horizontal



Detector mode: Average

Polarity: Horizontal

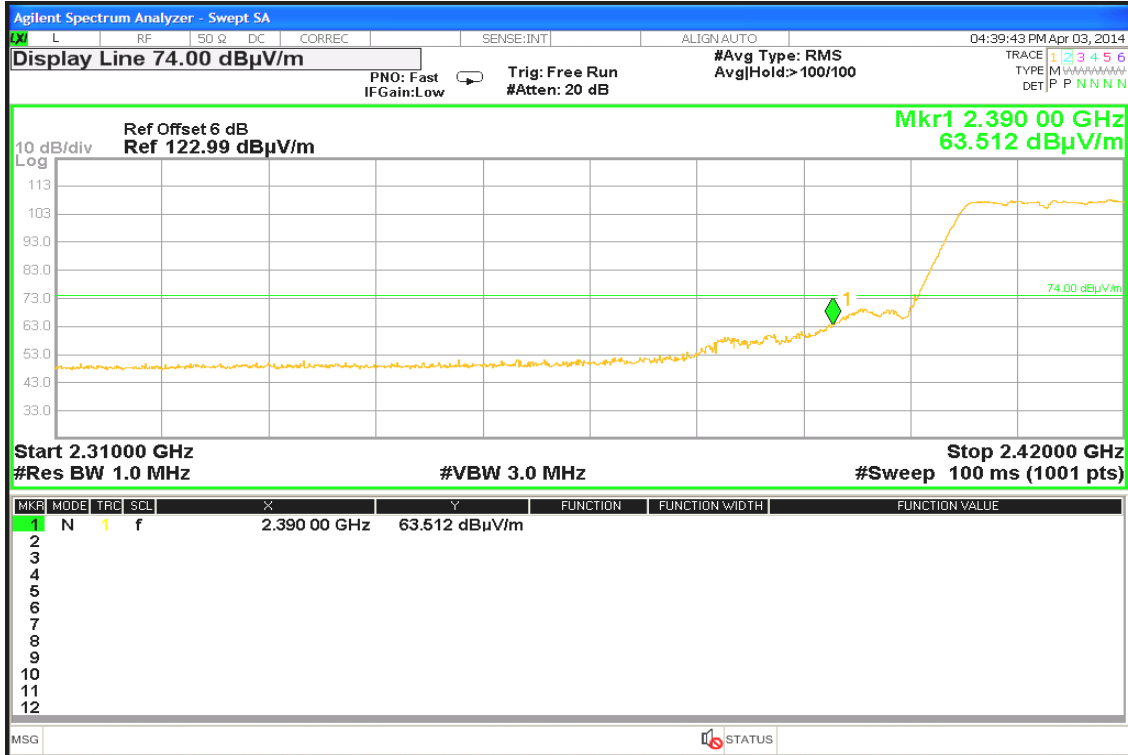




### Band Edges (IEEE 802.11n HT20 mode / CH Low)

Detector mode: Peak

Polarity: Vertical



Detector mode: Average

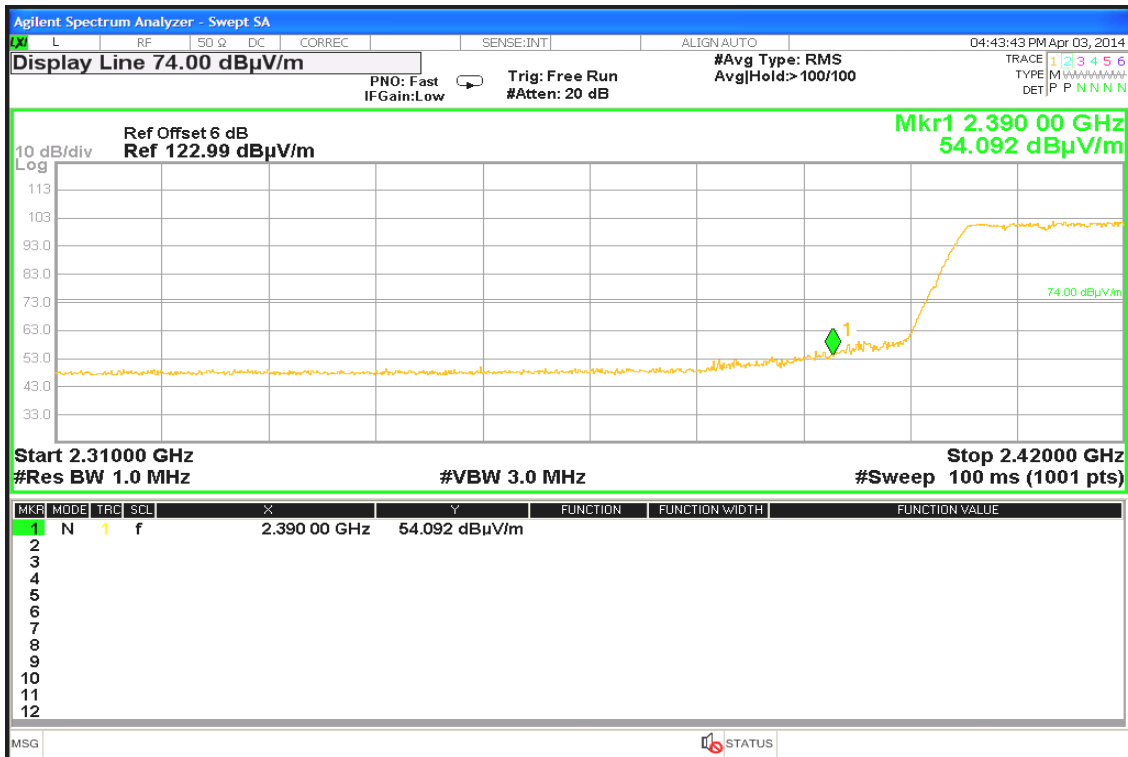
Polarity: Vertical





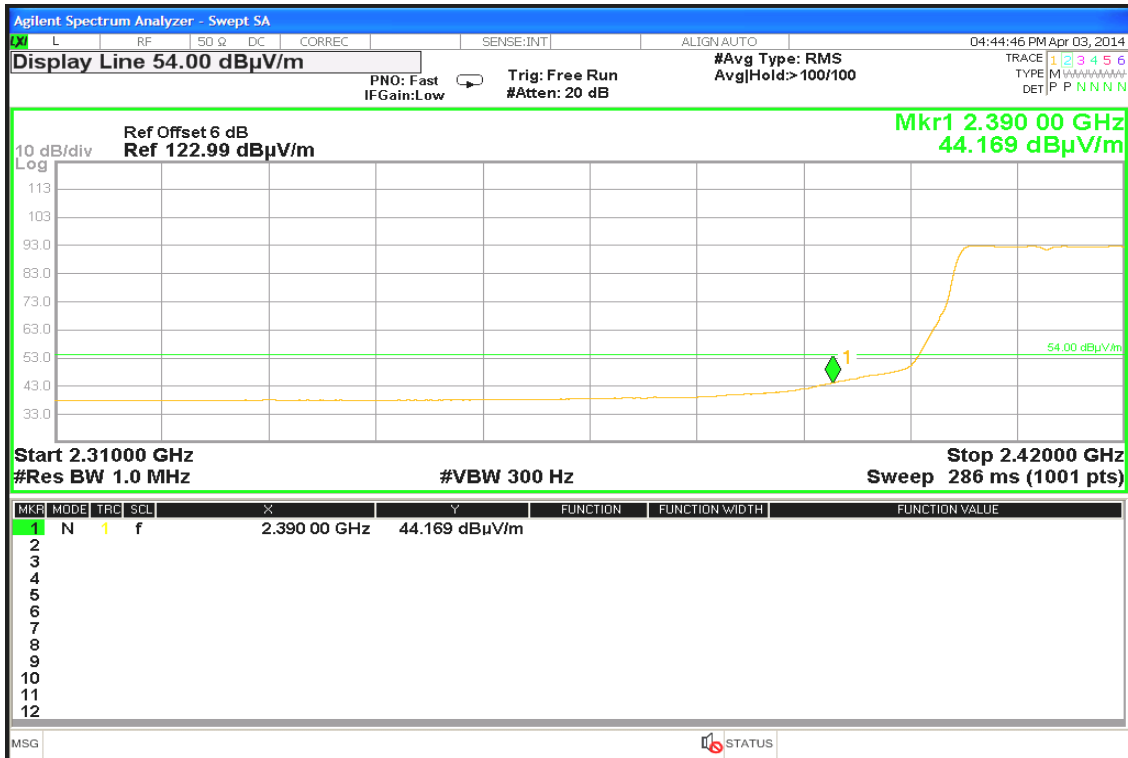
Detector mode: Peak

Polarity: Horizontal



Detector mode: Average

Polarity: Horizontal

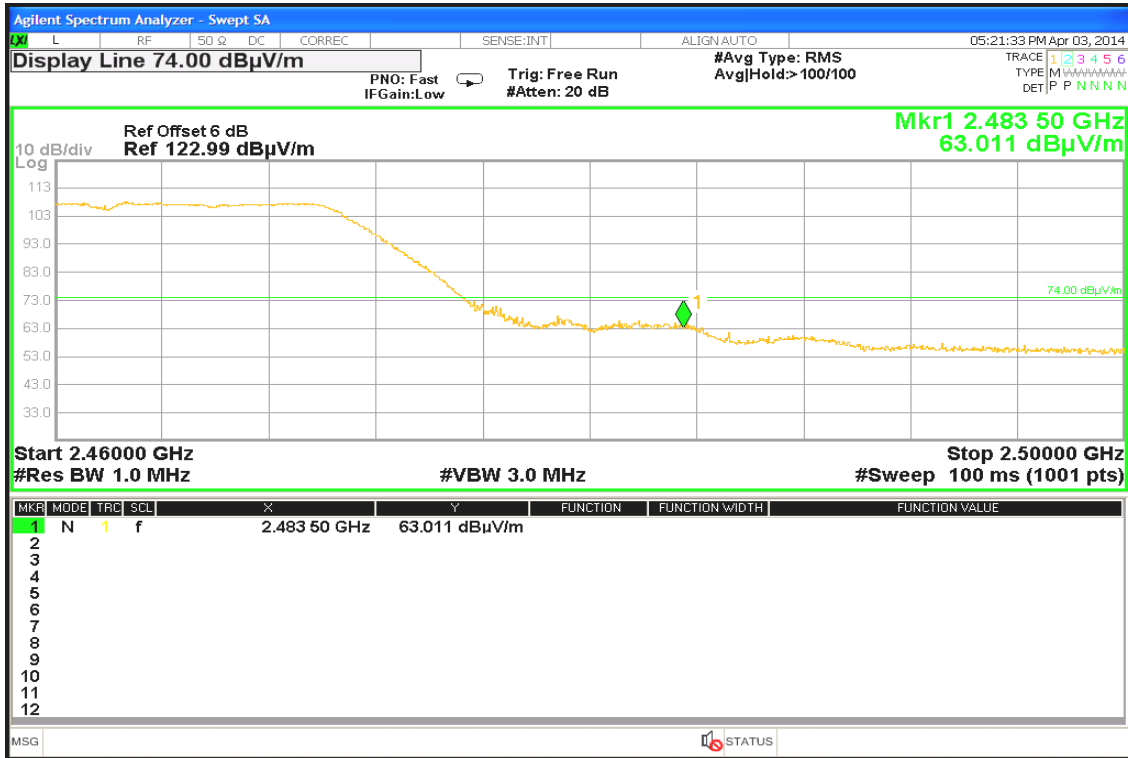




Band Edges (IEEE 802.11n HT20 mode / CH High)

Detector mode: Peak

Polarity: Vertical



Detector mode: Average

Polarity: Vertical

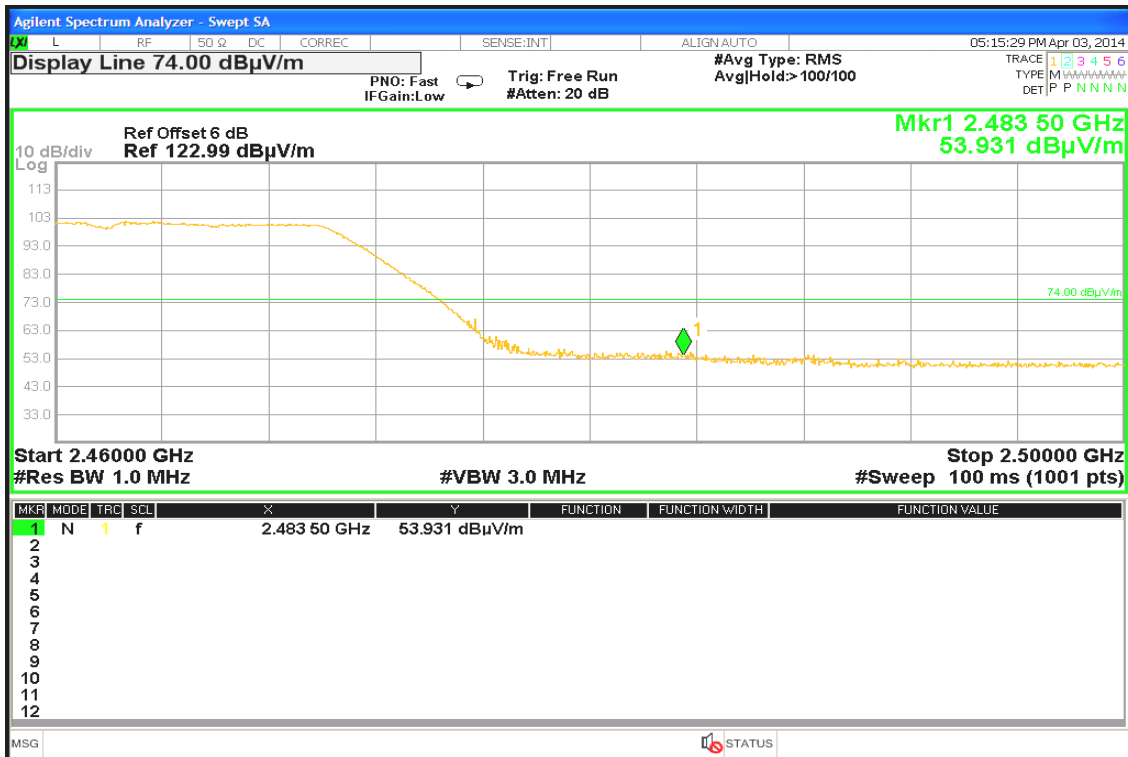






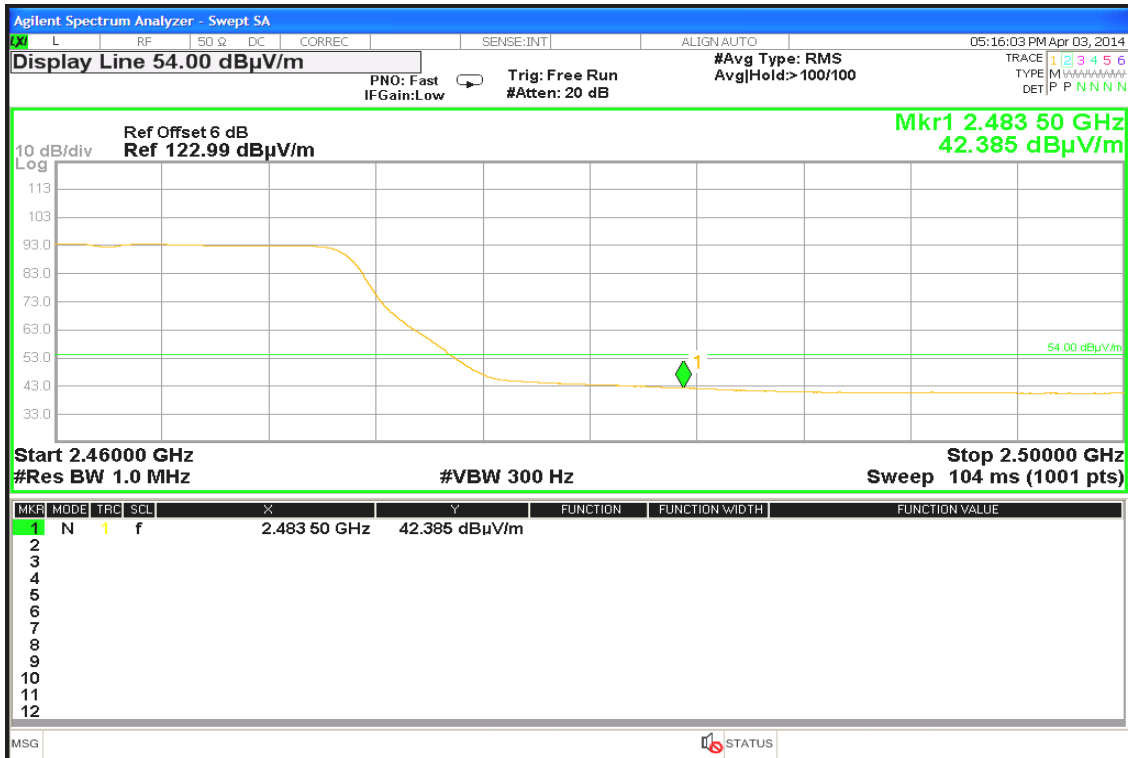
Detector mode: Peak

Polarity: Horizontal



Detector mode: Average

Polarity: Horizontal

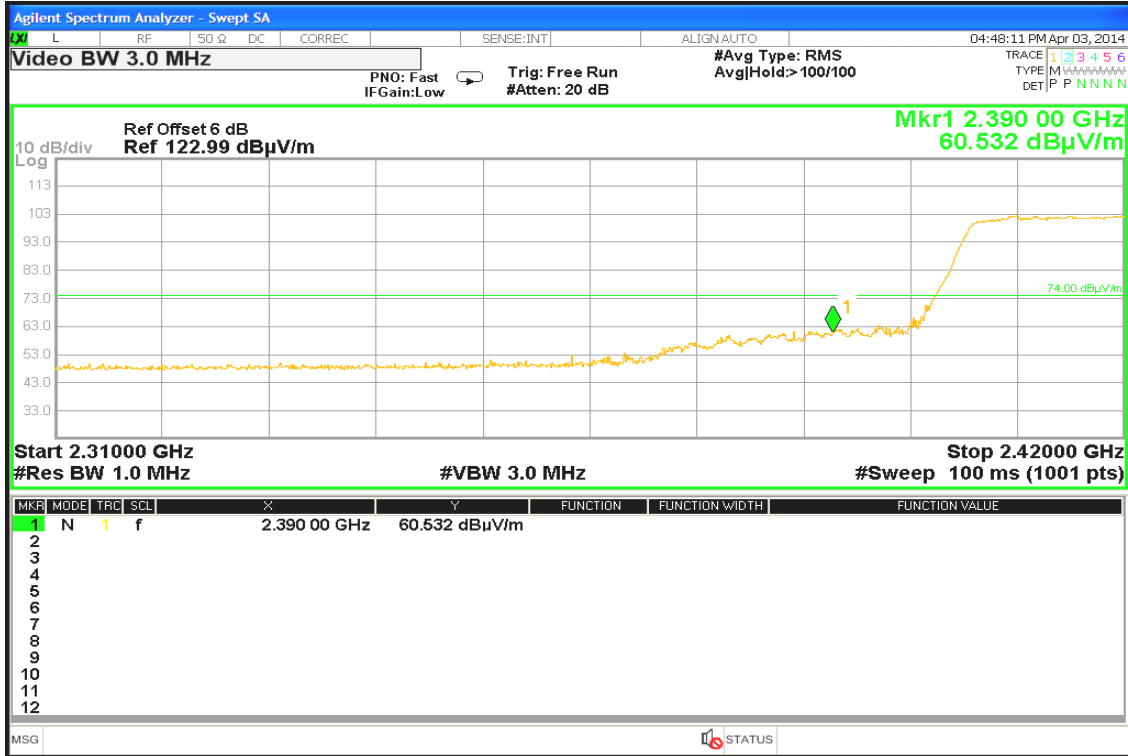




Band Edges (IEEE 802.11n HT40 mode / CH Low)

Detector mode: Peak

Polarity: Vertical



Detector mode: Average

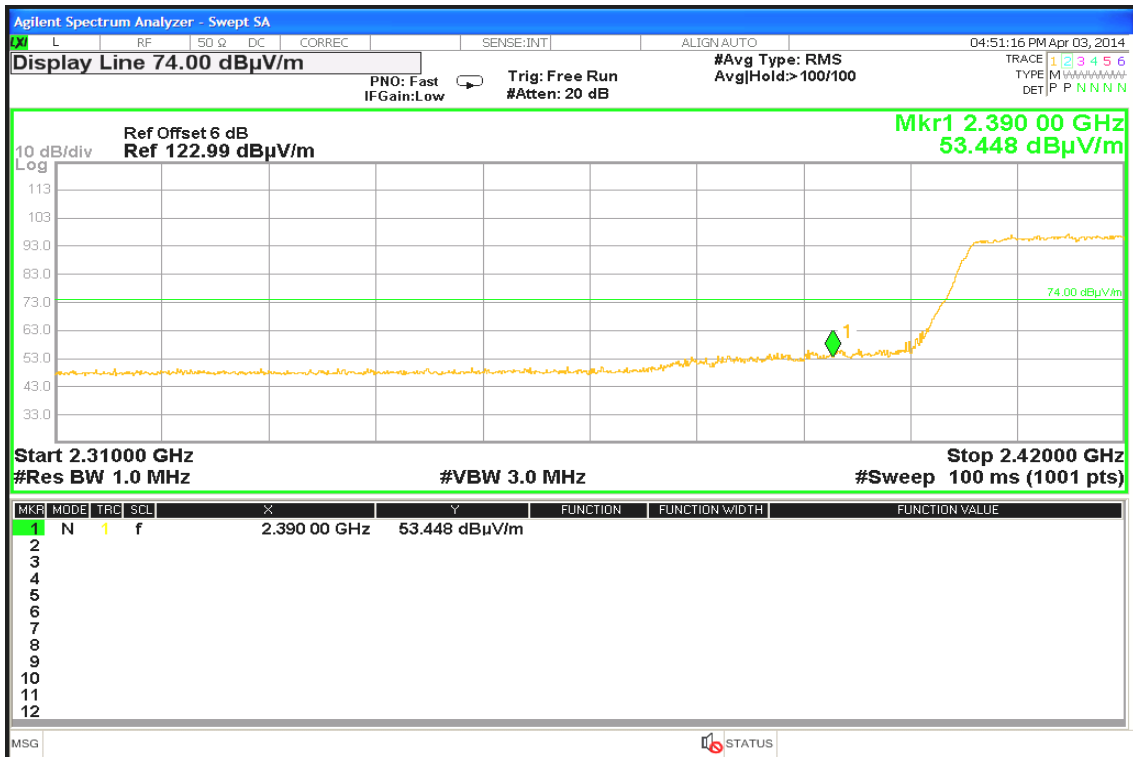
Polarity: Vertical





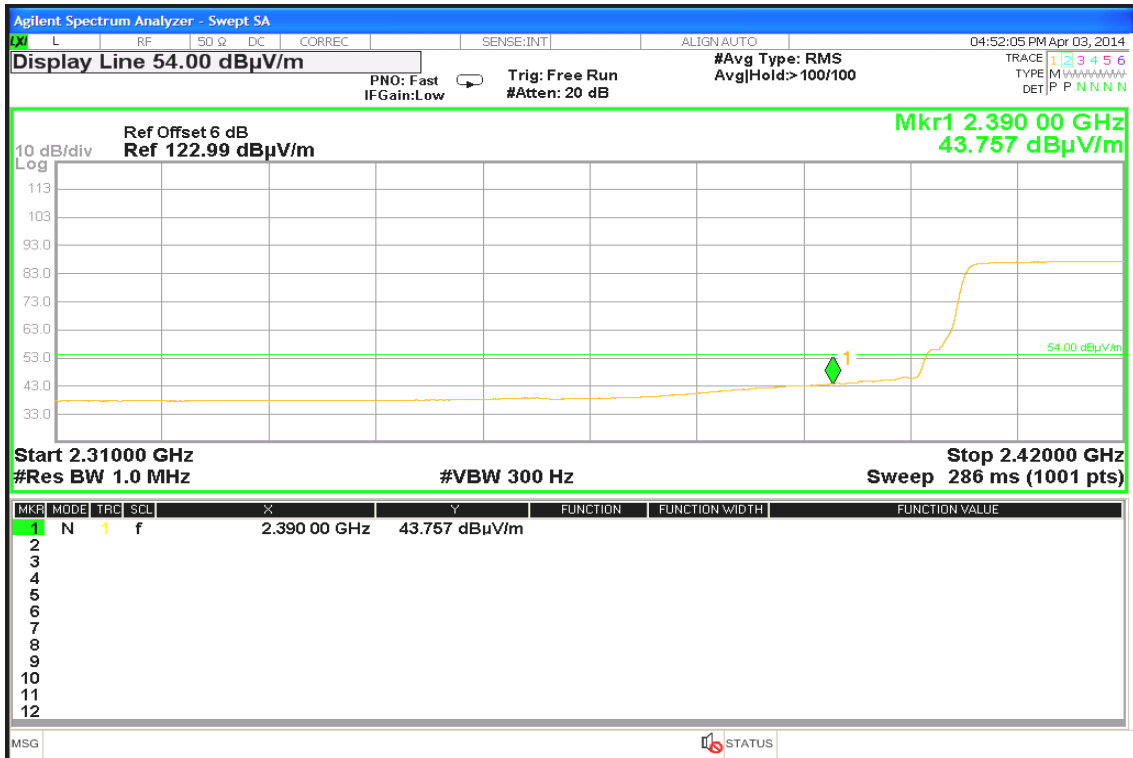
Detector mode: Peak

Polarity: Horizontal



Detector mode: Average

Polarity: Horizontal

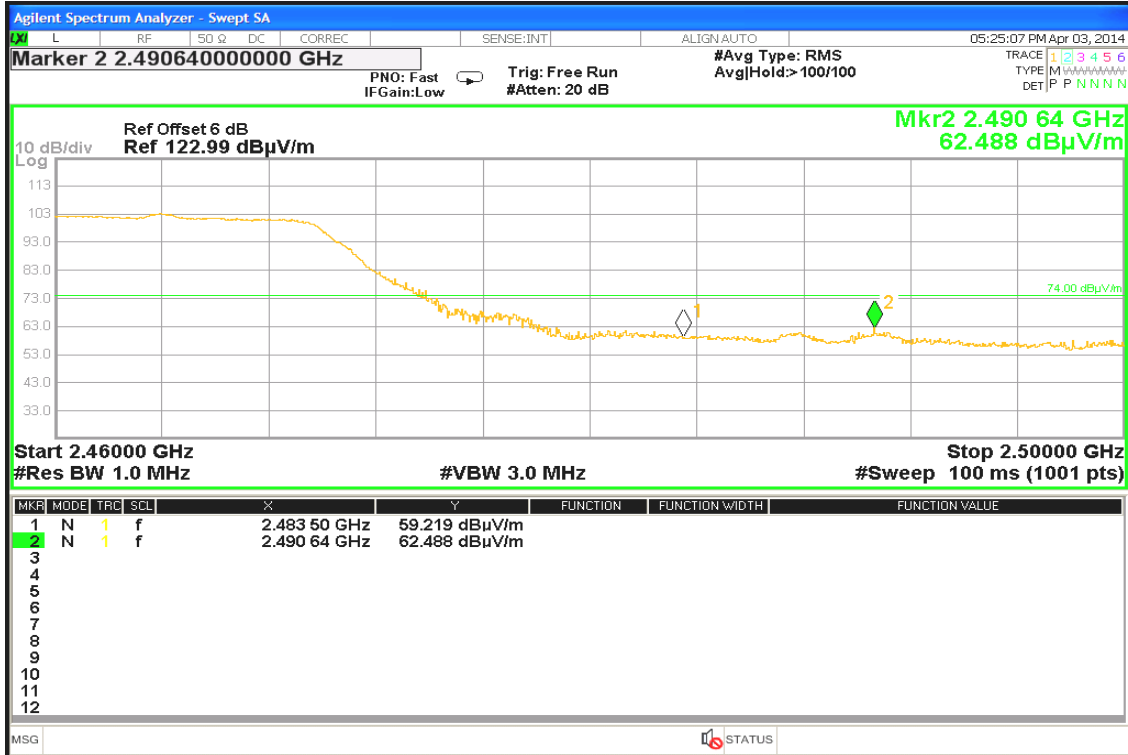




Band Edges (IEEE 802.11n HT40 mode / CH High)

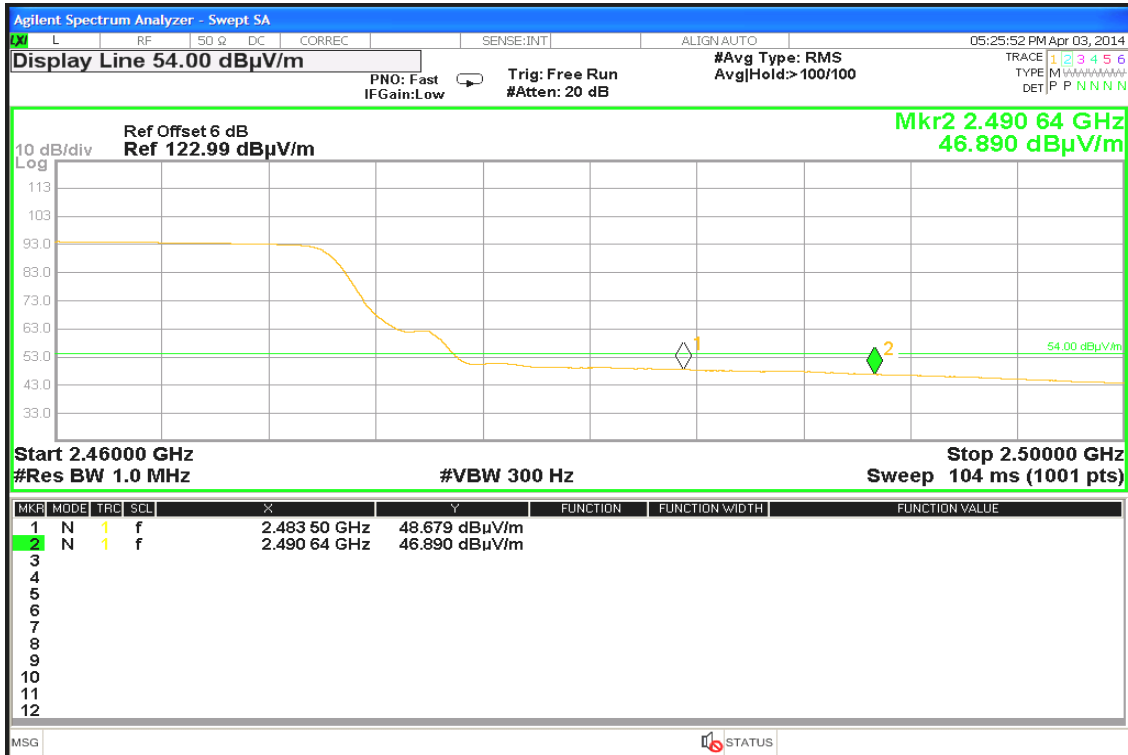
Detector mode: Peak

Polarity: Vertical



Detector mode: Average

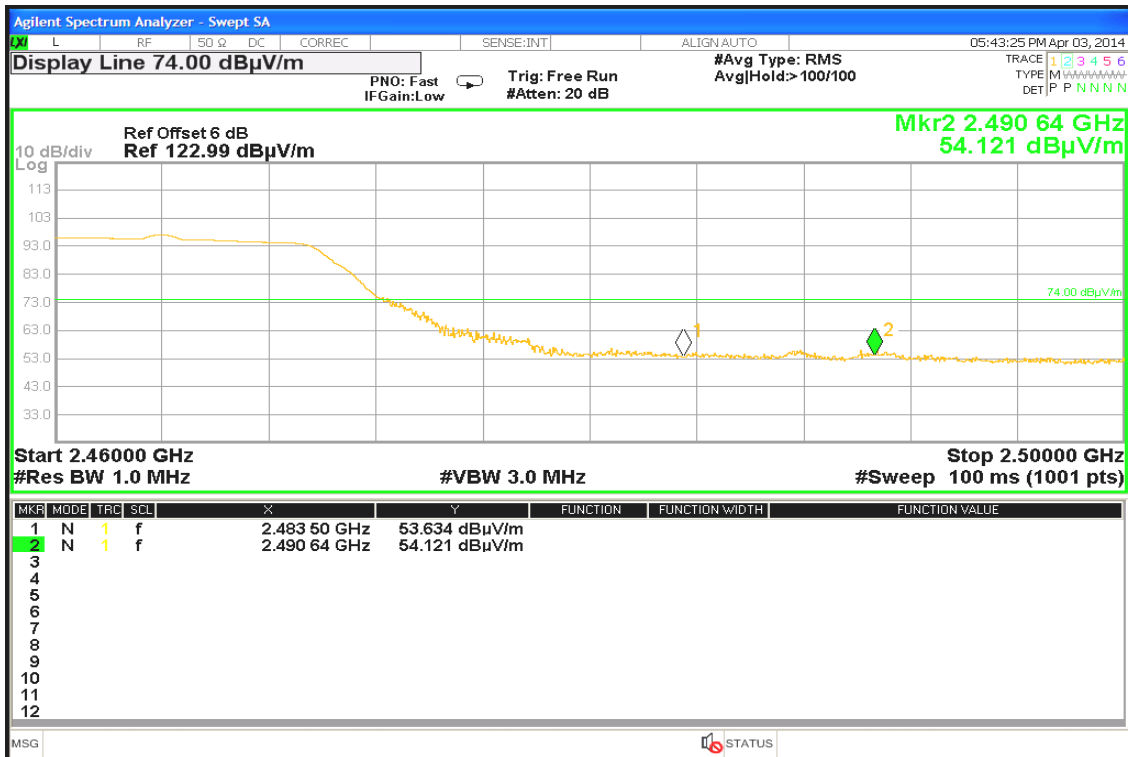
Polarity: Vertical





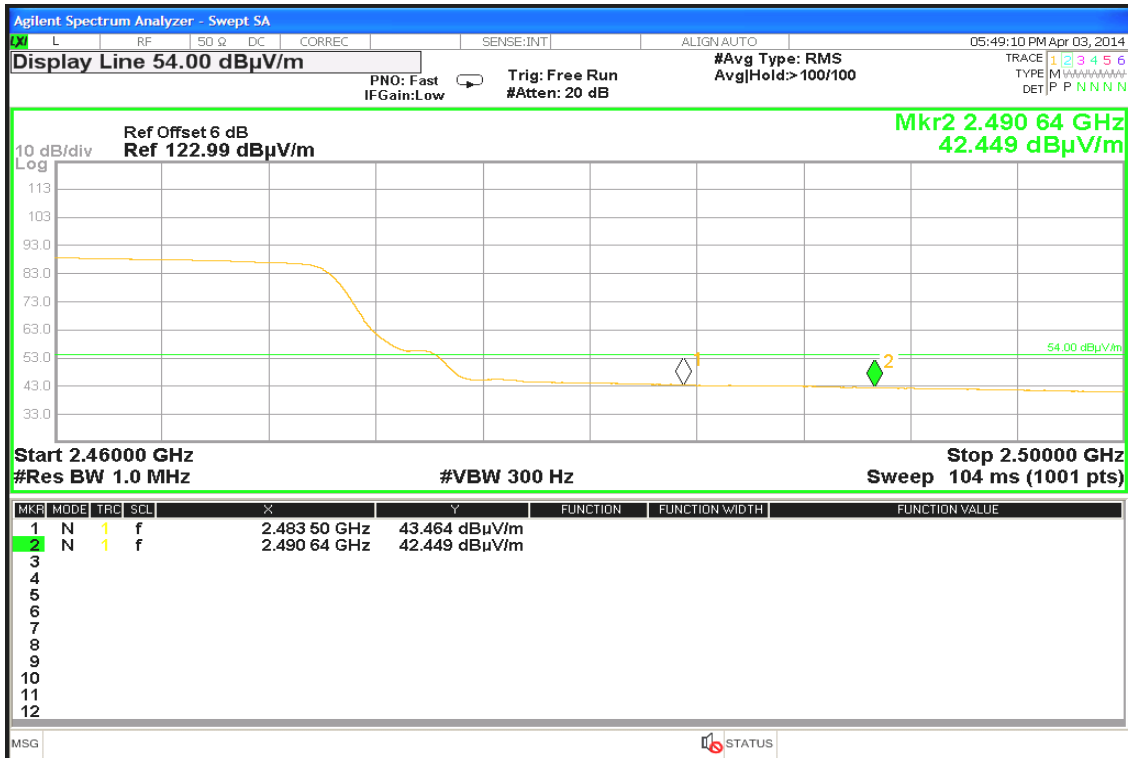
Detector mode: Peak

Polarity: Horizontal



Detector mode: Average

Polarity: Horizontal



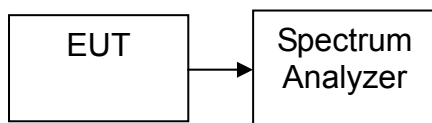


## **7.5 PEAK POWER SPECTRAL DENSITY**

### **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 v03r01**

This procedure must be used if maximum peak conducted output power was used to demonstrate compliance to the fundamental output power limit, and is optional if the maximum (average) conducted output power was used to demonstrate compliance.

1. Set analyzer center frequency to DTS channel center frequency.
2. Set the span to 1.5 times the DTS channel bandwidth.
3. Set the RBW  $\geq 3$  kHz.
4. Set the VBW  $\geq 3 \times$  RBW.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.

Use the peak marker function to determine the maximum amplitude level.

If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat

### **TEST RESULTS**

*No non-compliance noted*



### TEST DATA

#### Test mode: IEEE 802.11b mode

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Result
Low	2412	-0.54	8.00	PASS
Mid	2437	-1.95		
High	2462	-8.60		

#### Test mode: IEEE 802.11g mode

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Result
Low	2412	-11.30	8.00	PASS
Mid	2437	-11.82		
High	2462	-12.87		

#### Test mode: IEEE 802.11n HT20 mode

Channel	Frequency (MHz)	PPSD(dBm)			Limit (dBm)	Result
		Chain 0	Chain 1	Total		
Low	2412	-12.83	-13.10	-9.95	5.99	PASS
Mid	2437	-13.72	-12.66	-10.15		PASS
High	2462	-13.52	-12.92	-10.20		PASS

**Remark:**

1. Total PPSD (dBm) = 10\*LOG(10^(Chain 0 PPSD / 10)+10^(Chain 1 PPSD / 10))

2. The maximum antenna gain is 8.01dBi; therefore the reduction due to antenna gain is 2.01dBi, so the limit is 5.99dBm

#### Test mode: IEEE 802.11n HT40 mode

Channel	Frequency (MHz)	PPSD(dBm)			Limit (dBm)	Result
		Chain 0	Chain 1	Total		
Low	2422	-18.37	-17.55	-14.93	5.99	PASS
Mid	2437	-18.36	-18.00	-15.17		PASS
High	2452	-18.75	-16.86	-14.69		PASS

**Remark:**

1. Total PPSD (dBm) = 10\*LOG(10^(Chain 0 PPSD / 10)+10^(Chain 1 PPSD / 10))

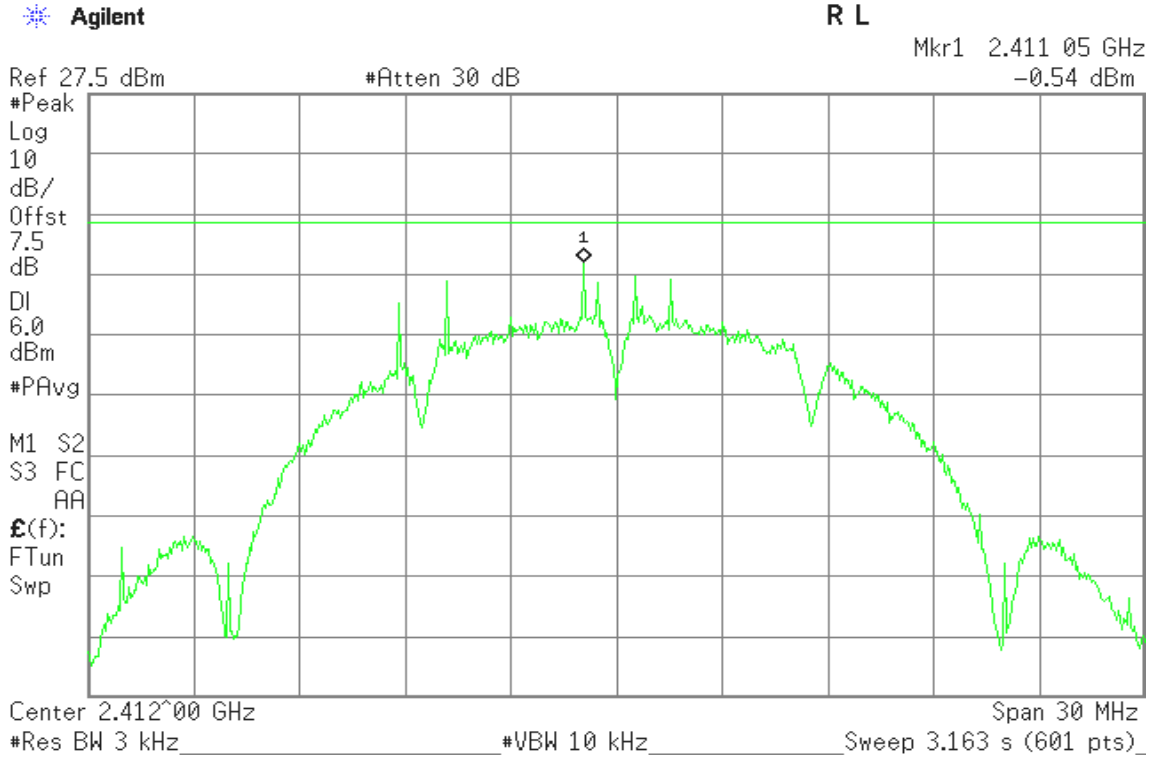
2. The maximum antenna gain is 8.01dBi; therefore the reduction due to antenna gain is 2.01dBi, so the limit is 5.99dBm



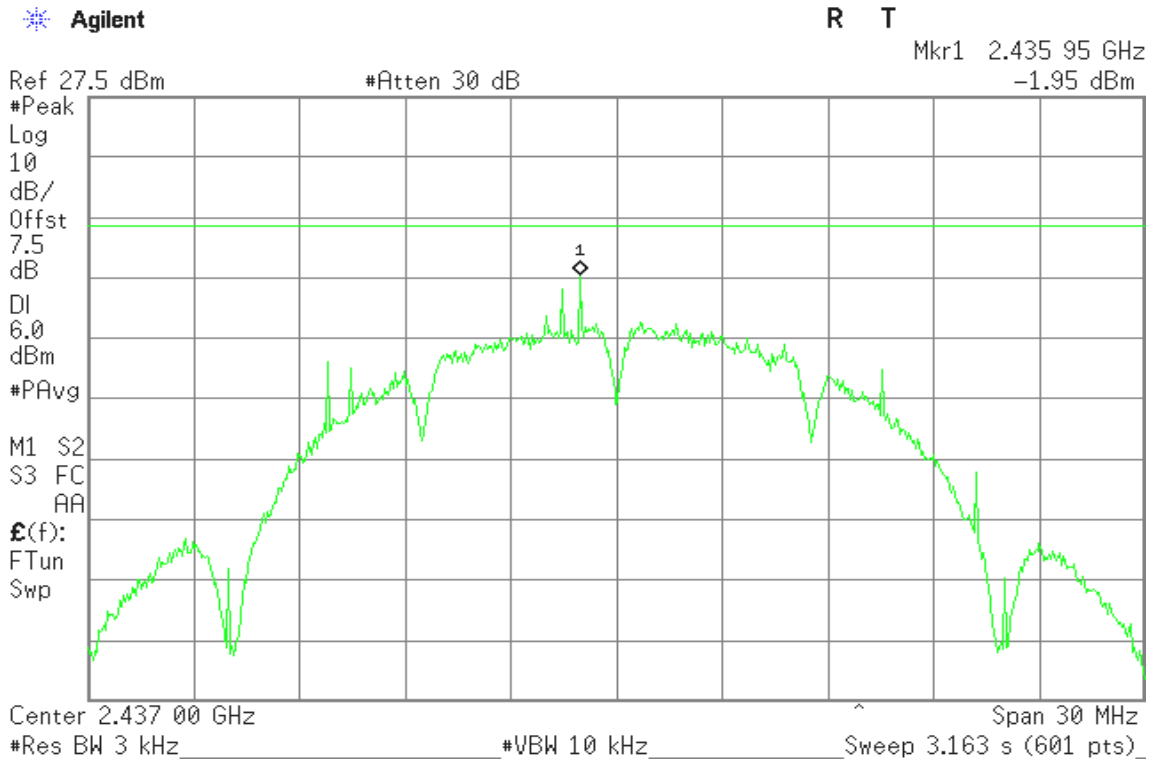
Test Plot

IEEE 802.11b mode

PPSD (CH Low)



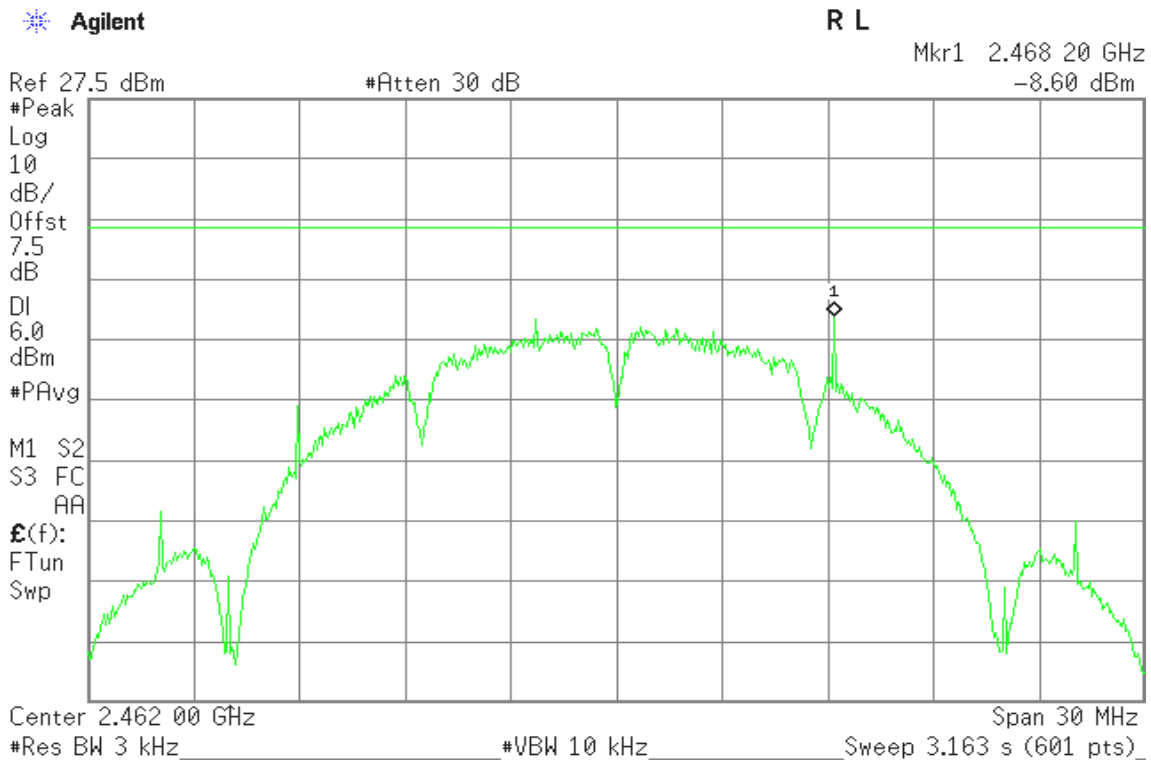
PPSD (CH Mid)





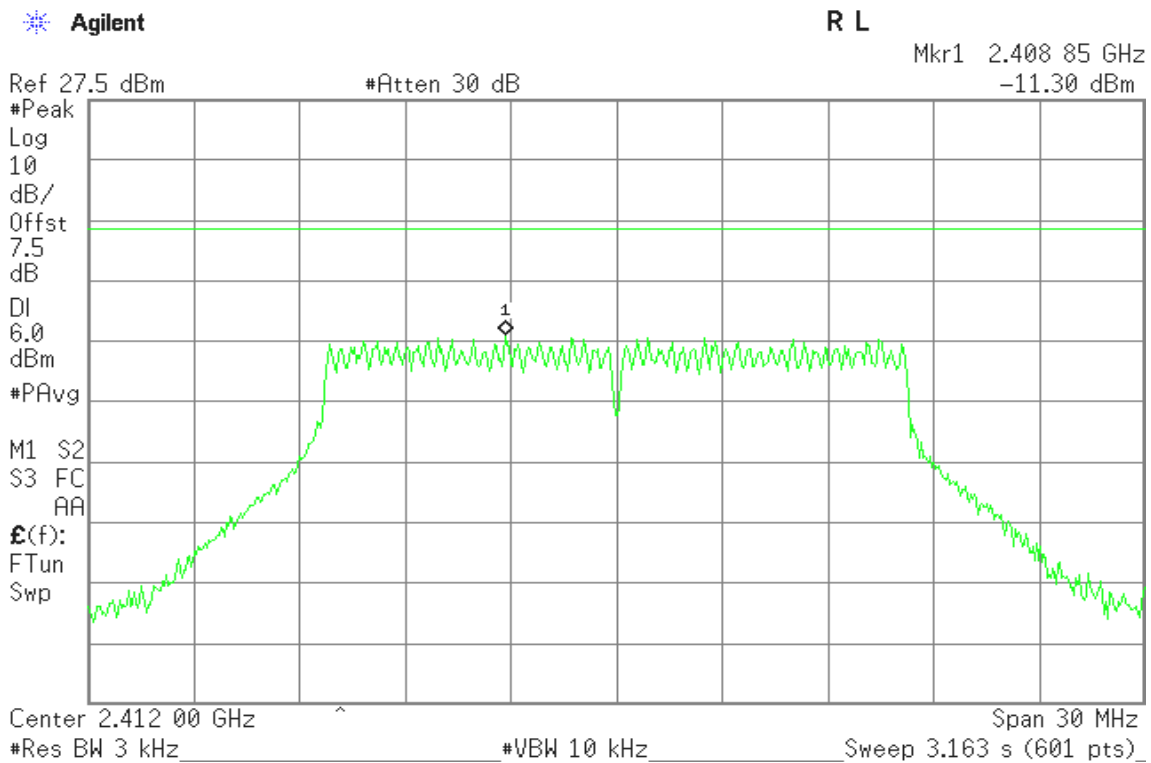


### PPSD (CH High)



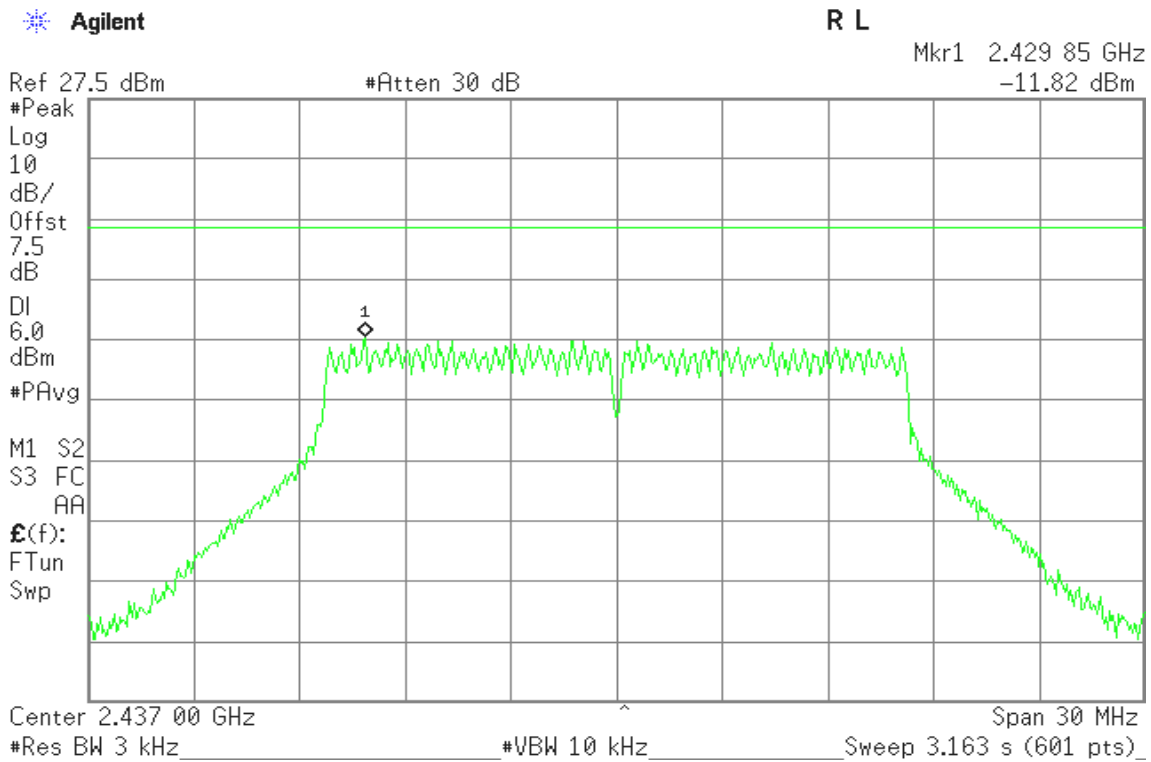
### IEEE 802.11g mode

### PPSD (CH Low)

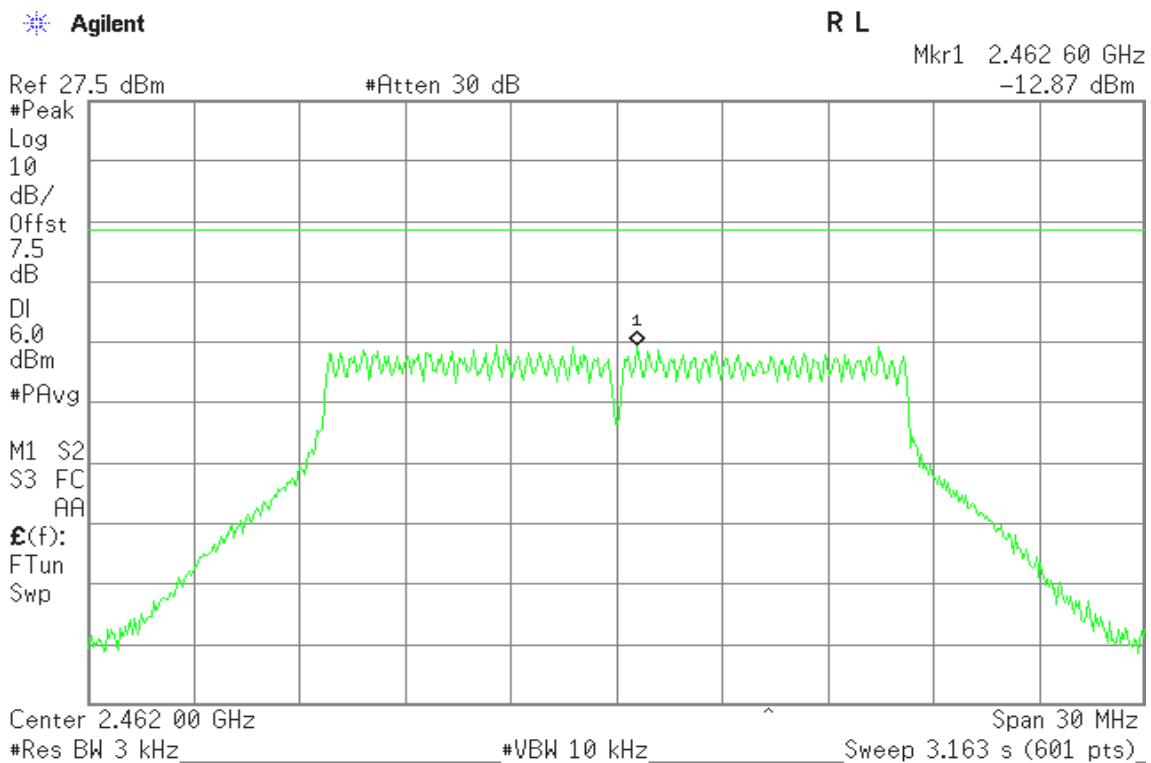




### PPSD (CH Mid)



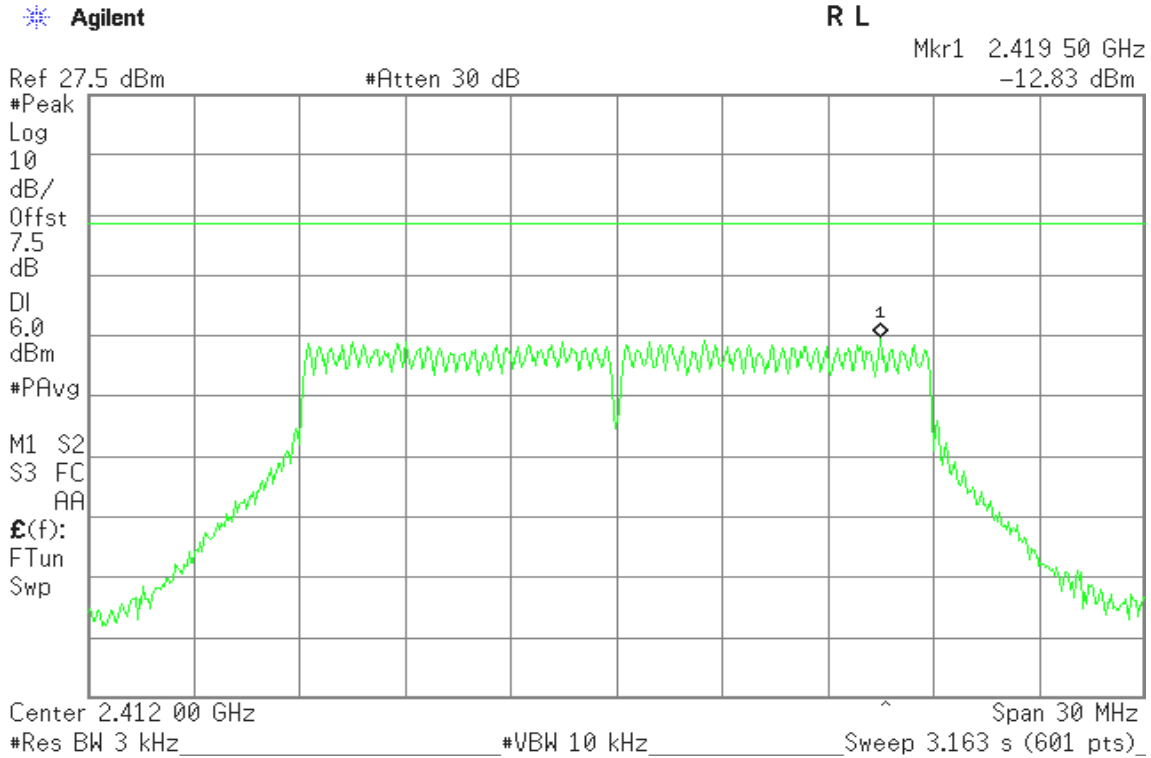
### PPSD (CH High)



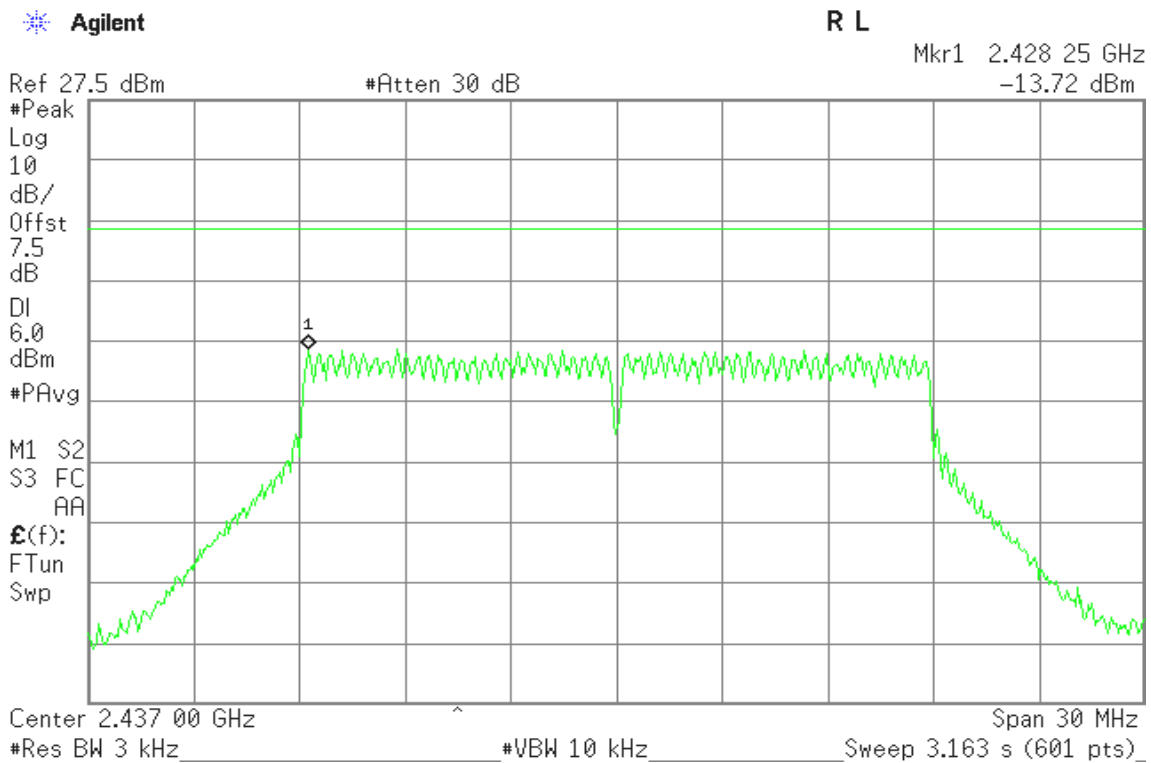


IEEE 802.11n HT20 mode / Chain 0

PPSD (CH Low)

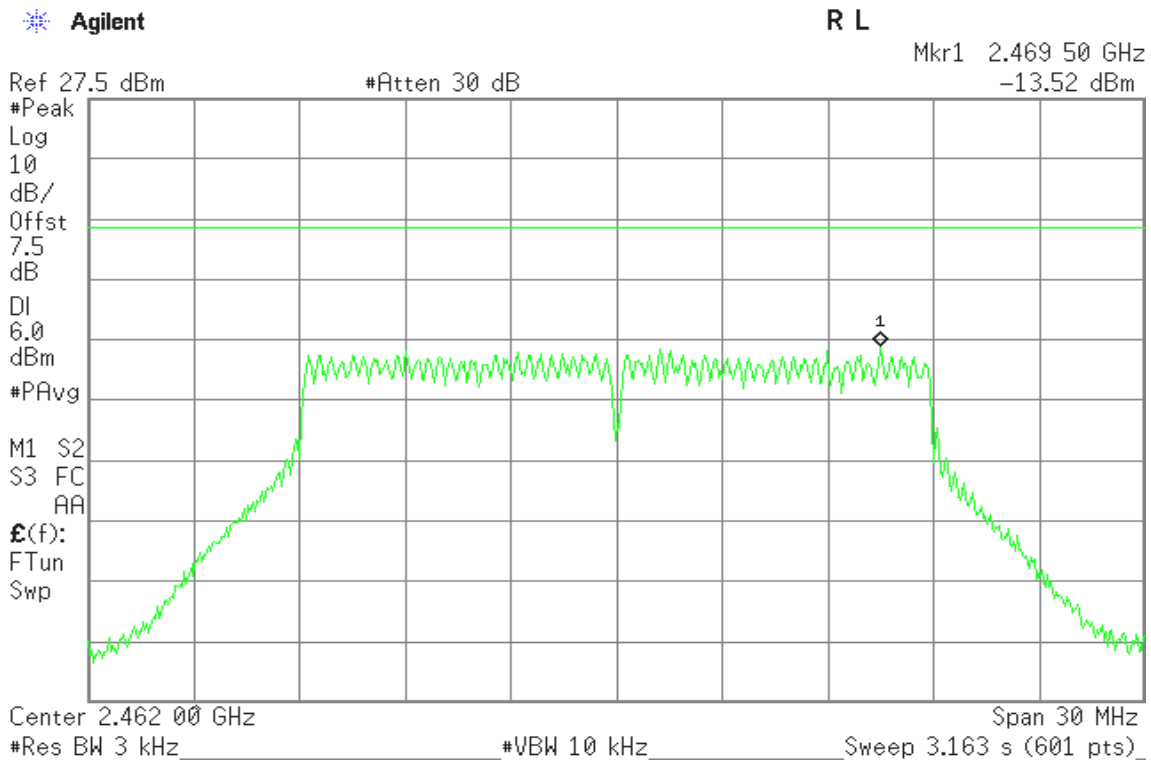


PPSD (CH Mid)



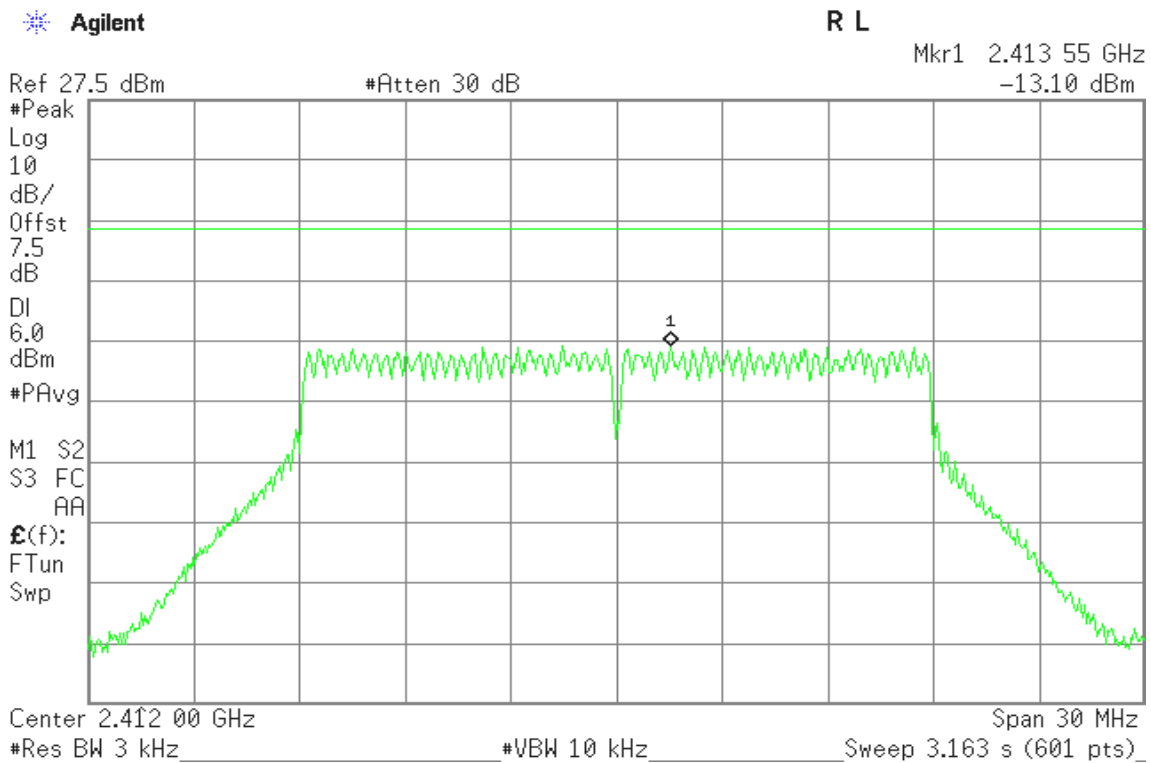


### PPSD (CH High)



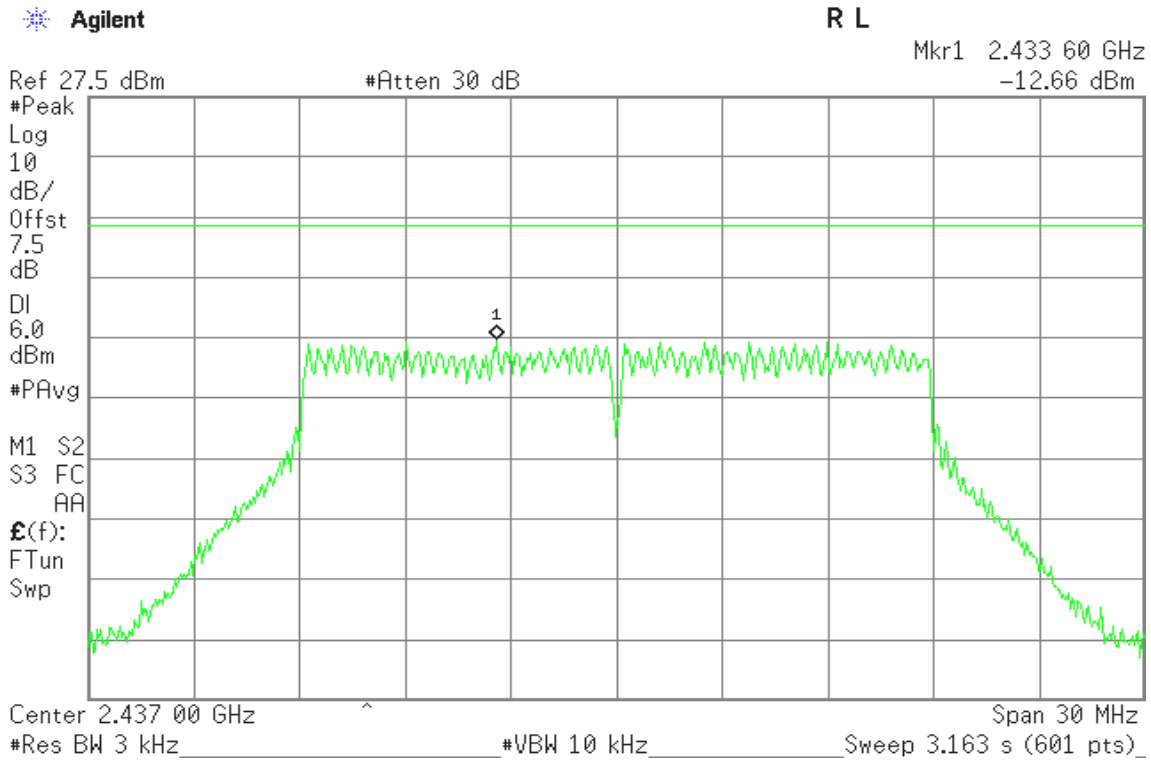
### IEEE 802.11n HT20 mode / Chain 1

#### PPSD (CH Low)

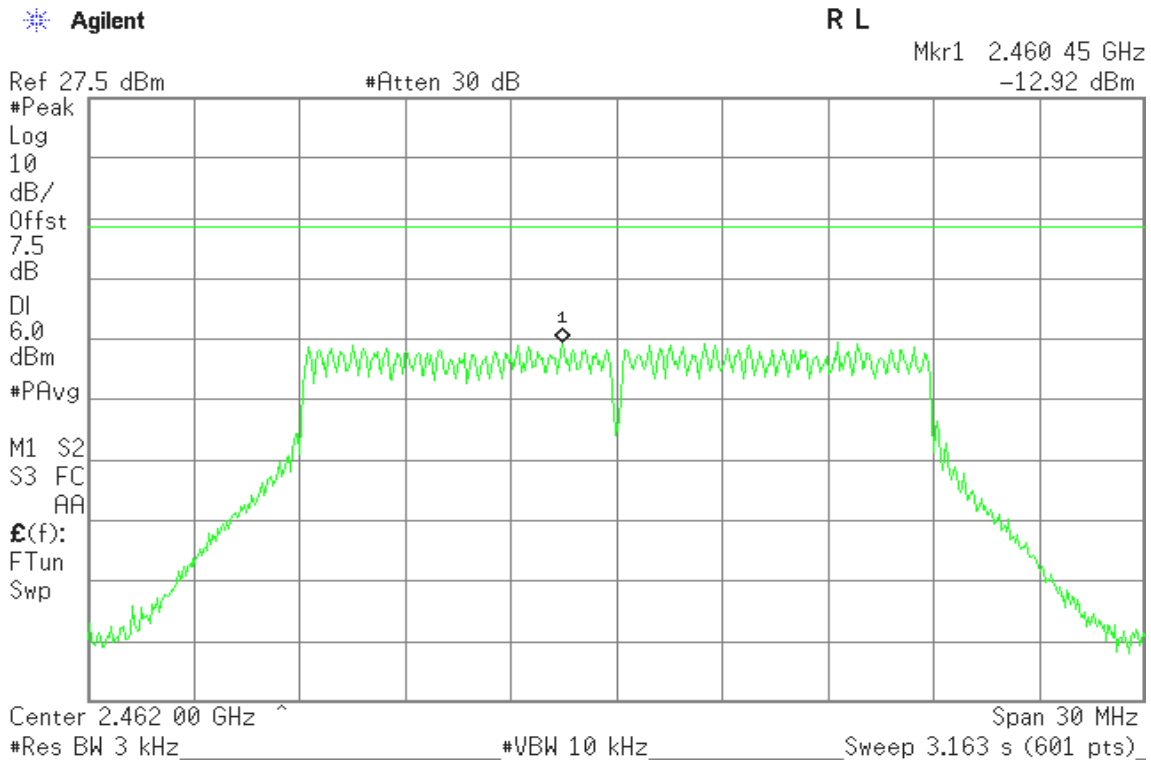




### PPSD (CH Mid)



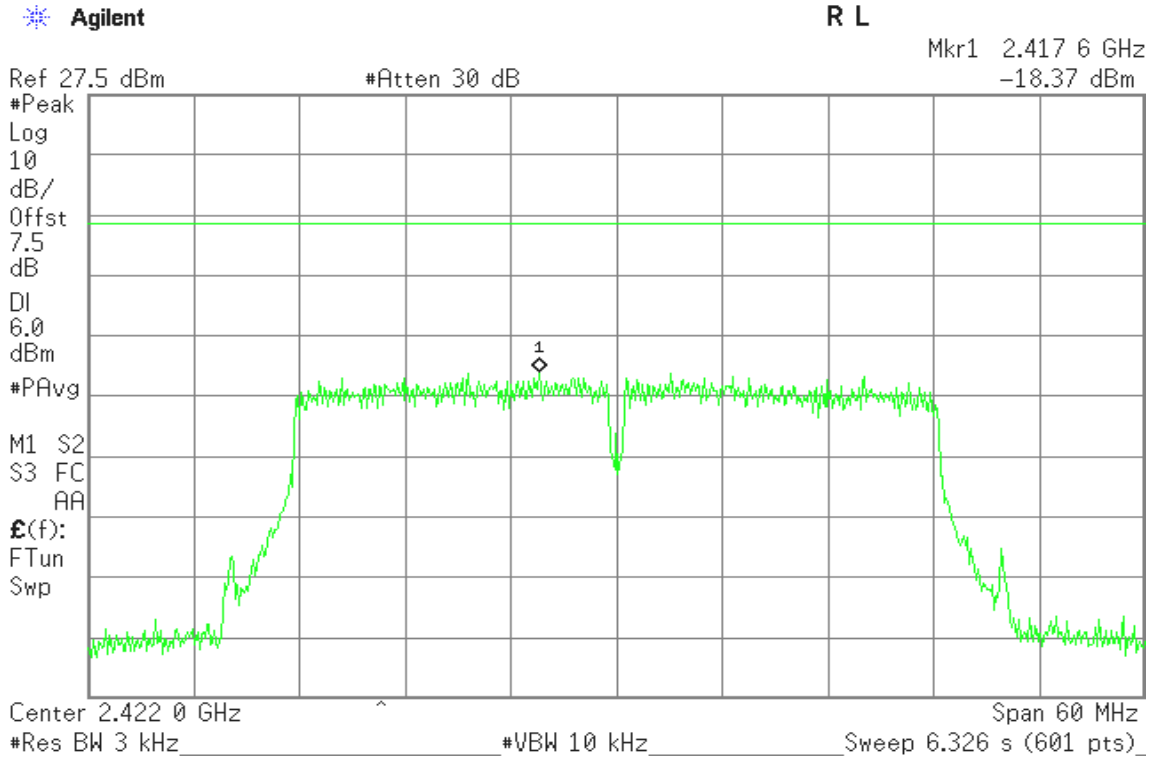
### PPSD (CH High)



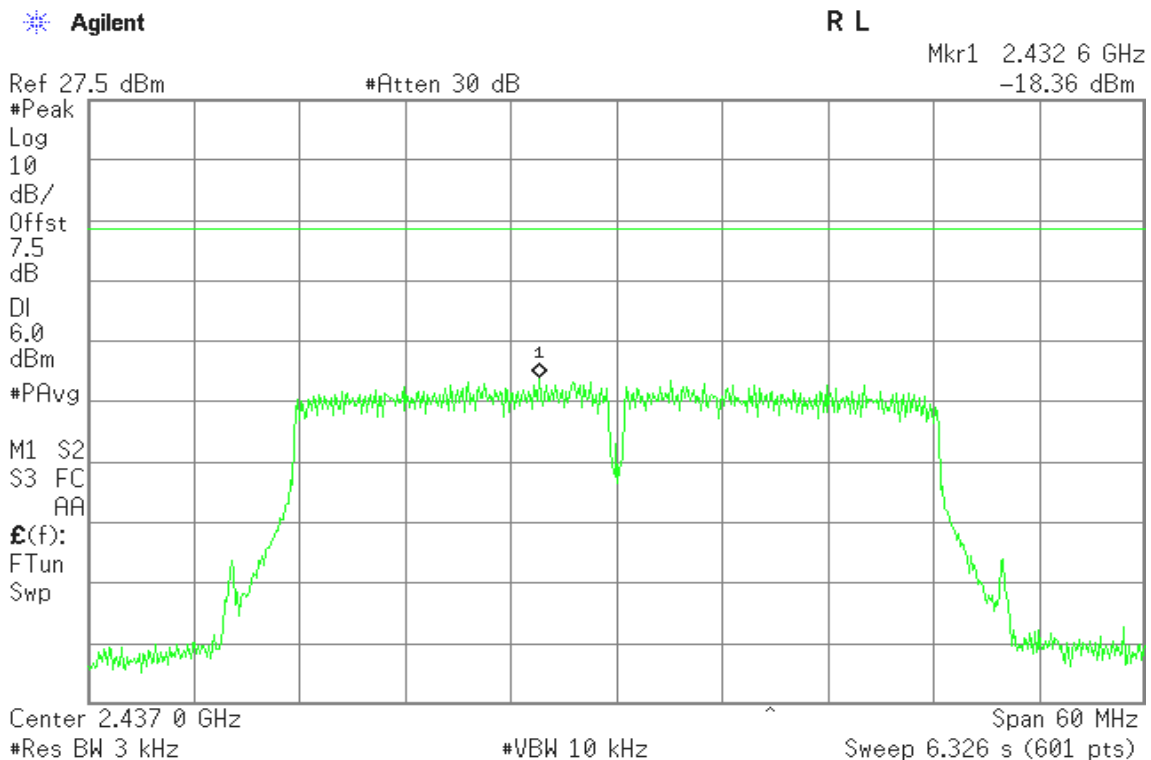


**IEEE 802.11n HT40 mode / Chain 0**

**PPSD (CH Low)**

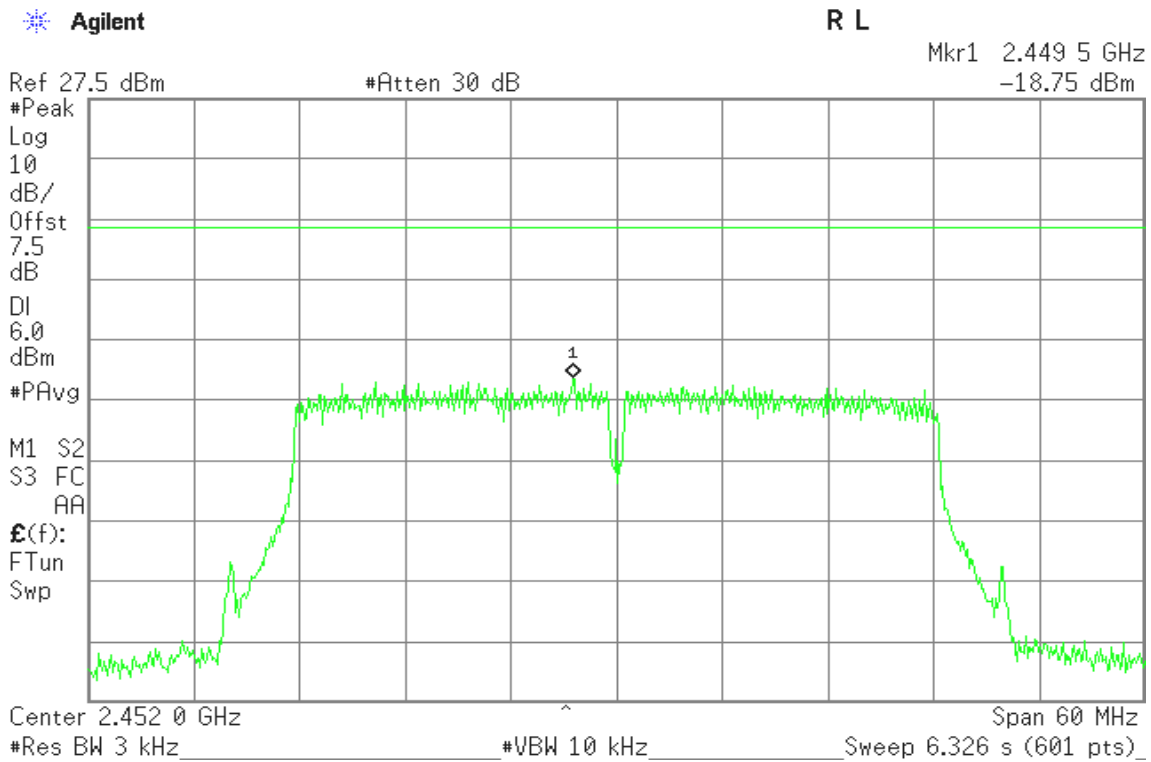


**PPSD (CH Mid)**



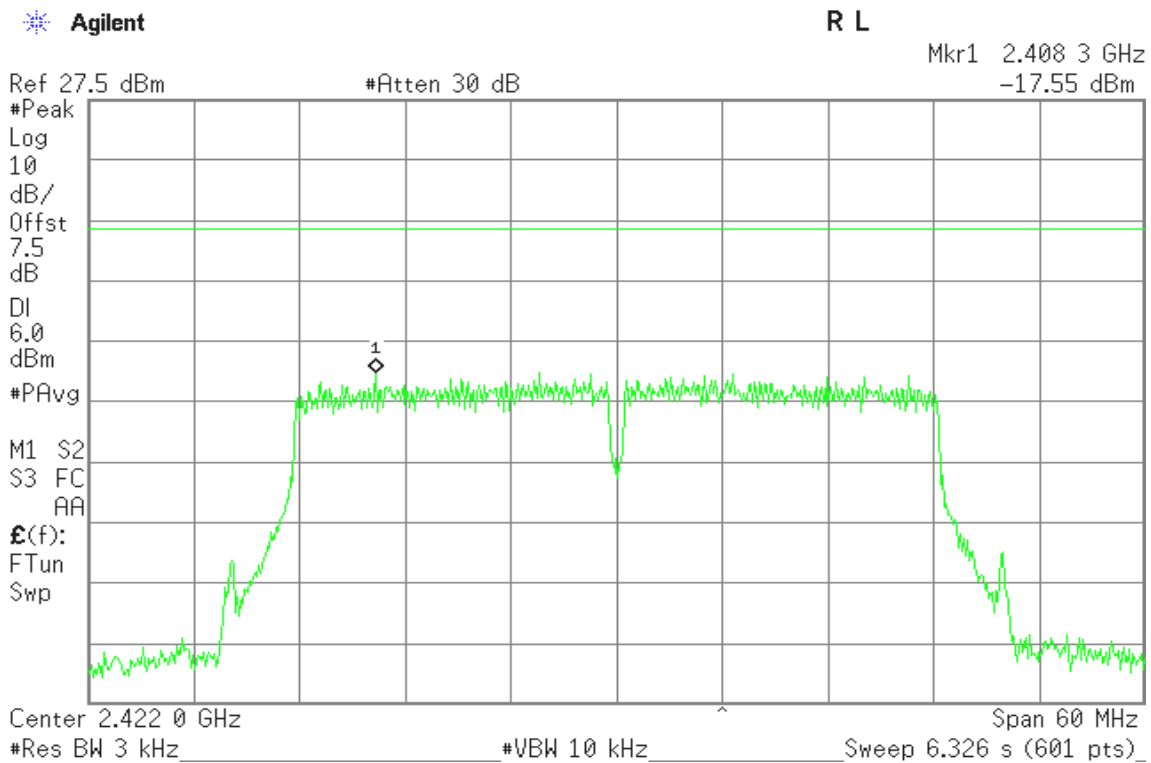


### PPSD (CH High)



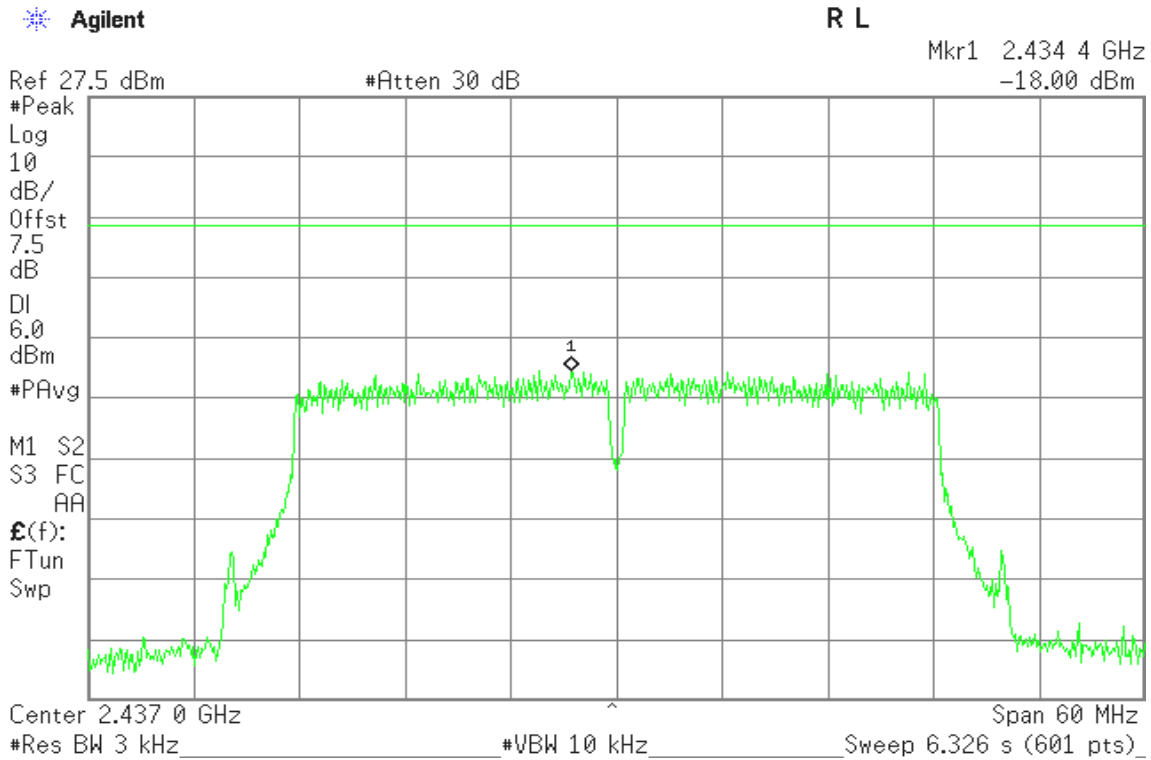
### IEEE 802.11n HT40 mode / Chain 1

### PPSD (CH Low)

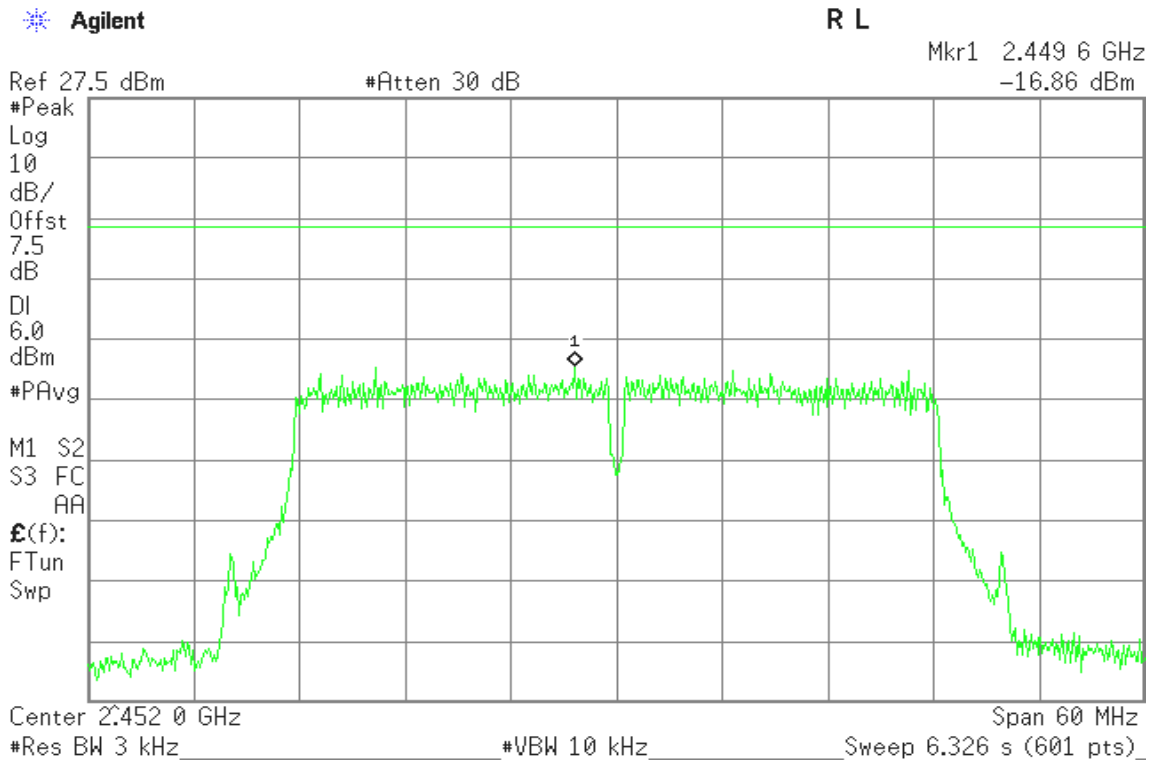




### PPSD (CH Mid)



### PPSD (CH High)







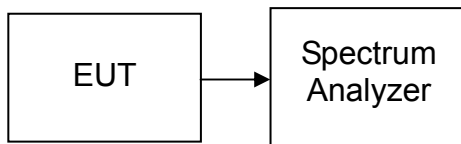
## **7.6 SPURIOUS EMISSIONS**

### **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 20dB below that in the 100kHz 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**

*Per KDB 662911 D01 Multiple Transmitter Output v01r02*

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**

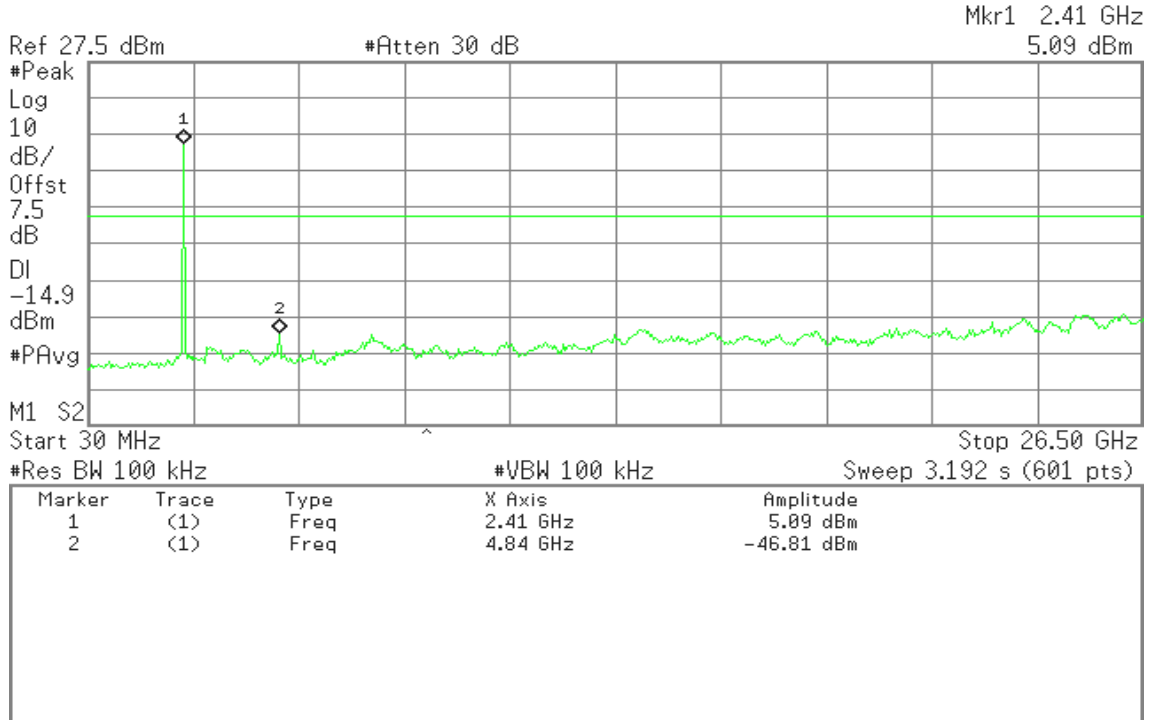
**Spurious Emissions**

**IEEE 802.11b mode**

**CH Low**

Agilent

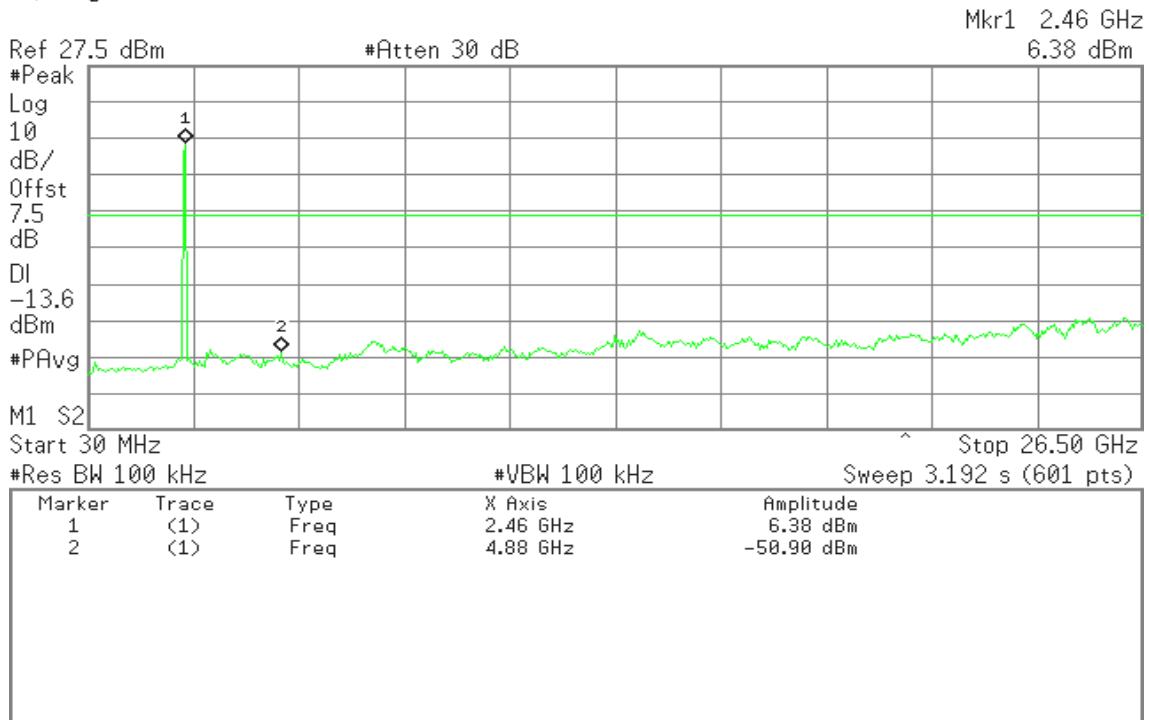
R T



**CH Mid**

Agilent

R L



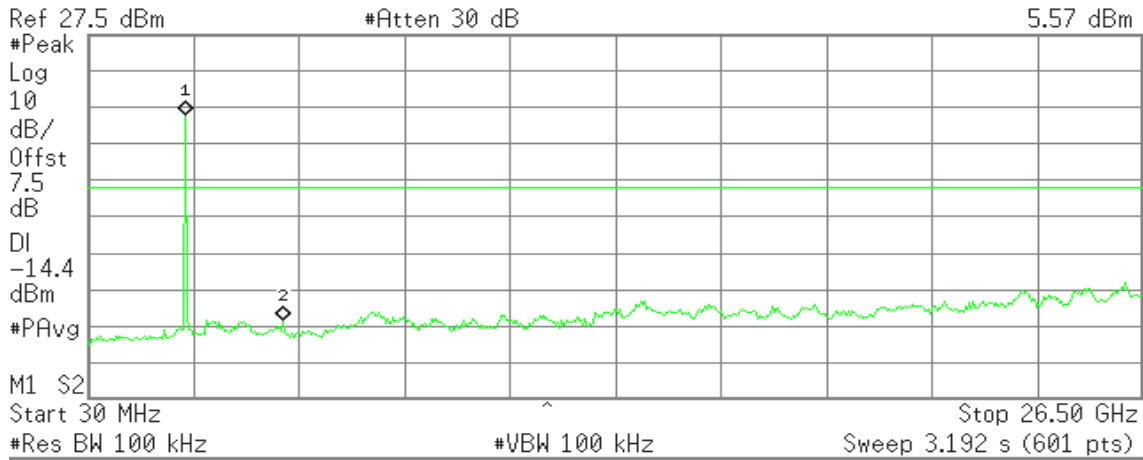


### CH High

Agilent

R L

Mkr1 2.46 GHz  
5.57 dBm



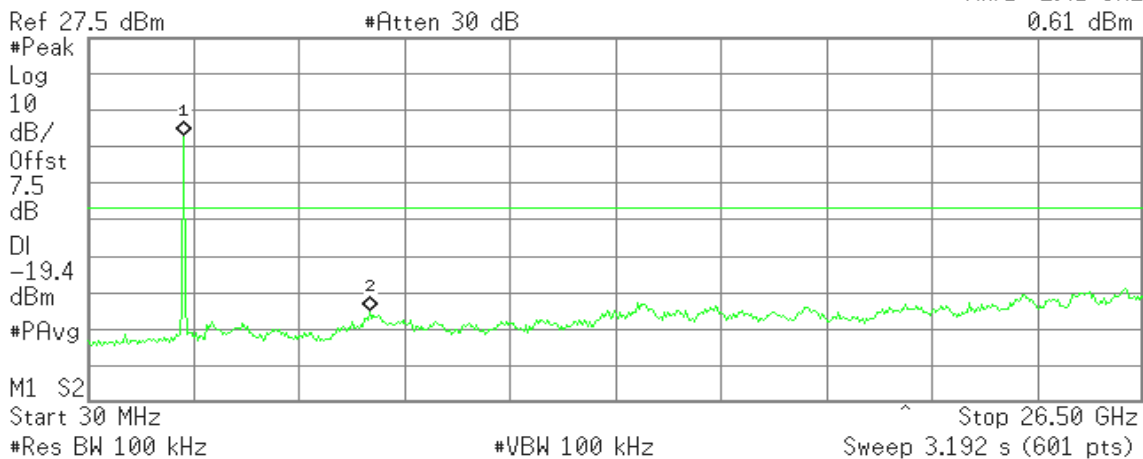
### IEEE 802.11g mode

#### CH Low

Agilent

R T

Mkr1 2.41 GHz  
0.61 dBm

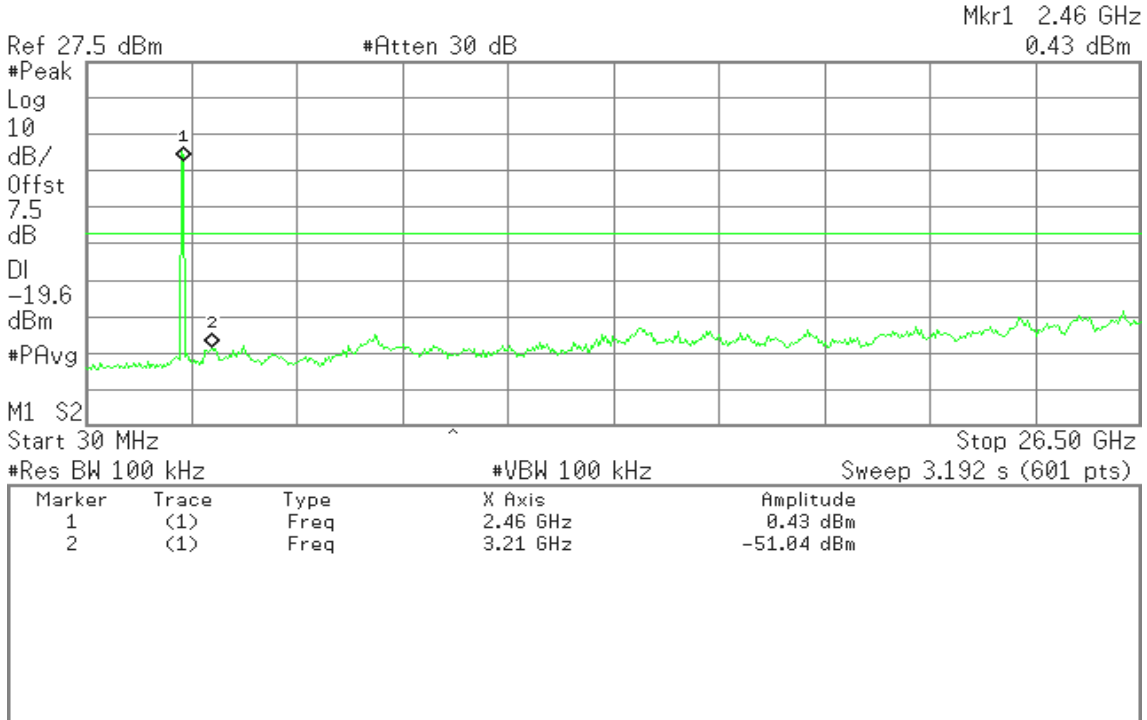




### CH Mid

Agilent

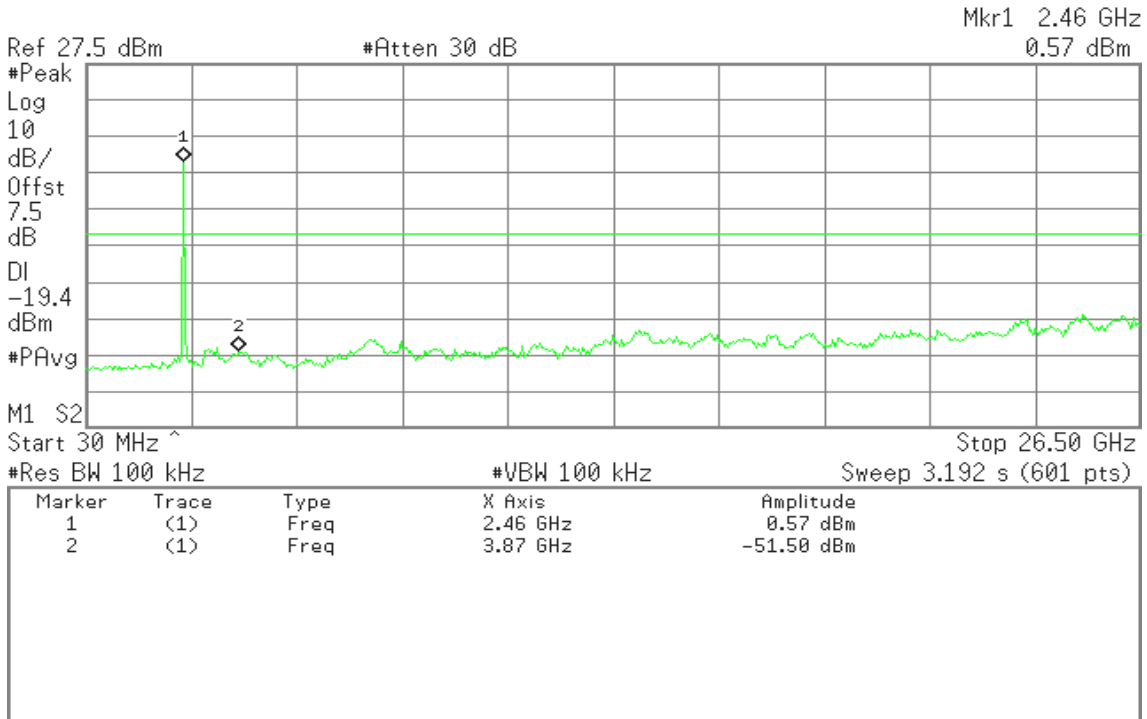
R L



### CH High

Agilent

R L





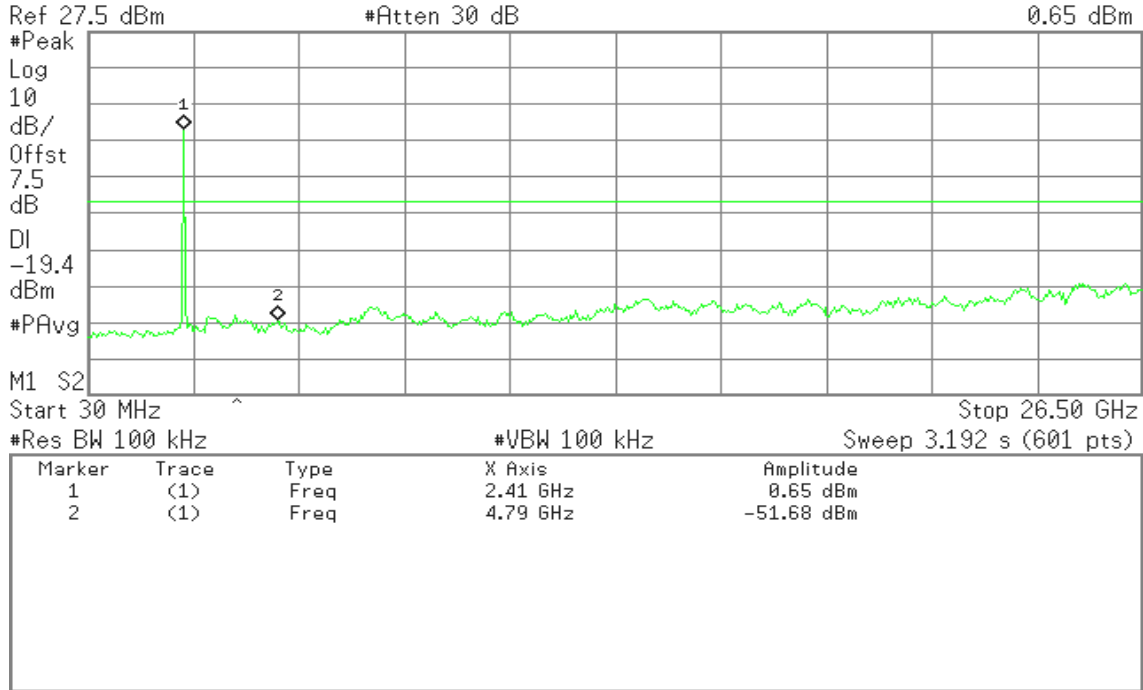
IEEE 802.11n HT20 mode / Chain 0

CH Low

Agilent

R L

Mkr1 2.41 GHz  
0.65 dBm

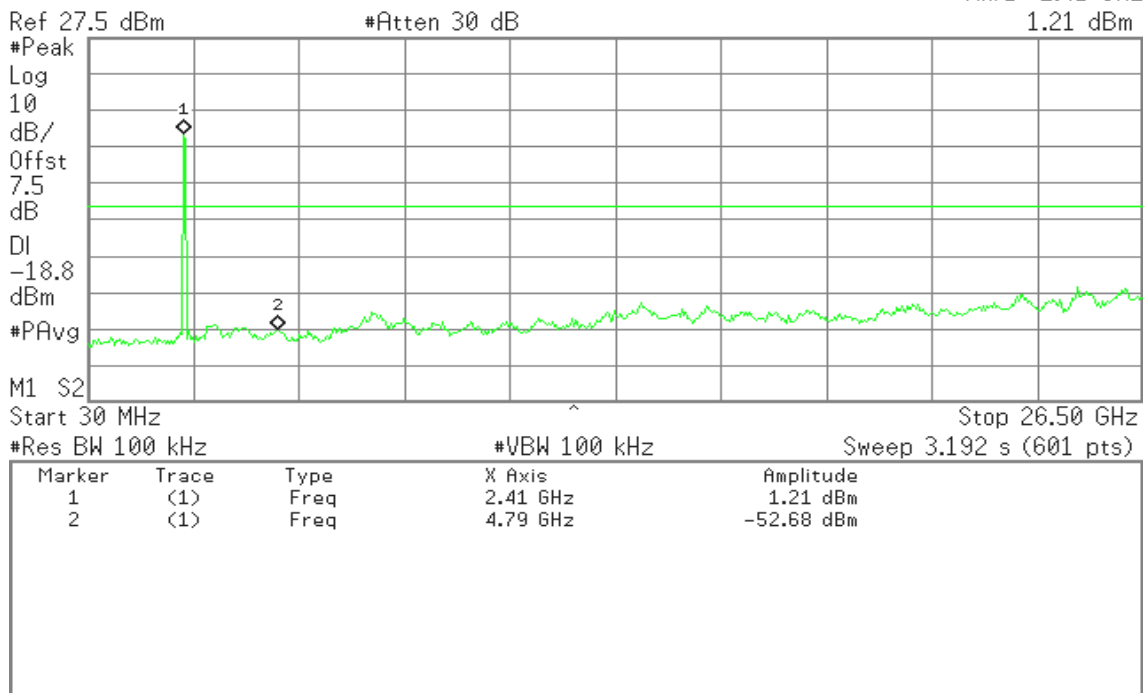


CH Mid

Agilent

R L

Mkr1 2.41 GHz  
1.21 dBm

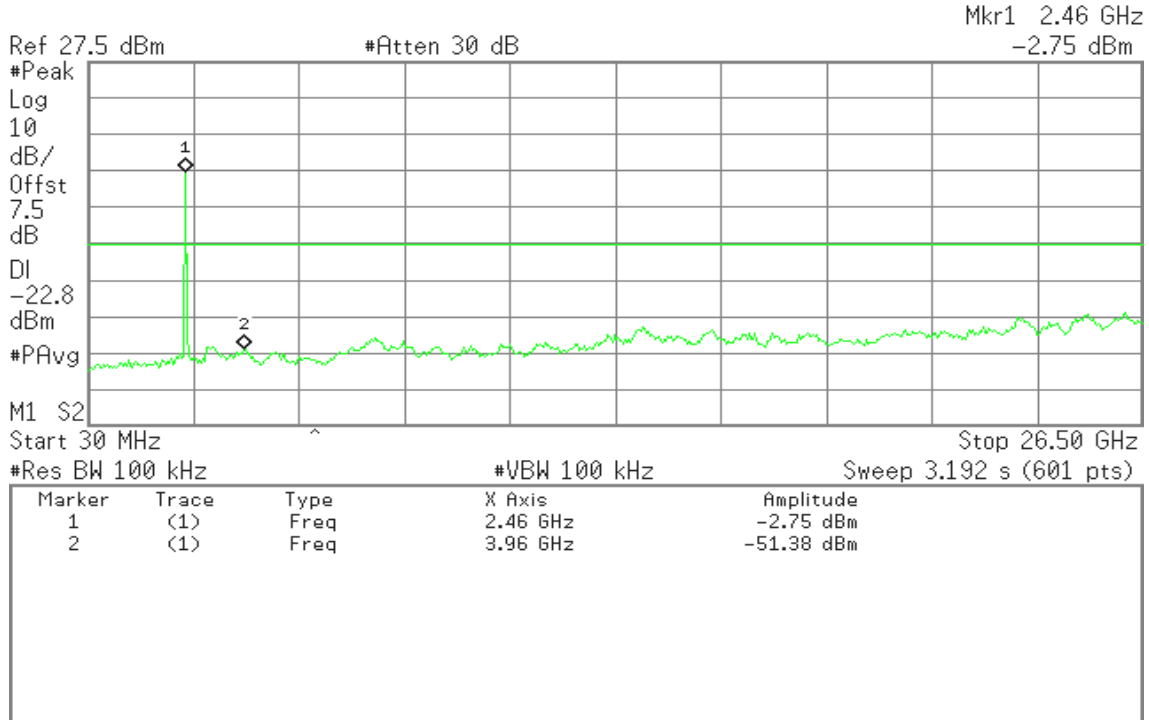




CH High

Agilent

R L

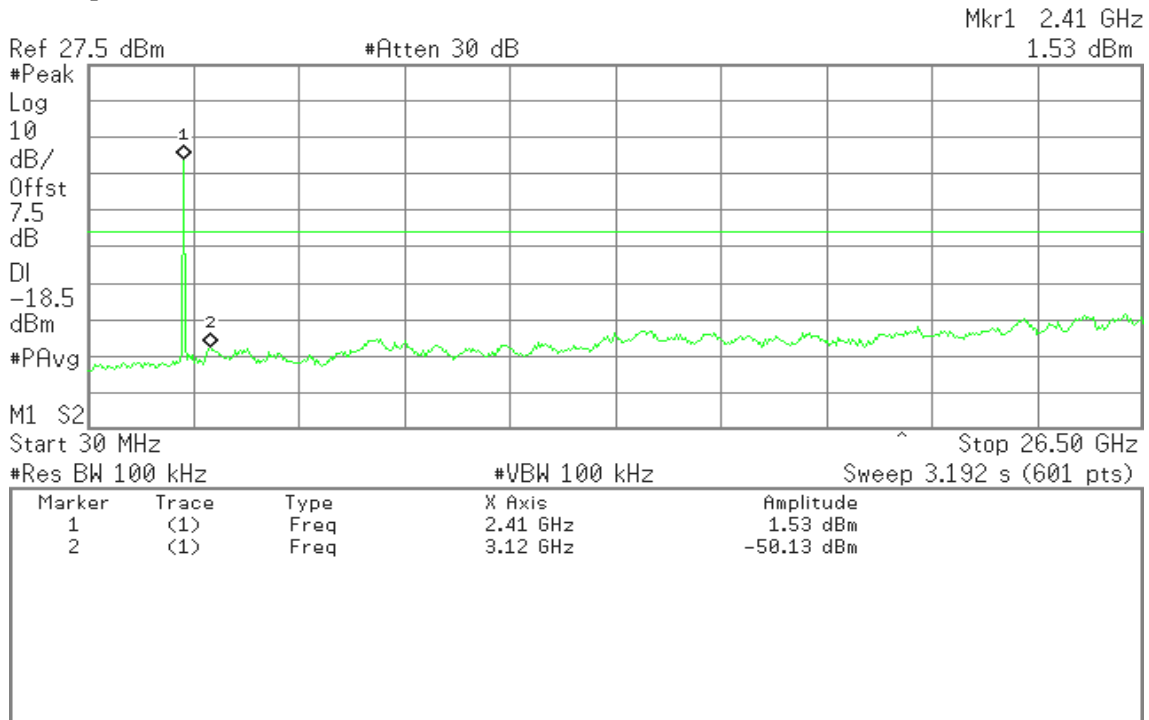


IEEE 802.11n HT20 mode / Chain 1

CH Low

Agilent

R L



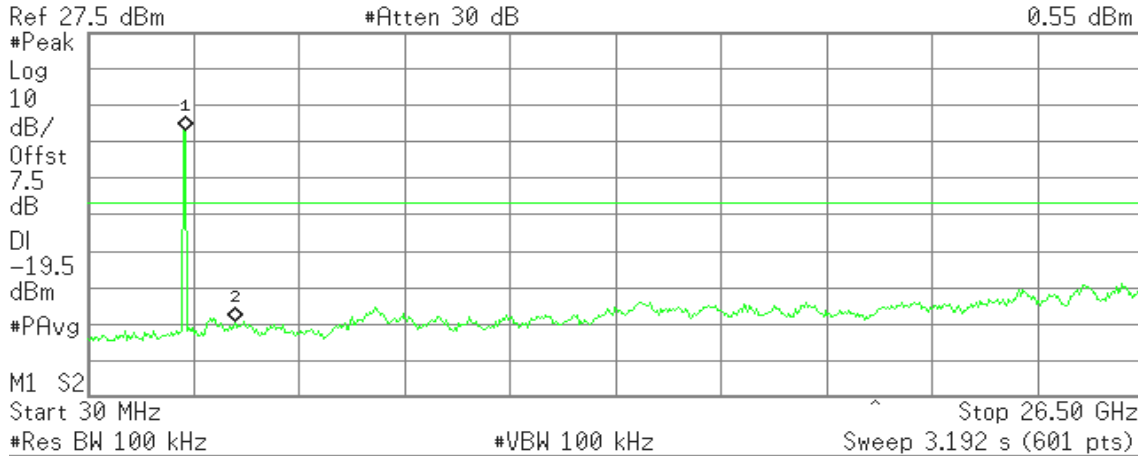


### CH Mid

Agilent

R L

Mkr1 2.46 GHz  
0.55 dBm



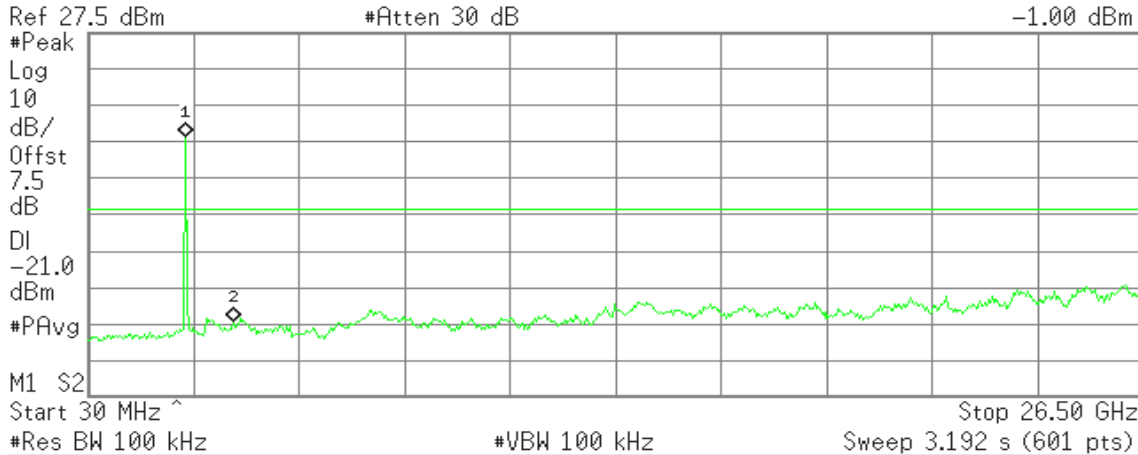
Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.46 GHz	0.55 dBm
2	(1)	Freq	3.74 GHz	-51.55 dBm

### CH High

Agilent

R L

Mkr1 2.46 GHz  
-1.00 dBm



Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.46 GHz	-1.00 dBm
2	(1)	Freq	3.69 GHz	-51.82 dBm



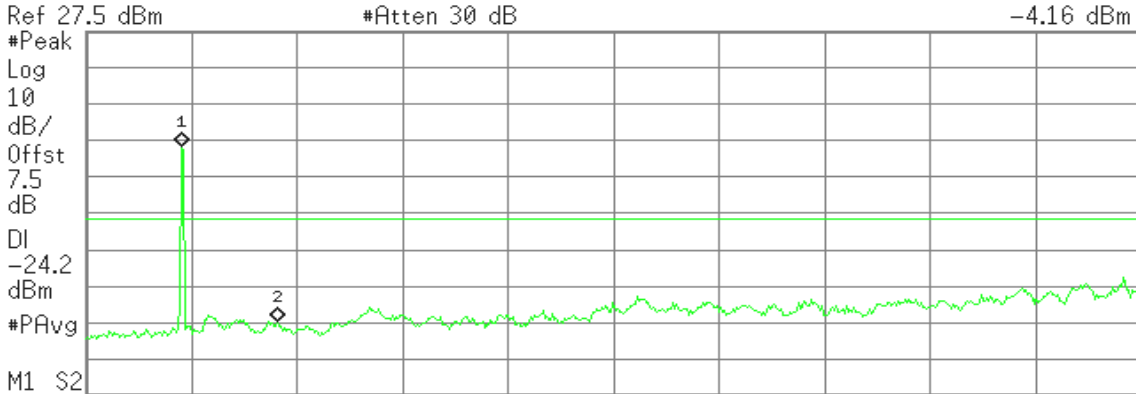
IEEE 802.11n HT40 mode / Chain 0

CH Low

Agilent

R L

Mkr1 2.41 GHz  
-4.16 dBm



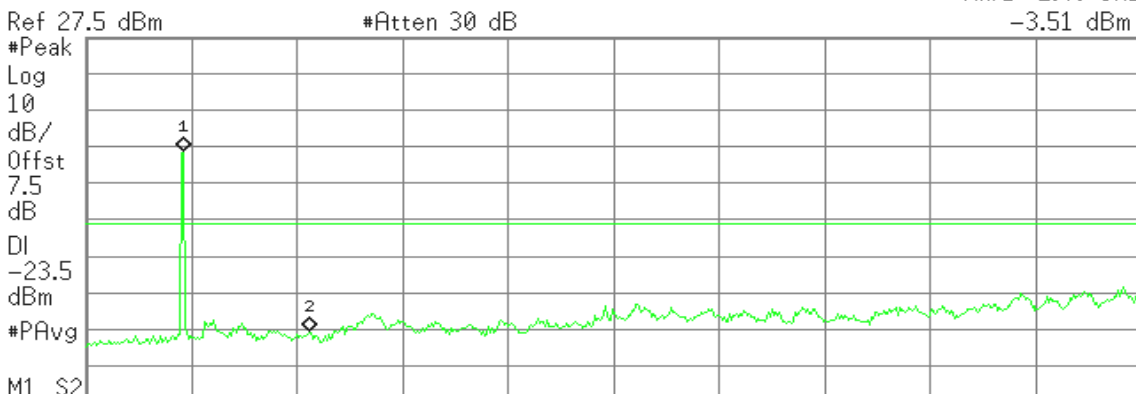
Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.41 GHz	-4.16 dBm
2	(1)	Freq	4.84 GHz	-52.03 dBm

CH Mid

Agilent

R L

Mkr1 2.46 GHz  
-3.51 dBm



Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.46 GHz	-3.51 dBm
2	(1)	Freq	5.63 GHz	-53.01 dBm



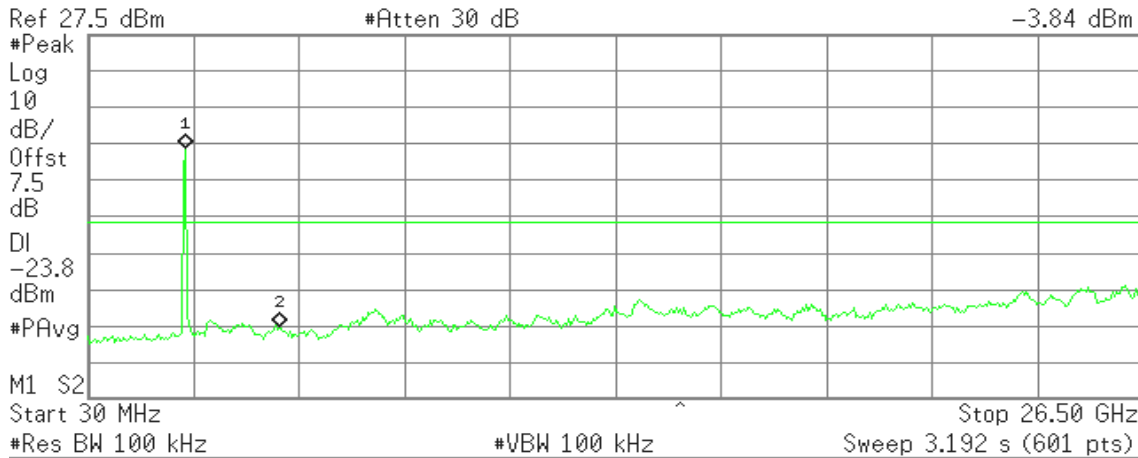


### CH High

Agilent

R L

Mkr1 2.46 GHz  
-3.84 dBm



Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.46 GHz	-3.84 dBm
2	(1)	Freq	4.84 GHz	-52.66 dBm

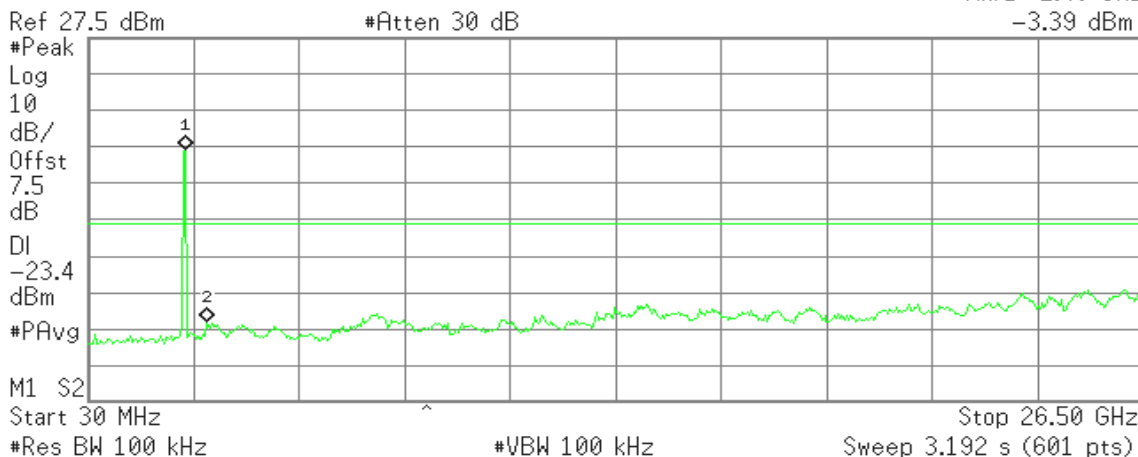
### IEEE 802.11n HT40 mode / Chain 1

#### CH Low

Agilent

R L

Mkr1 2.46 GHz  
-3.39 dBm



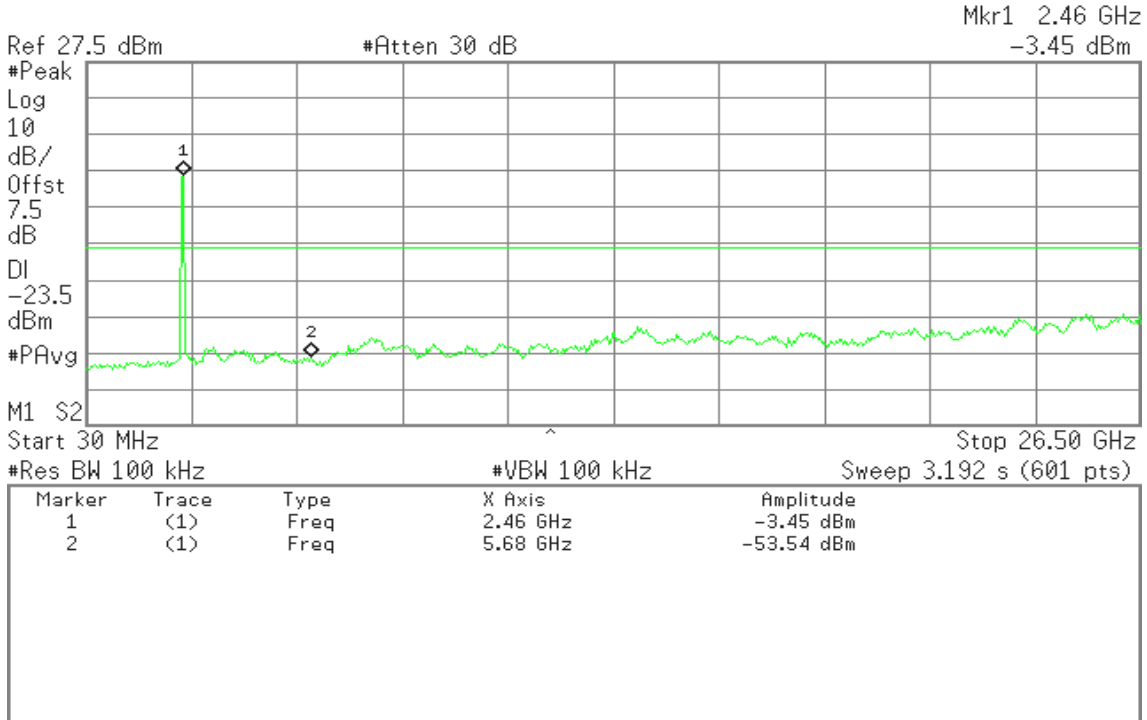
Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.46 GHz	-3.39 dBm
2	(1)	Freq	3.03 GHz	-50.29 dBm



### CH Mid

Agilent

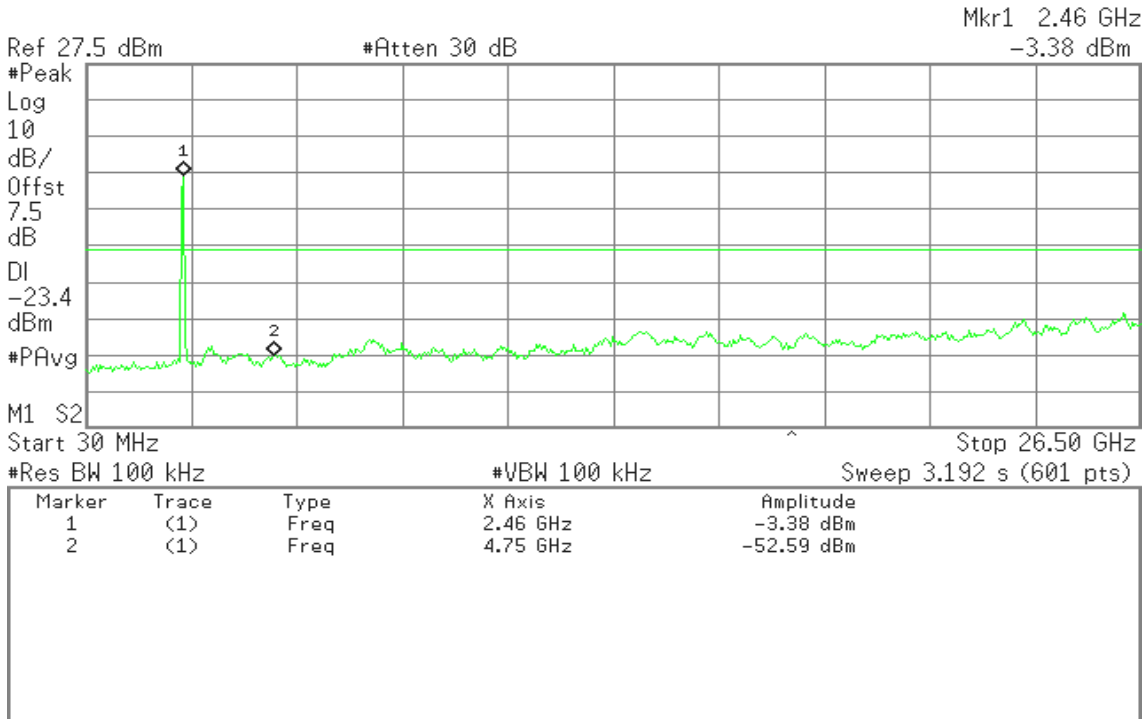
R L



### CH High

Agilent

R L





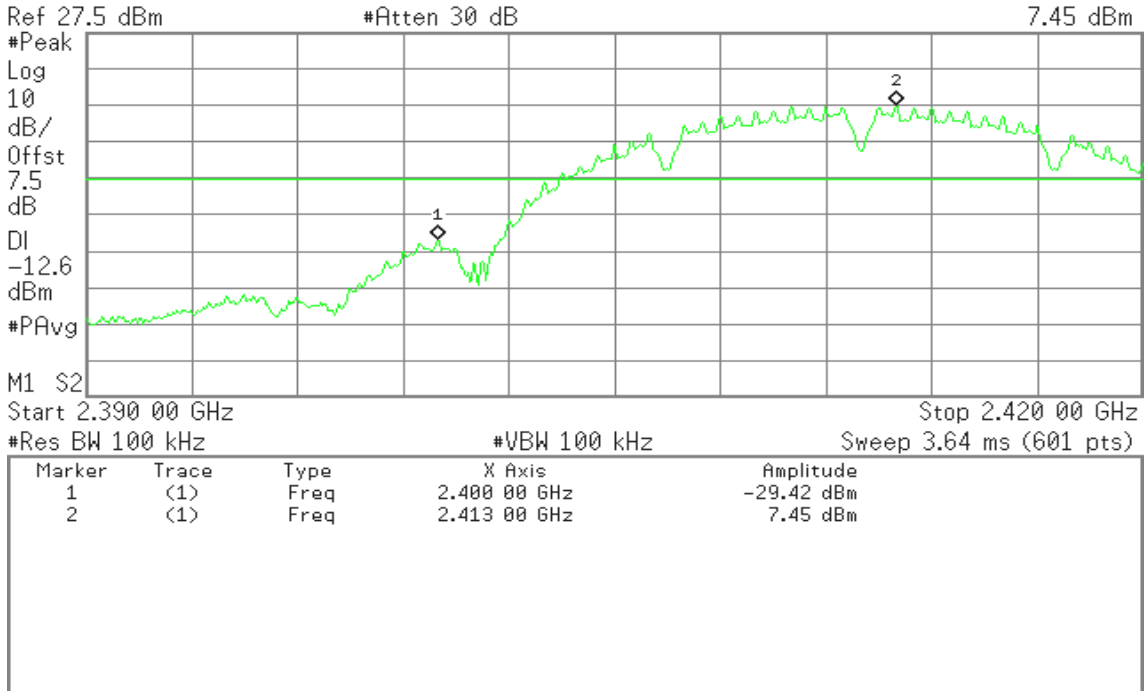
**Conducted band-edge**

**IEEE 802.11b mode**

**CH Low**

Agilent

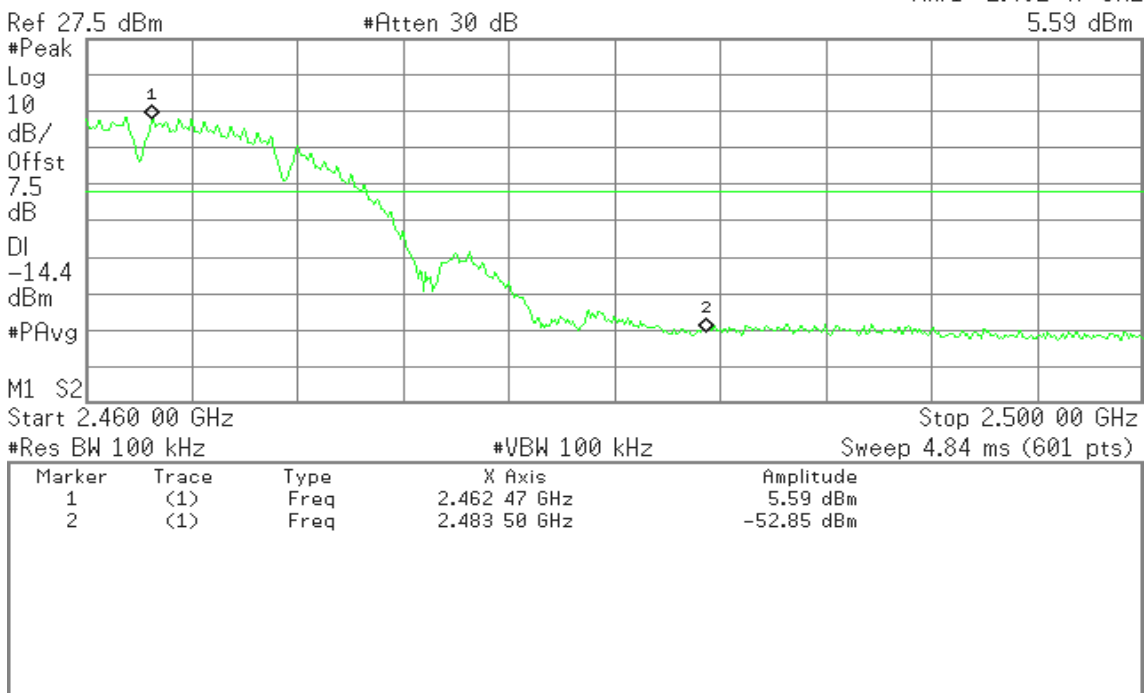
R L



**CH High**

Agilent

R L





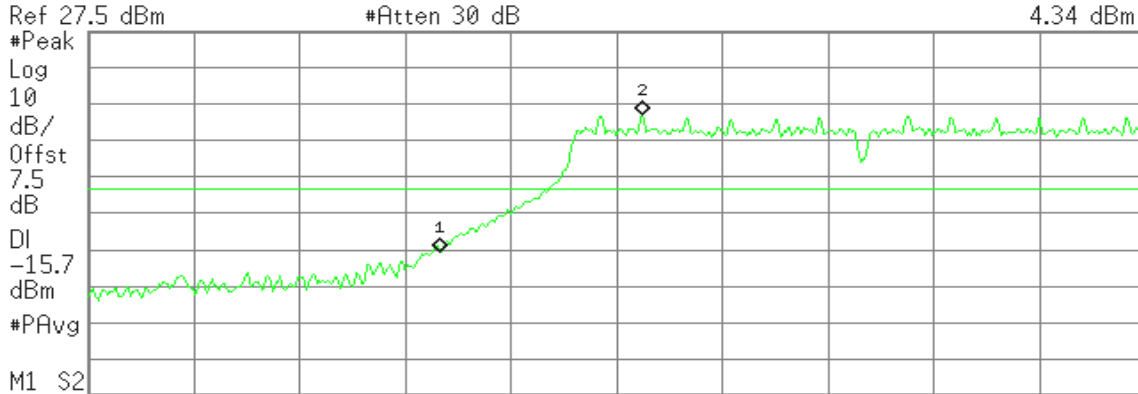
**IEEE 802.11g mode**

**CH Low**

Agilent

R L

Mkr2 2.405 75 GHz  
4.34 dBm



Start 2.390 00 GHz Stop 2.420 00 GHz  
 #Res BW 100 kHz #VBW 100 kHz Sweep 3.64 ms (601 pts)

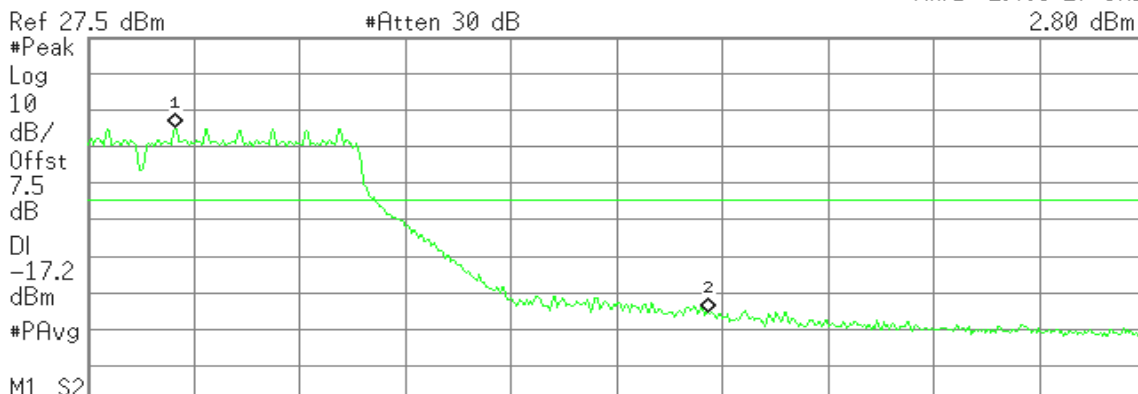
Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.400 00 GHz	-33.23 dBm
2	(1)	Freq	2.405 75 GHz	4.34 dBm

**CH High**

Agilent

R L

Mkr1 2.463 27 GHz  
2.80 dBm



Start 2.460 00 GHz Stop 2.500 00 GHz  
 #Res BW 100 kHz #VBW 100 kHz Sweep 4.84 ms (601 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.463 27 GHz	2.80 dBm
2	(1)	Freq	2.483 50 GHz	-47.78 dBm



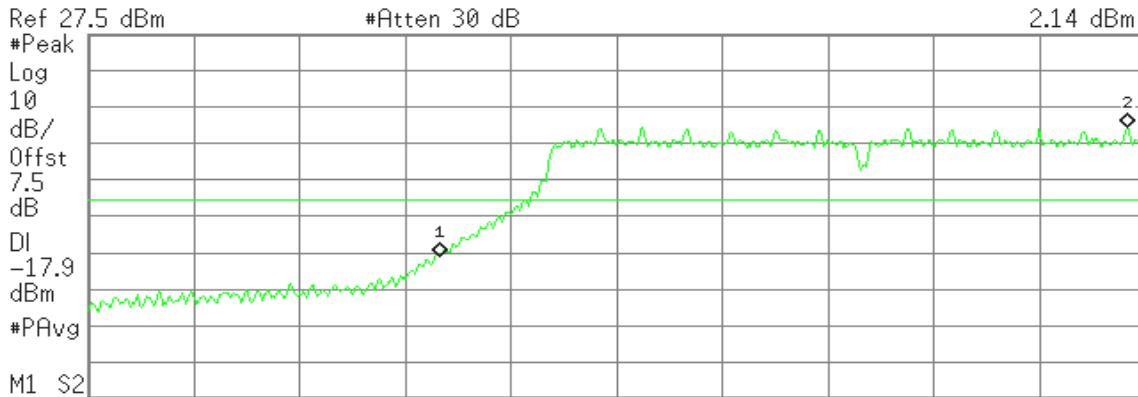
IEEE 802.11n HT20 mode / Chain 0

CH Low

Agilent

R L

Mkr2 2.419 50 GHz  
2.14 dBm



Start 2.390 00 GHz Stop 2.420 00 GHz  
#Res BW 100 kHz #VBW 100 kHz Sweep 3.64 ms (601 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.400 00 GHz	-33.70 dBm
2	(1)	Freq	2.419 50 GHz	2.14 dBm

CH High

Agilent

R L

Mkr1 2.469 53 GHz  
-0.02 dBm



Start 2.460 00 GHz Stop 2.500 00 GHz  
#Res BW 100 kHz #VBW 100 kHz Sweep 4.84 ms (601 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.469 53 GHz	-0.02 dBm
2	(1)	Freq	2.483 50 GHz	-50.58 dBm



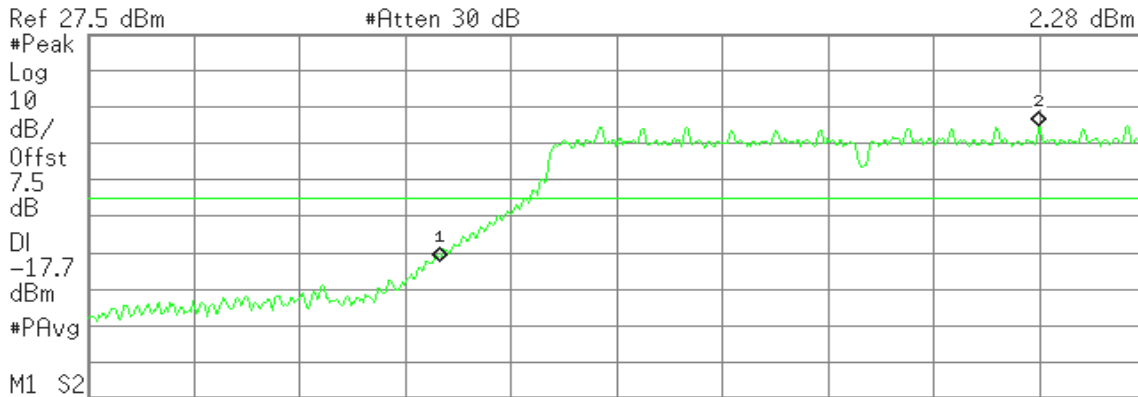
IEEE 802.11n HT20 mode / Chain 1

CH Low

Agilent

R T

Mkr2 2.417 00 GHz  
2.28 dBm



#Atten 30 dB #Res BW 100 kHz #VBW 100 kHz Sweep 3.64 ms (601 pts)

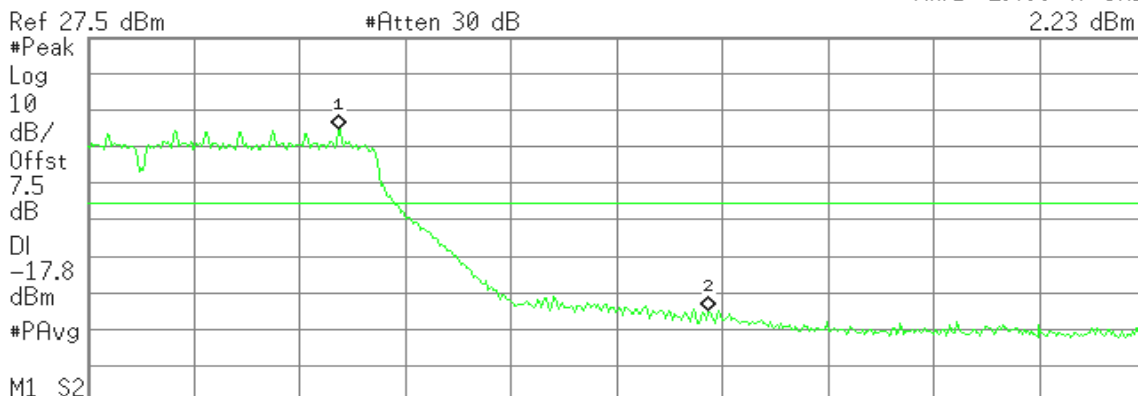
Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.400 00 GHz	-34.72 dBm
2	(1)	Freq	2.417 00 GHz	2.28 dBm

CH High

Agilent

R L

Mkr1 2.469 47 GHz  
2.23 dBm



#Atten 30 dB #Res BW 100 kHz #VBW 100 kHz Sweep 4.84 ms (601 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.469 47 GHz	2.23 dBm
2	(1)	Freq	2.483 50 GHz	-47.40 dBm



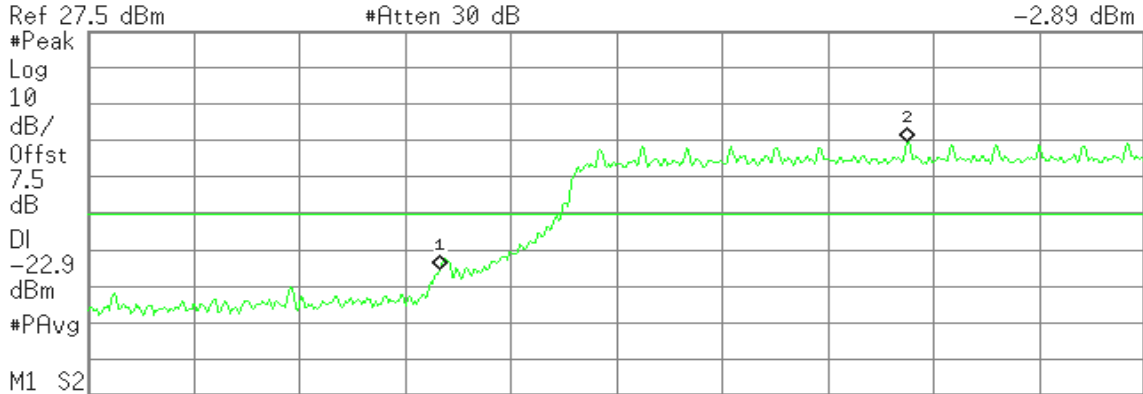
IEEE 802.11n HT40 mode / Chain 0

CH Low

Agilent

R L

Mkr2 2.413 25 GHz  
-2.89 dBm



Start 2.390 00 GHz Stop 2.420 00 GHz  
#Res BW 100 kHz #VBW 100 kHz Sweep 3.64 ms (601 pts)

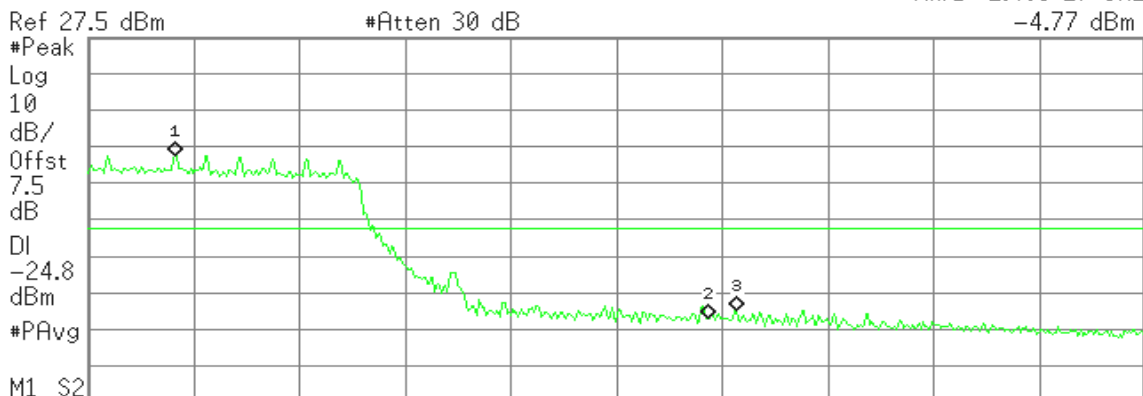
Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.400 00 GHz	-38.02 dBm
2	(1)	Freq	2.413 25 GHz	-2.89 dBm

CH High

Agilent

R L

Mkr1 2.463 27 GHz  
-4.77 dBm



Start 2.460 00 GHz Stop 2.500 00 GHz  
#Res BW 100 kHz #VBW 100 kHz Sweep 4.84 ms (601 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.463 27 GHz	-4.77 dBm
2	(1)	Freq	2.483 50 GHz	-49.69 dBm
3	(1)	Freq	2.484 53 GHz	-47.35 dBm



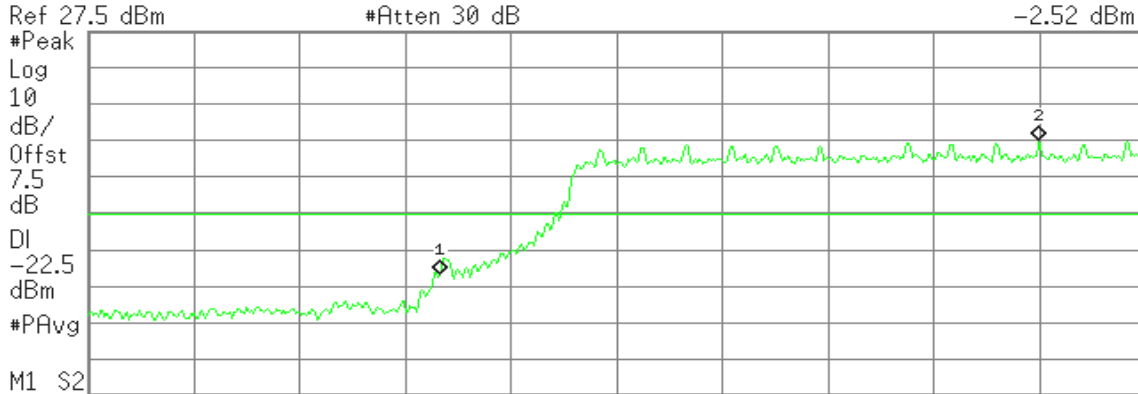
IEEE 802.11n HT40 mode / Chain 1

CH Low

Agilent

R T

Mkr2 2.417 00 GHz -2.52 dBm



Start 2.390 00 GHz Stop 2.420 00 GHz  
 #Res BW 100 kHz #VBW 100 kHz Sweep 3.64 ms (601 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.400 00 GHz	-39.18 dBm
2	(1)	Freq	2.417 00 GHz	-2.52 dBm

CH High

Agilent

R L

Mkr1 2.465 80 GHz -2.78 dBm



Start 2.460 00 GHz Stop 2.500 00 GHz  
 #Res BW 100 kHz #VBW 100 kHz Sweep 4.84 ms (601 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.465 80 GHz	-2.78 dBm
2	(1)	Freq	2.483 50 GHz	-48.92 dBm
3	(1)	Freq	2.489 47 GHz	-45.21 dBm





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

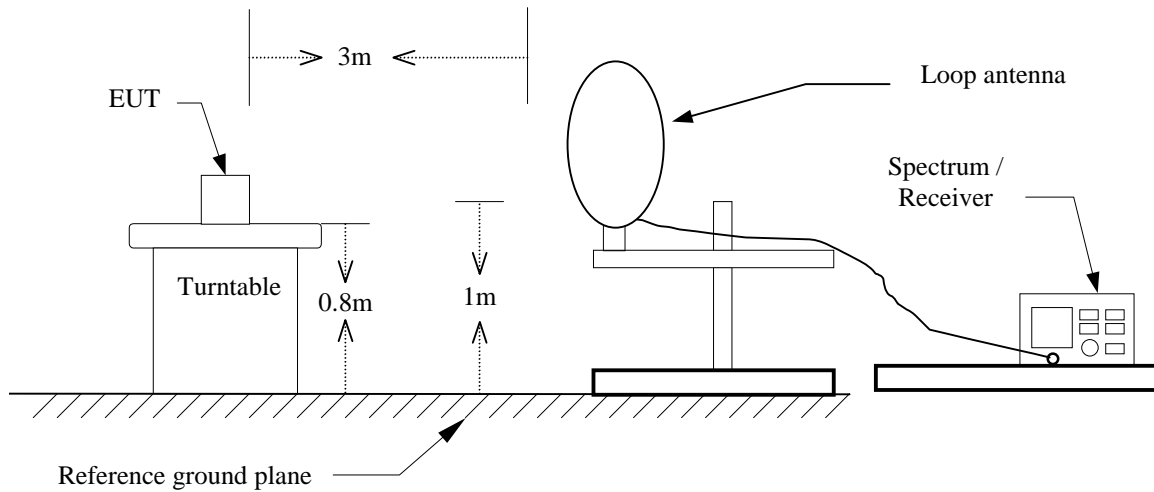
2. In the emission table above, the tighter limit applies at the band edges.

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

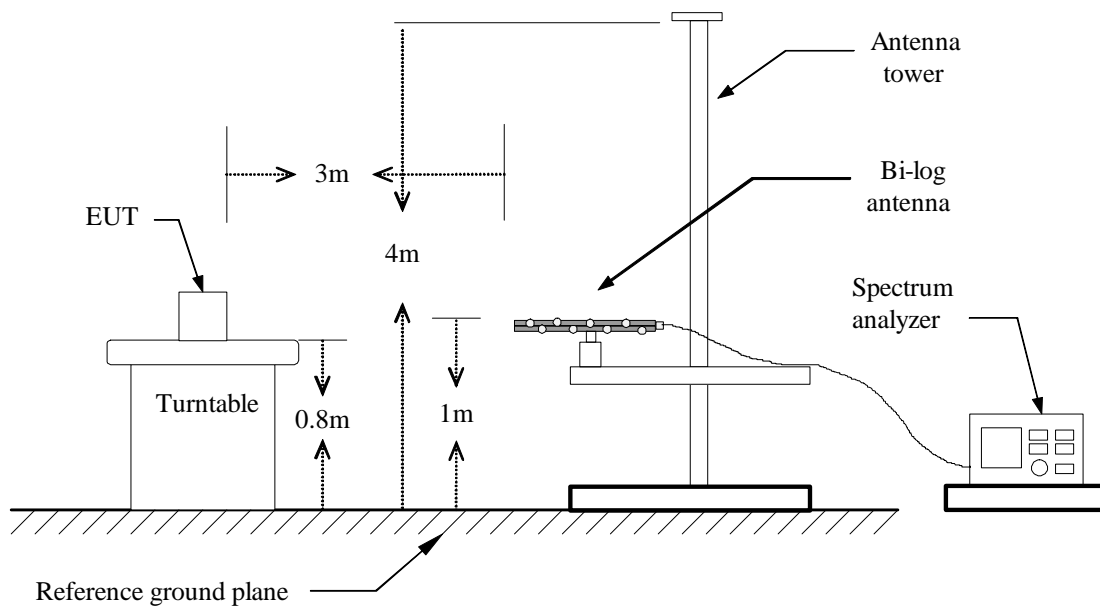


## TEST CONFIGURATION

### 9kHz ~ 30MHz

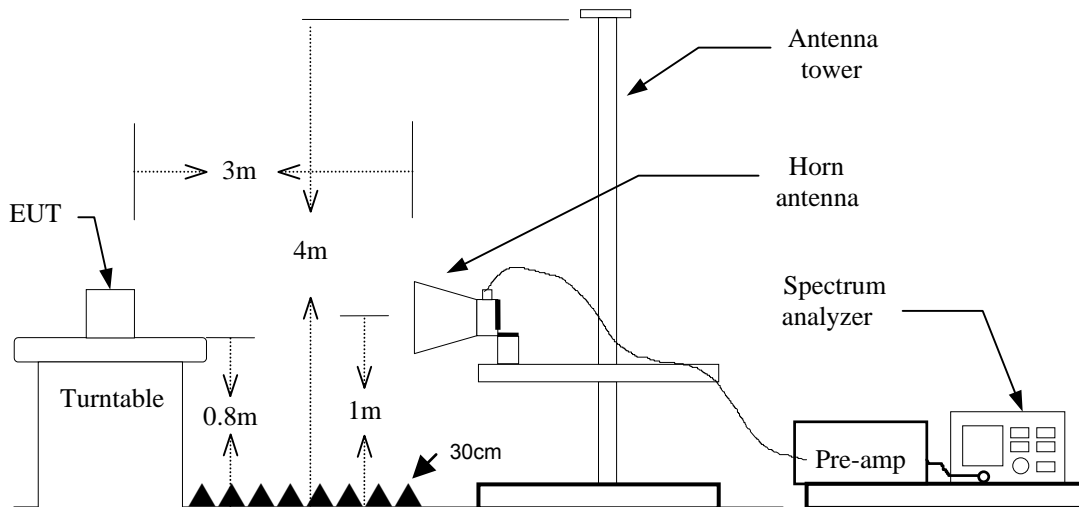


### 30MHz ~ 1GHz





## 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=10kHz / VBW=30kHz / Sweep=AUTO

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

RBW=100kHz / VBW=300KHz / Sweep=AUTO

### **Above 1GHz:**

- a) PEAK: RBW=1MHz / VBW=3MHz / Sweep=AUTO
- b) AVERAGE: RBW=1MHz / VBW=300Hz / 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:** 2014/4/2  
**Temperature:** 26°C                                      **Tested by:** Louis Shen  
**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
32.9800	46.60	-10.69	35.91	40.00	-4.09	V	QP
40.0200	52.40	-14.35	38.05	40.00	-1.95	V	QP
112.5000	38.90	-15.60	23.30	43.50	-20.20	V	QP
246.3100	45.60	-13.81	31.79	46.00	-14.21	V	QP
412.1800	41.10	-10.13	30.97	46.00	-15.03	V	QP
900.0900	38.30	-3.92	34.38	46.00	-11.62	V	QP
30.6200	30.40	-9.36	21.04	40.00	-18.96	H	QP
40.0000	42.55	-14.34	28.21	40.00	-11.79	H	QP
300.0040	44.10	-12.48	31.62	46.00	-14.38	H	QP
362.7400	34.90	-10.87	24.03	46.00	-21.97	H	QP
412.5070	38.60	-10.13	28.47	46.00	-17.53	H	QP
900.0100	39.60	-3.92	35.68	46.00	-10.32	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:** 2014/4/3-7  
**Temperature:** 26°C    **Tested by:** Francis Lee  
**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
1640.000	54.30	-5.13	49.17	74.00	-24.83	V	peak
2252.000	54.72	-1.44	53.28	74.00	-20.72	V	peak
2252.000	42.84	-1.44	41.40	54.00	-12.60	V	AVG
2702.000	55.01	-1.48	53.53	74.00	-20.47	V	peak
2702.000	41.97	-1.48	40.49	54.00	-13.51	V	AVG
3995.000	40.85	3.39	44.24	74.00	-29.76	V	peak
4825.000	51.66	2.68	54.34	74.00	-19.66	V	peak
4825.000	49.12	2.68	51.80	54.00	-2.20	V	AVG
7430.000	39.12	11.37	50.49	74.00	-23.51	V	peak
1394.000	53.95	-7.05	46.90	74.00	-27.10	H	peak
2150.000	53.91	-3.67	50.24	74.00	-23.76	H	peak
2842.000	53.82	-2.16	51.66	74.00	-22.34	H	peak
4385.000	41.51	7.03	48.54	74.00	-25.46	H	peak
4825.000	47.00	5.88	52.88	74.00	-21.12	H	peak
4825.000	45.01	5.88	50.89	54.00	-3.11	H	AVG
7310.000	38.67	11.77	50.44	74.00	-23.56	H	peak

**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 limiter 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: 2014/4/3-7

Temperature: 26°C

Tested by: Francis Lee

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
1354.000	54.85	-7.55	47.30	74.00	-26.70	V	peak
1934.000	54.25	-2.34	51.91	74.00	-22.09	V	peak
2280.000	55.21	-1.51	53.70	74.00	-20.30	V	peak
2280.000	42.44	-1.51	40.93	54.00	-13.07	V	AVG
2850.000	53.88	-1.38	52.50	74.00	-21.50	V	peak
2850.000	41.44	-1.38	40.06	54.00	-13.94	V	AVG
3600.000	41.20	2.93	44.13	74.00	-29.87	V	peak
4875.000	47.50	3.81	51.31	74.00	-22.69	V	peak
7500.000	39.37	11.54	50.91	74.00	-23.09	V	peak
1430.000	55.01	-7.53	47.48	74.00	-26.52	H	peak
2150.000	53.87	-3.67	50.20	74.00	-23.80	H	peak
2836.000	53.61	-2.21	51.40	74.00	-22.60	H	peak
3910.000	41.16	5.18	46.34	74.00	-27.66	H	peak
4875.000	45.11	6.73	51.84	74.00	-22.16	H	peak
7320.000	39.18	11.72	50.90	74.00	-23.10	H	peak

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 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: 2014/4/3-7

Temperature: 26°C

Tested by: Francis Lee

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
1538.000	53.74	-5.08	48.66	74.00	-25.34	V	peak
1998.000	53.16	-1.33	51.83	74.00	-22.17	V	peak
2290.000	55.95	-1.53	54.42	74.00	-19.58	V	peak
2290.000	44.44	-1.53	42.91	54.00	-11.09	V	AVG
2858.000	53.78	-1.26	52.52	74.00	-21.48	V	peak
2858.000	41.60	-1.26	40.34	54.00	-13.66	V	AVG
3625.000	41.37	2.82	44.19	74.00	-29.81	V	peak
4925.000	44.08	4.61	48.69	74.00	-25.31	V	peak
7580.000	38.43	11.84	50.27	74.00	-23.73	V	peak
1422.000	54.11	-7.36	46.75	74.00	-27.25	H	peak
2186.000	54.10	-3.59	50.51	74.00	-23.49	H	peak
2798.000	54.34	-2.50	51.84	74.00	-22.16	H	peak
4330.000	40.18	7.44	47.62	74.00	-26.38	H	peak
4925.000	42.88	7.26	50.14	74.00	-23.86	H	peak
7295.000	38.67	11.75	50.42	74.00	-23.58	H	peak

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 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: 2014/4/3-7

Temperature: 26°C

Tested by: Francis Lee

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
1606.000	54.34	-4.84	49.50	74.00	-24.50	V	peak
1986.000	54.38	-1.52	52.86	74.00	-21.14	V	peak
1986.000	41.01	-1.52	39.49	54.00	-14.51	V	AVG
2262.000	55.19	-1.47	53.72	74.00	-20.28	V	peak
2262.000	42.58	-1.47	41.11	54.00	-12.89	V	AVG
2684.000	55.69	-1.58	54.11	74.00	-19.89	V	peak
2684.000	42.57	-1.58	40.99	54.00	-13.01	V	AVG
3805.000	40.10	3.58	43.68	74.00	-30.32	V	peak
4825.000	47.47	2.68	50.15	74.00	-23.85	V	peak
7570.000	38.97	11.80	50.77	74.00	-23.23	V	peak
1598.000	53.55	-4.80	48.75	74.00	-25.25	H	peak
1988.000	54.30	-1.49	52.81	74.00	-21.19	H	peak
1988.000	41.06	-1.49	39.57	54.00	-14.43	H	AVG
2894.000	54.46	-0.75	53.71	74.00	-20.29	H	peak
2894.000	41.28	-0.75	40.53	54.00	-13.47	H	AVG
3800.000	40.66	3.69	44.35	74.00	-29.65	H	peak
4875.000	46.56	3.81	50.37	74.00	-23.63	H	peak
7625.000	39.61	11.62	51.23	74.00	-22.77	H	peak

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 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: 2014/4/3-7

Temperature: 26°C

Tested by: Francis Lee

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
1598.000	53.55	-4.80	48.75	74.00	-25.25	V	peak
1988.000	54.30	-1.49	52.81	74.00	-21.19	V	peak
1988.000	41.06	-1.49	39.57	54.00	-14.43	V	AVG
2894.000	54.46	-0.75	53.71	74.00	-20.29	V	peak
2894.000	41.28	-0.75	40.53	54.00	-13.47	V	AVG
3800.000	40.66	3.69	44.35	74.00	-29.65	V	peak
4875.000	46.56	3.81	50.37	74.00	-23.63	V	peak
7625.000	39.61	11.62	51.23	74.00	-22.77	V	peak
1410.000	53.17	-7.11	46.06	74.00	-27.94	H	peak
2194.000	53.99	-3.57	50.42	74.00	-23.58	H	peak
2706.000	54.38	-3.32	51.06	74.00	-22.94	H	peak
3785.000	40.08	4.90	44.98	74.00	-29.02	H	peak
4875.000	42.57	6.73	49.30	74.00	-24.70	H	peak
7315.000	38.84	11.74	50.58	74.00	-23.42	H	peak

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 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: 2014/4/3-7

Temperature: 26°C

Tested by: Francis Lee

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
1588.000	53.51	-4.85	48.66	74.00	-25.34	V	peak
2012.000	53.75	-1.57	52.18	74.00	-21.82	V	peak
2012.000	41.06	-1.57	39.49	54.00	-14.51	V	AVG
2296.000	55.07	-1.54	53.53	74.00	-20.47	V	peak
2296.000	43.03	-1.54	41.49	54.00	-12.51	V	AVG
2676.000	54.93	-1.64	53.29	74.00	-20.71	V	peak
2676.000	42.38	-1.64	40.74	54.00	-13.26	V	AVG
3610.000	41.06	2.88	43.94	74.00	-30.06	V	peak
4925.000	44.13	4.61	48.74	74.00	-25.26	V	peak
7535.000	39.05	11.67	50.72	74.00	-23.28	V	peak
1388.000	53.49	-7.21	46.28	74.00	-27.72	H	peak
2212.000	54.27	-3.89	50.38	74.00	-23.62	H	peak
2792.000	53.66	-2.55	51.11	74.00	-22.89	H	peak
3770.000	41.80	4.70	46.50	74.00	-27.50	H	peak
4925.000	40.94	7.26	48.20	74.00	-25.80	H	peak
7430.000	39.95	11.18	51.13	74.00	-22.87	H	peak

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 limiter 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 802.11n HT20 mode / CH Low

Test Date: 2014/4/3-7

Temperature: 26°C

Tested by: Francis Lee

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
1494.000	52.77	-5.34	47.43	74.00	-26.57	V	peak
1974.000	53.31	-1.71	51.60	74.00	-22.40	V	peak
2244.000	54.62	-1.43	53.19	74.00	-20.81	V	peak
2244.000	42.23	-1.43	40.80	54.00	-13.20	V	AVG
2608.000	55.73	-2.11	53.62	74.00	-20.38	V	peak
2608.000	43.93	-2.11	41.82	54.00	-12.18	V	AVG
2854.000	54.25	-1.32	52.93	74.00	-21.07	V	peak
2854.000	41.48	-1.32	40.16	54.00	-13.84	V	AVG
3790.000	40.01	3.57	43.58	74.00	-30.42	V	peak
4825.000	49.14	2.68	51.82	74.00	-22.18	V	peak
7415.000	39.48	11.34	50.82	74.00	-23.18	V	peak
1416.000	53.78	-7.24	46.54	74.00	-27.46	H	peak
2182.000	53.72	-3.60	50.12	74.00	-23.88	H	peak
2816.000	54.25	-2.36	51.89	74.00	-22.11	H	peak
3635.000	41.12	2.77	43.89	74.00	-30.11	H	peak
4825.000	49.52	2.68	52.20	74.00	-21.80	H	peak
4825.000	37.67	2.68	40.35	54.00	-13.65	H	AVG
7535.000	38.63	11.67	50.30	74.00	-23.70	H	peak

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 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 802.11n HT20 mode / CH Mid

Test Date: 2014/4/3-7

Temperature: 26°C

Tested by: Francis Lee

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
1588.000	52.83	-4.85	47.98	74.00	-26.02	V	peak
1998.000	53.42	-1.33	52.09	74.00	-21.91	V	peak
1998.000	42.12	-1.33	40.79	54.00	-13.21	V	AVG
2270.000	54.97	-1.48	53.49	74.00	-20.51	V	peak
2270.000	43.43	-1.48	41.95	54.00	-12.05	V	AVG
2688.000	54.89	-1.55	53.34	74.00	-20.66	V	peak
2688.000	42.80	-1.55	41.25	54.00	-12.75	V	AVG
4195.000	41.32	5.95	47.27	74.00	-26.73	V	peak
4865.000	42.84	6.56	49.40	74.00	-24.60	V	peak
7310.000	38.83	11.77	50.60	74.00	-23.40	V	peak
1948.000	54.21	-6.10	48.11	74.00	-25.89	H	peak
2190.000	53.60	-3.58	50.02	74.00	-23.98	H	peak
2754.000	54.37	-2.89	51.48	74.00	-22.52	H	peak
3800.000	40.36	5.10	45.46	74.00	-28.54	H	peak
4880.000	45.42	6.81	52.23	74.00	-21.77	H	peak
4880.000	37.95	6.81	44.76	54.00	-9.24	H	AVG
7320.000	39.51	11.72	51.23	74.00	-22.77	H	peak

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 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 802.11n HT20 mode / CH High

Test Date: 2014/4/3-7

Temperature: 26°C

Tested by: Francis Lee

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
1542.000	54.37	-5.06	49.31	74.00	-24.69	V	peak
1996.000	52.84	-1.36	51.48	74.00	-22.52	V	peak
2296.000	55.00	-1.54	53.46	74.00	-20.54	V	peak
2296.000	43.13	-1.54	41.59	54.00	-12.41	V	AVG
2706.000	54.85	-1.51	53.34	74.00	-20.66	V	peak
2706.000	43.20	-1.51	41.69	54.00	-12.31	V	AVG
3705.000	41.55	2.53	44.08	74.00	-29.92	V	peak
4925.000	44.06	4.61	48.67	74.00	-25.33	V	peak
5880.000	40.79	6.03	46.82	74.00	-27.18	V	peak
1408.000	53.73	-7.07	46.66	74.00	-27.34	H	peak
2186.000	54.13	-3.59	50.54	74.00	-23.46	H	peak
2824.000	53.98	-2.30	51.68	74.00	-22.32	H	peak
3800.000	40.15	5.10	45.25	74.00	-28.75	H	peak
4920.000	41.78	7.24	49.02	74.00	-24.98	H	peak
7275.000	38.77	11.49	50.26	74.00	-23.74	H	peak

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 limiter 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 802.11n HT40 mode / CH Low

Test Date: 2014/4/3-7

Temperature: 26°C

Tested by: Francis Lee

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
1622.000	54.09	-4.98	49.11	74.00	-24.89	V	peak
1980.000	53.68	-1.62	52.06	74.00	-21.94	V	peak
1980.000	43.13	-1.62	41.51	54.00	-12.49	V	AVG
2920.000	53.50	-0.79	52.71	74.00	-21.29	V	peak
2920.000	42.15	-0.79	41.36	54.00	-12.64	V	AVG
3600.000	41.06	2.93	43.99	74.00	-30.01	V	peak
4845.000	43.46	3.13	46.59	74.00	-27.41	V	peak
7480.000	39.57	11.49	51.06	74.00	-22.94	V	peak
1410.000	53.05	-7.11	45.94	74.00	-28.06	H	peak
2120.000	54.13	-3.74	50.39	74.00	-23.61	H	peak
2858.000	53.16	-2.04	51.12	74.00	-22.88	H	peak
4355.000	40.82	7.25	48.07	74.00	-25.93	H	peak
5970.000	39.27	8.95	48.22	74.00	-25.78	H	peak
7315.000	38.62	11.74	50.36	74.00	-23.64	H	peak

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 limiter 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 802.11n HT40 mode / CH Mid

Test Date: 2014/4/3-7

Temperature: 26°C

Tested by: Francis Lee

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
1620.000	54.59	-4.96	49.63	74.00	-24.37	V	peak
2006.000	54.66	-1.44	53.22	74.00	-20.78	V	peak
2006.000	41.02	-1.44	39.58	54.00	-14.42	V	AVG
2232.000	54.34	-1.40	52.94	74.00	-21.06	V	peak
2232.000	41.55	-1.40	40.15	54.00	-13.85	V	AVG
2704.000	55.44	-1.50	53.94	74.00	-20.06	V	peak
2704.000	42.46	-1.50	40.96	54.00	-13.04	V	AVG
3840.000	41.09	2.80	43.89	74.00	-30.11	V	peak
4875.000	43.63	3.81	47.44	74.00	-26.56	V	peak
7570.000	39.05	11.80	50.85	74.00	-23.15	V	peak
1446.000	54.49	-7.87	46.62	74.00	-27.38	H	peak
2214.000	54.12	-3.95	50.17	74.00	-23.83	H	peak
2714.000	55.10	-3.25	51.85	74.00	-22.15	H	peak
4215.000	42.13	6.23	48.36	74.00	-25.64	H	peak
5910.000	39.44	9.18	48.62	74.00	-25.38	H	peak
7355.000	39.43	11.54	50.97	74.00	-23.03	H	peak

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 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 802.11n HT40 mode / CH High

Test Date: 2014/4/3-7

Temperature: 26°C

Tested by: Francis Lee

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
1576.000	54.24	-4.90	49.34	74.00	-24.66	V	peak
1914.000	54.58	-2.66	51.92	74.00	-22.08	V	peak
2184.000	54.39	-1.69	52.70	74.00	-21.30	V	peak
2184.000	41.36	-1.69	39.67	54.00	-14.33	V	AVG
2870.000	54.80	-1.09	53.71	74.00	-20.29	V	peak
2870.000	41.45	-1.09	40.36	54.00	-13.64	V	AVG
3800.000	40.71	3.69	44.40	74.00	-29.60	V	peak
5345.000	39.90	5.76	45.66	74.00	-28.34	V	peak
7495.000	39.33	11.53	50.86	74.00	-23.14	V	peak
1402.000	53.13	-6.94	46.19	74.00	-27.81	H	peak
2194.000	53.63	-3.57	50.06	74.00	-23.94	H	peak
2796.000	54.19	-2.52	51.67	74.00	-22.33	H	peak
4310.000	40.50	7.59	48.09	74.00	-25.91	H	peak
6360.000	40.80	7.84	48.64	74.00	-25.36	H	peak
7350.000	38.93	11.57	50.50	74.00	-23.50	H	peak

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 limiter 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 30MHz shall not exceed the limits in the following table, as measured using a 50 μH/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 (dBμV)	
	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.

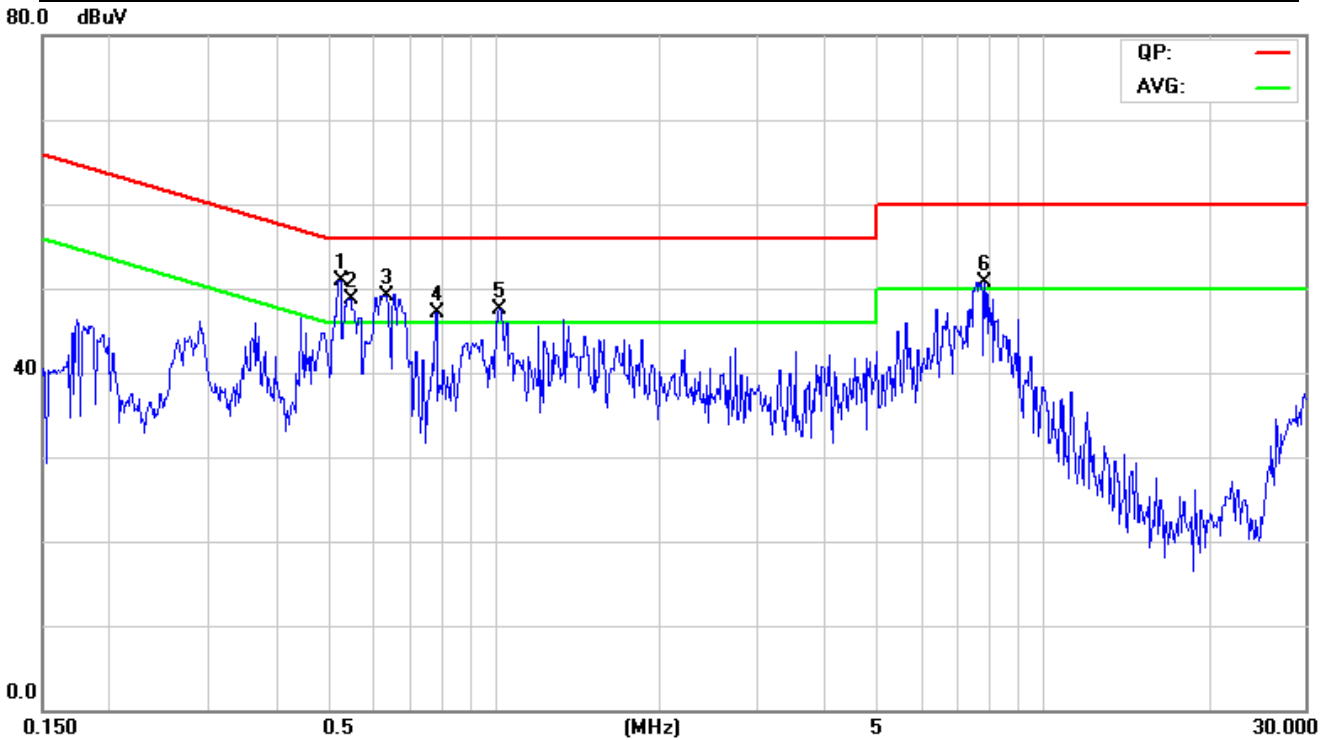
### TEST RESULTS

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>	25°C, 57% RH	<b>Test Date:</b>	2014/4/2
<b>Tested By</b>	Louis Shen	<b>Line</b>	L1

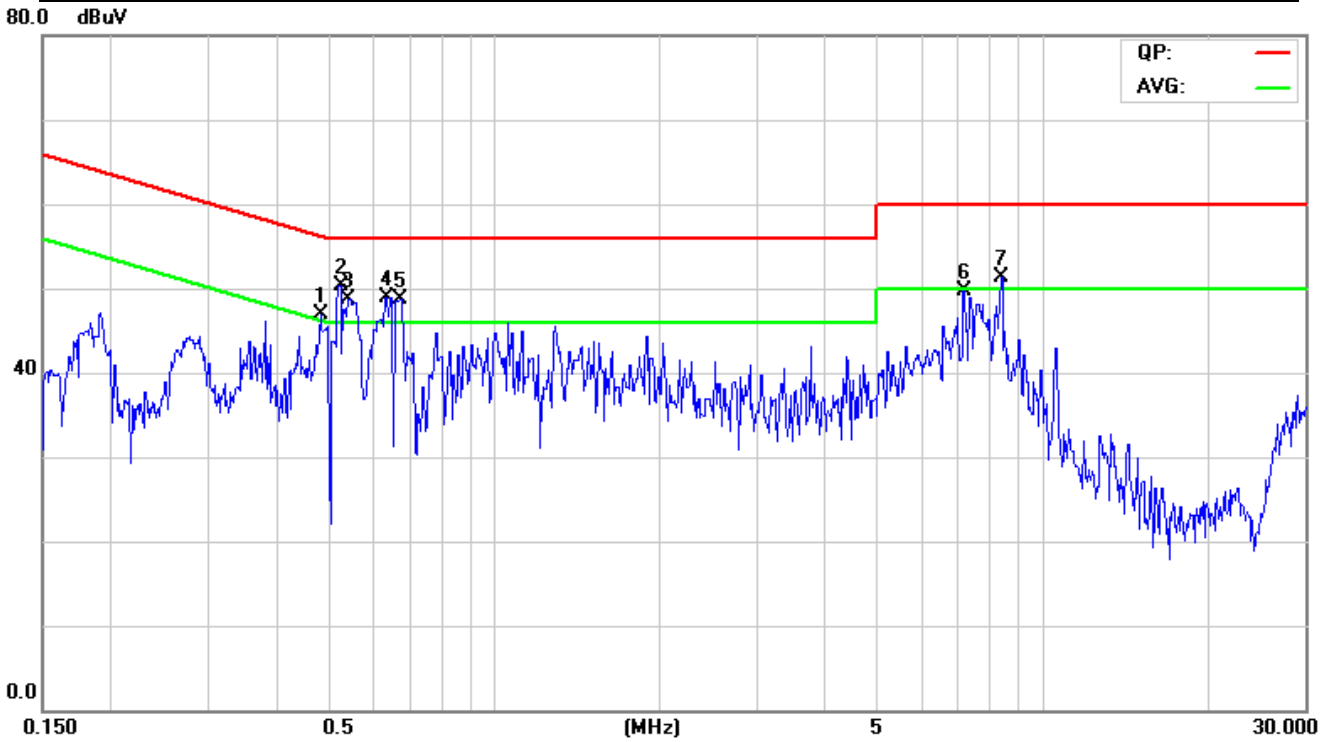


NO.	Frequency (MHz)	QuasiPeak reading (dBuV)	Average reading (dBuV)	Correction factor (dB)	QuasiPeak result (dBuV)	Average result (dBuV)	QuasiPeak limit (dBuV)	Average limit (dBuV)	QuasiPeak margin (dB)	Average margin (dB)	Remark
1	0.5240	35.06	19.30	9.85	44.91	29.15	56.00	46.00	-11.09	-16.85	Pass
2	0.5516	33.64	21.27	9.85	43.49	31.12	56.00	46.00	-12.51	-14.88	Pass
3*	0.6441	35.09	22.43	9.86	44.95	32.29	56.00	46.00	-11.05	-13.71	Pass
4	0.7874	27.86	16.62	9.87	37.73	26.49	56.00	46.00	-18.27	-19.51	Pass
5	1.0149	30.44	17.79	9.89	40.33	27.68	56.00	46.00	-15.67	-18.32	Pass
6	7.7810	30.84	22.20	10.16	41.00	32.36	60.00	50.00	-19.00	-17.64	Pass

**REMARKS:**L1 = Line One (Live Line)



<b>Test Mode</b>	Charging	<b>6dBBandwidth</b>	9 kHz
<b>Environmental Conditions</b>	25°C, 57% RH	<b>Test Date:</b>	2014/4/2
<b>Tested By</b>	Louis Shen	<b>Line</b>	L2



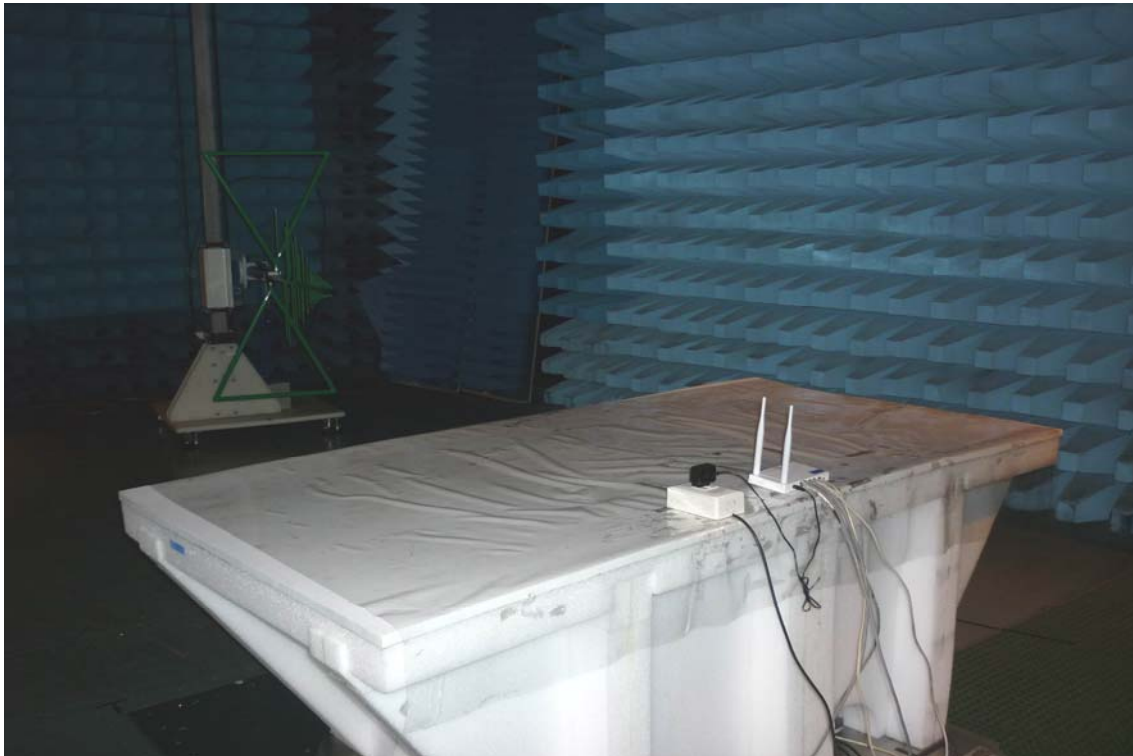
NO.	Frequency (MHz)	QuasiPeak		Correction factor (dB)	Average		QuasiPeak limit (dBuV)	Average limit (dBuV)	QuasiPeak margin (dB)	Average margin (dB)	Remark (Pass/Fail)
		reading (dBuV)	Average reading (dBuV)		result (dBuV)	result (dBuV)					
1	0.4804	30.05	15.20	9.77	39.82	24.97	56.33	46.33	-16.51	-21.36	Pass
2	0.5275	34.91	19.34	9.77	44.68	29.11	56.00	46.00	-11.32	-16.89	Pass
3	0.5441	34.46	21.04	9.77	44.23	30.81	56.00	46.00	-11.77	-15.19	Pass
4*	0.6467	35.67	22.43	9.79	45.46	32.22	56.00	46.00	-10.54	-13.78	Pass
5	0.6725	34.51	18.55	9.79	44.30	28.34	56.00	46.00	-11.70	-17.66	Pass
6	7.0862	29.45	20.91	10.15	39.60	31.06	60.00	50.00	-20.40	-18.94	Pass
7	8.3560	31.22	22.05	10.24	41.46	32.29	60.00	50.00	-18.54	-17.71	Pass

**REMARKS:**L2 = Line Two (Neutral Line)



## 8. APPENDIX I PHOTOGRAPHS OF TEST SETUP

### Radiated Emission Set up Photos Below 1GHz





## Above 1GHz







## Conducted Emission Setup Photos





## Powerline Conducted Emissions Setup Photos





## **APPENDIX 1: PHOTOGRAPHS OF EUT**

**Refer to T140328D05 Photographs.**