



**FCC 47 CFR PART 15 SUBPART C AND ANSI C63.4:2003  
TEST REPORT**

**For**

**Wireless Mini-PCI**

**Model : WMP-N07-5635A1**

**Trade Name : Alpha**

**Issued for**

**Alpha Networks Inc.**

**No.8 Li-shing 7th Rd., Science-based Industrial Park,  
Hsinchu, Taiwan, R.O.C.**

**Issued by**

**Compliance Certification Services Inc.**

**Tainan Laboratory**

**No. 8, Jiu Cheng Ling, Jiaokeng Village, Sinhua  
Township, Tainan Hsien 712, Taiwan R.O.C.**

**TEL: +886-6-580-2201**

**FAX: +886-6-580-2202**

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

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



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## Revision History

Rev.	Issue Date	Revisions	Effect Page	Revised By
00	03/11/2010	Initial Issue	All Page 127	Winnie Chen
01	05/11/2010	Update 6dB BANDWIDTH	Page 13 ~ 25	Winnie Chen



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## 1. TEST REPORT CERTIFICATION

**Applicant** : Alpha Networks Inc.  
**Address** : No.8 Li-shing 7th Rd., Science-based Industrial Park,  
Hsinchu, Taiwan, R.O.C.  
**Equipment Under Test** : Wireless Mini-PCI  
**Model** : WMP-N07-5635A1  
**Trade Name** : Alpha  
**Tested Date** : January 25, 2010 ~ March 10, 2010 ; May 10, 2010

APPLICABLE STANDARD	
Standard	Test Result
FCC Part 15 Subpart C AND ANSI C63.4:2003	PASS

WE HEREBY CERTIFY THAT: The above equipment has been tested by Compliance Certification Services Inc., and found compliance with the requirements set forth in the technical standards mentioned above. The results of testing in this report apply only to the product/system, which was tested. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

**Approved by:**

Jeter Wu  
Section Manager

**Reviewed by:**

Eric Yang  
Senior Engineer



## 2. EUT DESCRIPTION

### 2.1 DESCRIPTION OF EUT & POWER

<b>Product Name</b>	Wireless Mini-PCI
<b>Model Number</b>	WMP-N07-5635A1
<b>Frequency Range</b>	IEEE 802.11b/g, 802.11n HT20 : 2412MHz~2462MHz IEEE 802.11n HT40 : 2422MHz~2452MHz
<b>Transmit Power</b>	IEEE 802.11b : 23.02dBm (0.2004W) IEEE 802.11g : 21.21dBm (0.1321W) IEEE 802.11n HT20 : 20.68dBm (0.1170W) IEEE 802.11n HT40 : 20.55dBm (0.1135W)
<b>Channel Spacing</b>	IEEE 802.11b/g, 802.11n HT20/HT40 : 5MHz
<b>Channel Number</b>	IEEE 802.11b/g : 11 Channels IEEE 802.11n HT40 : 7 Channels
<b>Transmit Data Rate</b>	IEEE 802.11b : 11, 5.5, 2, 1 Mbps IEEE 802.11g : 54, 48, 36, 24, 18, 12, 9, 6 Mbps IEEE 802.11n HT20: 130, 117, 104, 78, 65, 58.5, 52, 39, 26, 19.5, 13, 6.5 Mbps IEEE 802.11n HT40: 270, 243, 216, 162, 135, 121.5, 108, 81, 54, 40.5, 27, 13.5Mbps
<b>Type of Modulation</b>	IEEE 802.11b : DSSS (CCK, DQPSK, DBPSK) IEEE 802.11g : OFDM (64QAM, 16QAM, QPSK, BPSK) IEEE 802.11n HT20/40 : OFDM (64QAM, 16QAM, QPSK, BPSK)
<b>Antenna Type</b>	RF PCB Antenna x 2, Antenna Gain 1.9dBi Connector : I-PEX MHF-1 Plug for RG-178 (20278-112r-18)
<b>Power Source</b>	3.3 VDC (From Notebook PC, Powered From Host Device)
<b>Note</b>	Ralink RF Module Model : RT2820 + RT2860

**Remark :**

1. The sample selected for test was engineering sample that approximated to production product and was provided by manufacturer.
2. For more details, please refer to the User's manual of the EUT.
3. This submittal(s) (test report) is intended for FCC ID: RRK20105635A1 filing to comply with Section 15.207, 15.209 and 15.247 of the FCC Part 15, Subpart C Rules.



### 3. DESCRIPTION OF TEST MODES

The EUT is an 802.11n MIMO transceiver in Mini-PCI module form factor. It has two transmitter chains and two receive chains (2 × 2 configurations). The 2 × 2 configuration is implemented with two outside chains (Chain 0 and 1).

802.11b/g mode, only examines Chain 0, because only Chain 0 is functional according to the user diver of Ralink. The power is transmitted from TX0 only at 11b/g normal mode in Ralink solution.

The RF chipset is manufactured by Ralink Technology, Corp.

#### **IEEE 802.11b, 802.11g, 802.11n HT20 mode**

The EUT had been tested under operating condition.

There are three channels have been tested as following :

Channel	Frequency (MHz)
Low	2412
Middle	2437
High	2462

IEEE 802.11b mode : 11Mbps data rate (worst case) were chosen for full testing.

IEEE 802.11g mode : 6Mbps data rate (worst case) were chosen for full testing.

IEEE 802.11n HT20 mode : 6.5Mbps data rate (worst case) were chosen for full testing.

#### **IEEE 802.11n HT40 mode**

The EUT had been tested under operating condition.

There are three channels have been tested as following :

Channel	Frequency (MHz)
Low	2422
Middle	2437
High	2452

IEEE 802.11n HT40 mode : 13.5Mbps data rate (worst case) were chosen for full testing.

### 4. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4 : 2003 and FCC CFR 47, 15.207, 15.209 and 15.247.



## **5. FACILITIES AND ACCREDITATION**

### **5.1 FACILITIES**

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

No. 8, Jiu Cheng Ling, Jiaokeng Village, Sinhua Township, Tainan Hsien 712, Taiwan R.O.C.

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 : 2003 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 preselectors 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	FCC	3/10 meter Open Area Test Sites to perform FCC Part 15/18 measurements	 FCC MRA: TW-1037
Japan	VCCI	3/10 meter Open Area Test Sites to perform conducted/radiated measurements	 C-2882 ; R-2635
Taiwan	TAF	CISPR 11, FCC METHOD-47 CFR Part 18, EN 55011, EN 60601-1-2, CISPR 22, CNS 13438, EN 55022, EN 55024, AS/NZS CISPR 22 CISPR 14, EN 55014-1, EN 55014-2, CNS 13783-1, CISPR 22, CNS 13439, EN 55013, FCC Method-47 CFR Part 15 Subpart B, IC ICES-003, VCCI V-3 & V-4 FCC Method-47 CFR Part 15 Subpart C and ANSI C63.4, LP 0002 EN / IEC 61000-4-2 / -3 / -4 / -5 / -6 / -8 / -11 EN 61000-3-2, EN 61000-3-3 EN 61000-6-3, EN 61000-6-1, AS/NZS 4251.1, EN 61000-6-4, EN 61000-6-2, AS/NZS 4251.2, EN 61204-3, EN 50130-4, EN 62040-2, EN 50371, EN 50385, AS/NZS 4268, ETSI EN 300 386 ETSI EN 300 328, ETSI EN 301 489-1/-3/-9/-17 ETSI EN 301 893, ETSI EN 300 220-2/-1 ETSI EN 300 440-2/-1 ETSI EN 301 357-2/-1 RSS-310, RSS-210 Issue 7, RSS-Gen Issue 2	
Taiwan	BSMI	CNS 13438, CNS 13783-1, CNS13439	 SL2-IN-E-0039 SL2-R1/R2-0039 SL2-A1-E-0039
Canada	Industry Canada	RSS210, Issue 7	 IC 2324H-1

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



## 6. CALIBRATION AND UNCERTAINTY

### 6.1 MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

### 6.2 MEASUREMENT UNCERTAINTY

The following table is for the measurement uncertainty, which is calculated as per the document CISPR 16-4.

PARAMETER	UNCERTAINTY
Semi Anechoic Chamber (966 Chamber) / Radiated Emission, 30 to 200 MHz	+/- 3.6878
Semi Anechoic Chamber (966 Chamber) / Radiated Emission, 200 to 1000 MHz	+/- 3.0885
Semi Anechoic Chamber (966 Chamber) / Radiated Emission, 1 to 26.5GHz	+/- 3.2000
Conducted Emission	+/- 1.7468

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



## 7. SETUP OF EQUIPMENT UNDER TEST

### SUPPORT EQUIPMENT

No.	Product	Manufacturer	Model No.	Serial No.	FCC ID
1	Notebook PC	DELL	Latitude D610	CN-0C4708-48643-625-5565	E2K24BNHM
2	Notebook PC	HP	nx6130	CNU543274R	CNTWM3B2200BGA
3	Wireless Access Point	D-Link	DWL-7100AP	DQ6114B00002	KA22003040018-1
4	Modem	ZyXEL	Omni 56K	S1Z4107727	1880MN156K
5	Printer	HP	hp desk jet 948c	CN19S6S1XS	DoC
6	Mouse	KINYO	KM-770	0804	DoC

### SETUP DIAGRAM FOR TESTS

EUT & peripherals setup diagram is shown in appendix setup photos.

### EUT OPERATING CONDITION

#### **RF Mode**

1. Set up all computers like the setup diagram.
2. The "Ralink QA Test Program for RT 2860 ver1.0.0.2" software was used for testing.

The EUT driver software installed in the host support equipment during testing was RT2860 QATEST PCI WDM Driver.

(1) TX Mode:

- ⇒ Tx Data Rate: MCS=3; LP 11Mbps Bandwidth 20 (IEEE 802.11b mode)  
MCS=0; 6Mbps Bandwidth 20 (IEEE 802.11g mode)  
MCS=0; 6.5Mbps Bandwidth 20 (IEEE 802.11n HT20 mode)  
MCS=0; 6.5Mbps Bandwidth 40 (IEEE 802.11n HT40 mode)

⇒ Power control

- IEEE 802.11b Channel Low (2412MHz) TX Power0 08 (only chain0 TX)
- IEEE 802.11b Channel Mid (2437MHz) TX Power0 0F (only chain0 TX)
- IEEE 802.11b Channel High (2462MHz) TX Power0 09 (only chain0 TX)
- IEEE 802.11g Channel Low (2412MHz) TX Power0 0B (only chain0 TX)
- IEEE 802.11g Channel Mid (2437MHz) TX Power0 11 (only chain0 TX)
- IEEE 802.11g Channel High (2462MHz) TX Power0 0F (only chain0 TX)



IEEE 802.11n HT20 Channel Low (2412MHz) TX Power0 09 / TX Power1 13  
IEEE 802.11n HT20 Channel Mid (2437MHz) TX Power0 0A / TX Power1 12  
IEEE 802.11n HT20 Channel High (2462MHz) TX Power0 0B / TX Power1 12  
IEEE 802.11n HT40 Channel Low (2422MHz) TX Power0 06 / TX Power1 0F  
IEEE 802.11n HT40 Channel Mid (2437MHz) TX Power0 0B / TX Power1 12  
IEEE 802.11n HT40 Channel High (2452MHz) TX Power0 06 / TX Power1 0D

(2) RX Mode : Start RX

3. All of the function are under run.
4. Start test.

### **Normal Mode**

1. Set up all computers like the setup diagram.
2. All of the function are under run.
3. Notebook PC (2) ping 192.168.0.10 –t to Notebook PC (1).
4. Notebook PC (1) ping 192.168.0.20 –t to Notebook PC (2).
5. Notebook PC (1) ping 192.168.0.50 –t to Wireless Access Point (3).
6. Start test.



## 8. FCC PART 15.247 REQUIREMENTS

### 8.1 6dB BANDWIDTH

#### LIMITS

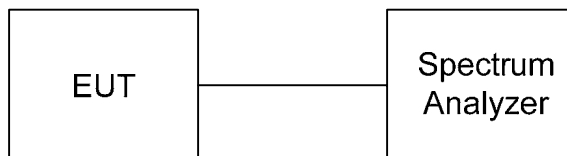
§ 15.247(a) (2) For direct sequence systems, the minimum 6dB bandwidth shall be at least 500kHz.

#### TEST EQUIPMENT

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	AGILENT	E4446A	MY43360132	06/09/2010
Spectrum Analyzer	AGILENT	E4446A	MY46180323	05/26/2010

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

#### TEST SETUP



#### TEST PROCEDURE

The transmitter output was connected to a spectrum analyzer. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 100 KHz RBW and 300 KHz VBW. The 6dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 6dB.

**TEST RESULTS****IEEE 802.11b Mode**

Channel	Channel Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (kHz)	Pass / Fail
Low	2412	12.50	500	PASS
Middle	2437	12.17	500	PASS
High	2462	12.50	500	PASS

**IEEE 802.11g Mode**

Channel	Channel Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (kHz)	Pass / Fail
Low	2412	16.67	500	PASS
Middle	2437	16.58	500	PASS
High	2462	16.58	500	PASS

**IEEE 802.11n HT20 Mode (Two TX)**

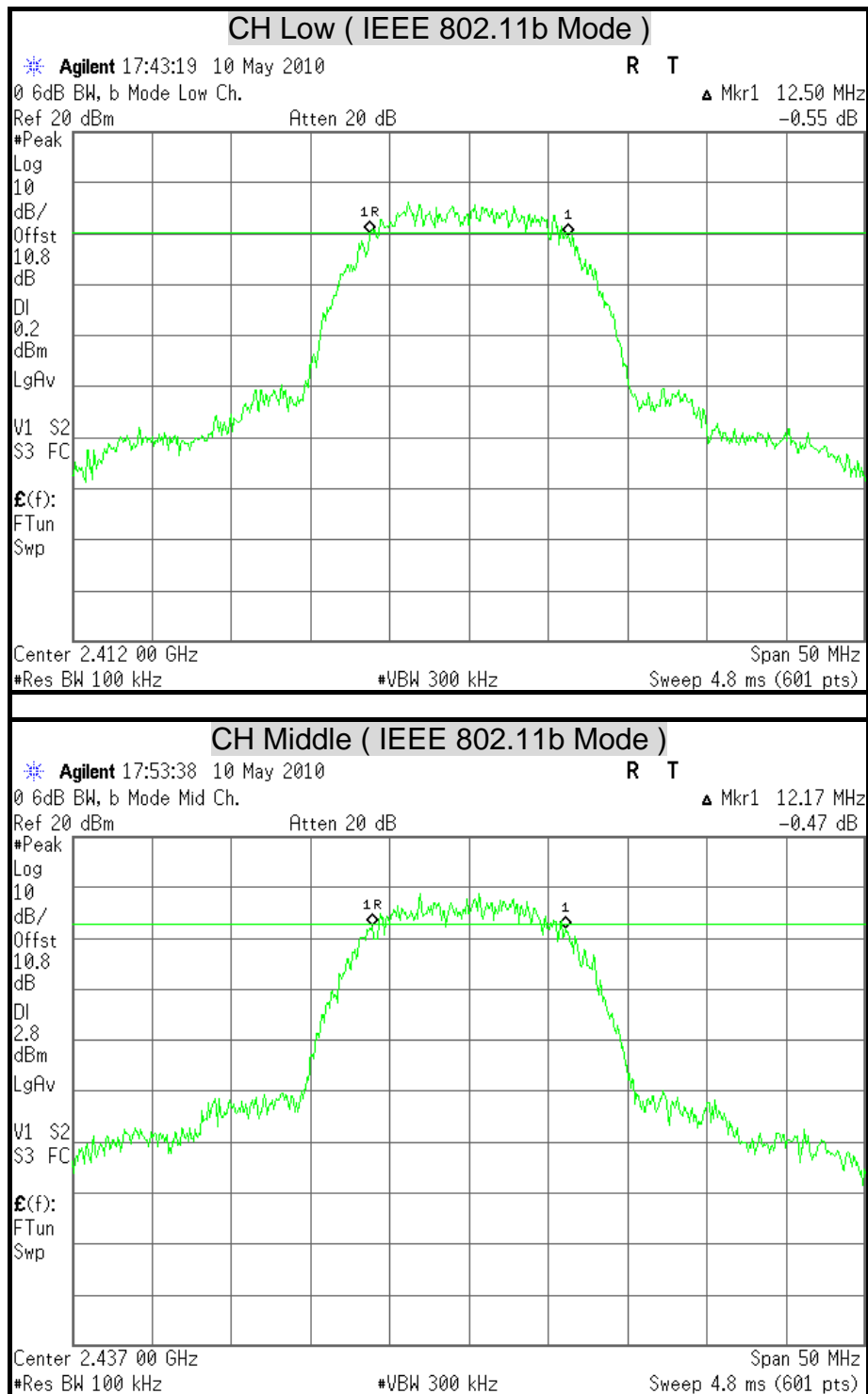
Channel	Channel Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (kHz)	Pass / Fail
		Chain 0	Chain 1		
Low	2412	17.83	17.83	500	PASS
Middle	2437	17.75	17.83	500	PASS
High	2462	17.83	17.83	500	PASS

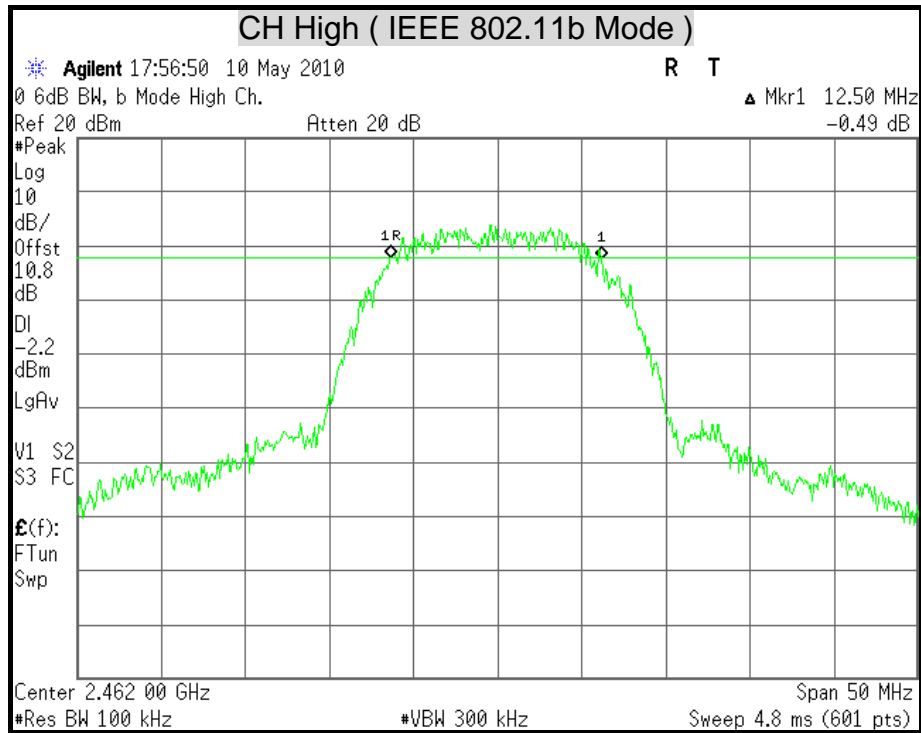
**IEEE 802.11n HT40 Mode (Two TX)**

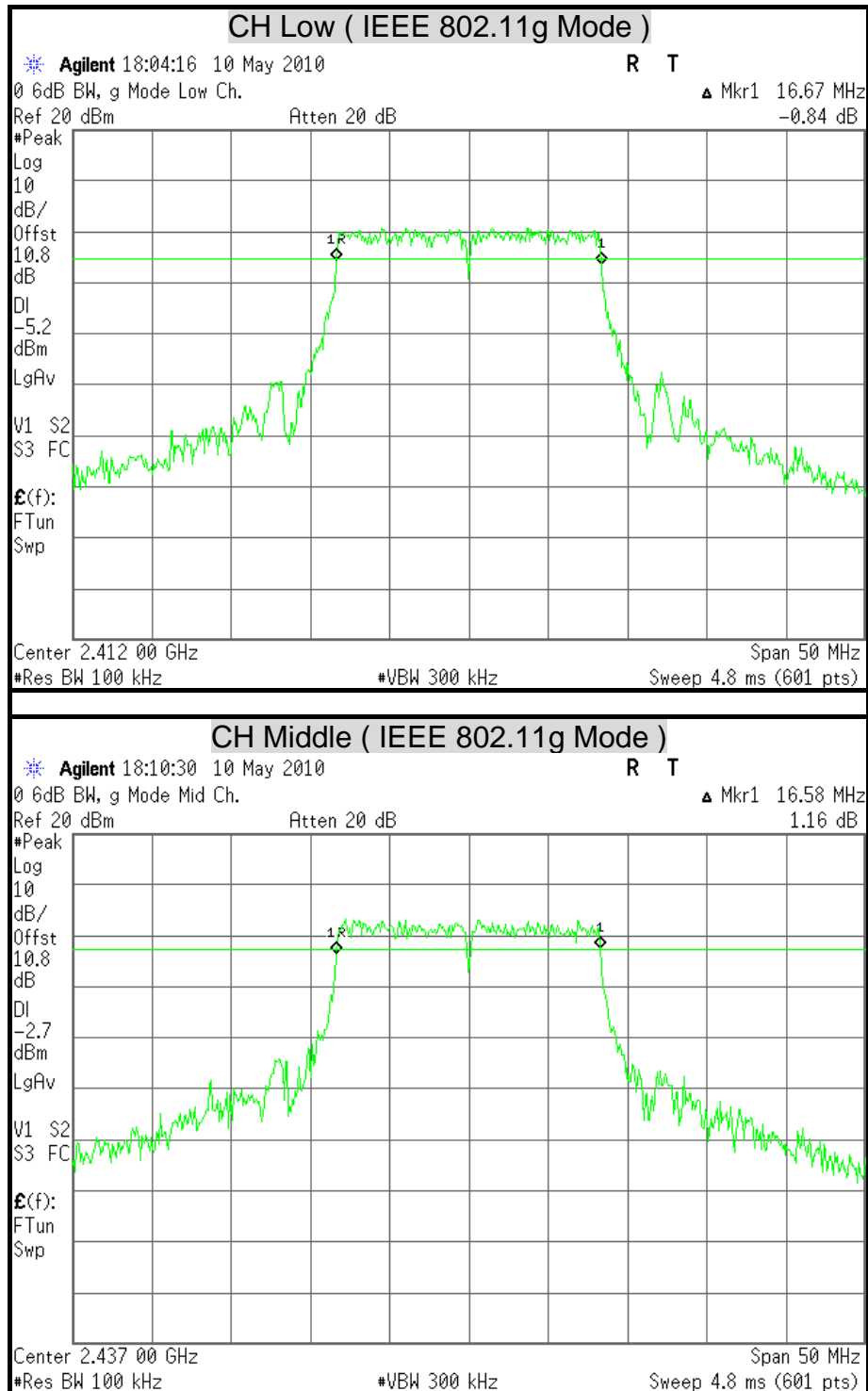
Channel	Channel Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (kHz)	Pass / Fail
		Chain 0	Chain 1		
Low	2422	36.50	36.50	500	PASS
Middle	2437	36.50	36.50	500	PASS
High	2452	36.50	36.50	500	PASS

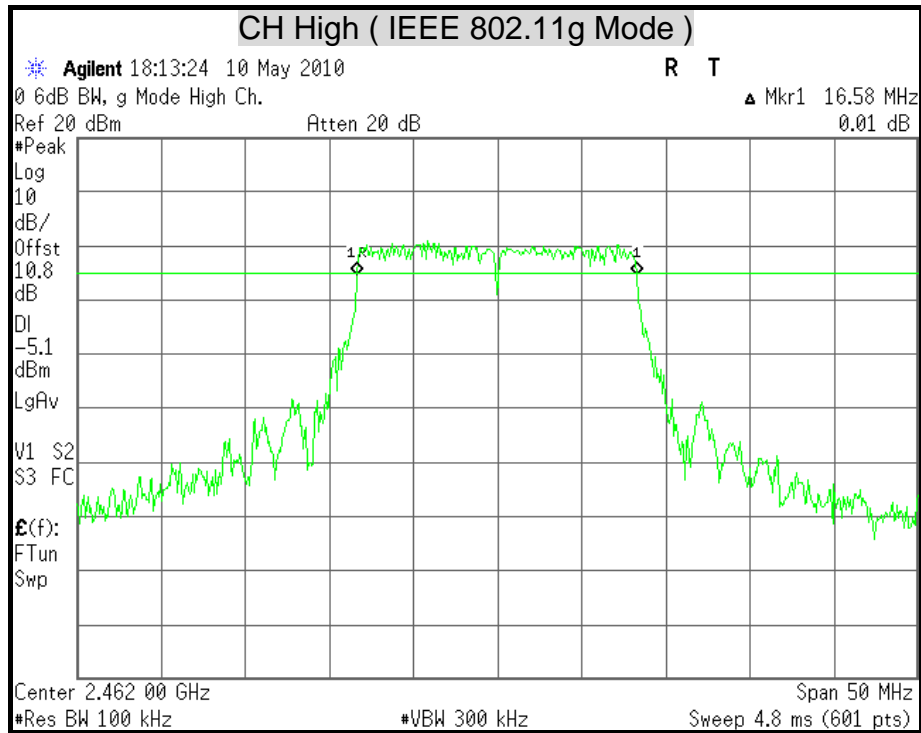


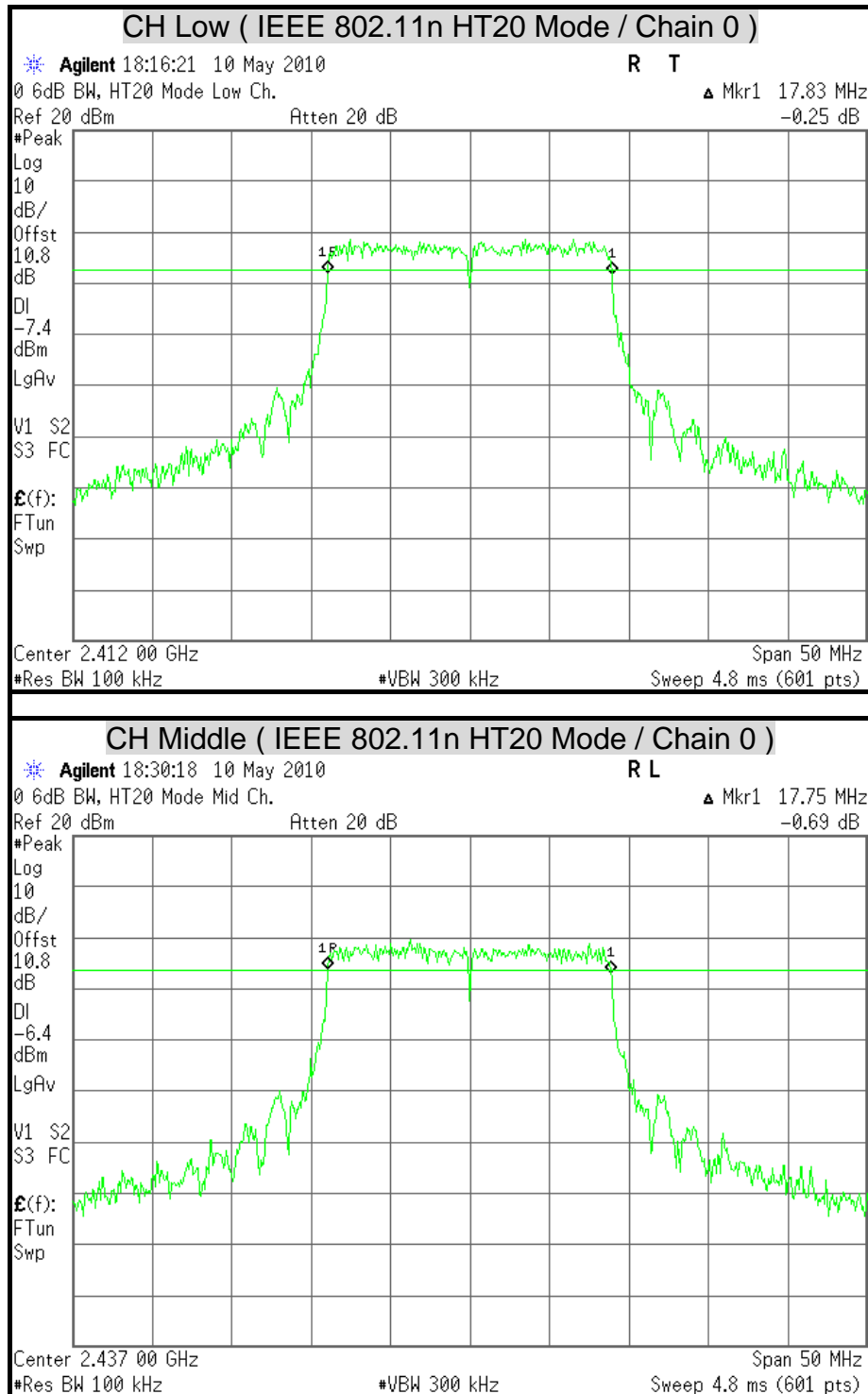
## 6dB BANDWIDTH

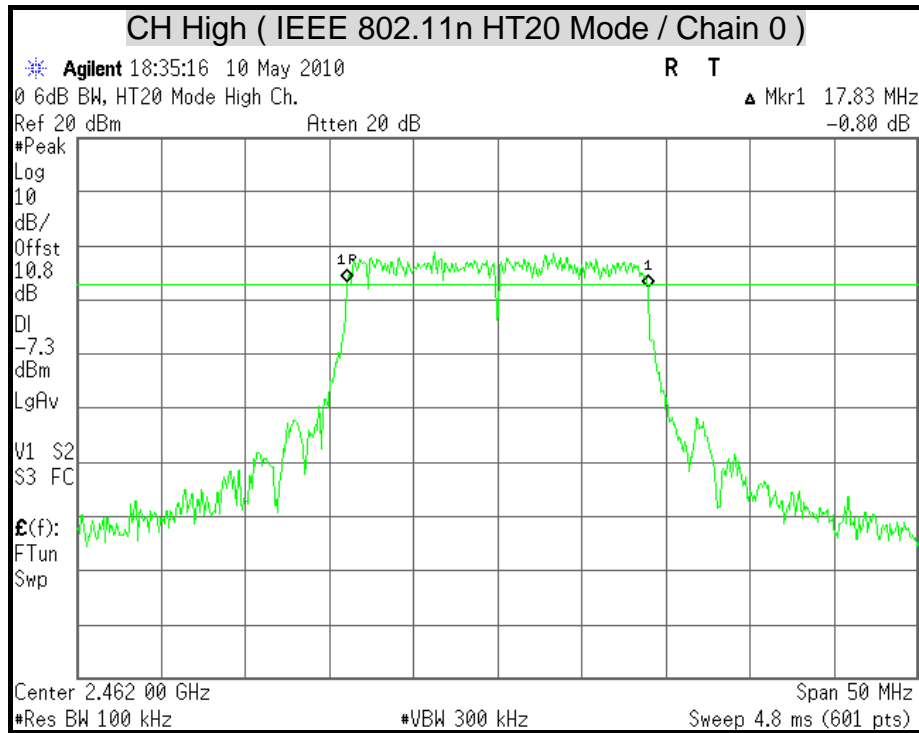


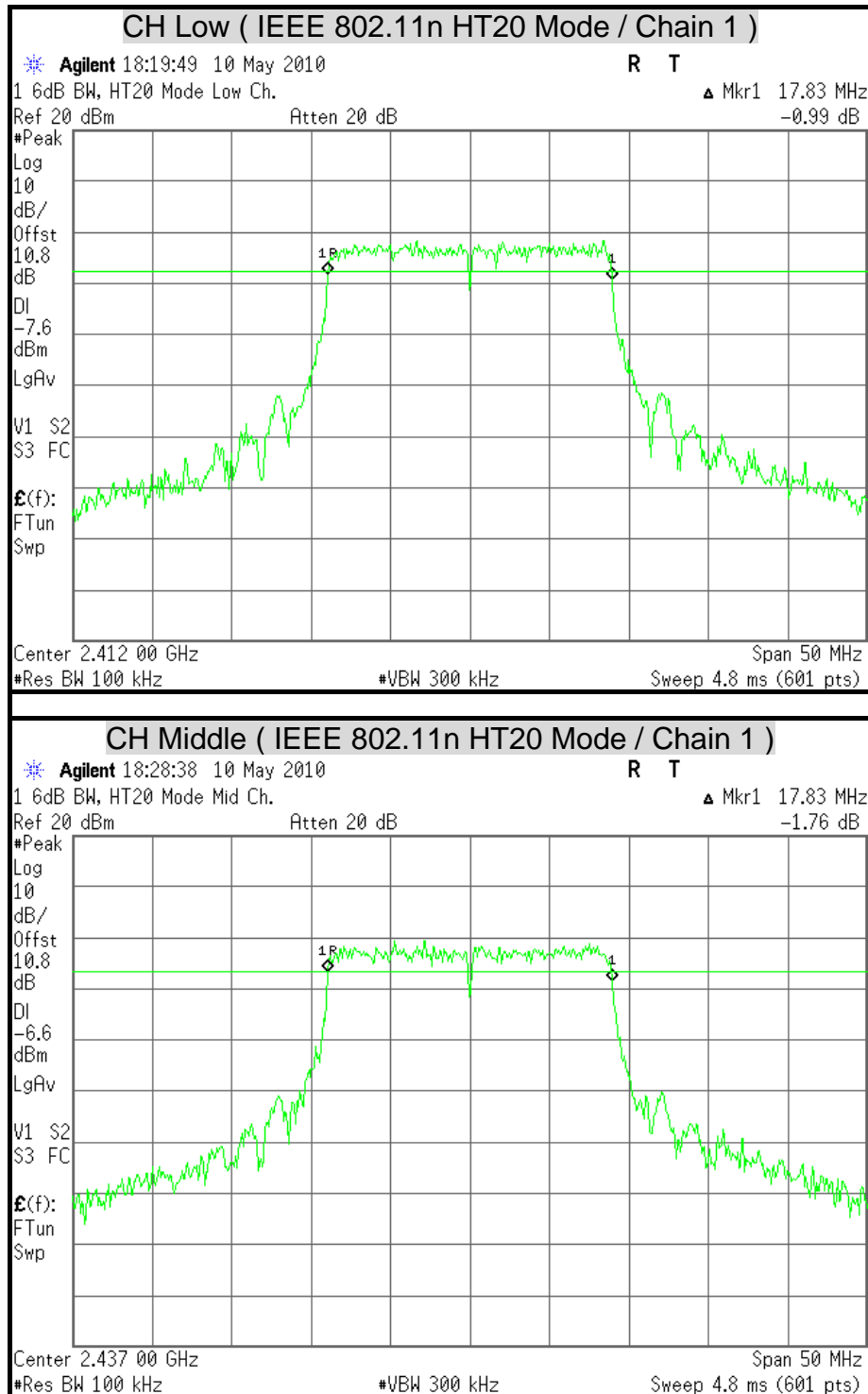


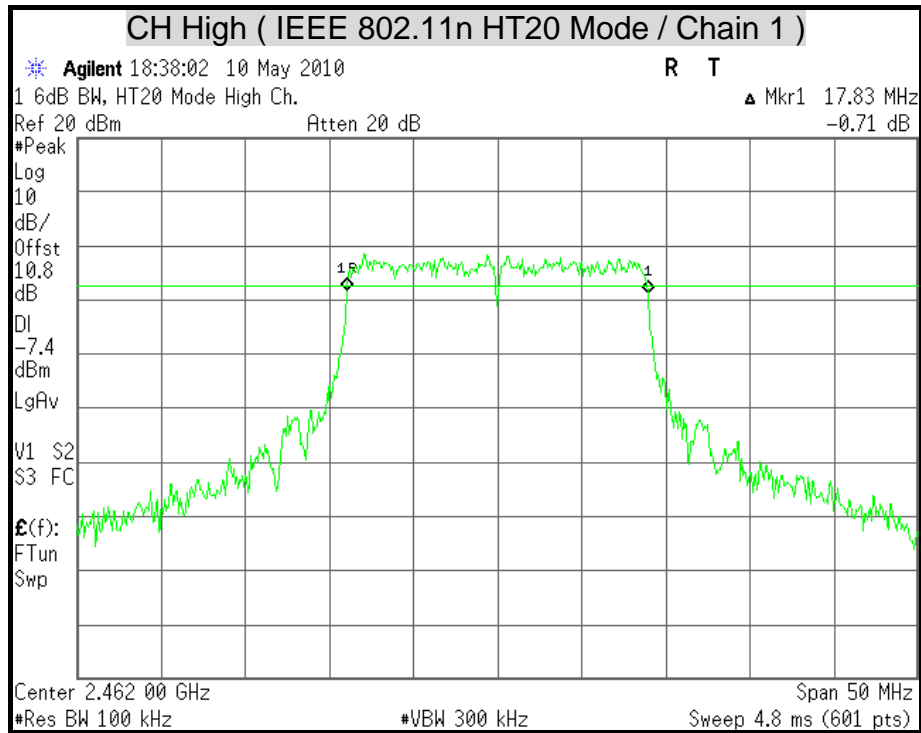


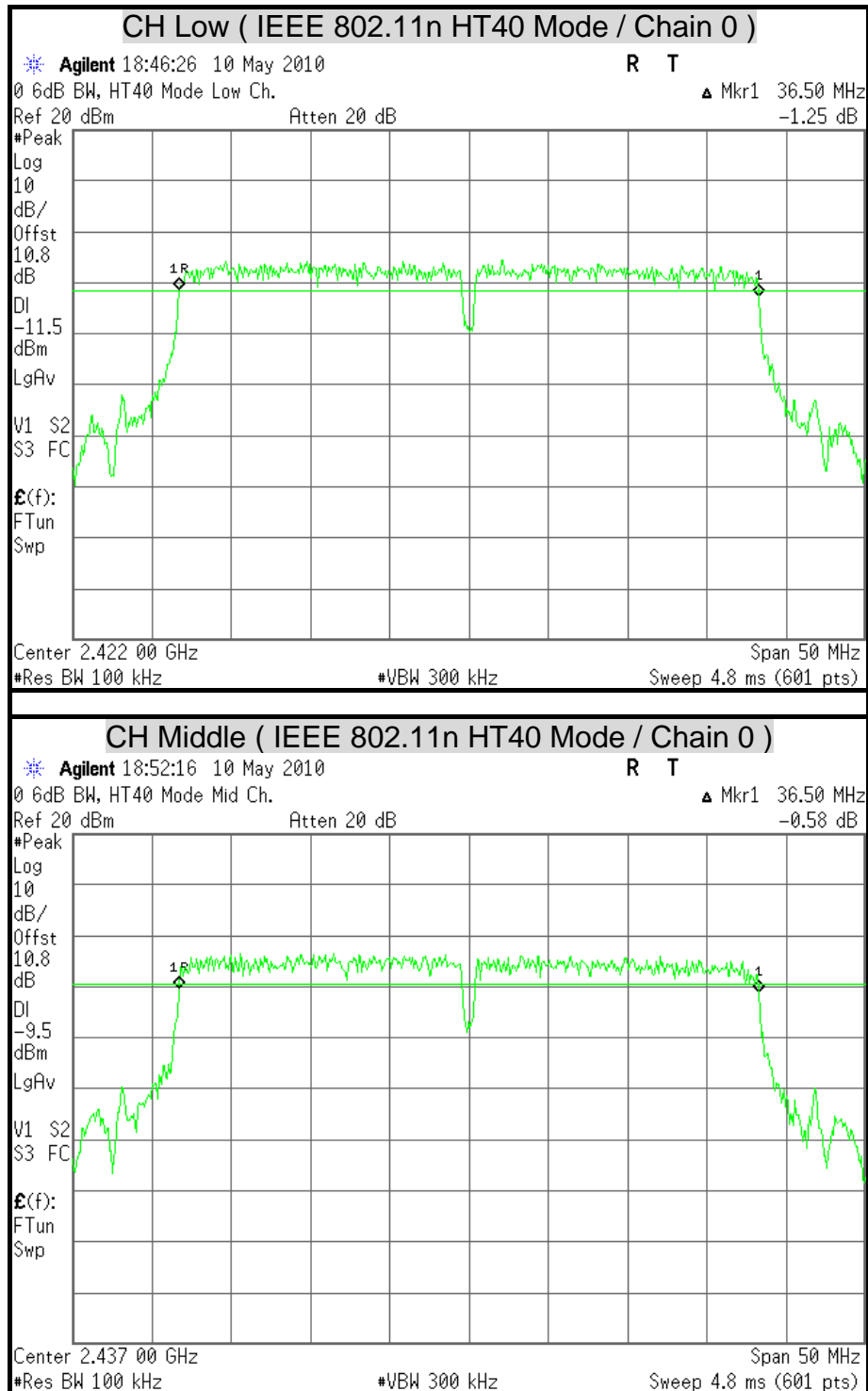


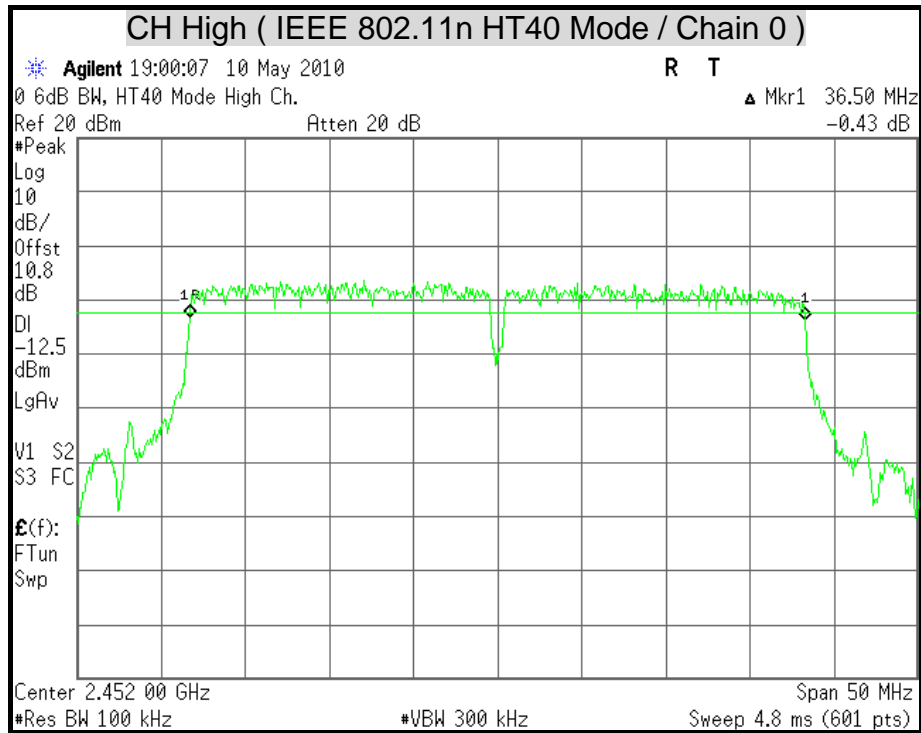


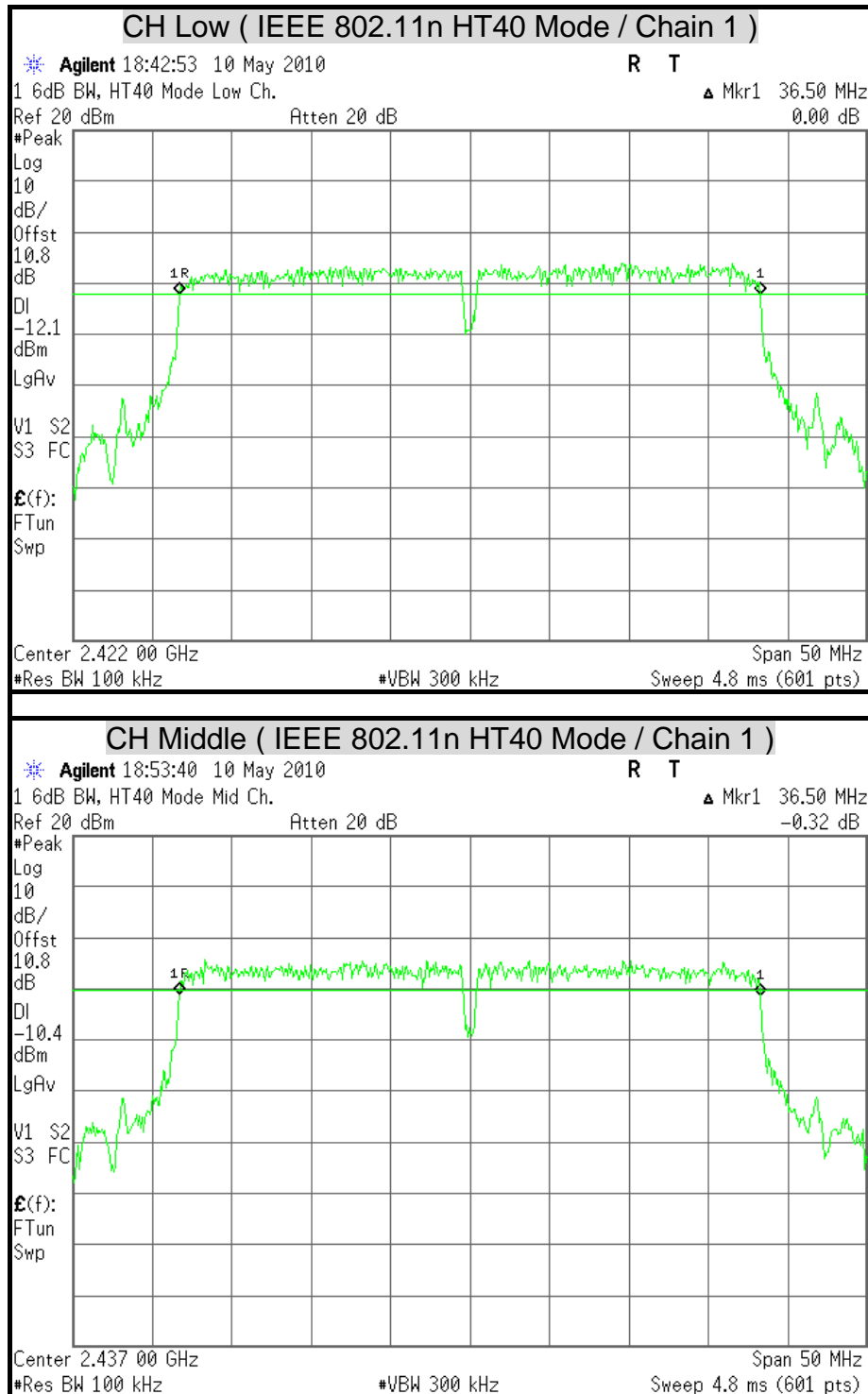


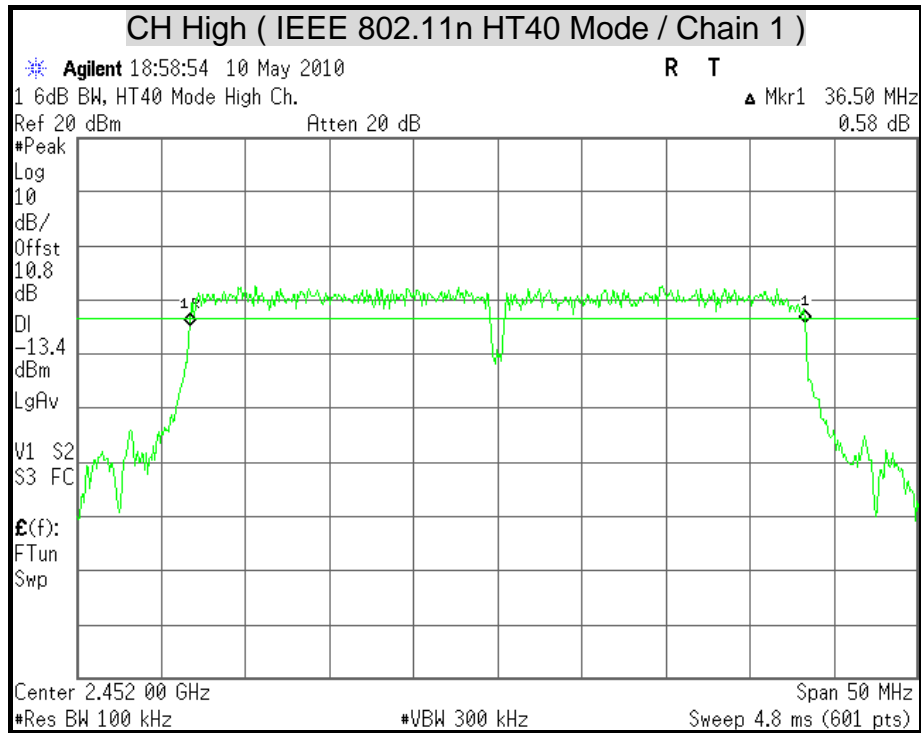














## 8.2 MAXIMUM PEAK OUTPUT POWER

### LIMITS

§ 15.247(b) The maximum peak output power of the intentional radiator shall not exceed the following :

§ 15.247(b) (3) For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands : 1 watt.

§ 15.247(b) (4) Except as shown in paragraphs (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used the peak output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1) or (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 EQUIPMENT

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	AGILENT	E4446A	MY43360132	06/09/2010
Spectrum Analyzer	AGILENT	E4446A	MY46180323	05/26/2010

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

### TEST SETUP



### TEST PROCEDURE

1. The spectrum shall be set as follows :  
Span : 1.5 times channel integration bandwidth.  
RBW : 1MHz  
VBW : 3MHz  
Detector : Peak  
Sweep : Single trace
2. Compute the combined power of all signal responses contained in the trace by covering all the data points.
3. The peak output power is the channel power integrated over 26dB bandwidth.

**TEST RESULTS**

Total peak power calculation formula:

$10 \log (10^{\text{Chain 0 Power} / 10} + 10^{\text{Chain1 Power} / 10})$ .

The maximum antenna gain is 1.9 dBi, therefore the limit is 30 dBm.

In the legacy mode, the effective antenna gain is  $1.9 + 10 \times \log(2) = 4.91 \text{ dBi}$ .

**IEEE 802.11b Mode**

Channel	Channel Frequency (MHz)	Peak Power		Peak Power Limit		Pass / Fail
		(dBm)	(W)	(dBm)	(W)	
Low	2412	20.95	0.1245	30	1	PASS
Middle	2437	23.02	0.2004	30	1	PASS
High	2462	19.01	0.0796	30	1	PASS

**Remark:**

1. At final test to get the worst-case emission at 11Mbps.
2. The cable assembly insertion loss of 10.8dB (including 10 dB pad and 0.8 dB cable) was Entered as an offset in the spectrum analyzer to allow for direct reading of power.

**IEEE 802.11g Mode**

Channel	Channel Frequency (MHz)	Peak Power		Peak Power Limit		Pass / Fail
		(dBm)	(W)	(dBm)	(W)	
Low	2412	18.81	0.0760	30	1	PASS
Middle	2437	21.21	0.1321	30	1	PASS
High	2462	18.93	0.0782	30	1	PASS

**Remark:**

1. At final test to get the worst-case emission at 6Mbps.
2. The cable assembly insertion loss of 10.8dB (including 10 dB pad and 0.8 dB cable) was Entered as an offset in the spectrum analyzer to allow for direct reading of power.

**IEEE 802.11n HT20 Mode (Two TX)**

Channel	Channel Frequency (MHz)	Peak Power (dBm)		Peak Power Total		Peak Power Limit		Pass / Fail
		Chain 0	Chain 1	(dBm)	(W)	(dBm)	(W)	
Low	2412	17.01	16.98	20.01	0.1001	30	1	PASS
Middle	2437	17.99	17.33	20.68	0.1170	30	1	PASS
High	2462	16.88	16.53	19.72	0.0937	30	1	PASS

**Remark:**

1. At final test to get the worst-case emission at 6.5Mbps.
2. The cable assembly insertion loss of 10.8dB (including 10 dB pad and 0.8 dB cable) was Entered as an offset in the spectrum analyzer to allow for direct reading of power.

**IEEE 802.11n HT40 Mode (Two TX)**

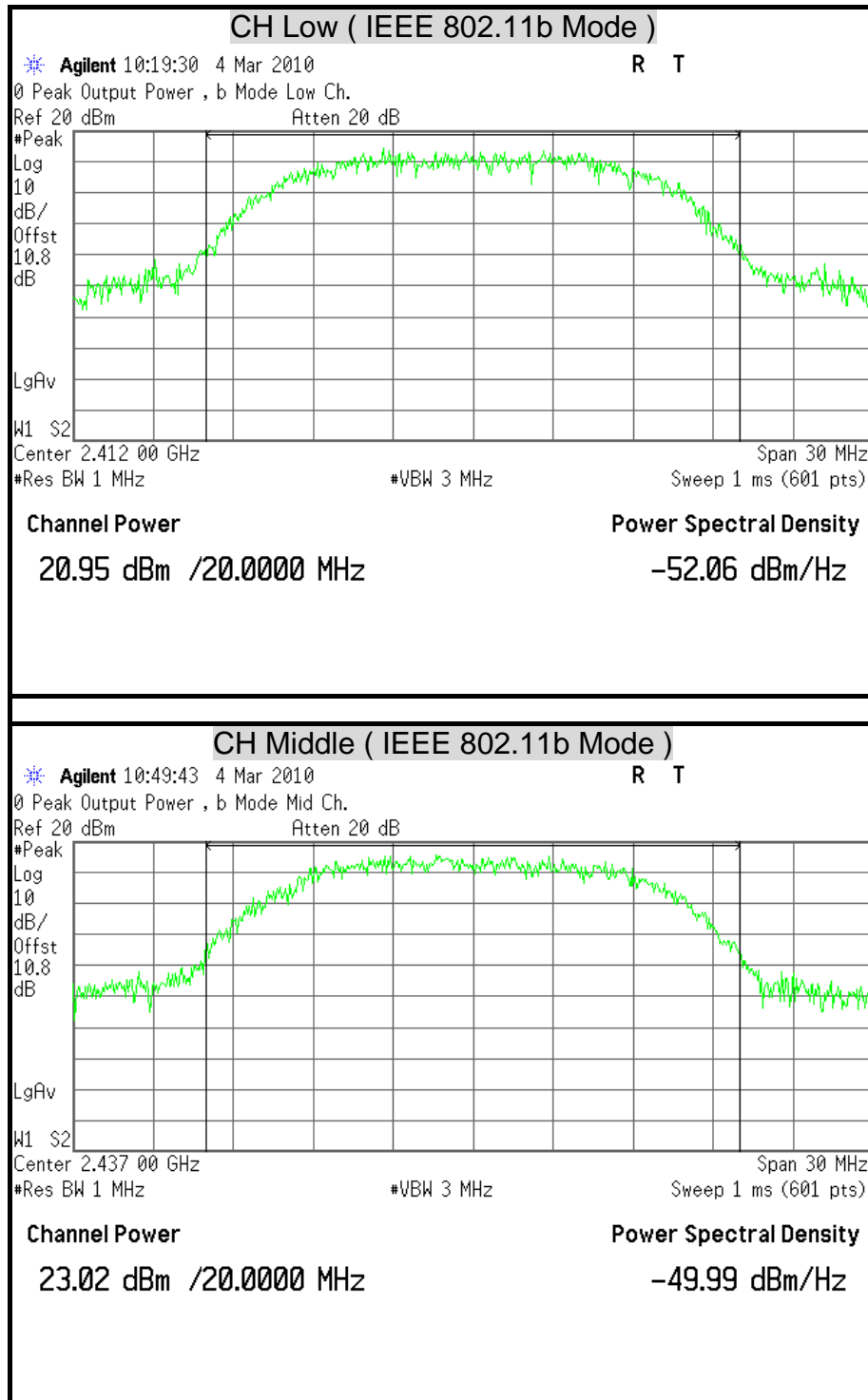
Channel	Channel Frequency (MHz)	Peak Power (dBm)		Peak Power Total		Peak Power Limit		Pass / Fail
		Chain 0	Chain 1	(dBm)	(W)	(dBm)	(W)	
Low	2422	15.61	14.91	18.28	0.0674	30	1	PASS
Middle	2437	17.94	17.10	20.55	0.1135	30	1	PASS
High	2452	14.84	13.87	17.39	0.0549	30	1	PASS

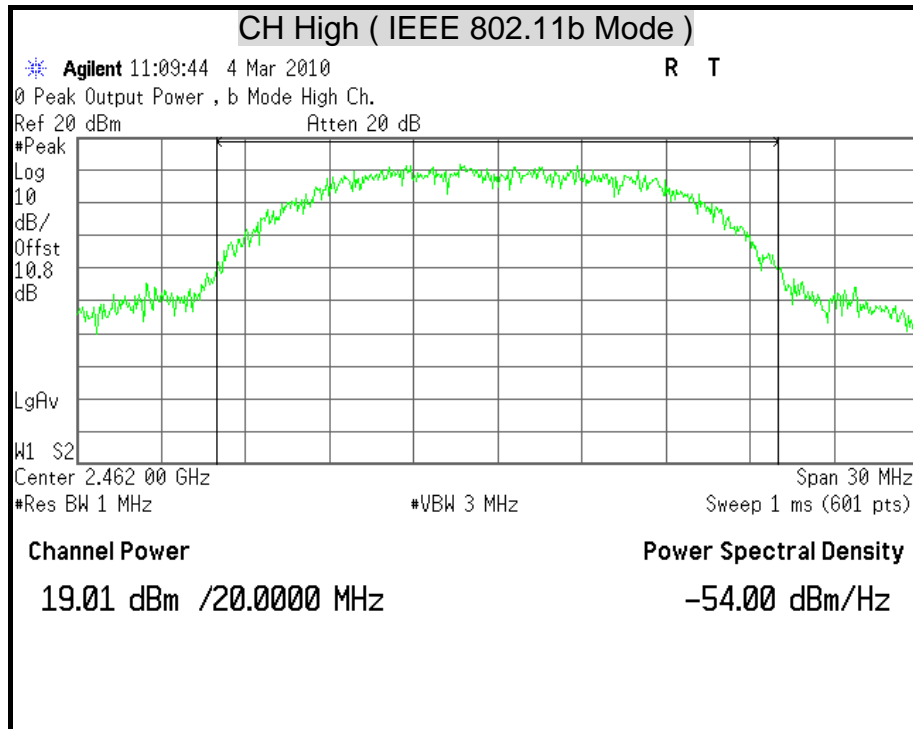
**Remark:**

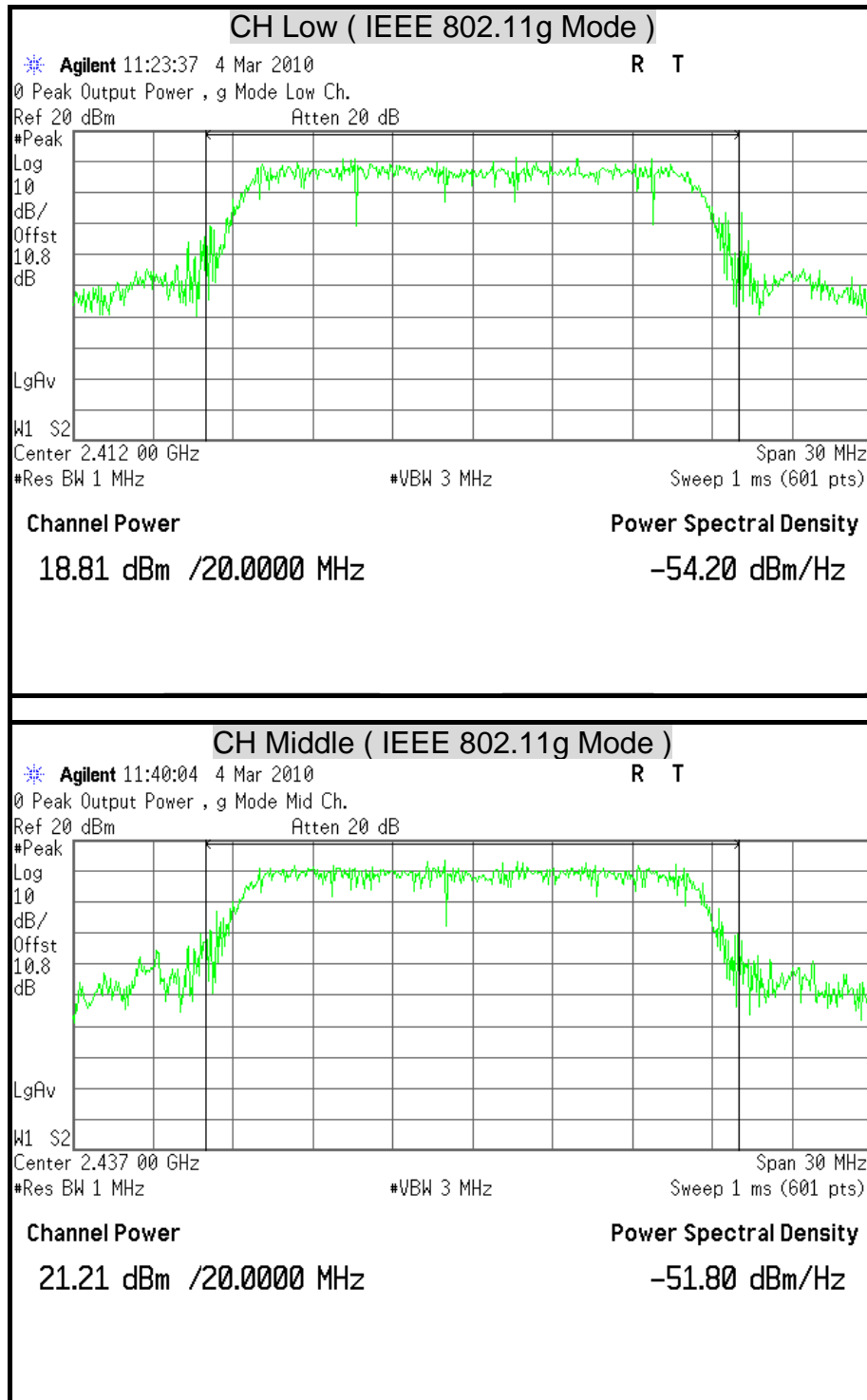
1. At final test to get the worst-case emission at 13.5Mbps.
2. The cable assembly insertion loss of 10.8dB (including 10 dB pad and 0.8 dB cable) was Entered as an offset in the spectrum analyzer to allow for direct reading of power.

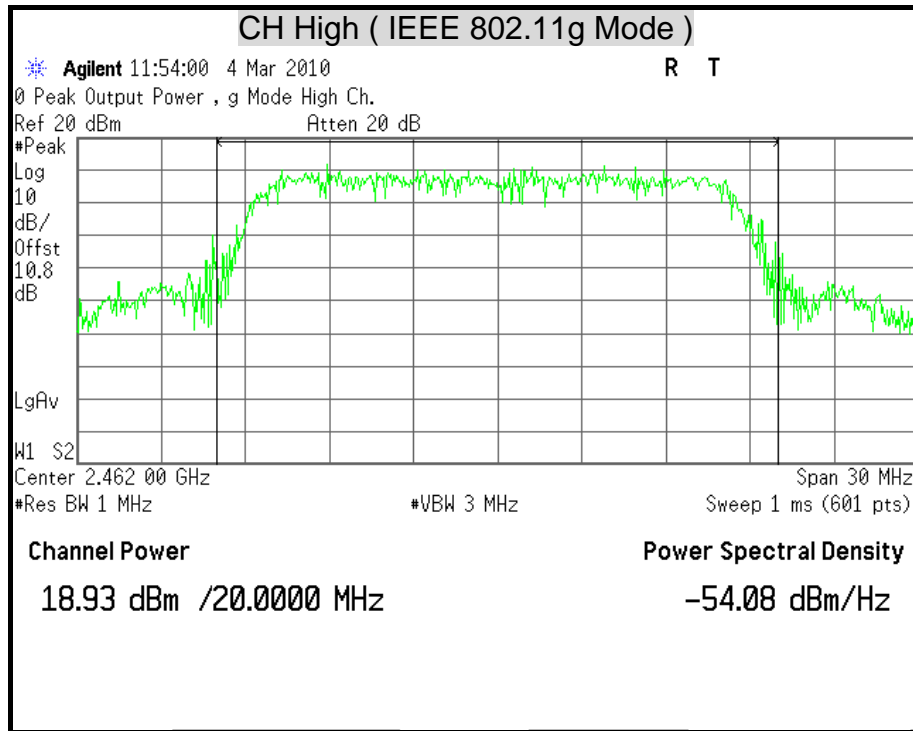


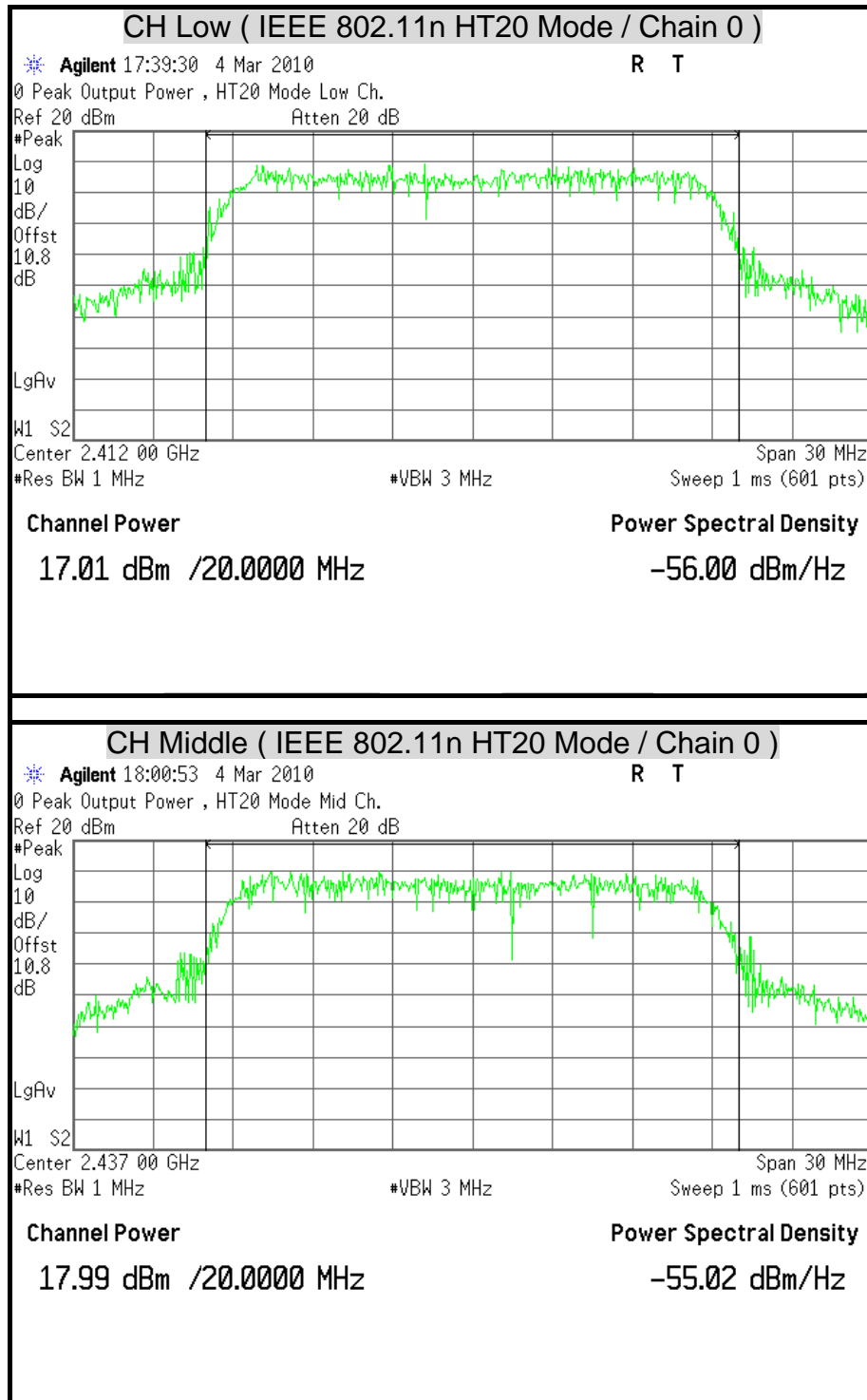
## MAXIMUM PEAK OUTPUT POWER

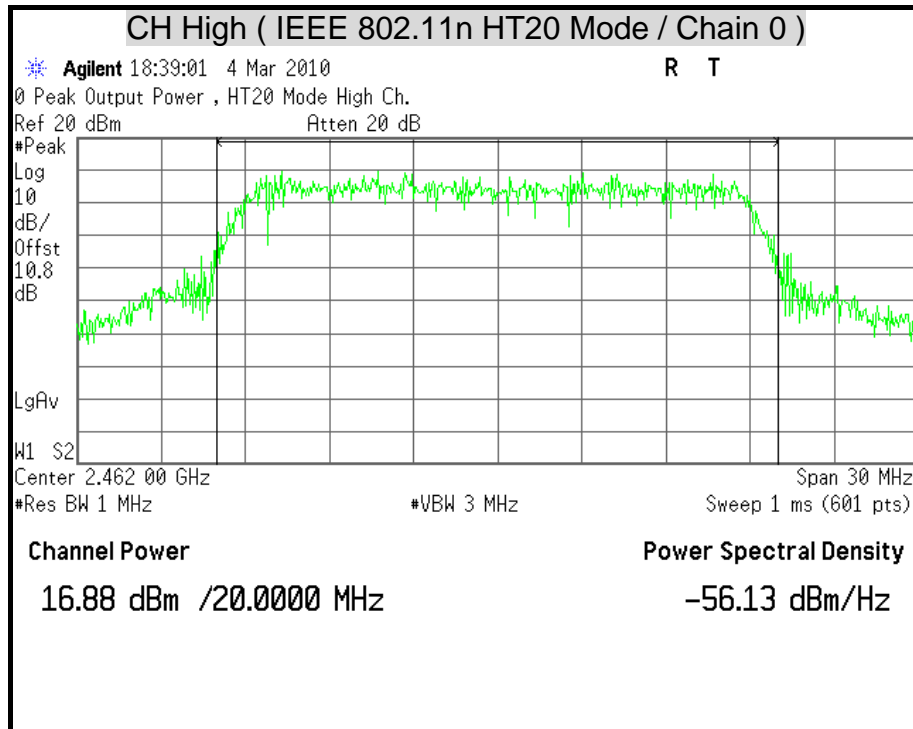


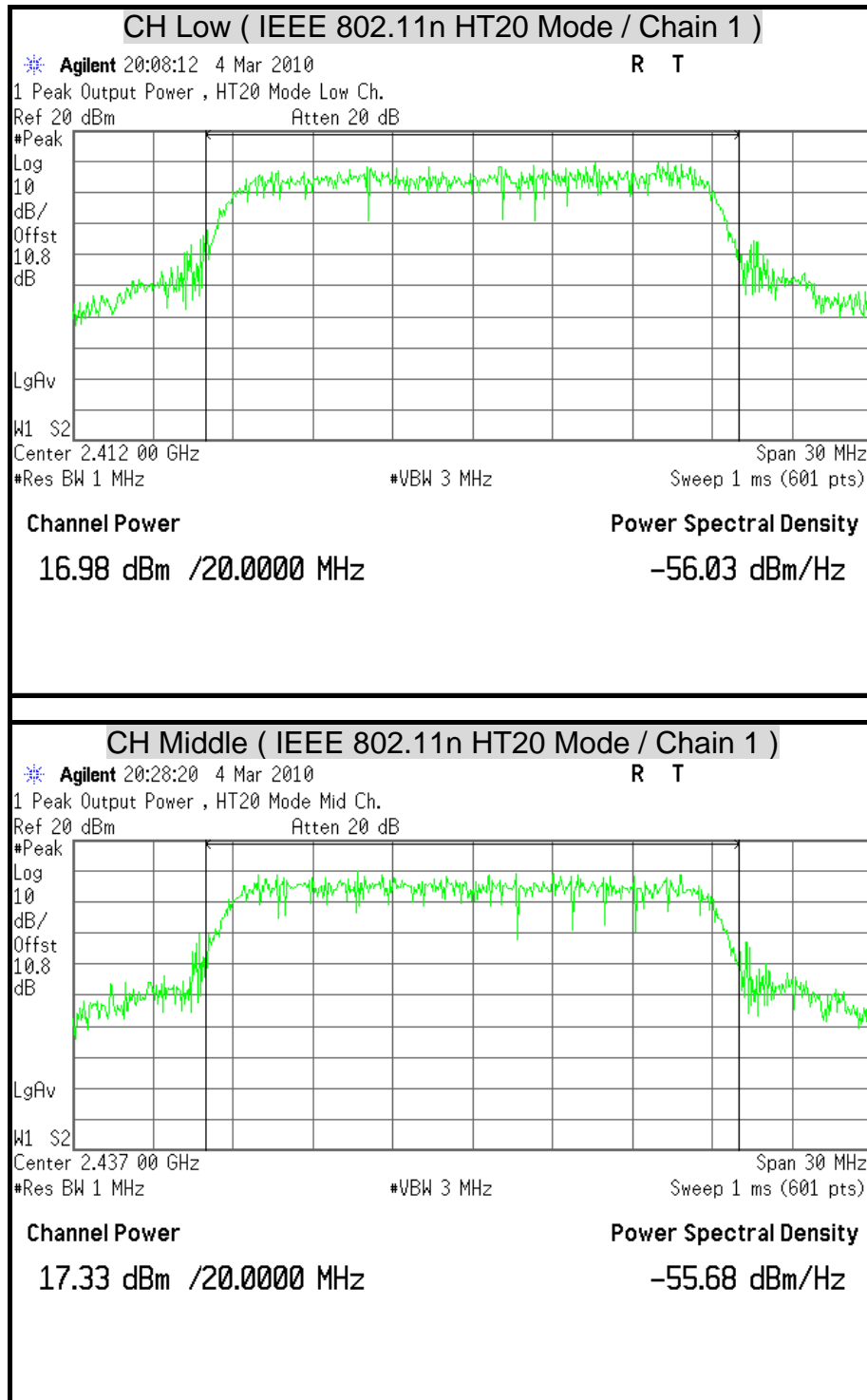


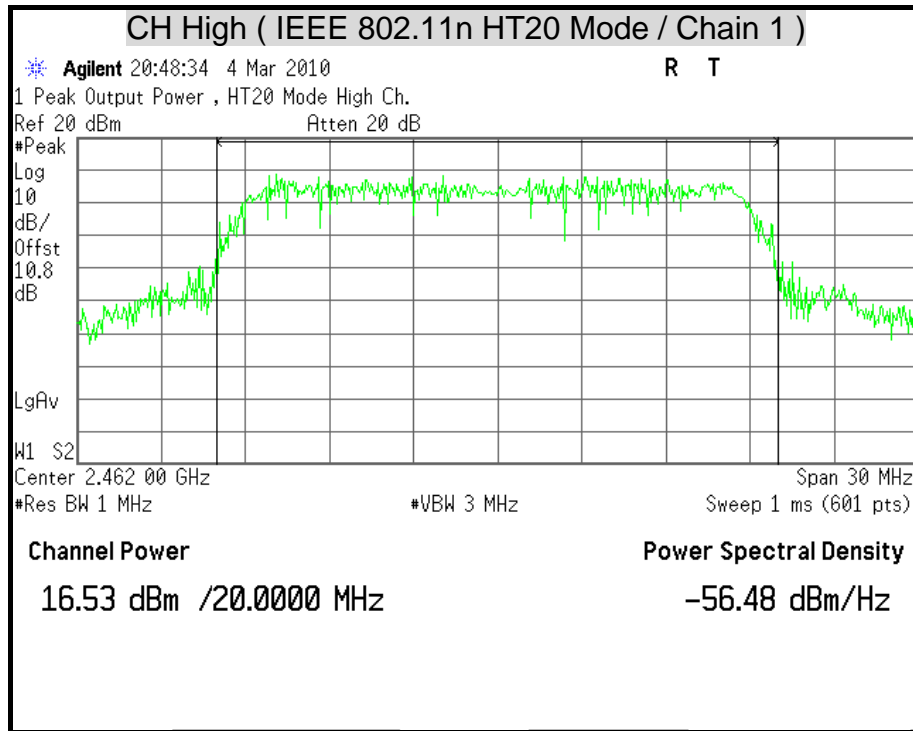


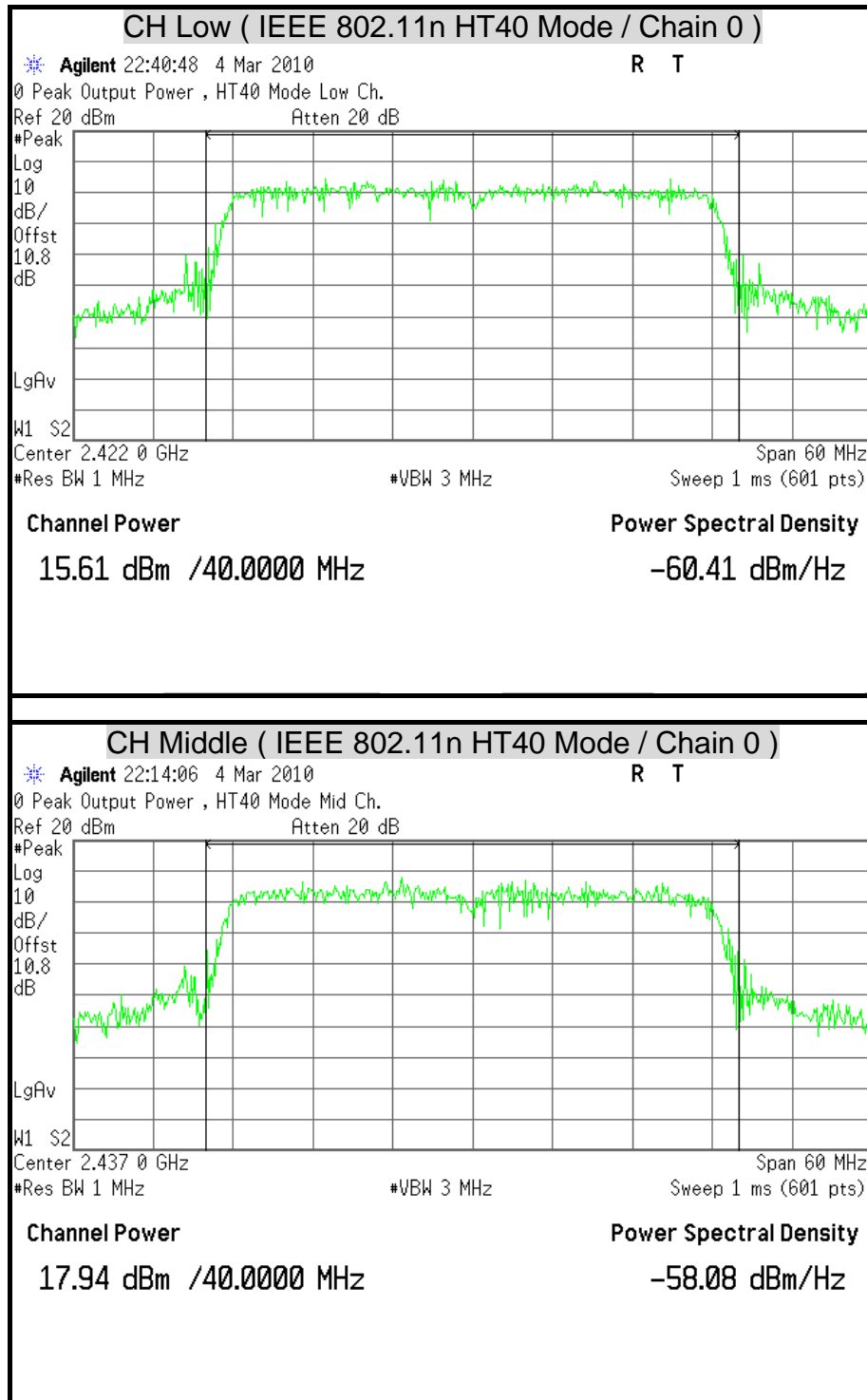


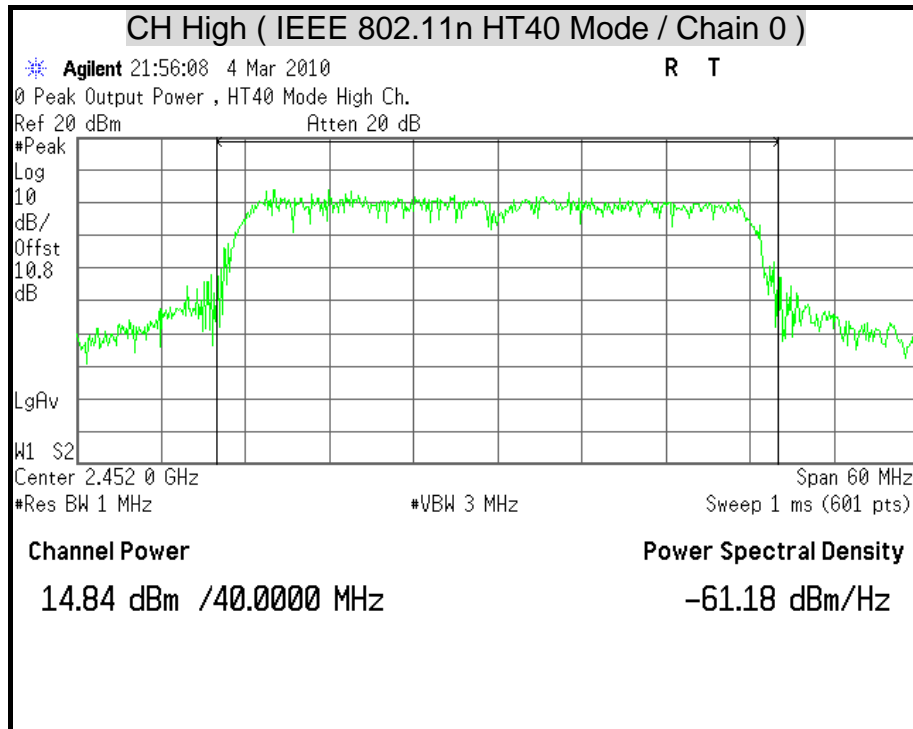


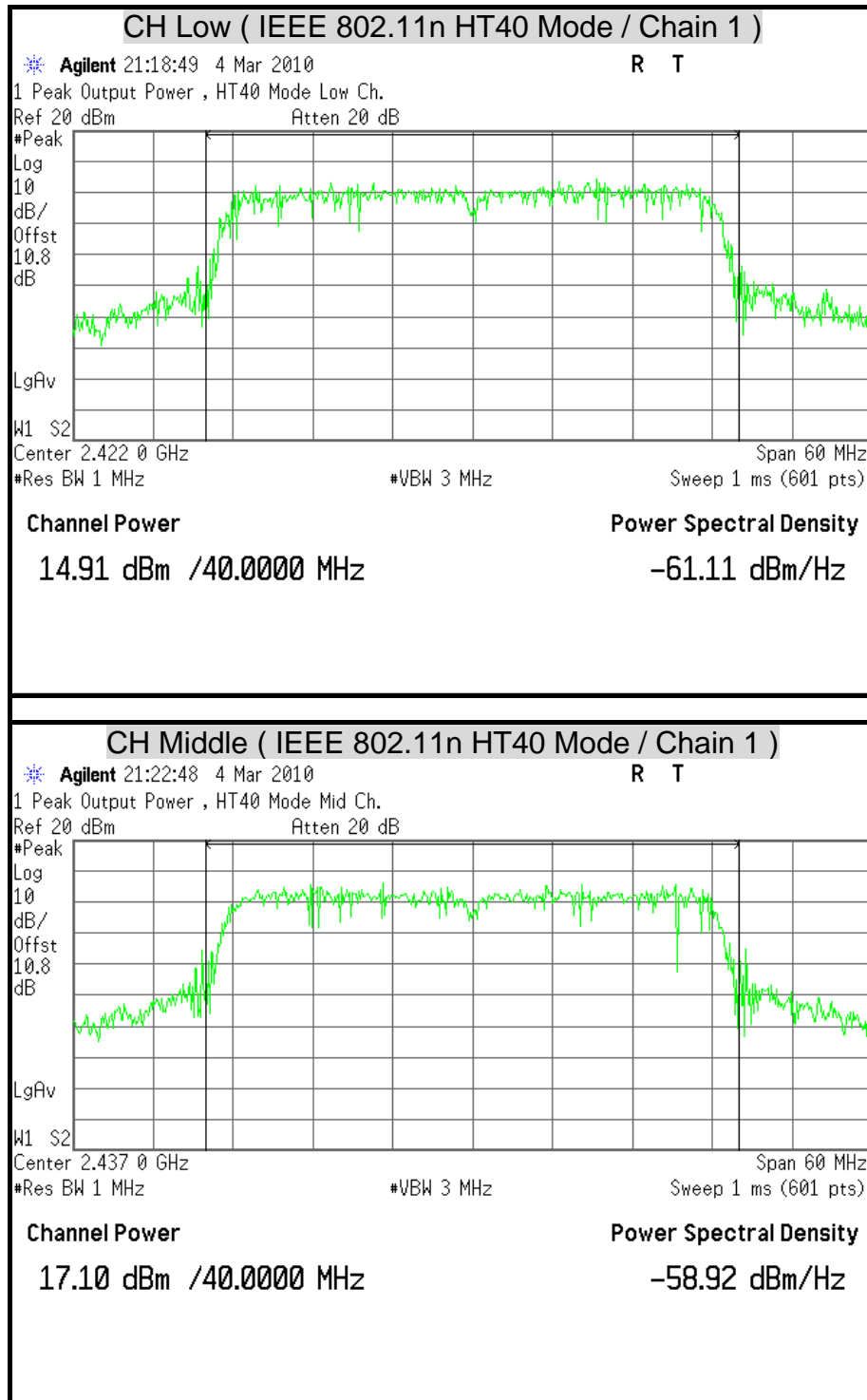


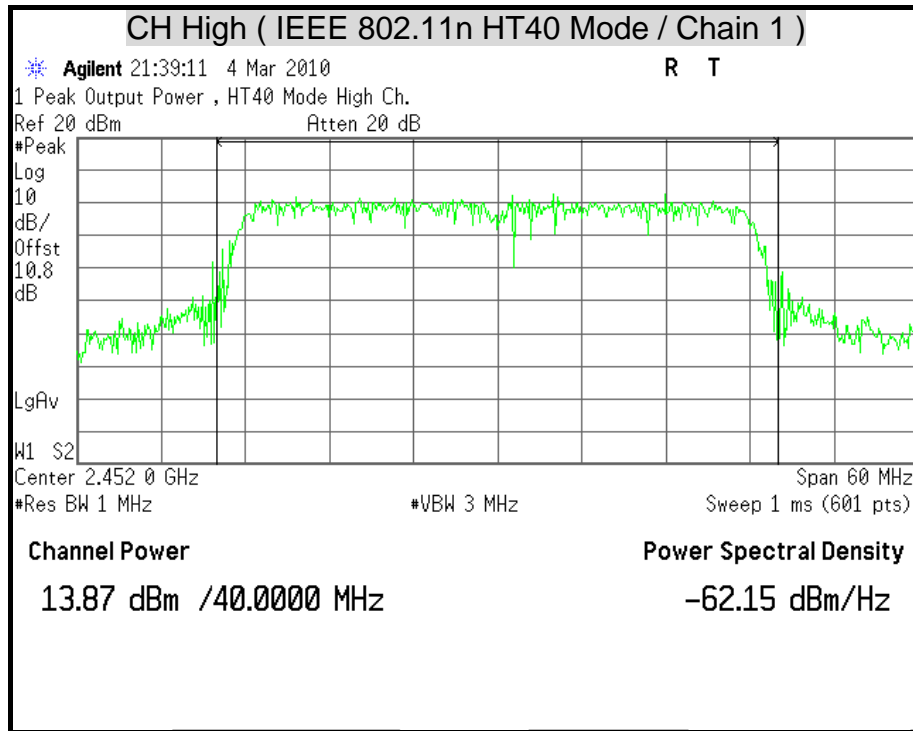














## 8.3 AVERAGE POWER

### LIMITS

None; for reporting purposes only.

### TEST EQUIPMENT

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	AGILENT	E4446A	MY43360132	06/09/2010
Spectrum Analyzer	AGILENT	E4446A	MY46180323	05/26/2010

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

### TEST SETUP



### TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer.

**TEST RESULTS****IEEE 802.11b Mode**

Channel	Channel Frequency (MHz)	Average Power Output (dBm)
Low	2412	17.91
Middle	2437	20.50
High	2462	16.40

**Remark:**

1. At final test to get the worst-case emission at 11Mbps.
2. The cable assembly insertion loss of 10.8dB (including 10 dB pad and 0.8 dB cable) was Entered as an offset in the spectrum analyzer to allow for direct reading of power.

**IEEE 802.11g Mode**

Channel	Channel Frequency (MHz)	Average Power Output (dBm)
Low	2412	15.75
Middle	2437	18.18
High	2462	15.70

**Remark:**

1. At final test to get the worst-case emission at 6Mbps.
2. The cable assembly insertion loss of 10.8dB (including 10 dB pad and 0.8 dB cable) was Entered as an offset in the spectrum analyzer to allow for direct reading of power.

**IEEE 802.11n HT20 Mode (Two TX)**

Channel	Channel Frequency (MHz)	Average Power Output (dBm)		Peak Power Total (dBm)
		Chain 0	Chain 1	
Low	2412	14.34	13.55	16.97
Middle	2437	14.60	14.04	17.34
High	2462	13.43	13.36	16.41

**Remark:**

1. At final test to get the worst-case emission at 6.5Mbps.
2. The cable assembly insertion loss of 10.8dB (including 10 dB pad and 0.8 dB cable) was Entered as an offset in the spectrum analyzer to allow for direct reading of power.

**IEEE 802.11n HT40 Mode (Two TX)**

Channel	Channel Frequency (MHz)	Average Power Output (dBm)		Peak Power Total (dBm)
		Chain 0	Chain 1	
Low	2422	12.48	11.88	15.20
Middle	2437	14.81	13.90	17.39
High	2452	11.19	10.49	14.27

**Remark:**

1. At final test to get the worst-case emission at 13.5Mbps.
2. The cable assembly insertion loss of 10.8dB (including 10 dB pad and 0.8 dB cable) was Entered as an offset in the spectrum analyzer to allow for direct reading of power.



## 8.4 POWER SPECTRAL DENSITY

### LIMITS

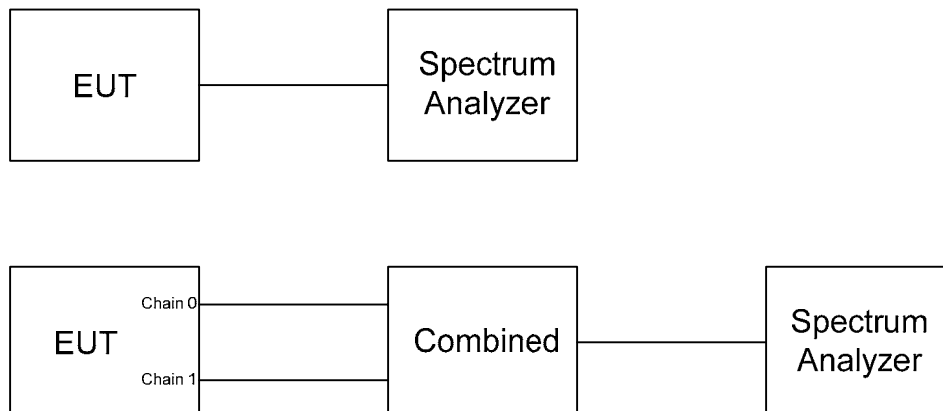
§ 15.247(e) For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

### TEST EQUIPMENT

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	AGILENT	E4446A	MY43360132	06/09/2010
Spectrum Analyzer	AGILENT	E4446A	MY46180323	05/26/2010

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

### TEST SETUP



### TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer, the bandwidth of the fundamental frequency was measured with the spectrum analyzer using RBW = 3KHz and VBW RBW, set sweep time = span / 3KHz.

The power spectral density was measured and recorded.

The sweep time is allowed to be longer than span / 3KHz for a full response of the mixer in the spectrum analyzer.

**TEST RESULTS**

Total power spectral density calculation formula:

$10 \log (10^{\text{Chain 0 PPSD} / 10} + 10^{\text{Chain 1 PPSD} / 10})$ .

**IEEE 802.11b Mode**

Channel	Channel Frequency (MHz)	Final RF Power Level in 3KHz BW (dBm)	Minimum Limit (dBm)	Pass / Fail
Low	2412	-6.73	8	PASS
Middle	2437	-4.54	8	PASS
High	2462	-8.57	8	PASS

**Remark:**

1. At final test to get the worst-case emission at 11Mbps.
2. The cable assembly insertion loss of 10.8dB (including 10 dB pad and 0.8 dB cable) was Entered as an offset in the spectrum analyzer to allow for direct reading of power.

**IEEE 802.11g Mode**

Channel	Channel Frequency (MHz)	Final RF Power Level in 3KHz BW (dBm)	Minimum Limit (dBm)	Pass / Fail
Low	2412	-13.59	8	PASS
Middle	2437	-11.15	8	PASS
High	2462	-13.48	8	PASS

**Remark:**

1. At final test to get the worst-case emission at 6Mbps.
2. The cable assembly insertion loss of 10.8dB (including 10 dB pad and 0.8 dB cable) was Entered as an offset in the spectrum analyzer to allow for direct reading of power.

**IEEE 802.11n HT20 Mode (Two TX)**

Channel	Channel Frequency (MHz)	Final RF Power Level in 3KHz BW (dBm)		PPSD Total (dBm)	Minimum Limit (dBm)	Pass / Fail
		Chain 0	Chain 1			
Low	2412	-13.72	-14.63	-11.14	8	PASS
Middle	2437	-13.71	-14.15	-10.91	8	PASS
High	2462	-14.26	-15.31	-11.74	8	PASS

**Remark:**

1. At final test to get the worst-case emission at 6.5Mbps.
2. The cable assembly insertion loss of 10.8dB (including 10 dB pad and 0.8 dB cable) was Entered as an offset in the spectrum analyzer to allow for direct reading of power.

**IEEE 802.11n HT20 Combined Mode (Two TX)**

Channel	Channel Frequency (MHz)	Final RF Power Level in 3KHz BW (dBm)	Minimum Limit (dBm)	Pass / Fail
Low	2412	-8.40	8	PASS
Middle	2437	-8.64	8	PASS
High	2462	-9.67	8	PASS

**Remark:**

1. At final test to get the worst-case emission at 6.5Mbps.
2. The cable assembly insertion loss of 14dB (including 10 dB pad and 4 dB cable) was Entered as an offset in the spectrum analyzer to allow for direct reading of power.

**IEEE 802.11n HT40 Mode (Two TX)**

Channel	Channel Frequency (MHz)	Final RF Power Level in 3KHz BW (dBm)		PPSD Total (dBm)	Minimum Limit (dBm)	Pass / Fail
		Chain 0	Chain 1			
Low	2422	-16.60	-17.42	-13.98	8	PASS
Middle	2437	-14.57	-15.51	-12.00	8	PASS
High	2452	-19.31	-18.56	-15.91	8	PASS

**Remark:**

1. At final test to get the worst-case emission at 13.5Mbps.
2. The cable assembly insertion loss of 10.8dB (including 10 dB pad and 0.8 dB cable) was Entered as an offset in the spectrum analyzer to allow for direct reading of power.

**IEEE 802.11n HT40 Combined Mode (Two TX)**

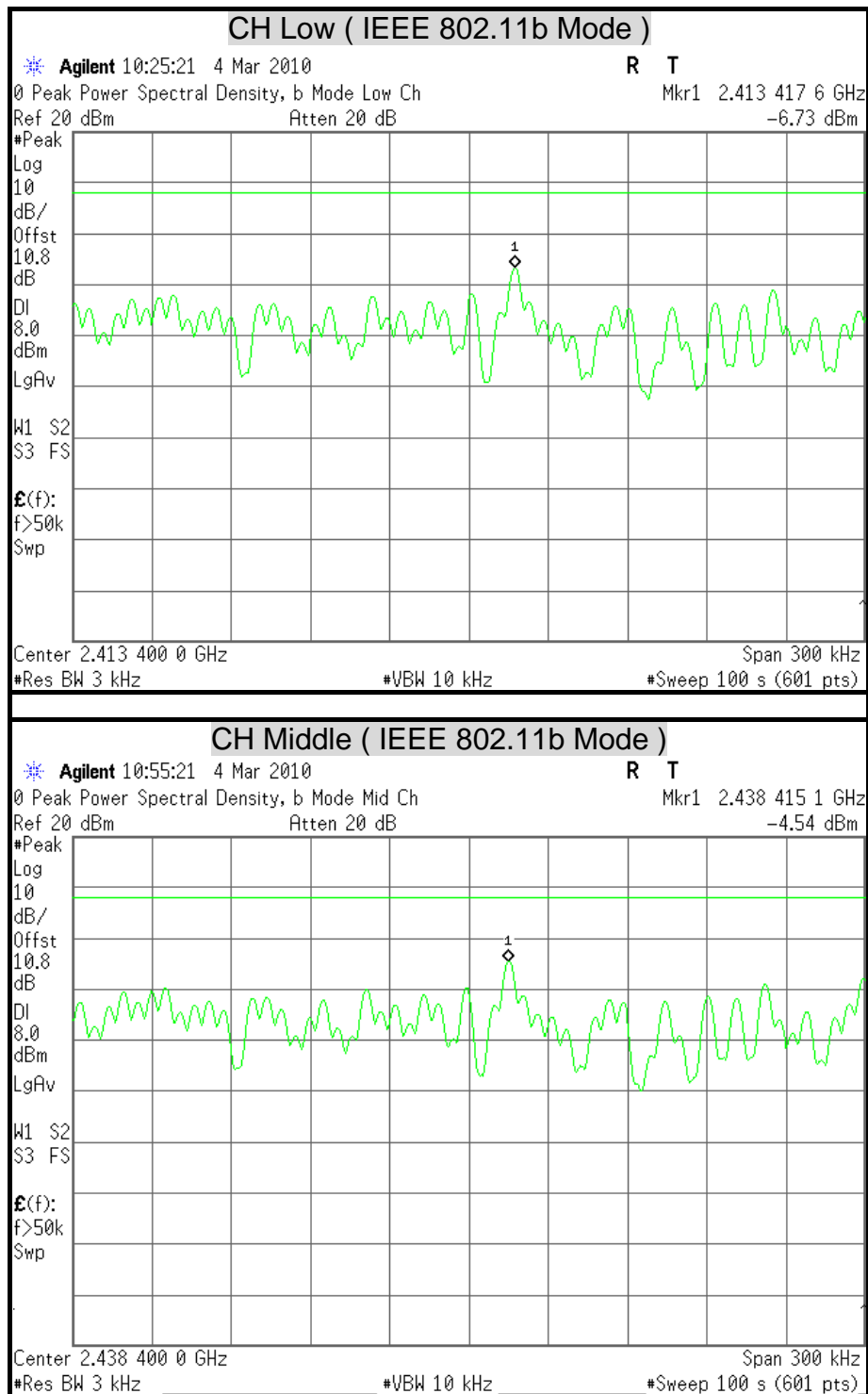
Channel	Channel Frequency (MHz)	Final RF Power Level in 3KHz BW (dBm)	Minimum Limit (dBm)	Pass / Fail
Low	2422	-12.74	8	PASS
Middle	2437	-11.10	8	PASS
High	2452	-13.23	8	PASS

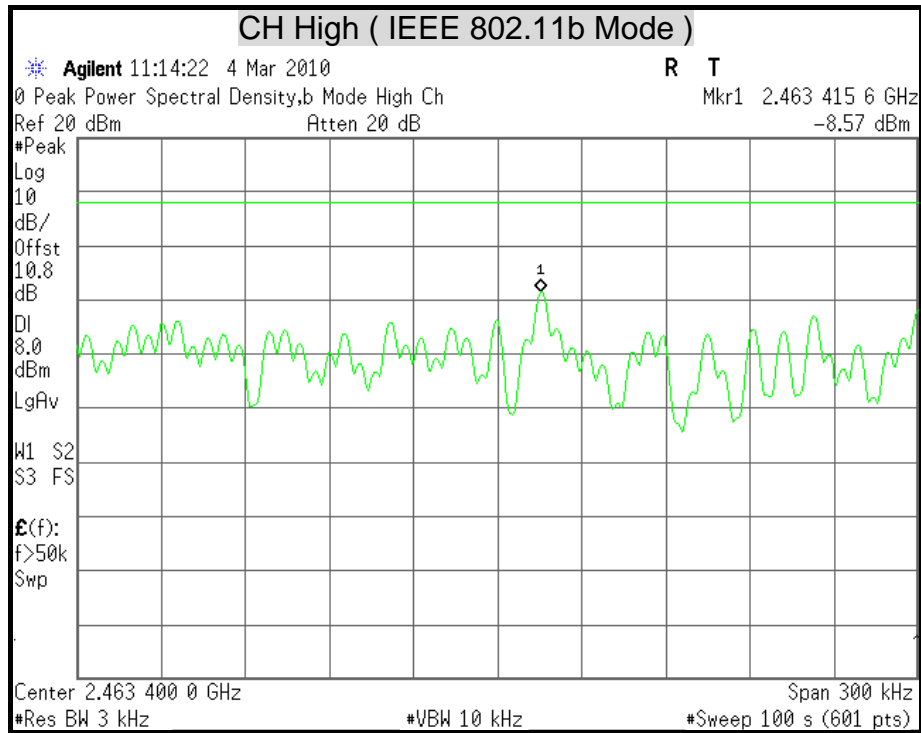
**Remark:**

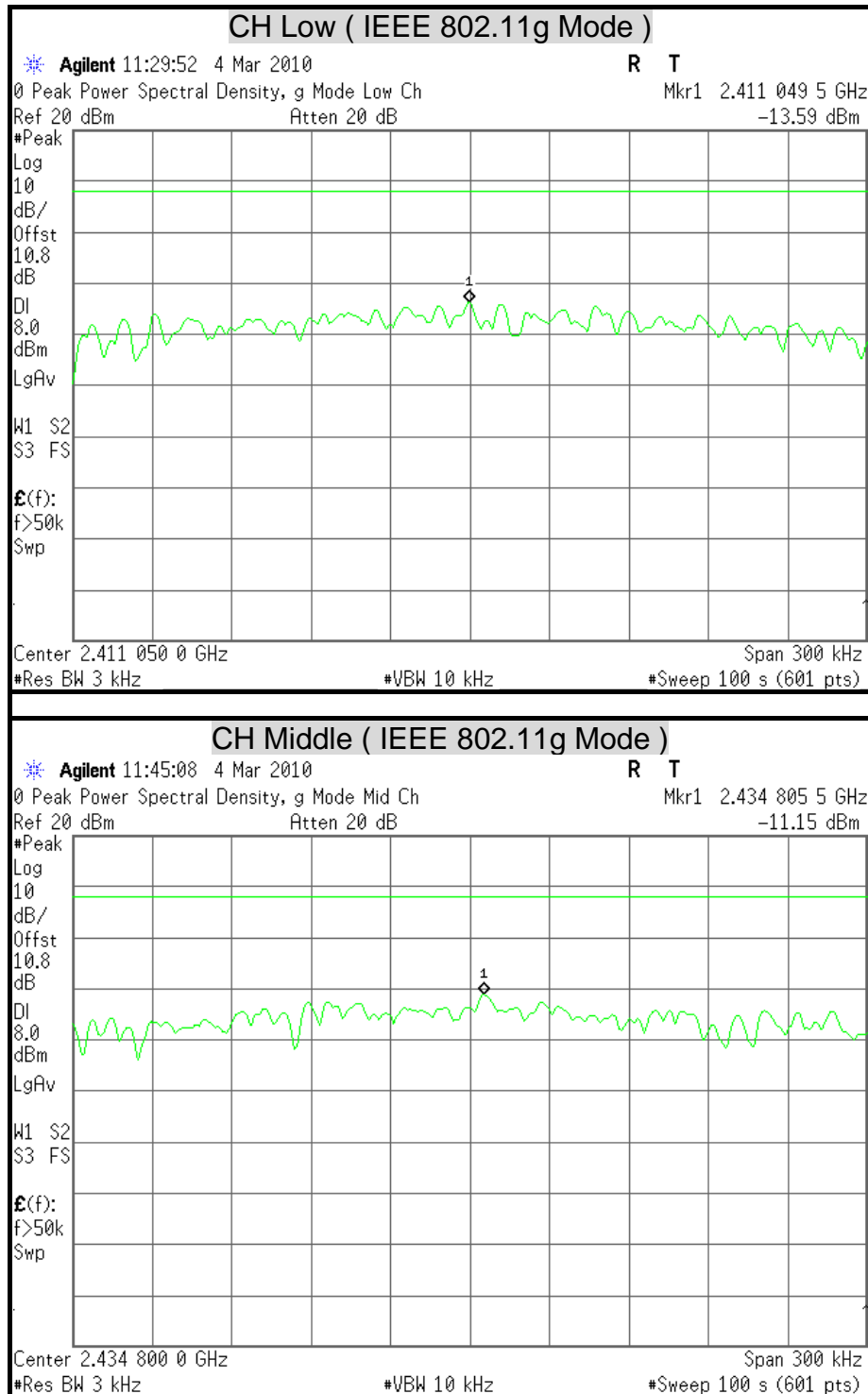
1. At final test to get the worst-case emission at 13.5Mbps.
2. The cable assembly insertion loss of 14dB (including 10 dB pad and 4 dB cable) was Entered as an offset in the spectrum analyzer to allow for direct reading of power.

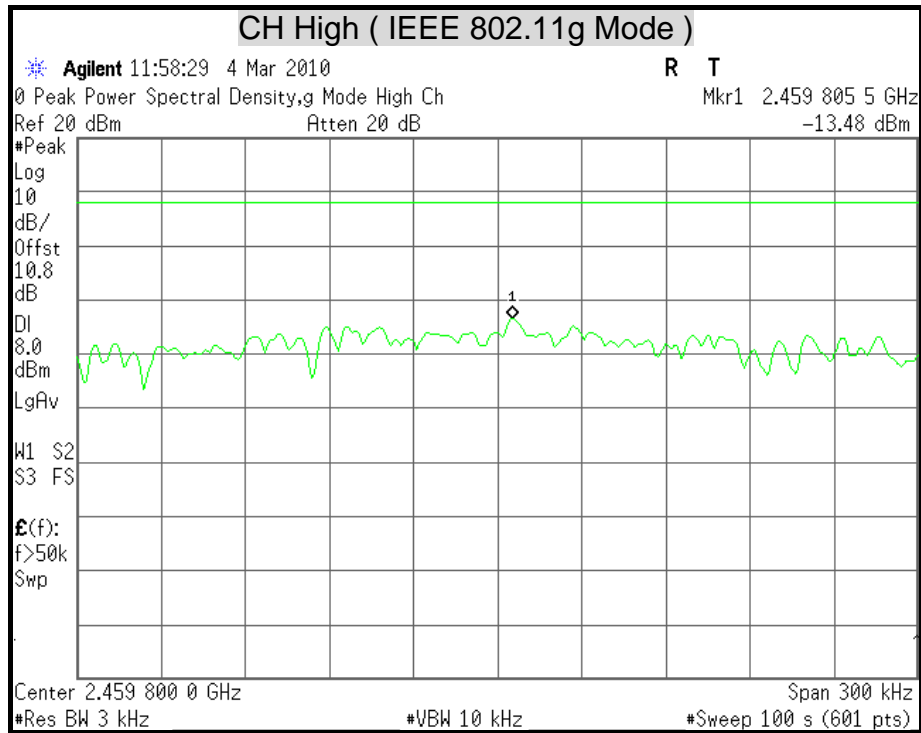


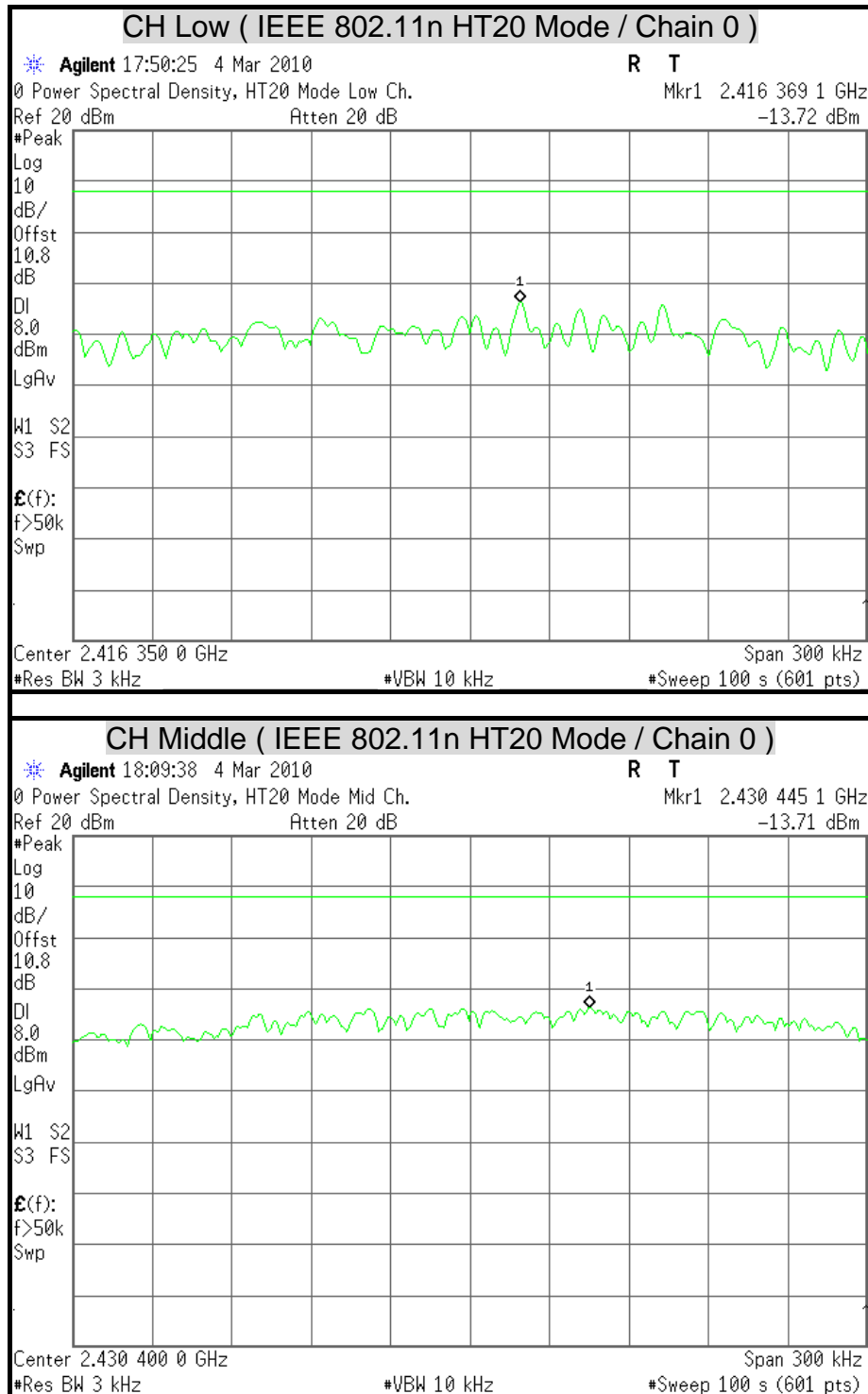
## POWER SPECTRAL DENSITY

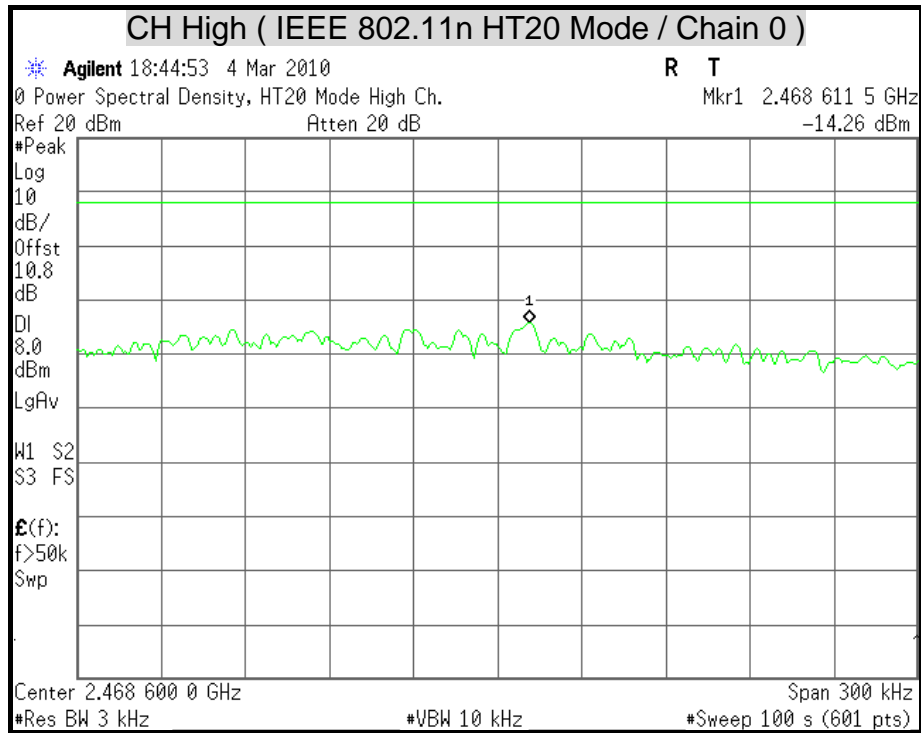


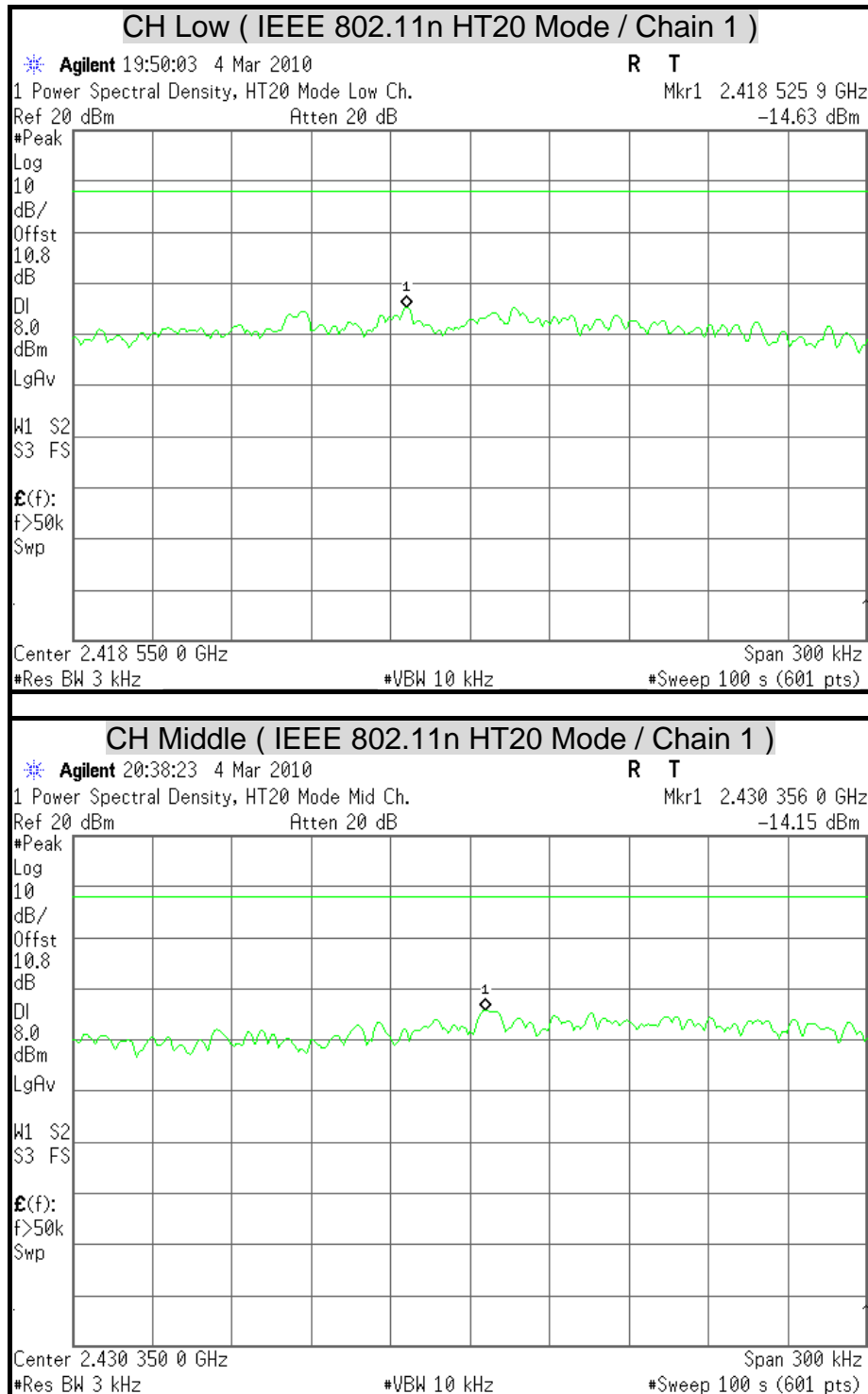


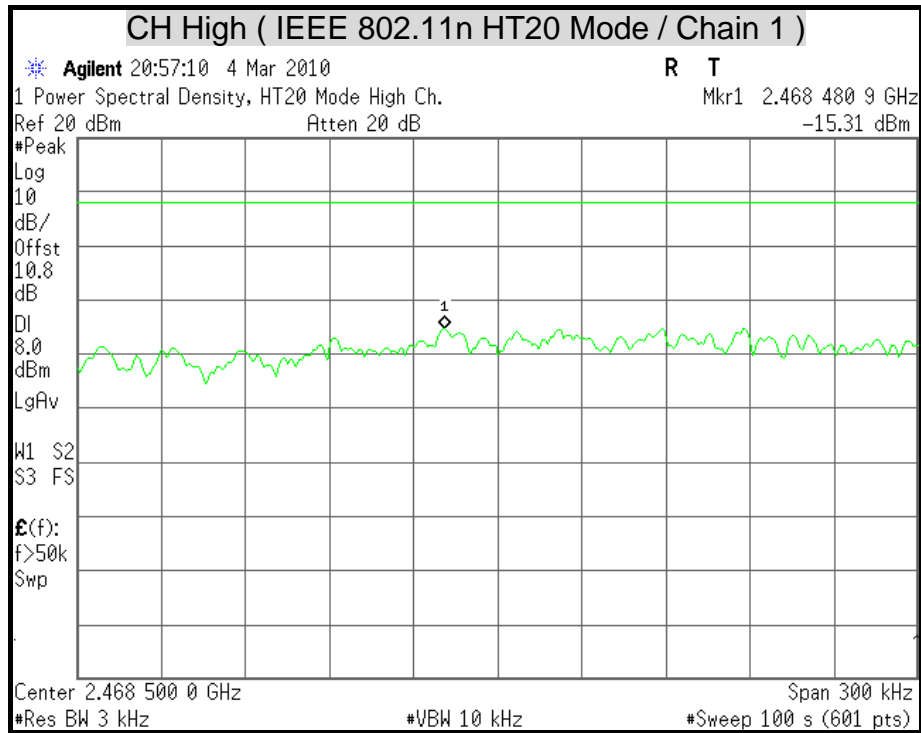


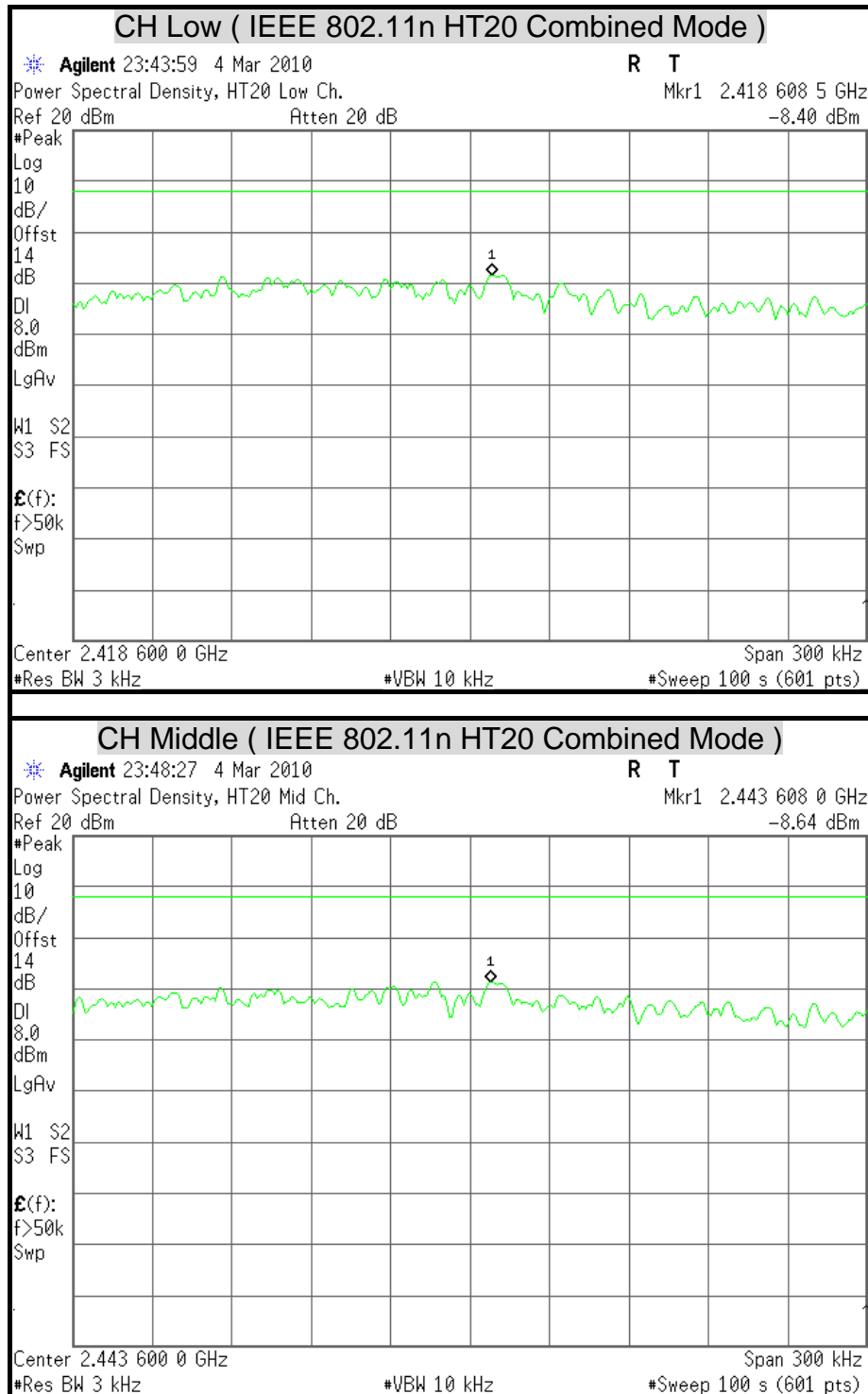


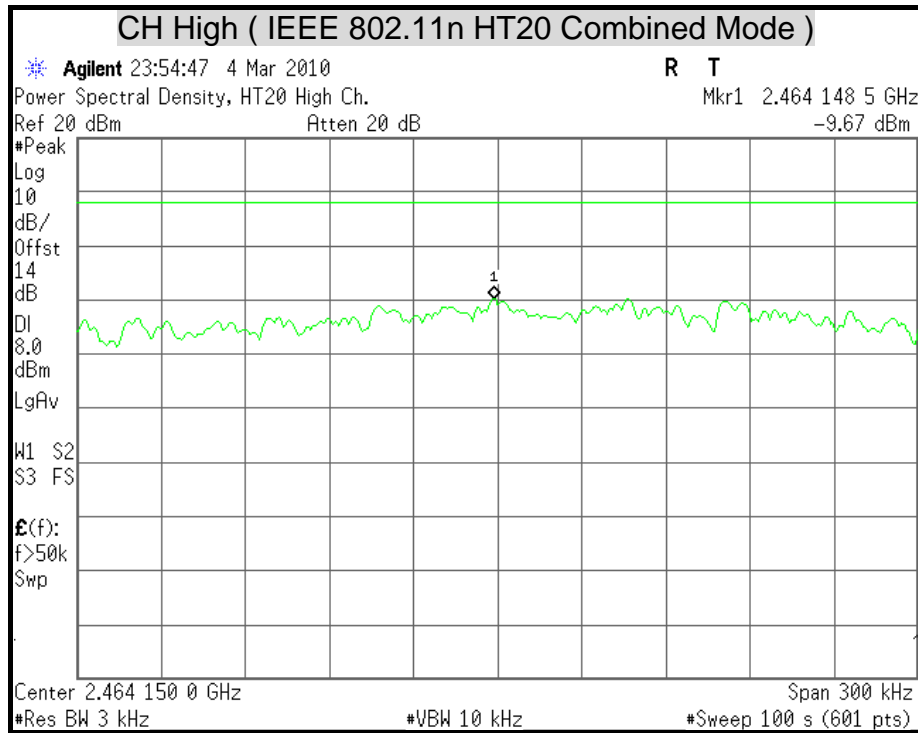


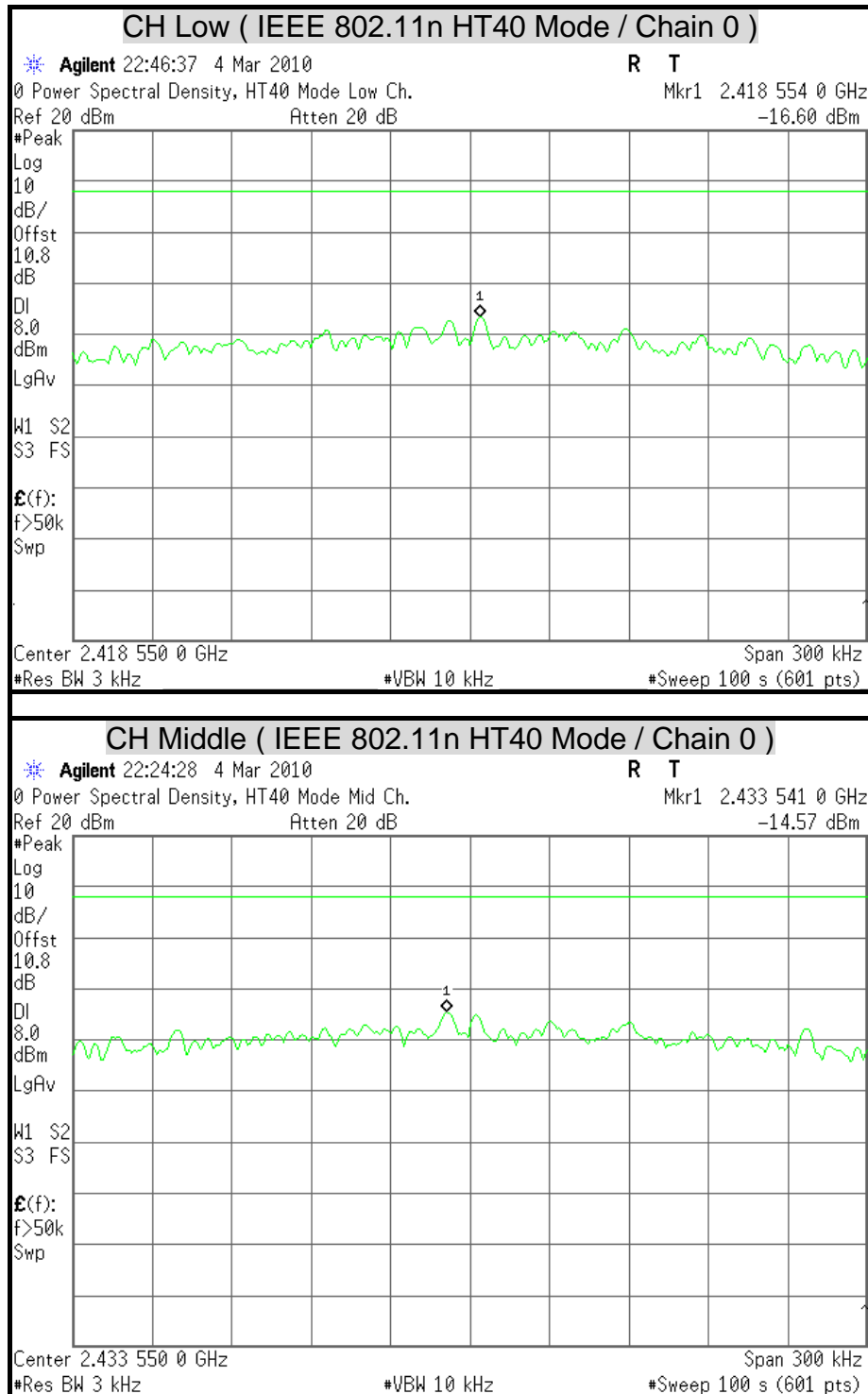


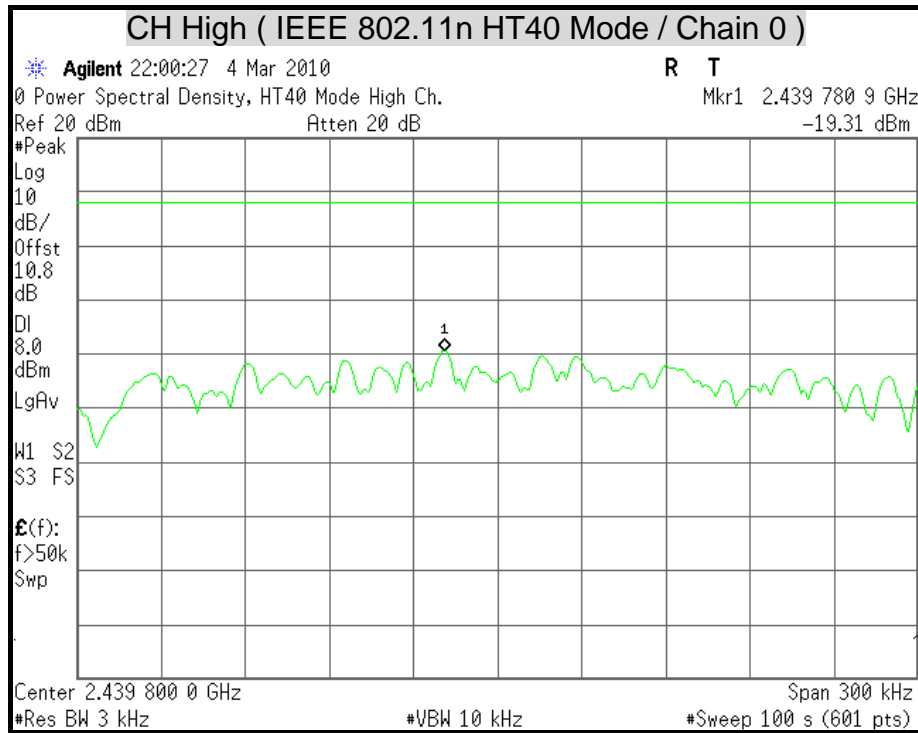


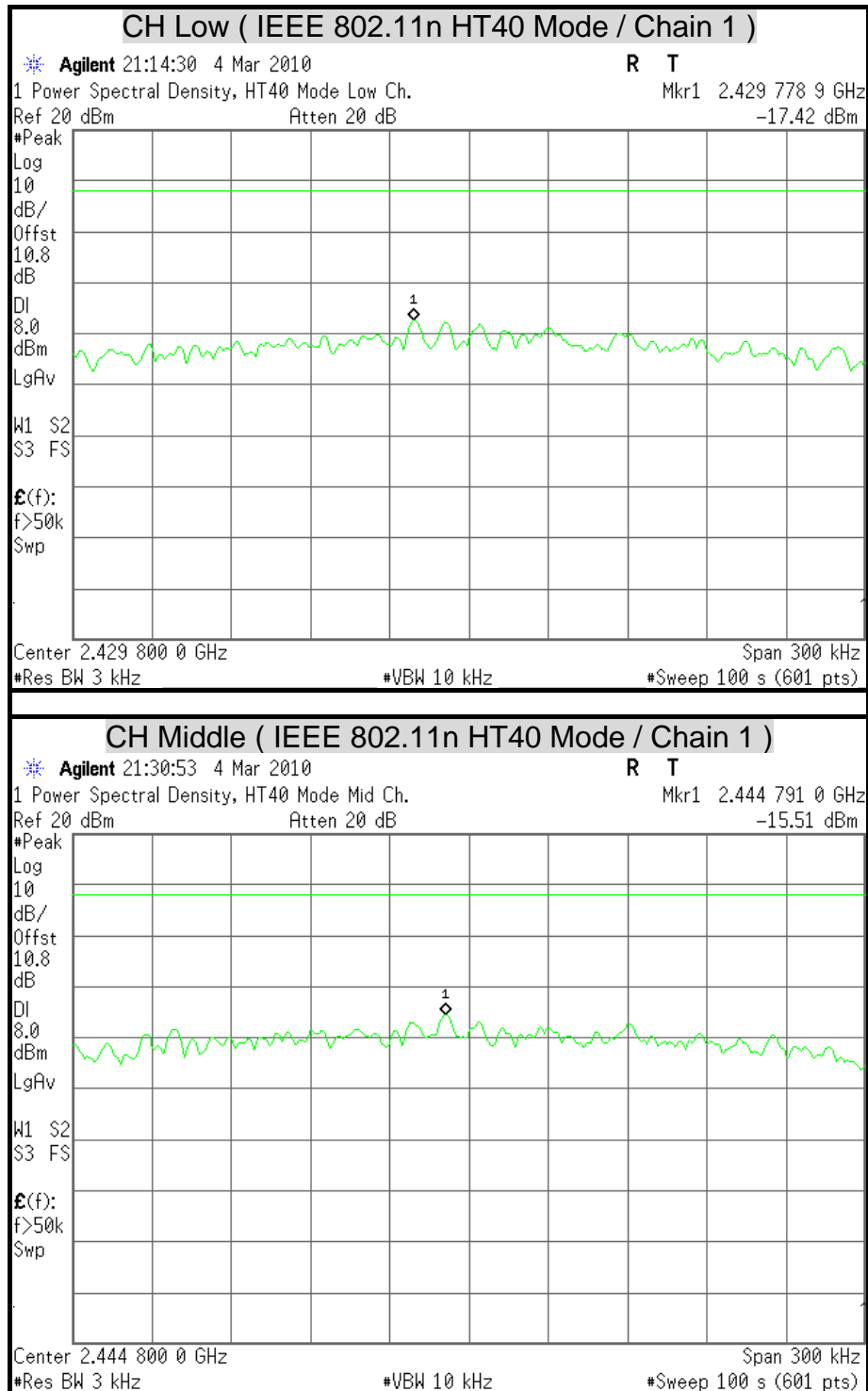


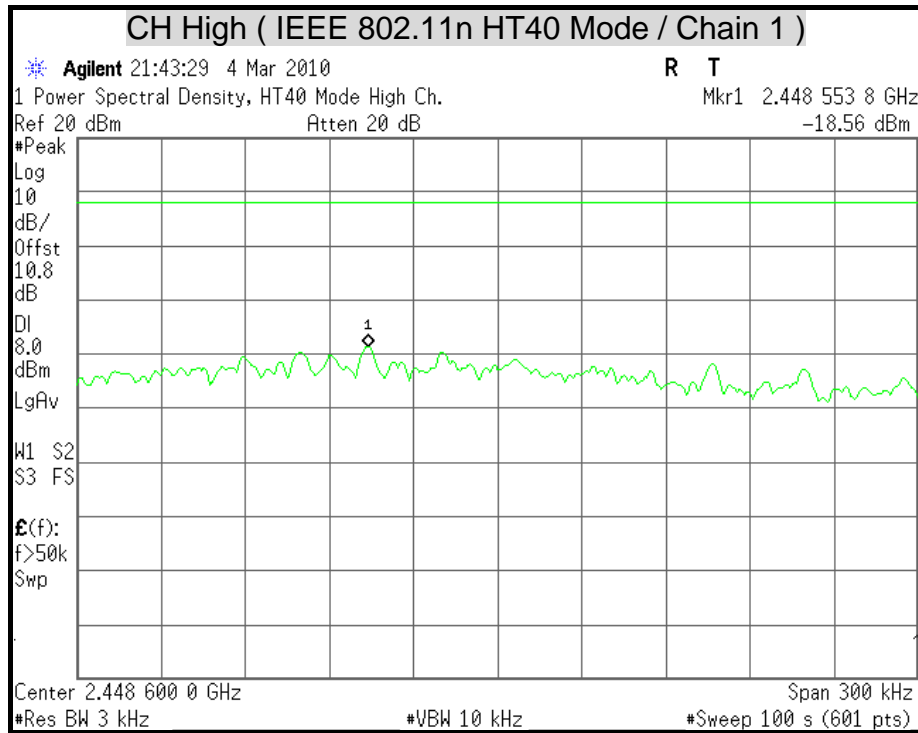


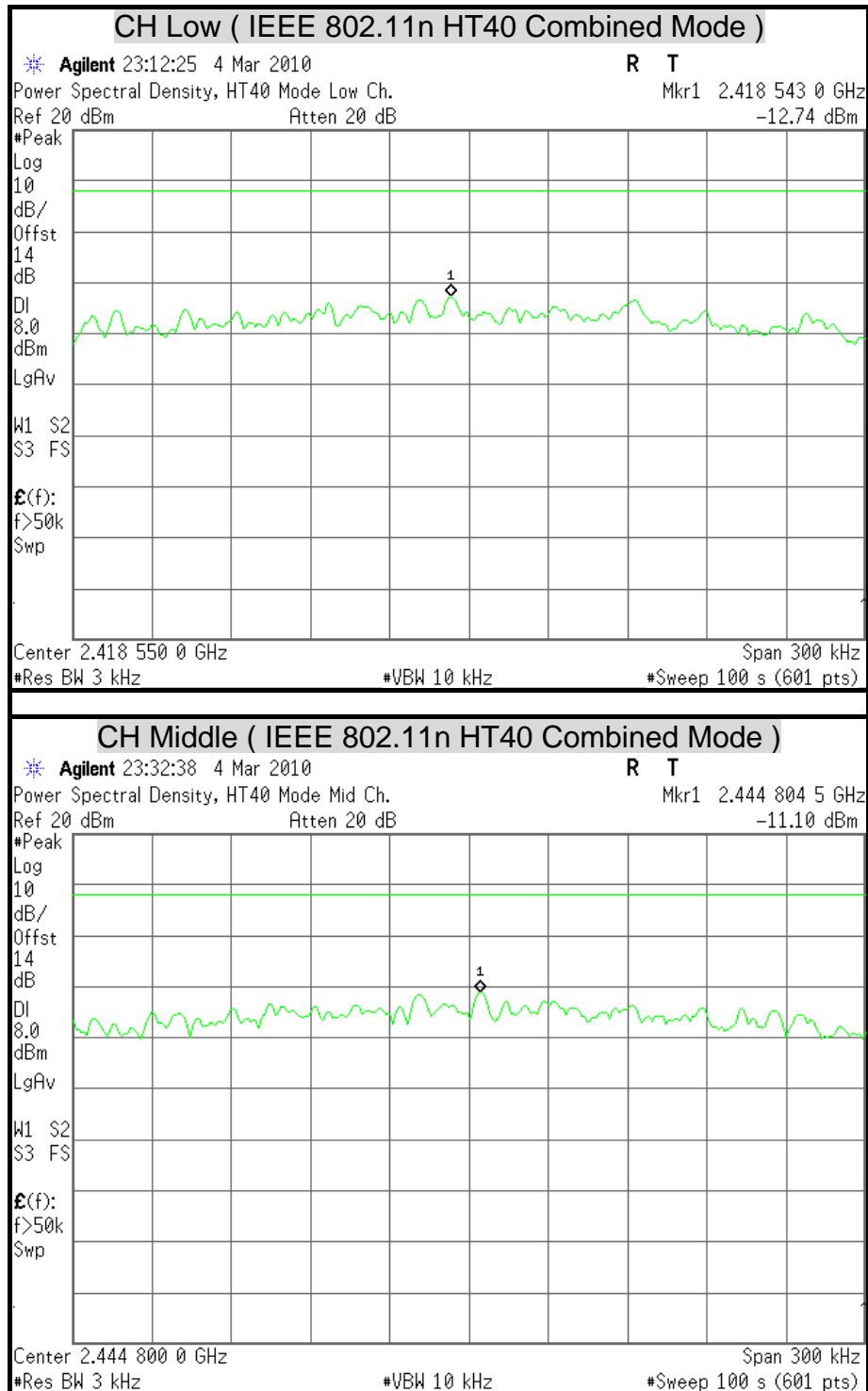


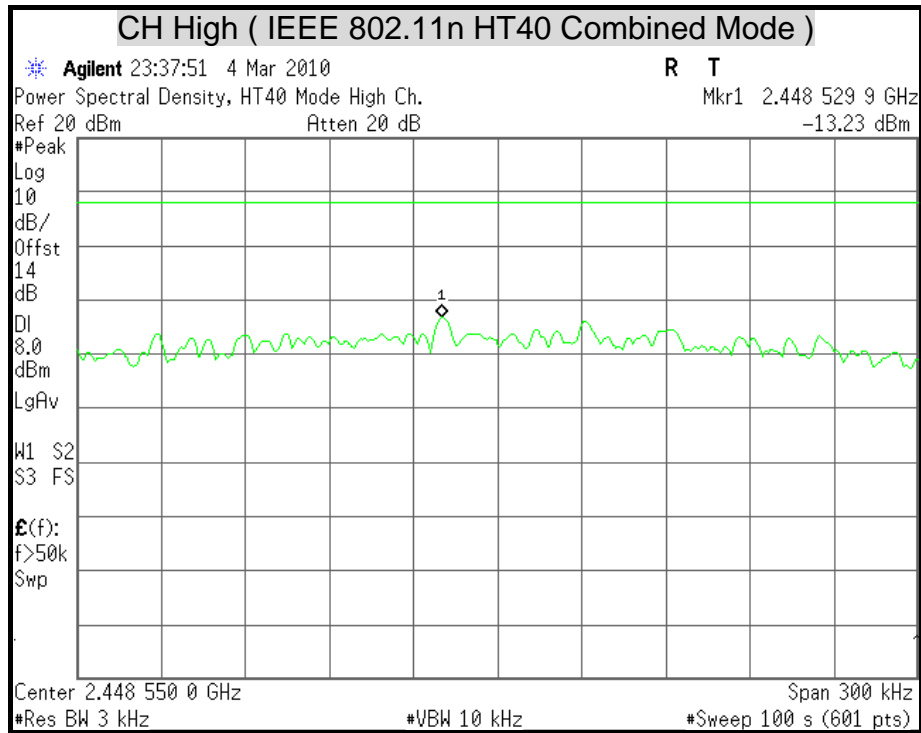














## 8.5 CONDUCTED SPURIOUS EMISSION

### LIMITS

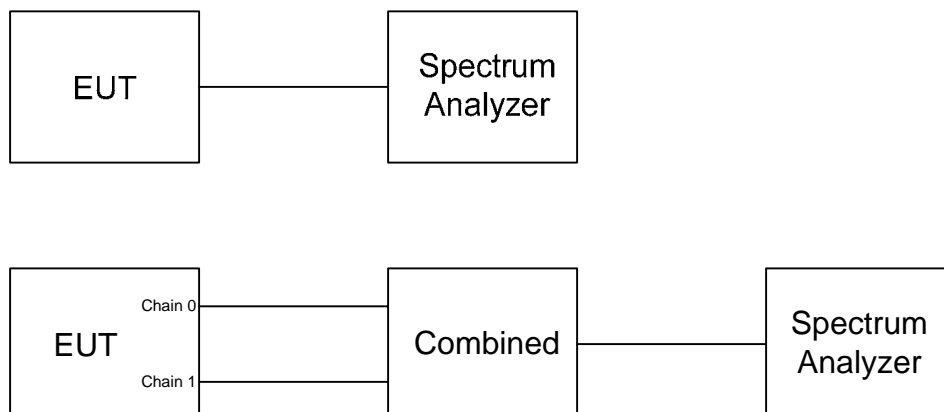
§ 15.247(d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in § 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a) (see § 15.205(c)).

### TEST EQUIPMENT

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	AGILENT	E4446A	MY43360132	06/09/2010
Spectrum Analyzer	AGILENT	E4446A	MY46180323	05/26/2010

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

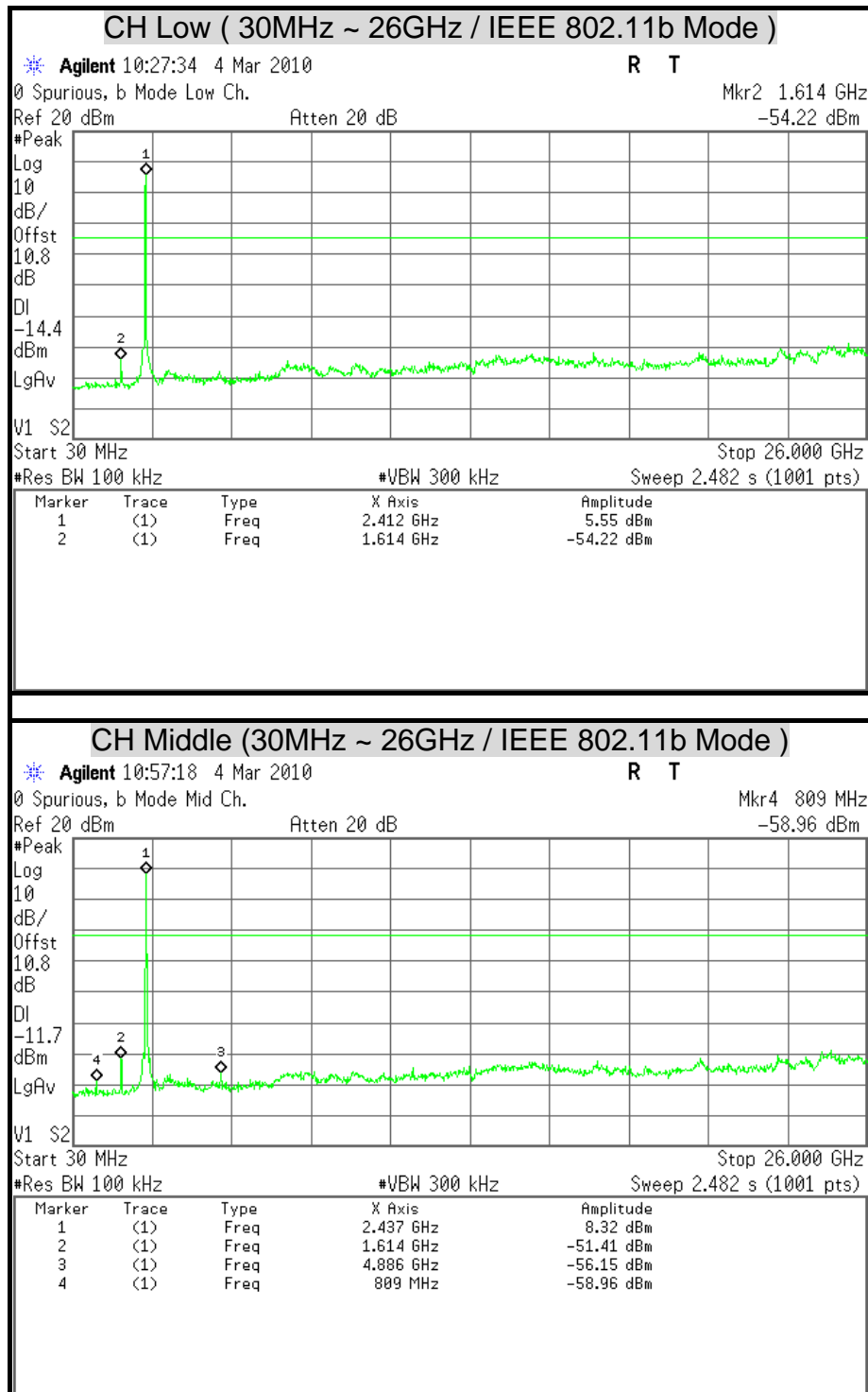
### TEST SETUP

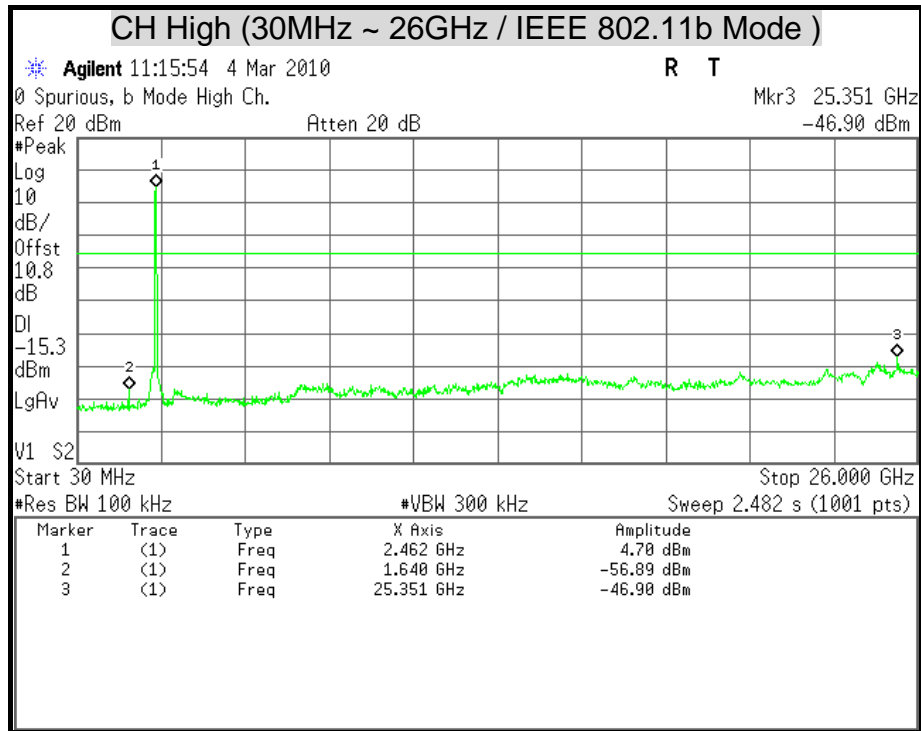


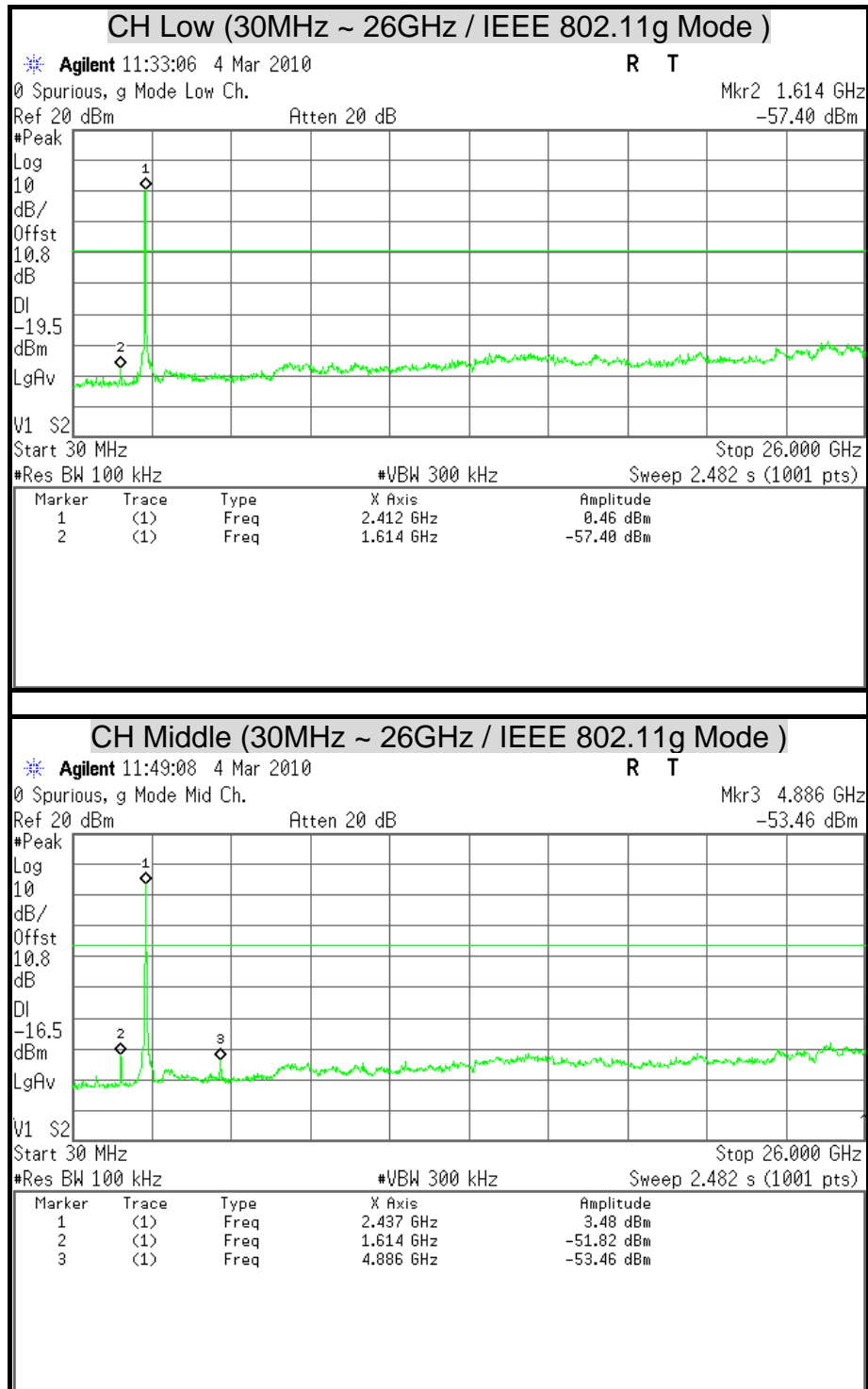
### TEST PROCEDURE

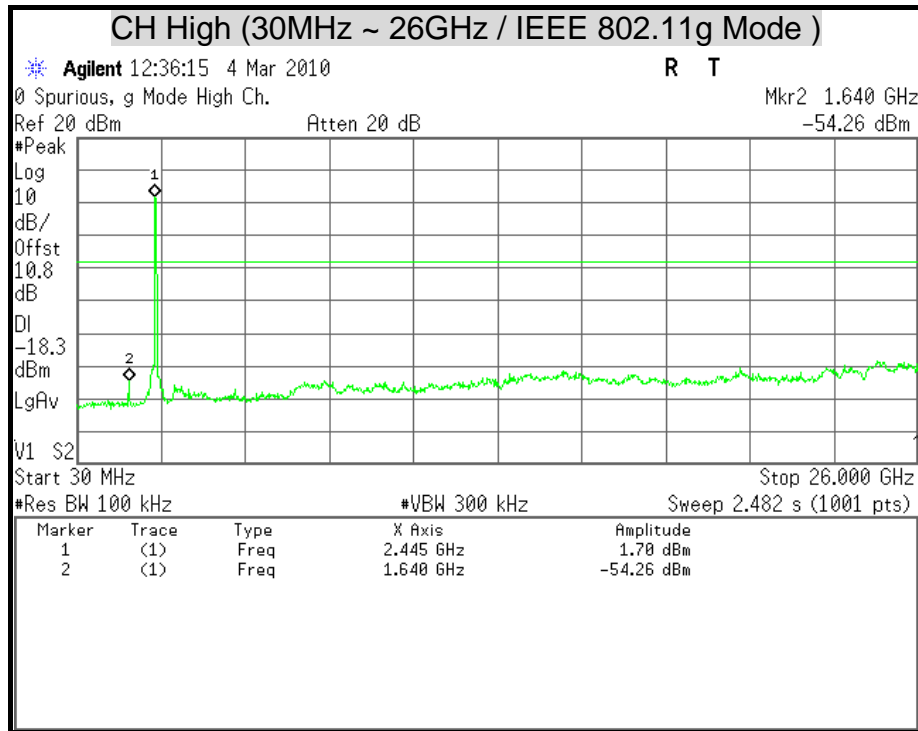
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

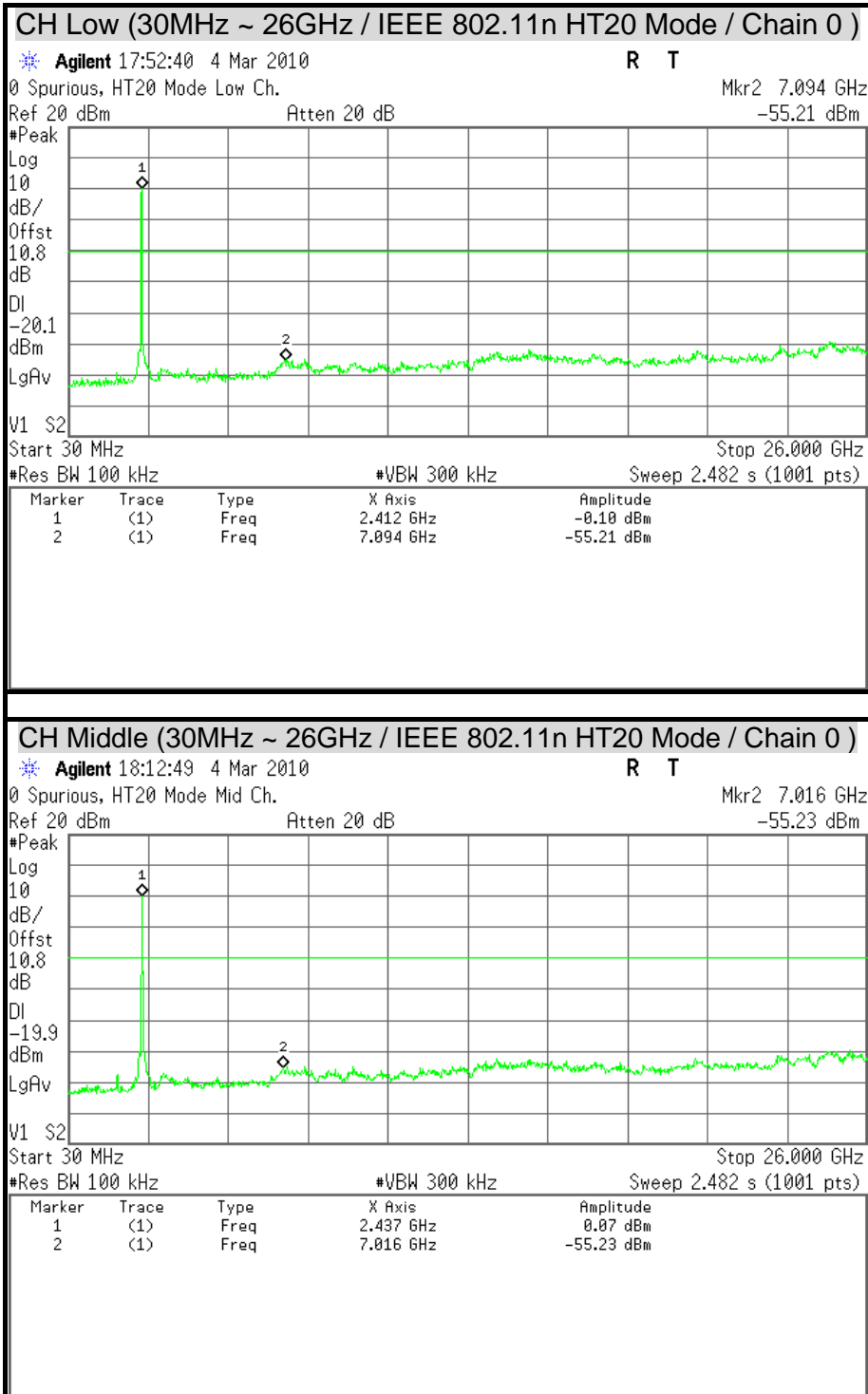
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in the 2.4 GHz band.

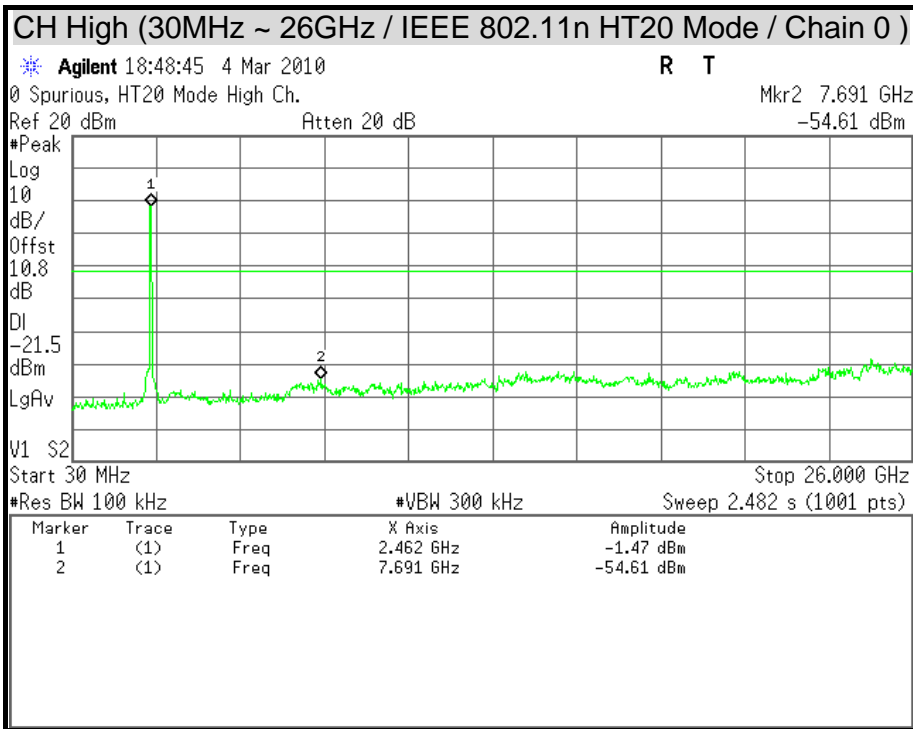
**TEST RESULTS****OUT-OF-BAND SPURIOUS EMISSIONS-CONDUCTED MEASUREMENT**











**CH Low (30MHz ~ 26GHz / IEEE 802.11n HT20 Mode / Chain 1 )**

Agilent 19:52:11 4 Mar 2010

R T

1 Spurious, HT20 Mode Low Ch.

Mkr3 4.808 GHz

Ref 20 dBm

Atten 20 dB

-57.23 dBm

#Peak

Log

10

dB/

Offst

10.8

dB

DI

-22.1

dBm

LgAv

V1 S2

Start 30 MHz

Stop 26.000 GHz

#Res BW 100 kHz

#VBW 300 kHz

Sweep 2.482 s (1001 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.412 GHz	-2.01 dBm
2	(1)	Freq	1.614 GHz	-51.61 dBm
3	(1)	Freq	4.808 GHz	-57.23 dBm

**CH Middle (30MHz ~ 26GHz / IEEE 802.11n HT20 Mode / Chain 1 )**

Agilent 20:40:55 4 Mar 2010

R T

1 Spurious, HT20 Mode Mid Ch.

Mkr4 4.860 GHz

Ref 20 dBm

Atten 20 dB

-55.26 dBm

#Peak

Log

10

dB/

Offst

10.8

dB

DI

-21.6

dBm

LgAv

V1 S2

Start 30 MHz

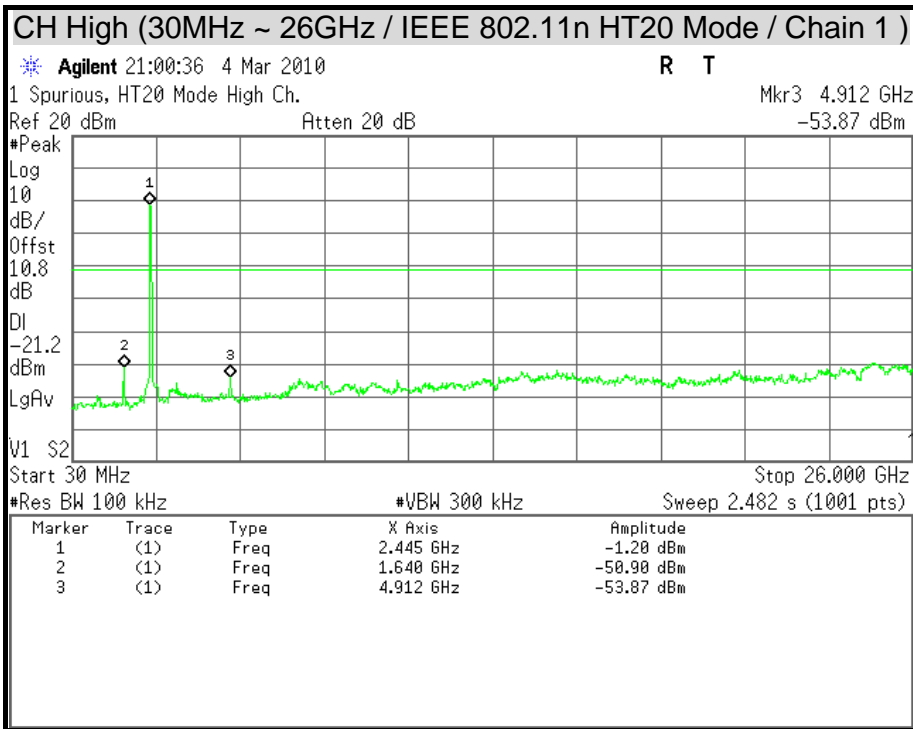
Stop 26.000 GHz

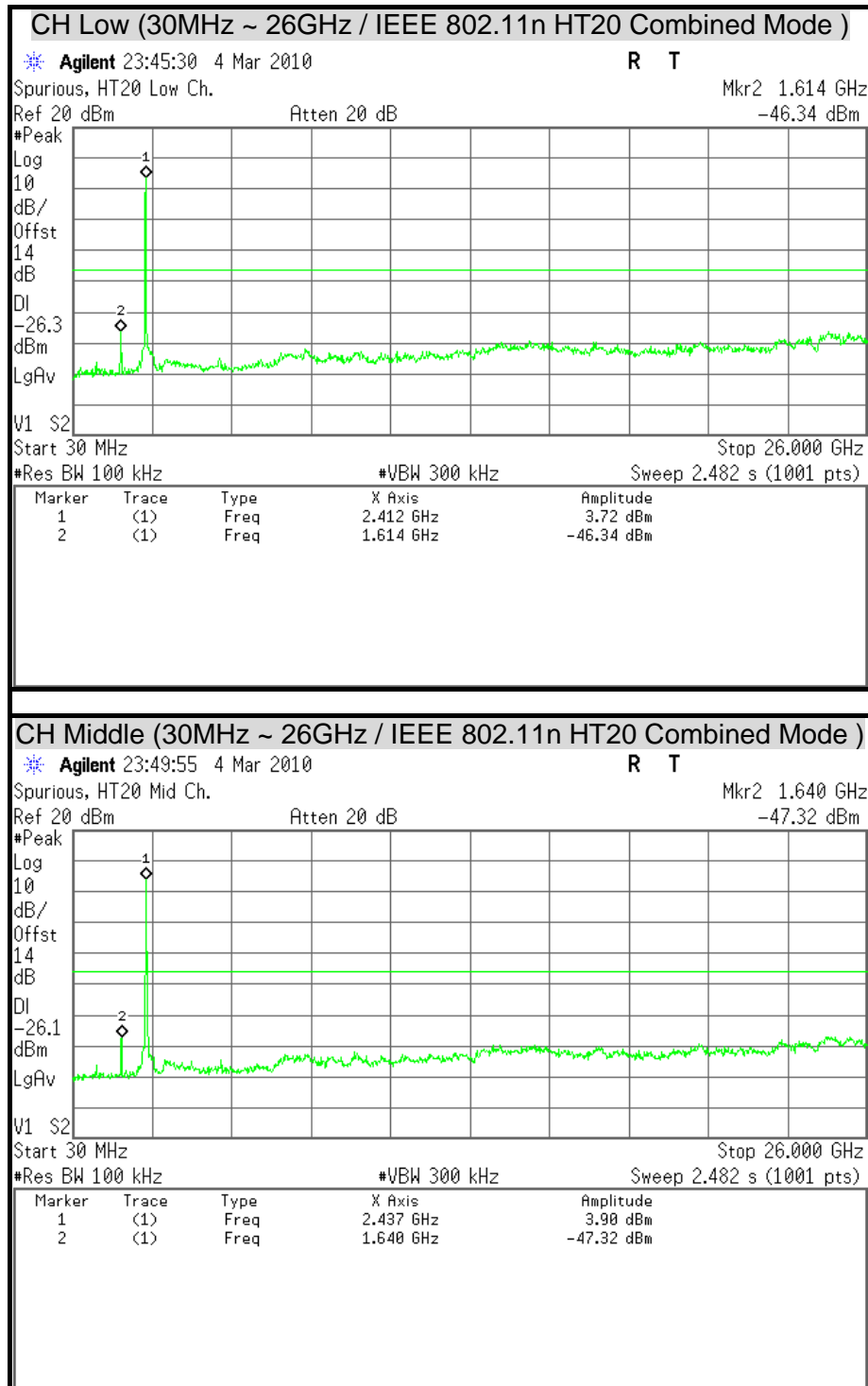
#Res BW 100 kHz

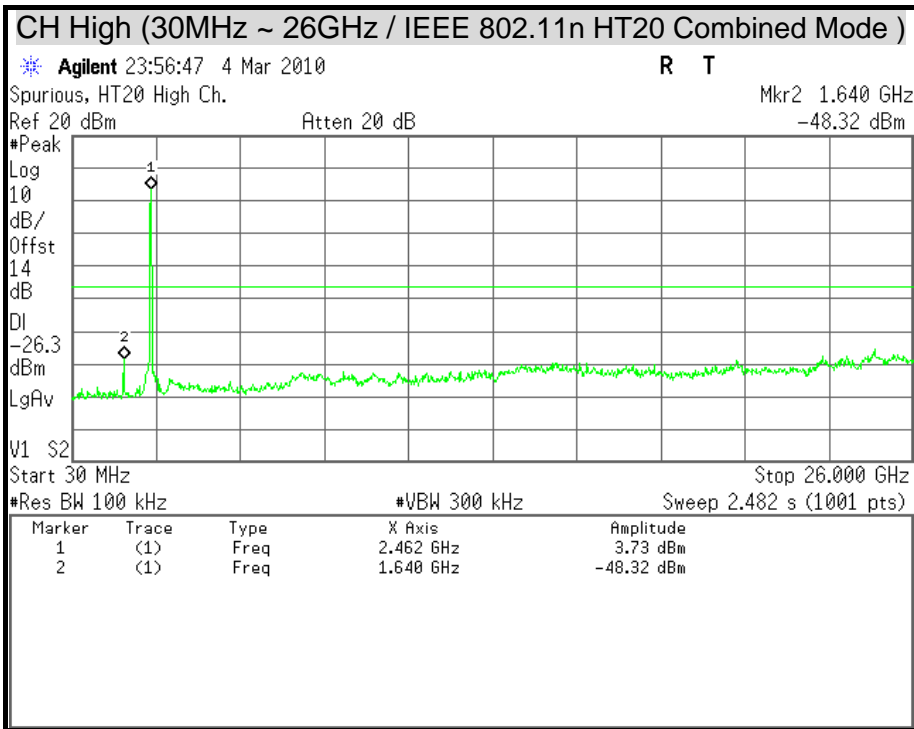
#VBW 300 kHz

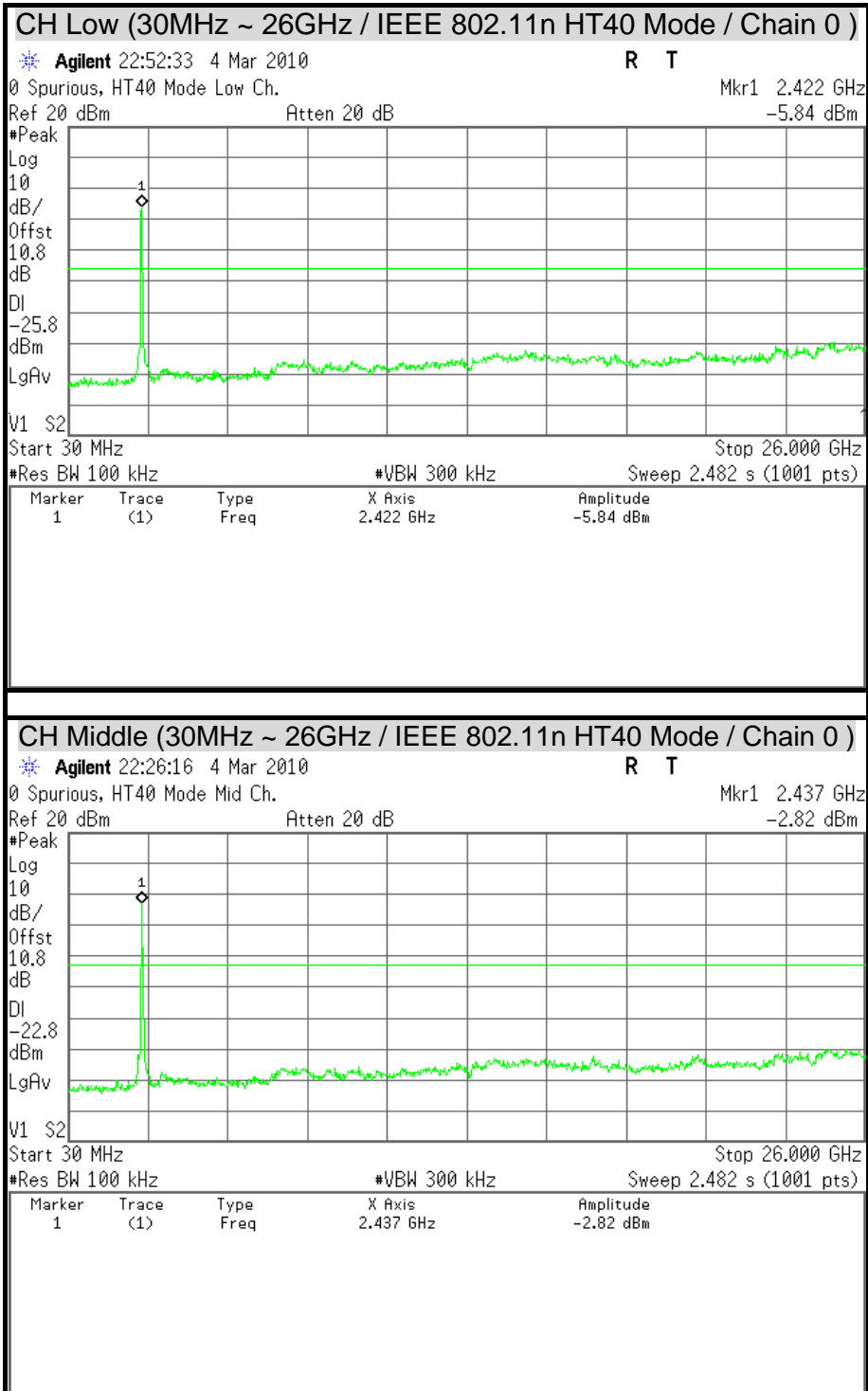
Sweep 2.482 s (1001 pts)

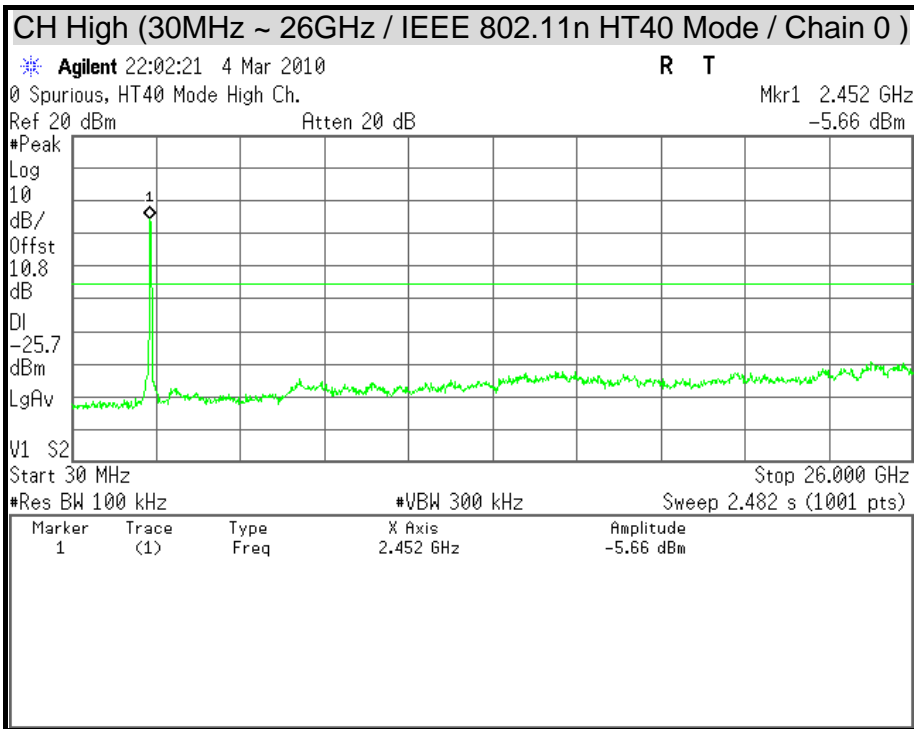
Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.437 GHz	-1.56 dBm
2	(1)	Freq	809 MHz	-57.15 dBm
3	(1)	Freq	1.640 GHz	-51.59 dBm
4	(1)	Freq	4.860 GHz	-55.26 dBm

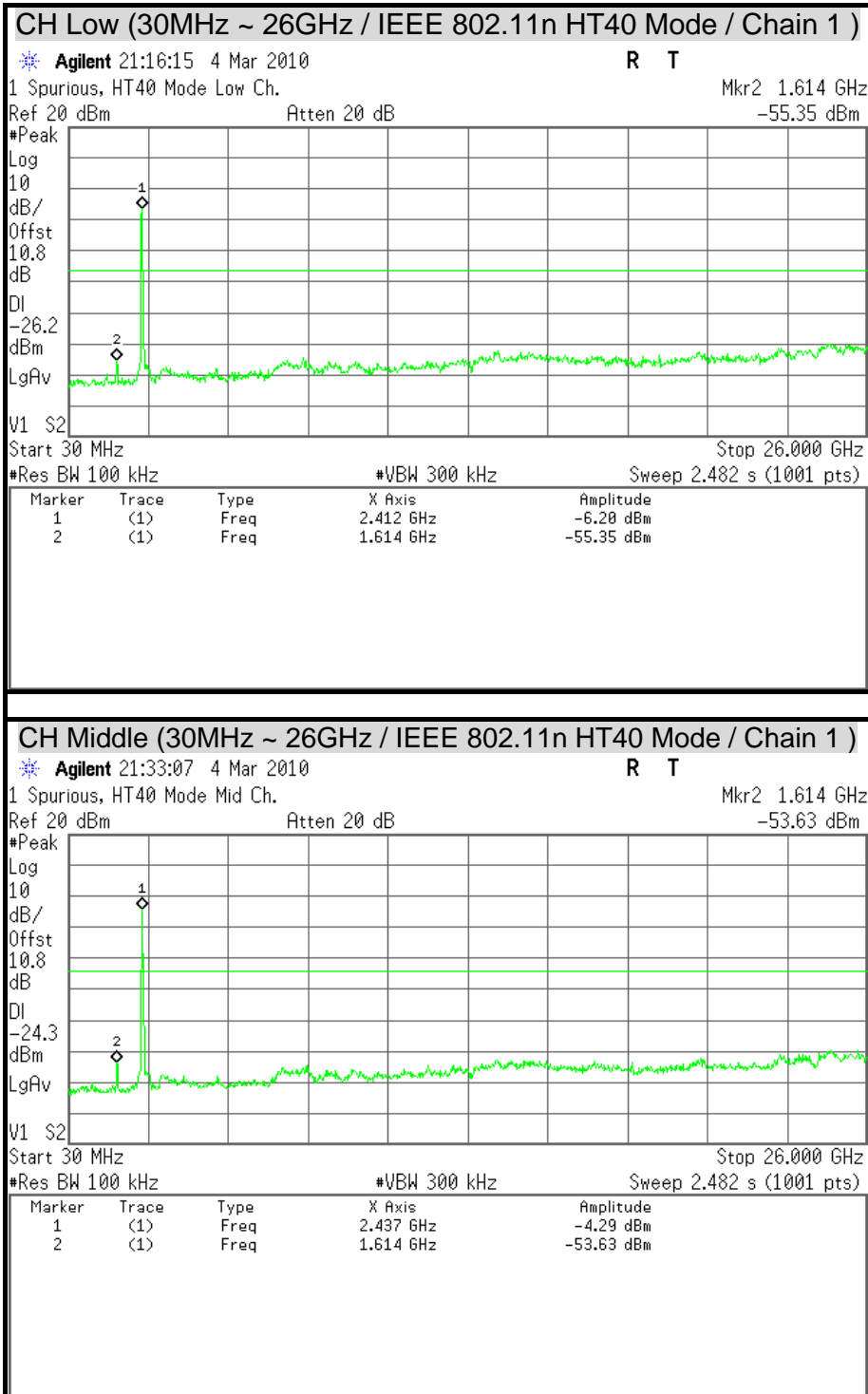


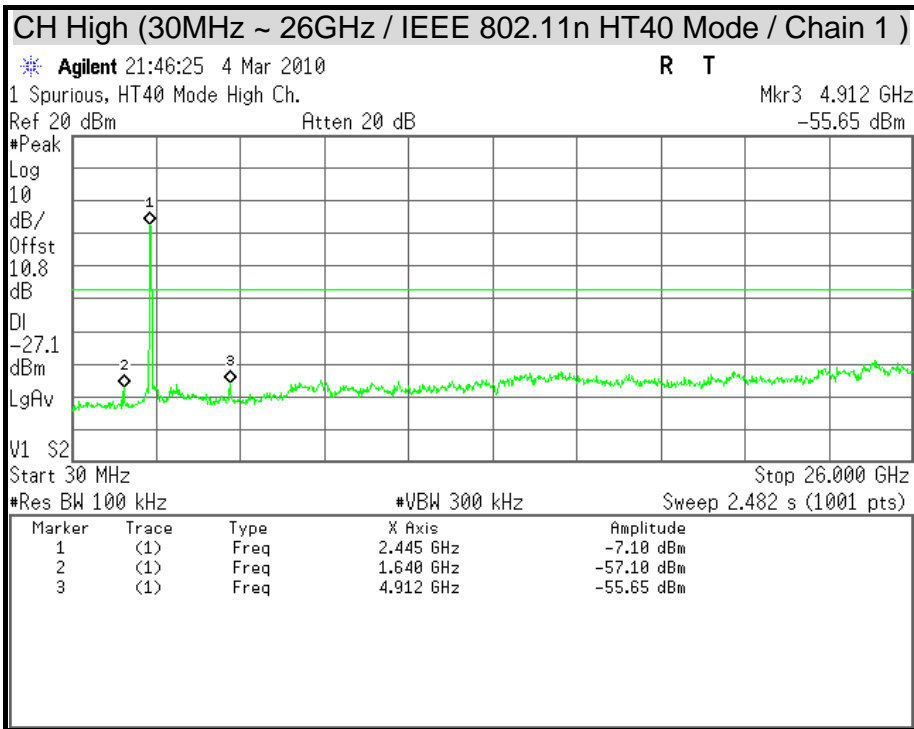


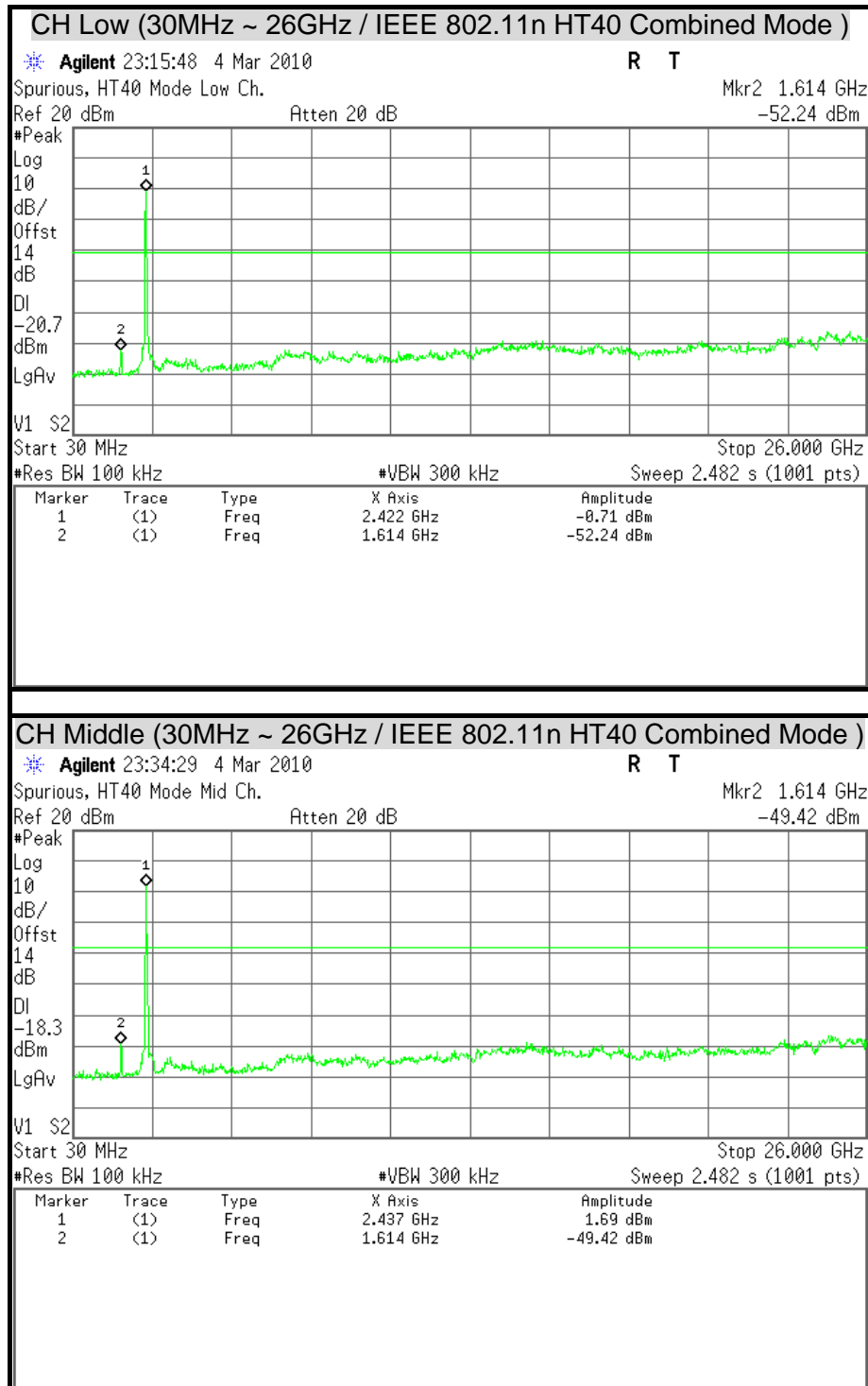


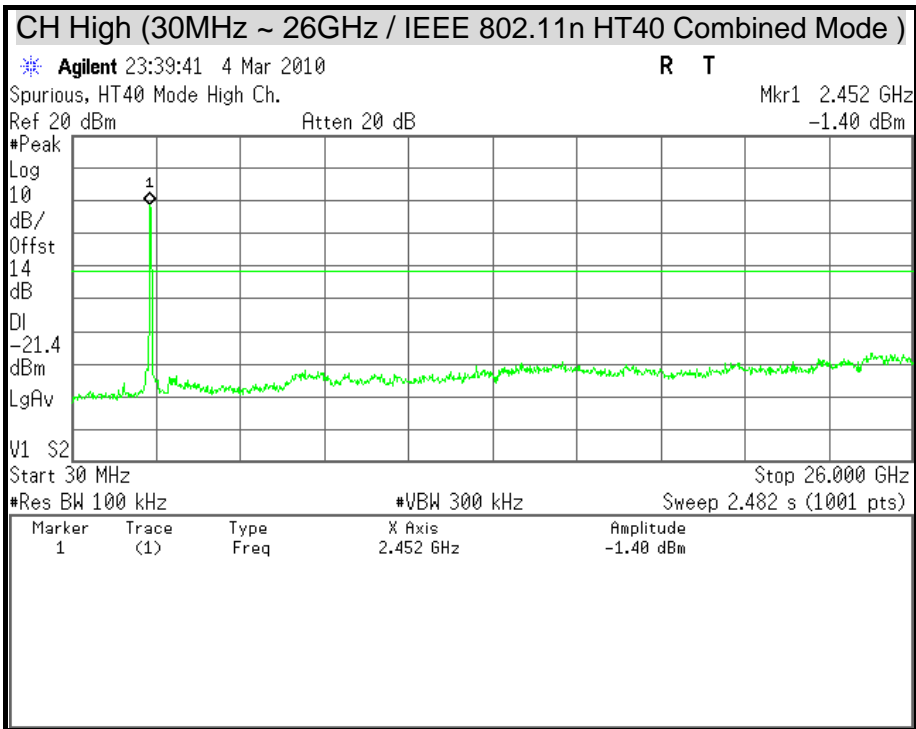














## 8.6 RADIATED EMISSION

### LIMITS

(1) § 15.205 (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 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3338	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	( <sup>2</sup> )
13.36 - 13.41			

**Remark:**

1. <sup>1</sup> Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.
2. <sup>2</sup> Above 38.6

(2) § 15.205 (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) 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 (microvolts/meter)	Measurement Distance (meters)
0.009 – 0.490	2400/F(KHz)	300
0.490 – 1.705	24000/F(KHz)	30
1.705 – 30.0	30	30
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.

- (4) According to § 15.209 (b) In the emission table above, the tighter limit applies at the band edges.

## TEST EQUIPMENT

### 966Chamber\_A

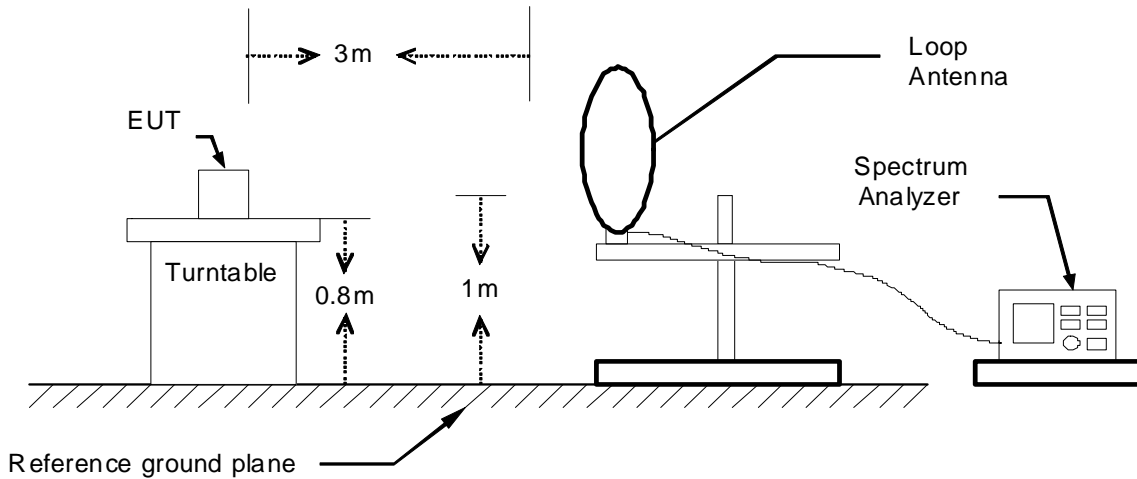
Name of Equipment	Manufacture	Model	Serial Number	Calibration Due
Spectrum Analyzer	AGILENT	E4446A	MY43360132	06/09/2010
EMI Test Receiver	ROHDE & SCHWARZ	ESCI	100221	05/17/2010
Bilog Antenna	SCHWARZBECK	VULB 9168	9168-249	11/12/2010
Double-Ridged Waveguide Horn	ETS LINDGREN	3117	00078732	06/30/2010
Pre-Amplifier	AGILENT	8449B	3008A01471	08/02/2010
Pre-Amplifier	HP	8447F	2944A03748	09/24/2010
RF Coaxial Cable	HUBER-SUHNER	SUCOFLEX 104PEA	SN31347	07/21/2010
RF Coaxial Cable	HUBER-SUHNER	SUCOFLEX 104PEA	SN31350	07/21/2010
RF Coaxial Cable	HUBER-SUHNER	SUCOFLEX 104PEA	SN31355	07/21/2010
LOOP ANTENNA	EMCO	6502	2356	05/28/2010
Notch Filters Band Reject	Micro-Tronics	BRM05702-01	009	N.C.R

**Remark:** 1. Each piece of equipment is scheduled for calibration once a year.  
2. N.C.R = No Calibration Request.

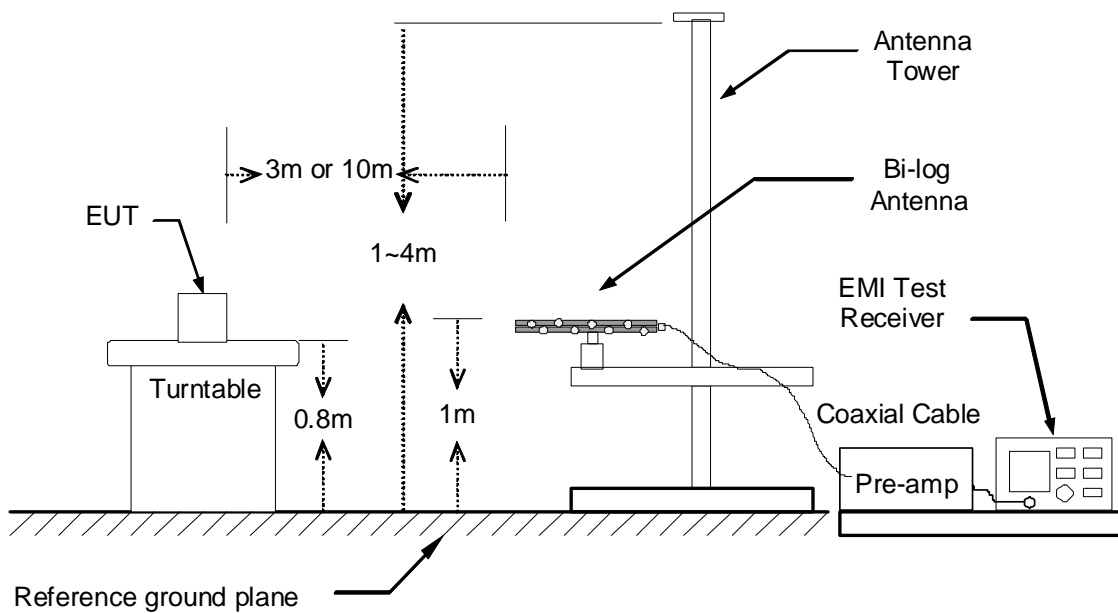
## TEST SETUP

The diagram below shows the test setup that is utilized to make the measurements for emission from below 1GHz.

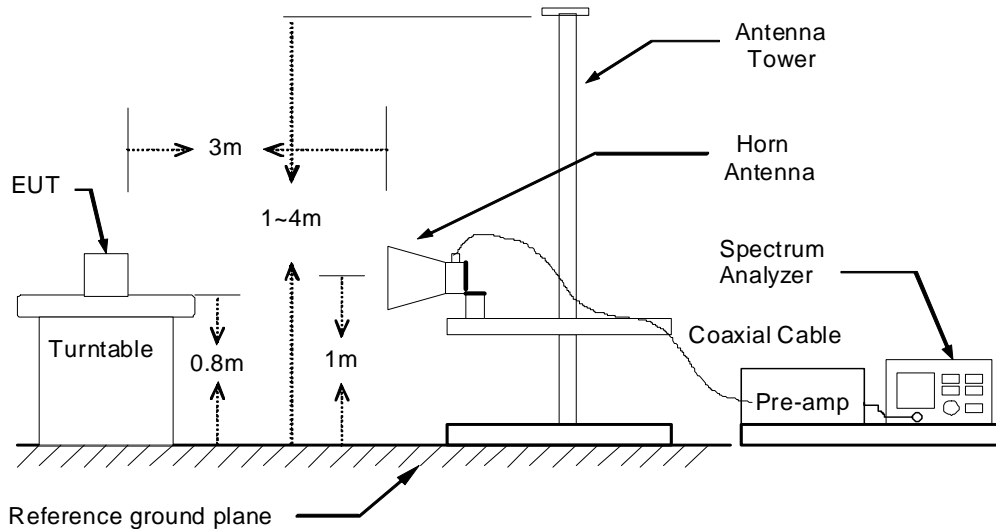
### 9kHz ~ 30MHz



### 30MHz ~ 1GHz



The diagram below shows the test setup that is utilized to make the measurements for emission above 1GHz.



### **TEST PROCEDURE**

1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 10 meter open area test site. The table was rotated 360 degrees to determine the position of the highest radiation.
2. While measuring the radiated emission below 1GHz, the EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. While measuring the radiated emission above 1GHz, the EUT was set 3 meters away from the interference-receiving antenna.
3. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarization of the antenna are set to make the measurement.
4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the table was turned from 0 degrees to 360 degrees to find the maximum reading.
5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
6. If the emission level of the EUT in peak mode was 10 dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10 dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

#### **Remark :**

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 KHz for Peak detection (PK) and Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz for Peak detection and frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 10 Hz for Average detection (AV) at frequency above 1GHz.

**TEST RESULTS****Below 1 GHz (9kHz ~ 30MHz)**

No emission found between lowest internal used/generated frequency to 30MHz.

**Below 1 GHz (30MHz ~ 1GHz)**

<b>Product Name</b>	Wireless Mini-PCI	<b>Test By</b>	Rueyyan Lin
<b>Model</b>	WMP-N07-5635A1	<b>Test Date</b>	2010/03/05
<b>Test Mode</b>	IEEE 802.11n HT20 TX / CH Low (worst-case)	<b>TEMP &amp; Humidity</b>	22.8°C, 61%

966 Chamber_A at 3Meter / Horizontal						
Frequency (MHz)	Reading (dBμV)	Correction Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Remark
160.95	49.62	-10.06	39.55	43.50	-3.95	Peak
193.93	53.45	-12.08	41.37	43.50	-2.13	Peak
221.09	56.50	-11.66	44.84	46.00	-1.16	QP
238.55	53.70	-11.07	42.63	46.00	-3.37	QP
260.86	55.27	-10.28	44.99	46.00	-1.01	QP
275.41	54.40	-9.76	44.64	46.00	-1.36	QP
321.97	47.80	-8.20	39.60	46.00	-6.40	QP
331.67	51.12	-7.90	43.21	46.00	-2.79	Peak
966 Chamber_A at 3Meter / Vertical						
Frequency (MHz)	Reading (dBμV)	Correction Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Remark
32.91	42.18	-11.08	31.10	40.00	-8.90	Peak
192.96	46.21	-12.03	34.18	43.50	-9.32	Peak
198.78	50.07	-12.32	37.75	43.50	-5.75	Peak
224.00	48.84	-11.56	37.28	46.00	-8.72	Peak
266.68	50.49	-10.07	40.42	46.00	-5.58	Peak
275.41	47.63	-9.76	37.87	46.00	-8.13	Peak
366.59	48.43	-6.84	41.58	46.00	-4.42	Peak
599.39	38.40	-1.32	37.07	46.00	-8.93	Peak

**Remark:**

1. Quasi-peak test would be performed if the peak result were greater than the quasi-peak limit.
2. 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.
3. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Loss (dB) – PreAmp.Gain (dB)
4. Result (dBμV/m) = Reading (dBμV) + Correction Factor (dB/m)
5. Margin (dB) = Remark result (dBμV/m) - Quasi-peak limit (dBμV/m).



## Above 1 GHz

<b>Product Name</b>	Wireless Mini-PCI	<b>Test By</b>	Rick Lin
<b>Model</b>	WMP-N07-5635A1	<b>Test Date</b>	2010/03/03
<b>Test Mode</b>	IEEE 802.11b TX / CH Low	<b>TEMP &amp; Humidity</b>	23.3 °C, 54%

966 Chamber_A at 3Meter / Horizontal									
Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1862.00	54.79	41.83	0.38	55.17	42.21	74.00	54.00	-11.79	AVG
2416.00	107.28	99.92	2.31	109.59	102.23	---	---	---	Carrier
3172.50	42.57	---	3.68	46.25	---	74.00	54.00	-7.75	Peak
4822.50	51.43	38.06	7.08	58.51	45.14	74.00	54.00	-8.86	AVG
5677.50	40.31	---	8.69	48.99	---	74.00	54.00	-5.01	Peak
7072.50	43.89	27.27	10.18	54.07	37.45	74.00	54.00	-16.55	AVG
966 Chamber_A at 3Meter / Vertical									
Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1330.00	56.38	---	-3.65	52.73	---	74.00	54.00	-1.27	Peak
1866.00	58.69	43.89	0.42	59.11	44.31	74.00	54.00	-9.69	AVG
2414.00	99.70	92.08	2.31	102.01	94.39	---	---	---	Carrier
3217.50	44.97	---	3.76	48.73	---	74.00	54.00	-5.27	Peak
4822.50	50.26	37.28	7.08	57.34	44.36	74.00	54.00	-9.64	AVG
5835.00	40.97	---	8.96	49.93	---	74.00	54.00	-4.07	Peak
6825.00	40.89	---	10.11	51.00	---	74.00	54.00	-3.00	Peak

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Average test would be performed if the peak result were greater than the average limit.
3. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
4. 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.
5. In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.
6. Result = Reading + Correction Factor  
Margin = Result - Limit  
Remark Peak = Result(PK) - Limit(AV)  
Remark AVG = Result(AV) - Limit(AV)



<b>Product Name</b>	Wireless Mini-PCI	<b>Test By</b>	Rick Lin
<b>Model</b>	WMP-N07-5635A1	<b>Test Date</b>	2010/03/03
<b>Test Mode</b>	IEEE 802.11b TX / CH Middle	<b>TEMP &amp; Humidity</b>	23.3°C, 54%

966 Chamber_A at 3Meter / Horizontal									
Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1626.00	54.30	---	-1.87	52.43	---	74.00	54.00	-1.57	Peak
1862.00	55.32	41.09	0.38	55.70	41.47	74.00	54.00	-12.53	AVG
2434.00	108.64	101.21	2.34	110.98	103.55	---	---	---	Carrier
4275.00	41.58	---	6.11	47.69	---	74.00	54.00	-6.31	Peak
4875.00	49.74	36.56	7.11	56.85	43.67	74.00	54.00	-10.33	AVG
6000.00	40.73	---	9.25	49.98	---	74.00	54.00	-4.02	Peak
6750.00	41.26	---	10.02	51.28	---	74.00	54.00	-2.72	Peak
966 Chamber_A at 3Meter / Vertical									
Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1330.00	56.19	---	-3.65	52.54	---	74.00	54.00	-1.46	Peak
1858.00	57.94	43.60	0.34	58.28	43.94	74.00	54.00	-10.06	AVG
2434.00	102.66	95.40	2.34	105.00	97.74	---	---	---	Carrier
3442.50	43.00	---	4.18	47.18	---	74.00	54.00	-6.82	Peak
4875.00	49.79	35.94	7.11	56.90	43.05	74.00	54.00	-10.95	AVG
5775.00	40.61	---	8.86	49.47	---	74.00	54.00	-4.53	Peak
7305.00	46.06	34.94	9.69	55.75	44.63	74.00	54.00	-9.37	AVG

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Average test would be performed if the peak result were greater than the average limit.
3. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
4. 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.
5. In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.
6. Result = Reading + Correction Factor  
Margin = Result - Limit  
Remark Peak = Result(PK) - Limit(AV)  
Remark AVG = Result(AV) - Limit(AV)



<b>Product Name</b>	Wireless Mini-PCI	<b>Test By</b>	Rick Lin
<b>Model</b>	WMP-N07-5635A1	<b>Test Date</b>	2010/03/03
<b>Test Mode</b>	IEEE 802.11b TX / CH High	<b>TEMP &amp; Humidity</b>	23.3°C, 54%

966 Chamber_A at 3Meter / Horizontal									
Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1330.00	54.79	---	-3.65	51.14	---	74.00	54.00	-2.86	Peak
2460.00	106.07	98.48	2.38	108.45	100.86	---	---	---	Carrier
4035.00	41.37	---	5.24	46.62	---	74.00	54.00	-7.38	Peak
4920.00	41.29	---	7.14	48.43	---	74.00	54.00	-5.57	Peak
5610.00	40.22	---	8.57	48.79	---	74.00	54.00	-5.21	Peak
7072.50	40.89	---	10.18	51.07	---	74.00	54.00	-2.93	Peak
966 Chamber_A at 3Meter / Vertical									
Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1330.00	56.00	---	-3.65	52.35	---	74.00	54.00	-1.65	Peak
1862.00	58.41	43.91	0.38	58.79	44.29	74.00	54.00	-9.71	AVG
2464.00	101.34	93.83	2.38	103.72	96.21	---	---	---	Carrier
3285.00	44.13	---	3.89	48.02	---	74.00	54.00	-5.98	Peak
4927.50	42.20	---	7.14	49.34	---	74.00	54.00	-4.66	Peak
6832.50	40.66	---	10.12	50.78	---	74.00	54.00	-3.22	Peak
7905.00	43.75	27.33	10.78	54.53	38.11	74.00	54.00	-15.89	AVG

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Average test would be performed if the peak result were greater than the average limit.
3. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
4. 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.
5. In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.
6. Result = Reading + Correction Factor  
Margin = Result - Limit  
Remark Peak = Result(PK) - Limit(AV)  
Remark AVG = Result(AV) - Limit(AV)



<b>Product Name</b>	Wireless Mini-PCI	<b>Test By</b>	Rick Lin
<b>Model</b>	WMP-N07-5635A1	<b>Test Date</b>	2010/03/03
<b>Test Mode</b>	IEEE 802.11g TX / CH Low	<b>TEMP &amp; Humidity</b>	23.3°C, 54%

966 Chamber_A at 3Meter / Horizontal									
Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1864.00	54.12	40.07	0.40	54.52	40.47	74.00	54.00	-13.53	AVG
2416.00	104.85	96.37	2.31	107.16	98.68	---	---	---	Carrier
4057.50	41.53	---	5.33	46.86	---	74.00	54.00	-7.14	Peak
4822.50	49.58	36.44	7.08	56.66	43.52	74.00	54.00	-10.48	AVG
5767.50	40.57	---	8.84	49.41	---	74.00	54.00	-4.59	Peak
6705.00	40.77	---	9.96	50.73	---	74.00	54.00	-3.27	Peak
966 Chamber_A at 3Meter / Vertical									
Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1328.00	56.32	---	-3.66	52.67	---	74.00	54.00	-1.33	Peak
1864.00	58.37	44.03	0.40	58.77	44.43	74.00	54.00	-9.57	AVG
2420.00	96.24	87.47	2.32	98.56	89.79	---	---	---	Carrier
4822.50	43.22	---	7.08	50.30	---	74.00	54.00	-3.70	Peak
5535.00	40.39	---	8.43	48.83	---	74.00	54.00	-5.17	Peak
6435.00	40.43	---	9.64	50.07	---	74.00	54.00	-3.93	Peak
7230.00	41.78	---	9.85	51.63	---	74.00	54.00	-2.37	Peak

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Average test would be performed if the peak result were greater than the average limit.
3. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
4. 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.
5. In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.
6. Result = Reading + Correction Factor  
Margin = Result - Limit  
Remark Peak = Result(PK) - Limit(AV)  
Remark AVG = Result(AV) - Limit(AV)



<b>Product Name</b>	Wireless Mini-PCI	<b>Test By</b>	Rick Lin
<b>Model</b>	WMP-N07-5635A1	<b>Test Date</b>	2010/03/03
<b>Test Mode</b>	IEEE 802.11g TX / CH Middle	<b>TEMP &amp; Humidity</b>	23.3°C, 54%

966 Chamber_A at 3Meter / Horizontal									
Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1616.00	54.00	---	-1.97	52.04	---	74.00	54.00	-1.96	Peak
2442.00	108.70	100.07	2.35	111.05	102.42	---	---	---	Carrier
3232.50	42.70	---	3.79	46.49	---	74.00	54.00	-7.51	Peak
4867.50	44.36	---	7.11	51.46	---	74.00	54.00	-2.54	Peak
5985.00	39.72	---	9.23	48.95	---	74.00	54.00	-5.05	Peak
7312.50	41.89	---	9.68	51.57	---	74.00	54.00	-2.43	Peak
966 Chamber_A at 3Meter / Vertical									
Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1332.00	55.26	---	-3.64	51.62	---	74.00	54.00	-2.38	Peak
1862.00	58.70	43.96	0.38	59.08	44.34	74.00	54.00	-9.66	AVG
2434.00	102.03	93.42	2.34	104.37	95.76	---	---	---	Carrier
4860.00	50.47	34.39	7.10	57.57	41.49	74.00	54.00	-12.51	AVG
5925.00	40.56	---	9.12	49.68	---	74.00	54.00	-4.32	Peak
6802.50	40.83	---	10.08	50.91	---	74.00	54.00	-3.09	Peak
7312.50	49.34	36.03	9.68	59.02	45.71	74.00	54.00	-8.29	AVG

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Average test would be performed if the peak result were greater than the average limit.
3. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
4. 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.
5. In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.
6. Result = Reading + Correction Factor  
Margin = Result - Limit  
Remark Peak = Result(PK) - Limit(AV)  
Remark AVG = Result(AV) - Limit(AV)



<b>Product Name</b>	Wireless Mini-PCI	<b>Test By</b>	Rick Lin
<b>Model</b>	WMP-N07-5635A1	<b>Test Date</b>	2010/03/03
<b>Test Mode</b>	IEEE 802.11g TX / CH High	<b>TEMP &amp; Humidity</b>	23.3°C, 54%

966 Chamber_A at 3Meter / Horizontal									
Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1330.00	54.80	---	-3.65	51.15	---	74.00	54.00	-2.85	Peak
2464.00	104.02	95.25	2.38	106.40	97.63	---	---	---	Carrier
3435.00	42.41	---	4.16	46.58	---	74.00	54.00	-7.42	Peak
4927.50	41.85	---	7.14	48.99	---	74.00	54.00	-5.01	Peak
6232.50	40.24	---	9.46	49.70	---	74.00	54.00	-4.30	Peak
7170.00	41.53	---	9.98	51.50	---	74.00	54.00	-2.50	Peak
966 Chamber_A at 3Meter / Vertical									
Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1330.00	55.55	---	-3.65	51.90	---	74.00	54.00	-2.10	Peak
1866.00	58.72	44.11	0.42	59.14	44.53	74.00	54.00	-9.47	AVG
2046.00	52.85	39.63	1.77	54.62	41.40	74.00	54.00	-12.60	AVG
2466.00	99.94	91.25	2.38	102.32	93.63	---	---	---	Carrier
3855.00	41.89	---	4.88	46.76	---	74.00	54.00	-7.24	Peak
4927.50	41.86	---	7.14	49.00	---	74.00	54.00	-5.00	Peak
6075.00	41.17	---	9.32	50.49	---	74.00	54.00	-3.51	Peak
7050.00	40.75	---	10.23	50.98	---	74.00	54.00	-3.02	Peak

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Average test would be performed if the peak result were greater than the average limit.
3. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
4. 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.
5. In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.
6. Result = Reading + Correction Factor  
 Margin = Result - Limit  
 Remark Peak = Result(PK) - Limit(AV)  
 Remark AVG = Result(AV) - Limit(AV)



<b>Product Name</b>	Wireless Mini-PCI	<b>Test By</b>	Rick Lin
<b>Model</b>	WMP-N07-5635A1	<b>Test Date</b>	2010/03/03
<b>Test Mode</b>	IEEE 802.11n HT20 TX / CH Low	<b>TEMP &amp; Humidity</b>	23.3°C, 54%

**966 Chamber\_A at 3Meter / Horizontal**

Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1234.00	54.36	---	-3.98	50.38	---	74.00	54.00	-3.62	Peak
2408.00	103.87	94.52	2.30	106.17	96.82	---	---	---	Carrier
3195.00	42.75	---	3.72	46.48	---	74.00	54.00	-7.52	Peak
4822.50	55.63	41.41	7.08	62.71	48.49	74.00	54.00	-5.51	AVG
6292.50	40.46	---	9.51	49.97	---	74.00	54.00	-4.03	Peak
7170.00	41.11	---	9.98	51.09	---	74.00	54.00	-2.91	Peak

**966 Chamber\_A at 3Meter / Vertical**

Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1330.00	55.69	---	-3.65	52.04	---	74.00	54.00	-1.96	Peak
1612.00	54.77	---	-2.00	52.76	---	74.00	54.00	-1.24	Peak
1862.00	58.23	43.87	0.38	58.61	44.25	74.00	54.00	-9.75	AVG
2418.00	101.30	92.37	2.31	103.61	94.68	---	---	---	Carrier
4822.50	50.77	37.22	7.08	57.85	44.30	74.00	54.00	-9.70	AVG
6435.00	41.15	---	9.64	50.79	---	74.00	54.00	-3.21	Peak
6975.00	41.56	---	10.30	51.86	---	74.00	54.00	-2.14	Peak
7237.50	47.10	32.40	9.83	56.93	42.23	74.00	54.00	-11.77	AVG

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Average test would be performed if the peak result were greater than the average limit.
3. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
4. 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.
5. In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.
6. Result = Reading + Correction Factor  
Margin = Result - Limit  
Remark Peak = Result(PK) - Limit(AV)  
Remark AVG = Result(AV) - Limit(AV)



<b>Product Name</b>	Wireless Mini-PCI	<b>Test By</b>	Rick Lin
<b>Model</b>	WMP-N07-5635A1	<b>Test Date</b>	2010/03/03
<b>Test Mode</b>	IEEE 802.11n HT20 TX / CH Middle	<b>TEMP &amp; Humidity</b>	23.3°C, 54%

966 Chamber_A at 3Meter / Horizontal									
Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1626.00	63.60	51.89	-1.87	61.73	50.02	74.00	54.00	-3.98	AVG
2442.00	109.63	102.53	2.35	111.98	104.88	---	---	---	Carrier
4867.50	57.64	41.09	7.11	64.75	48.20	74.00	54.00	-5.80	AVG
5737.50	40.89	---	8.79	49.69	---	74.00	54.00	-4.31	Peak
6555.00	40.92	---	9.77	50.69	---	74.00	54.00	-3.31	Peak
7312.50	41.84	---	9.68	51.51	---	74.00	54.00	-2.49	Peak
966 Chamber_A at 3Meter / Vertical									
Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1328.00	56.27	---	-3.66	52.62	---	74.00	54.00	-1.38	Peak
1630.00	63.68	52.02	-1.83	61.85	50.19	74.00	54.00	-3.81	AVG
1864.00	58.68	44.10	0.40	59.08	44.50	74.00	54.00	-9.50	AVG
2434.00	105.90	96.39	2.34	108.24	98.73	---	---	---	Carrier
3255.00	43.65	---	3.83	47.48	---	74.00	54.00	-6.52	Peak
4875.00	51.78	37.16	7.11	58.89	44.27	74.00	54.00	-9.73	AVG
6495.00	40.91	---	9.69	50.60	---	74.00	54.00	-3.40	Peak
7305.00	52.05	35.85	9.69	61.74	45.54	74.00	54.00	-8.46	AVG

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Average test would be performed if the peak result were greater than the average limit.
3. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
4. 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.
5. In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.
6. Result = Reading + Correction Factor  
 Margin = Result - Limit  
 Remark Peak = Result(PK) - Limit(AV)  
 Remark AVG = Result(AV) - Limit(AV)



<b>Product Name</b>	Wireless Mini-PCI	<b>Test By</b>	Rick Lin
<b>Model</b>	WMP-N07-5635A1	<b>Test Date</b>	2010/03/03
<b>Test Mode</b>	IEEE 802.11n HT20 TX / CH High	<b>TEMP &amp; Humidity</b>	23.3°C, 54%

966 Chamber_A at 3Meter / Horizontal									
Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1642.00	57.83	45.18	-1.72	56.11	43.46	74.00	54.00	-10.54	AVG
2458.00	106.89	97.12	2.37	109.26	99.49	---	---	---	Carrier
3780.00	42.58	---	4.75	47.33	---	74.00	54.00	-6.67	Peak
4335.00	41.47	---	6.32	47.79	---	74.00	54.00	-6.21	Peak
4920.00	48.84	33.79	7.14	55.98	40.93	74.00	54.00	-13.07	AVG
5805.00	40.66	---	8.91	49.57	---	74.00	54.00	-4.43	Peak
966 Chamber_A at 3Meter / Vertical									
Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1328.00	56.33	---	-3.66	52.68	---	74.00	54.00	-1.32	Peak
1642.00	59.44	45.57	-1.72	57.72	43.85	74.00	54.00	-10.15	AVG
1860.00	58.69	44.02	0.36	59.05	44.38	74.00	54.00	-9.62	AVG
2460.00	102.75	93.14	2.38	105.13	95.52	---	---	---	Carrier
4065.00	41.68	---	5.35	47.03	---	74.00	54.00	-6.97	Peak
4927.50	41.84	---	7.14	48.98	---	74.00	54.00	-5.02	Peak
6592.50	40.48	---	9.82	50.29	---	74.00	54.00	-3.71	Peak

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Average test would be performed if the peak result were greater than the average limit.
3. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
4. 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.
5. In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.
6. Result = Reading + Correction Factor  
 Margin = Result - Limit  
 Remark Peak = Result(PK) - Limit(AV)  
 Remark AVG = Result(AV) - Limit(AV)



<b>Product Name</b>	Wireless Mini-PCI	<b>Test By</b>	Rick Lin
<b>Model</b>	WMP-N07-5635A1	<b>Test Date</b>	2010/03/03
<b>Test Mode</b>	IEEE 802.11n HT40 TX / CH Low	<b>TEMP &amp; Humidity</b>	23.3°C, 54%

966 Chamber_A at 3Meter / Horizontal									
Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1010.00	55.48	---	-4.74	50.75	---	74.00	54.00	-3.25	Peak
2430.00	102.02	93.04	2.33	104.35	95.37	---	---	---	Carrier
3502.50	42.59	---	4.29	46.88	---	74.00	54.00	-7.12	Peak
4845.00	44.31	---	7.10	51.40	---	74.00	54.00	-2.60	Peak
5640.00	40.85	---	8.62	49.46	---	74.00	54.00	-4.54	Peak
7035.00	40.62	---	10.26	50.88	---	74.00	54.00	-3.12	Peak
966 Chamber_A at 3Meter / Vertical									
Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1330.00	55.49	---	-3.65	51.84	---	74.00	54.00	-2.16	Peak
1860.00	59.03	44.08	0.36	59.39	44.44	74.00	54.00	-9.56	AVG
2428.00	99.66	90.12	2.33	101.99	92.45	---	---	---	Carrier
4845.00	42.09	---	7.10	49.19	---	74.00	54.00	-4.81	Peak
5617.50	40.73	---	8.58	49.31	---	74.00	54.00	-4.69	Peak
6457.50	42.16	---	9.66	51.82	---	74.00	54.00	-2.18	Peak
6757.50	41.49	---	10.03	51.52	---	74.00	54.00	-2.48	Peak

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Average test would be performed if the peak result were greater than the average limit.
3. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
4. 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.
5. In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.
6. Result = Reading + Correction Factor  
 Margin = Result - Limit  
 Remark Peak = Result(PK) - Limit(AV)  
 Remark AVG = Result(AV) - Limit(AV)



<b>Product Name</b>	Wireless Mini-PCI	<b>Test By</b>	Rick Lin
<b>Model</b>	WMP-N07-5635A1	<b>Test Date</b>	2010/03/03
<b>Test Mode</b>	IEEE 802.11n HT40 TX / CH Middle	<b>TEMP &amp; Humidity</b>	23.3°C, 54%

966 Chamber_A at 3Meter / Horizontal									
Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1012.00	55.47	---	-4.73	50.74	---	74.00	54.00	-3.26	Peak
1624.00	54.66	---	-1.89	52.77	---	74.00	54.00	-1.23	Peak
2434.00	106.53	97.42	2.34	108.87	99.76	---	---	---	Carrier
3240.00	42.14	---	3.81	45.95	---	74.00	54.00	-8.05	Peak
4357.50	41.57	---	6.40	47.97	---	74.00	54.00	-6.03	Peak
4875.00	48.40	36.15	7.11	55.51	43.26	74.00	54.00	-10.74	AVG
6277.50	40.53	---	9.50	50.03	---	74.00	54.00	-3.97	Peak
966 Chamber_A at 3Meter / Vertical									
Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1328.00	56.11	---	-3.66	52.45	---	74.00	54.00	-1.55	Peak
1628.00	57.83	45.20	-1.85	55.98	43.35	74.00	54.00	-10.65	AVG
1864.00	58.65	43.95	0.40	59.05	44.35	74.00	54.00	-9.65	AVG
2446.00	101.09	91.44	2.35	103.44	93.79	---	---	---	Carrier
3247.50	43.49	---	3.82	47.31	---	74.00	54.00	-6.69	Peak
4852.50	42.86	---	7.10	49.96	---	74.00	54.00	-4.04	Peak
6502.50	40.61	---	9.70	50.31	---	74.00	54.00	-3.69	Peak
7305.00	42.17	---	9.69	51.86	---	74.00	54.00	-2.14	Peak

**Remark:**

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Average test would be performed if the peak result were greater than the average limit.
3. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
4. 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.
5. In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.
6. Result = Reading + Correction Factor  
 Margin = Result - Limit  
 Remark Peak = Result(PK) - Limit(AV)  
 Remark AVG = Result(AV) - Limit(AV)

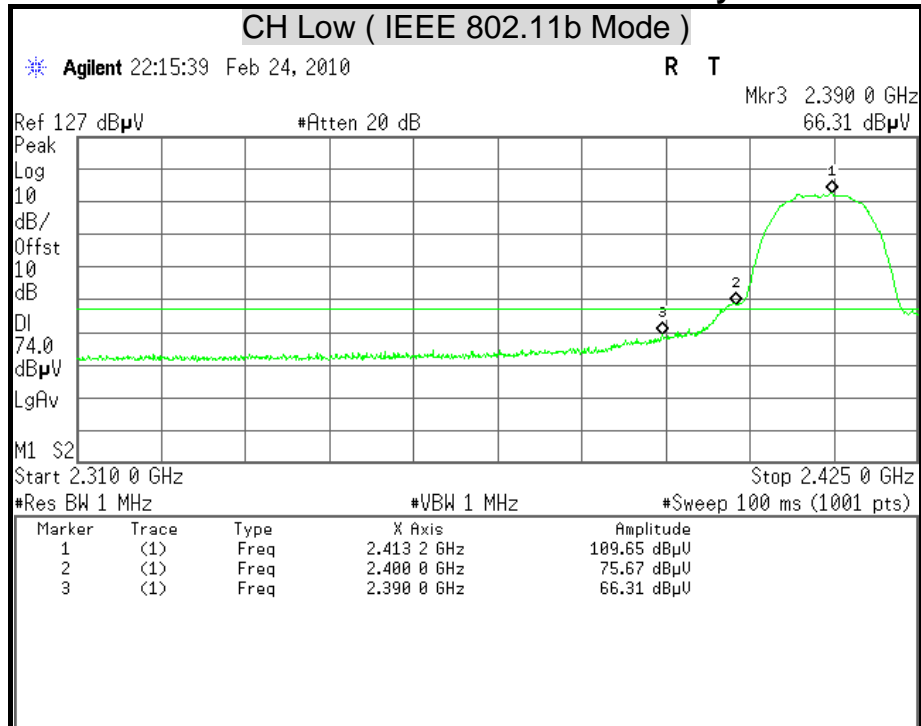
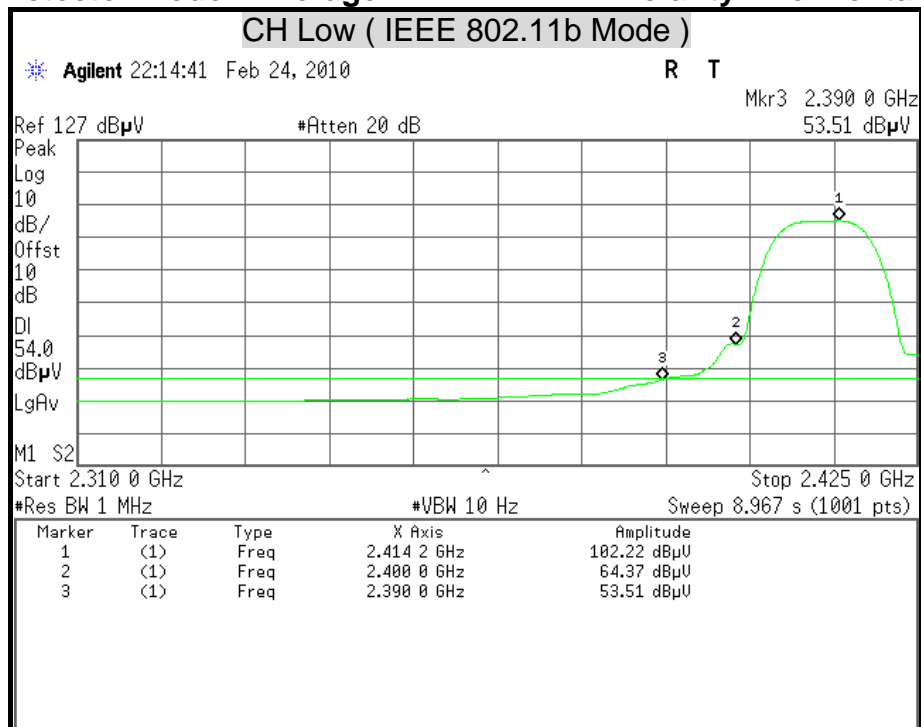


<b>Product Name</b>	Wireless Mini-PCI	<b>Test By</b>	Rick Lin
<b>Model</b>	WMP-N07-5635A1	<b>Test Date</b>	2010/03/03
<b>Test Mode</b>	IEEE 802.11n HT40 TX / CH High	<b>TEMP &amp; Humidity</b>	23.3°C, 54%

966 Chamber_A at 3Meter / Horizontal									
Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1110.00	55.21	---	-4.40	50.82	---	74.00	54.00	-3.18	Peak
2440.00	100.94	91.80	2.35	103.29	94.15	---	---	---	Carrier
3157.50	42.76	---	3.65	46.41	---	74.00	54.00	-7.59	Peak
4462.50	41.13	---	6.78	47.91	---	74.00	54.00	-6.09	Peak
4897.50	41.64	---	7.12	48.77	---	74.00	54.00	-5.23	Peak
7072.50	40.68	---	10.18	50.86	---	74.00	54.00	-3.14	Peak
966 Chamber_A at 3Meter / Vertical									
Frequency (MHz)	Reading-PK (dBuV)	Reading-AV (dBuV)	Correction Factor (dB/m)	Result-PK (dBuV/m)	Result-AV (dBuV/m)	Limit-PK (dBuV/m)	Limit-AV (dBuV/m)	Margin (dB)	Remark
1332.00	55.23	---	-3.64	51.58	---	74.00	54.00	-2.42	Peak
1862.00	59.03	44.02	0.38	59.41	44.40	74.00	54.00	-9.60	AVG
2458.00	96.91	87.52	2.37	99.28	89.89	---	---	---	Carrier
3270.00	42.97	---	3.86	46.83	---	74.00	54.00	-7.17	Peak
3570.00	42.74	---	4.40	47.14	---	74.00	54.00	-6.86	Peak
4905.00	41.39	---	7.13	48.52	---	74.00	54.00	-5.48	Peak
5625.00	40.64	---	8.59	49.23	---	74.00	54.00	-4.77	Peak

**Remark:**

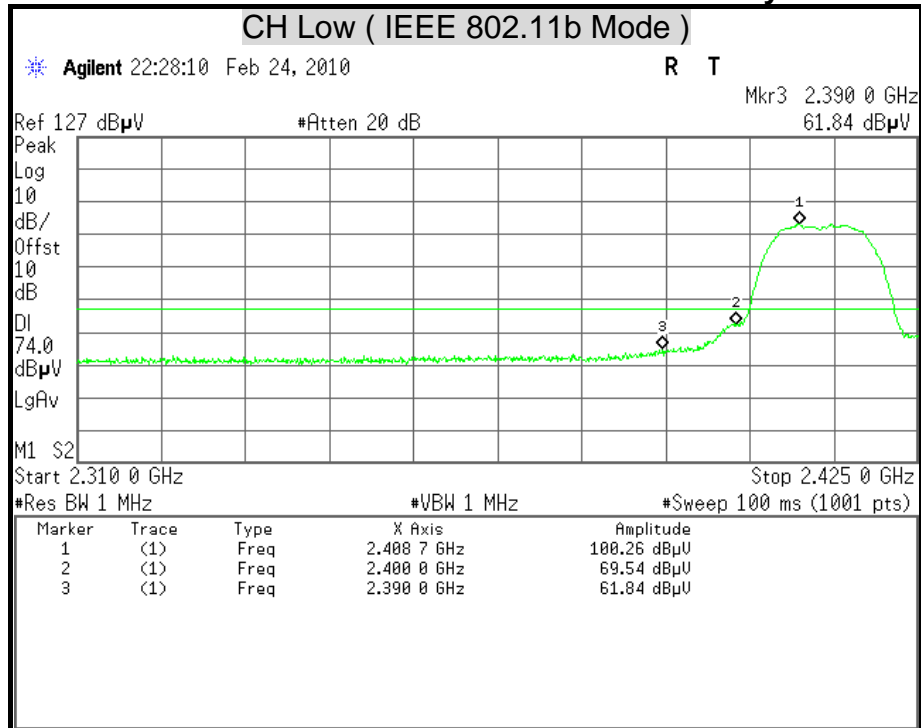
1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Average test would be performed if the peak result were greater than the average limit.
3. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
4. 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.
5. In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.
6. Result = Reading + Correction Factor  
 Margin = Result - Limit  
 Remark Peak = Result(PK) - Limit(AV)  
 Remark AVG = Result(AV) - Limit(AV)

**Restricted Band Edges****Detector Mode : Peak****Polarity : Horizontal****Detector Mode : Average****Polarity : Horizontal**



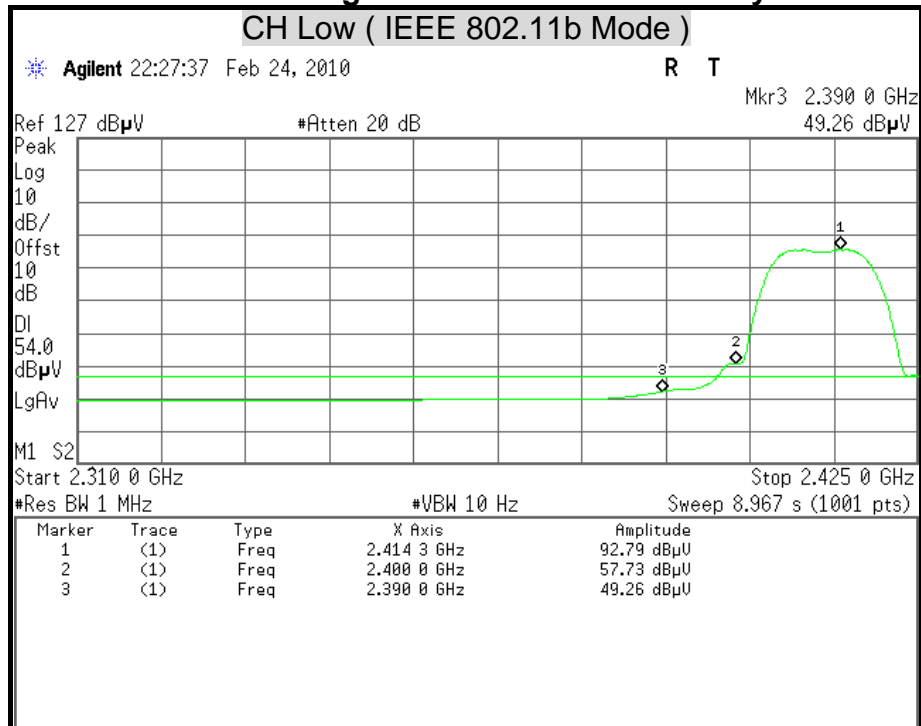
Detector Mode : Peak

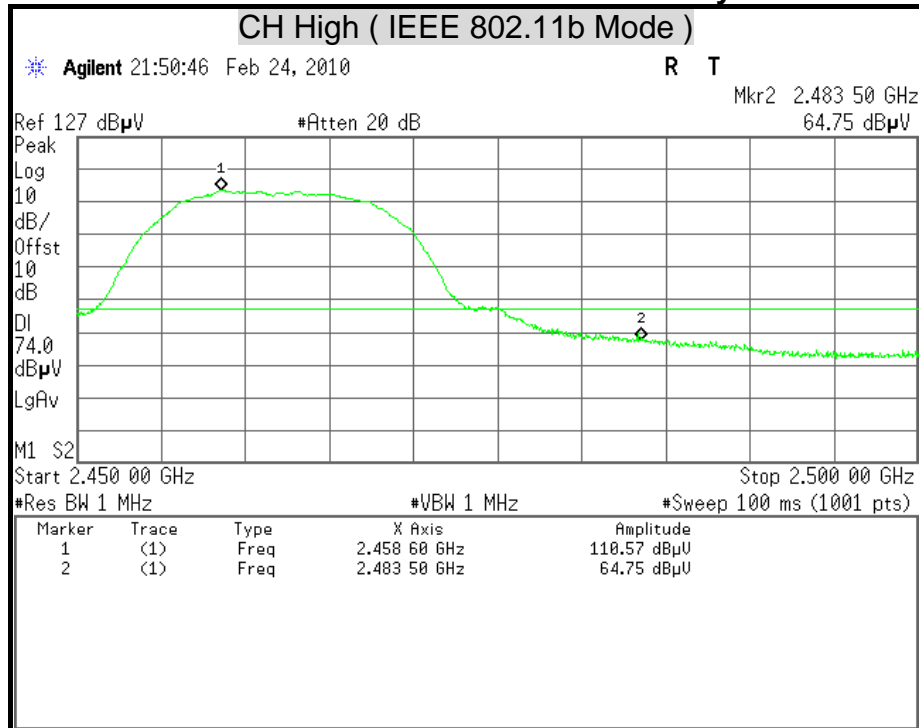
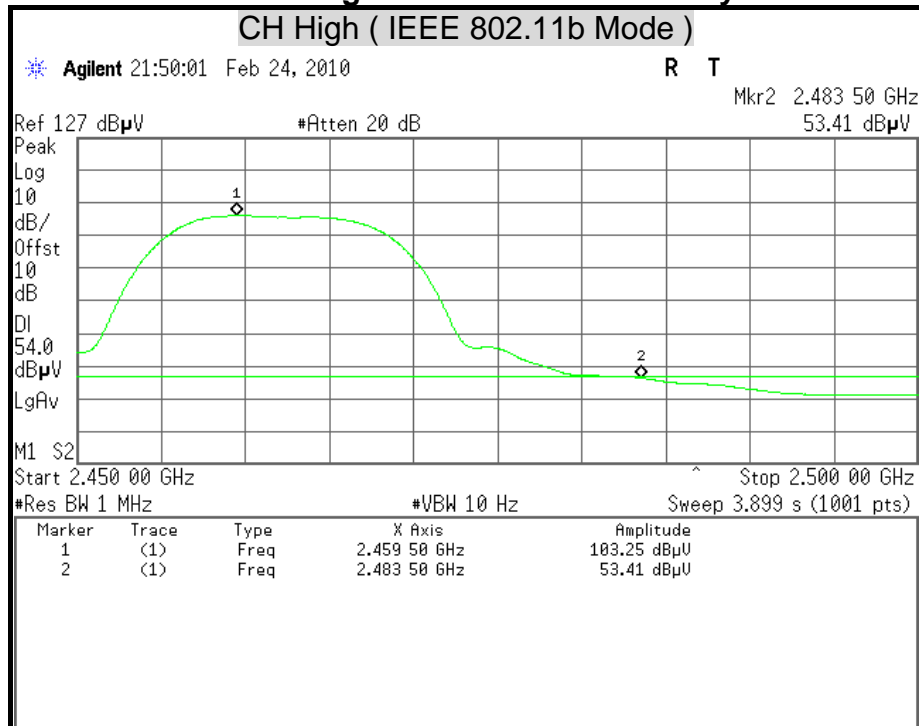
Polarity : Vertical

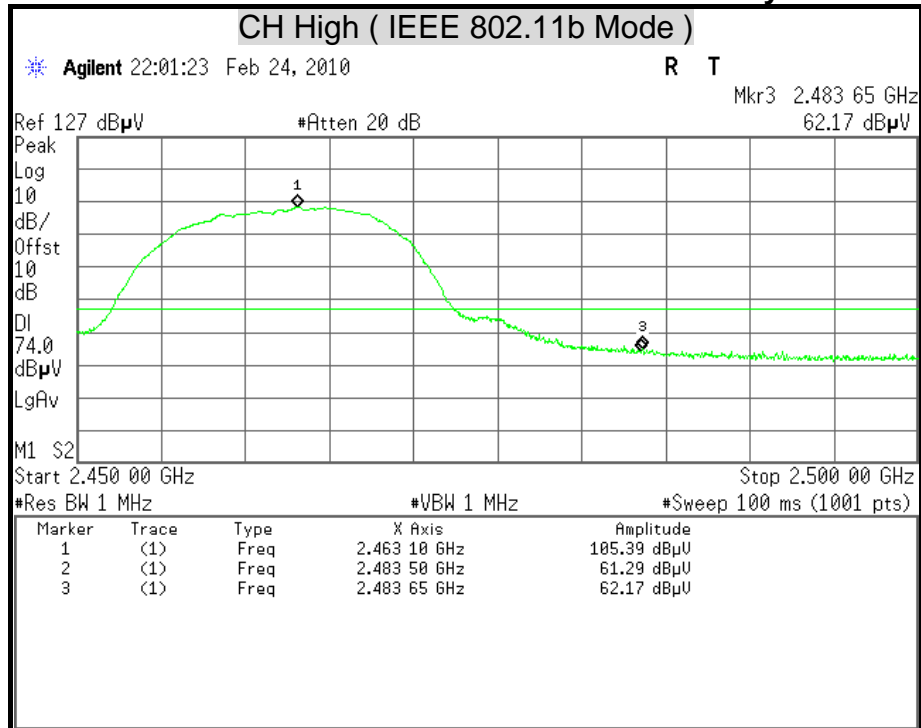
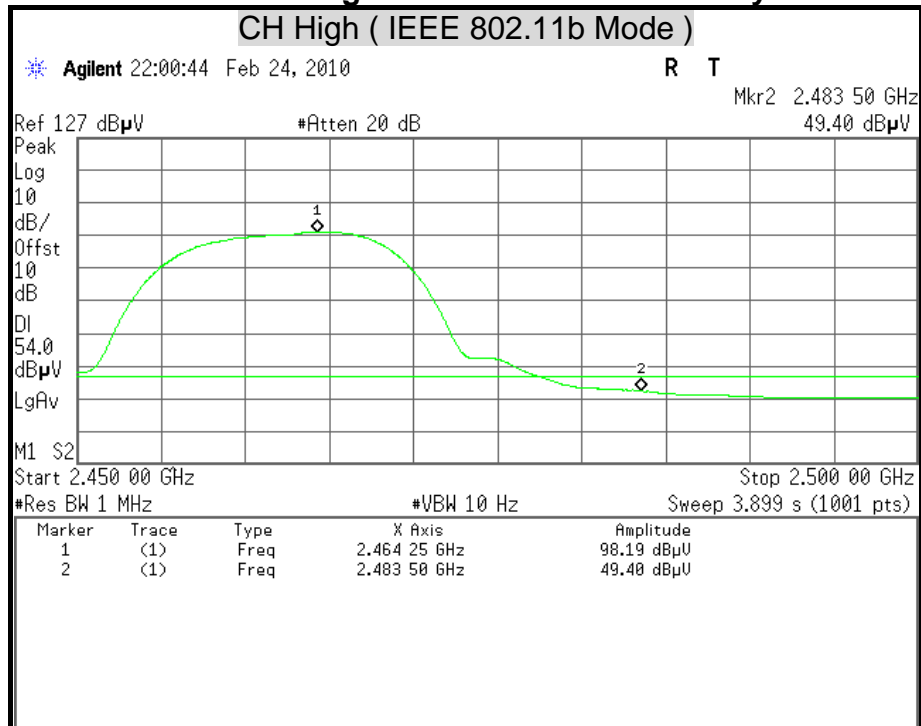


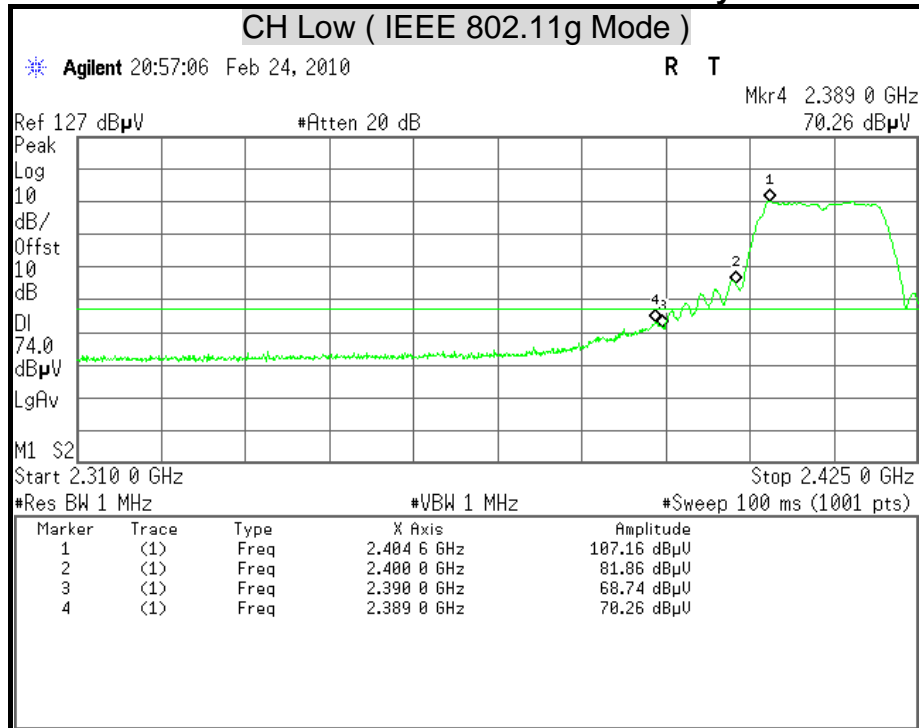
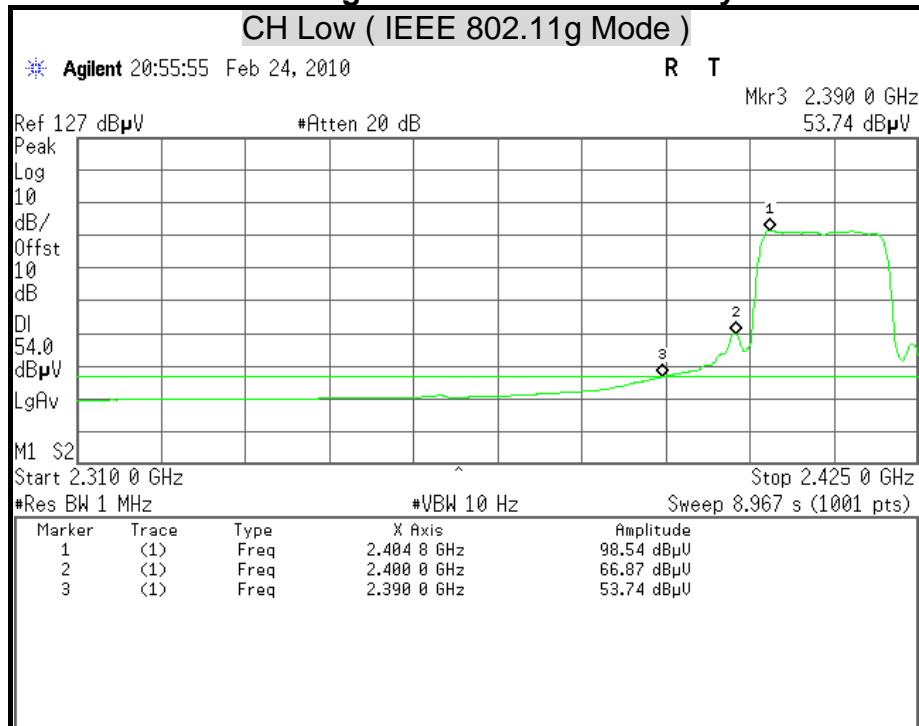
Detector Mode : Average

Polarity : Vertical



**Detector Mode : Peak****Polarity : Horizontal****Detector Mode : Average****Polarity : Horizontal**

**Detector Mode : Peak****Polarity : Vertical****Detector Mode : Average****Polarity : Vertical**

**Detector Mode : Peak****Polarity : Horizontal****Detector Mode : Average****Polarity : Horizontal**

**Detector Mode : Peak****Polarity : Vertical****CH Low ( IEEE 802.11g Mode )**

\* Agilent 21:14:33 Feb 24, 2010

R T

Mkr4 2.389 1 GHz  
65.42 dB $\mu$ VRef 127 dB $\mu$ V

#Atten 20 dB

Peak

Log

10

dB/

Offst

10

dB

DI

74.0

dB $\mu$ V

LgAv

M1 S2

Start 2.310 0 GHz

Stop 2.425 0 GHz

#Res BW 1 MHz

#VBW 1 MHz

#Sweep 100 ms (1001 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.404 9 GHz	101.67 dB $\mu$ U
2	(1)	Freq	2.400 0 GHz	75.61 dB $\mu$ U
3	(1)	Freq	2.390 0 GHz	64.00 dB $\mu$ U
4	(1)	Freq	2.389 1 GHz	65.42 dB $\mu$ U

**Detector Mode : Average****Polarity : Vertical****CH Low ( IEEE 802.11g Mode )**

\* Agilent 21:13:44 Feb 24, 2010

R T

Mkr3 2.390 0 GHz  
50.24 dB $\mu$ VRef 127 dB $\mu$ V

#Atten 20 dB

Peak

Log

10

dB/

Offst

10

dB

DI

54.0

dB $\mu$ V

LgAv

M1 S2

Start 2.310 0 GHz

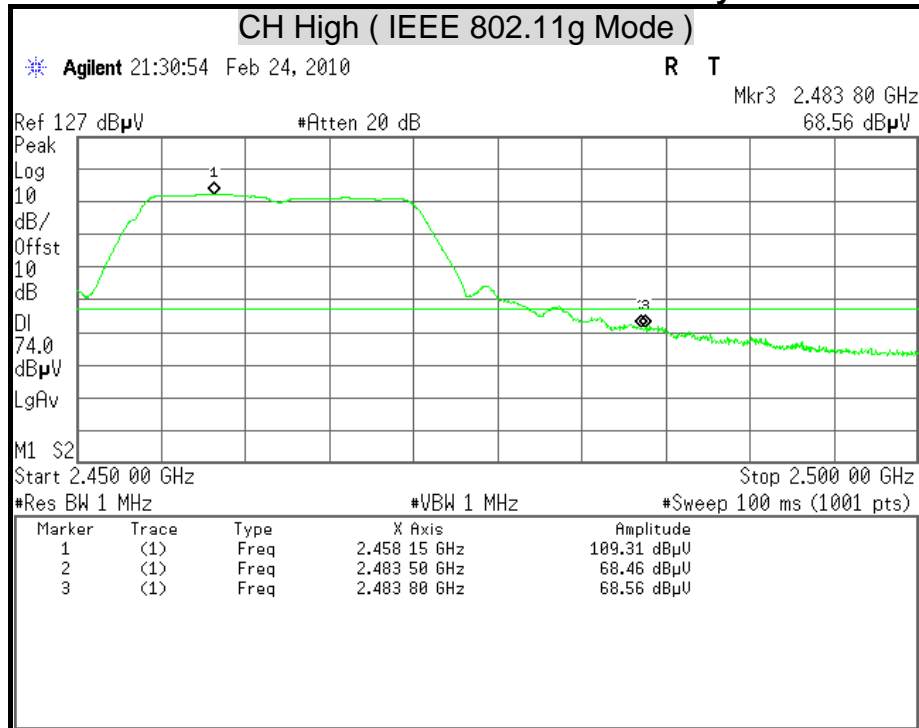
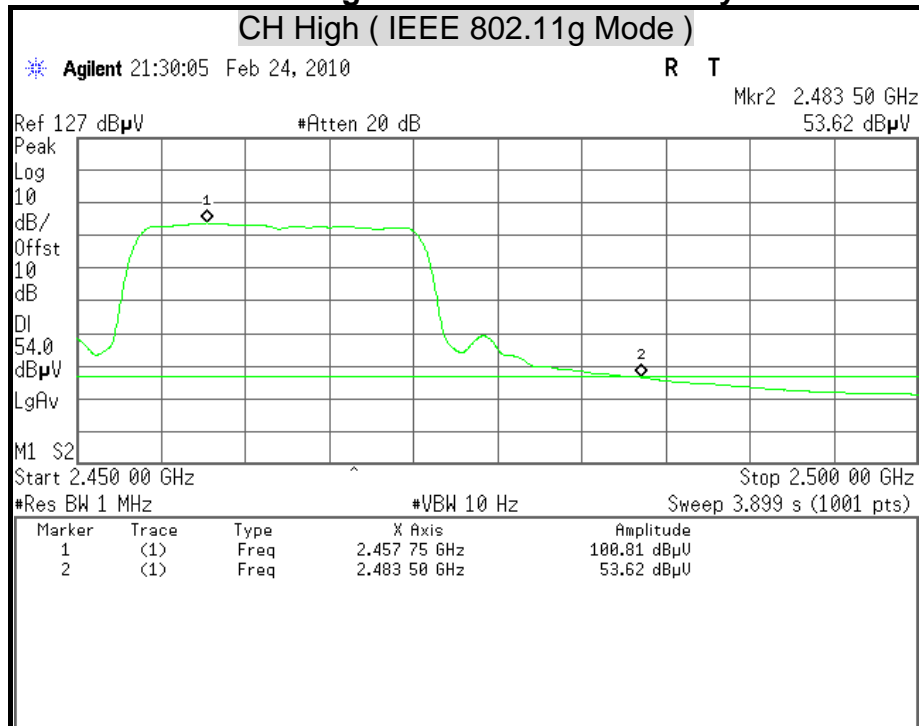
Stop 2.425 0 GHz

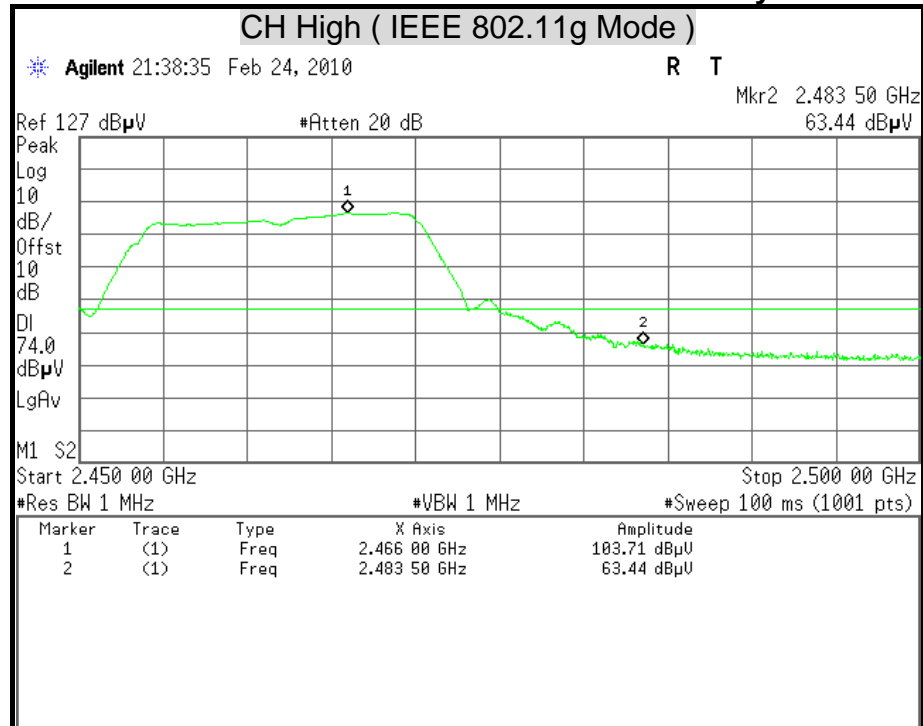
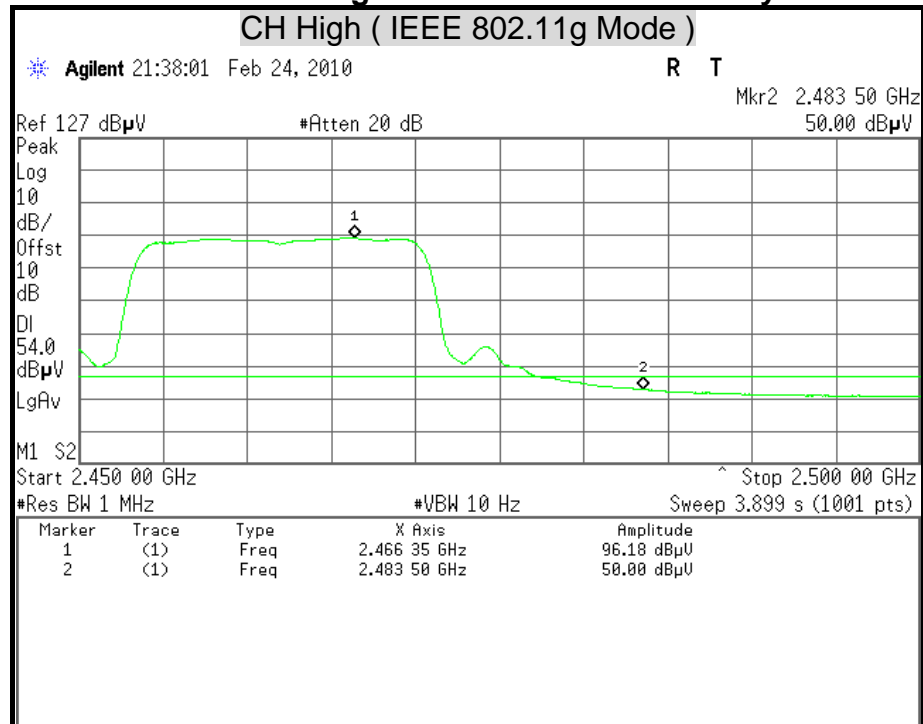
#Res BW 1 MHz

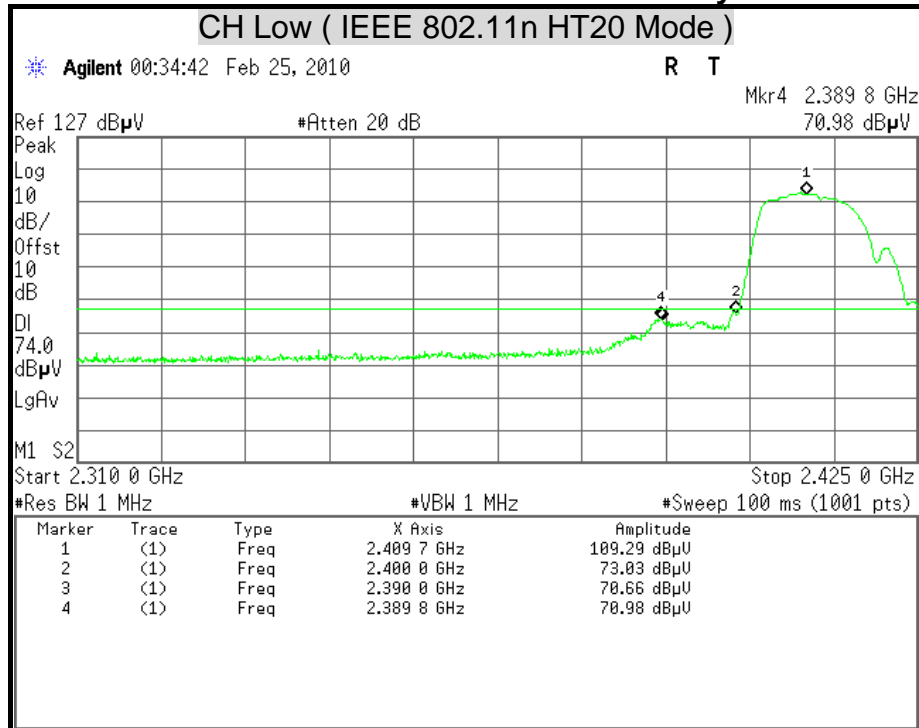
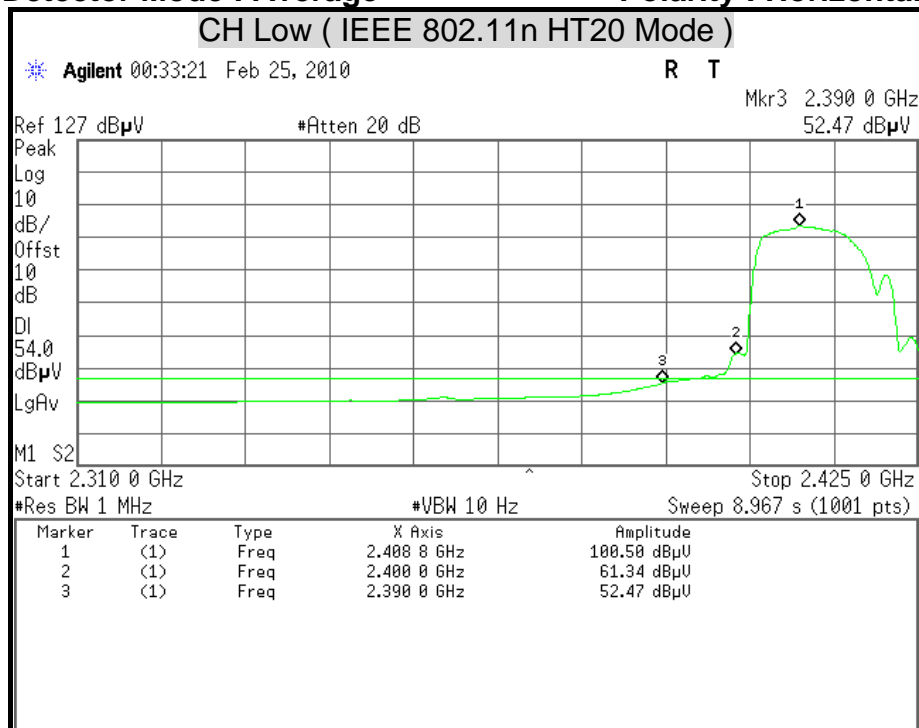
#VBW 10 Hz

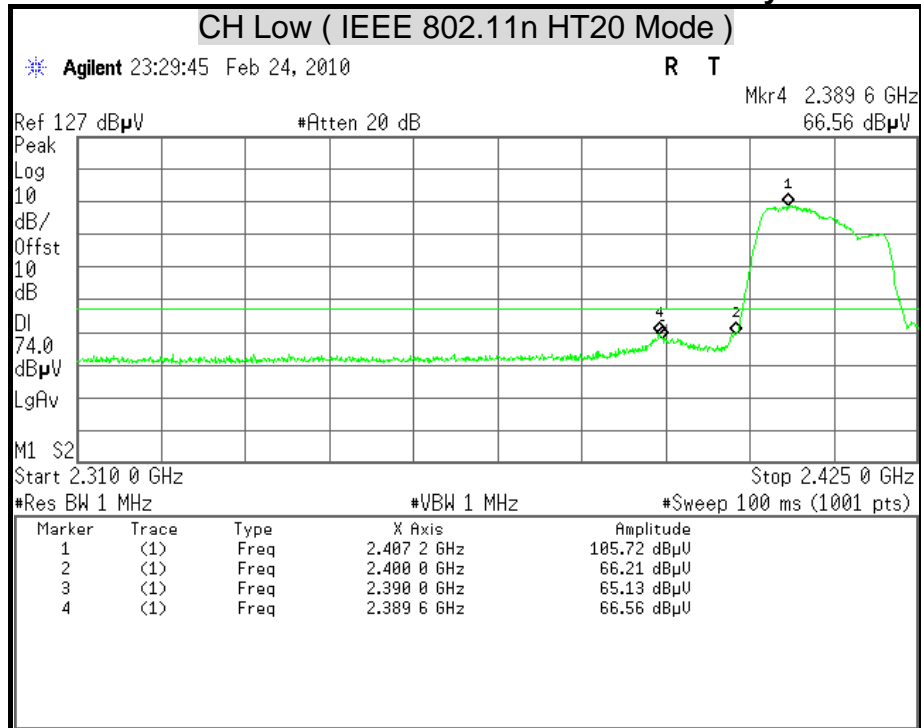
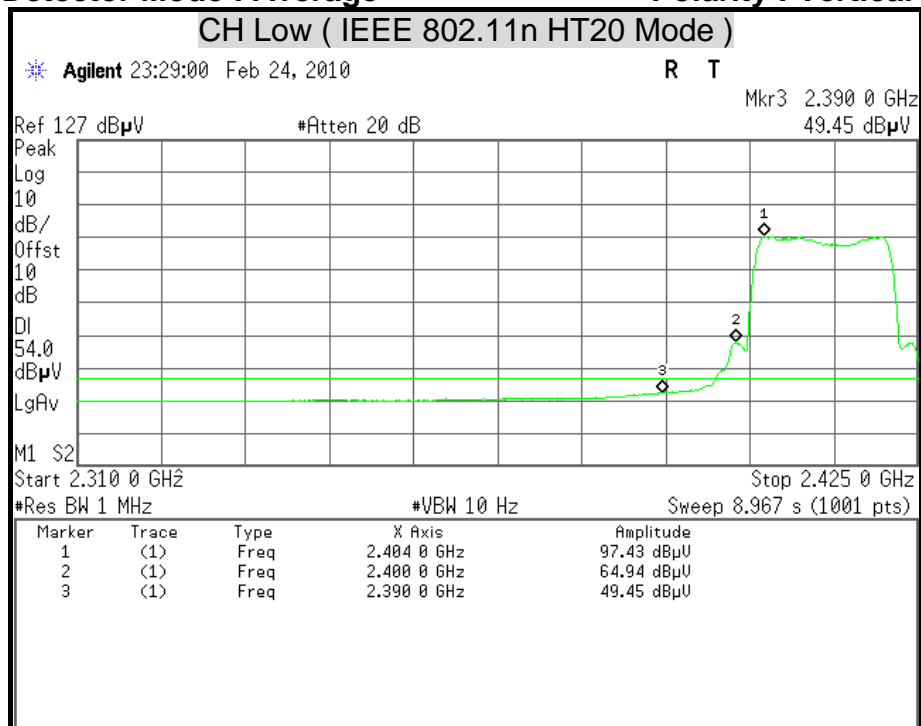
Sweep 8.967 s (1001 pts)

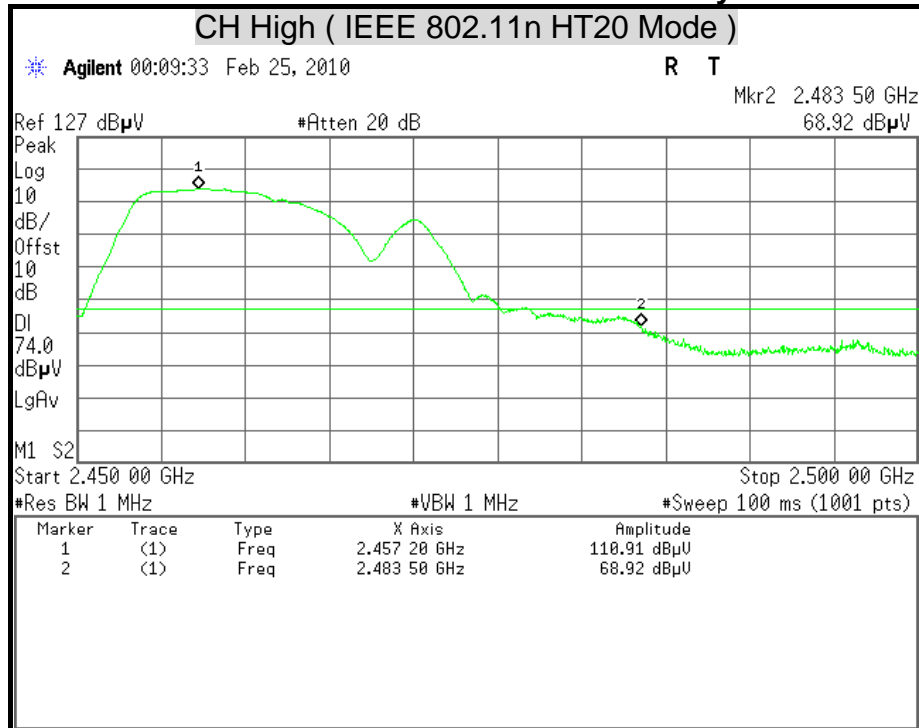
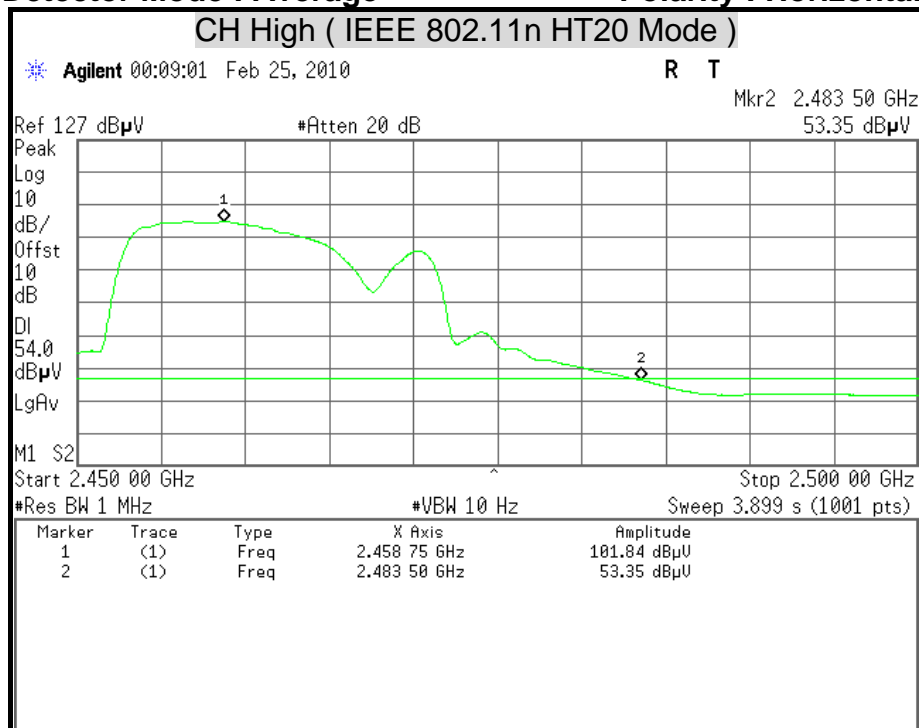
Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.404 9 GHz	92.97 dB $\mu$ U
2	(1)	Freq	2.400 0 GHz	60.78 dB $\mu$ U
3	(1)	Freq	2.390 0 GHz	50.24 dB $\mu$ U

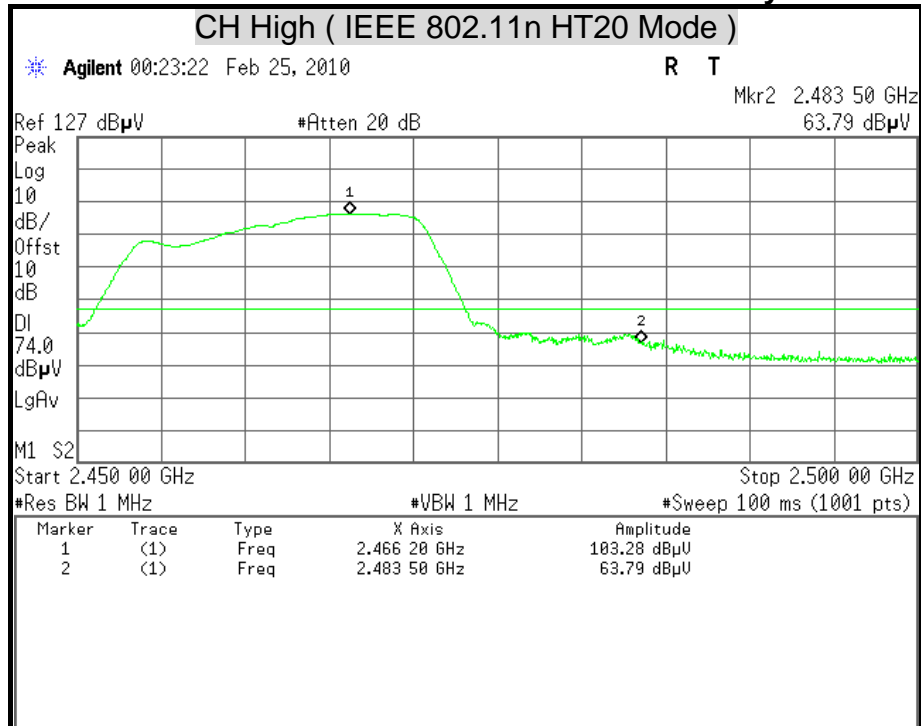
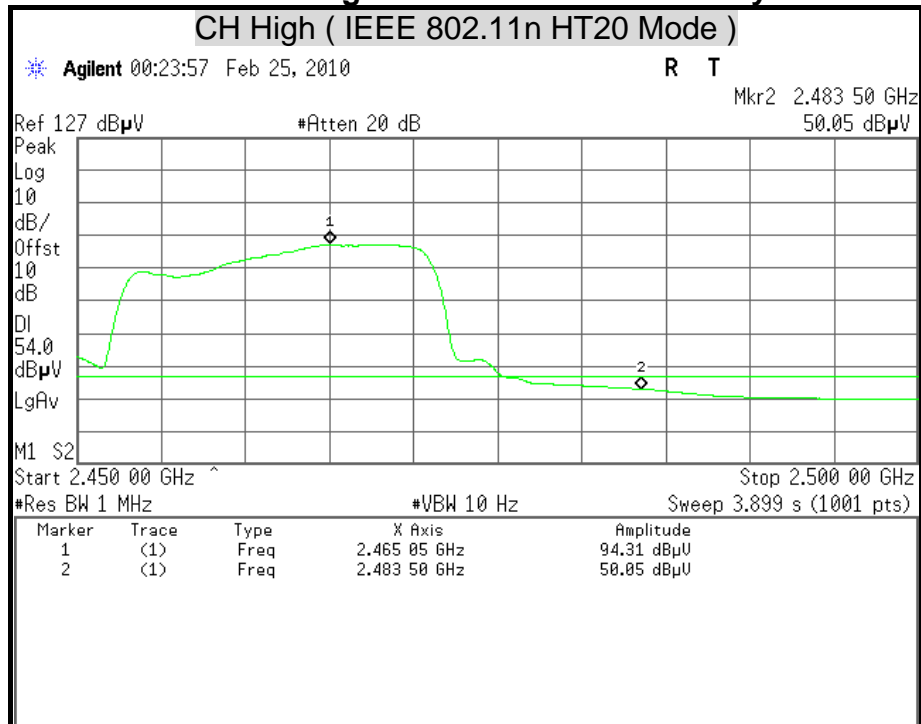
**Detector Mode : Peak****Polarity : Horizontal****Detector Mode : Average****Polarity : Horizontal**

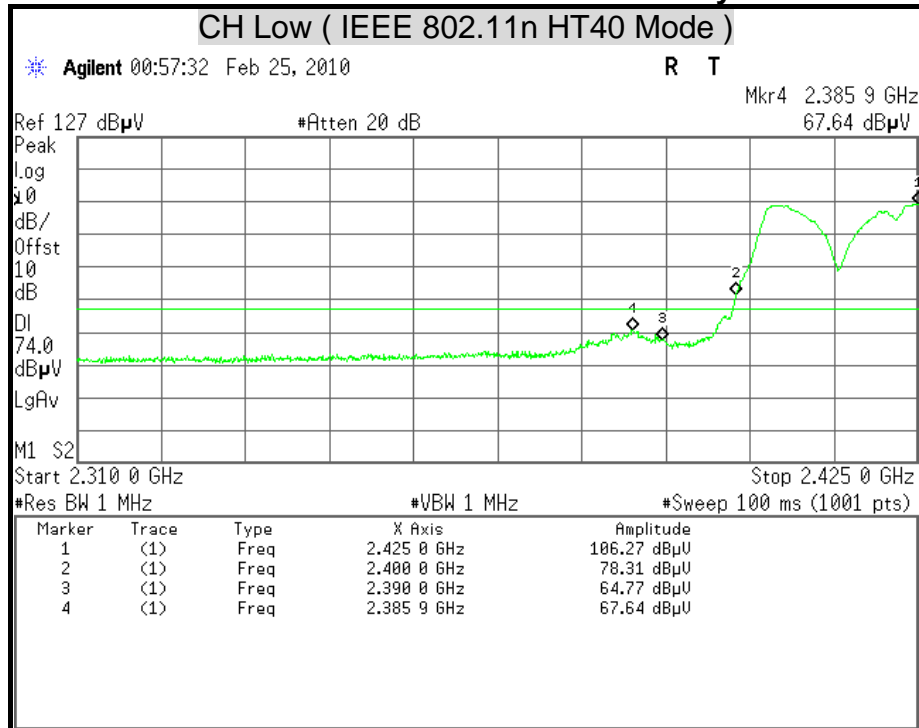
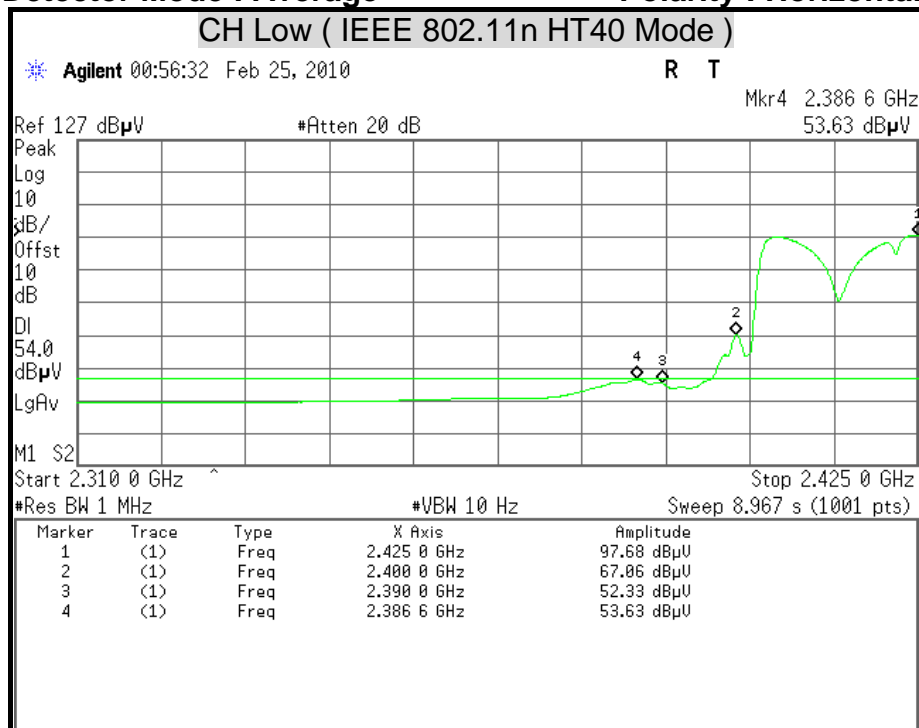
**Detector Mode : Peak****Polarity : Vertical****Detector Mode : Average****Polarity : Vertical**

**Detector Mode : Peak****Polarity : Horizontal****Detector Mode : Average****Polarity : Horizontal**

**Detector Mode : Peak****Polarity : Vertical****Detector Mode : Average****Polarity : Vertical**

**Detector Mode : Peak****Polarity : Horizontal****Detector Mode : Average****Polarity : Horizontal**

**Detector Mode : Peak****Polarity : Vertical****Detector Mode : Average****Polarity : Vertical**

**Detector Mode : Peak****Polarity : Horizontal****Detector Mode : Average****Polarity : Horizontal**

**Detector Mode : Peak****Polarity : Vertical****CH Low ( IEEE 802.11n HT40 Mode )**

\* Agilent 01:44:49 Feb 25, 2010

R T

Mkr4 2.389 6 GHz  
63.03 dB $\mu$ VRef 127 dB $\mu$ V

#Atten 20 dB

Peak

Log

10

dB/

Offst

10

dB

DI

74.0

dB $\mu$ V

LgAv

M1 S2

Start 2.310 0 GHz

Stop 2.425 0 GHz

#Res BW 1 MHz

#VBW 1 MHz

#Sweep 100 ms (1001 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.406 8 GHz	99.58 dB $\mu$ U
2	(1)	Freq	2.400 0 GHz	63.66 dB $\mu$ U
3	(1)	Freq	2.398 0 GHz	62.34 dB $\mu$ U
4	(1)	Freq	2.389 6 GHz	63.03 dB $\mu$ U

**Detector Mode : Average****Polarity : Vertical****CH Low ( IEEE 802.11n HT40 Mode )**

\* Agilent 01:43:48 Feb 25, 2010

R T

Mkr4 2.389 5 GHz  
50.74 dB $\mu$ VRef 127 dB $\mu$ V

#Atten 20 dB

Peak

Log

10

dB/

Offst

10

dB

DI

54.0

dB $\mu$ V

LgAv

M1 S2

Start 2.310 0 GHz

Stop 2.425 0 GHz

#Res BW 1 MHz

#VBW 10 Hz

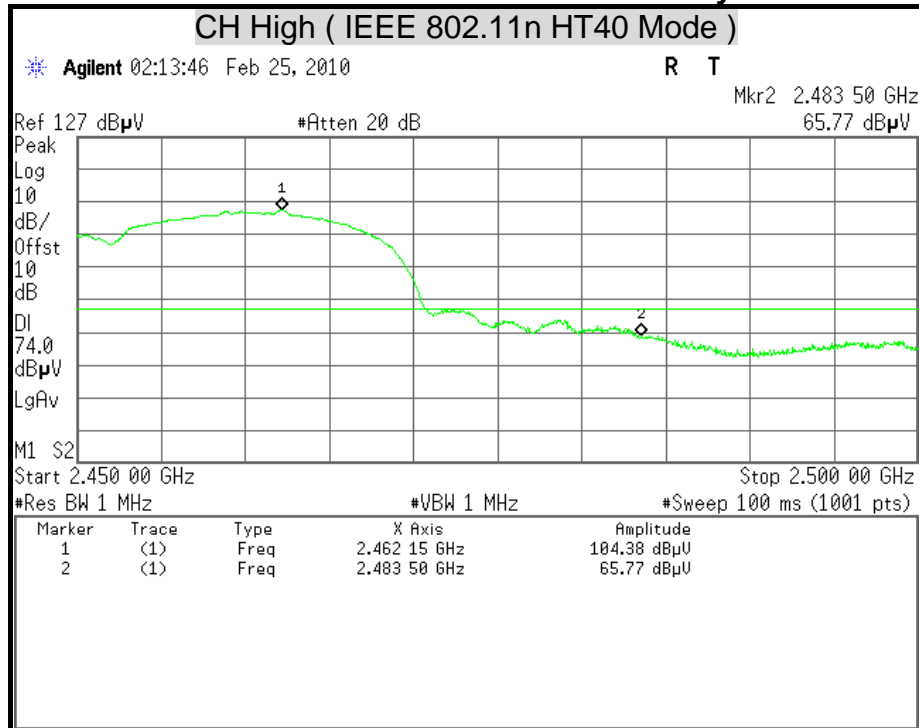
Sweep 8.967 s (1001 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.406 9 GHz	90.60 dB $\mu$ U
2	(1)	Freq	2.400 0 GHz	51.94 dB $\mu$ U
3	(1)	Freq	2.398 0 GHz	50.57 dB $\mu$ U
4	(1)	Freq	2.389 5 GHz	50.74 dB $\mu$ U



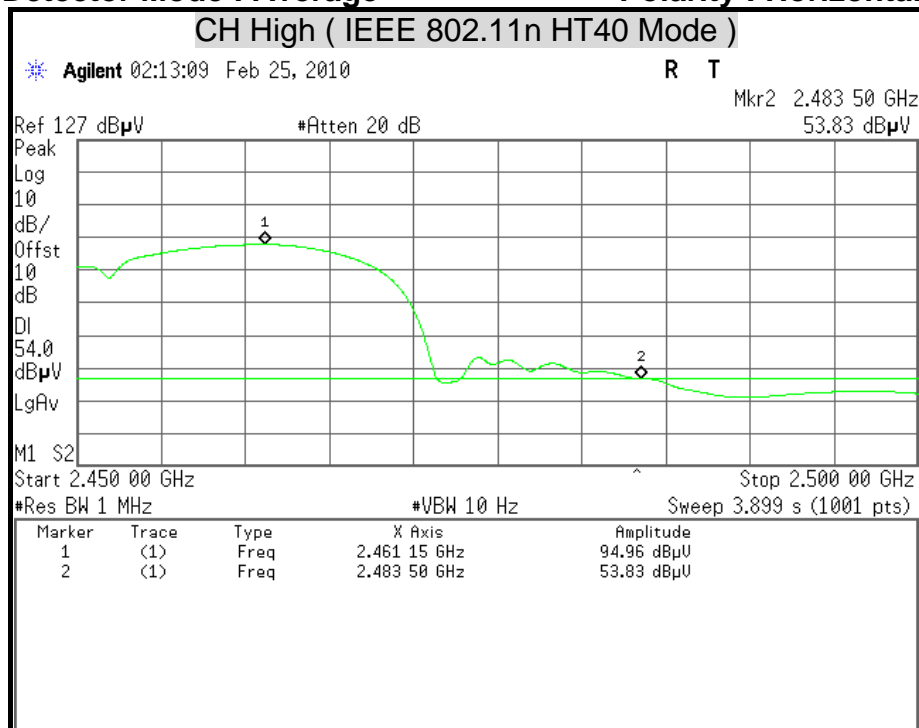
Detector Mode : Peak

Polarity : Horizontal



Detector Mode : Average

Polarity : Horizontal



**Detector Mode : Peak****Polarity : Vertical****CH High ( IEEE 802.11n HT40 Mode )**

\* Agilent 02:24:40 Feb 25, 2010

R T

Mkr3 2.487 95 GHz  
65.12 dBμV

Ref 127 dBμV

#Atten 20 dB

Peak

Log

10

dB/

Offst

10

dB

DI

74.0

dBμV

LgAv

M1 S2

Start 2.450 00 GHz

Stop 2.500 00 GHz

#Res BW 1 MHz

#VBW 1 MHz

#Sweep 100 ms (1001 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.467 80 GHz	97.69 dBμU
2	(1)	Freq	2.483 50 GHz	62.31 dBμU
3	(1)	Freq	2.487 95 GHz	65.12 dBμU

**Detector Mode : Average****Polarity : Vertical****CH High ( IEEE 802.11n HT40 Mode )**

\* Agilent 02:23:21 Feb 25, 2010

R T

Mkr3 2.484 40 GHz  
50.76 dBμV

Ref 127 dBμV

#Atten 20 dB

Peak

Log

10

dB/

Offst

10

dB

DI

54.0

dBμV

LgAv

M1 S2

Start 2.450 00 GHz

Stop 2.500 00 GHz

#Res BW 1 MHz

#VBW 10 Hz

Sweep 3.899 s (1001 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.467 20 GHz	88.81 dBμU
2	(1)	Freq	2.483 50 GHz	50.40 dBμU
3	(1)	Freq	2.484 40 GHz	50.76 dBμU



## 8.7 CONDUCTED EMISSION

### LIMITS

§ 15.207 (a) Except as shown in paragraph (b) and (c) 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.

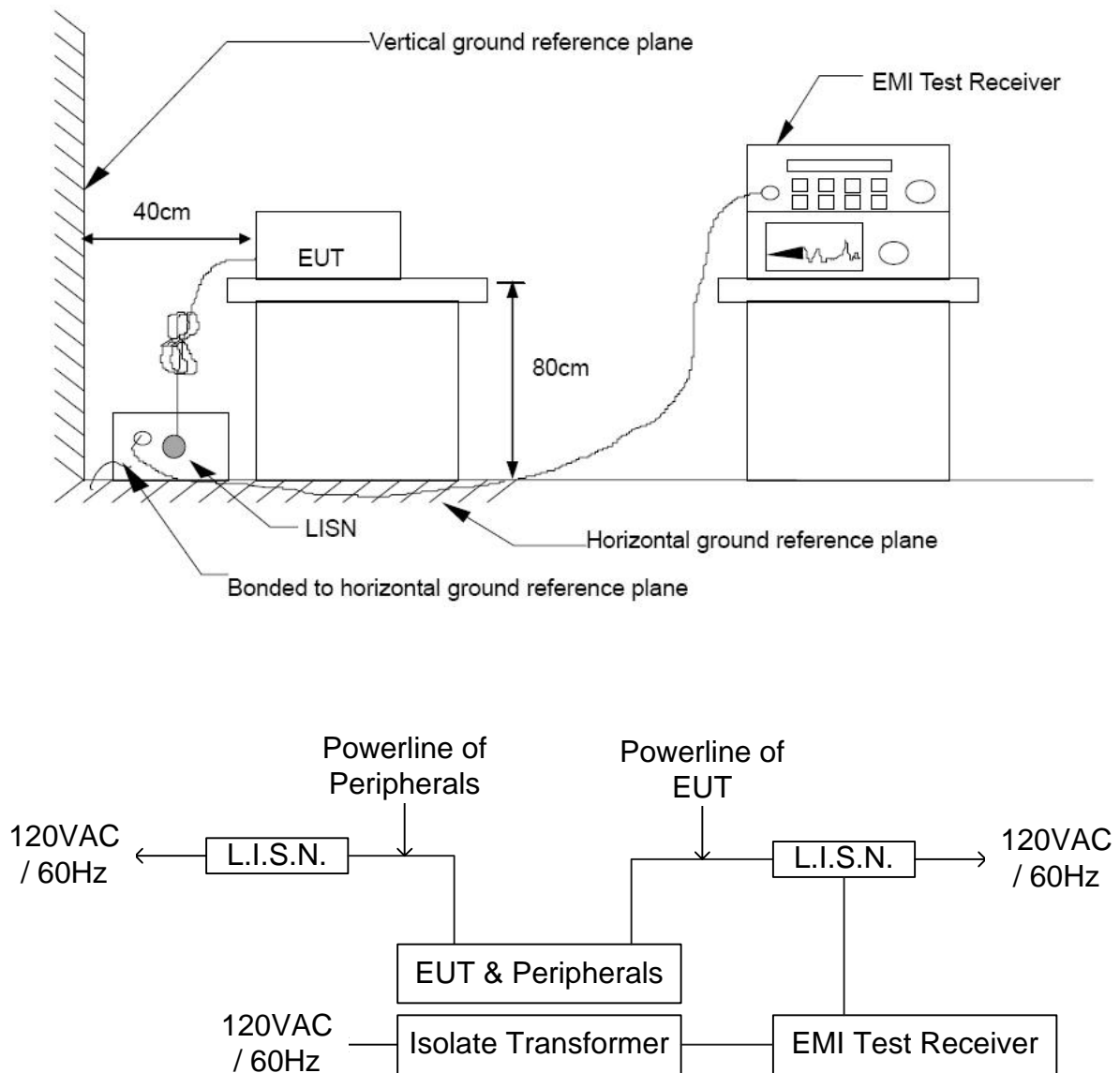
Frequency Range (MHz)	Conducted Limit (dB $\mu$ v)	
	Quasi-peak	Average
0.15 - 0.50	66 to 56	56 to 46
0.50 - 5.00	56	46
5.00 - 30.0	60	50

### TEST EQUIPMENT

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
L.I.S.N	SCHWARZBECK	NSLK 8127	8127-465	08/13/2010
TEST RECEIVER	ROHDE & SCHWARZ	ESHS30	838550/003	01/28/2011
PULSE LIMIT	ROHDE & SCHWARZ	ESH3-Z2	100117	09/17/2010
N Type Coaxial Cable	BELDEN	8268 M17/164	003	07/09/2010

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

## TEST SETUP





## **TEST PROCEDURE**

The basic test procedure was in accordance with ANSI C63.4:2003.

The test procedure is performed in a 4m × 3m × 2.4m (L×W×H) shielded room.

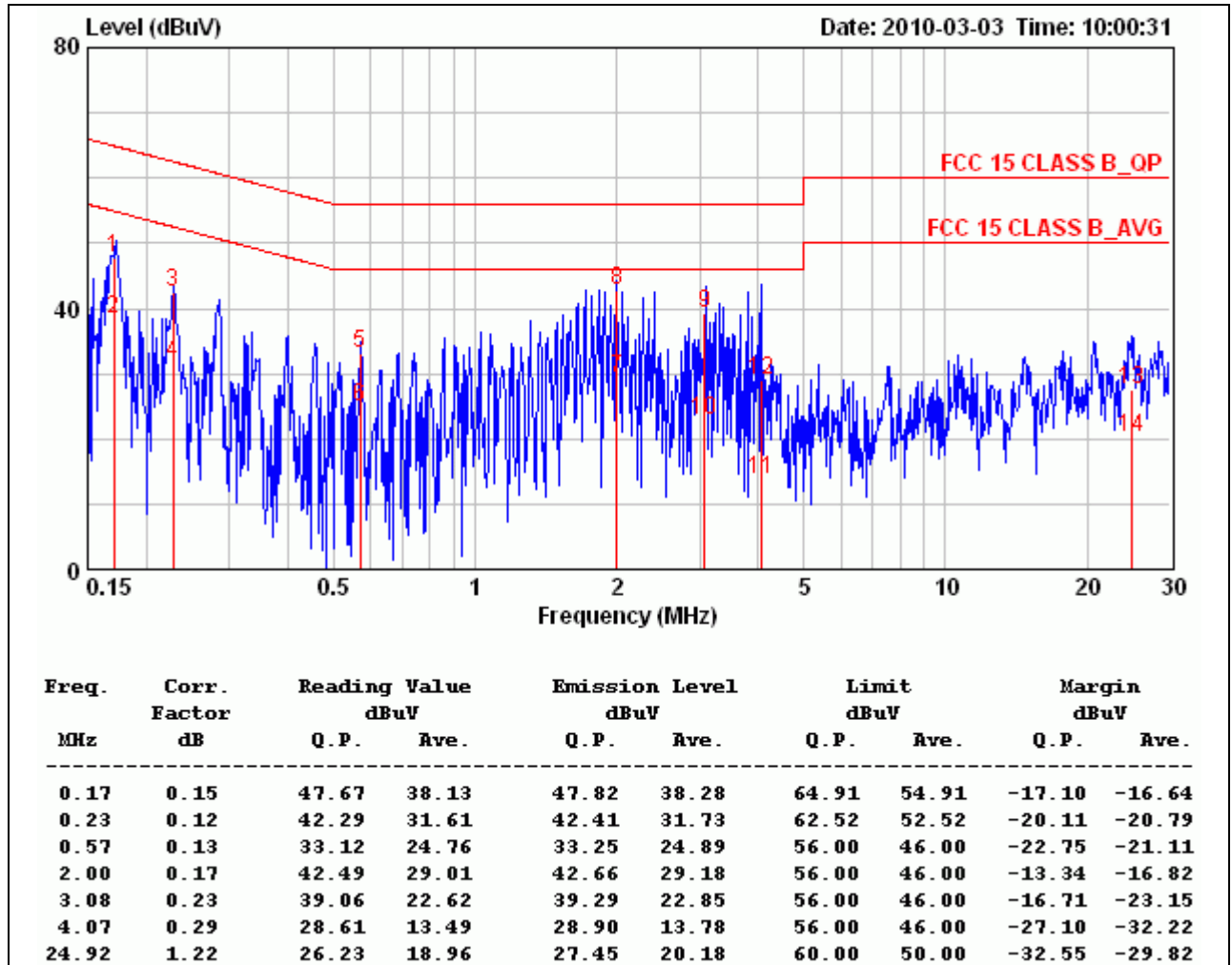
The EUT along with its peripherals were placed on a 1.0m (W) × 1.5m (L) and 0.8m in height wooden table and the EUT was adjusted to maintain a 0.4 meter space from a vertical reference plane.

The EUT was connected to power mains through a line impedance stabilization network (LISN) which provides 50 ohm coupling impedance for measuring instrument and the chassis ground was bounded to the horizontal ground plane of shielded room. All peripherals were connected to the second LISN and the chassis ground also bounded to the horizontal ground plane of shielded room.

The EUT was located so that the distance between the boundary of the EUT and the closest surface of the LISN is 0.8 m. Where a mains flexible cord was provided by the manufacturer shall be 1 m long, or if in excess of 1 m, the excess cable was folded back and forth as far as possible so as to form a bundle not exceeding 0.4 m in length.

**TEST RESULTS**

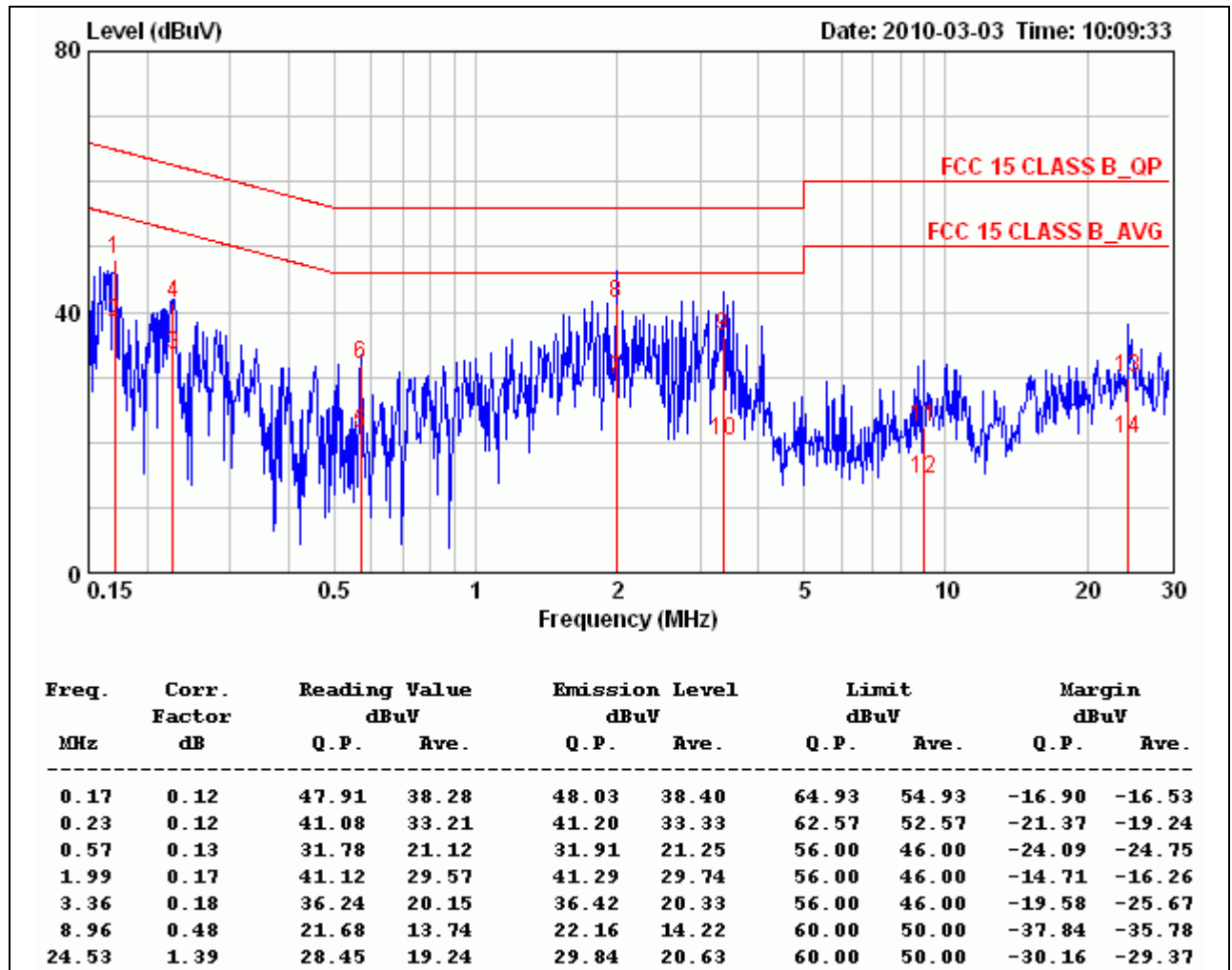
<b>Product Name</b>	Wireless Mini-PCI	<b>Test By</b>	Rick Lin
<b>Model</b>	WMP-N07-5635A1	<b>Test Date</b>	2010/03/03
<b>Test Mode</b>	Normal operating (worst-case)	<b>TEMP &amp; Humidity</b>	22.1°C, 74%

**LINE****Remark:**

1. Correction Factor = Insertion loss + cable loss
2. Margin value = Emission level – Limit value



<b>Product Name</b>	Wireless Mini-PCI	<b>Test By</b>	Rick Lin
<b>Model</b>	WMP-N07-5635A1	<b>Test Date</b>	2010/03/03
<b>Test Mode</b>	Normal operating (worst-case)	<b>TEMP &amp; Humidity</b>	22.1°C, 74%

**NEUTRAL****Remark:**

1. Correction Factor = Insertion loss + cable loss
2. Margin value = Emission level – Limit value



## APPENDIX I MAXIMUM PERMISSIBLE EXPOSURE

According to FCC 1.1310 : The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation as specified in 1.1307(b) LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm <sup>2</sup> )	Average Time
(A) Limits for Occupational / Control Exposures				
300-1,500	--	--	F/300	6
1,500-100,000	--	--	5	6
(B) Limits for General Population / Uncontrol Exposures				
300-1,500	--	--	F/1500	6
1,500-100,000	--	--	1	30

### CALCULATIONS

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

Where  $E$  = Field strength in Volts / meter

$P$  = Power in Watts

$G$  = Numeric antenna gain

$d$  = Distance in meters

$S$  = Power density in milliwatts / square centimeter

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

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

Changing to units of mW and cm, using:

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

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

Yields

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

Where  $d$  = Distance in cm

$P$  = Power in mW

$G$  = Numeric antenna gain

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

**LIMIT**

Power Density Limit,  $S=1.0\text{mW/cm}^2$

**TEST RESULTS**

Mode	Antenna Gain (dBi)	Minimum separation distance (cm)	Output Power (dBm)	Numeric antenna gain (mW)	Power Density Limit (mW/cm <sup>2</sup> )	Power Density at 20cm (mW/cm <sup>2</sup> )
IEEE 802.11b	1.90	20.0	23.02	1.55	1.00	0.061762
IEEE 802.11g	1.90	20.0	21.21	1.55	1.00	0.040712
IEEE 802.11n HT20	1.90	20.0	20.68	1.55	1.00	0.036035
IEEE 802.11n HT40	1.90	20.0	20.55	1.55	1.00	0.034972

**Remark:** For mobile or fixed location transmitters, the maximum power density is  $1.0\text{ mW/cm}^2$  even if the calculation indicates that the power density would be larger.