



**FCC CFR47 PART 15 SUBPART C  
INDUSTRY CANADA RSS-210 ISSUE 7  
CERTIFICATION TEST REPORT  
CLASS II PERMISSIVE CHANGE**

**FOR**

**EBOOK, WLAN, AND USB PORTS WITHOUT WWAN**

**MODEL NUMBER: BNRV100**

**FCC ID: XHHBNRV100  
IC: 8961A-BNRV100**

**REPORT NUMBER: 10U13106-1**

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**NVLAP LAB CODE 200065-0**

Revision History

Rev.	Issue Date	Revisions	Revised By
---	06/2/10	Initial Issue	T. Chan

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## 1. ATTESTATION OF TEST RESULTS

**COMPANY NAME:** BARNES AND NOBLE  
400 Hamilton Avenue  
PALO ALTO, CA 94301, U.S.A.

**EUT DESCRIPTION:** EBOOK, WLAN, AND USB PORTS WITHOUT WWAN

**MODEL:** BNRV100

**SERIAL NUMBER:** 1001150000270048

**DATE TESTED:** APRIL 14-23, 2010

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 Part 15 Subpart C	Pass
Industry Canada RSS-210 Issue 7 Annex 8	Pass
Industry Canada RSS-GEN Issue 2	Pass

Compliance Certification Services, Inc. (CCS) tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by CCS based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

**Note:** The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by CCS and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by CCS will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of any government.

Approved & Released For CCS By:

Tested By:



THU CHAN  
EMC MANAGER  
COMPLIANCE CERTIFICATION SERVICES

CHIN PANG  
EMC ENGINEER  
COMPLIANCE CERTIFICATION SERVICES

## 2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.10-2009, FCC CFR 47 Part 2, FCC CFR 47 Part 15, RSS-GEN Issue 2, and RSS-210 Issue 7.

## 3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 Benicia Street, Fremont, California, USA.

CCS is accredited by NVLAP, Laboratory Code 200065-0. The full scope of accreditation can be viewed at <http://www.ccsemc.com>.

## 4. CALIBRATION AND UNCERTAINTY

### 4.1. MEASURING INSTRUMENT CALIBRATION

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

### 4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

$$\begin{aligned} \text{Field Strength (dBuV/m)} &= \text{Measured Voltage (dBuV)} + \text{Antenna Factor (dB/m)} + \\ &\text{Cable Loss (dB)} - \text{Preamplifier Gain (dB)} \\ 36.5 \text{ dBuV} + 18.7 \text{ dB/m} + 0.6 \text{ dB} - 26.9 \text{ dB} &= 28.9 \text{ dBuV/m} \end{aligned}$$

### 4.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

PARAMETER	UNCERTAINTY
Conducted Disturbance, 0.15 to 30 MHz	3.52 dB
Radiated Disturbance, 30 to 1000 MHz	4.94 dB

Uncertainty figures are valid to a confidence level of 95%.

## **5. EQUIPMENT UNDER TEST**

### **5.1. DESCRIPTION OF EUT**

The EUT is an eBook, WLAN, and USB port device without WWAN.  
The radio module is manufactured by Marvel.

### **5.2. MAXIMUM OUTPUT POWER**

The test measurement passed within  $\pm 0.5$ dBm of the original output power.

### **5.3. DESCRIPTION OF CLASS II PERMISSIVE CHANGE**

The following changes filed under this application are for cost reduction purposes.

1. Booting Micro-SD is replaced by iNAND.
2. The EPD power that is powered by discrete components are replaced by PMIC.

### **5.4. DESCRIPTION OF AVAILABLE ANTENNAS**

The radio utilizes a chip antenna, with a maximum peak gain of 1.3 dBi.

### **5.5. SOFTWARE AND FIRMWARE**

The EUT driver software installed during testing was Usbnet driver and bumini tool v0.12  
The test utility software used during testing was telnet 192.168.0.17.

### **5.6. WORST-CASE CONFIGURATION AND MODE**

The worst-case channel is determined as the channel with the highest output power.

802.11b Mode (20 MHz BW operation): 11 Mbps, CCK.  
802.11g Mode (20 MHz BW operation): 54 Mbps, OFDM.

The EUT is a portable device that has three orientations; therefore X, Y and Z orientations have been investigated. The worst case was found to be Z orientation.

For radiated emissions below 1 GHz the worst-case configuration is determined to be the mode and channel with the highest output power.

## 5.7. DESCRIPTION OF TEST SETUP

### SUPPORT EQUIPMENT

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	Manufacturer	Model	Serial Number	FCC ID
Laptop	Dell	Latitude D620	NA	Doc
AC Adapter	Dell	PA-1650-08D3	CN-ODF263-71615-72M-2925	Doc

### I/O CABLES

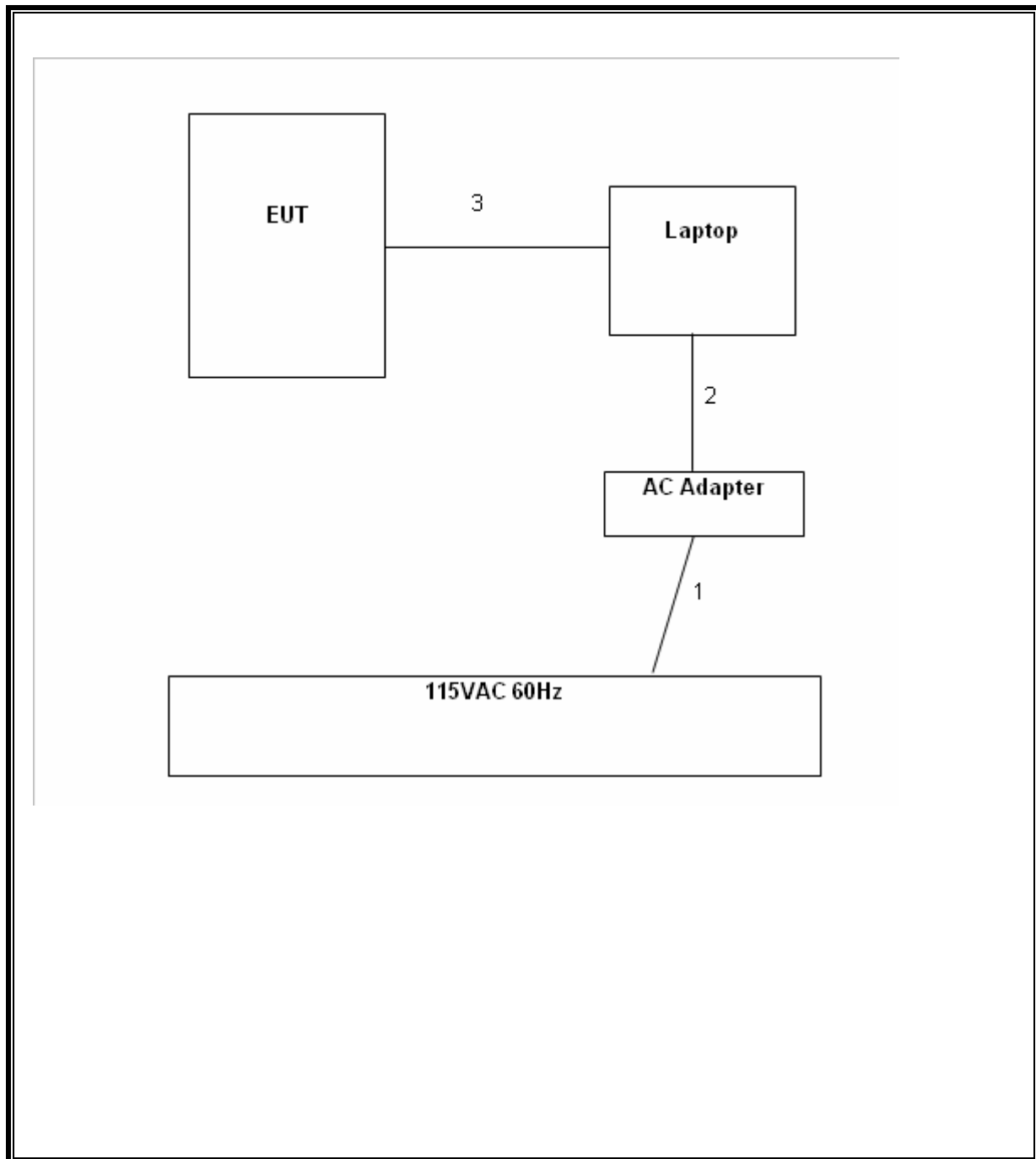
I/O CABLE LIST						
Cable No.	Port	# of Identic Ports	Connector Type	Cable Type	Cable Length	Remarks
1	AC	1	US 115V	Un-shielded	2m	NA
2	DC	1	DC	Un-shielded	1m	NA
3	USB	1	EUT	Un-shielded	2m	NA

### TEST SETUP

The EUT is installed in a host laptop computer during the tests. Test software exercised the radio card.



**SETUP DIAGRAM FOR TESTS**



## 6. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report.

TEST EQUIPMENT LIST				
Description	Manufacturer	Model	Asset	Cal Due
Preamplifier, 1300 MHz	Agilent / HP	8447D	C00778	07/06/10
Preamplifier, 26.5 GHz	Agilent / HP	8449B	C01063	08/04/10
Antenna, Bilog, 2 GHz	Sunol Sciences	JB1	C01011	07/14/10
Antenna, Horn, 18 GHz	EMCO	3115	C00783	07/29/10
EMI Test Receiver, 30 MHz	R & S	ESHS 20	N02396	05/06/11
LISN, 30 MHz	FCC	LISN-50/250-25-2	N02625	11/06/10
Spectrum Analyzer, 26.5 GHz	Agilent / HP	E4440A	C01178	08/31/10
Peak Power Meter	Boonton	4541	C01189	03/01/11
Peak Power Sensor	Boonton	57318	NA	02/24/11

## 7. ANTENNA PORT TEST RESULTS

### 7.1. 802.11b MODE IN THE 2.4 GHz BAND

#### 7.1.1. 6 dB BANDWIDTH

##### LIMITS

FCC §15.247 (a) (2)

IC RSS-210 A8.2 (a)

The minimum 6 dB bandwidth shall be at least 500 kHz.

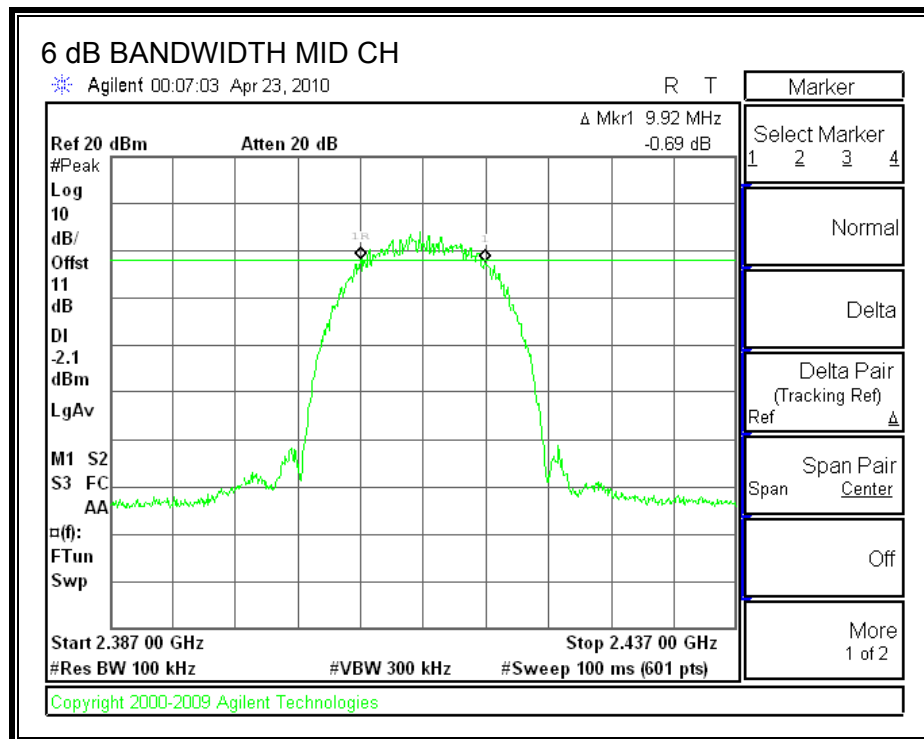
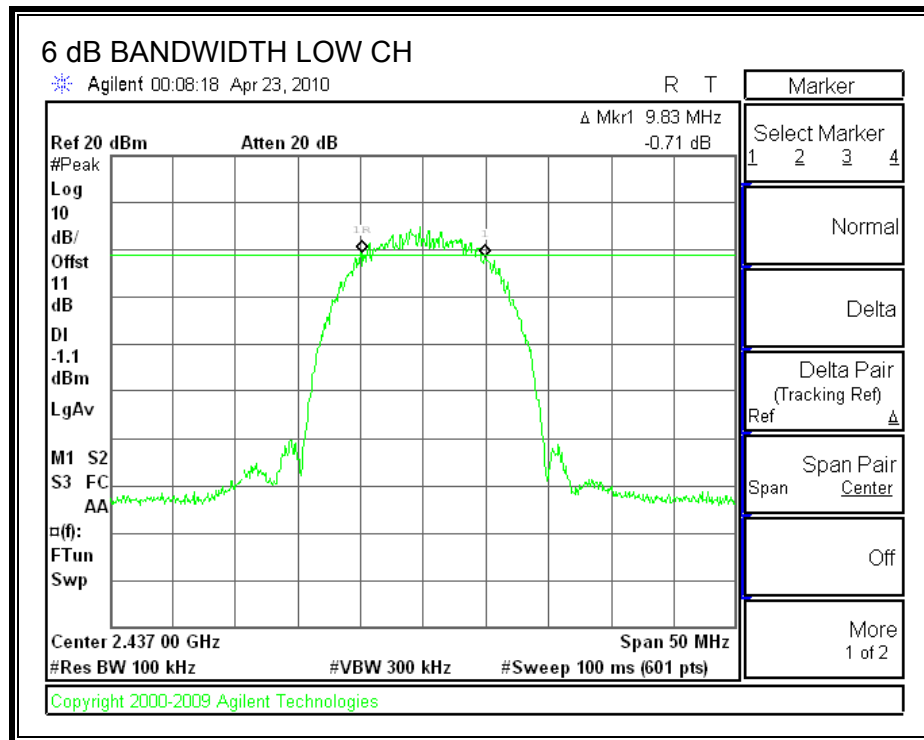
##### TEST PROCEDURE

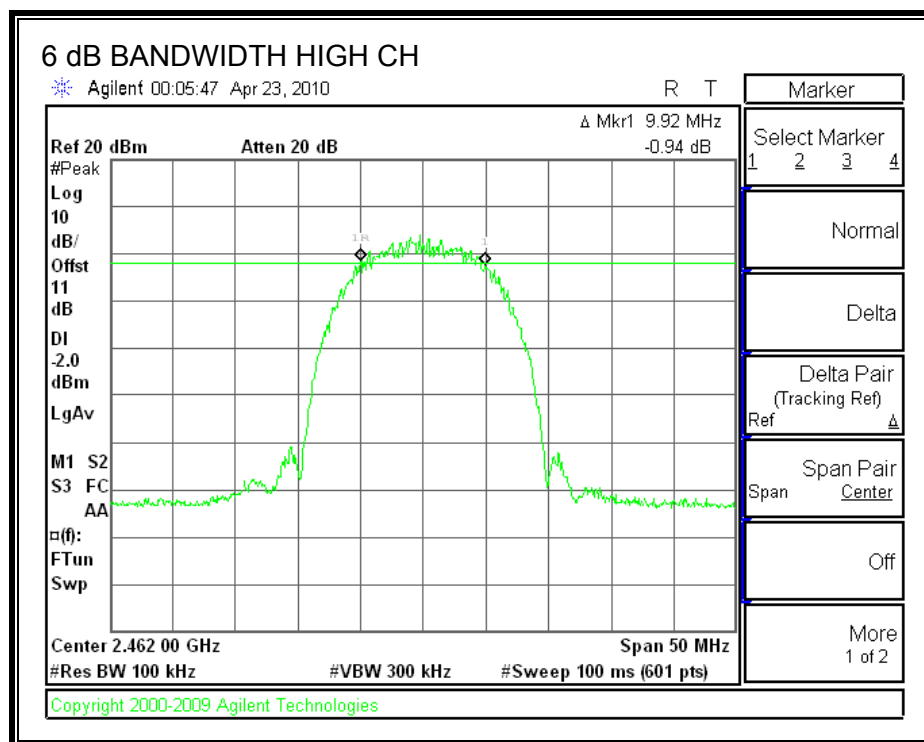
The transmitter output is connected to a spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 300 kHz. The sweep time is coupled.

##### RESULTS

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2412	9.83	0.5
Middle	2437	9.92	0.5
High	2462	9.92	0.5

## 6 dB BANDWIDTH





### 7.1.2. 99% BANDWIDTH

#### LIMITS

None; for reporting purposes only.

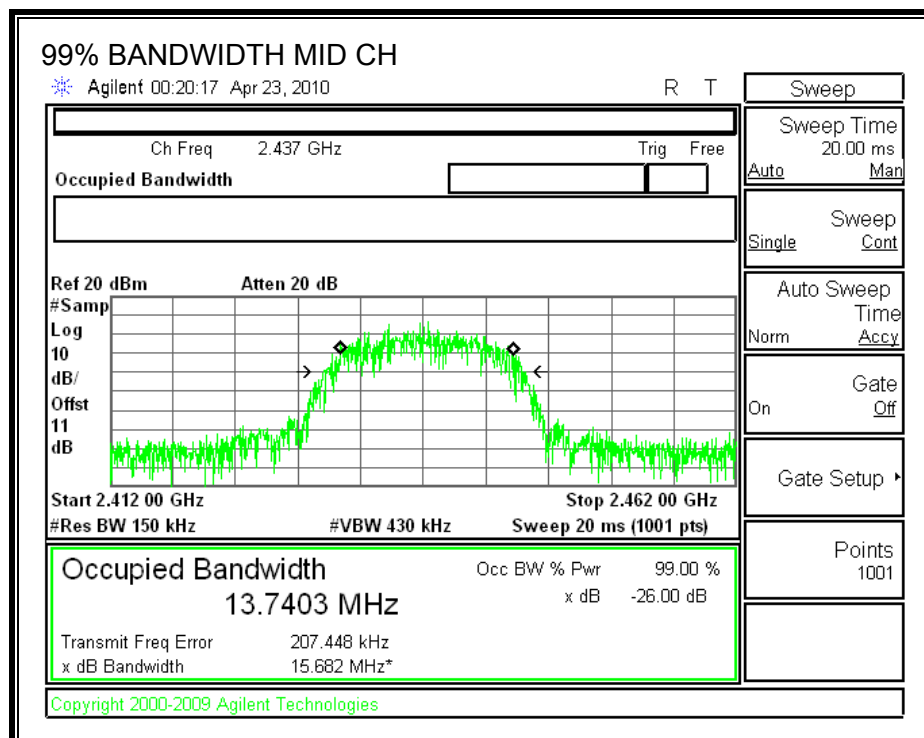
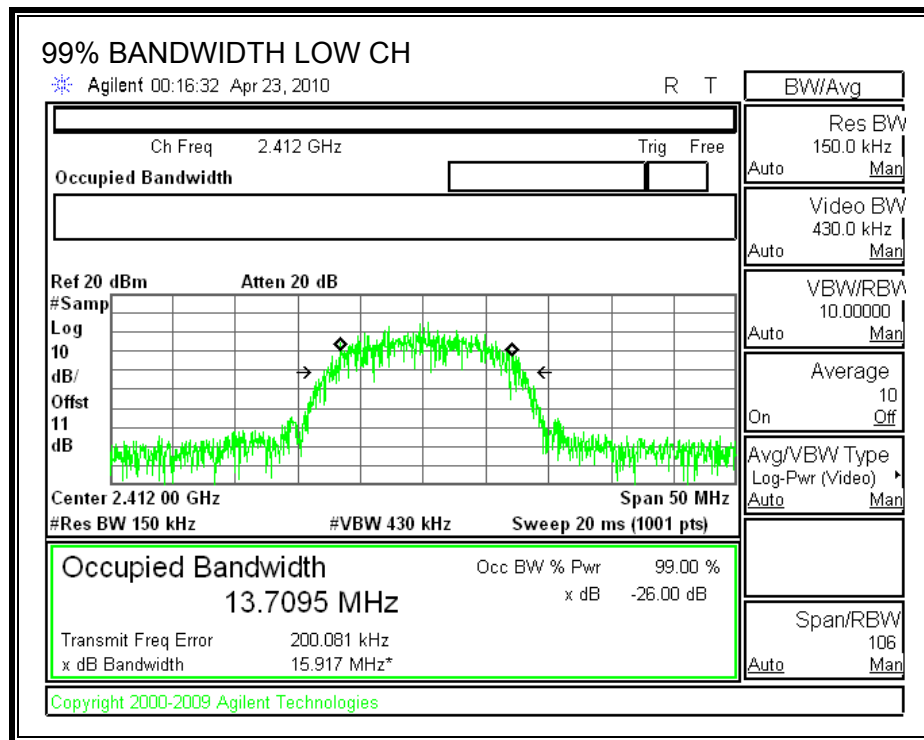
#### TEST PROCEDURE

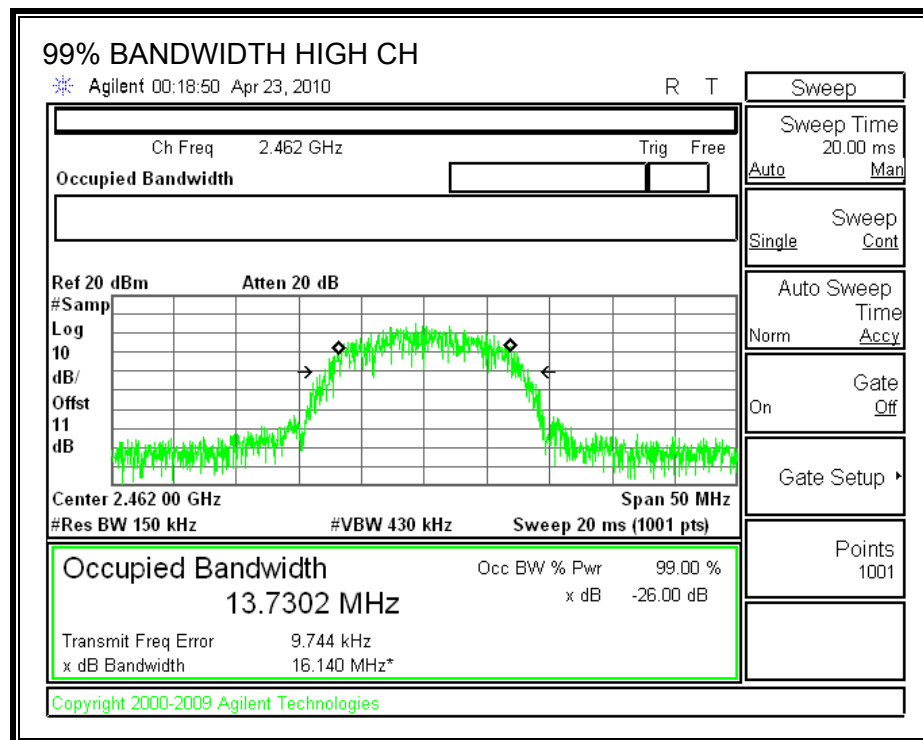
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

#### RESULTS

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2412	13.710
Middle	2437	13.740
High	2462	13.730

# **99% BANDWIDTH**







### 7.1.3. POWER SPECTRAL DENSITY

#### LIMITS

FCC §15.247 (e)

IC RSS-210 A8.2 (b)

The power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

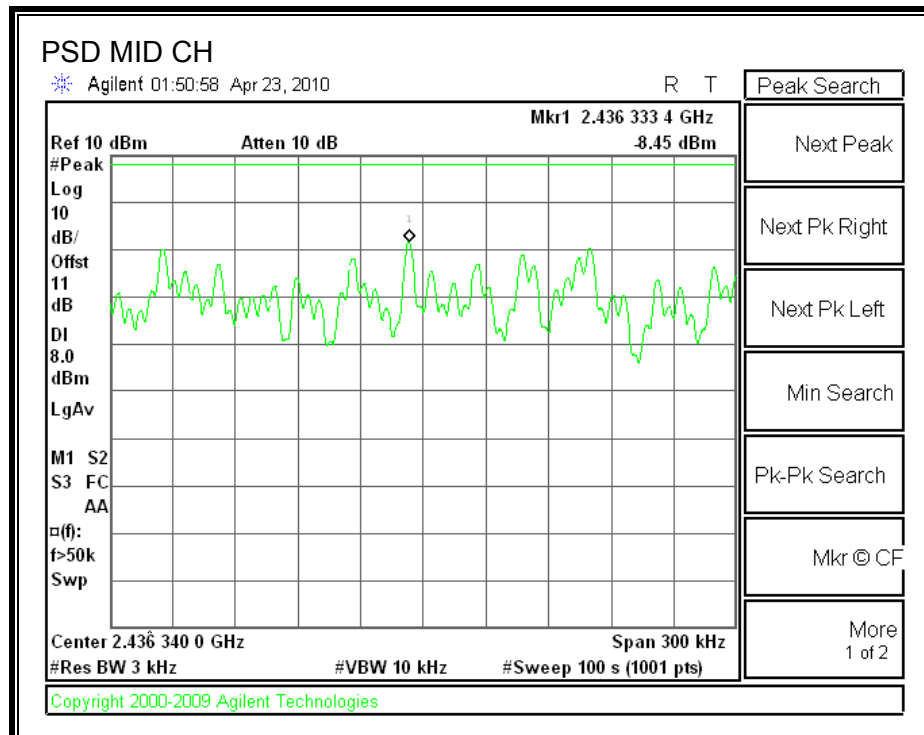
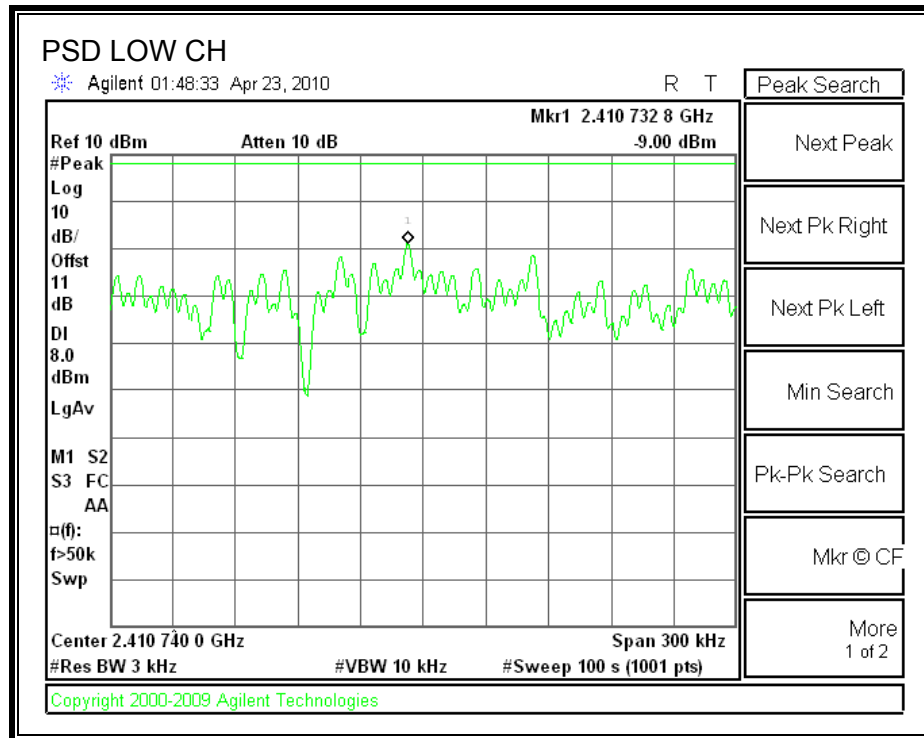
#### TEST PROCEDURE

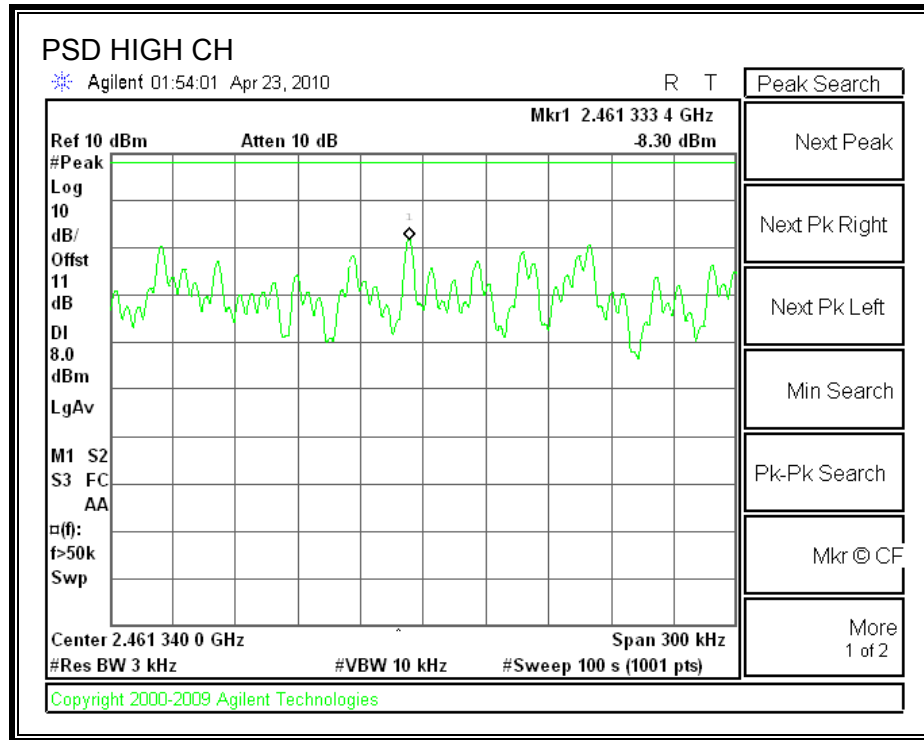
Output power was measured based on the use of a peak measurement, therefore the power spectral density was measured using PSD Option 1 in accordance with FCC document "Measurement of Digital Transmission Systems Operating under Section 15.247", March 23, 2005.

#### RESULTS

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
Low	2412	-9.00	8	-17.00
Middle	2437	-8.45	8	-16.45
High	2462	-8.30	8	-16.30

# POWER SPECTRAL DENSITY





#### **7.1.4. CONDUCTED SPURIOUS EMISSIONS**

##### **LIMITS**

FCC §15.247 (d)

IC RSS-210 A8.5

Output power was measured based on the use of a peak measurement, therefore the required attenuation is 20 dB.

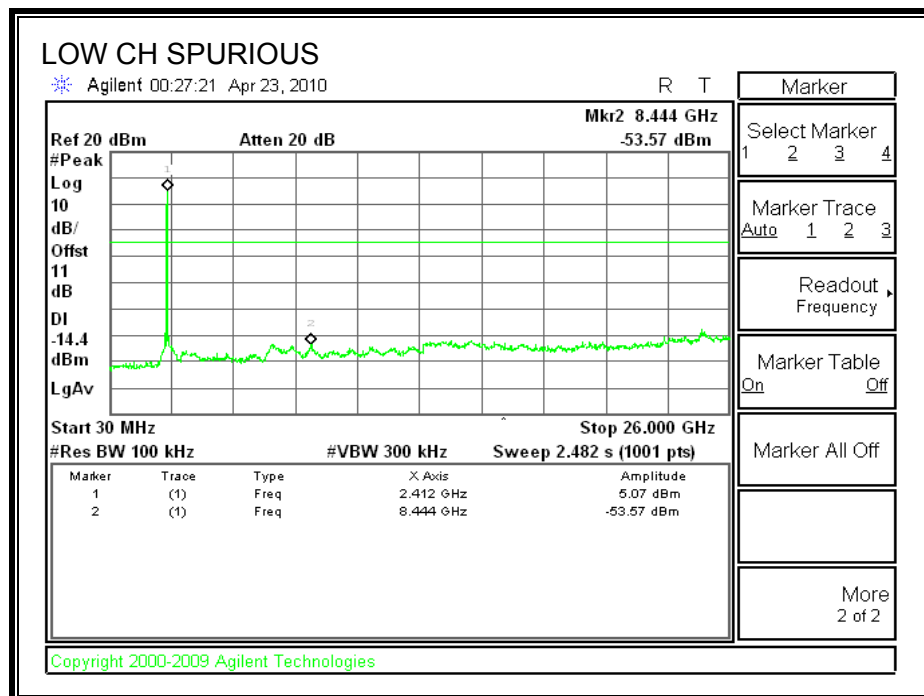
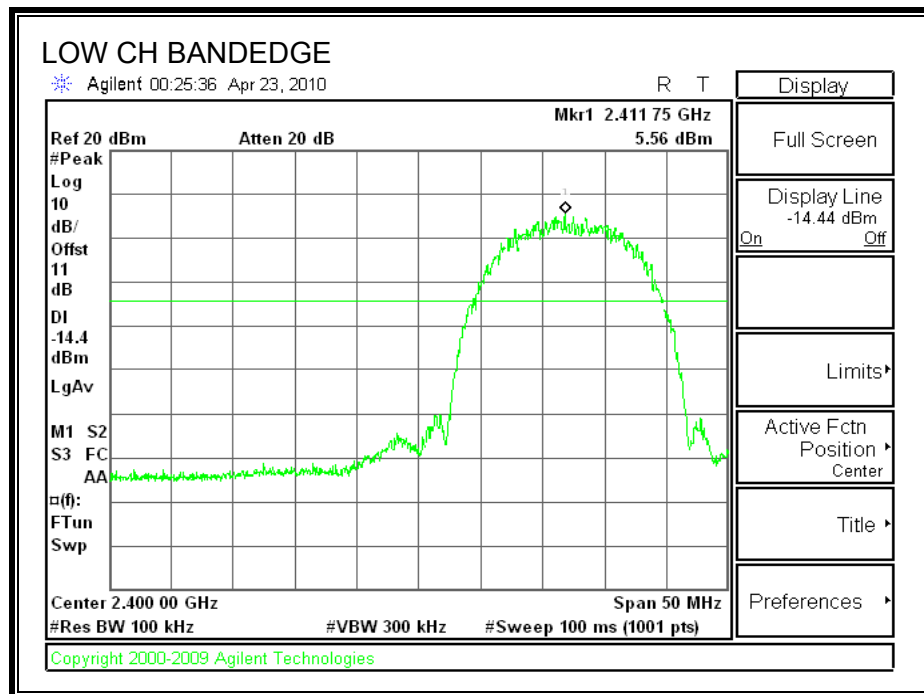
##### **TEST PROCEDURE**

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

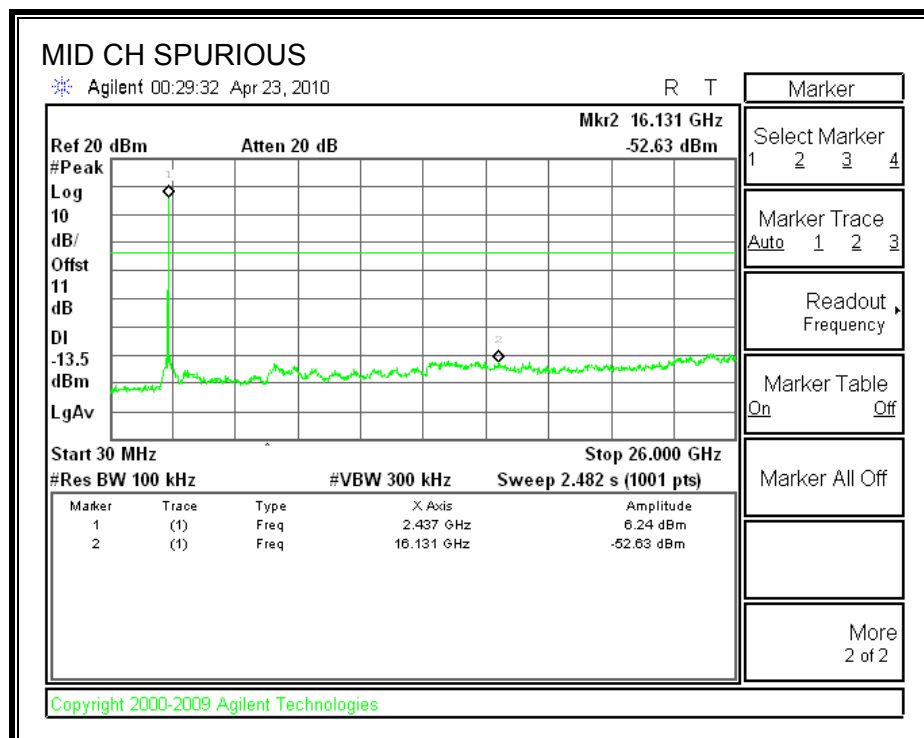
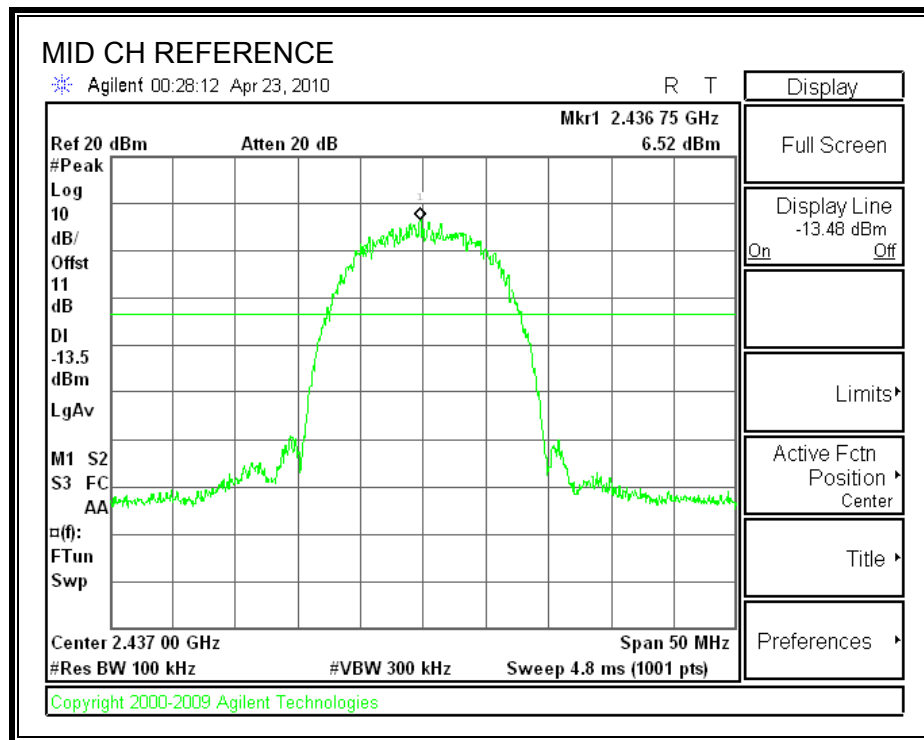
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

## RESULTS

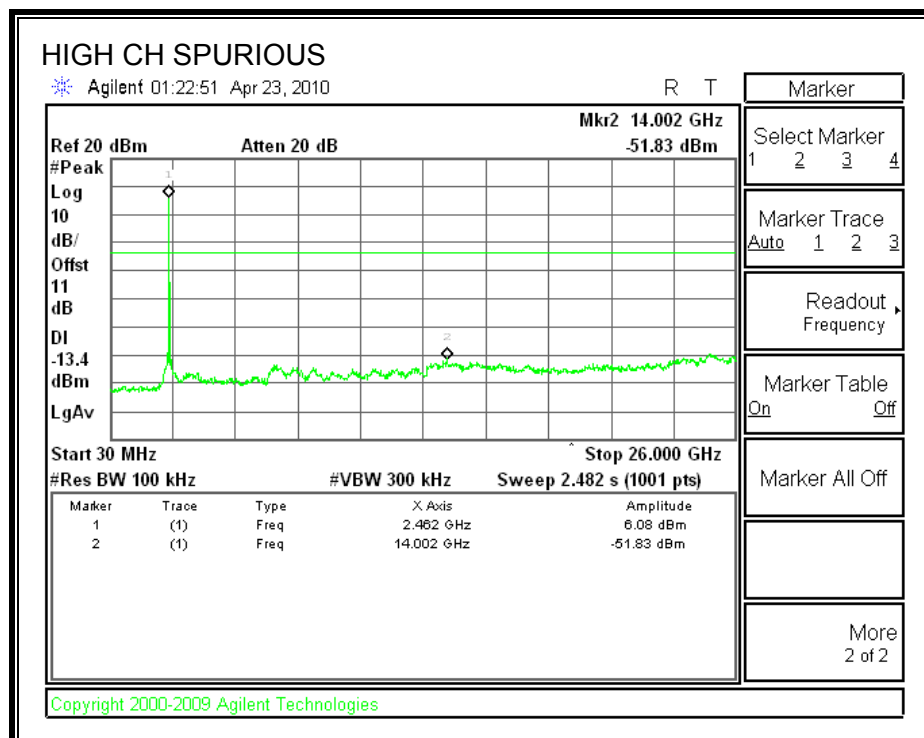
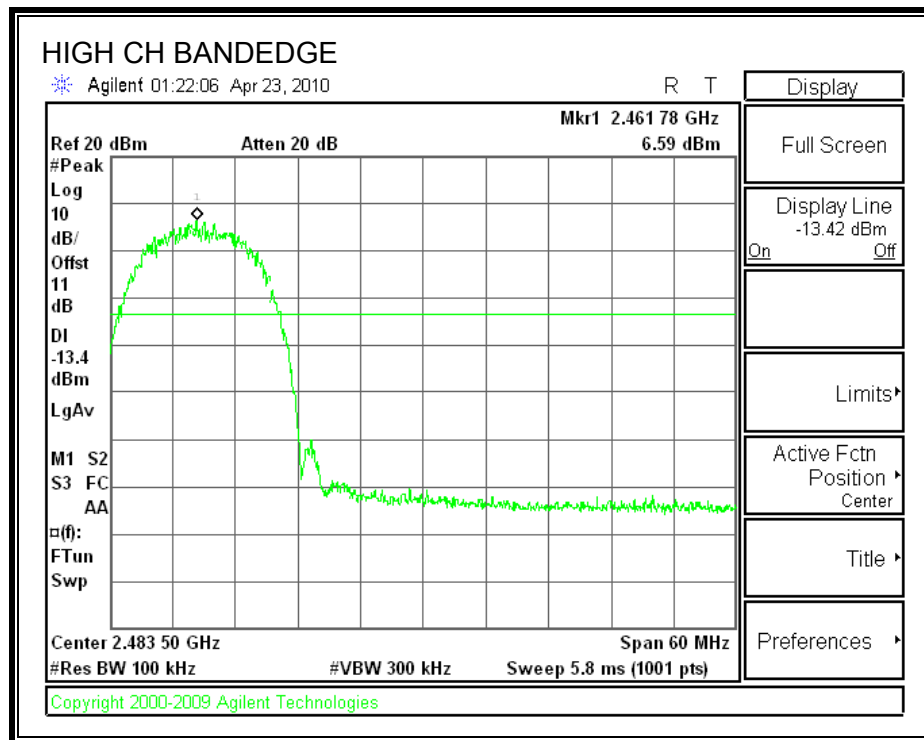
### SPURIOUS EMISSIONS, LOW CHANNEL



# **SPURIOUS EMISSIONS, MID CHANNEL**



# **SPURIOUS EMISSIONS, HIGH CHANNEL**



## 7.2. 802.11g MODE IN THE 2.4 GHz BAND

### 7.2.1. 6 dB BANDWIDTH

#### LIMITS

FCC §15.247 (a) (2)

IC RSS-210 A8.2 (a)

The minimum 6 dB bandwidth shall be at least 500 kHz.

#### TEST PROCEDURE

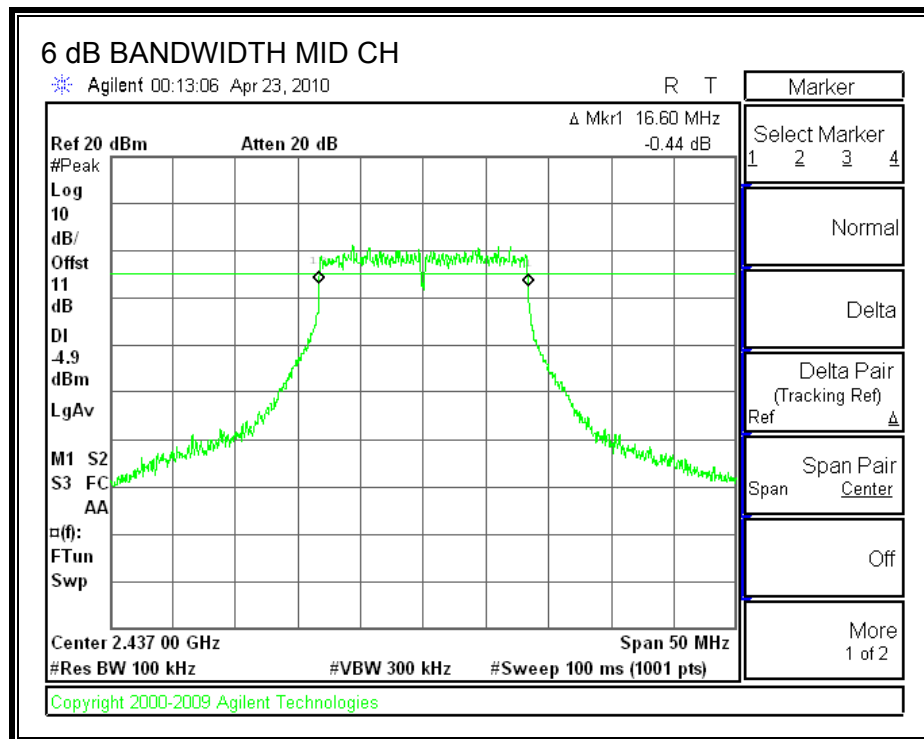
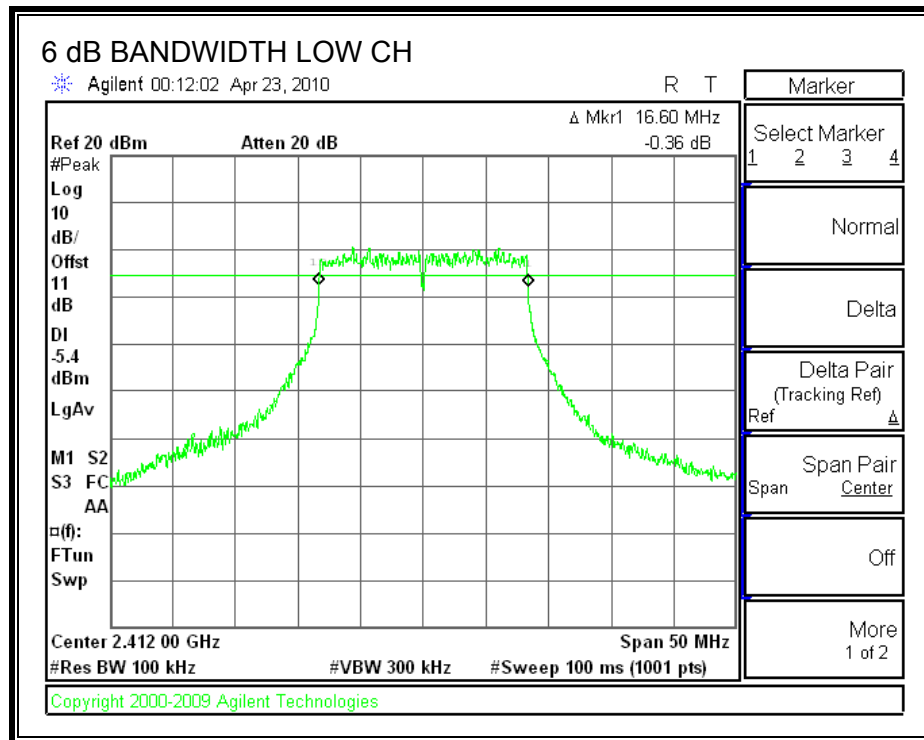
The transmitter output is connected to a spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 300 kHz. The sweep time is coupled.

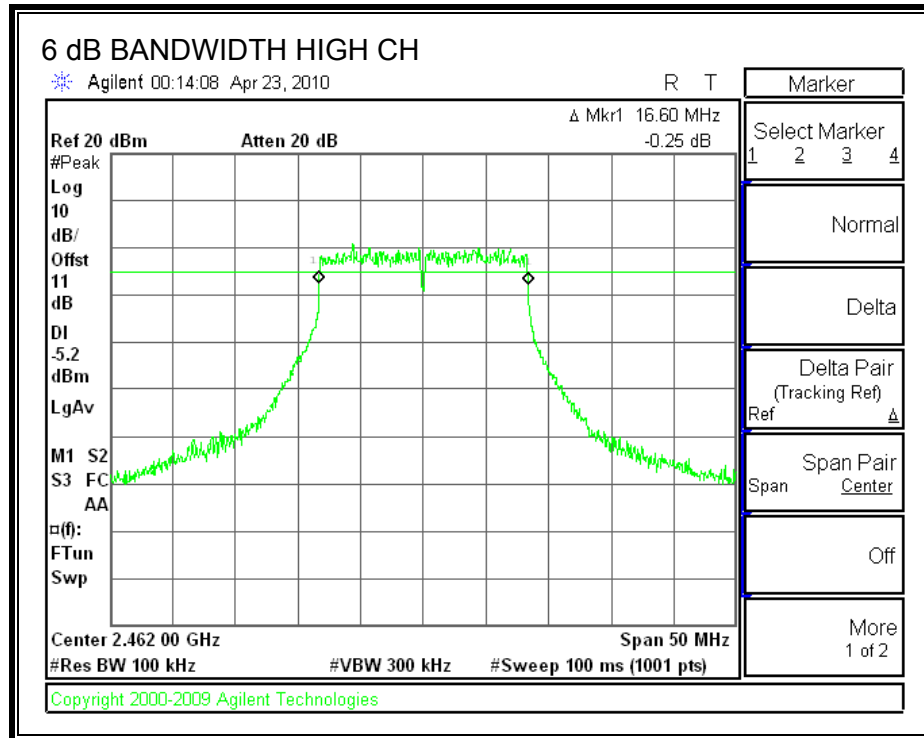
#### RESULTS

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2412	16.6	0.5
Middle	2437	16.6	0.5
High	2462	16.6	0.5



## 6dB BANDWIDTH





## 7.2.2. 99% BANDWIDTH

### LIMITS

None; for reporting purposes only.

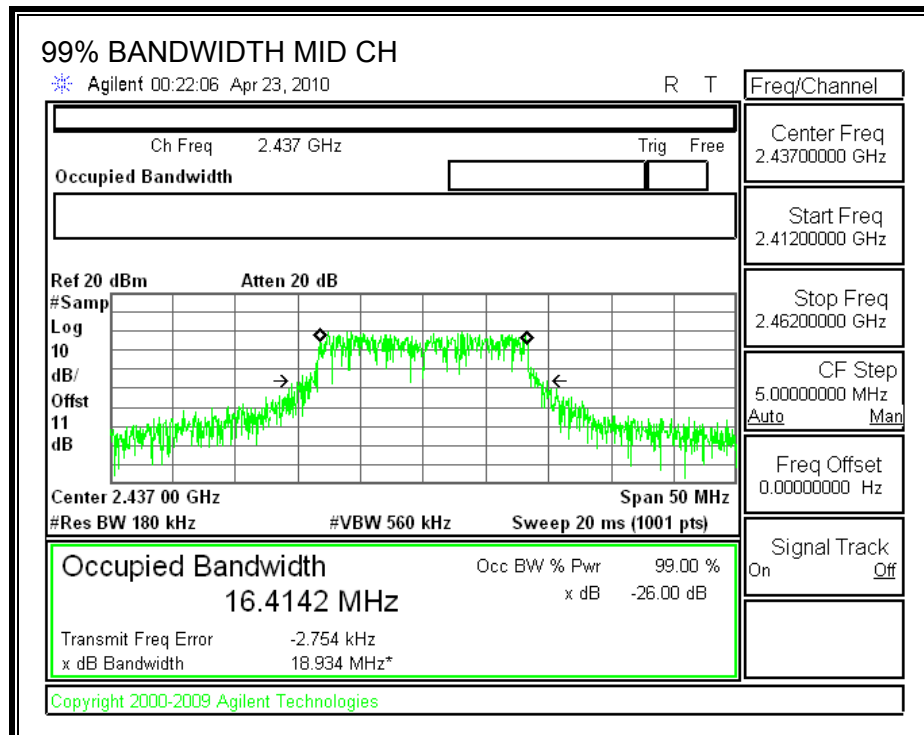
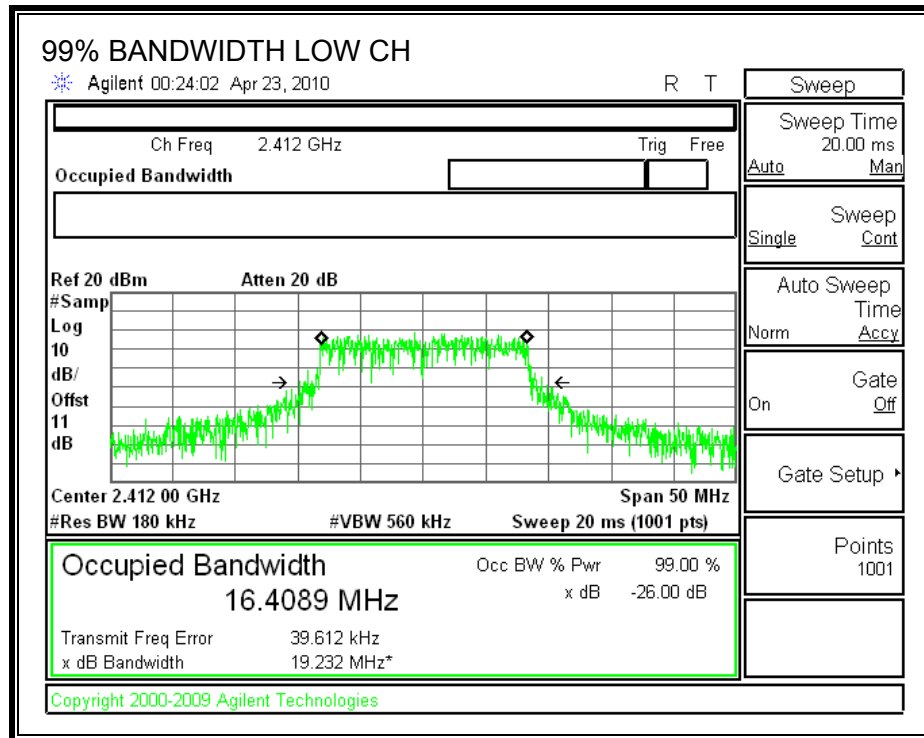
### TEST PROCEDURE

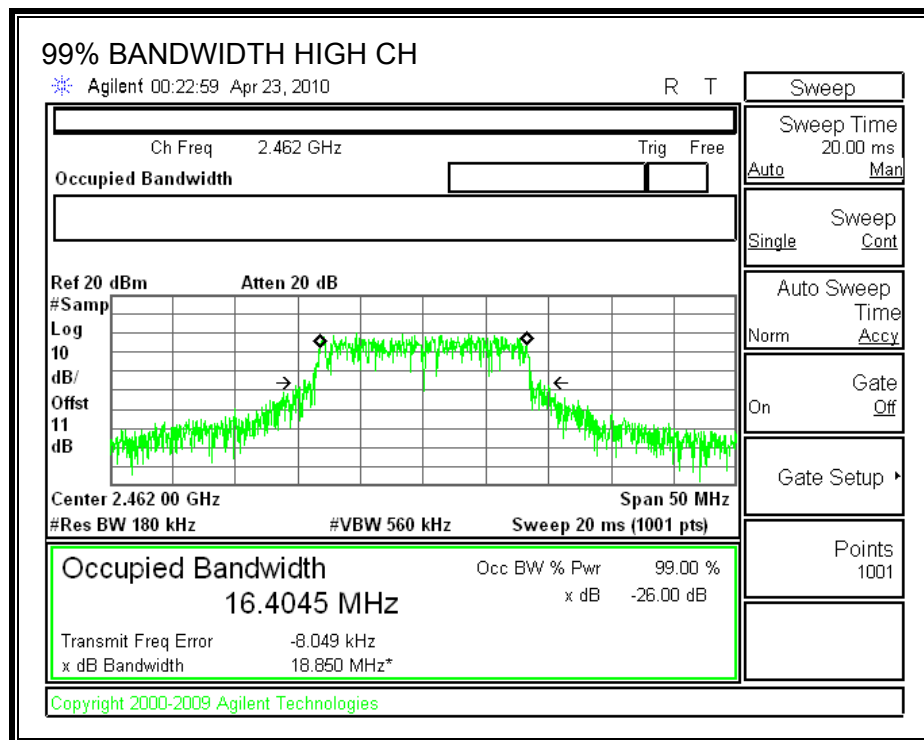
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

### RESULTS

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2412	16.4089
Middle	2437	16.4142
High	2462	16.4045

# **99% BANDWIDTH**





### 7.2.3. POWER SPECTRAL DENSITY

#### LIMITS

FCC §15.247 (e)

IC RSS-210 A8.2 (b)

The power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

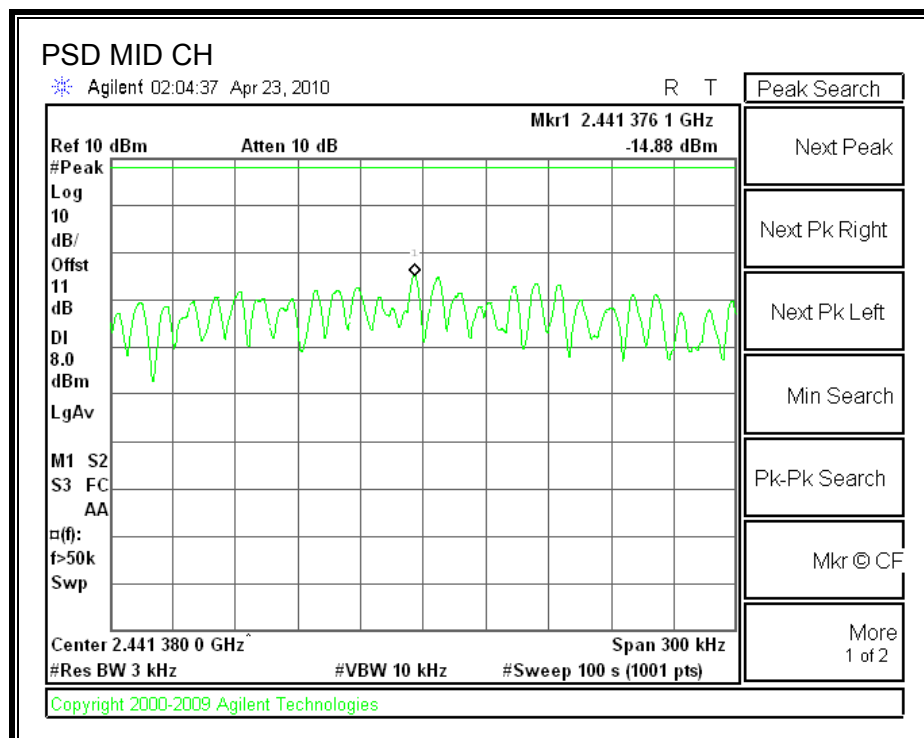
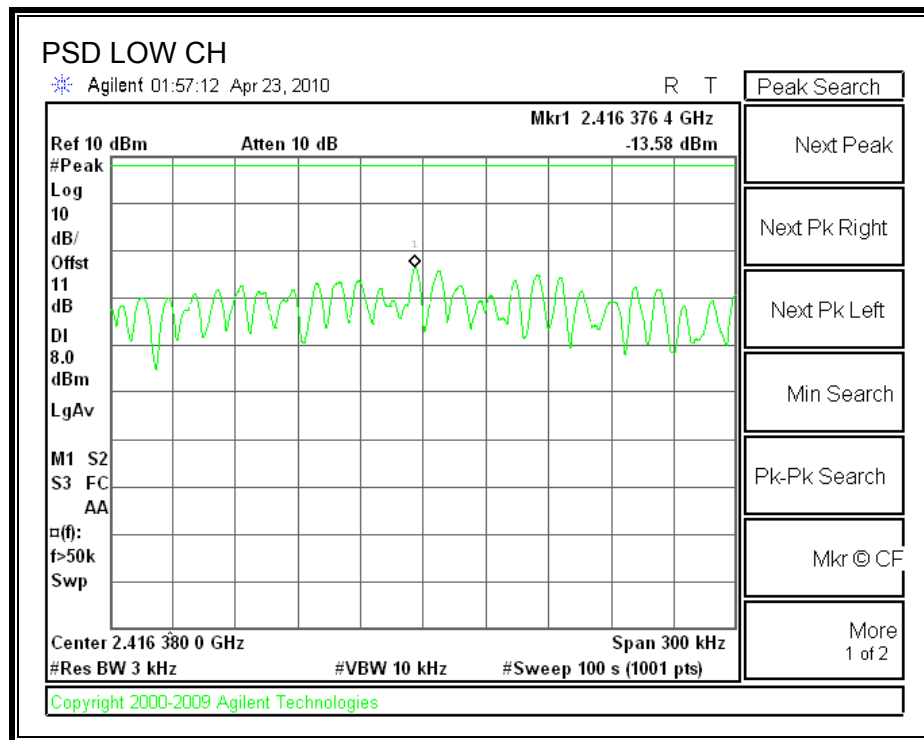
#### TEST PROCEDURE

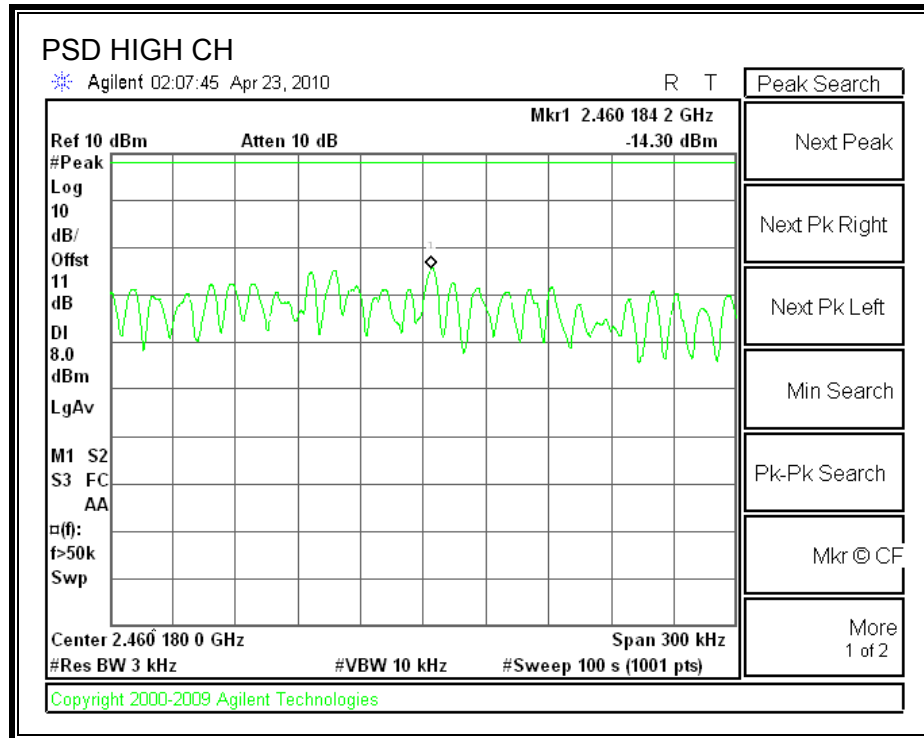
Output power was measured based on the use of a peak measurement, therefore the power spectral density was measured using PSD Option 1 in accordance with FCC document "Measurement of Digital Transmission Systems Operating under Section 15.247", March 23, 2005.

#### RESULTS

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
Low	2412	-13.58	8	-21.58
Middle	2437	-14.88	8	-22.88
High	2462	-14.30	8	-22.30

**POWER SPECTRAL DENSITY**







## **7.2.4. CONDUCTED SPURIOUS EMISSIONS**

### **LIMITS**

FCC §15.247 (d)

IC RSS-210 A8.5

Output power was measured based on the use of a peak measurement, therefore the required attenuation is 20 dB.

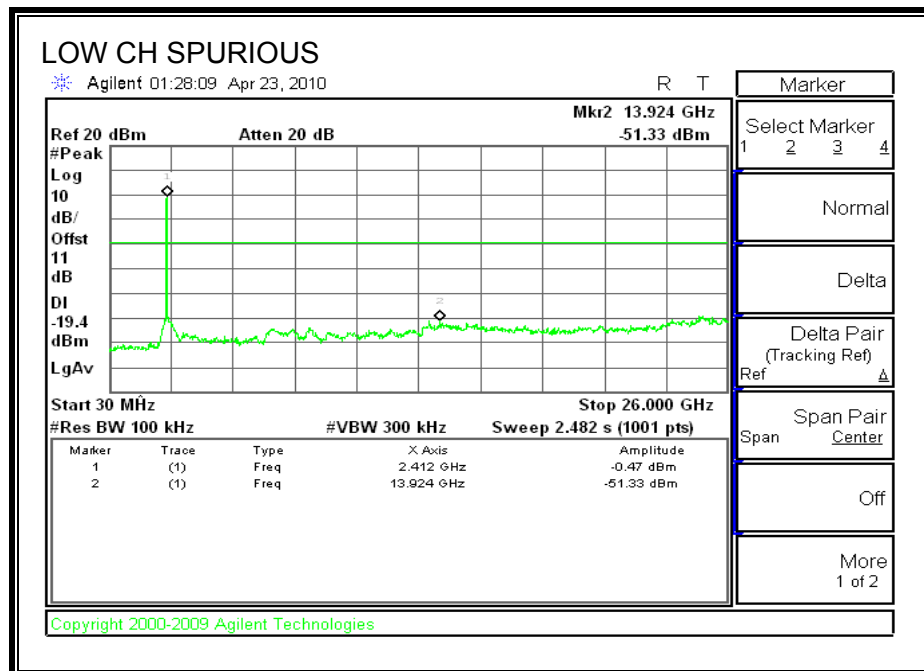
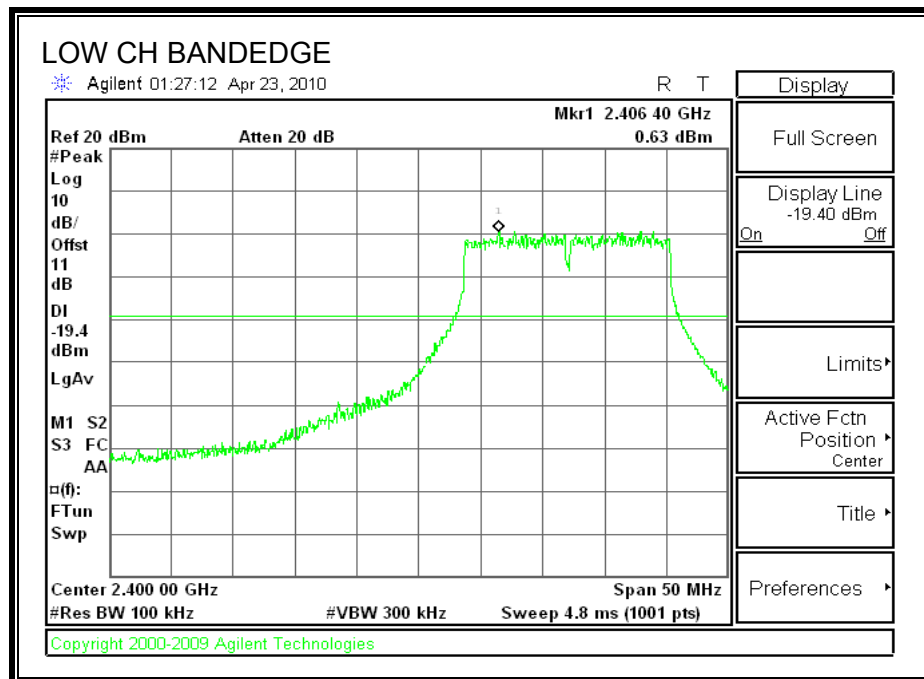
### **TEST PROCEDURE**

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

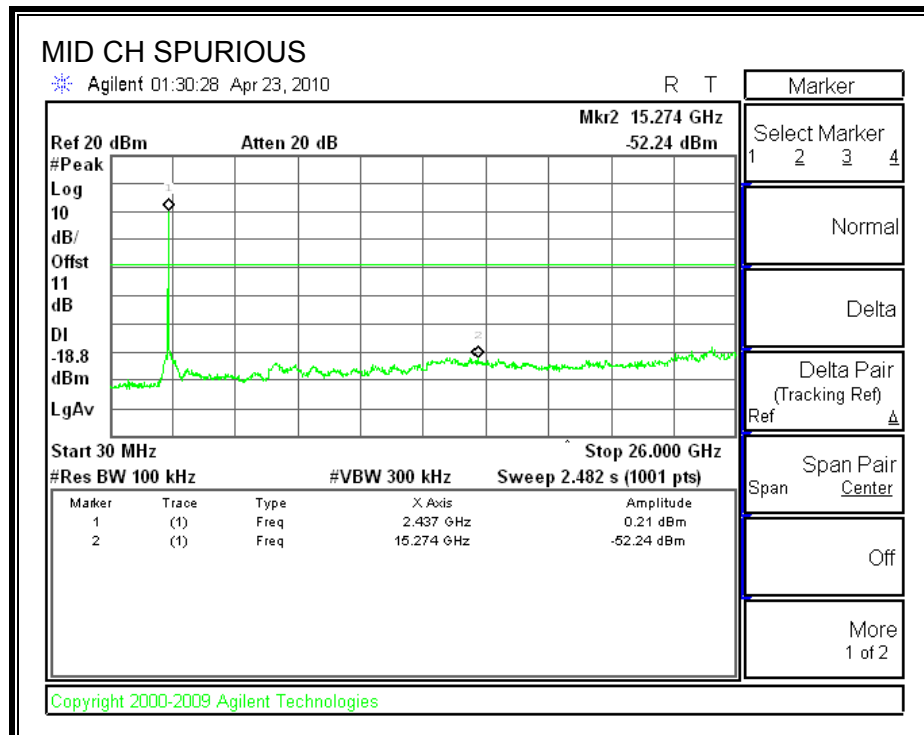
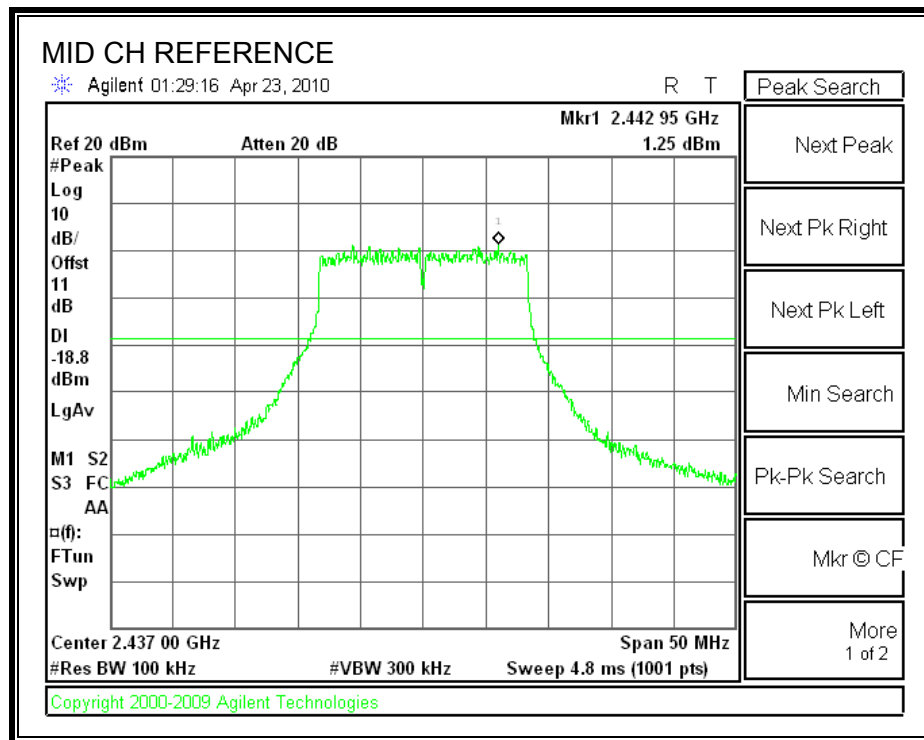
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

## RESULTS

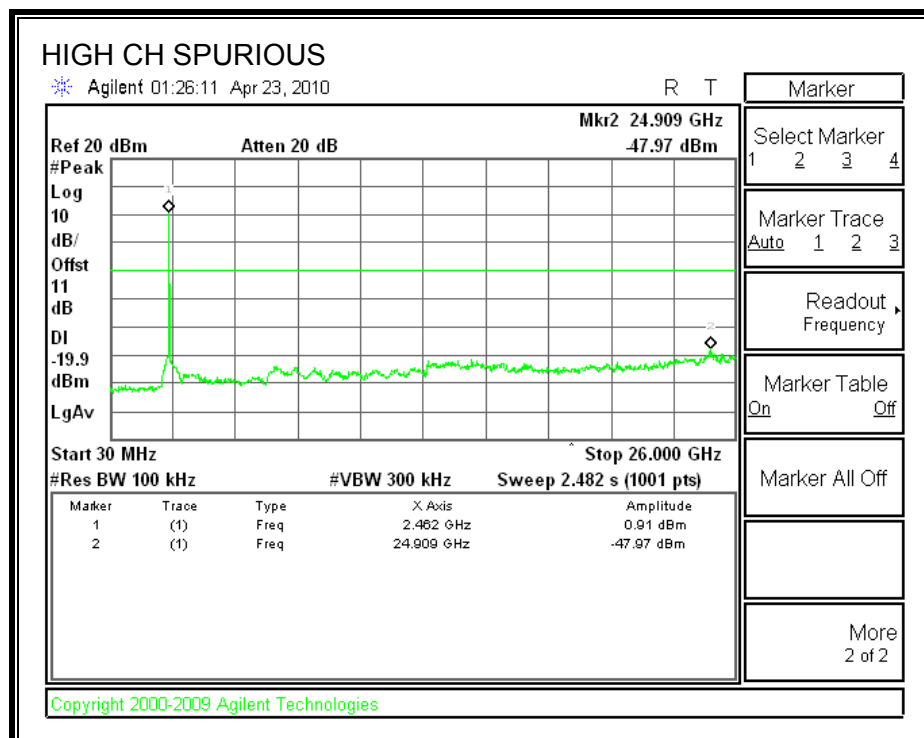
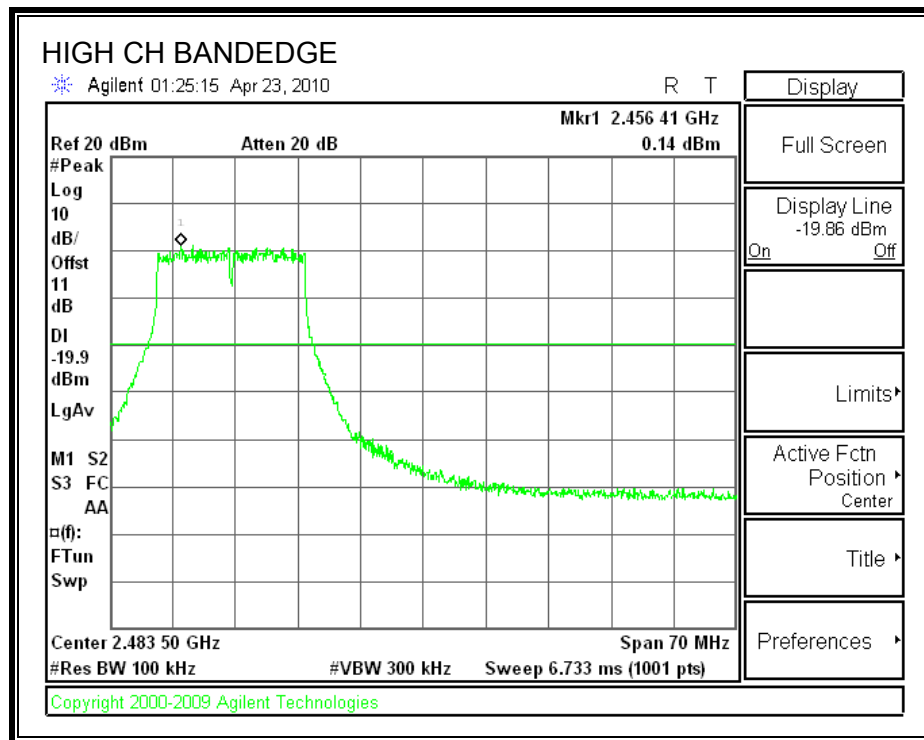
### SPURIOUS EMISSIONS, LOW CHANNEL



# **SPURIOUS EMISSIONS, MID CHANNEL**



# **SPURIOUS EMISSIONS, HIGH CHANNEL**



## 8. RADIATED TEST RESULTS

### 8.1. LIMITS AND PROCEDURE

#### LIMITS

FCC §15.205 and §15.209

IC RSS-210 Clause 2.6 (Transmitter)

IC RSS-GEN Clause 6 (Receiver)

Frequency Range (MHz)	Field Strength Limit (uV/m) at 3 m	Field Strength Limit (dBuV/m) at 3 m
30 - 88	100	40
88 - 216	150	43.5
216 - 960	200	46
Above 960	500	54

#### TEST PROCEDURE

The EUT is placed on a non-conducting table 80 cm above the ground plane. The antenna to EUT distance is 3 meters. The EUT is configured in accordance with ANSI C63.4. The EUT is set to transmit in a continuous mode.

For measurements below 1 GHz the resolution bandwidth is set to 100 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 1 MHz for peak measurements and 10 Hz for average measurements.

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

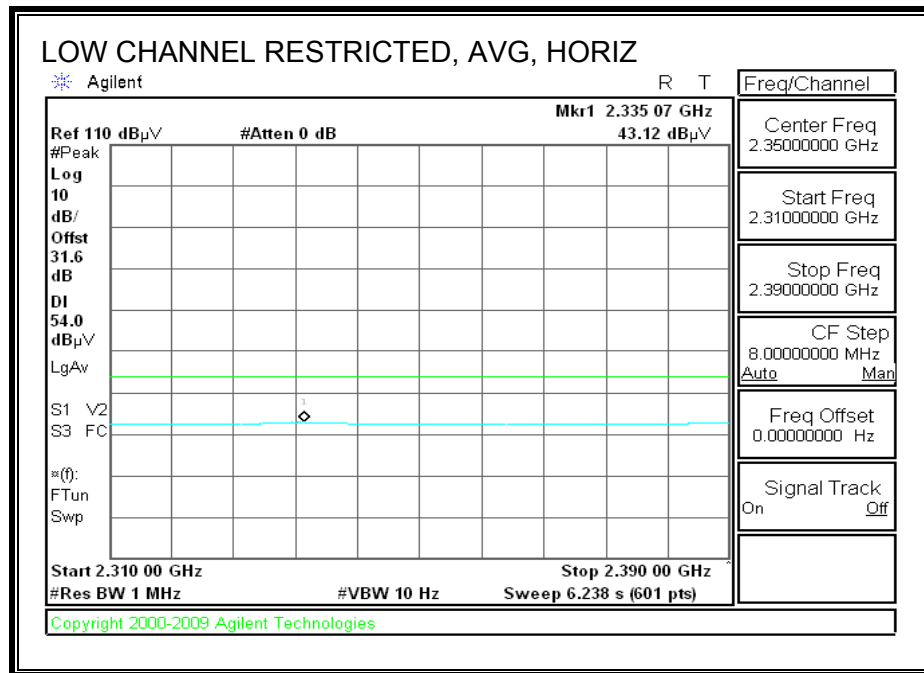
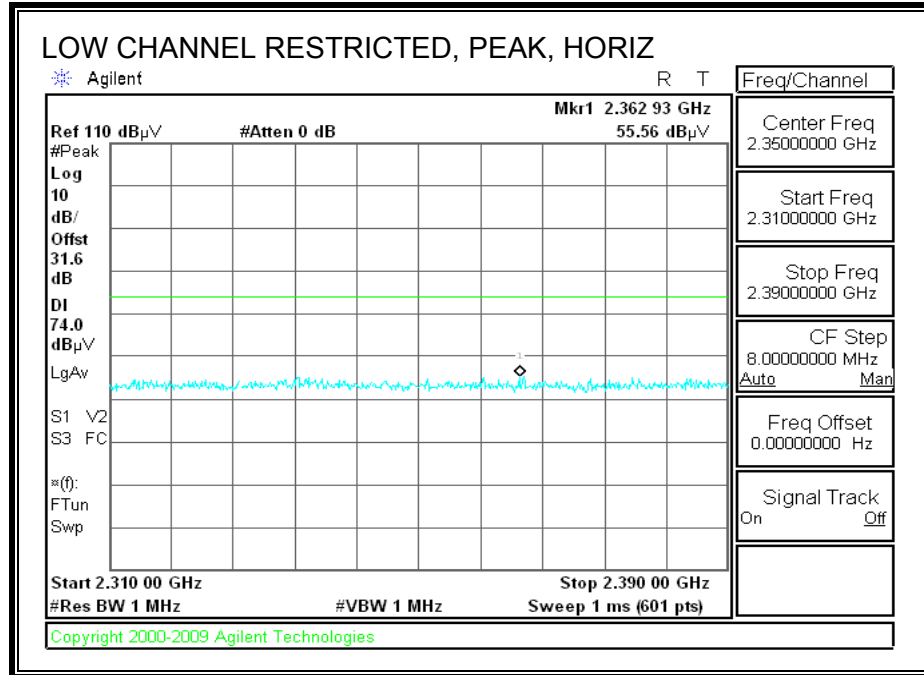
The spectrum from 30 MHz to 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each applicable band.

The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized in both the vertical and the horizontal positions.

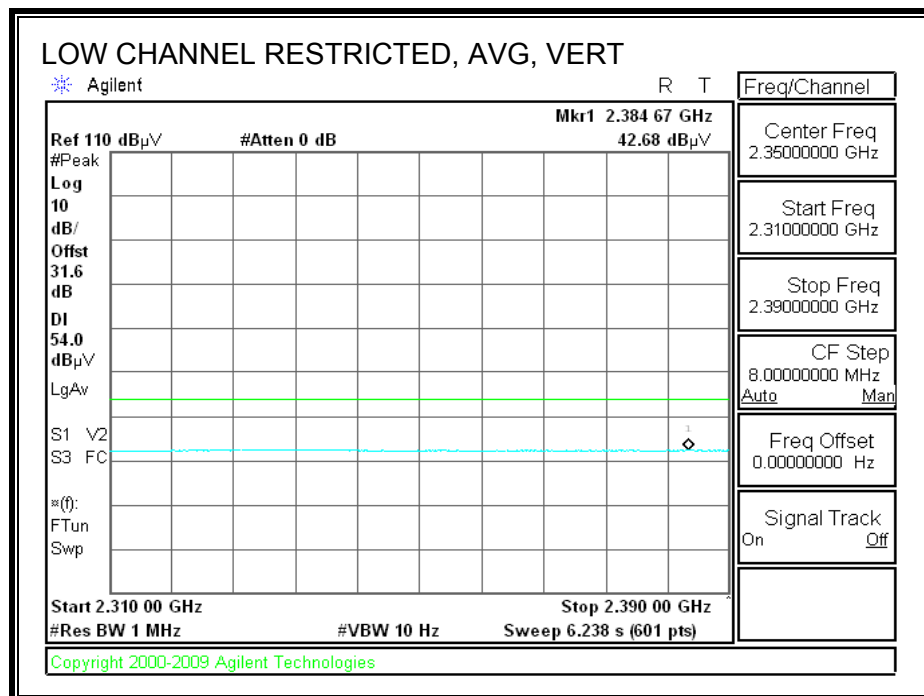
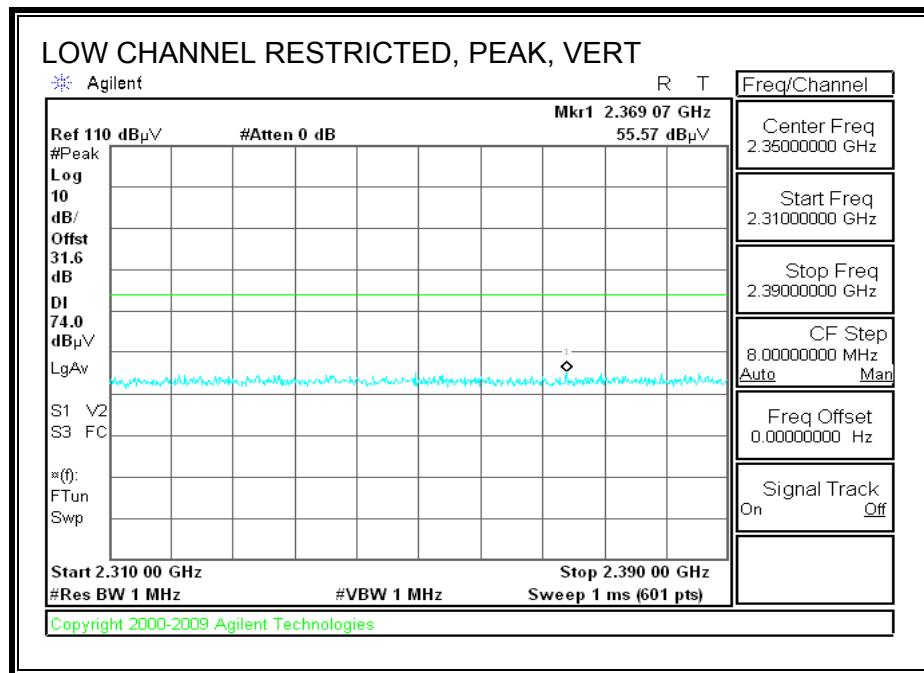
## 8.2. TRANSMITTER ABOVE 1 GHz

### 8.2.1. TRANSMITTER ABOVE 1 GHz FOR 802.11b MODE IN THE 2.4 GHz BAND

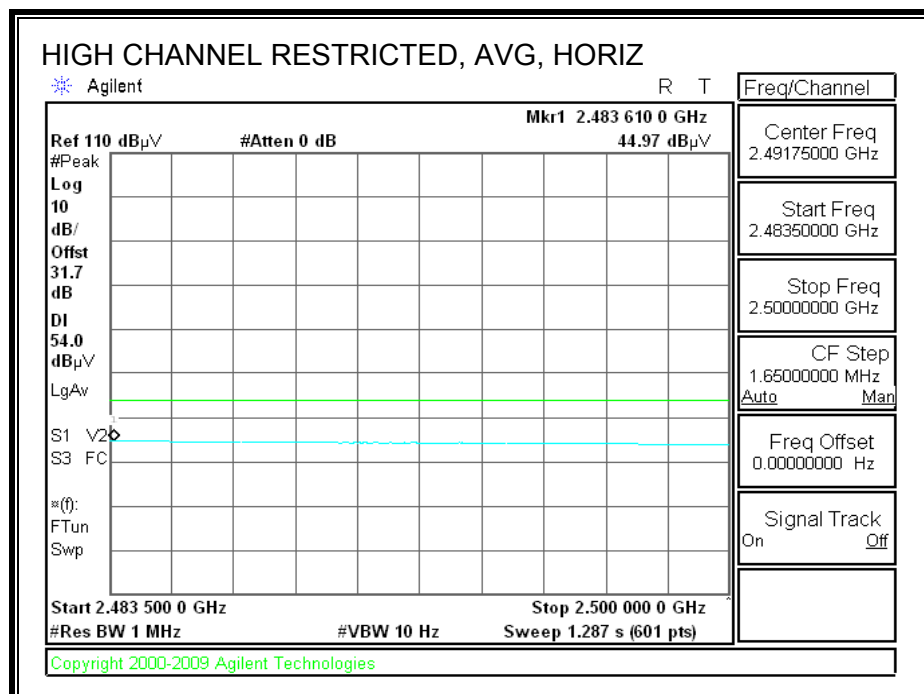
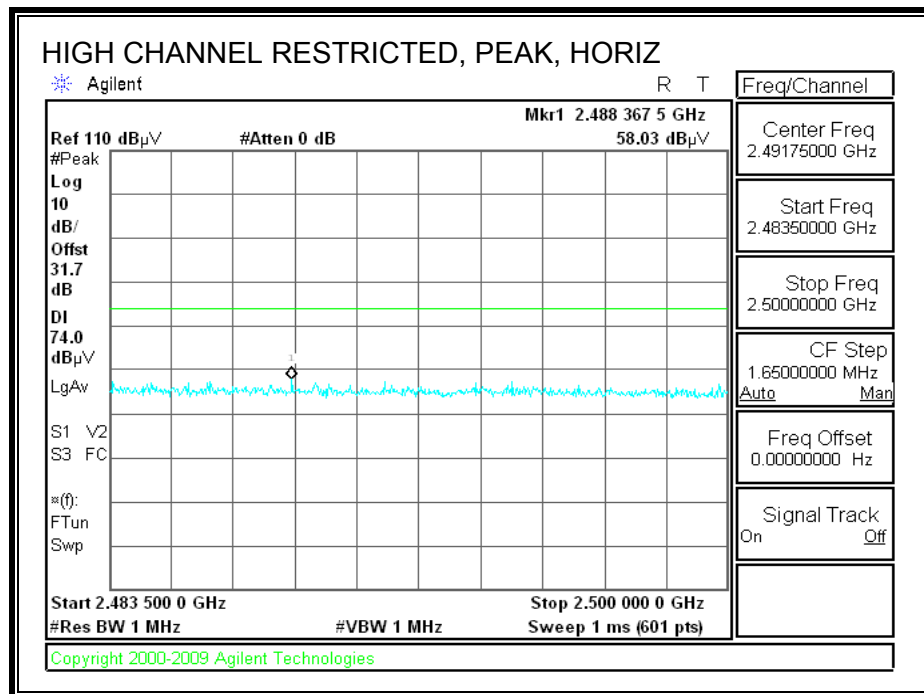
#### RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



**RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)**

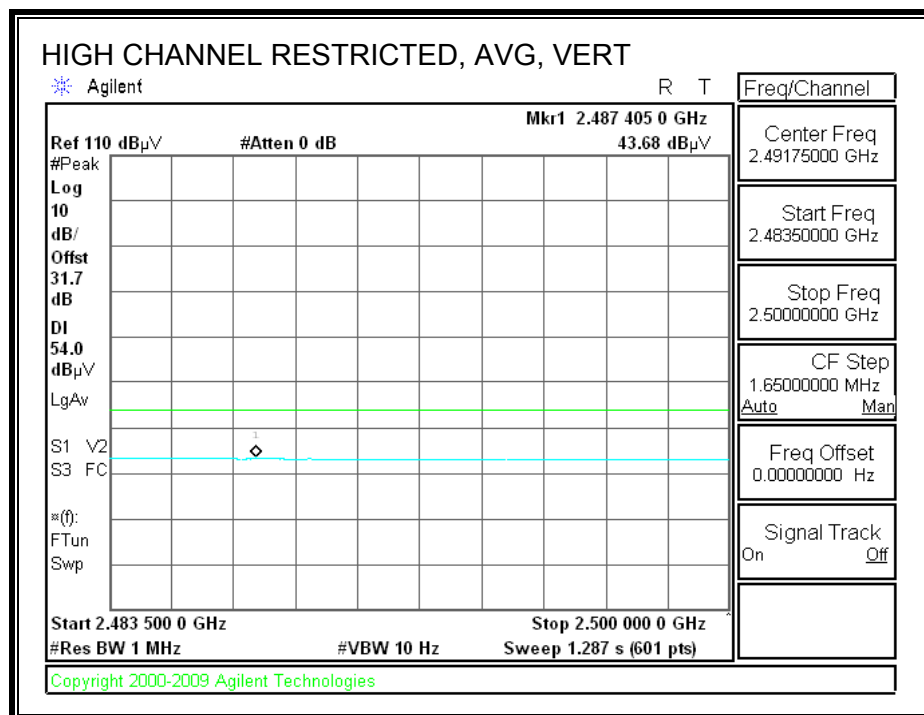
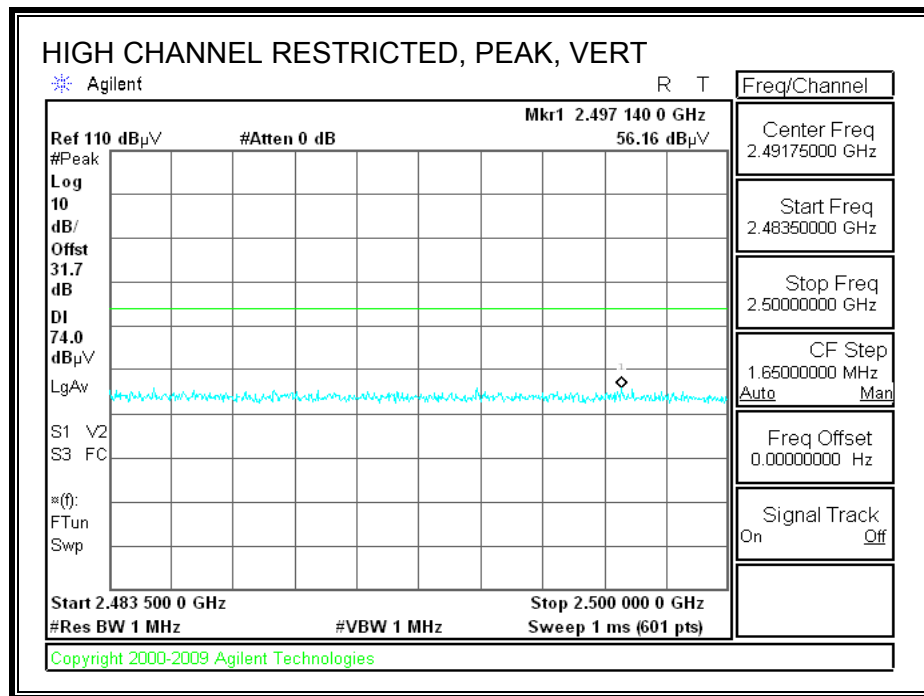


**RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)**





**RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)**



# HARMONICS AND SPURIOUS EMISSIONS

## High Frequency Measurement

Compliance Certification Services, Fremont 5m Chamber

Test Engr: Chin Pang  
Date: 04/14/10  
Project #: 10U13106  
Company: Barnes and Noble  
EUT Description: Ebook Reader with WLAN and USB ports  
Configuration: EUT only  
EUT M/N: TBD  
Test Target: FCC 15.247  
Mode Oper: TX, b Mode

f	Measurement Frequency	Amp	Preamp Gain	Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field Strength	Margin vs. Peak Limit
CL	Cable Loss	HPF	High Pass Filter	

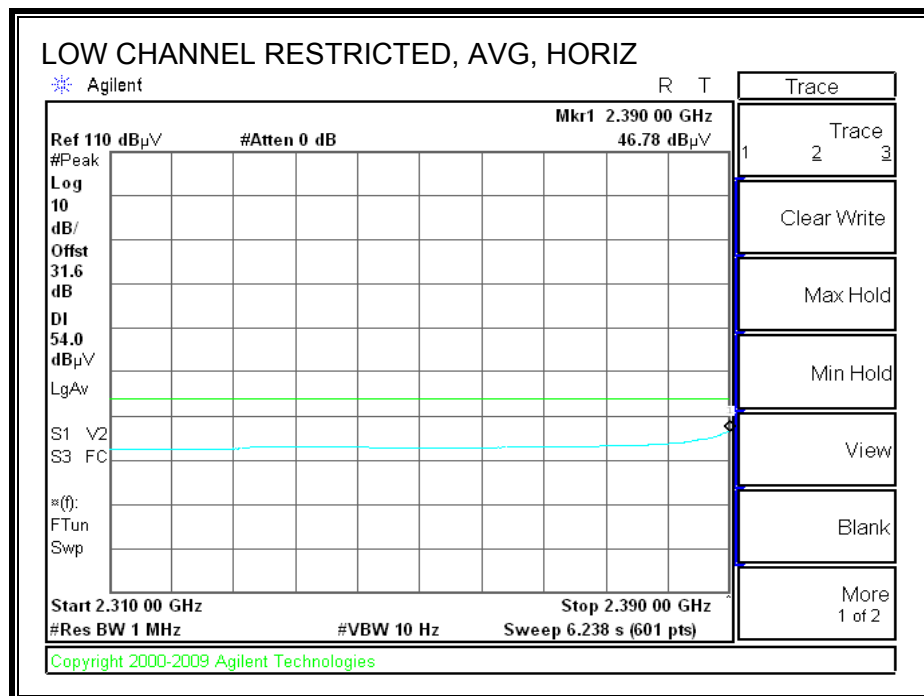
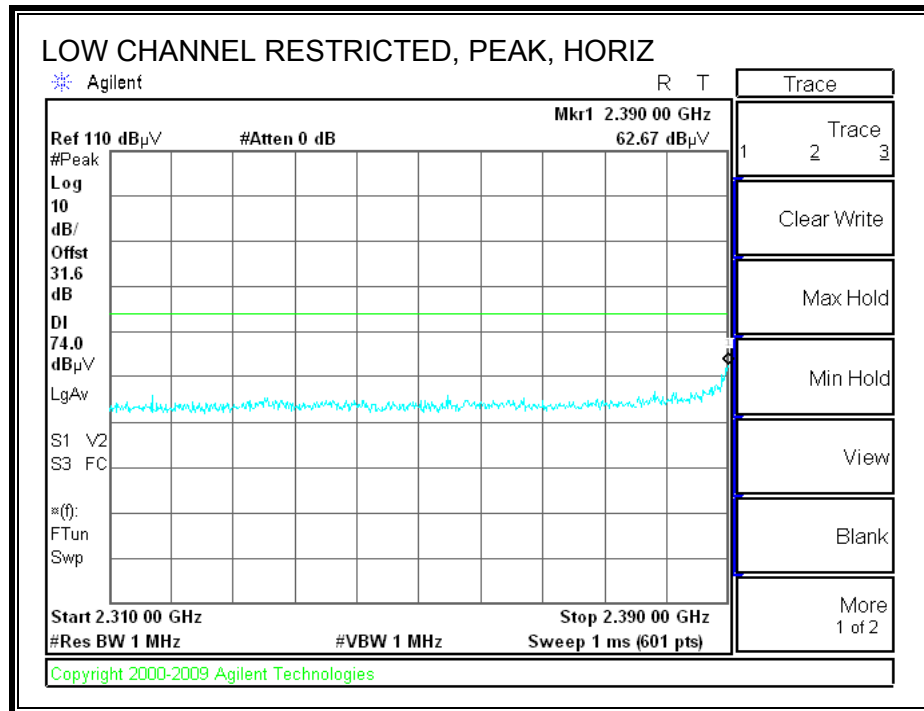
f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fitr dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Notes
<b>Low Ch, 2412MHz</b>													
4.824	3.0	36.8	32.7	5.8	-34.8	0.0	0.0	40.5	74.0	-33.5	V	P	
4.824	3.0	24.2	32.7	5.8	-34.8	0.0	0.0	27.8	54.0	-26.2	V	A	
4.824	3.0	36.2	32.7	5.8	-34.8	0.0	0.0	39.9	74.0	-34.1	H	P	
4.824	3.0	24.2	32.7	5.8	-34.8	0.0	0.0	27.9	54.0	-26.1	H	A	
<b>Mid Ch, 2437MHz</b>													
4.874	3.0	35.6	32.7	5.8	-34.8	0.0	0.0	39.3	74.0	-34.7	V	P	
4.874	3.0	23.7	32.7	5.8	-34.8	0.0	0.0	27.4	54.0	-26.6	V	A	
7.311	3.0	35.4	35.5	7.3	-34.1	0.0	0.0	44.1	74.0	-29.9	V	P	
7.311	3.0	22.9	35.5	7.3	-34.1	0.0	0.0	31.5	54.0	-22.5	V	A	
4.874	3.0	36.1	32.7	5.8	-34.8	0.0	0.0	39.8	74.0	-34.2	H	P	
4.874	3.0	23.7	32.7	5.8	-34.8	0.0	0.0	27.5	54.0	-26.5	H	A	
7.311	3.0	36.0	35.5	7.3	-34.1	0.0	0.0	44.6	74.0	-29.4	H	P	
7.311	3.0	22.8	35.5	7.3	-34.1	0.0	0.0	31.5	54.0	-22.5	H	A	
<b>High Ch, 2462MHz</b>													
4.924	3.0	36.4	32.7	5.9	-34.8	0.0	0.0	40.2	74.0	-33.8	V	P	
4.924	3.0	24.0	32.7	5.9	-34.8	0.0	0.0	27.8	54.0	-26.2	V	A	
7.386	3.0	35.6	35.6	7.3	-34.1	0.0	0.0	44.4	74.0	-29.6	V	P	
7.386	3.0	23.1	35.6	7.3	-34.1	0.0	0.0	31.9	54.0	-22.1	V	A	
4.924	3.0	36.5	32.7	5.9	-34.8	0.0	0.0	40.3	74.0	-33.7	H	P	
4.924	3.0	24.0	32.7	5.9	-34.8	0.0	0.0	27.8	54.0	-26.2	H	A	
7.386	3.0	35.3	35.6	7.3	-34.1	0.0	0.0	44.1	74.0	-29.9	H	P	
7.386	3.0	23.2	35.6	7.3	-34.1	0.0	0.0	31.9	54.0	-22.1	H	A	

Rev. 4.1.2.7

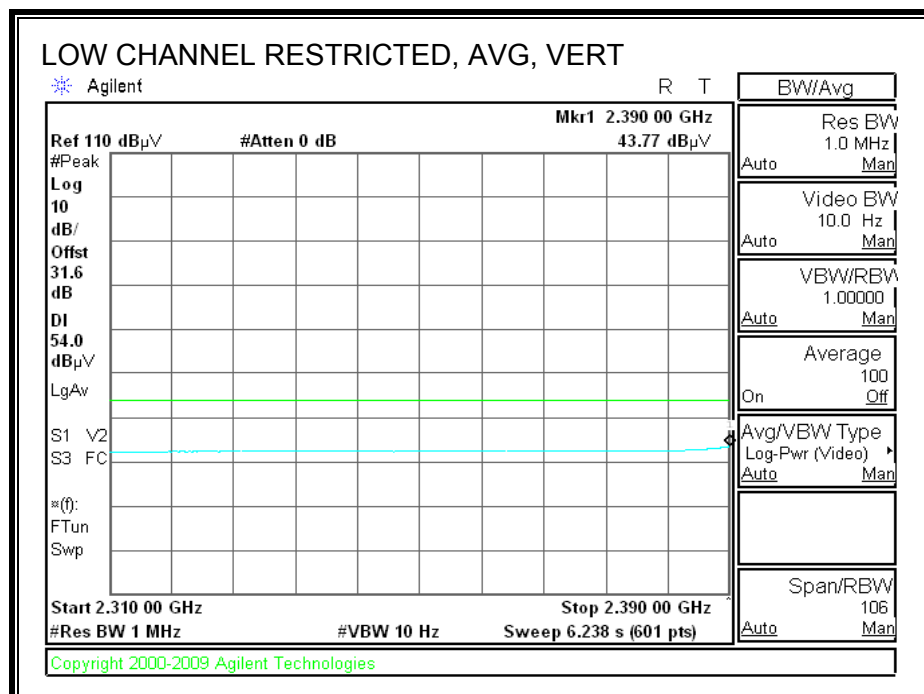
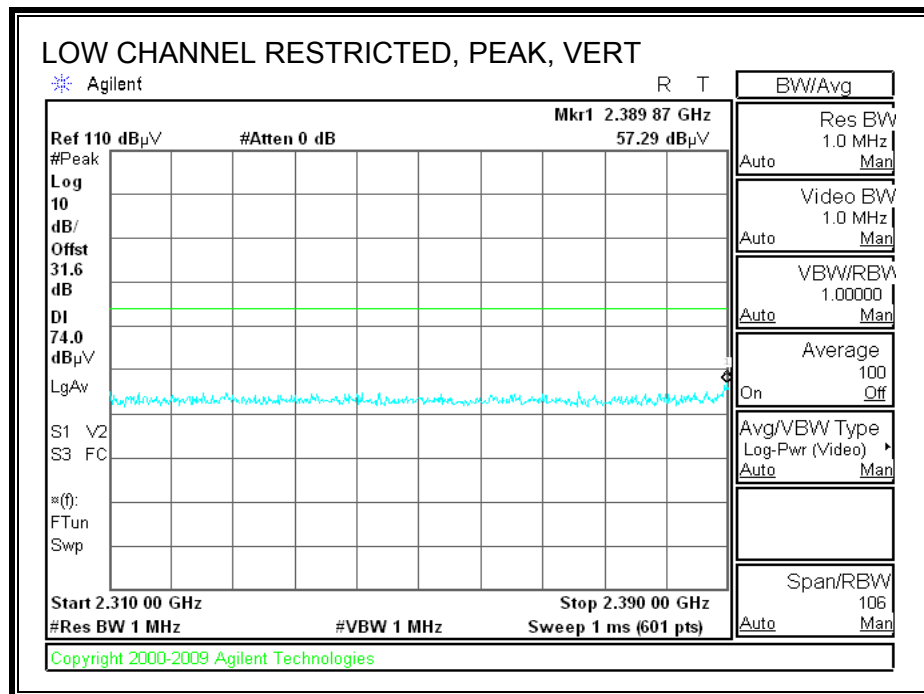
Note: No other emissions were detected above the system noise floor.

## 8.2.2. TRANSMITTER ABOVE 1 GHz FOR 802.11g MODE IN THE 2.4 GHz BAND

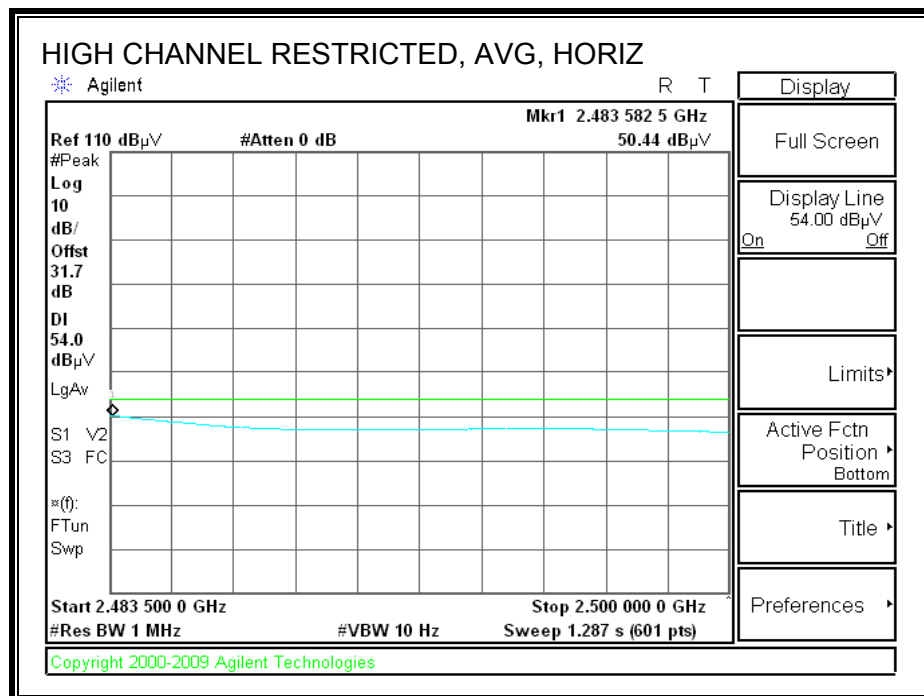
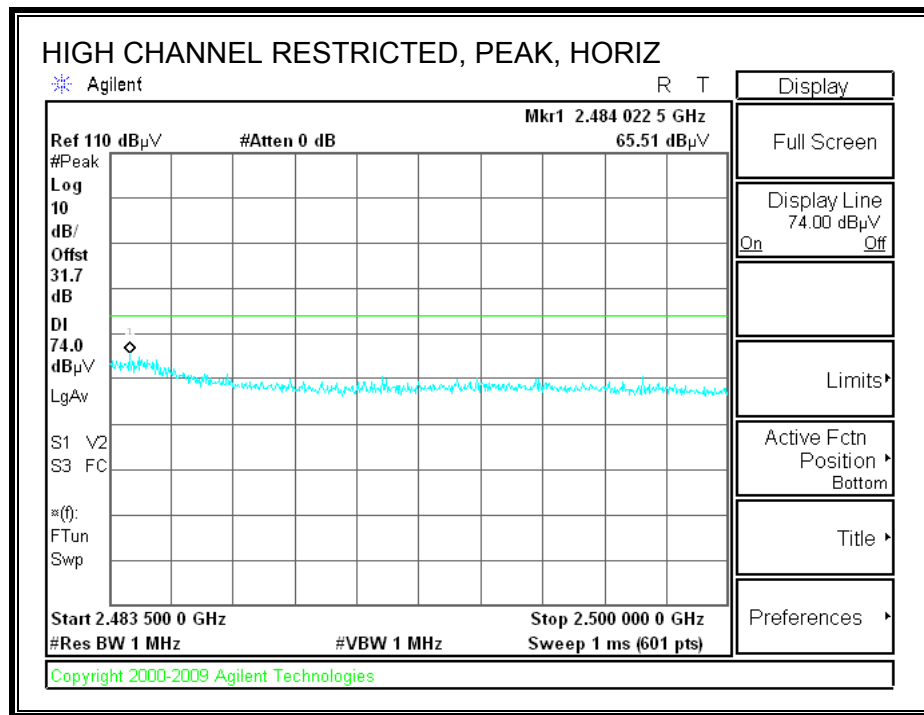
### RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



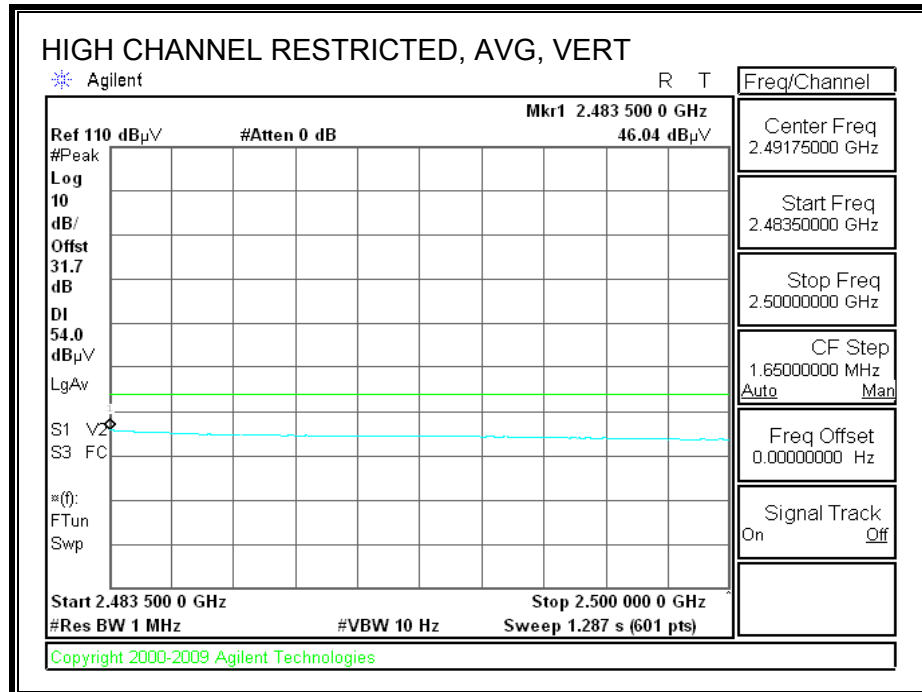
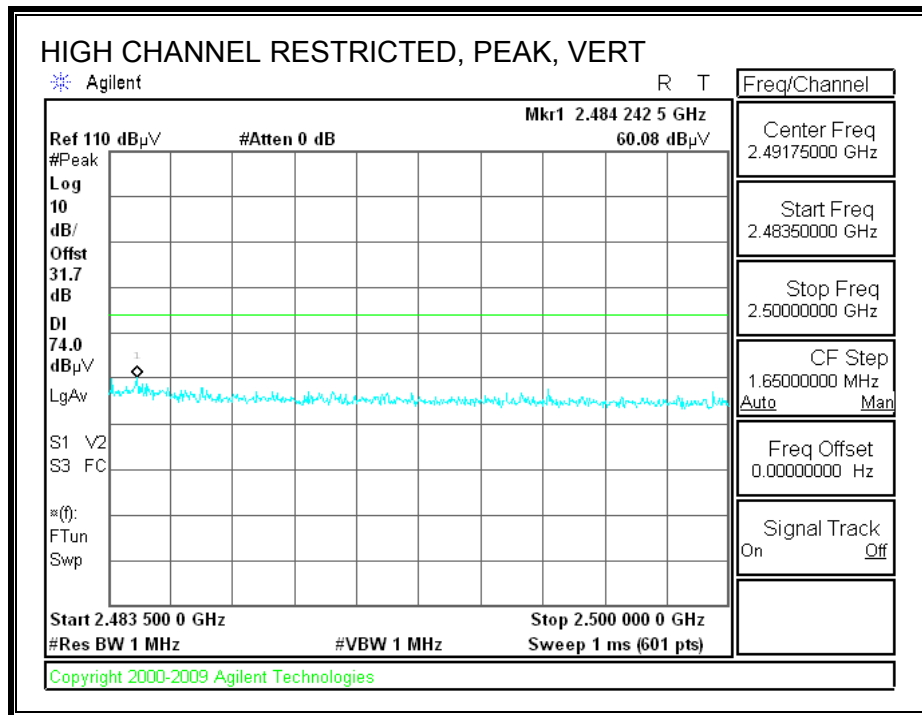
**RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)**



**RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)**



**RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)**



## HARMONICS AND SPURIOUS EMISSIONS

### High Frequency Measurement

Compliance Certification Services, Fremont 5m Chamber

Test Engr: Chin Pang  
Date: 04/14/10  
Project #: 10U13106  
Company: Barnes and Noble  
EUT Description: eBook Reader with WLAN and USB ports  
Configuration: EUT only  
EUT M/N: TBD  
Test Target: FCC 15.247  
Mode Oper: TX, g mode

f Measurement Frequency Amp Preamp Gain Average Field Strength Limit  
Dist Distance to Antenna D Corr Distance Correct to 3 meters Peak Field Strength Limit  
Read Analyzer Reading Avg Average Field Strength @ 3 m Margin vs. Average Limit  
AF Antenna Factor Peak Calculated Peak Field Strength Margin vs. Peak Limit  
CL Cable Loss HPF High Pass Filter

f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Notes
<b>Low Ch, 2412MHz</b>													
4.824	3.0	36.5	32.7	5.8	-34.8	0.0	0.0	40.1	74.0	-33.9	V	P	
4.824	3.0	24.1	32.7	5.8	-34.8	0.0	0.0	27.7	54.0	-26.3	V	A	
4.824	3.0	37.4	32.7	5.8	-34.8	0.0	0.0	41.0	74.0	-33.0	H	P	
4.824	3.0	24.1	32.7	5.8	-34.8	0.0	0.0	27.7	54.0	-26.3	H	A	
<b>Mid Ch, 2437MHz</b>													
4.874	3.0	36.0	32.7	5.8	-34.8	0.0	0.0	39.7	74.0	-34.3	V	P	
4.874	3.0	23.6	32.7	5.8	-34.8	0.0	0.0	27.3	54.0	-26.7	V	A	
7.311	3.0	35.5	35.5	7.3	-34.1	0.0	0.0	44.2	74.0	-29.8	V	P	
7.311	3.0	22.8	35.5	7.3	-34.1	0.0	0.0	31.5	54.0	-22.5	V	A	
4.874	3.0	37.2	32.7	5.8	-34.8	0.0	0.0	40.9	74.0	-33.1	H	P	
4.874	3.0	23.6	32.7	5.8	-34.8	0.0	0.0	27.3	54.0	-26.7	H	A	
7.311	3.0	35.5	35.5	7.3	-34.1	0.0	0.0	44.1	74.0	-29.9	H	P	
7.311	3.0	22.8	35.5	7.3	-34.1	0.0	0.0	31.4	54.0	-22.6	H	A	
<b>High Ch, 2462MHz</b>													
4.924	3.0	37.2	32.7	5.9	-34.8	0.0	0.0	41.0	74.0	-33.0	V	P	
4.924	3.0	23.9	32.7	5.9	-34.8	0.0	0.0	27.7	54.0	-26.3	V	A	
7.386	3.0	35.0	35.6	7.3	-34.1	0.0	0.0	43.8	74.0	-30.2	V	P	
7.386	3.0	23.0	35.6	7.3	-34.1	0.0	0.0	31.8	54.0	-22.2	V	A	
4.924	3.0	36.5	32.7	5.9	-34.8	0.0	0.0	40.3	74.0	-33.7	H	P	
4.924	3.0	23.9	32.7	5.9	-34.8	0.0	0.0	27.7	54.0	-26.3	H	A	
7.386	3.0	35.0	35.6	7.3	-34.1	0.0	0.0	43.8	74.0	-30.2	H	P	
7.386	3.0	23.1	35.6	7.3	-34.1	0.0	0.0	31.9	54.0	-22.1	H	A	

Rev. 4.1.2.7

Note: No other emissions were detected above the system noise floor.

### **8.3. RECEIVER ABOVE 1 GHz**

Note: No emissions were found within above 1GHz of 20dB below the system noise floor.



## 8.4. WORST-CASE BELOW 1 GHz

### SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE)

#### DATA

##### 30-1000MHz Frequency Measurement

Compliance Certification Services, Fremont 5m Chamber

Test Engr: Chin Pang  
Date: 04/14/10  
Project #: 10U13106  
Company: Barnes and Noble  
EUT Description: eBook reader with WLAN and USB Ports without WWAN  
Configuration: EUT only  
EUT M/N: TBD  
Test Target: FCC 15.247  
Mode Oper: TX (Worst Case)

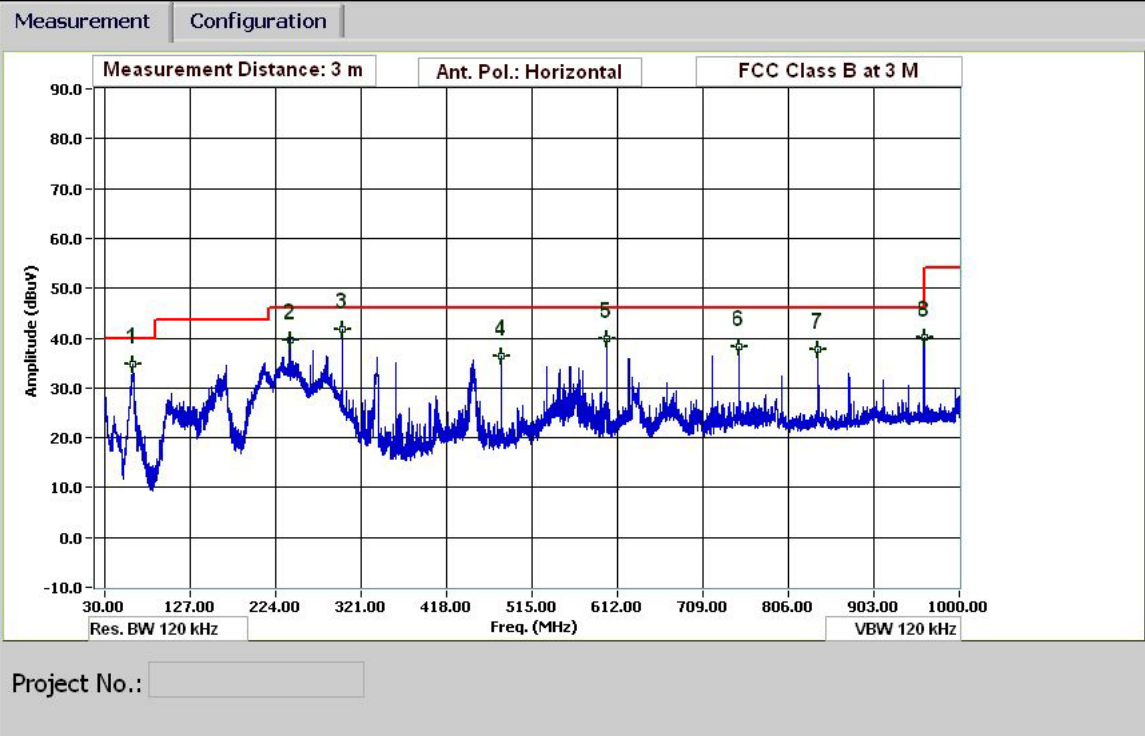
f	Measurement Frequency	Amp	Preamp Gain	Margin	Margin vs. Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters		
Read	Analyzer Reading	Filter	Filter Insert Loss		
AF	Antenna Factor	Corr.	Calculated Field Strength		
CL	Cable Loss	Limit	Field Strength Limit		

f MHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Filter dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol V/H	Det. P/A/QP	Notes
61.561	3.0	54.3	8.0	0.7	28.3	0.0	0.0	34.6	40.0	-5.4	H	P	
240.009	3.0	53.9	11.8	1.3	27.4	0.0	0.0	39.6	46.0	-6.4	H	P	
299.411	3.0	54.2	13.5	1.5	27.4	0.0	0.0	41.8	46.0	-4.2	H	P	
480.019	3.0	46.5	16.5	1.9	28.5	0.0	0.0	36.4	46.0	-9.6	H	P	
600.024	3.0	47.9	18.5	2.2	28.6	0.0	0.0	39.9	46.0	-6.1	H	P	
749.910	3.0	44.2	19.9	2.5	28.4	0.0	0.0	38.2	46.0	-7.8	H	P	
840.033	3.0	41.9	21.4	2.6	28.1	0.0	0.0	37.8	46.0	-8.2	H	P	
960.038	3.0	42.5	22.5	2.8	27.7	0.0	0.0	40.1	54.0	-13.9	H	P	
42.841	3.0	49.0	12.4	0.6	28.4	0.0	0.0	33.6	40.0	-6.4	V	P	
61.681	3.0	53.2	8.0	0.7	28.3	0.0	0.0	33.6	40.0	-6.4	V	P	
101.163	3.0	50.9	9.6	0.8	28.2	0.0	0.0	33.1	43.5	-10.4	V	P	
299.411	3.0	49.0	13.5	1.5	27.4	0.0	0.0	36.6	46.0	-9.4	V	P	
360.014	3.0	46.3	14.4	1.6	27.8	0.0	0.0	34.6	46.0	-11.4	V	P	
448.817	3.0	47.4	15.9	1.9	28.3	0.0	0.0	36.8	46.0	-9.2	V	P	
840.033	3.0	40.2	21.4	2.6	28.1	0.0	0.0	36.1	46.0	-9.9	V	P	

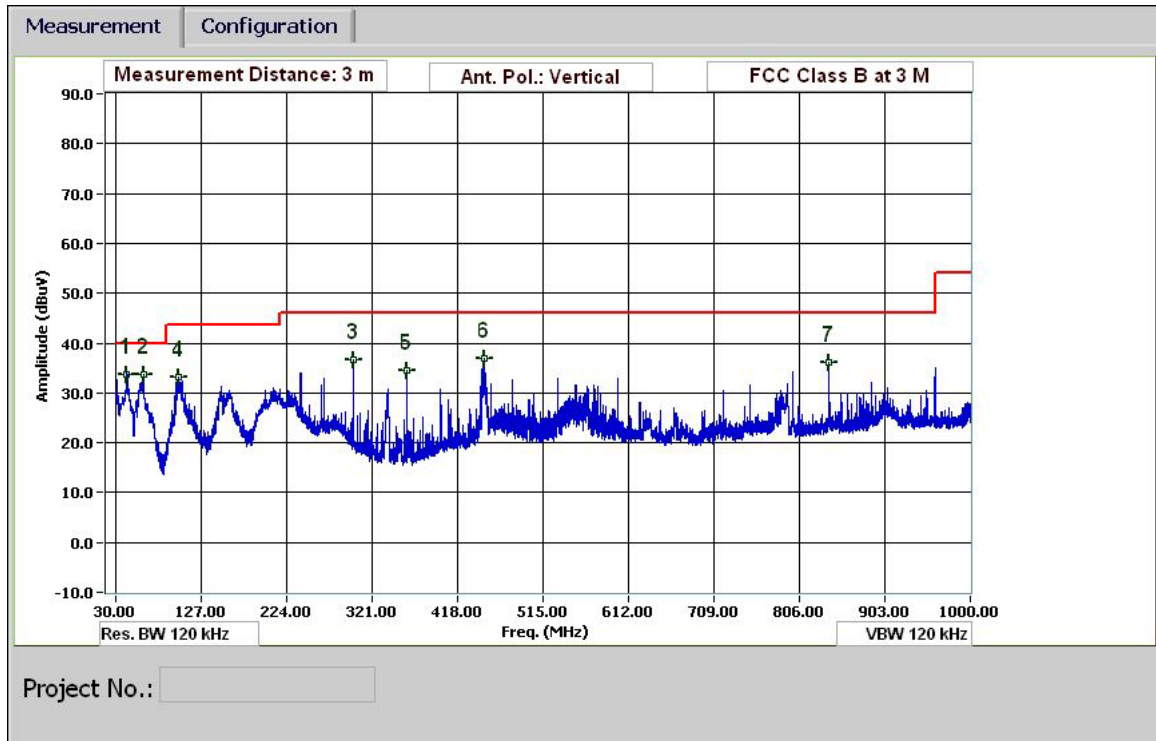
Rev. 1.27.09

Note: No other emissions were detected above the system noise floor.

## HORIZONTAL PLOT



## VERTICAL PLOT



## 9. AC POWER LINE CONDUCTED EMISSIONS

### LIMITS

FCC §15.207 (a)

RSS-Gen 7.2.2

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56 <sup>*</sup>	56 to 46 <sup>*</sup>
0.5-5	56	46
5-30	60	50

<sup>\*</sup> Decreases with the logarithm of the frequency.

### TEST PROCEDURE

ANSI C63.4

## RESULTS

### EUT AND AC ADAPTER WITH HEADSET

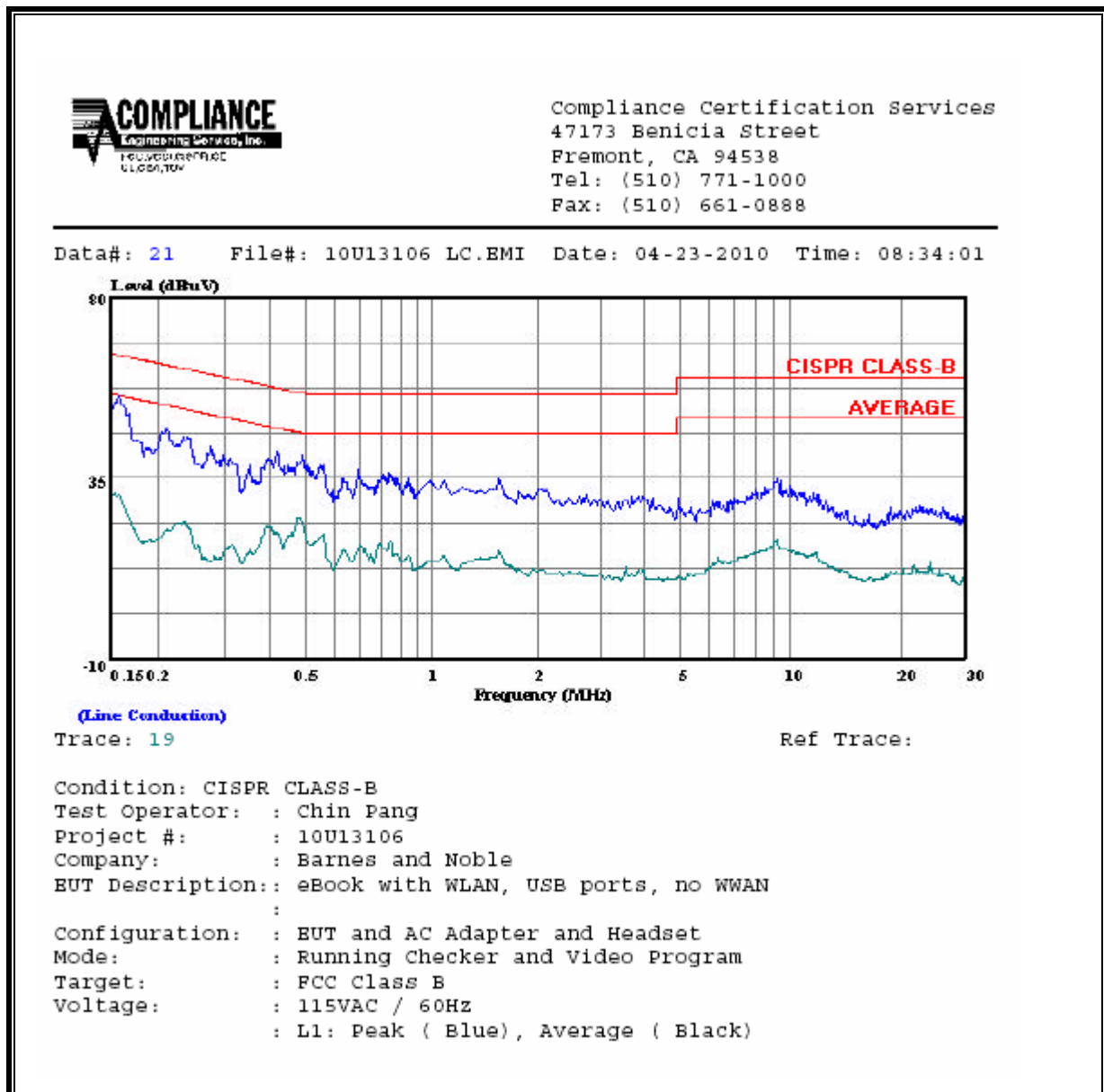
CONDUCTED EMISSIONS DATA (115VAC 60Hz)									
Freq.	Reading			Closs	Limit	EN_B	Margin		Remark
(MHz)	PK (dBuV)	QP (dBuV)	AV (dBuV)	(dB)	QP	AV	QP (dB)	AV (dB)	L1 / L2
0.16	55.38	--	29.90	0.00	65.52	55.52	-10.14	-25.62	L1
0.48	41.80	--	25.09	0.00	56.32	46.32	-14.52	-21.23	L1
9.30	34.78	--	19.47	0.00	60.00	50.00	-25.22	-30.53	L1
0.15	47.79	--	24.65	0.00	65.89	55.89	-18.10	-31.24	L2
0.48	41.92	--	21.66	0.00	56.36	46.36	-14.44	-24.70	L2
2.78	28.92	--	14.78	0.00	56.00	46.00	-27.08	-31.22	L2
6 Worst Data									

### EUT AND LAPTOP WITH HEADSET

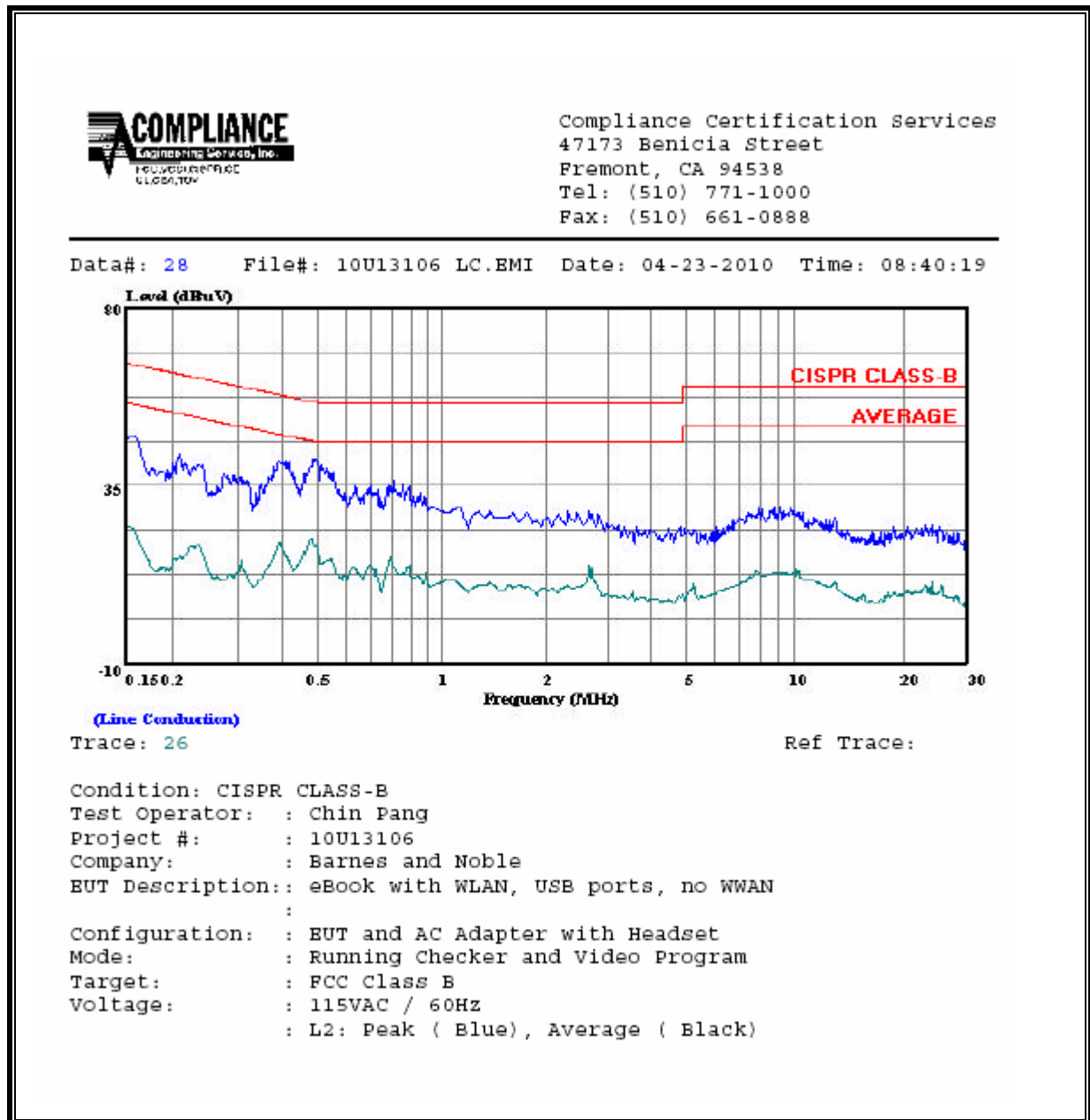
CONDUCTED EMISSIONS DATA (115VAC 60Hz)									
Freq.	Reading			Closs	Limit	EN_B	Margin		Remark
(MHz)	PK (dBuV)	QP (dBuV)	AV (dBuV)	(dB)	QP	AV	QP (dB)	AV (dB)	L1 / L2
0.18	52.93	--	28.79	0.00	64.58	54.58	-11.65	-25.79	L1
0.24	47.40	--	24.73	0.00	62.10	52.10	-14.70	-27.37	L1
0.66	41.18	--	24.58	0.00	56.00	46.00	-14.82	-21.42	L1
0.20	47.16	--	27.36	0.00	63.69	53.69	-16.53	-26.33	L2
0.33	47.37	--	28.03	0.00	59.45	49.45	-12.08	-21.42	L2
0.53	45.11	--	30.47	0.00	56.00	46.00	-10.89	-15.53	L2
6 Worst Data									

## EUT AND AC ADAPTER WITH HEADSET

### LINE 1 RESULTS

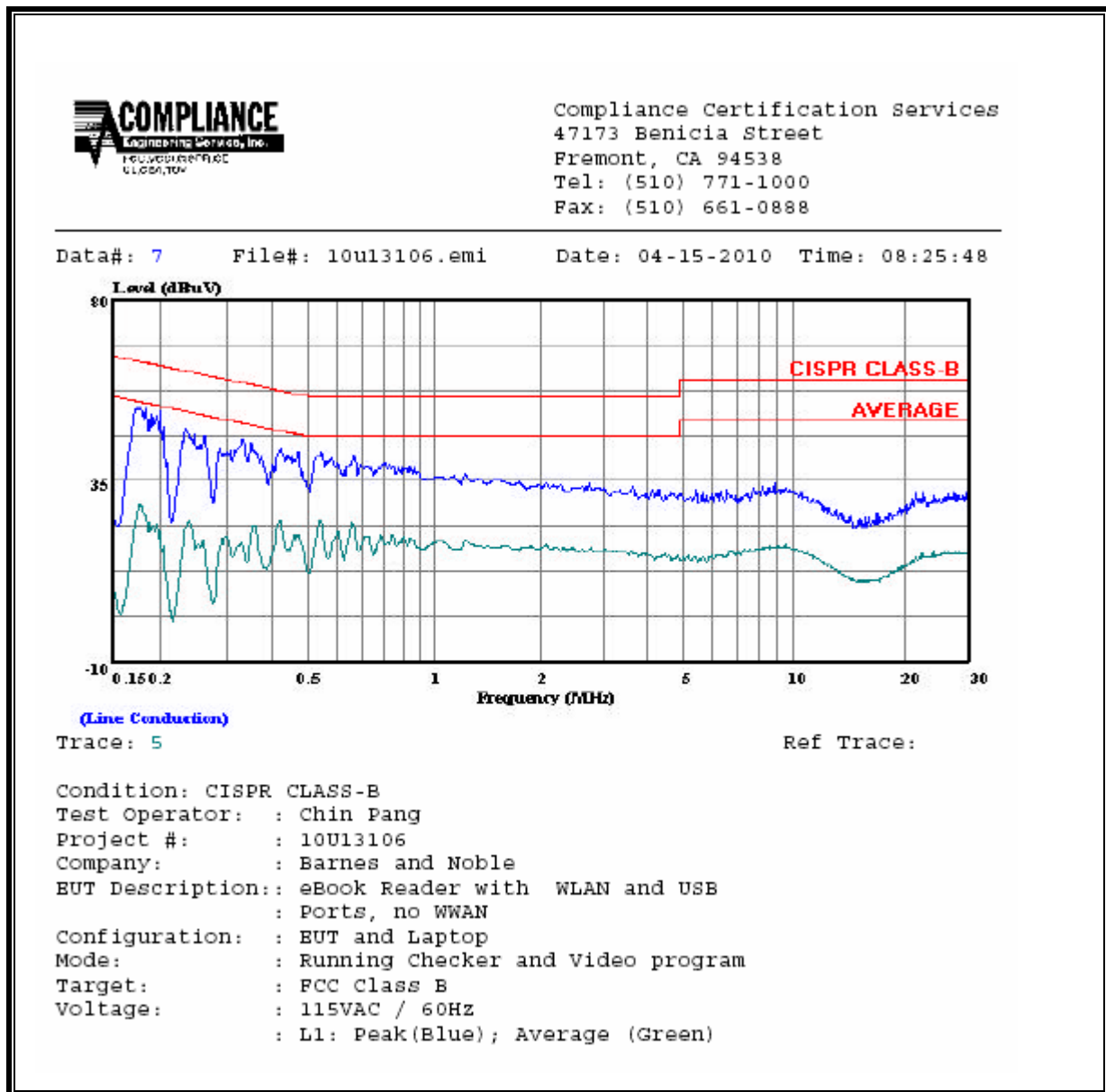


## LINE 2 RESULTS



## EUT AND LAPTOP WITH HEADSET

### LINE 1 RESULTS



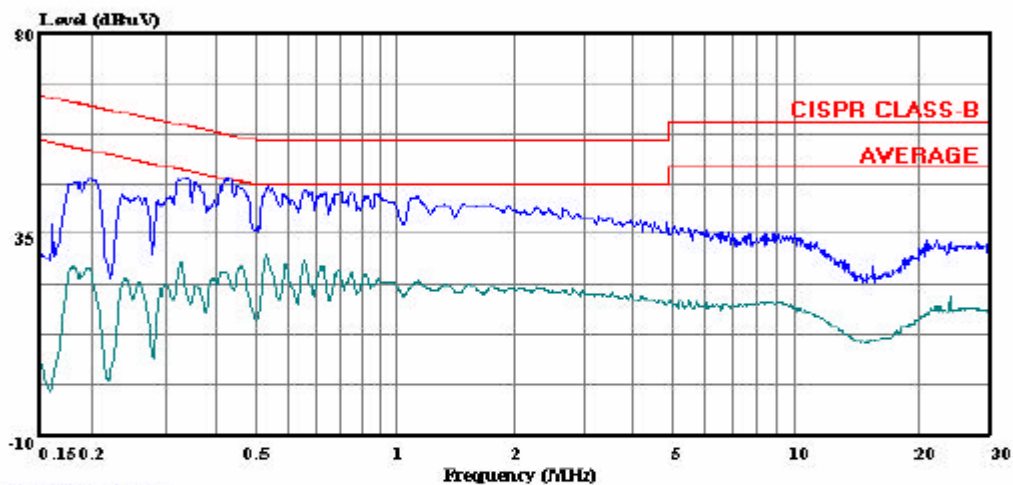


## LINE 2 RESULTS



Compliance Certification Services  
47173 Benicia Street  
Fremont, CA 94538  
Tel: (510) 771-1000  
Fax: (510) 661-0888

Data#: 14 File#: 10u13106.emi Date: 04-15-2010 Time: 08:41:39



(Line Conduction)

Trace: 12

Ref Trace:

Condition: CISPR CLASS-B  
Test Operator: : Chin Pang  
Project #: : 10U13106  
Company: : Barnes and Noble  
EUT Description: : eBook Reader with WLAN and USB  
: Ports, no WWAN  
Configuration: : EUT and Laptop  
Mode: : Running Checker and Video program  
Target: : FCC Class B  
Voltage: : 115VAC / 60Hz  
: L2: Peak(Blue); Average (Green)

## 10. MAXIMUM PERMISSIBLE EXPOSURE

### FCC RULES

§1.1310 The criteria listed in Table 1 shall be used to evaluate the environmental impact of human exposure to radio-frequency (RF) radiation as specified in §1.1307(b), except in the case of portable devices which shall be evaluated according to the provisions of §2.1093 of this chapter.

TABLE 1—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> )	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
0.3–3.0 .....	614	1.63	*(100)	6
3.0–30 .....	1842/f	4.89/f	*(900/f <sup>2</sup> )	6
30–300 .....	61.4	0.163	1.0	6
300–1500 .....	.....	.....	f/300	6
1500–100,000 .....	.....	.....	5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3–1.34 .....	614	1.63	*(100)	30
1.34–30 .....	824/f	2.19/f	*(180/f <sup>2</sup> )	30

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)—Continued

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm <sup>2</sup> )	Averaging time (minutes)
30–300 .....	27.5	0.073	0.2	30
300–1500 .....	.....	.....	f/1500	30
1500–100,000 .....	.....	.....	1.0	30

f = frequency in MHz

\* = Plane-wave equivalent power density

NOTE 1 TO TABLE 1: Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure.

NOTE 2 TO TABLE 1: General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or can not exercise control over their exposure.

## IC RULES

IC Safety Code 6, Section 2.2.1 (a) A person other than an RF and microwave exposed worker shall not be exposed to electromagnetic radiation in a frequency band listed in Column 1 of Table 5, if the field strength exceeds the value given in Column 2 or 3 of Table 5, when averaged spatially and over time, or if the power density exceeds the value given in Column 4 of Table 5, when averaged spatially and over time.

**Table 5**  
**Exposure Limits for Persons Not Classed As RF and Microwave Exposed Workers (Including the General Public)**

1 Frequency (MHz)	2 Electric Field Strength; rms (V/m)	3 Magnetic Field Strength; rms (A/m)	4 Power Density (W/m <sup>2</sup> )	5 Averaging Time (min)
0.003–1	280	2.19		6
1–10	$280/f$	$2.19/f$		6
10–30	28	$2.19/f$		6
30–300	28	0.073	2*	6
300–1 500	$1.585f^{0.5}$	$0.0042f^{0.5}$	$f/150$	6
1 500–15 000	61.4	0.163	10	6
15 000–150 000	61.4	0.163	10	$616\,000/f^{1.2}$
150 000–300 000	$0.158f^{0.5}$	$4.21 \times 10^{-4}f^{0.5}$	$6.67 \times 10^{-5}f$	$616\,000/f^{1.2}$

\* Power density limit is applicable at frequencies greater than 100 MHz.

**Notes:**

1. Frequency,  $f$ , is in MHz.
2. A power density of 10 W/m<sup>2</sup> is equivalent to 1 mW/cm<sup>2</sup>.
3. A magnetic field strength of 1 A/m corresponds to 1.257 microtesla (μT) or 12.57 milligauss (mG).

## **EQUATIONS**

Power density is given by:

$$S = \text{EIRP} / (4 * \pi * D^2)$$

where

S = Power density in W/m<sup>2</sup>

EIRP = Equivalent Isotropic Radiated Power in W

D = Separation distance in m

Power density in units of W/m<sup>2</sup> is converted to units of mW/cm<sup>2</sup> by dividing by 10.

Distance is given by:

$$D = \text{SQRT} (\text{EIRP} / (4 * \pi * S))$$

where

D = Separation distance in m

EIRP = Equivalent Isotropic Radiated Power in W

S = Power density in W/m<sup>2</sup>

For multiple colocated transmitters operating simultaneously in frequency bands where the limit is identical, the total power density is calculated using the total EIRP obtained by summing the Power \* Gain product (in linear units) of each transmitter.

$$\text{Total EIRP} = (P_1 * G_1) + (P_2 * G_2) + \dots + (P_n * G_n)$$

where

P<sub>x</sub> = Power of transmitter x

G<sub>x</sub> = Numeric gain of antenna x

In the table(s) below, Power and Gain are entered in units of dBm and dBi respectively and conversions to linear forms are used for the calculations.

## **LIMITS**

From FCC §1.1310 Table 1 (B), the maximum value of S = 1.0 mW/cm<sup>2</sup>

From IC Safety Code 6, Section 2.2 Table 5 Column 4, S = 10 W/m<sup>2</sup>

## **RESULTS**

Band	Mode	Separation Distance (m)	Output Power (dBm)	Antenna Gain (dBi)	IC Power Density (W/m <sup>2</sup> )	FCC Power Density (mW/cm <sup>2</sup> )
2.4 GHz	WLAN	0.20	20.90	1.94	0.38	0.038