



**FCC 47 CFR PART 15 SUBPART C AND ANSI C63.4:2003**  
**TEST REPORT (Class II Permissive Change Report)**

**For**

**Cable Modem**

**Model : CH6640A**

**Data Applies To : SVG6541**

**Trade Name : CBN**

**Issued for**

**COMPAL BROADBAND NETWORKS, INC.**

**7F., No.500, Ruiguang Rd., Neihu, Taipei (11492), Taiwan, R.O.C.**

**Issued by**

**Compliance Certification Services Inc.**

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**Issued Date: March 04, 2013**



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## Revision History

<b>Rev.</b>	<b>Issue Date</b>	<b>Revisions</b>	<b>Effect Page</b>	<b>Revised By</b>
00	03/04/2013	Initial Issue	All Page 109	Victoria Liu



## TABLE OF CONTENTS

TITLE	PAGE NO.
<b>1. TEST REPORT CERTIFICATION .....</b>	<b>4</b>
<b>2. EUT DESCRIPTION .....</b>	<b>5</b>
<b>3. DESCRIPTION OF CLASS II CHANGE.....</b>	<b>6</b>
<b>4. DESCRIPTION OF TEST MODES .....</b>	<b>6-7</b>
<b>5. TEST METHODOLOGY .....</b>	<b>8</b>
<b>6. FACILITIES AND ACCREDITATION.....</b>	<b>8</b>
6.1 FACILITIES .....	8
6.2 ACCREDITATIONS.....	8
6.3 MEASUREMENT UNCERTAINTY .....	9
<b>7. SETUP OF EQUIPMENT UNDER TEST.....</b>	<b>10-11</b>
<b>8. FCC PART 15.247 REQUIREMENTS .....</b>	<b>12</b>
8.1 6dB BANDWIDTH .....	12-25
8.2 MAXIMUM PEAK OUTPUT POWER .....	26-28
8.3 POWER SPECTRAL DENSITY .....	29-43
8.4 CONDUCTED SPURIOUS EMISSION .....	44-62
8.5 RADIATED EMISSION.....	63-96
8.6 CONDUCTED EMISSION.....	97-103
<b>APPENDIX I MAXIMUM PERMISSIBLE EXPOSURE.....</b>	<b>104-105</b>
<b>APPENDIX II SETUP PHOTOS .....</b>	<b>106-109</b>



## 1. TEST REPORT CERTIFICATION

**Applicant** : COMPAL BROADBAND NETWORKS, INC.  
**Address** : 7F., No.500, Ruiguang Rd., Neihu, Taipei (11492), Taiwan,  
R.O.C.  
**Equipment Under Test** : Cable Modem  
**Model** : CH6640A  
**Data Applies To** : SVG6541  
**Trade Name** : CBN  
**Tested Date** : August 09 ~ 27, 2012 ; February 18 ~ 27, 2013

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:**

Sb. Lu  
Sr. Engineer

**Reviewed by:**

Gundam Lin  
Sr. Engineer



## 2. EUT DESCRIPTION

<b>Product Name</b>	Cable Modem
<b>Model Number</b>	CH6640A
<b>Identify Number</b>	T130218S01
<b>Received Date</b>	August 09, 2012
<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 : 21.36 dBm (0.1368W) IEEE 802.11g : 26.35 dBm (0.4315W) IEEE 802.11n HT20 : 28.52 dBm (0.7113W) IEEE 802.11n HT40 : 25.32 dBm (0.3400W)
<b>Channel Spacing</b>	IEEE 802.11b/g, 802.11n HT20/HT40 : 5MHz
<b>Channel Number</b>	IEEE 802.11b/g, 802.11n HT20 : 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 : 144.44, 130, 117, 115.56, 104, 86.667, 78, 72.2, 65, 58.5, 57.778, 52, 43.333, 39, 28.889, 26, 21.7, 19.5, 14.444, 13, 7.2, 6.5 Mbps IEEE 802.11n HT40 : 300, 270, 243, 240, 216, 180, 162, 150, 135, 121.5, 120, 108, 90, 81, 60, 54, 45, 40.5, 30, 27, 15, 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>	PCB Antenna × 2, Antenna 1 (Chain A) Gain 2.51 dBi, Antenna 2 (Chain B) Gain 2.82 dBi
<b>Power Rating</b>	12Vdc
<b>Test Voltage</b>	120Vac, 60Hz
<b>DC Power Cable Type</b>	Non-shielded cable 1.5m × 2 (Non-detachable)
<b>I/O Port</b>	RJ-11 Port × 2, RJ-45 Port × 4, (Coaxial Cable) RF Port × 1, Power Port × 1



**Power Adapter :**

No.	Manufacturer	Model No.	Power Input	Power Output
1	A.P.D	WB-18F12FU	120Vac, 60Hz, 0.6A Max	12Vdc,1.5A
2	I.T.E.	ML18-7120150-A1	120Vac, 60Hz, 0.5A	12Vdc,1.5A

**The difference of the series model**

Model	Trade Name	Difference
CH6640A	CBN	Marketing identification
SVG6541	MOTOROLA	

**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 report is modified from T120809S04-RP1.
4. This submittal(s) (test report) is intended for FCC ID: O2UCG6640A filing to comply with Section 15.207, 15.209 and 15.247 of the FCC Part 15, Subpart C Rules.
5. Client consigns only one sample to test (model number: CH6640A). Therefore, the testing Lab. just guarantees the unit, which has been tested.

### 3. DESCRIPTION OF CLASS II CHANGE

The major change filed under this application is:

Have additional 2 RJ-11 voice port and change two adapter.

For the detail of this RJ-11 voice port and adapter, please refer to spec.

### 4. DESCRIPTION OF TEST MODES

The EUT is an 802.11n transceiver in Cable Modem form factor.

IEEE 802.11b/g Mode : 1TX (Chain A).

IEEE 802.11n HT20/HT40 Mode : 2TX.

#### Conducted Emission / Radiated Emission Test (Below 1 GHz)

1. The following test modes were scanned during the preliminary test:

No.	Pre-Test Mode
1	Normal Operating / Power Adapter 1
2	Normal Operating / Power Adapter 2

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

Final Test Mode	
Emission	Radiated Emission
	Normal Operating / Power Adapter 1
Emission	Normal Operating / Power Adapter 2
	Conducted Emission
Emission	Normal Operating / Power Adapter 1
	Normal Operating / Power Adapter 2

**Remark :** Then, the above highest emission mode of the configuration of the EUT and cable was chosen for all final test items.



**Conducted / Radiated Emission Test (Above 1 GHz)**

**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 : 1Mbps 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 : 13Mbps 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 : 27Mbps data rate (worst case) were chosen for full testing.



## 5. 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.

## 6. FACILITIES AND ACCREDITATION

### 6.1 FACILITIES

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

NO. 989-1 Wen Shan Rd., Shang Shan Village,  
Qionglin Shiang Hsinchu County 30741, Taiwan, R.O.C

The sites are constructed in conformance with the requirements of ANSI C63.4:2003 and CISPR 22. All receiving equipment conforms to CISPR 16-1-1, CISPR 16-1-2, CISPR 16-1-3, CISPR 16-1-4, CISPR 16-1-5.

### 6.2 ACCREDITATIONS

Our laboratories are accredited and approved by the following approval agencies according to ISO/IEC 17025.

**Taiwan**      TAF

The measuring facility of laboratories has been authorized or registered by the following approval agencies.

<b>Canada</b>	INDUSTRY CANADA
<b>Japan</b>	VCCI
<b>Taiwan</b>	BSMI
<b>USA</b>	FCC MRA

Copies of granted accreditation certificates are available for downloading from our web site, <http://www.ccsrf.com>



## 6.3 MEASUREMENT UNCERTAINTY

The following table is for the measurement uncertainty, which is calculated as per the document CISPR 16-4-2.

PARAMETER	UNCERTAINTY
Semi Anechoic Chamber (966 Chamber_B) / Radiated Emission, 30 to 1000 MHz	+/- 3.97
Semi Anechoic Chamber (966 Chamber_B) / Radiated Emission, 1 to 18GHz	+/- 3.58
Semi Anechoic Chamber (966 Chamber_B) / Radiated Emission, 18 to 26 GHz	+/- 3.59
Semi Anechoic Chamber (966 Chamber_B) / Radiated Emission, 26 to 40 GHz	+/- 3.81
Conducted Emission (Mains Terminals), 9kHz to 30MHz	+/- 2.48

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

Consistent with industry standard (e.g. CISPR 22, clause 11, Measurement Uncertainty) determining compliance with the limits shall be base on the results of the compliance measurement. Consequently the measure emissions being less than the maximum allowed emission result in this be a compliant test or passing test.

The acceptable measurement uncertainty value without requiring revision of the compliance statement is base on conducted and radiated emissions being less than  $U_{CISPR}$  which is 3.6dB and 5.2dB respectively. CCS values (called  $U_{Lab}$  in CISPR 16-4-2) is less than  $U_{CISPR}$  as shown in the table above. Therefore, MU need not be considered for compliance.



## 7. SETUP OF EQUIPMENT UNDER TEST

### SUPPORT EQUIPMENT

No.	Product	Manufacturer	Model No.	Serial No.	FCC ID
1	Notebook PC	HP	ProBook 4421s	CNF03242PJ	DoC
2	Notebook PC	HP	ProBook 4421s	CNF03242PM	DoC
3	Notebook PC	Lenovo ideaPad	S10e_4068-RZ1	L3CEV2D	DoC
4	CMTS	MOTOROLA	BSR2000	Q060351000087447	---
5	Telephone	ROMEO	TC-215	20080124	---
6	Telephone	ROMEO	TC-215	20080149	---
7	Switch Hub	ASUS	GX1008B	90-Q872AN1N0NAM A0-88QSA1003522	---

No.	Signal Cable Description
1	Non-shielded RJ-45 cable, 12 m × 1
2	Non-shielded RJ-45 cable, 1.2 m × 3
3	Non-shielded RJ-11 cable, 1.2 m × 2
4	Shielded coaxial cable, 10m × 1

### SETUP DIAGRAM FOR TESTS

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

### EUT OPERATING CONDITION

#### **RF Mode:**

1. Set up whole system for test as shown on diagram.
2. Set a fixed ip, into the Network Neighborhood to confirm EUT obtained ip
3. Run Putty software → IP address 192.168.1.100
4. Analyze in advance of pressing the power button and hold panel WPS
5. Analyze power after about five seconds, the computer will be connected to
6. Execution put, to be DOS window is closed
7. Executive MP\_TEST, press open, 1 ~ 2 times to control applications

#### **TX Mode:**

Tx Data Rate: 1Mbps Bandwidth 20 (IEEE 802.11b mode) (chain A TX)  
6Mbps Bandwidth 20 (IEEE 802.11g mode) (chain A TX)  
MCS8 Bandwidth 20 (IEEE 802.11n HT20 mode) (2 TX)  
MCS8 Bandwidth 40 (IEEE 802.11n HT40 mode) (2 TX)



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Power control

IEEE 802.11b Channel Low (2412MHz) TX PowerA 46 (chain A TX)  
IEEE 802.11b Channel Mid (2437MHz) TX PowerA 46 (chain A TX)  
IEEE 802.11b Channel High (2462MHz) TX PowerA 40 (chain A TX)  
IEEE 802.11g Channel Low (2412MHz) TX PowerA 52 (chain A TX)  
IEEE 802.11g Channel Mid (2437MHz) TX PowerA 61 (chain A TX)  
IEEE 802.11g Channel High (2462MHz) TX PowerA 44 (chain A TX)  
IEEE 802.11n HT20 Channel Low (2412MHz) TX PowerA 49 /TX PowerB 47  
IEEE 802.11n HT20 Channel Mid (2437MHz) TX PowerA 57 /TX PowerB 55  
IEEE 802.11n HT20 Channel High (2462MHz) TX PowerA 42 /TX PowerB 41  
IEEE 802.11n HT40 Channel Low (2422MHz) TX PowerA 46 /TX PowerB 44  
IEEE 802.11n HT40 Channel Mid (2437MHz) TX PowerA 45 /TX PowerB 43  
IEEE 802.11n HT40 Channel High (2452MHz) TX PowerA 39 /TX PowerB 37

8. All of the functions are under run.

9. Start test.

**Normal Mode:**

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

1. Setup whole system for test as shown on diagram.
2. Power on all equipments.
3. Coaxial Cable link Headend-CMTS.  
CMTS set DOWN STREAM : -10 dBmV, UP STREAM: + 40 dBmV.
4. Notebook PC ping EUT IP through LAN connected by RJ45 cable.
5. Notebook PC ping EUT IP through wireless LAN.
6. EUT and laptop connection transfer rate appears as 1Gbps.
7. LAN 2~4 port link ethernet switch load.
8. Set telephones on the talking mode.
9. Start the 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	06/14/2013

*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	10.33	500	PASS
Middle	2437	10.33	500	PASS
High	2462	10.33	500	PASS

### IEEE 802.11g Mode

Channel	Channel Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (kHz)	Pass / Fail
Low	2412	16.58	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 A	Chain B		
Low	2412	17.75	17.75	500	PASS
Middle	2437	17.83	17.83	500	PASS
High	2462	17.75	17.83	500	PASS

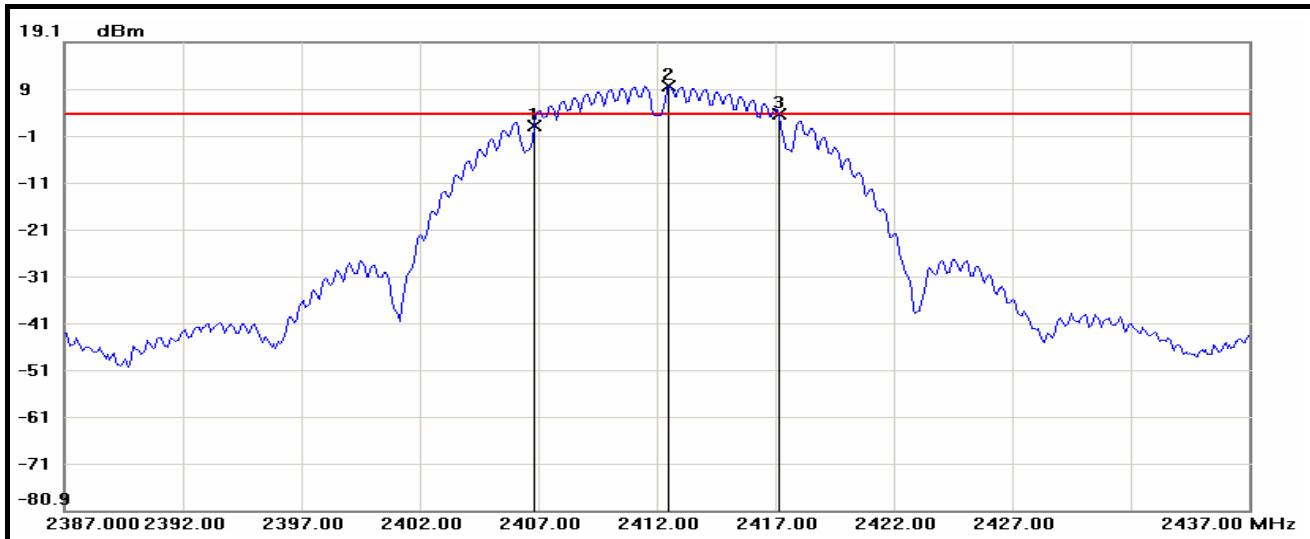
### IEEE 802.11n HT40 Mode (Two TX)

Channel	Channel Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (kHz)	Pass / Fail
		Chain A	Chain B		
Low	2422	36.25	35.83	500	PASS
Middle	2437	36.17	35.83	500	PASS
High	2452	36.08	36.00	500	PASS



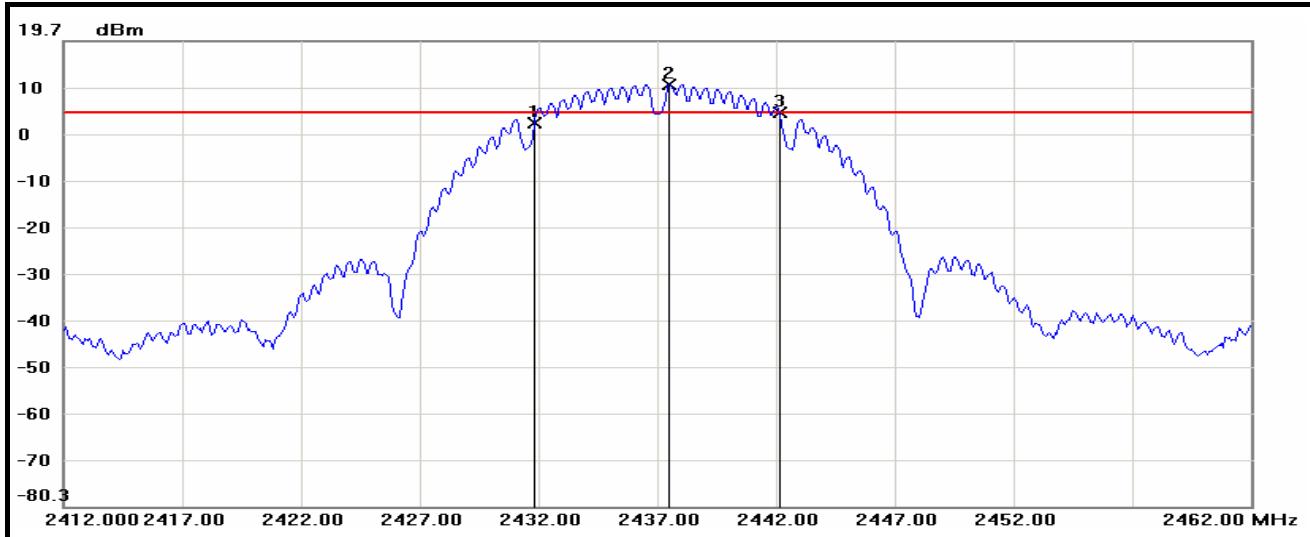
## 6dB BANDWIDTH

### IEEE 802.11b Mode / CH Low



No.	Frequency(MHz)	Result(dBm)
1	2406.8333	1.30
2	2412.5000	9.75
3	2417.1667	3.72

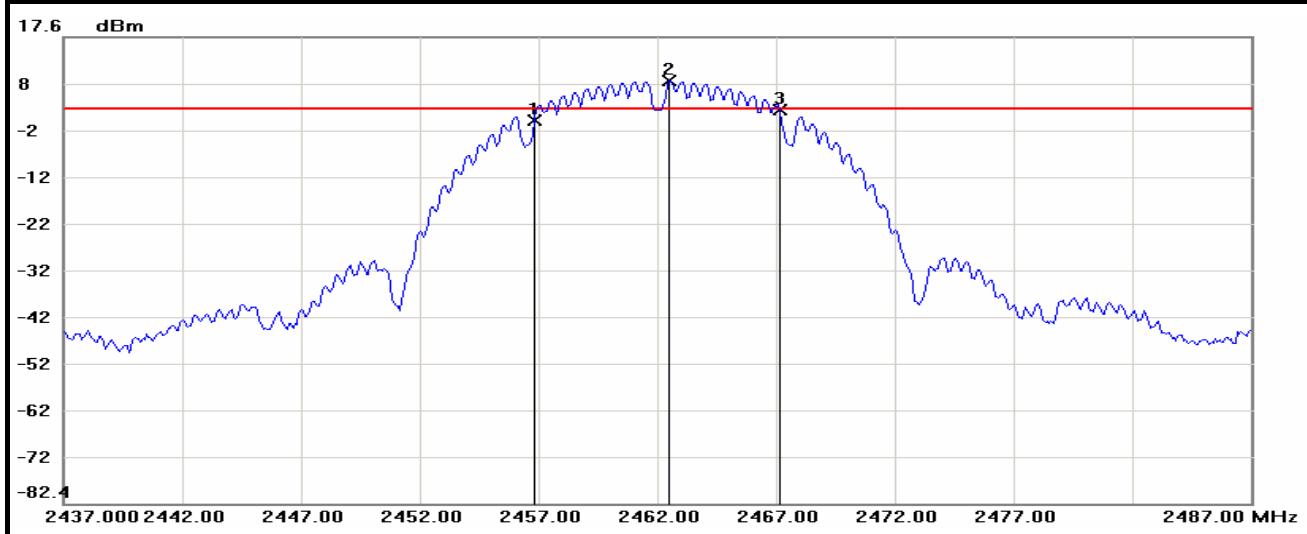
### IEEE 802.11b Mode / CH Middle



No.	Frequency(MHz)	Result(dBm)
1	2431.8333	2.10
2	2437.5000	10.45
3	2442.1667	4.31



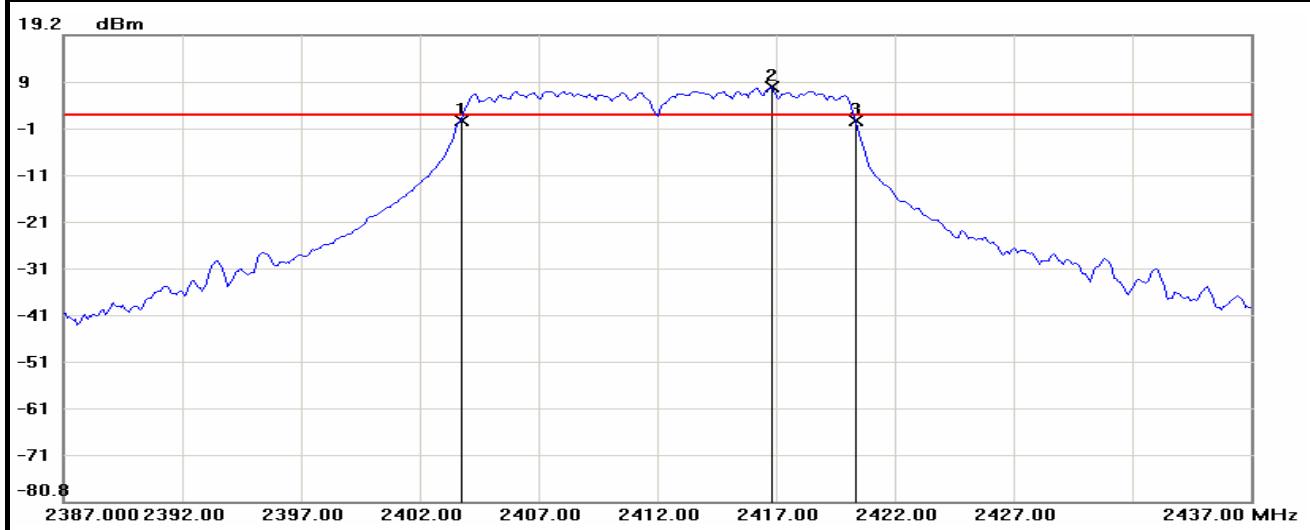
IEEE 802.11b Mode / CH High



No.	Frequency(MHz)	Result(dBm)
1	2456.8333	-0.25
2	2462.5000	8.15
3	2467.1667	2.04

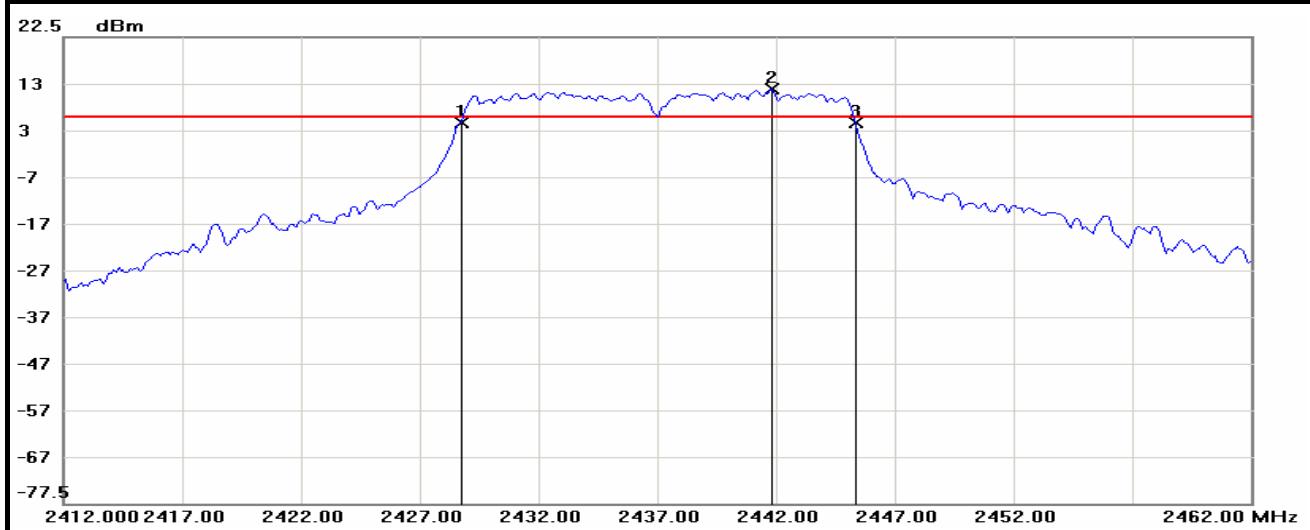


### IEEE 802.11g Mode / CH Low



No.	Frequency(MHz)	Result(dBm)
1	2403.7500	0.81
2	2416.8333	8.02
3	2420.3333	0.85

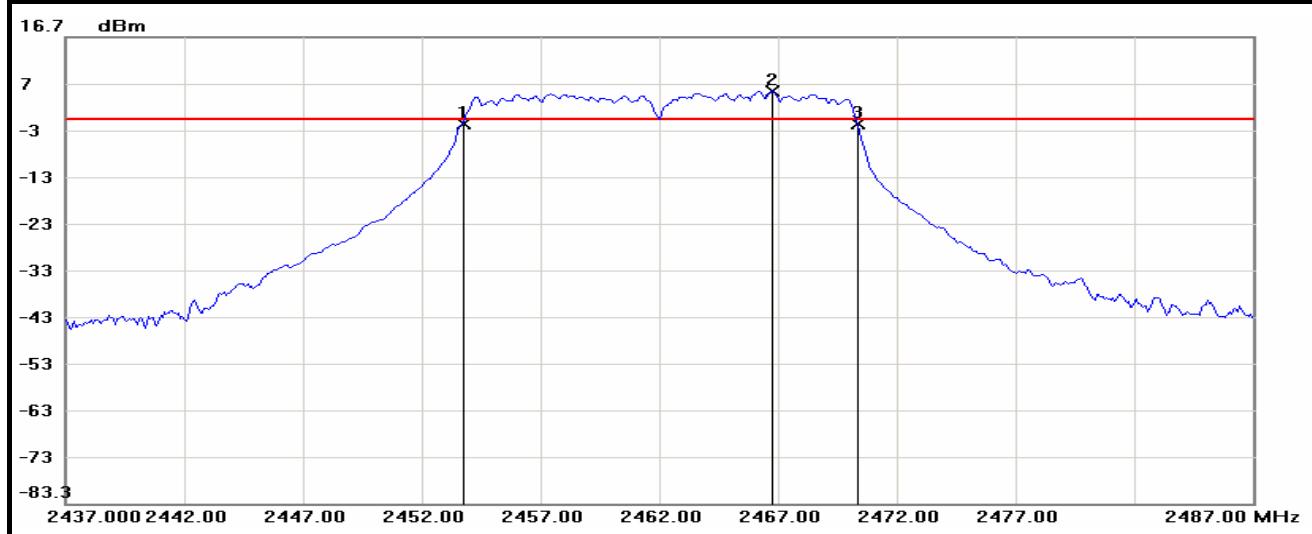
### IEEE 802.11g Mode / CH Middle



No.	Frequency(MHz)	Result(dBm)
1	2428.7500	4.25
2	2441.8333	11.33
3	2445.3333	4.13



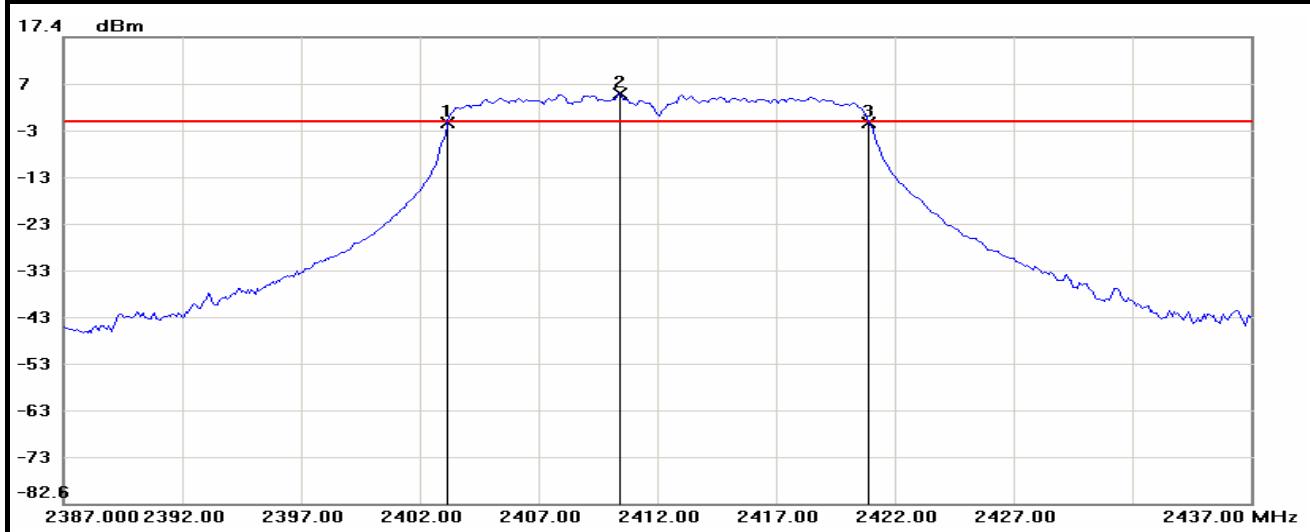
IEEE 802.11g Mode / CH High



No.	Frequency(MHz)	Result(dBm)
1	2453.7500	-1.89
2	2466.7500	5.24
3	2470.3333	-1.92

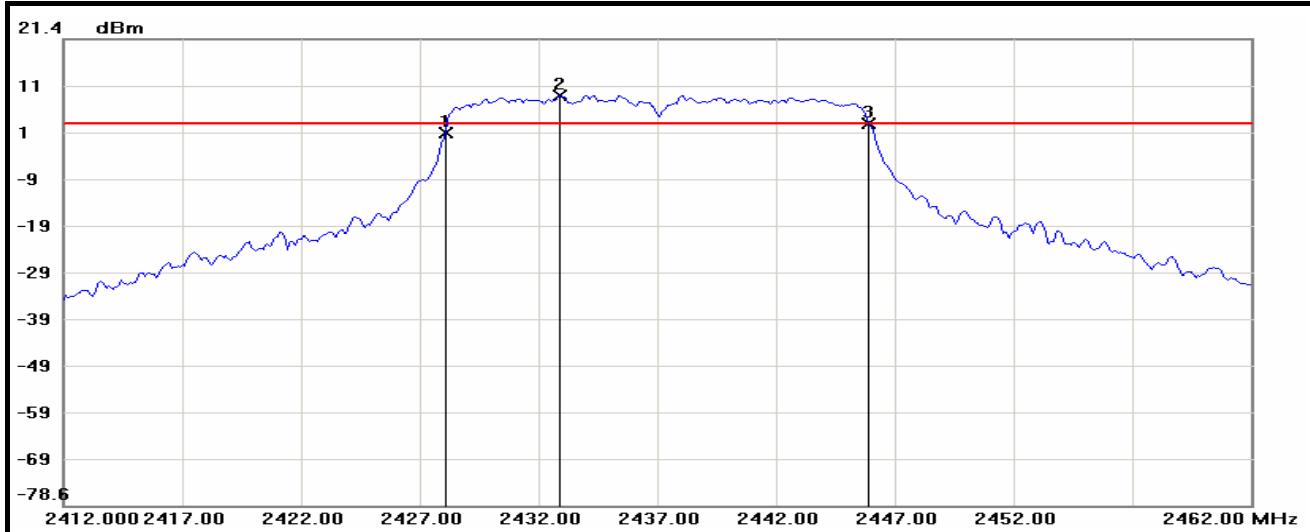


### IEEE 802.11n HT20 Mode / Chain A / CH Low



No.	Frequency(MHz)	Result(dBm)
1	2403.1667	-0.99
2	2410.4167	5.16
3	2420.9167	-1.01

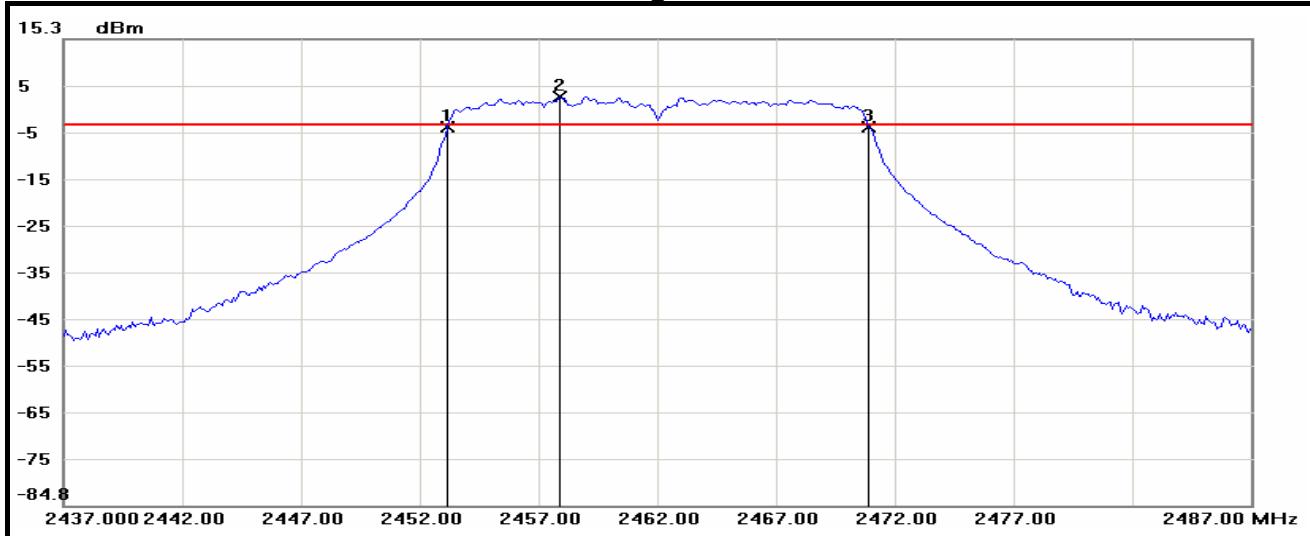
### IEEE 802.11n HT20 Mode / Chain A / CH Middle



No.	Frequency(MHz)	Result(dBm)
1	2428.0833	1.24
2	2432.9167	9.33
3	2445.9167	3.25



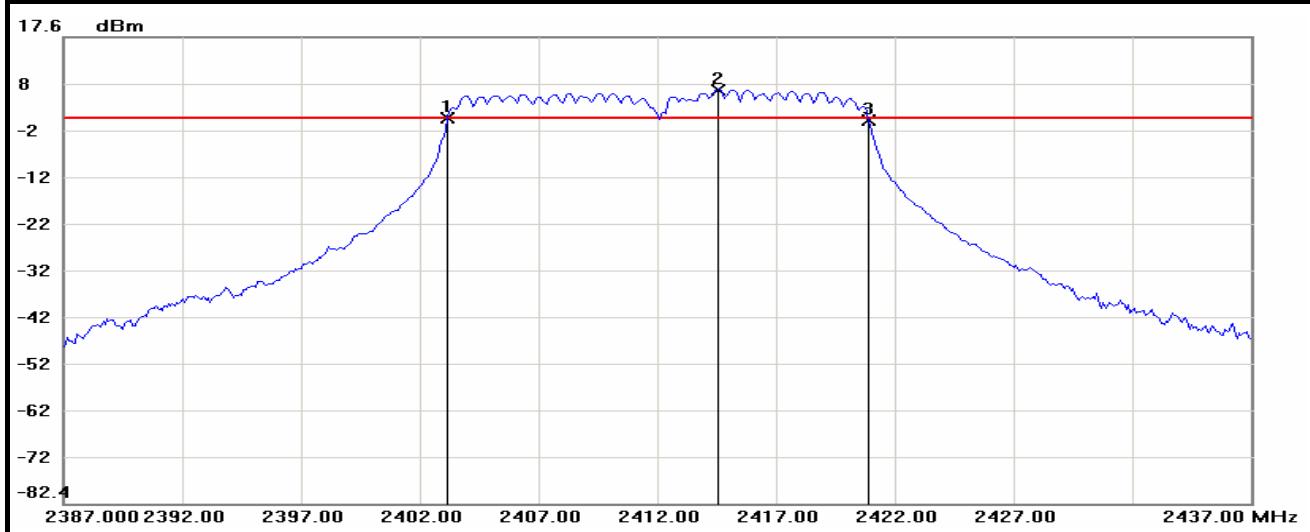
IEEE 802.11n HT20 Mode / Chain A / CH High



No.	Frequency(MHz)	Result(dBm)
1	2453.1667	-3.63
2	2457.9167	2.79
3	2470.9167	-3.73

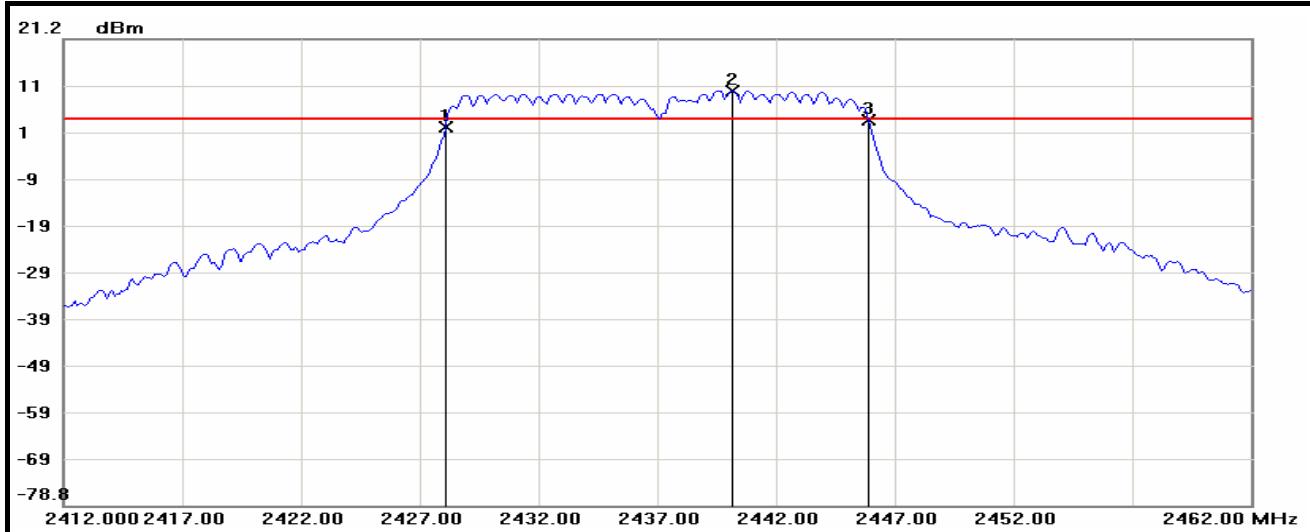


### IEEE 802.11n HT20 Mode / Chain B / CH Low



No.	Frequency(MHz)	Result(dBm)
1	2403.1667	0.31
2	2414.5833	6.35
3	2420.9167	-0.29

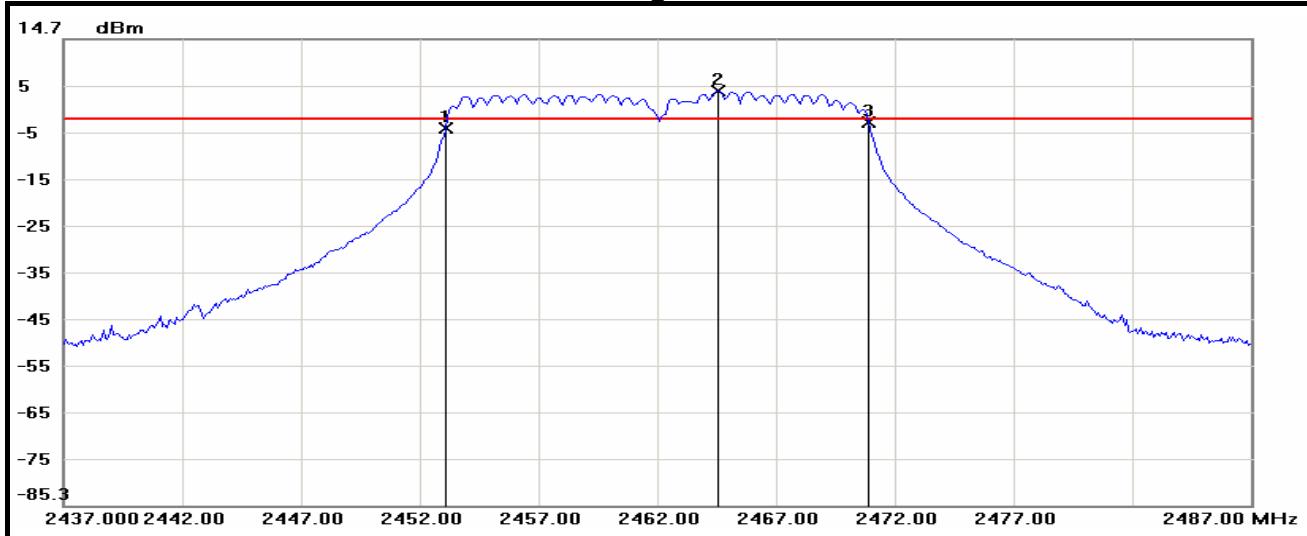
### IEEE 802.11n HT20 Mode / Chain B / CH Middle



No.	Frequency(MHz)	Result(dBm)
1	2428.0833	2.22
2	2440.1667	10.11
3	2445.9167	3.77



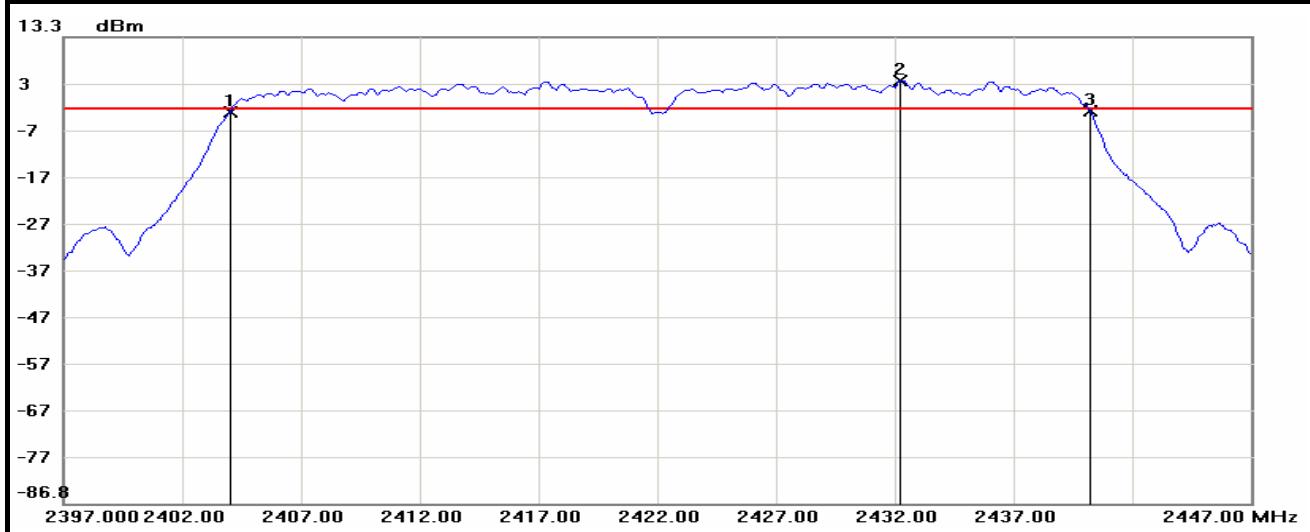
IEEE 802.11n HT20 Mode / Chain B / CH High



No.	Frequency(MHz)	Result(dBm)
1	2453.0833	-4.35
2	2464.5833	3.50
3	2470.9167	-3.06

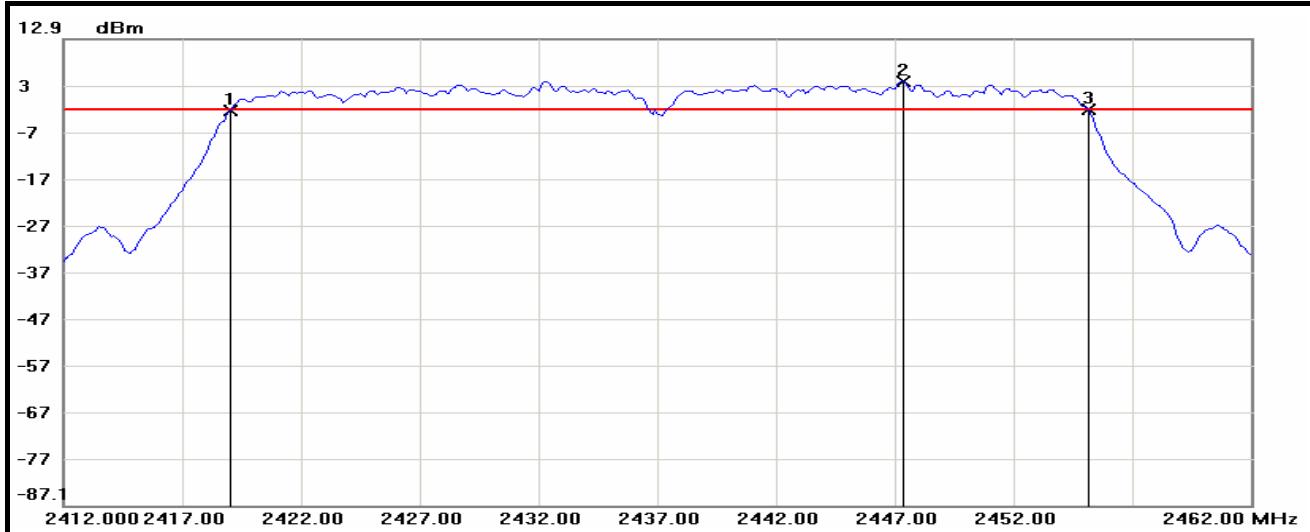


### IEEE 802.11n HT40 Mode / Chain A / CH Low



No.	Frequency(MHz)	Result(dBm)
1	2404.0000	-2.75
2	2432.2500	3.96
3	2440.2500	-2.54

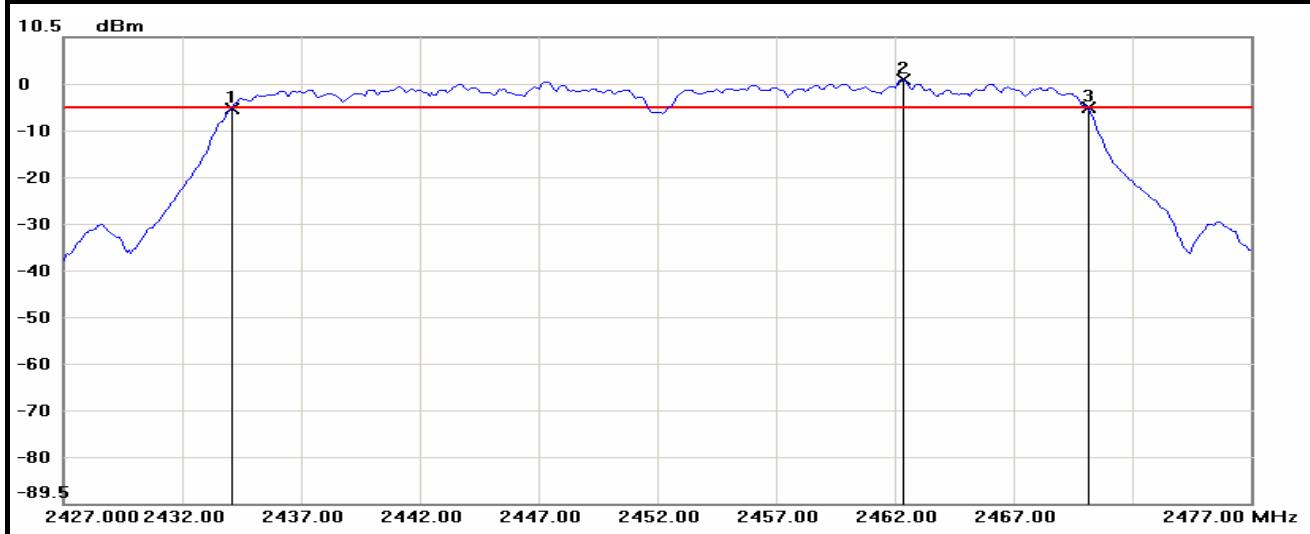
### IEEE 802.11n HT40 Mode / Chain A / CH Middle



No.	Frequency(MHz)	Result(dBm)
1	2419.0000	-2.52
2	2447.3333	3.90
3	2455.1667	-2.13



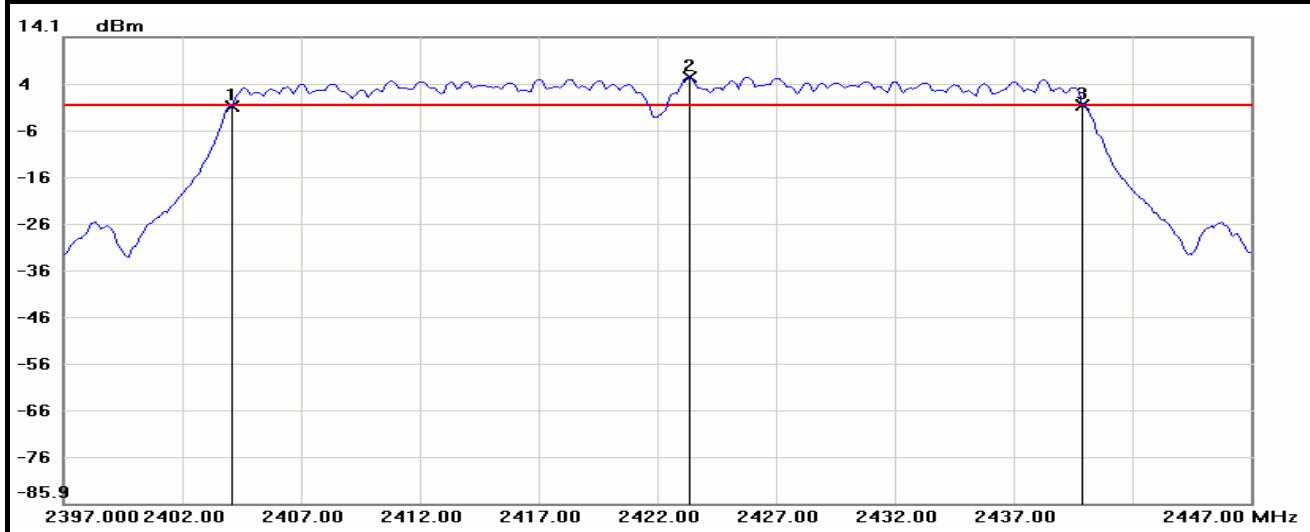
IEEE 802.11n HT40 Mode / Chain A / CH High



No.	Frequency(MHz)	Result(dBm)
1	2434.0833	-4.79
2	2462.3333	1.29
3	2470.1667	-4.78

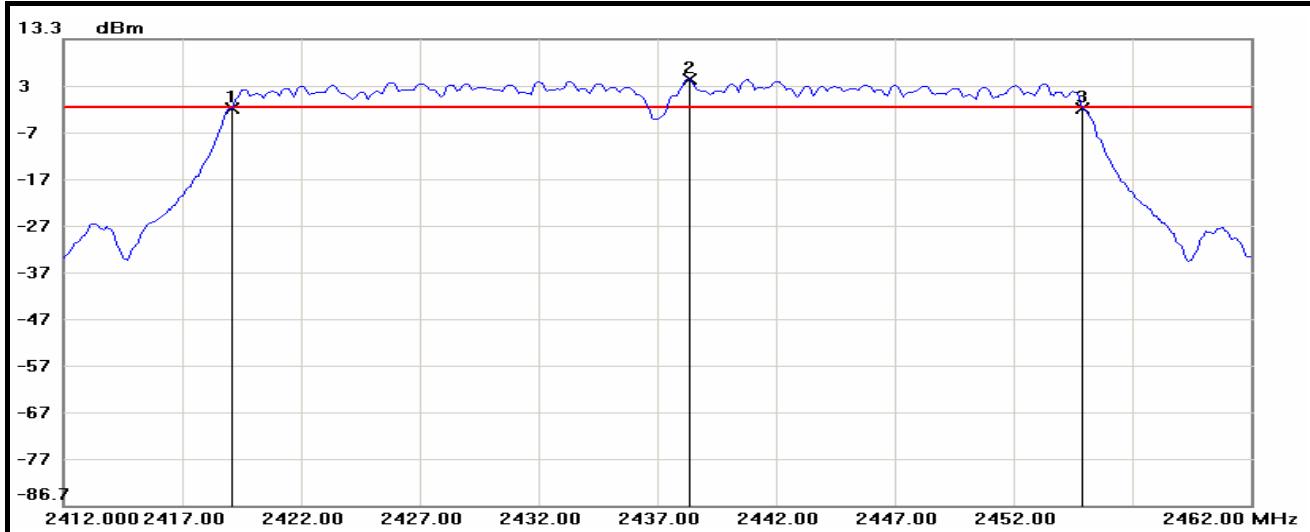


### IEEE 802.11n HT40 Mode / Chain B / CH Low



No.	Frequency(MHz)	Result(dBm)
1	2404.0833	-0.85
2	2423.3333	5.56
3	2439.9167	-0.50

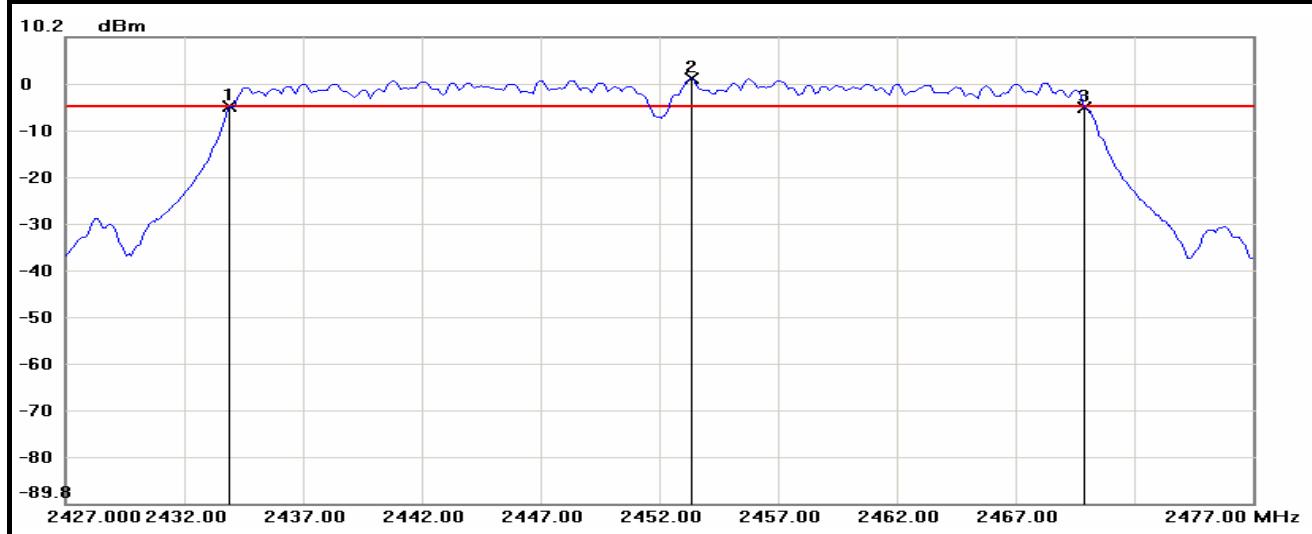
### IEEE 802.11n HT40 Mode / Chain B / CH Middle



No.	Frequency(MHz)	Result(dBm)
1	2419.0833	-1.50
2	2438.3333	4.67
3	2454.9167	-1.61



IEEE 802.11n HT40 Mode / Chain B / CH High



No.	Frequency(MHz)	Result(dBm)
1	2433.9167	-4.75
2	2453.3333	1.29
3	2469.9167	-4.90



## 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.

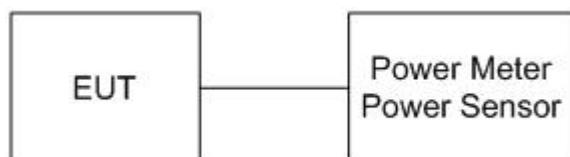
§ 15.247(b) (4) Except as shown in paragraphs (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used the peak output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1) or (b)(2), and (b)(3) of this section, as appropriate, 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
Power Meter	Anritsu	ML2495A	1149001	12/07/2012
Power Sensor	Anritsu	MA2411B	1126148	12/14/2012

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

### TEST SETUP



### TEST PROCEDURE

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



## TEST RESULTS

### IEEE 802.11b Mode

Channel	Channel Frequency (MHz)	Peak Power		Peak Power Limit		Pass / Fail
		(dBm)	(W)	(dBm)	(W)	
Low	2412	20.88	0.1225	30	1	PASS
Middle	2437	21.36	0.1368	30	1	PASS
High	2462	18.98	0.0791	30	1	PASS

**Remark:**

1. At final test to get the worst-case emission at 1Mbps.
2. The cable assembly insertion loss of 11.5dB (including 10 dB pad and 1.5 dB cable) was Entered as an offset in the power meter 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	25.17	0.3289	30	1	PASS
Middle	2437	26.35	0.4315	30	1	PASS
High	2462	23.06	0.2023	30	1	PASS

**Remark:**

1. At final test to get the worst-case emission at 6Mbps.
2. The cable assembly insertion loss of 11.5dB (including 10 dB pad and 1.5 dB cable) was Entered as an offset in the power meter 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 A	Chain B	(dBm)	(W)	(dBm)	(W)	
Low	2412	23.66	23.53	26.61	0.4577	30	1	PASS
Middle	2437	25.52	25.50	28.52	0.7113	30	1	PASS
High	2462	21.45	20.70	24.10	0.2571	30	1	PASS

**Remark:**

1. At final test to get the worst-case emission at 13Mbps.
2. The cable assembly insertion loss of 11.5dB (including 10 dB pad and 1.5 dB cable) was Entered as an offset in the power meter to allow for direct reading of power.
3. The maximum antenna gain for the MIMO mode is 5.68dBi which is less than 6dBi, the limit should be 1W.
4. Total peak power = Chain A + Chain B.

IEEE 802.11n HT40 Mode (Two TX)

Channel	Channel Frequency (MHz)	Peak Power (dBm)		Peak Power Total		Peak Power Limit		Pass / Fail
		Chain A	Chain B	(dBm)	(W)	(dBm)	(W)	
Low	2422	22.32	22.29	25.32	0.3400	30	1	PASS
Middle	2437	22.30	22.29	25.31	0.3393	30	1	PASS
High	2452	19.45	18.70	22.10	0.1622	30	1	PASS

**Remark:**

1. At final test to get the worst-case emission at 27Mbps.
2. The cable assembly insertion loss of 11.5dB (including 10 dB pad and 1.5 dB cable) was Entered as an offset in the power meter to allow for direct reading of power.
3. The maximum antenna gain for the MIMO mode is 5.68dBi which is less than 6dBi, the limit should be 1W.
4. Total peak power = Chain A + Chain B.



## 8.3 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 be 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	06/14/2013

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

### TEST SETUP



### TEST PROCEDURE

1. Use this procedure when the maximum peak conducted output power in the fundamental emission is used to demonstrate compliance.
2. Set the RBW = 100 kHz.
3. Set the VBW  $\geq$  300 kHz.
4. Set the span to 5-30 % greater than the EBW.
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.
10. Scale the observed power level to an equivalent value in 3 kHz by adjusting (reducing) the measured power by a bandwidth correction factor (BWCF) where  $BWCF = 10\log(3 \text{ kHz}/100\text{kHz}) = -15.2 \text{ dB}$ ).



## TEST RESULTS

### IEEE 802.11b Mode

Channel	Channel Frequency (MHz)	Final RF Power Level In 3kHz BW (dBm)	Minimum Limit (dBm)	Pass / Fail
Low	2412	-6.79	8	PASS
Middle	2437	-6.15	8	PASS
High	2462	-8.40	8	PASS

**Remark:**

1. At final test to get the worst-case emission at 1Mbps.
2. The cable assembly insertion loss of 11.5dB (including 10 dB pad and 1.5 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	-12.82	8	PASS
Middle	2437	-9.54	8	PASS
High	2462	-15.56	8	PASS

**Remark:**

1. At final test to get the worst-case emission at 6Mbps.
2. The cable assembly insertion loss of 11.5dB (including 10 dB pad and 1.5 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)		Total Power Spectral Density (dBm)	Minimum Limit (dBm)	Pass / Fail
		Chain A	Chain B			
Low	2412	-15.03	-13.68	-11.29	8	PASS
Middle	2437	-11.01	-9.96	-7.44	8	PASS
High	2462	-17.29	-16.46	-13.84	8	PASS

**Remark:**

1. At final test to get the worst-case emission at 13Mbps.
2. The cable assembly insertion loss of 11.5dB (including 10 dB pad and 1.5 dB cable) was Entered as an offset in the spectrum analyzer to allow for direct reading of power.
3. Total power spectral density = Chain A + Chain B.

IEEE 802.11n HT40 Mode (Two TX)

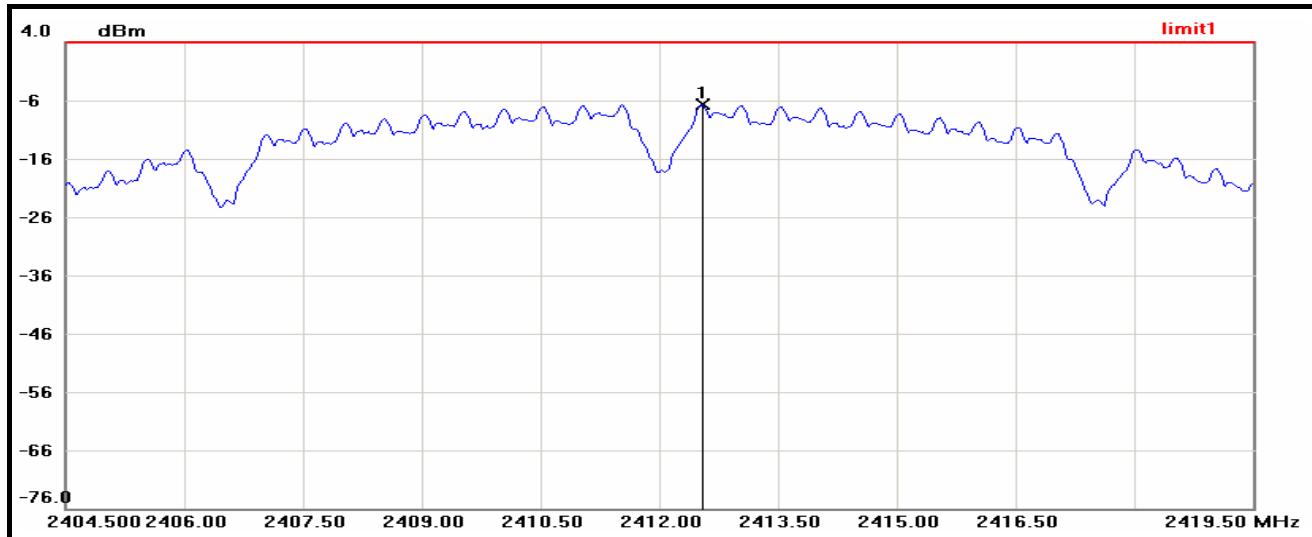
Channel	Channel Frequency (MHz)	Final RF Power Level In 3kHz BW (dBm)		Total Power Spectral Density (dBm)	Minimum Limit (dBm)	Pass / Fail
		Chain A	Chain B			
Low	2422	-19.23	-17.33	-15.17	8	PASS
Middle	2437	-19.37	-18.63	-15.97	8	PASS
High	2452	-21.90	-21.76	-18.82	8	PASS

**Remark:**

1. At final test to get the worst-case emission at 27Mbps.
2. The cable assembly insertion loss of 11.5dB (including 10 dB pad and 1.5 dB cable) was Entered as an offset in the spectrum analyzer to allow for direct reading of power.
3. Total power spectral density = Chain A + Chain B.

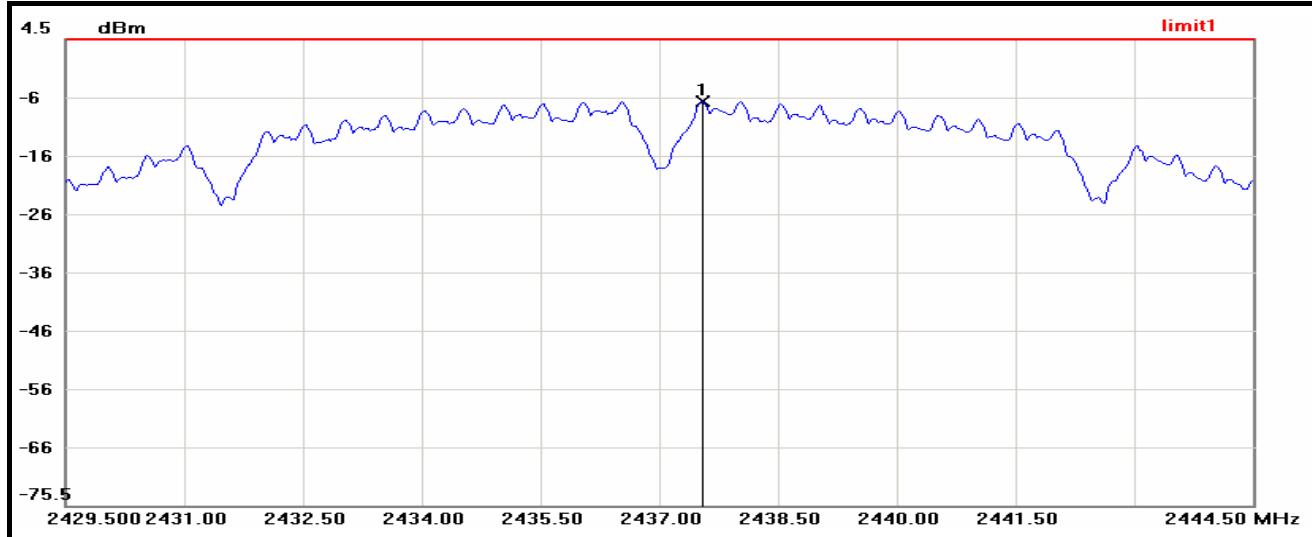


### IEEE 802.11b Mode / CH Low



No.	Frequency(MHz)	Result(dBm)	Limit(dBm)	Margin(dBm)
1	2412.5500	-6.79	8.00	-14.79

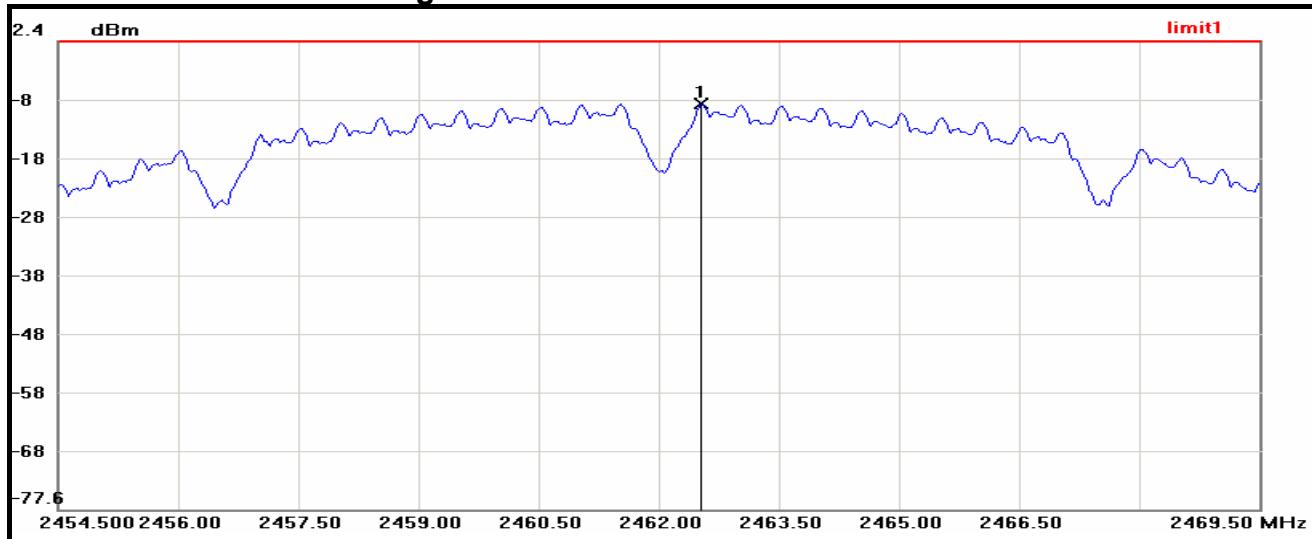
### IEEE 802.11b Mode / CH Middle



No.	Frequency(MHz)	Result(dBm)	Limit(dBm)	Margin(dBm)
1	2437.5500	-6.15	8.00	-14.15



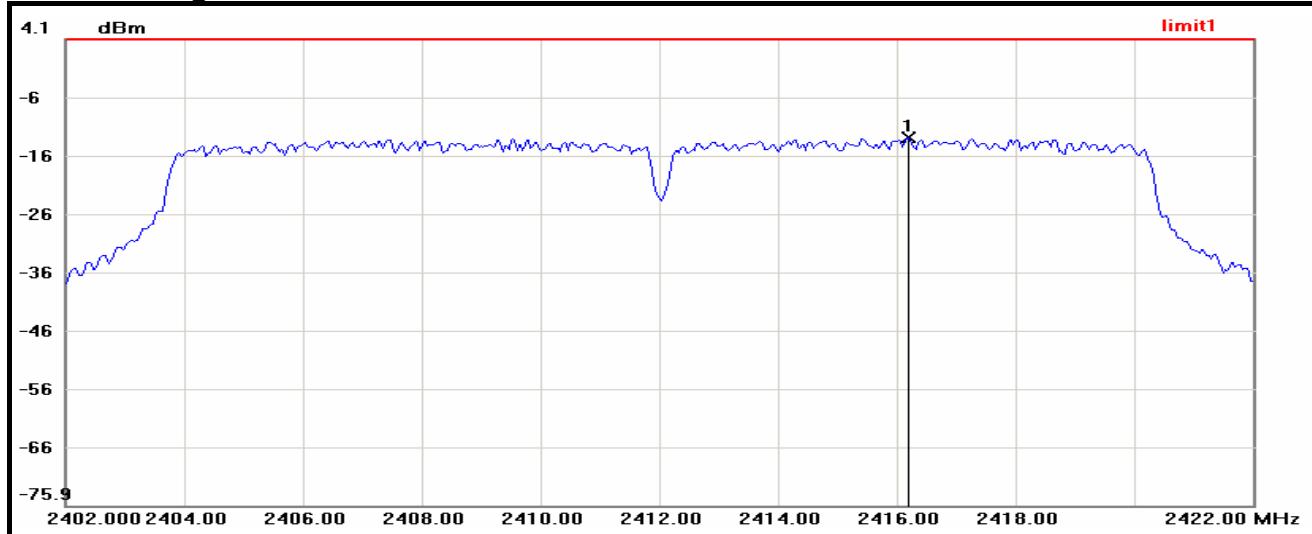
IEEE 802.11b Mode / CH High



No.	Frequency(MHz)	Result(dBm)	Limit(dBm)	Margin(dBm)
1	2462.5250	-8.40	8.00	-16.40

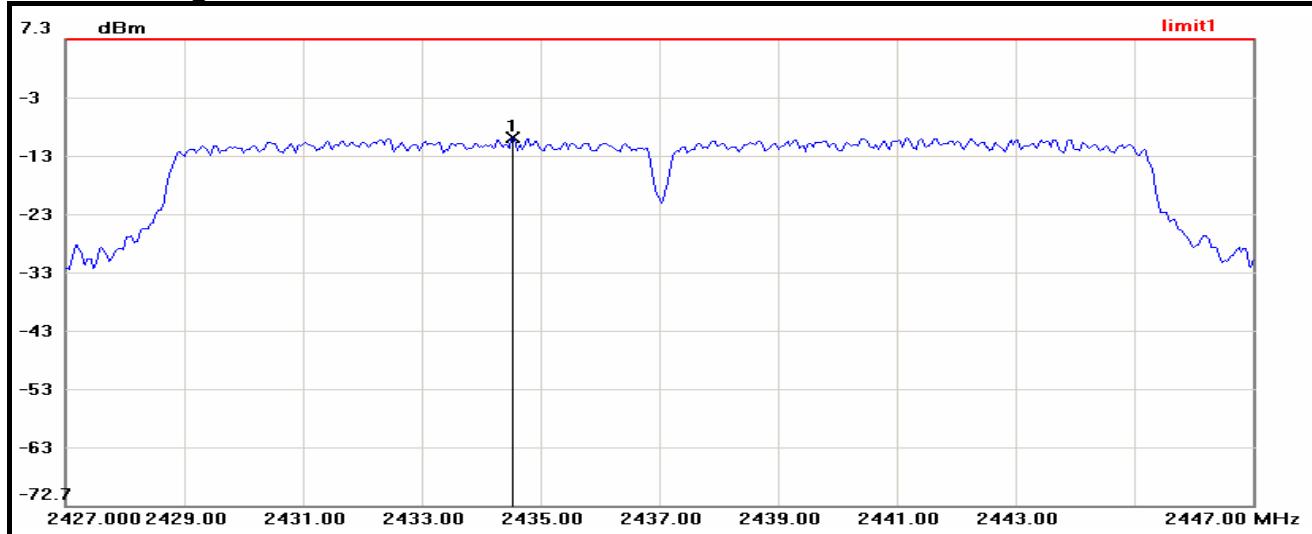


### IEEE 802.11g Mode / CH Low



No.	Frequency(MHz)	Result(dBm)	Limit(dBm)	Margin(dBm)
1	2416.2000	-12.82	8.00	-20.82

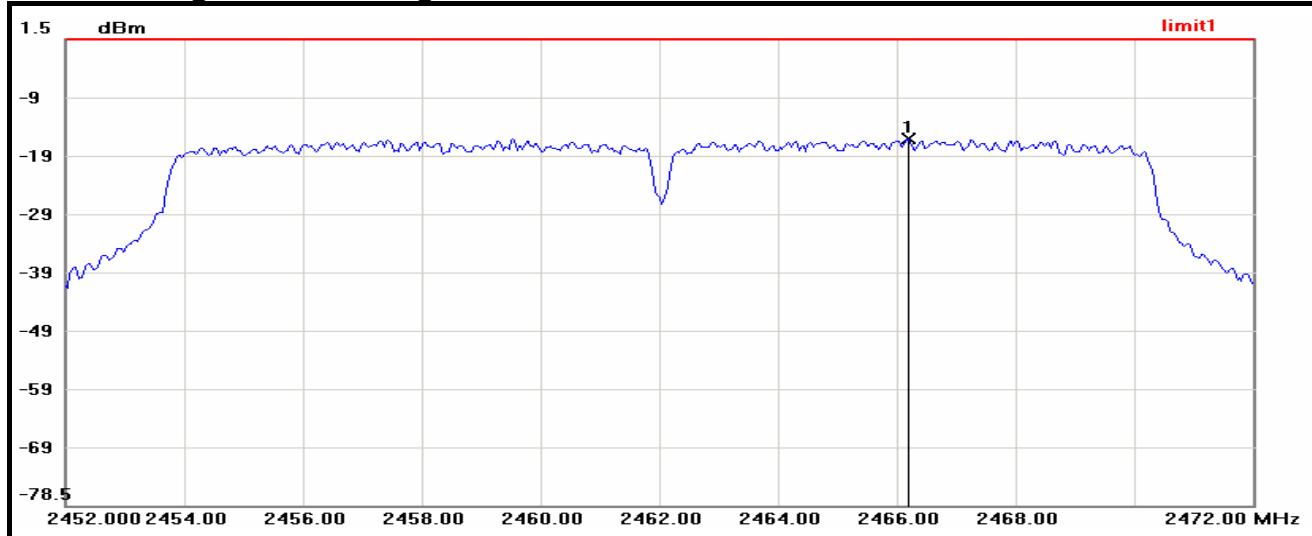
### IEEE 802.11g Mode / CH Middle



No.	Frequency(MHz)	Result(dBm)	Limit(dBm)	Margin(dBm)
1	2434.5333	-9.54	8.00	-17.54



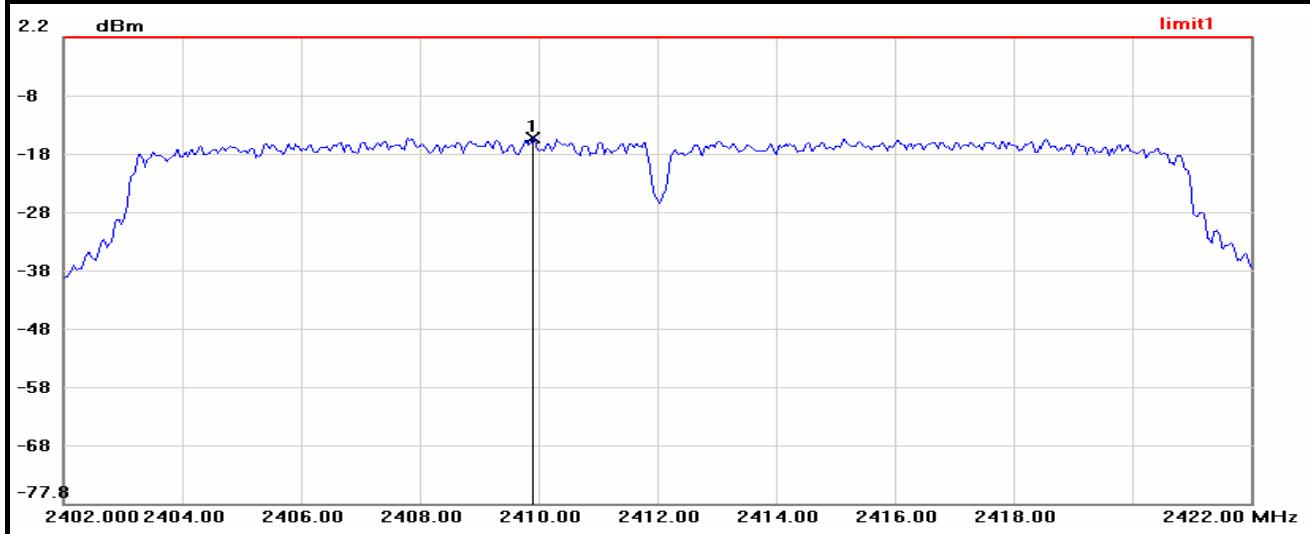
IEEE 802.11g Mode / CH High



No.	Frequency(MHz)	Result(dBm)	Limit(dBm)	Margin(dBm)
1	2466.2000	-15.56	8.00	-23.56

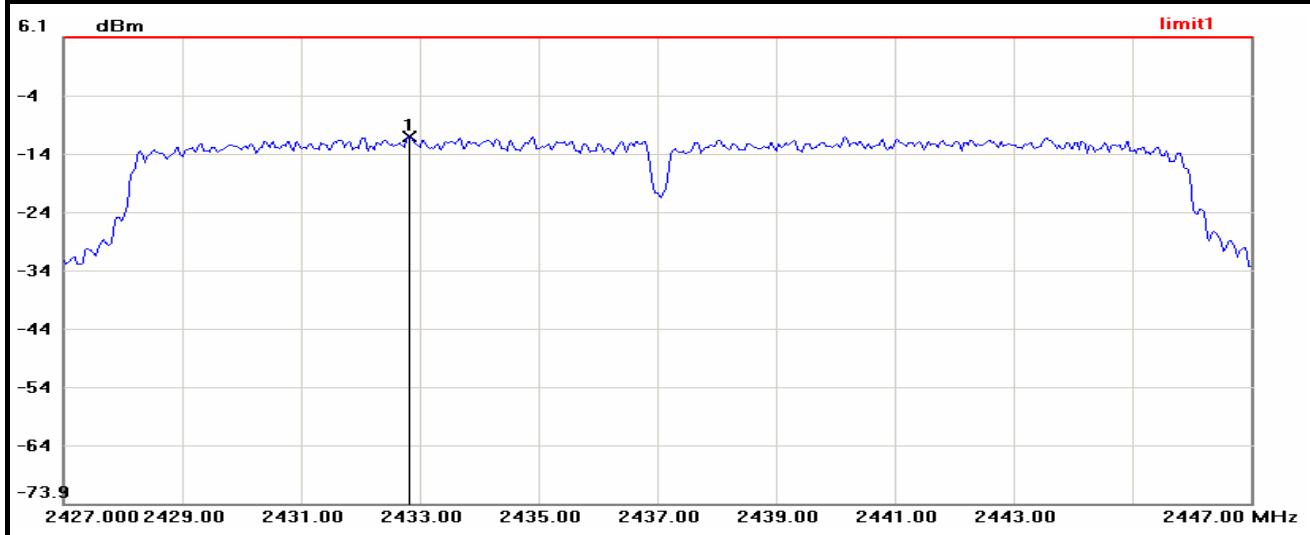


IEEE 802.11n HT20 Mode / Chain A / CH Low



No.	Frequency(MHz)	Result(dBm)	Limit(dBm)	Margin(dBm)
1	2409.9000	-15.03	8.00	-23.03

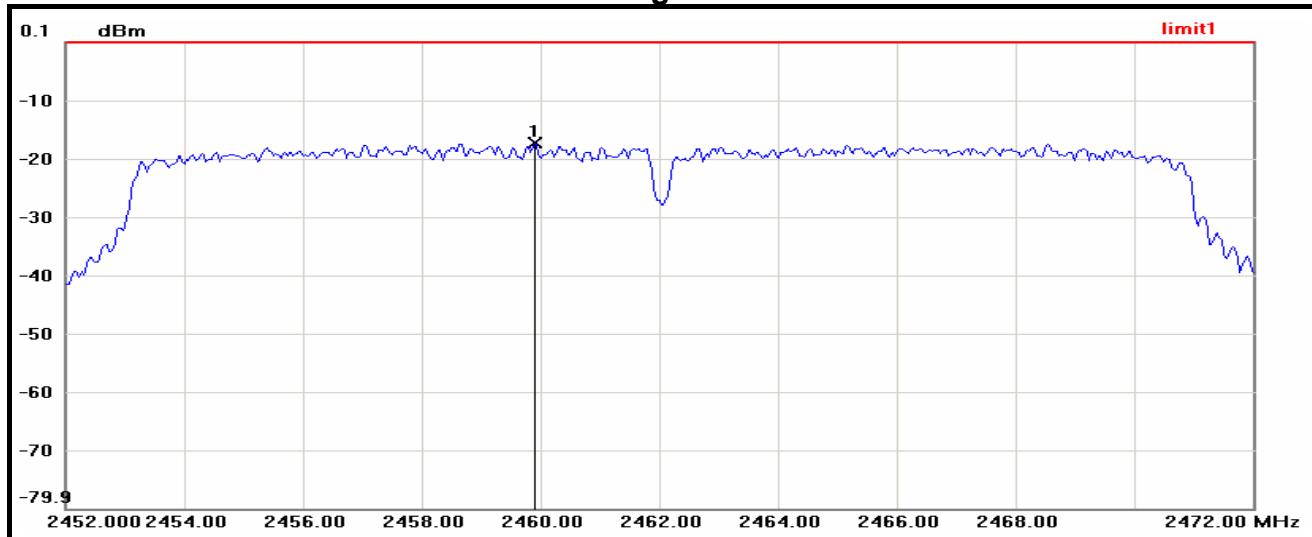
IEEE 802.11n HT20 Mode / Chain A / CH Middle



No.	Frequency(MHz)	Result(dBm)	Limit(dBm)	Margin(dBm)
1	2432.8333	-11.01	8.00	-19.01



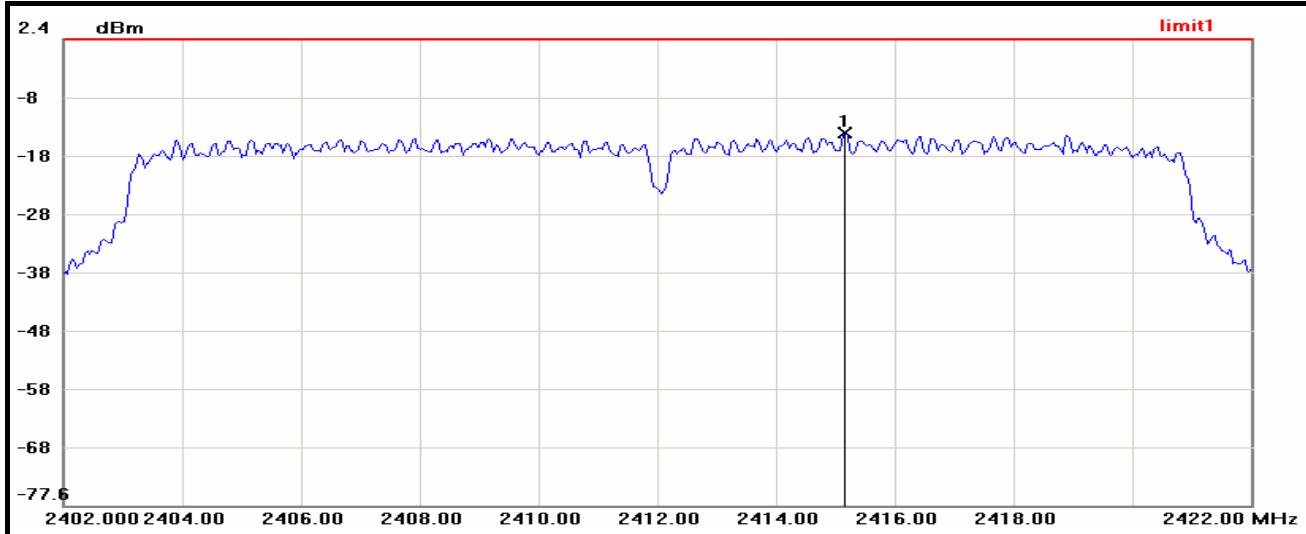
IEEE 802.11n HT20 Mode / Chain A / CH High



No.	Frequency(MHz)	Result(dBm)	Limit(dBm)	Margin(dBm)
1	2459.9000	-17.29	8.00	-25.29

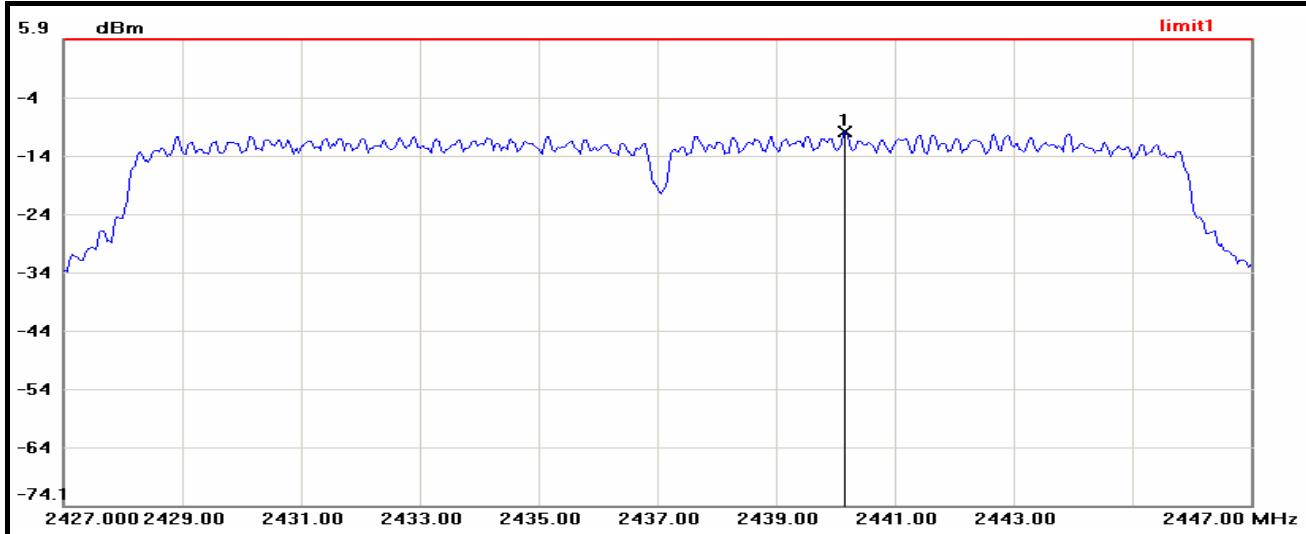


IEEE 802.11n HT20 Mode / Chain B / CH Low



No.	Frequency(MHz)	Result(dBm)	Limit(dBm)	Margin(dBm)
1	2415.1667	-13.68	8.00	-21.68

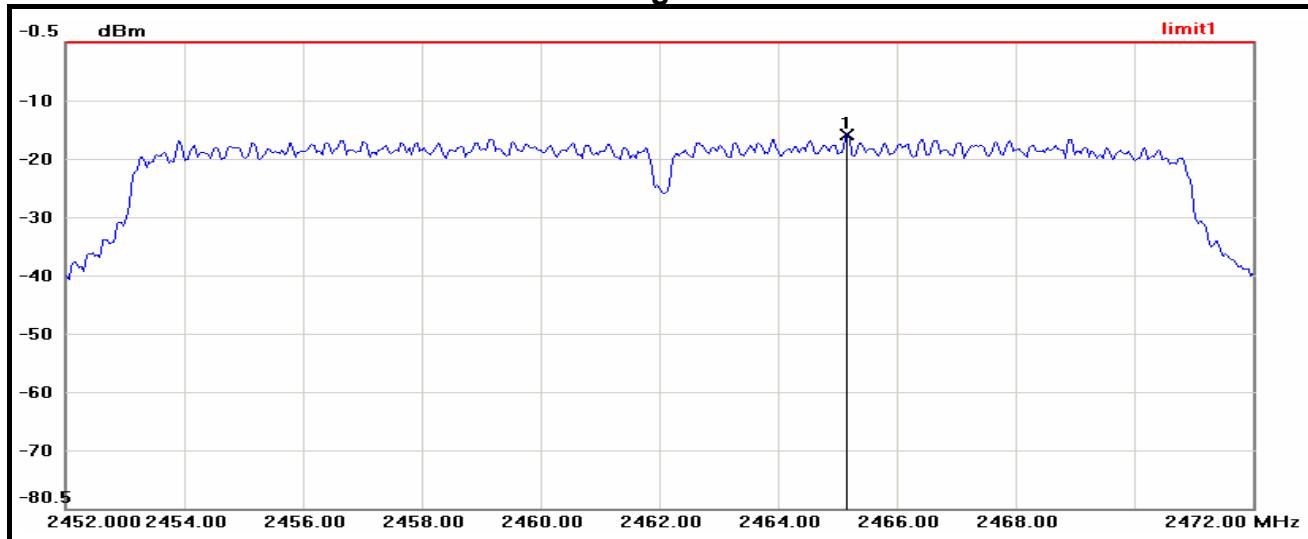
IEEE 802.11n HT20 Mode / Chain B / CH Middle



No.	Frequency(MHz)	Result(dBm)	Limit(dBm)	Margin(dBm)
1	2440.1667	-9.96	8.00	-17.96



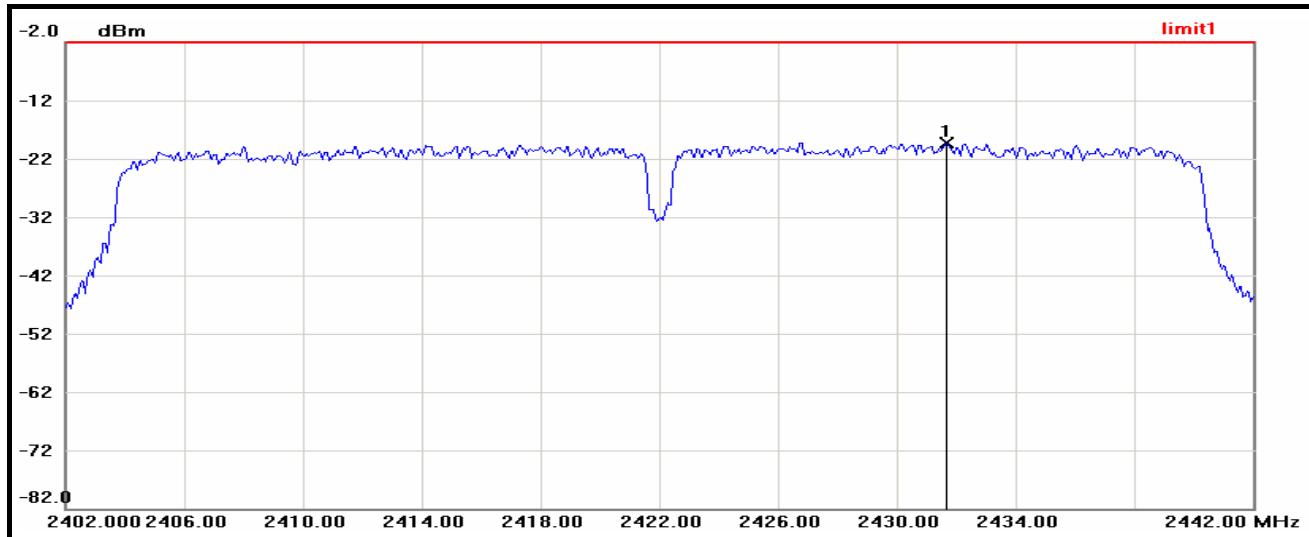
IEEE 802.11n HT20 Mode / Chain B / CH High



No.	Frequency(MHz)	Result(dBm)	Limit(dBm)	Margin(dBm)
1	2465.1667	-16.46	8.00	-24.46

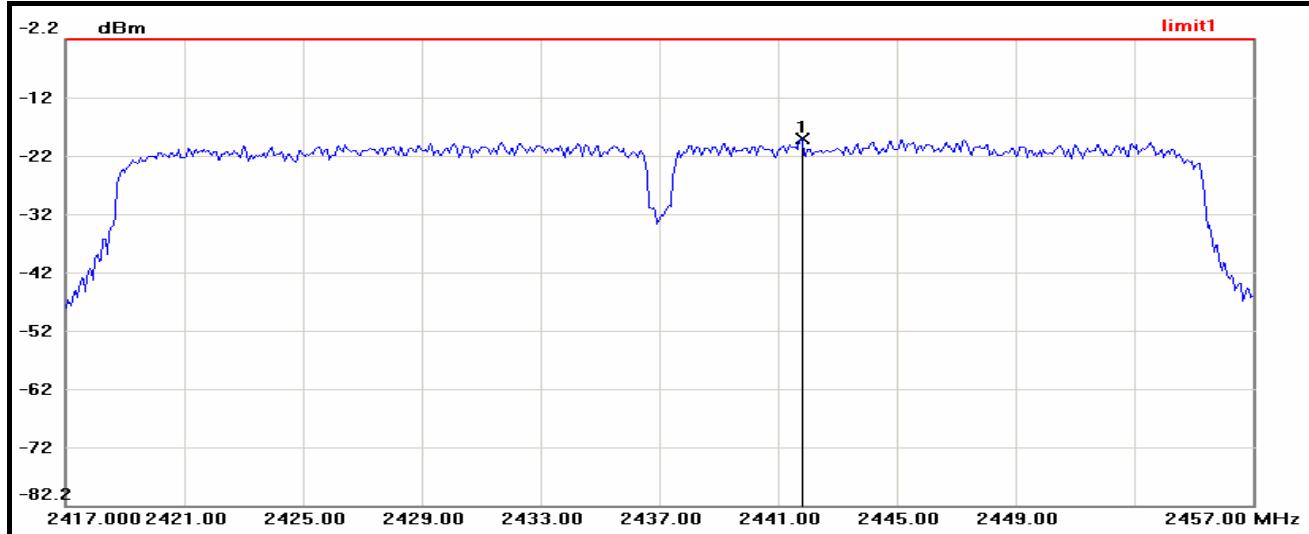


IEEE 802.11n HT40 Mode / Chain A / CH Low



No.	Frequency(MHz)	Result(dBm)	Limit(dBm)	Margin(dBm)
1	2431.6667	-19.23	8.00	-27.23

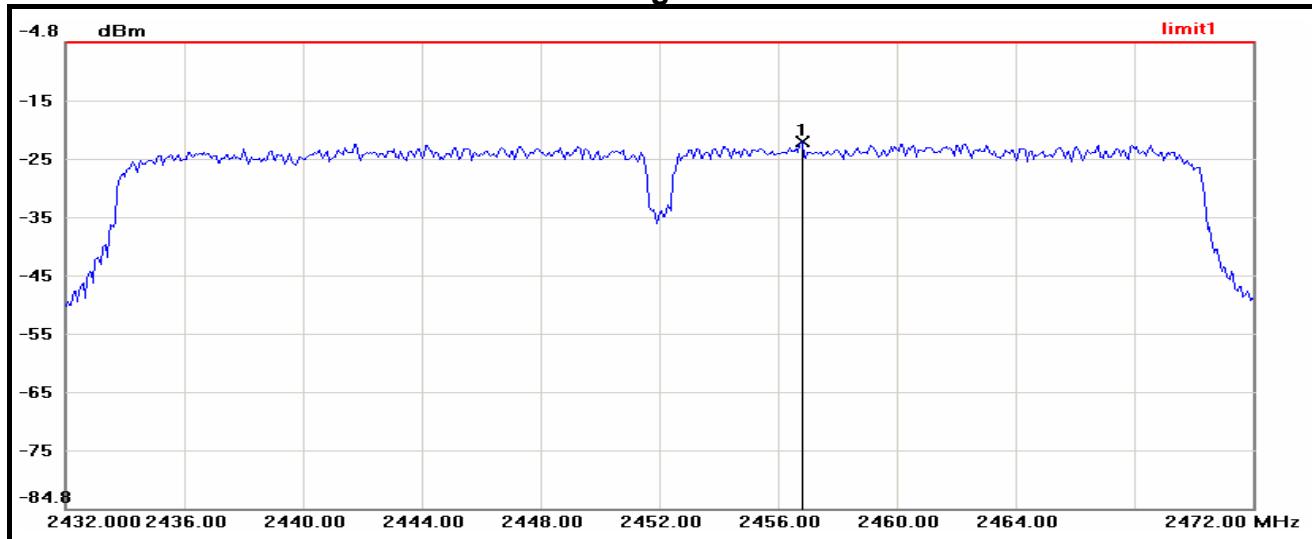
IEEE 802.11n HT40 Mode / Chain A / CH Middle



No.	Frequency(MHz)	Result(dBm)	Limit(dBm)	Margin(dBm)
1	2441.8000	-19.37	8.00	-27.37



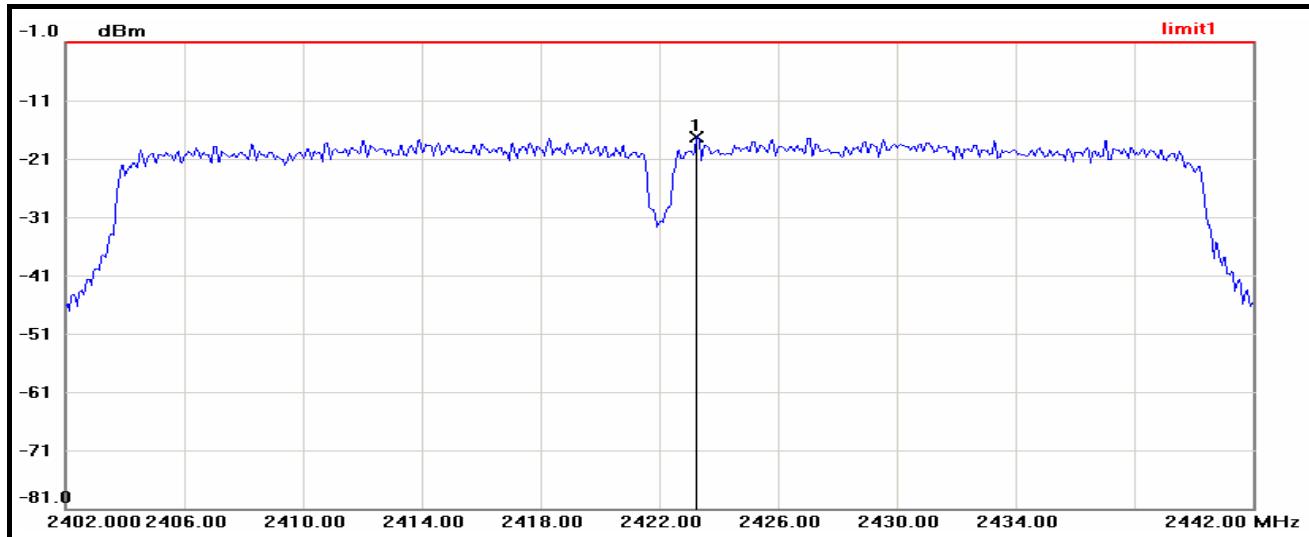
IEEE 802.11n HT40 Mode / Chain A / CH High



No.	Frequency(MHz)	Result(dBm)	Limit(dBm)	Margin(dBm)
1	2456.8000	-21.90	8.00	-29.90

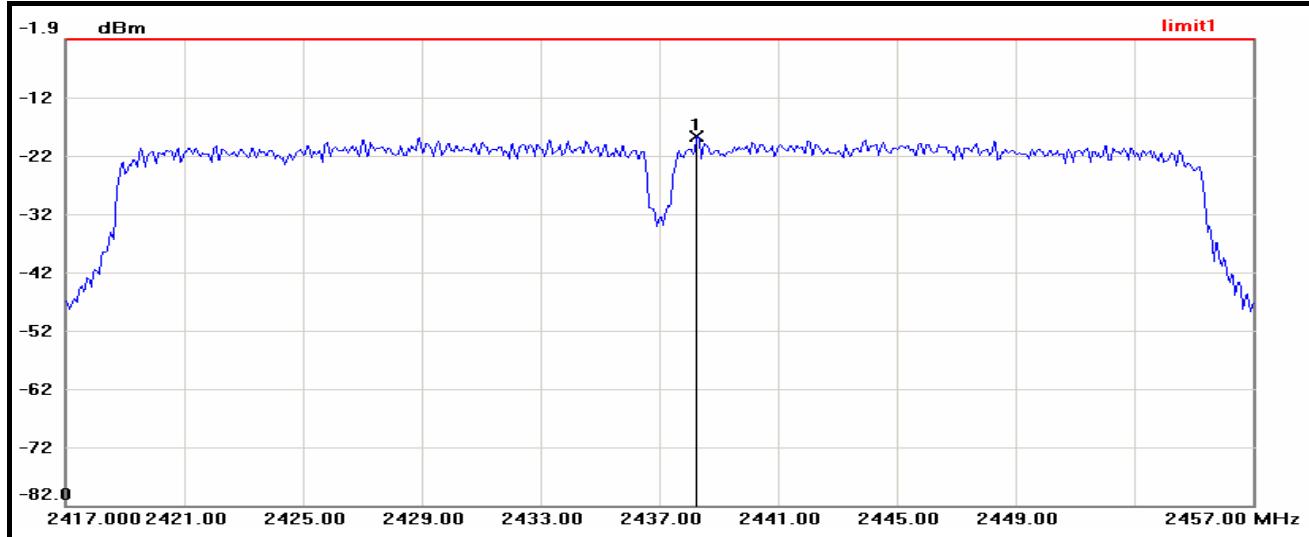


IEEE 802.11n HT40 Mode / Chain B / CH Low



No.	Frequency(MHz)	Result(dBm)	Limit(dBm)	Margin(dBm)
1	2423.2667	-17.33	8.00	-25.33

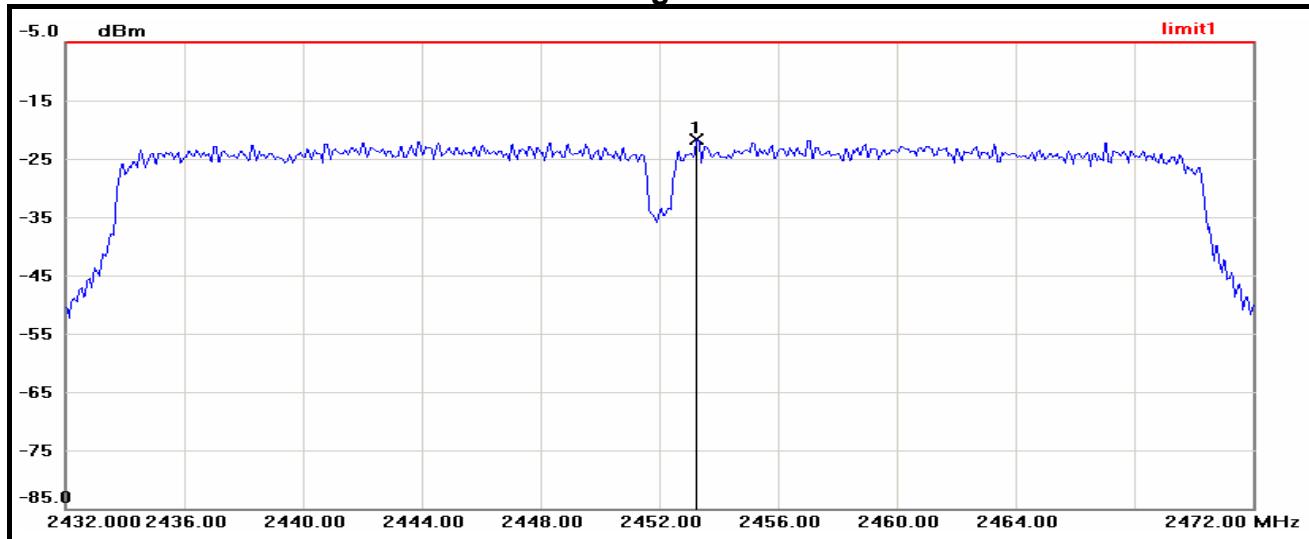
IEEE 802.11n HT40 Mode / Chain B / CH Middle



No.	Frequency(MHz)	Result(dBm)	Limit(dBm)	Margin(dBm)
1	2438.2667	-18.63	8.00	-26.63



IEEE 802.11n HT40 Mode / Chain B / CH High



No.	Frequency(MHz)	Result(dBm)	Limit(dBm)	Margin(dBm)
1	2453.2667	-21.76	8.00	-29.76



## 8.4 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 and 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	06/14/2013

*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 25 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in the 2.4 GHz band.



## TEST RESULTS

### IEEE 802.11b Mode / CH Low / 2.38GHz ~ 2.5GHz



No.	Frequency(MHz)	Result(dBm)	Limit(dBm)	Margin(dBm)
1	2399.5600	-29.59	-11.48	-18.11
2	2412.5200	8.52	-11.48	20.00
3	2485.0000	-50.76	-11.48	-39.28

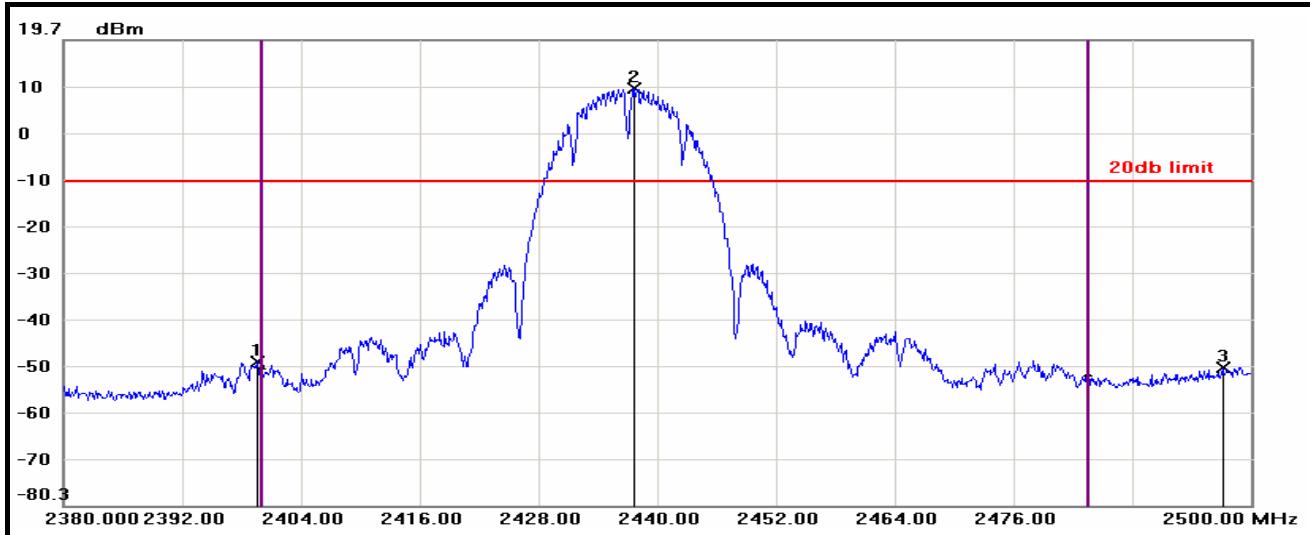
### IEEE 802.11b Mode / CH Low / 30MHz ~ 25GHz



No.	Frequency(MHz)	Result(dBm)	Limit(dBm)	Margin(dBm)
1	2377.1800	-46.04	-11.48	-34.56
2	24775.2700	-48.16	-11.48	-36.68



IEEE 802.11b Mode / CH Middle / 2.38GHz ~ 2.5GHz



No.	Frequency(MHz)	Result(dBm)	Limit(dBm)	Margin(dBm)
1	2399.5600	-49.38	-10.78	-38.60
2	2437.6000	9.22	-10.78	20.00
3	2497.1200	-50.66	-10.78	-39.88

IEEE 802.11b Mode / CH Middle / 30MHz ~ 25GHz



No.	Frequency(MHz)	Result(dBm)	Limit(dBm)	Margin(dBm)
1	2352.2100	-53.56	-10.78	-42.78
2	4874.1800	-45.48	-10.78	-34.70



IEEE 802.11b Mode / CH High / 2.38GHz ~ 2.5GHz



No.	Frequency(MHz)	Result(dBm)	Limit(dBm)	Margin(dBm)
1	2380.3600	-54.10	-13.12	-40.98
2	2462.5600	6.88	-13.12	20.00
3	2487.7600	-48.06	-13.12	-34.94

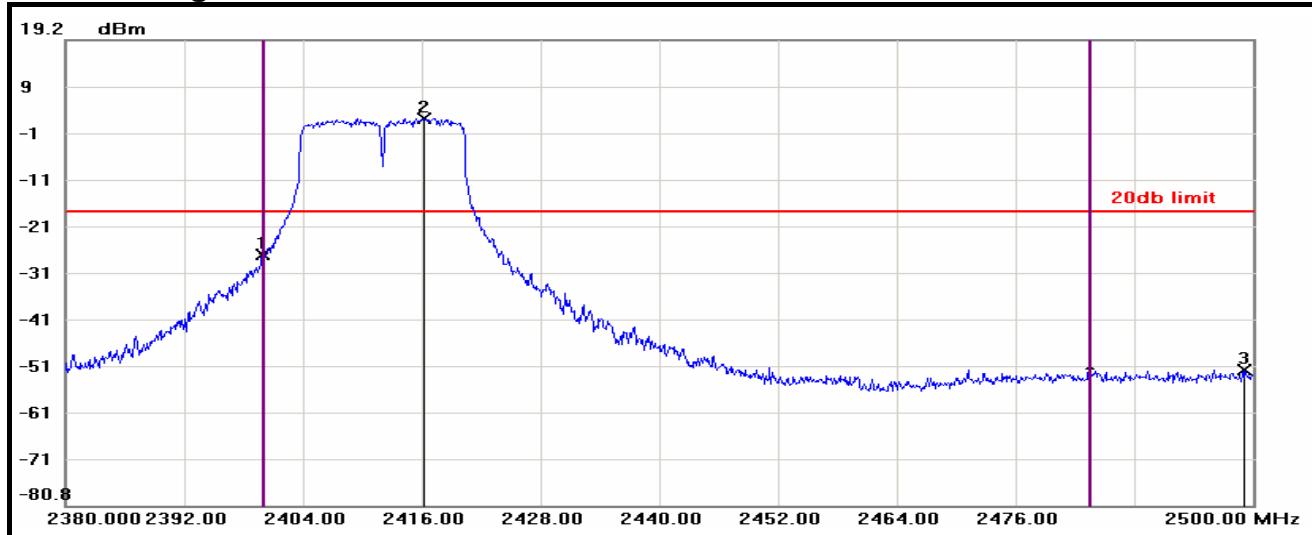
IEEE 802.11b Mode / CH High / 30MHz ~ 25GHz



No.	Frequency(MHz)	Result(dBm)	Limit(dBm)	Margin(dBm)
1	2352.2100	-56.25	-13.12	-43.13
2	24800.2400	-47.75	-13.12	-34.63



IEEE 802.11g Mode / CH Low / 2.38GHz ~ 2.5GHz



No.	Frequency(MHz)	Result(dBm)	Limit(dBm)	Margin(dBm)
1	2399.9200	-26.82	-17.53	-9.29
2	2416.2400	2.47	-17.53	20.00
3	2499.0400	-51.62	-17.53	-34.09

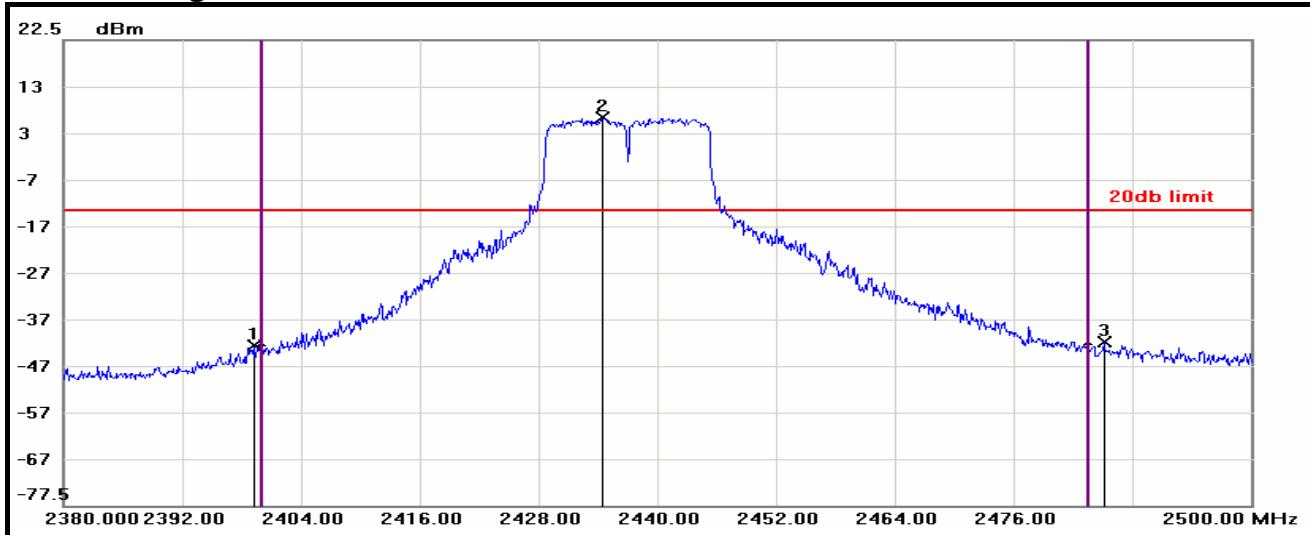
IEEE 802.11g Mode / CH Low / 30MHz ~ 25GHz



No.	Frequency(MHz)	Result(dBm)	Limit(dBm)	Margin(dBm)
1	2377.1800	-47.06	-17.53	-29.53
2	24725.3300	-47.34	-17.53	-29.81

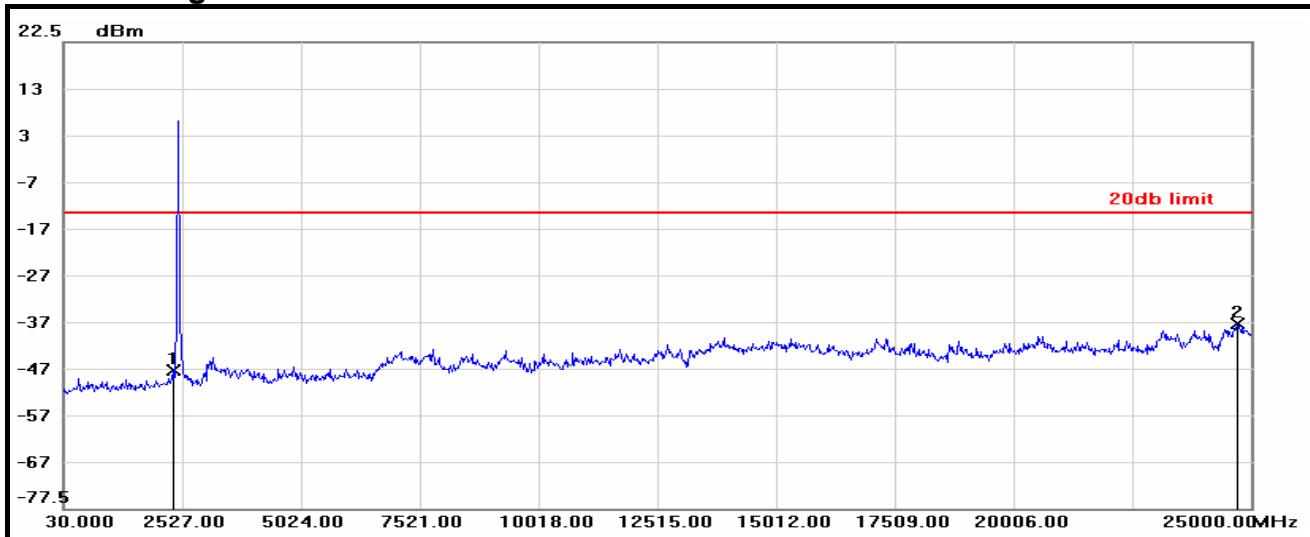


IEEE 802.11g Mode / CH Middle / 2.38GHz ~ 2.5GHz



No.	Frequency(MHz)	Result(dBm)	Limit(dBm)	Margin(dBm)
1	2399.2000	-43.04	-14.17	-28.87
2	2434.4800	5.83	-14.17	20.00
3	2485.1200	-42.35	-14.17	-28.18

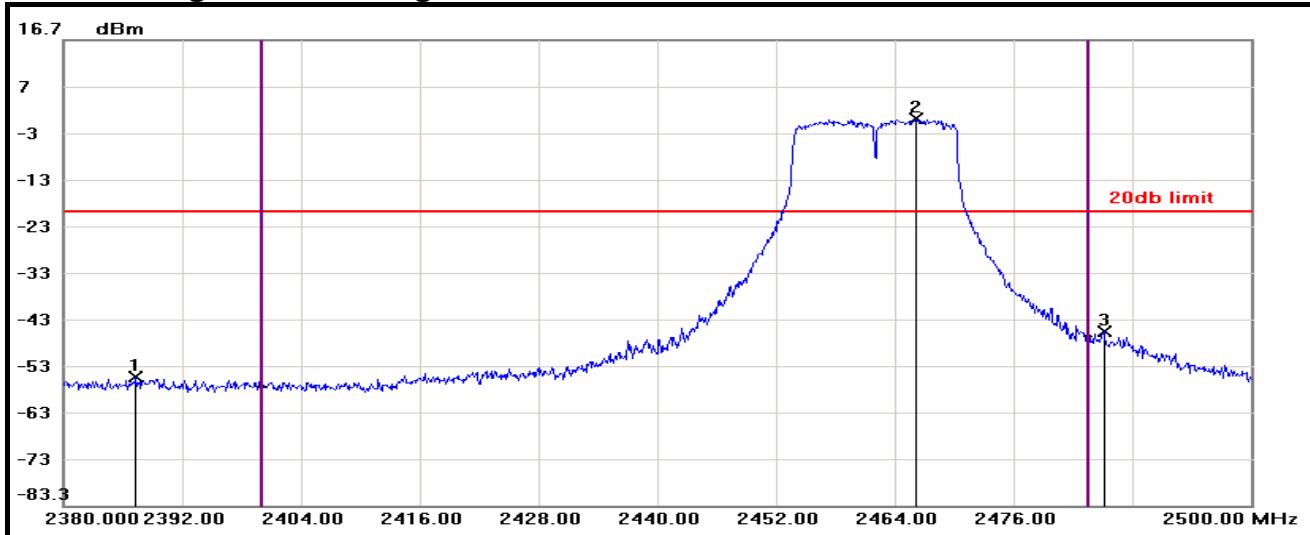
IEEE 802.11g Mode / CH Middle / 30MHz ~ 25GHz



No.	Frequency(MHz)	Result(dBm)	Limit(dBm)	Margin(dBm)
1	2327.2400	-47.73	-14.17	-33.56
2	24700.3600	-37.81	-14.17	-23.64



IEEE 802.11g Mode / CH High / 2.38GHz ~ 2.5GHz



No.	Frequency(MHz)	Result(dBm)	Limit(dBm)	Margin(dBm)
1	2387.3200	-55.71	-20.23	-35.48
2	2466.1600	-0.23	-20.23	20.00
1	2485.1200	-45.96	-20.23	-25.73

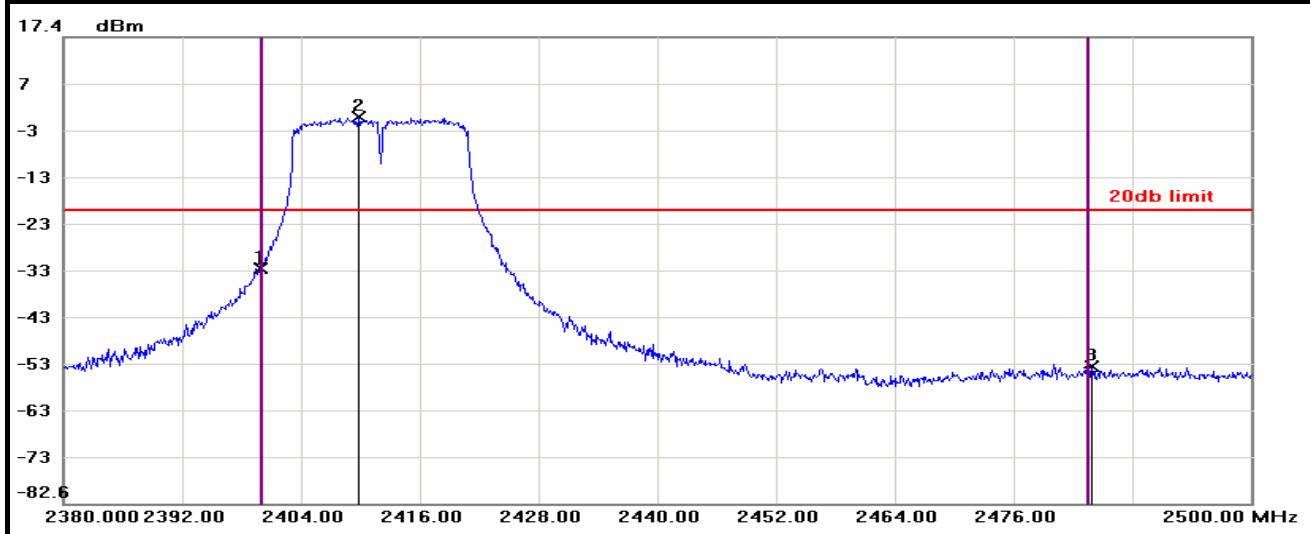
IEEE 802.11g Mode / CH High / 30MHz ~ 25GHz



No.	Frequency(MHz)	Result(dBm)	Limit(dBm)	Margin(dBm)
1	2327.2400	-57.14	-20.23	-36.91
2	24750.3000	-47.20	-20.23	-26.97



IEEE 802.11n HT20 Mode / Chain A / CH Low / 2.38GHz ~ 2.5GHz



No.	Frequency(MHz)	Result(dBm)	Limit(dBm)	Margin(dBm)
1	2399.9200	-32.10	-19.74	-12.36
2	2409.8800	0.26	-19.74	20.00
3	2483.9200	-53.24	-19.74	-33.50

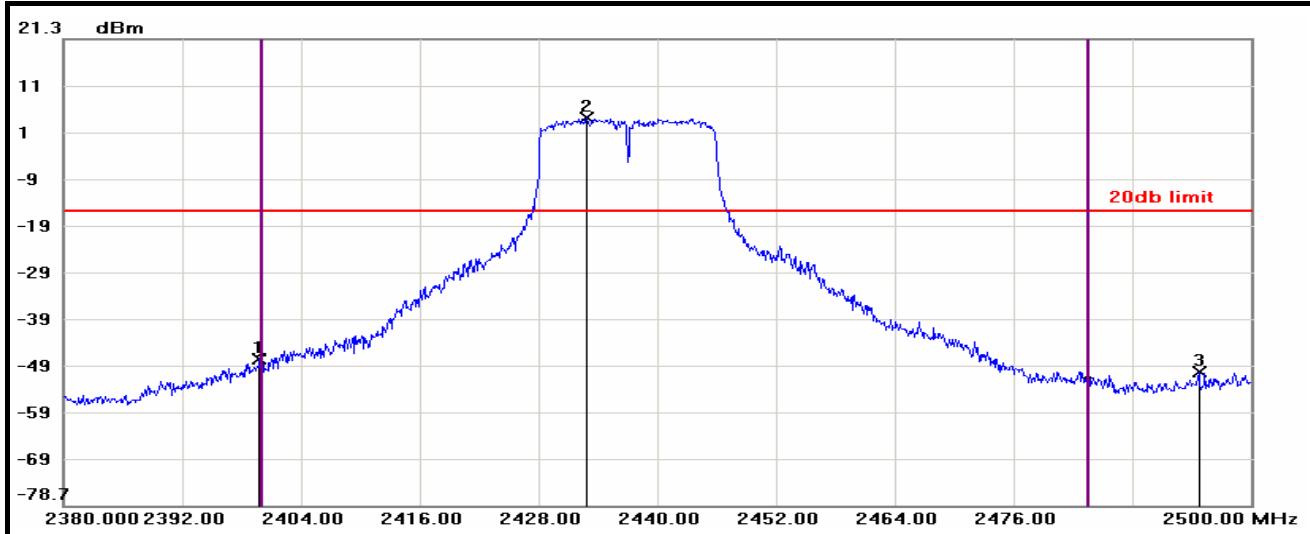
IEEE 802.11n HT20 Mode / Chain A / CH Low / 30MHz ~ 25GHz



No.	Frequency(MHz)	Result(dBm)	Limit(dBm)	Margin(dBm)
1	2377.1800	-49.46	-19.74	-29.72
2	24725.3300	-47.62	-19.74	-27.88

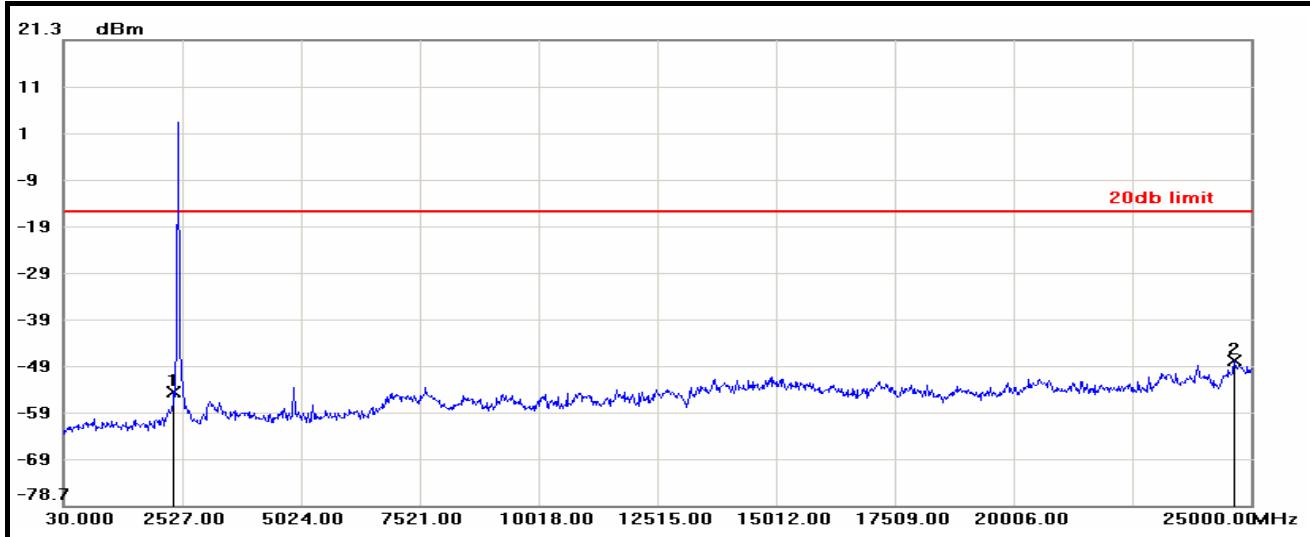


IEEE 802.11n HT20 Mode / Chain A / CH Middle / 2.38GHz ~ 2.5GHz



No.	Frequency(MHz)	Result(dBm)	Limit(dBm)	Margin(dBm)
1	2399.8000	-47.42	-15.56	-31.86
2	2432.8000	4.44	-15.56	20.00
3	2494.7200	-50.16	-15.56	-34.60

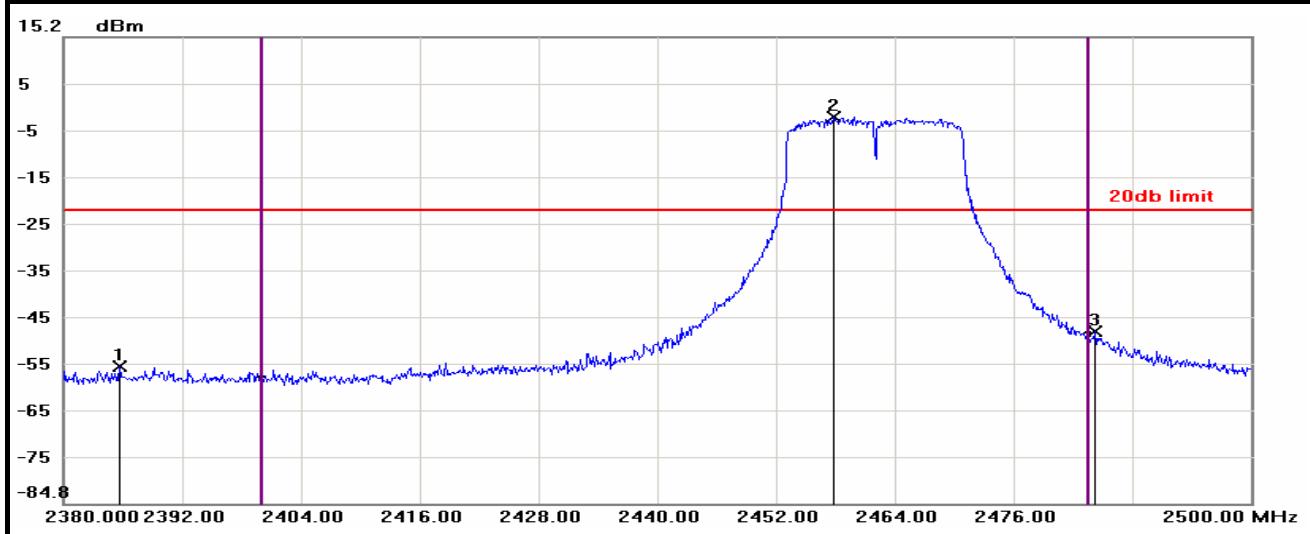
IEEE 802.11n HT20 Mode / Chain A / CH Middle / 30MHz ~ 25GHz



No.	Frequency(MHz)	Result(dBm)	Limit(dBm)	Margin(dBm)
1	2352.2100	-54.30	-15.56	-38.74
2	24650.4200	-47.65	-15.56	-32.09

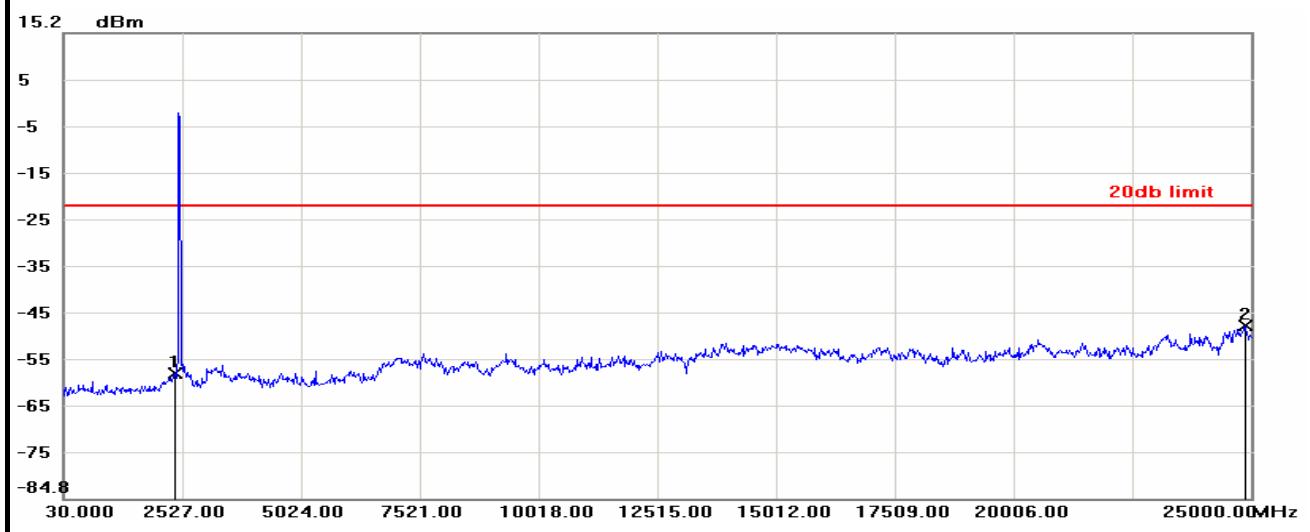


IEEE 802.11n HT20 Mode / Chain A / CH High / 2.38GHz ~ 2.5GHz



No.	Frequency(MHz)	Result(dBm)	Limit(dBm)	Margin(dBm)
1	2385.6400	-55.55	-21.94	-33.61
2	2457.8800	-1.94	-21.94	20.00
3	2484.2800	-47.98	-21.94	-26.04

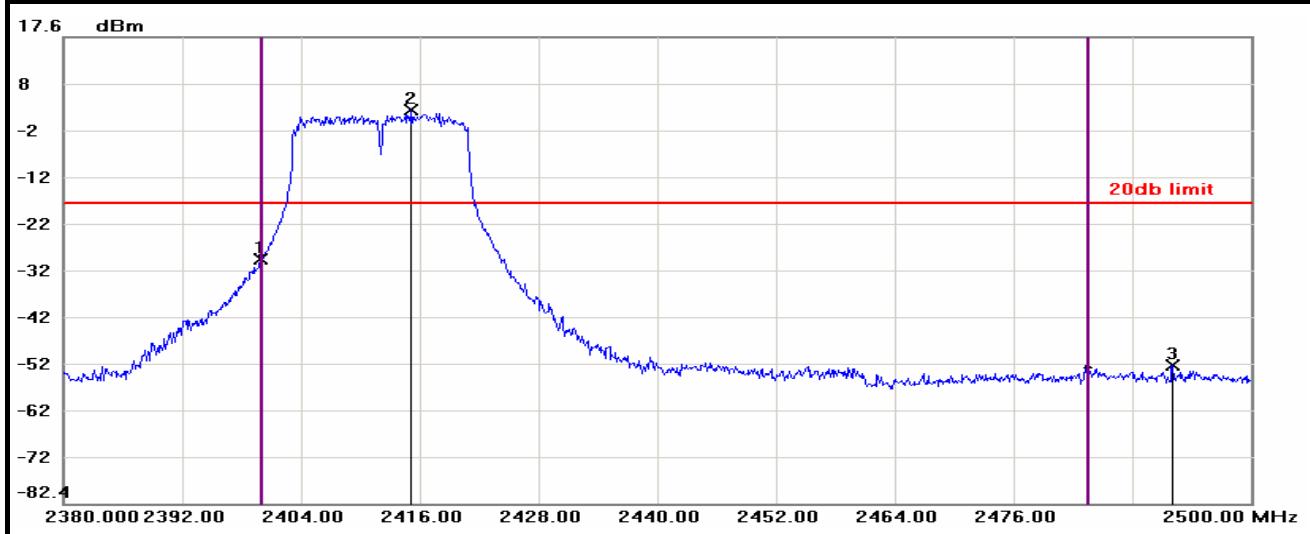
IEEE 802.11n HT20 Mode / Chain A / CH High / 30MHz ~ 25GHz



No.	Frequency(MHz)	Result(dBm)	Limit(dBm)	Margin(dBm)
1	2377.1800	-57.99	-21.94	-36.05
2	24875.1500	-47.81	-21.94	-25.87



IEEE 802.11n HT20 Mode / Chain B / CH Low / 2.38GHz ~ 2.5GHz



No.	Frequency(MHz)	Result(dBm)	Limit(dBm)	Margin(dBm)
1	2399.9200	-30.04	-18.04	-12.00
2	2415.1600	1.96	-18.04	20.00
3	2492.0800	-52.86	-18.04	-34.82

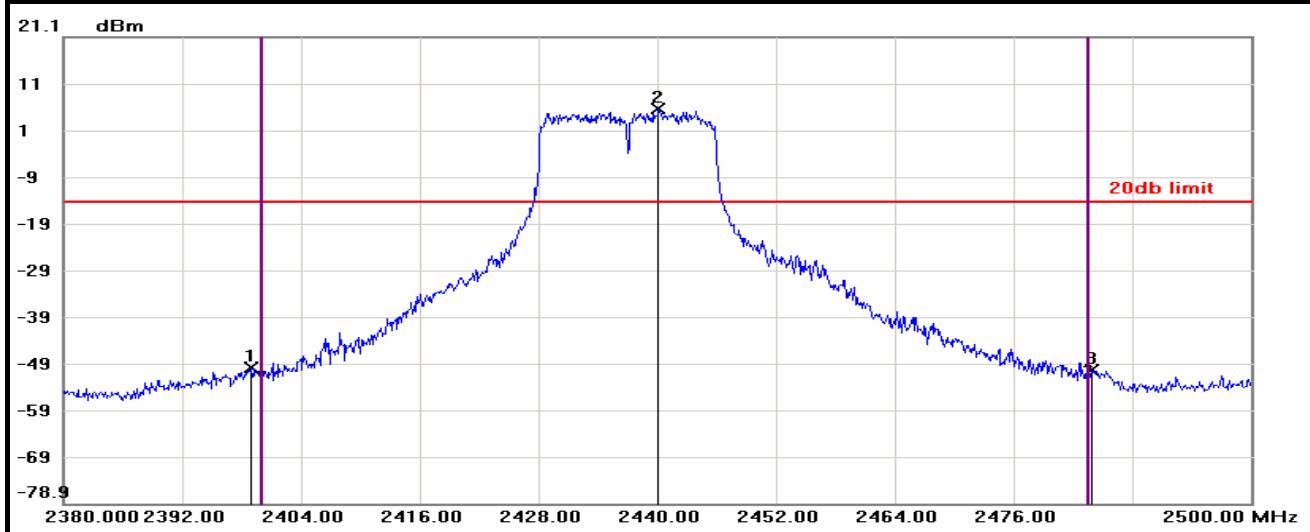
IEEE 802.11n HT20 Mode / Chain B / CH Low / 30MHz ~ 25GHz



No.	Frequency(MHz)	Result(dBm)	Limit(dBm)	Margin(dBm)
1	354.6100	-49.44	-18.04	-31.40
2	24725.3300	-47.29	-18.04	-29.25



IEEE 802.11n HT20 Mode / Chain B / CH Middle / 2.38GHz ~ 2.5GHz



No.	Frequency(MHz)	Result(dBm)	Limit(dBm)	Margin(dBm)
1	2398.9600	-49.67	-14.16	-35.51
2	2440.1200	5.84	-14.16	20.00
3	2483.9200	-50.11	-14.16	-35.95

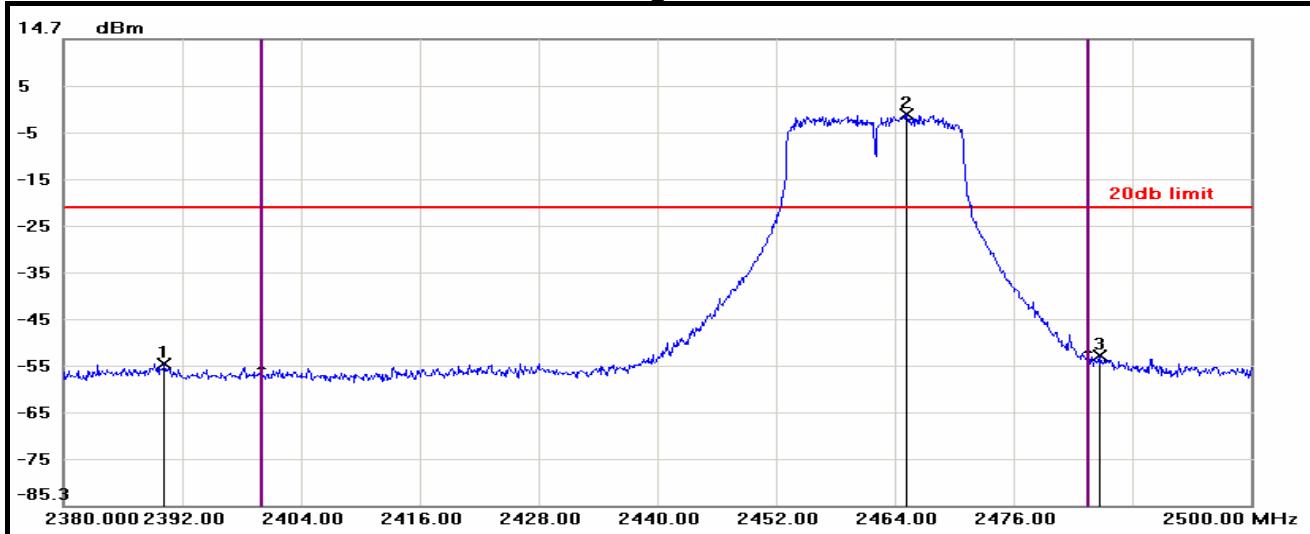
IEEE 802.11n HT20 Mode / Chain B / CH Middle / 30MHz ~ 25GHz



No.	Frequency(MHz)	Result(dBm)	Limit(dBm)	Margin(dBm)
1	329.6400	-51.47	-14.16	-37.31
2	7296.2700	-44.59	-14.16	-30.43



IEEE 802.11n HT20 Mode / Chain B / CH High / 2.38GHz ~ 2.5GHz



No.	Frequency(MHz)	Result(dBm)	Limit(dBm)	Margin(dBm)
1	2390.2000	-54.89	-21.41	-33.48
2	2465.2000	-1.41	-21.41	20.00
3	2484.7600	-53.06	-21.41	-31.65

IEEE 802.11n HT20 Mode / Chain B / CH High / 30MHz ~ 25GHz



No.	Frequency(MHz)	Result(dBm)	Limit(dBm)	Margin(dBm)
1	329.6400	-47.43	-21.41	-26.02
2	24725.3300	-47.25	-21.41	-25.84

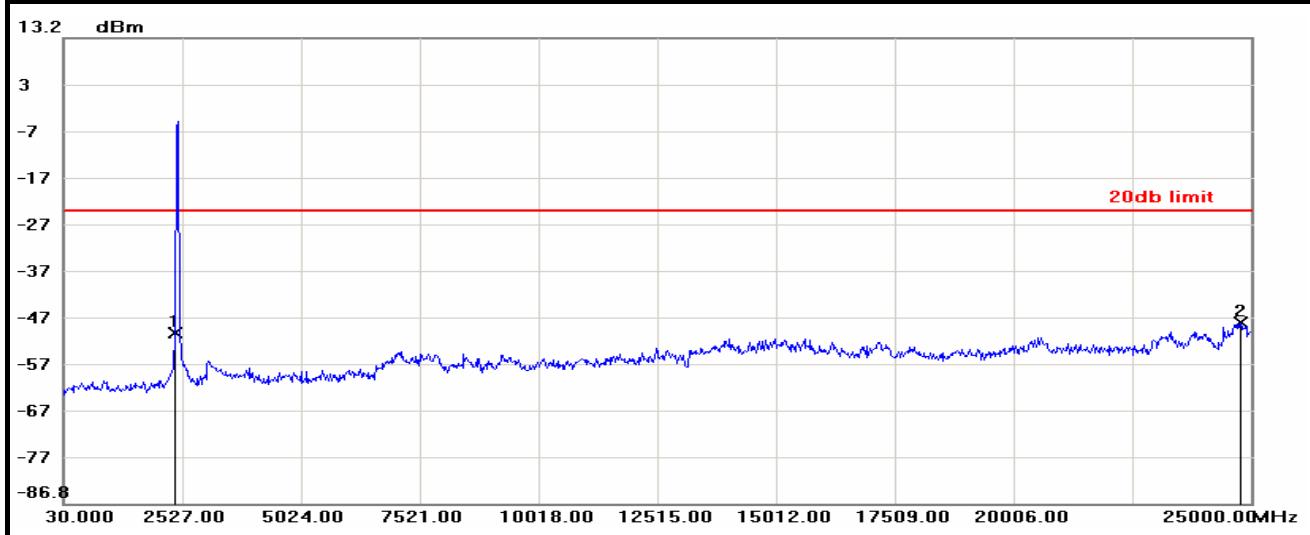


IEEE 802.11n HT40 Mode / Chain A / CH Low / 2.38GHz ~ 2.5GHz



No.	Frequency(MHz)	Result(dBm)	Limit(dBm)	Margin(dBm)
1	2398.6000	-34.08	-23.89	-10.19
2	2431.6000	-3.89	-23.89	20.00
3	2486.3200	-52.45	-23.89	-28.56

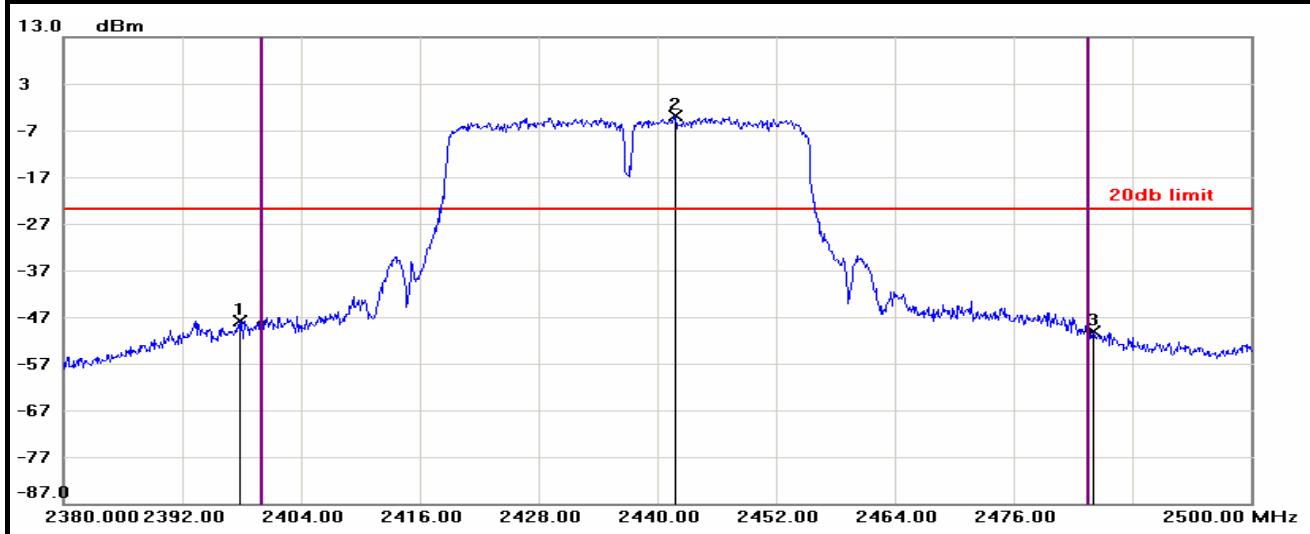
IEEE 802.11n HT40 Mode / Chain A / CH Low / 30MHz ~ 25GHz



No.	Frequency(MHz)	Result(dBm)	Limit(dBm)	Margin(dBm)
1	2377.1800	-50.10	-23.89	-26.21
2	24775.2700	-47.93	-23.89	-24.04

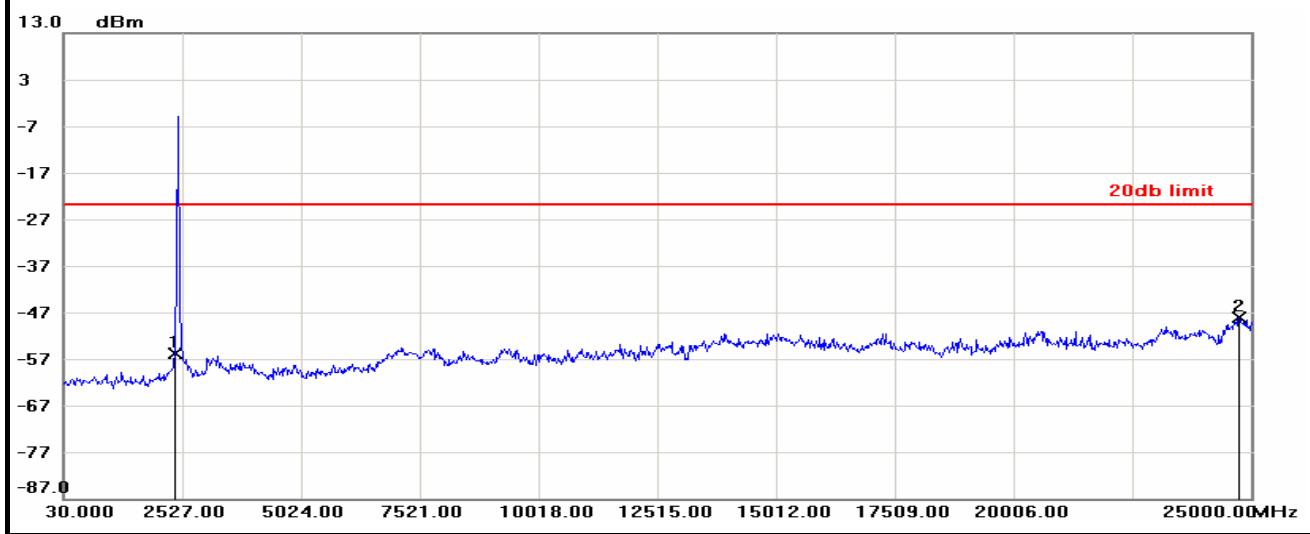


IEEE 802.11n HT40 Mode / Chain A / CH Middle / 2.38GHz ~ 2.5GHz



No.	Frequency(MHz)	Result(dBm)	Limit(dBm)	Margin(dBm)
1	2397.8800	-47.78	-24.00	-23.78
2	2441.8000	-4.00	-24.00	20.00
3	2484.0400	-50.02	-24.00	-26.02

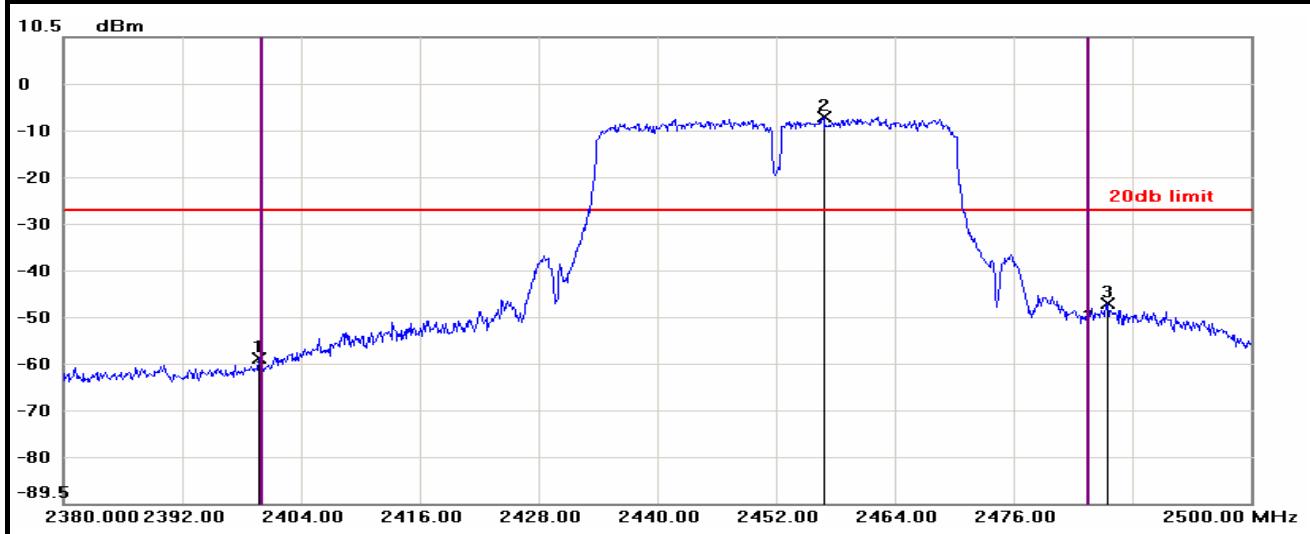
IEEE 802.11n HT40 Mode / Chain A / CH Middle / 30MHz ~ 25GHz



No.	Frequency(MHz)	Result(dBm)	Limit(dBm)	Margin(dBm)
1	2377.1800	-55.79	-24.00	-31.79
2	24750.3000	-48.26	-24.00	-24.26



IEEE 802.11n HT40 Mode / Chain A / CH High / 2.38GHz ~ 2.5GHz



No.	Frequency(MHz)	Result(dBm)	Limit(dBm)	Margin(dBm)
1	2399.8000	-58.41	-26.61	-31.80
2	2456.8000	-6.61	-26.61	20.00
3	2485.4800	-46.71	-26.61	-20.10

IEEE 802.11n HT40 Mode / Chain A / CH High / 30MHz ~ 25GHz



No.	Frequency(MHz)	Result(dBm)	Limit(dBm)	Margin(dBm)
1	2352.2100	-61.98	-26.61	-35.37
2	2502.0300	-51.23	-26.61	-24.62

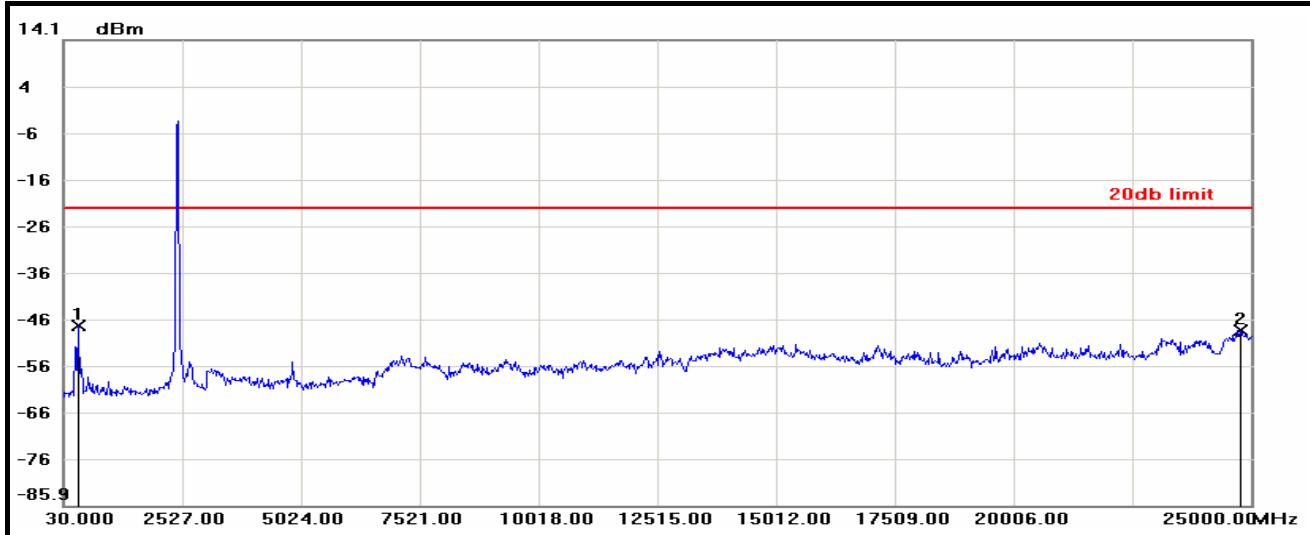


IEEE 802.11n HT40 Mode / Chain B / CH Low / 2.38GHz ~ 2.5GHz



No.	Frequency(MHz)	Result(dBm)	Limit(dBm)	Margin(dBm)
1	2398.6000	-33.38	-22.11	-11.27
2	2423.3200	-2.11	-22.11	20.00
3	2492.4400	-53.30	-22.11	-31.19

IEEE 802.11n HT40 Mode / Chain B / CH Low / 30MHz ~ 25GHz



No.	Frequency(MHz)	Result(dBm)	Limit(dBm)	Margin(dBm)
1	329.6400	-47.25	-22.11	-25.14
2	24775.2700	-48.13	-22.11	-26.02

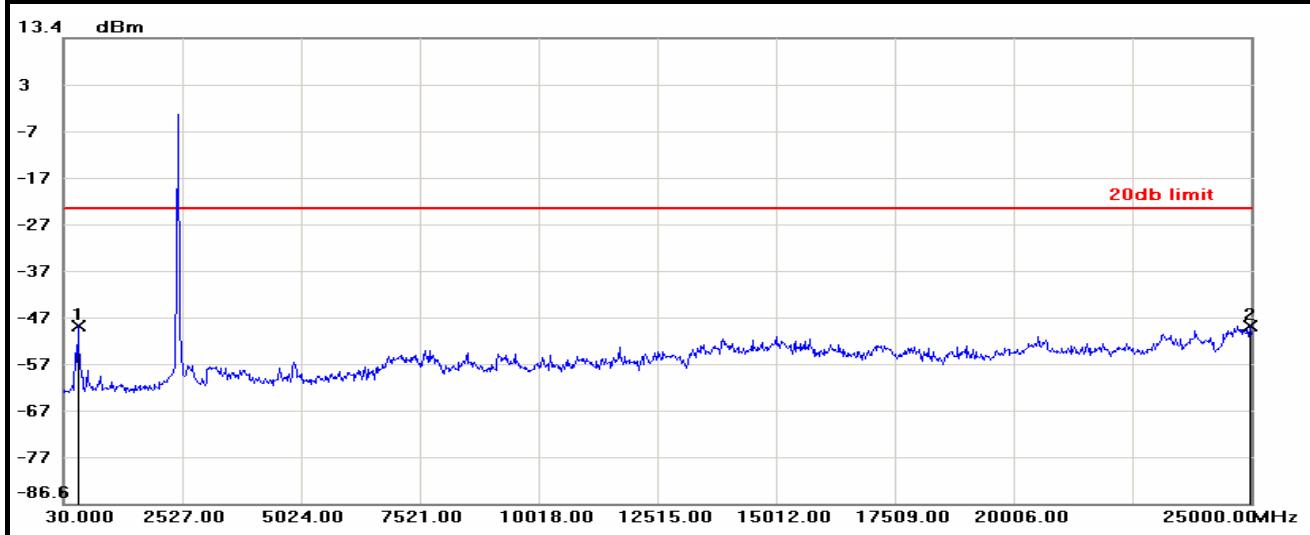


IEEE 802.11n HT40 Mode / Chain B / CH Middle / 2.38GHz ~ 2.5GHz



No.	Frequency(MHz)	Result(dBm)	Limit(dBm)	Margin(dBm)
1	2399.4400	-49.53	-23.21	-26.32
2	2438.3200	-3.21	-23.21	20.00
3	2492.9200	-52.31	-23.21	-29.10

IEEE 802.11n HT40 Mode / Chain B / CH Middle / 30MHz ~ 25GHz



No.	Frequency(MHz)	Result(dBm)	Limit(dBm)	Margin(dBm)
1	329.6400	-48.44	-23.21	-25.23
2	24975.0300	-48.41	-23.21	-25.20



IEEE 802.11n HT40 Mode / Chain B / CH High / 2.38GHz ~ 2.5GHz



No.	Frequency(MHz)	Result(dBm)	Limit(dBm)	Margin(dBm)
1	2380.7200	-58.89	-26.50	-32.39
2	2453.3200	-6.50	-26.50	20.00
3	2485.4800	-52.91	-26.50	-26.41

IEEE 802.11n HT40 Mode / Chain B / CH High / 30MHz ~ 25GHz



No.	Frequency(MHz)	Result(dBm)	Limit(dBm)	Margin(dBm)
1	329.6400	-46.76	-26.50	-20.26
2	2502.0300	-55.42	-26.50	-28.92



## 8.5 RADIATED EMISSION

### LIMITS

(1) According to § 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) According to § 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**

### **Radiated Emission / 966Chamber\_B**

Name of Equipment	Manufacture	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	E4446A	MY46180323	04/22/2013
EMI Test Receiver	ROHDE & SCHWARZ	ESCI	101131	01/14/2014
Bi-log Antenna	SCHWARZBECK	VULB 9168	9168-250	09/26/2013
Double-Ridged Waveguide Horn	ETS-LINDGREN	3117	00078733	12/11/2013
Horn Antenna	COM-POWER	AH-840	03077	12/20/2013
Pre-Amplifier	Agilent	8447D	2944A10052	07/17/2013
Pre-Amplifier	Agilent	8449B	3008A01916	07/17/2013
LOOP Antenna	EMCO	6502	8905-2356	06/10/2013
Notch Filters Band Reject	Micro-Tronics	BRM05702-01	026	N.C.R

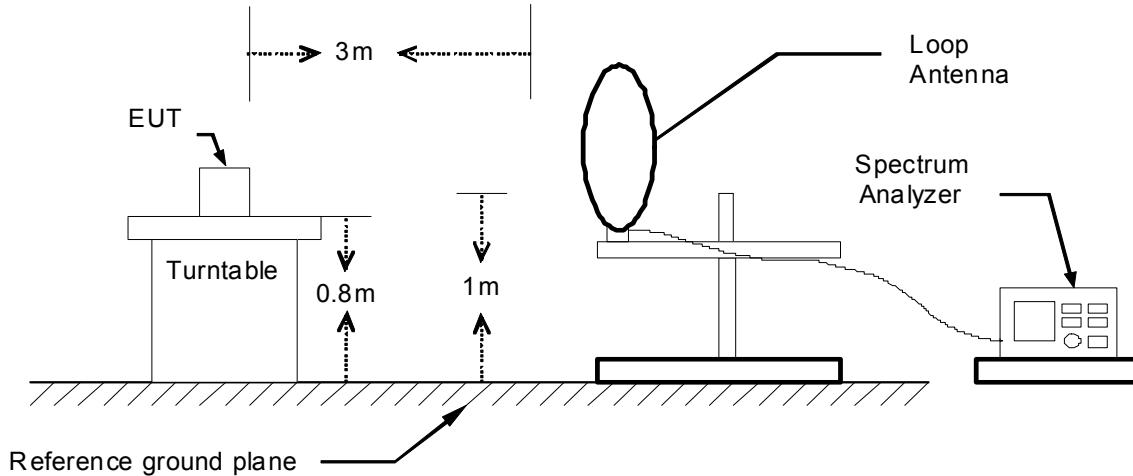
**Remark:** 1. Each piece of equipment is scheduled for calibration once a year.  
2. N.C.R = No Calibration Request.



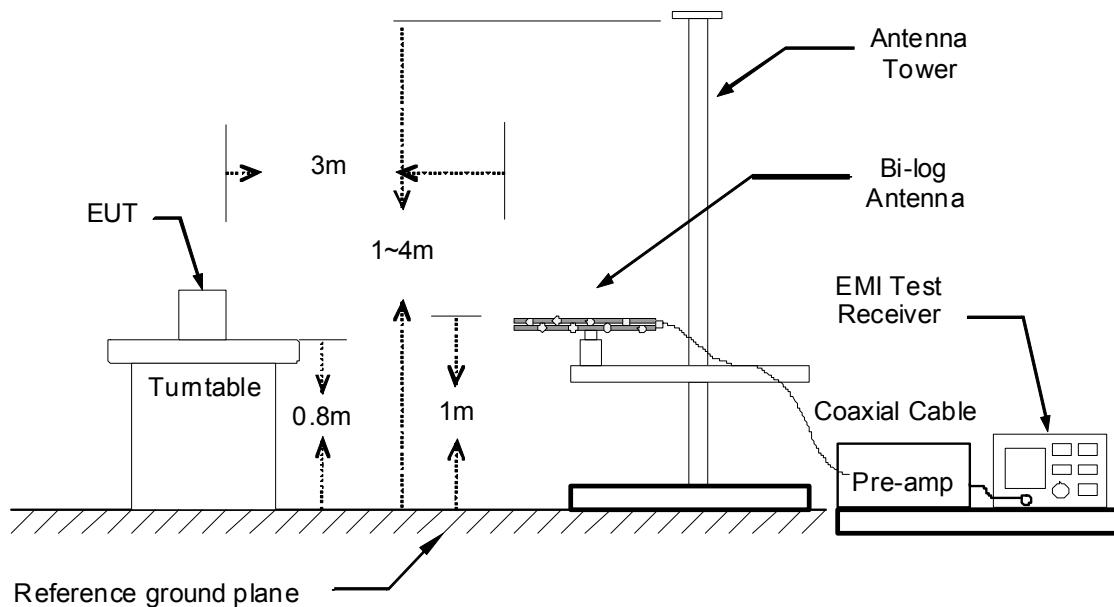
## TEST SETUP

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

### **9kHz ~ 30MHz**

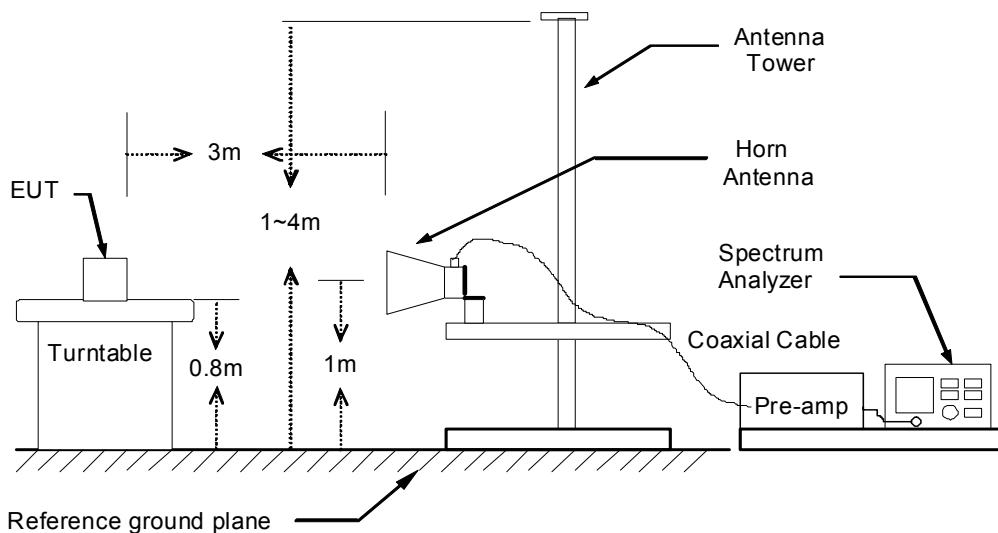


### **30MHz ~ 1GHz**





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. 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)

Product Name	Cable Modem	Test By	Jack Dai
Test Model	CH6640A	Test Date	2013/02/25
Test Mode	Normal Operating / Power Adapter 1	Temp. & Humidity	25°C, 55%

966 Chamber_B at 3Meter / Horizontal								
Frequency (MHz)	Reading (dB $\mu$ V)	Correction Factor (dB/m)	Result (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Azimuth (°)	Height (cm)	Remark
168.71	49.00	-13.82	35.19	43.50	-8.31	49.80	200.00	Peak
250.19	56.20	-13.21	42.99	46.00	-3.01	232.20	100.00	QP
337.49	52.90	-10.66	42.24	46.00	-3.76	275.70	100.00	QP
375.32	50.26	-9.92	40.35	46.00	-5.65	331.40	100.00	Peak
624.61	44.73	-5.18	39.55	46.00	-6.45	225.80	100.00	Peak
874.87	43.40	-0.97	42.43	46.00	-3.57	309.70	100.00	QP

966 Chamber_B at 3Meter / Vertical								
Frequency (MHz)	Reading (dB $\mu$ V)	Correction Factor (dB/m)	Result (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Azimuth (°)	Height (cm)	Remark
125.06	55.60	-15.29	40.31	43.50	-3.19	60.40	100.00	QP
250.19	55.06	-13.21	41.84	46.00	-4.16	239.40	100.00	Peak
375.32	51.90	-9.92	41.98	46.00	-4.02	260.50	100.00	QP
500.45	49.29	-7.78	41.51	46.00	-4.49	257.60	100.00	Peak
624.61	49.40	-5.18	44.22	46.00	-1.78	274.80	100.00	QP
874.87	45.40	-0.97	44.43	46.00	-1.57	248.10	111.60	QP

#### **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 (dB $\mu$ V/m) = Reading (dB $\mu$ V) + Correction Factor (dB/m)
5. Margin (dB) = Remark result (dB $\mu$ V/m) - Quasi-peak limit (dB $\mu$ V/m).



<b>Product Name</b>	Cable Modem	<b>Test By</b>	Waternil Guan
<b>Test Model</b>	CH6640A	<b>Test Date</b>	2013/02/04
<b>Test Mode</b>	Normal Operating / Power Adapter 2	<b>Temp. &amp; Humidity</b>	23°C, 64%

966 Chamber_B at 3Meter / Horizontal								
Frequency (MHz)	Reading (dB $\mu$ V)	Correction Factor (dB/m)	Result (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Azimuth (°)	Height (cm)	Remark
250.19	55.05	-13.21	41.84	46.00	-4.16	212.10	100.00	Peak
337.49	52.64	-10.66	41.98	46.00	-4.02	91.80	100.00	Peak
375.32	51.80	-9.92	41.88	46.00	-4.12	289.40	100.00	QP
500.45	51.80	-7.78	44.02	46.00	-1.98	322.00	192.50	QP
600.36	46.04	-5.30	40.74	46.00	-5.26	147.20	100.00	Peak
874.87	43.16	-0.97	42.19	46.00	-3.81	320.80	100.00	Peak

966 Chamber_B at 3Meter / Vertical								
Frequency (MHz)	Reading (dB $\mu$ V)	Correction Factor (dB/m)	Result (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Azimuth (°)	Height (cm)	Remark
125.06	53.97	-15.29	38.68	43.50	-4.82	173.60	100.00	Peak
250.19	54.00	-13.21	40.79	46.00	-5.21	57.80	100.00	QP
500.45	50.80	-7.78	43.02	46.00	-2.98	273.50	100.00	QP
600.36	47.95	-5.30	42.65	46.00	-3.35	284.10	100.00	Peak
624.61	49.20	-5.18	44.02	46.00	-1.98	279.70	100.00	QP
874.87	45.60	-0.97	44.63	46.00	-1.37	229.40	100.00	QP

**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 (dB $\mu$ V/m) = Reading (dB $\mu$ V) + Correction Factor (dB/m)
5. Margin (dB) = Remark result (dB $\mu$ V/m) - Quasi-peak limit (dB $\mu$ V/m).



Above 1 GHz

<b>Product Name</b>	Cable Modem			<b>Test By</b>		Waternil Guan		
<b>Test Model</b>	CH6640A				<b>Test Date</b>		2012/08/22	
<b>Test Mode</b>	IEEE 802.11b TX / CH Low				<b>Temp. &amp; Humidity</b>		24°C, 58%	

966 Chamber_B 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
1800.00	44.13	---	0.45	44.58	---	74.00	54.00	-9.42	Peak
2516.00	46.73	---	3.98	50.71	---	74.00	54.00	-3.29	Peak
2600.00	44.63	---	4.16	48.79	---	74.00	54.00	-5.21	Peak
3225.00	41.74	---	5.46	47.20	---	74.00	54.00	-6.80	Peak
3870.00	40.92	---	6.88	47.80	---	74.00	54.00	-6.20	Peak
4830.00	45.46	42.63	9.24	54.70	51.87	74.00	54.00	-2.13	AVG

966 Chamber_B 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
1720.00	45.27	---	-0.27	45.00	---	74.00	54.00	-9.00	Peak
1880.00	46.40	---	1.17	47.57	---	74.00	54.00	-6.43	Peak
2490.00	54.69	44.08	3.92	58.61	48.00	74.00	54.00	-6.00	AVG
3285.00	41.71	---	5.58	47.29	---	74.00	54.00	-6.71	Peak
3990.00	40.78	---	7.16	47.94	---	74.00	54.00	-6.06	Peak
4830.00	45.38	40.32	9.24	54.62	49.56	74.00	54.00	-4.44	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. Result = Reading + Correction Factor  
Margin = Result - Limit  
Remark Peak = Result(PK) - Limit(AV)  
Remark AVG = Result(AV) - Limit(AV)



<b>Product Name</b>	Cable Modem	<b>Test By</b>	Waternal Guan
<b>Test Model</b>	CH6640A	<b>Test Date</b>	2012/08/22
<b>Test Mode</b>	IEEE 802.11b TX / CH Middle	<b>Temp. &amp; Humidity</b>	24°C, 58%

966 Chamber_B 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
1720.00	45.20	---	-0.27	44.93	---	74.00	54.00	-9.07	Peak
2342.00	46.74	---	3.41	50.15	---	74.00	54.00	-3.85	Peak
2526.00	47.50	---	4.00	51.50	---	74.00	54.00	-2.50	Peak
4200.00	40.30	---	7.66	47.96	---	74.00	54.00	-6.04	Peak
4875.00	40.79	---	9.36	50.15	---	74.00	54.00	-3.85	Peak
7305.00	44.16	39.01	13.33	57.49	52.34	74.00	54.00	-1.66	AVG

966 Chamber_B 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
1720.00	48.78	---	-0.27	48.51	---	74.00	54.00	-5.49	Peak
2356.00	48.41	---	3.46	51.88	---	74.00	54.00	-2.12	Peak
2530.00	54.32	44.53	4.01	58.33	48.54	74.00	54.00	-5.46	AVG
3270.00	42.80	---	5.55	48.35	---	74.00	54.00	-5.65	Peak
4200.00	40.31	---	7.66	47.97	---	74.00	54.00	-6.03	Peak
4875.00	40.60	---	9.36	49.96	---	74.00	54.00	-4.04	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. Result = Reading + Correction Factor  
Margin = Result - Limit  
Remark Peak = Result(PK) - Limit(AV)  
Remark AVG = Result(AV) - Limit(AV)



<b>Product Name</b>	Cable Modem	<b>Test By</b>	Waternal Guan
<b>Test Model</b>	CH6640A	<b>Test Date</b>	2012/08/17
<b>Test Mode</b>	IEEE 802.11b TX / CH High	<b>Temp. &amp; Humidity</b>	25°C, 50%

966 Chamber_B 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
1720.00	45.00	---	-0.27	44.73	---	74.00	54.00	-9.27	Peak
2380.00	47.13	---	3.54	50.67	---	74.00	54.00	-3.33	Peak
2854.00	43.69	---	4.69	48.38	---	74.00	54.00	-5.62	Peak
4200.00	41.39	---	7.66	49.05	---	74.00	54.00	-4.95	Peak
4635.00	39.60	---	8.73	48.33	---	74.00	54.00	-5.67	Peak
4920.00	40.29	---	9.48	49.77	---	74.00	54.00	-4.23	Peak

966 Chamber_B 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
1720.00	47.71	---	-0.27	47.44	---	74.00	54.00	-6.56	Peak
2530.00	50.55	40.32	4.01	54.56	44.33	74.00	54.00	-9.67	AVG
2558.00	50.38	40.39	4.07	54.45	44.46	74.00	54.00	-9.54	AVG
3360.00	41.67	---	5.73	47.40	---	74.00	54.00	-6.60	Peak
4815.00	40.82	---	9.20	50.02	---	74.00	54.00	-3.98	Peak
4920.00	41.20	---	9.48	50.68	---	74.00	54.00	-3.32	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. Result = Reading + Correction Factor  
Margin = Result - Limit  
Remark Peak = Result(PK) - Limit(AV)  
Remark AVG = Result(AV) - Limit(AV)



<b>Product Name</b>	Cable Modem	<b>Test By</b>	Waternal Guan
<b>Test Model</b>	CH6640A	<b>Test Date</b>	2012/08/22
<b>Test Mode</b>	IEEE 802.11g TX / CH Low	<b>Temp. &amp; Humidity</b>	24°C, 58%

966 Chamber_B 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
1288.00	45.18	---	-2.99	42.19	---	74.00	54.00	-11.81	Peak
1808.00	44.87	---	0.52	45.39	---	74.00	54.00	-8.61	Peak
1984.00	43.15	---	2.11	45.26	---	74.00	54.00	-8.74	Peak
3330.00	41.52	---	5.67	47.19	---	74.00	54.00	-6.81	Peak
4410.00	39.94	---	8.16	48.10	---	74.00	54.00	-5.90	Peak
4830.00	40.51	---	9.24	49.75	---	74.00	54.00	-4.25	Peak

966 Chamber_B 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
1698.00	47.06	---	-0.47	46.59	---	74.00	54.00	-7.41	Peak
1800.00	47.89	---	0.45	48.34	---	74.00	54.00	-5.66	Peak
2488.00	54.67	42.62	3.91	58.58	46.53	74.00	54.00	-7.47	AVG
3375.00	41.12	---	5.76	46.88	---	74.00	54.00	-7.12	Peak
4275.00	40.07	---	7.83	47.91	---	74.00	54.00	-6.09	Peak
4830.00	39.21	---	9.24	48.45	---	74.00	54.00	-5.55	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. Result = Reading + Correction Factor  
Margin = Result - Limit  
Remark Peak = Result(PK) - Limit(AV)  
Remark AVG = Result(AV) - Limit(AV)



<b>Product Name</b>	Cable Modem		<b>Test By</b>	Waternal Guan
<b>Test Model</b>	CH6640A		<b>Test Date</b>	2012/08/22
<b>Test Mode</b>	IEEE 802.11g TX / CH Middle		<b>Temp. &amp; Humidity</b>	24°C, 58%

966 Chamber_B 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
1720.00	46.14	---	-0.27	45.87	---	74.00	54.00	-8.13	Peak
2364.00	48.05	---	3.49	51.54	---	74.00	54.00	-2.46	Peak
2390.00	45.60	---	3.58	49.17	---	74.00	54.00	-4.83	Peak
2483.50	57.81	43.69	3.90	61.71	47.59	74.00	54.00	-6.41	AVG
3240.00	41.32	---	5.49	46.81	---	74.00	54.00	-7.19	Peak
4875.00	54.85	42.51	9.36	64.21	51.87	74.00	54.00	-2.13	AVG
7305.00	52.15	39.00	13.33	65.48	52.33	74.00	54.00	-1.67	AVG

966 Chamber_B 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
1880.00	47.13	---	1.17	48.30	---	74.00	54.00	-5.70	Peak
2390.00	54.20	42.56	3.58	57.78	46.14	74.00	54.00	-7.86	AVG
2483.50	61.82	46.46	3.90	65.72	50.36	74.00	54.00	-3.64	AVG
4200.00	40.49	---	7.66	48.15	---	74.00	54.00	-5.85	Peak
4875.00	50.33	36.60	9.36	59.69	45.96	74.00	54.00	-8.04	AVG
7320.00	49.78	36.83	13.34	63.12	50.17	74.00	54.00	-3.83	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. Result = Reading + Correction Factor

Margin = Result - Limit

Remark Peak = Result(PK) - Limit(AV)

Remark AVG = Result(AV) - Limit(AV)



<b>Product Name</b>	Cable Modem	<b>Test By</b>	Waternal Guan
<b>Test Model</b>	CH6640A	<b>Test Date</b>	2012/08/18
<b>Test Mode</b>	IEEE 802.11g TX / CH High	<b>Temp. &amp; Humidity</b>	25°C, 50%

966 Chamber_B 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
1360.00	46.56	---	-2.74	43.82	---	74.00	54.00	-10.18	Peak
1720.00	45.90	---	-0.27	45.63	---	74.00	54.00	-8.37	Peak
2546.00	45.73	---	4.05	49.78	---	74.00	54.00	-4.22	Peak
3390.00	41.45	---	5.80	47.24	---	74.00	54.00	-6.76	Peak
4200.00	40.68	---	7.66	48.34	---	74.00	54.00	-5.66	Peak
4950.00	39.23	---	9.56	48.79	---	74.00	54.00	-5.21	Peak

966 Chamber_B 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
1476.00	45.64	---	-2.33	43.31	---	74.00	54.00	-10.69	Peak
1720.00	47.54	---	-0.27	47.27	---	74.00	54.00	-6.73	Peak
1880.00	45.91	---	1.17	47.08	---	74.00	54.00	-6.92	Peak
3915.00	41.24	---	6.98	48.22	---	74.00	54.00	-5.78	Peak
4920.00	38.98	---	9.48	48.46	---	74.00	54.00	-5.54	Peak
5325.00	40.46	---	10.13	50.59	---	74.00	54.00	-3.41	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. Result = Reading + Correction Factor  
Margin = Result - Limit  
Remark Peak = Result(PK) - Limit(AV)  
Remark AVG = Result(AV) - Limit(AV)



<b>Product Name</b>	Cable Modem	<b>Test By</b>	Waternal Guan
<b>Test Model</b>	CH6640A	<b>Test Date</b>	2012/08/22
<b>Test Mode</b>	IEEE 802.11n HT20 TX / CH Low	<b>Temp. &amp; Humidity</b>	24°C, 58%

966 Chamber_B 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
1320.00	46.89	---	-2.88	44.01	---	74.00	54.00	-9.99	Peak
2494.00	55.20	45.48	3.93	59.13	49.41	74.00	54.00	-4.59	AVG
2684.00	53.76	44.29	4.34	58.10	48.63	74.00	54.00	-5.37	AVG
3420.00	42.07	---	5.86	47.93	---	74.00	54.00	-6.07	Peak
4815.00	52.00	42.33	9.20	61.20	51.53	74.00	54.00	-2.47	AVG
7230.00	44.79	35.78	13.28	58.07	49.06	74.00	54.00	-4.94	AVG

966 Chamber_B 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
1408.00	48.92	---	-2.57	46.35	---	74.00	54.00	-7.65	Peak
2508.00	57.48	46.38	3.97	61.45	50.35	74.00	54.00	-3.65	AVG
2608.00	50.75	42.75	4.18	54.93	46.93	74.00	54.00	-7.07	AVG
3180.00	41.75	---	5.37	47.12	---	74.00	54.00	-6.88	Peak
3990.00	40.57	---	7.16	47.72	---	74.00	54.00	-6.28	Peak
4815.00	46.59	35.57	9.20	55.79	44.77	74.00	54.00	-9.23	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. Result = Reading + Correction Factor  
Margin = Result - Limit  
Remark Peak = Result(PK) - Limit(AV)  
Remark AVG = Result(AV) - Limit(AV)



<b>Product Name</b>	Cable Modem	<b>Test By</b>	Waternal Guan
<b>Test Model</b>	CH6640A	<b>Test Date</b>	2012/08/22
<b>Test Mode</b>	IEEE 802.11n HT20 TX / CH Middle	<b>Temp. &amp; Humidity</b>	24°C, 58%

966 Chamber_B 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
2364.00	52.38	42.36	3.49	55.87	45.85	74.00	54.00	-8.15	AVG
2390.00	47.48	---	3.58	51.05	---	74.00	54.00	-2.95	Peak
2483.50	56.99	44.66	3.90	60.89	48.56	74.00	54.00	-5.44	AVG
2640.00	54.62	42.76	4.24	58.86	47.00	74.00	54.00	-7.00	AVG
4200.00	40.95	---	7.66	48.61	---	74.00	54.00	-5.39	Peak
4875.00	54.20	40.30	9.36	63.56	49.66	74.00	54.00	-4.34	AVG
7320.00	52.59	39.32	13.34	65.93	52.66	74.00	54.00	-1.34	AVG

966 Chamber_B 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
2390.00	58.51	48.74	3.58	62.09	52.32	74.00	54.00	-1.68	AVG
2483.50	60.06	48.95	3.90	63.96	52.85	74.00	54.00	-1.15	AVG
2642.00	52.53	42.05	4.25	56.78	46.30	74.00	54.00	-7.70	AVG
4230.00	40.72	---	7.73	48.45	---	74.00	54.00	-5.55	Peak
4875.00	52.81	40.16	9.36	62.17	49.52	74.00	54.00	-4.48	AVG
7305.00	48.13	36.48	13.33	61.46	49.81	74.00	54.00	-4.19	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. Result = Reading + Correction Factor  
Margin = Result - Limit  
Remark Peak = Result(PK) - Limit(AV)  
Remark AVG = Result(AV) - Limit(AV)



<b>Product Name</b>	Cable Modem	<b>Test By</b>	Waternal Guan
<b>Test Model</b>	CH6640A	<b>Test Date</b>	2012/08/18
<b>Test Mode</b>	IEEE 802.11n HT20 TX / CH High	<b>Temp. &amp; Humidity</b>	25°C, 50%

966 Chamber_B 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
1572.00	44.94	---	-1.60	43.33	---	74.00	54.00	-10.67	Peak
1920.00	43.54	---	1.53	45.07	---	74.00	54.00	-8.93	Peak
2698.00	50.65	42.03	4.37	55.02	46.40	74.00	54.00	-7.60	AVG
3285.00	41.33	---	5.58	46.91	---	74.00	54.00	-7.09	Peak
4170.00	40.95	---	7.58	48.54	---	74.00	54.00	-5.46	Peak
4920.00	42.06	---	9.48	51.54	---	74.00	54.00	-2.46	Peak
966 Chamber_B 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
1704.00	44.97	---	-0.41	44.56	---	74.00	54.00	-9.44	Peak
1880.00	47.43	---	1.17	48.60	---	74.00	54.00	-5.40	Peak
2696.00	50.58	41.50	4.36	54.94	45.86	74.00	54.00	-8.14	AVG
4035.00	40.27	---	7.26	47.54	---	74.00	54.00	-6.46	Peak
4575.00	39.90	---	8.57	48.46	---	74.00	54.00	-5.54	Peak
4965.00	39.88	---	9.60	49.48	---	74.00	54.00	-4.52	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. Result = Reading + Correction Factor  
Margin = Result - Limit  
Remark Peak = Result(PK) - Limit(AV)  
Remark AVG = Result(AV) - Limit(AV)



<b>Product Name</b>	Cable Modem	<b>Test By</b>	Waternal Guan
<b>Test Model</b>	CH6640A	<b>Test Date</b>	2012/08/22
<b>Test Mode</b>	IEEE 802.11n HT40 TX / CH Low	<b>Temp. &amp; Humidity</b>	24°C, 58%

966 Chamber_B 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
1984.00	43.43	---	2.11	45.54	---	74.00	54.00	-8.46	Peak
2483.50	45.31	---	3.90	49.21	---	74.00	54.00	-4.79	Peak
2494.00	47.33	---	3.93	51.26	---	74.00	54.00	-2.74	Peak
2692.00	50.43	42.08	4.35	54.78	46.43	74.00	54.00	-7.57	AVG
3405.00	41.55	---	5.83	47.37	---	74.00	54.00	-6.63	Peak
4065.00	40.89	---	7.33	48.22	---	74.00	54.00	-5.78	Peak
4845.00	48.31	39.86	9.28	57.59	49.14	74.00	54.00	-4.86	AVG

966 Chamber_B 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
1800.00	47.93	---	0.45	48.38	---	74.00	54.00	-5.62	Peak
2483.50	57.79	46.09	3.90	61.69	49.99	74.00	54.00	-4.01	AVG
2634.00	46.95	---	4.23	51.18	---	74.00	54.00	-2.82	Peak
3150.00	42.52	---	5.31	47.83	---	74.00	54.00	-6.17	Peak
4245.00	40.40	---	7.76	48.16	---	74.00	54.00	-5.84	Peak
4830.00	40.27	---	9.24	49.51	---	74.00	54.00	-4.49	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. Result = Reading + Correction Factor  
Margin = Result - Limit  
Remark Peak = Result(PK) - Limit(AV)  
Remark AVG = Result(AV) - Limit(AV)



<b>Product Name</b>	Cable Modem	<b>Test By</b>	Waternal Guan
<b>Test Model</b>	CH6640A	<b>Test Date</b>	2012/08/23
<b>Test Mode</b>	IEEE 802.11n HT40 TX / CH Middle	<b>Temp. &amp; Humidity</b>	24°C, 58%

966 Chamber_B 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
2390.00	45.22	---	3.58	48.80	---	74.00	54.00	-5.20	Peak
2483.50	54.14	42.98	3.90	58.04	46.88	74.00	54.00	-7.12	AVG
2652.00	47.65	---	4.27	51.92	---	74.00	54.00	-2.08	Peak
3435.00	40.97	---	5.89	46.86	---	74.00	54.00	-7.14	Peak
4860.00	52.46	41.48	9.32	61.78	50.80	74.00	54.00	-3.20	AVG
7305.00	48.50	36.92	13.33	61.83	50.25	74.00	54.00	-3.75	AVG

966 Chamber_B 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
2390.00	66.36	47.43	3.58	69.94	51.01	74.00	54.00	-2.99	AVG
2483.50	66.94	48.70	3.90	70.84	52.60	74.00	54.00	-1.40	AVG
2638.00	45.61	---	4.24	49.85	---	74.00	54.00	-4.15	Peak
3075.00	43.79	---	5.15	48.94	---	74.00	54.00	-5.06	Peak
4860.00	51.10	37.30	9.32	60.42	46.62	74.00	54.00	-7.38	AVG
7320.00	46.80	35.98	13.34	60.14	49.32	74.00	54.00	-4.68	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. Result = Reading + Correction Factor  
Margin = Result - Limit  
Remark Peak = Result(PK) - Limit(AV)  
Remark AVG = Result(AV) - Limit(AV)



<b>Product Name</b>	Cable Modem	<b>Test By</b>	Waternal Guan
<b>Test Model</b>	CH6640A	<b>Test Date</b>	2012/08/18
<b>Test Mode</b>	IEEE 802.11n HT40 TX / CH High	<b>Temp. &amp; Humidity</b>	25°C, 50%

966 Chamber_B 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
1720.00	46.82	---	-0.27	46.55	---	74.00	54.00	-7.45	Peak
2662.00	46.50	---	4.29	50.79	---	74.00	54.00	-3.21	Peak
2762.00	45.58	---	4.50	50.08	---	74.00	54.00	-3.92	Peak
3285.00	42.36	---	5.58	47.94	---	74.00	54.00	-6.06	Peak
4215.00	39.98	---	7.69	47.67	---	74.00	54.00	-6.33	Peak
4905.00	40.61	---	9.44	50.05	---	74.00	54.00	-3.95	Peak
966 Chamber_B 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
1720.00	46.67	---	-0.27	46.40	---	74.00	54.00	-7.60	Peak
1880.00	47.19	---	1.17	48.36	---	74.00	54.00	-5.64	Peak
2600.00	50.00	40.01	4.16	54.16	44.17	74.00	54.00	-9.83	AVG
3270.00	42.17	---	5.55	47.72	---	74.00	54.00	-6.28	Peak
4125.00	40.45	---	7.48	47.93	---	74.00	54.00	-6.07	Peak
4890.00	39.04	---	9.40	48.44	---	74.00	54.00	-5.56	Peak

**Remark:**

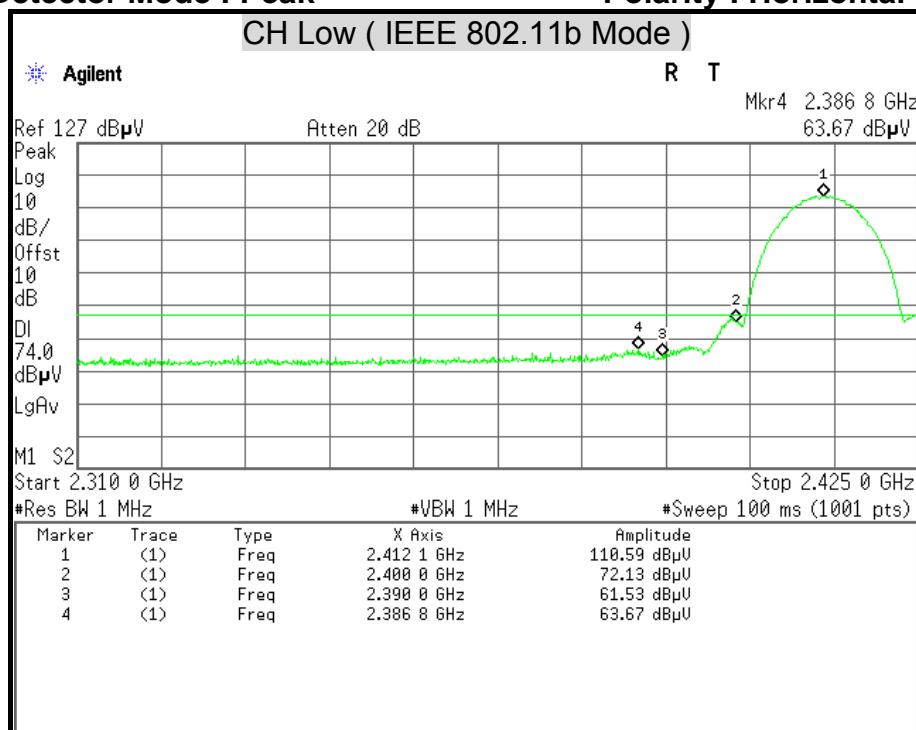
1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Average test would be performed if the peak result were greater than the average limit.
3. Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are 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. Result = Reading + Correction Factor  
Margin = Result - Limit  
Remark Peak = Result(PK) - Limit(AV)  
Remark AVG = Result(AV) - Limit(AV)



## Restricted Band Edges

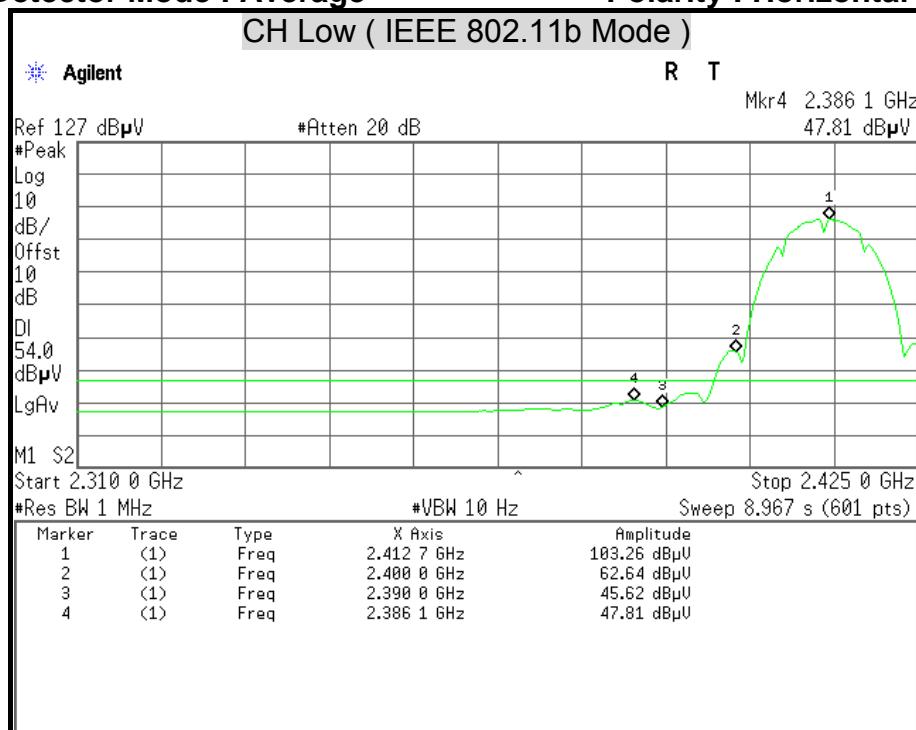
### Detector Mode : Peak

### Polarity : Horizontal



### Detector Mode : Average

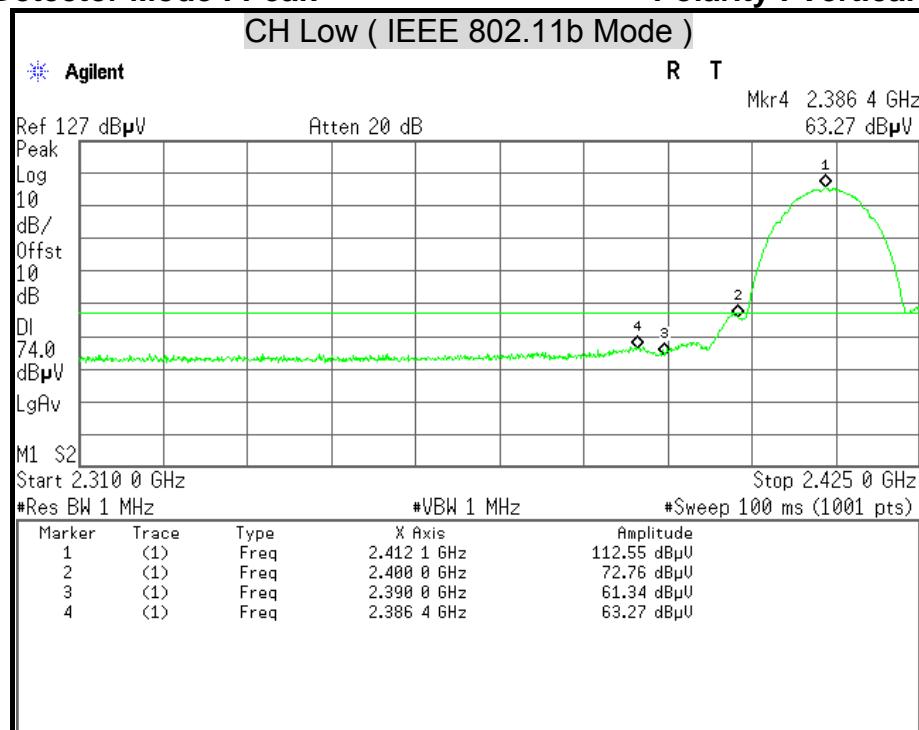
### Polarity : Horizontal





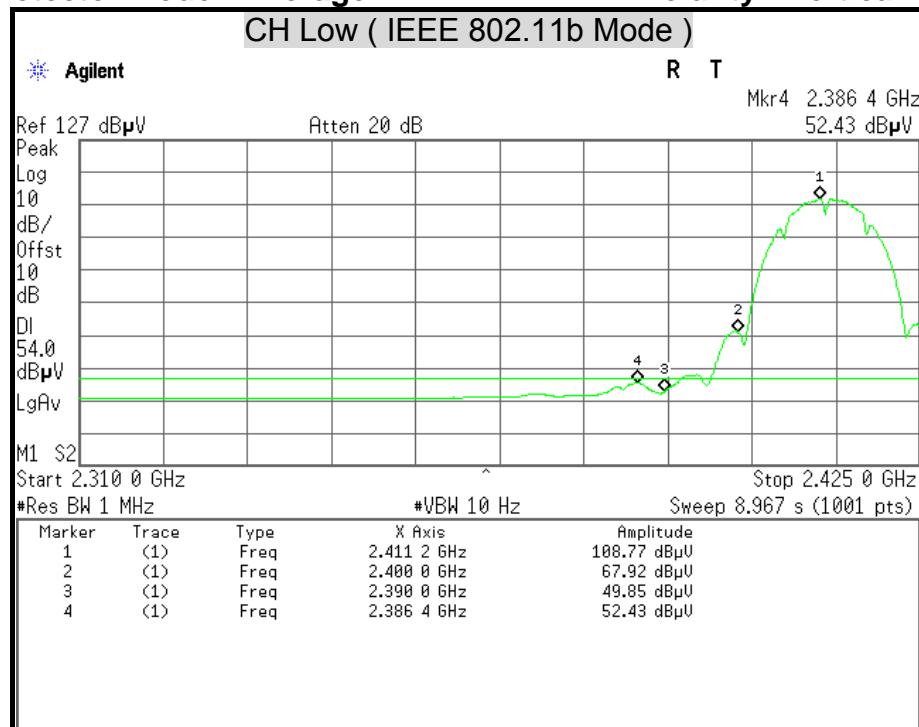
**Detector Mode : Peak**

**Polarity : Vertical**



**Detector Mode : Average**

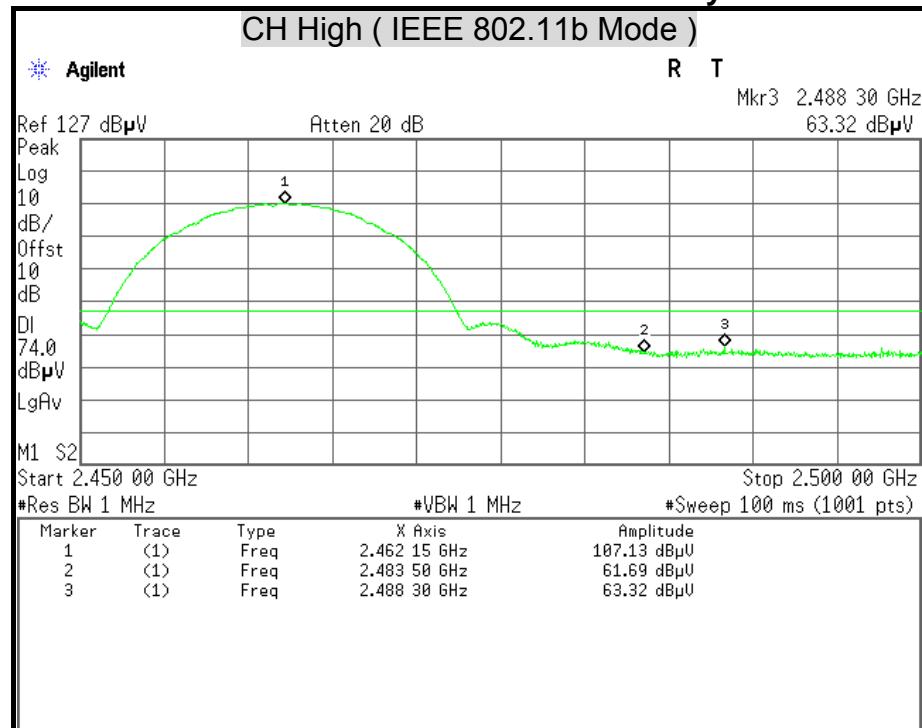
**Polarity : Vertical**





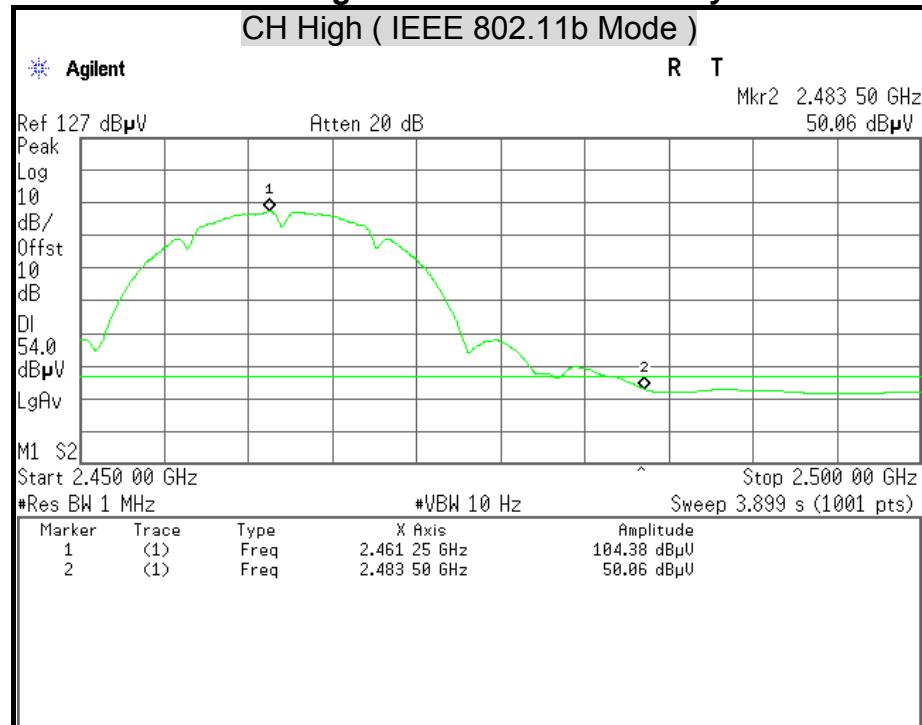
**Detector Mode : Peak**

**Polarity : Horizontal**



**Detector Mode : Average**

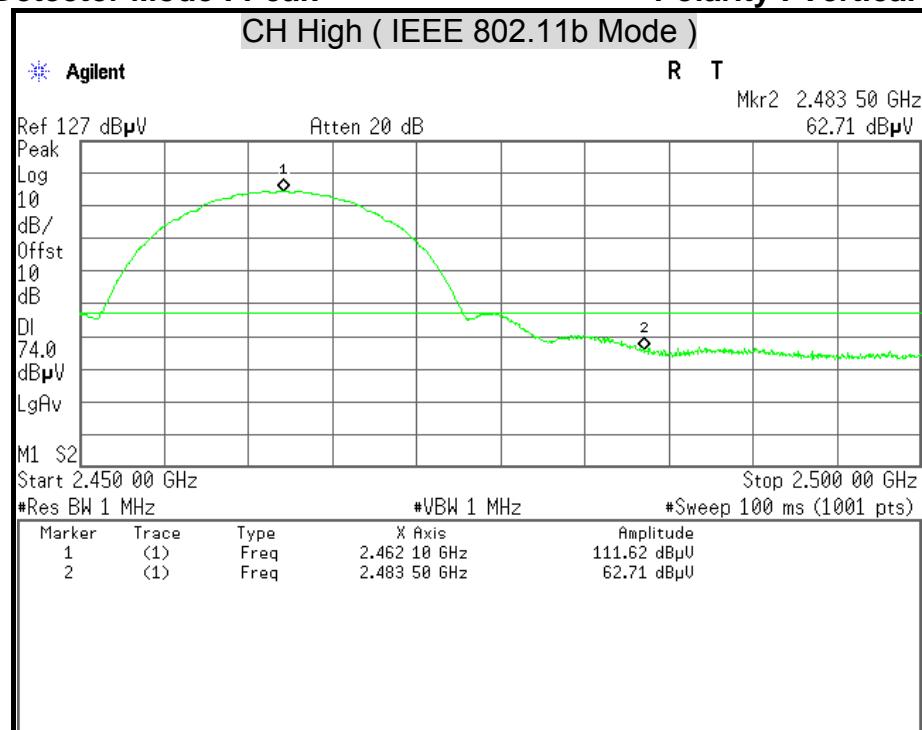
**Polarity : Horizontal**





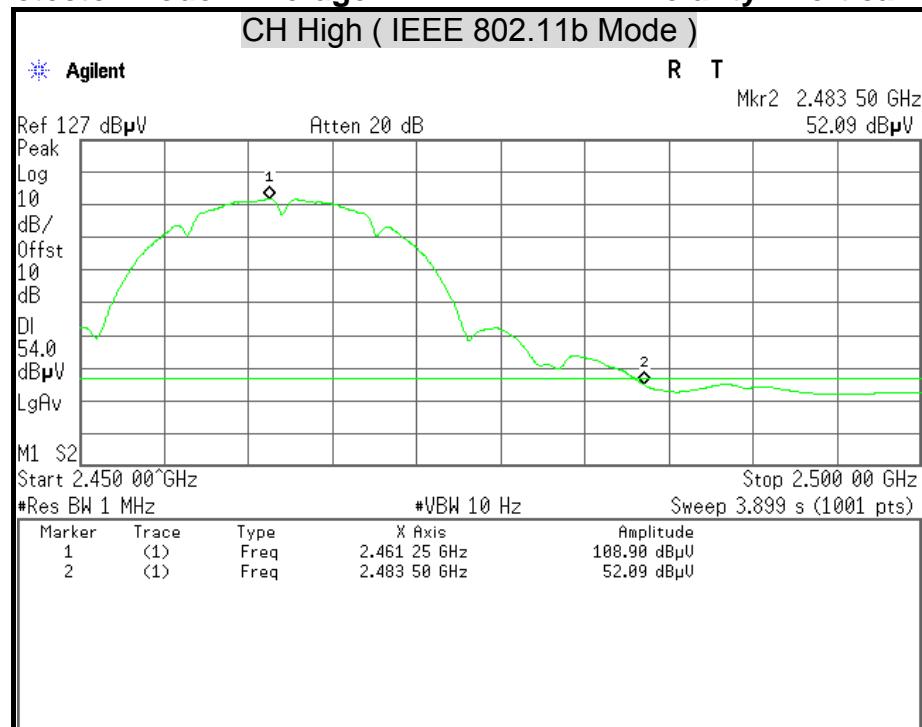
**Detector Mode : Peak**

**Polarity : Vertical**



**Detector Mode : Average**

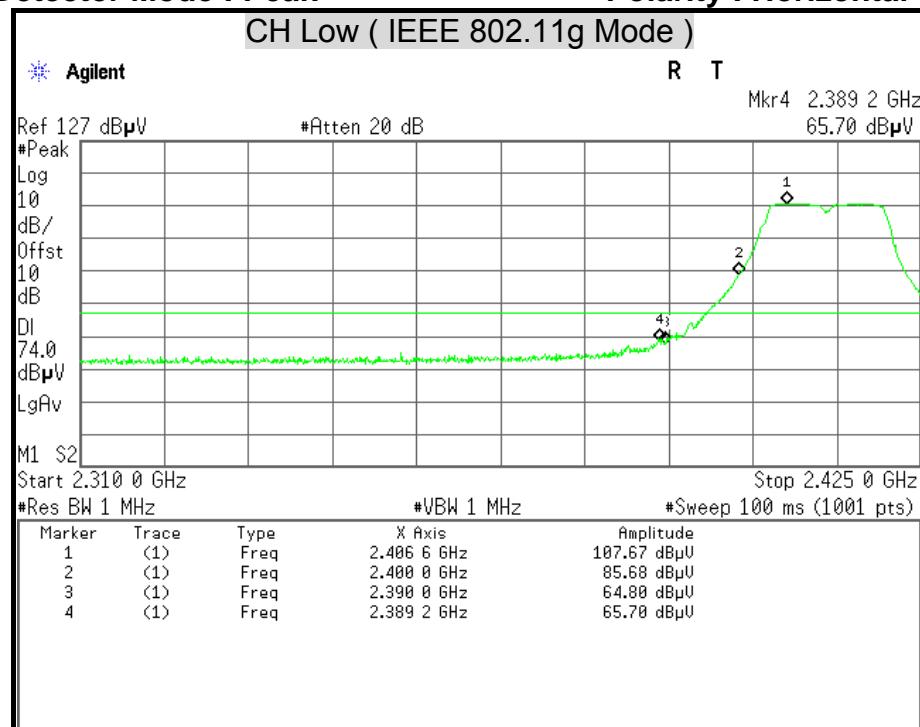
**Polarity : Vertical**





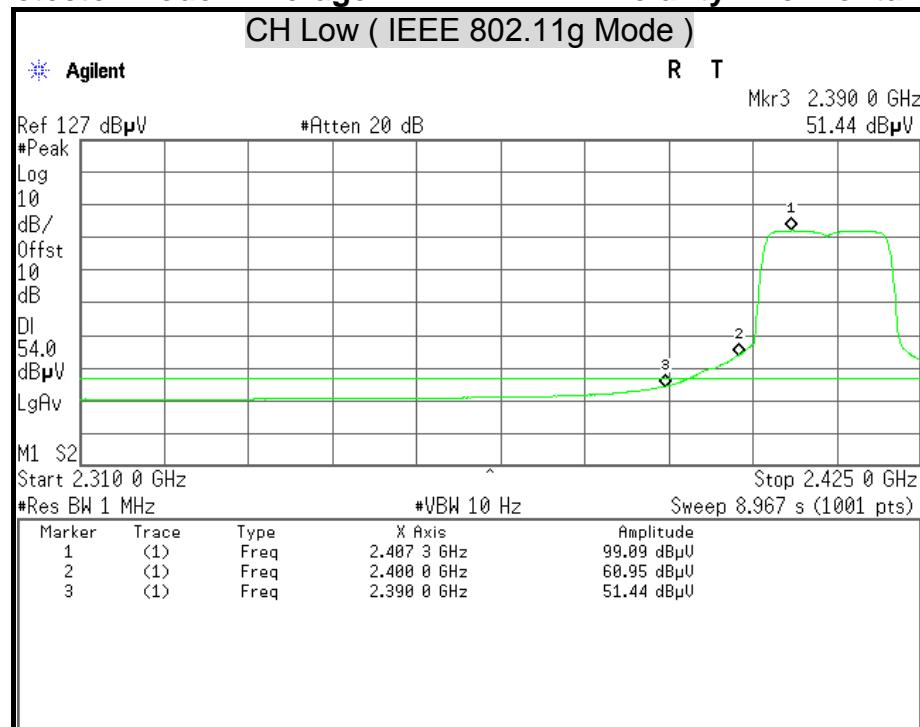
**Detector Mode : Peak**

**Polarity : Horizontal**



**Detector Mode : Average**

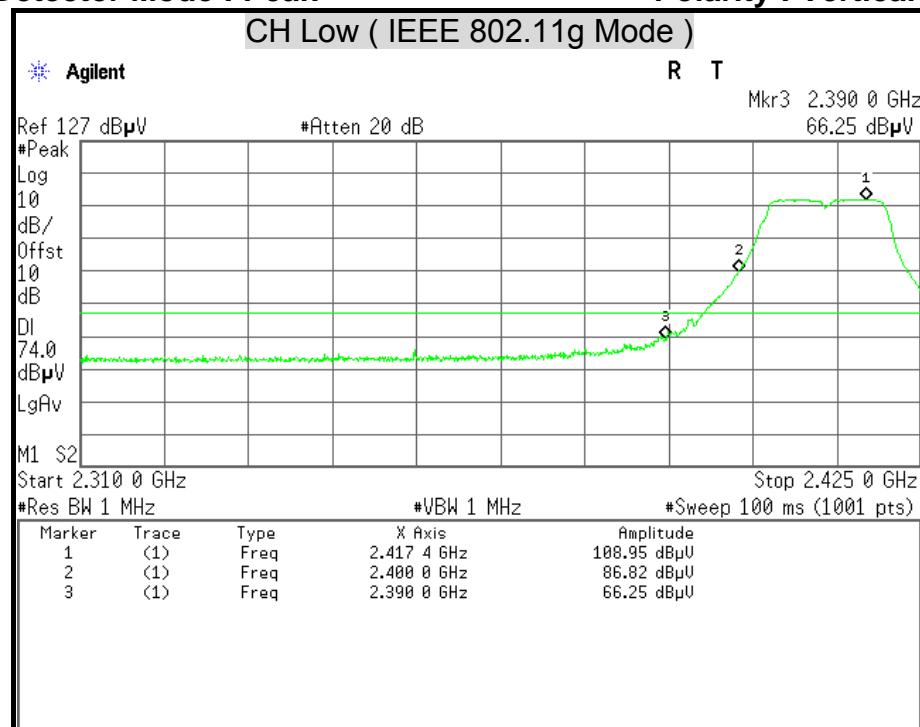
**Polarity : Horizontal**





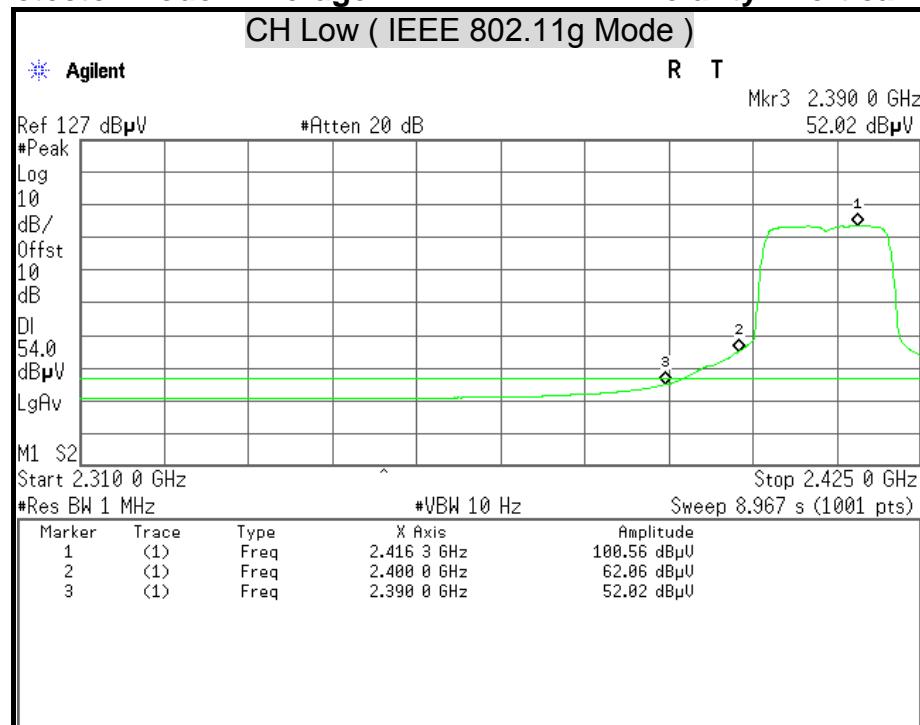
**Detector Mode : Peak**

**Polarity : Vertical**



**Detector Mode : Average**

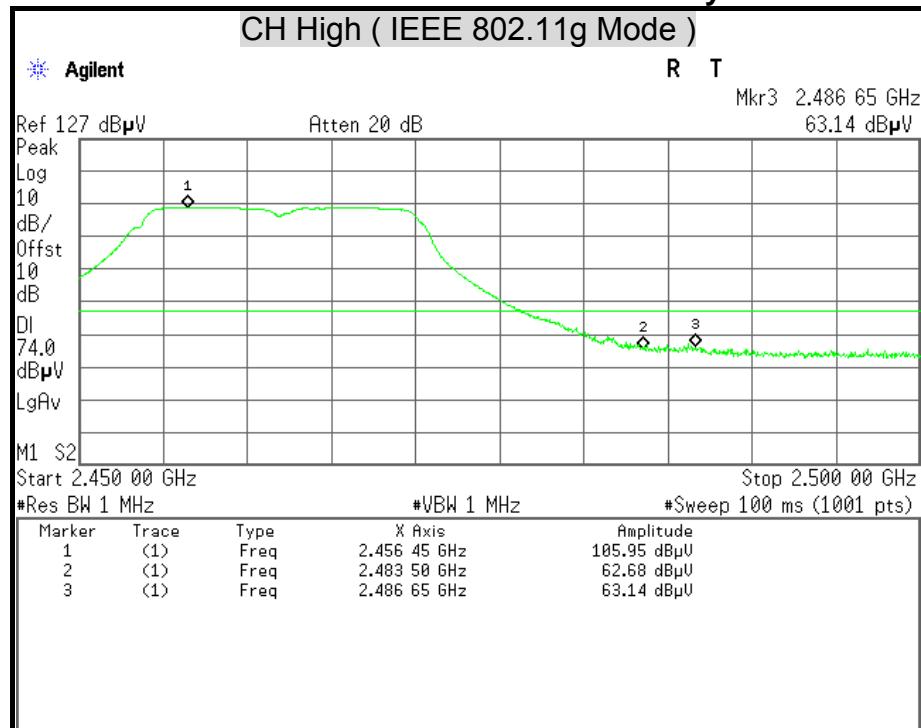
**Polarity : Vertical**





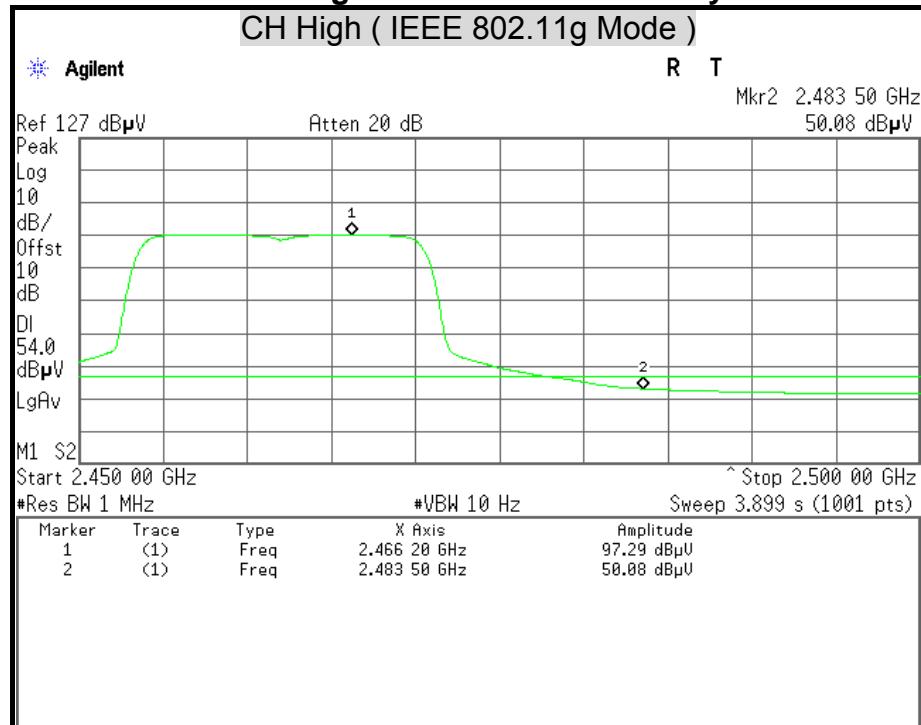
**Detector Mode : Peak**

**Polarity : Horizontal**



**Detector Mode : Average**

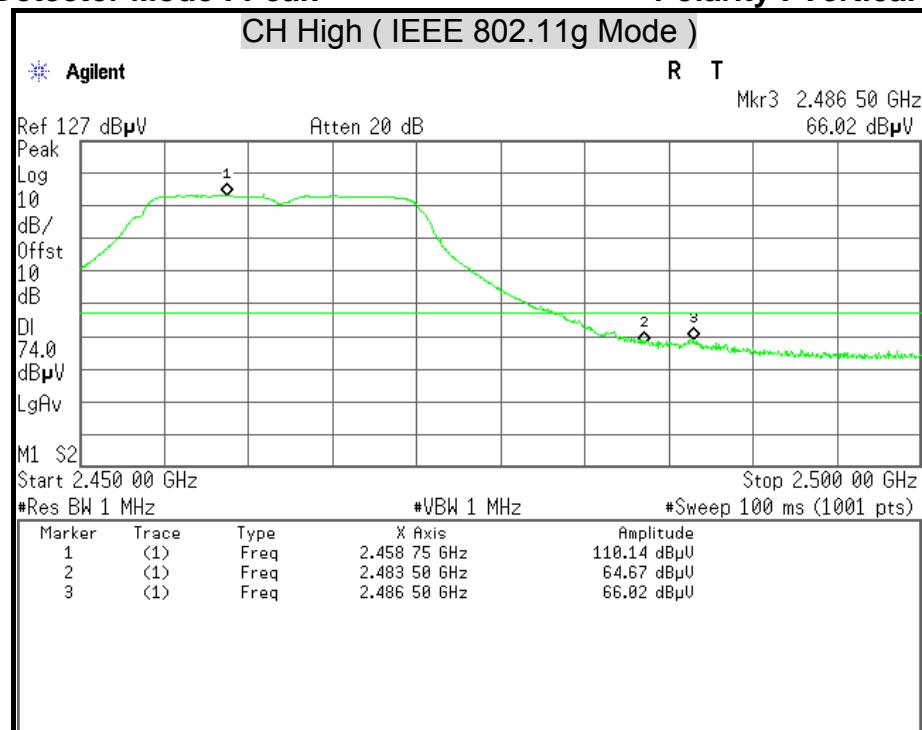
**Polarity : Horizontal**





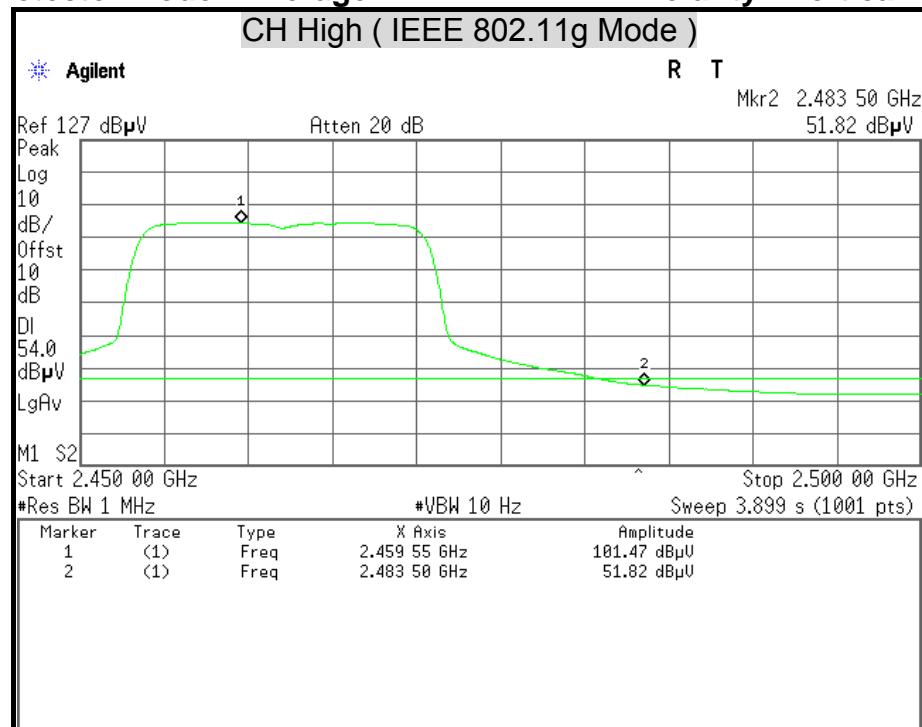
**Detector Mode : Peak**

**Polarity : Vertical**



**Detector Mode : Average**

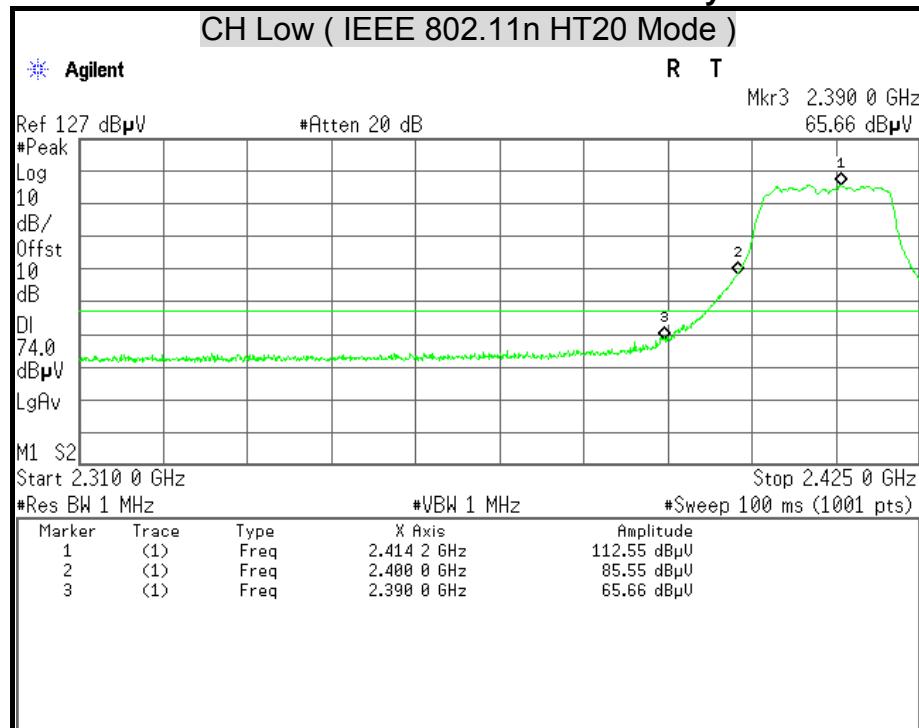
**Polarity : Vertical**





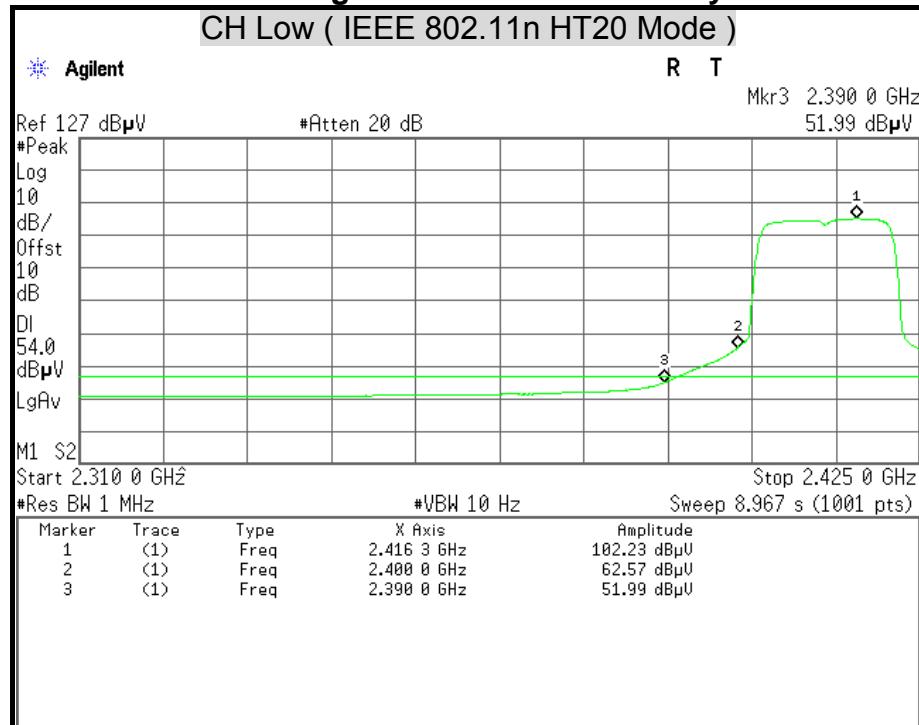
**Detector Mode : Peak**

**Polarity : Horizontal**



**Detector Mode : Average**

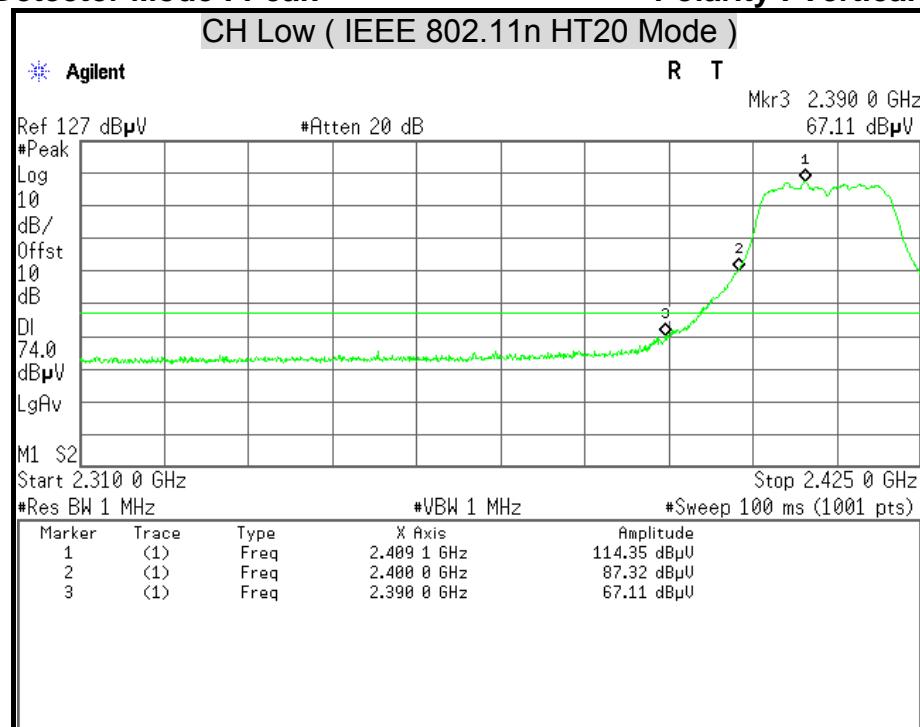
**Polarity : Horizontal**





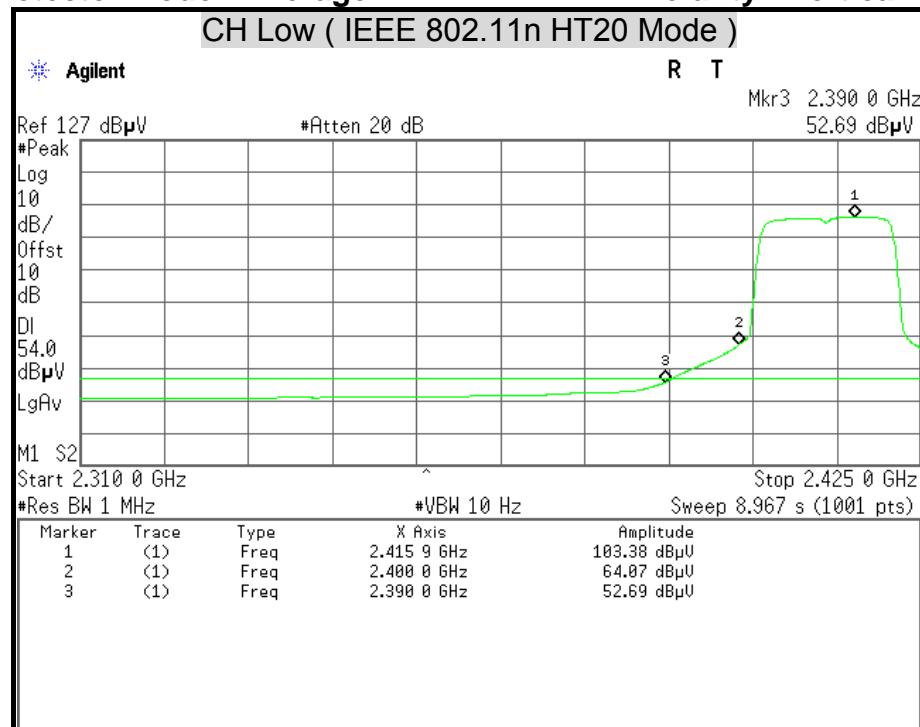
**Detector Mode : Peak**

**Polarity : Vertical**



**Detector Mode : Average**

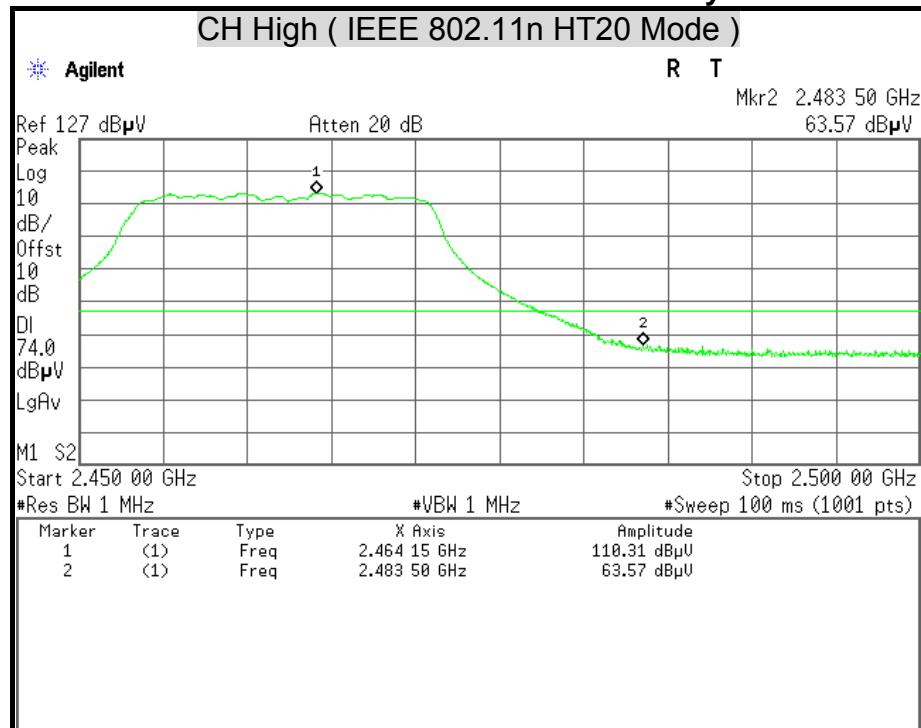
**Polarity : Vertical**





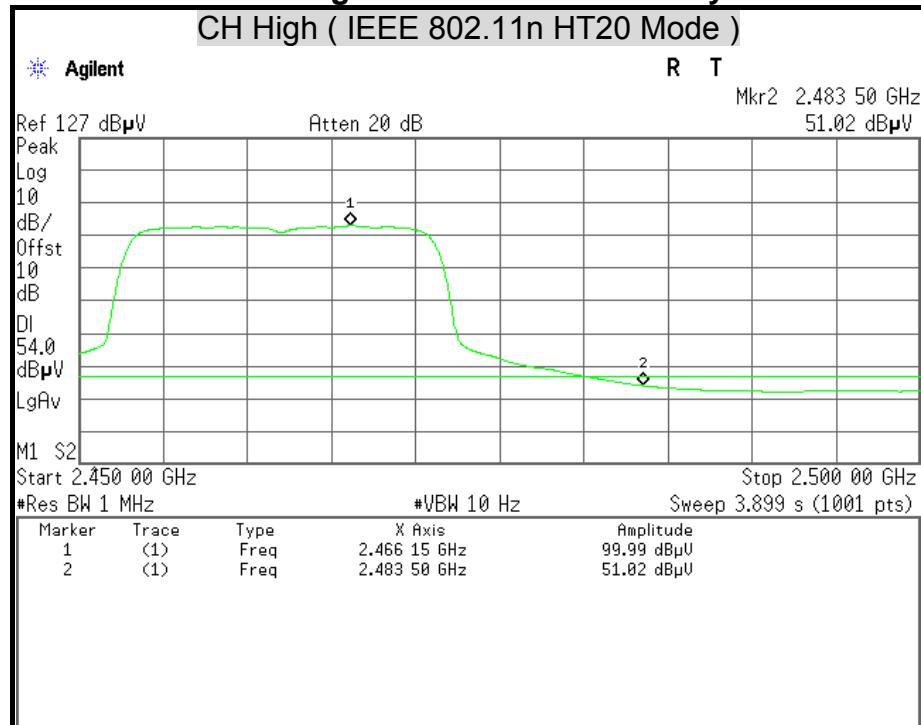
**Detector Mode : Peak**

**Polarity : Horizontal**



**Detector Mode : Average**

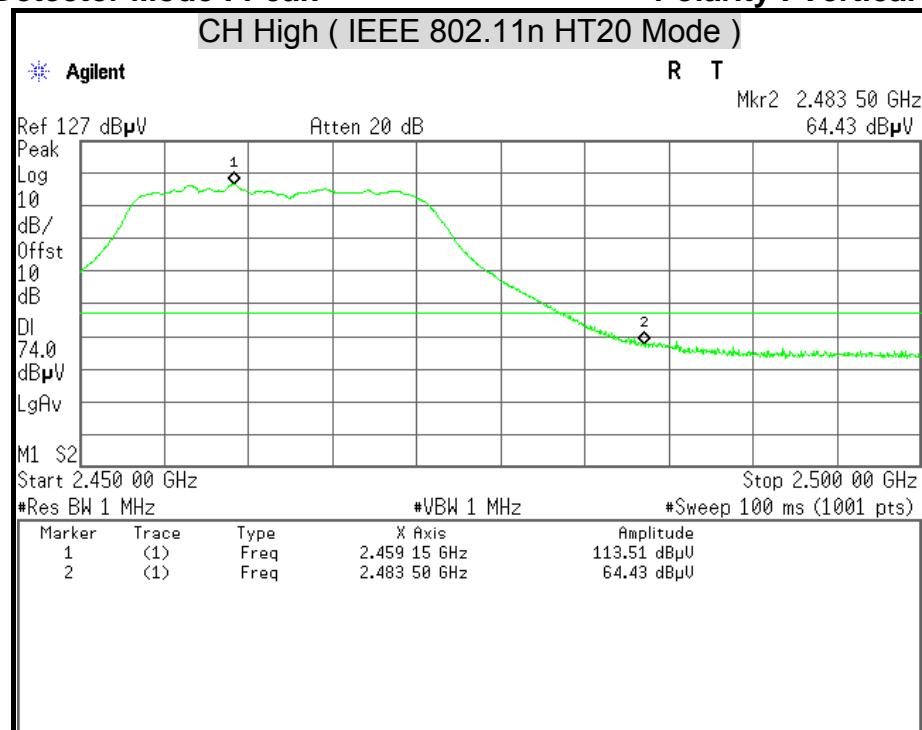
**Polarity : Horizontal**





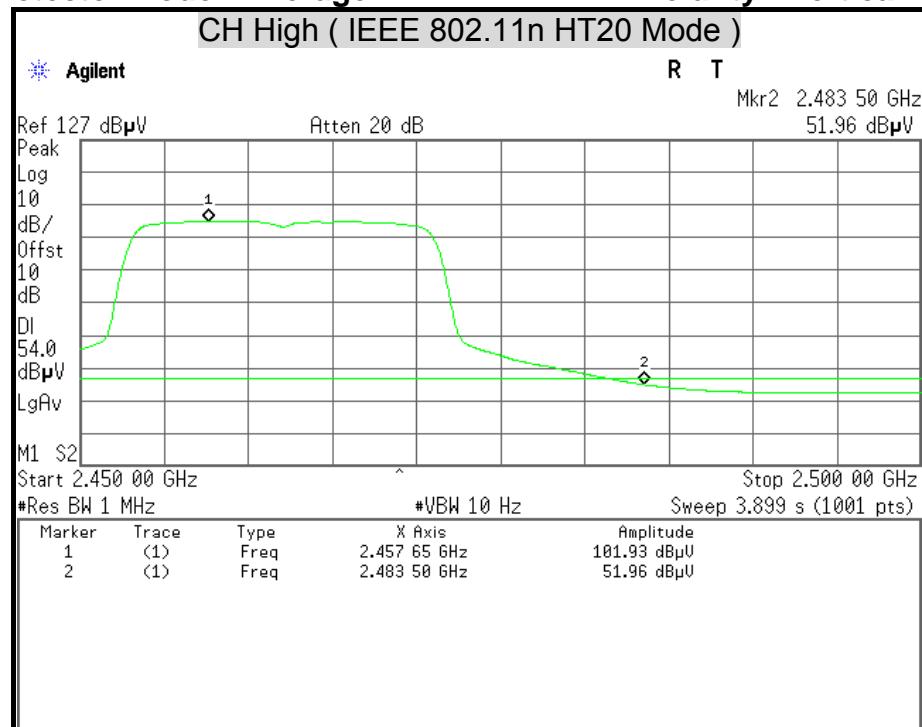
**Detector Mode : Peak**

**Polarity : Vertical**



**Detector Mode : Average**

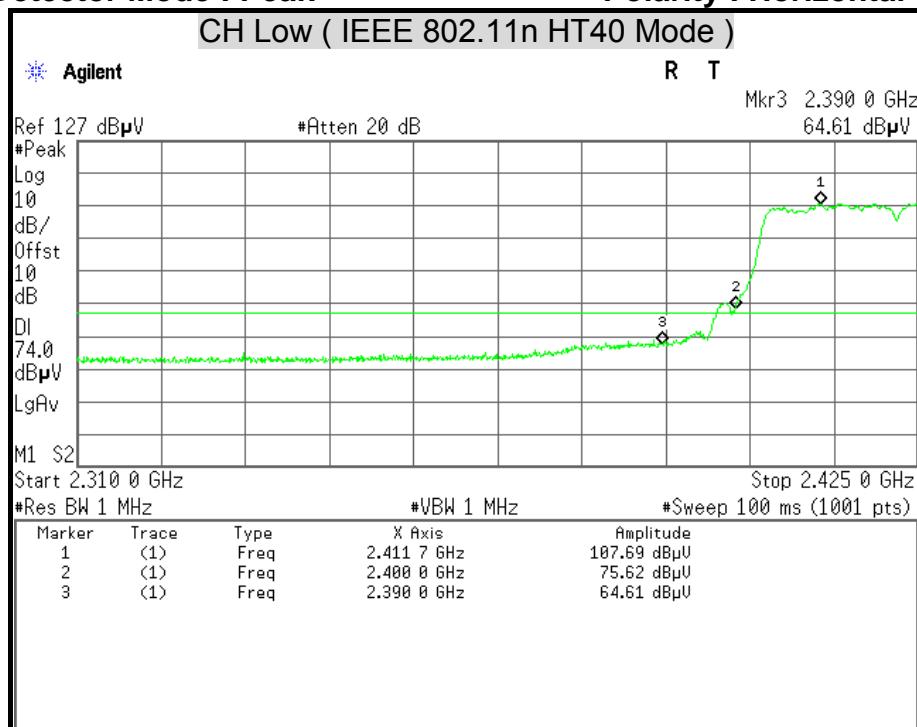
**Polarity : Vertical**





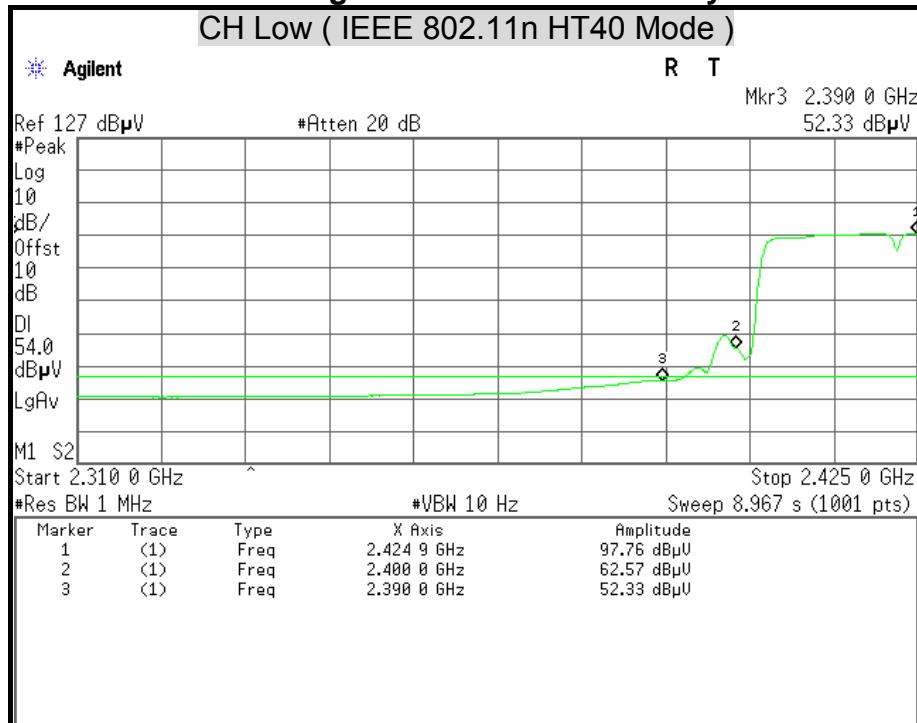
**Detector Mode : Peak**

**Polarity : Horizontal**



**Detector Mode : Average**

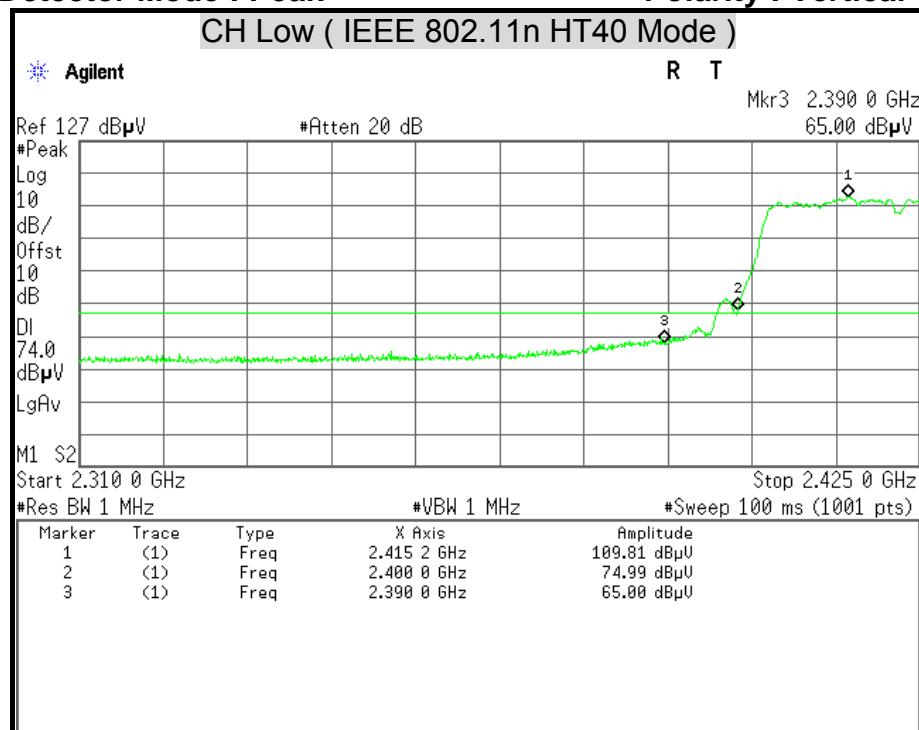
**Polarity : Horizontal**





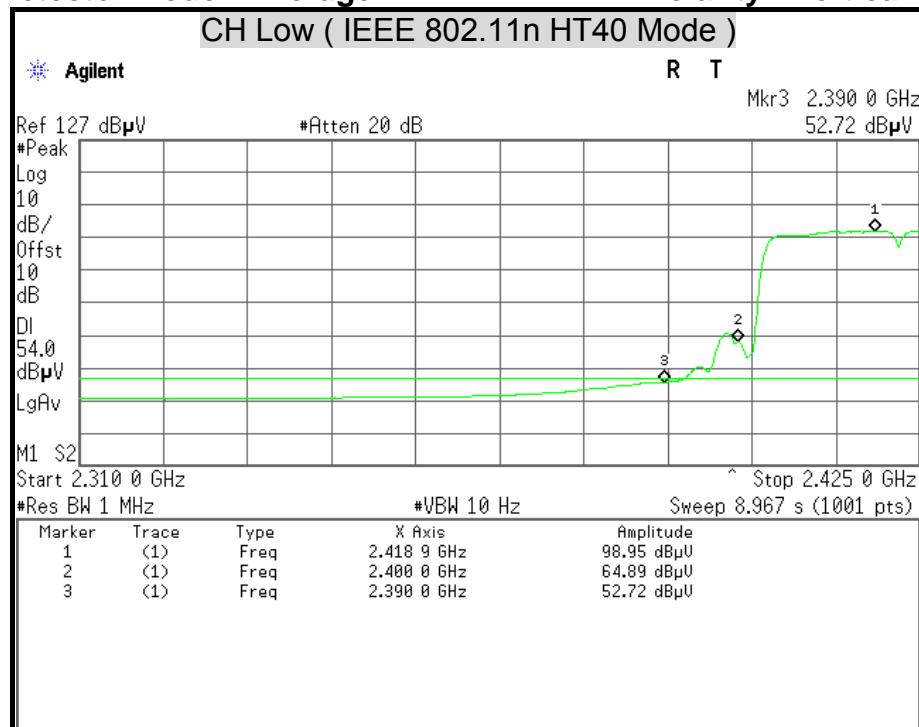
**Detector Mode : Peak**

**Polarity : Vertical**



**Detector Mode : Average**

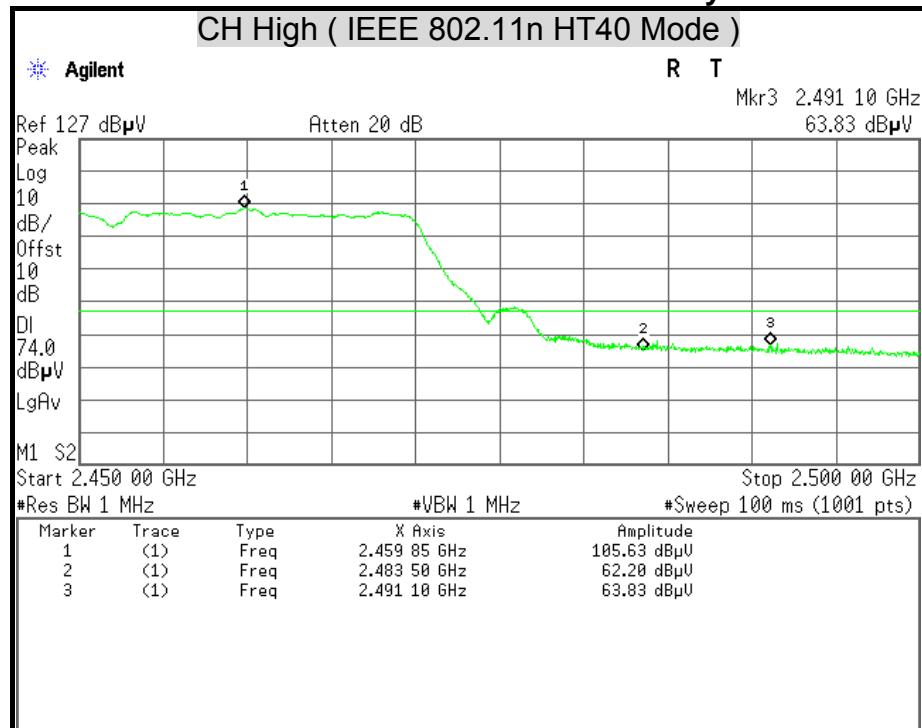
**Polarity : Vertical**





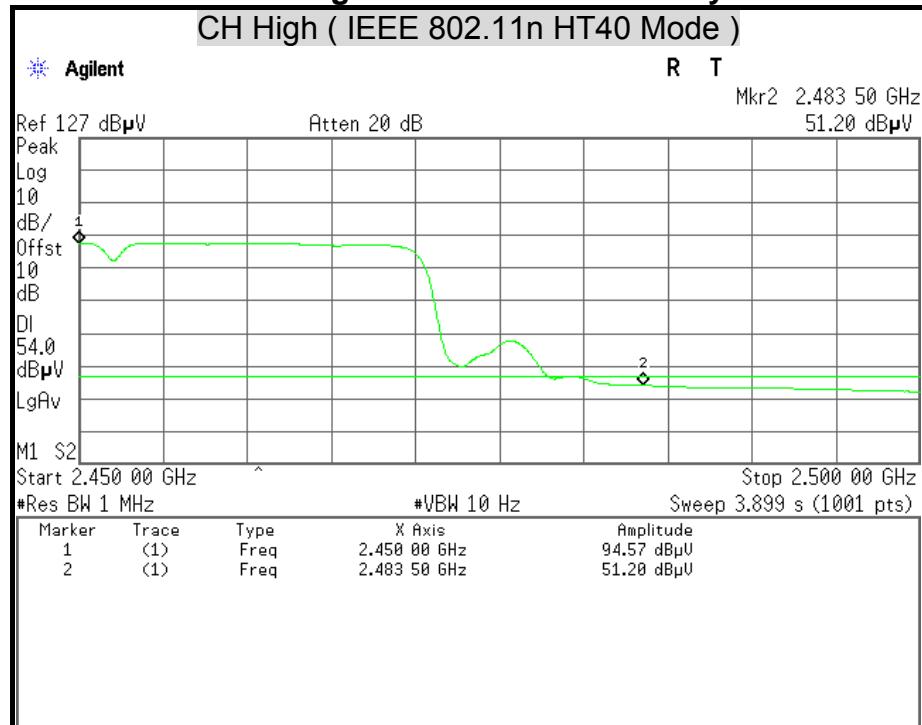
**Detector Mode : Peak**

**Polarity : Horizontal**



**Detector Mode : Average**

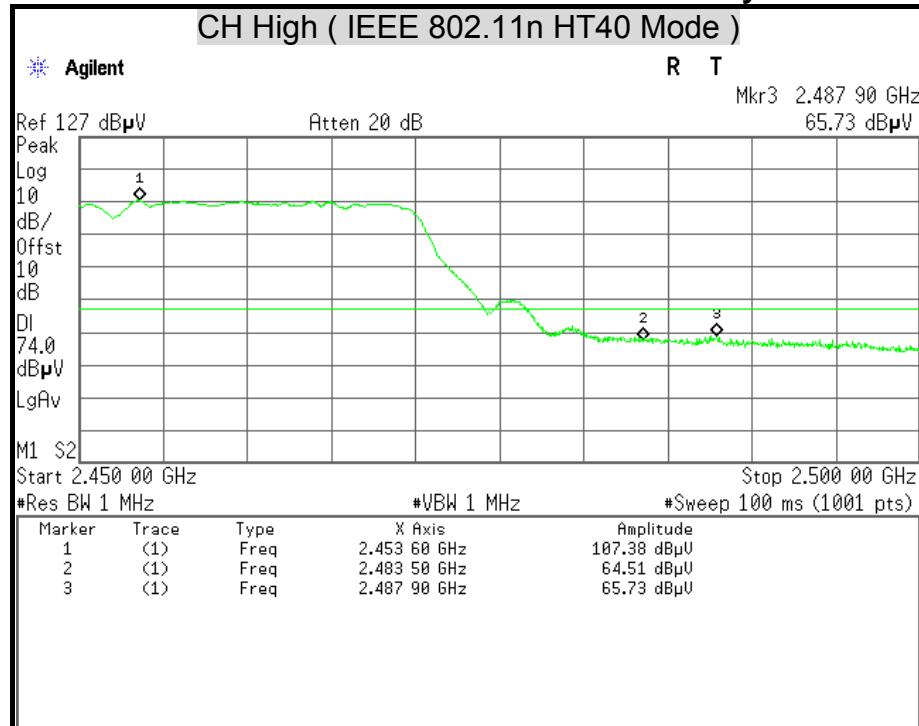
**Polarity : Horizontal**





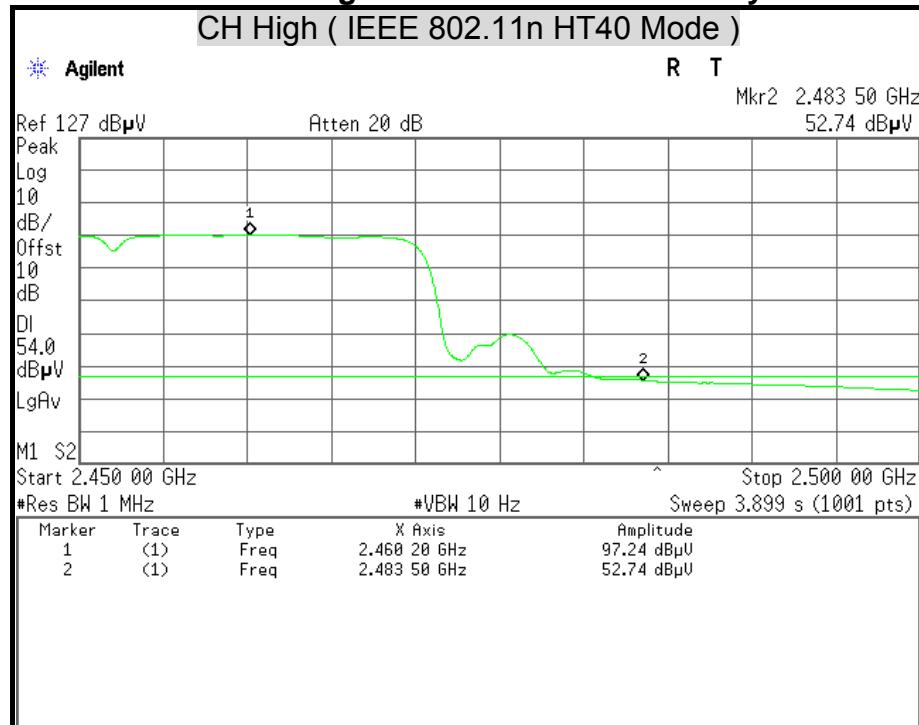
**Detector Mode : Peak**

**Polarity : Vertical**



**Detector Mode : Average**

**Polarity : Vertical**





## 8.6 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

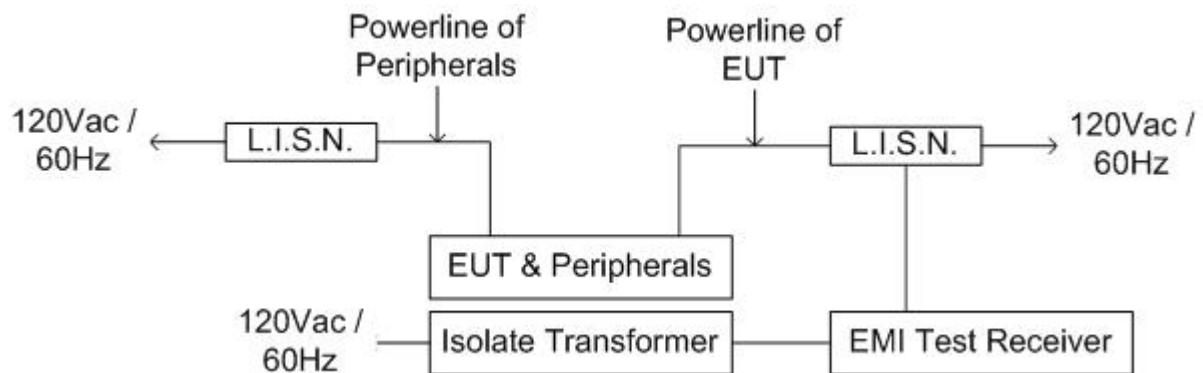
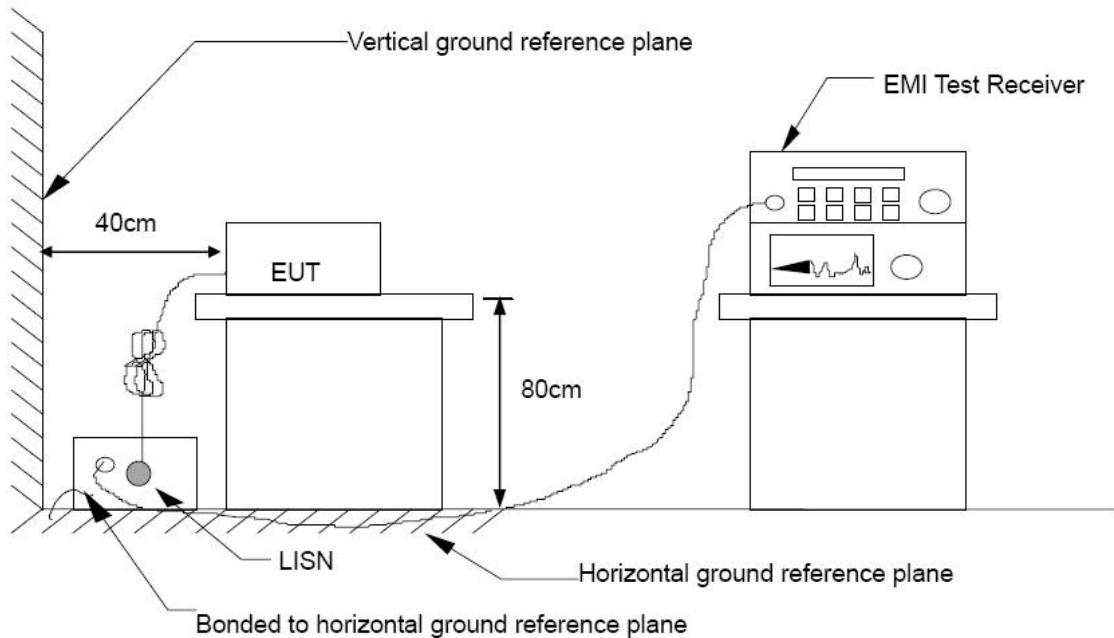
### TEST EQUIPMENT

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
L.I.S.N	SCHWARZBECK	NSLK 8127	8127-465	08/07/2013
L.I.S.N	SCHWARZBECK	NSLK 8127	8127-473	03/12/2013
EMI Receiver	ROHDE & SCHWARZ	ESCS 30	835418/008	10/16/2013
Pulse Limiter	ROHDE & SCHWARZ	ESH3-Z2	100117	07/03/2013

*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.

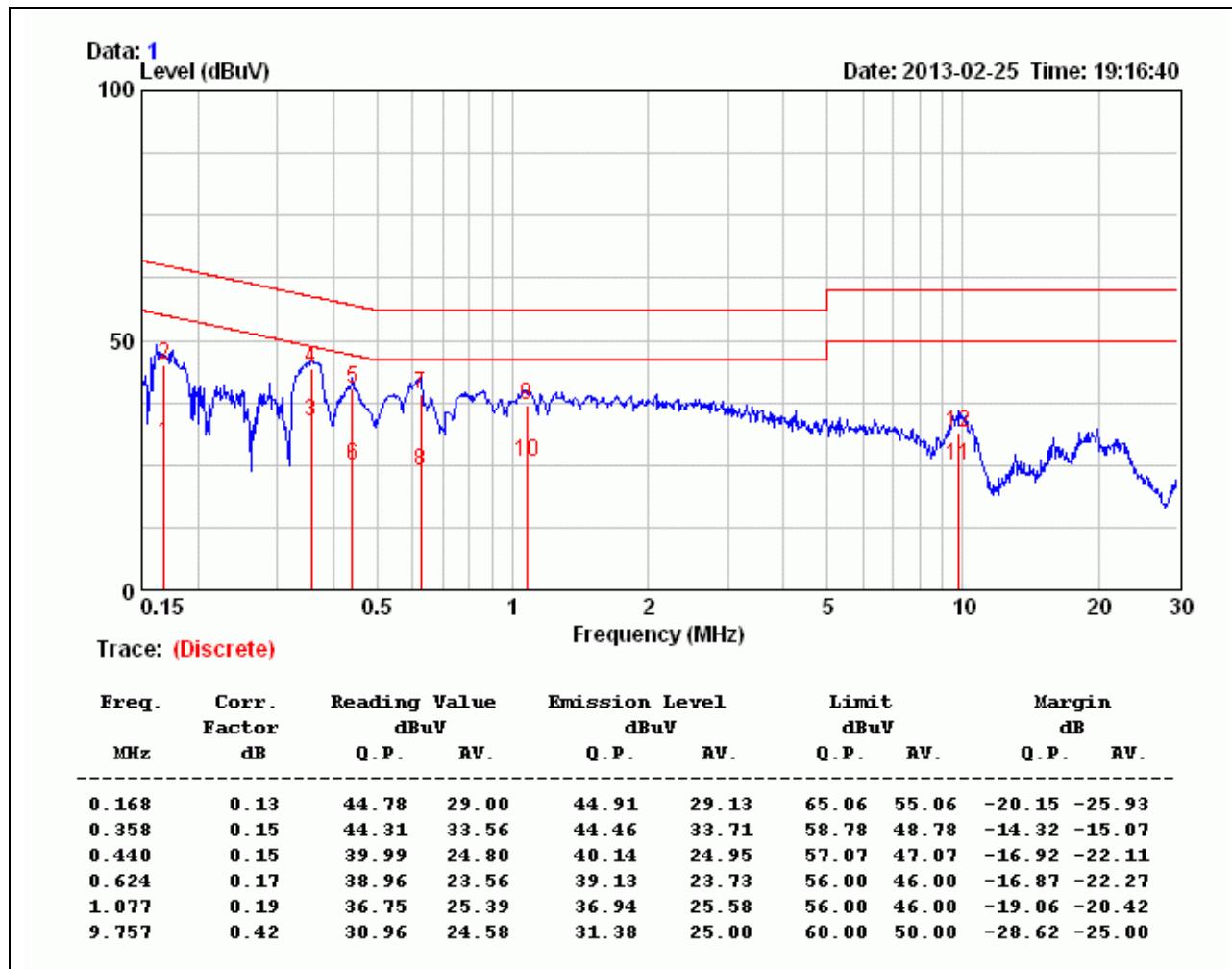
The EUT was located so that the distance between the boundary of the EUT and the closest surface of the LISN is 0.8 m. Where a mains flexible cord was provided by the manufacturer shall be 1 m long, or if in excess of 1 m, the excess cable was folded back and forth as far as possible so as to form a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



## TEST RESULTS

Product Name	Cable Modem	Test By	Ted Wu
Test Model	CH6640A	Test Date	2013/02/25
Test Mode	Normal Operating / Power Adapter 1	Temp. & Humidity	23°C, 55%

### LINE



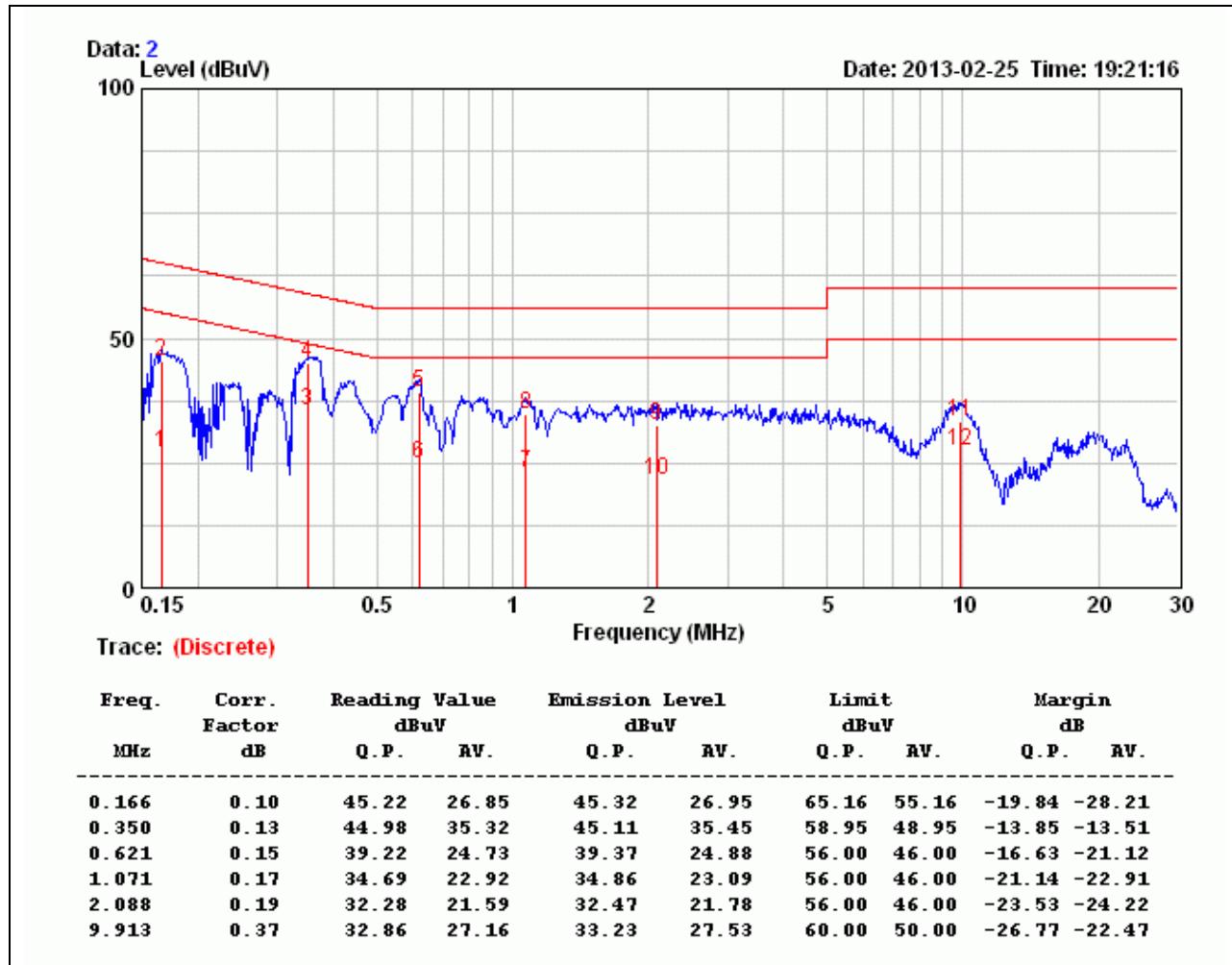
### Remark:

1. Correction Factor = Insertion loss + Cable loss
2. Emission level = Reading Value + Correction factor
3. Margin value = Emission level – Limit value



Product Name	Cable Modem	Test By	Ted Wu
Test Model	CH6640A	Test Date	2013/02/25
Test Mode	Normal Operating / Power Adapter 1	Temp. & Humidity	23°C, 55%

NEUTRAL



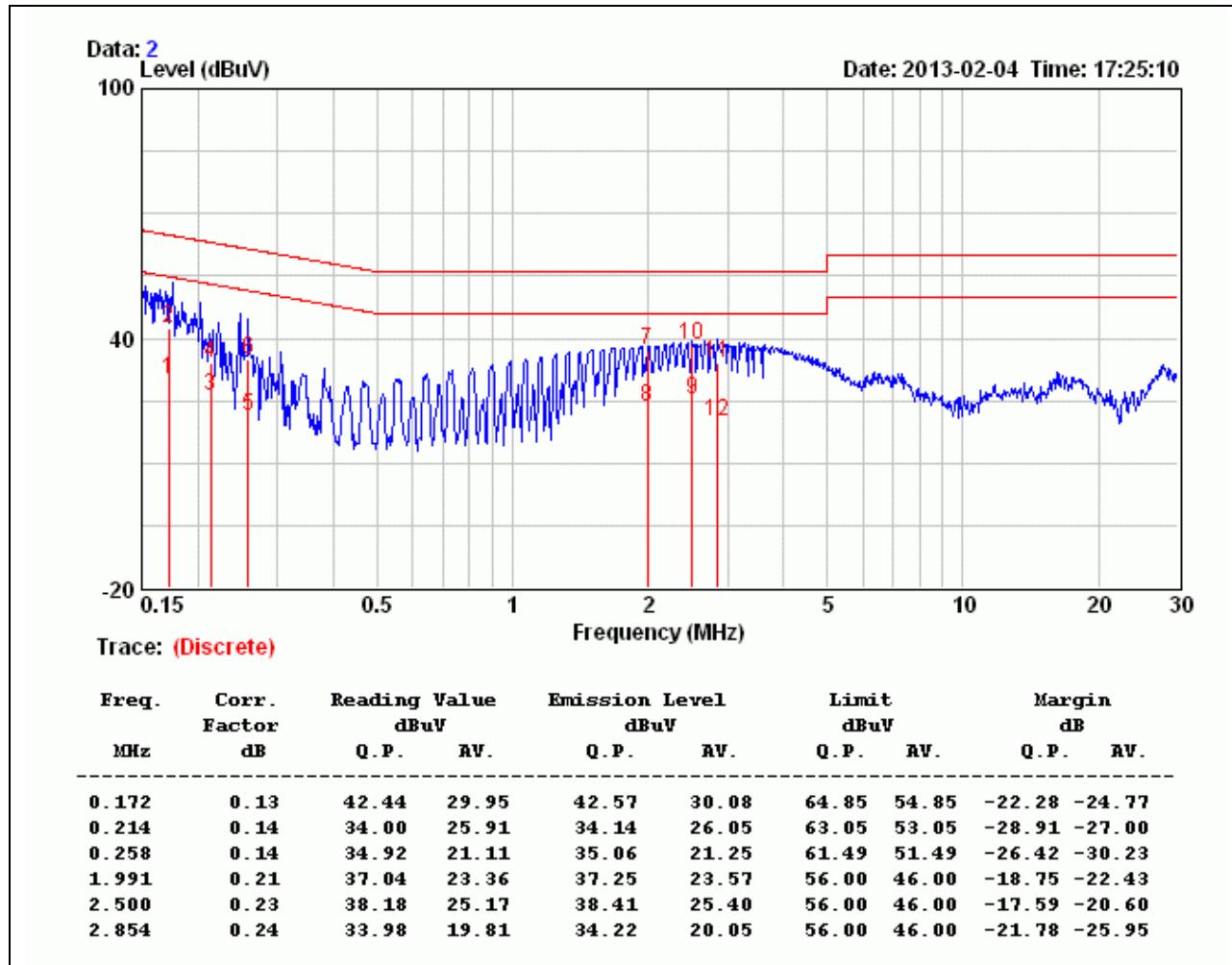
Remark:

1. Correction Factor = Insertion loss + Cable loss
2. Emission level = Reading Value + Correction factor
3. Margin value = Emission level – Limit value



Product Name	Cable Modem	Test By	Ted Wu
Test Model	CH6640A	Test Date	2013/02/04
Test Mode	Normal Operating / Power Adapter 2	Temp. & Humidity	21°C, 61%

LINE



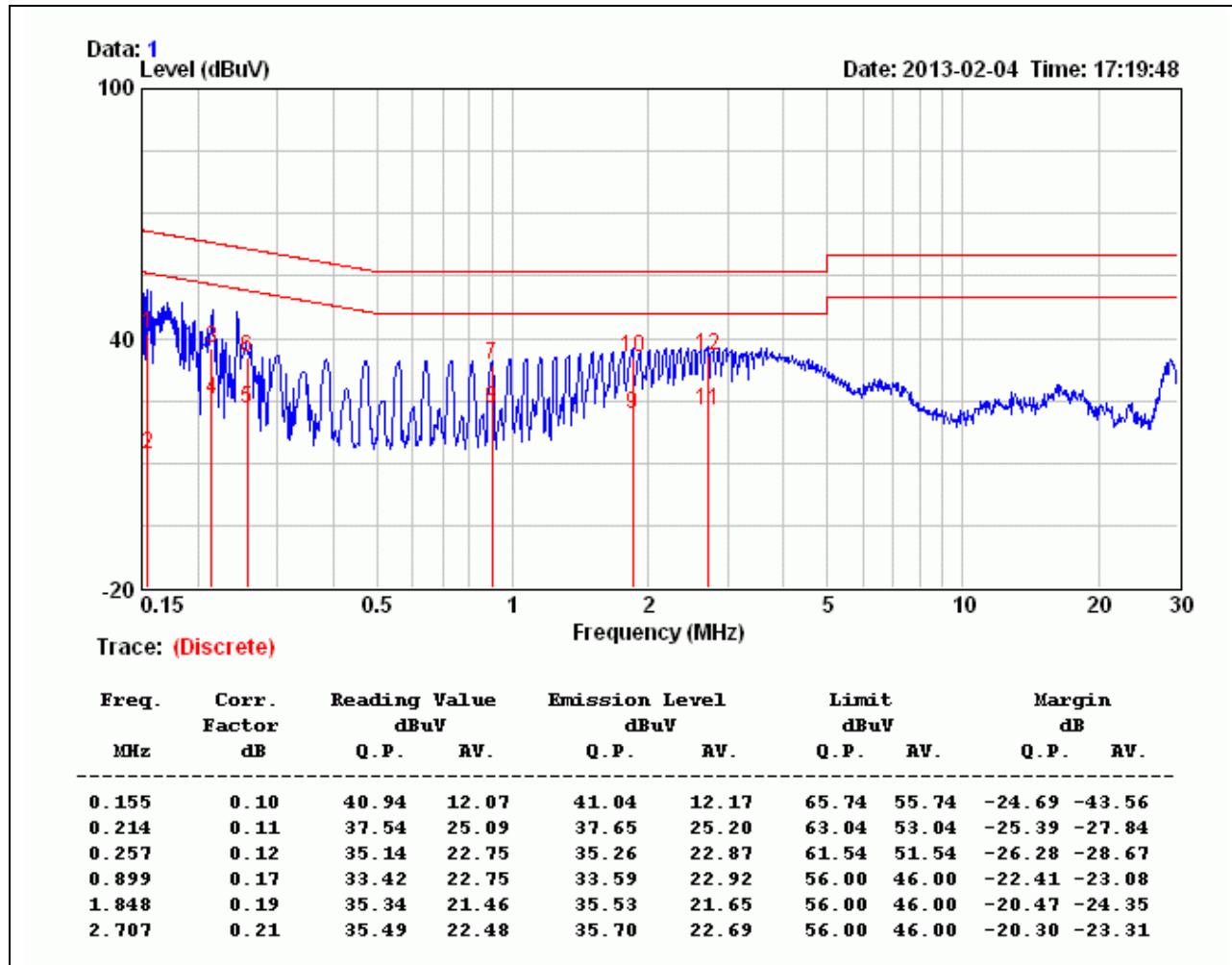
Remark:

1. Correction Factor = Insertion loss + Cable loss
2. Emission level = Reading Value + Correction factor
3. Margin value = Emission level – Limit value



Product Name	Cable Modem	Test By	Ted Wu
Test Model	CH6640A	Test Date	2013/02/04
Test Mode	Normal Operating / Power Adapter 2	Temp. & Humidity	21°C, 61%

NEUTRAL



Remark:

1. Correction Factor = Insertion loss + Cable loss
2. Emission level = Reading Value + Correction factor
3. 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:

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

Changing to units of mW and cm, using:

$P$  (mW) =  $P$  (W) / 1000 and

$d$  (cm) =  $d$ (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	2.51	20	21.36	1.78	1.00	0.048498
IEEE 802.11g	2.51	20	26.35	1.78	1.00	0.153010
IEEE 802.11n HT20	2.51	20	25.52	1.78	1.00	0.261512
	2.82		25.50	1.91		
IEEE 802.11n HT40	2.51	20	22.32	1.78	1.00	0.125019
	2.82		22.29	1.91		

**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.